

World Radiocommunication Conference 2015

Purpose

This paper informs Members of the agenda items to be discussed at the coming World Radiocommunication Conference 2015 (WRC-15) and briefs Members on the positions of the Asia Pacific Telecommunity (APT) and some international organisations.

Background

2. The International Telecommunication Union (ITU) is the United Nations specialised agency for information and communication technologies ensuring the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including those using satellite orbits. World Radiocommunication Conferences (WRC) are held regularly under the auspices of ITU Radiocommunication Sector (ITU-R) to review, and, if necessary, revise the Radio Regulations (RR), which govern the use of the radio-frequency spectrum and the satellite orbits. The last World Radiocommunication Conference, WRC-12, was held in Geneva from 23 January to 17 February 2012 while the next conference, WRC-15, will take place in Geneva from 2 to 27 November 2015.

3. WRC-15 will discuss 18 agenda items (AIs) covering a wide variety of frequency bands and radio services, as well as several other items covering general radio regulatory and procedural matters. The outcome of WRC-15 may create new opportunities for spectrum use but at the same time may affect existing services.

4. Mainland China is a Member State of the ITU. The Ministry of Industry and Information Technology (MIIT) of the Mainland will attend WRC-15 and the Office of the Communications Authority (OFCA) will join the Mainland delegation. As the spectrum manager for radio

frequency spectrum in Hong Kong, OFCA will set out the Hong Kong positions on the WRC-15 agenda items and coordinate with MIIT for the formulation of the Mainland positions.

Asia Pacific Telecommunity (APT)

5. APT has established the APT Conference Preparatory Group for WRC-15 (APG-15) with the objective of harmonising views and developing common proposals from the Asia Pacific region for WRC-15. The last APG-15 meeting was held in July 2013 and the first draft of the Preliminary APT Views on WRC-15 AIs was compiled as the meeting outcome.

6. The Preliminary Views would be further developed at the next meeting scheduled for June 2014. According to the APG-15 work plan, these Preliminary Views will be finalised as APT Common Proposals by July 2015 for contribution to WRC-15.

Other Organisations

7. International organisations including the International Civil Aviation Organisation (ICAO), International Maritime Organisation (IMO) and World Meteorological Organisation (WMO) have been actively preparing for WRC-15. ICAO has already published its position paper on the WRC-15 AIs, while IMO and WMO have developed preliminary views. Civil Aviation Department and Hong Kong Observatory have rendered their general support for the ICAO and WMO positions on relevant WRC-15 AIs respectively.

Agenda Items of Significance

8. Annex 1 gives an overview for each of the 18 AIs concerning the frequency allocations and radio services as well as a summary of the latest views of some international/regional organisations. Of these 18 AIs, the following are considered to be of particular significance to Hong

Kong.

- (a) AI 1.1 - Identification of additional spectrum for International Mobile Telecommunications (IMT)

WRC-15 will consider, under this agenda, additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for IMT and related regulatory provisions. In this regard, ITU-R Joint Task Group 4-5-6-7 (JTG) was established after WRC-12 to initiate studies on frequency-related matters on IMT and other terrestrial mobile broadband applications.

At the last APG-15 meeting held in July 2013, the participants expressed different views on this issue, in particular the candidate frequency bands for IMT. The list of the proposed candidate frequency bands is open and will be delivered to the next APG-15 meetings for further consideration.

In order to meet the evolving needs and user demand for IMT services, ITU-R would identify IMT spectrum as far as possible, with regard to the sharing and compatibility studies being conducted by ITU-R in those bands and adjacent bands. In this connection, Hong Kong will keep in view the preparatory studies being conducted by ITU-R for this agenda item.

- (b) AI 1.3 - Broadband public protection and disaster relief (PPDR)

Resolution 646 (Rev.WRC-12) originally adopted by WRC-03 encourages administrations, for the purpose of harmonisation, to consider certain identified frequency bands on a regional basis for public protection and disaster relief (PPDR) solutions. In Region 3, the following frequency bands were identified: 406.1-430 MHz, 440-470 MHz, 806-824/851-869 MHz, 4940-4990 MHz and 5850-5925 MHz. In line with the WRC Resolution, the bands 406.1-430 MHz and 4940-4990 MHz are reserved for government users with PPDR missions in Hong Kong.

Existing narrowband PPDR technologies are utilised for voice and low-speed data communications. With the development of

broadband technologies, multimedia services combining voice, video and data services become a possibility for PPDR agents to use. This agenda item aims to review and revise Resolution 646 (Rev. WRC-12) for broadband PPDR.

Under this agenda item, studies are ongoing in ITU-R towards identifying the requirements (such as frequency arrangements, radio interface standards, etc.) for broadband IMT-based PPDR networks. Given the emerging demand for broadband applications, OFCA will keep in view the development of harmonised standards and spectrum requirement for PPDR.

- (C) AI 1.16 - Consideration of regulatory provisions and spectrum allocations for new Automatic Identification System (AIS) technology applications and new maritime radiocommunication

Automatic Identification System (AIS) is mandated under Chapter V of the international convention for the safety of life at sea (SOLAS) and supported by a large shore-based VHF infrastructure and can be detected by satellite. Currently, two channels AIS1 and AIS2¹ are designated in Appendix 18 of the Radio Regulations for AIS applications. With increasing demand for maritime VHF data communications, WRC undertake to consider additional spectrum allocation for AIS technology applications.

