INTERNATIONAL TELECOMMUNICATION UNION

ITU-T Q.272

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

SPECIFICATIONS OF SIGNALLING SYSTEM No. 6

SIGNALLING LINK

REQUIREMENTS FOR THE SIGNALLING DATA LINK

ITU-T Recommendation Q.272

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation Q.272 was published in Fascicle VI.3 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

6.1 REQUIREMENTS FOR THE SIGNALLING DATA LINK

6.1.1 *General*

a) The signalling data link may be either an analogue signalling data link (§ 6.1.1.1 below) or a digital signalling data link (§ 6.1.1.2 below).

b) System No. 6 is capable of operating over signalling data links with the longest loop propagation time visualized (see also § 6.7.3 below).

c) To reduce the possibility of the called party being distorted or clipped, the propagation time of the signalling data link should be as low as possible and should not be significantly greater than that of any speech circuits with which it is associated.

d) The signalling data link shall be dedicated to the use of a System No. 6 signalling link between two points, the only switching to be provided being that required for the security arrangements (see Recommendation Q.292).

e) A means must be furnished for disabling the echo suppressors which might be associated with the circuits used for the signalling data links. Disabling must be accomplished by local action by the processor at each terminal.

6.1.1.1 *Analogue signalling data link*

The analogue signalling data link shall be made up of standard international voice-frequency channels, either 3-kHz or 4-kHz spaced, and associated modems. The overall transmission characteristics of the voice-frequency channels must be equalized if necessary to meet the recommendations of § 6.1.3 below.

6.1.1.2 *Digital signalling data link*

The digital signalling data link shall be derived from the 1544 kbit/s (Recommendation Q.47) or 2048 kbit/s (Recommendation Q.46) primary multiplex equipment and includes the appropriate digital interface adaptor.

6.1.2 *Error rate characteristics of the data channel*

6.1.2.1 *Analogue data channel*

The data transmitted at 2400 bits per second with four-phase PSK *(phase shift keying)* modulation over a data channel as specified should meet a long-term bit error rate of less than 1 in 10^5 in normal operation (see Recommendation Q.295, § 9.2.7). This figure excludes interruptions exceeding 350 ms in length.

6.1.2.2 *Digital data channel*

The data transmitted at permitted data rates over digital data channels as specified should meet a long term bit error rate of less than 1 in 10^6 in normal operation (see Recommendation Q.295, § 9.2.7). This figure excludes interruptions exceeding 350 ms in length.

6.1.3 *Transmission characteristics of the voice-frequency channel*

The transmission characteristics of the voice-frequency channels used in the signalling data link are based on those in Recommendation M.761.

However, for the System No. 6 data rate and modulation method, Recommendation M.761 offers some latitude in the selection of channels. The equalization for attenuation distortion and delay distortion of the channels can be restricted to the frequency band 1000 to 2600 Hz (see Figures 15/Q.272 and 16/Q.272).

a) *Overall loss at 800 Hz.* - The overall loss at 800 Hz of the channels of a transfer link is not specified.

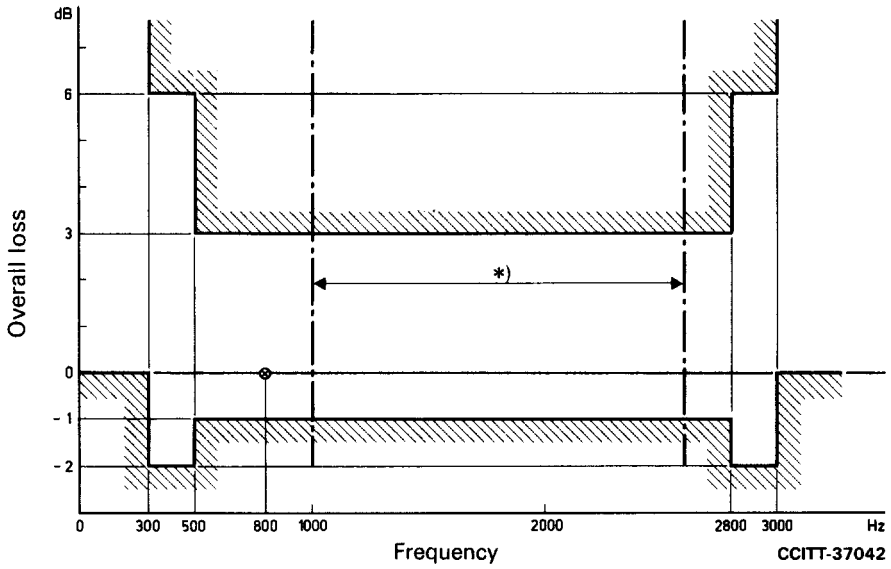
The channels of a transfer link should be set up so that when a test signal at a level of -10 dBm0 is connected to the input of the transfer channel, the level received at the output of the transfer channel at the distant end is as close as possible to - 10 dBm0.

