



# SLOVENSKI STANDARD

## SIST EN 300 689 V1.2.1:2004

01-oktober-2004

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**Dostop in terminali (AT) - Digitalni zakupljeni vodi za prenosno hitrost 34 Mbit/s (D34U, D34S) - Vmesnik terminalske opreme**

Access and Terminals (AT); 34 Mbit/s digital leased lines (D34U and D34S); Terminal equipment interface

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# ETSI EN 300 689 V1.2.1 (2001-07)

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*European Standard (Telecommunications series)*

**Access and Terminals (AT);  
34 Mbit/s digital leased lines (D34U and D34S);  
Terminal equipment interface**

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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 the 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 300 686: "Access and Terminals (AT); 34 Mbit/s and 140 Mbit/s digital leased lines (D34U, D34S, D140U, D140S); Network interface presentation";
- EN 300 687: "Access and Terminals (AT); 34 Mbit/s digital leased lines (D34U and D34S); Connection characteristics".

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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### National transposition dates

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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 of a minimum set of leased lines with harmonized technical characteristics.

The 34 Mbit/s unstructured and structured leased lines are not part of the minimum set of leased lines under the leased line Directive, however these standards are being written with the intention that where 34 Mbit/s leased lines are offered, they will be in accordance with these harmonized standards.

Two categories (voluntary and regulatory) of standard were used for the interfaces of terminal equipment designed for connection to the ONP leased lines. Technical Basis for Regulations (TBRs) gave the earlier essential requirements under the Directive 91/263/EEC (see annex E), later replaced by 98/13/EC (see annex E), for attachment to the leased lines, whereas other voluntary standards (ETSS or ENs) gave the full technical specifications for these interfaces. The present document, which is based on an earlier ETS, belongs to the second category.

The requirements of TBR 24 (see annex E) are a subset of the present document.

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

ETS 300 166 (see annex E) and ITU-T Recommendation G.703 [4] were used as the basis for the terminal equipment interface aspects of the present document.

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## 1 Scope

The present document specifies the mechanical and electrical characteristics (except safety, overvoltage and EMC aspects), the necessary functional characteristics and the corresponding conformance tests for a terminal equipment interface for:

- connection to the network termination points of 34 368 kbit/s digital unstructured leased lines (D34U); and
- connection to the network termination points of 34 368 kbit/s digital structured leased lines (D34S) which support an unstructured 33 920 kbit/s information transfer rate.

These leased lines are defined in EN 300 686 [7] and EN 300 687 [8].

The present document is written only to ensure that the interface of the terminal equipment is compatible with the 34 Mbit/s digital unstructured or structured leased line. The present document 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 requirements may apply in addition to the present document.

Customer premises wiring and installation between the terminal equipment and the Network Termination Point (NTP) are outside the scope of the present document.

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## 2 References

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

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

- [1] IEC 60169-8 (1978): "Radio frequency connectors; Part 8: R.F coaxial connectors with inner diameters of outer conductor 6,5 mm (0,256 in) with bayonet lock - Characteristic impedance 50 ohms (Type BNC)".
- [2] IEC 60169-13 (1976): "Radio frequency connectors; Part 13: R.F. coaxial connectors with inner diameter of outer conductor 5,6 mm (0,22 in) - Characteristic impedance 75 ohms (Type 1,6/5,6) - Characteristic impedance 50 ohms (Type 1,8/5,6) with similar mating dimensions".
- [3] ISO/IEC 10173 (1998): "Information technology - Telecommunications and information exchange between systems - Interface connector and contact assignments for ISDN primary rate access connector located at reference points S and T".
- [4] ITU-T Recommendation G.703 (1998): "Physical/electrical characteristics of hierarchical digital interfaces".
- [5] ITU-T Recommendation O.151 (1992): "Error performance measuring equipment operating at the primary rate and above".
- [6] ITU-T Recommendation O.171 (1997): "Timing jitter and wander measuring equipment for digital systems which are based on the plesiochronous digital hierarchy (PDH)".
- [7] ETSI EN 300 686: "Access and Terminals (AT); 34 Mbit/s and 140 Mbit/s digital leased lines (D34U, D34S, D140U, D140S); Network interface presentation".
- [8] ETSI EN 300 687: "Access and Terminals (AT); 34 Mbit/s digital leased lines (D34U and D34S); Connection characteristics".

