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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".

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1 Scope

This second part of ETS 300 659 specifies the subscriber line protocol for the support of PSTN display services at Local Exchange in "off-hook" state by using asynchronous voice-band FSK signalling. This specification is a complement of part 1 that deals with "on-hook data transmission associated or not associated with ringing". This ETS contains only differences and extensions to ETS 300 659-1 [1].

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 300 659-1 (1996): "Public Switched Telephone Network (PSTN); Subscriber line protocol over the local loop for display (and related) services; Part 1: On-hook data transmission".

[2] 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)]".

3 Definitions and abbreviations

The following abbreviation applies in addition to the definitions and abbreviations described in ETS 300 659-1 [1]:

SAS Subscriber Alerting Signal

4 Data Encoding

Data encoding described in ETS 300 659-1 [1] shall be applied.

5 Protocol Requirements

5.1 Presentation Layer

Presentation layer requirements described in ETS 300 659-1 [1] shall be applied.

5.2 Data-link Layer

Data-link layer requirements described in ETS 300 659-1 [1] shall be applied with the following differences:

a) **Channel Seizure Signal:** it shall not be transmitted.

b) **Mark Signal:** consists of a block of 80 ± 25 mark bits.

5.3 Physical Layer

Physical layer requirements described in ETS 300 659-1 [1] shall be applied and be extended as follows:

The sentence "FSK modulation..." shall be modified:

FSK modulation shall be strictly applied only during transmission of data hence it shall be immediately stopped after the last bit of Data-link message has been transmitted: (it is for further study how, in case of off-hook data transmission, more than one Data-link layer message could be transmitted within a same FSK modulation transmission).

6 Data transmission requirements: signalling, timing and tolerance

In addition to on-hook data transmission described in ETS 300 659-1 [1] the following shall apply:

Interface Z shall support data transmission to the TE also in off-hook state.

6.1 Off-hook data transmission

Data transmission requirements refer to the network end of the local loop (interface point Z, see annex F of ETS 300 659-1 [1]).

A TE Alerting Signal (TAS) will be used to signal to the TE that data transmission is to be expected. The TAS is a Dual Tone-Alerting Signal (off-hook).

A Subscriber Alerting Signal (SAS) could be sent (e.g. Call Waiting Tone) from the LE to the subscriber before protocol signalling process: presence/absence of the SAS, SAS transmission procedure and SAS physical characteristics are outside the scope of this ETS.

Sequence of the events at the network end:

Event 1: The LE shall block the speech path to and from the far-end party in order to minimise interference with any alerting signal and the data transmission. This also prevents the far-end party from receiving these signals.

Event 2: The LE transmits the TAS.

Event 3: The LE waits for the TE-Acknowledgement Signal (TE-ACK).

Event 4, case a: If the LE does not recognize a valid TE-ACK within a time-out, the LE shall not send any data transmission and shall restore the speech path.

Event 4, case b: If the LE recognize a valid TE-ACK within the time-out, FSK modulation transmission shall follow.

Event 5: After FSK modulation transmission the speech transmission shall be restored.

If the TE goes in quiescent state the signalling process should be aborted.

Figure 1 presents time diagram at the network end of the local loop in case of successful attempt.