b) *Variation of overall loss al 800 Hz.* - The variation with time overall loss at 800 Hz should be as small as possible but should not exceed the following limits:

Short-term variation (over a period of a few seconds) ..... ± 3 dB

Long-term variation (over long periods including
daily and seasonal variations)..... ± 4 dB

c) *Attenuation/frequency distortion.* - The variation of the overall loss of the channel with frequency over the range of 1000 to 2600 Hz relative to the attenuation at 800 Hz should not exceed the limits shown in Figure 15/Q.272.



* Frequency band with defined characteristics for Signalling System No. 6.

Note 1 – Alternative relaxed limits are shown in Annex A to Recommendation Q.272.

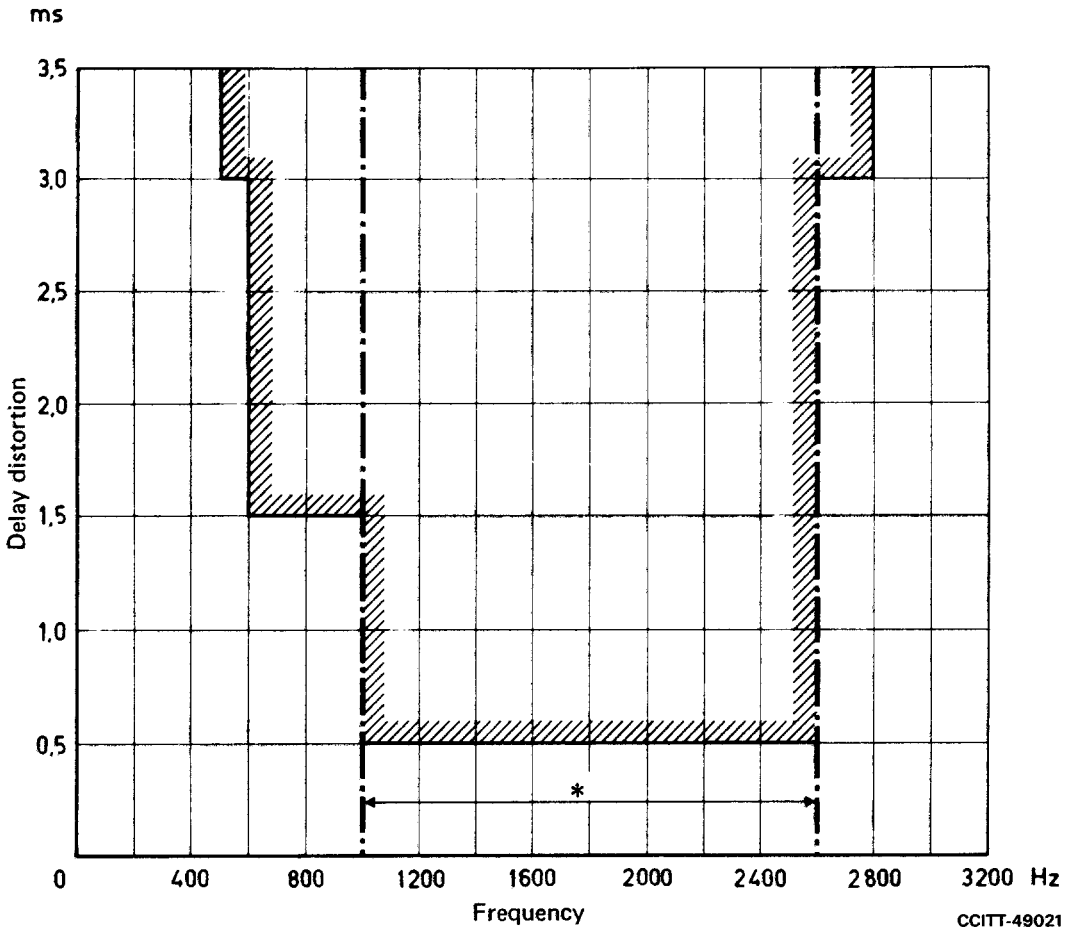
Note 2 – Below 300 Hz and above 3000 Hz the loss shall not be less than 0.0 dB but is otherwise unspecified.

