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|  | ASIA-PACIFIC TELECOMMUNITY | Document No: |
| **The 2nd Meeting of the APT Conference Preparatory Group for WRC-23 (APG23-2)** | **APG23-2/INF-19****(Rev.1)** |
| 19 – 23 April 2021, Virtual/Online Meeting | 29 March 2021 |

Chairman, DG on AI 1.16

**brief on wrc-23 agenda item 1.16**

**Agenda Item 1.16:**

*to study and develop technical, operational and regulatory measures, as appropriate, to facilitate the use of the frequency bands 17.7-18.6 GHz and 18.8 19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) by non-GSO FSS earth stations in motion, while ensuring due protection of existing services in those frequency bands, in accordance with Resolution 173 (WRC 19);*

**Relevant Resolutions and Responsible/Contributing ITU-R Groups**

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| Resolution**173 (WRC‑19)**Use of the frequency bands 17.7‑18.6 GHz and 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) by earth stations in motion communicating with non-geostationary space stations in the fixed-satellite service | resolves to invite ITU-R1 to study the technical and operational characteristics and user requirements of the different types of earth stations in motion that plan to operate within non-GSO FSS systems in the frequency bands 17.7-18.6 GHz and 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5‑29.1 GHz and 29.5-30 GHz (Earth-to-space), or parts thereof;2 to study sharing and compatibility between earth stations in motion operating with non-GSO FSS systems and current and planned stations of primary services allocated in the frequency bands 17.7-18.6 GHz and 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5‑30 GHz (Earth-to-space), or parts thereof, to ensure protection of, and not impose additional constraints on, GSO systems and other services, including terrestrial services, in those frequency bands and in adjacent bands, including passive services;3 to develop the technical and regulatory provisions for the operation of aeronautical and maritime earth stations in motion with non-GSO FSS systems, taking into account the results of studies under *resolves to invite ITU-R* 1 and 2;4 to ensure that the technical and operational measures and the possible regulatory changes established in accordance with this Resolution shall not affect the relevant provisions related to the protection of GSO networks from non-GSO FSS systems;5 to ensure that the results of ITU‑R studies are agreed by Member States taking into account the required consensus on this matter;6 to complete studies in time for WRC‑23,resolves to invite WRC‑23to review the results of these studies and take appropriate action. |

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| **Responsible group** | **Contributing group** |
| **WP 4A** | **WP 3M, WP 4C, WP 5A, WP 5B, WP 5C, WP 7B, WP 7C** |

**1. Background Information**

* The agenda was proposed by Luxembourg at CPM19-2.
* CEPT, CIETEL and ATU contributed to the agenda at WRC-19
* Use of similar band by earth station in motion communicating with geostationary space stations in the fixed-satellite service was addressed by the following resolutions.

	+ Resolution 156 (WRC-15)

Use of the frequency bands 19.7-20.2 GHz and 29.5-30.0 GHz by earth stations in motion communicating with geostationary space stations in the fixed-satellite service

* + Resolution 169 (WRC-19)

Use of the frequency bands 17.7-19.7 GHz and 27.5-29.5 GHz by earth stations in motion communicating with geostationary space stations in the fixed-satellite service

* Incumbent Services allocated in the frequency bands under study are listed in table 1 and 2 below.

Table 1: Service Allocation under study (17.7-20.2GHz)

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| **Frequency range (GHz)** | **Service Allocation** |
| 17.7-17.8 | FIXED, MOBILE,GSO FSS, BSS, Non-GSO FSS |
| 17.8-18.4 | FIXED, MOBILE,GSO FSS, BSS, Non-GSO FSS, Meteorological satellite service |
| 18.4-18.6 | FIXED, MOBILE, GSO FSS, Non-GSO FSS |
| (18.6-18.8) | EESS (passive), SRS (passive) |
| 18.8-19.3 | FIXED, MOBILE, GSO FSS, Non-GSO FSS |
| (19.3-19.7) | FIXED, MOBILE, GSO FSS, Non-GSO FSS |
| 19.7-20.2 | GSO FSS, Non-GSO FSS, MSS |

Table2: Service Allocation under study (27.5-30GHz)

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| **Frequency range (GHz)** | **Service Allocation** |
| 27.5-28.5 | FIXED, MOBILE, GSO FSS, Non-GSO FSS |
| 28.5-29.1 | FIXED, MOBILE, GSO FSS, Non-GSO FSS, Earth exploration-satellite service |
| (29.1-29.5) | FIXED, MOBILE, GSO FSS, Non-GSO FSS, Earth exploration-satellite service |
| 29.5-30 | GSO FSS, Non-GSO FSS, MSSEarth exploration-satellite service |

\*Bracketed frequency ranges are not included in bands where NGSO ESIM plan to use.

