SLOVENSKI STANDARD
SIST-TP ETSI/ETR 207 E1:2005

01-januar-2005

Javno komutirano telefonsko omreģje (PSTN) ï Nadomestni oddajnik veļ frekvenļ nega signalizacijskega sistema za uporabo v telefonih s tipkami [priporoļ ilo CEPT T/STI 46-04 E (1986)]

Public Switched Telephone Network (PSTN); Alternative sender for multifrequency signalling system to be used for push-button telephones [CEPT Recommendation T/STI 46-04 E (1986)]

Ta slovenski standard je istoveten z: **ETR 207 Edition 1**

ICS:

33.040.35 Telefonska omrežja Telephone networks

SIST-TP ETSI/ETR 207 E1:2005 **en**

ETSI

ETSI TECHNICAL REPORT

ETR 207

September 1995

Source: ETSI TC-SPS

Reference: DTR/SPS-00001-8

ICS: 33.020

Key words: PSTN, DTMF

Public Switched Telephone Network (PSTN); Alternative sender for multifrequency signalling system to be used for push-button telephones

[CEPT Recommendation T/STI 46-04 E (1986)]

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

*

Foreword

This ETSI Technical Report (ETR) has been produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

ETRs are informative documents resulting from ETSI studies which are not appropriate for European Telecommunication Standard (ETS) or Interim European Telecommunication Standard (I-ETS) status. An ETR may be used to publish material which is either of an informative nature, relating to the use or the application of ETSs or I-ETSs, or which is immature and not yet suitable for formal adoption as an ETS or an I-ETS.

This work was initiated by the restructuring of CEPT (Conférence Européenne des administrations des Postes et des Télécommunications) and the creation of ETSI. As reported to the 16th Technical Assembly of ETSI, CEPT has proposed to transfer some Recommendations to ETSI which pertain to standardization.

Technical Committee SPS decided to convert these Recommendations into ETRs without any modification. The reader should note that undated references may no longer be relevant.

Endorsement notice

The text of CEPT Recommendation T/STI 46-04 E (1986) was approved by ETSI as an ETR without any modification.

NOTE: Due to the unavailability of the endorsed CEPT Recommendation, it is reproduced on the following pages of this ETR.

Recommendation T/STI 46-04 (Odense 1986)

ALTERNATIVE SENDER FOR MULTIFREQUENCY SIGNALLING SYSTEM TO BE USED FOR PUSH-BUTTON TELEPHONES

Recommendation proposed by Working Group T/WG 11
"Signalling systems and telephone networks/ISDN" (STI)

Text of the Recommendation adopted by the "Telecommunications" Commission:

"The European Conference of Postal and Telecommunications Administrations,

considering,

— that access to the services of the telephone network will be provided by telephone sets equipped with 12 or 16 push-buttons as recommended in CCITT Recommendation Q.11 [1] for multifrequency signalling,

— that the use of these telephone sets and their signalling technique for a simple type of end-to-end data transmission in the international as well as in national networks requires standardisation of the technique to be used,

— that the existing CCITT Recommendations on the subject do not yet assure the required standardisation,

— that the Administrations are in favour of harmonising telecommunications equipment and systems which could lead to a reduction in development and manufacturing cost for those industries that provide equipment for several countries,

— a more economic design may be allowed by means of new technology use of cannon circuits for speech and MFPB which require changed operational parameters with respect to Recommendation T/CS 46-02 [2];

recommends,

the use by the CEPT members of the multifrequency signalling system for push-button telephones (including those of private automatic branch exchanges), conforming with the specifications set out hereafter."

Blank page

Annex

1. SIGNALLING SYSTEM PRINCIPLES AND CODING

1.1. General

This Section deals with the general characteristics of the signalling system and conforms to CCITT Recommendation Q.23 [3].

1.2. Signal frequencies and codes

1.2.1. *Signal frequencies*

The signal frequencies shall be selected from two separate groups within the speech band (300-3,400 Hz), a low group and a high group, each group providing four signalling frequencies.

These frequencies shall be:
— low group frequencies: 697, 770, 852 and 941 Hz;
— high group frequencies: 1,209, 1,336, 1,477 and 1,633 Hz.

1.2.2. *Signal format*

Each signal shall consist of two and only two of the signalling frequencies; one frequency from each of the low and high groups. Both frequencies shall be applied simultaneously in parallel across the line.

