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CABLE REVIEW

**study undertaken by
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for DG IV of
the European Commission**

Study on the competition implications in telecommunications and multimedia markets of (a) joint provision of cable and telecoms networks by a single dominant operator and (b) restrictions on the use of telecommunications networks for the provision of cable TV services.

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This study, prepared by Arthur D. Little on behalf of Directorate General (DG) IV of the European Commission, is an input to the Commission's review, as required under Directives 95/51/EC ("Cable TV Directive") and 96/19/EC ("Full Competition Directive"), of the continuing liberalisation of the European telecommunications sector.

During the Commission's public consultation of 1992 on the effectiveness of measures liberalising the telecommunications sector, many service providers and users highlighted the bottleneck created by restrictions on the use of alternative infrastructures for liberalised services, and in particular on the use of cable TV networks. There was a particular concern that in some Member States, limiting the role of cable TV networks to the distribution of television broadcasts was holding back the development of new interactive services that combined images and telecommunications. In addition, in some Member States the dominant telecommunications operator has the right to establish cable TV networks. In this case, the Commission believed, the operator might overcharge for use of the cable infrastructure for non-reserved services, to increase traffic on its telecommunications network.

On 11 October 1995, the Commission adopted the Cable TV Directive, lifting the restriction on the use of cable networks for telecommunications services (other than basic voice telephony services) from 1 January 1996. This Directive allows alternative telecommunications companies to access customers via cable TV network without having to rely on lines provided by the dominant telecommunications operator (except where the CATV networks are owned by the dominant operator). The Directive gave a boost to the increased interest in cable television networks as a possible means of directly accessing customers and by-passing telephone networks.

In relation to this study, the Directive 96/19/EC noted that:

"Whilst Directive 95/51/EC lifted all restrictions with regard to the provision of liberalised telecommunications services over cable television networks, some member states still maintain restrictions on the use of public telecommunications networks for the provision of cable television capacity. The commission should assess the situation with regard to such restrictions in the light of the objectives of that Directive once the telecommunications markets approach full liberalisation."

It also stated that:

"By 1 January 1998, the Commission will carry out an overall assessment of the situation with regard to remaining restrictions on the use of public telecommunications networks for the provision of cable television capacity."

In February 1996, the Commission adopted the Full Competition Directive, committing the European Union to full competition in the provision of telecommunications infrastructure and services by 1 January 1998, subject to transitional periods in countries with less developed networks. The Directive liberalised the provision of telecommunications infrastructure, allowing new entrants

freedom to provide services without having to rely on their main competitor, the dominant telecommunications provider, for transmission capacity.

The European Commission believes that the structure of cable TV network ownership and the services that the networks deliver are important to the development of competition in both the telecommunications and multimedia sectors; these networks could provide competing local access infrastructure for the provision of voice telephony and interactive broadband services to homes.

Specifically, in relation to this study, the Directive 95/51/EC stated:

“Where a single operator with exclusive rights to provide public telecommunications network infrastructure also provides cable TV network infrastructure, the Commission shall, before 1 January 1998, carry out an overall assessment of the impact of such joint provision in relation to the aims of the Directive.”

The Commission’s overall objectives for the study are:

- To examine options for developing competition in local telephone markets, for example, via cable networks competing with existing local loop infrastructure.
- To understand the barriers and drivers to the development of broadband networks in the European Union Member States, thus encouraging development of multimedia services over advanced networks.

In this report, we assess the impact of two specific forms of regulation on the development of telecommunications and multimedia markets:

- The joint ownership of telecommunications and cable TV networks by dominant telecoms operators (referred to as “joint ownership”), addressed in the Cable TV Directive, and
- Existing restrictions on the provision of cable TV capacity on public telecommunication networks, addressed in the Full Competition Directive.

Overall, joint ownership and the restrictions on cable TV capacity over public telecommunications networks do not appear to encourage development towards the European Union’s objectives. They do not contribute to securing employment within the European Union member states; they give, at best, a minor incentive for incumbents and entrants to invest in telecommunications and multimedia infrastructures and services, and they limit innovation.

The background and arguments supporting our overall conclusion are presented in the three chapters of the report. In summary:

- Chapter 2: The situation and challenges in European telecommunications and multimedia markets.
 - No Member State yet has the infrastructure to support rapid development of competitive telecommunications and multimedia markets.

- In some Member States, regulation is hindering the development of competing infrastructures.
- Of the technologies now available and in development, fixed wire telecommunications and cable TV networks have the highest potential for the development of infrastructure competition in the local loop.
- Chapter 3: The impact of joint ownership and restrictions on cable TV capacity on the development of the markets.
 - Joint ownership of telecommunications and cable TV networks appears to be detrimental to optimal development.
 - Restrictions on the provision of cable TV services on public telecommunications networks have had limited effect to date, but will limit development of broadband infrastructures and multimedia services.
- Chapter 4: Options for development of integrated telecommunications and multimedia markets – including action that can be taken to accelerate the development of these sectors in the European Union.
 - A variety of options is available to accelerate progress by overcoming barriers presented by joint ownership.
 - Lifting the restrictions on provision of cable TV capacity by PTOs¹ (Public Telecommunications Operators) would enhance the development of the broadband interactive services that is essential to progress.

2. Situations and Challenges in European Union Telecommunications and Multimedia Markets

The telecommunications and multimedia markets in the European Union are diverse in development and in regulation, with many technologies in use or in development.

- As a reference, we define the framework for the optimal development of telecommunications and multimedia markets (Section 2.1).
- We examine the diversity of development by country and by sector (Section 2.2).
- We examine the diversity of regulation by country (Section 2.3).
- We assess the potential contribution of the various technologies in telecommunications and multimedia to optimal development (Section 2.4).

2.1 The Framework for Optimal Development

To assess progress in the telecommunications and multimedia sector towards the Commission's goals of a prosperous economy, with widespread employment opportunities and an advance in social welfare across the European Union, we have developed a framework based on four criteria (Table 0.1).

¹ The term PTO is used for all telecom operators

Table 0.1: Framework for the Optimal Development of Telecommunications and Multimedia Markets

Framework for the Optimal Development of Telecommunications and Multimedia Markets	
<i>The Goal:</i>	
To create a framework for the optimal development of the telecommunications and multimedia markets in the European Union to enable prosperous economic growth, increase employment opportunities and social welfare for all.	
<i>The criteria:</i>	
•	Innovation – A stream of innovative products, services and applications are launched in these markets to meet existing or anticipated customer needs.
•	Service competition – Various service providers, with alternative products and services, compete for the customer.
•	Infrastructure competition – Driven by competition, network operators continuously exploit advances in technology to improve their cost/performance and extend the range of applications.
•	Infrastructure upgrade – The limitations on network infrastructures for telecommunications and multimedia services are overcome through the availability of effective and efficient technologies that increase: <ul style="list-style-type: none"> – Availability of products and services – Accessibility of customers – Capacity – Performance

Innovation.

An environment needs to be created to stimulate the conception, development, and launch of innovative services and applications in the Member States. Companies should have open and equal access to the widest range of networks and technologies for the distribution of products and services.

The worldwide web is a good example of a technology that has fostered the development of new products and services, such as the Internet, WebTV, and Internet telephony.

Service competition.

The consumer is offered the widest range of products and services by the widest range of competing services providers.

Infrastructure competition.

Infrastructure competition will have an impact on the consumer, the infrastructure provider and the service provider. For the consumer, infrastructure competition augments the benefits of service competition by giving customers a choice of access technology: consumers will be able to select the best technology to suit their needs. For infrastructure providers, the ability to use technology as a competitive advantage will promote the application of the latest technologies to upgrade existing infrastructure and/or develop new access technologies. For service providers, infrastructure competition will guarantee equal access to a given access technology.

Network upgrade.

The range of telecommunications and multimedia services delivered to the home is restricted by the technical limitations of the distribution networks. Technical limitations also restrict the provision of competing service providers over the same access network. The availability of effective and efficient technologies will enable network upgrades to overcome these limitations.

Network upgrades will make the widest range of telecommunications and multimedia services available to the consumer.

Improvements in accessibility will allow service providers unbundled, non-discriminatory access to residential consumers, thereby supporting both service competition (choice of provider) and infrastructure competition.

The capacity of existing networks will increase to improve the range of services available, such as the number of television channels, the level of interactivity via upstream channels, and the speed of Internet access.

Cost performance improvements will lead to greater efficiency in operating the infrastructure, increasing availability of more attractive services for the consumer (in terms of price, choice, quality).

2.2 Diversity of Telecommunications and Multimedia Markets

The state of development of telecommunications and multimedia markets varies widely across the European Union. In distinct market sectors in a few Member States, such as voice telephony in the U.K., development is close to meeting the criteria outlined above. In most countries and in most market sectors, however, it is not.

Availability Of Telecommunications And Multimedia Services

The range of telecommunications and multimedia services available is limited in the majority of the Member States. Citizens are not able to choose from the widest possible spectrum of telecoms and multimedia services. The evidence, in order of importance to the development of the telecommunications and multimedia sector, is as follows:

- Only Sweden has more telephone main lines per 100 inhabitants than the U.S. (62 compared to 68 in the U.S.). In Spain, Portugal and Ireland, the average is relatively low, at approximately 40 lines per 100 inhabitants.
- More than half of all households in the European Union (57 per cent) are without cable or satellite television and therefore unable to receive multichannel television.
- Most Member States had fewer Internet hosts (access points) per 1000 inhabitants in 1996 than the U.S. with 48; only Finland has more (56).
- In most Member States, less than one per cent of homes are connected to the integrated services digital network (ISDN).

- Terrestrial television services are limited in some countries; Luxembourg has only one national terrestrial television service.

Development of Innovative Services

With some exceptions, Member States have been slow to develop innovative telecommunications and multimedia services and technologies:

- Only Telecom Finland, Telia and BT are actively developing Internet telephony services.
- Wireless local loop telephony is available, or is being launched, in selected regions of a minority of Member States: France, Finland, Germany, Italy and the U.K.
- Only four out of the 15 Member States have a penetration of Pay-TV greater than 10 per cent; the highest is in France with 20 per cent.

Development of Infrastructure Competition

There is competition between infrastructures in only a few market sectors in some Member States. Users should be able to select from a range of competing infrastructures for the provision of telecommunications and multimedia services.

- In no Member States is there competition between wireline infrastructures for the distribution of cable TV services.
- Most (59 per cent) cable TV subscribers in the European Union are owned by the dominant public telecommunications operator.
- There is effective competition for local loop infrastructure in only three out of the 15 Member States: Sweden, the U.K., and Finland. In the remaining countries there is an effective monopoly on the provision of local loop services.

Overcoming Limitations of Infrastructures

Advances in technology to expand the capabilities of the existing infrastructures are being exploited in only a minority of countries. As a result, the range of services available will be restricted:

- In some Member States, PTOs are not upgrading their cable TV networks for the provision of cable telephony services to bi-directional service, thus restricting competition for voice telephony at the local access level.
- In some Member States, the average bandwidth of the local loop cable networks is half that in the leading countries, restricting the availability of multichannel television.
- Digital terrestrial television is being actively developed by only a minority of European Union countries. Most of the households that currently receive analogue terrestrial television services will not therefore benefit from new digital services.

- In many Member States, competing infrastructure access technologies are not available, especially for local telecommunications services, because the dominant telecoms operator owns parts of the cable markets.

2.3 The Impact of Regulatory Regimes on the Development of Telecommunications and Multimedia Markets

Regulation can have a major impact on the development of telecommunications and multimedia markets. In the Member States, however, the current regulatory framework hinders progress towards the optimal development described in 2.1 above.

The Regulatory Framework for Telecommunications Infrastructure and Services

The regulatory framework hinders development in these markets.

- In many Member States, the regulatory regimes for service competition do not foster the development of infrastructure and services. Most Member States do not have an effective and efficient interconnection regime.
- National policy encourages local loop infrastructure competition to varying degrees. Regulatory barriers prevent the use of emerging alternative delivery platforms for telephony, such as broadband cable networks and wireless local loop.

The Regulatory Framework for Cable TV Infrastructure and Services

Here too, the regulatory framework hinders development.

- Licensing regimes in some countries do not enable infrastructure competition.
- Restrictions on the content cable TV operators carry are not the subject of this study, but they do reduce the potential for development of telecommunications and multimedia markets.
- Specific restrictions on dominant telecommunications operators' providing cable TV services exist only in two countries; their impact on telecommunications and multimedia markets is therefore low.

2.4 Comparison of Competing Telecommunications and Multimedia Access Technologies

Throughout the European Union, cable TV and public switched telephone networks (PSTN) have the highest potential to foster the development of the telecommunication and multimedia sector. In the mid to long term, a range of fixed and wireless platforms will be available. In the short term these will not meet all the criteria for optimal development.

We outline below how various access technologies will influence the fulfilment of the framework criteria (Table 0.1).

Range of Services

Upgraded cable TV and PSTN access technologies have the potential to offer the widest range of telecommunications and multimedia services, including multichannel TV, voice telephony, and high-speed Internet access. While telephony services will be available from a range of alternative wireline and wireless networks, such as powerlines and wireless local loop (WLL), these technologies are unlikely to have the capacity to deliver the full range of audiovisual services. The lack of an inherent return path will prevent other technologies that are well suited to the delivery of broadcasting multichannel TV and multimedia services from providing a full range of interactive and two-way services.

Service Innovation

Both cable TV and telecommunications networks have the technical capabilities to foster the conception, development, and realisation of the widest range of innovative telecommunications and multimedia services: for example, switched video services, broadcast services, pointcast services, and high speed data services. In contrast, the development of innovative services over alternative access technologies will be limited, owing to, for example, lack of upstream capacity or bandwidth per user.

Infrastructure Limitations

Every telecommunications infrastructure has technological limitations on the range of services that can be offered. Both cable TV and PSTN access technologies can be upgraded to overcome most of these limitations and provide a suitable platform for the development of the telecommunications and multimedia sector. The bandwidth can be upgraded by replacing with broadband fibre optics. Bi-directional amplifiers and switching fabrics can be installed to provide switching capabilities. Digitalisation will greatly enhance the quality and variety of services of both wireline and wireless technologies. By contrast, the upgrading of many wireless technologies, such as wireless local loop and DTH satellite, will be limited by technical or environmental restraints.

Infrastructure Competition

Cable TV and PSTN systems can be equal competitors in the local loop for the provision of all telecommunications and multimedia services. In the mid to long term, there will be competition from digital satellite and wireless local loop operators for the provision of television and telephony services respectively. However, cable TV and PSTN systems are in place today and will accelerate competition in the local loop.

3. The Impact of Joint Ownership and Current Restrictions on Cable TV Services

Overall, joint ownership and restrictions on the provision of cable TV services are delaying, rather than encouraging, the development of European telecommunications and multimedia markets:

- Joint ownership of telecommunications and cable TV networks impedes development: it discourages the development of competing technological

platforms for the provision of alternative products and services, and restricts competition in telecommunications and multimedia services.

- Restrictions on provision of cable TV services on public telecommunications networks have had limited effect to date, but will limit development of broadband infrastructures and multimedia services in future.

3.1 Impact of Joint Ownership

Our assessment of the joint ownership of telecommunications and cable TV networks by dominant PTOs suggests that it impedes development of telecommunications and multimedia markets in the Member States:

- Delaying the bi-directional upgrade of cable TV networks that would exploit their full potential for interactive services.
- Blocking the development of competing infrastructures.
- Limiting competition in services.
- Constraining innovation.

Impact of joint ownership on cable TV upgrade.

Joint ownership does not encourage the bi-directional upgrading of cable TV networks that would exploit the full potential of broadband access to the home, enabling competition in telephony and forming the platform for delivering multimedia services and high speed Internet access. Independent operators, on the other hand, have a strong incentive to develop their networks.

As Table 0.2 shows, the majority of joint owners are not considering upgrading their cable TV networks to provide telephony. Among our interviewees, only Cablelink, Telecom Eireann's arms length subsidiary, was evaluating the possibility of offering telephony. In contrast, most independently owned cable TV operators are already offering or planning to offer telephony.

Table 0.2: Joint Ownership and Plans for Upgrade of Cable TV Networks for Two-Way Capability

	Already Offer Or Are Considering Telephony	Not Planning to Upgrade to Offer Telephony
Dominant PTOs with joint ownership	Telecom Eireann/Ireland	Tele Danmark/Denmark Telecom Finland/Finland HPY/Finland France Telecom/France Deutsche Telekom/Germany Telecom Portugal/Portugal
Independent cable TV operators	Kabelsignal/Austria Telenet/Belgium Svenska Kabel-TV/Denmark* Stofa/Denmark Lyonnaise Communication/France CMI/Ireland A2000/Netherlands Casema/Netherlands Vecai/Netherlands Intercabo/Portugal Cableuropa/Spain Kablevision/Sweden Telewest/U.K. General Cable/U.K. Cable and Wireless/U.K.	Electrabel/Belgium HTV/Finland Veba/Germany StjarnTV/Sweden

Source: Interview programme by Arthur D. Little

* Svenska Kabel-TV is partly owned by Telia of Sweden. Upgrade refers to Denmark only

Joint owners are unlikely to upgrade their cable TV networks.

The joint owner has little incentive to upgrade the cable TV networks to exploit bi-directional services such as telephony. Upgrading has no intrinsic financial benefit for the joint owner, which already earns telephony revenues. Moreover the cable TV network is not central to the joint owner's business.

Independent operators have plans to upgrade their cable TV networks.

The potential to generate new revenue streams from telecommunications services is stimulating independent operators to upgrade their cable TV networks, and possibly expand them to cover more of the population.

Impact of joint ownership on infrastructure competition.

Infrastructure competition results in the continual development of networks, as players develop innovative services that require investment and competing networks strive to maintain their competitiveness. Joint ownership reduces the potential for infrastructure competition and causes:

- Limited choice of telephony service providers for residential customers.
- Less competition in long distance markets.
- Delayed development of broadband interactive services.

Limited choice of telephony service providers for residential customers.

The absence of infrastructure competition will exclude the vast majority of residential customers from the choice of telecommunications operator. Without a

competing cable TV network, new entrants to the telephony market will have to rely on using indirect access to serve customers. The experience of operators in the U.K. is that indirect access is only economically viable for the highest spending 20 per cent of residential customers.

Less competition in long distance markets.

Competition in local infrastructure can facilitate the development of alternative long distance telecommunications networks. Experience from Finland and the U.K. shows that local access providers who are not tied to long distance carriers can stimulate competition in long distance markets.

Delayed development of broadband interactive services.

Joint ownership could delay the introduction of broadband interactive services. Cable TV networks that are not owned by dominant PTOs can be upgraded to provide a range of interactive services. A dominant PTO is unlikely to upgrade the cable TV infrastructure to provide these new services.

Impact of joint ownership on service competition.

Joint ownership reduces the development of competition in telecommunications and multimedia service by limiting infrastructure competition; without competing infrastructures, service providers will be at a disadvantage to the incumbent and customers will suffer. The drawbacks of service competition, when it is not underpinned by infrastructure competition, are that:

- There will be a long term need for regulation to control the monopoly infrastructure supplier.
- New entrants will always be at a disadvantage to the incumbents, even with fair interconnection arrangements.

Impact of joint ownership on service innovation.

Joint owners may delay the development of innovative products:

- Creating de facto sub-optimal standards where cable network applications do not incorporate telecommunications capability.
- Failing to take a lead in developing new markets.
- Limiting the ability of other service providers to innovate.

3.2 The Impact of Restrictions on the Provision of Cable TV Services

The Cable TV Directive ensures that cable TV networks are allowed to provide all liberalised telecommunications services. There is, however, no Directive ensuring that telecommunications networks are free to provide cable TV services. Whether telecommunications operators can compete on equal terms with cable operators, as the technologies converge, depends on national or even local regulations.

Convergence of telecoms and cable TV networks.

Until the last few years, cable TV and telecommunications networks were technically quite different, had different capabilities and were designed for different purposes. As a result, in many Member States, cable TV and telecommunications were licensed in different ways; no specific restrictions were applied to stop telecommunications networks providing cable TV services, since the possibility that

they would provide such services had not arisen. Such restrictions as do exist generally apply to the operator or use made of the network, rather than to the network or technology used.

The capabilities of the two types of network are now converging, with the development of new technologies; ADSL is dramatically enhancing the capacity of telecoms networks, making it possible for them to carry TV signals, while cable modems are making it possible for cable networks to carry two-way data flows. In consequence, the original rationale for different types of regulation no longer applies.

Restrictions on the provision of cable TV in Member States.

Cable TV provision is heavily regulated. The technical division between cable TV networks and telecommunications networks has led, in many Member States, to different licensing regimes for the two types of network. Under French law, for instance, telecommunications networks are not considered a means of TV distribution.

In particular, regulation has seldom been developed with the possibility of competing networks in mind; in some Member States licences have been exclusive within an area, in others licences are at the discretion of the municipalities, which may own or have some involvement with an existing cable network. Whether licences would be granted to operators hoping to install a second infrastructure, and on what terms those licences might be offered, has yet to be tested. The legal implications are therefore unclear.

Regulations affecting the provision of cable TV infrastructure and services by PTOs fall into three categories:

- Controls specifically preventing PTOs providing cable TV services.
- Limits on issuing cable TV infrastructure licences that could stop PTOs developing a new service.
- Other controls on cable TV service licences and the commercial freedom of operators that would make them less likely to contemplate offering a service.

Impact of restrictions on market development.

At present, there is little pressure for removal of restrictions on telecommunications operators providing cable TV capacity over their telecoms networks. Many of the dominant PTOs already own separate cable TV infrastructure and it will be a few years before the technology for broadcasting TV over existing telecommunications networks is economically feasible.

As the capabilities of telecommunications networks grow, they could become indistinguishable, in service delivery capacity, from cable TV networks. Discriminating between the networks according to whether they developed from cable or from telecommunications will no longer be relevant.

These restrictions could prevent or discourage telecoms operators from building new broadband networks or from upgrading their networks as they want, resulting in:

- Lower investment.
- Fewer competing delivery mechanisms for interactive multimedia services.
- Less innovation in multimedia products and services, as fewer networks compete for customers.
- A less competitive European telecommunications and multimedia market.

4. Options for the Development of Telecommunications and Multimedia Markets

Interviews with industry players across the European Union and analysis of regulatory regimes and policies in the Member States suggest a need to consider ways to accelerate development towards the Information Society. We present options for dealing with the obstacles to optimal development presented by joint ownership, on the one hand, and restrictions on the provision of cable TV services on the other.

The options are on a continuum from maintaining the status quo to direct intervention by a regulator, policy maker of a Member State, or telecommunications or cable company. In each case, we rank the impact on progress as low, medium or high. Our definition of low impact is self evident – progress towards the European Union’s objectives will continue at the current unsatisfactory pace, with the majority of Member States lagging behind the most advanced markets for the foreseeable future. By medium impact we mean that more European Union countries will have the chance to progress quickly towards the competitive environment that is developing already in the U.K., where infrastructure competition has begun, and companies are vying for licences for emerging technologies such as Digital Terrestrial Television. An option that has high impact will accelerate progress towards a market with a wide choice of services provided over competing infrastructures and companies that produce a continuous stream of innovative products and services, creating additional employment and contributing to social welfare.

4.1 Options for Joint Ownership

The options available to regulators and policy makers in dealing with the telecommunications and multimedia markets range from encouraging joint ownership to the enforced divestiture of the cable TV operations of the dominant telecommunications operator. Broadly, they fall into four categories:

- Maintaining joint ownership.
- Partial joint ownership.
- Divestiture of the cable TV operation.
- Transition from joint ownership to divestiture.

In the first category, we examine six options that impose different degrees of restriction on the joint owner; the impact on the development of infrastructure and services increases with transparency of and separation within the joint owner’s group of companies.

The second category, partial joint ownership, covers increasing separation of the cable TV company from the joint owner, as additional shareholders take bigger shares. The higher their share, the higher the impact on accelerated development of infrastructure and services in the Member States.

Divestiture of the joint owner's cable TV network, the third category, has a high impact on infrastructure and service development, leading to greater capacity increase, greater accessibility of residential customers and availability of services, high innovation and the ability of other service providers to offer their services over different infrastructures. Implementing this option will offer a sound basis for development of telecommunication and multimedia markets in line with the European Union's objectives.

In the fourth category, transition, we look at two options mentioned by many interviewees for the period between joint ownership and partial and/or full divestiture: introducing an independent trustee and structural separation. These options can be combined. In The Netherlands, for example, KPN had not only to separate its cable operations legally from the telecommunications operations but also to set up separate management and an independent trustee. The regulator enforced these steps to initiate a partial divestiture of KPN's cable operations, moving it towards an eventual minority share of less than 25 per cent.

The other options described above can also be part of an overall transition from joint ownership.

Figure 0.1 below summarises the results of our examination of ten main options within the four categories described.

Figure 4.1: Ownership Options

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Options for Ownership	Impact on Infrastructure					Impact on Services		Comments
	Capacity Upgrade	Accessibility to Residential Customers	Cost / Performance Improvement	Availability of Products and Services	Increasing Choice of Service Providers	Innovation Rate for New Services and Applications		
1 Maintain joint ownership without other change								<ul style="list-style-type: none"> No cable upgrade Less innovation in service provision Slow down of content service development No short or medium-term infrastructure competition Strong regulator needed
2 Maintain joint ownership / DTH development towards digital multichannel services								<ul style="list-style-type: none"> Influence on cable upgrade to remain competitive Increasing availability of products and services because of rising competition Rising number of service providers in the market No impact on upgrade to bi-directional services
3 Maintain joint ownership but establish ONP on joint owner's cable network								<ul style="list-style-type: none"> Extended content service competition Strong regulator required Cable upgrade investment requirements vary strongly between countries



Options for Ownership	Impact on Infrastructure					Impact on Services		Comments
	Capacity Upgrade	Accessibility to Residential Customers	Cost / Performance Improvement	Availability of Products and Services	Increasing Choice of Service Providers	Innovation Rate for New Services and Applications		
4. Maintain joint ownership but open up spectrum for wireless local loop (narrowband)								<ul style="list-style-type: none"> Potentially medium-term infrastructure competition Potential devaluation of cable Joint owner forced to upgrade cable to remain competitive Increase of content-service development Digital, two-way broadband technology not yet available at competitive price, widespread rollout not realistic in near future
5. Legal separation (creation of 100% cable subsidiary)								<ul style="list-style-type: none"> Minimum condition for effective surveillance of competitive behaviour Transparency of assets and costs Clear allocation of profit / loss Allows shareholders and regulator to see profitability of CATV
6. Legal separation and management separation								<ul style="list-style-type: none"> As point 5 Separate management needs to present achievements to shareholders and public Motivation for management to increase number of services and network performance Financial and management details still have to be revealed to parent company



Figure 4.1: Ownership Options (continued)

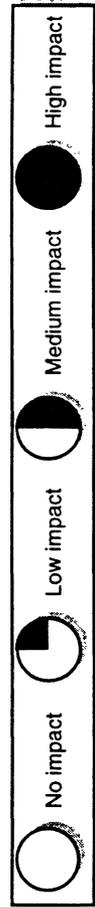
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Options for Ownership	Impact on Infrastructure					Impact on Services		Comments
	Capacity Upgrade	Accessibility to Residential Customers	Cost / Performance Improvement	Availability of Products and Services	Increasing Choice of Service Providers	Innovation Rate for New Services and Applications		
7 Partial joint ownership 7.1 Incumbent owns >50%							<ul style="list-style-type: none"> All of points 5 and 6 <ul style="list-style-type: none"> Majority of shares allows joint owner to make management decisions and therefore avoid competition between the two infrastructures Specific contract with other shareholders may impact development of infrastructure and services 	
7.2 Incumbent owns <50%							<ul style="list-style-type: none"> Cable upgrade achievable according to business case Higher possibility for additional service providers next to joint owner Financial and management decisions have to be revealed to parent company Blocking vote of joint owner against major competitive action, i.e. in POTS 	
7.3 Incumbent owns <25%							<ul style="list-style-type: none"> Since joint owner does not have "blocking" minority vote, a full service competitor can be established by management according to business case Joint owner can keep link to CATV network for the provision of cable TV services 	



Figure 4.1: Ownership Options (continued)

Options for Ownership	Impact on Infrastructure				Impact on Services		Comments
	Capacity Upgrade	Accessibility to Residential Customers	Cost / Performance Improvement	Availability of Products and Services	Increasing Choice of Service Providers	Innovation Rate for New Services and Applications	
8 No joint ownership							<ul style="list-style-type: none"> Service and infrastructure competition Increased accessibility of residential customers Full upgrade of CATV network Technology improvement usable as competitive advantage – continuous network operator Increasing choice of service providers, even of similar services, because of additional capacity and competing infrastructures
<i>Additional options for transition periods</i>							
9 Independent trustee							<ul style="list-style-type: none"> Independent trustee is able to optimise cost / performance of networks Independent trustee is unlikely to receive funds for network upgrade In the Netherlands the trustee option is used during the transition to partial divestiture
10 Separation of network and services (creation of separate subsidiaries for joint owner)							<ul style="list-style-type: none"> Very limited network upgrade owing to risk aversion of network owner (cannot participate in upside) Price increase since network operation has to be profitable stand alone Strong regulator needed to control increasing prices If service providers are allowed to invest in network upgrade, "shared ownership" is created



4.2 Options for Restrictions on the Provision of Cable TV Capacity

In this report, we consider three policy options for the provision of Cable TV capacity:

- Maintaining the status quo.
- Lifting restrictions on specific PTOs and/or giving dominant PTOs rights to provide cable TV capacity over telecommunications infrastructure.
- Lifting restrictions on licences for cable TV infrastructure.

As shown in the Figure 0.2, lifting restrictions that apply specifically to PTOs and giving them rights to provide cable TV capacity over their existing networks would have limited impact on the market, but lifting the general restrictions on licence availability for cable TV infrastructure would have a major impact on the long term development of broadband multimedia markets.

We describe and evaluate each of the options in more detail below.

Option 1. Maintain status quo (no lifting).

In Option 1, maintaining the status quo, restrictions on the existing PTOs providing cable TV capacity over their telecommunications infrastructure and restrictions on specific PTOs providing cable TV services would remain.

We expect that the current cable TV infrastructures in Member States would be upgraded to provide more channel capacity as they increasingly compete against satellite to provide entertainment. However, in the absence of competing broadband infrastructures, upgrades to provide full interactivity may be limited. Network expansion would continue as planned with major build out, particularly in Spain and the U.K., as new licences are issued and the current roll-outs are completed.

Option 2. Lift restrictions on specific PTOs and/or give dominant PTOs rights to provide cable TV capacity over telecommunications infrastructure.

Under Option 2, we examine the impact of lifting specific restrictions on PTOs providing cable TV capacity. This would affect BT and other PTOs in the U.K. and Telefónica in Spain. In addition, the dominant PTOs would be given rights as part of their telecommunications licences or concessions to provide cable TV capacity over their existing telecommunications networks.

Giving the telecommunications networks the legal right to provide cable TV capacity would remove any regulatory uncertainty about the uses to which a telecommunications network could be put, despite the differing licensing regimes for cable TV infrastructure. In Belgium and France, this would remove any discretion that local communities have in the licensing of the PTOs to provide cable TV infrastructure. In Ireland and the U.K., where the current cable TV licensing regime is based on exclusive local franchises, this change could allow the PTOs to become new competitors in the market where existing operators had built their business plans on the assumption of continuing exclusivity. This unexpected change in the rules of the game could affect the credibility of the regulatory regime.

Options for Lifting Restrictions on the Provision of Cable TV Capacity	Impact on Infrastructure						Impact on Services		Comments
	Capacity Upgrade	Accessibility to Residential Customers	Cost / Performance Improvement	Availability of Products and Services	Increasing Choice of Service Providers	Innovation Rate for New Services and Applications			
1 Maintain status quo									<ul style="list-style-type: none"> In 7 Member States restrictions on new broadband infrastructure remain Reduces opportunity for competition and innovation in multimedia services
2 Lift restrictions on specific PTOs and / or give dominant PTOs rights to provide cable TV capacity via telecommunications infrastructure									<ul style="list-style-type: none"> Potentially large impact as removes legal uncertainty and explicit restrictions on PTOs Potential competitive risk through enhanced position of dominant PTOs Lifts specific restrictions on PTOs where they exist (UK and Spain)
3 Lift restrictions on licences for cable TV infrastructure									<ul style="list-style-type: none"> Removes asymmetry between cable and telecoms regulation Potentially high impact on creation of new broadband networks and multimedia services



Option 3: Lift restrictions on licences for cable TV infrastructure.

Option 3 removes any major restrictions on the availability of licences for cable TV infrastructure and places it on a similar footing to telecommunications infrastructure licences. There would be no limits on the number of licences offered; they could be refused only on the grounds of limited resources (rights of way).

As well as allowing the existing PTOs to provide cable TV capacity over their telecommunications networks, this option would enable new PTOs to build new broadband infrastructures.

This study, prepared by Arthur D. Little on behalf of Directorate General (DG) IV of the European Commission, is an input to the Commission's review, as required under Directives 95/51/EC ("Cable TV Directive") and 96/19/EC ("Full Competition Directive"), of the continuing process of liberalisation of the European telecommunications sector.

In the 1980s, the European Commission recognised that telecommunications was crucial to the competitiveness and well being of the European Communities. DG XIII task forces were therefore asked to create a telecommunications strategy, which in turn led to a series of measures designed to open up the sector to competition.

In 1993, in a white paper on "Growth, Competitiveness and Employment", the European Union made "developing the Information Society" a priority. The document recognised the broad implications of information and communications technology for jobs and economic growth, and argued for the need to take a significant step to put the Information Society in Europe ahead of its competitors. As a result, a working group chaired by Commissioner Martin Bangemann presented a report on "Europe and the Global Information Society" in June 1994. The report highlighted the need to accelerate the liberalisation of the telecommunications sector and to impose new regulatory safeguards. It stated that the European Union had a key role to play in promoting the development of the Information Society.

The Commission then published a Communication¹ with an action plan that recognised that the private sector would take a leading role in the implementation of the Information Society. The plan also accepted the need for the European Union to play a catalytic role in supporting the development of large networks such as ISDN, integrated broadband communications and mobile and satellite networks, and set out measures for encouraging the development of basic services and applications.

The European Commission believes that the structure of cable TV network ownership and the services that they are allowed to be used for are important to the development of both the telecommunications and multimedia sectors; these networks could provide competing local access infrastructure for the provision of voice telephony and interactive broadband services to homes.

The ownership of cable TV networks varies considerably throughout the European Union. In France, Germany, Portugal and Sweden, for example, it is concentrated in the dominant PTOs; in other countries PTO ownership of cable networks is almost nil, or cable television is at an early stage of development.

Directive 96/19/EC (The Full Competition Directive), adding public voice telephony and infrastructure to the services already liberalised, completed the liberalisation of telecommunications markets².

Directive 90/388/EEC, with its various amendments, concluding with 96/2/EC, ensured that telecommunications services, with the exception of voice telephony, are open to competition.

¹ (Com 1994, 347 final)

² This section draws on the text of Directive 96/16/EC

On 29 February 1996, the Commission adopted a Directive committing the European Union to full competition in the provision of telecommunications infrastructure and services by January 1st, 1998, subject to transitional periods of up to five years in countries with less developed networks (Spain, Ireland, Greece, and Portugal) and of up to two years for Luxembourg.

The Directive liberalised the provision of telecommunications infrastructure, recognising that new entrants would otherwise be limited in their freedom to provide services and would be reliant on their main competitor for the provision of transmission capacity, their raw material.

In particular the Directive noted that:

“Whilst Directive 95/51/EC lifted all restrictions with regard to the provision of liberalised telecommunications services over cable television networks, some member states still maintain restrictions on the use of public telecommunications networks for the provision of cable television capacity. The commission should assess the situation with regard to such restrictions in the light of the objectives of that Directive once the telecommunications markets approach full liberalisation.”

It also stated that:

“By 1 January 1998, the Commission will carry out an overall assessment of the situation with regard to remaining restrictions on the use of public telecommunications networks for the provision of cable television capacity.”

Specifically, in relation to this study, the Directive stated:

“Where a single operator with exclusive rights to provide public telecommunications network infrastructure also provides cable TV network infrastructure, the Commission shall, before 1 January 1998, carry out an overall assessment of the impact of such joint provision in relation to the aims of the Directive.”

The study should therefore be viewed as part of the continuing liberalisation of the telecommunications and multimedia sectors in Europe and of the development of the Information Society.

The Commission’s overall objectives for the study are:

- To examine options for developing competition in local telephone markets, for example, via cable networks competing with existing local loop infrastructure.
- To understand the barriers and drivers to the development of broadband networks in the European Union Member States, thus encouraging development of multimedia services over advanced networks.

In this report, we assess the impact of two specific forms of regulation on the development of telecommunications and multimedia markets:

- The joint ownership of telecommunications and cable TV networks by dominant telecoms operators (referred to as “joint ownership”), addressed in the Cable TV Directive, and
- Existing restrictions on the provision of cable TV capacity on public telecommunication networks, addressed in the Full Competition Directive.

Overall, joint ownership and the restrictions on cable TV capacity over public telecommunications networks do not appear to encourage development towards the Commission’s objectives. They do not contribute to securing employment within the European Union member states; they give, at best, a minor incentive for incumbents and entrants to invest in telecommunications and multimedia infrastructures and services, and they limit innovation.

Our main findings in support of that overall conclusion are as follows:

- No Member State yet has the infrastructure to support rapid development of competitive telecommunications and multimedia markets.
- In some Member States, regulation is hindering the development of these markets.
- Of the technologies now available and in development, fixed wire telecommunications and cable TV networks have the highest potential for the development of competition.
- Joint ownership of telecommunications and cable TV networks appear to be detrimental to optimal development.
- Restrictions on the provision of cable TV services on public telecommunications networks have had limited effect to date, but will limit development of broadband infrastructures and multimedia services.
- A variety of options is available to accelerate progress to the optimum development, overcoming barriers presented by joint ownership.
- Lifting the existing restrictions on provision of cable TV capacity by PTOs¹ (Public Telecommunications Operators) would enhance the development of broadband interactive services, therefore promoting progress toward the information society.

These findings are summarised in the Executive Summary. The background and arguments supporting our findings are presented in detail in the three chapters of this main report:

- Chapter 2: The situation and challenges in European telecommunications and multimedia markets.

¹ The term PTO is used for all telecom operators

- Chapter 3: The impact of joint ownership and restrictions on cable TV capacity on the development of the markets.
- Chapter 4: Options for development of integrated telecommunications and multimedia markets – including action that can be taken to accelerate the development of these sectors in the European Union.

The telecommunications and multimedia markets in the European Union are diverse in development and in regulation, with many technologies in use or in development.

- As a reference, we define the framework for the optimal development of telecommunications and multimedia markets (Section 2.1).
- We examine the diversity of development by country and by sector (Section 2.2).
- We examine the diversity of regulation by country (Section 2.3).
- We assess the potential contribution of the various technologies in telecommunications and multimedia to optimal development (Section 2.4).

2.1 Framework for the Development of Telecommunications and Multimedia Markets

Table 2.1 provides a framework for assessing the potential contribution of the telecommunications and multimedia sector to a prospering economy, fostering employment and social welfare across the European Union. This framework is based on four key criteria: innovation, service competition, infrastructure competition and infrastructure upgrade.

Table 2.1:

Framework for the Optimal Development of Telecommunications and Multimedia Markets
<p><i>The Goal:</i></p> <p>To create a framework for the optimal development of the telecommunications and multimedia markets in the European Union to enable prosperous economic growth, increase employment opportunities and social welfare for all.</p> <p><i>The criteria:</i></p> <ul style="list-style-type: none"> • Innovation – A stream of innovative products, services and applications are launched in these markets to meet existing or anticipated customer needs. • Service competition – Various service providers, with alternative products and services, compete for the customer. • Infrastructure competition – Driven by competition, network operators continuously exploit advances in technology to improve their cost/performance and extend the range of applications. • Infrastructure upgrade – The limitations on network infrastructures for telecommunications and multimedia services are overcome through the availability of effective and efficient technologies that increase: <ul style="list-style-type: none"> – Availability of products and services – Accessibility of customers – Capacity – Performance

Innovation.

An environment needs to be created to stimulate the conception, development, and launch of innovative services and applications in all the Member States. Companies should have open and equal access to the widest range of networks and technologies for the distribution of products and services.

The world wide web is a good example of a technology that has fostered the development of new products and services, such as the Internet, WebTV, and Internet telephony.

Service competition.

The consumer is offered the widest range of products and services by the widest range of competing service providers.

Infrastructure competition.

Infrastructure competition will have an impact on the consumer, the infrastructure provider and the service provider. For the consumer, infrastructure competition augments the benefits of service competition by giving customers a choice of access

technology: consumers will be able to select the best technology to suit their needs. For infrastructure providers, the ability to use technology as a competitive advantage promotes the application of the latest technologies to upgrade existing infrastructure and/or develop new access technologies. For service providers, infrastructure competition guarantees equal access to a given access technology.

Network upgrade.

The range of telecommunications and multimedia services delivered to the home is restricted by technical limitations of the distribution networks. Technical limitations also restrict the provision of competing service providers over the same access network. The availability of effective and efficient technologies will enable network upgrades to overcome these limitations.

Network upgrades will make the widest range of telecommunications and multimedia services available to the consumer.

Improvements in accessibility will allow service providers unbundled, non-discriminatory access to residential consumers, thereby supporting both service competition (choice of provider) and infrastructure competition.

The capacity of existing networks will increase to improve the range of services available, such as the number of television channels available, the level of interactivity via upstream channels, and the speed of Internet access.

Cost performance improvements will lead to greater efficiency in operating the infrastructure, resulting in the availability of more attractive services for the consumer (in terms of price, choice, quality).

2.2 Diversity of Telecommunications and Multimedia Markets

The state of development of telecommunications and multimedia markets varies widely across the European Union. In distinct market sectors in a few Member States, such as voice telephony in the U.K., development is close to optimal. In most countries and in most market sectors, however, it is not.

In this section, we assess the degree to which each of the Member States meets the criteria for development, examining in turn:

- The availability of telecommunications and multimedia services for service competition.
- The development of innovative services.
- The level of infrastructure competition, and
- The use of technology to overcome the limitations of the existing infrastructures (network upgrade).

We also compare the Member States with the U.S., a country that the European Commission has identified as a leading telecommunications and multimedia market¹.

Our conclusions on each of the four aspects of optimal development are as follows:

- The range of telecommunications and multimedia services available is limited; in the majority of Member States, citizens are not able to choose from the widest possible spectrum of telecoms and multimedia services. Our evidence, in order of importance to the development of the telecommunications and multimedia sector, is as follows:
 - Only Sweden has more telephone main lines per 100 inhabitants than the U.S. (62 compared to 68 in the U.S.). In Spain, Portugal and Ireland, the average is low, at approximately 40 lines per 100 inhabitants.
 - More than half of all households in the European Union (57 per cent) are without cable or satellite television and therefore unable to receive multichannel television.
 - Most Member States had fewer Internet hosts (access points) per 1,000 inhabitants in 1996 than the U.S., which had 48; only Finland had more (56).
 - In most Member States, less than one per cent of homes are connected to the integrated service digital network (ISDN).
 - Terrestrial television services are limited in some countries; Luxembourg has only one national terrestrial television service.
- With some exceptions, Member States have been slow to develop innovative telecommunications and multimedia services and technologies:
 - Only Telecom Finland, Telia and BT are actively developing Internet telephony services.
 - Wireless local loop telephony is available in only a small number of Member States: France, Finland, Germany, and the U.K.
 - Only four out of the 15 Member States have a penetration of Pay-TV greater than 10 per cent; the highest is in France, with 20 per cent.
- There is competition between infrastructures in only a few market sectors in some Member States. Users should be able to select from a range of competing infrastructures for the provision of telecommunications and multimedia services:
 - In no Member State is there competition between different wireline infrastructures for the distribution of cable TV services.

¹ Liberalising Telecommunications – Infrastructure: An Essential Step On The Path to the Information Society, 1994

- Most (59 per cent) cable TV subscribers in the European Union are owned by the dominant public telecommunications operator.
- There is effective competition for local telephony services in only three out of the 15 Member States: Sweden, the U.K., and Finland. In the remaining countries there is an effective monopoly on the provision of voice telephony services.
- Advances in technology to expand the capabilities of the existing infrastructures are being adopted in only a minority of countries. As a result, the range of services available will be restricted:
 - In some Member States, PTOs are not upgrading their cable TV networks for the provision of cable telephony services, thus restricting competition for voice telephony at the local access level.
 - In some Member States, the average bandwidth (maximum data rate) of the local loop cable networks is half that in others, restricting the availability of multichannel television.
 - Digital terrestrial television is being actively developed by only a minority of Member States. The majority of existing households receiving analogue terrestrial television services will not therefore benefit from new digital services.

We expand on these findings below.

2.2.1 Availability of Telecommunications and Multimedia Services

The range of telecommunications and multimedia services is limited in many Member States.

In our framework for optimal development, everyone would have access to the widest range of telecommunications and multimedia services. In this section we compare the availability of telecommunications and multimedia services across the European Union on the following parameters: penetration of fixed-line telephony services, cable and satellite TV, Internet access, ISDN, and terrestrial broadcast TV.

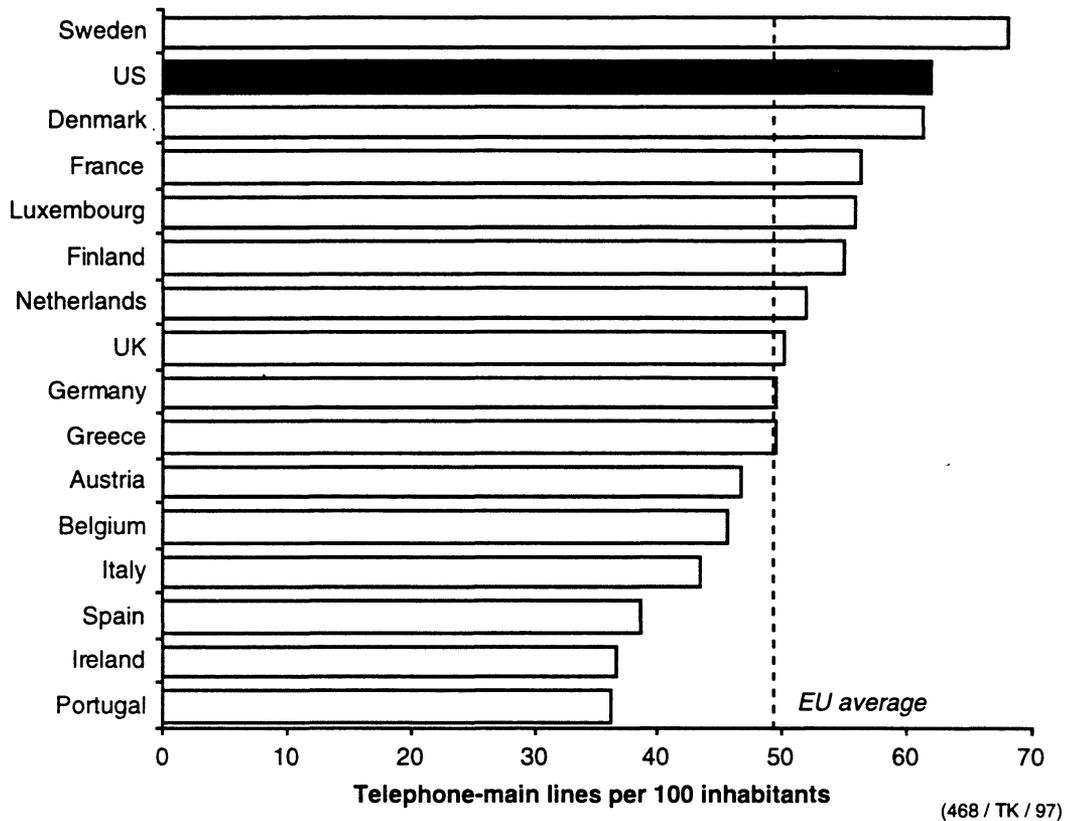
Telephone main lines.

Voice telephony is the basic telecommunications service. The penetration of voice telephony – teledensity – is measured in main lines per 100 inhabitants.

The European Union average for main telephone lines is 49 per 100 people. Countries such as Sweden and Denmark are higher than average, with between 60 and 68 lines per 100 people. Spain, Portugal and Ireland are lower, with about 40. Most other countries in Europe have teledensity close to the average.

Only one Member State, Sweden, has a greater teledensity than the U.S.: 69 main lines per 100 inhabitants compared to 62. The teledensity in most of the Member States therefore needs to be increased.

Figure 2.1: Telephone Main Lines per 100 Inhabitants, 1995



Source: OECD, Communications Outlook, 1997

Cable and DTH satellite services.

The availability of cable and satellite TV is an important measure of the development of the telecommunications and multimedia sector. Cable and satellite networks are the most common means of delivering multichannel (more than 10) television services in Europe. In addition, cable TV networks will be very important for the development of telecommunications and multimedia sector. As stated by the DG IV¹:

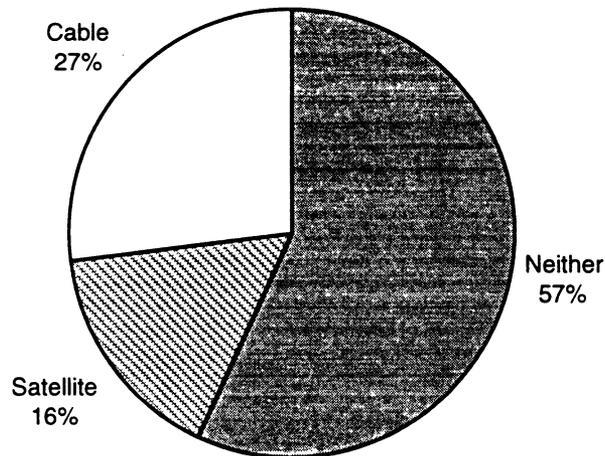
“Cable television networks could play a crucial role in the competitive provision of telecommunications services, especially voice telephony, to the end-user. In addition, the establishment of hybrid networks allowing the provision of both telecommunications and cable television services will encourage the development of multimedia services, an important future growth sector, the success of which will largely depend on the flexibility of the regulatory frameworks.”

In the U.S., multichannel television is connected to over 67 per cent of TV homes. By the end of 1996, some 16 per cent of TV homes in the European Union were subscribing to satellite services, while 27 per cent were connected to a cable TV

¹ European Commission, DG IV, Request for Proposal

network. The majority of TV homes – 57 per cent – receive neither cable TV nor satellite services and are therefore unable to receive multichannel television.

Figure 2.2: Penetration of Cable TV and Satellite Services in European Union TV Homes, 1996



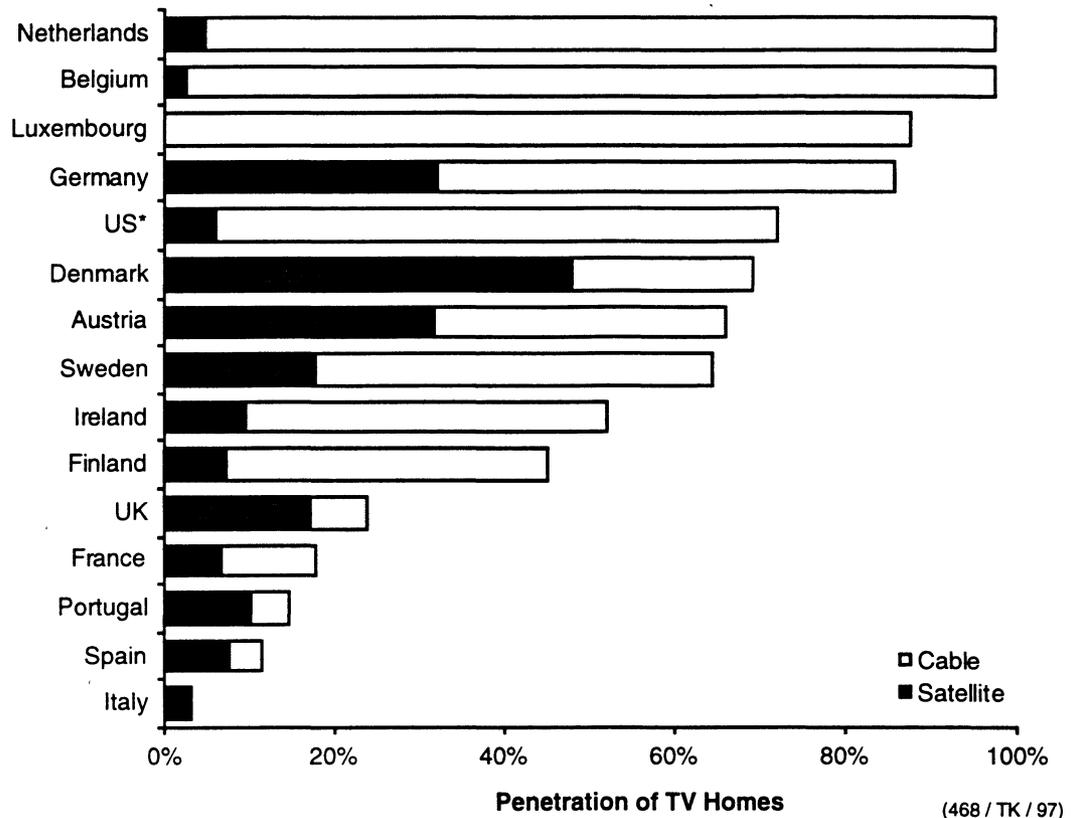
(468 / TK / 97)

Source: Arthur D. Little

The availability of cable TV and satellite services across the European Union varies; some countries have virtually none, in others cable is the dominant means of distributing television programming. In Italy, less than five per cent of TV homes are connected to either a cable or satellite system, mainly because of the availability of a large number of terrestrial television services; in the Netherlands over 90 per cent of homes are connected to cable.

The majority of European Union countries have a lower penetration of cable TV and satellite services than the U.S. The exceptions are Germany, Luxembourg, Belgium and the Netherlands, where cable networks have been built to support terrestrial services.

Figure 2.3: Penetration of Satellite and Cable TV Services, End 1996



Source: ASTRA, Arthur D. Little

* U.S. figures are for June 1996

Internet access.

The Internet will be a driving force in the development of the European telecommunications and multimedia sector. In Europe, the number of users of Internet services grew from nearly 3 million in 1994 to 5.5 million in 1995. This trend will continue for the foreseeable future, with a growing number of users demanding increasingly high-speed access to the Internet.

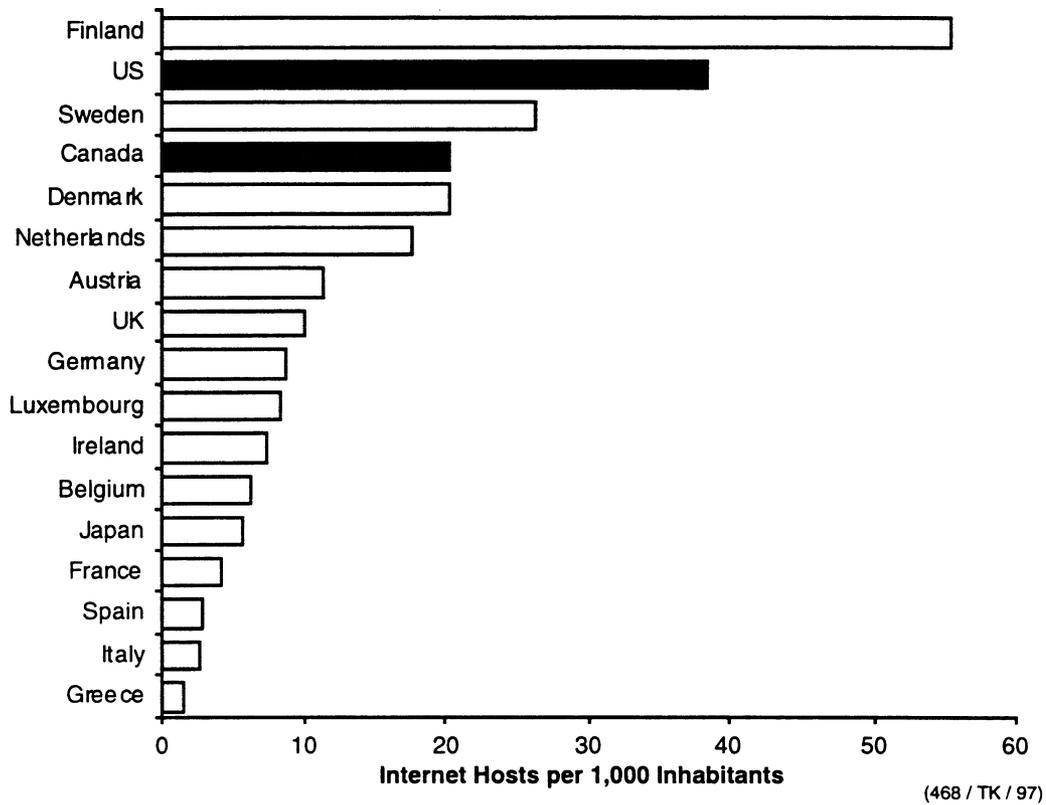
The number of Internet hosts (access points) per 1,000 inhabitants is one indicator of the maturity of a country’s telecommunications and multimedia services. The U.S. has more Internet users than Europe, and the European Commission has identified lack of access as a shortcoming of the European telecommunications and multimedia market¹:

“Currently, some 10 per cent of the 40 million Internet users are European: More than 70 per cent are American. Europe needs not less Internet but more. At the moment, only one out of 100 Europeans has access to the Internet.”

¹ Competition in the Information Society – Multimedia, Annual General Meeting European Multimedia Forum, November 1996

As shown in Figure 2.4, only Finland has a higher penetration of Internet hosts than the U.S. Only Sweden and Finland have a higher penetration of Internet hosts than either Canada or the U.S.

Figure 2.4: Number of Internet Hosts per 1,000 Inhabitants, 1996

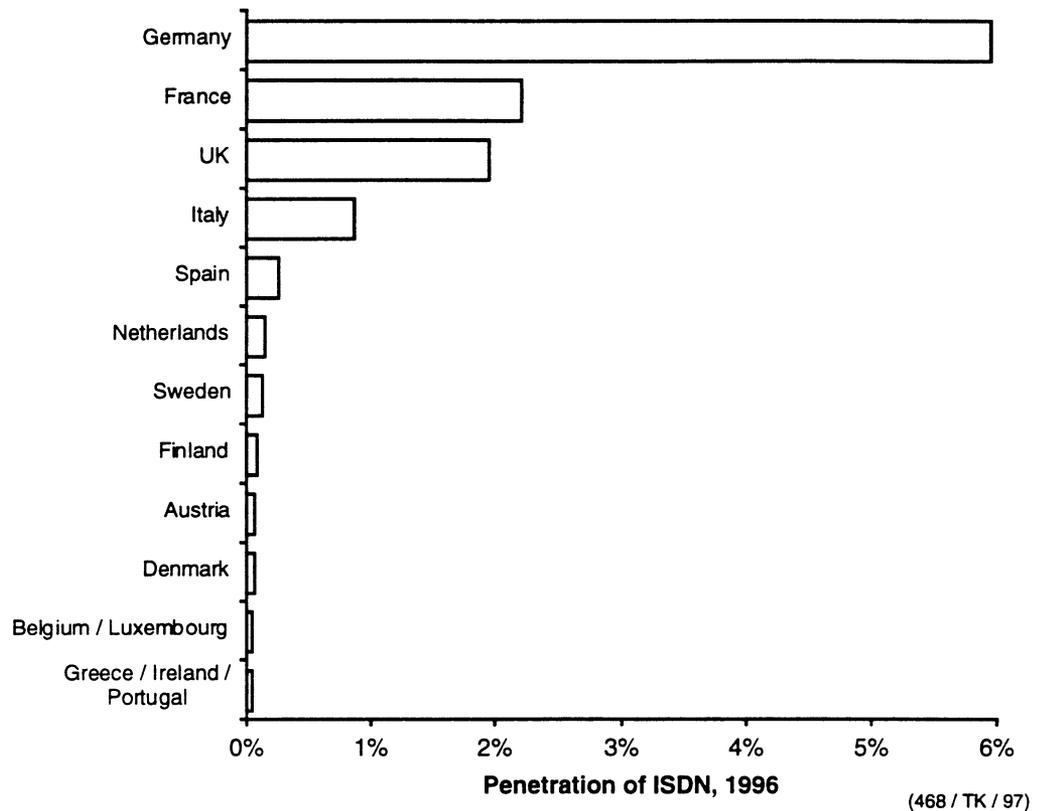


Source: OECD

Integrated service digital network.

ISDN is the first step towards increasing the capacity of existing telecommunications networks. Penetration of ISDN throughout the European Union countries is very low: in most countries it is available in less than one per cent of homes. In Germany, where Deutsche Telekom has been upgrading its national networks, the service accounts for barely six per cent of main line connections.

Figure 2.5: Penetration of ISDN lines in the European Union, 1996



Source: Frost & Sullivan, 1997

Terrestrial broadcast television.

Terrestrial television is the most common medium for the delivery of basic television services in Europe. The availability of terrestrial television services varies across the European Union: in Italy, television viewers can choose from up to nine free national terrestrial services; Luxembourg has only one national service.

Table 2.2: Availability of Terrestrial Channels in the Member States

Country	Number of Free National Terrestrial Channels, 1996	
Austria	2	ORF1, ORF2
Belgium	6	BRTN1, BRTN2, RTBF1, RTBF Tele21, RTL-TV1, Club RTL
Denmark	2	DR TV, TV-2
Finland	4	TV1, TV2, EST 1-2, MTV 3
France	5	FT1, F2, F3, Arte/La 5, M6
Germany	7	ARD, ZDF, RTL, SAT 1, Vox, N-TV, Pro-7
Greece	6	ET1, ET2, Antenna, Mega, Star, Sky
Ireland	7	RTE1, Network2, BBC1, BBC2, Ulster TV, Channel4, HTV
Italy	9	RAI1, RAI2, RAI3, Canale 5, Rete 4, TMC, Italia 1, Rete A, Videomusic,
Luxembourg	1	RTL Hei Elei
Netherlands	3	NED1, NED2, NED3
Portugal	4	RTP1, RTP2, SIC, TVI
Spain	4	TVE 1, TVE 2, Antenna 3, Tele 5
Sweden	4	SVT-1, SVT2, TV3, TV4, TV5 Nordic TV6
U.K.	4	BBC1, BBC2, ITV, Channel 4

Source: IDATE, 1996

2.2.2 Development of Innovative Services

Traditionally, European PTOs have focused on developing and implementing telecommunications technologies rather than on finding and exploiting the services the customer is looking for. In a liberalised environment, market pull will replace the traditional approach.

In this section we compare the development of new telecommunications and multimedia services in the Member States with the innovation criterion presented in section 2.1.

New telecommunications and multimedia services.

Telecommunications and multimedia services available already in other parts of the world include:

- Internet telephony – a service that has the potential to destabilise the core business of most PTOs.
- Wireless local loop telephony – a technology that can be used to bypass the fixed local loop belonging to the dominant PTO.
- Pay-TV in various bouquets and with a personalised selection of additional channels.

Internet telephony.

Internet telephony has the potential to destabilise the core business of dominant telecommunication operators.

Internet telephony has already been extensively developed in the U.S., where it is rapidly gaining acceptance as a viable competitor to the established telephony operators. In contrast, only a small number of European companies are actively developing Internet telephony services. At the end of 1996, Telecom Finland became the first incumbent carrier to offer Internet telephony. BT in the U.K. and Sweden's Telia are developing Internet Protocols (IP) for telephony services over PC-to-PC and phone-to-phone connections.

Wireless local loop.

Wireless Local Loop (WLL) is a generic term for an access system that uses a wireless link to connect subscribers to their local exchange in place of conventional copper cable. This technology has been adopted, or is being trialled in Finland, France, Germany, Italy and the U.K.: in most European Union countries it has yet to emerge as a competitor to the fixed-line operators.

In Finland, WLL has been deployed by two telecommunication operators: Telecom Finland and the privately owned Finnish telecommunications operator Helsinki Telephone Company (HTC). In France, competitive telephony services are being offered over WLL networks in Nice by SFR-Cegetel, a consortium of the French water utility, Compagnie Générale des Eaux, BT and Vodafone of the U.K., and Mannesman of Germany. Cegetel is expected to build a local loop in Paris in 1997, followed by the roll-out of networks in more than 30 towns in France. In Germany, Mannesmann has conducted extensive trials of Digital European Cordless Telephony (DECT). In Italy, Telecom Italia has trialed WLL solutions based on DECT. Ionica in the U.K. was the first company in Europe to utilise a type of WLL technology called Proximity 1.

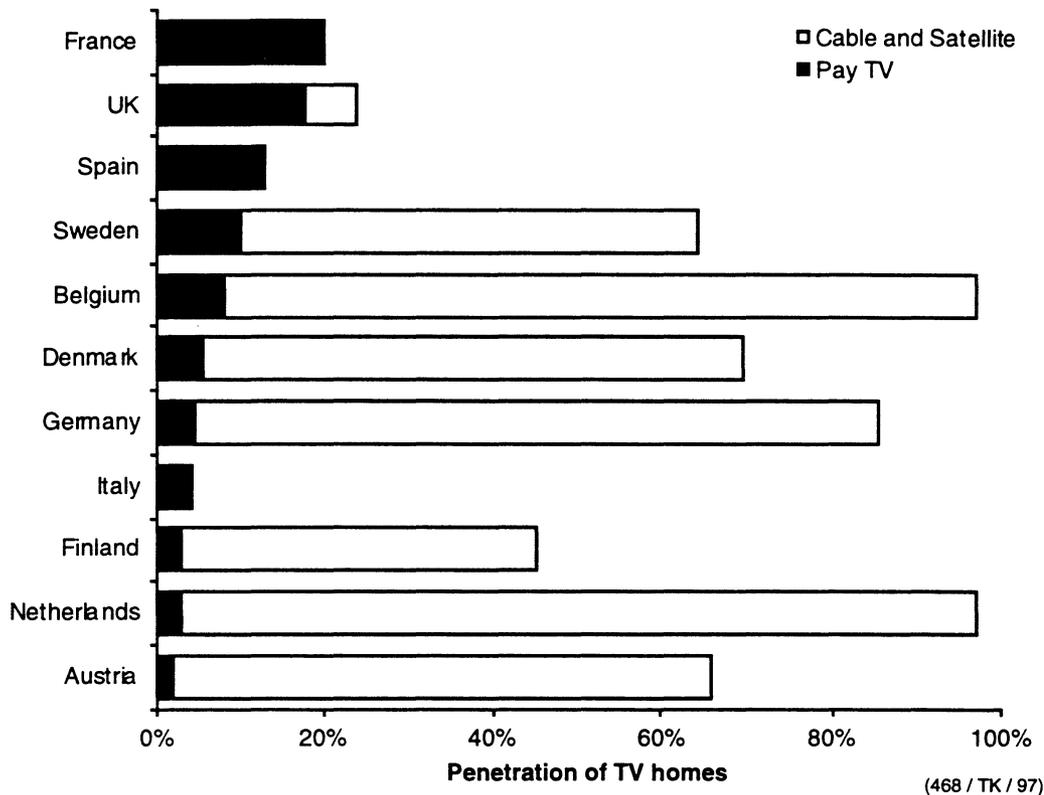
Pay-TV services.

Pay-TV services can be purchased independently of other channels for a monthly subscription. The advent of multichannel (digital) satellite and cable TV networks, and the increasing popularity of thematic programming (such as news, sports and film) will drive the development of Pay-TV services.

By the end of 1996, some 13 million households in the European Union subscribed to Pay-TV: 10 per cent of total European Union households. Only four out of the 15 Member States have a penetration of Pay-TV greater than 10 per cent. The highest penetration of Pay-TV is in France, where some 20 per cent of TV homes subscribe. In the U.K., Spain and Sweden, subscribers account for 17 per cent, 13 per cent and 10 per cent respectively.

In Belgium, Germany, and the Netherlands, over 80 per cent of TV homes receive television services via cable and satellite networks, but under 10 per cent subscribe to Pay-TV, mainly because of the lack of attractive and exclusive Pay-TV content.

Figure 2.6: Penetration of Pay-TV Services and Satellite/Cable TV, 1996



Source: ASTRA (Satellite/Cable TV), Screen Digest (Pay-TV), January 1997

2.2.3 Development of Infrastructure Competition

In a competitive market, consumers would be able to choose from the largest number of competing infrastructures for the provision of telecommunications and multimedia services. For example, interactive television services would be available over cable TV, PSTN, digital satellite, digital terrestrial and wireless cable networks. Similarly, telephony services would be available over cable TV networks, PSTN, WLL networks, mobile phone networks, powerline networks, and the Internet. Open and equal competition between infrastructure providers would therefore encourage the improvement of networks in terms of cost/performance and the availability of services.

Below, we compare the development of competing infrastructures for the delivery of telecommunications and multimedia services across the European Union, using the criteria described in section 2.1. Our overall conclusion is that as yet there is little competition between cable TV and telecommunications infrastructures for the provision of cable TV services. In some Member States, the dominant PTO is the sole provider of both basic telecommunications services and cable TV. And in voice telephony, PTOs still have a monopoly in most countries and considerable market share in the rest.

Wireline competition for cable TV services.

In some countries – U.S., Canada, and Australia – two or more wireline companies compete for the provision of cable TV services to individual households. In this respect, countries are closer to optimal development of the telecommunications and multimedia sector. However, no wireline network operators compete for cable TV subscribers in the Member States.

There are competing wireline networks in at least 20 franchises in the U.S., where their introduction has reduced the price of cable TV services. According to Ameritech, wireline competition for the provision of cable services has forced cable incumbents to cut prices by as much as 50 per cent, to offer free pay-per-view events, and to upgrade their systems. Elsewhere, the threat of competition has prompted the cable operator to add extra channels to its basic tier services and cut the cost of its programming package by 93 per cent¹.

In June 1996, cable TV competition officially began in Canada, with the licensing of Pacific Place Communications in the franchise area of Rogers Cablesystems, the dominant cable operator.

Fixed wire operators already compete in Australia too. Groups led by Optus Vision and Foxtel are building hybrid-fibre coaxial cable systems. To generate additional revenue, both plan to offer a wider variety of services: local phone services, pay-per-view television and interactive services.

Control of cable TV market by dominant PTO.

In some Member States, the dominant PTO is the sole provider of both cable TV and basic telecommunications services. The European Commission has made its views on sole provision clear²:

“PTOs enjoy an increasing share of the cable subscriber market and thus the platform for alternative provision of local telecoms access is shrinking. This is problematic also in the global context: many parts of the European Union area are already at a tremendous disadvantage compared to, for example, Canada and the U.S., in terms of the independent infrastructure available for the competitive provision of telecommunications services.”

Across Europe, the development of cable TV networks has been motivated by the demand for simple broadcast television services. However, technological developments have created opportunities for cable operators to expand into new service areas. In cable telephony, these developments could bring some cable operators into conflict with their PTO parent.

The ownership of cable TV subscribers by the dominant PTO varies across the European Union. In Portugal, Sweden, and France, the PTO has between 56 per cent and 80 per cent share of cable TV homes. In contrast, British Telecom has less than a one per cent share of cable TV subscribers in the U.K.

¹ Falcon Cable TV, December 1996, in response to threat of competition from GTE Media Ventures

² European Commission, DG IV, Request for Proposal

The ownership hierarchy of cable TV homes in Germany is different from that in the other Member States. The cable networks are divided into four levels:

- Level 1 – The transmission of signals
- Level 2 – The headend operation
- Level 3 – The trunk operation from headend to local distribution point at street level
- Level 4 – The cable connection between the local distribution point to the home, apartment block or office building

The ownership structure of cable TV homes in the level 3 and level 4 networks is tabulated below.

Table 2.3: The Ownership Distribution of Cable TV Homes in Germany, 1996

Network Level 3	Deutsche Telekom AG 16.7 million	Private Network Operators 3.0 million										
Network Level 4	<table border="1" style="width: 100%;"> <tr> <td style="text-align: center;">Deutsche Telekom AG</td> <td style="text-align: center;">ANGA</td> <td style="text-align: center;">Other</td> </tr> <tr> <td style="text-align: center;">5.5 million</td> <td style="text-align: center;">5.5 million</td> <td style="text-align: center;">6.7 million</td> </tr> </table>	Deutsche Telekom AG	ANGA	Other	5.5 million	5.5 million	6.7 million	<table border="1" style="width: 100%;"> <tr> <td style="text-align: center;">ANGA</td> <td style="text-align: center;">Others</td> </tr> <tr> <td style="text-align: center;">1.5 million</td> <td style="text-align: center;">1.5 million</td> </tr> </table>	ANGA	Others	1.5 million	1.5 million
Deutsche Telekom AG	ANGA	Other										
5.5 million	5.5 million	6.7 million										
ANGA	Others											
1.5 million	1.5 million											

Source: ANGA, 1997

Deutsche Telekom owns and operates the level 1 and level 2 backbone distribution network. Deutsche Telekom and a number of independent cable operators own the level 3 and level 4 networks – the final drop into the home. According to the latest figures from ANGA, the association of independent cable TV operators, 16.7 million cable subscribers were connected to Deutsche Telekom’s backbone distribution network and a further 3 million connected to private cable networks – see Table 2.3 above. As a result, Deutsche Telekom controls directly only 28 per cent of cable TV subscribers. The private network owners, whose level 4 network is led by Deutsche Telekom’s level 3 network, could choose to have their services provided by one of the new city carriers that are expected to develop.

Table 2.4: Ownership of CATV Subscribers by Dominant PTOs, 1996

Country	Telephone operator share (% subscribers)	Country	Telephone operator share (% subscribers)
Austria (4)	0	Ireland (6)	48
Belgium	0	Italy (7)	-
Denmark	52	Luxembourg	0
Finland (5)	40	Netherlands (3)	15
France (3)	56	Portugal	80
Germany (1)	85	Spain	2
Germany (2)	28	Sweden	60
Greece (7)	-	U.K.	1

Source: Arthur D. Little, FT Media & Telecoms

(1) 16.7 million out of 19.7 million cable subscribers were connected via Deutsche Telekom's distribution network.

(2) 5.5 million out of 19.7 million German households were subscribing to Deutsche Telekom's cable TV service

(3) Dutch share reflects KPN's 76.7% stake in Casema

(4) France Telecom total includes networks operated by third parties

(5) The Austrian PTA has a monopoly on trunk distribution of cable to headends

(6) Finland total includes networks operated by Telecom Finland and local companies

(7) Irish share reflects Telecom Eireann's 75% stake in Cablelink

(8) Cable television networks are less developed in Italy and Greece

As pointed out by the European Commission, the most recent OECD figures show that European PTOs control an increasing share of the cable subscriber market:

Table 2.5: Cable TV Subscriber Trends in the European Union for PTO Owned Systems

	1990	1991	1992	1993	1994
Total Cable TV Subscribers in the EU (000)	21,524	24,433	27,569	29,441	32,918
Cable TV Subscribers to PTO cable system in the EU as % of EU total	52.65	54.54	56.60	56.30	58.52
Subscribers to PTO owned cable systems in monopoly PSTN markets in the EU as a % of all subscribers in monopoly PSTN markets in the EU	49.99	52.71	55.73	56.15	59.18

Source: OECD, Arthur D. Little

This trend is not restricted to the European Union; in the OECD countries, the PTO share of cable TV subscribers in monopoly PSTN markets grew from 54 per cent in 1990 to more than 60 per cent in 1994.

Table 2.6: Cable TV Subscriber Trends in the OECD Area for PTO Owned Systems

	1990	1991	1992	1993	1994
Total Cable TV Subscribers in the OECD area (000)	82,430	88,298	93,973	98,966	105,958
Cable TV Subscribers to PTO cable system in the OECD area as % of OECD total	13.00	14.43	15.92	16.23	17.56
Subscribers to PTO owned cable systems in monopoly PSTN markets in the EU area as a % of all subscribers in monopoly PSTN markets in the EU area	53.81	56.48	58.85	58.72	60.91

Source: OECD, Arthur D. Little

Competition for voice telephony services.

In all but three Member States – the U.K., Finland, and Sweden – national PTOs have a legal monopoly of local, trunk and international infrastructure. Even in countries that have been liberalised, the PTOs retain considerable market share.

Removal of the monopoly on basic telecommunication services in the U.K., Finland and Sweden has allowed competitors to enter the market. As pointed out by the OECD, whether new entrants gain market share from the incumbent depends largely on the ownership and access to the customer:

“Both BT and NTT could retain market share because of their control over local access, whilst in Finland the Finnet companies were able to capture a huge market share overnight because of their greater access to customers, some of whom were direct owners of private local telecommunications companies.”¹

New operators in the Finnish market have gained a larger market share than new operators in either the U.K. or Sweden. In Finland, after a year of competition with Telecom Finland, the Finnet consortium of privately owned local telephony companies had captured a 58² per cent of the local telephony market. In the U.K., new entrants have gained market share more slowly than their counterparts in the U.S., even taking the later starting date of liberalisation in the U.K. into account.

¹ *Local Telecommunications Competition: Developments and Policy Options*, OECD, 1996

² OECD

Table 2.7: National Long Distance Market Shares of New Operators (% Share of Switched Minutes)

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
EU												
Finland											0.0	60.0
Sweden											0.0	5.0
U.K.		0.0	2.0	4.0	6.0	7.0	8.0	9.0	10.7	14.4	16.5	18.6
Non-EU												
Australia								0.0	0.5	2.0	7.6	11.7
Canada							0.0	5.0	7.0	14.0	18.0	
N.Z.							0.0	12.0	18.0	19.0	21.0	22.0
Japan			0.0	3.0	6.0	10.0	15.9	22.4	26.8	29.1	31.3	
U.S.	19.8	20.2	23.2	28	31.5	35.1	37.4	37.8	39.4	39.8	41.4	43.5

Source: OECD

2.2.4 Overcoming Infrastructure Limitations On Network Upgrade – Development of New Services

Advances in technology can be used to overcome infrastructure limitations and broaden the range of services available to consumers. In this section, we assess how Member States are exploiting technology to develop new telecommunications and multimedia services across the European Union.

Only a minority of Member States are taking full advantage of technological developments to increase the availability of telecommunications and multimedia services through:

- Digital terrestrial television.
- Digital satellite DTH television.
- Cable telephony services, and
- Multichannel television over broadband cable TV networks.

Digital terrestrial.

Digital terrestrial television will expand the range of services available over terrestrial broadcasting networks compared to the existing analogue networks. Digitalisation will increase the number of television channels available. A range of new interactive services, such as teleshopping, pay-per-view, and telebanking, will also be possible.

Digital terrestrial television is being actively developed by only a minority of European Union countries. So far, the U.K. is in the lead in providing the regulatory framework for its introduction. Detailed proposals have also been produced in Sweden, and other European countries are still assessing the potential.

The penetration of digital terrestrial television will be low in the majority of Member States. Only four countries are expected to have DTT penetration greater than 10 per cent within 20 years of launch – see Table 2.8. In one other Member State, The Netherlands, penetration of DTT will be modest, owing to environmental concerns about the erection of receiver aerials in flat country. In the remaining Member States, DTT services are unlikely to start within the next 20 years.

In some countries, owing to the lack of frequencies, digital services can only be introduced by gradually switching off analogue channels to make room for digital ones, delaying the launch of digital terrestrial services.

Table 2.8: Forecast Penetration of Digital Terrestrial Television

	Earliest Closure to Analogue TV	Penetration of DTT After 20 Years
France	2015	32
Germany	2013	28
Netherlands	2010	19
Spain	2018	43
Sweden	2013	42
U.K.	2017	44

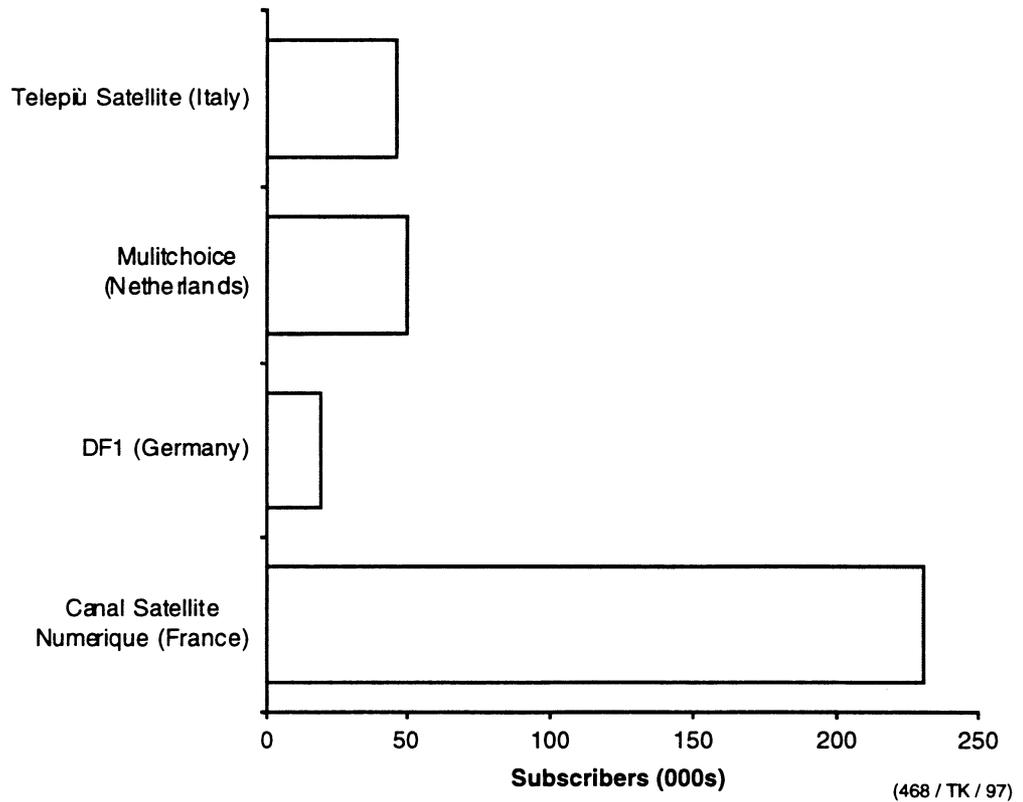
Source: Convergent Decision Group

Digital satellite.

Digital DTH satellite services have already started in most of the larger European markets: Germany, France, Scandinavia, Italy and Benelux. Services are due soon in the U.K., and Spain. It is unlikely that digital satellite services will be available in some European Union countries, for example Portugal and Greece, before the end of the millennium.

Figure 2.7 shows the latest subscriber figures for digital satellite services in the main European Union markets.

Figure 2.7: Digital Satellite Subscribers



Source: FT Media & Telecoms, March 1997

Cable telephony.

In some Member States, cable companies are not upgrading their networks for cable telephony. Table 2.9 lists a selection of the cable operators worldwide who are developing cable telephony. Only two out of the sample of 17 cable companies currently trialing or launching cable telephony services are controlled by a dominant PTO.

Table 2.9: Sample of Worldwide Cable Telephony Trials and Launches

Country	Company	Plans	Ownership
Australia	Optus Vision	Commenced roll out of cable telephony services.	Optus Communications, Cablevision, Nine Network, Seven Network.
Austria	Kabelsignal	Introduction of telephony planned for Jan 1998.	91% Siemens, 9% Others
Belgium	Telenet		US West, Electrabel, GIMV.
Canada	Cogeco Cable Inc.	Canada's first trial of the access network for providing voice telephony services.	
Chile	VTRSA	Plans installation of cable telephony in early 1997.	Grupo Luksic, Southwestern Bell
Denmark	Stofa	Plans to offer cable telephony in 1997/98.	Telia, Swedish PTO
France	Lyonnaise Communications	Plans to launch commercial service in quarter of 1998.	Lyonnaise des Eaux, US West, others.
Germany	Deutsche Telekom Cable	Running cable telephony trials	Deutsche Telekom
Germany	Vebacom	Announced desire to launch telephony services.	Veba, RWE
Japan	Jupiter Telecom	Has begun testing cable telephony service, and plans to offer commercial services by the end of 1997.	Joint venture between TCI2 and Sumitomo Corp.
Malaysia	Bina Sat-Com Sdn Bhd	Announced deal with Motorola to provide switching equipment for telephony services.	Malaysian shareholders, US West.
New Zealand	Saturn Communications	Been awarded telephony licence.	United Holdings International
The Netherlands	A2000 Casema	Plans to offer cable telephony services from 1 July 1997. Starting trials May 1997. Large-scale roll out expected later in 1997	50% UPC, 50% US West.

