

MOD

## RESOLUTION 657 (REV.WRC-19)

**Protection of radio spectrum-reliant space weather sensors used for global prediction and warnings**

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

*considering*

- a) that space weather observations are important for detecting solar activity events that impact services critical to the economy, safety and security of administrations and their population;
- b) that these observations are made from ground-based and space-based systems;
- c) that 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;
- d) that spectrum-reliant space weather sensor technology has been developed and operational systems have been deployed without much regard for domestic or international spectrum regulations, or for the potential need for protection from interference;
- e) that a wide variety of spectrum-reliant space weather sensors currently operate relatively free of harmful interference; however, the radio interference environment could change as a result of changes made to the Radio Regulations;
- f) that spectrum-reliant space weather sensors may be vulnerable to interference from both terrestrial and spaceborne systems;
- g) that, while all spectrum-reliant space weather observation systems are important, the most critical need for radio regulatory protection is for those systems that are used operationally in the production of forecasts and warnings of space weather events that can cause harm to important sectors of national economies, human welfare and national security;
- h) that frequency use is not consistent across the limited number of operational systems,

*recognizing*

- a) that no frequency bands have been documented in any manner in the Radio Regulations for space weather sensor applications;
- b) that Report ITU-R RS.2456-0, on space weather sensor systems using radio spectrum, contains a summary of spectrum-reliant space weather sensors and identifies the most critical operational systems (hereafter referred to as operational systems);
- c) that the systems used for operational space weather monitoring, prediction and warnings documented in Report ITU-R RS.2456-0 are deployed globally;

- d) that, while the number of systems is currently limited, the interest in and the importance of data from space weather monitoring systems is growing with time;
- e) that certain, receive-only space weather applications may operate in a manner consistent with the definition of the meteorological aids (Met aids) service, but for scientific reasons observations cannot be conducted in frequency bands currently allocated to the Met aids service;
- f) that the ITU Radiocommunication Sector (ITU-R) has a study Question ITU-R 256/7 to study the technical and operational characteristics, frequency requirements and appropriate radio service designation for space weather sensors,

*noting*

- a) that any regulatory action associated with space weather sensor applications should take into account incumbent services that are already operating in the frequency bands of interest;
- b) that ITU-R studies may show the protection of some systems to be a strictly national matter rather than requiring WRC action;
- c) that, while data products are used for forecast and warnings related to public safety, among other purposes, the provisions of Nos. **1.59** and **4.10** do not apply to spectrum-reliant space weather sensors,

*resolves to invite the ITU Radiocommunication Sector*

- 1 to identify, in time for WRC-23, and based on existing and possible further ITU-R studies on the technical and operational characteristics, specific space weather sensors which need to be protected by appropriate regulation, including:
- to determine if receive-only space weather sensors shall be designated as applications of the Met aids service;
  - to determine the appropriate radiocommunication service, if any, for cases where it is determined that receive-only space weather sensors do not fall under the Met aids service;
- 2 to conduct, in time for WRC-23, 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, while not placing additional constraints on incumbent services;
- 3 to develop potential solutions to describe in the Radio Regulations, in Articles **1** and **4**, and/or as a WRC resolution, if deemed appropriate, for consideration by WRC-23, space weather sensor systems and their corresponding usage, as well as protection requirements for receive-only space weather sensors;
- 4 to conduct studies, in time for WRC-23, on the technical and operational characteristics of active space weather sensors and conduct necessary sharing studies with incumbent systems operating in frequency bands used by active space weather sensors, with the objective of determining the appropriate radiocommunication service for those sensors,

*instructs the Director of the Radiocommunication Bureau*

to report on the results of the ITU-R studies to WRC-23,

*invites administrations*

to participate actively in the studies and provide the technical and operational characteristics of the systems involved by submitting contributions to ITU-R,

*instructs the Secretary-General*

to bring this Resolution to the attention of the World Meteorological Organization and other international and regional organizations concerned.