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| APTlogogreen3 | ASIA-PACIFIC TELECOMMUNITY | **Document No:** |
| **The 4th Meeting of the APT Conference Preparatory Group for WRC-19 (APG19-4)** | **APG19-4/INP-101** |
| 7 – 12 January 2019, Busan, Republic of Korea | **31 December 2018** |

China (People’s Republic of)

**preliminary views on WRC-19 agenda items 1.13, 1.16, 9.1 (issues 9.1.1, 9.1.5, 9.1.8)**

**Agenda Item 1.13:**

*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)****;*

**1. Background**

Resolution **238 (WRC-15)** calls for studies to determine the spectrum needs for the terrestrial component of IMT in the frequency range between 24.25 GHz and 86 GHz, as well as sharing and compatibility studies, taking into account the protection of services to which the frequency band is allocated on a primary basis, for the frequency bands:

* 24.25-27.5 GHz[[1]](#footnote-1), 37-40.5 GHz, 42.5-43.5 GHz, 45.5-47 GHz, 47.2-50.2 GHz, 50.4‑52.6 GHz, 66-76 GHz and 81-86 GHz, which have allocations to the mobile service on a primary basis; and
* 31.8-33.4 GHz, 40.5-42.5 GHz and 47-47.2 GHz, which may require additional allocations to the mobile service on a primary basis.

At the sixth/last meeting of ITU-R Task Group 5/1, the draft CPM text relating to this agenda item has been finalized.

ITU-R Task Group 5/1 meeting has finalized its sharing and compatibility studies on key services. The results of the studies are captured in working document attached to Chairman’s report, as below.

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| Frequency bands (GHz) | | Services | Input Doc# from China | Output Doc# in Chairman’s Report |
| 24.25-27.5 | 23.6-24 | EESS passive | 5-1/148, 220, 333, 453, | 5-1/478 Annex 03 Part 2 |
| 23.6-24 | RAS | 5-1/216, 332 | 5-1/478 Annex 03 Part 2 |
| 25.5-27 | EESS/SRS (s-E) (in-band) | 5-1/60, 150, 217, 218, 334, 335, 451, 452 | 5-1/478 Annex 03 Part 1 |
| 25.25-27.5 | ISS | 5-1/58, 151, 219, 337, 455 | 5-1/478 Annex 03 Part 4 |
| 24.65-25.25/27-27.5 | FSS (E-s) | 5-1/61, 152, 221, 336, 454 | 5-1/478 Annex 03 Part 3 |
| 31.8-33.4 | 31.8-33.4 | RNS | 5-1/59, 153, 222 | 5-1/478 Annex 04 Part 1 |
| 37-42.5 | 36-37 | EESS passive | 5-1/149, 223, 338, 456 | 5-1/478 Annex 05 Part 3 |
| 37.5-42.5 | FSS (s-E) | 5-1/62, 154, 224, 339, 457 | 5-1/478 Annex 05 Part 1 |
| 42.5-43.5 | RAS | 5-1/340 | 5-1/478 Annex 05 Part 5 |
| 71-76 | 71-76 | FS | 5-1/155, 225 | 5-1/478 Annex 12 Part 1 |
| 81-86 | 81-86 | FS | 5-1/156, 226 | 5-1/478 Annex 13 Part 2 |
| 79-92 | RAS | 5-1/227, 342 | 5-1/478 Annex 13 Part 4 |
| 86-92 | EESS passive | 5-1/228, 341, 458 | 5-1/478 Annex 13 Part 1 |

Besides, the draft CPM text has been developed in the last and final TG5/1 meeting and will be further finalized in the CPM19-2 meeting. Methods and conditions with different options for separate frequency ranges were discussed and/or included in the draft CPM text.

**2. Preliminary Views**

China supports the consideration of additional frequency bands for International Mobile Telecommunications (IMT), including possible additional mobile allocations on a primary basis, in accordance with Resolution **238 (WRC-15)**.

