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| **The 3rd Meeting of the APT Conference Preparatory Group for WRC-23 (APG23-3)** | **APG23-3/OUT-30** |
| 8 – 13 November 2021, Virtual/Online Meeting | 13 November 2021 |

Working Party 4

**PRELIMINARY VIEWs on WRC-23 agenda item 1.17**

**Agenda Item 1.17:**

*to determine and carry out, on the basis of the ITU-R studies in accordance with Resolution 773 (WRC 19), the appropriate regulatory actions for the provision of inter-satellite links in specific frequency bands, or portions thereof, by adding an inter-satellite service allocation where appropriate*

**1. Background**

Under this agenda item, Resolution **773 (WRC-19)** invites the ITU-R:

* to develop the technical and operational characteristics of different types of space stations that plan satellite-to-satellite transmissions in the frequency bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz;
* to study the technical and operational characteristics, including spectrum requirements, off-axis equivalent isotropically radiated power (e.i.r.p.) values and out-of-band emission limits, for transmissions between space stations in the frequency bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz;
* to study sharing and compatibility between satellite-to-satellite links intending to operate between space stations in the frequency bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz and current and planned stations in the FSS and other existing services allocated in the same frequency bands and adjacent frequency bands, including passive services, with a view to ensuring protection of the primary services referred to above;
* to develop, for different types of space stations, the technical conditions and regulatory provisions for satellite-to-satellite operations in the frequency bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz, or portions thereof, including new ISS allocations, as appropriate, taking into account the results of the studies above,

In accordance with the results of CPM23-1, the above studies are being conducted by ITU-R Working Party 4A (WP 4A) which the detailed activities are in the Chairman’s Report of

ITU-R Working Party 4A (Document 4A/522).

**2. Documents**

* Input Documents APG23-3/[INP-10](https://www.apt.int/sites/default/files/2021/10/APG23-3-INP-10_AUS_contribution_for_WP4_Preliminary_Views_on_WRC-23_Agenda_Items_1.15_1.16_1.17_1.18_1.19_and_7.docx)(AUS), [INP-14](https://www.apt.int/sites/default/files/2021/10/APG23-3-INP-14_Thailand_PV_WP4_AI_1.15_1.17.docx)(THA), [INP-18](https://www.apt.int/sites/default/files/2021/10/APG23-3-INP-18_Indonesia-Preliminary_Views_on_WRC-23_Agenda_Items_1.15_1.16_and_1.17.docx)(INS), [INP-27 (Rev.1)](https://www.apt.int/sites/default/files/2021/11/APG23-3-INP-27Rev.1_WP4_Kor_1.15_1.16_1.17_7_rev1.docx)(KOR) , [INP-31](https://www.apt.int/sites/default/files/2021/11/APG23-3-INP-31_J-4_WP4_PRELIMINARY_VIEWS_ON_WRC-23_AGENDA_ITEMS_1.15_1.16_1.17_1.18_1.19_AND_7.docx)(J), [INP-38](https://www.apt.int/sites/default/files/2021/11/APG23-3-INP-38_SNG_WP4__AI1.15_1.16_1.17_7.docx)(SNG), [INP-44](https://www.apt.int/sites/default/files/2021/11/APG23-3-INP-44_China_WP4.docx)(CHN)
* Information Documents APG23-3/[INF-01](https://www.apt.int/sites/default/files/2021/10/APG23-3-INF-01_Preliminary_WMO_Position_on_WRC-23_Agenda.docx)(WMO),[INF-15](https://www.apt.int/sites/default/files/2021/10/APG23-3-INF-15_ICAO-Position_for_ITU_WRC-23.docx)(ICAO),[INF-20](https://www.apt.int/sites/default/files/2021/11/APG23-3-INF-20_Status_of_CEPT_Preparation_for_WRC-23_and_RA-23.pdf)(CEPT), [INF-34](https://www.apt.int/sites/default/files/2021/11/APG23-3-INF-34_Briefing_on_AI1.17.docx)(Chairman, DG AI1.17),[INF-37](https://www.apt.int/sites/default/files/2021/11/APG23-3-INF-37_ASMG_Preparation_for_WRC-23.pdf)(ASMG)

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

**3.1.1 Australia** - **Document APG23-3/INP-10**

Australia supports ITU-R studies to develop technical conditions and regulatory provisions that establish a harmonised framework which facilitates the use of satellite-to-satellite operations in the 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz frequency bands in accordance with Resolution **773 (WRC-19)**. Such use must ensure protection of primary services allocated in the bands and in the adjacent bands.