Table 2.9: Sample of Worldwide Cable Telephony Trials and Launches (continued)

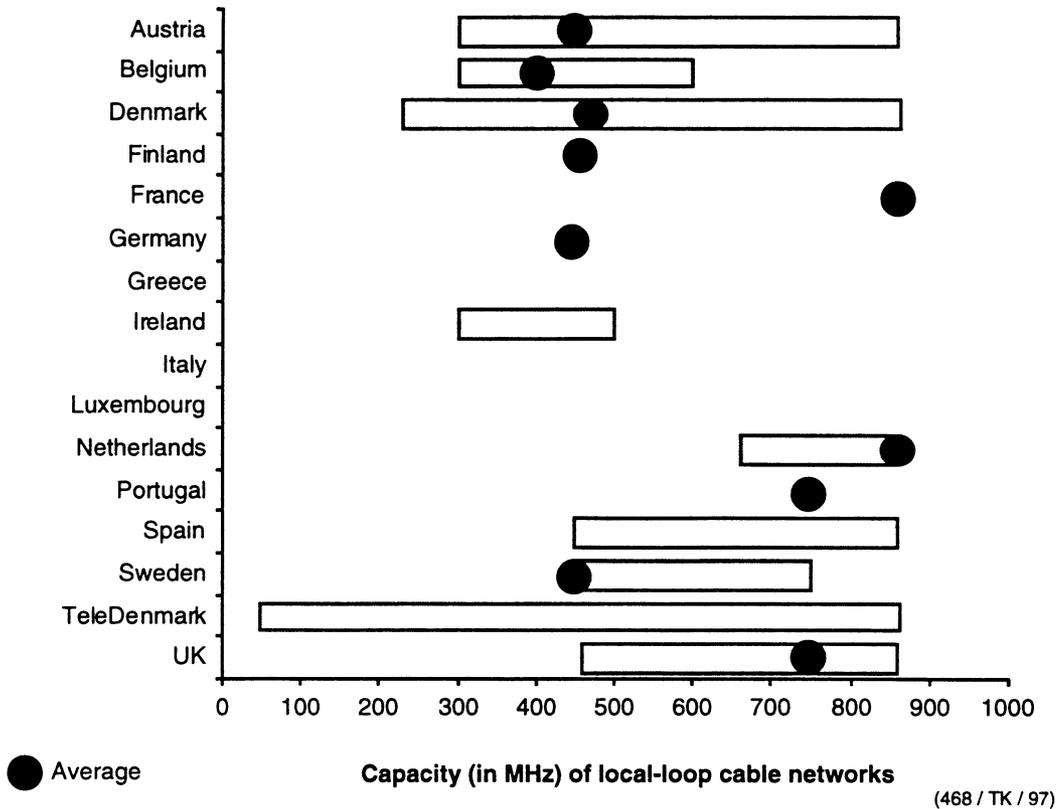
Country	Company	Plans	Ownership
South Korea	Korea Electric Power Corporation (Kepeco)	Started trials in preparation for national roll out.	21% public owned, 79% government owned.
Sweden	Kablevision	Plans to launch cable telephony services mid 1996.	Subsidiary of Kinnevik Group.
U.K.	Telewest, General Cable, CWC	Now more cable telephony subscribers than cable TV subscribers	Various non-telcos
U.S.	TCI and Adelphi Cable Comms MediaOne	Filed applications with the FCC for telephony licences Plans to offer telephony to all homes passed by the end of 1998	Tele-Communications Inc. Subsidiary of US West

Source: Arthur D. Little

Multichannel television over broadband cable TV networks.

The number of channels that can be received in cable homes is determined by the technical characteristics of the cable network. The capacity of the system is normally expressed in bandwidth (MHz). In general, the number of channels increases with bandwidth. The norm for new broadband systems worldwide is a bandwidth of 860 MHz, but the average in most Member States is half that capacity at 450 MHz – in the Netherlands the average local loop cable bandwidth is 860 MHz, in Belgium it is only 400 MHz. An 860 MHz system has the capacity to convey between 30 and 50 analogue television channels.

Figure 2.8: European Union Comparison of Local Loop Cable Bandwidth*, End 1995



Source: European Cable Communication Association, 1997

* Each bar shows the maximum and minimum capacity of networks in each country (where data are available) in 1995; the circles indicates the average capacity – i.e. the most common system bandwidth

2.3 The Impact of Regulatory Regimes

Regulation has a major impact on the development of telecommunications and multimedia markets. The highly complex regulatory structure across the Member States works against optimal development of telecommunications and multimedia markets.

The telecommunications and cable TV industries are subject to extensive regulation in most Member States. Regulation has been motivated by differing objectives, including assurance of universal service, the encouragement of economic activities and a competitive telecommunications market, and protecting the position of the national PTO. It has also promoted specific policy aims, such as encouraging construction of cable TV infrastructure.

The overall framework of telecommunications and cable TV policy and regulation is now being set at the European Union level; continuing differences in regulation between the Member States, however, reflect their different development paths. Much of the change under way is due to the liberalisation of the telecommunication

and multimedia sectors. This section provides an overview of the diversity of regulatory frameworks in the telecommunications and cable industries in the Member States, showing action taken and its implications for the market. We discuss industry specific regulation rather than general competition law.

In summary, in terms of the structure, the variety of regulatory bodies creates high complexity, hindering the development of telecommunications and multimedia markets. In many Member States the current regulatory regimes for telecommunications service competition do not foster the development of infrastructure and services. Efficient interconnection regimes required to do so are underdeveloped in most Member States. National policy encourages local loop infrastructure competition to varying degrees. There are regulatory barriers to using the alternative delivery platforms, such as broadband cable networks and WLL, that are emerging as options to also provide telephony. The regulation of cable TV infrastructure and services does not encourage progress towards optimal development.

A detailed review of the regulatory situation in each Member State appears in Appendix D.

2.3.1 The Structure of the Regulatory Authorities

The complexity of the regulatory structures in the Member States works against the development of telecommunications and multimedia markets. In this section, we describe the function and interrelationships of different regulatory bodies, how regulatory tasks are divided at regional and national level, and the degree of independence of the various bodies. Licensing regimes in some countries do not enable infrastructure competition.

Industry specific regulators.

Among other developments, trends towards horizontal and vertical integration in the telecommunications, cable and content industries, new technology and market liberalisation are encouraging new market entrants. Industry convergence is not, however, reflected in a convergence of regulatory bodies in the Member States. The regulators in most Member States are separate for broadcasting, cable TV and telecommunications and for aspects of competition. The issues of programming ownership, control and content are still, in most Member States, the province of broadcasting regulators, while infrastructure and pricing are mostly the concern of telecommunications regulators or other bodies. In the Netherlands, for example, telecommunications services and infrastructure lie with a section of a Ministry (the Telecommunications and Post Department of the Ministry of Transport, Public Works and Water Management) that also licenses infrastructure for cable TV networks and allocates frequencies. The Dutch broadcasting sector, however, is regulated by the Media Authority responsible for licensing broadcasters and supervising content issues as well as settling disputes between cable operators and content providers.

In many countries, related activities fall under the jurisdiction of other organisations, complicating the situation. These activities include granting licences (as opposed to policing them), and allocating radio frequency. For example, in the U.K., telecommunications licences, including licences to install and operate cable

networks, are awarded by the Department of Trade and Industry (DTI), but policed by OFTEL (the independent telecommunications regulator). The Department of National Heritage (DNH), a government department, has the power to enact secondary legislation in the broadcasting sector. Broadcasting licences (for broadcasters other than the BBC) and licences for providing cable TV services are issued by the Independent Television Commission (ITC). The radio spectrum is managed, and licences for its use are issued, by the Radiocommunications Agency.

Some issues raised in the context of the converging telecommunications, cable and multimedia industries lie outside existing regulations. As a result, in most countries, the variety of regulatory bodies involved imposes a heavy regulatory burden on companies in the sectors: this complexity creates uncertainty and lack of clarity about regulatory implications in some countries.

Regional and national regulators.

In some countries, market players have to deal with the complexity of conferring not only with a multiplicity of national regulatory bodies with different functions but with regional regulators as well. In Germany and Belgium, for example, broadcasting is regulated regionally, while telecommunications are controlled by the Federal government. In Spain, broadcasting is dealt with at both regional and national level.

In Germany, media regulation is controlled by the Landesmedienanstalten; each of the 16 federal states has its own Media Act. General provisions are defined by a "State Broadcasting Act".

As in Germany, telecommunications are regulated by the federal government in Belgium; control of the media and broadcasting sector lies with the three different linguistic communities, each with its own regional government.

In Spain, national and regional governments share power in regulating the media. All regional governments grant concessions to run regional channels; in a number of regions, both regional legislation and national law apply.

Varying degrees of independence.

In the past, regulatory bodies in the telecommunications sector in many Member States lacked independence from government, and many PTOs were state-owned. The conflict of interest in being a shareholder of a company and encouraging competition with that company is obvious. In consequence, regulatory bodies with a strong interest in the incumbent operator may, for example, be slow to negotiate fair interconnect regimes.

To remove the conflict, demands have been made for independent bodies to regulate the converging telecommunications and media industries. The Commission Directive 90/388/EEC, which defined conditions for the implementation of full competition in telecommunications markets, sets out requirements in relation to independent regulatory bodies. The proposal by the European Parliament and Council amending Directive 90/387/EEC and 92/44/EEC for the purpose of introducing a competitive environment in telecommunications COM (95) 543 states that the regulatory authority has to be legally distinct and financially independent of

all organisations that provide telecommunications network equipment and services. Member States must ensure the separation of the regulatory activities from activities related to ownership or control of the PTO. Tasks that the regulator is assigned can be undertaken by more than one body.

To ensure independence, the trend in Europe is to charge a non-ministerial body with regulatory operational tasks, even if they could be conducted by the Ministry because it is not the direct owner of a PTO.

The range of regulatory practice stretches from the situation in the U.K., where an autonomous authority, OFTEL (Office of Telecommunications), regulates the sector and the government has no shares in the dominant operator, British Telecom (BT), to that in Germany, where regulation is carried out by the Ministry of Posts and Telecommunications and the government still owns the majority share of Deutsche Telekom (DTAG), the dominant operator.

The Directives referred to above are changing regulatory practice in a number of countries. In some countries independent regulatory authorities have been created. In France, for example, the *Autorité de Régulation des Télécoms (ART)*, an independent body, took over the regulation of the telecommunication industries on 1 January, 1997. In Germany, the independent regulatory body for telecommunications created by the Telecommunications Act 1996 is currently being formed; it will be affiliated not with the Ministry of Posts and Telecommunications (BMPT) but with the Ministry of Economy. In the Netherlands, an independent regulator will take over several tasks related to telecommunications infrastructure and services in 1998.

2.3.2 The Regulation of Telecommunications Infrastructure and Services

Telecommunications infrastructure and services are being deregulated across Europe. The speed at which competition for residential customers in the local loop develops will be determined by various features of the regulatory regimes in place or emerging:

- The overall timetable for telecommunications liberalisation, enabling service competition.
- The regulatory framework for service competition, in particular the interconnection regime and provisions for unbundling.
- The regulatory framework for infrastructure competition, specifically the licensing of new local infrastructures and the conditions of access to them, and ownership of cable TV by dominant telecoms operators.

Restrictions on the content the cable operators' networks carry slow the development of telecommunications and multimedia markets.

Liberalisation to enable service competition.

Telecommunications infrastructure and services are being deregulated across Europe. Some countries have had liberalised telecoms markets for several years; most will remove the monopolies of their dominant operators in public voice telephony, the basic telecoms service, on 1 January, 1998.

In Finland, Sweden and the U.K., telecommunications markets have been fully liberalised for several years; Denmark has recently liberalised its market. In the rest of Europe the pace of liberalisation is dictated by two key directives:

- The Full Competition Directive, which requires the implementation of full competition in telecommunications services and infrastructure by 1 January, 1998 and the use of alternative infrastructure for liberalised services from 1 July, 1996.
- The Cable TV Directive, Directive 95/51 EEC, 18 October, 1995, which abolished restrictions on the use of cable television networks for the provision of already liberalised telecommunications services from 1 July, 1996.

The Full Competition Directive allowed for possible derogations for Luxembourg, Greece, Spain, Portugal and Ireland. Ireland and Portugal have now agreed to liberalise voice telephony services and infrastructure by 1 January, 2000 and Luxembourg has agreed to a 1 July, 1998 deadline. Spain has agreed to a 30 November, 1998 deadline. The Commission will make a decision on the timing of liberalisation in Greece at a later date.

The full timetable is shown in Table 2.10 below.

Table 2.10: Liberalisation Timetable for European Telecommunications

Country	Liberalisation of Voice Telecommunications Services	Liberalisation of Voice Telecommunications Infrastructure	Liberalisation of Alternative Infrastructure	Implementation of Cable Directive ¹	Comments
Austria	1 August 1997 (presumably).	1 August 1997 (presumably)	Yes	Yes	New Act coming into force soon will specify the details.
Belgium	1 January 1998	10 December 1996	10 December 1996	Yes, since 10 December 1996	Mobile telephony being liberalised now.
Denmark	1 January 1994	1 July 1996	1 July 1996	1 January 1996	
Finland	1 January 1994 for domestic trunk services, 1 July 1994 for international trunk services.	Liberalised for many years, formalised in Jan 1994.	Yes	Yes	
France	1 January 1998	1 January 1998	1 July 1996	Yes, since 1990, official implementation in 1995.	
Germany	1 January 1998	1 January 1998	1 August 1996	Yes	
Greece	1 January 2003, under discussion with EU.	1 January 2003, under discussion with EU.	Current regulation unclear.	No	Mobile liberalised to a degree.
Ireland	1 January 2000	1 January 2000	1 July 1997	No	
Italy	1 January 1998	Expected 31 July 1997.	Expected 31 July 1997.	No, expected 31 July 1997.	New Telecommunications Act expected by 31 July 1997.

¹ Permitting the provision of liberalised services (excluding public voice telephony) over cable TV networks. The Commission has published a communication on the implementation of the Telecommunications Directives: Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions on the implementation of the telecommunications regulatory package, COM (97) 236, 29 May 1997

Table 2.10: Liberalisation Timetable for European Telecommunications (*continued*)

Country	Liberalisation of Voice Telecommunications Services	Liberalisation of Voice Telecommunications Infrastructure	Liberalisation of Alternative Infrastructure	Implementation of Cable Directive ¹	Comments
Luxembourg	Framework regulation in place since April 1997. Full liberalisation to take place before 1 July 1998.	Framework regulation in place since April 1997. Full liberalisation to take place before 1 July 1998.	Framework regulation in place since Apr 1997. Implementing regulation to be published.	Yes	Mobile being liberalised now.
Netherlands	1 July 1997	1 July 1997	1 July 1996	Yes, 1 July 1996	
Portugal	1 January 2000	1 January 2000	1 July 1997	No	Portugal is contesting the Cable TV Directive as it did not provide for derogation.
Spain	Full liberalisation estimated for Dec 1998. Faster process possible.	Full liberalisation estimated for Dec 1998. Faster process possible.	Yes	No	
Sweden	Liberalisation from 1980 to 1989. Full competition since 1989, official implementation of 96/19 Directive 1 July 1997.	Full liberalisation since 1989, official implementation 1 July 1997.	Full liberalisation since 1989, official implementation 1 July 1997.	Yes	
U.K.	Voice duopoly from 1984, since 1991 full competition.	Voice duopoly 1984-1991, full liberalisation from 1991, since July 1996 full competition for international facilities.	Yes	Yes	

Source: Arthur D. Little, Ashurst Morris Crisp and correspondents listed in Appendix D

The regulatory framework for service competition.

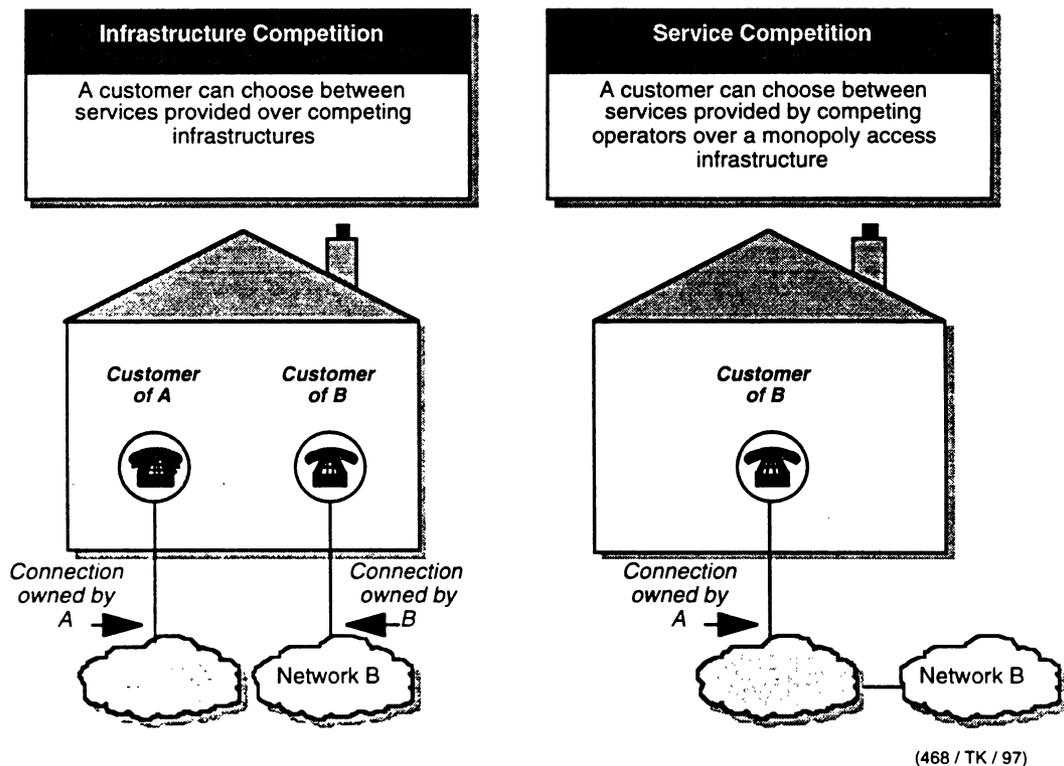
In most Member States, the current regulatory regimes for service competition do not foster the development of infrastructure and services. The interconnection regimes required to do so are underdeveloped.

¹ Permitting the provision of liberalised services (excluding public voice telephony) over cable TV networks. The Commission has published a communication on the implementation of the Telecommunications Directives: Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions on the implementation of the telecommunications regulatory package, COM (97) 236, 29 May 1997

Where dominant PTOs control local infrastructure, an effective interconnect regime can prevent the local loop bottleneck reducing competition. How the interconnection regimes will work has still to be defined in many European countries; they will at the least have to comply with the minimum requirements in the Full Competition Directive and the Interconnection Directive¹. Interconnection has not yet been an issue in many Member States; with 1998 rapidly approaching it has become a much debated one.

Varying degrees of interconnection are possible: in basic telephony only; using intelligent network services such as virtual private networks, freephone, and premium rate services; and unbundling to secure infrastructure competition. Unbundling allows direct access to the main distribution frame, and the independent use of ADSL. The extent to which the interconnection regime can reduce the incumbent's dominance of the local loop is influenced by whether the regulation is designed to foster infrastructure or service competition. The difference between the two is shown in Figure 2.9.

Figure 2.9: Infrastructure and Service Competition



Where there is infrastructure competition, customers choose among different players to provide their telecommunications service and are connected by different physical infrastructures. Where there is service competition only, customers choose among providers who deliver their services over the same infrastructure. Generally, the

¹ The agreement reached by Council and European parliament on 19 March 1997 under the conciliation approved by the Council on 2 June 1997 and adopted on 17 June 1997.

customer is unlikely to care what infrastructure the service is delivered on. All that matters from the customer's point of view is having a choice of service offerings.

Proponents of service competition believe that having more than one infrastructure is a waste of resources, and that there is a natural monopoly in telecommunications infrastructure. Proponents of infrastructure competition believe that it is a prerequisite for stimulating real competition that new entrants using the dominant PTO's infrastructure will be at a disadvantage, and that customers will benefit fully only when there is competition at all levels.

According to OFTEL in the U.K., the development of competing networks is of strategic importance, as competition in services needs to be underpinned by competition in networks. OFTEL believes that even vigorous competition between service providers will not prevent inefficient and/or expensive provision of network services. Even in countries where service provision has been liberalised and interconnection fees and tariffs are cost related, the fees may still be excessive, because the network operator's costs are higher than they would be with competition between networks.

Interconnection is a major issue for new entrants in telecommunications markets and interconnection costs form a major part of their business plans. In the U.K., for example, almost 40 per cent of the second operator, Mercury's, costs were due to interconnect payments in 1995. If pricing and costing regimes are imperfect and access to the networks is not completely open, there is a case for infrastructure competition.

How far the interconnect regime favours competition depends on such factors as the pricing models for calculating the cost of access to the PSTN, availability of access to unbundled local loop elements, and method of choice of long distance operator, points of interconnect and time for provisioning:

- Different pricing models range from using fully allocated historic costs as the basis for price calculations (which results in high costs) to long-run incremental costs (which results in lower costs).
- Unbundling is the separation of the various elements that might be required by a new entrant to access customers. Unbundled access to local loop elements would allow new entrants to buy access to the local loop copper without necessarily buying local switching from the incumbent.
- The arrangements for long distance operator selection determine how easy it is for the consumer to use competitive services. Options include preselection (choice of default long distance operator), easy access (access to competing phone-company via a short access code, but with default to incumbent), equal access (user chooses long distance network with no bias to incumbent).

To encourage service competition and/or infrastructure competition, the optimal environment for new entrants would be non-discriminatory access to unbundled local loop elements at long run incremental costs. A new entrant could then connect its network to the incumbent's so that it used only the parts of the network it wanted (the copper pair to the customer's premises) and not the incumbent's local switch; the interconnect charge for using the copper, based on incremental costs only, would be low.

In many Member States, the interconnection regime is not yet fully defined; how easy it will be for new entrants to enter the market and whether they will prefer to build new networks or use the incumbent's network to access customers is not yet clear. Speedy definition of these regimes will be key to the development of a competitive telecommunications industry in those Member States. Until the regime is clear, competitors and new entrants will have to find alternative ways to by-pass the local loop infrastructure of incumbent telecommunications companies.

The key facets of interconnect regimes are illustrated in Table 2.11.

Table 2.11: Current Interconnect Regimes in Member States¹

Country	Interconnect Charges by Commercial Agreement, Regulator Involved in Case of Disagreement	Cost Model Used	Access to Unbundled Local Loop Elements Specified in Regulation	Long Distance Operator Selection	Comments
Austria	-	-	-	-	Regulated by new Telecommunications Act 1997 expected, to come into force on 1 Aug 1997.
Belgium	Yes	No provisions as yet.	No provisions as yet.	No provisions as yet.	A draft Royal Decree will be issued shortly .
Denmark	Yes	Until Jan 1999 historic incremental costs. After Jan 1999 based on forward looking long range incremental costs.	Yes	No barriers.	
Finland	Yes	General premise is cost based pricing; further principles can be put in place. Ministry may intercede where there is unfair price setting.	Yes	PTOs must offer free of charge preselection of long distance carrier through a default choice and also the ability to select on a call-by-call basis.	
France	Yes	Long run incremental costs basis.	No specific provisions.	Pre-selection until 2000, call by call selection.	Different rules apply to dominant operators and others.

¹ In a number of Member States interconnect regimes are currently being revised

Table 2.11: Current Interconnect Regimes in Member States¹ (continued)

Country	Interconnect Charges by Commercial Agreement, Regulator Involved in Case of Disagreement	Cost Model Used	Access to Unbundled Local Loop Elements Specified in Regulation	Long Distance Operator Selection	Comments
Germany	Yes	"Cost-efficient service provision".	Yes	Choice of default/easy access.	Approval of charges by Regulierungsbehörde required.
Greece	-	-	-	-	No existing regulation.
Ireland	Yes	Government position: Price should take into account the proper allocation of the appropriate costs to each network.	No	No provisions.	
Italy	Yes	Dominant operator likely to publish standard unbundled interconnection rates by 31 July 1997, long run incremental costs basis provided for in the new Act.	No provisions.	No provisions.	
Luxembourg	Yes	Guidelines will be set out by the Institute of Telecommunications providing that tariffs must be based on objective criteria and on the effective costs.	No provisions.	No provisions.	
Netherlands	Yes	Ministry will publish guidelines for cost models, tariff structures etc.	Ministry will publish guidelines on this issue.	Four-digit prefix carrier select regime (16xx).	Guidelines to be published covering the whole issue.
Portugal	Yes	Cost-based tariff convention.	No	N/A	Post 2000 regime unclear on choice of long-distance operator.

¹ In a number of Member States interconnect regimes are currently being revised

Table 2.11: Current Interconnect Regimes in Member States¹ (continued)

Country	Interconnect Charges by Commercial Agreement, Regulator Involved in Case of Disagreement	Cost Model Used	Access to Unbundled Local Loop Elements Specified in Regulation	Long Distance Operator Selection	Comments
Spain	Yes	Cost basis.	Not specifically identified.	Not specified, however, as interconnect must be transparent, objective and non-discriminatory, possibly easy access or call by call.	
Sweden	Yes	Actual costs for dominant operator, alternatives are being considered.	No, subject to negotiations.	No regulation.	
U.K.	Yes	If no commercial agreement, Director General determines charges on fully allocated historic cost. Possibility of moving towards a forward looking long run incremental cost model.	No	Easy access, no carrier pre-selection.	Proposal made to move from charge price caps to general framework of price floors and ceilings to be introduced 1 Oct 1997.

Source: Arthur D. Little, Ashurst Morris Crisp and country correspondents listed in Appendix D

Infrastructure competition.

Infrastructure competition can be achieved either by fostering alternative infrastructures and delivery mechanisms and roll-out of new infrastructure or by separating the ownership of cable and PSTN networks where they are owned by a dominant PTO. Different national policies in the Member States encourage local loop infrastructure competition to varying degrees. The dominant PTOs' ownership of cable affects the usage of cable as a competing infrastructure.

¹ In a number of Member States interconnect regimes are currently being revised

National policy on local loop competition.

Control of local loop infrastructure offers advantages to the incumbent telephone operator. The copper local loop of the dominant telecoms operators is not the only medium for delivering services into homes. Two other options, in particular, broadband cable networks and WLL technologies, have the potential to provide telephony (see Chapter 2.4. for detailed description). The barriers to the use of these technologies are regulatory as well as structural and technical.

Although cable TV networks can be upgraded or built to provide telephony, in most countries telephony over cable networks is not allowed prior to the general liberalisation of voice telephony, as shown in Table 2.12. Under the provisions of the Cable TV Directive, cable networks may be used to carry other liberalised telecommunications services. This Directive has now been implemented in all Member States except Greece, Ireland, Italy, Spain, and Portugal – which is contesting it through the courts.

The only countries that permit voice telephony over cable TV networks – Denmark, Finland, Sweden and the U.K. – have liberalised telecommunications markets.

**Table 2.12: Cable TV Operators Provision of Voice Telephony Services
(as of June 1997)**

Country	Can Cable TV Operators Provide Voice Telephony Services Over their Own Infrastructures	Additional Comments
Austria	No	Cable Companies can provide non-voice services using PTO infrastructure.
Belgium	No	New Act will permit it after 31 December 1997.
Denmark	Yes	Within local municipal areas. TeleDanmark in practice has a monopoly over long distance.
Finland	Yes	Permitted by law, however, cable TV networks are owned by PTOs and have been historically leased solely for cable TV activities. After 1 June 1997 some excess channel capacity subject to unbundled network leasing requirements.
France	No	Cable Companies cannot offer voice telephony until Jan 1998. Other services permitted.
Germany	No	Permitted by law from 1 January 1998.
Greece	No	
Ireland	No	Telecom Eireann holds 70% of Cablelink, the main cable TV operator in Ireland. The network is not used for telecommunications.
Italy	No	Regulation is expected shortly.
Luxembourg	No	Must apply for a new telephony licence. Framework legislation is in place, however implementing legislation is not in force.
Netherlands	No	Cable companies cannot offer telephony until 1 July 1997. Other services permitted.
Portugal	No	
Spain	No	Will be permitted once voice telephony is liberalised (Dec 1998).
Sweden	Yes	No restrictions on the use of cable infrastructure for telecommunications services.
U.K.	Yes	Since 1991 cable operators have been allowed to offer voice telephony in their own right.

Source: Arthur D. Little, Ashurst Morris Crisp and the country correspondents listed in Appendix D

When voice telephony markets are fully liberalised, WLL systems will be able to provide the infrastructure for new entrants. The barrier to exploitation of these technologies is expected to be not the availability of licences for telecoms operators, but the availability of spectrum, and the economic issues arising from it, such as cost of implementation and access. Spectrum availability for the various WLL technologies such as DECT, CDMA, PHS and proprietary systems is, as yet, unknown in many Member States; the strength of competition that it could enable is unclear.

In Member States where spectrum has been made available, new operators have emerged. For example, in Denmark, Netcom is building a WLL network. In the U.K., Ionica is rolling out its network, competing against both BT and the cable companies to provide telephony to residential customers and small businesses. The U.K. has also made spectrum available and issued licences to encourage the development of wireless services to BT, Radio TEL Systems, Mercury Communications, Scottish Telecom, NTL, Atlantic Telecommunications Ltd. and Liberty.

Dominant telecommunications operators control of cable infrastructure.

In many Member States, where dominant telecoms operators are allowed to own or control parts of the cable markets, the availability of competing infrastructures for the provision of local telecommunications services may be low. The dominant operator is unlikely to upgrade its cable networks to offer telephony in competition with its existing telecommunications infrastructure. Doing so would not generate additional revenue streams, and could cannibalise the core business.

For example in the U.K., the cable franchises owned by BT are the only ones not upgraded for telephony. The German situation is highly complex, in that network level 3 is owned to 83 per cent by the incumbent DTAG, which controls only 27 per cent of homes connected on network level 4, the highly fragmented infrastructure on private ground. DTAG has no firm plans to upgrade network level 3 to provide bi-directional services or telephony; it states that the private operators on level 4 can use alternative infrastructure such as the fibre optic backbones laid out by new entrants in telecommunications. Upgrading plans by the dominant PTOs that own cable TV are discussed in Chapter 3.1.

In some countries, cable regulation is, or has been, biased to the national operators; in Greece, ERT and OTE have the exclusive right to develop and operate CATV networks (third parties can be introduced), and in Portugal cable operators have to use the infrastructure of Portugal Telecom unless it lacks capacity. In Portugal, most cable operators install coaxial cables in consumers' homes using the ducts of Portugal Telecom. Infrastructure built by the cable company reverts to the State on termination of the licence.

Other countries where regulation has favoured the PTOs are Germany, Denmark and France.

- In Germany, the German Federal Post Office (DBP) had a monopoly on the construction and operation of all telecommunications and cable TV services until 1989; it had to provide comprehensive telecommunication and television services across the whole of Germany. It was therefore able to build out telecommunications and cable infrastructure without competitive pressure influencing cost-effectiveness.
- In Denmark, ownership of cable TV networks was restricted to municipalities, antenna societies and TeleDanmark until 1996.

- In France, until 1986, France Télécom had a monopoly on the right to build cable for TV networks and cable TV operators were legally obliged to have arrangements with France Télécom to provide their services.

The situation in Sweden is unique in the European Union. Cable TV is open to national competition; the dominant PTO, however, owns many of the cable networks.

Even in countries where the dominant operator does not own large cable networks, the fact that it would be allowed, under the regulatory regime, to build and operate them may be a disincentive to other organisations to invest; the dominant operator might decide to enter the market, providing powerful competition.

An overview of joint ownership is shown in Table 2.13. Shares of ownership by the dominant PTO of the cable TV networks are shown in Chapter 2.2.

Table 2.13: Dominant PTO Allowed to Own Cable Infrastructure

Country	Dominant PTO Allowed to Own Cable Infrastructure	Comments
Austria	Yes	Technically, Post & Telekom Austria can provide infrastructure for cable TV but in practice it does not.
Belgium	Yes	No specific restrictions.
Denmark	Yes	No restrictions.
Finland	Yes	Subject to general competition law. All cable TV networks owned by PTOs in practice.
France	Yes	Subject to general competition law and the obligation to grant fair and equitable terms. France Telecom owns majority of cable TV networks.
Germany	Yes	Network level 3 is owned to 83% by the incumbent DTAG, but it controls only 27% of homes connected on network level 4, the infrastructure on private ground.
Greece	Yes	OTE and ERT have the exclusive right to operate, install and manage cable TV infrastructure, the current policy therefore excludes local loop competition.
Ireland	Yes	In practice, Telecom Eireann holds 70% of Cablelink, the main cable TV operator in Ireland. However, the Commission has indicated in its derogation decision that Cablelink should be managed at arms length.
Italy	Yes	Ownership of cable TV infrastructure limited to Telecom Italia, except for "local" networks.
Luxembourg	Yes	General competition law (June 17th 1970) prohibits the abuse of a dominant position.
Netherlands	Yes	Theoretically yes, however, KPN was recently forced to divest most of its interest in the Dutch cable TV market (from 77% to 20%) on the grounds that holding the cable licence would affect the efficient provision of telecommunication services and the creation of competition in the provision of fixed connections.
Portugal	Yes	Portugal Telecom is authorised to provide cable TV services subject to the provisions laid down in Decree-Law 292/91 (cable television general law).
Spain	Yes	Telefónica can apply for the right to provide cable telephony via its infrastructure in any area and will receive one of two new cable TV licences in every franchise area, but will have to wait for between 16 months and two years before commencing operations if a licence is granted to a cable operator in the same area.
Sweden	Yes	No restrictions.
U.K.	Yes	BT, Mercury and Kingston can operate separate local cable networks if awarded a franchise. They have to bid for exclusive local franchise licences.

Source: Arthur D. Little, Ashurst Morris Crisp and the country correspondents listed in Appendix D

2.3.3 The Regulation of Cable TV Infrastructure and Services

The differing regulatory regimes imposed on the cable TV sector in the Member States have differing influences on the development of cable TV infrastructure and services.

Licensing for cable TV infrastructure and services.

Licensing regimes in each Member State influence the development of infrastructure and services. In some countries licensing regimes do not enable infrastructure competition. In some emerging markets, regulators grant exclusive licences to encourage the development of alternatives to the original infrastructure. Licences that are effectively exclusive can also be found in mature cable markets such as Belgium, Ireland and the U.K.

Licences vary in terms of:

- Geographical coverage of franchise areas and exclusivity
- To whom licences are available
- Types of licence required and duration
- Network building requirements.

Examples of these differences are given below.

Geographical coverage of franchise areas and exclusivity.

The development of cable TV networks has been determined in part by geographic licences and whether they are exclusive. In certain countries, licensing has been based on predefined franchise areas (sometimes political areas such as municipalities). Countries with franchise areas include the U.K., Ireland, Denmark and Spain. In the Netherlands and Belgium, cable TV licences are restricted to municipalities, which can be divided into non-exclusive licence areas. Whether franchise areas are exclusive also varies.

- In the U.K. and Ireland, cable franchises are both local and exclusive. One result is that national cable companies have not emerged, although there are trends, particularly in the U.K., towards consolidation. Following the formation of Cable & Wireless Communications, the U.K. now has 10 major cable operators, the two largest serving 60 per cent of the market.
- In the U.K., over 148 cable operator licences have been granted. In giving exclusive rights to provide cable TV services, the licences have limited direct competition, reducing business risk and helping to finance and develop the networks. The build schedules imposed on the operators and the costly requirement that cables should be buried in ductwork have been a further disincentive.

To whom licences are available.

The types of organisations, bodies and persons allowed to hold cable licences differ between the Member States, for example:

- In Portugal any organisation can hold a licence but the operator has to use Portugal Telecom's infrastructure where available.

- In Sweden there is no licensing regime; anyone can build and operate a cable TV network so long as the company obtains permission from landowners for construction.

Types of licence required and duration.

Various activities are licensed differently in different Member States:

- (a) Installing and operating cable TV infrastructure.
- (b) Providing cable television services over cable TV infrastructure.
- (c) Providing telephony and other telecoms services over cable TV infrastructure.
- (d) Providing the television services provided over the infrastructure.

In the U.K., for example, a Telecommunications Act licence covers (a) and (c); a Broadcast Act licence (local delivery licence) covers (b); and programme licences under the Broadcast Act cover (d) for services provided solely on cable networks. The holder of the telecommunications licence is given an exclusive right to install cable TV infrastructure and provide cable TV services in a particular geographic area, with no exclusive right to provide telecommunications services.

In Finland, a telecommunications licence covers (a), (b) and (c), provided that the network is intended for use primarily for voice telephony or employs terrestrial wireless links. A notification covers (a), (b) and (c) above, provided that the network is not used for significant voice telephone activities, extends beyond a municipality, encompasses a subscribership of more than 100 households, and does not employ wireless links; a frequency licence covers (a), (b) and (c), provided that wireless links are employed in the network and a cable broadcasting licence covers (d), provided that the cable operator is not the Finnish Broadcasting Company, which is exempt from cable broadcast licensing.

In other countries one licence covers (a), (b), (c) and (d). The pure broadcasting licence (d) may also be the one that allows services to be provided over the network.

The duration of licences also varies. In some countries licence periods are unlimited, in others they can be for a definite period. Short term licences may give operators limited incentives to upgrade their networks to provide services that will have long payback periods.

Building requirements.

In some countries the minimum network roll-out required of the cable operator is determined in the licence. For example, in the U.K., cable operators must meet the “build milestones” (of homes passed) set out in their licences. In Spain, specific regulations govern the share capital of the company investing in cable franchises.

Licensing regimes.

An overview of current licence regimes is given in Table 2.14 below. In some countries, for instance Italy and Spain, cable networks have been underdeveloped to date, partly because licensing regimes lack clarity. In Greece the regulatory situation has also impeded the development of cable.

Table 2.14: Key Licence Terms for Cable Infrastructure and Services

Country	Franchise Areas/ Exclusivity	Terms and Length	Building/ Coverage Requirements	Availability to Whom
Austria	Infrastructure and Services: One or more urban areas/no, but yes in practice.	Infrastructure: Unlimited Services: No provisions.	Yes	Infrastructure: No restrictions. Services: Not political parties, ORF, media enterprises.
Belgium	Infrastructure: Yes/yes in all language communities and the Brussels capital area.	Infrastructure: Flemish: 18 years, renewal for 9 years. French: 9 years, renewal for 6 years. Brussels Capital Region: 9 years renewable.	No	In theory anyone, however network owned by municipalities and high built-out, price caps on access charges/services.
Denmark	Infrastructure: Yes (in practice local)/no, yes in practice. Cable TV services: Yes local/no Telecoms services: Yes/yes	Infrastructure: Indefinite Cable TV services: Local 7 years, larger area indefinite (as long as it is in use) Telecoms services: No demand for licence.	No, however in licence application information is given about the cable network for Ministerial approval. Telecoms services: Indefinite	Infrastructure: Prior to May 1996 only municipalities, antennae societies and TeleDanmark, now no specific restrictions. Cable TV services: Local: majority of board of company must be residents in local area, larger area no restrictions. Telecoms services: No restrictions.
Finland	Infrastructure and Services: Varies depending on the services and area (see Appendix D).	Infrastructure and Services: Varies depending on the services and area (see Appendix D).	Yes, with regard to coverage of cable TV services.	No restrictions for licence for cable TV services.

Table 2.14: Key Licence Terms for Cable Infrastructure and Services (continued)

Country	Franchise Areas/ Exclusivity	Terms and Length	Building/Coverage Requirements	Availability to Whom
France	<p>Infrastructure:</p> <p>Yes (municipality or groups of municipalities)/no, except when the installation of the TV cable network is considered as a public service or the municipality itself sets up the cable TV network.</p> <p>Services:</p> <p>Yes, the service provider is authorised by CSA to broadcast in a specific area/no (in practice yes).</p>	<p>Infrastructure:</p> <p>Subject to negotiation, no specific limited duration.</p> <p>Services:</p> <p>In practice no fee, length max. 30 years. The convention between the channel provider and service provider over the CSA usually lasts 10 years.</p>	No	<p>Infrastructure:</p> <p>Holder must be company, otherwise no restrictions except as to technical requirements.</p> <p>Services:</p> <p>Holder must be company, cable operator, and service providers enter into agreement with independent channel owners to produce own channels, restrictions based on number of licences and coverage.</p>
Germany	No/no	<p>Infrastructure:</p> <p>Unlimited</p> <p>Services:</p> <p>Varies in each Bundesland ranging between 8 and 12 years.</p>	No	In theory anyone, network level 3 owned by DTAG and level 4 by private cable operators and DTAG.
Greece	Varies/yes	Not defined.	Not specified.	OTE and ERT have exclusive rights to install and operate cable networks.
Ireland	Yes/yes in practice.	CATV licences renewable on annual basis, MMDS licences renewable for up to 10 years.	No	No foreign or maximum ownership restrictions.

Table 2.14: Key Licence Terms for Cable Infrastructure and Services (continued)

Country	Franchise Areas/ Exclusivity	Terms and Length	Building/ Coverage Requirements	Availability to Whom
Italy	<p>Infrastructure: Local/no</p> <p>Services: Local/no</p>	<p>Infrastructure: 20 years max. renewable.</p> <p>Services: Six years renewable.</p>	Yes, for building requirements.	<p>Infrastructure: National: Only incumbent PTO. Local level: private operators can obtain licence.</p> <p>Services: Limitation on public entities holding.</p> <p>Italian or European citizenship (unless reciprocal agreement).</p>
Luxembourg	<p>Infrastructure and services: Set in "cahier des charges".</p>	<p>Infrastructure and services: Set in "cahier des charges". However, the licence must be limited to a definite period of time but may be renewed.</p>	No, but in practice will grant licence to operator with largest coverage.	<p>Infrastructure and services: Ownership restrictions not specified in regulations however, may be imposed in "cahier des charges".</p>
Netherlands	<p>Infrastructure: Municipalities (except national infrastructure licences)/no (in practice yes).</p> <p>Cable TV services: Municipalities (but concession holder and national infrastructure licensees can offer cable TV services nationally)/no (in practice yes).</p> <p>Telecoms services: Additional registration required.</p>	<p>Terms and restrictions set out in Ministerial Decree and in their licence.</p>	Yes	<p>Infrastructure: Anyone, however KPN forced to reduce its cable interest. Concession holder of national infrastructure can provide cable TV as part of their licence. Licences granted upon request on first come first serviced basis.</p> <p>Cable TV services: No restrictions.</p>

Table 2.14: Key Licence Terms for Cable Infrastructure and Services (*continued*)

Country	Franchise Areas/ Exclusivity	Terms and Length	Building/Coverage Requirements	Availability to Whom
Portugal	Cable TV services: Yes (municipalities)/no	Cable TV services 15 years renewable	Yes	Cable operators have to use PT duct infrastructure unless it lacks capacity.
Spain	Yes ("areas")/one cable operator and Telefónica.	Max. 25 years	Yes	Yes including non-EU companies must not hold more than 25% in cable operator and must be based in Spain.
Sweden	No licencing regime required for infrastructure and services: national and local/ no	No licences are required.	No	Anyone, no licences required, no restrictions.
U.K.	Telecoms services: Yes/yes. Only one operator licensed to operate a cable network, however, no exclusivity in provision of telecommunications services. Cable TV Services: Yes/yes. Policy is one licence per franchise area. Exclusive for provision of cable TV services.	Length of the Telecoms Act licence varies according to the nature of the cable system ¹ . Cable TV services: LDL licence 15 years.	Yes	TA and LDL licence granted to same company. Infrastructure: Competitive tender. No restrictions. Services: Cannot be held by local authorities, religious bodies, advertising agencies. Competitive tender.

Source: Arthur D. Little, Ashurst Morris Crisp and the country correspondents listed in Appendix D

Limitations on programming and services.

Restrictions on programming and services are not the subject of this study. Since they affect the development of the telecommunications and multimedia market, however, they are outlined below.

In some countries, the cable operators' control of content (which channels are broadcast) is limited, as are the services (other than broadcasting) that they deliver.

¹ Before 1990: 23 years for a switched star network; 15 years for a tree and branch network

In several Member States, cable network owners are prohibited from owning or having a significant interest in cable programming/channels. In some Member States, separation is enforced between the organisations that determine which programmes are provided and the cable network owners. In Germany, for instance, the Landesmedienanstalten decide which services must be carried, which may be carried and in which order; Deutsche Telekom, the owner of the infrastructure, has no control over the services its network carries: recently DTAG made a request to take part in the decision on which services it can carry. In Denmark, programming is chosen by a ballot of households after a two year period during which the operator may choose the content to be provided.

If a commercial operator owns the network, the ability of the regulator or of anyone other than the operator itself to determine what services can be provided and at what band of the network could affect the commercial viability of the network and its attractiveness to investors.

In 12 countries, the network owner may offer its own content or, at least, package content/services and sell them to a consumer. In Finland, uniquely, the access regime gives independent service providers access to existing cable infrastructure.

Regulation of prices charged to the end-consumer and for network access affects the economics of cable networks. In Belgium, for example, investment in infrastructure has been hampered by the very restricted price increases allowed by the controlling Ministry.

Hardly any Member States place specific restrictions on the carriage or provision of other services over cable TV network, e.g. multimedia, on-line, interactive, pay-per-view. Some Member States impose additional licensing requirements on the provision of these services. In Portugal, however, cable TV networks are restricted to the retransmission of TV and radio broadcasting.

Further details of restrictions on cable TV operators are given in Table 2.15 below.

Table 2.15: Cable TV Operator's Control of Content/Services

Country	Can Owner of Cable TV Network Control Which Content/Services are Distributed?	Is Owner of Cable TV Network Allowed to Offer Own Content?	Additional Comments
Austria	Yes, depending on negotiation between network operator and service providers.	Yes	Since August 1996 cable TV operators have been allowed to produce their own programming. Normally the owner of the network also packages content/services.
Belgium	In all Communities and Brussels: Yes, subject to wide "must carry" obligations and permission of the Executive.	In all Communities and Brussels: No, except in Flemish Community, subject to authorisation by the government.	
Denmark	Yes, if strong market position the owner is obliged to give access on interconnection basis. Yes for cable TV to a degree for the first two years.	Yes, since 1995 for cable TV with special licence.	For cable TV services households balloted on choice every second year and some "must carry" requirements. Operator may choose the content for the first two years.
Finland	Yes	Yes	Within constraints of the "must carry" requirements.
France	It is always the channel owner who keeps responsibility of the content of the programme.	Yes, in practice cable operator often has service provider authorisation and packages content of the service.	The cable TV operator can be granted a service provider licence, the channel owner can in some cases be the service provider.
Germany	No	Yes	Landesmedienanstalten decide which services needs to be carried, may be carried and in which ranking order. No restriction on private cable TV operators to offer content but on DTAG because of "state-distance".
Greece	Yes	N/A	No specific regulation and no practice concerning own content.

Table 2.15: Cable TV Operator's Control of Content/Services (*continued*)

Country	Can Owner of Cable TV Network Control Which Content/Services are Distributed?	Is Owner of Cable TV Network Allowed to Offer Own Content?	Additional Comments
Ireland	Yes, subject to ministerial or regulatory control.	Yes, however, in practice operators only rebroadcast programming provided by other operators.	
Italy	Yes, if the operator also holds the service licence.	Yes	Typically the cable TV operator will purchase content, package it and sell it to the end consumer.
Luxembourg	Yes	Yes	Operator determines general terms and conditions for access to its network.
Netherlands	Yes	Yes	General and specific competition rules apply.
Portugal	Yes	No	In practice they provide foreign satellite services and terrestrial channels.
Spain	Yes	Yes	40% must be reserved to independent programmes, provided enough space is available.
Sweden	Yes	Yes	Must comply with the "must carry" requirements.
U.K.	Yes	Yes	Local Delivery Licence (LDL)/ Telecommunications Act (TA) licence holder decides.

Source: Arthur D. Little, Ashurst Morris Crisp and the country correspondents listed in Appendix D

Limitations on provision of cable TV services by dominant PTO.

Specific restrictions preventing dominant telecommunications operators providing cable TV services exist in a few countries, with little impact on the development of telecommunications and multimedia markets. An overview of specific regulatory restrictions on the provision of cable television services by dominant PTOs (meaning the packaging, carriage and selling of such services to end consumers, rather than restrictions on producing and owning content) is provided in Table 2.16.

Table 2.16: Restrictions on Dominant PTOs' Provision of Cable TV Services

Country	Restrictions on Dominant PTOs Providing Cable TV Services	Comments
Austria	No	Technically PTOs can provide infrastructure and services but in practice they do not.
Belgium	No	No particular restrictions on Belgacom. Since 1996, Belgacom has been allowed to provide sound and television broadcasting services, however it is subject to the regulatory provisions of each Community where it provides a broadcasting service.
Denmark	No	As of July 1996, the Broadcasting Act removed the restriction on TeleDanmark and other cable network owners from offering broadcasting on a national basis. However, households are balloted every second year on which programmes should be distributed.
Finland	No	No specific restrictions provided the necessary licence is granted, however general competition rules apply.
France	No	Distinction between broadcasting services and cable TV services.
Germany	Yes	Deutsche Telekom cannot broadcast, only carry programming, as long as it is majority state-owned, because broadcasting has to be state-distant. Other PTOs would need licence from Landesmedienanstalten.
Greece	No	OTE and ERT have the exclusive right to install, develop and operate cable networks and they may for that purpose conclude cooperation arrangements with third parties.
Ireland	No	Subject to obtaining a licence by the government, Telecom Eireann could provide cable TV services over telecommunications infrastructure. Government might not do so for policy reasons/challenge by other operators.
Italy	Yes	Telecom Italia's broadband networks can now be used to convey third party programming, however some public entities are prevented from owning broadcasting licences and currently TI is not allowed to broadcast on cable.
Luxembourg	No	No specific restrictions. General competition law applies.
Netherlands	No	No regulatory impediments to investments by KPN in cable operations, but in reality KPN has been forced by the government to reduce its cable interest owing to concerns that KPN's continuing to hold cable licences adversely affected the efficient provision of telecommunications services and the creation for that purpose of competition in fixed networks.
Portugal	No	PTOs can distribute services under the same terms and conditions as cable TV companies. Portugal Telecom can retransmit programmes of third parties (without inserting subtitles and without time-delays) but is not allowed to have an interest in producing its own content. PT is not authorised to produce and broadcast its own content.

Table 2.16: Restrictions on Dominant PTOs' Provision of Cable TV Services (continued)

Country	Restrictions on Dominant PTOs Providing Cable TV Services	Comments
Spain	Yes	Telefónica can provide cable operator services, although it must wait for 16 months to two years before commencing operations if another operator is granted a licence in the same area. No restriction under Spanish law in providing cable TV services over telecommunications network, however, under EC competition law Telefónica was prohibited from doing so in a joint venture with Canal+ España.
Sweden	No	No restrictions.
U.K.	Yes	BT and other PTOs are prohibited from delivering cable entertainment services on a national basis to residential customers. They are free to apply for licences for the regional provision of service. They can operate separate local cable networks if awarded a franchise and are free to carry signals for broadcasters such as the BBC.

Source: Arthur D. Little, Ashurst Morris Crisp and the country correspondents listed in Appendix D

The regulatory restrictions fall into two categories: specific restrictions on telecommunications operators and general restrictions. In the U.K., specific restrictions on national PTOs have been designed to foster local telecommunications competition in the interests of residential customers. This has helped cable companies that provide both cable TV and telephony by removing a major source of potential competition. In Spain, the dominant PTO Telefónica can provide cable TV services although it has to wait for between 16 months and two years before starting operations if another operator is granted a licence in the same area. The restriction is designed to give new entrants in cable a head-start. In most Member States, however, there are no such restrictions. Accordingly, such restrictions have not had a major impact on the development of telecommunications and multimedia markets in most Member States.

In some countries regulatory regimes separate the telephony business from provision of cable TV (e.g. arms length operation, separate accounting, limitations on cross subsidisation); in others they prohibit the provision of services altogether. The cable TV Directive requires accounting separation between the two business activities of a PTO in certain circumstances.

Restrictions have been introduced for a range of reasons, such as encouraging the development of new infrastructure by limiting the involvement of PTOs in cable services, giving new entrants incentives to establish local access networks.

2.4 Comparison of Competing Telecommunications and Multimedia Access Technologies

An increasing number of technologies is available for the delivery of telecommunications and multimedia services. Wireline technologies include cable TV and the PSTN; the many wireless technologies include digital terrestrial, digital satellite, microwave distribution systems, WLL and Mega-LEO satellite systems. Each has different technical capabilities. Some permit bi-directional communications while others are restricted to unidirectional transmissions. Some are capable of conveying a greater quantity of information per second than others.

The range of services available via different access technologies also differs. Wireline networks can be upgraded to provide broadband data and entertainment services. Many of the wireless networks can also offer a wide range of telecommunications and multimedia services. However, spectrum scarcity and the lack of an inherent return path mean that the range of services is not as wide as the range available over upgraded cable TV and PSTN networks.

Cable TV and PSTN networks can be upgraded to foster the optimal development of the telecommunications and multimedia sector, offering the widest range of telephony, entertainment and data services. Except for terrestrial television networks, more households are connected to cable TV and PSTN networks than to any other wireline or wireless distribution medium. Compared to the alternatives, the technology for providing broadband telecommunications and multimedia over cable TV and PSTN networks is well established and is available in most Member States.

The growth of the European telecommunications and multimedia sector towards the optimal development of the telecommunications and multimedia sector will be highly dependent on the development of cable TV and PSTN networks. On all four criteria: choice of services; service innovation; removal of infrastructure limitations; and encouragement of infrastructure competition, upgraded cable TV and PSTN can promote optimal development. Moreover, only upgraded cable TV and PSTN perform well on all four criteria. The others limit the choice of services available, and the ability to stimulate service innovation, overcome technical limitations, and promote infrastructure competition.

Table 2.17: Ability of Access Technologies to Develop Telecommunications and Multimedia Sector

	Cable TV ¹	PSTN ²	DTT ³	DTH ⁴	MDS ⁵	LEO ⁶	WLL ⁷
Choice of Services	High	High	Medium	Medium	Medium	Low	Low
Service Innovation	High	High	Medium	Medium	Medium	Low	Low
Infrastructure competition	High	High	Low	Low	Low	High	High
Overcoming Limitations	High	High	Medium	Medium	Medium	Low	Low
Overall	High	High	Medium	Medium	Medium	Low	Low

High  Medium  Low 

Source: Arthur D. Little

- (1) Cable TV network upgrade with Hybrid Fibre Coax (HFC)
- (2) PSTN upgraded with digital subscriber line (DSL) technologies
- (3) Digital Terrestrial Television
- (4) Digital Direct to Home Satellite
- (5) Microwave Distribution System
- (6) Broadband satellite at Low Earth Orbit, e.g. Teledesic
- (7) Wireless Local Loop

Upgraded cable TV and PSTN access technologies have the potential to offer the widest range of telecommunications and multimedia services, including multichannel TV, voice telephony, and high-speed Internet access. While telephony services will be available from a range of alternative wireline and wireless networks, such as powerlines and WLL, these technologies are unlikely to have the capacity to deliver the full range of audiovisual services. The lack of an inherent return path will prevent other technologies that are well suited to the delivery of broadcasting multichannel TV and multimedia services from providing a full range of interactive and two-way services.

Both cable TV and telecommunications networks have the technical capabilities to foster the conception, development, and realisation of the widest range of innovative telecommunications and multimedia services: for example, switched video services, broadcast services, pointcast services, and high speed data services. In contrast, the alternative access technologies lack the upstream capacity or bandwidth per user to develop innovative services.

Every telecommunications infrastructure has technological limitations restricting the range of services that can be offered. Both cable TV and PSTN access technologies can be upgraded to provide a platform for the development of the sector. The bandwidth can be upgraded by replacement with broadband fibre optics. Bi-directional amplifiers and switching fabrics can be installed to provide switching capabilities. Digitalisation will greatly enhance the quality and variety of services of both wireline and wireless technologies. The upgrading of many wireless technologies, however, such as WLL and DTH satellite, will be limited by physical or environmental restraints.

Cable TV and PSTN systems can be equal competitors in the local loop for the provision of all telecommunications and multimedia services. In the mid to long term, digital satellite and WLL operators will compete for the provision of television and telephony services respectively. However, cable TV and PSTN systems are in place today, and are able to accelerate competition in the local loop.

Box 1 gives an overview of the access technologies used throughout this section. Appendix E gives a more detailed description of each.

Box 1: Overview of Access Technologies

Cable TV (CATV) networks.

Cable TV systems distribute television signals from a central headend via a local network. Most cable TV networks in Europe are constructed of copper coaxial cable in a tree and branch architecture. There are two main categories of cable networks: broadband and narrowband. Many cable operators are replacing the trunk portions of the networks with broadband fibre optic cable in a hybrid fibre coaxial (HFC) configuration, retaining the existing copper coaxial for the final drop into the home.

Public switched telephone network (PSTN).

The traditional PSTN consists of twisted-pair copper wires in a switched-star configuration. Analogue signals are sent from a local exchange to a switching cabinet in the street. The households are connected to the street cabinets via copper-pair wires. The PSTN can be upgraded using digital subscriber line (DSL) technologies. PTOs connect a pair of DSL modems to the ends of the copper pair to increase the bandwidth of the wire. There are two common types of DSL: asymmetric digital subscriber line (ADSL) and very high rate digital subscriber line (VDSL). ADSL is used to connect the home to the local exchange to provide data rates up to 6 Mbps. With VDSL, the trunk copper wires are replaced with fibre optics, and a pair of DSL modems is placed on the ends of the copper wires into the home. VDSL can provide data rates up to 55 Mbps.

Digital terrestrial television (DTT).

Digital terrestrial television refers to the use of ultra high frequencies (UHF) for the broadcasting of television services over terrestrial aerials. Between four and six digital channels can be squeezed into each existing analogue band. Thus a country with four national terrestrial channels could accommodate several hundred digital channels.

Direct-to-home (DTH) satellite.

This term refers to the use of a small dish antenna installed in the home for the reception of satellite programming direct from a broadcasting satellite.

Microwave distribution systems.

Microwave distribution systems (MDS) are also known as wireless cable. Microwave frequencies link headend stations with small antennae placed on the customers' premises for the conveyance of television services. MDS operates at three different frequencies: microwave multichannel distribution system (MMDS) in the 2–3 GHz range, local microwave distribution system (LMDS) at 20 GHz range, and microwave video distribution system (MVDS) at 40–43 GHz range.

Low earth orbit.

The Mega Low Earth Orbit (LEO) satellites provide multimedia via satellite. The most well-known is Bill Gates's Teledesic project: the numerous other projects include some that might be competing with those based on geostationary satellites, such as the Skybridge project.

Wireless local loop.

Wireless local loop (WLL) is a generic term for an access system that uses a wireless link to connect subscribers to their local exchange in place of conventional copper cable. WLL is a narrowband services for the provision of voice telephony circuits. WLL technologies available today include: DECT, PHS, and various proprietary solutions such as Nortel's Proximity I.

2.4.1 Range of Services

With optimal development of the telecommunications and multimedia sector, European Union citizens would be able to choose from the widest range of telecommunications and multimedia services.

Cable TV and PSTN access technologies can offer the widest range of broadband telecommunications and multimedia services available today. Basic voice telephony services are available from a range of alternative wireline and wireless networks, such as Internet telephony and WLL; these technologies do not, however, have the broadband capacity required to deliver the full spectrum of television and multimedia services.

The lack of an inherent return path will prevent other technologies that are well suited to the delivery of broadcasting multichannel TV and multimedia services from providing a full range of telephony, interactive, and broadband two-way services.

The key findings of this section are shown in Table 2.18.

Table 2.18: Choice of Services Available Over Competing Access Technologies

Service	Cable and PSTN		Alternative Access Technologies				
	Cable TV	PSTN	DTT	DTH	MDS	LEO	WLL
Telephony	Well suited to application		Can be expanded to offer service	Can be expanded to offer service	Well suited to application		
Internet access	Well suited to application		Can be expanded to offer service	Well suited to application			
Internet Telephony	Well suited to application		Can be expanded to offer service	Can be expanded to offer service	Well suited to application		
Regional TV	Well suited to application		Well suited to application		Well suited to application		
Broadcast TV	Well suited to application		Well suited to application				
Interactive TV	Well suited to application		Can be expanded to offer service	Well suited to application			
Multichannel TV (1)	100–200	3–10	60–100	200–500	33–300	0	0
HDTV	Well suited to application		Can be expanded to offer service	Can be expanded to offer service	Can be expanded to offer service	Well suited to application	
VOD	Can be expanded to offer service	Well suited to application		Can be expanded to offer service	Can be expanded to offer service	Well suited to application	
NVOD	Well suited to application		Well suited to application				
Overall	Well suited to application		Can be expanded to offer service	Can be expanded to offer service	Can be expanded to offer service	Well suited to application	

Source: Arthur D. Little

(1) Number of television channels theoretically possible

Well suited to application		Possible, but only with costly network enhancement	
Can be expanded to offer service		Not able to deliver service	

Access technologies for telephony.

Voice telephony services are available over a wide range of access technologies – cable TV, PSTN, MDS, LEO and WLL networks. Telephony services cannot be delivered via DTH satellite or terrestrial broadcast networks.

Cable operators can use their existing duct networks, and in some cases coaxial cables, for the provision of voice telephony. Telephony can be provided over a separate twisted copper pair, either enclosed in the same cable as the coax (Siamese cable) or attached by simply wrapping the twisted pair around the existing coaxial. Alternatively, telephony services can be provided using cable modems. See Appendix E for detail.

Microwave distribution systems are capable of providing telephony services. However, whether sufficient spectrum has been allocated to make their provision an economic proposition is not yet clear; the number of users served by a microwave network is limited by the number of homes passed, penetration, and the total spectrum available.

Technical limitations have, until now, precluded the use of satellites for wide-scale mobile voice telephony. However, a number of satellite systems at low and middle earth orbits (LEOs and MEOs) have been proposed to overcome these problems, including Iridium, Globalstar, I-CO, and Odyssey. Telephony services over LEO satellite systems are due to start early in 1998.

In the U.K., the WLL operator Ionica has penetrated the local telephony market using a Proximity I system. By the end of 1996, Ionica had reached a penetration rate of 5 per cent of homes passed.

Technologies for Internet access.

In the optimal telecommunications and multimedia sector, consumers would have access to the Internet at the highest possible speed. Cable TV, PSTN and MDS networks can be upgraded to provide the highest bi-directional Internet access speeds. Wireless technologies – terrestrial, DTH satellite, and LEO satellites – can provide high download speeds, but do not offer broadband upstream capacity.

Upgraded HFC cable TV networks can be used for the provision of high-speed Internet access. In the U.K., cable operators such as Telewest are offering Internet services at speeds up to 27 Mbps using cable modems. Users of the service are charged a flat rate fee each month, independent of usage.

Digital subscriber line technologies, such as ADSL and VDSL, can provide Internet access speeds in the range of 2–50 Mbps over the existing copper telecommunications networks. As a rule, the more copper cables replaced with fibre optics the faster the data rates. Ultimately, all the copper wires can be replaced by single mode fibre optics to provide data rates measured in the Gbps range.

Internet access can be provided using DTH satellite networks. In March 1996, DirecTV in the U.S. formed a partnership with Microsoft Corp. in which the software firm developed systems to enable PCs to capture data beamed down from an orbiting satellite. Typically, customers with DirecTV's 18-inch satellite dish and

a PC capable of storing the large volumes of data are able to receive “multimedia magazines”, combining video clips, sound bites and text into an on-screen presentation. The return path (from PC to Internet server) is provided by the existing PSTN.

In the U.S., the satellite operator, Hughes, leases one satellite channel to provide 30 Mbps. Hughes limits each subscriber's connection to 400 kbps, however, it can handle only a few hundred users simultaneously (a tiny fraction of its 2,000 subscribers use the service at any one time).

Internet access over wireless cable networks is still at an early stage of development. In one of the first moves towards “Internet over the air”, a wireless ATM technology¹ has recently been unveiled which, according to the manufacturers, will allow the deployment of two-way broadband Internet services over MMDS or MVDS networks.

Mega LEOs provide multimedia via satellite. The Teledesic project promises Internet access via a connectionless datagram service based on fast packet switching Asynchronous Transfer Mode (ATM) technology.

Access technologies for Internet telephony.

Internet telephony is a means of offering a switched telephony service over an existing Internet Protocol (IP) network. Any access technology that permits two-way interaction with the Internet at moderate speeds can be used for Internet telephony.

Some of the access technologies that offer downloading from the Internet do not automatically provide Internet telephony, which requires bi-directional functionality. Both digital terrestrial and digital satellite are unidirectional and can therefore be used to download information from the Internet. Bi-directional functionality can only be achieved using an alternative return channel, such as the PSTN or cable TV networks.

All the bi-directional access technologies can offer Internet telephony: cable TV, PSTN, MDS, LEO, and WLL.

Access technologies for regional TV.

Regional TV services can be provided via any access technology that has a small coverage area, including cable TV, PSTN, DTT and MDS.

Regional television services to a city or district can provide valuable local news and local language programming. Both cable TV and PSTN networks provide a convenient method of distributing regional programming. In contrast, the vast coverage area of most DTH satellites systems means that regional services can be provided only by using a different transponder for each area – a very expensive option.

¹ Electronic Engineering Times, February, 1997

Digital terrestrial television will continue to offer regional programming. As stated by one industry observer, the possibility of delivering regional programming will be the saving grace of many terrestrial broadcasters, differentiating them from the highly competitive satellite operators, especially in the U.K.

The cell sizes of wireless cable networks vary from 2–20 km. Consequently, these systems offer the potential to provide local services. Reducing transmission power creates even smaller cells, allowing the transmission of television services within, say, a university or a sports stadium.

Technologies for broadcast TV.

Television signals can be broadcast by most access technologies, including cable TV, DTT, DTH, and MDS. The existing PSTN can also be upgraded using fibre optics to provide broadcast-type services.

Cable TV networks were originally designed and built to broadcast (or simply relay) the television service available over terrestrial or satellite networks; terrestrial UHF and satellite systems were originally designed for one-way broadcasting of television services. Telecommunications networks, by contrast, were designed and built to provide dedicated lines for switched, point-to-point, narrowband, services; they are not well suited to the delivery of broadcast television services. Nonetheless, it is possible to simulate a broadcast network by pulling fibre closer to the home and using digital subscriber lines such as VDSL for the last 100 metres.

Technologies for interactive TV.

Any access technology that can provide a return channel capacity can provide interactive services. Interactive television enables the viewer to control, select, and access remote databases. Applications include camera angle selection at sporting events, home shopping, home banking, and on-line gaming. Having a natural return path, both cable TV and PSTN networks are well suited to the delivery of interactive services. In view of the pressure on spectrum availability, the fixed-line cable TV and PSTN networks will be used by a growing range of wired and wireless service providers for access to a return channel. In conjunction with fixed or wireless media, both digital satellite and digital terrestrial networks will have the capacity to deliver interactive services. A number of interactive TV services use the PSTN as a return channel; however these services require constant, and therefore uneconomic, usage of the telephone line.

The launch of British Interactive Broadcasting (BIB) in May 1997 was the latest move by the consortium led by BSkyB and BT to be the first to deliver interactive television in the U.K. using satellite DTH networks. BIB will offer a package of interactive services including home shopping, banking, education, holidays and travel, games, sports, Internet and email and public services. In Germany, Kirch, the media company, is also a leading developer of digital interactive broadcasting.

Most basic interactive applications can be offered on a wireless telephony or fixed wireline return path. For wireless distribution systems, such as microwave multichannel distribution systems (MMDS) and microwave video distribution system (MVDS), the limited frequency available requires further work on

compression to enable these systems to offer more channels and significant interactivity.

Access technologies for multichannel TV.

Digital compression standards such as MPEG2 have dramatically increased the spectral efficiency of many access technologies, leading to the possibility of delivering a vast number of television channels over various access technologies. The channels typically available over the competing access technologies are listed in Table 2.18.

Each analogue terrestrial standard colour television channel typically occupies up to 11 UHF bands of 8-MHz, and there are also generous allocations for channel separation and for black and white channels. Between four and six digital channels could be squeezed into each 8-MHz band: a country with four national terrestrial channels could accommodate several hundred digital channels.

An all-digital local microwave distribution system (LMDS) transmitter can deliver data and telecom lines to serve 15,000 to 18,000 customers while supporting 224 digital video channels across 1 GHz of spectrum¹. Digital LMDS can also accommodate a combined cable-telephone system with video delivered in the broadcast mode, but it would take a higher concentration of transmitters to allow for dedicated video channels.

Technologies for high definition television.

High definition television (HDTV) provides quality superior to the current PAL or NTSC standards. To date, HDTV requires some 15 to 20 Mbps (compressed) and is therefore available over only a limited range of broadband access technologies. By replacing coaxial cables with fibre optics, cable operators can expand the capacity of their cable networks for the provision of HDTV. Similarly, telecommunications operators can adopt advanced VDSL technologies with the capacity to deliver up to 55 Mbps over lines up to 300 metres in length.

Technologies for video on demand.

Video on demand (VOD) is the real-time selection of entertainment services from an audio-visual library remote from the consumer. Typically, viewers use a simple keypad to make their selections. True VOD requires a dedicated connection between the head end server containing the programme information and the viewer at home. As a result, the PSTN networks are one of the best suited technologies to the deliver true VOD services.

Cable TV, digital terrestrial and satellite networks can also be used to provide VOD services; however they would require the reservation of one channel per viewer, something which will be neither technologically nor economically feasible, in most cases.

Technologies for near video on demand.

Near video on demand (NVOD) restricts the range of programmes available and the times at which they can be watched. In general, the more channels available, the

¹ Interactive Week, January 1996

closer the programmes can be scheduled (starting every five minutes instead of every 30 minutes, for instance).

Since the ability to provide NVOD services increases with the number of channels available, cable TV, digital terrestrial, and digital satellite systems will provide an appropriate delivery mechanism. The existing telecommunications networks will also be capable of providing NVOD services from a central server.

2.4.2 Service Innovation

With optimal development of the telecommunications and multimedia sector, a variety of access technologies should be available for the conception, development and launch of new and innovative services. Both cable TV and telecommunications networks have the potential to provide the broadband two-way capacity necessary to facilitate the development of the widest range of services.

Innovative services in telecommunications include: groupware, teleworking and group video conferencing; in media distribution they include: pointcasting, push media and WebTV. For illustration, we examine the ability of access technologies to deliver one service from each category.

Table 2.19: The Development of New and Innovative Services

Innovative Service	Cable and PSTN		Alternative Access Technologies				
	Cable TV	PSTN	DTT	DTH	MDS	LEO	WLL
Pointcast	High	High	High	High	High	High	High
Groupware	High	High	Medium	Medium	Low	Low	Low
Overall	High	High	Medium	Medium	Low	Low	Low

Source: Arthur D. Little

High  Medium  Low

Groupware.

Groupware products enable geographically dispersed users to interact with a shared resource, such as an electronic document or digitalised video sequence. Many potential applications of groupware, such as high resolution colour documents and digitised video clips, require high-speed, bi-directional communication links between sites. Such requirements can only be met by broadband fixed cable or fibre optic networks.

Pointcast services.

Pointcasting means the direct broadcasting of personalised news and information services to the user's computer or television set. Services range from simple text bulletins to broadcast-quality video presentations. Technologies that are broadband, and capable of supporting a high number of users simultaneously are suitable for providing pointcast services.

Cable TV, PSTN, digital terrestrial, digital satellite, wireless cable, and Mega-LEOs have the capabilities to offer broadband broadcast services. WLL is essentially a narrowband service.

2.4.3 Infrastructure Limitations

For optimal development of the telecommunications and multimedia sector, the technical limits on coverage, bandwidth and range of services available need to be overcome. Range of services was discussed in section 2.4.1; here we discuss the coverage and bandwidth.

The technical capabilities of cable TV and PSTN access technologies can be upgraded in line with consumer demand to provide the optimal level of upstream and downstream bandwidth, and of switching capacity. In contrast, wireless technologies such as WLL and broadband satellite will be restricted because of spectrum scarcity and the transmission power needed to communicate with satellite systems.

Table 2.20 summarises the ability of cable TV, PSTN, and a range of access technologies to provide the broadcast capabilities, bandwidth, two-way communications, and coverage.

Table 2.20: Ability of Competing Access Technologies to Overcome Technical Limitations

Limitation	Cable and PSTN		Alternative Access Technologies				
	Cable TV	PSTN	DTT	DTH	MDS	LEO	WLL
Coverage							
Downstream bandwidth per user	30 Mbps	1.5–52 Mbps	N/A	400kbs	128 kbps–7.0 Mbps	16kbps–60 Mbps	64 kbps ¹
Upstream bandwidth per user	10 Mbps	0.3–1.5 Mbps	N/A	N/A	128 kbps–1.5 Mbps	64 kbps	64 kbps ¹
Overall							

Source: Arthur D. Little

(1) Multiple channels of 64 kbps each are available.

High Medium Low

Coverage.

The geographic coverage of different technologies will be restricted by a number of factors, notably attenuation, line-of-sight requirements and topography of the area. These affect the coverage of both wireline and wireless access technologies.

In many areas across the European Union, connection to a cable TV network will never be economic. As one interviewee commented, “this idea of everyone teleworking from the country is a fallacy, some areas don’t even get mains water or electricity, why should we provide them with cable!”

The majority of telephone lines are suitable for upgrading with ADSL technologies. In the U.K., some 90 per cent of households can be reached by ADSL with at least 2 Mbps downstream and 300 kbps upstream¹.

In most cases, a digital terrestrial transmission network can be built at reasonable cost to reach at least 90 per cent of the population in a country within 2–5 years, assuming the use of existing transmitter sites. However, as with analogue services, many small transmitters would be required to reach 100 per cent of any population. In France, for example, the mountainous terrain means that the costs of launching a digital terrestrial television service to more than 70 per cent of the population would be prohibitive.

In some countries, lack of frequencies means that one of the existing analogue terrestrial television channels would need to be switched off to make room for a new digital service, delaying the transition to all-digital transmission.

The coverage of wireless cable networks is mainly restricted by cell size, susceptibility to rain-induced attenuation, the sharing of frequencies between adjacent cells, and line-of-sight requirements. The size of high frequency wireless cable cells is a problem, especially for MVDS where the maximum cell radius is some 2–3 km. Low antenna angles make line of sight requirements a problem in densely build urban areas.

The Mega-LEO projects such as Teledesic will give almost 100 per cent coverage across the Member States.

Bandwidth per user.

One of the limitations of existing infrastructures is the bandwidth available to individual users. The bandwidth per user will determine the speed at which users can download information from on-line services such as the Internet².

Upgraded cable TV and PSTN networks offer higher bandwidths per user than alternative wireless networks.

Cable Modems operate over two-way hybrid fibre/coax networks to deliver user rates as high as 30 Mbps. Typically, data are sent and received in one of two ways. In the downstream direction, the digital data are modulated and then carried on a typical 6 MHz television carrier, somewhere between 42 MHz and 750 MHz. The downstream channel is continuous, but divided into cells or packets, with addresses in each packet determining who actually receives a particular packet. In the U.K., Telewest has launched an Internet service using cable modems. Internet speeds up to 27 Mbps downstream and 10 Mbps upstream are offered.

For the PSTN, since each DSL connection is a dedicated service between the local exchange and the home, there is normally no noticeable degradation of bit rate with increasing number of users. VDSL is the fastest of the DSL technologies. It delivers maximum downstream speeds between 51 and 55 Mbps over lines up to 300 meters

¹ The Full Service Access Networks, IEEE Communications Magazine, April 1997

² Internet access speeds are also limited by the Internet backbone and PC speed.

in length. Downstream speeds as low as 13 Mbps over lengths beyond 1500 meters are also possible.

Implementation of ISDN allows transmission speeds between 56 kbps and 128 kbps.

Capacity over wireless cable networks can be increased using sectorising, as already used in cellular-telephone systems. Instead of sending the same signals out in all directions, the antenna splits the transmission area into wedges. Each wedge is treated as a separate area, and the frequencies reused in each one. A recent trial in Lakeland, Florida, by two operators, American Telecasting and People's Choice TV, used 48 wedges. Even more vigorous sectorising should become possible in the future. With digital transmission, the wireless operators estimate they will be able to serve up to 50,000 users per channel, all at a speed of 128 kbps.

According to Teledesic, user data rates from the digital satellite system will vary between 16 kbps and 2.048 Mbps depending on the number of users. The satellite operator estimates that when fully deployed, the system could support two million simultaneous basic rate (16 kbps) connections, roughly corresponding to 20 million users at typical wireline business usage levels.

WLL technologies can typically offer data rates in multiples of 64 kbps. In the U.K., the government has announced plans to issue licences at 10 GHz for the provision of high-speed data services (possibly up to 2 Mbps) over WLL networks. A number of operators are already considering the feasibility of these technologies; it is too early to say when services will be commercially available.

Upstream bandwidth.

The upstream bandwidth defines the speed at which users can send information from the home to the source from which they receive signals: an antenna, cable headend, satellite, or local microwave link. From the source, information can be passed to a number of telecommunications networks, including the Internet, the PSTN, a wide area network (WAN) or a proxy server located at the source itself.

Users should be able to send data at high speeds upstream as well as receiving data at high speeds in the downstream direction, enabling the distribution of content from the home. This feature would make possible, for example, home videoconferencing, small office home office (SOHO) working, and video post-production from the home.

Traditionally, the only access technology to permit bi-directional communications was the PSTN; technological developments now enable a range of alternative methods.

In cable TV networks the upstream (or reverse path) is transmitted between 5 and 40 MHz. Reverse path speeds are, theoretically, around 700–800 kbps, with practical throughput of roughly 500 kbps. The upstream channel has a media access control that slots user packets or cells into a single channel. To avoid collisions, the system gates each upstream packet onto the network with control signals embedded in the downstream information stream.

The range of upstream and downstream data rates possible over a range of DSL technologies is summarised in Table 2.21. VDSL offers one of the highest upstream data rates for the transmission of information from the home to the nearest local exchange.

Table 2.21: Relative Data Rates of xDSL Technologies

	Downstream (exchange to home)	Upstream (home to exchange)
ADSL	1.5–9 Mbps	16–640 kbps
VDSL	13–52 Mbps	1.5–9 Mbps
HDSL	1.544 Mbps	1.544 Mbps

Source: ADSL Forum

The use of microwave distribution systems providing high speed two way data services is in a preliminary stage of development. Nonetheless, some manufacturers have successfully trialed equipment for supplying a 1.5 Mbps upstream dedicated digital service.

In WLL networks, each channel can provide up to 64 kbps. Users can buy multiple channels which can be combined to give more than 64 kbps speed.

2.4.4 Infrastructure Competition

Optimal development of the telecommunications and multimedia sector demands effective competition in the local loop for the provision of the widest range of telecommunications and multimedia services.

Cable TV and PSTN systems can be equal competitors in the local loop for the provision of all telecommunications and multimedia services. In the mid to long term, there will be competition from digital satellite and WLL operators for the provision of television and telephony services respectively. However, cable TV and PSTN systems in place could accelerate competition in the local loop.

Competition between access technologies will also accelerate the development of new services. The U.K. is a good example: the impending launch of digital satellite services has prompted the cable operators to digitalise their networks and launch a range of interactive services such as high speed Internet access.

Assessing the impact of each access technology on the competitiveness of the telecommunications and multimedia sector on two criteria: commercial availability and range of services offered, shows that:

- The technology for providing a full range of telecommunications and multimedia services over cable TV and PSTN infrastructures has been implemented successfully in a number of countries.
- Only cable TV and PSTN infrastructures can deliver a full range of services, including telephony, digital television, interactive television, and Internet access.

Table 2.22: Impact of Access Technologies on Competitiveness of Telecommunications and Multimedia Sector

	Cable and PSTN		Alternative Access Technologies				
Infrastructure Competition	Cable TV	PSTN (ADSL)	DTT	DTH	MDS	LEO	WLL
Commercial availability of technology	pre-1997	1997	1997	1997	1999	2002	pre-1997
Range of Services	High		Medium	Medium	Medium	Low	Low
Overall	High				Medium	Low	Medium

Source: Arthur D. Little

High  Medium  Low 

Commercial availability of technology.

Each of the different access technologies is at a different level of technological development. In the U.K., for instance, upgraded cable TV networks are already providing a full range of telephony, video and Internet services. On the other hand, Mega-LEO services are not expected to be launched until about 2002.

The technology for providing broadband telecommunications and multimedia services over upgraded cable TV networks is well developed and is being deployed in several Member States. In the U.K., cable operators have been offering telephony services for six years, and Internet access for the past two years. More recently, high-speed Internet access has become available, using new cable modems over hybrid fibre coaxial networks.

ADSL technologies have been tried and tested by the majority of dominant telecoms operators in Western Europe. ADSL cards are now available off-the-shelf from a number of manufacturers. In the U.S., local exchange carriers are already preparing ADSL as a means of developing a broadband network in the local loop to combat cable companies' plans to offer cable modem and telephony services.

DTT is not expected to be widely available for some time; only five Member States – France, Germany, Spain, Sweden and the U.K. – are expected to have more than 10 per cent penetration of DTT within 20 years of launch. Digital terrestrial services are not likely to be available in the remaining Member States before the end of the millennium.

Digital satellite technologies are well developed, and services are available in some larger Member States: Germany, France, Scandinavia, Italy and Benelux. New digital services are due to be launched before the end of 1997 in the U.K.

The technology of microwave distribution systems (MDS) is still in development. Moreover, the licensing of wireless frequencies in the 40–42 GHz across the European Union will further delay the availability of advanced telecommunications and multimedia services over MDS networks.

Broadband "Internet in the sky" services delivered via Mega-LEO systems will not be available before 2002.

A growing number of companies are using and developing WLL access technologies. In the U.K., Ionica has demonstrated the technical feasibility of WLL, penetrating five per cent of telephone homes in its franchise areas.

Range of Services

Cable TV and PSTN networks have the potential to offer the widest range of telecommunications and multimedia services. See section 2.4.1 for a full description of the range of services offered by each access technology.

The main points are summarised here:

- Cable TV networks can be used to provide telephony services, in addition to a broad range of interactive digital television and Internet services.
- PSTN networks can be upgraded using asymmetrical digital subscriber lines (ADSL) to deliver a wide range of entertainment services, such as interactive television and high-speed Internet access
- Digital satellite and digital terrestrial can deliver a broad range of digital television services, but are not able to deliver telephony services.
- Low earth orbit satellites will be used to deliver mobile telephony services and a limited range of data applications, such as Internet access.
- Wireless local loop will be used to provide simple telephony services. It will not be capable of providing the full range of digital television services.

Overall, joint ownership and restrictions on the provision of cable TV services appear to be delaying rather than encouraging the development of European telecommunications and multimedia markets:

- Joint ownership of telecommunications and cable TV networks by dominant PTOs impedes development: it discourages the development of competing technological platforms for the provision of alternative products and services, and restricts competition in basic and advanced telecommunications and multimedia services
- Restrictions on provision of cable TV services on public telecommunications networks have had limited effect to date, but will limit development of broadband infrastructures and multimedia services in future.

3.1 Impact of Joint Ownership

Our assessment of the joint ownership of telecommunications and cable TV networks by dominant PTOs suggests that it impedes development of telecommunications and multimedia markets in the Member States:

- Delaying the bi-directional upgrade of cable TV networks that would exploit their full potential for interactive services.
- Blocking the development of competing infrastructures.
- Limiting competition in services.
- Constraining innovation.

The extent to which joint ownership affects the development of markets in any Member State depends on the market penetration of cable TV and the dominant PTO's share of that market. For instance, BT is a joint owner in that it holds cable TV franchises; since BT has only one per cent of cable TV market, the impact of its joint ownership is minimal. The cable TV market is still developing in Portugal, with penetration of only 4.8 per cent; because Portugal Telecom controls 80 per cent of the market joint ownership will be increasingly important as the market is growing quickly. Deutsche Telekom controls 28 per cent of the mature German cable TV market with 54 per cent penetration; its joint ownership could have a major impact on market development.

3.1.1 Impact of Joint Ownership on Cable TV Upgrade

We use "upgrade" here to refer to upgrading the cable TV networks for bi-directional services, including telephony. Simply extending current capacity or enabling the transmission of digital signals would have less impact on progress towards the European Commission's objectives.

Joint ownership does not encourage the bi-directional upgrading of cable TV networks that would exploit the full potential of this broadband access pipe to the home, enabling competition in telephony and forming the platform for delivering multimedia services and high speed Internet access. Independent operators, on the other hand, have a strong incentive to develop their networks. This does not mean that joint owners will not upgrade their networks to offer greater capacity or provide

digital transmission: Deutsche Telekom recently announced that it intends to offer up to 150 digital channels through an agreement with KirchGroup and CLT-UFA.

As Table 3.1 shows, the majority of joint owners are not considering upgrading their cable TV networks to provide telephony. Among our interviewees only Cablelink, Telecom Eireann's arms length subsidiary, was evaluating the possibility of offering telephony.

In contrast, most independently owned cable TV operators are already offering or planning to offer telephony. Of the exceptions, the Finnish and Swedish operators believe that call charges in their countries are so low that telephony would not be a profitable business for them.

Table 3.1: Joint Ownership and Plans for Upgrade of Cable TV Networks for Two-Way Capability

	Already Offer Or Are Considering Telephony	Not Planning to Upgrade to Offer Telephony
Dominant PTOs with joint ownership	Telecom Eireann/Ireland *	TeleDanmark/Denmark Telecom Finland/Finland HPY/Finland France Télécom/France Deutsche Telekom/Germany Telecom Portugal/Portugal
Independent cable TV operators	Kabelsignal/Austria Telenet/Belgium Svenska Kabel-TV/Denmark** Stofa/Denmark Lyonnaise Communication/France CMI/Ireland A2000/Netherlands Casema/Netherlands Vecai/Netherlands Intercabo/Portugal Cableuropa/Spain Kablevision/Sweden Telewest/U.K. General Cable/U.K. Cable and Wireless/U.K.	Electrabel/Belgium HTV/Finland Veba/Germany StjarnTV/Sweden

Source: Interviews by Arthur D. Little

* Cablelink, Telecom Eireann's cable TV subsidiary, is evaluating the possibility of upgrade but has not yet decided. However, its ability to compete with Telecom Eireann might be limited.

