

RECOMMENDATION ITU-R M.1799

Sharing between the mobile service and the mobile-satellite service in the band 1 668.4-1 675 MHz

(2007)

Scope

This Recommendation addresses sharing between the mobile service and mobile-satellite service (MSS) in the band 1 668.4-1 675 MHz and recommends using the information contained herein in planning the use of this band.

The ITU Radiocommunication Assembly,

considering

- a) that the band 1 668.4-1 675 MHz is allocated to the mobile service and mobile-satellite service (MSS) (Earth-to-space) on a primary basis;
- b) that Resolution 744 (WRC-03) invites ITU-R to study, as a matter of urgency and in time for WRC-07, the use of the band 1 668.4-1 675 MHz by the mobile service, and to complete any relevant sharing studies between the mobile service and the MSS in this band, taking care to avoid undue constraints on either service;
- c) that Appendix 7 of the Radio Regulations (RR) gives the methodology and parameter values to determine the coordination area for mobile earth stations with respect to potential interference from mobile earth stations to mobile stations;
- d) that RR Article 21 contains no e.i.r.p. limits on mobile stations applicable in the band 1 668.4-1 675 MHz;
- e) that studies regarding interference from mobile stations to MSS space stations are contained in Annex 1,

noting

- a) that the studies in Annex 1 have shown that the unconstrained operation of some mobile systems and MSS networks would not be compatible in the band 1 668.4-1 675 MHz;
- b) that the use of the band 1 668-1 675 MHz by MSS uplinks is likely to be in conjunction with the corresponding downlink band, 1 518-1 525 MHz,

recognizing

- a) that RR Article 21 contains pfd limits applicable to MSS systems in the band 1 518-1 525 MHz and applicable to a certain defined geographical area between 71° W and 125° W, and that these limits prevent the operation of MSS systems in that geographical area and also preclude use of some orbital locations by MSS networks in the same band;
- b) that the *resolves* of Resolution 744 (WRC-03);
- c) that RR No. 5.380 identifies the band 1 670-1 675 MHz for aeronautical public correspondence systems;

d) that, as shown in Annex 1, some types of mobile system would cause interference to MSS satellites above the acceptable level,

recommends

1 that, when planning use of the band 1 668.4-1 675 MHz, account should be taken of the following:

- to adequately protect MSS networks, the e.i.r.p. of transportable radio-relay stations should not exceed -27 dBW in a reference bandwidth of 4 kHz in the direction of the geostationary orbit;
- the operation of some types of mobile system which could be envisaged for this band, as detailed in Annex 1, would not be compatible with the use of this band by the MSS.

Annex 1

Interference calculations to assess sharing between the mobile service and the MSS in the band 1 668.4-1 675 MHz

1 Introduction

This Annex provides interference calculations based on the mobile system and mobile-satellite system characteristics currently available.

2 Characteristics of MSS satellite receivers

The band 1 668-1 675 MHz is allocated for MSS (Earth-to-space) but is unlikely to be useable in the United States of America, where alternative terrestrial uses are planned. This and other restrictions which are likely in other parts of the world mean that this band is unlikely to be used by non-GSO MSS systems. Where the band is used for MSS, it is likely to be paired with the band 1 518-1 525 MHz, which is allocated to MSS (space-to-Earth) and which is subject to coordination requirements with a number of countries which operate terrestrial systems. This situation probably prevents the downlink band being used by MSS systems operating “global” beams but will limit systems to those which make use of high-gain satellite antennas and small spot beams.

Hence the band 1 668-1 675 MHz is most likely to be used by GSO MSS systems employing multiple spot beams, of which representative characteristics are shown in Table 1.

TABLE 1

Representative space station parameters

Orbit	Geostationary
Peak antenna gain (dBi)	41
Polarization	Circular
Satellite receiver noise temperature (K)	501

Regarding the interference criterion for studies relating to sharing between the mobile service and MSS space stations, it is expected that any interference received at the satellite will be almost constant in power level and therefore a “long-term” sharing criterion of $6\% \Delta T/T$ or $I/N = -12$ dB has been used. This value is used as the threshold for coordination between GSO MSS systems, and has been used in previous sharing studies, for example those relating to sharing between mobile and MSS services in the band 2 500-2 690 MHz (see Report ITU-R M.2041).

3 Calculations of interference from mobile systems to an MSS satellite receiver

3.1 Interference from transportable radio-relay stations

Transportable radio-relay stations are used to provide temporary point-point links. They operate as part of the mobile service.

While there are a number of different systems in operation, they have generally similar characteristics which allow for a single set of representative characteristics. It may be noted that the systems all have wide tuning ranges, for example 1 350-1 850 MHz or 1 350-2 690 MHz. With respect to the transportable radio-relay antenna, the diameter can be taken as about 1.2 m, which gives a peak gain of about 24 dBi at 1 670 MHz. Using the reference antenna pattern for Recommendation ITU-R F.699, the side-lobe gain beyond 48° is 1.8 dBi. With respect to the transmitter power, the value of 7 dBW is taken as a representative maximum. To determine the power spectral-density of the transmitter, it is assumed that the maximum power would be used with the high bit-rate/wide bandwidth carriers and that the corresponding bandwidth is about 2 MHz.

The representative transportable radio-relay parameters are shown in Table 2.

Three scenarios are considered:

- Scenario 1:* Interference from the side-lobe of a transmitting antenna into a satellite at high elevation.
- Scenario 2:* Interference from the side-lobe of a transmitting antenna into a satellite at low elevation.
- Scenario 3:* Interference from the main-lobe of a transmitting antenna into a satellite at low elevation.

Results are shown in Table 2.

TABLE 2

Interference from transportable radio-relay systems to MSS space stations

Parameter	Unit	Scenario 1	Scenario 2	Scenario 3
Frequency	MHz	1 670	1 670	1 670
Elevation to satellite	degrees	90	5	5
Distance	km	35 786	41 127	41 127
Free space loss	dB	188.0	189.2	189.2
Satellite receiver temperature	K	501	501	501
Reference bandwidth	kHz	4	4	4