IWG-3/037
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DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

A.I. 1.25 to consider possible additional allocations to the mobile-satellite service in accordance with Resolution 231 (WRC-07)- Additional allocations in the mobile satellite service with focus on the bands between 4 GHz and 16 GHz

Background

Working Party 4C was the lead ITU-R Working Party for developing information related to Agenda Item 1.25 (WRC-11). It initiated this activity through a set of Liaison statements to other Working Parties requesting information on certain spectrum allocations of interest. The bands of interest were those which were potential candidates for additional Mobile Satellite Service allocations.

Working Parties to which the liaisons were sent were those with services/bands that were of potential interest. In all cases the bands identified were being extensively used and would appear to present difficult sharing with the addition of a Mobile Satellite Service (MSS).

The return Liaison Statements from the Working Parties included reference to various protection criteria and related ITU-R Recommendations. These were developed to provide for the sharing of the allocations by the services in the band whether of the same service or other services. It became apparent that if an MSS allocation were to be added to any of the allocations concerned they would need to conform to the referenced criteria.

There are no "clean" allocations. Therefore, the only allocations which could be used by the MSS would be those where it could be demonstrated that the intended applications would conform to the protection, and sharing criteria associated with the services already using the allocations.

The Executive Summary of the draft CPM text for this agenda item indicates that studies of possible bands for new allocations to the mobile-satellite service (MSS) were developed in the (Earth-to-space) and (space-to-Earth) directions, with particular focus on the range 4-16 GHz, taking into account sharing and compatibility, without placing undue constraints on existing services in this band. Based on the results of studies, an appropriate amount of spectrum may be made available to the MSS systems in the 4-16 GHz range to overcome the shortfall of spectrum for the present and future MSS systems. The total requirements for the MSS in the 4-16 GHz range for the year 2020 are estimated to be between [240 and 335 MHz][1] in each direction, and are contained in PDNRep ITU-R M.[MSS-REQS].

The Draft CPM text sets forth several Methods for each of the bands under consideration. The bands under consideration are indicated in the Table below. In general, the Methods of interest to the MSS proponents: Method A2, B2, C2, D2, E, F2, which provide for sharing with the incumbent services, are reflected in the proposals below.

FREQUENCY BAND	MSS DIRECTION (DL = DOWNLINK) (UL = UPLINK)
5150-5250 MHZ	DL
7055-7250 MHZ	DL
8400-8500 MHZ	UL
10.5 - 10.6 GHZ	DL
13.25-13.4 GHZ	DL
15,43-15.63 GHZ	UL

Proposals

USA/1.25/5150-5250MHZ

Introduction of primary MSS downlink allocation in RR Article **5**, together with additional provisions in RR Articles **5** and **21** and RR Appendices **5** and **7** to ensure necessary protection of existing services, developed based on the studies conducted in the Working Document towards a Preliminary Draft New Report ITU-R M.[MSS-SHARING]. This method includes the following provisions:

- Footnote in RR Article **5** limiting use of the MSS allocation to GSO systems.
- Power-flux density limits in RR Article **21** to protect mobile services (including RLANs) operating under RR No. **5.446A**
- Power-flux density levels in RR Appendix **5** as coordination thresholds to protect Aeronautical Mobile Telemetry (AMT) operating under RR No. **5.446C**. RR No. **9.14** would be applied through the footnote referring to RR No. **9.11A**.
- Footnote in RR Article **5** to require coordination of MSS and non-GSO MSS feeder links under RR No. **9.11A** in order to address interference from MSS satellites into non-GSO MSS feeder link satellite receivers. The coordination trigger in RR Appendix **5** would be frequency overlap under the current entries for RR No. **9.13** and RR No. **9.12A**.
- With respect to regulatory conditions for potentially affected receiving MESs, there are two options:

  Option (1): Add columns for the frequency band to the appropriate Tables of RR Appendix **7**, regarding coordination of transmitting non-GSO MSS feeder link stations (Table 9a), RLANs (Table 8c) and AMT stations (Table 8c) with respect to receiving MSS earth stations. Such changes to RR Appendix **7** only apply cross-border coordination, to allow Administrations who wish to implement MSS to coordinate these MESs with neighbouring countries.

  Option (2): Regulatory conditions would ensure that MSS earth stations shall not claim protection from terrestrial services and transmitting earth stations in the FSS.
- It may also be necessary to develop appropriate regulatory measures to address sharing between MSS and ARNS; and between MSS and RDSS.

USA/1.25/7055-7250 MHZ

Introduction of primary MSS downlink allocation in RR Article **5** in one or several portions of the band 7 055-7 250 MHz, combined with NOC option in the other parts. The method is developed based on the

studies conducted in the Working Document towards a Preliminary Draft New Report ITU-R M.[MSS-SHARING], subject to the further development of the studies anticipated before WRC-12.
It should be noted that the options to make an MSS allocation in each sub-band below are not mutually exclusive, nor limited to just the specific sub-bands listed.

