



**2<sup>nd</sup> ITU INTER-REGIONAL WORKSHOP  
ON WRC-15 PREPARATION  
(Geneva, 12 – 13 November 2014)**

**Satellite Regulatory  
Issues**

**Panels-6&7 Discussions  
on WRC-15 Agenda  
items 7, 9.1 (9.1.1, 9.1.2,  
9.1.3, 9.1.5, 9.1.8), 9.3**

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- **AI 7** – Consider possible changes in advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks
- **AI 9.1.1** – Protection of the systems operating in the mobile-satellite service in the band 406-406.1 MHz
- **AI 9.1.2** – Studies on possible changes to current  $\Delta T/T$  coordination trigger and on possible reduction of the coordination arc
- **AI 9.1.3** – Use of satellite orbital positions and associated frequency spectrum to deliver international public telecommunication services in developing countries
- **AI 9.1.5** – Consideration of technical and regulatory actions to support existing and future operation of FSS within the band 3 400-4 200 MHz as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1
- **AI 9.1.8** – Regulatory aspects for nanosatellites and picosatellites
- **AI 9.3** – Due diligence in applying the principles embodied in the Constitution

- Consider possible changes in advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks
- Resolution 86 (Rev.WRC 07)
- **Current Issues:**
  - **Issue A:** Informing the Bureau of a suspension under RR No. **11.49** beyond six months
  - **Issue B:** Publication of information on bringing into use of satellite networks at the ITU website
  - **Issue C:** Review or possible cancellation of the advance publication mechanism for satellite networks subject to coordination under section II of Article **9** of the Radio Regulations
  - **Issue D:** General use of modern electronic means of communications in coordination and notification procedures
  - **Issue E:** Failure of a satellite during the ninety-day bringing into use period

- **Informing the Bureau of a suspension under RR No. 11.49 beyond six months**
  
- **ITU-R Studies**
  - Some administrations believe that the provisions of RR No. **13.6** establish a procedure to clarify the suspension situation
  - Some administrations believe that introducing an incentive in the procedure would encourage administrations to timely report the suspension
  - Six possible examples describing situations which may be applicable to the case of suspension were introduced. In most cases, it is unlikely that administrations or operators will require more than 6 months to identify the requirement for a suspension

- Informing the Bureau of a suspension under RR No. 11.49 beyond six months
  
  - **Methods Proposed in the draft CPM Report**
    - **Method A1:** No change to the Radio Regulations
    - **Method A2:** modify RR No. **11.49** to provide a regulatory mechanism that addresses the case of an administration informing the BR, after the initial six months, of a suspension of use of frequency assignments that is going to last longer than six months.
      - **Option A in Method A2:** Day-for-day reduction in the suspension period after 6 months
      - **Option B in Method A2:** Day-for-day reduction in the suspension period after 6 months up to 12 months\* followed by two times reduction thereafter
- \* Note: the 12 months period can be changed

- **Publication of information on bringing into use of satellite networks at the ITU website**
  
- **ITU-R Studies**
  - Administrations provide information about the satellite networks to the BR in the procedures for effecting advance publication, coordination and notification of satellite networks, in accordance with Articles **9** and **11** of the RR. The BR publishes the information in accordance with the same provisions of the RR.
  - At the same time, there is no clarity in the provisions of the RR with regard to publication of information directly related to bringing into use of the satellite networks and the suspension of the use of frequency assignments.
  - The BR's actions regarding the publication of information needs to be considered as a result of changes in regulatory provisions for bringing into use and suspension of satellite networks made during WRC-12



- Publication of information on bringing into use of satellite networks at the ITU website
  
- **Methods Proposed in the draft CPM Report**
  - **Method B1:** implement amendments to RR Nos. **11.44B**, **11.49** and **11.49.1** to clarify BR's actions
  - **Method B2:** implement amendments to RR Nos. **11.44B**, **11.49** and **11.49.1** to clarify BR's actions. The information about bringing into use would be available at the ITU-R website
  - **Method B3:** Identify the additional actions required by the BR, and put them in specific instructions to the BR in the minutes of a Plenary meeting of a WRC

- **Review or possible cancellation of the advance publication mechanism for satellite networks subject to coordination under section II of Article 9 of the Radio Regulations**
  
- **ITU-R Studies**
  - The six-month minimum period of APIs contains very little benefit since it currently includes very limited data for satellite networks subject to coordination. Also, it may result in the unavailability of orbital positions.
  - Eliminating the six-month minimum period may result in uncertainty and less flexibility for Administrations with regards to coordination requests and the associated cost recovery charges. Some solutions were introduced to reduce this effect.
  - It was concluded that if the six-month minimum period is eliminated, the coordination process of the satellite network with identified administrations may commence sooner than under the current situation



- **Review or possible cancellation of the advance publication mechanism for satellite networks subject to coordination under section II of Article 9 of the Radio Regulations**
  
- **ITU-R Studies (Cont'd)**
  - If the six-month minimum period was suppressed, no transitional measures are required
  - If the complete API mechanism was suppressed, transitional measures are required
  - Reducing the minimum period may require transitional measures
  - If RR No. **9.5B** is suppressed, there is a need to address the case of an administration intending to comment on satellite networks subject to coordination with respect to their existing satellite networks which are not subject to coordination.

