RECOMMENDATION ITU-R M.1389*

# Methods for achieving coordinated use of spectrum by multiple non-geostationary mobile-satellite service systems below 1 GHz and sharing with other services in existing mobile-satellite service allocations

(Question ITU-R 83/8)

(1999)

**Scope**

This Recommendation concerns methods for achieving coordinated use of spectrum by multiple non-geostationary mobile-satellite service systems below 1 GHz and sharing with other services in existing mobile-satellite service allocations. A table indicates the techniques to use for narrow band and wideband systems in connection with different services.

The ITU Radiocommunication Assembly,

*considering*

a) that WARC-92, WRC-95 and WRC-97 allocated the bands 137-138 MHz, 148-149.9 MHz, 149.9-150.05 MHz (land mobile-satellite service (LMSS) only), 399.9-400.05 MHz (LMSS only), 400.15-401 MHz, 454-455 MHz in certain countries, 455-456 MHz (Region 2 and in certain other countries) and 459-460 MHz (Region 2 and in certain other countries) to the MSS;

b) that these allocations are shared by other space and terrestrial services;

c) that various techniques have been developed to achieve the coordinated use of these allocations among these services,

*recognising*

a) that Radio Regulations (RR) Article 9/Appendix 5 provides for coordination between these services,

*noting*

a) that the aggregate impact of transmissions from mobile earth station (MES) of multiple mobile satellite system (MSS) systems be taken into consideration when determining the coordinated use of spectrum,

*recommends*

**1** that the techniques indicated in Table 1 should be used as a guide to the coordinated use of existing MSS allocations below 1 GHz with both space and terrestrial services,

* Radiocommunication Study Group 8 made editorial amendments to this Recommendation in 2005 in accordance with Resolution ITU-R 44.

TABLE 1

**Non-GSO MSS sharing summary**

| | Narrow-band | Wideband |
|---|---|---|
| Fixed and mobile (148-149.9 MHz) (455-456 MHz and 459-460 MHz in Region 2) | Combination:<br>– Dynamic channel avoidance (Recommendation ITU-R M.1039)<br>– Low duty cycle<br>– Brief message duration<br>– Geographical separation (RR Appendix 7) | Combination:<br>– Low output power density<br>– Brief message duration<br>– Low data rate<br>– Filtering at satellite<br>– Geographical separation |
| Fixed and mobile (137-138 MHz)* (400.15-401 MHz) | Ground level pfd (see § 1.1 of Annex 1 of RR Appendix 5) | Ground level pfd (see § 1.1 of Annex 1 of RR Appendix 5) |
| Meteorological satellites (137-138 MHz)* (400.15-401 MHz) | Assignment separation | Combination:<br>– Low pfd at ground level<br>– Cross polarization discrimination<br>– Adaptive filter at satellite |
| Space operations Space research (137-138 MHz)* | Channel avoidance | Combination:<br>– Low pfd<br>– Cross polarization discrimination |
| Space research (400.15-401 MHz) | Channel avoidance | Combination:<br>– Low pfd<br>– Cross polarization discrimination |
| Meteorological aids (400.15-401 MHz) | Channel avoidance | Combination:<br>– Low pfd<br>– Cross polarization discrimination |
| Radionavigation satellite (149.9-150.05 MHz) (399.9-400.05 MHz) | – pfd limit<br>– Channel avoidance<br>– Coordination distance<br>– Antenna elevation limit | |
| Other MSS systems (uplink) | – Assignment separation for spread-spectrum systems<br>– Channel avoidance for FDMA systems<br>– Geographic separation<br>– Controlled frequency avoidance | – Assignment separation for FDMA systems<br>– Spectrum sharing for other spread spectrum multiple access (SSMA) systems<br>– Controlled frequency avoidance |
| Other MSS systems (downlink) | Combination:<br>– Channel locations<br>– Cross polarization discrimination<br>– Assignment separation | Combination:<br>– Low satellite e.i.r.p. density<br>– Cross polarization discrimination<br>– CDMA<br>– Assignment separation |
| Other MSS systems (400.15-401 MHz) | Assignment separation | Assignment separation |
| Radio astronomy | Filtering/bit shaping | Filtering/bit shaping |

* See RR Article 1.

**2** that for uplink sharing, between non-GSO MSS and other services the sharing techniques include the following:

– terrestrial services and frequency division multiple access (FDMA) MSS systems – dynamic channel assignment and/or operational constraint on the MES transmissions (see Recommendation ITU-R M.1039);

– terrestrial services and code-division multiple access (CDMA) MSS systems – low power density transmissions and/or operational constraints on the MES transmissions;

– sharing between MSS systems may require separate spectrum assignments;

**3** that for downlink sharing, principle techniques for sharing are the use of:

– CDMA/FDMA sharing through use of opposite senses of circular polarization is made possible with high axial ratio performance of the spacecraft antennas;

– pfd threshold to permit necessary coordination;

– frequency assignment separation;

– dynamic control of data rate to reduce interference to acceptable levels;

**4** that for uplink sharing between non-GSO, MSS (see RR No.5.224A) and RNSS, MES controlled frequency avoidance techniques and coordination distance should be used to avoid transmission on the same frequency during specified periods of time.