
GOVERNMENT NOTICES • GOEWERMENTSKENNISGEWINGS

DEPARTMENT OF SCIENCE AND TECHNOLOGY

NO. 1166

23 NOVEMBER 2015

NOTICE OF INTENTION TO MAKE REGULATIONS ON THE PROTECTION OF THE KAROO CENTRAL ASTRONOMY ADVANTAGE AREAS IN TERMS OF THE ASTRONOMY GEOGRAPHIC ADVANTAGE ACT, 2007.

This notice applies to the Karoo Central Astronomy Advantage Areas declared for the purpose of radio astronomy and related scientific endeavours in terms of section 9(1) and (2) of the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007) (hereinafter referred to as "the Act").

I, Grace Naledi Mandisa Pandor, Minister of Science and Technology, in accordance with sections 22, 23, 42 and 50 to 52 of the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007) (hereinafter referred to as the "the Act") and having obtained the concurrence of the Independent Communications Authority of South Africa and of the Minister of Finance (to the extent that these Regulations have financial implications), hereby give notice of my intention to make Regulations, as set out in the Schedules hereto and as listed hereunder.

Schedule A: Regulations to prohibit and restrict the use of certain radio frequency spectrum and certain activities in the Karoo Central Astronomy Advantage Areas declared for radio astronomy purposes.

Schedule B: Regulations on administrative matters for Central Astronomy Advantage Areas declared for radio astronomy purposes.

Schedule C: Regulations on financial compensation procedures for Central Astronomy Advantage Areas.

Schedule D: Regulations restricting electromagnetic interference within the Karoo Central Astronomy Advantage Area 1.

The draft regulations apply to the Karoo Central Astronomy Advantage Areas declared for the purpose of radio astronomy and related scientific endeavours in terms of section 9(1) and (2) of the Act. The document pack with the regulations will be made available in the Northern Cape.

Interested or affected persons and members of the public are invited to submit written representations on or objections to the regulations contained in the Schedules within sixty (60) days from the publication of this notice to:

Mr Mere Kgampe
Dept of Science and Technology
Building 53, CSIR Campus
Meiring Naude Road
Brummeria
Pretoria
0184

Or Dept of Science and Technology
Private Bag X894
Pretoria
0001

Or

E-mail address mere.kgampe@dst.gov.za

Enquiries can be made at telephone number 012 843 6644

Attention is drawn to the matters described hereunder –

- The previous written and oral representations made during the public participation process for the declaration of the Karoo Central Astronomy Advantage Areas will be considered together with any new submissions to be made in response to this Notice in so far as they relate to aspects included in the draft regulations. A person who has already made a written and/or an oral representation may submit further representations.
- Please note that any written representations which are received after the closing date may be disregarded.
- Any person submitting written representations who wishes to also make an oral representation at a public hearing must indicate this in their written representations.
- Attention is drawn to Notice 649 of 2010 published in the Government Gazette No. 33328 on 2 July 2010 in which interested and affected parties in the proposed core, central and co-ordinated astronomy advantage areas as indicated in the schedule to that notice, were invited to register their details with the Department. Any person who may not have registered yet, and who wishes to do so, may contact the Department to request that they be registered. Contact details that may have changed for persons who have registered, should be updated.


MRS GNM PANDOR, MP
MINISTER OF SCIENCE AND TECHNOLOGY

SCHEDULE A

REGULATIONS TO PROHIBIT AND RESTRICT THE USE OF CERTAIN RADIO FREQUENCY SPECTRUM AND CERTAIN ACTIVITIES IN THE KAROO CENTRAL ASTRONOMY ADVANTAGE AREAS DECLARED FOR RADIO ASTRONOMY PURPOSES.

ARRANGEMENT OF REGULATIONS

| | |
|---|----|
| 1. Definitions..... | 2 |
| 2. Scope of the regulations..... | 6 |
| 3. Prohibition and restrictions on the use of radio frequency spectrum from 100 MHz to 25.5 GHz..... | 6 |
| 4. Conditions on the use of radio frequency spectrum from 100 MHz to 25.5 GHz | 8 |
| 5. Conditions on construction, upgrade, expansion or use of radio stations or radio apparatus | 9 |
| 6. Exempted radio apparatus | 11 |
| 7. Location of the SKA Virtual Centre and protection corridors..... | 12 |
| 8. Extension of the one year period..... | 12 |
| 9. Financial compensation..... | 12 |
| 10. Offences and penalties..... | 12 |
| 11. Short title and commencement..... | 12 |
| Annexure A: Map of protection corridors containing the SKA radio astronomy stations within the Karoo Central Astronomy Advantage Area 1 | 13 |

1. Definitions

In these regulations unless the context indicates otherwise –

“**Act**” means the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007);

“**assessment point**” means the SKA Virtual Centre or another geographical location or point defined in terms of these regulations, which location is used as the assessment point for the applicable protection measures as prescribed in these regulations;

“**co-management entity**” means an organ of state, a local community, an individual or other party with whom the relevant management authority has entered into a co-management agreement in terms of section 18 of the Act;

“**dBm**” means the radio frequency power level expressed in decibels relative to one milliwatt;

“**effective radiated power**” means the product of the power level supplied to the antenna and the antenna gain relative to a half-wave dipole in the relevant direction;

“**essential service**” means a radio communications service used in a central astronomy advantage area that is classified as an essential service in terms of the criteria and procedures prescribed in regulation 7 of the Regulations on Administrative Matters for central astronomy advantage areas declared for radio astronomy, 2015;

“**Karoo central astronomy advantage areas**” means the Karoo central astronomy advantage areas declared by Notice No. 198 published in *Government Gazette* No. 37434 on 12 March 2014;

“**Karoo core astronomy advantage area**” means the Karoo core astronomy advantage area declared by Notice No. 723 published in *Government Gazette* No. 33462 on 20 August 2010;

“licence exempt operator” means a person who provides a service pursuant to an exemption granted by the Independent Communications Authority of South Africa (ICASA) in terms of section 6 of the Electronic Communications Act, 2005 or uses radio frequency spectrum which is exempt from requiring a radio frequency spectrum licence by virtue of section 31(6) of the Electronic Communications Act, 2005 and regulations made in terms thereof;

“licensee” as defined in the Electronic Communications Act, 2005 means a person issued with a licence to provide services in terms of Chapter 3 or to use the radio frequency spectrum in terms of Chapter 5 of the Electronic Communications Act, 2005;

“protection corridors” mean strips of land, alongside a radio astronomical spiral arms configuration, within which SKA stations in the Karoo Central Astronomy Advantage Area 1 are to be positioned, within a width of 5 km on either side of each spiral arm, as depicted and described in Annexure A;

“radio apparatus” means an electronic communications facility which is capable of transmitting or receiving any signal by radio;

“Radio Astronomy Protection Levels Regulations” means the regulations made to define the radio astronomy observation protection levels for the astronomy advantage areas declared for purposes of radio astronomy, published under Notice No. R.90 in the *Government Gazette* No. 35007 on 10 February 2012;

“radio astronomy station” means one or more receiving systems at a location, including accessory equipment, for receiving radio waves of cosmic origin for the purposes of radio astronomy;

“radio communication” means the emission, transmission or reception of information, including, without limitation, voice, sound, data, text, video, animation, visual images, moving images and pictures, signals or a

combination thereof by means of radio or other electromagnetic waves without the aid of a tangible conductor;

“radio frequency interference” means the detrimental effect of received radio signals that exceed the protection levels prescribed in the Radio Astronomy Protection Levels Regulations, 2012, for more than 5% of the time over a 24 hour period;

“Radio Frequency Spectrum Regulations 2015” means the regulations made by ICASA as published by Notice 279 of 2015, in Government Gazette No. 38641 on 30 March 2015;

“radio station” as defined in the Electronic Communications Act, 2005, means one or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying an electronic communications service, broadcasting service or any electronic communications authorised by ICASA, and any radio apparatus used at a specific geographical location;

“Regulations on Administrative Matters for central astronomy advantage areas declared for radio astronomy, 2015” means the regulations published by Notice No. xxx in Government Gazette No. xxx on xxx;

“Regulations on Financial Compensation Procedures for central astronomy advantage areas, 2015” means the regulations published by Notice No. xxx in Government Gazette No. xxx on xxx;

“saturation level” means a received power level of (minus) -100 dBm, or higher, for a radio frequency interference signal at which the saturation phenomenon occurs at a radio astronomy station or at a specified assessment point or points, or within a specified area;

“SKA” means the Square Kilometre Array radio telescope consisting of an array of radio astronomy stations to be located within the Republic of South Africa and in participating African countries in accordance with the

decision of the SKA Organisation, a private company (limited by guarantee) incorporated in the United Kingdom; and

“SKA Virtual Centre” means the geographical point located at geographical co-ordinates 30.71292 degrees south and 21.44380 degrees East that relates to the SKA array of radio astronomy stations within the Karoo Astronomy Advantage Areas and is specified as the centre Assessment Point for the application of the protection levels as defined in the Radio Astronomy Protection Levels Regulations.

2. Scope of the regulations

- (1) These regulations apply to the relevant Karoo Central Astronomy Advantage Areas in relation to the frequency spectrum specified in the Notice declaring the Karoo Central Astronomy Advantage Areas.
- (2) If there are differences between the English and the Afrikaans versions of these regulations, the English version will take precedence.

3. Prohibition and restrictions on the use of radio frequency spectrum from 100 MHz to 25.5 GHz

- (1) One (1) year from the date that these regulations come into operation no licensee, licence exempt operator or any other person may use the radio frequency spectrum from 100 MHz to 25.5 GHz for transmissions within the Karoo Central Astronomy Advantage Areas unless –
 - (a) this use is required for the purposes of radio astronomy and related scientific endeavours declared to be so in terms of section 28(1) of the Act; or
 - (b) the use of specific spectrum within the restricted spectrum has been exempt from this prohibition in terms of the relevant provisions of the Regulations on Administrative Matters for central astronomy advantage areas declared for radio astronomy, 2015; or
 - (c) the spectrum use has been exempted in terms of regulation 6 of these regulations; and
 - (d) in the case of paragraph 3(1)(b), the relevant management authority has issued to that person a permit in terms of regulation 4 in the Regulations on Administrative Matters for central astronomy advantage areas declared for radio astronomy, 2015 in relation to the use of that spectrum.

- (2) (a) The prohibition in sub-regulation 3(1) does not apply to the use of radio frequency spectrum from 100 MHz to 200 MHz which was lawfully used immediately before the date of promulgation of these regulations;
- (b) Any licensee or licence exempt operator using any of the radio frequency spectrum referred to in sub-regulation 3(2)(a) within the Karoo Central Astronomy Advantage Areas may only do so if the relevant management authority has issued to that person a permit in terms of sub-regulation 3(1)(d) in relation to the use of that spectrum.
- (3) One (1) year from the date that these regulations come into operation, no television broadcasting service licensee or broadcasting signal distribution licensee may transmit a television broadcasting service in analogue format from a terrestrial transmitting station within the Karoo Central Astronomy Advantage Areas.
- (4) One (1) year from the date that these regulations come into operation no licensee or licence exempt operator or any person may engage in any radio communication with the use of radio frequency spectrum from 100 MHz to 25.5 GHz within the Karoo Central Astronomy Advantage Areas unless –
- (a) this activity is required for the purposes of radio astronomy and related scientific endeavours declared to be so in terms of section 28 (1) of the Act;
- (b) this activity has been exempted from the possession of a permit in terms of regulation 6; or
- (b) possible radio frequency interference has been considered and dealt with by the relevant management authority or co-management entity when considering the licensee or licence exempt operator's application for a permit in terms of the Regulations on Administrative

Matters for central astronomy advantage areas declared for radio astronomy, 2015.

- (5) Any use contemplated in sub-regulation (4) must comply with regulation 4 of these regulations.

4. Conditions on the use of radio frequency spectrum from 100 MHz to 25.5 GHz

- (1) One (1) year from the date that these regulations come into operation, no licensee or licence exempt operator or any person may use radio frequency spectrum from 100 MHz to 25.5 GHz and engage in any radio communication within the Karoo Central Astronomy Advantage Areas unless such use and transmission activity comply with the following conditions –
- (a) does not exceed an effective radiated power of 40 dBm;
 - (b) does not exceed the saturation level within the protection corridors in the Karoo Central Astronomy Advantage Areas, as defined in Annexure A or within a radius of 20 kilometres from the SKA Virtual Centre; and
 - (c) does not exceed the protection levels prescribed in the Radio Astronomy Protection Levels Regulations as applied at the SKA Virtual Centre, unless the use or activity is for an essential service for which a specified interference level in excess of the prescribed protection level has been specified in a permit issued in terms of regulation 4 in the Regulations on Administrative Matters for central astronomy advantage areas declared for radio astronomy, 2015 to the person using that spectrum and conducting that activity.
- (2) Sub-regulation 4(1) also applies to the construction, upgrade, expansion or use of any radio station as contemplated in regulation 5 and in relation to which a permit has been issued.
- (3) Sub-regulation 4(1), except for sub-regulation 4(1)(b), does not apply to any licensee or licence exempt operator who, immediately prior to the date of promulgation of these regulations,

was lawfully permitted to use radio frequency spectrum between 100 MHz to 200 MHz.

