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| **COMMISSION FOR BASIC SYSTEMS** |  |
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| **Steering Group on Radio Frequency Coordination (SG-RFC)****Geneva, 24-27 January 2017****Submitted by : Focal Point for MetSat** | **Document SG-RFC/2017-Doc 11bAgenda Item (4.2)** |
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|  | **English only** |
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|  | **Restricted access required? (Y/N)[[1]](#footnote-1)\*** | **N** |  |
| MetSat issues of interest to WMO |

**1 Introduction**

The following sections provide a summary of MetSat issues discussed in the framework of the ITU Working Party 7B.

**2 EESS and MetSat systems performance, interference and sharing criteria – revision ongoing in the framework of ITU-R Working Party 7B**

In continuation of the work performed over the previous study period and last WP 7B meeting, WP 7B further considered the issue of EESS and METSAT systems performance, interference and sharing criteria, in a view to revisit and simplify the current set of numerous ITU-R SA series Recommendations dealing with this subject.

2.1 Performance criteria

WP 7B at its October 2016 meeting agreed a preliminary draft revision to Recommendation ITU-R SA.1159 with the target for its finalisation during the April 2017 WP 7B meeting and sending the agreed draft revised Recommendation (DRR) to the second session of SG 7 in April 2017.

Revision to Recommendation ITU-R SA.1025 (performance criteria for data transmission systems using non-GSO satellites) was ongoing since the April 2016 meeting of 7B. After consideration of ITU-R SA.1159 (see paragraph above) and ITU-R SA.1162, it appeared that the performance criteria given in Rec. ITU-R SA.1025 and Rec. ITU-R SA.1162 are fully covered by Rec. ITU-R SA.1159 rendering those Recommendations superfluous. Consequently, suppression of Recommendations ITU-R SA.1025 and ITU-R SA.1162 will be proposed to SG 7 once the DRR ITU-R SA.1159 is adopted and approved.

2.2 Interference and sharing criteria for EESS and METSAT data transmission systems using non-GSO satellites

Preliminary revisions to ITU-R Recommendations dealing with data transmission systems using non-GSO satellites, namely with Rec. ITU-R SA.1026 (interference criteria) and Rec. ITU-R SA.1027 (sharing criteria), were agreed at the April 2016 meeting of WP 7B with a target for their finalisation at the October 2016 meeting of WP 7B.

With some further modifications at the October 2016 meeting of WP 7B the draft revision Rec. ITU-R SA.1026 was agreed and forwarded to SG 7 to be considered at its April 2017 meeting. This revision constitutes a major simplification to this important recommendation in view of WRC-19 agenda item 1.13 (5G) by just retaining a single interference criteria per frequency band, based on the most representative reference system for each band.

Consequential to the revisions to Rec. ITU-R SA.1026, the revision to Recommendation ITU-R SA.1027 (sharing criteria) was dealt with in the same way and was also forwarded to SG 7.

2.3 Interference and sharing criteria for EESS and METSAT data transmission systems using GSO satellites

Similar to the approach taken for non-GSO, WP 7B worked on the revision to ITU-R Recommendations dealing with data transmission systems using GSO satellites, namely Rec. ITU-R SA.1160 (interference criteria) and Rec. ITU-R SA.1161 (sharing criteria) to first, retaining a single criteria per frequency band and secondly, proposing a new reference system in the 25.5-27 GHz band.

The preliminary draft revisions of Recommendations ITU-R SA.1160 and ITU-R SA.1161 were agreed at the October 2016 meeting of WP 7B with a target for their finalisation at the next WP 7B meeting in April 2017 and sending the agreed DRR to the second session of SG 7 in April 2017.

This is again of particular importance in view of WRC-19 agenda item 1.13 (IMT >24 GHz). Therefore, it is of paramount to finalise the revision to Rec. ITU-R SA.1160 in particular, to first, verify whether System A described in the preliminary draft revision of Rec. ITU-R SA.1160 for the 25.5-27 GHz band is still relevant and secondly, to provide additional up-to-date reference systems in this band.

2.4 Interference and sharing criteria for EESS and METSAT DCS

WP 7B also works on the revisions to ITU-R Recommendations dealing with data collection systems (DCS) namely Rec. ITU-R SA.1163 (interference criteria) and Rec. ITU-R SA.1164 (sharing criteria).

The envisaged revisions corrects some mistakes in formulas in current version of Rec. ITU-R SA.1163 and updates to the reference data collection systems to be used for interference criteria analysis, both leading to new proposed interference criteria.

The revision to Rec. ITU-R SA.1164 Document 7B/105 contains an update to the parameters used for the apportionment to the sharing criteria in the band 401-403 MHz.

The preliminary draft revisions of Recommendations ITU-R SA.1163 and ITU-R SA.1164 were agreed with the target of their finalisation during the next WP 7B meeting in April 2017 and sending the agreed DRR to the second session of SG 7 in April 2017.

