Radiocommunication Study Groups

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ITU-APT Foundation of India (IAFI[1])

NEXT STEPS ON RR NO. 21.5

1 Introduction

From WRC-19 Document 550 and the minutes of the twelfth WRC-19 Plenary meeting: *"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**)".*

2 Discussion

During their recent meetings, Working Parties 4A and 4C discussed the work being done by Working Party (WP) 5D on the antenna modelling for active antenna systems (AAS), i.e. an antenna that consists of an array of active elements, used by IMT stations and the applicability of the limit specified in RR No. **21.5** for such IMT stations as well as the notification of IMT stations that use such AAS. This latter issue is based on WRC-19 Document 550.

In the course of the discussions on these topics, there were diverging views, and no consensus was reached in WP 5D on how to make progress and whether or not to involve other WPs, such as WPs 4A and 4C, in the work being conducted by WP 5D on these issues. It was also noted that CPM23-1 designated WP 5D as the responsible group for the latter of these two issues.

The discussion of RR No. **21.5** emanates from the need to ensure interference free operations between co-primary services.

It is essential to maintain an interference free operations environment for other services, especially when notified under RR Article **11**. IAFI also notes that after an extensive study by Task Group (TG) 5/1 of WRC-19 cycle, the outcome of WRC-19 towards the identification of IMT spectrum bands above 24 GHz vide provisions of Resolution **242** (**WRC-19**) ensured the protection of other co-primary services including satellite services. It is noted that RR No. **21.5** applies to all fixed and

[1] ITU-APT Foundation of India (IAFI) is a new Sector Member of ITU-R. Details of IAFI can be seen at itu-apt.org.

mobile stations (operating in the applicable frequency bands) and applies irrespective of whether the stations are notified to the BR.

It is further noted that IMT systems have been using MIMO and as and when required, these IMT stations have been notified to the ITU-R through the existing process. RR No. **21.5** limits the power delivered by "a transmitter to the antenna of a station". There is a concern that applying the RR No. **21.5** limit to the power delivered to each radiating element of an AAS antenna could result in a significant increase in the radiated power to space stations operating in the same frequency bands, which could lead to excessive interference. It is clear that RR No. **21.3** limits the equivalent isotropically radiated power (e.i.r.p.) of a station, i.e., the collection of transmitters and antennas, set at +55 dBW. However, noting that this value of +55 dBW as mentioned in RR No. **21.3** is also a typical value for a VSAT e.i.r.p., it can be seen that this limit is not an effective limit on its own to protect satellite uplinks.

Broadly there are two possible approaches regarding RR No. **21.5**:

(1) that the RR No. **21.5** applies to the total power delivered to the antenna where an antenna consists of an array of active elements;

(2) that the RR No. **21.5** applies to each individual radiating element of an array of active elements.

In case RR No. **21.5** limit applies to each individual radiating element of an AAS antenna, there is a possibility of a significant increase in the power radiated towards space stations operating in the same frequency bands which may lead to harmful interference.

3 Proposal

Note from the Chairmen of Study Group 4 and Study Group (SG) 5 to Working Parties 4A, 4C and 5D in Document 4A/167 / 4C/122 may be seen in this regard. Accordingly, it is proposed that WP 4A/WP 4C should send a LS to WP 5D to propose the following as a way forward on this issue:

a) WP 5D should continue to work, discuss, and develop a working document in order to responds to the questions from BR on this issue.

b) WP 5D be requested to progress this document to a certain level of stability, keeping in view the protection of satellite services keeping the provisions of Resolution **242** (**WRC-19**) in mind.

c) Once the work in WP 5D has reached a level of maturity, the results should be liaised back to WPs 4A and 4C before the document is finalized by the WP 5D and sent to the BR Director.

d) If needed, a joint session between experts from WPs 4A, 4C and 5D should be organised, to clarify that satellite service protection is not impacted.

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