

Government Gazette Staatskoerant

REPUBLIC OF SOUTH AFRICA
REPUBLIEK VAN SUID-AFRIKA

Vol. 524

Pretoria, 5 February 2009
Februarie

No. 31855

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GOVERNMENT NOTICE

DEPARTMENT OF SCIENCE AND TECHNOLOGY**No. 82****5 February 2009****ASTRONOMY GEOGRAPHIC ADVANTAGE ACT, 2007 (Act No. 21 of 2007)****DECLARATION OF AREAS AS ASTRONOMY ADVANTAGE AREAS.**

I, Mosibudi Mangena, Minister of Science and Technology, hereby in terms of section 5(1)(a) of the Astronomy Geographic Act, 2007 (Act No. 21 of 2007) declare the areas indicated in the schedule to be Astronomy Advantage Areas.

SCHEDULE

1. In this notice any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned and, unless the context indicates otherwise.

DESCRIPTION OF AREAS TO BE DECLARED AS ASTRONOMY ADVANTAGE AREAS

2.
 - (1) All land in the Northern Cape Province situated within 250 kilometres from the centre of the Southern African Large Telescope (SALT) dome for optical astronomy purposes.
 - (2) The whole of the territory of the Northern Cape Province excluding Sol Plaatje Municipality for radio astronomy purposes.

M MANGENA**MINISTER OF SCIENCE AND TECHNOLOGY**

GENERAL NOTICES

NOTICE 115 OF 2009

NOTICE OF INTENTION TO DECLARE AREAS IN TERMS OF THE ASTRONOMY GEOGRAPHIC ADVANTAGE ACT, 2007 (Act No. 21 OF 2007) TO BE ASTRONOMY ADVANTAGE AREAS.

I, Mosibudi Mangena, Minister of Science and Technology, hereby intends under sections 7(1)(a), 9(1)(a) and 11(1)(a) of the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007) to declare the areas indicated in the schedule to be Astronomy Advantage Areas, and further invite public comments in terms of section 42 of the said Act.

Comments should be submitted not later than 16h30 on the 6th March 2009 to:

Ms Lipuo Mothae
Dept of Science and Technology
Building 53, CSIR Campus
Meiring Naude Road
Brummeria
Pretoria

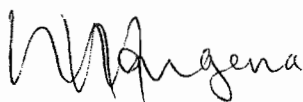
Or

Dept of Science and Technology
Private Bag X 894
Pretoria
0001

E mail address lipuo.mothae@dst.gov.za

Enquiries can be made at telephone number 012 843 6463

M MANGENA
MINISTER OF SCIENCE AND TECHNOLOGY



SCHEDULE

1.

In this notice any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned and, unless the context indicates otherwise

“Polygon” means a closed plane figure bounded by straight lines.

DESCRIPTION OF BOUNDARIES OF OPTICAL ASTRONOMY ADVANTAGE AREAS

2.

- (1) Sutherland observing station of South African Astronomical Observatory (SAAO) and all land within 3 kilometre radius of the centre of the Southern African Large Telescope (SALT) dome is the Sutherland core optical astronomy advantage area.
- (2) All land within 75 kilometre radius of the centre of the SALT dome within the Northern Cape Province is the Sutherland central optical astronomy advantage area.
- (3) All land within 250 kilometre radius of the centre of the SALT dome within the Northern Cape Province is the Sutherland coordinated optical astronomy advantage area.

DESCRIPTION OF BOUNDARIES OF RADIO ASTRONOMY ADVANTAGE AREAS

3.

- (1) The Karoo core radio astronomy advantage area comprises of the farm Mey's dam 68 in the Municipality of Kareeberg, Carnavon Road in the Northern Cape in extent of 7046,0463 hectares deed of transfer T047450/08 and portion 1 of the farm Losberg 73, Fraser Road, Northern Cape Province in the extent of 1825,2707 hectares deed of transfer T045934/08.
- (2) The Karoo central radio astronomy advantage area 1 is the area between the boundaries of the Karoo core radio astronomy advantage area and outer boundaries in the form of a polygon for which the geographical coordinates according to the World Geodetic System 84 datum are provided in the table below.

Point references Karoo central radio astronomy advantage area 1	Longitude (degrees East)	Latitude (degrees South)
A 1	18.810000	29.350000
B 1	20.990000	28.780000
C 1	21.600000	28.910000
D 1	22.050000	29.520000
E 1	23.430000	30.590000
F 1	22.220000	31.960000
G 1	20.980000	32.370000
H 1	19.000000	30.410000

- (3) The Karoo central radio astronomy advantage area 2 is the area between the boundaries of the Karoo core radio astronomy advantage area and outer boundaries in the form of a polygon for which the geographical coordinates according to the World Geodetic System 84 datum are provided in the table below.

Point reference Karoo central radio astronomy advantage area 2	Longitude (degrees East)	Latitude (degrees South)
A 2	19.660000	29.510000
B 2	21.660000	29.220000
C 2	22.770000	30.080000
D 2	22.630000	31.510000
E 2	20.650000	31.820000
F 2	19.570000	30.810000

- (4) The Karoo central radio astronomy advantage area 3 is the area between the boundaries of the Karoo core radio astronomy advantage area and outer boundaries in the form of a polygon for which the geographical coordinates according to the World Geodetic System 84 datum are provided in the table below.

Point reference Karoo central radio astronomy advantage area 3	Longitude (degrees East)	Latitude (degrees South)
A 3	20.490000	29.790000
B 3	21.810000	29.340000
C 3	22.760000	30.080000
D 3	22.540000	31.060000
E 3	21.420000	31.380000
F 3	20.100000	30.680000

- (5) The Karoo coordinated radio astronomy advantage area 1 is the area between the boundaries formed by Karoo central astronomy advantage area 1 and the boundaries of the Northern Cape Province excluding Sol Plaatje Municipality.
- (6) The Karoo coordinated radio astronomy advantage area 2 is the area between the boundaries formed by Karoo central astronomy advantage area 2 and by Karoo central astronomy advantage area 1.

NOTICE 116 OF 2009**NOTICE OF INTENTION TO MAKE REGULATIONS REGARDING THE ASTRONOMY ADVANTAGE AREAS.**

The Minister of Science and Technology hereby gives notice of intention to make regulations in the schedule in terms of section 50 read with sections 5,7,9 and 11 of the Astronomy Geographic Advantage Act, 2007(Act No.21 of 2007), which are hereby published for public comment under section 42 of the said Act.

Interested persons are hereby invited to submit written comments or written representations with regard to the proposed regulations not later than 16h30 on the 6th of March 2009. For the attention of:

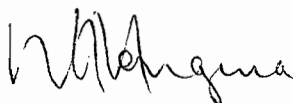
Ms Lipuo Mothae
Dept of Science and Technology
Building 53,CSIR Campus
Meiring Naude Road
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Or

Dept of Science and Technology
Private Bag X894
Pretoria
0001
Or

E mail address lipuo.mothae@dst.gov.za

Enquiries can be made at telephone number 012 843 6463



M MANGENA

MINISTER OF SCIENCE AND TECHNOLOGY

SCHEDULE

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Definitions

In these regulations any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned and, unless the context indicates otherwise –

“Act” means the Astronomy Geographic Advantage Act 21 of 2007

“Cut-off” means luminaires emit no more than 1% of their total light output above 90 degrees, and no more than 3% above 80 degrees.

“Declaration” means declaring of an area as astronomy advantage area by notice in the Gazette

“Detrimental optical interference” means phenomena that endanger or obstruct the functioning of optical astronomy devices and impacts negatively on the related scientific endeavours in the optical astronomy advantage areas.

“Detrimental radio interference” means a radio frequency interference which endangers or obstructs the functioning of radio astronomy devices and impacts negatively on the related scientific endeavours in the radio astronomy advantage areas.

“Efficient lighting” means an output of at least 95% of that achieved by standard high-pressure sodium lamps (9500 lumens for a 100W lamp, for example).

“Essential radio communications services” means electronic radio communications required in the central astronomy advantage area which include:

- a) Broadcasting signal distribution for licensed terrestrial broadcasting services;
- b) Public fixed line radio communications;
- c) Public mobile radio communications;
- d) Eskom radio communications to operate and maintain electrical power line systems;

- e) Transnet radio communications to operate and maintain rail transport; and
- f) Radiocommunication services operated by the safety and security cluster, as defined in the Constitution, local authorities, health services and emergency services.
- g) Satellite communications including South African broadcasting services

“Full cut-off lighting” means luminaires emit no light above the horizontal (above 90 degrees), and no more than 3% of the total light above 80 degrees.

“ICASA” means Independent Communications Authority of South Africa established by section 3 of the Independent Communications Authority of South Africa Act of 2000 (Act.No.13 of 2000)

“ITU” means International Telecommunications Union

“ITU RAS protection levels” means threshold levels of interference detrimental to radio astronomy observations in terms of input power, (dBW), power flux density(pfd) ($\text{dB(W/m}^2\text{)}$) and spectral power flux density(spfd) ($\text{dB(W/(m}^2\text{/Hz))}$) as specified in the latest version of the International Telecommunications Union Recommendation ITU-R RA.769.

“Luminaire” means an apparatus that distributes the light emitted by a lamp or lamps.

“Operating institution” means an entity which is responsible for the optical and radio astronomy research activities

“Optical” refers to wavelengths between 350 and 50 000 nanometres.

“Radiocommunications” means electronic communications carried out making use of the radio frequency spectrum.

“SAAO” means South African Astronomical Observatory

“Safety-of-life radiocommunication services” means electronic radio communication services operating in aeronautical and maritime frequency spectrum allocations relating to the safety and regularity of flight and includes communication, radio navigation and surveillance systems

“SALT” means Southern African Large Telescope

“Saturation” means a phenomenon whereby a radio receiver no longer operates linearly within the specified operating frequency range.

“Semi cut-off” means luminaires emit no more than 5% of their total light output above 90 degrees, and no more than 10% above 80 degrees.

“Transmission site” means a location, structure, or object essentially comprising one or more radio transmitters, transposers or transponders.

CHAPTER 1

Administration

Scope of regulation

1.

These regulations apply to any declared astronomy advantage area.

CHAPTER 2

Astronomy advantage areas

Core optical astronomy advantage area

2.

An area declared as a core astronomy advantage area for the purposes of optical astronomy and related scientific endeavours, in terms of section 7(1) of the Act, cannot be used for any purpose other than optical astronomy and related scientific endeavours, unless such other activity is expressly permitted in terms of these regulations.

Core radio astronomy advantage area

3.

An area declared as a core astronomy advantage area for the purposes of radio astronomy and related scientific endeavours, in terms of section , 7(1) of the Act, cannot be used for any purpose other than radio astronomy and related scientific endeavours, unless such other activity is expressly permitted in terms of these regulations.

CHAPTER 3

Criteria for declaration

4.

- (1) The area to be declared must be suitable and required for the particular astronomical activities to be conducted.
- (2) The area must be suitable for conducting astronomical activities because of geographical advantage that the area provides, which would be adversely affected by any detrimental optical and radio interference if the interference is not constrained.
- (3) In the case of astronomical observations at ultraviolet, infrared and visible wavelengths, the site must satisfy the minimum standard for a dark optical astronomy site as specified by the International Dark Sky Association (IDSA), namely that, at an elevation of 45 degrees, there is no direction in which the night sky brightness exceeds that due to natural phenomena by more than 10%.
- (4) The area to be declared must:
 - (a) Be used for the advancement of astronomy for national purposes and not for recreational or commercial purposes.
 - (b) Be suitable and used to develop skills, capabilities and expertise of those engaged in astronomy and related scientific endeavours.
 - (c) Have the potential for measures to advance astronomy and related scientific endeavours.
 - (d) Be suitable for undertaking astronomy projects of national strategic importance.

CHAPTER 4

Protection of astronomy advantage areas

Optical astronomy

5.

Once an area has been declared an astronomy advantage area for the purposes of optical astronomy and related scientific endeavours, it will be protected from detrimental optical interference.

Core optical astronomy advantage area

6.

