



Radiocommunications (Unacceptable Levels of Interference 2.3 GHz Band) Determination 2024

The Australian Communications and Media Authority makes the following determination under subsection 145(4) of the *Radiocommunications Act 1992*.

Dated: 29 February 2024

Adam Suckling
[signed]
Member

Carolyn Lidgerwood
[signed]
Member/~~General Manager~~

Australian Communications and Media Authority

1 Name

This is the *Radiocommunications (Unacceptable Levels of Interference – 2.3 GHz Band) Determination 2024*.

2 Commencement

This instrument commences on 31 March 2024.

3 Authority

This instrument is made under subsection 145(4) of the Act.

4 Repeal of the *Radiocommunications (Unacceptable Levels of Interference – 2.3 GHz Band) Determination 2013*

The *Radiocommunications (Unacceptable Levels of Interference – 2.3 GHz Band) Determination 2013* [F2013L02155] is repealed.

5 Purpose

This Determination sets out what is an unacceptable level of interference caused by a radiocommunications transmitter operating under a spectrum licence issued in the 2.3 GHz band, so as to ensure that high levels of radio emission from radiocommunications transmitters operated under a spectrum licence are kept within the geographic area and frequency band of the licence.

Note 1: Under section 145 of the Act, the ACMA may refuse to register a radiocommunications transmitter if it is satisfied that the operation of the transmitter could cause an unacceptable level of interference to the operation of other radiocommunications devices under that or any other spectrum licence, or any other licence.

Note 2: The ACMA has issued written advisory guidelines under section 262 of the Act about compatibility requirements in relation to the assignment of frequencies to radiocommunications transmitters operated under apparatus licences and the operation of radiocommunications transmitters under spectrum licences. The ACMA will take these guidelines into account during the settlement of interference disputes. Each case will be assessed on its merits. The guidelines do not prevent a licensee negotiating other compatibility requirements with another licensee. The guidelines are:

- *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters — 2.3 GHz Band) 2024*; and
- *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers — 2.3 GHz Band) 2024*.

These instruments can be accessed free of charge at www.legislation.gov.au.

6 Definitions

(1) In this instrument, unless the contrary intention appears:

2.3 GHz band means the frequency band 2300 MHz to 2400 MHz.

2.3 GHz spectrum licence means a spectrum licence that authorises the operation of radiocommunications devices in the 2.3 GHz band.

device boundary: see item 1 of Schedule 1.

device boundary criterion: see item 2 of Schedule 1.

Recommendation ITU-R P.525-4 means the ITU-R Recommendation “P.525-4 Calculation of free-space attenuation”.

Note: The ITU-R Recommendations are available, free of charge, from the International Telecommunication Union’s website at www.itu.int.

Recommendation ITU-R P.526-15 means the ITU-R Recommendation “P.526-15 Propagation by diffraction”.

Note: The ITU-R Recommendations are available, free of charge, from the International Telecommunication Union’s website at www.itu.int.

Recommendation ITU-R P.2108-0 means the ITU-R Recommendation “P.2108-0 Prediction of clutter loss”.

Note 1: The ITU-R Recommendations are available, free of charge, from the International Telecommunication Union’s website at www.itu.int.

Note 2: A number of other expressions used in this instrument are defined in the Act, including the following:

- (a) ACMA;
- (b) core condition;
- (c) frequency band;
- (d) interference;
- (e) radiocommunications device;
- (f) radiocommunications receiver;
- (g) radiocommunications transmitter;
- (h) radio emission;
- (i) Register;
- (j) spectrum licence.

Note 3: A number of other expressions used in this instrument may be defined in the *Radiocommunications (Interpretation – Technical Framework) Determination 2024* or another instrument made under subsection 64(1) of the *Australian Communications and Media Authority Act 2005* to replace it, including the following:

- (a) AAS;
- (b) Act;
- (c) Australian territorial sea baseline;
- (d) average ground height;
- (e) geographic area;
- (f) HCIS identifier;
- (g) ITU-R Recommendation.

- (2) In this instrument, unless otherwise specified, a reference to a part of the spectrum or a frequency band includes all frequencies that are greater than but not including the lower frequency, up to and including the higher frequency.

Note: This subsection means the lower number in a part of the spectrum or a frequency band is not included in the frequency band.

7 References to other instruments

In this instrument, unless the contrary intention appears:

- (a) a reference to any other legislative instrument is a reference to that other legislative instrument as in force from time to time; and
- (b) a reference to any other kind of instrument or writing is a reference to that other instrument or writing as in force or existing from time to time.