Among the channels identified by WRC-12 in Appendix 18 to address the emerging requirements on maritime communications, channels 27, 87, 28 and 88² may be used for possible testing of future AIS applications.

WRC-15 will consider possible regulatory provisions and spectrum allocations for enhanced AIS technology applications and for enhanced maritime radiocommunication. OFCA will

¹ The frequencies of the channels AIS1 and AIS2 are 161.975/161.975 MHz and 162.025/162.025 MHz respectively for transmitting from ship/coast stations.

² The frequencies of the channels 27, 87, 28 and 88 are 157.350/161.950 MHz, 157.375/157.375 MHz, 157.400/162.000 MHz and 157.425/157.425 MHz respectively for transmitting from ship/coast stations.

monitor the progress of relevant studies concerning additional spectrum allocation for AIS.

View Sought

9. OFCA will keep monitoring the progress of the ITU-R studies concerned and the development of the positions on individual AIs at the APG-15 meetings. Members who have close liaison with their counterpart organisations are welcome to give their views on the WRC-15 AIs for OFCA's consolidation in the formation of the Hong Kong positions.

Office of the Communications Authority
September 2013

The Key Issues of WRC-15 Agenda Items

Agenda Item 1.1 (Res. 233)

Possible additional spectrum allocations to mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT)

Background

IMT technology, encompassing both IMT-2000 and IMT-Advanced ones collectively, has been the main means of delivering wide area mobile broadband applications. Adequate and timely availability of spectrum³ is essential to support future growth of IMT and other mobile broadband systems.

Key Issue

This agenda item invites WRC-15 to consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for IMT and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, taking into account the results of ITU-R studies to be conducted.

Summary of Views and Considerations in the formation of Hong Kong Position

1. APT supported potential additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for IMT. While considering potential candidate bands, APT supported studies currently carried out by ITU-R to address the identification of additional spectrum for IMT and to determine the sharing and compatibility between terrestrial mobile broadband applications including IMT and primary services to which the bands are allocated.
2. ICAO opposed any new allocation to the mobile service in or adjacent to the frequency bands allocated to aeronautical safety services or those used by fixed satellite service systems for aeronautical purposes as part of the ground infrastructure for transmission of aeronautical and meteorological information or for aeronautical mobile-satellite service feeder links, unless no impact on aeronautical services is ascertained through agreed studies.
3. IMO considered it necessary to ensure that any new additional frequency band

³ Bands currently identified in the Radio Regulations for IMT are covered by the document at <http://www.itu.int/ITU-D/tech/MobileCommunications/Spectrum-IMT.pdf>

identified for IMT would not affect the interests of the maritime services.

4. WMO opposed any allocation/identification for terrestrial mobile broadband applications including IMT of the bands 1400-1427MHz, 1675-1710 MHz, 2025-2110 MHz, 2200-2290 MHz, 2700-2900 MHz and 5350-5470 MHz. WMO also required that the protection of sensors in the band 1400-1427 MHz be ensured from unwanted emissions of terrestrial mobile broadband applications including IMT if proposed in the adjacent bands. In addition, WMO stated its requirement to maintain relevant fixed satellite service capacity and availability in the band 3400-4200 MHz should be maintained.
5. The results of sharing and compatibility studies being conducted by ITU-R on candidate/possible frequency bands may facilitate the identification of additional spectrum for terrestrial mobile broadband applications including IMT. In this connection, Hong Kong will keep in view the progress of these studies.

Agenda Item 1.2 (Res. 232)

Possible use of the band 694-790 MHz by the mobile, except aeronautical mobile, service in Region 1

Background

According to Article 12.6 of the GE06 Agreement, the transition from analogue to digital television shall end on 17 June 2015 in all Region 1 countries. As a result of the transition, the band 694-862 MHz, or parts of it, in some countries may be available for applications in the mobile service including IMT.

Key Issue

This agenda item invites ITU-R to study the spectrum requirement and channelling arrangements for the mobile service and its compatibility with other services currently allocated in the band 694-790 MHz. ITU-R is also invited to study solutions for accommodating applications ancillary to broadcasting requirements. WRC-15 is expected to specify the technical and regulatory conditions applicable to the mobile service allocation in this band in Region 1.

Summary of Views and Considerations in the formation of Hong Kong position

1. This agenda item is not applicable to services in Region 3.
2. APT was of the view that any possible regulatory actions under this agenda item should be limited to Region 1, and global harmonisation of the channelling arrangement for the mobile service should be explored and adopted in the band below 790 MHz by taking into account channelling arrangements in the band 698-806 MHz as contained in Recommendation ITU-R M.1036.

Agenda Item 1.3 (Res. 648)

Provisions to support broadband public protection and disaster relief (PPDR)

Background

Resolution 646 (Rev.WRC-12) originally adopted by WRC-03 encourages administrations, for the purpose of harmonisation, to consider certain frequency bands identified on a regional basis for PPDR solutions. In Region 3, these frequencies were identified as 406.1-430 MHz, 440-470 MHz, 806-824/851-869 MHz, 4940-4990 MHz and 5850-5925 MHz.

As technologies advance, there has been emerging demand for broadband PPDR applications, including real-time mobile video applications. Further spectrum harmonisation may be required to increase the interoperability and availability of equipment especially in national, regional and cross-border emergency situations and disaster relief activities.

