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| **The 5th Meeting of the APT Conference Preparatory**  **Group for WRC-23 (APG23-5)** | **APG23-5/OUT-28** |
| 20 – 25 February 2023, Busan, Republic of Korea | 24 February 2023 |

Working Party 4

**PRELIMINARY VIEWs 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)*

**1. Background**

In *resolves* 1.16of Resolution **811 (WRC-19)**, the 2019 World Radiocommunication Conference (WRC-19) resolved “to study and develop technical, operational and regulatory measures, as appropriate, to facilitate the use of 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) by non‑geostationary fixed-satellite service earth stations in motion, while ensuring due protection of existing services in those frequency bands, in accordance with Resolution **173 (WRC-19)**” as part of the agenda for WRC-23.

The last two WRCs have adopted regulatory frameworks for the operations of GSO ESIM in Ka-band. WRC-15 adopted Resolution **156 (WRC-15),** allowing the use of ESIM communicating with GSO FSS networks in the 19.7-20.2 GHz and 29.5-30.0 GHz bands and WRC-19 adopted Resolution **169 (WRC-19),** allowing the use of ESIM communicating with GSO FSS networks in the frequency bands 17.7-19.7 GHz and 27.5-29.5 GHz. It is necessary to conduct relevant studies on the sharing situations between non-GSO ESIM and the incumbent services in the Ka band. The parameters of non-GSO ESIM and GSO ESIM have some similarities but also differences, which need to be paid attention to and considered in the follow-up studies under WRC‑23 agenda item 1.16.

WP 4A is the responsible group, according to the CPM23-1 results (CA/215), to address the ITU-R preparatory work for WRC-23 and established Correspondence Group (CG) and Sub-Working Group (SWG), both chaired by Mr. Mario Neri, who was the chairman of AI 1.5(WRC-19). The WP 4A meeting in September 2022 developed the following documents.

1. Working document on WRC-23 agenda item 1.16 [NON GSO\_ESIM] (Doc.4A/856 Annex 14)
2. Draft CPM text for WRC-23 agenda item 1.16 (Doc.4A/856 Annex 23)

The draft CPM text includes methods below to satisfy this agenda item.

* **Method A** – No changes to the Radio Regulations and suppression of Resolution 173 (WRC-19).
* **Method B** – Add a new footnote in RR Article 5 that refers to a new WRC Resolution with technical, operational, and regulatory conditions for the operation of non-GSO maritime and aeronautical ESIMs while ensuring protection of allocated services and consequential suppression of Resolution 173 (WRC-19).

The draft CPM text and draft new Resolution were reviewed in detail only partially due to the lack of time at the meeting of WP 4A in September. Notes in the text indicate the relevant parts subject to detailed consideration.

**2. Documents**

* Input Documents for PV

APG23-5/ [INP-11 (THA),](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-11_Thailand-WP4-Preliminary_Views_on_WRC-23_Agenda_Items_1.15_1.16_1.17_and_7.docx) [INP-17 (J)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-17_Japan-WP4-Preliminary_Views_on_WRC-23_Agenda_Items_1.15_1.16_1.17_1.18_1.19_and_7.docx), [INP-29 (IND)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-29_India_WP4-Preliminary_Views_on_WRC_23_Agenda_Items_1.15_1.16_1.17_and_7.docx), [INP-35 (BGD)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-35_Bangladesh_WP4-Preliminary_Views_on_WRC_23_Agenda_Items_1.15_1.16_1.17_1.18_and_1.19.docx), [INP-39 (IRN)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-39_Iran-WP4-Preliminary_Views_on_WRC_23_Agenda_Items_1.15_1.16_1.17_1.18_1.19_and_7.docx), [INP-48 (SNG)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-48_Singapore-WP4-Preliminary_Views_on_WRC_23_Agenda_Items_1.15_1.16_1.17_and_7.docx), [INP-55 (VTN)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-55_Viet_Nam-WP4-Preliminary_Views_on_WRC-23_Agenda_Items_1.15_1.16_1.18_1.19_and_7.docx), [INP-59 (AUS)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-59_Australia-WP4-Preliminary_Views_on_WRC-23_Agenda_Items_1.15_1.16_1.17_1.18_1.19_and_7.docx), [INP-66 (KOR)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-66_Rep_of_Korea-WP4-Preliminary_Views_on_WRC-23_Agenda_Items_1.15_1.16_1.17_1.18_and_7.docx), [INP-75 (NZL)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-75_New_Zealand-WP4-Preliminary_Views_on_WRC-23_Agenda_Items_1.16_and_1.18.docx), [INP-81 (INS)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-81_Indonesia-WP4-Preliminary_Views_on_WRC-23_Agenda_Items_1.15_1.16_1.17_and_7.docx), [INP-83 (TON)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-83_Tonga-WP4-Preliminary_Views_on_WRC-23_Agenda_Items_1.16_and_1.17.docx), [INP-91 (CHN)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-91_China-WP4-Preliminary_Views_on_WRC-23_Agenda_Items_1.15_1.16_1.17_1.18_1.19_and_7.docx), [INP-98 (MLA)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-98_Malaysia-WP4-Preliminary_Views_on_WRC-23_Agenda_Items_1.15_1.16_1.19_and_7.docx)

