



# PUBLIC NOTICE

**Federal Communications Commission**  
45 L Street NE  
Washington, DC 20554

News Media Information 202-418-0500  
Internet: [www.fcc.gov](http://www.fcc.gov)

**DA 26-182**

**Released: February 23, 2026**

**OFFICE OF INTERNATIONAL AFFAIRS SEEKS COMMENT ON  
RECOMMENDATIONS APPROVED BY THE WORLD RADIOCOMMUNICATION  
CONFERENCE ADVISORY COMMITTEE**

**OIA Docket No. 24-30**

On February 19, 2026, the World Radiocommunication Conference Advisory Committee (WRC-27 Advisory Committee) approved and provided for Commission consideration its draft recommendations on issues that will be considered by the 2027 World Radiocommunication Conference (WRC-27). Based upon an initial review of the draft recommendations forwarded to the Commission, the Office of International Affairs, in coordination with other Commission Bureaus and Offices, tentatively concludes that we can generally support most of the content found in attachment in the WRC-27 Advisory Committee draft recommendation. This table indicates which documents were transmitted to the Commission on a consensus or non-consensus basis:

Consensus	Non-Consensus
WAC-27/038	WAC-27/037
WAC-27/039	WAC-27/040
WAC-27/041	WAC-27/043
WAC-27/042	WAC-27/044
WAC-27/046	WAC-27/045
WAC-27/047	

We seek comment on the draft recommendation provided by the WRC-27 Advisory Committee (Attachment A). In addition, we seek comment on the National Telecommunications and Information Administration (NTIA) draft proposals in Attachment B. The comments provided by interested parties will assist the FCC in its upcoming consultations with the U.S. Department of State and NTIA in the development of U.S. positions for WRC-27. The proposed recommendations that are attached to this Public Notice may evolve in the course of interagency discussions as we approach WRC-27 and, therefore, do not constitute any final U.S. Government positions on any issue.

The deadline for comments on the proposed recommendations is March 6, 2026. It is necessary that all comments be received by March 6, 2026, in order to allow sufficient time to finalize the U.S. position before commencement of regional WRC-27 preparatory meetings.

All comments are to reference OIA Docket No. 24-30 and to specific recommendations by WAC document number. Pursuant to sections 1.415 and 1.419 of the Commission's rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments on or before March 6, 2026.

Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). See Electronic Filing of Documents in Rulemaking Proceedings, 63 FR 24121 (1998). Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: <http://apps.fcc.gov/ecfs/>.

Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. Filings can be sent by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701. U.S. Postal Service first-class, Express, and Priority mail must be addressed to 45 L Street, N.E., Washington DC 20554.

People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to [fcc504@fcc.gov](mailto:fcc504@fcc.gov) or call the Consumer and Governmental Affairs Bureau at 202-418-0530 (voice), 1-888-835-5322 (tty). In addition, one copy of each pleading must be sent to: Gregory Baker, Designated Federal Official, Global Strategy and Negotiation Division, Office of International Affairs, 45 L Street, N.E., Washington, D.C. 20554; email: [WRC-27@fcc.gov](mailto:WRC-27@fcc.gov).

The complete texts of these recommendations are available by accessing the FCC's WRC-27 web site at: [www.fcc.gov/wrc-27](http://www.fcc.gov/wrc-27). For further information, please contact Gregory Baker at (202) 919-0758 or by email at: [WRC-27@fcc.gov](mailto:WRC-27@fcc.gov).

Attachment A

**WRC-27 Agenda Item 1.7**

IWG-2 members were not able to reach consensus on a proposal for WRC-27 Agenda Item 1.7 and, therefore, forwards three views on how the FCC could handle this matter.

View A is supported by CTIA, AT&T, Ericsson, GSMA, Nokia, Qualcomm, T-Mobile, and Verizon

View B is supported by Apple, Boeing, Broadcom, CONFERS, Car Connectivity Consortium, Charter, Comcast, Fleet Space, Lockheed Martin, NCTA, Planet, SIA, and UWB Alliance.

View C is supported by Nokia, AT&T, Ericsson, GSMA, Qualcomm, T-Mobile, and Verizon

# VIEW A

## United States of America

### PROPOSALS FOR THE WORK OF THE CONFERENCE

#### Agenda item 1.7

**Agenda Item 1.7:** *to consider studies on sharing and compatibility and develop technical conditions for the use of International Mobile Telecommunications (IMT) in the frequency bands 4 400-4 800 MHz, 7 125-8 400 MHz (or parts thereof), and 14.8-15.35 GHz taking into account existing primary services operating in these, and adjacent, frequency bands, in accordance with Resolution 256 (WRC-23).*

#### BACKGROUND

WRC-27 will consider the possibility of making available specific mid-band spectrum frequencies 4.4 – 4.8 GHz and 7.125 – 8.4 GHz, either on a regional or global basis, and the 14.8 – 15.35 GHz band, through an identification for the terrestrial component of International Mobile Telecommunications (IMT), in accordance with Resolution 256 (WRC-23):

- 4 400-4 800 MHz (or parts thereof) in Regions 1 and 3;
- 7 125-8 400 MHz (or parts thereof) in Regions 2 and 3;
- 7 125-7 250 MHz and 7 750-8 400 MHz (or parts thereof) in Region 1; and
- 14.8-15.35 GHz.

Today, the early vision for 6G, also known as IMT-2030, is starting to emerge as communications and broader vertical ecosystems embark on foundational technology research preparing for the next decade of innovations. Commercial deployments are expected later in the decade.

Contiguous spectrum bandwidths other than those currently available are necessary to address growing and intensifying consumer data and ubiquitous connectivity demands. As such, discussions have already started to identify the most desirable frequency bands to address these needs. While no single frequency range satisfies all of the spectrum needs, the upper mid-band range (below 10 GHz) is well-suited to bolster current offerings and facilitate next generations of wireless technologies.

In July 2025, President Trump signed The One Big Beautiful Bill Act (OBBBA) into U.S. law that creates a spectrum pipeline by instructing the Federal Communications Commission (FCC) and the National Telecommunications and Information Administration (NTIA) to identify 800 megahertz of spectrum for commercial licensed use. The OBBBA specifies that the FCC auction at least 300 megahertz for non-Federal use; and NTIA, in consultation with the FCC, identify an additional 500 megahertz of Federal use spectrum within the 1.3 – 10.5 GHz range, excluding 3.1 – 3.45 GHz and 7.4 – 8.4 GHz, for reallocation to non-Federal use, shared Federal and non-Federal use, or a combination thereof, for competitive bidding for

full power commercial licensed use cases. In December 2025, the President released a Presidential Memoranda calling for the start of the process to open the 7.125-7.4 GHz band for full-power commercial licensed use cases in the United States.

Under WRC-27 agenda item 1.7, it is important to recognize that the incumbent services in the candidate bands, and adjacent bands, provide important systems for public safety, aviation, earth observation and other uses operating under the existing primary allocations, and such operations must be protected.

- 7 125-8 400 MHz: The frequency band 7 125-8 400 MHz, or parts thereof, is allocated to several services on a primary basis in all three Regions (i.e., Fixed, Fixed Satellite Services, Mobile, Mobile Satellite Service including Maritime Mobile-Satellite Service, Space Research Service, Earth Exploration Satellite Service and Meteorological Satellite Service).

Incumbent services did not arbitrarily select these bands for their operations—the same features which make them favorable for IMT are similarly necessary to fulfill the critical missions of incumbents. ITU-R sharing and compatibility studies have been completed and the results show the feasibility of introducing IMT while ensuring the protection of those services to which the frequency band is allocated on a primary basis without imposing additional constraints on those services, in the same or adjacent band.

## PROPOSALS

### ARTICLE 5

#### Frequency allocations

#### Section IV – Table of Frequency Allocations

(See No. 2.1)

MOD PP/1.7/1

Supports: USA

#### 6 700-7 250 MHz

Allocation to services		
Region 1	Region 2	Region 3
6 700-7 075	FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE 5.457D 5.457E 5.457F 5.458 5.458A 5.458B	
7 075-7 145	FIXED MOBILE 5.457E 5.457F ADD 5.IMT 5.458 5.459	

<b>7 145-7 190</b>	FIXED MOBILE ADD 5.IMT SPACE RESEARCH (deep space) (Earth-to-space) 5.458 5.459
<b>7 190-7 235</b>	EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A 5.460B FIXED MOBILE ADD 5.IMT SPACE RESEARCH (Earth-to-space) 5.460 5.458 5.459
<b>7 235-7 250</b>	EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A FIXED MOBILE ADD 5.IMT 5.458

### 7 250-8 500 MHz

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
<b>7 250-7 300</b>	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE ADD 5.IMT 5.461	
<b>7 300-7 375</b>	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile ADD 5.IMT 5.461	
<b>7 375-7 450</b>  5.461AC	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile ADD 5.IMT MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB	
...		

ADD PP/1.7/2

### Supports: USA

**5. IMT** The frequency band 7 125-7 450 MHz, or portions thereof, is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations.



# **VIEW B**

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

**AGENDA ITEM 1.7:** to consider studies on sharing and compatibility and develop technical conditions for the use of International Mobile Telecommunications (IMT) in the frequency bands 4 400-4 800 MHz, 7 125-8 400 MHz (or parts thereof), and 14.8-15.35 GHz taking into account existing primary services operating in these, and adjacent, frequency bands, in accordance with Resolution **256 (WRC-23)**;

### **BACKGROUND:**

WRC-27 will consider the possibility of making available specific mid-band spectrum frequencies 4.4 – 4.8 GHz and 7.125 – 8.4 GHz, either on a regional or global basis, and the 14.8 – 15.35 GHz band, through an identification for the terrestrial component of International Mobile Telecommunications (IMT), in accordance with Resolution 256 (WRC-23):

- 4 400-4 800 MHz (or parts thereof) in Regions 1 and 3;
- 7 125-8 400 MHz (or parts thereof) in Regions 2 and 3;
- 7 125-7 250 MHz and 7 750-8 400 MHz (or parts thereof) in Region 1; and
- 14.8-15.35 GHz.

Today, the early vision for 6G, also known as IMT-2030, is starting to emerge as communications and broader vertical ecosystems embark on foundational technology research preparing for the next decade of innovations. Commercial deployments are expected later in the decade.

Contiguous spectrum bandwidths other than those currently available are necessary to address growing and intensifying consumer data and ubiquitous connectivity demands. As such, discussions have already started to identify the most desirable frequency bands. While no single frequency range satisfies all of the spectrum needs, the upper mid-band range (below 10 GHz) is well-suited to bolster current offerings and facilitate next generations of wireless technologies.

In July 2025, President Trump signed The One Big Beautiful Bill Act (OBBBA) into U.S. law that creates a spectrum pipeline by instructing the Federal Communications Commission (FCC) and the National Telecommunications and Information Administration (NTIA) to identify 800 megahertz of spectrum for commercial licensed use. The OBBBA specifies that the FCC auction at least 300 megahertz for non-Federal use; and NTIA, in consultation with the FCC, identify an additional 500 megahertz of mid-band spectrum currently allocated to Federal use within the 1.3-3.1 GHz, 3.45-7.4 GHz, and 8.4-10.5 GHz frequency ranges for reallocation to non-Federal use, shared Federal and non-Federal use, or a combination thereof, for competitive bidding (“auction”) for full power commercial licensed use cases. The 7.4-8.4 GHz frequency range is one of the ranges specifically excluded for such reallocation and auction.

Under WRC-27 agenda item 1.7, it is important to recognize that the incumbent services in the candidate 7 125- 8 400 MHz frequency range, and adjacent bands, provide important systems for Fixed, Fixed-Satellite, Mobile, Mobile-Satellite including Maritime Mobile-Satellite, Space Research, Earth Exploration-Satellite, and Meteorological-Satellite services operating under the existing primary allocations, and such operations must be protected.

A number of countries, including various CITELE administrations, have already authorized the above-mentioned incumbent services, and others are considering the same in the 7 400-8 400 MHz frequency range. Incumbent services, such as the Fixed-Satellite, Mobile-Satellite, and Earth Exploration-Satellite services, operate inherently across national borders and depend on globally coordinated frequencies, technical standards, and interference protections. As a result, international regulatory harmonization is essential to ensure seamless coverage, system interoperability, and reliable worldwide operation. Further, studying and considering identification of the 7 400-7 750 MHz frequency range, among others, for the terrestrial component of IMT for Region 1 is outside the scope of agenda item 1.7. Omitting an IMT identification in the 7 400-8 400 MHz frequency range would allow efforts to focus on where global harmonization for both IMT and the incumbent services is realistic. Accordingly, the United States proposes no change to the Radio Regulations for the 7 400-8 400 MHz frequency range.

Furthermore, consistent with prior precedent to promote U.S. domestic policy decisions internationally (e.g. 6 425-7 125 MHz (6 GHz)), the U.S. seeks no change to the frequency range 7 400-8 400 MHz. Specifically, the U.S. and CITELE proposal to WRC-23 was no change to making IMT identifications in the 6 GHz band to harmonize license-exempt use of the band.

It is premature for the United States to take a position for the 7 125-7 400 MHz frequency range while domestic and international studies remain pending. In December 2025, the President released a Presidential Memoranda that directs NTIA to commence studies on operations in the 7 125-7 4 00 MHz frequency range and to determine how to relocate certain affected federal systems to other frequency ranges, including 7 400-8 400 MHz. Results of those studies are to be completed within 12 months. Results of the separate ITU studies have not yet been finalized either. Consequently, consideration of the 7 125-7 400 MHz frequency range is premature until these studies are completed and sharing conditions are developed without imposing additional regulatory or technical constraints on incumbent services.

**Proposal:**

**NOC** PP/1.7/1

**ARTICLES**

**Reasons:** No change to the Table of Frequency Allocations for 7 400-7 450 MHz. Incumbent government services, including national security applications, already operate pursuant to an internationally harmonized allocation. Maintaining the existing framework preserves regulatory certainty and protects continued investment and operational stability.

**NOC** PP/1.7/2

**ARTICLES**

**Reasons:** No change to the Table of Frequency Allocations for 7 450-8 400 MHz. Incumbent government services, including national security and meteorological applications, and commercial uses, including satellite remote sensing, already operate under internationally harmonized allocations. Maintaining the existing framework preserves regulatory certainty and protects continued investment and operational stability.

**NOC** PP/1.7/3

## APPENDICES

**Reasons:** No change to the Appendices for 7 400-8 400 MHz. Incumbent government services, including national security and meteorological applications, and commercial uses, including satellite remote sensing, already operate under internationally harmonized allocations. Maintaining the existing framework preserves regulatory certainty and protects continued investment and operational stability.

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# VIEW C

## United States of America

### PROPOSALS FOR THE WORK OF THE CONFERENCE

#### Agenda item 1.7

**Agenda Item 1.7:** *to consider studies on sharing and compatibility and develop technical conditions for the use of International Mobile Telecommunications (IMT) in the frequency bands 4 400-4 800 MHz, 7 125-8 400 MHz (or parts thereof), and 14.8-15.35 GHz taking into account existing primary services operating in these, and adjacent, frequency bands, in accordance with Resolution 256 (WRC-23).*

#### BACKGROUND

WRC-27 will consider the possibility of making available specific mid-band spectrum frequencies 4.4 – 4.8 GHz and 7.125 – 8.4 GHz, either on a regional or global basis, and the 14.8 – 15.35 GHz band, through an identification for the terrestrial component of International Mobile Telecommunications (IMT), in accordance with Resolution 256 (WRC-23):

- 4 400-4 800 MHz (or parts thereof) in Regions 1 and 3;
- 7 125-8 400 MHz (or parts thereof) in Regions 2 and 3;
- 7 125-7 250 MHz and 7 750-8 400 MHz (or parts thereof) in Region 1; and
- 14.8-15.35 GHz.

Today, the early vision for 6G, also known as IMT-2030, is starting to emerge as communications and broader vertical ecosystems embark on foundational technology research preparing for the next decade of innovations. Commercial deployments are expected later in the decade.

Contiguous spectrum bandwidths other than those currently available are necessary to address growing and intensifying consumer data and ubiquitous connectivity demands. As such, discussions have already started to identify the most desirable frequency bands to address these needs. While no single frequency range satisfies all of the spectrum needs, the upper mid-band range (below 10 GHz) is well-suited to bolster current offerings and facilitate next generations of wireless technologies.

The U.S. Administration has demonstrated that achieving 6G leadership is a strategic national objective. In July 2025, President Trump signed The One Big Beautiful Bill Act (OBBBA) into U.S. law that creates a spectrum pipeline by instructing the Federal Communications Commission (FCC) and the National Telecommunications and Information Administration (NTIA) to identify 800 megahertz of spectrum for commercial licensed use. The OBBBA specifies that the FCC auction at least 300 megahertz for non-Federal use; and NTIA, in consultation with the FCC, identify an additional 500 megahertz of Federal use spectrum within the 1.3 – 10.5 GHz range, excluding 3.1 – 3.45 GHz and 7.4 – 8.4 GHz, for reallocation to non-Federal use, shared Federal and non-Federal use, or a combination thereof, for competitive bidding for full power commercial licensed use cases. In December 2025, the President released a Presidential Memorandum directing Federal planning and resources to “win the global race for 6G,” including clearing critical spectrum

bands for American industry and mobilizing diplomatic efforts to advance U.S. leadership, including starting the process to open the 7.125-7.4 GHz band for full-power commercial licensed use cases in the United States.

The U.S. Administration has also unequivocally framed U.S. leadership over next-generation wireless technologies — including 6G — as a strategic priority tied to national security and economic leadership and has stressed the importance of relying on “trusted vendors” to avoid dependencies on technologies with links to foreign adversaries. An IMT allocation in 7125-8400 MHz best enables international harmonization and global proliferation of 6G deployment, providing opportunities that can support the U.S. to lead in 6G using trusted vendors while preserving the U.S. authority to retain a Federal allocation above 7.4 GHz.

Under WRC-27 agenda item 1.7, it is important to recognize that the incumbent services in the candidate bands, and adjacent bands, provide important systems for public safety, aviation, earth observation and other uses operating under the existing primary allocations, and such operations must be protected.

- 7 125-8 400 MHz: The frequency band 7 125-8 400 MHz, or parts thereof, is allocated to several services on a primary basis in all three Regions (i.e., Fixed, Fixed Satellite Services, Mobile, Mobile Satellite Service including Maritime Mobile-Satellite Service, Space Research Service, Earth Exploration Satellite Service and Meteorological Satellite Service).

The U.S. has conducted and submitted a number of ITU-R sharing and compatibility studies, and the majority demonstrate that IMT can be introduced while ensuring the protection of incumbent services to which the frequency band is allocated on a primary basis without imposing additional constraints on those services. The table below provides a summary of U.S. studies to date including results and additional notes.

Services	Frequency Band	Study	Results	Notes
SRS (deep space) (E-s)	7145 – 7190 MHz	<a href="#">5D/960</a> (USA)	Compatible with margin	
SRS (E-s)	7190 – 7235 MHz	<a href="#">5D/1175</a> (USA)	Compatible with margin	
MetSat (s-E)	7450 – 7550 MHz / 7750 – 7900 MHz	<a href="#">5D/964</a> (USA)	60 km (NGSO)	Via bilateral coordination, sharing with a few operational MetSat stations (i.e., JPSS, GOES) is feasible.
EESS (s-E)	8025 – 8400 MHz	<a href="#">5D/954</a> (USA)	48-53 km (NGSO) 38-43 km (GSO)	Via bilateral coordination and careful planning with GSO and NGSO ground stations, distances can be reduced.
		<a href="#">5D/1174</a> (USA)	2-182 km (NGSO)	
FSS (s-E)	7250 – 7750 MHz	<a href="#">5D/764</a> (USA)	5-10 km (GSO)	
		<a href="#">5D/1178</a> (USA)	<5-85 km (GSO)	Via bilateral coordination and careful planning with GSO ground stations, distances can be reduced.
MSS (s-E)	7250 – 7375 MHz	<a href="#">5D/1177</a> (USA)	Up to 67km	
FSS (E-s)	7900 – 8400 MHz	<a href="#">5D/951</a> (USA)	GSO Compatible with margin	
		<a href="#">5D/1181</a> (USA)	NGSO Compatible (long-term). For short-term, 1 to 3.5 dB exceedance.	If FSS satellite antenna total integrated gain (TIG) is properly considered, no exceedance occurs for the short-term criterion.
		<a href="#">5D/1180</a> (USA)	NGSO 14-19 dB exceedance (long-term)	The methodology to model NGSO systems is being reviewed, e.g., that all IMT base stations in NGSO satellites orbit/Field of View are always kept within the satellite antenna main beam.

MSS (E-s)	7900 – 8025 MHz	<a href="#">5D/951</a> (USA)	GSO Compatible with margin.	
		<a href="#">5D/1181</a> (USA)	NGSO Compatible (long-term). For short-term, 1 to 3.5 dB exceedance.	If FSS satellite antenna total integrated gain (TIG) is properly considered, no exceedance occurs for the short-term criterion.
		<a href="#">5D/1179</a> (USA)	NGSO 14-19 dB Exceedance (long-term); 26-32 dB (short-term)	The methodology to model NGSO systems is being reviewed, e.g., that all IMT base stations in NGSO satellites orbit/Field of View are always kept within the satellite antenna main beam.
Fixed	7125 – 8400 MHz	<a href="#">5D/950</a> (USA)	Attach A: 43-53 km Attach B: 53-83 km	Side-lobe (Attach A): 14-20 km Back-lobe (Attach A): < 3km Via bilateral coordination and careful planning with FS stations, distances can be reduced.

## PROPOSALS

### ARTICLE 5

#### Frequency allocations

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

MOD PP/1.7/1

Supports: USA

#### 6 700-7 250 MHz

Allocation to services		
Region 1	Region 2	Region 3
<b>6 700-7 075</b>	FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE 5.457D 5.457E 5.457F 5.458 5.458A 5.458B	
<b>7 075-7 145</b>	FIXED MOBILE 5.457E 5.457F ADD 5.IMT 5.458 5.459	
<b>7 145-7 190</b>	FIXED MOBILE ADD 5.IMT SPACE RESEARCH (deep space) (Earth-to-space) 5.458 5.459	

<b>7 190-7 235</b>	EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A 5.460B FIXED MOBILE ADD 5.IMT SPACE RESEARCH (Earth-to-space) 5.460 5.458 5.459
<b>7 235-7 250</b>	EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A FIXED MOBILE ADD 5.IMT 5.458

### 7 250-8 500 MHz

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
<b>7 250-7 300</b>	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE ADD 5.IMT 5.461	
<b>7 300-7 375</b>	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile ADD 5.IMT 5.461	
<b>7 375-7 450</b>	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile ADD 5.IMT MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB 5.461AC	
<b>7 450-7 550</b>	FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile ADD 5.IMT MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB 5.461A 5.461AC	
<b>7 550-7 750</b>	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile ADD 5.IMT MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB 5.461AC	
<b>7 750-7 900</b>	FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile ADD 5.IMT	
<b>7 900-8 025</b>	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE ADD 5.IMT 5.461	

<b>8 025-8 175</b>	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 ADD 5.IMT 5.462A
<b>8 175-8 215</b>	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE 5.463 ADD 5.IMT 5.462A
<b>8 215-8 400</b>	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 ADD 5.IMT 5.462A
...	

**ADD PP/1.7/2**

**Supports: USA**

**5. IMT** The frequency band 7 125-8400 MHz, or portions thereof, is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations.

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## United States of America

### DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

#### Agenda item 1.2

**Agenda Item 1.2:** *to consider possible revisions of sharing conditions in the frequency band 13.75-14.0 GHz to allow the use of uplink fixed-satellite service earth stations with smaller antenna sizes, in accordance with Resolution 129 (WRC-23);*

**BACKGROUND:** Resolution 129 (WRC-23) calls for studies on technical and operational limitations regarding the minimum antenna size and associated power limitations of GSO and non-GSO FSS earth stations in the frequency band 13.75-14 GHz (Earth-to-space), while ensuring the protection of the services stipulated in Nos. 5.502 and 5.503.

The frequency band 13.75-14.0 GHz has been subject to regulatory changes over the years. since FSS (Earth-to-space) was allocated at WARC-92. WRC-03 modified the requirements for minimum size of satellite earth station antennas operating in the 13.75-14 GHz band (1.2 m for geostationary satellite orbit (GSO) networks; maintained the 4.5 m for non-geostationary satellite orbit (non-GSO) systems); and introduced the maximum power flux density that an earth station can transmit towards the sea. Accordingly, changes to Nos. 5.502 and 5.503 were made to use earth station antennas of 1.2 meters for the GSO FSS networks, but no changes were made in Nos. 5.502 and 5.503 regarding earth station antennas for NGSO systems.

The purpose of these limitations is to protect the radiolocation and space research services. Additionally, there is a significant mismatch in bandwidth between available non-planned uplink and downlink FSS spectrum in the 10-15 GHz range for smaller satellite user terminals, e.g., VSATs, satellite news gathering, in all three ITU Regions. In Region 2, the spectrum available for uplink without limitation is only 500 MHz whereas for downlink, it is 1000 MHz, twice the uplink spectrum. Same for Region 1 and 3. This mismatch between uplink and downlink bandwidth highlights the need to identify more uplink capacity that can be efficiently used by smaller antennas that can communicate with GSO and non-GSO satellites.

Innovation both in GSO high throughput satellites (HTS), software defined satellites (SDS) and non-GSO satellites along with innovation in earth station terminals capable of providing large throughputs and broadband connections, has highlighted the critical need for additional Ku-band uplink spectrum to meet the increasing demand for connectivity to customers, particularly for the use of small user terminals, such as VSATs. There has been a rapid increase in number of operational satellite networks and use of orbit and spectrum resources over the last decades corresponding to increased development of a variety of applications and satellite user equipment. Given these advancements FSS customers are requiring higher data transmission rates, smaller user terminals, and increasingly flexible products. From an operational point of view, the frequency band 13.75-14.0 GHz, being adjacent to the 14.0-14.5 GHz (Earth-to-space) band currently used for uplink, would allow FSS operators to meet the demands of customers in a straightforward and inexpensive manner.

WRC-23 again identified the need for further studies to address the operational and technical limitations regarding the minimum antenna size and associated power limitations for GSO and NGSO FSS earth stations in the 13.75-14.0 GHz band. Resolution 129 (WRC-23) acknowledges the increasing demand for uplink spectrum by smaller antennas for earth stations and the necessity to review sharing conditions with the RLS and SRS to support the evolving needs of FSS applications efficiently and rationally.

**Proposal:**

MOD PP/1.2/1

## ARTICLE 5

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

\* \* \* \* \*

**13.4-14 GHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
<b>13.4-13.65</b> EARTH EXPLORATION-SATELLITE (active) FIXED-SATELLITE (space-to-Earth) 5.499A 5.499B RADIOLOCATION SPACE RESEARCH 5.499C 5.499D Standard frequency and time signal-satellite (Earth-to-space) 5.499E 5.500 5.501 5.501B	<b>13.4-13.65</b> EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.499C 5.499D Standard frequency and time signal-satellite (Earth-to-space)  5.499 5.500 5.501 5.501B	
<b>13.65-13.75</b>	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	
<b>13.75-14</b>	FIXED-SATELLITE (Earth-to-space) 5.484A RADIOLOCATION Earth exploration-satellite Standard frequency and time signal-satellite (Earth-to-space) Space research 5.499 5.500 5.501 MOD 5.502 SUP 5.503	

\* \* \* \* \*

MOD PP/1.2/2

**5.502** In the band 13.75-14 GHz, to ensure protection of the radiolocation service, the location of earth stations with an antenna diameter smaller than 1.2 m for geostationary fixed-satellite service networks or an antenna diameter smaller than 4.5 m for non-geostationary fixed-satellite service systems shall maintain a separation distance of at least X km, respectively, from the respective border(s) of neighboring countries, unless a shorter distance is otherwise agreed between the concerned administrations. In addition, the e.i.r.p.,

averaged over one second, radiated by a station in the radiolocation or radionavigation services shall not exceed 59 dBW for elevation angles above 2° and 65 dBW at lower angles.

**Reason:** Modernizing the provisions for protecting the radiolocation service in this frequency band to enable broadband satellite operations is appropriate given that the sharing studies demonstrate that even with conservative assumptions, a separation distance of X km is sufficient to mitigate any potential interference into RLS receivers making co-existence feasible. Also, reducing the terminal size from 1.2 m for GSO networks and from 4.5 m for NGSO systems to smaller diameters shows little to no impact in the interference received.

**SUP** PP/1.2/3 **5.503**

**Reason:** Modernizing the provisions for protecting the space research service in this frequency band to enable broadband satellite operations is appropriate given that sharing studies indicate that the space research service (SRS) is protected with a significant margin and given the limited SRS usage in this band. Enabling greater use of this frequency band will supplement the growing Ku-band demand in the uplink direction and allow for broadband satellite operations.

**SUP** PP/1.2/4

## RESOLUTION 129 (WRC-23)

### **Studies on possible revisions of sharing conditions in the frequency band 13.75-14 GHz to allow the use of uplink fixed-satellite service earth stations with smaller antenna sizes**

**Reason:** Resolution 129 is no longer needed as the studies are completed and changes to the Radio Regulations have been identified.

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## United States of America

### DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

#### Agenda Item 1.3

**Agenda Item 1.3:** *to consider studies relating to the use of the frequency band 51.4-52.4 GHz to enable use by gateway earth stations transmitting to non-geostationary-satellite orbit systems in the fixed-satellite service (Earth-to-space), in accordance with Resolution 130 (WRC-23);*

#### **BACKGROUND:**

WRC-19 allocated the frequency band 51.4-52.4 GHz to the fixed-satellite service (Earth-to-space), subject to Radio Regulation No. **5.555C**, which limited the use of the band to gateway earth stations of geostationary-satellite networks with a minimum antenna diameter of 2.4 meters. In the ITU-R study cycle leading up to WRC-19, studies demonstrated the possibility of sharing and compatibility with the appropriate protection measures. Studies included sharing and compatibility between FSS and other primary services in the band, such as fixed service and mobile service (including IMT-2020). Studies were also performed for the protection of Earth Exploration-Satellite Service (EESS) and Space Research Service (SRS) allocated in adjacent bands. WRC-19 confirmed the feasibility to use gateway FSS earth stations with diameters as small as 2.4 meters compatibly with existing primary services in the same and adjacent frequency bands.

WRC-23 adopted Resolution **130 (WRC-23)** and WRC-27 Agenda Item 1.3 to consider the possibility of expanding the FSS (Earth-to-space) allocation to include the use by gateway FSS earth stations communicating with non-geostationary orbit (non-GSO) satellite systems. Recognizing the need for additional uplink spectrum in the 50 GHz frequency range for non-GSO FSS gateway earth station use, the Resolution calls for sharing and compatibility studies with existing services, including in adjacent bands, while protecting fixed and mobile services. The Resolution also calls for compatibility studies between non-GSO FSS gateway operations in the 51.4-52.4 GHz band and existing primary passive services operating in the frequency band 52.6-54.25 GHz, taking into consideration the aggregated interference from GSO gateway earth stations and non-GSO FSS gateway earth stations as per *resolves to invite the ITU-R 2* from Resoluition **130 (WRC-23)**. Next, the Resolution calls for studies to determine the conditions needed to ensure protection of radioastronomy observations in the 51.4-54.25 GHz band in conformity with No. **5.556**. Finally, the Resolution calls for studes regarding the protection of GSO FSS space stations from emissions of non-GSO FSS gateway earth stations, including possible inclusion of the band within the scope of Resolutions **769 (WRC-19)** and **770 (Rev.WRC-23)**.

The ITU-R studies called for in Resolution **130 (WRC-23)** have confirmed that the allocation to the FSS (Earth-to-space) in the frequency band 51.4-52.4 GHz can be extended to gateway earth stations communicating with non-GSO FSS satellites without the need for a minimum antenna diameter. The changes made to Tables 21.2 and 21.3 of Article **21** at WRC-19 for the addition of the FSS allocation made under No. **5.555C** would not need to be further modified for the expansion of the footnote to include non-GSO FSS gateway earth station use. Updates to Resolution 750 (Rev.WRC-19) to include protection of EEES (passive) in the 52.6-53.24 GHz band, based on ITU-R studies looking at both GSO and non-GSO gateway earth station use of the FSS in 51.4-52.4 GHz band would be needed. Finally, studies confirm that protection of GSO FSS space stations from

emissions of non-GSO FSS gateway earth stations would be achieved by inclusion of the non-GSO FSS allocation in the 51.4-52.4 GHz band into RR Nos. **22.5L** and **22.5M** and Resolutions **769 (WRC-19)** and **770 (Rev.WRC-23)**, and that any attempt to bring an epfd regime into this range would create many unnecessary complications.

The regulatory changes that are needed to implement the inclusion of non-GSO FSS gateway earth stations in the FSS allocation in the 51.4-52.4 GHz band are proposed below:

**Proposals:**

ARTICLE 5

**Frequency allocations**

**Section IV – Table of Frequency Allocations**

(See No. 2.1)

MOD USA/1.3/1

**51.4-55.78 GHz**

Allocation to services		
Region 1	Region 2	Region 3
<b>51.4-52.4</b>	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.338A 5.547 5.556	MOD5.555C ADD5.AI1.3
...		
...		
...		

**MOD5.555C** The use of the frequency band 51.4-52.4 GHz by geostationary-orbit networks in the fixed-satellite service (Earth-to-space) shall be limited to gateway earth stations with a minimum antenna diameter of 2.4 metres. (WRC-27)

**ADD5.AI1.3** The use of the frequency band 51.4-52.4 GHz by non-geostationary-orbit systems in the fixed-satellite service (Earth-to-space) shall be limited to gateway earth stations. The use of the band 51.4-52.4 GHz by non-geostationary-satellite systems in the fixed-satellite service (Earth-to-space) is subject to application of the provisions of No. **9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service. (WRC-27)

**Reasons:** Extends the allocation to the FSS (Earth-to-space) in 51.4-52.4 GHz to include non-GSO FSS gateway earth stations, and applies No. **9.12** for coordination of non-GSO FSS gateway use.

MOD USA/1.3/2

**5.338A** In the frequency bands 1 350-1 400 MHz, 1 427-1 452 MHz, 22.55-23.55 GHz, 30-31.3 GHz, 49.7-50.2 GHz, 50.4-50.9 GHz, 51.4-52.6 GHz, 81-86 GHz and 92-94 GHz, Resolution **750 (Rev.WRC-27)** applies. (WRC-27)

**Reasons:** Applies the limits for non-GSO FSS ES unwanted emissions as contained in the proposed revision to Resolution **750 (Rev.WRC-27)**.