5. Conditions on construction, upgrade, expansion or use of radio stations or radio apparatus

- (1) From the date that these regulations come into operation, and unless required for the purposes of radio astronomy and related scientific endeavours, no licensee or licence exempt operator or any other person may construct, upgrade or expand any radio station within the Karoo Central Astronomy Advantage Areas with the use of the radio frequency spectrum from 100 MHz to 25.5 GHz unless such person has applied for, and been granted, a permit for such upgrade or expansion by the relevant management authority in terms of regulation 4 in the Regulations on Administrative Matters for central astronomy advantage areas declared for radio astronomy, 2015.
- (2) One (1) year from the date that these regulations come into operation, no licensee or licence exempt operator or any person may use any radio station or any radio apparatus or any appliance within the Karoo Central Astronomy Advantage Areas that causes radio frequency interference at the SKA Virtual Centre, or saturation level radio frequency interference within the protection corridors in the Karoo Central Astronomy Advantage Areas described in Annexure A, or within 20 km of the SKA Virtual Centre.
- (3) Compliance assessment must be carried out by the licensee or licence exempt operator prior to the issuing of any permit in terms of regulation 4 in the Regulations on Administrative Matters for central astronomy advantage areas declared for radio astronomy, 2015 and must include the following aspects to the extent that they are applicable –
 - (a) The determination of the radio frequency interference level at the SKA Virtual Centre and the saturation level radio frequency interference within the protection corridors in the Karoo Central

- Astronomy Advantage Areas described in Annexure A, or within a radius of 20 km from the SKA Virtual Centre;
- (b) The determination of radio frequency interference referred to in sub-regulation 5(3)(a) must firstly be carried out on the base (fixed) radio stations or radio apparatus or appliances located at a fixed geographical location;
 - (c) If radio frequency interference or saturation level interference may also be caused by mobile or portable radio stations or radio apparatus used in conjunction with the base station or radio apparatus at a fixed location, the determination of radio frequency interference levels must also be carried out with respect to the mobile or portable radio apparatus; and
 - (d) The determination and assessment of radio frequency interference may also be applied to any radio apparatus for which radio frequency spectrum licence exemptions have been prescribed by ICASA in Part III, section (4) of the Radio Frequency Spectrum Regulations 2015 that produces a radiated power level of greater than 250 milliwatt.
- (4) Additional conditions, which may include limitations on the geographical area in which the mobile and portable radio stations may be used or any other method that will restrict the interference to the protection level, will be prescribed for any permit already granted in the event that-
- (a) mobile or portable radio stations used with a base radio station for which a permit had been granted cause radio frequency interference at the SKA Virtual Centre; or
 - (b) there exists saturation level radio frequency interference within the protection corridors in the Karoo Central Astronomy Advantage Areas described in Annexure A, or within 20 km of the SKA Virtual Centre.

6. Exempted radio apparatus

- (1) Radio apparatus, for which radio frequency spectrum licence exemptions have been prescribed by ICASA in Part III, regulation (4) of the Radio Frequency Spectrum Regulations, 2015, is exempted from the requirement prescribed in these regulations for the possession of a permit, provided that -
 - (a) Radio apparatus that produces a radiated power level of greater than 250 milliwatt is excluded from the exemption;
 - (b) Radio frequency interference exceeding the relevant protection level, as prescribed in the Radio Astronomy Protection Levels Regulations, is not caused by the exempted radio apparatus at the SKA Virtual Centre or saturation level interference is not caused within the protection corridors or within a 20 km radius from the SKA Virtual Centre; and
 - (c) The exempted apparatus is only used as prescribed by ICASA and not when the apparatus transmission characteristics are enhanced or multiple units are linked into networks.
- (2) Should any of the radio apparatus contemplated in sub-regulation 6(1) cause radio frequency interference, the use of such apparatus will be subject to protection measures being applied by –
 - (a) the Minister declaring core astronomy advantage areas within which all the exempted radio apparatus may not be used; or
 - (b) the relevant management authority determining permit conditions for the use of that category of radio apparatus.
- (3) The granting or amendment of a permit contemplated in sub-regulation 6(2)(b) will be subject to the procedures and criteria prescribed in the Regulations on Administrative Matters for central astronomy advantage areas declared for radio astronomy, 2015.
- (4) The radio apparatus for which radio frequency spectrum licence exemptions have been prescribed by ICASA, in Part III, section (4) of the Radio Frequency Spectrum Regulations, 2015, should not be operational or be used within 50 km of the SKA Virtual Centre.

7. Location of the SKA Virtual Centre and protection corridors

(1) The geographical location of the SKA Virtual Centre is subject to review and finalisation within twelve (12) months of the promulgation of these regulations.

(2) The protection corridors within the Karoo Central Astronomy Advantage Area 1 are subject to annual review in accordance with progression in the development of the SKA with the intention to phase them out and to require only the protection of the radio astronomy stations located within the corridors.

8. Extension of the one year period

The Minister may, by notice in the *Gazette*, extend the one year period contemplated in sub-regulations 3(1), 3(3), 3(4), 4(1) and 5(2) up to a maximum period of three (3) years.

9. Financial compensation

Any financial compensation contemplated in terms of section 23(3)(a) of the Act with respect to a restriction on radio communication transmissions that were lawfully conducted within the Karoo Central Astronomy Advantage Areas before the promulgation of these regulations will be subject to the Regulations on Financial Compensation Procedures for central astronomy advantage areas, 2015.

10. Offences and penalties

Any person who contravenes these regulations is guilty of an offence and liable on conviction to a fine not exceeding R1 000 000 (one million rand) or to imprisonment or to both a fine and imprisonment.

11. Short title and commencement

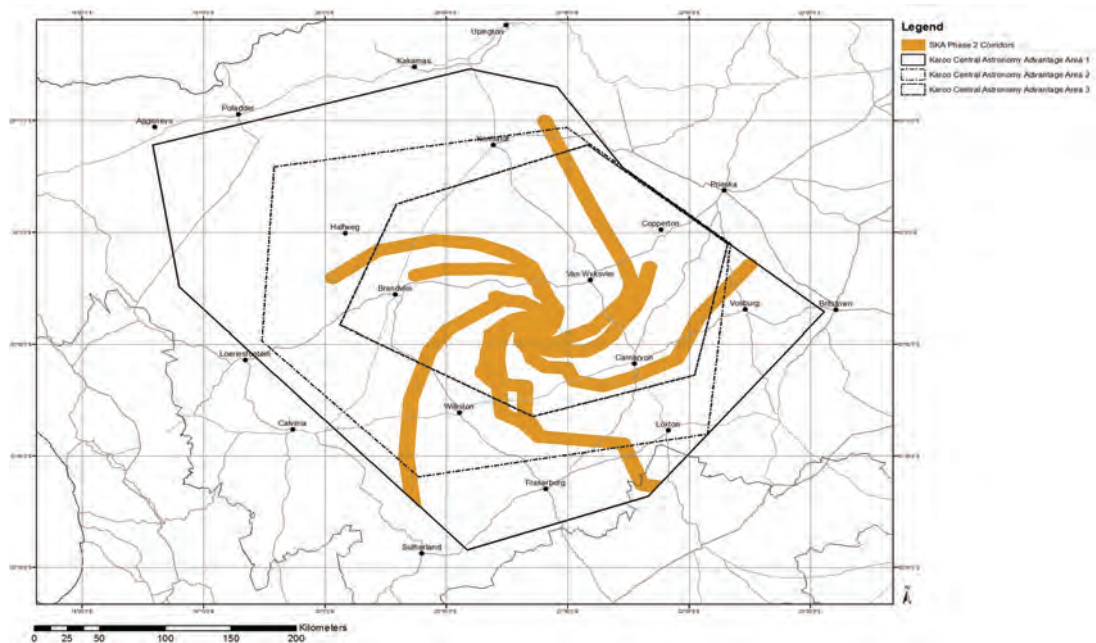
These regulations are called the Karoo Central Astronomy Advantage Areas Spectrum Regulations, 2015 and will come into operation on a date to be determined by the Minister by notice in the *Gazette*.

ANNEXURE A

Map of protection corridors containing the SKA radio astronomy stations within the Karoo Central Astronomy Advantage Area 1

The map below depicts the protection corridors required for approximately 54 SKA radio astronomy stations located within the Karoo Central Astronomy Advantage Area 1 but which fall outside the 20 km radius around the SKA Virtual Centre. The protection corridors are required in the development process for the SKA configuration over time.

A smaller scale version of the map below and/or a GIS-shape file is available on request from the management authority or co-management entity. The perimeters of the corridors are 5 km distant on either side of the spiral arms along which the SKA stations are to be positioned.



SCHEDULE B**REGULATIONS ON ADMINISTRATIVE MATTERS FOR CENTRAL ASTRONOMY
ADVANTAGE AREAS DECLARED FOR RADIO ASTRONOMY PURPOSES****ARRANGEMENT OF REGULATIONS**

| | |
|---|----|
| 1. Definitions | 2 |
| 2. Scope of the regulations | 6 |
| 3. Exemption from prohibition or restrictions on radio frequency spectrum use | 6 |
| 4. Requirements for a permit and compliance assessment..... | 7 |
| 5. Evaluation of compliance assessment and the application for a permit | 10 |
| 6. Technical criteria for the determination of radio frequency interference levels .. | 13 |
| 7. Criteria, procedures and conditions that apply to an essential service..... | 15 |
| 8. Criteria to be met by a person carrying out compliance assessment | 17 |
| 9. Permit register | 18 |
| 10. Offences and penalties | 19 |
| 11. Short title and commencement | 19 |
| ANNEXURE A: Framework for compliance assessment report..... | 20 |
| ANNEXURE B: Framework for an application for a permit | 23 |

1. Definitions

In these regulations, unless the context indicates otherwise –

"Act" means the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007);

"affected person" means a person who –

- (a) lawfully conducted an activity in a central astronomy advantage area prior to the restriction of that activity by virtue of regulations made by the Minister in terms of section 23 of the Act; and
- (b) is required by the Minister in terms of section 23(3) (a) of the Act to cease that activity or to comply with conditions prescribed in terms of section 23(3) (b) of the Act;

"assessment point" means the geographical location or any relevant point within an area defined in the relevant central astronomy advantage area Spectrum Regulations, which location or point is used as the assessment point for the applicable protection measures prescribed in the relevant Spectrum Regulations;

"co-management entity" means an organ of state, a local community, an individual or other party with whom the management authority has entered into a co-management agreement in terms of section 18 of the Act;

"competent person" means a person who meets each of the criteria prescribed in regulation 8 of these regulations;

"compliance assessment" means:

- (a) the comparison of radio frequency interference levels at the applicable assessment points according to the protection measures as prescribed in the relevant Spectrum Regulations with the applicable protection levels determined in accordance with the Radio Astronomy Protection Levels Regulations;
- (b) the comparison of radio frequency interference levels at the applicable assessment points according to the protection measures as prescribed in the applicable Spectrum Regulations, with the Saturation Level; and

(c) the determination whether there is compliance with all applicable regulations made in terms of the Act;
to be carried out by the Competent Person designated by the applicant for a permit in terms of regulation 8 of these regulations.

"dBm" means the radio frequency power level expressed in decibels relative to one milliwatt;

"effective radiated power" means the product of the power level supplied to the antenna and the antenna gain relative to a half-wave dipole in the relevant direction;

"essential service" means a radio communications service used in a central astronomy advantage area that is classified as an essential service in terms of the criteria and procedures prescribed in regulation 7 of these regulations;

"ITU" means the International Telecommunications Union;

"licence exempt operator" means a person who provides a service pursuant to an exemption granted by ICASA in terms of section 6 of the Electronic Communications Act, 2005, or uses radio frequency spectrum which is exempt from requiring a radio frequency spectrum licence by virtue of section 31(6) of the Electronic Communications Act, 2005, and regulations made in terms thereof;

"licensee" as defined in the Electronic Communications Act, 2005 (Act No. 36 of 2005) means a person issued with a licence to provide services in terms of Chapter 3 or to use the radio frequency spectrum in terms of Chapter 5 of the Electronic Communications Act, 2005;

"radio apparatus" means an electronic communications facility which is capable of transmitting or receiving any signal by radio;

"Radio Astronomy Protection Levels Regulations" means the regulations made to define the radio astronomy observation protection levels for the astronomy advantage areas declared for purposes of radio astronomy, published

under Notice No. R.90 in the Government Gazette No. 35007 on 10 February 2012;

“radio astronomy station” means one or more receiving systems at a location, including accessory equipment, for receiving radio waves of cosmic origin for the purposes of radio astronomy;

"radio communication" means the emission, transmission or reception of information, including without limitation, voice, sound, data, text, video, animation, visual images, moving images and pictures, signals or a combination thereof by means of radio or other electromagnetic waves without the aid of a tangible conductor;

"radio communications network service licensee" means a person to whom ICASA has issued an electronic communications network service licence in terms of Chapter 3 of the Electronic Communications Act, 2005;

"radio communications service" means any service provided to the public, sections of the public, the State, or the subscribers to such service, which consists wholly or mainly of the conveyance by any means of radio communications over a radio communications network;

“radio frequency interference” means the detrimental effect of received radio signals that exceed the protection levels prescribed in the Radio Astronomy Protection Levels Regulations, 2012, for more than 5% of the time over a 24 hour period;

“Radio Frequency Spectrum Regulations 2015” means the regulations made by ICASA as published by Notice 279 of 2015, in Government Gazette No. 38641 on 30 March 2015;

"radio station" as defined in the Electronic Communications Act, 2005 means one or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying an electronic communications service, broadcasting service or any

electronic communications authorised by ICASA, and any radio apparatus used at a specific geographical location;

"restricted radio frequency spectrum" means radio frequency spectrum the use of which is prohibited or restricted by the Minister in terms of section 22 of the Act;

"saturation level" means a received power level of (minus) -100 dBm, or higher, for a radio frequency interference signal at which the saturation phenomenon occurs at a radio astronomy station or at a specified assessment point or points, or within a specified area; and

"Spectrum Regulations" means the regulations to prohibit and restrict the use of certain radio frequency spectrum in terms of section 22 of the Act and certain declared activities in terms of section 23 of the Act, within the relevant central astronomy advantage area declared for radio astronomy purposes.

