

COMMENTS ON DRAFT AMENDMENT OF THE RADIO FREQUENCY SPECTRUM REGULATIONS, 2015 (GOVERNMENT GAZETTE NO. 54677)

Submitted by the South African Radio Astronomy Observatory, in response to ICASA General Notice 3927 of 2026

1. Introduction

We thank the authority for the opportunity to once again comments on this process and we especially welcome the inclusion of provisions intended to protect radio astronomy services and astronomy advantage areas within the Draft Amendment of the Radio Frequency Spectrum Regulations, 2015.

The explicit recognition of radio astronomy protection requirements, including reference to ITU-R RA.769 and the South African Radio Astronomy Protection Levels Regulations, is an important and positive development. Given the international scientific significance of the MeerKAT telescope and the SKA-Mid Observatory. We also find it essential that the regulatory framework provides protection mechanisms that are clear and unambiguous, technically robust, and enforceable in practice.

The comments below are intended to support that objective and all amendments to the draft regulations are underlined.

We propose that the Management Authority in provision 2.3 of Regulation one be written as **Astronomy** Management Authority to give clarity to the jurisdiction.

2. Management Authority for the Purpose of Regulation 28B

SARAO would like to thank the Authority for inclusion of this provision, and we believe to a great extent it will address the technical issues and address protection and mitigation measures measures on radio frequency interference in the declared astronomy advantage areas from satellite emissions.

Regulation 28B provision 3 requires satellite space segment operators to coordinate with the Management Authority before commencing operations. In addition, the references to ITU-R RA.769-2 and the South African Radio Astronomy Protection Levels Regulations are welcomed. However, compatibility assessments for NGSO systems should explicitly consider aggregate and time-varying interference effects. Assessment based solely on a single satellite or single beam may not adequately represent the operational characteristics of modern large constellations. Consideration should therefore be given to clarifying that compliance assessments must address all effects of aggregate interference. To further clarify Regulation 28B provision 3 it is proposed to have it reads as follows:

“To mitigate potential interference to Astronomy devices, the satellite space segment operator must, before commencing operations, coordinate with the Astronomy Management Authority to ensure a mutually acceptable agreement to mitigate the impact of its satellites on astronomy devices, taking into consideration 28B(6) and the South African Radio Astronomy Protection Levels Regulations (No.R.90 of 2012).”

It is also recommended that the Regulations clarify that the relevant Management Authority is the authority designated under the Astronomy Geographic Advantage Act for the applicable astronomy advantage area. Thus, provision 2.2.6 of Regulation 28A, on the draft publication should read as follows:

“It is for this reason that the Authority is requiring space segment operators to coordinate with the **Astronomy** Management Authority before commencing with operations to mitigate possible radio frequency interference **including impacts of aggregate interference**”

To account for the provision to include aggregate interference in the assessment process, the insertion of Recommendation ITU-R RA.1513 is also proposed in provision 6 of Regulation 28B so that it reads as follows:

“A satellite space segment operator providing services in the Republic must take all necessary protection measures to comply with the protection thresholds contained in Recommendation ITU-R

RA.769-2, **Recommendation ITU-R RA.1513** in frequency bands allocated on a primary basis to the RAS, which should also be reviewed during coordination process mentioned in 28B(3).”

We believe that such modifications are essential for the regulatory framework to provide protection mechanism that is clear and unambiguous, technically robust and enforceable in practice.

3. Clarification on coordination process

The requirement for coordination before commencement of operations is welcomed. However, the term the provision may benefit from further clarification. In the context of radio astronomy protection, coordination should involve a substantive technical compatibility assessment rather than a simple notification process. The ICASA mandates that commercial satellite operators coordinate with the Astronomy Management Authority to mitigate radio interference. Operators must file mitigation plans and regularly update agreements to protect the Radio Astronomy Service (RAS) from satellite signals. The coordination may use bore-side avoidance, frequency management or any other method to ensure the protection of radio astronomy.

A coordination process should include, at minimum:

- provision of relevant technical and operational information;
- assessment against applicable radio astronomy protection criteria;
- consideration of mitigation measures where required;
- documentation of assessment outcomes; and
- confirmation of agreed operating conditions where applicable.

On the basis of the above concerns, we would like if the Authority could consider, addition of the following text in the final regulation in Regulation 28B.

