

**Hong Kong's Positions on Agenda Items for
World Radiocommunication Conference 2019**

Purpose

This paper covers Hong Kong's positions on the relevant agenda items of the World Radiocommunication Conference 2019 ("WRC-19") of the International Telecommunication Union, which will be held in Sharm el-Sheikh, Egypt from 28 October to 22 November 2019.

Background

2. At previous meetings of the Radio Spectrum and Technical Standards Advisory Committee ("SSAC"), the Office of the Communications Authority ("OFCA") presented SSAC Papers [1/2018](#), [9/2018](#) and [1/2019](#) in relation to the coming WRC-19 including its agenda items relevant to Hong Kong and Hong Kong's preliminary positions on these agenda items.

3. Earlier this year, OFCA attended the 2nd session of the Conference Preparatory Meeting ("CPM") for WRC-19 and the 5th meeting of the Asia Pacific Telecommunity ("APT") Conference Preparatory Group for WRC-19 in order to monitor the relevant development. In this regard, CPM has compiled a report ("CPM Report") summarising relevant matters, considerations and methods to satisfy the respective agenda items to facilitate fruitful discussions in WRC-19. Same as other regional organisations, APT also works with its members to develop common proposals ("ACPs") for some WRC-19 agenda items to facilitate WRC-19 in reaching consensus on the relevant matters.

4. Having considered SSAC Members' previous comments on the relevant matters, CPM Report and the preliminary ACPs on hand, OFCA recently met with the Ministry of Industry and Information Technology of

China exchanging views on the WRC-19 agenda items. OFCA will join the Chinese delegation to attend WRC-19.

Hong Kong's Positions

5. Having regard to the above-said discussions, OFCA formulated Hong Kong's positions on the WRC-19 agenda items as enclosed in **Annex**.

Advices Sought

6. Members are welcome to offer comments on Hong Kong's position on the relevant WRC-19 agenda items.

Office of the Communications Authority
September 2019

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 and Methods to Satisfy this Agenda Item

This agenda item (“AI”) concerns a possible new allocation to the amateur service in the 50 – 54 MHz band for Region 1 with a view to achieving full or partial harmonisation with that of Regions 2 and 3.

Four Methods², including no change (“NOC”) to the Radio Regulations (“RR”), are proposed in the report as prepared and approved by the Conference Preparatory Meeting at its second session (“CPM Report”) for WRC-19 to satisfy this AI:

- Method A: An allocation to the amateur service on a primary basis in Region 1 in the 50 – 54 MHz band, or part thereof;
- Method B: An allocation to the amateur service on a secondary basis in Region 1 in the 50.080 – 50.280 MHz band (Method B1), or in the 50 – 52 MHz band (Method B2);
- Method C: An allocation to the amateur service in Region 1 on a partly primary and partly secondary basis in all or part of the 50 – 54 MHz band;
- Method D: NOC.

Consideration

This AI covers spectrum use in Region 1 of the International Telecommunications Union (“ITU”).

Hong Kong’s Position

Neutral.

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

² “Method” is the term of the International Telecommunications Union for proposals of resolving an agenda item. The proposal may cover technical, regulatory, operational and/or procedural approaches, to satisfy a WRC agenda item.

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)³

Key Points and Methods to Satisfy this Agenda Item

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

Four Methods for the 399.9 – 400.05 MHz band (A, B, C and D), and three Methods for the 401 – 403 MHz band (E, F and G) are proposed in CPM Report to satisfy this AI.

- Method A: NOC;
- Method B: Addition of a new footnote in the 399.9 – 400.03 MHz band in the Table of Frequency Allocations in RR Article 5 to include relevant equivalent isotropically radiated power (“e.i.r.p.”) limits and leaving the 400.03 – 400.05 MHz band without e.i.r.p. limits. This Method proposes a transition period up to 22 November 2024 for some systems operating in MSS;
- Method C: Similar to Method B above, except that the relevant e.i.r.p. limits are specified to be within reference bandwidth of 4 kHz and within 399.9 – 400.05 MHz without leaving any bands without e.i.r.p. limits;
- Method D: Addition of a new footnote in the 399.9 – 400.02 MHz band in the Table of Frequency Allocations in RR Article 5 to include the relevant e.i.r.p. limits and leaving the 400.02 – 400.05 MHz band without e.i.r.p. limits. This Method proposes a transition period up to 22 November 2029 for some systems operating in MSS; and
- Method E: Addition of a new footnote in the 401 – 403 MHz band in the Table of Frequency Allocations in RR Article 5 to include the relevant e.i.r.p. limits within reference bandwidth of 4 kHz. This Method proposes a transition period up to 22 November 2024 or 2029 (date to be decided by WRC-19), depending on WRC-19 decision.

³ 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

- Method F: Addition of a new footnote in the bands within the frequency range of 401 – 403 MHz in the Table of Frequency Allocations in RR Article 5 to include both the relevant e.i.r.p. limits and e.i.r.p. densities in different bands. This Method proposes specific measures for telecommand operations to ensure protection of EESS and MetSat.
- Method G: Addition of a new footnote in the 401 – 403 MHz band in the Table of Frequency Allocations in RR Article 5 to include the relevant e.i.r.p. limits and developing a WRC Resolution, which provides provisions for continuation of some telecommand operations while ensuring the protection of EESS and MetSat in these bands after 1 January 2029.

Consideration

In Hong Kong, the 399.9 – 400.5 GHz band is vacant and yet to be planned, while the 401 – 403 MHz band is allocated to the Meteorological aids service (“MetAids”), EESS (Earth-to-space) and MetSat (Earth-to-space) on a primary basis. Report SA.2430-0 of the ITU Radiocommunication Sector (“ITU-R”) provides technical characteristics and results of ITU-R studies for in-band power limits applicable to earth stations in MSS in the 399.9 – 400.05 MHz band and that of MetSat and EESS in the 401 – 403 MHz band. Such ITU-R studies show that non-geostationary MSS earth station (Earth-to-space) in telecommand operations are not compatible with the low power operations of MSS, EESS, and MetSat systems in the 399.9 – 400.05 MHz and 401 – 403 MHz bands respectively.

Hong Kong’s Position

Hong Kong supports the establishment of appropriate in-band power limits for earth stations transmitting in the 399.9 – 400.05 MHz and 401 – 403 MHz bands for telecommand purposes with a transition period introduced.

