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Poslovne telekomunikacije (BTC) - Digitalni zakupljeni vodi za prenosno hitrost 2 048 kbit/s in za strukturirane signale (D2048S) - Prenosne znaļ ilnosti

Business TeleCommunications (BTC); 2 048 kbit/s digital structured leased lines (D2048S); Connection characteristics

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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 resulted from a mandate from the Commission of the European Community (CEC) to provide harmonized standards for 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 300 420: "Business TeleCommunications (BTC); 2 048 kbit/s digital structured leased line (D2048S); Terminal equipment interface".

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

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. Under the Second Phase Directive (91/263/EEC), terminal equipment for connection to these leased lines will be required to fulfil certain essential requirements.

CCITT Recommendation I.340 for Integrated Services Digital Network (ISDN) connection types is used as a basis for the connection characteristics. ETS 300 167 and CCITT Recommendations G.704 and G.706 are used as the basis for the structure.

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1 Scope

This ETS specifies the technical requirements and test principles for connection characteristics of Open Network Provision (ONP) 2 048 kbit/s digital structured leased lines. The leased line operates at 2 048 kbit/s and provides an information transmission capability, without restriction on binary content, of 1 984 kbit/s. The remaining 64 kbit/s provides a 8 kHz framing structure in accordance with ETS 300 167 and CCITT Recommendations G.704 and G.706.

A connection is presented via interfaces at Network Termination Points (NTPs) and includes any equipment that may provide the NTP. Signals between terminal equipments are subject to impairments during their transfer over the connection. The limits to these impairments are stated in this ETS. Together with the companion standard, ETS 300 418 defining the network interface presentation, this ETS describes the technical characteristics of the leased line service offered to the user.

The tests specified in this ETS cannot be carried out by the leased line provider, while the leased line is in service, i.e. carrying users' traffic. Thus the tests are designed for bringing into and returning into service, although there is no obligation to perform these tests each time a leased line is brought into or returned into service. However, because the connection is structured, the error performance may be monitored by the leased line provider while the line is in service.

This ETS is applicable for leased lines, including part time leased lines, for which the establishment or release does not require any protocol exchange or other intervention at the NTP.

This ETS specifies the compliance tests for the connection requirements. This ETS does not include details concerning the implementation of the tests, nor does it include information on any relevant regulations.

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 into it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] CCITT Recommendation O.151 (1992): "Error performance measuring equipment for digital systems at the primary bit rate and above".

[2] CCITT Recommendation O.153 (1992): "Basic parameters for the measurement of error performance at bit rates below the primary rate".

[3] CCITT Recommendation O.171 (1992): "Timing jitter measuring equipment for digital systems".

[4] ETS 300 418: "Business TeleCommunications (BTC); 2 048 kbit/s digital unstructured and structured leased lines (D2048U and D2048S); Network interface presentation".

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 E. 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:

Background Block Error (BBE): An errored block not occurring as part of a Severely Errored Second (SES).

BBE ratio: The ratio of errored blocks to total blocks during a fixed measurement interval excluding all blocks during severely errored seconds and while the leased line connection is in the unavailable state (see ITU-T Recommendation G.826).

block: A set of 2 048 consecutive bits equivalent to one Sub-MultiFrame (SMF). Each block is monitored by means of a Cyclic Redundancy Check-4 bit (CRC-4) error check. The length of each block corresponds to a period of 1 ms.

NOTE: This definition is relevant only to this ETS and is more specific than the generic definition given in ITU-T Recommendation G.826.

controlled slip: The irretrievable loss or gain of a set of consecutive digit positions in a digital signal, in which both the magnitude and instant of that loss or gain are controlled, to enable the signal to accord with a rate different from its own.

errored block: A block in which one or more bits are in error (see ITU-T Recommendation G.826).

Errored Second (ES): A one-second period with one or more errored blocks (see ITU-T Recommendation G.826).

