



# SLOVENSKI STANDARD

## SIST TBR 021 E1:2004

01-oktober-2004

HYfa ]bUg\_UcdfYa UfH9Ł!`Df]\_`1 ]lj YbYnU hYj YnUj gYYj fcdg\_c`cXcVf]hYj `nU  
df]\_`1 Yj Ub`Y`bUUbUc[ bU`Uj bU`ca i hfUbUH`YZ`bg\_Uca fYj`UfDGHBgŁ  
hYfa ]bUg\_YcdfYa Y`ffUhYb`H9ž\_]`dcXd]fUgŁcf]hYj `[ cj cfbYh`YZ`b]`YŁždf]`UhYf]`Y  
ca fYjbc`bUg`Uj`Ub`Yž` Y`Y`bUj c`Łž]nj YXYbc`g`Łcbg\_c`g][ bU]nUW`c`fb HA : Ł

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

(standards.iteh.ai)

[SIST TBR 021 E1:2004](https://standards.iteh.ai/catalog/standards/sist/6b32d243-7042-4e65-a750-73c8342c927a/sist-tbr-021-e1-2004)

<https://standards.iteh.ai/catalog/standards/sist/6b32d243-7042-4e65-a750-73c8342c927a/sist-tbr-021-e1-2004>

Ta slovenski standard je istoveten z: TBR 021 Edition 1

### ICS:

33.040.35 Telefonska omrežja Telephone networks

SIST TBR 021 E1:2004

en

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST TBR 021 E1:2004](#)

<https://standards.iteh.ai/catalog/standards/sist/6b32d243-7042-4e65-a750-73c8342c927a/sist-tbr-021-e1-2004>



**T**ECHNICAL  
**B**ASIS for  
**R**EGULATION

**TBR 21**

January 1998

Source: ATA

Reference: DTBR/ATA-005055

ICS: 33.020

**Key words:** PSTN, terminal equipment

**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**

**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

**Copyright Notification:** No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 1998. All rights reserved.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST TBR 021 E1:2004](https://standards.iteh.ai/catalog/standards/sist/6b32d243-7042-4e65-a750-73c8342c927a/sist-tbr-021-e1-2004)

<https://standards.iteh.ai/catalog/standards/sist/6b32d243-7042-4e65-a750-73c8342c927a/sist-tbr-021-e1-2004>

## Contents

Foreword .....	7
Introduction .....	9
1 Scope .....	11
2 Normative references .....	11
3 Definitions and abbreviations .....	12
3.1 Definitions .....	12
3.1.1 General terms .....	12
3.1.2 States .....	13
3.2 Abbreviations .....	13
4 Requirements .....	14
4.1 General requirement .....	14
4.2 Physical characteristics of the connection to the PSTN .....	14
4.3 Requirements under all conditions .....	15
4.3.1 Polarity .....	15
4.4 General requirements in quiescent state .....	15
4.4.1 DC resistance .....	15
4.4.2 Characteristics of TE for ringing signals .....	15
4.4.2.1 Impedance .....	15
4.4.2.2 Transient response .....	15
4.4.2.3 DC current .....	16
4.4.3 Impedance unbalance about earth .....	16
4.4.4 Resistance to earth .....	16
4.5 Ringing signal detector sensitivity .....	17
4.6 Transition from quiescent to loop state .....	17
4.6.1 Acceptance of breaks in the loop in a call attempt .....	17
4.6.2 Loop current characteristics .....	18
4.7 General loop steady state requirements .....	19
4.7.1 DC characteristics .....	19
4.7.2 Impedance .....	20
4.7.3 Sending level limitations .....	21
4.7.3.1 Mean sending level .....	21
4.7.3.2 Instantaneous voltage .....	21
4.7.3.3 Sending level in a 10 Hz bandwidth .....	21
4.7.3.4 Sending level above 4,3 kHz .....	22
4.7.4 Impedance unbalance about earth .....	23
4.7.4.1 Longitudinal Conversion Loss .....	23
4.7.4.2 Output Signal Balance .....	23
4.7.5 Resistance to earth .....	24
4.8 Call attempt .....	24
4.8.1 Automatic dialling .....	24
4.8.1.1 Dialling without dial tone detection .....	24
4.8.1.2 Dialling with dial tone detection .....	25
4.8.2 DTMF signalling .....	25
4.8.2.1 Frequency combinations .....	25
4.8.2.2 Signalling levels .....	25
4.8.2.2.1 Absolute levels .....	25
4.8.2.2.2 Level difference .....	26
4.8.2.3 Unwanted frequency components .....	26
4.8.2.4 Tone duration .....	26
4.8.2.5 Pause duration .....	26
4.8.3 Automatically repeated call attempts .....	26
4.9 Transition from loop to quiescent state .....	27