** Svenska Kabel-TV is partly owned by Telia of Sweden. Upgrade refers to Denmark only.

Joint owners are unlikely to upgrade their cable TV networks.

The joint owner has little incentive to upgrade the cable TV networks to exploit bi-directional services such as telephony. Upgrading has no intrinsic financial benefit for the joint owner, which already earns telephony revenues. Moreover the cable TV network is not central to the joint owner's business.

No financial incentives.

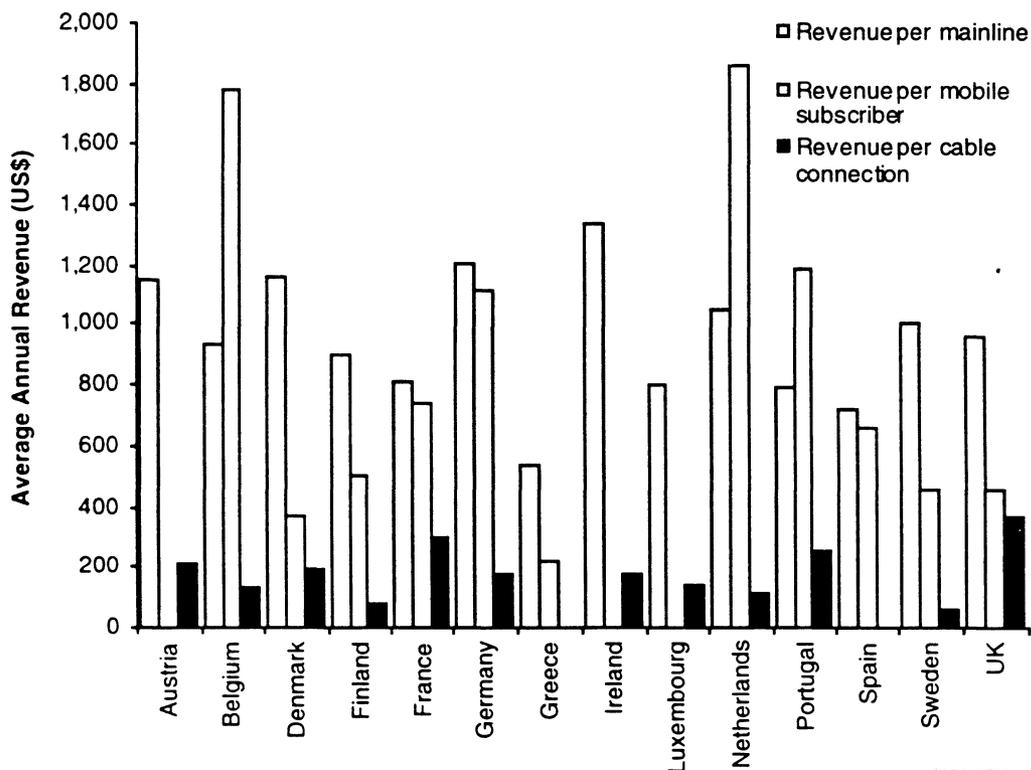
Dominant PTOs have little or no incentive to upgrade their cable TV networks to two-way capabilities: doing so would be the first step towards the introduction of cable telephony services that could cannibalise their primary revenue source. TeleDanmark states that “it does not make economic sense to provide upstream return path capacity in cable TV networks”, Telecom Finland that “since we are a telecom operator... we focus on the PSTN as the future access network to the home and are therefore more interested in ADSL than any cable upgrade technology”.

Cable TV not central to joint owner’s business.

Dominant PTOs do not see cable TV networks as a central part of their business. Compared to telecommunications, cable TV attracts only minor management attention, and in general is given low priority for investment in new technologies.

The low priority is in line with the current value of these two markets. In revenue terms, the cable TV market in 1995 was only 3.6 per cent of the telephony market in Western Europe: ECU4.6 billion out of ECU128.2 billion. On average across Europe, less than 10 per cent of revenues per subscriber comes from cable TV subscribers. Figure 3.1 compares the revenues generated by mainline, mobile and cable services across the European Union.

Figure 3.1: Revenues From Mainline, Mobile, and Cable Services Across the European Union, 1995



(468 / TK / 97)

Source: OECD, CIT Research, Arthur D. Little analysis

The OECD comments on the strategic rather than financial importance of cable networks to their joint owners:

“The cable networks of joint owners contribute only a small fraction of total revenue, and therefore may be more important in strategic terms than in actual revenue importance relative to communications... TeleDanmark operates Denmark’s largest cable television business. Cable television, however, only contributes around two per cent of net revenue meaning that ownership may be more important in strategic terms than in actual revenue importance relative to telecommunication”¹.

The independent cable operators also believe that dominant PTOs see the cable TV market as a limited opportunity. According to an independent cable TV operator in Sweden, “Telia is not really interested in developing their cable infrastructures where they “only” have a 60 per cent market share. They are more interested in upgrading the PSTN where they have 100 per cent”.

An additional indication of the PTOs’ view that cable TV is not their core business is that in the U.K., where cable TV networks are licensed regionally, BT gave up the majority of its cable TV interests in the late 1980s. One factor in its decision was that it wanted to concentrate on pursuing national rather than regional opportunities.

Despite Deutsche Telekom’s statement that² “Cable is part of our core business”, cable TV revenues amounted to just DM2.4 billion, 5.4 per cent of total revenues of DM44.6 billion, in 1995.

The cable TV subscriber base of the dominant PTOs is – with the exception of Ireland and Sweden – small in relation to the PSTN connections installed, supporting the view that cable TV is not part of the core business of PTOs (Table 3.2).

¹ Local Telecommunications Competition: Developments and Policy Issues, OCDE/Gd(96)179, 1996

² Cable & Satellite Express, July 1996

Table 3.2: PSTN Connections and Cable TV Subscribers of Dominant PTOs in Europe

Country	PSTN Connections of PTO in millions	Cable TV Subscribers of PTO in millions	Cable TV Subscribers as % of PSTN Connections
Austria	3.6	0	0
Belgium	4.5	0	0
Denmark	3.5	0.14	4
Finland	2.9	0.13	4
France	32.4	0.43	1
Germany	40.1	5.50	14
Greece	1.8	0	0
Ireland	1.1	0.30	27
Italy	22.0	0	0
Luxembourg	0.2	0	0
Netherlands*	7.8	1.17	15
Portugal	3.2	0.13	4
Spain	16.9	0	0
Sweden	6.1	1.20	20
U.K.	4.3	0	0

Source: CIT Research 1996

* In process of partial divestiture

In bold = PTOs with joint ownership

The low priority attached to the cable TV infrastructure by some PTOs may lead to under-investment. For example, in Ireland one independent cable TV operator complained that "Telecom Eireann's joint ownership is creating difficulties for the industry as a whole. Cablelink [of which Telecom Eireann holds 75 per cent]...is being starved of cash and its infrastructure is degenerating to the point where much of it needs replacing". Cablelink refuted this point, however, claiming that it fully participates in industry activities.

Independent operators have plans to upgrade their cable TV networks.

The potential to generate new revenue streams from telecommunications services is stimulating independent operators to upgrade their cable TV networks, and possibly expand them to cover more of the population.

Upgrading networks.

Using cable TV networks to provide telephony enables independent cable TV operators to enter telecommunications markets to serve residential customers, because upgrading cable TV networks costs less than building a telecommunications infrastructure from scratch.

Telecommunications services offer a potentially large new revenue stream to the independent cable TV operators. From the economic point of view, upgrading for telephony makes sense for the independent cable operator, as the costs of upgrade are lower than those of building new infrastructure. The typical cost of rolling out a new hybrid fibre/coax cable TV network is about \$1,000 per home passed in Europe, while the cost of upgrading one for provision of telephony can be only an additional \$130 per home passed – in addition, each customer connected will need to be supplied with a cable modem at a cost of around \$250. Much of the cost of a network is incurred in laying the coaxial cable and, where required, in constructing ductwork and manholes. Upgrading a network to provide telephony requires, essentially, upgrading the amplifiers and other electronics in the system.

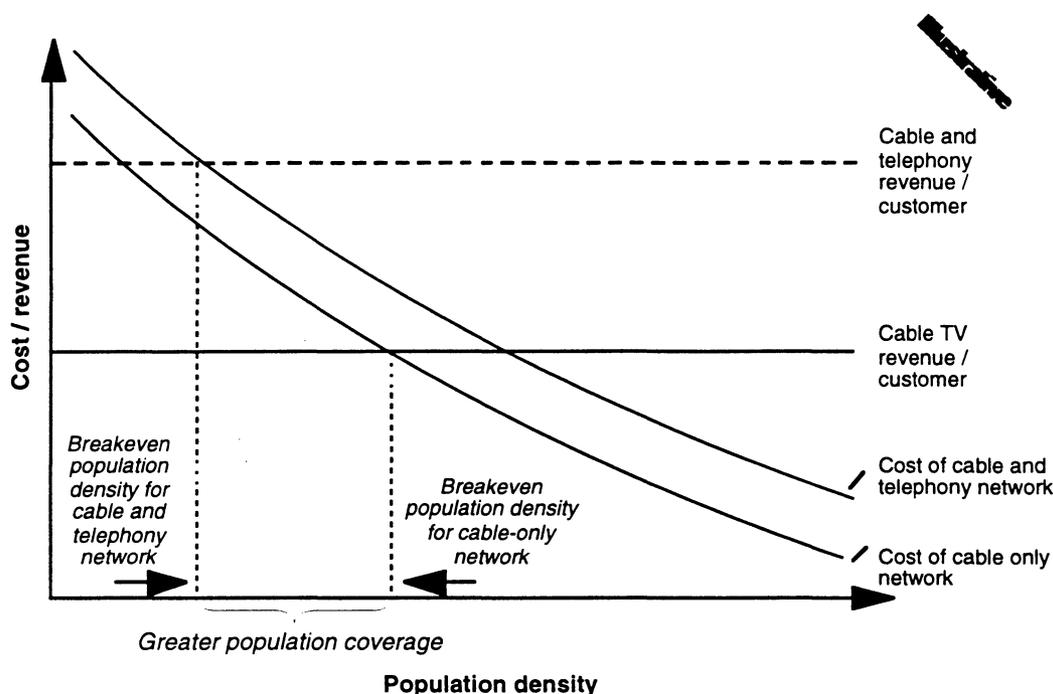
Even if the cable operator decides not to provide telephony via the cable network all the way into the home, it could still use the cable network to launch telephony based on WLL equipment, with cable providing the links between the wireless base station and the telephone exchange. Générale des Eaux in France is currently deploying DECT equipment in this way under an experimental licence at St-Maur-des-Fosses near Paris.

Expanding networks.

Independent operators are more likely to extend their networks to cover a greater proportion of the population, offering new services and products to customers who otherwise would not have had access to them.

Independent cable operators have an incentive to extend cable TV networks in less densely populated areas than dominant PTOs. Doing so will enable them to generate two revenue streams from a cable network: cable TV services and telecommunications services. For the dominant PTO, the only additional revenue stream will be from cable TV services; it already has the telecommunications revenues. The cost of passing additional potential customers with cable rises rapidly as population density decreases, leading to a higher break even point for the operator in less built-up areas. The marginal cost of building a cable TV network with telephony capacity is low in relation to the overall cost of the network, but the addition of telephony can more than double revenues. In the U.K. the average telephony revenue per subscriber is about 10 per cent higher than the cable TV revenue per subscriber for the cable operators. As a result, the break-even point for an operator offering both telephony and cable TV services is at a lower population density than for a pure cable TV provider, as shown in Figure 3.2.

Figure 3.2: Additional Revenue Streams for Independent Cable TV Operators



(468 / TK / 97)

3.1.2 Impact of Joint Ownership on Infrastructure Competition

Infrastructure competition results in the continuous development of networks, as players develop innovative services that require investment and competing networks strive to maintain their competitiveness.

As a recent example, the announcement of the introduction of digital DTH by BSkyB in the U.K., with the capability to deliver over 200 television channels, has led the independent cable TV operators to bring forward their plans to digitalise their cable TV networks in order to offer more channels with additional features.

Many independent cable companies point out that the dominant PTOs own cable networks only as a defensive measure, to prevent others using them as a platform to enter the telephony market.

The situation in the U.K. demonstrates both the potential for cable TV networks to provide competition and the reason that joint ownership is such a strong defensive move. In the U.K. most of the residential customers who have moved away from BT, the incumbent operator, use cable companies to provide their telephone service, though some are now beginning to use services provided by WLL operators.

In contrast, in Germany, the majority of cable TV operators are not planning to upgrade their networks to provide telephony, because Deutsche Telekom is not planning to upgrade its cable TV networks, on which they would rely. As a result, new entrants, except Viag Interkom which plans to build a unified fixed/mobile

network, are intending to rely on interconnecting their networks with Deutsche Telekom's PSTN, rather than to compete through another local infrastructure. In Finland, almost all cable TV networks are owned by local PTOs, who built the networks with cable operator financing. Cable operators provide cable TV services on networks provided by the PTOs under long term agreements. The PTOs generally do not allow the cable operators to use the networks for any purpose other than offering cable TV services.

Although PTOs with joint ownership are not intending to use their cable TV networks to offer telephony in their domestic markets, they see cable TV as a strategic element in exploiting foreign telecommunications markets. As an example, in Denmark, where voice telephony was liberalised in 1996, Svenska Kabel-TV, a subsidiary of Telia in Sweden, offers telephony over cable TV networks; in its domestic market Telia prefers not to cannibalise its core business.

The impacts of reduced infrastructure competition are:

- Limited choice of telephony service supplier for residential customers.
- Reduced competition in long distance markets.
- Delayed development of broadband interactive services.

Limited choice of telephony service supplier for residential customers.

The absence of infrastructure competition will exclude the vast majority of residential customers from a choice of telecommunications operator. In the absence of the competing infrastructure that a cable TV network could provide, new entrants to the telephony market will have to use indirect access to serve customers. The experience of operators in the U.K. is that indirect access is economically viable only for serving the highest spending 20 per cent of residential customers.

To provide a service by indirect access, a service provider does not provide the local connection to the customer. Customers continue to pay line rental to the dominant operator; when they want to use a competing operator to make a call, they dial a short access code to gain access to the competing network through the incumbent's network. The customer is likely to use the competing service provider only for long distance and international calls; using it for local calls is likely to be more expensive, because the call will have to travel over the incumbent's local network to his local switch and transfer to the competing operator's network only to be switched straight back to the local switch for delivery. The cost of paying two interconnection charges; one for origination and one for termination, as well as his own switching costs is likely to make this an expensive service for the new entrant to provide, although it will depend on the exact level of the interconnection charge.

Since operators serving a customer via indirect access will have fixed costs in customer service and billing, only new entrants who are targeting customers with long distance and international call revenue big enough to overcome these costs will find it worthwhile (see Figure 3.3).

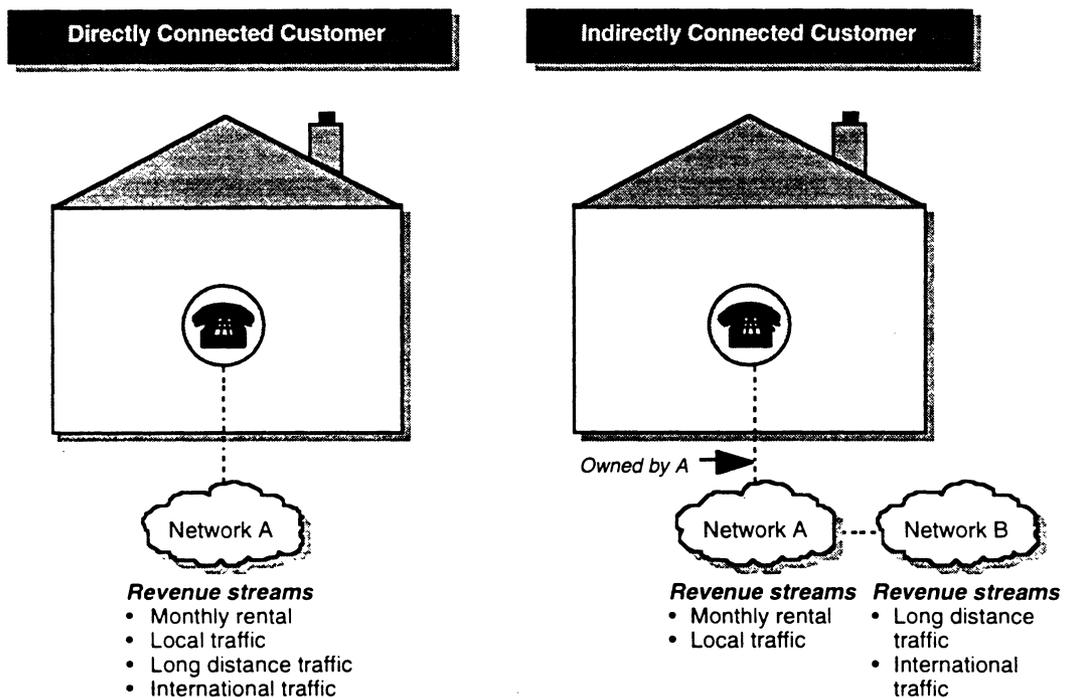
Mercury, the second operator in the U.K., targeted the top 20 per cent of residential customers and put others off by levying a monthly charge; for the other 80 per cent the savings on long distance and international calls did not outweigh the monthly

charge. Even pursuing this strategy, Mercury found the business unprofitable and withdrew from the market.

As a result, BT lost virtually no market share in the residential market between the introduction of competition in 1984 and 1991. From then on, as the independent cable TV operators have extended their networks, it has lost about 22 per cent market share in areas passed by cable TV.

Mercury Communications merged recently with three of the leading U.K. cable operators: Bell Cable Media, Nynex CableComms and Videotron, to form Cable & Wireless Communications. These operators appear to have decided that to have their own infrastructure is essential to compete for residential customers.

Figure 3.3: Impact of Joint Ownership on Services to Residential Customers



(468 / TK / 97)

Reduced competition in long distance markets.

Competition in local infrastructure can facilitate the development of alternative long distance telecommunications networks. Experience from Finland and the U.K. shows that local access providers who are not tied to long distance carriers can stimulate competition in long distance markets.

In Finland customers in most parts of the country are served by local PTOs that are not related to Telecom Finland, the country's dominant long distance carrier (which also serves some local areas). With the introduction of competition from a long distance carrier, Telecom Finland lost almost 40 per cent market share in only one year, as the new carrier easily accessed traffic from customers of local PTOs not tied to Telecom Finland.

MFS Communications in the U.K., an alternative long distance carrier, gains substantial business from the cable TV operators who are competing with BT in local access. These route long distance and international telephony traffic over MFS's backbone network rather than BT's. If the cable TV companies had not captured ownership of the customer from BT, the alternative long distance carriers would not have been so successful.

Delayed development of broadband interactive services.

Joint ownership could delay the introduction of broadband interactive services.

Both cable TV networks and the PSTN are capable of being developed to provide broadband interactive services such as high speed Internet access. Other platforms will be able to provide some of the capability of these networks, but none will be complete substitutes, as described in Chapter 2.4.

Cable TV networks that are not owned by dominant PTOs can be upgraded to provide a range of interactive services. The PTOs will be able to compete over their existing local access network using ADSL technology to enhance bandwidth.

A dominant PTO is unlikely to upgrade the cable TV infrastructure to provide new services, as discussed above. For instance, a PTO may provide fast Internet access by upgrading the cable TV network for downstream purposes with uni-directional cable modems and use the PSTN as the return channel. Many of the joint owners we interviewed are not planning to integrate their cable networks with the PSTN, preferring to use the cable TV network purely for broadband distribution. Without integrating the broadcast capability of the cable TV network with the switched two-way capability of the PSTN, the joint owners may also find it more difficult to offer an array of broadcast and interactive multimedia services to customers.

3.1.3 Impact of Joint Ownership on Service Competition

Joint ownership reduces the development of competition in telecommunications and multimedia service by limiting infrastructure competition; without competing infrastructures, service providers will be at a disadvantage to the incumbent and customers will suffer. The drawbacks of service competition, when it is not underpinned by infrastructure competition, are that:

- There will be a long term need for regulation to control the monopoly infrastructure supplier.
- New entrants will always be at a disadvantage to the incumbents even with fair interconnection arrangements.

Until markets are fully competitive, there will be a need for regulation to control dominant operators and ensure that entrants have access to infrastructure on transparent, non-discriminatory, cost oriented terms. As long as joint ownership limits competition, regulation will be required.

Several new operators expressed concern that regulation favours the incumbent, because regulators have been given insufficient power to control the dominant player, lack the staff and the expertise to regulate effectively, and tend to be biased towards the dominant PTO. An example of bias towards incumbents is shown by

the variance in the interconnect rates that regulators have set across Europe. In Italy, for instance, interconnect rates are twice as high as in some other European Union countries. As a result, customers may not feel the full benefits of competition.

Even where there is a strong regulator, practical factors place new entrants at a disadvantage to the incumbent. Mercury in the U.K., for example, points out that, even if a regulator sets appropriate pricing arrangements for interconnection, it cannot regulate other factors – quality of service, responsiveness and ease of physical access to sites – so easily. In consequence, the incumbent's network operations might favour its internal customers.

Without direct access to residential customers, new entrants have to compete on the service level; providing services based on others' infrastructure. This limits their ability to innovate and differentiate themselves from the incumbent.

Innovative products and services – such as IN and VPN services – require some intelligence (switching, routing etc.) within the network infrastructure itself. Where new operators use the same basic infrastructure as the incumbent, they cannot deliver innovative products and services and cannot influence investment and specifications of upgrades.

One method of interconnection that could help reduce the incumbent's control over access to customers could be allowing new entrants access to unbundled local loop elements. This practice is still subject to discussion within most member states (see Chapter 2.3). Under this regime, new operators could buy from the incumbents only the elements they need (e.g. the copper loop), and not those they do not need (e.g. local switching). They could connect their networks to the customer's copper loop at the incumbent's main distribution frame, where the twisted pair cables enter the local exchange. Doing so would enable them to offer competing services more cost effectively; they might even be able to offer broadband interactive services by attaching ADSL equipment directly to the copper.

However, Oftel believes that “access to BT's copper loop might tend to reposition BT's access network as a common utility and undermine the significant investment in other networks”¹. Allowing access to the frame could entrench the position of the copper loop and limit investment in new infrastructures with the capability to offer services not possible over twisted pair copper. Some new operators in our interview programme said that being given access to the frame would not be a great advantage, in view of the practical problems of access, and that the benefit would reduce as incumbents use more fibre in their access networks.

3.1.4 Impact of Joint Ownership on Service Innovation

The search for competitive advantage drives innovation: “By opening up local telecommunication markets to competition, governments are providing a framework in which incumbent PTOs and new entrants are focusing on innovation and cost reduction in customer access networks. Benefits of this type have been increasingly evident in long distance telecommunication for a decade but largely absent from

¹ Statement on Interconnection and Accounting Separation, March 1994

local access networks". OECD¹. Joint ownership may delay that search, and therefore the development of innovative products as joint owners:

- May create de facto sub-optimal standards.
- Fail to take a lead in developing new markets.
- Limit the ability of other service providers to innovate.

Operators who intend to use cable networks for television and radio distribution only may invest in set top boxes that simply manage access to premium rate programming, rather than providing a more sophisticated interface for multimedia services. If a joint owner controls a large part of the cable TV market, it may set the de facto standard for the entire market, limiting the development of innovative services by all operators, not just its own.

Joint owners who are dominant in cable TV as well as telecommunications may also hold back the development of interactive services by failing to give a lead. According to one independent cable TV operator we interviewed in a Member State with cable operations dominated by a joint owner, "the cable industry is being impeded as it cannot consolidate and pull together to offer interactive services or even telephony. It is difficult for the small operators to get together without [the dominant player]... The small operators wanted to band together to carry out field trials of interactivity, but it was unable or unwilling to become involved."

In those countries where the cable TV infrastructure is provided by the dominant PTO, independently owned cable TV operators expressed concern that their plans for developing and providing new services are being delayed by the incumbent PTO.

In Germany, for example, most private cable TV operators use Deutsche Telekom's broadband distribution network (the network level 3) to feed cable programmes into their networks. The private operators associated with ANGA, a trade association, want to give their customers a greater variety of channels. Deutsche Telekom, so far, has not upgraded its cable TV network to the extent they have been asking for, because, it says, the business case for doing it was not strong enough. As Deutsche Telekom points out, it is not necessarily constraining the ANGA members, these operators could have their programmes delivered over other competing networks or via satellite; they prefer to continue to receive their programming from Deutsche Telekom.

In some areas in France, France Télécom provides the underlying cable TV network that is then used by private cable TV operators to deliver cable TV services. Because of the separation of network and services, the cable TV operators are not free to invest in the networks to provide the services they would like, in particular telecommunications services. New operators in France see cable TV as the only way to compete with France Télécom in the local loop in the short term. France Télécom is, however, according to some interviewees and cable associations in France, delaying agreements on interconnect, price and access. As an example, Internet access via cable TV, a major innovation, has still not been successful because of the lack of the appropriate functionality in cable TV networks.

¹ Communications Outlook 1997

Lyonnaise Communications in France has already launched Internet services on some of its networks but has been unable to make an agreement with France Télécom for the networks France Télécom owns. Lyonnaise has been negotiating with France Télécom for more than a year without reaching an agreement. Lyonnaise has now asked ART, the French regulator, to arbitrate, but a decision is not expected before July of this year, thus delaying the roll-out of the new services. Lyonnaise expressed concern that it could face the same difficulties in upgrading the networks for provision of telephony services.

The examples above illustrate the difficulties associated with separating network and services. The service provider has difficulty in influencing the infrastructure investment required for the services it wants to provide. The network provider may be asked to risk investing in expensive network upgrades while relying on the service provider to generate the returns.

France Télécom and Deutsche Telekom both state that they would be happy to upgrade the networks as the service providers want them to, but only if there is a business case for doing so. The reason that they have not done so, they say, is that the service providers are underestimating the costs of upgrading and are not prepared to recompense the PTOs.

3.2 The Impact of Restrictions on the Provision of Cable TV Services

The Full Competition Directive (Directive 96/19/EC) contains a requirement for:

“an overall assessment of the situation with regard to remaining restrictions on the use of public telecommunications networks for the provision of cable television capacity.”

The Cable TV Directive (Directive 95/51/EC) ensures that cable TV networks are allowed to provide all liberalised telecommunications services. There is, however, no Directive ensuring that telecommunications networks are free to provide cable TV services. Whether telecommunications operators can compete on equal terms with cable operators therefore depends on national or even local regulations.

The asymmetry in the regulation of PTOs and cable TV reduces the likelihood that PTOs will upgrade their networks to provide cable TV, and prevents new PTOs from investing in networks providing both telephony and cable TV.

To level the playing field, the regulatory regime for cable TV would need, broadly, the following elements:

- No restrictions on number of licences issued, except where dictated by scarce resources.
- No restrictions on the pricing of non-dominant operators.

- Application of Open Network Provision principles that do not currently apply to broadcast services:
 - Third party access to infrastructure of major players.
 - End user access to services offered by providers other than the incumbent.
 - Access criteria published, transparent and objective.
 - Access pricing transparent, non-discriminatory and market-driven.

As well as these freedoms relating to the network, since a successful cable TV service depends on attractive content, it might be necessary to regulate relations between content providers and cable TV service providers.

The original reasons for the difference in regulation between the two types of operation were technical. With the convergence of telecommunications and cable TV, these reasons no longer apply. In the longer term – the early years of the next decade – the impact of these restrictions could be damaging. As the capabilities of telecommunications networks grow, they could become indistinguishable, in service delivery capability, from cable TV networks. Continuing restrictions could prevent or discourage telecoms operators from building new broadband networks or upgrading their existing networks.

3.2.1 Convergence of Telecoms and Cable TV Networks

Until the last few years, cable TV and telecommunications networks were technically quite different, had different capabilities and were designed for different purposes. As a result, in many Member States, cable TV and telecommunications were licensed in different ways; no specific restrictions were applied to telecommunications networks providing cable TV services, since the possibility that they would provide such services had not arisen. Such restrictions as do exist generally apply to the operator or to the use made of the network, rather than to the network or technology used.

The capabilities of the two types of network are now converging, with the development of new technologies; ADSL is dramatically enhancing the capacity of telecoms networks, making it possible for them to carry TV signals, while cable modems are making it possible for cable networks to carry two-way data flows. In consequence, the original rationale for different types of regulation no longer applies.

Until recently, the two types of networks provided different types of services. Cable TV services broadcast – distribute signals simultaneously to multiple destinations – television and radio signals via wire based networks. Telecommunications services provide two-way transfer of information, are point-to-point rather than point to multi-point, and generally need lower capacity signals than those required for TV distribution.

Now both telecoms and cable networks have the potential to deliver multimedia services, defined here as the interactive transfer of information or content over point to point links involving high capacity transmission links capable of providing, say, broadcast quality video.

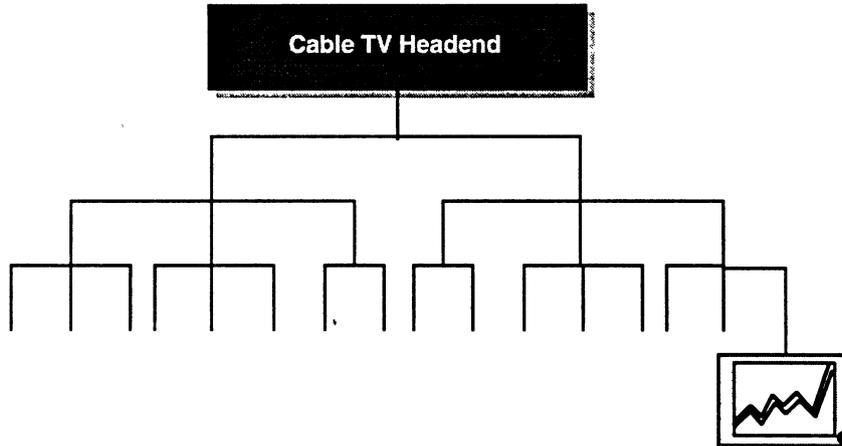
Examples of services in each category are shown in Table 3.3.

Table 3.3: Typical Telecommunications, Cable and Multimedia Services

Telecommunications	Cable TV	Multimedia
Voice telephony	Basic TV distribution	Video on demand
Data communications	Encrypted premium rate packages	On-line gaming
Leased lines	Pay per view programmes	High speed Internet access
	Near video on demand	

Cable TV networks, as shown in Figure 3.4, are designed to carry the same high bandwidth signal from a central point (the headend) simultaneously to multiple houses. The signal is carried over coaxial cable that branches out until it reaches the consumer. The signal is amplified along the route to maintain its strength. The bandwidth on the cable is typically 450MHz, allowing around 30–40 channels to be carried. The customer receives all these channels at home and tunes the television to see the chosen channel. The network has no capability for sending signals from the consumer up towards the headend.

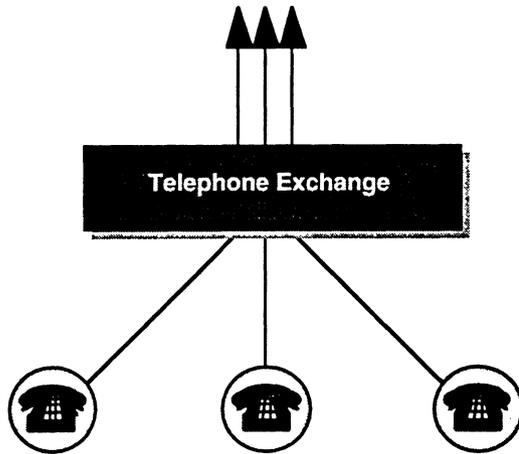
Figure 3.4: A Typical Cable TV Network Architecture



(468 / TK / 97)

In contrast, telecommunications networks are primarily designed to carry voice telephony. Each customer is connected separately to an exchange through a pair of copper wires, as shown in Figure 3.5. The system is designed to carry signals with a bandwidth of about 3kHz. These signals can travel both ways along the wires so that customers can both speak and listen. At the telephone exchange, the signals from any pair of copper wires can be connected with the signals from any other copper pair. The telephone exchanges have enough capacity for typical usage of a few minutes use per line per day, not hours at a time like television.

Figure 3.5: A Typical Local Telephone Network Architecture



(468 / TK / 97)

Because television signals contain much more information than a normal voice telephone call, cable TV services cannot be provided over a standard telephone network. To provide the bandwidth required, telephone operators have had to build a new coaxial cable TV network side by side with the telephone network; the two services could not be combined on the telephone network. There are, however, synergies in sharing ductwork and street furniture between the two networks. Partly for this reason, no country specifically restricts the use of a telephone network for cable TV, though there are some restrictions on PTOs providing a cable TV service. No operator has started full scale deployment of TV distribution over switched networks, though numerous technical and marketing trials are under way.

ADSL technology and compression techniques are now making it possible for telecoms operators to transmit high bandwidth signals (typically 1–6 TV channels) down the copper pairs. PTOs are therefore beginning to contemplate competing with the cable TV operators. However because the telephone line, even with ADSL, cannot carry more than a few channels simultaneously, it will not be able to deliver the same range of programming as a cable TV networks, without additional equipment in the exchange. Broadband switching equipment in the exchange would switch the required channel down the customer's line in response to demand, rather than sending all channels continuously, as on cable systems.

In the long term, copper pairs and ADSL may be used to deliver broadcast services; at present the main impetus to ADSL deployment is the requirement to deliver faster and faster Internet services into the homes. An additional advantage is that with ADSL, Internet traffic does not pass through the telephone exchange but is split off from normal telephone traffic. Use of ADSL diminishes the load on exchanges not designed to cope with the extremely long calls of Internet users – hours rather than minutes.

In addition, the use of hybrid fibre/coax networks for cable TV combined with the use of cable modems enables delivery of two-way services, including simple voice telephony.

3.2.2 Restrictions On the Provision of Cable TV In Member States

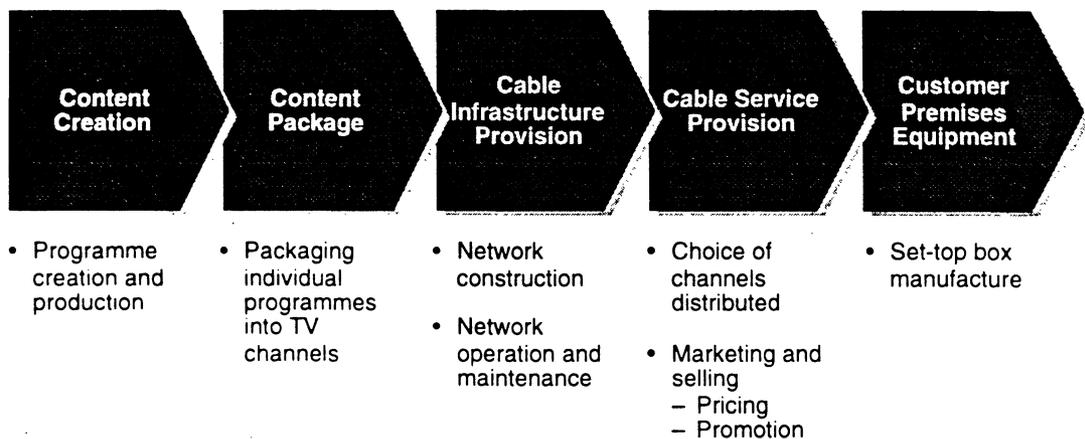
Cable TV provision is heavily regulated. In most Member States the regulatory structure could affect the ability of PTOs to provide cable TV capacity or services, potentially limiting market development

As discussed, the technical division between cable TV networks and telecommunications networks has led, in many Member States, to different licensing regimes for the two types of network. Under French law, for instance, telecommunications networks are not considered a means of TV distribution.

In particular, regulation has seldom been developed with the possibility of competing networks in mind; in some Member States licences have been exclusive within an area, in others granting licences is at the discretion of the municipalities, which may own or have some relationship with an existing cable network. Whether licences would be granted to operators hoping to install a second infrastructure, and on what terms those licences might be offered, has yet to be tested. The legal implications are therefore unclear.

Figure 3.6 shows the different elements in a cable TV service: the cable TV value chain.

Figure 3.6. The Cable TV Value Chain



(468 / TK / 97)

The way in which each element is regulated varies between Member States; in the majority, however, regulations are in force that might prevent or discourage PTOs from upgrading their existing networks, or building new broadband networks, to provide cable TV services.

In examining the restrictions in detail we concentrate on the provision of cable TV infrastructure and services, not on the licensing of the content carried over the

infrastructure. The content and the channels for broadcasting are subject to regulation; restrictions on cross-media ownership and on linkages between the ownership of TV channels and cable TV infrastructure are common.

Regulation affecting the provision of cable TV infrastructure and services by PTOs falls into three categories:

- Controls specifically preventing PTOs providing cable TV services.
- Limits on issuing cable TV infrastructure licences that could stop PTOs developing a new service.
- Other controls on cable TV service licences and the commercial freedom of operators that would make them less likely to contemplate offering a service.

Specific restrictions on PTOs.

In many Member States the national PTO is allowed to provide cable TV services; in many it is a major cable network owner. Two Member States (the U.K. and Spain), however, impose specific restrictions on telecommunications operators providing cable TV services: PTOs in the U.K. and Telefónica in Spain can own both telecommunications and cable infrastructures but only under certain conditions.

By imposing these restrictions policy makers and regulators had the aims of:

- Fostering the development of cable infrastructure in countries where it was limited or non-existent.
- Ensuring that the new networks were not dominated by the incumbent PTO.

Neither of these specific restrictions is intended to last indefinitely; in both countries they are designed to last long enough to achieve their aims. In neither case, however, has the impact of the restriction on the PTOs been significant.

Restrictions on PTOs in the U.K.

In the U.K., BT and other PTOs cannot simply choose to offer broadcast services nationally; they have to compete for local exclusive cable licences on the same basis as any other organisation. This restriction was imposed to encourage the development of cable TV networks; its impact on competition in broadcast services offered by BT over its telecommunications network has been limited.

In the 1980s the U.K. began licensing cable TV operators. Licences have now been issued for franchise areas covering about 18 million of the 2 million television homes in the country; the networks are about halfway through roll-out, with over 8 million homes now passed.

Although in law there is no limit on the number of licences for cable operators, Local Delivery Licences (LDLs), that can be issued within any franchise area, it is policy that only one licence is issued.

BT and the other PTOs are prevented from using their networks nationally to convey or provide broadcast television to residential customers. This is a narrow restriction:

“It [BT] is able to do so on the same basis as all other companies, by competing for franchises. BT can even use its existing network within the franchises it holds. It can also deliver on its existing network broadcast television nationally to businesses, and it is free to offer interactive, on-demand services nationally to both businesses and homes. This freedom includes such services as video on demand, with an appropriate licence from the ITC (Independent Television Commission). The only prohibition is on BT using its network nationally to convey or provide broadcast television to homes, as this would give it an overwhelming advantage over cable and other operators that are still building their networks.”¹

The commitment in the previous government’s 1991 white paper, “Competition and Choice” is to review these limited restrictions in 1998 and 2001 for conveyance and provision, respectively, of broadcast television, if the Director General of Telecommunications advises that competition is becoming well enough established to warrant a review. The new government is believed, however, to want to fulfil the promise it made in opposition two years ago, that BT would be allowed to compete with the cable TV industry sooner than the 2001 review. In return, BT would connect schools, hospitals and libraries to the Internet.

The objective of preventing BT’s broadcasting television was to encourage the development of the new cable networks by limiting competition. Despite the restriction, the cable operators face competition in telecommunications from BT and in broadcasting from satellite television. The restriction on BT’s broadcasting is to be lifted when the cable operators are strong enough to survive in a competitive environment. Its duration gives the cable TV operators the time needed to recover their investment.

The cable operators argue strongly that the current restriction should not be lifted ahead of the date set for its review, because regulatory stability is important and because the threat of a review affects their fragile share price and their ability to raise finance. The £12 billion being invested in cable infrastructure in the U.K. is based on assurances about the competitive environment and the exclusive nature of the licences. Cable operators, regulators and policy makers believe that the exclusive nature of their licences is vital in encouraging the development of new broadband networks across the country. Lifting the restriction on BT and other PTOs early would create doubts about the stability of the regulatory regime and could reduce the likelihood of investment in other aspects of the sector. In any case, since the cable industry has been less successful than originally forecast by analysts, its share prices drop whenever additional competition is discussed.

The importance of a stable regulatory regime in encouraging investment in new markets has been underlined by Rupert Gavin, BT’s Director, Internet and Multimedia Services, in discussing investments in digital television; “There must be some certainty in the way regulation will be applied – investors cannot be expected

¹ Written parliamentary answer, April 1997

to enter the market with the possibility of being controlled by undefined and arbitrary provisions.”¹

The restriction does not appear to have been the main reason for the decision of BT and other PTOs not to upgrade their telecommunications networks to compete with cable operators in the delivery of broadcast television. Rather the reason appears to have been the absence of a sound business case for developing the networks - only now is the business case beginning to look plausible - and other regulatory restrictions. To quote Rupert Gavin again:

“Over the last few years we have established out technical capability to deliver broadcast and on-demand entertainment over our existing telephony network. We have overcome the technical barriers so that from a delivery perspective, we know that we are able to deliver to in excess of 92 percent of the United Kingdom population over our current copper fixed network... The questions therefore centre around the economic viability of so doing. Here we have made considerable advances and in the past two years the estimated costs of providing such a service have reduced quite significantly. In addition, through our extensive work in interactive television trials as well as our work in Internet services, we have a far better estimate of the customer demand that such a service would be able to generate and the revenues that would flow. It represents still a challenging case to us. However it is one that we are confident, with time and industry, that we will be able to overcome. Clearly if we were able to see as part of the potential revenue generated from such a service the delivery of what is known today as broadcast television, then that would be an attractive factor to help make the case look positive. I would emphasise however that there are some other hurdles that we have to overcome. Some are economic, some, importantly, are regulatory”²

One of the regulatory barriers referred to in the quotation above is the rate of return restriction. The restriction arises from the requirement that BT separates its network business from its service provision businesses to prevent unfair cross-subsidisation. If BT were to invest heavily in providing new broadband services, the venture would require several years of investment before beginning to see a return. Failure to demonstrate that the investment was not being unfairly subsidised – could be a barrier. Another regulatory barrier is lack of clarity on which relationships with other companies the regulator might deem inappropriate. In launching new content related services through forming partnerships with content owners, BT needs to know which business relationships are acceptable. This is particularly important because of BT’s close relationship with News International, and concerns voiced about the market power that these two partners, dominant in their own fields, could wield. The Director General of Ofcom has announced that he will monitor closely how BT and BSkyB, a subsidiary of News International, do business in their new joint venture, British Interactive Broadcasting, under conditional access regulation.

¹Minutes of Evidence on The BBC and the Future of Broadcasting to the National Heritage Committee, Thursday, 23 January 1997

² Minutes of Evidence on The BBC and the Future of Broadcasting to the National Heritage Committee, Thursday, 23 January 1997

One of our interviewees in BT believes that even if the restrictions had been lifted five years ago, and BT had been investing aggressively in broadcast services, it would only now be beginning to compete with the cable companies. The pressure within BT for the restrictions to be lifted has waned in recent years, according to one BT senior manager, as BT has found other ways of providing services, including delivery of content via satellite or digital terrestrial television, with the telephone network used only for the return path. The restriction may even have been of benefit to BT, preventing it from making expensive mistakes by investing in fibre in the local access network where there was no business case for doing so. Investing in a fibred local access network, BT believes, would have stimulated the development of a service provider structure.

However, despite the fact that up to now the restrictions have had little effect, BT believes that it should be free to react to and to anticipate market needs.

Restrictions in Spain.

The cable TV networks in Spain have been underdeveloped, with fewer than 0.5 million customers connected to broadband networks, partly because of the absence of any clear legislation before the introduction of the cable law in 1995 and its implementing regulations in 1996. Under the new laws, licences will be issued to one operator in each geographical area. Telefónica has the automatic right to provide cable TV services in all areas. The number of areas is still being established, but Ministerial sources indicate that there are numerous applications for service. The operators awarded licences will be determined by a bidding process.

Where there are no bids from private operators to provide cable services, Telefónica may provide services without restriction. However, where private operators do receive a licence, Telefónica may start to operate in a new cable territory only 16 months after that licence is granted. Other amendments authorise the government, upon proposal from the Telecommunications Commission, a) to prevent Telefónica from entering into such cable territories for a maximum of 24 months, and b) to shorten that period when "necessary for the existence of real competition in the rendering of cable communication services". The delay is designed to give new operators a chance to become established before Telefónica enters the market.

The restriction is expected to have little impact. Completing the build of a new cable infrastructure will take several years; in the U.K. it is expected to take nearly 10 years; the 16 month delay imposed on Telefónica is short by comparison. In addition, the restriction on Telefónica does not prevent it from building a new network, only from operating it; Telefónica will therefore be able to offer the service as soon as the 16 months are up.

Despite the extremely limited restriction on Telefónica, and its announcement that it will build cable TV networks, many consortia are currently bidding for licences.

One issue that all cable operators in Spain will have to address is how to connect the large proportion of the population who live in apartment blocks. These blocks have two wired infrastructures: twisted pair cables for telephony and coax for distributing broadcast signals from SMATV antennae. Whether a cable company will be able to

gain access to, or upgrade, the existing system is unclear. To get permission to install new cables, the cable company would need the permission of every householder, posing problems for the cable operator who does not act quickly or where there is a large number of satellite customers. Telefónica believes that some form of Open Network for the household cable will be necessary to remove the bottleneck, allowing all operators to share the infrastructure. For practical reasons, householders are unlikely to give permission for more than one cable network to be installed.

Limits on cable infrastructure licence availability.

Member States other than the U.K. and Spain put no specific restrictions on the provision of cable TV services by PTOs. However, the regulatory structure for cable TV markets in many countries may restrict their development of broadband networks. Telecommunications operators may not automatically be entitled to offer a cable TV service or provide cable TV infrastructure.

In some Member States, licences to provide cable TV infrastructure or services are not freely available; there may be limits on the number of licences available in any geographical area, or the provision of cable TV infrastructure may be the exclusive preserve of the national PTO.

Cable TV licensing is much more regionally focused than telecommunications licensing, for two reasons:

- Since cable TV networks have distributed signals only from a central point, interconnection has not been necessary.
- Cable TV has not been seen as an essential service like telephony, and has been concentrated around urban areas where the costs of deployment are lower. Only in countries such as Belgium and the Netherlands where cable is the standard way of receiving television signals, with penetration rates above 90 per cent, are de facto universal service obligations imposed on the cable operators collectively.

In countries where cable TV infrastructure has been provided as a local utility and where a second competing network has never been considered, whether a new operator who wanted to provide cable TV services would obtain a licence is unclear.

Where cable TV service is provided by multiple local bodies, their capacity to compete with dominant telecommunications operators may be reduced, since they will lack economies of scale in operations and purchasing. They will not have the capacity to invest heavily in developing risky new products, especially multimedia products, they will not be attractive partners to powerful content providers and they will not have the strength or depth of management of a larger company.

In the U.K., the need for scale has prompted consolidation within the industry and the formation of Cable and Wireless Communications from three of the major cable TV operators and Mercury Communication, the second PTO.

Some structures can overcome some of these barriers, as Telenet in Flanders has shown; 17 cable companies are part owners of Telenet, which will upgrade the cable networks to provide telephony and interactive services. However, removing any restrictions on mergers and acquisitions among cable operators would also help the cable industry consolidate and compete with the major PTOs.

Where cable TV licences are not available to telecoms operators, market development might be slow because new telecoms operators might decide not to build broadband networks, creating only narrowband networks existing operators might fail to upgrade to broadband.

In the majority of Member States, there are restrictions that will affect telecommunications operators providing cable TV infrastructure. As discussed in Chapter 2.3, the licensing regime for cable is usually independent of the licensing regime for telecommunications, and often more locally controlled. As a result, a PTO that wants to provide cable TV infrastructure may have to obtain multiple licences from different authorities covering different areas. The complexity could act as a significant barrier to the PTO's plans.

Sweden has the most liberal regulatory environment, with no licensing regime for cable infrastructure providers. In Finland, Germany, Luxembourg and the Netherlands, where cable infrastructure is licensed as telecommunications infrastructure, there are no barriers to the provision of cable infrastructure by PTOs. In Greece, regulation makes the provision of cable infrastructure the exclusive preserve of the incumbent PTO, and in Italy there is a strong bias to the incumbent. In all the other states, local authorities carry out, or strongly influence, licensing of cable infrastructure (Table 3.4).

Table 3.4: Restrictions on Cable TV Infrastructure**Austria**

Permits for the installation and operation of a cable network are non-exclusive and are for unlimited periods. The permits are regional, as they are issued as community television antennas, but cable operators can interconnect their networks under a special additional licence.

The permit may be subject to the condition that PTA's (the incumbent PTO) broadband lines are used entirely, or in part, if this can be justified on the grounds of economically extending the PTA telecommunications network.

Belgium

In Belgium, telecommunications are regulated at the federal level, but broadcasting (including cable TV) is regulated by the; French, Flemish and German speaking language communities.

Authorisation to operate a broadcasting network is obtained from the appropriate language community. The current cable operators, who are closely linked to the municipalities, have de facto monopolies in their areas. Whether the language communities would issue additional cable TV infrastructure licences to a telecoms operator is unclear.

Denmark

Those wanting to construct and operate a cable network need a licence issued by the telecommunications regulator, Telestyrelsen. There are no restrictions on the number of licences issued or on franchise areas; licences are normally issued within a local area.

Finland

The construction and operation of non-local cable TV networks requires a licence under the Telecommunications Act, though local networks used solely for cable TV broadcasting are not subject to licensing. The geographic area covered by the licence varies. Regulatory barriers to market entry are low and licences, where required, easy to obtain. The draft Telecommunications Market Act proposes the removal of all licensing requirements for PTOs, except for mobile operators.

Although under the law there is no restriction on the ownership of cable TV networks, in practice they are owned by the local PTOs and leased to cable broadcasters solely for cable TV activities; this precludes their being used for providing competing telephony services.

France

In France a company that wants to install a cable TV network needs the agreement of the relevant municipalities or group of municipalities. The award process for cable networks varies between municipalities; a municipality must examine any application received. The municipalities cannot technically grant exclusive licences to a private organisation, however they are not required to grant authorisations and can refuse to offer licences on technical or economic grounds. As a result, in practice, a municipality can grant exclusivity to a cable network operator.

Legally, a municipality can grant exclusive rights where:

- The installation of the cable TV network is considered as a public service.
- The municipality itself sets up the cable TV network.

Germany

Since the passing of the Telecommunications Act in August 1996, the construction and operation of a cable TV network requires a licence, but there are no restrictions on the number of licences that can be granted and no specific franchise areas. A licence application can be rejected only if there are reasonable doubts about the applicant's integrity or competence.

Greece

Current legislation in Greece provides that the "exclusive right" for the provision of cable TV services belongs jointly to ERT (the state broadcaster) and OTE (the state owned telecommunications operator). OTE holds an exclusive right to provide cable TV infrastructure. There are no obligations to provide access to other service providers, though OTE/ERT can form ventures with third parties if they want.

The current legislative framework is liable to be liberalised under pressure from the European Commission.

Ireland

Separate licences are granted for cable and MMDS retransmission. In practice the licences are granted in respect of geographical areas specified in licences and they grant de facto territorial exclusivity; this practice has been subject to court challenge in relation to the MMDS systems. Currently, legislative amendments are being prepared to change the licensing system.

Italy

The Italian cable TV market is underdeveloped, in part because of legal uncertainties and a lack of implementation of secondary legislation.

Current legislation is designed to encourage the use of infrastructure provided by "public means"; taken to mean the incumbent PTO, Telecom Italia. The ownership of cable TV infrastructure is restricted to Telecom Italia except in the case of "local" operators, where Telecom Italia cannot provide the infrastructure. The method of ascertaining whether Telecom Italia has the infrastructure and the definition of "local" are to be described in regulations that have not yet been issued.

Luxembourg

As a result of new and changing legislation, the details of the cable licensing regime, in particular the detailed conditions to be attached to licences, are not yet clear. However in principle, the establishment of cable TV infrastructure is subject to the same licensing regime as telecommunications networks and the number of players permitted to operate cable networks is unlimited. "Passive broadcasting" – transmission of already licensed material – does not require a licence. The licences may determine geographical coverage.

The Netherlands

Under the new telecommunications licensing regime, holders of national telecommunications licences, but not regional licences, can offer cable TV services, as can the existing cable TV operators and the concession holder (KPN). Licences cover both network infrastructure and the provision of services.

Originally, only one cable TV licence was issued, but the Telecommunications Act does not preclude the granting of more than one licence. Recently, the Ministry responsible announced that under specific conditions (particularly the under-performance of the first licence holder), more than one licence might be granted. The cable TV licences are geographically restricted to the area of a municipality.

Portugal

In Portugal there are no restrictions on the availability of licences to offer cable TV services. Both Portugal Telecom, the incumbent operator, and independent companies have cable licences. There are no limits on the number of operators in any one area. All cable operators have to use Portugal Telecom's duct infrastructure where there is spare capacity. Licences cover specific geographical areas based on municipality limits. The assets of the cable operator revert to the state on termination of the licences, as with Portugal Telecom's assets at the end of its concession.

Spain

Under the 1995 Cable Law, licences will be granted to one operator in each geographical area; the licensing process is still under way. The licensing areas are being defined by the municipalities involved. The single licence is in addition to the privileges granted to Telefónica, which can provide cable services nationally. Where a private operator is awarded a licence, Telefónica is forbidden to offer a service for 16–24 months.

Sweden

The Swedish cable TV market is one of the least regulated in the world. No licence is required for the establishment or operation of a cable network or for the provision of a television service over the network. There are no limits on the number of operators, and any potential operator can lay cables provided it has the permission of the landowner.

U.K.

The U.K.'s licensing policy allows for one cable operator in each of the franchise areas defined by the regulator.

BT and the other PTOs are currently forbidden to convey or provide broadcast services nationally over their networks to homes. They can, however, compete for franchises or buy cable operators in the same manner as any other organisation. The restrictions on conveyance and provision are scheduled for review in 1998 and 2001 respectively. However, the new government is expected to lift them early.

Restrictions on cable operator's commercial freedoms.

Other regulatory controls on cable TV operators, such as pricing control and control over choice of programming, may make it less attractive for new players, including PTOs, to enter the market. The provision of cable TV services has often been seen as a utility service, with the result that, in some Member States, cable TV has been provided by, or on behalf of, municipalities, with a limited remit to retransmit television and radio signals. Where cable TV is seen as a monopoly public service, public bodies may put pricing controls and mechanisms on the programming delivered over the networks.

If cable network operators have limited control over the choice of programming, their ability to develop attractive programme packages and services that will generate returns on the network investment will be reduced. In particular, if an independent body determines programming, it could require the existing and the new cable service provider to carry the same programming. In these circumstances, the new operator would have little opportunity to differentiate its offering. Whether such restrictions would be placed on a new cable operator is untested. In the countries where these restrictions exist, no new operator has entered a market already served by an incumbent.

Similarly, if the pricing of the cable services they provide is strictly controlled, the operators will have less control over their revenues and no guarantee that they will be allowed to raise prices in line with inflation.

Most operators we interviewed believe that broadcast TV programming will be an essential element of the overall package of broadband services that customers want. Without broadcast services, the overall package will be less attractive, take-up reduced and the business plan for investment in broadband infrastructure less attractive. BT's trials in Westminster, where it owns a cable franchise, have shown opportunities for cross promotion of broadcast and interactive services, for instance. Restrictions on telecommunications operators providing cable TV services will stop them realising these additional revenue streams, making them less likely to invest in a broadband network.

Restrictions on cable operators in programming and pricing are described in Chapter 2.3. Table 3.5 below summarises the countries in which such restrictions could make the cable TV market less attractive for new market entrants by limiting their ability to choose their programming. Requirements on cable TV operators such as: "must carry" channels, domestic programming or controls for taste, decency and protection of minors are not included.

Table 3.5: Programming and Pricing Restrictions on Cable Operators**Belgium**

In Belgium, telecommunications are regulated at the federal level, but broadcasting (including cable TV) is regulated by the French, Flemish and German language communities.

This division of responsibilities has led to conflicts over which authority should regulate services other than broadcasting, such as multimedia services and video on demand; this issue is the subject of a judicial review.

Following the passing of the new law of 20th December, 1995, Belgacom is authorised to provide "radio broadcasting", including the transmission of television signals.

As a result, Belgacom has significantly more freedom to provide cable TV services than the cable operators. The cable operators have no control of the programming transmitted over their network; the local municipalities make the choice. However, Belgacom is now producing a television channel, "Event TV", and has obtained authorisation for this channel from the German language community. The channel has become a "must carry" channel over the cable networks.

The current market structure may not be tenable if competition increases and the cable operators lose market share. Pricing is strictly controlled and cable operators are currently only marginally profitable, helped by the fact that their networks are heavily depreciated. They rely on recouping revenue from many households with their greater than 95 per cent penetration. Additional competition, reducing their revenue base, would upset the balance.

Denmark

Households are currently balloted every second year on which programmes should be distributed over the networks (in addition to the "must carry" programmes), limiting the potential for operators to control and develop the value of the proposition offered to customers.

Germany

The regional media boards, the Landesmedienanstalten, currently determine which programmes are carried over the limited capacity of the existing networks. Whether they would exert control over content, rather than over standards, if more capacity were available on competing networks, is not clear.

The principle of "State-Distance" in the German constitution prevents state control of broadcasters. While Deutsche Telekom was an entirely state owned organisation it was prevented from determining which programming was distributed over its cable networks. Following its partial privatisation, whether "State-Distance" applies has become less clear.

Ireland

The pricing of the basic tier of programming on cable TV networks is strictly controlled.

Italy

A strict interpretation of the broadcasting legislation prevents public entities from obtaining broadcast licences. So while Telecom Italia remains state owned it should not be able to provide a cable TV service to consumers. However, Telecom Italia's subsidiary, STREAM, is broadcasting now – purely, it says, on an experimental basis.

Portugal

All cable operators are limited in terms of the services they can offer. The current law restricts cable TV operators from providing any service except the retransmission of the programming of others. As a result, cable operators cannot even add subtitles to existing programmes or time delay broadcasts.

This law is likely to be reviewed, as the cable Directive will require that cable operators are also permitted to provide liberalised telecommunications services. There is pressure from cable operators on the government to relax the restrictions on providing programme content, which limit the amount of programming available to a Portuguese speaking audience.

3.2.3 Impact of Restrictions On Market Development

As network technologies develop, the restrictions will limit market development.

At present, there is little immediate pressure for removal of restrictions on telecommunications operators providing cable TV capacity over their telecoms networks. Many of the dominant PTOs already own separate cable TV infrastructure and it will be a few years before the technology for broadcasting TV over existing telecommunications networks is economically feasible. Among our interviewees, only a BT spokesperson mentioned it as an issue, pointing out that the economics of the business were just as big a hurdle. The new telecommunications operators who might want to build broadband infrastructures do not yet exist.

The current focus of PTOs in delivering broadband services is high speed Internet access. Almost all the operators are examining methods of doing so, particularly via ADSL. Restrictions on providing cable TV capacity do not stop the PTOs doing this because Internet is not a broadcast service. The same applies, in many Member States, to Video On Demand, also not strictly a broadcast service, since each viewer receives the programme it ordered. However, the legal status of these new services is not always clear, as the dispute between the language communities and federal authorities in Belgium over which should have jurisdiction demonstrates.

As the capabilities of telecommunications networks grow they could become indistinguishable, in service delivery capacity, from cable TV networks. Discriminating between the networks according to whether they developed from a cable background or from a telecommunications background will no longer be relevant.

These restrictions could prevent or discourage telecoms operators from building new broadband networks or from upgrading their existing networks as they want, damaging the business case for building a broadband network. Regulation that prevents broadband networks being built or used to their full capacity could result in:

- Lower investment.
- Fewer competing delivery mechanisms for interactive multimedia services.
- Less innovation in multimedia products and services, as fewer networks compete for customers.
- A less competitive European telecommunications and multimedia market, with less attractive employment prospects.

Interviews with industry players across the European Union and analysis of regulatory regimes and policies in the Member States suggest a need to consider ways to accelerate development towards the Information Society. Building on the discussion of the current situation in Chapter 2 of this report, and the detailed discussion of joint ownership and restrictions on the provision of cable TV services in Chapter 3, we outline below the likely results of various options for dealing with the obstacles to optimal development presented by joint ownership and by restrictions on the provision of cable TV services. The options are on a continuum from maintaining the status quo to direct intervention by a regulator, policy maker of a Member State, or telecommunications or cable company.

In each case, we rank the option's impact as low, medium or high. Our definition of low impact is self evident – progress towards the European Commission's objectives will continue to be slow, with the majority of Member States lagging behind the most advanced markets for the foreseeable future. Medium impact means that more European Union countries will have the chance to progress quickly towards the competitive environment that is developing already in the U.K., where infrastructure competition has begun, and companies are vying for licences for emerging technologies such as DTT. An option that has high impact will create a market with a wide choice of services provided over competing infrastructures; companies will produce a continuous stream of innovative products and services, creating additional employment and contributing to social welfare.

In the first section of this chapter we outline options for the treatment of joint ownership and their likely impact on market development, ranging from the maintenance of the status quo to the divestiture of the cable TV network by the dominant PTO. In the second part, we look at various options for dealing with restrictions on the provision of cable TV services, assessing the impact of lifting these restrictions on the telecommunications and multimedia markets.

4.1 Options for Joint Ownership

The ownership structure of cable TV networks varies throughout the Member States (see Table 4.1). In most countries, some form of joint ownership exists. The percentage of cable TV network ownership however varies significantly: some dominant PTOs own a small percentage (below five per cent market share) of the cable TV market, others dominate the sector (above 50 per cent). Joint ownership can be found in all the emerging cable TV markets (see Chapter 2.3).

Table 4.1: Geographical Overview of Ownership

State of Market	Joint Ownership*	No Joint Ownership
Less developed markets	<ul style="list-style-type: none"> • Greece • Italy • Portugal • Spain 	
Developed markets	<ul style="list-style-type: none"> • Denmark • Finland • France • Germany • Ireland • Netherlands** • Sweden • U.K. 	<ul style="list-style-type: none"> • Austria • Belgium • Luxembourg

* The Cable TV market share of the joint owners varies from about 1 per cent in the U.K. to about 80 per cent in Portugal

** Reduced to a 20 per cent share in Casema (The Netherlands)

The options available to regulators and policy makers in dealing with the telecommunications and multimedia markets range from encouraging joint ownership to the enforced divestiture of the cable TV operations of the dominant telecommunications operator. Broadly, the options fall into four categories:

- Maintaining joint ownership.
- Partial joint ownership.
- Divestiture of the cable TV operation.
- Transition from joint ownership to divestiture.

In the first category, we examine six options with different degrees of restriction on the joint owner; the impact on the development of infrastructure and services increases with the transparency of and separation within the joint owner's group of companies.

The second category, partial joint ownership, covers increasing separation of the cable TV company from the joint owner, as new shareholders take bigger shares. The higher their share, the higher the impact on accelerated development of infrastructure and services in the Member States.

Divestiture of the joint owner's cable TV network, the third category, has a high impact on infrastructure and service development, leading to the highest level of infrastructure development in terms of capacity increase, accessibility of residential customers and availability of services, as well as to high innovation and the ability of other service providers to offer their services over different infrastructures. Implementing this option will offer the basis for development of telecommunication and multimedia markets in line with the European Commission's objectives.

In the fourth category, transition, we look at two options mentioned by many interviewees for the period between joint ownership and partial and/or full divestiture: introducing an independent trustee and structural separation. These options can be combined. In The Netherlands, KPN had not only to separate its

cable operations legally from the telecommunications operations but also to set up separate management and an independent trustee. The regulator enforced these steps to initiate a partial divestiture of KPN's cable operations, moving it towards an eventual minority share of less than 25 per cent.

The other options described above can also be part of an overall transition from joint ownership.

Figure 4.1 below summarises the results of our examination of 10 main options within the four categories described.

Although the majority of our interviewees see joint ownership as a barrier to market development, five companies interviewed support continuing joint ownership, arguing that technological development of alternative local loop accesses and market dynamics will regulate the market structure, and that existing competition law is enough to enable market self regulation.

Some market participants argue that the regulator could encourage competition by forcing the incumbent to upgrade the cable TV for full bi-directional services. The regulator would need to intervene strongly to guarantee open and non-discriminatory access to unbundled local loop elements.

As outlined in the Introduction to this report, the Cable TV Directive has enforced accounting separation. The first step towards transparency of the cable TV operation of the joint owner is therefore ensured. Transparency will highlight and thus discourage the cross subsidy that is a subject of major concern to regulators in a number of Member States; they see PTOs using revenues deriving from their market monopoly to support their cable TV operations, putting existing competitors and entrants at a disadvantage. Accounting separation will not on its own enable the regulator to evaluate the joint owner's cable TV network activities, since many intergroup services and price arrangements cannot be monitored.

Option 1: Maintain joint ownership.

The dominant telecommunications operator maintains ownership of cable operations as a division of its company. If it is not already doing so, as required by the European Commission Cable TV Directive, it begins to account separately for its cable operations. This is the situation now in Germany, Greece and Finland. In contrast to the two more developed markets, the Greek market is still embryonic; OTE shares the monopoly for building cable networks with the Greek public broadcaster ERT.

Impact on infrastructure.

Joint ownership is unlikely to encourage the development of infrastructure, since upgrading the infrastructure will not bring in attractive new revenue streams for the owner. Upgrading for two-way capacity, for example, will not generate additional telephony revenues. Upgrading for cable modems will incur significantly higher investment than upgrading the PSTN network (ADSL) to meet customer demand. Some joint owners are considering an upgrade for multichannel (analogue and/or digital) services, but with no obvious business justification for the new services, they are in no hurry. Moreover, upgrading offers no competitive advantage.

Figure 4.1: Ownership Options

Options for Ownership	Impact on Infrastructure					Impact on Services			Comments
	Capacity Upgrade	Accessibility to Residential Customers	Cost / Performance Improvement	Availability of Products and Services	Increasing Choice of Service Providers	Innovation Rate for New Services and Applications			
1 Maintain joint ownership without other change									<ul style="list-style-type: none"> No cable upgrade Less innovation in service provision Slow down of content service development No short or medium-term infrastructure competition Strong regulator needed
2 Maintain joint ownership / DTH development towards digital multichannel services									<ul style="list-style-type: none"> Influence on cable upgrade to remain competitive Increasing availability of products and services because of rising competition Rising number of service providers in the market No impact on upgrade to bi-directional services
3 Maintain joint ownership but establish ONP on joint owner's cable network									<ul style="list-style-type: none"> Extended content service competition Strong regulator required Cable upgrade investment requirements vary strongly between countries



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Figure 4.1: Ownership Options (continued)

Options for Ownership	Impact on Infrastructure					Impact on Services			Comments
	Capacity Upgrade	Accessibility to Residential Customers	Cost / Performance Improvement	Availability of Products and Services	Increasing Choice of Service Providers	Innovation Rate for New Services and Applications			
4. Maintain joint ownership but open up spectrum for wireless local loop (narrowband)									<ul style="list-style-type: none"> Potentially medium-term infrastructure competition Potential devaluation of cable Joint owner forced to upgrade cable to remain competitive Increase of content-service development Digital, two-way broadband technology not yet available at competitive price, widespread rollout not realistic in near future
5. Legal separation (creation of 100% cable subsidiary)									<ul style="list-style-type: none"> Minimum condition for effective surveillance of competitive behaviour Transparency of assets and costs Clear allocation of profit / loss Allows shareholders and regulator to see profitability of CATV
6. Legal separation and management separation									<ul style="list-style-type: none"> As point 5 Separate management needs to present achievements to shareholders and public Motivation for management to increase number of services and network performance Financial and management details still have to be revealed to parent company



Figure 4.1: Ownership Options (continued)

Options for Ownership	Impact on Infrastructure					Impact on Services		Comments
	Capacity Upgrade	Accessibility to Residential Customers	Cost / Performance Improvement	Availability of Products and Services	Increasing Choice of Service Providers	Innovation Rate for New Services and Applications		
7 7.1 Partial joint ownership Incumbent owns >50%							<ul style="list-style-type: none"> All of points 5 and 6 <ul style="list-style-type: none"> Majority of shares allows joint owner to make management decisions and therefore avoid competition between the two infrastructures Specific contract with other shareholders may impact development of infrastructure and services 	
7.2 Incumbent owns <50%							<ul style="list-style-type: none"> Cable upgrade achievable according to business case Higher possibility for additional service providers next to joint owner Financial and management decisions have to be revealed to parent company Blocking vote of joint owner against major competitive action, i.e. in POTS 	
7.3 Incumbent owns <25%							<ul style="list-style-type: none"> Since joint owner does not have "blocking" minority vote, a full service competitor can be established by management according to business case Joint owner can keep link to CATV network for the provision of cable TV services 	



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Figure 4.1: Ownership Options (continued)

Options for Ownership	Impact on Infrastructure					Impact on Services		Comments
	Capacity Upgrade	Accessibility to Residential Customers	Cost / Performance Improvement	Availability of Products and Services	Increasing Choice of Service Providers	Innovation Rate for New Services and Applications		
8 No joint ownership								<ul style="list-style-type: none"> Service and infrastructure competition Increased accessibility of residential customers Full upgrade of CATV network Technology improvement usable as competitive advantage – continuous network operator Increasing choice of service providers, even of similar services, because of additional capacity and competing infrastructures
<i>Additional options for transition periods</i>								
9 Independent trustee								<ul style="list-style-type: none"> Independent trustee is able to optimise cost / performance of networks Independent trustee is unlikely to receive funds for network upgrade In the Netherlands the trustee option is used during the transition to partial divestiture
10 Separation of network and services (creation of separate subsidiaries for joint owner)								<ul style="list-style-type: none"> Very limited network upgrade owing to risk aversion of network owner (cannot participate in upside) Price increase since network operation has to be profitable stand alone Strong regulator needed to control increasing prices If service providers are allowed to invest in network upgrade, "shared ownership" is created



Entrants have no alternative way of gaining access to the residential customer but to use the dominant operator's network or to build a new network. Building a network takes time, delaying their ability to compete on an equal basis.

Neither the cost structure nor the performance of cable TV services is likely to improve with joint ownership. Without a network upgrade, transmission costs for a TV channel will remain at least four times higher than the costs of digital signal transmission. In Germany, for example, Deutsche Telekom announced in June that it would increase the transmission costs for broadcasters by 3000 per cent unless it was allowed to share revenues with the programme suppliers (it currently proposes to take a share of about 35 per cent). In other countries, the broadcaster does not have to carry the transmission costs; the cable TV operator takes them over.

With separate infrastructures for cable TV and PSTN services, the joint owner has no impetus to provide PSTN and other services to the customer via cable TV. Continuing joint ownership will not therefore increase the availability of products and services.

Impact on services.

Until the network is upgraded, service providers will have limited capacity for cable TV services on the cable TV network, and no additional telephony or multimedia services, via cable modem, for example, will be available.

When the market includes just a few service providers, the joint owner's network capacity is crucial. Additional content services are being delayed by the bottleneck in capacity in most Member States.

Option 2: Maintain joint ownership/accelerated development towards digital DTH (Direct to Home) multichannel services.

Digital DTH multichannel services have a positive impact on the development of multimedia markets. In European markets where these services are established or are being established, the cable TV operators are under pressure to upgrade the network for digital multichannel services. In the U.K., for example, the cable companies started planning their own upgrade to digital multichannel services when BSkyB announced its plan to offer digital multichannel services. Even with joint ownership a multichannel DTH service can extend the range of services.

However, advanced DTH is not an alternative to the wireline full service network, since it does not offer two-way capacity (see also Chapter 2.5). The wireline networks still need to be employed for the return path.

Option 2 will lead to a slight, indirect increase in access to residential customers, because of the additional capacity, but only among existing or potential DTH customers. Households in apartment blocks already connected to cable TV are more likely to stay with the infrastructure they have. In Spain, a developed and, thanks to digitisation, increasingly attractive DTH service will be a market barrier to cable roll out. Larger apartment blocks already devoted to DTH via SMATV and a critical mass of DTH subscribers will not be easily diverted to cable.

The increased DTH capacity will allow new providers to offer the existing service bouquets, as will the provision of digital multichannel services via cable.

The impact on infrastructure and services will be similar to that of Option 1.

Option 3: Establish open network provision on joint owner's cable network.

This option depends on the willingness of the joint owner to upgrade the network for multichannel services. As detailed in Chapter 3.2, Open Network Provision (ONP) for the cable TV network will enable service providers to compete to broadcast on the cable TV network of the joint owner as long as capacity is available. Many cable TV networks in the European Union have capacity for only 30–40 analogue TV channels, far fewer than the broadcasters who want to enter cable TV networks demand. ONP would be a step towards equal competition in the cable TV market. Even an upgrade enabling the transmission of digital signals would not increase capacity enough to allow all potential service providers to enter the cable TV network in countries such as Spain, France, the U.K. and Germany. Upgrading capacity to 150 or even more digital TV channels would not fulfil all capacity requirements. In the U.S., the digital DTH operator DirecTV offers capacity for about 200 TV channels, still not enough from the potential competitors' point of view.

A capacity upgrade for the provision of all communications services (PSTN services and cable TV services) is highly unlikely with joint ownership (see Chapter 3.1), and has not taken place in any Member State.

Option 3 does not include “access to the network” for the service provider, because of the difficulty of protecting the ownership of the service provider's network or of the existing cable network. This extension would lead to “shared ownership”, because of the necessary investment protection. Access to the cable TV network has not yet been tested in the European Union or in other developed countries.

ONP for cable TV services on the joint owner's cable TV network is already possible where the regulator or an independent board decides on the channels broadcast over the network. In Germany, for example, the Landesmedienanstalten decide which channels are broadcast over the cable networks as long as there is scarce capacity. In the Netherlands, an independent municipal board takes the decision on what broadcasters carry.

Extending this option, each broadcaster or multichannel service provider could provide services over the cable TV network if the network had been upgraded to digital signal transmission capacity. In transmission of traditional analogue signals, limited capacity leads to a bottleneck requiring independent control.

Impact on infrastructure.

Opening the network to other providers will give the joint owner no additional incentive to upgrade the cable TV network. On the contrary, being forced to share the new service possibilities with others, rather than exploit them exclusively, is likely to be an unattractive prospect.

Other service providers will benefit, gaining access to residential customers through the cable TV network.

As suggested earlier, the cost structure and performance of the network will be improved by a cable upgrade, with or without ONP, as will the availability of products and services for the consumer. Option 3 will not in itself have much impact on these factors.

Impact on services.

ONP will secure the availability of several service providers. But here too, only a network upgrade will make a big difference. ONP will increase the innovation rate, since competition encourages innovation. With limited existing capacity, however, the scope for new services is limited.

Option 4: Maintain joint ownership, but open up spectrum for wireless local loop (narrowband).

To establish an alternative local loop access, the regulator could open up spectrum for narrowband and broadband wireless local loop technologies (see also Chapter 2.4). The allocation of broadband spectrum, however, will take time.

The introduction of narrowband wireless local loop technology will have virtually no impact on the development of telecommunication and multimedia markets. The only such service so far is the Ionica network in Cambridge/U.K., which provides additional capacity and another infrastructure for PSTN type services. Since it cannot provide other services such as cable TV, it cannot compete, on equal terms, with an upgraded PSTN or a cable TV network.

High bandwidth wireless local loop technology, when it arrives, will have a high impact on telecommunication and multimedia markets, providing both telephony and cable TV services. A broadband wireless network in the local loop with digital and two-way capacity would be a major competitor for the existing wireline networks, accelerating the development of infrastructure and services. Recent successful tests performed by the Swiss PTT show the feasibility of the technology. The technology is not, however, commercially available; the allocation of spectrum, moreover, takes time: allocating spectrum for DECT, for example, has taken three years. Other broadband wireless local loop technologies do not have a significant impact in the Member States. LMDS in Ireland, for example, carries only 11 analogue channels; its overall competitive impact is insignificant.

Option 5: Legal separation.

In Option 5, the joint owner owns and controls the cable TV network, but has transferred the asset of the cable network to a separate legal entity. This is the situation in Italy, Portugal, Spain and the U.K.; in Spain, Telefónica has announced that it is willing to move to partial joint ownership (Option 7.1), taking minority equity partners into each cable franchise.

This option will increase the transparency of assets and costs, allowing shareholders and the regulator to monitor the profitability of the cable TV network. It will also make it possible for the regulator to enact competition law, since the cable TV

operation is a separate legal entity. Regulators see this move as a means of influencing market structure to ensure competition.

Impact on infrastructure.

Legal separation allows for a clear allocation of profit and loss, putting the cable TV networks under even more pressure to create a competitive business. It does not, however, give the joint owner a reason for upgrading the networks to provide advanced services. Customers will have access to more products and services, since the clear allocation of profit and loss enforces improves network usage. This option will also reduce network costs and improve performance.

Impact on services.

Option 5 will lead to a small increase in choice of service providers as a result of network optimisation. The number of service providers will still be limited by network capacity, resulting in only a few more TV channels and other services (e.g. one additional teletext). The introduction of these services will not, however, increase the innovation rate for new services and applications, since the joint owner is unlikely to take the additional risk required of investing in unproven technologies and untested services.

Option 6: Legal and management separation.

To the legal separation described above, Option 6 adds separate management of the joint owner's cable TV network: as an example, the CEO of the joint owner cannot also be the CEO of the cable TV network subsidiary. Option 6 is already in place in Denmark and Sweden.

This option encourages competition by creating the need for the management of the cable TV network subsidiary to present its achievements to shareholders and to the public. Although the financial and management details still have to be revealed to the parent company, management has an incentive to increase the number of products and services and to improve operational performance.

Impact on infrastructure and services.

Option 6 will have the same impact on infrastructure and services as Option 5, but a higher impact on the availability of products and services and on cost/performance improvement, in view of the greater incentive for the management to publicise its achievements.

Option 7: Partial joint ownership.

In partial joint ownership, the joint owner owns a percentage of the cable TV network, while the rest is owned by one or more individuals or institutions. The cable TV network assets then become part of a separate company. One result of all partial ownership options is that cross-subsidisation is much reduced, since the companies are legally separate.

Partial joint ownership options fall into three bands – dominant telecommunications operator owns more than 50 per cent, less than 50 per cent and less than 25 per cent.

Option 7.1: Dominant operator owns more than 50 per cent.

This option is in place in France and in Ireland. In both countries the joint owner is still in control of the network and fills at least some of the senior management positions.

Retaining the majority share allows the joint owner to make management decisions and therefore avoid competition between the two infrastructures. A number of interviewees described the relationship between the joint owner and the cable company as interdependent, with the joint owner talking about “our cable subsidiary”. These remarks suggest that where the joint owner still has a majority share, it sees cable TV network as part of the group and therefore part of group strategy, paying little attention to the potentially different requirements of other shareholders.

Ensuring that the contract between joint owner and the other shareholders includes a network upgrade for the provision of bi-directional services may have a positive impact on the development of services and/or infrastructure.

Impact on infrastructure.

This option has only a small impact on network capacity, since the joint owner is unlikely to be interested in upgrading the network for potential competitors to its core business, telecommunications. Other providers do not gain more access to residential customers, since the joint owner remains in control of the network.

Since the cable company reports not only to the joint owner but also to other shareholders, the joint owner’s incentive to make the network more attractive and more profitable through cost and performance improvement may be higher; on the other hand, it will demand additional investment in reorganisation and perhaps even reconstruction. At the same time, shareholders encourage new products and services.

Impact on services.

Improving the performance of the network increases the choice of service providers for the consumer. It also encourages innovation in services and applications. However, since the joint owner is still in control, the impact on the development of services will not be high.

Option 7.2: Dominant operator owns less than 50 per cent.

When the joint owner has a minority share in the cable TV network, the company still has to reveal financial and management decisions to the joint owner, who will probably be able, through the shareholder contract, to block decisions to invest in upgrade. The shareholder contract strongly influences the remaining level of influence. However, having handed over control of the company to another shareholder(s), the joint owner’s influence on the company’s development and competitive behaviour is less than when it is majority shareholder.

Whether the majority shareholder in Option 7.2 pushes the decision to upgrade the network will depend on whether it can make a business case for doing so. If the network needs to be upgraded for cable telephony, a conflict may arise with the minority shareholding joint owner. If the conflict over introducing two-way services

cannot be resolved, the joint owner may reach an agreement with the other shareholder(s) to reduce its share to below 25 per cent, or to zero.

Impact on infrastructure.

Option 7.2 will have a positive impact on capacity upgrade, since the majority owner will have a strong interest in improving the cost/and performance structure of the network and its operations. For the cable TV network, the accessibility of residential customers will also increase.

It will be in the majority shareholder's interest to provide the consumer with as many attractive products and services as possible.

Impact on services.

Having an independent majority shareholder will open up the opportunity to other providers to provide services on the cable TV network and therefore increase the consumer's choice. The innovation rate of new services and applications is likely to increase as new entrants arrive.

Option 7.3: Dominant operator owns less than 25 per cent.

Implementing this option makes full network competition a possibility. A joint owner with a less than 25 per cent share will be unable to block major decisions by the majority shareholder. Depending on the details of the shareholder contract, with a share below 25 per cent the joint owner is much less likely to have a blocking vote on important business development decisions. By keeping a smaller share in the company, however, the joint owner can keep the right to provide services over the network and therefore to provide the full range of communications services to a household. Providing PSTN, cable TV and multimedia services as one package to the household might be an important part of the joint owner's corporate strategy. The right to remain a service provider would need to be agreed upon in the shareholder contract.

After the completion of the privatisation process in The Netherlands, for example, KPN will own less than 25 per cent of Vision Networks, the former cable TV subsidiary.

Impact on infrastructure and services.

The impact of this option will be high, comparable to that of Option 8.

Option 8: No joint ownership.

The availability of two competing wireline networks able to provide PSTN and cable TV services will create viable infrastructure competition and have a high impact on the development of the telecommunications and multimedia markets. (See also Chapter 3.1).

In Austria, Belgium and Luxembourg, there is no joint ownership of telecommunications and cable TV networks. In these countries the ownership of PTOs has developed separately from the outset. Other countries could abolish joint ownership only by divesting the cable TV network operations of dominant PTOs.

Impact on infrastructure.

Separation of ownership will have a high impact on network upgrade, since the new owner will want to provide a full range of communication services. To date, there are no examples of divestiture in the Member States to demonstrate the impact. In The Netherlands, however, where Vision Networks is upgrading the cable network for two-way services to increase the network's value, potential new entrants are competing to purchase the company. Private investors do therefore appear to be willing to make the huge investments necessary. In Spain, several competing consortia are currently bidding for cable licences; Telefónica, the dominant PTO, has also announced plans to build out a cable TV network.

Having two independent, competing networks increases accessibility to residential customers for existing or new service providers, giving them a choice of network partners. As one interviewee said, "divestiture is the only way to achieve real competition at the local access level"; another said "divestiture increases the accessibility of residential customers through alternative and better access to infrastructure".

With divestiture, cross-subsidies disappear. In addition, the shareholders have an interest in optimising the performance of the network and creating the most attractive service portfolio for customers. They will also push for cost reduction as another means of achieving profitability.

The availability of products and services will increase for the consumer with the establishment of a second full communication services network, since competition spurs the need for additional and potentially unique services; as interviewees said, "divestiture should lead to greater service provision in response to customer demand", "divestiture will accelerate the creation of cable telephony services".

Impact on services.

In the absence of joint ownership, the choice of service providers will increase. To launch the upgraded network in the market, the new shareholders will push for rapid innovation in services and applications.

Option 9: Independent trustee.

In the Netherlands an independent board of trustees managed the transition from KPN's 100 per cent ownership to below 25 per cent share (see Option 7.3). To prepare the cable network for infrastructure competition, the board of trustees has to act independently of the joint owner. The independent trustee also has to establish the transparency required for divestiture.

Impact on infrastructure.

The independent trustee is unlikely to have or to receive the funds to upgrade the existing network. Upgrade for bi-directional services will certainly not be in the interest of the joint owner, since it will accelerate telephony competition from another wireline network. The funding for upgrade can be generated only by government cooperation, in the form of guarantees, or a loan. This way of financing an upgrade will however narrow the financing options for the future shareholder(s).

The accessibility of residential customers will increase, since the independent trustee will want to attract additional business to the network, especially from service providers not related to the joint owner. Network capacity will limit the extent of the increase.

To increase profitability, the trustee will want to optimise the performance of the network within the existing limits, increasing the number of services provided.

Option 10: Structural separation.