- (1) Astronomical activities on the site and adjacent areas within 3 kilometres radius are controlled by the operating institution, with the adjacent areas covered by cooperative agreements.
- (2) Activities of those admitted to the site will be under the control of the management authority in coordination with the operating institution, these activities shall include but not be limited to-
 - a) Light emission
 - b) Any activity that produces dust, smoke or equivalent pollution as may be determined by the management authority.
- (3) For the protection of optical astronomy, no additional outdoor lighting may be installed in the core astronomy advantage area without the permission of the management authority in coordination with the operating institution.
- (4) Monitoring of sky brightness and transparency will be carried out on the observing plateau of the site, using the 0.5m telescope and photometer and/or a standard telescope provided through the International Dark-sky Association.

Central optical astronomy advantage area**7.**

- (1) All developments including industrial, domestic, sporting, cultural and tourism shall be subject to standards determined by the management authority to assess potential impact on the observing conditions at the core site.
- (2) All new outdoor lighting fittings and fixtures to be converted to lower power, full cut-off devices so as to minimise night sky pollution.
- (3) The lighting should not permit more than 0.8% of the total flux to be emitted in the upper hemisphere for illuminations less than 15000 lumens.
- (4) Outdoor light fixtures, or arrays of light fixtures, emitting more than 800 lumens should not emit more than 0.8% of the total flux in the upper hemisphere.
- (5) Lighting should be low pressure sodium.
- (6) Conversion of existing outdoor lighting facilities will be coordinated with the management authority through the relevant municipalities.
- (7) Open cast mining is prohibited.
- (8) Other mining and construction activities shall be agreed to with the management authority after the receipt of assessment.
- (9) All outdoor light fittings and fixtures to be converted to full cut off devices conforming in the case of street lighting to illumination levels no higher than those specified by SANS 10998-1, so as to minimise night sky pollution.
- (10) Activities which detrimentally interfere with optical astronomy by affecting the sky brightness and/or sky transparency as measured at the Sutherland observing site as described in 6(4) must be mitigated immediately as agreed with the management authority so as to end the detrimental interference.

Coordinated optical astronomy advantage area**8.**

- (1) Municipalities shall develop plans to reduce external lightning by moving to lower power, high efficiency public lighting with lower impact on sky brightness. In the case of street lighting, roads should be no more brightly lit than specified by SANS 10998-1 (at the end of the recommended replacement cycle for lamps). In new projects, full cut-off or cut-off luminaires should be used at zero rake angle. Existing lighting should be replaced with high-efficiency luminaires (cut-off where practical, semi cut-off where expense and pole spacing make cut-off luminaires impractical).
- (2) Municipalities shall develop plans to minimise external sporting, cultural and advertising lighting by using the full cut off fixtures and/or cut-off fixtures. Billboards and structures may not be lit from below if more than 5% of the light will reach the sky.
- (3) The management authority and Municipalities shall develop regulations requiring commercial and security lighting to use cut-off fixtures, in cooperation with the management authority.
- (4) The management authority and Municipalities shall develop plans to minimise large scale dust and smoke pollution that might reach the Sutherland core optical astronomy advantage area.
- (5) Pursuant to sections (1)(2)(3), and (4) the municipalities will concur with the management authority.

Radio Astronomy protection requirements**9.**

- (1) Once an area has been declared an astronomy advantage area for the purposes of radio astronomy and related scientific endeavours, measures for protection from detrimental radio interference will be applied as provided for in regulations applicable to the specific areas.
- (2) Protection levels shall be enforced on any new radio frequency services operating within the specified frequency ranges for the particular areas and on the existing radio frequency services operating within the specified frequency ranges for the particular areas with the proviso that concessions may be granted as prescribed in these regulations.
- (3) The implementation of protection for radio astronomy observations and assessment of existing or planned transmissions will be carried out in two phases
 - (a) Initial period in which all existing transmissions need to be authorised or coordinated by the management authority including any existing new requirements for transmission or upgrading.
 - (b) An ongoing process to deal with new requirements and upgrading which involves increased radiation levels towards the specified centre of core astronomy advantage area.

Core radio astronomy advantage areas**10.**

- (1) Radiocommunications with transmitters located within the core radio astronomy advantage areas which operate within specified frequency bands are declared activities that may only be undertaken as prescribed in any Astronomy Geographic Advantage Act regulations.

- (2) No fixed transmitting stations operating within the specified frequency spectrum may be located in the core radio astronomy advantage area.
- (3) Any existing transmitter stations operating within the specified frequency spectrum within the core radio astronomy advantage area will have to be relocated to a location outside the core radio astronomy advantage area.
- (4) No terrestrial mobile or portable transmitting devices may be brought into the core radio astronomy advantage area unless it has been authorised by the management authority or by a person delegated by the management authority.
- (5) All electrical and electronic equipment brought into the core radio astronomy advantage area must comply with electromagnetic compatibility requirements and on site usage policies and guidelines as determined by the management authority or by a person delegated by the management authority.

Central radio astronomy advantage areas

11.

- (1) Radiocommunications with transmitters located within the central radio astronomy advantage areas which operate within specified frequency bands are declared activities that may only be undertaken as prescribed in any Astronomy Geographic Advantage Act regulations;
- (2) All transmitters located or to be located within central radio astronomy advantage areas shall be subject to authorisation by the management authority on an individual basis and in accordance with the following:
 - (a) Only transmissions within frequency bands authorised for radio communication within the central radio astronomy advantage

area will be considered for authorisation of the individual transmissions by the management authority.

- (b) The impact of spurious emissions such as harmonic and intermodulation products will be taken into account during the authorisation process.
- (c) The radio frequency interference impact at the specified reference point of a core radio astronomy advantage area from any transmission must not exceed a specific threshold level prescribed unless exemption has been granted, in which case a concessionary level will be determined.
- (d) No transmission causing interference which saturates radio astronomy receiving equipment located within a core radio astronomy advantage area will be authorised.
- (e) In the event that an essential or safety-of-life radio communication service transmission within the central radio astronomy advantage area is involved and the transmission design has been optimised to minimise the radio frequency interference impact to the maximum extent feasible exemption will be granted and the transmission and its characteristics will be authorised.
- (f) Essential and safety-of-life radio communication services within a central radio astronomy advantage area will be determined by the management authority in consultation with the relevant entities and in accordance with the procedures prescribed in section 14 of the regulations.

Authorisation process for radio communications transmissions in central radio astronomy advantage areas

12.

- (1) The authorisation process, including assessments will be done by the management authority in concurrence with ICASA where required by the Act
- (2) The authorisation process will be conducted in two stages-
 - a) The once off stage which will deal with all existing transmissions and existing requirements for new transmissions and upgrades.
 - b) The ongoing process which will deal with the need for new transmissions and upgrading when required.
- (3) In conducting the once off stage which deals with all existing transmissions and existing requirements for new transmissions, the management authority will –
 - (a) Require the submission of specified data for all existing transmissions at stations located within the central radio astronomy advantage area.
 - (b) If there are plans for the transmissions or changes at the time of making submissions to existing submissions to increase radiated power in the direction of the core astronomy advantage area, this data must be submitted at the same time but must be listed and identified separately.
 - (c) The management authority may decide to allocate different dates on which submissions are to be made by different licensed operators involved in the central radio astronomy advantage area.
 - (d) The management authority must publish the submission schedule 30 days in advance of the first submission.
 - (e) The submissions need to be made within 30 working days after the publication of the schedule or on a date determined for a particular entity.

- (f) The schedule must be published in the form of a notice in the gazette.
- (g) The required data must be submitted in comma delimited ascii file format.
- (h) The data required is specified in the following sub items—
 - I. The carrier frequency for the signal to be assessed in MHz to 4 decimals.
 - II. A unique reference number, not exceeding ten characters or numerals or a mix thereof, for each comprehensive signal transmitted on the particular carrier frequency.
 - III. The entity or person licensed or exempted to transmit the signal.
 - IV. The station name where the transmission takes place.
 - V. The geographical coordinates for the mast or structure on which the transmitting antenna is located at the station in degrees up to six decimals.
 - VI. The height above sea level of the mast or structure base (ground level) in metres.
 - VII. The height of the transmitting antenna above ground level referred to in subsection VI, in metres
 - VIII. The effective isotropic radiated power (eirp) level in the direction of the specified reference point in the core astronomy advantage area in dBm.
 - IX. The polarisation of the transmitted signal.
 - X. The bandwidth of the transmitted signal.
- (i) The submissions of similar radio communication services using common transmission sites will be dealt with concurrently.
- (4) The assessment of submissions will be carried out by the management authority as follows:
 - (a) The assessment will be carried out by means of a computerised system which uses scientific methods recommended by the ITU

and which calculates the signal level at the specified reference point in the core radio astronomy advantage area.

(b) Any options provided for in the ITU recommendations will be agreed upon in advance by the management authority and the relevant entities.

(c) The calculated signal will be compared to the prescribed protection level, and the licensed operator or licence exempt operator of the transmitter which produces the signal will be informed in writing of the outcome of the assessment by the management authority.

(d) If the calculated signal level does not exceed the prescribed protection level, the management authority will authorise the transmission in writing within a period of 90 working days from the date on which the submission was made, and provide the licensed operator or licence exempt operator with the authorisation reference number and authorisation date.

(e) If the calculated radio frequency interference signal exceeds the prescribed protection level, the management authority will inform the licensed operator or licence exempt operator in writing within a period of 90 working days from the date on which the submission was made.

(f) The operator must investigate and consider methods to reduce the signal level to the prescribed protection levels and inform the management authority within a period of 30 working days from the date on which the notice in subsection (e) was given of the outcome of the study and the new transmission data that will be applied.

(g) The new transmission characteristics must be implemented within 90 working days of acceptance thereof by the management authority or as otherwise mutually agreed if only changes to an existing transmitting installation are required.

- (h) If the transmitter needs to be relocated or shut down it must be done within a period of 9 months or as otherwise mutually agreed.
- (i) If a signal exceeding the prescribed protection level relates to an essential service and cannot be reduced without negatively affecting service delivery, the licensed operator or licence exempt operator must submit to the management authority the motivation and technical arguments as to why the signal level cannot be reduced and request that a minimum required level of transmission which causes an excessive signal be authorised.
- (j) The management authority will deal with the request referred to in subsection (i) as follows:
 - I. Give due consideration to the request, consult with ICASA, and provide its decision within a period of 30 working days.
 - II. If the request to authorise transmission for an essential service which exceeds the prescribed protection level is turned down, the management authority will inform the operator in writing of its decision and the reasons thereof within a period of 30 working days after the request was submitted.
- (5) In conducting an ongoing process which deals with the need for new transmissions and upgrading when required, the management authority requires that –
 - (a) A request for authorisation is made when the planning is carried out by the licensed operator or licence exempt operator and before any implementation takes place.
 - (b) The data must be submitted in comma delimited ascii file format
 - (c) The data must include the following –
 - i. The carrier frequency for the signal to be assessed in MHz to 4 decimals.

- ii. A reference number, not exceeding ten characters or numerals or a mix thereof, for each comprehensive signal transmitted on the particular carrier frequency.
 - iii. The entity or a person licensed or exempted to transmit the signal.
 - iv. The station name where the transmission takes place.
 - v. The geographical coordinates for the mast or structure on which the transmitting antenna is located in degrees up to six decimals.
 - vi. The height above sea level of the mast or structure base (ground level) in metres.
 - vii. The height of the transmitting antenna above the ground level referred to subsection 6 in metres.
 - viii. The effective isotropic radiated power level in the direction of the specified reference point in the core astronomy advantage area in dBm.
 - ix. The polarisation of the transmitted signal.
 - x. The bandwidth of the transmitted signal.
- (6) The assessment of the submissions will be carried out by the management authority as follows:
- (a) The assessment will be carried out by the means of a computerised system which uses scientific methods recommended by the ITU and calculates the signal level at the specified reference point in the core radio astronomy advantage area.
 - (b) Any options provided for in the ITU recommendations will be agreed upon in advance by the management authority and the relevant entities.
 - (c) The calculated signal level will be compared to the prescribed protection level, and the licensed operator or licence exempt operator of the transmitter which produces

signal will be informed in writing of the decision of the management authority.

