

## **Summary of WRC-15 Decisions**

The WRC-15 agenda items are categorised into five areas: mobile/amateur, science, aeronautical/maritime/radar, satellite spectrum and satellite regulations issues. There is also an ad hoc issue on global flight tracking. The WRC-15 decisions (with footnote reference to the Provisional Final Acts of WRC-15 where applicable) on these agenda items are reported by category as follows –

### **1. Mobile and amateur issues (Agenda items 1.1, 1.2, 1.3, 1.4)**

- **Agenda item 1.1**

*to consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT) and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution 233 (WRC-12);*

**WRC-15 decision:** In addition to the existing spectrum for IMT, WRC-15 identified the band 1427 – 1518 MHz for IMT in all three ITU Regions and the bands 470 – 698 MHz, 3300 – 3400 MHz, 3600 – 3700 MHz and 4800 – 4990 MHz in some countries not including China.<sup>1</sup>

- **Agenda item 1.2**

*to examine the results of ITU-R studies, in accordance with Resolution 232 (WRC-12), on the use of the frequency band 694-790 MHz by the mobile, except aeronautical mobile, service in Region 1 and take the appropriate measure;*

**WRC-15 decision:** Similar to what was decided by the World Radiocommunication Conference in 2007 for ITU Region 2 (Americas) and ITU Region 3 (Asia-Pacific), WRC-15 allocated the band 694 – 790 MHz to the mobile service and identified it for IMT in ITU Region 1 (covering Europe, Africa, the Middle East and Central Asia).<sup>2</sup>

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<sup>1</sup> Article 5, pages 15, 20, 27, 28, 33, 34

<sup>2</sup> Article 5, page 15

- **Agenda item 1.3**

*to review and revise Resolution 646 (Rev.WRC-12) for broadband public protection and disaster relief (PPDR), in accordance with Resolution 648 (WRC-12);*

**WRC-15 decision:** To address the requirements of PPDR, including broadband PPDR, WRC-15 revised Resolution 646. The bands 806 – 824 MHz / 851 – 869 MHz and 5850-5925 MHz are removed from the list of the frequency ranges harmonised for PPDR in ITU Region 3 (the bands remaining in the list for Region 3 include 406.1 – 430 MHz, 440 – 470 MHz and 4940 – 4990 MHz). Use of the parts of the frequency range 694 – 894 MHz, as described in the most recent version of Recommendation ITU-R M.2015<sup>3</sup>, is encouraged.<sup>4</sup>

- **Agenda item 1.4**

*to consider possible new allocation to the amateur service on a secondary basis within the band 5250 – 5450 kHz in accordance with Resolution 649 (WRC-12);*

**WRC-15 decision:** WRC-15 addressed the lack of spectrum available for amateur radiocommunication in the 5 MHz band and decided to allocate the band 5351.5 – 5366.5 kHz to the amateur service on a secondary basis with a provision that the maximum equivalent isotropically radiated power shall not exceed 15 W.<sup>5</sup>

## 2. Science issues (Agenda items 1.11, 1.12, 1.13, 1.14)

- **Agenda item 1.11**

*to consider a primary allocation for the Earth exploration satellite service (Earth-to-space) in the 7-8 GHz range, in accordance with Resolution 650 (WRC-12);*

**WRC-15 decision:** To alleviate the congestion in the 2 GHz band, WRC-15 decided to allocate the band 7190 – 7250 MHz to the Earth exploration satellite service for satellite telemetry, tracking and control with provisions to protect the existing services.<sup>6</sup>

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<sup>3</sup> The current version “Frequency arrangements for public protection and disaster relief radiocommunication systems in UHF bands in accordance with Resolution 646 (Rev.WRC-12)” shall be revised following the WRC-15 decision.