The final review at the April 2017 meeting of WP 7B will focus in particular to first, verify the new formulas in the preliminary draft revision of Rec. ITU-R SA.1163 and secondly, analyse the new annex proposed in the preliminary draft revision of Rec. ITU-R SA.1164. In addition, consistency of the modifications proposed in both Recommendations will have to be assessed.

The following table provides the status of work on EESS/METSAT protection criteria:

| Rec. ITU-R | Recommendation title | Action |
| --- | --- | --- |
| [SA.514-3](http://www.itu.int/rec/R-REC-SA.514/en)(1997) | Interference criteria for command and data transmission systems operating in the Earth exploration-satellite and meteorological-satellite services  | TBD  |
| [SA.1020](http://www.itu.int/rec/R-REC-SA.1020/en)(1994) | Hypothetical reference system for the Earth exploration‑satellite and meteorological-satellite services | Unchanged |
| [SA.1021](http://www.itu.int/rec/R-REC-SA.1021/en)(1994) | Methodology for determining performance objectives for systems in the Earth exploration‑satellite and meteorological-satellite services  | Unchanged |
| [SA.1022-1](http://www.itu.int/rec/R-REC-SA.1022/en)(1999) | Methodology for determining interference criteria for systems in the Earth exploration-satellite and meteorological-satellite services | Unchanged |
| [SA.1023](http://www.itu.int/rec/R-REC-SA.1023/en)(1994) | Methodology for determining sharing and coordination criteria for systems in the Earth exploration-satellite and meteorological-satellite services | Unchanged |
| [SA.1025-3](http://www.itu.int/rec/R-REC-SA.1025/en)(1999) | Performance criteria for space-to-Earth data transmission systems operating in the Earth exploration-satellite and meteorological-satellite services using satellites in low-Earth orbit | Proposed for suppression in April 2017 SG 7 (2nd session) in conjunction with approval of revised SA.1159. |
| [SA.1026-4](http://www.itu.int/rec/R-REC-SA.1026/en)(2009) | Aggregate interference criteria for space-to-Earth data transmission systems operating in the Earth exploration-satellite and meteorological-satellite services using satellites in low-Earth orbit | Proposed for revision. DRR sent to April 2017 SG 7 (1st session) |
| [SA.1027-4](http://www.itu.int/rec/R-REC-SA.1027/en)(2009) | Sharing criteria for space-to-Earth data transmission systems in the Earth exploration-satellite and meteorological-satellite services using satellites in low-Earth orbit | Proposed for revision. DRR sent to April 2017 SG 7 (1st session) |
| [SA.1159-3](http://www.itu.int/rec/R-REC-SA.1159/en)(2006) | Performance criteria for data dissemination, data collection and direct data readout systems in the Earth exploration-satellite service and meteorological-satellite service | Proposed for revision. PDRR considered at October 2016 WP 7B. Target DRR in April 2017 SG 7 (2nd session)  |
| [SA.1160-2](http://www.itu.int/rec/R-REC-SA.1160/en)(1999) | Interference criteria for data dissemination and direct data readout systems in the earth exploration-satellite and meteorological-satellite services using satellites in the geostationary orbit | Proposed for revision. PDRR considered at October 2016 WP 7B. Target DRR in April 2017 SG 7 (2nd session)  |
| [SA.1161-1](http://www.itu.int/rec/R-REC-SA.1161/en)(1999) | Sharing and coordination criteria for data dissemination and direct data readout systems in the Earth exploration-satellite and meteorological-satellite services using satellites in geostationary orbit | Proposed for revision. PDRR considered at October 2016 WP 7B. Target DRR in April 2017 SG 7 (2nd session)  |
| [SA.1162-2](http://www.itu.int/rec/R-REC-SA.1162/en)(2003) | Performance criteria for service links in data collection and platform location systems in the Earth exploration- and meteorological-satellite services  | Proposed for suppression in April 2017 SG 7 (2nd session) in conjunction with approval of revised SA.1159. |
| [SA.1163-2](http://www.itu.int/rec/R-REC-SA.1163/en)(1999) | Interference criteria for service links in data collection systems in the Earth exploration‑satellite and meteorological-satellite services | Proposed for revision. PDRR considered at October 2016 WP 7B. Target DRR in April 2017 SG 7 (2nd session)  |
| [SA.1164-2](http://www.itu.int/rec/R-REC-SA.1164/en)(1999) | Sharing and coordination criteria for service links in data collection systems in the Earth exploration-satellite and meteorological-satellite services | Proposed for revision. PDRR considered at October 2016 WP 7B. Target DRR in April 2017 SG 7 (2nd session)  |
| [SA.1627](http://www.itu.int/rec/R-REC-SA.1627/en)(2003) | Telecommunication requirements and characteristics of EESS and MetSat service systems for data collection and platform location | TBD |

3 Preliminary draft new Report ITU-R SA.[EESS-METSAT CHAR]

WP 7B is still working on the working document toward a preliminary draft new Report on “*Characteristics to be used for assessing interference to systems operating in the earth exploration-satellite and meteorological-satellite services, and for conducting sharing studies*”.