(d) If the calculated signal level does not exceed the prescribed protection level, the management authority will authorise the transmission in writing within a period of 90 days after the date on which the submission was made.

(e) The management authority will provide the licensed operator or licence exempt operator with an authorisation reference number and the authorisation date.

(f) If the calculated signal level exceeds the prescribed protection level, the management authority will inform the licensed operator or licence exempt operator in writing within a period of 90 working days from the date on which the submission was made.

(g) The licensed operator or licence exempt operator will be afforded an opportunity to review the planned transmission and resubmit the request with the revised data which is meant to result in a transmission complying with the prescribed protection level.

(h) If the signal exceeding the prescribed protection level relates to an essential or a safety-for-life service, and cannot be sufficiently reduced without negatively affecting service delivery, the licensed operator or licence exempt operator must submit a motivation and technical arguments as to why the signal level cannot be reduced and request that the minimum required level of transmission which causes an excessive signal level be authorised.

(i) In dealing with the request referred to in subsection (h) the management authority will give due consideration to the request, consult with ICASA and provide its decision within a period of 30 working days after the request was made.

- (j) If the request referred to in subsection (h) is turned down, the management authority will inform the operator of its decision and the reasons thereof within 30 working days after the request was made.
- (7) Authorised transmitters and their transmission characteristics will be entered into a database for the central radio astronomy advantage area.
- (8) The detailed information to be accommodated in the database will be in accordance with the information required for the assessment process.

Authorisation process for frequency bands to be used for radio communication in the central radio astronomy advantage area

13.

- (1) The authorisation process will be carried out in two phases-
- (a) The first phase will be a once off process where the frequency bands required at that particular time will be determined.
- (b) The second phase will be an ongoing process where the requirement for the use of additional frequency bands can be requested.
- (2) In conducting the once off process referred to in subsection (1)(a), the management authority will publish a list of frequency bands that are in current use.
- (3) The request will be made for written representations on the frequency bands list and proposals included in the publication which must be made within a period of 30 working days.
- (4) The list will be compiled with the existing licensed operators or licence exempt operators who have transmitters in the central radio astronomy advantage area.

- (5) The published list may include proposals for the consolidation of small fragments of spectrum being used in the central astronomy advantage area.
- (6) The management authority will consult ICASA on the frequency bands included in the list.
- (7) The management authority will consider the representations received and may request additional information.
- (8) After consideration, the management authority will authorise the frequency bands that may be used for transmitters located within the central astronomy advantage area.
- (9) The management authority will publish the list of authorised frequency bands in the gazette within 90 working days from the closing date for representations.
- (10) The ongoing process referred to in subsection (1)(b) will resume by requests being made to the management authority at any time after a period of 12 months after the conclusion of phase one referred to in subsection(1)(a).
- (11) The request may be for the extension of frequency bands being used which were previously authorised or new frequency bands within the prescribed radio astronomy frequency spectrum.
- (12) The management authority will consider the requests and publish them in the gazette for comment by interested parties within a period of 30 working days.
- (13) The management authority may request additional information when considering the representations.
- (14) Subsequent to this process the management authority will consult with ICASA on the frequency bands to be included in the list.
- (15) After consideration of the representations, the management authority will publish the amended frequency band list in the gazette within a period of 60 working days after the representations referred to in subsection 12.

Determination of essential and safety-of-life radio communication services in the Central Radio Astronomy Advantage Area

14.

- (1) The essential and safety-of-life radio communications services to be determined by the management authority are those that are operated from the electronic communications stations located within a central radio astronomy advantage area.
- (2) Radio communication services would be declared as essential or safety-of-life services within central radio astronomy advantage areas by notice in the Gazette.
- (3) An essential radio communication service is not an essential radio communication service if a functionally suitable alternative exists that complies with the radio astronomy protection requirements.
- (4) Transmitted electromagnetic energy and its coverage need to be minimised and focused on the communities or infrastructure being served.

Coordinated radio astronomy advantage areas

15.

- (1) Radio communications with transmitters located within coordinated radio astronomy advantage areas which operate within specified frequency bands and at radiated powers exceeding specified levels are identified activities which must be coordinated as prescribed in any Astronomy Geographic Advantage Act regulations.
- (2) All transmissions within coordinated astronomy advantage areas within the specified frequency bands and exceeding specified power levels must be coordinated to ensure that the radio

frequency interference caused is below the applicable specified protection level or alternatively is reduced to an agreed level.

Coordination Process

16.

- (1) The coordination process will be conducted in two phases-
 - (a) In phase 1 all existing transmissions and existing plans for new transmissions and upgrades will be attended to as a once off process.
 - (b) In phase 2 the needs for new transmissions and upgrades will be attended to when required as an ongoing process.
- (2) The first phase will take place as follows-
 - (a) The management authority will require the submission of specified data for all existing transmissions at stations located within the coordinated radio astronomy advantage areas.
 - (b) If there are plans for new transmissions or changes at the time of making the submissions to existing transmissions to increase radiated power in the direction of the specified reference point in a core astronomy advantage area, the data must be submitted at the same time but must be listed and identified separately.
 - (c) The management authority may decide to allocate different dates on which submissions are to be made by different licensed operators involved in the coordinated astronomy advantage area.
 - (d) The management authority must publish the submission schedule 30 working days in advance of the first submission.
 - (e) The required submissions must be made within 30 working days after the publication of the notice.
 - (f) The data must be submitted in comma delimited ascii file format
 - (g) The data required must include –
 - I. The carrier frequency for the signal being assessed in MHz to 4 decimals.

- II. A reference number, not exceeding ten characters or numerals or a mix thereof, for each comprehensive signal transmitted on the particular carrier frequency.
 - III. The entity or a person licensed or exempted to transmit the signal.
 - IV. The station name where the transmission takes place.
 - V. The geographical coordinates for the mast or structure on which the transmitting antenna is located at the station in degrees up to six decimals.
 - VI. The height above sea level of the mast or structure base (ground level) in metres.
 - VII. The height of the transmitting antenna above the ground level referred to in subsection (VI) in metres.
 - VIII. The effective isotropic radiated power level in the direction of the specified reference point in the core astronomy advantage area in dBm.
 - IX. The polarisation of the transmitted signal.
 - X. The bandwidth of the transmitted signal.
- (h) The management authority will assess the submissions as follows:
- I. The assessment will be carried out by means of a computerised system which uses scientific methods recommended by the ITU and calculates the signal level at the reference point in the core radio astronomy advantage area.
 - II. Any options provided for in the ITU recommendations will be agreed to in advance by the management authority with relevant entities.
 - III. The calculated signal level will be compared to the prescribed protection level and the licensed operator of the transmitter will be informed in writing of the results.

- (i) If the calculated signal level does not exceed the prescribed protection level, the licensed operator or licence exempt operator will be informed in writing within a period of 90 working days after the date on which the submission was made.
- (j) The management authority will provide the licensed operator or licence exempt operator with the coordination reference number and the coordination date.
- (k) If the calculated radio frequency interference signal exceeds the prescribed protection level, the management authority will inform the licensed operator or licence exempt operator in writing within a period of 90 working days from the date which the submission was made.
- (l) The licensed operator or licence exempt operator will investigate and consider the methods to reduce the signal level to the prescribed protection level and inform the management authority within a period of 30 working days after the date on which the response was requested, of the outcome of the study and the new transmission data that will be applied.
- (m) The new transmission characteristics must be implemented within 90 working days of acceptance thereof by the management authority or as otherwise mutually agreed if only changes at an existing transmitting installation are required.
- (n) If the transmitter is to be shut down or relocated, implementation must occur within a period of nine months after acceptance of the new transmission characteristics by the management authority, or within a time mutually agreed to.
- (o) If a signal exceeding the prescribed protection level cannot be reduced sufficiently without negatively affecting service delivery, the licensed operator or licence exempt operator must submit a motivation and technical arguments why the signal level cannot be reduced and request that the minimum required

level of transmission which causes an excessive signal be given coordinated status.

(p) In considering a request to give coordinated status to an excessive signal received, the management authority will deal with the matter as follows-

- I. Give due consideration to the request, consult ICASA, and provide its decision within a period of 90 working days after receipt of the request.
- II. If the motivation and technical arguments are acceptable, the licensed operator or licence exempt operator will be notified in writing that the coordination has been successful.
- III. Enter the applicable transmission data and the coordination reference number and date into the database within a period of 30 working days after the decision was taken.

(3) The second phase will take place as follows –

(a) The requests for coordination must be made when planning is carried out by the licensed operators or licence exempt operators before any implementation.

(b) The data must be submitted in a comma delimited ascii file format

(c) The data must include the following –

- I. The carrier frequency for the signal being assessed in MHz to 4 decimals.
- II. A unique reference number, not exceeding ten characters or numerals or a mix thereof for each comprehensive signal transmitted on the particular carrier frequency.
- III. The entity or person licensed or exempt to transmit the signal.

- IV. The station name where the transmission takes place.
- V. The geographical coordinates for the mast or structure on which the transmitting antenna is located in degrees up to six decimals.
- VI. The height above sea level of the mast or structures base (ground level) in metres.
- VII. The height of the transmitting antenna above ground level referred to in subsection (VI) in metres.
- VIII. The effective isotropic radiated power level in the direction of the specified reference point in the core astronomy advantage area in dBm.
- IX. The polarisation of the transmitted signal.
- X. The bandwidth of the transmitted signal.

(d) The management authority will assess the submissions as follows-

- I. The assessment will be carried out by means of computerised system which uses scientific methods recommended by the ITU and calculate the signal level at the reference point in the core radio astronomy advantage area.
- II. Any options provided for in the ITU recommendation will be agreed upon in advance by the management authority and the relevant entities.
- III. The calculated signal level will be compared to the prescribed protection level and the licensed operator or licence exempt operator of the transmitter will be informed in writing of the results.

(e) If the calculated signal level does not exceed the prescribed protection level, the management authority will notify the licensed operator or licence exempt operator in writing within a period of 90 working days after the date on which the submission was made.

- (f) The management authority will provide the licensed operator or licence exempt operator with a coordination reference number and the coordination date.
 - (g) If the calculated signal level exceeds the prescribed protection level, the management authority will inform the licensed operator or licence exempt operator in writing within a period of 90 working days from the date on which the submission was made.
 - (h) The licensed operator or licence exempt operator will be afforded an opportunity to review the planned transmission and resubmit the request with the revised data which is meant to result in a transmission complying with the prescribed protection level.
 - (i) if a signal exceeding the prescribed protection level cannot be reduced sufficiently without negatively affecting service delivery, the licensed operator or licence exempt operator must submit a motivation and technical arguments why the signal level cannot be reduced, and request that the minimum required level of transmission which causes an excessive signal be given coordinated status.
 - (j) In dealing with the request for coordinated status of an excessive signal, the management authority will –
 - I. Give due consideration to the request, consult ICASA and provide its decision within 90 working days after the request was received.
 - II. If the motivation and technical arguments are satisfactory, the licensed operator or licence exempt operator will be notified in writing that the coordination has been successful.
 - III. Enter the applicable transmission data and the coordination reference number and date into database within a period of 30 working days after the decision was made.
- (4) Coordination results for transmitters and their transmission characteristics will be entered into an electronic database for the coordinated radio astronomy advantage area.

- (5) The detailed information to be accommodated will be in accordance with the information required for the assessment process referred to in subsection (3).

CHAPTER 5

Access to core astronomy advantage areas

Optical astronomy

17.

- (1) When an area has been declared as a core astronomy advantage area for the purpose of optical astronomy and related scientific endeavours, access to such an area will be controlled by the management authority.
- (2) The management authority or person delegated by the management authority will determine and authorise personnel to access to the core optical astronomy advantage area for the purposes of optical astronomy and related scientific endeavours.
- (3) Access to the core optical astronomy advantage area will be in accordance with the management authority's internal rules.
- (4) No unauthorised persons will have access to the core optical astronomy advantage area designated for the purposes of optical astronomy and scientific related endeavours.
- (5) In granting authority to access the core optical astronomy advantage area, the management authority will impose conditions on persons entering the area.
- (6) No person entering the core optical astronomy advantage area will have in their possession any device, equipment or instrument which may cause detrimental optical interference.
- (7) Permissible time to access the core optical astronomy advantage area will be determined by the management authority.