## ARTICLE 21

### Terrestrial and space services sharing frequency bands above 1 GHz

#### Section II – Power limits for terrestrial stations

NOC USA/1.3/3

TABLE 21-2 (Rev.WRC-23)

**Reasons:** Applies the limits in Nos. **21.2**, **21.3** and **21.5** to the newly-revised allocation.

#### Section III – Power limits for earth stations

NOC USA/1.3/4

TABLE 21-3 (Rev.WRC-19)

**Reasons:** Applies the limits in No. 21.8 to the newly-revised allocation.

## ARTICLE 22

### Space services<sup>1</sup>

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<sup>1</sup> **A.22.1** In applying the provisions of this Article, the level of accepted interference (see No. **1.168**) shall be fixed by agreement between the administrations concerned, using the relevant ITU-R Recommendations as a guide.

## Section II – Control of interference to geostationary-satellite systems

MOD USA/1.3/5

**22.5L** 9) A non-geostationary-satellite system in the fixed-satellite service in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-52.4 GHz (Earth-to-space) shall not exceed:

- – a single-entry increase of 3% of the time allowance for the *C/N* value associated with the shortest percentage of time specified in the short-term performance objective of the generic<sup>26</sup> geostationary-satellite orbit reference links; and
- – a single-entry permissible allowance of at most 3% reduction in time-weighted average spectral efficiency calculated on an annual basis for the generic geostationary-satellite orbit reference links using adaptive coding and modulation. (WRC-27)

**Reasons:** Extends the limits in No. **22.5L** to the new non-GSO FSS allocation in 51.4-52.4 GHz.

MOD USA/1.3/6

**22.5M** 10) Administrations operating or planning to operate non-geostationary-satellite systems in the fixed-satellite service in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-52.4 GHz (Earth-to-space) shall ensure that the aggregate interference to geostationary-satellite FSS, MSS, and BSS networks caused by all non-geostationary-satellite FSS systems operating in these frequency bands does not exceed:

- – an increase of 10% of the time allowance for the *C/N* value associated with the shortest percentage of time specified in the short-term performance objective of the generic geostationary-satellite orbit reference links; and
- – a reduction of at most 8% in a calculated annual time-weighted average spectral efficiency for the generic geostationary-satellite orbit reference links using adaptive coding and modulation, taking into account that the methodology ensures that the degradation of time-weighted average spectral efficiency on each link is lower than the maximum permissible reduction,

for each generic geostationary-satellite orbit reference link in Annex 1 to Resolution **770 (WRC-27)**;

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<sup>26</sup> **22.5L.1** Generic geostationary-satellite orbit reference links are comprised of parametric link budget parameters and are used for the purpose of determining the compliance of a non-geostationary-satellite system with respect to No. **22.5L**. The generic geostationary-satellite orbit reference link parameters are found in Table 1 of Annex 1 to Resolution **770 (Rev.WRC-27)**.

The procedures and methodologies specified in Resolution **770 (Rev.WRC-27)** shall be used for the calculations. The equivalent power flux-density levels from the non-geostationary-satellite FSS system should be derived using the most recent version of Recommendation ITU-R S.1503. (WRC-27)

and:

- – an increase of 10% of the time allowance for the  $C/N$  values associated with the short-term performance objectives of the supplemental geostationary-satellite orbit links; and
- a reduction of at most 8% in a calculated annual time-weighted average spectral efficiency for the supplemental geostationary-satellite orbit links associated with notified and brought into use frequency assignments using adaptive coding and modulation, taking into account that the methodology ensures that the degradation of time-weighted average spectral efficiency on each link is lower than the maximum permissible reduction.

Resolution **769 (WRC-27)** shall also apply. (WRC-27)

**Reasons:** Extends the limits in No. **22.5M** to the new non-GSO FSS allocation in 51.4-52.4 GHz.

APPENDIX 7 (REV.WRC-15)

**Methods for the determination of the coordination area around an earth station in frequency bands between 100 MHz and 105 GHz**

ANNEX 7

**System parameters and predetermined coordination distances for determination of the coordination area around an earth station**

MOD USA/1.3/7

TABLE 7c (Rev.WRC-27)

**Parameters required for the determination of coordination distance for a transmitting earth station**

Transmitting space radiocommunication service designation	Fixed-satellite	Fixed-satellite	Fixed-satellite <sup>2</sup>	Fixed-satellite	Space research	Earth exploration-satellite, space research	Fixed-satellite, mobile-satellite, radionavigation-satellite	Fixed-satellite <sup>2</sup>	Fixed-satellite	Fixed-satellite <sup>2</sup>
Frequency bands (GHz)	24.65-25.25 27.0-29.5	24.65-25.25 27-27.5	28.6-29.1	27.5-28.6 29.1-29.5 <sup>3</sup>	34.2-34.7	40.0-40.5	42.5-47 47.2-50.2 50.4-51.4	47.2-50.2	51.4-52.4	51.4-52.4
Receiving terrestrial service designations	Fixed (except HAPS), mobile	Fixed (HAPS ground station)	Fixed, mobile	Fixed, mobile	Fixed, mobile, radiolocation	Fixed, mobile	Fixed, mobile, radionavigation	Fixed, mobile	Fixed, mobile	Fixed, mobile
Method to be used	§ 2.1	§ 2.1	§ 2.2	§ 2.2		§ 2.1, § 2.2	§ 2.1, § 2.2	§ 2.2	§ 2.1	§ 2.2
Modulation at terrestrial station <sup>1</sup>	N	N	N	N		N	N	N	N	N
Terrestrial station interference parameters and criteria	$p_0$ (%)	0.005	0.01	0.005	0.005	0.005	0.005	0.001	0.005	0.005
	$n$	1	1	2	1	1	1	1	1	1
	$p$ (%)	0.005	0.005	0.0025	0.005	0.005	0.005	0.001	0.005	0.005
	$N_L$ (dB)	0	0	0	0	0	0	0	0	0
	$M_s$ (dB)	25	10	25	25	25	25	25	25	25
	$W$ (dB)	0	0	0	0	0	0	0	0	0
Terrestrial station parameters	$G_x$ (dBi) <sup>4</sup>	50	0 <sup>5</sup>	50	50	42	42	46	42	42
	$T_e$ (K)	2 000	350	2 000	2 000	2 600	2 600	2 000	2 600	2 600
Reference bandwidth	$B$ (Hz)	10 <sup>6</sup>	10 <sup>6</sup>	10 <sup>6</sup>	10 <sup>6</sup>	10 <sup>6</sup>	10 <sup>6</sup>	10 <sup>6</sup>	10 <sup>6</sup>	10 <sup>6</sup>
Permissible interference power	$P_f(p)$ (dBW) in $B$	-111	-134	-111	-111	-110	-110	-111	-110	-110

<sup>1</sup> A: analogue modulation; N: digital modulation.

<sup>2</sup> Non-geostationary satellites in the fixed-satellite service.

<sup>3</sup> Feeder links to non-geostationary-satellite systems in the mobile-satellite service.

<sup>4</sup> Feeder losses are not included.

<sup>5</sup> Maximum HAPS ground station antenna gain toward the horizon.

**Reasons:** Update Appendix 7 for the new non-GSO FSS uplink in 51.4-52.4 GHz.



MOD USA/1.3/8

## RESOLUTION 750 (REV.WRC-27)

### **Compatibility between the Earth exploration-satellite service (passive) and relevant active services**

The World Radiocommunication Conference (Shanghai, 2027),

*considering*

- a)* that primary allocations have been made to various space services such as the fixed-satellite service (Earth-to-space), the space operation service (Earth-to-space) and the inter-satellite service and/or to terrestrial services such as the fixed service, the mobile service and the radiolocation service, hereinafter referred to as “active services”, in frequency bands adjacent or nearby to frequency bands allocated to the Earth exploration-satellite service (EESS) (passive), subject to No. 5.340;
- b)* that unwanted emissions from active services have the potential to cause unacceptable interference to EESS (passive) sensors;
- c)* that, for technical or operational reasons, the general limits in Appendix 3 may be insufficient in protecting the EESS (passive) in specific frequency bands;
- d)* that, in many cases, the frequencies used by EESS (passive) sensors are chosen to study natural phenomena producing radio emissions at frequencies fixed by the laws of nature, and therefore shifting frequency to avoid or mitigate interference problems is not possible;
- e)* that the frequency band 1 400-1 427 MHz is used for measuring soil moisture, and also for measuring sea-surface salinity and vegetation biomass;
- f)* that long-term protection of the EESS in the frequency bands 23.6-24 GHz, 31.3-31.5 GHz, 50.2-50.4 GHz, 52.6-54.25 GHz and 86-92 GHz is vital to weather prediction and disaster management, and measurements at several frequencies must be made simultaneously in order to isolate and retrieve each individual contribution;
- g)* that, in many cases, the frequency bands adjacent to or nearby passive service frequency bands are used and will continue to be used for various active service applications;
- h)* that it is necessary to ensure equitable burden-sharing for achieving compatibility between active and passive services operating in adjacent or nearby frequency bands,

*noting*

- a)* that some of the compatibility studies between relevant active and passive services operating in adjacent and nearby frequency bands are documented in Report ITU-R SM.2092 and in Report ITU-R S.2463;
- b)* that the compatibility studies between International Mobile Telecommunications (IMT) systems in the frequency bands 1 375-1 400 MHz and 1 427-1 452 MHz and EESS (passive) systems in the frequency band 1 400-1 427 MHz are documented in Report ITU-R RS.2336;

- c) that Report ITU-R F.2239 provides the results of studies covering various scenarios between the fixed service, operating in the frequency bands 81-86 GHz and/or 92-94 GHz, and the EESS (passive), operating in the frequency band 86-92 GHz;
- d) that Recommendation ITU-R RS.2017 provides the interference criteria for satellite passive remote sensing,

*noting further*

that, for the purpose of this Resolution:

- – point-to-point communication is defined as radiocommunication provided by a link, for example a radio-relay link, between two stations located at specified fixed points;
- – point-to-multipoint communication is defined as radiocommunication provided by links between a single station located at a specified fixed point (also called “hub station”) and a number of stations located at specified fixed points (also called “customer stations”),

*recognizing*

- a) that studies documented in Report ITU-R SM.2092 do not consider point-to-multipoint communication links in the fixed service in the frequency bands 1 350-1 400 MHz and 1 427-1 452 MHz;
- b) that, in the frequency band 1 427-1 452 MHz, mitigation measures, such as channel arrangements, improved filters and/or guardbands, may be necessary in order to meet the unwanted emission limits for IMT stations in the mobile service specified in Table 1 of this Resolution;
- c) that, in the frequency band 1 427-1 452 MHz, IMT mobile stations typically perform better than the equipment specifications as stated by relevant standards organizations, which may be taken into account in meeting the limits specified in Table 1 (see also sections 4 and 5 of Report ITU-R RS.2336),

*resolves*

- 1 that unwanted emissions of stations brought into use in the frequency bands and services listed in Table 1 below shall not exceed the corresponding limits in that table, subject to the specified conditions;
- 2 to urge administrations to take all reasonable steps to ensure that unwanted emissions of active service stations in the frequency bands and services listed in Table 2 below do not exceed the recommended maximum levels contained in that table, noting that EESS (passive) sensors provide worldwide measurements that benefit all countries, even if these sensors are not operated by their country;
- 3 that the Radiocommunication Bureau shall not make any examination or finding with respect to compliance with this Resolution under either Article **9** or **11**.

TABLE 1

EESS (passive) frequency band	Active service frequency band	Active service	Limits of unwanted emission power from active service stations in a specified bandwidth within the EESS (passive) frequency band <sup>1</sup>
...			
52.6-54.25 GHz	51.4-52.4 GHz	Fixed-satellite (E-to-s) <sup>4</sup>	<p>For earth stations operating in [FSS networks[ or systems], in order to protect non-GSO EESS (passive) space stations:</p> <p>–37 dBW in any 100 MHz of the EESS (passive) band for FSS earth stations with elevation angles lower than 75°</p> <p>–52 dBW in any 100 MHz of the EESS (passive) band for FSS earth stations with elevation angles equal to or higher than 75°</p> <p>For earth stations operating with a GSO FSS space station whose nominal geocentric orbital separation <math>\Delta</math> is equal to or smaller than 2.5° from any GSO EESS (passive) space station from the time of its notification in accordance with No. <b>11.44</b> with nominal orbital positions: 0°, 9.5° E, 76° E, 79° E, 99.5° E, 105° E, 123.5° E, 133° E, 165.8° E, 14.5° W and 137.2° W:</p> <p>–84 + 200 <math>\Delta</math> dBW for <math>0^\circ \leq \Delta &lt; 0.1^\circ</math></p> <p>–67 + 22.8 <math>\Delta</math> dBW for <math>0.1^\circ \leq \Delta &lt; 0.5^\circ</math></p> <p>–61 + 11.3 <math>\Delta</math> dBW for <math>0.5^\circ \leq \Delta &lt; 1.9^\circ</math></p> <p>–47 + 4 <math>\Delta</math> dBW for <math>1.9^\circ \leq \Delta \leq 2.5^\circ</math></p> <p>in any 100 MHz of the EESS (passive) band</p>
...			

Notes to Table 1:

<sup>1</sup> The unwanted emission power level is to be understood here as the level measured at the antenna port, unless it is specified in terms of total radiated power (TRP).

...

<sup>4</sup> The limits apply under clear-sky conditions. During fading conditions, the limits may be exceeded by earth stations when using uplink power control.

...

...

*Editor's Note: Any additional provisions, based on ongoing studies, needed for non-GSO FSS gateway earth stations for protection of EESS (passive), including from aggregate GSO/non-GSO emissions, would be included in the box above.*

**Reasons:** Limit the unwanted emissions from the non-GSO FSS Earth stations falling in the band 52.6-54.25 GHz to protect the EESS (passive).

MOD USA/1.3/9

## RESOLUTION 769 (WRC-27)

### **Protection of geostationary fixed-satellite service, broadcasting-satellite service and mobile-satellite service networks from the aggregate interference produced by multiple non-geostationary fixed-satellite service systems in the frequency bands 37.5-39.5 GHz, 39.5-42.5 GHz, 47.2-50.2 GHz and 50.4-52.4 GHz**

The World Radiocommunication Conference (Shanghai, 2027),

*considering*

- a)* that the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-52.4 GHz (Earth-to-space) are allocated, *inter alia*, on a primary basis to the fixed-satellite service (FSS);
- b)* that the frequency bands 40.5-41 GHz and 41-42.5 GHz are allocated on a primary basis to the broadcasting-satellite service (BSS);
- c)* that the frequency bands 39.5-40 GHz (space-to-Earth) and 40-40.5 GHz (space-to-Earth) are allocated on a primary basis to the mobile-satellite service (MSS);
- d)* that Article 22 contains regulatory and technical provisions on sharing between geostationary-satellite (GSO) and non-geostationary-satellite (non-GSO) FSS systems in the frequency bands referred to in *considering a)*;
- e)* that, in accordance with No. 22.2, non-GSO systems shall not cause unacceptable interference to GSO FSS and GSO BSS networks and, unless otherwise specified in the Radio Regulations, shall not claim protection from GSO FSS and GSO BSS networks;
- f)* that administrations planning to operate non-GSO FSS systems require quantification of the technical regulatory measures required for protection of GSO FSS, GSO MSS and GSO BSS networks operating in the frequency bands referred to in *considering a), b)* and *c)* above;
- g)* that the operating parameters and orbital characteristics of non-GSO FSS systems are usually inhomogeneous;
- h)* that the time allowance for the *C/N* value specified in the short-term performance objective associated with the shortest percentage of time (lowest *C/N*) or decrease of the long-term throughput (spectral efficiency) caused to reference GSO FSS, GSO MSS and GSO BSS links by non-GSO FSS systems is likely to vary according to the parameters of such systems;
- i)* that the aggregate interference from multiple non-GSO FSS systems will be related to the actual number of systems sharing a frequency band based on the single-entry operational use of each system;
- j)* that, to protect GSO FSS, GSO MSS and GSO BSS networks in the frequency bands listed in *considering a), b)* and *c)* from unacceptable interference, the aggregate impact of interference caused by all co-frequency non-GSO FSS systems shall not exceed the aggregate impact limit specified in No. 22.5M;
- k)* that the aggregate levels are likely to be the summation of worst-case single-entry levels of interference caused by non-GSO FSS systems,

*noting*

- a) that Resolution **770 (Rev.WRC-27)\*** contains the methodology for determining conformity to the single-entry limits to protect the GSO networks;
- b) that Recommendation ITU-R S.1503 provides guidance on how to compute the equivalent power flux-density (epfd) levels from a non-GSO system into GSO earth stations and satellites;
- c) that Resolution **770 (Rev.WRC-27)** contains GSO system characteristics to be used in non-GSO/GSO frequency sharing analyses in the frequency bands 37.5-39.5 GHz, 39.5-42.5 GHz, 47.2-50.2 GHz and 50.4-52.4 GHz;
- d) that WRC-27 expanded the FSS (Earth-to-space) allocation in the frequency band 51.4-52.4 GHz to include non-geostationary-orbit systems limited to gateway earth stations,

*recognizing*

- a) that non-GSO FSS systems may need to implement interference mitigation techniques, such as avoidance angles, Earth station site diversity and GSO arc avoidance, to facilitate sharing frequencies among non-GSO FSS systems and to protect GSO FSS, GSO MSS and GSO BSS networks;
- b) that administrations operating or planning to operate non-GSO FSS systems will need to agree cooperatively through consultation meetings to share the aggregate interference allowance for all non-GSO FSS systems sharing the frequency bands listed in *considering a)* in order to achieve the desired level of protection for GSO FSS, GSO MSS and GSO BSS networks that is stated in No. **22.5M**;
- c) that administrations operating or planning to operate GSO FSS, GSO MSS or GSO BSS networks are invited to participate and be involved in the consultation meetings mentioned in *recognizing b)* above, especially as the aggregate interference level approaches the limits specified in No. **22.5M**;
- d) that, taking into account the single-entry allowance in No. **22.5L**, the aggregated worst-case impact of all non-GSO FSS systems can be computed without the need for specialized software tools, based on the results of the assessment of single-entry levels of interference caused by each system;
- e) that, in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-52.4 GHz (Earth-to-space), signals experience high levels of attenuation due to atmospheric effects such as rain, cloud cover and gaseous absorption;
- f) that, given these expected high levels of fading, it is desirable for GSO networks and non-GSO FSS systems to implement fade countermeasures such as automatic level control, power control and adaptive coding and modulation,

*resolves*

- 1 that administrations operating or planning to operate non-GSO FSS systems in the frequency bands referred to in *considering a)* above shall jointly take all necessary steps, including, if necessary, appropriate modifications to the operational characteristics of their systems or networks, to ensure that the aggregate interference impact to GSO FSS, GSO MSS and GSO BSS networks caused by such systems operating co-frequency in these frequency bands does not exceed the aggregate limits specified in No. **22.5M**;
- 2 that, to carry out the obligations in *resolves 1* above, administrations operating or planning to operate non-GSO FSS systems shall agree cooperatively through the regular consultation discussions referred to in *recognizing b)* to ensure that operations of all non-GSO FSS networks do not exceed the aggregate level of protection for GSO networks;

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\* *Note by the Secretariat:* This Resolution was revised by WRC-23.

3 that, taking into account *resolves 2*, failure by a responsible administration operating or planning to operate non-GSO FSS systems to participate in the consultation process does not relieve that administration of obligations under *resolves 1* above, nor does it remove their systems from consideration in any aggregate calculations by the consultation group;

4 that *resolves 2* and *3* above begin to apply when a second non-GSO FSS system with frequency assignments in the frequency bands referred to in *considering a)* meets the criteria listed in Annex 2 to this Resolution;

5 that, to carry out the obligations in *resolves 1* above, administrations shall use the generic GSO reference links listed in Resolution **770 (Rev.WRC-27)** and validated supplemental GSO links associated with notified and brought-into-use frequency assignments submitted to the Radiocommunication Bureau (BR) by administrations to determine the results of the aggregate impact on GSO networks;

6 that administrations (including representatives of administrations operating GSO FSS, GSO MSS and GSO BSS networks) participating in a consultation meeting are allowed to use their own software in conjunction with any software tools used by BR for the calculation and verification of the aggregate limits, subject to the agreement of the consultation meeting;

7 that administrations, in carrying out their obligations under *resolves 1* above, shall take into account only those non-GSO FSS systems with frequency assignments in the frequency bands referred to in *considering a)* above that have met the criteria listed in Annex 2 to this Resolution through appropriate information provided in the course of the consultation discussions referred to in *resolves 2*;

8 that administrations, in developing agreements to carry out their obligations under *resolves 1*, shall establish mechanisms to ensure that all notifying administrations and operators that are planning to operate FSS, BSS and MSS systems and networks are given full visibility of, and the opportunity to participate in, the consultation process, either in person or remotely, regardless of the stage of development and deployment of these systems and networks;

9 that, taking into account *resolves 2*, a responsible administration operating or planning to operate non-GSO FSS systems that is unable to participate in the consultation process, either in person or remotely, is still responsible for meeting its obligations under *resolves 1* above and for providing information on its systems so that they may be included in the aggregate calculations by the consultation group;

10 that each administration, in the absence of an agreement reached at consultation meetings referred to in *resolves 2*, shall ensure that each of its non-GSO FSS systems subject to this Resolution are operated in accordance with reduced single-entry interference impact allowances, calculated by an amount proportional to their single-entry contribution to the aggregate, so as to ensure that the aggregate allowance in No. **22.5M** is not exceeded;

11 that the administrations participating in the consultation discussion referred to in *resolves 2* shall designate one convener to be responsible for communicating to BR the results of the aggregate non-GSO system operational calculation and sharing determinations made in application of *resolves 1, 3* and *9* above, without regard to whether such determinations result in any modifications to the published characteristics of their respective systems, providing a draft record of each consultation meeting, and providing BR with the approved record, as specified in Annex 1 to this Resolution,

*invites administrations*

to submit to BR, as necessary, supplemental GSO links, in a format consistent with the generic links in Annex 1 to Resolution **770 (Rev.WRC-27)**, and in the frequency bands listed in *considering a)*, that are associated with GSO networks,

*invites the Radiocommunication Bureau*

to participate in the consultation meetings in *resolves 2* as an observer,

*invites the ITU Radiocommunication Sector*

- 1 to carry out studies and develop, as a matter of urgency, a suitable methodology, considering a range of input values and assumptions, including both best and worst case, for calculating the aggregate interference produced by all non-GSO FSS and as appropriate non-GSO MSS systems operating or planning to operate in the frequency bands referred to above co-frequency with GSO FSS, GSO MSS and GSO BSS networks, which may be used to determine whether the systems are in compliance with the aggregate limits specified in No. **22.5M**;
- 2 to carry out studies and develop, as a matter of urgency a methodology to validate supplemental GSO links;
- 3 to study the selection and use of *C/N* objectives, and the necessity of specifying one or more *C/N* objective points at associated percentages of time, with regard to the GSO link performance;
- 4 to report back to a future world radiocommunication conference, as appropriate, under Resolution **86 (Rev.WRC-07)**,

*instructs the Radiocommunication Bureau*

- 1 to collect and, once a methodology is available, evaluate for validation purposes and provide for information the supplemental GSO links submitted by administrations for frequency assignments associated with GSO networks;
- 2 to provide the consultation meeting, for use in the aggregate calculations, with the validated supplemental GSO links associated with networks brought into use;
- 3 to make available on the ITU website within one month from the closing date of any consultation meeting all information, such as that in Annex 2, referred to in *resolves* 11;
- 4 to exclude the aggregate calculations given in No. **22.5M** as part of a satellite network examination under No. **11.31**.

## ANNEX 1 TO RESOLUTION 769 (Rev.WRC-27)

**List of geostationary-satellite network characteristics and format of the result of the aggregate calculation to be provided to the Radiocommunication Bureau for publication for information**

**a) I GSO FSS and GSO BSS network characteristics to be used in the calculation of aggregate emissions from non-GSO FSS systems**

**b) I-1 GSO FSS, GSO MSS and GSO BSS network characteristics**

The GSO network characteristics to be considered in the aggregate calculation are the:

- – generic links contained in Annex 1 to Resolution **770 (Rev.WRC-27)**.

**c) I-2 Non-GSO FSS system constellation parameters**

For each non-GSO system, the following parameters should be provided to BR for publication in the aggregate calculation:

- – notifying administration;
- – number of space stations used in aggregate calculations;
- – single-entry contribution to the aggregate of each non-GSO FSS system.

**d) II Results of the aggregate epfd calculation**

- – summary record of the meeting;
- – single-entry contribution of each non-GSO FSS system;

- – detailed description of methodology used to calculate the aggregate interference;
- – the aggregate assessment of the non-GSO systems on the generic and validated supplemental GSO links, if any;
- – all input materials submitted to the meeting; and
- – studies conducted prior to or at the meeting as well as any other materials deemed necessary for demonstrating compliance with No. **22.5M**.

ANNEX 2 TO RESOLUTION 769 (Rev.WRC-27)

**List of criteria for the application of *resolves* 7**

1 Submission of appropriate coordination and/or notification information for non-GSO FSS systems.

2 Entry into satellite manufacturing or procurement agreement, and entry into satellite launch agreement.

The non-geostationary FSS system operator should possess:

- i) evidence of a binding agreement for the manufacture or procurement of its satellites; and
- ii) evidence of a binding agreement to launch its satellites.

The manufacturing or procurement agreement should identify the contract milestones leading to the completion of manufacture or procurement of satellites required for the service provision, and the launch agreement should identify the launch date, launch site and launch service provider. The notifying administration is responsible for authenticating the evidence of an agreement. The information required under this criterion may be submitted in the form of a written commitment by the responsible administration.

3 As an alternative to satellite manufacturing or procurement and launch agreements, evidence of guaranteed funding arrangements for the implementation of the project would be accepted. The notifying administration is responsible for authenticating the evidence of these arrangements and for providing such evidence to other interested administrations in furtherance of its obligations under this Resolution.

**Reasons:** Update Resolution **769** for the new non-GSO FSS uplink in 51.4-52.4 GHz.

## RESOLUTION 770 (REV.WRC-27)

**Application of Article 22 of the Radio Regulations to the protection of geostationary fixed-satellite service and broadcasting-satellite service networks from non-geostationary fixed-satellite service systems in the frequency bands 37.5-39.5 GHz, 39.5-42.5 GHz, 47.2-50.2 GHz and 50.4-52.4 GHz**

The World Radiocommunication Conference (Shanghai, 2027),

*considering*

- a) that geostationary-satellite (GSO) and non-geostationary-satellite (non-GSO) fixed-satellite service (FSS) networks may operate in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-52.4 GHz (Earth-to-space);
- b) that WRC-19 adopted Nos. **22.5L** and **22.5M**, which contain single-entry and aggregate limits for non-GSO FSS systems in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) to protect GSO networks operating in the same frequency bands, and WRC-27 modified Nos. **22.5L** and **22.5M** to include the frequency band 51.4-52.4 GHz;
- c) that the ITU Radiocommunication Sector (ITU-R) has developed a methodology, contained in Recommendation ITU-R S.1503, that results in the equivalent power flux-density (epfd) generated by any one non-GSO FSS system considered and a GSO location that corresponds to the worst-case geometry that generates the highest levels of epfd into potentially affected GSO earth stations and satellites;
- d) that WRC-27 expanded the FSS (Earth-to-space) allocation in the frequency band 51.4-52.4 GHz to include non-geostationary-orbit systems limited to gateway earth stations,

*recognizing*

- a) that, in accordance with calculations utilizing Recommendation ITU-R S.1503, verification of the worldwide epfd interference of any one non-GSO system can be carried out by a set of generic GSO reference link budgets having characteristics that encompass global GSO network deployments that are independent of any specific geographical locations;
- b) that Resolution **769 (Rev.WRC-27)** addresses the protection of GSO networks from aggregate emissions from non-GSO systems,

*resolves*

- 1 that, during the examination under Nos. **9.35** and **11.31**, as applicable, of a non-GSO FSS satellite system with frequency assignments in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-52.4 GHz (Earth-to-space), compliance with No. **22.5L** shall be verified using the technical characteristics of generic GSO reference links contained in Annex 1 to this Resolution and Recommendation ITU-R S.2157-0;
- 2 that frequency assignments to non-GSO FSS systems referred to in *resolves* 1 shall receive a favourable finding with respect to the single-entry provision given in No. **22.5L** if compliance with No. **22.5L** is established under *resolves* 1, otherwise the assignments shall receive an unfavourable finding;
- 3 that, if the Radiocommunication Bureau (BR) is unable to examine non-GSO FSS systems subject to the single-entry provision given in No. **22.5L** due to a lack of available software, the notifying administration shall provide all necessary information sufficient to demonstrate

compliance with No. **22.5L** and send BR a commitment that the non-GSO FSS system complies with the limits given in No. **22.5L**;

4 that frequency assignments to non-GSO FSS systems that cannot be assessed under *resolves* 1 shall receive a qualified favourable finding under Nos. **9.35** and **11.31** with respect to No. **22.5L** if *resolves* 3 is satisfied, otherwise the assignments shall receive an unfavourable finding;

5 that, if an administration believes that a non-GSO FSS system for which the commitment referred to in *resolves* 3 was sent has the potential to exceed the limits given in No. **22.5L**, it may request additional information from the notifying administration with regard to compliance with these limits and No. **22.2**, and both administrations shall cooperate to resolve any difficulties, with the assistance of BR, if so requested by either of the parties;

6 that *resolves* 3, 4 and 5 shall no longer be applied after BR has communicated to all administrations via a circular letter that validation software is available and BR is able to verify compliance with the limits in No. **22.5L**,

*invites the ITU Radiocommunication Sector*

1 to study and, as appropriate, develop a functional description that could be used to develop software for the procedures outlined in *resolves* 1 above;

2 to review and, as appropriate, provide updates to the generic GSO reference links in Annex 1 to this Resolution under Resolution **86 (Rev.WRC-07)**,

*instructs the Director of the Radiocommunication Bureau*

1 to take all necessary measures to facilitate the implementation of this Resolution, in particular to accelerate the development of the validation software;

2 to send, once the validation software as described in *resolves* 3 above is available, a letter to administrations having submitted coordination requests and/or notification information for frequency assignments to non-GSO FSS satellite systems for which a qualified favourable finding has been issued under *resolves* 4, to offer the possibility to modify, within 90 days following publication of the circular letter referred to in *resolves* 6, their associated Appendix 4 parameters, limited to items listed under A.4.b.6*bis*, A.4.b.6.a, A.4.b.7 and A.14, and to retain the protection date of the initial frequency assignments, provided that the modified frequency assignments receive a favourable finding under No. **9.35** or No. **11.31**, as applicable, with respect to No. **22.5L**;

3 to review, once the validation software referred to in *resolves* 3 is available, BR's findings made in accordance with Nos. **9.35** and **11.31** under *resolves* 4.

## ANNEX 1 TO RESOLUTION 770 (REV.WRC-27)

...

**Reasons:** Update Resolution **770** for the new non-GSO FSS uplink in 51.4-52.4 GHz.

SUP USA/1.3/11

RESOLUTION 130 (WRC-23)

**Studies relating to the use of the frequency band 51.4-52.4 GHz to enable its use by gateway earth stations transmitting to non-geostationary-satellite orbit systems in the fixed-satellite service (Earth-to-space)**

**Reasons:** Consequential

## UNITED STATES OF AMERICA

### DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

#### Agenda Item 1.4

**Agenda Item 1.4** to consider a possible new primary allocation to the fixed-satellite service (space-to-Earth) in the frequency band 17.3-17.7 GHz and a possible new primary allocation to the broadcasting-satellite service (space-to-Earth) in the frequency band 17.3-17.8 GHz in Region 3, while ensuring the protection of existing primary allocations in the same and adjacent frequency bands, and to consider equivalent power flux-density limits to be applied in Regions 1 and 3 to non-geostationary-satellite systems in the fixed-satellite service (space-to-Earth) in the frequency band 17.3-17.7 GHz, in accordance with Resolution **726 (WRC-23)**;

Resolution **726 (WRC-23)** – Possible new primary allocation to the fixed-satellite service (space-to-Earth) in the frequency band 17.3-17.7 GHz and possible new primary allocation to the broadcasting-satellite service (space-to-Earth) in the frequency band 17.3-17.8 GHz in Region 3, and consideration of equivalent power flux-density limits to be applied in Regions 1 and 3 to non-geostationary-satellite systems in the fixed-satellite service (space-to-Earth) in the frequency band 17.3-17.7 GHz

#### **Background:**

WRC-23 recognized the critical need to support new technologies in the fixed-satellite service (FSS) for broadband delivery, and to address the disparity in usable downlink bandwidth in the FSS in Region 3, compared with Regions 1 and 2, for the frequency range 17-20 GHz associated with the uplink frequency range of 27-30 GHz. The frequency band 17.3-17.7 GHz is already allocated to the FSS (space-to-Earth) in Region 1 and coexists with BSS user links (space-to-Earth) in Region 1, as well as with feeder links (Earth-to-space) that are subject to Appendix 30A in all three Regions. In addition, WRC-23 agreed a new primary allocation to the FSS in the space-to-Earth direction in the frequency band 17.3-17.7 GHz in Region 2 was necessary, feasible and could coexist with the existing BSS (space-to-Earth) allocation in the 17.3-17.8 GHz band in the Region.

Considering the above, WRC-23 established agenda item 1.4 to study a new primary allocation to the fixed-satellite service (space-to-Earth) in the frequency band 17.3-17.7 GHz, a new primary allocation to the broadcasting-satellite service (space-to-Earth) in the frequency band 17.3-17.8 GHz in Region 3 and to consider equivalent power flux-density limits to be applied in Regions 1 and 3 to non-geostationary-satellite systems in the fixed-satellite service (space-to-Earth) in the frequency band 17.3-17.7 GHz. In accordance with Resolution **726 (WRC-23)**, WRC-23 invited sharing and compatibility studies between the FSS (space-to-Earth) and BSS (space-to-Earth) with existing services in co-frequency and adjacent bands for either of these new allocations in Region 3. The outcome of these studies should guarantee that the protection of existing primary services would be possible without adversely affecting the existing allocations to the FSS and BSS, including assignments to the BSS feeder links in Appendix **30A**, and FSS NGSO (Earth-to-space). WRC-23 further invited consideration of the applicability of Region 2 non-GSO FSS efpd limits pertaining to the frequency band 17.3-17.7 GHz to Regions 1 and 3, so as to ensure the protection to GSO networks.

