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**COMMUNICATION FROM THE COMMISSION
CONCERNING
THE IMPLEMENTATION OF COUNCIL RECOMMENDATION
86/659/EEC
ON THE
COORDINATED INTRODUCTION OF THE
INTEGRATED SERVICES DIGITAL NETWORK (ISDN)
IN THE EUROPEAN COMMUNITY**

**FIRST ANNUAL PROGRESS REPORT
FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT**

CONTENTS

CONTENTS

PREFACE 3

SUMMARY 5

1. INTRODUCTION 7

2. MAJOR OBJECTIVES OF RECOMMENDATION 86/659/EEC 8

3. ACHIEVEMENTS TO DATE - PROBLEMS ENCOUNTERED 11

4. OBSERVATIONS AND PROPOSED SOLUTIONS 25

ANNEXES

- A Full text of Council Recommendation 86/659/EEC on the co-ordinated introduction of the Integrated Services Digital Network (ISDN) in the European Community
- B National reports based on information provided by the Member States (SOGT)
- C Glossary of Technical Terms

PREFACE

The purpose of this Report is to give an account of progress on the implementation of Council Recommendation 86/659/EEC of 22 December 1986 concerning the coordinated introduction of the Integrated Services Digital Network (ISDN)* in the European Community. The following general remarks were thought necessary to put the Report in its proper context.

An appreciation of the situation up to the end of 1987 must take into account a number of factors

- delays in the world-wide definition of complete and stable ISDN standards, giving rise to a dangerous situation in Europe, where decisions have already had to be taken at national level,
- the lead-time needed for translating the available standards into industrial products and for the adjustment of existing equipment,
- problems in matching industrial plans with the strategic objectives of the Recommendation,
- the still limited consciousness on the part of users of the opportunities opened up for them by the availability of ISDN services

Despite these factors and notwithstanding the problems described in this Report it is important to emphasize the positive aspects and the considerable efforts of Member States at national and international level concerning the implementation of the Council Recommendation.

* The ISDN can be considered as a natural evolution of the telephone network. It should allow, via a single access, using the existing subscriber line, the transmission of voice (telephony), text, data and images in the form of a multitude of more efficient or new services (see COM(86) 205). ISDN will greatly facilitate the introduction of Integration Broadband Communications (IBC), the objective of the RACE programme.

- the considerable efforts, in particular through the quadripartite collaboration between British Telecom, Deutsche Bundespost, France Télécom and Società Italiana per la Telecomunicazioni, that have contributed to the definition of services and to the standardisation and interconnectivity of networks in Europe,
- the measures taken by various Telecommunications Administrations to achieve the objectives of the Recommendation on the national level, on the basis of still incomplete international standards, and their commitment to migrate towards commonly agreed standards as soon as they become available,
- the activities of various Member States to accelerate Europe-wide availability of ISDN by bi-lateral and multi-lateral agreements on the provision of international ISDN services

Through these efforts, Europe has succeeded, despite the general difficulties that have been encountered, in maintaining

- the conceptual lead of the Community in comparison with the United States and Japan concerning the commercial offering of ISDN services and the related opportunity for industry and users to prepare themselves for the future implementation and use of advanced ISDN services,
- the opportunity for European industry to take the lead in a very advanced technological domain, with regard to definition of standards as well as provision of equipment and components

SUMMARY

This Report has been prepared for submission to the European Parliament in accordance with Article 7 of the Council Recommendation on the co-ordinated introduction of the Integrated Services Digital Network (ISDN) in the European Community (86/659/EEC)

1988 is a crucial year, which will see implementation of commercial operation of ISDN or at least a pilot phase in the majority of Member States The Integrated Services Digital Network has gained substantial credibility in the Community with users, industry and Telecommunications Administrations. It is beginning to fulfill its promise of developing into a new base for the Community's telematics market of the early nineties

However, substantial problems remain and must be resolved The time schedule for the Community-wide availability of harmonised and compatible ISDN services has slipped significantly National specifications or specific options of the international standards are in use The interconnection of national ISDNs in the Community is still in its preparatory phase

In order to remedy current deficiencies a number of immediate measures will be necessary

- acceleration of the establishment of common specifications for equipment and interfaces at the European level, by concentrating available resources within the framework of the European standardisation system and, in particular, of the European Telecommunications Standards Institute (ETSI), recently set up in line with the Green Paper's suggestion
- establishment of a "Memorandum of Understanding" between the Telecommunications Administrations on the provision of at least a minimum set of common ISDN services and features, and on the introduction of a common signalling system This agreement should take account of Community competition rules and of the objective of the creation of an open Community-wide market for telecommunications services for all market participants, particularly for value-added services Information on agreements envisaged should be communicated to the Commission before their conclusion

Such a Memorandum of Understanding should be open to all interested Administrations to join. The "Memorandum of Understanding" on the coordinated introduction of pan-European mobile communications, reached by the Telecommunications Administrations in 1987, could serve as an example.

- seeking a commitment from manufacturers to contribute, within the framework of existing European standardisation and as rapidly as possible, to the development of common specifications for terminals and PABXS. These specifications should make it possible to guarantee end-to-end communications. The Commission will promote initiatives to this purpose.

- Rapid working out of a Proposal for a Council Directive on Open Network Provision (ONP), as foreseen in the Council Resolution of 30 June 1988, covering ISDN, and including in particular Europe-wide definition of a minimum set of common user/network interfaces. This proposal should take into account the requirements for the coordinated introduction of ISDN as they are set out in this Report.

- Further discussion on the European level regarding user privacy protection requirements in the context of features of new services, in accordance with the Resolution of the European Parliament of 12 December 1986 on the ISDN Recommendation.

1. INTRODUCTION

The promotion of ISDN in the Community is part of the first action line in the Community's Action Programme in the field of Telecommunications approved by Council on 17 December 1984

COORDINATION REGARDING FUTURE DEVELOPMENT OF TELECOMMUNICATIONS NETWORKS AND SERVICES IN THE COMMUNITY AND COMMON INFRASTRUCTURE PROJECTS

The importance of ISDN is recalled in the text of the Recommendation

" the technical resources afforded by the Integrated Services Digital Network (ISDN) make it possible to provide a range of harmonized and compatible services for all Community users and to create new means of communication using sound, the written word and images,"

"a coordinated policy for the introduction of the ISDN will make possible the establishment of a European market in telephone and data-processing terminals capable of creating, by virtue of its size, the indispensable development conditions which will enable the European telecommunications industries to maintain and increase their share of world markets,"

The factual basis for this Report has been obtained from information provided in the course of 1987 by the Member States through SOGT in accordance with article 7 of the Council Recommendation, and from information gathered by the Commission in accordance with the monitoring task assigned to the Commission and SOGT in the Recommendation

Changes since 1987 reported to the Commission by August 1988 have been incorporated

2. MAJOR OBJECTIVES OF RECOMMENDATION 86/659/EEC

The strengthening of European telecommunications has become one of the major conditions for promoting a harmonious development of economic activities and a competitive market throughout the Community and for achieving the completion of the Community-wide market for goods and services by 1992

In view of this situation the Council approved in the conclusions of its meeting on 17 December 1984 the main objectives of a Community telecommunications policy aiming at

- promoting the creation of an advanced European telecommunications infrastructure,
- contributing to the creation of a Community-wide market for services and equipment,
- contributing to the competitiveness of European industry and service providers

Since 1984 the Community has made substantial progress in this field [see COM(88) 240 for details on progress to date] In this context the Council adopted on 22 December 1986 the "Recommendation on the coordinated introduction of the Integrated Services Digital Network (ISDN) in the European Community" (86/659/EEC)

All Member States are in agreement that in the years to come ISDN will play the central role in the evolution of the telecommunications network Based on the ongoing digitisation of the telephone network it offers the possibility of extending digital services using current technology through the existing telecommunications infrastructure, including the less favoured regions of the Community, and it represents a major step towards the future Integrated Broadband Communications (IBC)

The Recommendation reflects the recognition that only with the coordinated introduction of ISDN, across Europe, will many of the benefits of ISDN be obtained For this reason the Recommendation not only aims at initiating a number of concrete activities in the Member States but also and in particular at developing a political commitment to pursue actively the following major objectives

- provision of a range of harmonised and compatible services for all Community users and creation of new means of communication using sound, the written word and images,
- establishment of a common European market in telecommunications and data processing terminals enabling the European telecommunications industries to maintain and increase their share of world markets,
- closer cooperation, at Community level, between the Telecommunications Administrations,
- proper attention to data security and user privacy at the Community level

