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Poslovne telekomunikacije (BTC) - Digitalni zakupljeni vodi za prenosno hitrost 2 048 kbit/s in za strukturirane signale (D2048S) - Vmesnik terminalske opreme

Business TeleCommunications (BTC); 2 048 kbit/s digital structured leased lines (D2048S); Terminal equipment interface

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Business Telecommunications (BTC) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETS results from a mandate from the Commission of the European Community (CEC) to provide harmonized standards for the support of the Directive on Open Network Provision (ONP) of leased lines (92/44/EEC).

There are two other standards directly related to this ETS:

- ETS 300 418: "Business Telecommunications (BTC); 2 048 kbit/s digital unstructured and structured leased lines (D2048U and D2048S); Network interface presentation";
- ETS 300 419: "Business Telecommunications (BTC); 2 048 kbit/s digital structured leased line (D2048S); Connection characteristics".

This ETS is based on information from ITU-T Recommendations and ETSI publications and the relevant documents are quoted where appropriate.

Transposition dates	
Date of adoption of this ETS	17 November 1995
Date of latest announcement of this ETS (doa):	28 February 1996
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 August 1996
Date of withdrawal of any conflicting National Standard (dow):	31 August 1996

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Introduction

The Council Directive on the application of ONP to leased lines (92/44/EEC) concerns the harmonization of conditions for open and efficient access to, and use of, the leased lines provided over public telecommunications networks, and the availability throughout the European Union (EU) of a minimum set of leased lines with harmonized technical characteristics.

The consequence of the Directive is that telecommunications organizations within the EU shall make available a set of leased lines between points in these countries with specified connection characteristics and specified interfaces.

Two classes of standard will be used for the interfaces of terminal equipment designed for connection to the ONP leased lines. European Telecommunication Standards (ETSS), which are voluntary, give the full technical specifications for these interfaces, whereas Technical Basis for Regulations (TBRs) give the essential requirements under the Second Phase Directive (91/263/EEC) for attachment to the leased lines. This standard, which is an ETS, belongs to the first category. The TBR (TBR 13) is a subset of this corresponding ETS.

ETS 300 166 and CCITT Recommendations G.703, G.704 and G.706 are used as the basis for the terminal interface.

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1 Scope

This ETS specifies the full physical and electrical characteristics, the necessary functional characteristics and the corresponding test principles for a terminal equipment interface for connection to the Network Termination Points (NTPs) of Open Network Provision (ONP) 2 048 kbit/s digital structured leased lines using 120 Ω interfaces with an information transfer rate of 1 984 kbit/s without restriction on binary content.

This ETS is not intended for regulatory purposes. A separate TBR (TBR 13) covers the essential requirements for attachment under the Second Phase Directive (91/263/EEC).

This ETS is to ensure that the interface of the terminal equipment is compatible with the ONP 2 048 kbit/s digital structured leased line. A terminal equipment interface that conforms to this ETS will also be compatible with an ONP 2 048 kbit/s unstructured leased line. This ETS is applicable to all interfaces designed for connection to the leased line, however in the cases of apparatus that carries a particular service, of complex apparatus and of apparatus in private networks, other ETSS may apply in addition to this ETS.

Customer premises wiring and installation between the terminal equipment and the NTP are outside the scope of this ETS.

2 Normative references

This ETS incorporates by dated and 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 into it by amendment or revision. For undated references the latest edition of the publication referred to applies.

