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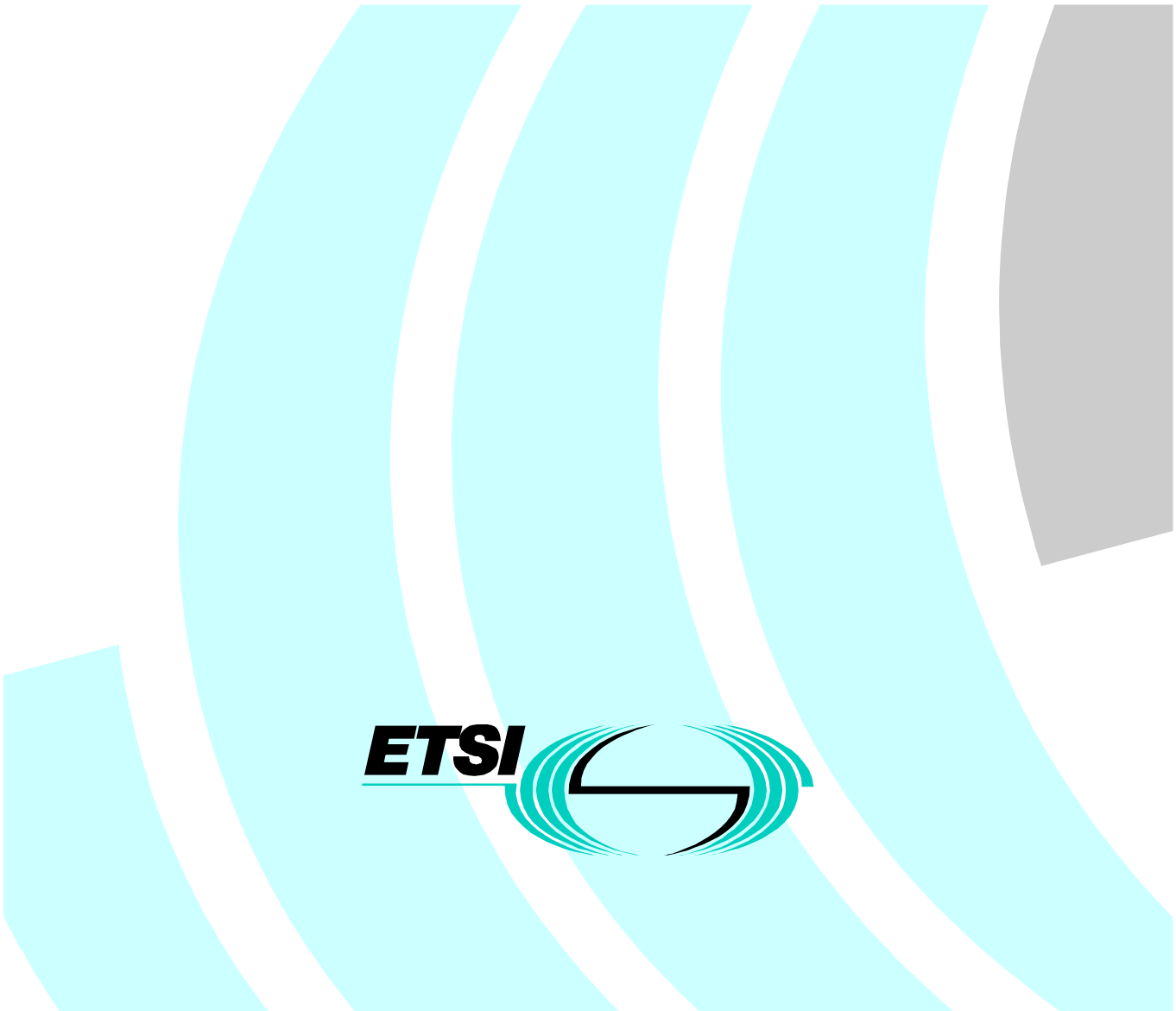
ETSI Standard

2-wire analogue voice band interfaces; Loop Disconnect (LD) dialling specific requirements



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Contents

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Foreword

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

Introduction

The present process of harmonization of the 2-wire analogue voice band terminal access requirements (traditionally PSTN) with TBR 21 [1], left opened the possibility of harmonizing some particular TE facilities. Loop Disconnect dialling is such a facility.

