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| APTlogogreen3 | ASIA-PACIFIC TELECOMMUNITY | **Document:**  |
| **The 3rd Meeting of the APT Conference Preparatory Group for WRC-19 (APG19-3)** | **APG19-3/OUT-10** |
| 12 – 16 March 2018, Perth, Australia | 16 March 2018 |

Working Party 2

**PRELIMINARY VIEWs on WRC-19 agenda item 9.1 (ISSUE 9.1.1)**

**Agenda Item 9** *to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with* ***Article 7*** *of the Convention:*

**9.1.** *on the activities of the Radiocommunication Sector since WRC-15;*

**Issue 9.1.1: Resolution 212 (Rev.WRC-15)**

*Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110 -2 200 MHz*

1. **Background**

Resolution **212 (Rev. WRC-15)** invites the 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.

The terrestrial component of IMT has already been deployed or is being considered for deployment in the frequency bands 1 885–1 980 MHz, 2 010–2 025 MHz and 2 110–2 170 MHz. Both the terrestrial and satellite components of IMT have already been deployed or are being considered for deployment in the frequency bands 1 980–2 010 MHz and 2 170–2 200 MHz.

It was noted that co-frequency deployment of independent satellite and terrestrial IMT components in the same geographical area is not feasible unless technique, such as the use of an appropriate guardband or other mitigation techniques are applied to ensure coexistence and compatibility between the terrestrial and satellite components of IMT.

It was also noted that satellite and terrestrial IMT components deployed in adjacent geographical areas might require technical and operational measures to avoid harmful interference between them.

Within ITU-R, WP 4C and WP 5D which are responsible for the studies, have jointly developed the working document towards a preliminary draft new [Recommendation/Report] ITU-R M.[MSS&IMT-ADVANCED SHARING]. This working document provides the ITU-R studies conducted in the frequency bands 1 980-2 010 MHz and 2 170–2 200 MHz for the co-existence and the compatibility between the satellite component of IMT and terrestrial component of IMT in adjacent geographical areas across different countries. However, much of the substantive text is not agreed and in square brackets with no decisions arrived at to the status of the document being either a Recommendation or Report, nor has the document progressed from working document status.

Before APG19-3 event, WP 5D was held 29th meeting during 31 January - 7 February 2018, Seoul, Korea. Similarly one week after WP 5D meeting, WP 4C was held 20th meeting during 13-20 February 2018, Geneva, Switzerland. Both Working Parties updated the relevant parts of the draft CPM text ([Chapter 4 (Attachment 4.11) to Document 5D/875-E](https://www.itu.int/dms_ties/itu-r/md/15/wp5d/c/R15-WP5D-C-0875%21H04%21MSW-E.docx) and [Annex 15 to Document 4C/343-E](https://www.itu.int/dms_ties/itu-r/md/15/wp4c/c/R15-WP4C-C-0343%21N15%21MSW-E.docx)) however, the *conclusions* part of the text remain not agreed and is still in square brackets.

1. **Documents**
* Input Documents:
APG19-3/[INP-22 (KOR)](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-22_KOR-WP2.docx), [INP-29Rev.1 (IRN)](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-29Rev.1_IRN_WP2.docx), [INP-35 (NZL)](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-35_New_Zealand_WP2_0.docx), [INP-42 (AUS)](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-42_Australia_WP2.docx), [INP-50 (J)](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-50_Japan_WP2.docx), [INP-70 (SNG&THA)](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-70_Singapore-Thailand_WP2.docx), [INP-79 (INS)](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-79_Indonesia_WP2.docx), [INP-83 (VTN)](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-83_Vietnam_WP2.docx), [INP-87 (CHN)](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-87_China_WP2.docx), [INP-97Rev.1 (BGD)](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-97Rev.1_BGD_WP2.docx)
* Information Documents:
[APG19-3/INF-6](https://www.apt.int/sites/default/files/2018/03/APG19-3-INF-06_CEPT_Preparation.pdf) (CEPT), [INF-08](https://www.apt.int/sites/default/files/2018/03/APG19-3-INF-08Rev.1_CITEL_Preparation.pdf)Rev.1 (CITEL)
1. **Summary of Discussions**
	1. **Summary of APT Members’ view**
		1. **Korea (Rep. of) – Document** [APG19-3/INP-22](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-22_KOR-WP2.docx)

The Administration of Korea proposes modifications to the APT Preliminary View adopted as at the APG19-2 meeting, as stated below:

“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.

APT Members are of the view that the protection of terrestrial component of IMT stations from interference caused by earth stations in satellite component of IMT can be ensured by application of the current coordination procedure specified in the provisions of ITU RR Article **9**.”

* + 1. **Iran (Islamic Republic of) – Document** [APG19-3/INP-29Rev.1](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-29Rev.1_IRN_WP2.docx)

This administration 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).**

This administration is of the view that the proposed interference mitigation techniques in draft CPM text and recommendation/report for space component IMT, should be potentially feasible in point of current technological advancement and impact on IMT service-delivery.