Studies being carried out by ITU-R on this agenda item include:

- Review of Recommendation ITU-R M.2009 (Radio interface standards for use by PPDR operations in some parts of UHF bands)
- Review of Recommendation ITU-R M.2015 (Frequency arrangements for PPDR radiocommunication systems in UHF bands)
- Revision of Report ITU-R M.2033 (Radiocommunication objectives and requirements for public protection and disaster relief)
- Development of a new Report on Broadband Public Protection and Disaster Relief

These studies are being supported by APT Wireless Group (AWG) and other technical bodies. Within the AWG, a report on Mission Critical broadband PPDR requirements is being developed. Meanwhile, the last APG-15 meeting noted that it might be possible to meet the technical and operational requirements of broadband PPDR within the frequency bands already identified in respect of Region 3.

Key Issue

This agenda item invites ITU-R to study technical and operational issues relating to broadband PPDR and its future development, and to develop/revise recommendations as required. WRC-15 will consider the results of the studies and take appropriate action with regard to revision of Resolution 646 (Rev. WRC-12).

Summary of Views and Considerations in the formation of Hong Kong position

1. APT supported relevant ITU-R studies on broadband PPDR under this agenda items.
2. In line with Resolution 646 (Rev.WRC-12), the bands 406.1-430 MHz and 4940-4990 MHz have been already reserved in Hong Kong for PPDR on a primary basis.
3. Noting that WRC-15 would review and revise, as appropriate, Resolution 646 (Rev.WRC-12) for broadband PPDR based on the studies being conducted by ITU-R, OFCA will keep in view the development of harmonised standards and spectrum requirement for PPDR.

Agenda Item 1.4 (Res. 649)

Possible secondary allocation to the amateur service within the band 5250-5450 kHz

Background

Usable frequencies in HF communication vary with the time of day, season and other propagation factors. In the current allocation to the amateur service in the HF bands, there is a gap which causes problems in terms of communication when the maximum usable frequency (MUF) falls below 7 MHz and the lowest usable frequency (LUF) is above 4 MHz. Therefore, amateur stations have a need to be able to access spectrum at around 5 MHz in order to maintain stable communication, particularly when they are engaged in providing emergency communications in response to disaster situations

Key Issue

This agenda item invites WRC-15 to consider the possibility of making an allocation of an appropriate amount of spectrum to the amateur service on a secondary basis within the band 5250-5420 kHz.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT was of the view that the protection of the existing services and their future development in this band should be ensured. APT also stressed that no constraints should be imposed upon the existing services and their future development in the band 5250-5450 kHz.
2. ICAO was of the view that any allocation made to the amateur service should not cause harmful interference to aeronautical systems operating under the allocation to the aeronautical mobile service in the adjacent frequency band 5450-5480 kHz in Region 2.
3. Following the Region 3 primary allocation to the fixed and mobile services in the band 5250-5450 kHz, Hong Kong has allocated the entire band for the fixed service.

Agenda Item 1.5 (Res. 153)

Potential use of frequency bands allocated to the fixed-satellite service not subject to Appendices 30, 30A and 30B for the control and non-payload Communications of unmanned aircraft systems (UAS) in non-segregated airspaces

Background

Unmanned aircraft systems (UAS) currently operate in fixed-satellite service (FSS) frequency bands for the unmanned aircraft (UA)-to-satellite link to relay the control and non-payload communications (CNPC). So far, UA operations have been restricted to segregated airspaces where separation from manned aircraft can be assured. To introduce UA in non-segregated airspace, continued safety of other airspace users as well as life and property on the ground needs to be maintained by ensuring the UAS CNPC links in FSS frequency bands freedom from harmful interference.

Key Issue

The agenda items seeks WRC-15 to consider the possible regulatory actions to support the use of FSS frequency bands for the UAS CNPC links, based on the results of the ITU-R studies to be conducted.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT supported ITU-R to conduct the studies on measures for UAS operation in FSS bands. Preferring a clear identification of globally harmonised spectrum for UAS CNPC links, APT was of a view that satellite command and control links should comply with accepted safety requirements including ICAO Standards and Recommended Practices when developed. APT added that any regulation modifications relating to UAS operation in FSS bands should not impact on existing and future satellite networks of FSS and other services in the same band.
2. ICAO supported the use of FSS systems for UAS CNPC links in non-segregated airspace provided that the technical and regulatory actions identified by studies under Resolution 153 (WRC-12) must be consistent with the Recommendations 1/12 and 1/13 of the 12th Air Navigation Conference, and satisfy the following conditions:
 - i) That the technical and regulatory actions should be limited to the case of UAS using satellites, as studied, and not set a precedent that puts other aeronautical safety services at risk.
 - ii) That all frequency bands which carry aeronautical safety

communications need to be clearly identified in the Radio Regulations.

- iii) That the assignments and use of the relevant frequency bands have to be consistent with article 4.10 of the Radio Regulations which recognises that safety services require special measures to ensure their freedom from harmful interference.
- iv) Knowledge that any assignment operating in those frequency bands:
 - is in conformity with technical criteria of the Radio Regulations,
 - has been successfully co-ordinated, including cases where co-ordination was not completed but the ITU examination of probability of harmful interference resulted in a favourable finding, or any caveats placed on that assignment have been addressed and resolved such that the assignment is able to satisfy the requirements to provide beyond-line-of sight (BLOS) communications for UAS, and
 - has been recorded in the International Master Frequency Register.
- v) That interference to systems is reported in a transparent manner and addressed in the appropriate timescale.
- vi) That realistic worst case conditions, including an appropriate safety margin, can be applied during compatibility studies.
- vii) That any operational considerations for UAS will be handled in ICAO and not in the ITU.