Bearing in mind these objectives, the Recommendation has placed particular emphasis on the following means

- Stimulating the process for the creation of technical standards at precise interfaces
Of particular importance is the interface for the connection of user equipment (terminals) to the ISDN in order to achieve full compatibility of terminals at a European level and enable, by cooperation between manufacturers, consolidation of terminal production, leading to much stronger economies of scale across a market comparable with those of the United States and Japan
- A co-ordinated approach to the implementation of ISDN in particular with regard to the timing for the implementation of the various phases, thus using the opportunity to transform the current unco-ordinated development of national ISDNs into a Community-wide approach

If the tight development timescales are adhered to and the standards defined, then the associated European equipment manufacturers could be successful in export markets

- Precise targets for the penetration of ISDN and the related services in terms of number of ISDN accesses and geographic availability Within the co-ordinated approach it is necessary to reach a critical mass of subscribers before a totally demand-driven policy can be followed

- Studies, within the framework of CEPT, on tariff structures and levels for ISDN services

3. ACHIEVEMENTS TO DATE - PROBLEMS ENCOUNTERED

This section describes the major achievements with the coordinated introduction of ISDN in Europe and the problems encountered. It refers to each Article of the Council Recommendation (see Annex A) particularly concentrating on the main elements: standardisation and implementation of network and services.

The conclusions are based on the information provided by the Member States. Additional information on the progress of specification work within CEPT and the progress with ISDN in the Member States has been obtained by two studies on these issues, commissioned from European consultancy organisations by the Commission, available on request.

There are some problems in determining exactly what has been achieved, and in making comparisons. This is partly due to the lack of consistency in terminology between CEPT, CCITT and other bodies.

For detailed descriptions of the progress of work within each Member State see Annex B.

3.1 Status of implementation - in general

Article 1

The Council recommends that the Telecommunications Administrations implement the detailed recommendations concerning the coordinated introduction of the Integrated Services Digital Network (ISDN) in the Community, as described in the annex [of the Recommendation]

The Recommendation has provided a focal point for ISDN implementation planning by the telecommunications administrations in the Member States. Administrations reported plans for ISDN implementation demonstrate a recognition of the value of compliance with the Recommendation's programme.

The majority of Administrations (the Administrations in Belgium, Denmark, France, the Federal Republic of Germany (FRG), Ireland, Italy, the Netherlands, Portugal, Spain and the United Kingdom (UK)) report considerable progress in the implementation of initial national ISDNs and are able to provide plans for implementation of further aspects

As a result of the Recommendation and its application by the Member States, ISDN has gained substantial credibility in the Community with users, industry and Telecommunications Administrations. It is beginning to fulfill its promise of developing into a new base for the Community's telematics market of the early nineties

The Administrations in two Member States, Greece and Luxembourg, currently have no firm plans for the introduction of ISDN although it is their expressed intention to follow the Recommendation when implementation does occur

Notwithstanding the above, it has to be recognised that the extent to which the reported plans comply with the requirements of the Council Recommendation varies from Administration to Administration. Significant delays and deviations have been encountered

- The timescales for availability of ISDN services proposed in the Recommendation must be recognised to have slipped significantly in the majority of cases (see also section 3 2 2)
- The national specifications of services and equipment are based on CCITT and CEPT specifications as they were available some years ago, and comprise numerous different national options (see also section 3 2 1).
- The reported plans for the interconnecting of the national ISDNs for providing services Europe-wide are behind schedule. Bi- or multi-lateral agreements for commercial offerings are required which have to be extended as soon as possible to the whole Community (See also section 3 4)

The most important reason for this situation may be found in delays with the international standardisation process for ISDN. European standardisation efforts strongly depend on the worldwide standardisation activities in CCITT. In several areas the work in CCITT was delayed or immature which resulted in difficulties for the specification work in Europe and which could not have been forecasted in 1986, when the Recommendation was approved.

For the future, a consensus among all parties concerned (operators and manufacturers) is needed on whether the achievement of an early European standard is to be attempted, or whether a European decision has to be postponed until a world-wide standard is available.

Other reasons may be found in the different stage of network evolution in the Member States, the governments' differing priorities and strategies for the development of telecommunications services and the influence of differing interests of the manufacturing industry. While most manufacturers are earnestly striving to fulfil the CEPT Recommendations, they are at liberty to choose relatively ad hoc solutions where standards are missing or are ambiguous.

Substantial further efforts are needed in order to bring the implementation of ISDN in line with the Recommendation's objectives in particular by

- review of the process of, and concentration of the available resources for, the development and application of such standards. Acceleration of the application of the existing NET mechanism and of the developing mechanisms for the production of European Telecommunications Standards, in order to establish Community-wide specifications for equipment and interfaces.

The recent establishment of the European Telecommunications Standards Institute (ETSI), as proposed in the Green Paper, should play an essential role in this context.

- along the lines of the Memorandum of Understanding on the co-ordinated introduction of pan-European digital mobile communications, Europe-wide agreement among Telecommunications Administrations on the provision of at least a minimum set of common ISDN services and features and on the introduction of a common signalling system.

- a Commission initiative to reach an agreement of, and commitment from, manufacturers to establish as rapidly as possible common specifications concerning terminals and PABXs. These specifications should make it possible to guarantee end to end communications

Additional attention has to be given to a number of complementary activities and decisions of the Community

- Council Directive 83/189/EEC concerning an information procedure on technical standards and regulations
- Council Directive 86/361/EEC on the initial stage of the mutual recognition of type approval for telecommunications terminal equipment, establishing the NET mechanism ("Normes Européennes des Télécommunications")
- Council Decision 87/95/EEC on standardization in the field of information technology and telecommunications, which has established a firm framework for the co-operation with CEN-CENELEC
- The future Directives on Open Network Provision (ONP) concerning, inter alia, ISDN, according to the proposals in the Green Paper

3.2 Status of major issues

Article 2

The Council recommends that implementation of these recommendations focuses particularly on (a) standardization and implementation of the S/T interface, (b) the timetable set out, and (c) the network-penetration objectives, as compatible with commercial strategies

Telecommunications Administrations have made considerable efforts to focus on the issues which have been set out under Article 2 of the Recommendation

3 2 1 Standardisation and implementation of the S/T interfaces

One of the most important objectives of the Recommendation was the harmonisation of the subscriber access to the network, by standardisation of the interface between network and terminal equipment at the S/T reference point

Most progress has been made with the introduction of subscriber interfaces for the Basic Rate Access (2B+D). All administrations will support interfaces at the S/T reference point. National specifications are available (some of them since 1986) and sufficiently stable

This is the most crucial aspect for a common approach to ISDN in Europe (see also section 3 4). The underlying specifications for the subscriber interface consists of three "layers". No problems exist regarding Layers 1 and 2. Concerning Layer 3, most Administrations use national specifications or national options or variants. This is largely due to the unavailability of a stable international Layer 3 specification when fixing standards for the first implementations of national ISDNs in question for Phase 1.

The situation is further complicated by the timing of CCITT, which will finish its current study period with the release of new specifications by the end of 1988. Accordingly the ratification of the related NET 3 specification failed in early 1988. Although it will be possible to set up ISDN connections during Phase 1 for all essential bearer and teleservices, presumably it will not be possible to connect terminals designed for a specific national network to another (so-called terminal portability) during Phase 1.

A particular problem is the utilisation of a common physical plug. Not all Member States are yet using the standard plug as recommended by CEN/CENELEC (EPS 41001)

For the Primary Rate Interface, pre-standardisation studies are now included in the agreed 1988 ETSI work programme, but the work is lagging behind the dates projected by the Recommendation.

This means that one of the major objectives of the Recommendation has not yet been achieved

With regard to the next phase it is necessary and urgent that the Administrations migrate to a common Layer 3 specification. A quadripartite agreement between France, FRG, Italy and the UK has been approved by their Director Generals of telecommunications on proposal from the Senior Experts Group, to introduce by 1992 a common Layer 3 protocol, which will enable full portability of terminals for access via the main line

As the major problems for the implementation for the Primary Rate Access are strongly related to Layer 3 of the D-channel protocol, this migration might also offer a solution for terminals in this context.