Prior to WRC-23, in Region 2, the 17.3-17.7 GHz frequency band was allocated to the unplanned GSO BSS (by definition, a downlink) and the GSO FSS in the Earth-to-space direction, although limited to BSS feeder links operating under Appendix **30A** (AP**30A**). At WRC-23, the suggested FSS downlink allocation, was deemed technologically similar to the operations of the incumbent BSS allocation, and as such became subject to coordination under No. **9.7** through a coordination trigger defined in Appendix **5**. For ground path interference, where a transmitting feeder link earth station may cause interference with nearby receiving FSS earth stations, sharing procedures exist through the application of site coordination under Article **6** of Appendix **30A** using the coordination area determined by Appendix **7**.

For NGSO FSS operations in this band, the protection of the BSS and the AP30A was ensured by extending the provisions of Article **22** to the Region 2 FSS (space-to-Earth) allocation in the frequency band 17.3-17.7 GHz, by including these frequencies to Table 22-1B for the application of  $epfd_{\downarrow}$  and to Table 22-3 for the application of  $epfd_{is}$ . Sharing between FSS NGSOs was assured by extending the application of No. **9.12** (NGSO-NGSO coordination) to 17.3-17.7 GHz (space-to-Earth) in Region 2.

Current satellite communication trends encourage the development and implementation of new technologies in FSS for broadband applications to provide high-capacity and low-cost means of broadband communication even to the most isolated regions of the world. The allocation of the 17.3-17.7 GHz to FSS in Region 3 would facilitate global harmonization in the use of satellite radiocommunication technology and would facilitate the efficient use of this spectrum worldwide while aligning with the Regions 1 and 2 Table of Allocations. The inclusion of an FSS downlink allocation in 17.3-17.7 GHz in Region 3 would provide a contiguous amount of FSS spectrum for broadband applications throughout all three Regions.

The proposals below constitute a comprehensive set of regulatory changes fully within the scope of AI 1.4 and Resolution **726 (WRC-23)**. These proposals preserve the existing FSS (Earth-to-space) allocation and No. 5.516, consistent with Resolution 726's directive that studies be conducted without adversely affecting the existing allocations to the FSS (Earth-to-space). Moreover, the  $epfd$  limits proposed herein are based on global harmonization principles, drawing from the established Region 2 regulatory framework developed under AI 1.19 for WRC-23. Consistent with the WRC-23 plenary minutes, these limits remain under study. . This approach maximizes both harmonization among the regions and functionality for operators and incumbents. Finally, this proposal does not seek to modify Resolution **35 (Rev.WRC-23)** to include the 17.3-17.7 GHz FSS (space-to-Earth) band in the Table in *resolves* 1. The Bureau is tasked by the Resolution to identify and report on specific bands for possible addition to the Table, and this consideration could be handled under either Agenda Item 4 or Agenda Item 9.2, if appropriate.

**Proposals:****MOD** USA/AI 1.4/1

TABLE 5-1 (Rev.WRC-27)

**Technical conditions for coordination**  
(see Article 9)

## ARTICLE 5

**Frequency allocations****Section IV – Table of Frequency Allocations**  
(See No. 2.1)**15.4-18.4 GHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
<b>17.3-17.7</b> FIXED-SATELLITE (Earth-to-space) 5.516 (space-to-Earth) MOD 5.484A 5.516A 5.516B Radiolocation  5.514	<b>17.3-17.7</b> FIXED-SATELLITE (Earth-to-space) 5.516 (space-to-Earth) MOD 5.484A 5.515A 5.515B 5.517 BROADCASTING- SATELLITE Radiolocation  5.514 5.515	<b>17.3-17.7</b> FIXED-SATELLITE (Earth-to-space) 5.516 (space-to-Earth) MOD 5.484A ADD 5.515CRadiolocation  5.514

**Reasons:** Introduce the FSS (space-to-Earth) allocation in the frequency band 17.3-17.7 GHz in Region 3 and apply the No. **5.515C** (based on existing No. **5.516A** applying in Region 1) to this new allocation. Also, No. **5.484A** is modified to extend the use of the frequency band 17.3-17.7 GHz (space-to-Earth) in Region 3, for application of the provisions of No. **9.12** for non-GSO satellite systems.

**MOD** USA/AI 1.4/2

**5.484A** The use of the frequency bands 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), 11.7-12.2 GHz (space-to-Earth) in Region 2, 12.2-12.75 GHz (space-to-Earth) in Region 3, 12.5-12.75 GHz (space-to-Earth) in Region 1, 13.75-14.5 GHz (Earth-to-space), 17.3-17.7 GHz (space-to-Earth), 17.8-18.6 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 27.5-28.6 GHz (Earth-to-space), 29.5-30 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to application of the provisions of No. **9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. **5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in

the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. (WRC-27)

**Reasons:** No. **5.484A** is modified to extend the application of the provisions of No. **9.12** for coordination between non-GSO FSS systems in the FSS in the frequency band 17.3-17.7 GHz (space-to-Earth) in Regions 1 and 3. In Region 1, non-GSOs are subject to coordination under No. **9.12** as per the Rule of Procedure (RoP) of No. **9.11A**, Table 9.11A-1. The RoP of No. **9.11A** should be updated by the Radio Regulations Board after WRC-23 to include the frequency bands considered under revised No. **5.484A** which would imply that No. **9.12** would be applied in both directions by default. The last sentence of No. **5.484A** is unnecessary.

**ADD** USA/AI 1.4/3

**5.515C** In the band 17.3-17.7 GHz, earth stations of the fixed-satellite service (space-to-Earth) in Region 3 shall not claim protection from the broadcasting-satellite service feeder-link earth stations operating under Appendix **30A**, nor put any limitations or restrictions on the locations of the broadcasting-satellite service feeder-link earth stations anywhere within the service area of the feeder link. (WRC-27)

**Reasons:** Extend the applicability of the footnote No. **5.516A** to Region 3 following the same approach as the one retained by WRC-23 with a dedicated footnote allowing specific provisions for Region 3 as appropriate without impacting Region 1.

## ARTICLE 22

### Space services<sup>1</sup>

## Section II – Control of interference to geostationary-satellite systems

MOD USA/AI 1.4/4

TABLE 22-1B (Rev.WRC-27)

**Limits to the epfd<sub>↓</sub> radiated by non-geostationary-satellite systems  
in the fixed-satellite service in certain frequency bands<sup>3, 6, 8, 8bis</sup>**

Frequency band (GHz)	epfd <sub>↓</sub> (dB(W/m <sup>2</sup> ))	Percentage of time during which epfd <sub>↓</sub> may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter and reference radiation pattern <sup>7</sup>
17.3-17.7 17.8-18.6	-175.4	0	40	1 m Recommendation <a href="#">ITU-R S.1428-1</a>
	-175.4	90		
-172.5	99			
-167	99.714			
-164	99.971			
-164	100			
-161.4	0	1 000		
-161.4	90			
-158.5	99			
-153	99.714			
-150	99.971			
-150	100			
	-178.4	0	40	2 m Recommendation ITU-R S.1428-1
	-178.4	99.4		
	-171.4	99.9		
	-170.5	99.913		
	-166	99.971		
	-164	99.977		
	-164	100		
	-164.4	0	1 000	
	-164.4	99.4		
	-157.4	99.9		
	-156.5	99.913		
	-152	99.971		
	-150	99.977		
	-150	100		
	-185.4	0	40	5 m Recommendation ITU-R S.1428-1
	-185.4	99.8		
	-180	99.8		
	-180	99.943		
	-172	99.943		
	-164	99.998		
-164	100			
-171.4	0	1 000		
-171.4	99.8			
-166	99.8			
-166	99.943			
-158	99.943			
-150	99.998			
-150	100			

**Reasons:** to extend the applicability in Regions 1 and 3 of Table **22-1B** epfd limits to the frequency band 17.3-17.7 GHz to non-GSO systems to protect downlink operations (space-to-Earth) for the Fixed Satellite Service (FSS) of GSO satellite networks.

MOD USA/AI 1.4/5

TABLE 22-3 (Rev.WRC-27)

**Limits to the  $epfd_{is}$  radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands<sup>19, 19bis</sup>**

Frequency band (GHz)	$epfd_{is}$ (dB(W/m <sup>2</sup> ))	Percentage of time during which $epfd_{is}$ level may not be exceeded	Reference bandwidth (kHz)	Reference antenna beamwidth and reference radiation pattern <sup>20</sup>
10.7-11.7 (Region 1) 12.5-12.75 (Region 1) 12.7-12.75 (Region 2)	-160	100	40	4° Recommendation ITU-R S.672-4, $L_s = -20$
17.3-17.7 17.8-18.4	-160	100	40	4° Recommendation ITU-R S.672-4, $L_s = -20$

MOD USA/AI 1.4/6

<sup>19bis</sup> **22.5F.4** A non-geostationary-satellite system operating in any Region, at any position in the orbit, shall meet the limits of this table for the 17.3-17.7 GHz band with respect to a receiving space station in the broadcasting-satellite feeder link of Appendix **30A**, in all three Regions. (WRC-27)

**Reasons:** Extend the applicability of Table **22-3** epfd limits to ensure the protection of the assignments of receiving geostationary satellite systems under Appendix **30A** from the interference produced by non-geostationary satellite systems of the fixed-satellite service.

MOD USA/AI 1.4/7

TABLE 22-4B (Rev.WRC-27)

**Operational limits to the epfd↓ radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands<sup>21, 25</sup>**

Frequency band (GHz)	epfd↓ (dB(W/m <sup>2</sup> ))	Percentage of time during which epfd↓ may not be exceeded	Reference bandwidth h (kHz)	Geostationary-satellite system receive earth station antenna gain (dBi)	Orbital inclination of geostationary satellite (degrees)
19.7-20.2	-157	100	40	≥ 49	≤ 2.5
	-157	100	40	≥ 43 <sup>25</sup>	≤ 2.5
	-155	100	40	≥ 49	> 2.5 and ≤ 4.5
19.7-20.2	-143	100	1 000	≥ 49	≤ 2.5
	-143	100	1 000	≥ 43 <sup>25</sup>	≤ 2.5
	-141	100	1 000	≥ 49	> 2.5 and ≤ 4.5
17.3-17.7	-164	100	40	≥ 49	≤ 2.5
17.8-18.6	-162	100	40	≥ 49	> 2.5 and ≤ 4.5
17.3-17.7	-150	100	1 000	≥ 49	≤ 2.5
17.8-18.6	-148	100	1 000	≥ 49	> 2.5 and ≤ 4.5

**Reasons:** In order to extend the applicability of Table 22-4B epfd limits to the frequency band 17.3-17.7 GHz in all three Regions.

MOD USA/AI 1.4/8

APPENDIX 30A (REV.WRC-27)\*

**Provisions and associated Plans and List<sup>1</sup> for feeder links for the broadcasting-satellite service (11.7-12.5 GHz in Region 1, 12.2-12.7 GHz in Region 2 and 11.7-12.2 GHz in Region 3) in the frequency bands 14.5-14.8 GHz<sup>2</sup> and 17.3-18.1 GHz in Regions 1 and 3, and 17.3-17.8 GHz in Region 2 (WRC-27)**

**Reasons:** Consequential

MOD USA/AI 1.4/9

## ARTICLE 7 (Rev.WRC-27)

**Coordination, notification and recording in the Master International Frequency Register of frequency assignments to stations in the fixed-satellite service (space-to-Earth) in the frequency band 17.3-18.1 GHz to stations in the fixed-satellite service (Earth-to-space) in Region 2 in the frequency bands 14.5-14.8 GHz and 17.8-18.1 GHz, to stations in the fixed-satellite service (Earth-to-space) in countries listed in Resolution 163 (WRC-15) in the frequency band 14.5-14.75 GHz and in countries listed in Resolution 164 (WRC-15) in the frequency band 14.5-14.8 GHz where those stations are not for feeder links for the broadcasting-satellite service, and to stations in the broadcasting-satellite service in Region 2 in the frequency band 17.3-17.8 GHz when frequency assignments to feeder links for broadcasting-satellite stations in the frequency bands 14.5-14.8 GHz and 17.3-18.1 GHz in Regions 1 and 3 or in the frequency band 17.3-17.8 GHz in Region 2 are involved<sup>28</sup> (Rev.WRC-27)**

**Section I – Coordination of transmitting space or earth stations in the fixed-satellite service or transmitting space stations in the broadcasting-satellite service with assignments to broadcasting-satellite service feeder links**

**Reasons:** Consequential to extending FSS (space-to-Earth) to 17.3-17.7 GHz in Region 3.

MOD USA/AI 1.4/10

7.1 The provisions of No. 9.7 and the associated provisions under Articles 9 and 11 are applicable to transmitting space stations in the fixed-satellite service in the frequency band 17.3-18.1 GHz, to transmitting earth stations in the fixed-satellite service in Region 2 in the frequency bands 14.5-14.8 GHz and 17.8-18.1 GHz, to transmitting earth stations in the fixed-satellite service in countries listed in Resolution 163 (WRC-15) in the frequency band 14.5-14.75 GHz and in countries listed in Resolution 164 (WRC-15) in the frequency band 14.5-14.8 GHz where those stations are not for feeder links for the broadcasting-satellite service, and to transmitting space stations in the broadcasting-satellite service in Region 2 in the frequency band 17.3-17.8 GHz. (WRC-27)

**Reasons:** Extend the applicability of the provisions in Appendix 30A, Article 7, to the FSS (space-to-Earth) in the frequency band 17.3-17.7 GHz.

**MOD** USA/AI 1.4/11

**APPENDIX 5 (REV.WRC-27)**

**Identification of administrations with which coordination is to be effected or agreement sought under the provisions of Article 9**

**Reasons:** Consequential.

MOD USA/AI 1.4/12

TABLE 5-1 (continued) (Rev.WRC-27)

Reference of Article 9	Case	Frequency bands (and Region) of the service for which coordination is sought	Threshold/condition	Calculation method	Remarks
...					
No. 9.7 GSO/GSO (cont.)		<p>2bis) 13.4-13.65 GHz (Region 1)</p> <p>3) 17.3-19.7 GHz and 27.5-29.5 GHz</p> <p>3bis) 19.7-20.2 GHz and 29.5-30 GHz</p>	<p>i) Bandwidth overlap, and</p> <p>ii) any network in the space research service (SRS) or any network in the FSS and any associated space operation functions (see No. 1.23) with a space station within an orbital arc of <math>\pm 6^\circ</math> of the nominal orbital position of a proposed network in the FSS or SRS</p> <p>i) Bandwidth overlap, and</p> <p>ii) any network in the FSS and any associated space operation functions (see No. 1.23) with a space station within an orbital arc of <math>\pm 8^\circ</math> of the nominal orbital position of a proposed network in the FSS</p> <p>i) Bandwidth overlap, and</p> <p>ii) any network in the FSS or in the mobile-satellite service (MSS) and any associated space operation functions (see No. 1.23) with a space station within an orbital arc of <math>\pm 8^\circ</math> of the nominal orbital position of a</p>		

			<p>proposed network in the FSS or in the MSS.</p>		
<p>...</p>					

**Reasons:** Covers the coordination of two GSO networks of the FSS (except earth stations operating in opposite directions of transmission) under No. 9.7.

SUP USA/AI 1.4/13

RESOLUTION 726 (WRC-23)

**Possible new primary allocation to the fixed-satellite service (space-to-Earth) in the frequency band 17.3-17.7 GHz and possible new primary allocation to the broadcasting-satellite service (space-to-Earth) in the frequency band 17.3-17.8 GHz in Region 3, and consideration of equivalent power flux-density limits to be applied in Regions 1 and 3 to non-geostationary-satellite systems in the fixed-satellite service (space-to-Earth) in the frequency band 17.3 17.7 GHz**

**Reasons:** Consequential. Studies are complete

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## United States of America

### PROPOSALS FOR THE WORK OF THE CONFERENCE

#### Agenda item 1.5

**Agenda Item 1.5:** *to consider regulatory measures, and implementability thereof, to limit the unauthorized operations of non-geostationary-satellite orbit earth stations in the fixed-satellite and mobile-satellite services and associated issues related to the service area of non-geostationary-satellite orbit satellite systems in the fixed-satellite and mobile-satellite services, in accordance with Resolution 14 (WRC-23);*

#### I. BACKGROUND

WRC-23 considered reports regarding the presence of unauthorized transmissions from transmitting earth stations of non-GSO fixed-satellite service (FSS) and mobile-satellite service (MSS) systems within the territory of administrations that had not authorized such operations. Resolution **14 (WRC-23)** was developed in response to these concerns and invites the ITU-R to study regulatory and implementability aspects of limiting unauthorized non-GSO earth station operations.

However, the existing provisions of the Radio Regulations already provide a comprehensive and sufficient international framework. Notably, Article **18** mandates licensing requirements for all transmitting stations. No. **18.1** of the Radio Regulations states that no transmitting station may be established or operated “... without a licence issued in an appropriate form and in conformity with the provisions of these Regulations by or on behalf of the government of the country to which the station in question is subject”. Furthermore, Resolution **22 (Rev.WRC-23)** clarifies, *inter alia*, that the operation of transmitting earth stations within the territory of an administration shall be carried out only if the operation is authorized by that administration, and Resolution **25 (Rev.WRC-23)** specifies that global satellite systems must be licensed so that terminals only operate within authorized territories, in accordance with Articles **17** and **18**.

These regulatory provisions support Member States’ sovereign right to control and authorize satellite services within their territories, and include an appropriate and technology-neutral framework for addressing Earth-to-space unauthorized operations of non-GSO FSS and MSS earth stations.

Non-GSO FSS and MSS satellite systems provide crucial communication services worldwide. Additionally, some non-GSO systems provide essential safety of life communications for global aeronautical and maritime services. Existing provisions impose mandatory licensing and authorization obligations which respect the sovereignty and responsibilities of individual Member States. It is important to avoid overregulation and ensure the continuity of essential communication services, particularly in emergency and distress scenarios. Any regulatory changes that negatively affect non-GSO services and undercut the current effective framework should be avoided.

Furthermore, ITU-R studies under Resolution **14** have not yielded any practical regulatory or technical proposals that can address the specific ask of Resolution 14, or be widely implemented. Technical measures such as geofencing, coverage exclusion, and NMNC-based control mechanisms might work for certain system designs, but they are not suitable for a variety of system architectures. Importantly, in systems built for global coverage, including for continuous and safety-of-life r communications, these mechanisms could negatively affect service availability in authorized regions.

With respect to the studies under *resolves* 2 of Resolution **14 (WRC-23)**, and noting that any Member States may wish to exclude its territory from the service area of a non-GSO FSS or MSS system, no measures were identified that could either effect such an exclusion of territory without adversely affecting the provision of service in the rest of the service area of the non-GSO satellite system, or be considered implementable by administrations operating non-GSO FSS or MSS systems with worldwide coverage areas.

Discussions within ITU-R have raised questions about whether satellite terminals can be remotely deactivated when they operate in unauthorized areas, or whether certain territories can be excluded from a non-GSO system's service area without affecting service elsewhere. Although these considerations do not justify changes to the Radio Regulations, their relevance to specific technical architectures could be recognized in ITU-R Reports.

Finally, the United States recognizes that there could be non-mandatory actions taken by the ITU-R in the form of recommendations, reports or handbooks containing guidance (e.g., consolidated best practices for licensing, notification, monitoring, and incident response) for administrations choosing not to authorize access to non-GSO FSS or MSS systems from their territories, or guidance or reminders from the Bureau or RRB as appropriate and warranted by situations that may arise over time. Such measures, however, do not require or warrant any action by WRC-27 under WRC-27 agenda item 1.5.

In light of the comprehensive regulatory framework already in place and the absence of clearly defined measures responsive to Resolution 14 that are implementable across all non-GSO systems, the United States proposes no change to the Radio Regulations under Agenda Item 1.5.

## II. PROPOSALS

### NOC USA/1.5/1

#### Volumes 1 and 2 of the Radio Regulations

Proposal: No change to the Radio Regulations under Agenda Item 1.5.

Reasons: The current Radio Regulations, including Article **18**, Resolution **22 (Rev.WRC-23)**, and Resolution **25 (Rev.WRC-23)**, provide a comprehensive framework for licensing and controlling

satellite earth stations. These tools already address unauthorized operations, and no further regulatory measures are necessary.

**NOC** USA/1.5/2

RESOLUTION 22 (REV.WRC-23)

**Measures to limit unauthorized uplink transmissions from earth stations**

Reasons: The current Radio Regulations, including Article 18, Resolution 22 (Rev.WRC-23), and Resolution 25 (Rev.WRC-23), provide a comprehensive framework for licensing and controlling satellite earth stations. These tools already address unauthorized operations, and no further regulatory measures are necessary.

**NOC** USA/1.5/3

RESOLUTION 25 (REV.WRC-23)

**Operation of global satellite systems for personal communications**

Reasons: The current Radio Regulations, including Article 18, Resolution 22 (Rev.WRC-23), and Resolution 25 (Rev.WRC-23), provide a comprehensive framework for licensing and controlling satellite earth stations. These tools already address unauthorized operations, and no further regulatory measures are necessary.

**SUP** USA/1.5/4

RESOLUTION 14 (WRC-23)

**Studies on development of regulatory measures, and implementability thereof, to limit the unauthorized operations of non-geostationary-satellite orbit (non-GSO) earth stations in the fixed-satellite service (FSS) and mobile-satellite service (MSS) and associated issues related to the service area of non-GSO FSS and MSS satellite systems**

Reason:

Resolution 14 should be suppressed because the existing international regulatory framework adequately addresses the matters under study. The studies have not identified a technically viable and universally implementable basis for regulatory change.

## United States of America

### DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

#### Agenda item 1.11

**Agenda Item 1.11** *to consider the technical and operational issues, and regulatory provisions, for space-to-space links among non-geostationary and geostationary satellites in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660 MHz, 1 670-1 675 MHz and 2 483.5-2 500 MHz allocated to the mobile-satellite service, in accordance with Resolution 249 (Rev. WRC-23);*

#### **Background**

There are non-geostationary-satellite orbit (non-GSO) satellites that operate with limited and non-real-time connectivity to earth stations. Having continuous (or near-continuous) communication across their orbits would significantly enhance the availability and value of collected instrument data for applications requiring low latency and would help overcome their traditional orbital and operational limitations. To achieve continuous (or near-continuous) communications for such non-GSO satellites across their orbits, the global and near-global coverage provided by non-GSO and GSO Mobile-satellite service (MSS) systems, using space-to-space links, can be leveraged.

Recent advances in technology have made this approach feasible, with the development of a range of space terminals capable of operating space-to-space links with existing MSS systems and relaying data to or from the ground. By utilizing space-to-space communication links between lower-altitude non-GSO small satellites (“user space stations”) and non-GSO and GSO MSS service provider space stations (operating at higher orbital altitudes), to relay data to or from the ground, a range of new opportunities becomes possible.

It is noted that the number of filings for transmissions between non-GSO space stations and GSO satellite systems, as well as between non-GSO space stations and non-GSO systems, is increasing, albeit currently under RR No. 4.4. Because RR No. 4.4 operations are not reflected in the Table of Frequency Allocations and do not establish a stable, generally applicable regulatory basis, continued reliance on No. 4.4 for these growing filings creates uncertainty and is not an adequate substitute for clear Radio Regulations provisions.

The following terminology is used to describe the host MSS networks and systems and the small satellite user stations:

- An “MSS service provider space station” is considered to be a space station transmitting in a band allocated to the MSS (space-to-Earth) towards user space stations which receive within the framework of the MSS (space-to-space) or inter-satellite service (ISS) at lower altitudes, and receiving in a band allocated to the MSS (Earth-to-space) from user space stations at lower altitudes, all within the notified beams of the MSS service provider network or system.
- A “user space station” is considered to be a space station transmitting within the framework of the MSS (s-s) or ISS in a band allocated to the MSS (Earth-to-space) towards MSS service provider space stations at higher altitudes, and receiving in a band allocated to the MSS (space-to-Earth) from MSS service provider space stations at higher altitudes, all within the notified beams of the MSS service provider network or system.

The ITU-R has conducted extensive sharing and compatibility studies to assess the feasibility of introducing satellite-to-satellite links in many of the frequency bands called out in Resolution **249 (Rev. WRC-23)**. Based on these studies, the United States of America proposes that use of satellite-to-satellite links be recognized in the Radio Regulations within the mobile-satellite service in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and 1 670-1 675 MHz with transmissions limited to the same direction of transmission (e.g., Earth-to-space or space-to-Earth) of the GSO or non-GSO MSS service providers' space station. The non-GSO user is to be part of the MSS network or system providing the service and will operate in a manner that replicates the operations of other users of the MSS network or system. Other user space stations, e.g., space science satellite, would include MSS frequencies and be part of the MSS network or system as a non-GSO space station

A proposed new WRC-27 Resolution establishes operating conditions and regulatory rules for use of satellite-to-satellite links and to protect incumbent services' operations.

Accordingly, the following proposals set out the associated Radio Regulations modifications, including updates to Article 5 and related provisions, and a new WRC-27 Resolution to implement this approach.

**Proposals****ARTICLE 5****Frequency allocations****Section IV – Table of Frequency Allocations**  
(See No. 2.1)**MOD USA/4344A11/1****1 300-1 525 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
...	...	...
<b>1 492-1 518</b> FIXED MOBILE except aeronautical mobile 5.341A 5.341 5.342	<b>1 492-1 518</b> FIXED MOBILE 5.341B 5.343 5.341 5.344	<b>1 492-1 518</b> FIXED MOBILE 5.341C 5.341
<b>1 518-1 525</b> FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) (space-to-space) MOD 5.348 MOD 5.348A MOD 5.348B 5.351A ADD 5.A111 5.341 5.342	<b>1 518-1 525</b> FIXED MOBILE 5.343 MOBILE-SATELLITE (space-to-Earth) (space-to-space) MOD 5.348 MOD 5.348A MOD 5.348B 5.351A ADD 5.A111 5.341 5.344	<b>1 518-1 525</b> FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) (space-to-space) MOD 5.348 MOD 5.348A MOD 5.348B 5.351A ADD 5.A111 5.341

**Reasons:** Include footnote in Article 5 recognizing satellite-to-satellite operations as part of the mobile-satellite service in the indicated frequency bands.

**ADD USA/4344A11/2**

5.A111 The frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and 1 670-1 675 MHz, are also allocated to the mobile-satellite service (space-to-space), Resolution XXX (WRC-27) shall apply. Use of the frequency bands 1 525-1 544 MHz, 1 545-1 559 MHz, 1 626.5-1 645.5 MHz and 1 646.5-1 660 MHz by space stations in the mobile-satellite service (space-to-space), shall be limited to space-to-space links between non-geostationary satellites and geostationary satellites. No. 4.10 does not apply.(WRC-27)

**Reasons:** New footnote recognizing satellite-to-satellite operations in the mobile-satellite service in the indicated frequency bands with provisions for operation specified in a new WRC-27 Resolution. Such use would not fall under the safety service provisions of Article 4.10.

**MOD USA/4344A11/3**

**5.348** The use of the band 1 518-1 525 MHz by the mobile-satellite service (space-to-Earth) is subject to coordination under No. 9.11A. In the band 1 518-1 525 MHz stations in the mobile-satellite service (space-to-Earth) (space-to-space) shall not claim protection from the stations in the fixed service. No. 5.43A does not apply. (WRC-27)

**Reasons:** Modify No. 5.348 to clarify that coordination under No. 9.11A applies to space-to-Earth MSS operations. Space-to-space operations will be within the envelope of the typical earth stations of the GSO MSS service provider network.

**USA/4344A11/4**

**5.348B** In the band 1 518-1 525 MHz, stations in the mobile-satellite service (space-to-Earth) (space-to-space) shall not claim protection from aeronautical mobile telemetry stations in the mobile service in the territory of the United States (see Nos. 5.343 and 5.344) and in the countries listed in No. 5.342. No. 5.43A does not apply. (WRC-27)

**Reasons:** Modify No. 5.348B to clarify that both MSS space-to-Earth and MSS space-to-space shall not claim protection from aeronautical mobile telemetry stations in the mobile service in the territory of the United States.

**MOD USA/4344A11/5**

**1 525-1 610 MHz**

Allocation to services		
Region 1	Region 2	Region 3
<b>1 525-1 530</b> SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.351A ADD 5.A111 Earth exploration-satellite Mobile except aeronautical mobile 5.349 5.341 5.342 5.350 5.351 5.352A MOD 5.354	<b>1 525-1 530</b> SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.351A ADD 5.A111 Earth exploration-satellite Fixed Mobile 5.343  5.341 5.351 MOD 5.354	<b>1 525-1 530</b> SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.351A ADD 5.A111 Earth exploration-satellite Mobile 5.349  5.341 5.351 5.352A MOD 5.354
<b>1 530-1 535</b> SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.351A 5.353A ADD 5.A111 Earth exploration-satellite Fixed Mobile except aeronautical mobile	<b>1 530-1 535</b> SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.351A 5.353A ADD 5.A111 Earth exploration-satellite Fixed Mobile 5.343	

5.341 5.342 5.351 MOD 5.354	5.341 5.351 MOD 5.354
<b>1 535-1 544</b>	MOBILE-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.351A 5.341 5.351 5.353A MOD 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A ADD 5.A111
<b>1 544-1 545</b>	MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.353A MOD 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A
<b>1 545-1 559</b>	MOBILE-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.351A 5.341 5.351 5.353A MOD 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A ADD 5.A111
<b>1 559-1 610</b>	AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.328B 5.329A 5.341

**Reasons:** Include footnote in Article 5 recognizing satellite-to-satellite operations as part of the mobile-satellite service in the indicated frequency bands. Frequency range 1 535-1 559 MHz is split to exclude space-to-space in the frequency range 1 544-1 545 MHz.

**MOD USA/4344A11/6**

**5.354** The use of the bands 1 525-1 559 MHz (space-to-Earth) and 1 626.5-1 660.5 MHz (Earth-to-space) by the mobile-satellite services is subject to coordination under No. **9.11A**. (WRC-27)

**Reasons:** Modify No. **5.354** to clarify that coordination under No. **9.11A** applies to space-to-Earth and Earth-to-space MSS operations. Space-to-space operations will be within the envelope of the typical earth stations of the GSO MSS service provider network.

**MOD USA/4344A11/7**

**1 610-1 660 MHz**

Allocation to services		
Region 1	Region 2	Region 3
<p><b>1 610-1 610.6</b> MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION</p> <p>5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.371 <b>5.372</b></p>	<p><b>1 610-1 610.6</b> MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION-SATELLITE (Earth-to-space)</p> <p>5.341 5.364 5.366 5.367 5.368 5.370 <b>5.372</b></p>	<p><b>1 610-1 610.6</b> MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.369</p> <p>5.341 5.355 5.359 5.364 5.366 5.367 5.368 <b>5.372</b></p>
<p><b>1 610.6-1 613.8</b> MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION</p> <p>5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.371 MOD 5.372</p>	<p><b>1 610.6-1 613.8</b> MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION RADIODETERMINATION-SATELLITE (Earth-to-space)</p> <p>5.149 5.341 5.364 5.366 5.367 5.368 5.370 MOD 5.372</p>	<p><b>1 610.6-1 613.8</b> MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.369</p> <p>5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 MOD 5.372</p>

<p><b>1 613.8-1 616</b> MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B</p> <p>5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.371 MOD 5.372 5.372A</p>	<p><b>1 613.8-1 616</b> MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) 5.208B</p> <p>5.341 5.364 5.365 5.366 5.367 5.368 5.370 MOD 5.372 5.372A</p>	<p><b>1 613.8-1 616</b> MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B Radiodetermination-satellite (Earth-to-space) 5.369</p> <p>5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 MOD 5.372 5.372A</p>
<p><b>1 616-1 621.23</b> MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A ADD 5.A111 AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) (space-to-space) 5.208B ADD 5.A111</p> <p>5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.371 MOD 5.372 5.372A</p>	<p><b>1 616-1 621.35</b> MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A ADD 5.A111 AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) (space-to-space) 5.208B ADD 5.A111</p> <p>5.341 5.364 5.365 5.366 5.367 5.368 5.370 MOD 5.372 5.372A</p>	<p><b>1 616-1 621.35</b> MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A ADD 5.A111 AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) (space-to-space) 5.208B ADD 5.A111 Radiodetermination-satellite (Earth-to-space) 5.369</p> <p>5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 MOD 5.372 5.372A</p>
<p><b>1 621.35-1 626.5</b> MARITIME MOBILE- SATELLITE (space-to-Earth) 5.373 5.373A MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A ADD 5.A111 AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) (space-to-space) except maritime mobile satellite (space-to-Earth) ADD 5.A111</p> <p>5.208B 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.371 MOD 5.372</p>	<p><b>1 621.35-1 626.5</b> MARITIME MOBILE- SATELLITE (space-to-Earth) 5.373 5.373A MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A ADD 5.A111 AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) (space-to-space) except maritime mobile satellite (space-to-Earth) ADD 5.A111</p> <p>5.208B 5.341 5.364 5.365 5.366 5.367 5.368 5.370 MOD 5.372</p>	<p><b>1 621.35-1 626.5</b> MARITIME MOBILE- SATELLITE (space-to- Earth) 5.373 5.373A MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A ADD 5.A111 AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) (space-to-space) except maritime mobile satellite (space-to-Earth) ADD 5.A111 Radiodetermination-satellite (Earth-to-space) 5.369</p> <p>5.208B 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 MOD 5.372</p>
<p><b>1 626.5-1 645.5</b></p>	<p>MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.355 5.357A 5.359 5.362A 5.374 5.375 5.376 ADD 5.A111</p>	
<p><b>1 645.5-1 646.5</b></p>	<p>MOBILE-SATELLITE (Earth-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.355 5.357A 5.359 5.362A 5.374 5.375 5.376</p>	

<b>1 646.5-1 660</b>	MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.355 5.357A 5.359 5.362A 5.374 5.375 5.376 ADD 5.A111
----------------------	---

**Reasons:** Include footnote in Article 5 recognizing satellite-to-satellite operations as part of the mobile-satellite service in the indicated frequency bands. Frequency range 1 626.5-1 660 MHz is split to exclude space-to-space in the frequency range 1 645.5-1 646.5 MHz.

**MOD USA/4344A11/8**

**5.372** Harmful interference shall not be caused to stations of the radio astronomy service using the frequency band 1 610.6-1 613.8 MHz by stations of the radiodetermination-satellite and mobile-satellite services (No. 29.13 applies). The equivalent power flux-density (epfd) produced in the frequency band 1 610.6-1 613.8 MHz by all space stations of a non-geostationary-satellite system in the mobile-satellite service (space-to-Earth) operating in frequency band 1 613.8-1 626.5 MHz and the mobile-satellite service (space-to-space) operating in frequency band 1 616-1 626.5 MHz shall be in compliance with the protection criteria provided in Recommendations ITU-R RA.769-2 and ITU-R RA.1513-2, using the methodology given in Recommendation ITU-R M.1583-1, and the radio astronomy antenna pattern described in Recommendation ITU-R RA.1631-0. (WRC-27)

**Reasons:** Modify No. 5.372 to ensure that compliance with the protection criteria provided in Recommendations ITU-R RA.769-2 and ITU-R RA.1513-2 also includes the epfd produced in the frequency band 1 610.6-1 613.8 MHz from MSS (space-to-space) operations in 1 616-1 626.5 MHz.