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)⁴

Key Points and Methods to Satisfy this Agenda Item

This AI concerns upgrade of MetSat (space-to-Earth) allocation from secondary to primary status in the 460 – 470 MHz band and addition of a primary allocation of EESS (space-to-Earth) in the band. While protection to the existing primary services to which the band is already allocated and to services in the adjacent bands, as well as the conditions contained in RR No. **5.289** would be maintained, no additional constraints should be imposed in this regard.

The following three Methods are proposed in CPM Report to satisfy this AI:

- Method A: NOC;
- Method B: An upgrade of MetSat (space-to-Earth) allocation from secondary to primary status and addition of a primary EESS (space-to-Earth) allocation in the 460 – 470 MHz band, followed by introduction of power flux-density (“pfd”) limits for both geostationary (“GSO”) and non-GSO MetSat / EESS satellites to protect terrestrial services, and a new WRC Resolution to provide the transitional measures for the existing MetSat / EESS frequency assignments; and
- Method C: An upgrade of MetSat (space-to-Earth) allocation from secondary to primary status and addition of a primary EESS (space-to-Earth) allocation in the 460 – 470 MHz band, followed by introduction of a new WRC Resolution to protect existing terrestrial services in the 460 – 470 MHz band by introducing regulatory provisions, including pfd limits for both GSO and non-GSO MetSat / EESS satellites and also grandfathering the existing MetSat / EESS frequency assignments.

Consideration

In Hong Kong, the 460 – 470 MHz band is allocated to land mobile service (“LMS”). ITU-R Report SA.2429 gives the relevant studies related to this AI, for which it is based on the most restrictive study results on pfd levels as required to protect mobile service (“MS”) and fixed service (“FS”) systems due to MetSat / EESS satellite downlinks. The said ITU-R

⁴ 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.

studies have determined the applicable pfd limits on downlink of non-GSO and GSO satellites.

Hong Kong's Position

Hong Kong supports upgrading the secondary allocation of MetSat (space-to-Earth) service to primary allocation and adding a new allocation to EESS (space-to-Earth) on a primary basis in the 460 – 470 MHz band, subject to the need for protecting the existing primary services.

Agenda Item 1.4

to consider the results of studies in accordance with Resolution 557 (WRC-15)⁵, 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 networks

Key Points and Methods to Satisfy this Agenda Item

This AI considers the removal of some or all of the current limitations on the use of orbital arc for broadcasting-satellite service (“BSS”) networks in Annex 7 to RR Appendix 30 (Rev. WRC-15). Two Methods are proposed.

- Method A: NOC; and
- Method B: This Method proposes to retain some limitations in Annex 7 which are classified as “A1b”, “A2c” and “B” in CPM Report while the others would be deleted. It also recommends adding new resolutions for protection of new BSS networks with respect to limitations “A1a” and “A2a”, and giving priority to national assignments in the Regions 1 and 3 Plan with equivalent downlink protection margin values equal to or below -10dB.

Consideration

In the 11.7 – 12.7 GHz band, BSS and fixed-satellite service (“FSS”) networks from different Regions may operate simultaneously and share orbital resource in their respective Regions. Both Methods will not reduce the level of protection to existing BSS and FSS services in the 11.7 – 12.7 GHz band in Region 3.

Hong Kong’s Position

Neutral.

⁵ Resolution 557 (WRC-15): Consideration of possible revision of Annex 7 to Appendix 30 of the Radio Regulations

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 communicating (“ESIM”) with geostationary space stations in the fixed-satellite service and take appropriate action, in accordance with Resolution 158 (WRC-15)⁶

Key Points and Methods to Satisfy this Agenda Item

This AI considers the use of the 17.7 – 19.7 GHz band (space-to-Earth) and 27.5 – 29.5 GHz band (Earth-to-space) by ESIM communicating with GSO space stations in FSS. Three categories of ESIM, i.e. aeronautical, maritime and land, are considered depending on the type of vehicle on which they are installed.

The following two Methods have been identified for this AI:

- Method A: NOC; and
- Method B: Addition of a new footnote No. **5.A15** in RR Article 5 and a reference to a new WRC Resolution providing technical, operational and regulatory conditions for the operation of ESIM and protection of the services to which the bands are allocated.

Consideration

In Hong Kong, the 17.7 – 19.7 GHz band is allocated to FS and FSS (space-to-Earth and Earth-to-space). The 27.5 – 28.35 GHz band is allocated to FS, MS and FSS (Earth-to-space), while the 28.35 – 29.5 GHz band is allocated to FS and FSS (Earth-to-space). ITU-R has conducted sharing and compatibility studies between ESIMs and existing services operating in the 17.7 – 19.7 GHz and 27.5 – 29.5 GHz bands, and provides details on how ESIMs can protect these existing services. For instance, it is proposed that ESIMs should not claim protection from terrestrial services operating in the 17.7 – 19.7 GHz band and should not cause unacceptable interference to receiving stations of terrestrial services operating in the 27.5 – 29.5 GHz band. In addition, some ITU-R studies conclude that ESIMs would not cause interference to EESS (passive) operating in the 18.6 – 18.8 GHz band as both services are receiving signals in this band.

⁶ 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

Hong Kong's Position

Hong Kong supports the development of technical and operational conditions as well as regulatory provisions for ESIMs operating in the 17.7 – 19.7 GHz and 27.5 – 29.5 GHz bands in order to protect existing services to which these bands are allocated.

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)⁷

Key Points and Methods to Satisfy this Agenda Item

This AI considers two issues related to the development of regulatory framework for non-GSO FSS satellite systems in the 50/40 GHz bands.

Issue 1

Issue 1 concerns the development of a regulatory framework for non-GSO FSS satellite systems that may operate in the 37.5 – 39.5 GHz band (space-to-Earth), 39.5 – 42.5 GHz band (space-to-Earth), 47.2 – 50.2 GHz band (Earth-to-space) and 50.4 – 51.4 GHz band (Earth-to-space). There are two Methods to address this issue.

- Method A: Modify RR Article 22 to enable the operation of non-GSO systems in the concerned bands; and
- Method B: To carry forward the studies to a new WRC-23 agenda item.

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. There are two options to be considered –

- OPTION A: Revision of limits for non-GSO systems only; and
- OPTION B: Revision of limits for both GSO networks and non-GSO systems

Consideration

Issue 1

The 50/40 GHz bands are not allocated to FSS in Hong Kong. Currently, there is no regulatory provision in RR for sharing the 50/40 GHz bands between non-GSO and GSO networks. The development of technical, operational and regulatory provisions in these bands would facilitate sharing of the said bands between non-GSO and GSO FSS / BSS /

⁷ 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)

MSS networks.