Whilst in many countries the networks accept DTMF dialling everywhere, there are still several networks that utilize Loop Disconnect dialling.

It should be noted that the purpose of the present document is not to encourage further use of Loop Disconnect dialling. It should also be noted that some networks do not permit TE to use Loop Disconnect dialling without the TE being able to signal DTMF as well.

The present document tries to provide a set of harmonized requirements that will satisfy the needs of these countries whilst enabling TE manufacturers to gain the benefit of a single European approval route. The parameters have been selected such that they should have no impact on those countries who have no Loop Disconnect signalling requirements.

1 Scope

The present document specifies the technical characteristics to be provided by Terminal Equipment (TE) intended to be connected to a 2-wire analogue interface of the PSTN at which network addressing is performed by means of Loop Disconnect signalling, nominally at 10pps, insofar as they are particular to the Loop Disconnect signalling function.

Although the present document aims to specify harmonized solutions, Loop Disconnect dial generators fulfilling these requirements can not ensure inter working with all existing networks.

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.
- 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] TBR 21: "Terminal Equipment (TE); Attachment requirements for pan-European approval for connection to the analogue Public Switched Telephone Networks (PSTNs) of TE (excluding TE supporting the voice telephony service) in which network addressing, if provided, is by means of Dual Tone Multi Frequency (DTMF) signalling".

[2] EG 201 120: "Public Switched Telephone Network (PSTN); Method of rating terminal equipment so that it can be connected in series and/or in parallel to a Network Termination Point (NTP)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply, together with figure 1.

