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**Integrated Services Digital Network (ISDN);  
Primary rate User-Network Interface (UNI);  
Part 3: Implementation Conformance Statement (ICS) and  
Implementation eXtra Information for Testing (IXIT)  
proforma specification for interface I<sub>A</sub> and I<sub>B</sub>**

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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<sub>A</sub> and I<sub>B</sub>";

**Part 3: "Implementation Conformance Statement (ICS) and Implementation eXtra Information for Testing (IXIT) proforma specification for Interface I<sub>A</sub> and I<sub>B</sub>".**

Transposition dates	
Date of adoption of this ETS:	6 March 1998
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## Introduction

To evaluate conformance of a particular implementation, it is necessary to have a statement of which capabilities and options have been implemented for a telecommunication specification. Such a statement is called an Implementation Conformance Statement (ICS).

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## 1 Scope

This second edition European Telecommunication Standard (ETS) provides the Implementation Conformance Statement (ICS) and Implementation eXtra Information for Testing (IXIT) proforma for the Primary rate User Network Interface (UNI), layer 1 specification defined in ETS 300 011-1 [1] in compliance with the relevant requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-4 [3] and ETS 300 406 [2].

## 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 300 011-1 (1996): "Integrated Services Digital Network (ISDN); Primary rate User Network Interface (UNI); Part 1: Layer 1 specification".
- [2] ETS 300 406 (1995): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".
- [3] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance Testing Methodology and Framework - Part 1: General concepts".
- [4] ISO/IEC 9646-7 (1995): "Information technology - Open systems interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".
- [5] EN 60603-7 (1993): "Connectors for frequencies below 3 MHz for use with printed boards - Part 7: Detail specification for connectors, 8-way, including fixed and free connectors with common mating features".
- [6] CCITT Recommendation X.200 (1994): "Information technology - Open Systems Interconnection - Basic reference model: The basic model".
- [7] ETS 300 011-2 (1996): "Integrated Services Digital Network (ISDN); Primary rate User Network Interface (UNI); Part 2: Conformance test specification for interface I<sub>A</sub> and I<sub>B</sub>".
- [8] ISO/IEC 10173 (1991): "Information technology - Integrated Services Digital Network (ISDN) primary access connector at reference points S and T".

## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

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

**interface I<sub>A</sub>**: User side of the ISDN UNI for the primary rate access.

**interface I<sub>B</sub>**: Network side of the ISDN UNI 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 Termination (NT)**: An equipment providing interface I<sub>B</sub>

NOTE: This term is used in this ETS to indicate network-terminating aspects of NT1 and NT2 functional groups where these have an I<sub>B</sub> 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 [6] reference model. Private Telecommunication Network Exchanges (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.

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

**User side:** Terminal terminating layer 1 aspects of TE1, Terminal Adapter (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 purpose of this ETS, the following abbreviations apply:

AIS	Alarm Indication Signal
CRC	Cyclic Redundancy Check
HDB3	High-Density Bi-polar 3 (line code)
HDLC	High level Data Link Control
ICS	Implementation Conformance Statement
IUT	Implementation Under Test
IXIT	Implementation eXtra Information for Testing
LOS	Loss Of Signal
MPH	Management (entity) - PPhysical (layer) [primitive]
MPH-AI	MPH - Activate Indication
MPH-DI	MPH - Error Indication
NOF	Normal Operational Frames
NT	Network Termination
PCTR	Protocol Conformance Test Report
PH	PHysical (layer)
PH-AI	PH - Activate Indication



PH-DI	PH - Deactivate Indication
PNT	Private Network Termination
PRBS	Pseudo-Random Binary Sequence
PTN	Private Telecommunications Network
PTNX	Private Telecommunications Network Exchange
RAI	Remote Alarm Indication
RSE	Remote Single layer Embedded
SCS	System Conformance Statement
SCTR	System Conformance Test Report
SMF	Sub-MultiFrame
SUT	System Under Test
TA	Terminal Adapter
TE	Terminal Equipment

## Annex A (normative): ICS proforma for ETS 300 011-1

Notwithstanding the provisions of the copyright clause related to the text of this ETS ETSI grants that users of this ETS may freely reproduce the Implementation Conformance Statement (ICS) proforma in this annex so that it can be used for its intended purposes and may further publish the completed ICS.

