

Part B

Update to Section 5 of the National Radio Frequency Plan 2018

SARAO appreciates the support given by the Authority with the inclusion of section 5 in the National Radio Frequency Plan 2018 (NRFP2018). The inclusion of the section creates awareness to ICASA's radio frequency spectrum stakeholders on the possible restrictions and/or prohibition on spectrum use that may exist in the Northern Cape province. Such restrictions aimed at the protection of the observations undertaken by the SKA premier radio telescope and other radio astronomy instruments hosted in the established radio quiet zone.

Section 5 of the draft NRFP2021 is a bit outdated and since the publication of the NRFP2018, there have been several spectrum management and regulatory developments in the Karoo Central Astronomy Advantage Areas (KCAAs). Hence, this submission is made to request that the Authority considers update this section to reflect the development, ensure the protection of radio astronomy earth stations located outside KCAA, further strengthen awareness to interested spectrum users in the Northern Cape Province and support the government's effort in establishing a radio quiet zone for the observations undertaken by the SKA.

The following developments prompts the need to update this section to reflect the spectrum usage restrictions and/or prohibitions in the final publication of the National Radio Frequency Plan 2021.

- The Karoo Central Astronomy Advantage Areas regulations were only published in December 2017, which was several months after the public consultation process on the draft NRFP2018.
- The list of radio frequency bands permitted for use in the Karoo Central Astronomy Advantage Area was first published in 2019 and recently developed in 2021.
- The MeerKAT and HartRAO radio telescopes were published in the MIFR in 2018 and the SKA radio telescope is currently filed and is currently published "As Received" only and awaiting final publication by the BR.
- In September 2018, South Africa contributed to the development of Revision of Report ITU-R RA. 2259, which is now in the final stage. The establishment of the radio quiet zone in SA is regarded amongst international best practices for protection of radio astronomy areas.
- The impact of WRC-15 and WRC-19 decisions, particularly with the allocation of IMT in frequency band(s) or adjacent to frequency bands listed in No. 5.149 of the Radio Regulations.

On the basis of the above, we request that the Authority considered our request to update section 5 of NRFP2018, as provided in the next section, to reflect recent development in the country's effort to protect the SKA.

5 RADIO ASTRONOMY

The Astronomy Geographic Act, 2007 (AGA Act No. 21 of 2007) provides the legal basis and framework for the declaration of astronomy advantage area and protection of such areas from harmful radio frequency interference that may hamper the cosmic observations by scientific instruments located within those areas. The authority develops the national spectrum allocation, assign frequencies to licensees, and monitor compliance with licence terms. The Astronomy Management Authority (AMA) within the Department of Science and Innovation was assigned to management the declared Karoo Central Astronomy Advantage Areas (KCAAAAs). The Authority gave notice to all radio frequency spectrum licensees operating within the KCAAAAs to apply for a permit with the AMA in terms of KCAAAAs Regulations; through [GG No. 42080 under Notice No. 765 of 4 December 2018](#).

This section provides information on the regulatory framework established for the protection of radio astronomy in South Africa.

5.1 DECLARATION OF ASTRONOMY ADVANTAGE AREAS

The Minister responsible for science and technology may declare any area or part of an area in the Province of the Northern Cape as an astronomy advantage area to be protected, preserved and properly maintained in respect of radio frequency interference or interference in any other way.

- i. The whole of the territory of the Northern Cape Province excluding Sol Plaatje Municipality is declared for radio astronomy purpose, as Declared in [GG No. 32951 Notice No. 115](#) of 19 February 2010.
- ii. The Karoo Core Astronomy Advantage Area (KCoreAAA) is used for the purposes of radio astronomy and related scientific endeavours, as declared in [GG No. 33462 Notice No. 723](#) of 20 August 2010.
- iii. The Karoo Central Astronomy Advantage Area (KCAAAAs) is used for the purpose of radio astronomy and related scientific endeavours, as declared in [GG No. 37434 Notice No. 198](#) of 12 March 2014.

The purpose of the declaration of areas as astronomy advantage areas is to ensure that the geographic area, which are suitable for astronomy and related scientific endeavours is protected, preserved and properly maintained in accordance with good national and international practices.

5.2 REGULATIONS OF ASTRONOMY ADVANTAGE AREAS

The Minister responsible for science and technology may make regulations for the management and protection of astronomy advantage areas.

