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Part 1: Off-line data transmission

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 4 92 94 42 00 - Fax: +33 4 93 65 47 16

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Foreword

This European Telecommunication Standard (ETS) has been produced by ETSI Project Analogue Terminals and Access (ATA).

The present document is part 1 of a multi-part ETS covering the Protocol over the local loop for display and related services; Terminal Equipment requirements, as identified below:

Part 1: **"Off-line data transmission";**

Part 2: "On-line data transmission".

Transposition dates	
Date of adoption:	5 September 1997
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1 Scope

This European Telecommunication Standard (ETS) specifies the electrical characteristics, the functional characteristics and the corresponding conformance tests for Terminal Equipment (TE) for connection to the network termination points of a Public Switched Telephone Network (PSTN) interface providing a Protocol over the local loop for display and related services based on the protocols defined in ETS 300 659-1 [1]. This ETS applies to the asynchronous voice-band Frequency Shift Keying (FSK) based subscriber line protocols. For those networks that implement a Dual Tone Multi Frequency (DTMF) based subscriber line protocol, network specific TE requirements apply (see annex A).

This ETS applies to off-line data transmission only.

The requirements are intended to ensure correct reception and detection of the received data. The method of displaying the received data is not defined.

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): "Signalling Protocols and Switching (SPS); Public Switched Telephone Network (PSTN); Subscriber line protocol over the local loop for display (and related) services; Part 1: On hook data transmission".

[2]   CCITT Recommendation V.23 (1988): "600/1 200-baud modem standardized for use in the general switched telephone network".

[3]   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".

[4]   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

3.1 Definitions

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

Dual Tone Alerting Signal (DT-AS): A specific combination of tones used as a TE Alerting Signal (TAS).

idle line signalling state: The state into which the TE when connected to the network, is placed such that it is capable of receiving or sending speechband signalling without entering the loop state.

idle state: An electrical condition into which the TE when connected to the network is placed such that it does not activate the exchange. Equivalent to the quiescent state.

loop state: An electrical condition into which the TE when connected to the network is placed such that it draws enough current to be capable of activating the exchange.

off-line: The TE is said to be off-line when it is in the idle state. The off-line state is also known as the on-hook state.

on-line: The TE is said to be on-line when it is in the loop state. The on-line state is also known as the off-hook state.

ringing state: An idle state into which a ringing signal is applied.

Ringing Pulse Alerting Signal (RP-AS): A single pulse of ringing current used as a TAS.

TE Alerting Signal (TAS): A signal transmitted from the network to the TE to initiate a change in state of the TE from idle state to the idle line signalling state.

twist: Level difference between different frequencies in a signal.

ring pattern: One or more ringing pulses separated by short silent periods.

3.2   Abbreviations

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

CLI	Calling Line Identity
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
DIT	Data Information Transfer
DT-AS	Dual Tone Alerting Signal
DTMF	Dual Tone Multi Frequency
FSK	Frequency Shift Keying
IRA	International Reference Alphabet
NTP	Network Termination Point
PSTN	Public Switched Telephone Network
RP-AS	Ringing Pulse Alerting Signal
TAS	TE Alerting Signal
TE	Terminal Equipment
TEUT	Terminal Equipment Under Test

4   Physical layer requirements
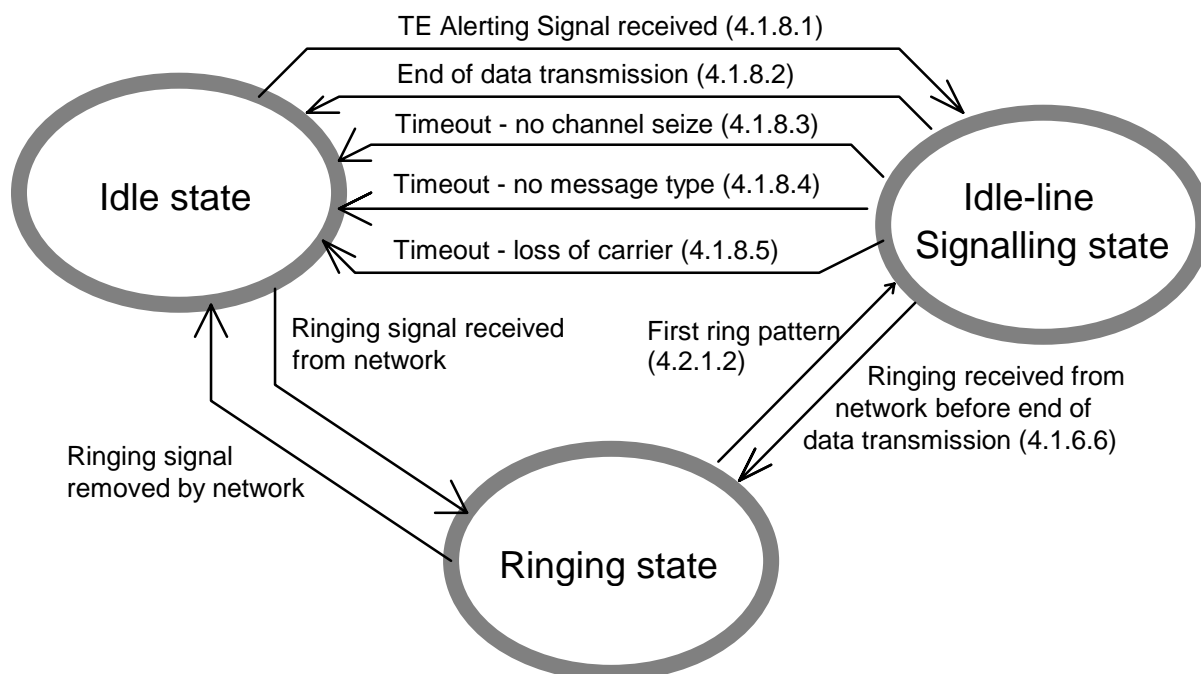
Figure 1: State diagram for caller display terminals

4.1 General requirements

4.1.1 Idle state

There are no idle state requirements under this ETS.

Idle state requirements are imposed under the various European and national regulatory access requirements. Additional installation specific values may be recommended.

4.1.2 Polarity

Requirement: All requirements in this ETS shall be met independently of the polarity of the dc voltage applied to the line terminals of the TE.

Test: Compliance shall be checked by the test described in clause C.1.

4.1.3 AC termination

4.1.3.1 Data transmission not associated with ringing or prior to ringing

Requirement: For TE intended to operate where data transmission is not associated with ringing or where data transmission is prior to ringing, the TE shall present one of the following AC conditions during the idle line signalling state:

a)   an impedance not less than 8 kΩ, but with a phase angle not exceeding +5$°$ over the frequency range 200 Hz to 4 000 Hz;

b)   a return loss over the frequency range 1 000 Hz to 2 500 Hz of not less than 10 dB with respect to a network comprising a resistor of 820 Ω in series with a parallel combination of a 360 Ω resistor and a 180 nF capacitor.

   NOTE: Condition a) may be met by the appropriate regulatory quiescent state impedance.

Test: Compliance shall be by suppliers declaration.

4.1.3.2 Data transmission during ringing

Requirement: For TE intended to operate where data transmission takes place during ringing, the TE shall present the AC condition a) of subclause 4.1.3.1 during the idle line signalling state.

Test: Compliance shall be by suppliers declaration.

4.1.4 DC termination

Requirement: During the idle-line signalling state the TE shall present either of the following DC conditions to the network:

a)   the current drawn by the TE shall not exceed 0,5 mA at 50 V;

b)   the current drawn by the TE shall not exceed the current drawn by a 5 MΩ resistor when connected to 100 V.

Test: Compliance shall be checked by the test described in clause C.1.

4.1.5 Signalling format

Data transmission to the TE is by means of the Frequency Shift Keying (FSK) method based upon CCITT Recommendation V.23 [2].

4.1.5.1 Signalling frequencies

Requirement: The TE shall be capable of correctly receiving FSK signalling tones within the following frequency ranges; mark frequency: 1 300 Hz ±1,5 %, space frequency: 2 100 Hz ±1,5 % at a rate of 1 200 bits/s ±1 %.

Test: Compliance shall be checked by the test described in clause C.3.

4.1.5.2 Signalling levels

Requirement: The TE shall be capable of correctly receiving FSK signalling tones with levels within the range -8 to -36 dBV, and with a twist between the mark and space tones not exceeding 6 dB.

Test: Compliance shall be checked by the test described in clause C.3.

4.1.5.3 Unwanted signals

Requirement: The TE shall correctly receive FSK signalling tones of correct frequency and level in the presence of unwanted voice band (300 Hz to 3 400 Hz) signals with a total power not exceeding a level 25 dB below the total power level of the FSK signalling during channel seizure.

Test: Compliance shall be checked by the test described in clause C.3.