In an effort to achieve a stable technical environment for ISDN in Europe it is desirable that the quadripartite agreement is widened as far as possible, with a view to adopt those standards that carry the broadest possible consensus among Telecommunication Administrations and industry

The Commission will discuss this matter with representatives from CEPT/TRAC and ETSI

3.2.2 Timetable for service definition and implementation

The time schedule set out for the implementation of the Recommendation (Article 2b) has been recognised to be very ambitious for both service specification and introduction. Even if the Administrations have concentrated their efforts on pragmatic solutions for the specifications and on those services which are most relevant for a demand and cost oriented introduction of ISDN, the timescales for the availability of ISDN services must be recognised to have slipped significantly in the majority of cases

Three phases have been defined for the preparation of services specifications and their implementation

Phase 1 Services to be defined and specified in detail by the end of 1986 in order to be provided in all Member States starting from 1988

CEPT has matched the ambitious schedule of the Recommendation and completed major parts of the required specifications for Phase 1. These specifications are stable and were adopted in September 1987, nine months after the projected date

Nevertheless some important technical issues, particularly concerning supplementary services, the integration of ISDN based teleservices (teletex, facsimile etc) and related signalling and addressing aspects still require further development

With regard to the implementation of the first phase services the majority of the Member States reported plans for the provision of at least a number of these services France, FRG, Italy, the Netherlands and Spain will implement all requested bearer and teleservices Belgium and UK (British Telecom) have decided that their role in the support of teleservices will be restricted to the transport of information necessary for the provision of services Greece and Luxembourg have no firm plans on the introduction of services

With this situation the concrete opportunity exists, that the conceptual lead of Europe in this sector can be transformed into a concrete offering of commercial services, at least in a number of European countries

However, the timescale for the introduction of these services has slipped Instead of being provided from 1988 onwards, the introduction of these services in some Member States is not planned before 1991 Only France (commercial service opened on 21 December 1987) and FRG (November 1988) will meet the requirement

Phase 2 Services to be specified by the end of 1987 and which might be implemented during the period 1988 to 1993

The status of the specification work for Phase 2 gives rise to concern This work should have been completed by the end of 1987 but many specifications remain relatively unstable and incomplete

Also with regard to the implementation plans for Phase 2 limited progress for the introduction of services is reported Five administrations (Belgium, France, FRG, Italy, Spain) have specific plans to introduce a packet bearer service on the D channel and only in France, FRG, Italy and Spain will at least some of the new teleservices be provided

Nevertheless, the quadripartite countries intend to introduce the Phase 2 services during 1992 A prerequisite for this is the agreement at the level of CEPT/ETSI on a common user-network interface specification (i.e. NET 3) by the end of 1989 at the latest This

effort is strongly supported by the Commission.

Phase 3 Services to be specified by the end of 1990

For Phase 3 specifications have been requested by the end of the year 1990 and it is premature to evaluate at this early stage the progress of the work

In most cases where Administrations are implementing or planning for ISDN, services are being introduced on a 'pilot' rather than an operational basis. In some cases plans for the expansion or conversion of the pilot services into operational service have not been made clear.

Tariff considerations

The setting of tariffs is crucial for the rapid take-up of ISDN. As discussed in the Green Paper, tariffs should be cost oriented. Article 6 of the Annex of the Recommendation invites the Telecommunications Administrations to study within CEPT the following tariff principles:

- *less distance dependent tariffs*
- *the relationship between ISDN services and today's telephone tariffs*
- *tariffs for teleservices using the same bearer service should be independent of the [specific nature of that] teleservice*
- *a ratio of the order of 10 between the basic rate access and the primary rate access*

In many Member States tariff issues are still under study. Only Belgium, France, FRG and UK (BT) have released tariff information. UK (MCL) did not announce tariffs because they consider them commercially confidential.

The structure of the announced tariffs is similar in the four countries. They appear to be largely based on existing tariff structures, rather than reflecting, for example, long term ISDN costs. The basic access charges will be similar to telephony with some premium on rental and connection charges. Thus, there has been no specific move towards the implementation of less distance dependent tariffs, other than that which is taking place on

existing networks

In all countries where tariffs have been announced, the same tariffs will be applied for all teleservices which use the same bearer service. At present, in France the usage tariff for a 3.1 kHz bearer service differs from the usage tariff for the basic 64 kbit/s bearer service, but France Télécom will make them converge progressively.

Only in France and FRG is the ratio between the basic and the primary rate access known and in both cases is in line (7.1) with the Recommendation.

3.2.3 Network penetration objectives

In Article 8 of the Annex the Recommendation requests that by the end of 1993 the provision of ISDN basic rate access should be equivalent in number to 5% of 1983 subscriber mainlines and that the territorial coverage should be sufficient to permit 80% of customers to have the option of ISDN.

The availability of plans for the level of penetration of ISDN is important, because it allows the terminal equipment industry to have an indication of the size of the potential market. Telecommunications Administrations have therefore been asked to indicate schedules up to 1993 for their ISDN implementation targets. It is the expressed objective of most Administrations to achieve a network penetration in line with the figures set out in the Recommendation but only France, FRG, Italy, and the Netherlands reported long-term plans at this stage. UK (BT) 'anticipates' plans. Spain has provided long-term targets but only for access provision. Other Telecommunications Administrations have not yet decided on procurement of equipment or only for limited pilots.

Only a few Telecommunications Administrations are adopting a pro-active supply-oriented approach to ISDN service introduction. Only France and FRG might reach the quantitative target. In Italy the objective is to reach a penetration of 30 000 users by 1992.

3 3 Harmonisation work within CEPT

Article 3

The Council recommends that the Telecommunications Administrations continue the harmonization work within the CEPT, particularly concerning the objectives and timetable drawn up in the Annex for those specifications on ISDN which have still to be completed.

From the above discussion of the specification issues it can be said that the Telecommunications Administrations supported by industry have made considerable efforts to concentrate on the harmonisation of specifications in CEPT. These harmonisation efforts have to accommodate different manufacturers' interests, national network needs and requirements stemming from the international standardisation bodies themselves. Proper coordination with CCITT is difficult, not least because of the different study periods and timing of meetings between CCITT and CEPT. It must be recognised that CCITT Recommendations seldom give all the details necessary for full implementation. For some service specifications it was necessary for CEPT to act ahead of CCITT, necessarily risking deviations from future worldwide standards. Also the internal coordination amongst the many working groups within CEPT proved to be difficult and caused some inconsistency between their specifications. In a number of cases, these differences are relatively unimportant and can easily be solved. However, one particular case (Packet switching on the D-channel) gives cause for concern as two CEPT working groups differ in their interpretation of the Recommendation and prioritise their work accordingly. CEPT will solve this problem by transferring the work to ETSI.

Notable areas where further specification work is necessary are

- User-network signalling for the operation of supplementary services
- Compatibility between user-network signalling and network common channel signalling
- Addressing of the terminals on incoming calls
- Primary Rate Access for ISPBXs
- Definition of the characteristics of the terminal - ISPBX interface (S interface)
- Coding of messages to provide the necessary network bearer services for particular teleservices and terminals

- Interworking conditions between services and between networks, particularly on an international level
- Standards for the attachment of terminals to the ISDN (NETs)
- Specification of Packet Switched services on the D-channel

3 4 Europe-wide coordination

Article 4

The Council recommends that the Telecommunications Administrations undertake all those measures which will facilitate the coordinated introduction of the ISDN, particularly those relating to implementation of CEPT specifications in equipment concerned by ISDN

Four of the major European Telecommunications Administrations (France Télécom, Deutsche Bundespost, British Telecom and SIP) took the initiative of establishing the Quadripartite Collaboration. Their major objective is to prepare contributions, as input to regular CEPT (sub) working group meetings. This positive approach to tackling the immense amount of specification work required for ISDN can be considered beneficial both to CEPT, and the four Administrations

It would be desirable, to speed up the work of the various working groups, to have an input from all Administrations

Despite the progress which has been made in standardisation and introduction of national services, it appears that there is up to now a lack of concrete measures to guarantee either the Community-wide interoperability of ISDN or the harmonisation of equipment specifications

In so far the Telecommunication Administrations have not achieved the major objectives of the Recommendation

- The harmonisation of equipment specifications for ISDN is at a very early stage. The achievement of a common market in this sector by 1992 looks unlikely (see also 3 2 1)

- Although Administrations are operating or planning ISDN trials and pilot services, there has as yet been no international interconnection of these trials. Whilst some technical agreements exist (for example between the members of the Quadripartite group) and many Administrations have indicated their wish to interconnect trials, Administrations will need to develop a number of additional agreements concerning the international transit exchanges for implementing such interconnections. A related activity has now been established within the appropriate working group of CEPT.