FIGURE 15/Q.272

Limits for overall loss of the transfer link relative to that at reference frequency

d) *Delay/frequency distortion.* - The delay/frequency distortion in the band of frequencies from 1000 to 2600 Hz relative in that band should not exceed the limits given in Figure 16/Q.272. It may be necessary to select channels and/or provide suitable delay distortion equalizers to ensure that these limits are not exceeded.

Where the full-time reserved link is a TASI speech circuit taken into use for signalling purposes, this characteristic may not be met unless all TASI channels in the route meet the transmission requirements specified above. In addition, it may be necessary to restrict the number of 3-kHz-spaced channels used in a signalling data link.



* Frequency band with defined characteristics for Signalling System No. 6. The tolerance scheme is taken from Recommendation M.1020.

Note – The limits shown in this Figure are under study. Proposed changes are shown in Annex A to Recommendation Q.272.

FIGURE 16/Q.272

Permissible variation of overall delay distortion with frequency for the voice-frequency channel

e) *Uniform spectrum random circuit noise.* - See Recommendation M.761, particularly the note to Recommendation M.761, § 2.6.

f) *Impulse noise.* - Impulsive noise on the voice-frequency channel should not exceed 18 peaks in 15 minutes, greater than -21 dBm0. Measurements should be made during peak hours.

According to Recommendation M.761, impulsive noise should be measured with an instrument complying with Recommendation O.71. The value given above is a provisional limit for maintenance purposes; final values are still under study.

6.1.4 *Nominal data carrier power level*

The nominal data carrier power level is -15 dBm0 (see Recommendation Q.15).

Recommendations H.41 and V.2 allow a power level of -10 dBm0 when no more than 5% of the channels in a multichannel system are used for non-speech applications simultaneously in both directions. If the percentage of channels in this type of service is considerably more than 5%, the power should be reduced. Recommendation Q.15 allows a mean absolute power level of -15 dBm0.

6.1.5 *Slip characteristics of the digital data channel*

The occurrence of slips adversely affects the service dependability of the signalling system. Means must be provided for

a) preventing slips from occurring, e.g., by use of synchronization or by use of a contra-directional interface, or

b) detecting slips, or

c) providing accurate clocks to reduce the occurrence of undetected slips.

Although a means can be provided to detect slips, in general each slip that occurs will cause a signal unit to be received in error. When using a slip detecting mechanism, the slip rate must be such that the dependability requirements of Recommendation Q.276, § 6.6.1 are still met (see also Recommendation Q.276, § 6.8.3).

6.1.5.1 *The 1544 kbit/s primary multiplex*

Provisionally, the need for a slip requirement is not foreseen.

6.1.5.2 *The 2048 kbit/s primary multiplex*

a) 4 kbit/s signalling rate

The coding for deriving the 4 kbit/s channel from the 64 kbit/s bearer is designed so that slips are always detected and the true data recovered.