4.1.6 Timing requirements
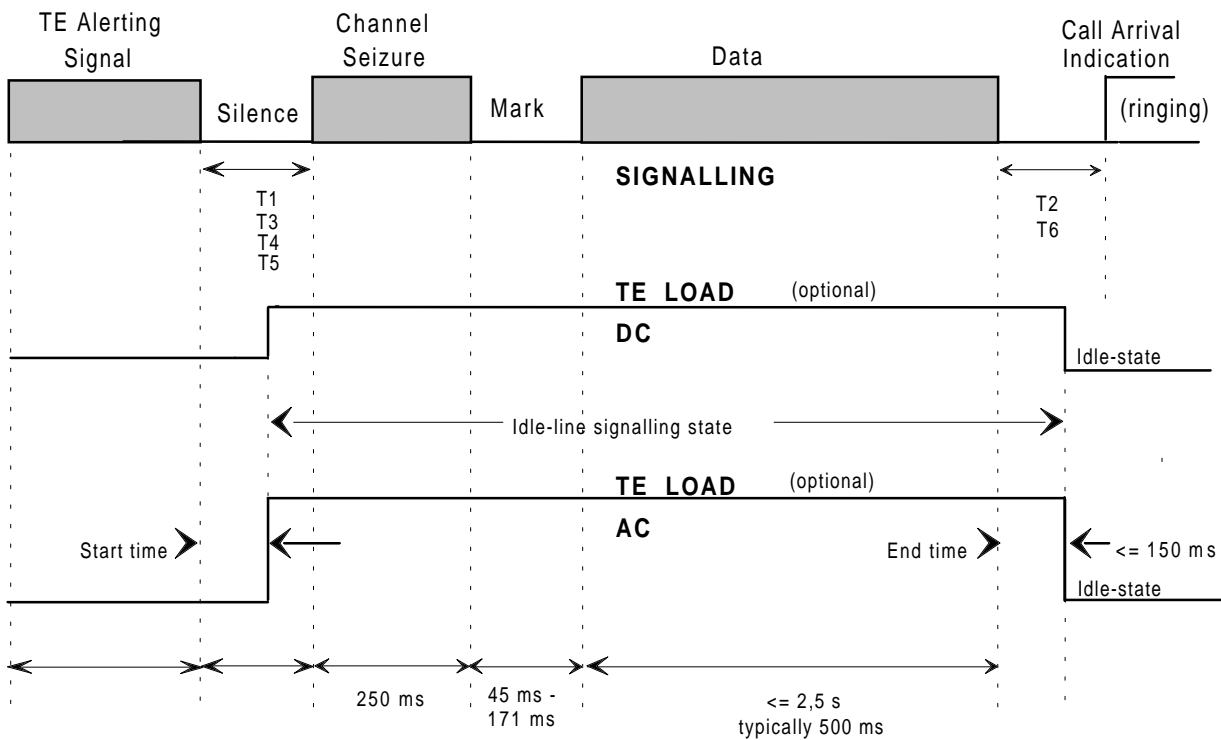
Figure 2: Timing illustration

4.1.6.1 Start time

Requirement: The TE shall enter the idle-line signalling state within one or more of the following time periods measured from the end of the TAS (see figure 2):

a)   45 ms when a TAS of type DT-AS is used;

b)   500 ms when a TAS of type RP-AS is used;

c)   45 ms when a TAS of type "Line reversal + DT-AS" is used;

d)   500 ms when a TAS of type "first ring pattern" is used.

   NOTE: It is recommended that the start time chosen allows sufficient settling time to enable FSK data reception.

Test: Compliance shall be by suppliers declaration.

4.1.6.2 End time

Requirement: The TE shall leave the idle-line signalling state and revert to the idle state within 150 ms from when the FSK data transmission has been completely signalled (see figure 2).

Test: Compliance shall be by suppliers declaration.

4.1.6.3 Timeout - channel seizure not received

Requirement: If a channel seizure signal is not received the TE shall revert to the idle state within 2,15 s from the end of the TAS.

Test: Compliance shall be by suppliers declaration or by the test described in clause C.2.

4.1.6.4 Timeout - message type byte not received

Requirement: If a message type byte is not received the TE shall revert to the idle state within 2,15 s from the end of the channel seizure signal.

Test: Compliance shall be by suppliers declaration.

4.1.6.5 Timeout - loss of carrier

Requirement: Where the TE is subjected to a reduction of the FSK signal level to below -50 dBV rms following normal reception of a channel seizure, the TE shall revert to the idle state within 150 ms.

Test: Compliance shall be checked by the test of clause C.10

4.1.6.6 Ringing arrival

Requirement: The TE shall leave the idle-line signalling state within 150 ms of receiving a ring burst.

Test: Compliance shall be by suppliers declaration or by the test described in clause C.2.

4.2 Service dependent requirements

The TE should enter an idle-line signalling state in response to a TE Alerting Signal (TAS) or first ring pattern applied to the TE via the network connection point, and should leave the idle-line signalling state when the signalling is completed (see figure 1).

4.2.1 Data transmission associated with ringing

The data transmission can either precede the normal ring pattern, as shown in figures 4, 5 and 6 or occur during the first long silent period during normal ring pattern as shown in figure 3.

The values of timing parameters T0, T1, T2, T3, T4, T5, T6 and T7 are defined in ETS 300 659-1 [1]. The definitions are shown in table 1.

Table 1: Timing parameters

T0	T1	T2	T3	T4	T5	T6	T7
T0 ≥ 100ms	T1 ≥ 45ms	200ms ≤ T2 ≤ 500ms	500ms ≤T3 ≤800ms	45ms ≤T4 ≤ 500ms	T5 ≥ 500ms < 2 000ms	T6 ≥ 200ms	T7 ≤ 700ms
From Line Reversal to DT-AS	From end of DT-AS to start of FSK data transmission	From end of FSK data transmission to first ring pattern	From end of RP-AS to start of FSK data transmission	From end of DT-AS to start of FSK data transmission	From first ring pattern to start of FSK data transmission	From end of FSK data transmission to second ring pattern	From Line Reversal to start of FSK data transmission

Requirement: For TE intended to operate with data transmission associated with ringing, the TE shall comply with one or more of the following requirements:

a)   data transmission prior to ringing (see subclause 4.2.1.1);

b)   data transmission during ringing (see subclause 4.2.1.2).

Test: See subclause 4.2.1.1 or 4.2.1.2.

4.2.1.1 Data transmission prior to ringing

Requirement: For TE intended to operate with data transmission prior to ringing, the TE shall correctly detect one or more of the following types of TAS:

a)   Dual Tone Alerting Signal (DT-AS) (see subclause 4.2.3.1).

b)   Ringing Pulse Alerting Signal (RP-AS) (see subclause 4.2.3.2).

c)   A line reversal followed by a Dual Tone Alerting Signal (DT-AS) (see subclause 4.2.3.3).

Test: See subclauses 4.2.3.1, 4.2.3.2 or 4.2.3.3, respectively.

> NOTE: The TE may receive different DT-AS from the network to identify other services.

4.2.1.2 Data transmission during ringing

Requirement: For TE intended to operate with data transmission during ringing, the TE shall correctly detect a first ring pattern with a duration of 350 ms to 1 200 ms and an amplitude in the range 30 V rms to 90 V rms, at a frequency of 25 Hz and/or 50 Hz,

> NOTE: Although the structure of the first ring pattern is network specific it is assumed to have the following common characteristics:
>
> -   Each ringing pulse has a duration not less than 350 ms.
>
> -   Any short silent period has a duration not more than 450 ms.

Test: Compliance shall be checked by the appropriate test of clause C.2

TIME
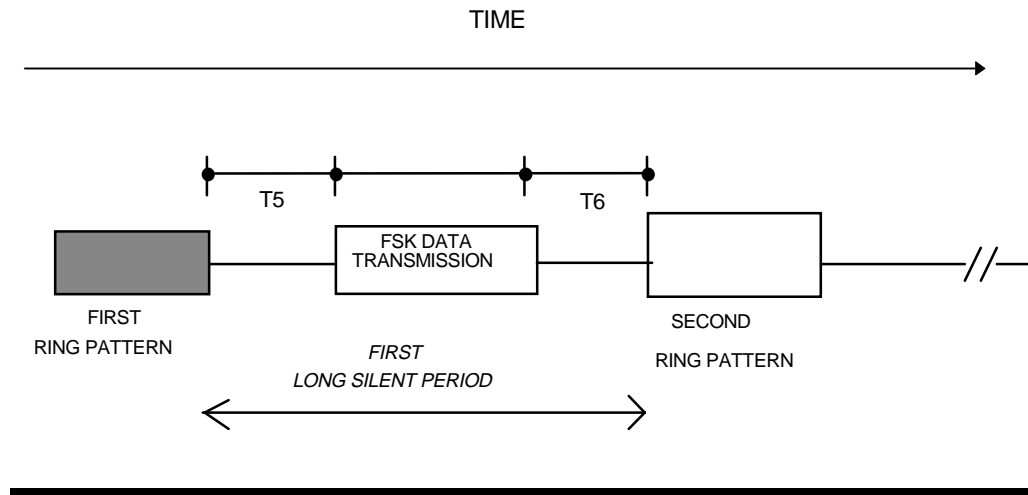
Figure 3: Data transmission during ringing

4.2.2 Data transmission not associated with ringing

Requirement: For TE intended to operate where data transmission is not associated with ringing, the TE shall meet the requirements for TAS recognition defined in subclause 4.2.1.1.

Test: Compliance shall be checked by the appropriate test of subclause 4.2.1.1.

NOTE: An example of data transmission not associated with ringing is message waiting indication.

4.2.3 TE alerting signals

4.2.3.1 Dual Tone Alerting Signal (DT-AS)

Requirement: The TE shall detect the DT-AS in the presence of unwanted voice band (300 Hz to 3 400 Hz) signals with a total power not exceeding 25 dB below the level of the received signalling tones. The signal characteristics are shown in table 2.