2. Scope of the regulations

- (1) These regulations apply to any central astronomy advantage areas declared for radio astronomy purposes as contemplated in section 9 of the Act.
- (2) If there are differences between the English and the Afrikaans versions of these regulations, the English version will take precedence.

3. Exemption from prohibition or restrictions on radio frequency spectrum use

- (1) In order to determine which radio frequency spectrum may be exempt from a prohibition or restrictions imposed in the relevant Spectrum Regulations on its use for transmissions located within a central astronomy advantage area, the relevant management authority or co-management entity must give notice in the *Gazette*, as soon as reasonably practical after the Spectrum Regulations for that area have been promulgated, of a list of the radio frequency spectrum to be considered for exemption from a prohibition or restrictions on its use for transmissions located within that area.
- (2) The notice contemplated in sub-regulation (1) –
 - (a) may also propose the consolidation of radio frequency spectrum already being used in that central astronomy advantage area; and
 - (b) must invite interested or affected parties to submit written representations on the notice within sixty (60) days from the date of the notice.
- (3) Before gazetting the notice contemplated in sub regulation (1), the relevant management authority or co-management entity must –
 - (a) consult ICASA on the radio frequency spectrum to be considered for exemption; and
 - (b) in the manner contemplated in section 22(4) of the Act, notify all existing licensees and licence exempt operators who operate radio stations in that central astronomy advantage area and who are listed in the permanent register of interested and affected parties for that area, of the notice to be gazetted.

- (4) The relevant management authority or co-management entity must consider the representations received and may request additional information from any person who made written representations.
- (5) After considering the representations and any additional information received, the relevant management authority or co-management entity must make recommendations to the Minister regarding the radio frequency spectrum to be exempted.
- (6) The Minister may, by notice in the *Gazette*, publish the list of exempted radio frequency spectrum at least six (6) months prior to the date when the prohibition or restrictions on the use of spectrum within that area will come into operation.
- (7) The relevant management authority or co-management entity, in response to a request from ICASA, may consider the exemption of additional radio frequency spectrum for use within a central astronomy advantage area.

4. Requirements for a permit and compliance assessment

- (1) A licensee or licence exempt operator or any person who transmitted signals from a radio station within a central astronomy advantage area using radio frequency spectrum immediately before the Spectrum Regulations for that area were promulgated, may only continue transmitting those signals for a period of one (1) year after the coming into operation of those regulations unless the relevant management authority has issued to that licensee or operator a permit for the transmission of those signals beyond such period.
- (2) The Minister may, by notice in the *Gazette*, extend the one (1) year period contemplated in sub-regulation 4(1) to a maximum period of three (3) years.
- (3) A licensee or licence exempt operator or any person may not commence transmitting signals from a radio station within a central astronomy advantage area using radio frequency spectrum after the Spectrum Regulations for that area have been promulgated unless the relevant

management authority has issued to that licensee or operator a permit for the transmission of those signals.

- (4) Radio apparatus, exempted by ICASA in Part III, section (4) of the Radio Frequency Spectrum Regulations, 2015, from the requirement to have a radio frequency spectrum licence do not require a permit to continue or to commence transmitting signals within a central astronomy advantage area after the Spectrum Regulations have been published, provided that -
- (a) the radio apparatus with a radio frequency power output level of greater than 250 milliwatt are excluded from this exemption;
 - (b) the radio apparatus with a radio frequency power output level of less than 250 milliwatt comply fully with the relevant requirements and conditions that are stated in Annexure B of the Radio Frequency Spectrum Regulations 2015,
 - (c) the radio frequency interference described in the relevant Spectrum Regulations is not caused;
 - (d) if radio frequency interference is caused, the geographical use of the apparatus may be restricted as prescribed in the relevant Spectrum Regulations; and
 - (e) The exemption from the requirement for a permit only applies to apparatus used individually as specified in the Radio Frequency Spectrum Regulations 2015 and not when multiple units are linked into networks or the apparatus is enhanced in any way.
- (5) If radio frequency interference is caused by the radio apparatus referred to in regulation 4(4), or if the radio apparatus is not used according to the requirements and conditions prescribed in the Radio Frequency Spectrum Regulations 2015 or if multiple units are linked or the units are enhanced, then a compliance assessment, as contemplated in sub-regulation 4(6) and 4(7), must be carried out to determine the extent of the radio frequency interference and an application for a permit must be made.
- (6) Prior to the issuing of any permit for the transmission of a signal from a radio station within a central astronomy advantage area using radio

frequency spectrum, a compliance assessment must be carried out by the licensee or licence exempt operator on each such signal.

- (7) A compliance assessment may only be carried out by a competent person, as contemplated in regulation 8 of these regulations, who is employed by the licensee or the licence exempt operator transmitting or intending to transmit the signal, or by a competent person contracted by the licensee or operator for this purpose.
- (8) Radio frequency interference levels that are produced by a signal transmitted from any radio station within a central astronomy advantage area must be determined by using the radio station data to be stated in the compliance assessment report and according to the technical criteria prescribed in regulation 6 of these regulations.
- (9) The compliance assessment report applicable to computer modelling must conform with the framework provided in Annexure A to these regulations and include all the information and data required therein.
- (10) For measurements, contemplated in sub-regulation 5(6), an appropriate detailed assessment report must be provided that includes a description of the measurement process and standards used, the list of measuring and ancillary equipment used with calibration certificates, full information on measurement parameters (location, height, date, time, weather, etc.) and the measurement results.
- (11) An application for a permit must conform with the framework provided in Annexure B to these regulations and include all the information and data required therein.
- (12) The completed application form and the compliance assessment report must be submitted by the licensee or licence exempt operator to the relevant management authority for evaluation.
- (13) The radio station data must be submitted in an electronic format, preferably ascii, which must be capable of being captured or converted for use in a computer programme.

- (14) If a substantial number of transmissions and compliance assessments are dealt with in a single application and report, the information and data required in Annexures A and B may be provided in a Microsoft Excel spreadsheet, or any other electronic tabulated data format.
- (15) If a licensee or licence exempt operator is transmitting or intends to transmit signals from a radio station within a central astronomy advantage area using restricted radio frequency spectrum, and would like to continue to use that spectrum after the date when the prohibition or restrictions take effect, that licensee or operator may request an exemption from that prohibition or those restrictions, which request together with the motivation for the request must accompany the permit application and the compliance assessment report submitted to that authority or entity.

5. Evaluation of compliance assessment and the application for a permit

- (1) The relevant management authority or the co-management entity must evaluate each compliance assessment report and application for a permit submitted to it.
- (2) If an incomplete compliance assessment report or permit application is received –
- (a), the applicant will be notified thereof in writing within fourteen (14) days of receiving the application;
 - (b) the incomplete report and/or application may be replaced with a complete version; and
 - (c) The evaluation process will only start when the complete versions of the report and the application are available.
- (3) If the radio frequency spectrum used -
- (a) is not restricted radio frequency spectrum;
 - (b) the determined radio frequency interference levels do not exceed the applicable prescribed protection levels; and
 - (c) the transmission complies with all the applicable restrictions and regulations made in terms of the Act,

the relevant management authority, must within thirty (30) days of the date the permit application and assessment report was submitted to it, excluding the time taken for mandatory external consultations or responses to requests for information to the applicant, issue the permit and notify the licensee or operator in writing.

- (4) If a licensee or licence exempt operator has submitted a request to the relevant management authority for an exemption relating to restricted radio frequency spectrum, that authority, must within sixty (60) days of the date the application was submitted to it, excluding the time taken for mandatory external consultations or responses to requests for information to the applicant, advise the licensee or licence exempt operator in writing of its decision concerning the request for exemption.
- (5) If the determined radio frequency interference levels exceed the applicable prescribed protection levels or the transmission does not comply with any applicable restrictions or regulations, the relevant management authority must, within thirty (30) days of the date that the compliance assessment report was submitted to it, advise the licensee or licence exempt operator of this in writing.
- (6) In the event of a dispute between the applicant and the relevant management authority and co-management entity on the other hand, about:
 - (a) the validity of the radio frequency interference levels determined by means of computer calculations, or
 - (b) the accuracy of the determined radio frequency interference levels that are considered to be unacceptable by the management authority and co-management entity,then appropriate and feasible measurements of the actual interference level at the prescribed assessment point must be carried out in accordance with the relevant provisions in regulation 6 of these regulations.
- (7) A licensee or licence exempt operator who receives a written notification as contemplated in sub regulation 5(5) may investigate and consider methods to reduce the interference levels to the prescribed protection levels and to

comply with the applicable restrictions and regulations, and submit those proposed methods in writing to the relevant management authority within thirty (30) days from the date on which the notice in sub-regulation 5(5) was received.

- (8) The relevant management authority or the co-management entity must evaluate those proposed methods and, within thirty (30) days of the date of receipt thereof, excluding time taken for mandatory external consultations or responses to requests for information to the applicant, advise the licensee or operator in writing whether the proposed method to limit radio frequency interference is acceptable.
- (9) If the relevant management authority or co-management entity accepts the proposals, then the licensee or operator must implement those proposals within ninety (90) days of the date of receipt of the decision, whereupon that authority must, subject to the successful implementation of the proposals, issue and deliver a permit to the licensee or operator.
- (10) If the relevant management authority requires more time than the time specified within which to make a decision in terms of sub-regulations 5(3), 5(4), 5(5) or 5(8) or it is found that an extensive technical evaluation and/or measurements is required, it may, within the specified period of time, including any valid additional time, advise the licensee or operator that additional time, up to a maximum of one hundred and eighty (180) days is required and provide reasons why it is required.
- (11) If the relevant management authority fails to act within the periods specified in sub-regulations 5(3), 5(4), 5(5) or 5(8) or where the authority, in terms of sub-regulation 5(10) has extended the period by a certain amount of time and fails to act within the extended period, it will be deemed to be a refusal of the application.
- (12) A permit issued to a licensee or a licence exempt operator by the relevant management authority must specify the frequencies or frequency band that may be used, together with the transmission characteristics and the conditions with which the licensee or licence exempt operator must comply.

- (13) If it is reported after a permit has been issued that radio frequency interference to radio astronomy is higher than the level specified in the permit, the compliance assessment report must be verified by applicant for the permit and the relevant management authority.
- (14) The compliance assessment related to the verification referred to in sub-regulation 5(13) and carried out in terms of these regulations, must be reviewed by the applicant and the relevant management authority to determine its correctness taking into account the accuracy of the computer modelling applied or measurements carried out.
- (15) If considered necessary by the relevant management authority or co-management entity, measurements of the radio frequency interference must be carried out. The results of the review will determine whether the transmission characteristics specified in the permit issued must be adjusted in order to avoid that the applicable protection level is exceeded.
- (16) If a licensee or licence exempt operator to whom a permit has been issued seeks to amend the frequencies or frequency band that may be used, the transmission characteristics or the conditions specified in its permit, then it must apply to the relevant management authority for such amendment.
- (17) Regulations 4(6) to 4(16), read with the necessary changes, apply to such application for an amendment of a permit issued.
- (18) If the relevant management authority finds, thirty (30) days after the issuing of a permit, that the conditions specified in the permit are not complied with, then the permit will be immediately withdrawn by the relevant management authority. The holder of such permit must immediately cease any activity conducted under such permit.

6. Technical criteria for the determination of radio frequency interference levels

- (1) The compliance assessment, contemplated in sub-regulation 4(6), must include the following:
 - (a) The determination of the radio frequency interference levels related to the protection measures prescribed in the relevant Spectrum

- Regulations with respect to the relevant protection levels prescribed in the Radio Astronomy Protection Levels Regulations;
- (b) The determination of the radio frequency interference levels related to the protection measures prescribed in the relevant Spectrum Regulations with respect to the Saturation Level; and
 - (c) The determination of whether there is compliance with all applicable regulations made in terms of the Act.
- (2) The determination of the radio frequency interference levels should in the first instance be carried out by means of computer modelling which uses scientific methods recommended by the ITU and which calculates the radio frequency interference levels related to the protection measures prescribed in the relevant Spectrum Regulations and the criteria specified in sub-regulation 6(7).
 - (3) If computer modelling is not feasible or appropriate, or if greater accuracy is required than computer modelling can provide, then, the radio frequency interference levels must be determined by means of measurements.
 - (4) The measurement standards and techniques to be used must be agreed upon between the relevant management authority or co-management entity and the competent person, as contemplated in regulation 8 of these regulations, who is conducting the compliance assessment.
 - (5) If agreement cannot be reached, the relevant management authority or co-management entity must determine the appropriate standard and techniques to be used.
 - (6) The reference height for measurements or signal predictions is 10 meters above ground level at the assessment points for the protection measures prescribed in the relevant Spectrum Regulations.
 - (7) The calculation of radio frequency interference levels must be based on the following criteria –
 - (a) the application of the relevant ITU Recommendation on propagation;
 - (b) signal levels that will not be exceeded for more than 5% of the time over a twenty four (24) hour period;

- (c) an isotropic antenna condition with 0dB gain at the assessment points for the protection measures prescribed in the relevant Spectrum Regulations;
 - (d) the use of the best available digital terrain model; and
 - (e) transmitting station data provided by the licensed or licence exempt electronic communication network operator or radio frequency spectrum licensee according to the stated details in Annexure A to these regulations.
- (8) The competent person conducting the compliance assessment must carry out –
- (a) A point-to-point calculation on the propagation paths between the radio station or location of the radio apparatus and the specified assessment points of the radio frequency interference level at the assessment points for the protection measures prescribed in the relevant Spectrum Regulations;.
 - (b) the calculation of the signal path losses over the propagation paths referred to in (a), in dB; and
 - (c) The comparison of the radio frequency interference levels, at the applicable assessment points referred to in (a), to determine whether it exceeds the applicable protection level or not, with:
 - (i) the relevant protection level prescribed in the Radio Astronomy Protection Levels Regulations, or
 - (ii) the saturation level.