**MOD USA/4344A11/9**

**1 660-1 710 MHz**

Allocation to services		
Region 1	Region 2	Region 3
...		
<b>1 668.4-1 670</b>	METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.379C RADIO ASTRONOMY 5.149 5.341 5.379D 5.379E	
<b>1 670-1 675</b>	METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (Earth-to-space) (space-to-space)5.351A MOD 5.379B 5.341 5.379D 5.379E 5.380A ADD 5.A111	
<b>1 675-1 690</b>	METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.341	
...	...	

**Reasons:** Include footnote in Article 5 recognizing satellite-to-satellite operations as part of the mobile-satellite service in the indicated frequency bands.

**MOD USA/4344A11/10**

**5.379B** The use of the frequency band 1 668-1 675 MHz by the mobile-satellite service (Earth-to-space) is subject to coordination under No. **9.11A**. (WRC-27)

**Reasons:** Modify No. **5.379B** to clarify that coordination under No. **9.11A** applies to Earth-to-space MSS operations. Space-to-space operations will be within the envelope of the typical earth stations of the GSO MSS service provider network.

## ARTICLE 21

**Terrestrial and space services sharing frequency bands above 1 GHz****Section V – Limits of power flux-density from space stations****MOD USA/4344A11/11**

TABLE 21-4 (Rev.WRC-27)

Frequency band	Service*	Limit in dB(W/m <sup>2</sup> ) for angles of arrival ( $\delta$ ) above the horizontal plane				Reference bandwidth
		0°-5°	5°-25°	25°-90°		
1 670-1 700 MHz	Earth exploration-satellite Meteorological-satellite	-133 (value based on sharing with meteorological aids service)				1.5 MHz
1 518-1 525 MHz (Applicable to the territory of the United States in Region 2 between the longitudes 71° W and 125° W)	Mobile-satellite (space-to-Earth) (space-to-space)	$0^\circ \leq \delta \leq 4^\circ$	$4^\circ < \delta \leq 20^\circ$	$20^\circ < \delta \leq 60^\circ$	$60^\circ < \delta \leq 90^\circ$	4 kHz
		-181.0	-193.0 + 20 log $\delta$	-213.3 + 35.6 log $\delta$	-150.0	
1 518-1 525 MHz (Applicable to all other territory of the United States in Region 2)	Mobile-satellite (space-to-Earth) (space-to-space)	$0^\circ \leq \delta \leq 43.4^\circ$	$43.4^\circ < \delta \leq 60^\circ$		$60^\circ < \delta \leq 90^\circ$	4 kHz
		-155.0	-213.3 + 35.6 log $\delta$		-150.0	
...						

\* The references to services are those services which have allocations in Article 5.

**Reasons:** Makes the same pfd limits applied to MSS (space-to-Earth) in the frequency range 1 518-1 525 MHz applicable to MSS (space-to-space) operations.

## APPENDIX 4 (REV.WRC-27)

**Consolidated list and tables of characteristics for use in the application of the procedures of Chapter III**

## ANNEX 2

### **Characteristics of satellite networks, earth stations or radio astronomy stations<sup>2</sup> (Rev.WRC-27)**

#### **Footnotes to Tables A, B, C and D**

---

<sup>2</sup> The Radiocommunication Bureau shall develop and keep up-to-date forms of notice to meet fully the statutory provisions of this Appendix and related decisions of future conferences. Additional information on the items listed in this Annex together with an explanation of the symbols is to be found in the Preface to the BR IFIC (Space Services). (WRC-12)

MOD USA/4344A11/12

**TABLE A**  
**GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM,**  
**EARTH STATION OR RADIO ASTRONOMY STATION (Rev.WRC-27)**

Items in Appendix	<i>A - GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM, EARTH STATION OR RADIO ASTRONOMY STATION</i>
...	
<b>A.40</b>	<b>COMPLIANCE WITH § 4.1.13bis of ARTICLE 4 OF APPENDIX 30/30A (WRC-23) or § 6.15quat of ARTICLE 6 OF APPENDIX 30B (WRC-23)</b>
A.40.a	a commitment to respect the power-flux density limits specified under § 4.1.13bis of Article 4 of Appendix 30/30A or § 6.15quat of Article 6 of Appendix 30B, as appropriate Required only for a submission under § 4.1.12 of Article 4 of Appendix 30/30A or under §§ 6.17/6.25 of Article 6 of Appendix 30B
<b>A.41</b>	<b>COMPLIANCE WITH RESOLUTION [USA/4344A11/SAT-TO-SAT] (WRC-27)</b>
A.41.a	the exclusion zone angle in degrees, defined as a minimum angle between the geostationary arc and the space-to-space link transmitting direction, measured at the non-geostationary transmitting space station Required only for non-geostationary space stations transmitting to another non-geostationary space station in the frequency bands 1 616-1 626.5 MHz and 1 670-1 675 MHz
A.41.b	the mask pattern defined in terms of the e.i.r.p. in a 40 kHz bandwidth as a function of the off-axis angle between the non-geostationary transmitting space station boresight line and the line from the non-geostationary transmitting space station to a point on the geostationary-satellite orbit, and as a function of the latitude at nadir of the non-geostationary transmitting space station Required only for non-geostationary space stations transmitting to another non-geostationary space station in the frequency bands 1 616-1 626.5 MHz and 1 670-1 675 MHz or non-geostationary space stations transmitting to a geostationary space station in the frequency bands 1 616-1 645.5 MHz, 1 646.5-1 660 MHz and 1670-1675 MHz

Advance publication of a geostationary-satellite network	Advance publication of a non-geostationary-satellite network or system not subject to coordination under Section II of Article 9	Notification or coordination of a geostationary-satellite network (including space operation functions under Article 2A of Appendices 30 or 30A)	Notification or coordination of a non-geostationary-satellite network or system	Notification or coordination of an earth station (including notification under Appendices 30A or 30B)	Notice for a satellite network in the broadcasting-satellite service under Appendix 30 (Articles 4 and 5)	Notice for a satellite network (feeder-link) under Appendix 30A (Articles 4 and 5)	Notice for a satellite network in the fixed-satellite service under Appendix 30B (Articles 6 and 8) or for Appendix 30B ESIM in accordance with Resolution 121 (WRC-23)	Items in Appendix	Radio astronomy
								<b>A.40</b>	
					+	+	+	A.40.a	
								<b>A.41</b>	
			+					A.41.a	
			+					A.41.b	

Reasons: Two new Appendix 4 data elements are added for compliance with provisions for space-to-space operations for space stations operating in accordance with Resolution (WRC-27)

**ADD USA/4344A11/13**

RESOLUTION [XXX] (WRC-27)

**Space-to-space links in the mobile-satellite service in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and 1 670-1 675 MHz**

The World Radiocommunication Conference (Shanghai, 2027),

*considering*

- a) that there is a need for non-geostationary-satellite orbit (non-GSO) space stations to be able to relay data to the Earth, and that part of this need could be met by allowing such non-GSO space stations to communicate with MSS space stations operating in the geostationary-satellite orbit (GSO) and in the non-GSO in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660 MHz, 1 670-1 675 MHz and 2 483.5-2 500 MHz, or parts thereof;
- b) that the administration responsible for the notification of non-GSO space stations communicating with GSO or non-GSO space stations in the MSS at higher altitude does not need to be the same administration that has already notified assignments in the MSS;
- c) that there is growing interest in utilizing space-to-space links for a variety of applications;
- d) that the ITU Radiocommunication Sector (ITU-R) has carried out studies on sharing and compatibility between incumbent services in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660 MHz, 1 670-1 675 MHz and 2 483.5-2 500 MHz and adjacent bands and space-to-space transmissions in the MSS;
- e) that these studies considered the limitation of the use of frequency bands to a specific direction, in accordance with the existing mobile-satellite service (MSS) allocations in these frequency bands;
- f) that the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and 1 670-1 675 MHz are also allocated to terrestrial and space services used by a variety of different systems, and these existing services and their future development need to be protected, without the imposition of additional constraints, from the operation of space-to-space links,

*recognizing*

- a) that any course of action taken under this Resolution has no impact on the original date of receipt of the frequency assignments of the GSO MSS network or the non-GSO MSS system with which non-GSO space stations communicate or on the coordination requirements of that satellite network;
- b) that the protection of frequency assignments to MSS satellite systems and networks in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 616-1 626.5 MHz, 1 626.5-1 645.5

MHz, 1 646.5-1 660 MHz, and 1 670-1 675 MHz, or parts thereof, is a fundamental and important issue due to the fact that those frequency bands are used for the telecommunication/information and communication technology (ICT) infrastructure of many countries, as well as critical safety services,

*resolves*

1 that, for a non-GSO user space station<sup>1</sup> subject to this Resolution communicating with a GSO or non-GSO MSS service provider space station<sup>2</sup> within the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and 1 670-1 675 MHz, or parts thereof, the following conditions shall apply:

1.1 the non-GSO user space station transmitting in the frequency bands 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and/or 1 670-1 675 MHz and receiving in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz and/or 1 616-1 626.5 MHz, or parts thereof, shall only operate space-to-space links when its apogee altitude<sup>3</sup> is lower than the minimum operational altitude<sup>4</sup> of the GSO or non-GSO MSS space station with which it communicates and when the off-nadir angle between that GSO or non-GSO space station and the non-GSO space station with which it communicates is less than or equal to  $\theta_{Max}$  (as defined in Annex 1 to this Resolution);

1.2 the GSO or non-GSO MSS service provider space station receiving in the frequency band 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and/or 1 670-1 675 MHz and transmitting in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz and/or 1 616-1 626.5 MHz, or parts thereof, shall only operate space-to-space links when its minimum operational altitude is higher than the apogee altitude of the non-GSO space station with which it communicates;

1.3 that the use of space-to-space links by GSO or non-GSO MSS service provider space stations transmitting in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz and/or 1 616-1 626.5 MHz and receiving in the frequency band 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and/or 1 670-1 675 MHz is limited to those with recorded assignments in the relevant MSS (space-to-Earth) and (Earth-to-space) allocations in those frequency bands;

---

<sup>1</sup> A “user space station” is considered to be a space station transmitting within the framework of the MSS (space-space) in a band allocated to the MSS (Earth-to-space) towards MSS service provider space stations at higher altitudes, and receiving in a band allocated to the MSS (space-to-Earth) from MSS service provider space stations at higher altitudes, all within the notified beams of the MSS service provider network or system.

<sup>2</sup> An “MSS service provider space station” is considered to be a space station transmitting in a band allocated to the MSS (space-to-Earth) towards user space stations which receive within the framework of the MSS (space-space) at lower altitudes, and receiving in a band allocated to the MSS (Earth-to-space) from user space stations at lower altitudes, all within the notified beams of the MSS service provider network or system.

<sup>3</sup> See item A.4.b.4.d of Appendix 4.

<sup>4</sup> See item A.4.b.4.f of Appendix 4.

1.4 that non-GSO user space stations transmitting in the frequency bands 1 626.5-1 645.5 MHz and 1 646.5-1 660 MHz, or parts thereof, and receiving in the frequency bands 1 525-1 544 MHz and 1 545-1 559 MHz, or parts thereof, shall only communicate with GSO service provider space stations;

2 that, for a non-GSO user space station transmitting in the frequency band 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and/or 1 670-1 675 MHz, the following conditions shall apply:

2.1 this non-GSO user space station shall transmit only when within the cone whose apex is the GSO or non-GSO receiving MSS service provider space station and whose angle is  $\theta_{Max}$  (as defined in Annex 1 to this Resolution);

2.2 the emissions of this non-GSO user space station shall remain within the envelope of the recorded characteristics of the associated transmitting MSS earth stations of the GSO MSS network or non-GSO MSS system with which it communicates;

2.3 the emission of this non-GSO user space station shall not produce a pfd at any point in the GSO arc greater than the pfd produced by earth stations associated with the satellite network/system with which they communicate, and Annex 2 to this Resolution shall apply;

3 that for an MSS service provider space station transmitting in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, and/or 1 616-1 626.5 MHz, or parts thereof, the following conditions shall apply:

3.1 this non-GSO or GSO MSS service provider space station shall transmit only when the receiving non-GSO user space station is within the cone whose apex is the GSO or non-GSO transmitting space station and whose angle is  $\theta_{Max}$  (as defined in Annex 1 to this Resolution);

3.2 the transmissions shall remain within the envelope of the recorded characteristics of the transmitting GSO MSS or non-GSO MSS service provider space station towards its associated MSS earth stations;

4 that non-GSO user space stations receiving in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, and/or 1 616-1 626.5 MHz, or parts thereof, shall not claim protection from MSS networks and systems, space operation service systems or radionavigation-satellite service systems, or from terrestrial services operating in conformity with the Radio Regulations;

5 that MSS service provider space stations receiving space-to-space transmissions in the frequency bands 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and/or 1 670-1 675 MHz from non-GSO user space stations shall not claim protection for space-to-space links from other MSS networks and systems or from terrestrial services operating in conformity with the Radio Regulations,

*further resolves*

1 that, subject to this Resolution:

a) the notifying administration for a non-GSO user space station transmitting in the frequency bands 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz and 1 670-1 675 MHz towards a GSO MSS service provider network and receiving in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, and 1 616-1 626.5 MHz shall send the Bureau the relevant Appendix 4 advance publication information containing

the characteristics of the non-GSO user space station and the name of the associated notified GSO MSS service provider network with which it intends to communicate;

- b) the notifying administration for a non-GSO user space station transmitting in the frequency bands 1 616-1 626.5 MHz and 1 670-1 675 MHz towards a non-GSO MSS service provider system and receiving in the frequency bands 1 518-1 525 MHz and 1 616-1 626.5 MHz shall send the Bureau the relevant Appendix 4 advance publication information containing the characteristics of the non-GSO user space station and the name of the associated notified non-GSO MSS service provider system(s) with which it intends to communicate;
- c) the notifying administration for a non-GSO MSS service provider system operating space-to-space links and receiving in the frequency bands 1 616-1 626.5 MHz and 1 670-1 675 MHz or of a GSO MSS service provider network operating space-to-space links and receiving in the frequency bands 1 616-1 626.5, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz and 1 670-1 675 MHz is responsible for eliminating any case of unacceptable interference;

2 that, upon examination of the information submitted by the notifying administration under *further resolves* 1a) or 1b), if no recorded frequency assignments with typical earth stations for the relevant frequency bands can be identified for the GSO MSS service provider network or non-GSO MSS service provider system with which the notifying administration for the non-GSO user space station intends to communicate, the Bureau shall return the information to the notifying administration,

*instructs the Director of the Radiocommunication Bureau*

- 1 to take all necessary actions to facilitate the implementation of this Resolution, together with providing any assistance for the resolving of interference, if and when required;
- 2 to report to future world radiocommunication conferences on any difficulties or inconsistencies encountered in the implementation of this Resolution;
- 3 to use the methodology given in Appendices 1 to 2 to Annex 2 to this Resolution when assessing compliance with Annex 2.

## ANNEX 1 TO RESOLUTION [XXX] (WRC-27)

**Determination of the off-nadir angle**

1 A non-geostationary (non-GSO) user space station transmitting in the frequency bands 1 616-1 626.5 MHz and 1 670-1 675 MHz, or parts thereof, and receiving in the frequency bands 1 518-1 525 MHz and 1 616-1 626.5 MHz, or parts thereof, shall communicate with a non-GSO MSS service provider space station only when the off-nadir angle between this non-GSO user space station and the non-GSO MSS service provider space station with which it communicates is equal to or smaller than:

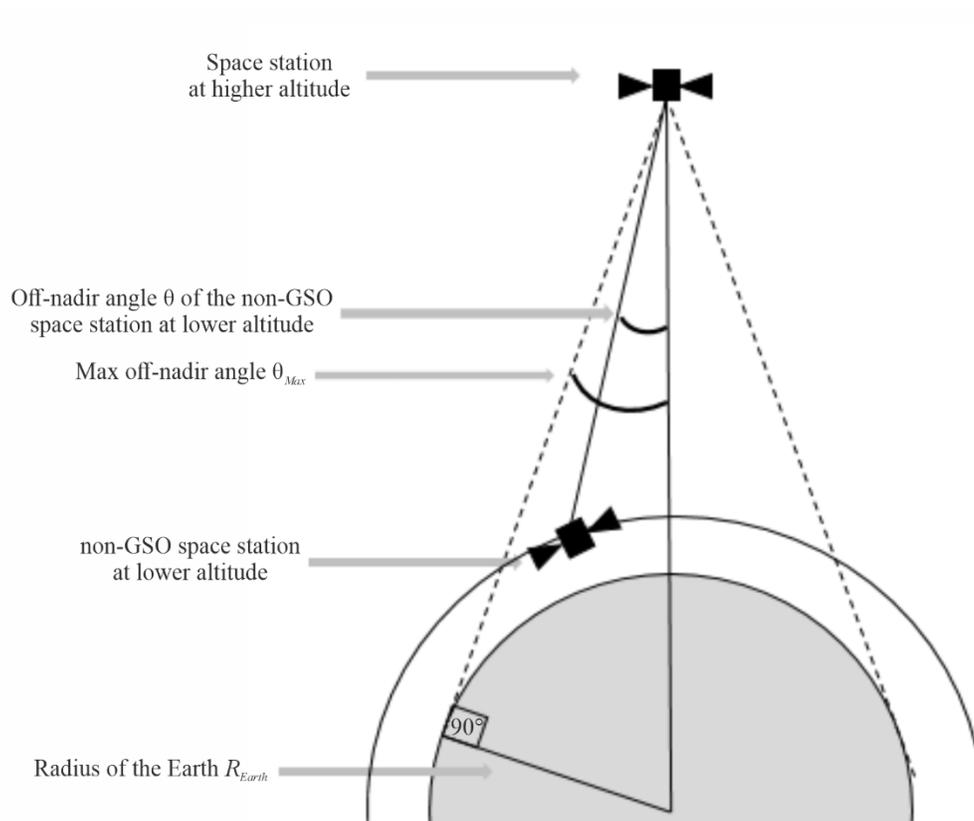
$$\theta_{Max} = \sin^{-1} \left( \frac{R_{Earth}}{R_{Earth} + Alt_{Higher}} \right)$$

where:

$$R_{Earth} = 6\,378 \text{ km}$$

$Alt_{Higher}$  = altitude of the non-GSO service provider space station at a higher orbital altitude in km.

FIGURE 1



2 A non-GSO user space station transmitting in the frequency bands 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz and 1 670-1 675 MHz, or parts thereof, and receiving in the frequency bands 1 518-1 544 MHz and 1 545-1 559 MHz, or parts thereof, shall communicate with a geostationary (GSO) MSS service provider space station only when the off-nadir angle between this GSO MSS service provider space station and the non-GSO user space station with which it communicates is equal to or smaller than:

- if the altitude of the non-GSO user space station is less than 2 000 km:

$$\theta_{Max} = \sin^{-1} \left( \frac{R_{Earth} + Alt_{non-GSO}}{R_{Earth} + Alt_{GSO}} \right)$$

- if the altitude of the non-GSO user space station is greater than or equal to 2 000 km:

$$\theta_{Max} = \sin^{-1} \left( \frac{R_{Earth}}{R_{Earth} + Alt_{GSO}} \right)$$

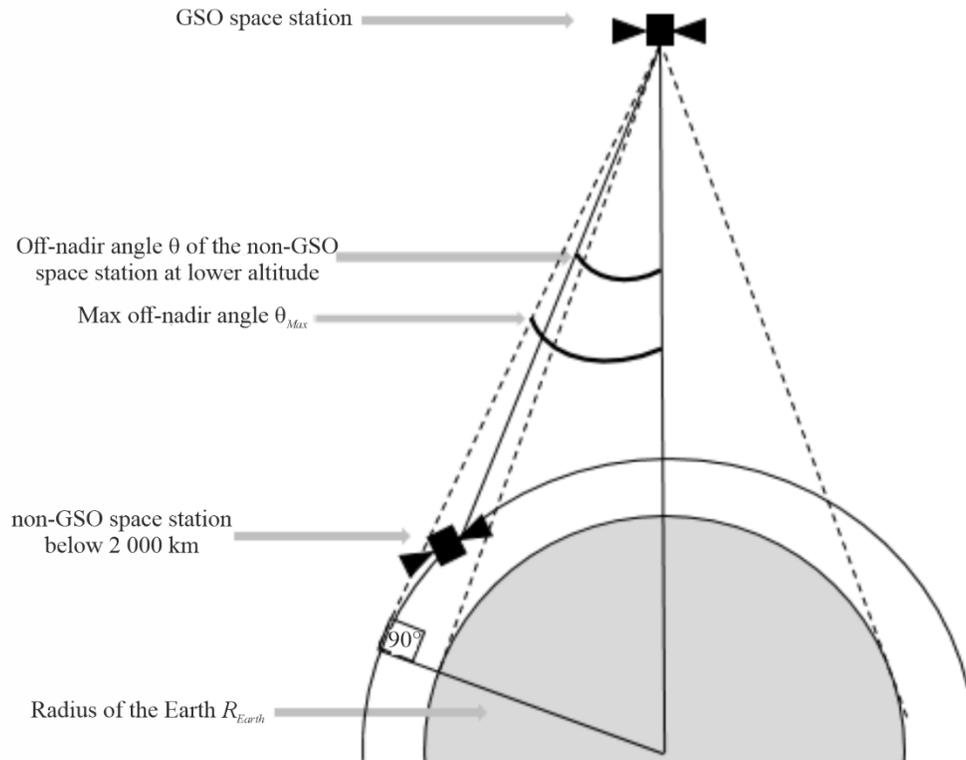
where:

$R_{Earth} = 6\,378$  km

$Alt_{GSO} =$  altitude of the GSO MSS service provider space station in km

$Alt_{non-GSO} =$  altitude of the non-GSO user space station in km.

FIGURE 2



3 If the altitude of the non-GSO user space station transmitting in the frequency bands 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz and 1 670-1 675 MHz, or parts thereof, and receiving in the frequency bands 1 518-1 544 MHz and 1 545-1 559 MHz, or parts thereof, is less than 2 000 km, the angle between the vector from this user space station to the centre of the Earth and the vector between this user space station and the GSO MSS service provider space station shall be at least 90°.

4 Where the notified service area of the GSO or non-GSO MSS service provider network/system at a higher orbital altitude is not global, the maximum off-nadir angle  $\theta_{Max}$  will vary at each azimuth according to the notified service area and there will be a specific maximum off-nadir angle associated with each azimuth, based on the position in space of the MSS service provider network/system at higher orbital altitude and the geographical coordinates (latitude, longitude) of the border of the notified service area at each azimuth, which are extracted from the Graphical Interference Management System (GIMS) database container that was submitted to the Bureau when notifying a specific non-global service area:

$$\theta_{Max} = \cos^{-1} \left( \frac{\left( R_{Earth} + Alt_{Higher} \right)^2 + dist^2 - R_{Earth}^2}{2 \times \left( R_{Earth} + Alt_{Higher} \right) \times dist} \right)$$

with:

$$dist = \sqrt{(X_E - X_S)^2 + (Y_E - Y_S)^2 + (Z_E - Z_S)^2}$$

$$X_E = R_{Earth} \times \cos(lat_{sab}(\varphi)) \times \cos(lon_{sab}(\varphi))$$

$$Y_E = R_{Earth} \times \cos(lat_{sab}(\varphi)) \times \sin(lon_{sab}(\varphi))$$

$$Z_E = R_{Earth} \times \sin(lat_{sab}(\varphi))$$

$$X_S = (R_{Earth} + Alt_{Higher}) \times \cos(lat_{SS}) \times \cos(lon_{SS})$$

$$Y_S = (R_{Earth} + Alt_{Higher}) \times \cos(lat_{SS}) \times \sin(lon_{SS})$$

$$Z_S = (R_{Earth} + Alt_{SS}) \times \sin(lat_{Higher})$$

where:

$lat_{sab}(\varphi)$  = latitude of the service area border for the azimuth  $\varphi$

$lon_{sab}(\varphi)$  = longitude of the service area border for the azimuth  $\varphi$

$lat_{SS}$  = latitude of the sub-satellite point of the GSO/non-GSO MSS service provider space station

$lon_{SS}$  = longitude of the sub-satellite point of the GSO/non-GSO MSS service provider space station.

## ANNEX 2 TO RESOLUTION [XXX] (WRC-27)

**Provisions for user space stations in the frequency bands  
1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz and 1 670-1 675  
MHz to protect MSS space stations**

1 In the frequency bands 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz and 1 670-1 675 MHz, or parts thereof, when a non-geostationary-satellite (non-GSO) user space station, as identified in *further resolves 1a)* of this Resolution, identifies an associated geostationary-satellite (GSO) MSS service provider network, as described in *further resolves 1a)*, to operate space-to-space links, the Radiocommunication Bureau shall perform the examination described in Appendix 1 to this Annex.

2 In the frequency bands 1 616-1 626.5 MHz and 1 670 1 675 MHz, or parts thereof, when a non-GSO user system, as identified in *further resolves 1b)* of this Resolution, identifies a non-GSO MSS service provider system, as described in *further resolves 1b)*, to operate space-to-space links, the Bureau shall perform the examination described in Appendix 2 to this Annex.

3 The notifying administration for the service provider network or system identified in § 1 or § 2 above shall respect all coordination agreements that have already been recorded.

4 The notifying administration for the service provider network identified in § 1 or § 2 above shall provide, upon any request from the notifying administration of another MSS network or system involved in the coordination agreements referred to above, additional information on how the relevant coordination agreements will be respected with regard to protection from space-to-space links. This information shall be provided within 90 days after the receipt of the request.

## APPENDIX 1 TO ANNEX 2

The aim of this Appendix is to provide a method to be used by the Radiocommunication Bureau to assess whether the emissions from a non-geostationary (non-GSO) user space station operating space-to-space links with a geostationary (GSO) MSS service provider space station are within the envelope of the typical earth stations of the GSO MSS network.

Step 1: For each group of the transmitting non-GSO user space station notification.

Step 2: For each of the receiving GSO MSS service provider networks, as listed in *further resolves 1a)* of this Resolution.

Step 3: For each beam in the Earth-to-space direction of the receiving GSO MSS service provider network notification, compute the maximum equivalent isotropically radiated power (e.i.r.p.) produced in one hertz (*EIRPSD*).

Step 4: Compute the reduction in free-space loss at the altitude of the user space station using:

$$\Delta FSL = 20 \log_{10} \left( \frac{GSO_{alt}}{GSO_{alt} - NGSO_{alt}} \right)$$

where  $NGSO_{alt}$  is the altitude of the transmitting non-GSO system user space stations and  $GSO_{alt} = 35\,786$  km. It should be noted that, if several altitudes are included in the notification, each altitude shall be tested.

Step 5: Compute the reduced e.i.r.p. spectral density as  $EIRPSD_{reduced} = EIRPSD - \Delta FSL$ .

Step 6: For all beams in the non-GSO system user space station notification with a class of station ES, the e.i.r.p. spectral density mask is given in Appendix 4, data item A.41.b.

Step 7: For all emissions in the GSO network notification, compute the e.i.r.p. spectral density mask for all off-axis angles between  $0^\circ$  and  $80^\circ$ , with a step of  $1^\circ$ , and reduce it by  $\Delta FSL$ . The e.i.r.p. spectral density mask computation should assume that the maximum gain is for an off-axis angle of  $0^\circ$ .

Step 8: Frequency assignments to non-GSO systems shall receive a favourable finding with respect to Annex 2 if, for all beams:

- the maximum value of the e.i.r.p. spectral density mask from Step 6 does not exceed the  $EIRPSD_{reduced}$  quantity, computed at the same altitude; and
- the e.i.r.p. spectral density mask of the transmitting non-GSO space station from Step 6 is less than the reduced e.i.r.p. spectral density mask, compared in one hertz, from Step 7 for all angles for at least one emission in the GSO network notification.

Otherwise, the assignments shall receive an unfavourable finding.

## APPENDIX 2 TO ANNEX 2

The aim of this Appendix is to provide a method to be used by the Radiocommunication Bureau to assess whether the emissions from a non-geostationary (non-GSO) user space station operating space-to-space links with a non-GSO MSS service provider space station are within the envelope of the typical earth stations of the non-GSO MSS service provider system.

Step 1: For each group of the transmitting non-GSO user space station notification.

Step 2: For each of the receiving non-GSO MSS service provider systems, as listed in *further resolves 1b)* of this Resolution.

Step 3: For each beam in the Earth-to-space direction of the receiving non-GSO MSS service provider system notification, compute the maximum equivalent isotropically radiated power (e.i.r.p.) produced in one hertz ( $EIRPSD$ ).

Step 4: Compute the reduction in free-space loss at the altitude of the user space station using:

$$\Delta FSL = 20 \log_{10} \left( \frac{GSO_{alt}}{GSO_{alt} - NGSO_{alt}} \right)$$

where  $NGSO_{alt}$  is the altitude of the transmitting non-GSO system user space stations and  $GSO_{alt} = 35\,786$  km. It should be noted that if several altitudes are included in the notification, each altitude shall be tested.

Step 5: Compute the reduced e.i.r.p. spectral density as  $EIRPSD_{reduced} = EIRPSD - \Delta FSL$ .

Step 6: For all beams in the non-GSO system user space station notification with a class of station ES, the e.i.r.p. spectral density mask is given in Appendix 4, data item A.41.b.

Step 7: For all emissions in the receiving non-GSO MSS service provider network notification, compute the e.i.r.p. spectral density mask for all off-axis angles between  $0^\circ$  and  $80^\circ$ , with a step of  $1^\circ$ , and reduce it by  $\Delta FSL$ . The e.i.r.p. spectral density mask computation should assume that the maximum gain is for an off-axis angle of  $0^\circ$ .

Step 8: Frequency assignments to non-GSO systems user space station shall receive a favourable finding with respect to Annex 2 if, for all beams:

- the maximum value of the mask from Step 6 does not exceed the  $EIRPSD_{reduced}$  quantity, computed at the same altitude; and
- the e.i.r.p. spectral density mask of the transmitting non-GSO space station from Step 6 is less than the reduced e.i.r.p. spectral density mask from Step 7 for all angles.

Otherwise, the assignments shall receive an unfavourable finding.

**Reasons:** Draft new WRC-27 Resolution provides the operating conditions for satellite-to-satellite operations in the mobile-satellite service to ensure protection of incumbent services operations.

**SUP**      **USA/4344A11/14**

## RESOLUTION 249 (REV. WRC-23)

**Study of technical and operational issues and regulatory provisions for space-to-space transmissions in the frequency bands 1 518- 1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660 MHz, 1 670-1 675 MHz and 2 483.5-2 500 MHz**

**Reasons:** Adoption by WRC-27 of the aforementioned proposals satisfies the agenda item and therefore Resolution **249 (Rev. WRC-23)** is no longer needed.

**UNITED STATES OF AMERICA**  
**DRAFT PRELIMINARY VIEW FOR WRC-27**

**Agenda Item 1.13** - *to consider studies on possible new allocations to the mobile-satellite service for direct connectivity between space stations and International Mobile Telecommunications (IMT) user equipment to complement terrestrial IMT network coverage, in accordance with Resolution 253 (WRC-23)*

**U.S. Preliminary View:**

The U.S. is of the view that existing terrestrial mobile operations using frequency bands identified for IMT should be protected from harmful interference, while new MSS operations are incorporated to extend existing terrestrial mobile broadband coverage. Furthermore, no additional regulatory measures are needed to the IMT user equipment transmitting in the MSS uplink, provided they operate under the same technical conditions as the terrestrial IMT.

It should be noted that the use of the 1435-1525 MHz band in Region 2 and the 2360-2395 MHz band in the U.S by the aeronautical mobile service for telemetry has priority over other uses by the mobile service (See No. **5.343** and **5.394**). The U.S. is of the view that PFD values should be incorporated into Article 21 towards the U.S. to ensure in band protection of AMT in the frequency bands 1435-1525 MHz and 2360-2395 MHz.

The U.S. is of the view that any possible new allocations to the MSS for DC-MSS-IMT under WRC-27 AI 1.13 should be allocated on a secondary basis given the complementary nature of the application and the need for continued terrestrial IMT deployment under the mobile service to which the bands are already allocated on a primary basis.

Furthermore, the U.S. recognizes that each administration has its own needs and that there may be scenarios in which different frequency arrangements have been adopted for the rollout of IMT systems, even between neighbouring countries. Therefore, the U.S. believes it is relevant to keep in mind these scenarios in the sharing and compatibility studies, especially those relative to the use of different duplex schemes (FDD or TDD) and propagation directions, in order to support informed decisions by CITEL Administrations.

## United States of America

### PROPOSALS FOR THE WORK OF THE CONFERENCE

#### Agenda item 1.14

**Agenda Item 1.14:** *studies on possible new frequency allocations to the mobile-satellite service (MSS) in the frequency bands 2 010-2 025 MHz (Earth-to-space) and 2 160-2 170 MHz (space-to-Earth) in Regions 1 and 3 and 2 120-2 160 MHz (space-to-Earth) in all Regions (Resolution 254 (WRC-23));*

#### BACKGROUND

Resolution 254 (WRC-23) explores the feasibility of new MSS frequency allocations in the frequency bands 2 010-2 025 MHz (Earth-to-space) and 2 160-2 170 MHz (space-to-Earth) in Regions 1 and 3 and 2 120-2 160 MHz (space-to-Earth) in all Regions. ITU-R studies will focus on the –

- relevant spectrum requirements and technical, operational, and regulatory matters regarding these possible new MSS allocations;
- protection of existing services that are allocated on a primary basis, as well as services in adjacent frequency bands; and
- possible technical, operational, and regulatory measures to ensure the protection of existing services and their future development.

In Region 2, the 2 120-2 160 MHz band is allocated to the mobile satellite service on a secondary basis. In addition, the 2 120-2 160 MHz frequency band is allocated to the fixed and mobile service on a primary basis, including an identification for IMT in accordance with Resolution 212 (Rev. WRC-23). At WRC-23, the band was further identified for use by high altitude platform stations as IMT base stations (HIBS). This frequency range supports the extensive use of terrestrial mobile services throughout the Region 2.<sup>5</sup> Further, these bands are also under study under WRC-27 agenda item 1.13 for the provision of supporting supplementary coverage from space, providing direct connectivity between space stations and IMT user equipment to complement terrestrial IMT network coverage.

