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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 | **Addendum 27 toDocument 117-E** |
|  | **29 October 2023** |
|  | **Original: English** |
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| Indonesia (Republic 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)**,

 INS/117A27/1

Indonesia’s views on the proposal of WRC‑27 agenda item to review
and update regulatory provisions for sharing between non-GSO systems
and GSO networks in the portions of frequency bands 14/11 GHz
and 30/20 GHz in which Article 22 epfd limits apply

Introduction

Indonesia is welcoming of the BR Director’s Report to the WRC‑23 (Document [Addendum 1 to Document 4](https://www.itu.int/dms_pub/itu-r/md/23/wrc23/c/R23-WRC23-C-0004%21A1%21MSW-E.docx)) as well as the Chairman’s Report of Study Group (SG) 4 to the RA-23 ([Document 4/1001](https://www.itu.int/dms_ties/itu-r/md/19/sg04/rp/R19-SG04-RP-1001%21%21MSW-E.docx)). The SG 4 Chairman's Report notes that positive progress is being made in areas pertaining to the need for non-geostationary satellite systems (non-GSO) to conform with the agreed norms that protect fixed-satellite service systems according to the interference limits contained in RR Article **22**. Furthermore, the work on revising Recommendations ITU‑R S.1503-4 (on the “Functional description to be used in developing software tools for determining conformity of non-geostationary-satellite orbit fixed-satellite service systems or networks with limits contained in Article **22** of the Radio Regulations”) and ITU‑R S.1714-1 (“Static methodology for calculating epfd↓ to facilitate coordination of very large antennas under Nos. **9.7A** and **9.7B** of the Radio Regulations”) have also been reported.

The BR Director’s Report to the WRC‑23’s work in revising these two Recommendations is very important because:

a) it has been noted that there is a need to improve the methodologies (not the Articles of the Radio Regulations (RR) used as basis for certainty in global sharing and coordination) to assess conformity of non-GSO systems with epfd limits;

b) the need to improve the said assessment methodologies arises from the unprecedented, ongoing, and unconstrained deployment of very large non-GSO systems – low Earth Orbit (LEO) mega-constellations; and

c) the unprecedented deployment volumes of unconstrained, very large, non-GSO systems are rapidly consuming the shared and limited spectrum resources, warranting a decline of the acceptable interference environment to other critical systems sharing the resource, including GSO fixed-satellite service (FSS) and broadcasting-satellite service (BSS).

Notwithstanding the ongoing progress in the revision of relevant ITU-R Recommendations, the work on Recommendation ITU-R S.1503-4 continues, as necessary, under ITU-R Working Party (WP) 4A. This also points to the need to appropriately implement Resolution **85 (WRC‑03)** thatrequires the BR to review its findings made in accordance with RR Nos. **9.35** and **11.31**.This is for frequency assignments to non-GSO FSS satellite systems against the single-entry epfd limits in RR Tables **22-1A**, **22-1B**, **22-1C**, **22-1D**, **22-1E**, **22-2** and **22-3** in RR Article **22**. Resolution **85 (WRC‑03)** was developed before an assessment software was available, therefore now opening the possibility of misapplication of Resolution **85 (WRC‑03)**. Given that currently there is available software to conduct the assessment of epfd limits, Resolution **85 (WRC‑03)** should be either suppressed or modified for use only in cases where a new version of Recommendation ITU‑R S.1503-4 has been adopted but not yet implemented in the ITU software.

Furthermore, there is the single-entry epfd limits stated in the RR Article **22,** and Resolution **76 (Rev.WRC-15)** which specifies the mandatory aggregate epfd limits. All these various processes are linked to the continued revision of Recommendation ITU‑R S.1503-4.

The requirement for the BR to review findings in accordance with RR Nos. **9.35** and **11.31**, and the challenge of the implementation of the Resolution **76 (Rev.WRC‑15)** due to multiple filings being submitted for the same non-GSO systems through different administrations, deserves a detailed review because this impacts the interference assessment of non-GSO systems.

Therefore, it is our view that in order to effectively address the ongoing non-GSO interference assessment needs, the above complexities cannot be ignored. At least the stable common denominator that allows for these complexities to be understood (that is Article **22** of the RR) cannot be modified, because a number of important issues have arisen and require resolving:

a) the non-GSO split filing practices;

b) the improvement of the assessment methodology of Recommendation ITU-R S.1503-4 under WP 4A;

c) improving the implementation of Resolution **76 (Rev.WRC‑15)**;

d) the suppression or modification of Resolution **85 (WRC‑03)** for its appropriate application; and

e) the outcome of WRC‑23 agenda item 7, Topic J.