**3.1.2 Thailand (Kingdom of)** - **Document APG23-3/INP-14**

Thailand supports ITU-R studies currently carried out in accordance with Resolution **773 (WRC-19)**. The development of technical conditions and regulatory provisions for the use of satellite-to-satellite operations in the frequency bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz shall ensure the protection of existing services as well as their future developments in the same frequency bands and in adjacent frequency bands.

**3.1.3 Indonesia (Republic of)** - **Document APG23-3/INP-18**

Indonesia is of the view that the protection of current and planned stations of primary services allocated in the frequency band 11.7-12.7 GHz, 18.1-18.6 GHz, and 18.8-20.2 GHz and 27.5-30 GHz, or parts thereof, and current and planned stations of the FSS and other existing services allocated in same frequency bands and adjacent frequency bands, including passive services, should be ensured during sharing and compatibility studies under Agenda Item 1.17.

**3.1.4 Korea (Republic of)** - **Document APG23-3/INP-27(Rev.1)**

The Republic of Korea is of the opinion that:

* the technical conditions and regulatory provisions should be developed to enable the operation of satellite-to-satellite links in the frequency bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz in the FSS, or parts thereof, while ensuring protection of other FSS networks or systems and other existing services allocated in the same frequency bands and adjacent frequency bands;
* the technical conditions and regulatory provisions developed under WRC-23 agenda item 1.17 shall not impact on the terrestrial services operating in the frequency band 27.5-30 GHz.

**3.1.5 Japan - Document APG23-3/INP-31**

In order to protect the Reg. 3 BSS in the band 11.7 - 12.2 GHz and not to impose any additional constraints on future development of the Reg. 3 BSS in the band 11.7 - 12.2 GHz, Japan support NOC for the Reg. 3 BSS in the band 11.7 - 12.2 GHz. Japan supports ITU-R studies on the sharing and compatibility as well as to develop technical conditions and regulatory provisions for the use of satellite-to-satellite operations in the 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz frequency bands in accordance with Resolution 773 (WRC-19), as such the use shall ensure protection of primary services allocated in the bands and in the adjacent bands.

**3.1.6 Singapore (Republic of) -** **Document APG23-3/INP-38**

Singapore supports studies under both concept of operations for WRC-23 Agenda Item 1.17 based on current Fixed Satellite Service (FSS) allocation in accordance with Resolution **773 (WRC-19)** and the FSS directionality indicators (i.e. Earth-to-space or space-to-Earth).

With a view to develop appropriate technical and regulatory conditions allowing satellite-to-satellite transmissions in the 11.7-12.7 GHz, 18.1‑18.6 GHz, 18.8‑20.2 GHz and 27.5-30 GHz frequency bands or portions thereof, Singapore is also supportive of the eventual development of a Resolution that would permit the use of satellite-to-satellite links in these frequency bands, or portions thereof, within the existing FSS allocation while ensuring protection of existing services including other applications in the FSS in the same frequency bands and adjacent frequency bands.

**3.1.7 China (People’s Republic of)** - **Document APG23-3/INP-44**

China supports studying sharing and compatibility between satellite-to-satellite links intending to operate in the above relevant frequency bands and existing primary services allocated in same frequency bands as well as EESS (passive) allocated in the adjacent frequency bands.

China supports studying the concept of operation, characteristics, and spectrum requirement of the systems that intend to operate satellite-to-satellite links in the frequency bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz.

China is the view of that satellite-to-satellite link transmissions will comply with the same directionality indicators as in the existing FSS allocations (Earth-to-space = from user space station to service provider space station, space-to-Earth = from service provider space station to user space station).

