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|  | ASIA-PACIFIC TELECOMMUNITY | **Document No:** |
| **The 2nd Meeting of the APT Conference Preparatory**  **Group for WRC-23 (APG23-2)** | **APG23-2/OUT-11**  **(Rev.1)** |
| 19 – 23 April 2021, Virtual/Online Meeting | 23 April 2021 |

Working Party 1

**PRELIMINARY VIEWs on STUDIES ON RR NO. 21.5**

**Studies on RR No. 21.5:**

*– From* [*WRC-19 Document 550*](https://www.itu.int/md/R16-WRC19-C-0550/en) *– “ITU‑R is invited to study, as a matter of urgency, the applicability of the limit specified in No.****21.5*** *of the Radio Regulations to IMT stations, that use an antenna that consists of an array of active elements, with a view to recommend ways for its possible replacement or revision for such stations, as well as any necessary updates to Table* ***21-2*** *related to terrestrial and space services sharing frequency bands. Furthermore, the ITU-R is invited to study, as a matter of urgency, verification of No.****21.5*** *regarding the notification of IMT stations that use an antenna that consists of an array of active elements, as appropriate.” (Responsible Group: WP 5D)*

**1. Background**

At WRC-19, two contributions ([WRC-19 Documents 12!A13](https://www.itu.int/md/R16-WRC19-C-0012/en), [128](https://www.itu.int/md/R16-WRC19-C-0128/en)) in relation to RR No. **21.5** were submitted. This topic was extensively discussed under WRC-19 agenda item 1.13 and the results of discussions were included in WRC-19 [Document 550](https://www.itu.int/md/R16-WRC19-C-0550/en). The text set out in the annex to the [Document 550](https://www.itu.int/md/R16-WRC19-C-0550/en) was approved as a decision of the conference and included in the minutes of twelfth Plenary meeting (WRC-19 Document [573](https://www.itu.int/md/R16-WRC19-C-0573/en)).

This outcome of WRC-19 on RR No. **21.5** was brought to the attention of CPM23-1 that requests study be performed in ITU-R. This does not specifically request action or reporting to WRC-23 so is not included in the topics under WRC-23 agenda item 9.1 in Annex 7 to [CA/251](https://www.itu.int/md/R15-CPM19.02-R-0001/en). However, ITU-R WP 5D, as the responsible group, is invited to carry out the requested study as a matter of urgency and to report the results of the study to the Director of the Radiocommunication Bureau to be considered as the Director deems appropriate.

There have been four WP 5D meetings after CPM 23-1, in which the topic of RR No. **21.5** was discussed. At the 37th WP 5D meeting, extensive discussions on each of the input contributions and compilation of the working document were conducted in the DG Art. 21.5. The Note from the Chairmen of Study Group 4 and 5 in Document [5D/407](https://www.itu.int/md/R19-WP5D-C-0407/en) was considered as the guidance of its future work. There were some debates on different aspects, such as the stepwise approach to proceed the future work, structure of the working document, interpretation of the single-element solution, and bandwidth factor under the TRP solution. No consensus was reached due to different understandings and viewpoints. There was also a suggestion that several different approaches proposed to date should be categorized into two groups (i.e., single element or TRP) and corresponding text for each of the group should be drafted in the working document. The details of discussion at the 37th meeting of WP 5D can be found in Section 2.4 of Attachment 4.3 to the WP 5D [Chairman’s Report](https://www.itu.int/md/R19-WP5D-C-0545/en).

**2. Documents**

* Input Documents APG23-2/INP-[10 (Rev.1)](https://www.apt.int/sites/default/files/2021/04/APG23-2-INP-10Rev.1.docx) (J), [20](https://www.apt.int/sites/default/files/2021/04/APG23-2-INP-20_Samoa_input_on_RR_21.5.docx) (SMO), [21](https://www.apt.int/sites/default/files/2021/04/APG23-2-INP-21_New_Zealand_input_to_WP1_-_AIs_1.1_1.2_9.1_Topic_C_Art._No_21.5.docx) (NZL), [24](https://www.apt.int/sites/default/files/2021/04/APG23-2-INP-24_AUS_contribution_for_WP1_Preliminary_Views_on_WRC-23_Agenda_Items_1.1_1.2_1.3_1.4_1.5_9.1Topic_c_and_No._21.5.docx) (AUS), [30](https://www.apt.int/sites/default/files/2021/04/APG23-2-INP-30_WP1_kor.docx) (KOR), [44](https://www.apt.int/sites/default/files/2021/04/APG23-2-INP-44_PRELIMINARY_VIEWS_ON_WRC-23_AGENDA_ITEMS_1.1_1.2_1.3_AND_NO.21.5.docx) (CHN)
* Information Documents APG23-2/INF-[13](https://www.apt.int/sites/default/files/2021/03/APG23-2-INF-13_Briefing_on_RR21.5.docx) (DG Chair), [35](https://www.apt.int/sites/default/files/2021/04/APG23-2-INF-35_Status_of_CEPT_Preparation_for_WRC-23_and_RA-23.docx) (CEPT), [36](https://www.apt.int/sites/default/files/2021/04/APG23-2-INF-36_RCC_Preparation_to_the_World_Radio_Conference_and_Radio_Assembly_2023.docx) (RCC)