China also supports ITU-R studies on spectrum needs for the terrestrial component of IMT and sharing and compatibility studies in accordance with Resolution **238 (WRC-15)**. It is important for these sharing and compatibility studies to ensure the protection of services to which the band is allocated on a primary basis.

China supports the frequency band 24.75-27.5GHz identified to IMT under the following conditions:

* The key parameters of IMT BSs, such as the maximum total radiated power (TRP), the mechanical tilt, the maximum deployment density and the antenna pattern, are included in the RR, in order to fully protect the incumbent services.
* Condition A2a: Option 1 - to revise Resolution **750** **(WRC-15)**.

China is also of the following views:

* For the frequency band 24.65-25.25GHz, it is suggested to ITU-R develop Recommendation to provide the guideline e.g. coordination distance to support the cross- border coordination.
* It is necessary to ensure the protection of other services having allocation in the considered and adjacent frequency bands, including EESS/SRS in 25.5-27GHz, RAS in 23.6-24GHz and also EESS (passive) in 50.2-50.4 GHz and 52.6-54.25 GHz.

China opposes the frequency band 31.8-33.4 GHz identified to IMT.

China supports the identification of parts of the frequency band 37-43.5GHz to IMT in order to ensure the balance between spectrum available for IMT and spectrum available for satellite ubiquitous earth stations (e.g. HDFSS). In addition, protection of the EESS (passive) in 36-37GHz and RAS/FSS (E-s) in 42.5-43.5GHz also should be considered.

China supports the ITU-R studies on sharing and compatibility studies of frequency bands 66-71GHz, 71-76GHz and 81-86GHz. In these frequency bands, China supports the future development of IMT-2020 and other new radio services. It is important for those sharing and compatibility studies to take into account the protection of incumbent services to which the band is allocated on a primary basis.

**Agenda Item 1.16:**

*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)****.*

**1. Background**

World Radiocommunication Conference 2015 approved WRC-19 agenda item 1.16 and invited ITU-R to perform sharing and compatibility studies between WAS/RLAN and incumbent services in the frequency band 5 150-5 350 MHz, 5 350-5 470 MHz, 5 725-5 850 MHz and 5 850-5 925 MHz, in accordance with Resolution 239 (WRC-15).

At the 20th ITU-R WP5A meeting held from 21 to 31 May 2018, the draft CPM text for this agenda item was finalized. In the draft CPM text, NOC was proposed to be the only method for the frequency bands 5 250-5 350 MHz, 5 350-5 470 MHz and 5 850-5 925 MHz. For the other two frequency bands 5 150-5 250 MHz and 5 725-5 850 MHz, four and three methods including NOC were proposed respectively based on different study results.

At the 21th ITU-R WP5A meeting held from 5 to 15 November 2018, the sharing study documents for the 5 150-5 250 MHz, 5 350-5 470 MHz and 5 725-5 850 MHz frequency bands were updated based on contributions received at this meeting. Work on these documents will continue at the April/May 2019 meeting of ITU-R WP5A with an attempt to finalize these documents for submission to ITU-R Study Group 5.

Among all the sharing study documents, the most complicated one is the document addressing the 5 150-5 250 MHz band. In the past two years, China has submitted several contributions to this document with study addressing the potential interference from outdoor WAS/RLAN applications to MSS feeder link in the frequency band 5 150-5 250 MHz. The preliminary results of the study showed that sharing between outdoor WAS/RLAN and MSS feeder link in this frequency band is very difficult. This conclusion is similar with several other studies in this document.

**2. Preliminary Views**

* In the frequency bands 5 150-5 250 MHz, China supports NOC to the Radio Regulations, due to the negative sharing results between outdoor WAS/RLAN applications and MSS feeder links showed in several ITU-R studies.
* In the frequency bands 5 250-5 350 MHz, 5 350- 5 470 MHz and 5 850-5 925 MHz, China also supports NOC to the Radio Regulations, due to unfeasible sharing results showed in ITU-R studies.