* Input Documents for modification of the Draft CPM

APG23-5/[INP-23 (J)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-23_Japan-WP4-Proposed_modification_to_the_Chapter_4_of_draft_CPM_Report.docx), [INP-44 (IRN)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-44_Iran-WP4-Proposed_modification_to_the_Chapter_4_of_draft_CPM_Report.docx)

* Information Documents

APG23-5/[INF-01 (WMO)](https://www.apt.int/sites/default/files/2023/01/APG23-5-INF-01_WMO_Position_on_WRC-23_Agenda.docx), [INF-05 (Chairman)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-05_Brief_on_AI1.16.docx), [INF-39 (CEPT)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-39_Status_of_CEPT_preparation_for_WRC-23_and_RA-23.pdf), [INF-43 (CITEL)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-43_CITEL_preparation_for_WRC-23.pdf) , [INF-45 (RCC)](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-45_Status_of_RCC_preparation_to_the_WRC-23.pdf)

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

**3.1.1 Thailand (Kingdom of)** - **Document APG23-5/INP-11**

Thailand supports Method B in the current draft CPM text, in order to facilitate the use of 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) by non-GSO FSS earth stations in motion, in accordance with Resolution 173 (WRC-19).

Thailand also supports in principle to define responsibilities of the notifying administration related to the operation of non-GSO ESIM in those frequency bands as agreed in ITU-R WP 4A and reflected in the current draft CPM text.

Thailand is of the view that further ITU-R developments of, among other things, the regulatory provisions, appropriate technical conditions and a methodology to examine power flux-density (pfd) limits of non-GSO ESIM by the Bureau should ensure protection of the existing services, including their future developments, in those frequency bands and adjacent frequency bands.

**3.1.2 Japan**- **Document APG23-5/INP-17**

Japan supports Method B on the condition that it protects existing services, including fixed, mobile and the other fixed satellite services and not imposing constraints on their future use of subject frequency bands.

Invited by Resolution 169 (WRC-19), WP 4A has been developing the examination methodology by BR with respect to the conformity with the pfd limits at the Earth’s surface for aeronautical ESIM, and came close to an agreement at its September 2002 meeting. Japan considers that the methodology is a reasonable solution in order to protect the terrestrial services in the frequency bands since it examines the pfd limits with the EIRP levels of the aeronautical ESIM and its altitudes, and it is taken into account the measure to limit emission at the altitudes where pfd level exceeds the limits.

Resolution 169 (WRC-19) is applicable to ESIMs communicating with GSO satellites, and the target of the Agenda item 1.16 is ESIMs communicating with non-GSO satellites. However, Japan is of the view that the examination methodology for Resolution 169 (WRC-19) should also be applied to non-GSO aeronautical ESIM which is considered the pfd limits in the same manner to protect the terrestrial services, since the methodology is not depending on an orbit of space station.