* WP4A established correspondence group(CG#2) under SWG AI1.16 to address the agenda item.
* The chairman of the WP4A SWG AI1.16(and CG#2) is Mr. Mario Neri of Telesat, who was the chairman of AI1.5 at WRC-19, which developed Resolution 169.

**2. Information on on-going ITU-R Study**

* WP4A is developing the following documents.
	+ Draft CPM text
	+ Draft new Resolution
	+ Working document which supports draft CPM text and draft new Resolution and contains technical characteristics of incumbent services and ESIM planning to communicate with NGSO FSS, and sharing and compatibility studies between them.
* The issues to be addressed are listed below, however, WP4A SWG AI1.16 has not discussed in detail about each issue yet. It has been collecting and organizing information from members including characteristics of ESIM communicating with NGSO FSS and incumbent services, and preliminary sharing and compatibility studies between those services.
1. Collection of technical and operational characteristics of ESIM planning to communicate with NGSO FSS in the frequency bands and incumbent services in the frequency bands under study and adjacent bands.
2. Sharing and compatibility studies between ESIM planning to communicate with NGSO FSS and incumbent services in the frequency bands under study and adjacent bands.

Table3: Incumbent Services to be studied for sharing and compatibility

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| **#** | **Incumbent Service to be studied** | **Status** |
| 1 | Fixed Services |  |
| 2 | Mobile Services |  |
| 3 | Meteorological Satellite Service |  |
| 4 | Mobile Satellite Services |  |
| 5 | Broadcasting Satellite Service |  |
| 6 | Geostationary Fixed-satellite Service |  |
| 7 | Non-geostationary Fixed-satellite Service |  |
| 8 | Non-Geostationary Mobile-satellite Service feeder-link in the FSS |  |
| 9 | Broadcasting satellite services feeder-link |  |
| 10 | Earth Exploration-Satellite Service |  |
| 11 | Earth Exploration-Satellite (passive) and Space research (passive) Services(adjacent band) |  |
| 12 | (inter-satellite service) |  |

