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|  | ASIA-PACIFIC TELECOMMUNITY | Document No: |
| **The 6th Meeting of the APT Conference Preparatory****Group for WRC-23 (APG23-6)** | **APG23-6/OUT-25** |
| 14 – 19 August 2023, Brisbane, Australia | 18 August 2023 |

Working Party 3

**APT VIEW and Preliminary APT Common Proposal on WRC-23 agenda item 9.1 (TOPIC A)**

**Agenda Item 9.1:**

*9.1 on the activities of the ITU Radiocommunication Sector since WRC 19:*

*– In accordance with Resolution* ***657 (Rev. WRC 19)****, review the results of studies relating to the technical and operational characteristics, spectrum requirements and appropriate radio service designations for space weather sensors with a view to describing appropriate recognition and protection in the Radio Regulations without placing additional constraints on incumbent services;*

**1. Background**

Space weather refers to the physical processes occurring in the space environment that ultimately affects human activities on Earth and in space. Space weather is influenced by the X-ray, ultraviolet (UV), high energic particles and strong solar wind generated by Coronal Mass Ejection (CME). Space weather observations are important for detecting and forecasting solar activity events that impact services critical to the economy, safety and security of administrations and their population. These observations are made from ground-based and space-based systems. Some of the sensors operate by receiving signals of opportunity, including, but not limited to, low-level natural emissions of the Sun, Earth’s atmosphere and other celestial bodies, and therefore may suffer harmful interference at levels which could be tolerated by other radio systems. However, no frequency bands have been documented in any manner in the Radio Regulations for space weather sensor applications.

Agenda item 9.1, topic a) was therefore established with a view to describing appropriate recognition and protection of space weather sensors in the Radio Regulations (RR) without placing additional constraints on incumbent services.

ITU-R Working Party (WP) 7C is designated as the responsible group for this topic and has undertaken the study of the technical and operational characteristics, spectrum requirements and appropriate radio service designations for space weather sensors in response to Resolution **657 (Rev.WRC-19)**.

CPM23-2 in March/April 2023 considered and finalised the CPM text as found in the [CPM Report](https://www.itu.int/md/R19-CPM23.2-R-0001/en). Specifically, the CPM Report provides:

* an example definition for space weather in the RR Article **1** with the text “*space weather*: natural phenomena, mainly originating from solar activity and occurring beyond the major portion of the Earth’s atmosphere, that impact Earth’s environment and human activities;”
* potential radio service designation for space weather sensors by creating a subset of the meteorological aids service (*space weather*) and adding a new provision of RR Article **4** which reads“Space weather sensor systems may operate under the meteorological aids service (space weather) allocations;”
* need to finalise the candidate frequency bands to be protected, which new allocations could be made at WRC-27 to the MetAids (*space weather*) for space weather sensors;
* necessity that the supporting Resolution for this WRC-27 agenda item includes, inter alia, protection of services to which the band is allocated as well as services in the adjacent band, should the agenda of WRC‑27 include space weather as an agenda item.

**2. Documents**

* Input Documents APG23-6/ INP-[19](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-19_India_WP3_PACP_WRC-23_Agenda_Items.docx) (IND), [35](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-35_Japan_WP3_PACP_WRC-23_Agenda_Item_9.1a.docx) (J), [60](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-60_Thailand_WP3_PACP_WRC-23_Agenda_Items.docx) (THA), [67](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-67_Iran_WP3_Preliminary_Views_on_WRC-23_Agenda_Items.docx) (IRN), [82](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-82_Australia_WP3_PACP_WRC-23_Agenda_Items_and_Res.655_WRC-15.docx) (AUS),
[89](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-89_KOR_WP3_PACP_WRC-23_Agenda_Items.docx) (KOR), [100](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-100_New_Zealand_WP3_PACP_WRC-23_Agenda_Items.docx) (NZL), [105](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-105_China_WP3_PACP_WRC-23_Agenda_Items.docx) (CHN), [111](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-111_Malaysia_WP3_PACP_WRC-23_Agenda_Items.docx) (MLA)
* Information Documents APG23-6/ INF-[01](https://www.apt.int/sites/default/files/2023/06/APG23-6-INF-01_ITU_BR-WRC_agenda_items_4_6_9.1_10.docx) (BR), [02](https://www.apt.int/sites/default/files/2023/06/APG23-6-INF-02_WMO_Position_on_WRC-23_Agenda.docx) (WMO), [22](https://www.apt.int/sites/default/files/2023/07/APG23-6-INF-22_Brief_on_AI_9.1a.docx) (Chair, DG),
[25](https://www.apt.int/sites/default/files/2023/07/APG23-6-INF-25_ICAO-Position_for_ITU-WRC23.docx) (ICAO), [30](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-30_IARU_Views_on_WRC-23_Agenda_Items.docx) (IARU), [45](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-45_Status_of_RCC_preparation_to_WRC-23.pdf) (RCC), [46](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-46_Status_of_CEPT_preparation_for_WRC-23_and_RA-23.pdf) (CEPT), [52](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-52_CITEL_preparation_for_WRC-23.pdf) (CITEL)