- **Review or possible cancellation of the advance publication mechanism for satellite networks subject to coordination under section II of Article 9 of the Radio Regulations**
  
- **Methods Proposed in the draft CPM Report**
  - **Method C1:** No change to the API mechanism
  - **Method C2:** Suppression of the API for satellite networks subject to coordination under Section II of RR Article 9
  - **Method C3:** Changing the period before expiry of the API for satellite networks subject to coordination under Section II of RR Article 9
  - **Method C4:** Suppression of the current API mechanism and generation of API at the receipt of a coordination request
  - **Method C5:** Suppressing the six-month minimum period between the date of receipt of an API and the date of receivability of the associated coordination request

- **General use of modern electronic means of communications in coordination and notification procedures**
  
- **ITU-R Studies**
  - Fax communication have become increasingly unreliable or difficult to perform
  - Administrations are nowadays equipped with modern electronic means of communications that can be used for implementing coordination and notification provisions of the RR
  - The aspects of security will have to be considered and properly implemented
  - Other, traditional means of communication can continue to be used if modern electronic means are not available

- General use of modern electronic means of communications in coordination and notification procedures
- **Method Proposed in the draft CPM Report**
  - **Method D:** Amendments to Resolutions **907 (WRC-12)** to include the use of modern electronic means, and to Resolution **908 (WRC-12)** to expand its scope to all kind of satellite network filings and to request the BR to analyse whether it is possible to have a single consolidated interface for both the submission of satellite network filings and the related correspondence

- Failure of a satellite during the ninety-day bringing into use period

- **ITU-R Studies**

- The current provisions of the RR do not address a possible scenario of a satellite failure during the bringing into use (BIU) period of ninety days, where the satellite operator has few possibilities to restore the service
- Adding such provisions would provide an administration with a clear understanding on the status of its frequency assignments before taking a decision on a replacement satellite
- Adding provisions to the RR to award BIU status to a satellite failure during the BIU/bringing back into use (BBIU) period could have the opposite effect and encourage abuse of the BIU rules

- Failure of a satellite during the ninety-day bringing into use period
  
- **Methods Proposed in the draft CPM Report**
  - **Method E1:** adding a footnote to RR No. **11.44B**: if failure during BIU, frequency assignments brought into use
  - **Method E2:** in addition to Method E1, adding a footnote to RR No. **11.49**: if failure during BBIU, frequency assignments brought back into use
  - **Method E3:** No Change



- Consider changes in advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks
  
- **Other Issues**
  - The list of issues under Agenda Item 7 is not finalized yet.
  - The Special Committee is the responsible group for regulatory and procedural aspects of Agenda Item 7. Therefore, more issues might be included under this agenda item based on the meeting of the Special Committee.
  - Examples of issues under consideration:
    - **Issue X: Review of the orbital position limitations in Annex 7 to RR Appendix 30**
    - **Issue Y: Possible method to mitigate excessive satellite network filings issue.**

- **Protection of the systems operating in the mobile-satellite service in the band 406-406.1 MHz**
- **Resolution 205 (Rev.WRC-12)**
  
- **ITU-R Studies**
  - Permissible levels of interference were developed for different systems in operation within the frequency band 406-406.1 MHz
  - Specified spurious emission levels indicate that the data collection platforms operating in the EESS do not produce in-band emissions exceeding the narrowband interference criteria for MSS systems
  - Operation of radiosondes in the MetAids will not exceed the broadband measured sensitivity levels of the search-and-rescue receivers for LEO, MEO or GSO satellites

- **Protection of the systems operating in the mobile-satellite service in the band 406-406.1 MHz**
- **Resolution 205 (Rev.WRC-12)**
- **ITU-R Studies (Cont'd)**
  - Some simulations show that the MSS LEO component experiences interference due to mobile deployment from 406.1 to 407 MHz, the MSS MEO component receives interference up to 410 MHz depending on the constellation. The MSS geostationary component receives severe interference due to mobile deployment within the 406.1-406.2 MHz frequency band.
  - Some simulations show that increased deployment of land mobile stations in the 406.1-420 MHz range may cause performance degradation for the LEOSAR Search and Rescue (SAR) processor.
  - MEOSAR (Galileo) within its larger footprint may be also affected by an an increased usage of land mobile systems in the 406.1-406.2 MHz frequency band.

