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Digitalno omreģje z integriranimi storitvami (ISDN) ï Primarni vmesnik uporabnik-omreģje ï Specifikacija prve plasti in naļ ela preskuġanja

Integrated Services Digital Network (ISDN); Primary rate user-network interface; Layer 1 specification and test principles

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Foreword

This European Telecommunication Standard (ETS) was produced by the Transmission and Multiplexing (TM) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETS aims to meet urgent requirements of network operators and equipment manufacturers who are designing equipment to operate with an Integrated Services Digital Network (ISDN) primary rate access user-network interface. This ETS shall replace CEPT Recommendation T/L 03-14 (November 1987).

This ETS is based upon CCITT Recommendation I.431 (1988) [9] and provides modifications and further requirements to that base document. It also is affected by CCITT Recommendations G.703 [2], G.704 [3] and G.706 [4] (1988), and modifications and statements to these CCITT Recommendations are provided within this ETS.

This ETS also takes into account requirements contained in ECMA Standard 104: "Physical layer at the primary rate access interface between data processing equipment and private switching networks (1985)", which are given in Annex B.

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1 Scope

This European Telecommunication Standard (ETS) specifies requirements and test principles for the ISDN 72048 kbit/s primary rate user-network interface including the physical, electrical and functional characteristics and the information exchange with higher layers. Compliance with this ETS ensures that, with regard to layer 1 interface aspects, equipment for use with ISDN primary rate access is portable within countries that adhere to this ETS and, furthermore, that interworking with higher layer protocols for ISDN is supported.

This ETS is applicable to equipment having interface I_a or I_b for the connection to the ISDN primary rate user-network interface intended to be installed on customers' premises. In accordance with CCITT Recommendation I.411 [10], this ETS is to be applied to interfaces at reference points S, T and S/T (coincident S and T) of the ISDN reference configuration.

This ETS is applicable for ISDN channel arrangements as defined in CCITT Recommendation I.412 [11], as far as the primary rate at 2048 kbit/s is concerned.

This ETS is based on CCITT Recommendation I.431 [9] and gives further requirements or modifications to that Recommendation. Furthermore, this ETS identifies for each clause of CCITT Recommendation I.431 [9] whether it is regarded as normative, informative or as not relevant in the sense of an ETS.

This ETS also specifies, in Annex A, reference configurations and special requirements for application of this interface as a user-network interface for leased lines or as a user-user interface in particular for Private Telecommunications Network Exchange (PTNX) interconnections.

Annex B specifies additional requirements for interfaces at reference point S.

Annex C to this ETS specifies the relevant test principles to verify the requirements, and for testing conformance to this ETS. It is outside the scope of this ETS to define the static conformance requirements an equipment has to meet for attachment approval to a public network.

This ETS does not specify:

- safety requirements;
- interface or equipment overvoltage protection requirements;
- immunity requirements against electromagnetic interferences;
- emission limitation requirements.

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 amendments or revision. For undated references the latest edition of the publication referred to applies.

[1] ETS 300 012 (1992): "Integrated Services Digital Network (ISDN); Basic rate user-network interface, Layer 1 specification and test principles".

[2] CCITT Recommendation G.703 (1988): "Physical/electrical characteristics of hierarchical digital interfaces".

[3] CCITT Recommendation G.704 (1988): "Synchronous frame structures used at primary and secondary hierarchical levels".

[4] CCITT Recommendation G.706 (1988): "Frame alignment and cyclic redundancy check (CRC) procedures relating to basic frame structures defined in Recommendation G.704".

[5] CCITT Recommendation O.151 (1988): "Error performance measuring equipment for digital systems at the primary bit rate and above".

[6] ETS 300 125: "Integrated Services Digital Network (ISDN); User-network interface data link layer specification, Application of CCITT Recommendations Q.920/I.440 and Q.912/I.441".

[7] prEN 50096: "Integrated Services Digital Network (ISDN); Equipment with ISDN user-network interface at basic and primary rate, EMC requirements".

[8] Final draft prETS 300 046: "Integrated Services Digital Network (ISDN); Primary rate access - safety and protection".

[9] CCITT Recommendation I.431 (1988): "Primary rate user-network interface - Layer 1 specification".

[10] CCITT Recommendation I.411 (1988): "ISDN user-network interfaces - Reference configurations".

[11] CCITT Recommendation I.412 (1988): "ISDN user-network interfaces".

[12] ISO/IEC 10173: "Information Technology Integrated Services Digital Network (ISDN Primary Access Connector at Reference Point S and T)".

[13] ENV 41001 (1987): "ISDN Connector up to 8 pins and up to 2,048 M bit/s".

[14] ETR 001: "Integrated Services Digital Network (ISDN); Customer access maintenance".

[15] EN 60950 (1990): "Safety of information technology equipment including electrically operated business machines".