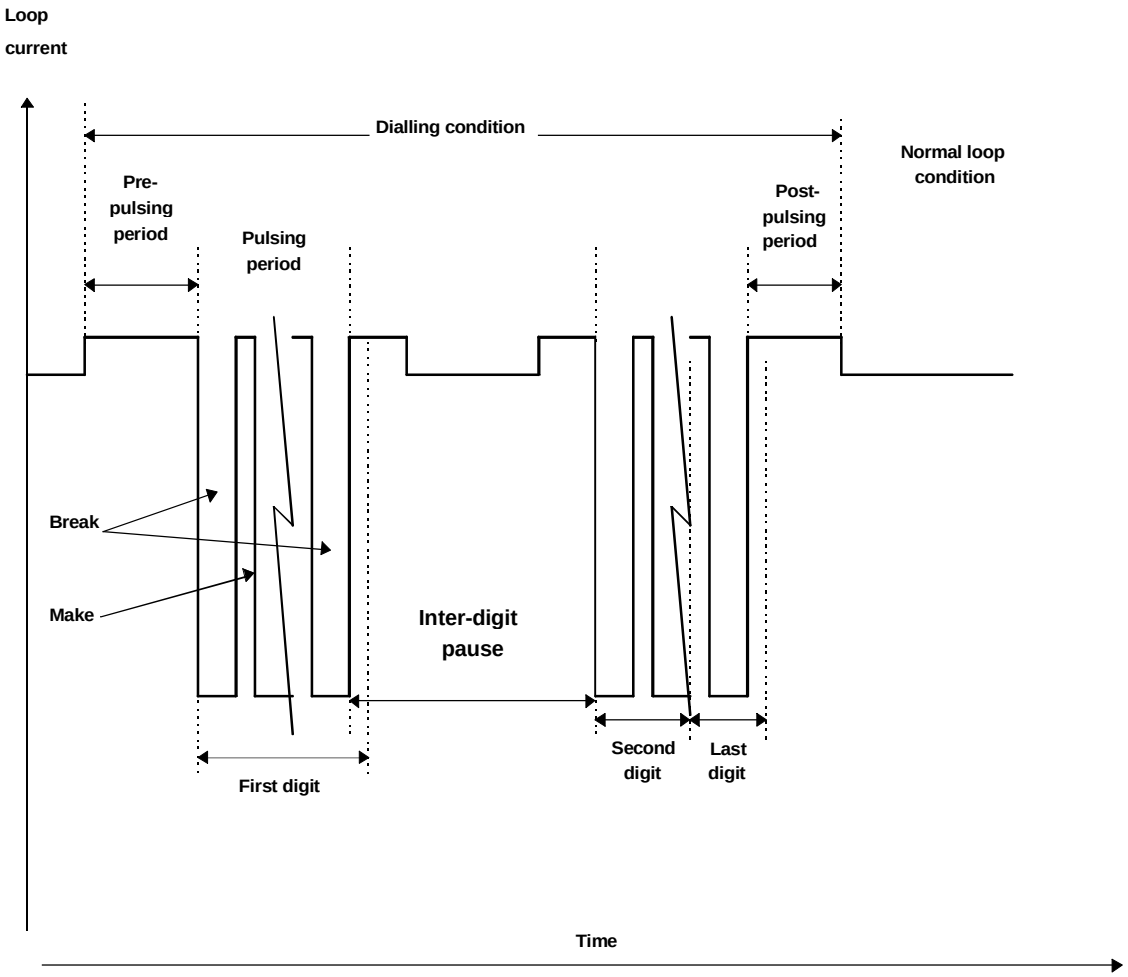

Figure 1: Dialling sequence

dialling condition: period interval starting not earlier than 1,5 s before the first break and ending not later than 1,5 s after the last break.

pre-pulsing period: period before the first break period, after the change of state from normal loop condition to dialling condition.

post-pulsing period: period after the last break period, before the change of state from dialling condition to normal loop condition.

break period: time interval where the pulsing loop is open.

make period: time interval between two consecutive breaks belonging to the same set of pulses (one digit) where the pulsing loop is closed.

inter-digit pause: time interval between two breaks belonging to two consecutive digits where the pulsing loop is closed.

total pulse period: sum of the make period and the break period, including the transition times between the make and the break states.

pulsing period: sequence of total pulse periods representing a Loop Disconnect digit.

3.2 Abbreviations

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

ADSL	Asymmetrical Digital Subscriber Line
DC	Direct current
DTMF	Dual tone multi-frequency dialling
IDP	Inter-Digit Pause
LD	Loop Disconnect
PSTN	Public Switched Telephone Network
TE	Terminal Equipment

4 Technical requirements

4.1 General

At the present time most types of TE support both LD and DTMF dialling. However, some support only LD or DTMF.

Where TEs support both LD and DTMF there is usually a method for switching between them. For instance, it is common for there to be a mechanism to which automatically determines whether to use LD or DTMF signalling. This is typically done by sending the first digit in DTMF and then checking to see if dial tone is removed. If it is removed, the remainder of the digits are signalled in DTMF format. If dial tone is not removed, the first digit is resent in LD format followed by the remaining digits in LD format.

Another commonly used practice is the so called "Go To MF" feature. This is used for setting up, or partially setting up, a call by LD signalling, then switching to DTMF mode without releasing the connection and sending MF digits, either to complete sending the required network address (e.g. for indirect network access) or for communicating with the far end equipment e.g. for voice-mail or banking services. The equipment reverts to LD mode for the next call attempt.

Where a TE can be switched between LD and DTMF it is useful for information on the means of switching to be provided to the user. Further, where there are user accessible parameters relating to the operation of LD (e.g. dial pulse ratio) information should be provided on how to set these parameters for the intended use.

Requirement: The TE supplier should provide information on how to select the LD mode and how to set any relevant user accessible parameters.

Test: By inspection of the TE user information.

4.2 Signalling

4.2.1 Pulsing speed

Requirement: When tested with a DC voltage of 50 V and a feed resistor of 1 000 Ω, the pulsing speed shall be 10 ± 1 total pulse periods per second.

Test: The measurement arrangement is based on annex A. The measurement is performed while the terminal is sending a dial string. This requirement shall be tested at Rf = 1 000 Ω and VDC = 50 V.

4.2.2 Make period current

Requirement: When tested with a DC voltage of 50 V and a feed resistor of 2 050 Ω, the loop current during the make period shall be ≥ 20 mA. During the IDP and the pre- and post-pulsing period the DC characteristics shall comply to the DC characteristics requirements as stated in subclause 4.7.1 of TBR 21 [1].