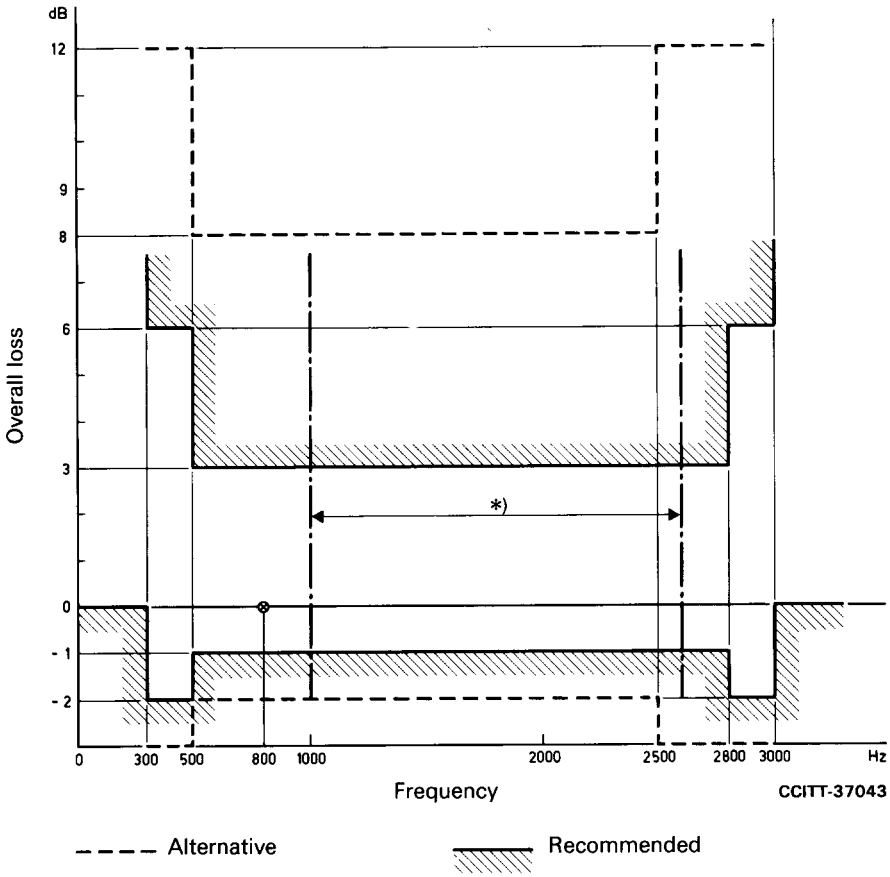
b) 56 kbit/s signalling rate

The coding for deriving the 56 kbit/s channel from the 64 kbit/s bearer may be used to detect slips. Provisionally an undetected slip rate not exceeding once in 16 days is required.

ANNEX A

(to Recommendation Q.272)

Proposed changes presently under study

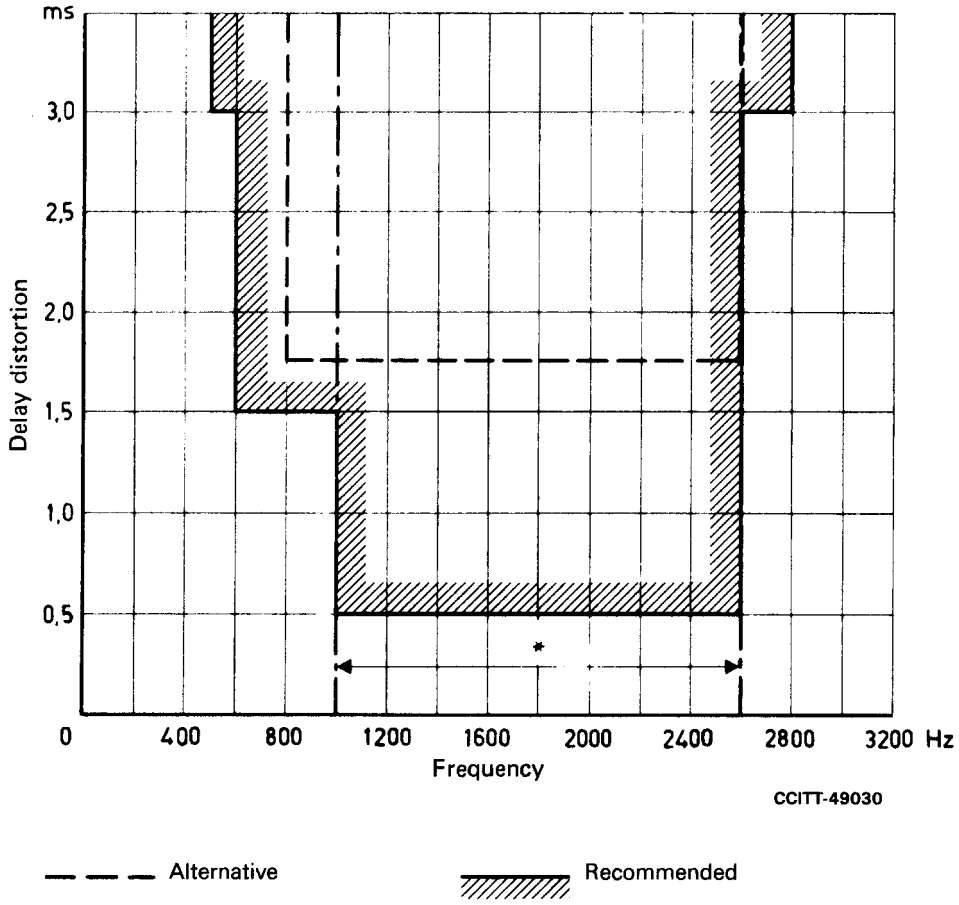


* Frequency band with defined characteristics for Signalling System No. 6.

Note – Below 300 Hz and above 3000 Hz the loss shall not be less than 0.0 dB but is otherwise unspecified.

FIGURE 15

Limits for overall loss of the transfer link relative to that at reference frequency (Alternative if tests confirm suitability)



*Frequency Band with defined characteristics for Signalling System No. 6.

FIGURE 16

Permissible variation of overall delay distortion with frequency for the voice-frequency channel (Alternative if tests confirm suitability)