Agenda Item 1.6 (Res. 151 & 152)

Possible additional primary allocations to the fixed-satellite service (Earth-to-space and space-to-Earth) of 250 MHz in Region 1 within the band 10-17 GHz and to the fixed-satellite service (Earth-to-space) of 250 MHz in Region 2 and 300 MHz in Region 3 within the band 13-17 GHz

Background

The spectrum in the band 10-15 GHz allocated to the unplanned fixed-satellite service (FSS)⁴ in the Earth-to-space and space-to-Earth directions is respectively 750 MHz and 750 MHz in Region 1, 750 MHz and 1000 MHz in Region 2, and 750 MHz and 1050 MHz in Region 3. However, satellite traffic is typically symmetrical in a large variety of applications. In order to fully and effectively utilise the limited frequency resource to cope with the increasing spectrum demand, there is a need for equal amounts of the Earth-to-space and space-to-Earth spectrum in the band 10-15 GHz among these Regions.

Key Issue

This agenda item seeks WRC-15 to consider possible bands for a new primary allocation to the FSS of 250 MHz in both directions in Region 1 in the band 10-17 GHz, as well as 250 MHz in Region 2 and 300 MHz in Region 3 in the Earth-to-space direction in the band 13-17 GHz, taking into account the results of the ITU-R studies to be conducted.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT supported ITU-R to conduct studies on the possibility of additional primary allocation to FSS while ensuring protection of existing primary services in the band(s) concerned. APT was of the view that the bands 10.6-10.7 GHz and 13.25-13.75 GHz should be excluded from consideration for the sake of protecting the Earth Exploration-Satellite service, and if consideration would be given to use of the band 14.5-14.8 GHz, appropriate measures should be taken to ensure the integrity and adequate protection of the Plan and List identified in Appendix 30A of the RR.

⁴ The unplanned Fixed-Satellite Service (FSS) bands are accessed on a first-come-first-served basis in accordance with Articles 9 and 11 of the ITU Radio Regulations (RR). Successful coordination of a satellite network gives international recognition to the use of frequencies by this network at a given orbital location.

2. ICAO opposed any new FSS allocation unless no impact on aviation use of the relevant frequency band was identified through agreed studies.
3. WMO opposed a new allocation to FSS in the bands 13.25-13.75 GHz and 10.6-10.7 GHz. WMO also required that protection of sensors in the band 10.6-10.7 GHz be ensured from unwanted emissions of FSS systems.
4. In Hong Kong, 1000 MHz in the band 13-17 GHz has already been allocated to FSS (Earth-to-space). Apart from this 1000 MHz and the prohibited band 15.35-15.4 GHz, the band 13-17 GHz is mainly allocated to the fixed, mobile, radiolocation and aeronautical radiolocation services.

Agenda Item 1.7 (Res. 114)

Review of the use of the band 5091-5150 MHz by the fixed-satellite service (Earth-to-space) (limited to feeder links of the non-geostationary mobile-satellite systems in the mobile-satellite service)

Background

Being an internationally standardised aeronautical radionavigation system (ARNS), a microwave landing system (MLS) may use the band 5091-5150 MHz if its requirements cannot be satisfied in the band 5030-5091 MHz. In order to protect ARNS in the band 5091-5150 MHz, the Radio Regulations (RR) No. 5.444A provides that the fixed satellite service (FSS) providing feeder links for non-geostationary satellite (non-GSO) in the mobile satellite service (MSS) can use the band 5091-5150 MHz on a primary basis prior to 1 January 2018, and will become secondary to ARNS after 1 January 2018. Also, no new assignments can be made to the FSS in this band after 1 January 2016.

Key Issue

This agenda item invites ITU-R to study the technical and operational issues relating to sharing of the band 5091-5150 MHz between new systems of the ARNS and the FSS providing feeder links of the non-GSO systems in the MSS (Earth-to-space). WRC-15 will review the allocation to these two services in this band.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT supported studies of the ITU-R on compatibility between ARNS and FSS (Earth-to-space) (limited to feeder links of the non-GSO systems in the MSS) in the band 5091-5150 MHz with a view to considering, if appropriate, the removal of the date limitations on the FSS.
2. ICAO supported the removal of date limitations on the FSS allocation in the band 5091-5150 MHz subject to the retention of the aeronautical protections contained in Resolution 114 (WRC-12) and the improvement in the flexibility for managing the allowed FSS satellite noise temperature increase by the aeronautical mobile and aeronautical radionavigation services operating in this band.
3. In Hong Kong, this band is entirely allocated to aeronautical radionavigation service.

Agenda Item 1.8 (Res. 909)

Review of provisions relating to earth stations located on board vessels (ESVs) which operate in fixed-satellite service (FSS) networks in the uplink bands 5925-6425 MHz and 14-14.5 GHz

Background

WRC-03 introduced provisions in Resolution 902 (WRC-03) relating to the use of ESVs in certain bands allocated to the FSS. This resolution sets forth the limitations (such as distances from the coastline and antenna diameters) on the operation of ESVs in order to protect terrestrial services operating in both 6 GHz and 14 GHz. In the light of the new ESV technologies being deployed (e.g. use of spread spectrum modulation), these provisions need to be reviewed.

