

RECOMMENDATION ITU-R SM.1751

**An additional methodology for the evaluation of the effect of interference
between radiocommunication networks operating
in a shared frequency band**

(2006)

Scope

This Recommendation offers an additional methodology for the evaluation of the effect of interference between radiocommunication networks operating in a shared frequency band.

The ITU Radiocommunication Assembly,

considering

- a) that the development of radiocommunication facilities could cause an increase in the mutual interference between radiocommunication networks working in the same frequency band;
- b) that setting maximum acceptable emission parameters determining the value of interference caused to other radiocommunication networks is one of the most important ITU-R tasks;
- c) that mutually acceptable emission levels are commonly a result of compromise;
- d) that the ITU-R goal is to provide radiocommunication services with access to the spectrum on an equitable basis;
- e) that to evaluate the effect of interference, various methodologies have been used which are based on assessing the signal quality at the radiocommunication channel output, channel unavailability, increase in the receiving link noise, etc., which makes such evaluations incomparable,

recommends

- 1 that when evaluating and comparing the effect of interference caused by other networks or radiocommunication systems operating in a shared frequency band, the energy margin loss (EML) methodology may be used by administrations as an additional tool for guidance in assessing and comparing the effects of interference. The methodology is equal to the relative value of the energy budget increase which would be necessary to preserve in the interfered link the performance and availability objectives which existed before the appearance of the interference (see Annex 1);
- 2 that the EML methodology should in no way replace or exclude the use of other methodologies for radio-system sharing that are contained in the Radio Regulations and in the existing ITU-R Recommendations;
- 3 that the EML methodology should not be used by the Bureau in any technical and/or regulatory examination of any notice submitted to it;
- 4 that the EML methodology should not be used to evaluate the effect of interference on passive services;
- 5 that the following Notes should be considered as part of this Recommendation.

NOTE 1 – That in the event when the values of the wanted signal and interference powers are time-variant, it is appropriate to determine the value of EML which would preserve both long-term and short-term performance and availability objectives, and the maximum value of EML should be used to evaluate the effect of interference.

NOTE 2 – That in the event when the values of the wanted signal and/or interference powers are different for various cases of the location of mutually affecting networks (e.g. when these values depend on the location of stations of the networks on the Earth's surface or in the space), it is necessary to determine and take into account not only the maximum and average EML values but also the EML value providing for the necessary performance objective for the agreed percentage of situations.

NOTE 3 – That when considering the effect of additional interference on a radiocommunication link or system where a certain set of internal or external interference already exists, the noise power which existed before the appearance of the interference under consideration should mean the sum of the thermal noise and existing interference, i.e. the EML value caused by the effect of the additional interference should be determined.

NOTE 4 – That the EML value should be calculated in each specific frequency-sharing case taking into account the wanted and interfering signal properties (statistical and others) and corresponding performance objectives.

NOTE 5 – That the EML value should be calculated for the approved reference mutually interfering networks of the agreed structure and with the parameters (or a set of parameters) typical for these networks.

NOTE 6 – That the EML constitutes a calculated value directly indicating the effect of interference for comparing these effects in different cases, but it does not mean the need to increase the interfered-with link energy budget in all cases.

Annex 1

General provisions of methodology for calculation of EML for the evaluation of effect of the interference between radiocommunication networks operating in the shared frequency band

To calculate EML, for the interfered-with link, performance or availability objectives PO_n are required to be known (if established by appropriate regulations) or set (if these objectives are under consideration) for corresponding probability (per cent of time) value F_n when these objective values may be exceeded.

Taking into account signal transmission (modulation, encoding, etc.) and demodulation methods, existing formulas or experimental data make it possible to determine values r_n of the signal-to-noise ratio $r = C/N_\Sigma$ providing for the prescribed PO_n values.

Here N_Σ represents the sum of thermal noise and interferences affecting the victim link before the occurrence of the interference under study $N_\Sigma = N + \Sigma I_0$ converted to the receiver of the last link's terminal.