The results from (a), (b) and (c) above must be stated in the compliance assessment report prescribed in sub-regulation 4(8).

7. Criteria, procedures and conditions that apply to an essential service

- (1) Radio communication services that provide the applications listed below may be considered by the relevant management authority for classification as essential services –

- (a) broadcasting signal distribution via geostationary satellites for distribution to terrestrial broadcasting transmitters and for direct-to-home reception;
 - (b) electronic communications network services of provincial and national scope licensed by ICASA in terms of section 5(3) of the Electronic Communications Act;
 - (c) electronic communications for the operation and maintenance of electricity transmission and distribution power systems;
 - (d) electronic communications for the operation and maintenance of rail transport;
 - (e) electronic communications for security services and their objects as defined in Chapter 11 of the Constitution of the Republic of South Africa 1996, local government and their objects as defined in Chapter 7 of the Constitution, health services and emergency services;
 - (f) electronic communications for aeronautical and maritime services in frequency spectrum allocations relating to the safety and regularity of flight and sea vessels, including communications, radio navigation and surveillance systems; and
 - (g) geostationary satellite communications.
- (2) In the determination by the relevant management authority of whether a radio communication service included in sub-regulation 7(1) should be classified as an essential service, or not, consideration must be given to –
- (a) the existence of a functionally suitable and economically feasible alternative which complies with or better meets the restrictions, conditions and standards prescribed in these regulations for the protection of radio astronomy; and
 - (b) the possible use of an alternative frequency band and/or an alternative technology that has a lesser radio frequency interference impact on the protection of radio astronomy.
- (3) An applicant for a permit required in accordance with regulation 4 in connection with a radio communication service that may qualify to be

classified as an essential service in terms of sub-regulation 7(1), must indicate this in such application.

- (4) The classification for each different type of radio communication service, operating in a different frequency band or using a different technology, in particular for licensees providing multiple types of services, must be determined separately and so indicated in the permit to be issued.
- (5) The relevant management authority or co-management entity must, before the evaluation process for the compliance assessment and the application for a permit prescribed in regulation 5 commences, determine whether the radio communication service involved will be classified as an essential service.
- (6) If a radio frequency interference level relating to an essential service exceeds the applicable prescribed protection level in terms of the Radio Astronomy Protection Levels Regulations at the prescribed assessment points and cannot be reduced without significantly affecting that service, the provider of that service must include an explanation in the application submitted to the management authority or co-management entity as to the reasons why the interference level cannot be reduced and request that a radio frequency interference level in excess of the prescribed value be permitted.
- (7) A classification as an essential service may be cancelled by the relevant management authority when another electronic communication system that is functionally suitable and economically feasible becomes available which complies with or better meets the restrictions, conditions and standards prescribed in the relevant Spectrum Regulations for the protection of radio astronomy.
- (8) No relief may be granted by the relevant management authority where radio frequency interference may exceed the saturation level at any applicable reference point prescribed in the relevant Spectrum Regulations.

8. Criteria to be met by a person carrying out compliance assessment

- (1) A person who carries out a compliance assessment and compiles the report, must:

- (a) possess a tertiary academic qualification in electronic or radio frequency engineering at least at the level that would qualify that person to be registered as a professional engineering technologist in terms of the Engineering Profession Act, 2000 (Act No. 46 of 2000);
 - (b) have access to or be able to obtain access to a computerised frequency spectrum planning system that is usable to carry out the computer modelling for the radio frequency signal level calculations based on the relevant ITU Recommendations on propagation and uses the best available digital terrain model; and
 - (c) be able to provide at least two references for work carried out successfully within the last five (5) years which involves the determination of radio wave propagation and signal levels.
- (2) Alternative to sub-regulation 8(1), the relevant management authority or the co-management entity must carry out an assessment of the skills and experience of a person wishing to carry out the compliance assessment and the compilation of the report to determine whether the person possesses the required ability and capacity.
 - (3) The required information as stipulated in Annexure A, item 1, must be provided by the applicant for a permit for consideration and assessment by the management authority or co-management entity.

9. Permit register

- (1) The transmission characteristics and the conditions specified in each permit issued in terms of regulation 5 must be entered, by the relevant management authority, into a permit register for the applicable central astronomy advantage area.
- (2) The detailed information to be entered in the permit register must include the data used for the compliance assessment and the assessment results as reflected in Annexure A, items 2 to 6, for each assessment point involved.
- (3) The assessment information in the register may only be made available to the relevant management authority or co-management entity and the permit holder.

10. Offences and penalties

Any person who contravenes these regulations is guilty of an offence and liable on conviction to a fine not exceeding R1 000 000 (one million rand) or to imprisonment or to both a fine and imprisonment.

11. Short title and commencement

These regulations are called the Regulations on Administrative Matters for the Central Astronomy Advantage Areas (Radio Astronomy), 2015, and will come into operation on a date to be determined by the Minister by notice in the Gazette.

ANNEXURE A: Framework for compliance assessment report

1. Competent person who carried out the investigation

- 1.1. Name of the competent person:
- 1.2. Proof that the competent person meets each of the requirements prescribed in Regulation 8:
- 1.2.1. Academic qualification:
.....
- 1.2.2. Access to computerised frequency planning system
.....
- 1.2.3. Two references for frequency spectrum planning work carried out in last five years:
- 1.2.3.1.
- 1.2.3.2.
- 1.3. Alternative to 1.2, request that an assessment of the person is carried out
.....

2. Radio station data for a particular transmission

The items below apply to a fixed radio station. If another situation is involved in the assessment, then only the applicable items must be completed and sufficient information provided to properly characterise and identify the transmission source.

A tabulated schedule must be used for multiple transmissions from a station at a particular location or from stations at different locations

- 2.1. Carrier frequency (in MHz to 4 decimals):
.....
- 2.2. Unique reference number (not more than ten characters/numerals):
.....
- 2.3. Name of licensee or licence exempt operator:
.....
- 2.4. Radio station name:
.....
- 2.5. Geographical coordinates (in degrees up to four decimals)
.....

2.6. Ground level height above sea level (in metres):

.....

2.7. Height above ground level of the transmitting antenna centre (in metres):

.....

2.8. EIRP in the direction of the Assessment Point (AP) (in dBm):

.....

2.9. Polarisation of the transmitted signal:

.....

2.10. Bandwidth of the transmitted signal (in MHz):

.....

3. Technical criteria applied to signal level calculation

3.1. Computerised frequency planning system used:

.....

3.2. The ITU Recommendation applied in propagation calculations:

.....

3.3. Option chosen (if any) in the ITU Recommendation applied:

.....

3.4. Digital topographical terrain model used:

.....

4. Results of the radio frequency interference (RFI) compliance assessment at the applicable AP with respect to the radio astronomy protection level

4.1. Applicable AP: Geographical coordinates (in degrees up to four decimals):

.....

4.2. RFI level (in dBm/Hz) at the AP:

.....

4.3. Propagation path loss (in dB) between the radio station and the AP:

.....

4.4. Protection level (PL)(in dBm/Hz) as determined in terms of the Radio Astronomy Protection Levels Regulations:.....

4.5. Result of the RFI and PL levels comparison:

.....

5. Results of the RFI compliance assessment at the applicable AP with respect to the saturation level

5.1. Location of the applicable AP: Geographical coordinates (in degrees up to four decimals)

.....

5.2. RFI levels at the applicable AP

.....
.....

5.3. Result of the comparison with the saturation level

.....

6. Assessment of compliance with all applicable regulations made in terms of the Act

6.1. All applicable regulations are complied with: Yes.....or No.....

6.2. Provide references to applicable regulations that are not complied with, with the reasons for non-compliance

.....
.....

7. Compliance Assessment Report signed by:

In signing this Compliance Assessment Report, I declare that the information and results provided in this report are to the best of my knowledge truthful and correct.

Name of person

Signature

Date

Place

ANNEXURE B: Framework for an application for a permit**1. Applicant**

1.1. Name of person or entity.....

1.2. ID or registration number.....

1.3. If an entity, name of contact person and her/his
position.....

1.4. Postal address.....

1.5. Email address.....

1.6. Telephone numbers.....

2. Details of transmissions for which permits are required (if more than three transmissions are involved, use a tabulated schedule)

| Details | Transmission 1 | Transmission 2 | Transmission 3 |
|---|----------------|----------------|----------------|
| Site name | | | |
| Geographical coordinate (latitude) | | | |
| Geographical coordinate (longitude) | | | |
| Type of radio communications | | | |
| Carrier/centre frequency (MHz) | | | |
| Transmit power at antenna input (dBm) | | | |
| Antenna type & gain (dB) | | | |
| ICASA radio frequency spectrum licence number | | | |

| | | | |
|---|--|--|--|
| Frequency spectrum in use (Restricted/Exempted) | | | |
| Compliance assessment done (Yes/No) | | | |
| Radio frequency interference exceeds protection level (Yes/No) | | | |
| Radio frequency interference exceeds saturation level (Yes/No) | | | |
| Compliance with applicable restrictions in Spectrum Regulations (Yes/No) | | | |
| Considered to qualify for classification as an essential service (yes/no) | | | |

3 Application for a permit or permits signed by:

In signing this Application, I declare that the information provided is to the best of my knowledge truthful and correct.

Name of person

Signature

Date

Place

SCHEDULE C
REGULATIONS ON FINANCIAL COMPENSATION PROCEDURES FOR
CENTRAL ASTRONOMY ADVANTAGE AREAS

ARRANGEMENT OF REGULATIONS

| | |
|---|---|
| 1. Definitions..... | 2 |
| 2. Scope of the regulations..... | 4 |
| 3. Procedures and criteria to apply for financial compensation..... | 4 |
| 4. Processing of the application by the management authority..... | 6 |
| 5. Determination of compensation by the Minister | 7 |
| 6. Acceptance of the offer by the applicant | 8 |
| 7. Offences and penalties..... | 8 |
| 8. Short title and commencement..... | 8 |

1. Definitions

In these regulations unless the context indicates otherwise –

"Act" means the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007);

"affected person" means a person who –

- (a) lawfully conducted an activity in a central astronomy advantage area prior to the restriction of that activity by virtue of regulations made by the Minister in terms of section 23 of the Act; and
- (b) is required by the Minister in terms of section 23(3) (a) of the Act to cease that activity or to comply with conditions prescribed in terms of section 23(3) (b) of the Act;

"co-management entity" means an organ of state, a local community, an individual or other party with whom the relevant management authority has entered into a co-management agreement in terms of section 18 of the Act;

"financial loss" means –

- (a) the cost to a radio communications network service licensee to implement a requirement or a condition imposed in terms of section 23 of the Act;
- (b) the connecting cost and additional user cost to a radio communications service user for an electronic communications service that is different to the electronic communications service used by that user prior to the promulgation of a regulation made in terms of section 23 of the Act;

"GPS" means global positioning system;

"licence exempt operator" means a person who provides a service pursuant to an exemption granted by ICASA in terms of section 6 of the Electronic Communications Act, 2005, or uses radio frequency spectrum which is exempt from requiring a radio frequency spectrum licence by virtue of section 31(6) of the Electronic Communications Act, 2005, and regulations made in terms thereof;

"licensee" means a person to whom ICASA has issued a licence to provide a service in terms of Chapter 3 or to use radio frequency spectrum in terms of section 31 of the Electronic Communications Act, 2005; and

"Spectrum Regulations" means the regulations to prohibit and restrict the use of certain radio frequency spectrum in terms of section 22 of the Act and certain declared activities in terms of section 23 of the Act, within the relevant central astronomy advantage area declared for radio astronomy purposes.

2. Scope of the regulations

- (1) These regulations apply to any central astronomy advantage area declared for radio astronomy purposes and related scientific endeavours.
- (2) If there are differences between the English and the Afrikaans versions of these regulations, the English version will take precedence.