**3.2 Summary of issues raised during the meeting**

APT members express the concerns on the using the satellite-to-satellite link transmissions and potential intended impact on primary services allocated in the bands and in the adjacent bands, taking into account the part of these frequency band has been used for the FSS in many countries.

**4. APT Preliminary View(s)**

APT Members support ITU-R studies on the sharing and compatibility as well as to develop technical conditions and regulatory provisions for the use of satellite-to-satellite operations in the 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz frequency bands or portions thereof, in accordance with Resolution **773 (WRC-19)**, as such the use shall ensure protection of primary services allocated in the bands and in the adjacent bands.

APT Members are of the view that the use of these bands for inter-satellite service needs to fully protect the FSS in these bands, taking into account that part of these frequency bands studied under the agenda item are core FSS bands which are used for telecommunication infrastructure in many countries.

APT Members are of the view that the technical conditions and regulatory provisions developed under WRC-23 agenda item 1.17 shall not impact on the terrestrial services operating in the frequency band 27.5-29.5 GHz.

APT Members are also of the view that consideration should be given to the operation of the secondary terrestrial services as currently contained in the Radio Regulations in order that these terrestrial services should not be adversely affected by inter-satellite service in the frequency band being studied under AI 1.17.

**5. Other View(s) from APT Members**

Some APT Members are of the view that satellite-to-satellite link transmissions should comply with the same propagation direction in the existing FSS allocations (Earth-to-space = from user space station to service provider space station, space-to-Earth = from service provider space station to user space station).

Some APT members are of the view that the frequency band 11.7-12.2 GHz in Region 3 shall be no change under AI 1.17 in order to protect and not to adversely affect the existing and future BSS in Region 3 in the frequency band 11.7-12.2 GHz.

**6. Issues for Consideration at Next APG Meeting**

Taking into account the use of satellite-to-satellite operations in the 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz frequency bands or portions thereof shall ensure protection of primary services allocated in the bands and in the adjacent bands, APT members are invited to follow the progress of the ITU-R studies (including the concepts of operations, sharing and compatibility studies, CPM report and so on), and are encouraged to submit their contributions for further considerations at the next meeting.

**7. Views from Other Organisations**

**7.1 Regional Groups**

**7.1.1 ASMG** - **Document APG23-3/INF-37**

* Support to develop a regulatory framework to ensure the protection of the in-band and adjacent bands services to which the frequency bands referred to in this agenda item, in particular, existing and future FSS services be guaranteed.
* Support the “within the cone of coverage” concept of operation, which allows satellite-to-satellite transmissions to be granted regulatory recognition under the current FSS allocation, without the need for a new inter-satellite service allocation.
* Support the allocation of satellite-to-satellite transmissions within current FSS allocation, with same directional designators as in FSS, i.e. Earth-to-space and space-to-Earth.
* The technical parameters shall be approved for uplink and downlink transmissions between two spacecraft with different altitude communicating with the earth stations

