

Radio Spectrum and Technical Standards Advisory Committee

SSAC Paper 1/2019 for Information: Preparation for WRC-19 – Outcome of CPM19-2



Background

WRC 2015

1st Session
of CPM

ITU-R
Studies

2nd session
of CPM

WRC-19

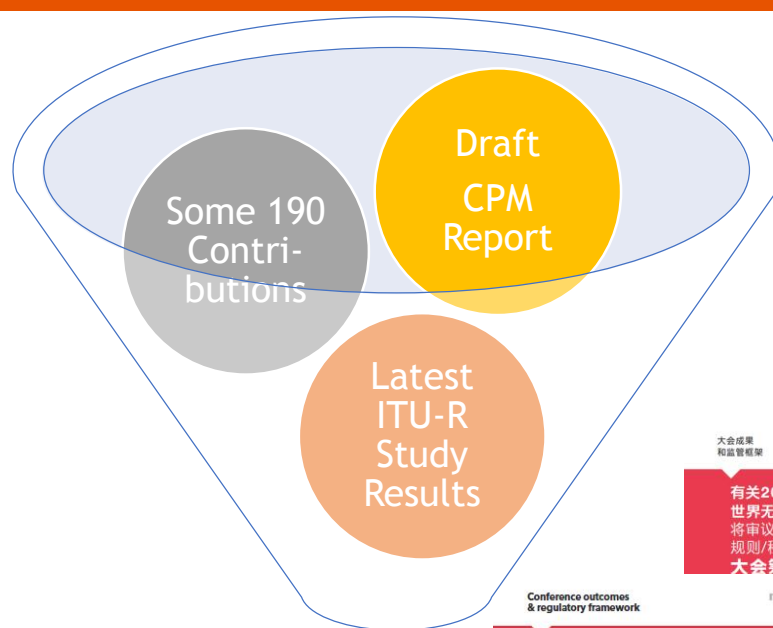
- World Radio-communication Conference (“WRC”) 2015 defined Agenda Items for WRC 2019 (“Als”)
- 1st Session of Conference Preparatory Meeting (“CPM”) in 2015 to decide the necessary preparatory studies for WRC 2019 (“WRC-19”)
- Radio-communication Sector of the International Tele-communication Union (“ITU-R”) conducted studies and prepared draft CPM text
- 2nd Session of CPM (“CPM19-2”) in February 2019 to consolidate the CPM text that includes methods to satisfy the respective Als (“Methods”)
- WRC-19 to be convened from 28/10 - 22/11/2019 in Egypt will consider the CPM text and modify the Radio Regulations (“RR”) (e.g. additional allocation / identification of frequency bands), as necessary

Activities of CPM19-2

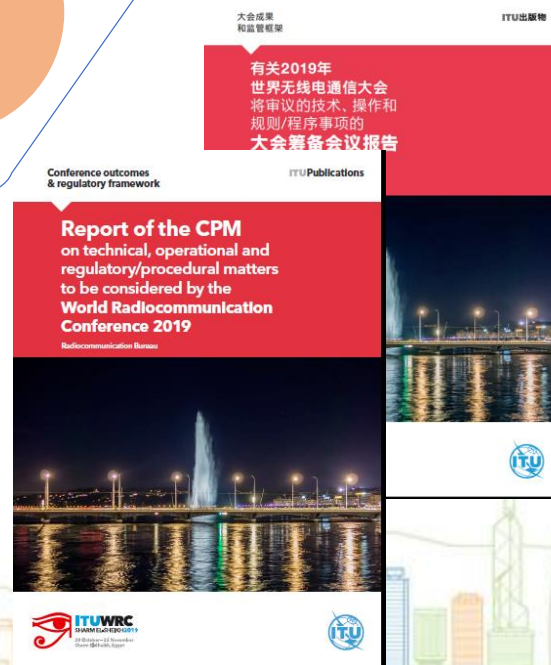
- CPM19-2 was held on 18 - 28 February 2019 in Geneva and attended by some 1300 participants from 107 Member States and 83 Sector members
- WRC-19 AIs were grouped according to the following categories and discussed under their respective working groups as shown below

Working Group (“WG”)	Issues	WRC-19 AIs
WG 1	Land mobile and fixed services	1.11, 1.12, 1.14, 1.15
WG 2	Broadband applications in the mobile service	1.13, 1.16, 9.1 (issues 9.1.1, 9.1.5, 9.1.8)
WG 3	Satellite services	1.4, 1.5, 1.6, 7, 9.1 (issues 9.1.2, 9.1.3, 9.1.9), 9.3
WG 4	Science services	1.2, 1.3, 1.7
WG 5	Maritime, aeronautical and amateur services	1.1, 1.8, 1.9, 1.10, 9.1 (issue 9.1.4)
WG 6	General issues	2, 4, 8, 9.1 (issues 9.1.6, 9.1.7), 10