4.10	Safety .....	27
4.11	EMC .....	27
Annex A (normative): Test methods .....		28
A.1	General .....	28
A.1.1	Equipment connection .....	28
A.1.2	Test environment .....	28
A.1.3	Powered state .....	29
A.1.4	Measurements to earth .....	29
A.1.5	Equivalent test methods .....	29
A.1.6	Additional information to support the test .....	29
A.2	Test impedances .....	30
A.2.1	Reference impedance .....	30
A.2.2	Non-reactive line termination .....	30
A.3	Feeding bridge .....	30
A.4	Test methods .....	30
A.4.1	General requirement .....	30
A.4.2	Physical characteristics of connection to the PSTN .....	30
A.4.3	Requirements in all conditions .....	31
A.4.3.1	Polarity .....	31
A.4.4	General requirements in quiescent state .....	31
A.4.4.1	DC Resistance .....	31
A.4.4.2	Characteristics of TE for ringing signals .....	32
A.4.4.2.1	Impedance .....	32
A.4.4.2.2	Transient response .....	33
A.4.4.2.3	DC current .....	33
A.4.4.3	Impedance unbalance about earth .....	34
A.4.4.4	Resistance to earth .....	35
A.4.5	Ringing signal detector sensitivity .....	36
A.4.6	Transition from quiescent to loop state .....	37
A.4.6.1	Acceptance of breaks in the loop in a call attempt .....	37
A.4.6.2	Loop current characteristics .....	37
A.4.7	General loop state requirements .....	38
A.4.7.1	DC characteristics .....	38
A.4.7.2	Impedance .....	39
A.4.7.3	Sending level limitations .....	40
A.4.7.3.1	Mean sending level .....	40
A.4.7.3.2	Instantaneous voltage .....	41
A.4.7.3.3	Sending level in a 10 Hz bandwidth .....	42
A.4.7.3.4	Sending level above 4,3 kHz .....	43
A.4.7.3.4.1	Sending level above 4,3 kHz during DTMF dialling .....	43
A.4.7.3.4.2	Sending level above 4,3 kHz during communication .....	44
A.4.7.4	Impedance unbalance about earth .....	45
A.4.7.4.1	Longitudinal Conversion Loss .....	45
A.4.7.4.2	Output Signal Balance .....	46
A.4.7.5	Resistance to earth .....	47
A.4.8	Call attempt .....	48
A.4.8.1	Automatic dialling .....	48
A.4.8.1.1	Dialling without dial tone detection .....	48
A.4.8.1.2	Dialling with dial tone detection .....	48
A.4.8.2	DTMF signalling .....	49
A.4.8.2.1	Frequency combinations .....	49
A.4.8.2.2	Signalling levels .....	50
A.4.8.2.3	Unwanted frequency components .....	51
A.4.8.2.4	Tone duration .....	52
A.4.8.2.5	Pause duration .....	54
A.4.8.3	Automatically repeated call attempts .....	55

A.4.9	Transition from loop to quiescent state.....	56
Annex B (normative):	TBR Requirements Table (TBR-RT) .....	57
B.1	Guidance for completion of the TBR-RT .....	57
B.1.1	Condition table .....	57
B.1.2	Requirements table.....	57
Annex C (informative):	Bibliography.....	60
History.....		61

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST TBR 021 E1:2004](https://standards.iteh.ai/catalog/standards/sist/6b32d243-7042-4e65-a750-73c8342c927a/sist-tbr-021-e1-2004)

<https://standards.iteh.ai/catalog/standards/sist/6b32d243-7042-4e65-a750-73c8342c927a/sist-tbr-021-e1-2004>

Blank page

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST TBR 021 E1:2004](https://standards.iteh.ai/catalog/standards/sist/6b32d243-7042-4e65-a750-73c8342c927a/sist-tbr-021-e1-2004)

<https://standards.iteh.ai/catalog/standards/sist/6b32d243-7042-4e65-a750-73c8342c927a/sist-tbr-021-e1-2004>



## Foreword

This Technical Basis for Regulation (TBR) has been produced by the ETSI Project Analogue Terminals and Access (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 on the approximation of the laws of the Member States concerning telecommunications terminal equipment, including the mutual recognition of their conformity (Directive 91/263/EEC, known as "the TTE Directive").

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

Technical specifications relevant to the 91/263/EEC Directive are given in the TBR-Requirements Table (TBR-RT) in annex B.