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

**3.1.1 India (Republic of)** - **Document APG23-6/INP-**[**19**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-19_India_WP3_PACP_WRC-23_Agenda_Items.docx)

India supports the ITU-R studies so far carried out relating to the definition of space weather and appropriate radiocommunication service designations (MetAids) for operation of space weather sensors, as proposed in the CPM Report for inclusion in Articles 1 and 4 of the Radio Regulations.

Should the agenda of WRC-27 include space weather as an agenda item, it is necessary that supporting Resolution for this new agenda item includes, inter alia, protection of services to which the band is allocated as well as services in the adjacent band.

**3.1.2 Japan** - **Document APG23-6/INP-**[**35**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-35_Japan_WP3_PACP_WRC-23_Agenda_Item_9.1a.docx)

Space weather observations are vital for a wide range of areas, including stable use of radio in telecommunications, broadcasting, and positioning, as well as electric power grids, aviation and space applications, and their necessity is further increasing in the evolving ICT society. Japan supports the example definition of ‘space weather’ and the approach of designating the use of frequencies by space weather sensors under a subset of the meteorological aids service developed in the ITU-R studies. Japan also supports the issues relating to space weather sensors to be adopted as an agenda item of WRC-27, including the allocation for space weather sensors and the notification and registration procedures for the Master International Frequency Register, without any additional adverse effects on existing services to which the same and adjacent frequency bands are allocated.

Furthermore, Japan supports the potential new WRC‑23 Resolution on the importance of space weather applications presented in the CPM Report as a draft new Resolution [XXX SW IMPORTANCE] (WRC-23).

**3.1.3 Thailand (Kingdom of)** - **Document APG23-6/INP-**[**60**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-60_Thailand_WP3_PACP_WRC-23_Agenda_Items.docx)

Thailand supports the definition of space weather as specified in the CPM Report and the designation of space weather sensing as an application of the meteorological aids service.

Thailand also supports View D in the CPM Report with the elaboration of the aforementioned definition and designation in the WRC resolution related to the WRC-27 preliminary agenda on space weather sensors in order to avoid the modification of the Radio Regulations at WRC-23.

**3.1.4 Iran (Islamic Republic of)** - **Document APG23-6/INP-**[**67**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-67_Iran_WP3_Preliminary_Views_on_WRC-23_Agenda_Items.docx)

This Administration supports the following views as adopted by APG23-5 meeting:

APT Members support the ITU-R studies so far carried out relating to the definition of space weather and appropriate radiocommunication service designations (MetAids) for operation of space weather sensors, as proposed in the CPM Report for inclusion in Articles **1** and **4** of the Radio Regulations.

Should the agenda of WRC-27 include space weather as an agenda item, it is necessary that supporting Resolution for this new agenda item includes, inter alia, protection of services to which the band is allocated as well as services in the adjacent band.

This Administration is of the view that any changes to the Radio Regulations are outside of the scope of Agenda item 9.1, Topic a). Therefore, any changes to the Radio Regulations such as identification of frequency bands used for providing data critical for space weather forecasting/warnings and necessary protection to be provided to the incumbent services need to be well studied through a possible new agenda item for WRC-27 in line with the preliminary agenda item 2.6 of Resolution **812 (WRC-19)**. In this case, all sharing studies and possible identification of new allocations to the MetAids (*space weather*) could be studied in time for WRC‑27.

The result of ITU-R studies so far carried out relating to the definition of space weather and designation of the meteorological aids service for space weather sensors are proposed to be included in Resolution **657 (Rev. WRC-19)** related for a new space weather agenda item.

In this connection the following Preliminary APT Common Proposals (PACPs) are proposed to be considered by APG23-6 and finalized for WRC-23: *[The proposed PACP is omitted.]*

**3.1.5 Australia** - **Document APG23-6/INP-**[**82**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-82_Australia_WP3_PACP_WRC-23_Agenda_Items_and_Res.655_WRC-15.docx)

Australia supports studies addressing space weather sensors with a view to ensuring the Radio Regulations include appropriate recognition and future protection for space weather sensors. These studies should ensure that additional constraints are not placed on incumbent services.

