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# ***Consideration on WRC-23 Agenda Items***

***Xi'an, People's Republic of China***

***6 November 2018***

*Takahiro MITOME (Japan)*

# Background

- **WRC-19 will be held on 3 to 28 November 2018**
- **WRC-19 will discuss and decide WRC-2023 agenda items**
- **Before WRC-2023 agenda items are decided, all the proposed WRC-2023 agenda items should be carefully reviewed, in order to check potential impact on RNSS as well as possible benefit to RNSS.**

# Space Weather

- **Since Space Weather is in preliminary agenda items for WRC-2023 (See resolve 2.3 of Resolution (WRC-15))**
- 2.3 in accordance with Resolution **657 (WRC-15)**, to 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 providing appropriate recognition and protection in the Radio Regulations without placing additional constraints on incumbent services
- **Resolution 657 (WRC-15) contains;**
- Resolve to invite WRC-2023, while taking into account the results of ITU-R studies and without placing additional constraints on incumbent services, to consider regulatory provisions necessary to provide protection to space weather sensors operating in the appropriately designated radio service that is to be determined during
- ITU-R studies, 3 to conduct, in time for WRC-23, any necessary sharing studies for incumbent systems operating in frequency bands used by space weather sensors, with the objective of determining regulatory protection that can be provided while not placing additional constraints on incumbent services

# Space Weather Monitoring Stations in RNSS Spectrum

- **Since it is already in preliminary WRC-2023 agenda items, ITU-R is conducting some studies and summarizing the characteristics of space weather monitoring stations, which is now contained in Preliminary Draft New Report (PDNRep) ITU-R RS.[SPACE\_WEATHER\_SENSORS]. :**
- **In this ITU-R study, Space Weather Monitoring Stations in RNSS spectrum are listed - Ground-Based RNSS Meteorology Network, including GNSS Ionospheric Scintillation and TEC Monitoring (GISTM) System:** This system generates ultra-low noise scintillation indices and RNSS measurements while logging and streaming data at up to 100 Hz, providing real time output of TEC & scintillation indices. The RNSS receiver tracks all visible RNSS signals at the L1 frequency (1 575.42 MHz) and the L2 frequency (1 227.6 MHz). It measures phase and amplitude (at a 50-Hz or 100-Hz rate) and code/carrier divergence (at 1-Hz rate) for each satellite being tracked on L1 and L2 Total Electron Content (TEC) is computed from combined L1 and L2 pseudorange and carrier phase measurements.

# Discussion

- **PDNRep ITU-R RS.[SPACE\_WEATHER\_SENSORS] also contains the following discussion;**
- Several frequency bands in use by space weather instruments are allocated to the RAS and EESS (passive) and can potentially provide space weather some level of regulatory protection to the degree that the particular space weather application falls within the definition of the allocated radio service. A few of the frequency bands identified are very well protected under Radio Regulation No. 5.340, which explicitly states that no man-made radio emissions are permitted within those bands. However, if the particular space weather application does not fall within the definition of the allocated science service then it is not entitled to claim protection from RFI events that may occur or legitimately report those RFI occurrences to regulatory authorities.
- To assist the reader, the following radio service definitions are extracted from the Radio Regulations.
- **Radiodetermination:** The determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of *radio waves*.
- **Radionavigation:** *Raiodetermination* used for the purposes of navigation, including obstruction warning.
- **Radionavigation-satellite service:** *A radiodetermination-satellite service used for the purpose of radionavigation.*
- RNSS-based observations
- Table 4 contains characteristics of representative space weather sensor systems that rely on the reception of RNSS signals. Reviewing the definition of the RNSS, it is unclear whether these sensors would be afforded protection under the frequency allocation to the RNSS. Depending on the reader's interpretation, the current definition of RNSS, which may, or may not, be applicable to these systems. Specifically, the systems could be considered to not fall under the definition of navigation. It should be noted that the term navigation is not defined in the Radio Regulations.

# Proposal

- **It would be worthwhile for Space Weather Monitoring Stations in RNSS spectrum to enjoy the same regulatory protection as RNSS receivers are currently enjoying.**
- **Thus, the proposed WRC-2023 agenda item for the protection of space weather stations can be supported by RNSS community.**
- **RNSS providers are encouraged to communicate their telecommunication administrations for this support.**