Licensing and coordination procedures for area-wide apparatus licensed services in the 26/28 GHz bands

Radiocommunications Assignment and Licensing Instruction

**rali: [new]**

**date of effect: tbd**

Amendment history

| Date | Comments |
| --- | --- |
| Month 2020 | Initial draft covering arrangement for area-wide apparatus licences in the 26 GHz and 28 GHz bands |
|  |  |
|  |  |

Suggestions for improvements to Radiocommunications Assignment and Licensing Instruction MS xx may be addressed to:

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or by email to: [freqplan@acma.gov.au](mailto:freqplan@acma.gov.au).

Please notify the ACMA of any inaccuracy or ambiguity found in this RALI, so that it can be investigated and appropriate action taken.

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# Introduction

## Purpose

[This section will be included for consultation when the ACMA consults on arrangements for area-wide apparatus licences (AWLs) in the 26 and 28 GHz bands]

## Scope

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

# Coexistence arrangements -Frequency coordination procedures

## Identification of potentially affected services

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

## Coexistence arrangements

### Coexistence with adjacent AWL services

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Coexistence with 26 GHz band spectrum licensed services

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Coexistence with space receive stations

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Coexistence with SRS earth stations

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Coexistence with passive EESS

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Coexistence with FSS gateway uplinks

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Coexistence with ubiquitous FSS earth stations

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Coexistence with legacy point-to-point services

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Coexistence with class licensed services

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Notional receiver and compatibility requirement

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

# Coordination procedures

## Preliminary coordination procedures

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

## Registration of earth stations

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

## Coordination at the geographic boundary

### Coordination at the AWL boundary

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Coordination at the boundary of a 26 GHz band spectrum licence

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Additional boundary coordination for earth station transmitters

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

## Fallback synchronisation uplink-downlink configuration

Spectrum licences in the 26 GHz band and the AWL Licence Condition Determination (for AWLs in the 26/28 GHz bands) include a synchronisation requirement which may be invoked to resolve interference if negotiation between affected parties to resolve the interference fails (also see sections 2.2.1 and 2.2.2.).[[1]](#footnote-2) The uplink-downlink configuration to be used when the synchronisation requirement is invoked is:

* [An uplink-downlink configuration which is consistent with the FR2.120-2 UL-DL pattern described in Table A.1.3-2 of 3GPP TS 38.101-4 V15.4.0[[2]](#footnote-3), where:
* The period of the slot configuration pattern is 0.5 ms;
* The period of a slot is 0.125 ms; and
* There are 14 symbols within a slot.]
* [An uplink-downlink configuration which is consistent with the FR2.120-1 UL-DL pattern described in Table A.1.3-2 of 3GPP TS 38.101-4 V15.4.0[[3]](#footnote-4), where:
* The period of the slot configuration pattern is 0.625 ms;
* The period of a slot is 0.125 ms; and
* There are 14 symbols within a slot.]

The uplink-downlink configuration detailed above is incorporated by reference by 26 GHz band spectrum licences and in the AWL LCD. The ACMA will not make any amendment to the uplink-downlink configuration detailed in this section without first consulting with relevant licensees.

## Coordination requirements with SRS earth stations

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

## Coexistence with passive EESS

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

## Coordination with legacy point-to-point fixed links

Interference from a proposed AWL transmitter into a fixed link receiver is assessed using the steps described below. There is no requirement to assess interference from a point-to-point transmitter to an AWL receiver – see section 2.1.7.

The coordination process calculates a wanted-to-unwanted signal level ratio at the fixed link receiver input and compares it against the relevant protection ratio value(s) given in the tables at Appendix B.

A prospective AWL transmitter is not to be included in the RRL if it fails this coordination process.

**Step 1**: The first step is to identify all fixed link receivers that may be affected by the operation of the proposed AWL transmitter. To identify potentially affected fixed link receivers, a recommended minimum distance cull around the site of the proposed transmitter of 100 km is required.

A frequency cull is then applied to further reduce the number of cases requiring more detailed coordination calculations and is based on protecting fixed link receivers from emissions at frequency offsets up to and including the second adjacent channel of the AWL transmitter. Assuming a maximum transmit channel bandwidth of 400 MHz[[4]](#footnote-5), all fixed links with a centre frequency within 1056 MHz of the proposed transmitter centre frequency are to be included in the detailed coordination calculations.