The voting phase for this TBR was undertaken on the understanding that the arrangements described below will apply within the EU and that all necessary obligations will be laid down in any Commission Decision for a Common Technical Regulation (CTR 21). These arrangements were agreed in a meeting of the ACTE Heads of Delegation on 16th September 1997.

It is the intention that a pan-European approval scheme using TBR 21 as the basis will be legitimised, but the scheme will recognize that nationally, technical differences exist and are described in Advisory Notes. The Advisory Notes themselves will not be mandatory, however manufacturers will be encouraged to ensure that their products conform to the relevant Advisory Notes. This recommendation will be reflected in any Decision.

In the interests of transparency, the above mentioned Advisory Notes are contained in an ETSI Guide (EG 201 121). This ETSI Guide in no way changes the voluntary nature of Advisory Notes either *de jure* or *de facto*. Initially, all Advisory Notes have been included and the adoption of the ETSI Guide has taken place in parallel to the adoption of this TBR.

The maintenance of both the TBR and the ETSI Guide will follow the normal ETSI maintenance procedures, based on experience.

## Transition Arrangements

A transition period of 12 months will permit parallel approval procedures for equipment falling within the scope of the CTR. Thereafter national approvals for new equipment falling within the scope of the CTR will not be permitted. However, national approvals may continue for equipment intended for applications outside the scope of the CTR, e.g. terminals intended for series or parallel connection. Only such equipment may be marked with national marks. Equipment, falling within the scope of TBR 21, and approved against national regulations before the end of the transition period may continue to be placed on the market after the end of the transition period.

### Obligations of the manufacturer

- a) During the transition period, manufacturers will be obliged to associate a notice with all pan-European approval products.

The text of this notice is proposed as follows:

*"The equipment has been approved to [Commission Decision "CTR 21"] for pan-European single terminal connection to the Public Switched Telephone Network (PSTN). However, due to differences between the individual PSTNs provided in different countries the approval does not, of itself, give an unconditional assurance of successful operation on every PSTN network termination point.*

*In the event of problems, you should contact your equipment supplier in the first instance."*

The manufacturer should ensure that the seller and user of the equipment is clearly informed of the above information by means of packaging and/or user-manuals.

The necessity of continuing to **oblige** manufacturers to use this notice after the transition period has expired, shall be subject to a review in ACTE, based on experience with the Commission Decision.

- b) In addition, manufacturers must make a network compatibility declaration to the Notified Body, the seller and user. This declaration will indicate the networks with which the equipment is designed to work and any notified networks with which the equipment may exhibit interworking difficulties.

The manufacturer shall also make it clear where network compatibility is dependent on physical and software switch settings.

### Obligations of the Notified Body

Notified Bodies shall ensure that the manufacturer complies with the provisions of the paragraph covering the obligations of the manufacturer and that the network compatibility declarations referred to in a) and b) above are made in the correct form.

The Notified Bodies should also ensure that manufacturers are aware of the applicable Advisory Notes concerning the specific requirements of certain networks.

The Notified Body does not evaluate equipment against applicable Advisory Notes, since they are voluntary. The role of the Notified Body in this respect is to clarify with the manufacturer the intended purpose of the equipment.

During the transition period the National Authorities shall ensure that the Notified Bodies inform other Notified Bodies of the network compatibility declarations whenever the approval is granted.

## Introduction

The existing analogue presentation of Public Switched Telephone Networks (PSTNs) in European countries are technically somewhat different, due to historical reasons. The services being offered to the end users also differ to a certain extent.

The increasing use of analogue terminals in the European networks, and especially terminals offering non-voice services, such as modems and facsimile, is a measure of the need for such equipment seen by European business companies. This type of equipment is undergoing constant and rapid development, and it is therefore imperative that the delay in, and cost of, market introduction caused by the approval procedures is the minimum possible. Otherwise, new innovative products may be available to Europe at later dates than to other regions in the world. Also, countries in Europe where the market is comparatively small may never benefit from these products, if the cost of market introduction is too high.

According to Directive 91/263/EEC, Terminal Equipment (TE) is required, among other things, to:

- not cause harm to the network - Article 4(d);
- be able to interwork with the network in order to set up, hold, modify, charge for and clear down a connection - Article 4(f);
- interwork via the public telecommunications network, in justified cases - Article 4(g).

Although different, the networks have some basic commonalities. By restricting the requirements to cover only the interworking that is essential for the establishment of a call to/from a terminal, the signalling aspects can be simplified and harmonized.