1.2.3. *Signal code*

The 16 discrete signals shall be allocated as shown in Table 1 (T/STI 46-04).

Hz	High group frequencies			
	1,209	1,336	1,477	1,633
697	1	2	3	A
770	4	5	6	B
852	7	8	9	C
941	*	0	#	D

Table 1 (T/STI 46-04).

Table 1 (T/STI 46-04) gives the full allocation of signal codes. The system may be utilized with only 10 discrete signals, in which case the signals designated *; #, A, B, C and D will not be used; or with 12 discrete signals, in which case the signals A, B, C and D will not be used.

Note. The presentation in Table 1 (T/STI 46-04) corresponds to the actual lay-out of the push-buttons on the terminal equipment. The arrangements and designations of buttons are further specified in Recommendation T/CS 34-01 [4].

2. PUSH-BUTTON SENDER

2.1. Area of application and general

This Section deals with the multifrequency sender which is used in push-button telephones.

The sender has basically been specified for signalling to the exchange. However, regard has also been taken of the possible use of push-button telephones for end-to-end data transmission when manual operation applies.

The requirements stated in this Section will allow the use of a regulated generator, i.e. a generator in which the output levels are controlled by the line current.

Note. For countries that do not allow the use of regulated senders, paragraph 2.3.3.2. is not applicable.

The purpose of the new specification is to make allowances for new semiconductor and other technologies being applied to the design of MF Senders.

However, MF Senders designed to this specification must still be compatible with MF Receivers designed to the Recommendation T/CS 46-02 [2].

2.2. **Operational conditions**

The sender is expected to operate under varying environmental conditions.

(a) A general purpose sender should operate in temperature controlled locations and partly temperature controlled locations, i.e. in normal living and working areas as well as entrances, staircases of buildings, factories and industrial plants; etc. The relevant climate conditions are described in Recommendation T/TR 02-06 and summarised in Figure 4 (T/STI 46-04). The sender must meet the requirements within these conditions.

(b) A wide temperature range sender should operate in open air as well as sites with heat trap, i.e. telephone booths and similar installations. The relevant climatic conditions are described in CEPT Recommendation T/TR 02-06 (Figure 3) [5]. That figure is included as Figure 5 (T/STI 46-04) of this Recommendation. The wide temperature range sender must meet the requirements within these conditions.

2.3. **Signal output requirements**

2.3.1. *Frequency tolerance*

The output frequencies shall be maintained within ± 1.5% of their nominal values. This tolerance shall also include the effect of different line impedances offered to the sender.

2.3.2. *Sending level*

2.3.2.1. Sending level for unregulated senders

The sending levels with a load resistance of 600 ohms for an unregulated sender shall be for:

Option 1:
— the high frequency group: − 9 dBm ± 2 dB,
— the low frequency group: −11 dBm ± 2 dB.

Option 2:
— the high frequency group: −6 dBm ± 2 dB,
— the low frequency group: −8 dBm ± 2 dB;

with a restriction that the level of the higher frequency component of the compound signal shall be 2 ± 1 dB above the level of the lower frequency component.

2.3.2.2. Sending levels for regulated senders

If an Administration allows the use of regulated senders, the working conditions shall be in mask "a":
for Option 1: as shown in Figure 2A (T/STI 46-04);
for Option 2: as shown in Figure 2B (T/STI 46-04);
with the restrictions that at I_{LMIN} the levels must be as defined in 2.3.2.1. and that the level of the higher frequency component of the compound signal shall be 2 ± 1 dB above the level of the lower frequency components.

I_{LMIN} is taken from Table 2 (T/STI 46-04).

I_{LMAX} is calculated from $\frac{V_{BMAX}}{R_{FMIN} + R_{TMIN}}$,

where V_{BMAX} and R_{FMIN} are taken from Table 2 (T/STI 46-04) and R_{TMIN} is the minimum resistance of the telephone set. "A" is the sensitivity of the receiver.

Note 1. In many countries there is a value of current (F) above which current limitation is performed by the exchanges. In addition it should be noted that some modern exchanges have a constant current feed and this may prevent the sender regulation circuit from functioning and the sender will then transmit at maximum level even on short lines.

