

INTERNATIONAL TELECOMMUNICATION UNION

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PLENARY MEETING

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**Member States of the Inter-American Telecommunication Commission (CITEL)**

PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda item 1.6.1

1.6.1 to the fixed-satellite service (Earth-to-space and space-to-Earth) of 250 MHz in the range between 10 GHz and 17 GHz in Region 1;

**Background Information:** The bands between 10 and 17 GHz have allocations to a variety of services with worldwide applications, including Earth exploration-satellite, space research, aeronautical radionavigation, mobile and aeronautical mobile services, representing significant and, in many cases, global commitments by Administrations. Efforts to rectify previous WRC agreements that created imbalances between fixed-satellite service (FSS) up and downlinks in the frequency range 10-17 GHz need to ensure the protection of vital incumbent operations. The United States does not support an additional primary allocation to the FSS (Earth-to-space or space-to-Earth) in the frequency range 13.75-17 GHz in Region 1 due to the potential for interference into existing global services. The United States has no objection to a Region 1 FSS (space-to-Earth) allocation in the band 13.4-13.75 GHz.

#### 13.25-13.4 GHz

The 13.25-13.4 GHz frequency band has allocations to the Earth exploration-satellite service (EESS) (active), the aeronautical radionavigation service (ARNS) and the space research service (active) on a primary basis in all three ITU regions subject to Radio Regulation Nos. **5.497**, **5.498A**, and **5.499**.

ITU-R sharing studies demonstrate that the proposed FSS (space-to-Earth and Earth-to-space) links will interfere with the ARNS in the bands 13.25-13.4 GHz, exceeding protection criteria by large margins. The studies also show that the ARNS transmissions would cause interference into the FSS earth station receivers.

#### 13.4-13.75 GHz

The 13.4-13.75 GHz frequency band has allocations to the EESS (active), the radiolocation service (RLS) and the space research service (active) on a primary basis in all three ITU regions. RR No. **5.501A** indicates that the use of the band 13.4-13.75 GHz by the space research service on a primary basis is limited to active spaceborne sensors. Other uses of the band by the space research service are on a secondary basis. RR Nos. **5.499**, **5.500**, **5.501**, and **5.501B** apply.

ITU-R sharing studies demonstrate that the proposed FSS (Earth-to-space) links in the 13.25-13.75 GHz bands will interfere with existing authorized services in the bands 13.25-13.4 GHz and 13.4-13.75 GHz. The sharing studies' results show that EESS (active) altimeter measurements of lakes, reservoirs, and coastal areas will be lost over a large area of the Earth spanning over all three ITU regions. Mitigation techniques sufficient to protect the EESS (active) altimeters operating in the current allocations may impose severe if not impractical restrictions on new FSS systems that might operate in this band. Studies also show that the proposed FSS (Earth-to-space) would significantly exceed allowed aggregate interference levels into the ARNS.

With respect to FSS downlinks from Region 1 operating in the band 13.4-13.75 GHz, ITU-R studies indicate that EESS (active) systems operating across all three ITU regions in the band 13.4-13.75 GHz will not be unduly constrained. Therefore, operations of U.S. EESS (active) assets operating in the 13.4-13.75 GHz band on a global basis would not be adversely affected by an ITU Region 1 FSS (space-to-Earth) allocation in the 13.4-13.75 GHz band.

### 14.5-15.35 GHz

The 14.5-15.35 GHz frequency range has allocations to the fixed and mobile services on a primary basis in all three ITU regions. The frequency band 14.5-14.8 GHz also has an allocation to FSS (Earth-to-space) on a primary basis in all three ITU regions subject to Radio Regulation No. **5.510**. No. **5.510** limits FSS use to feeder links for the broadcasting-satellite service outside Europe, which are subject to the Appendix **30A** Broadcast Satellite Plan and associated procedures. Aeronautical mobile data links currently operate in the 14.5-15.35 GHz range under the mobile service (MS) allocation, the parent service to aeronautical mobile service (AMS).

The space research service has an allocation on a secondary basis in the frequency range 14.5-15.35 GHz in all three regions.

In particular, the United States and other Administrations operate many critical aeronautical mobile systems (uplink, downlink, and air-air) on a 24/7 basis around the world to support coordinated security, law enforcement, and humanitarian assistance efforts throughout the 14.5-15.35 GHz frequency range and cannot afford disruptions. Sharing studies show that in order to protect the AMS receivers operating in the range 14.5-15.35 GHz, there is a required separation distance in the range of 400-575 km for aircraft altitude of 19 km and in the range of 150-180 km for aircraft altitude of 2.4 km. In addition to the studies conducted in the ITU-R, the United States performed additional analysis of possible approaches to facilitate sharing, e.g., via minimum FSS antenna size-restrictions, PFD limits, and/or other mitigation techniques that could be utilized by FSS providers. However, in each case, studies concluded that interference to aeronautical mobile operations would still occur over large distances and that implementation of proposed mitigation techniques was not practical. While larger antennas are likely to decrease the density of FSS deployments and narrow the beams through which aeronautical systems might fly, even signals from low densities of high-gain FSS antennas would frequently exceed airborne receiver thresholds and at greater levels and distances than that those resulting from small dishes. Sharing studies also show that in order to protect the FSS receivers (space-to-Earth) operating in the frequency range 14.5-15.35 GHz, there is a required separation distance of up to 572 km (not accounting for terrain obstruction).

