# UNITED STATES OF AMERICA

# DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

**AGENDA ITEM 10**: *to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, in accordance with Article 7 of the Convention;*

**BACKGROUND INFORMATION**:

Article **1.22** of the Radio Regulations defines *fixed-satellite service* (FSS) as follows:

A *radiocommunication service* between *earth stations* at given positions, when one or more *satellites* are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases this service includes satellite-to-satellite links, which may also be operated in the *inter-satellite service*; the fixed-satellite service may also include *feeder links* for other *space radiocommunication services*.

The “some cases” in which satellite-to-satellite links are included in the FSS are not elaborated in either the Radio Regulations or associated ITU publications. Nevertheless, the possibility for satellite-to-satellite links within the FSS exists. This possibility seems particularly reasonable in cases where a link from a space station in non-geostationary satellite orbit (non-GSO) is being transmitted in the same general direction (e.g., Earth-to-space) within the receive beam of a higher-altitude geostationary-orbit (GSO) space station using technical parameters identical or substantially similar to transmitting FSS ground stations within that GSO space station receive beam.

As reported by the Director of the Radiocommunication Bureau to the final CPM for WRC-19, since 2014, there have been 27 submissions of advance publication information for non-GSO satellite systems under No. **4.4** of the Radio Regulations specifying use by a non-allocated space service of frequency bands allocated to another space service. *See* Document CPM19-2/017, at Section 3.1.3.2 (Preliminary Draft Report of the Director to WRC-19 on Activities of the Radiocommunication Sector). Notification information was subsequently filed for frequency assignments to 3 of these systems. The Director’s draft report states that “[n]one of these frequency assignments was reported to the BR as causing harmful interference to any service of another administration.” Document CPM19-2/017, at Section 3.1.3.2

The challenge comes, as the Director of the Radiocommunication Bureau has acknowledged, in finding a path to recognition in the Radio Regulations for such uses, where possible, based on the technical conditions derived from ITU-R studies. Because frequency bands allocated to the fixed-satellite service are used for links between space stations and earth stations, it is necessary to analyze the use of the same bands for satellite-to-satellite links to ensure compatibility and avoid harmful interference. The sharing scenario is likely to differ as the orbital characteristics of the linked satellites vary.

Preliminary ITU-R studies have identified factors to be considered in assessing the compatibility of non-GSO satellite-to-GSO satellite links, in the Earth-to-space direction, with other FSS operations and other services in the 27.5 – 30 GHz frequency band. Continued development and completion of these studies will permit the development of appropriate ITU-R regulatory text to define the cases in which such transmissions may be provided within the fixed-satellite service and/or the inter-satellite service, and allow for a determination of whether the recognition of compatible links can be made via appropriate modifications to the studied FSS allocations in Article 5.

**Proposals:**

**MOD USA/10/[SAT-TO-SAT-1]**

RESOLUTION 810 (WRC‑19)

**Agenda for the 2023 World Radiocommunication Conference**

The World Radiocommunication Conference (Sharm-el-Sheikh, 2019),

\* \* \*

*resolves to give the view*

that the following items should be included in the agenda for WRC-23:

\* \* \*

2 on the basis of proposals from administrations and the Report of the Conference Preparatory Meeting, and taking account of the results of WRC-19, to consider and take appropriate action in respect of the following items:

\* \* \*

* 1. to identify the cases and conditions under which transmissions in the Earth-to-space direction from non-geostationary orbit space stations to geostationary-orbit space stations may be accommodated on a basis other than under No. 4.4 of the Radio Regulations in the 27.5 – 30 GHz, 47.2 – 50.2 GHz, and 50.4 – 51.4 GHz frequency bands, taking into account the necessary protection of existing services, in accordance with Resolution **[A10-SAT-TO-SAT] (WRC-19)**;

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**ADD USA/10/[SAT-TO-SAT-2]**

draft new RESOLUTION [A10-SAT-TO-SAT] (WRC‑19)