Network operator and service providers can be separated in two ways to allow fair and equal competition. One is to stop the joint owner providing services on the network, the other to allow the joint owner, among others, to provide services. In neither case will the joint owner have an incentive to upgrade the network to two-way services, since doing so would reduce its revenues from PSTN.

In countries where there is joint ownership, interviewees frequently mentioned the option of separating the network operator from the service providers. Some interviewees said that they would prefer not to invest in the network upgrade but to have the joint owner remain responsible for this task. A network upgrade in this option would be an upgrade to a full service network. This option also implies that the joint owner is operating the network.

Joint owner is allowed to provide services.

A joint owner allowed to provide services on the cable TV network can participate in the benefits of certain network upgrades. So, however, can every other service provider, reducing the joint owner's motivation to upgrade extensively. To allow the joint owner to be one of the service providers might give it an advantage, because of its knowledge and the cooperation of its service provider and the network operator. The dominant position of the joint owner is therefore supported.

Joint owner is not allowed to provide services.

If the joint owner is operating the network only, and is not able to benefit from the additional revenues created by a network upgrade, it is even less likely to invest in an upgrade. If the potential beneficiaries, the service providers, are allowed to invest in the network, ownership becomes indirectly shared, complicating the regulator's job.

The following issues raise additional complexity for the regulator in both cases:

- Will all service providers have to give permission for a network upgrade, since their business is influenced by the new network configuration and the changing competitive environment?
- Is there a ranking of service providers, or are several, or all, allowed to invest in a network upgrade?
- How can a service provider who has not invested in an upgrade be stopped from exploiting the opportunity when the upgrade has taken place?

Such complications make this option an impracticable one. If it is adopted or used for a transition period, a strong regulator is required to maintain stability.

Impact on infrastructure.

The impact on network upgrade will be low, since the network operator will have to make enough revenue from network operations to be profitable. Since the potential upside for the service providers will not benefit the network operator, the network operator will be more risk averse.

The impact on the accessibility of residential customers will be significant, with open access to the network and an incentive for the network operator to increase network usage. The provision of multichannel services will raise the issue of scarce network capacity, leading to a demand for an institutional body to regulate the bottleneck.

The cost/performance improvements will be limited, since the joint owner will continue operating the network, with limited upgrades. The availability of services will increase, but at high prices, as a result of the separation of network operation and service provision. The network operator needs to achieve profitability without providing services, and needs additional margins to cover the extra layer of company and management structure.

Impact on services.

The choice of service providers will increase slightly, because the network operator will want to increase traffic. However, the limited upgrade will reduce the choice of service providers.

The network operator's unwillingness to take risks will reduce the impact of this form of structural separation on innovation. The rate of innovation will be limited, driven by the service providers.

4.2 Options for Restrictions on the Provision of Cable TV Capacity

Maintaining current restrictions on the provision of cable TV capacity over telecommunications networks could limit the development of new broadband networks. Lifting restrictions on specific PTOs and giving dominant PTOs rights to provide cable TV capacity over their telecommunications networks will have a limited impact. Lifting restrictions on licences for cable TV infrastructure on all PTOs, existing and new, could have a major impact on the development of competing broadband network infrastructure in the long term.

Table 4.2 gives an overview of the countries currently affected by three types of restriction.

Table 4.2: Overview of Restrictions on the Provision of Cable TV

On Cable TV Service Provision by PTOs	On Cable TV Infrastructure Licences	On Cable TV Commercial Freedom
Spain U.K.	Belgium France* Greece Ireland Italy Spain U.K.*	Denmark Germany Ireland Italy Portugal

* Policy, not law

To encourage the development of new cable TV networks in the U.K. and Spain, PTOs are temporarily restricted from providing cable TV services. In the U.K., BT and other PTOs are prohibited from using their networks nationally for delivering broadcast services to homes. In Spain, Telefónica can provide cable TV services, although it has to wait for between 16 months and two years before starting operations if another operator is granted a licence in a particular area.

Some Member States restrict the granting of licences for cable TV infrastructure. In some cases, for example Ireland, franchises are exclusive within a franchise area; in others the granting of licences is at the discretion of a licensing body. In some countries there are differences between government policy and law. Even where there are no legal barriers to entering the cable TV market, the government may decide that only one infrastructure licence is issued, as in the U.K. These restrictions affect all organisations, not just PTOs.

In several Member States a separate service licence is required to provide a cable TV service over a cable TV infrastructure; the impact of removing restrictions on cable TV service licences and on cable TV businesses' commercial freedom is beyond the scope of this study.

Below, we consider the impact of giving PTOs the right to provide cable TV capacity, not to provide a service. We consider three broad options:

- Maintaining restrictions.
- Lifting restrictions on specific PTOs and giving dominant PTOs the right to provide cable TV capacity.
- Lifting restrictions on licences for cable TV infrastructure.

As in Section 4.1, we evaluate these options in terms of their impact on infrastructure and services; in considering infrastructure, we look at capacity upgrade, availability of products and services, accessibility and cost/performance improvement; in considering services, we examine increasing choice of providers and innovation rate. Our assessment of these options is shown in Figure 4.2 We evaluate the impact of each of the options below.

Figure 4.2: Options for Provision of Cable TV Capacity

Options for Lifting Restrictions on the Provision of Cable TV Capacity	Impact on Infrastructure					Impact on Services		Comments
	Capacity Upgrade	Accessibility to Residential Customers	Cost / Performance Improvement	Availability of Products and Services	Increasing Choice of Service Providers	Innovation Rate for New Services and Applications		
1 Maintain status quo								<ul style="list-style-type: none"> In 7 Member States restrictions on new broadband infrastructure remain Reduces opportunity for competition and innovation in multimedia services
2 Lift restrictions on specific PTOs and / or give dominant PTOs rights to provide cable TV capacity via telecommunications infrastructure								<ul style="list-style-type: none"> Potentially large impact as removes legal uncertainty and explicit restrictions on PTOs Potential competitive risk through enhanced position of dominant PTOs Lifts specific restrictions on PTOs where they exist (UK and Spain)
3 Lift restrictions on licences for cable TV infrastructure								<ul style="list-style-type: none"> Removes asymmetry between cable and telecoms regulation Potentially high impact on creation of new broadband networks and multimedia services



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Option 1: Maintain restrictions.

In Option 1, restrictions would not be removed

In eight Member States, there are no restrictions, in principle, on the number of licences to provide cable TV infrastructure; the PTOs, however, still have to obtain multiple licences to offer a nationwide service, as licensing is carried out at local level. In Belgium and France, there is some local discretion in awarding licences: whether a PTO would obtain a licence is uncertain. In Ireland and the U.K., cable licences are local and exclusive. A PTO cannot offer cable services in areas where it does not have the franchise. The situation in Spain is similar, except that Telefónica, the dominant PTO, has the right to provide cable services in addition to another operator in each area. In Greece, cable infrastructure is the exclusive preserve of OTE, and in Italy there is a strong bias towards Telecom Italia being the main infrastructure provider; independent operators can build their own infrastructure only in areas where Telecom Italia cannot provide it. In these two countries there is virtually no cable infrastructure. Restrictions on programming and pricing described in Chapter 3.2 remain; whether they will apply to new cable TV service providers using a new infrastructure is uncertain.

Current plans are to remove restrictions on PTOs in the U.K. and on Telefónica in Spain over the next few years. In the U.K., the restrictions on BT and other PTOs conveying cable TV signals are due to be reviewed in 1998. The new government is, however, expected to lift all restrictions on PTOs providing cable TV services before 2001, the review date proposed under the previous government. In Spain the restrictions prevent Telefónica competing with cable operators for only 16–24 months after they are licensed.

Impact on infrastructure.

The cable TV infrastructure in many Member States will need to be upgraded to provide more channel capacity, since cable TV providers compete against digital satellite DTH, which has the potential to offer hundreds of TV channels. However, in the absence of competing broadband infrastructures, upgrades to provide full interactivity may be limited. Network expansion will continue as planned with major build out, particularly in Spain, as new licences are issued, and in the U.K., as roll-outs are completed. Without any competitive incentive or regulatory requirement to build networks, cable infrastructure in Greece and Italy is likely to remain limited.

The dominant PTOs are unlikely to upgrade their telecommunications networks to provide cable TV in the short term, not only because of the restrictions, but because the high cost of providing broadband services over these networks does not make economic sense. However, as the technology develops, the economic barriers will fall. Regulations or legal uncertainty in seven Member States will continue to limit the opportunity for competition and innovation in multimedia.

Impact on services.

PTOs are likely to continue to innovate in delivering non-broadcast services over their telecommunications networks, for instance high speed Internet access, using ADSL equipment on telephone lines. Development of services based on exploiting the full capacities of interactive broadband networks will not be stimulated.

Option 2: Lift restrictions on specific PTOs and give dominant PTOs rights to provide cable TV capacity via telecommunications networks.

Giving the networks the right to provide cable TV would remove regulatory uncertainty about the uses to which a telecommunications network could be put, despite the different licensing regimes for cable TV infrastructure. In Belgium and France, local communities would no longer have discretion in the licensing of the PTOs to provide cable TV infrastructure. In Ireland, and the U.K., where cable TV licensing is based on exclusive local franchises, the PTOs could become new competitors in a market in which existing operators had assumed continuing exclusivity. This unexpected change in the rules of the game could, however, damage the credibility of the regulatory regime, reducing the propensity of other entrants to invest in the sector in future.

Moreover, by enhancing the position of the dominant PTOs in the cable TV sector, Option 2 could reduce rather than encourage competition. Because dominant PTOs are national players, while cable operators are regional, they might have big economies of scale. If the PTO could provide services or broadcast as well as just provide infrastructure it would have other competitive advantages: being able to negotiate more strongly with content providers and attract national advertising revenues.

Giving PTOs rights to provide cable TV services over their networks, as well as provide the infrastructure to others, could have advantages. If the PTO is not entitled to provide a service over its network it may have less incentive to invest in developing the network: investing in a broadband network is likely to be a high risk, particularly as the market demand for many advanced new services is unproven. Unless the PTO has a guaranteed long term contract with the service provider to provide network capacity, it will be relying on a third party to attract customers and grow revenues that will generate its return on the investment. The PTO could bear all the investment risk while the service provider could stand to reap the returns.

Some players operate under restrictive licence terms such as price caps, obligations to connect on demand any customer within a defined area, or controlled content. Where the PTOs are licensed to compete with these players, the playing field should not be tilted in the PTO's favour by giving it greater freedom.

Impact on infrastructure.

In the short term, the impact of removing these restrictions would be limited, since telecommunications networks are not suitable for broadband services and the upgrade, though technically feasible, does not yet make business sense. However, in a few years, delivery of cable TV over the existing networks is likely to be economically feasible. Then the PTOs will be able to compete with cable (though probably not where they already own the cable networks). Licensing the PTOs could extend the availability of cable services, since the PSTN can reach the majority of homes in Europe, while cable infrastructure is concentrated in urban areas. BT estimates that ADSL technology makes it technically possible to serve 92 per cent of households in the U.K.

There may be a case for restricting the availability of licences to PTOs in regions that have no cable infrastructure yet. A period free from competition from PTOs

could encourage investment, as it has in the U.K. Protection could be linked to build requirements to ensure that the new networks are built, as in Spain and the U.K.

Impact on services.

With infrastructure competition could come an increased choice of service providers; any licensed broadcaster or provider of cable TV services would be able to choose to use the PTO's infrastructure. Allowing PTOs to compete here will increase the innovation rate for new services and applications, as PTOs strive to maximise their return on investment.

Option 3: Lift restrictions on licences for cable TV infrastructure.

Option 3 gives all PTOs the right to provide cable TV capacity on their telecommunications networks. It affects only the licensing of infrastructure to provide capacity or infrastructure for cable TV services, not the licensing of broadcasters or the providers of cable TV services. Removing any major restrictions on the availability of licences for Cable TV infrastructure would put these licences on a similar footing to telecommunications infrastructure licences. There would be no limits on the number offered; licences could be refused only on the grounds of scarce resources (such as rights of way); any licensed broadcaster could use the infrastructure to broadcast signals to customers.

Option 3 would remove any uncertainties created at the discretion of licensing bodies. It would also remove the requirement for PTOs to obtain licences from multiple authorities if the right to provide cable TV capacity were part of their telecommunications licence, removing a potentially delaying administrative burden.

As well as allowing the existing PTOs to provide cable TV capacity over their telecommunications networks, this option would help new PTOs develop a business case to build new broadband infrastructures. Cable TV services are likely to be an essential part of the overall package of broadband services offered by operators of broadband interactive networks:

- BT marketing trials suggest that packaging cable TV with other multimedia services would give it a considerable advantage; customers might not subscribe to multimedia and other advanced services without cable TV in the offering.
- Without the revenue stream from cable TV, the investment in the broadband infrastructure might not be justified in extra revenues.

Removing the barrier to new broadband multimedia infrastructures could have a high impact on the development of the market. The competition will stimulate network operators to upgrade their networks, offer a choice of service providers to customers, and stimulate innovation in advanced multimedia products and services.

As in Option 2, opening up markets where the existing operators had invested in networks on the understanding that their licences would be exclusive could damage the credibility of the regulatory regime and so discourage further investment. However, the impact on cable operators of opening up mature cable TV markets to competition needs to be considered. In some Member States cable TV is provided as a utility, the main method of delivery of television signals to homes. Some Cable

TV networks, such as those in Belgium and the Netherlands, have limited ability to react to competition because, for instance, pricing, investment and programming are determined by municipalities or other government bodies. These networks need high market penetration to generate the revenues to cover their costs. If they lose market share to new competitors they may no longer be viable. The licence terms of the new operators should not give them an unfair advantage over the existing players.

Impact on infrastructure.

Infrastructure competition to deliver cable TV services to the home is rare. However “overbuild”, the creation of a new network in an already cabled area, has been commercially successful in some areas in the United States, and in Spain independent companies have expressed interest in bidding for cable licences, despite Telefónica’s statement that it too will enter the market.

Lifting restrictions on the availability of licences for cable TV infrastructure would allow the market to evolve as technology allowed and demand required. As markets for new multimedia and interactive services grow, new operators will be able to enter the markets and provide services over their own infrastructure. Though the immediate impact may be small, because of the immaturity of markets for interactive broadband services, in the long run the provision of competing infrastructures will be essential to market development.

Impact on services.

Opening the market to a variety of players could greatly increase the number of service providers; it could also accelerate the innovation rate for new services and applications, since companies would no longer be kept out of certain market segments or be limited in choice of infrastructure.

During our study, we conducted primary research at three levels and ensured press coverage in leading industry journals and publications in order to give every party affected by the issues of this study the opportunity to air their opinion:

1. We contacted CEO's of over 100 companies as well as regulators for face-to-face interviews, some of them passed our request on to individuals within the company identified to be appropriate to comment on the issues of the study. During the face-to-face interview programme, we asked our interviewees about the drivers and barriers of the development of telecommunications and multimedia markets, specifically concerning two issues: joint ownership of cable TV and telecommunications networks and restrictions on the provision of cable TV services.

A complete questionnaire and the list of people contacted are given below.

2. We mailed over 400 operators, regulators, associations and consumer groups in the telecommunications and multimedia sector asking for responses to a questionnaire via fax/mail and/or participation on a WWW-site. In the questionnaire we asked about effects of policy options such as divestiture of cable networks, arms length operation and open and equal access on the development of telecommunications and multimedia markets. The questionnaire also asked about the impact on the development of policies concerning PTOs being allowed to use their networks for the delivery of cable capacity and services. Finally, the opinion on the most important barriers facing the development such as regulation, technology, market dominance and consumer demand was asked.
3. We set up a WWW-site to enable commentators to discuss the issues via an online forum at all times. The site was published in a press-release and in all the mail sent to companies and other commentators. It contained four main discussion areas with statements from industry players to comment and to air views. The background to the study and the issues concerned were also explained. The site was constantly monitored for new input and updated several times with feedback we had received from face-to-face interviews. However, the "hits" the site received exceeded the submissions by far. The reason mentioned by commentators were the highly political implications of this study, making an unpublic paper or telephone contribution more sensitive.

Appendix A: Primary Research – List of People Contacted for Face-to-Face Interviews

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Name	Job Title	Company	Interview Status	Country
Bammer		Kabelsignal GmbH	interview conducted	Austria
Dr. Helmut Draxler	General Director	ÖBB	interview declined	Austria
Dr. Josef Sindelka	CEO	Post & Telekom Austria	interview conducted	Austria
Dr. Alfreda Bergamann-Fialia	CEO	Telekabel Wien GmbH	interview declined	Austria
Dr. Karl Skyba	General Director	United Telekom Austria	interview declined	Austria
Marcel Desutter	President	APEC	interview conducted	Belgium
Simon Hampton Mark Naitel Henri van der Voeren	Public Affairs Advisor Senior Legal Counselor Broadband Multimedia Project Manager	Belgacom	interview conducted	Belgium
Erie van Keerberther	General Secretary Adjoint	Coditel	interview conducted	Belgium
Peter Kokken	President	ECCA	interview conducted	Belgium
Jacques van der Meiren Mariane Simons	Legal Counselor Director	Electrabel	interview conducted	Belgium
P. van der Abbeele	General Secretary Adjoint	Intermixt	interview conducted	Belgium
Jo van Gorp	Head of Regulations	MFS	interview conducted	Belgium
Walter Verbeke Philippe van Wassenhove	Head of Regulatory Affairs Public Relations Manager	Telenet Operaties N.V.	interview conducted	Belgium
Mr de Wergifosse	President	Union Professionnelle de Radio et Télédistribution	interview conducted	Belgium

Name	Job Title	Company	Interview Status	Country
Ebbe Jørgensen	Managing Director	Netcom Systems Denmark	interview conducted	Denmark
Jens Løgstrup Madsen	Spokesman	Parliament of Denmark	interview conducted	Denmark
Knud Hansen Joergen Naesager	Managing Director Director	STOFA	interview conducted	Denmark
Freddie Fjeldsted	S&M Director	Tele DK-Cable TV	interview conducted	Denmark
Tom Togsverd Susanne Andersen	Vice President H. Corporate pl.	TeleDanmark	interview conducted	Denmark
Claus Jacobsen	Managing Director	Telia	interview conducted	Denmark
Kurt Nordman	CEO	Helsinki Telephone Company	interview conducted	Finland
Olavi Peltonen Karin-Erika Leiwo	President Legal Affairs	Helsinki Television	interview conducted	Finland
Jukka Alho	Technical Director	HPY	interview conducted	Finland
Aimo Eloholma Aulis Salin	Technical Director CEO	Telecom Finland	interview conducted	Finland
Mrs. Dubarry	Head of Services Interconnection and Local Loop	ART (Autorité de Régulation des Télécoms)	interview conducted	France
M. De Broeck	Head of the National and European Regulation Service	France Télécom	interview conducted	France
M. Treppoz	Telecom Project Manager and Representative to the General Management	CGE (Compagnie Générale des Eaux)	interview conducted	France

Name	Job Title	Company	Interview Status	Country
M. Richet	Director of Bouygues Development Telecommunications	Groupe Bouygues	interview conducted	France
Pierre Bouriez Cyrille du Peloux Patricia de Suzzoni	Director of Development CEO Director of Telecommunication	Lyonnais Communications Lyonnais Cable	interview conducted	France
Dr. Bernd Jäger	Managing Director	ANGA	interview conducted	Germany
Horst Enzelmüller	Managing Director	COLT Telecom GmbH	interview conducted	Germany
Dr. Lutz Blank	Head of Business Development	COLT Telecom GmbH	interview conducted	Germany
Hans-Albert Auckes Volker Steiner Dr. Torsten Kreindl Martina Errens Reinhard Wieck Dr. Stefan Mette Patrick Krisam Wolfgang Kopf	Senior Executive Director Senior Executive Director Multimediacommunication Senior Executive Director Broadband Cable, Network and Services Director Regulation Strategy EU Director Regulation Strategy (National) Assistant Director Regulation Strategy EU Assistant Director Regulation and Competition Strategy (National) Assistant Director Regulation and Notification	Deutsche Telekom AG	interview conducted	Germany
Karl-Heinz Mäver	Managing Director	Hansenet Hamburg	interview will be conducted	Germany

Name	Job Title	Company	Interview Status	Country
Horst Schäfers	Managing Director	ISIS Multimedia Net GmbH	interview will be conducted	Germany
Werner Hanf Hans-Udo Pauck	Managing Director Managing Director	Netcologne	interview will be conducted	Germany
Dr. Ulf Bohla Dr. Ehrmann	Managing Director Head of Strategy	o.tel.o communications GmbH	interview conducted	Germany
Dipl.-Math. Peter Dreyer	Vice President	Siemens AG	interview conducted	Germany
Dr. Hans-Peter Kohlhammer	Vice Chairman of the Board	Thyssen Handelsunion AG	interview conducted	Germany
Dr. Hermann Krämer	Managing Director	VEBA AG	interview conducted	Germany
Dr. Maximilian Ardeit	Member of the Board	VIAG AG	interview declined	Germany
Iakobus Ovfanos Dr. Andreas Tsigopoulos	Project Manager Telecom Engineer	OTE	interview conducted	Greece
Kevin Windle	CEO	Cablelink	interview conducted	Ireland
Raymond Doyle	CEO	Cable Management Ireland (CMI)	interview conducted	Ireland
Martin Brennan Steven Banable	Telecom Regulatory Division	Department of Transport, Energy and Communication	interview conducted	Ireland
Denis O'Brien Jarlath Burke	Chairman Head of Regulation	ESAT	interview conducted	Ireland
Gerard O'Brien	Finance Director	RTE	interview conducted	Ireland
Noel Herity Patrick Galvin	Head of Strategy Head of Regulations	Telecom Eireann	interview conducted	Ireland

Appendix A: Primary Research – List of People Contacted for Face-to-Face Interviews (continued)

Name	Job Title	Company	Interview Status	Country
Tommaso Pompei	Director of Telecommunication Projects	ENEL	interview conducted	Italy
Raffaele Minicucci	Managing Director	Telespazio	interview conducted	Italy
Hans Wolfert	Managing Director	A2000	interview conducted	Netherlands
Henk de Goede	President and CEO	Casema	interview conducted	Netherlands
Otto Puis	Director Business Development	Dutch PTT	interview conducted	Netherlands
Hans Savalle	Director Corporate Development	EDON (Castel)	interview conducted	Netherlands
J. van den Beukel	Legal Department	VECAI	interview conducted	Netherlands
Paul t'Hoen	Managing Director	Vision Networks	interview conducted	Netherlands
Mário Freitas	Chairman	APOCABO	interview conducted	Portugal
António Vidigal António Pita de Abreu	President Board Member	ETG Executive Committee	interview conducted	Portugal
Fernando Mendes	President	Instituto das Comunicações (ICP)	interview conducted	Portugal
Francisco Padinha	Executive Board Member	Portugal Telecom (P. T.)	interview conducted	Portugal
Dr. Miguel Paes Amaral	President	Televisao Independente (TVI)	interview conducted	Portugal
José Graça Bau	President	TV Cabo	interview conducted	Portugal
Pedro Peñar	Chief Operating Officer	Cableuropa	interview conducted	Spain
Ildefonso de Miguel Vicente Díaz	CEO Director	Retevisión	interview conducted	Spain

Name	Job Title	Company	Interview Status	Country
Mariano Soillos Ollero	Vice President Operations	Telefónica	interview conducted	Spain
Terje Andreassen	President	Kabelvision	interview conducted	Sweden
Kjell Hellberg Gunnar Asp	Managing Director Director of Administration	Sjarn TV	interview conducted	Sweden
Hans Larsson	Managing Director	Svenska Kabel TV (Telia)	interview conducted	Sweden
Anders Björkman Sven Forsberg Anders Isaksson	CEO Product and Service Development CEO	Tele 2	interview conducted	Sweden
Daniel Johanneson	President	Telenordia	interview conducted	Sweden
David Greggains	General Secretary	ADSL Forum	interview conducted	U.K.
Nigel Kay Crawford Stewart Huw Williams	Senior Regulatory Advisor Commercial Manager Strategy & Market Analysis Manager	BT	interview conducted	U.K.
Gavin Young Dr. David Faulkner	Fibre Access Technology	BT Laboratories	interview conducted	U.K.
Anthony Hewitt	Deputy Director	Cable ITC	interview conducted	U.K.
Tony Morbin	Editor	Cable Magazine	interview conducted	U.K.

Appendix A: Primary Research – List of People Contacted for Face-to-Face Interviews (continued)

CONFIDENTIAL

Name	Job Title	Company	Interview Status	Country
Neil McKenzie	Head Commercial Broadcasting	Department of National Heritage	interview conducted	U.K.
Johnathan Wood	Head, Network Infrastructure and Conveyance Policy	Department of Trade and Industry	interview conducted	U.K.
Tony Eden-Brow	Communications and Information Directorate	Department of Trade and Industry	Interview conducted	U.K.
Gita Sorensen	Director of Telephony & Regulation	General Cable	interview conducted	U.K.
Trevor Smale	Legal & Regulatory Affairs	The Cable Communications Association	interview conducted	U.K.
Jonathan Pacey James Douglas	Regulatory Strategy Manager Senior Regulatory Manager	Mercury	interview conducted	U.K.
Niall MacFadyen	Business Development Associate	Nortel	interview conducted	U.K.
Phil Kirby	Director of Regulatory Affairs	NTL Inc.	interview conducted	U.K.
Andrew Flemming	Head of Regulation	Nynex	interview conducted	U.K.
Edwin James Sandy Grom	Cable, Satellite and Multi-media Regulation Broadcasting	OFTEL	interview conducted	U.K.
Mathew Copland	Regulatory Affairs	TeleWest Communications	interview conducted	U.K.

Written Responses

Name	Company	Country
Susanne Mahler	Telestyrelseu	Denmark
Martti Soramäki	Yleisradio Oy (Finnish Broadcasting Company YLE)	Finland
Trygve Still	Jakobstadsnordens Telefon Ab	Finland
W. O'Brian	National Electronics Technology Centre	Ireland
Ron Waumans	Nutsbedryf Heerlen	Netherlands
Mae Ligster	Nutsbedryf Amstelland	Netherlands

Title	Publishers	Date of Publication
European Telematics Profile		1997
The Future of Universal Service in Telecommunications in Europe	Analysys	1997
Distribution of Broadband Services	Booz.Allen & Hamilton	Feb 1997
Cable Television in the United States	CableLabs	1995
Promoting Local Network Competition	Case Associates	1996
Yearbook of European Telecommunications - 1997	CIT Publications	1997
ITU Briefing Report - Regulatory Implications of Telecommunications Convergence	David Townsend	Feb 1997
Development of the Information Society	Department of Trade and Industry (UK)	
European Cable Communications Association 42nd Annual Meeting	ECCA	1996
Global Telecoms Yearbook	Euromoney Publications	1996
Proceedings from 42nd Annual Meeting	European Cable Communications Association	1996
Green Paper on the Liberalisation of Telecommunications Infrastructure and Cable Television Networks	European Commission	1995
Cable and Satellite Yearbook - 1997	FT Media and Telecoms	1997
European Markets for New Cable Services	FT Media and Telecoms	1996
Liberalising Telecoms in Western Europe	FT Media and Telecoms	1997
Public Policy Options Arising from Telecommunications and Audio-visual Convergence	KPMG	Sept. 1996
The BBC and the Future of Broadcasting	National Heritage Committee	1997

Title	Publishers	Date of Publication
Future Policy for Telecommunications Infrastructure and CATV Networks	Mercer Management Consultants	1994
Interconnect and Accounting Separation: The Next Steps	Office of Telecommunications (OFTEL)	1994
Beyond the Telephone, the Television, and the PC	Office of Telecommunications (OFTEL)	1995
Telecommunications Companies: Comparable Performance Indicators	Office of Telecommunications (OFTEL)	1997
Local Telecommunications Competition: Developments and Policy Issues	Organisation For Economic Co-Operation And Development	1996
Alternative Local Loop Technologies: A Review	Organisation For Economic Co-Operation And Development	1996
Information Infrastructures Policies in OECD Countries	Organisation For Economic Co-Operation And Development	1996
Information Infrastructures: Their Impact and Regulatory Requirements	Organisation For Economic Co-Operation And Development	1997
Current Status of Communication Infrastructure Regulation Cable TV	Organisation For Economic Co-Operation And Development	1996
Communications Outlook, 1997	Organisation For Economic Co-Operation And Development	1997
Cable: The Emerging Force in Telecoms and Interactive Markets	OVUM Ltd	1996
Cable Business International	Pearson Professional Ltd	1997
Screen Digest	Screen Digest Ltd	1995-1996

Austria

	Austria		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	3.03	0.16	32.75

PSTN

% main lines/100 people	1995	46.6%	36.1%	68.1%
% of digital main lines	1996	72.0%	37.0%	100%

ISDN

Number of connections	1996	29,000	29,000	2,950,000
% ISDN / main lines	1996	0.96%	0.04%	5.96%

Cable Networks

% home passed/TV households	1995	54.4%	<1%	98.4%
% home connected/TV households	1996	34.3%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	31.7%	0.0%	47.8
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MMDS

% subscriber homes/TV households		No Service	0	7.10%
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Terrestrial Television

Number of free national channels	1996	2	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

One third of the Austrian homes are connected with cable TV and almost 60 per cent are passed by a cable network. This high number of users is due to a limited number of terrestrial channels. There are only two state-owned TV channels in Austria. Telekabel, a subsidiary of Philips is the dominant cable-operator, which accounts for about 50 per cent of the subscribers and approx. 270 cable-operators share the market.

Most of the cable networks in Austria are copper/coax, with an average capacity of 450 MHz and 300 MHz. Telekabel is upgrading some of its older networks in order to be able to offer interactive services.

Belgium

	Belgium		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	4.35	0.16	32.75

PSTN

% main lines/100 people	1995	45.6%	36.1%	68.1%
% of digital main lines	1996	67%	37.0%	100%

ISDN

Number of connections	1996	–	29,000	2,950,000
% ISDN / main lines	1996	<0.1%	0.04%	5.96%

Cable Networks

% home passed/TV households	1995	96.2%	<1%	98.4%
% home connected/TV households	1996	94.9%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	2.5%	0.0%	47.8
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MMDS

% subscriber homes/TV households		No Service	0	7.10%
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Terrestrial Television

Number of free national channels	1996	6	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

Belgium has one of the highest densities of cable coverage in the European Union. By the end of 1996 there were some 4.13 million connections to cable networks in Belgium, representing some 94.9 per cent of TV homes.

Cable networks in Belgium have been built by both private and public sector companies. Local municipalities are responsible for cable networks within their boundaries. By the end of 1996 there were some 34 different cable operators in Belgium, each falling into one of the following categories:

- Public-owned – the municipality, either on its own or as part of a larger group of other municipalities.
- Mixed private and public ownership – the municipality establishes a joint venture with a private or public company.
- Privately owned – the municipality chooses not to undertake cable investments, giving the authority for a private operator to do so.

In 1995, more than half (54 per cent) of cable subscribers were connected to networks of mixed ownership.

Cable operators have been allowed to offer teleshopping video on demand, interactive games and data services since January 1996. In September 1996 the government announced the liberalisation of alternative infrastructures to allow cable operators, railway or utilities to operate non-voice services.

Telenet

Telenet is a consortium of 17 local cable distribution companies and utilities (includes Electrabel), an insurer, a bank, U.S. West, and a consortium of private sector backers.

After more than a year of consultation Telenet, the Flanders company handling the biggest cable project in the world to date for convergence of television and telephony, has launched its £1 billion investment in upgrading an existing cable network. Excavation for cable laying began in late 1996, but it will be 2001 before installation of a 600 km fibre optic cable backbone ring and the changeover from the 52,000 km of existing coaxial cable to an interactive broadband network is complete.

Denmark

	Denmark		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	2.3	0.16	32.75

PSTN

% main lines/100 people	1995	61.3%	36.1%	68.1%
% of digital main lines	1996	61.0%	37.0%	100%

ISDN

Number of connections	1996	37,500	29,000	2,950,000
% ISDN / main lines	1996	0.06%	0.04%	5.96%

Cable Networks

% home passed/TV households	1995	75%	n.a	98.4%
% home connected/TV households	1996	21.3%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	47.8%	0.0%	47.8
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MMDS

% subscriber homes/TV households		No Service	0	7.10%
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Terrestrial Television

Number of free national channels	1996	2	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

The Danish cable market is highly developed and fragmented. In 1995 the largest CATV operator was the PTO Tele Danmark, which accounts for more than half of the subscribers, second largest Stofa, which was taken over by Telia in 1995.

According to the Danish Cable Association, the high penetration of Tele Denmark telephones and the increasing usage of mobile phones will limit future opportunities for cable telephony.

Stofa has been building its own fibre optic trunk system to link up its local network. For multimedia services Stofa relies on the experience of its parent company Telia before committing itself to a Danish trial. Tele Danmark Kabel TV claims that the Danish market does not justify the expense for a VOD system.

Finland

	Finland		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	2.04	0.16	32.75

PSTN

% main lines/100 people	1995	55%	36.1%	68.1%
% of digital main lines	1996	89.9%	37.0%	100%

ISDN

Number of connections	1996	43,000	29,000	2,950,000
% ISDN / main lines	1996	0.08%	0.04%	5.96%

Cable Networks

% home passed/TV households		n.a	n.a	98.4%
% home connected/TV households	1996	37.7%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	7.4%	0.0%	47.8
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MMDS

% subscriber homes/TV households		No Service	0	7.10%
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Terrestrial Television

Number of free national channels	1996	4	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

The well developed cable market in Finland is dominated by telecommunications companies, which provide the local cable TV operations. Connected are over 40 per cent of households and 66 per cent of homes passed. The operations require a licence provided by the Council of States, whereas the construction of local cable TV networks is free. Interactive services, along with telecommunications services, are allowed on cable TV networks. The largest operator is HTV (Helsinki Television Oy), owned by Finish media group Sanoma with a single network in Helsinki accounting for 22 per cent of the country's subscribers; with about 15 per cent the second cable operator is Telecom Finland. With approximately 7 per cent of the connections and about 60,000 subscribers Tampereen Tietoverkko runs one network in the area of Tampere.

DTH satellite is targeting the sparsely populated areas as it is not economically viable to lay new lines there, whereas the most urban areas are passed by cable networks. So it will be sensitive to increase the connections rate in total.

The momentary main operators are FilmNet (NetHold group), FilmNet Movies, FilmNet Plus and, since September 1996, TV 1000.

Cable television subscribers in Lappeenranta, Finland are to get cable Internet access through the area's two-way interactive television network built by Telecom Finland. Cable is split to allow both television and PC to connect to system. Cable modems, which operate at 4 Mbps, will be supplied by Zenith, giving access to the Internet through a package dubbed Cabinet. Telecom Finland is also to beginning converting cable networks in the town of Kouvola to a two-way interactive system.

France

	France		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	20.99	0.16	32.75

PSTN

% main lines/100 people	1995	56.3%	36.1%	68.1%
% of digital main lines	1995	100%	37.0%	100%

ISDN

Number of connections	1996	1,250,000	29,000	2,950,000
% ISDN / main lines	1996	2.22%	0.04%	5.96%

Cable Networks

% home passed/TV households	1996	30.4%	n.a	98.4%
% home connected/TV households	1996	11.2%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	6.7%	0.0%	47.8
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MMDS

% subscriber homes/TV households		No Service	0	7.10%
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Terrestrial Television

Number of free national channels	1996	5	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

Since 1986, private-sector companies have been allowed to construct and operate broadband cable networks. France Télécom continued to build broadband cable networks (Plan Câble networks), but private-sector companies, such as Compagnie Générale des Eaux and Lyonnaise Communications, started to construct and operate their own broadband networks. The private sector networks are known as hors Plans Câble networks.

Three main operators are sharing 82 per cent of home passed and 76 per cent of subscribers in the French cable market; that are CGV-Téléservice, Lyonnaise-Communication, which both are subsidiaries of large groups involved in water distribution to municipalities, and France Télécom. As a major player France Telecom operates its networks for about half of the subscribers and some networks, which are actually operated by private cable operators, for about 20 per cent of the subscribers. France Télécom's strategy for the future is to support on both networks new services and to keep the position of a major player.

In view of France Telecom's exclusive right to construct and operator telephone networks, the government granted CGE, a cable operator, an experimental license to

construct digital European cordless telephone (DECT) networks in Saint-Maur-des-Fosses, near Paris.

In November 1996 the Conseil Supérieur de l'Audiovisuel (CSA) announced its support of MMDS as the medium for digital television. The CSA has now signed a MOU with all terrestrial TV stations, except Canal Plus, to work on MMDS trials. In most countries MMDS uses the 2.5 GHz range, however this is used by the French army and so two alternatives have been suggested – 3.5 GHz and 40 GHz.

Germany

	Germany		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	32.75	0.16	32.75

PSTN

% main lines/100 people	1995	49.5%	36.1%	68.1%
% of digital main lines	1996	51.0%	37.0%	100%

ISDN

Number of connections	1996	2,950,000	29,000	2,950,000
% ISDN / main lines	1996	5.96%	0.04%	5.96%

Cable Networks

% home passed/TV households	1996	66.7%	n.a	98.4%
% home connected/TV households	1996	53.5%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	32.1%	0.0%	47.8
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MMDS

% subscriber homes/TV households		No Service	0	7.10%
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Terrestrial Television

Number of free national channels	1996	7	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

All public telecommunications and cable TV infrastructures are owned and operated by Deutsche Telekom.

Cable networks in Germany are divided into four distinct levels:

- Level 1 – The transmission of signals.
- Level 2 – The headend operation.
- Level 3 – The trunk operation from headend to local distribution point (Übergabepunkt) at street level.
- Level 4 – The cable connection between the local distribution point to the home, apartment block or office building.

Deutsche Telekom is almost exclusively responsible for the transmission and trunk operations of cable networks. Private operators have, however, been allowed to build Level 3 networks in eastern Germany.

Deutsche Telekom's cable TV network, is with more than 16 million connected households and over 24 million homes passed the largest cable TV network in Europe. Deutsche Telekom is also a main player in providing on-line services and multimedia such as T-online. As a large number of channels are free of charge and available via cable and satellite in Germany Pay-TV is not viable, e. g. Premiere (since long time the only one) accounts only one million subscribers. DF1 is the first digital pay TV channel with still very low customer base.

Greece

	Greece		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	–	0.16	32.75

PSTN

% main lines/100 people	1995	49.4%	36.1%	168.1%
% of digital main lines	1996	37.0%	37.0%	100%

ISDN

Number of connections	1996	n.a	29,000	2,950,000
% ISDN / main lines	1996	n.a	0.04%	5.96%

Cable Networks

% home passed/TV households		n.a	n.a	98.4%
% home connected/TV households	1995	0.1%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	0.6%	0.0%	47.8
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MMDS

% subscriber homes/TV households		No Service	0	7.10%
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Terrestrial television

Number of free national channels	1996	6	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

There are limited cable TV networks in Athens which are owned by municipal authorities because of environmental considerations. By the end of 1995, less than 0.1 per cent of homes were connected to a cable TV network.

In 1995 exclusive rights to build such network were given to two main players by a media law. These companies are the national telecommunications operator OTE and the state broadcaster ERT.

Greece has until 2003 to liberalise its telecommunications, but is being monitored by the European Commission, who has complained that they have not implemented the full service directive.

Ireland

	Ireland		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	1.15	0.16	32.75

PSTN

% main lines/100 people	1995	36.7%	36.1%	68.1%
% of digital main lines	1996	80.0%	37.0%	100%

ISDN

Number of connections	1995	4600	4,600	2,950,000
% ISDN / main lines	1996	<0.1	0.04%	5.96%

Cable Networks

% home passed/TV households		n.a	n.a	98.4%
% home connected/TV households	1995	0.1%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	0.6%	0.0%	47.8
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MMDS

% subscriber homes/TV households	1996	9.6%	0	7.10%
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Terrestrial Television

Number of free national channels	1996	7	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

With a link to the implementation of MMDS systems, which accounted for approx. 70,000 subscribers in 1995 (seven per cent of TV households) the cable networks are well developed in Ireland. There are 43 per cent of TV households passed and 37 per cent connected. Ireland has been divided into 29 MMDS cells of which many have been combined to form larger MSO franchise areas and which serve between few hundred and 50,000 subscribers (cable and MMDS together).

With approximately 60 per cent Cablelink, jointly owned by Telecom Eireann and the state broadcaster RTE, is the largest main player for cable TV and MMDS in Ireland. Other main players are Princes Holdings, gathering several leading MSOs, and owned by Independent Newspapers and TCI/United International Holdings; and Cable Management Ireland (CMI), which accounts for approx. 45,000 subscribers.

Although Ireland has a special derogation to postpone liberalisation until 2003 it announced in 1995 that it would aim for full telecoms competitive by the year 200.

Italy

	Italy		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	20.2	0.16	32.75

PSTN

% main lines/100 people	1995	43.4%	36.1%	68.1%
% of digital main lines	1995	75.6%	37.0%	100%

ISDN

Number of connections	1995	375,000	4,600	2,950,000
% ISDN / main lines	1996	0.86%	0.04%	5.96%

Cable networks

% home passed/TV households	1996	1.0%	n.a	98.4%
% home connected/TV households	1996	0.3%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	3.3%	0.0%	47.8
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MMDS

% subscriber homes/TV households	1996	No service	0	7.10%
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Terrestrial television

Number of free national channels	1996	9	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

The cable industry in Italy is still in its infancy. By the end of 1996 there only some 60,000 cable subscribers in Italy.

Cable TV services were first introduced in 1995 when Telecom Italia began the "Programma Socrata" cable project. According to Telecom Italia, there were 117,000 homes passed by the end of 1995. In September 1996 Telecom Italia announced that it has scaled back its plans to pass 10 million homes with cable by the year 2000 and now plans to cover 5.5 million households.

Videostrada, a company formed in September 1995, plans to build and operate cable networks once the law permits. The new company hopes to install fibre optic cable to apartment blocks and then use coaxial cable to link the individual apartments allowing it to offer a variety of services including telephony and cable TV.

In March 1996, a joint venture to cable Milan was announced by the Milan City Council, European Cable Capital Partners and a U.K.-based investment fund. The new company will be controlled by the Milan City Council and managed by ECCP.

Luxembourg

	Luxembourg		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	0.16	0.16	32.75

PSTN

% main lines/100 people	1995	55.8%	36.1%	68.1%
% of digital main lines	1995	70.0%	37.0%	100%

ISDN

Number of connections	1995	n.a	4,600	2,950,000
% ISDN / main lines	1996	<0.1	0.04%	5.96%

Cable Networks

% home passed/TV households	1996	95.0%	n.a	98.4%
% home connected/TV households	1996	87.5%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	1.9%	0.0%	47.8
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MMDS

% subscriber homes/TV households	1996	No service	0	7.10%
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Terrestrial Television

Number of free national channels	1996	1	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

The cable network is well developed in Luxembourg, and some 95 per cent of the households are passed. In 1995, the total subscriber grew by less than 2 per cent, demonstrating the maturity of the cable TV sector. The PTO is not involved in cable operations and telecommunications services are not proposed over cable. The main operators are Eltrona, Coditel and Siemens.

Netherlands

	Netherlands		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	6.45	0.16	32.75

PSTN

% main lines/100 people	1995	51.8%	36.1%	68.1%
% of digital main lines	1995	100%	37.0%	100%

ISDN

Number of connections	1995	77,500	4,600	2,950,000
% ISDN / main lines	1996	0.15%	0.04%	5.96%

Cable Networks

% home passed/TV households	1996	98.4%	n.a	98.4%
% home connected/TV households	1996	92.7%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	4.7%	0.0%	47.8
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MMDS

% subscriber homes/TV households	1996	No service	0	7.10%
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Terrestrial Television

Number of free national channels	1996	3	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

Cable TV is the dominant means of distributing television services in the Netherlands and is commonly perceived as a utility. The cable TV market has reached a saturation point; there were 5.98 million cable subscribers out of 6.45 TV homes by the end of 1996.

Cable customers are served by 358 companies which operate 870 different networks. The six largest cable companies control 60 per cent of the market. These are NV Casema, CasTel, A2000, Telekabel and PNEM.

In 1996, A200, the joint venture between U.S. West and UPC, was granted the first telephony license and interconnect agreement in the Netherlands. The license and interconnect agreement (with PTT Telecom) covers all of A2000's franchise area with the network currently serving more 500,000 customer. The contract lets A2000 phone subscribers access national and international phone services. Trials began early 1997 with a gradual roll-out planned for mid 1997.

Amsterdam cable television operator A2000 and Netherlands based Internet service provider Ninet are to joined forces to develop a new cable Internet service. A2000 is

expected to offer subscribers high-speed cable Internet access through PCs or televisions by July 1997.

Portugal

	Portugal		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	3.1	0.16	32.75

PSTN

% main lines/100 people	1995	36.1%	36.1%	68.1%
% of digital main lines	1995	70.0%	37.0%	100%

ISDN

Number of connections	1995	n.a	4,600	2,950,000
% ISDN / main lines	1996	<0.1%	0.04%	5.96%

Cable Networks

% home passed/TV households	1996	35.5%	n.a	98.4%
% home connected/TV households	1996	7.0%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	10.3%	0.0%	47.8
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MMDS

% subscriber homes/TV households	1996	No service	0	7.10%
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Terrestrial Television

Number of free national channels	1996	4	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

The Portuguese cable TV market remains dominated by TV Cabo. 100% owned by Telecom Portugal, with a reported 1.1 million homes passed and 220,000 connections.

A number of other companies have been looking to offer cable services but they are not yet operational. These include United and Philips Communications, Lusomundo Televisao por Cabo (LTC) and Telecomunicacoes e Diffusao Lds (TVTEL)

Portugal has been exempted from full telecommunications liberalisation until the year 2003.

Spain

	Spain		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	11.72	0.16	32.75

PSTN

% main lines/100 people	1995	38.5%	36.1%	68.1%
% of digital main lines	1995	56.7%	37.0%	100%

ISDN

Number of connections	1995	95,000	4,600	2,950,000
% ISDN / main lines	1996	0.25%	0.04%	5.96%

Cable Networks

% home passed/TV households	1996	9%	n.a	98.4%
% home connected/TV households	1996	3.8%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	7.7%	0.0%	47.8
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MMDS

% subscriber homes/TV households	1996	No service	0	7.10%
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Terrestrial Television

Number of free national channels	1996	4	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

In December 1995 a cable Telecommunications Law, which allows the provision of cable networks in Spain, was passed and two licences provided per franchise area (within a range of 50,000 to 2 million inhabitants), with one systematically given away to Telefonica, while the other will be awarded by competitive tender.

However operators are restricted to deregulated services at least until 1998, while PTO is already entering media market. Although it is too early to name main players besides Telefonica, there are many that many foreign companies are interested in investing in Spanish cable industry. Indeed Multitel (multi-activities Spanish group) with equity in many different cable companies has formed an alliance with two Spanish banks in order to create a joint company named Cableuropa. Canal+ has formed a joint venture with Telefonica, called Cablevision, and has made agreements with Prisa to offer pay-TV and multimedia services.

There were approximately. four per cent subscribers and about nine per cent households passed in 1996.

In anticipation of being awarded several cable television licenses, Telefonica assembled a consortium of Spanish media and financial groups to prepare the

existing telecommunication network for the provision of VOD and other multimedia technologies using ADSL technology.

Despite a 1996 court ruling which banned Telefonica from using its telecommunications network for cable television, the PTO has advanced it plans to form a joint venture in Spanish satellite television broadcasting.

Sweden

	Sweden		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	3.93	0.16	32.75

PSTN

% main lines/100 people	1995	68.1%	36.1%	68.1%
% of digital main lines	1995	91.0%	37.0%	100%

ISDN

Number of connections	1996	94,000	4,600	2,950,000
% ISDN / main lines	1996	0.14%	0.04%	5.96%

Cable Networks

% home passed/TV households	1996	n.a	n.a	98.4%
% home connected/TV households	1996	46.6%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	17.8%	0.0%	47.8
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MMDS

% subscriber homes/TV households	1996	No service	0	7.10%
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Terrestrial Television

Number of free national channels	1996	4	1	9
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Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

With a 60 per cent market share Telia is also the dominant cable networks operator. Operations are conducted by its wholly-owned subsidiary, Telia Kabel-TV. In total were passed 58 per cent of TV households and 50 per cent of homes connected in 1996 but the following years the growth does not increase as fast as before and now the concentration lays on new cabled rural areas. The remaining market is shared by three other operators: Stjaren TV-Naetet, a Singapore Telecom subsidiary; Kabelvision, owned by Kinnevik, Time Warner, UCI, Bonnier and others and Sweden-On-Line, owned mainly by Riksbyggen.

Telecommunications services can be offered without restrictions on cable networks and therefore PTO Telia is trying to avoid that other competitors can enter the market to minimise the competition with its telephone network.

Pay-TV is also well developed in Sweden, both through cable and DTH. Two channels (FilmNet Plus and The Complete Movie Channel) are operated by NetHold, which are also broadcasted in digital format on Intelsat 601 and Thor satellites. The remaining pay-TV service is owned by Kinnevik together with Time Warner (TV 1000).

United Kingdom

	U.K.		European Union	
	Date	Data	Min. EU	Max. EU
Number of TV households (million)	1996	22.6	0.16	32.75

PSTN

% main lines/100 people	1995	50.2%	36.1%	68.1%
% of digital main lines	1995	88.3%	37.0%	100%

ISDN

Number of connections	1995	975,000	4,600	2,950,000
% ISDN / main lines	1996	1.94%	0.04%	5.96%

Cable Networks

% home passed/TV households	1996	29.1%	n.a	98.4%
% home connected/TV households	1996	6.8%	0.1%	94.9%

Satellite (DTH + SMATV)

% home equipped/TV households	1996	17.0%	0.0%	47.8
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MMDS

% subscriber homes/TV households	1996	No service	0	7.10%
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Terrestrial Television

Number of free national channels*	1996	4	1	9
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- * A fifth channel is now available but not on a national basis

Source: IDATE, ASTRA, OECD, Frost & Sullivan

Cable TV Industry Structure

The largest MSO in the U.K. (apart from C&W Communications) is Telewest with 2.4 million homes passed and 520 thousand cable TV subscribers by October 1996.

Cable TV operators have, since the ending of the BT and Mercury duopoly in 1991, been permitted to offer telephony services. This has accelerated the construction of cable networks in the U.K. By mid-1996, cable telephony services were offered in 109 franchises and revenues for the telephony services exceeded that of cable programming (£540 compared to £360). In order to offer a telephony service, cable operators must obtain a licence from the DTI.

Most of the cable companies in the U.K. are owned by U.S. and Canadian companies. CGE of France and KPN of the Netherlands also own U.K. cable interests.

The Internet is regarded as a high priority for cable operators in the U.K. The first operators to offer Internet services were Cabletel (Cable on-line) and Telewest (Cable Internet).

A. Introduction

1. Overview of Regulation

This appendix contains a regulatory overview of certain aspects of the regulation of the telecommunications and cable sectors relevant to the study for each of the 15 European Union Member States.

2. Research Method

Arthur D. Little, in conjunction with Ashurst Morris Crisp, determined the key regulatory issues which were most relevant to the study and a questionnaire was prepared covering those issues. A copy of the questionnaire, including guidance notes on the information to be covered in each section, is contained in Section B of this appendix. The key areas covered in the regulatory overview are as follows:

- General framework for the regulation of the telecommunications and cable sectors.
- Telecommunications regulation including the liberalisation timetable and interconnection issues.
- Cable communications regulation including licensing structures.
- Telecommunications operators and restrictions concerning ownership of cable TV networks and the provision of cable TV services.

Ashurst Morris Crisp co-ordinated the review in each Member State. Regulatory experts in the area of the telecommunications and cable sectors in a law firm in each European Union Member State were identified and approached to contribute to the study. A list of the country contributors, including their contact details, is contained in Section C of this appendix.

The questionnaire was forwarded to each country contributor who completed the questionnaire in relation to the regulatory environment in their Member State. A detailed report (based on the questionnaire) from each country contributor is contained in Section D of this appendix.

The regulatory regimes in the European Union Member States are diverse. For ease of comparison the information is presented in a standard format, however, there are differences in certain aspects of the regulation in various Member States and in the interpretation of the concepts due to the differing regulatory frameworks and approaches to regulation. Accordingly the approach to each section in the questionnaire is different for each Member State.

The regulation in many of the Member States in the telecommunications and cable sectors is currently undergoing a period of rapid change largely due to the Directives concerning the sectors implemented by the European Commission. In many Member States new legislation has recently come into force or draft legislation is currently under discussion. The information is current as at 30th May, 1997.

3. Acknowledgements

Ashurst Morris Crisp thanks each country contributor and acknowledges their commitment and contribution to this regulatory overview and the willingness shown in clarifying and resolving regulatory issues which arose.

4. Disclaimer

Every effort has been made to ensure the information in this appendix is accurate, however, Ashurst Morris Crisp, and each country correspondent accept no responsibility for the completeness or accuracy of any information contained in this appendix. The information does not constitute legal advice and should not be treated as legal advice or acted upon without professional legal advice. Ashurst Morris Crisp and each country contributor accept no responsibility for any loss arising in any way whatsoever in connection with this appendix or the use of the information contained in it.



B. European Union Member States – Questionnaire**1. General Framework****1.1 Key Drivers/Barriers**

Guidance Note – what are the key elements (drivers and barriers) in terms of government policy and legislation which have led to the current telecommunications and cable network industry structure; what has enhanced or thwarted the development of the industry?

1.2 Regulatory Bodies

Guidance note – specific bodies (including ministries and government departments) regulating telecommunications services and infrastructure, cable TV, broadcasting/content including those that regulate frequency allocation, content and licensing.

1.3 Key Legislation

Guidance note – outline the name, scope, motivation and objectives, main paradigm, (e.g. enacting European Union legislation, allowing the development of new services/convergence. Is there anything in particular in the legislation which either allowed or restricted the development of infrastructure. Please include a short note on any draft or new legislation noting likely date of introduction.

2. Telecommunications**2.1 Liberalisation Timetable**

Guidance note – Dates for liberalisation of voice telephony, telecommunications infrastructure, liberalisation of alternative infrastructures and cable TV Infrastructure used for telecom services.

2.1.1 Voice telephony.

Guidance note: Commission Directive 96/19 EEC of 13 March 1996 on the implementation of full competition in telecommunications market (“The Full Competition Directive”) which amends Commission Directive 90/388 (the “Services Directive”).

Has the directive been implemented? If not, what is the time frame for implementation? Is it necessary to implement it or is it fully liberalised – i.e. is full competition in the provision of voice telephony already permitted?

2.1.2 Telecommunications infrastructure.

Guidance Note: The Full Competition Directive provided for the liberalisation of network infrastructure for the provision of voice telephony.

Has the directive been implemented? If not, what is the time frame for implementation? Is it necessary to implement it or is it fully liberalised – i.e. is full competition in the provision of telecommunications infrastructure for voice telephony already permitted?

2.1.3 Liberalisation of alternative infrastructures.

Guidance note: Commission Directive 96/19 EEC of 13 March 1996 on Implementation of Full Competition in telecommunications market amending Commission Directive 90/388. Under this Directive permitting the use of alternative infrastructure for liberalised services (those excluding voice telephony) was required to be liberalised from July 1, 1996.

Has the directive been implemented? If not, what is the time frame for implementation? Is it necessary to implement it or is it fully liberalised – i.e. is the use of alternative infrastructure for telecoms services already permitted?

2.1.4 Cable television infrastructure used for telecoms services.

Guidance note: Cable Television Directive 95/51 EEC of 18 October 1995 on the abolition of restrictions on the use of Cable Television Networks for the provision of already liberalised telecommunications services.

Has the directive been implemented? If not, what is the time frame for implementation? Is it necessary to implement it or is it fully liberalised – i.e. is the use of cable television infrastructure for telecoms services already permitted?

2.2 Interconnection**2.2.1 Price setting mechanisms.**

Guidance note: e.g. price-cap mechanism, matter of negotiations between operators, what happens in case of disagreement (who gets involved, how). In relation to interconnection between the dominant operator and new players is there a regulated interconnection regime; is it a commercial negotiation, is there any arbitration procedure? Must the dominant operator publish standard interconnection rates? Is the dominant operator required to determine interconnect prices on a set basis e.g. historic costs or long run incremental costs? If regulation does not cover these matters, are they being considered?

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?**2.2.3 Do the regulations include provisions for new operators to have access to customer systems, e.g. billing systems? If not, are they being considered?****2.2.4 Does the regulatory regime determine the arrangements for a consumer to choose a long distance operator who is not the dominant operator?**

Guidance note: e.g. is it pre-selection (choice of default), easy access (access to competing phone company via direct access code), equal access (user needs to choose long distance network on a call by call basis). If not, what regime is being considered?

2.3 Policy on Licensing for Wireless Local Loop Operators

Guidance note: Is it possible to obtain a licence or authorisation (both narrow or broadband) to provide telecom services including voice telephony by wireless in the local loop? For example, in the U.K. Atlantic Telecom and Ionica have been granted radio fixed access licences.

2.4 Regulatory Involvement In Investment Decisions

Guidance note: could you please answer these questions for both telecommunications infrastructure and cable television infrastructure.

2.4.1 *Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology?*

Guidance note: (e.g. specific licences for trials or monitoring on licence fees). Has the government/regulator taken any specific initiatives to attract investment in infrastructure? Has the government/regulator taken a view on what technologies should be employed?

2.4.2 *Incentives/obligations for network development by government.*

Guidance note: does the government/regulator take specific action to encourage the development of new service or infrastructure? e.g. grace periods such as Spain for new cable operators before facing competition. Does the government impose obligations to construct the network e.g. in the U.K. cable operators have “build milestones” which must be met.

2.5 Requirements for Separation of Service and Network Provision

Guidance note: Are there any regulatory boundaries which may impact on the development of new services; for example provisions which prohibit cross-subsidies between different types of services or require separate accounting (e.g. BT having to account separately for networks and services). Please note: please do not include information on the accounting separation required under the Cable Television Network Directive which requires separate accounting in certain circumstances.

3. Cable Communications

Guidance note:

Generally:

In this section we are dealing with cable TV networks. We are trying to gather an understanding of the regulatory, policy and industry structure.

There are several activities which, in different Member States, are licensed differently:

- (a) Installing cable TV infrastructure and operating it.
- (b) Providing voice telephony over Cable TV infrastructure.
- (c) Providing other telecoms services over Cable TV infrastructure.
- (d) Providing cable television services over Cable TV infrastructure.
- (e) Licenses for the actual television services which are provided over the infrastructure.

U.K.:

In the U.K. there is:

1. A Telecommunications Act licence which covers (a), (b) and (c);
2. A Broadcasting Act licence (local delivery licence) covering (d); and
3. Programme licences under the Broadcasting Act covering (e).

In the U.K., in this section we cover licence 1 (the Telecoms Act licence) and licence 2 (the Broadcasting Act, local delivery licence).

In the U.K. these two licences are held by the same person. That person, under U.K. government policy, is given an exclusive right to install cable TV infrastructure and provide cable TV and telecoms services in a particular geographic area.

We are less interested in licence 3 for the U.K. as it is a pure content or broadcasting licence and we only very briefly refer to it.

Your Member State:

We would like to have a similar understanding of the regulatory and industry structure in your Member State. Whether there are 1, 2 or 3 licences and the interrelationship between them; i.e. whether they are held by the same person or different people; whether this is provided for legislation or just in practice. We are not interested in detailed rules in relation to content but any matters which have an impact on the structure of the industry, the level of investment and development.

We have therefore divided this section into two sections in 3.1 and 3.2:

- One covering infrastructure (and services if appropriate) (3.1); and
- One covering services (3.2).

Please use this format if appropriate, otherwise please use any format which will cover the information below and give us an understanding of the regulatory, policy and industry structure. E.g.:

- If there is only one licence which covers (a), (b), (c), (d) and (e) please use only one section.
- If the pure broadcasting licence, i.e. (e). is also the one which allows services to be provided over the network, please mention it in 3.2.

In 3.3 we are focusing on the interrelationship between the licence to install infrastructure (and the person who holds it) and the licence to provide services (and the person who holds it.)

3.1 Infrastructure (and Services if Appropriate)**3.1.1 Structure of licences offered.**

Guidance note: are licences exclusive?

3.1.2 Geographical coverage.

Guidance note: franchise areas, number of operators in geographical area.

3.1.3 Terms and length of licence.

Guidance note: Duration, cost, concessions and arrangements regarding service availability; are there requirements to build a certain amount of infrastructure in a certain area, must it be built underground or above ground; e.g. in the U.K. cable operators must meet “build milestones” (of homes passed) set out in their licences. Is there anything else which affects the cost and may be a barrier to expansion of cable networks?

3.1.4 Award procedure.

Guidance note: what is the licensing award procedure? Competitive tender, auction? Is the decision based on subjective or objective factors? Which authority awards the licence?

3.1.5 Availability of access to bottleneck resources (e.g. ducts, poles).

Guidance note: Does a new operator have access under the regulatory regime to ducts or poles or is it a commercial negotiation?

3.1.6 Restrictions on cable TV infrastructure, ownership and/operation.

Guidance note: who is allowed to own and operate the infrastructure.

3.2 Service Provision**3.2.1 Structure of licences offered.**

Guidance note: are licences exclusive?

3.2.2 Geographical coverage.

Guidance note: franchise areas, number of operators in geographical area.

3.2.3 Terms and length of licence.

Guidance note: Duration, cost, concessions and arrangements regarding service availability.

3.2.4 Award procedure.

Guidance note: what is the licensing award procedure? Competitive tender or auction? Is the decision based on subjective or objective factors? Which authority awards the licence?

3.2.5 Availability of access to infrastructure.

Guidance note: is the licence to provide services on a cable network to provide services on one particular network or may the services be provided on several different networks. Do the licence or regulations give the holder of the licence the right to access to a network or is this subject to commercial negotiations?

3.2.6 Restrictions on holding licences to provide services on cable TV network.

Guidance note: who is permitted to hold the licence?

3.3 Relationship Between Ownership of Infrastructure and Service Provision**3.3.1 Separation of infrastructure from service provision.**

Guidance note: does the person who owns the network have control over the services/content provided over it? Does the same person who holds the licence to

install infrastructure also hold the licence to provide services? Is this the result of legislation, policy or commercial practice?

3.3.2 Cable TV operators allowed to offer own content.

Guidance note: does the person who owns the network allowed (at least) to “package” content/services and sell them to a consumer? What happens in practice, is it the owner of the network who packages content/services or a third party?

3.3.3 Cable TV operators control of choice of programming/content.

Guidance note: does the owner of the infrastructure control the services, programming content and choose who provides it? Does the holder of the licence provide services, control the services, who provides programming etc? Is it someone else i.e. the regulator, government, local authority?

3.3.4 Are there restrictions on carriage/provision of other services over cable TV networks.

Guidance note: (e.g. multimedia, on-line, interactive, pay-per-view). In some countries cable TV networks could only be used to carry cable TV not telecoms services which led to the Cable TV Directive. Are there any other similar restrictions for other types of services?

3.3.5 Rights of access of independent service providers to cable TV networks.

Guidance note: are there any regulations which would give a third party the right of access to a cable TV network e.g. in Finland there is an access regime.

3.4 Price Regulation

Guidance note: How are prices set? Are there any regulations concerning the price of access to network infrastructure or the price of services to consumers which could deter the development of infrastructure or services?

3.5 Licensing for Other Broadband Service Delivery Mechanisms

Guidance note: e.g. are microwave licences available in areas where there are cable TV operators?

4. Telecommunications Operators and Cable TV Networks and Other Services

In this section, we are particularly concerned about rights and restrictions on dominant PTOs.

- 4.1 Restrictions on Dominant PTOs Owning Cable TV Infrastructure**
- 4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure (Taking into Account Own Content/Other Content)**
- 4.3 Restrictions on Dominant PTOs Providing Cable TV Services Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non-broadcast).**
- 4.4 Requirements for Separation from Telephony Business for PTOS Allowed To Provide Cable TV (e.g. Arms Length Operation, Separate Accounting, Limitations on Cross Subsidisation (Excluding the Cable TV Directive, See 2.5 Above)**

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1. General Framework

1.1 Key Drivers/Barriers

The key legislation is:

- The Telecommunications Act 1993 (Fernmeldegesetz 1993), which is expected to be amended in mid 1997;
- The Cable and Satellite-Broadcasting Act 1997 (Kabel-und Satelliten-Rundfunkgesetz 1997); and
- The Broadcasting Regulation 1965 (Rundfunkverordnung 1965).

Liberalisation has been and will be implemented by the above named legislation. In addition draft legislation (the Telecommunications Act 1997 (Regierungsvorlage) has been published which is expected to enter into force on 1 August 1997. The objective of this legislation is to implement the EUROPEAN UNION Directives in the field of telecommunications services and the introduction of complete competition in telecommunications markets as well as the allocation of telecommunications licences. It will also implement the Interconnection Directive. It will therefore contain provisions in relation to the joint use of telecommunication infrastructure, the allocation of licences, competition regulation, access to networks and interconnection.

1.2 Regulatory Bodies

Section Four of the Ministry of Science and Transport is responsible for policy in the terrestrial, cable and satellite sectors. The Ministry of Finance is responsible for the state-owned Post & Telecom Austria AG ("PTA").

Broadcasting and media regulation is overseen by the Federal Chancellery, Department for the Media (Bundeskanzleramt) and the Commission for the Observance of the Broadcasting Act (Kommission zur Wahrung des Rundfunkgesetzes). Carriage regulations, radio station (technical) licensing, CATV licensing, spectrum management and surveillance fall within the responsibilities of the Ministry of Science and Transport.

Compliance with the provisions of the Cable and Satellite Broadcasting Act (Kabel-und Satelliten-Rundfunkgesetz) is overseen by the Regional Radio and Cable Broadcasting Agency (Regionalradio-und Kabelrundfunkbehörde) and the Commission for the observance of the Regional Broadcasting Act and the Commission for the observance of the Broadcasting Act (Kommission zur Wahrung des Regionalradiogesetzes als Kommission zur Wahrung des Kabel-und Satelliten-Rundfunkgesetzes) according to sections 39 et seq Cable and Satellite Broadcasting Act (Kabel- und Satelliten-Rundfunkgesetz).

An independent regulatory authority for telecommunications is expected to be introduced in mid 1997, prior to that date Section Four of the Ministry has the responsibility in relation to telecommunications which will be assigned to this new body.

The most important Austrian broadcasting company is the Österreichischer Rundfunk (ORF).

Post und Telekom Austria Aktiengesellschaft (PTA) has a monopoly in fixed voice telephony until the end of 1997.

Mobile telephony is operated by two companies, namely mobilkom (75 percent PTA, 25 percent Stet Hellas Communications s.a., Italy) and max.mobil (private consortium). There is a proposal to grant a third licence (DCS 1800) in 1997, and proceedings are currently pending.

1.3 Key Legislation

The current Telecommunications Act 1993 (Fernmeldegesetz 1993) came into effect on 1 April 1994. As discussed in section 1.1 above, a new telecommunications bill is expected to come into force on 1 August 1997.

Broadcasting is defined in the Federal Constitutional Act of 1974. Federal acts lay down detailed provisions: the 1984 Broadcasting Act defines and regulates the role of the Austrian Public Broadcasting Corporation (ORF).

CATV is governed by the Cable and Satellite Broadcasting Act 1997 (Kabel-und Satelliten-Rundfunkgesetz 1997).

The Broadcasting Regulation 1965 (Rundfunkverordnung 1965) governs inter alia the construction and operation of networks for cable television.

2. Telecommunications

2.1 Liberalisation Timetable

Liberalisation is expected to take place at the end of 1997. Details will be stipulated in the new Telecommunications Act. As the Telecommunications Act is not in force, we refer below to the regulations of the Telecommunications Act 1993.

2.1.1 Voice telephony.

PTA has a monopoly on the provision of fixed voice telephony services until the end of 1997.

2.1.2 Telecommunications infrastructure.

PTA has a monopoly on the provision for infrastructure used for fixed voice telephony services until 1998.

2.1.3 Liberalisation of alternative infrastructures.

In line with Article 90 of the Directive, alternative networks may be used for services other than voice telephony. The permits are granted on the basis of section 9 of the Telecommunications Act, which permits granting of "test licences" despite the existing obligation to use the PTA infrastructure. By way of these licences, the liberalisation process began subject to the impending provisions of the new Telecommunications Act 1997.

2.1.4 Cable television infrastructure used for telecoms services.

The provision of liberalised telecommunications services on cable television networks is liberalised.

2.2 Interconnection

The present law does not provide any regulations in relation to interconnection. Regulations are expected to be part of the new Telecommunications Act 1997.

2.2.1 Price setting mechanisms.

We are not aware of respective provisions in the present law. Regulations are expected to be part of the new Telecommunications Act 1997.

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?

We are not aware of respective provisions in the present law. Regulations are expected to be part of the new Telecommunications Act 1997.

2.2.3 Do the regulations include provisions for new operators to have access to customer systems, e.g. billing systems? If not, are they being considered?

We are not aware of respective provisions in the present law. Regulations are expected to be part of the new Telecommunications Act 1997.

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance operator that is not the dominant operator?

We are not aware of respective provisions in the present law.

2.3 Policy on Licensing for Wireless Local Loop Operators

As far as we are aware, no such licences have been granted.

2.4 Regulatory Involvement in Investment Decisions

2.4.1 Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology?

We are not aware of any legislation explicitly containing such provisions.

2.4.2 Incentives/obligations for network development by government.

As far as we know, such incentives/obligations do not exist.

2.5 Requirements for Separation of Service and Network Provision

Accounting principles according to Telecom Tariff Regulation 1996 (Telekom-Tarifgestaltungsverordnung 1996) exist, under which service providers and network operators have to separately account for different types of services.

3. Cable Communications

In Austria, a distinction must be made between installing and operating a cable network for cable TV on the one hand and the provision of services on this cable network on the other hand.

Installation of a network for cable TV (cable TV infrastructure) requires a permit under the Broadcasting Regulation (Rundfunkverordnung).

The provision of CATV-services must only be notified to the authorities (Regional- und Kabelrundfunkbehörde).

PTA will have a monopoly until 1998 in relation to voice telephony.

3.1 Infrastructure

3.1.1 Structure of licences offered.

In practice, the installation and operation of a cable network for cable TV (cable TV infrastructure) requires a permit to be granted for an antenna system in accordance with Sections 20 et seq Broadcasting Regulation, Federal Law Gazette 1965/333, as amended (§ 20 ff der Rundfunkverordnung, Bible 1965/333 idgF).

As a rule, this non-exclusive permit will be granted for an unlimited period of time.

3.1.2 Geographical coverage.

Austria has some larger cable networks (each of them covering primarily urban areas or even smaller villages) and a large number of smaller cable networks. As far as we know, there is no area which is covered by several cable TV networks.

Interconnection of cable TV networks is admissible although a special telecommunications permit must be obtained for that purpose (Section 23 (2) Broadcasting Regulation – Rundfunkverordnung).

3.1.3 Terms and length of licence.

As a rule, the licence will be granted for an unlimited period of time and may be revoked in accordance with Section 18 Broadcasting Regulation (Rundfunkverordnung) under certain circumstances.

The cable TV network must meet the technical provisions acknowledged upon its installation (Section 20 (1) Broadcasting Regulation – Rundfunkverordnung). Provision must be made for the transmission of the signals of the radio and TV broadcasting programmes of the ORF (Österreichischer Rundfunk), provided this does not entail disproportionate efforts (Section 21 (3) (c) Broadcasting Regulation – Rundfunkverordnung). The licence may be subject to the condition that PTA's broadband lines shall be used entirely or in part, provided the economic extension of the public telecommunications networks so requires (Section 22 (1) Broadcasting Regulation – Rundfunkverordnung).

The licence is royalty-free (Section 25 (2) Broadcasting Regulation – Rundfunkverordnung).

3.1.4 Award procedure.

The award of the licence is allocated by the telecommunications authorities in the first instance and by the Ministry for Science and Transport in the final instance. The licence will be awarded on application without public tender or auction. The licence will be granted following compliance with statutory requirements.

3.1.5 Availability of access to bottleneck resources (e.g. ducts, poles).

Such a provision is not incorporated into the relevant laws.

3.1.6 Restrictions on cable TV infrastructure, ownership and operation.

These restrictions do not exist in Austria.

3.2 Service Provision

3.2.1 Structure of licences offered.

CATV operation does not require a licence; it only has to be notified to the authorities (Section 4 Cable and Satellite Broadcasting Act – Kabel-und Satelliten-Rundfunkgesetz).

3.2.2 Geographical coverage.

There are several CATV operators in Austria and each of them concentrates its activities on one or more urban areas or smaller villages.

3.2.3 Terms and length of licence.

Such provisions do not exist in Austria.

3.2.4 Award procedure.

CATV broadcasts and the dissemination of programs must only be notified to the regional radio and cable broadcast authorities and the regions (Bundesländer) and municipalities concerned one week prior to the dissemination (Section 4 Cable and Satellite Broadcasting Act – Kabel-und Satelliten-Rundfunkgesetz).

3.2.5 Availability of access to infrastructure.

The licence does not give the holder the right to access a network. Access is therefore primarily subject to commercial negotiations. According to Section 11 Cable and Satellite Broadcasting Act (Kabel-und Satelliten-Rundfunkgesetz), access to a network may be enforced under certain circumstances prescribed by law in case commercial negotiations should fail.

3.2.6 Restrictions on holding licences to provide services on cable TV network.

According to Section 5 Cable and Satellite Broadcasting Act, certain persons (e.g. political parties and the Austrian Public Broadcasting Corporation – ORF) are excluded from CATV.

Media enterprises may not operate a CATV and may acquire only a certain percentage shares of companies operating CATV (Section 6 Cable and Satellite Broadcasting Act – Kabel-und Satelliten-Rundfunkgesetz).

3.3 Relationship Between Ownership of Infrastructure and Service Provision

3.3.1 Separation of infrastructure from service provision.

These restrictions do not exist in Austria.

3.3.2 Cable TV operators allowed to offer own content.

Since August 1996 cable operators have been allowed to produce their own programming, thus breaking the programme production monopoly held by the state

broadcaster ORF. Cable operators were previously limited to delivering Kabletext – text and still pictures related to local information and cultural items.

Normally the owner of a network also packages content and services.

3.3.3 Cable TV operators control of choice of programming/content.

The person who is feeding the programme into the network controls the content of the programme. Whether the network operator can also influence programming depends on the commercial negotiations between the network operator and service provider. Certain programming standards are laid down by law (Sections 14 et seq Cable and Satellite Broadcasting Act – Kabel-und Satelliten-Rundfunkgesetz). Compliance with these programming standards is overseen by the regional radio and cable broadcasting authority and the Commission for the observance of the Regional Broadcasting Act as well as the Commission for the observance of the Cable and Satellite Broadcasting Act (Sections 39 et seq Cable and Satellite Broadcasting Act – Kabe-und Satelliten-Rundfunkgesetz).

3.3.4 Are there restrictions on carriage/provision of other services over cable TV network?

PTA has a fixed voice telephony monopoly until the end of 1997.

3.3.5 Rights of access of independent service providers to cable TV networks.

See point 3.2.5.

3.4 Price Regulation

There is no regulation governing tariffs charged by cable operators. If no agreement can be reached “appropriate” pricing is instituted by the arbitration authority. (Section 11 Cable and Satellite Broadcasting Act – Kabe-und Satelliten-Rundfunkgesetz).

3.5 Licensing for Other Broadband Service Delivery Mechanisms

No regulation.

4. Telecommunications Operators and Cable TV Networks and Other Services

4.1 Restrictions on Dominant PTOs Owning Cable TV Infrastructure

None. The PTA does not provide CATV networks. However this is not based on law, but rather on a former PTA decision.

4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure (Taking into Account Own Content/Other Content)

No specific legislation.

4.3 Restrictions on Dominant PTOs Providing Cable TV Services Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non/Broadcast)

No specific legislation.

4.4 Requirements for Separation From Telephony Business for PTOs Allowed to Provide Cable TV (e.g. Arms Length Operation, Separate Accounting, Limitations on Cross Subsidisation (Excluding the Cable TV Directive See 2.5 Above)

PTA has to separately account for telecommunication services and for other services.

1. General Framework

1.1 Key Drivers/Barriers

Use of networks and telecommunications services.

Telecommunications is the responsibility of the Federal Government.

Until 1996, BELGACOM benefited from a monopoly for the exploitation of the telecommunication networks, and for the telecommunications services. Currently, BELGACOM benefits from a monopoly on telephony and telegraphy until 31 December 1997.

Since 28 October 1996, any person with an individual licence from I.B.P.T. (see below) has a free right of access on the public network. Since the same date, every person also has the right to use its own telecommunication infrastructure. Only the existing networks, be they public or private, may be used for telecommunications services offered to the public. For telecommunications services not designed for the public, anyone may build its own telecommunication infrastructure.

Telecommunications not reserved to BELGACOM must be the subject of a simple prior declaration.

The I.B.P.T. (see below) gives the right of access freely, and manages the organisation of the networks.

Broadcasting services.

Broadcasting is the responsibility of the Communities (French Community, Flemish Community and the German-speaking Community).

Only the competent Communities' authorities may grant the prior authorisation to transmit broadcasting services. The operators may only transmit broadcasting services authorised by or by virtue of the law.

A dispute has arisen concerning the definition of the telecommunications services, and that of the (radio) broadcasting services, each of which are subject to different rules, and different responsibilities.

1.2 Regulatory Bodies

Telecommunications services and infrastructure.

Federal

Minister of telecommunications: Mr Elio Di Rupo; assistant adviser (“conseiller-adjoint”): M. Paternoster.

Minister of communications and infrastructure.

Belgian Institute of Postal and Telecommunications Services (“Institut Belge des services Postaux et des Télécommunications” – I.B.P.T.), public institution (“organisme d'intérêt public de type A”) having its office in the Region of Brussels-

Capital (established on the basis of sections 71 to 73 of the Act of 21 March 1991 concerning the reform of certain public economic enterprises), subject to the supervision of the Minister responsible for telecommunications. Its obligations include:

- To render motivated advice (section 75 of the Act of 21 March 1991 concerning the reform of certain public economic enterprises).
- To manage the radio-electric frequencies and to control their use in the country. It assigns the frequencies necessary for the functioning of the radiocommunication authorised operators and networks and co-ordinates them, both on the national and on the international level. It must comply, for the attribution of frequencies, with the provisions of the Reglementation of radiocommunications, for their co-ordination, with the provisions of the agreements concluded internationally, regionally, or specifically in the field (section 17, Royal Decree of 15 October 1979 concerning the private radiocommunications).
- To monitor the application of the Royal and Ministerial Decrees entered into on the basis of the Act of 30 July 1979 concerning radiocommunications. In particular, it monitors the authorised radiocommunication operators and networks and their broadcasting (section 31, Royal Decree of 15 October 1979 concerning private radiocommunications).
- To consider the applications for individual licences which are mandatory to operate a public telecommunications network, and to give the Minister a positive or negative recommendation (section 7 et seq. of the Royal Decree of 28 October 1996 (I) concerning the conditions upon which it may be derogated from section 92, para. 1 of the Act of 21 March 1991 concerning the reform of certain public economic enterprises).

Broadcasting/other services.

By virtue of section 127 of the Belgian Constitution, this matter is the exclusive responsibility of the French, Flemish and German-speaking Communities.

French Community

Minister of the French Community and of audiovisual: Mrs Laurette Onkelinckx.

Minister of the French Community, Direction of administration of audiovisual: Mr Henry Ingberg.

Superior Council of Audiovisual (“Conseil supérieur de l’audiovisuel”) (president: Mr Robert Wangermée), established by virtue of section 38 of the French Community Order of 17 July 1987 on the audiovisual, responsible for giving prior advice on the authorisation and the recognition, the renewal, the suspension or the withdrawal of the authorisation or of the recognition for pay television services and of distribution networks of local and communities television and all other cable services, or advises upon the request of the Government, or upon its own initiative, upon all questions related to the audiovisual sector. Such Council should soon be subject to a reform, to become a true independent regulatory body.

The powers of the Government of the French-speaking community cover the following areas:

- Supervision of the public broadcasting agency (RTBF).
- Authorisation to create and operate broadcasting undertakings (private television stations, pay television stations, local or community television stations, private radio stations) subject to Government-decreed conditions with regard to the nature of licensees (private companies, non-profit-making bodies, etc.) and the content of their services (own programming, quotas for European programming, etc.).
- Authorisation for broadcasters, including the RTBF, to run commercial advertising.
- Authorisation to operate cable television systems and regulation of broadcasters' access to such systems.
- Authorisation to utilise cable television systems to deliver services other than radio or television programmes.

With regard to the allocation and management of the broadcast spectrum, the Government of the French-speaking community assigns over-the-air and satellite frequencies to broadcasters: in this, the Community government is required to adhere to the general technical standards laid down by the federal Government: it may, however, set particular technical standards consistent with those of the federal authorities.

Flemish Community

Minister of the Flemish Community

Administration of the Arts, Direction Media

Flemish Council for Media ("Vlaamse Mediaraad") (president: Dr Fauconnier)

The Flemish Council for Media gives advice to the Flemish Government, among others, on:

- The authorisation of private entities of telebroadcasters.
- The suspension or the withdrawal of the authorisation of private entities of radiobroadcasting (section 39, 72, 76 of the Flemish Consolidated Orders of 25 January 1995).

1.3 Key Legislation

Federal

Belgian legislation regarding telecommunications has been revised considerably since the beginning of the nineties. Telecommunications remain an area for which the Federal Government is responsible.

The key legislation in that respect is the act of 21 March 1991 concerning the reform of certain public economic enterprises, which regulate the public telecommunications services reserved to BELGACOM until 1st of January 1998 (sections 82 to 86), the telecommunications services not reserved to BELGACOM (sections 87 to 89), the telecommunications installations (section 91 and 92), the terminal apparatus (sections 93 to 96), cables, overhead lines and related equipments (sections 97 to 105), the measures taken in order to preserve a loyal competition (sections 106 to 109), the sanctions, the monitoring, the secret, and the criminal provisions (sections 109 *quarter* to 118).

The Act of 20 December 1995 has also been an important step for the deregulation of the sector, since it has, to a certain extent, opened the telebroadcasting network to the telecommunications services, and it has abrogated the prohibition imposed upon BELGACOM to operate radiobroadcasting services for sound and television.

The Royal Decree of 28 October 1996 set out the criteria that must be met in order to obtain the mandatory individual licence for operating public telecommunications services (by derogation to section 92, para 1 of the Act of 21 March 1991). This Royal Decree provides that a mere preliminary declaration is necessary to operate non-public telecommunications services.

We must also cite the Act of 30 July 1979 concerning radiocommunications.

The Communities are responsible in the area of radiobroadcasting and telebroadcasting, save for the operators established in the Region of Brussels-Capital whose activities may not be considered to belong exclusively to one of the Communities. For such operators, the Federal Government is still responsible (section 2 of the Act of 30 March 1995).

French Community

Operating of the tele- and radiobroadcasting networks.

The French Community order of 17 July 1987 concerning audiovisual, and its application Decree, the Decree of 22 December 1988 fixing the conditions for the granting, the suspension and the withdrawal of the authorisation to broadcast programs from external televisions in accordance with section 22, para. 2 of the said Order.

The Decree of 7 April 1995 of the Government authorising the interconnection of radio or TV cable networks.

Flemish Community

Establishment and operation of the cable TV networks.

The order of the Flemish Communities of 4 May 1994 concerning radio broadcasting and cable TV network, and concerning the required authorisation to establish and operate these networks, and concerning the promotion of broadcasting and the production of television programs.

Broadcasting.

The co-ordinated decrees of the Flemish Community – Decree of the Flemish Community dealing with the co-ordination of the decrees concerning radio and tele broadcasting of 25 January 1995.

Region of Brussels–Capital

Infrastructure of cable TV.

The Act of 6 February 1987 concerning radiobroadcasting and cable TV networks and commercial advertisements on radio and television and the Royal Decree of 16 September 1993 fixing the date of effect of Chapter II of such Act to 15 September 1993.

Operating of the cable TV networks and radiobroadcasting.

The Act of 30 March 1995 concerning the cable TV networks and the operating of radiobroadcasting activities in the bilingual Region of Brussels-Capital, section 42 of which abrogates sections 2 and 3 of the Act of 6 February 1987.

2. Telecommunications

2.1 Deregulation Timetable

2.1.1 Voice telephony.

Currently, and until 1 January 1998, voice telephony constitutes a service which is reserved to BELGACOM, with the exception of mobile telephony (sections 83 and 92, para 2 of the Act of 21 March 1991 concerning the reform of certain public economic enterprises).

2.1.2 Telecommunications infrastructure.

Since 10 December 1996, (the date of entering into effect of the Royal Decree of 28 October 1996 concerning the conditions upon which it may be derogated from section 92, para 1 of the Act of 21 March 1991 (section 23 of such Royal Decree)), the operating of telecommunications infrastructure is no longer reserved to BELGACOM.

Telecommunications services offered to the public (public network licence), including fixed links, are subject to a mere individual licence by virtue of sections 2, para. 3 and section 3 of the Royal Decree of 28 October 1996 concerning the conditions upon which it may be derogated from section 92 para. 1 of the Act of 21 March 1991.