Activities of CPM19-2



Observations on the respective AIs as per outcomes of CPM19-2 are summarised in the following slides



Chapter 1 Land mobile and fixed services (AI 1.11) (1)

Global or regional harmonised frequency bands to support railway radiocommunication systems between train and trackside (“RSTT”)

- Considerations

- RSTT serves to improve railway traffic control, passenger safety and improved security for train operations
- Global or regional harmonised frequency bands will improve interoperability of RSTT with a view to reducing the railway infrastructure investment and providing economies of scale for RSTT within existing mobile service allocations

Chapter 1 Land mobile and fixed services (AI 1.11) (2)

Global or regional harmonised frequency bands to support railway radiocommunication systems between train and trackside

• Outcomes

- The latest outcomes on the proposed Methods as worked out by CPM19-2 are **highlighted in orange** below
 - ▶ Method A: No Change to RR (“NOC”)
 - ▶ Method B: Addition of a new Resolution **indicating harmonised frequency ranges of RSTT with references to a preliminary draft new (“PDN”) Recommendation ITU-R M.[RSTT_FRQ]**
 - ▶ Method C: Addition of a new Resolution **without indicating any harmonised frequency ranges of RSTT** with references to a PDN Recommendation ITU-R M.[RSTT_FRQ]
- **No consensus on the harmonised frequency bands** for RSTT could be reached, in particular, for **Region 1 and Region 2**

Chapter 1 Land mobile and fixed services (AI 1.12) (1)

Possible global or regional harmonised frequency bands, to the maximum extent possible, for the implementation of evolving Intelligent Transport Systems (“ITS”)

- Considerations

- Evolving ITS, covering vehicle-to-vehicle, vehicle-to-infrastructure, vehicle-to-network and vehicle-to-pedestrian communications, have been deployed in some countries to facilitate safer driving and to support transportation system efficiency and environmental sustainability
- Member States generally agreed that there is a need to consider global or regional harmonised frequency bands under existing mobile service allocations for the implementation of evolving ITS

Chapter 1 Land mobile and fixed services (AI 1.12) (2)

Possible global or regional harmonised frequency bands, to the maximum extent possible, for the implementation of evolving Intelligent Transport Systems

- Outcomes

- The latest outcomes on the proposed Methods as worked out by CPM19-2 are **highlighted in orange** below
 - ▶ Method A: NOC
 - ▶ Method B: Addition of a new Resolution **specifying the use of 5850 - 5925 MHz, or parts thereof, as global harmonised bands for evolving ITS applications and non-mandatory reference to ITU-R Recommendation**
 - ▶ Method C: Addition of a new Resolution and non-mandatory reference to ITU-R Recommendation

Chapter 1 Land mobile and fixed services (AI 1.14) (1)

Regulatory actions for high-altitude platform stations (“HAPS”)

- Considerations

- HAPS provides fixed broadband connectivity that enables wireless broadband deployment in remote areas with minimal ground network infrastructure
- WRC decisions in the past have resulted in a global identification for HAPS in some frequency bands
- WRC-19 will consider identification of additional frequency bands for HAPS in those bands allocated to the fixed service

Chapter 1 Land mobile and fixed services (AI 1.14) (2)

Regulatory actions for high-altitude platform stations

• Outcomes

No.	Frequency Bands	Methods and Options		
		Method A ("M A")	Method B ("M B")	Method C ("M C")
1	6440 – 6520 MHz	√	B1	√
2	6560 – 6640 MHz	√	Not proposed	√
3	21.4 – 22 GHz (Region 2 only)	√	B2	N/A
4	24.25 – 25.25 GHz (Region 2 only)	√	B3*	N/A
5	25.25 – 27.5 GHz (Region 2 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	√

Summary of Methods and associated frequency bands

- M_A: NOC
- M_B: Bands designation for HAPS with options
 - ▶ B1: Revision of regulatory provisions for existing HAPS designation
 - ▶ B2: Addition of a new HAPS designation
 - ▶ B3: Addition of primary allocation to the fixed service and a new HAPS designation
- M_C: Suppression of existing HAPS designation

* Concerns were raised on additional primary allocation to the fixed service and modification of RR footnote 5.536A concerning protection status of other incumbent services