In light of the above, Indonesia would like to kindly note that in the 5th APT Conference Preparatory Group for WRC‑23 (APG23-5) in Busan, Republic of Korea (20-25 February 2023) and the 6th APG23-6 in Brisbane, Australia (14-19 August 2023) received input documents (APG23-5/INP-[85](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-85_Tonga-WP5-Preliminary_View_on_WRC-23_Agenda_Item_10.docx), APG23-6/1NP-[12](https://www.apt.int/sites/default/files/2023/07/APG23-6-INP-12_Kiribati_AI_10.docx), [125](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-125_Multicountry_WP5_PACP_WRC-23_Agenda_Item_10.docx)) for WRC‑23 agenda item 10 from four (4) APT member countries. The proposal was to review the epfd limits within the RR Article **22**. Despite the intense discussions during APG23-5 and APG23-6, the proposal did not receive the consensus support of the APT membership. This was due to the serious concerns raised by many APT Members about the proposal. As a result, there was no agreement to consider an APT Common Proposal on the matter.

The last WP 4A meeting (26 June – 7 July 2023) also received a similar contribution (Document [4A/971](https://www.itu.int/md/R19-WP4A-C-0971/en)) from one of the said APT members and no output document was developed, given the concerns raised at WP 4A.

Background

Indonesia is one of the APT Administrations that have serious concerns about any proposal that attempts to modify RR Article **22** by allowing higher interference levels from non-GSO systems into GSO networks. The interference protection criteria (epfd limits) set out in RR Article **22** is a requirement non-GSO systems must meet to protect GSO networks, agreed by consensus, and following detailed studies, by ITU Member States (WRC‑2000). The ongoing deployment of some massive LEO mega-constellations, which by design are set to consume the bulk of the shared orbital and spectrum resources in LEO, is not improving the interference environment GSO networks must cope with from non-GSO systems. To the contrary, the advancement of receiver technology in GSO networks in combination with the emergence of spectrum resource-covetous LEO mega-constellations indicate existing epfd limits are the only effective mechanism in ensuring the interference protection of critical GSO networks.

Moreover, there are multiple other issues about LEO mega-constellations, including their potential externalities, that need to be resolved as matter of urgency; instead of promoting regulatory instability and planning uncertainty through proposing an opening of well-established interference management provisions of the Radio Regulations. This is particularly important considering the unconstrained deployment of very large non-GSO systems (aka. LEO mega-constellations) is warranting a decline in the acceptable interference environment across the shared and limited spectrum resources – because they are limited and because a few LEO systems are being set to rapidly consume all of the available epfd margins that protect GSO networks.

One matter that must be addressed is the practice of splitting a non-geostationary satellite system into several filed systems. Splitting non-GSO filings into several filings is a practice that undermines the effectiveness of the assessment of single-entry epfd limits (contained in RR Article **22**). This also has an impact onthe implementation of Resolution **76** **(Rev.WRC-15)**. The splitting of non-GSO filings problem was raised by the BR Director in its preliminary draft Report to WRC-23, as submitted to CPM23-2 (Section 3.1.4 of [Part 1 of Document CPM23-2/236](https://safe.menlosecurity.com/https%3A/www.itu.int/md/R19-CPM23.2-C-0236/en)). Splitting non-GSO filings results in the misapplication of single entry epfd limits for the sole purpose of lowering epfd levels, and therefore, to get a favourable finding status as a result of the regulatory examination performed by the Radiocommunication Bureau under RR No. **11.31**.

Splitting non-GSO filings to artificially create the notion that non-GSO systems are producing lower epfd levels is one clear indication that the interference environment in which GSO networks are being forced to operate is not improving at all – but to the very contrary. Therefore, proposing to relax epfd limits of RR Article **22** so that non-GSO systems are given even more interference production margins will not be an appropriate regulatory intervention.

Moreover, noting that the mandatory aggregate epfd limits are specified in Resolution **76 (Rev.WRC‑15)**, there is the challenge that methodologies and procedures in Resolution **76** **(Rev.WRC‑15)** are unclear, that is to effectively determine whether these aggregate epfd limits are being exceeded. As a consequence, validating compliance with Resolution **76 (Rev.WRC‑15)** is not feasible at this point, although several LEO mega-constellations are already being deployed without any constraints.

In view of these issues, the Republic of Indonesia submits this document to share its views and concerns. Because the impacts of very large non-GSO deployments are yet to be fully understood and addressed as explained above, Indonesia is not in a position to support any changes to the established and agreed GSO interference protection criteria (epfd limits) provided in RR Article **22**. Proposing to modify the current epfd limits of RR Article **22** is an unreasonable undertaking in any agenda item of future WRCs because the ongoing unconstrained deployment of LEO mega-constellations is unlikely to be improving the interference conditions in the frequency bands they share with GSO networks.

