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#ITUWRC

**Satellite Regulatory Issues
WRC-23 agenda item 7**

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Background – Agenda item 7

7 *to consider possible changes, in response to Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference, on advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks, in accordance with Resolution 86 (Rev.WRC-07), in order to facilitate the rational, efficient and economical use of radio frequencies and any associated orbits, including the geostationary-satellite orbit;*

- WRC-19 invited ITU-R to study two areas “as a matter of urgency”:
 - “... tolerances for certain orbital characteristics of non-GSO space stations of the fixed-satellite, mobile-satellite or broadcasting satellite services to account for potential differences between the notified and deployed orbital characteristics for the inclination of the orbital plane, the altitude of the apogee of the space station, the altitude of the perigee of the space station and the argument of the perigee of the orbital plane.”
 - “... possible development of a post-milestone procedure taking into account the reporting defined in § 19 of the Resolution 35 (WRC-19)”
- In addition, the 12th Plenary meeting of WRC-19 agreed to include the following in the minutes of the Plenary meeting for consideration as a possible future issue during the studies under WRC-23 agenda item 7:
 - “To consider the protection of geostationary satellite networks in the MSS operating in 7/8 and 20/30 GHz from emissions of non-geostationary satellite systems operating in the same frequency bands and identical directions”
- These three items became the first three “Topics” identified under WRC-23 agenda item 7
 - In previous study cycles, areas of study under AI 7 were referred to as “Issues”, but these are now called “Topics”

Current list of AI 7 Topics

- In addition to the Topics created from WRC-19 invitations for study, the membership has proposed other items for study under AI 7, and some of these have been identified as Topics by Working Party 4A
- Other possible Topics are still being considered, with the list to be finalized at the next meeting
- The current list of WRC-23 AI 7 Topics, as of the most recent meeting of WP 4A, is as follows:
 - Topic A: Tolerances for certain notified orbital plane characteristics for non-GSO systems in the FSS, BSS, and MSS
 - Topic B: Possible development of a post milestone procedure for non-GSO systems
 - Topic C: Protection of GSO MSS in the 7/8 and 20/30 GHz bands
 - Topic D: Modifications to Annex 1 to Appendix 4 of RR Appendix **30B**
 - Topic E: Improved procedures in Appendix **30B** for new Member States
 - Topic F: Excluding uplink service area in Appendix **30A** for R1&3 and Appendix **30B**
 - Topic G: Revisions to Resolution **770 (WRC-19)** to allow its implementation
- Each of these Topics will be discussed, in turn, on the following slides

Topic A – Non-GSO Orbital Tolerances

- WRC-19 defined the conditions to be satisfied for the bringing into use (BIU), or bringing back into use (BBIU) of non-GSO systems in the FSS, MSS or BSS
- Part of those conditions includes the requirement of deploying a space station on a notified orbital plane, defined by the: i) inclination, ii) altitude of the apogee, iii) altitude of the perigee, and iv) argument of the perigee of the orbital plane
- The question then arises as to how far away from these four parameters (i.e. with what *tolerance*) should a space station's orbit be allowed to deviate and still be considered as operating consistent with the notified orbital plane
- WP 4A has compiled a fairly extensive working document on this Topic (<https://www.itu.int/md/R19-WP4A-C-0522/en> (Annex 22))
 - The working document contains some possible approaches for different ways to specify allowable tolerances
 - The working document also contains statistics on the differences of actual deployed system parameters compared to their corresponding ITU filed parameters
- The biggest obstacle, to date, has been identifying a practical way to specify allowable tolerance that provides the required operational flexibility, while at the same time addresses efficient use of orbital resources

Topic B - Post milestone procedure for non-GSO systems

- WRC-19 spent considerable time discussing, and ultimately agreeing on, a milestone-based approach for deployment of non-GSO systems in specific frequency bands and services (i.e. Resolution **35 (WRC-19)**)
- The objective was that, at the end of the milestone process, there would be good agreement between the number of space stations deployed in a system and the number notified in the Master International Frequency Register (MIFR)
- One aspect that was discussed, but not fully addressed, was what happens if the number of space stations deployed after the milestone process decreases over time, either for an interim period or long-term
 - *Resolves 19* of Resolution **35 (WRC-19)**, requires some reporting of such a reduction for information only
- Topic B considers possible development of a more complete post-milestone procedure
- Working Party 4A has developed two working documents on this Topic (<https://www.itu.int/md/R19-WP4A-C-0522/en> (Annexes 23 and 29))
 - There are different ideas on the reporting threshold, e.g. a fixed %, or a varying % based on system size
 - There is also the suggestion that any such reporting may need to be expanded beyond the non-GSO systems addressed by Resolution **35 (WRC-19)**
 - Some examples of regulatory implementation of a procedure have been proposed in draft CPM text