Radio astronomy

18.

- (1) When an area has been declared as a core radio astronomy advantage area for the purpose of radio astronomy and related scientific endeavours, access to such an area will be controlled by the management authority or by a delegated person.
- (2) The management authority or a person delegated by the management authority will determine and authorise personnel to access the core radio astronomy advantage area for the purposes of radio astronomy and related scientific endeavours.
- (3) Access to the core radio astronomy advantage area will be in accordance with the management authority internal rules.
- (4) No unauthorised persons will have access to the core radio astronomy advantage area for the purposes of radio astronomy and related scientific endeavours.
- (5) In granting authority to access the core radio astronomy advantage area, the management authority will impose conditions on persons entering the area.
- (6) No person entering the core radio astronomy advantage area will have in their possession any device, equipment or instrument which may cause detrimental radio interference on radio astronomy and related scientific endeavours.
- (7) Permissible time to access the core radio astronomy advantage area will be determined by the management authority or a delegated person.

CHAPTER 6

Offences and Penalties

General offences and penalties

19.

- (1) Any person who contravenes these regulations maybe found guilty of an offence in terms of section 52(1) of the Act.
- (2) Any person found guilty of an offence in terms of subsection 1 shall be held liable in terms of section 52(2) of the Act.

CHAPTER 7

General

Review of the regulations

20.

These regulations may from time to time be reviewed.

Short title

21.

These regulations are called the Astronomy Advantage Areas Regulations.

NOTICE 117 OF 2009**NOTICE OF INTENTION TO MAKE REGULATIONS REGARDING THE KAROO RADIO ASTRONOMY ADVANTAGE AREA FOR THE MeerKAT RADIO TELESCOPE**

The Minister of Science and Technology hereby gives notice of intention to make regulations in the schedule in terms of section 50 read with sections 7,9 and 11 of the Astronomy Geographic Advantage Act, 2007(Act No. 21 of 2007), in respect of the MeerKAT radio telescope, which are hereby published for public comment under section 42 of the said Act.

Interested persons are hereby invited to submit written comments or written representations with regard to the proposed regulations not later than 16h30 on the 6th of March 2009. For the attention of:

Ms Lipuo Mothae
Dept of Science and Technology
Building 53, CSIR Campus
Meiring Naude Road
Brummeria
Pretoria

Or

Dept of Science and Technology
Private Bag X894
Pretoria
0001

Or

E mail address lipuo.mothae@dst.gov.za

Enquiries can be made at telephone number 012 843 6463

M MANGENA



MINISTER OF SCIENCE AND TECHNOLOGY.

SCHEDULE**ARRANGEMENT OF REGULATIONS****Subject**

Definitions

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Scope of regulation 2

Specific protection requirements 3

Karoo core radio astronomy advantage area 4

Karoo central radio astronomy advantage area 5

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Karoo central radio astronomy advantage area map

Annexure B

Karoo coordinated radio astronomy advantage area 1 map

Annexure C

Karoo coordinated radio astronomy advantage area 2 map

Definitions

In these regulations any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned and, unless the context otherwise indicates__-

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

“Detrimental radio interference” means radio frequency interference which endangers or obstructs the functioning of astronomy devices and impacts negatively on the related scientific endeavours.

“RAS” means Radio Astronomy Services.

“Saturation” means a phenomenon that occurs in radio receivers by which they cease operation when high level of electromagnetic energy reaches the receiver, independent of the frequency.

Purpose of regulations**1.**

- (1) To provide for the protection of the Karoo radio astronomy advantage areas in the context of their use for the MeerKAT radio telescope.
- (2) For effective protection purpose these regulations must be read together with other regulations of astronomy advantage areas.

Scope of regulation**2.**

These regulations apply to the Karoo radio astronomy advantage areas which will be used for the MeerKAT radio telescope.

Specific protection requirements**3.**

- (1) Protection for Karoo radio astronomy advantage areas in the Northern Cape against detrimental radio frequency interference is based on specified protection levels at the reference point within the Karoo core radio astronomy advantage area located at geographical coordinates 21.388000 degrees East and 30,71480 degrees South.
- (2) The designated frequency spectrum within which radio astronomy observations will be carried out and which needs protection is the continuous spectrum from 500 MHz to 10.0 GHz.
- (3) In the event of saturation in the radio astronomy receiving equipment causing malfunctioning of the equipment due to the received signals from transmitters operating on frequencies below 500 MHz band exceeding -120 dBm/Hz, then the transmitting installations involved will have to be relocated or its transmission characteristics changed to reduce the signals causing the saturation to below -120 dBm/Hz.

- (4) The requirement in subsection (3) will take precedence over any other requirement with respect to protection which may imply a concession on the need to avoid saturation.
- (5) The protection levels to be applied in connection with all the Karoo radio astronomy advantage areas, to which these regulations are applicable, are as follows:

(a) The protection levels are derived using the methodology described in ITU Recommendation ITU-R RA.769-2.

(b) The technical assumptions made in the derivation are that receiver and sky temperatures are linearly interpolated from those values found in ITU-R RA.769-2, and that receiver bandwidth is assumed to be 10% of the observing frequency.

(c) Derived protection levels, which are equivalent to threshold levels of interference for new generation radio astronomy observatories and based on the methodology outlined in ITU-R RA.769-2, are specified in Figure 1.

(d) A linearly piecewise function is defined as the South African RAS (SARAS) protection level. This function is described by the following equations, which are to be used to calculate the required protection level at any frequency in the spectrum from 500 MHz to 10 000 MHz:

$$SARAS [dBm / Hz] = -17.2708 \log_{10}(f) - 197.0714, \quad f < 2 \text{ GHz}$$

$$SARAS [dBm / Hz] = -0.065676 \log_{10}(f) - 253.8661, \quad f \geq 2 \text{ GHz}$$

The values of (f) are to be in MHz

(e) The South African protection levels are reflected in Figure 1 below together with the ITU interpolated continuum threshold levels of interference.

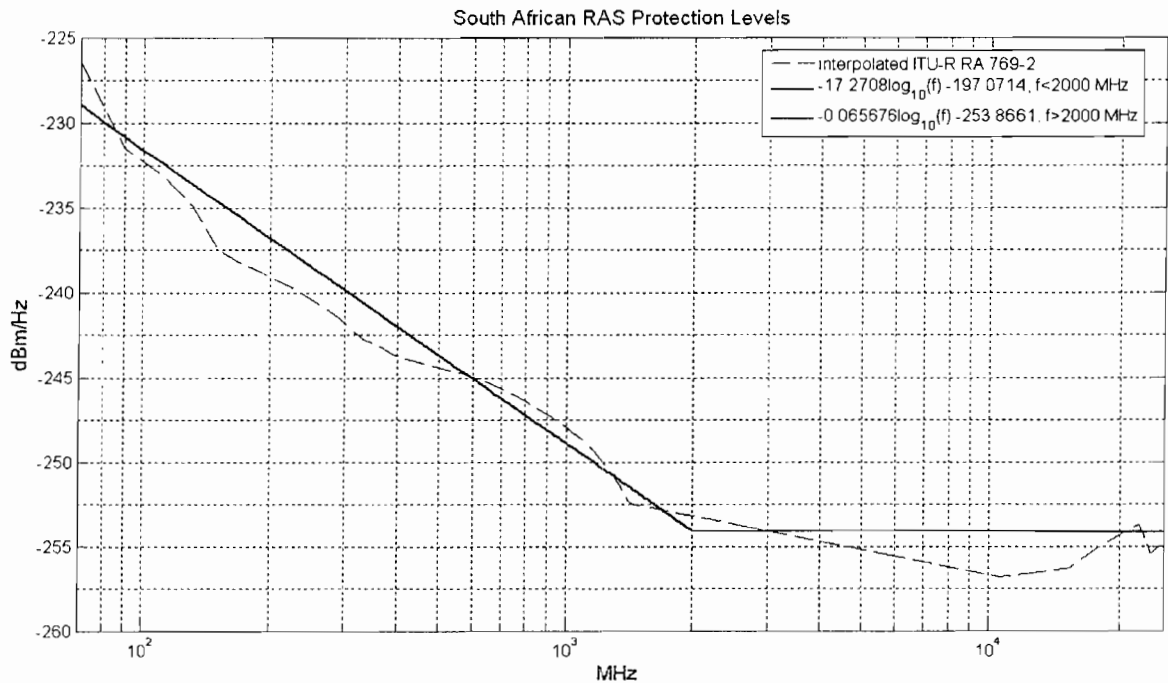


Figure 1: South African Radio Astronomy Service Protection Levels

(f) Due to the variety of units used within the electronic communications sector, the following list of unit conversions is provided (assuming an isotropic radiator).

$$dB(W / m^2 / Hz) \rightarrow dBm : SPFD - 20 \log_{10}(f) + 10 \log_{10}(\Delta f) + 188.5$$

$$dBm \rightarrow dBm / Hz : dBm - 10 \log_{10}(\Delta f)$$

$$dBW \rightarrow dBm : dBW + 30$$

$$dBW \rightarrow dB(W / m^2) : dBW + 20 \log_{10}(f) - 158.5$$

The values of "f" and "Δf" are to be in MHz

- (6) The radio frequency interference impact assessment will be carried out on the signal level received or predicted at the common reference point within the Karoo core radio astronomy advantage area at the height of 10 metres.

Karoo core radio astronomy advantage area

4.

- (1) The Karoo core radio astronomy advantage area to which these regulations are applicable has been declared in the Gazette number xxxx and in accordance with section 7(1)(a) of the Act.
- (2) Radio communications with transmitters located within the Karoo core radio astronomy advantage area which operate within the frequency band from 500 MHz to 10.0 GHz are declared activities that may only be undertaken as prescribed in these regulations.
- (3) No fixed transmitting stations operating within the frequency spectrum from 500 MHz to 10.0 GHz may be located in the Karoo core radio astronomy advantage area.
- (4) Any existing transmitter stations operating within the frequency spectrum from 500 MHz to 10.0 GHz within the Karoo core radio astronomy advantage area will have to be relocated to a location outside the Karoo core radio astronomy advantage area.

Karoo central radio astronomy advantage areas

5.

- (1) The Karoo central radio astronomy advantage areas to which these regulations are applicable have been declared in the Gazette number xxxx and in accordance with section 9(1)(a) of the Act;
- (2) Radio communications with transmitters located within the Karoo central radio astronomy advantage areas which operate within the frequency band from 500 MHz to 10.0 GHz are declared activities that may only be undertaken as prescribed in these regulations;
- (3) The geographical extent of the Karoo central radio astronomy advantage areas as defined in the declaration are the areas beyond the Karoo core radio astronomy advantage area and within the outer geographical boundaries of the areas referred to as Karoo central radio astronomy advantage areas 1, 2 and 3.
- (4) Karoo central radio astronomy advantage area 1 shall apply to the frequency band 500 to 1710 MHz.

- (5) Karoo central radio astronomy advantage area 2 shall apply to the frequency band 1710 to 6000 MHz
- (6) Karoo central radio astronomy advantage area 3 shall apply to the frequency band 6000 MHz to 10.0 GHz.
- (7) Frequency bands within the radio astronomy band from 500 MHz to 10.0 GHz to be authorised for radio communication within the Karoo central radio astronomy advantage areas will be determined by the management authority in consultation with the entities involved according to prescribed procedures.
- (8) The radio frequency interference impact at the Karoo core radio astronomy advantage area reference point specified in section 3(1) from any transmission within the specified frequency band must not exceed the threshold level prescribed in section 3(5) unless exemption has been granted, in which case a concessionary protection level will be determined.

Karoo coordinated radio astronomy advantage areas

6.