### A.1 Guidance for completing the ICS proforma

#### A.1.1 Purposes and structure

The purpose of this ICS proforma is to provide a mechanism whereby a supplier of an implementation of the requirements defined in ETS 300 011-1 [1] may provide information about the implementation in a standardized manner.

The ICS proforma is subdivided into subclauses for the following categories of information:

- guidance for completing the ICS proforma;
- identification of the implementation;
- identification of the reference ETS;
- global statement of conformance.

#### A.1.2 Abbreviations and conventions

The ICS proforma contained in this annex is comprised of information in tabular form in accordance with the guidelines presented in ISO/IEC 9646-7 [4].

##### Item column

The item column contains a number which identifies the item in the table.

##### Item description column

The item description column describes in free text each respective item (e.g. parameters, timers, etc.). It implicitly means "is <item description> supported by the implementation?".

##### Status column

The following notations, defined in ISO/IEC 9646-7 [4], are used for the status column:

m	mandatory - the capability is required to be supported;
o	optional - the capability may be supported or not;
n/a	not applicable - in the given context, it is impossible to use the capability;
x	prohibited (excluded) - there is a requirement not to use this capability in the given context;
o.i	qualified optional - for mutually exclusive or selectable options from a set. "i" is an integer which identifies a unique group of related optional items and the logic of their selection which is defined immediately following the table;
ci	conditional - the requirement on the capability ("m", "o", "x" or "n/a") depends on the support of other optional or conditional items. "i" is an integer identifying a unique conditional status expression which is defined immediately following the table.

##### Reference column

The reference column makes reference to ETS 300 011-1 [1], except where explicitly stated otherwise.

### Support column

The support column shall be filled in by the supplier of the implementation. The following common notations, defined in ISO/IEC 9646-7 [4], are used for the support column:

- Y or y supported by the implementation;
- N or n not supported by the implementation;
- N/A, n/a or - no answer required (allowed only if the status is n/a, directly or after evaluation of a conditional status).

If this ICS proforma is completed in order to describe a multiple-profile support in a system, it is necessary to be able to answer that a capability is supported for one profile and not supported for another. In that case, the supplier shall enter the unique reference to a conditional expression, preceded by "?" (e.g. ?3). This expression shall be given in the space for comments provided at the bottom of the table. It uses predicates defined in the System Conformance Statement (SCS), each of which refers to a single profile and which takes the value TRUE if and only if that profile is to be used.

EXAMPLE:               ?3:    IF prof1 THEN Y ELSE N.

It is also possible to provide a comment to an answer in the space provided at the bottom of the table.

### Values allowed column

The values allowed column contains the type, the list, the range, or the length of values allowed. The following notations are used:

- range of values:               <min value> .. <max value>  
example:                        5 .. 20
- list of values:                 <value1>, <value2>, ....., <valueN>  
example:                        2 ,4 ,6 ,8, 9  
example:                        '1101'B, '1011'B, '1111'B  
example:                        '0A'H, '34'H, 2F'H
- list of named values:         <name1>(<val1>), <name2>(<val2>), ....., <nameN>(<valN>)  
example:                        reject(1), accept(2)
- length:                         size (<min size> .. <max size>)  
example:                        size (1 .. 8)

### Values supported column

The values supported column shall be filled in by the supplier of the implementation. In this column, the values or the ranges of values supported by the implementation shall be indicated.

### References to items

For each possible item answer (answer in the support column) within the ICS proforma a unique reference exists, used, for example, in the conditional expressions. It is defined as the table identifier, followed by a solidus character "/", followed by the item number in the table. If there is more than one support column in a table, the columns are discriminated by letters (a, b, etc.), respectively.

EXAMPLE 1:               A.5/4 is the reference to the answer of item 4 in table 5 of annex A.

EXAMPLE 2:               A.6/3b is the reference to the second answer (i.e. in the second support column) of item 3 in table 6 of annex A.

### Prerequisite line

A prerequisite line takes the form: Prerequisite: <predicate>.

A prerequisite line after a clause or table title indicates that the whole clause or the whole table is not required to be completed if the predicate is FALSE.

### A.1.3 Instructions for completing the ICS proforma

The supplier of the implementation shall complete the ICS proforma in each of the spaces provided. In particular, an explicit answer shall be entered, in each of the support or supported column boxes provided, using the notation described in subclause A.1.2.