Interconnection of national ISDNs is of particular interest from the Community's point of view. The Council recommends the TUP+ as the signalling means for the first phase. For various reasons this choice is not favoured by all Member States, some will immediately apply the ISUP, the solution proposed for the next phase. Thus a full interconnection at an early stage is not probable, but at least the countries of the quadripartite collaboration and Spain¹ and Denmark will introduce TUP+. The four quadripartite countries have firm plans to interconnect their ISDNs from 1990 onwards. It remains still a question whether and how interworking of the national network signalling systems will be implemented. It is necessary that a migration process towards one interconnection signalling protocol is agreed by all Member States before the implementation of phase 2.

For this purpose the Commission will address a letter to the Directors General of Telecommunications Administrations inviting them for a meeting to consider appropriate measures for an accelerated harmonisation of equipment specification and Community-wide interoperability of ISDN.

3.5 Support by Community financial instruments

Article 5

The Council recommends that the Community financial instruments take this recommendation into account within the framework of their interventions, particularly as regards the investment required for ISDN implementation.

¹ Spain will migrate to ISUP when the Blue Book version is available.

A precondition for the introduction of ISDN is the digitisation of the network (switching and transmission) The Community programme STAR is developing advanced telecommunications in the less favoured regions All Member States which participate in the STAR programme use major parts of it for the modernisation of their networks In a number of countries concrete plans for the support of ISDN by STAR funds are under way

Further support can be obtained from the Regional Fund for national projects, e.g. for the digitisation of the networks

3.6 Encouragement by Member State Governments

Article 6

The Council recommends that the Member State Governments encourage Telecommunications Administrations to implement this Recommendation

The evolution of the public telecommunication networks towards ISDN is recognised by the Member States as a key strategic issue

In a number of countries the introduction of ISDN is official Government policy but in most cases the financial risk for the introduction of the ISDN infrastructure and of the new services stays with the Telecommunications Administrations.

The considerable investments required for digitising networks and introducing ISDN may result in requests by some Telecommunications Administrations for public funding of such investment

3 7 Progress Report

Article 7

The Council recommends that Member State Governments inform the Commission at the end of each year, from the end of 1987, of the measures taken and problems which may be encountered in the course of implementing this Recommendation. The progress of work will be actively examined by the Commission and the SOGT set up by the Council on 4 November 1983 in order to ascertain whether the priorities and the implementation of the programme as a whole is satisfactorily achieved. The progress of work will be the subject of an annual Report from the Commission to the European Parliament

Member States' submissions are summarised in Annex B to this Report. The Commission has also examined the progress of work in the Member States by commissioning two studies from independent consultancy organisations.

The draft annual Report has been discussed in SOGT and is herewith submitted to the European Parliament.

4. OBSERVATIONS AND PROPOSED SOLUTIONS

During the period in question, the Integrated Services Digital Network has gained substantial credibility in the Community with users, industry, and Telecommunications Administrations

The Recommendation has provided a focal point for ISDN implementation planning by the Telecommunication Administrations in the Member States. Reported plans for ISDN implementation demonstrate a recognition of the value of compliance with the Recommendation's programme for ISDN implementation.

In particular, the so called Quadrupartite Collaboration contributed substantially to CEPT and has led to an acceleration of specification work.

To this extent, the Recommendation has served successfully one of its major purposes, i.e. to promote the introduction of ISDN products and services

Despite this positive recognition, and taking into account the general remarks set out in the preface, it has to be stated that the major objectives, as adopted by the Council in this Recommendation, have been achieved only in part

- The time schedule for the Community-wide availability of harmonised and compatible ISDN services has slipped significantly - even for the minimum set of services which have been recommended to be implemented before the end of 1988,
- The application of national specifications or specific options of the international standards has resulted in differing designs for terminals across Member States so that terminals used in one country cannot necessarily be used in another
- Not all of the Telecommunications Administrations which have expressed their intention to implement the Recommendation have been fully involved in the coordination at European level

The questions concerning data security and user privacy have been dealt with in some cases at the national level, but different technical and regulatory solutions will create additional problems for Community-wide provision of services in the near future

The general awareness of the need for a common approach and the contributions from the Member States to this Report suggest a concrete opportunity to reach the objectives of the Recommendation by an additional effort on the Community level Due account will have to be given to the requirements of reasonable transition from existing implementations

The instruments for such strengthening of the common efforts are partly available, in Directive 86/361/EEC which provides a mechanism for establishing common conformity specifications (NETs) for terminals and applying them in a binding form. However, an accelerated preparation is required for NETs and European Telecommunications Standards related to ISDN, taking into account the specific problems with ISDN implementation and the relationship between ETSI and world-wide standardisation efforts in CCITT

The Member States have proposed to the Commission a certain number of actions

- early establishment of a Memorandum of Understanding on ISDN services, features and common signalling system,
- supporting the convergence of specifications and the related compatibility of future ISDN equipment and terminals,
- formulation of a framework of basic requirements for common standards for ISDN-terminal equipment at the S reference point for public and private networks,
- early introduction of ISDN for use in the Commission's services and other Community institutions,
- organising Europe-wide marketing activities in order to increase the awareness of the capabilities of ISDN,
- measures for early stabilisation of the ISUP specification, which is of particular importance for the interconnection of national networks

On this basis, the Commission proposes the following measures, in order to remedy current deficiencies in the Community-wide introduction of ISDN

- acceleration of the establishment of common specifications for equipment and interfaces at the European level, by concentrating available resources within the framework of the European standardisation system and, in particular, of the European Telecommunications Standards Institute (ETSI), recently set up in line with the Green Paper's suggestion
- establishment of a "Memorandum of Understanding" between the Telecommunications Administrations on the provision of at least a minimum set of common ISDN services and features, and on the introduction of a common signalling system. This agreement should take account of Community competition rules and of the objective of the creation of an open Community-wide market for telecommunications services for all market participants, particularly for value-added services. Information on agreements envisaged should be communicated to the Commission before their conclusion (without prejudice to notification by the Telecommunications Administrations under Regulation 17/62)

Such a Memorandum of Understanding should be open to all interested Administrations to join. The "Memorandum of Understanding" on the co-ordinated introduction of pan-European mobile communications, reached by the Telecommunications Administrations in 1987, could serve as an example

- seeking a commitment from manufacturers to contribute, within the framework of existing European standardisation and as rapidly as possible, to the development of common specifications for terminals and PABXS. These specifications should make it possible to guarantee end-to-end communications. The Commission will promote initiatives to this purpose

In order to proceed with the promising efforts so far undertaken for the introduction of ISDN it is now necessary to stimulate the commitment of industry and potential users for ISDN in order to realise this new market opportunity

New means which have been developed or will be established as a result of the broad consensus reached by the discussions on the "Green Paper on the Development of the Common Market for Telecommunications Services and Equipment (COM(87) 290" - see also COM(88) 48 and COM(88) 240 for progress to date - will help to implement the Council Recommendation on ISDN in the very near future:

- Rapid working out of a Proposal for a Council Directive on Open Network Provision (ONP), as foreseen in the Council Resolution of 30 June 1988, covering ISDN, and including in particular Europe-wide definition of a minimum set of common user/network interfaces This proposal should take into account the requirements for the coordinated introduction of ISDN as they are set out in this Report

- Further discussion on the European level regarding user privacy protection requirements in the context of features of new services, in accordance with the Resolution of the European Parliament of 12 December 1986 on the ISDN Recommendation

COUNCIL RECOMMENDATION

of 22 December 1986

on the coordinated introduction of the integrated services digital network (ISDN), in the European Community

(86/659/EEC)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community,

Having regard to the proposal from the Commission ⁽¹⁾,

Having regard to the opinion of the European Parliament ⁽²⁾,

Having regard to the opinion of the Economic and Social Committee ⁽³⁾,

Whereas recommendation 84/549/EEC ⁽⁴⁾ calls for the introduction of services on the basis of a common harmonized approach in the field of telecommunications,

Whereas the resources offered by the telecommunications networks should be utilized to the full to maintain the Community's worldwide competitiveness in the light of the rapid pace of development in the telecommunications sector,

Whereas the technical resources afforded by the integrated services digital network (ISDN) make it possible to provide a range of harmonized and compatible services for all Community users and to create new means of communication using sound, the written word and images,

Whereas current investment in digital switching and digital transmission equipment in the Member States makes it possible to envisage the development of the integrated services digital network,

Whereas a coordinated policy for the introduction of the ISDN will make possible the establishment of a European market in telephone and data-processing terminals capable of creating, by virtue of its size, the indispensable development conditions which will enable the European telecommunications industries to maintain and increase their share of world markets,