Australia supports the definition of space weather as proposed in the CPM text and the inclusion of space weather systems under the MetAids, with a subset of the MetAids (space weather) in order to accommodate all space weather sensors.

Australia is not proposing a Preliminary APT Common Proposal on this issue.

**3.1.6 Korea (Republic of)** - **Document APG23-6/INP-**[**89**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-89_KOR_WP3_PACP_WRC-23_Agenda_Items.docx)

The Republic of Korea supports a new definition for space weather and designation of space weather observations on the RR Article 1 and 4, respectively, as presented on Agenda item 9.1 Topic a) of the CPM Report to WRC-23.

Taking into account Resolution **657 (Rev.WRC-19),** ITU-R should conduct study to identify specific space weather sensors which need to be protected by appropriate regulation, conduct any necessary sharing studies with incumbent systems operating in frequency bands used by space weather sensors with the objective of determining potential regulatory provisions that can be provided to receive-only operational space weather sensors for their appropriate recognition in the Radio Regulations. However, most of the *resolves* in **657 (Rev.WRC-19)** have not been completed during the period for WRC-23.

Therefore, the Republic of Korea is of a view that it may be considered further ITU-R studies on the technical and operational characteristics of space weather sensors, necessary sharing studies with incumbent systems operating in frequency bands of active space weather sensors, and development of potential solutions to identify space weather sensors.

**3.1.7 New Zealand** - **Document APG23-6/INP-**[**100**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-100_New_Zealand_WP3_PACP_WRC-23_Agenda_Items.docx)

New Zealand could support the work of step 1 of the CPM text by adding a new definition of space weather into the Radio Regulations.

In regards to sharing studies as outlined in step 2 of the CPM text, New Zealand could support the work laid out in Resolution **812 (WRC-19)** for a possible new agenda item for WRC-27 which should include the finalisation of candidate bands to be protected as part of Resolution **657 (Rev. WRC-19)**. New Zealand notes the potential impact of space weather of both terrestrial and space based services, so this work should progress at WRC-23.

**3.1.8 China (People's Republic of)** - **Document APG23-6/INP-**[**105**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-105_China_WP3_PACP_WRC-23_Agenda_Items.docx)

China supports studies addressing space weather sensors with a view to ensuring the Radio Regulations include appropriate recognition and future protection for space weather sensors.

China supports the current APT Preliminary View.

**3.1.9 Malaysia** - **Document APG23-6/INP-**[**111**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-111_Malaysia_WP3_PACP_WRC-23_Agenda_Items.docx)

Malaysia supports the recognition and protection of space weather sensors, including identification of space weather sensor systems under an appropriate radiocommunication service and development of a new WRC Resolution on the importance of space weather sensor systems.

Furthermore, identification of new allocations and the associated sharing studies need to be included in the new WRC Resolution, taking into account protection of incumbent services to which the band is allocated as well as in the adjacent band.

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

None

**4. APT View(s)**

*The APT has considered agenda item 9.1, topic a) and drafted a Preliminary APT Common Proposal on the matter. In addition, the APT has formed the following view(s) on the issue.*

APT Members support the ITU-R studies so far carried out relating to the definition of space weather and appropriate radiocommunication service designations (MetAids) for operation of space weather sensors, as proposed in the CPM Report for inclusion in Articles **1** and **4** of the Radio Regulations**.**

Should the agenda of WRC-27 include space weather sensors as an agenda item, it is necessary that the supporting Resolution for this new agenda item includes, inter alia, protection of services to which the band is allocated as well as services in adjacent bands.

**5. Preliminary APT Common Proposal**



**6. Issues for Consideration at APG Coordination Meeting at WRC-23 (if any)**

Nothing particular foreseen at this stage

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

APG23-6)

**7.1 Regional Groups**

**7.1.1 ASMG** - **Document APG23-4/INF-**[**21**](https://www.apt.int/sites/default/files/2022/08/APG23-4-INF-21_ASMG_Preparation_for_WRC-23.pdf)

Support studies to identify priority bands that provide necessary data for recognition and protection of space weather systems and to develop appropriate definitions in the Radio Regulations (RR) used by space weather sensors without imposing any additional restrictions on existing services.

**7.1.2 ATU** - **Document APG24-4/INF-**[**02**](https://www.apt.int/sites/default/files/2022/07/APG23-4-INF-02_ATU_preparation.docx)

Support the recognition and protection of the application given the importance of space weather system in human welfare and national security while ensuring that services, in the identified Broadcasting, Broadcasting and Fixed satellites, Radio Astronomy and other incumbent service are protected.