The interference management procedure in case of unacceptable interference caused by non-GSO ESIM is needed to be identified, assuming that the notifying administration of the non-GSO satellite system with which ESIM communicate is responsible for the operation of non-GSO ESIM.

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**3.1.3 India (Republic of)** - **Document APG23-5/INP-29**

India Supports Method B: add a new footnote in RR Article 5 that refers to a new WRC Resolution with technical, operational and regulatory conditions for the operation of non-GSO maritime and aeronautical ESIMs while ensuring protection of allocated services, and consequential suppression of Resolution 173 (WRC-19)

**3.1.4 Bangladesh (People’s Republic of)** - **Document APG23-5/INP-35**

In order to facilitate the use of 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) by non-geostationary fixed-satellite service earth stations in motion, Bangladesh administration prefers method B of the draft CPM report to WRC-2023.

**3.1.5 Iran (Islamic Republic of)** - **Document APG23-5/INP-39**

This Administration supports method A (NOC) at this point of time; however, the preliminary views of the Islamic Republic of Iran are as follows:

* In order to make it possible to use the aeronautical and maritime earth stations communicating with 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), it is required to continue studies to develop technical/ regulatory solution(s) for all concerns that are currently raised. Completion of studies and decisions shall be made to ensure the protection of the existing services.
* ESIMs operating with non-GSO FSS system shall not cause unacceptable interference to the terrestrial services in those frequency bands and in adjacent frequency bands and not adversely affect these terrestrial services, and ESIMs shall not claim protection from existing radiocommunication services (including terrestrial services) in those frequency bands and adjacent bands.
* To this effect, the notifying administration of A-ESIM and M-ESIM when submitting Appendix 4 data elements to the Bureau shall also send a firm commitment undertaking that in case of any interference to Allotment in the Plan, assignments in the List and MIFR shall immediately cease emission or reduce it to the minimum level acceptable to the interfered assignments of administration (s).

With respect to other space services, it shall operate within the envelope of technical characteristics and envelope of coordination agreement.

* The only administration that could notify ESIM is the administration notifying the Non-GSO system to which the ESIM communicates. Thus, notification of any frequency assignment for ESIMs shall only be made by one single administration, which will be responsible for ESIM operation.
* An administration the territory of which is situated inside the service area of a satellite and has provided explicit authorization to receive the service/ to be served by any type of ESIM has no obligation nor any mandate, whatsoever, to be involved directly or indirectly in detection, identification, reporting, resolution of any interference caused by the operation of the ESIM the operation of which was authorized.
* Interference management mechanism and operation mechanism of ESIMs shall be clearly defined by completing relevant studies for inclusion in the draft new Resolution.
* The current version of interference management system as described in the draft CPM text has not been duly analyzed and fully discussed and agreed upon since it was submitted by some administrations to one of the almost last meeting of ITU-R study groups. Moreover, it is incomplete as there are no timing elements for each function to be performed.
* The use of PFD mask in order to protect terrestrial services, that shall be prepared based on studies including different operating conditions (comprising the range of aircraft altitude change), the outcome of the PFD limit would only be considered as guidance.
* Compliance to the limit once performed by the Bureau does not release the notifying administration of A-ESIM and M-ESIM from their responsibility and commitment not to cause unacceptable interference nor claiming protection from the terrestrial services.
* There are several other inconsistencies, shortcomings, ambiguities which were already included in draft CPM text and its attached draft Resolution which shall be addressed, resolved and agreed upon.

**3.1.6 Singapore** - **Document APG23-5/INP-48**

Singapore supports Method B.

For protection of terrestrial services in the 27.5–29.1 GHz frequency band, the same technical conditions as applicable to GSO ESIM shall apply (pfd limit on the ground for A-ESIM; minimum distance from the coast and max EIRP spectral density towards the horizon for M-ESIM).

For the protection of secondary allocation to terrestrial services in the 29.5-30 GHz (No. **5.542**), the conditions for non-GSO ESIM in the 27.5-29.1 GHz shall apply with respect to administrations mentioned in No. **5.542**.

