**Required Information for RF Based Space Weather Observing Systems**

Work is ongoing within the Radiocommunication Sector of the International Telecommunications Union (ITU-R) to document the technical and operational characteristics of radio frequency (RF) based observing systems that are used for observation of space weather conditions. The system may transit and receive, or be receive only. In addition, they may be ground, aircraft or satellite based.

It has been noted that RF-based space weather observing systems may not be adequately protected from interference that could be caused by other radio services, either existing or as a result of future changes in spectrum regulations. Work within the ITU-R is ongoing to understand the situation and determine what steps can and need to be taken to provide additional protection. The first step is documenting the technical and operational characteristics of the observing systems so that spectrum regulators know what is operating or planned to be operated in support of space weather operations. Without this information it is not possible to determine what the next steps should be to provide the needed protection in the international radio regulations.

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**Observing System Nomenclature:**

**Technical Contact for Further Questions: (***Organization and Email Address***)**

**Description of Deployment** (*Please provide a description of how this system is deployed, the number of systems believed to be operating globally, and, if possible, the locations.*)**:**

**Functional Description** (*Please provide a high level description of how the system operates, how it relies of reception of radio frequency signals, how it processes the signal to produce data, and a description the data it provides.*)**:**

**Diagrams and Graphics to Help Understand System (***Please provide any antenna pattern plots, system block diagrams, or other graphics that will help in understanding the system***):**

**How Does Data From this System Support Space Weather Monitoring and Forecast Operations?**

**Please provide the basis for selection of the frequencies in use. (e.g. Are they unique physical?)**

**Are there alternative frequencies that could be used? If so, which?**

**Please complete the appropriate table below for the system described above.**

Table 1- GNSS Receivers used for Space Weather Observations

(Add more columns for additional systems)

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **System 1** |
| **Frequencies of Operation** | MHz |  |
| **Maximum receiver antenna gain in upper hemisphere**  | dBi |  |
| **Maximum receiver antenna gain in lower hemisphere**  | dBi |  |
| **RF filter 3 dB bandwidth**  | (MHz) |  |
| **Pre-correlation filter 3 dB bandwidth (MHz)** | (MHz) |  |
| **Receiver system noise temperature (K)** | (K) |  |
| **Tracking mode threshold power level of aggregate narrow-band interference at the passive antenna output (dBW)** | (dBW) |  |
| **Acquisition mode threshold power level of aggregate narrow-band interference at the passive antenna output (dBW)** | (dBW) |  |
| **Tracking mode threshold power density level of aggregate wideband interference at the passive antenna output**  | (dB(W/MHz)) |  |
| **Acquisition mode threshold power density level of aggregate wideband interference at the passive antenna output**  | (dB(W/MHz)) |  |
| **Receiver input compression level**  | (dBW) |  |
| **Receiver survival level**  | (dBW) |  |
| **Overload recovery time**  | (s) |  |

TABLE 2- Ionospheric Sounders and Radars

(Add more columns for additional systems)

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **System 1** |
| **Frequencies of Operation** | (MHz) |  |
| **Transmit Power** | (dBW) |  |
| **Signal Modulation Type** |  |  |
| **Pulse Width(s)** | (s) |  |
| **Duty Cycle** | % |  |
| **Receive Noise Temperature** | (K) |  |
| **Receive RF (3dB) Bandwidth** | (kHz) |  |
| **Receive IF (3 dB) Bandwidth** | (kHz) |  |
| **Receiver Input Compression Level** | (dBW) |  |
| **Receiver Survival Level** | (dBW) |  |
| **Overload Recovery Time** | (s) |  |
| **Antenna Main Beam Gain** | (dBi) |  |
| **Antenna Pattern** |  |  |
| **Required Signal to noise ratio** | **(dB)** |  |

TABLE 3- Solar Spectrographs

(Add more columns for additional systems)

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **System 1** |
| **Frequencies of Operation** | (MHz) |  |
| **Receive Noise Temperature** | (K) |  |
| **Receive RF (3dB) Bandwidth** | (kHz) |  |
| **Receive IF (3 dB) Bandwidth** | (kHz) |  |
| **Receiver Input Compression Level** | (dBW) |  |
| **Receiver Survival Level** | (dBW) |  |
| **Overload Recovery Time** | (s) |  |
| **Antenna Main Beam Gain** | (dBi) |  |
| **Antenna Pattern** |  |  |
| **Required Signal to noise ratio** | **(dB)** |  |

TABLE 4- Solar Flux Monitors

(Add more columns for additional systems)

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **System 4A** |
| **Frequencies of Operation** | (MHz) |  |
| **Receive Noise Temperature** | (K) |  |
| **Receive RF (3dB) Bandwidth** | (kHz) |  |
| **Receive IF (3 dB) Bandwidth** | (kHz) |  |
| **Receiver Input Compression Level** | (dBW) |  |
| **Receiver Survival Level** | (dBW) |  |
| **Overload Recovery Time** | (s) |  |
| **Antenna Main Beam Gain** | (dBi) |  |
| **Antenna Pattern** |  |  |
| **Required Signal to noise ratio** | **(dB)** |  |