- (1) The Karoo coordinated radio astronomy advantage areas to which these regulations are applicable have been declared in the Gazette number xxxx and in accordance with section 11(1)(a) of the Act.
- (2) Radio communications with transmitters located within the Karoo coordinated radio astronomy advantage areas which operate within the specified frequency band from 500 to 6000 MHz are identified activities that may only be undertaken as prescribed in these regulations;
- (3) The geographical extent of the Karoo coordinated radio astronomy advantage areas are defined in the declaration and are the areas:
 - (a) Between Karoo central radio astronomy advantage area 1 outer boundary and the borders of the Northern Cape, excluding Municipality

Sol Plaatje, for the frequency band from 500 to 1710 MHz and for transmissions with an effective radiated power exceeding 60 dBm.

(b) Between Karoo central radio astronomy advantage area 2 outer boundary and Karoo central radio astronomy advantage area 1 outer boundary for the frequency band from 1710 to 6000 MHz and for transmissions with an effective radiated power exceeding 60 dBm.

- (4) All the transmissions within the coordinated astronomy advantage areas as specified in subsection (3) must be coordinated to ensure that the radio frequency interference caused is below the applicable protection level prescribed in regulation 3(5) or alternatively be reduced to an agreed level.

Offences and penalties

7.

- (1) Any person who contravenes these regulations may be found guilty of an offence in terms of section 52(1) of the Act.
- (2) Any person found guilty of an offence in terms of subsection (1) shall be held liable in terms of section 52(2) of the Act.

Review of the regulations

8.

These regulations may from time to time be reviewed.

Repeal of regulations

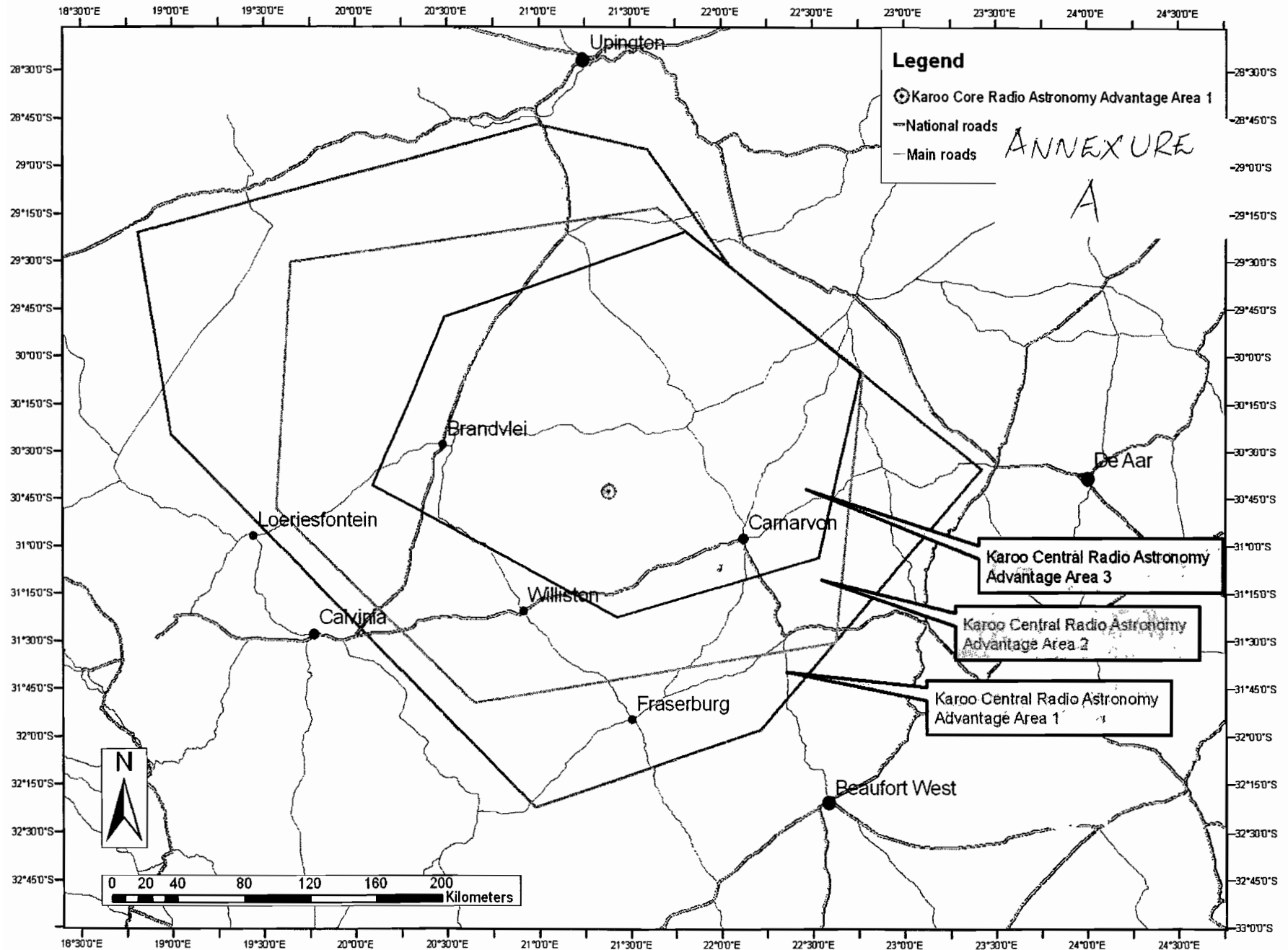
9.

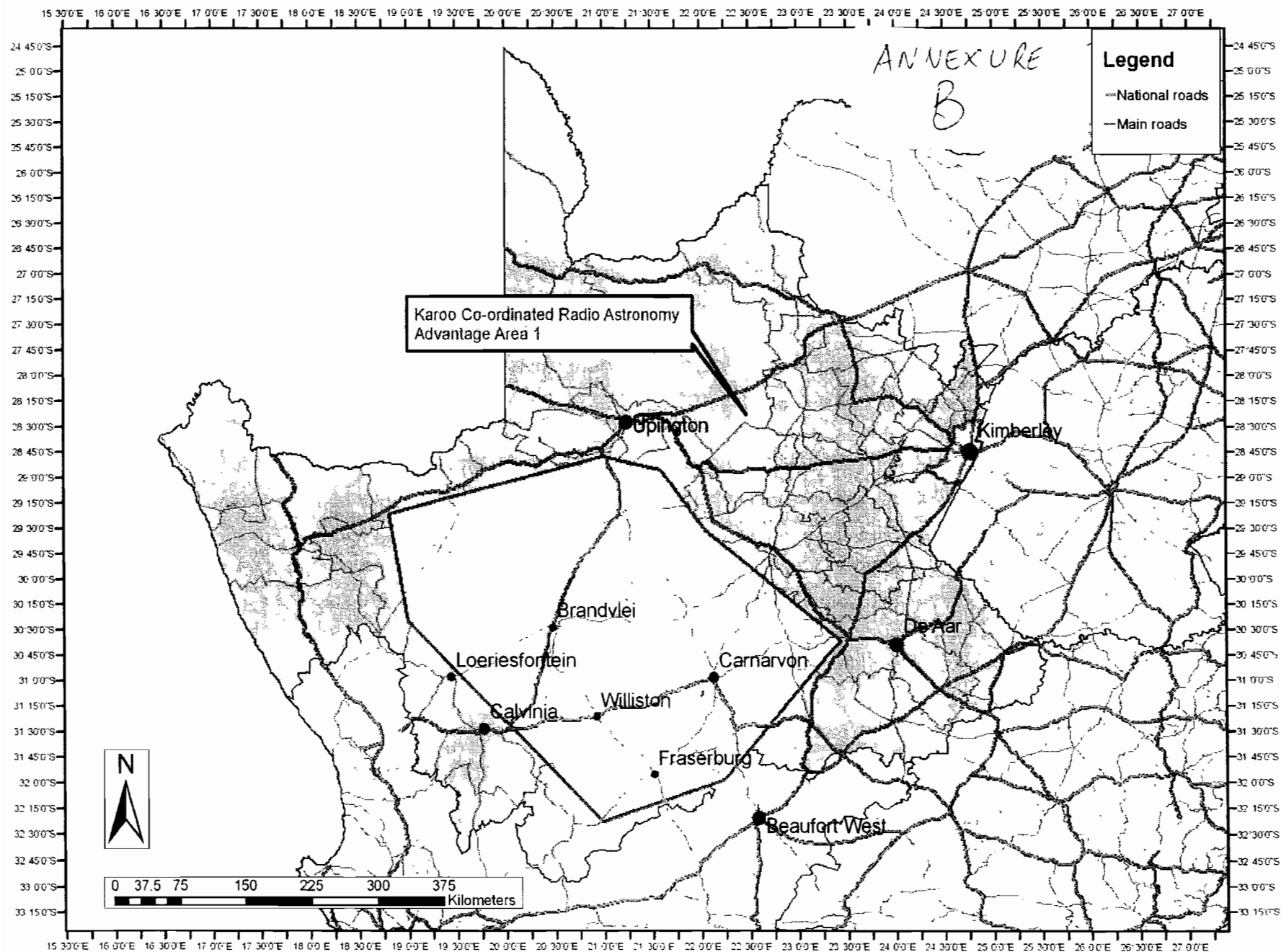
- (1) These regulations will be repealed by the commencement of the regulations of the Karoo radio astronomy advantage areas for Square Kilometre Array radio telescope.

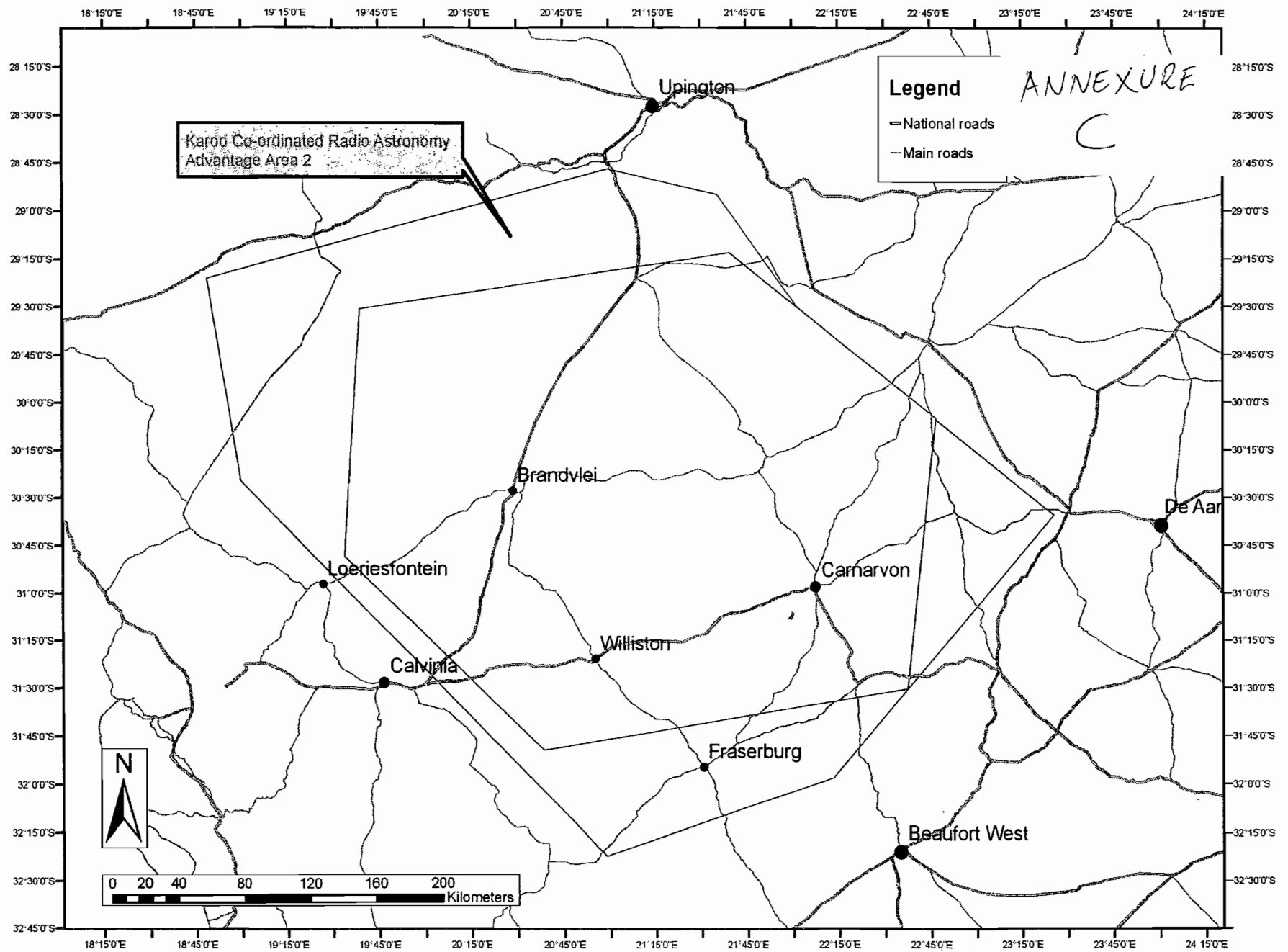
- (2) Upon the operationalisation of the Square Kilometre Array radio telescope, the regulations on protection of the Karoo radio astronomy advantage areas for Square Kilometre Array radio telescope will become effective.
- (3) Repeal of these regulations will be done by notice in the Gazette.