Chapter 1 Land mobile and fixed services (AI 1.15) (1)

Identification of frequency bands for the land mobile and fixed services applications operating in the frequency range 275 – 450 GHz

• Considerations

- The 275 GHz - 450 GHz band is currently **NOT** allocated for any services, but **identified for passive service applications**, such as the radio astronomy service (“RAS”), Earth exploration-satellite service (“EESS”) (passive) and space research service (passive)
- Report **ITU-R M.2417-0 - spectrum needs of Land Mobile Service (“LMS”) applications** operating in the 275 - 450 GHz band, e.g. close proximity mobile system applications/intra-device applications, and wireless links between data centres, are **50 GHz**
- Report **ITU-R F.2416-0, spectrum needs of Fixed Service (“FS”) applications** operating within the same frequency range are around **25 GHz**

Chapter 1 Land mobile and fixed services (AI 1.15) (2)

Identification of frequency bands for the land mobile and fixed services applications operating in the frequency range 275 – 450 GHz

• Outcomes

- With **addition of two new Methods** in CPM19-2, a total of **seven Methods** were proposed and summarised below

Method	Action	Application Service	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

Chapter 2 Broadband applications in the mobile service (AI 1.13) (1)

Identification of frequency bands for the future development of International Mobile Telecommunications (“IMT”)

- Considerations

- 11 candidate bands in the frequency range between 24.25 - 86 GHz were identified with a view to accommodating the spectrum needs of future IMT systems
- Methods were organised by frequency bands with NOC included for each band
- Other Methods are accompanied by alternatives for allocation and/or identification and conditions for protection measures of different existing services

Chapter 2 Broadband applications in the mobile service (AI 1.13) (2)

Identification of frequency bands for the future development of International Mobile Telecommunications

• Outcomes

- NOC is the only Method proposed for the 31.8 - 33.4 GHz band
- For the 45.5 - 47 GHz, 47 - 47.2 GHz and 66 - 71 GHz bands, further ITU-R compatibility and sharing studies are required
- For the 37 - 40.5 GHz band, a new Method for identification of this band for IMT (except Region 1) was added
- For the 24.25 - 27.5 GHz, 40.5 - 42.5 GHz, 42.5 - 43.5 GHz, 47.2 - 50.2 GHz and 50.4 - 52.6 GHz bands, conditions for protection measures of different existing services were discussed and modified

Chapter 2 Broadband applications in the mobile service (AI 1.16) (1)

Issues related to wireless access systems, including radio local area networks (“WAS/RLAN”), in the frequency bands between 5150 MHz and 5925 MHz (“5 GHz”)

- Considerations

- WRC-15 has examined the possibility of additional global allocations to the mobile service to facilitate contiguous spectrum for WAS/RLAN, but no agreement was reached
- WRC-19 will continue to consider additional spectrum allocations to the mobile service in the 5 GHz frequency range

Chapter 2 Broadband applications in the mobile service (AI 1.16) (2)

Issues related to wireless access systems, including radio local area networks, in the frequency bands between 5150 MHz and 5925 MHz

• Outcomes

- For the 5150 - 5250 MHz band, two new Methods were proposed
 - ▶ to facilitate limited RLAN outdoor operations for unmanned system/in-car use/in-train use
 - ▶ to enable outdoor RLAN operations while addressing the protection of incumbent services in this band and also its adjacent band
- Existing identifications of the 5250 - 5350 MHz, 5350 - 5470 MHz and 5850 - 5925 MHz bands for WAS/RLAN would unlikely be changed, i.e. NOC
- The 5725 - 5850 MHz band would likely be limited for allocation to the mobile service on a primary basis in some regions (not Region 2), instead of worldwide

Chapter 2 Broadband applications in the mobile service (AI 9.1 - Issue 9.1.1) (1)

Implementation of International Mobile Telecommunications in the frequency bands 1885 – 2025 MHz and 2110 – 2200 MHz