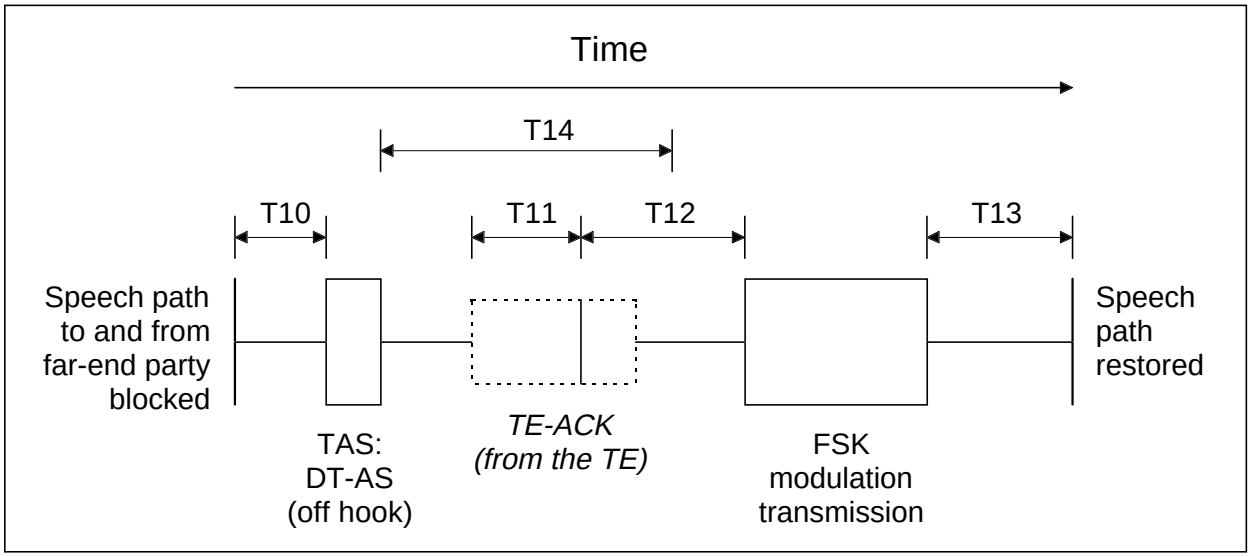

Figure 1: Time diagram at the network end of the local loop: successful attempt

Figure 2 presents time diagram at the network end of the local loop in case of unsuccessful attempt.

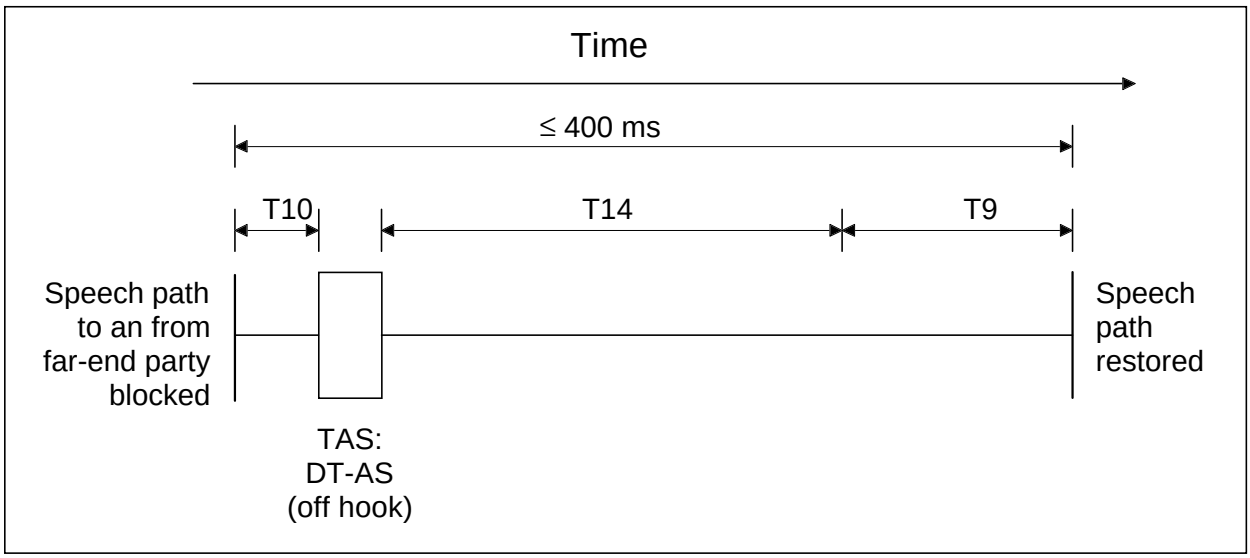

Figure 2: Time diagram at the network end of the local loop: unsuccessful attempt

6.1.1 Timing

Table 1 presents time interval and values related to the described events:

Table 1: Off-hook timing definitions and values

Time interval	Value	Definition
T10	0 - 150 ms	The time between speech path blocking and beginning of TAS sending. (note)
T11	40 - 55 ms	The time for the LE to recognize the TE -ACK.
T12	55 - 200 ms	The time between TE-ACK recognition and the start of FSK modulation transmission.
T13	40 - 120 ms	The time to restore the speech path after the end of FSK modulation transmission.
T14	160 ± 5 ms	The maximum time allowed within which a valid TE-ACK shall be correctly detected. The time interval, for which T14 is the maximum, shall begin at the end of TAS transmission.
T9	0 - 150 ms	The time to restore the speech path after the end of T14.