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https://standards.iteh.ai/catalog/standards/sist/e1-300-420-e1-2004-417f-0521-1624ad6001a9/sist-ets-300-420-e1-2004
- [1] CCITT Recommendation G.703 (1991): "Physical/electrical characteristics of hierarchical digital interfaces".
 - [2] CCITT Recommendation G.704 (1991): "Synchronous frame structures used at primary and secondary hierarchical levels".
 - [3] CCITT Recommendation O.151 (1992): "Error performance measuring equipment for digital systems at the primary rate and above".
 - [4] CCITT Recommendation O.171 (1992): "Timing jitter measuring equipment for digital systems".
 - [5] EN 60950 (1992): "Safety of information technology equipment including electrical business equipment".
 - [6] ETS 300 046-2 (1992): "Integrated Services Digital Network (ISDN); Primary rate access - safety and protection Part 2: Interface I_a - safety".
 - [7] ETS 300 046-3 (1992): "Integrated Services Digital Network (ISDN); Primary rate access - safety and protection Part 3: Interface I_a - protection".

NOTE: This ETS also contains a number of informative references which have been included to indicate the sources from which various material has been derived, hence they do not have an associated normative reference number. Details of these publications are given in annex F. In some cases the same publication may have been referenced in both a normative and an informative manner.

3 Definitions and abbreviations

3.1 Definitions

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

errored Sub-MultiFrame: A Sub-MultiFrame (SMF) where the calculated Cyclic Redundancy Check-4 bit (CRC-4) does not correspond with the CRC-4 contained within the next SMF (see subclause C.2.2).

frame: A sequence of 256 bits of which the first 8 bits define the frame structure (see annex C).

leased lines: The telecommunications facilities provided by a public telecommunications network that provide defined transmission characteristics between NTPs and that do not include switching functions that the user can control, (e.g. on-demand switching).

multiframe: A sequence of two SMFs containing the multiframe alignment word (see annex C).

Network Termination Point (NTP): All physical connections and their technical access specifications which form part of the public telecommunications network and are necessary for access to and efficient communication through that public network.

PRBS(2¹⁵-1): A Pseudo Random Bit Sequence (PRBS) (as defined in subclause 2.1 of CCITT Recommendation O.151 [3]).

S_a bits: bits 4 to 8 (bits S_{a4} to S_{a8}) in frames not containing the frame alignment signal (see annex C).

Safety Extra-Low Voltage (SELV) circuit: A secondary circuit which is so designed and protected that under normal and single fault conditions, the voltage between any two accessible parts and, for class 1 equipment, between any accessible part and the equipment protective earthing terminal does not exceed a safe value (subclause 1.2.8.5 of EN 60950 [5]).

Sub-Multiframe (SMF): A sequence of 8 frames, each of 256 bits, over which the CRC-4 is calculated (see annex C).

terminal equipment: Equipment intended to be connected to the public telecommunications network, i.e.:

- to be connected directly to the termination of a public telecommunication network; or
- to interwork with a public telecommunications network being connected directly or indirectly to the termination of a public telecommunications network,

in order to send, process, or receive information.

3.2 Abbreviations

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

AIS	Alarm Indication Signal
AMI	Alternate Mark Inversion
CRC-4	Cyclic Redundancy Check-4 bit
D2048S	2 048 kbit/s digital structured leased line
dc	direct current
EMC	ElectroMagnetic Compatibility
ETS-RT	ETS Requirements Table
HDB3	High Density Bipolar code of order 3 (see annex B)
ISDN	Integrated Services Digital Network
NTP	Network Termination Point
ONP	Open Network Provision
ppm	parts per million
PRBS	Pseudo Random Bit Sequence
RAI	Remote Alarm Indication
rms	root mean square

RX	RX is a signal input (at either the terminal equipment interface or the test equipment, see figure 1)
SDH	Synchronous Digital Hierarchy
SELV	Safety Extra-Low Voltage
SMF	Sub-MultiFrame
TX	TX is a signal output (at either the terminal equipment interface or the test equipment, see figure 1)
UI	Unit Interval

4 Requirements

The terminal equipment interface is for use with 2 048 kbit/s structured leased lines that provide bidirectional, point-to-point digital connections with an information transfer rate of 1 984 kbit/s without restriction on binary content. Any structuring of the data within the transparent 1 984 kbit/s part of the frame is the responsibility of the user.

