

ITU-R

Radiocommunication Sector of ITU

Recommendation ITU-R M.1902-2
(01/2022)

**Characteristics and protection criteria
for receiving earth stations in the
radionavigation-satellite service
(space-to-Earth) operating in the band
1 215-1 300 MHz**

M Series
**Mobile, radiodetermination, amateur
and related satellite services**



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Foreword

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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

(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 M.1902-2

**Characteristics and protection criteria for receiving earth stations
in the radionavigation-satellite service (space-to-Earth)
operating in the band 1 215-1 300 MHz**

(Questions ITU-R 217-2/4 and ITU-R 288/4)

(2012-2019-2022)

Scope

Characteristics and protection criteria for radionavigation-satellite service (RNSS) receiving earth stations operating in the band 1 215-1 300 MHz are presented in this Recommendation. This information is intended for performing analyses of radio-frequency interference impact on RNSS (space-to-Earth) receivers operating in the band 1 215-1 300 MHz from radio sources other than in the RNSS. It is worth mentioning that it is expected that this Recommendation should be used for civilian purposes.

Keywords

RNSS, protection criteria, radiofrequency interference impact

Abbreviations/Glossary

AWGN	Additive white Gaussian noise
PDC	Pulse duty cycle
PNT	Position, navigation and timing
PRF	Pulse repetition frequency
RHCP	Right-hand circular polarization
SQPN	Staggered quadrature pseudo-random noise
SQPSK	Staggered quadrature phase-shift keying
SSC	Spectral separation coefficient

Related ITU Recommendations, Reports

- Recommendation ITU-R M.1318-1 Evaluation model for continuous interference from radio sources other than in the radionavigation-satellite service to the radionavigation-satellite service systems and networks operating in the 1 164-1 215 MHz, 1 215-1 300 MHz, 1 559-1 610 MHz and 5 010-5 030 MHz bands
- Recommendation ITU-R M.1787-4 Description of systems and networks in the radionavigation-satellite service (space-to-Earth and space-to-space) and technical characteristics of transmitting space stations operating in the bands 1 164-1 215 MHz, 1 215-1 300 MHz and 1 559-1 610 MHz
- Recommendation ITU-R M.1901-3 Guidance on ITU-R Recommendations related to systems and networks in the radionavigation-satellite service operating in the frequency bands 1 164-1 215 MHz, 1 215-1 300 MHz, 1 559-1 610 MHz, 5 000-5 010 MHz and 5 010-5 030 MHz

- Recommendation ITU-R M.1903-1 Characteristics and protection criteria for receiving earth stations in the radionavigation-satellite service (space-to-Earth) and receivers in the aeronautical radionavigation service operating in the band 1 559-1 610 MHz
- Recommendation ITU-R M.1904-1 Characteristics, performance requirements and protection criteria for receiving stations of the radionavigation-satellite service (space-to-space) operating in the frequency bands 1 164-1 215 MHz, 1 215-1 300 MHz and 1 559-1 610 MHz
- Recommendation ITU-R M.1905-1 Characteristics and protection criteria for receiving earth stations in the radionavigation-satellite service (space-to-Earth) operating in the band 1 164-1 215 MHz
- Recommendation ITU-R M.1906-1 Characteristics and protection criteria of receiving space stations and characteristics of transmitting earth stations in the radionavigation-satellite service (Earth-to-space) operating in the band 5 000-5 010 MHz
- Recommendation ITU-R M.2030-0 Evaluation method for pulsed interference from relevant radio sources other than in the radionavigation-satellite service to the radionavigation-satellite service systems and networks operating in the 1 164-1 215 MHz, 1 215-1 300 MHz and 1 559-1 610 MHz frequency bands
- Recommendation ITU-R M.2031-1 Characteristics and protection criteria of receiving earth stations and characteristics of transmitting space stations of the radionavigation-satellite service (space-to-Earth) operating in the band 5 010-5 030 MHz
- Report ITU-R M.2220-1 Calculation method to determine aggregate interference parameters of pulsed RF systems operating in and near the frequency bands 1 164-1 215 MHz and 1 215-1 300 MHz that may impact radionavigation-satellite service airborne and ground-based receivers operating in those bands
- Report ITU-R M.2458-0 Radionavigation-satellite service applications in the 1 164-1 215 MHz, 1 215-1 300 MHz, and 1 559-1 610 MHz frequency bands
- Report ITU-R M.2496 Use of RNSS receiver characteristics in assessment of interference from pulsed sources in the 1 164-1 215 MHz, 1 215-1 300 MHz and 1 559-1 610 MHz frequency bands