Issue 2

In Hong Kong, all emissions in the concerned band is prohibited.

Hong Kong's Position

Hong Kong supports Method A for Issue 1, i.e. to develop sharing criteria between non-GSO systems and GSO networks and has a neutral position on Issue 2, i.e. protection of EESS (passive) in the 50.2 – 50.4 GHz band.

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)⁸

Key Points and Methods to Satisfy this Agenda Item

This AI considers the spectrum needs for TT&C in SOS for non-GSO SD missions and also 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 considered in this regard.

The following four Methods and associated regulatory texts are developed to satisfy this AI:

- Method A: NOC;
- Method B1: A new SOS (Earth-to-space) allocation for non-GSO SD systems in the 403 – 404 MHz band;
- Method B2: A new SOS (Earth-to-space) allocation for non-GSO SD systems in the 404 – 405 MHz band; and
- Method C: Using SOS allocation in the 137 – 138 MHz band for downlink and the 148 – 149.9 MHz band for uplink and providing appropriate associated regulatory provisions in RR for telecommand links of non-GSO SD.

Consideration

In Hong Kong, the 137 – 138 MHz and 148 – 149.9 MHz bands are allocated to MetSat (space-to-Earth) and LMS respectively while the 403 – 406 MHz is allocated to MetAids on a primary basis. ITU-R studies found that the existing allocations in the 148 – 149.9 MHz band (Earth-to-space) and 137 – 138 MHz band (space-to-Earth) could accommodate the spectrum needs of non-GSO SD missions, while further ITU-R studies are required for introduction of appropriate regulatory and technical provisions in RR. ITU-R studies for the 403 – 406 MHz band show varying conclusions regarding the feasibility of sharing between new allocations for non-GSO SD systems and MetAids however.

⁸ Resolution 659 (WRC-15): Studies to accommodate requirements in the space operation service for non-geostationary satellites with short duration missions

Hong Kong's Position

Hong Kong supports Method C, i.e. using SOS allocations in the 137 – 138 MHz band for downlink and the 148 – 149.9 MHz band for uplink, and introducing appropriate regulatory provisions in RR for telecommand links of non-GSO SD missions.

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)⁹

Key Points and Methods to Satisfy this Agenda Item

This AI covers two issues concerning GMDSS. Issue A concerns the modernisation of GMDSS through the introduction of Navigational Data (“NAVDAT”) service into GMDSS. Issue B concerns the introduction of an additional satellite system into GMDSS.

Issue A

The International Maritime Organisation (“IMO”) has adopted a modernisation plan for GMDSS. New technologies for possible introduction in modernised GMDSS include 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 MF and HF bands. This AI considers regulatory provisions for both MF and HF NAVDAT applications and three Methods (A1, A2 and A3) are proposed to satisfy this issue.

Method A1 proposes NOC.

Method A2 includes frequencies to be used for MF and HF NAVDAT systems, in support of GMDSS modernisation.

Method A3 is similar to Method A2 with the following conditions:

- NAVDAT transmits only from coastal stations; and
- Their usage is subject to agreement of the affected administrations.

Issue B

At present, IMO has only one satellite system in GMDSS. Issue B concerns the introduction of additional satellite systems into GMDSS.

⁹ Resolution 359 (WRC-15): Consideration of regulatory provisions for updating and modernisation of the Global Maritime Distress and Safety System

Four Methods (B1, B2, B3 and B4) are proposed to reflect in RR the frequencies in the 1616 – 1626.5 MHz band as used by a non-GSO MSS GMDSS satellite system.

Method B1 proposes retaining the secondary allocation to MSS (space-to-Earth) in the 1613.8 – 1626.5 MHz band, while adding a footnote in MSS allocation to identify their use in GMDSS and adding the 1616 – 1626.5 MHz band to Table 15-2 of RR Appendix **15**, as well as provisions RR No. **33.50** and RR No. **33.53** of RR Article **33**, followed by modification of provisions RR Nos. **5.364** and **5.368** to avoid any inconsistency and ambiguity on the regulatory status of the maritime mobile service (MMS) in the 1616 – 1626.5 MHz band when used for GMDSS.

Method B2 is divided into two sub-Methods as follows:

- Method B2(a): Same as Method B1 above (i.e. retaining the secondary allocation to MSS (space-to-Earth) in the 1613.8 – 1626.5 MHz band), except with NOC to RR No. **5.364**, and addition of a footnote to prevent constraints on MSS on adjacent band; and
- Method B2(b): Same as Method B4 below (i.e. upgrade of the allocation to MSS (space-to-Earth) to primary in the 1621.35 – 1626.5 MHz band) with addition of a footnote to prevent constraints on MSS on the adjacent band

Method B3 proposes NOC.

Method B4 proposes upgrading the maritime mobile-satellite service (“MMSS”) from secondary to primary allocation in the 1621.35 – 1626.5 MHz band and defining in RR the unwanted emission limits for protecting radio astronomy service (“RAS”).

Consideration

Issue A

In Hong Kong, the relevant MF and HF sub-bands as considered in ITU-R studies under this issue are allocated to MMS on a primary basis.

Issue B

In Hong Kong, the 1616 – 1626.5 MHz band is covered by the Telecommunications (Telecommunications Apparatus) (Exemption from Licensing) Order for use by mobile earth stations without the need for licensing. According to CPM Report, regarding the regulatory status of non-GSO MSS system, any potential adverse impact in respect of any change to the regulatory status of other systems operating in the concerned or adjacent bands, or the

apparent inconsistency and potential constraint of RR No. **5.368** have not been studied. Furthermore, the compatibility issues related to the protection of RAS have not been solved.

Hong Kong's Position

For Issue A, Hong Kong supports the inclusion of additional frequencies for MF and HF NAVDAT systems in support of GMDSS modernisation.

For Issue B, Hong Kong supports the introduction of additional satellite systems into GMDSS taking into consideration IMO's activities, while ensuring no additional impact on the services to which the band is allocated, particularly RAS, within the identified band and the adjacent bands under study.

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)¹⁰ based on the results of ITU-R studies

Key Points and Methods to Satisfy this Agenda Item

This AI 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 and AIS including AIS VHF data link needs to be ensured.