It is important to note that the band 14.5-14.8 GHz is a planned band allocated to the FSS (Earth-to-space), limited to feeder links for the broadcasting-satellite service (BSS) outside Europe. Such planned bands anticipate the future needs of developing countries. Despite some satellites currently recorded in the Master International Frequency Register, no typical or specific earth stations have been notified for this band. The limitation to FSS feeder links for BSS, while not ensuring protection of all AMS operations, minimizes the potential conflict.

### 15.4-17 GHz

The frequency range 15.4-17.0 GHz has allocations to the RLS on a primary basis in all three Regions and to the aeronautical radionavigation service on a primary basis in all three Regions. Some Administrations will operate airborne synthetic aperture radars worldwide as part of the global RLS allocation in the range 15.4-17 GHz. Some Administrations also operate an airport surface detection system on a co-primary basis with the primary RLS in the range 15.7-16.2 GHz.

ITU-R sharing studies demonstrate that the proposed FSS (Earth-to-space) links in the 10.0-17.0 GHz range will interfere with existing authorized services in the ranges 14.5-15.35 GHz and 15.4-

17.0 GHz. In addition, the band 15.35-15.4 GHz is an exclusive passive band in which RR 5.340 prohibits all emissions in the band. The studies also show that in order to protect radiolocation stations operating in the range 15.4-17.0 GHz, a separation distance of up to 420 km (not accounting for terrain obstruction) is required. Given the large, required separation distances around AMS and RLS receivers' operational area and the mobile nature of AMS/RLS airborne receiver, the ubiquitous deployment of FSS transmitters would make mitigation and coordination approaches to permit sharing with the FSS very difficult or impractical. In addition, ITU-R studies have yet to demonstrate how FSS space station receivers in the geostationary satellite orbit could mitigate unacceptable levels of interference from existing operations in these bands.

With respect to FSS downlinks from Region 1, operating in the range 15.4-17.0 GHz, ITU-R studies indicate radiolocation stations in Region 2 operating in the frequency ranges 15.4-17.0 GHz may receive unacceptable levels of interference from FSS space stations in the geostationary satellite orbit. Similarly, FSS downlink earth stations may receive unacceptable levels of interference from airborne stations beyond the radio horizon. Mitigation techniques sufficient to protect the systems operating in the current allocations may impose severe if not impractical restrictions on new FSS systems that might operate in this band.

**Proposals**

**ARTICLE 5**

**Frequency allocations**

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

**NOC USA/1.6.1/1**

**11.7-14 GHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
<b>13.25-13.4</b>	EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active) 5.498A 5.499	

**Reasons:** ITU-R studies indicate a potential for interference into existing EESS (active) systems from FSS (Earth-to-space). ITU-R studies indicate a potential for interference between the proposed FSS (space-to-Earth) and the existing ARNS systems.

**NOC USA/1.6.1/2**

**11.7-14 GHz**

Allocation to services		
Region 1	Region 2	Region 3
13.4-13.75	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.501A Standard frequency and time signal-satellite (Earth-to-space) 5.499 5.500 5.501 5.501B	

**Reasons:** ITU-R studies indicate a potential for interference into existing EESS (active) systems from FSS (Earth-to-space). EESS (active) systems would not be adversely impacted if Region 1 were to implement FSS (space-to-Earth) links in this band. This NOC proposal applies only with regard to the FSS (Earth-to-space) direction.

**NOC USA/1.6.1/3**

**14-15.4 GHz**

Allocation to services		
Region 1	Region 2	Region 3
14.5-14.8	FIXED FIXED-SATELLITE (Earth-to-space) 5.510 MOBILE Space research	
14.8-15.35	FIXED MOBILE Space research 5.339	
15.35-15.4	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.511	

**Reasons:** ITU-R studies indicate a potential for interference into existing MS and AMS systems. All emissions are prohibited by RR 5.340 in the exclusive passive band 15.35-15.4 GHz.

**NOC USA/1.6.1/4**

**15.4-18.4 GHz**

Allocation to services		
Region 1	Region 2	Region 3
15.4-15.43	RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION 5.511D	
15.43-15.63	FIXED-SATELLITE (Earth-to-space) 5.511A RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION 5.511C	
15.63-15.7	RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION 5.511D	

<b>15.7-16.6</b>	RADIOLOCATION 5.512 5.513
<b>16.6-17.1</b>	RADIOLOCATION Space research (deep space) (Earth-to-space) 5.512 5.513

**Reasons:** ITU-R studies indicate a potential for interference into existing RLS systems.

**SUP USA/1.6.1/5**

## RESOLUTION 151 (WRC-12)

### **Additional primary allocations to the fixed-satellite service in frequency bands between 10 and 17 GHz in Region 1**

The World Radiocommunication Conference (Geneva, 2012),

**Reasons:** Consequential change to completion of the agenda item.