ES ratio: The ratio of ES to total seconds during a fixed measurement interval. The ES ratio is not evaluated while the leased line connection is in the unavailable state (see ITU-T Recommendation G.826).

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

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

frame slip: A slip of one complete frame.

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 B).

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(2^9-1): A Pseudo Random Bit Sequence (PRBS) (as defined in subclause 2.1 of CCITT Recommendation O.153 [2]).

PRBS(2^{15}-1): A PRBS (as defined in subclause 2.1 of CCITT Recommendation O.151 [1]).

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

satellite transmission: A transmission via an earth orbiting satellite.

severely disturbed period: For out-of-service measurements, a severely disturbed period occurs when, over a period of time equivalent to four contiguous blocks, either all the contiguous blocks are affected by a high bit error density of = 10^{-2}, or a loss of signal is observed. For in-service monitoring purposes, a severely disturbed period is estimated by the occurrence of loss of signal or loss of frame alignment (see ITU-T Recommendation G.826).

Severely Errored Second (SES): A one-second period which contains = 805 errored blocks or at least one severely disturbed period **(see ITU-T Recommendation G.826).**

SES ratio: The ratio of SES to total seconds during a fixed measurement interval. The SES ratio is not evaluated while the leased line connection is in the unavailable state (see ITU-T Recommendation G.826).

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

uncontrolled slip: The loss or gain of a digit position or a set of consecutive digit positions in a digital signal, resulting from an aberration of the timing processes associated with transmission or switching of a digital signal, and in which either the magnitude or the instant of that loss or gain is not controlled.

unavailability period: An unavailability period begins at the onset of 10 consecutive SES. These 10 seconds are considered to be part of the unavailability period. The unavailability period ends at the onset of 10 consecutive non-SES. These 10 seconds are not considered part of the unavailability period.

unavailable state: The leased line connection is in the unavailable state if an unavailability period is occurring in one or both directions of transmission.

3.2 Abbreviations

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

BBE	Background Block Error
BIS	Bringing Into Service
CRC-4	Cyclic Redundancy Check-4 bit
D2048S	2 048 kbit/s digital structured ONP leased line
EMC	ElectroMagnetic Compatibility
ES	Errored Second
HDB3	High Density Bipolar code of order 3
NTP	Network Termination Point
ONP	Open Network Provision
ppm	parts per million
PRBS	Pseudo Random Bit Sequence
PRC	Primary Reference Clock
RAI	Remote Alarm Indication
RX	RX is a signal input (at either the leased line interface or the test equipment)
SES	Severely Errored Second
SMF	Sub-MultiFrame
TX	TX is a signal output (at either the leased line interface or the test equipment)
UI	Unit Interval

4 Requirements

The performance of the leased line shall comply with these requirements only if the conditions of supply of the network equipment providing the NTP are met, (e.g. if the equipment is connected to an appropriate power supply on the customer's premises).

The ITU-T attribute technique is used to express the connection requirements. The following attributes from ITU-T Recommendation I.140 are specified in this ETS:

- Transfer rate;
- Information transfer susceptance;
- Structure;
- Establishment of connection;
- Symmetry;
- Connection configuration;
- Network performance.

The following network performance sub-attributes are considered relevant for this ETS:

- Transmission delay;
- Jitter;
- Slip;
- Error.

4.1 Attributes

The connection attributes are displayed in table 1. In effect, these attributes define the service being offered.

The values and the associated compliance tests can be found in the subsequent subclauses.

Table 1: Connection attributes

Connection type attributes	Value	
Description	**Nature**	**Reference subclause**
Transfer rate Leased line timing Information transfer rate	 2 048 kbit/s 1 984 kbit/s	 See 4.1.1.1 See 4.1.1.2
Information transfer susceptance	No restriction on binary content	See 4.1.2
Structure	Frame integrity	See 4.1.3
Establishment of connection	Without user intervention	See 4.1.4
Symmetry	Symmetrical in both directions	See 4.1.5
Connection configuration	Point-to-point	See 4.1.6

(continued)