<sup>4</sup> Resolution 646 (REV.WRC-15), pages 288-293

<sup>5</sup> Article 5, page 4

<sup>6</sup> Article 5, page 37

- **Agenda item 1.12**

*to consider an extension of the current worldwide allocation to the Earth exploration satellite service (active) in the frequency band 9300 – 9900 MHz by up to 600 MHz within the frequency bands 8700 – 9300 MHz and/or 9900 – 10500 MHz, in accordance with Resolution 651 (WRC-12);*

**WRC-15 decision:** WRC-15 decided to allocate the bands 9200 – 9300 MHz and 9900 – 10400 MHz to the Earth exploration-satellite service (active) for systems requiring necessary bandwidth greater than 600 MHz that cannot be fully accommodated within the band 9300 – 9900 MHz.<sup>7</sup>

- **Agenda item 1.13**

*to review No. 5.268 with a view to examining the possibility for increasing the 5 km distance limitation and allowing space research service (space-to-space) use for proximity operations by space vehicles communicating with an orbiting manned space vehicle, in accordance with Resolution 652 (WRC-12);*

**WRC-15 decision:** For the use of the band 410 – 420 MHz by the space research service, WRC-15 considered the compatibility of space vehicles and revised No. 5.268 of the Radio Regulations (“RR”) to remove the 5 km limitation on distance between space-to-space communication links with an orbiting manned space vehicle.<sup>8</sup>

- **Agenda item 1.14**

*to consider the feasibility of achieving a continuous reference time-scale, whether by the modification of coordinated universal time or some other Method, and take appropriate action, in accordance with Resolution 653 (WRC-12)*

**WRC-15 decision:** As ITU-R would conduct further study in cooperation with relevant international organisations the definition and dissemination of future reference time scales, WRC-15 decided that the coordinated universal time would continue to apply until WRC-23.<sup>9</sup>

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<sup>7</sup> Article 5, pages 40-41

<sup>8</sup> Footnote 5.268, page 13

<sup>9</sup> Articles 1 and 2, pages 1-2

3. **Aeronautical, maritime and radiolocation issues** (Agenda items 1.5, 1.15, 1.16, 1.17, 1.18)

• **Agenda item 1.5**

*to consider the use of frequency bands allocated to the fixed satellite service (FSS) not subject to Appendices 30, 30A and 30B for the control and non-payload communications of unmanned aircraft systems in non-segregated airspaces, in accordance with Resolution 153 (WRC-12);*

**WRC-15 decision:** WRC-15 decided that assignments to stations of geostationary satellite networks in FSS operating in the bands 10.95 – 11.2 GHz, 11.45 – 11.7 GHz, 11.7 – 12.2 GHz in ITU Region 2, 12.2 – 12.5 GHz in ITU Region 3, 12.5 – 12.75 GHz in ITU Regions 1 and 3, and 19.7 – 20.2 GHz in the space-to-Earth direction and 14 – 14.47 GHz and 29.5 – 30.0 GHz in the Earth-to-space direction may be used for control and non-payload communications (CNPC) links of unmanned aircraft systems (UAS) in non-segregated airspace, provided that respective standards to be developed by the International Civil Aviation Organization for UAS and by ITU-R for use of CNPC links are made available. WRC-23 will review, and if necessary, revise the WRC-15 decision on this agenda item taking into account relevant ITU-R studies.<sup>10</sup>

• **Agenda item 1.15**

*to consider spectrum demands for on-board communication stations in the maritime mobile service in accordance with Resolution 358 (WRC-12);*

**WRC-15 decision:** The bands 457.5125 – 457.5875 MHz and 467.5125 – 467.5875 MHz are identified in RR No. **5.287** for on-board communication stations in the maritime mobile service. For the sake of more efficient use of spectrum, WRC-15 revised No. **5.287** to enable the use of narrower channel spacing in these bands.<sup>11</sup>

• **Agenda item 1.16**

*to consider regulatory provisions and spectrum allocations to enable possible new Automatic Identification System technology applications and possible new applications to improve maritime radiocommunication in accordance with Resolution 360 (WRC-12);*

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<sup>10</sup> Article 5, pages 42, 45, 47, 52, 53 and 54

<sup>11</sup> Footnote 5.287, page 13

**WRC-15 decision:** WRC-15 revised RR Appendix 18 to identify some of the existing VHF maritime radiocommunication channels for non-critical data communications using the new technology of Automatic Identification System. For new maritime satellite applications, WRC-15 also allocated the bands 161.9375 – 161.9625 MHz and 161.9875 – 162.0125 MHz to the maritime mobile satellite service in the Earth-to-space direction.<sup>12</sup>

- **Agenda item 1.17**

*to consider possible spectrum requirements and regulatory actions, including appropriate aeronautical allocations, to support wireless avionics intra-communications), in accordance with Resolution 423 (WRC-12);*

**WRC-15 decision:** WRC-15 decided to allocate the band 4200-4400 MHz for the aeronautical mobile (route) service to support the implementation of wireless avionics intra-communication systems enabling communications between two or more points on a single aircraft.<sup>13</sup>