3. Procedures and criteria to apply for financial compensation

- (1) An affected person who has suffered a financial loss solely as a direct result of that person's compliance with a requirement or a condition imposed in terms of section 23(3)(a) or (b) of the Act, or a person whose use of the service of a licensee or a licence exempt operator is adversely affected as a direct result of that operator's compliance with a requirement or a condition imposed in terms of section 23(3)(a) or (b) of the Act, may apply for compensation in terms of this regulation.
- (2) The application for compensation contemplated in sub-regulation (1) must be done on a form obtained from the relevant management authority or co-management entity and submitted to the relevant management authority or co-management entity within two (2) years of the implementation of the relevant requirement or condition.
- (3) The said application must contain –
 - (a) the applicant's full name, postal address, email address, telephone number and tax reference number;
 - (b) the address where the applicant will accept service of any notice, process or any other document concerning the application;
 - (c) the address or GPS location where the applicant lawfully conducted the relevant activity or used the service, which is the subject of the application, immediately before the implementation of the relevant requirement or condition;
 - (d) if at the time of making the application, the applicant conducts the activity or uses the service which is the subject of the application at an address or GPS location different from the address or location provided in sub-regulation (c) , the details of the different address or location;

- (e) a copy of all relevant documents published by notice in the *Gazette* in terms of section 23 of the Act;
- (f) a detailed description of the activity lawfully conducted or the service used by the applicant immediately before the implementation of the relevant requirement or condition;
- (g) an affidavit by the applicant confirming –
 - (i) whether the applicant solely as a direct result of compliance with the requirement imposed in terms of section 23(3) (a) of the Act, ceased the relevant activity and the date thereof;
 - (ii) the manner and extent to which the applicant modified its conduct of the relevant activity solely as a direct result of compliance with a condition imposed in terms of section 23(3)(b) of the Act; or
 - (iii) the manner and extent to which the applicant's use of the service was adversely affected solely as a direct result of compliance with a requirement or condition imposed in terms of section (23)(3)(a) or (b).
- (h) a detailed description of any property or equipment which was owned or used by the applicant to conduct the relevant activity or the service where the use of that property or equipment has been adversely affected solely as a direct result of compliance with the requirement or condition imposed in terms of section 23(3) of the Act, including a detailed description of –
 - (i) the condition of the property or equipment;
 - (ii) the extent to which the applicant used the property or equipment to conduct the relevant activity or use the service;
 - (iii) the market value of the property or equipment;
 - (iv) the record of the acquisition or use of the property or equipment;
 - (v) the extent to which the State invested in, subsidised, or otherwise assisted the applicant with the acquisition or maintenance of the property or equipment or the conduct of the relevant activity; and

- (vi) the extent to which the property or equipment has been adversely affected solely as a direct result of compliance with the requirement or condition imposed in terms of section 23(3) of the Act, taking into account other possible uses of that property by the applicant or a third party;
 - (i) a detailed description of any financial loss suffered by the applicant solely as a direct result of compliance with the requirement or conditions imposed in terms of section 23(3) of the Act, including any financial loss due to a conversion to an alternative electronic communication service as the impacted service was no longer usable;
 - (j) any other particulars which are relevant or necessary for the relevant management authority or co-management entity to-
 - (i) consider the application; and
 - (ii) calculate the amount of compensation to be paid, if any, including full particulars as to the basis and manner of calculation of all amounts;
 - (k) a complete record of any correspondence with, and written representations submitted to the relevant management authority or co-management entity in terms of section 23 of the Act; and
 - (l) supporting evidence in respect of paragraphs (f) to (j).
- (4) If an applicant applies for compensation in relation to different activities or services, the applicant must submit a separate application in relation to each activity or service.

4. Processing of the application by the management authority

- (1) The relevant management authority or co-management entity may request, in writing, such further information from the applicant as may be necessary to consider the application and the applicant must respond to the request for further information within thirty (30) days from the date that the request was sent.
- (2) The relevant management authority or co-management entity must consult ICASA, on each application received, to determine whether the activity

involved in the application for financial compensation was lawfully conducted within the relevant central astronomy advantage area immediately before the relevant Spectrum Regulations were promulgated.

- (3) The relevant management authority or co-management entity must refer the application, all relevant documentation and any further particulars submitted by the applicant, together with a recommendation by the relevant management authority or co-management entity on the application, to the Minister for a decision within sixty (60) days from the date that the last information required was received.
- (4) The relevant management authority or co-management entity must -
 - (a) Within ninety (90) days of receipt of the last information required for an application, inform the applicant in writing of the Minister's decision and provide the applicant with written reasons for the decision; and
 - (b) Any decision to grant compensation must be accompanied by an offer of compensation determined by the Minister.

5. Determination of compensation by the Minister

- (1) If the Minister decides that the applicant should receive compensation, the amount of compensation, the manner and the time of payment thereof must be just and equitable, reflecting an equitable balance between the public interest and the interests of the affected person, having regard to all the relevant circumstances, including –
 - (a) the nature and extent of the activity lawfully conducted or the service used by the applicant immediately before the implementation of the relevant requirement or condition;
 - (b) the extent to which the applicant ceased the relevant activity, the nature and extent to which the applicant modified its conduct of the relevant activity, or the extent and nature to which the applicant's use of the service was adversely affected, solely as a direct result of compliance with the requirement or conditions imposed in terms of section 23(3) of the Act;

- (c) the property or equipment which was owned or used by the applicant to conduct the relevant activity or use the service and the extent to which the use thereof has been adversely affected solely as a direct result of compliance with the requirement or conditions imposed in terms of section 23(3) of the Act; and
- (d) the financial loss suffered by the applicant solely as a direct result of compliance with the requirement or conditions imposed in terms of section 23(3) of the Act.

6. Acceptance of the offer by the applicant

- (1) Within thirty (30) days of the receipt of the offer in sub-regulation 4(4)(b), the applicant must inform the relevant management authority or co-management entity in writing of its acceptance or rejection of the offer.
- (2) If the applicant accepts the offer made in terms of sub-regulation 4(4)(b), the relevant management authority or co-management entity must pay the applicant the amount in a manner and within the period agreed upon by the applicant and the relevant management authority or co-management entity, which period may not be more than sixty (60) days after receipt of notice of acceptance of the offer from the applicant.
- (3) The applicant may take the Minister's decision, contemplated in regulation 5(1), on review in terms of the provisions of the Promotion of Administrative Justice Act, 2000.

7. Offences and penalties

Any person who contravenes these regulations is guilty of an offence and liable on conviction to a fine not exceeding R1 000 000 (one million rand) or to imprisonment or to both a fine and imprisonment.

8. Short title and commencement

These regulations are called the Regulations on Financial Compensation Procedures for central astronomy advantage areas, 2015, and will come into operation on a date to be determined by the Minister by notice in the Gazette.

SCHEDULE D**REGULATIONS RESTRICTING ELECTROMAGNETIC INTERFERENCE
WITHIN THE KAROO CENTRAL ASTRONOMY ADVANTAGE AREA 1****ARRANGEMENT OF REGULATIONS**

| | |
|---|----|
| 1. Definitions | 2 |
| 2. Scope of the regulations | 5 |
| 3. Conditions for electrical infrastructure | 5 |
| 4. Additional conditions for electricity generation by means of wind turbines | 6 |
| 5. Additional conditions for distribution or transmission power systems | 6 |
| 6. Application and conditions for a permit | 7 |
| 7. Determination of electromagnetic emission levels | 8 |
| 8. Determination of minimum separation distances | 9 |
| 9. Procedures to resolve electromagnetic interference | 10 |
| 10. Location of the SKA Virtual Centre and protection corridors | 11 |
| 11. Offences and penalties | 11 |
| 12. Short title and commencement | 12 |
| | |
| Annexure A: Map of protection corridors containing the SKA radio astronomy stations within the Karoo Central Astronomy Advantage Area 1 | 12 |

1. Definitions

In these regulations unless the context indicates otherwise –

"Act" means the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007);

"co-management entity" means an organ of state, a local community, an individual or another party with whom the relevant management authority has entered into a co-management agreement in terms of section 18 of the Act;

"distribution power system" means a power system that operates below 132 kV;

"electrical equipment" means any electrical machinery, appliances or devices used for construction, exploration, farming, household, manufacturing, maintenance, or mining purposes;

"electrical infrastructure" means any infrastructure or facility to be used in any way for electricity generation, electricity distribution, electricity transmission, or for a distribution or transmission power system, or electrical facilities and equipment used for any application excluding electricity distribution and transmission that existed prior to the date on which these regulations are promulgated by publication in the Government Gazette;

"electricity distribution" means the conveyance of electricity through a distribution power system;

"electricity generation" means the production of electricity by any means including inverters converting direct current into alternating current;

"Electricity Regulation Act" means the Electricity Regulation Act, 2006 (Act No. 4 of 2006);

"electricity transmission" means the conveyance of electricity through a transmission power system;

"electromagnetic interference" means radio frequency interference emitted unintentionally by electricity generation installations, electricity distribution or transmission infrastructure, and electrical equipment, and which characteristically occupies broad parts of the radio frequency spectrum;

"ITU" means the International Telecommunications Union;

"Karoo Central Astronomy Advantage Area 1" means the Karoo Central Astronomy Advantage Area 1 declared in Notice No. 198 in Government Gazette No. 37434 published on 12 March 2014;

"protection corridors" mean strips of land, alongside a radio astronomical spiral arms configuration, within which SKA stations within the Karoo Central Astronomy Advantage Area 1 are to be positioned, with a width of 5 km on either side of each spiral arm, as defined in Annexure A;

"Radio Astronomy Protection Levels Regulations, 2012" means the regulations made to define the radio astronomy observation protection levels for the astronomy advantage areas declared for purposes of radio astronomy, published in Notice No. R.90 in Government Gazette No. 35007 on 10 February 2012;

"radio astronomy station" means one or more receiving systems at a location, including accessory equipment, for receiving radio waves of cosmic origin for the purposes of radio astronomy;

"radio frequency interference" means the detrimental effect of received radio signals or signals from electromagnetic emissions that exceed the protection levels prescribed in the Radio Astronomy Protection Levels Regulations, 2012;

“SABS” means the South African Bureau of Standards established by section 3 of the Standards Act, 2008 (Act No. 8 of 2008);

"SANS" means a South African National Standard developed by the SABS in terms of the Standards Act, 2008 (Act No. 8 of 2008), and includes international standards adopted by the SABS;

"separation distance" means the minimum clear distance required between any electrical infrastructure and the nearest SKA Infrastructure Territory, in order not to exceed the applicable protection levels prescribed in the Radio Astronomy Protection Levels Regulations;

“SKA” means the Square Kilometre Array radio telescope consisting of an array of radio astronomy stations to be located in the Republic of South Africa and in participating African countries in accordance with the decision of the SKA Organisation, a private company (limited by guarantee) incorporated in the United Kingdom;

“SKA Infrastructure Territories” means the protection corridors within the Karoo Central Astronomy Advantage Area 1 as defined in Annexure A and the 20km radius circular area around the SKA Virtual Centre;

“SKA Virtual Centre” means the geographical point located at geographical co-ordinates 30.71292 degrees South and 21.44380 degrees East that relates to the SKA array of radio astronomy stations within the Karoo Astronomy Advantage Areas and is specified as the centre Assessment Point for the application of protection levels as defined in the Radio Astronomy Protection Levels Regulations, 2012; and

"transmission power system" means a power system that operates at or above 132 kV.

2. Scope of the regulations

- (1) Subject to sub-regulation 3(3), these regulations apply to any electrical infrastructure and electrical equipment within the Karoo Central Astronomy Advantage Area 1.
- (2) If there are differences between the English and the Afrikaans versions of these regulations, the English version will take precedence.

3. Conditions for electrical infrastructure

- (1) No person may construct, install, operate or use any electrical infrastructure and electrical equipment within the Karoo Central Astronomy Advantage Area 1 unless it complies with these regulations and the relevant management authority has issued a permit in relation thereto.
- (2) All electrical infrastructure and any electrical equipment used in connection therewith –
 - (a) may not cause electromagnetic interference within SKA Infrastructure Territories which exceeds the protection levels prescribed in the Radio Astronomy Protection Levels Regulations, 2012; and
 - (b) must be separated from the nearest SKA Infrastructure Territory by a minimum separation distance determined in accordance with regulation 8 of these regulations.
- (3) Electrical infrastructure with an electrical power rating of less than 10 kVA, located at a distance greater than 6 km from the nearest SKA Infrastructure Territory, is exempted from the requirement to acquire and possess a permit and to provide the information specified in sub-regulation 6(2) unless it is found that interference is caused.
- (4) Electrical infrastructure with an electrical power rating of more than 10 kVA but not more than a 100 kVA, located at a distance from the nearest SKA Infrastructure Territory of greater than that to be prescribed by the Minister for the various types of facilities or

equipment, must acquire a permit but is exempted from compliance with sub-regulation 6(2) of these regulations subject thereto that electromagnetic interference is not caused.

4. Additional conditions for electricity generation by means of wind turbines

- (1) In addition to the conditions in regulation 3, no person may erect a wind-driven electrical turbine generator with a capacity of 10 kVA or more within any radio line-of-sight of the SKA Infrastructure Territories.
- (2) In order to determine whether a radio line-of-sight condition exists, a topographical terrain profile must be drawn between –
 - (a) the maximum height above sea level of the tip of a turbine blade on the generator; and
 - (b) the ground height above sea level plus 15 metres at the nearest point of any SKA Infrastructure Territory, or any other point within the SKA Infrastructure Territories if deemed to be required by the relevant management authority as a result of intervening topography;using a minimum of 20 meter resolution digital terrain model for the area and taking the ground conductivity in the Karoo Central Astronomy Advantage Area 1 into account.
- (3) If the determination in sub-regulation (2) is affected by the possible use of non-reflective turbine blades or the non-existence of a radio frequency interference source that may be reflected, an assessment with calculations or measurements must be carried out to verify that the applicable protection levels as prescribed in the Radio Astronomy Protection Levels Regulations, 2012, will not be exceeded.