WRC-12 decided that a review of the provisions relating to C and Ku band ESVs should be conducted at WRC-15. Studies are being conducted to determine if the coordination distances can be modified by adopting other interference assessment methodologies.

Key Issue

This agenda item seeks WRC-15 to review the provisions relating to ESVs which operate in the FSS in the uplink bands 5925-6425 MHz and 14-14.5 GHz and consider possible modifications to the set of limitations on the operation of ESVs contained in Resolution 902 (WRC-03), by taking into account the results of the ITU-R studies to be conducted.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT was of the view that the proposed review was necessary and should take into account all relevant prevailing factors that were not considered previously, as well as the protection of the terrestrial services, to enable administrations to decide on the potential for possible relaxation of the current restrictions applying to ESVs.
2. Recognising the need to continue to protect the other services to which the bands 5925-6425 MHz and 14-14.5 GHz are allocated, IMO requested that modifications to Resolution 902 (WRC-03) permit ESVs to operate by the mariner in an uncomplicated, straightforward manner closer to the shore. While also recognising the differing needs of administrations, IMO further requested that Resolution 902 (WRC-03) as modified seek to avoid, to the extent practical, any complicated ESV operational restrictions outside of the Administration's national

waters.

3. In Hong Kong, the band 5925-6425 MHz is co-allocated to the fixed service and the FSS (Earth-to-space) on a primary basis. The primary allocation of the band 14-14.5 GHz is given to the FSS (Earth-to-space) while the secondary allocation of this band is given to the mobile satellite service (Earth-to-space).

Agenda Item 1.9 (Res. 758)

Possible extension of allocations to the fixed-satellite service (FSS) and maritime-mobile satellite service (MMSS) in the band 7-8 GHz

Background

The bands 7250-7750 MHz (space-to-Earth) and 7900-8400 MHz (Earth-to-space) are allocated worldwide to the FSS and other services such as the fixed and mobile services, the meteorological-satellite service (MetSat) and the Earth exploration-satellite service (EESS) (space-to-Earth). The bands 7250-7375 MHz (space-to-Earth) and 7900-8025 MHz (Earth-to-space) are also allocated to the MMSS on a primary base, subject to agreement obtained under the Radio Regulations No. 9.21 through No. 5.461. In exploring additional allocations to the FSS and the MSS in the band 7-8 GHz, it should be noted that the ubiquitous deployment of very small aperture terminal (VSAT)-like FSS earth stations is generally not compatible with the protection of the space research service (SRS) currently allocated with the bands 7150-7250 MHz and 8400-8500 MHz.

Key Issue

This agenda item seeks WRC-15 to consider the result of the ITU-R studies to be conducted on:

1. The possible new allocations to the FSS except the VSAT-like FSS in the bands 7150-7250 MHz (space-to-Earth) and 8400-8500 MHz (Earth-to-space); and
2. The possible new allocations to the maritime-MSS in the bands 7375-7750 MHz (space-to-Earth) and 8025-8400 MHz (Earth-to-space).

Summary of Views and Considerations in the formation of Hong Kong position

1. APT supported ITU-R studies on the possible new allocations to the FSS (excluding small VSAT-like FSS) in the bands 7150-7250 MHz (space-to-Earth) and 8400-8500 MHz (Earth-to-space), as well as the possible new allocations to the MMSS in the band 7-8 GHz. APT was also of the view that the pfd limits for a space station of FSS in the band 7375-7750 MHz (space-to-Earth) shown in Table 21-4 of Article 21 of the Radio Regulations could also be applicable to a space station of MMSS.
2. IMO supported further spectrum being made available for the maritime-mobile satellite service which might be used to support future GMDSS and e-navigation requirements.
3. WMO considered that no new allocations to the MMSS should be made in the

bands 7450-7550 MHz and 8025-8400 MHz unless acceptable sharing criteria with EESS and MetSat would be developed. WMO noted particular concern with regard to potential interference to EESS (space-to-Earth) operations in the band 8025-8400 MHz at high latitudes from ships operating in proximity.

4. Hong Kong currently has the allocation of the band 7150-7750 MHz to the fixed and mobile services and the band 7900-8500 MHz to the fixed service, in which the band 8025-8400 MHz is also allocated to the EESS (space-to-Earth). There are currently point-to-point microwave links operating in the band 7-8 GHz, with some of them carrying important safety-related data.

Agenda Item 1.10 (Res. 234)

Possible additional primary allocations to the mobile-satellite service (MSS) in the band 22-26 GHz

Background

Report ITU-R M.2077 and Report ITU-R M.2218 have indicated respective shortfalls of spectrum available for the satellite component of International Mobile Telecommunications (IMT) in the Earth-to-space direction of between 19 MHz and 90 MHz, the satellite component of IMT in the space-to-Earth direction of between 144 MHz and 257 MHz, and MSS broadband applications of between 240 MHz and 335 MHz in both the Earth-to-space and space-to-Earth directions by the year 2020.

