Annex 1

World Radiocommunication Conference 2019 ("WRC-19") Decisions

Agenda Item 1.1 (Res. 658)

*to consider an allocation of the frequency band 50 – 54 MHz to the amateur service in Region 1, in accordance with Resolution **658 (WRC-15)***[1]

Key Points

This agenda item addresses a possible new Region 1 allocation to the amateur service in the 50 – 54 MHz band by full or partial global harmonisation with the existing 4 MHz primary allocations in Regions 2 and 3.

WRC-19 Decision

WRC-19 decided to allocate the 50 – 52 MHz band to the amateur service in Region 1 on a secondary basis while the administrations of Region 1 wishing to allocate the 50 – 54 MHz band, or portions thereof, to the amateur service on a primary basis added their names to Footnote **No. 5.169*bis*** of the Radio Regulations ("RR").

Agenda Item 1.2 (Res. 765)

*to consider in-band power limits for earth stations operating in the mobile-satellite service ("MSS"), meteorological-satellite service ("MetSat") and Earth exploration-satellite service ("EESS") in the frequency bands 401 – 403 MHz and 399.9 – 400.05 MHz, in accordance with Resolution **765 (WRC-15)***[2]

Key Points

This agenda item considers establishing, within RR, in-band power limits applicable to earth stations transmissions in the 399.9 – 400.05 MHz and 401 – 403 MHz bands in order to ensure the operation of existing and future systems that usually implement low or moderate output powers for MSS, EESS and MetSat systems.

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[1] Resolution **658 (WRC-15)**: Allocation of the frequency band 50 – 54 MHz to the amateur service in Region 1

[2] Resolution **765 (WRC-15)**: Establishment of in-band power limits for earth stations operating in mobile-satellite service, the meteorological-satellite service and the Earth exploration-satellite service in the frequency bands 401 – 403 MHz and 399.9 – 400.05 MHz

WRC-19 Decision

WRC-19 decided to apply equivalent isotropically radiated power ("e.i.r.p.") limits for earth stations operating in MSS in the 399.9 – 400.05 MHz band with transition period until 22 November 2022 and e.i.r.p. limits for earth stations operating in MetSat and EESS in the 401 – 403 MHz band with transition period until 22 November 2029 by additions of new Footnotes.

Agenda Item 1.3 (Res. 766)

*to consider possible upgrading of the secondary allocation to the meteorological-satellite service (space-to-Earth) to primary status and a possible primary allocation to the Earth exploration-satellite service (space-to-Earth) in the frequency band 460 – 470 MHz, in accordance with Resolution **766 (WRC-15)**[3]*

Key Points

This agenda item aims at determining the possibility of upgrading the secondary MetSat (space-to-Earth) allocation to primary status and adding a primary EESS (space-to-Earth) allocation in the 460 – 470 MHz band. This has to be performed while providing protection and not imposing any additional constraints on existing primary services to which the band is already allocated and to services in the adjacent bands, and maintaining the conditions contained in RR **No. 5.289**.

WRC-19 Decision

WRC-19 decided that no change ("NOC") is made to RR.

Agenda Item 1.4

*to consider the results of studies in accordance with Resolution **557 (WRC-15)**[4], and review, and revise if necessary, the limitations mentioned in Annex 7 to Appendix **30 (Rev.WRC-15)**, while ensuring the protection of, and without imposing additional constraints on, assignments in the Plan and the List and the future development of the broadcasting-satellite service within the Plan, and existing and planned fixed-satellite service ("FSS") networks*

[3] Resolution **766 (WRC-15)**: Consideration of possible upgrading of the secondary allocation to the meteorological-satellite service (space-to-Earth) to primary status and a primary allocation to the Earth exploration-satellite service (space-to-Earth) in the frequency band 460 – 470 MHz

[4] Resolution **557 (WRC-15)**: Consideration of possible revision of Annex 7 to Appendix **30** of the Radio Regulations

Key Points

This agenda item considers removing some or all of the current limitations on the use of the orbital arc for broadcasting-satellite service ("BSS") networks as contained in Annex 7 to RR Appendix **30 (WRC-15)**.

WRC-19 Decision

WRC-19 approved to remove some of the current limitations in Annex 7 to RR Appendix **30**. However, the limitations for protecting Region 3 satellites BSS and FSS services are still retained.

Agenda Item 1.5 (Res. 158)

*to consider the use of the frequency bands 17.7 – 19.7 GHz (space-to-Earth) and 27.5 – 29.5 GHz (Earth-to-space) by earth stations in motion ("ESIM") communicating with geostationary space stations in the fixed-satellite service and take appropriate action, in accordance with Resolution **158 (WRC-15)***[5]

Key Points

This agenda item considers the use of the 17.7 – 19.7 GHz (space-to-Earth) and 27.5 – 29.5 GHz (Earth-to-space) bands by ESIM communicating with geostationary ("GSO") space stations in FSS. The studies under this agenda item considered three types of ESIM: aeronautical, maritime and land, depending on the type of vehicle on which they are installed.