**Agenda Item 9.1 (issue 9.1.1):**

*To study possible technical and operational measures to ensure coexistence and compatibility between the terrestrial component of IMT (in the mobile service) and the satellite component of IMT (in the mobile-satellite service)in the frequency bands 1980-2010MHz and 2170 2200MHz where those frequency bands are shared by the mobile service and the mobile-satellite service in different countries, in particular for the deployment of independent satellite and terrestrial components of IMT and to facilitate development of both the satellite and terrestrial components of IMT, in accordance with Resolution* ***212 (Rev.WRC-15)****;*

**1. Background**

The frequency bands 1885-2025 MHz and 2110-2200 MHz have been identified in the Radio Regulations (RR) for use by IMT. Within these broader frequency ranges, the frequency bands 1 980-2010 MHz and 2170-2200 MHz are allocated to the FS, MS and MSS on a co-primary basis. The MSS allocation is in the Earth to-space direction in the 1980-2010 MHz frequency band, and in the space-to-Earth direction in the 2170-2200 MHz frequency band. Both the satellite and terrestrial components of IMT have been deployed or are being considered for further deployment within the 1980-2010 MHz and 2170-2200 MHz frequency bands.

Resolution 212 (Rev.WRC-15) invites *“ITU-R to study possible technical and operational measures to ensure coexistence and compatibility between the terrestrial component of IMT (in the mobile service) and the satellite component of IMT (in the mobile service and the mobile-satellite service) in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz where those frequency bands are shared by the mobile service and the mobile-satellite service in different countries, in particular for the deployment of independent satellite and terrestrial components of IMT and to facilitate development of both the satellite and terrestrial components of IMT”*.

Pursuant to Resolution **212 (Rev.WRC-15)**, the possible technical and operational measures are invited to study to ensure coexistence and compatibility between the terrestrial component of IMT and the satellite component of IMT in the frequency bands 1980-2010MHz and 2170‑2200MHz in different countries. ITU-R Working Parties WP 4C and WP 5D are designated as the responsible working parties for conducting the studies and concluding the draft CPM text requested in the invites ITU-R on this issue 9.1.1.

Currently, the working document towards the preliminary draft new Report or Recommendation ITU-R M. [MSS&IMT-ADVANCED SHARING] have shown the preliminary results of sharing studies and the draft CPM report has been jointly completed by WP4C and WP5D.

* For Scenario A1, in the 1980-2010 MHz frequency band, it was observed that the level of potential interference from IMT BS into IMT space stations is high, while the level of potential interference from IMT UE into IMT space stations is low. The studies have identified technical and operational measures to mitigate the potential interference from IMT BS and IMT UE. For IMT UEs, the measures can wholly eliminate the potential excess interference. For IMT BSs, there is no agreement on whether the measures can wholly eliminate the potential excess interference.
* For Scenario A2, in the frequency band 2170-2200 MHz, it was observed that potential interference from IMT BS into IMT MES may occur. The potential interference may be mitigated by one or more of: assessment of terrain and clutter effects and system characteristics, deployment environments, and separation distance. Given the varying characteristics of the border area across various countries, administrations can bilaterally determine the appropriate mitigation techniques on a case-by-case basis.
* For Scenario B1, in the frequency band 1980-2010 MHz, potential interference from IMT MESs to IMT BSs and IMT UEs, could be managed by bilateral/multilateral negotiation, in which actual technical/operational characteristics and mitigation measures for satellite and terrestrial components of IMT could be taken into account.
* For Scenario B2, in the frequency band 2170-2200 MHz, potential interference from the IMT space stations to IMT UEs, could be managed by bilateral/multilateral negotiation, in which actual technical/operational characteristics and mitigation measures for satellite and terrestrial components of IMT could be taken into account.

