INTERNATIONAL TELECOMMUNICATION UNION

ITU-T G.215

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

INTERNATIONAL ANALOGUE CARRIER SYSTEMS

GENERAL CHARACTERISTICS COMMON TO ALL ANALOGUE CARRIER-TRANSMISSION SYSTEMS

HYPOTHETICAL REFERENCE CIRCUIT OF 5000 KM FOR ANALOGUE SYSTEMS

ITU-T Recommendation G.215

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation G.215 was published in Fascicle III.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.

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Recommendation G.215

HYPOTHETICAL REFERENCE CIRCUIT OF 5000 km FOR ANALOGUE SYSTEMS

(Geneva, 1980)

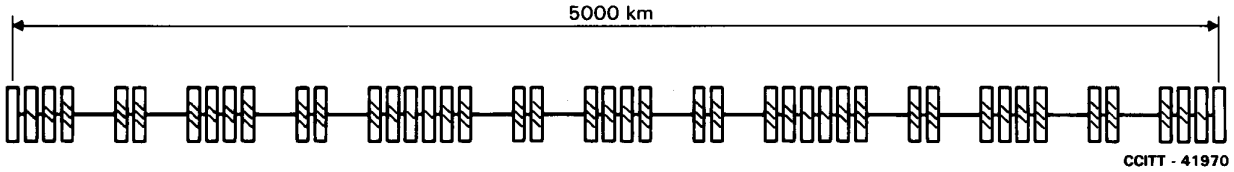
1 Composition of the hypothetical reference circuit

This hypothetical reference circuit is 5000 km long and applies to various types of carrier systems on coaxial cable and radio-relay systems, specially designed for very long international circuits. It has, for each direction of transmission, a total of:

- one pair of channel modulators which includes translation from the audio-frequency band to the basic group and vice versa;
- three pairs of group modulators, each pair including translation from the basic group to the basic supergroup and vice versa;
- six pairs of supergroup modulators, each pair including translation from the basic supergroup to a higher order modem and vice versa;
- twelve pairs of higher order modulators, each pair providing the necessary modulation stages to and from the line frequency.

Figure 1/G.215 shows the principle of the hypothetical reference circuit.

This hypothetical reference circuit consists of 12 homogeneous sections of equal length (see Recommendation G.212). Two homogeneous sections may be connected in tandem without translating equipment at the junction if the transmission system has suitable line regulating capability and does not introduce undesirable noise and crosstalk into any telephone channel.



Note - Each homogenous section has a length of approximately 420 km.

FIGURE 1/G.215

Diagram of a hypothetical reference circuit of 5000 km

2 Design objectives for circuit noise[1)]

The same noise values as for the 2500 km HRC apply (Recommendation G.222, § 1).

Note 1 - This design objective is in line with Recommendation G.123, "Circuit noise in national networks", which in § 2.1.1 recommends that the line noise in channels used to provide very long-distance circuits (over 2500 km) should not exceed 2 pW0p/km.

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1) Although the noise objective for the 5000 km HRC is in principle agreed, some countries will not be soon in the position to install equipment of the desired performance, and will continue to use existing systems on the very long national and international circuits, according to established planning and design practices.

Note 2 - Designers are expected to fit their noise distribution curves fall below all §§ 1.1 and 1.2 of Recommendation G.222.

Note 3 - In applying these design objectives, §§ 2.4 through 2.7 of Recommendation G.222 should be taken into account.

The subdivision of the total noise between the various sources of noise is left entirely to the designer of the system, within the limits of 2500 pWOp for the terminal equipment and 7500 pWOp for the line. This allocation is intended to permit the use of modulating equipment meeting the maximum values recommended in Table 1/G.222 of Recommendation G.222 as indicated in Table 1/G.215.

TABLE 1/G.215

Equipment	Maximum noise contributed by the send and receive side together	Number of modulator pairs	Total noise
Channel modulators	200 pW0p	1	200pW0p
Group modulators	80 pW0p	3	240 pW0p
Supergroup modulators	60 pW0p	6	360 pW0p
Higher order modulators	120 pW0p	12	1440 pW0p
Through connecting equipment	–	–	260 pW0p
		Total:	2500 pW0p

Note - This Table assumes two stages of modulation in the higher modulator.