The same Decree provides that telecommunications not aimed at the public (non-public network licence) are subject to a prior declaration.

• **Alternative Infrastructures.**

The alternative infrastructures of telecommunication have been deregulated since 10 December 1996 by virtue of section 10 of the Royal Decree of 28 October 1996 abrogating section 92 para. 5 of the Act of 21 March 1991.

- Cable Television Infrastructures used for Telecommunications Services.
The infrastructures concerning cable TV have been deregulated since 10 December 1996 by virtue of section 10 of the Royal Decree of 28 October 1996, abrogating section 92, para. 5 of the Act of 21 March 1991.

The operators of cable TV networks may operate telecommunications services aimed at the public, provided that they obtain the mandatory individual licence (public network licence) and may operate services not aimed at the public (own use or closed user groups) upon the condition that they make a prior declaration (non-public network licence). Individual licences have already been granted to Telenet, Brutélé, Coditel/Welcom, LCL, and Hermès.

Only the infrastructures existing as of 10 December 1996 may be used to be operated as public telecommunications networks (section 3, 2° and 1, 7° of the Royal Decree of 28 October 1996).

On the other hand, new telecommunications infrastructures may be installed concerning non-public telecommunications networks.

2.2 Interconnection

2.2.1 Price setting mechanisms.

A Royal Decree should set out the delays and the general principles applicable to commercial negotiations conducted to enter into interconnection agreements (section 109 of the Act of 21 March 1991).

A draft Royal Decree has been presented at the Council of Ministers of 30 May 1997, concerning this question. The text is, however, confidential at this stage.

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?

The person who has an individual licence for operating a telecommunication network benefits in principle from all rights given by the Act of 21 March 1991 and its application decrees to the operators of public telecommunications infrastructure, inter alia concerning interconnection and the use of the public domain and properties (section 5 of the Royal Decree of 28 October 1996 concerning the conditions upon which it may be derogated from section 92 para. 1 of the Act of 21 March 1991).

2.2.3 Do the regulation include provisions for new operators to have access to customer systems, e.g. Billing systems? If not, are they being considered?

Not as far as we are aware.

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance operator that is not dominant operator?

Not as far as we are aware.

2.3 Policy on Licensing for Wireless Local Loop Operators

No provisions.

2.4 Regulatory Involvement in Investment Decisions**2.4.1 Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology?**

The Regions (Flemish, Walloon and Brussels-Capital) have exclusive responsibility for economic development policies.

Until now, two projects have been supported: Telenet in the Flemish Region, and Wallonie Intranet, in the Walloon Region.

2.4.2 Incentives/Obligations for network development by government.

It is the exclusive responsibility of the Regions (Flemish, Walloon and Brussels-Capital) in the field of economic policies and development.

2.5 Requirements for Separation of Service and Network Provision

BELGACOM must organise its accountancy in such a way that its operating results relating to public telecommunications appear distinguished from its other activities. No subsidies are allowed from public telecommunications towards the other activities of BELGACOM. Specific accounting principles will be established by way of a Royal Decree to permit the compliance with such obligation (section 109 of the Act of 21 March 1991).

On the other hand, no subsidisation is allowed in a sector where a person benefits from exclusive or reserved rights, or from a dominant position towards non reserved services. The I.B.P.T. has access to all the accounting documents of this person, and may have them produced to it under confidentiality obligations.

The persons who wish to offer non-reserved telecommunications services and who benefit on the other hand from exclusive or reserved rights or from a dominant position are under the obligation to have a separate accounting for these telecommunications activities. Specific accounting principles must be set out by way of a Ministerial Decree in order to permit the compliance with such obligations (section 109 bis of the Act of 21 March 1991).

3. Cable Communications

To provide telecommunications services, and in order to use the public switched telephone network owned by BELGACOM, a licence is needed. BELGACOM has a monopoly over voice telephony and telegraphy until 01.01.98.

To provide cable communications services, a cable operator must firstly obtain an infrastructure licence. He will then need to make a formal declaration to the IBPT that he intends to provide such services.

A service provider (other than voice telephony and telegraphy) will need to make a similar declaration before he can provide services over a cable operator's network.

3.1 Infrastructure

The territory is covered by several cable TV operators (public, private or mixed), who benefit on their territory (several counties) from a de facto monopoly.

3.1.1/3.1.2/3.1.3 Structure of licences offered, geographical cover, terms and length.*French Community*

The permission to operate a broadcasting network is given in writing by the Executive under the conditions laid down by the Executive and on the basis of an informative file.

The permission is given for a period of nine years, renewable for periods of 6 years. Only legal persons, with their registered office and with their operating office in the French speaking Region or in the Brussels Capital Region, are able to obtain this permission. It contains the operating territory and the list of programs subject to a “must carry” or “may carry” retransmitted by the operator. This permission can be suspended or revoked in case of the violation of the sections of this Decree (section 20 of the Audiovisual Order of July 17, 1987).

Since the Royal Decree of April 7, 1995, cable TV operators have the possibility to interconnect their networks.

Flemish Community

Similar permission to that of the French Community, in order to operate a Cable TV Network (section 105 and following of the Consolidated Broadcasting on Television Order of January 25, 1995). It is given for a period of 18 years, renewable for periods of nine years.

The cable TV operators have the right to install a network on their own costs and given the permission of the authority of the concerning “public domain” (section 110 of the Consolidated Order).

Brussels Capital Region

Similar permission to that of the French Community, in order to operate a cable TV Network (section 4 and following the Act of March 30, 1995 concerning distribution networks for broadcast transmissions and broadcasting activities in the Bilingual Brussels capital Region).

The permission is given to a legal person, with its registered office and operating office in the European Union, for a period of nine years, renewable, and for a determined territory, if because of its activities, it cannot be considered as being part exclusively of one of the Communities.

3.3.2 Cable TV operators to offer own content.*French Community*

At present, cable TV operators merely transmit programmes.

Under article 24(1) of the Audiovisual Order of 17 July 1987, they are only allowed to transmit television or radio programmes without altering them in any manner whatever.

Article 19 *quarter* allows the possibility of distributing other broadcasting services by cable, but only for companies separate from cable TV operators.

An Executive Order dated 25 November 1996 sets out these other services and the conditions for implementing them.

Telecommunications services that are not reserved for BELGACOM, i.e. services other than telephone and telegraph services (section 83 of the Act of 21 March 1991 introducing reforms to certain public economic corporations) may be freely operated provided that the conditions and procedures laid down in the Act and in the Ministerial Order of 25 November 1996 (setting down the procedures for the declaration for operating services not reserved for the area of telecommunications) are complied with.

There is a conflict of jurisdiction between the Federal State and the French Community of Belgium on “*services other than broadcasting*”, such as multimedia services and video on demand. An action for judicial review has been raised before the Supreme Administrative Court against the Order of the French Community Government dated 25 November 1996 relating to the implementation of other services on cable.

Flemish Community

With the agreement of the Government, which can be made subject to certain conditions, there is a possibility of retransmitting by cable network other broadcast programmes than those permitted by law, or other services (article 113 of the Consolidated Broadcasting and Television Order of 25 January 1995;

By Order dated 20 December 1995, the inter-municipal distribution companies are permitted to become members of companies extending the cable network in Flanders to an interactive communications network and/or to operate it.

Brussels–Capital Region

At present, cable TV operators merely transmit programmes, at the time they are broadcast and in their entirety:

- Sound programmes or television programmes; and
- Other services authorised under the Act (sections 13, 14, 15 and 20 of the Act of March 20, 1995 concerning distribution networks for broadcast transmissions and broadcasting activities in the Bilingual Brussels Capital Region).

3.3.3 Cable TV operators' control of the choice of programming/content.*French Community*

An operator that is authorised to operate a broadcasting network must transmit certain programmes at the time of their being broadcast and in their entirety these are "must carry" provisions. These are all television programmes set out in article 22 (1) of the Audiovisual Order of 17 July 1987 (television programmes of the public broadcasting service of the Community, local and community television programmes, etc.).

An operator authorised to operate a broadcasting network may, with the prior written permission of the Executive, transmit television programmes, at the time they are broadcast and in their entirety, from any other broadcasting station authorised by the State in which it has its registered office, and satisfying the conditions laid down by the Executive in the authorisation permit. This authorisation can be revoked (art. 22 (1) ("may carry")). This prior authorisation regime has been judged by the Court of Justice to be contrary to article 2 of the "Television Without Frontiers" Directive of 3 October 1989 (ECJ, 10 September 1996, Commission v. Belgium).

The operator may also, with the prior express authority of the Executive, transmit (at the time they are broadcast and in their entirety):

- The television programmes of broadcasting bodies that insert commercial advertising particularly aimed at viewers in the French Community (art. 22 (2) *bis* of the Audiovisual Order of 17 July 1987).
- The television programmes of broadcasting bodies from each of the other Communities, and authorised by them, subject to reciprocity (art. 22 (2) *ter* of the Audiovisual Order of 17 July 1987).
- The services other than sound programmes or television programmes aimed at all or part of the general public and provided by broadcasting bodies under conditions laid down by the Executive (Articles 22 (4) and (19) *quarter* of the Audiovisual Order of 17 July 1987).

By application of article 24 (1), television distributors may not transmit anything else.

Flemish Community

Similar provisions to those of the French Community (must carry and, according to the view of the Flemish Media Council, in certain cases or with the prior agreement of the Flemish Government in other cases, may carry). A maximum of two of its own programmes of uninterrupted recorded music are authorised (article 112 of the Consolidated Broadcasting and Television Order of 25 January 1995).

With the Government's agreement, which can be made subject to certain conditions, there is a possibility for television distributors to retransmit other broadcast programmes or other services by the cable network (article 113 of the Consolidated Broadcasting and Television Order of 25 January 1995).

Brussels–Capital Region

Provisions are similar to those for the French Community (must carry and, on the basis of a prior authorisation from the Minister, may carry) (Act of 30 March 1995 concerning distribution networks for broadcast transmissions and broadcasting activities in the bilingual Brussels–Capital Region).

The notion of a television programme is very broad: it covers the entire television transmissions by a broadcasting body as well as the other transmissions of televised images or words whether or not in an encoded form and whether or not accompanied by sounds, which are transmitted by means of a single channel (art. 1, 5 of the Act of 30 March 1995).

The distributor may, on the network, transmit:

- An own sound programme with continuous music, and
- A televised programme, containing technical information regarding the functioning of the cable network (art. 22 of the Act of 30 March 1995).

It may also transmit at the time of them being broadcast and in their entirety, other services than those authorised under the Act (art. 20 of the Act of 30 March 1995).

3.3.4 Are there restrictions on the carriage/provision of other services over cable TV networks?*Federal*

Telecommunications services that are not reserved for BELGACOM, i.e. services other than telephone and telegraph services (section 83 of the Act of 21 March 1991 introducing reforms to certain public economic corporations) may be freely operated provided that the conditions and procedures laid down in the Act and in the Ministerial Order of 25 November 1996 (setting down the procedures for the declaration for operating services not reserved for the area of telecommunications) are complied with.

There is a conflict of jurisdiction between the Federal State and the French Community of Belgium on "*services other than broadcasting*", such as multimedia services and video on demand. An action for judicial review has been raised before the Supreme Administrative Court against the Order of the French Community Government dated 25 November 1996 relating to the implementation of other services on cable.

French Community

With the prior access authorisation of the Executive, the distributor may transmit services other than sound programmes or television programmes aimed at all or part of the general public and provided by broadcasting bodies under conditions laid down by the Executive.

The Executive can also, under conditions that it shall determine, authorise companies distinct from the distributors to put into effect other types of cable services as it may determine (articles 22 (4) and (19) *quarter* of the Audiovisual Order of 17 July 1987; Governmental Order of 25 November 1996 by the Government of the French Community relating to the implementation of other cable services).

Flemish Community

With the Government's agreement, which can be given subject to certain conditions, there is a possibility to retransmit by cable network other broadcast programmes than those authorised by law or other services (article 113 of the Consolidated Broadcasting and Television Order of 25 January 1995).

They may use the broadcasting network or the cable TV network to operate services reserved to BELGACOM, subject to agreement with BELGACOM (art. 6 of the Act of 6 February 1987 on the radio broadcast networks and the television broadcast networks, and the commercial advertising on radio and television, not abolished for the Flemish Community).

Brussels-Capital Region

Prior authorisation of the Minister is needed for transmission of televised words and images, whether or not in encoded form and whether or not accompanied by sounds, which are transmitted by a single channel, other than radio broadcasting programmes (art. 1, 5 of the Act of 30 March 1995).

The distributor may use the broadcasting network or the cable TV network to operate services reserved to BELGACOM, subject to agreement with BELGACOM (art. 6 of the Act of 6 February 1987 on the radio broadcast networks and the television broadcast networks, and the commercial advertising on radio and television, not abolished for the Brussels-Capital Region).

4. Telecommunications Operators and Cable TV Networks And Other Services

4.1 Restrictions on Dominant PTOs Owning Cable TV Infrastructure

There are no particular restrictions on BELGACOM itself.

The corporate objects of BELGACOM do not make express provision for television distribution activities to be undertaken, but they are sufficiently broad to cover this.

The prohibition on BELGACOM against operating sound and television broadcasting services has been lifted (sec. 104 of the Act of 20 December 1995).

Telecommunications services not reserved to BELGACOM can be operated by that body under the conditions laid down in the Act of 21 March 1991 introducing reforms to certain public economic corporations (sec. 87 of the same Act).

BELGACOM is subject to the regulatory provisions of each Community where it provides a broadcasting service.

In the French Community, a distributor and its management are not allowed together to hold more than 24 per cent of the capital in a private broadcasting body, or to have a holding of more than one-third in the management organs, or to manage a private broadcasting body or community television station (art. 21 of the Order of 17 July 1987).

In the Brussels-Capital Region, a distributor and his operator are not allowed to own together 24 per cent of the capital and of the voting rights in a sound or television broadcasting body. They cannot participate in the management of a radio broadcast body, including the local radio broadcasting bodies and the local television broadcasting bodies (art. 6 of the Act of March 30, 1995 concerning distribution networks for broadcast transmissions and broadcasting activities in the bilingual Brussels Capital Region).

In the Flemish Community, BELGACOM can execute agreements with the distributors allowing BELGACOM to use a cable TV network to provide one or more services under the condition not to cause damage to the television programmes transmitted by this network (art. 6 of the Act of 6 February 1987 on the radio broadcast networks and the television broadcast networks, and the commercial advertising on radio and television, not abolished for the Flemish Community).

4.2 Restrictions on Dominant PTO's Providing Cable TV Services Over Cable TV Infrastructure (Taking Into Account Own Content/Other Content)

There are no *particular* restrictions on BELGACOM.

4.3 Restrictions on Dominant PTO's Providing Cable TV Services Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non-Broadcast)

There exist no particular restrictions on BELGACOM.

4.4 Requirements For Separation From Telephony Business For PTOs Allowed to Provide Cable TV (e.g. Arms Length Operation, Separate Accounting, Limitations On Cross Subsidisation (Excluding the Cable TV Directive, See 2.5 Above).

BELGACOM has to organise its accounting so that the operating results concerning the public telecommunication are separate from the results regarding the other activities. No cross-subsidisation is allowed from the public telecommunication services to the other activities of BELGACOM. Specific accounting principles will be laid down in a Royal Decree to implement these obligations (art. 109 of the 31 March 1991 Act holding the reform of certain public economic corporations).

1. General Framework

1.1 Key Drivers/Barriers

The government wished to liberalise the legislation in both telecommunication and cable networks in order to develop the industry. Therefore, in 1966, the government changed the legislation. Furthermore the government realised that it was impossible for Denmark to avoid competition from other countries because of the size of Denmark and its population. By changing the legislation in 1996, the government wanted to ensure that both private and business consumers had a broad and varied supply of better and cheaper telecommunication services.

On the other hand, the government wants to ensure, up to a point, that Danish program-suppliers have access to networks. The government also wishes to avoid bad influences on children and young people and in the legislation there are rules which prohibit programs and telecommunication services that may harm the mental and moral development of minors.

1.2 Regulatory Bodies

Telecommunications in Denmark are regulated by Telestyrelsen (National Telecom Agency) established in 1991, which is an autonomous department within the Ministry of Research and Information Technology. Telestyrelsen has wide-ranging powers over the provision of telecommunications in Denmark, similar to the U.K. regulator, Oftel.

The Ministry of Research and Information Technology is responsible for sector policy in the terrestrial, cable and satellite sectors. Frequency management and spectrum allocation are the domain of Telestyrelsen who also advise the Ministry of Culture. Broadcasting is overseen by the "Kulturministeriet".

A company wishing to broadcast services in a larger area than the local one must apply to the Satellite and Cable Board, an independent body appointed by the Ministry of Culture.

1.3 Key Legislation

Radio & Television Broadcasting Act 1997. The main purpose of the Radio & Television Broadcasting Act is, as it states, that Denmark's Radio and TV2 has a right to broadcast programs. Furthermore it states, that in order to broadcast programs on a local basis or on satellite, the institution or company needs a licence.

Radiocommunications Act 1996. The main purpose of the Radiocommunications Act is to provide that to set up and operate installations for radio communications on a Danish territory, it is necessary to have a licence for the necessary frequencies.

Act concerning Different Conditions in the Telecommunication Area as amended 1997. This Act contains rules that liberalise the infrastructure. The Ministry of Research and Information Technology grant concessions to use telecommunication networks. For further details see "Agreement in principle of the Total Liberalisation of Telecommunications sector in Denmark, mid-1996".

Act relating to the Duty to Supply Consumers inside the Telesector 1997. This Act contains rules for the Minister to determine certain distributors of telecommunication services who have a duty to supply consumers, e.g. Tele Danmark. Telestyrelsen decides the maximum price for the services.

Act relating to Competition and Traffic inside the Telesector 1997. This Act regulates the competition between the providers of telecommunication network and telecommunication services.

Act of allocation and use of number resource 1997. This Act regulates the use of numbers to secure for the consumer the possibility to be connected between the different public telefonets.

Act of radiocommunication and assign radiofrequency 1997. This Act regulates the use of frequencies.

2. Telecommunications

2.1 Liberalisation Timetable

The rules in Denmark were changed and liberalised in June 1996 and June 1997. The rules were liberalised fully in June 1997 in accordance with EUROPEAN UNION Directives.

2.1.1 Voice telephony.

The provision of voice telephony is fully liberalised.

Data communications services have been open to competition since 1 January 1993.

2.1.2 Telecommunications infrastructure.

Tele Danmark's monopoly on the provision of infrastructure used for voice telephony services ended 1 January 1996. New entrants have been allowed to build their own infrastructure since 1 January 1997.

2.1.3 Liberalisation of alternative Infrastructures.

Not applicable for Denmark. Denmark follows European Union directive and the use of alternative infrastructure is already liberalised.

2.1.4 Cable television infrastructure used for telecoms services.

The use of cable television networks for the provision of all telecoms services has been permitted since 1 January 1996. In relation to television services see 3.2.

2.2 Interconnection

2.2.1 Price setting mechanisms.

Matter of negotiations between operators, the National Telecom Agency (NTA) has the power to arbitrate. An operator seeking to reach an interconnection agreement with another operator can request the intervention of NTA, if no agreement has been reached after three months of commercial negotiations.

As of 1 July 1996 interconnect rates need to be published by the NTA.

The long run average incremental cost method will be used from 1 January 1999. Until then the rates are based on historic incremented costs.

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?

Yes, according to the Act concerning competition and traffic in the telesector.

2.2.3 Does the regulations include provisions for new operators to have access to customer systems, e.g. billing systems? If not, are they being considered?

For some services the regulations include such provisions, e.g. service 900 numbers.

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance operator that is not the dominant operator?

Yes, the regulatory regime does determine such arrangements for the consumer. The user needs to choose a long distance network on a call by call basis for communication outside Denmark. If the consumer wants to use another operator instead of Tele Danmark, the consumer must dial an indirect access code or push a pre-set number selection. According to the new law about allocation and use of number resource 1997, the NTA will assign number-series to different operators.

2.3 Policy on Licensing for Wireless Local Loop Operators

It is possible to obtain a licence for broadband to provide telecom services including voice telephony by wireless in the local loop.

The use of 3,4 – 3,6 GHz is under consideration, however it is not yet confirmed.

2.4 Regulatory Involvement in Investment Decisions

There are no regulations regarding investment decisions.

2.4.1 Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology .

By changing the rules in 1996 and implementing the European Union directives, the government took the initiative to attract investment in infrastructure. There are no specific licences for trials or monitoring licence fees.

2.4.2 Incentives/obligations for network development by government.

There are no specific incentives or obligations for network development.

2.5 Requirements for Separation of Service and Network Provision

According to the act about Competition and Traffic inside the Telesector, operators who have a dominant influence on the market, must have a separation of the accounts for network and services. A dominant provider of telecommunication has at least 25 per cent of the market in the area in which the provider provides services. The act does not prohibit cross-subsidies between different types of services.

3. Cable Communications

3.1 Infrastructure (and Services if Appropriate)

3.1.1 Structure of licences offered.

A person who wants to construct and operate a physical network needs a licence from Telestyrelsen. These licences include provisions concerning technical requirements for the networks and maintenance.

The licence only covers network delivery of radio and TV programs to private homes.

There are special rules for small networks i.e. networks for less than 25 households.

3.1.2 Geographical coverage.

No restrictions on franchise areas or number of operators in a geographical area. However, a licence is normally granted within a local area, but without an exclusive right to establish the distribution system in the given area. A new licence is required if the owner of the network wants to increase the area.

3.1.3 Terms and length of licence.

The licence has no specific expiry date and is valid as long as the owner fulfils the conditions in the licence. The Minister of Research and Information Technology has the power to collect a fee for the licence.

The owner of the network has to arrange an election in which the households decide which programs they want the network to deliver. Some Danish TV channels have a right to be distributed in the network.

There are no requirements in the licences to construct networks to a certain level. In the licence application information is required about the cable network which will be built. The licence is for a specific area. The Ministry approves the technical standards and the use of the technical material.

3.1.4 Award procedure.

Any organisation may apply for a licence to establish a physical network. There is no limit on the number of licences in the local area.

3.1.5 Availability of access to bottleneck resources (e.g. ducts, poles).

A new operator has access to ducts and poles.

3.1.6 Restrictions on cable TV infrastructure, ownership and/operation.

In May 1996, ownership rules were changed to allow new entrants to acquire and establish cable networks in Denmark. Previously ownership was restricted to municipalities, antenna societies and Tele Danmark.

There are no different network levels and no specific restrictions. Cable operators may link their networks together to operate a new cable extended service, but in that case, they must apply for a new licence.

3.2 Service Provision

3.2.1 Structure of licences offered.

According to the Radio & Television Broadcasting Act, the local TV-Board grants licences for the local area and the Satellite and Cable Board (an independent body, but appointed by the Minister for Culture) licences programme services to be broadcast in an area larger than one local area.

If a cable operator wants to provide other telecommunications services there is no longer a need to obtain an additional licence.

3.2.2 Geographical coverage.

There are no limits on the area and the number of operators.

3.2.3 Terms and length of licence.

For the television licences:

- A licence fee is payable for a licence in the local area. For a licence for a larger area, the Minister for Culture determines a small licence fee to cover the expenses of the Satellite and Cable Board.
- The local licences are limited to a 7 year period. There is no limit for licences covering a larger area as long as they are in use.
- Commercials are not allowed for licences covering more than the local area.

3.2.4 Award procedure.

For television licences, licences for the local area are issued by the local TV-Board. Licences for a larger area are issued by the Satellite and Cable board. The decision is based on both subjective and objective factors. A licence application, among other things, includes information about the programming, special target groups, ownership, financing etc.

3.2.5 Availability of access to infrastructure.

For a television licence, access for a licence holder to a network is subject to commercial negotiation.

3.2.6 Restrictions on holding licences to provide services on cable TV network.

For television licences there are no restrictions for licences covering more than the local area. Licences for the local area can only be given to companies, associations etc. where the majority of board members are residents of the local area, the sole object of the company shall be radio and television broadcasting and the controlling influence in any such company etc. must not be exerted by any commercial undertakings except if they are daily newspapers or district papers.

3.3 Relationship between Ownership of Infrastructure and Service Provision

3.3.1 Separation of infrastructure from service provision.

The holder of the licence to provide a service referred to in 3.2.1 cannot obtain a licence to construct and operate a physical network. The person who holds the

licence to provide service (see 3.2.1) is different to the person who holds the licence to install and operate the network (see 3.1.1).

The person who owns the network can apply for a television licence for an area larger than the local area. see 3.1.1. The application for providing service in an area larger than the local area must follow the procedures in 3.2.1 and must be filed with the Satellite and Cable Board. The services which are provided for an area larger than the local area are not permitted to include advertisements. The same person may provide telecommunication services without an additional licence.

3.3.2 Cable TV operators allowed to offer own content.

Since Autumn 1995 cable operators have been allowed to produce their own programming, although they need a special licence. See also 3.1.3 concerning the election of programming.

3.3.3 Cable TV operators control of choice of programming/content.

The owner of the network (the holder of the licence referred to in 3.1.1 above) has the right to package channels and sell them to consumers. [For the first two years, the owner of the physical network may decide the content of the premium channels.] After two years, subscribers can have an influence on programming of cable television operators. The idea is – through compulsory voting every second year – to secure for subscribers the right to decide on the use of the capacity in the networks and to secure for minorities a way to vote in programmes of their own.

3.3.4 Are there restrictions on carriage/provision of other services over cable TV network?

None.

3.3.5 Rights of access of independent service providers to cable TV networks.

The cable network owners must carry a certain number of Danish programmes and also the Danish National Radio and Television Station programmes, including TV2 (the national TV station with commercials) and the local TV station in a particular area.

3.4 Price Regulation

The tariffs for liberalised services are regulated by ordinary competition law.

3.5 Licensing for Other Broadband Service Delivery Mechanisms

No regulation.

4. Telecommunications Operators and Cable TV Networks and Other Services

In May 1996, Tele Danmark was allowed to offer television services on a national scale.

4.1 Restrictions on Dominant PTOs Owning Cable TV Infrastructure

None.

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4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure (Taking into Account Own Content/Other Content)

None.

4.3 Restrictions on Dominant PTOs Providing Cable TV Services Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non/Broadcast)

There are no general restrictions on the National PTO in relation to producing and providing CATV.

4.4 Requirements for Separation From Telephony Business for PTOs Allowed to Provide Cable TV (e.g. Arms Length Operation, Separate Accounting, Limitations on Cross Subsidisation (Excluding the Cable TV Directive see 2.5 Above)

See section 2.5 above.

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1. General Framework

1.1 Key Drivers/Barriers

Finland commenced liberalisation of its telecommunications markets in 1987 with the enactment of the Telecommunications Act (1987/183). The aim of the liberalisation was to break up the monopolies of locally owned and operated service providers, lower service charges, and promote industry growth while ensuring access to reliable, advanced, and secure telecommunications for the entire nation.

Formerly locally owned and operated PTOs were each granted an exclusive concession to build and operate own network in a specified geographic area. Since the areas were fragmented along municipality and community borders, the number of local PTOs exceeded 800 in the 1950s. Today only 47 local PTOs remain to service an area equal to approximately 20 per cent of Finland, but comprising 70 per cent of Finland's population. The state Postal and Telecommunications Office (in 1994, the telecommunications branch was incorporated as Telecom Finland Oy) built and operated telecommunications networks for the remainder of the country propitiously situated outside the local PTOs' concessions. Domestic and international long-distance telephony services and mobile telephony services were up until the mid 1980s, exclusively operated by the Office.

Under the 1987 Telecommunications Act, Finland's telecommunications markets were liberalised in stages. Accordingly, there has been competition in Finland's market for domestic telecommunications, both for local and long-distance services, since the beginning of 1994. Likewise, there has been competition in the market for international telecommunications since July 1994. Finland currently has full competition in both telecommunications infrastructure and in the provision of telecommunications services.

In 1996, there were close to 80 PTOs registered in Finland including the local PTOs and Telecom Finland Oy. The local PTOs maintain a 70 per cent hold on the local voice telephony market and a 53 per cent hold on the domestic long-distance voice telephony market. International telephony services are dominated by Telecom Finland Oy (approximately 70 per cent), but this dominance is under siege by the local PTOs' alliance and Telivo Oy, which is owned by Sweden's national PTO Telia AB and Finland's state-owned power company IVO Oy. Competition in the market for data transmission services is also rigorous.

The local PTOs' market dominance in local loop services is under siege as a result of Finland's high mobile telephone subscribership (over 30 per cent of the population in 1996). Statistics indicate that wireless voice telephony competes vigorously with wireline local loops. Finland's mobile voice telephony network infrastructure currently comprises 2 national NMT networks, a national GSM network, and a DCS 1800 network owned and operated by Telecom Finland Oy, a national GSM network and a DCS 1800 network owned and operated by an alliance of the local PTOs, and a DCS 1800 network owned and operated by Telivo Oy. To compete with local loop monopolies Telecom Finland Oy has also commenced with DECT services in some municipalities.

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Finland's telecommunications networks are, for all practical purposes, 100 per cent digitised and represent the latest in technology. Pursuant to a ministerial resolution, number portability is required to be implemented during the summer of 1997. Finland boasts the highest concentration per capita of Internet host machines in the world. Finland has also been selected as the Northern Europe gateway site for an LEO-based mobile communications system. While Finland's national trunk capacity runs almost entirely on broadband fiber-optic infrastructure, last mile broadband capacity is still lacking. To correct this, some PTOs are upgrading the cable TV networks they own to offer real integrated two-way broadband capacity to homes. As of 1996, over 43 per cent of Finnish homes are connected to a cable TV network.

In 1987, Finland passed the Cable Broadcast Act (1987/184) to promote the broadband cable industry. This was effected through a liberalisation of the cable broadcast service market and removal of network access barriers for program providers and cable operators. Almost all cable networks in Finland are owned by PTOs who built the networks with cable operator financing. Cable operators provide cable broadcast services on the networks under long term agreements. These arrangements were entered into partly because PTOs could at the time obtain the necessary public telecommunications licences and rights of way easier than nascent cable operators. Presently, local network construction and operation primarily for cable TV broadcast is not subject to the licensing and notification under the Telecommunications Act.

1.2 Regulatory Bodies

The Council of State: the Council of State is composed of the Finnish ministers of government. In the context of telecommunications, the Council is empowered to grant telecommunications and cable broadcast licences. Due to a rearrangement of the manner in which decisions are made in the Council, both telecommunications and cable broadcast licences are granted in practice by the competent ministry.

The Ministry of Transport and Communications: The implementation of the Telecommunications Act and the Cable Broadcast Act is vested in the Ministry of Transport and Communications, which is empowered to issue resolutions under these Acts, administer notification and licensing procedures, issue PTO and cable operator specific decisions, and terminate licensed activities for just cause. The Telecommunications Department within the Ministry is charged with those responsibilities pertaining to the Telecommunications Act and the Mass Communications Department is charged with those pertaining to the Cable Broadcast Act. In making licensing decisions the discretion exercisable by the Ministry is bound to the criteria set forth in the applicable acts and adverse decisions can be appealed.

The Telecommunications Administrative Center: the Center is primarily responsible for administering frequency licensing, numbering and Internet domain name allocation, and technical specifications and type approvals. The Center is empowered to issue regulations on these matters.

The State Film Inspectorate: the Inspectorate comprises a chairperson and a deputy chairperson and a necessary number of male and female inspectors appointed for

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three year periods of which one represents the Ministry of Justice and one the Ministry of Finance. In appointing members to the Inspectorate, mental health, education, and social welfare issues as well as artistic talent should be well represented. The Inspectorate is charged with screening qualifying films for prescribed content and determining the applicable film tax. Decisions of the Inspectorate may be appealed to the Film Board.

The Film Board: the Board comprises 11 members appointed for three year periods. Of the members of the Board, one must represent the Ministry of Justice, one the Ministry of Finance, one the Ministry of Education, and one the Movie Industry. The Board is charged with reviewing the decisions of the State Film Inspectorate. The decisions of the Board may be appealed to the Supreme Administrative Court.

The Ministry of Education: the Ministry is vested with the responsibility of overseeing Finland's education system. In the context of communications, the Ministry may exempt in special circumstances educational and artistic films from the inspection requirements. The Ministry is also charged with overseeing the implementation of Finland's copyright laws.

1.3 Key Legislation

The Telecommunications Act (1987/183) regulates all telecommunications activities in Finland. The construction and operation of a wireline network primarily intended for voice telephony as well as the construction and operation of a wireless network are subject to licensing under the Act. All other telecommunications activities, save for specified de minimis activities and VAN service provision, are only subject to a notification under the Act. As a result of far reaching amendments enacted in August of 1996, the aims of the Act have been to promote the application of general competition principles to Finnish telecommunications markets. To a great extent service charges and universal service obligations have been deregulated.

The Cable Broadcast Act (1987/307) establishes a legal regime for licensing cable broadcast activities and regulates cable broadcast and satellite broadcast activities as well as setting forth minimum content requirements. The definition for "cable" also includes microwave distribution systems. The Act distinguishes between cable operators, who are subject to licensing requirements under the Act, and programming providers, who are responsible for their programming but who are not subject to licensing requirements. The Act also distinguishes between network ownership and operation, which are regulated under the Telecommunications Act, and cable operation. The Act imposes must carry and access rules on network owners as well as on cable operators. The Finnish Broadcasting Company is exempted from the licensing requirements of the Act for its cable operations.

The Radio Liability Act (1971/219) mandates the appointment of a qualified Finnish resident to supervise and take responsibility for each broadcast program. The Act assigns contributory liability to programming providers, and broadcasters that fail this obligation. The Act also imposes on broadcasters an obligation to reasonably correct errors in their broadcast or broadcasts. These provisions apply by reference to cable broadcasting.

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The Radio Equipment Act (1927/8) creates a legal licensing regime for the operation of radio transmitters used for public broadcasting. Licences are granted by the Council of State for maximum ten year periods. Local broadcast licences for periods of three months or shorter are granted by the Ministry of Transport and Communications. The Act also establishes a national system for collecting TV and radio broadcast reception fees from the viewing and listening public.

The Radio Act (1988/517) establishes a legal regime for licensing radio transmitters and for frequency management. Reception equipment is not subject to any licensing requirements save for electrical equipment type approvals and standards provided for under the Electricity Act and the Electrical Equipment Act.

The Act on the Finnish Broadcasting Company (1993/1380) establishes the legal existence of the Company and provides for its administration and financing through annual TV and radio receiver fees exacted from all viewers and listeners. The Company is prohibited from broadcasting commercials. The Act also sets forth the public service obligations of the Company.

The Film Review Act (1965/299) establishes a constitutionally approved State mechanism to prevent the non-TV public display of films that are apparently against the law or good customs, morally debased or harmful to mental health, public order, state security, or foreign relations. This Act does not apply to films produced by the Finnish Broadcasting Company. Since the Cable Broadcast Act also prohibits the broadcast of films that by definition would also fail the criteria set forth in the Film Review Act, it is recommended that review be sought for films to be transmitted via cable. Indeed, cable operators that cable broadcast a film approved by the Inspectorate may be sheltered from claims for damages caused by, for instance, any violence depicted in the film.

In December of 1996 the Traffic Ministry submitted a bill proposing to replace the Telecommunications Act with a Telecommunications Market Act. This bill, which is expected to be enacted soon and enter into force by the latest June of 1997, proposes to deregulate the telecommunications industry as far as European Union directives will permit. The bill proposes to remove all licensing requirements for PTOs except those constructing and operating mobile networks. Licences for such networks will be issued on a network by network basis and be valid for maximum 20 year periods. Other network and service PTOs may be required to only notify the Ministry of Transport and Communications of their telecommunications activities unless such notification is not warranted. PTOs will not be required to be registered Finnish companies or branch offices. PTOs would be required to provide telecommunications services that, among other things, are competitive, technically advanced, good in quality, functionally reliable and secure, and reasonably priced. Interconnection between PTOs will be subject to commercial agreement between PTOs. PTOs that by definition possess dominant market power may be subject to minimum interconnection requirements with other PTOs and service providers. Service PTOs will be permitted greater freedom to select the switched network in which they wish to offer their services. The Traffic Ministry may resolve interconnection and PTO disputes on predetermined fair play terms.

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2. Telecommunications

2.1 Liberalisation Timetable

2.1.1 Voice telephony.

The Directive's provisions do not, in general, require further market opening in Finland as the provision of voice telephony has been liberalised in Finland, since 1 January 1994.

2.1.2 Telecommunications infrastructure.

The provision and use of telecommunications infrastructure has been liberalised in Finland, since 1 January 1994.

2.1.3 Liberalisation of alternative infrastructures.

Officially, alternative infrastructure has been liberalised since the Telecommunications Act 1987. The Directive's provisions do not require further market opening in Finland. Alternative infrastructure is already used by, for example, Telivo Oy, a former subsidiary of the State owned power company IVO Oy. Telivo Oy provides international and domestic services through fibre-optic cable wrapped around the lightning arresting coils strung along IVO Oy's power lines. Through a unique system of long-term fibre-optic cross-lease agreements, Finnish PTOs already use fibre-optic cable laid, inter alia, along railroad rights of way. While the national railroad company does not itself provide public telecommunications services over the fibre-optic backbone of its command and control system, it could obtain a licence to provide such service.

2.1.4 Cable Television infrastructure used for telecommunications services.

The use of cable TV networks for the provision of all telecommunications services in Finland is already permitted by law since the Telecommunications Act 1987. However, cable TV networks are not used for telecommunications services because of the present ownership of these networks. Almost without exception, all cable TV networks in Finland are owned by the PTOs and leased on the basis of long-term agreements to cable operators solely for cable TV activities. Leasing cable operators are neither contractually entitled nor, as a rule, licensed to offer telecommunications services over these systems. PTOs are reluctant to open these networks up for telecommunications service provision because of perceived local loop competition. As a result of several amendments to the Telecommunications Act, local networks used solely for cable TV broadcast are not subject to licensing or notification under the Act. Additionally, PTOs are required to provide competitors with access to any excess space in the cable housing of their telecommunications network if the network is used to provide telecommunications services.

If the government bill discussed above in section 1.3 is enacted, cable TV network owners that allow the provision of telecommunications or cable broadcast services on their networks would also be required to lease excess network capacity to competing service operators. The terms for leasing are to be reasonable and non-discriminatory as determined by the Ministry of Transport and Communications.

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While the accounting separation required by the provision of the Directive has not been taken into account in Finnish laws, it is doubtful that any change will be required. The construction and operation of a cable TV network is not an activity conferring exclusive rights and in the case of a local cable TV network is not even subject to licensing or notification under the Telecommunications Act. Additionally, cable operator licence holders, while restricted to the area specified in the licence, are not granted exclusive rights to operate in any given area.

Notwithstanding the above, the government bill discussed above proposes to augment the limited accounting separation requirements currently imposed on PTOs that provide telecommunications services offered through leased capacity. The proposed requirement will be imposed on all PTOs and mandate that a PTO's accounting for its network provision operations be separated from its service provision operations. It is not clear whether this will be imposed on cable operators that do not offer telecommunications services over their cable TV networks (though of no practical application since currently cable operators do not own network infrastructure).

2.2 Interconnection

The Ministry of Transport and Communications are currently reviewing the terms of the proposed EC Directive on Interconnection. It is expected that the government bill discussed above in section 1.3 should cover any gaps existing between Finnish legislation and the requirements of the Directive. Essentially, Finland's interconnection regime is based on private contracting between the PTOs. The only amendments to Finnish legislation that may be required are provisions to implement the dominant market power and universal service funding provisions of the Directive. These provisions have been proposed in the government bill discussed above in section 1.3.

2.2.1 Price setting mechanisms.

Under the Telecommunications Act, PTOs are required to interconnect their networks. Responsibility for the organisation of network interconnection is carried jointly by PTOs. The Ministry of Transport and Communications has issued a detailed regulation outlining requirements for interconnection, including proportional rate-of-return limitations on international traffic, billing procedures and CLI data transfer, and communications routing. The Ministry has empowered the Telecommunications Administration Center to exempt PTOs from their interconnection obligations for limited periods of time and, in the event of disagreement, order PTOs to interconnect. The Ministry has also issued a separate regulation outlining the rights and obligations of service operators such as VPN operators seeking connection to fixed and mobile networks.

The Telecommunications Act empowers the Ministry to set forth the general principles for interconnection charges. Currently, no such principles exist save for the general reliance on market forces for determining interconnection charges. As a rule, the telecommunications industry is subject to Finland's general competition laws. The Ministry is, however, empowered to intercede in the market when the pricing practices of a dominant PTO or general pricing developments threaten the maintenance and development of public telecommunications networks in Finland.

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Additionally, the Ministry may intercede in market developments when European Union legislation requires.

As mentioned above, the Ministry has issued a separate resolution outlining the rights and obligations of service providing PTOs seeking connection to wireline and wireless networks. Pursuant to this resolution, a service providing PTO is entitled on the basis of law to connect its exchanges to wireline and wireless networks as a subscriber connection. PTOs providing wireless network infrastructure must offer the service providing PTO the possibility of being able to itself open and close the connections of its customers. Additionally, a service providing PTO may, if mutually agreed with the network providing PTO concerned, connect its exchanges to a wireline or wireless network using other connection solutions than a subscriber connection. The network providing PTO concerned may, however, restrict the network functions available to the service providing PTO.

Before a service PTO can connect its exchanges and initiate operations, a clarification must be obtained from the Telecommunication Administration Center that the service providing PTO has fulfilled the applicable technical requirements. These requirements regard such matters as the technical requirements for the exchanges, the operating terms necessary for the reliable use of the exchanges and for the quality of connected telecommunications, and the technical identification of the networks concerned. In determining whether a service providing PTO has fulfilled these requirements, the Center must take into consideration the restrictions agreed upon between the service providing PTO and the network providing PTO. Service providing PTO's equipment and program applications that do not fulfil Finnish technical requirements or which are not inter-operable with the network concerned may not be connected.

The service providing PTO and the network providing PTO must agree upon terms concerning the possible termination of the service providing PTO's activities. Additionally, the network providing PTO may require from a connecting service providing PTO a reasonable guarantee and deposit to safeguard the uninterrupted operation of the network. Any agreement between a service providing PTO and a network providing PTO regarding the connection of exchange equipment to a public network must be filed with the Ministry of Transport and Communications. For filing, the Ministry requires an original version of the agreement or a certified copy.

The ministerial resolution on service providing PTOs' connection to a public network entitles network providing PTOs to terminate the connect rights of, or disconnect, a service providing PTO in prescribed circumstances. The resolution also provides that network and service providing PTO's must mutually agree on equipment and software changes (as well as cost distribution) required due to the connection of the service providing PTO to the network. Additionally, network providing PTOs are not required to release to a service providing PTO any more than a limited amount of billing information. Accordingly, network providing PTOs are required to give service providing PTOs the connection number from which the services have been used as well as the name and address of the party responsible for the bill. During the connection, PTOs are required, if technically possible, to transfer to the receiving network CLI data regarding the connection number responsible for paying the bill.

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2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?

The point of interconnection is determined by mutual agreement. PTOs have a legal obligation to develop their network, as a result they are under an obligation to interconnect at any level of the local loop.

Formerly, PTOs were required, within the capacity of their networks, to lease connections to any requesting party, regardless of the intended use. This obligation was, however, limited to mean that PTOs were not required to provide excess network capacity to competing PTOs entitled to build a network. While many PTOs surreptitiously leased connections through third parties, this limitation prevented, in effect, rigorous competition in those areas serviced by the network monopoly of the local PTOs. Since building parallel, competing networks in these areas is economically untenable and environmentally questionable, these local PTOs have maintained their dominant market position in local fixed telephony services.

As a result of far reaching amendments to the Telecommunications Act in August 1996, PTOs are required to lease network connections (subscriber lines and dedicated connections and lines) to competing PTOs that require such connections for public telecommunications. PTOs are not, however, required to lease network connections to PTOs for public telecommunications if such connections are necessary for fulfilling the current or reasonable future needs of their own customers. PTOs claiming they need connections for their own customers as a reason for refusing to lease must demonstrate such need. PTOs' claims that they cannot lease out connections to other PTOs can only be temporary by nature, since licensed PTOs carry a general obligation to develop their networks to fulfil the future telecommunications needs of the entire nation. Licensed PTOs that lease connections as described above from other PTOs are required to separate the business accounting for all their activities based on these leased connections from the accounting for all their other activities.

Environmental considerations also number prominently in assigning lease obligations under the August 1996 amendments. PTOs are required to lease excess space in their cable housings and on antenna platforms on their radio masts to other PTOs, if building parallel cables or radio masts is not permitted for environmental protection reasons or under zoning plans. Again, PTOs may refuse to lease if they can demonstrate that they need the cable housings or mast platforms to fulfil the needs of their own customers.

The Ministry has issued a regulation setting forth the obligations and rights of PTOs in leasing connections, cable housing, and antenna platforms. Under the regulation, for instance, PTOs contemplating the construction of cables or antenna masts in areas where parallel construction is not possible or permitted must take into account the reasonable needs announced by PTOs. PTOs that can show that leasing negotiations for connections, cable housing space, or antenna platforms have not been successful after two months of negotiation may request the Ministry to resolve the matter. Lease charges in such circumstances are determined by the Ministry in accordance with cost-based pricing taking into consideration a reasonable return on invested capital. In determining the costs incurred in providing the connections and leased lines, consideration is given under the Act to the profitability and long term

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return on the cost of providing such connections and leased lines. Additionally, alternative uses for the connections and leased lines may be taken into account as well as the network providing PTO's general statutory obligations to maintain and develop its network. It is also permitted to calculate the costs incurred in providing connections and leased lines as a reasonable commercial profit earned on capital invested in the network.

2.2.3 Do the regulations include provisions for new operators to have access to customer systems, e.g., billing systems? If not, are they being considered?

The ministerial resolution on interconnection provides that the PTO party to the connection agreement with a subscriber is obliged to collect, on reasonable terms agreed between the interconnecting PTOs, service charges incurred by the subscriber connection for the use of these PTOs' services or provide the subscriber information necessary for billing the services. During a connection, PTOs are required, if technically possible, to transfer to the receiving network CLI data regarding the connection number responsible for paying the bill. The provisions for service providing PTOs connected to a network are discussed above in clause 2.2.1.

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance PTO that is not the dominant PTO?

The ministerial resolution on interconnection provides that PTOs must offer consumers free of charge the ability to pre-select long distance and international carriers through a default choice. PTOs must also provide consumers at the same time with the ability to select long distance and international carriers on a call-by-call basis.

2.3 Policy on Licensing for Wireless Local Loop Operators

PTOs that construct and operate a public network for the primary purpose of carrying voice or a public network utilising wireless links are required to obtain a network licence from the Ministry of Transport and Communications. There are no licensing fees for such licences. There are no application fees for such a network licence and the licensing process can be initiated informally by telefax. The Ministry strives to issue the necessary licence promptly (sometimes within 24 hours) but in complicated matters the licensing process could take up to two months. The Ministry must issue a network licence when it is apparent that:-

- (a) The applying PTO has sufficient financial resources to fulfil its statutory operating obligations;
- (b) The applying PTO will comply with the relevant telecommunications provisions and regulations; and
- (c) The radio frequencies necessary for network operations are available.

Adverse decisions may be appealed to the Finnish Supreme Administrative Court.

Frequency regulation in Finland is set forth under the Radio Act and is administered by the Telecommunications Administration Center. As a general rule, a frequency

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licence must be obtained from the Center to operate a radio transmitter in Finland. There are, however, a myriad of exceptions to this general rule. Certain type-approved transmitters that operate at specified common frequencies are exempted from the transmitter frequency licence requirement. GSM, NMT, and DECT phones and INMARSAT-C and M stations are just a few of the various transmitters that are exempt. In the case of a wireless local loop network, frequency licences will be required. The licences are not auctioned off, but rather issued on a first-come-first-serve basis. The annual cost for a frequency licence is nominal.

2.4 Regulatory Involvement in Investment Decisions

2.4.1 Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology?

The authorities support and encourage investment decisions through their scaled down regulatory presence and the price deregulation that has occurred since August 1996. Market access barriers are very low in Finland, e.g., there are no fees for network licences, licensing fees for frequency spectrum are very nominal, and all other telecommunications activity aside from voice telephony and wireless network construction and operation is either subject to only a notification or fully exempted from these registration formalities. The discretion of the Ministry in deciding on licensing issues is restricted by law and decisions may be appealed. Cable broadcast licensing is similarly arranged though the licensing is more involved due to the requirement that local governments are permitted to voice their opinion on the merits of an application.

Both the Ministry of Transport and Communications and the Telecommunications Administration Center heavily involve PTOs in planning, research, and the drafting of proposals for matters concerning the industry. For instance, the reshuffling of radio frequencies required before DCS 1800 systems could be rolled out involved lengthy negotiations mediated by the Telecommunications Administration Center between affected PTOs and frequency users and those PTOs desiring to invest in the new technology. The Telecommunications Act also permits PTOs to construct experimental networks and connect to their networks, for example, experimental equipment that has not been type approved.

2.4.2 Incentives/obligations for network development by government.

As a general obligation PTOs are required to develop their networks to ensure the economical and adequate fulfilment of the telecommunications needs of both the entire nation and individual areas, in times of peace as well as in times of emergency. This general obligation serves as the cornerstone for all PTO obligations and user rights. This same general obligation is further defined in the government bill discussed above in section 1.3: "The purpose of this Act is to promote the efficiency of the nation's telecommunications markets so that the available means for telecommunications are:

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- 1) In accordance with users' reasonable telecommunications needs;
- 2) Competitive with each other;
- 3) Technically advanced;
- 4) good in quality;
- 5) functionally reliable and secure; and
- 6) reasonable in price".

There are no specifically defined milestones imposed on PTOs.

2.5 Requirements for Separation of Service and Network Provision

As discussed above in section 2.1.4 PTOs are required in certain circumstances to maintain their accounting for their network provision activities separate from their accounting for their service provision activities. The government bill discussed above in section 1.3 proposes a more encompassing accounting separation requirement.

In addition to the accounting separation requirement, PTOs are subject to Finland's general competition laws. The Telecommunications Act also prohibits the unbundling of mobile telephone purchases to service provision.

3. Cable Communications

3.1.1 Structure of licences.

The following activities are subject to licensing or notification procedures in Finland:-

- (a) The construction and operation of non-local cable TV infrastructure;
- (b) The provision of a significant proportion of voice telephony over cable TV infrastructure;
- (c) The provision of other telecommunications services over cable TV infrastructure; and
- (d) The provision of other cable TV services over cable TV infrastructure.

In Finland there is:-

- 1) A telecommunications network licence which covers (a), (b), and (c) above provided that the network is intended to be used primarily for voice telephony or the network employs terrestrial wireless links (fixed radio connections and VSAT and SNG connections with satellite constitute de minimis activities and therefore are not subject to the licensing or general notification requirements of the Telecommunications Act);
- 2) A notification which covers (a), (b), and (c) above provided that the network is not used for significant voice telephony activities, encompasses an area extending beyond a municipality or community, encompasses a subscribership of more than 100 households, and does not employ wireless links;

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- 3) A frequency licence for (a), (b), and (c) above provided that wireless links are employed in the network; and
- 4) A cable broadcasting licence covering (d) above provided that the cable operator is not the Finnish Broadcasting Company, which is exempt from cable broadcast licensing.

As explained above in section 2.1.4, PTOs own almost exclusively all cable TV infrastructure in Finland and for competition reasons they are reluctant to allow this infrastructure to be used for competing telecommunications services. Cable operators are entitled to apply and obtain telecommunications licences and make notifications for their qualifying telecommunications activities, likewise PTOs may, upon obtaining a cable broadcasting licence, engage in cable broadcasting services. The development of the cable TV market and its use as an alternative telecommunications infrastructure has been shaped more by practical considerations and facts of ownership than by legal restraints.

See section 2.1.4 and 2.4.1 in relation to the award procedure and other terms of the licence.

3.1.2 Availability of access to bottleneck resources (e.g., ducts, poles).

Access to infrastructure bottlenecks such as network capacity, cable housing, and antenna platforms is provided for under the Telecommunications Act as discussed above in section 2.2.2. There is no provision specifically dealing with access to infrastructure poles. PTOs are entitled to route telecommunications networks through public and private property on the basis of qualifying network routing plans. Additionally, property owners are required to permit, against reasonable compensation, the installation of network cables and necessary attachments for the purpose of benefiting the needs of the public or the property concerned.

3.2 Service Provision

3.2.1 Structure of licences offered.

As discussed above in section 2.1.4 PTOs hold the telecommunications network licences, if applicable, and are reluctant to open these networks to competing telecommunications services for fear of competition over local loop service provision.

Finnish companies and Finnish registered branches of foreign enterprises are entitled to engage in cable broadcasting activities provided they have obtained a cable broadcasting licence from the Council of State. The Finnish Broadcasting Company, Oy Yleisradio Ab, is entitled to engage in cable broadcasting activities without a cable broadcasting licence.

3.2.2 Geographical coverage.

The area of operation in which the activity may be conducted is stipulated in each cable broadcasting licence. While a cable operator's activities are restricted to a specified geographic area, the operator is not granted exclusive rights to service that area.

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3.2.3 Terms and length of licence.

Licences may be granted for maximum five-year periods. A licence expires if activity is not commenced within two years from the date on which the licence becomes valid. See 3.2.1 and 3.1 in relation to other terms.

3.2.4 Award procedure.

The discretion of the Council of State and the Ministry of Transport and Communications is restricted by the law. There is no tender or auction procedure. A licence is to be granted provided that the applicant has sufficient financial resources and it is apparent that the applicant will be able to engage in regular cable broadcasting activities as well as comply with the Cable Broadcast Act and the resolutions and regulations issued thereunder. Before the Council makes its decision a statement must be obtained from the municipal or community governments in which areas the cable broadcasting activity is to occur.

An application for a cable broadcasting licence must be submitted to the Council of State and contain the following information: the name of the applicant and place of business; the area of operation for which the application is made; what programming the applicant intends to broadcast in addition to the public broadcasting programming falling under the must carry rules; how the applicant intends to fulfil its obligations to reserve programming channels and time for local programming; an indication of whether the applicant will fulfil its recording obligations itself or through a third party; as well as the place where such recordings are viewable. Additionally, the applicant must provide a copy of its latest confirmed financial statements, a trade register extract indicating that the applicant is a Finnish company or a registered branch of a foreign enterprise, as well as a 5-year general plan and financing plan for the cable broadcasting activities for which the application is made.

3.2.5 Availability of access to infrastructure.

The owner of a telecommunications network which permits such network to be used for cable broadcasting activity is required to provide the unused portion of the network for cable broadcasting activities to any legal person entitled to engage in such activities. This requirement does not apply to property owner's networks. A telecommunications network or portion thereof is considered to be free for cable broadcasting activities when 1) the owner of the network doesn't commence its own cable broadcasting activities within six months after a cable operator requested capacity or 2) a cable operator, with whom a telecommunications operator has entered into an agreement for capacity provision, does not commence cable broadcasting activities within six months after the agreement was concluded.

Cable operators are required to carry public TV broadcasts that are intended for reception throughout the nation as well as in the area covered by the cable operator's licence. If more than one cable operator uses the same distribution infrastructure, these operators must agree among themselves on the carriage of these public broadcasts.

Cable operators are also required to reserve one programming channel or time-slot for local programming activity. Cable operators are required to provide to other

This section has been prepared by Ulf-Henrick Kull and Craig Thompson of Rochier-Holmberg Waselius.

cable operators the free portion of their programming channels and time remaining after their own programming and their must carry obligations. In providing programming channels and time to other cable operators, a cable operator must, on a priority basis, provide such capacity for local, regional, and other Finnish programming.

A telecommunications network may be provided to licensed cable operators and programming channels and time-slots to programming providers for maximum five-year periods. In providing a telecommunications network, programming channels or time, the terms of the provision must be non-discriminatory with respect to programmers and cable operators and comply with the Cable Broadcast Act and the resolutions and regulations issued thereunder. Notwithstanding the above, a licensed cable operator may provide programming channels and time to local, regional, and other Finnish programming providers on more favourable terms.

3.2.6 Restriction on holding licences to provide services on cable TV network.

There are no restrictions on holding a licence to provide services on a cable TV network save for the requirement that the licensee be a registered Finnish company or branch of a foreign enterprise.

3.3 Relationship Between Ownership of Infrastructure and Service Provision

3.3.1 Separation of infrastructure from service provision.

There are no industry specific restrictions on cross-ownership of network infrastructure and service provision and content save for Finland's general competition laws.

3.3.2 Cable TV operators allowed to offer own content.

Cable operators are allowed to offer their own content within the restraints of the must carry rules described above on section 3.2.5. In providing its own content, cable operators carry primary criminal liability for their programming which violates the law as well as primary liability for any damages caused by their programming.

3.3.3 Cable TV operators control of choice of programming/content.

Cable operators are allowed to choose programming but must comply with 'must carry' requirements. Within the restraints of their must carry obligations, cable operators are very limitedly entitled to exercise editorial control over other broadcasters' content. Cable operator's rights to exercise editorial control obtain significance when the content to be broadcast violates the content restriction of the Cable Broadcast Act. Accordingly, cable operators must not broadcast programming that depicts hardcore violence, is damaging to mental health, or is improper. In deciding on content, cable operators must comply with their general broadcasting obligations prescribed in the Cable Broadcast Act. These obligations entail a general obligation to promote the freedom of speech in their broadcasts, support national, regional, and local cultural values, provide information and opinions on matters concerning an area, promote open public discussion, and abide by good custom. Additionally, cable operators must broadcast the amount of Finnish programming stipulated in their licences. This amount may not be less than

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15 per cent. and no greater than 50 per cent. Of the cable operator's total programming time over a year period. In calculating the portion of programming of Finnish origin, advertisements, non-news text TV, tuning picture displays, and the inactive display of pictures to fill time-slots do not constitute programming. Cable operators must also limit the amount of advertisements broadcast to 11 per cent of their programming time during any given one month period unless their programming channel is used for broadcasting solely advertisements. If advertisements are broadcast in conjunction with regular programming, the advertisements must be broadcast clearly separated from the other programming content and in a manner that does not break up the continuity of the regular programming.

The Cable Broadcast Act imposes criminal liability on programming providers for their programming which is in violation of the law. The Act also requires that programming providers appoint a qualified Finnish resident to be responsible for each broadcast program. This requirement mirrors the requirements of the Radio Liability Act. The names of these individuals are to be kept on record with the cable operators in a place where they can be viewed by the public. Cable operators and other broadcasters, together with the responsible programming providers, are liable for any damage caused by content broadcast over their cable TV networks. Cable operators are required to record or have recorded all content broadcast over their cable TV networks. Such recordings must be stored and accessible to the public for 3 months after the broadcast. Cable operators are obliged, if reasonable, to correct notified errors in their broadcasts.

In the event that a cable operator distributes public broadcasts through its system, a notification concerning this distribution, the origin of the broadcast, and the scope of the distribution network must be effected to the Telecommunications Administration Center before service is commenced.

3.3.4 Are there restrictions on carriage/provision of other services over cable TV network.

There are no restrictions in Finland on the carriage or provisions of other services over cable TV networks, provided that the necessary licences are obtained.

3.3.5 Rights of access of independent service providers to cable TV networks.

As discussed above in section 3.2.5 there is an access regime for other cable operators and programming providers.

3.4 Price Regulation

Cable TV pricing is not subject to any industry specific regulation. The industry is subject to Finland's general competition and consumer protection laws.

3.5 Licensing for Other Broadband Service Delivery Mechanisms

The Cable Broadcast Act applies equally well to cable TV networks employing microwave links and to satellite distribution systems. Frequency licensing and, for non-local networks, network telecommunications licensing for these networks would have to be obtained.

This section has been prepared by Ulf-Henrick Kull and Craig Thompson of Rochier-Holmberg Waselius.

4. Telecommunications Operators and Cable TV Networks and Other Services

4.1 Restrictions on Dominant PTOs Owning Cable TV Infrastructure

Currently, there are no industry specific restrictions in Finland on dominant PTOs preventing them from owning cable TV infrastructure. The industry is, however, subject to Finland's general competition laws.

The proposed Telecommunications Market Act discussed above in section 1.3 singles out PTOs possessing significant market power for the purpose of shouldering minimum interconnection, network access, and universal service obligations. Under the proposed Act significant market power is assumed when, as would be required under Article 4(3) of the European Union Interconnection Directive proposal, a PTO's market power in its relevant operating market exceeds 25 per cent. Or when a lower threshold determined by the Ministry is exceeded. These provisions should not, however, affect PTOs present obligations to provide network infrastructure to cable operators under the Cable Broadcast Act.

4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure (Taking into Account Own Content/Other Content)

There are no industry specific restrictions in Finland provided the necessary licences, if applicable, are obtained.

4.3 Restrictions on Dominant PTOs Providing Cable TV Service Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non-Broadcast)

There are no industry specific restrictions in Finland provided the necessary licences are obtained.

4.4 Requirements for Separation From Telephony Business for PTOs Allowed to Provide Cable TV (e.g., Arms Length Operation, Separate Accounting, Limitations on Cross-Subsidisation (Excluding the Cable TV Directive See 2.5 Above))

See section 2.5 above.

1. General Framework

1.1 Key Drivers/Barriers

Following the liberalisation adopted by the European Union, a new Telecommunications Regulation Law ("the Telecommunications Act of 26 July 1996") was adopted in July 1996 by the French Parliament which prepares the structure of the French market for the full deregulation of the European Telecommunications market in January 1998.

Prior to this, a law "related to experimentations in the field of information technologies and services" was passed in March 96. It allows the operators (after the agreement of the French regulator) to offer experimental telecommunication services, including voice telephony, in a limited geographical area and to a subscriber base limited to 20 000 persons. The objective of the law is to give the opportunity to potential competitors of France Telecom to prepare themselves for the full liberalisation of the market in January 1998.

1.2 Regulatory Bodies

Until the end of 1996, the DGPT (Direction Generale des Postes et Telecommunications), part of the French Ministry of Post and Telecommunications, was the French regulator. One of the main innovations of the Telecommunications Act is the creation of a fully independent regulator called *Autorite de Regulation des Telecoms* (ART, Telecom Regulation Authority). The Telecommunications Act has also created the *Agence Nationale des Frequences* (ANF) which is under the control of the Minister of Telecoms, the Defense Minister and the Culture Minister. The Telecommunications Ministry is responsible for:-

- General regulations.
- International representation.
- Monitoring France Telecom.

The ART's role will be crucial for the liberalisation of the French market. The ART is responsible for:

- Settling disputes arising with regard to interconnection and infrastructure sharing;
- Approving the interconnection reference offer for public network operators with significant market power;
- Allocating resources (radio frequencies and telephone numbers);
- Processing licence applications (in particular drafting licences for public network operators and public service providers);
- Authorising establishment of independent networks (processing applications and issuing the licences);
- Proposing the contributions payable by operators to fund universal service obligations; and
- Regulating and supervising competition.

The ANF is responsible for:-

- Organisation and planning of the hertzian spectrum

- Frequency allocation to administrations
- International negotiations on frequencies

The Conseil Superieur de l'Audiovisuel (CSA) is the French National Authority for Audiovisual Broadcasting.

1.3 Key Legislation

- Law on Freedom of Telecommunications of 30 Sept. 1986 (Audiovisual Law 1986)/Loi sur la Liberty des Telecommunication No. 86-1067, last modified in 1994.
- Law related to experimentations in the field of information technologies and services of 26 March 1996.
- Law on Regulation of Telecommunications 26 July 1996 (Telecommunications Act 1996)/Loi sur la Reglementation des Telecommunications No. 96-65. This 1996 Act is aimed at:
 - Creating a situation of full competition on the telecommunication network and service markets. Competition is henceforth as of right with respect to the exercise of telecommunications activities;
 - Taking into account the European concept of universal service.
 - Implementing a new market regulatory system, a competitive environment leading to the creation of the ART.
- February 20, 1997 – Senate adopted the Proposal for the Audiovisual Law modifying the law no.86-1067.
- March 20, 1997 – The National Assembly adopted the Proposal for the Audiovisual Law.

This Proposal makes 4 changes:

- Choice of a unique regime on satellite audiovisual service provision.
- Harmonisation of French law with the Television Without Frontiers Directive.
- More powers for the CSA.
- Status changes for Radio France, Radio France Internationale et Institut National de l'Audiovisuel.

2. Telecommunications

2.1 Liberalisation Timetable

The Telecommunications Act on the regulation of Telecommunications 1996 transposes into French legislation the provisions of the Full Competition Directive of 13 March 1990. The Act introduces even more extensive provisions than those contained in the Directive.

The new Act has been applicable since 26 July 1996, and only a few provisions have been since then.

Network/infrastructure liberalisation came into force on 1 July 1996, the ART was created on 1 January 1997, and telephony services will be open to competition from 1 January 1998.

2.1.1 Voice telephony.

The Telecommunications Act 1996 brings France into line with European Union policy. Fixed voice telephony will be fully liberalised in January 1998. Until then, telephone service between fixed points is the object of a privilege of exclusivity in favour of the public operator, France Telecom, save for the particular case of radio-telephone service.

In the mobile telephony sector, there are 3 digital operators (2 GSM : France Telecom Mobiles and SFR, 1 DCS 1800: Bouygues Telecom).

Wireless Local Loop : At the present time, Cegetel is experimenting DECT WLL in Nice and Saint Maur. Such CT2 experiments as France Télécom's « Bi-Bop » and Prologos Aquitaine's « Kapt » are also entering the scope of WLL.

Telephony over cable infrastructure : experiments by Lyonnaise Communications (see below).

Telephony services permitted for closed user groups (see "Liberalisation of Alternative Infrastructure").

2.1.2 Telecommunications infrastructure.

The Telecommunications Act 1996 transposes the provisions of the Full Competition Directive into French legislation.

Full competition in the provision of telecommunications infrastructure has been permitted since 1 July 1996, subject to obtaining a licence delivered by the Minister of Telecommunications. This licence may only be refused on grounds of protection of public safety and national defence, frequency spectrum limitations, the applicants' lack of technical or financial means to carry out long term operations or its prior violation of operating conditions or legal or regulatory provisions relating to its activity.

2.1.3 Liberalisation of alternative infrastructures.

Since 1 July 1996, companies that own a private network are allowed to use it or rent it to third parties to provide services that are already liberalised such as data transmissions, mobile telephony (e.g. provide backbone for cellular operators) or closed user groups.

In relation to the Telecommunications Act 1996, only operators which have been granted a licence in accordance with Article L. 33-1 of the Code des Postes et Télécommunications (networks open to the public) may be called "Alternative Infrastructures Operators". On June 1, 1997 they were the following:

- France Manche SA (Eurotunnel), since November 29, 1996 (ALT 1);
- Télécom Développement (SNCF, the French railway company), since November 28, 1996 (ALT 2);

- Colt Télécommunications France SAS, since December 12, 1996 (ALT 3);
- MFS Communications SA, since December 12, 1996 (ALT 4).

Others operators of telecommunications have been granted licences according to the Telecommunications Act of April 10, 1996, relating to experiences in the field of information technologies services:

- Aéroports de Paris, since July 31, 1996 (LEX 1);
- Marseille-Provence SA (Port Autonome de Marseille), since December 27, 1996 (LEX 2);
- Compagnie Générale de Radiocommunication de Proximité (Compagnie Générale des Eaux), since December 27, 1996 (LEX 3);
- Auxipar SA (Lyonnaise Communications), since December 27, 1996 (LEX 4);
- Kapt' Aquitaine (Bordeaux) since December 31, 1996 (LEX 5);
- Belgacom Téléport SA since February 7, 1997 (LEX 6);
- Cegetel Entreprises (Paris La Défense) since May 9, 1997 (LEX 7);

For the time being, RATP and EDF licences are only available for Closed Users Groups, thus out of the scope of Alternative Infrastructures.

2.1.4 Cable television infrastructure used for telecoms services.

There was no need to implement the Cable Television Directive 95/51 EEC in French law, as the 1990 Telecommunications Act already authorised the use of Cable TV network for telecommunications services with the exception of voice telephony.

Nevertheless, the wording of Article L. 34–4 of the Posts and Telecommunications Code was reviewed with the 1996 Telecommunications Act as follows:

“Art. L.34–4 : The provision of public telecommunications services other than the telephone service, over networks established in accordance with the Broadcasting Act of 29 July 1982 [i.e. cable TV networks] and article 34 of the law n° 86–1067 of 30 September 1986, shall be subject to a declaration with the telecommunications regulatory authority [i. e. ART] (...)

When the service proposed is the public telephone service, the provision of the service shall be licensed in accordance with the provisions of article L.34–1 [i. e. like any other telecoms services provider]. In this case, the licence shall be granted after consultation with the local authorities which have established or authorised the establishment of the network.”

Moreover, and as regards European law, insofar as the aforementioned Directive 95/51 is clearly, precisely and unconditionally written and grants rights to individuals, it may be considered as directly applicable to the French territory without any implementation.

2.2 Interconnection

2.2.1 Price setting mechanisms.

A Decree in relation to interconnection was adopted on 4 March 1997 under the 1996 Telecommunications Act. This Decree amends the Code des Postes et Telecommunications. The Decree distinguishes between "dominant" operators (who exert significant influence on the relevant market – >25 per cent market share), and other operators. More stringent rules apply to dominant operators.

The Decree allows for commercial agreements between operators of both fixed and mobile networks. Such agreements between 2 parties determine the technical and financial conditions of interconnection and are given within 10 days of conclusion, to the ART. The Decree details the elements to be included in the interconnection convention. Interconnection rates must be in compliance with the principles of objectivity, transparency and non-discrimination. Operators must provide interconnection on a non-discriminatory basis, including with regards to their own services or subsidiaries.

The Decree specifies further requirements for dominant operators (these primarily affect France Telecom). They must publish a catalogue of their interconnection offer which must be approved by the ART. This catalogue includes technical specifications and a list of interconnection rates. The offers differ depending on whether they are addressed to network operators or service providers. Dominant operators must hold separate accounts for their different interconnection activities.

The ART is placed in the position of arbitrator of any refusal of access, (which becomes definitive only after its approval), and, generally, of any dispute arising with regard to the interconnection or access to the network.

Pursuant to EC law (ONP Directive) and French implementation of it (Telecommunications Act 1996, Interconnection Decree 1997), interconnection prices should take into account international benchmarks and should be determined on the basis of long run incremental costs:

"The costs taken into account shall be relevant (...); [they] shall aim to increase long term economic efficiency, that is, the costs considered shall take into account the capital invested for technical renewal, based on the best industrially available technology and aimed at the optimum sizing of the network, based on the assumption that the quality of service is maintained." (article D. 99-17 of the P and T Code).

Accordingly, ART has approved France Télécom's standard interconnection offer on April 9, 1997. It seemed advantageous to approve and publish the main technical components of this offer, before the initial public offering of France Telecom shares due to the privatisation process (scheduled in May). Other points will have to be added and further detailed until July 1997.

The average prices for interconnection for "telecom networks operators" in accordance with article L. 33-1, from the tariffs listed in the France Telecom offer are as follows:

This section has been prepared by Frederique Dupuis Toubol of Jeantet & Associes.

- 6,09 centimes per minute for intra-local exchanges;
- 12,78 centimes per minute for single transit;
- 17,57 centimes per minute for dual transit.

These average prices comprise both usage charges (peak and off-peak traffic), and access charges for the 2 MBPS capacity used by the new entrant.

These prices shall be higher for L. 34–1 operators (“telecom services operators”), mainly public telephone service providers.

The catalogue includes the majority of the services and components listed in article D.99–16 of the P and T Code, i. e.:

- The main switched traffic routing services;
- The description of the physical points of interconnection and the access conditions at these points;
- The conditions governing the establishment of third party interconnection links to points of interconnection;
- A description of the interconnect interfaces;
- Leased line connection services (2 to 34 MBPS digital leased lines).

The offer also includes provisions on carrier selection (to be re-examined and further completed in the light of rules laid down by ART in accordance with article L. 36–6 of the P and T Code).

The following points must be added to France Telecom’s offer until July 1997:

- For public network operators:
- Supplementary and advanced services and functions (article D. 99–16 of the P and T Code);
- Tariffs for routing international calls and calls to overseas departments;
- Arrangements for implementing number portability (article L. 36–6 of the P and T Code).
- For public telephone service providers:
- Services and components listed in article D. 99–16 (see above).

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?

This question is related to the previous one; there is no specific provision on this matter.

“Unbundling” (dégroupage) of local loop elements is not enforced by French law, and is not expected to be applied by local loop operators within the next few months.

Nevertheless, article D. 99–15 provides that:

“ ... The tariffs which relate to interconnection services shall be sufficiently unbundled, so that the applicant operator is not required to pay for facilities which are not strictly related to the service requested.

In accordance with this principle, these operators shall offer access in the standard interconnection offer, particularly to:

- Their local exchanges;
- Their higher level exchanges or an equivalent technical solution.”

This should be considered in the light of the general provisions of article L. 34–8 in fine of the P and T Code:

“The (...) interconnection offering shall be composed of a variety of conditions designed to meet on the one hand the interconnection requirements of public network operators and on the other hand the network access requirements of public telephone service providers, taking into account the rights and obligations of each of these categories of operators. The conditions shall contain sufficient details to show the specific elements necessary to meet the various demands.”

2.2.3 Do the regulations include provisions for new operators to have access to customer systems, eg. billing systems? If not, are they being considered?

Article D. 99–9 of the P and T Code (in Paragraph 1: “Principles applicable to all operators”) provides that:

“Interconnection agreements shall specify as a minimum, except with the specific accord of ART:
(...) the description of the interconnection services provided and the corresponding remuneration: billing services for third parties;
(...) the technical characteristics of interconnection services: billing information supplied at the interconnect interface.”

In addition, French law (article D. 99–16 of the P and T Code) provides that:

“The standard interconnection offers of these operators [i. e. “powerful operators”, such as France Telecom] shall, as a minimum, include the following services and components, for public network operators: (...)

- supplementary and advanced services and functions (including access to the intelligent network resources necessary for interconnection or for optimum routing of traffic) and the associated contractual terms, based on a pre-established list drawn up by the Telecommunications Regulatory Authority, after consultation with the Interconnection Committee;”

In the context of this list, access to customer billing systems may be requested from France Telecom.

The only advanced functions included in the France Telecom interconnection standard offer will be (from July 1997):

- Identification/non-identification of the originator;
- Call transfer;
- Signalisation from user to user;
- Terminal portability;
- Sub-address.

These functions will be further detailed before then (see 2.2.1 above).

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance operator that is not the dominant operator?

The matter is governed by article L. 34–10 of the P and T Code, which provides:

“A national numbering plan shall be established and controlled by ART. It shall ensure equal access for users to the various telecommunications networks and services and equivalent numbering formats.”

It is thereby within the competence of the ART to allocate prefixes and numbers.

From 1998 to 2000: the initial operator transfers calls to the new operator of the customer's choice, on a “call-by-call” basis: the first number therefore determines the long-distance operator (from 1 to 9). Failing that, using “zero” as the first number means that the local operator is chosen for long distance service as well.

This specific mechanism is designed for nation-wide service operators; others will be granted a “16XY” prefix.

From 2000: in addition to the mechanism described above, (which will be maintained,) to allow users to make a call-by-call choice, a new mechanism will be implemented. Under these conditions, a 10-digit number with “zero” as the first digit will be automatically routed by the local operator to the subscribed long-distance operator.

Since Cable TV operators are technically destined to enter the telecommunications market in the local loop area, issues regarding numbering should be considered from the viewpoint of portability (i. e. the technical possibility for a user to keep his phone number when he wants to change his local operator), rather than of the selection of long distance operator.

Regarding portability, article L. 34-10 of the P and T Code rules the matter:

“As of January 2001 users may, on request:

- retain their telephone number in the event of a change of operator without a change of geographical location;
- obtain a number from their operator, which they may retain in the event of a change of operator or geographical location.”

Implementing this article, the provisions of the Interconnection Decree (1997) are as follows:

“article D. 99-9 (regarding all operators):

Interconnection agreements shall specify ... the technical characteristics of interconnection services: measures implemented to allow users equal access to the various networks and services, equivalent formats, and number portability.

Article D. 99-16 (regarding operators exerting a significant influence):

The standard interconnection offers of these operators shall, as a minimum, include the following services and components, for public network operators:

(...) arrangements for implementing number portability and carrier selection so as to guarantee equal access.”

In the light of these provisions, France Telecom’s standard offer will contain these possibilities as of July 1997 (see 2.2.3. in fine above).

2.3 Policy on Licensing for Wireless Local Loop Operators

For telecommunications services, using a radio network (other than voice telephony), a licence is required in the following two cases. Where the service requires the establishment of a new network infrastructure or the modification of an existing infrastructure, a licence must be obtained from the Telecommunications Minister. In such a case, all the provisions relating to licences for the establishment and operation of a public infrastructure will be applicable (for example, separate accounting for companies which exceed an annual turnover threshold, establishment of a new legal entity for operators which hold a dominant position or monopoly, exclusion of certain foreign companies in the absence of reciprocity).

If the service is provided via a network using frequencies assigned by an authority not within the telecommunications sector (namely, the Conseil Supérieur de L'Audiovisuel) the licence will be subject to the approval of the said authority and will be accompanied by a schedule of operating conditions.

As a general rule, the number of licences awarded is unlimited. There is no bidding, except in the case of scarce resources, essentially the assignment of frequencies (e.g. for GSM and DCS 1800 licences).

Wireless local loop will be permitted from 1 January 1998. ART is currently preparing the terms and conditions for the grant of licences for WLL (which technology, how many licences, etc).

A public enquiry called "La Boucle Locale Radio – Consultation publique" was launched by the former DGPT (French Ministry of Posts and Telecoms) in September 1996. Answers had to be given before December 13, 1996; about 50 potential operators and other concerned persons or companies (industrial companies, consumers associations, etc.) expressed their opinions.

A synthesis of this enquiry should be issued by the DGPT in mid 1997.

It is to be noted that Cegetel is experimenting with the provision of DECT services in both Nice and in Saint Maur (see 2.1.1 above).

2.4 Regulatory Involvement in Investment Decisions

2.4.1 Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology .

See 1.1 in relation to the Law relating to the experimentations in the field of information technologies. This Law is designed to encourage experimentations in the telecommunications field. Authorisations for such experiments are granted by the Minister of Telecommunications. In order to support industry research and program development, the Ministry of Telecoms will dedicate F5 billion to "PME" (mid size companies) in this field.

2.4.2 Incentives/obligations for network development by government.

- In 1996, French Telecom and Space Minister François Fillon stated that French government was opposed to the settlement of a strong duopolistic situation in the market of telecommunications.
- ART Chairman Jean Michel Hubert said also that there is a need for at least three national wide operators, including France Telecom. It is expected that the French authorities will promote not only the second nationwide operator (Cegetel-SNCF consortium), but also a third one. No specific incentives have been taken in this respect. Nevertheless, it is expected that there will be an agreement between Bouygues Telecom and EDF (public electricity company) in the next months, with the consent of the government.
- French policy in the scope of telecoms experimentation seeks to enhance effective competition in this market, and the Law relating to the experimentations in the field of information technologies has been designed to appeal to new entrants as well. Authorisations are granted by the Minister of Telecommunications for a duration of five years; they may concern all telecommunications infrastructures and services, including voice telephony. Licences may also be issued by the CSA (the French audio-visual regulation authority) through a simplified procedure to telecoms services providers which intend to provide audio-visual broadcasts as well.

2.5 Requirements for Separation of Service and Network Provision

Dominant operators (>25 per cent market share) must comply with accounting separation.

The ART designates an organisation who audits the accounts of these operators. Accounting separation enables identification of:

- General network costs
- Specific interconnection services costs
- Specific operator services costs
- Common costs

France Telecom (the PTO)'s contractual obligations require it to maintain analysable accounts which permit an analysis of its costs. In this way, the regulator can determine if prices reflect the structure of costs.

3. Cable Communications

Cable Television Sector

The cable network sector is well developed in France. On 1st June 1997 there were 632 authorised networks and approximately 12 cable operators. The channels transmitted on the cable networks include 20 French channels (including private channels and terrestrial channels) and a variety of foreign channels.

The cable television sector is subject to comprehensive regulation. In particular, cable networks are heavily regulated.

The Ministry of Culture is the government department responsible for setting broadcasting policy. The Ministry of Telecommunications and the ART (Autorité de Régulation des Télécommunications) are responsible if the activity involves telecommunications services.

Under the current law in France, audio-visual communication by cable is governed by the Law n° 86-1067 of September 30, 1986 relating to Freedom of Communication (Act) and is under the authority of the CSA (Conseil Supérieur de l'Audiovisuel). The Act is presently being revised. There are also a variety of other legislative measures governing the sector. Telecommunications are regulated under the Code des Postes et Telecommunications and the authority of the ART (Autorité de Régulation des Télécommunications).

To examine the legal status of cable networks in France, it is necessary to distinguish between the infrastructure and the services including the service provider and the status of the channel owners.

In fact, in France there are two sorts of authorisations concerning, the construction (“établissement” in French) of a cable TV network, which means the installation of the infrastructure, and another for the operation (“exploitation” in French) of such network. The authorisation concerning the installation (see 3.1) of the infrastructure is granted to the cable operator and the authorisation concerning the operation of the cable TV network (see 3.2) is granted to the service provider.

3.1 Infrastructure (and Services if Appropriate)**3.1.1 Structure of licences offered.**

According to article 34 of the Act, only the municipality or group of municipalities are competent to grant authorisations to install a cable television network (infrastructure) in the territory of such municipality or group of municipalities. Such authorisation is given by the council of the municipality concerned led by the Mayor or, by the entity governing the group if the territory concerned covers a group of municipalities.

The Act does not define such “group” but according to the “Code des Communes”, “group” means unions or districts.

The technical requirements set down for the cable network are monitored by the Government. They have been defined by a ministerial decision (arrêté) passed on March 27, 1993.

3.1.2 Geographical coverage.

The territory concerned may cover either one municipality or a group of municipalities such as, for instance, the Annecy region which means the city of Annecy and the 3 or 4 surrounding villages.

It is important to note that a municipality (or group of municipalities) is legally obliged to examine any application received concerning the intent to install a cable television network in the territory concerned. Consequently, it is theoretically not possible for the municipality (or group of municipalities) to grant the exclusive right to a private company for installation of a cable TV network.

To grant such an authorisation, the municipality (or group of municipalities) should respect criteria such as the aesthetic quality of the area, the technical and economical coherence of the television infrastructure broadcasting or the public interest.

Consequently, on the basis of such criteria, a municipality (or group of municipalities) can, in practice grant exclusivity to a cable network operator. It is important to note that the municipality (or group of municipalities) is not obliged to grant such authorisation but the refusal of the request concerning the installation of a cable television network must be reasoned.

Exclusive rights are automatically granted in only two cases:-

- When the installation of the television cable network is considered as a public service (service public);
- The municipality itself sets up the television cable network and in such a case, the television cable network belongs to the municipality.

3.1.3 Terms and length of licence.**(i) Fee**

The agreement concluded between the operator and the municipality sets forth the rights and obligations of both parties. Among the operator’s obligations, the operator may have to pay a fee freely determined by both parties.

(ii) *Length*

There is no specific limited duration.

3.1.4 Award Procedure.

(i) As indicated in section 3.1.2, the licensing award procedure varies according to the municipality which has to examine all applications. Two principles laid down by the Act (article 34) must be complied with by the municipality:

- To ensure the coherence of the whole infrastructure of TV distribution (technical but also economical coherence);
- To ensure the aesthetic quality of the area where the cable network is built.

As soon as the authorisation to install a TV cable network is granted by the municipality to a private operator, such television cable network belongs to the operator.

(ii) Refusal to grant the authorisation

The municipality's refusal must be reasoned as it is a unilateral negative decision of the Civil Service. Such refusal can be based on technical or economic criteria. It can also be based on an examination of the financial aspects of the cable network operator's project.

(iii) For installation of the television cable network

Article 34–3 of the Act institutes an easement for the cities or the authorised companies to set up and maintain the cable infrastructures over private/collective properties (immeubles ou lotissements).

The beneficiary of the easement must respect the aesthetic nature of the site and must carry out the necessary works in the least infringing manner. Disputes may be referred to the courts for a determination of the damage caused.

3.1.5 Availability of access to bottleneck resources (e.g. ducts, poles).

To determine whether a new operator can have access to bottleneck resources, it is necessary to determine to whom the network belongs. The network may belong to the municipality or to a private operator. Consequently, the access will be authorised either by the municipality or by the private operator. In any case, if a new operator installs another network or shares the network already installed, it will be necessary to obtain an authorisation delivered by the municipality. No legal provision obliges a private operator (owner of the network) to grant another operator access to its network.

3.1.6 Restrictions on cable TV infrastructure, ownership and/operation.

The only restrictions imposed on the cable network operator are compliance with the technical requirements described in the ministerial decision (*arrêté*) (27 March, 1993). There are no other restrictions concerning the companies which install cable infrastructures.

3.2 Service Provision

Concerning the services, it is necessary to examine the legal status of the service provider (“exploitant” in French) and the status of the channels which have been chosen by the service provider to make its service plan (“plan de service”).

