

**Access and Terminals (AT);  
Analogue Access to Public Telephone Network;  
Advisory Notes to Standards Harmonizing Terminal Interface;  
Part 2: Generally applicable Advisory Notes;  
Sub-part 1: Modification to sending spectral  
density requirements**

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**Reference**

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## Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Access and Terminals (AT).

The present document is part 2, sub-part 1 of a multi-part deliverable covering Access and Terminals (AT); Analogue Access to Public Telephone Network; Advisory Notes to Standards Harmonizing Terminal Interface, as identified below:

Part 1: "List of all Advisory Notes";

**Part 2: "Generally applicable Advisory Notes";**

**Sub-part 1: "Modification to sending spectral density requirements".**

Part 3: "Country Specific Advisory Notes".

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# 1 Scope

The present document gives guidance on the application of TBR 021 [1] and is therefore applicable to Terminal Equipment falling within the scope of TBR 021 [1].

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# 2 References

For the purposes of this Technical Report (TR), the following references apply:

- [1] ETSI TBR 021: "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] ITU-T Recommendation V.34: "A modem operating at data signalling rates of up to 33 600 bit/s for use on the general switched telephone network and on leased point-to-point 2-wire telephone-type circuits".
- [3] ITU-T Recommendation V.90: "A digital modem and analogue modem pair for use on the Public Switched Telephone Network (PSTN) at data signalling rates of up to 56 000 bit/s downstream and up to 33 600 bit/s upstream".
- [4] ITU-T Recommendation V.92: "Enhancements to Recommendation V.90".

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# 3 Definitions and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TBR 021 [1] apply.

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TBR 021 [1] apply.

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# 4 Variation for existing requirements in TBR 021

## 4.1 Problem under consideration

In consideration of the following:

When analogue modems are connected to a digital remote terminal it is possible to go beyond the usual limitation of a typical analogue to analogue modem connection.

The now widely used ITU-T Recommendation V.90 [3] allows modems to receive data at up to 56 kbit/s and transmit data at speeds up to 33,6 kbit/s (V.34 modulation). TBR 021 [1] limits were aligned with highest speed ITU-T Recommendation Voice band modems existing at that time.

ITU-T Recommendation V.92 [4] allows modems to transmit at speeds up to 48 kbit/s. This results in a power spectral density that exceeds the limits allowed in TBR 021 [1], clauses 4.7.3.3 and 4.7.3.4.

## 4.2 Proposed solution

When a modulation is designed to be used with a digital remote modem the sending limits can be higher than the ones in clauses 4.7.3.3 and 4.7.3.4 of TBR 021 [1].

## 4.3 Requirements and associated tests

### 4.3.1 Voltage level in 10 Hz bandwidth (requirement - based on TBR 021: clause 4.7.3.3)

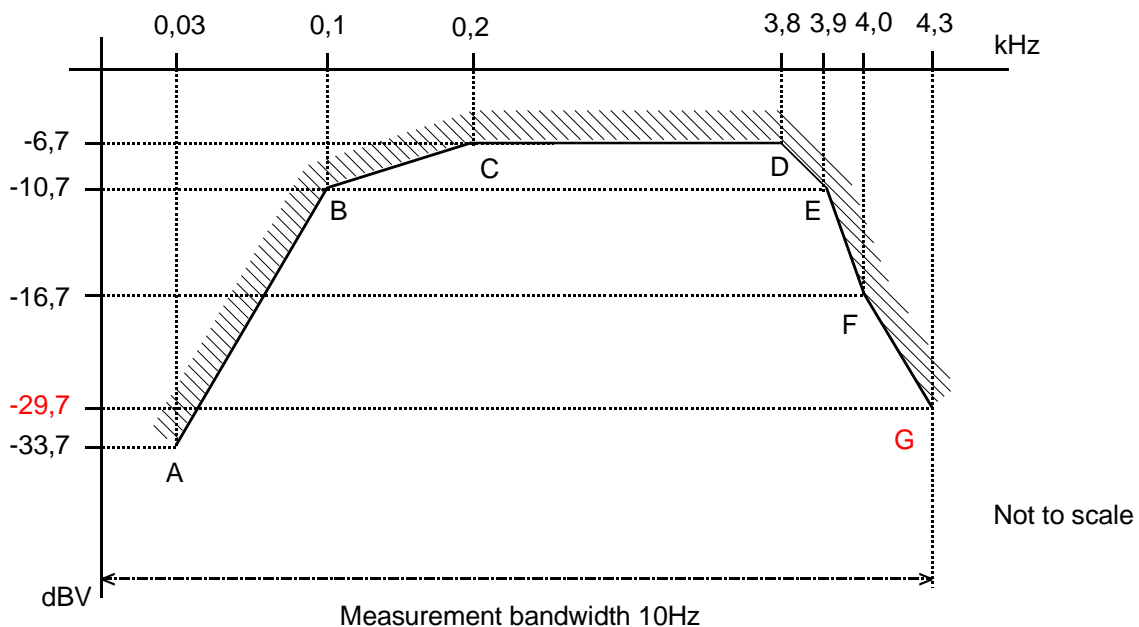
**Justification:** protection of the PSTN from harm is assured by limiting the signal sent into the PSTN by the TE so that the interfering effects of the signal can be predicted and avoided.

