International Telecommunication Union

ITU-R

Radiocommunication Sector of ITU

Recommendation ITU-R P.581-3

(08/2022)

The concept of "worst month"

P Series

Radiowave propagation

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.*

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RECOMMENDATION ITU-R P.581-3

The concept of "worst month"

(1982-1986-1990-2022)

The ITU Radiocommunication Assembly,

considering

a) that performance criteria for radiocommunication systems often refer to "any month" as the period of reference;

b) that for the design of such systems it is necessary to have statistics of propagation effects that are relevant to the period of reference of the performance criteria;

c) that consequently there is a need for an unambiguous definition for the period of reference;

d) that the distribution of a propagation variable within a period of time is a random process;

e) that the fraction of time a propagation random variable exceeds a specified threshold (i.e. the time fraction of excess) is a random variable and is known as the exceedance probability or the complementary cumulative distribution function (CCDF);

f) that the fraction of time a propagation random variable does not exceed (i.e. is less than) a specified threshold is a random variable and is known as the cumulative probability or the cumulative distribution function (CDF),

recommends

1 that the month of a calendar year corresponding to the highest exceedance probability or the lowest cumulative probability for a specified threshold is known as the "worst-month", which may be different for different thresholds;

2 that the exceedance probability for the worst month of a year is referred to as "the annual worst-month exceedance probability", while the cumulative probability for the worst month of a year is referred to as "the annual worst-month cumulative probability";

3 that the statistic relevant for the performance criteria referring to "any month" is the long-term average annual worst-month exceedance probability or cumulative probability.

NOTE – Recommendation ITU-R P.841 presents a model for the conversion of the average annual time fraction of excess to the average annual worst-month time fraction of excess. Global values of the parameters of this model are given, as well as more detailed values for several regions of the world.