### Rec. ITU-R SF.558-2

## **RECOMMENDATION ITU-R SF.558-2\***

# MAXIMUM ALLOWABLE VALUES OF INTERFERENCE FROM TERRESTRIAL RADIO LINKS TO SYSTEMS IN THE FIXED-SATELLITE SERVICE EMPLOYING 8-BIT PCM ENCODED TELEPHONY AND SHARING THE SAME FREQUENCY BANDS

(1978-1982-1986)

The ITU Radiocommunication Assembly,

### considering

*a)* that systems in the fixed-satellite service and line-of-sight radio-relay systems share frequency bands in the range above 1 GHz;

*b)* that interference from radio-relay systems would degrade the bit error ratio performance of a satellite system relative to its performance in the absence of frequency sharing;

c) that it is desirable that the bit error ratio in systems in the fixed-satellite service due to interference from transmitters of radio-relay systems should, during most of the time, be a controlled fraction of the total bit error ratio in those systems, as set out in Recommendation ITU-R S.522;

*d)* that it is necessary to determine the maximum allowable interfering RF power in a satellite system to establish the maximum transmitter power and equivalent isotropically radiated power of line-of-sight radio-relay stations, and to determine whether specific locations for satellite-earth stations and terrestrial radio-relay stations would be satisfactory;

e) that interference from radio-relay systems may vary with time due to the effect of varying propagation conditions;

*f*) that systems in the fixed-satellite service may receive interference both through the satellite receiver and through the earth-station receiver but will receive the higher levels of interference associated with small percentages of time primarily through the earth-station receivers;

g) that where propagation variations are small it is preferable to define the permissible interference limit as a fraction of the pre-demodulator noise power, as this allows multiple interference entries to be superimposed on each other on the basis of RF power addition,

#### recommends

1. that systems in the fixed-satellite service and radio-relay systems sharing the same frequency bands be designed in such a manner that the interference to an 8-bit PCM telephony system in the fixed-satellite service caused by the aggregate of the transmitters of radio-relay stations operating in accordance with Recommendation ITU-R SF.406, should conform to the following provisional<sup>\*\*</sup> limit at the output of the hypothetical reference digital path as defined in Recommendation ITU-R S.521;

1.1 the interfering power<sup>\*\*\*</sup>, averaged over any ten minutes, should not exceed, for more than 20% of any month, 10% of the total noise power at the input to the demodulator that would give rise to an error ratio of 1 in  $10^6$ ;

<sup>\*</sup> Radiocommunication Study Group 4 and 9 made editorial amendments to this Recommendation in 2000 in accordance with Resolution ITU-R 44.

<sup>\*\*</sup> These criteria may need to be amended in the light of further studies.

<sup>\*\*\*</sup> It is assumed in this Recommendation that the long-term interference from the terrestrial radio links is of a continuous nature. The situation relating to cases where interference is not of a continuous nature has not been considered.

1.2 the interfering RF power should not cause an increase of more than 0.03% of any month during which the bit error ratio exceeds  $1 \times 10^{-4}$  averaged over 1 min;

1.3 the interfering RF power should not cause an increase of more than 0.005% of any month during which the bit error ratio exceeds  $1 \times 10^{-3}$  averaged over 1 s.

Note 1 - To calculate the limit referred to in § 1.1, it must be assumed that the total noise power at the input to the demodulator is of a thermal nature.

*Note 2* – The interference criterion of recommends 1.1 is related to the maximum permissible levels of interference in a geostationary-satellite network in the fixed-satellite service using 8-bit PCM encoded telephony, caused by other networks of the fixed-satellite service, as defined in Recommendation ITU-R S.523. Note 7 of Recommendation ITU-R S.523 indicates that the limits of interference power for more than 20% of any month should normally be evaluated with the assumption that the total noise power level present is that which produces the specified bit error ratio under unfaded conditions of the received signal.