Short title

These regulations are called the Karoo radio astronomy advantage areas regulations for MeerKAT radio telescope.







NOTICE 118 OF 2009**NOTICE OF INTENTION TO MAKE REGULATIONS REGARDING THE KAROO
RADIO ASTRONOMY ADVANTAGE AREA FOR SQUARE KILOMETRE ARRAY
RADIO TELESCOPE**

The Minister of Science and Technology hereby gives notice of intention to make regulations in the schedule in terms of section 50 read with sections 7,9 and 11 of the Astronomy Geographic Advantage Act, 2007 (Act No.21 of 2007), which are hereby published for public comment under section 42 of the said Act.

Interested persons are hereby invited to submit written comments or written representations with regard to the proposed regulations not later than 16h30 on the 6th of March 2009. For the attention of:

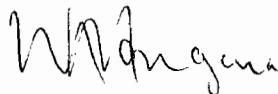
Ms Lipuo Mothae
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Pretoria
Or

Dept of Science and Technology
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0001
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Enquiries can be made at telephone number 012 843 6463

M MANGENA



MINISTER OF SCIENCE AND TECHNOLOGY

SCHEDULE**ARRANGEMENT OF REGULATIONS****Subject**

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Annexure A

Karoo central radio astronomy advantage area map

Annexure B

Karoo coordinated radio astronomy advantage area 1 map

Annexure C

Karoo coordinated radio astronomy advantage area 2 map

Definitions

In these regulations any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned and, unless the context otherwise indicates

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

“Detrimental radio interference” means a radio frequency interference which endangers or obstructs the functioning of the radio astronomy devices and impacts negatively on the related scientific endeavours.

“Saturation” means a phenomenon that occurs in radio receivers by which they cease operation when a high level electromagnetic energy reaches the receiver, independent of the frequency.

Purpose of regulations**1.**

- (1) To provide for the protection of the Karoo radio astronomy advantage areas in the context of their use for the Square Kilometre Array (SKA) radio telescope.
- (2) For effective protection purpose these regulations must be read together with other regulations of astronomy advantage areas.

Scope of regulation**2.**

These regulations apply to the Karoo radio astronomy advantage areas which will be used for the Square Kilometre Array radio telescope.

Commencement of regulations**3.**

- (1) These regulations will commence and become effective on the date the Square Kilometre Array radio telescope becomes operational.
- (2) The commencement date will be published by a notice in the Gazette
- (3) On commencement date these regulations shall become effective.

Specific protection requirements**4.**

- (1) Protection for the Karoo radio astronomy advantage areas in the Northern Cape against detrimental radio frequency interference is based on specified protection levels at the reference point, within the Karoo core radio astronomy advantage area located at geographical coordinates 21.388000 degrees East and 30,71480 degrees South.

- (2) The designated frequency spectrum within which radio astronomy observations will be carried out and which needs protection is the continuous spectrum from 100 MHz to 25.5 GHz.
- (3) Observations will also be carried out in the spectrum from 70 to 100 MHz.
- (4) Existing transmitters operating in the frequency band between 87.5 and 100 MHz will not be subject to the protection requirement needed for radio astronomy observations in this band.
- (5) In the event of saturation in the radio astronomy receiving equipment causing malfunctioning of the equipment due to the received signals within 87.5 and 100 MHz band exceeding -120 dBm/Hz, the transmitting installation involved will have to be relocated or its transmission characteristics changed to reduce the signals causing the saturation to below -120 dBm/Hz.
- (6) The requirement referred to in subsection (5) will take precedence over any other requirement with respect to protection which may imply a concession on the need to avoid saturation.
- (7) The protection levels to be applied in connection with all the Karoo radio astronomy advantage areas, to which these regulations are applicable, are as follows:
 - (a) The protection levels are derived using the methodology described in ITU Recommendation ITU-R RA.769-2.
 - (b) The technical assumptions made in the derivation are that receiver and sky temperatures are linearly interpolated from those values found in ITU-R RA.769-2, and that receiver bandwidth is assumed to be 10% of the observing frequency.
 - (c) Derived protection levels, which are equivalent to threshold levels of interference for new generation radio astronomy observatories and based on the methodology outlined in ITU-R RA.769-2, are specified in Figure 1.

(d) A linearly piecewise function is defined as the South African Radio Astronomy Services (SARAS) protection level. This function is described by the following equations, which are to be used to calculate the required protection level at any frequency in the spectrum from 70 MHz to 25,500 MHz.

$$SARAS [dBm / Hz] = -17.2708 \log_{10}(f) - 197.0714, \quad f < 2 \text{ GHz}$$

$$SARAS [dBm / Hz] = -0.065676 \log_{10}(f) - 253.8661, \quad f \geq 2 \text{ GHz}$$

The values of (f) are to be in MHz

(e) The South African protection levels are reflected in Figure 1 below together with the ITU interpolated continuum threshold levels of interference.

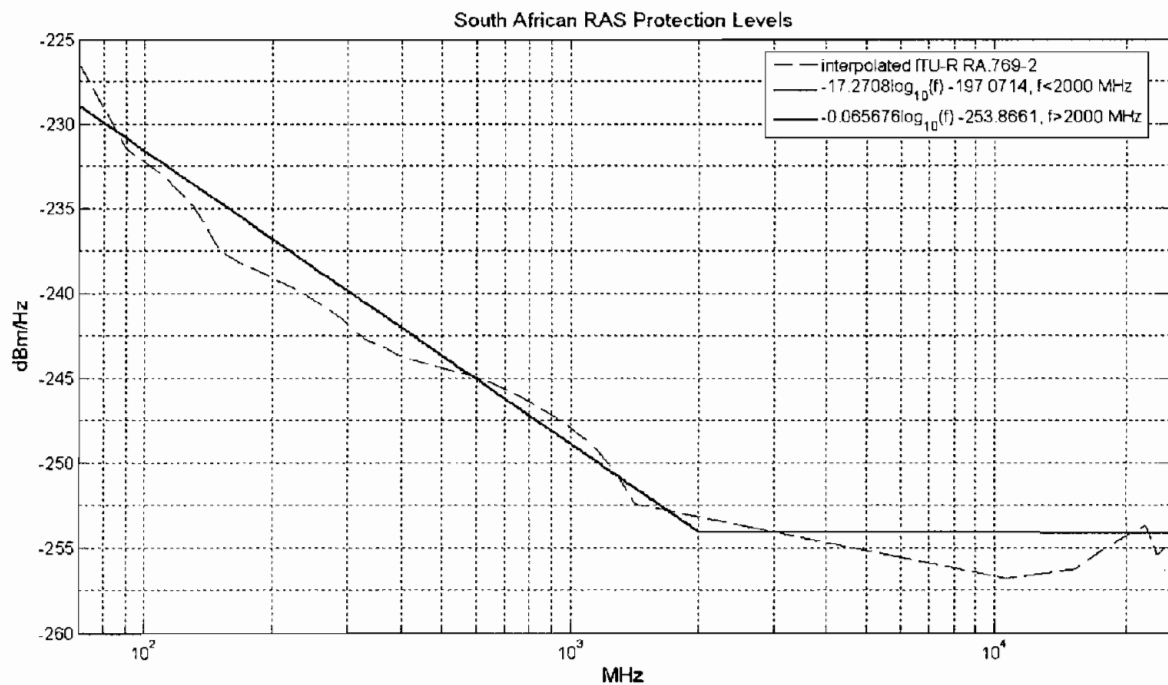


Figure 1: South African Radio Astronomy Service Protection Levels

(f) Due to the variety of units used within the electronic communications sector, the following list of unit conversions is provided (assuming an isotropic radiator).

$$dB(W / m^2 / Hz) \rightarrow dBm : SPFD - 20 \log_{10}(f) + 10 \log_{10}(\Delta f) + 188.5$$

$$dBm \rightarrow dBm / Hz : dBm - 10 \log_{10}(\Delta f)$$

$$dBW \rightarrow dBm : dBW + 30$$

$$dBW \rightarrow dB(W / m^2) : dBW + 20 \log_{10}(f) - 158.5$$

The values of "f" and "Δf" are to be in MHz.

- (8) The radio frequency interference impact assessment will be carried out on the signal level received or predicted at the common reference point within the Karoo core astronomy advantage area at the height of 10 metres.

Karoo core radio astronomy advantage area

5.

- (1) The Karoo core radio astronomy advantage area to which these regulations are applicable has been declared in the Gazette number xxxx and in accordance with section 7(1)(a) of the Act.
- (2) Radio communications with transmitters located within the Karoo core radio astronomy advantage area which operate within the frequency band from 70 MHz to 25.5 GHz are declared activities that may only be undertaken as prescribed in these regulations.
- (3) No fixed transmitting stations operating within the frequency spectrum from 70 MHz to 25.5 GHz may be located in the Karoo core radio astronomy advantage area.
- (4) Any existing transmitter stations operating within the frequency spectrum from 70 MHz to 25.5 GHz within the Karoo core radio

astronomy advantage area will have to be relocated to a location outside the Karoo core radio astronomy advantage area.

Karoo central radio astronomy advantage areas

6.

- (1) The Karoo central radio astronomy advantage areas to which these regulations are applicable have been declared in the Gazette number xxxx in accordance with section 9(1)(a) of the Act.
- (2) Radio communications with transmitters located within the Karoo central radio astronomy advantage areas which operate within the frequency band from 70 MHz to 25.5 GHz are declared activities that may only be undertaken as prescribed in these regulations.
- (3) The geographical extent of the Karoo central radio astronomy areas are defined in the declaration are the areas beyond the declared Karoo core radio astronomy advantage area and within the outer boundaries of the areas referred to as Karoo central radio astronomy areas 1, 2 and 3, herein referred to as annexure A.
- (4) Karoo central radio astronomy area 1 shall apply to the frequency band 70 to 1710 MHz.
- (5) Karoo central radio astronomy area 2 shall apply to the frequency band 1710 to 6000 MHz.
- (6) Karoo central radio astronomy area 3 shall apply to the frequency band 6000 MHz to 25.5 GHz.
- (7) Frequency bands within the radio astronomy band from 70 MHz to 25.5 GHz to be authorised for radio communication within the Karoo central radio astronomy advantage areas will be determined by the management authority in consultation with the entities involved according to prescribed procedures.

- (8) The radio frequency interference impact at the Karoo core radio astronomy advantage area reference point specified in section 4(1) from any transmission within the specified frequency band must not exceed the threshold level prescribed in section 4(7) unless exemption has been granted, in which case a concessionary level will be determined.

Karoo coordinated radio astronomy advantage areas

7.