NOTE: This requirement defines a value selected to ensure the positive detection of a valid make condition by all equipment including older technology equipment. The value selected satisfies the criteria in the TBR 21 [1] DC characteristic mask and TBR 21 [1] loop current characteristics, including the transition to loop state (TBR 21 [1], subclause 4.6.2).

For series and/or parallel connection, refer to EG 201 120 [2].

Test: The measurement arrangement is based on annex A. This requirement shall be tested at Rf = 2 050 Ω and VDC = 50 V. The measurement is performed while the terminal is sending a dial string, and the current during the make period is monitored.

4.2.3 Break period current

Requirement: When connected to a DC voltage of 50 V and a feed resistor of 500 Ω, the break period current shall be ≤ 0,5 mA at the lowest point of the exponential fall of the break period, as defined in subclause 4.2.4 (break ratio). Once this level of current has been reached, the current shall remain below 0,5 mA for the remainder of the break period. This requirement defines a value selected to ensure the positive detection of a valid break condition by all equipment including older technology equipment.

Test: The measurement arrangement is based on annex A. This requirement shall be tested at Rf = 500 Ω and VDC = 50 V. The measurement is performed while the terminal is sending a dial string, and the current during the break period is monitored.

4.2.4 Break period

Requirement: Depending on the network the break period shall be either:

a) 63 % to 72 %; or

b) 56 % to 64 %

of the total pulse period, when tested with a DC voltage of 50 V and a feed resistor of 1 000 Ω. The ratio shall be maintained for all pulses during the dialling condition.

Test: The measurement arrangement is based on annex A. This requirement shall be tested at Rf = 1 000 Ω and VDC = 50 V. The break period shall be measured from the point where the current has fallen to 10 % below the make period current (beginning of the exponential fall) to the point where the break current has increased to above 1 mA from its lowest value (start of the exponential rise).

4.2.5 Pulse shape

Requirement: When tested with a DC voltage of 50 V and a feed resistor of 1 000 Ω, the make to break transition shall fall within the mask shown in figure 2 and given in table 1. It shall be noted that the t0 reference point (t = 0 ms) is at the start of the exponential fall of the break period current.

The transition from break to make (1 mA to the steady make current value) shall be completed within 2 ms.

Table 1: Pulse shape limits

Loop current [mA]	Lower limit [ms]	Upper limit [ms]
15	0,13	2,9
4	0,28	6,1
2	0,35	7,8
1	0,43	9,5
0,5		11,1
0,5		12
NOTE: The limits were determined by taking the effect of spark quench circuitry (essential for exchanges with inductive line feed circuits) into account. (Spark quench circuit: R = 100 Ω in series with C = 0,1 to 2,2 µF). The lower limit also assists in minimizing noise that could influence the performance of new technologies like ADSL.		

