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CONSULTATIVE COMMITTEE

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MAINTENANCE: COMMON CHANNEL SIGNALLING SYSTEMS

TRANSMISSION CHARACTERISTICS FOR SETTING UP AND LINING UP A TRANSFER LINK FOR COMMON CHANNEL SIGNALLING SYSTEM No. 6 (ANALOGUE VERSION)

Recommendation M.4030

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation M.4030 was revised by Study Group IV and was approved under the Resolution No. 2 procedure on the 5th of October 1992.

CCITT NOTE

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

Recommendation M.4030

TRANSMISSION CHARACTERISTICS FOR SETTING UP AND LINING UP A TRANSFER LINK FOR COMMON CHANNEL SIGNALLING SYSTEM No. 6 (ANALOGUE VERSION)[1)]

(Published 1980 as M.761; revised and renumbered in 1992)

Abstract

Provide details of the transmission characteristics required of a link which will be used for the exchange of signalling information in the common channel Signalling System No. 6 format.

Keywords

– lining up;
– setting up;
– Signalling System No. 6;
– transfer link;
– transmission characteristics.

1 Setting up and lining up a transfer link

1.1 The method to be used and procedure to be followed in setting up and lining up a transfer link are similar to those given in Recommendation M.1050 [1] in so far as it applies. However, in this context, any reference to national sections in Recommendation M.1050 [1] should be ignored since a transfer link exists between terminal international centres and does not include national sections.

1.2 Routing restrictions may be necessary to achieve the loss/frequency and group-delay distortion limits specified below if the need to insert equalizers is to be avoided. Factors that may contribute to difficulties in meeting these limits are the number of through-group filters in group links, the use of edge band channels in group links, etc.

In addition, the number of channel translating equipment should be minimized in order that equalization, if required, may be more easily achieved, and that the effect of other parameters, such as noise, may be minimized.

2 Transmission characteristics of a transfer link

2.1 *General*

The transmission characteristics of the circuit to be used as the signalling data link are based on those for international leased circuits conforming to Recommendation M.1020 [2]. Optionally, the relaxed overall loss/frequency characteristic and group-delay distortion limits specified in Recommendation Q.272 [3] may be applied where agreed between the Administrations involved and if tests confirm suitability.

2.2 *Overall loss at reference frequency*

The overall loss at reference frequency of the channels of a transfer link is not specified.

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1) A general description of the transfer link for the common channel Signalling System No. 6 may be found in Recommendation M.760 [6].

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.

2.3 *Variation with time of the overall loss at reference frequency*

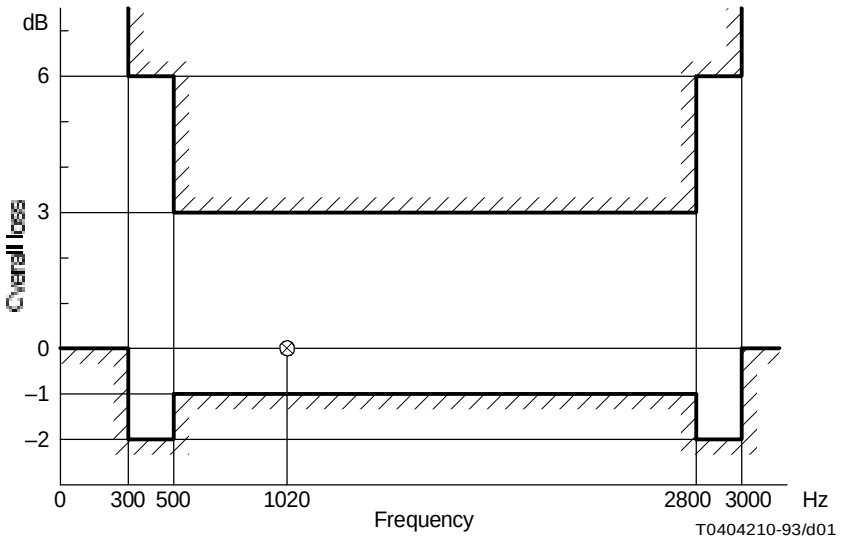
The variation with time of the overall loss at reference frequency should be as small as possible but should not exceed the following limits:

– 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.