**Step 2**: Calculate the level of wanted power at each receiver identified in step 1.

**Step 3**: Calculate the level of unwanted power at each receiver identified in step 1. Two separate cases exist (unwanted levels are to be calculated for both cases):

* Case 1 – applies to AWL transmitters which are required to be included in the RRL. Calculate the unwanted power level on the basis of the application details for the AWL transmitter, using transmit power and antenna gain (with any discrimination taken into account), the licensed fixed point-to-point receiver gain (with any discrimination taken into account), and propagation loss from an appropriate propagation model.
* Case 2 – applies to AWL transmitters which are not required to be in the RRL. If the geographical location of the transmitter in case 1 is within 20 km[[5]](#footnote-6) of the fixed link receiver, coordination is deemed to fail. However, an AWL transmitter may still be included in the RRL if it can be shown that the coverage area of the case 2 transmitter does not overlap the interference zone of the fixed link receiver, assuming the notional transmitter characteristics in Table 1.

Table 1: Notional parameters for transmitters not required to be included in the RRL

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Value** | **Unit** |
| TRP | 35 (for transmitters operating in the 26 GHz band in areas outside those defined in Schedule 1 of Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 26 GHz Band) 2020  23 (for all other transmitters) | dBm/occupied bandwidth |
| Antenna gain | 17 (in the direction of the case 1 transmitter for calculation of coverage area and in the direction of the fixed link receiver for unwanted level calculations) | dBi |
| Antenna height | 5 | metres |

If the fixed link receiver is greater than 20 km from the case 1 transmitter, calculate the unwanted power level at the fixed link receiver assuming a transmitter located at the same coordinates as the case 1 transmitter and operating with the notional parameters in Table 1, the licensed fixed point-to-point receiver gain (with any discrimination taken into account), and propagation loss from an appropriate propagation model.

**Step 4**: Determine the applicable protection criteria for each victim receiver identified in step 1. To protect receivers from unacceptable interference, the unwanted power levels at a victim receiver must not exceed the required protection criteria for that receiver.

In this RALI protection ratios are used for the protection of fixed link receivers. Protection ratios should be adjusted to take account of actual path length and rainfall rate. Protection ratio correction factor graphs are also provided in Appendix B.

**Step 5**: A comparison of the calculated wanted-to-unwanted rations from steps 2 and 3 with the relevant protection ratio value(s) in the tables in Appendix B will determine if the protection criteria at the victim fixed link receiver is achieved. If the required protection ratio is not met, the coordination is deemed to fail and the prospective AWL transmitter is not to be included in the RRL.

# Licensing

## Overview of Licensing

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

## Licence conditions

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

## Assignment rules

### Assignment instructions

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Channel raster

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Assignment priority

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

### Advisory notes

[This section will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

# Exceptions

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

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

All requests for exemptions should be submitted to [freqplan@acma.gov.au](mailto:freqplan@acma.gov.au).

# RALI Authorisation

[not approved] xx/xx/2020

Manager  
Spectrum Planning Section  
Spectrum Planning and Engineering Branch

Communications Infrastructure Division  
Australian Communications and Media Authority

# Appendix A: Examples of compliance at the geographic boundary

[This appendix will be included for consultation when the ACMA consults on arrangements for AWLs in the 26 and 28 GHz bands]

# Appendix B: Protection criteria for fixed link receivers

Protection ratios for 28 GHz band fixed services are provided in the following tables. Protection ratios apply at frequency offsets (between the channel edge of the receiver and the edge of the transmitter’s occupied bandwidth) of up to and including two-times the transmitters occupied channel bandwidth.

1. Protection ratios for victim 28 MHz channel fixed link receiver and interfering AWL transmitter

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Frequency offset (foffset)  (note 1) | BW < 100 MHz | 100 MHz ≤ BW < 200 MHz | 200 MHz ≤ BW < 400 MHz | BW ≥ 400 MHz |
| foffset < 0 MHz (note 2) | 62 | 59 | 56 | 53 |
| 0 MHz ≤ foffset < BW | 50 | 47 | 44 | 41 |
| BW ≤ foffset < 2xBW | 42 | 39 | 36 | 33 |

1. Protection ratios for victim 56 MHz channel fixed link receiver and interfering AWL transmitter

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Frequency offset (foffset)  (note 1) | BW < 100 MHz | 100 MHz ≤ BW < 200 MHz | 200 MHz ≤ BW < 400 MHz | BW ≥ 400 MHz |
| foffset < 0 MHz (note 2) | 64 | 62 | 59 | 56 |
| 0 MHz ≤ foffset < BW | 52 | 49 | 46 | 43 |
| BW ≤ foffset < 2xBW | 44 | 42 | 39 | 36 |

1. Protection ratios for victim 112 MHz channel fixed link receiver and interfering AWL transmitter

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Frequency offset (foffset)  (note 1) | BW < 100 MHz | 100 MHz ≤ BW < 200 MHz | 200 MHz ≤ BW < 400 MHz | BW ≥ 400 MHz |
| foffset < 0 MHz (note 2) | 64 | 64 | 62 | 59 |
| 0 MHz ≤ foffset < BW | 52 | 49 | 47 | 44 |
| BW ≤ foffset < 2xBW | 47 | 44 | 42 | 39 |