**2. Preliminary Views**

The People’s Republic of China supports to conduct ITU-R studies on possible technical and operational measures to ensure coexistence and compatibility between the terrestrial component of IMT and the satellite component of IMT in the frequency bands 1980–2010MHz and 2170–2200MHz in different countries.

* Relevant ITU-R Recommendations or Reports should be adopted to facilitate the compatibility and co-existence between satellite and terrestrial components of IMT.
* Preliminary results of sharing study show that potential harmful interference would occur from terrestrial IMT BSs into satellites in the band 1980-2010MHz and also from satellites into terrestrial IMT UEs in the band 2170-2200MHz. Therefore, technical and operational measures should be taken by both terrestrial and satellite components of IMT to ensure coexistence and compatibility. The proposed measures in draft CPM report are necessary to be reviewed by ITU-R, in particular the extent to which such measures could address the interference issue, and the values as well as the appropriateness or otherwise of combination of both satellite and terrestrial mitigation measures may be considered are yet to be verified and agreed upon.
* Due to the availability and feasibility of technical and operational measurements under Agenda Item 9.1 Issue 9.1.1, China support to conduct proper frequency arrangements and introduce appropriate modifications to RR Appendices 5 and 7 to identify coordination thresholds between satellite and terrestrial components of IMT in the frequency bands under consideration in WRC-19.

Based on the above, China proposes to make some modifications on APT Preliminary View(s) and Other View(s):

**APT Preliminary View(s)**

1. APT Members supports conducting ITU-R studies on possible technical and operational measures to ensure coexistence and compatibility between the terrestrial component of IMT and the satellite component of IMT in the frequency bands 1 980–2 010 MHz and 2 170–2 200 MHz in different countries, in accordance with Resolution **212 (Rev.WRC-15)**. Relevant ITU-R Recommendations or Reports should be adopted to facilitate the compatibility and co-existence between satellite and terrestrial components of IMT.

**Other View(s)**

Some APT Members have a view that since the Radio Regulations did not establish priority neither between terrestrial and satellite components of IMT, nor between mobile and mobile-satellite services in the bands 1 980-2 010 MHz and 2 170-2 200 MHz. Implementation of these technical and operational measures could be considered for new services to be deployed after a specific future date decided by WRC-19 while existing services already deployed before this date would not be constrained by these measures.

Some APT Members expressed the view that studies should be conducted with a view of protecting terrestrial IMT systems operating in the adjacent frequency bands 1 920 – 1 980 MHz and 2 110–2 170 MHz.

Some APT Members expressed the view that preliminary results of sharing study show that potential harmful interference would occur from terrestrial IMT BSs into satellites in the band 1 980-2 010 MHz and also from satellites into terrestrial IMT UEs in the band 2 170-2 200 MHz. Therefore, it should be taken measures by both terrestrial IMT and satellite IMT systems to ensure coexistence and compatibility, as appropriate. The ITU-R studies regarding this issue have not been completed yet. The proposed measures in draft CPM report are necessary to be reviewed by ITU-R, in particular the extent to which such measures could address the interference issue, and the values as well as the appropriateness or otherwise of combination of both satellite and terrestrial mitigation measures may be considered are yet to be verified and agreed upon.

Some APT members are of view that the compatibility between stations in IMT terrestrial component (in mobile service) and IMT satellite component (in mobile-satellite service) can be ensured by the following measurements:

* Conduct proper frequency arrangements in the band 1980-2010MHz；
* Apply current coordination procedure specified in the provisions of RR Article 9 and introduce appropriate modifications to RR Appendices 5 and 7 to identify coordination thresholds in the frequency bands under consideration.

**Agenda Item 9.1 (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.*

**1. Background**

Resolution **764 (WRC‑15)** resolves to invite ITU-R:

1 to investigate the technical and regulatory impacts on the services referred to in Nos. **5.447F** and **5.450A** that would result from referencing Recommendation ITU R M.1638-1 in place of Recommendation ITU R M.1638-0 in those footnotes, while ensuring that no undue constraints are imposed on the services referenced in these footnotes;

2 to investigate the technical and regulatory impacts on the services referred to in Nos **5.447F** and **5.450A** that would result from adding a new reference to Recommendation ITU R M.1849-1 to these footnotes, while ensuring that no undue constraints are imposed on the services referenced in these footnotes.