Appropriate examination methodology by the Bureau for non-GSO ESIM should be established to ensure the protection of services to which the frequency bands are allocated and operated in accordance with the Radio Regulations. In the absence of such methodology, necessary transitional measures should be developed and agreed by WRC-23.

For protection of space services, non-GSO ESIM characteristics shall remain within the envelope characteristics of typical earth stations associated with the non-GSO system.

For the protection of GSO FSS networks operating in the 17.8-18.6 GHz, 19.7-20.2 GHz, 27.5-28.6 GHz and 29.5-30.0 GHz the relevant EPFD limits in Nos. **22.5C**, **22.5D** and **22.5F** shall apply. The methodology included in Recommendation ITU-R S.1503 for determination of compliance with EPFD limits in Article **22** is applicable to ESIMs communicating with non-GSO FSS systems.

**3.1.7 Viet Nam (Socialist Republic of)** - **Document APG23-5/INP-55**

Viet Nam supports on-going ITU-R studies to develop technical, operational and regulatory measures, as appropriate, to facilitate the use of 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) by non-GSO FSS ESIM, while ensuring the protection of existing services in those frequency bands and the adjacent bands in accordance with Resolution **173 (WRC-19)**.

Viet Nam supports the development of an appropriate examination methodology by the Bureau for non-GSO ESIM to ensure the protection of services to which the frequency bands are allocated and operated in accordance with the Radio Regulations.

Viet Nam is of the view that interference management mechanism to deal with interference occurs from operation of non-GSO ESIM to other administrations need to be finalized.

**3.1.8 Australia** - **Document APG23-5/INP-59**

Australia supports the establishment of a harmonised regulatory framework and technical and operational measures that facilitate the use of non-geostationary (non-GSO) earth-stations in motion (ESIM) in the fixed-satellite service in the 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) frequency bands; while ensuring protection of services allocated in the bands and, as appropriate in the adjacent bands, and shall not adversely affect the operation of terrestrial services on territories of those administrations mentioned in No. 5.542 operating in the 29.5-30.0 GHz band as an additional secondary allocation.

Further Australia supports the inclusion of the results of the sharing studies which have been transferred in to the Draft New Resolution, as well as PFD limits which have been included for the purpose of protection of terrestrial services. The use of regulatory options in the Draft New Resolution to ensure deployed non-GSO FSS ESIM in the bands 17.7-18.6 GHz and 18.8-19.3 GHz (space-to-Earth) will not result in increased adjacent band interference to EESS (passive) operations in the 18.6-18.8 GHz band is also supported, as well as conditions for the non-GSO ESIM to comply with all provisions applicable to the typical earth station, including: existing epfd limit, pfd limit, GSO arc exclusion zone etc., such that ESIM will not cause more interference and will not need more protection than a typical earth station.

The developed Draft New Resolution includes a PFD limit compliance examination methodology for the Bureau, in addition to adequate transitional measures in case WRC-23 could not agree on the methodology. Australia supports the development of such a methodology under WRC-23 AI 1.16. Australia is of the view that the progress on WRC-23 agenda item 1.16 should not be conditional upon the development of the methodology under Resolution **169 (WRC-19)**, which relates to a PFD examination for GSO ESIM operations.

Australia supports the developed Draft New Resolution included in Method B in the draft CPM text.

**3.1.9 Korea (Republic of)** - **Document APG23-5/INP-66**

The Republic of Korea has preliminary views as follows:

