Frequency coordination procedures for the Earth Station Protection zones

Amendment History

| Date | Comments |
| --- | --- |
| Month 2015 | Initial draft covering xxxxx |
|  |  |
|  |  |

Suggestions for improvements to Radiocommunications Assignment and Licensing Instruction MS xx may be addressed to The Manager, Spectrum Engineering, ACMA at PO Box 78, Belconnen, ACT, 2616, or by e-mail to [freqplan@acma.gov.au](mailto:freqplan@acma.gov.au). It would be appreciated if notification to ACMA of any inaccuracy or ambiguity found be made without delay in order that the matter may be investigated and appropriate action taken.

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TITLE

# Purpose

The purpose of this Radiocommunications Assignment and Licensing Instruction (RALI) is to provide a framework for the management of interference to and from Earth stations communicating with satellites (or space stations) in the fixed-satellite service (FSS) in specific defined areas.

The information in this document reflects the ACMA’s statement of current policy in relation to frequency coordination of FSS Earth stations. In making decisions, accredited frequency assigners and the ACMA’s officers should take all relevant factors into account and decide each case on its merits. Issues relating to this document that appear to fall outside the enunciated policy should be referred to the Manager, Spectrum Engineering Section, PO Box 78, Belconnen, ACT, 2616, or by e-mail to [freqplan@acma.gov.au](mailto:freqplan@acma.gov.au).

## Scope

This RALI only considers the coordination with the Earth stations communicating with satellites in the fixed-satellite service.

Proposed earth stations are not required to perform the coordination assessments detailed in this RALI. It is further noted that Earth station deployed within an ESPZ are not required to adhere to the notional earth station characteristics defined in this RALI. However, earth stations within an ESPZ will only be afforded protection as provided by this RALI.

Matters concerning international coordination of satellite networks are conducted within frameworks specified in the International Telecommunication Union (ITU) Radio Regulations and are not addressed in this RALI. Coordination of intra-Australian satellite networks is also outside the scope of this RALI.

This RALI is intended to evolve over time to include other bands and potentially other locations as required.

# Protection of Earth receive bands

For coordination of proposed transmitters operating co-channel with an Earth station receiver in one of the 3.6 GHz Earth receive bands, as defined at Appendix A, the coordination procedure defined in this section should be used.

## Notional Earth station receiver characteristics

Table 1 provides notional Earth station receiver characteristics that may be used for coordination in accordance with this RALI.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Location | Feeder loss (dB) | Antenna | | | | |
| Model | D/ ratio | Gain  (dBi) | Height  (m a.g.l) | Minimum angle  (degrees) |
| Mingenew | 0 | ITU-R S.465 | 100 | 58 | 10 | 5 |
| Quirindi | 0 | ITU-R S.465 | 100 | 58 | 10 | 15 |
| Moree | 0 | ITU-R S.465 | 100 | 58 | 10 | 15 |
| Roma | 0 | ITU-R S.465 | 100 | 58 | 10 | 15 |
| Uralla | 0 | ITU-R S.465 | 100 | 58 | 25 | 5 |

Table 1: Notional Earth station receiver characteristics

## Coordination criteria

For a successful coordination of proposed transmitters, the level of co-channel interference to a notional Earth station receiver, modelled with the characteristics detailed above, must not exceed the level listed in Table 2 below at each point listed in Appendix A. There is no requirement for consideration of adjacent channel interference.

An assessment only needs to be performed to those points listed in Appendix A that are within 210 km of a proposed transmitter.

For the purposes of coordination in GSO frequency ranges (Table A1 and B1 of Appendix A and B respectively), the Earth station antenna shall be oriented for all azimuth-elevation combinations that point at the GSO arc within the permissible angles of elevation.

When coordinating in NGSO frequency ranges (Table A2 and B2 of Appendix A and B respectively) it is assumed that the Earth station antenna is pointing in all azimuth directions at the minimum elevation angle described in Table 1.

Table 2 provides the protection criteria and recommended propagation model to be used in assessments.

|  |  |  |
| --- | --- | --- |
| Propagation model | Percentage time (%) | Maximum level of interference |
| ITU-R P.452 | 20 | -158.6 dBW/MHz |

Table 2: Earth Station protection criteria and recommended propagation model

# Coordination from a FSS Earth station transmitter

This section provides the notional criteria required for coordination between proposed receivers and C-band FSS Earth station transmitters.

