



Recommendation ITU-R RS.2042-1
(12/2018)

**Typical technical and operating
characteristics for spaceborne radar
sounder systems using the 40-50 MHz band**

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.

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 RS.2042-1

Typical technical and operating characteristics for spaceborne radar sounder systems using the 40-50 MHz band

(2014-2018)

Scope

This Recommendation provides the technical and operating characteristics of spaceborne radar sounders that would operate in the 45 MHz region. This information is to be used for compatibility studies.

Keywords

Earth exploration-satellite service (active), spaceborne active sensor, radar sounder, glacial bed surface, subsurface scattering layers, earth fossil aquifers in desertic environments, Shallow Radar Sounder (SHARAD)

Related ITU-R Recommendations and Reports

Draft new Report ITU-R RS.[VHF_SOUNDERS] – Preliminary results of sharing studies between a 45 MHz radar sounder and incumbent fixed, mobile, broadcasting and space research services operating in the 40-50 MHz frequency range

Report ITU-R M.2234 – The feasibility of sharing sub-bands between oceanographic radars operating in the radiolocation service and fixed and mobile services within the frequency band 3-50 MHz.

The ITU Radiocommunication Assembly,

considering

- a) that spaceborne radar sounders can provide radar maps of subsurface scattering layers to locate water/ice deposits using active spaceborne sensing;
- b) that the mission scientific objectives are 1) to understand the global thickness, inner structure, and the thermal stability of the Earth's ice sheets such as in Greenland and Antarctica as an observable parameter of earth climate evolution, and 2) to understand the occurrence, distribution and dynamics of the earth fossil aquifers in desertic environments such as northern Africa and the Arabian peninsula as key elements in understanding recent paleoclimatic changes;
- c) that measurement of reflectivity from subsurface scattering layers as deep as 10 m to 100 m is necessary;
- d) that the penetration depth from subsurface scattering layers at microwave wavelengths increases approximately inversely with the frequency;
- e) that worldwide, repetitive measurements of subsurface water deposits in desertic environments such as northern Africa and the Arabian peninsula and worldwide, repetitive measurements of Earth's ice sheets such as in Greenland and Antarctica require the use of spaceborne active sensors;
- f) that the 40-50 MHz frequency range is preferable to satisfy all requirements for spaceborne radar sounders;
- g) that the 40-50 MHz band is allocated to the fixed, mobile and broadcasting services on a primary basis;
- h) that the uses of the 40.98-41.015 MHz frequency band by the space research service are on a secondary basis;