Note 2. Taking into account *Note 1* regulation will become less applicable in the future. The masks in Figures 2A (T/STI 46-04) and 2B (T/STI 46-04) are the limits taking into account existing regulated senders.

Note 3. Unregulated senders always fall within the mask "a" of figures 2A (T/STI 46-04) and 2B (T/STI 46-04).

Note 4. The use of these masks will allow each Administration which wishes to use regulated senders to define regulation characteristics for MFPB levels which are in line with their speech regulation characteristics.

Note 5. The specification for regulated senders are not applicable to push-button telephones for use with private automatic branch exchanges.

2.3.3. *Unwanted frequency components*

2.3.3.1. When a signal is output:

(a)The total power level of all unwanted frequency components shall be at least 20 dB below the level of the low group frequency component of the signal.

(b)The level of any individual unwanted frequency component shall not exceed the following limits:

— in the frequency band 300-4,300 Hz: −33 dBm;
— in the frequency band 4,300-28,000 Hz: −37 dBm at 4,300 Hz, the falling at 12 dB per octave to 28 kHz;
— in the frequency band 28 kHz to 10 MHz: −70 dBm.

2.3.3.2. When the sender unit is active, but there is no tone output, the limits of unwanted frequencies shall not exceed the following:

— psophometric noise: −64 dBmp.

The level of any individual frequency component of the signal shall not exceed:

— in the frequency band 4,300-8,900 Hz: −40 dBm;
— in the frequency band 8,900 Hz to 50 kHz: −40 dBm at 8,900 Hz, falling to −70 dBm at 50 kHz;
— in the frequency band 50 kHz to 10 MHz: −70 dBm.

2.3.4. *Risetime*

The risetime is the time from switching on the sender output to the time when the output level is within the limits of paragraph 2.3.2.

All transients shall have ceased and the signal power shall be within the limits of paragraph 2.3.2. at a time less than 7 ms after the start of signal output.

The risetime is not critical if the duration of the signal tones is controlled by the sender.

2.3.5. *Signal timing*

Soon after a button is depressed, the signal is output to line. It may continue until the button is released. If the minimum duration of the signal output is controlled by the sender, the duration of the signal shall not be less than 65 ms excluding risetime. In this case, the interdigital pause shall have a minimum value of 65 ms.

Note 1. Frequency tolerance

The tolerance specified in CCITT Recommendation Q.23 [3] is 1.8%. However, it was considered that 1.5% could be achieved in practice without any difficulty for the operating conditions specified in Section 2.2.

Note 2. Sending level

i) The lower sending levels are based on the application of CCITT Recommendation Q.15 [6] to the use of push-button telephones for end-to-end data transmission. Assumptions were made for average power losses and activity factors.

ii) The pre-emphasis of 2 dB is a compromise between different national requirements. A tolerance of 1 dB was specified because it can be assumed that the drift in the power levels of the two single frequency components will be correlated.

Note 3. Unwanted frequency components

In paragraph 2.3.3.1., the requirement (a) is related to the performance of the multifrequency signalling system itself. The requirement (b) is to avoid interference to this and other inband signalling systems and other channels in multiplex systems.

Allowance also needs to be made in both paragraphs 2.3.3.1. and 2.3.3.2. for Data-over-Voice and other systems operating outside the audio band.

The specification in paragraph 2.3.3.2. assures that none of the frequencies is audible during the conversation condition.

Note 4. Risetime

While a button is moving from the undepressed to the depressed position, the direct current and alternating current characteristics of the telephone set are changed, which will cause transients. The transients and the characteristics of the two-frequency signal limit the accuracy with which the risetime can be measured. Further, the time at which the button is operated may be difficult to identify. A firmer requirement than 7 ms could therefore hardly be verified in practice. The amplitude of the transients depends upon the characteristics of the sender, the local line and the exchange feeding bridge. Although a limitation of the transients is necessary, it has not yet been possible to specify maximum values. Two factors must be taken into account when specifying the amplitude and duration of transients:

(a) For signalling to the exchange the influence of transients on the receiver performance must be limited.

(b) For the purpose of data transmission, Administrations must ensure that in practice (i.e.: when the telephone, sender, local line and feeding bridge are associated) that amplitude and duration of transients at the output of the exchange feeding bridge does not significantly increase the level of the mean power transmitted to the national network.