Provisions to be associated with Method B2 in the various listed bands

	SERVICES				
Band (MHz)	FSS↓↑	FS/MS	SRS(deep space)↑	SRS(near earth)↑	SOS↑
7055-7075	1, 2, 3	1, 3, 4			
7075-7145		1, 3, 4			1, 11 (above 7100 MHz)
7145-7190		1, 3, 4	1, 5, 6, 7		1, 11 (below 7155 MHz)
7190-7235		1, 3, 4		1, 8, 9, 10	1, 11
7235-7250		1, 3, 4			

Provisions applicable to Method B2

1. Footnote in RR Article **5** limiting use of the MSS allocation to GSO systems.

2. With respect to the FSS uplink allocation (generally used for BSS feeder links), RR No. **9.7** would apply for coordination between GSO systems. RR Appendix **5** provides the coordination trigger and RR Appendix **8**, Section 2.2.2, provides the calculation method for bidirectional situations. A footnote in RR Article **5** would be required to address coordination of MSS and NGSO FSS systems under RR No. **9.11A** in order to address interference from MSS satellites into NGSO FSS satellite receivers. The coordination trigger in RR Appendix **5** would be frequency overlap under the current entries for RR No. **9.13** and RR No. **9.12A**.

3. With respect to regulatory conditions for potentially affected receiving MESs, there are two options:

   Option (1): Add columns for the frequency band to the appropriate Tables of RR Appendix 7, regarding coordination of transmitting fixed or mobile service stations (Appendix 7, Table 8c) and transmitting BSS feeder link earth stations (Appendix 7, Table 9a) with respect to receiving MESs. Such changes to RR Appendix 7 only apply cross-border coordination, to allow administrations who wish to implement MSS to coordinate these MESs with neighbouring countries.

   Option (2): Regulatory conditions would ensure that MESs shall not claim protection from terrestrial services and transmitting earth stations in the FSS.

4. Power-flux density levels to protect the fixed and mobile services (including broadcasting auxiliary service applications):

   Option (1): Coordination thresholds in Appendix **5**, together with a footnote in RR Article **5** applying RR No. **9.14**.

   Option (2): Hard limits in Article **21**.

5. MESs would select channels without interference in the vicinity of the small number of deep space SRS earth stations in 7 145-7 190 MHz. Therefore, no changes would be made to RR Appendix **7**. A footnote would be added to RR Article **5** stating that, in this band, MSS shall not claim protection from current and future SRS earth stations.

6. With respect to protection of SRS space stations in deep space, insert a pfd limit in Article 22 at 2 x 106 km from the earth.

7. WRC Resolution to establish procedures to address the Earth fly-bys, LEOPs, and sample return operations of deep space missions through operational coordination.

8. MSS earth stations would select channels without interference in the vicinity of the limited number of near Earth SRS earth stations in 7 190-7 235 MHz. Therefore, no changes would be made to RR Appendix **7**. A footnote would be added to RR Article **5** stating that, in this band, MSS shall not claim protection from current and future SRS near-Earth stations.

9. With respect to protection of SRS space stations, RR No. **9.7** would apply for coordination between GSO systems. RR Appendix **5** provides the coordination trigger and RR Appendix **8**, Section 2.2.2, provides the calculation method for bidirectional situations.

10. WRC Resolution to establish procedures to address the coordination between GSO MSS and near-earth SRS space stations through operational coordination.

11. It may be necessary to develop appropriate regulatory provisions to address sharing between MSS and space operations under footnote No. **5.459**. A footnote would be added to RR Article **5** stating that, in this band, MSS shall not claim protection from current and future SOS earth stations.

USA/1.25/8400-8500 MHZ

Introduction of a primary MSS uplink allocation in RR Article **5** in the band 8 400-8 500 MHz, together with additional provisions in RR Article **5** and RR Appendices **5** and **7** and an associated Resolution to ensure necessary protection of existing services, developed based on the studies conducted in the Working Document towards a Preliminary Draft New Report ITU-R M.[MSS-SHARING]. This method entails the following provisions:

– Footnote in RR Article **5** limiting use of the MSS allocation to GSO systems.

– To ensure protection of current and planned terrestrial services and SRS earth stations: Add columns for the frequency band to the appropriate Tables of RR Appendix **7**, regarding coordination of transmitting MSS earth stations with respect to receiving SRS earth stations (Appendix **7**, Table 9a) and receiving fixed and mobile stations (Appendix 7, Table 7b). Such changes to RR Appendix **7** only apply cross-border coordination, to allow countries who wish to implement MSS to coordinate these MSS terminals with neighbouring countries. Coordination requirements would be enabled through No. **9.17** and No. **9.17A**.

– WRC Resolution to establish a procedure to determine exclusion zones to protect current and future SRS earth stations, and a footnote in RR Article **5** that refers to this Resolution.