3.2.1 Structure of licences offered.**(i) The service provider**

Once the cable TV network is installed, it is necessary to obtain another authorisation to operate it. The CSA is in charge of granting licences to provide services on cable TV networks.

This authorisation may be granted either to the company which obtained the authorisation to install the network or to another company. Only companies, including companies under municipal control (régie communale ou intercommunale) and HLM organisms may apply.

(ii) The channel owners

The service plan includes different channels, some of which may be produced by the operator and others which are independent. The operator freely chooses these channels and enters into contracts for broadcasting, provided that such channels have first signed an agreement with the CSA (article 34–1).

Both French and foreign channels (represented by a legal entity) must sign an agreement (article 34.1).

There are several exceptions to this rule, in particular for private television services or public television services when the programs broadcast are entirely simultaneously broadcast by hertz terrestrial network. The agreement between each channel and the CSA should include several types of information such as advertisement rules, duration (limited to 10 years renewable), identification of the channel owner, commitments to produce audiovisual movies or financial information.

The characteristics of the agreement will be different if the channel is from France, from another country of the European Community, from a member State of the European Convention providing crossborder television or from another country.

3.2.2 Geographical coverage.

In theory, the authorisation given by the CSA to a service provider to operate a cable TV network is not exclusive.

In practice, service providers often demand such exclusive rights from the municipality which will propose them to the CSA. There is no example in France where two providers offer cable TV services in the same geographical area.

The channels will be transmitted in the geographical area where the service provider has been authorized by the CSA.

3.2.3 Terms and length of licence.

(i) *Fees*

A television service provider may have to pay a licence fee to the municipality. This licence fee is theoretically determined by the CSA. In practice no licence fee is paid; the licence fee is generally negotiated in the agreements between the cable TV network operator and the municipality. The service provider pays a fee to the channel owner. Such amount is determined in the contract concluded between the parties.

(ii) *Length*

The authorisation granted to the service provider specifies the duration of the licence (art 34 L 86). It can reach a maximum of 30 years (D. 92.881) du 1er.09.1992). In practice, the CSA provides for the duration to be the same as the duration of the authorisation granted for the infrastructure.

The agreement signed between the channel's owner and the CSA (D..N° 92–882 1st September 1992) is concluded for 10 years maximum (renewable).

3.2.4 Award procedure.

The Service Provider

- (i) The authorisation for the service provider to use the cable network to provide TV services is obtained from the CSA on the proposal of the municipality (or group of municipalities) which has delivered the authorisation to install the cable TV network. It means of course that the regulatory authority cannot authorise any service provider not proposed by the municipality (or group of municipalities) however the CSA may refuse to authorise the applicant proposed.

A file must be sent to the CSA which specifies certain characteristics such as the nature of the project, the identification of the company, its activities in communication and various other information in order for the CSA to be able to decide whether it will give its authorisation, its refusal or ask for modifications. In practice, the CSA has never refused to authorise such an applicant but has sometimes subjected its agreement to the modification of the project when it did not respect rules concerning pluralism or technical specifications.

The regulator must provide an answer within two months after it receives the file. According to the decree n°92–881 passed on September 1, 1992, if the CSA has not answered after two months, it does not mean that it has authorised the project. The authorisation specifies which geographical area is covered by the network, which company will be the provider and lists the distributed services. The decision is published in the “Journal Officiel de la République Française”. The authorisation is delivered for the length of time specified in point 3.2.3 (ii) above.

- (ii) Articles 41–1 and 41–2 of the Act prohibits a company from providing a cable network broadcasting television service when such company already has significant communication activities.
- On a national level, (Art. 41–1) an authorisation to provide a television cable network broadcasting service will not be issued if the company already holds two of the following:
 - One or more authorisations for television broadcasting services by terrestrial hertzian waves to an area with a population of 4 million;
 - One or more authorisations allowing television services to be broadcast over a cable network to an area with a population of more than 6 million;
 - One or more authorisations allowing radio broadcasting over an area with a population of at least 30 million;
 - It controls one or several daily newspapers specialising in politics or general information representing more than 20 per cent of the total market in France for similar publications.
- On a regional and local level, (Art. 41.2) an authorisation for a geographic area (other than national) to operate a television cable network broadcasting service will not be issued if the company already holds two of the following:
 - One or more authorisations (whether or not national) concerning television services broadcast by terrestrial hertzian waves in the area;
 - One or more authorisations concerning the operation of a cable network broadcasting television and radio services in the area;
 - One or more authorisations allowing radio broadcasting for a potential audience of more than 10 per cent in the area;
 - If it controls one or several daily newspapers specialising in politics or general information distributed in the area concerned.

The channel owner

The agreement concluded between the channel owner and the CSA sets forth the rules to be complied with by the channel owner such as advertising, youth's protection program etc.

3.2.5 Availability of access to infrastructure.

The authorisation granted by the CSA to the service provider to operate a network indicates on which network (in the territory of the municipality or group of municipalities). The authorisation is therefore granted for a given network.

Concerning the access to infrastructure, see above (3.1.5)

3.2.6 Restrictions on holding licences to provide services on cable TV network.

- (i) Must be owned by a company (see 3.2.4).
- (ii) No multiple licence ownership (see 3.2.4).
- (iii) As long as the channels have entered into an agreement with CSA, and the service plan is not modified, the CSA sets only few obligations on the service provider. However, such obligations may exist, such as for the re-broadcasting of services broadcast via hertz.

3.3 Relationship Between Ownership of Infrastructure and Service Provision

3.3.1 Separation of infrastructure from service provision.

The service provider may be different from the cable operator. Licences are different and can be held by different companies.

The cable operator is not required under any specific legislation to provide access to its cable network to any third parties. The cable operator is free to choose the service provider who will provide services on the network.

3.3.2 Cable TV operators allowed to offer own content.

Yes

3.3.2 Cable TV operators control of choice of programming/content.

The Conseil Supérieur de l'Audiovisuel controls programming over all broadcasting channels in France including CATV networks.

3.3.4 Are there restrictions on carriage/provision of other services over cable TV network.

Multimedia and on-line services over CATV networks are submitted to the ART authorisation.

3.3.5 Rights of access of independent service providers to cable TV networks.

A cable operator must carry the terrestrial television services broadcast in their area. There is no obligation to provide access to the network to third parties.

3.4 Price Regulation

There is no price regulation for CATV services.

3.5 Licensing for Other Broadband Service Delivery Mechanisms

According to the Law related to experimentations in the field of information technologies and services, MMDS experimentations can be authorised in limited geographical areas where no CATV services are provided.

4. Telecommunications Operators and Cable TV Networks and Other Services

4.1 Restrictions on Dominant PTO's Owning Cable TV Infrastructure

No. France Telecom owns the infrastructure used by more than 50 per cent of the CATV subscribers in France.

4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure (Taking into Account Own Content/Other Content)

No. France Telecom Cable, a subsidiary of France Telecom, is a CATV operator in France.

French law does not provide restrictions on this specific matter.

However, France Telecom owns most of Cable TV infrastructures in France, which cover about 2/3 of potential subscribers, for historical and legal reasons (telecommunications monopoly before 1986). Within the frame of "Plan Câble" (Law n° 82-652 of July 29, 1982 and law n° 84-743 of August 1, 1984) France Telecom was granted the monopoly right to build and to run Cable TV networks. Commercial Cable TV operators were legally obliged to pass arrangements with the PTO to provide their services, excluding the provision of telecommunications services.

That is why article L. 34-4 of the P and T Code (implementing Directives 95/51 and 96/19) provides that:

"Arrangements in force which prohibit the provision of telecommunications services over the [Cable TV] networks or which impose restrictions of a legal or technical nature, shall be brought into conformity with this article by 1 January 1998 at the latest. These same arrangements shall guarantee the owner the proper remuneration of these networks to cover the cost of the investments undertaken for this purpose. They shall specify the means of making additional capacity available when necessary and the technical conditions governing the use of these networks. ART may be called upon to settle disputes according to the provisions of article L. 36-8."

France Telecom must therefore grant to cable TV operators access to its infrastructures under fair and equal conditions.

It is to be noticed that, according to this article, disputes have already been submitted by Lyonnaise Communication and Compagnie Générale de Vidéocommunication to ART, concerning price conditions offered by France Telecom (for the transportation of Internet services on Cable TV network).

A decision should be reached on this matter before the end of July 1997.

4.3 Restrictions on Dominant PTOs Providing Cable TV Services Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non/Broadcast)

As a general rule, French law does not prevent telecommunications operators from providing Cable TV services over telecommunications infrastructures, and no specific restriction should be applied to France Telecom as dominant PTO.

Nevertheless, this question should be further clarified, particularly regarding the concept of “Cable TV services”. Accordingly, a distinction should be drawn between broadcasting services (TV channels), which are not applied by the telecommunications regulations, and Cable TV services *stricto sensu*, within the scope of 1996 Telecommunications Act.

Two topics must be mentioned on this issue:

- Concerning broadcasting services, many thresholds in terms of ownership or economic control must be taken into consideration. Thus, in accordance with article 39 of Law n° 86–1067 of September 30, 1986, a company should not own more than 49 per cent of a broadcasting company (TV channel and others).
- Concerning Cable TV services, at first sight ordinary competition law should normally apply. Pursuant to EC and French law, insofar as France Telecom owns and/or runs the largest Cable TV network in France, this infrastructure should be contemplated as an “essential facility” and France Telecom should give access to it under reasonable price conditions; failing that, France Telecom’s behavior could be considered as an abuse of dominant position.

4.4 Requirements for Separation From Telephony Business for PTOs Allowed to Provide Cable TV (eg. Arms Length Operation, Separate Accounting, Limitations on Cross Subsidisation (Excluding the Cable TV Directive See 2.5 Above))

Once more, this particular issue is not provided for in French law. Nevertheless, pursuant to specific rules of accounting, France Telecom must hold a separate accounting of its various activities (voice telephony, mobile activities, and a fortiori Cable TV services).

This results from:

- The provisions of article L. 33–1.II of the P and T Code:

“An operator with an annual turnover exceeding a threshold set by the telecommunications minister and the minister for the economy shall be required to keep separate accounts for the authorised activity.
Moreover, if the competition authority considers that an operator enjoys a monopoly or dominant position in a sector other than the telecommunications sector, and the infrastructure used for this activity may be separated, the operator shall be required to separate this activity from his telecommunications activities on a legal basis for the purposes of fair competition.”

France Telecom had already separated its Cable TV activities, at least as a Cable TV service provider; accordingly, France Telecom Cable is a subsidiary of France Telecom.

- The provisions of article D. 98-2 of the P and T Code (Decree n° 96-1175 of December 27, 1996, implementing article L. 33-1 aforementioned);

The provisions of article 18 of the Decree n° 96-1225 of December 27, 1996 (schedule of conditions for France Telecom), insofar as France Telecom is obliged to hold a precise accounting on its various activities and services.

1. General Framework

1.1 Key Drivers/Barriers

Prior to 1989 the German Federal Post Office (Deutsche Bundespost, DBP) held a monopoly on the construction and operation of all telecommunication and television services in Germany. During this time due to a political decision comprehensive telecommunication and television services had to be provided covering the whole territory of Germany. So the DBP built a telecommunication and cable television network in Germany without having to worry about cost-effectiveness.

The first postal reform commenced July 1, 1989 but was not very far reaching. In essence the DBP was divided into three Federal Special Funds (Sondervermögen), one of which was the DBP Telekom. In addition the monopoly in the telecommunications sector was partially lifted. Only the construction and operation of telecommunication networks and the provision of voice telephony remained monopolies. Other sectors (services, telecommunication equipment) were opened up to competition.

The second postal reform which was implemented on January 1, 1995 again did not bring fundamental changes for the liberalisation of the telecommunications market. The Federal Special Funds were transformed into public stock corporations. Further a constitutional amendment was enacted that obliged Germany to create workable competition in the telecommunications sector and at the same time to provide for adequate and sufficient availability of telecommunication services throughout Germany.

Thereby the second postal reform provided the basis for the liberalisation of the telecommunications market which took place with the enactment of the Telecommunications Act in July 1996.

At this time it was the understanding of the legislature that modern telecommunication and information technology with its immensely fast development could not be handled by a state monopoly which would not be able to make full use of its innovation potential. Since the development of new services in this area also had large potential for creating new jobs, the political intention was to utilise this potential through the creation of a competitive market. These circumstances together with the enactment of the EC-Directives which forced Germany to liberalise the telecommunications market were key drivers in the development of the German telecommunications market.

The development of the cable television industry in Germany is quite unique. In the early 1980s the political intention was to develop a dual broadcasting system with private broadcasters alongside the existing public broadcasting stations. Because of a shortage of available terrestrial frequencies this could only be achieved through the development of a broadband cable network. As outlined above the political directive was to create comprehensive infrastructure coverage throughout Germany and the question of costs was not of major importance. This is why Germany constructed a huge cable television network very early. Most of this network was constructed by the DBP under its network monopoly, with the exception of the level 4 networks (links to homes on private land). The licence to build these level 4

networks was granted to radio and television businesses as a compensation for the business they would lose in the sector of building terrestrial antennas. Therefore the Deutsche Telekom AG (DTAG) as the successor of the DBP in the telecommunication sector owns and operates a huge cable television network but faces stiff competition in the field of local cable television network connecting the homes on private land. Today there are approx. 17 million individual cable television outlets in Germany, approx. 6 million of which are owned and operated by DTAG and approx. 11 million by its competitors.

According to the political directive that led to the construction of the cable television network by DBP this network was and still is exclusively dedicated to broadcasting services. Today that proves to be one of the key barriers for the further development of this infrastructure. Since the provision of broadcasting under the German constitution falls within the exclusive powers of the 16 Länder, DTAG has no influence over the contents carried/provided over its network. As long as it is unclear how further capacities on the cable television network can be used, there is little economic incentive for DTAG to provide further capacities on its broadband cable network because it could not use these capacities in a commercially successful manner. Currently there is an intense political discussion about this problem taking place in Germany.

1.2 Regulatory Bodies

The Federal Ministry of Posts and Telecommunications (BMPT) enacts the regulations under the Telecommunication Laws and regulates the terms and conditions of DTAG for the provision of voice telephony. After December 31, 1997 the BMPT will be dissolved and its tasks assumed by the Ministry of Economics (BMW). (BMW).

The Federal Office for Post and Telecommunications (BAPT) sets the standards for telecommunication equipment and administers the frequency allocation.

The regulatory council (Regulierungsrat) reviews the regulations drafted by BMPT until December 31, 1997.

The Regulatory Office for Posts and Telecommunications (Regulierungsbehörde) will be responsible for the licensing under the Telecommunications Act and the monitoring of the telecommunication network operators and telecommunication service providers after January 1, 1998. It is also responsible for enacting some regulations under the Telecommunications Act. Until December 31, 1997 the tasks of the Regulierungsbehörde are assumed by the BMPT.

The Landesmedienanstalten regulate broadcasting according to the Rundfunkstaatsvertrag which is a state treaty between the 16 German states (Länder) and the respective State Media Acts (Landesmediengesetze).

1.3 Key Legislation

The Telecommunications Act of 1996 covers the licensing for the construction and operation of all telecommunication networks (wirebound and wireless). It also sets forth the obligations of telecommunication network operators with respect to pricing

and granting access under the ONP-provisions. Finally it sets up the Regulierungsbehörde and defines its powers.

The Telecommunication Installation Act (Fernmeldeanlagen-gesetz) grants the monopoly for the provision of voice telephony services to DTAG until December 31, 1997.

The Telecommunications Granting Regulation (Telekommunikationsverleihungs-verordnung) grants the right to provide voice telephony to closed user groups until December 31, 1997.

The Rundfunkstaatsvertrag is a state treaty between the 16 German states that sets forth a uniform broadcasting regulation within the different states which have the exclusive right under the German Constitution (Grundgesetz) to regulate broadcasting.

The State Media Acts (Landesmediengesetze) regulate broadcasting in the respective states according to the provisions of the Rundfunkstaatsvertrag. They set up the Landesmedienanstalten as the regulatory body for broadcasting.

Currently there are two drafts of legislation referring to the provision of telecommunication services other than telecommunication and broadcasting. One is the draft of an Information and Communication Services Act (Informations und Kommunikationsdienstegesetz) and the Mediendienstestaatsvertrag. Both statutes try to establish a framework for the provision of new information and communication services (e.g. telebanking, data transfer and other data services). The necessity for two separate statutes in this area results from the intricate allocation of legislative powers between the German Federation and the states, but both are striving to reach a harmonised regulation. This is important because the exact demarcation of which services will be governed by which statute is still to some extent unclear. Under both statutes no licences will be required for the provision of the services. Subject matter of the regulation is e.g. who is responsible for the content of the services provided, data protection rules, digital signatures etc. Both statutes are likely to come in force on January 1, 1998.

2. Telecommunications

2.1 Liberalisation Timetable

2.1.1 Voice telephony.

The Telecommunications Act of July 1996 implemented the EC Full Competition Directive with respect to voice telephony. Currently DTAG still has a monopoly in the provision of public voice telephony services which expires December 31, 1997. From January 1, 1998 anybody holding a licence under the Telecommunications Act is able to provide public voice telephony services. There are no market entry restrictions for foreign telecommunications operators/service providers.

Until January 1, 1998 competitors of DTAG are only allowed to provide voice telephony services to closed user groups (e.g. group companies).

2.1.2 Telecommunication infrastructure.

The Telecommunications Act also implemented the EC Full Competition Directive with respect to telecommunication infrastructure. The monopoly of DTAG in the construction and operation of telecommunication infrastructure ended on August 1, 1996. Since then any holder of a licence under the Telecommunications Act is allowed to construct and operate telecommunication infrastructure except for voice telephony. In order to enable competitors of DTAG to construct such infrastructure the Telecommunications Act grants any licence holder for a telecommunication network intended for public use a gratuitous right of way to build his infrastructure on publicly and privately owned land. In the opinion of the municipalities this provision of the Telecommunications Act violates their constitutional right of municipal self-government. They will therefore challenge this provision in the Constitutional Court, but for the time being they will grant rights of way under the Telecommunications Act if the telecommunication infrastructure will not permanently restrict the purpose for which the public land was dedicated and complies with the generally accepted state of technology. The telecommunication operator may be required to build the telecommunication infrastructure either underground or above ground according to the principles of urban development of the particular municipality. In addition to the right of way, the telecommunications operator also has to obtain additional permits required by other statutes (e.g. from the authorities for road traffic, nature conservation, protection of monuments, etc.). In any case the telecommunication operator has to restore the public land to its condition before the construction works and will be liable for any damage caused. While the right of way itself is free the municipal authorities will charge an administrative fee according to the actual administrative expense incurred.

2.1.3 Liberalisation of alternative infrastructures.

The Telecommunications Act does not distinguish between telecommunications infrastructure and alternative infrastructure. Therefore alternative infrastructures are subject to the same regulations outlined under 2.1.2.

2.1.4 Cable television infrastructure used for telecom services.

The EC Cable Television Directive has also been implemented by the Telecommunications Act. There are no legal restrictions on the provision of other telecommunication services on the cable television network. However, the largest cable television network, owned and operated by DTAG, is exclusively dedicated to broadcasting (see 1.1). Therefore, that network is not available for the provision of other telecommunications services.

Operators of other cable television networks (level 4 networks) are allowed to and in fact do provide other telecommunication services on their networks. For example, operators of cable television networks which link the apartments of a big housing complex use their networks to provide local information for their customers, for house internal intercom services and to collect information used for the calculation of the additional property expenses from individual apartments.

2.2 Interconnection

2.2.1 Price setting mechanisms.

Under the Telecommunications Act prices for telecommunication services must not contain premiums which can only be imposed because of a dominant market position or discounts which will restrict fair competition. The prices have to be determined on the basis of the cost of efficient provision of the services and any discrimination between different applicants requesting telecommunication services is prohibited without a justified cause.

The adherence to these pricing rules is supervised by the Regulierungsbehörde. Under the Telecommunications Act there are two ways of controlling prices.

An operator of wirebound telecommunication services and public voice telephony (licence classes 3 and 4) who has a dominant market position has to obtain approval for his prices for specific services by the Regulierungsbehörde before putting them into effect. The Regulierungsbehörde must publish the approved prices.

Prices for all other telecommunication services (licence classes 1 and 2) are only subject to subsequent review by the Regulierungsbehörde if it suspects a violation of the pricing rules.

The Regulierungsbehörde exercises its pricing control either by way of reviewing the prices for individual services or by setting price-benchmarks for a package of services which the operator may not exceed. Under the second alternative the operator has a wider discretion for the pricing of individual services.

The price setting for the interconnection/access of other telecommunication networks has also to be done according to the rules of the Telecommunications Act that are outlined above. Therefore interconnection/access charges are generally subject to negotiations between the operators but the outcome of these negotiations is subject to a subsequent review by the Regulierungsbehörde.

2.2.2 Does the regulatory regime give a competing operator access to unbundled loop elements? If not is it being considered?

Under the Telecommunications Act any operator of a public telecommunication network with a dominant market position has to grant free and non-discriminatory access to his network to competitors. This can be done either by way of general access granted to any user of the network or by way of special access individually granted to a limited number of users (e.g. interconnection of networks). Under this regulation the dominant operator also has to grant access to unbundled local loop elements of his network.

If the operators of public telecommunication networks cannot reach such an access/interconnection agreement, the access/interconnection can be imposed by an order of the Regulierungsbehörde.

The interconnection provisions of the Telecommunications Act only apply to dominant telecommunication network operators. The right to obtain access to the networks of other operators can only be asserted under general statutory provisions of German cartel law or European cartel law (Art. 85, 86 EC-Treaty). In Germany

this is especially relevant for new operators of wireless telecommunication networks because in this market at present no dominant operator exists.

2.2.3 Do the regulations include provisions for new operators to have access to customer systems, e.g. billing systems? If not, are they being considered?

Any telecommunications operator who offers public voice telephony has to grant a competitor access to his customer database according to the TKG but respecting data protection laws in order to enable the competitor to offer enquiry services.

2.2.4 Does the regulatory regime determine the arrangements for the consumer to choose a long distance operator who is not the dominant operator?

The operator of any public telecommunication network is required to make appropriate arrangements in his network to enable any customer to choose a long distance operator of his choice. The telecommunication network operator must install a specific pre-selected long distance operator for the customer and must also provide the possibility for the customer to choose different long distance operators via a direct access code on a case-by-case basis. Therefore, the German system is a combination of choice of default and easy access. In addition, any network operator is required to make appropriate arrangements so that a customer is able to keep his telephone number if he changes the operator as long as he does not change his location.

2.3 Policy on Licensing for Wireless Local Loop Operators

The operation of wireless telecommunication systems including wireless local loop networks requires a licence (class 1) under the Telecommunications Act. The number of these licences can be restricted if the number of applicants exceeds the available frequencies, in which case licences are awarded either by way of auction or competitive tender.

There have been two pilot projects for testing DECT wireless local loop systems, the result of which was that the DECT-system is technically feasible for providing voice telephony services but not for providing larger amounts of data transfer, e.g. for ISDN.

Therefore the BMPT is apparently of the opinion that a shortage of frequencies for DECT-systems will not occur.

2.4 Regulatory Involvement in Investment Decisions

2.4.1 Is there any temporary relief from specific governmental actions or initiatives to encourage the development of advanced telecommunications technology?

There was a parliamentary initiative by the Social Democratic Party to include new and innovative telecommunication technologies in the universal services that have to be provided by dominant PTOs to customers in the hope that this would lead to faster development and broader availability of these technologies. The plan for this kind of regulatory involvement in investment decisions was abandoned though.

Therefore, in Germany today there is no regulatory involvement in investment decisions.

2.4.2 Incentives/obligations for network development by government.

There are no incentives/obligations for network development by the German government.

2.5 Requirements for Separation of Service and Network Provision

Companies which are dominant in markets other than telecommunications have to exercise their telecommunication operations in a separate legal entity. Companies which are dominant in the telecommunications market have to account separately for different telecommunication services in the licensed sector and the unlicensed sector respectively in order to guarantee transparency of accounting and financial relations between the different sectors. The purpose of this rule is to prevent unfair competition through cross-subsidies or dumping.

3. Cable Communications**3.1 Infrastructure (and Services if Appropriate)****3.1.1 Structure of licences offered.**

Since the enactment of the Telecommunications Act (August 1, 1996) the construction and operation of a cable television network requires a licence (class 3) under the Telecommunications Act. These licences permit the construction and operation of the network and there are no restrictions as to the number of licences which can be granted in one specific area. An application for such a licence can only be rejected if there are reasonable doubts regarding the applicant's integrity or competence or indications that he will not be able to make long term use of the licence.

3.1.2 Geographical coverage.

There are no specific franchise areas under German Telecommunications Law.

The number of operators in one geographical area is not restricted, but technical and logistical issues may cause bottlenecks.

3.1.3 Terms and length of licence.

The terms of the licence are set forth in the Telecommunications Act and the regulations enacted thereunder. Licences are, in principle, granted for an unlimited period of time. Time limitations are only possible for licences to provide wireless telecommunication services and only if such a time limit is necessary to give other competitors who were denied a licence because of a shortage of available frequencies a chance to obtain a licence at a later date. The licences contain no requirement to build a certain amount of infrastructure in a specific area. The licence fee is to be regulated in a fee regulation which is currently being drafted.

3.1.4 Award procedure.

Since the number of licences under the Telecommunications Act is generally not restricted an applicant has to be granted a licence unless one of the limited refusal grounds (see 3.1.1) is applicable. Once it is established, the Regulierungsbehörde will be responsible for awarding licences under the Telecommunications Act. Until then this task is assumed by the BMPT.

3.1.5 Availability of access to bottleneck resources (e.g. ducts, poles).

If the construction of a new telecommunication cable line is either impossible or would require disproportionate expenses a telecommunications operator can request the sharing of existing facilities for the accommodation of telecommunication cables (e.g. ducts and poles). The owner of these facilities has to permit their use as long as that is reasonable and does not require major construction. In the latter case the user has to pay the owner of the facility reasonable monetary compensation.

3.1.6 Restrictions on cable TV infrastructure, ownership and operation.

Under the Telecommunications Act there are no restrictions with respect to ownership or operation of cable television networks. Only general cartel law restrictions apply.

3.2 Service Provisions**3.2.1 Structure of licences offered.**

For the historic political reasons set forth under 1.1 the broadband cable network owned and operated by DTAG is exclusively dedicated to broadcasting (television and radio). That means that, although there are no statutory restrictions, DTAG is currently not able to provide other services through its cable television network because of politically induced self-restraint. Under the German Constitution (Grundgesetz) the regulation of broadcasting falls within the exclusive competence of the 16 states (Länder). Therefore, the respective Landesmedienanstalten allocate the available frequencies on the cable television network of DTAG to different broadcasters.

Operators of other broadband cable networks (e.g. level 4 networks) are allowed to provide any service on their networks except for voice telephony (until January 1, 1998). Except for broadcasting, no licence is required for the provision of these services.

3.2.2 Geographical coverage.

Broadcasting licences are allocated by the Landesmedienanstalten to certain broadcasters either state wide or for certain areas. The number of operators in a certain geographical area is only limited by the capacity of the available broadband cable network. On the cable television network owned and operated by DTAG, currently 31 channels are available.

3.2.3 Terms and length of licence.

Broadcasting licences are granted only for one state by the respective Landesmedienanstalt; therefore, the terms and length differ from state to state. The duration of such licences is usually around ten years. The cost of obtaining a licence for a full time, state wide television broadcasting programme differs from state to state but is generally within the range of DM 18,000.00 to DM 20,000.00 payable upon granting of the licence. The terms of the licences are set forth in the respective state Media Acts (Landesmediengesetze) which especially impose conditions as to programme content and the permissible number and duration of breaks for commercials.

3.2.4 Award procedure.

The available broadcasting frequencies are allocated by the Landesmedienanstalten according to the criteria set forth in the respective state media acts (Landesmediengesetze). If the number of applicants exceeds the number of available frequencies the Landesmedienanstalt awards the licence to the applicant who is best qualified to fulfil the media political objectives in that state. Therefore the award procedure is a political rather than a commercial decision. Criteria to be taken into consideration are if the applicant's programme offers a broad variety of contents and contributes to the cultural and political variety of the media scene in Germany as well as in the particular state.

3.2.5 Availability of access to infrastructure.

Although this is not legally required, the cable television network owned by DTAG is currently exclusively dedicated for broadcasting by DTAG. Therefore the access to that infrastructure is exclusively regulated by the Landesmedienanstalten under the respective Media Acts (Landesmediengesetze). The consequence is that the provisions of the EC-Directive 90/387 (ONP-Directive) do not apply to this network because of the exemption clause for broadcasting services in Art. 2 no. 4 of the ONP-Directive. As a result, service providers who want to provide services other than broadcasting on DTAG's cable television network cannot claim access to that network under the ONP-Directive.

3.2.6 Restrictions on holding licences to provide services on cable TV network.

There are no such restrictions under German telecommunication laws. There are, however, restrictions under the state Media Acts (Landesmediengesetze) on granting licences to broadcasters who have a dominant market position in order to ensure the variety of content of the programmes offered.

3.3 Relationship Between Ownership of Infrastructure and Service Provision**3.3.1 Separation of infrastructure from service provision.**

Under telecommunications laws there are no legal restrictions on the owner of a cable television network in relation to providing services of whatever kind on that network. There is, however, a restriction with respect to broadcasting, which applies in particular to the cable television network owned and operated by DTAG. Under the German Constitution the provision of broadcasting must not be influenced by the state (the principle of "state-distance in broadcasting"). Therefore as long as the cable television network was owned and operated by the state, the DBP was not allowed to provide services on it. At present the constitutional situation is unclear, because on one hand the DTAG is now a stock corporation but on the other hand the state is still the majority shareholder. There are, however, constitutional lawyers who argue that for the time being DTAG should be allowed to provide broadcasting over its cable television network, but as a matter of commercial policy DTAG has no intention to do so.

3.3.2 Cable TV operators allowed to offer own content.

The cable TV operators are only allowed to do so under the restrictions outlined under 3.3.1.

3.3.3 Cable TV operators control of choice of programming/content.

DTAG as a cable television network owner/operator which dedicated its network exclusively for broadcasting has no control of choice of programming/content. Rather, control is exercised by the holder of the broadcasting licence and the Landesmedienanstalten. Although there are no statutory restrictions, it could be that the constitutional principle of state distance in broadcasting prohibits DTAG from packaging programmes. Even if pure packaging of programmes does not influence the content, under the current allocation of control there would be intense conflict with the Landesmedienanstalten over this subject.

Apart from broadcasting there are no such restrictions. Therefore, operators who provide other services on their cable television networks have a choice of programming/content. But they have to grant other service providers access to their networks under the ONP provisions of the Telecommunications Act.

3.3.4 Are there restrictions on carriage/provision of other services over cable TV networks?

There are no legal restrictions on the carriage/provision of other services over cable television networks. There is, however, the unique situation in Germany that the cable television network owned and operated by DTAG is dedicated exclusively for broadcasting, so that the DTAG network has no available capacity for the provision of alternative services. Currently DTAG is negotiating with the Landesmedienanstalten how additional capacities which may be developed by DTAG on its cable television network could be used for other broadcasting services.

If DTAG could carry/provide other services on its network it would face the problem that level 4 networks, which provide the connection to the users, are operated by different operators and DTAG would have to negotiate the carriage/provision of each service it wants to provide with the operators of these level 4 networks.

Other network operators are not subject to restrictions as to the services they can provide over their cable television networks.

3.3.5 Rights of access of independent service providers to cable TV networks.

Since the DTAG cable television network is used exclusively for broadcasting, there are no capacities available which could be used by independent service providers and they cannot request access to this network under the provisions of the EC ONP-Directive and the ONP-provisions of the Telecommunications Act. However, these provisions grant them access to other cable television networks.

3.4 Price Regulation

The pricing mechanism under the Telecommunications Act (see 2.1) is also applicable to the pricing of the access fees to the cable television network. Cable television operators have to determine their prices on the basis of the cost for efficient provision of services and the prices must not contain premiums which can only be imposed because of a dominant market position or discounts which will restrict fair competition.

3.5 Licensing for Other Broadband Services Delivery Mechanisms

The licences are technology specific but there is no legal provision which prohibits the operation of two or more broadband service delivery mechanisms using different technologies in one area. Such licences must be granted under the conditions of the Telecommunications Act. In practice there are no broadband service delivering mechanisms other than broadband cable (excluding digital terrestrial TV and satellite) in operation.

4. Telecommunications Operators and Cable TV Networks and Other Services

4.1 Restrictions on Dominant PTOs Owning Cable TV Infrastructure

Since the end of the network monopoly with the enactment of the Telecommunications Act there are no more restrictions on the ownership of any telecommunication infrastructure except for those under general cartel law.

4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure (Taking into Account Own Content/Other Content)

There are no such restrictions with the exception of the constitutional requirement of state-distance in broadcasting (see 3.3.1). That means no restrictions apply to the provision of other content but DTAG would probably be prohibited from providing its own broadcasting services. Other PTOs would only need a broadcasting licence from the respective Landesmedienanstalten. Other cable television services (e.g. video on demand) could be provided without a licence (but not on the cable TV network of DTAG).

4.3 Restrictions on Dominant PTOs Providing Cable TV Services Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non-Broadcast)

There are no such restrictions with the exception of the above-mentioned requirements in the area of broadcasting.

4.4 Requirement for Separation From Telephony Business for PTOs to Provide Cable TV (e.g. Arms Length Operation, Separate Accounting, Limitations on Cross-Subsidisation (Excluding the Cable TV Directive, Section 2.5 Above)

Companies which are dominant in markets other than telecommunications have to exercise their telecommunication operations in a separate legal entity. Companies which are dominant in the telecommunications market have to account separately for the different telecommunication services in the licensed sector and the unlicensed sector respectively in order to guarantee transparency of accounting and the financial relations between the different sectors. The purpose of this rule is to prevent unfair competition through cross-subsidies or dumping.

1. General Framework

1.1 Key Drivers/Barriers

In Greece, telecommunications, TV and radio have been the monopoly of State-owned entities for decades. This spirit was reflected in recent Law 2328/1995, that granted OTE (the Hellenic Telecommunications Organisation) together with ERT (the state broadcaster), both State-owned entities (while OTE is now in a transitory phase of gradual privatisation) the exclusive right to develop and operate cable TV. OTE is in the second stage of a gradual privatisation. The State currently owns 92.45 per cent of the shares in OTE. After the offering it will own 80.5 per cent of the outstanding shares and have the exclusive right to develop and operate cable TV.

However, the Greek Competition Committee has recently judged that this exclusive right constitutes misuse of OTE's dominant position and requests that the pertinent legislation is amended, in order to permit other entities to become involved in this field, in compliance with European Union Directive 95/51.

Last December, Commissioner Van Miert expressed his concerns about the implementation delays in Greece which were preventing undertakings providing telecommunications services, already liberalised in other Member States. The Greek Minister for Transport and Telecoms has recently presented to the Commissioner a precise timetable for liberalisation within the following twelve months that has appeared satisfactory to the Commissioner. While welcoming this positive move, the Commission will continue to process infringement procedures against Greece until it is satisfied that all the relevant European Union telecommunications directives have been properly implemented.

1.2 Regulatory Bodies

Though at present there is no worthwhile cable TV industry in Greece, it is nonetheless regulated by the General Directorate of Posts and Telecommunications in readiness for the industry to take off.

Governmental Control: The Ministry of Transport and Communication "MTC" and the Ministry of Press and Mass Media "MPMM" control the cable television sector.

Frequency Management Authority: The MTC, the NCRT and the NTC.

Licensing authority: The MPMM and the MPT are the licensing authorities. There is however, a legislative debate as to whether the regulation on terrestrial transmission is also applicable on a cable transmission.

Coverage by cable television is on a national, regional or local level depending on the specific cable network capacities. There is a possibility of signal encryption for part or all of the transmission time.

Licensing Award procedure: The MTC issue licences for cable television networks. The operation and exploitation of cable television networks, their property status and the cooperation conditions of the ERT and the OTE with third parties is determined by Presidential Decree on the proposal of the NTC and the MPMM. The installation, of cable networks and antennae on public domain is by Presidential

Decree on the proposal of the MTC and the Minister of Environment and Public Works.

1.3 Key Legislation

In September 1995, the government passed a new media law (Law 2328/1995) hoping to stimulate the development of the cable TV market and control broadcasting piracy.

Legislation passed in September 1995 splits the state monopoly on the installation of cables between the telecoms organisations OTE and the ERT. It also allows the private sector limited access to any cable infrastructure via public service concessions.

There are no specific regulations governing cable television in Greece. Provisions for "active cable television" and "passive cable television" exist within the legislation governing terrestrial television.

In 1987 legislation first introduced the distinction between "active" and "passive" cable television. Legislation implemented in 1995 allowed for local television stations to use cable transmission facilities subject to the award of a relevant licence. The 1995 legislation on the legal status of private television and local radio stations contains specific provisions on the supply of cable television services, although their compatibility with European legislation on the liberalisation of infrastructures and the introduction of competition on alternative networks is highly questionable. Specifically that legislation provides that the "exclusive" right for the provision of cable television services jointly belong to ERT and the OTE. (The wording of the law is not any more precise. OTE has an exclusive right to establish and operate telecommunications and cable TV networks). ERT is the Greek national Television broadcaster and service provider. Third parties can offer cable services subject to obtaining a licence from the Ministry and subject to agreement with the ERT and the OTE.

2. Telecommunications

2.1 Liberalisation Timetable

In June 1996, the Greek government made a request to the European Union Commission to be granted an additional time period until January 2003 to implement liberalisation of voice telephony and networks. No decision has yet been taken by the Commission.

2.1.1 Voice Telephony.

Greece is excluded from voice telephony liberalisation until 2003. Since September 1992 there has been an 8 year duopoly between the two licensed GSM mobile operators, namely,

- Panafon S.A. – an international consortium formed by Vodaphone, France Telecom, Intracom and Data Bank of Greece.
- Stet Hellas – formed by Stet Italy, Nynex and Interamerican.

Recently the Greek government has granted OTE a special mobile communications licence. Accordingly OTE is entitled to provide its own mobile terrestrial services on an exclusive basis for 25 years. Panafone claims that the grant of this licence is violating its exclusive right to develop its GSM network and has filed for a claim of annulment of the OTE licence.

2.1.2 Telecommunications infrastructure.

In June 1996 the Greek Government made a request to the European Commission to be granted an additional time period until January 2003 for the full liberalisation of its telecommunication market. The Commission is due to decide on a request by Greece for an additional period for the liberalisation of voice telephony and public networks on 1 January 1998.

The Greek request for a derogation is based in particular on the state of development of the public telephone network of OTE, which is now involved in an extensive exercise to upgrade its network towards a fully digitalised network. The modernisation investments are financed by the monopoly revenues of the telephone service. The Cohesion funds of the European Union are also contributing to this effort.

The Commission is expected to bring forward a decision on the Greek request for a derogation shortly, in line with decisions already taken for Ireland and Portugal and also taking into account the specific features of the telecommunications network in Greece.

2.1.3 Liberalisation of alternative infrastructures.

The provisions of the 1995 legislation on the legal status of private television and local radio stations together with the provisions in the 1995 legislation on the regulation of the telecommunications sector tend to limit the provisions of cable infrastructure to the national TO. The current legislation in Greece does not contain any clear provisions for the development of alternative infrastructures (i.e. local and independent networks, networks for closed user groups) and this may create significant market distortions for future local loop competitive applications, such as entertainment services and video-on-demand based on private alternative infrastructures.

2.1.4 Cable Television infrastructure used for telecoms services.

The Greek Government plans to submit to the Commission a draft presidential decree for the transposition to national legislation of Directive 95/51 by the end of May.

2.2 Interconnection**2.2.1 Price setting mechanisms.**

These matters are not regulated. As there are no “players” involved in this market yet, these issues have not arisen. Since regulation is being considered, though, in order to implement the directives, it will have to deal with these matters as well.

This section has been prepared by Catherine-Marie Karatza of Karatzas & Perakis.

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?

The law is not precise on this point and only provides that OTE has a monopoly over the telecommunications network. There is no clear provision in relation to access to unbundled local loop elements.

2.2.3 Do the regulations include provisions for new operators to have access to customer systems, e.g. billing systems? If not, are they being considered?

There are no regulations as to this matter. See 2.2.1

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance operator that is not the dominant operator?

No existing regulation. See 2.2.1.

2.3 Policy on Licensing for Wireless Local Loop Operators

One may acquire a licence for the establishment or use of wireless telecommunication. This licence is granted by the Ministry of Transport and Telecommunications. However, such stations may not be used for business purposes. Given that the right to provide voice telephony services is granted exclusively to OTE until 2003, we believe that wireless telecommunication systems may not be used to provide such services.

2.4 Regulatory Involvement in Investment Decisions

2.4.1 Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology .

Law 2328/1995 currently reserves the establishment of cable TV infrastructure to the State Telecommunications operator OTE. The Greek Government has presented to Commissioner Karel Van Miert its plans to amend this law, together with the transposition to national legislation of Directive 95/51. The Greek Minister for Transport and Telecoms has announced to the Commissioner that draft presidential decree for the transposition of this directive will be submitted to the Commission by the end of May and that law 2328/95 will be modified within 12 months at the latest. He added that provisional applications for the establishment of such networks could nevertheless be filed in the meantime, which would have to be completed after the adoption of the Presidential Decree.

2.4.2 Incentives/obligations for network development by government.

No.

2.5 Requirements for Separation of Service and Network Provision

No.

3. Cable Communications

3.1 Infrastructure (and Services if Appropriate)

There are no cable infrastructure licences apart from the exclusive licence granted to the OTE, who has a monopoly over all network infrastructure.

The ERT is the national cable TV services provider. In practice it has a monopoly over such services, although third parties may conclude agreements with OTE to provide cable TV services over OTE's network, subject to obtaining a licence from MTC and MPMM, that is granted after a proposal of the NCRT and NTC. There are no such providers in existence as yet.

3.1.1 Structure of licences offered.

OTE and ERT are granted, as mentioned before, the exclusive right to provide cable television services. These two entities may develop cable TV networks, create companies or execute cooperation contracts between each other and with private parties or even with other enterprises of the public sector or local administration organisations or companies constituted by local administration organisations or to participate in companies together with the above entities.

3.1.2 Geographical coverage.

Coverage by cable television is on a national basis, regional or local level depending on the specified cable network capacities. There is a possibility of signal encryption for part or all of the transmission time.

See 3.1.

3.1.3 Terms and length of licence.

Duration of licences has yet to be determined. It is possible that it will be for the same duration as a terrestrial television licence. i.e. 4 years with renewal possible.

3.1.4 Award Procedure.

Ministerial Decision issued by Ministry of Transport and Communication (MTC) for licensing of CATV networks. Presidential decree issued on joint proposal of MTC and Ministry of Press and Mass Media (MPMM) on the operation and exploitation of cable television networks, on their proprietary status and the cooperation conditions of ERT and OTE with third parties.

The MTC issues licences for cable television networks. The operation and exploitation of cable television networks, their proprietary status and the cooperation conditions of the ERT and the OTE with third parties is determined by Presidential Decree on the proposal of the NTC and the MPMM. The installation of cable networks and antennae on public domain is by Presidential Decree on the proposal of the MTC and the Minister of Environmental and Public Works

3.1.5 Availability of access to bottleneck resources (e.g. ducts, poles).

The OTE has a monopoly over all network infrastructure.

3.1.6 Restrictions on cable TV infrastructure, ownership and/operation.

The OTE and ERT have sole right to provide services. Private and public operators are obliged to use the public infrastructure. These bodies are entitled to develop cable television networks to form companies or to conclude contracts whether between themselves or with third parties (public or private, municipalities, local administrations) for the exploitation of cable television networks.

Restrictions regarding cross media ownership are not specified; the general rules on media ownership apply. Likewise, the restrictions on cross-channel ownership are not specified; general sector rules apply. Restrictions on maximum ownership stakes, the nature of shareholders/shareholding and foreign ownership are not specified.

3.2 Service Provision

3.2.1 Structure of licences offered.

See above 3.1.

3.2.2 Geographical coverage.

See above 3.1.2.

3.2.3 Terms and length of licence.

See above 3.1.3.

3.2.4 Award Procedure.

See above 3.1.4.

3.2.5 Availability of access to infrastructure.

See above 3.1.4, 3.1.1 and 3.1.4 above.

Cable operators have the same obligations as terrestrial television operators with regards to access, sharing and service provision rights as set out in the 1995 legislation on the legal status of private television and local radio stations. Currently there are no obligations on ERT to provide access to other operators. Access conditions of both business and individual user groups to cable infrastructures are to be specified. There is a need for extensive regulation and broadcasting services, excluding video on demand, transmitted by cable to closed user groups.

3.2.6 Restrictions on holding licences to provide services on cable TV network.

Public and private radio and television stations are prohibited from providing voice telephony services, as there is a monopoly by OTE over voice telephony services (excepting mobile telephony) and over all telecommunications infrastructure. There are no other explicit restrictions for the provision of other telecommunications services through cable, ISDN, fibre optics and similar networks, subject to being awarded an operating licence by the NTC. The ambiguous status of regulation and the dependence on the ERT/OTE business culture and exclusive rights on network exploitation creates potential barriers for cable television operators to provide telecommunications services. There is a need for further liberalisation.

3.3 Relationship Between Ownership of Infrastructure and Service Provision

3.3.1 Separation of infrastructure from service provision.

The development, installation, exploitation and management of all infrastructure may be effected exclusively by OTE. OTE has the exclusive right to install infrastructure and together with ERT the right to provide services. Others may be given licences to provide services.

3.3.2 Cable TV operators allowed to offer own content.

It is not specified in the law. There has been no practice yet.

3.3.3 Cable TV operators control of choice of programming/content.

If a licence is granted and an agreement has been made between the owner of the network and the user, use of the network for provision of services is permitted (which probably means that there is no further control of such use).

3.3.4 Are there restrictions on carriage/provision of other services over cable TV network.

There are no specific restrictions for other services.

3.3.5 Rights of access of independent service providers to cable TV networks.

The use of cable television networks (and other networks with adequate technical capacities) for the retransmissions of radio and television programmes, as well as for passive reception of television signals, is free. The exercise of the above activities, however, depends on firstly, the conclusion of a contract between the cable network operator and business user, secondly, the conclusion of contracts between the business user and the end user and thirdly, the award of a licence by the MTC and the MPMM on the proposal of the NCRT and the NTC which requires the agreement of OTE and ERT.

3.4 Price regulation

No specific regulations.

3.5 Licensing for Other Broadband Service Delivery Mechanisms

No specific regulation. There is no practice yet.

4. Telecommunications Operators and Cable TV Networks and Other Services

4.1 Restrictions on Dominant PTO's Owning Cable TV Infrastructure

No specific regulation – the rights granted to OTE are very broad to cover all activities.

4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure (Taking into Account Own Content/Other Content)

No specific regulations – the rights granted to OTE are very broad to cover all activities.

4.3 Restrictions on Dominant PTOs Providing Cable TV Services Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non/Broadcast)

There is no restriction on OTE providing cable TV services over its telecoms infrastructure.

This section has been prepared by Catherine-Marie Karatza of Karatzas & Perakis.

Under the telecommunications legislation, entertainment services may, in theory, be freely provided on a commercial basis by enterprises possessing licence granted by the MTC subject to the approval of the NTC. In practice, however, business restrictions may arise from the award of special or exclusive right to ERT under the broadcasting legislation which effectively grants ERT a monopoly to broadcast over cable.

4.4 Requirements for Separation From Telephony Business for PTOs Allowed to Provide Cable TV (e.g. Arms Length Operation, Separate Accounting, Limitations on Cross Subsidisation (Excluding the Cable TV Directive See 2.5 Above)

No specific regulations.

1. General Framework

1.1 Key Drivers

- European Union liberalisation
- Increased consumer sophistication
- Awareness of developments in neighbouring territories
- Globalisation of Irish based business
- Promotion of Ireland as telemarketing centre

Barriers

- Dominance of Telecom Eireann
- State ownership and control of Telecom Eireann
- Trade Union and political opposition to liberalisation and possible privatisation
- Low population density outside main population centres
- Relatively low line penetration
- Small size of market
- Relatively underdeveloped telecommunications infrastructure

1.2 Regulatory Bodies

- Telecommunications and infrastructure, Cable TV
The Director of Telecommunications Regulations
The Minister for Transport, Energy and Communications
- Broadcasting Content
The Minister for Transport, Energy and Communications
Independent Radio and Television Commission (RTC).

1.3 Key Legislation¹

- Telecommunications
The Postal and Telecommunications Services Act, 1993
The Telecommunications (Miscellaneous Provisions) Act, 1996
- Cable TV and MMDS
Wireless Telegraphy Act, 1926 (as amended)
Wireless Telegraphy (Wired Broadcast Relay Licences) Regulation
1974, as amended (SI 67/74)
Wireless Telegraphy (Television Programme Retransmission) Regulations
1989 (SI 39/89)
- Broadcasting
Broadcasting Authority Act, 1960 (as amended)
Broadcasting and Wireless Telegraphy Act, 1988
Radio and Television Act, 1988
Broadcasting Act, 1990

¹ Irish legislation on telecommunications and broadcasting is voluminous. Only key legislation is identified in response to this question.

2. Telecommunications

2.1 Liberalisation Timetable

Ireland has obtained a number of derogations from the implementation of measures liberalising the telecommunications market. These derogations are set out timetable for the European Union below.

Obligation concerned	Date foreseen in the Directives	Additional period requested by Ireland	Period granted
Liberalisation of voice telephony and underlying networks	1 January 1998	1 January 2000	1 January 2000
Liberalisation of the use of own alternative networks for other already liberalised services	1 July 1996	1 July 1999	1 July 1997
Direct international interconnection of mobile networks with other mobile or fixed networks	February 1996	1 January 2000	1 January 1999

2.1.1 Voice telephony.

See 2.1 above.

2.1.2 Telecommunications infrastructure.

See 2.1 above.

2.1.3 Liberalisation of alternative infrastructures.

See 2.1 above.

2.1.4 Cable Television Infrastructure used for telecoms service.

The Cable Television Directive has not been implemented in Ireland. In practice the main cable TV network in Ireland is controlled by Telecom Eireann. As a result that network is not used for telecommunications.

2.2 Interconnection

2.2.1 Price setting mechanisms.

The Government's policy is that interconnecting networks should negotiate the terms of an interconnection agreement themselves. The Office of the Director of Telecommunications Regulation is expected to establish a framework for negotiation which will include a basic set of requirements to be incorporated in an interconnection agreement. If the parties cannot reach an agreement the Telecoms Regulator will determine the terms and conditions, including price. The Government's position is that the interconnection fee should take account of the proper allocation of the appropriate costs to each network.

This section has been prepared by Damian Collins of McCann Fitzgerald.

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements?

None.

2.2.3 Do the regulations include provisions for new operators to have access to customer systems? If not are they being considered?

None.

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance operator that is not the dominant operator?

Not yet determined.

2.3 Policy on Licensing for Wireless Loop Operators

None.

2.4 Regulatory Involvement in Investment Decisions

2.4.1 Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology.

None.

2.4.2 Incentives/obligations for network development by government.

None.

2.5 Requirements for Separation of Service and Network Provision

None.

3. Cable Communications

3.1 Structure of Licences Offered

Key cable legislation is the Wireless Telegraphy Act 1926, as amended. Multi-channel retransmission is regulated under the terms of two statutory instruments, the Wireless Telegraphy (Wired Broadcast Relay Licences) Regulations, 1974 as amended (SI 67/74) and the Wireless Telegraphy (Television Programme Retransmissions) Regulations 1989 (SI 39/89). These regulations set out the conditions under which a licence is granted.

3.1.2 Geographical coverage.

Separate licences are granted for cable and MMDS retransmission. In practice the licences are granted in respect of geographical areas specified in the licences. In addition, licences grant de facto territorial exclusivity for the areas which they cover. The de facto exclusivity of the licences has been subject to court challenge. There are currently legislative amendments being prepared to change the basis of the licensing system.

This section has been prepared by Damian Collins of McCann Fitzgerald.

3.1.3,4 Terms and length of licence & award procedure.

CATV and MMDS systems must be operated under a licence issued by the Minister. Before the operator will be granted a licence it must prove its commercial, financial and technical competence.

CATV licences are renewable on an annual basis, subject to licence compliance, including licence fee payments; MMDS licences are renewable up to a period of ten years. A cable licence is terminable by notice of not less than two years once the licence has run for seven years or more. A licence is subject to termination without notice in the event of a breach of licence conditions.

Licence fees are levied on the basis of gross subscriptions and installation charges. Prices charged for CATV services are subject to Ministerial approval in advance. Direct price control is not in place for MMDS services although the Minister can order a price review and tariff alteration as he sees fit.

3.1.5 Availability of access to bottleneck resources (e.g ducts, poles).

None, other than general competition law principles (essential facility etc).

3.1.6 Restrictions on cable TV infrastructures, ownership and operation.

There are no limits to foreign ownership of cable operations in Ireland. there are no maximum ownership stake requirements.

3.2 Service Provision

3.2.1 Structure of licences offered.

See 3.1.2 and 3.1.4 & 5 above.

3.2.2 Geographical coverage.

See 3.1.2 above.

3.2.3 Terms and length of licence.

See 3.1.3 above.

3.2.4 Award procedures.

See 3.1.4 above.

3.2.5 Availability of access to infrastructure.

Not applicable, no distinction made between infrastructure control and service provision.

3.2.6 Restrictions on holding licences to provide services on cable TV network.

Not applicable, see 3.2.5 above.

3.3 Relationship between Ownership of Infrastructure and Service Provision

3.3.1 Separation of infrastructure from service provision.

Owner of network controls content subject to Ministerial or regulatory intervention. Owners of network invariably are responsible for the provision of content/services.

3.3.2 Cable TV operators allowed to offer own content.

In practice, Cable TV operators only rebroadcast programming provided by other content providers (e.g BBC, MTV etc.)

3.3.3 Cable TV operators control of choice of programming/content.

Subject to ministerial or regulatory control.

3.3.4 Are there restrictions on carriage/provision of other services over Cable TV network.

In principle, the regulatory authority, by means of the licence, may control the services carried over the cable TV network. In practice, a combination of limited capacity, lack of technological development and the continuing derogations in favour of Telecom Eireann mean that cable TV networks carry only TV and radio programmes. The ownership of Cablelink, the largest Cable TV operator, by Telecom Eireann is also a significant factor.

3.3.5 Rights of access of independent service providers to cable TV networks.

None.

3.4 Price Regulation

Not applicable.

3.5 Licensing for other Broadband Service Delivery Mechanisms

Licensed by the Department of Energy, Transport and Communications, soon to be transferred to the Director of Telecommunications Regulation.

4. Telecommunications Operators and Cable TV Networks and Other Services

4.1 Restrictions on Dominant PTO's Owing Cable TV Infrastructure

None. Telecom Eireann controls the largest cable TV operator, Cablelink.

4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure/Taking into Account Own Content (Other Content)

None.

4.3 Restrictions on Dominant PTOs Providing Cable TV Services Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non-broadcast)

Subject to licensing by Department of Energy, Transport and Communication; this licensing function will be transferred to Director of Telecommunications Regulation.

4.4 Requirements for Separation from Telephony Business for PTOs Allowed to Provide Cable TV (e.g Arms Length Operation, Separate Accounting, Limitations on Cross Subsidisation (Excluding the Cable TV Directive).

There is no domestic regulation other than the Cable TV Directive.

1 General Framework

1.1 Key Drivers/Barriers

The key elements, with reference only to the past twenty years in terms of government policy and legislation, which have led to the current telecommunications and cable network industry structure, are, in essence, the government's strong monopolistic media approach, in the media sector which allowed the creation and the existence of a second private pole only by way of recourse of the private operator to judicial remedies and extremely articulated TV management procedures (e.g. national terrestrial diffusion of the private operator obtained by way of national distributions of cassettes in all Italian regions, on a daily basis, not broadcast simultaneously but with minimal time differences of diffusion of air signal) more than tenders or open procedures. Within this framework, terrestrial TV has been the main item of debate between the public/private poles and, by express government will, cable TV was not allowed to develop on the grounds that the largest Italian private TV operator started with community cable TV.

From the public broadcasting side, R.A.I. obtained its first exclusive licence as U.R.I. as per the provisions of L. June 30th, 1910 n. 395 and thereafter renewed.

The private broadcasting (terrestrial) operators obtained their formal licences in August 1992 (and had been operating since 1984 according to temporary renewed legislation). Cable TV and sound services, apart from the experimented service currently carried out by Stream S.p.A., are not developed.

Cable television is ruled by the provisions of the Post Code (D.P.R. n.163 of March 23rd 1973), by the L. 223 of August 6th 1993 (so called "Mammì Law"), by D.L. n.73 of February 22nd 1991, by the Ministry of PTT decrees and by the applicable and acknowledged European directives.

The private enterprise in this sector has been restricted by a "local" limitation of the cable TV infrastructure owned and managed by a private operator. The convergence of media and telecommunications on the one hand and the future acknowledgment of directives 95/51 EEC and 96/16 EEC on the other hand will give cable TV and sound a concrete possibility of development.

On the telecommunications side the services directive was implemented only in 1995 (D.L. n. 103 of March 17th 1995 and the relevant regulation D.P.R. 420 of September 4th, 1995) in quite a restrictive way in terms of implementation of European Union legislation (e.g. the satellite directive was not acknowledged by way of this instrument, despite the fact that it was issued as of October 1994), and in quite a liberal way in terms of treatment of already existing providers of private telecommunication services operating on the assumption of a direct enforceability of the services directive within the Italian jurisdiction (allowing a de facto regularization of the status quo [art. 12 D.L. 103/95] by way of filing of a declaration or an application for a licence).

Further to the enforcement of D.L. 103/95 over five hundred applications (declarations and requests of authorization) have been filed with the Ministry of P.T.T. and the most part, as of February 1997, have been awarded.

From a telecoms public corporate structure perspective, a number of telecommunications companies controlled by Stet S.p.A. (Italcable S.p.A., Telespazio S.p.A., Iritel S.p.A., Sirm S.p.A.) were the object of a major restructuring, merging into S.I.P. S.p.A., which then had its corporate name modified to Telecom Italia S.p.A.

The major expected legislative change consists of the Regulation which shall be issued by July 1997 acknowledging the directives referred to under section 1.3 n. 13 and will represent in essence the new Italian sole text for telecommunications.

The Regulation addresses the following issues: universal service, interconnection, conditions of access to the network, class and individual licences, economic conditions of offer, costs accountability, accounting separation, quality of services and supplementary services, numbering, essential requirements, right of way and common use of infrastructures, standards, data protection, relations with end users, directories and calling cards, arbitration, sanctions, mobile and personal systems and authority.

1.2 Regulatory Bodies

Broadcasting, publishing and cable is administered by the Broadcasting and Publishing Authority (“Garante per la Radiodiffusione e l’Editoria”), the cabinet of the Prime Minister and the Parliamentary Commission for the public service.

The Broadcasting and Publishing authority with responsibilities both for content and for infrastructure (in conjunction with the Ministry of P.T.T.) also maintains express antitrust powers in its own field as per art. 20 L. 287/1990.

Telecommunications as well as spectrum allocation are currently managed by the Ministry of P.T.T.

L.n.481 of November 14th 1995 provides for the establishment of a National Telecommunication Authority. The Authority is currently the object, amongst other items, of the regulation presently pending before Parliament which shall acknowledge EEC directives 95/51, 95/62, 96/19 and possibly 96/2.

The model proposed in the draft Regulation (see 1.3 n.s 12 and 14) provides for a single Telecommunications Authority (appointed by way of Decree of the President of the Republic upon presentation by the government, following consultation with the relevant Parliamentary commissions) articulated in two different commissions, one in charge of infrastructures and networks and the other one responsible for services and content.

1.3 Key Legislation

The key legislation can be summarized as follows:

1. “Post Code”, D.P.R. n.156 of March 29th 1973.
2. L.n. 103 April 14th 1975 and L. n.10 of February 4th 1985.
3. L. n. 223 of August 6th, 1990, “Broadcasting text”.
4. Approval of the National Telecommunication Plan, April 6th, 1990 D.M. Min. P.T.T.
5. D.L. n. 73, 1991, Provisions pertaining infrastructure for the diffusion of sound and TV via cable.
6. Provisions for the reform of the telecommunication sector January 29th, 1992 L. n. 58.
7. ONP Internal Market for telecommunication services. February 9th, 1993 D.L. n. 55 (acknowledgment of Directive 90/387/EEC).
8. ONP Leased Lines, May 2nd, 1994 D.L. n. 289 (acknowledgment of Directive 92/44/EEC).
9. Competition telecommunication services, March 17th, 1995 D.L. n. 103 (acknowledgment of Directive 90/388/EEC).
10. Regulation pertaining to characteristics and modalities of telecommunication services as per art. 3 para. 1 of D.L. March 17th, 1995 n. 103. September 4th, 1995 D.P.R. n. 420.
11. Determination of compensation for authorisations pertaining to liberalised telecommunication service. September 5th, 1995 D.M. Ministry P.T.T. and subsequent amendments.
12. Telecommunication Authority, “Regulations pertaining to the compensation and the regulation of the public utility services. Establishment of the Authorities for public utility services”. November 14th, 1995 L. n. 481.
13. Directive 95/51 EEC, Cable TV for telecoms. Directive 95/62 EEC, ONP voice telephony. Directive 96/19 EEC, Full competition. October 23rd, 1996 D.L. n. 545, art. 2/December 23rd, 1996 L. 650, Provisions for telecoms. Provisions of acknowledgment of the referenced directives.
14. Draft of Telecom Regulation of acknowledgment also of n.12 and 13.
15. Directive 96/2 EEC, Mobile and personal communications, May 1st, 1997, n. 115. Provision for acknowledgment of the Directive.

In the telecommunications sector the key legislation in essence is the “Post Code” and D.L. 103/95, deed of enactment of the services directive as well as the relevant regulation D.P.R. 420/1995.

The Post Code sets out the general framework for the sector and D.L. 103/95 represents the major change since the drafting of the Code marking the initial liberalisation of the sector.

The Post Code is articulated in four sections.

The first section addresses common provisions for postal services, services of “bancoposta” and telecommunications; the second and third section address postal services and services of “bancoposta” in detail, the fourth section addresses telecommunications services in detail. The provisions pertaining to telecommunications services address public and private licence, legal limitations, rights of way, control and supervision, telegraphic services, telephonic services and radioelectric services.

D.L. 103/95 in essence acknowledges an essential version of the services directive.

In the cable sector the key legislation is provided by L. n. 103 April 14th, 1975 , by L. n. 10 of February 4th 1985 by L. n. 223 of August 6th, 1990 and by D.L. n. 73, 1991.

The mentioned bills focus mainly on the broadcasting and the publishing area addressing licences awards, public service, radio frequencies allocation, zoning provisions, broadcasting and publishing authority, advertising, sponsorship, news broadcasting, keeping of a national registry, transfer of property, prohibition of dominant position in the media sector, obligations of the licensee, public TV, cable TV and sanctions.

2. Telecommunications

2.1 Liberalisation Timetable

Voice telephony	January 1st, 1998
Telecommunications infrastructure	Not fixed, expected July 1997
Alternative infrastructure	Not fixed, expected July 1997
Cable TV infrastructure used for telecom services	Not fixed, expected July 1997

2.1.1 Voice telephony.

Directive 96/19 CEE of March 13th, 1996 (“full competition”) has not yet been implemented within the Italian jurisdiction.

The expected time frame for implementation is July 1997.

It is necessary to implement the directive as the legislative scheme is still not fully liberalised.

Closed users groups have been allowed by way of Administrative jurisprudence (Autorità Garante della Concorrenza e del Mercato/judgment n.2662 Telsystem/Sip) prior to the enforcement of the services directive by way of D.L. n. 103 of March 17th 1995.

2.1.2 Telecommunications infrastructure.

Telecommunications infrastructures are not fully liberalised.

The interested operators must lease capacity from the incumbent operator.

Should the Regulation detailed under Section 1.3, n14 above be passed by the government, the full competition directive will be implemented within the Italian jurisdiction.

It is expected that the Regulation will be passed by the Parliament by July 1997.

2.1.3 Liberalisation of alternative infrastructures.

See 2.1.2, the situation is the same.

The major alternative infrastructures are controlled directly or indirectly by the following operators : ENEL S.p.A. (energy), Autostrade S.p.A.(highways), SNAM S.p.A.(gas), F.S. S.p.A (railways).

All of the above mentioned operators have entered into preliminary or final (but conditional upon enforcement of liberalisation bills) agreements with other operators (e.g. Enel S.p.A. has entered into an agreement with Deutsche Telekom, which was disclosed in the last week of May 1997 for the joint tender for the third operator for mobile PCS; Albacom S.p.A. is about to finalise a number of preliminary agreements with Snam S.p.A.)

2.1.4 Cable television infrastructure used for telecoms services.

The directive 95/51 EEC of October 18th, 1995 has not been implemented yet.

The time frame for implementation is July 1997.

It is necessary to implement such directive as the sector is not fully liberalised.

The practical effects of such a liberalisation will be relevant within the Italian jurisdiction only in the global context of acknowledgment of both directives 95/51 EEC and 96/19 EEC given the extremely limited coverage of cable TV and of sound on the National territory.

2.2 Interconnection**2.2.1 Price setting mechanisms.**

In terms of general interconnection tariffs between the incumbent operator and the new players there is a regulated interconnection regime set by National legislation implemented mostly by way of decrees of the Ministry of P.T.T. or specific conventions.

The most recent and most comprehensive provision in terms of tariffs are the four decrees of the Ministry P.T.T. of February 28th 1997 pertaining to national and international tariffs, as well as fees and lease installments for leased national lines and tariffs for connections with internet providers.

In accordance with Decree 103/95, the costs of the access to the public switched network (with the limitations in terms of services better detailed under art.2), as well as the interconnection costs between leased lines and with the public switched network, are published, together with the technical and commercial provisions, in the Official Gazette.

The Ministry of P.T.T. in relation to the raising of the tariffs pertaining to leased lines is obliged to communicate to the European Union Commission the single items of cost increase.

As far as satellite services are concerned (e.g. satellite uplink – downlink), the negotiation of the interconnection cost, restricted to the mark up cost, customarily takes place.

In terms of arbitration procedure the immediate action to which an operator is entitled in case of disputes pertaining to interconnection (refusal of interconnection or excessive costs of interconnection) of leased lines, for telecommunication services including switched networks (pending the implementation of the full competition directive) is a recourse to the Ministry of P.T.T. which should decide on the issue within ninety days (non peremptory term).

A specific arbitration panel of five members is provided for both GSM licences (art.46).

The dominant operator must publish the standard un-bundled interconnection rates by July 1997.

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?

There is no specific legislation apart from provisions relating to rights of way (art.232 of the Post Code). Operators, if licensed, can obtain un-bundled local loop elements, providing their own infrastructure.

2.2.3 Do the regulations include provisions for new operators to have access to customer systems, e.g. Billing systems? If not, are they being considered?

The incumbent operator, in accordance with art. 38 of the Convention with the Ministry P.T.T. must allow access to the automatic computerized directory list to other foreign public operators with which the incumbent has entered an agreement and with other telephone operators (it is not more clearly specified).

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance operator that is not the dominant operator?

Voice telephony is not liberalised and no legislation addresses this specific topic for voice telephony.

2.3 Policy on Licensing for Wireless Local Loop Operators

It is not possible to obtain a licence for wireless voice telephony (in the strictest sense according to the definition of Directive 388/90 EEC and further amendments) by a private operator for the local loop.

It is possible to obtain a licence to provide telecom services including radio communications by wireless in the local loop.

Such telecom services are substantially based on PMR (European frequencies 60/160/440/800 Mhz) and by way of PAMR, basically using trunking technologies, M.P.T. 1327 (analog radio digital signaling, frequencies 150/450 Mhz); Tetra, fully digital TDMA, frequencies 380–400Mhz for emergencies services, 410–430Mhz, 450–470Mhz, 870–876, 915–921Mhz for civil and commercial services.

The above licences are awarded following individual applications filed with the Ministry of P.T.T. upon review of technical and financial parameters.

By way of D.L. May 1st, 1997 n. 115, specific urgent provisions for the acknowledgment of directive 96/2 EEC on mobile and personal communications have been envisaged providing for the acknowledgment of said directive within 90 days (non peremptory term) of the date of enactment (May 3rd 1997) of said D.L.

The new regulation will reallocate the frequency bands for the mobile and personal communication services; reserve the frequency bands 1755 – 1785 Mhz and 1850 – 1880 Mhz to the Ministry of Post and Telecommunications for the further allocation for D.C.S. 1800 service to be provided by the companies awarded with a tender and to the companies which will provide G.S.M. services as of January 1st 1998; allocate to the Ministry of Defense, by December 31st 2004, the frequency bands 2025 – 2040 Mhz and 2200 – 2215 Mhz, allocate to the Ministry P.T.T. as of January 1st 2005 the frequency bands 1740 – 1755 Mhz and 1835 – 1850 Mhz and any further bandwidth necessary for the provision of personal and mobile communications systems; restructure, by way of reallocation the bandwidth 2468 – 2690 Mhz, reserving to the Ministry of Defense the bands 2537 – 2593 Mhz and 2611 – 2667 Mhz and to the Ministry of P.T.T. the residual bandwidth; and to provide a regulatory framework for the satellite personal communications.

The bill provided for a procedure of compensation to the Ministry of Defense for the costs incurred for frequency reallocations.

2.4 Regulatory Involvement in Investment Decisions

2.4.1 Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology?

Yes. The current Italian legislation envisages temporary relief from the obligation of coverage of territory and of population for a number of telecommunication services performed by a private operator (1) prior to the start of commercial service (e.g. GSM art.5 of the Conventions) and (2) a relief from obtaining a final satellite licence

by way of providing for a provisional licence pending the completion of technical verification of compliance of a satellite application with European standards .

2.4.2 Incentives/obligations for network development by government

The obligations for network development set by the government consist of the requirement to (1) respect the development of the network within the “local” area and (2) to comply with the legislation concerning public works and telecommunications for public use (art.4.4. D.L. 73/91).

2.5 Requirements for Separation of Service and Network Provision

In Italy the legal provision pertaining to the separation of services from network provision, also addressing cross subsidies, have focused on telecommunications in a broad sense and on some specific sectors in detail (e.g. GSM).

For telecommunications services in general within the framework of the Post Code the legislation addresses the issue of “general conditions for the provision of telecommunications services” (art. 7.3. DPR n.420 of September 4th 1995) which need to be rendered to the public and in any case made known to the end user which may reflect obligations of separation of service/network provision.

The proposed new Regulation specifically addresses this issue. Every telecommunication entity classified as having “relevant market force” (in general terms a T.O. who controls over 25 percent of a particular telecom market in a national ambit or in the geographic ambit where the same is licensed to operate; we shall not mention the exceptions) shall modify its cost accounting according to the scheme in the regulation.

The accounting system shall provide for the separation of at least the following elements: a) direct costs for installation, management, maintenance and marketing of infrastructures and of services; b) common costs shall be accounted for i) according to the analysis of its origin; ii) if such analysis is not possible, by way of indirect relation to other categories; iii) should an indirect analysis not be possible, a parameter shall be set by structuring a relation between the expenses attributed to such prevailing service and those pertinent to other services.

Other costs mechanisms and, in particular, long term prospective incremental costs, can be utilised, should they be deemed to comply with the spirit of the Regulation.

3. Cable Communications

3.1 Infrastructure (and Services if Appropriate)

3.1.1 Structure of licences offered.

The cable TV industry is quite underdeveloped on the Italian territory.

The industry is in the shape it is due to legal uncertainties and the lack of implementation of secondary legislation.

A physical or juridical person or another entity willing to build and operate the physical network (rectius cable network and equipment for broadcasting or sound diffusion, mono or plurichannel) and thereafter provide cable services, is required to apply for (1) a network licence and thereafter, depending on the type of content, apply (2) for the relevant content licence (TV sound or telecommunication services).

Such an application can be filed only if “non availability of public means (infrastructures) is ascertained” (art.4 D.L. 73 / 1991).

The licence application shall include a business plan and a specific technical plan (art. 4.2 D.L. 73/1991).

The Ministry of PTT shall reply to such a request within 180 days from the receipt of the application. Such term is however deemed not preemptory.

3.1.2 Geographical coverage.

In accordance with DPR n. 73 /91, the geographical coverage envisaged is “local” (art.4.1.). The definition of local was to be detailed in a regulation which was never issued (art. 13) and the definition of geographic boundaries of the specific area are dealt with on a case by case basis referring to the provisions of L.223 of August 6th 1990 (“Broadcasting Text”) by way of legislative reference and of analogy.

Operators may interconnect network infrastructures following specific authorizations from the Ministry P.T.T.

3.1.3 Terms and length of licence.

The distribution of cable TV and sound services over a network controlled by the incumbent operator is possible essentially for the incumbent operator on behalf of third parties and, in the restricted cases of local provision, for the private operator subject to 3.1.1.

A private operator can file an application for a cable TV/sound network and equipment licence (“concession”) for an area where no available public means (i.e. infrastructures) are envisaged. The procedure to ascertain whether “public means” are present or not is delegated to modalities to be listed in a regulation (as per art. 13 of DPR 73/91, in accordance with art. 17 of L. August 23rd 1988 n. 400) which was never issued.

The duration of the licence for the installation and the management of the network and of the equipment cannot exceed 20 years and can be renewed.

The costs for such licence are detailed in the table annexed to the D.P.R. dated October 26th 1972 n.631 as subsequently modified by art.6 DPR n. 73/91 and are:

- Installation and management of a network of cable diffusion of TV (and not of sound) within a local geographical area:
Lit 2.280.000
- Annual renewal
Lit 2.280.000

- Annual cost
Lit 1.142.000

All monetary amounts are upgraded automatically according to multiple indexes.

Consideration of the public interest is expressly envisaged in the legislation (art.8.2.of D.L. n. 73/91) and can set grounds for modifications of the licence.

3.1.4 Award procedure.

The licence for Cable TV network and equipment is awarded upon an application filed with the Ministry P.T.T. and is analysed on a case by case basis and is conditional upon a final satisfactory business plan, technical plan and payment of the initial fee.

3.1.5 Availability of access to bottleneck resources (e.g. ducts, poles).

The general provisions of the Post Code provide for the de jure right of way as far as wiring on buildings is concerned.

The government policy is to encourage the incumbent operator to share infrastructure wherever possible and some explicit wording, even if pertaining to public entities, can be found in the Telecom Italia licence.

3.1.6 Restrictions on cable TV infrastructure, ownership and/operation.

The cable TV and sound legislation refers, by way of analogy, to the broadcasting legislation.

The ownership of the cable TV infrastructure is restricted to the incumbent operator, with the exception of the possibility of a private operator obtaining a licence for “local” installation of infrastructure.

The operation of a cable TV infrastructure is allowed for the licensed private operator on a “local” basis and is otherwise permitted to the public TV operator R.A.I.

3.2 Service Provision

3.2.1 Structure of licences offered.

The cable TV and sound legislation refers, by way of analogy, to the broadcasting legislation and creates difficulties in interpretation (e.g. the broadcasting licence to which the cable bill refers to is valid also as a licence for infrastructure whereas the cable bill provides for a separate and different infrastructure licence).

The licence is issued (on a local basis) for a six year period and is renewable.

The licence details the technical scheme of the network and of the equipment, the location, the area and all other connected items. The licence can be issued, with the same limitations, to the same entities detailed in art. 3.2.6. according to the same parameters.

3.2.2 Geographical coverage.

The service licence (“autorizzazione” [art. 9 D. L. 73/91]) is restricted on the basis of an infrastructure licence (“concessione” [art. 4 D. L. 73/91]) limited to a defined “local area” which is not better defined.

3.2.3 Terms and length of licence.

The licence is issued on objective criteria which are the economic potential, the quality of the content and the technical and financial projects. For the applicant who has previously carried out broadcasting activities other elements will be considered such as market share, quality of content, broadcasting time, self-produced news services and audience indexes.

The costs envisaged for the cable TV and sound are the same of the broadcasting on a local area. The local area will be accounted for by way of analogy by enumerating the so called audience areas which the cable TV and/or sound “local” area is going to address.

A fee is fixed for one audience area and the total cost, by way of interpretation, will be the result of the sum of how many audience areas are included in the local area.

The duration of the service licences, by way of interpretation, is the same as the broadcasting licences, that is to say six years, and it is renewable.

3.2.4 Award procedure.

The distribution of cable TV and sound is subject to a licence (“autorizzazione”) issued by way of decree of the Ministry of P.T.T. on a case by case application.

3.2.5 Availability of access to infrastructure.

The licence to provide services on a cable network is awarded to provide services on a specific network and not on several different networks.

The licence gives the holder the right to access the public network (art.10 DL73/91) or to his own network, should he hold a relevant infrastructure licence.

3.2.6 Restrictions on holding licences to provide services on cable TV network.

The licence cannot be awarded to public entities, companies with prevailing public participation and to banks (art. 16 of the Broadcasting Text and subsequent amendments and art 9 of D.L. 73/91), by way of legal interpretation.

The licences cannot be assigned and can be awarded to a limited liability company or physical person or an entity (better detailed in art 12. of the civil code), of Italian or European Union nationality or citizenship. Non European Union nationalities are accepted on a reciprocity basis.

The limited liability company detailed above must be controlled by European Union companies or by non European Union companies on a reciprocity basis and the final physical person/s, beneficial owner/s, must be declared.

3.3 Relationship Between Ownership of Infrastructure and Service Provision

3.3.1 Separation of infrastructure from service provision.

The two licences (one for infrastructure and the other one for service) can be held by the same entity.

The owner of the infrastructure retains control of the content provided on that network.

The possibility for the private owner of the infrastructure to hold the content licence is provided for by the law.

3.3.2 Cable TV operators allowed to offer own content.

Cable operators are allowed to provide their own content. In practice, however, there are few examples to refer to. Typically, the cable operator will purchase the content and package it in a content/service product for the end-user.

3.3.3 Cable TV operators control of choice of programming/content.

The owner of the infrastructure can control the services should such owner also hold the service licence; otherwise the owner of the infrastructure does not retain control over the content.

The holder of the service licence has the responsibility for the content and for the compliance of the same with the Broadcasting Text and the relevant regulatory provisions.

3.3.4 Are there restrictions on carriage/provision of other services over cable TV network?

Cable TV networks, according to the relevant service licence, unless specified differently in the same or a different licence, and legal provisions are used to carry cable TV. A broad interpretation of the current legislation, mostly in favour of the incumbent, would consider the public infrastructure for use of the provision of telecommunication services and of cable distribution services.

3.3.5 Rights of access of independent service providers to cable TV networks.

The access of independent services providers to cable TV networks is specifically addressed in art. 10 DL 73/91 and is conditional on the issue of a specific regulation.

Independent service providers can request access to cable networks run and managed by a private operator. Such private operator must permit the passage of the signal on the residual capacity of the infrastructure run by the private operator. The provision refers for implementation to secondary legislation which was never issued.

3.4 Price Regulation

Cable TV pricing from the end-user side is not subject to specific restrictions.

Cable TV pricing from the independent service provider side is set by way of Decree of the Ministry of PTT.

A cable TV operator is subject to the Broadcasting Authority (“Garante per la Radiodiffusione e per l’editoria”) and must disclose the relevant pricing structure if requested.

3.5 Licensing for Other Broadband Service Delivery Mechanisms

The broadband service delivery mechanism which utilizes the optimisation of the terrestrial television signal, by way of utilising the intervals of the signal, might be mentioned but is unlikely to be considered a broadband service in its own right.

4. Telecommunications Operators and Cable TV Networks and Other Services

4.1 Restrictions on Dominant PTO’s Owning Cable TV Infrastructure

Telecom Italia S.p.A. is the dominant PTO.

A PTO can own the infrastructure also allocated for use of cable TV.

4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure (Taking into Account Own Content/Other Content)

The current licence of Telecom Italia S.p.A., initially awarded to S.i.p. S.p.A., provides for “the installation and management of telecommunications equipment and providing of the relevant telecommunications services (with a number of exceptions e.g. terrestrial TV) ”.

A general provision restricting the dominant PTO owning cable TV infrastructure from providing cable TV services could be found, by way of interpretation and of analogy, in the Broadcasting Text whereby the relevant licence cannot be issued to public entities, also public economic entities, to companies with a prevalent public participation and to banks (art. 16.12 L.223 of August 6th 1990 and subsequent amendments).

It must be noted, however, that in accordance with L. April 14th n.103 1975 and further amendments the “diffusion by way of cable of sound or of TV programs on a national scale” is restricted to the State. The public entity indicated in the relevant Convention is the public TV operator R.A.I.

D.L. n.73/91 derogates (judgments of the Constitutional Court had already previously provided for a wider interpretation of legal limitations) to the previous discipline allowing a private cable operator to provide cable services over proprietary (local) or leased (local) infrastructure.

D.L. 73/91 provides for a specific obligation for the PTO to assure the distribution of sound and TV programs to the entities holding title to the relevant content licence (art.3).

4.3 Restrictions on Dominant PTOs Providing Cable TV Services Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/non Broadcast)

The licence awarded to the PTO excludes the provision of terrestrial TV and does not evidence a prohibition on providing cable TV services in the same fashion.

For the cable distribution services of sound and TV programs the applicants must refer to the PTO unless the applicant has obtained a licence for the establishment of its own infrastructure, on a local basis, or wishes to use another private operator's infrastructure. In the former case the applicant has the power to enforce a must carry provision for the residual capacity not used by the other private operator.

The must carry obligation pending versus the private operator destinee of the application is suspended until the issuing of the secondary legislation (Regulation ex art. 13 D.L. 73/91) which, as of today, has not been enforced.

The relevant prices for the use of the private or of the public infrastructure are set by a Decree of the Ministry P.T.T.

4.4 Requirements for Separation From Telephony Business for PTOs Allowed to Provide Cable TV (e.g. Arms Length Operation, Separate Accounting, Limitations on Cross Subsidization (Excluding the Cable TV Directive See 5.5 Above)

No provisions are currently in place for separation of cable TV from telephony business provided by the incumbent.

According to the price mechanism set for telecommunications authorisation, as per D.L. 103/95, the applicant is obliged to pay a fee (one million Lire) for the first application or renewal, an amount (one million Lire) for every premises where a switching knot is installed, an amount (one million lire) to be remitted on an annual basis for technical verifications.

In the GSM sector both operators (TIM S.p.A. an independent company created from the splitting of an ongoing business concern from Telecom Italia S.p.A. and Omnitel Pronto Italia S.p.A.) have similar economical conditions. In both cases two levels of regulations are addressed, a temporary and a permanent one (arts. 14, 15, 16 Omnitel S.p.A. convention approved by way of D.P.R. December 2nd, 1994 and arts. 14, 15, 16 of Telecom S.p.A. convention approved by way of D.P.R. December 22nd, 1994).

The temporary level envisages on access charge for fix-mobile and for mobile-fix of 200 lira/minute average. Such charge can be fragmented in different levels, by the Ministry P.T.T., following an audition with the interested parties and in any case cannot result in an amount higher than 320 lira/minute.

As far as the fix network for international intercontinental traffic is concerned, oriented to users of the GSM network the global amount, to which Italy has title, is subdivided between the licensee (40percent) and the incumbent operator (60percent).

As per the specific provisions pertaining to GSM service both GSM licences have undertaken to adopt a system of accounting separation which must identify the specific activities developed by the company with regard to the final service, allow a control of a lack of cross subsidiaries and of discriminatory practices, the definition of the amount of the access charge, the different charges for the utilisation of different infrastructures.

The financial results of every single activity for which an interconnection is required, shall be evidenced on a yearly basis in the balance sheet and connected statutory documents.

The Government has allowed the two GSM licensees to utilise, pending the adoption of a full accounting separation within 24 months from the from the issuing of the licence, their own industrial accounting allowing parametric accounting techniques.

The Ministry P.T.T. retains the power to further instruct the two licences in terms of accounting reparations splitting obligations and deadlines.

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1. General Framework

1.1 Key Drivers/Barriers

Since 1884 the provision of telegraphy and telephony services were reserved exclusively to the State. The Post and Telecommunication (P&T) was responsible for the infrastructure and the supply of the above-mentioned services. In 1992 the law creating the “Entreprise des Postes et Telecommunication” granted to the new company a concession for telecommunication services. However, this concession is not exclusive.

As regards radio broadcasting no monopoly was granted to the State. However on the basis of the law of December 19, 1929 (hereafter “the 1929 Law”), the first one to regulate such sector in Luxembourg, an exclusive concession (except for radiobroadcasting by low-powered transmitters not exceeding 100 Watt) was granted in 1930 to a private operator, the “Société Luxembourgeoise d'Etudes Radiophoniques (SLER)” which became one year later the “Compagnie Luxembourgeoise de Radiodiffusion (CLR)”. In 1954 the Luxembourg Government granted a monopoly for television broadcasting to CLR which changed its name to “Compagnie Luxembourgeoise de Télédiffusion (CLT)” and operated under the title “Radio-Télé-Luxembourg (RTL)”.

Although no exclusivity was granted by law to the CLT and the government was free to grant concessions to other operators, the CLT enjoyed a *de facto* monopoly in Luxembourg in order to allow it to operate a financially viable network.

