International Telecommunication Union

ITU-R
Radiocommunication Sector of ITU

Recommendation ITU-R M.2122-0
(01/2019)

Technical and operational characteristics for aeronautical mobile service systems limited to aircraft transmissions of aeronautical mobile telemetry for flight testing in the band 5 150-5 250 MHz in Region 1 and in Brazil in accordance with RR No. 5.446C

M Series

Mobile, radiodetermination, amateur and related satellite services

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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

(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.2122-0

Technical and operational characteristics for aeronautical mobile service systems limited to aircraft transmissions of aeronautical mobile telemetry for flight testing in the band 5 150-5 250 MHz in Region 1 and in Brazil in accordance with RR No. 5.446C

(2019)

Scope

This Recommendation provides technical and operational characteristics for aeronautical mobile telemetry (AMT) operated in countries of Region 1 (except in Algeria, Saudi Arabia, Bahrain, Egypt, United Arab Emirates, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Syrian Arab Republic, Sudan, South Sudan and Tunisia) and in Brazil in the frequency range 5 150-5 250 MHz in accordance with RR No. **5.446C** which recognizes an allocation to the aeronautical mobile service on a primary basis, limited to aeronautical telemetry transmissions from aircraft stations.

Related ITU Recommendations, Reports

Recommendation ITU-R S.580 – Radiation diagrams for use as design objectives for antennas of earth stations operating with geostationary satellites

Recommendation ITU-R M.1459 – Protection criteria for telemetry systems in the aeronautical mobile service and mitigation techniques to facilitate sharing with geostationary broadcasting-satellite and mobile-satellite services in the frequency bands 1 452-1 525 MHz and 2 310-2 360 MHz

Recommendation ITU-R M.1828 –Technical and operational requirements for aircraft stations of aeronautical mobile service limited to transmissions of telemetry for flight testing in the bands around 5 GHz

Report ITU-R M.2221 – Feasibility of MSS operations in certain frequency bands

Report ITU-R M.2238 – Compatibility study to support line of sight control and non-payload communications links for unmanned aircraft systems proposed in the frequency band 5 091-5 150 MHz

Keywords

Telemetry, aircraft

Abbreviations/Glossary

AMS: Aeronautical mobile service

AMT: Aeronautical mobile telemetry

I/*N*: Interference-to-noise ratio

The ITU Radiocommunication Assembly,

considering

a) that various technically and operationally different aeronautical mobile service (AMS) limited to transmissions of telemetry systems for flight testing networks are already in operation in the 5 GHz frequency band subject to Resolution **418 (Rev.WRC-15)**;

b) that the operation of aircraft station is usually a subject of national and international rules and regulations including satisfactory conformance to a mutually agreed technical standard and operational requirements;

c) that there is a need for identifying the technical and operational characteristics for performing sharing analysis involving AMS limited to aircraft transmissions of telemetry systems for flight testing;

d) that the identification of technical and operational requirements for aircraft stations is presented in Recommendation ITU-R M.1828 and provides a common technical basis for facilitating conformance testing of aircraft station by various national and international authorities and the development of mutual recognition arrangements for conformance of aircraft stations,

recognizing

a) that in the frequency band 5 150-5 250 MHz there are global allocations to aeronautical radionavigation, fixed-satellite (Earth-to-space) and mobile except aeronautical mobile services on a primary basis;

b) that, pursuant to RR No. **5.446C**, in Region 1 (except in Algeria, Saudi Arabia, Bahrain, Egypt, United Arab Emirates, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Syrian Arab Republic, Sudan, South Sudan and Tunisia) and in Brazil, the band 5 150-5 250 MHz is also allocated to the aeronautical mobile service on a primary basis, limited to aeronautical telemetry transmissions from aircraft stations;

c) that under RR No. **5.446C**, aeronautical mobile telemetry (AMT) aircraft stations shall not claim protection from other stations operating in accordance with Article **5**;

d) that the characteristics of the telemetry equipment operated in the frequency band 5 150-5 250 MHz may also be applicable for the frequency band 5 091-5 150 MHz if this equipment is also operated in that frequency band in the administrations referenced in *recognizing b)*,

noting

that Recommendation ITU-R M.1459, and Reports ITU-R M.2221 and ITU-R M.2238, also contain technical parameters and protection criteria for telemetry systems for flight testing,

recommends

1 that the technical and operational characteristics for transmitting aircraft stations and receiving aeronautical stations of the aeronautical mobile service limited to transmissions of telemetry for flight testing in the frequency band 5 150-5 250 MHz given in Annex, should be used to perform sharing analysis;

2 that the aggregate interference protection criterion for ground AMT receiving stations of I/N of −6 dB should be used.

Annex

Technical and operational characteristics of aeronautical mobile stations limited to aircraft transmissions of aeronautical mobile telemetry for flight testing in the frequency band 5 150-5 250 MHz in Region 1 and in Brazil in accordance with RR No. 5.446C

1 Aeronautical mobile telemetry characteristics

The following Table provides the aeronautical mobile telemetry transmitting and receiving stations characteristics relevant for performing sharing analysis with other services in co-frequency.

TABLE 1

Aeronautical mobile telemetry characteristics

	Aeronautical mobile telemetry system
Transmitter (onboard aircraft)	
Frequency range (MHz)	5 150-5 160
Channel bandwidth (MHz)	8
Modulation	Single Carrier-SOQPSK or COFDM-QPSK
Maximum transmit power (dBW) (1)	20
Aircraft antennas location	One antenna on the bottom of the aircraft and another antenna on the top of the aircraft
Tx antenna gain (dBi)	0
Cable loss (dB)	2
Aircraft altitude (m)	0 – 15 000
Aircraft deployment	Typical: 3 Aircraft in flight at the same time but not co-frequency (each aircraft use different channels) Maximum: 5 Aircraft in flight at the same time but not co-frequency (each aircraft use different channels)
Receiver (on ground)	
Antenna pattern	Steering Parabolic antenna Recommendation ITU-R S.580
Receiver antenna gain (dBi)	40
Noise figure (dB)	9
Receiver frequency range (MHz)	5 150-5 160MHz
Receiver bandwidth (MHz)	8
Receiver altitude from ground level (m)	Between 6 and 40
Receiver antenna elevation range (degree)	Between −5 and 90 (99% of time the elevation is between −2° and 5°)

(1) The effective power is adjusted to comply with the pfd limits defined in Annex 1 of Resolution **418 (Rev.WRC-15)**.