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

Four Methods regarding the different types of AMRD and the technologies used are proposed.

Method A considers amendments to the footnote f) in RR Appendix 18 to allow AMRD Group A to operate on frequency channel 156.525 MHz (channel 70), 161.975 MHz (channel 2087/AIS 1) and 162.025 MHz (channel 2088/AIS 2),

Considering the harmonisation on use of spectrum for AMRD Group B, the following three Methods (B1, B2 and B3) are proposed:

- Method B1: Use of frequency channel 160.9 MHz (channel 2006) as listed in RR Appendix 18 for AIS technology;
- Method B2: Use of channels 2006 as listed in RR Appendix 18 for AIS technology and use of 161.525 MHz (channel 2078), 161.550 MHz (channel 2019) and 161.575 MHz (channel 2079) as listed in RR Appendix 18 for non-AIS technology; and
- Method B3: Use of channel 2006 as listed in RR Appendix 18 for AIS technology and channels 2078, 2019 and 2079 as listed in RR Appendix 18 for non-AIS technology, with an e.i.r.p. limitation inserted in RR.

Consideration

In Hong Kong, the 156 – 162.05 MHz band is allocated to MMS on a primary basis.

¹⁰ Resolution 362 (WRC-15): Autonomous maritime radio devices operating in the frequency band 156 – 162.05 MHz

Hong Kong's Position

Hong Kong supports identification of appropriate frequency channels, as well as determination of the related technical / operational characteristics and device classification, for the respective groups of AMRDs operating in the 156 – 162.05 MHz band.

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)¹¹ based on the results of ITU-R studies

Key Points and Methods to Satisfy this Agenda Item

This AI 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.

Six Methods are proposed in CPM Report to satisfy this AI. The main differences among these Methods lie on the frequency plan and pfd mask to be imposed on MMSS (space-to-Earth) emissions, which are further described in ITU-R Report M.2435-0.

The Methods to satisfy this AI are summarised as follows:

- Method A: NOC;
- Method B: Based on frequency plan alternative 2 in section 3.3 of ITU-R Report M.2435-0 with new primary allocations for MMSS (Earth-to-space and space-to-Earth) and introduction of coordination mechanism with respect to terrestrial services under RR No. **9.14** with two options for the pfd masks provided in ITU-R Recommendation M.2092-0 and Annex 2 of ITU-R Report M.2435-0;
- Method C: Based on same frequency plan as Method B but with new secondary allocations for MMSS (Earth-to-space) and (space-to-Earth);
- Method D: Based on same frequency plan as Method C except with the addition of a pfd limit, as defined in section 6.1.2.2.3.2 of ITU-R Report M.2435-0 or section 6.1.2.2.2 of ITU-R Report M.2435-0, in RR Article 5 in order to protect the terrestrial services;
- Method E: Based on same frequency plan as Method B but with new secondary allocations for MMSS (Earth-to-space) and (space-to-Earth) subject to agreement

¹¹ 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

obtained under No. 9.21 of RR to be limited to the use of VDES satellite component (“VDE-SAT”) to ensure compatibility with existing services; and

- Method F: Based on frequency plan alternative 3 in section 3.3 of ITU-R Report M.2435-0 with new primary allocations for MMSS (Earth-to-space) and (space-to-Earth) with introduction of coordination mechanism with respect to terrestrial services with the pfd masks provided in ITU-R Recommendation M.2092-0.

Consideration

Compatibility between downlink of the satellite component of VDES and MS as well as FS has been evaluated by two methodologies. They lead to four different pfd masks (based on different assumptions) with a view to ensuring compatibility with the incumbent FS and MS.

Hong Kong’s Position

Hong Kong supports new frequency allocations to MMSS for VDE-SAT within the 156.0125 – 157.4375 MHz and 160.6125 – 162.0375 MHz bands, while ensuring no additional impact on existing services and systems within the same and adjacent bands.

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)¹²

Key Points and Methods to Satisfy this Agenda Item

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

Three Methods (A, B and C) are proposed in CPM Report, each of which includes NOC to RR Article 5, i.e. the Table of Frequency Allocations.

Method A suggests modification of RR Article 30 and addition of a new RR Article 34A to recognise GADSS in RR.

Comparing with Method A, Method B proposes different modifications to RR Article 30 and RR Article 34A, and a new WRC Resolution concerning the development of ITU-R Recommendations to list out the bands of the systems contributing to GADSS, their technical characteristics and protection criteria. It also advocates that systems composing GADSS shall only operate in primary allocations when used for safety purposes.

Method C proposes NOC.

Consideration

In Hong Kong, the 406 – 406.1 MHz band is allocated to MSS (Earth-to-space) and is deployed solely for emergency position-indicating radio beacon (“EPIRB”). Based on the studies within the International Civil Aviation Organisation (“ICAO”), ICAO determined that the GADSS requirements can be satisfied using existing systems operating within existing aeronautical frequency allocations and distress spectrum, including the use of EPIRB operating in the 406 – 406.1 MHz band. Thus, NOC to RR Article 5 was proposed by ICAO for the introduction of GADSS.

Hong Kong’s Position

Hong Kong supports the implementation of GADSS and prefers Method A.

¹² Resolution 426 (WRC-15): Studies on spectrum needs and regulatory provisions for the introduction and use of the Global Aeronautical Distress and Safety System

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)¹³

Key Points and Methods to Satisfy this Agenda Item

This AI considers appropriate actions to facilitate the identification of global or regional harmonised bands for implementation of RSTT, within existing mobile service allocations.

The following three Methods are proposed in CPM Report to satisfy this AI:

- Method A: NOC;
- Method B: Addition of a new Resolution [A111-METHOD B] (WRC-19) specifying the frequency ranges for RSTT and referencing the most recent version of ITU-R Recommendation M.[RSTT_FRQ]; and
- Method C: Addition of a new Resolution [B111-METHOD C] (WRC-19) without specifying frequency ranges for RSTT, while referencing the most recent version of ITU-R Recommendation M.[RSTT_FRQ].

