



# SLOVENSKI STANDARD

## SIST EN 300 659-1 V1.3.1:2003

01-december-2003

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8 cglrcd`j]b`hYfa ]bUj`f5 HŁĚ`5 bUc[ b]`Xcglrcd`Xc`Uj bY[ U\_ca i HfUbY[ UHfYZc]bg\_Y[ U  
ca fYj`UfDGHBŁĚ`Dfclc\_c`bUfc b]y\_Y[ Uj cXUj `fUfj b]`nUb\_]`nUdf]\_Uhcj UbYf]b  
gcfcXbYŁgłcf]j] YĚ`%`XY. `DfYbcg`dcXUh\_cj `df]`dc`cÿYb]`dc[ cj cf\_]`

Access and Terminals (AT); Analogue access to the Public Switched Telephone Network (PSTN); Subscriber line protocol over the local loop for display (and related) services; Part 1: On-hook data transmission

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# ETSI EN 300 659-1 V1.3.1 (2001-01)

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*European Standard (Telecommunications series)*

**Access and Terminals (AT);  
Analogue access to the  
Public Switched Telephone Network (PSTN);  
Subscriber line protocol over the local loop for  
display (and related) services;  
Part 1: On-hook data transmission**

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## Foreword

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

Version 1.2.1 of the present document had been submitted to One-step Approval Procedure 200017 but was withdrawn due to the receipt of substantial technical comments.

The present document is part 1 of a multi-part standard covering the PSTN subscriber line protocol over the local loop for display (and related) services, as described below:

- Part 1: "On-hook data transmission";**
- Part 2: "Off-hook data transmission";
- Part 3: "Data link message and parameter codings".

<b>National transposition dates</b>	
Date of adoption of this EN:	12 January 2001
Date of latest announcement of this EN (doa):	30 April 2001
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 October 2001
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# 1 Scope

The present document specifies the subscriber line protocol for the support of PSTN display services at Local Exchange (LE) in "on-hook" state. The subscriber line protocol is accomplished by using asynchronous voice-band Frequency-Shift Keying (FSK) signalling. The data transmission specified in the present document is provided only in the direction from the LE to the TE.

In addition, annex B is provided in order to allow the continuation of use in those networks that already implemented a Dual Tone Multi-Frequency (DTMF) based subscriber line protocol.

The requirements imposed on the FSK signalling-based subscriber line protocol deal with data encoding, data transmission requirements and the three layers of the protocol at the network side of the interface:

- presentation layer;
- data link layer; and
- physical layer.

The requirements imposed on the DTMF-based subscriber line protocol deal with the transfer of the DTMF coded display information. The procedures and the encoding arrangements are specified in annex B of the present document.

Terminal Equipment (TE) can be connected by analogue access directly to the LE or through an Access Network (AN). In the latter case, data transmission can be applied from the LE or from elsewhere in the network hence a transmission path needs to exist from the LE to the TE before data transmission. It is the network operator's responsibility to ensure transmission path establishment. Transmission path establishment procedures are outside the scope of the present document.

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# 2 References

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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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] ETSI TR 101 182: "Analogue Terminals and Access (ATA); Definitions, abbreviations and symbols".
- [2] ETSI ETS 300 648 (1997): "Public Switched Telephone Network (PSTN); Calling Line Identification Presentation (CLIP) supplementary service; Service description".
- [3] ETSI ES 201 235: "Specification of Dual Tones Multi-Frequency (DTMF) Transmitters and Receivers", Part 1 to Part 4.
- [4] ITU-T Recommendation Q.11 (1988): "Numbering plan for the international telephone service".
- [5] ITU-T Recommendation T.50 (1992): "International Reference Alphabet (IRA) (Formerly International Alphabet No.5 or IA5) - Information technology - 7-bit coded character set for information interchange".
- [6] ITU-T Recommendation V.23 (1988): "600/1200-baud modem standardized for use in the general switched telephone network".



