INTERNATIONAL TELECOMMUNICATION UNION

ITU-T M.910

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

MAINTENANCE: INTERNATIONAL LEASED GROUP AND SUPERGROUP LINKS

SETTING UP AND LINING UP AN INTERNATIONAL LEASED GROUP LINK FOR WIDE-SPECTRUM SIGNAL TRANSMISSION

ITU-T Recommendation M.910

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation M.910 was published in Fascicle IV.2 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.

Recommendation M.910

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1 General

1.1 The international leased group links in this Recommendation relate to corrected group links in the Recommendation cited in [1].

1.2 The composition of a leased group link and the terminology used for maintenance purposes is given in Recommendation M.900.

1.3 The procedure for setting up an international leased group link should as far as possible follow the principles given in Recommendation M.460 [2].

1.4 For the purpose of this Recommendation, the constitution and subsequent line-up and maintenance practice assumes that the group link between renters' premises is operated throughout in the frequency range 60-108 kHz.

1.5 Where, as in some cases, modems are fitted at the terminal national centres the group link is defined as existing between defined access points at these centres.

In such cases the terminal national section is treated for lining-up and maintenance purposes as a separate section and not part of the group link as defined in Recommendation M.900.

1.6 In some cases, where the wide-spectrum transmission equipment located at the renter's premises is not frequency band restricted, it may be found necessary to include a through-group filter at the terminal national centre in the transmitting direction of transmission, in order to prevent interference by the wide-spectrum signals into adjacent groups in the carrier systems, over which the group is routed.

Also, when measuring at the terminal national centre in the receiving direction of transmission, a through-group filter may be necessary in the measuring circuit, in order to prevent signals from adjacent groups affecting the measurement results.

2 Setting-up of an international leased group link

2.1 *National and international main section*

With the exception of the terminal national section, the provisions of Recommendation M.460 [2] shall apply to the setting-up and the interconnection of the group sections constituting the national and international main section.

2.2 *Terminal national sections*

Because of the particular arrangements adopted for providing these sections within the country concerned, the setting-up of such sections will follow the practice determined within the country concerned.

2.3 *Application of the group reference pilot*

The application of a group reference pilot (preferably 104.08 kHz), whether injected into the group path at the renter's premises or whether it is injected at the terminal national centre, should conform to the requirements of Recommendation M.460 [2].

3 Lining up an international leased group link

3.1 *Lining up the national and international main sections*

3.1.1 The reference test frequency to be used should be 84 kHz.

3.1.2 The lining-up of these sections should follow the procedure and method given in the Recommendation cited in [3].

3.1.3 The national main sections may be lined up separately from the international main sections since no international cooperation is needed.

3.1.4 The limits given in Table 2/M.460 [4] should apply to these main sections. In addition, the group-delay distortion of the national and international sections should be measured and the results recorded.

3.2 *Terminal national sections*

The lining-up of these sections will follow the national practice of the country concerned.

3.3 *Interconnection of terminal national sections and national main section*

The levels and impedances in the frequency band concerned of the terminal national sections and the national main section at the terminal national centre should be made compatible with the levels and impedances specified for the access point at this centre.

3.4 *Overall line-up of the link*

When the national and international main sections have been lined up and interconnected using the necessary through-group equipment, measurements should be made between the terminal access points, either at the renter's premises or in exceptional cases at the terminal national centres.

In addition to level measurements the group-delay distortion within the frequency band 68-100 kHz should be measured and the values relative to the minimum group-delay distortion within the band should be recorded for subsequent maintenance use. If necessary, group-delay equalizers have to be inserted into the link where appropriate.

The procedure and method to be used for the line-up should follow that given in Recommendation M.460 [2], but the limits to be achieved are those given below.

3.4.1 *Overall loss at the reference frequency*

The overall loss at the reference frequency between the renters' premises cannot normally be specified because of the freedom accorded to Administrations to adopt nominal relative levels which is their national or agency practice.