4.1 Physical characteristics

Currently no standardised connector is readily available. Consequently, the only method of connection that can be specified in this ETS is the use of solid conductors of 0,4 mm to 0,6 mm. This ETS requires the terminal equipment to be capable of presenting either a point for the attachment of unterminated solid conductors, or solid conductors themselves (see subclause 4.1.1). It is a requirement that such a connection method be available to be provided for use with the terminal equipment if necessary.

In order to allow connection to be made using other methods (e.g. connectors), the terminal equipment is permitted to be supplied with a connection method suitable for use with those methods (see subclause 4.1.2).

NOTE: The following are examples of arrangements that comply with the requirements. The list below should not be regarded as an exhaustive list of all permitted arrangements:

- a) a cord, permanently connected to the terminal equipment at one end and unterminated at the other end, with wires that are solid conductors with diameters in the range 0,4 mm to 0,6 mm;
- b) a cord, connected via a plug and socket to the terminal equipment at one end and unterminated at the other end, with wires that are solid conductors with diameters in the range 0,4 mm to 0,6 mm;
- c) an insulation displacement connector, designed to accept wires with solid conductors with diameters in the range 0,4 mm to 0,6 mm, but with no cord;
- d) a screw connector, designed to accept wires with solid conductors with diameters in the range 0,4 mm to 0,6 mm, but with no cord;
- e) the arrangement in b) plus one or more additional alternative cords with the same plug or socket arrangement at the terminal end and any plug or socket at the other end;
- f) the arrangement in c) or d) plus one or more cords suitable for connection to the terminal equipment at one end and any plug or socket at the other end.

The transmit pair is the output from the terminal equipment interface. The receive pair is the input to the terminal equipment interface, as shown in figure 1. Where the terms "output" and "input" are used without qualification in this ETS, they refer to the terminal equipment interface.

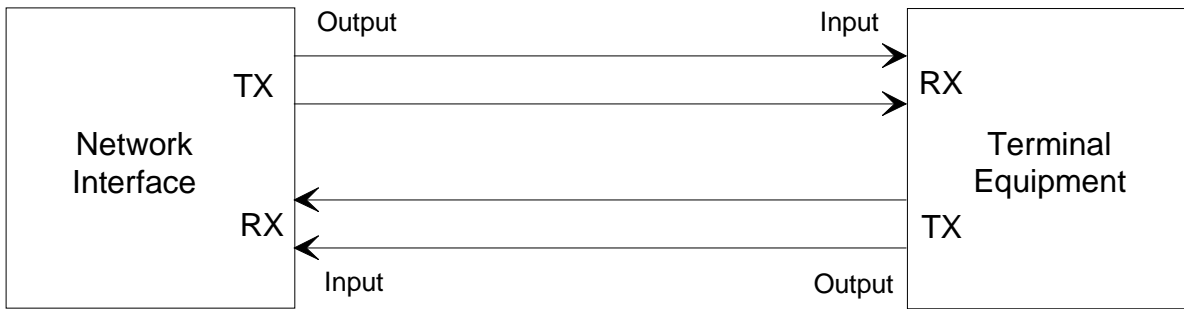


Figure 1

NOTE: The use of a shielded cord or cable may be necessary to meet radiation and immunity requirements defined in ElectroMagnetic Compatibility (EMC) standards.

4.1.1 Hardwired connection

Requirement: The terminal equipment shall provide:

- a) a set of connection contacts (e.g. an insulation displacement connector or a screw terminal block) to which solid wire conductors with diameters in the range 0,4 mm to 0,6 mm may be connected; or
- b) a wiring arrangement connected by any means to the terminal equipment, with unterminated solid wire conductors with diameters in the range 0,4 mm to 0,6 mm at the end distant from the terminal equipment.

Test: There is no test. All subsequent tests are carried out via the specified connection method.

4.1.2 Alternative means of connection

Any alternative means of connection may be provided in addition to the connection arrangements under subclause 4.1.1.

