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| **The 3rd Meeting of the APT Conference Preparatory Group for WRC-23 (APG23-3)** | **APG23-3/OUT-24** |
| 8 – 13 November 2021, Virtual/Online Meeting | 13 November 2021 |

Working Party 3

**PRELIMINARY VIEWs 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 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 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 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)**.

In the previous study cycle, Report ITU-R [RS.2456-0](https://www.itu.int/pub/R-REP-RS.2456-2019) was developed, which summarizes the current status of operational space weather sensor systems. At the WP 7C meeting in September 2021, revisions to Report ITU-R RS.2456 was proposed and converted to [Annex 10](https://www.itu.int/dms_ties/itu-r/md/19/wp7c/c/R19-WP7C-C-0283!N10!MSW-E.docx) to the Chairman’s Report (Doc. [7C/283](https://www.itu.int/md/R19-WP7C-C-0283/en)). Working documents towards ITU-R Reports on receive-only space weather sensor spectrum requirements, on receive-only space weather sensor interference criteria and on active space weather sensor spectrum requirements, respectively, are being developed. Their latest versions are attached to the Chairman’s Report as [Annexes 8](https://www.itu.int/dms_ties/itu-r/md/19/wp7c/c/R19-WP7C-C-0283!N08!MSW-E.docx), [7](https://www.itu.int/dms_ties/itu-r/md/19/wp7c/c/R19-WP7C-C-0283!N07!MSW-E.docx) and [9](https://www.itu.int/dms_ties/itu-r/md/19/wp7c/c/R19-WP7C-C-0283!N09!MSW-E.docx), respectively. Due to time constraints, these documents could not be fully reviewed and will therefore be considered in the correspondence group (its terms of reference are attached to the Chairman’s Report as [Annex 13](https://www.itu.int/dms_ties/itu-r/md/19/wp7c/c/R19-WP7C-C-0283!N13!MSW-E.docx)).

At the September 2021 meeting, WP 7C started work on a document regarding WP 7C views on this agenda item and a draft CPM text. The former document addresses the possible planned course of action for this agenda item, including the definition for space weather, the designation of the radio service for space weather sensors, their possible inclusion in the Radio Regulations and further elaboration of an agenda item of WRC-27. These documents are attached to Chairman’s Report as [Annexes 11](https://www.itu.int/dms_ties/itu-r/md/19/wp7c/c/R19-WP7C-C-0283!N11!MSW-E.docx) and [12](https://www.itu.int/dms_ties/itu-r/md/19/wp7c/c/R19-WP7C-C-0283!N12!MSW-E.docx).

**2. Documents**

* Input Documents APG23-3/INP-09 (AUS), 17 (INS), 26 (KOR), 30 (J)
* Information Documents APG23-3/INF-01 (WMO), 12 (DG Chair), 17 (IARU),   
  20 (CEPT), 37 (ASMG), 39 (ATU)

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

**3.1.1 Australia** - **Document APG23-3/INP-09**

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.

**3.1.2 Indonesia (Republic of)** - **Document APG23-3/INP-17**

Indonesia is of the view to support studies by ITU-R relating to the technical and operational characteristics, spectrum requirements, interference criteria, as well as appropriate radio service designations of space weather sensors with a view to describing appropriate recognition and protection in the Radio Regulations without placing additional constraints on incumbent services.

**3.1.3 Korea (Republic of)** - **Document APG23-3/INP-26**

The Republic of Korea is of the view that space weather sensors, their technical and operational characteristics, spectrum requirements and appropriate radio service designations need to be studied in ITU-R for protection by appropriate and the potential regulatory provisions should not place additional constraints on incumbent services.

**3.1.4 Japan** - **Document APG23-3/INP-30**

Japan supports ITU-R studies on space weather sensors being conducted concerning appropriate recognition and protection thereof. For the recognition, Japan considers it necessary to develop appropriate recognition of the space weather sensors in the Radio Regulations (RR) and determine the appropriate radio service for space weather sensors. For protection, Japan supports further study on spectrum requirements and the relevant interference criteria for passive space weather sensors, especially those that are highly used and operational for space weather monitoring/forecasting.

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

The APT preliminary views below were developed in the drafting group based on the preliminary views from APT Members.

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

APT Members support ITU-R studies relating to the identification of space weather sensors, their technical and operational characteristics, spectrum requirements and appropriate radio service designations with a view to describing appropriate recognition and protection in the Radio Regulations without placing additional constraints on incumbent services.

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

None

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

APT Members are encouraged to contribute to the next APG meeting for further consideration on agenda item 9.1, topic a, taking into account the progress of ITU-R studies.

**7. Views from Other Organisations**

**7.1 Regional Groups**

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

Follow-up the studies to identify priority bands that provide critical 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 APG23-3/INF-39**

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 APG23-3/INF-20**

CEPT supports the following definition for space weather:

*space weather: information relating to the characteristics of natural phenomena occurring in space and in high atmosphere that impact Earth’s environment and human activities.*

CEPT also supports the:

* Identification of priority frequency bands used for providing data critical for space weather forecasting/warnings and that will require protection;
* Recognition in the Radio Regulations of space weather sensors;
* Determination of the appropriate service(s) in line with the space weather definition.

In addition, CEPT supports the new agenda item for WRC-27 in line with the preliminary agenda approved by WRC-19 (agenda item 2.6) under WRC-23 agenda item 10.

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

To be developed

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

To be developed

**7.2 International Organisations**

**7.2.1 IARU** - **Document APG23-3/INF-17**

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.

IARU will monitor developments in WP 7C and will contribute to inputs via WP 5A.

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

WMO supports ensuring the protection of space weather sensors that use radio spectrum and will contribute to the corresponding studies.

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