**7.1.2 CEPT -as of 12 November 2021**

* CEPT supports the development of a regulatory framework to enable the operation of satellite‐to‐satellite links within the fixed‐satellite service (FSS) allocation in the 11.7‐12.7 GHz, 18.1‐18.6 GHz, 18.8‐20.2 GHz and 27.5‐30 GHz bands, or parts thereof, while ensuring protection of existing services in the same frequency bands and adjacent bands. CEPT supports avoiding a new ISS allocation in these core and heavily‐used FSS bands.
* CEPT supports that the introduction of satellite‐to‐satellite transmissions must ensure the same level of protection for GSOs and non‐GSOs as currently provided in the RR and must not impose new constraints on GSOs and non‐GSOs to protect satellite‐to‐satellite links from interference.
* CEPT supports that the introduction of satellite‐to‐satellite transmissions must ensure the same level of protection for terrestrial services as currently provided in the RR and must not impose new constraints on terrestrial services to protect satellite‐to‐satellite links from interference.
* CEPT proposes that space stations that plan satellite‐to‐satellite transmissions should be governed by the following preliminary guiding principles:
* CEPT supports operations within the cone of coverage of GSO or non‐GSO service provider space stations. The cone of coverage[[1]](#footnote-1) of a service provider space station is the conical volume of space defined by a cone whose apex is at the service provider space station and whose base does not extend beyond the edge of coverage of the Earth as viewed by the service provider space station; and operations within the volume of space defined by the service provider space station and the visible service area defined in the ITU satellite network of the service provider space station;
* CEPT will further consider the possibility to allow operations outside the cone of coverage, within FSS, provided that no undue constraints are placed on other FSS use and services and that unacceptable interference is not caused to other FSS use and services.
* CEPT final support to a concept of operation will depend on the outcome of the studies;
* Satellite‐to‐satellite link transmissions will comply with the same directionality indicators as in the existing FSS allocations (Earth‐to‐space = from user space station to service provider space station, space‐to‐Earth = from service provider space station to user space station);
* Non‐GSO user space stations will operate in a manner that should resemble typical user stations of the host FSS service provider system;
* Non‐GSO user space stations should comply with applicable EPFD limits in the portions of the Ku‐ and Ka‐ bands where these limits apply when communicating with a non‐GSO FSS service provider space station;
* The higher altitude to lower altitude link transmissions in 11.7‐12.7 GHz, 18.1‐18.6 GHz and 18.8 20.2 GHz from the GSO or non‐GSO FSS service provider space station to the non‐GSO user space station would be identical in technical characteristic to the transmissions from GSO or non‐GSO service providers to any ground‐based user in the service provider’s network;
* Enabling the operation of satellite‐to‐satellite links should not result in an increase of the interference to EESS (passive) sensors operating in the 18.6‐18.8 GHz band. Any measure on non‐GSO or GSO service provider space stations providing satellite‐to‐satellite links that may be needed to limit the interference to EESS (passive) sensors operating in the 18.6‐18.8 GHz shall be applicable only to those non‐GSO or GSO service provider systems notified/brought into use after the last day of WRC‐23.

**7.1.3 CITEL** - **Document APG23-2/INF-34**

* Some administrations support studies under the terms of Resolution 773 (WRC-19) to consider technical and regulatory provisions to allow satellite-to-satellite links in the frequency bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz.
* These Administrations support confining studies to links that operate in the same direction of transmission as provided for in the current allocations and confined to satellite located on different orbits.

**7.1.4 RCC** - **Document APG23-2/INF-36**

* The use of satellite-to-satellite links in the bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz, and 27.5-30 GHz may impose severe constraints on the use of the existing and future systems/ networks of FSS, interalia, over the national territories.
* Support the studies of technical and operational characteristics, including spectrum requirements, off-axis e.i.r.p. values and out-of-band emission limits, for transmissions between space stations in the bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz.
* Support studying sharing and compatibility between satellite-to-satellite links, intending to operate between space stations in the bands 11.7-12.7 GHz, 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 the same frequency bands and in adjacent bands. The results of these ITU-R studies should be agreed by Member States by consensus.
* Technical conditions and regulatory provisions should be developed for different types of space stations for satellite-to-satellite operations in the bands 11.7-12.7 GHz, 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz, or portions thereof, including new ISS allocations.

**7.1.5 ATU**

None.

**7.2 International Organisations**

**7.2.1 ICAO - Document APG23-3/INF-15**

* To ensure that, given the overlap in frequency bands, any radio regulatory action taken as a result of this agenda item does not adversely affect the provision of UAS CNPC under Resolution **155** (**Rev. WRC-19**).

**7.2.2 IMO**

None.

**7.2.3 WMO- Document APG23-3/INF-01**

* WMO supports studies, as necessary, to ensure satellite-to-satellite links will protect the co-frequency band MetSat allocation and that the operation of satellite-to-satellite links in the frequency bands adjacent to 18.6-18.8 GHz will not result in increased adjacent band interference to EESS (passive) operations.

**7.2.4 IARU**

None.

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1. This definition is purely geometrical and does not take into account the list of countries or geographic designations identified by each FSS filing, which could limit operation within the cone of coverage accordingly. The possible operational limitation of a non-GSO user space station, due to specific parameters of the satellite network of the service provider space station, will be addressed during the development of the regulatory text in the draft CPM text. [↑](#footnote-ref-1)