Test: Compliance shall be checked by the test described in clause C.2.

Table 2: DT-AS signal characteristics

Nominal frequencies	2 130 Hz and 2 750 Hz ± 0,5 %
Signal level	-9 to -40 dBV/tone
Twist	6 dB max
Duration	100 ms ±10 ms
NOTE: In some networks the signal level may increase to -4 dBV/tone.	

TIME
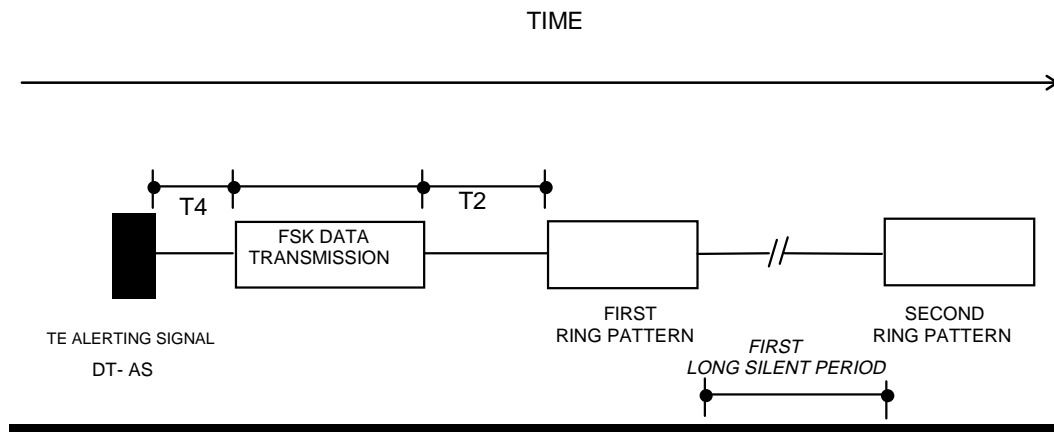
Figure 4: Dual Tone Alerting Signal (DT-AS) preceding the FSK data transmission

4.2.3.2 Ringing Pulse Alerting Signal (RP-AS)

Requirement: The TE shall detect a Ringing Pulse Alerting Signal (RP-AS) with an amplitude in the range 30 V rms to 90 V rms at a nominal frequency of 25 Hz and/or 50 Hz, and of duration 200 ms to 300 ms.

    NOTE 1:   In some networks the RP-AS may extend to 450 ms.

    NOTE 2:   In some networks the RP-AS may be accompanied by a polarity reversal.

    NOTE 3:   The ringing frequency of 25 Hz or 50 Hz is network dependent.

Test: Compliance shall be checked by the test described in clause C.2.

TIME
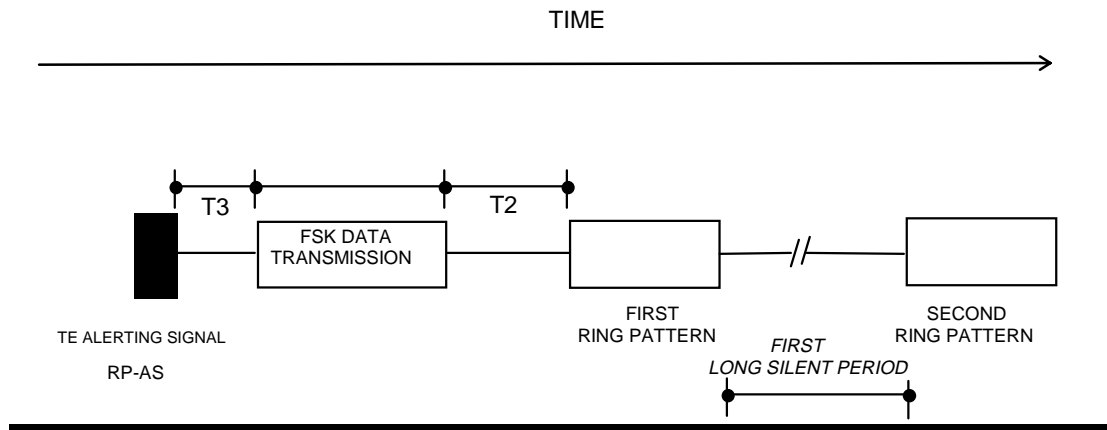
Figure 5: Ringing Pulse Alerting Signal (RP-AS) preceding the FSK data transmission

4.2.3.3 Line reversal followed by a DT-AS

Requirement: The TE shall detect a TE alerting signal comprising a line reversal followed by DT-AS.

Test: Compliance shall be checked by the test described in clause C.2.

    NOTE: In some networks it is recommended that the TE draws a pulse of current from the line. The current should be greater than 25 mA for 11 ± 5 ms applied 20 ± 5 ms from end of alerting signal.
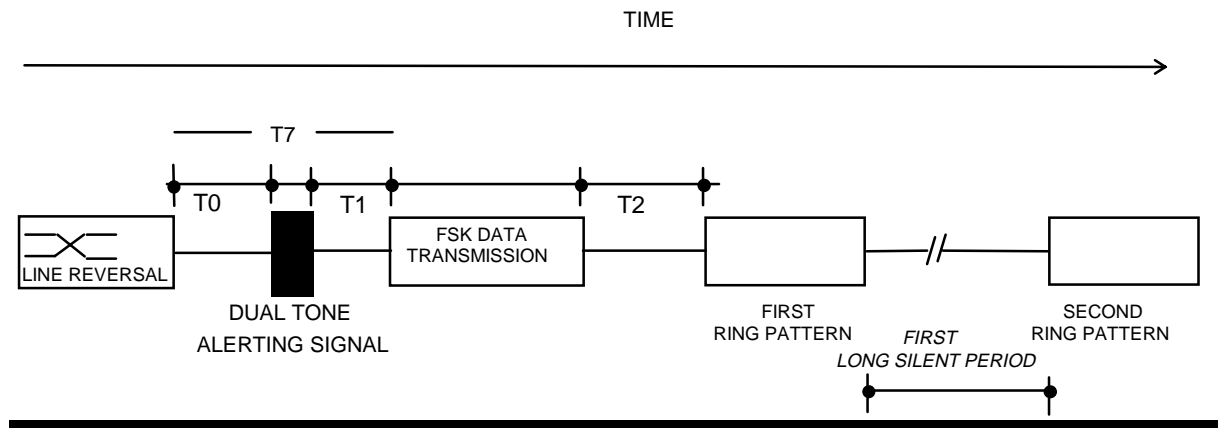
**Figure 6: Line reversal followed by Dual Tone Alerting Signal (DT-AS)
preceding the FSK transmission**

5 Datalink layer - data reception

The FSK data is transmitted to the TE in the form of a datalink packet comprising several data fields of variable length. The structure of the datalink packet is shown in annex E.

5.1 Channel seizure

Requirement: The TE shall detect datalink packets with the following channel seizure field of length:

- 300 alternating bits of mark-space at 1 200 bits/s.

    NOTE: In some networks the channel seizure may be within 96 bits to 300 bits.

Test: Compliance shall be checked by the test described in clause C.4.

5.2 Mark signal

Requirement: The TE shall detect datalink packets with the following mark signal field length of:

a) 180 ± 25 mark bits at 1 200 bits/s; or

b) 80 ± 25 mark bits at 1 200 bits/s.

Test: Compliance shall be checked by the test described in clause C.5.

5.3 Message type

Requirement: The TE shall detect one of the following datalink packets containing "call setup", "message waiting indicator" and "advice of charge" message types, as shown in table 3.

Test: Compliance shall be checked by the test described in clause C.6.

Table 3: Datalink message type

Type (binary)	Type (hex)	Message Name
1000 0000	80 H	Call setup
1000 0010	82 H	Message waiting indicator
1000 0110	86 H	Advice of charge

5.4 Message length

Requirement: The TE shall detect datalink packets with presentation layer messages of length 3 to 75 bytes.

Test: Compliance shall be checked by the test described in clause C.7.

> NOTE: Although the maximum length of message currently identified is 75 bytes, future applications may extend this to 255 bytes. It is recommended that the TE should be able to calculate the validity of the checksum for messages up to the maximum length.

5.5 Checksum

Requirement: The TE shall receive datalink packets with a valid checksum and a presentation layer message field of length 0 to 75 bytes. The TE shall identify any incorrect checksum fields and shall either ignore the transmission or indicate an error as indicated by the supplier. The TE shall identify any received datalink packets without a checksum field and shall either ignore the transmission or display an error message.

Test: Compliance shall be checked by the test described in clause C.8.

> NOTE 1: Although the maximum length of message currently identified is 75 bytes, future applications may extend this to 255 bytes. It is recommended that TE should be able to calculate the validity of the checksum for messages of the maximum length.

> NOTE 2: The checksum may be validated in the TE by calculating the modulo-256 sum of all the fields from the message type field to the checksum field inclusive and ignoring any carry from the most significant bit. A resultant sum of zero indicates a correct checksum.

6 Presentation layer - message interpretation

Requirement: The TE shall correctly interpret messages containing the mandatory parameter types for those services the TE is intended to support.

> NOTE: The TE may optionally interpret the non-mandatory parameters associated with each service.

Test: Compliance shall be checked by tests defined for each service.