2.4 *Loss/frequency distortion*[2)]

The variation of overall loss with frequency relative to the loss at reference frequency should not exceed the limits shown in Figure 1/M.4030.



Note 1 – Below 300 Hz and above 3000 Hz the loss shall not be less than 0.0 dB but is otherwise unspecified.

Note 2 – 1020 Hz is the reference test frequency as explained in Recommendation O.6 [7].

FIGURE 1/M.4030

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

2) The limits of Recommendation M.1020 [2] have been chosen for the loss/frequency characteristics although these limits are appropriate for a leased circuit extending over national plant including local lines to customers' premises. Transfer links will only extend between international centres and their routing will not involve any audio line plant with its inherent increasing attenuation with frequency.

2.5 *Group-delay distortion*

The group-delay distortion relative to the minimum delay should not exceed the limits shown in Figure 2/M.4030.

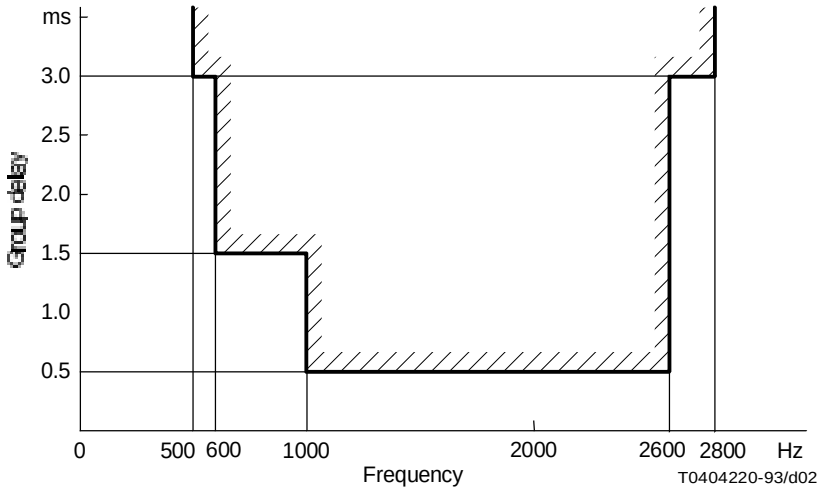


FIGURE 2/M.4030

Limits for group delay relative to the minimum measured group delay in the 500-2800 Hz band

Note – It is believed that in many cases the limits specified in §§ 2.4 and 2.5 may be achieved without the addition of equalizing equipment.

2.6 *Random noise*

The level of the psophometric noise power at the receiving terminal international centre depends upon the actual length and constitution of the transfer link. The provisional limit for transfer links of distances greater than 10 000 km is –38 dBm0p. However, transfer links of shorter length will have substantially less random noise, as shown in Figure 3/M.4030.

Figure 3/M.4030 displays random noise versus length and is presented as a guide to the random noise performance which may be found on a transfer link.

Note – For transfer links routed via satellite, the satellite section (between earth stations) will contribute approximately 10 000 pW0p (–50 dBm0p) to the overall circuit noise. Therefore, for the purpose of determining the noise limits for the Signalling System No. 6 transfer link, the section of the transfer link provided by the satellite may be considered to be equivalent to a length of 1000 km. The effective noise length of such a transfer link will be 1000 km plus the total length of the terminal routings.

2.7 *Impulsive noise*

Impulsive noise should be measured with an instrument complying with Recommendation O.71 [4]. As a provisional limit, the number of impulsive noise peaks exceeding –21 dBm0 should not be more than 18 in 15 minutes.

