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Contents

1   Scope

The purpose of this document is to provide a basic guide to the standards for the European ISDN. ETSI has published or will publish both European Telecommunication Standards (ETSs) or ETSI Technical Reports (ETRs) to specify or provide guidance on the services and standards for the European ISDN. This document therefore identifies the services and standards required and provides an overview of the structure, inter-relationship of the ETSs/ETRs. It does not indicate the status of the various ETSs/ETRs.

This basic guide has been produced by the ISDN Standards Management Group (ISM).

2   Background to the ISDN - CCITT Recommendations

An ISDN is a network providing end-to-end digital connectivity to support a wide range of telecommunication services. These services include voice and non-voice services to which customers have access by a small set of standard user-network interfaces.

The CCITT has prepared, in the I-Series, Recommendations which provide principles and guidelines on the ISDN concept, as well as detailed specifications. Information about the ISDN concept can be found in the following CCITT Recommendations:

.110	provides a structure for the Recommendations in the I-Series and also a list of those Recommendations.
.112	defines those terms that are considered essential to the understanding and application of the principles of an ISDN.
.120	describes the concept and principles of an ISDN.
.130	provides a method for describing telecommunication services (3 stage methodology).
.210.2	includes the description of the principles for defining telecommunication services supported by an ISDN including the concept of bearer services, teleservices and supplementary services.
1.310	describes the ISDN network functional principles.
1.410	describes general aspects and principles relating to the user-network interface.

Based on these principles the European Commission has embarked on a European ISDN.

3 The Memorandum of Understanding (MOU) and the ETSI work programme

In 1989 a MOU was agreed and signed between European Network Operators to enable European ISDN services to be offered across Europe in 1992. This includes a minimum set of services which all signatories will provide (indicated with a * in table 1). This MOU requires:

standards for a common range of services which all signatories will follow.

standards for user-network interfaces and protocols having the objective of enabling any customer equipment implemented to the required standards to be connected to and operated with the ISDN provided by each party (terminal interchangeability).

standards for interconnecting national systems in order to provide international services.

4 Commonality between public and private ISDN standardisation

As a basic objective, the ISDN standards, in particular those covering service descriptions, have been designed to be common to both public and private ISDNs.

The principle of terminal interchangeability is to ensure that a terminal shall be (as far as possible) capable of participating in services independent of the actual network to which it is attached, i.e. different national ISDNs, private ISDNs, etc.

However, the ETSs describing a European ISDN include options which:

> cover historical variants of services and their usage in individual countries;

> allow for innovation.

Interworking between networks is assured, and where this might affect terminal interchangeability this is listed in an annex to the relevant ETS.

The ETSs also cover interworking of the European ISDN with private ISDNs which support identical or similar services to those of the public ISDN.

Again, whenever terminal interchangeability between public and private ISDNs might be affected, appropriate listings can be found in annexes to the private ISDN standards.

For the definition of terminal interchangeability and for the guidance on acrAeving terminal interchangeability see Annex B.

For the alignment of standardisation principles between public and private ISDNs see Annex C.

Annex D gives the list of abbreviations used in this document.

5 General organisation of ETSs/ETRs and numbering scheme for ETSs

5.1 Numbering

Numbers for ISDN ETSs (and all other ETSs) will commence from 300 001 and will be allocated on a consecutive basis, ETSs with such numbers can be purchased from the appropriate national standards body. ETSI has decided that no gaps should be left in any ETS numbering scheme, therefore numbers will not relate to any organisational structure. Until such numbers have been allocated by ETSI a temporary code has been given which uniquely identifies the draft ETS. ETRs are also identified by a unique code.

5.2 Titles

The title of each ISDN ETS consists of three elements:

> an introductory element indicating the general field to which the standard belongs (e.g. "Integrated Services Digital Network (ISDN)");

> a main element indicating the principle subject treated within that general field (e.g. name of telecommunication service such as "Explicit Call Transfer (ECT) supplementary service"; name of Interface type such as "Basic user-network interface");

5   User equipment end-to-end protocols

           Includes the specification of the end-to-end protocols for the bearer and
           teleservices.

6   Network aspects

           lncludes the ETSs/ETRs on:

               - routing, numbering and addressing, and service interworking aspects

               - interworking aspects between terminals and networks.

7   Attachment requirements

           Attachment requirements are contained in NETs (Normes Europäennes de
           Tölöcommunications). NETs are common technical regulations and as such
           are of an obligatory nature.

