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Transmission and Multiplexing (TM); Physical layer User Network Interface (UNI) for 2 048 kbit/s Asynchronous Transfer Mode (ATM) signals

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Foreword

This European Telecommunication Standard (ETS) defines the user network access physical layer interface to be applied to the T_B , S_B reference points of the reference configurations of the B-ISDN User Network Interface (UNI) for Broadband Integrated Services Digital Network (B-ISDN) applications. It addresses the structure of the transmission system that is used at these interfaces as well as the implementation of the UNI related Operation Administration and Maintenance (OAM) functions at the physical layer.

This ETS has been produced by the Transmission and Multiplexing Technical Committee of the European Telecommunications Standards Institute (ETSI) taking into account the recommendations given in ITU-T Recommendations I.413 [7] and I.432 [8].

Transposition dates	
Date of adoption:	4 April 1997
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1 Scope

This European Telecommunication Standard (ETS) defines the physical layer interface to be applied to the S_B and T_B reference points of the reference configurations of the Broadband Integrated Services Digital Network (B-ISDN) User Network Interface (UNI) at 2 048 kbit/s. It addresses separately the physical media and the transmission system used at these interfaces and addresses also the implementation of UNI related Operation Administration and Maintenance (OAM) functions.

The physical medium for the interfaces at the S_B and T_B reference points should take into account that only electrical wires are to be used to cable customer equipment.

This ETS mainly is based on ETS 300 300 [13], being responsible for the bit rates 155 520 kbit/s and 622 080 kbit/s and the ITU-T Recommendation I.432 [8] being responsible for the bit rates 622 080 kbit/s, 155 520 kbit/s, 2 048 kbit/s and 1 544 kbit/s.

2 Normative references

This ETS incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ITU-T Recommendation G.804: "ATM cell mapping into Plesiochronous Digital Hierarchy (PDH)".
- [2] ETS 300 166 (1993): "Transmission and Multiplexing (TM); Physical and electrical characteristics of hierarchical digital interfaces for equipment using the 2048 kbit/s - based plesiochronous or synchronous digital hierarchies".
- [3] ITU-T Recommendation I.431: "Primary rate user-network interface - Layer 1 specification".
- [4] ITU-T Recommendation G.823 (1993): "The control of jitter and wander within digital networks which are based on the 2 048 kbit/s hierarchy".
- [5] ITU-T Recommendation I.113 (1993): "Vocabulary of terms for broadband aspects of ISDN".
- [6] ITU-T Recommendation I.361 (1993): "B-ISDN ATM Layer specification".
- [7] ITU-T Recommendation I.413 (1993): "B-ISDN user-network interface".
- [8] ITU-T Recommendation I.432.1 (1995): "B-ISDN user-network interface - Physical Layer specification, General Characteristics".
ITU-T Recommendation I.432.3 (1995): "B-ISDN user-network interface - Physical Layer specification for 2 048 kbit/s".
- [9] ITU-T Recommendation I.610 (1993): "B-ISDN operation and maintenance principles and functions".
- [10] ITU-T Recommendation X.200: "Information technology - Open Systems Interconnection - Basic reference model: The basic model".
- [11] IEC 950: "Safety of information technology equipment, including electrical business equipment".
- [12] ITU-T Recommendation I.321 (1991): "B-ISDN protocol reference model and its application".

- [13] ETS 300 300 (1997): "Broadband Integrated Services Digital Network (B-ISDN); Synchronous Digital Hierarchy (SDH) based user network access; Physical layer User Network Interfaces (UNI) for 155 520 kbit/s and 622 080 kbit/s Asynchronous Transfer Mode (ATM) B-ISDN applications".
- [14] ITU-T Recommendation I.604: "Application of maintenance principles to ISDN primary rate access".
- [15] ITU-T Recommendation G.706: "Frame alignment and cyclic redundancy check (CRC) procedures relating to basic frame structures defined in Recommendation G.704".
- [16] ITU-T Recommendation G.704: "Synchronous frame structures at primary and secondary hierarchical levels".
- [17] ITU-T Recommendation G.732: "Characteristics of primary PCM multiplex equipment operating at 2 048 kbit/s".
- [18] ITU-T Recommendation G.775: "Loss of signal (LOS) and alarm indication signal (AIS) defect detection and clearance criteria".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS, the definitions given in ITU-T Recommendation I.113 [5] apply, specially for idle cell, valid cell and invalid cell.

to be defined: These items or values are not yet specified.

for further study: These items are required for further study.

