INTERNATIONAL TELECOMMUNICATION UNION

ITU-T G.134

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

TRANSMISSION SYSTEMS AND MEDIA

GENERAL CHARACTERISTICS OF THE 4-WIRE CHAIN FORMED BY THE INTERNATIONAL CIRCUITS AND NATIONAL EXTENSION CIRCUITS

LINEAR CROSSTALK

ITU-T Recommendation G.134

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation G.134 was published in Fascicle III.1 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.

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Recommendation G.134

LINEAR CROSSTALK[1)]

(Geneva, 1964; amended at Mar del Plata, 1968)

1 Linear crosstalk between different 4-wire chains of circuits (analogue and mixed)

As a network performance objective, the signal-to-crosstalk ratio which may exist between two 4-wire chains of circuits comprising international and national circuits is restricted by Recommendation G.151, § 4.1, as regards circuits, and by Recommendation Q.45 [1], as regards international centres.

2 Linear crosstalk between go and return channels of the 4-wire chain of circuits (analogue and mixed)

As a network performance objective, the signal-to-crosstalk ratio between the two directions of transmission of a 4-wire chain of circuits is restricted by Recommendation G.151, § 4.2, as regards circuits and by Recommendation Q.45 [1] as regards international centres.

ANNEX A
(to Recommendation G.134)

Methods for measuring crosstalk in exchanges, on international telephone circuits and on a chain of international telephone circuits

A.1 The method used for measuring crosstalk will depend on the type of crosstalk. In general one or the other of the following two situations will be encountered:

a) crosstalk in an exchange arising mainly from a single source or from several nearby sources;

b) crosstalk measured at the end of a circuit or chain of circuits and which is the result of multiple sources of crosstalk occurring at points along the circuit or chain of circuits. The total crosstalk will depend on the relative phases of the individual contributions and may accordingly vary greatly with frequency. On long circuits or chains of circuits, difficulties may arise when making crosstalk measurements at a single frequency owing to small variations in the frequency of the master oscillators supplying translating equipment at various points along the circuit or chain of circuits.

A.2 Available methods for measuring crosstalk are as follows:[2)]

a) single-frequency measurements (e.g. at 800 Hz or 1000 Hz);

b) measurements made at several frequencies (e.g. at 500, 1000 and 2000 Hz), the results being averaged on a current or voltage basis;

c) measurements made using a uniform spectrum random noise or closely spaced harmonic series signal shaped in accordance with a speech power density curve. Such measurements should be made in accordance with the Recommendation cited in [3];

d) voice/ear tests, in which speech is used as the disturbing source and the crosstalk is measured by listening and comparing its level with a reference source whose level can be adjusted by some form of calibrated attenuating network.

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1) Recommended methods for the measurement of crosstalk are described in Annex A.

2) It is a question here of the measurement of the frequency (or frequencies) to be used; the measure of the crosstalk for a given frequency is described in [2].

A.3 Pending further study, the following methods are provisionally recommended for "type tests" and "acceptance tests" involving crosstalk measurement.

A.3.1 *Crosstalk in exchanges*

Crosstalk should be measured at 1100 Hz which, in the experience of some Administrations, is equivalent to a measurement made with a conventional telephone signal generator (Recommendation G.227 [41) and a psophometer.

A.3.2 *Crosstalk on an international telephone circuit or chain of international telephone circuits*

Crosstalk should be measured using a uniform spectrum random noise or closely spaced harmonic series signal shaped in accordance with the speech power density curve of Recommendation G.227 [41. The measurements should be made in accordance with the Recommendation cited in [3].

Note 1 - In cases of difficulty with A.2.a) and A.2.b), voice/ear tests are recommended.

Note 2 - In the case of telephone circuits used for voice-frequency telegraphy the near-end signal-to-crosstalk ratio between the two directions of transmission should be measured at each of the telegraph channel carrier frequencies, i.e. at each odd multiple of 60 Hz from 420 Hz to 3180 Hz inclusive. However, difficulty can arise in practice because of the effect mentioned in A.1.b) above.

References

[1] CCITT Recommendation *Transmission characteristics of an international exchange*, Vol. VI, Rec. Q.45.

[2] *Measurement of crosstalk,* Green Book, Vol. IV.2, Supplement No. 2.4, ITU, Geneva, 1973.

[3] CCITT Recommendation *12-channel terminal equipments,* Vol. III, Rec. G.232, § 9.2.

[4] CCITT Recommendation *Conventional telephone signal,* Vol. III, Rec. G.227.