- i. Regulations on radio astronomy protection levels in astronomy advantage areas declared for the purpose of radio astronomy were published in Government Gazette [No. 35007 under Notice No. R. 90](#) of 10 February 2012.
- ii. Regulations to prohibit or restrict certain activities in the core astronomy advantage areas declared for the radio astronomy purposes were published in Government Gazette No. [35450, under notice No. R. 465](#) of 22 June 2012.
- iii. Regulations on the protection of the Karoo central astronomy advantage areas declared for the purpose of radio astronomy were published in Government Gazette [No. 41321, under Notice No. 1411](#) of 15 December 2017.

The Minister obtained concurrence of ICASA when making regulations for prohibiting or restricting activities that have an adverse effect on astronomy and related scientific endeavours.

5.3 ASTRONOMY DEVICES

The Minister may declare any existing or proposed scientific endeavour to be astronomy and related scientific endeavours for the purpose of the Astronomy Geographic Advantage Act.

- i. The establishment and operation of MeerKAT telescope is declared a scientific endeavour in Government Gazette [No. 33614, under Notice No. 897](#) of 15 October 2010.
- ii. The establishment and operation of Square Kilometre Array (SKA) telescope is declared a scientific endeavour in Government Gazette [No. 33614, under Notice No. 897](#) of 15 October 2010.
- iii. The operation of C-BASS telescope within the spectrum between 4.5 GHz and 6.5 GHz is declared a scientific endeavour in Government Gazette [No. 36826, under Notice No. 684](#) of 13 September 2013.
- iv. The development and operation of PAPER telescope and HERA telescope within the spectrum between 100 MHz and 200 MHz is declared a scientific endeavour in Government Gazette [No. 36826, under Notice No. 684](#) of 13 September 2013.

5.4 SPECTRUM LIST EXEMPTED FROM PROHIBITION

From one (1) year after the date that KCAAs Regulations become operational, no licensee or licence exempted operator shall use, or continue to use the radio frequency spectrum from 100 MHz to 25.5 GHz to conduct radio transmissions within the declared KCAAs, unless the spectrum is exempted from prohibition. The Minister published a list of the radio frequency spectrum and applications that are exempted from the prohibition of use for transmissions located within the KCAAs in Government Gazette No. 45045, under Notice No. 753 of 26 August 2021.

5.5 ASTRONOMY FACILITIES WITHIN THE DECLARED AREAS

The use of radio frequency bands in the areas declared as Karoo Core and Central Astronomy Advantage Areas are regulated as follows:

Unless required for the purpose of radio astronomy and related scientific endeavours the use of the radio frequency spectrum in Table 1 is restricted within the declared as Karoo Core and Central Astronomy Advantage Areas.

Table 1: Restrictions on the use of radio frequency spectrum

Declared Area	Prohibited Band
KCoreAAA	9 kHz to 3 000 GHz
KCAAA 1	100 MHz to 2 170 MHz
KCAAA 2	100 MHz to 6 GHz
KCAAA 3	100 MHz to 25.5 GHz

In terms of section 22(6) of the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007), read with section 30(1) and section 31 of the Electronic Communications Act, 2005 (Act No. 36 of 2005) ("ECA"), the Authority has an obligation not to issue Radio Frequency Spectrum Licences where frequency used could cause radio frequency interference ("RFI") in the KCAAA. As a result, the Authority has put measures in place to ensure that it fulfils its role of preventing RFI in the KCAAA when licensing radio communication and broadcasting spectrum licenses. The Authority shall apply the necessary enforcement steps in terms of section 31 of the ECA and relevant regulations pertaining to the failure by a Radio Frequency Spectrum Licensees to comply with the provisions of the ECA including Notice No. 765 in Government Gazette No. 42080 of 4 December 2018.

5.5 ASTRONOMY FACILITIES OUTSIDE THE DECLARED AREAS

The radio instruments located at Hartebeesthoek Radio Astronomy Observatory near Pretoria are registered in the ITU-R MIFR and they include HART15M, HARTRAO and HARTVGS. The observations undertaken by these instruments in RAS bands are globally recognised and internationally protected. The applications and services operating within a 15 km radius from the location; Latitude 25°53'24.06"S and Longitude 27°41'7.45"E; must coordinate with SARAO and give due consideration when operating stations in frequency bands listed under No. 5.149, also identified in the NRFP2021 table of frequency allocation.