COMMISSION OF THE EUROPEAN COMMUNITIES

COM(86) 1 final

Brussels, 22 January 1986

Proposal for a

COUNCIL DIRECTIVE

on the adoption of common technical specifications of the MAC/packet family of standards for direct satellite television broadcasting

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(submitted to the Council by the Commission)

CONTENTS

A. SUMMARY

Direct broadcasting from satellites to individual homes is becoming a reality within the Community, with three new transmission systems intended to commence service within the next two years. Use of the existing standards for conventional television broadcast within the Communitiy - PAL and SECAM - is not suitable, since they are wasteful of the power available in the satellite.

Therefore, the European Broadcasting Union (EBU) and the European Consumer electronics manufacturing industry have developed a family of transmission systems which include not only systems for direct satellite broadcasting, but also retransmission into existing cable networks; there is thus a family of "MAC-packet" (MAC - multiplexed analogue components) transmission systems which vary according to the respective signal processing for picture and sound/data transmission.

Technical specifications have been identified for two specific applications of the systems, namely:

- for direct satellite television broadcasting the C-MAC/packet system and the D2-MAC/packet system with frequency modulation

- for cable distribution the D-MAC/packet system and the D2-MAC/packet system with vestigial-sideband amplitude modulation.

The three systems C-MAC, D-MAC and D2-MAC are compatible and would meet the varying service reqirements amongst the Member States.
In accord with recent Resolutions of the European Parliament, and following the favourable reception by the Council of a communication from the Commission to the Council (1) on the subject of the adoption

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(1) doc. COM(85)264 final of 31st May 1985

of common standards for direct TV transmission via satellites, the Commission proposes a Directive on the adoption of the technical specifications of the family of MAC/Packet systems as unique standards in the Community for direct satellite television broadcasting.

The purpose of the Directive is to:

- direct the outstanding decisions of the Member States towards the exclusive adoption of a system of the MAC/packet family

- exclude - even during a transition period - the adoption of any amended version of existing television broadcasting systems (such as PAL or SECAM) and to avoid that different incompatible systems exist within the Community for direct satellite TV broadcasting

- establish for the relevant Community manufacturing industry a clear framework for its decisions on the equipment for direct reception of European-wide TV broadcasting programmes

- pave the way for the creation of a large open European market for direct satellite TV broadcasting equipment for the benefit of the consumers, the operators and the manufacturing industry in the Community.

- make the broadcasting of multilingual television programmes possible.

The adoption of the MAC/packet systems as a common standard in the Community is not an intermediate transitional solution. The technical concept of MAC/packet systems allows for long term evolution towards High Definiton Television systems, thus responding to the requirements of operators and consumers during the coming decades.

The Directive lays down a procedure for adaptation to the technical progress, in particular to the further development of the technical specifications of the MAC/packet family.

B. EXPLANATORY MEMORANDUM

I. INTRODUCTION

1. Direct transmission of television programmes via satellites represents a significant technological step forward in TV broadcasting. It opens the way to true Pan-European television, with geographical coverage of areas larger than the territories of the individual national States in Europe. However, in order to ensure that consumers industries and broadcasters throughout the Community can fully benefit from this technical progress, it will be necessary to implement common technical solutions, and to agree on common standards.

2. The Commission has already expressend its concern on the establisment of common standards in the field of telecommunications in previous communications to the Council, for instance for the new integrated services digital networks (ISDN), videotex services and mobile cellular radio communications.

   Direct satellite TV broadcasting is another area where the adoption by the Member States of common standards appears imperative.

3. The European Broadcasting Union (EUB) and the European manufacturing industry have recently developed a new transmission system together with a set of three technical standards, varying according to the different application purposes. This set of standards is called the family of MAC/Packet standards.

   The EBU and manufacturing industry have firmly expressed the view, that this family of MAC/packet systems should serve as

the technical framework for the development of direct satellite television broadcasting services in Europe.

4. In proposing a directive on the family of MAC/packet systems, the Commission seeks to unify the potential market for the necessary home receivers for direct broadcast satellite systems. Current estimates for the size of this market foresee a total of approximately 10 million home receiver equipments, which implies a market value over the next 10-15 years of some 10 milliard ECU. At the same time, and in addition to equipment manufacturing industry the basic framework for planning decisions will be established for broadcasters, cable network operators and end-users.