1. Technical and regulatory provisions for the operation of ESIM communicating with NGSO FSS
* Relevant hyperlinks

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| Hyperlinks to CPM23 Preparatory page |
| [ITU-R Preparatory Studies for WRC-23 page](https://www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-23-studies.aspx) |
| [ITU-R Preparatory Studies for WRC-23 Res.173(WRC-23)](https://www.itu.int/dms_pub/itu-r/oth/0c/0a/R0C0A00000D0016PDFE.pdf) |
| WP4A # | WP4A Doc Title (Hyperlink) | Source | Date |
| 246 | [Report on the meeting of Working Party 4A (22 February - 3 March 2021) (Virtual Meeting)](https://www.itu.int/md/R19-WP4A-C-0246/en) | Chairman, WP4A | 2021/03/24 |
| 240  | [Reply liaison statement to ITU-R Working Party 4A - Preparations for WRC-23 agenda items 1.16 and 1.17](https://www.itu.int/md/R19-WP4A-C-0240/en) | WP 4C | 2021/02/19 |
| 227 | [Document title a working document on WRC-23 agenda item 1.16](https://www.itu.int/md/R19-WP4A-C-0227/en) | Egypt (Arab Republic of) | 2021/02/15 |
| 221 | [Preliminary draft CPM text for WRC-23 agenda item 1.16](https://www.itu.int/md/R19-WP4A-C-0221/en) | Egypt (Arab Republic of) | 2021/02/15 |
| 214 | [Proposed additions to elements towards a working document on WRC-23 agenda item 1.16 [NON-GSO\_ESIM]](https://www.itu.int/md/R19-WP4A-C-0214/en) | Luxembourg | 2021/02/15 |
| 207 | [Proposal for elements towards a working document on WRC-23 agenda item 1,16 [NON-GSO\_ESIM], operation of earth stations in motion communicating with non-Geostationary space stations in the fixed-satellite service allocations at 17.7-18.6 GHz, 18.8-19.3 GH](https://www.itu.int/md/R19-WP4A-C-0207/en) | United States of America | 2021/02/15 |
| 192 | [Modifications to elements towards a working document on WRC-23 agenda item 1.16 [NON-GSO\_ESIM]](https://www.itu.int/md/R19-WP4A-C-0192/en) | Canada | 2021/02/15 |
| 185 | [Proposals on WRC-23 agenda item 1.16](https://www.itu.int/md/R19-WP4A-C-0185/en) | China (People's Republic of) | 2021/02/10 |
| 175 | [Characteristics of space and terrestrial frequency assignments which may be used in sharing and compatibility studies under WRC-23 agenda items 1.16, 1.17 and 1.19](https://www.itu.int/md/R19-WP4A-C-0175/en) | Director, BR | 2021/02/02 |
| 172 | [Report of activities of the Correspondence Group on WRC-23 agenda item 1.16 to the Working Party 4A meeting of February/March 2021](https://www.itu.int/md/R19-WP4A-C-0172/en) | Chairman, CG on WRC-23 a.i. 1.16 | 2021/02/01 |
| 161 | [Liaison statement to ICAO (copy to Working Party 4A for information) - Clarification on the draft ICAO position on WRC-23 agenda items 1.15, 1.16 and 1.17](https://www.itu.int/md/R19-WP4A-C-0161/en) | WP 5B | 2020/11/25 |
| 147 | [Reply liaison statement to Working Party 4A - Preparations for WRC-23 agenda items 1.16 and 1.17](https://www.itu.int/md/R19-WP4A-C-0147/en) | WP 4C | 2020/10/27 |
| 140 | [Working document towards a Preliminary Draft New Report ITU-R S.[KA\_NGSO\_ESIM] for sharing and compatibility study with non-GSO ESIM operating in the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.](https://www.itu.int/md/R19-WP4A-C-0140/en) | Luxembourg | 2020/10/21 |
| 125 | [Characteristics for Earth stations in motion communicating with non-GSO satellites to be used in sharing studies](https://www.itu.int/md/R19-WP4A-C-0125/en) | Canada | 2020/10/21 |
| 118 | [New working document towards a preliminary draft new Report for studies related to agenda item 1.16](https://www.itu.int/md/R19-WP4A-C-0118/en) | Canada | 2020/10/21 |
| 90 | [Working document towards a preliminary draft new Report ITU-R S.[NGSO\_FSS\_ESIMS] for sharing and compatibility studies in the frequency bands 17.7-18.6 GHz and 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-sp](https://www.itu.int/md/R19-WP4A-C-0090/en) | United States of America | 2020/10/16 |
| 81 | [Report of activities of the Correspondence Group on WRC-23 agenda item 1.16 to Working Party 4A](https://www.itu.int/md/R19-WP4A-C-0081/en) | Chairman, CG on WRC-23 a.i.1.16 | 2020/10/08 |
| 78 | [Reply liaison statement to Working Party 4A (copy for information to Working Parties 3M, 4C, 5A, 5B, 5C, and 7B - WRC-23 agenda item 1.16](https://www.itu.int/md/R19-WP4A-C-0078/en) | WP 7C | 2020/10/06 |
| 67 | [Reply liaison statement to Working Party 4A (copy to Working Parties 3M, 4C, 5A, 5B, 5C, and 7C for information) - WRC-23 agenda item 1.16](https://www.itu.int/md/R19-WP4A-C-0067/en) | WP 7B | 2020/09/28 |
| 64 | [Contribution to Working Party 4A on agenda item 1.16](https://www.itu.int/md/R19-WP4A-C-0064/en) | Iran (Islamic Republic of) | 2020/09/21 |
| 45 | [Reply liaison statement to Working Party 4A (copy to Working Parties 3M, 4C, 5A, 5B, 7B and 7C for information) - WRC-23 agenda item 1.16](https://www.itu.int/md/R19-WP4A-C-0045/en) | WP 5C | 2020/08/06 |
| 36 | [Reply liaison statement to Working Party 4A WRC-23 agenda item 1.16 - Radiodetermination and aeronautical characteristics in the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz, 19.7-20.2 GHz, 27.5-29.1 GHz and 29.5-30 GHz](https://www.itu.int/md/R19-WP4A-C-0036/en) | WP 5B | 2020/08/05 |
| 19  | [Proposed schedule for Working Party 4A Correspondence Groups on WRC-23 agenda items 1.15, 1.16, 1.17, 1.19, 7 - Inter/intra-service sharing and FSS/BSS characteristics](https://www.itu.int/md/R19-WP4A-C-0019/en) | Chairman, WP 4A | 2020/05/19 |
| 15 | [Contribution to Working Party 4A on agenda item 1.16 of the WRC-23](https://www.itu.int/md/R19-WP4A-C-0015/en) | Iran (Islamic Republic of) | 2020/05/03 |
| 11  | [Proposed draft liaison statement to contributing Working Parties regarding WRC-23 agenda item 1.16](https://www.itu.int/md/R19-WP4A-C-0011/en) | Chairman, WP 4A | 2020/05/01 |
| CPM19-2 # | CPM19-2 Doc Title (Hyperlink) | Source | Date |
| 7 | [Proposals for WRC-23 agenda items](https://www.itu.int/md/R15-CPM19.02-C-0007/en) | Luxembourg  | 2018/12/18 |