However, the tables containing in subclause A.5 shall only be completed for implementations of interface  $I_A$  and the tables containing in subclause A.6 shall only be completed for implementations of interface  $I_B$ .

If necessary, the supplier may provide additional comments in space at the bottom of the tables, or separately on sheets of paper.

More detailed instructions are given at the beginning of the different subclauses of the ICS proforma.

## A.2 Identification of the implementation

Identification of the Implementation Under Test (IUT) and the system in which it resides (the System Under Test (SUT)) should be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

The product supplier information and client information should both be filled in if they are different.

A person who can answer queries regarding information supplied in the ICS should be named as the contact person.

### A.2.1 Date of the statement

.....

### A.2.2 Implementation Under Test (IUT) identification

IUT name:

.....  
.....

IUT version:

- Hardware:

- Layer 1 chip, type and version: .....

- Board version:.....

- Firmware version:.....

- Software version: .....

### A.2.3 SUT identification

SUT name:

.....  
.....

Hardware configuration:

.....  
.....  
.....

Operating system:

.....

**A.2.4 Product supplier**

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

.....

**A.2.5 Client (if different from product supplier)**

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....  
.....  
.....

**A.2.6 ICS contact person**

(A person to contact if there are any queries concerning the content of the ICS)

Name:

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....  
.....  
.....

**A.3 Identification of the reference ETS**

This ICS proforma applies to the following ETS:

**ETS 300 011-1 [1]:** "Integrated Services Digital Network (ISDN); Primary rate User Network Interface (UNI); Layer 1 specification".

**A.4 Global statement of conformance**

Are all mandatory capabilities implemented? (Yes/No) .....

NOTE: Answering "No" to this question indicates non-conformance to the ETS specification. Non-supported mandatory capabilities are to be identified in the ICS, with an explanation of why the implementation is non-conforming, on pages attached to the ICS proforma.

## A.5 ICS proforma for interface I<sub>A</sub> (TE)

Table A.1: Optional capabilities for interface I<sub>A</sub>

Item No.	Item	Reference	Status	Support
1.1	TE/Network Termination (NT2) has only one UNI.	5.8, 8.3.2 and 8.3.3.1	o.101	
1.2	TE/NT2 has more than one UNI.	5.8, 8.3.2 and 8.3.3.2	o.101	
2.1	TE using interface connector according to EN 60603-7 [5] and a contact assignments given in subclause 4.4 of ETS 300 011-1 [1].	4.4	o.102	
2.2	TE permanently wired to NT.	4.4	o.102	
3	TE/NT2 designed for interconnection via leased lines.	5.8, 8.3.2.2 and 8.3.3.3	o	
4	TE designed to act as master: output frequency accuracy $\pm 32$ ppm.	5.8	o	
5	Is the TE PTNX with a high clock accuracy class: output frequency accuracy $\pm 1$ ppm.	5.8	o	
6	Is the TE designed to be connected to the T reference point only.	5.8	o	
7	Does the TE use bit 2 of frames without frame alignment signal for detection of loss of frame alignment.	6.8.1.1	o	
o.101: It is mandatory to support at least one of these items.				
o.102: It is mandatory to support at least one of these items.				

Table A.2: Timers for interface I<sub>A</sub>

Item No.	Item	Reference	Status	Support	Range/value	
					Allowed	Support
1	Timer for recognition of the persistent receipt of A bit set to 1 Remote Alarm Indication (RAI) and E bit set to 0 (CRC4 error).	6.1	m		10 ms - 50 ms	
2	Timer for recognition of loss of signal.	6.1	m		> 1 ms	
3	The persistent receipt of signals other than normal frames verified by timer T1.	7.3.2.3	m		100 ms - 1 000 ms	
4	The persistent receipt of normal frames verified by timer T2.	7.3.2.3	m		10 ms - 100 ms	