Whereas it is appropriate to implement Council Directive 83/189/EEC of 28 March 1983 laying down a procedure for the provision of information in the field of technical standards and regulations ⁽⁵⁾,

Whereas consideration should be given to Council Directive 86/361/EEC of 24 July 1986 on the initial stage of the

mutual recognition of type approval for telecommunications terminal equipment ⁽⁶⁾ and to Council Regulation (EEC) No 3300/86 of 27 October 1986 instituting a Community programme for the development of certain less-favoured regions of the Community by improving access to advanced telecommunications (STAR programme) ⁽⁷⁾,

Whereas it is appropriate to make use of the potential of the Community's financial instruments in order to promote the development of the Member States infrastructure,

Whereas the implementation of such policy should pay proper attention to user privacy protection,

Whereas the implementation of such a policy will lead to closer cooperation, at Community level, between the telecommunications industry and the administrations and the recognized private operating agencies offering telecommunications services, hereinafter referred to as 'telecommunications administrations',

Whereas a favourable opinion has been delivered by the senior officials group on telecommunications (SOGT) according to which the detailed recommendations drawn up by the analysis and forecasting group (GAP) provide a strategic basis for the development of an ISDN that will truly enable European users to communicate efficiently and economically,

Whereas favourable opinions on these recommendations have been delivered by the telecommunications administrations, by the European Conference of Postal and Telecommunications Administrations (CEPT) and by the telecommunications equipment manufacturers in the Member States,

HEREBY RECOMMENDS

- 1 that the telecommunications administrations implement the detailed recommendations concerning the coordinated introduction of the integrated services digital network (ISDN) in the Community, as described in the Annex,
- 2 that implementation of these recommendations focuses particularly on
 - (a) standardization and implementation of the S/T interface,
 - (b) the timetable set out,
 - (c) the network-penetration objectives, as compatible with commercial strategies,

⁽¹⁾ OJ No C 157, 24 6 1986, p 3

⁽²⁾ Opinion delivered on 12 December 1986 (not yet published in the Official Journal)

⁽³⁾ Opinion delivered on 17 September 1986 (not yet published in the Official Journal)

⁽⁴⁾ OJ No L 298, 16 11 1984, p 49

⁽⁵⁾ OJ No L 109, 26 4 1983, p 8

⁽⁶⁾ OJ No L 217, 5 8 1986, p 21

⁽⁷⁾ OJ No L 305, 30 10 1986, p 1

- 3 that the telecommunications administrations continue the harmonization work within the CEPT, particularly concerning the objectives and timetable drawn up in the Annex for those specifications on ISDN which have still to be completed,
4. that the telecommunications administrations undertake all those measures which will facilitate the coordinated introduction of the ISDN, particularly those relating to implementation of CEPT specifications in equipment concerned by ISDN,
5. that the Community financial instruments take this recommendation into account within the framework of their interventions, particularly as regards the investment required for ISDN implementation,
- 6 the Member State Governments encourage telecommunications administrations to implement this recommendation,
- 7 that Member State Governments inform the Commission at the end of each year, from the end of 1987, of the measures taken and problems which may be encountered in the course of implementing this recommendation. The progress of work will be actively examined by the Commission and the SOGT set up by the Council on 4 November 1983 in order to ascertain whether the priorities and the implementation of the programme as a whole is satisfactorily achieved. The progress of work will be the subject of an annual report from the Commission to the European Parliament

Done at Brussels, 22 December 1986

For the Council
The President
G SHAW

ANNEX

DETAILED RECOMMENDATIONS CONCERNING THE COORDINATED INTRODUCTION OF THE INTEGRATED SERVICES DIGITAL NETWORK (ISDN) IN THE COMMUNITY

1 RECOMMENDATIONS ESTABLISHED FOR THE RAPID CONVERGENCE OF EUROPEAN ACTIVITY ON THE INTRODUCTION OF ISDN

All the following recommendations are related and should not be dissociated

1.1 General philosophy

All Member States are in agreement that ISDN (subscriber access at 144 Kbit/s and 2 Mbit/s) should be considered as a natural evolution of the telephone network, i.e. it should be used by both professional and residential subscribers and the existing structure of the current telephone network should not be fundamentally changed by this evolution. The first decisions must take this into account.

Nevertheless, the speed of market penetration will depend on numerous economic, social and cultural factors and, of course, on the impact of the network itself, i.e. the dissemination or actual penetration of the new services at any point in time.

It is clear that in all Member States, the professional sector has significantly greater expectations and requirements for the services than the residential sector.

The professional sector will be penetrated through the supply of multiservice PABXs and of ISDN accesses. In this sector, a major submission is that the terminals connected to ISDN basic access and behind the PABXs should also be compatible, which necessitates the use of a common standard for both public and private networks.

A significant demand from the residential sector will only develop following a sustained policy of anticipated supply launched over such a period as to attain a critical mass of new service penetration and thus creating in effect a 'snowball' reaction.

This policy should be supported by marketing and tariffing activities to help stimulate demand.

1.2 Definition of the interface between the public and private network

A standard physical interface between ISDN terminals and the public network is recommended.

This should be at the CCITT S or T reference point and should be in accordance with CCITT and CEPT recommendations.

In the case of basic access (i.e. 144 Kbit/s) the physical interfaces at the S and T reference points must be identical. This terminal interface should also be offered by PABX manufacturers so that common design of terminals can be achieved.

The above statements imply that for basic access at least the NT1 function is provided by the public network operator.

Agreement is urgently needed between telecommunications administrations within the framework of CEPT, on a standard physical interface at the T reference point for primary rate access (i.e. 2048 Kbit/s).

Clearly, during a transitional phase of several years PABX multiservices will use different standards but as soon as possible these PABXs ought to be able to offer, in addition to these standards, the S interface. The manufacturers's representatives consulted were in agreement on this point.

2 SERVICES TO BE DEFINED AND SPECIFIED IN DETAIL BY THE END OF 1986 IN ORDER TO BE PROVIDED IN ALL MEMBER STATES STARTING FROM 1988

The following items will have to be specified in detail at the latest by the end of 1986

(a) *Bearer services*

Circuit switched transparent at 64 Kbit/s,

(b) *Teleservices*

— Telephony 3,1 kHz at 64 Kbit/s,

— Facsimile at 64 Kbit/s (Group IV),

- Teletex at 64 Kbit/s,
- Mixed-mode teletex/facsimile at 64 Kbit/s

(c) *Supplementary services*

In order to enhance the services, a common set of supplementary services among the Member States should be implemented. These supplementary services are intended to be added to those already available in the telephone network and to those inherent in the definition of ISDN protocols (Procedures for subaddressing, terminal portability, user to user signalling in call control messages have to be specified although their implementation is foreseen at a later stage.)

The telecommunications administrations are invited to establish, within the framework of CEPT, the following supplementary services:

- call-waiting,
- calling-line identification,
- closed-user-group (this service might be implemented later by some countries),
- direct-dialling-in

(d) *Adaptors (for connection of existing terminals to the ISDN via the S interface)*

- adaptor X 21,
- adaptor X 25 on the B channel (for access to packet switched services),
- A/D adaptor specified according to national needs

Note 1

Special attention should be given to the definition of personal computer use on the bearer service at 64 Kbit/s

Note 2

Special attention should be given to compatibility between circuit switched and packet switched services where compatibility may be realized in the terminal or in the network

3 SERVICES TO BE SPECIFIED BY THE END OF 1987 AND WHICH MIGHT BE IMPLEMENTED DURING THE PERIOD 1988 to 1993

(The precise date of introduction of such services will be decided as soon as possible.)

(a) *Bearer service*

Packet bearer service on D channel

The telecommunications administrations are invited to study within the framework of CEPT the usefulness of teleservices in particular videotex, teletex, message handling and teleaction on packet bearer service

(b) *Teleservices at 64 Kbit/s*

In order to augment demand, the following list of teleservices should be considered with priority

- Telephony (7 kHz) at 64 Kbit/s,
- Audioconference at 64 Kbit/s,
- Videotex alphanumeric at 64 Kbit/s,
- Image transmission and computer communication at 64 Kbit/s. For these two teleservices, the telecommunications administrations are asked to identify, within the framework of CEPT, possible services and produce detailed specifications of first services

(c) *Adaptors*

- X 21 bis,
- for asynchronous terminals (V 24)

(d) *Supplementary services*

The telecommunications administrations are invited to study, within the framework of CEPT, by the end of 1987, the following list of supplementary services based on CEPT's own list

- Advice of charge,
- Completion of call meeting busy,

- Conference call,
- Diversion
- Freephone
- Malicious call identification,
- Three party call,
- Called user identification

Note

The provision of these supplementary services assumes the availability of an ISDN user part (ISUP). Should the ISUP not be available, their provision via the telephone user part (TUP)+ may be restricted.

