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| **42 MEETING OF PERMANENT****CONSULTATIVE COMMITTEE II:****RADIOCOMMUNICATIONS****August 28 to September 01, 2023****Ottawa, Canada** | **OEA/Ser.L/XVII.4.2.42****CCP.II-RADIO /doc. 5899/23****06 August 2023****Original: English** |
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|  | **PROPOSALS FOR THE WORK OF THE CONFERENCE AGENDA ITEM 10 – C BAND ISS** |  |
|  | **(Item on the Agenda: 3.1 (SGT-5))** |  |
|  | **(Document submitted by the delegation of the United States of America)** |  |

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| **Impact on the sector:** |
| This document supports the work of CITEL’s PCC.II Working Group for WRC under 3.1 of the agenda. |

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| **Executive Summary:** |
| This contribution is a preliminary proposal towards an agenda item 10 for the WRC-27 agenda. This proposal seeks to study the sharing and compatibility of adding inter-satellite service allocation in the frequency bands 3 700-4 200 MHz (space-to-Earth) and 5 925-6 425 MHz (Earth-to-space) for non-GSO user space stations operating at lower orbital altitudes, in communication with GSO satellites in the fixed-satellite service. |

**UNITED STATES OF AMERICA**

**PROPOSALS FOR THE WORK OF THE CONFERENCE**

Agenda Item 10

*10 to recommend to the Council items for inclusion in the agenda for the next WRC, and items for the preliminary agenda of future conferences, in accordance with Article 7 of the Convention and Resolution 804 (Rev.WRC-19)*

**Study of technical and operational issues and regulatory provisions for adding inter-satellite service allocation in the frequency bands**

**3 700-4 200 MHz (space-to-Earth) and 5 925-6 425 MHz (Earth-to-space) for non-GSO user space stations operating at lower orbital altitudes, in communication with GSO satellites in the fixed-satellite service**

**Background**

The development of satellite data relay applications using the satellite services has shown tremendous progress in the last 4 years, and initial market analysis shows no indication of slowing down in the near future. Commercial satellite operators are underway with designing and testing these data relay systems which will be beneficial to many end users, who operate low earth orbiting (LEO) satellites with limitations on the capability of getting the data to a earth station in a timely manner, to ensure that the data remains valuable. As a part of the satellite data relay landscape, C-band offers unique opportunity in contact time and coverage with the LEO user space station. One application is for urgent/real-time tasking of data relay services to the end user.

This proposal seeks to study the sharing and compatibility of adding inter-satellite service allocation in the frequency bands 3 700-4 200 MHz (space-to-Earth) and 5 925-6 425 MHz (Earth-to-space) for non-GSO user space stations operating at lower orbital altitudes, in communication with GSO satellites in the fixed-satellite service.

**Proposal:**

SUP USA/10 (CBAND\_ISS))/1

RESOLUTION 812 (WRC-19)

Preliminary agenda for the 2027 World Radiocommunication Conference

**Reasons:** This Resolution must be suppressed, as WRC-23 will create a new Resolution that will include the agenda for WRC-27.

ADD USA/10 (CBAND\_ISS)/2

DRAFT NEW RESOLUTION [AI 10] (WRC‑23)

Agenda for the 2027 world radiocommunication conference

The World Radiocommunication Conference (Dubai, 2023),

considering

*a)* that, in accordance with No. 118 of the ITU Convention, the general scope of the agenda for a world radiocommunication conference (WRC) should be established four to six years in advance and that a final agenda shall be established by the ITU Council two years before the conference;

*b)* Article 13 of the ITU Constitution relating to the competence and scheduling of WRCs and Article 7 of the Convention relating to their agendas;

*c)* the relevant resolutions and recommendations of previous world administrative radio conferences (WARCs) and WRCs,

recognizing

*a)* that this conference has identified a number of urgent issues requiring further examination by WRC‑27;

*b)* that, in preparing this agenda, some items proposed by administrations could not be included and have had to be deferred to future conference agendas,

resolves

to recommend to the Council that a WRC be held in 2027 for a maximum period of four weeks, with the following agenda:

1 on the basis of proposals from administrations, taking account of the results of WRC‑23 and the Report of the Conference Preparatory Meeting, and with due regard to the requirements of existing and future services in the frequency bands under consideration, to consider and take appropriate action in respect of the following items:

1.x to consider, based on the results of ITU-R studies, possible measures to address, adding an inter-satellite service allocation in the frequency bands 3 700 - 4 200 MHz
(space-to-Earth) and 5 925-6 425 MHz (Earth-to-space) for non-GSO space stations operating at lower orbital altitudes, in communication with GSO satellites in the fixed-satellite service Resolution **[CBAND\_ISS] (Rev.WRC-23)**;

 *resolves further*

to activate the Conference Preparatory Meeting,

*invites the ITU Council*

to finalize the agenda and arrange for the convening of WRC‑27, and to initiate as soon as possible the necessary consultations with Member States,

*instructs the Director of the Radiocommunication Bureau*

to make the necessary arrangements to convene meetings of the Conference Preparatory Meeting and to prepare a report to WRC‑27,

*instructs the Secretary-General*

to communicate this Resolution to international and regional organizations concerned.

**Reasons**:To provide for studies, possible regulatory measures foran inter-satellite service allocation in the frequency bands 3 700 - 4 200 MHz (space-to-Earth) and 5 925-6 425 MHz (Earth-to-space) for non-GSO space stations operating at lower orbital altitudes, in communication with GSO satellites in the fixed-satellite service;

ADD USA/10 (CBAND\_ISS)/3

RESOLUTION [AI10 ISL] (WRC-23)

**Study of technical and operational issues and regulatory provisions for** **adding inter-satellite service allocation in the frequency bands**

**3 700-4 200 MHz (space-to-Earth) and 5 925-6 425 MHz (Earth-to-space) for non-GSO user space stations operating at lower orbital altitudes, in communication with GSO satellites in the fixed-satellite service**

The World Radiocommunication Conference (Dubai, 2023),

*considering*

*a)* that many non-geostationary-satellite orbit (non-GSO) satellites operate with limited and non-real-time connectivity to earth stations;

*b)* that space-to-space communication between such non-GSO satellites and geostationary satellite orbit FSS satellites would enhance the efficiency of operations and that the effective re-use of some frequency bands allocated to the FSS for transmissions between space stations may increase spectral efficiency in those frequency bands;

*c)* that the frequency bands 3 700-4 200 MHz (space-to-Earth) and 5 925-6 425 MHz (Earth-to-space) allocated to the FSS are used for links between earth stations and space stations;

*d)* that there is growing interest for utilizing satellite-to-satellite links for a variety of

applications and that there have been expressions of interest by some administrations in using the

frequency bands 3 700-4 200 MHz and 5 925-6 425 MHz for inter-satellite service transmissions between space stations in those frequency bands;

*e)* that it is technically feasible for a lower orbital altitude non-GSO space station to transmit data to and receive data from a higher orbital altitude GSO space station when passing within the satellite antenna coverage beam that is directed towards the Earth;

*f)* that sharing and compatibility studies were performed between satellite-to-satellite links intending to operate between space stations in the frequency bands 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz and current and planned stations of the FSS and other existing services allocated in same frequency bands and adjacent frequency bands, including passive services, with a view to ensuring protection of the primary services,

*recognizing*

*a)* that it is necessary to study the impact to primary services, taking into account applicable footnotes to the Table of Frequency Allocations, through sharing and compatibility studies, the protection of primary allocated services in the frequency bands 3 700-4 200 MHz (space-to-Earth) and 5 925-6 425 MHz (Earth-to-space) and adjacent bands;

*b)* that there should be no additional regulatory or technical constraints imposed on incumbent services to which the frequency band and adjacent frequency bands are currently allocated;

*c)* that it is necessary to study whether space-to-Earth direction transmissions from GSO space stations can be successfully received by lower orbital altitude non-GSO satellites, without imposing any additional constraints on all allocated services in these frequency bands;

*d)* that the sharing scenarios may vary because of the wide variety of orbital characteristics of the non-GSO FSS space stations;

*e)* that out-of-band emissions, signals due to antenna pattern sidelobes, reflections from receiving space stations and in-band unintentional radiation due to Doppler shifts may impact services operating in the same and adjacent or nearby frequency bands;

*recognizing further*

*a)* that the use of frequency bands by the FSS in the frequency ranges 3 700-4 200 MHz and 5 925-6 425 MHz is subject to existing Resolutions, coordination requirements and country footnotes taking into account, in particular, the protection of primary incumbent services;

*b*) that the 3700 – 4200 MHz band is allocated to the Fixed and Mobile service on a primary basis in Regions 2 and 3,

*c*)\* that in Region 1, the 3700 – 4200 MHz band is allocated to the fixed service on a primary basis, [the 3700 – 3800 MHz band is allocated to the mobile service on a primary basis]