Proposed receivers operating in one of the C-band Earth station transmit bands defined at Appendix B must follow the coordination procedure defined in this section.

## Notional Earth station transmitter characteristics

Table 3 provides notional FSS Earth station transmitter characteristics that can be used for coordination purposes when assessing a proposed receiver in accordance with this RALI.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Location | Feeder loss (dB) | Antenna | | | | |
| Model | D/ ratio | Gain  (dBi) | Height  (m a.g.l) | Minimum angle  (degrees) |
| Mingenew | 0 | ITU-R S.465 | 100 | 58 | 10 | 15 |
| Quirindi | 0 | ITU-R S.465 | 100 | 58 | 10 | 15 |
| Moree | 0 | ITU-R S.465 | 100 | 58 | 10 | 15 |
| Roma | 0 | ITU-R S.465 | 100 | 58 | 10 | 15 |

Table 3: Notional FSS Earth station transmitter characteristics

## Coordination criteria

For successful coordination of proposed receivers should ensure the level of co-channel interference from a notional Earth station transmitter, modelled with the characteristics detailed in this section for each point listed in Appendix B, meets the level of interference that is acceptable for the proposed receiver requirements.

An assessment only needs to be performed to those points listed in Appendix B that are within 210 km of a proposed transmitter.

For the purposes of coordination in GSO frequency ranges, the Earth station antenna shall be oriented for all azimuth-elevation combinations that point at the GSO arc within the permissible angles of elevation.

For NGSO frequency ranges it is assumed that the Earth station antenna is pointing in all azimuth directions at the minimum elevation angle described in Table 1.

Table 4 provides the notional FSS Earth station transmitter coordination criteria.

|  |  |
| --- | --- |
| Location | Power spectral density  (dBW/MHz) |
| Mingenew | 30 |
| Quirindi | 30 |
| Moree | 30 |
| Roma | 30 |

Table 4: Notional FSS Earth station transmitter power

# Exceptions

Exceptions to the requirements of this RALI for prospective assignments require case-by-case consideration by the Manager, Spectrum Engineering Section.

A request for exemption from the requirements of this RALI would need to be accompanied by evidence to support the request.

# RALI Authorisation

(Note: Approval of RALI is via email, they are no longer signed. The email giving approval should be filed as a record of the approval)

[not approved] xx/xx/2018

Manager  
Spectrum Engineering Section  
Spectrum Planning and Engineering Branch

Communications Infrastructure Division  
Australian Communications and Media Authority

# Glossary

ACMA Australian Communications and Media Authority

GSO Geostationary Orbit

FSS Fixed Satellite Service

ITU International Telecommunications Union

RALI Radiocommunications Assignment and Licensing Instruction

# Appendix A: Earth receive bands

## A1. GSO Earth receive band details

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ESPZ name | Frequency range (MHz) | Point ID | Latitude (GDA94) | Longitude (GDA94) |
| Quirindi | 3575 - 4200 | 1 | -31.278542 | 150.664064 |
| 2 | -31.531797 | 150.392637 |
| 3 | -31.758854 | 150.673901 |
| 4 | -31.334364 | 150.462804 |
| 5 | -31.683343 | 150.483362 |
| 6 | -31.524093 | 150.815250 |
| 7 | -31.472816 | 150.681203 |
| Moree | 3575 - 4200 | 1 | -29.202410 | 149.840025 |
| 2 | -29.470438 | 149.530685 |
| 3 | -29.740189 | 149.840030 |
| 4 | -29.436083 | 150.130913 |
| 5 | -29.375475 | 149.730499 |
| 6 | -29.566334 | 149.730211 |
| 7 | -29.566412 | 149.949630 |
| 8 | -29.366173 | 149.949382 |
| Roma | 3575 - 4200 | 1 | -26.571626 | 148.633980 |
| 2 | -26.590870 | 148.501616 |
| 3 | -26.708009 | 148.632882 |
| 4 | -26.840857 | 148.784921 |
| 5 | -26.710678 | 148.940348 |
| 6 | -26.588340 | 149.083815 |
| 7 | -26.571818 | 148.935420 |
| 8 | -26.516060 | 148.779018 |
| 9 | -26.589408 | 148.856840 |