– WRC Resolution to establish procedures to address potential interference to MSS satellites from near-earth operations of SRS spacecraft in the band 8 400-8 500 MHz through operational coordination.

– Coordination under RR No. **9.7** would address coordination of GSO MSS and GSO SRS satellites (which may operate in the band 8 450-8 500 MHz) without any additional changes to the Radio Regulations.

USA/1.25/10.5-10.6 GHZ

Introduction of MSS primary downlink allocation in the band 10.5-10.6 GHz in RR Article **5**, together with additional provisions in RR Article **5** and RR Appendices **5** and **7,** and/or Article **21** to ensure necessary protection of existing services, developed based on the studies conducted in the Working Document towards a Preliminary Draft New Report ITU-R M.[MSS-SHARING], subject to the further development of the studies anticipated before WRC-12. This method entails the following provisions:

– Footnote in RR Article **5** limiting use of the MSS allocation to GSO systems.

– Power-flux density levels to protect the fixed and mobile services (including broadcasting auxiliary service applications):

Option (1): Coordination thresholds in Appendix **5**, together with a footnote in RR Article **5** applying RR No. **9.14**.

Option (2): Hard limits in Article **21**.

– Regulatory provisions for the protection of the radiolocation service. Provisions need to be developed, and may include possible pfd limits in Article **21**.

– Add columns for the frequency band to the appropriate Tables of RR Appendix **7**, regarding coordination of transmitting fixed or mobile service stations (Table 8c) with respect to receiving MSS earth stations. Such changes to RR Appendix **7** only apply cross-border coordination, to allow countries who wish to implement MSS to coordinate these MSS terminals with neighbouring countries.

– Measures for protection of the radio astronomy service in the adjacent band, 10.6-10.7 GHz, may be required. This could be through use of Recommendation ITU-R RA.769, pfd limits, or pfd threshold levels for consultation.

– respect to regulatory conditions for potentially affected receiving MESs, there are two options:

Option (1): Add columns for the frequency band to the appropriate Tables of RR Appendix **7** (Appendix 7, Table 8c) regarding coordination of transmitting stations in the fixed, mobile and radiolocation services with respect to receiving MSS earth stations. Such changes to RR Appendix **7** only apply cross-border coordination, to allow Administrations who wish to implement MSS to coordinate these MESs with neighbouring countries.

Option (2): Regulatory conditions would ensure that MSS earth stations shall not claim protection from terrestrial services (including the radiolocation service).

USA/1.25/13.25-13.4 GHZ

Introduction of an MSS primary downlink allocation in the band 13.25-13.4 GHz in RR Article **5**, together with additional provisions in the RR to ensure necessary protection of existing services, developed based on the studies conducted in the Working Document towards a Preliminary Draft New Report ITU-R M.[MSS-SHARING], subject to the further development of the studies anticipated before WRC-12. This method entails the following provisions:

– Footnote in RR Article **5** limiting use of the MSS allocation to GSO systems.

– It may also be necessary to develop appropriate regulatory measures to address sharing between the MSS and ARNS (limited to Doppler navigation aids); and between the MSS and the EESS (active); and between the MSS and the space research (active) service. With regard to sharing with the ARNS, one option is to include MSS into the scope of RR No. **5.498A.**

– with respect to regulatory conditions for potentially affected receiving MESs, there are two options:

Option (1): A coordination process between terrestrial services and receiving MESs would be developed.

Option (2): Regulatory conditions to ensure that MESs shall not claim protection from terrestrial services (including the radiolocation service).

UAS/1.25/15.43-15.63 GHZ

Introduction of a MSS primary uplink allocation in the band 15.43-15.63 GHz in RR Article **5**, together with additional provisions in the RR to ensure necessary protection of existing services, developed based on the studies conducted in the Working Document towards a Preliminary Draft New Report ITU-R M.[MSS-SHARING], subject to the further development of the studies anticipated before WRC-12. The band allocated to MSS would take into account the possible need for an allocation in the range 15.4-15.7 GHz to address the requirements of UASs (WRC-12 Agenda item 1.3) and the requirements of

radiolocation systems (WRC-12 Agenda item 1.21). For example allocations could be made to each of the three proposed new services in the range 15.4-15.7 GHz.
This method entails the following provisions:

– Footnote in RR Article **5** limiting use of the MSS allocation to GSO systems.

– It may also be necessary to develop appropriate regulatory measures to address sharing between MSS and ARNS (RR No. **4.10** applies); and between MSS and FSS (limited to non-GSO MSS feeder links).

– Measures for protection of the radio astronomy service in the nearby band, 15.35-15.4 GHz, may be required.

USA/1.25/RES 231 MOD

RESOLUTION 231 (WRC-07)

Additional allocations to the mobile-satellite service with particular focus on the bands between 4 GHz and 16 GHz

5/1.25/6.2 Methods A2, B2, C2, , D2, E2, F2, :
[TBD]

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