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<sup>5</sup> CITELE Report on Implementation Plans in the Americas of Bands Identified for IMT (document CCPII-2025-45-6221r1\_i), May 2025.

ITU-R studies have illustrated that the co-frequency coexistence of MSS with IMT systems is significantly challenging. Similar sharing scenarios were also evaluated at WRC-19 under agenda item 9.1, issue 9.1.1. The results of these studies demonstrate that coexistence between IMT and co-primary MSS in the 2 120-2 160 MHz band presents serious challenges as the IMT interference threshold was exceeded, jeopardizing the reliable functioning of IMT systems in one of the globally harmonized core bands.

Based on the results of ITU-R sharing studies and deliberations at WRC-27, should Regions 1 and 3 consider a new primary allocation to the 2 010-2 025 MHz (Earth-to-space) or 2 160-2 170 MHz (space-to-Earth), the same regulatory conditions applicable to No. **5.389E**<sup>6</sup> should apply to Region 2 operations of the fixed and mobile services.

## PROPOSALS

1. **NOC** USA/1.14/1
- 2.
3. Radio Regulations Volumes 1 and 2
- 4.
- 5.
6. Reason: ITU-R sharing and compatibility studies have illustrated the difficulty in sharing between a co-primary MSS allocation and IMT networks. Therefore, the United States believes that no regulatory action is justified for changes to the Radio Regulations. Appropriate conditions on the current secondary MSS (space-to-Earth) allocation in Region 2 for providing direct connectivity to IMT user equipment could be considered under WRC-27 agenda item 1.13.
- 7.
8. **SUP** USA/1.14/2

### RESOLUTION 254 (WRC-23)

**Studies on possible new frequency allocations to the mobile-satellite service in the frequency bands 2 010-2 025 MHz (Earth-to-space) and 2 160-2 170 MHz (space-to-Earth) in Regions 1 and 3 and 2 120-2 160 MHz (space-to-Earth) in all Regions**

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<sup>6</sup> **5.389E** The use of the bands 2 010-2 025 MHz and 2 160-2 170 MHz by the mobile-satellite service in Region 2 shall not cause harmful interference to or constrain the development of the fixed and mobile services in Regions 1 and 3.

Reason: Consequential action.



## United States of America

### PROPOSALS FOR THE WORK OF THE CONFERENCE

#### Agenda item 1.15

**Agenda Item 1.15:** *to consider studies on frequency-related matters, including possible new or modified space research service (space-to-space) allocations, for future development of communications on the lunar surface and between lunar orbit and the lunar surface, in accordance with Resolution 680 (WRC-23);*

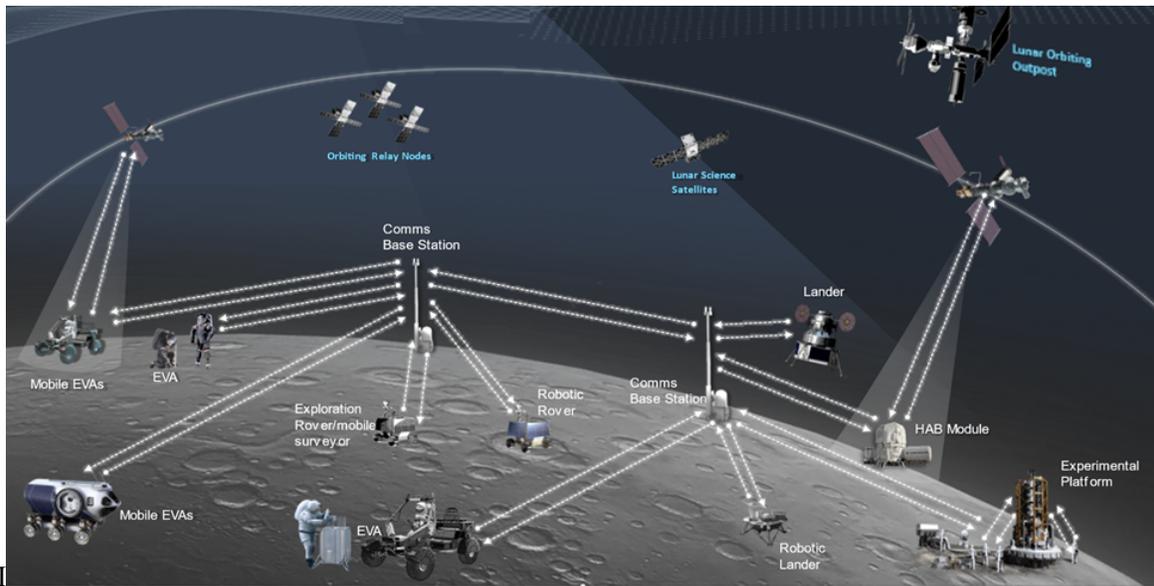
#### **BACKGROUND:**

There is a growing amount of interest, from governments and commercial entities, to explore and operate on the Moon, and beyond. Studying and identifying usable frequencies on the Moon is crucial because of the distinct challenges and requirements for effective lunar communication networks, especially as international space agencies work toward sustainable human and robotic presence on the Moon.

These networks not only enable scientific and exploratory missions but also present a strategic opportunity for developing and underdeveloped countries to support the establishment of a space-based infrastructure in the long-term. By investing in lunar communications, these nations can foster technological growth, build capacity in aerospace sectors, and gain access to global partnerships that support long-term development.

WRC-27 AI 1.15, in accordance with Resolution 680 (WRC-23), aims to establish regulatory provisions to support near-term lunar in-situ spectrum needs for scientific exploration and discovery objectives in time for decision by WRC-27.

To support the near-term lunar and cislunar exploration activities, basic infrastructure is needed, including communications, PNT (position, navigation and timing), transportation, and radio frequency management. Communication between spacecraft in the lunar orbit and on the lunar surface are depicted in Figure 1 below.



**Figure 1. Envisioned Near-term SRS Lunar Surface/Lunar Orbit Architecture**

Communication between space stations, as well as between the Earth and Earth-orbiting satellites, is already well-defined and understood within the spectrum regulatory environment. In addition to the technical challenges, developing a set of regulatory procedures for on and around the Moon could enable these stations to co-exist without harmful interference and foster scientific discoveries and technological advancements and expedite space commerce development in the years to come. As noted in the Director's Report to WRC-23, the Bureau has received inquiries from administrations and operators about the appropriate services and class of stations to be used for radio stations operating on the surface of the Moon. These include stations that are intended to be used while in motion or during halts at unspecified points or fixed points (unrelated to the radiocommunication service) with respect to being on or near the surface of the moon. Based on Article 1 of the Radio Regulations, the Bureau can only classify them as space stations, even if the station will be operating on the surface of the Moon. However, it may be useful in the development of regulatory procedures to create distinct classes of stations to distinguish space stations that are operating on the surface of the Moon, as compared to space stations that are orbiting around the Moon or in outer space. WRC-27 may wish to consider the appropriateness of creating distinct classes of stations for such space stations operating on the surface of the Moon.

Both the text of agenda item 1.15 and the associated Resolution **680 (WRC-23)** clearly limit consideration of spectrum at WRC-27 to the future development of communications on the lunar surface and between lunar orbit and the lunar surface through possible new or modified space research service (space-to-space) allocations.

Near-term scientific exploration and discovery objectives are currently being undertaken by industry and space agencies around the world under the Artemis Program. The upcoming Artemis II launch is a historic 10-day crewed test flight sending four astronauts on a lunar flyby, marking humanity's farthest journey beyond Earth since Apollo, aiming to pave the way for future Moon landings. Artemis III is NASA's next crewed lunar mission, aiming to land astronauts on the Moon by 2027. These commercial lander programs are being carried out to conduct technology demonstrations and survey the lunar environment in preparation

for a return of humans to the Moon in the next several years, working toward achieving a sustainable and robust presence on the Moon in the next decade.

Technical studies are underway in the ITU to address the issues raised in *resolves to invite the ITU Radiocommunication Sector to complete in time for the 2027 world radiocommunication conference 1 to 5* of Resolution **680 (WRC-23)** to enable the implementation of systems in the SRS which may operate on the lunar surface, or systems in lunar orbit communicating with systems on the lunar surface, in the identified frequency ranges or portions thereof, as well as, advanced wireless technologies for direct communications between landers, rovers, extra-vehicular activity (EVA) astronauts conducting sortie missions, and to return data from unique scientific experiments for relay back to Earth.

These studies also aim to ensure protection to radioastronomical observations in the Shielded Zone of the Moon, as established in RR Article **22.22-22.25**. It should be noted that the shielded zone of the Moon (SZM) is the last accessible place left to make radio observations of the universe with no interference anywhere in the spectrum and given the absence of appreciable water vapor and oxygen in its atmosphere, it allows for radioastronomical observations which are not possible on Earth.

The scientific discoveries and technological advancements resulting from the near-term space exploration objective are anticipated to further promote new industries and technologies and accelerate space commerce. Resolution **680 (WRC-23)** invites ITU-R to begin studies and provide a progress report through the Director of the BR to WRC-27 regarding future radiocommunications needs for activities in the lunar vicinity beyond space research, considering existing space radiocommunication services, and regulatory provisions.

**Proposal:**

MOD PP/1.15/1

ARTICLE 5

**Frequency allocations**

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

**335.4-410 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
...		
<b>390-399.9</b>	FIXED MOBILE SPACE RESEARCH (space-to-space) 5.A115-1A 5.254	
<b>399.9-400.05</b>	MOBILE-SATELLITE (Earth-to-space) 5.209 5.220 5.260A 5.260B SPACE RESEARCH (space-to-space) 5.A115-1A	
<b>400.05-400.15</b>	STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz) SPACE RESEARCH (space-to-space) 5.A115-1A 5.261 5.262	
<b>400.15-401</b>	METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.263 5.A115-1A Space operation (space-to-Earth) 5.262 5.264	
<b>401-402</b>	METEOROLOGICAL AIDS SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) SPACE RESEARCH (space-to-space) 5.A115-1A Fixed Mobile except aeronautical mobile 5.264A 5.264B	

<b>402-403</b>	METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) SPACE RESEARCH (space-to-space) 5.A115-1A Fixed Mobile except aeronautical mobile 5.264A 5.264B
<b>403-406</b>	METEOROLOGICAL AIDS SPACE RESEARCH (space-to-space) 5.A115-1A Fixed Mobile except aeronautical mobile 5.265
<b>406-406.1</b>	MOBILE-SATELLITE (Earth-to-space) SPACE RESEARCH (space-to-space) 5.A115-1A 5.265 5.266 5.267
...	

**410-460 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
...		
<b>420-430</b>	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.A115-1A Radiolocation 5.269 5.270 5.271	
...		
<b>440-450</b>	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.A115-1A Radiolocation 5.269 5.285 5.270 5.271 5.284 5.286	
...		

**Reason:** Modification of the table of frequency allocations to add new space research service allocations for space-to-space use is appropriate given that the sharing studies demonstrate protection of incumbent services with significant margin.

**ADD** PP/1.15/2

**5.A115-1A** The use of the frequency bands 390-406 MHz (lunar orbit-to-lunar surface direction), 406-406.1 MHz (lunar surface-to-lunar orbit direction), 420-430 MHz, and 440-450 MHz (lunar surface-to-lunar orbit direction) by stations in the space research service (space-to-space) is limited to the vicinity of the Moon outside the shielded zone of the Moon and shall be in accordance with Resolution **aaa (WRC-27)**. (WRC-27)

**Reason:** Adding a new footnote limits the use of these bands for the new SRS allocation to the vicinity of the Moon and outside the shielded zone of the Moon which is consistent with Resolution **680 (WRC-23)**. Additional mandatory conditions to be provided in Resolution **aaa**.

**MOD** PP/1.15/3

**2 170-2 520 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
...		
<b>2 300-2 400</b> FIXED MOBILE 5.384A Amateur Radiolocation 5.150 5.282 5.395	<b>2 300-2 400</b> FIXED MOBILE 5.384A RADIOLOCATION Amateur 5.150 5.282 5.393 5.394	
<b>2 400-2 450</b> FIXED MOBILE 5.384A SPACE RESEARCH (space-to-space) 5.A115-1B Amateur Radiolocation 5.150 5.282 5.395	<b>2 400-2 450</b> FIXED MOBILE 5.384A RADIOLOCATION SPACE RESEARCH (space-to-space) 5.A115-1B Amateur 5.150 5.282 5.393 5.394	
<b>2 450-2 483.5</b> FIXED MOBILE SPACE RESEARCH (space-to-space) 5.A115-1B Radiolocation 5.150	<b>2 450-2 483.5</b> FIXED MOBILE RADIOLOCATION SPACE RESEARCH (space-to-space) 5.A115-1B 5.150	

<p><b>2 483.5-2 500</b>                  FIXED                  MOBILE                  MOBILE-SATELLITE                  (space-to-Earth) 5.351A                  RADIODETERMINATION-SATELLITE                  (space-to-Earth) 5.398                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Radiolocation 5.398A                    5.150 5.368 5.372A 5.399 5.401                  5.402</p>	<p><b>2 483.5-2 500</b>                  FIXED                  MOBILE                  MOBILE-SATELLITE                  (space-to-Earth) 5.351A                  RADIOLOCATION                  RADIODETERMINATION-SATELLITE                  (space-to-Earth) 5.398                  SPACE RESEARCH (space-to-space) 5.A115-1B                    5.150 5.368 5.372A 5.402</p>	<p><b>2 483.5-2 500</b>                  FIXED                  MOBILE                  MOBILE-SATELLITE                  (space-to-Earth) 5.351A                  RADIOLOCATION                  RADIODETERMINATION-SATELLITE                  (space-to-Earth) 5.398                  SPACE RESEARCH (space-to-space) 5.A115-1B                    5.150 5.368 5.372A 5.401 5.402</p>
<p><b>2 500-2 520</b>                  FIXED 5.410                  MOBILE except aeronautical mobile 5.384A 5.409A                  SPACE RESEARCH (space-to-space) 5.A115-1B                    5.412</p>	<p><b>2 500-2 520</b>                  FIXED 5.410                  FIXED-SATELLITE (space-to-Earth) 5.415                  MOBILE except aeronautical mobile 5.384A 5.409A                  SPACE RESEARCH (space-to-space) 5.A115-1B</p>	<p><b>2 500-2 520</b>                  FIXED 5.410                  FIXED-SATELLITE (space-to-Earth) 5.415                  MOBILE except aeronautical mobile 5.384A 5.409A                  MOBILE-SATELLITE (space-to-Earth) 5.351A 5.407 5.414 5.414A                  SPACE RESEARCH (space-to-space) 5.A115-1B                  5.404</p>

**2 520-2 700 MHz**

<p style="text-align: center;"><b>Allocation to services</b></p>		
<p style="text-align: center;"><b>Region 1</b></p>	<p style="text-align: center;"><b>Region 2</b></p>	<p style="text-align: center;"><b>Region 3</b></p>
<p><b>2 520-2 655</b>                  FIXED 5.410                  MOBILE except aeronautical mobile 5.384A 5.409A                  BROADCASTING-SATELLITE 5.413 5.416                  SPACE RESEARCH (space-to-space) 5.A115-1B</p>	<p><b>2 520-2 655</b>                  FIXED 5.410                  FIXED-SATELLITE (space-to-Earth) 5.415                  MOBILE except aeronautical mobile 5.384A 5.409A                  BROADCASTING-SATELLITE 5.413 5.416                  SPACE RESEARCH (space-to-space) 5.A115-1B</p>	<p><b>2 520-2 535</b>                  FIXED 5.410                  FIXED-SATELLITE (space-to-Earth) 5.415                  MOBILE except aeronautical mobile 5.384A 5.409A                  BROADCASTING-SATELLITE 5.413 5.416                  SPACE RESEARCH (space-to-space) 5.A115-1B                  5.403 5.414A 5.415A</p>

<p>5.339 5.412 5.418B 5.418C</p>	<p>5.339 5.418B 5.418C</p>	<p><b>2 535-2 655</b>                  FIXED 5.410                  MOBILE except aeronautical mobile 5.384A 5.409A                  BROADCASTING-SATELLITE 5.413 5.416                  SPACE RESEARCH (space-to-space) 5.A115-1B                  5.339 5.418 5.418A 5.418B 5.418C</p>
<p><b>2 655-2 670</b>                  FIXED 5.410                  MOBILE except aeronautical mobile 5.384A 5.409A                  BROADCASTING-SATELLITE 5.208B 5.413 5.416                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Earth exploration-satellite (passive)                  Radio astronomy                  Space research (passive)</p> <p>5.149 5.412</p>	<p><b>2 655-2 670</b>                  FIXED 5.410                  FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.415                  MOBILE except aeronautical mobile 5.384A 5.409A                  BROADCASTING-SATELLITE 5.413 5.416                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Earth exploration-satellite (passive)                  Radio astronomy                  Space research (passive)</p> <p>5.149 5.208B</p>	<p><b>2 655-2 670</b>                  FIXED 5.410                  FIXED-SATELLITE (Earth-to-space) 5.415                  MOBILE except aeronautical mobile 5.384A                  BROADCASTING-SATELLITE 5.208B 5.413 5.416                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Earth exploration-satellite (passive)                  Radio astronomy                  Space research (passive)</p> <p>5.149 5.420</p>
<p><b>2 670-2 690</b>                  FIXED 5.410                  MOBILE except aeronautical mobile 5.384A 5.409A                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Earth exploration-satellite (passive)                  Radio astronomy                  Space research (passive)</p> <p>5.149 5.412</p>	<p><b>2 670-2 690</b>                  FIXED 5.410                  FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.208B 5.415                  MOBILE except aeronautical mobile 5.384A 5.409A                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Earth exploration-satellite (passive)                  Radio astronomy                  Space research (passive)</p> <p>5.149</p>	<p><b>2 670-2 690</b>                  FIXED 5.410                  FIXED-SATELLITE (Earth-to-space) 5.415                  MOBILE except aeronautical mobile 5.384A                  MOBILE-SATELLITE (Earth-to-space) 5.351A 5.419                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Earth exploration-satellite (passive)                  Radio astronomy                  Space research (passive)</p> <p>5.149</p>
<p>...</p>		

**2 700-3 600 MHz**

<p><b>Allocation to services</b></p>		
<p><b>Region 1</b></p>	<p><b>Region 2</b></p>	<p><b>Region 3</b></p>
<p>...</p>		

<p><b>3 400-3 500</b>                  FIXED                  FIXED-SATELLITE (space-to-Earth)                  MOBILE except aeronautical mobile 5.430A                  Radiolocation                  5.431</p>	<p><b>3 400-3 500</b>                  FIXED                  FIXED-SATELLITE (space-to-Earth)                  MOBILE except aeronautical mobile 5.431A 5.431B                  Amateur                  Radiolocation 5.433                  5.282</p>	<p><b>3 400-3 500</b>                  FIXED                  FIXED-SATELLITE (space-to-Earth)                  Amateur                  Mobile 5.432 5.432B                  Radiolocation 5.433                  5.282 5.432A</p>
<p><b>3 500-3 600</b>                  FIXED                  FIXED-SATELLITE (space-to-Earth)                  MOBILE except aeronautical mobile 5.430A                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Radiolocation</p>	<p><b>3 500-3 600</b>                  FIXED                  FIXED-SATELLITE (space-to-Earth)                  MOBILE except aeronautical mobile 5.431B                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Radiolocation 5.433</p>	<p><b>3 500-3 600</b>                  FIXED                  FIXED-SATELLITE (space-to-Earth)                  MOBILE except aeronautical mobile 5.433A                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Radiolocation 5.433</p>

**3 600-4 800 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
<p><b>3 600-3 800</b>                  FIXED                  FIXED-SATELLITE (space-to-Earth)                  MOBILE except aeronautical mobile 5.433B 5.434A 5.434B 5.435A                  SPACE RESEARCH (space-to-space) 5.A115-1B</p>	<p><b>3 600-3 700</b>                  FIXED                  FIXED-SATELLITE (space-to-Earth)                  MOBILE except aeronautical mobile 5.434                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Radiolocation 5.433</p>	<p><b>3 600-3 700</b>                  FIXED                  FIXED-SATELLITE (space-to-Earth)                  MOBILE except aeronautical mobile                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Radiolocation 5.435</p>
	<p><b>3 700-3 800</b>                  FIXED                  FIXED-SATELLITE (space-to-Earth)                  MOBILE except aeronautical mobile 5.435B                  SPACE RESEARCH (space-to-space) 5.A115-1B</p>	
<p><b>3 800-4 200</b>                  FIXED                  FIXED-SATELLITE (space-to-Earth)                  Mobile</p>	<p><b>3 800-4 200</b>                  FIXED                  FIXED-SATELLITE (space-to-Earth)                  MOBILE except aeronautical mobile 5.435B</p>	
<p>...</p>		

**4 800-5 250 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
...		
<b>5 150-5 250</b>	FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B AERONAUTICAL RADIONAVIGATION SPACE RESEARCH (space-to-space) 5.A115-1B 5.446 5.446C 5.446D 5.447 5.447B 5.447C	

**5 250-5 570 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
<b>5 250-5 255</b>	EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH MOD 5.447D 5.A115-1B 5.447E 5.448 5.448A	
<b>5 255-5 350</b>	EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH (active) SPACE RESEARCH (space-to-space) 5.A115-1B 5.447E 5.448 5.448A	
<b>5 350-5 460</b>	EARTH EXPLORATION-SATELLITE (active) 5.448B RADIOLOCATION 5.448D AERONAUTICAL RADIONAVIGATION 5.449 SPACE RESEARCH (active) 5.448C SPACE RESEARCH (space-to-space) 5.A115-1B	
<b>5 460-5 470</b>	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION 5.448D RADIONAVIGATION 5.449 SPACE RESEARCH (active) SPACE RESEARCH (space-to-space) 5.A115-1B 5.448B	

<b>5 470-5 570</b>	EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION SPACE RESEARCH (active) SPACE RESEARCH (space-to-space) 5.A115-1B 5.448B 5.450 5.451
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**5 570-6 700 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
<b>5 570-5 650</b>	MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION SPACE RESEARCH (space-to-space) 5.A115-1B 5.450 5.451 5.452	
<b>5 650-5 725</b>	MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION SPACE RESEARCH (space-to-space) 5.A115-1B Amateur Space research (deep space) 5.454 5.282 5.451 5.453 5.455	
<b>5 725-5 775</b> FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur 5.150 5.451 5.453 5.455	<b>5 725-5 775</b> RADIOLOCATION Amateur 5.150 5.453 5.455	
<b>5 775-5 830</b> FIXED-SATELLITE (Earth-to-space) RADIOLOCATION SPACE RESEARCH (space-to-space) 5.A115-1B Amateur 5.150 5.451 5.453 5.455	<b>5 775-5 830</b> RADIOLOCATION SPACE RESEARCH (space-to-space) 5.A115-1B Amateur 5.150 5.453 5.455	

<p><b>5 830-5 850</b>                  FIXED-SATELLITE (Earth-to-space)                  RADIOLOCATION                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Amateur                  Amateur-satellite (space-to-Earth)                  5.150 5.451 5.453 5.455</p>	<p><b>5 830-5 850</b>                  RADIOLOCATION                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Amateur                  Amateur-satellite (space-to-Earth)                    5.150 5.453 5.455</p>	
<p><b>5 850-5 925</b>                  FIXED                  FIXED-SATELLITE (Earth-to-space)                  MOBILE                  SPACE RESEARCH (space-to-space) 5.A115-1B                    5.150</p>	<p><b>5 850-5 925</b>                  FIXED                  FIXED-SATELLITE (Earth-to-space)                  MOBILE                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Amateur                  Radiolocation                  5.150</p>	<p><b>5 850-5 925</b>                  FIXED                  FIXED-SATELLITE (Earth-to-space)                  MOBILE                  SPACE RESEARCH (space-to-space) 5.A115-1B                  Radiolocation                  5.150</p>
<p>...</p>		

**24.75-29.9 GHz**

<p><b>Allocation to services</b></p>		
<p><b>Region 1</b></p>	<p><b>Region 2</b></p>	<p><b>Region 3</b></p>
<p>...</p>		
<p><b>27.5-28.35</b></p>	<p>FIXED 5.537A                  FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.517B                  5.539                  INTER-SATELLITE 5.521A                  MOBILE                  SPACE RESEARCH (space-to-space) 5.A115-1B                  5.538 5.540</p>	
<p><b>28.35-5-28.5</b></p>	<p>FIXED 5.537A                  FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.517B                  5.539                  INTER-SATELLITE 5.521A                  MOBILE                  5.538 5.540</p>	
<p>...</p>		

**Reason:** Modification of the table of frequency allocations to add new or modify space research service allocations for space-to-space use is appropriate given that the sharing studies demonstrate protection of incumbent services with significant margin.

**MOD** PP/1.15/4

**5.447D** The allocation of the band 5 250-5 255 MHz to the space research service on a primary basis is limited to active spaceborne sensors, and for space-to-space radiocommunications in accordance with No. **5.A115-1B**. Other uses of the band by the space research service are on a secondary basis. (WRC-27)

**Reason:** Modification of No. **5.447D** is necessary to reflect the upgrade of the space-to-space use to primary for the purposes indicated in No. **5.A115-1B**.

**ADD** PP/1.15/5

**5.A115-1B** The use of the frequency bands 2 400 – 2 483.5 MHz, 2 483.5 – 2 500 MHz (lunar orbit-to-lunar surface direction), 2 500 - 2 690 MHz, 3 500 – 3 800 MHz, 5 150 – 5 570 MHz, 5 570 – 5 725 MHz, 5 775 – 5 925 MHz, and 27.5 – 28.35 GHz by stations in the space research service (space-to-space) is limited to the vicinity of the Moon and shall be in accordance with Resolution **aaa (WRC-27)**. (WRC-27)

**Reason:** Adding a new footnote limits the use of these bands for the new SRS allocation to the vicinity of the Moon which is consistent with Resolution **680 (WRC-23)**. Additional mandatory conditions to be provided in Resolution **aaa**.

**ADD** PP/1.15/6

#### RESOLUTION aaa (WRC-27)

**Use of the bands 390-406.1 MHz, 420-430 MHz, 440-450 MHz, 2 400-2 690 MHz, 3 500-3 800 MHz, 5 150-5 570 MHz, 5 570-5 725 MHz, 5 775-5 925 MHz, and 27.5-28.35 GHz by stations in the space research service (space-to-space) in the vicinity of the Moon**

The World Radiocommunication Conference (Shanghai, 2027)

*considering*

- a) that allocation in frequency bands 390-406.1 MHz, 420-430 MHz, 440-450 MHz, 2 400-2 690 MHz, 3 500-3 800 MHz, 5 150-5 570 MHz, 5 570-5 725 MHz, 5 775-5 925 MHz, and 27.5-28.35 GHz to the space research service (space-to-space) on a primary basis is intended to support communications on the lunar surface and between lunar orbit and the lunar surface;
- b) that Report ITU-R SA.2553 contains the technical and operational characteristics for space research systems in the vicinity of the Moon;
- c) that results of ITU Radiocommunication Sector studies indicate that sharing of these frequency bands with terrestrial and active space services in the vicinity of the Earth is feasible given the Earth-Moon distances involved;

*recognizing*

a) that the shielded zone of the Moon (SZM) comprises the area of the Moon's surface and an adjacent volume of space which are shielded from emissions originating within a distance of 100 000 km from the centre of the Earth (see **No. 22.22.1**);

b) that **No. 22.25** contains the provision for protection of radio astronomy observations and other passive services in the SZM by agreement between concerned administrations in frequency bands in which emissions are not prohibited by **No. 22.22-22.24**,

*resolves*

1 that the use of the frequency bands 390-406.1 MHz, 420-430 MHz, and 440-450 MHz by stations in the space research service (space-to-space) be limited to space stations outside the SZM;

2 that the use of frequency bands 390-406 MHz (lunar orbit-to-lunar surface direction) and 440-450 MHz (lunar surface-to-lunar orbit direction) by stations in the space research service (space-to-space) are limited to transmissions between a space station in orbit in the vicinity of the Moon and a space station on or near the surface of the Moon;

3 that the use of the frequency bands 406-406.1 MHz (lunar surface-to-lunar orbit direction) by stations in the space research service (space-to-space) are limited to transmissions from a space station operating in the vicinity of the Moon to transmit position-indicating radio beacon data;

4 that the use of the frequency bands 420-430 MHz, 2 400-2 483.5 MHz, 2 500-2 690 MHz, 3 500-3 800 MHz, 5 150-5 570 MHz, 5 570-5 725 MHz, 5 775-5 925 MHz, and 27.5-28.35 GHz by stations in the space research service (space-to-space) are limited to transmissions between space stations separated by less than 20 km and operating in the vicinity of the Moon;

5 that the use of the frequency band 2 483.5-2 500 MHz (lunar orbit-to-lunar surface direction) by stations in the space research service (space-to-space) are limited to transmissions from a space station in orbit in the vicinity the Moon to transmit positioning, navigation and timing data,

*instructs the Director of the Radiocommunication Bureau*

to take all necessary measures to implement this Resolution.

**Reason:** Inclusion of a new resolution provides additional constraints on the use of the bands for the space research service (space-to-space) in the vicinity of the Moon.

**SUP** PP/1.15/7

RESOLUTION 680 (WRC-23)

**Studies on frequency-related matters, including possible new or modified space research service (space-to-space) allocations, for future development of communications on the lunar surface and between lunar orbit and the lunar surface**

**Reason:** Consequential.

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## United States of America

### PROPOSALS FOR THE WORK OF THE CONFERENCE

#### Agenda item 1.16

**Agenda item 1.16:** *to consider studies on the technical and regulatory provisions necessary to protect radio astronomy operating in specific Radio Quiet Zones, and in frequency bands allocated to the radio astronomy service on a primary basis globally, from aggregate radio-frequency interference caused by non-geostationary-satellite orbit systems, in accordance with Resolution 681 (WRC-23);*

- **BACKGROUND**

Resolution 681 (WRC-23) invites ITU-R to conduct studies on how interference from unwanted emissions from single and multiple non-GSO satellite systems operating in the adjacent and nearby frequency bands listed in its Table 1 affects the operation of RAS stations in the frequency bands allocated to the RAS on a primary basis in that table (resolves 1 and 2). It also invites studies on: (i) the possible recognition, in the ITU framework, of the two specific Radio Quiet Zones (RQZs) associated with the Square Kilometre Array Observatory in South Africa and the Atacama Large Millimeter/submillimeter Array (ALMA) in Chile identified in *considering k*; (ii) how aggregate interference from non-GSO satellite systems affects the operation of RAS stations within those RQZs; (iii) potential new measures to facilitate operation of non-GSO satellite systems and RAS stations in those RQZs; and (iv) methods for calculating separation distances between gateways of non-GSO systems operating in bands adjacent to or near RAS allocations and RAS stations protected by those RQZs (resolves 3–6). The Resolution further notes Report ITU-R RA.2259 as a source of information on the characteristics of national RQZs and measures to establish them.

The United States has supported technical sharing and compatibility studies under Resolution 681, with the understanding that they are informational in nature and that, where useful, their results can be reflected in ITU-R Reports and existing RA-series Recommendations. These studies do not, in the view of the United States, justify modification of allocations, introduction of new footnotes, or changes to procedures or additional technical or operational constraints in the Radio Regulations.

In the bands where RAS has a primary allocation, Article 5 of the Radio Regulations, together with a well-established body of ITU-R Resolutions and Recommendations, already provides a

robust technical and regulatory framework to protect radio astronomy while allowing active services to operate. This includes, for example, RR Nos. 5.149 and 5.340 identifying and, in some cases, prohibiting emissions in key passive bands, Resolution 739 (Rev.WRC-19) on compatibility between the radio astronomy service and active space services in certain adjacent and nearby frequency bands, and Recommendations ITU-R RA.769, RA.1513 and RA.1631, as well as Report ITU-R RA.2259 on the characteristics of Radio Quiet Zones. These instruments enable administrations to tailor implementation to national circumstances and the characteristics of specific sites without requiring further modification to the Radio Regulations for agenda item 1.16.

For the two RQZ sites referenced in Resolution 681, the concerned administrations have already implemented comprehensive national frameworks to manage and limit emissions in the relevant frequency ranges. These include land-use regimes, licensing conditions, spectrum-management measures, and enforcement tools that can address satellite interference scenarios without requiring additional ITU-level regulation. Interested Member States have also been invited by RA-23 to contribute additional information to the ITU's RQZ database.<sup>7</sup>

The United States considers that concepts such as international "recognition" of RQZs, global definitions of RQZs, or new ITU-level mechanisms relating to separation distances or operational constraints for non-GSO systems would go beyond the scope of Resolution 681 and are neither necessary nor appropriate. Such constructs, if adopted in the Radio Regulations, would impose new obligations not only on non-GSO systems (including systems supporting safety-related and other critical services) already operating in accordance with the Radio Regulations, but could also unintentionally create additional regulatory burden on other active services, including terrestrial and other space services, operated by other Member States. In addition, technical or operational techniques – for example, mandatory boresight-avoidance schemes – have shown to be technically or operationally unsuitable for many non-GSO architectures and could unnecessarily deny or degrade service, including outside the limited RQZ contexts referenced in the Resolution.

Accordingly, from the perspective of an administration relying on globally deployed non-GSO MSS and FSS systems, the goal of agenda item 1.16 should be limited to conducting technical studies and, where beneficial, revising or developing new ITU-R Reports to provide guidance. Any outcome of WRC-27 under this agenda item should be No Change (NOC) to the Radio Regulations, with protection of specific RQZ sites remaining a national matter.

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<sup>7</sup> <https://www.itu.int/en/ITU-R/study-groups/rsg7/rwp7d/Pages/rqz-db.aspx>

- **PROPOSALS**
- **NOC USA/1.16/1**

- 

- Radio Regulations, Volumes 1 and 2

- Reason: The Radio Regulations already provide a complete and sufficient framework to protect the radio astronomy service in the bands where it has allocations and to enable administrations to manage spectrum around sensitive sites through national measures. Primary RAS allocations in Article 5, together with RR Nos. 5.149 and 5.340, Resolution 739 (Rev.WRC-19), and existing RA-series Recommendations and Reports (including ITU-R RA.769, RA.1513, RA.1631 and RA.2259), give administrations the tools needed to address unwanted emissions from non-GSO systems and other services without further modification of the Radio Regulations. Any additional outputs from agenda item 1.16 can therefore be accommodated in ITU-R Reports and Recommendations, while the detailed protection of specific Radio Quiet Zones and coordination around particular observatories remain a national responsibility.

