SLOVENSKI STANDARD
SIST ETS 300 688 E1:2003

01-december-2003

Poslovne telekomunikacije (BTC) ï Digitalni zakupljeni vodi za prenosno hitrost 140 Mbit/s (D140U, D140S) ï Priključ itvene znaľ ilnosti

Business TeleCommunications (BTC); 140 Mbit/s digital leased lines (D140U and D140S); Connection characteristics

Ta slovenski standard je istoveten z: ETS 300 688 Edition 1

ICS:

33.040.50	Vodi, zveze in tokokrogi	Lines, connections and circuits

SIST ETS 300 688 E1:2003 **en**

EUROPEAN TELECOMMUNICATION STANDARD

ETS 300 688

March 1996

Source: ETSI TC-BTC

Reference: DE/BTC-02055

ICS: 33.020

Key words: leased line, network, connection, D140U, D140S

Business TeleCommunications (BTC); 140 Mbit/s digital leased lines (D140U and D140S); Connection characteristics

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

Contents

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 harmonised standards for support of the Directive on Open Network Provision (ONP) of leased lines (92/44/EEC).

There is one other standard that is directly related to this ETS:

> ETS 300 686: "Business TeleCommunications (BTC); 34 Mbit/s and 140 Mbit/s digital leased lines (D34U, D34S, D140U and D140S); Network interface presentation".

Transposition dates	
Date of adoption of this ETS:	15 March 1996
Date of latest announcement of this ETS (doa):	30 June 1996
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 December 1996
Date of withdrawal of any conflicting National Standard (dow):	31 December 1996

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

Introduction

The Council Directive on the application of ONP to leased lines (92/44/EEC) concerns the harmonisation 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 of a minimum set of leased lines with harmonised technical characteristics.

The 140 Mbit/s unstructured and structured leased lines are not part of the minimum set of leased lines under the Directive, however, this ETS is being written with the intention that where 140 Mbit/s leased lines are offered, they will be in accordance with these harmonised standards.

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

Blank page

1 Scope

This ETS specifies the technical requirements and conformance tests for connection characteristics of point-to-point 140 Mbit/s digital leased lines. These leased lines operate at:

- 139 264 kbit/s providing an information transmission capability, without restriction on binary content, (D140U); and

- 139 264 kbit/s providing an information transmission capability, without restriction on binary content, of 138 240 kbit/s, (D140S); the remaining 1 024 kbit/s provides an 8 kHz framing structure in accordance with ETS 300 337 (ITU-T Recommendation G.832).

A connection is presented via interfaces at Network Termination Points (NTPs) and includes any equipment that may provide the NTP. Signals between NTPs are subject to impairments during their transfer over the connection. The limits to these impairments are stated in this ETS. This ETS, together with the companion standard ETS 300 686, defining the network interface presentation, describes the technical characteristics of the leased line.

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, if 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 conformance 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] ETS 300 686: "Business TeleCommunications (BTC); 34 Mbit/s and 140 Mbit/s digital leased lines (D34S, D34U, D140S and D140U); Network interface presentation".

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

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

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

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

3.1 Definitions

Background Block Error Ratio (BBER): 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.

Background Block Error (BBE): An errored block not occurring as part of a severely errored second.

block: A block is a set of consecutive bits equivalent to one frame; each bit belongs to one and only one block. The length of each block corresponds to a period of 125 microseconds.

errored block: A block in which one or more bits are in error.

Errored Second (ES): A one-second period with one or more errored blocks.

Errored Seconds Ratio (ESR): The ratio of errored seconds to total seconds during a fixed measurement interval. The ESR is not evaluated while the leased line connection is in the unavailable state.

frame: A repetitive set of consecutive bits in which the position of each bit can be identified by reference to a frame alignment signal.

frame alignment signal: The distinctive signal inserted in every frame always occupying the same relative position within the frame and used to establish and maintain frame alignment.