*d*) that the 3700 – 3800 MHz band is identified in Region 2 via No. 5.IMT;

*e*) that any future use of ISS in the 3700 – 4200 MHz band shall not claim protection from terrestrial services operating in accordance with the Radio Regulations;

*f)* that the FSS, fixed and mobile services are allocated globally on a co-primary basis in the frequency band 5 925- 6 425 MHz;

*g)* that the use of the frequency bands 3 700-4 200 MHz and 5 925-6 425 MHz by the non-GSO FSS is subject to the application of the provisions 22.5C and 22.5D;

*g)* that the frequency bands 5 925-6 425 MHz may be used for the FSS (Earth-to-space) for the provision of earth stations located on board vessels subject to No. **5.457A** and **5.457B;**

*i)* that the use of the frequency bands 5 925-6 425 MHz by aeronautical mobile telemetry is subject to the application of the provisions of No. **5.457C**,

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\*This Region 1 allocation for FS/MS is pending the WRC-23 outcome, and this recognizing further should be revised or removed based on the conclusion of AI 1.2/1.3

*resolves to invite the ITU Radiocommunication Sector*

1 to study the technical and operational characteristics of different types of non-GSO space stations that operate or plan to operate space-to-space links with GSO FSS networks in the following frequency bands:

a) Earth-to-space direction in the frequency bands 5 925-6 425 MHz, for transmissions from non-GSO user space stations operating at lower orbital altitudes in communication with GSO service provider space stations in the fixed-satellite service; and

b) space-to-Earth direction in the frequency bands 3 700-4 200 MHz, for transmissions from FSS GSO service provider space stations, towards non-GSO user space stations;

2 to study sharing and compatibility between inter-satellite service space-to-space links in the cases described in *resolves to invite the ITU Radiocommunication Sector* 1 and

– current and planned stations of the FSS;

– other existing services allocated in the same frequency bands; and

– other existing services allocated in adjacent frequency bands,

in order to ensure protection of, and not impose undue constraints on, other services allocated in those frequency bands and in adjacent frequency bands, taking into account *recognizing further a)* to i*)*;

3 to develop technical conditions and regulatory provisions for the operation of ISS links in these frequency bands, taking into account the results of the studies called for in *resolves to invite the ITU Radiocommunication Sector* 1 and 2 above;

4 to complete these studies by WRC-27,

*invites administrations*

to participate in the studies by submitting contributions to ITU-R,

*invites the 2027 World Radiocommunication Conference*

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

**ATTACHMENT**

**PROPOSAL FOR FUTURE AGENDA ITEM FOR [CBAND\_ISS]**

**Subject:** Proposed WRC-2027 future agenda item to consider, based on the results of ITU‑R studies, a spectrum allocation and associated regulatory provisions for an inter-satellite service (ISS) allocation in the frequency bands 3 700 - 4 200 MHz (space-to-Earth) and 5 925-6 425 MHz (Earth-to-space) for non-GSO space stations operating at lower orbital altitudes, in communication with GSO satellites in the fixed-satellite service Resolution **[CBAND\_ISS] (WRC‑23)**;

**Origin**: United States of America

***Proposal****:* to enable the establishment of an ISS spectrum allocation and associated regulatory provisions in the frequency bands 3 700 - 4 200 MHz (space-to-Earth) and 5 925-6 425 MHz (Earth-to-space), to support intersatellite links; in accordance with Resolution **[CBAND\_ISS] (WRC‑23);**

***Background/reason:***

Satellite data relay services continue to be a growing market for satellite operators and C-band can offer near real time, urgent request tasking as part of the larger system of satellite data relays in higher frequency bands. To provide a means for recognizing in the Radio Regulations transmissions for an ISS allocation to support intersatellite links in the frequency bands 3 700 - 4 200 MHz (space-to-Earth) and 5 925-6 425 MHz (Earth-to-space) in accordance with Resolution **[CBAND\_ISS] (WRC‑23)**;

***Radiocommunication services concerned:***

Inter satellite service, Fixed-satellite service, Fixed Service, Mobile Service

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

***Previous/ongoing studies on the issue:*** Certain studies have been initiated in Working Party 4A during the 2019-2023 ITU-R Study Cycle relevant to space-to-space satellite links in parts of the Ku and Ka frequency bands.

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| ***Studies to be carried out by:*** ITU-R Study Group 4 – WP 4A | *with the participation of:* ITU-R SG 5WPs 5A, 5B, 5C, 5D  |

***ITU-R Study Groups concerned:*** SG 4, and SG 5

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

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

***Remarks***