* Regulatory provision, and technical and operational measures with appropriate examination methodology conducted by the Bureau for non-GSO ESIM should be established to ensure the protection of services to which the frequency bands are allocated and operated in accordance with the Radio Regulations;
* The ESIMs operating with non-GSO FSS system shall not cause unacceptable interference to the terrestrial services in those frequency bands and in adjacent frequency bands and not adversely affect these terrestrial services;
* Transmitting non-GSO ESIMs in the frequency band 29.5-30.0 GHz shall not adversely affect the operations of terrestrial services to which this frequency band is allocated and that operate in accordance with the Radio Regulations, and technical conditions in Annex 1 to new Resolution shall apply with respect to administrations mentioned in RR No. **5.542**;
* The only administration that could notify ESIM is the same administration as the one notifying the non-GSO system to which the ESIM communicate. Thus, notification of any frequency assignment for ESIMs shall only be made by one single administration, which will be responsible for ESIM operation;
* In cases where an ESIM is found to be causing unacceptable interference in a territory outside the permitted operating area, the decision for the ESIM to cease transmission shall be commanded from the notifying administration of the satellite with which ESIM communicate. This notifying administration of the satellite with which ESIM communicate shall immediately authorize the NCMC to cease or adjust transmissions as necessary to mitigate the interference within an established time frame;
* For protection of GSO FSS networks operating in the 17.8-18.6 GHz, 19.7-20.2 GHz, 27.5-28.6 GHz, and 29.5-30.0 GHz, the relevant EPFD limits in RR Nos. **22.5C**, **22.5D** and **22.5F** shall apply;

**3.1.10 New Zealand** - **Document APG23-5/INP-75**

New Zealand supports Method B a view to enable and establish a harmonised framework to support non-GSO Earth stations in motion (ESIMs) in the 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) frequency bands. This framework may be similar to that for GSO ESIMs, as appropriate. New Zealand considers that it is not normal ITU-R practice to consider protection of secondary service allocations from primary service allocations (either existing or under study for potential allocation). However, it is noted that section 4/1.16/3.3.4 of the Draft CPM Report outlines that the conditions in Annex 1 of the draft new Resolution should be applied in this frequency band only for the administration mentioned in RR No. **5.542**.

**3.1.11 Indonesia (Republic of)** - **Document APG23-5/INP-81**

Indonesia is of the view to support the implementation of ESIMs with ensuring the protection of current and planned stations of primary services allocated in the frequency band 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 in adjacent frequency bands, including passive services.

Furthermore, the required pending technical regulations and mechanisms have to be resolved before the implementation of ESIMs, *inter alia* control and monitoring of ESIMs, interference management procedures, authorization of ESIMs when passing through the territory of a country.

**3.1.12 Tonga (Kingdom of)** - **Document APG23-5/INP-83**

Tonga supports Method B subject to the following conditions:

NGSO ESIM operating in the frequency bands 17.7 – 18.6, 18.8 – 19.3 GHz and 19.7-20.2 GHz (No 5.524) shall not claim protection from terrestrial services to which the frequency band is allocated and operating in accordance with the Radio Regulations.

For protection of terrestrial services in the 27.5–29.1 GHz frequency band, the same technical conditions as applicable to GSO ESIM shall apply (pfd limit on the ground for A-ESIM; minimum distance from the coast and max EIRP spectral density towards the horizon for M-ESIM).

For protection of space services, non-GSO ESIM characteristics shall remain within the envelope characteristics of typical earth stations associated with the non-GSO system.

For the protection of secondary allocation to terrestrial services in the 29.5-30 GHz (No. 5.542), the conditions for non-GSO ESIM in the 27.5-29.1 GHz shall apply with respect to administrations mentioned in No. 5.542.

The development of a methodology regarding the examination by the Bureau of compliance with pfd limits by non-GSO aeronautical ESIM and of adequate transitional measures, in case WRC-23 could not finalize the methodology, are supported as appropriate

For the protection of GSO FSS networks operating in the 17.8-18.6 GHz, 19.7-20.2 GHz, 27.5-28.6 GHz and 29.5-30.0 GHz the relevant EPFD limits in Nos. 22.**5C**, **22.5D** and **22.5F** shall apply. The methodology included in Recommendation ITU-R S.1503 for determination of compliance with EPFD limits in Article **22** is applicable to ESIMs communicating with non-GSO FSS systems.

**3.1.13 China (People’s Republic of)** - **Document APG23-5/INP-91**

This administration 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) while ensuring the protection of the incumbent services in accordance with Resolution **173 (WRC-19)**. Based on that, this administration is of the view that Method B, in general, is the way to satisfy this Agenda Item.

Furthermore, this administration is of the view that in order to protect EESS (passive) operating in 18.6-18.8GHz frequency band, it is necessary to set up appropriate pfd limits for OOB emissions from non-GSO satellite transmitters with which ESIM communicate.