## A2. NGSO Earth receive band details

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ESPZ name | Frequency range (MHz) | Point ID | Latitude (GDA94) | Longitude (GDA94) |
| Mingenew | 3400 - 4200 | 1 | -29.045905 | 115.350437 |
| 2 | -29.078611 | 115.233333 |
| 3 | -29.078611 | 115.457778 |
| 4 | -28.9 | 115.457778 |
| 5 | -28.9 | 115.233333 |
| Uralla | 3600 - 4200 | 1 | -30.6315 | 151.5661 |

# Appendix B: Earth Station transmit bands

## B1. GSO Earth transmit band details

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ESPZ name | Frequency range (MHz) | Point ID | Latitude (GDA94) | Longitude (GDA94) |
| Quirindi | 5850 - 6700 | 1 | -31.278542 | 150.664064 |
| 2 | -31.531797 | 150.392637 |
| 3 | -31.758854 | 150.673901 |
| 4 | -31.334364 | 150.462804 |
| 5 | -31.683343 | 150.483362 |
| 6 | -31.524093 | 150.815250 |
| 7 | -31.472816 | 150.681203 |
| Moree | 5850 - 6700 | 1 | -29.202410 | 149.840025 |
| 2 | -29.470438 | 149.530685 |
| 3 | -29.740189 | 149.840030 |
| 4 | -29.436083 | 150.130913 |
| 5 | -29.375475 | 149.730499 |
| 6 | -29.566334 | 149.730211 |
| 7 | -29.566412 | 149.949630 |
| 8 | -29.366173 | 149.949382 |
| Roma | 5850 - 6700 | 1 | -26.571626 | 148.633980 |
| 2 | -26.590870 | 148.501616 |
| 3 | -26.708009 | 148.632882 |
| 4 | -26.840857 | 148.784921 |
| 5 | -26.710678 | 148.940348 |
| 6 | -26.588340 | 149.083815 |
| 7 | -26.571818 | 148.935420 |
| 8 | -26.516060 | 148.779018 |
| 9 | -26.589408 | 148.856840 |

## B2. NGSO Earth transmit band details

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ESPZ name | Frequency range (MHz) | Point ID | Latitude (GDA94) | Longitude (GDA94) |
| Mingenew | 5850 - 6700 | 1 | -29.045905 | 115.350437 |
| 2 | -29.078611 | 115.233333 |
| 3 | -29.078611 | 115.457778 |
| 4 | -28.9 | 115.457778 |
| 5 | -28.9 | 115.233333 |

# Appendix C: ESPZ area definitions

| Area name | HCIS |
| --- | --- |
| Moree | MU5G, MU5H, MU5L, MU5C8, MU5C9, MU5D7, MU5D8, MU5D9, MU5K1, MU5K2, MU5K3, MU5K4, MU5K5, MU5K6, MU5K8, MU5K9, MU6A7, MU6E1, MU6E2, MU6E4, MU6E5, MU6E7, MU6E8, MU6I1, MU6I2, MU6I4, MU6I5, MU6I7 |
| Quirindi | MV3G, MV3H, MV3K, MV3L, MV3C8, MV3C9, MV3D7, MV3F3, MV3F5, MV3F6, MV3F8, MV3F9, MV3J2, MV3J3, MV3J5, MV3J6, MV3J9, MV3O1, MV3O2, MV3O3, MV3P1 |
| Roma | MT4H, MT4K, MT4L, MT4F9, MT4G2, MT4G3, MT4G4, MT4G5, MT4G6, MT4G7, MT4G8, MT4G9, MT4J3, MT4J6, MT4O1, MT4O2, MT4O3, MT4O6, MT4P1, MT4P2, MT4P3, MT4P4, MT4P5, MT5E4, MT5E7, MT5I1, MT5I2, MT5I4, MT5I5, MT5I7, MT5M1 |
| Mingenew | BU4B, BU1N, BU1M6, BU1M8, BU1M9, BU1O4, BU1O7, BU1O8, BU4A2, BU4A3, BU4A6, BU4C1, BU4C2, BU4C4 |