           NETs are based on ETS(s) or part thereof and include requirements for the
           user-network interfaces, protocols and equipment.

           Section 7 contains references to those ETSs which have been prepared as
           can d i date NETs.

NOTE: Conformance testing specifications are appropriate to all standards except
           Stage 1 and 2 descriptions; conformance to Stage 1 and Stage 2 is met by
           conformance to the Stage 3 standard and the end-to-end protocol standard
           if appropriate. Standards for the groups numbered 2 to 6 above may contain
           conformance testing specifications either as an integral part or a separate
           ETS. Where separate standards for conformance testing have been
           produced these are listed in the same group of standards as the
           requirements standard.

NOTE 1: The stage 2 aspects of the Telephony 3,1 kHz, Facsimile Group 4, Teletex, and ISDN syntax-based videotex services are covered in the frame of ETS T/S 23-01.

2.3.2.1.4 Multiparty services
    2.3.2.1.4.1   CONF   ETS 300 185   ETS T/S 46-34J1
    2.3.2.1.4.2 3PTY   ETS 300 188   ETS T/S 46-34J2
    2.3.2.1.4.2   MMC contains no signalling in addition to basic call
2.3.2.1.5 Community of interest services
    2.3.2.1.5.1 CUG   ETS 300 138   ETS T/S 46-34H
2.3.2.1.6 Charging related services
    2.3.2.1.6.1 AOC   ETS 300 182   ETS T/S 46-34K
2.3.2.1.7 Additional information transfer service
    2.3.2.1.7.1   UUS is specified in the ETS for the basic call
2.3.2.1.8 Other
    2.3.2.1.8.1 TP   ETS 300 055   ETS T/S 46-34E
    2.3.2.1.8.2 FPH   ETS 300 210   ETS T/S 46-34P
2.3.2.1.9 Generic procedures
    2.3.2.1.9.1   Generic keypad protocol
    for the control of ISDN supplementary services   ETS 300 122
    2.3.2.1.9.2   Conformance test
    specification for 300 122   DE/SPS-5004
    2.3.2.1.9.3   Generic functional procedures
    for the control of ISDN supplementary services   ETS 300 196
    2.3.2.1.9.4   Conformance test
    specification for ETS 300 196   DE/SPS-5005
    2.3.2.1.10   Interactions of supplementary services   ETS 300 195
2.3.2.2 ISDN interconnection interface
    2.3.2.2.1 ISUP Version 1 (NOTE 2)   ETS 300 121
    2.3.2.2.2 ISUP Version 2   DE/SPS-6001

NOTE 2: Version 1 contains the following supplementary services: DDI, MSN, CLIP, CLIR, COLP, COLR, SUB, MMC, CUG, TP and UUS service 1.

3 User-network interface aspects

3.1 User-network interface
    3.1.1   Layer 1
      3.1.1.1 Primary rate interface   ETS 300 011
      3.1.1.2 Basic rate Interface   ETS 300 012
    3.1.2   Layer 2 basic and primary rate specification   ETS 300 125
      3.1.2.1 Conformance test specification for ETS 300 125   DE/SPS-5001
      3.1.2.2 PICS proforma for ETS 300 125   DE/SPS-5006
      3.1.2.3 PIXIT proforma for ETS 300 125   DE/SPS-5008
    3.1.3   Layer 3 basic call (NOTE 3)   ETS 300 102-1
                                   ETS 300 102-2

    NOTE 3: specifies protocols for circuit switched basic telecommunications.

      3.1.3.1 Conformance test specification for ETS 300 102-1   DE/SPS-5002
      3.1.3.2 PICS proforma for ETS 300 102-1   DE/SPS-5007
      3.1.3.3 PIXIT proforma for ETS 300 102-1   DE/SPS-5009
      3.1.3.4 Use of ISDN for accessing packet switching functions ETS 300 007
      3.1.3.5 Conformance test specification for ETS 300 007   DE/SPS-5003
      3.1.3.6 Application document for the coding of   ETR 018
        information elements
      3.1.3.7 Application of ETS 300 102-1 to videotelephony   DE/SPS-5010
        and telephony 7 kHz

Annex A: ISDN services and specifications - matrix

A.1 Introduction

The tables contained in this annex list all the ETSs required for defining basic services (i.e. bearer and teleservices), supplementary services and network capabilities as required by the ETSI work programme for the European ISDN.