II. THE AIM OF THE PROPOSED DIRECTIVE

1. In its communication to the Council of 31st May 1985 (doc. COM(85)264 final) the Commission expressed the view that the transmission systems of the MAC/packet family are particularly suitable under the conditions prevailing in Europe, and that decisions on its adoption should now be taken without delay, considering that the launch of the first European direct broadcasting satellites will take place in 1986.

Some Member States have meanwhile taken the decision to adopt one or the other system of the MAC/packet family and other Member States are likely to follow suit.

In conformity with the views expressed by the European Parliament and considering the position of the European manufacturing industry, the Commission feels the need to submit to the Council a proposal for a Directive with the following objectives:

- directing the outstanding decisions of other Member States towards the exclusive adoption of a system of the MAC/packet family

- excluding - even during a transition period - the adoption of any amended version of existing television broadcasting systems (such as PAL and SECAM) and to avoid that incompatible systems continue to exist within the Community for the purpose of direct satellite TV broadcasting

- establishing for the manufacturing industry in the Community a definite framework for decisions concerning the development of technologies and manufacturing of equipment allowing the direct reception of all European TV broadcasting programms.

- paving the way for the creation of a large open European market for direct satellite TV broadcasting equipment for the benefit of the consumers, the operators and the manufacturing industry in the Community.

- making it possible for European broadcasters to envisage the production and broadcasting of multilingual television programmes.

III. THE FAMILY OF MAC/PACKETS STANDARDS

1. The present progress of microelectronic technology has made it possible to develop new television transmission systems with considerably improved quality of picture and sound transmission and reception, adequate for direct satellite broadcasting.

A set of new TV systems called the MAC/packet family has been developed and proposed by the EBU and the European equipment manufacturers. Originally, a transmission system only for direct satellite broadcasting on the up- and downward path was conceived, but other additional requirements were soon taken into consideration, in particular the applicability to terrestrial broadcasting and distribution networks for cable TV.

2. The essential advantage of the MAC technical procedure is the provision of a significantly enhanced quality of the transmission and reproduction of pictures and sound through a special processing of picture and sound information, making use of technological advances in microprocessors and memories designed for new signal processing techniques.

   The same degree of quality cannot be reached in satellite transmission systems using the existing procedures (PAL, SECA,, NTSC), which are not well suited for direct satellite transmission.

3. The digital sound signals or data can be modulated and encoded in different ways corresponding to the respective transmission media to be used (satellite path or cable). The European MAC proposal provides at present for three sound/data transmission systems forming a coherent family of three compatible systems:

   - C-MAC/packet
   - D-MAC/packet
   - D2-MAC/packet

   it should be noted that the MAC part for picture transmission is identical in all of the three systems.

The C-MAC/packet system was the first of the three systems and was developed in EBU. It is conceived and optimized for use in direct satellite television broadcasting in the 12 GHz band with a satellite channel bandwidth of 27 MHz.

The system offers transmission of high-quality pictures together with up to eight high-fidelity sound channels.

This characteristic of the C-MAC/packet system is of particular interest in the European context, since the same TV programme can be transmitted simultaneously throughout Europe in different languages.

However, due to the large bandwidth required by the C-MAC system, the satellite programmes cannot be retransmitted in existing cable networks.

Such re-transmission has been made possible with the D-MAC/packet system, a modification of the C-MAC system, which can be used on cable networks with a minimum channel spacing of 10,5 MHz.

However, in most of the present cable distribution networks the channel spacing is still lower, about 7 or 8 MHz. In this case another sound/data multiplexing and encoding procedure is used, which is referred to as the D2-MAC/packet system, developed by the manufacturing industry. It is compatible with C-MAC/packet and suitable for lower bandwidth cable distribution systems with a minimum channel spacing of 7 MHz. The adaptation to the bandwidth of cable transmission implies a reduction of the transmission capacity to 4 sound/data channels whilst the same high picture quality of C-MAC is retained. Transition from C-MAC satellite transmission to D2-MAC cable distribution transmission is feasible.

4. At a joint conference of EBU with technical experts of the European Association of Consumer Electronics Manufacturers (EACEM) earlier this year, agreement was reached that the family of compatible MAC/packet standards achieve the service requirements of both the direct satellite broadcasting and the cable TV distribution in the different national contexts as well as the economic demands of the markets. Moreover the MAC/packet systems family is characterized by a great flexibility as regards telematic applications.