5. Additional conditions for distribution or transmission power systems

- (1) In addition to the conditions in regulation 3 of these regulations, no person may construct or install any new overhead distribution or transmission power systems with a voltage rating –

- (a) equal or greater to sixty-six thousand Volts (66 000 V) within sixteen km of SKA Infrastructure Territory; and
 - (b) less than sixty-six thousand Volts (66 000 V) within six km of SKA Infrastructure Territories.
- (2) Despite compliance with sub-regulation (1), the distribution or transmission power system may not cause electromagnetic interference to SKA Infrastructure Territories which exceeds the protection levels prescribed in the Radio Astronomy Protection Levels Regulations, 2012.

6. Application and conditions for a permit

- (1) An applicant for a permit, contemplated in sub-regulation 3(1) of these regulations, must submit the application to the management authority or co-management entity for the Karoo Central Astronomy Advantage Area 1.
- (2) The application contemplated in sub-regulation (1) must contain –
- (a) a design report of the proposed new infrastructure and a list of all the electrical equipment to be installed or used;
 - (b) a GIS-shape file or electronically tabulated data, of the proposed location of the new infrastructure, including the ground level height above sea level and the maximum height of the new infrastructure above ground level;
 - (c) the electromagnetic emissions determined in accordance with regulation 3(3);
 - (d) the required minimum separation distance; and
 - (e) the list of geographical locations where the required separation distance is not complied with.
- (3) The management authority or the co-management entity must consider the application and inform the applicant in writing of its decision no later than sixty (60) days of receipt of the application.
- (4) If the authority or entity considering the application is satisfied that the electrical infrastructure and any electrical equipment used in

connection therewith complies with regulations 3, 4 and 5 of these regulations, that authority must issue a permit to the applicant.

- (5) If the application does not comply with regulations 3, 4 and 5, the authority or entity must allow an applicant, within a period of thirty (30) days of date of request, to provide details of mitigation measures which the applicant will take to comply with the regulations.
- (6) The relevant management authority or entity considering the application must take into account the mitigating measures and take a decision on the application no later than sixty (60) days of receipt of the application.
- (7) If the authority or entity decides to grant the permit,
 - (i) the authority or entity must issue the permit; and
 - (ii) the permit must include all the conditions with which the applicant must comply relating to electrical infrastructure, and its construction, installation or operation.
- (8) If a person or entity who has been issued a permit ceases its operations or ceases to use any electrical infrastructure to which the permit relates, that person or entity must give written notice thereof to the authority or entity which granted the permit within three months of such cessation.

7. Determination of electromagnetic emission levels

- (1) For the purposes of these regulations, electromagnetic emissions must be determined with reference to any applicable SANS standard or a standard prescribed in terms of the Electricity Regulation Act.
- (2) If the emission standard has not been determined as contemplated in sub-regulation (1), or the emissions are different to those specified in the applicable standard, a detailed measurement report of the actual emission levels based on the applicable SANS measurement standard or a measurement report from an accredited measurement laboratory in the Republic or another country must be provided by the applicant to the authority or entity, together with supporting documentation.

- (3) If an applicable standard, as contemplated in sub-regulation (1) or (2) above, is not available or deemed to be inappropriate by the relevant management authority, and the undertaking of a measurement campaign is not possible due to technical or other reasons, the relevant management authority or co-management entity must determine which existing standard is the most appropriate and must be used.
- (4) A suitable standard may also be established in terms of section 37 of the Act.

8. Determination of minimum separation distances

- (1) The determination of the minimum separation distance by the applicant must be carried out by means of physical measurements or computerised propagation calculations to determine the required frequency dependent attenuation of the electromagnetic interference to avoid any interference exceeding the protection levels prescribed in the Radio Astronomy Protection Levels Regulations, 2012, within the SKA Infrastructure Territories.
- (2) The reference heights for the measurement or prediction process are –
 - (a) the maximum height above sea level of the electrical infrastructure; and
 - (b) the ground height above sea level plus 15 metres at any relevant location within the SKA Infrastructure Territories.
- (3) The determination of the separation distance must be based on the following criteria:
 - (a) The relevant ITU Recommendations on propagation.
 - (b) The interference level that will not be exceeded for more than 5% of the time over a twenty-four hour period.
 - (c) The use of an isotropic antenna with 0dB gain at the relevant point within the SKA Infrastructure Territories.

- (d) The use of a digital terrain model with the best resolution available.
 - (e) The ground conductivity within the Karoo Central Astronomy Advantage Area 1.
 - (f) The electromagnetic emission level determined according to regulation 7 of these regulations that would cause the highest level of interference.
- (4) The required frequency dependant attenuation of the electromagnetic interference to be used to determine the minimum separation distance is the difference between the highest electromagnetic emission level determined according to regulation 7 of these regulations that would cause the highest level of interference and the applicable protection level prescribed in the Radio Astronomy Protection Levels Regulations, 2012.
- (5) The minimum separation distance must be determined using the applicable ITU Recommendation for radio wave propagation and the required attenuation of the electromagnetic interference determined in sub-regulation 8(4) of these regulations.

9. Procedures to resolve electromagnetic interference

In the event that electromagnetic interference is caused by electrical infrastructure or electrical equipment exempted from these regulations in terms of sub-regulations 3(3) or 3(4) of these regulations or by electrical infrastructure or electrical equipment for which a permit has been issued, due to errors or accuracy limitations in the calculations to determine separation distances, the following criteria and procedures shall apply-

- (1) The relevant management authority must request a detailed measurement report on the actual electromagnetic interference levels based on the applicable SANS measurement standards, or another applicable standard as determined by the relevant management authority, together with supporting documentation, to be provided to the management authority or the co-management entity by the person who owns the infrastructure or electrical equipment.

- (2) If the person who owns the electrical infrastructure or electrical equipment is not able to provide the report, then the management authority or the co-management entity must, at the cost of the person who owns the infrastructure or electrical equipment, arrange for the measurements to be done in order to determine to what extent the applicable protection level prescribed in the Radio Astronomy Protection Levels Regulations, 2012, is exceeded.
- (3) The electromagnetic interference must be reduced to below the applicable protection level prescribed in the Radio Astronomy Protection Levels Regulations, 2012, by establishing the required minimum separation distance determined in accordance with regulation 8 of these regulations or by implementing appropriate mitigation measures around the source of the electromagnetic interference.
- (4) A permit must be issued by the management authority in which the conditions for the ongoing operation of the electrical infrastructure or electrical equipment are specified.

10. Location of the SKA Virtual Centre and protection corridors

- (1) The geographical location of the SKA Virtual Centre is subject to review and finalisation within 12 months of the promulgation of these regulations.
- (2) The protection corridors within the Karoo Central Astronomy Advantage Area 1 are subject to annual review in accordance with progression in the development of the SKA with the intention to phase them out and to require only the protection of the radio astronomy stations located within the corridors.

11. Offences and penalties

Any person who contravenes these regulations is guilty of an offence and liable on conviction to a fine not exceeding R1 000 000 (one million rand) or to imprisonment or to both a fine and imprisonment.

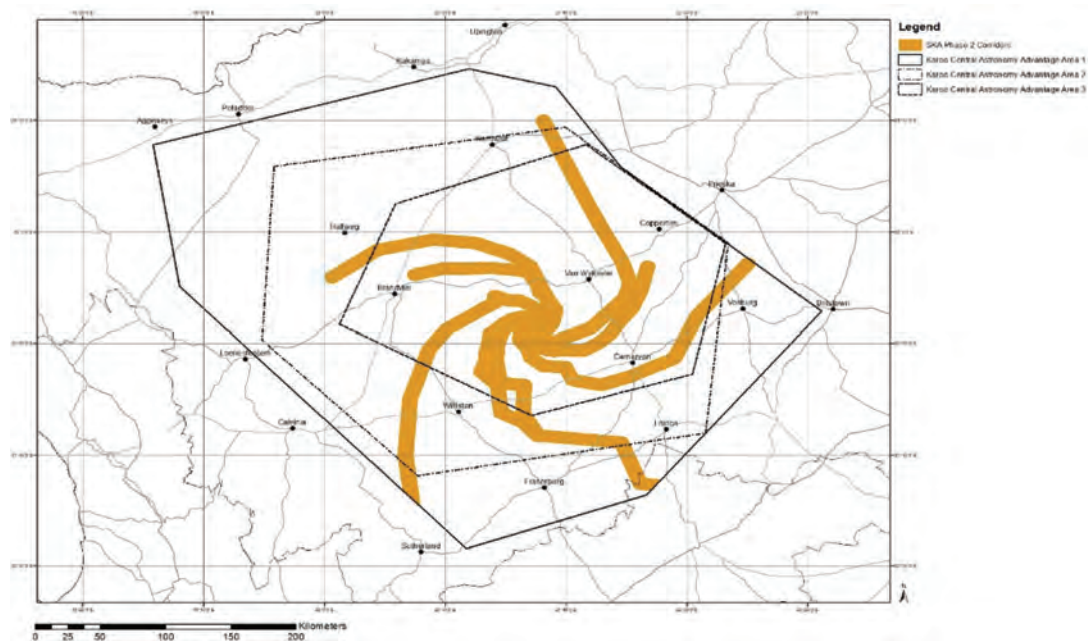
12. Short title and commencement

These regulations are called the Regulations Restricting Electromagnetic Interference in the Karoo Central Astronomy Advantage Area 1, 2015, and will come into operation on a date to be determined by the Minister by notice in the Gazette.

ANNEXURE A**Map of protection corridors containing the SKA radio astronomy stations within the Karoo Central Astronomy Advantage Area 1**

The map below depicts the protection corridors required for approximately 54 SKA radio astronomy stations located within the Karoo Central Astronomy Advantage Area 1 but which fall outside the 20 km radius around the SKA Virtual Centre. The protection corridors are required in the development process for the SKA configuration over time.

A smaller scale version of the map below and/or a GIS-shape file is available on request from the relevant management authority or co-management entity. The perimeters of the corridors are 5 km distant on either side of the spiral arms along which the SKA stations are to be positioned.



EXPLANATORY MEMORANDUM ON THE DRAFT REGULATIONS FOR THE PROTECTION OF THE KAROO CENTRAL ASTRONOMY ADVANTAGE AREAS

An abbreviated version of this memorandum is available. The full length and abbreviated versions are also available in Afrikaans. Nothing in this document will negate anything prescribed in the

Contents

1. Introduction
2. Radio astronomy and the SKA
3. Protection and the Astronomy Geographic Advantage Act
4. Summary of the protection measures and procedures in the draft Regulations
 - 4.1. Draft Karoo Central Astronomy Advantage Areas (AAAs) Spectrum Regulations, 2015
 - 4.2. Draft Regulations on Administrative Matters for central AAAs (Radio Astronomy), 2015
 - 4.3. Draft Regulations on Financial Compensation Procedures for central AAAs, 2015
 - 4.4. Draft Regulations restricting EMI in the Karoo Central AAA1
5. Frequently asked questions and answers
6. Abbreviations

Regulations.

1. Introduction

- 1.1. The purpose of this explanatory memorandum is to provide additional information, a description of the protection scheme for the declared Karoo Central Astronomy Advantage Areas (AAAs), and summaries of the draft Regulations.
- 1.2. The Karoo Central AAAs were declared on 12 March 2014 after the conclusion of the prescribed public consultation and consideration of all representations.
- 1.3. A map of the declared areas is available on page 4 of this document.

2. Radio Astronomy and the SKA

- 2.1. Radio astronomy is a field of scientific research conducted globally, along with optical astronomy, to increase the knowledge and understanding of the universe and the scientific laws that govern it. By receiving and analysing the cosmic radio signals emitted by stars and other matter in the universe, we are able to better understand and explain much of the phenomena observed in the vast extent of the universe in, and beyond, our solar system.
- 2.2. The cosmic radio signals received from space are extremely weak, as they have travelled across the universe for millions of years over vast distances before reaching the earth. The levels of these signals are about a million times weaker than that received by cell phones and other radio communication devices.
- 2.3. Very large and sensitive receiving installations are used for radio astronomy. The weak cosmic signals received, can be interfered with and made unusable by signals from radio communication and electromagnetic radiation that exceed the reception threshold level for radio astronomy. Reception at this level must therefore be protected. The established protection levels are based on internationally accepted standards and procedures developed by the International Telecommunication Union.