**Study of technical, operational issues, and regulatory provisions for transmissions in the Earth-to-space direction from non-geostationary satellites in the Earth-to-space direction to geostationary satellites in the fixed-satellite service in the 27.5 – 30 GHz, 47.2 – 50.2 GHz, and 50.4 – 51.4 GHz frequency bands**

The World Radiocommunication Conference (Sharm-el-Sheikh, 2019),

*considering*

*a)* that the definition of fixed-satellite service (FSS) in No. **1.22** of the Radio Regulations includes the possibility, in some cases, of satellite-to-satellite links, which may also be operated in the inter-satellite service;

*b)* that there have been expressions of interest by some administrations of using the FSS (Earth-to-space) band at 27.5-30 GHz, 47.2 – 50.2 GHz, and 50.4 – 51.4 GHz frequency bands for transmissions in the Earth-to-space direction from non-geostationary orbit (non-GSO) satellites toward FSS satellites operating in geostationary orbit (GSO);

*c)* that frequency bands allocated to the fixed-satellite service are used for links between earth stations and space stations, and that such links may not be operated in the inter-satellite service;

*d)* that the ITU-R has begun preliminary studies on the technical and operational issues associated with the use of non-GSO satellites transmitting toward the GSO in the 27.5-30 GHz FSS band, and that such studies are expected to continue in this band and other bands after WRC-19;

*e)* that all allocations to the fixed-satellite service include a direction indicator,

*recognizing*

*a)* that it is necessary to analyse the use of the FSS (Earth-to-space) band at 27.5-30 GHz, 47.2 – 50.2 GHz, and 50.4 – 51.4 GHz frequency bands for transmissions in the Earth-to-space direction from non-GSO satellites toward GSO FSS satellites to ensure compatibility with all allocated services in this band and avoid harmful interference;

*b)* that the sharing scenario is likely to differ as the orbital characteristics of the non-GSO satellites vary;

*c)* that the use by a non-allocated space service of frequency bands allocated to another space service under No. **4.4** of the Radio Regulations, without recognition and on a non-harmful interference/non-protected basis, is being made today,

*noting*

*a)* that preliminary ITU-R studies have identified factors to be considered in assessing the compatibility of non-geostationary satellite to-geostationary FSS satellite links in the Earth-to-space direction with existing services in the 27.5 – 30 GHz frequency band;

*b)* that further development of these studies, may identify and define the cases in which transmissions in the Earth-to-space direction from non-GSO satellites to GSO FSS satellites in the 27.5-30 GHz, 47.2 – 50.2 GHz, and 50.4 – 51.4 GHz frequency bands, band can be made without causing unacceptable or harmful interference to existing services,

*recognizing further*

*a)* that the use of the frequency bands 27.5-28.6 GHz and 29.5-30 GHz by non-geostationary fixed-satellite service systems is subject to the application of the provisions of Nos. **5.484A**, **22.5C** and **22.5I**;

*b)* that use of the frequency band 28.6-29.1 GHz by geostationary and non-geostationary fixed-satellite service networks is subject to the application of the provisions of No. **9.11A**, and No. **22.2** does not apply (No. **5.523A**);

*c)* that use of the frequency band 29.1-29.5 GHz (Earth-to-space) by the fixed-satellite

service is limited to geostationary-satellite systems and feeder links to non-geostationary satellite

systems in the mobile-satellite service, and that such use is subject to the application of the provisions of No. **9.11A**, but not subject to the provisions of No. 22.2, except as indicated in Nos. **5.523C** and **5.523E**, where such use is not subject to the provisions of No. **9.11A** and shall continue to be subject to Articles **9** (except No. **9.11A**) and **11** procedures, and to the provisions of No. **22.2** (No. **5.535A**);

*d)* that the frequency band 27.5-30 GHz may be used by the fixed-satellite service (Earth-to-space) for the provision of feeder links for the broadcasting-satellite service (No. **5.539**);

*e)* that feeder links of non-geostationary networks in the mobile-satellite service and

geostationary networks in the fixed-satellite service operating in the frequency band 29.1-29.5 GHz (Earth-to-space) shall employ uplink adaptive power control or other methods of fade compensation, such that the earth station transmissions shall be conducted at the power level required to meet the desired link performance while reducing the level of mutual interference between both networks (No. **5.541A**);

