

Recommendation ITU-R M.2159-0 (12/2023)

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

Technical and regulatory measures to provide compatibility between international mobile telecommunications and mobile-satellite services with respect to mobile-satellite services operations in the frequency band 1 518-1 525 MHz for administrations wishing to implement international mobile telecommunications in the frequency band 1 492-1 518 MHz

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 <https://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.

Electronic Publication
Geneva, 2023

© ITU 2023

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without written permission of ITU.

RECOMMENDATION ITU-R M.2159-0*

Technical and regulatory measures to provide compatibility between international mobile telecommunications and mobile-satellite services with respect to mobile-satellite services operations in the frequency band 1 518-1 525 MHz for administrations wishing to implement international mobile telecommunications in the frequency band 1 492-1 518 MHz¹

(2023)

Scope

This Recommendation provides technical and regulatory measures for adjacent band compatibility between satellite systems in the mobile-satellite service (MSS) operating in the band 1 518-1 525 MHz and terrestrial international mobile telecommunications (IMT) systems operating in the band 1 492-1 518 MHz as invited by Resolution **223 (Rev.WRC-19)**. See also footnote 1.

Keywords

IMT, MES, adjacent band compatibility

Abbreviations/Glossary

BS	Base station
e.i.r.p.	Equivalent isotropically radiated power
FDD	Frequency division duplex
IMT	International mobile telecommunications
MES	Mobile earth station
MSS	Mobile-satellite service
pdf	Power flux-density
SDL	Supplemental downlink
TDD	Time division duplex
UE	User equipment

Related ITU-R Recommendations/Reports

Recommendation ITU-R M.1036 – Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications in the bands identified for IMT in the Radio Regulations

* This Recommendation should be brought to the attention of the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO), and the International Mobile Satellite Organization (IMSO).

¹ While the Recommendation is based on studies requested by Resolution **223 (Rev.WRC-19)** relating to coexistence between IMT in the band 1 492-1 518 MHz and MSS in the band 1 518-1 525 MHz, the technical requirements and regulatory measures recommended are also effective and may be applicable to mobile Earth stations operating in the band 1 525-1 559 MHz.

Report ITU-R M.2529 – Adjacent band compatibility studies of IMT systems in the mobile service in the band 1 492-1 518 MHz with respect to systems in the mobile-satellite service in the frequency band 1 518-1 525 MHz

The ITU Radiocommunication Assembly,

considering

- a) that the frequency band 1 492-1 525 MHz is allocated to the mobile service in Regions 2 and 3 and to the mobile, except aeronautical mobile, service in Region 1 on a primary basis;
- b) that WRC-15 identified the frequency band 1 427-1 518 MHz globally for use by administrations wishing to implement terrestrial IMT systems;
- c) that the frequency band 1 518-1 559 MHz is allocated in all three Regions to the mobile-satellite service (MSS) on a primary basis;
- d) that the frequency band 1 518-1 559 MHz may be used for land MSS, maritime MSS and aeronautical MSS applications;
- e) that there is a need to ensure the continued operations of the MSS in the frequency band 1 518-1 525 MHz, in accordance with Resolution **223 (Rev.WRC-19)**;
- f) that there may be a need to ensure compatibility between terrestrial IMT systems and MESs at ports and airports, and land MESs. This is particularly the case for some legacy MESs without adequate blocking protection;
- g) that new mobile earth stations (MES) are being developed, providing better protection against blocking interference from the adjacent band,

recognizing

- a) that Resolution **223 (Rev.WRC-19)** invites the ITU-R to conduct compatibility studies in order to provide technical measures to ensure coexistence between MSS in the frequency band 1 518-1 525 MHz and IMT in the frequency band 1 492-1 518 MHz, including guidance on the implementation of frequency arrangements for IMT deployment in the frequency band 1 427-1 518 MHz, taking into account the results of these studies;
- b) that Report ITU-R M.2529 contains the technical measures to ensure coexistence between MSS in the frequency band 1 518-1 525 MHz and IMT in the frequency band 1 492-1 518 MHz;
- c) that guidance on frequency arrangements for the implementation of terrestrial IMT is contained in Recommendation ITU-R M.1036-6,

noting

that, whilst the recommendations for IMT and MES equipment may provide a certain level of compatibility, there may be areas within a country where additional measures may be applied to facilitate compatibility,

recommends

- 1 that administrations should consider the emission levels from IMT equipment operating in the band 1 492-1 518 MHz as provided in Annex 1;
- 2 that, administrations should consider the MES blocking levels as provided in Annex 2;
- 3 that administrations should consider further regulatory measures for IMT BSs, to provide for compatibility with ship earth stations and aircraft earth stations in selected areas, as described in Annex 3;

4 that where this Recommendation is used for compatibility with land MESs, administrations should consider further regulatory measures to IMT, as described in Annex 4.

Annex 1

Emission levels from IMT equipment operating in the band 1 492-1 518 MHz

This Annex provides the technical requirements for the unwanted emissions from IMT equipment. Unwanted emissions from IMT base stations and user equipment operating in the band 1 492-1 518 MHz could cause interference to MSS operations above 1 518 MHz. Administrations should consider application of the unwanted emission limits for IMT base stations and user equipment from the options provided in this Annex.

The following Tables contain different options based on the different results of the studies in Report ITU-R M.2529. It should be noted that the requirements expressed in the different options below are based on results of compatibility studies related to interference from unwanted emissions. Potential interference due to MES receiver blocking is addressed separately, however the unwanted emissions for IMT base stations will be affected by the required reduction of the IMT in-band signal to meet the pfd level related to blocking requirements.

Options for IMT base stations are defined in Table 1. In this Table, those options employing the lower unwanted emission limits for IMT base stations would lower the risk of harmful interference to MSS operations in the frequency band above 1 518 MHz. However, in order for IMT base stations to meet the unwanted emission limits in this table, technical or operational measures (e.g. filtering, reduction of in-band power or guard band) are required, in particular for those base stations using channels above 1 502 MHz or 1 507 MHz depending on the individual manufacturers equipment characteristics.

TABLE 1

Options for IMT base stations unwanted emission limits

Option	MSS operations in the band 1 518-1 525 MHz (Y/N)	Maximum unwanted emissions (e.i.r.p.) (Δf is the frequency relative to and above 1 518 MHz)
1 ⁽¹⁾	Y	−0.8 dBm/MHz ($0 \text{ MHz} \leq \Delta f \leq 2 \text{ MHz}$), −30 dBm/MHz ($2 \text{ MHz} < \Delta f \leq 41 \text{ MHz}$)
2	N	No additional requirement ($0 \leq \Delta f \leq 7 \text{ MHz}$), −30 dBm/MHz ($7 \text{ MHz} < \Delta f \leq 41 \text{ MHz}$)
3	Y	−41 dBm/MHz ($0 \text{ MHz} < \Delta f \leq 41 \text{ MHz}$)
4	N	No additional requirement ($0 \leq \Delta f \leq 7 \text{ MHz}$), −41 dBm/MHz ($7 \text{ MHz} < \Delta f \leq 41 \text{ MHz}$)
5	Y	−30 dBm/MHz ($0 \text{ MHz} \leq \Delta f \leq 2 \text{ MHz}$), −41 dBm/MHz ($2 \text{ MHz} < \Delta f \leq 7 \text{ MHz}$), −52 dBm/MHz ($7 \text{ MHz} < \Delta f \leq 41 \text{ MHz}$)