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Javno komutirano telefonsko omrežje (PSTN) - Naročniški vodovni protokol na krajevni zanki za prikazovalne (in povezane) storitve - 1. del: Prenos podatkov ob položeni slušalki

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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Contents

Foreword

This European Telecommunication Standard (ETS) has been produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETS is part 2 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";

The attention of ETSI has been drawn to the Intellectual Property Rights (IPRs) listed below which are, or may be, or may become, Essential to this ETS and, in particular, on hook data transmission associated with ringing, network operator option: "transmission during ringing". The IPR owner has undertaken to grant irrevocable licences, on fair, reasonable and non-discriminatory terms and conditions under these IPRs pursuant to the ETSI interim IPR Policy. Further details pertaining to these IPRs can be obtained directly from the IPR owner.

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1 Scope

This first part of ETS 300 659 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. In addition, annex C 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 C of this ETS.

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 this ETS.

2 Normative references

This ETS incorporates by dated and 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 in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1]   ETS 300 001 (1996): "Attachments to the Public Switched Telephone Network (PSTN); General technical requirements for equipment connected to an analogue subscriber interface in the PSTN".

[2]   ETS 300 648 (1996): "Public Switched Telephone Network (PSTN); Calling Line Identification Presentation (CLIP) supplementary service; Service description".

[3]   ETR 206 (1995): "Public Switched Telephone Network (PSTN); Multifrequency signalling system to be used for push-button telephones [CEPT Recommendation T/CS 46-02 E (1985)]".

[4]   CCITT Recommendation Q.11 (1988): "Numbering plan for the international telephone service".

[5]   CCITT 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]   CCITT Recommendation V.23 (1988): "600/1200-baud modem standardized for use in the general switched telephone network".

3 Definitions and abbreviations

3.1 Definitions

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

calling line identity: See ETS 300 648 [2].

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

long silent period: Silent period between ring patterns.

loop state: Status of the TE, see ETS 300 001 [1].

mark bit: Symbol "1" (see CCITT Recommendation V.23 [6]).

"off hook": Status of LE in which a DC current drawn by a TE in loop state is sufficient to activate the LE, see ETS 300 001 [1].

"on hook": Status of the LE in which a DC current drawn by a TE in quiescent state is insufficient to activate the LE, see ETS 300 001 [1].

ring pattern: A 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 this ETS.

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 CCITT Recommendation V.23 [6]).

3.2 Abbreviations

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

AN	Access Network
AS	Alerting Signal
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
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
PSTN	Public Switched Telephone Network
RP-AS	Ringing Pulse Alerting Signal
TAS	TE Alerting Signal
TE	Terminal Equipment
TE-ACK	TE Acknowledgement Signal

4 Data encoding

Graphic characters and the "space" character are coded according to national versions of the IRA as specified in CCITT Recommendation T.50 [5] (see annex E).

Control characters 0/0 to 1/15 and 7/15 are not used within this protocol. Characters 8/0 to 15/15 are reserved for network operator use.

5 Protocol requirements

5.1 Presentation layer

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

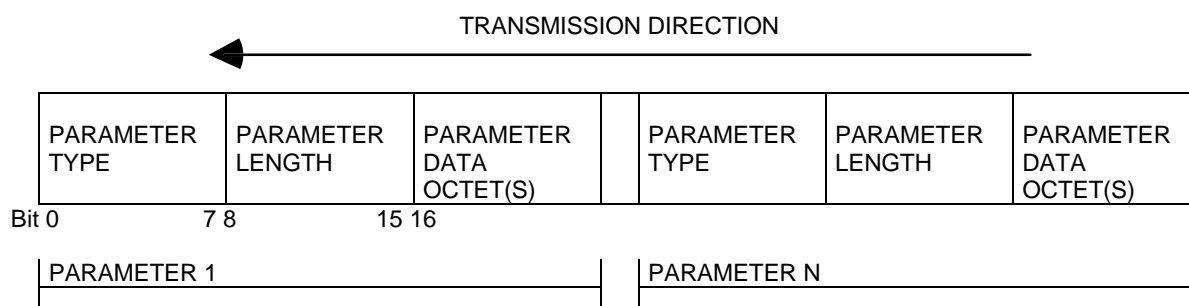The Presentation layer message format is illustrated in figure 1.

TRANSMISSION DIRECTION

PARAMETER TYPE	PARAMETER LENGTH	PARAMETER DATA OCTET(S)		PARAMETER TYPE	PARAMETER LENGTH	PARAMETER DATA OCTET(S)

Bit 0   7 8   15 16

PARAMETER 1	PARAMETER N

Figure 1: Presentation layer message format

Each parameter consists of a Parameter type, a Parameter length and Parameter octets(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 CCITT Recommendation T.50 [5].

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 is illustrated in figure 2.

TRANSMISSION DIRECTION

CHANNEL SEIZURE SIGNAL	MARK SIGNAL	MESSAGE TYPE	MESSAGE LENGTH	PRESENTATION LAYER MESSAGE	CHECKSUM
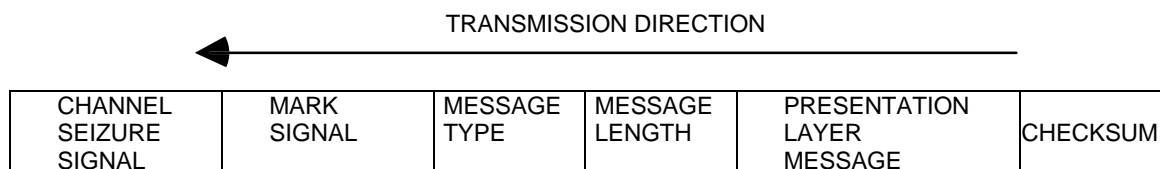
Figure 2: Data Link message format

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 ± 25 mark bits or, as a network operator option, Mark Signal may consist of 80 ± 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.

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: Any incorrect Data Link message 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 F).

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 standard characteristics as specified in CCITT Recommendation V.23 [6] for the forward data transmission channel.

The transmission levels are described in table 1.

Table 1: Transmission levels

Signal Level	-13,5 dBm ± 1,5 dB (When the line is looped on an impedance equivalent to the source impedance).
Signal Purity	Total power of all extraneous signal in the band 300-3 400 Hz shall be at least 30 dB lower than the power of signal fundamental frequency, measured at the point of application to the loop .
Source impedance	Network specific.

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;

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