WRC-19 Decision

WRC-19 approved a new Footnote **No. 5.A15** for the operation of ESIM in the 17.7 – 19.7 GHz (space-to-Earth) and 27.5 – 29.5 GHz (Earth-to-space) bands subject to the provisions set out by a new WRC Resolution on ESIM. The new WRC Resolution sets out, among others, the regulatory framework and interference management mechanisms required for maritime and aeronautical ESIM to follow for the protection of terrestrial and space services operating in the same bands, including the designated power emission limits under different scenarios conditions. The new WRC Resolution also specifies that ESIM shall not claim protection from and cause unacceptable interference to terrestrial services.

[5] Resolution **158 (WRC-15)**: Use of the frequency bands 17.7 – 19.7 GHz (space-to-Earth) and 27.5 – 29.5 GHz (Earth-to-space) by earth stations in motion communicating with geostationary space stations in the fixed-satellite service

Agenda Item 1.6

*to consider the development of a regulatory framework for non-GSO FSS satellite systems that may operate in the frequency bands 37.5 – 39.5 GHz (space-to-Earth), 39.5 – 42.5 GHz (space-to-Earth), 47.2 – 50.2 GHz (Earth-to-space) and 50.4 – 51.4 GHz (Earth-to-space), in accordance with Resolution **159 (WRC-15)***[6]

Key Points

This agenda item considers two issues.

Issue 1

Issue 1 develops a regulatory framework for non-GSO FSS satellite systems that may operate in the 37.5 – 39.5 GHz (space-to-Earth), 39.5 – 42.5 GHz (space-to-Earth), 47.2 – 50.2 GHz (Earth-to-space) and 50.4 – 51.4 GHz (Earth-to-space) bands.

Issue 2

Issue 2 proposes to revise Resolution **750 (WRC-15)** for the protection of EESS (passive) in the 50.2 – 50.4 GHz band.

WRC-19 Decision

Issue 1

WRC-19 approved new Footnotes specifying that non-GSO satellite systems used for provision of FSS operating in the 37.5 – 39.5 GHz (space-to-Earth), 39.5 – 42.5 GHz (space-to-Earth), 47.2 – 50.2 GHz (Earth-to-space) and 50.4 – 51.4 GHz (Earth-to-space) bands are required to comply with RR **No. 9.12** for coordination with other non-GSO satellite systems in FSS only. Apart from the requirement on frequency coordination, WRC-19 approved two new WRC Resolutions to set out the criteria for the protection of other geostationary satellite services operating in the same bands.

Issue 2

WRC-19 approved the addition of a number of provisions under existing Resolution **750** to protect EESS (passive) in the 50.2 – 50.4 GHz band.

[6] Resolution **159 (WRC-15)**: Studies of technical, operational issues and regulatory provisions for non-geostationary fixed-satellite services satellite systems in the frequency bands 37.5 – 39.5 GHz (space-to-Earth), 39.5 – 42.5 GHz (space-to-Earth), 47.2 – 50.2 GHz (Earth-to-space) and 50.4 – 51.4 GHz (Earth-to-space)

Agenda Item 1.7 (Res. 659)

*to study the spectrum needs for telemetry, tracking and command ("TT&C") in the space operation service ("SOS") for non-GSO satellites with short duration ("non-GSO SD") missions, to assess the suitability of existing allocations to the space operation service and, if necessary, to consider new allocations, in accordance with Resolution **659 (WRC-15)***[7]

Key Points

This agenda item considers the spectrum needs for TT&C in SOS for non-GSO SD missions and also assesses the suitability of existing allocations to SOS below 1 GHz band. New allocations in the 150.05 – 174 MHz and 400.15 – 420 MHz bands are under consideration.

WRC-19 Decision

WRC-19 decided to allocate the 137 – 138 MHz (space-to-Earth) and 148 – 149.9 MHz (Earth-to-space) bands to SOS for non-GSO SD missions on a co-primary basis in accordance with new Resolutions **COM5/5 (WRC-19) and COM5/9 (WRC-19)**. These systems shall not cause harmful interference to, or claim protection from, the existing services to which the bands are allocated on a primary basis.

Agenda Item 1.8 (Res. 359)

*to consider possible regulatory actions to support Global Maritime Distress Safety Systems ("GMDSS") modernisation and to support the introduction of additional satellite systems into the GMDSS, in accordance with Resolution **359 (WRC-15)***[8]

Key Points

This agenda item covers two issues related to GMDSS. The first issue ("Issue A") concerns the modernisation of GMDSS through the introduction of Navigational Data ("NAVDAT") service into GMDSS. The second issue ("Issue B") concerns the introduction of an additional satellite system into GMDSS.