4.2 **Electrical characteristics**

4.2.1 **Output port**

4.2.1.1 **Signal coding**

Requirement: The signal transmitted at the output port shall comply with the High Density Bipolar code of order 3 (HDB3) encoding rules (see annex B).

Test: The test shall be conducted according to subclause A.2.1.

4.2.1.2 **Waveform shape**

Requirement: The pulse at the output port shall comply with the requirements given in table 1 and figure 2, based on CCITT Recommendation G.703 [1].

Table 1: Waveform shape at output port

Pulse shape (nominally rectangular)	All marks of a valid signal shall conform with the mask (see figure 2) irrespective of the polarity. The value V corresponds to the nominal peak voltage of a mark.
Test load impedance	120 Ω non-reactive
Nominal peak voltage V of a mark	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 the 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

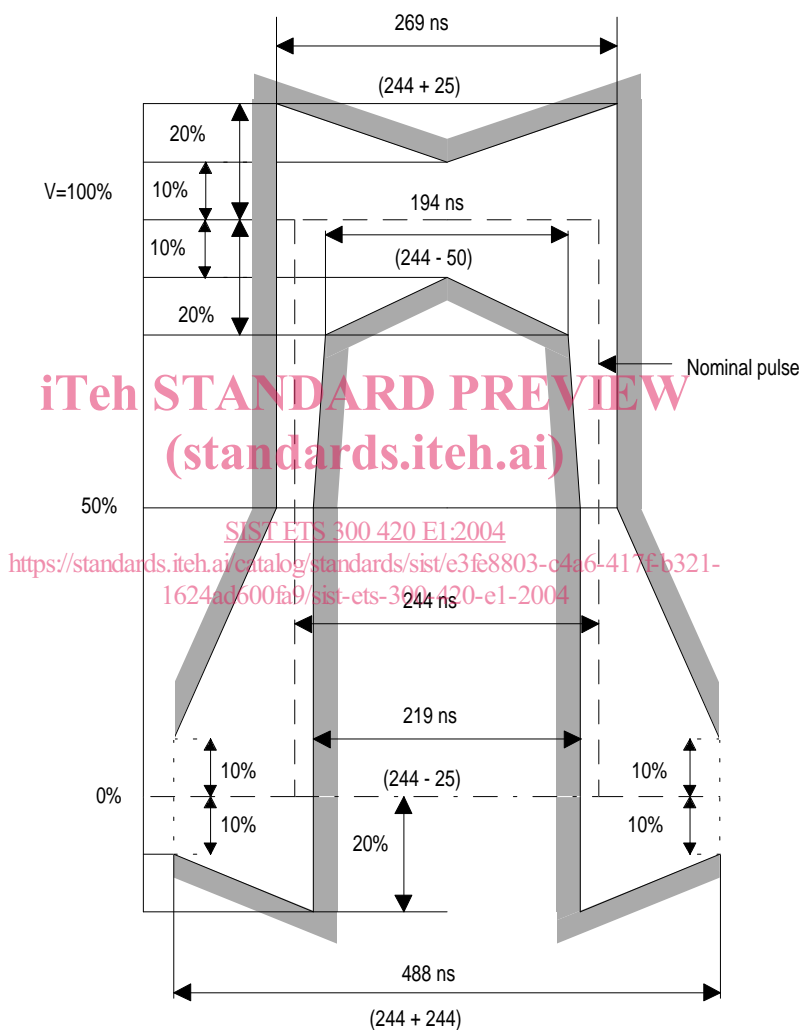


Figure 2: Pulse mask for 2 048 kbit/s pulse

Test: The test shall be conducted according to subclause A.2.2.

4.2.1.3 Output timing

This requirement is such that the terminal equipment is capable of operating when connected to leased lines capable of carrying user timing within the range 2 048 kbit/s \pm 50 parts per million (ppm) and when connected to leased lines that provide timing that is synchronous to the network timing. For further information see annex E.