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

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^{23}-1): A Pseudo Random Bit Sequence (PRBS) (as defined in subclause 2.2 of ITU-T Recommendation O.151 [2]).

satellite transmission: 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.

Severely Errored Second (SES): A one-second period which contains ≥ 30 % errored blocks or at least one severely disturbed period.

Severely Errored Seconds Ratio (SESR): The ratio of severely errored seconds to total seconds during a fixed measurement interval. The SESR is not evaluated while the leased line connection is in the unavailable state.

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-severely errored seconds. 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:

AIS	Alarm Indication Signal
BBE	Background Block Error
BBER	Background Block Error Ratio
BIP-8	Bit Interleaved Parity (8 bit)
BIS	Bringing Into Service
CMI	Coded Mark Inversion
CRC-7	Cyclic Redundancy Check (7 bit)
D140U	140 Mbit/s digital unstructured leased line
D140S	140 Mbit/s digital structured leased line
EM	Error Monitoring
EMC	ElectroMagnetic Compatibility
ES	Errored Second
ESR	Errored Seconds Ratio
FA1	Frame Alignment byte 1
FA2	Frame Alignment byte 2
GC	General purpose Communications channel
LSB	Least Significant Bit
MA	Maintenance and Adaptation
MSB	Most Significant Bit
NR	Network operator byte
NTP	Network Termination Point
ONP	Open Network Provision
ppm	parts per million
PRBS	Pseudo Random Bit Sequence
RDI	Remote Defect Indication
REI	Remote Error Indication
RPO	Reference Performance Objective
RX	RX is a signal input (at either the leased line interface or the test equipment)
SES	Severely Errored Second
SESR	Severely Errored Seconds Ratio
TM	Timing Marker
TR	TRail trace
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 CCITT attribute technique is used to express the connection requirements. The following attributes from CCITT 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;
- Error;
- Availability.

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

	D140U	D140S
Connection type attributes	**Value / nature**	
Transfer rate - leased line timing - information transfer rate	 139 264 kbit/s ± 15 ppm 139 264 kbit/s ± 15 ppm	 139 264 kbit/s ± 15 ppm 138 240 kbit/s ± 15 ppm
Information transfer susceptance	Unrestricted digital	
Structure	Unstructured	Frame integrity
Establishment of connection	Without user intervention	
Symmetry	Symmetrical in both directions	
Connection configuration	Point-to-point	
Transmission delay - terrestrial (for distance G in km) - satellite	 ≤ (10 + 0,01 G) ms ≤ 350 ms	
Jitter at input port	0,4 UI from 200 Hz to 500 Hz 0,075 UI from 10 kHz to 3 500 kHz	
Jitter at output port	1,4 UI from 200 Hz to 3 500 Hz 0,07 UI from 10 kHz to 3 500 Hz	
Availability	No requirement	
Error parameters	**D140U and D140S**	
	Terrestrial	**Satellite**
End-to-end performance objectives - Errored Seconds Ratio (ESR) - Severely Errored Seconds Ratio (SESR) - Background Block Error Ratio (BBER)	 ≤ 8,00 % ≤ 0,10 % ≤ 0,01 %	 ≤ 12,480 % ≤ 0,156 % ≤ 0,016 %
Performance levels over a 24 hour period - Errored Seconds (ES) - Severely Errored Seconds (SES) - Background Block Errors (BBE)	 ≤ 6 746 ≤ 68 ≤ 68 594	 ≤ 10 575 ≤ 112 ≤ 107 170

4.1.1 Transfer rate

4.1.1.1 Leased line timing

Requirement: The leased line shall be capable of carrying user timing within the range of 139 264 kbit/s ± 15 ppm.

The leased line provider may also offer to the user in certain installations the capability for the leased line to be synchronised to network timing.

NOTE: Network timing is timing that is derived from the source or sources of timing that are used for the network (i.e. a national primary reference clock). Thus the timing provided by the leased line will be similar to that provided by other digital services.

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