Consideration

In Hong Kong, the allocations for the relevant bands under consideration by ITU-R for RSTT are listed below –

Agenda Item 1.11 Concerned Frequency	Hong Kong Allocation	
	Bands	Primary Allocation unless otherwise stated
138 – 174 MHz	138 – 174 MHz	Most part of this band is allocated to the land mobile service and maritime mobile service.
335.4 – 470 MHz	335.4 – 406.1 MHz	Fixed, mobile, mobile satellite, meteorological aids, earth exploration satellite, and/or meteorological satellite services (except the 399.9 – 400.05 MHz band which is yet to be planned)
	406.1 – 430 MHz	Fixed service Land mobile service
	430 – 440 MHz	<i>Primary allocation:</i> Radiolocation service

¹³ Resolution 236 (WRC-15): Railway radiocommunication systems between train and trackside

		<i>Secondary allocation: Amateur service</i>
	440 – 470 MHz	Land mobile service
703 – 748 MHz	703 – 748 MHz	Broadcasting service
758 – 803 MHz	758 – 798 MHz	Broadcasting service
	798 – 803 MHz	Broadcasting service Mobile service
873 – 915 MHz	873 – 915 MHz	Land mobile service
918 – 960 MHz	918 – 960 MHz	
1770 – 1880 MHz	1770 – 1880 MHz	Fixed service Mobile service
43.5 – 45.5 GHz	43.5 – 45.5 GHz	To be planned
92 – 109.5 GHz	92 – 100 GHz	To be planned
	100 – 102 GHz	All emissions prohibited
	102 – 109.5 GHz	To be planned

ITU-R study shows that the total spectrum needs for train radio applications of RSTT in a typical scenario would be 11.9 MHz to 14.04 MHz (for uplink), and 4.7 MHz to 8.37 MHz (for downlink).

Hong Kong's Position

Hong Kong supports global or regional harmonisation of bands for RSTT within the existing MS allocations.

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)¹⁴

Key Points and Methods to Satisfy this Agenda Item

This AI considers possible identification of global or regional harmonised bands for implementation of evolving ITS under the existing MS allocations.

The following three Methods are proposed in CPM Report to satisfy this AI:

- Method A: NOC;
- Method B: Addition of a new WRC Resolution to encourage the use of 5850 – 5925 MHz band, or parts thereof, as global harmonised evolving ITS bands and the use of other harmonised bands for evolving ITS applications by referring to the most recent version of ITU-R Recommendation M.2121; and
- Method C: Addition of a new WRC Resolution to encourage the use of globally and regionally harmonised bands for evolving ITS applications by referring to the most recent version of ITU-R Recommendation M.2121.

Consideration

In Hong Kong, the 5850 – 5925 MHz band is allocated to FS and FSS (Earth-to-space) on a primary basis, while part of which, i.e. the 5850 – 5875 MHz band, is also allocated to the industrial, scientific and medical equipment on a primary basis. ITU-R studies indicated that, for some countries in each of the three Regions, the 5850 – 5925 MHz band or parts thereof has been designated for the deployment of evolving ITS. ITU-R Recommendation M.2121 recommends that several bands within each Region, in whole or in part, be used for current and future ITS applications.

Hong Kong’s Position

Hong Kong supports the addition of a new WRC Resolution, i.e. Method B or C, to encourage the identification of global or regional harmonised bands for implementation of evolving ITS under the existing MS allocations, while ensuring adequate protection of the existing primary services operating in the same band.

¹⁴ Resolution 237 (WRC-15): Intelligent Transport Systems 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)¹⁵

Key Issue and Methods to Satisfy this Agenda Item

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

The Methods to satisfy this AI are organised by bands. NOC is a choice for all candidate bands as included in CPM Report. Other Methods are accompanied by two alternatives for IMT identification, i.e. Alt 1 and Alt 2 for identifying the band for the terrestrial component of IMT within LMS, and the terrestrial component of IMT respectively. Furthermore, more conditions for protecting the respective services are included, as appropriate.

The table below summarises the candidate bands between 24.25 and 86 GHz together with the applicable Methods –

Candidate Bands	Applicable Methods
24.25 – 27.5 GHz	NOC, IMT identification (Alt 1 or 2)
31.8 – 33.4 GHz	NOC
37 – 40.5 GHz	NOC, IMT identification (Alt 1 or 2)
40.5 – 42.5 GHz	NOC, IMT identification (Alt 1 or 2)
42.5 – 43.5 GHz	NOC, IMT identification (Alt 1 or 2)
45.5 – 47.0 GHz	NOC with proposal for further ITU-R study, NOC, IMT identification (Alt 1 or 2)
47.0 – 47.2 GHz	NOC with proposal for further ITU-R study, NOC, IMT identification (Alt 1 or 2)
47.2 – 50.2 GHz	NOC, IMT identification (Alt 1 or 2)
50.4 – 52.6 GHz	NOC, IMT identification (Alt 1 or 2)

¹⁵ 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

66 – 71 GHz	NOC, IMT identification (Alt 1 or 2)
71 – 76 GHz	NOC, IMT identification (Alt 1 or 2)
81 – 86 GHz	NOC, IMT identification (Alt 1 or 2)

Consideration

Regarding the list of candidate bands, the corresponding frequency allocations in Hong Kong are tabulated below –

Candidate Bands	Primary Allocation unless otherwise stated
24.25 – 27.5 GHz	Fixed service (24.25 – 27.5 GHz) Mobile service (24.25 – 27.5 GHz) Radionavigation service (24.25 – 24.65 GHz) FSS (Earth-to-space) (24.75 – 25.25 GHz) FSS (Earth-to-space) (27 – 27.5 GHz)
31.8 – 33.4 GHz	To be planned (31.8 – 33 GHz) Radionavigation service (33 – 33.4GHz)
37 – 40.5 GHz	Fixed service (37 – 39.5 GHz) To be planned (39.5 – 40.5 GHz)
40.5 – 42.5 GHz	To be planned
42.5 – 43.5 GHz	To be planned
45.5 – 47.0 GHz	To be planned
47.0 – 47.2 GHz	Amateur service Amateur satellite service
47.2 – 50.2 GHz	To be planned
50.4 – 52.6 GHz	Fixed service (50.4 – 51.15 GHz) To be planned (51.15 – 52.6 GHz)
66 – 76 GHz	To be planned
81 – 86 GHz	To be planned

Except the 45.5 – 47.2 band for which no ITU-R sharing studies were performed, ITU-R studies show that sharing of the concerned bands is feasible between IMT and FSS (space-to-Earth or Earth-to-space), subject to deployment of FSS earth stations at specific locations and the adoption of mitigation measures to address potential cases of interference so as to achieve compatibility between IMT stations and FSS space stations. In addition, with a view to protecting EESS (passive) in adjacent bands, suitable limits on unwanted emissions from IMT stations should be introduced.