- **Protection of the systems operating in the mobile-satellite service in the band 406-406.1 MHz**
- **Resolution 205 (Rev.WRC-12)**
- **Regulatory and procedural considerations**
  - Two options have been identified: both consist in adding a footnote to RR Article 5 pointing to a modified version of Resolution **205 (Rev.WRC-12)**. The difference between the options concerns the way this Resolution is modified.
  - **Option A:**
  - Administrations should consider frequency drift characteristics when selecting an operating frequency in the 405-406 MHz range and take all practical steps to avoid frequency drifting in the 405.9-406 MHz band
  - **Option B:**
  - Strongly recommend to administrations not to make new frequency assignments within the frequency band 406.1-406.2 MHz
  - and that administrations shall take into account frequency drift characteristics of radiosondes when selecting their operating frequencies above 405 MHz and take all practical steps to avoid frequency drifting close to 406 MHz

- Studies on possible reduction of the coordination arc and changes to current  $\Delta T/T$  coordination trigger
- Resolution 756 (WRC-12)
  
- **ITU-R Studies**
  - Resolves 1: Examine effectiveness and appropriateness of the current criterion ( $\Delta T/T > 6\%$ ) used in the application of RR **No. 9.41** and consider any other possible alternatives.
  - Resolves 2: reduction in the coordination Arc.
  - The two issues are addressed separately. However, there is an interconnection between them, and therefore the implications of this interconnection should be considered while deciding on these issues

- **Studies on possible reduction of the coordination arc and changes to current  $\Delta T/T$  coordination trigger**
- **Resolution 756 (WRC-12)**
- **ITU-R Studies (Cont'd)**
  - Resolves 1:
  - All current ITU-R Recommendations are based on interference level being adopted many years ago. Nowadays, satellite communication technologies have evolved dramatically.
  - Consideration needs to be given to the large number of satellite networks
  - In addition to the coordination arc, mainly three different types of coordination triggers or protection criteria are used in the RR:  $\Delta T/T$ , C/I and pfd
  - Submissions for satellite networks often contain a wide range of technical parameters. Some of the combinations of these parameters may lead to unrealistic links that are either very sensitive to interference (i.e. trigger coordination very easily) or create unrealistic high levels of interference.
  - Statistics show a steady increase of the use of RR No. **9.41** after the reduction of the coordination arc for some frequency bands in WRC-12



- Studies on possible reduction of the coordination arc and changes to current  $\Delta T/T$  coordination trigger
- Resolution 756 (WRC-12)
  
- **ITU-R Studies (Cont'd)**
  - Resolves 2:
  - Studies show that reduction in the coordination arc sizes may greatly reduce the number of satellite networks identified while affording appropriate protection to existing satellite networks.
  - It is suggested that the 8 degrees coordination trigger in the Ka-band is still appropriate. However, a conclusion on a decision to reduce the coordination arc in the Ka-band should not be merely based on the operational networks but also on the results of studies of representative technical elements of Ka-band satellite networks
  - Any reduction of the coordination arc may have an impact on the use of RR No. **9.41**

- Studies on possible reduction of the coordination arc and changes to current  $\Delta T/T$  coordination trigger
- Resolution 756 (WRC-12)
- **Resolves 1 Regulatory & procedural considerations**
  - Option 1A
    - NOC to current RR App. 5 identification of coordination requirements
    - Change threshold levels for application of RR No. 9.41 for some frequency bands
    - Replace C/I in RR No. 11.32A with uplink/downlink pfd masks for some frequency bands
  - Option 1B
    - Retain RR Nos. 9.7, 9.41 and 11.32A essentially unchanged
    - Change trigger criteria from  $\Delta T/T$  to  $C/I=C/N + X$  dB, where X is less than 12.2 dB (the value corresponding to 6%  $\Delta T/T$ )
    - RR No. 11.32A would use the same C/I criteria as above
  - Option 1C
    - Same as Option 1B, with  $X=12.2$  dB
  - Option 1D: NOC

- Studies on possible reduction of the coordination arc and changes to current  $\Delta T/T$  coordination trigger
- Resolution 756 (WRC-12)
- ***Resolves 2 Regulatory & procedural considerations***
  - Option 2A
    - Reduce coordination arc as:
      - 6/4 GHz band  $\pm 8^\circ$  reduces to  $\pm 6^\circ$
      - 14/10/11/12 GHz band  $\pm 7^\circ$  reduces to  $\pm 5^\circ$
      - 30/20 GHz band NOC to  $\pm 8^\circ$
  - Option 2B
    - Reduce coordination arc as:
      - 6/4 GHz band  $\pm 8^\circ$  reduces to  $\pm 6^\circ$
      - 14/10/11/12 GHz band  $\pm 7^\circ$  reduces to  $\pm 5^\circ$
      - 30/20 GHz band  $\pm 8^\circ$  reduces to  $\pm 6^\circ$
  - Option 2C
    - NOC