Table A.3: Functional characteristics for interface I<sub>A</sub>

Item No.	Item	Reference	Status	Support
1	Only point-to-point configuration.	4.1	m	
2	Does the IUT provide a point where a shield for the receive and transmit pair can be connected to.	4.3	o.301	
3	Does the IUT provide separate points where a shield of the receive and transmit point can be connected to.	4.3	o.301	
4	Layer 1 functions: B-channel or H0-channel or H1-channel, D-channel. Bit timing, octet timing, frame alignment, power feeding, maintenance and Cyclic Redundancy Check (CRC) procedure.	5.1	m	
5	Two interchange circuits for transmission of digital signals.	5.2	m	
6	Power feeding via the interface.	5.2	m	
7	Interface is permanent active.	5.3	m	
8	Definitions of primitives: - PH-AI Activate indication; - PH-DI Deactivate indication; - MPH-AI Management activate indication; - MPH-DI Management deactivate indication.	5.4	m	
9	Eight bits per time slot.	5.5.1	m	
10	32 time slots per frame.	5.5.2	m	
11	Assignments of bits in time slot 0, frame alignment signal.	5.5.3	m	
12	Allocation of bit 1 to 8 of the frame for a complete CRC-4 multiframe.	5.5.4.1	m	
13	Sub-multiframe.	5.5.4.2	m	
14	Use of bit 1 in CRC-4 multiframe.	5.5.4.3	m	
15	Multiplication/division process.	5.5.5.1	m	
16	Encoding procedure.	5.5.5.2	m	
17	Decoding procedure.	5.5.5.3	m	
18	Independent transmission provided by the time slots.	5.6	m	
19	Code is High-Density Bi-polar 3 (line code) (HDB3).	5.7	m	
20	The TE synchronizes its timing from the signal received.	5.8	m	
21	TE is able to synchronize its clock to more than one interface.	5.8	c301	
22	Does the IUT re-synchronize to the network clock within 30 s, with a frequency deviation of $\pm 1$ ppm	5.8	m	
o.301: It is mandatory to support at least one of these items. c301: If A.1/1.2 THEN m ELSE n/a				

Table A.4: Interface procedures for interface I<sub>A</sub>

Item No.	Item	Reference	Status	Support
1	Signals between the network and user sides: - Normal Operational Frames (NOF); - RAI remote alarm indication; - LOS no received signal; - AIS alarm indication signal; - CRC error information.	6.1	m	
2	States at user sides: - F0 state: Loss of power on users side; - F1 state: Operational state; - F2 state: Reception of RAI; - F3 state: Loss of signal or frame alignment; - F4 state: Reception of AIS; - F5 state: Reception of RAI and continuous CRC error-report; - F6 state: Power on state.	6.2	m	
3	Operational functions as defined in state tables for user side.	6.3 and 6.5/table 5	m	
4	States at network sides:	6.4	n/a	
5	Time slot 16 is assigned to the D-channel.	6.6	m	
6	Assignment of channels (B or H0 or H1).	6.6	m	
7	High level Data Link Control (HDLC) flags to be transmitted when layer 2 has no frames to send.	6.7	m	
8	Loss of frame alignment:	6.8.1.1	m	
9	Strategy for frame alignment recovery:	6.8.1.2	m	
10	CRC multiframe alignment: detection of two valid CRC multiframe alignment signal within 8 ms.	6.8.2	m	
11	CRC bit monitoring.	6.8.3	m	
12	Monitoring procedure.	6.8.3.1	m	
13	Monitoring for false frame alignment: Detection of 915 or more errored CRC blocks out of 1 000 indicates false frame alignment.	6.8.3.2	m	
14	Error performance monitoring using CRC-4, a) direct information; b) integrated information.	6.8.3.3	m	

Table A.5: Maintenance of the interface for interface I<sub>A</sub>

Item No.	Item	Reference	Status	Support
1	Definition of maintenance signals: - RAI, indicates loss of layer 1 capability at the user side, RAI is transmitted in the opposite direction of the error; - AIS, indicates loss of layer 1 capability in the ET-to-TE direction of the UNI; - CRC, error report: E bit.	7.1	m	
2	Use of CRC-4	7.2	n/a	
3	General requirements: - detect anomalies; - detect defects; - take action when anomalies or/and defects are detected; - detect received defect indication signals.	7.3.1	m	
4	Maintenance functions on the user side, anomalies and defects detection: - loss of power; - loss of incoming signal; - loss of frame alignment; - CRC error.	7.3.2.1	m	
5	Detection of defect indication signals on the user side: - RAI; - AIS.	7.3.2.2	m	
6	Consequent actions on the user side (see clause A.2 of ETS 300 011-1 [1] concerning the timers).	7.3.2.3	m	
7	Maintenance function on the network side.	7.3.3	n/a	