NOTE: If, according to a service description, a SAS is sent and the speech path has been blocked before the SAS and:
a) it is restored between the SAS and the TAS, then T10 is the time between the final speech path blocking and the beginning of TAS sending;
b) it is not restored between the SAS and the TAS, then T10 shall commence at the end of the SAS.

Values indicated in table 1 should respect the constraints at the network end as specified in tables 2 and 3.

Table 2: Network End constraints

Constraint (ms)
T10 + 85 [DT-AS_{max}] + 165 [$T14_{max}$] + **T9** ≤ 400
NOTE 1: Text in square brackets on the right of a value are used to indicate the parameter related to that value.
NOTE 2: T10 and T9 are implementation dependent.

Table 3: Network End constraint reasons

Reason	Simplified constraint (ms)
400 ms is the maximum carrier blocking time allowed by some videotex terminals (see figure 2: unsuccessful attempt).	**T10+T9** ≤ 150

6.1.2 TAS physical characteristics

The TAS is a Dual Tone-Alerting Signal (off-hook). Physical characteristic of the DT-AS (off-hook) are described in table 4.

Table 4: TAS: Dual Tone Alert Signal (Off-hook)

Nominal Frequencies	same as specified for DT-AS in ETS 300 659-1 [1])
Signal Level	same as specified for DT-AS in ETS 300 659-1 [1])
Maximum difference in the power between tones	same as specified for DT-AS in ETS 300 659-1 [1])
Signal Purity	same as specified for DT-AS ETS 300 659-1 [1])
Duration	80 ms ± 5 ms

6.1.3 TE-Acknowledgement Signal

The LE shall accept the DTMF "D" as described in ETR 206 [2] as a valid TE-ACK.

As a network option, the DTMF "A", "B" and "C" may be considered as a valid alternative TE-Acknowledgement Signal from other types of Terminal Equipment.

Annex A (informative): Constraints on the timing at the TE - LE interface

This annex records reasons for constraints that have been considered to ensure correct interworking between LE and TE.

Table A.1: Constraint reasons

n	Reason
1	The TE-ACK sending should be ensured by the TE before the LE time-out expiring (transmission delays should be taken into account).
2	A minimum DTMF length should be ensured by the TE to allow recognition at LE.
3	Overlapping between DT-AS receiving and DTMF sending at TE shall be avoided by the TE.
4	A maximum DTMF length should be ensured by the TE to avoid overlapping between DTMF receiving and FSK transmission at the LE .
5	The TE should ensure a minimum expiration time for FSK recognition expiring (transmission delays should be taken into account).

A.1 Transmission delay

For calculation purposes a 15 ms transmission return delay between LE-TE has been used. Longer transmission delays may exist.

Annex B (informative): CLIP on Call Waiting

This annex describes how the interface could support the ETSI "PSTN - Calling Line Identification Presentation" service during Call Waiting.

The Local Exchange should use the message "Call Setup" in "off-hook" data transmission. The message needs to contain the parameters as specified in table B.1.

Table B.1

Parameter Name	Status
Date and Time	Optional
Calling Line Identity or Reason for absence of Calling Line Identity	Mandatory
Called Line Identity	Optional
Calling Party Name	Optional
Reason for absence of Calling Party Name	Optional
Complementary Calling Line Identity	Optional
Call type	Optional
First called Line Identity (in case of forwarded call)	Optional
Network Message System Status	Optional
Type of Forwarded call (in case of forwarded call)	Optional
Type of Calling User	Optional
Redirecting Number (in case of forwarded call)	Optional
Extension for network operator use	Optional (note)
Network Operator Parameter	Optional
NOTE: Mandatory when a reserved value for network operator is used in Message Type, Parameter Type, Parameter data value.	

History

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