Hong Kong's Position

Hong Kong supports the identification of additional bands, including possible additional allocations to MS on a primary basis, for future development of IMT systems, and the needs of imposing technical constraints and mitigating measures to ensure proper protection of the existing services in the same and adjacent bands.

Agenda Item 1.14 (Res. 160)

to consider, on the basis of ITU-R studies in accordance with Resolution 160 (WRC-15)¹⁶, appropriate regulatory actions for high-altitude platform stations (“HAPS”), within existing fixed-service allocations

Key Points and Methods to Satisfy this Agenda Item

This AI considers additional HAPS identification worldwide in FS 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.

The following generic Methods are outlined in CPM Report to satisfy this AI for the corresponding nine bands under study:

- Method A: NOC;
- Method B: Identification of bands for HAPS, in accordance with Resolution 160 (WRC-15) with options:
 - Method B1: Revision of the regulatory provisions for HAPS in FS with a primary status in bands already identified for HAPS;
 - Method B2: Addition of new identification(s) for HAPS in bands already allocated to FS with a primary status;
 - Method B3: Addition of a primary allocation to FS and a new identification for HAPS in the 24.25 – 25.25 GHz band (Region 2) not already allocated to FS; and
- Method C: Suppression of the existing HAPS identification, pursuant to resolves 3 of Resolution 160 (WRC-15).

An overview of Methods and relevant options considered under this AI is provided in the table below

¹⁶ Resolution 160 (WRC-15): Facilitating access to broadband applications delivered by high-altitude platform stations

Table 1/1.14/4 in CPM Report

Summary of Methods to satisfy the agenda item and associated bands

No.	Bands	Methods and Options		
		Method A	Method B	Method C
1	6440 – 6520 MHz	√	B1	√
2	6560 – 6640 MHz	√	Not proposed	√
3	21.4 – 22 GHz (R2 only)	√	B2	N/A
4	24.25 – 25.25 GHz (R2 only)	√	B3	N/A
5	25.25 – 27.5 GHz (R2 only)	√	B2	N/A
6	27.9 – 28.2 GHz	√	B1	√
7	31.0 – 31.3 GHz	√	B1	√
8	38 – 39.5 GHz	√	B2	N/A
9	47.2 – 47.5 GHz / 47.9 – 48.2 GHz	√	B1	√

Consideration

In Hong Kong, the existing allocations of the bands under consideration of this AI are summarised below –

Bands	Primary Allocation unless otherwise stated
6440 – 6640 MHz	Fixed service Fixed satellite (Earth-to-space) service
27.9 – 28.2 GHz	Fixed service Fixed satellite (Earth-to-space) service Mobile service
31 – 31.3 GHz	Fixed service
38 – 39.5 GHz	Fixed service
47.2 – 48.2 GHz	To be planned

ITU-R studies show that application of appropriate pfd masks under clear-sky conditions at the surface of the Earth and limitation of e.i.r.p. density on downlinks of HAPS system in the 6440 – 6520 MHz and 27.9 – 28.2 GHz bands would ensure protection of FS and FSS (Earth-to-space) in the same bands, while protection between HAPS ground stations and FS or FSS earth stations can be managed on a case-by-case basis. Similar results are shown in the sharing and compatibility studies of FS and HAPS systems operating in the 31 – 31.3 GHz and 38 – 39.5 GHz bands.

Furthermore, ITU-R studies show that application of the appropriate pfd mask under clear-sky conditions at the surface of the Earth on the downlink of HAPS system in the 27.9 –

28.2 GHz band would ensure protection of MS receivers due to single entry of HAPS emission.

Hong Kong's Position

Hong Kong supports the identification of additional bands and the appropriate technical constraints to facilitate the development of global broadband applications through HAPS while ensuring adequate protection of the existing services operating in the same band.

Agenda Item 1.15 (Res. 767)

to consider identification of frequency bands for use by administrations for the land mobile and fixed services applications operating in the frequency range 275 – 450 GHz, in accordance with Resolution 767 (WRC-15)¹⁷

Key Points and Methods to Satisfy this Agenda Item

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

A total of seven Methods are proposed in CPM Report to satisfy this AI, as summarised in the table below.

Method	Action	Application Service	Proposed Bands for FS/LMS			
			Band 1 (GHz)	Band 2 (GHz)	Band 3 (GHz)	Band 4 (GHz)
A	NOC	---	---	---	---	---
B	Modify RR footnote 5.565	FS & LMS	275-296	306-313	318-333	356-450
C	Add RR footnote 5.A115	FS & LMS	275-296	306-313	320-330	356-450
D	Add RR footnote 5.B115	FS & LMS	275-296	306-313	320-330	356-450
E	Add RR footnote 5.C115 Modify RR footnote 5.565	FS & LMS	275-296	306-313	318-333	356-450
F (new)	Add RR footnote 5.D115	FS	275-296	306-313	318-336	348-450
		LMS	275-296	306-313	319-332	356-450
G (new)	Add RR footnote 5.E115	FS & LMS	275-296	306-313	320-330	400-420

Consideration

In Hong Kong, spectrum in the frequency range 275 GHz – 450 GHz is yet to allocate to any service. Meanwhile, a new ITU-R report on compatibility between LMS, FS applications

¹⁷ 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

and both EESS (passive) and RAS in the 275 – 450 GHz band is being developed. According to ITU-R study results, sharing is feasible between LMS or FS, and EESS (passive) or RAS in the following bands: 275 – 296 GHz, 306 – 313 GHz, 320 – 330 GHz and 356 – 450 GHz. However, some specific conditions (e.g. minimum separation distances and/or avoidance angles) should be considered to ensure protection of RAS sites from FS and/or LMS applications in the relevant bands as identified for RAS in RR No. **5.565** (275 – 323 GHz, 327 – 371 GHz, 388 – 424 GHz and 426 – 442 GHz) on a case-by-case basis.

Hong Kong's Position

Hong Kong supports the identification of frequencies in the 275 – 296 GHz, 306 – 313 GHz, 320 – 330 GHz and 356 – 450 GHz bands for LMS and FS, and ascertaining the need to protect EESS (passive) in the 296 – 306 GHz, 313 – 320 GHz and 331 – 356 GHz bands and RAS in the relevant bands as identified in RR No. **5.565** (i.e. 275 – 323 GHz, 327 – 371 GHz, 388 – 424 GHz and 426 – 442 GHz bands).