Table A.6: Electrical characteristics for interface I<sub>A</sub>

Item No.	Item	Reference	Status	Support
1	Is the interface balanced with an impedance of 120 Ω	8.1	m	
2.1	Bit rate when unsynchronized is 2 048 kbit/s ± 1 ppm (TE PTNX with a high clock accuracy class).	5.8	c601	
2.2	Bit rate when unsynchronized is 2 048 kbit/s ± 32 ppm (PTNX designed as a master).	5.8	c602	
2.3	Bit rate when unsynchronized is 2 048 kbit/s ± 50 ppm (all others).	5.8	c603	
3.1	Is the TE able to synchronize to 2 048 kbit/s ± 1 ppm	5.8	c604	
3.2	Is the TE able to synchronize to 2 048 kbit/s ± 32 ppm (PTNX interconnection).	5.8	c605	
4	Is AIS recognized at a bit rate is 2 048 kbit/s ± 32 ppm	5.8	c606	
5	Is AIS recognized at a bit rate is 2 048 kbit/s ± 50 ppm	5.8	c607	
6	Is the nominal bit rat 2 048 kbit/s	8.2.1	m	
7	Waveform shape including nominal peak voltage: 3 V, peak voltage of a space: 0 ± 0,3 V, nominal pulse width: 244 ns. Ratio of the amplitudes of positive and negative pulses at the centre of pulse interval: 0,95 to 1,05. Ratio of the widths of positive and negative pulses at the nominal half amplitude: 0,95 to 1,05.	8.2.2	m	
8	Return loss at the output port.	8.2.3	m	
9	Impedance towards ground of the output port.	8.2.4	m	
10	Is the receiver able to detect input signal with 6 dB attenuation without errors.	8.3.1	m	
11	Return loss at the input port.	8.3.2	m	
12	Input port immunity against reflections: signal to interference ratio 18 dB.	8.3.3	m	
13	Tolerable longitudinal voltage:	8.3.4	m	
14	Impedance towards ground of the input port.	8.3.5	m	
15.1	TE Input Jitter Tolerance: Minimum tolerance to jitter and wander.	8.4.2.1	c608	
15.2	Tolerable jitter at the inputs (PTNX interconnection).	8.4.2.2	c605	
16.1	TE Output Jitter: only one UNI:	8.4.3.1	c609	
16.2	More than one UNI.	8.4.3.2	c610	
16.3	TE/NT2 interconnection via leased lines.	8.4.3.3	c605	
c601: IF A.1/5 THEN m ELSE n/a c602: IF A.1/4 THEN m ELSE n/a c603: IF (NOT A.1/4 AND NOT A.1/5) THEN m ELSE n/a c604: IF (A.1/5 Or A.1/6) THEN m ELSE n/a c605: IF A.1/3 THEN m ELSE n/a c606: IF (NOT A.1/3 AND NOT A.1/6) THEN m ELSE n/a c607: IF (A.1/3 AND A.1/6) THEN m ELSE o c608: IF (NOT A.1/3) THEN m ELSE n/a c609: IF (A.1/1.1 AND NOT A.1/3) THEN m ELSE n/a c6011: IF (A.1/1.2 AND NOT A.1/3) THEN m ELSE n/a				

Table A.7: Power source for ISDN primary rate

Item No.	Item	Reference	Status	Support
2	Provision of power to the NT1 via I <sub>A</sub> .	9.1	m	
3	Power available at the NT1 - Power > 10 W.	9.2	m	
4	Voltage at the input of the NT1 - -57 V ≤ U ≤ -20 V.	9.3	m	
5	Safety requirements: - protection against short circuits and overload.	9.4	m	

NOTE: The power source can be an integrated part of a TE or physically separated.

Table A.8: Conformance for interface I<sub>A</sub>

Item No.	Item	Reference ETS 300 011-2 [7]	Status	Support
1	Transparent loopback of at least 1 time slot towards the interface.	4.2	o.801	
2	Ability to transmit a 2 <sup>11</sup> -1 Pseudo-Random Binary Sequence (PRBS) in a time slot.	4.2	o.801	

o.801: It is mandatory to support at least one of these items.