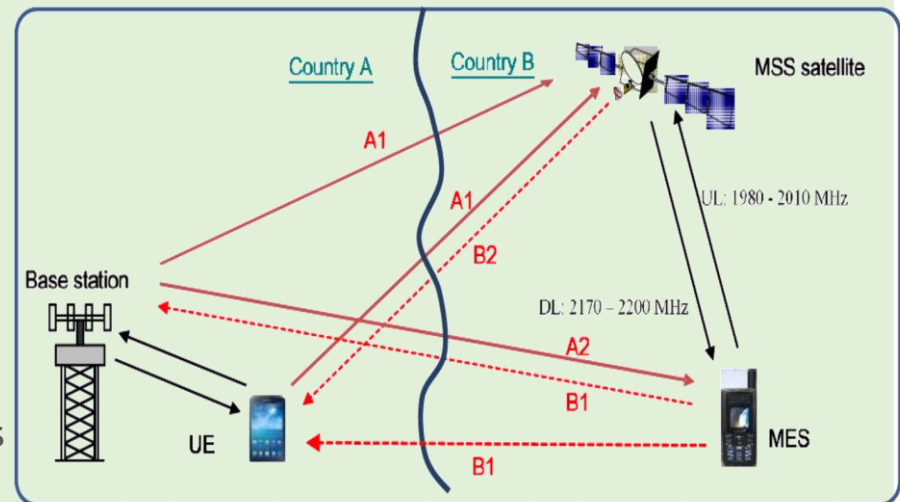
- Considerations

- Pursuant to Resolution 212 (Rev. WRC-15), ITU-R conducted the technical and operational studies for the implementation of IMT in the 1980 - 2010 MHz and 2170 - 2200 MHz bands
- The studies considered the issue of coexistence and compatibility of terrestrial and satellite components of IMT deployed in different countries, which constitute four interference scenarios

Chapter 2 Broadband applications in the mobile service (AI 9.1 - Issue 9.1.1) (2)

Implementation of International Mobile Telecommunications in the frequency bands 1885 – 2025 MHz and 2110 – 2200 MHz

- ▶ Scenario A1: Interference from IMT Base Stations (“BSs”) and IMT User Equipment (“UEs”) to IMT Space Stations
- ▶ Scenario A2: Interference from IMT BSs to IMT Mobile Earth Stations (“MESs”)
- ▶ Scenario B1: Interference from IMT MESs to IMT BSs and IMT UEs
- ▶ Scenario B2: Interference from IMT Space Stations to IMT UEs



• Outcomes

- Summary and Analysis of the results of the ITU-R studies and the conclusions for each interference scenarios were included in the CPM report
- Details of studies are documented in the working document towards a PDN [Recommendation or Report] ITU-R M.[MSS&IMT-ADVANCED SHARING]

Chapter 2 Broadband applications in the mobile service (AI 9.1 - Issue 9.1.5)

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

• Considerations

- WRC 2003 allocated the 5150 - 5350 MHz and 5470 - 5725 MHz bands to the mobile service globally for implementation of wireless access systems including radio local area networks (“RLANs”)
- Given the potential impact on the widespread deployment of RLANs, WRC-19 would review the issue of referencing Recommendations in RR footnote 5.447F and 5.450A

• Outcomes

- CPM19-2 concluded two modified approaches to satisfy this issue as below
 - ▶ Replace the referencing Recommendations by Resolution 229 (Rev. WRC-12) in both RR footnotes 5.447F and 5.450A
 - ▶ Replace the referencing Recommendations by RR footnote 5.446A in both RR footnote 5.447F and 5.450A

Chapter 2 Broadband applications in the mobile service (AI 9.1 - Issue 9.1.8)

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

- Outcomes

- Based on the results of relevant ITU-R studies, CPM19-2 concluded that
 - ▶ there is **no need to take any regulatory action in RR** with respect to specific spectrum for the use of narrowband and broadband MTC
 - ▶ the **implementation of narrowband and broadband MTC infrastructures** could be further accomplished through the course of the work in ITU-R Study Groups including the development of ITU-R Recommendations, Reports and/or Handbooks, as appropriate

Chapter 4 Science services (AI 1.2) (1)

In-band power limits for earth stations operating in the mobile-satellite service (“MSS”), meteorological-satellite service (“MetSat”) and Earth exploration-satellite service in the frequency bands 401 – 403 MHz and 399.9 – 400.05 MHz

- Considerations

- EESS (Earth-to-space) and MetSat (Earth-to-space) systems operate in the 401 - 403 MHz band, while MSS (Earth-to-space) systems operate in the 399.9 - 400.05 MHz band
- There have been significant increase in the use of these bands for satellite uplink telecommand purposes, which are operating at much higher power levels and might cause harmful interference to those satellite receivers of MSS, EESS and MetSat systems which operate at low power levels

Chapter 4 Science services (AI 1.2) (2)

In-band power limits for earth stations operating in the mobile-satellite service, meteorological-satellite service and Earth exploration-satellite service in the frequency bands 401 – 403 MHz and 399.9 – 400.05 MHz