On the basis of the 1929 Law a concession for the satellite system ASTRA was granted to the “Société Européenne des Satellites (SES)”.

In accordance with European Community law, on July 27, 1991, Luxembourg adopted a law on electronic media (hereafter “the 1991 Media Law”, in force since September 1, 1991) and more recently on March 21, 1997 a law on telecommunication (hereafter “the 1997 Law”, in force since April 1). Both laws implemented into Luxembourg legislation the EC directive on crossborder television of October 10, 1989, directive 92/44 on the application of open network provisions to leased lines and directive 90/388 as subsequently amended.

Luxembourg has thus adopted a legal framework providing for the full liberalisation of the telecommunication sector.

Since the 1991 Media Law some new radio stations have been granted concessions. It may be noted that prior to the 1991 Media Law a number of radiobroadcasters were operating illegally on Luxembourg territory.

The concession granted to CLT (CLT-UFA since January 1, 1997) was renewed on the basis of the 1991 Media Law. The same applied to the concession granted to SES.

Apart from the above, no other concessions in the TV and satellite sectors than the above quoted have been granted in Luxembourg.

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1.2 Regulatory Bodies

There are five main regulatory authorities dealing with the Sector Policy.

The Government: the Minister in charge of media and the Minister responsible for the telecommunication sector. are responsible for the Sector Policy. At the moment it is the Prime Minister who is responsible for the Media and the Minister of Communication who is responsible for telecommunications.

The Media and Audiovisual Service is an administrative department of the State Ministry and assists the Prime Minister to define and execute the Media policy, to favour the development of the services as far as programmes are concerned, to promote the Grand-Duchy as a European Centre in collaboration with audio-visual activities from the other competent services.

The Media and Audiovisual Service further assists the government commissioners in the supervision of the companies to which a concession for radio broadcasting or satellite operating has been granted.

The commission on radio broadcasting is governed by article 30 of the 1991 Media Law. It is an independent authority which applies the provisions relating to the authorisation and operation of programmes broadcasted by low-powered transmitters and gives advice to the Government as far as authorisations for other radio programmes, as well as withdrawal of these authorisations, are concerned.

The national council for programmes is made up of a maximum of twenty-five members appointed for five years by the organisations which are most representative of the social and cultural life of the country, including recognised religious bodies, parliamentary political groups, the trade unions with the greatest national representation, as well as national federations of associations which are active with young people and immigrants, or involved in the field of culture, sport, the family, charity and ecology. A Grand-Ducal decree lays down which organisations are to be represented, and the number of delegates which they are permitted to have.

The function of the National Council for Programmes is to advise the Government on content and supervision of radio programmes broadcasted by high-powered transmitters as well as television and teletext programmes transmitted to a national audience and to check that companies are observing the legal, regulatory and other provisions set out in their terms and conditions of operation insofar as these provisions relate to the content of programmes.

It makes proposals to ensure there is a diversity of programming in an improving but balanced way.

If the Council becomes aware that the legal provisions or the terms and conditions (*cahiers des charges*) are being infringed, it informs the Minister responsible for the Media, who summons the company holding the licence to a meeting. In case the Minister comes to the conclusion that the provisions have been infringed, he notifies such conclusion to the company in question and orders it to comply with the legal

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requirements. If further infringements occur, the Government may withdraw the operating licence.

*The 1997 Law provides for the creation of a **Luxembourg Institute of Telecommunication** (hereafter “the Institute”).*

The Institute's task is to assist the Minister in charge of telecommunications as regards the preparation of telecommunication regulations and the *cahiers des charges* applicable to the licences granted under the 1997 Law. A Grand Ducal regulation will determine a “cahier des charges” for each type of licence. In addition to that the Minister may further specify for each licensee specific terms and conditions which may however not be more restrictive than those in the “cahier des charges” determined by the Grand Ducal regulation. The Institute intervenes in the licensing award procedure and is further responsible for consumer protection in the telecommunication sector.

Licensing Authority

Under the 1991 media law:

The authorisation for radiobroadcasting is granted by the Government on the proposal of the Minister in charge of telecommunications. Programmes for international radiobroadcasting may be authorised by the Government only after consultation of the Independent Commission on Radio Broadcasting and on the proposal of the Minister in charge of the Media.

The same applies to television and teletext programmes, radio programmes broadcasted to Luxembourg residents by high powered transmitters, and programmes broadcast by satellite or cable.

Radio programmes broadcasted to Luxembourg residents by low-powered transmitters are authorised by the Independent Commission for Radiobroadcasting.

Concessions for the establishment and operating of satellite systems may be granted by the Government on joint proposal of the Minister in charge of telecommunications and the Minister responsible for the Media.

A distinction should be made between passive and active broadcasting. Passive broadcasting, simultaneous transmission of programmes already licensed, does not require any authorisation (Article 24 of Media Law), whereas active broadcasting of programmes not already licensed requires a licence.

Under the 1997 law:

The above-mentioned Institute prepares the selection procedure of the applicants.

The Minister in charge of the telecommunication sector is finally responsible for the issuing of licences under the 1997 Law.

(as regards the matters covered by the 1991 Media Law and the 1997 Law see below point 1.3.)

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Frequency management authority.

According to article 9(1) of the 1997 Law, a Grand-ducal regulation (not yet adopted) may determine the frequencies which may be assigned to applicants. However, the same law gives power to the Minister in charge of telecommunications to establish a plan for the assignment of frequencies (on proposal of the Institute) and to manage the herzian frequency spectrum.

Power of licensing authority.

The licensing authority i.e. the Government may:

- Establish a plan of herzian frequencies.
- Give broadcasting authorisations.
- Determine obligations or permissions, terms and conditions which need to be complied with by the licensee.
- Withdraw concessions or licences.

The Government (Minister responsible for the media or the Minister responsible for the telecommunication sector, depending under which law the licence or concession has been granted) or the Independent Commission on Radio Broadcasting may decide to withdraw a concession or a permission in case the legal provisions are not complied with by the concerned company (article 35 of the 1991 Media Law; articles 11 and 67 of the 1997 Law).

Depending on the *cahiers des charges* under which the authorisation has been granted, the Government may have a right of inspection of the articles of incorporation of the broadcasting company, the shareholders of the broadcasting company, the organs of the broadcasting company and all the companies participating in the running of the concession.

1.3 Key Legislation

See above point 1.1.

Radiobroadcasting as well as broadcasting through satellite networks are regulated under the 1991 Media Law (which replaced partly the 1929 law on radioelectrical stations).

The provisions of the 1997 Law are so wide-reaching that they may apply to the licensing of any form of telecommunication services or networks. As regards cable TV network operators, article 71 of the 1997 law specifies that licences granted under such new law will replace the previous licences or authorisations issued in such field.

However, between the 1991 Law and the 1997 Law there seems to be substantial overlapping leading to an incoherent system. Many details of the 1997 Law are to be regulated by Grand-Ducal regulations *inter alia* the exact content of each licence. Depending on the content of such regulations, eventual overlapping might in future be avoided. However at the present moment the exact scope of both laws is unclear. The result is that although Luxembourg has adopted a legal framework to permit full liberalisation of the telecommunication sector, no real competition may at the

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present moment exist for a number of services due to the lack of adequate detailed legislation.

Other forms of regulation.

The conditions under which concessions for Luxembourg cable programmes, TV programmes in general and teletext may be granted, are specified by two 'Scandinavian Broadcasting System S.A.' – Grand-Ducal regulations of March 17, 1993. The Minister in charge of telecommunications will, on proposal of the Institute, issue new licences for cable TV operators and determine the *cahiers des charges* applicable to such licences (article 71 of the 1997 Law).

The Grand-Ducal regulation of April 25, 1997 determines the *cahiers des charges* applicable to mobile phone service providers and network operators.

2. Telecommunications

2.1 Liberalisation Timetable

See point 1.1. and 1.3.

2.1.1 Voice telephony.

The 1997 Law provides a framework implementing into Luxembourg legislation EC directive 90/388 as subsequently amended. Thus full competition in the provision of voice telephony is permitted in theory. However full liberalisation in practice will only occur once secondary regulation comes into force. The legislation must come into force before 1 July, 1998, the end of the derogation period granted by the Commission.

2.1.2 Telecommunications infrastructure.

As above, the 1997 Law provides a framework implementing into Luxembourg legislation the EC provisions on the liberalisation of telecommunication infrastructure. However full liberalisation in practice will only occur once secondary regulation comes into force, before 1 July 1998.

2.1.3 Liberalisation of alternative infrastructures.

As above, the 1997 Law provides a framework for liberalisation of alternative infrastructure. However full liberalisation in practice will only occur once secondary regulation comes into force.

2.1.4 Cable Television Infrastructure used for telecoms services

Subject to the exception explained below, neither the 1997 Law nor any other statutes contain any provisions which would prohibit the use of cable television infrastructure for telecom services. The aim of the 1997 Law is to provide for the full liberalisation of any telecommunication services as well as the corresponding infrastructure. However as above, in practice this liberalisation will occur only once a secondary regulation comes into force.

Article 71 of the 1997 Law which provides for the replacement of previous cable TV licences or authorisation states that the new licences to be granted to cable TV network operators (which were already operating under the previous legislation) are

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to be limited to the use of cable TV services. The use of such cable TV infrastructure for telecom services is thus excluded. Where the owner of a cable infrastructure under the previous legislation wishes to use it also for telecom services including voice telephony, he will have to apply for a new licence in order to provide voice telephony services.

2.2 Interconnection

2.2.1 Price setting mechanisms.

According to article 9 of the 1997 Law, a Grand-ducal regulation shall establish for each type of licence a *cahier des charges* which determines *inter alia* interconnection conditions. At the present moment no such regulation has been adopted.

The Institute referred to by the 1997 Law will set out guidelines for the determination of interconnection rates. Interconnection rates must be based on objective criteria and on the effective costs. As a matter of general principle the 1997 Law provides for the contractual freedom of operators. Interconnection is thus a matter of commercial negotiation between operators. However the Institute may oblige in certain cases an operator to grant interconnection to another operator. The interconnection agreement needs to be communicated to the Institute which may require the parties to amend it in order to avoid any discrimination between competitors. The Institute may require the operator to change his tariff notes if these are not in conformity with its guidelines.

In case of disagreement between operators as regards the access to any infrastructure, interconnection agreements or refusal to secure interconnection, the concerned parties may engage in a conciliation procedure before the Institute.

Title IV (articles 21 to 27) of the 1997 Law regulates the interconnection regime and access to telecommunication infrastructure.

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?

This point is not covered by national law.

2.2.3 Do the regulations include provisions for new operators to have access to customer systems, e.g. billing systems? If not, are they being considered?

Luxembourg legislation does not contain any provisions on access to customer systems.

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance operator that is not the dominant operator?

This point is not covered by national legislation.

2.3 Policy on Licensing for Wireless Local Loop Operators

No specific provisions apply on licensing for wireless local loop operators.

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2.4 Regulatory Involvement in Investment Decisions

The 1991 Law on electronic media provides for the right of inspection of the Government as regards shareholding, articles of incorporation and organs of the broadcasting company. In the *cahiers des charges* to be complied with by each company, the Government may set out a number of requirements in respect of the above-mentioned matters. The 1991 Law applies to satellite operators and programmes, cable programmes as well as radio and TV broadcasting companies.

The 1997 Law on telecommunication does not contain any similar provisions. However, the grand-ducal regulation (to adopted) fixing the *cahiers des charges* applicable to each type of licences may impose to the licensees certain conditions to be complied with in the interest of national defence and public security. It would thus be possible for the Government to reserve itself a right of inspection as under the 1991 Law (cf. article 9(1) n) of the 1997 Law).

2.4.1 Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology.

Neither the Luxembourg Parliament nor the Luxembourg Government has taken any specific initiatives to encourage the deployment of advanced telecommunication technology. Luxembourg has limited its action to the implementation of the EC directives.

2.4.2 Incentives/obligations for network development by government.

Each licence delivered under the 1997 Law is followed by a *cahier des charges* which is to be complied with by any operator. The *cahier des charges* may set out conditions as regards the quality, permanency, availability, characteristics and the geographical coverage of the concerned service or infrastructure (article 9 of the 1997 Law). Further any licensed operator is obliged to participate financially to universal services (article 20(2) of the 1997 Law).

A Grand-ducal regulation which has not been adopted at the present time shall determine the *cahier des charges* for each type of licence.

2.5 Requirements for Separation of Service and Network Provision

The *cahier des charges* (referred to in the above paragraph) to which every licence is subject may determine requirements in respect of separate accounting (article 9(2)j) of the 1997 Law). The 1997 Law does not contain any further or more specific provisions as regards separate accounting or which would hinder the development of new services.

3. Cable Communications

3.1 Infrastructure (and services if appropriate)

3.1.1 Structure of licences offered.

The establishment of a telecommunication and cable infrastructure is subject to a licence by the Minister in charge of the telecommunication sector. According to article 7(2) of the 1997 Law a Grand-ducal regulation shall specify the content of the

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licences offered. However at the present moment no regulation on this matter has been adopted.

3.1.2 Geographical coverage (National, regional).

As explained above a Grand-ducal regulation (not yet adopted) shall set out the *cahier des charges* for each type of licence under the 1997 Law. Such terms and conditions may determine the geographical coverage of the licence.

3.1.3 Terms and length of licence.

See point 2.4.2. above.

In addition to the *cahiers des charges* set out by the Grand-ducal regulation, the Minister in charge of the telecommunication sector may determine a number of specific conditions to be complied by the licensee in question. These conditions may however not be more restrictive than those imposed by the *cahiers des charges* (article 10(3) of the 1997 Law).

A licence may be issued only for a determined period of time but it may be renewed. Refusal to renew the licence under the 1997 Law is subject to the payment of an indemnity by the Government unless such refusal is justified by the operators previous behaviour i.e. non-compliance with legal provisions, or the terms and conditions (article 11 of the 1997 Law).

Number of players permitted to operate.

The number of players permitted to operate is as a matter of general principle unlimited but subject to the availability of frequencies.

According to article 8 of the 1997 Law the Minister in charge of telecommunication may on advice of the Institute limit the number of licences if such limitation is justified by considerations of public interest.

3.1.4 Licensing award procedure.

Under the 1991 Media Law there was no formal process for the licensing of cable TV networks in Luxembourg. However, Article 22 of the 1991 Media Law specifies that the telecommunication legislation is applicable.

According to article 7 of the 1997 Law a licence shall be awarded either by competitive tender or on request of the applicant. A Grand-ducal regulation (not yet adopted) shall determine for each category of licences the licensing award procedure.

A special procedure has been established by article 71 of the 1997 Law in order to replace the previous authorisations granted to cable TV operators (hereafter "the operators"). Operators which were operating under a licence before the 1997 Law have to present to the Institute a file containing a number of requirements (specified by article 71: e.g. legal status of the owner of the network, geographical coverage, technical characteristics, services offered etc.). Such file has to be transmitted to the Institute within four months after the entering into force of the 1997 Law (i.e. until September 1, 1997). The Minister in charge of telecommunications grants, on the proposal of the Institute, new licences followed by a *cahier des charges*.

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3.1.5 Availability of access to bottleneck resources (e.g. ducts, poles).

According to Article 34 ff. of the 1997 Law a licensed operator may have access to the State or Commune administered property (this includes in our opinion ducts and poles). The infrastructure plan needs, however, to be approved by the State or the concerned Commune. No taxes or indemnity are payable for such use of the public property (article 35 of the 1997 Law).

As regards private property, the network operator has to solicit the consent of the private owner. In case of disagreement the Institute may suggest a solution. It may reject the application of the operator in case the establishment of a supplementary network would lead to unnecessary multiplication of the telecommunication networks (article 36 of the 1997 Law).

3.1.6 Restrictions on cable TV infrastructure, ownership and/operation.

In principle, there are no ownership restrictions but the 1991 Media Law provides that the *cahier des charges* imposed by the appropriate authorities may contain such restrictions. These requirements are not published so it is consequently difficult to give more details on this point.

The 1997 Law does not provide explicitly for a right of the government to inspect the shareholding of a licensed company nor does it contain any ownership restrictions. However, as explained under point 2.4. the Government could on the basis of Article 9(2)n) of such law (national defence and public security) impose ownership restrictions on network operators and service providers.

3.2 Service Provision

Note: The legal provisions applicable on services are as a matter of general principle identical to those applicable to infrastructure.

3.2.1 Structure of licences offered.

3.2.2 Geographical coverage.

See section 3.1.2.

3.2.3 Terms and length of licence.

There are no “must carry” rules in Luxembourg. The simultaneous and unmodified transmission of programmes which have already been approved for transmission by the Grand-Duchy is unrestricted.

3.2.4 Award procedure.

See point 3.1.4. above.

Under the 1991 Media Law, a concession for the broadcasting of programmes through a cable network may be granted by the Government on proposal of the Minister in charge of Media.

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3.2.5 Availability of access to infrastructure.

Under the 1997 Law network operators have to determine the general terms and conditions of access to their network which must be based on objective, transparent and non-discriminatory criteria such as to ensure equal access to the network. Thus a network operator has to grant access to its network on request of any licensed service provider. The terms and conditions as well as any amendment thereof are communicated to the Institute which may oblige the operators to change them (Articles 21 to 23 of the 1997 Law).

According to Article 12 ff. of the 1997 Law the providing of certain telecommunication services is not subject to licence but only to declaration i.e. the service provider has to inform the Institute about his intention to offer such services. In case the Institute disagrees with the service provider it must object within two months otherwise the service provider may consider itself to be authorised to offer its services. The 1997 Law states that such service providers have a right to use directly or indirectly the telecommunication infrastructure.

A Grand-ducal regulation (not yet adopted) shall determine the services subject to licence and those subject to declaration.

Also see also point 2.2. above.

3.2.6 Restrictions on holding licences to provide services on cable TV network.

The licence granted under the 1991 Law Media Law and the Grand-ducal regulation dated March 17, 1993 for the broadcasting of Luxembourg cable TV programmes will be followed by a *cahier des charges* which may specify a number of conditions relating *inter alia* to ownership restrictions (cf also conditions on the content of the programmes). The same applies to licences granted under the 1997 Law for the provision of other services through a cable network. As the Grand-ducal regulation which shall specify the *cahiers des charges* applicable to each licence (granted under the 1997 Law) has not yet been adopted it is not possible at the present moment to give further details on the restrictions to be complied with by licensees.

As explained under point 3.1.6. the Government could provide for ownership restrictions although the 1997 Law does not explicitly specify any such restrictions.

Also see point 2.1.4 as regards article 71 of the 1997 Law.

3.3 Relationship between Ownership of Infrastructure and Service Provision

3.3.1 Separation of infrastructure from service provision.

Under the 1991 Media Law, network operating and supply of services over such network was subject to different licences. However no provision restricts the right of a network operator to apply for both licences.

The 1997 Law provides for the possibility to obtain a single licence for installing an infrastructure and providing of services. Separate licences may also be granted.

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3.3.2 Cable TV operators allowed to offer own content.

The *cahier des charges* to be complied with by the licensee may restrict the use of the network to certain services. Thus the owner of the network may not necessarily decide by himself the type of services offered on his network (see also point 3.3.4.).

Each network operator has to determine the general terms and conditions for access to its network (article 21 ff. of the 1997 Law). This would allow him to specify to a certain extent the content of the services which a third party may offer through its network. It should however be born in mind that such terms and conditions are to be communicated to the Institute which may require them to be amended.

In cases where the cable TV operator obtains a licence which is not limited to the operating of the network but allows him to broadcast programmes himself, he is free to determine the content offered subject to the provisions of the 1991 Media Law and the *cahier des charges* attached to his licence.

3.3.3 Cable TV operators control of choice of programming/content.

The 1997 Law aims to grant equal access of service providers to the networks. Thus once a network operator has fixed its general terms and conditions of access to the network, he may not refuse a service provider which fulfils such terms and conditions he has previously set up.

Further it should be noted that the *cahier des charges* imposed on the network provider may determine restrictions/conditions as regards the programmes to be offered on a specific network, e.g. an obligation to maintain a certain pluralism as regards the presentation of news and ideas or to contribute through its programmes to the promotion of artistic creativity and culture.

Such *cahier des charges* could impose on the network operator an obligation to ensure that the service providers operating on his network also comply with the conditions set out in the *cahier des charges*. The licence of the service provider is also subject to a *cahier des charges* which must be complied with.

The 1991 Law states a number of criteria which are to be met by the programmes of each broadcaster e.g. the programmes must not contain any elements which might endanger national security or public order or constitute an incentive to hatred or contrary to accepted standards of good behaviour.

Article 27 of the 1991 Media Law further specifies the proportion of time each broadcaster has to dedicate to European works.

The number and characteristics of broadcasted commercials are also strictly regulated by the 1991 Media Law (Article 28).

The National Council for Programmes supervises the content of the programmes.

3.3.4 Are there restrictions on carriage/provision of other services over cable TV network.

As a matter of general principle, Luxembourg legislation does not contain any such restrictions.

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However as explained under point 2.1.4. Article 71(2) of the 1997 Law provides that the new licences to be granted to cable TV network operators (which were already operating under the previous legislation) are to be limited to the use of cable TV services. The use of such cable TV infrastructure for telecom services is thus excluded. In case these cable TV network operators wish to use their infrastructure also for telecom services it may be expected that they will have to go through the whole licensing award procedure again.

3.3.5 Rights of access of independent service providers to cable TV networks.

The network operator may determine the access conditions to its infrastructure within the limits of the provisions of the *cahier des charges*. He may thus fix certain conditions or guidelines in respect of the programs to be offered on its network by a service provider. However, it will be the service provider who packages and sells programming to each consumer.

3.4 Price Regulation

According to article 9 of the 1997 Law the *cahiers des charges* to be specified by a Grand-ducal regulation for each type of licence may determine certain criteria for the fixing of access fees to a network. However the principle set out by the 1997 Law is the free fixing of prices by the network operator who must state his price list in his own general terms and conditions (cf. above point 3.2.5.). The prices must be based on objective and non-discriminatory criteria. The price list is subject to publication and has to be communicated to the Institute.

3.5 Licensing for Other Broadband Service Delivery Mechanisms

The *cahiers des charges* to be specified by the Grand-ducal regulation may determine the nature and characteristics of the network and services. It would thus be possible to impose technology specific licences. At the present moment however, there exists no such legal provisions.

4. Telecommunications Operators and Cable TV Networks and Other Services

4.1 Restrictions on Dominant PTO's Owning Cable TV Infrastructure

Luxembourg legislation does not contain any specific restrictions on dominant PTO's operators. The general provisions set out by the law of June 17, 1970 prohibiting the abuse of a dominant position also apply to PTO's operators.

4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure (Taking into Account Own Content/Other Content)

There are no explicit barriers which prevent the Public Operator from providing entertainment services over the network or from producing the content itself.

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4.3 Restrictions on Dominant PTOs Providing Cable TV Services Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non-Broadcast)

There are no explicit barriers which prevent the Public Operator from providing entertainment services over the network or from producing programme content itself.

4.4 Requirements for Separation from Telephony Business for PTOs Allowed to Provide Cable TV (e.g. Arms Length Operation, Separate Accounting, Limitations on Cross Subsidisation (Excluding the Cable TV Directive, See 2.5 Above)

There are no regulations in Luxembourg which set out any requirements for separation from telephony business for PTOs allowed to provide cable TV.

1. General Framework

1.1 Key Drivers/Barriers

Government policy and legislation primarily have been led by the developments on the European level as laid down in the directives of the European Commission and European Council. Also the market for cable operators has continuously emphasised the need for further liberalisation of the telecommunications sector. Parliament made it possible to introduce competition in voice telephony as of July 1, 1997.

1.2 Regulatory Bodies

The regulation of telecommunications infrastructure and services lies in the hands of the Telecommunications and Post Department (HDTP) of the ministry of Ministry of Transport, Public Works and Water Management (V&W). The ministry or one of its departments is responsible for licensing cable television networks, frequency allocation, etc. An independent regulator should take over several tasks linked with fixed telecommunications infrastructure and services as of next year.

The broadcasting sector (traditional broadcasting, pay TV and certain broadcasting related interactive services) is regulated in the Media Act. An independent regulatory body, the Media Authority (Commissariaat voor de Media) is responsible for licensing broadcasters and supervises content issues. Also the Media Authority has the power to settle disagreements between cable operators and content providers.

The Ministry of Economic Affairs is responsible for supervision of the Competition Act. Within the framework of the Competition Act, the Ministry has taken decisions concerning conflicts between cable operators and content providers.

1.3 Key Legislation

The Telecommunications Act of 1988 has been amended several times with a significant change in 1996, the so-called interim legislation, introducing a new infrastructure permit and licence-regime (national and regional). The changes allow cable operators and other owners of alternative infrastructure to carry all liberalised telecommunications services. Also, the Act allows the building of new alternative infrastructure. There are specific rights and obligations linked to infrastructure licences (digging and interconnection rights versus roll out and – potentially – ONP and interconnection obligations). Permit holders have no specific obligations or rights, but depend on commercial negotiations. Furthermore, the revised Act liberalises voice telephony as of July 1, 1997. A new Telecommunications Act, fully implementing the European regulatory framework is planned to enter into force by the end of the year.

The Media Act regulates all issues concerning content as far as broadcasting services are concerned.

This section has been prepared by Kenneth Defares of Nauta Dutilh.

2. Telecommunications

2.1 Liberalisation Timetable

Since the interim legislation was enacted, the following timetable applies:

Party	Public Telephony and Telex	Radio and TV	Miscellaneous (leased lines, etc.)
Concession holder KPN	Yes	Yes	Yes
Licence: National licensee	As of 01.07.1977**	Yes	Yes
Licence: Regional licensee	As of 01.07.1977**	No***	Yes
Permit: the present alternative infrastructure operator art. 21 (cable)+registration*	As of 01.07.1997**	Yes	Yes
Permit: the present alternative infrastructure operator art. 23 (business use)+registration*	As of 01.07.1997**	No	Yes

* Those who register may also provide leased lines.

** Next year it will be announced whether conditions will be set for the provision of telephony and telex, and if so, which.

***A regional licensee who is also already a CTV permit holder retains his right to distribute radio and TV based on that permit. The new regional licence does not provide that right.

Source: Ministry of Transport Public Works and Water Management

2.1.1 Voice telephony.

Voice telephony will be fully liberalised as of July 1, 1997. See Table 2.1.

2.1.2 Telecommunications infrastructure.

The use of telecommunications infrastructure for voice telephony will be liberalised as of July 1, 1997.

2.1.3 Alternative infrastructure.

Alternative infrastructure has been fully liberalised since the interim regulation of 1996.

2.1.4 Cable television use for telecommunications services.

Cable television infrastructure can be used for telecommunications services based on the infrastructure licence and registration regime introduced by the interim regulation of 1996.

2.2 Interconnection

2.2.1 Price setting mechanisms.

Infrastructure licence holders have interconnection rights (permit holders do not have interconnections rights, but can only get interconnection on the basis of negotiations). If commercial negotiation does not result in interconnection agreements, the Ministry has the power under a procedure set out in the Telecommunications Act, to settle disputes. The dominant operator has to publish

its interconnection rates. The Ministry (who published a consultation document recently) will publish guidelines for interconnection. These guidelines will clarify the cost model, tariff structures, etc.

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?

Access to unbundled local loop elements has to be offered. The forthcoming guidelines will further clarify this issue.

2.2.3 Do the regulations include provisions for new operators to have access to customer systems, e.g. billing systems? If not, are they being considered?

These kind of obligations do exist or can be introduced by Ministerial decree.

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance operator that is not the dominant operator?

Under the present number plan-regime a four digit-prefix carrier select regime (16XX) is introduced.

2.3. Policy on Licensing for Wireless Local Loop Operators

There is no very specific policy on wireless local loop. However under the existing regulatory regime licences can be granted.

2.4 Regulatory involvement in investment decisions

In order to obtain an infrastructure or CATV licence, business plan information has to be provided. A licence will be refused if the relevant criteria concerning the continuity of the telecommunications infrastructure to which the application relates are not met. There is no direct involvement in investment decisions.

2.4.1 Is there any temporary relief from specific government actions or initiatives to encourage the deployment of advanced technology?

No. However, there are some general subsidy and support regimes from the Ministry of Economic Affairs concerning the ICT sector.

2.4.2 Incentives/obligations for network development.

Cable operators received preferential treatment to expand into so-called “white areas” which have not yet been accessed (mostly industrial areas). Also cable operators were granted, limited in time, a first right of refusal for the infrastructure licence in their service area. Furthermore, infrastructure licence holders have five years to comply with build out obligations. ONP and interconnection obligations do not have to be met in the first five years and/or will be imposed at a later stage.

2.5 Requirements for separation of service and network provision.

Cross subsidisation of cable television services (in particular basic services) and telecommunications services is restricted under the supervision rules of the Media Authority and the Ministry of Economic Affairs. Also, the tariffs for basic CATV services can be regulated. Furthermore, restrictions apply for energy companies who want to cross-subsidise monopoly activities in the energy sector and activities in the telecommunications/CATV sector (Energy legislation). The Ministerial

decrees on infrastructure licences do not contain specific provisions on the separation of services and network provision.

3. Cable Communications

3.1 Structure of Licences Offered

Originally only one CATV licence per municipality was granted, although the Telecommunications Act does not exclude the granting of more than one licence. Recently the Ministry has announced that under specific conditions (in particular under performance of the first licence holder) more than one licence can be granted. CATV networks are allowed to interconnect. Besides this specific licence-regime, the provision of CATV-services is also part of the concession (of the incumbent operator) and of the national infrastructure licences.

3.1.1 Geographical coverage.

CATV licences are geographically restricted to the area of the municipality, which can be divided into several licence areas. The concession holder and the national infrastructure licensees can offer CATV services on a national basis.

3.1.2 Terms and length of licence.

CATV licence holders have to meet terms and restrictions set out in a ministerial decree and in their licence. Building must commence within one year. Licence holders have an obligation to connect every household upon request within their licence area. The Ministry has technical requirements for the CATV networks and supervises the quality of the networks. The length of the licence is not limited. The Media Act specifies the must and may carry obligations of CATV licensees. It also obliges the CATV licensee to have a programming council which advises on the composition of the basic service. Furthermore, tariff control can be introduced on the basic service.

The concession holder and the national infrastructure licensees have to meet the obligations of their licence as far as it specifies rules concerning the provision of CATV services. The length of their licence also includes CATV services.

3.1.3 Award procedure.

Licences were granted on the basis of first come, first served. There are no specific procedures for the newly introduced possibility of more than one licence. In principle, they are awarded upon request. Today licences have been granted for almost the entire area of the Netherlands. Licences are granted by the Ministry of Transport, Public Works and Water Management based upon objective factors.

The concession holder and the national infrastructure licensees can provide CATV-services as part of their concession and licences.

3.1.4 Availability of access to bottleneck resources (e.g. ducts, poles).

All CATV-licence holders have to get access to bottleneck resources through commercial negotiations.

The concession holder and the national infrastructure licensees can make use of the digging rights which are part of their concession/licences. CATV operators which also have a regional infrastructure licence can use the digging rights that are part of their licence (Probably as far as the telecommunications infrastructure coincide with their CATV infrastructure. However, this point is not entirely clear).

3.1.5 Restrictions on Cable TV infrastructure, ownership and operation.

There are no ownership/operation restrictions on CATV networks/licences. However, infrastructure licences shall be refused if it is, in the opinion of the Minister, plausible that the granting of the licence may adversely affect an efficient provision of telecommunications and the creation for that purpose of competition in the provision of fixed connections. This criteria was used to oblige KPN to divest most of its interest in the Dutch cable-market.

3.2 Service Provision**3.2.1 Structure of licences offered.**

Originally CATV-licence were exclusive. One of the reasons was the universal service obligation that is part of the licence. Also, it was not seen as appropriate or in the public interest to provide more than one licence. As indicated before, it now is possible (see 3.1) to grant more than one licence.

A CATV-licence only allows for the distribution of broadcasting services. For telecommunications services an additional registration or infrastructure licence is required. Only one infrastructure licence is granted. If the CATV licensee does not apply, a tender takes place. (Note: holders of alternative infrastructure (such as the energy companies) can also apply for infrastructure licences which might cover, in part, the same service area as the CATV licensee).

3.2.2 Geographical coverage.

See 3.1.1.

3.2.3 Terms and length of the licence.

See 3.1.2.

3.2.4 Award procedure.

See 3.1.3.

3.2.5 Availability of access to infrastructure.

The provision of services is restricted to the specific CATV network. Interconnection of CATV networks is allowed. For telecommunications services the permit or infrastructure licence regime applies.

3.2.6 Restrictions on holding licence to provide services on cable TV networks.

See 3.1.5.

3.3 Relations Between Ownership of Infrastructure and Service Provision**3.3.1 Separation of infrastructure from service provision.**

CATV licences include both services and infrastructure. It is possible that an independent operator runs the network for the licence holder. In this case the

licence holder will always be held responsible. The regional infrastructure licence regime introduces the possibility that with the consent of the CATV licence holder concerned, the infrastructure licence is granted to the operator of the CATV network.

3.3.2 Cable TV operators allowed to offer own content.

CATV operators can offer services on their own. They have to comply with the rules for those services (i.e. for commercial broadcasting a licence is required). Also, within the rules on must/may carry and on the provision of a basic service, they can package broadcasting services. Today most CATV operators offer one (basic) or two (basic and extended basic) packages. Pay-TV services are either offered by the CATV operator through joint-ventures with others or CATV operators or pass on the services of independent service providers. The access to the CATV networks is supervised by the Media Authority and the Ministry of Economic Affairs who have developed a kind of “ONP like” regime.

There are no specific rules on the packaging of telecommunications services.

3.3.3 Cable TV operators control of choice of programming/content.

As far as broadcasting services are concerned, the licence holder is the only one responsible for the provision of the services. The broadcasters themselves are held responsible for content issues (“the message”). Recent changes in the Media Act oblige the licence holder to create a Programming Council, nominated by the Municipality, which advises on the composition of the basic service as defined in the Media Act (15 television and 25 radio programmes).

For telecommunications services the traditional telecommunications regime applies (in principle no involvement with content).

3.3.4 Are there restrictions on carriage/provision of other services over cable TV networks.

As mentioned before all services are allowed on CATV networks with the exception of voice telephony. Voice telephony will be possible as of July 1, 1997.

3.3.5 Rights of access of independent service providers to cable TV networks.

There is an access regime for broadcasting services based upon the rules set out by the Media Authority and the Ministry of Economic affairs.

3.4 Price Regulation

Access rates are under the supervision of the Media Authority and the Ministry of Economic Affairs. These rules limit the possibility of generating profits on the offer of access to the network by broadcasting services and (therefore) of cross subsidisation of broadcasting and telecommunications activities.

3.5 Licensing for Other Broad band Service Delivery Mechanism

Microwave licences are available. A limited number of these licenses have been granted. However, none of them are yet in operation. No specific restrictions exist on offering alternative broadband services.

4. Telecommunications Operators and Cable TV Networks and Other Services

4.1 Restrictions on Dominant PTO's Owning Cable TV Infrastructure

None. However KPN was forced to divest most of its interests in the cable networks (see section 4.4)

4.2 Restrictions on Dominant PTO's Providing Cable TV Services Over Cable TV Infrastructure (Taking Into Account Own Content/Other Content)

None.

4.3 Restrictions on dominant PTO's providing cable TV Services over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non-Broadcast)

None.

4.4 Requirements for Separation From Telephony Business for PTO's Allowed to Provide Cable TV (e.g. Arms Length Operation, Separate Accounting, Limitations on Cross Subsidisation (Excluding the Cable TV Directive, See 2.5 Above))

No formal restrictions. However, as mentioned earlier, infrastructure licences shall be refused if it is, in the opinion of the Minister, plausible that the granting of the licence may adversely affect an efficient provision of telecommunications and the creation for that purpose of competition in the provision of fixed connections. This criteria was used to oblige KPN to divest most of its interest in the Dutch cable market. The Minister of Transport, Public Works and Water Management ordered that the interest of KPN in Casema (the cable company) should be reduced to a maximum of 20 per cent. From 1 January 1997, a "structure-regime" applies. Pursuant to the applicable legislation major decisions (strategic, financial) should be exercised by the supervisory board. The supervisory directors and management of Vision Networks (formerly known as KPN Casema) and Casema will not have any ties with KPN. KPN, Vision Networks and Casema must not exchange information which is not available to competitors of Vision Networks and Casema. This divestiture has to be completed by the end of this year.

This section has been prepared by Filipa Arantes Pedroso and Tomas Vas Pinto of Morais Leitao & J. Galvao Teles.

1. General Framework

1.1 Key Drivers/Barriers

In order to comply with regulation enacted from the European Community (later the European Union) Portugal has been restructuring its telecommunication sector in the recent years.

With the approval of Law 88/89, of September 11, introducing the Basis of the Establishing, Managing and Operation of the Telecommunications Infrastructure and Services, a clear difference was established between the basic services (for public use, namely vocal telephony), the complementary services and value-added services.

The basic services, including management of telecommunication infrastructure, were considered as being a responsibility of the State and therefore exclusive rights were granted to public operators.

Meanwhile, the Government has gathered in one sole company – Portugal Telecom (hereinafter PT) – all public companies of the telecommunication sector, so creating a strong structure capable of facing the new environment and preparing for the liberalisation.

In 1990, a new regulation on the television sector was adopted through Law 58/90, of September 7, enabling this activity to be developed by private entities. In 1992, two private operators – SIC and TVI – were licensed following a public tender.

The first licence for complementary services (mobile communications) was first granted to Telecel – Comunicações Pessoais, S.A., being the other operator of a company controlled by PT (TMN).

Through Decree-law 292/91, of August 13, cable distribution of television programming was first authorised, with a free access regime although with some restrictions.

More recently, Portugal has been implementing several directives on telecommunications according to the agreed timetables, as set out below. In that regard, Portugal has challenged the application of the Cable Directive 95/51 and we await further developments.

As we can see from this brief introduction, the State and its public operator PT has had, until recent years, almost a monopoly in the telecommunications sector, not only regarding services but also the managing of the basic infrastructure.

Furthermore, even today most of the services developed by private entities still require the use of the public network, which is an important source of revenue for PT. That is the reason Portugal has requested a derogation period in most areas covered by the Directives.

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With the liberalisation, however, the Government will maintain important supervision powers regarding the compliance with the regulation by private operators, namely in relation to the content of the information.

1.2 Regulatory Bodies

The ICP (Portuguese Institute for Communications) regulates the telecommunications sector including cable TV.

The Minister of Social Infrastructure is responsible for the co-ordination, supervision and planning of the telecommunication sector and licenses the cable operators. The Ministry of Social Infrastructure is also the government body responsible for Portugal Telecom.

The ICP is responsible for technical advice and proposals to the Minister regarding the issuing of licences. Once the licences are issued, ICP will continue to supervise the operator's activities and can impose fines on those operators who do not comply with the legislation. The operators may appeal to the Courts from decisions of the ICP.

ICP has supervision powers over radio broadcasting content. AACS (High Authority for the Communications) has supervision powers over the television content, and the General Office of Communications (“Direcção Geral de Comunicação Social”) can impose fines on TV operators regarding any breach of their licences (including non compliance with content regulation).

1.3 Key Legislation

1.3.1 Cable television.

- Decree-law 292/91, of August 13, 1991
Regulates the access and exercise of the activity of operator's of cable television networks restricted to the transmission of television signals from third parties.
- Portaria 509/95, of May 26, 1995
Regulates the operation of cable television networks; technical standards for installation/ operation of cable networks. It provides for certain rights and obligations of cable operators including rights to broadcast third party programming, rights of access to the telecommunication network on fair and reasonable terms; and obligations to ensure equal access to television operators and to ensure geographical coverage as agreed.
- Decree-law 239/95, of September 13
Authorises simultaneous radio broadcasting by operators of cable television networks.
- Cable operators also distribute foreign TV channels.

1.3.2. Other legislation.

- Law 88/89, of September 11
Is the basis of the managing and operation of infra-structure and telecommunications services.

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- Law No. 58 of 7th September 1990 concerns the regulation of television activity;
- Decree-law 40/95, of February 15 Approves the basis of the telecommunication public service concession granted to Portugal Telecom, S.A.

1.3.3. General or specific competition rules.

Competition Law 371/93 of 29 October 1993.

2. Telecommunications

2.1 Liberalisation Timetable

2.1.1 Voice telephony.

Directive 96/19 EEC of 13 March 1996 has not yet been implemented. Presently there is no competition in the provision of voice telephony. As allowed by article two, n° 2, paragraph 4 of the Directive, Portugal has requested a derogation period until 2000, which has been accepted. Voice telephony will then be liberalised from January 2000.

2.1.2 Telecommunications infrastructure (voice telephony infrastructure).

Directive 96/19/EC of 13 March 1996 has not yet been implemented. Presently there is no competition in this sector. As allowed by article 2, n° 2, paragraph 4 of the Directive, Portugal has requested a derogation period until 2000, which has been accepted. Telecommunications infrastructure will be then liberalised from January 2000.

2.1.3 Liberalisation of alternative infrastructures.

Alternative infrastructures will be allowed to offer liberalised telecoms services from July 1997.

2.1.4 Cable television infrastructure used for telecoms services.

Portugal is contesting the Cable Directive, which should have been transposed into national law allowing the use of cable infrastructures for liberalised telecommunications services. Among other reasons because it did not allow for a derogation for countries such as Portugal with less developed networks.

2.2 Interconnection

2.2.1 Price setting mechanisms.

According to Decree-law 207/92, of October 2, principles of interconnection prices are fixed through a Convention between the General Directorate of Commerce and Competition (former General Directorate of Competition and Prices), ICP and the exclusive operators of telecom public services (such as PT).

In principle, interconnection rates are set by negotiation between operators on cost based principles. In the event of failure to agree the ICP will step in.

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The current tariff convention is due to expire in December 1997 and negotiations to develop its replacement are expected to take place in the second half of 1997. The details of the new interconnection regime which are likely to emerge are unclear.

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?

None.

2.2.3 Do the regulations include provisions for new operators to have access to customer systems, eg. billing systems? If not, are they being considered?

None.

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance operator that is not the dominant operator?

The details of the post 2000 interconnection regime are still to be defined.

2.3 Policy on Licensing for Wireless Local Loop Operators

The policy on licensing wireless local loop is still to be defined.

2.4 Regulatory Involvement in Investment Decisions

There is no specific regulation on investment decisions. The law only requires cable operators to have an equity ratio of 25 percent of the total investment and to obtain the requested coverage in due time.

Portugal Telecom must maintain the infrastructure it operates in good condition, but once again there is no specific regulation regarding compulsory investment.

2.4.1 Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology.

None. There are only some technical rules to comply with.

2.4.2 Incentives/obligations for network development by government.

The law imposes certain levels of coverage within certain periods. These obligations are set out in the licences.

2.5 Requirements for Separation of Service and Network Provision

Presently, Portugal Telecom is still working to develop basic cost accounting systems, but until 1998 it is required to have accounting separation between different types of services and between network provision and services (basis 19 Decree-Law 40/95).

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3. Cable Communications

3.1 Infrastructure and Services

3.1.1 Structure of licences offered.

Cable operators' licences are not exclusive, i.e., there can be many licences in the same area, and there is no limit to access as long as the applicant complies with the legal requirements.

Portugal Telecom directly owns one of the licensed companies (TV Cabo).

The installation of a cable network is subject to the obtaining of an authorisation from the municipality and the operation of such a network is subject to an authorisation of establishment.

The operator has access to the infrastructure network of Portugal Telecom, SA; only if PT's infrastructure lacks sufficient capacity may the operators install their own infrastructure (which will revert to the State on termination of the licence). In practice, cable operators use Portugal Telecom's infrastructure.

3.1.2 Geographical coverage.

The delimitation of each geographical area an operator wishes to cable is subject to governmental authorisation. The cable operator is obliged to achieve a certain coverage in its franchise area within a certain number of years.

The geographical limits correspond to the municipality limits. More than one cable operator can be licensed for a municipality.

3.1.3 Terms and length of licence.

Licences are awarded on criteria, namely distribution and a satisfactory technical plan. A cable operator must have a licence to operate a cable television programme service. A separate additional licence is required to operate a network (if this is the case). None of the existing operators have a network because the law prevents them from owning a network unless there is an evident lack of capacity on the public network (ie. Portugal Telecom).

There is no restriction on the number of players permitted to operate.

Licensing award procedures are by direct request to ICP and there is no competitive tender.

Licence fees are fixed by regulation and are paid by the operator to the State to obtain and maintain a licence – Dispatch of Ministry of Finance and Ministry of Social Infrastructure, of March 13, 1995 fixed the amounts (PTE 2,000,000 for the issue and an additional amount of PTE 250,000 for any modification).

The licence is valid for 15 years and may be renewed on request provided that the requirements for the original licence are still met.

The ICP supervises and co-ordinates the telecommunications sector and advises the Government on these matters. The ICP is responsible for technical advice and

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proposals to the Minister regarding the issuing of licences. Once issued the ICP continues to supervise the activities of the cable operators. The ICP can impose fines on those operators not complying with legislation.

Each licensed entity must cover a certain geographical area in time as defined in the authorisation.

3.1.4 Award procedure.

Cable television operators are licensed by the Government on the basis of an ICP proposal. There is no tender process. Licence will be granted if the applicant complies with all the requirements laid down in article 6 of Decree-law n° 292/91, namely technical and economic study, organised accounting and sufficient financial resources.

3.1.5 Availability of access to bottleneck resources (e.g. ducts, poles).

PT must grant access to bottleneck resources. See interconnection prices. Cable operators do not use all parts of the PT network. In fact, cables into the home do not belong to PT and PT does not have coaxial cables into homes. The cable operators use PT ducts and install their own coaxial cables.

3.1.6 Restrictions on cable TV infrastructure, ownership and/operation.

Apart from the fact that cable operators are only entitled to have an infrastructure of their own in certain cases, there are no ownership restrictions and no cross-media ownership restrictions.

3.2 Service Provision

In this section we will deal with the already liberalised services that can be provided by cable operators, which presently are the television channels programming and the radio broadcast service (Decree-law 239/95, of September 13).

3.2.1 Structure of licences offered.

See 3.1.1.

The licence to radio broadcast is issued by the Government on proposal by the ICP, and is subject to the conditions of the cable operator licence issued in accordance with Decree-law 292/91.

3.2.2 Geographical coverage.

See 3.1.2

3.2.3 Terms and length of licence.

See 3.1.3

3.2.4 Award procedure.

See 3.1.4.

Operators must prove that radio broadcasting operators are duly licensed, and attach a declaration of those operators authorising cable operators to distribute their programming.

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3.2.5 Availability of access to infrastructure.

Cable operators have a right of access to the telecommunications infrastructure on fair and reasonable terms (however cable operators must pay PT for that access).

There is an obligation to provide access to the cable network to TV operators based on an access regime (to be negotiated on commercial terms). The cable operators must also carry the public service channels.

3.2.6 Restrictions on holding licences to provide services on cable TV network.

Free access provided legal requirements are met. The applicant must have as its social object the activity of distribution.

3.3 Relationship Between Ownership of Infrastructure and Service Provision

3.3.1 Separation of infrastructure from service provision.

Presently cable operators use PT's infrastructure, therefore there is a separation between the owner of that infrastructure and the provider of the services. PT does not have any control over the content/services.

The services that can be provided by cable operators are presently television signal and radio broadcast. The other services are still not liberalised (multimedia, on-line, interactive, pay-per-view).

There is a commercial relationship between the operators (PT and cable operators) in relation to the use of the infrastructure, due to the fact that PT must provide access to cable operators that are not in principle authorised to have their own infrastructure (See however the Network Cable Directive).

3.3.2 Cable TV operators allowed to offer own content.

Cable TV operators are not allowed to develop their own content. They are only allowed to carry and deliver TV programmes and radio broadcasting of third parties, as well as to package content and services.

3.3.3 Cable TV operators control of choice of programming/content.

Cable operators have a right to choose what to provide as long as it is third party programming (TV programmes and radio broadcasting), as well as a right to lease broadcasting capacity to third parties. PT does not have any control over this choice.

3.3.4 Are there restrictions on carriage/provision of other services over cable TV network.

Cable TV networks are only licensed for the distribution of television signals (and radio broadcast). There is no provision allowing other services. Certainly Portugal was one of "those" European Union countries "responsible" for the approval of the Cable Network Directive.

3.3.5 Rights of access of independent service providers to cable TV networks.

There is an obligation to carry public service channels as well as to provide access to private operators.

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3.4 Price Regulation

Prices are set in accordance with the agreements entered into with the consumers. If these agreements are adhesion contracts then a copy must be forwarded to ICP and to the National Institute of Consumer Defence (Instituto Nacional de Defesa do Consumidor)

3.5 Licensing for Other Broadband Service Delivery Mechanisms

None.

4 Telecommunications Operators and Cable TV Networks and Other Services

4.1 Restrictions on Dominant PTO's Owning Cable TV Infrastructure

Portugal Telecom owns the cable TV infrastructure and provides cable operators with access to the network.

The supervision entity responsible for Portugal Telecom is ICP.

4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure (Taking into Account Own Content/Other Content)

Presently Portugal Telecom controls one of the licensed cable operators (TV Cabo). Although PT is authorised through the Concession Agreement to provide cable services directly it presently does not provide those services. If PT were to provide it then it would have to comply with the provisions laid down in Decree-Law 292/91.

See 3.1.1. and 3.3.4 above.

Portugal Telecom is not authorised to produce and broadcast its own entertainment programmes.

4.3 Restrictions on Dominant PTOs Providing Cable TV Services Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non/Broadcast)

See section 4.2. If PT were to provide cable services then it would be authorised to use the telecommunications infrastructure

4.4 Requirements for Separation From Telephony Business for PTOs Allowed to Provide Cable TV (e.g. Arms Length Operation, Separate Accounting, Limitations on Cross Subsidisation (Excluding the Cable TV Directive See 2.5 Above)

Until 1998 PT is required to have separate accounting between different types of services (basis 19 Decree-Law 40/95).

1. General Framework

1.1 Key Drivers/Barriers

Before the Cable Law 1995 there was a legal vacuum in relation to legislation concerning cable networks which was used by cable operators to build cable networks of varying quality. They must now apply for validation of their current networks.

The Government has recently enacted (April 25, 1997) Law 12/1997 on the "Liberalisation of Telecommunications", which is intended to implement European Union legislation and provide a general competitive framework in the industry.

The new Law gives broad powers to the "recreated" Telecommunications Commission, some of which are regarded as potentially anti-competitive (i.e. arbitration authority). The Telecommunications Act is amended by introducing the obligation for existing operators of open telecommunications networks to assure full interconnection and total compatible operation of the services. As of 1998, licensed cable operators shall be entitled to render basic telephony services within their concession areas, subject to securing the approvals that may be required at that time.

The minimum share capital requirement specified for cable companies has led to complaints by smaller companies, which have claimed that the regulation is forcing them out of business or that they will be forced to limit their activities to the smallest category (see 3.1.2).

In addition, the regulations also state that in order to be awarded an operator's concession any new networks built must be fibre optic networks in the "trunk network", (that is the part of the access network going from the head connection point to the points of final distribution). The network design must also support interactive features. These requirements may have a significant impact on development of the business structure and could deter newcomers from building up their own networks.

1.2 Regulatory Bodies

Telecommunications in Spain are regulated by the Ministry of Development. The Ministry is also responsible for issuing licences to concessionaire companies in monopoly markets and to companies in competitive markets. A new regulatory body, Commission del Mercado de las Telecomunicaciones ("CMT") has been formed. The aim is that this body will act in a similar role to OFTEL in the U.K. taking care of all the issues related to telecommunications competition. It will act as an independent body, even though the first members were nominated by different political parties. Spanish competition law is overseen by the independent competition council, the Tribunal de Defensa de la Competencia.

Cable communications are regulated by Autonomous Communities ("AC") and the Ministry of Development. The ACs, however, only have authority within their territorial jurisdictions.

1.3 Key Legislation

The current summary of applicable Spanish legislation is as follows:

- Telecommunications Law 31/1987 as amended.
- Law 10/1988 governing Private Television.
- Royal Decree 1160/1989 enacting Technical Regulations on Television Broadcasting Services and its supporting Carrier Services.
- Law 42/1995 on Telecommunications by Cable enacted in December 1995 and its Technical and Service Regulations enacted by Royal Decree 2066/1996 in September 1996.

This cable law was considered to be in breach of European Union competition Directives, thus requiring amendment. Amendments introduced by Law 12/1997 now allow cable operators not only to render value added services but also to act as carriers for other telecommunications services through Hertzian waves. This includes basic telephony services. The government announced its intention to set a framework allowing cable operators to also render mobile telephony services.

The new law states that Telefónica de Espana may start to operate in a given cable territory 16 months after the licence is granted. Other amendments, however, authorise the government, upon proposal from the Telecommunications Commission to (i) prevent Telefónica de Espana from entering into such cable allocated territories for a maximum of 24 months, but also to (ii) shorten such delay when "necessary for the existence of real competition in the rendering of cable communication services".

Many aspects of the legislation are left to future implementing regulations.

- Law 12/1997 dated April 24, on the Liberalisation of Telecommunications, which introduced different amendments to the Telecommunications Law and the telecommunications legislation on Satellite and Cable.

2. Telecommunications

2.1 Liberalisation Timetable

2.1.1 Voice Telephony.

Due to the fact that Spain's network is relatively underdeveloped, it was allowed by the European Union to wait until 2003 before liberalising its market. The government, however, is targeting to achieve full liberalisation by the end of 1998 although Telefónica Espana would like to see the date brought forward to 1 January 1998. The provision of other services are partially liberalised to date.

Currently, Retevisión has the licence to operate in duopoly with Telefónica in the provision of basic telephony services. Retevisión is in the middle of a privatisation process that will be completed by the end of June 1997. In this process a minimum

of 60 per cent of the shares are to be sold. Due to the process, actions to build their own infrastructure were stopped. It is possible that Retevisión could start to heavily deploy its infrastructure and to implement the processes and systems to launch the new services by July 1997, in order to compete against Telefónica as soon as possible.

The Government also announced its intention to grant a third licence to operate GSM mobile services (in the 1800 Mhz range, known as PCN) as of September 1997 and to grant licences to cable operations on a regional basis, a move which would allow cable operators to move into rendering mobile services. Therefore, it is envisaged that by the end of 1988 several GSM mobile operators may exist: the two existing ones (Telefónica and Airtel) plus another in the 1800 Mhz range plus several regional operators.

The Government has recently made political "declarations of intentions", including, but not limited, to changing the general concept of "administrative concession" for a more flexible one of "regulated authorisation" based on transparent, objective and non discriminatory conditions. This would require an overhauling of the Telecommunications Law that has already been applied to Telefónica de España S.A and Telefónica Moviles S.A., a Telefónica affiliate providing mobile telephony services.

Furthermore, the government announced its intention to continue to liberalise television distribution services, a move requiring new legislation on Regional (Autonomic) Channels.

2.1.2 Telecommunications infrastructure.

Telefónica had a monopoly on the provision of telecommunications infrastructure until 1996, when Retevisión was licensed as a second carrier. Retevisión will have infrastructure for new telecoms services. It owns a microwave, not SDH infrastructure to distribute TV and Radio signals to the broadcasting towers.

The 1987 Telecommunications Act has been amended by introducing the obligation for existing operators of open telecommunications networks to assure full interconnection and total compatible operation of the services.

Airtel, the second GSM operator is building up its own infrastructure which is, at the current pace, expected to reach the present area coverage of Telefónica's own network in about a year and a half.

The compensations from the government to Airtel for the licence fee it was bound to pay include a reduced fee for interconnection with Telefónica. Telefónica has announced its intention to challenge the agreement reached between the government and Airtel.

2.1.3 Liberalisation of alternative infrastructures.

Any person entitled to provide liberalised services may do so using alternative infrastructure. Cable operators may enter into arrangements with owners of alternative infrastructure to obtain capacity for the provision of liberalised services.

With regard to infrastructure, not only Telefónica, Retevisión and the Postal Services have adequate infrastructure capacity but also Red Electrica Espanola (REE), the state electric grid, Red Nacional de Ferrocarriles Espanoles (RENFE), the Spanish railroad network, and several electric companies also have digital transmission capabilities, to a large extent available for use by third parties.

Finally, the regional governments may also have available infrastructures which they may offer for these purposes. For example, the Communications Centre of the Catalanian Government has offered excess capacity of its digital networks. Similarly, the electric company Iberdrola has made a similar proposal in the Castilla-Leon single area.

2.1.4 Cable television infrastructure used for telecoms services.

The cable television directive has not been implemented in Spanish Legislation, although a substantial degree of liberalisation has been achieved in this regard as set out in this section.

In late 1996, the government withdrew a court challenge to EC rules allowing cable operators to offer already liberalised non-voice services. The withdrawal was a gesture to the commissioner Karel van Miert who wanted faster liberalisation in Spain in return for approving Telefónica's participation in Unisource. Telefónica has now dropped out of the Unisource alliance to join Concert.

Cable companies operating under the legal vacuum existing before the enactment of the Cable law had to apply, before June 25, 1997, for a formal licence allowing them to render services for three more years (with a possible extension for a similar period). However, the granting of such a licence would not allow approval to make investments in their current networks.

Under article 7 of Law 42/1995, cable licensees are entitled to either build their own infrastructure (subject to the national and/or local regulations on occupation and use of the public and/or municipal domains) or use existing ones. Cable operators are authorised to interconnect their networks, either directly (in case of neighbouring networks) or by using authorised carrier services.

Cable operators will be permitted to provide all kinds of telecommunications services subject to the exception in described in point 2.1.1 above in relation to mobile services.

In January 1998, Cable TV operators will be allowed to offer (in their franchises) basic voice telephony services.

2.2 Interconnection

2.2.1 Price setting mechanisms.

Pursuant to Law 12/1997, owners/operators of open telecommunication networks must make such networks available to all interested operators in transparent, objective, equal and non discriminatory terms and conditions.

Until such time when the market proves to be effectively competitive, the interconnection prices shall be determined on the basis of costs. Admissible costs

include the initial connection costs, transmission costs and other costs specifically related to essential requirements. Agreements must be negotiated between the parties involved but, failing agreement on the applicable prices, the Telecommunications Commission may be called to mediate by either party.

Contracts executed in connection with the use of existing infrastructures must be reported to the Ministry of Development and the Telecommunications Commission together with a breakdown of the capacity contracted and the prices to be paid therefor.

Interconnection agreements will be subject to administrative authorisation from the Directorate General for Telecommunications.

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?

The provisions on interconnection are broadly worded "network operators shall allow access to their networks to all interested service operators in order to allow for interconnection of circuits and the interactive play of services". It does not specify that access must be to unbundled local loop elements.

2.2.3 Do the regulations include provisions for new operators to have access to customer systems, eg. billing systems? If not, are they being considered?

Facilitating access to customer systems is not a listed obligation of existing operators. However, they are bound to provide to independent programmers (but not to other operators) information on the number of subscribers of independent programmers' channels and audience polls, if available, as well as their marketing activities.

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance operator that is not the dominant operator?

The regime is not yet determined. In relation to cable, this question will become applicable once cable operators are entitled to render telephony services. Based on the wording of the law regarding the principles of interconnection ("on a transparent, objective and non discriminatory basis...") the result could be either easy access or call by call.

2.3 Policy on Licensing for Wireless Local Loop Operators

Cable operators will be entitled to render all services, with the exception described in 1.3 above, subject to similar licensing processes.

In accordance with current regulations, the use of the radioelectric domain is subject to authorisation. The National Chart on Frequency Allocation is managed by central government through the Directorate General for Telecommunications.

The Cable Communications Law provides that services can be rendered whether transitorily or permanently in specific sectors, through wireless systems subject to specific concession allowing the use of the relevant part of the radioelectric spectrum.

2.4 Regulatory Involvement in Investment Decisions

2.4.1 *Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology?*

The Cable Law specifically states that the rights provided therein are granted at the sole risk of the operator. The authorised operators may benefit from condemnation (expropriation) proceedings that may be necessary to deploy the network.

The cable operator is entitled to exploit the service in conditions making the rendering of the service viable. The awarding authority have responsibilities in this regard and the granting of additional licences in areas already subject to concession as well as the amendment to the limits of an awarded geographical area may make the intervening authority responsible for the damages that the operator may suffer.

However, the law specifically sets forth that neither the entry of new competitors nor the change in the established terms and conditions that may derive from the law or from the enactment of European Union regulations shall entitle the operator to any indemnification whatsoever (Art. 29, Cable Law Implementing Regulations).

In principle, Telefónica de Espana S.A. has a preemptive right to render service in any new geographical area.

We understand that operators may not be precluded from applying for the granting of the subsidies and incentives provided in the legislation on regional subsidies, which establish different kinds of compensations for investments in new assets, creation of employment, etc.

2.4.2 *Incentives/obligations for network development by government.*

The nature and extent of the concession depends upon the number of inhabitants in the target area, which derives from the different kinds of possible areas ("A" through "D" – see below). These are the maximum number of households an operator may reach. No operator can reach more than 1.5 million inhabitants. There are no minimum build requirements within the franchise area.

Operators must meet standards such as the quality of the network (e.g. fibre optic for the trunk network), extent of the services, continuing rendering of services, etc.

2.5 Requirements for Separation of Service and Network Provision

Such requirements are not listed as a general obligation of operators, but may become applicable should any of them reach a dominant position.

With regard to cable, Telefónica de Espana S.A., (as the dominant operator having a privilege with regard to the rendering of services in any new geographical area) is subject – in case it opts for rendering services in new areas – to specific limitations in this regard. For example:

- (a) Service must be rendered in each area through a different affiliate where Telefónica would own more than 50 per cent.

- (b) Cross subsidies between cable activities and pre-existing carrier and final services is prohibited.
- (c) For as long as Telefónica has a monopoly or a dominant position, it will be bound to have separate accounts, on a consolidated basis, for services and infrastructure made available to cable operators.

Telefónica's inventory will have to separate the accounting for infrastructure used in cable activities from the infrastructure used in the rendering of other carrier or final services. In general, it must take the measures necessary to ensure that the relevant assets are allocated to the relevant activities.

- (d) In order to support such separation, Telefónica will have to file the relevant documentation, on a yearly basis, validated by a report from an external auditor.

3. Cable Communications

3.1 Infrastructure (and Services)

3.1.1 Structure of licences offered.

The cable concessions are governed by the Cable Law No.42/1995 and its implementing regulations enacted by Royal Decree 2066/1996.

The licences are granted in the form of a "Concession". The concession, once granted, authorises the operator to render the following services:

- (a) Carrier Services, (Servicios Portadores) either by the operator's own Network or through interconnection.
- (b) Broadcasting Services (Servicios de Difusion) such as video on demand and others; with the exception of terrestrial television through hertzian waves (see above).
- (c) Value Added Services, in particular, those related to multimedia formats and computer uses. Subject to securing additional licences therefor.
- (d) End to end Services (Servicios finales), such as basic telephony. This will be operational once the voice transmission is fully liberalised.

The rendering of most of these services will have to be confirmed by additional licences, which will have to be applied for pursuant to the procedures in force at the time the relevant application is filed.

3.1.2 Geographical coverage.

In 1995, the Spanish parliament passed legislation to open up the cable television industry, dividing up the country into franchise areas containing between 500,000 and 1.5 million people.

The Cable Law provides that the licences (Concessions) are granted to one operator per "Geographical Area" (Demarcacion), a term encompassing the geographical limits of the rights of the operator. This is without prejudice and in addition to the privileges granted to Telefónica de España.

Areas are defined by the Municipalities involved, with a prior report of the relevant Autonomous Community where the Municipalities are located. In such a case the area shall be made by the Autonomous Community. In the case where the area encompasses Municipalities of different Autonomous Communities, the area shall be established by the Ministry of Development.

At present, several areas already exist: Three in Cataluna (Barcelona, Catalonia North West and Catalonia West), Valencia (750,000 inhabitants) Cadiz (150,000 inhabitants), Gijon (260,000 inhabitants), Oviedo (200,000 inhabitants), Sevilla (700,000 inhabitants) and Palma de Mallorca (300,000 inhabitants). In addition, other Autonomous Communities have established a single community wide area such as Murcia (1,000,000 inhabitants).

The Cable legislation includes minimum share capital requirements which the joint stock companies applying for licences must meet. Pursuant to the implementing regulations of the Cable Law, such requirements are as follows:

Type "A" areas:	Area with more than 500,000 inhabitants – One billion (thousand million) Pesetas (1,000,000,000 Pts).
Type "B" areas:	Areas with between 200,000 and 500,000 inhabitants – Four Hundred million Pesetas (400,000,000 Pts).
Type "C" areas:	Areas with between 100,000 and 200,000 inhabitants – Two Hundred Million Pesetas (200,000,000 Pts).
Type "D" areas:	Areas with less than 100,000 inhabitants – One Hundred Million Pesetas (100,000,000 Pts).

The latest information from Ministerial sources indicates that some 800 applications for cable operations exist. The areas are being established and the number is still not final.

Even though some franchises are currently operative, all of them are going to be assigned or confirmed through a bidding process. During 1997 there will be a full liberalisation of the market, and there will be bids in almost all franchises.

In each area there will be two operators: Telefónica which has the licence all over Spain, and the one awarded in the bidding process. Telefónica will be permitted to commence services between sixteen months and two years after the granting of the licence. See Section 1.3.

3.1.3 Terms and length of licence.

Concessions will be granted for a maximum of 25 years. The period will be established in light of the investment required. Renewals of licences may be permitted at the end of each term upon the petition of the concessionaire, for a further five years.

The terms of roll out and targets will be included in each regional concession.

3.1.4 Award Procedure.

The award follows a bidding process based on terms and conditions (specs) approved by the Ministry of Development.

Pursuant to Art. 8 of the Implementing Regulations of the Cable law, the bids are called and the concessions awarded by the Ministry of Development. It is necessary to distinguish between the procedure to establish the Areas (which may be a responsibility of the Municipalities, the autonomous Communities or the Ministry of Development, depending upon the circumstances, as described above) and the calling for the bids and the award, which is under the Ministerial authority.

Calls must take place within the six months immediately following the establishment of the Area.

To gain a licence, a company must show its technical and economic viability, the amount of homes it can reach, the level of environmental impact on the public domain, and to what extent it is willing to use existing infrastructure.

3.1.5 Availability of access to bottleneck resources (e.g. ducts, poles).

Telefónica must make available to other cable operators its operable infrastructure on the basis of neutrality, transparency and non-discrimination.

Telefónica must give cable operators access, if available, to the infrastructure supporting networks interconnecting the cable poles with the users. Such obligations refer exclusively to trunk networks and must include facilities for network management and maintenance allowing cable providers to offer, at least, a service having the same quality as the service provided by the relevant affiliate of Telefónica de España in the area.

The terms and conditions for such interconnection must be negotiated. Failing agreement, the Telecommunications Commission may be called upon to resolve a dispute.

3.1.6 Restrictions on cable TV infrastructure, ownership and operation.

Levels in the network are established on the basis of the population reached. No single legal person or individual may:

- Hold shares in one or more concessionaire companies reaching, in the aggregate, more than 1.5 million inhabitants in Spain; nor
- Otherwise control operator companies reaching, in the aggregate, more than 1.5 million inhabitants.

These limits shall not apply to activities in telephony and Value Added Services.

Ownership is restricted by the Cable Law as follows:

1. Participation of foreign (non European Union) persons in the capital of cable operator companies is limited to 25 per cent only.
2. Operator companies must be based in Spain.
3. Prior approval from the Ministry of Development will be necessary for any individual or legal entity to sell, encumber or otherwise assign shares of cable operator companies.

With regard to service, the operator is bound by limitations in connection with content (see below) and is obliged to distribute all open national and regional (third channels) TV channels broadcasting in the area of the concession. The rules on competition must be strictly followed and the legislation on intellectual property must be respected at all times.

3.3 Relationship Between Ownership of Infrastructure and Service Provision

3.3.1 Separation of infrastructure from service provision.

The same entity holds the licence to provide services and construct and operate the network.

3.3.2 Cable TV operators allowed to offer own content.

Yes, cable operators are permitted to offer their own content and it is perceived to be very valuable for the operators to offer their own content.

3.3.2 Cable TV operators control of choice of programming/content.

See 3.3.1 above.

It is the right of the operator to provide programming and is subject to the following limitations:

1. Forty per cent of the programs must be reserved for “independent programmers”.

Please note that independent programmers are defined as those “individuals or legal entities owning audiovisual programs or data distributed by the cable operator and who are not subject to direct or indirect dominant control by this latter, either through ownership or financial contribution”. i.e. sources different from the operator.

The above restriction does not apply in the case where there not a sufficient offering in the market to reach such 40 per cent figure.

Pursuant to Art 38 of the Regulations:

- (a) The 40 per cent is calculated on the total number of channels offered in the cable television broadcasting services. As a basis for calculation, the operator’s own program offer would be taken into consideration, but only in such an indirect manner.

- (b) It shall be up to the Autonomous Communities to set the rules whereby such 40 per cent shall be calculated.
- (c) Doubts as to the way in which such 40 per cent must be calculated will be solved by the competent body of the single relevant Autonomous Community concerned (or from the Secretary General for Telecommunications should the situation affect more than one Autonomous Community) upon the request of the interested operator.

In particular, the Generalist de Cataluna has already put in place regional legislation on the content of cable TV programs within the territory of the AC.

- 2. Independent programmers must receive equal and non-discriminatory treatment.
- 3. Once the number of cable subscribers of a given operator exceeds either (i) 50 per cent of all the subscriber dwellings in the territory of an Autonomous Community; or (ii) 25 per cent of all the subscriber dwellings in Spain, the programs of such operator shall be subject to the rules in the General Advertising Law 25/1994.

3.3.4 Are there restrictions on carriage/provision of other services over cable TV network?

No, except for the prohibition to act as carrier for television Hertzian waves (see above). Any operator can ask for interconnection.

Services included in the licence of the bidding process are:

- Carrier service in the franchise.
- Broadcasting (not terrestrial) of content commercialisation.
- Value added services, especially those related to multimedia.

Final telecommunication services, especially basic telephony by January 1998, and others when or if liberalised.

The cable law makes it possible to use cable for all kinds of interactive TV.

3.3.5 Rights of access of independent service providers to cable TV networks.

The legislation is not precise on this matter, however, it should be noted that Article 26 of the Regulations establish that cable operators must give no discriminatory treatment to independent programmers and service providers, making available to the same all commercial aspects of its (audiovisual) offer.

3.4 Price Regulation

Prices for access to networks must be agreed upon by the interested parties. In the absence of agreement on the prices, the granting authority would decide.

Prices to be paid by final users must be transparent and non-discriminatory. Prices must be reported to the Directorate General for Telecommunications before the date of their coming into effect.

In the course of the bidding process, the applicant can commit to maintain tariffs for a certain period of time. The granting authority will evaluate this aspect as positive. In the absence of such commitment, operators can set and apply tariffs subject to prior notice as described in the previous paragraph.

After three years from the date the concession is granted, the granting authority may set maximum rates, but only if (i) the market is affected by collusive practices or abuses of dominant position; and (ii) such practices have a damaging impact on final users or consumers.

Tariffs applied by dominant operators can be subject to further restrictions under the Technical Regulations on the Rendering of Carrier Services for Leased Circuits. (Royal Decree 1558/1995).

3.5 Licensing for Other Broadband Service Delivery Mechanisms

In addition to the specific technical requirements for the establishment of the infrastructure (i.e. use of optic fibre in the trunk network, the possibility to use either optic fibre or coaxial cable in the transmission network, etc), Article 50 of the Regulations allow cable operators to build their infrastructures through systems making use of the radioelectric spectrum in those areas (or part thereof) where the social and geographical distribution of the population would make it advisable.

Networks so built up can have a return channel through different networks in the 5–55 Mhz band. Technical specifications are described in the Annexes to the regulations.

In any event, the possibility of building up a network through radio systems requires the granting of a special and additional concession. Specific Regulations on the use of radio frequencies would then apply to the cable operator.

4. Telecommunications Operators and Cable TV Networks and Other Services

4.1 Restrictions on Dominant PTOs Owning Cable TV Infrastructure

The general competition principles apply. In principle, it would seem that unless it can be proven that the anticompetitive activities have a European dimension, the Spanish competition legislation (Competition Law 16/1989) will apply.

Article 32 of the Cable Regulations deals with dominant positions in the market by giving the Directorate General for Telecommunications overseeing authority over the market and arbitration powers to solve controversies.

At present, such authority is enforced through the arbitration powers granted to the Telecommunications Commission (see above). Arbitration resolutions can be appealed to the courts.

Regarding anticompetitive situations affecting independent programmers in a given Area established within the territory of a single Autonomous Community vested with authority on communications matters (not all of them have such authority) it will be up to this latter body to act to solve the competition problem.

4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure (Taking into Account Own Content/Other Content)

This aspect has already been dealt with above. Telefónica has the preemptive right to enter into the new Areas to be created subject to a waiting period in case there is private offering for a given Area.

As noted above Telefónica is banned from offering television services over its cable network for a period of between sixteen months and two years after the award of licences in each government-designated territory. The rationale behind the law is to give the other (private) company in each franchise a chance to establish itself before having to compete with Telefónica.

4.3 Restrictions on Dominant PTOs Providing Cable TV Services Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non/Broadcast)

Telefónica de Espana is authorised to provide cable services over other telecommunications infrastructure, subject to the rules on separation and non-cross subsidisation described above in section 2.5.

The outcome of the Telefónica/Canal Plus joint venture indicates that this is possible only when Telefónica operates by itself. In June 1996, Telefónica and Cablevision were ordered to suspend their use of Telefónica telephone network for cable television. This suspension order was a result of an indictment by rival cable company Cable Europa.

4.4 Requirements for Separation From Telephony Business for PTOs Allowed to Provide Cable TV (eg. Arms Length Operation, Separate Accounting, Limitations on Cross Subsidisation (Excluding the Cable TV Directive See 2.5 Above)

See above section 2.5.

1. General Framework

1.1 Key Drivers/Barriers

The telecommunications sector was formerly strictly regulated and a monopoly situation existed. After the abolishment of this monopoly freedom of establishment and competition now prevail, although subject to a licensing regime concerning certain telecommunications services and connections.

Through technological development and liberalisation of market conditions, the market for telecommunications services, especially mobile telephone services, has expanded rapidly in recent years.

The evolution of cable television has not been confined to franchise areas but has become free and open to competition on a national basis.

The Swedish regime for channels transmitted by cable is unique compared to other European regimes in that these channels do not require any operating licence but only require compliance with the regulations currently in force.

1.2 Regulatory Bodies

The registration and licensing for providing telecommunications services is undertaken by the Telecommunications Authority (Telestryrelsen).

The registration and licensing of public service broadcasting is undertaken by the Radio and Television Authority (Radio-och Televerket). It also grants licences for community and local radio, handles fees for radio and television and has to follow the developments within the area of broadcasting. The Swedish Broadcasting Commission oversees the management of the regulations and of broadcasting content unless the matter falls within the area of competence of the government or some specifically appointed authority as specified above.

The instruction for the Broadcasting Commission (Granskoingsourbmnden for radio och Television, SFS 1994:728) states that the Commission will supervise compliance with rules applicable to the content of broadcasting for Radio and Television broadcast to the public.

The instruction for the Radio and Television Authority (SFS 1994:729 and 1996:867) states that it will decide on matters of authorisation, fees and registration as far as radio and television broadcasts directed to the Swedish public are concerned, unless the government or some specifically appointed authority decides on such issues.

1.3 Key Legislation

The Radio and Television Act (SFS 1996:844) regulates the provision of radio and television services by terrestrial, satellite and cable networks broadcasting (including content).

The Radio Communications Act (SFS 1993:559) regulates the operation of radio installations and the use of radio waves.

The Telecommunications Act (SFS 1993:597) regulates the provision of telecommunications services.

All sectors are governed by the Competition rules as laid down in the Competition Act 1993, which broadly mirrors the EC Competition Rules.

2. Telecommunications

2.1 Liberalisation Timetable

2.1.1 Voice telephony.

Voice telephony was liberalised between 1980 and 1989. Full competition has been in place since 1989. Official implementation of the Directive took place on 1 July 1997.

Amendments to the Telecommunications Act, which correspond with Directive 96/19, are expected to enter into force July 1, 1997 (Prop. 1996/97:61). However, there currently exist no restrictions, as mentioned in the Directive, for the provision of voice telephony.

Swedish cable operators are allowed to provide cable telephony via their networks. Although this is not subject to any special cable licence, none of the Swedish cable operators currently offers telephony services.

2.1.2 Telecommunications infrastructure.

Full liberalisation since 1989. Official implementation of Directive 1 July 1997.

2.1.3 Liberalisation of alternative Infrastructures.

Full liberalisation since 1989. Official implementation of Directive 1 July 1997.

2.1.4 Cable television infrastructure used for telecoms services.

Directive 95/51 has been implemented and there exist no restrictions for the use of cable infrastructure for telecommunications services.

2.2 Interconnection

2.2.1 Price setting mechanisms

Every licensed telecommunications operator is required to interconnect with any other operator which wants to interconnect with it. Operators are expected to reach agreements on the technical and commercial terms for interconnection. Fees between different telecommunications operators shall be based on costs, defined as the actual costs for the dominant operator. Alternative calculation methods are being considered. It has now been proposed (the same proposal as 2.1.1 above), that dominant operators should have to prove that their charged fees are cost-based and that they shall publish standard interconnection rates. A non-discrimination clause is also to be added. The Telecommunications Authority will advise in the event of disputes, but has no powers to enforce an interconnect agreement, unless major interests for the society as a whole arise.

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?

This is subject to commercial negotiations and not subject to any regulatory regime. However, it has been proposed, see 2.2.1 above, that a dominant operator should have to comply with reasonable demands for suggested interconnections in this respect.

2.2.3 Do the regulations include provisions for new operators to have access to customer systems, e.g. billing systems? If not, are they being considered?

See 2.2.2 above.

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance operator that is not the dominant operator?

No regulation in this respect exists or is being considered.

2.3 Policy on Licensing for Wireless Local Loop Operators

A licence is necessary. No data is available on the granting of such licences.

2.4 Regulatory Involvement in Investment Decisions

2.4.1 Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology .

No regulatory measures have been taken in this respect.

2.4.2 Incentives/obligations for network development by government.

No governmental action has been taken to encourage the development of new services or infrastructure, as far as we are aware.

2.5 Requirements for separation of service and network provision

PTOs are required to maintain accounting separation for the purpose of establishing interconnect or access charges.

3. Cable Communications

3.1 Infrastructure (and Services if Appropriate)

3.1.1 Structure of licences offered.

The number of permitted cable operators is unlimited. As no operating licences are required, any potential cable operator can dig up the road to lay television cables and start operating its cable network providing that they have the permission of the landowners. Before commencing broadcasting a notification must be made to the Radio and TV Authority.

Swedish Cable TV, still indirectly state owned, has about 60 per cent of all cable capacity. At the moment the channels delivering cable have a relatively small viewing share compared to the terrestrial channels.

3.1.2 Geographical coverage.

National and local. Swedish Cable TV's network covers the whole of Sweden. Other operators cover different areas in Sweden. To our knowledge there is no area in Sweden where there are 2 parallel operators in the same block.

3.1.3 Terms and length of licence.

No licences are required, see 3.1.1 above.

3.1.4 Award procedure.

No licences are needed for the establishment/operation of a cable network, i.e., ownership of it; or the provision of a television service on that network. The cable operation does not need registration with the Radio and television authority nor the Patent Office.

All the cable companies have to get a frequency allocated by means of authorisations by the National Post and Telecom Agency which also supervises the compliance pursuant to the Radio Communications Act. Further to this, the Board makes plans for frequency sharing and co-ordination with Intelsat, Inmarsat, Eutelsat etc.

Swedish Copyright governing this area is non-specific to cable and satellite television, although Sweden is a signatory to the Berne Convention.

3.1.5 Availability of access to bottleneck resources (e.g. ducts, poles).

Access to such resources is subject to commercial negotiations.

3.1.6 Restrictions on cable TV infrastructure, ownership and/operation.

There are no foreign, size of share holding, number of stations or other ownership restrictions on individuals or corporations investing or providers of terrestrial broadcasting infrastructure (including CATV) and services.

There are also no restrictions on source of funding/revenue, neither are there restrictions on foreign ownership, cross-channel or cross-media, maximum ownership and other lines of business. With respect to other telecom services, there are no restrictions for cable operators.

The Cable TV Directive (95/51/EEC) has been implemented. Both cable and satellite operators are entitled to provide other telecommunications services providing their behaviour is not in breach with the Competition Rules as laid down in the Competition Act 1993.

3.2 Service Provision

3.2.1 Structure of licences offered.

No licences required.

3.2.2 Geographical coverage.

National and local. No current data available.

3.2.3 Terms and length of licence.

The Radio and Television Act prescribes that anyone who owns or disposes a cable network reaching more than ten households is obliged to carry, without compensation, the three Swedish terrestrial channels SVT1, SVT2, and TV4 (must carry). If the network reaches more than one hundred households, a channel must also be kept available for a local television station as if such has been authorised for the municipality in question by the Radio and Television Authority. The cable operator must ensure that the programmes on these channels can be received with satisfactory quality and free of charge by the households connected to the network.

3.2.4 Award procedure.

No licence is required, see above.

3.2.5 Availability of access to infrastructure.

There are no limitations on using a particular network. Access to a network is subject to commercial negotiations.

3.2.6 Restrictions on holding licences to provide services on cable TV network.

No restrictions exist as regards the possibility of providing services.

3.3 Relationship between Ownership of Infrastructure and Service Provision**3.3.1 Separation of infrastructure from service provision.**

The owner of a network and the provider of services could be the same person. The relationship between different owners of a network and providers of services is only subject to commercial negotiations.

3.3.2 Cable TV operators allowed to offer own content.

Cable operators are free to offer their own content, while complying with the must-carry principle, see 3.2.4 above. The relationship between owners of a network and cable operators is subject only to commercial negotiations.

3.3.3 Cable TV operators control of choice of programming/content.

There are no local content requirements for broadcasters of terrestrial television which prescribe how much programming must be produced in Sweden. However, it is stated that, in general, broadcasters have to offer a varied programme service of high quality in Swedish. Another requirement for broadcasters of terrestrial television prescribes that 50 per cent of the Swedish programmes shall be produced outside of Stockholm. These rules also apply to the Swedish national radio broadcasting companies SR and OUR.

No requirements exist for domestically produced content on cable television, not even for Local Cable Broadcasters that are licensed by the Swedish Radio and TV authority to work a non-commercial cable channel (Cable Act 1991:2027).

All independent broadcasters choose, package and sell their own programming. The cable operator gives a contractual undertaking that he will not interfere with the independent broadcasters' programming. A cable operator, however, may also be a broadcaster.

3.3.4 Are there restrictions on carriage/provision of other services over cable TV network.

No restrictions exist.

3.3.5 Rights of access of independent service providers to cable TV networks.

There exists no access regime for independent service providers.

3.4 Price Regulation

There is no price regulation, except ones which indirectly could follow from the application of Competition law.

3.5 Licensing for Other Broadband Service Delivery Mechanisms

No regulatory regime exists in this respect.

4. Telecommunications Operators and Cable TV Networks and Other Services

4.1 Restrictions on Dominant PTO's Owning Cable TV Infrastructure

No such restrictions exist.

4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure (Taking into Account Own Content/Other Content)

See 4.1 above.

4.3 Restrictions on Dominant PTOs Providing Cable TV Services Over Telecommunications Infrastructure (Own Content/Other Content, Broadcast/Non/Broadcast)

See 4.1 above.

4.4 Requirements for Separation From Telephony Business for PTOs Allowed to Provide Cable TV (e.g. Arms Length Operation, Separate Accounting, Limitations on Cross Subsidisation (Excluding the Cable TV Directive See 2.5 Above))

There is a special agreement between the only present PTO of Sweden, Telia, and the State, represented by the Government. As the only owner of Telia, the Government has total control over Telia, which is active within cable networks through its subsidiary Swedish Cable Television. Swedish Cable Television packages and provides programming to customers.

There has been a discussion on putting some restrictions on Telia as far as limiting vertical integration from distribution into production. So far, no such requirements have been set.

1. General Framework

1.1 Key Drivers/Barriers

BT was formed as a public corporation in 1981 when it took over the telecommunication assets of the U.K. Post Office and became the monopoly United Kingdom telecommunication supplier. In 1984, the assets of the corporation were vested in BT as a separate company and it was then privatised in three stages up to 1993.

Mercury was formed in 1982 as the first privately-owned provider of telecommunication services in the United Kingdom and was granted a licence to provide domestic telecommunication services over leased lines in competition with BT. In 1983, the Government established a policy (the “Duopoly Policy”) not to licence other telecommunications companies until 1990. In 1984, Mercury was granted a PTO licence under the Telecommunications Act and was the only competitor to BT on a national and international basis.

Until 1983, cable companies were only allowed to retransmit terrestrial television and radio services and a limited range of additional programming and the networks were generally narrowband. In 1983, the Government adopted a strategic plan to promote the establishment of a broadband cable industry as part of a wider liberalisation of the telecommunication industry and awarded eleven cable TV franchises in specific geographic areas. The policy was adopted to award one only licence per franchise area allowing the cable operators to have exclusive rights in relation to the provision of cable television services in those areas. In addition, the licensees were permitted to supply telecommunications services (excluding voice telephony) in their own right. Cable operators were only permitted to provide voice telephony (excluding mobile telephony) as agents of BT and Mercury after obtaining the authorisation of the Director General.