## A.6 ICS proforma for interface I<sub>B</sub> (NT)

Table A.9: Optional capabilities for interface I<sub>B</sub>

Item No.	Item	Reference	Status	Support
1.1	Is the network termination of type 1 (NT1).	3.1	o.901	
1.2	Is the network termination of type 2 (NT2).	3.1	o.901	
2.1	Is the NT using interface connector according to ISO/IEC 10173 [8].	4.4	o.902	
2.2	Is the NT hardwired to TE.	4.4	o.902	
3	Does the NT use bit 2 frames not containing frame alignment signal to detect loss of frame alignment.	6.8.1.1	o	
4	Does the digital transmission link process CRC 4.	7.2.2.1	c901	
5	Is the NT powered via the interface.	9.1	o	
6	Does the PTNX act as a timing master.	5.8	c902	

o.901: It is mandatory to support at least one of these items.  
o.902: It is mandatory to support at least one of these items.  
c901: IF A.9/1.1 THEN m ELSE o  
c902: IF A.9/1.2 THEN o ELSE x

Table A.10: Timers for interface I<sub>B</sub>

Item No.	Item	Reference	Status	Support	Range/value	
					Allowed	Support
1	Timer for recognition of the persistent receipt of A bit set to 1 (RAI) and E bit set to 0 (CRC4 error).	6.1	m		10 ms - 50 ms	
2	Timer for recognition of loss of signal.	6.1	m		> 1 ms	
3	The persistent receipt of signals other than normal frames verified by timer T1.	7.3.3.3	m		100 ms - 1 000 ms	
4	The persistent receipt of normal frames verified by timer T2.	7.3.3.3	m		10 ms - 100 ms	

Table A.11: Functional characteristics for interface I<sub>B</sub>

Item No.	Item	Reference	Status	Support
1	Only point-to-point configuration.	4.1	m	
2	Does the IUT provide a point where a shield can be connected to.	4.3	m	
3	Layer 1 functions: B-channel or H0-channel or H1-channel, D-channel. Bit timing, Octet timing, Frame alignment, Power feeding, maintenance and CRC procedure.	5.1	m	
4	Two interchange circuits for transmission of digital signals.	5.2	m	
5	Interface is permanent active.	5.3	m	
6	Definitions of primitives: - PH-AI Activate indication; - PH-DI Deactivate indication; - MPH-AI Management activate indication; - MPH-DI Management deactivate indication.	5.4	m	
7	Eight bits per time slot.	5.5.1	m	
8	32 time slots per frame.	5.5.2	m	
9	Assignments of bits in time slot 0, frame alignment signal.	5.5.3	m	
10	Assignments of bits in time slot 0, CRC4 multiframe alignment signal, CRC4-bits, CRC4 error bits.	5.5.4	m	
11	Allocation of bit 1 to 8 of the frame for a complete CRC-4 multiframe.	5.5.4.1	m	
12	CRC-4 multiframe structure.	5.5.4.2	m	
13	Use of bit 1 in CRC-4 multiframe.	5.5.4.3	m	
14	Multiplication/division process.	5.5.5.1	m	
15	Encoding procedure.	5.5.5.2	m	
16	Decoding procedure.	5.5.5.3	m	
17	Independent transmission provided by the time slots.	5.6	m	
18	Code is HDB3.	5.7	m	
19	The NT derives its timing from the network clock.	5.8	m	

Table A.12: Interface procedures for interface I<sub>B</sub>

Item No.	Item	Reference	Status	Support
1	Definition of signals between the network and user side: - Normal operational frames; - RAI remote alarm indication; - LOS no received signal; - AIS alarm indication signal; - CRC error information.	6.1	m	
2	Definitions of states at network side: - G0 state: Loss of NT power; - G1 state: Operational state; - G2 state: Transmitting RAI; - G3 state: Loss timing at network side; - G4 state: Transmitting AIS; - G5 state: Transmitting RAI and continuous CRC error-report; - G6 state: Power on state.	6.2	m	
3	States at user sides:	6.3	n/a	
4	Operational functions as defined in state tables for network side.	6.4 and 6.5/table 6	m	
5	Time slot 16 is assigned to the D-channel.	6.6	m	
6	Assignment of channels (B or H0 or H1).	6.6	m	
7	HDLC flags to be transmitted when layer 2 has no frames to send.	6.7	m	
8	Loss of frame alignment:	6.8.1.1	m	
9	Strategy for frame alignment recovery:	6.8.1.2	m	
10	CRC multiframe alignment: - detection of two valid CRC multiframe alignment signal within 8 ms.	6.8.2	m	
11	CRC bit monitoring.	6.8.3	m	
12	Monitoring procedure.	6.8.3.1	m	
13	Monitoring for false frame alignment: - Detection of 915 or more errored CRC blocks out of 1 000 indicates false frame alignment.	6.8.3.2	m	