* + 1. **New Zealand – Document** [APG19-3/INP-35](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-35_New_Zealand_WP2_0.docx)

New Zealand supports appropriate studies on the technical and operational measures to ensure coexistence and compatibility between the terrestrial and satellite components of IMT.

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, New Zealand is currently of the view that the 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.

* + 1. **Australia – Document** [APG19-3/INP-42](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-42_Australia_WP2.docx)

Australia supports development of appropriate 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 in accordance with Resolution **212 (Rev.WRC-15)**.

Australia is of the view that any outcome of this Issue should not result in any changes to the Radio Regulations. Australia is further of the view that this Issue may be addressed by appropriate technical and operational measures in new or revised ITU-R Recommendations or Reports.

* + 1. **Japan – Document** [APG19-3/INP-50](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-50_Japan_WP2.docx)

The Administration of Japan proposes modifications to the APT Preliminary View adopted as at the APG19-2 meeting, as stated below:

“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.

APT members are of the view that these measures should be carefully studied in order to provide flexible and implementable solutions by taking into account actual and realistic system characteristics/conditions rather than the worst-case characteristics/conditions only. It is important to avoid applying a unitary solution based on the worst-case interference conditions, especially to the actual and realistic interference case in which less interference levels could be expected.”

* + 1. **Singapore and Thailand - Document** [APG19-3/INP-70](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-70_Singapore-Thailand_WP2.docx)

Singapore and Thailand support appropriate studies on the technical and operational measures to ensure coexistence and compatibility between the satellite and terrestrial components of IMT in the frequency bands 1 980–2 010 MHz and 2 170–2 200 MHz. Interference mitigation measures may be required to ensure that the operation of one service in any particular country should not constrain the operation of the other service in other countries. Studies should also 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.

* + 1. **Indonesia (Republic of) – Document** [**APG19-3/INP-79**](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-79_Indonesia_WP2.docx)

Indonesia is of the view to follow the progress studies in ITU Study Group and support the compatibility studies for the frequency band which is potentially shared by IMT terrestrial component (mobile service) and IMT satellite component (mobile satellite service) with neighboring countries in the frequency range 1 980−2 010 MHz and 2 170−2 200 MHz.

* + 1. **Viet Nam (Socialist Republic of) – Document** [**APG19-3/INP-83**](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-83_Vietnam_WP2.docx)

Viet Nam (Socialist Republic of) is of the view to support appropriate studies on the technical and operational measures to ensure coexistence and compatibility between the satellite and terrestrial components of IMT with a view to protecting terrestrial IMT operating in the frequency bands 1 920 – 1 980 MHz and 2 110–2 170 MHz.

* + 1. **China (People’s Republic of) – Document** [**APG19-3/INP-87**](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-87_China_WP2.docx)

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 1 980–2 010 MHz and 2 170–2 200 MHz in different countries. To ensure co-existence and facilitate the global development of both satellite and terrestrial components of IMT, according to preliminary study results of ITU-R, China currently makes the following views:

1. 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 shall be taken measures by both terrestrial IMT and satellite IMT systems to ensure coexistence and compatibility.
2. For mitigation measures to avoid the potential harmful interference from terrestrial IMT BSs into satellite IMT in the band 1 980-2 010 MHz, it is proposed for terrestrial IMT being considered for deployment to avoid using the certain paired frequency arrangements which are partly overlapped with the band 1 980-2 010 MHz for terrestrial IMT BSs in the Recommendation **M.1036**.
3. For mitigation measures to avoid the potential harmful interference from terrestrial IMT BSs into satellite IMT in the band 1 980-2 010 MHz, it is proposed for satellite IMT being considered for deployment to use higher direction satellite beam coupled with digital beam-forming, which would reduce the impact of satellite IMT from terrestrial IMT deployed in the neighboring countries.
4. Potential interference between terrestrial IMT BS or UE and satellite MES can be managed by the current cross-border coordination provisions in the ITU RR. Since actual technical/operational characteristics are expected to be exchanged, such bilateral coordination results can enjoy more flexibility than worst-case compatibility analysis and establish separation distance based on the actual local propagation conditions, including actual terrain and clutter effects.
5. For mitigation the potential downlink interference from the IMT satellites to IMT terrestrial outdoor UEs, it is proposed to establish a new IMT satellite PFD coordination threshold according to the study results of ITU-R to ensure coexistence and compatibility with IMT terrestrial.
	* 1. **Bangladesh – Document** [**APG19-3/INP-97Rev.1**](https://www.apt.int/sites/default/files/2018/03/APG19-3-INP-97Rev.1_BGD_WP2.docx)

Bangladesh supports ITU-R studies regarding 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.

