# UNITED STATES OF AMERICA

**DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE**

**Agenda Item 1.7***:**to study the spectrum needs for telemetry, tracking and command (TT&C) in the space operation service for non-geostationary (NGSO) satellites with short duration missions, to assess the suitability of existing allocations to the space operation service and, if necessary, to consider new allocations, in accordance with Resolution* ***659 (WRC-15)***

**BACKGROUND**:

The demand for suitable spectrum for NGSO satellites with short duration (SD) missions is growing due to the increasing number of these types of satellite missions. The term “short duration mission” used in Resolution **659 (WRC-15)** refers to a mission having a limited period of validity of typically not more than 3 years, where the operator does not launch replenishment or replacement spacecraft. The mass and dimensions of these satellites contribute to their success and their use will likely grow. These types of missions provide an affordable means for scientific and commercial space purposes and are increasingly used by new entrants in space. Nevertheless, it is important to ensure that these missions do not cause harmful interference to existing systems and incumbent services. WRC-19 Agenda Item 1.7 invites studies to accommodate spectrum requirements for TT&C in the space operation service, below 1 GHz, for NGSO satellites with short duration missions (SD-NGSO) in existing bands not subject to No. **9.21**, If those studies conclude the Space Operations Service (SOS) applications are not able co-exist with current usage, then possible new spectrum allocation(s) or an upgrade of an existing allocations within the frequency ranges 150.05-174 MHz and 400.15-420 MHz (e.g., so that RR No. **9.21** does not apply) can be considered. Studies show that in the Earth-to-space direction all frequency allocations to the SOS below 1 GHz are subject to RR No. **9.21**.

Compatibility studies have shown that current technical and operational characteristics of SD-NGSO may not protect global maritime distress and safety service (GMDSS) frequencies for space, coast, ship and aircraft station frequencies between 156-163 MHz, nor frequencies used for the safety of life COSPAS/SARSAT system in the band 406-406.1 MHz. Considering the impact to safety services, no regulatory method has been considered for possible solutions to remove RR No. **9.21** for existing space operation service Earth-to-space ground stations to ensure incumbent protection from harmful interference. In addition, technical studies for both methods proposing a new SOS (Earth-to-space) allocation between 403-405 MHz has shown varying conclusions regarding the feasibility of sharing. Finally, studies have raised concern about using the existing SOS (s-E) allocation in the 137-138 MHz due to possible impacts on aeronautical systems operating below 137 MHz.

**CURRENT USE OF 136-137 MHz BY AVIATION:**

The frequency band 117.975 – 137 MHz is allocated worldwide to the AM(R)S service and is used to transmit Air Traffic Control (ATC) and Airline Operational Control (AOC) communications in all phases of flight and in all airspace. The upper portion of this frequency band, 136-137 MHz, is primarily used for air-ground digital communications to supplement existing voice communications. The highest assignable channel, 136.975 MHz, is the Very High Frequency Data Link Mode 2 (VDL M2) Common Signaling Channel (CSC) as specified in Annex 10 to the Convention on International Civil Aviation Volume III 6.1.2.3.

Some administrations have suggested using existing SOS allocations in the 137-138 MHz band for the SD-NGSO downlink. Assuming the characteristics in the DN Report for SD-NGSO uplink and downlink, the SOS emissions below 137 MHz will be too high to protect the AM(R)S service. Similarly, proposed use of the existing SOS (E-s) allocation in the 148-149.9 MHz band using the stated characteristics will result in required separation distances that would not be supportable operationally.

**CHANGE IN COORDINATION:**

The Draft CPM proposes thresholds for coordination similar to those for MSS in 137-138 MHz, which is specified in Annex 1 of Appendix **5** of the RR and removal of No. **9.21** in RR No. **5.218**. The coordination for MSS (space-to-Earth) in 137-138 MHz is done under RR No. **9.11A**, requiring meeting a pfd threshold on the earth’s surface for coordination with terrestrial services. The ground stations for SOS between 148-149.9 MHz are coordinated under RR No. **9.21**, which was deemed not suitable for SD-NGSO in Resolution **658** (**WRC-15**). The current CPM proposal specifies “appropriate mechanisms” for coordination in 137-138 MHz and 148-149.9 MHz. It is uncertain how this new regulatory mechanism will be able to protect aviation.