[7] Resolution **659 (WRC-15)**: Studies to accommodate requirements in the space operation service for non-geostationary satellites with short duration missions

[8] Resolution **359 (WRC-15)**: Consideration of regulatory provisions for updating and modernisation of the Global Maritime Distress and Safety System

Issue A

The International Maritime Organisation ("IMO") has adopted a modernisation plan for the GMDSS. New technologies for possible introduction in the modernised GMDSS include very high frequency ("VHF") data exchange system ("VDES") and NAVDAT system. NAVDAT is a kind of digital system for broadcasting maritime safety information from shore-to-ship and could operate in both the Medium Frequency ("MF") and High Frequency ("HF") bands. This agenda item considers the regulatory provisions for both MF and HF NAVDAT applications.

Issue B

At present, only one satellite system is incorporated by IMO in GMDSS. This issue considers issues relating to the introduction of additional satellite systems into GMDSS.

WRC-19 Decision

On Issue A, WRC-19 decided to support GMDSS modernisation by including additional frequencies in the 415 – 526.5 kHz and 4 MHz – 27.5 MHz bands for NAVDAT system under maritime mobile service allocations with its transmission limited to coast stations and subject to agreement between interested and affected administrations. On Issue B, WRC-19 decided to allocate the 1621.35 – 1626.5 MHz band to the maritime mobile-satellite service ("MMSS") (space-to-Earth) on a co-primary basis.

Agenda Item 1.9.1 (Res 362)

*to consider regulatory actions within the frequency band 156 – 162.05 MHz for autonomous maritime radio devices ("AMRD") to protect the GMDSS and automatic identifications system ("AIS") in accordance with Resolution **362 (WRC-15)**[9] based on the results of ITU-R studies*

Key Points

This agenda item considers the regulation of AMRD's operation in order to enhance safety of navigation and to ensure the integrity of GMDSS. Furthermore, the integrity of the collision avoidance system, AIS, including the AIS VHF data link needs to be ensured.

AMRD are grouped and identified as AMRD Group A that enhance the safety of navigation and AMRD Group B that do not enhance the safety of navigation.

[9] Resolution **362 (WRC-15)**: Autonomous maritime radio devices operating in the frequency band 156 – 162.05 MHz

WRC-19 Decision

WRC-19 identified the frequencies of 156.525 MHz, 161.975 MHz and 162.025 MHz for the use by AMRD Group A using digital selective calling and/or AIS technology and the frequency of 160.9 MHz for the use by AMRD Group B using AIS technology. For Group B AMRD using non-AIS technology, no spectrum was identified by WRC-19.

Agenda Item 1.9.2 (Res 360)

*to consider modifications of the Radio Regulations, including new spectrum allocations to the maritime mobile-satellite service (Earth-to-space and space-to-Earth), preferably within the frequency bands 156.0125 – 157.4375 MHz and 160.6125 – 162.0375 MHz of Appendix **18**, to enable a new VHF data exchange system satellite component, while ensuring that this component will not degrade the current terrestrial VDES components, applications specific messages ("ASM") and AIS operations and not impose any additional constraints on existing services in these and adjacent frequency bands as stated in recognising d) and e) of Resolution **360 (WRC-15)**[10] based on the results of ITU-R studies*

Key Points

This agenda item considers new spectrum allocations to MMSS (Earth-to-space) and (space-to-Earth), preferably within the 156.0125 – 157.4375 MHz and 160.6125 – 162.0375 MHz bands.

WRC-19 Decision

WRC-19 decided to allocate the 157.1875 – 157.3375 MHz and 161.7875 – 161.9375 MHz bands to MMSS (Earth-to-space) and (space-to-Earth) on a secondary basis limited to non-GSO satellite systems operating in accordance with Appendix **18**. The use of these bands in MMSS (space-to-Earth) is subject to agreement obtained under **No. 9.21** with respect to the terrestrial services in Azerbaijan, Belarus, China, Korea (Rep. of), Cuba, the Russian Federation, the Syrian Arab Republic, the Dem. People's Rep. of Korea, South Africa and Viet Nam.

[10] Resolution **360 (WRC-15)**: Consideration of regulatory provisions and spectrum allocations to the maritime mobile-satellite service to enable the satellite component of the VHF Data Exchange System and enhanced maritime radiocommunication

Agenda Item 1.10 (Res. 426)

*to consider spectrum needs and regulatory provisions for the introduction and use of the Global Aeronautical Distress and Safety System ("GADSS"), in accordance with Resolution **426 (WRC-15)**[11]*

Key Points

This agenda item considers spectrum needs and regulatory provisions for the introduction and the use of GADSS.

WRC-19 Decision

WRC-19 decided that NOC is made to RR.

Agenda Item 1.11

*to take necessary actions, as appropriate, to facilitate global or regional harmonised frequency bands to support railway radiocommunication systems between train and trackside ("RSTT") within existing mobile service allocations, in accordance with Resolution **236 (WRC-15)**[12]*

Key Points

This agenda item considers taking appropriate actions to facilitate the identification of globally or regionally harmonised bands for the implementation of RSTT, within existing mobile service allocations.