**SUP** USA/1.5/2

#### RESOLUTION 681 (WRC-23)

**Studies of technical and regulatory provisions necessary to protect radio astronomy operating in specific Radio Quiet Zones and, in radio astronomy service primary allocated frequency bands globally, from aggregate radio-frequency interference caused by systems in the non-geostationary-satellite orbit**

## United States of America

### PROPOSALS FOR THE WORK OF THE CONFERENCE

#### Agenda item 1.19

**Agenda Item 1.19:** *to consider possible primary allocations in all Regions to the Earth exploration-satellite service (passive) in the frequency bands 4 200-4 400 MHz and 8 400-8 500 MHz, in accordance with Resolution 674 (WRC-23);*

#### **BACKGROUND**

Resolution **674 (WRC-23)** invites ITU-R to consider possible primary allocations in all Regions to the Earth exploration-satellite service (EESS) (passive) in the frequency bands 4 200-4 400 MHz and 8 400-8 500 MHz, without protection from existing services in these frequency bands and in adjacent bands.

Remote sensing over ocean surfaces is used to measure many of the same parameters as are measured over land (e.g. water vapour, rain rate, wind speed) as well as parameters that provide information on the state of the ocean itself (e.g. sea surface temperature, ocean salinity, sea ice thickness, etc.). Due to the sensitivity of the brightness temperature of the sea surface with regard to frequency, sea surface temperature (SST) measurements are performed within the 4-9 GHz range. These satellite measurements are complimented by drifting buoys, strategically deployed across various oceanic regions, that serve as sentinel outposts collecting real-time data on ocean conditions. These floating platforms are equipped with sensors that measure parameters, such as sea surface temperature, salinity, and currents. The data retrieved from buoys contribute to the development of accurate models and forecasts, aiding in the prediction of events such as storms, tsunamis, and climate variations.

Today, EESS passive sensing may be authorized in the frequency band 4 200-4 400 MHz on a secondary basis (see Radio Regulation (RR) No. **5.437**), however no EESS sensors are deployed in this band. The frequency band 4 950-4 990 MHz and 6 425-7 250 MHz has been utilized by opportunistic use (i.e. no allocation) of the Earth exploration-satellite service (EESS) (passive) for operations carried out over oceans (see No. **5.339** and No. **5.458**).

The frequency bands 4 200-4 400 MHz and 8 400-8 500 MHz, as well as adjacent bands, are utilized by several active radiocommunication services. The frequency band 4 200-4 400 MHz is allocated to the primary aeronautical mobile (Route) service (AM(R)S) for use of wireless avionics intra-communication systems (WAIC) under RR No. **5.436**, and to the primary aeronautical radionavigation service (ARNS) for use of radio altimeters onboard aircraft and associated

transponders on ground under RR No. **5.438**. In the adjacent band 3 600-4 200 MHz, the fixed service is allocated on a primary basis, and the mobile service is allocated on a primary basis in Regions 2 and 3, and a secondary basis in Region 1, and is currently being operated or under study for mobile broadband use in many countries. Furthermore, the frequency bands 3 600-4 200 MHz and 4 500-4 800 MHz are allocated to fixed satellite services (space-to-Earth), for use by satellites beams with full or partial ocean overlap. The adjacent 4 400-4 500 MHz band is allocated to the fixed and mobile service on a primary basis, and is used for aeronautical and maritime mobile operations. The 8 400-8 500 MHz band is allocated on a primary basis to the fixed, mobile and space research service (space-to-Earth). The adjacent frequency band 8 215-8 400 MHz is allocated on a primary basis to the earth exploration-satellite service (space-to-Earth), fixed, mobile, and fixed-satellite service (Earth-to-space). Noting the sensitivity of the EESS receivers taking temperature measurements of the sea surface, any allocation to the EESS (passive) under this agenda item cannot claim protection from existing services in these frequency bands, or adjacent bands, per Resolution **674 (WRC-23)**.

ITU-R sharing and compatibility studies were conducted to assess the impact on the protection criteria for EESS (passive) sensors based on Recommendation ITU-R RS.2017. Studies performed indicated that SST measurements would experience interference from existing primary active services, including aeronautical mobile (R) service and aeronautical radio navigation service operations, and the fixed and mobile service in band and adjacent band operations.

## PROPOSALS

9. NOC USA/1.19/1

10.

11. Radio Regulations Volumes 1 and 2

12.

13.

14. Reason: ITU-R sharing and compatibility studies between EESS (passive) and existing primary services in the 4 200-4 400 MHz and 8 400-8 500 MHz frequency bands demonstrated the protection criteria of EESS (passive) could not be satisfied. As specified in Resolution **674**, any consideration of a new primary allocation to the EESS (passive) would have to be on the condition of no protection from existing services in these frequency bands and in

adjacent bands. Therefore, the United States believes that no regulatory action is justified for changes to the Radio Regulations.

15.

16. **SUP** USA/1.19/2

RESOLUTION 674 (WRC-23)

**Studies on possible allocations to the Earth exploration-satellite service (passive)  
in the bands 4 200-4 400 MHz and 8 400-8 500 MHz**

Reason: Consequential action.

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Attachment B



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Telecommunications and**  
**Information Administration**  
Washington, D.C. 20230

February 18, 2026

Mr. Thomas Sullivan  
Chief, Office of International Affairs  
Federal Communications Commission  
45 L Street NE  
Washington, DC 20554

Dear Mr. Sullivan,

The National Telecommunications and Information Administration (NTIA), on behalf of the Executive Branch agencies, provides the attached WRC-27 proposals for Agenda Items **1.2**, on smaller antenna sizes for FSS uplinks at 14 GHz, **1.9**, on Appendix 26 aeronautical HF modernization, **1.10**, Article 21 pfd and eirp limits for FSS, MSS, and BSS at 70 and 80 GHz, **1.11**, on MSS space-to-space links, and **1.15**, on lunar communications.

NTIA looks forward to working with the FCC in reconciling these proposals for submission to CITELE PCC II as U.S. contributions. Please reach out to me concerning these matters, at [dkhlopin@ntia.gov](mailto:dkhlopin@ntia.gov) or (202) 482-2141.

Sincerely,

**Derek Khlopin**

Derek Khlopin  
Deputy Associate Administrator for  
Spectrum Planning and Policy  
Office of Spectrum Management

Enclosures (5)

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## 1. UNITED STATES OF AMERICA

### 2. DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

**Agenda Item 1.2:** *to consider possible revisions of sharing conditions in the frequency band 13.75-14 GHz to allow the use of uplink fixed-satellite service earth stations with smaller antenna sizes, in accordance with Resolution 129 (WRC-23);*

#### **BACKGROUND**

WARC-92 imposed power limitations to the e.i.r.p of any emission from an earth station in the Fixed-Satellite Service in the 13.75 – 14.0 GHz band and imposed a minimum antenna diameter of 4.5 meters.

WRC-2000 decided to review the usage of the band 13.75-14 GHz, in accordance with Resolution 733 (WRC-2000). Consequently, WRC-03 evaluated the sharing conditions in Nos. 5.502 and 5.503 and decided at that time to not change the antenna diameter associated to the non-GSO FSS Earth stations. However, it approved relaxed limitations on the minimum size of the satellite earth station antennas for GSO.

Due to the current development of fixed-satellite service (FSS) applications and mass availability of new equipment with small antennas (both reflector and arrays) in the Ku band, the increasing communications requirements, and, taking into consideration innovation both in GSO networks and non-GSO Systems, and, noting that the frequency band 13.75-14 GHz has been allocated to Fixed satellite service (FSS) on a primary basis in all International Telecommunication Union (ITU) regions since 1996, WRC-23 resolved “to study on the technical and operational limitations regarding the minimum antenna size and associated power limitations of GSO and non-GSO FSS earth stations in the frequency band 13.75-14 GHz (Earth-to-space), while ensuring the protection of the services stipulated in Nos. 5.502 and 5.503” of Radio Regulation, under Resolution **129 (WRC-23)**.

While the band is globally harmonized to FSS, its use is subject to those FSS existing regulatory provisions. The operational characteristics and technical requirements of the radiolocation service (RLS) and space research service (SRS) are contained in ITU-R recommendations and reports. Given these cases, and the growing demand for flexible FSS deployments using small terminals, the ITU-R studies under Resolution **129 (WRC-23)** are examining possible approaches to review footnotes Nos. 5.502 and 5.503. Any prospective revision would be contingent upon the results of studies that would ensure the continued protection and use of RLS and SRS.

**PROPOSAL**

The United States proposes to modify footnotes 5.502 and 5.503 in Article 5, Section IV, for the 13.4–14 GHz frequency band to permit the use of smaller earth station antennas within the Fixed-Satellite Service (FSS), while ensuring protection of the Radiolocation and Space Research Services operating in this band.

**ARTICLE 5**

**Frequency allocations**

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

**MOD USA/XXXXA2/1**

**13.4-14 GHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
...		
<b>13.75-14</b>	FIXED-SATELLITE (Earth-to-space) 5.484A RADIOLOCATION Earth exploration-satellite Standard frequency and time signal-satellite (Earth-to-space) Space research 5.499 5.500 5.501 MOD 5.502 MOD 5.503	

**Reasons:** RR No. **5.502** and **5.503** are proposed to be modified to satisfy this agenda item.

**MOD USA/XXXXA2/2**

**5.502** In the band 13.75-14 GHz, the e.i.r.p. averaged over one second, radiated by a station in the radiolocation or radionavigation services shall not exceed 59 dBW for elevation angles above 2° and 65 dBW at lower angles. Before an administration brings into use an earth station in the fixed-satellite service in this band with an antenna diameter smaller than 4.5 m, it shall ensure that the power flux-density produced by this earth station does not exceed:

- –118 dB(W/(m<sup>2</sup> · 10 MHz)) produced at 36 m above sea level at the low water mark, as officially recognized by the coastal State;
- –118 dB(W/(m<sup>2</sup> · 10 MHz)) produced 3 m above ground at the border of the territory of an administration deploying or planning to deploy land mobile radars in this band, unless prior agreement has been obtained.

For earth stations brought into use before [XXX], or the date of entry into force of the Final Acts of WRC-27, or employing antennas with an equivalent diameter equal to or greater than 1.2 m for geostationary and 4.5 m for non-geostationary fixed-satellite service, shall continue to be subject to the –115 dB(W/m<sup>2</sup> · 10 MHz) limit.

For earth stations within the fixed-satellite service having an antenna diameter greater than or equal to 4.5 m, the e.i.r.p. of any emission should be at least 68 dBW and should not exceed 85 dBW.  
(WRC-27)

**Reasons:** The antenna diameter restriction has been removed to accommodate smaller antennas. Similarly, the limitation to the geostationary satellite network has been removed to accommodate modern non-geostationary satellite constellations. Consequently, the PFD has been adjusted to accommodate an expected increased FSS deployment. Finally, the time percentage has been removed to be aligned with the radar protection criteria.

**MOD USA/XXXXA2/3**

**5.503** In the band 13.75-14 GHz, geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 shall operate on an equal basis with stations in the fixed-satellite service; after that date, new geostationary space stations in the space research service will operate on a secondary basis. Until those geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 cease to operate in this band:

- in the band 13.77-13.78 GHz, the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in geostationary-satellite orbit shall not exceed:
  - i)  $12.6D + 14.85$  dB (W/40 kHz), where D is the fixed-satellite service earth station antenna diameter (m) for antenna diameters less than 1.2 m
  - ii)  $4.7D + 28$  dB (W/40 kHz), where D is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 1.2 m and less than 4.5 m;
  - iii)  $49.2 + 20 \log (D/4.5)$  dB (W/40 kHz), where D is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 4.5 m and less than 31.9 m;
  - iv) 66.2 dB (W/40 kHz) for any fixed-satellite service earth station for antenna diameters (m) equal to or greater than 31.9 m;
  - v) 56.2 dB (W/4 kHz) for narrow-band (less than 40 kHz of necessary bandwidth) fixed-satellite service earth station emissions from any fixed-satellite service earth station having an antenna diameter of 4.5 m or greater;
- the e.i.r.p. density of emissions from any earth station in the fixed-satellite service with an antenna diameter greater than or equal to 1.2m operating with a space station in non-geostationary-satellite orbit shall not exceed 51 dBW in the 6 MHz band from 13.772 to 13.778 GHz.

– the e.i.r.p. density of emissions from any earth station in the fixed-satellite service with an antenna diameter less than 1.2m operating with a space station in non-geostationary-satellite orbit shall not exceed 45.5 dBW in the 6 MHz band from 13.772 to 13.778 GHz. Automatic power control may be used to increase the e.i.r.p. density in these frequency ranges to compensate for rain attenuation, to the extent that the power flux-density at the fixed-satellite service space station does not exceed the value resulting from use by an earth station of an e.i.r.p. meeting the above limits in clear-sky conditions. (WRC-27)

**Reasons:** The EIRP has been adjusted to accommodate an expected increased FSS deployment with smaller antennas.

**MOD USA/XXXXA2/4**

**APPENDIX 4**

<b>Items in Appendix</b>	<i>A - GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM, EARTH STATION OR RADIO ASTRONOMY STATION</i>
A.16.b	<p>a commitment by administrations that the filed system will meet the single entry power flux-density limits that are specified in No. 5.502</p> <p>Required only for specific earth station antennas less than 4.5 m in diameter operating in the fixed-satellite service in the frequency band 13.75-14 GHz</p>

**SUP USA/XXXXA2/5**

**RESOLUTION 129 (WRC-23)**

**Studies on possible revisions of sharing conditions in the frequency band 13.75-14 GHz to allow the use of uplink fixed-satellite service earth stations with smaller antenna sizes**

**Reason:** The work for this Agenda Item has been completed.

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**UNITED STATES OF AMERICA**  
**DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE**

**AGENDA ITEM 1.9:** *to consider appropriate regulatory actions to update Appendix 26 to the Radio Regulations in support of aeronautical mobile (OR) high frequency modernization, in accordance with Resolution 411 (WRC-23);*

**Background**

The High Frequency (HF) band has been identified as an effective alternative to provide much-needed integrated and interoperable Beyond-Line-of-Sight (BLOS) communications capabilities. HF is also a critical and affordable option when other communications services are unavailable due to natural disasters or other national emergencies. The challenge with meeting the growing requirement for modern HF is the need for increased bandwidth. These bandwidth needs would be required to achieve higher data rates and improved voice quality communications while not impeding the legacy frequency needs of incumbent users, groups, or countries. Appendix 26 of the ITU Radio Regulations currently limits Aeronautical Mobile (OR) Service (AM(OR)S) to a maximum bandwidth of 2.8 kHz.

There are modern wideband HF (WBHF) technologies available that enable the flexibility to use wider channel bandwidths within advanced digital HF. This includes enhanced applications that can support a shared environment while also maximizing spectrum efficiency. Current wideband technology and methodologies are available that automate the optimization of the Radio Frequency (RF) environment while preventing any harmful interference to existing users in, or adjacent to, a desired HF frequency range.

WRC-23 through Resolution 411 (WRC-23) resolves to invite the Radiocommunication Sector to review Appendix 26 of the Radio Regulations and consider necessary changes, as appropriate, to Appendix 26, on the basis of studies without modifying the existing area allotments, and while taking into account that the current use of the narrowband systems shall remain unchanged and shall not be impacted nor precluded by the revision of Appendix 26.

**Proposals:**

The United States proposes to modify Appendix 26 of the ITU Radio Regulations to allow the aggregation of allotted channels in order to transmit analog and digital data in wider bandwidths than what is currently allowed for AM(OR)S.

**MOD USA/4355A9/1**

APPENDIX 26 (REV.WRC-27)

**Provisions and associated Frequency Allotment Plan for the aeronautical mobile (OR) service in the bands allocated exclusively to that service between 3 025 kHz and 18 030 kHz**

**Reasons:** The asterisk is no longer relevant.

**MOD USA/4355A9/2**

**26/2.2 Allotment in the aeronautical mobile (OR) service**

A frequency allotment in the aeronautical mobile (OR) service which comprises:

- a frequency channel from the channels appearing in the channelling arrangement in No. 26/3<sup>1</sup>;
- an occupied bandwidth of up to 2.8 kHz, situated wholly within the frequency channel concerned;  
a power within the limits laid down in No. 26/4.4 or specified against the allotted frequency channel;
- an allotment area which is the area in which the aeronautical station can be situated, and which coincides with all or part of the territory of the country, or of the geographical area, as indicated against the frequency channel concerned in the Frequency Allotment Plan.

**Reasons:** Added footnote to indicate that channels may now be aggregated with this update. The word occupied added to be consistent with other provisions in Appendix 26.

**MOD USA/4355A9/3**

**26/3.5** The aeronautical radiotelephone stations shall use only single-sideband emissions (J(2,3,7,9)E). The upper sideband shall be employed, and the assigned frequency (see No. 1.148) shall be 1 400 Hz higher than the carrier (reference) frequency.

**Reasons:** Updated emission designators consistent with modification to 26/4.2. This aligns with updates to Appendix 27 made at WRC-23.

**MOD USA/4355A9/4**

**26/3.6** The channelling arrangement specified in No. 26/3.1 does not prejudice the rights of administrations to establish, and to notify assignments to stations in the aeronautical mobile (OR) service other than those using radiotelephony, provided that:

- for single channel or non-contiguous aggregation, the occupied bandwidth does not exceed 2 800 Hz and is situated wholly within one frequency channel;

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<sup>1</sup> The channels appearing in No. 26/3 may be aggregated to provide wideband communication, see No. 26/3.7

- for contiguous aggregation, wider occupied bandwidths can be implemented using currently allotted frequency channels;
- the limits of unwanted emission are met (see Appendix 27, No. 27/74). (WRC-2000)

**Reasons:** Adding language to specify aggregation of channels.

**ADD USA/4355A9/5**

**26/3.7** Individual non-contiguous or contiguous channels complying with the provisions of the Plan<sup>2</sup> contained in this Appendix may be aggregated to provide wideband communication without changing the Plan of individual channels. Any aggregation of channels shall be situated wholly within the respective frequency bands listed in **No. 26/1**.

**Reasons:** This provision specifies how to implement aggregation of channels without modification to the channel Plan. The footnote specifies the specific technical provisions that need to be followed in order to comply.

**MOD USA/4355A9/6**

**26/4.2 Telephony – single-sideband suppressed carrier**

- J(2,3,7,9)E

**Reasons:** Update emission designators to be consistent with updates to Appendix 27 made at WRC-23.

**MOD USA/4355A9/7**

**26/4.3 Telegraphy and including automatic data transmission**

- A1A, A1B, F1B;
- (A,H)2(A,B);
- (R,J)2(A,B,D);
- J(7,9)(B,D,X);
- D(1,2)D
- G1D

**Reasons:** Update emission designators to be consistent with updates to Appendix 27 made at WRC-23 as well as adding a new emission designator that implements modern modulation techniques.

**MOD USA/4355A9/8**

**26/4.4** Unless otherwise specified in Part III of this Appendix, the following transmitter power limits<sup>1</sup> (i.e. power supplied to the antenna) shall be applied:

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<sup>2</sup> The provisions related to the carrier and assigned frequencies (Nos. 26/3.1, 26/3.5 and 26/3.6), class of emission (Nos. 26/4.2 and 26/4.3), power limits (Nos. 26/4.4 and 26/4.5), out-of-band spectrum mask (No. 27/74) and the compatibility (**Part IV**).

Class of emission	Power limit values (peak envelope power supplied to the antenna)	
	Aeronautical station	Aircraft station
J(2,3,7,9)E	36 dBW (PX)	23 dBW (PX)
A1A, A1B	30 dBW (PX)	17 dBW (PX)
F1B	30 dBW (PX)	17 dBW (PX)
A2A, A2B	32 dBW (PX)	19 dBW (PX)
H2A, H2B	33 dBW (PX)	20 dBW (PX)
(R,J)2(A,B,D)	36 dBW (PX)	23 dBW (PX)
J(7,9)(B,D,X)	36 dBW (PX)	23 dBW (PX)
D(1,2)D	30 dBW (PX)	17 dBW (PX)
G1D	30 dBW (PX)	17 dBW (PX)

**Reasons:** Update emission designators to be consistent with updates to Appendix 27 made at WRC-23 as well as adding a new emission designator that implements modern modulation techniques.

**ADD USA/4355A9/9**

**26/7.4** The procedures in Nos. 26/7.1, 26/7.2, and 26/7.3 above do not apply to wide-band channels formed by aggregation of individual channels pursuant to 26/3.7.

**Reasons:** This provision has been included because provisions 26/7.1 through 26/7.3 pertain to requesting allotments and renouncing allotments, therefore applying these existing provisions to wide-band channels would allow for altering the allotment plan which would be outside of the scope of Resolution **411 (WRC-23)**.

**SUP USA/4355A9/10**

## RESOLUTION 411 (WRC-23)

### **Consideration of appropriate regulatory actions to update Appendix 26 in support of modernization of high-frequency spectrum use in the aeronautical mobile (OR) service**

**Reasons:** The work for this agenda item has been completed.

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## UNITED STATES OF AMERICA

## DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

**Agenda Item 1.10:** *to consider developing power flux-density and equivalent isotropically radiated power limits for inclusion in Article 21 of the Radio Regulations for the fixed-satellite, mobile-satellite and broadcasting-satellite services to protect the fixed and mobile services in the frequency bands 71-76 GHz and 81-86 GHz, in accordance with Resolution 775 (Rev.WRC-23);*

**BACKGROUND**

WRC-2000 made changes to the allocations in the frequency bands 71-76 GHz and 81-86 GHz based on the information known at that time. However, due to lack of information, the sharing conditions between fixed service, mobile service, and satellite services could not be fully developed.

Due to the current and ongoing development of the terrestrial and satellite services in the 71-76 GHz and 81-86 GHz bands, the bands have become increasingly more important and complex. One major development since WRC-2000 is the design of antennas on newer satellites. Modern antennas allow satellites to control their beams and footprint effectively to reduce interference on the ground and to nearby satellites. However, advancements have been made in manufacturing and development processes, allowing more satellites to be made at a lower cost, resulting in exponentially more deployments. More information on the technical and operational characteristics of these services has become available to the ITU-R, allowing for studies to be conducted to expand Article 21 of the Radio Regulations.

**PROPOSAL**

The United States proposes to include the power limits for earth stations in the 81-86 GHz as well as add a power-flux density (PFD) limit for the Fixed-Satellite Service (FSS) in the 71-86 GHz band, noting that the possibility for the inclusion of other satellite space station services such as Mobile-Satellite Service (MSS) and Broadcasting-Satellite Service (BSS) and their respective orbits, non-geostationary or geostationary, can be considered in the future.

## ARTICLE 21

**Terrestrial and space services sharing frequency bands above 1 GHz**

**MOD** USA/XXXXA10/1

**Section III – Power limits for earth stations**

TABLE 21-3 (Rev.WRC-19)

Frequency band	Services
2 025-2 110 MHz	Earth exploration-satellite
5 670-5 725 MHz (for the countries listed in No. 5.454 with respect to the countries listed in Nos. 5.453 and 5.455)	Fixed-satellite Meteorological-satellite Mobile-satellite

5 725-5 755 MHz <sup>6</sup>	(for Region 1 with respect to the countries listed in Nos. <b>5.453</b> and <b>5.455</b> )	Space operation
5 755-5 850 MHz <sup>6</sup>	(for Region 1 with respect to the countries listed in Nos. <b>5.453</b> and <b>5.455</b> )	Space research
5 850-7 075 MHz		
7 190-7 250 MHz		
7 900-8 400 MHz		
10.7-11.7 GHz <sup>6</sup>	(for Region 1)	
12.5-12.75 GHz <sup>6</sup>	(for Region 1 with respect to the countries listed in No. <b>5.494</b> )	
12.7-12.75 GHz <sup>6</sup>	(for Region 2)	
12.75-13.25 GHz		
14.0-14.25 GHz	(with respect to the countries listed in No. <b>5.505</b> )	
14.25-14.3 GHz	(with respect to the countries listed in Nos. <b>5.505</b> and <b>5.508</b> )	
14.3-14.4 GHz <sup>6</sup>	(for Regions 1 and 3)	
14.4-14.8 GHz		
17.7-18.1 GHz		Fixed-satellite
22.55-23.15 GHz		Earth exploration-satellite
27.0-27.5 GHz <sup>6</sup>	(for Regions 2 and 3)	Mobile-satellite
27.5-29.5 GHz		Space research
31.0-31.3 GHz	(for the countries listed in No. <b>5.545</b> )	
34.2-35.2 GHz	(for the countries listed in No. <b>5.550</b> with respect to the countries listed in No. <b>5.549</b> )	
51.4-52.4 GHz		Fixed-satellite
81-84 GHz		Fixed-satellite
84-86 GHz		Fixed-satellite

**Reasons:** The proposed EIRP limits for FSS earth stations in 81-86 GHz satisfies the consideration for protection by this agenda item.

**MOD USA/XXXXA10/2**

### Section V – Limits of power flux-density from space stations

TABLE 21-4 (end) (Rev.WRC-23)

Frequency band	Service*	Limit in dB(W/m <sup>2</sup> ) for angles of arrival ( $\delta$ ) above the horizontal plane			Reference bandwidth
		0°-5°	5°-25°	25°-90°	
40.5-42 GHz			5°-15°	15°-25°	1 MHz

<sup>6</sup> **21.12.1** The equality of right to operate when a band of frequencies is allocated in different Regions to different services of the same category is established in No. **4.8**. Therefore any limits concerning inter-Regional interference which may appear in ITU-R Recommendations should, as far as practicable, be observed by administrations.

	Fixed-satellite (geostationary-satellite orbit) Broadcasting-satellite (geostationary-satellite orbit)	$-120^{21}$	$-120 + (\delta - 5)^{21}$	$-110 + 0.5(\delta - 15)^{21}$	$-105^{21}$	
42-42.5 GHz	Fixed-satellite (non-geostationary-satellite orbit) Broadcasting-satellite (non-geostationary-satellite orbit)	$-120^{11, 21}$	<b>5°-25°</b> $-120 + 0.75(\delta - 5)^{11, 21}$		$-105^{11, 21}$	1 MHz
42-42.5 GHz	Fixed-satellite (geostationary-satellite orbit) Broadcasting-satellite (geostationary-satellite orbit)	$-127^{21}$	<b>5°-20°</b> $-127 + (4/3)(\delta - 5)^{21}$	<b>20°-25°</b> $-107 + 0.4(\delta - 20)^{21}$	$-105^{21}$	1 MHz
In Region 1: 47.5-47.9 GHz 48.2-48.54 GHz 49.44-50.2 GHz	Fixed-satellite (geostationary-satellite orbit)	$-115$	<b>5°-25°</b> $-115 + 0.5(\delta - 5)$		$-105$	1 MHz
71-74 GHz	Fixed-satellite (geostationary-satellite orbit)	$-115$	$-115 + 0.5(\delta - 5)$		$-105$	1 MHz
74-76 GHz	Fixed-satellite (geostationary-satellite orbit)	$-115$	$-115 + 0.5(\delta - 5)$		$-105$	1 MHz

**Reasons:** The proposed PFD limits for FSS (geostationary-satellite orbit) in 71-76 GHz satisfies the consideration for protection by this agenda item.

**SUP USA/XXXXA10/3**

RESOLUTION 775 (REV.WRC-23)

**Power flux-density and equivalent isotropically radiated power limits  
for inclusion in Article 21 for the fixed-satellite, mobile-satellite  
and broadcasting-satellite services to protect the fixed and mobile services  
in the frequency bands 71-76 GHz and 81-86 GHz**

**Reasons:** The work for this agenda item has been completed.

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## UNITED STATES OF AMERICA

### DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

**AGENDA ITEM 1.11:** *to consider the technical and operational issues, and regulatory provisions, for space-to-space links among non-geostationary and geostationary satellites in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660 MHz, 1 670-1 675 MHz and 2 483.5-2 500 MHz allocated to the mobile-satellite service, in accordance with Resolution 249 (Rev. WRC-23);*

#### **BACKGROUND INFORMATION:**

There are non-geostationary-satellite orbit (non-GSO) satellites that operate with limited and non-real-time connectivity to earth stations. Having continuous (or near continuous) communications across their orbits would significantly enhance the availability and value of collected instrument data for applications requiring low latency and overcome their traditional orbital and operational limitations. To achieve continuous (or near continuous) communications for such non-GSO satellites across their orbits, the global coverage provided by non-GSO and GSO Mobile-satellite service (MSS) systems, using space-to-space links, can be utilized.

Recent advances in technology have made this approach feasible, with the development of a range of space terminals that have the capability to operate space-to-space links with existing MSS systems, to relay data to or from the ground. By utilizing space-to-space communication links between lower-altitude non-GSO small satellites, (“user space stations”) and non-GSO and GSO MSS service provider space stations (operating at higher orbital altitudes), to relay data to or from the ground, a range of new opportunities becomes possible.

It is noted that the number of filings for transmissions between non-GSO space stations and GSO satellite systems, as well as between non-GSO space stations and non-GSO systems, is increasing, albeit currently under RR No. 4.4.

The following terminology is used to describe the key stations:

- An “MSS service provider space station” is considered to be a space station transmitting in a band allocated to the MSS (space-to-Earth) towards user space stations which receive within the framework of the MSS (space-to-space) or inter-satellite service (ISS) at lower altitudes, and receiving in a band allocated to the MSS (Earth-to-space) from user space stations at lower altitudes, all within the notified beams of the MSS service provider network or system.
- A “user space station” is considered to be a space station transmitting within the framework of the MSS (s-s) or ISS in a band allocated to the MSS (Earth-to-space) towards MSS service provider space stations at higher altitudes, and receiving in a band allocated to the MSS (space-to-Earth) from MSS service provider space stations at higher altitudes, all within the notified beams of the MSS service provider network or system.

The ITU-R has conducted extensive sharing and compatibility studies to assess the feasibility of introducing satellite-to-satellite links in many of the frequency bands called out in Resolution 249 (Rev. WRC-23).

#### **PROPOSAL**

The United States of America proposes that use of satellite-to-satellite links be recognized in the Radio Regulations within the mobile-satellite service in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and 1 670-1 675 MHz with transmissions limited to the same direction of transmission (e.g., Earth-to-space or space-to-Earth) of the GSO or non-GSO MSS service providers’ space station. The non-GSO user is to be part of the MSS network or system providing the service and will operate in a manner that would

replicate the operations of other users of the MSS network or system. Other user space stations, e.g., space science satellite, would include MSS frequencies and be part of the MSS network or system as a non-GSO space station under a contract with the MSS network or system operator providing the service.

A proposed new WRC-27 Resolution provides satellite-to-satellite link operating conditions and regulatory provisions to ensure protection of incumbent services operations.

**Proposals**

**ARTICLE 5**

**Frequency allocations**

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

**MOD USA/4344A11/1**

**1 300-1 525 MHz**

Allocation to services		
Region 1	Region 2	Region 3
...	...	...
<b>1 492-1 518</b> FIXED MOBILE except aeronautical mobile 5.341A 5.341 5.342	<b>1 492-1 518</b> FIXED MOBILE 5.341B 5.343 5.341 5.344	<b>1 492-1 518</b> FIXED MOBILE 5.341C 5.341
<b>1 518-1 525</b> FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) (space-to-space) MOD 5.348 5.348A MOD 5.348B 5.351A ADD 5.A111 5.341 5.342	<b>1 518-1 525</b> FIXED MOBILE 5.343 MOBILE-SATELLITE (space-to-Earth) (space-to-space) MOD 5.348 5.348A MOD 5.348B 5.351A ADD 5.A111 5.341 5.344	<b>1 518-1 525</b> FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) (space-to-space) MOD 5.348 5.348A MOD 5.348B 5.351A ADD 5.A111 5.341

**Reasons:** Include footnote in Article 5 recognizing satellite-to-satellite operations as part of the mobile-satellite service in the indicated frequency bands.

**ADD USA/4344A11/2**

**5.A111** For use of the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and 1 670-1 675 MHz, or parts thereof, by space stations in the mobile-satellite service (space-to-space), Resolution [USA/4344A11/SAT-TO-SAT] (WRC-27) shall apply. Use of the frequency bands 1 525-1 544 MHz, 1 545-1 559 MHz, 1 626.5-1 645.5 MHz and 1 646.5-1 660 MHz by space stations in the mobile-satellite service (space-to-space), shall be limited to space-to-space links between non-geostationary satellites and geostationary satellites. No. 4.10 does not apply. (WRC-27)

**Reasons:** New footnote recognizing satellite-to-satellite operations in the mobile-satellite service in the indicated frequency bands with provisions for operation specified in a new WRC-27 Resolution. Such use would not fall under the safety service provisions of Article 4.10.

**MOD USA/4344A11/3**

**5.348** The use of the band 1 518-1 525 MHz by the mobile-satellite service (space-to-Earth) is subject to coordination under No. 9.11A. In the band 1 518-1 525 MHz stations in the mobile-satellite service (space-to-Earth) (space-to-space) shall not claim protection from the stations in the fixed service. No. 5.43A does not apply. (WRC-27)

**Reasons:** Modify No. 5.348 to clarify that coordination under No. 9.11A applies to space-to-Earth MSS operations. Space-to-space operations will be within the envelope of the typical earth stations of the GSO MSS service provider network.

**MOD USA/4344A11/4**

**5.348B** In the band 1 518-1 525 MHz, stations in the mobile-satellite service (space-to-Earth) (space-to-space) shall not claim protection from aeronautical mobile telemetry stations in the mobile service in the territory of the United States (see Nos. 5.343 and 5.344) and in the countries listed in No. 5.342. No. 5.43A does not apply. (WRC-27)

**Reasons:** Modify No. 5.348B to clarify that both MSS space-to-Earth and MSS space-to-space shall not claim protection from aeronautical mobile telemetry stations in the mobile service in the territory of the United States.

