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| A close up of a sign  Description automatically generated | **World Radiocommunication Conference (WRC-23)Dubai, 20 November - 15 December 2023** |  |
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| PLENARY MEETING | **Revision 1 toDocument 202-E** |
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| Samoa (Independent State of) |
| PROPOSALS FOR THE WORK OF THE CONFERENCE |
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| Agenda item 10 |

10to recommend to the ITU Council items for inclusion in the agenda for the next world radiocommunication conference, and items for the preliminary agenda of future conferences, in accordance with Article 7 of the ITU Convention and Resolution **804 (Rev.WRC‑19)**,

# 1 Introduction

This input contribution highlights to the WRC-23 the ongoing work activities related to applying Article **22** of the Radio Regulations (RR) to ensure compatibility of non-GSO FSS operations with GSO networks. Given the ongoing work program within ITU-R, it is unnecessary and counterproductive to seek to revise the RR Article **22** limits themselves. WRC-23 is to note that no change is required in the provisions of RR Article **22** to protect GSO networks from non-GSO systems in the frequency bands below 30 GHz in which RR Article **22** equivalent power flux-density (epfd) limits apply.

The Director of BR will report on the progress of the ongoing work to the subsequent World Radiocommunication Conference (WRC) in 2027, given the prioritization and scope of the work already identified by the ITU Plenipotentiary Conference (PP-22) in its Resolution 219 (Bucharest, 2022).

# 2 Background

The PP-22, in its Resolution 219 (Bucharest, 2022), recognized Articles 6 and 44 of the ITU constitution on the role of ITU in facilitating the international coordination of radio frequencies used by space services, as well as the "continued and expanded launch and operation of a large number of non-geostationary satellites in outer space" and instructed the Radiocommunication Assembly (RA-23) as a matter of urgency, to ensure the continuation of the ongoing work being carried out by the Study Groups on the issue of improving the methodology to enhance the use of radio-frequency spectrum and associated orbital resources in non-GSO orbits.

PP-22 also encouraged Member States, "when authorizing non-GSO systems, to take all necessary actions to avoid unacceptable interference into GSO and other non-GSO systems, as well as to other radio services, of other administrations and to ensure the efficient use of radio-frequency spectrum and associated satellite-orbit resources; to this effect, the necessary regulatory frameworks need to be developed for the operation of non-GSO systems."

It was further stated that the Director of BR should submit the results of the ongoing non-GSO work by the ITU Study Groups to the subsequent WRC (with WRC‑27 being the earliest).

It was further recognized that the current framework between GSO and non-GSO and, particularly, establishing epfd limits as per RR Article **22**, took a decade to complete, involving two conference decisions and extensive studies in Study Group 4. RR Article **22** Section II covers in detail the control of unacceptable interference by non-GSO systems into GSO networks through single-entry downlink, uplink and inter-satellite links epfd limits for non-GSO systems. A considerable amount of work was done, reflected in numerous ITU Recommendations developed about the framework. The limits are based on hundreds of detailed GSO reference links shared by administrations worldwide, including required performance objectives and link margins. Resolution **76** **(Rev.WRC‑15)** forms the basis for the aggregate epfd limits for the protection of GSO networks in which downlink aggregate epfd limits are not to be exceeded for all non-GSO constellations combined.

The extensive study work carried out in establishing Resolution **76** **(Rev.WRC-15)** and RR Article **22** resulted in a regulatory and technical framework that has worked well for many years, protecting GSO networks and providing a solid basis for harmonized GSO and non-GSO operations. They facilitate a dynamic market environment by equitably protecting GSO networks and enabling entry by multiple non-GSO systems. The number of non-GSO satellites being designed and launched each year based on certifications to their licensing administration that they would comply with those limits proves that the current epfd limits have neither prevented non-GSO systems from deploying new satellite technologies and services nor stifled innovation.

It should be noted that any changes to the current regulatory framework would impact critical GSO use and infrastructure backed up by significant investments, including the planned technologies and services of many nations in bands of AP**30B**, AP**30** and AP**30A**. The issue that Resolution 219 (Bucharest, 2022) provided direction to address was not the epfd limits themselves, but rather the accuracy of the modelling used to implement the epfd limits.