Topic C - Protection of GSO MSS in the 7/8 and 20/30 GHz bands

- In discussing at WRC-19 possible agenda items for WRC-23, it was agreed that the protection of GSO MSS in 7/8 GHz and 20/30 GHz frequency bands from co-frequency/co-directional non-GSO systems could be addressed under WRC-23 agenda item 7
- While the wording of this issue is rather broad, there is agreement that the specific frequency bands in question are:
 - 7250-7750 MHz↓ / 7900-8025 MHz↑, 20.2-21.2 GHz↓ / 30-31 GHz↑
- Working Party 4A has developed a fairly extensive working document on this Topic (<https://www.itu.int/md/R19-WP4A-C-0522/en>) (Annex 24)
 - The document analyzes the current regulatory provisions in force and highlights several deficiencies/shortcomings with these provisions
 - The document includes two main regulatory options for addressing these deficiencies, with sub-options under the one of those
- Some concerns have been raised that the regulatory solutions that are being considered, which include new or modified Article **5** footnotes, or a new Article **22** footnote, go beyond the scope of Agenda item 7

Topic D - Modifications to Annex 1 to Appendix 4 of RR AP 30B

- WRC-19 adopted modifications to Annex 4 of RR Appendix **30B** replacing the orbital separation from 10° and 9° to 7° and 6°, respectively
- Unfortunately, in § 2 of Appendix 1 to Annex 4 of RR Appendix **30B**, the calculation of the aggregate *C/I* ratio at a given downlink test point still considers 10° and 9°
 - This was clearly an oversight on the part of WRC-19
- The Radio Regulation Board has already adopted a Rule of Procedure (RoP) to address this issue
- Topic D proposes to incorporate the current RoP on this issue directly in the Radio Regulations
- WP 4A has developed a complete draft CPM text for this Topic (<https://www.itu.int/md/R19-WP4A-C-0392/en> (Annex 35))
 - The text is stable and is considered essentially finished at this point

Topic E - Improved procedures in AP **30B** for new Member States

- There are currently new Member States that have no allotments in the Appendix **30B** Plan
- WRC-07 revised Article 7 of Appendix **30B**, which provides provisions for new ITU Member States to obtain allotments in the Plan
- WRC-19 adopted Resolution **170 (WRC-19)** in which administrations, which do not have any assignments in the RR Appendix **30B** List, or under coordination, have a one-off chance to file for assignments in the List using more preferential coordination criteria
- The initial idea for a regulatory solution for this Topic was to modify Article 7 of Appendix **30B** so as to apply the more preferential coordination criteria of Resolution **170 (WRC-19)**
- Those new Member States currently seeking allotments in the Plan have proposed an alternative solution, which they feel better addresses the issue
- Working Party 4A developed a working document based on the initial idea for a solution, and has material for developing another regulatory solution to be incorporated into that document (see: <https://www.itu.int/md/R19-WP4A-C-0392/en> (Annex 20))
 - Due to lack of time at the last meeting this additional material has not yet been incorporated into the initial working document

Topic F - Excluding uplink service area in AP 30A for Regions 1&3 and AP 30B

- Submissions under Article 4 of Appendix 30A for Regions 1 and 3, and Article 6 of Appendix 30B having global uplink coverage can create an impediment to later-filed systems, even when such later-filed systems are for national coverage
- In the downlink direction, later-filed systems can shape their beams to improve their coordination success with earlier-filed networks, but this is not possible in the uplink direction
- Topic F is exploring possible ways for:
 - an Administration to request the exclusion of its national territory from the service area of satellite networks of other Administrationsand/or
 - requiring the notifying Administration of an interfered-with satellite network to shape the coverage of its network outside its service area in order not to create an obstacle for the deployment of national or sub-regional satellite networks of other countries
- Working Party 4A has a working document on this Topic with some initial proposals, but these will require further development as they are not yet complete (see: <https://www.itu.int/md/R19-WP4A-C-0392/en> (Annex 21))

Topic G - Revisions to Resolution 770 (WRC-19) to allow its implementation

- Resolution **770 (WRC-19)** calls for the use of software tools to determine compliance with the single-entry interference limits specified in RR No. **22.5L**
- WP 4A has been working on a functional description of such software tools and has identified difficulties in application of this Resolution, along with possible solutions
- In order to ensure a proper implementation of the methodology called for in Resolution **770 (WRC-19)**, some changes to the Resolution are needed
- As this Resolution, and the accompanying software, will be used during BR examinations under Nos. **9.35** and **11.31**, as applicable, these changes to the Resolution fall under WRC-23 agenda item 7
- The most recent meeting of WP 4A agreed on the solutions to the difficulties previously identified, and it also agreed to create a Topic under agenda item 7 to address the required changes to Resolution **770 (WRC-19)** to address those difficulties
- Modifications following the identified solutions will be considered at future WP 4A meeting(s)

Summary

- WP 4A is currently addressing seven Topics under WRC-23 agenda item 7
 - Three of these came from WRC-19 whereas four others were brought by the membership
 - Additional Topics are still being considered, and the list will be finalized at the next meeting of WP 4A
- Working documents are being developed for each Topic and draft CPM text has started to be produced for some Topics
- As is normal with Agenda item 7, considerable discussion is required on each Topic to arrive at potential solutions
- The virtual meeting environment has slowed normal progress, but return to in-person meetings in 2022 should help to accelerate things
- The membership is encouraged to review the current status of all Topics and contribute on these to future meetings of WP 4A