This TBR specifies a harmonized set of requirements which will allow terminals, excluding voice telephony terminals subject to Article 4(g) requirements, to be analogue connected to the existing European PSTNs. It covers all relevant essential requirements in Directive 91/263/EEC. All safety requirements are covered by the Low Voltage Directive (LVD) and therefore there are no requirements for Articles 4(a) and 4(b). All ElectroMagnetic Compatibility (EMC) requirements are covered by the EMC Directive and therefore no requirements for Articles 4(c) are included in this TBR. Article 4(e) is not applicable for a non-radio system. Article 4(g) is not applicable for non-voice terminals.

This TBR specifies the connection arrangements (plug or socket, of the supplier's choice) to be provided by the terminal equipment. An adapter may be required between the terminal and the existing national network termination point in individual countries. Such an adapter is outside the scope of this TBR.

The pan-European approval requirements for TE access to an analogue presented PSTN are related to the network's capabilities. A single terminal may consume all of this (given) capability, or it can be shared by a number of terminals all being connected to the Network Termination Point (NTP) in an arbitrary combination of parallel and/or series connections. In this case the performance of each individual terminal will need to be better than required by this TBR to ensure satisfactory interworking with the network. Connection of terminal equipment in series and/or parallel is a national matter. Guidance on this subject can be found in EG 201 120.

Blank page

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST TBR 021 E1:2004](https://standards.iteh.ai/catalog/standards/sist/6b32d243-7042-4e65-a750-73c8342c927a/sist-tbr-021-e1-2004)

<https://standards.iteh.ai/catalog/standards/sist/6b32d243-7042-4e65-a750-73c8342c927a/sist-tbr-021-e1-2004>

## 1 Scope

This Technical Basis for Regulation (TBR) specifies the technical characteristics (electrical and mechanical interface requirements and access control protocol) under Articles 4(d) and 4(f) of Directive 91/263/EEC to be provided by a single Terminal Equipment (TE) which is:

- intended for pan-European approval; and
- capable of 2-wire access to an analogue Public Switched Telephone Network (PSTN) line at the Network Termination Point (NTP); but
- excluding TE which is capable of supporting the voice telephony justified case service as specified in Article 4(g) of Directive 91/263/EEC.

The objective of this TBR is to ensure that no harm occurs to the public network, and to ensure interworking between network and terminal so that calls can be routed successfully through the network, but without any guarantee of terminal to terminal interoperability. There are no requirements in this TBR under Article 4(g) of Directive 91/263/EEC.

This TBR covers TE which is capable of originating a circuit-switched call using Dual Tone Multi Frequency (DTMF) signalling and/or receiving an incoming circuit-switched call. Other signalling methods (e.g. loop disconnect signalling), if provided in the terminal and intended to be used in certain European countries, are subject to appropriate national regulations in addition to this TBR, in respect of that feature. Also, signalling for supplementary features (e.g. register recall, reception of metering pulses from the network) if provided in the terminal, and intended to be used in certain European countries, are subject to the appropriate national regulations.

For each requirement in this TBR a test is given, including measurement methods. Requirements apply at that interface of the TE which connects directly (by galvanic means) to the PSTN via a network termination point. The TE may be stimulated to perform the test by additional equipment if necessary.

This TBR specifies the connection arrangements (plug or socket, of the supplier's choice) to be provided by the TE. An adapter may be required between the terminal and the existing national network termination point in individual countries. Such an adapter is outside the scope of this TBR.

Where the origination or reception of calls by the TE is invoked, or otherwise controlled, by other equipment external to the TE, the TE still needs to be capable of fulfilling the essential requirements under Articles 4d) and 4f) at the interface to the public network. This TBR requires the manufacturer or supplier of the TE to declare the conditions met by such external devices so that their use does not cause the TE to fail to meet the essential requirements.

## 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] Miniature 6-position plug as described in FCC 47, CFR 68.500: "Code of Federal Regulations (USA); Title 47 Telecommunication; Chapter 1 Federal Communications Commission, Part 68 Connection of Terminal Equipment to the Telephone Network; Subpart F Connectors; Section 68.500 Specification".

NOTE: The above document can be obtained from:

Superintendent of Documents  
Washington DC 20402  
United States  
Tel: + 1 202 512 18003

- [2] CCITT Recommendation G.117 (1990): "Transmission aspects of unbalance about earth (definitions and methods)".
- [3] ITU-T Recommendation G.100 (1993): "Definitions used in Recommendations on general characteristics of international telephone connections and circuits".

### 3 Definitions and abbreviations

#### 3.1 Definitions

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

##### 3.1.1 General terms

**automatic repeat call attempts:** An automatic repeat call attempt made by the TE to the same network address as the result of the failure of the previous call attempt and not as a result of an external stimulus to the TE.