The biggest challenge of this task is to present the “right” set of reference system for each frequency band, which is of particular difficulty in bands with a large number of different systems, like in the band 8025 – 8400 MHz.

4 WRC-19 Agenda Item in relation to frequency bands used by DCS systems (AI 1.2, 1.3 and 1.7)

4.1 WRC-19 Agenda Item 1.2 (in-band power limits in the frequency bands 401-403 MHz and 399.9-400.05 MHz

WP 7B continued its work on Report ITU-R SA.[400 MHz-LIMITS] at its last meeting in October 2016 introducing additional technical elements related to EESS, METSAT and MSS in the bands 399.9-400.05 MHz and 401-403 MHz and established a first version of the draft CPM text on WRC-19 agenda item 1.2. This first version currently only considers the Executive summary and the background section.

The task on this agenda item will be to find the right balance with (a) power limit(s) that provide the necessary protection of DCS systems from other (non-DCS) systems, i.e. short duration missions, without hindering the operation of other DCS systems. Considering the different power levels of GSO and non-GSO DCS systems the question will have to be answered whether different limits for different DCS systems (GSO or non-GSO) even in different sub-bands should be envisaged.

Furthermore, as the Agenda item 1.7 explicitly calls only for studies to accommodate requirements in the space operation service for non-geostationary satellites with short duration missions, the question also is if only a limit for non-GSO DCS should be established.

**Action:** WMO SG-RFC might want to discuss the questions raised above and to develop an opinion on the possible ways to resolve this agenda item.

4.2. WRC-19 Agenda Item 1.3 (Upgrade of MetSat and EESS allocation in the band 460 – 470 MHz)

WP 7B continued its work on Report ITU-R SA.[460 MHZ METSAT-EESS] at its last meeting in October 2016 introducing additional technical elements related to EESS and METSAT as well as other incumbent services in the band 460-470 MHz and also established a first version of the draft CPM text on WRC-19 agenda item 1.3. This first version currently only considers the Executive summary section.

4.3. WRC-19 Agenda Item 1.7 (Short duration missions)

Resolution 659 (WRC-15) under this Agenda Item calls for: “Studies to accommodate requirements in the space operation service for non-geostationary satellites with short duration missions”, and it *invites ITU-R*:

 1 to study the spectrum requirements for telemetry, tracking and command in the space operation service for the growing number of non-GSO satellites with short duration missions, taking into account RR No. **1.23**;

 2 to assess the suitability of existing allocations to the space operation service in the frequency range below 1 GHz, taking into account *recognizing a)* and current use;

 3 if studies of the current allocations to the space operations service indicate that requirements cannot be met under *invites ITU-R* 1 and 2, to conduct sharing and compatibility studies, and study mitigation techniques to protect the incumbent services, both in-band as well as in adjacent bands, in order to consider possible new allocations or an upgrade of the existing allocations to the space operation service within the frequency ranges 150.05-174 MHz and 400.15‑420 MHz.

The band 400.15 – 403 MHz is one of the target bands under this agenda item. As there are only two frequency ranges identified (150.05-174 MHz and 400.15 420 MHz) and the fact that already past and existing short duration mission projects utilized frequencies in the band 400.15 – 403 MHz this band can be considered as one of the prime interests for the proponents of this agenda item.

WP 7B is currently working on the following reports in relation to this agenda item:

* PDN Report ITU-R SA.[SHORT DURATION NGSO – CHARACTERISTICS],
* WD to a PDN Report ITU-R SA.[SHORT DURATION NGSO – REQUIREMENTS],
* WD to a PDN Report ITU-R SA.[SHORT DURATION NGSO – SHARING STUDIES],
* Draft CPM Text on AI 1.7.

5 WRC-19 Agenda Item 1.13 (IMT in bands above 24 GHz)

CEPT intends to harmonise the 24.25-27.5 GHz band for Europe for 5G before WRC-19 through the adoption of a harmonisation decision and to promote it for worldwide harmonisation. Hence the 24.25-27.5 GHz is a clear priority for immediate study within CEPT. Studies need to take into account the compatibility with and protection of all existing services in the same and adjacent frequency bands in particular the protection of current and future EESS/SRS earth stations should be addressed.

CEPT supports the identification of global bands for IMT among the bands listed in resolves to invite ITU R 2 of Resolution 238, taking into account the results of sharing and compatibility studies with existing services. Bands outside those listed in resolves to invite ITU-R 2 of Resolution 238 are not supported for consideration under this Agenda item.

Note: CEPT has developed a roadmap on 5G (see ECC(16)110 Annex 17). In this respect it is noted that “Europe has harmonised the 27.5-29.5 GHz band for broadband satellite and is supportive of the worldwide use of this band for ESIM. This band is therefore not available for 5G”.

Considering the above, there is significant pressure within CEPT to identify also the band 25.5 – 27 GHz for IMT. The space agencies in Europe are already working on compatibility studies with 5G in this band in order to determine the protection/exclusion zones required around Earth stations receiving data from EESS and MetSat satellite systems.

1. [↑](#footnote-ref-1)