In 1990, on the expiry of the Duopoly period established by the government, the Secretary of State published a consultative document “Competition and Choice: Telecommunications Policy for the 1990’s”. After a period of public consultation the Government published a further document in 1991 known as the White Paper in which the Government announced its decision to end the Duopoly Policy. A full competition regime was adopted allowing anyone to provide telecommunications services over fixed links in the United Kingdom excluding international facilities. Accordingly, cable companies were permitted (instead of acting as agents of BT or Mercury) to provide telecommunication services including voice telephony in their own right and to switch their own telephone customers’ traffic.

The U.K. currently has a policy of full competition in both the provision of telecommunications infrastructure and the provision of telecommunication services. There are over 200 U.K. telecommunication licences issued to operators in the U.K., ranging from PTOs, broadband cable operators, international simple resale operators, and international facilities operators, through to those operators providing SMATV, radio, local loop, satellite services, cellular telephony, public access mobile radio and private networks.

1.2 Regulatory Bodies

The regulatory bodies and government departments having an influence on the sector include the following:

The Department of National Heritage (“DNH”); the Government department responsible for broadcasting. It appoints senior executives of the ITC (see below) and has the power to enact secondary legislation.

The Department of Trade and Industry (“DTI”); the Government department dealing with telecommunications. It has general responsibility for the regulation and promotion of business interests in the U.K. The Secretary of State issues telecommunications licences (after consultation with OFTEL) (see below).

The Independent Television Commission (“ITC”) regulates broadcasting and grants licences under the Broadcasting Act 1990, including cable operator licences. The ITC does not regulate the public broadcasting company, the BBC except to the extent the BBC is involved in digital terrestrial television.

The Broadcasting Standards Commission (“BSC”), which has the chief function of maintaining standards in broadcasting.

The Office of Telecommunications (OFTEL) (non-ministerial government department) set up by the Telecommunications Act 1984. It has responsibility for monitoring and enforcing telecommunications licences. One of its functions is to regulate telecommunications systems which convey broadcasting services. OFTEL is independent of Ministerial control. It ensures compliance with licences and initiates amendments of licences. It may refer a company to the Monopoly and Mergers Commission (competition regulator) and enforces competition legislation in relation to telecommunications companies.

The Director General of Telecommunications is appointed by the Secretary of Trade and Industry.

The Radiocommunications Authority, a branch of the DTI, controls frequency allocation.

1.3 Key Legislation

The Broadcasting Act 1990 (“BA”) covers the licensing and regulation of the provision of commercial and independent television and sound programme services including terrestrial television (except the BBC), domestic and non-domestic satellite television and cable television, including licensing procedures and conditions and programme content obligations and principles. It also regulates the local delivery licences to provide cable television services.

Some cable licences are granted under the old Cable and Broadcasting Act 1984 (the “1984 Cable Act”) (Prescribed Diffusion Licences “PDL”) allowing an operator to provide cable TV services by means of a cable network. That Act continues in force in relation to those licences, otherwise it is repealed.

The Broadcasting Act 1996 created a licensing regime for up to 18 new digital terrestrial television stations and introduced new rules on ownership restrictions on holding television interests.

The Telecommunications Act 1984 (“TA”) abolished BT’s exclusive privilege in relation to telecommunications. It provides that all telecommunications systems must be licensed and establishes a system of licensing.

The Wireless Telegraphy Acts 1949 – 1967 (“WTA”) provide additional controls on telecommunications involving radio transmissions (principally relating to allocation of radio spectrum and avoiding interference). A licence under the WTA is required if someone is engaged in microwave video distribution.

2. Telecommunications

2.1 Liberalisation Timetable

2.1.1 Voice telephony.

The Directive’s provisions do not, in general, require further market opening in the U.K. as the provision of voice telephony is already liberalised in the U.K.

2.1.2 Telecommunications infrastructure.

The provision and use of telecommunications infrastructure is liberalised in the U.K. Prior to July 1996 only Mercury and BT had the right to operate international facilities based telecommunication systems from the U.K. All other operators had to lease capacity from Mercury or BT. In July 1996 this restriction was removed and anyone may now approach the Department of Trade and Industry for a licence to build international facilities based telecommunication systems.

2.1.3 Liberalisation of alternative Infrastructures.

Again the Directive’s provision do not require further market opening in the U.K. Examples of operators who use or are planning to use alternative infrastructure in the provision of telecommunications services are: Energis Plc which uses overhead electric cable around which to wrap fibre-optic cable; Fibreway Plc use the canals and waterways owned by the British Waterways Board to run fibre-optic cable; and Hermes Railtel BV, which comprises a number of rail companies, plans to run fibre-optic cable along their existing railway infrastructure.

2.1.4. Cable Television Infrastructure used for telecoms services.

The use of cable TV networks for the provision of all telecommunication services (including voice telephony) in the U.K. is already allowed. However, there was one minor measure which the U.K. was required to introduce in order to comply fully with the Cable Network Directive, which requires Member States to allow interconnection of cable TV networks with the public telecommunications network and to allow direct interconnection of cable TV networks with other cable TV networks. This was necessary because Telecommunications Act licences issued prior to 11 March 1993 only permitted connection of the cable operator system to certain public telecommunications operators.

This section has been prepared by Tony Ghee and Catherine West of Ashurst Morris Crisp.

The Directive requires Member States to ensure that those cable TV operators who have an exclusive right to provide cable TV infrastructure maintain separate accounts for their telecommunications activities, where turnover in the latter exceeds 50 million ECU. The U.K. has notified the Commission (as it is permitted to do so under the Directive) that it intends to defer such an obligation in the U.K. until 1 January 1998, the date on which the accounting separation obligations under the Interconnection Directive would come into force.

Cable companies are permitted to provide telephony services in their franchise areas, and are also free to apply for PTO licences to enable them to provide national infrastructure and service coverage for telephony. As at 13 February 1997 fixed voice telephony services are now being offered or rolled out in all 148 cable franchise areas.

2.2 Interconnection

The DTI and OFTEL are currently reviewing the terms of the Interconnection Directive but do not expect to have to make any significant modifications to the current U.K. interconnection regime.

2.2.1 Price setting mechanisms.

Under the Telecommunications Act each licensee must permit, on agreed terms, connection between its network and the networks of other operators.

If two licensees cannot reach agreement on interconnection, material terms of interconnection (as referred to in the licence of the relevant licensee) can be determined by the Director General on the application of either licensee. Where two licensees cannot agree interconnection charges, the Director General must determine them at present on the basis of the fully allocated historic costs of conveyance of the licensee providing the interconnection, taking into account relevant overheads and reasonable return on capital employed. OFTEL is currently consulting on new interconnection charging arrangements, and is proposing to move to a forward looking long run incremental costs model in October of this year (see below).

In June, 1996, OFTEL released a statement entitled "Pricing of telecommunication services from 1997 – OFTEL's proposals for price control and fair trading". In this statement, OFTEL indicated that it intended to continue with its proposals to introduce network charge caps for interconnection charges, the starting values of which will be based on long run incremental costs.

In December 1996, OFTEL released a further consultation document entitled "Network Charges from 1997" in which OFTEL set out its proposals for network charges. These broadly set out a framework which OFTEL intends to adopt in relation to the pricing of BT's interconnection services, which largely depends on the degree of competition which is judged to exist in relation to the provision of those services for the period. A further set of refined proposals confirming the details of the new arrangements, was produced by OFTEL in May 1997. The overall idea is to move away from specific charge price caps towards a more general framework of price floors and ceilings planned to be introduced on 1 October 1997. Prices offered by BT are free to move between these floors and ceilings and their change over the time period will depend upon whether they are treated as

prospectively competitive, non-competitive or interconnect specific. Services treated as fully competitive will not be subject to any price controls.

The next document produced in early July will be a statement on OFTEL's final proposals and statutory consultation on licence modification proposals.

2.2.2 Does the regulatory regime give a competing operator access to unbundled local loop elements? If not, is it being considered?

In theory, other licensed operators can gain access to the local loop without having to interconnect with other parts of the network. This occurs occasionally in practice when licensed operators interconnect at the PTO's (BT) local exchange.

However, in practice most operators interconnect with BT at the "DMSU" (Digital Main Switching Unit). Part of the call is therefore conveyed between the DMSU and the local exchange and is "handled" with conveyance over the local loop.

BT is not obliged to offer direct access to the copper loop.

2.2.3 Do the regulations include provisions for new operators to have access to customer systems, e.g. billing systems? If not, are they being considered?

There are some provisions imposing obligations on BT, two examples are:

- Directory Enquiries:
There is a condition in all PTO licences which provides that a PTO must provide interconnecting PTO's with directory information on their subscribers. There is no obligation to provide this information to independent service providers. In practice all operators provide this information to BT which has a monopoly in the provision of directory services. This monopoly is due to various barriers to entry for example BT has an access code advantage. There have been suggestions made by OFTEL that this situation may be harmonised by the introduction of an access code such as 18X by which any PTO may be reached by customers making directory enquiries. (The "X" will differ for each PTO). This proposal is still uncertain. OFTEL is also looking at proposals for joint billing whereby PTOs will bill customers on behalf of the directory enquiries service providers and then pass the funds on. One issue which is currently the subject of investigation is the extent to which a PTO may cross-subsidise the service directory from revenue resulting from on-going call generation.
- There are proposals for joint billing (i.e. one billing system shared between operators).

This is already happening to a certain extent with premium rate services (e.g. 0898 numbers) which, although provided by other businesses, appear on e.g. a BT bill. The advantage to the third party provider is that billing costs are reduced if BT does this for them. Areas of this type of joint billing where provisions could be made in the future are in fixed/mobile convergence (where types of call are to be put on one bill) and directory enquiry calls.

There are two types of “joint billing” being considered, though there are no firm proposals for discussion, let alone implementation. One is “voluntary” joint billing where one network operator bills for different services they provide on one bill only. The other one is “mandatory” joint billing where it could be possible for a customer to be billed for services provided by different businesses.

2.2.4 Does the regulatory regime determine what the arrangements are for a consumer to choose a long distance operator that is not the dominant operator?

The present situation in the U.K. is easy access i.e. if people want to use another operator instead of BT, they dial an indirect access code or push a pre-set number selection. The U.K. does not have carrier pre-selection. The forthcoming European Union Directive is not expected to change the current “Easy Access” regime.

2.3 Policy on Licensing for Wireless Local Loop Operators

Under the WTA the establishing or use of any station for wireless telegraphy requires a licence from the Secretary of State, whose functions are executed by the Radiocommunications Agency. In the last five years, the U.K. Government has made frequency available to telecommunications operators wishing to provide fixed access wireless links. Such licences have been awarded at 2GHz to BT and Radio TEL Systems to ensure that customers living in certain remote rural areas have improved access to telecommunications services.

Mercury Communications, Ionica, Scottish Telecom and NTL have also been awarded licences at 10GHz. In addition, there are also, in the 2.4GHz band – Atlantic Telecommunications Ltd, in the 3.4GHz band – Ionica, and in the 4GHz band – Liberty.

The above licences have been awarded following public consultation whereby potential applicants express their interest. A form of competition then takes place whereby certain criteria are examined including whether the applicants have adequate managerial, financial and technical resources to install and operate the proposed network.

There is no rigid framework for the awarding of WTA licences and to date the process has depended on the outcome of the consultation process and the amount of spectrum available. Allocation is a political decision with the power of overall management of the spectrum remaining with the State.

In June 1996, the U.K. Government released a White Paper on Radio Spectrum Management which dealt with making spectrum available, co-ordinating discussions between persons which share spectrum and securing international co-ordination of the use of spectrum. The proposals call for a move towards more flexible charges based on the competitive value of spectrum. The new charging spectrum would include spectrum auctions and administrative pricing. No legislation has as yet been introduced into the U.K. Parliament.

2.4 Regulatory Involvement in Investment Decisions

2.4.1 Is there any temporary relief from specific governmental actions or initiatives to encourage the deployment of advanced telecommunications technology .

Section 73 of the BA provides that the ITC has a discretion as to which licences are granted and it is the ITC's current policy not to grant more than one local delivery licence (ie. cable operator) in any franchise area in order to encourage the development and construction of local network infrastructure in competition with BT's network. In addition the ITC refrains from granting LDL licences in respect of areas which are already served by licensees operating under "cable licences" granted under the 1984 Cable Act.

Cable operators are also protected from competition in the provision of some cable television services by the restriction on national PTOs which prohibits the PTOs from conveying broadcast entertainment services in their own right until 2001 at the earliest. See Section 4.3 for more information on this issue.

2.4.2 Incentives/obligations for network development by government.

Each cable company is subject to minimum build "milestones" based on the number of premises in the franchise area required to be passed by the cable TV network by specified dates. These obligations are generally set out in the TA licences (see section 3.1) and OFTEL is responsible for enforcing compliance with these schedules. The ITC is responsible for enforcing such compliance where the milestones are contained in the LDL licences (see section 3.2).

2.5 Requirements for Separation of Service and Network Provision

In the U.K. there are detailed rules for the provision of accounts by operators e.g. cable operators and BT who are obliged to provide yearly accounts which enable systems business to be separately identified from supplemental service business. Within the accounts an operator must show intra-group charges on an arms-length basis or an explanation of why they are not. There must also be an auditors statement saying that from the accounts it is possible to identify systems business and supplemental services business. These accounts must be prepared for each licensee notwithstanding that for other accounting purposes it is lawful only to prepare one set of group accounts.

If a licensee holds more from one PTO licence, separate sets of accounts must be prepared for each one, and transfer payments must be accounted for. Such rules no longer apply to Mercury nor do they apply to a new type of "slimline" PTO licences which are currently being granted, such as those of Energis and Worldcom. Restrictions still apply to certain cable operators and in particular BT's licence clearly sets out such restrictions.

Under BT's TA licence, it is required to maintain separate accounts for each business so that the activities and costs, revenues and assets of the activities of each business may be separately and clearly identified.

The purpose of this condition and similar conditions in cable licences is to ensure that the licensee does not unfairly subsidise or unfairly cross-subsidise or show

undue preference or exercise undue discrimination. They are also to assist the Director General to determine charges to be payable to the licensee by an operator which are properly and transparently derived from relevant costs. OFTEL looks at the issue of cross subsidisation on a case by case basis in order to establish whether it is unfair. It is unlikely that a cable company would have sufficient market power for such cross subsidisation to be deemed unfair. OFTEL may publish guidelines on criteria to be considered in determining the fairness or unfairness in different circumstances.

3. Cable Communications

The licensing structure in relation to the provision of cable communications in the U.K. is as follows:

- a) A Telecommunications Act licence is granted which permits the holder of the licence to install and operate infrastructure and provide voice telephony and other telecoms services over that network in the area covered by the licence. This licence is discussed in section 3.1 below.
- b) A licence under the Broadcasting Act (a local delivery licence) permitting the provision over the network of television services. This licence is discussed in section 3.2 below.
- c) Programme licences (licensable programme service licences) which are the licences for television services which are specifically intended for provision over cable infrastructure. This licence is mentioned in section 3.2 below. A cable operator in certain cases must also carry certain terrestrial services which are separately licensed under the BA. In addition services distributed by satellite which are licensed under the BA (domestic or non-domestic satellite licences) may also be distributed on the cable networks without the need to obtain an additional licence.

In the U.K. the Telecommunications Act licence (see a) above) and the local delivery licence granted under Broadcasting Act (see b) above) are granted to the same company. The U.K. has a policy of only granting one company the right to provide cable television services in a particular area. Accordingly the cable operator has the exclusive right to provide cable television services in that area. In relation to the provision of telecommunications services it must compete with other operators in the area.

The licence to provide a programme services issued under the Broadcasting Act (see c above) may or may not be held by the cable operator.

Further details of these licences are provided in this section. Further details of the licensing policy of the U.K. are provided in sections 2.4.1 and 3.1.2.

3.1 Infrastructure (and Services if Appropriate)

3.1.1 Structure of licences offered.

A cable company owning a system over which a local delivery service (see section 3.2) is conveyed requires a licence under the TA to construct and operate the physical network and provide telecommunications services (“TA licence”). These TA licences also permit the cable companies to connect their respective networks to other telecommunication networks or systems within the U.K. The TA licences contain the principal technical requirements for the networks, including transmission characteristics, performance and radio interference restrictions.

3.1.2 Geographical coverage.

Licences are granted for regional areas. The ITC determines the area.

The number of licences awarded is determined by the ITC. There is only one licence per geographical area. It is the ITC’s policy that only one LDL licence (and therefore TA licence) per franchise area will be awarded in order to encourage the development and construction of local cable infrastructure in competition with BT’s existing network (see above and section 2.4.1).

Operators may interconnect network infrastructure.

3.1.3 Terms and length of licence.

The terms and conditions of each TA licence vary according to the nature of the LDL system proposed, e.g. licences for running two-way broadband cable systems contain conditions and such systems are designated as Public Telecommunications Systems. One important condition in such licences is the requirement to connect to other systems and to allow services carried on those connected systems to be provided by the licensee’s own system if the customer requests. All PTO licences are subject to the standard obligations to publish charges, terms and conditions and not to show undue preference towards nor undue discrimination against any person or class of persons. A PTO may also be subject to a service obligation to satisfy reasonable demands for certain telecommunication services.

Before the 1990 Act, a TA licence for cable operators was granted for either a 23 year period (if the network was a switched star system) or a 15 year period (if the network was a tree and branch network).

Currently, TA licences for cable operators are granted for a term of 25 years and are technology neutral.

The terms and conditions of each TA licence, including the extent of services authorised vary according to the nature of the total delivery system proposed. The TA licence may also include build milestones which are based upon the project timetable included in the technical plan submitted by the licensee with its original franchise application. It is OFTEL’s responsibility to enforce the build milestones in the TA licence (also refer to 3.3.2). The ultimate sanction for a failure to achieve the milestones is revocation of the licence.

An application fee is payable which is generally related to the amount of work involved in issuing the licence. In addition an annual licence fee is payable which is either a lump sum payment (of £2,500) or a percentage of turnover (capped at 0.08 per cent, currently 0.05 per cent) whichever is the higher.

3.1.4 Award procedure.

See 3.2.4. below.

3.1.5 Availability of access to bottleneck resources (e.g. ducts, poles).

Although the government policy has been to encourage PTOs to share ducts and other infrastructure where possible, in practice operators have little interest in sharing ducts and poles and there is no regulatory requirement to do so.

OFTEL has released a consultative document which sets out a framework which it intends to adopt in relation to pricing of BT's interconnection services, e.g. bottleneck services will be subject to a price cap equal to RPI less x (a number yet to be determined).

3.1.6 Restrictions on cable TV infrastructure, ownership and/or operation.

There are no restrictions.

3.2 Service Provision**3.2.1 Structure of licences offered.**

Cable operators are granted a local delivery operator (LDL) licences under Part 2 of BA to use a telecommunications system for the purpose of the delivery of services including television broadcasting services (Channels 3, 4, 5 or the BBC), non-domestic satellite services and licensable programme services. Cable operators may also relay foreign satellite programmes.

As mentioned above, cable licences issued prior to January 1, 1991 under the Cable and Broadcasting Act ("PDL licences") continue in force unless otherwise repealed. The BA also allows for the conversion of PDL licences to LDL licences.

A third party (other than the cable operator) can also hold a licensable programme service licence (LPSL) i.e. a licence to provide programmes to be conveyed by means of a telecommunications system.

3.2.2 Geographical coverage.

There is only one LDL licence granted per geographic area. The area is the same as for the TA licence (see section 3.1.2 above).

3.2.3 Terms and length of licence.

LDL licences are granted for a term of 15 years (they are renewable on one or more occasions for further periods of 15 years on application). The grounds on which the ITC may refuse to renew a licence are limited. Such grounds may include a decision of the ITC to grant a fresh LDL to a different area to that previously licensed, or the failure by the licensee to achieve the coverage specified in the technical plan submitted with the licence application within the period specified in the plan.

The ITC charges on application fee for an LDL licence which is calculated according to a sliding scale based on the size of the franchise area advertised. In addition to the initial licence fee (that is the cash bid of the successful applicant) LDLs must pay an annual licence fee equal to a percentage of qualifying revenue. The percentage is set out in the licence. It varies between different franchises and is different for years one to five, years six to ten and years 11 to 15. Over the period of the licence the percentage varies between 0 and 8 per cent.

The operators must also pay an annual licence fee to the ITC to recover its costs. The fee depends on the type of licence and the number of homes in the franchise area.

3.2.4 Award procedure.

The LDL licence is awarded by the ITC by competitive tender. The TA licence (see 3.1 above) for the same area is awarded to the company who is awarded the LDL licence. The LDL licence is advertised and a public tender is opened. The licence will be awarded to the highest cash bidder provided that the coverage area of another operator is not greater. The licensee must also provide other information including details of funding, a business plan and technical plans. Both the DTI (who issues the TA licences) and the ITC (who issues the LDL licence) agree to the grant of those licences.

3.2.5 Availability of access to infrastructure.

The LDL and the TA licence are granted together to the same person. The LDL licence and the TA licence are therefore “tied”.

3.2.6 Restrictions on holding licences to provide services on cable TV network.

Local authorities, religious bodies and advertising agencies are prohibited from holding LDL licences.

In relation to accumulations of interests, the 1996 Act provides that no one person may hold 2 or more licences of any terrestrial (whether analogue or digital) and licensed satellite/cable programme services, (ie. the LPSL (see section 3.2.1 above) – the licences for a particular service) at any time when his audience time in respect of the period of twelve months ending with the last day of the preceding calendar month exceeds 15 per cent. of total audience time in respect of that period.

The restriction does not apply to the LDL licence (see section 3.2 above). By not including LDL licences in this restriction, the intention is that cable is treated as a method of delivery only, and a cable operator is only included in the restriction to the extent that the cable operator holds the LPSLs (and is therefore responsible for the editorial content of that programming).

There are no foreign ownership restrictions and no maximum ownership restrictions.

3.3 Relationship between Ownership of Infrastructure and Service Provision

3.3.1 Separation of infrastructure from service provision.

There are two separate licences, the TA licence and the LDL licence, however, they are held by the same person. The owner of the infrastructure therefore has control of the content provided on that network. That person decides which services will be provided on the network. The cable operator packages the various services and provides the service to customers. It operates the subscriber management system. Often the LPSL (the licences for the programme services) are held by a third party e.g. the producer of the channel who sells the service to different cable operators who on-sell it to customers.

3.3.2 Cable TV operators allowed to offer own content.

Cable operators are permitted in the U.K. to provide their own content. In order to provide their own content the cable operator must have a LPSL for each service transmitted (refer to section 3.2.1 above).

3.3.3 Cable TV operators control of choice of programming/content.

The holder of the LPSL licence, the non-domestic satellite licence, or the other terrestrial licences granted under the BA, has the responsibility for the programming and its compliance with the various laws and regulations, and ITC codes on programmes, advertising and sponsorship. As set out in section 3.3.1 above the holder of the TA licence and the LDL licence, determine which programme services are provided on its network.

3.3.4 Are there restrictions on carriage/provision of other services over cable TV network.

There are no such restrictions unless the service is banned by the ITC.

3.3.5 Rights of access of independent service providers to cable TV networks.

Independent service providers do not have any right to access mandated in legislation. General competition law may apply.

3.4 Price Regulation

Cable TV pricing is not subject to any pricing restrictions.

However, telecoms pricing by cable companies is subject to licences granted to them under the TA, and where the “well established operator” criteria are satisfied, they prohibit, in particular, undue discrimination or preference and linked sales. They also require cable companies to furnish details of prices and changes in prices to the Director General and make those details available for public inspection. Oftel is currently consulting with the cable companies on the incorporation of the fair trading condition which was introduced into BT’s licence on December 31, 1996. That condition provides similar prohibitions to those set out in Articles 85 and 86 of the EC Treaty and prohibits the operator from abusing a dominant position.

3.5 Licensing for Other Broadband Service Delivery Mechanisms

Under the Telecommunications Act, a class licence (“SMATV Licence”) is in place which covers Satellite Master Antenna TV (SMATV) systems for the provision of all types of broadcast services to areas serving no more than 1,000 homes. It is not necessary to obtain a licence under the Broadcasting Act 1990.

As the SMATV Licence is a class licence there is no need to obtain the licence. A licensee must be specified by the Secretary of State and have their name and particulars registered by the Director General. The specification will not be made by the Secretary of State for installation of a system in an area where a licence has been granted for a broadband cable network (under the 1984 Cable Act) or a local delivery licence has been granted (under the BA) unless a right of first refusal has been given to that licence holder which has not been exercised. The holder of the cable licence is given the opportunity of providing an alternative service to the one proposed by the SMATV operator.

4. Telecommunications Operators and Cable TV Networks and Other Services**4.1 Restrictions on Dominant PTO's Owning Cable TV Infrastructure**

National PTOs may apply for a licence to provide a local delivery service (i.e. a cable operator licence referred to in section 3.2) if the licence application was advertised after 31 March 1994 and immediately before an invitation for applications for the licence was published no part of the area of the service was covered by an existing cable television licence.

4.2 Restrictions on Dominant PTOs Providing Cable TV Services Over Cable TV Infrastructure (Taking into Account own Content/Other Content)

If a dominant PTO owns a cable network, the cable network is treated like any other network and the holder of the LDL and TA licences may provide all types of services over the network.

4.3 Restrictions on Dominant PTOs Providing Cable TV Services Over Telecommunications Infrastructure (own Content/Other Content, Broadcast/Non/Broadcast).

The licences granted to BT, Mercury, Kingston Communications and some others under the TA specifically prevent these operators from conveying, in their own right, broadcast entertainment services to residential customers i.e. the provision of broadcast entertainment services to one or more dwelling houses in the U.K. The conveyance of signals within the network to business customers is, however, permitted.

On September 29 1995, the ITC issued a statement confirming that BT and other national PTOs may, under their current licences, convey “video-on-demand” services which consist of the provision of television programmes over the networks of national PTOs in response to specific requests (over the phone) for such programmes.

The distinction between VOD and other broadcast entertainment services (which remain restricted) is that VOD is not provided for simultaneous reception in two or more dwelling houses in the U.K. (under the definition of local delivery services in the BA).

To date neither BT nor any other company in the U.K. provides video-on-demand services to the public although BT conducted video-on-demand trials in Colchester and Ipswich during 1996.

The licence restriction relates only to the final drop to the residential customer. The PTO can convey entertainment signals to business customers and within their networks. Thus BT is a major distributor of television programmes from studios to the transmission stations. Furthermore the PTOs can act as agents of the cable companies to convey signals to and from the customer provided that the cable company retains the ultimate responsibility or control.

The rationale for this restriction was to provide the embryonic cable industry with time to develop and become recognised as a real alternative to terrestrial wireless telegraphy broadcasting networks and at the same time to encourage the development of competitive telecommunications infrastructure in the “local loop”.

The previous Government did not intend to remove this present restriction until 2001. The Director General is able to review the restriction in 1998 and it could be removed if the Director General advises that removing the restriction would be likely to promote more effective competition. The new Labour Government has indicated that it may begin a rolling programme of lifting the ban in 1998 with a target of full and open competition with cable operators by 2002. The Government has made a general commitment to enhancing competition in all industry sectors.

4.4 Requirements for Separation from Telephony Business for PTOs Allowed to Provide Cable TV (e.g. Arms Length Operation, Separate Accounting, Limitations on Cross Subsidisation (Excluding the Cable TV Directive See 2.5 Above)

A PTO, as a “well established” business owning more than 25 per cent. of the market share, is subject to requirements to separate accounts.

Operators with both telecommunications and cable TV licences may provide both telephony and cable TV services within their franchised area. If an operator is or becomes “well established” certain fair trading provisions in its telecommunications licence will apply. For example, it will be prohibited from acting in an unduly discriminatory manner and may be prevented from unfairly cross-subsidising its products and services.

Access Technologies

Throughout this report we have discussed a number of different access technologies which can be used to deliver telecommunications and multimedia services. This appendix presents some of the details of these technologies.

This section is arranged in eight parts:

- Public switched telephone network.
- Cable TV networks.
- Digital terrestrial television.
- Digital satellite television.
- Microwave distribution systems.
- Low earth orbit satellite systems.
- Wireless local loop.

1. Cable TV networks

This section summarises two of the most important developments in the cable sector: the cable networks of hybrid fibre coaxial networks, and the development of cable modems.

1.1 Hybrid Fibre Coaxial.

In an Hybrid Fibre Coaxial (HFC) network, the trunk portion from the head-end to the outskirts of a community, covering on the order of 1000 homes, is replaced with high-reliability, low-attenuation fibre optic cable¹. By removing the need for a large number of analogue amplifiers this increases the reliability and quality of signals transported over the network.

The introduction of a 'cleaner', more efficient, communications path enables the introduction of two-way interactive services over the HFC network.

HFC enables an operator to build an infrastructure to support a wide range of services, and with the flexibility to migrate as demand and availability grow for the advanced services of tomorrow. Expansion of the service portfolio will help generate revenues, enabling operators to invest further, taking fibre closer to the kerb. Fibre is brought to street cabinets each supporting, perhaps, 100 homes or less, housing the final amplifiers before the short coaxial connection at the customer premises.

One of the main advantages of HFC is that it allows cable operators to incrementally upgrade networks in line with demand for broadband services. First, HFC can support both switched and broadcast services. For the foreseeable future, it is likely that most revenue will be generated by broadcast video services. But operators can ill afford to lose market share to competitors due to the inability to offer switched services.

For the foreseeable future, the HFC architecture is not likely to become obsolete. Operators can build a low-cost infrastructure and then add services incrementally without major changes to the infrastructure. As broadband media services are deployed, HFC is

¹ Cable Access Beyond the Hype: On Residential Broadband Data Services over HFC Networks, IEEE Communications Magazine, November 1996.

essentially a “pay as you go” architecture that matches infrastructure investment with new revenue streams, operational savings, and reliability enhancements.

1.2 Cable modems.

Cable modems allow users to send and receive high-speed data and telephony services over a hybrid fibre coaxial network.

Cable modems are currently being trialled by cable operators across Europe in preparation for the launch of interactive television services. Current European deployments include Lyonnaise des Eaux and Générale des Eaux in France where trials are reported to be at an advanced stage. There are more than 500 subscribers in the Lyonnaise trial which is due to be completed for the delivery of multimedia services². In the U.K., Telewest has started a new Internet service using cable modems. Trials of cable modems are also underway in Belgium, Netherlands, and Scandinavia.

Cable Modems operate over two-way hybrid fibre/coaxial network to deliver user rates as high as around 30 Mbps. Typically, data is sent and received in two slightly different fashions. In the downstream direction, the digital data is modulated and then carried on a typical 6 MHz television carrier, somewhere between 42MHz and 750 MHz. The upstream (also known as the reverse path) is transmitted between 5 and 40 MHz. In the Telewest service, Internet access speeds up to 30 Mbps download and 10 Mbps upload are available from this services.

Using 64 quadrature amplitude modulation (QAM), a downstream channel can realise about 30 Mbps. Upstream rates in low megabits should be available on good HFC systems. The downstream channel is continuous, but divided into cells or packets, with addresses in each packet determining who actually receives a particular packet. The upstream channel has a media access control that slots user packets or cells into a single channel. To avoid collisions, the system gates each upstream packet onto the network with control signals embedded in the downstream information stream.

There are a number of technical issues that need to be resolved before cable operators can offer high speed data services using cable modems.

- *Noise ingression.* The topology of most cable networks is tree and branch, sometimes serving as many as 10,000 customers from a single head-end, with one-way amplifiers that preclude any upstream data flow. Consequently, all the noise from each branch gets added together as the signals travel upstream, combining and increasing. To overcome this problem, most manufacturers will be using quadrature phase shift key (QPSK) or a similar modulation scheme in the upstream direction, because QPSK is a more robust scheme than higher order modulation techniques in a noisy environment.
- *Security.* Security of data may be compromised since all signals go to all cable modem users on a single line coaxial line. Encryption and authentication will be paramount to resolving this issue, and several cable modem vendors have put encryption into their modems.

² *Cable*, May/June, 1997

- *Data Rate.* Most cable networks have neighbourhood hubs that serve an average of about 300 subscribers. Such a hub may be able to deliver data at 10 Mbps, but this must be shared by all users; as each user connects to the services the maximum data rate is reduced. Some cable companies have argued that by the time they have signed enough subscribers to make any noticeable difference to the network, they will be earning enough to add another cable to the node.
- *Standards.* Over recent years, the deployment of cable modems has been hindered by a lack of standards. General Instruments, for example, have decided to avoid the problem of two-way modems standards by using the PSTN as an upstream channel.

2. Public Switch Telephone Network

The traditional PSTN consists of twisted-pair copper wires in a switched-star configuration. Analogue signals are sent from a local exchange to a switching cabinet in the street. The households are connected to the street cabinets via copper-pair wires. The PSTN can be upgraded using digital subscriber line (DSL) technologies. PTOs connect a pair of DSL modems to the ends of the copper pair to increase the bandwidth of the wire. There are two common types of DSL: asymmetric digital subscriber line (ADSL) and very high rate digital subscriber line (VDSL).

Asymmetric digital subscriber line (ADSL) and very high rate digital subscriber line (VDSL) technologies are now presented in more detail.

2.1 Asymmetric Digital Subscriber Line.

Asymmetric Digital Subscriber Line (ADSL) is a technology for converting existing twisted-pair telephone lines into access paths for multimedia and high speed data communications. ADSL transmits more than 6 Mbps to a subscriber, and as much as 640 kbps more in both directions. Such rates expand existing access capacity by a factor of 50 or more without the need to replace the existing copper networks.

An ADSL circuit connects an ADSL modem on each end of a twisted-pair telephone line, creating three information channels: a high speed downstream channel, a medium speed duplex channel, and a POTS (Plain Old Telephone Service) channel. The POTS channel is split off from the digital modem by filters, thus guaranteeing uninterrupted POTS, even if ADSL fails. The high speed channel ranges from 1.5 to 6.1 Mbps, while duplex rates range from 16 to 640 kbps.

Services Available

Most customers lie within 3.5km of an exchange, and can be provided with transmission rates of 1.5 to 6 Mbps over distances in this range. Advances in digitising and compressing video information make it possible to supply full-motion video of acceptable quality at rates down to 1.5 Mbps. For instance, video encoded at 2 Mbps according to the MPEG2 standard compares favourably to traditional VHS recordings. Digital subscriber lines operating at this rate will be able to supply multimedia services to nearly all households in a region. Transmission rates of 6 Mbps over shorter distances will allow several channels to be viewed simultaneously at a single subscriber location.

2.2 Very High Rate Digital Subscriber Line.

Very High Rate Digital Subscriber Line (VDSL) is the fastest of the DSL technologies. It delivers maximum downstream between 51 and 55 Mbps over lines up to 300 meters in length. Downstream speeds as low as 13 Mbps over lengths beyond 1500 meters are also possible. Upstream rates in early models will be asymmetric, just like ADSL, at speeds from 1.6 to 2.3 Mbps. The maximum operating distance is only 1,000 to 4,500 ft.

It is likely that PTOs will use VDSL as a means of upgrading their copper networks in line with the demand for broadband services. It will also be used initially to deliver high definition TV (HDTV) which requires some 16–20 Mbps for a single TV channel, something currently outside the capabilities of ADSL technologies.

3. Digital Terrestrial Television

Terrestrial transmission remains the dominant means by which the world's one billion plus television viewers receive their television programmes, despite the growth of other means of distribution such as cable and satellite which offer much higher channel capacities. It has generally been assumed the terrestrial broadcasting is destined to remain as narrowband transmission media, as scarcity of radio frequency forces television signals to come through ground cables while telephone calls would come through a roof-mounted antenna.

The view that radio spectrum is a narrowband medium is being challenged by the transition to digital technology and the advantages of digital compression. For many countries throughout the world, the digitalisation will be warmly welcomed as it will allow those frequencies currently allocated to television channels to be freed for more lucrative uses such as mobile communications³.

Technology

Advances in digital compression has reduced down to manageable proportions the quantity of information required in order to represent a given sequence of film or video material. The generally adopted international standard for compression is MPEG-2.

Each analogue terrestrial standard colour television channel typically occupies up to 11 UHF bands of 8 MHz, and there are also generous allocations for channel separation and for black and white channels. It is estimated that between four and six digital channels could be squeezed into each 8 MHz band. Thus a country with four national terrestrial channels could easily accommodate several hundred digital channels.

At present, each national analogue service requires several channels in order to avoid interference. However, digital services can be transmitted using a single frequency network (SFN) to cover wide areas. Combined with the aforementioned gains from compression this could lead to an improvement factor of about thirty on the number of services currently being offered. In practice this full benefit will not be realised since it is likely that regional services will proliferate.

It is anticipated that existing VHF/UHF antennae will suffice for the vast majority of TV households to receive digital terrestrial TV. In some countries, such as in the Netherlands

³ As an example of the increasing value of electromagnetic spectrum, the newly-elected Labour Party in the U.K. has announced its intention to tax spectrum used by mobile phone companies.

where there are restrictions on the erection of external antennae, it is necessary to reach set-top aerial which is a more demanding requirement than reaching rooftop aerials.

There will be a lengthy period of time during which analogue channels will be simulcast alongside digital channels. For this reason, terrestrial broadcasters are likely to demand more spectrum rather than less in the short term, and this may put extra pressure on an already scarce resource.

Services

From a consumer's point of view, digital terrestrial television (DTT) has the potential to offer considerable advantages over traditional analogue broadcasting:

- Wider choice of channels, expanding the range of programming and improving the picture and sound quality available to the public
- Combined with a suitable return path, DTT could potentially provide a wide range of interactive services.
- DTT transmission technology is inherently resilient to interference commonly associated with terrestrial television and will ensure no loss of quality to the viewer.
- Compared with satellite DTT will, it is claimed, enable the economic broadcasting of regional programming.
- Digital terrestrial programmes can be received on a large number of portable TV sets.
- DTT does not require expensive or obtrusive satellite dishes, and can be received in nearly all rural areas.

Market

So far, the U.K. is in the lead in providing a regulatory framework for digital terrestrial. Detailed proposals have also been produced Sweden, and other European countries are assessing the potential⁴. Nonetheless, there appears to be industry consensus that DTT will have more of an impact in the U.K. other European states.

According to a report by Convergent Decision Group (CDG) the penetration of homes by DTT is services expected to be more than 40 per cent in the U.K., Spain and Sweden after 20 years⁵. In contrast, penetration will be around 30 per cent in Germany and France and less than 20 per cent in the Netherlands.

France is some way behind the U.K. in the regulatory preparation for digital terrestrial television. Government working parties on frequency planning, regulation and the technical requirements of digital terrestrial television are due to be completed in early 1998. According to CDG, France is the European market where digital satellite appears to have the greatest advantage over digital terrestrial. The mountainous terrain means that a large number of transmitters would be required and the costs of launching a digital terrestrial television service to more than 70 per cent of the population would be prohibitive. As a result, CDG believes that only 32 per cent of French television homes will take a digital terrestrial service by 2017 out of a total of 67 per cent which take some form of digital television.

⁴ Financial Times, 11th December, 1996

⁵ Convergent Decision Group, London, 1996

4. Digital Direct to Home Satellite Television

Digital DTH services have already started in most of the larger European markets: Germany, France, Scandinavia, Italy and Benelux. New services are due soon in the U.K., and Spain.

According to a report by Consultant Decisions Group, digital satellite television faces a difficult time in Spain, where analogue direct-to-home satellite has not been a success. There is likely to be considerable consumer confusion because of the competing packages which are due to launch next year from groups led by Canal Plus Espana and Antena 3. In addition, about 70 per cent of the population lives in apartment blocks and receives television signals via master antenna systems (MATV). These would require rewiring or re-equipping to offer a full range of digital satellite services. Digital satellite operates at higher frequencies more prone to cabling problems. As a result, digital terrestrial television "has a significant cost advantage in reaching MATV homes compared to satellite."

In the U.K., the launch of British Interactive Broadcasting (BIB) in May 1997 heralded the latest move by the consortium led by BSkyB and BT to be the first to deliver interactive television in the U.K.. According to Chris Townsend, BIB's commercial director, BIB will offer a package of interactive services including: home shopping, banking, education, holidays and travel, games, sports, Internet and email and public services.

Interactive services over Digital Satellite

In March 1996, DirecTV in the US formed a partnership with Microsoft Corp. in which the software firm developed systems to enable PCs to capture data beamed down from an orbiting satellite at high speeds. Typically, customers with DirecTV's 18-inch satellite dish and a PC capable of storing the large volumes of data are able to receive "multimedia magazines", combining video clips, sound bites and text into an on-screen presentation.

Broadcast satellites like those used for digital television have plenty of bandwidth, but at the cost of individual channels and two-way communications. Hughes Network Systems adapts this to make this one-way flood imitate a two-way personal Internet connection. With DirectPC, its Internet service, subscribers send data requests over their regular telephone lines. Hughes routes the responses to its control centre, which codes them so that a subscriber's PC can recognise them as its own, and then sends them up to a satellite for broadcasting.

Leasing only one satellite channel in America (similar services will soon be offered in Europe and Canada) Hughes has just 30 Mbps of bandwidth to serve the entire U.S. – about as much as cable TV networks plan to distribute between 300 homes. Hughes limits each subscriber's connection to 400 kbps and can handle only a few hundred users simultaneously (only a tiny fraction of its 2,000 subscribers use the service at any one time).

The DirecTV venture is a significant move towards "interactivity in the sky", however, the options for truly interactive services are currently limited by the traditional telephone lines used to transport the upstream signal, and the memory capacity of the PC's for storing large volumes of video and audio clips.

5. Microwave Distribution Systems

Wireless cable is a generic term for the use of microwave frequencies to link head-end station with small antennae placed on the customers' premises for the conveyance of television services. Recent trials have demonstrated the capacity of wireless cable to deliver up to 100 channels of digital television, in addition to providing a return path for interactive and even voice telephony services, thus ensuring the future of wireless cable as a viable medium for the provision of telecommunications and multimedia services.

There are three types of microwave distribution systems technologies available in the world:

- Multichannel Multipoint Distribution Systems.
- Local Multipoint Distribution Service.
- Microwave Video Distribution System.

Each of these will be discussed in more detail in the remainder of this section.

5.1 Multichannel Multipoint Distribution Systems.

Multichannel multipoint distribution system operate at in the 2–3 GHz range. MMDS is commonplace in Ireland, where it is used to deliver up to 11 channels of television.

For MMDS to be a serious competitor to cable networks the importance of interactive capability for this wireless technology should not be understated. However, it remains to be seen whether commercially proven interactive solutions can be developed to ensure that MMDS can effectively compete with HFC and other media in the provision of Internet and other interactive services.

Technology

Wireless cable was first developed in the U.S. as the Multipoint Distribution System (MDS), where it operated in the 2.15–2.162 GHz band. After the demonstrating the feasibility of using MDS as a means of providing a "wireless" cable service which would compete with the established wired cable systems, the FCC allocated frequencies in the MDS band, and referred to the new system as MMDS. The initial trial supplied 135 households in Salt Lake City, and there are now over 700,000 MMDS subscribers on approximately 170 systems in the US. World-wide, there are MMDS operations in 40 countries in Europe, South America, Africa and the Pacific Rim. The largest wireless system in the world is in Mexico, which has over 275,000 subscribers.

While the system capacity of MMDS in the US is 33 channels, in Ireland it is only 11. This is partly a consequence of reduced spectrum allocation and the broader channel bandwidth of PAL transmission versus NTSC, but primarily as a result of the need to achieve national coverage.

A major limitation of MMDS is that it is essentially a line-of-sight system, requiring visual contact between the transmitting and receiving antennas. In rural areas the presence of foliage, hills and other obstacles can obstruct signal reception. This difficulty, which can be partly eliminated by the use of beambenders (low power transmitter using directional antennas), has proved to be a tricky problem to overcome in some hilly areas⁶.

⁶ I saw it on the wireless. Teltec – University College Cork, 1996.

Latest Developments

All current operational wireless cable TV systems are analogue, but the move to digital is being investigated, including providing a return-path for the delivery of interactive services. Zenith, Texas Instruments and Motorola now have digital MMDS transmitters claimed to offer 100 to 300 channels, stronger signals and interactive capability. As a result, several US telcos are considering MMDS as an interim method of introducing cable TV until their networks are upgraded to fibre.

It is expected that the MPEG 2 standard and 64 QAM will be employed for source coding and multiplexing for MMDS, similar to most applications involving the transport of broadcast quality video over distributive and communicative media.

The first European digital MMDS broadcast was in Ireland, in August 1994⁷. In the US there have been similar moves towards the digital standard⁸.

The limited frequency available on wireless requires further work on compression to enable these systems to offer more channels and significant interactivity, though most basic interactive applications can be handled using a wireless telephony return-path.

Capacity can be increased in several ways. One, already used in cellular-telephone systems, is called "sectorising". Instead of sending the same signals out in all directions, the antenna splits the transmission area into wedges. Each wedge is treated as a separate area, and the frequencies reused in each one. A recent trial in Lakeland, Florida, by two operators, American Telecasting and People's Choice TV, used 48 wedges. Even more vigorous sectorising should become possible in the future. With digital transmission, the wireless operators estimate they will be able to serve up to 50,000 users per channel, all at a speed of 128 kbps.

Summary

In the long-term, it is likely that the inherent bandwidth limitations of wireless compared to cable will limited the attractiveness of MMDS compared to digital cable and satellite networks. However, the adoption of wireless into integrated distribution networks is expected to increase, as a voice carriage medium for cable operators, and an interim cable TV carrier for telcos.

Wireless also provides a low-cost means of testing markets, which can then be wired with optical fibre and coaxial once demand merits, with the wireless transmitter moved to another site for expansion there.

5.2 Local Microwave Distribution System.

Local Microwave Distribution System (LMDS) is a recent development in microwave TV distribution in the US, and has evolved as a result of a desire to transmit a large number of broadband TV channels in a spectrum which is becoming increasingly congested. Like MMDS, it is a multi-cell, point-to-multipoint distribution system but one which operates at millimetre wave frequencies in the 28 GHz band.

⁷ Cable Management International Services and Star Telematics.

⁸ In April 1996, Pacific Telesis announced its intention to launch more than 100 channels of programming using digital MMDS and compression technology.

Along with providing higher quality video than MMDS due to the FM modulation, LMDS is also capable of operating without having a direct line-of-sight with the receiver. This feature, highly desirable in built-up urban areas, is achieved by the manner in which the transmitted signals arrive at the receiver via a number of different paths, a phenomenon known as multipath. This characteristic is enhanced by the manner in which millimetre wave signals are reflected from solid objects. LMDS operates in cells which have a typical radius of 5 to 8 km, a factor which is primarily related to the power which is presently available from millimetre wave sources. To minimise interference between adjoining cells, a combination of horizontal/vertical polarisation and frequency interleaving in diagonally proximate cells is used.

Experience in the US has demonstrated the technological and economic feasibility of Local Multipoint Distribution Service. Already many countries throughout the world have subscribed to this technology for the rapid and cost-effective deployment of multichannel video services. However, the prospects for widespread adoption LMDS in Europe are limited due to the lack of spectrum and the established base of cable and satellite programming.

Overview of US Experiences

In early 1991, the Federal Communications Council authorised Hye Crest Management Inc. to construct and operate the first transmitter in the 28 GHz band for video services in a suburb of New York City. Within a year, the transmission facility was offering forty-nine video channels within New York City and several adjacent counties.

After subsequently receiving some 971 applications from companies elsewhere in nation, the FCC established a new "Local Multipoint Distribution Service" (LMDS) in the 27.5 – 29.5 GHz range. Here, as elsewhere, the Commission was motivated by the desire to promote multichannel video competition.

LMDS has an advantage over wireless cable with its greater capacity - up to forty-nine channels in a 1 GHz band. This capacity affords a wide variety of video and interactive services, and even more will be available with digital compression technologies. Nonetheless, LMDS also shares the disadvantages of patchy signal coverage, line-of-sight requirements and low antenna angles.

The success, and thereby competitiveness, of LMDS will depend on a number of technical issue which have only recently been resolved. There are two noteworthy elements: susceptibility to rain fade, and the sharing of frequencies between adjacent cells.

Latest Developments

In 1992, the FCC ordered that 1 GHz be reserved for LMDS between 2.75 and 29.5 GHz, and proposed that only one license be issued per basic trading area. Because the commission would not permit use of one of the spectrum slots for return transmissions from subscribers to avoid interference with satellite uplinks, it proposed the addition of another 300 megahertz to the LMDS scheme at 31 GHz. This would allow each licensee 1.3 GHz of spectrum. Over this, licensees could deliver video, data and telephone services.

More recently, the Federal Communications Council has announced that incumbent cable operators and local phone companies should be excluded from the LMDS arena⁹. This is apparently in response to the threat of telcos under-utilising their LMDS to the detriment of competition in basic telephony services. Not surprisingly, this policy has received counterattacks from several cable and telecoms operators¹⁰.

According to estimates by Hewlett-Packard¹¹, the capital cost of supplying a 7 megabit-per-second downstream 1.5 Mbps upstream dedicated digital service will run approximately \$1,000 per customer. This estimate includes customer equipment.

According to manufacturer¹² of LMDS equipment, an all-digital LMDS transmitter can deliver data and telecom lines to serve 15,000 to 18,000 customers while supporting 224 digital video channels across 1 GHz of spectrum. Such a design would accommodate a combined cable-telephone system with video delivered in the broadcast mode, but it would take a higher concentration of transmitters to allow for dedicated video channels in a market where on-demand customers represented more than 5 per cent of the household base.

In November 1996, the Canadian Department of Industry awarded licenses for delivery of wireless broadband services. The licenses allow providers to deliver virtually any type of service on a common-carrier basis using LMDS. Some services are expected to get under way by mid-1997. The government plans to allocate at least two of four additional 500-megahertz blocks in the 28 GHz spectrum region over the next two years.

In February 1997, Broadband Networks in the US unveiled a technology called Local and Metropolitan Multipoint Distribution Service, a wireless asynchronous transfer mode (ATM) technology¹³. According to Broadband, the technology will allow telcos to deploy two-way broadband Internet services quickly in developing nations.

5.3 Microwave Video Distribution System.

In Europe, LMDS operates under a different name, and a different frequency. Currently under development in the U.K., the Microwave Video Distribution System (MVDS) has been licensed to operate in the 40.5 – 42.5 GHz band. The allocation of higher frequency bands displays a trend which is now becoming familiar as a result of increasing levels of spectrum congestion.

To date, eleven European countries have implemented a 1990 CEPT recommendation which designates the 40 GHz band as the harmonised frequency band in Europe. Like MMDS in Ireland, this system is proposed as a means of providing a broadband connection to rural households and is presently being investigated by a U.K. consortium, as a means of local delivery to communities in its franchise area in the South East of England.

⁹ FCC Adopts Service and Auction Rules For LMDS. Wireless Telecommunications Action, Federal Communication Council, March 11, 1997

¹⁰ Multichannel News, Vol. 17, n 42, p 28, October 14, 1996

¹¹ Wireless Week, -January 27, 1997

¹² Interactive Week, January 1996

¹³ Electronic Engineering Times, n 941, p 28, February 17, 1997

Technology

In the U.K., system specifications for analogue MVDS have been finalised by the Radiocommunications Agency. The channel plan outlined in this specification defines a bandwidth of 26 MHz with a co-polar channel spacing of 29.5 MHz. These are interleaved with cross-polar channels from the other channel groups at 14.75 MHz. This channel plan provides for the allocation of two groups of horizontally polarised channels and two groups of vertically polarised channels, each group consisting of 32 channels.

MVDS cells are even smaller than LMDS cells, typically 3 km. Again this is due to the lack of availability of higher power millimetre wave sources, and also to losses which result from gaseous absorption and rain attenuation. To overcome these losses and obtain acceptable signal quality at 2 km from the transmitter, a receiver incorporating a low conversion loss mixer and an antenna providing 32 dB antenna gain would need to be used. Due to the high frequency of operation, this level of gain can be obtained with a conical horn which has an aperture of approximately 15 cm. The small size of this horn, though desirable from an aesthetic point of view, presents a challenge at installation, due to the requirement of line-of-sight, and the susceptibility to sway which is induced by high winds and which can result in signal loss. Another problem is that of rain induced cross-polarisation. This has been evaluated as 25 dB for the severe conditions of a 5 km path experiencing 25 mm/h rainfall rate, and is thus unlikely to be a significant problem.

One final noteworthy issue is how new entrants to the wireless arena can provide powering for telephony services. This issue is not insoluble but is a major problem.

Services

To date, there have only been two commercial trials of MVDS: in the Netherlands by Kable Plus, and Mediset in Switzerland. In the Mediaset experiment, the 42 GHz system carries 24 analogue channels with a mixture of international and domestic programming. According to the PTT, tests to determine the attenuation due to snow and rain have produced excellent results, and surveys of potential customers have revealed high acceptance of the new service.

Swiss Telecom PTT is now testing digital MVDS systems for interactive services, including Internet, which are due to be launched in the near future.

6. Low and Medium Earth Orbit Satellites

Technological limitations have, until now, precluded the use of satellites for wide-scale mobile communications. However, at present a number of satellite systems at low and medium earth orbits (LEOs and MEOs) have been proposed to overcome these problems.

The market for these satellite-based communications services will be restricted to a small number of user segments, including the following;

- International business travellers.
- Mobile coverage in the remote areas of developed countries.
- Public service networks in under-developed countries where demand for fixed networks exceeds supply.
- Commercial vehicles, particularly international hauliers.
- Marine and aeronautical users.

Prospective operators believe that these niche markets provide the opportunity to charge a premium for service through the provision of service where terrestrial networks do not exist. As such, satellite-based mobile communications systems do not represent a direct competitor to the terrestrial cellular system; instead, they offer the opportunity to complement terrestrial cellular systems through enabling coverage to be expanded into areas where it would not be economically viable to do so.

There are three types of low earth orbit satellite system: 'Big', 'Small' and 'Mega'.

Table 5.1: Proposed Satellite Voice and Multimedia Satellite Services

	Iridium	Globalstar	I-CO	Teledesic	SkyBridge	Orbcomm
Type	Big LEO	Big LEO	Big LEO	Mega LEO	Mega LEO	Little LEO
Services	voice	voice	voice	multimedia	multimedia	data
Number of sats	66	48	10	840	64	36
Date of Launch	1998	1998	2Q1998	2001		1995
Date put into service	1998	1998	2000	2002	2002	1996
Projected cost	\$3bn	\$2.2bn	\$3bn	\$9bn	\$3.5bn	\$0.35bn
Cost Per minute	\$3	\$0.5	\$0.5 to \$3	n.a	n.a	n.a

Source: Arthur D. Little

6.1 Mega LEOs

"Mega LEOs" provide "multimedia via satellite". The most well-known is Bill Gates' Teledisc project, but there are numerous other projects in this field including some which might be competing with those based on revisited geostationary satellites, such as the SkyBridge project.

Teledesic

Backed principally by Bill Gates and Craig McCaw, Teledesic Corporation goes beyond any of the Big or Little LEOs with plans to offer broadband bandwidth-on-demand services closer to wireless fibre than cellular. Comprising a constellation of some 840 satellites, the Teledesic network will use high-gain, steerable scanning beams to lay down a fixed grid of some 20,000 supercells across the earth's surface. Each of these will consist of nine smaller cells within which users can flexibly obtain connectionless datagram services based on fast packet switching Asynchronous Transfer Mode (ATM) technology. User data rates can vary between 16 kbps and 2.048 Mbps.

Satellites will be linked to the terrestrial telecommunications web via high-capacity ground stations. However, they will also form an independent web of their own, using high-speed intersatellite links between each satellite and eight of its neighbours. This non-hierarchical geodesic mesh should be highly tolerant of faults, local congestion and the disruption of downlinks.

Teledesic estimates that when fully deployed, the system could support two million simultaneous basic rate (16 kbps) connections, roughly corresponding to 20 million users at typical wireline business usage levels. Yet, unlike the other LEOs, Teledesic is not focused on serving mobile customers. While a small degree of transportability will be accommodated, Teledesic is primarily designed to provide services to fixed locations.

Teledesic faces huge questions as to the viability of this ambitious project, not least of all is its intention to such a large number of over a two year period – a feat without precedent in the satellite industry.

If the technology works, a market for Teledesic's "Internet in the sky" should be there. New Yorkers and Londoners may enjoy an abundance of fibre-optic capacity in the near future, but it will be a while before many others can do the same.

SkyBridge

According to Alcatel, the SkyBridge system will provide bandwidth on demand for Internet as well as other types of high-speed data communications, at speeds up to 60 Mbps. The system will allow a large variety of applications, such as teleworking, high-quality, videoconferencing or entertainment services and provide the required infrastructure for LAN interconnection and wide area networking. Furthermore, it is claimed the SkyBridge system will provide high-speed, broadband, interactive services to both business and residential users around the world.

Spaceway

Hughes has proposed a global GEO system called Spaceway that will provide an interactive, "bandwidth on demand" service accommodating a broad range of digital data interchanges ranging from voice to video-and at costs substantially below today's costs. By employing such technologies as on-board digital signal processing, asynchronous transfer mode switching, and tightly focused spot beams, Hughes claims the Spaceway satellites will be able to transmit to ultra-small antennas of 26 inches in diameter with uplink power below a half-Watt.

6.2 Big LEOs.

"Big LEOs" will offer narrowband voice, data, paging and fax services. From a features and performance standpoint, they look like giant cellular telephone systems in the sky. Some will market dual-mode portable handsets that can fall back to conventional and less expensive terrestrial cellular networks wherever these are available.

Iridium

Iridium uses a form of 'intersatellite linking' to route calls by beaming voice and data from satellite to satellite, unlike other systems that rely on ground stations to make routing and circuit switching decisions. As a result, the Iridium satellites are relatively complex and expensive, and service costs are predicted to be the highest in the business at \$3 a minute.

Iridium's deployment of a large number of satellites to ensure comprehensive global coverage was considered revolutionary, as was its use of a lower than usual orbit-a feature which means that handsets do not require unwieldy, bulky batteries to send signals vast distances into space. In the future, it is expected that Iridium's "dual mode" handsets will automatically choose between terrestrial cellular or satellite service, depending on availability, with the presumption that terrestrial would always be cheaper and used first.

It is yet to be seen how Iridium will fare against the rapidly-expanding cellular sector, where call charges can be fixed at significantly lower rates compared to the premium rates targeted at high-end business executives.

The Iridium project suffered a setback in January with the explosion of a Delta rocket at Cape Canaveral in January 1997. This incident, together with problems with launches with the Russian Proton rocket, serve as clear reminders of the risks associated with satellite projects. Iridium's director of space systems, has confirmed that the project is on course to achieve commercial activation in September 1998¹⁴.

Globalstar

The Globalstar system is a satellite-based, wireless telecommunications system designed to provide voice, data, fax, and other telecommunications services to users world-wide. Users of Globalstar will make or receive calls using hand-held or vehicle mounted terminals similar to today's cellular phones. Calls will be relayed through the Globalstar satellite constellation, in a 756 nautical mile orbit above the Earth, to a groundstation, and then through local terrestrial wireline and wireless systems to their end destinations.

Globalstar's satellites are strictly "bent pipe" digital repeaters, with all the switching and call processing facilities on the ground. This is not only less costly but allows Globalstar to take advantage of ongoing improvements in switching technology.

I-CO

Inmarsat, an international government consortium, plans to launch a system based on a small number of satellites to provide mobile telephony services on a global basis.

The ICO system will comprise ten operational satellites and two in-orbit spares operating in intermediate circular orbit at an altitude of 10,355 km. Divided equally between two orthogonal planes, each 45 degrees to the equator, these will provide complete, continuous overlapping coverage of the earth's surface. The satellites will operate in S-band and C-band to provide communications services world-wide. Using a digital onboard processor and TDMA, each satellite will be able to handle 4,500 simultaneous telephone calls.

Satellites will communicate with ground networks through ICO's own network-the ICON ET. This will consist of twelve earth stations or satellite access nodes (SANs) located around the globe. The SANs will provide the primary interface with the ICO satellites for routing traffic and maintaining certain customer data. The SANs will also link with gateways that will serve as the primary interface with public switched telephone, mobile and data networks.

6.3 Little LEOs.

"Little LEOs" are similar in concept to Big LEOs but provide less ambitious services. They will offer only narrowband store-and-forward data, making them similar to two-way paging systems. More than half a dozen corporations are chasing this opportunity, lead by companies like Orbcomm and GE Americom.

¹⁴ Communications Week, May 1997

The Orbcom network under development by Magellan Systems. Orbital Communications using 36 low earth orbit satellites. It is designed to provide emergency signals, positional information and e-mail globally, with a message data capacity likely to be limited to 250 characters. The first two satellites were launched in mid-1995.

7. Wireless Local Loop

Wireless local loop (WLL) is a generic term for an access system that uses a wireless link to connect subscribers to their local exchange in place of conventional copper cable. Technological developments, the declining cost of terminal equipment, and the prospect of deregulation of the telecommunications market, has propelled local loop networks based on WLL to be seriously considered as a viable alternative to the traditional local wire loop.

There is increasing use of WLL in the U.K. to avoid the reliance of BT's fixed network: Ionica has achieved a annualised penetration of nearly 5 per cent in the East Anglia region, and similarly in Scotland, Altantic Telecom has launched service based on the Proximity system. Similar schemes are due to be launched in Finland and France. The announcement by AT&T in the US of its intention to enter the local telephony sector using WLL has been interpreted by many industry observers as a vindication of this emerging technology.

Comparison with Copper

In comparison to the alternative of deploying copper lines, WLL technology offers a number of key advantages:

- **Faster deployment.** WLL systems can be deployed considerably faster than overground or underground copper wire. This can mean sooner realisation of revenues and reduced time to payback of the deployment investment. The rapid rate of deployment can also yield first-mover advantage with respect to competitive services.
- **Lower construction costs.** The deployment of WLL technology involves considerably less heavy construction than does the laying of copper lines. The lower construction costs may be more than offset by the additional equipment costs associated with WLL technology, but, in urban areas especially, there may be considerable value in avoiding the disruption that the wide-scale deployment of copper lines entails.
- **Lower network maintenance, management, and operating costs.** Especially in areas where the deployment of copper lines has the potential to be haphazardly performed, wireless equipment can be less failure-prone than copper wire and can be less vulnerable to sabotage, theft, or damage due to the elements or animals. In some WLL systems, moreover, network management, including fault-finding and system reconfiguration, can be conducted from a centralised location to fully administer the WLL network between the telephone network interface and the subscriber terminal. The overall result is reduced lifetime network costs.
- **Lower network extension costs.** Once the WLL infrastructure – the network of base stations and the interface to the telephone network – is in place, each incremental subscriber can be installed at very little cost. WLL systems that are designed to be modular and scaleable can furthermore allow the pace of network deployment to closely match demand, minimising the costs associated with under-utilised plant.

Such systems are flexible enough to meet uncertain levels of penetration and rates of growth.

- **Market Adaptations.** Although WLL systems can be based on mobile wireless technology, it is principally a fixed service. With the location of the subscribers known, a WLL system deployment can be tailored to provide user coverage at less cost than a comparable mobile system. Traffic density may be much different, however, especially if the fixed WLL service has low or subsidised tariffs. And fixed service implies that the subscriber terminal may not be the handset normally associated with mobile service; rather, it may be a unit that provides one or more subscriber line interfaces for standard telephones, supporting multiple extensions or multiple lines.

Wireless local loop technologies have been launched a number of EU Member States, including the U.K., France and Finland.

Ionica Demonstrates Feasibility of WLL

Founded in 1991 following the end of the duopoly in the U.K. long distance PSTN market, Ionica was the first company in Europe to utilise the digital radio technology called Fixed Radio Access (FRA). Residential and business subscribers are connected to an Ionica base station via a radio link operating at frequencies between 3425 and 3490 MHz.

Finland Telecom Announces Trial of WLL

Telecom Finland is an investor in Ionica and is using FRA to install customer access networks where this provides the best solution. In March 1996 Telecom Finland commenced commercial deployment of Nortel's 'Proximity I' technology, the FRA technology licensed by Ionica, to provide customers with local access services.

Due to its established network facilities in rural and remote areas, Telecom Finland can target network expansion in the Southern and Western parts of Finland, those areas of greatest population density. This means most telecommunication users should have a choice of local access provider well ahead of virtually all other European countries.

SFR-Cegetel Offering WLL Service on a Commercial Basis

In France, competitive telephony services are being offered over WLL networks in Nice by SFR-Cegetel, the consortium of the French water utility, Compagnie Générale des Eaux, BT and Vodafone of the U.K., and Mannesman of Germany. It is using a DECT-based WLL solution to offer service to a target of 2,000 customers and is investing FFr150m in the network¹⁵.

Cegetel are expected to build a local loop in Paris later in 1997, followed by the roll-out of networks in more than thirty towns in France. In the long term, the company is expected to invest over FFr3bn in local loop networks in the next seven years.

¹⁵ Public Networks Europe, May, 1997

Analogue

The conventional telecoms technology that is being replaced by digital alternatives in all parts of the network. The analogue signal consists of variations in the electrical signal transmitted down a wire or over a radio link, unlike digital signals which comprise a stream of binary digits (1 and 0). The main drawbacks of analogue technology are its vulnerability to distortions or electrical interference and its limitations in bandwidth.

Asynchronous Digital Subscriber Line (ADSL)

An international digital transmission technology standard which transmits broadcast quality video through a telephone line in a frequency range enabling phone calls to be made at the same time. Incoming bandwidth is large enough to allow the transmission of video; the return line is more limited.

Asynchronous Transfer Mode (ATM)

A technique for Packet transfer that is expected to be used on networks built with fibre optic cable. The units of data that travel through the switch fabric have a fixed length and are called cells. The process is sometimes called cell relay.

Bandwidth

The difference between the highest and lowest sinusoidal frequency signals that can be transmitted across a transmission line or through a network. It is measured in hertz (Hz) and also defines the maximum information-carrying capacity of the line or network.

Basic Service

A package of one or more channels offered on a broadband cable network for a monthly subscription paid directly to the cable operator.

Bit

A digit in binary notation, i.e. 0 or 1. It is the smallest units of computer data.

Broadband

A circuit that is capable of carrying high frequency signal, e.g. a radio frequency signal, is said to be of broad bandwidth. Very often a broadband channel is used to carry several narrow band channels at the same time by modulating the narrow band channels onto a high frequency carrier.

Cable Modem

High speed modem used to interface communication equipment such as cable phone, to a cable local loop.

Cable Telephony

If sufficient capacity exists on the return path to allow the cable subscriber to interact with the head-end equipment, it would be possible to implement a fully bi-directional channel able to carry voice telephony on a cable television network. This technology is known as cable phone.

Cable TV/CATV

Community Antenna Television Cable TV systems distribute television programming from a central reception centre or headend via a local network to a number of households/apartment blocks. Cable remains the primary means of distributing satellite television in Europe. Networks can vary in size between a few thousand households to many hundreds of thousands.

Circuit Switching

Circuit switching enables a user to communicate with any other user in real time. In the telephone system, a user is able to talk to another by dialling a connection to the local exchange, and then by transmission links (possibly including other exchanges) to the user required. Once a transmission channel is established between the two users, it remains available until the call is finished. This is an example of circuit switching.

Coaxial Cable

A cable consisting of a central conductor (copper or aluminium) surrounded by and insulated from another conductor. It is the standard cable used in present day cable systems. Signals are transmitted through at different frequencies, giving greater channel capacity than is possible with twisted pair cable, but less than allowed by optical fibre.

Conditional Access

A system whereby only viewers who have paid for the relevant programme or service are able to view it, by buying the means to unlock a scrambled signal. A subscriber management system is also essential to manage paying viewers.

Consumer Protection

Measures taken by the government and independent bodies to protect consumers against unscrupulous trade practices such as false descriptions for goods, incorrect weights and measures, misleading prices and defective goods.

Conveyance

The term refers to how the information (e.g. television programme) is delivered to the receiving equipment.

Copper Twisted Pair Overlay

A network infrastructure used by Cable TV companies in the U.K. to carry telephone services, in which separate telephone wires share the same duct as Cable TV coaxial cable.

Cross-subsidisation

The practice by firms of offering internal subsidies to certain products of departments within the firm financed from the profits generated by other products or departments. Cross-subsidisation is often used by diversified and vertically integrated firms as a means of financing new product development.

Decoder

A device that interprets information represented in a defined code and generates output into a form required for another processing operation. For example, a device that converts electrical signals received at a receiving station into the form required by the data link control in the receiving terminal.

DGIV

Directorate General for Competition (within the European Commission).

DGX

Directorate General for Audiovisual, Media, Information, Communications and Culture.

DGXIII

Directorate General for Telecommunications, Information Markets and Exploitation of Research.

DGXV

Directorate General for Internal Market and Financial Services.

Digital Satellite TV (DSTV)

A single satellite transponder can carry many television channels when their signals have been digitised and compressed. The exact number of services depends on the type of channels broadcast. Since video compression relies upon the degree of similarity between successive frames, fast moving sports channels require greater capacity than more static news or talk shows.

Digital Subscriber Line (DSL)

A method of transmitting broadband digital signals over standard twisted pair copper wire, using modems on each end.

Digital Television

Television which involves the transmission of digital signals for picture and sound.

Digital Terrestrial TV (DTT)

A form of broadcast in which television signals are compressed into a digital code and transmitted by terrestrial broadcasting. Because of compression, digital terrestrial television allows more channels to be transmitted within the same spectrum. Approximately four digital channels can be carried in the space normally occupied by one analogue channel. A decoding device or inset chip is necessary to retrieve the signal.

Direct Broadcasting by Satellite (DBS)

A system of TV distribution using high power satellite signals intended for direct reception by a dish receiver at a subscriber's home (see DTH above).

Direct to Home (DTH)

A form of direct broadcast by satellite (DBS) in which TV signals are transmitted by geostationary satellites and received directly by small satellite dishes mounted in the viewer's home.

Downstream

The transmission of signals from the headend towards the home.

Economies of Scale

The long run reduction in average (or unit) costs that occurs as the scale of the firm's output is increased (all factor inputs being variable). There are available in most industries "economies of scale", so that when producing a greater quantity of a product, average or unit costs are reduced.

Economies of Scope

The long run reduction in average (or unit) costs that occur as the scope of the firm's activities increases. A firm can achieve economies of scope by sharing common inputs over a range of its activities or by jointly promoting or distributing its products.

Extended Basic Service

A package of additional channels available to subscribers to the basic package for an extra monthly payment paid directly to the cable operator.

Externality

Factors that are not included in gross national product but which have an effect on human welfare.

Fibre Optic Cable

A type of transmission medium that is replacing coaxial cable in many regions, fibre optic cable is made of thin filaments of glass or plastic through which a light beam is transmitted. The use of multiple internal reflections helps extend the transmission distance.

Fibre to the Home

A network transmission infrastructure involving fibre optic cable entering a premises.

Final Drop

The cable connection from the street into the subscriber's home.

Free to Air Television

Television service which no subscription is required for receiving television programmes.

Headend

The point in a cable network where signals are multiplexed from various sources – Satellite links, PSTN, Internet gateway – and distributed to the cable TV network.

High Bit Rate Digital Subscriber Line (HDSL)

DSL technology offering 1.5 to 2 Mbps. Also see DSL.

Homes Connected/Subscribers

The homes which are connected to the network and receiving programming.

Homes in Area

The total number of homes within an operator's defined franchise/ licensed area – i.e. those to whom he is allowed to offer a cable TV service. This term does not apply in markets where operators are not licensed to operate in a specific area – often those markets in which the PTO has historically dominated the cable TV market.

Homes Passed

The homes within reach of those parts of the network which have already been constructed.

Hybrid Fibre Coax (HFC)

A network transmission infrastructure with the latter part of the network entering the home via coaxial cable, with fibre optic cable used elsewhere.

Independent Television Commission (ITC)

U.K. public body appointed by government to be responsible for licensing and regulating commercially funded television services in and from the U.K. These include Channel 3 (ITV) Channel 4, Channel 5, public teletext and a range of cable, local delivery and satellite services. Does not include BBC or S4C.

Integrated Services Digital Network (ISDN)

An ISDN is a network, in general evolving from a telephony integrated digital network that provides end-to-end digital connectivity to support a wide range of services, to which users have access by a limited set of standard multi-purpose user network interfaces.

Interactive Television

Television whereby a user is able to interact in a variety of ways with the televisual content.

Interactive Services

Technically, an interactive service relies on two-way capability in the network. In practice, however, the use of the term is not always clear cut.

Interconnection

Determines the way in which networks are connected to each other and the charges payable for accepting traffic from or delivering traffic to another. The need for interconnection stems from the fact that the operators of new networks invariably need to connect their customers with those on existing networks.

Internet

The abbreviated name given to a collection of interconnected networks. Also, the name of U.S. government funded internetwork based on the TCP/IP suite.

Currently, the most popular uses are electronic mail and file transfer; use of the Internet to retrieve information is expected to grow as technology allows more sophisticated audio and visual data to be down-loaded within a reasonable time.

Internet Access

Defined as having the ability to use Internet based services.

Internet Telephony

The provision of a simple voice telephony service using the Internet Protocol.

Intranet

An intranet refers to the use of Internet technology to create a information service for a closed group of users.

Joint Ownership

The ownership of both cable and public switched telephone networks by a dominant public telecoms operator.

Line of Sight Microwave Transmission

The main form of radio transmission in telecommunications and broadcasting networks as alternative to copper and fibre trunks. They are used to transmit signals along waveguides and for point-to-point directional radio links. The term microwave specifically refers to frequencies above 1 GHz.

Local Loop

The loop of copper twisted pair connecting a terminal to a local exchange and providing a transmission channel by which the terminal is able to connect with an exchange hierarchy forming an overall network.

Local Multichannel in the 20Ghz Range Systems

Use of microwave frequencies to link homes to headend for the distribution of broadband television and telephony services.

MATV – Master Antenna Television

Small wired systems, typically linking apartments within a housing block to relay off-air signals only. The block is served by one yagi-type master antenna with a mini-network connecting each household unit. By definition, these networks are small with low channel capacity. However, in some countries the distinction between MATV and CATV is made on the number of connections to a network. The MATV market is closely linked with the apartment construction industry, where wired TV is often offered as one of the buildings facilities.

MVDS/MMDS – Microwave Video Distribution System/Multipoint Microwave Distribution System

These two definitions refer to the same technology and are used interchangeably. Instead of a wired network being used to deliver broadcast signals, a microwave link, using either AM or FM frequencies, connects the headend with the subscriber's home. The subscriber has a microwave antenna installed on the roof of his house – this antenna must have line of sight with the antenna at the cable operator's headend.

Microwave Multipoint Distribution System (MMDS)

A TV distribution service using microwave transmissions. Also called MVDS (Microwave Video Distribution System).

Modem

Modems are devices used to interface communications equipment (e.g. terminals and nodes) to a transmission line.

MPEG2

Motion Picture Experts Group (MPEG) is a working committee formed by the International Standards Organisation which has agreed standards for digital compression and decompression of motion video and audio. MPEG2 yields improved broadcast quality and has been agreed upon as the standard for digital satellite television in Europe.

Multiplexor

A device that enables a number of message signals to share the same physical transmission channel by using the techniques of frequency division multiplexing (FDM) or time division multiplexing (TDM). Such devices are used to improve the utilisation of communication networks.

Multiple System operator (MSO)

An MSO is a company which operates networks in more than one area. Examples are TeleWest, Philips/UIH, and Deutsche Telekom. All of the major players in the market fit into this category – some, like TeleWest and Philips, have more widespread operations than others – for example, Deutsche Telekom's cable TV activities are confined to its domestic market.

Must Carry

The obligation on cable systems to carry certain channels, usually the broadcast services.

Narrowband

Relating to a channel that can carry signals of only low frequency (e.g. voice frequency signals).

Near Video on Demand (NVOD)

Transmission of a small number of programmes (typically feature films), transmitted at staggered start times on different channels. The viewer never has to wait more than 15 or 20 minutes for the start time of a programme. Delivery can be via cable or satellite and has become possible with the launch of digital satellites and broadband cable.

OFTEL

Office of Telecommunications. The U.K. licensing and monitoring body established under the Telecommunications Act 1984.

On Demand Services

A generic term for services which maybe requested at any time.

On-line Services

Refers to services such as America On-line, CompuServe and Prodigy that enables a user with a computer and a modem to access content and services over phone lines and increasingly over cable networks.

Open Network Provision (ONP)

Open Network Provision is the network provision conditions which concern the open and efficient access to public telecommunication services and, where applicable, public telecommunication services and the efficient use of those networks and services.

Operating System

A special program permanently resident in a computer or a communications controller to control the hardware and software resources and to supervise the running of other programs, including user applications.

Pay Per View (PPV)

Payment made for a specific programme as opposed to a subscription for a whole channel or group of channels.

Pay TV/premium service

A channel which can be purchased independently of other channels, or within a mini-pay package/bouquet, by subscribers to the basic package, for a monthly subscription. The subscription may be paid to the cable operator, or be collected directly by the channel itself, even though the service is relayed over the cable network (common in the cases of Canal Plus and Premiere). In either case, a high proportion of the revenues from these channels ends up in the hands of the channel provider. In those cases where the channel provider collects subscriptions directly, a proportion is paid to the cable operator.

Pay Television (Pay TV)

Television service for which a viewer needs to pay a subscription fee to receive television programmes.

Point to Multipoint

A single source of information or service delivered to many. Typically involved in broadcast television.

Point to Point

A connection between two users. Typically involved in a telephone connection.

Price Differentiation

Charging a price for a service which more closely reflects the value of the service to the consumers that are buying it.

Price Discrimination

The ability of a supplier to sell the same product in a number of separate markets at different prices.

Public Switched Telephone Network (PSTN)

The traditional copper access network using twisted-pair copper wires in a switched-star configuration.

Public Telephone Operator (PTO)

Any organisation that has a licence to provide telecommunications services to the public.

Return Path

A channel used to convey information back to a transmitting terminal to provide control information about a call in progress.

Server

A computer program and/or processor that provides a service to users on a local area network, for example, accessing a file or controlling a printer. Servers vary according to whether the nodes and network are of a like architecture or different architectures.

Set Top Box (STB)

A device which connects to a standard television and contains electronics for receiving new digital services.

SMATV – Satellite Master Antenna Television

SMATV systems often begin life as MATV systems (Master Antenna Television). MATV systems are typically used to deliver terrestrially transmitted programming to a number of households in an apartment block. One terrestrial antenna serves all apartments in the block. SMATV is a natural extension of this system – a satellite antenna is added to the existing installation. A single satellite antenna can then serve all apartments in the block subscribing to the system.

Subsidiarity

Subsidiarity is defined in Article 3B of the Treaty of Maastricht as follows: “The Community shall act within the limits of the powers conferred upon it by this Treaty and of the objectives assigned to it therein. In areas which do not fall within its exclusive competence, the Community shall take action, in accordance with the principle of subsidiarity, only if and in so far as the objectives of the proposed action can not be sufficiently achieved by the Member States and can therefore, by reasons of the scale or effects of the proposed action, be better achieved by the Community. Any action by the Community shall not go beyond that which is necessary to achieve the objective of this Treaty”.

Terrestrial TV

Television broadcasting system which radiates television signals using ground based transmitting stations.

Transponder

Usually part of a communications satellite, a transponder receives a signal and retransmits it after amplifying it. The retransmission occurs on a different frequency than the original transmission.

Tree and Branch

Topology of one type of cable system, of traditional design. It comprises a trunk cable from which each subscriber link is tapped off. Because all parts of the system carry the totality of the service provided, it is difficult to build much interactive capability into such systems.

Universal Service

The provision of access to all potential consumers on similar terms. The achievement of universal service usually implies the subsidisation of consumers in locations that are more costly to serve.

Upstream

The transmission of signals from the home towards the headend.

Vertical Integration

The situation where the activities of a company extend over more than one successive stage in the production process or value chain.

Very High on Bit Rate Digital Subscriber Line (VDSL)

A DSL technology giving a bandwidth of 13 to 52 Mbps over copper twisted pair wires.

Video on Demand (VOD)

Consumers call-up programming from an on-line library and have access to interactive services such as banking, shopping, education, information and advertising.

Voice Telephony

A telephone service.

Wireless Local Loop (WLL)

The generic term for an access system that uses a wireless link to connect subscribers to their local exchange in place of conventional copper cable.

Source: "Public Policy Issues Arising from Telecommunications and Audiovisual Convergence", KPMG.

"Liberalising Telecoms in Western Europe", FT Media.

"European Cable Report, 1997" CIT Research

Telecommunications Terms

ACTS	Advanced communications technologies and services
ADC	Access deficit charge
ADSL	Asymmetric digital subscriber line
ALTC	Association of Local Telephone Companies
ATM	Asynchronous transfer mode
bps	bit per second
CAGR	Compound Annual Growth Rate
CDMA	Code division multiple access
CEPT	Conference Européenne des postes et des télécommunications
CPE	Customer premises equipment
DAB	Digital Audio Broadcasting
DCS-1800	Digital communications service (at 1800Mhz)
DCTV	Digital Cable TV
DECT	Digital European cordless telephony
DSL	Digital Subscriber Line
DSTV	Digital Satellite TV
DTH	Direct to Home
DVB	Digital Video Broadcasting
ENO	European Numbering Office
EPG	Electronic Programme Guide
ERMES	European radio messaging standard
ERC	European Radiocommunications Committee
ERO	European Radiocommunications Office
ETNO	European Telecommunications Network Operators
ETO	European Telecommunications Office
ETSI	European Telecommunications Standards Institute
FDMA	Frequency division multiple access
Ghz	Gigahertz
GSM	Global system for mobile communications
HI	Horizontal Integration
HFC	Hybrid Fibre Coax
HDSL	high bit rate Digital Subscriber Line
ICE	Information, Communication and Entertainment

IPR	Intellectual Property Right
ISDN	Integrated services digital network
ISPO	Information Society Project Office
ITC	Independent Television Commission (in the U.K.)
ITU	International Telecommunications Union
LAN	Local Area Network
LDO	Local delivery operator
LEO	Low earth orbiting [satellites]
Mbit/s	Megabits per second
Mhz	Megahertz
MECU	Million ECU
MMDS	Multipoint microwave distribution system
MPEG2	Motion Picture Expert Group Standard 2
NICs	Newly Industrialised Countries
NCA	National competition authority
NRA	National regulatory authority
NVOD	Near Video on Demand
OFTEL	Office of Telecommunications (in the U.K.)
ONP	Open network provision
PC	Personal Computer
PBX	Private branch exchange
PCN	Personal communications network
PICS	Platform For Internet Content Selection
POTS	Plain Old Telephony Services
PPV	Pay Per View
PSB	Public Service Broadcasting
PSO	Public Service Obligation
PSTN	Public switched telephone network
PTO	Public Telephone Operator
PTT	Post, Telegraph and Telephone Agency
R&D	Research and development
RACE	Research into advanced communications equipment
RPI	Retail price index
ROCE	Return on Capital Employed

SDH	Synchronous digital hierarchy
STB	Set Top Box
TO	Telecommunications Operator
TDMA	Time division multiple access
UMTS	Universal mobile telephone service
VBI	Vertical Blanking Interval
VANS	Value-added network services
VCHIP	Violence-chip
VCR	Video Cassette Recorder
VDSL	Very high bit rate Digital Subscriber Line
VI	Vertical Integration
VOD	Video-on-demand
VPN	Virtual private network
VR	Virtual Reality
VSAT	Very small aperture terminal
WAN	Wide area network

Companies, Government Departments and Regulators

ANGA	Arbeitsgemeinschaft für Antennen und Kommunikationstechnik [Germany]
ART	l'Authorité de Regulation des Télécommunications {France]
BAPT	Bundesamt für Post und Telekommunikation [Germany]
BMPT	Bundesministerium für Post und Telekommunikation [Germany]
BRT	British Rail Telecommunications (subsidiary of Racal Network Services
CGE	Compagnie Générale des Eaux [France]
CGV	Compagnie Générale des Videocommunications [France]
CNI	Communication Network International [Germany]
CPRM	Companhia Portuguesa Radio Marconi (now Portugal Telecom International)
DBKom	Deutsche Bahn Kommunikatons [Germany]
DGPT	Direction Générale de Postes et Télécommunications [France]
DTI	Department of Trade and Industry [UK]
GPT	GEC-Plessey Telecommunications [UK]
IRI	Istituto per la Ricostruzione Industriale [Italy]
KPN	Koninklijke PTT Nederland
MMC	Monopolies and Mergers Commission [UK]
NTL	National Transcommunications Limited (subsidiary of Cabletel) [UK]
Oftel	Office of Telecommunications [UK]
OTE	Hellenic Telecommunications Organisation [Greece]
PTA	Post und Telekom Austria
SFR	Société Française du Radiotéléphone [France]
SIP	Società Italiana per l'Esercizio delle Telecomunicazioni (now Telecom Italia)
SNCF	Société Nationale des Chemins-de-Fer [France]
Stet	Società Finanziaria Telefonica [Italy]