Each service is described in an entry matrix. The vertical entries are all specific parts where a given service can be defined. These are:

Stage 1:   This part is an overall description from the user's standpoint.

Stage 2:   This part is an overall description of the organization of the network functions to map service requirements into network capabilities.

Stage 3a: This part is the definition of switching and signalling capabilities needed to support services at the access protocol ("a" stands for access).

Stage 3n: This part is the definition of switching and signalling capabilities needed to support services in the network ("n" stands for network).

Protocol: Under this item only user-plane protocol specifications are listed.

For each of these vertical entries there is a column where the relevant ETS specifying the requirements, conformance testing (Conf.) and attachment testing (Attach.) is entered. ETRs are also included where relevant, and there is a column for CCITT Recommendations (Rel.Rec.) related to the requirement's ETS.

The following key applies to entries in the matrices:

    N/A   Not applicable

           None

    NOTE 1: Generic procedures for supplementary services (stage 3a) are included in draft ETSs 300 122 and ETS 300 196. Interactions between supplementary services are included in ETS 300 195.

    NOTE 2: There are no additional requirements over and above the basic call control procedures specified in ETS 300 102-1. Therefore no additional ETS is required.

    NOTE 3: Outside the scope of the ISM work programme

    NOTE 4: For equipment with ISDN interface.

A.2.3 Packet-mode (X.31 case B) B- and D- channel

Type: Bearer

Items	ETS/ETR	Conf.	Attach.	Rel.Rec.
Stage 1	300 048 300 049	N/A	N/A	1.232.1
Stage 2	T/S 23-03	N/A	N/A	--
Stage 3a	300 007	DE/SPS-5003	300 077	Q.931/ X.31
Protocol	300 007	DE/SPS-5003	300 077	X.31

NOTE: ETS 300 007 goes somewhat beyond stage 3 specification of the packet-mode switched bearer service in that it also includes specification of X.25 Terminal Adaptor which is ussually outside the scope of a stage 3 specification. In addition, some aspects of the stage 1 ETS (e.g. PLL access method an the D-channel) is not explicitly specified in ETS 300 007.

A.2.4 Circuit-mode speech

Type: Bearer

Items	ETS/ETR	Conf.	Attach.	Rel.Rec.
Stage 1	300 109	N/A	N/A	1.231.2
Stage 2	T/S 23-01	N/A	N/A	Q.71
Stage 3a	300 102-1 300 102-2 ETR 018	DE/SPS-5002	300 104 300 156	Q.931
Stage 3n	300 121	DE/SPS-6004	N/A	Q.767
Protocol	300 083	300 083	--	G.711

A.2.7 Teletex

Type: **Teleservice**

Items	ETS/ETR	Conf.	Attach.	Rel.Rec.
Stage 1	T/NA1(90)03	N/A	N/A	1.241.2
Stage 2	N/A	N/A	N/A	Q.71
Stage 3a	300 102-1 300 102-2 ETR 018	DE/SPS-5002	300 104 300 156	Q.931
Stage 3n	300 121	DE/SPS-6004	N/A	Q.767
Protocol (NOTE 3)	300 080 300 081	300 081	300 081	T.90

A.2.8 Telephony 7 kHz

Type: **Teleservice**

Items	ETS/ETR	Conf.	Attach.	Rel.Rec.
Stage 1	T/NA1(89)32	N/A	N/A	--
Stage 2	T/S 22-14	N/A	N/A	--
Stage 3a	300 102-1 300 102-2 DE/SPS-5010	DE/SPS-5002	300 104 300 156	Q.931
Stage 3n	DE/SPS-6001	DE/SPS-6007	N/A	Q.761/62 Q.763/64
Protocol	T/TE 12-06A 300 144 300 143	T/TE 12-06B	--	G.722 G.725 H.221 H.242

A.3 Supplementary services

A.3.1 Calling Line Identification Presentation (CLIP)

Type: Supplementary

Items	ETS/ETR	Conf.	Attach.	Rel.Rec.
Stage 1	300 089	N/A	N/A	1.251.3
Stage 2	300 091	N/A	N/A	Q.81.3
Stage 3a (NOTE 1)	300 092	T/S 46-34C	--	Q.951.3
Stage 3n	300 121	DE/SPS-6004	N/A	Q.767

A.3.2 Calling Line Identification Restriction (CLIR)

