

ITU-R

Radiocommunication Sector of ITU

Recommendation ITU-R F.1565-1
(11/2019)

Performance degradation due to interference from other services sharing the same frequency bands on a co-primary basis, or from other sources of interference, with real digital fixed wireless systems used in the international and national portions of a 27 500 km hypothetical reference path at or above the primary rate

F Series
Fixed service



International
Telecommunication
Union

Documents

Document Sharing Hub

Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

Policy on Intellectual Property Right (IPR)

ITU-R policy on IPR is described in the Common Patent Policy for ITU-T/ITU-R/ISO/IEC referenced in Resolution ITU-R 1. Forms to be used for the submission of patent statements and licensing declarations by patent holders are available from <http://www.itu.int/ITU-R/go/patents/en> where the Guidelines for Implementation of the Common Patent Policy for ITU-T/ITU-R/ISO/IEC and the ITU-R patent information database can also be found.

Series of ITU-R Recommendations

(Also available online at <http://www.itu.int/publ/R-REC/en>)

Series	Title
BO	Satellite delivery
BR	Recording for production, archival and play-out; film for television
BS	Broadcasting service (sound)
BT	Broadcasting service (television)
F	Fixed service
M	Mobile, radiodetermination, amateur and related satellite services
P	Radiowave propagation
RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

Electronic Publication
Geneva, 2019

© ITU 2019

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without written permission of ITU.

RECOMMENDATION ITU-R F.1565-1

Performance degradation due to interference from other services sharing the same frequency bands on a co-primary basis, or from other sources of interference, with real digital fixed wireless systems used in the international and national portions of a 27 500 km hypothetical reference path at or above the primary rate

(2002-2019)

Scope

This Recommendation* specifies performance degradation due to interference from other services sharing the same frequency bands on a co-primary basis, or from all other sources of interference, with real digital fixed wireless systems used in the international and national portions of a 27 500 km hypothetical reference path at or above the primary rate. These performance degradations are defined, for each direction of real fixed wireless links, for synchronous digital hierarchy (SDH) systems designed according to Recommendation ITU-T G.828, or for other systems designed according to Recommendation ITU-T G.826.

Keywords

Fixed wireless system, hypothetical reference path, interference, performance degradation, real fixed wireless systems link.

Abbreviations

BBER	Background bloc error ration
EPO	Error performance objective
ESR	Errored second ration
FWS	Fixed wireless systems
HRC	Hypothetical reference connection
HRP	Hypothetical reference path
SESR	Severely errored second ration
SDH	Synchronous digital hierarchy

Related ITU Recommendations and Reports

Recommendation ITU-R F.1094 – Maximum allowable error performance and availability degradations to digital fixed wireless systems arising from radio interference from emissions and radiations from other sources

Recommendation ITU-R F.1668 – Error performance objectives for real digital fixed wireless links used in 27 500 km hypothetical reference paths and connections

Recommendation ITU-T G.826 – End-to-end error performance parameters and objectives for international, constant bit-rate digital paths and connections

Recommendation ITU-T G.828 – Error performance parameters and objectives for international, constant bit-rate synchronous digital paths

* The structure and format of this Recommendation may need to be revised in the future to include the detailed technical information from the *recommends* part to a separate Annex.

The ITU-R Radiocommunication Assembly,

considering

- a) that there is a need to establish the allowable aggregate performance degradation due to interference from other co-primary services sharing the same bands with real fixed wireless systems (FWS) links in the international and national portions of a hypothetical reference path (HRP) defined in Recommendations ITU-T G.826 and ITU-T G.828;
- b) that there is a need to establish the allowable aggregate performance degradation due to interference from any source and applications other than co-primary in the considered frequency band of real FWS links in the international and national portions of a HRP;
- c) that Recommendation ITU-R F.1668, based on Recommendations ITU-T G.826 and G.828, specifies error performance objectives for real digital fixed wireless links which may form part of the international and national portion of a 27 500 km HRP and hypothetical reference connections (HRC);
- d) that Recommendation ITU-R F.1094 provides the maximum allowable error performance and availability degradations to digital fixed wireless systems arising from radio interference from co-primary services and emissions from other sources,

recommends

1 that, in each direction of any real digital FWS link of length L_{link} , in the international portion of an HRP at or above the primary rate, the allowable degradation in performance resulting from the aggregate of the emissions from systems of other co-primary services should not exceed the limits given by means of equation (1) in any month, using the values in Tables 1 and 2 for synchronous digital hierarchy (SDH) systems designed according to Recommendation ITU-T G.828 and values in Tables 3 and 4 for other systems designed according to Recommendation ITU-T G.826 (see Notes 1, 2, 3, 4, 10 and 11); the Tables are derived from the overall EPO presented in Recommendation ITU-R F.1668 and considering the appropriate maximum allowable value of degradation for frequency sharing on a primary basis (interservice sharing) $Y\% = 10\%$ established by Recommendation ITU-R F.1094.

$$\text{Degradation in EPO due to interference} = B_j \times (L_{link}/L_R) + C_j \quad (1)$$

where:

$j = 1$	for $L_{min} \leq L_{link} \leq 1\,000$ km	(intermediate country)
$j = 2$	for $1\,000 \text{ km} < L_{link}$	(intermediate country)
$j = 3$	for $L_{min} \leq L_{link} \leq 500$ km	(terminating country)
$j = 4$	for $500 \text{ km} < L_{link}$	(terminating country)

Error performance objective (EPO) is substituted by the parameters errored second ratio (ESR), severely errored second ratio (SESR) and background block error ratio (BBER) as appropriate.

L_{min} : lower limit of L_{link} , used to scale the objectives to the real case, provisionally equal to 50 km

L_R : reference length, $L_R = 2\,500$ km

B_R : block allowance ratio, $B_R = (0 < B_R \leq 1)$;