- Outcomes

- Relevant compatibility studies have been completed and Member States reached consensus on the relevant in-band power limits for earth stations to be applicable
- It seems that WRC-19 would focus on the regulatory actions for the application of those relevant in-band power limits for earth stations

Chapter 4 Science services (AI 1.3) (1)

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

• Considerations

- The functions provided by **MetSat (space-to-Earth)** and **EESS (space-to-Earth)** are essential for monitoring and predicting climate change, monitoring ocean, water resources, weather forecasting and assisting in protecting biodiversity, as well as improving maritime security
- A **primary allocation** to the MetSat (space-to-Earth) and EESS (space-to-Earth) in the **460 - 470 MHz band** is required

Chapter 4 Science services (AI 1.3) (2)

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

- Outcomes

- CPM19-2 concluded the results of relevant compatibility studies of the proposed allocation with existing services and **proposed a power flux density (“pfd”) limit** to be observed by MetSat (space-to-Earth) and EESS (space-to-Earth)
- **Divergent views** among Member States on **the application of the proposed pfd limits**

Chapter 4 Science services (AI 1.7)

Study of the spectrum needs for telemetry, tracking and command (“TT&C”) in the space operation service for non-GSO satellites with short duration missions

- Considerations

- Non-GSO satellites with short duration missions (“NGSO-SD”) provide an affordable means to allow new entrants to access orbital resources, in terms of both spectrum and orbit
- Demand for allocations for TT&C in the space operation service (“SOS”) is expected to increase

- Outcomes

- At CPM19-2, the relevant ITU-R studies have been completed
- New allocation in the 403 - 404 MHz band / 404 - 405 MHz band to SOS (Earth-to-space) for NGSO-SD or using the existing SOS allocation in the 137 - 138 MHz and 148 - 149.9 MHz bands with associated regulatory provisions in RR for telecommand links of NGSO-SD were proposed

Chapter 5 Maritime, aeronautical and amateur services (AI 1.1)

An allocation of the frequency band 50 – 54 MHz to the amateur service in Region 1

- Outcomes

- Based on the relevant ITU-R studies, Method B revised with **changes in orange** were proposed and summarised as below
 - ▶ Method A: Allocation to the amateur service **on a primary basis** in Region 1 in the 50 - 54 MHz band, or part thereof
 - ▶ Method B: Allocation to the amateur service **on a secondary basis** in Region 1 in **the 50.080 - 50.280 MHz band**, or part thereof (Method B1), or in **the 50 MHz - 52 MHz band** (Method B2)
 - ▶ Method C: 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

Chapter 5 Maritime, aeronautical and amateur services (AI 1.8) (1)

Possible regulatory actions to support Global Maritime Distress Safety Systems (“GMDSS”) modernisation and to support the introduction of additional satellite systems into the GMDSS

- Considerations

- This AI covers **two issues** related to GMDSS
 - ▶ “**Issue A**” concerns **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**

Chapter 5 Maritime, aeronautical and amateur services (AI 1.8) (2)

Possible regulatory actions to support Global Maritime Distress Safety Systems modernisation and to support the introduction of additional satellite systems into the GMDSS

- Outcomes

- For Issue A, there was general consensus at CPM19-2 to incorporate NAVDAT systems, operating in the 415 - 526.5 kHz band, or parts thereof, and the six channels recommended by Recommendation ITU-R M.2058 in the 4.221 - 4.231 MHz, 6.3325 - 6.3425 MHz, 8.438 - 8.448 MHz, 12.6585 - 12.6685 MHz, 16.9045 - 16.9145 MHz and 22.4455 - 22.4555 MHz bands, into GMDSS
- For Issue B, some regulatory issues and its compatibility with incumbent services, particularly RAS, are still under study

Chapter 5 Maritime, aeronautical and amateur services (AI 1.9.1) (1)

The frequency band 156 – 162.05 MHz for autonomous maritime radio devices (“AMRD”) to protect the GMDSS and automatic identifications system (“AIS”)

• Considerations

- Some AMRD, such as AIS station, could enhance the safety of navigation
- In other cases, signals or information from some other kinds of AMRD may distract or mislead the navigator and degrade the safety of navigation
- Two categories/groups of AMRD were identified
 - ▶ Group A AMRDs that enhance the safety of navigation
 - ▶ Group B AMRDs that have no such function

Chapter 5 Maritime, aeronautical and amateur services (AI 1.9.1) (2)

The frequency band 156 – 162.05 MHz for autonomous maritime radio devices to protect the GMDSS and automatic identifications system

