



Recommendation ITU-R RA.1237-2
(01/2010)

**Protection of the radio astronomy service
from unwanted emissions resulting
from applications of wideband
digital modulation**

RA Series
Radio astronomy



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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.

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 Annex 1 of 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 RA.1237-2

**Protection of the radio astronomy service from unwanted emissions
resulting from applications of wideband digital modulation**

(Question ITU-R 145/7)

(1997-2003-2010)

Scope

This Recommendation is concerned with the protection of the radio astronomy service from unwanted emissions resulting from applications of wideband digital modulation. Technical information is provided in Annex 1, especially on interference levels to radio astronomy from satellite systems. The Recommendation recommends that for systems employing wideband digital modulation techniques all practicable steps be taken to reduce unwanted emissions.

The ITU Radiocommunication Assembly,

considering

- a) that the radio astronomy service and other passive services continue to make important and substantial contributions to science;
- b) that progress in research in radio astronomy depends critically upon the ability to make observations at the extreme limits of sensitivity;
- c) that all services benefit from measures which reduce or remove unwanted emissions in the spectrum;
- d) that Resolution 739 (Rev.WRC-07) defines a consultation procedure, to be followed when the unwanted emissions of some space service downlinks that operate in specific bands exceed the detrimental interference level in certain radio astronomy bands;
- e) that, transmitters, particularly those in space stations, are increasingly employing direct sequence spread spectrum (DSSS) and other wideband digital modulation techniques which may produce unwanted emission sidebands extending to frequencies far removed from the carrier frequency as explained in Annex 1;
- f) that technical means to filter unwanted emission sidebands have been developed and successfully used;
- g) that spectrally efficient digital modulation techniques are known, which produce intrinsically low levels of unwanted emissions, and such techniques have been demonstrated;
- h) that, from the point of view of the victim service in an allocated band outside the band allocated to the service producing the unwanted emissions, there is no practical distinction between spurious domain and out-of-band domain interference,

noting

- a) that examples of satellite systems utilizing DSSS modulation that may cause interference to radio astronomy station are given in Report ITU-R SM.2091,

recommends

- 1** that, for systems employing wideband digital modulation techniques, all practicable steps should be taken to reduce the level of sidebands which fall outside the band allocated to the service, taking into account the guidance provided in Annex 1.