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

**3.1.1 Japan** - **Document APG23-2/INP-**[**10 (Rev.1)**](https://www.apt.int/sites/default/files/2021/04/APG23-2-INP-10Rev.1.docx)

Japan support the on-going ITU-R studies on the applicability of the limit specified in No. **21.5** of the Radio Regulations to IMT stations that use an antenna that consists of an array of active elements and the verification of No. **21.5** regarding the notification of these IMT stations.

Japan is of the view that

– in the case of an IMT station using AAS, the value of total radiated power (TRP) (i.e., the integral of the power transmitted from all antenna elements in different directions over the entire radiation sphere) should be used as an alternative measure instead of the “power delivered to the antenna”

– the interpretation “the power delivered by a transmitter to the antenna of a station” in RR No. **21.5** as the power delivered by a single transceiver to the antenna of an IMT station, will not be a workable solution to reach consensus in terms of not impacting the protection of satellite services

**3.1.2 Samoa** - **Document APG23-2/INP-**[**20**](https://www.apt.int/sites/default/files/2021/04/APG23-2-INP-20_Samoa_input_on_RR_21.5.docx)

Given that this issue is likely to require consideration at WRC-23, it is proposed that APG monitors the activity on this issue in the ITU-R with a view to potentially developing an APT common position later in the cycle, depending on progress in the ITU-R. This issue should be retained on the agenda for future APT APG meetings.

**3.1.3 New Zealand** - **Document APG23-2/INP-**[**21**](https://www.apt.int/sites/default/files/2021/04/APG23-2-INP-21_New_Zealand_input_to_WP1_-_AIs_1.1_1.2_9.1_Topic_C_Art._No_21.5.docx)

No new sharing and compatibility studies should be undertaken, nor should the existing studies be revisited. All the necessary conditions are contained in Resolution **242**

A reference bandwidth / power spectral density for RR No. 21.5 regarding IMT AAS stations in the 24.45-27.5 GHz band should be considered. It is noted that a 1 MHz reference bandwidth for frequencies above 15 GHz is used in other Article **21** provisions. Regarding notification of IMT stations using Advanced Antenna Systems (AAS), RR No. 21.5 should be applied as a power spectral density limit of +10 dBW per 1 MHz. For the purpose of notification Power supplied to the antenna = TRP.

**3.1.4 Australia** - **Document APG23-2/INP-**[**24**](https://www.apt.int/sites/default/files/2021/04/APG23-2-INP-24_AUS_contribution_for_WP1_Preliminary_Views_on_WRC-23_Agenda_Items_1.1_1.2_1.3_1.4_1.5_9.1Topic_c_and_No._21.5.docx)

Australia supports studies being conducted to address the applicability of No. **21.5** to clarify its operation in order to provide regulatory certainty for the deployment of IMT stations using active antenna systems (AAS). Australia has not yet formed a view on how best to resolve this issue.

**3.1.5 Korea (Republic of)** - **Document APG23-2/INP-**[**30**](https://www.apt.int/sites/default/files/2021/04/APG23-2-INP-30_WP1_kor.docx)

The Republic of Korea is of the preliminary views that taking into account the agreed guidance above by the Chairmen of SGs 4 and 5, the APT Members are encouraged to participate actively WP 5D to develop the study results.

The Republic of Korea is also of the preliminary views that, however, it would be useful for APG23-2 to review the background and intention of provisions of RR Nos. **21.3**, **21.4** and **21.5** introduced by EARC-63 and WARC-71, respectively,and to discuss potential impacts on Radio Regulations if such provisions are modified.