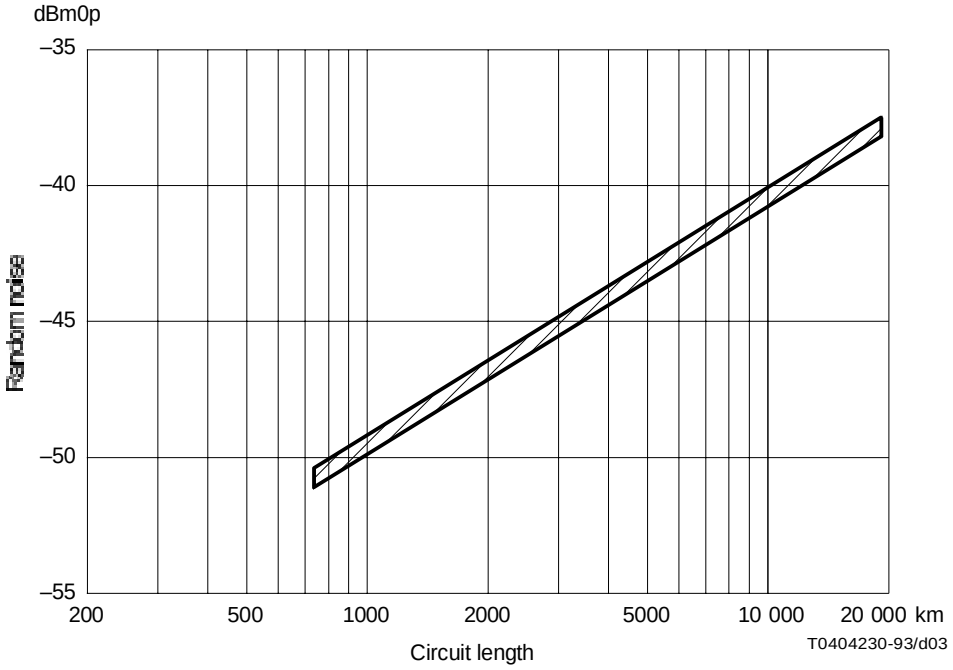


FIGURE 3/M.4030
Random noise performance

2.8 *Phase jitter*

The value of phase jitter depends upon the actual constitution of the transfer link (for example, upon the number of modulation equipment involved). It is expected that any measurement of phase jitter using an instrument complying with Recommendation O.91 [5] will not normally exceed 10° peak-to-peak. However, for transfer links of necessarily complex constitution, and where 10° peak-to-peak cannot be met, a limit of up to 15° peak-to-peak is permitted.

2.9 *Quantizing noise*

If any section of the transfer link is routed over a pulse code modulation system or through a digital exchange, the signal will be accompanied by quantizing noise. The minimum ratio of signal-to-quantizing noise normally expected is 22 dB.

2.10 *Single tone interference*

The level of single tone interference in the band 300-3400 Hz shall not exceed a value which is 3 dB below the circuit noise objective indicated in Figure 3/M.4030.

2.11 *Frequency error*

The frequency error introduced by the transfer link must not exceed ± 5 Hz. It is expected that in actual practice the frequency errors encountered will be less than 5 Hz.

2.12 *Harmonic distortion*

When a 700-Hz test frequency at –13 dBm0 is injected at the transmit end of the transfer link, the level of any individual harmonic frequency at the receiving end shall be at least 25 dB below the received level of the fundamental frequency.

3 Recording of results

All measurements made in completing the line-up of the transfer link are valuable as references. These final measurements should be recorded using an appropriate form.

If subsequent realignment or adjustment is necessary, these records should be updated.

References

[1] CCITT Recommendation M.1050 *Lining up an international point-to-point leased circuit.*

[2] CCITT Recommendation M.1020 *Characteristics of special quality international leased circuits with special bandwidth conditioning.*

[3] CCITT Recommendation Q.272 *Requirements for the signalling data link, Annex.*

[4] CCITT Recommendation O.71 *Impulsive noise measuring equipment for telephone-type circuits.*

[5] CCITT Recommendation O.91 *Phase jitter measuring equipment for telephone circuits.*

[6] CCITT Recommendation M.760 *Transfer link for common channel Signalling System No. 6.*

[7] CCITT Recommendation O.6 *1020 Hz Reference test frequency.*