Key Issue

This agenda item seeks WRC-15 to consider additional allocations to the MSS in the Earth-to-space and space-to-Earth directions in the band 22-26 GHz by taking into account the ITU-R studies to be conducted.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT was of the view that the frequency requirements for the 22-26 GHz band should be clearly identified for the potential MSS allocation taking into account current allocations for MSS above 19 GHz, and the requirements and additional allocations should be based on the compatibility studies in order to adequately protect the existing and their future development.
2. ICAO opposed any new mobile satellite service allocation unless no impact on aviation use in 24.25-24.65 GHz in Regions 2 and 3 was identified through agreed studies.
3. WMO opposed new MSS allocations in the bands 23.6-24 GHz and 25.5–26.0 GHz. WMO also added that allocations to MSS in other portions of the band 22-26 GHz should be associated with the adequate protection of EESS applications from emissions of MSS systems.
4. In Hong Kong, different portions of the band 22-26 GHz are allocated to different services: 22-24 GHz and 24.45-26 GHz for fixed service, 24-24.25 GHz for industrial, scientific and medical (ISM), 24.05-24.25 GHz for amateur services, 24.05-24.25 GHz for radiolocation, 24.25-24.45 GHz for radionavigation, and 24.75-25.25 GHz for FSS (Earth-to-space).

Agenda Item 1.11 (Res. 650)

Possible allocation for the Earth exploration-satellite service (Earth-to-space) in the band 7-8 GHz

Background

There has been congestion in the bands 2025-2110 MHz and 2220-2290 MHz allocated for Earth exploration-satellite tracking, telemetry and control (TT&C). A new allocation in the band 7-8 MHz for the Earth exploration-satellite service (EESS) in the Earth-to-space direction would allow its use for TT&C in combination with the existing EESS (space-to-Earth) allocation in the band 8025-8400 MHz, thereby alleviating the congestion problem in the band 2 MHz, increasing efficiency and reducing satellite complexity with uplinks and downlinks on the same transponder. A preliminary sharing analysis indicates that the band 7145-7235 MHz may present a favourable sharing scenario with the existing services (including space research service (SRS) mission uplinks, space operation service (SOS), mobile service (MS) and fixed service (FS)).

Key Issue

This agenda item seeks WRC-15 to consider the worldwide primary allocation to EESS (Earth-to-space) in the band 7-8 GHz with priority to the band 7145-7235 MHz, by taking into account the ITU-R studies to be conducted.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT supported the ITU-R studies in respect of this agenda item. APT was of the view that the band 7145-7190 MHz (deep-space SRS band) should be excluded for further considerations and the existing services in the band 7-8 GHz should be adequately protected from potential interference due to the possible new allocation to the EESS (Earth-to-space).
2. ICAO opposed any new allocation to the Earth exploration-satellite service unless no impact on aviation use in the band 8750-8850 MHz was identified through agreed studies.
3. WMO supported a new EESS (Earth-to-space) allocation in the band 7-8 GHz, provided that compatibility with meteorological-satellite systems operating in the bands 7450-7550 MHz and 7750-7900 MHz was ensured.
4. In Hong Kong, the band 7145-7235 MHz is allocated to the fixed and mobile services.

Agenda Item 1.12 (Res. 651)

Possible extension of the current worldwide allocation to the Earth exploration-satellite (active) service in the band 9300-9900 MHz by up to 600 MHz within the bands 8700-9300 MHz and/or 9900-10500 MHz

Background

There is a growing demand for increasing radar image resolution to satisfy global environmental monitoring which can only be achieved with greater transmission bandwidth. It results in a need for additional frequency spectrum around the existing allocation to the Earth exploration-satellite service (EESS) (active) in the band 9300-9900 MHz, in order to increase the available bandwidth by 600 MHz.

Key Issue

This agenda item seeks WRC-15 to consider the possible extension of the current worldwide allocation to the EESS (active) in the band 9300-9900 MHz by up to 600 MHz on a primary and/or secondary basis, as appropriate, within the bands 8700-9300 MHz and/or 9900-10500 MHz, taking into account the results of ITU-R studies to be conducted.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT supported current ITU-R studies on the sharing and compatibility issues for the extension of EESS (active) spectrum. APT was of the view that appropriate protection of the existing services currently allocated in the same and adjacent frequency bands should be ensured.
2. ICAO opposed any new allocation to the Earth exploration-satellite service in the band 9000-9200 MHz unless:
 - no impact on aviation use was identified through agreed studies
 - no additional constraints were placed on the use of the frequency band by aeronautical systems
 - no change to Nos. 5.337, 5.427, 5.474 and 5.475.
3. IMO considered that protection of the maritime radionavigation service, operating in the frequency band 9200-9500 MHz and used by safety service systems in accordance with Nos. 1.59 and 4.10, should be ensured.
4. WMO urged that a new EESS (Earth-to-space) allocation in the 9 GHz frequency range should ensure adequate protection of meteorological applications, in particular, meteorological radars in the band 9300-9500 MHz and passive sensors in the band 10.6-10.7 GHz.

5. In Hong Kong, the allocation of the bands within 8500-9800 MHz and 10450-10500 MHz are mainly for radiolocation and aeronautical/maritime radionavigation services. The band 10150-10300 MHz is allocated to the fixed service while the bands 9800-10150 MHz and 10300-10450 MHz are to be planned.

