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Digitalno omrežje z integriranimi storitvami (ISDN) – Primarni vmesnik uporabnik-omrežje (UNI) – 2. del: Specifikacija za preskušanje skladnosti za vmesnika IA in IB

Integrated Services Digital Network (ISDN); Primary rate User-Network Interface (UNI); Part 2: Conformance test specification for interface IA and IB

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ICS:

33.080	Digitalno omrežje z integriranimi storitvami (ISDN)	Integrated Services Digital Network (ISDN)
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Foreword

This second edition 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 (UNI).

This ETS is based upon CCITT Recommendation I.431 and provides modifications and further requirements to that document. It also is affected by CCITT Recommendations G.703, G.704 and G.706, and modifications 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 A.

This ETS consists of 3 parts as follows:

Part 1: "Layer 1 specification";

Part 2: "Conformance test specification for interface I_A and I_B";

Part 3: "Implementation Conformance Statement (ICS) and Implementation eXtra Information for Testing (IXIT) proforma specification for Interface I_A and I_B".

Transposition dates	
Date of adoption of this ETS:	6 March 1998
Date of latest announcement of this ETS (doa):	30 June 1998
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 December 1998
Date of withdrawal of any conflicting National Standard (dow):	31 December 1998

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1 Scope

This second edition European Telecommunication Standard (ETS) provides the test principles used to determine the compliance of an Implementation Under Test (IUT) for the requirements specified in ETS 300 011-1 [3].

It is outside the scope of this ETS to identify the specific tests required by an implementation where equipment has to meet attachment approval.

This ETS is applicable to interfaces I_A and I_B as appropriate. The field of applicability is reported at the beginning of each test.

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] CCITT Recommendation O.151 (1992): "Error performance measuring equipment operating at the primary rate and above".
- [2] ETR 001: "Integrated Services Digital Network (ISDN); Customer access maintenance".
- [3] ETS 300.011-1: "Integrated Services Digital Network (ISDN); Primary rate User Network Interface (UNI); Part 1: Layer 1 specification".
- [4] ETS 300.233 (1994): "Integrated Services Digital Network (ISDN); Access digital section for ISDN primary rate".
- [5] CCITT Recommendation X.200 (1994): "Information technology - Open Systems Interconnection - Basic reference model: The basic model".
- [6] CCITT Recommendation O.162 (1992): "Equipment to perform in-service monitoring on 2 048, 8 448, 34 368 and 139 264 kbit/s signals".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

Alternate Mark Inversion (AMI): Is a code where ONEs are represented by alternate positive and negative pulses, and ZEROs by spaces.

High-Density Bipolar 3 (HDB3): Is a modified AMI code. An exception occurs for blocks of 4 successive ZEROs. Each block of 4 successive ZEROs is replaced by OOOV or BOOV where B represents an inserted pulse conforming to the AMI and V represents an AMI violation. The choice of OOOV or BOOV is made so that the number of B pulses between consecutive V pulses is odd. In other words, successive V pulses are of alternate polarity so that no dc component is introduced.

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.

Network side: NT1, LT and ET functional groups in case of an interface at the T reference point; or relevant parts of the NT2 functional group in case of an interface at the S reference point.

Network option 1: The digital link between interface at the T and V reference point does not provide a CRC-4 processing, i.e. the CRC-4 is terminated in the TE and the ET. This digital link is called to be "without CRC processing" (see subclause 7.2.2.2 of ETS 300 011-1 [3]).

NOTE 1: This option is not provided by the public ISDN at the T reference point. However it might be used for PTNX interconnection using unstructured 2 048 kbit/s leased lines.

Network option 2: The digital link between interface at the T and V reference point provides CRC-4 processing in the NT1 and the ET according ETR 001 [2]. Therefore the combinations of CRC-4 error information and RAI indicate the fault condition; FC1 or FC4 (see subclause 7.2.2.1 of ETS 300 011-1 [3]).

NOTE 2: Option 3 of CCITT Recommendation I.604 with CRC-4 processing in NT1, LT and ET is not relevant for this ETS.

Network Termination (NT): An equipment providing interface I_B .

NOTE 3: 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.

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Network Termination type 2 (NT2): this functional group includes functions broadly equivalent to layer 1 and higher layers of the CCITT Recommendation X.200 [5] reference model. Private Telecommunication Network Exchange (PTNXs), local area networks and terminal controllers are examples of equipment or combinations of equipment that provide NT2 functions. NT2 functions include:

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

Private Telecommunication Network eXchange (PTNX): A nodal identity in a private telecommunication network which provides autonomous and automatic switching and call handling functions used for the provision of telecommunication services which are based on the definitions for those of the public ISDN.

Private Network Termination (PNT): A remote unit of equipment which terminates a transmission system employed between the PTNX and the interface I_B and the S reference point.

Simulator: (terminal or network) device generating a stimulus signal conforming to this ETS to bring the IUT into the required operational state and monitoring the receive signal from the IUT. It can either be a simulator for the user side or the network side of the interface.

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.

Terminal Equipment (TE): An equipment providing an interface I_A .

NOTE 4: This term is used in this ETS to indicate terminal-terminating layer 1 aspects of TE1, TA and NT2 functional groups, where these have an I_A interface.

NOTE 5: In annex A of ETS 300 011-1 [3], this definition applies with the exception that the NT2 functional grouping is not covered.

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.

User side: Terminal terminating layer 1 aspects of TE1, TA and NT2 functional groups.

