



# SLOVENSKI STANDARD

## SIST EN 300 419 V1.2.1:2003

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Access and Terminals (AT); 2 048 kbit/s digital structured leased lines (D2048S);  
Connection characteristics

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# ETSI EN 300 419 V1.2.1 (2001-07)

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*European Standard (Telecommunications series)*

**Access and Terminals (AT);  
2 048 kbit/s digital structured leased lines (D2048S);  
Connection characteristics**

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## Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Access and Terminals (AT).

The present document resulted from a mandate from the Commission of the European Community (CEC) to provide 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 the present document:

- EN 300 418: "Access and Terminals (AT); 2 048 kbit/s digital unstructured and structured leased lines (D2048U and D2048S); Network interface presentation".
- EN 300 420: "Access and Terminals (AT); 2 048 kbit/s digital structured leased lines (D2048S); Terminal equipment interface".

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

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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. Under the Directive 91/263/EEC, later replaced by 98/13/EC, terminal equipment for connection to these leased lines was required to fulfil certain essential requirements.

The present document has been produced to introduce some necessary changes.

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

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# 1 Scope

The present document 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 an 8 kHz framing structure in accordance with ETS 300 167 and ITU-T 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 the present document. Together with the companion standard, EN 300 418 [4] defining the network interface presentation, the present document describes the technical characteristics of the leased line service offered to the user.

The tests specified in the present document 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.

The present document 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.

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

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## 2 References (standards.iteh.ai)

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

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- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

- [1] ITU-T Recommendation O.151 (1992): "Error performance measuring equipment operating at the primary bit rate and above".
- [2] ITU-T Recommendation O.153 (1992): "Basic parameters for the measurement of error performance at bit rates below the primary rate".
- [3] ITU-T Recommendation O.171 (1997): "Timing jitter and wander measuring equipment for digital systems which are based on the plesiochronous digital hierarchy (PDH)".
- [4] ETSI EN 300 418: "Access and Terminals (AT); 2 048 kbit/s digital unstructured and structured leased lines (D2048U and D2048S); Network interface presentation".

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

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

**BBE ratio:** 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:** 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 the present document and is more specific than the generic definition given in ITU-T Recommendation G.826.

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

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

**ES ratio:** 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:** Sub-MultiFrame (SMF) where the calculated CRC-4 does not correspond with the CRC-4 contained within the next SMF (see clause B.2.2)

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

**frame slip:** slip of one complete frame

**leased lines:** 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:** 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<sup>9</sup>-1):** Pseudo Random Bit Sequence (PRBS) (as defined in clause 2.1 of ITU-T Recommendation O.153 [2])

**PRBS(2<sup>15</sup>-1):** PRBS (as defined in clause 2.1 of ITU-T Recommendation O.151 [1])

**S<sub>a</sub> bits:** bits 4 to 8 (bits S<sub>a4</sub> to S<sub>a8</sub>) in frames not containing the frame alignment signal (see annex B)

**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<sup>-2</sup>, 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):** one-second period which contains = 805 errored blocks or at least one severely disturbed period (see ITU-T Recommendation G.826)

**SES ratio:** 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):** sequence of 8 frames, each of 256 bits, over which the CRC-4 is calculated (see annex B)

**uncontrolled slip:** 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:** unavailability period begins at the onset of 10 consecutive SES. These 10 s are considered to be part of the unavailability period. The unavailability period ends at the onset of 10 consecutive non-SES. These 10 s are not considered part of the unavailability period

**unavailable state:** 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 the present document, 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
D2048U	2048 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 the present document:

- transfer rate;
- information transfer susceptance;
- structure;
- establishment of connection;
- symmetry;
- connection configuration;
- network performance.

The following network performance sub-attributes are considered relevant for the present document:

- 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 clauses.

**Table 1: Connection attributes**

Connection type attributes	Value	
Description	Nature	Reference clause
Transfer rate	2 048 kbit/s	See 4.1.1.1
Leased line timing	1 984 kbit/s	See 4.1.1.2
Information transfer rate		
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
<b>Network performance sub-attributes</b>		
<a href="https://standards.iteh.ai/catalog/standards/sist/7ee2h58f-d606-4020-809b-c151585e0045/sist-en-300-419-v1-2-1-2003">https://standards.iteh.ai/catalog/standards/sist/7ee2h58f-d606-4020-809b-c151585e0045/sist-en-300-419-v1-2-1-2003</a>		
Connection type attributes	Value	
Description	Nature	Reference clause
Transmission delay	Terrestrial and satellite options	See 4.1.7.1
Jitter	Input and output ports	See 4.1.7.2
Slip (controlled slip)	≤ 5 per 24 hour period	See 4.1.7.3
<b>Error parameters (see 5.1.7.4)</b>	<b>Terrestrial</b>	<b>Satellite</b>
End-to-end performance objectives		
Errored Seconds (ES) ratio	< 2,000 %	< 3,120 %
Severely Errored Seconds (SES) ratio	< 0,100 %	< 0,156 %
Background Block Errors (BBE) ratio	< 0,015 %	< 0,023 %
Performance level over 24 hour period (24 hour test limit)		
Errored Seconds (ES)	< 1 645	< 2 592
Severely Errored Seconds (SES)	< 68	< 112
Background Block Errors (BBE)	< 12 732	< 19 933