WRC-19 Decision

WRC-19 decided to add a new WRC Resolution of spectrum harmonisation for RSTT within the existing mobile service allocation to RR Volume 3 to encourage administrations, when planning for their RSTT, to consider the study results as per invites ITU-R, as well as other relevant ITU-R Recommendations/Reports, with a view to facilitating spectrum harmonisation for RSTT, in particular for train radio applications.

[11] Resolution **426 (WRC-15)**: Studies on spectrum needs and regulatory provisions for the introduction and use of the Global Aeronautical Distress and Safety System

[12] Resolution **236 (WRC-15)**: Railway radiocommunication systems between train and trackside

Agenda Item 1.12 (Res. 237)

to consider possible global or regional harmonised frequency bands, to the maximum extent possible, for the implementation of evolving Intelligent Transport Systems ("ITS") under existing mobile-service allocations, in accordance with Resolution ***237 (WRC-15)***[13]

Key Points

This agenda item considers possible globally or regionally harmonised bands for the implementation of evolving ITS under the existing mobile service allocations.

WRC-19 Decision

WRC-19 decided to add a new WRC Recommendation of harmonisation of bands for evolving ITS applications under mobile-service allocations to RR Volume 3 to recommend administrations consider using globally or regionally harmonised bands, or parts thereof, as described in the most recent versions of Recommendations (e.g. ITU-R M.2121), when planning and deploying evolving ITS applications.

Agenda Item 1.13 (Res. 238)

to consider identification of frequency bands for the future development of International Mobile Telecommunications ("IMT"), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution ***238 (WRC-15)***[14]

Key Points

This agenda item considers identification of additional bands for the future development of IMT and additional spectrum allocations to the mobile service on a primary basis in portion(s) of the frequency range between 24.25 and 86 GHz for the future development of IMT for 2020 and beyond, by taking into account the results of ITU-R studies.

[13] Resolution **237 (WRC-15)**: Intelligent Transport Systems applications

[14] Resolution **238 (WRC-15)**: Studies on frequency-related matters for International Mobile Telecommunications identification including possible additional allocations to the mobile services on a primary basis in portion(s) of the frequency range between 24.25 and 86 GHz for the future development of International Mobile Telecommunications for 2020 and beyond

WRC-19 Decision

Frequency Bands	Decision
24.25 – 27.5 GHz	Following additional allocation of the 24.25 – 25.25 GHz band to the mobile service except aeronautical mobile on a primary basis in the Region 1 and 2, WRC-19 identified this whole band, i.e. the 24.25 – 27.50 GHz band, for global use by the terrestrial component of IMT.
31.8 – 33.4 GHz	NOC
37.0 – 40.5 GHz	Following additional allocation of the 40.5 – 42.5 GHz band to the land mobile service on a primary basis globally, WRC-19 identified the 37 – 43.5 GHz band, or portions thereof, for use by the terrestrial component of IMT.
40.5 – 42.5 GHz	
42.5 – 43.5 GHz	
45.5 – 47.0 GHz	WRC-19 identified this whole band for use by countries listed in the Footnote to implement the terrestrial component of IMT. China is not in the Footnote list.
47.0 – 47.2 GHz	NOC
47.2 – 50.2 GHz	WRC-19 identified part of this band, i.e. the 47.2 – 48.2 GHz band, for use by Region 2 and some other countries listed in the Footnote to implement the terrestrial component of IMT. China is not in the Footnote list. WRC-19 decided NOC for the 48.2 – 50.2 GHz band.
50.4 – 52.6 GHz	NOC
66 – 71 GHz	WRC-19 identified this whole band for use by countries to implement the terrestrial component of IMT under the provisions in a new Footnote **No. 5.J113**.
71 – 76 GHz	NOC
81 – 86 GHz	NOC

Agenda Item 1.14 (Res. 160)

to consider, on the basis of ITU-R studies in accordance with Resolution ***160 (WRC--15)***[15]***,*** *appropriate regulatory actions for high-altitude platform stations ("HAPS"), within existing fixed-service allocations*

Key Points

This agenda item considers additional HAPS bands global identification in the fixed service bands at 6440 – 6520 MHz, 6560 – 6640 MHz, 27.9 – 28.2 GHz, 31 – 31.3 GHz, 38 – 39.5 GHz, as well as, for Region 2 only, the 21.4 – 22 GHz and 24.25 – 27.5 GHz bands, and related regulatory actions for HAPS gateway and fixed terminal links to provide broadband connectivity.