3.2 Symbols

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

ONE	binary "1"
ZERO	binary "0"

3.3 Abbreviations

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

AIS	Alarm Indication Signal
CRC	Cyclic Redundancy Check
dc	direct current
ET	Exchange Termination
HDB3	High-Density Bi-polar 3 (line code)
HDLC	High level Data Link Control
ICS	Implementation Conformance Statement
IUT	Implementation Under Test
NOF	Normal Operational Frames
NT	Network Termination
PRBS	Pseudo-Random Binary Sequence
PTN	Private Telecommunications Network
PTNX	Private Telecommunications Network Exchange
RAI	Remote Alarm Indication
Rx	Interface signal receiver of IUT or simulator
SMF	Sub-MultiFrame
TA	Terminal Adapter
TE	Terminal Equipment
Tx	Interface signal transmitter of IUT or simulator

4 Conformance tests

4.1 General information

Detailed test equipment accuracy and the specification tolerance of the test devices is not a subject of this ETS. Where such details are provided then those test details are considered as being an "informative" addition to the test description.

The test configurations given do not imply a specific realization of test equipment, nor arrangement, nor the use of specific test devices for conformance testing. However, any test configuration used shall provide those test conditions specified under "system state", "stimulus" and "monitor" for each individual test.

In the case of a multi-access implementation under test supporting interface I_A , unless otherwise stated, only one access at a time shall receive the stimulus. All other accesses shall receive "no signal" (state F3).

4.2 Additional information to support the test

It is assumed that, at least one of the following facilities is provided by IUT:

- 1) a transparent loopback of at least one timeslot towards the interface;

- 2) the ability to transmit a $2^{11}-1$ Pseudo-Random Binary Sequence (PRBS) in a timeslot.

When the IUT does not provide these facilities the equipment supplier may provide:

- a) a test equipment using the same chip set and interface components as in the IUT and able to provide a transparent loopback of at least one timeslot towards the interface; or
- b) a test equipment using the same chip set and interface components as in the IUT and able to provide a $2^{11}-1$ PRBS in a timeslot.

4.3 Connection of the simulator to the IUT

For testing the electrical characteristics of the IUT, the simulator, or its relevant part, shall be connected directly to the interconnecting points for the interface wiring at the IUT unless otherwise stated. For the tests given in subclauses 5.3 (except 5.3.1.1) and 5.5, a cord connected at an IUT shall be removed since a cord is regarded as integral part of the interface wiring.

All other tests may be performed with interface wiring complying with the requirements given in ETS 300 011-1 [3], subclause 4.3.

5 Conformance tests specification

5.1 Functional characteristics tests

These tests are designed to test conformance to the functional characteristics of the layer 1 of primary rate interface.

5.1.1 Frame structure **iTeh STANDARD PREVIEW**

These tests check the frame composition. **(standards.iteh.ai)**

5.1.1.1 Number of bits per timeslot **SIST ETS 300 011-2 E2:2003**

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Test to be performed at higher protocol layers.

5.1.1.2 Number of timeslots per frame

This requirement cannot be verified via layer 1 procedures.

Test to be performed at higher protocol layers.

5.1.1.3 Generation of frame alignment word

Test applicable for I_A and I_B interfaces.

Purpose: To check the correct generation of frame alignment word, multiframe alignment word, CRC bits C₁ to C₄.

Test configuration:

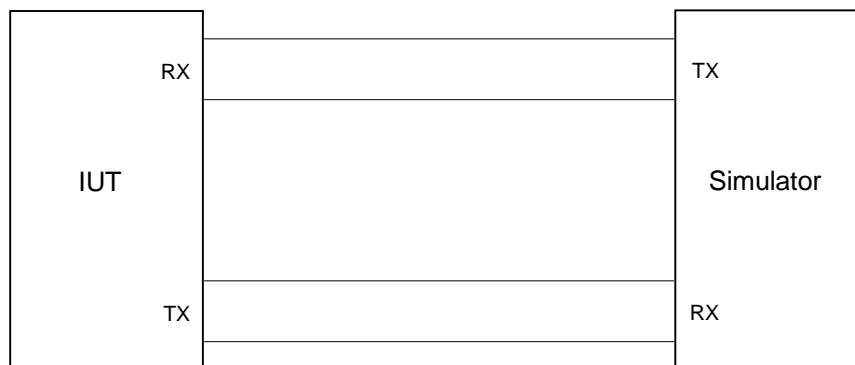


Figure 1: Test of frame alignment word

System state for I_A: Any state F1 to F5.

System state for I_B: State G1, G2, G3, G5.

Stimulus: Relevant signals defined to force IUT to enter the appropriate state.

Monitor: Correct frame alignment word pattern.

Results: No detection of incorrect frame alignment word, multiframe alignment word, and no received sub-multiframes in error within 4 seconds measured in any state. For IUT with CRC-DISABLE function activated (as defined in subclause A.2.3 of ETS 300 011-1 [3]) bit 1 of timeslot 0 shall always be ONE.

During this test the E bit is not considered.

5.1.1.4 S_a bits

Test applicable for I_A and I_B interfaces.

Purpose: To check the S_a bits contained in timeslot 0 of the frame not containing the frame alignment signal:

- bits 4 and 8 are reserved for international use are not defined;
- bits 5, 6 and 7 are specified in ETS 300 233 [4] for use in the access digital section.

Since no specific functions are defined for the S_a bits, no specific test is prescribed for the generation of these S_a bits. The immunity of the receiving side to the S_a bits is implicitly tested with the test described in subclauses 5.2.1 and 5.2.2.

5.1.2 Timeslot assignment

This requirement cannot be verified via layer 1 procedures.

Test to be performed at higher protocol layers.