Type: Supplementary

Items	ETS/ETR	Con_.	Attach.	Rel.Rec.
Stage 1	300 090	N/A	N/A	1.251.4
Stage 2	300 091	N/A	N/A	Q.81.4
Stage 3a (NOTE 1)	300 093	T/S 46-34D	--	Q.951.4
Stage 3n	300 121	DE/SPS-6004	N/A	Q.767

A.3.3 Direct Dialling In (DDI)

Type: Supplementary

Items	ETS/ETR	Conf.	Attach.	Rel. Rec.
Stage 1	300 062	N/A	N/A	1.251.1
Stage 2	300 063	N/A	N/A	Q.81.1
Stage 3a (NOTE 1)	300 064	T/S 46-34A	--	Q.951.1
Stage 3n	N/A	N/A	N/A	N/A

A.3.7 Completion of Calls to Busy Subscriber (CCBS)

Type: Supplementary

Items	ETS/ETR	Conf.	Attach.	Rel. Rec.
Stage 1	T/NA1(89)11	N/A	N/A	1.253.3
Stage 2	T/S 22-08	N/A	N/A	Q.83.3
Stage 3a (NOTE 1)	T/S 46-33G	T/S 46-34G	--	Q.953.3
Stage 3n	DE/SPS-6001	DE/SPS-6007	N/A	--

A.3.8 Closed User Group (CUG)

Type: Supplementary

Items	ETS/ETR	Conf.	Attach.	Rel. Rec.
Stage 1	300 136	N/A	N/A	1.255.1
Stage 2	300 137	N/A	N/A	Q.85.1
Stage 3a (NOTE 1)	300 138	T/S 46-34H	--	Q.955.1
Stage 3n	300 121	DE/SPS-6004	N/A	Q.767

A.3.9 User-user Signalling (UUS)

Type: Supplementary

Items	ETS/ETR	Conf.	Attach.	Rel. Rec.
Stage 1	T/NA1(89)06	N/A	N/A	1.257.1
Stage 2	T/S 22-17	N/A	N/A	Q.87.1
Stage 3a (NOTE 1)	300 102-1 Section 7.1	T/S 46-34T	--	Q.931 § 7 Q.957.1
Stage 3n	300 121	DE/SPS-6004	N/A	Q.767

A.3.13 Connected Line Identification Presentation (COLP)

Type: Supplementary

Items	ETS/ETR	Conf.	Attach.	Rel. Rec.
Stage 1	300 094	N/A	N/A	1.251.5
Stage 2	300 096	N/A	N/A	Q.81.5
Stage 3a (NOTE 1)	300 097	T/S 46-34L	--	Q.951.5
Stage 3n	300 121	DE/SPS-6004	N/A	Q.767

A.3.14 Connected Line Identification Restriction (COLR)

Type: Supplementary

Items	ETS/ETR	Conf.	Attach.	Rel. Rec.
Stage 1	300 095	N/A	N/A	1.251.6
Stage 2	300 096	N/A	N/A	Q.81.6
Stage 3a (NOTE 1)	300 098	T/S 46-34M	--	Q.951.6
Stage 3n	300 121	DE/SPS-6004	N/A	Q.767

A.3.15 Malicious Call Identification (MCID)

Type: Supplementary

Items	ETS/ETR	Conf.	Attach.	Rel. Rec.
Stage 1	300 128	N/A	N/A	1.251.7
Stage 2	300 129	N/A	N/A	Q.81.7
Stage 3a (NOTE 1)	300 130	T/S 46-34N	--	Q.951.7
Stage 3n	DE/SPS-6001	DE/SPS-6007	N/A	--

A.3.19 Explicit and Single step Call Transfer (CT)

Type: Supplementary

Items	ETS/ETR	Conf.	Attach.	Rel. Rec.
Stage 1	T/NA1(89)22.1 T/NA1(89)22.2	N/A	N/A	1.252.1
Stage 2	T/S 22-21	N/A	N/A	Q.82.1
Stage 3a (NOTE 1)	T/S 46-33Q1 T/S 46-33Q2	T/S 46-34Q	--	Q.952.1
Stage 3n	DE/SPS-6001	DE/SPS-6007	N/A	--

A.3.20 Call Forwarding Busy (CFB)

Type: Supplementary

Items	ETS/ETR	Conf.	Attach.	Rel. Rec.
Stage 1	300 199	N/A	N/A	1.252.2
Stage 2	300 203	N/A	N/A	Q.82.2
Stage 3a (NOTE 1)	300 207	T/S 46-34R1	--	Q.952.2
Stage 3n	DE/SPS-6001	DE/SPS-6007	N/A	Q.730