**3.1.14 Malaysia** - **Document APG23-5/INP-98**

Malaysia supports the development of regulatory framework and operational conditions to facilitate the use of ESIM communicating with non-GSO space stations 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) under **Method B**, while ensuring protection of the existing services including GSO FSS networks and other services operating in the same and adjacent frequency bands.

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

Some APT Members are of the view that Annex 2 of the Draft New Resolution **[A116] (WRC-23)** should be replaced with the latest development by WP4A on the methodology of examination of a GSO A-ESIM for Resolution **169 (WRC-19)**, which can also be applied to ESIMs communicating with non-GSO satellites.

Some other APT Members are of the view that operation of ESIM communicating with non-GSO is different from the operation of ESIM communicating with GSO. Therefore, methodology of examination for Resolution **169 (WRC-19)** may not be applicable.

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

APT Members are considering Method B under this agenda item provided that the issues raised in the section 3.1.5 above are duly resolved and agreed upon. However APT Members could also consider Method A.

APT Members are of the view that for the protection of other space services, non-GSO ESIM characteristics shall remain within the envelope characteristics as well as within the envelope of coordination agreement of typical earth stations associated with the non-GSO satellite system with which these ESIM communicate.

APT Members are of the view that for the protection of GSO FSS networks operating in the 17.8-18.6 GHz, 19.7-20.2 GHz, 27.5-28.6 GHz and 29.5-30.0 GHz the relevant EPFD limits in Nos. **22.5C**, **22.5D** and **22.5F** shall apply.

APT Members are of the view that the methodology included in the current version of Recommendation ITU-R S.1503-3 for determination of compliance with EPFD limits in Article **22** is applicable to ESIMs communicating with non-GSO FSS systems.

APT Members are of the view that currently there is no pfd limit to protect EESS (passive) operating in 18.6-18.8GHz frequency band from non-GSO satellite system. Therefore, it is necessary to set up appropriate pfd limits for unwanted emissions from non-GSO satellite transmitters with which ESIM communicate.

APT Members are of the view that receiving non-GSO ESIMs in the frequency bands 17.7-18.6 GHz and 18.8-19.3 GHz and 19.7-20.2 GHz (see No. **5.524**) shall not claim protection from terrestrial services to which the frequency bands are allocated and operating in accordance with the Radio Regulations.

APT Members are of the view that transmitting non-GSO ESIMs in the frequency band 27.5-29.1 GHz shall not cause unacceptable interference to terrestrial services to which the frequency band is allocated and that operate in accordance with the Radio Regulations, and Annex 1 to the new Resolution under this Agenda Item shall apply.

APT Members are of the view that transmitting non-GSO ESIMs in the frequency band 29.5-30.0 GHz shall not adversely affect the operations of terrestrial services to which this frequency band is allocated and that operate in accordance with the Radio Regulations, and technical conditions in Annex 1 to the new Resolution under this Agenda Item shall apply with respect to administrations mentioned in RR No. **5.542**.

APT Members are of the view that the provisions in the new Resolution under this Agenda Item, including Annex 1, set the conditions for the purpose of protecting terrestrial services from unacceptable interference from non-GSO ESIMs in neighboring countries in accordance with the provisions included in the *resolves* 1.2.3 of the new Resolution of the Draft CPM text under this Agenda Item in the frequency band 27.5-29.1 GHz and in the frequency band 29.5 - 30.0 GHz as guidance for administrations. However, the requirement not to cause unacceptable interference to, or claim protection from, terrestrial services to which the frequency bands are allocated and operating in accordance with the Radio Regulations remains valid. To this effect, the notifying administration of A-ESIM and M-ESIM when submitting Appendix **4** data elements to the Bureau shall also send a firm commitment undertaking that in case of any interference to terrestrial services shall immediately cease emission or reduce it to the acceptable level to the interfered services of administration (s).

APT Members are of the view that regulatory provision, and technical and operational measures with appropriate examination methodology by the Bureau for non-GSO ESIM should be established to ensure the protection of services to which the frequency bands are allocated and operated in accordance with the Radio Regulations. In the absence of such methodology necessary transitional measures should be developed and agreed by WRC-23.