   The three systems would be used according to their specific technical characteristics:

   - for direct satellite broadcasting the C-MAC/packet system recommended by EBU and the D2-MAC/packet system with frequency modulation recommended by the manufacturers.

   - for cable distribution the D-MAC/packet system and the D2-MAC/packet system with vestigial-sideband amplitude modulation.

5. The EBU and the manufacturers, firmly propose that the C-D-D2-MAC/packet systems should serve as the unique technical framework for the development of direct satellite television broadcasting services in Europe.

   Moreover, it is at present the only available set of standards in Europe which could now commonly be adopted throughout the Community as the European solution.

IV. CONSIDERATIONS CONCERNING THE ADOPTION AND INTRODUCTION OF THE MAC/PACKET SYSTEMS

1. The introduction of the proposed family of MAC/packet systems will have to respond to a number of requirements:

- opening up of the new C- or D2-MAC/system to those users wanting immediate acces to direct satellite TV broadcasting

- progressive transition from the present TV systems existing in the Member States for terrestrial broadcasting and cable distribution towards the family of MAC/packet systems

- rapid development by manufacturing industry of universal bi- or multi-standard C-D-D2-MAC microelectronic circuits and TV receivers, which could be manufactured for a large Community market

- possibility for consumers to continue to use during an adequate transition period existing TV equipment for receiving the present PAL or SECAM broadcasting as well as direct satellite broacasting

- possibility to continue to use during an adequate transition period existing video-recording apparatus

- possibility for future technical enhancement of the new system.

These objectives can for the time being only be reached by the proposed family of MAC/packets systems.

2. Following the introduction of the MAC/packet system, the users in these countries will have different options:

- TV spectators wanting to make direct full use of all advantages of the MAC system will have to acquire a multi-standard TV-set of the new generation designed for the C- and D2-MAC systems. It will allow them to receive TV programmes directly from the satellite via their own antenna or through a cable distribution system which will transmit MAC signals and in particular D2-MAC signals in the cable networks which will support the system;

- customers wanting to continue to use further their existing TV set will have the possibility to receive MAC signals by means of a decoder to be connected to their TV set or following transposition of MAC signals into PAL or SECAM standards by the cable network operators and retransmission over their network. In the latter case, however, the customer will not obtain the MAC quality, but he will be able to receive with his existing TV set one or more satellite TV programmes in addition to the conventional terrestrial PAL or SECAM transmissions.

This introduction strategy will allow for the customers a smooth transition from the present terrestrial PAL or SECAM emissions to the future satellite TV broadcasting whilst leaving to them the choice to acquire TV sets of the new generation when these TV sets will be available on the market at a reasonable price.

3. The introduction of the family of MAC/packet standards must not be considered as an intermediate transitional solution. The technical concept of these systems is such that it allows for a long term evolution and thus to respond to the requirement of the TV operators and the demands of the consumers during the coming decades.

4. A rapid decision by the Community Member States to adopt the MAC/packet family together with a flexible introduction strategy will establish for the manufacturing industry of TV equipment and components, as well as for the broadcasters, the cable network operators and the customers, the basic framework for their own planning decisions.

Considering the relatively short time span until the launch in 1986 of initial direct broadcasting satellites systems with regular satellite operation in 1987, it is in particular industry which needs clear policy decisions for planning the development and manufacturing of the micro-chips for TV sets working to the new MAC/packet standards.

5. An inherent characteristic of the family of MAC/packet systems is its evolutionary capabilities which allow further technical developments on the basis of the present concept, above all towards High Definition television systems.

However, technical progress achieved through further development work carried out in this area in the various Member States or elsewhere, should not lead again to divergent and possibly incompatible technical solutions.

Measures must therefore be taken so that adaptation of the technical specifications of the MAC/packet systems family to technical progress or the introduction of new technical solutions will be implemented according to procedures which allow common technical specifications to be retained and incompatible solutions avoided.

V. FUTURE DEVELOPMENTS

1. With respect to the existing PAL and SECAM TV transmission technique, the three MAC/packet systems represent a considerable step towards improvement in the quality of colour television broadcasting. Although maintaining the conventional number of 625 lines per picture, the advanced MAC/packet technique results in a clearly enhanced picture quality, together with a higher sound transmission quality and facilities for data transmission.