Furthermore, the Republic of Korea is of the preliminary view that the preparation of any possible modification of the provisions above should consider equal rights between terrestrial and space radiocommunication services taking into account technology development.

**3.1.6 China (People’s Republic of)** - **Document APG23-2/INP-**[**44**](https://www.apt.int/sites/default/files/2021/04/APG23-2-INP-44_PRELIMINARY_VIEWS_ON_WRC-23_AGENDA_ITEMS_1.1_1.2_1.3_AND_NO.21.5.docx)

Chinese preliminary views are as follows:

1. China supports ITU-R WP 5D as a responsible group to study the relevant tasks as stated by Document 550 of WRC-19 and mandated by CA/251.
2. China is of the view that the final study result of this issue shall not cause harmful interference to, or constrain the development of space services, while take into full consideration of the development of IMT.
3. China supports APT to formulate common views as early as possible subject to discussion and agreement.

**3.2 Summary of issues raised during the meeting**

* One issue was some input documents were provided under WRC-23 agenda item 9.2. It was pointed out that agenda item 9.2 is strictly limited to the Report of the Director on any difficulties or inconsistencies encountered in the application of the Radio Regulations, and this agenda item can be discussed only when its draft Report is available.
* Another issue was regarding equal rights between terrestrial IMT and space services in relation to the studies on RR No. **21.5**. It was clarified that the equality of rights is more related to the co-primary allocation between two services rather than an individual provision of the Radio Regulations.
* Considering complexity of the studies on RR No. **21.5**, APT Members were encouraged to participate in the discussion of ITU-R WP 5D

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

* APT Members support the on-going ITU-R studies on the applicability of the limits specified in RR No. **21.5** to IMT stations using active antenna systems (AAS) and the verification of RR No. **21.5** regarding the notification of these IMT stations, in accordance with the scope mentioned in Document 550 of WRC-19 and the guidance provided by the Chairmen of ITU-R Study Group 4 and 5.
* APT Members are of the view that the ITU-R studies should address the matters being raised so far and prepare solutions which provide regulatory provisions/measures for the operation of terrestrial IMT and space services and their future development in a balanced and fair manner.

**5. Other View(s) from APT Members**

None

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

* APT Members are encouraged to submit their contributions to future APG meetings taking into account progress of ITU-R studies.

**7. Views from Other Organisations** (as provided in the information documents to APG23-2)

**7.1 Regional Groups**

**7.1.1 CEPT** - **Document APG23-2/ INF-**[**35**](https://www.apt.int/sites/default/files/2021/04/APG23-2-INF-35_Status_of_CEPT_Preparation_for_WRC-23_and_RA-23.docx)

Issue A: To be developed

Issue B (verification of No. **21.5**):

For the purpose of verification of RR No. **21.5** in the notification of IMT stations that use an array of active elements under the provision of RR 2020 Edition [i.e. in the frequency band 24.45‐27.5 GHz], CEPT is of the view that the "power delivered to the antenna of a station” in RR No. **21.5** can be considered as the “total radiated power” (TRP). A bandwidth adjustment factor to the TRP will need to be applied. TRP is defined as the integral of the power transmitted from all antenna elements in different directions over the entire radiation sphere. A remark could be added in the assignment record to indicate the need to review the finding with the WRC‐23 decision.

Issue C: To be provided by CPG Project Team B

**7.1.2 RCC** - **Document APG23-2/INF-**[**36**](https://www.apt.int/sites/default/files/2021/04/APG23-2-INF-36_RCC_Preparation_to_the_World_Radio_Conference_and_Radio_Assembly_2023.docx)

Issue A - Notification of IMT station with AAS

Temporarily, unless modified by WRC-23, Item 8AA in Table 1 of RR Appendix 4 "the power delivered to the antenna" for notification of the IMT stations with ASS shall be the value of the “total radiated power” (TRP), defined as in Resolution 243 (WRC-19) and Resolution 750 (Rev. WRC-19).

Issue B - Verification of notifying IMT station with AAS

Keep unchanged the limit of power level in RR Article 21 No. **21.5** with adjustment factor regarding the bandwidth of the IMT station with AAS.

Issue C - Table 21-2 of RR Article 21

Add frequency band 24.45-27.5 GHz allocated to the mobile service by WRC-19 to the Table 21-2 of RR Article 21.

**7.2 International Organisations**

TBD

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