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Public Switched Telephone Network (PSTN); Attachment requirements for a terminal equipment incorporating an analogue handset function capable of supporting the justified case service when connected to the analogue interface of the PSTN in Europe

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**Public Switched Telephone Network (PSTN);
Attachment requirements for a terminal equipment incorporating
an analogue handset function capable of supporting
the justified case service when connected
to the analogue interface of the PSTN in Europe**

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Foreword

This Technical Basis for Regulation (TBR) has been produced by the ETSI Project Analogue Terminals and Access (EP ATA).

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 83/189/EEC (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document is intended to become a Harmonized Standard as requested by the above mentioned mandate, the reference of which will be published in the Official Journal of the European Communities referencing the Council Directive relating to telecommunications terminal equipment and satellite earth station equipment, including the mutual recognition of their conformity (Directive 98/13/EC).

A common technical regulation may be established by the European Commission in accordance with the Directive.

Technical specifications relevant to the 98/13/EC Directive are given in the TBR-Requirements Table (TBR-RT) in annex B.

Transposition dates	
Date of adoption of this TBR:	01 May 1998
Date of latest announcement of this TBR (doa):	31 August 1998
Date of latest publication of new National Standard or endorsement of this TBR (dop/e):	31 November 1998
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Introduction

This TBR is written in response to an European Commission standardization mandate requesting a harmonized standard for analogue voice terminals.

The scope of this TBR was laid down by ACTE and the requirements are based on I-ETS 300 677 (Public Switched Telephone Network (PSTN); Requirements for handset telephony), and on I-ETS 300 480 (Public Switched Telephone Network (PSTN); Testing specification for analogue handset telephony).

This TBR specifies only the technical characteristics for handset telephony and shall be used in conjunction with an appropriate access standard.

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1 Scope

This Technical Basis for Regulation (TBR) specifies the technical characteristics (electrical and acoustic requirements) under Article 5(g) of Directive 98/13/EC to be provided by a single, handset telephony, terminal equipment which is intended:

- a) for pan-European approval; and
- b) for connection by 2 wires to an analogue interface of a PSTN. This interface is characterized by a d.c. loop to indicate seizure and clearing, low frequency a.c. ringing signals below the speech passband to indicate an incoming call and the transmission phase having an approximate bandwidth of 3 kHz at the network terminating point; and
- c) for supporting the voice telephony justified case service.

The objective of this TBR is to ensure minimum speech quality when interworking via the public network between two single items of equipment.

This TBR only applies to terminal equipment supporting handset telephony.

This TBR is applicable to handset telephony function. In the case of multiple functions provided in the same terminal equipment, this TBR does not apply when those other functions are active in conjunction with handset telephony.

This TBR specifies the functions necessary to provide 2-way real-time speech conversation. Where a function is indicated as optional, it need not be provided, but, where such a function is provided, the terminal needs to conform to the requirements and test specified in this TBR.

A test is given for each requirement in this TBR including measurement methods. The terminal equipment may be stimulated to perform the tests by additional equipment if necessary.

The application of this TBR is not mandatory for:

- a) a handset telephony function with speech transmission performance specially designed for the disabled (e.g. with amplification of received speech as an aid for the hard of hearing);
- b) a handset telephony function employing a radio link (e.g. cordless telephones);
- c) a handset telephony function with speech transmission performance specifically designed to cater for hostile environments;
- d) any handsfree or loudspeaking voice telephony function;
- e) a handset telephony function employing non-linear or time variant techniques for the processing of the signal.

NOTE: The terminal equipment may provide additional functions or facilities to that of handset telephony.

2 Normative references

This TBR 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 TBR only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ITU-T Recommendation G.122 (03/93): "Influence of national systems on stability and talker echo in international connections".
- [2] I-ETS 300 480: "Public Switched Telephone Network (PSTN); Testing specification for analogue handset telephony".
- [3] ITU-T Recommendation P.64 (04/97): "Determination of sensitivity/frequency characteristics of local telephone systems".
- [4] ITU-T Recommendation P.51 (08/96): "Artificial mouth".
- [5] ITU-T Recommendation P.57 (08/96): "Artificial ears".
- [6] IEC 651: "Sound level meters".
- [7] ISO 3 (1973): "Preferred numbers - Series of preferred numbers".
- [8] ITU-T Recommendation P.79 (03/93): "Calculation of loudness ratings for telephone sets".
- [9] ITU-T Recommendation O.41 (10/94): "Psophometer for use on telephone-type circuits".

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3 Definitions, symbols and abbreviations

3.1 Definitions

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

artificial ear: A device for the calibration of earphones incorporating an acoustic coupler and a calibrated microphone for the measurement of sound pressure and having an overall acoustic impedance similar to that of the average human ear over a given frequency band.