**MOD USA/4344A11/5**

**1 525-1 610 MHz**

Allocation to services		
Region 1	Region 2	Region 3
<p><b>1 525-1 530</b>            SPACE OPERATION            (space-to-Earth)            FIXED            MOBILE-SATELLITE            (space-to-Earth) (space-to-space)            5.208B 5.351A ADD 5.A111            Earth exploration-satellite            Mobile except aeronautical            mobile 5.349            5.341 5.342 5.350 5.351            5.352A MOD 5.354</p>	<p><b>1 525-1 530</b>            SPACE OPERATION            (space-to-Earth)            MOBILE-SATELLITE            (space-to-Earth) (space-to-space)            5.208B 5.351A ADD 5.A111            Earth exploration-satellite            Fixed            Mobile 5.343              5.341 5.351 MOD 5.354</p>	<p><b>1 525-1 530</b>            SPACE OPERATION            (space-to-Earth)            FIXED            MOBILE-SATELLITE            (space-to-Earth) (space-to-space)            5.208B 5.351A ADD 5.A111            Earth exploration-satellite            Mobile 5.349              5.341 5.351 5.352A MOD            5.354</p>
<p><b>1 530-1 535</b>            SPACE OPERATION            (space-to-Earth)            MOBILE-SATELLITE            (space-to-Earth) (space-to-space)            5.208B 5.351A 5.353A ADD            5.A111            Earth exploration-satellite            Fixed            Mobile except aeronautical mobile            5.341 5.342 5.351 MOD 5.354</p>	<p><b>1 530-1 535</b>            SPACE OPERATION (space-to-Earth)            MOBILE-SATELLITE (space-to-Earth) (space-to-space) 5.208B            5.351A 5.353A ADD 5.A111            Earth exploration-satellite            Fixed            Mobile 5.343              5.341 5.351 MOD 5.354</p>	

<b>1 535-1 544</b>	MOBILE-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.351A 5.341 5.351 5.353A MOD 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A ADD 5.A111
<b>1 544-1 545</b>	MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.353A MOD 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A
<b>1 545-1 559</b>	MOBILE-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.351A 5.341 5.351 5.353A MOD 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A ADD 5.A111
<b>1 559-1 610</b>	AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.328B 5.329A 5.341

**Reasons:** Include footnote in Article 5 recognizing satellite-to-satellite operations as part of the mobile-satellite service in the indicated frequency bands. Frequency range 1 535-1 559 MHz is split to exclude space-to-space in the frequency range 1 544-1 545 MHz.

#### MOD USA/4344A11/6

**5.354** The use of the bands 1 525-1 559 MHz by the mobile-satellite service (space-to-Earth) and 1 626.5-1 660.5 MHz by the mobile-satellite service (Earth-to-space) is subject to coordination under No. **9.11A**. (WRC-27)

**Reasons:** Modify No. **5.354** to clarify that coordination under No. **9.11A** applies to space-to-Earth and Earth-to-space MSS operations. Space-to-space operations will be within the envelope of the typical earth stations of the GSO MSS service provider network.

#### MOD USA/4344A11/7

##### 1 610-1 660 MHz

Allocation to services		
Region 1	Region 2	Region 3
<b>1 610-1 610.6</b> MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION  5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.371	<b>1 610-1 610.6</b> MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space)  5.341 5.364 5.366 5.367 5.368 5.370	<b>1 610-1 610.6</b> MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.369  5.341 5.355 5.359 5.364 5.366 5.367 5.368
<b>1 610.6-1 613.8</b> MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION  5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.371 MOD 5.372	<b>1 610.6-1 613.8</b> MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space)  5.149 5.341 5.364 5.366 5.367 5.368 5.370 MOD 5.372	<b>1 610.6-1 613.8</b> MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.369  5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 MOD 5.372

<p><b>1 613.8-1 616</b> MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B</p> <p>5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.371 MOD 5.372 5.372A</p>	<p><b>1 613.8-1 616</b> MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) 5.208B</p> <p>5.341 5.364 5.365 5.366 5.367 5.368 5.370 MOD 5.372 5.372A</p>	<p><b>1 613.8-1 616</b> MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B Radiodetermination-satellite (Earth-to-space) 5.369</p> <p>5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 MOD 5.372 5.372A</p>
<p><b>1 616-1 621.23</b> MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A ADD 5.A111 AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) (space-to-space) 5.208B ADD 5.A111</p> <p>5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.371 MOD 5.372 5.372A</p>	<p><b>1 616-1 621.35</b> MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A ADD 5.A111 AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) (space-to-space) 5.208B ADD 5.A111</p> <p>5.341 5.364 5.365 5.366 5.367 5.368 5.370 MOD 5.372 5.372A</p>	<p><b>1 616-1 621.35</b> MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A ADD 5.A111 AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) (space-to-space) 5.208B ADD 5.A111 Radiodetermination-satellite (Earth-to-space) 5.369</p> <p>5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 MOD 5.372 5.372A</p>
<p><b>1 621.35-1 626.5</b> MARITIME MOBILE- SATELLITE (space-to-Earth) 5.373 5.373A MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A ADD 5.A111 AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) (space-to-space) except maritime mobile satellite (space-to-Earth) ADD 5.A111</p> <p>5.208B 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.371 MOD 5.372</p>	<p><b>1 621.35-1 626.5</b> MARITIME MOBILE- SATELLITE (space-to-Earth) 5.373 5.373A MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A ADD 5.A111 AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) (space-to-space) except maritime mobile satellite (space-to-Earth) ADD 5.A111</p> <p>5.208B 5.341 5.364 5.365 5.366 5.367 5.368 5.370 MOD 5.372</p>	<p><b>1 621.35-1 626.5</b> MARITIME MOBILE- SATELLITE (space-to- Earth) 5.373 5.373A MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A ADD 5.A111 AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) (space-to-space) except maritime mobile satellite (space-to-Earth) ADD 5.A111 Radiodetermination-satellite (Earth-to-space) 5.369</p> <p>5.208B 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 MOD 5.372</p>
<p><b>1 626.5-1 645.5</b></p>	<p>MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.355 5.357A 5.359 5.362A 5.374 5.375 5.376 ADD 5.A111</p>	
<p><b>1 645.5-1 646.5</b></p>	<p>MOBILE-SATELLITE (Earth-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.355 5.357A 5.359 5.362A 5.374 5.375 5.376</p>	

<b>1 646.5-1 660</b>	MOBILE-SATELLITE (Earth-to-space) (space-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.355 5.357A 5.359 5.362A 5.374 5.375 5.376 ADD 5.A111
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**Reasons:** Include footnote in Article 5 recognizing satellite-to-satellite operations as part of the mobile-satellite service in the indicated frequency bands. Frequency range 1 626.5-1 660 MHz is split to exclude space-to-space in the frequency range 1 645.5-1 646.5 MHz.

**MOD USA/4344A11/8**

**5.372** Harmful interference shall not be caused to stations of the radio astronomy service using the frequency band 1 610.6-1 613.8 MHz by stations of the radiodetermination-satellite and mobile-satellite services (No. 29.13 applies). The equivalent power flux-density (epfd) produced in the frequency band 1 610.6-1 613.8 MHz by all space stations of a non-geostationary-satellite system in the mobile-satellite service (space-to-Earth) operating in frequency band 1 613.8-1 626.5 MHz and the mobile-satellite service (space-to-space) operating in frequency band 1 616-1 626.5 MHz shall be in compliance with the protection criteria provided in Recommendations ITU-R RA.769-2 and ITU-R RA.1513-2, using the methodology given in Recommendation ITU-R M.1583-1, and the radio astronomy antenna pattern described in Recommendation ITU-R RA.1631-0. (WRC-27)

**Reasons:** Modify No. 5.372 to ensure that compliance with the protection criteria provided in Recommendations ITU-R RA.769-2 and ITU-R RA.1513-2 also includes the epfd produced in the frequency band 1 610.6-1 613.8 MHz from MSS (space-to-space) operations in 1 616-1 626.5 MHz.

**MOD USA/4344A11/9**

**1 660-1 710 MHz**

Allocation to services		
Region 1	Region 2	Region 3
...		
<b>1 668.4-1 670</b>	METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.379C RADIO ASTRONOMY 5.149 5.341 5.379D 5.379E	
<b>1 670-1 675</b>	METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (Earth-to-space) (space-to-space)5.351A MOD 5.379B 5.341 5.379D 5.379E 5.380A ADD 5.A111	
<b>1 675-1 690</b>	METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.341	
...	...	

**Reasons:** Include footnote in Article 5 recognizing satellite-to-satellite operations as part of the mobile-satellite service in the indicated frequency bands.

**MOD USA/4344A11/10**

**5.379B** The use of the frequency band 1 668-1 675 MHz by the mobile-satellite service (Earth-to-space) is subject to coordination under No. **9.11A**. (WRC-27)

**Reasons:** Modify No. **5.379B** to clarify that coordination under No. **9.11A** applies to Earth-to-space MSS operations. Space-to-space operations will be within the envelope of the typical earth stations of the GSO MSS service provider network.

ARTICLE 21

**Terrestrial and space services sharing frequency bands above 1 GHz**

**Section V – Limits of power flux-density from space stations**

**MOD USA/4344A11/11**

TABLE 21-4 (Rev.WRC-27)

Frequency band	Service *	Limit in dB(W/m <sup>2</sup> ) for angles of arrival ( $\delta$ ) above the horizontal plane			Reference bandwidth	
		0°-5°	5°-25°	25°-90°		
1 670-1 700 MHz	Earth exploration-satellite Meteorological-satellite	-133 (value based on sharing with meteorological aids service)			1.5 MHz	
1 518-1 525 MHz (Applicable to the territory of the United States in Region 2 between the longitudes 71° W and 125° W)	Mobile-satellite (space-to-Earth) (space-to-space)	0° ≤ $\delta$ ≤ 4°	4° < $\delta$ ≤ 20°	20° < $\delta$ ≤ 60°	60° < $\delta$ ≤ 90°	4 kHz
		-181.0	-193.0 + 20 log $\delta$	-213.3 + 35.6 log $\delta$	-150.0	
1 518-1 525 MHz (Applicable to all other territory of the United States in Region 2)	Mobile-satellite (space-to-Earth) (space-to-space)	0° ≤ $\delta$ ≤ 43.4°	43.4° < $\delta$ ≤ 60°		60° < $\delta$ ≤ 90°	4 kHz
		-155.0	-213.3 + 35.6 log $\delta$		-150.0	
...						

\* The references to services are those services which have allocations in Article 5.

**Reasons:** Makes the same pfd limits applied to MSS (space-to-Earth) in the frequency range 1 518-1 525 MHz applicable to MSS (space-to-space) operations.

APPENDIX 4 (REV.WRC-27)

**Consolidated list and tables of characteristics for use in the application of the procedures of Chapter III**

## ANNEX 2

### **Characteristics of satellite networks, earth stations or radio astronomy stations<sup>2</sup>** (Rev.WRC-27)

#### **Footnotes to Tables A, B, C and D**

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<sup>2</sup> The Radiocommunication Bureau shall develop and keep up-to-date forms of notice to meet fully the statutory provisions of this Appendix and related decisions of future conferences. Additional information on the items listed in this Annex together with an explanation of the symbols is to be found in the Preface to the BR IFIC (Space Services). (WRC-12)

**TABLE A**  
**GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM,**  
**EARTH STATION OR RADIO ASTRONOMY STATION** (Rev.WRC-27)

Items in Appendix	<i>A - GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK OR SYSTEM, EARTH STATION OR RADIO ASTRONOMY STATION</i>
...	
<b>A.40</b>	<b>COMPLIANCE WITH § 4.1.13bis of ARTICLE 4 OF APPENDIX 30/30A (WRC-23) or § 6.15quat of ARTICLE 6 OF APPENDIX 30B (WRC-23)</b>
A.40.a	a commitment to respect the power-flux density limits specified under § 4.1.13bis of Article 4 of Appendix 30/30A or § 6.15quat of Article 6 of Appendix 30B, as appropriate Required only for a submission under § 4.1.12 of Article 4 of Appendix 30/30A or under §§ 6.17/6.25 of Article 6 of Appendix 30B
<b>A.41</b>	<b>COMPLIANCE WITH RESOLUTION [USA/4344A11/SAT-TO-SAT] (WRC-27)</b>
A.41.a	the exclusion zone angle in degrees, defined as a minimum angle between the geostationary arc and the space-to-space link transmitting direction, measured at the non-geostationary transmitting space station Required only for non-geostationary space stations transmitting to another non-geostationary space station in the frequency bands 1 616-1 626.5 MHz and 1 670-1 675 MHz
A.41.b	the mask pattern defined in terms of the e.i.r.p. in a 40 kHz bandwidth as a function of the off-axis angle between the non-geostationary transmitting space station boresight line and the line from the non-geostationary transmitting space station to a point on the geostationary-satellite orbit, and as a function of the latitude at nadir of the non-geostationary transmitting space station Required only for non-geostationary space stations transmitting to another non-geostationary space station in the frequency bands 1 616-1 626.5 MHz and 1 670-1 675 MHz or non-geostationary space stations transmitting to a geostationary space station in the frequency bands 1 616-1 645.5 MHz, 1 646.5-1 660 MHz and 1670-1675 MHz

**Reasons:** Two new Appendix 4 data elements are added for compliance with provisions for space-to-space operations for space stations operating in accordance with Resolution [USA/4344A11/SAT-TO-SAT] (WRC-27)

Advance publication of a geostationary-satellite network	Advance publication of a non-geostationary-satellite network or system not subject to coordination under Section II of Article 9	Notification or coordination of a geostationary-satellite network (including space operation functions under Article 2A of Appendices 30 or 30A)	Notification or coordination of a non-geostationary-satellite network or system	Notification or coordination of an earth station (including notification under Appendices 30A or 30B)	Notice for a satellite network in the broadcasting-satellite service under Appendix 30 (Articles 4 and 5)	Notice for a satellite network (feeder-link) under Appendix 30A (Articles 4 and 5)	Notice for a satellite network in the fixed-satellite service under Appendix 30B (Articles 6 and 8) or for Appendix 30B ESIM in accordance with Resolution 121 (WRC-23)	Items in Appendix	Radio astronomy
								<b>A.40</b>	
					+	+	+	A.40.a	
								<b>A.41</b>	
			+					A.41.a	
			+					A.41.b	

**ADD USA/4344A11/13**

**RESOLUTION [USA/4344A11/SAT-TO-SAT] (WRC-27)**

**Space-to-space links in the mobile-satellite service in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and 1 670-1 675 MHz**

The World Radiocommunication Conference (Shanghai, 2027),

*considering*

- a) that there is a need for non-geostationary-satellite orbit (non-GSO) space stations to be able to relay data to the Earth, and that part of this need could be met by allowing such non-GSO space stations to communicate with MSS space stations operating in the geostationary-satellite orbit (GSO) and in the non-GSO in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660 MHz, 1 670-1 675 MHz and 2 483.5-2 500 MHz, or parts thereof;
- b) that the administration responsible for the notification of non-GSO space stations communicating with GSO or non-GSO space stations in the MSS at higher altitude does not need to be the same administration that has already notified assignments in the MSS;
- c) that there is growing interest in utilizing space-to-space links for a variety of applications;
- d) that the ITU Radiocommunication Sector (ITU-R) has carried out studies on sharing and compatibility between incumbent services in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660 MHz, 1 670-1 675 MHz and 2 483.5-2 500 MHz and adjacent bands and space-to-space transmissions in the MSS;
- e) that these studies considered the limitation of the use of frequency bands to transmission directions that are the same as those of the existing mobile-satellite service (MSS) allocations in these frequency bands;
- f) that the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and 1 670-1 675 MHz are also allocated to terrestrial and space services used by a variety of different systems, and these existing services and their future development need to be protected, without the imposition of additional constraints, from the operation of space-to-space links,

*recognizing*

- a) that any course of action taken under this Resolution has no impact on the original date of receipt of the frequency assignments of the GSO MSS network or the non-GSO MSS system with which non-GSO space stations communicate or on the coordination requirements of that satellite network;
- b) that the protection of frequency assignments to MSS satellite systems and networks in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and 1 670-1 675 MHz, or parts thereof, is a fundamental and important issue due to the fact that those frequency bands are used for the telecommunication/information and communication technology (ICT) infrastructure of many countries, as well as critical safety services,

*resolves*

1 that, for a non-GSO user space station<sup>10</sup> subject to this Resolution communicating with a GSO or non-GSO MSS service provider space station<sup>11</sup> within the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and 1 670-1 675 MHz, or parts thereof, the following conditions shall apply:

1.1 the non-GSO user space station transmitting in the frequency bands 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and/or 1 670-1 675 MHz and receiving in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz and/or 1 616-1 626.5 MHz, or parts thereof, shall only operate space-to-space links when its apogee altitude<sup>12</sup> is lower than the minimum operational altitude<sup>13</sup> of the GSO or non-GSO MSS space station with which it communicates and when the off-nadir angle between that GSO or non-GSO space station and the non-GSO space station with which it communicates is less than or equal to  $\theta_{Max}$  (as defined in Annex 1 to this Resolution);

1.2 the GSO or non-GSO MSS service provider space station receiving in the frequency band 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and/or 1 670-1 675 MHz and transmitting in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz and/or 1 616-1 626.5 MHz, or parts thereof, shall only operate space-to-space links when its minimum operational altitude is higher than the apogee altitude of the non-GSO space station with which it communicates;

1.3 that the use of space-to-space links by GSO or non-GSO MSS service provider space stations transmitting in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz and/or 1 616-1 626.5 MHz and receiving in the frequency band 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and/or 1 670-1 675 MHz is limited to those with recorded assignments in the relevant MSS (space-to-Earth) and (Earth-to-space) allocations in those frequency bands;

1.4 that non-GSO user space stations transmitting in the frequency bands 1 626.5-1 645.5 MHz and 1 646.5-1 660 MHz, or parts thereof, and receiving in the frequency bands 1 525-1 544 MHz and 1 545-1 559 MHz, or parts thereof, shall only communicate with GSO service provider space stations;

2 that, for a non-GSO user space station transmitting in the frequency band 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and/or 1 670-1 675 MHz, the following conditions shall apply:

---

<sup>10</sup> A “user space station” is considered to be a space station transmitting within the framework of the MSS (space-to-space) in a band allocated to the MSS (Earth-to-space) towards MSS service provider space stations at higher altitudes, and receiving in a band allocated to the MSS (space-to-Earth) from MSS service provider space stations at higher altitudes, all within the notified beams of the MSS service provider network or system.

<sup>11</sup> An “MSS service provider space station” is considered to be a space station transmitting in a band allocated to the MSS (space-to-Earth) towards user space stations which receive within the framework of the MSS (space-to-space) at lower altitudes, and receiving in a band allocated to the MSS (Earth-to-space) from user space stations at lower altitudes, all within the notified beams of the MSS service provider network or system.

<sup>12</sup> See item A.4.b.4.d of Appendix 4.

<sup>13</sup> See item A.4.b.4.f of Appendix 4.

- 2.1 this non-GSO user space station shall transmit only when within the cone whose apex is the GSO or non-GSO receiving MSS service provider space station and whose angle is  $\theta_{Max}$  (as defined in Annex 1 to this Resolution);
- 2.2 the emissions of this non-GSO user space station shall remain within the envelope of the recorded characteristics of the associated transmitting MSS earth stations of the GSO MSS network or non-GSO MSS system with which it communicates;
- 2.3 the emission of this non-GSO user space station shall not produce a pfd at any point in the GSO arc greater than the pfd produced by earth stations associated with the satellite network/system with which they communicate, and Annex 2 to this Resolution shall apply;
- 3 that for an MSS service provider space station transmitting in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, and/or 1 616-1 626.5 MHz, or parts thereof, the following conditions shall apply:
  - 3.1 this non-GSO or GSO MSS service provider space station shall transmit only when the receiving non-GSO user space station is within the cone whose apex is the GSO or non-GSO transmitting space station and whose angle is  $\theta_{Max}$  (as defined in Annex 1 to this Resolution);
  - 3.2 the transmissions shall remain within the envelope of the recorded characteristics of the transmitting GSO MSS or non-GSO MSS service provider space station towards its associated MSS earth stations;
- 4 that non-GSO user space stations receiving in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, and/or 1 616-1 626.5 MHz, or parts thereof, shall not claim protection from MSS networks and systems, space operation service systems or radionavigation-satellite service systems, or from terrestrial services operating in conformity with the Radio Regulations;
- 5 that MSS service provider space stations receiving space-to-space transmissions in the frequency bands 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz, and/or 1 670-1 675 MHz from non-GSO user space stations shall not claim protection for space-to-space links from other MSS networks and systems or from terrestrial services operating in conformity with the Radio Regulations,

*further resolves*

- 1 that, subject to this Resolution:
  - a) the notifying administration for a non-GSO user space station transmitting in the frequency bands 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz and 1 670-1 675 MHz towards a GSO MSS service provider network and receiving in the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, and 1 616-1 626.5 MHz shall send the Bureau the relevant Appendix 4 advance publication information containing the characteristics of the non-GSO user space station and the name of the associated notified GSO MSS service provider network with which it intends to communicate;
  - b) the notifying administration for a non-GSO user space station transmitting in the frequency bands 1 616-1 626.5 MHz and 1 670-1 675 MHz towards a non-GSO MSS service provider system and receiving in the frequency bands 1 518-1 525 MHz and 1 616-1 626.5 MHz shall send the Bureau the relevant Appendix 4 advance publication information containing the characteristics of the non-GSO user space station and the name of the associated notified non-GSO MSS service provider system(s) with which it intends to communicate;
  - c) the notifying administration for a non-GSO MSS service provider system operating space-to-space links and receiving in the frequency bands 1 616-1 626.5 MHz and 1 670-1 675 MHz or of a GSO MSS service provider network operating space-to-space

links and receiving in the frequency bands 1 616-1 626.5, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz and 1 670-1 675 MHz is responsible for eliminating any case of unacceptable interference;

2 that, upon examination of the information submitted by the notifying administration under *further resolves 1a) or 1b)*, if no recorded frequency assignments with typical earth stations for the relevant frequency bands can be identified for the GSO MSS service provider network or non-GSO MSS service provider system with which the notifying administration for the non-GSO user space station intends to communicate, the Bureau shall return the information to the notifying administration,

*instructs the Director of the Radiocommunication Bureau*

1 to take all necessary actions to facilitate the implementation of this Resolution, together with providing any assistance for the resolving of interference, if and when required;

2 to report to future world radiocommunication conferences on any difficulties or inconsistencies encountered in the implementation of this Resolution;

3 to use the methodology given in Appendices 1 to 2 to Annex 2 to this Resolution when assessing compliance with Annex 2.

### Determination of the off-nadir angle

1 A non-geostationary (non-GSO) user space station transmitting in the frequency bands 1 616-1 626.5 MHz and 1 670-1 675 MHz, or parts thereof, and receiving in the frequency bands 1 518-1 525 MHz and 1 616-1 626.5 MHz, or parts thereof, shall communicate with a non-GSO MSS service provider space station only when the off-nadir angle between this non-GSO user space station and the non-GSO MSS service provider space station with which it communicates is equal to or smaller than:

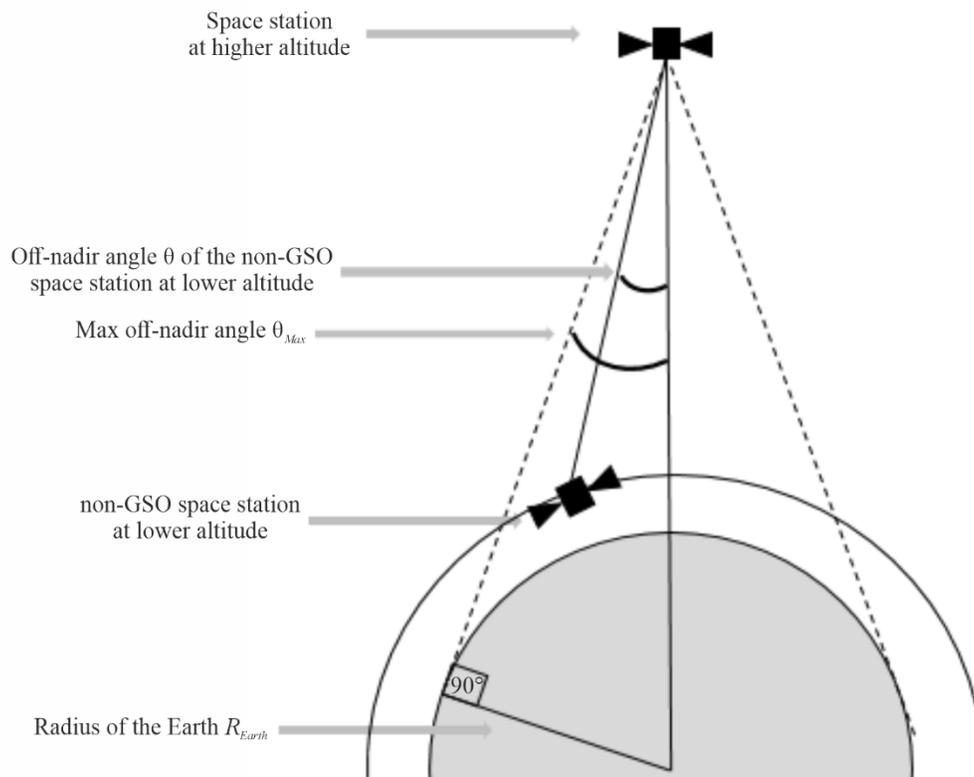
$$\theta_{Max} = \sin^{-1} \left( \frac{R_{Earth}}{R_{Earth} + Alt_{Higher}} \right)$$

where:

$$R_{Earth} = 6\,378 \text{ km}$$

$Alt_{Higher}$  = altitude of the non-GSO service provider space station at a higher orbital altitude in km.

FIGURE 1



2 A non-GSO user space station transmitting in the frequency bands 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz and 1 670-1 675 MHz, or parts thereof, and receiving in the frequency bands 1 518-1 544 MHz and 1 545-1 559 MHz, or parts thereof, shall communicate with a geostationary (GSO) MSS service provider space station only when the off-nadir angle between this GSO MSS service provider space station and the non-GSO user space station with which it communicates is equal to or smaller than:

- if the altitude of the non-GSO user space station is less than 2 000 km:

$$\theta_{Max} = \sin^{-1} \left( \frac{R_{Earth} + Alt_{non-GSO}}{R_{Earth} + Alt_{GSO}} \right)$$

- if the altitude of the non-GSO user space station is greater than or equal to 2 000 km:

$$\theta_{Max} = \sin^{-1} \left( \frac{R_{Earth}}{R_{Earth} + Alt_{GSO}} \right)$$

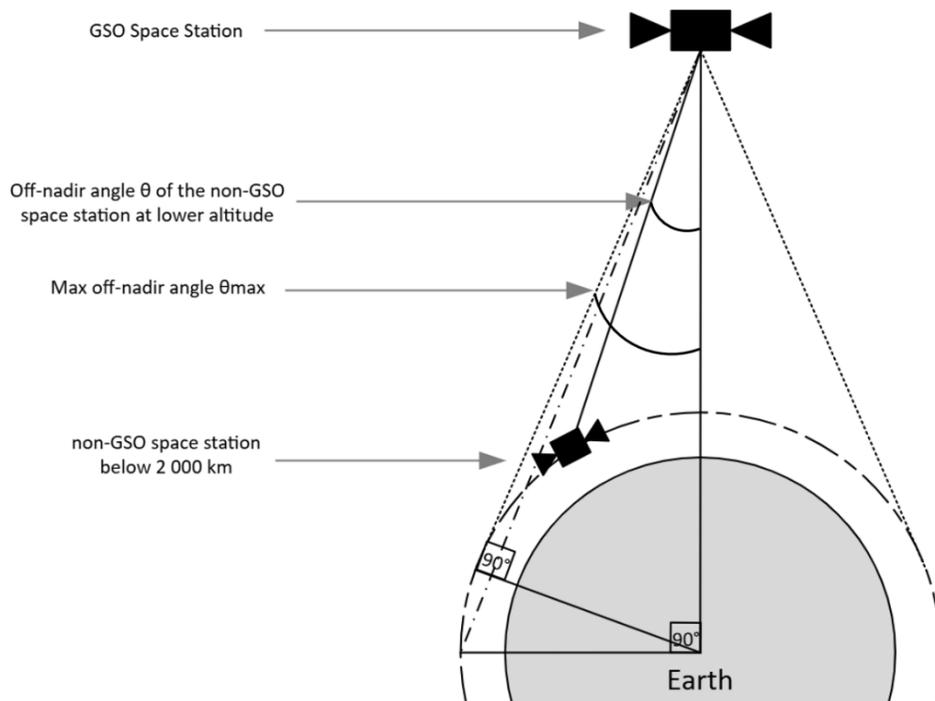
where:

$R_{Earth}$  = 6 378 km

$Alt_{GSO}$  = altitude of the GSO MSS service provider space station in km

$Alt_{non-GSO}$  = altitude of the non-GSO user space station in km.

FIGURE 2



3 If the altitude of the non-GSO user space station transmitting in the frequency bands 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz and 1 670-1 675 MHz, or parts thereof, and receiving in the frequency bands 1 518-1 544 MHz and 1 545-1 559 MHz, or parts thereof, is

less than 2 000 km, the angle at the centre of the Earth between the vector from the user space station to the centre of the Earth and the vector from the GSO MSS service provider space station to the centre of the Earth shall be less than or equal to 90°.

4 Where the notified service area of the GSO or non-GSO MSS service provider network/system at a higher orbital altitude is not global, the maximum off-nadir angle  $\theta_{Max}$  will vary at each azimuth according to the notified service area and there will be a specific maximum off-nadir angle associated with each azimuth, based on the position in space of the MSS service provider network/system at higher orbital altitude and the geographical coordinates (latitude, longitude) of the border of the notified service area at each azimuth, which are extracted from the Graphical Interference Management System (GIMS) database container that was submitted to the Bureau when notifying a specific non-global service area:

$$\theta_{Max} = \cos^{-1} \left( \frac{\left( R_{Earth} + Alt_{Higher} \right)^2 + dist^2 - R_{Earth}^2}{2 \times \left( R_{Earth} + Alt_{Higher} \right) \times dist} \right)$$

with:

$$dist = \sqrt{(X_E - X_S)^2 + (Y_E - Y_S)^2 + (Z_E - Z_S)^2}$$

$$X_E = R_{Earth} \times \cos(lat_{sab}(\varphi)) \times \cos(lon_{sab}(\varphi))$$

$$Y_E = R_{Earth} \times \cos(lat_{sab}(\varphi)) \times \sin(lon_{sab}(\varphi))$$

$$Z_E = R_{Earth} \times \sin(lat_{sab}(\varphi))$$

$$X_S = \left( R_{Earth} + Alt_{Higher} \right) \times \cos(lat_{SS}) \times \cos(lon_{SS})$$

$$Y_S = \left( R_{Earth} + Alt_{Higher} \right) \times \cos(lat_{SS}) \times \sin(lon_{SS})$$

$$Z_S = \left( R_{Earth} + Alt_{SS} \right) \times \sin(lat_{Higher})$$

where:

$lat_{sab}(\varphi)$  = latitude of the service area border for the azimuth  $\varphi$

$lon_{sab}(\varphi)$  = longitude of the service area border for the azimuth  $\varphi$

$lat_{SS}$  = latitude of the sub-satellite point of the GSO/non-GSO MSS service provider space station

$lon_{SS}$  = longitude of the sub-satellite point of the GSO/non-GSO MSS service provider space station.

## ANNEX 2 TO RESOLUTION [USA/4344A11/SAT-TO-SAT] (WRC-27)

### **Provisions for user space stations in the frequency bands 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz and 1 670-1 675 MHz to protect MSS space stations**

1 In the frequency bands 1 616-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660 MHz and 1 670-1 675 MHz, or parts thereof, when a non-geostationary-satellite (non-GSO) user space station, as identified in *further resolves 1a)* of this Resolution, identifies an associated geostationary-satellite (GSO) MSS service provider network, as described in *further resolves 1a)*, to operate space-to-space links, the Radiocommunication Bureau shall perform the examination described in Appendix 1 to this Annex.

2 In the frequency bands 1 616-1 626.5 MHz and 1 670 1 675 MHz, or parts thereof, when a non-GSO user system, as identified in *further resolves 1b)* of this Resolution, identifies a non-GSO MSS service provider system, as described in *further resolves 1b)*, to operate space-to-space links, the Bureau shall perform the examination described in Appendix 2 to this Annex.

3 The notifying administration for the service provider network or system identified in § 1 or § 2 above shall respect all coordination agreements that have already been recorded.

4 The notifying administration for the service provider network identified in § 1 or § 2 above shall provide, upon any request from the notifying administration of another MSS network or system involved in the coordination agreements referred to above, additional information on how the relevant coordination agreements will be respected with regard to protection from space-to-space links. This information shall be provided within 90 days after the receipt of the request.

### APPENDIX 1 TO ANNEX 2

The aim of this Appendix is to provide a method to be used by the Radiocommunication Bureau to assess whether the emissions from a non-geostationary (non-GSO) user space station operating space-to-space links with a geostationary (GSO) MSS service provider space station are within the envelope of the typical earth stations of the GSO MSS network.

Step 1: For each group of the transmitting non-GSO user space station notification.

Step 2: For each of the receiving GSO MSS service provider networks, as listed in *further resolves 1a)* of this Resolution.

Step 3: For each beam in the Earth-to-space direction of the receiving GSO MSS service provider network notification, compute the maximum equivalent isotropically radiated power (e.i.r.p.) produced in one hertz (*EIRPSD*).

Step 4: Compute the reduction in free-space loss at the altitude of the user using:

$$\Delta FSL = 20 \log_{10} \left( \frac{GSO_{alt}}{GSO_{alt} - NGSO_{alt}} \right)$$

where  $NGSO_{alt}$  is the altitude of the transmitting non-GSO system user space stations and  $GSO_{alt} = 35\,786$  km. It should be noted that, if several altitudes are included in the notification, each altitude shall be tested.

Step 5: Compute the reduced e.i.r.p. spectral density as  $EIRPSD_{reduced} = EIRPSD - \Delta FSL$ .

Step 6: For all beams in the non-GSO system user space station notification with a class of station ES, the e.i.r.p. spectral density mask is given in Appendix 4, data item A.41.b.

Step 7: For all emissions in the GSO network notification, compute the e.i.r.p. spectral density mask for all off-axis angles between 0° and 80°, with a step of 1°, and reduce it by  $\Delta FSL$ . The e.i.r.p. spectral density mask computation should assume that the maximum gain is for an off-axis angle of 0°.

Step 8: Frequency assignments to non-GSO systems shall receive a favourable finding with respect to Annex 5 if, for all beams:

- the maximum value of the e.i.r.p. spectral density mask from Step 6 does not exceed the  $EIRPSD_{reduced}$  quantity, computed at the same altitude; and
- the e.i.r.p. spectral density mask of the transmitting non-GSO space station from Step 6 is less than the reduced e.i.r.p. spectral density mask, compared in one hertz, from Step 7 for all angles for at least one emission in the GSO network notification.

Otherwise, the assignments shall receive an unfavourable finding.

## APPENDIX 2 TO ANNEX 2

The aim of this Appendix is to provide a method to be used by the Radiocommunication Bureau to assess whether the emissions from a non-geostationary (non-GSO) user space station operating space-to-space links with a non-GSO MSS service provider space station are within the envelope of the typical earth stations of the non-GSO MSS service provider system.