**Requirement:** the voltage within a 10 Hz bandwidth centred at any point in the frequency range 30 Hz to 4 300 Hz, and wholly contained within that frequency band, shall not exceed the limits given in table 1 and figure 1 when the TE interface is terminated with the reference impedance  $Z_R$ . This requirement does not apply to DTMF signals.

**Table 1: Voltage in a 10 Hz bandwidth**

Points	Frequency kHz	Sending level dBV
A	0,03	-33,7
B	0,1	-10,7
C	0,2	-6,7
D	3,8	-6,7
E	3,9	-10,7
F	4,0	-16,7
G	4,3	-29,7

NOTE: Limits for intermediate frequencies can be found by drawing a straight line between the break points on a logarithmic (Hz) - linear (dB) scale.



**Test:** The test shall be conducted according to clause A.4.7.3.3. of TBR 021 [1]

**Figure 1: Voltage level in a 10 Hz bandwidth**

### 4.3.2 Sending level above 4,3 kHz (requirement - based on TBR 021: clause 4.7.3.4)

**Justification:** protection of the PSTN from harm is assured by limiting the signal sent into the PSTN by the TE so that the interfering effects of the signal can be predicted and avoided.

**Requirement:** the total voltage level in a bandwidth, defined in table 2, wholly contained within the frequency range 4,3 kHz to 200 kHz, arising from normal operation of the TE when in an on-line, non-dialling state, and when terminated with  $Z_R$ , shall not exceed the limits shown in table 2 and figure 2.

During tone signalling the limits given in table 2 and figure 2 do not apply and are replaced by the following:

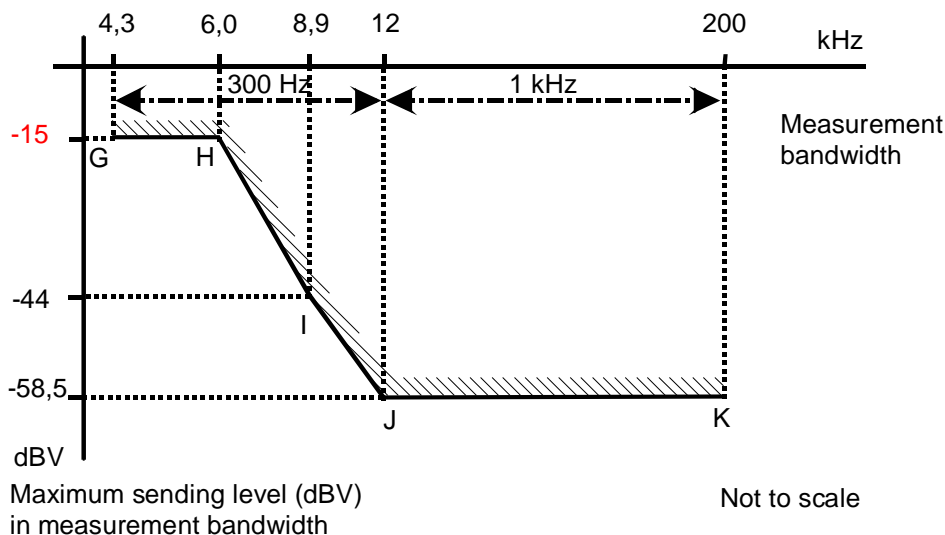
- In the range 4,3 kHz to 20 kHz, the individual level of any single frequency component shall not exceed -35,7 dBV.
- In the range 20 kHz to 200 kHz, the individual level of any single frequency component shall not exceed -40,7 dBV.

NOTE: "Normal operation of the TE" is defined in the test, see clause A.1.3.

**Table 2: Sending level above 4,3 kHz**

Points	Frequency range kHz	Sending level in a specified bandwidth dBV	Measurement bandwidth
G to H	4,3 to 6,0	-15	300 Hz
H to I	6,0 to 8,9	-15 decreasing to -44	300 Hz
I to J	8,9 to 12	-44 decreasing to -58,5	300 Hz
J to K	12 to 200	-58,5	1 kHz

NOTE: Limits for intermediate frequencies can be found by drawing a straight line between the break points on a logarithmic (Hz) - linear (dB) scale.



**Test:** The test shall be conducted according to clause A.4.7.3.4.1 of TBR 021 [1].

**Figure 2: Sending level above 4,3 kHz**

### 4.3.3 Requirement Table (CTR-RT)

The requirements table of TBR 021 [1], annex B is still applicable.

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## Annex A: Bibliography

ETSI EG 201 121: "A guide to the application of TBR 021".



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## History

<b>Document history</b>		
V1.1.1	February 2002	Publication