- (1) The Karoo coordinated radio astronomy advantage areas to which these regulations are applicable have been declared in the Gazette number xxxx in accordance with section 11(1)(a) of the Act.
- (2) Radiocommunications with transmitters located within the Karoo coordinated radio astronomy advantage areas which operate within the specified frequency band from 70 to 6000 MHz are identified activities that may only be undertaken as prescribed in these regulations.
- (3) The geographical extent of the Karoo coordinated radio astronomy advantage areas are defined in the declaration and are the areas:
 - (a) Between Karoo central radio astronomy area 1 outer boundary and the borders of the Northern Cape, excluding Municipality Sol Plaatje, for the frequency band from 70 to 1710 MHz and for transmissions with an effective radiated power exceeding 60 dBm, herein referred to as annexure B.
 - (b) Between Karoo central radio astronomy area 2 outer boundary and Karoo central radio astronomy area 1 outer boundary for the frequency band from 1710 to 6000 MHz and for transmissions with an effective radiated power exceeding 60 dBm, herein referred to as annexure C.

- (4) All the transmissions within the Karoo coordinated astronomy advantage areas as specified in subsection (3) must be coordinated to ensure that the radio frequency interference caused is below the applicable protection level prescribed in regulation 4 (7) or alternatively be reduced to an agreed level.

Offences and Penalties

8.

- (1) Any person who contravenes these regulations may be found guilty of an offence in terms of section 52(1) of the Act.
- (2) Any person found guilty of an offence in terms of subsection (1) shall be held liable in terms of section 52(2) of the Act.

Review of the regulations

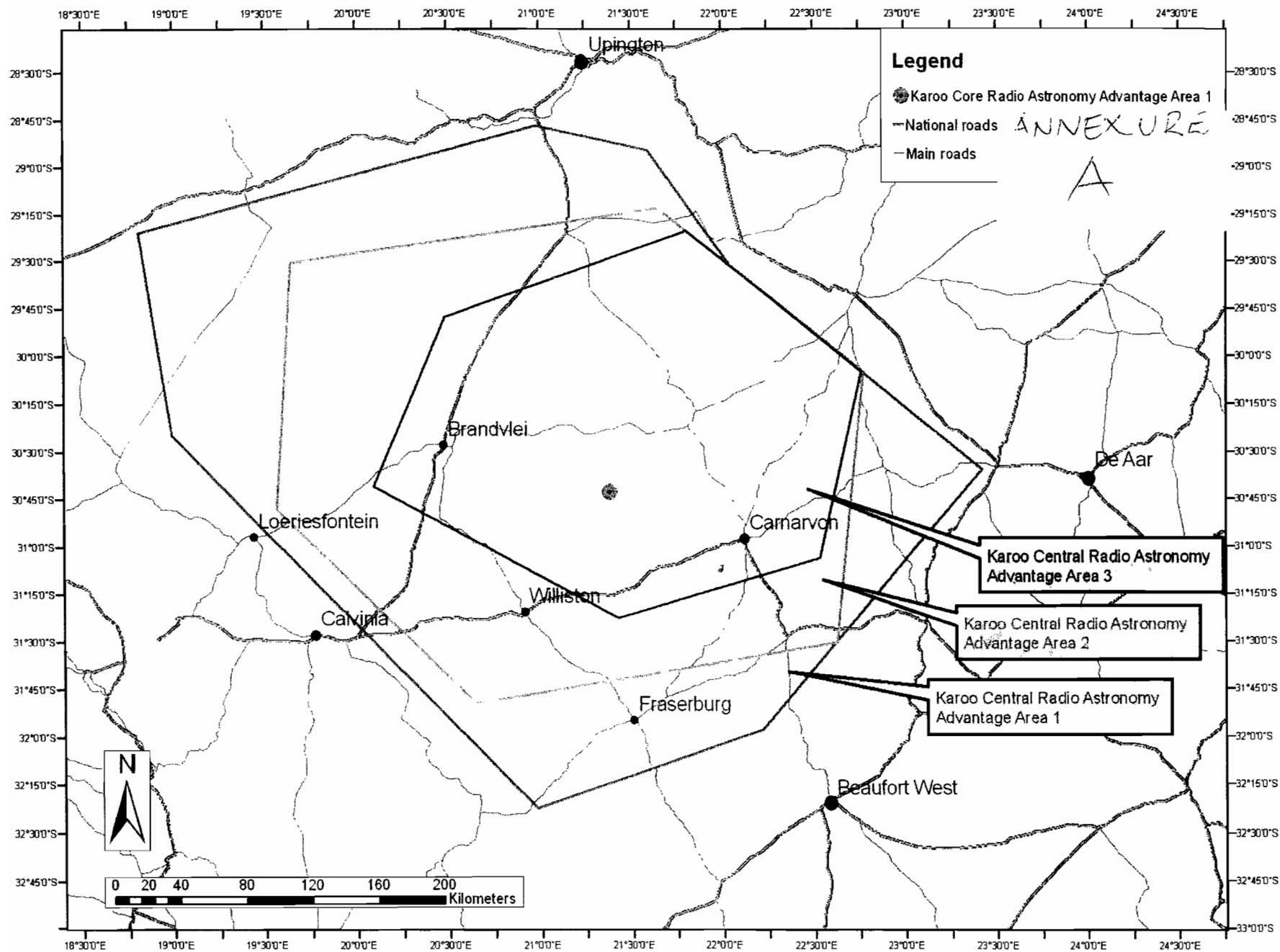
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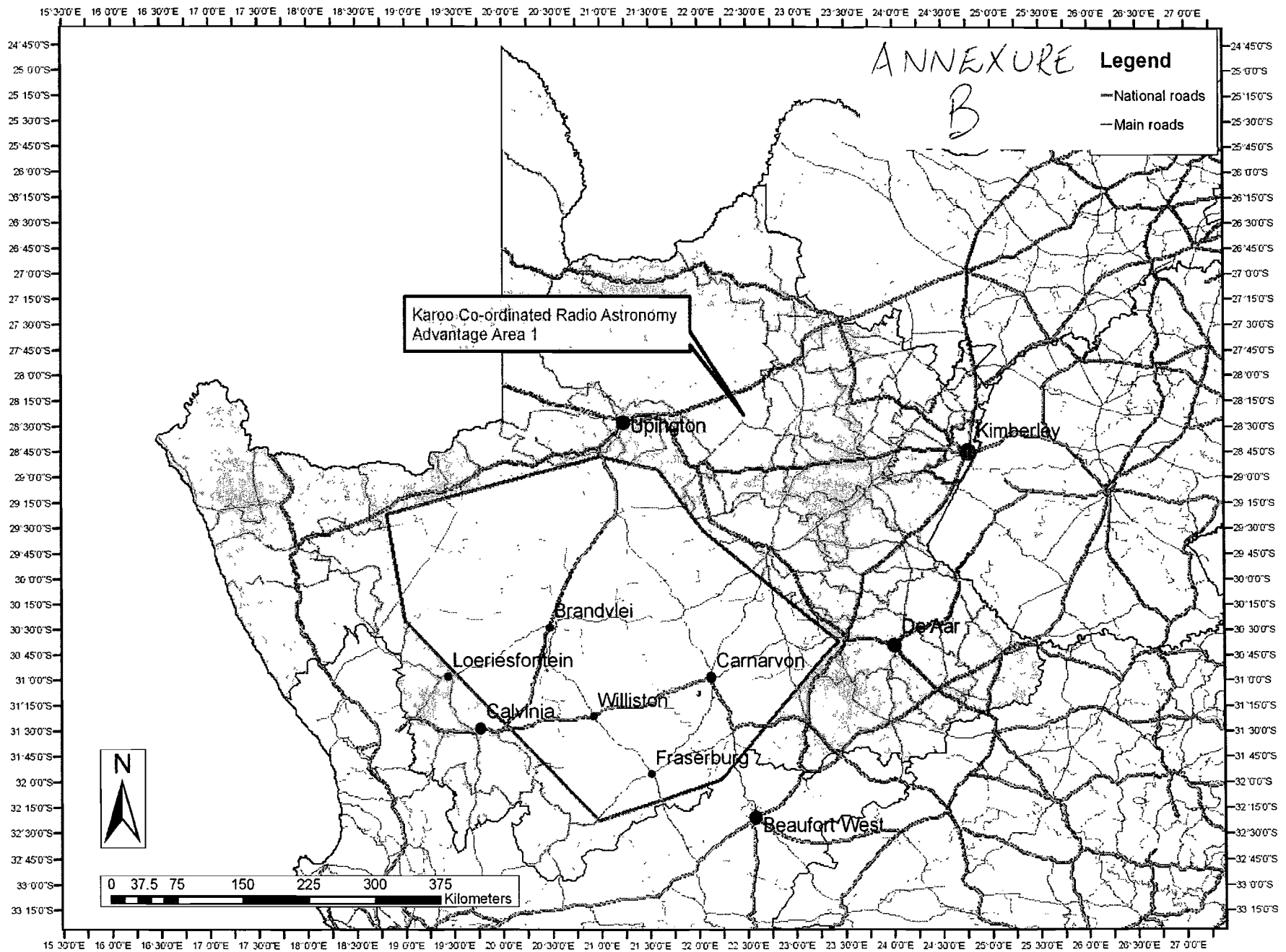
These regulations may from time to time be reviewed.

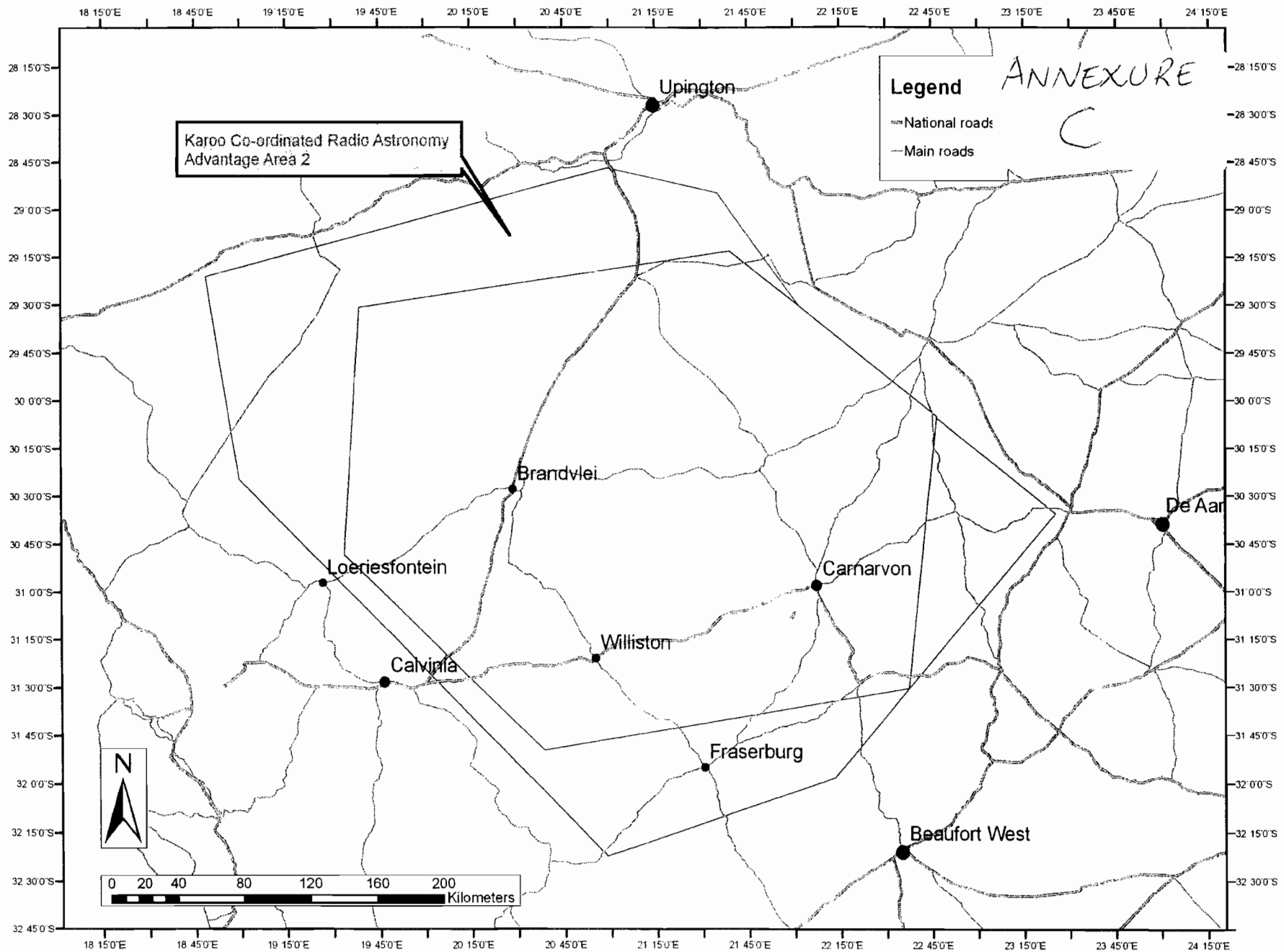
Short title

10.