- [7] ETSI EN 300 659-3 (V1.3.1): "Public Switched Telephone Network (PSTN); Subscriber line protocol over the local loop for display (and related) services; Part 3: Data link message and parameter codings".

## 3 Definitions and abbreviations

### 3.1 Definitions

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

**calling line identity:** see ETS 300 648 [2]

**graphic character:** character that has a visual representation normally hand-written, printed or displayed; in IRA characters 2/1 to 7/14 (see ITU-T Recommendation T.50 [5])

**long silent period:** silent period between ring patterns

**loop state:** see TR 101 182 [1]

**mark bit:** symbol "1" (see ITU-T Recommendation V.23 [6])

**quiescent state:** see TR 101 182 [1]

**ring pattern:** consists of one or more ringing pulses separated by short silent periods

**Ringing Pulse Alerting Signal (RP-AS):** pulse of ringing current used to alert the TE that a data transmission will follow. Duration of RP-AS is specified in the present document

**ringing pulse:** pulse of ringing current used for call arrival indication within a ring pattern. Ringing attributes (current values, duration of ringing pulses, number of ringing pulses in the ring patterns, cadence, etc.) are network specific

**short silent period:** silent period between ringing pulses in a ring pattern

**space bit:** symbol "0" (see ITU-T Recommendation V.23 [6])

### 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AN	Access Network
AS	Alerting Signal
CLIP	Calling Line Identification Presentation
DC	Direct Current
DT-AS	Dual Tone-Alerting Signal
DTMF	Dual Tone Multi-Frequency
FSK	Frequency-Shift Keying
IRA	International Reference Alphabet
LE	Local Exchange
LR	Line Reversal
LR+DT-AS	Line Reversal followed by a Dual Tone-Alerting Signal
PSTN	Public Switched Telephone Network
RP-AS	Ringing Pulse Alerting Signal
TAS	TE Alerting Signal
TE	Terminal Equipment

## 4 Data encoding

Data encoding shall be as described in EN 300 659-3 [7].

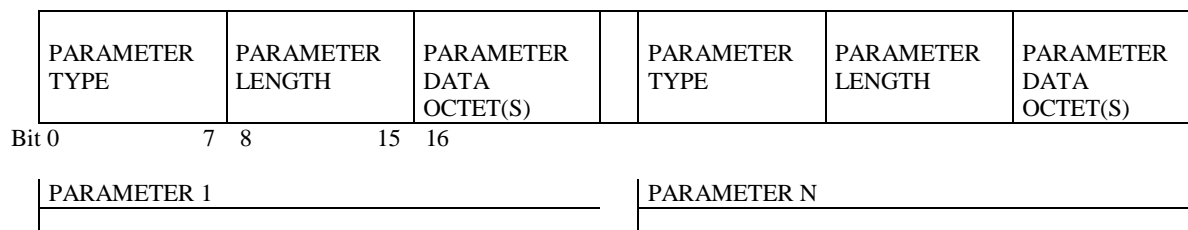
## 5 Protocol requirements

Annex D gives an overview of the data transmission format.

### 5.1 Presentation layer

The Presentation layer specifies the formats and sequence of information that LE transmits to the TE (Presentation layer message).

The Presentation layer message format is illustrated in figure 1.



**Figure 1: Presentation layer message format**

Each parameter shall consist of a Parameter type, a Parameter length and Parameter octet(s).

**Parameter type** (1 octet): shall contain an assigned binary encoded value to identify the Parameter.

**Parameter length** (1 octet): shall contain the binary encoded number of Parameter octets that follow.

**Parameter data octet(s)**: shall contain 1 or more (up to 253) octets. The value shall be either binary encoded or encoded in accordance with ITU-T Recommendation T.50 [5].