- **Agenda item 1.18**

*to consider a primary allocation to the radiolocation service for automotive applications in the 77.5 – 78.0 GHz frequency band in accordance with Resolution 654 (WRC-12);*

**WRC-15 decision:** The bands 76 – 77.5 GHz and 78 – 81 GHz are already allocated to the radiolocation service on a primary basis in all three ITU Regions. To provide a contiguous spectrum of 5 GHz to support radars of the latest technologies, WRC-15 decided to allocate the band 77.5 – 78 GHz to the radiolocation service with a provision limiting its use to short-range radars for ground-based applications, including automotive radars.<sup>14</sup>

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<sup>12</sup> Appendix 18 (Rev.WRC-15), pages 116-120

<sup>13</sup> Article 5, page 26

<sup>14</sup> Article 5, page 55

4. **Satellite spectrum issues** (Agenda items 1.6.1, 1.6.2, 1.7, 1.8, 1.9.1, 1.9.2, 1.10)

• **Agenda item 1.6.1**

*to consider possible additional primary allocations to the FSS (Earth-to-space and space-to-Earth) of 250 MHz in the range between 10 GHz and 17 GHz in Region 1, and review the regulatory provisions on the current allocations to the FSS within each range, taking into account the results of ITU-R studies, in accordance with Resolution 151 (WRC-12);*

**WRC-15 decision:** To cope with the increasing spectrum demand in satellite communications, WRC-15 allocated the band 13.4 – 13.65 GHz (space-to-Earth) to FSS in ITU Region 1.<sup>15</sup>

• **Agenda item 1.6.2**

*to consider possible additional primary allocations to FSS (Earth-to-space) of 250 MHz in Region 2 and 300 MHz in Region 3 within the range 13 – 17 GHz, and review the regulatory provisions on the current allocations to FSS within each range, taking into account the results of ITU-R studies, in accordance with Resolution 152 (WRC-12);*

**WRC-15 decision:** To resolve the imbalance of spectrum between Earth-to-space and space-to-Earth allocations to FSS, WRC-15 modified the existing FSS allocation such that the band 14.5 – 14.75 GHz in more than 30 countries in ITU Regions 1 and 2 and the band 14.5 – 14.8 GHz in 9 countries (including China) in ITU Region 3 can support not only feeder links for the broadcasting-satellite service but also other FSS uplinks.<sup>16</sup>

• **Agenda item 1.7**

*to review the use of the band 5091 – 5150 MHz by FSS (Earth-to-space) (limited to feeder links of the non-geostationary mobile-satellite systems in the mobile satellite service) in accordance with Resolution 114 (Rev.WRC-12);*

**WRC-15 decision:** According to the International Civil Aviation Organisation, no new aeronautical radionavigation systems in the band 5091 – 5150 MHz are foreseen. WRC-15 considered the compatibility of satellite communications in the 5 GHz band and

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<sup>15</sup> Article 5, page 43

<sup>16</sup> Article 5, page 48

decided to maintain the primary allocation to FSS (Earth-to-space) (limited to feeder links of the non-geostationary mobile-satellite systems in the mobile satellite service) in the band 5091 – 5150 MHz without date limitations.<sup>17</sup>

- **Agenda item 1.8**

*to review the provisions relating to Earth stations located on board vessels (ESVs), based on studies conducted in accordance with Resolution 909 (WRC-12);*

**WRC-15 decision:** In the light of the new ESV technologies and an increase in the number of operational ESVs, WRC-15 revised RR No. 5.457A to allow C band ESVs employing antenna with minimum diameter of 1.2 m to operate at least 330 km from the coast without the prior agreement of any administration.<sup>18</sup>

- **Agenda item 1.9.1**

*to consider, in accordance with Resolution 758 (WRC-12), possible new allocations to FSS in the frequency bands 7150 – 7250 MHz (space-to-Earth) and 8400 – 8500 MHz (Earth-to-space), subject to appropriate sharing conditions);*

**WRC-15 decision:** For consideration of new allocations to FSS in the bands 7150 – 7250 MHz (space-to-Earth) and 8400 – 8500 MHz (Earth-to-space), WRC-15 concluded that a new allocation was not feasible and decided to make no change to RR under this agenda item.