   Further technical development of the presently proposed family of MAC/packet systems is feasible and under way. The flexibility of the multiplexing technique of MAC/packet provides possibilities for further extended characteristics, in particular concerning the picture transmission. Reduction of sound/data transmission capacity in an enhanced C-MAC or D2-MAC system allows a special additional picture signal treatment, which results in pictures with a wider aspect ratio of about 5:3 and improved definition.

   The picture quality of this enhanced C-MAC, which is compatible with the original C-MAC and its conventional 4:3 aspect ratio as broadcast over DBS transmission channels, approaches that of High Definiton television systems to a degree which is adequate for all practical screen sizes and viewing distances under the usual domestic conditions.

   In addition, the flexibility built in the MAC-packet format should allow for adaptations, which could lead to more advanced High Definition TV systems than the presently contemplated MAC/packets enhancement or systems with 1125 lines and 60 Hz frame frequency.

VI. CONCLUSIONS

The foregoing considerations explain the context and the reasons which advocate in favour of the adoption of the family of MAC/packet systems as unique common standards for direct satellite television broadcasting in Europe.

The current MAC/packet technical specifications, as developed and proposed by the European Broadcasting Union and the European manufacturing industry are particularly suitable in the European framework and directly applicable for satellite TV broadcasting as well as for retransmission of satellite programmes in cable distribution networks.

The capability of simultaneous transmission of several sound channels per each high quality video channel opens up new possibilities for truly pan-European, multilingual television programmes.

Their adoption as common standard will create the true European dimension for the future satellite TV broadcasting and for the market of the European manufacturing industry in this area.

The attached proposal for a Directive concerning the adoption of common technical specifications relevant to the family of MAC/packet systems for direct satellite television broadcasting is thus in agreement with the measures proposed by the European Parliament in its Resolutions of 12 March 1982 and 28 October 1983 and by the Commission in its communication to the Council of 14 June 1984 on "Television without Frontieres".

Considering the favourable reception which the Council of Ministers of Industry and Telecommunications on 3 June 1985 in Luxembourg has given to the communication from the Commission on the subject of

common adoption of the MAC/packet specifications in the Community, the Commission proposes to the Council to adopt the attached proposal for a Directive.

Brussels, 4.12.1985

PROPOSAL FOR A

COUNCIL DIRECTIVE

ON THE ADOPTION OF COMMON TECHNICAL SPECIFICATIONS OF THE MAC/PACKET FAMILY OF STANDARDS FOR DIRECT SATELLITE TELEVISION BROADCASTING

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 100 thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Parliament (1),

Having regard to the opinion of the Economic and Social Committee (2),

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(1)

(2)

Whereas for the purposes of this Directive direct broadcasting by satellite means a broadcasting satellite service as defined in the Radio Regulations of the International Telecommunications Union using channels assigned to Member States in the 11.7 to 12.5 GHz band at the World Broadcasting Satellite Administrative Radio Conference (Geneva 1977) and intended for display on 625 lines domestic TV receivers;

Whereas, in the near future, satellites for direct television broadcasting will be placed in orbit by several European countries and subsequently new television sets corresponding to public needs will be introduced by the manufacturers,

Whereas the use of common technical specifications for direct satellite broadcasting of television programmes and possibly for their redistribution by cable becomes a pressing need in order to attain the objectives set out hereafter;

Whereas the implementation of common technical specifications simplifies the broadcasting of television programmes in all countries of the Community and makes a significant contribution to European unification and to the development of a true European identity;

Whereas the technical capability to transmit simultaneously on several sound channels opens the way to truly pan-European multilingual television programmes;

Whereas the implementation of common technical specifications leads to the creation of a large unified market, on which products will be freely exchanged without any technical barriers, which will be of great economic benefit for the European consumer electronics industry as regards its competitiveness;

Whereas it is indispensable that a guarantee be given to manufacturers and broadcasters in respect of their investments and supplies, by the application of such common technical standards at Community level;

Whereas the European Broadcasting Union (EBU) and the European manufacturers of the relevant branch represented by their associations have perfected and published technical specifications forming part of the MAC/packet family for the direct television broadcasting and the redistribution of programmes by cable;

Whereas the MAC/packet family includes:

- for direct satellite broadcasting: the system C-MAC/-packet and the system D2-MAC/packet with frequency modulation

- for cable distribution: the system D-MAC/packet and the system D2-MAC/packet with vestigial-sideband amplitude modulation;