6.1 Call set-up message

This message is used to send information related with an incoming call. It supports Calling Line Identification Presentation (CLIP) and related applications (CLIP on Ring-back-when-free-call, Calling Name Delivery).

Table 4: Call Set-up message

Parameter Name	Reference
Date and Time	ETS 300 659-1 [1] subclause 7.4.1
Calling Line Identity	ETS 300 659-1 [1] subclause 7.4.2
Reason for absence of Calling Line Identity	ETS 300 659-1 [1] subclause 7.4.4
Calling Party Name	ETS 300 659-1 [1] subclause 7.4.5
Called Line Identity	ETS 300 659-1 [1] subclause 7.4.3
Reason for absence of Calling Party Name	ETS 300 659-1 [1] subclause 7.4.6
Complementary Calling Line Identity	ETS 300 659-1 [1] subclause 7.4.8
Call type	ETS 300 659-1 [1] subclause 7.4.9
First called line Identity (in case of forwarded call)	ETS 300 659-1 [1] subclause 7.4.10
Network Message System Status	ETS 300 659-1 [1] subclause 7.4.11
Type of forwarded call (in case of forwarded call)	ETS 300 659-1 [1] subclause 7.4.12
Type of Calling User	ETS 300 659-1 [1] subclause 7.4.13
Redirecting Number (in case of forwarded call)	ETS 300 659-1 [1] subclause 7.4.14
Extension for network operator use	ETS 300 659-1 [1] subclause 7.4.16
Network operator parameter	-

6.1.1 CLIP

Requirement: For CLIP reception the TE shall correctly interpret valid "call setup" type messages containing one of the following parameter types:

a)   Calling Line Identity (CLI).

b)   Reason for absence of Calling Line Identity (CLI).

If the "call type" parameter is not included in the received data, the TE shall assume the call type is "voice call" and shall correctly process any valid data.

>   NOTE: If an unrecognized "call type" parameter is received, the TE should either ignore the message or indicate an error.

Test: Compliance shall be checked by the test described in clause C.9.

6.1.2 CLIP on Ring-back-when free

Requirement: The TE shall correctly interpret a valid "call setup" type message containing the following parameter type:

-     Called Line Identity (CLI).

Test: Compliance shall be checked by the test described in clause C.9.

6.1.3 Network message system status

Requirement: For TE intended to receive the Network message system status parameter, the TE shall correctly interpret valid "call set-up" type messages containing the following parameter types:

a)   Call type = message waiting call.

b)   Network message system status.

Test: Compliance shall be checked by the test described in clause C.9.

6.2 Message waiting indicator message

Requirement: The TE shall correctly interpret a valid "Message Waiting Indicator" type message containing the following parameter type:

-     Visual Indicator.

Test: Compliance shall be checked by the test described in clause C.9.

6.3 Advice of charge message

This message is used to send information related to the charge of a call.

Requirements related to this message may be introduced in a later enhancement of this ETS.

7   Safety

There are no Safety requirements under this ETS.

>   NOTE: Safety requirements are imposed under the Low Voltage Directive (73/23/EEC) and Articles 4(a) and 4(b) of Directive 91/263/EEC.

8 ElectroMagnetic Compatibility (EMC)

There are no EMC requirements under this ETS.

NOTE: General EMC requirements are imposed under the EMC Directive (89/336/EEC).

Annex A (normative): DTMF based subscriber line protocol

A.1 Introduction

This annex specifies the characteristics for TE for connection to the Network Termination Point (NTP) of a PSTN interface providing display information, based on the DTMF subscriber line protocol as defined in ETS 300 659-1 [1], annex C.

The requirements are intended to ensure correct physical conditions on the line at the NTP and correct reception and detection of the DTMF codes. In addition, some requirements are included and indicated as optional; these requirements are intended to give guidance about matters which are of interest for practical and operational needs of the served subscriber/user.

The method of displaying the received information is not defined in this annex.

A.2 Definitions

DTMF: The signalling system, also known as Multi-Frequency Push-Button (MFPB) signalling system, according to the CEPT Recommendation which is contained in ETR 206 [4].

idle polarity: The polarity of the feeding voltage between the a- and b-wire of the line in idle state; the idle polarity may be a-wire positive or a-wire negative with respect to b-wire.

Network Termination Point (NTP): The physical point at the boundary of the PSTN intended to accept the connection of a TE.

DIT-only TE: Terminal Equipment with the function of only receiving and displaying the provided display information, e.g. intended to be connected in parallel with TE (with or without such function). For this type of TE, only the quiescent condition and the DIT state condition are applicable.

Display Information Transfer (DIT) phase: The phase in the protocol procedure during which the display information is transferred with DTMF codes according to ETR 206 [4], with the DTMF sender in the PSTN exchange and the DTMF receiver in the TE.

Display Information Transfer (DIT) state: The physical and electrical condition of a TE during the DIT phase of the DTMF based protocol.

A.3 Requirements

A.3.1 General

A.3.1.1 Requirements in all conditions except the DIT state

In all conditions of the TE except the DIT state, the requirements are imposed under the various European regulatory and/or recommended access requirements. In the case the TE is a DIT-only TE, e.g. intended to always being connected in parallel with another TE, the various European regulatory and/or recommended access requirements apply.

A.3.1.2 Requirements in the DIT state

In the DIT state, the requirements are imposed under the various European regulatory and/or recommended access requirements.

A.3.1.3 Additional requirements in all conditions

The requirements shall be met independent of the polarity of the line feeding voltage (according to the various European regulatory and/or recommended access requirements). but the polarity reversals in quiescent condition and in DIT state shall be detected and interpreted as defined in subclauses A.3.2.1 and A.3.4.1 of this annex respectively.

A.3.1.4 Optional requirements related to parallel connectivity capability

The parallel connectivity capability of TEs, as determined by parameters in quiescent condition and during ringing, is also applicable for TEs with DIT function, in which for the DIT state the following applies:

a)   for the parameters "DC resistance" and "AC impedance" the values in the DIT state are defined in subclauses A.3.2.2. and A.3.2.3. respectively; these values are such that up to 5 TEs with DIT function can be connected in parallel;

b)   the values in the DIT state of the parameters "DC resistance to earth" and "impedance for ringing signals" shall be equal to or greater than the values in the quiescent condition.

For DIT-only TE, it is of special importance that this type of TE will have, both in quiescent condition and in DIT state, such parameter values, that this type of TE does not influence in a noticeable way the parallel connectivity capability at the NTP.

A.3.2 Establishing the DIT state

A.3.2.1 Transition to the DIT state

Starting from the quiescent condition of the TE and feeding voltage with idle polarity, the DIT state shall be established within 200 ms after the reversal of the feeding voltage polarity and the reversed voltage has reached a level of higher than 30 V dc.

A.3.2.2 DC resistance in the DIT state

In the DIT state the DC resistance between the line terminals shall not be less than 90 kΩ.

> NOTE: In some networks it is required that the DC resistance between the line terminals is between 90 kΩ and 110 kΩ.

A.3.2.3 AC impedance in the DIT state

In the DIT state the AC impedance in the frequency range of 300 Hz to 3 400 Hz shall be greater than 1 800 Ω and preferably lower than 2 400 Ω.

A.3.3 DTMF code reception in the DIT state

A.3.3.1 General

For the DTMF based subscriber line protocol of the DIT service, use is made of the DTMF signalling system according to ETR 206 [4] with the sender function in the exchange and the receiver function in the TE. Receipt of all 16 DTMF code signals shall be supported. The requirements in ETR 206 [4], section 1 and ETR 206 [4], section 3, subclause 3.3 shall be met, except for the characteristics as stated in the following subclauses.

A.3.3.2 Signal condition recognition level

Subclause 3.3.3.1, paragraph (c) of ETR 206 [4] is modified to read as follows:

"The level of each of the two signalling frequencies is within the range 0 to -30 dBV."

A.3.3.3 Immunity for accompanied frequencies

Subclause 3.3.3.1, paragraph (e) of ETR 206 [4] is modified to read as follows:

"The signal condition recognition shall not be affected when the DTMF signal is accompanied by signals with a level up to +18 dBV in the range 20 Hz to 60 Hz and/or with a level up to -8 dBV in the range 300 Hz to 550 Hz."

A.3.3.4 Signal condition non-recognition level

Subclause 3.3.3.2 of ETR 206 [4] is modified to read as follows:

"If none of the frequencies in the low signalling frequency group and/or none of the frequencies in the high signalling frequency group has a level higher than -40 dBV, no DTMF signal condition shall be recognized; when applicable, this condition shall be recognized as DTMF pause condition."

A.3.4 End of the DIT state

A.3.4.1 Leaving the DIT state

When the display information transfer is completed, the TE shall leave the DIT state and return to the quiescent condition with the ringing function, if provided, enabled, unless the TE has already left the DIT state while being forced to the loop condition (i.e. by answering the call).

A.3.4.2 Criteria for leaving the DIT state

The transfer of number information is to be regarded as completed when one of the following criteria are met:

a)   the DTMF code <C> (end code) is received;

b)   ringing signal is received;

c)   the feeding voltage polarity is reverted back to the idle polarity;

d)   no DTMF code is received within 1 s after the reversal of the feeding voltage polarity and the reversed voltage has reached a level of higher than 30 V DC;

e)   after receipt of a DTMF code the DTMF pause condition is present for more than 1 s.