**3. Position of the Regional Group (if available)**

* **CEPT**

**Preliminary CEPT position**

CEPT supports the development of a regulatory framework for the operation of ESIM communicating with non‐GSO satellite systems in the FSS in the frequency bands 17.7‐18.6 GHz, 18.8‐19.3 GHz and 19.7‐20.2 GHz (space‐to‐Earth) and 27.5‐29.1 GHz and 29.5‐30 GHz (Earth‐to‐space). The technical and operational requirements for the use of non‐GSO ESIM shall ensure the protection of GSO systems and other services operating in the same frequency bands and in adjacent bands.

CEPT is of the view that non‐GSO ESIM operating in the frequency bands 17.7‐18.6 GHz and 18.8‐19.3 GHz (space‐to‐Earth) shall not claim protection from terrestrial services having allocations in the same frequency bands and operating in accordance with the Radio Regulations.

CEPT is of the view that the protection of GSO networks in the fixed‐satellite service operating in the frequency bands 27.5‐ 28.6 GHz and 29.5‐30 GHz from non‐GSO ESIM can be achieved by complying with EPFD limits referred to in No. **22.5D**. The protection of GSO networks and non‐GSO systems in the FSS operating in the frequency band 28.6‐29.1 GHz shall be achieved on the basis of coordination agreements between administrations and operators in accordance with No. **9.11A**.

* **CITEL**

**Preliminary Views**

Some administrations support studies on the technical and operational characteristics of ESIMs and sharing and compatibility studies to develop technical and regulatory provisions for the operation of ESIM with non-GSO FSS systems in accordance with Resolution 173 (WRC-19) with a view to ensuring the protection of and not impose additional constraints on existing services, including terrestrial services and GSO FSS, in those frequency bands and in adjacent bands, including passive services.

* **RCC**

**Preliminary Position**

The RCC Administrations support sharing and compatibility studies between earth stations in motion (ESIMs) planned for operation in non-GSO FSS in the frequency bands 17.7–18.6 GHz, 18.8–19.3 GHz and 19.7–20.2 GHz (space-to-Earth), and 27.5–29.1 GHz and 29.5–30 GHz (Earth-to-space), or parts thereof, and stations of services operating in accordance with RR in bands above as well as adjacent bands.

The RCC Administrations are in favour of the development of regulatory provisions and technical requirements for aeronautical and maritime ESIMs in non-GSO FSS in order to ensure protection of, and not impose additional constraints on, satellite GSO networks and other services, including terrestrial services, in those frequency bands and in adjacent bands, including passive services. To accomplish this development, ITU-R should produce appropriate methodologies and procedures stipulated in *considering further* of Resolution **173** (WRC-19).

The RCC Administrations consider that ESIMs could be used in non-GSO FSS systems, if only the following conditions are met:

- the technical and operational measures and the regulatory provisions to be established based on the results of ITU-R studies while not affecting the RR provisions related to the protection of GSO networks from non-GSO FSS systems;

- characteristics of ESIMs in non-GSO FSS network should be within the envelope of characteristics of typical earth stations of the non-GSO FSS network initially published and recorded in the BR IFIC after appropriate coordination procedure;

- ESIMs in non-GSO FSS systems should not be used for safety-of-life applications;

- when operating ESIMs in non-GSO FSS, special measures shall be envisaged to exclude unauthorized use of ESIMs on the territory of States that have not granted relevant authorizations (licenses).

1. **Position of International Organizations (if available)**
* **WMO**

**WMO position on WRC-23 agenda item 1.16**

WMO supports studies to ensure non-GSO FSS ESIM deployment will ensure the protection of co-frequency band MetSat allocation and that in the frequency bands adjacent to 18.6-18.8 GHz will not result in increased adjacent band interference to EESS (passive) operations.