APT Members are of the view that the only administration that could notify ESIM is the administration notifying the non-GSO system to which the ESIM communicates. Thus, notification of any frequency assignment for ESIMs shall only be made by one single administration, which will be responsible for ESIM operation.

APT Members are of the view that there are still several issues on the operation of ESIMs to be clarified and specified in the Draft New Resolution, such as interference management mechanism and its due functionality. Moreover, the proper function of switching facility to respond to authorization provided for the operation of ESIM from the countries that did not agree with operation.

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

None.

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

APT Members are invited to follow the conclusion of the CPM23-2 with a view to submit their contributions under this Agenda Item to APG23-6 meeting.

**7. Views from Other Organisations** (as provided in the information documents to

APG23-5)

**7.1 Regional Groups**

**7.1.1 ASMG** - **Document APG23-5/INF-ZZ**

* ASMG views/positions based on direct extract from the relevant information document.

**7.1.2 ATU** - **Document APG23-5/INF-ZZ**

* ATU views/positions based on direct extract from the relevant information document.

**7.1.3 CEPT** - **Document APG23-5/INF-39**

CEPT supports the development of a regulatory framework for the operation of aeronautical and maritime ESIMs 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).

CEPT also supports the operations of Land ESIMs in the frequency bands above and recognizes that they are subject to national regulations. Such operations shall not cause unacceptable interference to terrestrial services in neighbouring countries.

CEPT supports that the technical and operational requirements for the use of non-GSO ESIM shall ensure the protection of GSO networks and other services operating in the same frequency bands and in adjacent bands:

* CEPT is of the view that the protection of GSO networks in the fixed-satellite service operating in the frequency bands 17.8-18.6 GHz, 19.7-20.2 GHz, 27.5-28.6 GHz and 29.5-30 GHz from non-GSO ESIM can be achieved by requiring that links involving non-GSO ESIM comply with epfd limits referred to in Nos. 22.5C, 22.5D and 22.5F and that the methodology included in Recommendation ITU-R S.1503 for determination of compliance with epfd limits in Article 22 is applicable to ESIM communicating with non-GSO FSS systems
* CEPT is of the view that to protect GSO networks – in those bands where epfd limits do not apply - and non-GSO systems in the FSS:
* non-GSO ESIM characteristics shall remain within the envelope characteristics of typical earth stations associated with the non-GSO satellite system with which the ESIM communicates;
* non-GSO ESIM shall not cause more interference and shall not claim more protection than typical earth stations in this non-GSO system;
* the operation of non-GSO ESIM shall comply with the coordination agreements obtained following the application of provisions under No. 9.11A.

CEPT supports that the technical and operational requirements for the use of non-GSO ESIM shall ensure the protection of fixed and mobile services with allocations in the frequency bands considered in this agenda item:

* 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-toEarth) shall not claim protection from stations in the fixed and mobile services operating in the same frequency bands in accordance with the Radio Regulations;
* CEPT supports the use of PFD (power flux density) limits on the Earth’s surface for aeronautical ESIMs to ensure the protection of fixed and mobile services. CEPT supports also the use of the methodology under development to examine compliance with the pfd limits by non-GSO aeronautical ESIM or transitional measures in case WRC-23 could not agree on the methodology;
* CEPT supports the applicability of the limits contained in Annex 3 to Resolution 169 (WRC-19) to aeronautical and maritime ESIMs communicating with non-GSO systems operating in the frequency band 27.5-29.1 GHz; such ESIMs shall not cause unacceptable interference to fixed and mobile services operating in the same frequency band;
* CEPT supports the use of the limits contained in Annex 3 to Resolution 169 (WRC-19) to protect stations in the fixed and mobile services operating in the frequency band 29.5-30 GHz on the entire territories of administrations mentioned in No. 5.542.
* CEPT is of the view that the notifying administration of the non-GSO system with which the ESIMs communicate should be identifiable to address the potential cases of harmful interference caused by any ESIM to fixed and mobile services. This identification could be done thanks to: i) the license issued by / authorization of the administration for the operation of the ESIM on its territory; ii) the assistance of the flag nation of aircraft/vessel; iii) the on-board radio license of the aircraft or vessel equipped with the ESIM.