The already approved Study Group 4 work program addresses various technical aspects contemplated under Resolution 219 (Bucharest, 2022), including implementing the limits. As outlined in section 3 below, the Conference should ensure that this work continues under the existing RR Article **22** epfd limits and that they are properly implemented in light of these new non-GSO constellations being designed and deployed, as directed in Resolution 219 (Bucharest, 2022) by PP-22. No actions by WRC-23 should jeopardize the delicate compromise that already exists in the existing epfd limits, including by creating a new agenda item by WRC-23 to re-evaluate the current epfd limits, as proposed by some proponents.

# 3 Work in Progress

The work performed by the Study Groups specific to issues related to GSO and non-GSO fixed-satellite service (FSS) systems contemplated under Resolution 219 (Bucharest, 2022) is outlined below and falls into three categories:

3.1 Study work covered through Working Party 4A includes the following:

**• Recommendation ITU-R S.1503:** Working Party (WP) 4A has considered proposals from Member States and sector members to improve the functional description of the software used to evaluate the compliance of non-GSO FSS systems with the equivalent power flux-density (epfd) limits contained in RR Article **22**. This work should continue into the next study cycle to ensure compliance with RR Article **22** epfd limits by improving the methodology for calculating epfd by modelling non-GSO FSS systems, including the impact into GSO networks of the many sidelobes produced by large non-GSO systems, and protecting GSO FSS and BSS systems based on RR Nos. **22.5C**, **22.5D** and **22.5F**. The evolutionary work of Recommendation ITU-R S.1503 has been recognized as ongoing work by WP 4A. It should remain a priority, as the availability of ITU software to properly model non-GSO FSS systems and ensure protection from unacceptable interference to GSO networks from non-GSO systems is essential.

**• Development of Recommendation on non-GSO sharing:** WP 4A has been developing a Recommendation that contains procedures and permissible interference criteria to aid administrations in completing coordination requirements when an assignment of the non-GSO system is involved. The work on this Recommendation will continue throughout the WRC-27 study cycle based on inputs into the ITU-R. Completing this Recommendation will aid administrations in coordinating and addressing interference issues when an assignment of a non-GSO system is involved.

**• Review of split filings for large non-GSO constellations,** the Bureau has noted the increase in usage of non-GSO that has resulted in several challenges in the coordination and notification procedures; these include splitting a non-GSO system into several filed systems. In addition, the Bureau's *Draft Report to WRC-23 on the activities of the Radiocommunication Sector and experience in the application of the radio regulatory procedures and other related matters*, notes that the “practice of splitting a non-geostationary satellite system into several filed systems, [] may affect the effectiveness of single-entry epfd limits contained in RR Article **22** to protect geostationary systems or have an impact in the implementation of Resolution **76 (Rev.WRC-15)**”. The Report also notes that "this issue was studied by WRC-03 under its agenda item 1.19 “to consider regulatory provisions to avoid misapplication of the non-GSO FSS single-entry limits in RR Article **22** based on the results of ITU-R studies carried out in accordance with Resolution **135 (WRC-2000)**”..and that WRC-2000 determined that “the only reason for misapplication of these single entry epfd limits by artificially splitting or combining non-GSO FSS systems, will be to lower the epfd levels and therefore to get a favourable finding status as a result of this regulatory examination”. (See 17 March 2023, Conference Preparatory Meeting, Document 236, <https://www.itu.int/md/R19-CPM23.2-C-0236>; see also Report of the Director on the activities of the Radiocommunication Sector, including post-CPM Addendums, WRC-23, Doc. 4, <https://www.itu.int/md/R23-WRC23-C-0004/en>.

3.2 Study work carried out towards WRC-23 agenda items includes the following:

**• Agenda item 7, Topics A and B:** Under Topic A of WRC-23 agenda item 7, Study Group 4, through Working Party 4A, conducted studies considering the matter of tolerances for specific orbital parameters of non-GSO FSS systems in certain frequency bands. This work focused on how much non-GSO FSS satellites can deviate from their notified orbital characteristics of apogee/perigee altitude and inclination without requiring a restart of the recording process or losing other rights. This work will identify allowed variations in altitude and inclination, taking into account the need for regulatory certainty and ensuring that the protection of other non-GSO systems, GSO networks and terrestrial services of different administrations remain unchanged.