At least the criteria d) and e) shall be supported by the TE, as these criteria will guarantee in both normal and abnormal display information transfer procedures, that the DIT state is left before or as soon as possible after the line comes into loop condition because the call is answered by one or another TE connected at the NTP.

Annex B (normative):   Test configuration

B.1   Test configuration

Unless otherwise stated in this ETS, the Terminal Equipment Under Test (TEUT), shall be connected as part of the test circuit shown in figure B.1. The data message shall be sent to the TE as defined in the relevant test, and the performance of the TEUT monitored to observe the response. Each test will be defined in 3 parts:

-       alerting case;
-       FSK signalling case;
-       test packet.

The alerting case defines the test values of the TAS; the signalling case defines the physical characteristics of the transmission e.g. tone frequencies and levels; and the test packet defines the messages and variants of the datalink packet structure. Each test is defined in the form "AC1:FSK1:TP3". Where options exist within the test, the options will be separated by the "/" symbol e.g. AC3/LR1/DT4:FSK1:TP6.

The line polarity shall be reversed between each test.

Figure B.1: Test circuit
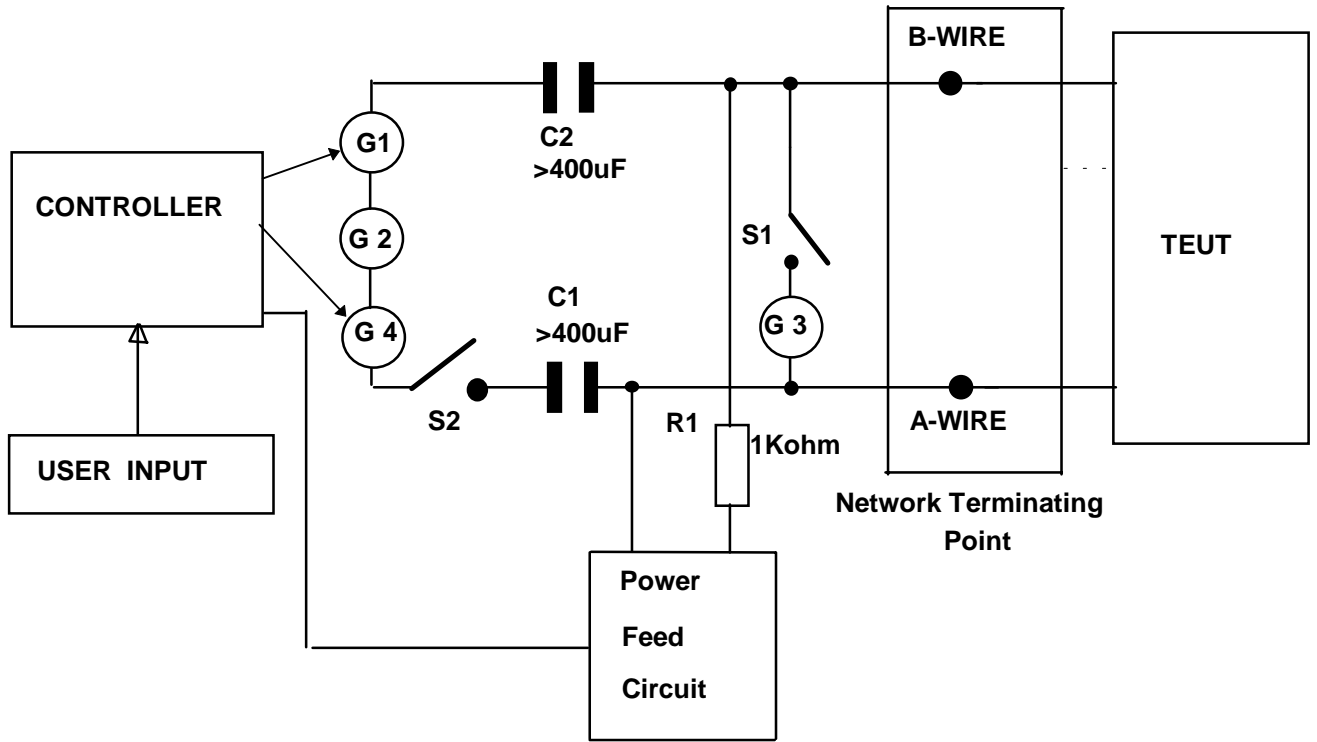
Where:
- G1 is a generator capable of providing FSK signalling frequencies and levels as defined in table B.2.
- G2 is a generator capable of providing unwanted voice band signals as defined in table B.2.
- G3 is a generator capable of providing a ringing signal at frequencies and levels defined in tables B.1 and B5.
- G4 is a generator capable of providing DT-AS.
- S1 is a switch used to apply the ringing signal to the terminal equipment for the required time.
- S2 is a switch used to prevent ringing current passing through the generators G1, G2 and G4.
- The Power Feed Circuit is a 50 V dc power supply with the capability of providing polarity reversals.
- The controller is used to generate the appropriate bit streams for the test packet types defined in table B.3, and applying them to generator G1 for conversion into FSK signals. The controller may also be used to control the operation of generators G2,G3 and G4, the switches S1 and S2, and polarity reversal of the Power Feed Circuit.

    NOTE: The impedances of the generators are not critical providing they are capable of producing the required levels at the network termination point. Generators G1 and G2 may be combined.

B.2   Test cases

Table B.1: RP-AS

Parameter	AC1	AC2	AC3
Ring Frequency - Hz	25/50	25/50	25/50
Ring voltage - V rms (between A-wire, B-wire)	90	30	50
Ring duration - ms	200	300	200
Silence duration - ms	500	500	750
NOTE: The supplier should state whether the TE is intended to operate with ringing frequency of 25 Hz, 50 Hz or both.			

Table B.2: FSK signalling tones

Parameter	FSK1	FSK2	FSK3	FSK4
Mark frequency (logic 1) - Hz	1 300	1 280,5	1 319,5	1 300
Space frequency (logic 0) - Hz	2 100	2 068,5	2 131,5	2 100
Mark level (between A-wire, B-wire)	-20 dBV	-30 dBV	-8 dBV	-55 dBV
Space level (between A-wire, B-wire)	-20 dBV	-36 dBV	-14 dBV	-55 dBV
Interfering signal power level referred to the power level of the signal fundamental frequency and with voice band limited white noise.	none	-25 dB	-25 dB	none

Table B.3: Data Link Packet structure

Test Packet type	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TP13	TP14	TP15
Channel seize	SZ1	SZ1	SZ1	SZ1	SZ1	SZ1	SZ1	SZ1	SZ1	SZ1	SZ1	SZ1	SZ1	SZ1	SZ1
Mark period	MK2	MK2	MK2	MK2	MK2	MK2	MK2	MK2	MK2	MK2	MK2	MK2	MK2	MK2	MK2
Message type	MT1	MT2	MT3	MT2	MT2	MT1	MT1	MT1	MT1	MT1	MT1	MT1	MT1	MT1	MT1
Presentation message	PM1	PM11	note 2	PM12	PM12	PM1	PM2	PM3	PM4	PM5	PM6	PM7	PM8	PM9	PM10
Checksum	CH1	CH1	CH1	CH1	CH2	CH2	CH1	CH1	CH1	CH1	CH1	CH1	CH1	CH1	CH1

NOTE 1: When the network option of 80 bits for the mark signal is used MK2 should be changed to MK1.
NOTE 2: Tests related to this message may be introduced in a later enhancement of this ETS.

Table B.4: Presentation layer test messages

Presentation Layer Message type	PM1	PM2	PM3	PM4	PM5	PM6	PM7	PM8	PM9	PM10	PM11	PM12
Message length (bytes)	ML1 (48)	ML1 (48)	ML2 (45)	ML3 (39)	ML3 (39)	ML7 (19)	ML5 (41)	ML6 (109)	ML8 (28)	ML4(6)	ML9 (3)	ML9 (3)
Call type	CT1	CT2	---	CT1	CT1	CT3	CT1	CT1	CT3	CT3	---	---
Date and Time	TD1	TD1	TD1	TD1	TD1	TD1	TD1	TD1	TD1	---	---	---
Calling Line Identity	CL1	CL1	CL1	---	---	---	CL1	CL3	CL1	---	---	---
Called Line Identity	CL2	CL2	CL2	CL2	CL2	---	CL2	CL4	---	---	---	---
Calling Party Name	CN1	CN1	CN1	CN1	CN1	---	---	CN2	---	---	---	---
Reason for absence of Calling Line Identity	---	---	---	RA1	RA2	---	---	---	---	---	---	---
Reason for absence of Calling Party Name	---	---	---	---	---	---	RA3	---	---	---	---	---
Visual Indicator	---	---	---	---	---	---	---	---	---	---	VI1	VI2
Network Message System Status	---	---	---	---	---	NM1	---	---	NM2	NM3	---	---

Table B.5: Initial ring pattern

Parameter	RC1	RC2	RC3
Voltage - V rms	30	50	90
Frequency - Hz	25/50	25/50	25/50
Pattern - Ring burst ms	400	1 000	1 200
Time to data - T5 - ms	500	1 000	2 000

NOTE: The supplier should state whether the TE is intended to operate with ringing frequency of 25 Hz, 50 Hz or both.