Agenda Item 1.13 (Res. 652)

Use of the band 410-420 MHz by the space research service (space-to-space)

Background

The band 410-420 MHz is allocated to the fixed, mobile (except aeronautical mobile) and space research (space-to-space) services on a primary basis subject to No. 5.268, which identifies the use of this band by SRS (space-to-space) for extra-vehicular activities (EVA) to operate within 5 km of an orbiting manned space vehicle within the specified power flux-density (pfd) limits. Further use of this band for space vehicles communicating in proximity with orbiting manned space vehicles, such as the International Space Station (ISS), would enable comparable coverage performance in the highly multipath environment of the ISS. However, space vehicles, whether manned or robotic, operating in the vicinity or approaching the ISS or other orbiting manned space vehicles, need to communicate over distances greater than 5 km to ensure safe operations and docking manoeuvres.

Key Issue

This agenda item seeks WRC-15 to review No. 5.268 in respect of the possible removal or relaxation of the 5 km distance limitation without modifying the current pfd limits and the possible use of the band 410-420 MHz for SRS (space-to-space) systems beyond extra-vehicular activities, taking into account the results of ITU-R studies.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT supported ITU-R studies on removal of the 5 km distance limitation for the Radio Regulations (RR) No. 5.268 which would allow SRS enhanced flexibility and safety for proximity operations by space vehicles communicating with an orbiting manned space vehicle, on condition that by removal of the distance limitation the current pfd limits included in RR No. 5.268 be maintained to assure continued protection of the fixed and mobile (except aeronautical) services in the band 410-420 MHz.
2. In Hong Kong, the band 410-420 MHz is reserved for land mobile systems supporting public protection and disaster relief.

Agenda Item 1.14 (Res. 653)

Future of the Coordinated Universal Time time-scale

Background

The Coordinated Universal Time (UTC) time-scale is the legal basis for time-keeping for most countries in the world, and de facto is the time-scale used in most others. In order to ensure that UTC does not differ by more than 0.9 seconds from the time determined by the rotation of the Earth (UT1), occasional insertion of leap seconds into UTC is required and hence creates difficulties for systems and applications that depend on accurate timing. Some organisations involved with space activities, global navigation satellite systems, metrology, telecommunications, network synchronisation and electric power distribution have requested a continuous time-scale.

Key Issue

This agenda item seeks WRC-15 to consider the feasibility of achieving a continuous reference time-scale, whether by the modification of UTC or some other method, taking into account the results of ITU-R studies to be conducted.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT supported the ITU-R studies on the feasibility of achieving a continuous reference time scale. APT was of view that an appropriate implementation of a continuous international time scale should be developed by relevant international organisations and the redefinition of UTC should be treated with caution.
2. It is noted that modification of the definition of UTC may have consequential changes to the procedure for specifying time in international radiocommunication activities.

Agenda Item 1.15 (Res. 358)

Possible additional UHF channels for on-board communication stations in the maritime mobile service (MMS)

Background

On-board communication stations are intended for internal communications on board a ship, or between a ship and its lifeboats and life-rafts during lifeboat drills or operations, or for communication within a group of vessels being towed or pushed, as well as for line handling and mooring instructions. Only six frequencies in the band 450-470 MHz are currently identified in the Radio Regulations No. 5.287 for on-board communication stations. In case of channel congestion, ship and port operations are impacted.

Key Issue

This agenda item seeks WRC-15 to identify possible additional UHF channels in the bands already allocated to the MMS for on-board communication stations, based on the results of ITU-R studies to be conducted.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT supported ITU-R studies on the spectrum demands for on-board communication stations in the MSS and considered the following as possible methods to address this agenda item:
 - (a) Use of analogue system with 12.5 kHz channel spacing to double the capacity compared with analogue 25 kHz system
 - (b) Use of Time Division Multiple Access (TDMA) or Frequency Division Multiple Access (FDMA) digital system to provide up to 4 times the capacity compared with analogue 25 kHz system
 - (c) Use of continuous tone-coded squelch system (CTCSS) and/or digital coded squelch (DCS) in analogue FM equipment to mitigate co-channel interference.

APT was also of view that no constraints should be placed on the existing analogue on-board communication systems with 25 kHz channel spacing, and studies on sharing and compatibility between on-board UHF communication stations and IMT systems should be taken into consideration if new frequencies would be required.
2. IMO supported the upgrade of the regulatory status of these frequencies to the exclusive use by the maritime mobile service.

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3. The band 450-470 MHz is one of the frequency bands currently identified in the Radio Regulations for IMT and is currently allocated for land mobile service in Hong Kong.

Agenda Item 1.16 (Res. 360)

Possible revision of regulatory provisions and addition of spectrum allocations for enhanced Automatic Identification System (AIS) technology applications and for enhanced maritime radiocommunication

Background

Automatic Identification System (AIS) mandated under Chapter V of the international convention for the safety of life at sea (SOLAS) has become well accepted by the maritime community and is being used by thousands of ships not subject to the SOLAS. AIS is supported by a large shore-based VHF infrastructure and can be detected by satellite. The AIS VHF data link (VDL) is designed mainly for navigation, with top priority on vessel collision avoidance and low priority on the application-specific messages (ASM) and other non-critical communications. With increasing demand for maritime VHF data communications, AIS has become heavily used. At times, the two existing channels designated as AIS1 and AIS2 in Appendix 18 of the Radio Regulations are nearly overloaded.