**• Under WRC-23 agenda item 7, Topic B**, the studies have expanded on decisions taken at WRC-19 to clarify the regulatory situation for non-GSO FSS systems in specific frequency bands where Resolution **35** **(WRC-19)** applies. The studies are considering whether there should be a mechanism for adjusting system sizes of non-GSO FSS systems that have completed the implementation of milestones in Resolution **35 (WRC‑19)** but suffered long-term reductions in the number of deployed satellites at some point after that.

**• Agenda item 7, Issue D2:** Building upon the efforts mentioned above to revise Recommendation ITU-R S.1503, this issue considers consequential changes to RR Appendix **4** data elements that would be necessary to ensure the information submitted about non-GSO systems aligns with that needed to implement the current set of revisions to Recommendation ITU-R S.1503 and thus align the Radio Regulations with the proposed changes to this Recommendation.

**• Agenda item 7, Issue G:** WRC-19 adopted two new Resolutions, **769 (WRC-19)** and **770 (WRC-19)**, that define technical and procedural provisions to facilitate regulatory clarity for non-GSO FSS systems operating in the frequency bands 50/40 GHz. This study cycle revisited these technical procedures and identified revisions that would allow for the effective implementation of these provisions.

**• Agenda item 7, Issue J:** Resolution **76 (WRC-15)** defines the technical requirements for non-GSO FSS systems to meet aggregate epfd limits to protect GSO FSS networks from unacceptable interference from non-GSO systems in the Ku and Ka bands. Under this issue, WP 4A have initiated studies to develop calculation techniques and a set of regulatory procedures that administrations of non-GSO FSS systems shall execute to meet their obligation not to exceed the aggregate epfd limits. The studies are to continue to develop accurate modelling techniques and other procedures for evaluating aggregate epfd to continue into the WRC-27 study cycle based on results and guidance from WRC-23.

### 3.3 Prioritization and scope of study work for the next cycle

Pursuant to PP-22 Resolution 219 (Bucharest, 2022), the prioritization of work should continue on the technical aspects of how to enhance the fidelity of the modelling of non-GSO systems while protecting GSO satellites under RR Article **22**, as outlined below:

**•** To continue to improve Recommendation ITU-R S.1503 modelling of the non-GSO interference to GSO through detailed evaluations of the various parameters under consideration as inputs to the methodology, including worst-case geometry, time frame transmissions, inclusion of sidelobes, etc.;

**•** To study possible changes to the GSO earth station antenna patterns used in epfd examination;

**•** To develop an efficient methodology and procedures for consultation meetings examining compliance with aggregate epfd limits to protect GSO FSS/BSS, including the Plans of RR AP**30B** and AP**30**; and

**•** To develop mechanisms for addressing the issue of splitting a non-GSO system into several filed systems, preventing abuse of pfd/epfd limits.

# 4 Proposal

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The PP-22 Resolution 219 (Bucharest, 2022) instructed the RA to prioritize the study work described above, in the ITU-R study groups with a view for the Director of the Bureau to report back to the subsequent WRC on these issues.

Following the review of the workload for the next cycle by RA-23, the co-signing Administration requests for the WRC-23 to note that:

**•** A considerable volume of work is already being carried out and will continue into the next cycle by the Study Groups;

**•** The issue of enhancing the modelling of non-GSO systems and ensuring the protection of GSO networks as per RR Article **22** epfd limits requires the development of an improved methodology for assessing compliance with the limits, and the work on this issue is already being undertaken by the ITU-R study groups, as identified in section 3.3 above;

**•** For the next cycle, it's essential for the current program of work to continue, as highlighted in section 3.3, and that the Director of the Bureau presents its findings to RA-27 and WRC-27 on the results of the studies undertaken for consideration and any necessary action, as appropriate.

Finally, given the above extensive ongoing work being done on implementation of the current epfd limits, there is neither any mandate nor any need to revisit the existing RR Article **22** epfd limits or to have any new agenda item to study the epfd limits in RR Article **22**. Therefore, the signatories to this contribution oppose any proposals for a Future Agenda item on RR Article **22** epfd limits that protect GSO networks from non-GSO interference.

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