WRC-19 Decision

Frequency Bands	**Decision**
6440 – 6520 MHz	NOC
6560 – 6640 MHz	NOC
21.4 – 22 GHz (Region 2 only)	WRC-19 identified this band for use by HAPS in the HAPS-to-ground direction in Region 2.
24.25 – 25.25 GHz (Region 2 only)	WRC-19 identified this band for use by HAPS in the HAPS-to-ground direction in Region 2
25.25 – 27.5 GHz (Region 2 only)	WRC-19 identified this band for use by HAPS in Region 2. HAPS shall be limited to the ground-to-HAPS direction in the 25.25 – 27.0 GHz band and to the HAPS-to-ground direction in the 27.0 – 27.5 GHz band, while the use of the 25.5 – 27.0 GHz band by HAPS is limited to gateway links.
27.9 – 28.2 GHz	NOC, except addition of country name of China in the Footnote **No. 5.537A**. Footnote **No. 5.537A** indicates the countries, in which the allocation to the fixed service in the 27.9 – 28.2 GHz band may be used by HAPS.
31.0 – 31.3 GHz	WRC-19 identified this band for global use by HAPS in both ground-to-HAPS and HAPS-to-ground directions.
38 – 39.5 GHz	WRC-19 identified this band for global use by HAPS in both ground-to-HAPS and HAPS-to-ground directions, with a constraint of that the development

[15] Resolution **160 (WRC-15)**: Facilitating access to broadband applications delivered by high-altitude platform stations

	of the fixed-satellite, fixed and mobile services shall not be unduly constrained by HAPS.
47.2 – 47.5 GHz / 47.9 – 48.2 GHz	These two bands are globally harmonisation bands identified for use by HAPS. WRC-19 amended the provisions of the existing Resolution for the use of these bands by HAPS to review the protection of existing services.

Agenda Item 1.15 (Res. 767)

*to consider identification of frequency bands for use by administrations for the land mobile ("LMS") and fixed services ("FS") applications operating in the frequency range 275 – 450 GHz, in accordance with Resolution **767 (WRC-15)***[16]

Key Points

This agenda item considers identification of spectrum for LMS and FS applications in the 275 – 450 GHz frequency range while maintaining protection of the existing EESS (passive) and the applications of radio astronomy service as identified in RR **No. 5.565**.

WRC-19 Decision

WRC-19 identified the 275 – 296 GHz, 306 – 313 GHz, 318 – 333 GHz and 356 – 450 GHz bands for the implementation of LMS and FS applications with no specific condition and use the 296 – 306 GHz, 313 – 318 GHz and 333 – 356 GHz bands by LMS and FS applications subject to specific conditions ensuring the protection of EESS (passive) applications.

[16] Resolution **767 (WRC-15)**: Studies towards an identification for use by administrations for land-mobile and fixed services applications operating in the frequency range 275 – 450 GHz

Agenda Item 1.16 (Res. 239)

to consider issues related to wireless access systems, including radio local area networks ("WAS/RLAN"), in the frequency bands between 5 150 MHz and 5 925 MHz, and take the appropriate regulatory actions, including additional spectrum allocations to the mobile service, in accordance with Resolution ***239 (WRC-15)***[17]

Key Points

This agenda item considers additional spectrum allocations to the mobile service in the bands between 5150 MHz and 5925 MHz and related regulatory actions.

WRC-19 Decision

Frequency Bands	**Decision**
5150 – 5250 MHz	WRC-19 decided to revise the existing WRC Resolution 229 to relax the restriction of indoor use of mobile stations operating in this band to include usage inside trains and automobiles, as well as controlled and/or limited outdoor usage subject to appropriate measures taken.
5250 – 5350 MHz	NOC
5350 – 5470 MHz	
5725 – 5850 MHz	
5850 – 5875 MHz	
5875 – 5925 MHz	

[17] Resolution **239 (WRC-15)**: Studies concerning Wireless Access Systems including radio local area networks in the frequency bands between 5 150 MHz and 5 925 MHz

Agenda Item 7

to consider possible changes, and other options, 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)***[18]*, in order to facilitate rational, efficient and economical use of radio frequencies and any associated orbits, including the geostationary-satellite orbit*

The agenda item covers 11 Issues, namely Issues A, B, C, D, E, F, G, H, I, J and K.

Issue A – Bringing into use of frequency assignments to all non-GSO satellite systems, and consideration of a milestone-based deployment approach for non-GSO satellite systems in specific bands and services

Key Points

Issue A considers the possible development of regulatory provisions beyond those under RR **Nos. 11.25** and **11.44** of Article 11 on the non-GSO FSS/MSS systems and the implications of the application of milestones to non-GSO FSS/MSS systems brought into use after WRC-15.

WRC-19 Decision

WRC-19 has agreed on the requirement for bringing into use of frequency assignments for non-GSO satellite systems to align with current practice for GSO satellite systems and approved the relevant Footnote changes and additions under Article 11 which includes, inter alia, the decision that non-GSO satellite systems shall be considered as having been brought into use when frequency assignment has been deployed and maintained on one of the notified orbital planes for a continuous period of 90 days.

As regards the requirement on the deployment of the number of satellites for non-GSO systems, WRC-19 decided to adopt a milestone-based approach under a new WRC Resolution which stipulates that the deployment should reach 10%, 50% and 100% of the total number of satellites indicated in the Master Register of the ITU within 2, 5 and 7 years respectively after the end of the seven-year regulatory period.