• Outcomes

- Consensus was reached on amendments to the footnote f) in RR Appendix 18 to allow Group A AMRD to operate on frequency channel of 156.525 MHz, 161.975 MHz and 162.025 MHz
- For Group B AMRD
 - ▶ Agreement to use channel 2006 (i.e. 160.9 MHz) as listed in RR Appendix 18 for AIS technology
 - ▶ Divergent views on using channels 2078 (i.e. 161.525 MHz) , 2019 (i.e. 161.550 MHz) and 2079 (i.e. 161.575 MHz) in RR Appendix 18 and the application of an e.i.r.p limit for non-AIS technology

Chapter 5 Maritime, aeronautical and amateur services (AI 1.9.2)

Modifications of the Radio Regulations, including new spectrum allocations to the maritime mobile-satellite service (“MMSS”)(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 (“VDES”) satellite component

• Considerations

- VHF VDES is a new technology likely to be adopted in the modernised GMDSS
- WRC-19 will consider modifications of RR, including new spectrum allocations within the 156.0125 - 157.4375 MHz and 160.6125 - 162.0375 MHz bands, to enable a new VDES satellite component

• Outcomes

- CPM19-2 concluded the relevant compatibility study results and proposed five different regulatory requirements, in terms of frequency plan and pfd mask to be imposed on the MMSS (space-to-Earth) for protection of terrestrial services

Chapter 5 Maritime, aeronautical and amateur services (AI 1.10)

Spectrum needs and regulatory provisions for the introduction and use of the Global Aeronautical Distress and Safety System (“GADSS”)

- Considerations

- International Civil Aviation Organisation (“ICAO”) developed a Concept of Operations (“ConOps”) to support the future development of GADSS
- ConOps supports aircraft tracking, autonomous distress tracking, post-flight localisation and recovery, as well as procedures and information management

- Outcomes

- At CPM19-2, based on the studies within ICAO determining that GADSS requirements can be satisfied using existing systems operating within existing aeronautical frequency allocations and distress spectrum (e.g. 406.1 MHz), NOC was proposed for the introduction of GADSS
- It is likely that WRC-19 will agree on this proposal as the issue is not controversial

Chapter 5 Maritime, aeronautical and amateur services (AI 9.1 – Issue 9.1.4)

Stations on board sub-orbital vehicles

• Outcomes

- CPM19-2 concluded that **NOC** was identified
- **Further ITU-R studies** are required for operational, technical and regulatory issues on
 - ▶ the status and type of **applications** of the station on-board sub-orbital vehicles
 - ▶ **the potential interference** to be considered in the case of sub-orbital vehicles
- Resolution 763 (Rev. WRC-15) would be revised, or a new Resolution would be developed to support these further studies by **considering a future AI for subsequent WRCs**

Chapter 3 Satellite services (AI 1.5) (1)

Consideration of 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

- Considerations

- Operation of ESIMs need to protect other existing services to which the 17.7 - 19.7 GHz and 27.5 - 29.5 GHz bands are allocated
- WRC-19 will consider the technical, operational and regulatory responsibilities of administrations responsible for the operation, authorisation and interference management system of ESIMs

Chapter 3 Satellite services (AI 1.5) (2)

Consideration of 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 with geostationary space stations in the fixed-satellite service

- Outcomes

- Two Methods were proposed
- Method A is NOC and Method B adds a new footnote 5.A15 in RR Article 5 referring a new Resolution with conditions for protection of existing services in the concerned band
- Some Member States wanted to limit the protection to existing terrestrial services, while some others wanted to extend protection to future terrestrial services

Chapter 3 Satellite services (AI 9.1 – Issue 9.1.2)

Compatibility of International Mobile Telecommunications and broadcasting-satellite service (“BSS”) (sound) in the frequency band 1452 – 1492 MHz in Regions 1 and 3

• Considerations

- 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
- There are provisions in RR regarding coordination for potential interference from IMT systems into the BSS (sound) receivers and from a BSS (sound) space station into IMT receivers

• Outcomes

- CPM19-2 concluded the relevant compatibility study results and proposed nine actions, in terms of pfd limits and coordination threshold to be stipulated, for the protection of both IMT and BSS (sound) in Regions 1 and 3

Chapter 3 Satellite services (AI 9.1 – Issue 9.1.9)

Studies relating to spectrum needs and possible allocation of the frequency band 51.4 – 52.4 GHz to the fixed-satellite service (“FSS”) (Earth-to-space)