3.2 Abbreviations

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For the purposes of this ETS, the following abbreviations apply:

AIS	Alarm Indication Signal
ATM	Asynchronous Transfer Mode
B-ISDN	Broadband Integrated Services Digital Network
B-NT	Broadband Network Termination
B-TA	Broadband Terminal Adapter
B-TE	Broadband Terminal Equipment
B-UNI	Broadband-User Network Interface
BER	Bit Error Rate
CATV	CABLE TeleVISION
CLP	Cell Loss Priority
CMI	Coded Mark Inversion
CRC	Cyclic Redundancy Check
EMC	Electro-Magnetic Compatibility
EMI	Electro-Magnetic Interference
FAW	Frame Alignment Word
HEC	Header Error Control
ISDN	Integrated Services Digital Network
LAN	Local Area Network
LCD	Loss of Cell Delineation
LOF	Loss Of Frame
LOS	Loss Of Signal
LSB	Least Significant Bit
MA	Medium Adapter
MPH	Management Physical Header
MSB	Most Significant Bit

NRZ	Non Return to Zero
OAM	Operation Administration and Maintenance
OCD	Out of Cell Delineation
OSI	Open Systems Interconnection
PDH	Plesiochronous Digital Hierarchy
ppm	parts per million
PH	Physical Header
PM	Physical Medium
RAI	Remote Alarm Indication
RDI	Remote Defect Indication
REI	Remote Error Indication
SDH	Synchronous Digital Hierarchy
SMF	Sub Multi Frame
STI	Surface Transfer Impedance
TC	Transmission Convergence
TFV	Terminal Failure Voltage
TS	Time Slot
UNI	User Network Interface
VC	Virtual Container
VP	Virtual Path

4 Reference configuration at the user-network interface

4.1 Functional groups and reference points

The reference configurations defined for ISDN basic access and primary access are considered general enough to be applicable to all aspects of the B-ISDN accesses.

Figure 1 shows the B-ISDN reference configurations which contain the following:

- functional groups: B-NT1, B-NT2, B-TE1, TE2, B-TE2, and B-TA;
- reference points: T_B , S_B and R.

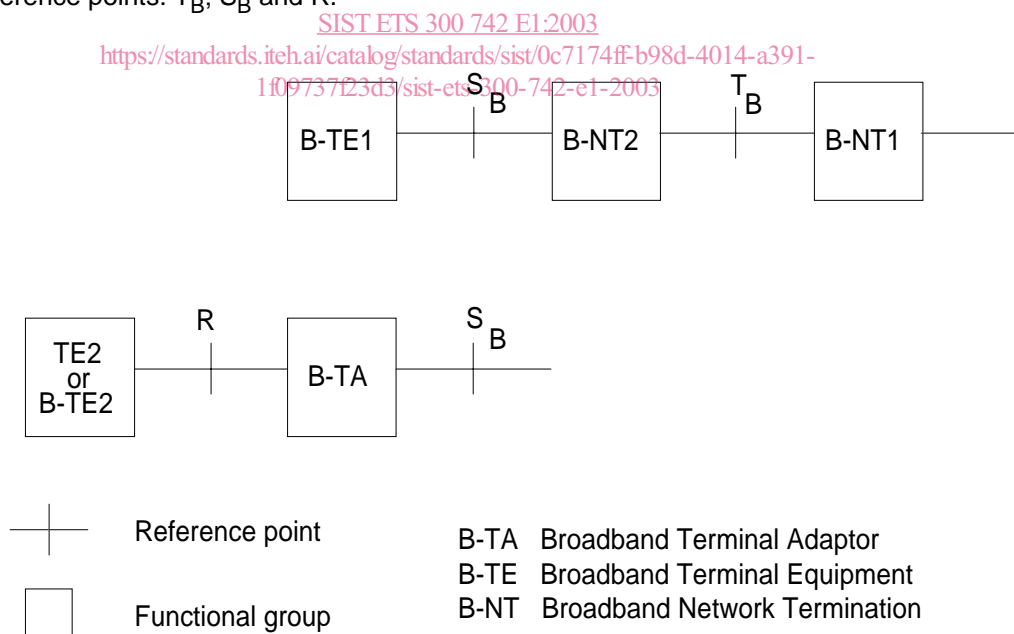


Figure 1: B-ISDN reference configurations

In order to clearly illustrate the broadband aspects, the notation for reference points and for functional groups with broadband capabilities are appended with the letter B (e.g. B-NT1, T_B). The broadband functional groups are equivalent to the functional groups defined in ISDN. Interfaces at the R reference point may or may not have broadband capabilities.

Interfaces at reference points S_B and T_B will be standardized. These interfaces will support all ISDN services.

4.2 Examples of physical realizations

Figure 2 gives examples of physical configurations illustrating combinations of physical interfaces at various reference points. The examples cover configurations that could be supported by standardized interfaces at reference points S_B and T_B . Other configurations may also exist. For example, physical configurations of B-NT2 may be distributed or use shared medium to support Local Area Network (LAN) emulation and other applications.

Figure 3 illustrates possible physical configurations, but does not preclude alternative configurations. Whether a single interface at the S_B reference point can cover different configurations, as illustrated in figure 3, is for further study.

Figures 2a and 2b show separate interfaces at the S_B and T_B reference points; figures 2c) and 2d) show an interface at S_B but not at T_B ; figures 2e and 2f show an interface at T_B but not at S_B ; figures 2g and 2h show separate interfaces at S , S_B and T_B ; figures 2i and 2j show interfaces at S_B and T_B which are coincident.

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