B.3   Test data

Table B.6: Test data

Test	Data	Comments
SZ1	300 bits alternating mark & space (start with space, end with mark)	ETSI channel seizure period
MK1	80 bits continuous mark	Network operator option
MK2	180 bits continuous mark	ETSI preferred value mark period
CH1	correct checksum	Calculated for each message
CH2	incorrect checksum	Calculated for each message
MT1	1000 0000 80H	Call setup message type
MT2	1000 0010 82H	Message waiting Indicator message type
MT3	1000 0110 86H	Advice of charge message type
ML1	0011 0000 30H	48 byte message
ML2	0010 1101 2DH	45 byte message
ML3	0010 0111 27H	39 byte message
ML4	0000 0110 06H	6 byte message
ML5	0010 1001 29H	41 byte message
ML6	0110 1101 6DH	109 byte message
ML7	0001 0011 13H	19 byte message
ML8	0001 1100 1CH	28 byte message
ML9	0000 0011 03H	3 byte message

Table B.7: CT1 test

CT1 test	Data	Meaning
Parameter type	0001 0001 11H	Call type
Parameter length	0000 0001 01H	1 byte parameter data
Parameter data	0000 0001 01H	Voice call

Table B.8: CT2 test

CT2 test	Data	Meaning
Parameter type	0001 0001 11H	Call type
Parameter length	0000 0001 01H	1 byte parameter data
Parameter data	0000 0010 02H	Ring back when free call

Table B.9: CT3 test

CT3 test	Data	Meaning
Parameter type	0001 0001 11H	Call type
Parameter length	0000 0001 01H	1 byte parameter data
Parameter data	1000 0001 81H	Message waiting call

Table B.10: RA1 test

RA1 test	Data	Meaning
Parameter type	0000 0100 04H	Reason for absence of Calling Line Identity
Parameter length	0000 0001 01H	1 byte parameter data
Parameter data	0100 1111 4FH	unavailable

Table B.11: RA2 test

RA2 test	Data	Meaning
Parameter type	0000 0100 04H	Reason for absence of Calling Line Identity
Parameter length	0000 0001 01H	1 byte parameter data
Parameter data	0101 0000 50H	Private (withheld)

Table B.12: RA3 test

RA3	Data	Meaning
Parameter type	0000 1000 08H	Reason for absence of Calling Party Name
Parameter length	0000 0001 01H	1 byte parameter data
Parameter data	0101 0000 50H	Private (withheld)

Table B.13: NM1 test

NM1	Data	Meaning
Parameter type	0001 0011 13H	Network message system status
Parameter length	0000 0001 01H	1 byte parameter data
Parameter data	0000 0011 03H	3 messages waiting

Table B.14: TD1 test

TD1	Data	Meaning - (10:30 a.m. 23rd February)
Parameter type	0000 0001 01H	Date and Time
Parameter length	0000 1000 08H	8 bytes parameter data
Parameter data	0011 0000 30H	0 IRA
"	0011 0010 32H	2 IRA
"	0011 0010 32H	2 IRA
"	0011 0011 33H	3 IRA
"	0011 0001 31H	1 IRA
"	0011 0000 30H	0 IRA
"	0011 0011 33H	3 IRA
"	0011 0000 30H	0 IRA

Table B.15: CL1 test (typical number length)

CL1	Data	Meaning - (0123-45678)
Parameter type	0000 0010 02H	Calling Line Identity
Parameter length	0000 1010 0AH	10 bytes parameter data
Parameter data	0011 0000 30H	0 IRA
"	0011 0001 31H	1 IRA
"	0011 0010 32H	2 IRA
"	0011 0011 33H	3 IRA
"	0010 1101 2DH	- IRA
"	0011 0100 34H	4 IRA
"	0011 0101 35H	5 IRA
"	0011 0110 36H	6 IRA
"	0011 0111 37H	7 IRA
"	0011 1000 38H	8 IRA

Table B.16: CL2 test (typical number length)

CL2	Data	Meaning - (0456-789123)
Parameter type	0000 0011 03H	Called Line Identity
Parameter length	0000 1011 0BH	11 bytes parameter data
Parameter data	0011 0000 30H	0 IRA
"	0011 0100 34H	4 IRA
"	0011 0101 35H	5 IRA
"	0011 0110 36H	6 IRA
"	0010 1101 2DH	- IRA
"	0011 0111 37H	7 IRA
"	0011 1000 38H	8 IRA
"	0011 1001 39H	9 IRA
"	0011 0001 31H	1 IRA
"	0011 0010 32H	2 IRA
"	0011 0011 33H	3 IRA

Table B.17: CL3 test (maximum length number)

CL3	Data	Meaning
Parameter type	0000 0010 02H	Calling Line Identity
Parameter length	0001 0010 14H	20 bytes parameter data
Parameter data	0011 0000 30H	0 IRA
"	0011 0001 31H	1 IRA
"	0011 0010 32H	2 IRA
"	0011 0011 33H	3 IRA
"	0010 1101 2DH	- IRA
"	0011 0100 34H	4 IRA
"	0011 0101 35H	5 IRA
"	0011 0110 36H	6 IRA
"	0011 0111 37H	7 IRA
"	0011 1000 38H	8 IRA
"	0010 1101 2DH	- IRA
"	0011 0001 31H	1 IRA
"	0011 0010 32H	2 IRA
"	0011 0011 33H	3 IRA
"	0011 0100 34H	4 IRA
"	0011 0101 35H	5 IRA
"	0011 0110 36H	6 IRA
"	0011 0111 37H	7 IRA
"	0011 1000 38H	8 IRA
"	0011 1001 39H	9 IRA

Table B.18: CL4 test - (maximum length number)

CL4	Data	Meaning
Parameter type	0000 0011 03H	Called Line Identity
Parameter length	0001 0010 14H	20 bytes parameter data
Parameter data	0011 0000 30H	0 IRA
"	0011 0100 34H	4 IRA
"	0011 0101 35H	5 IRA
"	0011 0110 36H	6 IRA
"	0011 0111 37H	7 IRA
"	0011 1000 38H	8 IRA
"	0010 1101 2DH	- IRA
"	0011 0001 31H	1 IRA
"	0011 0010 32H	2 IRA
"	0011 0011 33H	3 IRA
"	0011 0100 34H	4 IRA
"	0011 0101 35H	5 IRA
"	0010 1101 2DH	- IRA
"	0011 0110 36H	6 IRA
"	0011 0111 37H	7 IRA
"	0011 1000 38H	8 IRA
"	0011 1001 39H	9 IRA
	0011 0000 30H	0 IRA
	0011 0001 31H	1 IRA
	0011 0010 32H	2 IRA

Table B.19: CN1 test - (typical name length)

CN1	Data	Meaning
Parameter type	0000 0111 07H	Calling Party Name
Parameter length	0000 1000 08H	8 bytes parameter data
Parameter data	0100 0001 41H	A IRA
"	0010 1110 2EH	. IRA
"	0100 0011 43H	C IRA
"	0110 0001 61H	a IRA
"	0110 1100 6CH	l IRA
"	0110 1100 6CH	l IRA
"	0110 0101 65H	e IRA
"	0111 0010 72H	r IRA

Table B.20: CN2 test - (maximum length name)

CN2	Data	Meaning
Parameter type	0000 0011 03H	Calling Party Name
Parameter length	0011 0010 32H	50 bytes parameter data
"	0110 1101 6DH	m IRA
"	0110 0001 61H	a IRA
"	0111 1000 78H	x IRA
"	0110 1001 69H	i IRA
"	0110 1101 6DH	m IRA
"	0111 0101 75H	u IRA
"	0110 1101 6DH	m IRA
"	0010 0000 20H	Space IRA
"	0111 0100 74H	t IRA
"	0110 0101 65H	e IRA
"	0111 0011 73H	s IRA
"	0111 0100 74H	t IRA
"	0010 0000 20H	Space IRA
"	0110 1101 6DH	m IRA
"	0110 0101 65H	e IRA
"	0111 0011 73H	s IRA
"	0111 0011 73H	s IRA
"	0110 0001 61H	a IRA
"	0110 0111 67H	g IRA
"	0110 0101 65H	e IRA
"	0010 0000 20H	Space IRA
"	0111 0000 70H	p IRA
"	0100 0001 41H	a IRA
"	0111 0010 72H	r IRA
"	0111 0100 74H	t IRA
"	0111 1010 7AH	y IRA
"	0110 1110 6EH	n IRA
"	0100 0001 41H	a IRA
"	0110 1101 6DH	m IRA
"	0110 0101 65H	e IRA
"	0110 1101 6DH	m IRA
"	0110 0001 61H	a IRA
"	0111 1000 78H	x IRA
"	0110 1001 69H	i IRA
"	0110 1101 6DH	m IRA
"	0111 0101 75H	u IRA
"	0110 1101 6DH	m IRA
"	0010 0000 20H	Space IRA
"	0111 0100 74H	t IRA
"	0110 0101 65H	e IRA
"	0111 0011 73H	s IRA
"	0111 0100 74H	t IRA
"	0010 0000 20H	Space IRA
"	0110 1101 6DH	m IRA
"	0110 0101 65H	e IRA
"	0111 0011 73H	s IRA
"	0111 0011 73H	s IRA
"	0110 0001 61H	a IRA
"	0110 0111 67H	g IRA
"	0110 0101 65H	e IRA