The aggregate epfd limits contained in Resolution **76** **(Rev.WRC‑15)** and the single-entry epfd limits contained RR Article **22**, which are currently in force as mandatory conditions for relevant non-GSO systems to comply with, were originally developed and agreed by all the ITU Member States under agenda item 1.13 of WRC‑2000. There were more than 600 parameters in frequency bands 14/11 GHz and 200 parameters in frequency bands 30/20 GHz that were submitted by administrations and studied by the ITU‑R study groups in order to establish these epfd limits. The description of the GSO FSS systems that were referenced during the study are reported in the Recommendation ITU‑R S.1328. The study also calculated the effect of the rain fade compensation using adaptive coding for frequency bands 14/11 GHz and 30/20 GHz.

ITU‑R and its Member States, under agenda item 1.13 of WRC‑2000, agreed to define the epfd limits because there was a need to provide a regulatory mechanism that would ensure protection of GSO FSS/BSS networks from the maximum aggregate interference produced by multiple non-GSO FSS systems in frequency bands where epfd limits had been adopted. Therefore, to simply compare the masks of single-entry epfd↓ limits with some commonly used protection criteria of GSO FSS/BSS networks, such as Recommendation ITU‑R S.1432, would not be appropriate. In this respect, the current epfd limits contained in Resolution **76** **(Rev.WRC‑15)** and RR Article **22** are sufficient to adequately protect GSO FSS/BSS networks from all non-GSO FSS systems, which individually need to meet the limits of RR Article **22**, especially RR No. **22.2**, while allowing reasonable flexibility for non-GSO FSS systems to be deployed.

The technical and regulatory framework established in RR Article **22** and Resolution **76** **(Rev.WRC‑15)** addresses the permitted level of interference that non-GSO systems may generate into GSO networks without placing constraints on any systems or services sharing these frequency bands, including non-GSO systems.

RR Article **22** is an established and clear method for sharing spectrum between frequency bands 14/11 and 30/20 GHz GSO networks and non-GSO systems. Significant number of GSO networks have invested in existing and future frequency bands 14/11 and 30/20 GHz and their services rely on the existing epfd framework specified in RR Article **22**. New and innovative frequency bands 14/11 and 30/20 GHz GSO FSS HTS networks and services have been recently launched and many more in the next few years are currently being developed, all rely on the RR Article **22** limits.

Furthermore, a future agenda item to modify RR Article **22** would be redundant and counterproductive because the real issue is about ensuring that the methodology (Recommendation ITU‑R S.1503) provides an accurate assessment of non-GSO compliance with epfd limits of RR Article **22**, and such work is already being addressed by WP 4A. Discussions are currently ongoing within WP 4A on the update of Recommendation ITU‑R S.1503 which is used by the Radiocommunication Bureau (BR) to evaluate any non-GSO system filings to ensure that all epfd limits are met. Current revisions being considered are set to address the accuracy of non-GSO interference assessments. There is broad agreement that this work is important, urgent and needs to be done in reference to the established epfd limits. Any proposal to modify these limits would create uncertainty about the interference protection of existing and future GSO networks.

Given the need to provide continued certainty to the global and critical GSO networks and users that depend on GSO services, for example FSS and BSS networks, it is critical to ensure that unacceptable interference from the ongoing and unconstrained deployment of very large non-GSO systems continue to be managed. This is while all the potential impacts and externalities that deployments of massive LEO mega-constellations are being fully understood. Ongoing innovation in the design and deployment of both non-GSO systems and GSO networks needs to be compatible with a well-managed interference environment, because orbital and spectrum resources are a common global good and do not belong to a few private actors. This ecosystem needs to remain useful to all ITU Member States going forward, big or small, including those that rely on critical GSO networks and services under the provisions of RR Article **22**. WP 4A is already addressing the necessary refinements required in making sure non-GSO systems’ interference is assessed appropriately.

Views and Proposals

Considering that the ongoing deployment of very large non-GSO systems is unlikely to be improving the interference conditions GSO networks (FSS and BSS) are being subjected to, it is of critical importance to retain the current aggregate and single-entry epfd limits that seek to protect GSO networks from unacceptable interference from non-GSO systems (single-entry and aggregate). These limits have been incorporated in the design objectives of many operational and planned GSO FSS/BSS satellite networks. Therefore, Indonesia is of the view that changing RR Article **22** would be an unreasonable undertaking by any future WRC, given the multiple uncertainties being presented by the ongoing and unconstrained deployment of very large non-GSO systems. The practice of splitting non-GSO filings, and how such practice impacts an effective assessment of epfd protection limits, is one of the many issues being posed by non-GSO systems. This is followed by the need to complete the work within the WP 4A in refining the assessment methodology of Recommendation ITU‑R S.1503 by the BR.

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