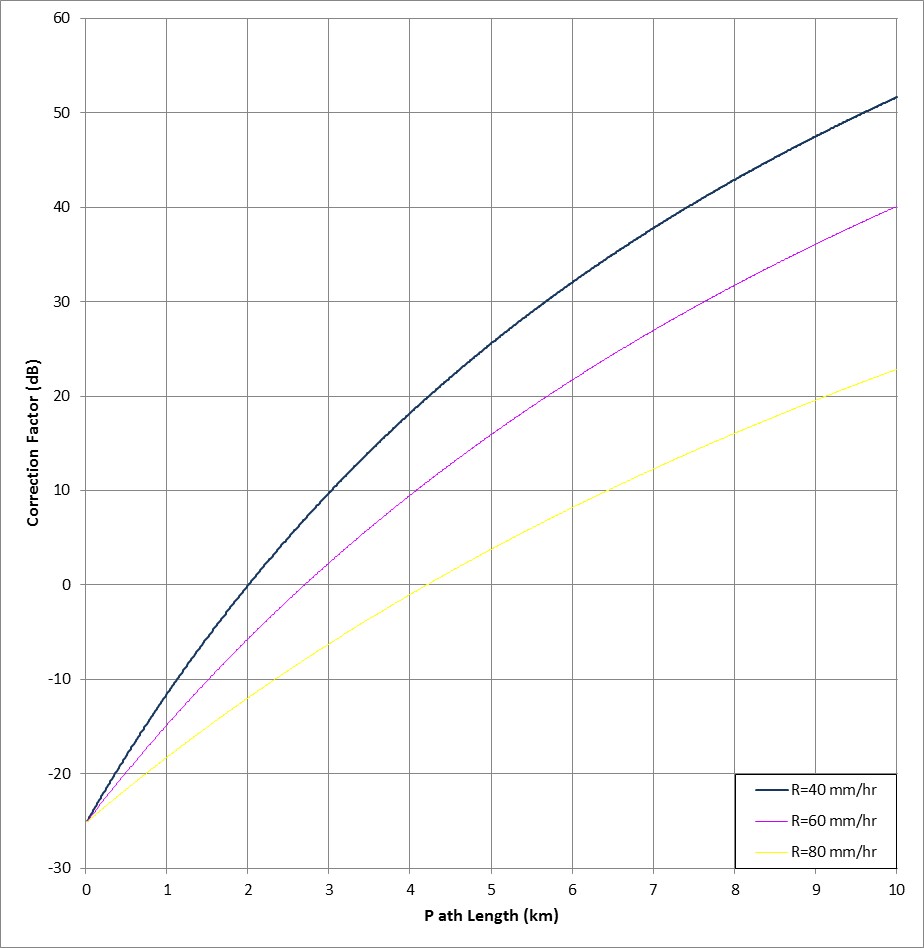
General notes:

1. foffset is the frequency offset between the channel edge of the receiver and the edge of the transmitter’s occupied bandwidth.
2. foffset is less than 0 MHz when there is an overlap of the receiver channel and the occupied bandwidth of the transmitter.
3. BW is the occupied bandwidth of the AWL transmitter.
4. Protection ratios are based on a 2 km path length and R (Rainfall rate in mm/hr for 0.01% of the worst month) of 40 mm/hr using Recommendation ITU-R P.530-15, section 2.4 as outlined in spectrum planning report SPP 2014/07. For other path lengths and rainfall rates refer to the appropriate path length correction factors graph on the following page.
5. Separate protection ratios for analog victims have not been defined. The above-mentioned protection ratios for digital systems shall be applied in such cases.

**THE 28 GHz BAND (27.5 – 29.5 GHz)**

**PROTECTION RATIO CORRECTION FACTORS**

**RAIN FADE**



R: Rainfall rate in mm/hr for 0.01% of the worst month.

For further details refer to Annex A to Appendix 1 of RALI FX-3.

1. The synchronisation requirement is detailed on 26 GHz band spectrum licences and in the AWL LCD. [↑](#footnote-ref-2)
2. Available on the [3GPP website](https://www.3gpp.org/DynaReport/38-series.htm). [↑](#footnote-ref-3)
3. Available on the [3GPP website](https://www.3gpp.org/DynaReport/38-series.htm). [↑](#footnote-ref-4)
4. Based on the maximum channel bandwidth of 400 MHz in the current 3GPP 38-series standard. [↑](#footnote-ref-5)
5. 20 km is considered the maximum cell radius expected to be achievable under an AWL. Should larger cells be used, AWL licensees are reminded that transmitters which are not required to be recorded in the RRL operate on a no interference basis as defined in the *Radiocommunications Licence Conditions (Area-Wide Licence) Determination 2020* (AWL LCD). [↑](#footnote-ref-6)