



Recommendation ITU-R RS.2017-0
(08/2012)

**Performance and interference criteria
for satellite passive remote sensing**

RS Series
Remote sensing systems



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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.

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Series of ITU-R Recommendations

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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 RS.2017-0*

Performance and interference criteria for satellite passive remote sensing

(2012)

Scope

This Recommendation provides information on the performance and interference criteria for satellite passive remote sensing of the Earth and its atmosphere for microwave passive sensors.

The ITU Radiocommunication Assembly,

considering

- a) that certain frequency bands, including some absorption bands of atmospheric gases (e.g. O₂ (oxygen) and H₂O (water vapour)), have been allocated for spaceborne passive microwave remote sensing;
- b) that some of these bands are also allocated to other radiocommunication services;
- c) that performance criteria are a necessary prerequisite to the establishment of interference and sharing criteria;
- d) that surface brightness temperature, the atmospheric temperature at points along a path and absorption coefficients can be determined from measurements of the sensor antenna temperature, T_A ;
- e) that the surface brightness temperature and the absorption coefficients, in turn, depend upon the physical properties of the surface or atmosphere that are to be sensed;
- f) that studies have established measurement sensitivity requirements;
- g) that interference criteria should be compatible with performance objectives;
- h) that interference criteria are a necessary prerequisite to the establishment of sharing criteria;
- j) that interference criteria can be stated in terms of interference power within a reference bandwidth;
- k) that passive microwave remote sensing is performed in absorption bands to obtain important three-dimensional atmospheric data that are used in particular to initialize numerical weather prediction (NWP) models;
- l) that studies have established that measurements in absorption bands are extremely vulnerable to interference because, in general, there is no possibility to detect and to reject data that are contaminated by interference, and because propagation of undetected contaminated data into NWP models may have a destructive impact on the reliability/quality of weather forecasting;
- m) that three-dimensional measurements of atmospheric temperature or gas concentration are performed in the absorption bands including those in the range 52.6-59.3 GHz, 115.25-122.25 GHz, 174.8-191.8 GHz, as well as the auxiliary window channels at 23.6-24 GHz, 31.3-31.8 GHz, 50.2-50.4 GHz and 86-92 GHz;
- n) that performance requirements for passive sensors can be stated in terms of measurement sensitivity, ΔT_e , and availability, measured at the satellite, assuming that degradation from other elements in the system will be small;

* Radiocommunication Study Group 7 made editorial amendments to this Recommendation in the year 2017 in accordance with Resolution ITU-R 1.