• Considerations

- According to [Resolution 162 \(WRC-15\)](#), ITU-R conducted studies considering [additional spectrum needs](#) for development of FSS and conducted [sharing and compatibility studies with existing services](#) to determine the suitability of new primary allocations to FSS (Earth-to-space) in [the 51.4 - 52.4 GHz band](#)

• Outcomes

- [CPM19-2](#) concluded the results of the sharing and compatibility studies with [the Mobile Service, FS, EESS, RAS and potential IMT applications](#), with [proposed mitigation measures](#) for the protection of existing services operating in-band and in adjacent bands as deliverables
- WRC-19 will consider the [associated regulatory actions](#) under RR

Chapter 3 Satellite services (AI 1.4)

Consideration of the results of studies in accordance with Resolution 557 (Rev. WRC-15), and review, and revise if necessary, the limitations mentioned in Annex 7 to Appendix 30 (Rev. WRC-15);

- **Considerations**

- In the 11.7 - 12.7 GHz band, Annex 7 to RR Appendix 30 imposes limitations on BSS for various inter-regional orbital sharing situations
- WRC-19 will consider the proposed revisions of the orbital position limitations in Annex 7 to RR Appendix 30 for possible additional BSS orbital resource

- **Outcomes**

- Limitations “A1b” and “A2c” protect Region 3 (where Hong Kong locates) BSS/FSS from Region 1 and Region 2 BSS interference
- Studies showed that both limitations “A1b” and “A2c” cannot be deleted
- Two Methods were discussed at CPM19-2, both of which will not reduce current protection to Region 3 BSS/FSS satellite networks

Chapter 3 Satellite services (AI 1.6)

Consideration of the development of a regulatory framework for non-GSO FSS 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)

• Considerations

- No provisions in RR for sharing between non-geostationary systems and geostationary (“GSO”) networks in the 50/40 GHz frequency bands
- WRC-19 will address this issue to clarify the uncertainties among potential operators of non-GSO satellite systems in the 50/40 GHz bands

• Outcomes

- Two Methods were identified. Some administrations proposed to modify RR Article 22 to enable the operation of non-GSO systems in the concerned frequency bands
- Other administrations proposed to carry forward the studies to WRC 2023 under a new agenda item

Chapter 3 Satellite services (AI 7)

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

- **Considerations**

- A collection of **11 issues** from Issue A to Issue K
- Mainly **deals with deficiencies and improvements in the regulatory/procedural matters** for frequency assignments **pertaining to space services**, ensuring these procedures, and the related appendices of RR reflect the latest technologies

Chapter 3 Satellite services (AI 7 – Issue A)

Bringing into use (“BIU”) of frequency assignments to all non-GSO systems, and consideration of a milestone-based approach for the deployment of non-GSO systems in specific frequency bands and services

- Considerations

- No provisions in RR that specifically address the BIU of frequency assignments to space stations in non-GSO systems
- The milestone-based approach defines further actions to be taken following the end of the seven-year regulatory period to ensure that the characteristics of the recorded frequency assignments of the non-GSO systems reflect its actual deployment

- Outcomes

- Four Methods were proposed on the number of continuous days, varying from 0 - 90 days, before BIU of a non-GSO space station in the target orbit
- Several options were developed to address the milestone-based approach but no consensus was reached at CPM19-2

Chapter 3 Satellite services (AI 7 – Issue B)

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

- Considerations

- To introduce the coordination arc of 8° as the 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 $\Delta T/T > 6\%$

- Outcomes

- Consensus was reached on the use of coordination arc of 8° for coordination between satellite systems operating in the 29.5 - 30 GHz (Earth-to-space) / 19.7 - 20.2 GHz (space-to-Earth) bands

Chapter 3 Satellite services (AI 7 – Issue C)

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

- Considerations

- 7 sub-Issues to address such things as resolving inconsistencies in regulatory provisions, clarifying certain existing practices, or increasing transparency in the regulatory process

- Outcomes

- These sub-Issues are viewed as being straightforward and consensus was readily achieved at the meetings

Chapter 3 Satellite services (AI 7 – Issue D)

Identification of those specific satellite networks and systems with which coordination needs to be effected under Radio Regulations Nos. 9.12, 9.12A and 9.13

- Considerations

- Studies the ITU-R proposal to improve the coordination process by 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

- Outcomes

- Two Methods were proposed to create a pre-compiled list of potentially affected satellite networks in CR/C Special Section

Chapter 3 Satellite services (AI 7 – Issue E)

Resolution related to Radio Regulations Appendix 30B

- Considerations

- 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

- Outcomes

- A single Method was identified to address Issue E
- The Method was slightly revised at CPM19-2 to include a reduced coordination arc to further alleviate the coordination burden for submissions made under the Resolution