Table A.13: Maintenance of the interface for interface I<sub>B</sub>

Item No.	Item	Reference	Status	Support
1	Definition of maintenance signals - RAI, indicates loss of layer 1 capability at the network side, RAI is transmitted in the opposite direction of the error. - CRC, error report: E bit.	7.1	m	
2	Use of CRC-4.	7.2	n/a	
3	General requirements: - detect anomalies; - detect defects; - take action when anomalies or/and defects are detected; - detect received defect indication signals.	7.3.1	m	
4	Maintenance function on the user side.	7.3.2	n/a	
5	Maintenance functions on the network side, anomalies and defects detection: - loss of power; - loss of incoming signal; - loss of frame alignment; - CRC error.	7.3.3.1	m	
6	Detection of defect and error indication signals on the network side: - RAI; - CRC error report.	7.3.3.2	m	
7	Consequent actions on the network side (see table 21 concerning the timers).	7.3.2.3	m	



Table A.14: Electrical characteristics for interface I<sub>B</sub>

Item No.	Item	Reference	Status	Support
1	Bit rate is 2 048 kbit/s ± 50 ppm when transmitting AIS.	5.8	m	
2	The NT synchronizes its timing to the network clock.	5.8	m	
3	Is the interface balanced with an impedance of 120 ohm.	8.1	m	
4	Is the nominal bit rate 2 048 kbit/s.	8.2.1	m	
5	Waveform shape including nominal peak voltage: 3 V, peak voltage of a space: $0 \pm 0,3$ V, nominal pulse width: 244 ns. Ratio of the amplitudes of positive and negative pulses at the centre of pulse interval: 0,95 to 1,05. Ratio of the widths of positive and negative pulses at the nominal half amplitude: 0,95 to 1,05.	8.2.2	m	
6	Return loss at the output port.	8.2.3	o	
7	Return loss at the input port.	8.3.2	m	
8	Is the receiver able to detect input signal with 6 dB attenuation without errors.	8.3.1	m	
9	Input port immunity against reflections:.	8.3.3	m	
10	Tolerable longitudinal voltage:	8.2.4	m	
11	Impedance towards ground of the output port.	8.3.4	m	
12	Impedance towards ground of the input port.	8.3.5	m	
13	NT1 input jitter tolerance: minimum tolerance to jitter and wander.	8.4.4.1	c1401	
14	NT input jitter tolerance: minimum tolerance to jitter and wander.	8.4.4.2	c1402	
15	NT output jitter: - low - high cut-off = 20 Hz - 100 kHz: - maximum jitter = 1,1 UI; - low - high cut-off = 400 Hz - 100 kHz: - maximum jitter = 0,11 UI.	8.4.3.1	c1401	
16	Leased line output jitter:	8.4.3.2	n/a	
c1401: IF A.9/1.1 THEN m ELSE n/a				
c1402: IF A.9/1.2 THEN m ELSE n/a				

Table A.15: Power feeding for interface I<sub>B</sub>

Item No.	Item	Reference	Status	Support
1	Provision of power to the NT via I <sub>B</sub> .	9.1	c1501	
2	Power consumption of the NT: - power ≤ 10 W.	9.2	c1501	
3	Voltage required by the NT: - $-57 \text{ V} \leq U \leq -20 \text{ V}$ .	9.3	c1501	
4	Safety requirements: no damage of power sink with interchange of wires.	9.4	c1501	
c1501: IF (A.9/1.1 AND A.9/5) THEN m ELSE o				

## Annex B (normative): IXIT proforma for ETS 300 011-1

Notwithstanding the provisions of the copyright clause related to the text of this ETS, ETSI grants that users of this ETS may freely reproduce the SCS, ICS and IXIT proformas in this annex so that they can be used for their intended purposes and may further publish the completed SCS, ICS and IXIT proformas.