[18] Resolution **86 (WRC-07)**: Implementation of Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference

Issue B – Application of coordination arc in the Ka-band, to determine coordination requirements between the FSS and other satellite services

Key Points

Issue B considers the introduction of the coordination arc with a value of 8 degrees as coordination criteria between FSS and MSS systems and among MSS systems, in the 29.5 – 30 GHz (Earth-to-space) / 19.7 – 20.2 GHz (space-to-Earth) bands in all 3 Regions, as substitution of the existing trigger of coordination $\Delta T/T > 6\%$.

WRC-19 Decision

WRC-19 decided that the use of coordination arc of 8-degree as coordination criteria between FSS and MSS systems and among MSS systems, in lieu of the existing noise temperature increase criterion in terms of $\Delta T/T > 6\%$.

Issue C – Issues for which consensus was achieved in ITU-R and a single method has been identified

Key Points

Issue C includes 7 sub-Issues which address such things as resolving inconsistencies in regulatory provisions, clarifying certain existing practices, or increasing transparency in the regulatory process. These sub-Issues are viewed as being straightforward and consensus was readily achieved at the meetings.

WRC-19 Decision

WRC-19 approved a number of updates under the RR provisions for resolving inconsistencies, clarifying existing practices and increasing transparency in the regulatory process.

Issue D – Identification of those specific satellite networks and systems with which coordination needs to be effected under RR Nos. 9.12, 9.12A and 9.13

Key Points

Issue D considers the proposal to publish a list of potentially affected satellite networks and/or systems following the receipt of a coordination request for frequency assignments subject to RR **Nos. 9.12**, **9.12A** and **9.13**, rather than a list of affected administrations only.

WRC-19 Decision

WRC-19 decided that the Radiocommunication Bureau should publish a list of affected satellite networks in the case of coordination under RR **Nos. 9.12**, **9.12A** and **9.13**.

Issue E – Resolution related to RR Appendix 30B

Key Points

Issue E addresses a special one-time applicable measure and procedure to be contained in a new WRC Resolution as an enhancement of equitable access to spectrum/orbital resources for developing countries to facilitate the processing of their submission in RR Appendix **30B**.

WRC-19 Decision

WRC-19 approved a new WRC Resolution as an enhancement of equitable access to spectrum/orbital resources in particular for developing countries to facilitate the processing of their submissions for fixed-satellite service under RR Appendix **30B** in the 4500 – 4800 MHz, 6725 – 7025 MHz, 10.70 – 10.95 GHz, 11.20 – 11.45 GHz and 12.75 – 13.25 GHz bands.

Issue F – Measures to facilitate entering new assignments into the RR Appendix 30B List ("the List")

Key Points

Issue F addresses administrations' difficulties in the coordination of submissions of new networks and access to the bands of RR Appendix **30B**. Specifically, it considers the proposals of reducing coordination arc, bringing the size of the coordination arc in line with that used for the unplanned bands and introducing power flux-density ("pfd") masks and levels like those in RR Appendices **30** and **30A**.

WRC-19 Decision

WRC-19 approved measures including revised pfd masks under Annex 3 and Annex 4 of RR Appendix **30B** to facilitate entering new assignments into the List.

Issue G – Updating the reference situation for Regions 1 and 3 networks under RR Appendices 30 and 30A when provisionally recorded assignments are converted into definitive recorded assignments

Key Points

Protection of a satellite network against later submissions is determined by its reference

situation. A new satellite networks could enter provisionally into the List even with disagreement from administrations of the affected satellite networks. The new satellite network could enter definitively in the Lists of RR Appendices **30** and **30A** after being in use for four months without complaint of harmful interference. Issue G studies whether the reference situation of the affected networks should be updated after the new satellite entering definitely in the Lists.

WRC-19 Decision

WRC-19 approved the arrangement for updating the reference situation for Regions 1 and 3 networks under RR Appendices **30** and **30A** in relation to broadcasting-satellite service when provisionally recorded assignments are converted into definitive recorded assignments.

Issue H – Modifications to RR Appendix 4 data items to be provided for non-geostationary satellite systems

Key Points

Issue H relates to the need to ensure that enough RR Appendix **4** data items are provided to facilitate the modelling of non-GSO satellites systems.

WRC-19 Decision

WRC-19 approved the addition of new data items in Annex 2 of Appendix **4** to facilitate the modelling of non-GSO satellites systems.

Issue I – Modified regulatory procedure for non-GSO satellite systems with short-duration missions

Key Points

Issue I addresses a simplified regulatory regime for the advance publication, notification and recording procedures for non-GSO satellite systems with short-duration missions.

WRC-19 Decision

WRC-19 adopted a new WRC Resolution on application of the provisions of Articles 9 and 11 for non-GSO satellite networks and systems identified as short-duration missions. The new WRC Resolution specifies that the total number of satellites in a non-GSO satellite network or system identified as short-duration mission shall not exceed 10 satellites and the typical mass of each satellite should not normally exceed 100 kg. In addition, the operational lifetime of these satellites should in general range from several weeks up to not more than three years.