4 SERVICES TO BE SPECIFIED BY THE END OF 1990

(a) *Teleservices based on packet service*

(If the telecommunications administrations agree on the need to specify such packet services referred to in paragraph 3 (a))

- Teletex,
- Videotex,
- Message handling (see CCITT recommendation X 400,
- Teleaction, set of services providing to the users a reliable transfer of small volumes of packed-sized information. This service may be adapted to several teleservices: tele-alarm, telesupervision, tele-alert, telecommand, telemetry, teleshopping, etc.

(b) *Teleservices based on 64 Kbit/s*

- Audiography at 64 Kbit/s,
- Alphaphotographic videotex at 64 Kbit/s,
- If possible, viewphone at 64 Kbit/s

(c) *Supplementary services*

Work to be continued

5 NUMBERING, ADDRESSING AND SIGNALLING

The achievement of the full CEPT specifications on ISUP, signalling connection control part (SCCP) and transaction capabilities (TCAP) is recommended to the telecommunications administrations in order to reach a common standard within Europe at the earliest opportunity.

As an interim solution, it is recommended to all telecommunications administrations that, starting from 1988 and when CCITT No 7 is introduced, international digital exchanges (linked by digital circuits or possibly also by analogue circuits) should be interconnected by means of the enhanced telephone user part (TUP+) for both PSTN and ISDN services.

The telecommunication administrations should provide within the framework of CEPT detailed technical specifications on TUP+ by the end of 1986.

It is required that interworking with the existing public telephone network is also achieved, including some means for identifying different teleservices and terminals.

Note

The TUP+ is based on the red book TUP of CCITT enhanced to meet ISDN requirements, including the supplementary services hereabove.

6 TARIFF CONSIDERATIONS

The issue of tariff levels and structures for the ISDN is fundamental for its rapid take-up.

In the longer term, following an inevitable period of high investment costs, the level of investment per basic access should be comparable with that of the current telephone network, with an investment structure related to the type of transmission and digital switching which may be different from that of today.

Several studies on ISDN tariffs have still to be completed. The telecommunications administrations are invited to study within the framework of CEPT the following proposals:

- In accordance with current trends, tariffs for all services, including telephony, should be less dependant on distance than at present (always bearing in mind the problems of transit costs through other countries)
- In the transitional phase from the analogue network to the ISDN corresponding to the period 1988 to 1993, the telecommunications administrations are requested to study within CEPT the relationship between, on the one hand, the tariff threshold applicable to ISDN services and ISDN basic access and, on the other, tariffs applicable to telephony
- Tariffs for teleservices which use the same bearer capabilities should be independent of the teleservice. On the contrary, all value added by the network should be charged independently of the utilization of the bearer capabilities
- An agreement should be obtained on the ratio between the monthly rental for the primary rate access (2 048 Kbit/s) and that for the basic access (144 Kbit/s)

A ratio of the order of 10 might be discussed

7 INTERWORKING BETWEEN NATIONAL ISDN TRIALS

Those administrations implementing national trials of ISDN before the full implementation of the present recommendations should endeavour, where provided, to interconnect these services in order to increase early experience of ISDN in Europe

8 LEVEL OF PENETRATION

Forecasts of demand in new fields, such as the services supported by ISDN, do not provide a particularly relevant basis for market planning

Nevertheless, it is realistic to set objectives attainable over the next eight years, i.e. up to the end of 1993 for a level of penetration of ISDN which permits the market for services and terminals to reach a mature phase

The objective should be for an adequate geographic coverage and rate of penetration at national level for each country

The administrations should plan to provide by 1993 ISDN accesses for a number equivalent to 5 % of 1983 subscriber main lines. This figure depends, among other things, on the capability of the industry to offer cost effective ISDN solutions for the infrastructure and the terminal equipments

The territorial coverage should be sufficient to permit 80 % of customers to have the option of the ISDN access

NATIONAL REPORTS ON THE BASIS OF THE INFORMATION PROVIDED

BY THE MEMBER STATES (SOGT)

1.	Belgium	2
2.	Denmark	3
3.	France	4
4.	Germany	6
5.	Greece	7
6.	Ireland	7
7.	Italy	7
8.	Luxembourg	8
9.	The Netherlands	8
10.	Portugal	9
11.	Spain	9
12.	United Kingdom	10

This annex describes the progress with the introduction of ISDN in the Member States, as reported by the Member States according to Article 7 of the Recommendation

1. Belgium

An ISDN pilot project with three exchanges is planned for the end of 1988. It will offer ISDN services to the public throughout the country from 1989 onwards. The project will offer 720 accesses at the basic rate and 26 accesses at the primary rate. A full commercial phase is planned from 1991 onwards.

The physical interfaces comply with CCITT/CEPT recommendations.

The technical specifications for the pilot project are based on the work that was available in CCITT and CEPT in mid 1986. The technical specifications for the next phase from 1991 onwards will comply with the CCITT and CEPT recommendations of the 1988 version.

Services planned for 1989 are bearer services for speech, 64 kbit/s unrestricted and packet switched virtual connections in the B-channel. Teleservices are subject to the availability of appropriate terminal equipment. The teleservice indicator is conveyed transparently through the network and is not interpreted nor verified. Supplementary services are call waiting, calling line identification, connected line identification, direct dialling in, subaddress, closed user group, user to user signalling, call forwarding, charge information and malicious call identification.

Additional services planned for 1991 are packet switched virtual connection on the D-channel and some supplementary services: conference call, CCBS, three party call.

The numbering plan complies with CCITT Recommendation E 163 and E 164.

Interconnection with other European networks based on CCITT signalling System No 7 TUP (Red Book version) is planned for 1988 with the U.K., for 1989 with the Netherlands, Italy, Switzerland, Sweden, Denmark, Spain, France, Norway and Finland, and for 1990 with FRG and Austria.

ISUP (Blue Book version) will be implemented from 1991 onwards. Introduction of TUP+ is not planned.

Tariffs: the proportion of the connection and rental charges to those of the PSTN are in accordance with the EC Recommendation. Usage charges are service independent and have the same structure as in the PSTN but are 20-0/0 more expensive.

For the pilot project no interconnection with other ISDNs in Europe is planned.

A sufficient level of territorial coverage will be reached in the commercial network (90 % by 1991).

2. Denmark

The introduction of ISDN with about 670 subscriber lines will begin in various forms of pilot experiments. Equipment has been ordered by the network operators for delivery to begin in March 1989. The experimental installations will be interlinked as far as possible within the various types of equipment. A pilot ISDN foreign exchange is planned for test operation as from 1990. Commercial operation for a number of services is expected to be introduced in mid 1990.

The physical interface will be at the S/T reference point for the basic access and the primary rate access.

The technical specification of the protocols for levels 1 and 2 in the D-channel will be implemented in line with CEPT recommendations. The implementation for level 3 will be based on company specifications, but when the changeover is made to commercial operation it is expected to be upgraded to the future CEPT standard.

Services planned for 1989 are expected to be most of the phase 1 services, based on what the equipment manufacturers can supply, but they will not be commercially available.

Services corresponding to phase 1 and 2 will be introduced in the form of test services during 1989-1990. They are expected to be open for commercial operation in mid 1990.

Introduction of phase 3 services is intended according to the Recommendation and could be expected by 1993 if the remaining problems can be solved in a practical and economical manner.

The situation as regards numbering, addressing and signalling is expected to be settled early in 1989. Test installations will support ISUP according to CCITT SS no 7's latest 1987 version.

Interconnection of the Danish test network with corresponding European ISDNs is planned for 1990. This will include the use of TUP+, the introduction of which is planned for January 1990.

Tariffs are expected to be defined during 1988. It is envisaged that the rate for traffic on the B-channel could be established as a unit rate on the same level as the highest rate for telephone traffic.

At the moment there is a limited scope for assessing market needs, which will be related heavily to the pricing policy. Until further notice the aims of the Recommendation will be used as a basis for penetration targets.

3. France

The commercial opening of ISDN took place on 21 12 1987. The commercial offerings, currently based on the basic rate access, will be expanded in 1989 by the provision of the primary rate access and gradually be spread over the whole territory until 1990.