At the 20th ITU-R WP5A meeting held from 21 to 31 May 2018, the draft CPM text for this issue was finalized. Based on different studies regarding the technical and regulatory impacts of referencing Recommendations ITU-R M.1638-1 and ITU-R M.1849-1 in RR Nos.**5.447F** and **5.450A**, different approaches (as alternatives for addressing the issue) were suggested. Approach A proposed to update the reference to Recommendation ITU-R M.1849-1 in RR Nos. **5.450A** and leave all other references unchanged. Approach B proposed to update both footnotes by removing the references and replacing them with the sentence “No. **5.43A** does not apply”. Approach C proposed no change to these footnotes.

After investigating the three approaches carefully, China considers that both Approach A and Approach C could satisfy this issue, while Approach B could cause minor impacts on the services referenced in these footnotes.

**2. Preliminary Views**

China supports Approach A or Approach C in the draft CPM text to satisfy this issue.

**Agenda Item 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 harmonized use of spectrum to support the implementation of narrowband and broadband machine-type communication infrastructures, in order to develop Recommendations, Reports and/or Handbooks, as appropriate, and to take appropriate actions within the ITU Radiocommunication Sector (ITU-R) scope of work, in accordance with Resolution* ***958 (WRC-15)***

**1. Background**

Resolution **958 (WRC-15)** calls for ITU-R to study technical and operational aspects of radio networks and systems, as well as spectrum needed, including possible harmonized use of spectrum for narrowband and broadband machine-type communication (MTC) infrastructures in order to develop Recommendations, Reports and/or Handbooks, as appropriate. ITU-R Working Party 5D (WP 5D), which is the responsible group on Agenda Item 9.1 (Issue 9.1.8), has developed a working document towards a preliminary draft new Report ITU-R M.[IMT. MTC] and the draft CPM texts. ITU-R Working Party 5A (WP 5A) is developing a PDNR ITU-R M. [NON\_IMT.MTC\_USAGE], which studies the technical and operational aspects of MTC applications by non-IMT mobile systems, and presents information on MTC applications including wireless industrial automation and smart grade. In addition, ITU-R Working Party 1B (WP 1B) developed ITU-R report SM.2423-0, this report provides the technical and operational aspects of LPWAN for MTC and IoT in frequency ranges harmonized for SRD operation.

The results of ITU-R studies of the current and future spectrum use for narrowband and broadband MTC performed, as expressed in Resolution 958 (WRC-15), concluded that there is no need for any regulatory action in the Radio Regulations with regard to specific spectrum intended for use by those applications. Nonetheless, there are other mechanisms, which could facilitate the harmonized use of spectrum to support the implementation of narrowband and broadband MTC infrastructures, including ITU-R Recommendations or Reports.

**2. Preliminary Views**

China's preliminary views are as follows:

1. China is of the view that the existing frequency arrangements for IMT, detailed in Rec. ITU-R M.1036, can help enable a wide range of narrowband and broadband MTC applications and devices.
2. China supports the conclusion of ITU-R studies and contents in CPM texts for this agenda item. China also supports APT to formulate preliminary common views that *there is no need to take any regulatory action in the Radio Regulations with respect to specific spectrum for the use of those applications in the Radio Regulations* subject to discussion and agreement, and to actively harmonize with other regional groups.

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1. When conducting studies in the frequency band 24.5-27.5 GHz, to take into account the need to ensure the protection of existing earth stations and the deployment of future receiving earth stations under the EESS (space-to-Earth) and SRS (space-to-Earth) allocation in the frequency band 25.5‑27 GHz. [↑](#footnote-ref-1)