These regulations are called the Karoo radio astronomy advantage areas regulations for the Square Kilometre Array radio telescope.







NOTICE 119 OF 2009**NOTICE TO MAKE REGULATIONS REGARDING THE MANAGEMENT
AUTHORITY ASSIGNED TO THE ASTRONOMY ADVANTAGE AREAS**

The Minister of Science and Technology, hereby in terms of section 50 read with sections 15, 16, 17, 18 and 19 of the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007) make the regulations in the schedule. Interested persons are hereby invited to submit written comments with regard to the proposed regulations not later than 16h30 on the 6th March 2009. For the attention of:

Ms Lipuo Mothae
Dept of Science and Technology
Building 53 CSIR Campus
Meiring Naude
Brummeria

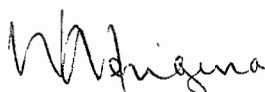
Or

Dept of Science and Technology
Private Bag X894
Pretoria
0001

Or

E mail address lipuo.mothae@dst.gov.za

Enquiries can be made at telephone number 012 843 6463



M MANGENA

MINISTER OF SCIENCE AND TECHNOLOGY

SCHEDULE**ARRANGEMENT OF REGULATIONS**

Subject	Regulation No
Definitions	
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Appointment of management authority	3
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Definitions

In these regulations any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned and, unless the context otherwise indicates

“Act” means the Astronomy Geographic Advantage Act 21, 2007.

“Contact details” means the postal address, telephone number, email address, facsimile number and any other detail where a natural and juristic person can be contacted.

“Core competencies” means capabilities that enable the proper management of the astronomy advantage areas in terms of the Act and skills that enable the management authority to deliver on its mandate in terms of the Act.

“Detrimental optical interference” means disturbance caused by undesired signals which endanger or obstruct the functioning of the astronomy devices in the astronomy advantage areas.

“Detrimental radio interference” means a radio frequency interference which endangers or obstructs the functioning of the radio astronomy devices in the astronomy advantage areas.

“Laws” means legislative framework applicable to astronomy.

Scope of the regulation

1.

These regulations apply to the management authority.

Management Authority

2.

- (1) Upon assigning the management of the astronomy advantage areas in terms of section 15(1) of the Act to the management authority, the management authority shall assume the overall management of the astronomy advantage areas.
- (2) The management authority must possess the core competencies required in regulation 4.
- (3) The management authority must ensure that the astronomy advantage areas are protected from detrimental optical interference and detrimental radio interference exceeding the prescribed levels.
- (4) In performing its functions the management authority must act in a manner consistent with the Act and the Regulations.

Appointment of management authority

3.

For the purpose of achieving the objects of the Act, there shall be a single management authority assigned to all the astronomy advantage areas.

Core competencies**4.**

- (1) The management authority shall possess the following core competencies including but not limited to -
- (a) Financial, administrative and human resource management skills.
 - (b) Ability to understand the requirements for optical astronomy and to advise on electrical lighting fixtures, light emission processes and illumination levels.
 - (c) Ability to understand the requirements of radio astronomy and to consider, assess and make rulings on radio frequency interference.
 - (d) Knowledge of local development and planning procedures.
 - (e) Legal expertise.
 - (f) Capability to implement and enforce the laws relating to astronomy.
 - (g) Understanding the dynamics of the astronomy advantage areas.
 - (h) Communications skills.
 - (i) Radio frequency spectrum management skills.
 - (j) Knowledge of technologies used in the telecommunications industry, including but not limited to:
 - I. Wireless technologies.
 - II. Broadcast signal distribution technologies
 - III. Aeronautical navigation and communication technologies.
 - (k) Radio frequency propagation modelling.

Functions**5.**

- (1) Develop, manage and maintain the permanent register of interested and affected parties for the astronomy advantage areas
- (2) The register to be developed must be in a form of an electronic database.
- (3) The register contemplated in subsection 1 must contain the following information –
 - (a) If the interested or affected party is the natural person, the name of the interested or affected party.
 - (b) The contact details of the natural person who is interested or affected.
 - (c) If the interested or affected party is a juristic person, the name of the company.
 - (d) The contact details of the juristic person who is interested or affected.
 - (e) The nature of the interest in respect of optical or radio astronomy and if the latter, then the portions of the radio frequency spectrum involved.
- (4) Ensure that the astronomy advantage areas are protected from detrimental optical interference and detrimental radio interference
- (5) Give advice and make rulings on any matter pertaining to protection of astronomy advantage areas.
- (6) Develop methods of coordination with all the affected parties within the astronomy advantage area
- (7) Develop standards to which all industrial, domestic, commercial, sporting, cultural and tourism activities shall be subject to, in order to assess potential impact on observing conditions in core optical astronomy advantage areas.

- (8) Undertake all assessments, authorisations and prohibitions as provided for in the Act and the Regulations in relation to optical astronomy. This includes, but is not limited to -
- (a) Authorisation of activities that will result in the introduction of sources of optical interference within core optical astronomy advantage areas, in coordination with the relevant operating institution
 - (b) Authorisation of additional outdoor lighting in core optical astronomy advantage areas, in coordination with the relevant operating institution
 - (c) Assessment of all developments and activities above in terms of developed standards.
 - (d) Prohibit all developments and activities above that do not meet prescribed levels of protection for optical interference .
 - (e) Cooperate with all Municipalities in the development and implementation of plans and municipal regulations as provided for in the Act and the Regulations.
 - (f) Authorise access to core optical astronomy advantage areas, in coordination with the relevant operating institution, as prescribed in section 17 of the Regulations of astronomy advantage areas.
- (9) Undertake all assessments, authorisations and prohibitions as provided for in the Act and the Regulations in relation to radio astronomy. This includes, but is not limited to -
- (a) Authorisation of all mobile or portable transmitting devices to be brought into core radio astronomy advantage areas, in coordination with the relevant radio astronomy observatory operating institution.
 - (b) Authorisation, on an individual basis, of all transmissions in the central radio astronomy advantage areas in accordance with

considerations outlined in Section 11(2) of the astronomy advantage areas regulations

(c) Authorisation, in concurrence with ICASA where required by the Act, of all existing and potential radio transmissions on an individual basis within the central radio astronomy advantage areas in accordance with the process described in Section 12(1)-(3) of the astronomy advantage areas regulations

(d) Assessment of all potential and existing radio transmissions in the central radio astronomy advantage areas on an individual basis, in accordance with the process described in section 12(4) of the astronomy advantage areas regulations.

(e) Authorisation of frequency bands to be used for radio communication in the central radio astronomy advantage areas as prescribed in section 13 of the astronomy advantage areas regulations.

(f) Coordinate all existing and potential radio transmissions in the coordinated radio astronomy advantage areas on an individual basis, in accordance with the process prescribed in section 16 of the astronomy advantage areas regulations.

(g) Authorise access to core radio astronomy advantage areas, in coordination with the relevant radio astronomy observatory operating institution, as prescribed in Section 17 of the astronomy advantage areas regulations.

(10) Determine essential and safety-of-life radio communication services in the central radio astronomy advantage areas, as prescribed in section 14 of the astronomy advantage areas regulations.

(11) Ensure compliance with the legislative framework that governs astronomy advantage areas.

(12) The management authority shall monitor compliance, and apply the enforcement provisions in the Act and the Regulations.

- (13) The management authority must:
 - (a) Submit monthly reports of any incidents of non compliance.
 - (b) The report must include-
 - I. The nature and reason of non compliance.
 - II. The effect the non compliance has on astronomy activities within the astronomy advantage areas.
 - III. The enforcement mechanism imposed.
 - IV. The proposed plan of action to prevent the non compliance from re-occurring.
 - V. The management may be requested to submit a report on the progress of implementing the plan of action referred to in subsection (5) above.
- (14) Develop mechanisms to enforce all assessments, authorisations and prohibitions as detailed in subsections (8) and (9) above.
- (15) Develop management plans for the protection of astronomy advantage areas.
- (16) Develop rules for proper administration and protection of the astronomy advantage areas.
- (17) Develop strategic partnerships with relevant stakeholders.
- (18) Promote and apply a risk management approach that seeks to protect the astronomy advantage areas.
- (19) Continuously conduct reviews and develop innovative methods of managing the astronomy advantage areas.
- (20) In performing its functions the management authority shall –
 - (a) Ensure that the management of astronomy advantage areas is in an integrated manner.
 - (b) Recognise the importance of protecting the astronomy advantage areas.
 - (c) Use the best available technology that will assist in the proper management of the astronomy advantage area.

- (d) Provide opportunities for community engagement in the integrated management of the astronomy advantage areas.
- (21) Promote the importance of protection of astronomy advantage areas.
- (22) The management authority shall advise on appropriate opportunities to communicate issues and outcomes relating to astronomy activities within the astronomy advantage areas.
- (23) Ensure that adequate and appropriate skills and resources are available, internally or externally, to execute the functions of the management authority as described in this section.
- (24) Ensure effective communications with the various communities residing and working within the astronomy advantage areas.

Funding

6.

- (1) The Department will fund the management authority.
- (2) The management authority will be responsible for making triennial budget proposals for approval to the Department.
- (3) Once the budget has been approved, the funds required shall be transferred to the management authority.

Governance

7.

- (1) The management authority shall –
 - (a) Submit information on matters relating to its functions and business when requested to do so.
 - (b) Operate within the relevant legislative framework

- (c) Review its performance quarterly and report to the Department as directed.
- (d) Develop and implement plans in accordance with the relevant legislative framework.
- (e) Develop annual reports detailing the following-
 - I. Activities
 - II. Financial position
 - III. Conditions and management of the astronomy advantage areas.
 - IV. The carrying out of its functions in accordance with the relevant legislative framework.
- (f) Ensure that appropriate and effective processes and systems are in place to monitor its performance.
- (g) Conduct audit or any review of any matter in relation to the performance of its functions, and the exercise of its powers.
- (h) Manage the funds in its disposal in the manner consistent with the management of public funds as outlined in Public Finance Management Act, 1999 (Act No. 1 of 1999).
- (i) Manage its operations in compliance with the relevant legislative framework.
- (j) Develop risk management systems and processes to effectively manage strategic, operational and financial risks to the protection of astronomy advantage areas in accordance with relevant legislative framework.
- (k) Develop and implement systems to manage and maintain its assets in a sustainable manner.
- (l) Develop and maintain a comprehensive register of relevant assets in accordance with the relevant legislative framework.

Management Plan**9.**

- (1) The management authority must submit the management plan for approval when requested to do so.
- (2) The management plan shall include but not be limited –
 - (a) Financial and legal management.
 - (b) Coordination of the work so as to meet the objectives of the Act.
 - (c) Description of mechanisms to be used for prioritising capabilities and new initiatives.
 - (d) The determination of the skills and resources required to execute the functions of the management authority as described in section 5.
 - (e) The acquisition, maintenance and development of the skills and resources required.
 - (f) The effective and efficient location and distribution of the skills and resources.
 - (g) The implementation plan for the determination of safety-of-life and essential radio communication services and the radio frequency bands to be used in the central radio astronomy advantage areas, and the authorisation on an individual basis of each transmission.
 - (h) The implementation plan for the coordination of radio communication services transmissions in the coordinated radio astronomy advantage areas on an individual basis.
 - (i) The establishment of arrangements with the astronomy observatories to conduct ongoing monitoring of possible detrimental interference and to report on the findings.
 - (j) The establishment of procedures to deal with detrimental interference and to enforce the prescribed standards.

Review of the regulations**10.**

These regulations may from time to time be reviewed.

Short title**11.**

These regulations are called the Management Authority Regulations