- **Agenda item 1.9.2**

*to consider, in accordance with Resolution 758 (WRC-12), the possibility of allocating the bands 7375 – 7750 MHz and 8025 – 8400 MHz to the maritime mobile satellite service and additional regulation measures, depending appropriate sharing conditions;*

**WRC-15 decision:** To relieve the asymmetric spectrum demand of some applications in the maritime mobile satellite service requiring additional bandwidth in the downlink direction, WRC-15 allocated the band 7375 – 7750 MHz to the maritime mobile satellite service (space-to-Earth) with a provision limiting its use to geostationary-satellite networks.<sup>19</sup>

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<sup>17</sup> Article 5, page 33

<sup>18</sup> Footnote 5.457A, page 38

<sup>19</sup> Article 5, page 39

- **Agenda item 1.10**

*to consider spectrum requirements and possible additional spectrum allocations for the mobile satellite service in the Earth-to-space and space-to-Earth directions, including the satellite component for broadband applications, including IMT, within the frequency range from 22 GHz to 26 GHz, in accordance with Resolution 234 (WRC-12);*

**WRC-15 decision:** WRC-15 reached no consensus on the compatibility of the mobile satellite service with the existing services in the frequency range 22 – 26 GHz and no revision to RR was made under this agenda item.

## 5. **Satellite regulatory issues (Agenda items 7 and 9.1)**

- **Agenda item 7**

*to consider regulatory provisions for informing the Bureau of a suspension under RR No. 11.49 beyond six months; (When an administration suspends the use of a satellite frequency assignment for a maximum period of three years, the administration must inform the Radiocommunications Bureau (BR), the executive arm of the ITU-R, of such suspension no later than six months from the start date of the suspension. Agenda item 7 considered a number of satellite regulatory issues which included, inter-alia, the regulatory procedures required in case an administration fails to meet the six-month deadline.)*

**WRC-15 decision:** At WRC-15, most administrations, except China and a few countries, supported a change in RR to reduce the three-year suspension time period by the amount of time that has elapsed between the end of the six-month period and the date that BR is informed of the suspension (“the day-to-day penalty”). With the support of regional groups, WRC-15 decided to modify RR No. 11.49 to implement the day-to-day penalty.

- **Agenda item 9.1**

*to consider possible reduction of the coordination arc and technical criteria used in satellite coordination; (Coordination arc refers to the orbital separation between satellite networks within which the coordination procedure is triggered. For orbital separation greater than the corresponding coordination arc, an administration needs to provide technical reasons to request for*



*coordination. One of the key topics considered under agenda item 9.1 was the studies on the possible reduction of the coordination arc and the changes of technical criteria for triggering satellite coordination.)*

**WRC-15 decision:** There were divided views on this topic. While European countries advocated the reduction of coordination arc, China and some other countries tended to keep the coordination arc unchanged. Consensus was reached at WRC-15 that a new footnote 11.32A.2 would be added to RR to stipulate the reduction of coordination arcs for C-band and Ku-band by one degree<sup>20</sup>. A new Resolution was also approved to apply power flux density (pfd), a technical means to calculate interference level, for requesting coordination outside the corresponding coordination arc.<sup>21</sup>

## 6. Ad-hoc issue

- **Global flight tracking for civil aviation**

*to consider various aspects of global flight tracking, as instructed by Resolution 185 adopted by the ITU Plenipotentiary Conference 2014*

**WRC-15 decision:** Automatic Dependent Surveillance-Broadcast (ADS-B) allows an aircraft to periodically broadcast its position. The band 1087.7 – 1092.3 MHz has been used for the transmission of ADS-B signals from aircrafts to terrestrial stations within line-of-sight. To extend ADS-B signals beyond line-of-sight to facilitate global flight tracking in oceanic, polar and other remote areas, WRC-15 allocated the band 1087.7 – 1092.3 MHz to the aeronautical mobile-satellite (route) service (Earth-to-space) to enable the transmission of ADS-B signals from aircrafts to satellites.<sup>22</sup>

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<sup>20</sup> The coordination arcs for C-band (6 GHz) and Ku-band (10/11/12/14 GHz) are reduced from 8° to 7° and 7° to 6° respectively.

<sup>21</sup> The pfd limit is the same as the threshold used before. However, it employs typical technical parameters rather than that given in the satellite network filing to calculate the potential interference level in order to avoid over-estimate of interference level by referring to unrealistic parameters, e.g. very small antenna, if any, contained in the satellite network filing.

<sup>22</sup> Article 5, page 19