The ITU Radiocommunication Assembly,

considering

- a) that systems and networks in the radionavigation-satellite service (RNSS) provide worldwide accurate information for many positioning, navigation and timing applications, including safety aspects for some frequency bands and under certain circumstances and applications;
- b) that any properly equipped earth station may receive navigation information from systems and networks in the RNSS on a worldwide basis;

- c) that Recommendation ITU-R M.1787 provides technical descriptions of systems and networks in the RNSS and technical characteristics of transmitting space stations operating in the bands 1 164-1 215 MHz, 1 215-1 300 MHz and 1 559-1 610 MHz;
- d) that Recommendation ITU-R M.1904 provides technical characteristics and protection criteria of receiving space stations operating in the RNSS (space-to-space) in the bands 1 164-1 215 MHz, 1 215-1 300 MHz and 1 559-1 610 MHz;
- e) that Recommendation ITU-R M.1463 contains system characteristics for radiodetermination systems in the 1 215-1 400 MHz band;
- f) that Recommendation ITU-R M.1901 provides guidance on this and other ITU-R Recommendations related to systems and networks in the RNSS operating in the frequency bands 1 164-1 215 MHz, 1 215-1 300 MHz, 1 559-1 610 MHz, 5 000-5 010 MHz and 5 010-5 030 MHz;
- g) that Report ITU-R M.2220 provides a calculation method to determine aggregate interference parameters of pulsed RF systems operating in and near the frequency bands 1 164-1 215 MHz and 1 215-1 300 MHz that may impact radionavigation-satellite service airborne and ground-based receivers operating in those bands;
- h) that Report ITU-R M.2458 describes RNSS applications in the 1 164-1 215 MHz, 1 215-1 300 MHz and 1 559-1 610 MHz frequency bands;
- i) that Report ITU-R M.2496 provides information on RNSS receiver front-end characteristics, including the appropriate usage of these parameters in interference evaluations, and also provides the associated consideration of pulsed interference models for RNSS receivers,

recognizing

- a) that the band 1 215-1 300 MHz is allocated on a primary basis to the Earth exploration-satellite service (EESS) (active), radiolocation service, RNSS (space-to-Earth and space-to-space) and space research service (active) in all three Regions;
- b) that in a number of countries the band 1 215-1 300 MHz also contains primary allocations to the fixed and mobile services, and/or to the radionavigation service (limited in some cases to aeronautical radionavigation use in a portion of the band);
- c) that No. **5.329** of the Radio Regulations (RR) states: “Use of the radionavigation-satellite service in the band 1 215-1 300 MHz shall be subject to the condition that no harmful interference is caused to, and no protection is claimed from, the radionavigation service authorized under RR No. **5.331**. Furthermore, the use of the radionavigation-satellite service in the band 1 215-1 300 MHz shall be subject to the condition that no harmful interference is caused to the radiolocation service. RR No. **5.43** shall not apply in respect of the radiolocation service. Resolution **608 (WRC-03)** shall apply”;
- d) that RR No. **5.332** states that EESS (active) in the band 1 215-1 260 MHz shall not cause harmful interference to RNSS,

noting

that Recommendation ITU-R RS.1749 contains characteristics for various space-borne synthetic aperture radars in the band 1 215-1 300 MHz and Recommendation ITU-R RS.1347 recommends that sharing be considered feasible in the band 1 215-1 260 MHz between space-borne synthetic aperture radars and RNSS based on demonstrations including ground compatibility testing,