Among the channels identified by WRC-12 in Appendix 18 to address the emerging requirements on maritime communications, Channels 80, 21, 81, 22, 82, 23, 83, 24, 84, 25, 85, 26 and 86 are reserved by respective administrations for digitally modulated emissions in accordance with ITU-R M.1842. Channels 75 and 76 are also allocated to the mobile-satellite service (Earth-to-space) for the reception of long-range AIS broadcast messages from ships. Channels 27, 87, 28 and 88 may be used for possible testing of future AIS applications.

To address the need to protect the integrity of the AIS VDL, the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) has proposed a new concept called VHF Data Exchange System (VDES) to move AIS applications and ASM to other channels and designate some of the duplex channels previously designated for VHF public correspondence (VPC) for digitally modulated emissions. The VDES which integrates the functions of AIS, ASM and VHF Data Exchange (VDE) includes both terrestrial and satellite components as well as the channels used for these functions.

Key Issue

This agenda item seeks WRC-15 to consider, based on the results of ITU-R studies to

be conducted, possible revision of regulatory provisions and addition of spectrum allocations to enable new AIS terrestrial and satellite applications and possible new applications to improve maritime radiocommunication.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT was of the view that :
 - The frequency band identified to VHF Data Exchange System (VDES) should accommodate the expected future AIS VHF Data Link (VDL) loading
 - The frequency bands identified by WRC-12 for digital modulation could be considered as possible candidates for the global and regional channel allocation for VDE
 - Any new allocation for the future applications, including satellite service, to the frequency bands listed in the Appendix 18 should be based on issued recommendations on gap analysis, sharing and compatibility, experiments and tests, applications, system architecture, characteristics, shipborne equipment standards, performance or managing requirements, etc.
 - Transitional arrangements are required to minimise the impact of use of new applications on the existing services using frequencies listed in the Appendix 18. The VDES equipment should provide backwards compatibility for existing AIS, the installation costs should be minimised and the proper transitional period should be considered.
2. ICAO found it essential to ensure that any change to the regulatory provisions and spectrum allocations resulting from this agenda item would not adversely impact on the capability of search and rescue aircraft to effectively communicate with vessels during disaster relief operations.
3. IMO was of view that modifications should not be required to existing AIS equipment on board existing vessels, but rather allow for new applications using AIS technology to evolve, supported by communication primarily on the new frequencies identified by WRC-12, while protecting the integrity of the original operational purpose of AIS as the primary function on the existing AIS frequencies.

Agenda Item 1.17 (Res. 423)

Possible spectrum requirements and regulatory actions, including appropriate aeronautical allocation, to support wireless avionics intra-communications (WAIC)

Background

Wireless Avionics Intra-Communications (WAIC) systems are restricted to radiocommunications between two or more points installed on a single aircraft. WAIC systems are being developed to operate safely and efficiently in one or more non-contiguous frequency bands currently allocated to the aeronautical mobile service and aeronautical radionavigation service.

Key Issue

This agenda item seeks WRC-15 to consider, based on the results of ITU-R studies, possible regulatory actions, including appropriate aeronautical allocations, to support the implementation of WAIC systems. This agenda item also suggests consideration of additional bands above 15.7 GHz currently allocated for aeronautical services if the frequency bands below 1 GHz cannot meet the spectrum requirements for WAIC systems.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT supported relevant ITU-R studies on WAIC under this agenda item. APT was also of the view that the possible introduction of WAIC systems should not cause harmful interference or constraints to services to which the frequency was allocated.
2. ICAO supported any necessary additional global aeronautical mobile service allocation required to facilitate the implementation of WAIC, provided technical studies show that WAIC systems would not cause harmful interference to existing or planned aeronautical systems operating in frequency bands allocated to aeronautical safety services.
3. WMO opposed to the use of the band 2700-2900 MHz and 5350-5460 MHz for WAIC based on the previous studies in the frequency band 5600-5650 MHz, which had concluded that mobile applications on board aircraft were not compatible with meteorological radars. For other frequency bands considered for WAIC (e.g. the frequency band 13.25-13.4 GHz or frequency bands above 15.7 GHz), compatibility with meteorological and Earth observation applications should be assessed and the adequate protection should be ensured.

Agenda Item 1.18 (Res. 654)

Possible primary allocation of the band 77.5-78.0 GHz to the radiolocation service to support automotive short-range high-resolution radar operations

Background

The use of information and communication technologies (ICT) within intelligent transport systems (ITS), such as automotive short-range high-resolution radars (SRR), may significantly contribute to the improvement of road safety. The frequency bands 76-77.5 GHz and 78-81 GHz are already allocated to the radiolocation service on a primary basis in all three ITU Regions. The 77-81 GHz frequency band seems to be the most suitable band for SRR, since 76-77 GHz is designated for long-range automotive radars in many countries.

Key Issue

This agenda item seeks WRC-15 to consider a primary allocation to the radiolocation service in the 77.5-78 GHz frequency band, taking into account the results of ITU-R studies.

Summary of Views and Considerations in the formation of Hong Kong position

1. APT supported ITU-R studies being conducted under this agenda item, including sharing studies with services in the band 77.5-78 GHz and compatibility studies with services operating in the adjacent bands.
2. In Hong Kong, the band 77.5-78 GHz is allocated to the amateur and amateur-satellite services on a primary basis.