CEPT supports the protection of EESS (passive) sensors in the frequency band 18.6-18.8 GHz, and compatibility studies with related non-GSO systems to define necessary protection measures. In particular, CEPT is of the view that enabling the operations of non-GSO ESIM 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 space stations communicating with aeronautical ESIM and maritime ESIM that may be needed to limit the interference to EESS (passive) sensors operating in the 18.6-18.8 GHz band shall be applicable only to those non-GSO systems notified/brought into use after the last day of WRC-23. In addition, CEPT supports that no specific measure is required for non-GSO systems operating in LEO orbits that make use of frequency reuse schemes employing at least three colours.

**7.1.4 CITEL** - **Document APG23-5/INF-43**

Some Administrations propose to add a new footnote, 5.A116, in RR Article 5, 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), pointing to a new Resolution, also proposed, that provides the conditions for the operation of aeronautical and maritime ESIMs communicating with non-geostationary FSS space stations in these bands, while ensuring the protection of incumbent services, as well propose the suppression of Resolution 173 (WRC 19) in consequence.

**7.1.5 RCC** - **Document APG23-5/INF-45**

Support development of regulatory provisions and technical requirements for aeronautical and maritime ESIMs in non-GSO FSS systems in the frequency bands 18/19/20 GHz (s-to-E) and 28/29/30 GHz (E-to-s).

* Non-GSO ESIMs could be used only if the following conditions are met:
* Non-GSO ESIMs in the frequency bands 18/19/20 GHz (s-to-E) shall not claim protection from terrestrial services;
* Non-GSO ESIMs in the frequency band 27.5-29.1 GHz (E-to-s) shall not cause unacceptable interference to terrestrial services to which the frequency band is allocated and that operate in accordance with the Radio Regulations;
* Non-GSO ESIMs in the frequency band 29.5-30.0 GHz (E-to-s) shall not adversely affect the operations of terrestrial services to which this frequency band is allocated and that operate in accordance with the Radio Regulations;
* Maintain relevant RR provisions for the protection of GSO networks from non-GSO FSS systems;
* Non-GSO ESIMs are within the characteristics for typical ES of non-GSO FSS systems published in Part II-S of the BR IFIC, as well as comply with coordination agreements between administrations;
* Non-GSO ESIMs shall not be used or relied upon for safety-of-life applications;
* Non-GSO ESIM shall comply with the e.p.f.d. limits specified in RR Nos. 22.5C, 22.5D and 22.5F ;
* In the frequency band 17.7-17.8 GHz (s-to-E) RR No. 22.2 applies;
* When operating ESIMs in non-GSO FSS systems, there shall be envisaged the measures, excluding unauthorized use of ESIMs in the territory of states that have not granted relevant authorization (licenses).

RCC administrations tend to Method B from the draft CPM Report.

**7.2 International Organisations**

**7.2.1 IARU** - **Document APG23-5/INF-ZZ**

* IARU views/positions based on direct extract from the relevant information document.

**7.2.2 ICAO** - **Document APG23-5/INF-ZZ**

* ICAO views/positions based on direct extract from the relevant information document.

**7.2.3 WMO** - **Document APG23-5/INF-01**

WMO does not oppose the use of the bands 17.7-18.6 GHz and 18.8-19.3 GHz (space-to-Earth) for communications with non-GSO FSS ESIM provided that an appropriate out-of-band pfd limit at the Earth’s surface is applied to ensure protection of the EESS (passive) in the band 18.6-18.8 GHz. Current studies show that a value of -126.4 dBW/m2/200 MHz might be suitable.

No studies have been conducted with respect to the MetSat service, however additional provisions may be required to ensure non-GSO FSS ESIM deployment will protect the co-frequency band MetSat allocation in the bands 18-18.3 GHz (ITU Region 2) and 18.1-18.4 GHz (ITU Regions 1 and 3).

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