- Use of satellite orbital positions and associated frequency spectrum to deliver international public telecommunication services in developing countries
- Resolution 11 (WRC-12)
- **ITU-R Studies**
  - Resolution **11 (WRC-12)** calls for studies and collaboration between ITU-R and ITU-D to help developing countries with development and implementation of satellite networks and services
  - List of relevant ITU-R and ITU-D Resolutions, Recommendations, Reports, Handbooks, Workshops, Seminars and Training Programs has been identified
  - Discussion has been made on current situation, Evolving satellite marketplace – Increased availability of satellite services, Efficient use of the orbital resource – Availability of satellite orbital resources

- Use of satellite orbital positions and associated frequency spectrum to deliver international public telecommunication services in developing countries
- Resolution 11 (WRC-12)
- **Regulatory and procedural considerations**
  - **Option A:** No Change to the RR, the current activities of ITU-R and ITU-D are sufficient
  - **Option B:** revise Resolution **11 (WRC-12)** in order to continue with the studies as it may be required for resolves 2 of Resolution **11 (WRC-12)** to continue even after WRC-15

- **Consideration of technical and regulatory actions in order to support existing and future operation of fixed-satellite service earth stations within the band 3 400-4 200 MHz, as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1**
  - **Resolution 154 (WRC-12)**
  - **ITU-R Studies**
  - Studies show a potential for interference from IMT and broadband wireless access stations into FSS earth stations at distances of up to several hundred kilometers. Such large separation distances would impose substantial constraints on deployments of both mobile and earth stations. The studies also show that interference can occur when IMT systems are operated in the adjacent frequency band.
  - In the African region there is extensive deployment of an aeronautical communication infrastructure based on FSS VSAT systems in the 3 400-4 200 MHz band.
  - The use of mobile service systems in the vicinity of airports has increased the number of cases of interference into these VSAT receivers



- **Consideration of technical and regulatory actions in order to support existing and future operation of fixed-satellite service earth stations within the band 3 400-4 200 MHz, as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1**
  - **Resolution 154 (WRC-12)**
- **Regulatory and procedural considerations**
  - Modification to Resolution **154 (WRC-12)**, calling for relevant administrations in Region 1 to use special care in the coordination, assignment, and management of frequencies taking into consideration the potential impact on the FSS earth stations used for satellite communications related to safe operation of aircraft and reliable distribution of meteorological information in the frequency band 3 400-4 200 MHz.
  - Consideration may be given to modifying RR No. **5.430A** to include a reference to the modified Resolution

- **Regulatory aspects for nanosatellites and picosatellites**
- **Resolution 757 (WRC-12)**
  
- **ITU-R Studies**
  - PDN Report ITU-R SA.[NANO/PICOSAT CHARACTERISTICS] addresses the characteristics of nanosatellites and picosatellites
  - PDN Report ITU-R SA.[NANO/PICOSAT CURRENT PRACTICE] addresses the current regulatory practice for nanosatellites and picosatellites

- **Regulatory aspects for nanosatellites and picosatellites**
- **Resolution 757 (WRC-12)**
  
- **Regulatory and procedural considerations**
  - The ITU-R Study Groups have concluded that additional efforts should be undertaken by the BR, administrations, and others to help increase knowledge and raise awareness about the applicable regulatory procedures for satellite networks among those entities involved in development and launch of nanosatellites and picosatellites.
  - Another relevant response to this issue could be to consider modifications to the regulatory procedures for notifying satellite networks to accommodate nanosatellite and picosatellite missions

- **Due diligence in applying the principles embodied in the Constitution.**
- **Resolution 80 (Rev.WRC-07)**
- **ITU-R Studies**
  - A variety of ITU-R Recommendations address efficient use of orbit and spectrum
    - Including topics such as: Station keeping for GSO satellites, Antenna performance standards, Maximum levels of off-axis e.i.r.p., Adaptive power control techniques, Sharing methodologies, etc.
  - BR has sponsored workshops and seminars to disseminate knowledge, information and best practices
  - AP30, 30A and 30B Plans were developed to guarantee access to GSO
- **Regulatory and procedural considerations**
  - If AP 30/30A/30B Plans are not working, perhaps they should be modified to better achieve their objective
  - Given that various groups, such as RAG, RRB, SC-WP, WP 4A and previous WRCs have not produced specific results for this Resolution, it may be time to decide on the retention or otherwise of this Resolution