Chapter 3 Satellite services (AI 7 – Issue F)

Measures to facilitate entering new assignments into the Radio Regulations Appendix 30B List

- Considerations

- Addresses administrations' difficulties in the coordination of submissions of new networks and access to the frequency bands of RR Appendix 30B
- Considers the proposals of reducing coordination arc, bringing the size of the coordination arc in line with that used for the unplanned frequency bands and introducing pfd masks and levels like those in RR Appendices 30 and 30A

- Outcomes

- Four Methods were proposed to address the issue
- Three of them adopt a coordination arc of 7° for C-band and 6° for Ku-band and the fourth Method proposes NOC

Chapter 3 Satellite services (AI 7 – Issue G)

Updating the reference situation for Regions 1 and 3 networks under Radio Regulation Appendices 30 and 30A when provisionally recorded assignments are converted into definitive recorded assignments

- **Considerations**

- Studies whether the reference situation of the affected networks should be updated after the new satellite network entering definitely in the Lists

- **Outcomes**

- Method G1: the administration with an interfered-with network will determine whether or not the reference situation shall be updated
- Method G2: proposes to modify the application of the provisions in §§ 4.1.18 - 4.1.20 of RR Appendices 30 and 30A to exclude their improper use
- Method G3: NOC

Chapter 3 Satellite services (AI 7 – Issue H)

Modifications to Radio Regulations Appendix 4 data items to be provided for non-geostationary satellite systems

- Considerations

- Relates to the need to ensure that enough RR Appendix 4 data items are provided to facilitate the modelling of non-GSO satellites systems

- Outcomes

- Consensus was reached on the use of a single Method to facilitate the modelling of non-GSO satellites systems

Chapter 3 Satellite services (AI 7 – Issue I)

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

- Considerations

- Addresses a simplified regulatory regime for the advance publication, notification and recording procedures for NGSO-SD (i.e. non-GSO satellite systems with short-duration missions)

- Outcomes

- Method M1: NOC
- Method M2: modifies §§9.1, §§ 9.2B, §§ 9.3 and §§ A.9.4 in RR Articles 9 to address the issue

Chapter 3 Satellite services (AI 7 – Issue J)

Power Flux Density limit in Section 1, Annex 1 of Radio Regulations Appendix 30

- Considerations

- Relates to the modification to allow List assignments to exceed the pfd limit specified in Section 1, Annex 1 of RR Appendix 30

- Outcomes

- Method J1: modifications to Section 1, Annex 1 of RR Appendix 30
- Method J2: NOC

Chapter 3 Satellite services (AI 7 – Issue K)

Difficulties for Part B examinations under § 4.1.12 or 4.2.16 of Radio Regulations Appendices 30 and 30A and § 6.21 c) of Radio Regulations Appendix 30B

• Considerations

- 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

• Outcomes

- A single Method was proposed to add one more examination under § 4.1.12 and § 4.2.16 of RR Appendices 30 and 30A and § 6.21 c) of RR Appendix 30B to avoid overprotection of senior networks (“Network SR”) based on the characteristics which are updated and no longer valid while ensuring Network SR is adequately protected

Chapter 3 Satellite services (AI 9.1.3)

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. Difficulties for Part B examinations under § 4.1.12 or 4.2.16 of Radio Regulations Appendices 30 and 30A and § 6.21 c) of RR Appendix 30B

- Considerations

- Addresses, specifically in the 6725 - 7025 MHz band, the protection of feeder links (space-to-Earth) for MSS systems from unacceptable interference from co-frequency non-GSO FSS earth stations operating in the Earth to space direction

- Outcomes

- The studies concluded that there is no need to review the values of the existing limits presented in RR Article 22 (i.e. equivalent power flux density limits) and RR Article 21 (i.e. pfd limits) for the 3700 - 4200 MHz, 4500 - 4800 MHz, 5925 - 6425 MHz, and 6725 - 7025 MHz bands

Way Forward

- Members are welcome to offer views and comments on the relevant WRC-19 AIs
- OFCA will
 - attend the coming preparatory meeting of Asia-Pacific Telecommunity which aims to develop APT common proposals for WRC-19
 - consolidate all inputs including Members' inputs and coordinate with the Ministry of Industry and Information Technology to facilitate its formulation of the China positions for WRC-19
- OFCA will formulate the Hong Kong final positions on WRC-19 AIs for discussion in SSAC in due course before joining the Mainland delegation team to attend WRC-19



Thank You