* 1. **Summary of issues raised during the meeting**

Some APT Members expressed the view that these measures should be carefully studied in order to provide flexible and implementable solutions by taking into account actual and realistic system characteristics/conditions rather than the worst-case characteristics/conditions only. It is important to avoid applying a unitary solution based on the worst-case interference conditions, especially to the actual and realistic interference case in which less interference levels could be expected.

Some other APT Members expressed the view that some system parameters, as well as deployment and propagation models in current studies, are from ITU-R Recommendations, therefore the study results are preliminary reliable (ITU-R characteristics and conditions have been considered and issues studied by both WP 4C and WP 5D carefully). The technical and operational measures should cover the worse cases in order to ensure coexistence and compatibility while the flexible and implementable solutions could be further considered during the coordination, as appropriate.

During the discussion on the proposal of one administration for protection of existing utilizations, it was concluded that it is premature to determine an implementation future date for utilization of the bands 1 885–2 025 MHz and 2 110–2 200 MHz by the terrestrial and satellite components of IMT before conclusion of ITU-R studies on technical and operational measures, to ensure protection of existing utilizations from the interference that may be caused by new comer terrestrial and satellite components of IMT in above frequency bands.

Pursuant to the Resolution **212** (**Rev. WRC-15**), protection of services in the frequency bands adjacent to 1 885–2 025 MHz and 2 110–2 200 MHz has not been studied yet within WP 4C or WP 5D at the moment. APT members are encouraged to submit contributions addressing adjacent band protection issue and confirming that whether it is in the scope of studies, if necessary, to the above working parties directly.

1. **APT Preliminary View(s)**

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)**.

1. **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.

Some APT Members are of the view that the compatibility between stations in terrestrial component of IMT and earth stations in satellite component of IMT can be ensured by application of the current coordination procedure specified in the provisions of RR Article 9.

1. **Issues for Consideration at Next APG Meeting**

APT Members are encouraged to submit their contributions for further considerations in the next APG19 meetings, taking into account progress of ITU-R studies and draft CPM text.

1. **Views from Other Organizations**
	1. **Regional Groups**
		1. **ASMG – Document APG19-2/INF-01**

Follow up the studies on this issue in the ITU Radio Sector Working Groups and support technicalal, operational and procedural measures for IMT systems to ensure compatibility between the terrestrial and satellite components of IMT systems in the frequency bands 1885-2025 MHz and 2110-2200 MHz.

Invite Arab administrations to clarify their preference for using either the terrestrial component or the satellite component or both.

* + 1. **ATU – Document APG19-2/INF-07**

No preliminary position on this agenda item yet.

* + 1. **CEPT) – Document** [**APG19-3/INF-6**](https://www.apt.int/sites/default/files/2018/03/APG19-3-INF-06_CEPT_Preparation.pdf)

CEPT is of the view that it is required to carry out compatibility studies and to define compatibility conditions of terrestrial component of IMT (in the mobile service) and satellite GSO and NGSO systems (in the mobile satellite service) in the frequency bands 1 980–2 010 MHz and 2 170–2 200 MHz considering the case that these frequency bands are used by the mobile service and mobile satellite service in different countries.

CEPT supports adequate measures for protection of MSS satellites from harmful interference from the terrestrial component of IMT, taking into account that the bands 1 980–2 010 MHz and 2 170–2 200 MHz are prioritised for MSS use in CEPT. For example, this can be achieved by limiting the e.i.r.p. of stations in the uplink band (1 980–2 010 MHz) or limiting the use of this band to the transmission from terminals to base stations. There is no requirement for additional measures to manage potential interference between the terrestrial IMT systems and MSS earth stations.

* + 1. **CITEL –Document** [**APG19-3/INF-08**](https://www.apt.int/sites/default/files/2018/03/APG19-3-INF-08Rev.1_CITEL_Preparation.pdf)**Rev.1**

(Preliminary View :) Need to ensure compatibility of both IMT components in neighboring countries without undue constraints.

* + 1. **RCC – Document** [**APG19-2/INF-05**](http://www.apt.int/sites/default/files/2017/07/APG19-2-INF-05_RCC.docx)

The RCC Administrations are in favour of development of technical and operational measures as well as regulatory provisions with regard to IMT systems in order to ensure compatibility between IMT terrestrial component (in mobile service) and IMT satellite component (in mobile-satellite service), including GSO and non-GSO systems, in the frequency bands 1 980−2 010 MHz and 2 170−2 200 MHz where those frequency bands are shared by mobile service and the mobile-satellite service in different countries.

The RCC Administrations consider that when developing technical and operational measures with regard to terrestrial IMT systems only those characteristics of terrestrial IMT systems which are specified in ITU-R Recommendations and Reports should be used.

* 1. **International Organizations**
		1. **International Amateur Radio Union (IARU)**

None

* + 1. **International Civil Aviation Organization (ICAO)**

None

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