### B.1 Guidance for completing the ICS proforma

#### B.1.1 IXIT proforma for interface point I<sub>A</sub> (TE)

##### B.1.1.1 Introduction

In order to test a implementation, information relating to the implementation and its testing environment in addition to that provided by the ICS is essential. Such extra information is called an Implementation eXtra Information for Testing (IXIT). A client who requests a conformance test should provide to the test laboratory a completed IXIT proforma for each layer to be tested.

The proforma provided in table B.2 should be used.

##### B.1.1.2 Proforma structure and contents

The IXIT proformas are tables containing pre-printed guide text and empty table space intended to be used by the client for explanations, specification of details etc.

The proforma given in table B.1 is intended for client indication of the environmental conditions to be used during testing, and test limitations, if any.

NOTE: In case no environmental value or range is indicated by the client, the test laboratory will use a value within the ranges pre-printed in the proforma.

##### B.1.1.3 References to items

For each possible item answer (answer in the support column) within the ICS proforma, a unique reference exists, used, for example, in the conditional expressions. It is defined as the table identifier, followed by a solidus character "/", followed by the item number in the table. If there is more than one support column in a table, the columns are discriminated by letters (a, b, etc.), respectively.

EXAMPLE 1: A.5/4 is the reference to the answer of item 4 in table 5 of annex A.

EXAMPLE 2: A.6/3b is the reference to the second answer (i.e. in the second support column) of item 3 in table 6 of annex A.

##### B.1.1.4 Instructions for completing the ICS proforma

The IXIT proformas should be filled in by the client. The filling in is done according to the pre-printed guide text in the tables indicating the kind of information to be entered.

In order to reduce the test time, it is essential not only that the required explanations, specifications etc. are detailed but also that conditions which cannot be predetermined are explained/specified in details (using empty table space, additional pages or giving references to manuals etc.).

The information provided in a IXIT should not conflict with information provided in the corresponding ICS or with the requirements of the standards.

**Table B.1: Environmental test conditions and test limitations**

TEST CANDIDATE REFERENCE (short identification)				
Environmental test conditions (indicate the conditions to be used during testing):				
Ambient temperature (range)	Relative humidity (range)	Air pressure (range)	Power supply	
			Voltage	Frequency
°C	%	kPa	V ± %	Hz ± %
If no values/ranges are indicated above by the client, the Implementation Under Test (IUT) will be tested under the following conditions				
15°C to 35°C	5 % - 75 %	86 kPa - 106 kPa	within ± 5 % of normal operating voltage	within ± 4 % of normal operating frequency

OTHER TEST CONDITIONS (indicate any other condition that may be needed/useful during testing):

TEST LIMITATIONS (explain if any of the abstract tests cannot be executed because of non implementation of Abstract Layer Primitives etc.):

**B.2 IXIT proforma for interface point I<sub>A</sub> (TE)**

**Table B.2: Means of control and observation and test co-ordination procedures etc.**

Item No.	Reference to ICS	Item	Answer below if relevant or make reference to table B.3
1		Is the power supply an integrated part of the TE.	
2		How is the information about the status indication (the states F0 - F5) presented.	
3		Can a loopback be established. If yes, describe how to do it and describe which time-slot(s) can be looped backed.	
4		Does the TE support leased line interface or user to user interface (PTNX interconnection).	
5		Is the TE user/network interface at the S reference point.	
6		Is the TE user/network interface at the T reference point.	
7		Does the TE have the ability to transmit a 2 <sup>11</sup> -1 PRBS in a time-slot. If yes, describe how to establish it.	
8		Has the TE more than one access. If yes, how many and from which of the accesses can the TE take its synchronization.	
9		What is the setup time for the TE.	

**Table B.3: Clients additional information**

Clients additional information

### B.3 IXIT proforma for interface point I<sub>B</sub> (NT)

Table B.4: Means of control and observation and test co-ordination procedures etc.

Item No.	Reference to ICS	Item	Answer below if relevant or make reference to table B.5
1		How is the information about the status indication (the states G0 - G5) presented.	
2		If the NT has the ability to loopback one or more time slots, describe how the loop is established.	
3		Is the NT UNI at the S reference point.	
4		Is the NT UNI at the T reference point.	
5		If the NT has the ability to transmit a 2 <sup>11</sup> -1 PRBS in a time slot, describe how to establish it.	
6		What is the setup time at power on for the NT.	

Table B.5: Clients additional information

Clients additional information

## History

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