Issue J – Pfd limit in Section 1, Annex 1 of RR Appendix 30

Key Points

Issue J relates to the modification to allow List assignments to exceed the pfd limit specified in Section 1, Annex 1 of RR Appendix **30**.

WRC-19 Decision

WRC-19 decided that NOC is made to RR.

Issue K – Difficulties for Part B examinations under § 4.1.12 or 4.2.16 of RR Appendices 30 and 30A and § 6.21 c) of RR Appendix 30B

Key Points

Issue K proposes to add one more examination under § 4.1.12 or § 4.2.16 of RR Appendices **30** and **30A** and § 6.21 c) of RR Appendix **30B**, such that should any remaining affected networks whose assignments have been entered in the List, as appropriate, before the submission under § 4.1.12 or § 4.2.16 of RR Appendices **30** and **30A** or § 6.17 of RR Appendix **30B**, ITU-R shall further examine if the remaining corresponding assignments in the List are still considered as being affected.

WRC-19 Decision

WRC-19 approved measures to address the difficulties encountered by the notifying administration for Part B examinations under § 4.1.12 or 4.2.16 of RR Appendices **30** and **30A** and § 6.21 c) of RR Appendix **30B**.

Agenda Items 9.1
(Issues 9.1.1, 9.1.2, 9.1.3, 9.1.4, 9.1.5, 9.1.6, 9.1.7, 9.1.8, 9.1.9)

Agenda item 9.1 is to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention, on the activities of the Radiocommunication Sector since WRC-15

Issue 9.1.1 – Resolution 212 (WRC-15): Implementation of International Mobile Telecommunications in the frequency bands 1885 – 2025 MHz and 2110 – 2200 MHz

Key Points

ITU-R conducted studies to evaluate the coexistence and compatibility between the terrestrial

component of IMT and the satellite component of IMT deployed in neighbouring countries, different concerned countries, and adjacent geographical areas across different countries in the 1980 – 2010 MHz and 2170 – 2200 MHz bands. The studies cover scenarios for satellite component of IMT with different characteristics, and terrestrial component of IMT deployments in several different environments.

WRC-19 Decision

WRC-19 decided to adopt results of the corresponding ITU-R studies and incorporate guidance to the concerned administrations on the implementation of technical and operational measures to facilitate coexistence between terrestrial and satellite components of IMT in the 1980 – 2010 MHz and 2170 – 2200 MHz bands in the existing WRC Resolution **212**.

Issue 9.1.2 – Resolution 761 (WRC-15): Compatibility of International Mobile Telecommunications and broadcasting-satellite service (sound) in the frequency band 1452 – 1492 MHz in Regions 1 and 3

Key Points

The compatibility studies between IMT and BSS (sound) in the 1452 – 1492 MHz band in Regions 1 and 3 were conducted by ITU-R, taking into account IMT and BSS (sound) operational requirements. Currently, there are provisions in RR regarding coordination on potential interference from IMT systems into BSS (sound) receivers and from a BSS (sound) space station into IMT receivers. This issue considers the coordination and pfd limits solutions.

WRC-19 Decision

WRC-19 decided to stipulate pfd limits for the protection of both IMT and BSS (sound) in Region 1 and 3 by modifying the existing WRC Resolution **761** with a view to facilitating the long-term stability of IMT and BSS (sound) in the 1452 – 1492 MHz band in Regions 1 and 3.

Issue 9.1.3 – Resolution 157 (WRC-15): Study of technical and operational issues and regulatory provisions for new non-geostationary satellite orbit systems in the 3700 – 4200 MHz, 4500 – 4800 MHz, 5925 – 6425 MHz and 6725 – 7025 MHz frequency bands allocated to the fixed-satellite service

Key Points

Article 21 of RR contains provisions specifying limits of pfd in the 3700 – 4200 MHz band to ensure compatibility of non-GSO FSS operations with fixed and mobile services.

Provisions are also made under Article 22 of RR in the 3700 – 4200 MHz and the 5925 – 6725 MHz bands on the uplink and downlink equivalent power flux-density ("epfd") limits to ensure compatibility of non-GSO FSS operations with GSO networks. However, no epfd limits are specified under Article 22 for non-GSO systems in the 4500 – 4800 MHz and 6725 – 7025 MHz bands allocated to the FSS and the use of which is subject to the provisions of RR Appendix **30B**. These limits specified for non-GSO FSS operations under Article 21 and Article 22 were established based on sharing studies with highly-elliptical orbits non-GSO systems without taking into account circular orbit non-GSO systems.

ITU-R has published two study reports "Technical and regulatory studies for 6/4 GHz non-GSO FSS sharing" and "Sharing between non-geostationary-satellite orbit systems in the FSS and existing and planned systems in the terrestrial and space services allocated on a primary basis in the frequency bands 3700 – 4200 MHz, 4500 – 4800 MHz, 5925 – 6425 MHz and 6725 – 7025 MHz" on the review of the values of the existing limits applicable to non-GSO systems in the concerned bands under RR Article 21 and Article 22.