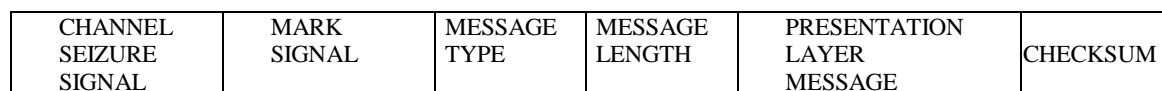
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### 5.2 Data Link layer

The Data Link layer is responsible for providing bit error detection capability and for prepending the Channel Seizure Signal and the Mark Signal to the Presentation layer message.

The Data Link layer message format shall be as illustrated in figure 2.



**Figure 2: Data Link message format**

**Channel Seizure Signal**: shall consist of a block of 300 continuous bits of alternating "0"s and "1"s. The first bit to be transmitted shall be a "0". The last bit to be transmitted shall be a "1". It shall start the data transmission only in "on-hook" data transmission.

**Mark Signal**: shall either consist of a block of  $180 \pm 25$  mark bits or  $80 \pm 25$  mark bits.

**Message type** (1 octet): shall contain an assigned binary encoded value to identify the message.

**Message length** (1 octet): shall contain the binary encoded number of octets of the Data Link layer message (not including the Message type, Message length and Checksum octets). This allows a presentation-layer message length between 3 and 255 octets.

**Presentation Layer Message**: shall contain at least one parameter.

**Checksum octet** (1 octet): shall contain the two's complement of the modulo 256 sum of all the octets in the message starting from the Message type octet up to the end of the message (excluding the Checksum itself).

The protocol does not support error correction or message retransmission. No sequence number or acknowledgement shall be used for the data messages transmitted from the LE to the TE.

NOTE: a Data Link message, received by the TE, resulting in an incorrect checksum should be discarded by the TE.

## 5.3 Physical layer

Physical layer requirements refer to the network end of the local loop (interface point Z, see annex C).

Simplex asynchronous voiceband data transmission technique is used to transfer data to the TE. A frequency modulator is required in the LE and a demodulator in the TE. The frequency modulator shall meet 1 200 baud V.23 [6] standard characteristics as specified in ITU-T Recommendation V.23 [6] for the forward data transmission channel.

The transmission levels are described in table 1.

**Table 1: Transmission levels**

Signal Level	-14,5 dBV $\pm$ 2,5 dB at the interface point Z, When the interface is terminated with the reference impedance $Z_R$ defined in TR 101 182 [1].
Signal Purity	Total voltage of all extraneous signal in the band 300 Hz-3 400 Hz at the interface point Z shall be at least 30 dB lower than the level of the signal fundamental frequency.
Source impedance	Network specific.
NOTE:	The level requirement is intended to take account of signal levels of existing interfaces.

When sending a Data Link message the following requirements shall be met:

- each data octet (i.e. Message type, Message length, each Presentation layer message octet and Checksum) shall be enveloped by a Start bit (space) and a Stop bit (mark) in the format shown in figure 3; in order to avoid corruption of the checksum by premature cessation of transmission, the Stop bit following the checksum shall be followed by an additional one to ten Mark bits;

0	A	B	C	D	E	F	G	H	1
	$2^0$	$2^1$	$2^2$	$2^3$	$2^4$	$2^5$	$2^6$	$2^7$	
Start bit	(least significant)							(most significant)	Stop bit

**Figure 3**

- the order of bits transmitted to line is: Start bit first, Stop bit last;
- the octets are transmitted according to the growing order of their number: octet 1 first, octet 2 second, etc.;
- the data signal shall be continuous.

FSK modulation shall be applied only during transmission of data hence it shall be immediately stopped after the last bit of Data Link message has been transmitted.

## 6 Data transmission requirements: signalling, timing and tolerance

Data transmission requirements refer to the network end of the local loop (interface point Z, see annex C).

Interface Z shall support data transmission to TE in either or both of the following modes:

- transmission is associated with ringing;
- transmission is not associated with ringing.

The data transmission mode is service-dependant.