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)¹⁸

Key Points and Methods to Satisfy this Agenda Item

This AI considers additional spectrum allocations to MS in the bands between 5150 MHz and 5925 MHz and related regulatory actions.

For the 5150 – 5250 MHz band, the following six Methods are proposed in CPM Report to satisfy this AI:

- Method A1: NOC
- Method A2: Revision to Resolution **229 (WRC-12)** to enable operation of outdoor radio local area networks (“RLAN”) including possible associated conditions for new e.i.r.p. limits;
- Method A3: Revision to Resolution **229 (WRC-12)** to enable outdoor RLAN operations by applying the same conditions of use as defined for the 5250 – 5350 MHz band in resolves 4 of Resolution **229 (WRC-12)**;
- Method A4: Revisions to Resolution **229 (WRC-12)** to facilitate limited RLAN outdoor operation and RLAN in-vehicle (cars and trains) usage operation with associated e.i.r.p. levels;
- Method A5: Revisions to Resolution **229 (WRC-12)** to enable in-car use of RLAN operation with e.i.r.p. up to 40 mW; and
- Method A6: Revision to Resolution **229 (WRC-12)** to enable outdoor RLAN operations including associated conditions for new e.i.r.p. limits and out-of-band emission limits.

For the 5725 – 5850 MHz band, the following three Methods are proposed:

- Method D1: NOC;
- Method D2: A new regional primary MS allocation to accommodate WAS/RLAN use restricted to indoor operation with e.i.r.p. limits up to 200 mW; and

¹⁸ 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

- Method D3: Addition of a new footnote having a mobile primary allocation to accommodate WAS/RLAN.

For the 5250 – 5350 MHz, 5350 – 5470 MHz and 5850 – 5925 MHz bands, only NOC to RR is proposed.

Consideration

In Hong Kong, the existing allocations of the bands under consideration of this AI are summarised below –

Bands	Primary Allocation unless otherwise stated
5150 – 5250 MHz	Aeronautical radionavigation service, Mobile service, except aeronautical mobile service
5250 – 5350 MHz	Radiolocation service, Mobile service, except aeronautical mobile service
5350 – 5470 MHz	Aeronautical radionavigation service
5725 – 5850 MHz	<i>Primary allocation:</i> Industrial, scientific and medical service <i>Secondary allocation:</i> Amateur service
5850 – 5875 MHz	Fixed service, Fixed satellite (Earth-to-space) service, Industrial, scientific and medical service
5875 – 5925 MHz	Fixed service, Fixed satellite (Earth-to-space) service

The 5150 – 5350 MHz and 5725 – 5850 MHz bands are covered by the Telecommunications (Telecommunications Apparatus) (Exemption from Licensing) Order in Hong Kong for which use of the said bands conforming to the conditions stated therein do not require a licence in Hong Kong. In particular, use of the 5150 – 5350 MHz band is restricted to indoor operations, while the 5725 – 5850 MHz band is subject to an emission limit of peak e.i.r.p. not to exceed 4W for frequency hopping spread spectrum modulation or digital modulation systems.

ITU-R studies show that an outdoor RLAN operating in the 5150 – 5250 MHz band without any mitigation measure would cause harmful interference to the aeronautical radionavigation service.

Hong Kong's Position

Hong Kong supports NOC to RR for the 5150 – 5470 MHz and 5850 – 5925 MHz bands and supports the use of the 5725 – 5850 MHz band for WAS/RLAN services in Region 3.

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)¹⁹, in order to facilitate rational, efficient and economical use of radio frequencies and any associated orbits, including the geostationary-satellite orbit

The AI covers 11 Issues, namely Issues A, B, C, D, E, F, G, H, I, J and K. Having regard to industry inputs and the implications on radiocommunication services, OFCA has identified Issues A, B and D for consideration.

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 and Methods to Satisfy this Agenda Item

Issue A considers the possible development of regulatory provisions beyond those under RR Nos. **11.25** and **11.44** on 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.

There is only one Method, which contains two separate elements. The first element addresses bringing into use (“BIU”) of frequency assignments to non-GSO systems. The second element introduces a milestone-based approach for maintaining in the Master International Frequency Register (“MIFR”) of assignments to non-GSO systems in specific bands and services, which allows administrations to use the particular assignments for a period longer than the regulatory period under RR No. **11.44** to complete deployment of all satellites and orbital planes for the notified non-GSO system.

For BIU, four options are proposed with respect to the minimum period during which a satellite has to be maintained in a notified orbital plane and summarised as follows:

- Option A: A continuous period of at least 90 days;
- Option B: A continuous period of X days (one to 90 days, to be defined);
- Option C: No fixed period; and

¹⁹ Resolution **86 (WRC-07)**: Implementation of Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference

- Option D: A continuous period of X days (one to 90 days, to be defined) subject to section II of Article 9 of RR, otherwise no fixed period.

The milestone-based approach does not impact on BIU status, but instead defines further actions to be taken within a set period of time following the end of the seven-year regulatory period to ensure that the characteristics of the recorded frequency assignments of the non-GSO systems reasonably reflect its actual deployment. Several options of possible implementations are developed to ensure that operators of systems subject to the milestone-based approach have enough time to re-evaluate and adjust their deployment plans.

Consideration

There is no provision in RR that specifically addresses BIU of frequency assignments to space stations in non-GSO systems and the need to ensure that the characteristics of the recorded frequency assignment in MIFR reflects the actual deployment of the non-GSO system concerned.

Hong Kong's Position

Hong Kong supports the adoption of more stringent options for BIU of frequency assignment to non-GSO systems and the implementation of a milestone-based approach.

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

Key Points and Methods to Satisfy this Agenda Item

Issue B considers the introduction of coordination arc as trigger for coordination 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 criteria of $\Delta T/T > 6\%$.

There is only one Method. Under which, a coordination arc of 8 degrees will be used to determine if coordination is required between satellite systems operating in the 29.5 – 30 GHz (Earth-to-space) / 19.7 – 20.2 GHz (space-to-Earth) bands, without any modifications to the status of allocations in these bands.

Consideration

The Method helps reduce the number of coordination requirements between FSS and MSS and among MSS systems within the proposed coordination arc.

Hong Kong's Position

Hong Kong supports the use of coordination arc as coordination criteria between FSS and MSS and among MSS systems.