Echo Return Loss (ERL): Return loss averaged with 1/f power weighting over the telephone band (300 Hz - 3 400 Hz), in accordance with clause 4 of ITU-T Recommendation G.122 [1].

handset: A combination of telephone microphone and receiver in a form convenient for holding simultaneously to mouth and ear, which, when in use, retains the microphone in a position fixed in relation to the receiver.

handset telephony: A function provided by terminal equipment whereby two-way real-time speech is supported by means of a handset that forms an integral part of the terminal equipment. The term "live speech" is also frequently used to describe "real-time speech". For the purposes of this TBR, they should be considered as having the same meaning.

handsfree function: A function whereby telephony transmission and reception is facilitated by the use of microphone(s) and loudspeaker(s) placed at a distance from the user. No handset is required to be used and normally the handset is not active.

loop state: The state where the TE draws sufficient DC current to activate the exchange.

loop steady state: A loop state excluding the transitions from and to quiescent state.

loudness rating: A measure, expressed in decibels, for characterizing the loudness performance of complete telephone connections or of parts thereof such as sending system, line, receiving system.

loudspeaking function: A function of a handset telephone using a loudspeaker associated with an amplifier as a telephone receiver.

Mouth Reference Point (MRP): A point 25 mm in front of and on the axis of the lip position of a typical human mouth (or artificial mouth).

nominal setting: A setting of the volume control where the RLR is as close as possible to -8 dB.

3.2 Symbols

For the purposes of this TBR, the following symbols apply:

Ω	Ohm
dB	decibel
dBPa	sound pressure level with respect to 1 Pa, expressed in dB
dBPa(A)	"A" weighted sound pressure level with respect to 1 Pa, expressed in dB
dBV	voltage level with respect to 1 V, expressed in dB
dBVp	psophometrically weighted voltage level with respect to 1 V, expressed in dB
Pa	Pascal
SPL	Sound Pressure Level
V	Volt

3.3 Abbreviations

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

a.c.	alternating current
d.c.	direct current
e.m.f.	electromotive force
ERL	Echo Return Loss
ERP	Ear Reference Point
ITU-T	International Telecommunications Union - Telecommunications sector
LRGP	Loudness Rating Guard-ring Position
MRP	Mouth Reference Point
PSTN	Public Switched Telephone Network
r.m.s.	root mean square
RL	Return Loss
RLR	Receiving Loudness Rating
SLR	Sending Loudness Rating
STMR	SideTone Masking Rating
TBR-RT	Technical Basis for Regulation - Requirements Table
TE	Terminal Equipment

4 Speech transmission aspects

4.1 General

4.1.1 Polarity independence

Reference: I-ETS 300 677, subclause 4.1.1.

Requirement: The TE shall conform to the requirements of this TBR for both polarities of line feeding voltage.

Justification: 98/13/EC, Article 5(g).

Interworking of terminal equipment via the public telecommunications network requires the TE to provide adequate speech performance with both feed polarities, since a fixed polarity is not guaranteed by the PSTN.

Test: Compliance shall be demonstrated by reversal of the d.c. voltage applied to the line terminals from test to test or between changes of test configuration when performing the tests of annex A.

4.1.2 Feed conditions

Reference: I-ETS 300 677, subclause 4.1.2.

Requirement: The TE shall conform to the requirements of this TBR when tested with a supply voltage of 50 V and with feed resistances ranging from 500 Ω to 2 800 Ω .

NOTE: Some requirements are only specified for single or specific values of feed resistance.

Justification: 98/13/EC, Article 5(g).

Interworking of terminal equipment via the public telecommunications network requires the TE to provide adequate speech performance over the range of feed conditions occurring in the loop steady state when connected to the PSTN.

Test: Compliance shall be demonstrated by performing the tests of annex A with the feed resistances specified in subclause 4.2 which are chosen from those permitted by I-ETS 300 480 [2].

4.1.3 Power supply

Reference: I-ETS 300 677, subclause 4.1.3.

Requirement: Where the terminal handset function is intended to be used with power additional to that derived from the network, the requirements of subclause 4.2 shall apply only when such additional power is provided and operating within specification.

Justification: 98/13/EC, Article 5(g).

Interworking of terminal equipment via the public telecommunications network requires any TE which needs a source of external power for its speech functions to have adequate speech performance when its power supply is connected and operative.

Test: Compliance shall be demonstrated by performing the tests of annex A with the power supply connected and operative.

4.1.4 Volume control

Reference: I-ETS 300 677, subclause 4.1.4.

Requirement: For TE with a user-controlled receiving volume control, the speech performance characteristics requirements apply with the user-controlled receiving volume control at the setting where the RLR is as close as possible to -8 dB, unless stated otherwise. This setting is to be taken as the nominal setting of the volume control.

Justification: 98/13/EC, Article 5(g).

Interworking of terminal equipment via the public telecommunications network requires the TE to provide adequate speech performance for at least one setting of the volume control.

Test: Compliance tests of annex A shall be carried out at the setting of the volume control where the RLR is as close as possible to -8 dB when measured with the feed resistance R_f set to 1 000 Ω , unless otherwise specified in the appropriate requirement.

NOTE: It is not necessary to strive to achieve values closer than 1 dB.