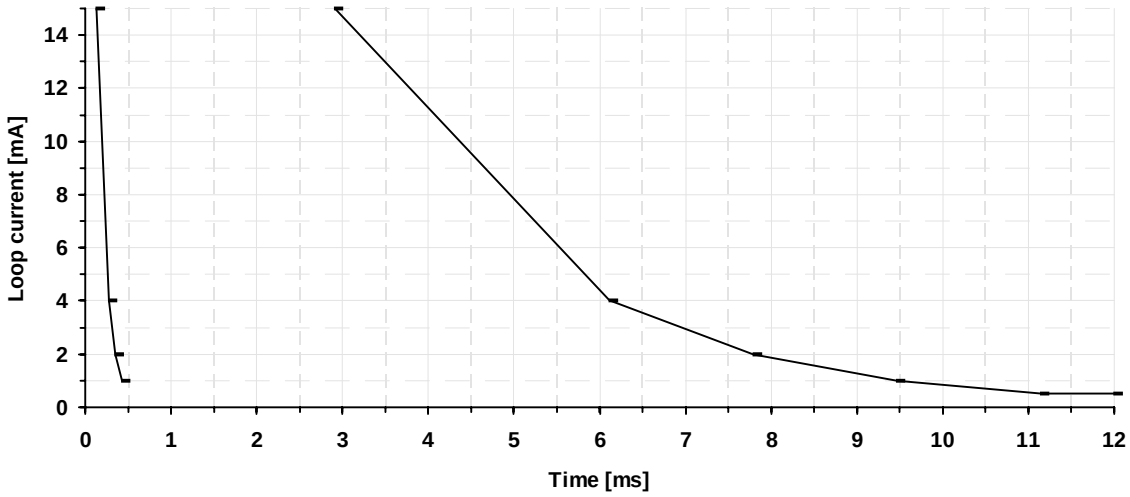

Figure 2: Pulse shape

Test: The measurement arrangement is based on annex A. The measurement is made while the terminal is generating a dial string. This requirement shall be tested at Rf = 1 000 Ω and VDC = 50 V.

4.2.6 Code

Requirement: The code assignment shall be in accordance with table 2.

Table 2

Digit 1	1 Break
Digit 2	2 Breaks
...	...
Digit 0	10 Breaks

Test: The measurement arrangement is based on annex A. This requirement shall be tested at Rf = 1 000 Ω and VDC = 50 V.

4.2.7 Inter-digit pause

Requirement: When tested with a DC voltage of 50 V and a feed resistor of 1 000 Ω, the IDP shall be ≥ 720 ms.

NOTE: This requirement defines a value acceptable to existing exchanges, including electromechanical exchanges.

It is recommended that the IDP be kept short (e.g. < 2 seconds) in order to minimize the occupancy of network common equipment and to avoid possible network dialling time-outs.

Test: The measurement arrangement is based on annex A. The IDP shall be measured from the end of the last break period of a digit to the beginning of the first break period of the following digit in the same dialling sequence. The measurement is made by monitoring the wave form across the feeding resistor. This requirement shall be tested at Rf = 1 000 Ω and VDC = 50 V.

4.2.8 Pre digit and post digit pause

Requirement: For a period of not less than 500 ms before the first break period of any pulsing period, and not less than 100 ms after the last break of any pulsing period, the loop current, when tested with a DC voltage of 50 V and a feed resistor of 1 000 Ω, shall be:

- not less than the current during the normal loop condition; or
- not less than the current during the dialling condition, whichever is the lower.

Test: The measurement arrangement is based on annex A. The measurement is made while the terminal is generating a dial string. This requirement shall be tested at Rf = 1 000 Ω and VDC = 50 V.

Annex A (normative): Test and measuring methods

A.1 Measurement principle

A.1.1 Preamble

Set the TE in loop steady state.

A.1.2 Test state

During the dialling condition.

A.1.3 Test configuration

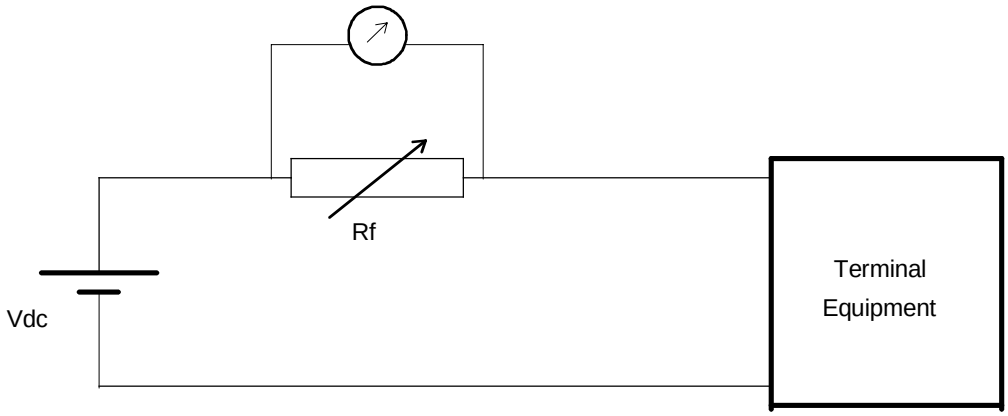

Figure A.1

A.1.4 DC feeding arrangement

A.1.4.1 Voltage

50 VDC.

A.1.4.2 Resistance

According to clause specific designation R_f shall have one of the following values: 2,05 kΩ, 1 kΩ and 500 Ω.

History

Document history			
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