## 3 Definitions and abbreviations

### 3.1 Definitions

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

**frame:** 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:** 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:** 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<sup>23</sup>-1):** Pseudo Random Bit Sequence (PRBS) (as defined in clause 2.2 of ITU-T Recommendation O.151)

**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 the present document, the following abbreviations apply:

AIS	Alarm indication Signal
AMI	Alternate Mark Inversion
ASCII	American Standard Code for Information Interchange
ATM	Asynchronous Transfer Mode
BIP-8	Bit Interleaved Parity (8 bit)
BNC	Bayonet Nut Connector
CRC-7	Cyclic Redundancy Check (7 bit)
dc	direct current
D34S	34 Mbit/s digital structured leased line
D34U	34 Mbit/s digital unstructured leased line
EM	Error Monitoring
EMC	ElectroMagnetic Compatibility
FA1	Frame Alignment byte 1
FA2	Frame Alignment byte 2
FAS	Frame Alignment Signal
GC	General purpose Communications channel
HDB3	High Density Bipolar code 3
LOF	Loss Of Frame
LOS	Loss Of Signal
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
RT	Requirements Table
RX	RX is a signal input (at either the terminal equipment or the test equipment, see figure 1)
SDH	Synchronous Digital Hierarchy
TM	Timing Marker
TU	Tributary Unit
TR	TRail trace
TTI	Trail Trace Identifier
TX	TX is a signal output (at either the terminal equipment or the test equipment, see figure 1)
UI	Unit Interval

## 4 Requirements

The D34U 34 368 kbit/s unstructured leased line provides a bi-directional point-to-point digital leased line for the support of an unstructured 34 368 kbit/s information transfer rate. Any structuring of the data is the responsibility of the user.

The D34S 34 368 kbit/s structured leased line provides a bi-directional point-to-point digital leased line for the support of an unstructured 33 920 kbit/s information transfer rate. Any structuring of the data within the transparent 33 920 kbit/s part of the frame is the responsibility of the user.

For both D34U and D34S the provision of timing is the responsibility of the user; however, in certain installations the leased line provider may be able to offer a leased line that is synchronized to the network.

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### 4.1 Mechanical characteristics (standards.iteh.ai)

The terminal equipment shall provide at least one of the methods of connection given in clauses 4.1.1 and 4.1.2.

NOTE 1: When connecting the terminal equipment to the NTP, any difference in ground potential between the two equipments may produce a voltage across the signal ground connection and may cause damage. See EN 50310 (see annex E) for details of earthing requirements within the customer's premises.

NOTE 2: 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 the present document, they refer to the terminal equipment interface.

NOTE 3: Normal practice is for the outer conductors of the input and output connectors to be connected via a dc path to the signal ground and thence to ground. This connection is to reduce EMC emissions. If there is a difference in ground potential between the terminal equipment and the NTP, this arrangement may result in high currents in the outer conductors and cause damage.

To prevent this problem, dc isolation may be introduced between the terminal equipment and the NTP, for example by introducing dc isolation between the outer conductor and the signal ground in the terminal equipment. Careful attention should be given to the requirements of standards on installation earthing practice.

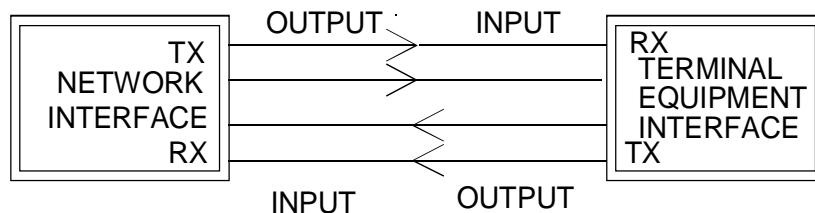


Figure 1

### 4.1.1 Sockets

**Requirement:** The terminal equipment interface shall provide two coaxial 75  $\Omega$  sockets, one each for transmit and receive; these sockets being either:

- a) 75  $\Omega$  sockets (type 1,6/5,6) complying with IEC 60169-13 [2]; or
- b) 75  $\Omega$  BNC sockets complying with the general requirements of IEC 60169-8 [1] with the mating dimensions specified in annex B of ISO/IEC 10173 [3].

The outer conductor of the coaxial pair shall be connected to signal ground both at the input port and at the output port.

**Test:** There shall be a visual inspection that the sockets are of the correct type.

### 4.1.2 Plugs

**Requirement:** The terminal equipment interface shall provide two coaxial 75  $\Omega$  plugs at the end of a cord (or cords), one each for transmit and receive; these plugs being either:

- a) 75  $\Omega$  plugs (type 1,6/5,6) complying with IEC 60169-13 [2]; or
- b) 75  $\Omega$  BNC plugs complying with the general requirements of IEC 60169-8 [1] with the mating dimensions specified in annex B of ISO/IEC 10173 [3].

The outer conductor of the coaxial pair shall be connected to signal ground both at the input port and at the output port.

NOTE: There is no requirement on the method of connection of the cord (or cords) to the terminal equipment.

**Test:** There shall be a visual inspection that the plugs are of the correct type.

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## 4.2 Electrical characteristics

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### 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 3 (HDB3) encoding rules (see annex B).

**Test:** The test shall be conducted according to clause 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 ITU-T Recommendation G.703 [4].

**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). The value V corresponds to the nominal peak voltage of a mark.
Test load impedance	75 $\Omega$ non-reactive
Nominal peak voltage V of a mark	1,0 V
Peak voltage of a space	0 $\pm$ 0,1 V
Nominal pulse width	14,55 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