Step 1: For each group of the transmitting non-GSO user space station notification.

Step 2: For each of the receiving non-GSO MSS service provider systems, as listed in *further resolves 1b*) of this Resolution.

Step 3: For each beam in the Earth-to-space direction of the receiving non-GSO MSS service provider system notification, compute the maximum equivalent isotropically radiated power (e.i.r.p.) produced in one hertz ( $EIRPSD$ ).

Step 4: Compute the reduction in free-space loss at the altitude of the user using:

$$\Delta FSL = 20 \log_{10} \left( \frac{GSO_{alt}}{GSO_{alt} - NGSO_{alt}} \right)$$

where  $NGSO_{alt}$  is the altitude of the transmitting non-GSO system user space stations and  $GSO_{alt} = 35\,786$  km. It should be noted that if several altitudes are included in the notification, each altitude shall be tested.

Step 5: Compute the reduced e.i.r.p. spectral density as  $EIRPSD_{reduced} = EIRPSD - \Delta FSL$ .

Step 6: For all beams in the non-GSO system user space station notification with a class of station ES, the e.i.r.p. spectral density mask is given in Appendix 4, data item A.41.b.

Step 7: For all emissions in the receiving non-GSO MSS service provider network notification, compute the e.i.r.p. spectral density mask for all off-axis angles between 0° and 80°, with a step of 1°, and reduce it by  $\Delta FSL$ . The e.i.r.p. spectral density mask computation should assume that the maximum gain is for an off-axis angle of 0°.

Step 8: Frequency assignments to non-GSO systems user space station shall receive a favourable finding with respect to Annex 5 if, for all beams:

- the maximum value of the mask from Step 6 does not exceed the  $EIRPSD_{reduced}$  quantity, computed at the same altitude; and

– the e.i.r.p. spectral density mask of the transmitting non-GSO space station from Step 6 is less than the reduced e.i.r.p. spectral density mask from Step 7 for all angles. Otherwise, the assignments shall receive an unfavourable finding.

**Reasons:** Draft new WRC-27 Resolution provides the operating conditions for satellite-to-satellite operations in the mobile-satellite service to ensure protection of incumbent services operations.

SUP USA/4344A11/14

• **RESOLUTION 249 (REV. WRC-23)**

**Study of technical and operational issues and regulatory provisions for space-to-space transmissions in the frequency bands 1 518- 1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660 MHz, 1 670-1 675 MHz and 2 483.5-2 500 MHz**

**Reasons:** Adoption by WRC-27 of the aforementioned proposals satisfies the agenda item and therefore Resolution **249 (Rev. WRC-23)** is no longer needed.

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## UNITED STATES OF AMERICA

## DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

**AGENDA ITEM 1.15:** *to consider studies on frequency-related matters, including possible new or modified space research service (space-to-space) allocations, for future development of communications on the lunar surface and between lunar orbit and the lunar surface, in accordance with Resolution 680 (WRC-23);*

**BACKGROUND INFORMATION:**

WRC-27 AI 1.15 aims to address the near-term in-situ scientific exploration and discovery objectives, in time for the 2027 WRC, based on results of the studies referred to in *Resolution 680 (WRC-23) resolves to invite the ITU Radiocommunication Sector to complete in time for the 2027 world radiocommunication conference 1 to 5*, for use in the vicinity of the Moon.

Radio frequency ranges under AI 1.15 were established explicitly to support investments and realization of already planned government and private lunar missions involving technology maturation, scientific experiments and exploration needs, including the Artemis program objectives, led by the United States with direct engagement of Artemis Accords signatories and international partner space agencies. Assurance of spectrum access under the existing international regulatory framework is essential to enable implementation of advance wireless technologies between landers, rovers, extravehicular activity (EVA) astronauts and to return data from unique scientific experiments for relay back to the Earth. *Resolution 680 (WRC-23) resolves to invite the ITU Radiocommunication Sector to complete in time for the 2027 world radiocommunication conference 1 to 5* provide the specific framework and scope for which to meet these time-critical near-term scientific mission objectives. The scientific discoveries and technological advancements resulting from the near-term space exploration objectives will directly promote new industries and technologies and accelerate space commerce in the decades to come.

Securing space research service allocations on a primary basis in the space-to-space direction under AI 1.15 at WRC-27 is fundamental to “lay the foundation for a new space age” directed in the December 18, 2025, Executive Order “Ensuring American Space Superiority”. This strategy also paves the way for a long-term robust space economy in the United States and globally through *Resolution 680 (WRC-23) invites the ITU Radiocommunication Sector 1 and 2*.

**PROPOSAL**

The United States proposes to (1) modify Article 5 Section IV in frequency bands, 390-406.1 MHz, 420-430 MHz and 440-450 MHz, limited to outside the shielded zone of the Moon (SZM), and 2 400-2 690 MHz, 3 500-3 800 MHz, 5 150-5 570 MHz, 5 570-5 725 MHz, 5 775- 5 925 MHz, and 27.5-28.35 GHz, (2) add Resolution [USA-XXX] (WRC-27), and (3) modify Resolution 680 (WRC-23).

# ARTICLE 5

## Frequency allocations

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

**MOD**

**335.4-410 MHz**

Allocation to services		
Region 1	Region 2	Region 3
...		
<b>390-399.9</b>	FIXED MOBILE SPACE RESEARCH (space-to-space) 5.A115-1A 5.254	
<b>399.9-400.05</b>	MOBILE-SATELLITE (Earth-to-space) 5.209 5.220 5.260A 5.260B SPACE RESEARCH (space-to-space) 5.A115-1A	
<b>400.05-400.15</b>	STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz) SPACE RESEARCH (space-to-space) 5.A115-1A 5.261 5.262	
<b>400.15-401</b>	METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.263 5.A115-1A Space operation (space-to-Earth) 5.262 5.264	
<b>401-402</b>	METEOROLOGICAL AIDS SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) SPACE RESEARCH (space-to-space) 5.A115-1A Fixed Mobile except aeronautical mobile 5.264A 5.264B	

<b>402-403</b>	METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) SPACE RESEARCH (space-to-space) 5.A115-1A Fixed Mobile except aeronautical mobile 5.264A 5.264B
<b>403-406</b>	METEOROLOGICAL AIDS SPACE RESEARCH (space-to-space) 5.A115-1A Fixed Mobile except aeronautical mobile 5.265
<b>406-406.1</b>	MOBILE-SATELLITE (Earth-to-space) SPACE RESEARCH (space-to-space) 5.A115-1A 5.265 5.266 5.267
...	

#### 410-460 MHz

Allocation to services		
Region 1	Region 2	Region 3
...		
<b>420-430</b>	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.A115-1A Radiolocation 5.269 5.270 5.271	
...		
<b>440-450</b>	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.A115-1A Radiolocation 5.269 5.285 5.270 5.271 5.284 5.286	
...		

### ADD

**5.A115-1A** The use of the frequency bands 390-406.1 MHz, 420-430 MHz, and 440-450 MHz by stations in the space research service (space-to-space) is limited to the vicinity of the Moon outside the shielded zone of the Moon (SZM) and shall be in accordance with *Resolution [USA-XXX] (WRC-27)*. (WRC-27)

**2 170-2 520 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
...		
<b>2 300-2 400</b> FIXED MOBILE 5.384A Amateur Radiolocation 5.150 5.395	<b>2 300-2 400</b> FIXED MOBILE 5.384A RADIOLOCATION Amateur 5.150 5.393 5.394	
<b>2 400-2 450</b> FIXED MOBILE SPACE RESEARCH (space-to-space) 5.A115-1B Amateur Radiolocation 5.150 5.282	<b>2 400-2 450</b> FIXED MOBILE RADIOLOCATION SPACE RESEARCH (space-to-space) 5.A115-1B Amateur 5.150 5.282	
<b>2 450-2 483.5</b> FIXED MOBILE SPACE RESEARCH (space-to-space) 5.A115-1B Radiolocation 5.150	<b>2 450-2 483.5</b> FIXED MOBILE RADIOLOCATION SPACE RESEARCH (space-to-space) 5.A115-1B 5.150	

<p><b>2 483.5-2 500</b>  FIXED  MOBILE  MOBILE-SATELLITE  (space-to-Earth) 5.351A  RADIODETERMINATION-SATELLITE  (space-to-Earth) 5.398  SPACE RESEARCH (space-to-space) 5.A115-1B  Radiolocation 5.398A</p> <p>5.150 5.368 5.372A 5.399 5.401 5.402</p>	<p><b>2 483.5-2 500</b>  FIXED  MOBILE  MOBILE-SATELLITE  (space-to-Earth) 5.351A  RADIOLOCATION  RADIODETERMINATION-SATELLITE  (space-to-Earth)5.398  SPACE RESEARCH (space-to-space) 5.A115-1B</p> <p>5.150 5.368 5.372A 5.402</p>	<p><b>2 483.5-2 500</b>  FIXED  MOBILE  MOBILE-SATELLITE  (space-to-Earth) 5.351A  RADIOLOCATION  RADIODETERMINATION-SATELLITE  (space-to-Earth)5.398  SPACE RESEARCH (space-to-space) 5.A115-1B</p> <p>5.150 5.368 5.372A 5.401 5.402</p>
<p><b>2 500-2 520</b>  FIXED 5.410  MOBILE except aeronautical mobile 5.384A 5.409A  SPACE RESEARCH (space-to-space) 5.A115-1B</p> <p>5.412</p>	<p><b>2 500-2 520</b>  FIXED 5.410  FIXED-SATELLITE (space-to-Earth) 5.415  MOBILE except aeronautical mobile 5.384A 5.409A  SPACE RESEARCH (space-to-space) 5.A115-1B</p>	<p><b>2 500-2 520</b>  FIXED 5.410  FIXED-SATELLITE (space-to-Earth) 5.415  MOBILE except aeronautical mobile 5.384A 5.409A  MOBILE-SATELLITE (space-to-Earth) 5.351A 5.407 5.414 5.414A  SPACE RESEARCH (space-to-space) 5.A115-1B  5.404</p>

**2 520-2 700 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
<p><b>2 520-2 655</b>  FIXED 5.410  MOBILE except aeronautical mobile 5.384A 5.409A  BROADCASTING-SATELLITE 5.413 5.416  SPACE RESEARCH (space-to-space) 5.A115-1B</p>	<p><b>2 520-2 655</b>  FIXED 5.410  FIXED-SATELLITE (space-to-Earth) 5.415  MOBILE except aeronautical mobile 5.384A 5.409A  BROADCASTING-SATELLITE 5.413 5.416  SPACE RESEARCH (space-to-space) 5.A115-1B</p>	<p><b>2 520-2 535</b>  FIXED 5.410  FIXED-SATELLITE (space-to-Earth) 5.415  MOBILE except aeronautical mobile 5.384A 5.409A  BROADCASTING-SATELLITE 5.413 5.416  SPACE RESEARCH (space-to-space) 5.A115-1B  5.403 5.414A 5.415A</p>

5.339 5.412 5.418B 5.418C	5.339 5.418B 5.418C	<b>2 535-2 655</b> FIXED 5.410 MOBILE except aeronautical mobile 5.384A 5.409A BROADCASTING-SATELLITE 5.413 5.416 SPACE RESEARCH (space-to-space) 5.A115-1B 5.339 5.418 5.418A 5.418B 5.418C
<b>2 655-2 670</b> FIXED 5.410 MOBILE except aeronautical mobile 5.384A 5.409A BROADCASTING-SATELLITE 5.208B 5.413 5.416 SPACE RESEARCH (space-to-space) 5.A115-1B Earth exploration-satellite (passive) Radio astronomy Space research (passive)  5.149 5.412	<b>2 655-2 670</b> FIXED 5.410 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A 5.409A BROADCASTING-SATELLITE 5.413 5.416 SPACE RESEARCH (space-to-space) 5.A115-1B Earth exploration-satellite (passive) Radio astronomy Space research (passive)  5.149 5.208B	<b>2 655-2 670</b> FIXED 5.410 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.208B 5.413 5.416 SPACE RESEARCH (space-to-space) 5.A115-1B Earth exploration-satellite (passive) Radio astronomy Space research (passive)  5.149 5.420
<b>2 670-2 690</b> FIXED 5.410 MOBILE except aeronautical mobile 5.384A 5.409A SPACE RESEARCH (space-to-space) 5.A115-1B Earth exploration-satellite (passive) Radio astronomy Space research (passive)  5.149 5.412	<b>2 670-2 690</b> FIXED 5.410 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.208B 5.415 MOBILE except aeronautical mobile 5.384A 5.409A SPACE RESEARCH (space-to-space) 5.A115-1B Earth exploration-satellite (passive) Radio astronomy Space research (passive)  5.149	<b>2 670-2 690</b> FIXED 5.410 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) 5.351A 5.419 SPACE RESEARCH (space-to-space) 5.A115-1B Earth exploration-satellite (passive) Radio astronomy Space research (passive)  5.149
...		

**2 700-3 600 MHz**

Allocation to services		
Region 1	Region 2	Region 3
...		

<b>3 400-3 500</b> FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.430A Radiolocation <b>5.431</b>	<b>3 400-3 500</b> FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.431A 5.431B Amateur Radiolocation 5.433 5.282	<b>3 400-3 500</b> FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.432 5.432B Radiolocation 5.433 5.282 5.432A
<b>3 500-3 600</b> FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.430A SPACE RESEARCH (space-to-space) 5.A115-1B Radiolocation	<b>3 500-3 600</b> FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.431B SPACE RESEARCH (space-to-space) 5.A115-1B Radiolocation 5.433	<b>3 500-3 600</b> FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.433A SPACE RESEARCH (space-to-space) 5.A115-1B Radiolocation 5.433

**3 600-4 800 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
<b>3 600-3 800</b> FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.433B 5.434A 5.434B 5.435A SPACE RESEARCH (space-to-space) 5.A115-1B	<b>3 600-3 700</b> FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.434 SPACE RESEARCH (space-to-space) 5.A115-1B Radiolocation 5.433	<b>3 600-3 700</b> FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.A115-1B Radiolocation 5.435
	<b>3 700-3 800</b> FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.435B SPACE RESEARCH (space-to-space) 5.A115-1B	
<b>3 800-4 200</b> FIXED FIXED-SATELLITE (space-to-Earth) Mobile	<b>3 800-4 200</b> FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile	
...		

**4 800-5 250 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
...		
<b>5 150-5 250</b>	FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B AERONAUTICAL RADIONAVIGATION SPACE RESEARCH (space-to-space) 5.A115-1B 5.446 5.446C 5.446D 5.447 5.447B 5.447C	

**5 250-5 570 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
<b>5 250-5 255</b>	EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH MOD 5.447D 5.A115-1B 5.447E 5.448 5.448A	
<b>5 255-5 350</b>	EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH (active) SPACE RESEARCH (space-to-space) 5.A115-1B 5.447E 5.448 5.448A	
<b>5 350-5 460</b>	EARTH EXPLORATION-SATELLITE (active) 5.448B RADIOLOCATION 5.448D AERONAUTICAL RADIONAVIGATION 5.449 SPACE RESEARCH (active) 5.448C SPACE RESEARCH (space-to-space) 5.A115-1B	
<b>5 460-5 470</b>	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION 5.448D RADIONAVIGATION 5.449 SPACE RESEARCH (active) SPACE RESEARCH (space-to-space) 5.A115-1B 5.448B	

<b>5 470-5 570</b>	EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION SPACE RESEARCH (active) SPACE RESEARCH (space-to-space) 5.A115-1B 5.448B 5.450 5.451
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**5 570-6 700 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
<b>5 570-5 650</b>	MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION SPACE RESEARCH (space-to-space) 5.A115-1B 5.450 5.451 5.452	
<b>5 650-5 725</b>	MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION SPACE RESEARCH (space-to-space) 5.A115-1B Amateur Space research (deep space) 5.454 5.282 5.451 5.453 5.455	
<b>5 725-5 775</b> FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur 5.150 5.451 5.453 5.455	<b>5 725-5 775</b> RADIOLOCATION Amateur  5.150 5.453 5.455	
<b>5 775-5 830</b> FIXED-SATELLITE (Earth-to-space) RADIOLOCATION SPACE RESEARCH (space-to-space) 5.A115-1B Amateur 5.150 5.451 5.453 5.455	<b>5 775-5 830</b> RADIOLOCATION SPACE RESEARCH (space-to-space) 5.A115-1B Amateur  5.150 5.453 5.455	
<b>5 830-5 850</b> FIXED-SATELLITE (Earth-to-space) RADIOLOCATION SPACE RESEARCH (space-to-space) 5.A115-1B Amateur Amateur-satellite (space-to-Earth)	<b>5 830-5 850</b> RADIOLOCATION SPACE RESEARCH (space-to-space) 5.A115-1B Amateur Amateur-satellite (space-to-Earth)	

5.150 5.451 5.453 5.455	5.150 5.453 5.455	
<b>5 850-5 925</b> FIXED FIXED-SATELLITE (Earth-to-space) MOBILE SPACE RESEARCH (space-to-space) 5.A115-1B  5.150	<b>5 850-5 925</b> FIXED FIXED-SATELLITE (Earth-to-space) MOBILE SPACE RESEARCH (space-to-space) 5.A115-1B Amateur Radiolocation 5.150	<b>5 850-5 925</b> FIXED FIXED-SATELLITE (Earth-to-space) MOBILE SPACE RESEARCH (space-to-space) 5.A115-1B Radiolocation 5.150
...		

### 24.75-29.9 GHz

Allocation to services		
Region 1	Region 2	Region 3
...		
<b>27.5-28.35</b>	<b>FIXED 5.537A</b> <b>FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.517B 5.539</b> <b>INTER-SATELLITE 5.521A</b> <b>MOBILE</b> <b>SPACE RESEARCH (space-to-space) 5.A115-1B 5.538 5.540</b>	
<b>28.35-28.5</b>	FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.517B 5.539 INTER-SATELLITE 5.521A MOBILE	
...		

## MOD

**5.447D** The allocation of the band 5 250-5 255 MHz to the space research service on a primary basis is limited to active spaceborne sensors, and for space-to-space radiocommunications in accordance with No. 5.A115-1B. Other uses of the band by the space research service are on a secondary basis. (WRC-27)

## ADD

**5.A115-1B** The use of the frequency bands 2 400 – 2 690 MHz, 3 500 – 3 800 MHz, 5 150 – 5 570 MHz, 5 570 – 5 725 MHz, 5 775 – 5 925 MHz, and 27.5 – 28.35 GHz by stations in the space research service (space-to-space) is limited to the vicinity of the Moon and shall be in accordance with *Resolution [USA-XXX] (WRC-27)*. (WRC-27)

**ADD**

**RESOLUTION [USA-XXX] (WRC-27)**

**Use of the bands 390-406.1 MHz, 420-430 MHz, 440-450 MHz, 2 400-2 690 MHz, 3 500-3 800 MHz, 5 150-5 570 MHz, 5 570-5 725 MHz, 5 775-5 925 MHz, and 27.5-28.35 GHz by stations in the space research service (space-to-space) in the vicinity of the Moon**

The World Radiocommunication Conference (Shanghai, 2027)

*considering*

- d)* that allocation in frequency bands 390-406.1 MHz, 420-430 MHz, 440-450 MHz, 2 400-2 690 MHz, 3 500-3 800 MHz, 5 150-5 570 MHz, 5 570-5 725 MHz, 5 775-5 925 MHz, and 27.5-28.35 GHz to the space research service (space-to-space) on a primary basis is intended to support communications on the lunar surface and between lunar orbit and the lunar surface;
- e)* that Report ITU-R SA.2553 contains the technical and operational characteristics for space research systems in the vicinity of the Moon;
- f)* that Report ITU-R RA.[FAC] includes documentation of existing and planned radio astronomy service sites on the Moon;
- g)* that results of ITU Radiocommunication Sector studies indicate that sharing of these frequency bands with terrestrial and active space services in the vicinity of the Earth is feasible given the Earth-Moon distances involved;

*recognizing*

- a)* that the shielded zone of the Moon (SZM) comprises the area of the Moon's surface and an adjacent volume of space which are shielded from emissions originating within a distance of 100 000 km from the centre of the Earth (see **No. 22.22.1**);
- c)* that **No. 22.25** contains the provision for protection of radio astronomy observations and other passive services in the SZM by agreement between concerned administrations in frequency bands in which emissions are not prohibited by **No. 22.22-22.24**;
- d)* that threshold levels of permissible interference to radio astronomy within the SZM are provided in [Recommendation] (ITU-R RA.[SZM-THRESH]),

*resolves*

6 that the use of the frequency bands 390-406.1 MHz, 420-430 MHz, and 440-450 MHz by stations in the space research service (space-to-space) be limited to space stations outside the SZM;

7 that the use of the frequency bands 390-406 MHz and 440-450 MHz by stations in the space research service (space-to-space) are limited to transmissions between a space station in orbit around the Moon operating within 100,000 km of the center of the Moon and a space station on or near the surface of the Moon;

8 that the use of the frequency bands 406-406.1 MHz by stations in the space research service (space-to-space) are limited to transmissions from a space station on or near the surface of the Moon to a space station in orbit around the Moon operating within 100,000 km of the center of the Moon for distress and safety purposes;

9 that the use of the frequency bands 420-430 MHz, 2 400-2 483.5 MHz, 2 500-2 690 MHz, 3 500-3 800 MHz, 5 150-5 570 MHz, 5 570-5 725 MHz, 5 775-5 925 MHz, and 27.5-28.35 GHz by stations in the space research service (space-to-space) are limited to transmissions between space stations separated by less than 20 km and operating within 100 000 km of the center of the Moon,

10 that the use of the frequency bands 2 483.5-2 500 MHz by stations in the space research service (space-to-space) are limited to transmissions from a space station in orbit around the Moon and within 100 000 km of the center of the Moon to enable positioning, navigation and timing accuracy;

*instructs the Director of the Radiocommunication Bureau*

1 to evaluate impacts to radio astronomy operations in the SZM, based upon the permissible levels of interference described in *recognizing c)*, for the frequency bands 2 400-2 483.5 MHz, 2 500-2 690 MHz, 3 500-3 800 MHz, 5 150-5 570 MHz, 5 570-5 725 MHz, 5 775-5 925 MHz, and 27.5-28.35 GHz, and notify concerned administrations of findings;

2 to take all other necessary measures to implement this Resolution.

**Reasons:** This new resolution implements the decision of WRC-27 in the making of new SRS (s-s) allocations in the bands identified in the title of this resolution.

**MOD**

**RESOLUTION 680 (Rev WRC-27)**

**Future spectrum needs for lunar communications and systems beyond space research**

**OR**

**Studies on frequency related matters of lunar communications for future space activities beyond space science**

The World Radiocommunication Conference (Shanghai, 2027),

*considering*

- a) that lunar scientific and exploration activities can advance the development of potential future space activities beyond space research, which may in the future include other relevant radiocommunication services for lunar communications;
- b) that space communication infrastructure and technologies for human presence and lunar outposts will mature through near-term scientific discovery and space exploration activities under the WRC-27 lunar vicinity SRS (s-s) allocations;
- e) that the scientific lunar-based operational experiences enable necessary improvements including enhancing sustainability, cost effectiveness, human wellness for future extension for activities beyond space research;
- f) that continued search for new knowledge beyond the Earth is an innate nature of humanity;

*noting*

- a) that Section V of Article **22** addresses protection of radio astronomy and passive services in the SZM;
- b) that Recommendation ITU-R RA.479-5 relates to the protection of frequencies for radioastronomical measurements in the SZM, with a view to preserving the unique radioastronomical capabilities in this zone;
- c) that the impact of unintended electromagnetic radiation from electrical and electronic systems into radio astronomy receivers should be assessed (see Question ITU-R 243/1);

*recognizing*

- a) that studies on future spectrum needs for lunar communications and systems, beyond those identified in Resolution **680 (WRC-23)** resolves to invite the ITU Radiocommunication Sector to complete in time for the 2027 world radiocommunication conference 1, were initiated in the 2023-2027 study cycle within WP 7B;

- b) that frequencies for communications between the Earth and the Moon are provided through the existing allocations to the SRS;
- c) that frequencies for communications between satellites orbiting the Moon can operate in existing frequency allocations to the SRS (space-to-space) and the inter-satellite service;
- d) that existing allocations to the amateur radio service have also been used for communications between the Earth and the Moon, and Earth-to-Earth via passive reflection from the Moon;
- e) that dedicated frequencies in the lunar vicinity for local communications between systems operating on the lunar surface and between systems in lunar orbit and systems on the lunar surface in the allocations made by the WRC-27 to the SRS (space-to-space) are available for near-term lunar vicinity technology maturation, experimental and exploration activities;

*resolves to invite the ITU Radiocommunication Sector*

- 1 to study spectrum needs for lunar communications and systems, taking into account *considering a)* and based on reference scenarios in Preliminary Draft New Report ITU-R SA.[FUTURE LUNAR COMMUNICATION AND SYSTEMS];
- 2 to study whether spectrum needs from *resolves to invite the ITU Radiocommunication Sector 1* can be accommodated within existing space radiocommunication services and whether the regulatory provisions described in the Radio Regulations are sufficient;
- 3 to prepare one or more reports containing the results of studies mentioned in resolves 1 and 2 above,

*invites administrations*

to participate in the studies by submitting contributions to the ITU Radiocommunication Sector,

*instructs the Director of the Radiocommunication Bureau*

to report to WRC-31 on the progress of this resolution.

**Reasons:** Completing the mandate and international agreement in RES 680 (WRC-23) *invites the ITU Radiocommunication Sector 1 and 2* in the 2028-2031 study cycle to enable lunar activities beyond space science for the benefit of all mankind. The modification focuses on future spectrum needs for lunar communications and systems beyond space research.



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Telecommunications and**  
**Information Administration**  
Washington, D.C. 20230

February 18, 2026

Mr. Thomas Sullivan  
Chief, Office of International Affairs  
Federal Communications Commission  
45 L Street NE  
Washington, DC 20554

Dear Mr. Sullivan,

The National Telecommunications and Information Administration (NTIA), on behalf of the Executive Branch agencies, provides the attached WRC-27 proposal for Agenda Item **1.7**, on terrestrial mid-band IMT (for the 7 GHz band).

NTIA looks forward to working with the FCC in reconciling this proposal for submission to CITEL PCC II as a U.S. contribution. Please reach out to me concerning this matter, at [dkhlopin@ntia.gov](mailto:dkhlopin@ntia.gov) or (202) 482-2141.

Sincerely,

**Derek Khlopin**

Derek Khlopin  
Deputy Associate Administrator for  
Spectrum Planning and Policy  
Office of Spectrum Management

Enclosures (1)

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**(B) UNITED STATES OF AMERICA**

**(C) DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE**

**AGENDA ITEM 1.7:** *to consider studies on sharing and compatibility and develop technical conditions for the use of International Mobile Telecommunications (IMT) in the frequency bands 4 400-4 800 MHz, 7 125-8 400 MHz (or parts thereof), and 14.8-15.35 GHz taking into account existing primary services operating in these, and adjacent, frequency bands, in accordance with Resolution 256 (WRC-23).*

**Part 2 – Frequency bands 7 125 -8 400 MHz**

**BACKGROUND INFORMATION:**

WRC-27 will consider making available specific mid-band spectrum frequencies 4.4 – 4.8 GHz and 7.125 – 8.4 GHz, either on a regional or global basis, and the 14.8 – 15.35 GHz band, through an identification for the terrestrial component of International Mobile Telecommunications (IMT), in accordance with Resolution **256 (WRC-23)**:

- 4 400-4 800 MHz (or parts thereof) in Regions 1 and 3;
- 7 125-8 400 MHz (or parts thereof) in Regions 2 and 3;
- 7 125-7 250 MHz and 7 750-8 400 MHz (or parts thereof) in Region 1; and
- 14.8-15.35 GHz.

The United States is of the view that mobile communication networks (5G/6G) will increasingly play a pivotal role regionally and worldwide in the development and adoption of socially and economically beneficial emerging technologies and that, as a result, the identification of radiofrequency spectrum for the allocation of 5G/6G networks internationally is a top priority. The United States has taken the position that not less than 275 megahertz of the 7.125-8.4 GHz band, namely 7.125 to at least 7.4 GHz, can accommodate the introduction of 5G/6G networks consistent with ITU-R Resolution 256 and with the inclusion of appropriate protections for incumbent systems, while maintaining the current allocation structure for the remaining portion of this band so that the incumbent allocations can still be used to continue to fulfill their mission requirements.

Based on the well-established need for the provision of spectrum to support the further development of IMT and the outcome of the ITU-R preparatory studies, the United States submits the following proposals for WRC-27 action under Agenda Item 1.7. Part 2 of the proposal under Agenda Item 1.7 addresses the frequency range 7 125 – 8 400 MHz.

**PROPOSAL**

**ARTICLE 5**

**Frequency allocations**

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

**MOD USA/1**

**6 700-7 250 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
...		
<b>7 075 -7 125</b>	FIXED MOBILE 5.457E 5.457F 5.458 5.459	
<b>7 125 -7 145</b>	FIXED MOBILE 5.457E 5.457F ADD <u>5.A017</u> 5.458 5.459 ADD 5.149	
<b>7 145-7 190</b>	FIXED MOBILE ADD <u>5.A017</u> SPACE RESEARCH (deep space) (Earth-to-space) 5.458 5.459 ADD 5.149	
<b>7 190-7 235</b>	EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A 5.460B FIXED MOBILE <u>ADD 5.A017</u> SPACE RESEARCH (Earth-to-space) 5.460 5.458 5.459 ADD 5.149	
<b>7 235-7 250</b>	EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A FIXED MOBILE ADD <u>5.A017</u> 5.458 ADD 5.149	

**Reasons:** To modify the frequency range and to include a footnote in Article 5 identifying IMT as part of mobile service in the frequency bands 7 125 – [7 400] MHz. Addition of Footnote 5.149 for awareness on the part of administrations.

**ADD USA/2**

**5.A017** The frequency bands 7 125 – [7 400] MHz are identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. The use of the frequency band 7 125 – [7 400] MHz by administrations for International Mobile Telecommunications (IMT) shall require measures to protect the services to which the band is allocated. To ensure protection of the Fixed Service, IMT base stations shall maintain a minimum separation distance from the fixed station in accordance with Resolution (XXX). Additionally, to ensure protection of the existing and future deployment of the Fixed-Satellite Service (FSS) and the Mobile-Satellite Service (MSS), the location of IMT base stations shall maintain a minimum separation distance from these registered earth stations in accordance with Resolution (XXX). IMT in the frequency band 7 145 – 7 235 MHz shall not claim protection from stations of the Space Research Service. IMT in the frequency band 7 190-7 235 MHz shall not claim protection from stations of the Earth Exploration-Satellite Service (Earth-to-space), and No. **5.43A** does not apply.

**Reasons:** To identify frequency bands for the terrestrial component of IMT as envisioned by **Resolution 256 (WRC-23)**.

**MOD USA/4388A7/1**

**5.149** In making assignments to stations of other services to which the bands:

13 360-13 410 kHz,	4 950-4 990 MHz,	102-109.5 GHz,
25 550-25 670 kHz,	4 990-5 000 MHz,	111.8-114.25 GHz,
37.5-38.25 MHz,	6 650-6 675.2 MHz,	128.33-128.59 GHz,
73-74.6 MHz in Regions 1 and 3,	7 125-[7 400] MHz,	129.23-129.49 GHz,
150.05-153 MHz in Region 1,	10.6-10.68 GHz,	130-134 GHz,
322-328.6 MHz,	14.47-14.5 GHz,	136-148.5 GHz,
406.1-410 MHz,	22.01-22.21 GHz,	151.5-158.5 GHz,
608-614 MHz in Regions 1 and 3,	22.21-22.5 GHz,	168.59-168.93 GHz,
1 330-1 400 MHz,	22.81-22.86 GHz,	171.11-171.45 GHz,
1 610.6-1 613.8 MHz,	23.07-23.12 GHz,	172.31-172.65 GHz,
1 660-1 670 MHz,	31.2-31.3 GHz,	173.52-173.85 GHz,
1 718.8-1 722.2 MHz,	31.5-31.8 GHz in Regions 1 and 3,	195.75-196.15 GHz,
2 655-2 690 MHz,	36.43-36.5 GHz,	209-226 GHz,
3 260-3 267 MHz,	42.5-43.5 GHz,	241-250 GHz,
3 332-3 339 MHz,	48.94-49.04 GHz,	252-275 GHz

3 345.8-3 352.5 MHz,  
 4 825-4 835 MHz,

76-86 GHz,  
 92-94 GHz,  
 94.1-100 GHz,

are allocated, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference. Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see Nos. 4.5 and 4.6 and Article 29). (WRC-07)

**Reasons:** Stations of the Radio Astronomy service, sited in remote geographic areas per RR 29.9, make opportunistic use of the 7 125 – [7 400] MHz frequency band, and cannot relocate these operations in frequency. Modification of footnote 5.149 to include this band serve to make administrations aware of these operations.

**MOD USA/3**

**7 250-8 500 MHz**

Allocation to services		
Region 1	Region 2	Region 3
7 250-7 300	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE ADD 5.A017 5.461 ADD 5.149	
7 300-7 375	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile ADD 5.A017 5.461 ADD 5.149	
7 375-7 400	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile ADD 5.A017 MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB 5.461AC ADD 5.149	
...		

**Reasons:** To include a footnote in Article 5 identifying IMT as part of mobile service in the frequency bands 7 125 – [7 400] MHz and to align the bands in the table accordingly. Addition of Footnote 5.149 for awareness on the part of administrations.

**NOC USA/4 ([7 400] – 8 400 MHz)**

**7 250-8 500 MHz**

<b>Allocation to services</b>		
<b>Region 1</b>	<b>Region 2</b>	<b>Region 3</b>
	...	
<b>7 400-7 450</b>	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB 5.461AC	
<b>7 450-7 550</b>	FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB 5.461A 5.461AC	
<b>7 550-7 750</b>	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB 5.461AC	
<b>7 750-7 900</b>	FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile	
<b>7 900-8 025</b>	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.461	
<b>8 025-8 175</b>	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	
<b>8 175-8 215</b>	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	
<b>8 215-8 400</b>	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	
	...	

**Reasons:**

The United States proposes no change (**NOC**) to frequency bands shown above in the range [7 400] – 8 400 MHz to enable the robust operations of the currently allocated services.

**ADD USA/5**

**Resolution XXX (WRC-27)**

**Terrestrial component of International Mobile Telecommunications (IMT)  
within the frequency band 7 125 – [7 400] MHz**

...

Reasons: To include a resolution that would capture the conditions by which the terrestrial component of IMT can be identified in these bands, with a focus on the outcomes of the studies and the necessary protections.

—