**7.1.3 CEPT** - **Document APG23-6/INF-**[**46**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-46_Status_of_CEPT_preparation_for_WRC-23_and_RA-23.pdf)

CEPT supports that the following definition for space weather is included in Article **1**, section VIII, of the Radio Regulations:

*space weather: natural phenomena, mainly originating from solar activity and occurring beyond the major portion of Earth´s atmosphere that impact Earth’s environment and human activities.*

CEPT also supports the:

* Designation of space weather observations (active and receive-only) as an application of the MetAids service, operated under a subset of this service called MetAids (space weather) through Article **4** as follows:

*Space weather sensor systems, may operate under the meteorological aids service (space weather) allocations;*

* Draft New WRC Resolution on the importance of MetAids (space weather) service applications, in which the definitions of active and receive-only space weather sensors will be introduced.

In addition, CEPT supports the further processing of the related work under an agenda item of WRC-27 - see preliminary agenda item 2.6 in Resolution **812 (WRC-19)**, in order to study the appropriate protection of receive-only space weather observations in the priority frequency bands which will be defined for this purpose.

Finally, CEPT supports the development of ITU-R Recommendation(s) to provide the relevant protection criteria for receive-only space weather sensors.

**7.1.4 CITEL** - **Document APG23-6/INF-**[**52**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-52_CITEL_preparation_for_WRC-23.pdf)

Preliminary Proposals

One Administration support **NOC** and the **SUP** of RES. **657 (REV. WRC-19)**.

Another Administration support the following modifications:

1. Modify Article **1**, Section VIII of the RR to **ADD** a new definition for “space weather”;
2. Modify Article **4** of the RR to **ADD** a new provision to make the connection between space weather and the MetAids;
3. Adopt a new WRC-23 Resolution to compensate for the lack of definition of active and receive-only space weather sensors and to reinforce the importance of space weather observations.
4. SUP Resolution **657 (WRC-19)** as this Resolution will be replaced with a new future agenda item Resolution developed under current AI 10.
5. Adopt a future agenda item Resolution to be reviewed and considered under current AI 10 [[CCPII-2023-41-5784\_i](https://www.oas.org/citelevents/en/Events/EToolDocDownloadFile/33092?eId=636)].

**7.1.5 RCC** - **Document APG23-6/ INF-**[**45**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-45_Status_of_RCC_preparation_to_WRC-23.pdf)

The RCC Administrations are of the view that, the space weather sensors may be considered as application of the Meteorological aids service (MetAids).

The RCC Administrations are of the view that, it is not allowed to use the space weather sensors without identification of the frequency bands within MetAids allocations for such applications in the Radio Regulations.

The RCC Administrations are of the view that, changes to the RR Articles 1, 4 and 5 can be made only based on outcomes of ITU-R studies, carried out under agenda item of futureWRC.

**7.2 International Organisations**

**7.2.1 IARU** - **Document APG23-6/INF-**[**30**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-30_IARU_Views_on_WRC-23_Agenda_Items.docx)

The IARU notes that the scope of Resolution 657 is very broad. The systems described in Report ITU-R RS.2456-0 utilize radio frequencies from 13 kHz up to at least 15 GHz.

A significant proportion of amateur activity is directly affected by daily and longer-term variations in space weather. Consequently, amateurs have a significant interest in space weather and its impact on the ionosphere and radio wave propagation. At the same time, the amateur and amateur-satellite services are incumbent services with allocations in frequency bands ranging from 135.7 kHz to 250 GHz.

In considering potential new regulatory provisions for the recognition of space weather systems, additional constraints on incumbent services including the amateur and amateur satellite services must be avoided.

**7.2.2 ICAO** - **Document APG23-6/INF-**[**25**](https://www.apt.int/sites/default/files/2023/07/APG23-6-INF-25_ICAO-Position_for_ITU-WRC23.docx)

To support continuation of ITU-R studies and support appropriate recognition in the Radio Regulations of space weather sensors, provided that space weather sensors do not impact current or planned aeronautical systems or applications.

**7.2.3 WMO - Document APG23-6/INF-**[**02**](https://www.apt.int/sites/default/files/2023/06/APG23-6-INF-02_WMO_Position_on_WRC-23_Agenda.docx)

WMO supports the proposed definition in the CPM Report for space weather and the approach regarding its recognition in the RR, through a subset of the MetAids service, called the MetAids (space weather).

WMO also supports the following actions:

* The recognition, at WRC-23, of space weather by modifications to RR Articles **1** and **4**, using the definition and provision provided in the CPM Report.
* The recognition of the importance of space weather applications by means of a new WRC Resolution as contained in the CPM report.
* The development of a new WRC-27 agenda item on space weather to define regulatory provisions while not placing undue constraints on incumbent services.

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