INTERNATIONAL TELECOMMUNICATION UNION

ITU-T G.441

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

INTERNATIONAL ANALOGUE CARRIER SYSTEMS

GENERAL CHARACTERISTICS OF INTERNATIONAL CARRIER TELEPHONE SYSTEMS ON RADIO - RELAY OR SATELLITE LINKS AND INTERCONNECTION WITH METALLIC LINES

PERMISSIBLE CIRCUIT NOISE ON FREQUENCY - DIVISION MULTIPLEX RADIO - RELAY SYSTEMS

ITU-T Recommendation G.441

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation G.441 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.441

PERMISSIBLE CIRCUIT NOISE ON FREQUENCY-DIVISION MULTIPLEX RADIO-RELAY SYSTEMS

1 Design objectives for noise on hypothetical reference circuits

In CCIR Recommendation 393[1)] [1] it is recommended:

"**1** that the noise power at a point of zero relative level in any telephone channel on a 2500-km hypothetical reference circuit for frequency-division multiplex radio-relay systems should not exceed the values given below, which have been chosen to take account of fading:

1.1 7500 pW0p, psophometrically weighted,[2)] one-minute mean power,[3)] for more than 20% of any month;

1.2 47 500 pW0p, psophometrically weighted,[2)] one-minute mean power,[3)] for more than 0.1 % of any month;

1.3 1 000 000 pW0, unweighted (with an integrating time of 5 ms), for more than 0.01% of any month."

Adding these values to the 2500 pW0p of psophometric power allowed for multiplexing equipment (Recommendation G.222, § 3) gives the recommended objectives shown in Recommendation G.222, § 1.1 for the telephone transmission and signalling aspect. CCIR Recommendation 393 [1] gives the conditions for applying these objectives to radio-relay systems; these conditions are in general the same as those given in Recommendation G.222, § 2 and in Recommendation G.223.

The CCIR has not yet recommended any noise objectives in connection with voice-frequency telegraph transmission. CCITT Recommendation G.442 covers this aspect.

2 Noise on real circuits

(See CCIR Recommendation G.395 [3].)

References

[1] CCIR Recommendation *Allowable noise power in the hypothetical reference circuit for radio-relay systems for telephony using frequency division multiplex*, Vol. IX, Rec. 393, Dubrovnik, 1986.

[2] CCIR Recommendation *Allowable noise power in the hypothetical reference circuit of transhorizon radio-relay systems for telephony using frequency division multiplex*, Vol. IX, Rec. 397, Dubrovnik, 1986.

[3] CCIR Recommendation *Noise in the radio portion of circuits to be established over real radio-relay links for FDM telephony*, Vol. IX, Rec. 395, Dubrovnik, 1986.

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1) This Recommendation relates only to "line-of-sight" radio-relay systems. Trans-horizon radio-relay systems are dealt with in Recommendation 397 [2].

2) The level of uniform-spectrum noise power in a 3.1-kHz band must be reduced by 2.5 dB to obtain the psophometrically weighted noise power.

3) For carrier transmission systems with one minute mean noise power distributions which are not well defined, the inclusion of another one minute mean noise clause would be desirable to ensure equivalent performance for all systems. This clause would specify that:

The mean psophometric noise power over one minute shall not exceed 20 000 pW0p for more than 3% of any month.

This clause has not been specifically included because CCIR has determined that for radio-relay links the application of clauses 1.2.1 and 1.2.2 are sufficient to ensure, with high probability, that the additional clause will also be satisfied.