Whereas it has been recognized by the European Broadcasting Union (EBU) and the European manufacturers of the relevant branch represented by their associations that the technical specifications forming part of the MAC/packet family and especially the versions C-MAC, D-MAC and D2-MAC are compatible;

Whereas these specifications would make it possible to meet the service requirements in the different national contexts and the economic demands of the market;

Whereas technical progress is liable to require adaptation of the technical specifications defined in the framework of this Directive and of those which will be defined subsequently in the field of direct television broadcasting by satellite;

Whereas it is advisable, in order to facilitate the implementation of the measures necessary for this purpose, to provide for a procedure for adaptation to technical progress by means of close cooperation between the Member States and the Commission within the framework of a committee;

Whereas the adoption at Community level of common technical specifications for direct satellite broadcasting of television programmes and their redistribution by cable corresponds to the measures recommended by the European Parliament in its Resolution of 12 March 1982, and by the Commission in its Communication to the Council of 14 June 1984, referred to as the "Green paper", concerning television without frontiers;

Whereas the Industry-Telecommunications Council meeting in Luxembourg on 3 June 1985 took a favourable view of the Communication of the Commission to the Council recommending the implementation of common technical specifications of the MAC/packet family,

HAS ADOPTED THIS DIRECTIVE:

Article 1

1. Member States shall use the systems forming part of the MAC/packet family; the list of the respective technical specifications established by the European Broadcasting Union (EBU) and the European manufacturers of the relevant branch represented by their associations is shown in the Annex, with an indication of the reference numbers and the dates of publication.

2. For the direct broadcasting by satellite of television programmes Member States shall exclusively use the C-MAC/packet system or the D2-MAC/packet system with frequency modulation.

3. For possible redistribution by cable of these programmes Member States shall use the D-MAC/packet system or the D2-MAC/-packet system with vertigial-sideband amplitude modulation or, failing that, the systems already in use at the date on which this Directive is implemented, as mentioned in Article 5.

4. Member States shall select the system or systems of the MAC/packet family which is or are more appropriate to the present or future structure of their broadcasting or cable distribution networks and shall inform the Commission of their option.

Article 2

The amendments necessary to adapt Annex I in line with technical progress, drawn up by competent international organizations, shall be made in accordance with the procedure laid down in article 4.

Article 3

1. A committee on the adaptation to technical progress of the technical specifications related to the direct television broadcasting by satellite and the redistribution of programmes by cable (hereinafter called "the Committee") is hereby set up. It shall consist of representatives of the Member States with a representative of the Commission as chairman.

2. The Committee shall adopt its own rules of procedure.

Article 4

1. Where the procedure laid down in this Article is to be followed, matters shall be referred to the Committee by its chairman, either on his own initiative or at the request of the representative of a Member State.

2. The representative of the Commission shall submit to the Committee a draft of the measures to be adopted. The Committee shall deliver its opinion on the draft within a period which shall not exceed two months. Opinions shall be

adopted by a majority of 54 votes, the votes of Member States being weighted as provided in Article 148 (2) of the Treaty.

The chairman shall not vote.

3. (a) The Commission shall adopt the measures envisaged where they are in accordance with the opinion of the Committee.

(b) Where the measures envisaged are not in accordance with the opinion of the Committee, or if no opinion is adopted, the Commission shall without delay propose to the Council the measures to be adopted. The Council shall act by a qualified majority.

(c) If, within three months of the proposal being submitted to it, the Council has not acted, the proposed measures shall be adopted by the Commission.

Article 5

1. Member States shall bring into force the provisions necessary to comply with this Directive at the latest on 1 January 1987 and shall forthwith inform the Commission thereof.

2. Member States shall communicate to the Commission the text of the provisions of national law which they adopt in the field governed by this Directive.

Article 6

This Directive is adressed to the Member States.

ANNEX

List of technical specifications relevant to the MAC/packet family of systems

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1) Television standards for the broadcasting satellite service - Specification of the C-MAC/packet system
EBU Doc: SPB 284 (4th revised version) February 1985

2) Method of conveying C-MAC/packet signals in small and large collective antenna and cable network installations.

Chapter A: Specification of the D-MAC/packet system
Chapter B: Specification of the D2-MAC/packet system
Chapter C: Specification of the D2-MAC/packet system with frequency modulation for DBS
EBU Doc. SPB 352 (revised version), February 1985

3) Frequency modulation parameters of the D2-MAC/packet system for DBS
EBU Doc. SPB 368, April 1985