The physical interfaces have been published early in 1987 and comply with CCITT Recommendation I 420 at the S/T reference point. They will be further developed according to the development of European Standards and CCITT Recommendations (Blue Book), as soon as they are available.

The technical specifications, e.g. the protocols for layer 3 of the D-channel have been implemented in following the CEPT specifications and will converge to the CEPT standard, as soon as it is available.

Bearer services supporting 3.1 kHz audio and unrestricted 64 kbit/s have been available since the opening of the commercial service end of 1987. Access to TRANSPAC via the B-channel (X 25) will be available from October 1988 onwards according to CCITT Recommendation X 31.

According to GAP (phase 1) teleservices have been offered since the end of 1987 for telephony, telefax group 4, teletex 64 kbit/s and mixed mode. In addition telefax group 3 by modem, videotex by modem and videotex at 64 kbit/s are offered.

According to GAP (phase 1) supplementary services have also been available since the end of 1987: terminal portability, subaddressing, user/user signalling, call waiting, calling line identification, direct dialling-in. A number of additional supplementary services are offered with adaptors A/S (since 1987) and X 21, X 24, X 25 and X 35 (by 1988).

France Télécom will introduce a packet service at the D-channel by 1991. Teleaction services will be decided on in the near future, as well as additional teleservices, offering of additional adaptors and supplementary services according to GAP (phase 2).

France intends to study the implementation of all services of GAP (phase 3) and contributes actively to their specification in CEPT.

Concerning numbering, addressing and signalling France has actively contributed to the specification work of CEPT and within the "quadrupartite" collaboration. France has decided to implement the available specifications as well as the national CCITT SS no 7. The exchange will be prepared for international connections (phase 1) from mid 1989 on. For implementation of future specifications (phase 2 and 3) a transition period will be required, starting from the formal adoption.

Initial tariffs were published in May 1986, those applicable for all of France from 1988 onwards were published in September 1987. Two types of tariffs for traffic have been adopted: for telephone services the same tariff will apply as for traditional telephony. For the transparent 64 kbit/s channel the tariffs will be less than twice the telephone tariff (tariffs of TRANSCOM). In the future the latter might converge to the telephone tariff.

On 30 06 1988 France also published the tariffs for the Primary Rate Access and for groups of Basic Accesses. The relation to the single Basic Access tariffs will be in line with the Recommendation.

The plans for implementing ISDN in France will surpass by far the penetration objectives of the Recommendation.

4. Federal Republic of Germany (FRG)

Two ISDN pilot projects have been in service since 1987. Commercial service is planned to start in November 1988. For this purpose an overlay network will be implemented with 8 local exchanges and 8 transit exchanges. The services concept of the Deutsche Bundespost (DBP) for the initial phase corresponds fully with the Recommendation. Up until 1990 the implementation of up to 80,000 basic accesses and 7,000 primary rate accesses are foreseen.

The physical interfaces are applicable to the S or T reference points and will be provided for the basic rate and the primary rate. The responsibility of the DBP ends both for basic rate access and for primary rate access at the network termination point and at the user/network interface.

The national technical specifications comply with CEPT recommendations T/TR 03-07 (layer 1), T/SPS 46-20 (layer 2). The layer 3 specifications are based on CCITT 1984 (Red Book) recommendation I 450/451 and have been enhanced by a great number of supplementary services. They were published in early 1986. Layers 1 and 2 have continuously been adapted to the latest CCITT versions which are compatible with the NET 3, part 1 standard. Layer 3 differs from the latest version of the D-channel protocol as it has already included a great number of supplementary services, whereas the envisaged NET 3, part 2 draft will not support any supplementary service.

In the FRG the additional introduction of a European layer 3 protocol based on CCITT Blue book and NET 3 is planned - beginning in 1991 with the packet service on the D-channel, followed by all other services/supplementary services included in an updated NET 3 in 1992. For the transition period both versions will be offered simultaneously at basic accesses and alternatively at primary rate accesses, an extension of the national version is not envisaged after the implementation of the European D-channel protocol.

All services to be implemented by 1988 according to the Recommendation will be offered by 1988, and in addition about 30 supplementary services.

All services to be implemented according to phase 2 will be provided before 1993.

An integrated numbering plan for ISDN and PSTN is envisaged according to CCITT Rec E 163 / E 164.

From 1990 onwards the international gateway exchanges will be connected to the national exchanges by CCITT SS No 7 and ISUP. From 1992 onwards implementation of the Blue Book version of ISUP is planned.

From 1990 onwards TUP+ will be implemented (test phase in 1989). International connections with France and Italy and the United Kingdom will be established from 1990, further connections are under discussion.

Tariffs have been published. The structure is service independent, tariff charges are the same as for PSTN.

Because of the early introduction of commercial services no interconnection of the pilot projects with other ISDNs is planned.

According to the national implementation strategy the penetration targets of the Recommendation will be fulfilled in all aspects.

5. Greece

In Greece initial decisions on the introduction of digital exchanges have been reached. Initial introduction of integrated services is expected by 1990 according to the STAR programme for Greece. It is stated that during the introduction phase Recommendation 86/659/EEC as well as relevant CCITT and CEPT recommendations will be strictly followed.

6. Ireland

ISDN field trials are intended to be carried out commencing in 1989. Telecom Eireann hopes to be in a position to provide a full commercial service before 1993.

Physical interfaces are planned for the basic rate and primary rate at the S/T reference points according to CCITT.

The technical specifications for the trial will vary from current CCITT and CEPT recommendations but Telecom Eireann hopes to be in a position by 1990/91 to specify their national ISDN standard based on the CCITT Blue Book, then available CEPT recommendations and result of the trial services to be implemented in the 1989 field trial to be as recommended (phase 1) with the exception of teletex (under discussion).

Services to be provided post field trial are not yet decided.

Numbering, addressing and signalling and implementation of international interconnections will depend on the final decisions for commercial service introduction and the availability of international standards.

Tariffs are still under study.

Telecom Eireann's objectives with regard to penetration targets and geographical coverage are to be in a position to meet customers' demand and to meet 80 % geographical coverage before 1993.

7. Italy

The national plan forecasts an ISDN pilot service to start in 1988/89 with 2000 users and a progressive extension. It is foreseen to provide from 1991 onwards a service including interconnection with national dedicated networks for data transmission and other European ISDN networks.

For the basic access physical interface the NT1 function will be supplied in agreement with CCITT and CEPT recommendations.

Technical specifications for the layer 3 protocol of the D-channel have been completed. The first implementation will be available in the ISDN pilot service.

All services of GAP phase 1 except 64 kbit/s mixed mode have been specified. All the adaptors included in the Recommendation will be available and usable for the ISDN pilot service before end of 1988.

All services listed under phase 2 will be introduced not later than the end of 1993.

Data transmission packet switched teleservices, teletex and videotex services of phase 3 will be defined by 1988, all other services are under study

The introduction of CCITT No 7 signalling system will be introduced in the national pilot service by 1988 For international interconnection TUP+ will be available in early 1990 Italy is working in agreement with the CEPT and quadripartite group related developments to define the exact ISUP specifications Digital interconnections are forecast for 1989 with France, FRG, UK, Switzerland, and for 1992 with Spain and Greece

ISDN tariffs have not yet been defined

It is expected that a solution for interconnecting the ISDN pilot services through CCITT SS No 7 TUP+ can be defined with FRG and the UK to be available via the international switching centres of Rome and Milan in the period of 1989 to 1990

It is expected to reach a penetration of about 30,000 users by 1992

8. Luxembourg

Luxembourg will rapidly introduce ISDN, but because of its size and its geographical situation its implementation strategy will strongly depend on the results of foreign experiments and introduction planning, in particular of its neighboring countries

9. The Netherlands

A first phase of ISDN will be introduced in 1988 The start of ISDN in accordance with international / European standards is planned for 1990/91 (second phase)

The physical interface between the public network and the peripheral equipment will be located at the T reference point for both the basic rate access and the primary rate access Discussions are in progress with suppliers of PABX about the provision of a standardised S-interface at the terminal side of the PABX

The technical specifications of the signalling protocols for the first phase (primary access) will be based on national specifications For the second phase the D-channel protocol for basic and primary accesses will be in line with the relevant international/European recommendations and standards

From 1988 onwards the circuit-switched unrestricted bearer service at 64 kbit/s and a 3.1 kHz telephony service at 64 kbit/s will be provided