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 and Methods to Satisfy this Agenda Item

Issue D considers the proposal for publishing 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.

Two Methods D1 and D2 are proposed. Both of which concern the creation of a pre-compiled list of potentially affected satellite networks and/or systems in Coordination Request Special Section C (“CR/C”). Method D1 further provides a definitive list of satellite networks/systems in the Coordination Request Special Section D (“CR/D”).

Consideration

A list of potentially affected satellite networks and/or systems is provided for coordination requests under RR Nos. **9.7, 9.7A and 9.7B**. Such information, if also provided for coordination requests under RR Nos. **9.12, 9.12A and 9.13**, would reduce the workload of administrations and operators in identifying the affected networks.

Hong Kong's Position

Hong Kong supports the publication of the list of potentially affected satellite networks and/systems for coordination under RR Nos. **9.12, 9.12A and 9.13**.

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 various scenarios for satellite component of IMT with different characteristics, and terrestrial component of IMT deployments in several different environments.

Summary as well as analysis of the relevant results of ITU-R studies and the conclusions for each interference scenarios are included in CPM Report. Details of studies are documented in a working document towards a preliminary draft new (“PDN”) [Recommendation or Report] ITU-R M.[MSS&IMT-ADVANCED SHARING].

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 Issue and Possible Actions to Satisfy this Issue

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. Solutions based on coordination and adoption of pfd limits are considered.

A total of nine possible actions are proposed to facilitate the long-term stability of IMT and BSS (sound) in the 1452 – 1492 MHz band in Regions 1 and 3.

<u>Possible Actions</u>	<u>Descriptions</u>
1	Maintain status quo (i.e. NOC);
2	Maintain status quo (i.e. NOC) for those countries for which the band is not identified for IMT;
3	Maintain status quo (i.e. NOC) for the protection of BSS (sound) and stipulate pfd limits for the protection of IMT in Regions 1 and 3. Three alternatives are proposed;
4	Maintain status quo (i.e. NOC) for the protection of BSS (sound) and stipulate pfd limits for the protection of IMT in some countries of Regions 1 and 3. Three alternatives are proposed;
5	Maintain status quo (i.e. NOC) for the protection of IMT and stipulate pfd limits for the protection of BSS (sound) in Regions 1 and 3;
6	Stipulate pfd limits for the protection of both IMT and BSS (sound) in Regions 1 and 3. Three alternatives are proposed;
7	Stipulate pfd limits for the protection of both IMT and BSS (sound) in some countries of Regions 1 and 3. Three alternatives are proposed;
8	Stipulate a new coordination threshold for the protection of both IMT and BSS (sound) in Regions 1 and 3; and
9	Stipulate a new coordination threshold for the protection of both IMT and BSS (sound) in some countries of 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 and the relevant pfd limits applicable in the 3700 – 4200 MHz band for ensuring compatibility of non-GSO FSS with FS and MS. 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 as allocated to FSS and the use of which is subject to the provisions of RR Appendix **30B**. These limits specified for non-GSO FSS operations under RR Article 21 and Article 22 were established based on sharing studies with highly-elliptical orbit non-GSO systems without taking into account circular orbit non-GSO systems.

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

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

Key Points

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

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 and Approaches to Satisfy this Issue

WRC 2003 allocated the 5150 – 5350 MHz and 5470 – 5725 MHz bands to MS 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 MS more stringent protection criteria than those stated in ITU-R Recommendation M.1638. During the WRC-15 study cycle, ITU-R Recommendation M.1638 was revised to ITU-R Recommendation M.1638-1 with the technical characteristics and protection criteria for ground based meteorological radars removed. Given the

potential impact on the widespread deployment of RLANs in the 5250 – 5350 MHz and 5470 – 5725 MHz bands, WRC-19 would review the issue of referencing these ITU-R Recommendations in RR Nos. **5.447F** and **5.450A**.

The two approaches are proposed in CPM Report:

- Approach A: Updates RR footnotes **5.447F** and **5.450A** by removing the existing references to the Recommendations and replacing them with the sentence “Resolution **229 (WRC-12)** applies”; and
- Approach B: Updates both footnotes by removing the existing references and replacing them with a reference to RR footnote **5.446A**.

Issue 9.1.6 – Issue 1) in the Annex to Resolution **958 (WRC-15)**: Studies concerning Wireless Power Transmission (“WPT”) 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 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. The appropriate frequency separation below and above 60 kHz (exclusion band) to protect standard frequency and time signal still needs to be studied to define values for X and Y. Based on these studies, further work will continue within ITU-R and NOC to RR is required at WRC-19.

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. Regarding issue 9.1.7 a) and b), two options have

been identified, i.e. NOC and development of a new WRC Resolution to assist administrations in the application of RR No. **18.1** with an option of provision of necessary guidelines on satellite monitoring capabilities to assist administrations in managing unauthorised operation of earth stations deployed within their territory.

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 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. Results of ITU-R studies concluded that there is no need for any regulatory measures in RR with regard to specific spectrum allocation intended for these applications, and that the use of ITU-R Recommendations or Reports will suffice.

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 on additional spectrum needs for development of FSS, and sharing and compatibility studies with existing services with a view to determining the suitability of new primary allocations to FSS in the 51.4 – 52.4 GHz band (Earth-to-space) limited to FSS gateway links for GSO systems, and the necessary regulatory measures.

Results of the analysis on additional spectrum needs are contained in DN ITU-R Report S.[SPECTRUM_NEEDS] and that for sharing and compatibility studies with incumbent services including FS, MS, EESS (passive), RAS, and sharing with potential IMT-2020 applications are contained in PDN ITU-R Report S.[SPECTRUM_SHARING].

Hong Kong's Position

On Issues 9.1.1, 9.1.2, 9.1.3, 9.1.5, 9.1.7, 9.1.8 and 9.1.9, Hong Kong supports the adoption of ITU-R study results, while Hong Kong supports the conduction of further ITU-R studies on Issues 9.1.4 and 9.1.6.

Agenda Items 2, 3, 4, 5, 6, 8, 9.2, 9.3 and 10

Agenda items 2, 3, 4, 5, 6, 8, 9.2, 9.3 and 10 are related to administrative work of WRC-19 and general issues. Among others, ITU-R will report to WRC-19 a summary of their work since the last WRC. Hong Kong would keep abreast of the relevant development.