- 2.4. The reception threshold and protection level for radio astronomy is far below the required levels for usable radio communications. The protection level varies somewhat over the radio frequency spectrum, but is in the range (minus) -220 dBm/Hz to (minus) -250 dBm/Hz.
- 2.5. The cosmic signals can be found across the radio frequency spectrum due to different frequencies emitted by different chemical elements. As a result, radio astronomy observations of cosmic signals have to be carried out over very large portions of the radio frequency spectrum.
- 2.6. Radio frequency interference (RFI) to the reception of cosmic signals may be caused by radio communication systems. Although the frequency spectrum occupation of these systems in the Northern Cape Province may be very low compared to other areas in the Republic of South Africa, some of the radio communication signals, and in particular high power terrestrial broadcasting transmissions, may propagate over very large distances depending on the site and mast elevation, the transmitted power used, the direction of the transmission and the intervening topographical terrain. Very high levels of RFI may cause saturation in the radio astronomy receiving system, destroying its cosmic signal reception capability entirely, or even causing permanent damage to the receiver equipment.
- 2.7. Electromagnetic interference (EMI) is another form of RFI, caused by electricity generation, electricity distribution and the use of electrical equipment and machinery. This interference occurs over very large frequency bands but occurs only over short distances, i.e. 5 to 20 km depending on the system and propagation conditions.
- 2.8. The Square Kilometre Array (SKA)¹ is a new generation, multi-national radio telescope that will be the most powerful observatory in the world. The key consideration in the location of the SKA was to find the most suitable area for the telescope with acceptable climatic conditions, extremely low levels of RFI and EMI and that protection will be provided against RFI and EMI. The SKA Organisation's decision to locate the major portion in the Karoo region of the Northern Cape Province in the Republic of South Africa followed a worldwide search and international bidding process. The final decision was taken after an intensive analysis by experts of all the factors affecting the location of the SKA.
- 2.9. For the SKA, protection is required to cover its expected lifetime of 50 years.

3. Protection and the Astronomy Geographic Advantage Act

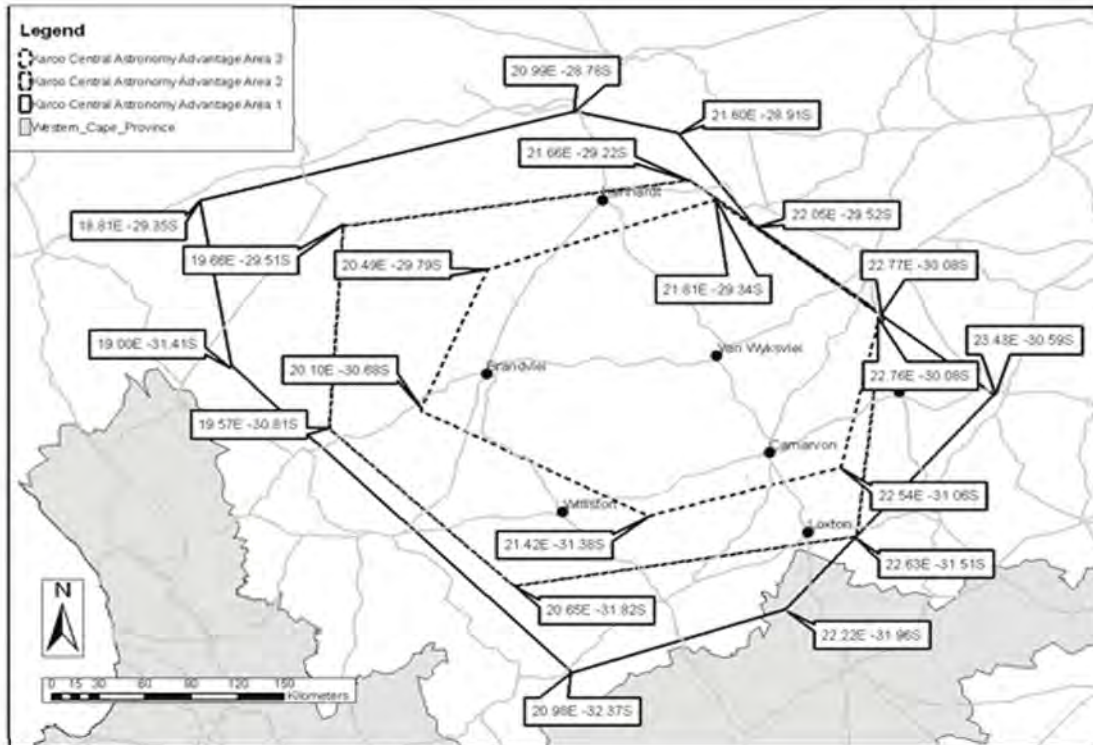
- 3.1. In order to establish a long term astronomy protection scheme for the Republic of South Africa, the Government of the Republic of South Africa considered it necessary to promulgate legislation for the protection of Astronomy Geographic Advantage Areas. The Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007) (hereinafter referred to as the AGA Act), was promulgated and published in Government Gazette No. 31157 on 17 June 2008 in English and in Tswana. The English version was signed by the President. The AGA Act became operational by the publication of Proclamation No. 28 in Gazette No. 32163 on 24 April 2009. An Afrikaans translation of the AGA Act is on request available from the Astronomy Management Authority at the Department of Science and Technology. The translated version has no official status.

¹ Much more information on the SKA can be found on the South African SKA website www.ska.ac.za/ and the international website www.skatelescope.org/.

- 3.2. The AGA Act provides the framework and principles to conduct and to protect the various kinds of astronomy anywhere within the Republic of South Africa. Protected areas are to be declared and protection measures prescribed in regulations for particular astronomy endeavours. The protection measures include the restriction of radio frequency spectrum use, restriction of possible detrimental activities, establishment of the required protection criteria and standards and the establishment of administrative procedures to implement and maintain the measures. Due to the complexity involved in declaring the different categories of protected areas and making protection regulations for each category, the implementation of the protection scheme is carried out in a number of sequential steps.
- 3.3. The AGA Act provides for comprehensive public participation during the declaration of areas and the making of protection regulations. This includes the following:
- 3.3.1. During the public consultation process for the declaration of the areas to be protected, permanent registers of interested and affected parties must be compiled for each of the core, central or coordinated AAAs; copies of the notice and proposed declarations must be sent by registered letters to any private land owner in the core or central AAAs and, where possible, any other lawful occupier of land within the relevant AAAs must be informed of the consultation process in an appropriate manner (all these activities were carried out during the consultation for the declaration of the Karoo Central AAAs);
- 3.3.2. Prior to publishing a notice to make regulations, copies of the notice and draft regulations must be sent to the persons included in the relevant permanent register of interested and affected parties by registered post or other method agreed to;
- 3.3.3. The notices, the draft declarations or regulations with sufficient information must be published in the Government Gazette and include an invitation to submit written representations or objections within 60 days. The notice must also be published in at least two national newspapers distributed in the area; and
- 3.3.4. The relevant provisions in the Promotion of Administrative Justice Act, 2000 (Act no.3 of 2000) (hereinafter referred to as PAJA) and its Regulations, must be complied with.
- 3.4. The following measures have already been implemented in terms of the AGA Act in order to provide the necessary protection for radio astronomy observations by the SKA:

| Protection Measures for the SKA radio telescope | AGA Act Reference | Government Gaz. Numbers | Date |
|--|--------------------------|--------------------------------|------------------|
| Declaration of the Northern Cape Province, excluding Sol Plaatje Municipality as an AAA | Section 5 | Notice 115 GG 32951 | 19 February 2010 |
| Declaration of the Karoo Core AAA consisting of 13 406 hectares land (Property of National Research Foundation) | Section 7 | Notice 723 GG 33462 | 20 August 2010 |
| Declaration of the establishment and operation of the MeerKAT and SKA to be astronomy and related scientific endeavours | Section 28(1) | Notice 897 GG 33614 | 15 October 2010 |
| Regulations prescribing the radio astronomy protection levels as the South African Radio Astronomy Service (SARAS) protection levels | Sections 37 & 50 | Notice R.90 GG 35007 | 10 February 2012 |

| | | | |
|---|----------------------|-----------------------|---------------|
| standard | | | |
| Regulations for the protection of the Karoo Core AAA restricting all radio frequency spectrum use and listed activities unless required for radio astronomy | Sections 22, 23 & 50 | Notice R.456 GG 35450 | 22 June 2012 |
| Declaration of the Karoo Central AAAs (Map below) | Section 9 | Notice 198 GG 37434 | 12 March 2014 |



3.5. The protection philosophy applied in the development of the protection scheme is based on the following principles:

- 3.5.1. That inference to the reception of cosmic radio signals and data loss will be minimised, so that the expected information and discoveries will be yielded;
- 3.5.2. That the impact of the protection scheme on radio communication, electrical activities and other activities that may adversely affect radio astronomy observations will be minimised;
- 3.5.3. That the required level of protection with respect to RFI will be applied at the SKA Virtual Centre (SVC), as the most sensitive part of the SKA, to the maximum extent possible. This will result in the restrictions on radio communications gradually decreasing with distance from the SVC. In addition, frequency use will be limited to exempted frequency bands and radiated power levels limited to 40 dBm;
- 3.5.4. That for EMI caused by electricity generation, distribution and electrical equipment and machinery, the required protection level will be applied to the 20 km radius area

- around the SKA Virtual Centre and the protection corridors for remote SKA stations in the Karoo Central AAA1. Protection will be achieved by maintaining the required separation distance between the interference sources and the stated protection areas;
- 3.5.5. That the required protection level to be applied will be in accordance with the South African Radio Astronomy Service (SARAS) Standard Regulations already promulgated;
- 3.5.6. That the provision of alternative radio communication options will be facilitated in the area where all existing terrestrial radio communication options would be restricted as a result of compliance with the protection measures, and, in some cases, where there are no existing terrestrial telecommunication service options available;
- 3.5.7. That the presence of limited RFI will be accepted following the consideration of requirements for essential radio communications, and the optimisation of the possible protection without completely restricting those communications; and
- 3.5.8. That saturating level RFI cannot be allowed within the protected area around the SKA Virtual Centre and within the protection corridors as this level of RFI would prevent the SKA radio astronomy receiving facilities from producing usable output and may damage the equipment.
- 3.6. The radio frequency spectrum from 100 MHz to 25.5 GHz will, within the respective declared Karoo Central AAAs, be reserved for SKA radio astronomy observations and must, to the maximum extent possible, be clear of any radio signals that exceed the protection level. Any use of the reserved spectrum for essential radio communication stations located within the Karoo Central AAAs will be considered for exemption (under certain conditions) from the restrictions.
- 3.7. All existing and future radio communication transmissions from fixed base stations located within the Karoo Central AAAs, and where necessary also from mobile and portable radio apparatus, need to be assessed according to prescribed procedures to determine whether the protection requirements will be met. Permits are to be issued for those stations and transmissions that may continue to operate within the Karoo Central AAAs. Permits will include exemptions for frequency spectrum to be used and the permitted transmission characteristics.
- 3.8. Low power (less than 250 mW) short range devices as defined by ICASA in their Radio Frequency Spectrum Regulations will be exempted. These devices should not be used within 50 km of the SKA Virtual Centre. Higher powered short range devices will be subject to assessment and protection measures to be applied.
- 3.9. Essential radio communication services are to be identified and designated as such by the Management Authority. If necessary, such services will be permitted to exceed the protection levels after the following have been determined:
- 3.9.1. That all restrictions imposed by the protection regulations have been taken into account;
- 3.9.2. That alternative technical options for the delivery of those services have been considered, and
- 3.9.3. That RFI and restrictions which will significantly affect the service delivery, have been minimised.

- 3.10. Electricity generation and distribution infrastructure existing when the Regulations are promulgated will be accepted in their current form
- 3.11. New electrical facilities or activities with a power rating of more than 10 kVA and/or within 6 km of the 20 km protected area around the SKA Virtual Centre or an SKA protection corridor, will require a permit subject to a prescribed assessment process first being conducted.
- 3.12. Any RFI or EMI caused by certain electrical or radio communication exempted in the protection regulations will be investigated with the object to eliminate such interference.

4. Summary of the Protection Measures and Procedures in the Draft Regulations

The draft Regulations that accompany the notice and the regulations schedule on the intention to make regulations to protect the Karoo Central AAAs, consist of four sets of Regulations that addresses four different aspects of the protection scheme. The summaries that follow will briefly describe the contents of each of the draft Regulations but the Regulations themselves must be studied to determine their full measure and meaning.

4.1. Schedule A - Draft Karoo Central AAAs Spectrum Regulations, 2015

- 4.1.1. Regulation 1 of the draft Regulations contains 23 definitions of terminology used in the Regulations to which certain meanings are ascribed.
- 4.1.2. Regulation 2 states that the regulation applies to the Karoo Central AAAs and that the English version will take precedence.
- 4.1.3. Regulation 3 prescribes that:
- (a) All measures in the Regulations on the use of frequency spectrum within the Karoo Central AAAs will apply to the frequency spectrum from 100 MHz to 25.5 GHz;
 - (b) The use of the specified radio frequency spectrum will be restricted one year after the Regulations came into operation unless an exemption has been granted, a permit issued for its use and RFI is not caused at the SVC;
 - (c) Existing spectrum use up to 200 MHz may continue to be used subject to the acquisition of permits; and
 - (d) One year after the Regulations came into operation, no radio communication may be engaged which causes or is capable of causing RFI at the SVC unless it has been considered by the management authority and a permit has been issued to the person conducting the activity.
- 4.1.4. Regulation 4 prescribes that one year after the Regulations came into operation, the conditions that will apply on the use of radio frequency spectrum or any radio communication, in addition to not causing, or being capable of causing, RFI at the SVC, will include the following:
- (a) Effective radiated power of transmitters is limited to 40 dBm;
 - (b) Saturation level RFI must not be exceeded within the protection corridors as described in Annexure A to the Regulations or within a radius of 20 km from the SVC;

- (c) Prescribed protection levels must not be exceeded at the SVC unless it is for an essential service and a level in excess of the protection level is specified in the permit issued; and
- (d) These conditions also apply to the construction, upgrade or expansion of any fixed radio station for which a permit has been issued but will not apply to radio communications within the frequency spectrum from 100 to 200 MHz that was in use before the Regulations were promulgated.