WRC-19 Decision

WRC-19 decided that NOC is made to RR as Member States could not agree on the proposed Footnotes added to the relevant bands under Article 5 for regulation of non-GSO satellite systems operating in the concerned bands.

Issue 9.1.4 – Resolution 763 (WRC-15): Stations on board sub-orbital vehicles

Key Points

This issue relates to the studies on the impact of the future deployments of sub-orbital vehicles on radiocommunication and regulations and some aspects would require further consideration.

WRC-19 Decision

WRC-19 decided that NOC is made to RR.

Issue 9.1.5 – Resolution 764 (WRC-15): Consideration of the technical and regulatory impacts of referencing Recommendations ITU-R M.1638-1 and ITU-R M.1849-1 in Nos. 5.447F and 5.450A of the Radio Regulations

Key Points

WRC 2003 allocated the 5150 – 5350 MHz and 5470 – 5725 MHz bands to the mobile

service globally for implementation of wireless access systems including RLANs. Radiolocation service in the 5250 – 5350 MHz band and radiodetermination services in the 5470 – 5725 MHz band should not impose on the mobile service more stringent protection criteria than those stated in Recommendation ITU-R M.1638. During the WRC-15 study cycle, Recommendation ITU-R M.1638 was revised to Recommendation ITU-R M.1638-1 and the technical characteristics and protection criteria for ground based meteorological radars were removed. Given the potential impact on the widespread deployment of RLANs in the 5250 – 5350 MHz and 5470 – 5725 MHz bands, this issue reviews the issue of referencing these Recommendations in RR Footnotes **Nos. 5.447F** and **5.450A**.

WRC-19 Decision

WRC-19 decided to update RR Footnotes **Nos. 5.447F** and **5.450A** by removing the existing references to the Recommendations and making new references to the modified WRC Resolution **229**.

Issue 9.1.6 – Issue 1) in the Annex to Resolution 958 (WRC-15): Studies concerning Wireless Power Transmission for electric vehicles ("WPT-EV"): a) to assess the impact of WPT for electric vehicles on radiocommunication services; b) to study suitable harmonised frequency ranges which would minimise the impact on radiocommunication services from WPT for electrical vehicles

Key Points

ITU-R conducted studies to assess the impact of WPT-EV on radiocommunications and suitable harmonised frequency ranges. The results of the ITU-R studies identified the 19 – 25 kHz, 55 – 5X kHz and 6Y – 65 kHz bands for high-power WPT-EV and the 79 – 90 kHz band for medium-power WPT-EV.

WRC-19 Decision

WRC-19 decided that NOC is made to RR.

Issue 9.1.7 – Issue 2) in the Annex to Resolution 958 (WRC-15): Studies to examine: a) whether there is a need for possible additional measures in order to limit uplink transmissions of terminals to those authorised terminals; b) the possible methods that will assist administrations in managing the unauthorised operation of earth station terminals deployed within its territory

Key Points

ITU-R studies examined the need for additional measures to limit uplink transmissions of

earth stations to authorised ones and possible methods to assist administrations in managing unauthorised operation of earth stations. With respect to issue 9.1.7 a) and b), two options of NOC and development of a new WRC Resolution to assist administrations with the application of RR **No. 18.1** and an option of provision of necessary guidelines on satellite monitoring capabilities to assist administrations with managing unauthorised operation of earth stations deployed within their territory have been identified respectively.

WRC-19 Decision

WRC-19 decided to add a new WRC Resolution of measures to limit unauthorised uplink transmissions from earth stations.

Issue 9.1.8 – Issue 3) in the Annex to Resolution 958 (WRC-15): Studies on the technical and operational aspects of radio networks and systems, as well as spectrum needed, including possible harmonised use of spectrum to support the implementation of narrowband and broadband machine-type communication ("MTC") infrastructures in order to develop Recommendations, Reports and/or Handbooks, as appropriate, and to take appropriate actions within the ITU-R scope of work.

Key Points

This issue addresses the harmonised use of spectrum to support the implementation of narrowband and broadband MTC infrastructures.

WRC-19 Decision

WRC-19 decided that NOC is made to RR.

Issue 9.1.9 – Resolution 162 (WRC-15): Studies relating to spectrum needs and possible allocation of the frequency band 51.4 – 52.4 GHz to the fixed-satellite service (Earth-to-space)

Key Points

ITU-R conducted studies considering additional spectrum needs for development of FSS and sharing and compatibility studies with existing services to determine the suitability of new primary allocations to FSS in the 51.4 – 52.4 GHz (Earth-to-space) band limited to FSS gateway links for GSO orbit use, and the possible associated regulatory actions.

WRC-19 Decision

WRC-19 approved the allocation of the 51.4 – 52.4 GHz band for FSS (Earth-to-space) for all the three Regions. Use of this band is limited to GSO satellite networks. In addition,

the earth stations operating in this band shall be limited to gateway earth stations with a minimum antenna diameter of 2.4 metres.