Table B.21: DT-AS

Case	Frequency Hz	Level of lower frequency tone	Level of higher frequency tone	Duration	Validity
DT1	2 120 and 2 737	-9 dBV	-15 dBV	90 ms	valid
DT2	2 140 and 2 763	-9 dBV	-15 dBV	110 ms	valid
DT3	2 140 and 2 763	-34 dBV	-40 dBV	110 ms	valid
DT4	2 130 and 2 750	-20 dBV	-40 dBV	100 ms	valid

Table B.22: Line reversal + DT-AS

Parameter	LR1	LR2
Reversal	+50 V to -50 V	+50 V to -50 V
Silent period: T0	100 ms	100 ms
Silent period: T1	45 ms	450 ms
Dual Tone: Frequency	2 130 and 2 750 Hz	2 140 and 2 763 Hz
Dual Tone: Level	-30 dBV	-10 dBV
Dual Tone: Twist	6 dB	6 dB
Dual Tone: Duration	90 ms	110 ms

Table B.23: NM2 test

NM2	Data	Meaning
Parameter type	0001 0011 13H	Network message system status
Parameter length	0000 0001 01H	1 byte parameter data
Parameter data	0000 0000 00H	no message waiting

Table B.24: NM3 test

NM3	Data	Meaning
Parameter type	0001 0011 13H	Network message system status
Parameter length	0000 0001 01H	1 byte parameter data
Parameter data	0000 0001 01H	One or more messages waiting

Table B.25: VI1 test

VI1	Data	Meaning
Parameter type	0000 1011 0BH	Visual Indicator
Parameter length	0000 0001 01H	1 byte parameter data
Parameter data	0000 0000 00H	Indicator OFF

Table B.26: VI2 test

VI2	Data	Meaning
Parameter type	0000 1011 0BH	Visual Indicator
Parameter length	0000 0001 01H	1 byte parameter data
Parameter data	1111 1111 FFH	Indicator ON

Annex C (normative): Test requirements

C.1 DC termination

The TE shall be connected as shown in figure B.1. The controller is set to transmit a valid alerting signal to the TE to place it in the idle line signalling state. The current drawn by the TE in the idle line signalling state is calculated from measurement of the voltage across resistor R1.

C.2 TAS and Timing

The TE shall be connected as shown in figure B.1. The controller is set to transmit the test packet TP1/TP2/TP3 to the TEUT for each of the following test cases.

Table C.1a: RP-AS

TAS case	Modem case	Result
AC1	FSK1	Correct reception of FSK data.
AC2	FSK1	Correct reception of FSK data.
AC3 Ringing starts 1 s after end of TAS	FSK1	TEUT returns to the idle state at start of ringing or to the ringing state if fitted with a ringer. No message displayed.
AC3	no data packet	TEUT returns to the idle state.
AC3	FSK1	Correct reception of FSK data

Table C.1b: Line Reversal + DT-AS

TAS case	Modem case	Result
LR1	FSK1	Correct reception of FSK data.
LR2	FSK1	Correct reception of FSK data.
LR1 Ringing starts 1 s after end of TAS	FSK1	TEUT returns to the idle state at start of ringing or to the ringing state if is fitted with a ringer. No message or error displayed.
LR1	no data packet	TEUT returns to the idle state.

Table C.1c: DT-AS

TAS case	Modem case	Result
DT1	FSK1	Correct reception of FSK data.
DT2	FSK1	Correct reception of FSK data.
DT3 Ringing starts 1 s after end of TAS single ring burst	FSK1	TEUT returns to the idle state at start of ringing or to the ringing state if is fitted with a ringer. No message or error displayed.
DT4	FSK1	Correct reception of FSK data.
DT3	no data packet	TEUT returns to the idle state.
DT3	FSK1	Correct reception of FSK data.

Table C.1d: Timing requirements - Initial ring pattern

TAS case	Modem case	Result
RC1	FSK1	Correct reception of FSK data.
RC2	FSK1	Correct reception of FSK data.
RC3	FSK1	Correct reception of FSK data.

C.3   Signalling

The TE shall be connected as shown in figure B.1. The controller is set to transmit the test packet TP1/TP2/TP3 to the TEUT for each of the following test cases:

Table C.2: Signalling requirements

TAS case	Modem case	Result
AC3, LR1, DT4, or RC2	FSK1	Correct reception of FSK data.
AC3, LR1, DT4, or RC2	FSK2	Correct reception of FSK data.
AC3, LR1, DT4, or RC2	FSK3	Correct reception of FSK data.

Check that the result for each case is in accordance with the above table.

C.4   Data reception

The TE shall be connected as shown in figure B.1. The controller is set to transmit the following test messages to the TEUT:

AC3/LR1/DT4/RC2:FSK1:TP1/TP2/TP3.

NOTE: In the case of TP2 which switches the visual indicator OFF the TE should first be preconditioned to visual indicator ON by transmitting the data link packet TP4.

Check that the message is correctly interpreted by the TEUT.

C.5   Mark signal

NOTE: The mark signal is tested concurrently with clause C.4.

C.6   Message type

NOTE: The message type is tested concurrently with clause C.4.

C.7   Message length

There is no specific test for message length.

NOTE: The check for correct interpretation of the message length field by the TEUT is implicit on correct interpretation of the range of messages tested in clause C.9.

C.8   Checksum

The TE shall be connected as shown in figure B.1. The controller is set to transmit the following test message to the TEUT:

AC3/LR1/DT4/RC2:FSK1:TP5/TP6 (incorrect checksum).

Check that the message is correctly rejected or an error message displayed by the TEUT.

NOTE: A valid checksum message is tested during test clause C.4.

C.9   Presentation layer messages

The TE shall be connected as shown in figure B.1. The controller is set to transmit the following test messages to the TEUT:

Table C.3: Presentation Layer messages

Test data	Test case	
AC3/LR1/DT4/RC2:FSK1:TP7	Call type: ring back when free - valid CLI message	
AC3/LR1/DT4/RC2:FSK1:TP8	Call type: absent - valid CLI message	
AC3/LR1/DT4/RC2:FSK1:TP9	Call type: voice - valid CLI message	
AC3/LR1/DT4/RC2:FSK1:TP10	Call type: voice - valid CLI message	
AC3/LR1/DT4/RC2:FSK1:TP11 **	Call type: message waiting - valid message	
AC3/LR1/DT4/RC2:FSK1:TP12	Call type: voice - valid CLI message	
AC3/LR1/DT4/RC2:FSK1:TP13	Call type: voice - maximum length valid CLI message	
AC3/LR1/DT4/RC2:FSK1:TP14 **	Call type: message waiting -valid message	
AC3/LR1/DT4/RC2:FSK1:TP15 **	Call type: message waiting - valid message	
AC3/LR1/DT4/RC2:FSK1:TP4 *	Message type: message waiting indicator ON - valid message	
AC3/LR1/DT4/RC2:FSK1:TP2 *	Message type: message waiting indicator OFF - valid message	
NOTE 1: AC3/LR1/DT4/RC2: TE Alerting Signal option (TAS). NOTE 2: * Only required when not tested under C.4. NOTE 3: ** For TE intended to receive the Network message system status.		

Check that each message is correctly interpreted by the TEUT.

C.10   Loss of carrier

The TE shall be connected as shown in figure B.1 The controller is set to transmit the following test message to the TEUT:

AC3/LR1/DT4/RC2:TP1/TP2/TP3

with SZ1+MK2 +MT1 transmitted as FSK1, and PM1+CH1 transmitted as FSK4

NOTE: In this particular test TP1/TP2/TP3 = SZ1+MK2 +MT1/MT2/MT3 +PM1+ CH1 as TP2 and TP3 have other definitions in table B.3.

Annex D (informative): Parameter coding

D.1 Call type parameter

Table D.1: Call type parameter

Octet number	Contents
1	0001 0001 11H: Call Type parameter type
2	0000 0001 01H: Parameter length (1)
3	0000 0001 01H: Voice Call
	0000 0010 02H: CLI Ring Back when free call
	0000 0011 03H: Calling Name Delivery
	1000 0001 81H: Message Waiting Call
	1000 0010 82H
	to
	1111 1111 FFH: Reserved for network operator use

D.2 Date and Time parameter

The purpose of the Date and Time parameter is to provide the date and the time to the user. It indicates the point in time when the message has been generated by the network.

Table D.2: Date and Time parameter

Octet number	Contents
1	0000 0001 01H: Date and Time parameter type
2	0000 1000 08H: Parameter length (8)
3	Month's most significant octet
4	Month's least significant octet
5	Day's most significant octet
6	Day's least significant octet
7	Hour's most significant octet
8	Hour's least significant octet
9	Minute's most significant octet
10	Minute's least significant octet
NOTE:	- Days are from 01 to 31.
	- Months are from 01 (January) to 12 (December).
	- Hours are from 00 (midnight) to 23.
	- Minutes are from 00 to 59.

Each Parameter Word shall be coded in IRA (ITU-T Recommendation T.50 [3]) with the 8th bit set to zero.

D.3 Calling line identity parameter

The purpose of the Calling line identity parameter is to identify the origin of a call.

Table D.3: Calling line identity parameter

Octet number	Contents
1	0000 0010 02H: CLI parameter type
2	000X XXX: Parameter length (max. 20)
3	Digit 1
...	...
n+2	Digit n

Digits, including the characters * and #, are coded in IRA (ITU-T Recommendation T.50 [3]).

The digits may be interspersed with IRA characters "space" (20H) or "-" (2DH) or "(" (28H) or ")" (29H).

D.4   Called line identity parameter

The purpose of the Called line identity parameter is to identify the called party of a call.