*f)* that the fixed and mobile services are allocated on a primary basis in the frequency bands 27.5-30 GHz, 47.2 – 50.2 GHz, and 50.4 – 51.4 GHz frequency bands on a global basis;

*g)* that the frequency band 28.5-29.5 GHz (Earth-to-space) is also allocated to the Earth exploration-satellite service on a secondary basis, and no additional constraints should be imposed on the EESS, and that the frequency band 50.2-50.4 GHz is allocated to the Earth exploration-satellite service (passive), and the conditions of fixed-satellite service operation are described in Resolution **750** (Rev. WRC-15;

*h)* that the frequency band 29.5-30 GHz (Earth-to-space) is also allocated to the mobile-satellite service on a primary basis in 29.5-30 GHz in Region 2, on a primary basis in 29.9-30 GHz in Regions 1 and 3, and on a secondary basis in Regions 1 and 3 in 29.5-29.9 GHz,

*resolves to invite ITU-R*

1 to study the technical and operational characteristics and user requirements of different

types of non-GSO space stations that plan transmissions in the general Earth-to-space direction to GSO FSS space stations in the frequency band 27.5-30 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz frequency bands;

2 to study sharing and compatibility between non-GSO space stations transmitting in the general Earth-to-space direction to GSO FSS space stations in the 27.5-30 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz frequency bands, and current and planned stations of the FSS and other existing services allocated in same frequency bands, to ensure protection of, and not impose undue constraints on, other FSS operations and other services allocated in those frequency bands, and taking into account *recognizings further* a) to h);

3 to develop, for different types of non-GSO space stations and different portions of the

frequency bands studied, technical conditions and regulatory provisions for their operation, including new or revised allocations as appropriate, taking into account the results of the studies above;

4 to complete these studies by the 2023 World Radiocommunication Conference,

*invites administrations*

to participate in the studies and to provide input contributions,

*resolves to invite the 2023 World Radiocommunication Conference*

to consider the results of the above studies and take necessary regulatory actions, as appropriate.

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**ATTACHMENT**

**PROPOSAL FOR FUTURE AGENDA ITEM FOR WRC-23**

**Subject:** Proposed Future WRC Agenda Item for WRC-2023 to consider the results of studies on the compatibility of non-GSO satellite-to-GSO satellite links, in the Earth-to-space direction, with other FSS operations and other services in the 27.5 – 30 GHz, 47.2 – 50.2 GHz, and 50.4 – 51.4 GHz frequency bands.

**Origin**: United States of America

*Proposal:* to identify the cases and conditions under which transmissions in the Earth-to-space direction from non-geostationary orbit space stations to geostationary-orbit space stations may be accommodated on a basis other than under No. 4.4 of the Radio Regulations in the 27.5 – 30 GHz, 47.2 – 50.2 GHz, and 50.4 – 51.4 GHz frequency bands, taking into account the necessary protection of existing services, in accordance with Resolution **[A10-SAT-TO-SAT] (WRC-19)**;

***Background/reason:***

To provide a means for recognizing in the Radio Regulations transmissions in the Earth-to-space direction from non-GSO to GSO space stations in the 27.5-30 GHz, 47.2 – 50.2 GHz, and 50.4 – 51.4 GHz frequency bands where conditions of avoiding interference with existing systems are met.

***Radiocommunication services concerned:***

Broadcasting-Satellite, Earth Exploration Satellite, Fixed, Fixed-Satellite, Mobile, Mobile Satellite.

***Indication of possible difficulties:***  None foreseen

***Previous/ongoing studies on the issue:*** Studies have been initiated in Working Party 4A during the 2016-2019 ITU-R Study Cycle

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| ***Studies to be carried out by:*** ITU-R Study Group 4 | *with the participation of:*  SGs 5 and 7 |

***ITU-R Study Groups concerned:*** SG 5 and SG 7

***ITU resource implications, including financial implications (refer to CV126):*** Minimal

***Common regional proposal:*** Yes/No ***Multicountry proposal:*** Yes/No

*Number of countries:*

***Remarks***