**call attempt:** The process by which the TE seizes the PSTN line and sends signalling characters of the network address with which the TE wishes to communicate.

**connection to earth:** Connection to earth means that all the following points, as applicable are connected to the earth point during measurement:

- a point in the TE which is intended to be connected to mains earth (in practice this might be carried out by connecting to the earth of the mains source which is supplying the TE);
- connector points which are intended to be connected to earth during the normal operation of the apparatus.

**dBV:** Absolute voltage level expressed in decibels with respect to 1 volt.

**Longitudinal Conversion Loss:** As described in CCITT Recommendation G.117 [2] subclause 4.1.3.

**Network Termination Point (NTP):** The physical point at the boundary of the PSTN intended to accept the connection of a TE. See figure 1.

**Output Signal Balance (OSB):** As described in CCITT Recommendation G.117 [2] subclause 4.3.1.

**peak to peak voltage:** Peak to peak voltage in this TBR is the difference between the maximum and minimum voltage during any 10 ms window.

**Public Switched Telephone Network (PSTN):** The term is used to describe the ordinary telephone system including subscriber lines, local exchanges and the complete system of trunks and the exchange hierarchy which makes up the network.

**reference impedance  $Z_R$ :** A complex impedance made up of 270 ohms in series with a parallel combination of 750 ohms and 150 nF. This is shown in annex A, figure A.1.

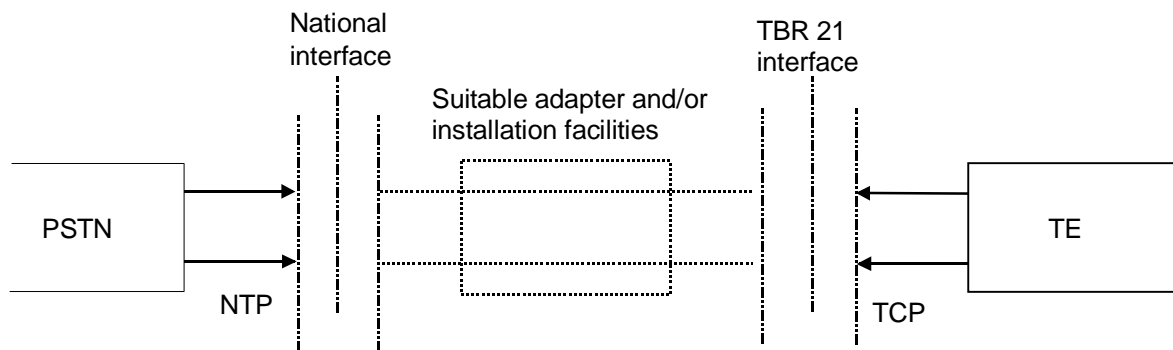
**repeat call attempt:** A further call attempt to the same network address resulting from a failure to establish connection during the previous call attempt.

**repeat call attempt sequence:** A series of internally generated automatic repeat call attempts made in response to an initial call attempt.

NOTE 1: Additional, but separate, call requests are permitted to initiate separate repeat call attempt sequences.

**return loss:** As described in ITU-T Recommendation G.100 [3] subclause 1.5.

**Terminal Connection Point (TCP):** The point of the TE intended to be connected to the PSTN. An adapter may be required between the terminal and the existing national network termination point in individual countries. Such an adapter is outside the scope of this TBR (see figure 1).



**Figure 1: Terminal Connection Point and Network Termination Point**

**Terminal Equipment (TE):** Equipment intended to be connected to the public telecommunication network; i.e.:

- to be connected directly to the termination of a public telecommunication network; or
- to interwork with a public telecommunication network being connected directly or indirectly to the termination of a public telecommunication network,

in order to send, process or receive information. The system of connection may be wire, radio, optical or other electromagnetic system.

NOTE 2: This definition is copied from the Directive 91/263/EEC.

### 3.1.2 States

**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.

**quiescent state:** The state where the TE draws insufficient DC current to activate the exchange.

### 3.2 Abbreviations

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

AC	Alternating Current
ADSI	Analogue Display Services Interface
DC	Direct Current
DTMF	Dual Tone Multi-Frequency
EMC	ElectroMagnetic Compatibility
LCL	Longitudinal Conversion Loss
LVD	Low Voltage Directive
NTP	Network Termination Point
OSB	Output Signal Balance
PSTN	Public Switched Telephone Network
rms	root mean square
SCWID	Spontaneous Call Waiting Identification
TCP	Terminal Connection Point
TBR-RT	TBR Requirements Table
TE	Terminal Equipment