

RECOMMENDATION ITU-R F.1494

**INTERFERENCE CRITERIA TO PROTECT THE FIXED SERVICE FROM TIME VARYING
AGGREGATE INTERFERENCE FROM OTHER SERVICES SHARING THE
10.7-12.75 GHz BAND ON A CO-PRIMARY BASIS**

(Question ITU-R 127/9)

(2000)

The ITU Radiocommunication Assembly,

considering

- a) that it is desirable to determine the protection criteria of fixed service (FS) systems operating in the 11/12 GHz (10.7-12.75 GHz) band with respect to aggregate interference from systems operating co-primary, especially short-term interference;
- b) that in interference situations involving non-geostationary satellites (non-GSO) space stations, FS systems are potentially exposed to high levels of interference for short periods of time which could affect the performance or availability of these systems;
- c) that the FS link design in the 11/12 GHz band is controlled by multipath fading, which can be modelled using Recommendation ITU-R P.530;
- d) that in the 11/12 GHz band, some administrations employ automatic transmit power control (ATPC) on some FS links and that the use of ATPC will increase the susceptibility of FS systems especially with regard to short-term interference;
- e) that some FS systems employing small net fade margins may not be fully protected from interference from non-GSO satellite systems without unduly constraining those services;
- f) that typical FS links using ATPC will require tighter protection criteria than those needed for FS links with large fade margin that do not use ATPC;
- g) that it is desirable to derive the aggregate FS protection criteria based on the calculation of the allowable degradation of error performance objective (EPO) due to interference, considering typical FS links using ATPC features;
- h) that the determination of the maximum degradation of EPO allowable to interference from other services sharing the same frequency band on a co-primary basis is given in Recommendation ITU-R F.1094;
- j) that Recommendations ITU-R F.1092 and ITU-R F.1189 give the EPO allowable for constant bit rate digital path at or above the primary rate carried by digital radio-relay systems which may form part of, respectively, the international and national portion of a 27 500 km hypothetical reference path (HRP);
- k) that the allowable degradation in performance of FS systems due to interference from other services sharing the same frequency bands on a primary basis, expressed as a permissible fraction of the total EPO is defined in Recommendations ITU-R F.1241 and ITU-R F.1398 for the FS systems which may form part of, respectively, the international and national portion of a 27 500 km HRP,

recognizing

- a) that the application of the criteria in this Recommendation may be subject to further consideration within sharing studies with other services;
- b) that any further development of this Recommendation that may be necessary is unlikely to require further study of the appropriateness of the non-GSO satellite fixed satellite service (FSS) power flux-density (pfd) limits in this band,

recommends

1 that the following interference criteria should be used to protect the FS from time varying aggregate interference from other services in the 10.7-12.75 GHz band on a co-primary basis:

1.1 for the short term, the I/N at the input of the FS receiver should not exceed +20 dB;

1.2 for the long term, the FDP (fractional degradation of performance as described in Recommendation ITU-R F.1108) or D_{ltEPO} (long-term degradation on error performance objectives), should not exceed 10%:

$$D_{ltEPO} \approx \left(0,89 \times \int_{10^{-6}}^1 \frac{I(t)}{N} dt \right) \times 100 \quad \%$$

2 that the information contained in Annex 1 should be used as guidance for the use of this Recommendation.

ANNEX 1

Derivation of FS aggregate protection criteria in the 11/12 GHz band

1 Introduction

This Annex aims to give numerical examples concerning the assessment of interference criteria in the 11/12 GHz band.

The interference is considered to be aggregate from all co-primary services.

These examples (see Recommendation ITU-R P.530) are based on the following typical FS links (the fade margins are given for a 1×10^{-3} BER):

- link with 37 dB fade margin, part of the international portion of the hypothetical reference path (HRP) ($q_t = 4.2$);
- link with 47 dB fade margin, part of the international portion of the HRP ($q_t = 2.2$);
- link with 37 dB fade margin, part of the national portion of the HRP ($q_t = 2.2$).

The methodology proposes to calculate the performance degradation due to a given short-term criterion (i.e. $I/N = 20$ dB for $1 \times 10^{-4}\%$ of the time) in order to verify its adequacy and then to give the rest of the interference allowance to the long term on the basis of an integration of the interference distribution with the fading.

2 Short-term criterion

The degradation due to a given interference short-term criterion (i.e. $I/N = 20$ dB for not more than $1 \times 10^{-4}\%$ of the time) is the probability of the simultaneous effect of this criterion and a fading higher than the net fade margin (F), defined as follows:

$$F = FM - ATPC_{range} - I/N \quad \text{dB}$$

where, for example:

FM : fade margin

$ATPC_{range} = 13$ dB

$I/N = 20$ dB.