4.1.5. Regulation 5 prescribes that:

- (a) From the date that the Regulations came into operation, no person may construct, upgrade or expand any fixed radio station within the Karoo Central AAAs which would cause or is capable of causing RFI at the SVC unless a permit in relation thereto has been acquired;
- (b) After one year no person may use any radio station, or apparatus or appliance that causes RFI at the SVC or saturation level RFI within the protection corridors or within 20 km of the SVC; and
- (c) The RFI assessment must firstly be carried out for radio stations or apparatus at fixed locations and secondly also on related mobile or portable stations or apparatus that may cause RFI, including Short Range Devices (SRDs) as defined by Independent Communications Authority of South Africa (ICASA) in their Radio Frequency Spectrum Regulations with an output greater than 250 mW; which may all be geographically restricted to avoid causing RFI. Typical examples of SRD's are internet modem routers with WiFi, DECT cordless phones and low power video surveillance equipment.

4.1.6. Regulation 6 states that:

- (a) The possession of a permit is not required for SRDs with an output of less than 250 mW subject thereto that RFI is not caused at the SVC or saturation level RFI is not caused within the protection corridors or within 20 km of the SVC;
- (b) The exemption for the possession of a permit only applies standard SRDs without any enhancements; and
- (c) In the event that interference is caused at any radio astronomy station by an SRD, the matter will be subjected to the prescribed compliance assessment procedures and methods which will be considered to reduce interference in order to comply with the required protection levels. SRDs should not be used within 50 km of the SVC.

4.1.7. Regulation 7 provides that the location of the SKA Virtual Centre is subject to review and finalisation within 12 months after the promulgation of the Regulations and that the protection corridors are subject to annual review with the intention that they be phased out leaving only the SKA stations to be protected.

4.1.8. Regulation 8 provides that the Minister may extend the one year periods prescribed in Regulations 3, 4 and 5 up to a maximum of 3 years.

4.1.9. Regulation 9 provides that any permitted financial compensation will be subject to the Regulations on Financial Compensation Procedures for central astronomy advantage areas, 2015.

- 4.1.10. Regulation 10 determines offences and penalties applicable.
- 4.1.11. Regulation 11 prescribes that the Regulations will come into operation on a date to be determined by the Minister by notice in the Gazette.
- 4.1.12. Annexure A provides a map of the protection corridors and information on their location.

4.2. Schedule B - Draft Regulations on Administrative Matters for the Central AAAs (Radio Astronomy), 2015

- 4.2.1. Regulation 1 of the draft Regulations contains 24 definitions of terminology used in the Regulations to which certain meanings are ascribed.
- 4.2.2. Regulation 2 states that the Regulations will apply to any central AAA declared for radio astronomy purposes and that the English version will take precedence.
- 4.2.3. Regulation 3 prescribes a process that must be carried out soon after the Regulations came into operation to determine the frequency spectrum to be exempted from the restriction that it may not be used within the relevant Central AAAs. The process includes consultation with ICASA; consultation with existing radio communication base station owners, registered interested and affected parties, publication of the proposed exempted spectrum and inviting written submissions. After consideration of the submissions, a list of the exempted spectrum must be published in the Government Gazette at least 6 months prior to the restriction on spectrum use coming into operation.
- 4.2.4. Regulation 4 prescribes that:
 - (a) Frequency use and radio transmissions that existed before the Spectrum Regulations came into operation may not continue to do so beyond one year (extendable to a max of 3 years) after the Spectrum Regulations came into operation, and any new frequency use and transmissions may not commence, unless a permit has been issued for that frequency use and those transmissions;
 - (b) Short range devices (SRDs) exempted by ICASA in their Radio Frequency Spectrum Regulations from the requirement to have a radio frequency spectrum licence do not require a permit if their output is less than 250 mW, they comply with the operating conditions prescribed by ICASA, radio frequency interference is not caused and they are used individually and not enhanced. If these conditions are not met, a permit must be applied for and a compliance assessment carried out;
 - (c) A compliance assessment must be carried out by a competent person appointed by the applicant before a permit can be issued; and
 - (d) The application for a permit and compliance assessment for the existing transmissions or for new transmissions must conform to prescribed criteria, specified document formats and must be submitted to the relevant management authority. If spectrum that is not exempted is to be used in the Karoo Central AAAs, a request and motivation for the use of that spectrum must be included in the permit application.
- 4.2.5. Regulation 5 prescribes the evaluation conditions and the processing of permit applications and compliance assessments by the management authority which must conform to specified criteria and prescribed time frames. Provision is made for the

applicant to make additional submissions in the event that an application is not in compliance with the protection requirements, for the resolution of disputes and for the extension of prescribed time frames. The contents of permits to be issued are prescribed. If RFI is caused after a permit has been issued for a compliant transmission, then the assessment process must be reviewed. Application may be made for the amendment of an issued permit which is subject to the processing and assessment criteria prescribed for new applications.

- 4.2.6. Regulation 6 prescribes the technical procedures, criteria, standards and the compliance assessment form to be completed for the determination of RFI levels and compliance with the protection levels.
- 4.2.7. Regulation 7 prescribes the types of radio communication services that may qualify as essential services, and the procedures and conditions for a radio communication service to be classified as an essential service. The determination whether a service is an essential service or not must be done before the compliance assessment for a permit application. An essential service may be allowed to exceed the protection level to a limited extent but will not be allowed to exceed the saturation level RFI.
- 4.2.8. Regulation 8 prescribes the criteria for persons who may carry out the compliance assessment and who must complete and sign the compliance assessment report.
- 4.2.9. Regulation 9 prescribes the criteria and conditions for a permit register to be kept.
- 4.2.10. Regulation 10 determines offences and penalties applicable.
- 4.2.11. Regulation 11 states that the Regulations will come into operation on a date to be determined by the Minister by notice in the Gazette.
- 4.2.12. Annexure A provides a framework for the compliance assessment report and Annexure B a framework for an application for a permit.

4.3. Schedule C - Draft Regulations on Financial Compensation Procedures for central AAAs, 2015

- 4.3.1. These Regulations gives effect to section 23(3)(a) in the AGA Act which provides for financial compensation where a radio communication activity that was lawfully conducted immediately before the promulgation of Spectrum Regulations for the relevant area is restricted or terminated in order to comply with the regulations .
- 4.3.2. Regulation 1 includes eight definitions for certain terminology used in the Regulations.
- 4.3.3. Regulation 2 states that the Regulations will apply to any central AAA declared for radio astronomy purposes and that the English version will take precedence.
- 4.3.4. Regulation 3 prescribes the information required in an application for financial compensation.
- 4.3.5. Regulation 4 prescribes the procedures and criteria for the processing of financial compensation applications by the relevant management authority.
- 4.3.6. Regulation 5 prescribes the criteria and procedures for decisions to be made by the Minister on financial compensation applications.
- 4.3.7. Regulation 6 prescribes the criteria for acceptance of offers for financial compensation, payment procedures and a provision for the review of the Minister's decision in terms of the provisions of PAJA.

4.3.8.Regulation 7 determines offences and penalties applicable.

4.3.9.Regulation 8 states that the Regulations will come into operation on a date to be determined by the Minister by notice in the Gazette.

4.4. Schedule D - Draft Regulations restricting EMI in the Karoo Central AAA1

4.4.1.Regulation 1 includes 23 definitions for certain terminology used in the Regulations.

4.4.2.Regulation 2 states that the Regulations apply to any electrical infrastructure and electrical equipment located within the Karoo Central AAA1 and that the English version will take precedence. The definition for electrical infrastructure excludes electricity distribution and transmission that existed prior to the publication of these regulations.

4.4.3.Regulation 3 prescribes that:

- (a) Electrical infrastructure and equipment may not be constructed, installed, operated or used within the Karoo Central AAA1 unless a permit has been issued for its use and it complies with the regulations ;
- (b) Electrical infrastructure and equipment may not cause RFI within SKA Infrastructure Territory (Protection corridors as described in Annexure A and a 20 km circular area around SVC) and must be separated by a required distance to avoid RFI;
- (c) Electrical infrastructure with a power rating of less than 10 kVA and with a separation distance of more than 6 km is exempted from the requirement to acquire and possess a permit unless EMI is caused; and
- (d) Electrical infrastructure with a power rating of more than 10 kVA but not more than 100 kVA, located at a distance greater than the distances for various facilities and equipment to be prescribed by the Minister must acquire a permit but is exempt from the requirement to provide EMI assessment reports unless EMI is caused.

4.4.4.Regulation 4 prescribes additional conditions for electricity generation with a capacity of 10 kVA or more when wind turbines are used.

4.4.5.Regulation 5 prescribes additional conditions for the transmission and distribution of electricity in order to comply the prescribed protection.

4.4.6.Regulation 6 prescribes the procedures involved in applications for permits and the information required.

4.4.7.Regulation 7 prescribes how the EMI level is to be determined.

4.4.8.Regulation 8 prescribes criteria and standards to be applied in the determination of the required separation distances to avoid EMI.

4.4.9.Regulation 9 prescribes procedures to attend to and resolve EMI that occurs.

4.4.10. Regulation 10 provides that the location of the SKA Virtual Centre is subject to review and finalisation within 12 months after the promulgation of the Regulations and that the protection corridors are subject to annual review with the intention that they be phased out leaving only the SKA stations to be protected.

4.4.11. Regulation 11 determines offences and penalties applicable.

4.4.12. Regulation 12 states that the Regulations will come into operation on a date determined by the Minister by notice in the Gazette.

4.4.13. Annexure A provides a map of the protection corridors and information on their location.

5. Frequently asked questions and answers

5.1. Will FM radio and television signals (reception) be affected?

The existing FM radio transmissions will not be restricted and reception will remain as it is. Existing television reception will change across the whole of South Africa as a result of the national project led by the Department of Communications to migrate from terrestrial analogue to terrestrial digital television transmissions. This change will also lead to a greater use of satellite reception in remote communities. The establishment of terrestrial digital television transmissions will need to comply with the protection requirements for the SKA. However, all television and radio services in South Africa are broadcasted via satellite covering the whole country, which will not be affected. Government has a policy in place to subsidise the poorest households for the migration cost to the new digital television transmissions, including satellite reception in the Northern Cape in areas affected by the SKA.

5.2. Will cell phone services be affected?

The availability of existing cell phone coverage around the SKA central infrastructure is sparse. Due to the high sensitivity of radio astronomy receivers within the SKA area, existing cell phone coverage still causes unacceptable interference to certain parts of the SKA central infrastructure and will need to be restricted. The circular area within a radius of about 80 km from the SKA Virtual Centre is the area where existing usable cell phone signals may be affected. However, cell phone coverage in the towns such as Carnarvon, Van Wyksvlei and Williston will not be affected. To compensate for the loss of communication within the affected area, and also to support SKA operations, an alternative radio communication system that will not interfere with the SKA is being planned for future deployment. It will be an advanced multi-channel duplex radio communication system that will operate with mobile, handheld and fixed radios. The network will use similar frequencies to the existing low frequency mobile communication network ('Marnet'), which will not be affected by the protection requirements. Additionally, a scheme for low cost satellite VSAT communications is being set up to provide for telephony and internet access.

5.3. Will the use of electrical machinery be affected?

The only possibility of an effect on electrical machinery or activities may be those located close to the Central SKA Infrastructure (up to 36 km from centre) or close to a remote SKA station (up to 16 km), depending on topography. Very few interference situations are expected, which can be attended to individually when they are identified, and would not involve any of the towns in the area.

5.4. Why the SKA was located in the Karoo and were the existing conditions considered?

The study to locate the SKA in South Africa started in 2003 when a thorough study on the suitability of existing and expected conditions in South Africa was carried out to consider hosting the SKA. In South Africa, the Northern Cape Province is by far the most suitable area with the lowest population and industrial density together with the lowest volume of radio communication and electrical activities. Three areas were considered in the Province, i.e. Kalahari, Karoo and Namaqualand. Karoo turned out to be the better option. Notwithstanding the low economic activity density, the Karoo does offer the basic infrastructure required to support the SKA alongside good atmospheric conditions, radio quietness, geotechnical stability and good security conditions. On a global basis, six countries thought that they may offer acceptable conditions but only Western Australia and

the Northern Cape Province met the requirements but with the latter being the better option.

6. Abbreviations

| | |
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| AAAs | Astronomy Advantage Areas |
| AGA | Astronomy Geographic Advantage |
| AGA Act | Astronomy Geographic Advantage Act |
| dBm | decibel above one milliwatt |
| DECT | Digital Enhanced Cordless Telecommunications |
| EMI | Electromagnetic Interference |
| FM | Frequency Modulation |
| GG | Government Gazette |
| GHz | Giga (thousand million) Hertz |
| ICASA | Independent Communications Authority of South Africa |
| km | kilometre |
| kVA | kilo Volt-Ampere |
| MHz | Mega (million) Hertz |
| RFI | Radio Frequency Interference |
| SARAS | South African Radio Astronomy Service |
| SKA | Square Kilometre Array |
| SRDs | Short Range Devices (as defined by ICASA) |
| SVC | SKA Virtual Centre |
| VSAT | Very Small Aperture Terminal (two-way satellite ground station) |
| WiFi | local area wireless computer networking technology mainly using the 2.4 and 5 GHz frequency bands |