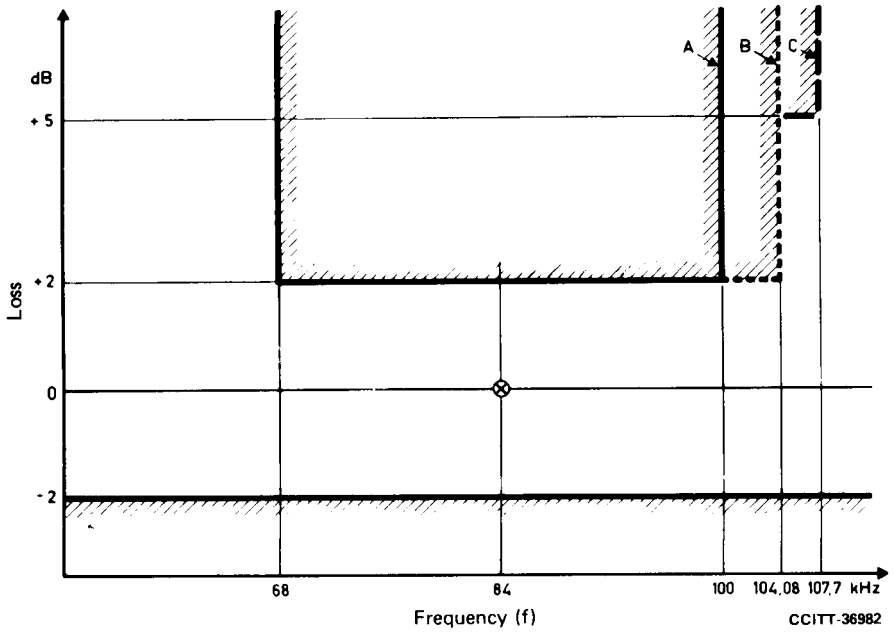
If, however, it is necessary to specify a particular value of overall loss as a result of a request by a renter this may be done only after prior consultation and agreement between the Administrations concerned.

3.4.2 *Loss/frequency distortion*

The loss/frequency distortion of the overall link is shown in Figure 1/M.910. It should be measured over the frequency range 60-108 kHz and equalized with a group link equalizer as necessary to meet the limits with respect to the loss at 84 kHz.

Note 1 – If the service channel is provided, additional equalization may be needed and there will be no possibility of employing simplified through-group filters.

Note 2 – 84 kHz is the reference frequency for the purposes of specifying and measuring attenuation distortion. The group reference pilot at 104.08 kHz may still be used as the regulating pilot, however, as required.



A: these limits apply if the group reference pilot (104.08 kHz) is injected at an intermediate point on the link (e.g., the terminal national centre)
B: these limits apply if the group reference pilot is transmitted throughout the link (e.g., if it is injected by the terminal equipment)
C: these limits apply if the service channel is provided

FIGURE 1/M.910
Limits for loss/frequency distortion

3.4.3 *Group-delay distortion*[1)]

3.4.3.1 The group-delay distortion of the link should not exceed 45 µs relative to the minimum value within the band of frequencies 68-100 kHz.

3.4.3.2 If the group-delay distortion exceeds the value given in § 3.4.3.1 above, equalization should be provided as agreed by the two terminal Administrations concerned to bring the group-delay distortion of the link within this value and the results recorded.

3.4.3.3 Where the group link terminates at the two terminal national centres, the value of the group-delay distortion given in § 3.4.3.1 above should apply between these two centres.

3.4.4 *Level variations*

Irrespective of whether the group link terminates at the two renters' premises concerned, or at the two terminal national centres the link should be checked in accordance with the Recommendation cited in [5] in order to ensure that no faults exist. The following limits should not be exceeded:

- short-term variations: ± 3 dB,
- long-term variations: ± 4 dB, relative to the nominal value.

1) This limit can normally be met without overall link equalization for group links consisting of three group sections in tandem using corrected through-groupe connection equipment.

3.4.5 *Carrier leak*

The group link should be subjected to measurement of each carrier leak individually at the receiving terminal in both directions of transmission.

The objective for the level of any carrier leak, appearing in the frequency band 60-108 kHz is –40 dBm0.

In some cases, however, because of the composition of the link, which will generally involve the use of both old and new types of equipment it may not be possible to achieve this value.

At all events, no carrier leak in the band 60-108 kHz should exceed –35 dBm0.

Note – The attention of users is drawn to the fact that failure to reach the value –40 dBm0 might cause difficulties in cases where links are used for data transmission.

3.4.6 *Impulsive noise*

For the specification of an impulsive-noise measuring instrument for wideband data transmissions, see Recommendation H.16 (O.72) [6]. No limit value can be given at the present time.

3.4.7 *Frequency error*

The frequency error over the group link should not exceed 5 Hz. When this measurement is necessary, it should be made according to bilateral agreement between Administrations.

3.4.8 *Background noise*

At the present time it is not possible to specify a limit value for background noise for this class of group link. However, a check of the background noise should be made and recorded at every line-up.

References

[1] CCITT Recommendation *Characteristics of group links for the transmission of wide-spectrum signals*, Vol. III, Rec. H.14, § 2.

[2] CCITT Recommendation *Bringing international group, supergroup, etc., links into service,* Vol.. IV, Rec. M.460.

[3] *Ibid*., § 7.2.

[4] *Ibid*., Table 2/M.460.

[5] *Ibid*., § 8.

[6] CCITT Recommendation *Characteristics of an impulsive-noise measuring instrument for wideband data transmission*, Vol. III, Rec. H.16.