Services to be added from 1990/91 on will include facsimile, teletex and mixed mode at 64 kbit/s as well as the supplementary services mentioned in the Recommendation under phase 1 Existing services as offered now on the PSTN and PSPDN and interworking with those networks will be supported X 21 adaption will not be provided because there is no service based on X 21 in the Netherlands

The packet bearer service in the D-channel and 64 kbit/s teleservices are under study The extent to which additional supplementary services will be provided will mainly depend on the progress made in CCITT/CEPT

Services to be specified by the end of 1990 are still under study

One integrated numbering plan will be implemented for the PSTN, PSPDN and ISDN

For 1989/1990 international routes with CCITT Signalling System No 7 and TUP have been planned with Belgium, FRG, UK, Spain, Austria, Sweden and the US

From 1991/1992 the CCITT No 7 Signalling System with ISUP (and possibly with TUP+) will be introduced on international routes

Tariffs for ISDN are still under study

No specific ISDN field trials are foreseen Under consideration are a number of possible projects with the objective of demonstrating the importance of 64 kbit/s end-to-end connectivity in a real business environment

In the five-year-period after introduction of ISDN in 1990/91 the demand for the penetration targets of the Recommendation (5%) will be met with nationwide unrestricted availability

10. Portugal

Initial trials with the basic access for ISDN are envisaged for 1989 with the primary rate for 1990 Public service introduction will follow one year later, strongly dependent on the progress of international standardisation

Implementation of services (from 1990 onwards) will follow the EEC recommendation as far as standards are developed in time and equipment is available from the Portuguese industry

Portugal expects to be in a position to open international links from 1991 onwards Preliminary tests might be established earlier

Tariffs are still under study

11. Spain

A pilot experiment is foreseen for 1988 and will provide 1024 basic rate and 6 primary rate accesses Commercial service will follow by 1990

The physical interface for the basic rate access and the primary rate access are planned at the S/T reference point

The technical specifications for the pilot experiment will be based on early versions of CCITT/CEPT recommendations and some national amendments For the commercial services it is envisaged to adjust the specifications to the Blue Book version of CCITT and related CEPT recommendations

For supplementary services, the target is to provide all the services included in GAP phase 2 by 1991

Services to be introduced by 1988 are bearer services for unrestricted 64 kbit/s, voice and 3.1 kHz audio transportation and packet mode on the B-channel (X 31), teleservices at 64 kbit/s for telephony 3.1 kHz, facsimile group IV, teletex and mixed mode (if the terminals are available) Adaptors will be available for analogue and X 25 terminals All recommended supplementary services will be supported

During the period 1989-1993 all recommended services will be introduced

Services of GAP phase 3 are under study

All international exchanges will support an ISDN numbering plan in compliance with CCITT Rec E 164. From 1989 one digital exchange will be implemented with signalling system CCITT No 7 TUP+ for first international connections by 1990. The other international exchange centres will be equipped with TUP+ or ISUP according to progress in international standardisation.

This will allow international connections to all major countries from 1990 onwards.

Tariffs are still not decided.

The penetration targets for 1992 are 46 000 basic accesses and 926 primary rate accesses in all the most densely populated regions of Spain.

12. United Kingdom (UK)

(British Telecom)

Primary Rate Access (Multi-line IDA, 2 Mbit/s) is being launched in October 1988. The introduction of Basic Rate Access (Single-Line IDA, 144 kbit/s) is planned for spring 1989.

The network termination point for Basic and Primary access is the T reference point.

Plans for the implementation of layer 3 D-channel protocol are based on CEPT recommendation T/SPS 46-30.

It is planned to introduce the following services during 1988/89 as appropriate:

- Basic Access: Closed User Group and Calling Line Identity
- Primary Access: Closed User Group, Calling Line Identity, Network Address Extension, and Call Charge Indication

Services which may be implemented between 1988 and 1993 for Basic and Primary Access are: Locked up time slots, Packet switching, and Access to packet switching.

Numbering, addressing and signalling plans for the introduction of TUP+, CCITT No 7 and ISUP are in line with recommendations. International interconnections for Basic Access to France and the USA are planned for introduction later this year.

Usage charges for services will be the same as those for the PSTN (and other standard services, as additional facilities are introduced). Connection and rental charges are related to standard charges.

There are no fixed plans for penetration targets of Basic Access, apart from the general commitment to meet demand. The medium term plan for introduction of Primary Access is to meet 95% of perceived demand.

(Mercury Communications Ltd.)

Information on ISDN trials has not been made available up to now to the Commission

For the physical interface for the basic access S, T and U reference points are all under consideration For the primary rate the access will be provided at the U reference point (at G 703)

The technical specifications for the basic rate access would support CEPT Rec T/CS 46-20 and -30 For the primary rate initially the UK standard DASS 2 has been adopted moving towards the international standard when it is fully defined

Services to be provided by 1987/88 are Circuit switched bearer service at 64 kbit/s, transparent 3.1 kHz telephony, facsimile and teletex at 64 kbit/s Supplementary services are call waiting, calling line identification, closed user group and direct dialling in Adaptors are under consideration and would be supplied to NET 9 standard

Information on future services has not been made available up to now to the Commission

The plan would be based on CCITT Rec E 163/164 CCITT Signalling System No 7 MTP is in operation compatible to the CCITT Q 702-704 Red Book version TUP+ and ISUP are under consideration for international interworking

International implementations, tariffs and penetration target are commercially confidential

ANNEX CGLOSSARY OF TECHNICAL TERMS

Addressing	The process by which a calling user indicates the identity of the called user on a particular call. It includes a network addressing (numbering) component to identify the called user-network interface, and may include further information (sub-address) to identify a particular terminal beyond the public network.
"B"-channel	For user-to-user information transport.
Basic access	Physical interface structure available at S or T reference point. 2x64 kbit/s "B" channels and 1x16 kbit/s "D" channel. In some configurations S and T reference points are joined.
Bearer Service	A type of telecommunications service that provides the capability for the transmission of signals between user network interfaces.
bit rate	Number of bits (units of messages) transmitted per second.
Calling Line Identification	Indicates the identification of the calling user line.
CCITT	International Telephone and Telegraph Consultative Committee (ITU).
CCITT Blue Book	Series of CCITT publications due to be adopted by the CCITT Plenary Assembly by the end of 1988, in particular revising or extending recommendations on ISDN.
CCITT Red Book	Series of CCITT publications, which have been adopted by the CCITT Plenary Assembly in 1984 (in particular Vol III Fascicle III 5) containing the essential definitions and recommendations on ISDN.

CEPT	European Conference of Postal and Telecommunications Administrations
"D"-channel	For user-to-user and user-network signalling information transport
ETSI	European Telecommunications Standards Institute, established in March 1988 and located in Sophia-Antipolis near Nice
GAP	Analysis and Forecasting Group (subgroup of SOG-T) Issued a report on ISDN in 1985 as a basis for the Council Recommendation
Green Paper	Green Paper on the development of the Common Market for Telecommunications Services and Equipment [COM(87) 290], published in June 1987 Outlines the Commission's position on the development of the Community's telecommunications policy and the proposals to reach the 1992 target in this sector, including required regulatory change at EC level
ISDN	Integrated Services Digital Network
ISPABX	Private Automatic Branch Exchange for Integrated Services
ISUP or ISDN-UP	ISDN User Part = part of the No 7 signalling systems allowing ISDN facilities
NET	("Normes Européennes des Télécommunications") an approved technical specification recommendations
Numbering	see "Addressing"
ONP	Open Network Provision, concept for the definition of general requirements for the use of the Telecommunications Administrations' network infrastructure and/or services including technical interfaces, tariff principles and conditions of use
Primary access	Physical interface at T reference point 30x64 kbit/s "B" channels and 1x64 kbit/s "D" channel
PSPDN	Packet Switched Public Data Network

PSTN	Public Switched Telephone Network
Quadripartite Collaboration	Close collaboration for the coordinated introduction of ISDN between the Telecommunications Administrations of France, FRG, Italy and UK.
Reference Point	A conceptual point at the conjunction of functional groups of the telecommunications network
Signalling System No 7	The new CCITT system allowing two switching centers to exchange information, e.g. information needed for establishing a telephone call
SOGT	Senior Officials Group on Telecommunications (EEC)
S/T reference point	Possible location of access for Bearer Services supported by an ISDN
TUP	Telephone User Part = part of the No 7 signalling system allowing telephony
TUP+	Extended TUP, allowing in addition to traditional telephony use of a 64 kbit/s bearer service