3 Definitions

For the purpose of this ETS the following definitions, together with those given in Clause 3 of ETS 300 012 [1] and in CCITT Recommendation I.411 [10] apply. Further definitions are given in Annex B.

Terminal equipment (TE): an equipment providing an interface I_a.

NOTE: This term is used in this ETS to indicate terminal-terminating aspects of TE1, TA and NT2 functional groups, where these have an I_a interface.

Terminal equipment type 1 (TE1): this functional group includes functions belonging to the functional group TE, and with an interface that complies with the ISDN user-network interface standard.

Network termination (NT): an equipment providing interface I_b

NOTE: This term is used in this ETS to indicate network-terminating aspects of NT1 and NT2 functional groups where these have an I_b interface.

Network termination type 1 (NT1): this functional group includes functions broadly equivalent to layer 1 (physical) of the OSI reference model. These functions are associated with the proper physical and electromagnetic termination of the network. NT1 functions are:

- Line transmission termination;
- layer 1 maintenance functions and performance monitoring;
- timing;
- layer 1 multiplexing;
- interface termination.

Network termination type 2 (NT2): this functional group includes functions broadly equivalent to layer 1 and higher layers of the CCITT Recommendation X.200 reference model. Private Automatic Branch Exchanges (PABXs), local area networks and terminal controllers are examples of equipment or combinations of equipment that provide NT2 functions. NT2 functions include:

- layer 2 and 3 protocol handling;
- layer 2 and 3 multiplexing;
- switching;
- concentration;
- maintenance functions;
- interface termination and other layer 1 functions.

Terminal adapter (TA): an equipment with interface I_a and one or more auxiliary interfaces that allow non-ISDN terminals to be served by an ISDN user-network interface.

Interface I_a: user side of the ISDN user-network interface for the primary rate access.

Interface I_b: network side of the ISDN user-network interface for the primary rate access.

4 Abbreviations

For the purpose of this standard the following abbreviations apply:

AIS	Alarm Indication Signal
CCITT	Consultative Committee on International Telegraphy and Telephony
CRC	Cyclic redundancy check
FC	Fault Condition
HDB3	High-Density Bi-polar 3 (line code)
ISPBX	Integrated Services Private Branch Exchange
IUT	Implementation Under Test
MPH	Management Primitives
NOF	Normal Operational Frames
NT	Network Termination
PABX	Private Automatic Branch Exchange
PH-AI	Primitive Active Indication
PH-DI	Primitive de-activate indication
PNT	Private Network Termination
PTN	Private Telecommunications Network
PRBS	Pseudo-Random Bit Sequence
PTNX	Private Telecommunications Network Exchange
RAI	Remote Alarm Indication
TA	Terminal Adaptor
TE	Terminal Equipment

Further abbreviations relevant to the test definitions are given in Annex C, Clause C.4.

5 Conformance

Conformance to this ETS can be claimed if the requirements contained in this ETS are complied with when tested according to the tests specified in Annex C.

The only exceptions are the following options:

- either CRC option 1 or CRC option 2 on the network side of the interface;
- the capability of the user side of the interface to support the application as user-network interface for leased line or user-user interface (Annex A);
- the application of the interface structures for different types of channels as defined in CCITT Recommendation I.412 [11];

- the use of bit 2 of timeslot O not containing the frame alignment signal, according to CCITT Recommendation G.706 [4], paragraph 4.

An equipment intended to be used at the S reference point shall conform to Annex B.

An interface at TE intended to be used as a user-network interface for leased lines or as a user-user interface shall meet the requirements of this ETS including those given in Annex A.

6 Requirements

The requirements to this ETS are given in CCITT Recommendation I.431 [9], together with the following statements, modifications and additional requirements to that Recommendation given in table 1 of this ETS.

References in CCITT Recommendation I.431 [9] to CCITT Recommendation I.604 should be read as to ETR 001 [14] (which is a delta document to CCITT Recommendation I.604) and those to CCITT Recommendation I.451 should be read as to ETS 300 102 Part 1.

As CCITT Recommendations I.431 [9], G.703 [2], G.704 [3] and G.706 [4] are only recommendations, it is necessary to indicate the status of the Clauses for the purposes of this ETS, therefore tables 1 to 4, which refer to CCITT Recommendations I.431 [9], G.703 [2], G.704 [3] and G.706 [4] respectively, indicate the status of each Clause as defined below.

Definitions:

N — Normative: Requirements with which it is necessary to comply in order to be able to claim compliance with this ETS. Therefore, functions and features in Clauses of CCITT Recommendation I.431 [9], stated as being normative in this ETS, shall be implemented and followed even if the text is given as a recommendation or an example.

I — Informative: The text of this Clause is provided for information only. Titles for Clauses and subclauses are marked as informative when the requirements are given in further subclauses.

N/R — Not relevant: This Clause is not relevant to this ETS.

Notes under normative Clauses of these CCITT Recommendations are to be considered as informative unless otherwise stated in the relevant table to this ETS.