

## RECOMMENDATION ITU-R SA.1158-3\*

**Feasibility of frequency sharing in the 1 670-1 710 MHz band between  
the meteorological-satellite service (space-to-Earth) and  
the mobile-satellite service (Earth-to-space)**

(Question ITU-R 204/7)

(1995-1997-1999-2003)

The ITU Radiocommunication Assembly,

*considering*

- a) that the World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992) (WARC-92) has allocated the 1 675-1 710 MHz band on a primary basis in Region 2 to the mobile-satellite service (MSS) (Earth-to-space) and maintained the primary status of the meteorological-satellite (MetSat service) service (space-to-Earth);
- b) that each of these two services may be provided by GSO satellite systems and non-GSO satellite systems;
- c) that MetSat operators have agreed to separate the band 1 670-1 710 MHz into four sub-bands which are being used and are expected to continue to be used as follows:
  - 1 670-1 683 MHz: main earth stations at fixed locations for reception of raw image data, data collection data and spacecraft telemetry from GSO meteorological satellites;
  - 1 683-1 690 MHz: main earth stations at fixed locations for reception of raw image data, data collection and spacecraft telemetry from GSO meteorological satellites; user stations for direct readout from GSO meteorological satellites (GVAR and S-VISSR) (see Note 1);
  - 1 690-1 698 MHz: user stations for direct readout services from GSO meteorological satellites;
  - 1 698-1 710 MHz: user stations for direct readout services and prerecorded image data at main earth stations from non-GSO meteorological satellites;
- d) that the 1 670-1 690 MHz band is and will continue to be used primarily but not exclusively by a limited number of main meteorological earth stations (command and data acquisition (CDA)) and the 1 683-1 690 MHz part of the band is and will continue to be used also by direct readout user stations (GVAR and S-VISSR);
- e) that the portion 1 670-1 675 MHz of the band is used by very few main MetSat earth stations;
- f) that there exist thousands of MetSat earth stations in the 1 690-1 710 MHz band, many of them using small antennas;

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\* This Recommendation should be brought to the attention of the World Meteorological Organization (WMO) and Radiocommunication Study Group 8 (WP 8D).

- g) that for different functions provided by the MetSat service, meteorological earth stations in the 1 690-1 710 MHz band and in the 1 683-1 690 MHz band can be fixed, mobile or transportable;
- h) that Recommendation ITU-R SA.1027 provides sharing criteria for current MetSat systems using satellites in low-Earth orbit (LEO);
- j) that Recommendation ITU-R SA.1161 provides sharing criteria for current MetSat systems using GSO satellites;
- k) that MSS earth station transmitters are expected to be deployed near or within a MetSat service area;
- l) that some operators of meteorological satellites plan to increase the channel bandwidths and revise the frequency assignment plans for new MetSat generations, which would make interleaving of meteorological and mobile-satellite channels impracticable;
- m) that GSO MetSat space stations, which initially serve a certain area, may be relocated from time to time in order to provide coverage of another area;
- n) that Annexes 1, 2, 3 and 4 provide a view pertaining to the technical sharing aspects of the MetSat and MSS services operating in the 1 670-1 710 MHz band;
- o) that mobile-satellite techniques are either available or may be able to be developed to automatically and dynamically avoid transmissions from earth stations in the vicinity of receiving MetSat earth stations and that such techniques are described in Annex 3,

*recognizing*

- 1** that No. 5.377 of the Radio Regulations (RR) states that, in the band 1 675-1 710 MHz, stations in the MSS shall not cause harmful interference to, nor constrain the development of, the MetSat and meteorological aids services and that the use of this band shall be subject to coordination under RR No. 9.11A;
- 2** that studies (see Annex 1) have indicated that potential interference to meteorological earth stations from co-frequency MSS earth stations would be acceptable when the meteorological earth stations are protected by exclusion zones with radii of up to several hundred kilometres and appropriate technical measures are employed to avoid transmissions by mobile earth stations within the respective exclusion zones;
- 3** that the control of the mobile earth stations (MES) could be achieved with a location determination system forming part of the mobile-satellite system; this location determination may require a narrow-band signalling channel transmitted from the MES to the mobile satellite;
- 4** that studies indicate that interference from mobile-satellite service (MSS) earth station emissions in the band 1 670-1 675 MHz to meteorological earth stations would be acceptable with limited restrictions on MSS operations;
- 5** that studies conclude the complex challenge of MSS sharing in the band 1 683-1 690 MHz with the increasing number of GVAR and S-VISSR stations (see Note 1), especially transportable and future stations, would be extremely difficult;
- 6** that sharing in the band 1 690-1 710 MHz would not be feasible in view of the large number of MetSat earth stations, their generally unknown locations and the increasing use of the service,

*recommends*

- 1 that MES possibly operating in part of the 1 670-1 690 MHz band do not transmit, except on a narrow-band signalling channel, inside the exclusion zones around main meteorological earth stations (CDA and primary data users station (PDUS)), taking into consideration the radii identified in *recognizing 2*, increased by the precision (km) of the position determination system referred to in *recognizing 3* (see Note 2);
- 2 that mobile-satellite systems be equipped with demonstrated location determination capability, permitting the determination of the position of the mobile earth stations, in order to assure compliance with *recommends 1*;
- 3 that the narrow-band signalling channel, which may be required worldwide by certain location determination systems, be assigned in agreement with the meteorological operators concerned;
- 4 that the MSS could share the band 1 670-1 675 MHz with the MetSat service based on minor restrictions to ensure no worldwide impact on MetSat operations in the band 1 670-1 710 MHz.

NOTE 1 – GOES stands for geostationary operational environmental satellite; GVAR stands for GOES variable; VISSR stands for visual and infrared spin scan radiometer; S-VISSR stands for stretched VISSR;

NOTE 2 – The WMO is invited to inform the ITU, at regular intervals, of the geographical position of main meteorological earth stations.

## **Annex 1**

### **Sharing analysis between the MetSat service and the MSS in the frequency bands 1 670-1 675 MHz and 1 683-1 690 MHz**

#### **1 Introduction**

The ITU-R conducted an extensive series of studies regarding the potential sharing situation between the MSS and the MetSat service in the band 1 683-1 690 MHz or in the vicinity of this band. The band 1 683-1 690 MHz is mainly used by three different types of meteorological earth stations. While there are only a limited number of main MetSat earth stations deployed in all three ITU Regions, there are a large number of meteorological earth stations operated in Regions 2 and 3 and the locations of many of these stations are unknown. Some of them are also mobile (on ships and trucks) or transportable. During WRC-2000, it was also acknowledged that there is an increase in use of these stations in Regions 2 and 3 and that potential MSS operation should not constrain current and future development of the MetSat service as specified in RR No. 5.377.

Regarding meteorological earth stations, main stations with antenna diameters up to 15 m as well as data user stations such as GVAR and S-VISSR are operating in the band 1 683-1 690 MHz. Only a limited number of main stations operates in the band 1 670-1 675 MHz. Sharing and interference criteria for space-to-Earth data transmission systems in the Earth exploration-satellite and MetSat services have been established in a number of ITU-R Recommendations. RR Appendix 7 and Recommendation ITU-R SA.1160 can be used for reference.