A.3.21 Call Forwarding No Reply (CFNR)

Type: Supplementary

Items	ETS/ETR	Conf.	Attach.	Rel. Rec.
Stage 1	300 201	N/A	N/A	1.252.3
Stage 2	300 205	N/A	N/A	Q.82.3
Stage 3a (NOTE 1)	300 207	T/S 46-34R2	--	Q.952.3
Stage 3n	DE/SPS-6001	DE/SPS-6007	N/A	Q.730

A.4 Basic and primary rate user network interface

A.4.1 Basic user network Interface layer 1

Items	ETS/ETR	Conf.	Attach.	Rel. Rec.
Decription	300 012	300 012	300 ¹53	1.430
Safety & Protection (NOTE 4)	300 047-1 300 047-2 300 047-3 300 047-4 300 047-5	300 047-1 300 047-2 300 047-3 300 047-4 300 047-5	3G3 153	K.22
Maintenance	ETR 001	N/A	N/A	1.601 1.603
EMC (NOTE 4)	300 126	300 126	N/A	--

A.4.2 Primary rate user-network Interface layer 1

Items	ETS/ETR	Conf.	Attach.	Rel. Rec.
Description	300 011	300 011	300 156	1.431
Safety & Protection (NOTE 4)	300 046-1 300 046-2 300 046-3 300 046-4 300 046-5	300 046-1 300 046-2 300 046-3 300 046-4 300 046-5	300 156	--
Maintenance	ETR 001	N/A	N/A	1.601 1.604
EMC (NOTE 4)	300 126	300 126	N/A	--

A.4.3 Basic rate user network Interface layer 2 (control plane)

Items	ETS/ETR	Conf.	Attach.	Rel.Rec.
Description	300 125	DE/SPS-5001	300 153	Q.920 Q.921

A.4.4 Primary rate user network Interface layer 2 (control plane)

Items	ETS/ETR	Conf.	Attach.	Rel.Rec.
Description	300 125	DE/SPS-5001	300 156	Q.920 Q.921

A.6 Network capabilities

Items	ETS/ETR	Rel.Rec.
Numbering and Addressing	ETR 006	E.164/ 165
Routing	300 100	E.170 1.132
Public/Private Numbering	DTR/NA-2002	--
Terminal Selection	DTR/NA-2007	1.333
Teleservice Interworking	ETR 030	I.5XX series

The only reason why a service will not operate is if either:

    a)   the service is not provided by the network; or

    b)   the service is not provided by the terminal equipment

A terminal equipment which supports standardised services may therefore be connected to any ISDN (public or private) at the access points X1, X2, X3 or X4 of figure 1.

Terminal Interchangeability includes interchanging terminal equipments between two accesses:

    1.   on one public network;

    2.   on two different public networks;

    3.   on one private network;

    4.   on two different private networks;

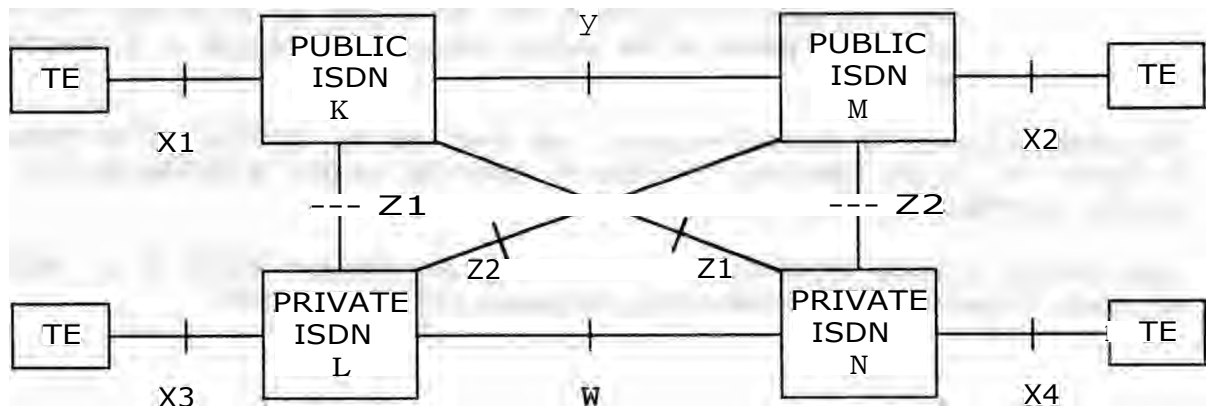   5.   one on a public network and one on a private network.