**CONCLUSION:**

The addition of SD-NGSO Satellites will create new opportunities, allowing administrations not previously involved in space, to become active. Concurrently, aviation is experiencing a growth in the new entrants to the airspace: drones, suborbital vehicles, HAPS, new VTOL transportation technology, as well as an increase in air transportation traffic. To accommodate current and new users, efficient use of the airspace will be required. Thus, it will be important to provide regulatory certainty to the aviation community while maintaining the same level of safety, not only on a national level, but international as well. If 137-138 MHz is identified to satisfy SOS s-E requirements, regulatory power flux density (PFD) limits should be implemented to ensure protection of the adjacent band AM(R)S. Additionally, removal of RR. No. **9.21** for 148-149.9 MHz should not be considered unless the new coordination method is able to protect incumbent safety services.

**Proposal**

**MOD** USA/AI 1.7/1

ARTICLE 5

**Frequency allocations**

**Section IV – Table of Frequency Allocations** (See No. **2.1**)

137-138 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 137-137.025 SPACE OPERATION (space-to-Earth) ADD 5.SOS  METEOROLOGICAL-SATELLITE (space-to-Earth)  MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209  SPACE RESEARCH (space-to-Earth)  Fixed  Mobile except aeronautical mobile (R)  5.204 5.205 5.206 5.207 5.2085 | | |
| 137.025-137.175 SPACE OPERATION (space-to-Earth) ADD 5.SOS  METEOROLOGICAL-SATELLITE (space-to-Earth)  SPACE RESEARCH (space-to-Earth)  Fixed  Mobile except aeronautical mobile (R)  Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209  5.204 5.205 5.206 5.207 5.208 | | |
| 137.175-137.825 SPACE OPERATION (space-to-Earth) ADD 5.SOS  METEOROLOGICAL-SATELLITE (space-to-Earth)  MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209  SPACE RESEARCH (space-to-Earth)  Fixed  Mobile except aeronautical mobile (R)  5.204 5.205 5.206 5.207 5.208 | | |
| 137.825-138 SPACE OPERATION (space-to-Earth) ADD 5.SOS  METEOROLOGICAL-SATELLITE (space-to-Earth)  SPACE RESEARCH (space-to-Earth)  Fixed  Mobile except aeronautical mobile (R)  Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209  5.204 5.205 5.206 5.207 5.208 | | |

ADD

5.SOS The frequency band 137-138 MHz is identified for use by administrations wishing to implement telemetry, tracking and command links for non-GSO satellites with short duration missions. In order to protect the aeronautical mobile (R) service, the aggregate power flux density at the surface of the earth shall not exceed -180 dB (W/m2/4 kHz) in any portion of the frequency band 117.975-137 MHz. Stations in the space operation service shall not claim protection from the aeronautical mobile (R) service operating in the frequency band 117.975-137 MHz.  (WRC‑19)

# Reasons: Protects existing AM(R)S service in the adjacent band.

**NOC** USA/AI 1.7/2

148-161.9375 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 148-149.9  FIXED  MOBILE except aeronautical mobile (R)  MOBILE-SATELLITE (Earth-to-space) 5.209 | 148-149.9  FIXED  MOBILE  MOBILE-SATELLITE (Earth-to-space) 5.209 | |
| 5.218 5.219 5.221 | 5.218 5.219 5.221 | |

# Reasons: Removal of RR No. 9.21 will not ensure protection of incumbent services. No regulatory method has been proposed to replace coordination under RR No. 9.21. Additionally, consideration of removal of RR 9.21 for this frequency band is outside the scope of this Agenda Item under *resolves* 3.

SUP USA/AI 1.7/3

RESOLUTION 659 (WRC-15)

Studies to accommodate requirements in the space operation service for non-geostationary satellites with short duration missions

# Reasons: The work is complete; therefore, the resolution is no longer needed.

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