Table D.4: Called line identity parameter

Octet number	Contents
1	0000 0011 03H: Called line identity parameter type
2	000X XXX: Parameter length (max. 20)
3	Digit 1
...	...
n+2	Digit n

Digits, including the characters * and #, are coded in IRA (ITU-T Recommendation T.50 [3]).

The digits may be interspersed with IRA characters "space" (20H) or "-" (2DH) or "(" (28H) or ")" (29H).

D.5   Reason for absence of calling line identity parameter

The purpose of the Reason for absence of calling line identity parameter is to describe the reason for absence of calling line identity. The parameters "Calling line identity" and "Reason for absence of calling line identity" are mutually exclusive within a message.

Table D.5: Reason for absence of calling line identity parameter

Octet number	Contents
1	0000 0100 04H: Reason for absence of calling line identity parameter type
2	0000 0001 01H: Parameter length (1)
3	0100 1111 4FH: ("O"): Unavailable 0101 0000 50H: ("P"): Private (Withheld) (CLIR involved) 1000 0000 80H to 1111 1111 FFH: Reserved for network operator use

Characters are coded in IRA ITU-T Recommendation T.50 [3]).

D.6 Calling party name parameter

The purpose of the Calling party name parameter is to identify the name of the origin of a call.

Table D.6: Calling party name parameter

Octet number	Contents
1	0000 0111 07H: Name parameter type
2	000X XXXX: Parameter length (max. 50)
3	Character 1
...	...
n+2	Character n

Characters are coded in IRA (ITU-T Recommendation T.50 [3]).

D.7 Reason for absence of calling party name parameter

The purpose of the Reason for absence of calling party name parameter is to describe the reason for absence of the calling party name. The parameters "Calling party name" and "Reason for absence of calling party name" are mutually exclusive within a message.

Table D.7: Reason for absence of calling party name parameter

Octet number	Contents
1	0000 1000 08H: Reason for absence of calling party name parameter type
2	0000 0001 01H: Parameter length (1)
3	0100 1111 4FH: ("O"): Unavailable 0101 0000 50H: ("P"): Private (Withheld) (name delivery has been blocked) 1000 0000 80H to 1111 1111 FFH: Reserved for network operator use

Characters are coded in IRA (ITU-T Recommendation T.50 [3]).

Annex E (informative):   Data format

The data received by the TE will normally be formatted as defined in this annex and shown in figure 2 and figure E.1.

Datalink packet: The data comprises a single continuous burst of binary Frequency Shift Keying bits.

Format: Data is transferred in a serial, binary, asynchronous format at a rate of 1 200 baud.

Sequence: Channel seize is transmitted first and checksum last. Within each data word, the least significant bit is transmitted first, the most significant bit last.

Channel seizure: The channel seizure field consists of 300 continuous bits of alternating mark and space. As a network operator option a field length of between 96 and 300 bits may be used.

Mark: The mark field consists of 180 ± 25 bits of continuous mark and, as a network option, 80 ± 25 mark bits.

Checksum: The checksum field comprises a single byte of data equal to the two's complement of the modulo 256 sum of all bytes in the data burst starting with the "message type" field up to and including the last message byte prior to the checksum.

Data word structure: Each data word comprises one start bit (space) then eight data bits followed by one stop bit and 0 - 9 mark bits.

Character set: The message characters are coded according to International Reference Alphabet (IRA) - {IA5} with the exception that position 2/4 (column 2; row 4) represents the national currency or $ sign. The 7 bit IRA code is sent in 8 bit format with the most significant bit set to zero. The non displayable characters with codes from 0 to 31 are not used.

ALERTING

CADENCED RINGING

DATA

DATALINK PACKET

SEIZE	MARK	MESSAGE TYPE	MESSAGE LENGTH	MESSAGE	CHECKSUM

PRESENTATION LAYER

PARAM TYPE	PARAM LENGTH	PARAM BYTES	- - - - - - - -	PARAM TYPE	PARAM LENGTH	PARAM BYTES

DATA WORD STRUCTURE

SINGLE START BIT

1 STOP BIT

$\underline{0 \ \text{to} \ 9}$
mark bits
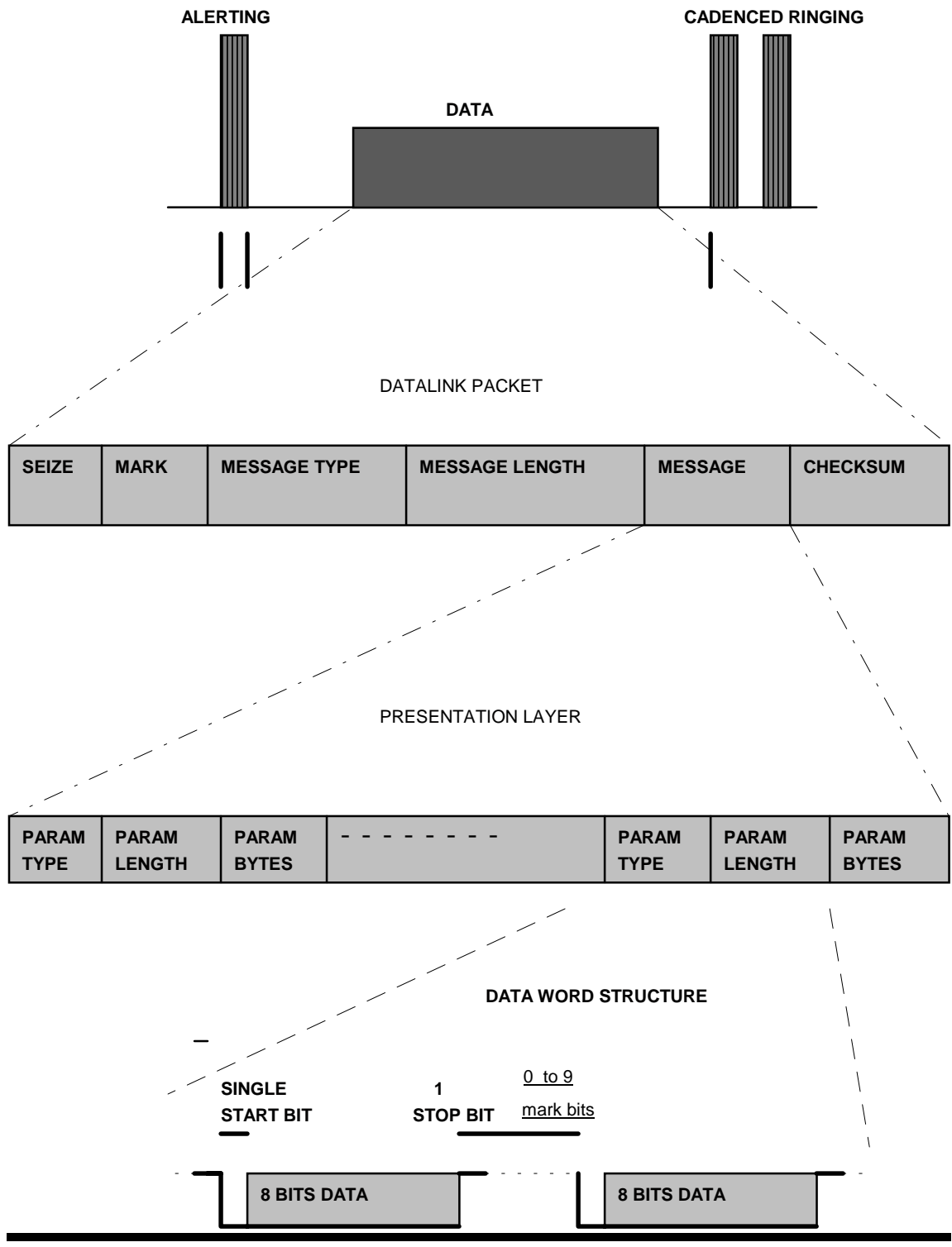
8 BITS DATA

8 BITS DATA

Figure E.1: Data structure

Annex F (informative): IRA (ITU-T Recommendation T.50 [3]) Character Coding; Basic Code

b4	b3	b2	b1		b7	0	0	0	0	1	1	1	1
					b6	0	0	1	1	0	0	1	1
					b5	0	1	0	1	0	1	0	1
						0	1	2	3	4	5	6	7
0	0	0	0	0				SP	0	②	P	②	p
0	0	0	1	1				!	1	A	Q	a	q
0	0	1	0	2				"	2	B	R	b	r
0	0	1	1	3				# / £	3	C	S	c	s
0	1	0	0	4				⊗ / $	4	D	T	d	t
0	1	0	1	5				%	5	E	U	e	u
0	1	1	0	6				&	6	F	V	f	v
0	1	1	1	7				'	7	G	W	g	w
1	0	0	0	8				(	8	H	X	h	x
1	0	0	1	9				)	9	I	Y	i	y
1	0	1	0	10				*	:	J	Z	j	z
1	0	1	1	11				+	;	K	②	k	②
1	1	0	0	12				,	<	L	②	l	②
1	1	0	1	13				-	=	M	②	m	②
1	1	1	0	14				.	>	N	②	n	②
1	1	1	1	15				/	?	O	_	o	DEL

NOTE 1: b8, the most significant bit, is always zero.
NOTE 2: ② no specific graphic character is allocated to these bit combinations. Available for national use.

History

Document history			
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