Figure 1[1] : Access and interconnection points in ISDN concept

B.3 Achieving terminal interchangeability in the standardisation process

Practical Terminal Interchangeability requires that the standards defining the services of the ISDN are written in a manner which prevents deliberate (or accidental) selection of options within a standard which will prevent two implementations of a service, each of which conform to the standard, failing to interwork.

However, the definition should not prevent terminal equipment or network suppliers from choosing to support only a limited set of the options of a service.

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[1] The interconnections W, Y and Z of figure 1 are not relevant to the subject of Terminal interchangeability.

Standardisation of the services and interfaces at point W of figure 1 is the subject of work currently being undertaken by ECMA.

Standardisation of the interface at point Y in figure 1 is the subject of work currently being undertaken by ETSI.

The public ISDN access points (Z1 and Z2) in figure 1 may be different to the access points X1 and X2. Standardisation of the interfaces and services at the access points Z1 and Z2 would allow for ISPBX interchangeability.

It is assumed that an unskilled user would not perform the reconfigurations or modifications necessary to achieve ISPBX interchangeability.

Annex C: Principles for standardisation alignment between public and private ISDNs

Joint ITAEGT (Information Technology Expert Group for private Telecommunications) and ISM (ISDN Standards Management) statement

ITAEGT and ISM have considered, in particular, the need for common service descriptions for public and private ISDN. Already ISM has produced stage 1 service descriptions, taking into account requirements form private ISDNs (presented by ECMA and ETSI TC-BT). As a general aim, a single service description document covering both public and private ISDNs is desirable.

To enhance the aim of producing a single service description document, there should be a single base standard and with conformance statements for both the public and private ISDNs.

It is further considered that this aim should be applied to all the standards being produced for public and private ISDNs. However, the time constraints of both the ISM and ITAEGT programmes of work made this difficult in the short term, but this should not constrain the long term aims.

Therefore, ITAEGT and ISM recommend that the following principles should be adopted for future standardization activities in the areas of public and private ISDNs:

1   Where European Standards for corresponding services are being developed concurrently in the public and private ISDN domain, the standardization bodies concerned deciare:

- that, while recognizing that some differences in the standards may be essential, unnecessary differences shall be avoided;

- a common format and layout should be used for both public and private network standards;

- there shall be, following ITAEGT procedures, a timely exchange of information;

- European ISDN Standards should indicate the differences between public and private applications.

2   Where a European Standard exists for a service for the public ISDN but not for the private ISDN, and it is decided to develop a standard for the private ISDN, the public ISDN standard shall form the core for a common ISDN standard, so that the user's perception of the service shall be kept the same as far as possible.

Necessary differences between the requirements of public and private networks shall be explicitly indicated by conformance statements.

3   Where a European Standard exists for a service for the private ISDN but not for the public ISDN, and it is decided to develop a standard for the public ISDN, the private ISDN standard shall form the core for a common ISDN standard, so that the user's perception of the service shall be kept the same as far as possible.

Necessary differences between the requirements of public and private networks shall be explicitly indicated by conformance statements.

4   Coordination is required to prevent unnecessary duplication of the development of standards.

Annex D: Abbreviations used in this document

CCITT	Comitö Consultatif International Tölägraphique et Tölöphonique
ECMA	European Computer Manufacturers Association
EMC	Electro-Magnetic Compatibility
ETR	European Technical Report
ETS	European Telecommunications Standard
ISDN	Integrated Services Digital Network
ISM	ISDN Standards Management
ISPBX	ISDN Private Branch Exchange
ISUP	ISDN User Part of CCITT Signalling System No. 7
ITAEGT	Information Technology Advisory (and Coordination) Expert Group for private Telecommunication networks
ITU	International Telecommunication Union
MOU	Memorandum of Understanding
MW	Message Transfer Part of CCITT Signalling System No. 7
MTUP	MW Testing User Part of CCITT Signalling System No. 7
NET	Normes Europöennes de Tölöcommunications
SCCP	Signalling Connection Control Part of CCITT Signalling System No. 7
SRC	Strategic Review Committee (on ISDN)
TC BT	Technical Committee Business Telecommunications
TCAP	Transaction Capabilities of CCITT Signalling System No. 7
VPN	Virtual Private Network