2.2.7 The coordination process shall be deemed complete only upon the execution of a written agreement between the satellite operator and the Astronomy Management Authority. Where the parties fail to reach agreement, either party may refer the matter to ICASA for mediation. The Astronomy Management Authority shall notify ICASA of any failure by the satellite operator to comply with Regulation 28B. Coordination shall include the continuous exchange of information between the satellite operator and the radio astronomy observatory, the timely notification of any

material changes to the satellite system that may affect radio frequency interference (RFI), and the reassessment of RFI following such changes or whenever reasonably required.

4. Technical Information Requirements under Form F

Form F provides a useful registration framework. However, additional information may be required where radio astronomy compatibility assessments are necessary, which may also not be available in the ITU-R Filling. Where operations may affect the KCAAA, consideration should be given to requiring additional technical information which is essential for the operator to demonstrate compatibility and for the AMA to verify the submitted assessment, where applicable:

- frequencies used over South Africa;
- unwanted and spurious emission levels;
- satellite antenna patterns;
- earth station and user-terminal antenna characteristics;
- beam footprints and beam management strategies;
- orbital and constellation ephemerides;
- traffic and loading assumptions used in interference analyses; and
- available interference mitigation mechanisms.

Provision of such information would assist the Astronomy Management Authorities in conducting meaningful compatibility assessments.

5. Clarification of the 10.7 GHz Requirement

The draft Regulations refer to suppression of NGSO satellite transmissions in the channel adjacent to 10.7 GHz, in provision 28B (5)

It is proposed that Authority emphasis that the purpose of this requirement is protection of the radio astronomy allocation in the 10.6–10.7 GHz band. We propose that provision 5 of Regulation 28B should read as follows:

A Satellite space segment operator providing services in the Republic must manage interference by limiting unwanted emissions. **For the purpose of limiting radio frequency interference into radio astronomy frequency band in the 10.6 – 10.7 GHz,** non-geostationary space segment operator will suppress any transmission in the satellite channel adjacent to 10.7 GHz.

6. Interference Reporting and Rapid Mitigation

Regulation 28A allows ICASA to require cessation of ESIM transmissions following reports of harmful interference from terrestrial licensees.

Consideration should be given to extending similar recognition to reports submitted by:

- the relevant Management Authority;
- an astronomy device management authority; and/or
- the operator of a declared Astronomy Device.

This would provide a clear regulatory pathway for rapid intervention where harmful interference affecting radio astronomy observations is detected or reasonably suspected.

Given the scientific and operational sensitivity of radio astronomy observations, timely mitigation is often essential.

7. Annexure K and Radio Astronomy Protection Obligations

Annexure K provides useful information regarding ESIM frequency bands and applicable provisions. However, it would be beneficial to clarify that inclusion of a frequency band within Annexure K does not constitute automatic compatibility clearance for operations that may affect an astronomy advantage area or declared Astronomy Device. For that reason, we propose the following addition of provision 10 to Regulation 28A of the draft RFS Regulations. 11) For the protection of the KCAAA, transmissions to ESIMs shall be in accordance with protection measures contained in Recommendation ITU-R RA.769-2 and the South African Radio Astronomy Protection Levels Regulations (No.R.90 of 2012) and coordination with AMA must be undertaken.

8. General Observation

The effectiveness of the proposed protections will depend largely on the clarity and enforceability of the coordination, assessment and mitigation framework.

For internationally significant facilities such as MeerKAT and SKA-Mid, protection measures should ensure that compatibility assessments are technically rigorous, based on appropriate radio astronomy criteria, and capable of addressing aggregate interference from evolving satellite systems.

Accordingly, our principal recommendation is that the Regulations provide greater clarity regarding:

- the responsible authorities for coordination;
- the technical content of coordination submissions;
- the criteria and methodology used to assess compatibility;
- mechanisms for mitigation and enforcement; and
- obligations arising when satellite systems change after registration.

These clarifications would significantly strengthen the practical effectiveness of the proposed radio astronomy protections while maintaining regulatory certainty for satellite operators.

We thank ICASA for the opportunity to comment on the Draft Amendment of the Radio Frequency Spectrum Regulations, 2015 and would welcome further engagement on these matters.

Once again we would like to thank the Authority for the draft RFS Regulation and the opportunity given to SARAO to make written submission. We would also like to indicate our availability and commitment to participate in further public participation process that the Authority may undertake in addition.

Your Sincerely



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