Note 1: For references to Commonwealth Acts, see section 10 of the *Acts Interpretation Act 1901*; and see also subsection 13(1) of the *Legislation Act 2003* for the application of the *Acts Interpretation Act 1901* to legislative instruments.

Note 2: All Commonwealth Acts and legislative instruments are registered on the Federal Register of Legislation.

Note 3: See section 314A of the Act.

8 Unacceptable levels of interference

- (1) A level of interference caused by a radiocommunications transmitter operated under a 2.3 GHz spectrum licence is unacceptable if:
 - (a) the operation of the transmitter results in a contravention of a core condition of the licence relating to the maximum permitted level of radio emission from the transmitter:
 - (i) outside the parts of the spectrum the use of which is authorised under the licence; or
 - (ii) outside the geographic area of the licence; or
 - (b) subject to subsection (2), any part of the device boundary of the transmitter lies outside of the geographic area of the licence; or
 - (c) the device boundary of the transmitter cannot be calculated in accordance with item 1 of Schedule 1.
- (2) A level of interference mentioned in paragraph (1)(b) is not unacceptable in relation to a part of the device boundary that:
 - (a) lies outside the geographic area of the licence; and
 - (b) is connected to a radial that:
 - (i) is mentioned in item 1 of Schedule 1; and
 - (ii) does not cross over land outside the geographic area of the licence that is permanently above the Australian territorial sea baseline; and
 - (iii) does not cross over any of the following HCIS identifiers: IW3E, IW3I, IW3M, IW6A, IW6E, KX9, LX7, LX8, LX9.

Note: The HCIS identifiers beginning with IW describe an area near Adelaide. The HCIS identifiers beginning with KX and LX describe an area in the Bass Strait.

- (3) This section does not apply in relation to a radiocommunications transmitter to which section 10 applies.

Note: Subsection 145(1) of the Act provides that the ACMA may refuse to include in the Register details of a radiocommunications transmitter if the ACMA is satisfied that operation of the transmitter could cause an unacceptable level of interference to the operation of other radiocommunications devices. However, some radiocommunications transmitters are exempt from the requirement to be registered in the Register under their 2.3 GHz band spectrum licence – see subsection 69(2) of the Act. Accordingly, these transmitters are not required to meet the device boundary criterion specified in this Determination.

9 Accuracy

Unless otherwise specified, the value of a parameter in Schedule 1 must be estimated with a level of confidence not less than 95 percent that the true value of the parameter will always remain below the requirement specified in this instrument.

10 Transitional – radiocommunications transmitter registered before commencement of this instrument

- (1) If a radiocommunications transmitter was included in the Register in relation to a 2.3 GHz band spectrum licence before the commencement of this instrument (*relevant transmitter*), and is taken to cause an unacceptable level of interference under section 8, this section applies in relation to that transmitter.

- (2) Subject to subsection (3), for the purposes of subsection 145(4) of the Act, a level of interference caused by a relevant transmitter is unacceptable if it would have been unacceptable under the *Radiocommunications (Unacceptable Levels of Interference – 2.3 GHz Band) Determination 2013*, as in force at the time the relevant transmitter was included in the Register.

Note: The *Radiocommunications (Unacceptable Levels of Interference – 2.3 GHz Band) Determination 2013* is available, free of charge, from the Federal Register of Legislation at www.legislation.gov.au.

- (3) For the purposes of subsection 145(4) of the Act, if:
- (a) after the commencement of this instrument, both:
 - (i) a detail of a relevant transmitter changes (***relevant change***); and
 - (ii) the change to the detail is recorded in the Register; and
 - (b) the distance of the new device boundary of the relevant transmitter is, on each radial mentioned in item 1 of Schedule 1, equal to or less than the distance of the old device boundary of the relevant transmitter on that radial; and
 - (c) but for the effect of this subsection, a level of interference caused by the relevant transmitter, immediately after the change time, would be unacceptable;
- the level of interference caused by the relevant transmitter, immediately after the change time, is not unacceptable because of the relevant change.
- (4) In subsections (3):

change time, for a relevant transmitter, means the time the relevant change is recorded in the Register.

new device boundary, of a relevant transmitter, means the device boundary of the transmitter established immediately after the change time, in accordance with this instrument as in force at the change time.

old device boundary, of a relevant transmitter, means the device boundary of the transmitter established immediately before the change time, in accordance with the *Radiocommunications (Unacceptable Levels of Interference – 2.3 GHz Band) Determination 2013*, as in force at the registration time.

registration time, for a relevant transmitter, means the time the transmitter was included in the Register.

Schedule 1 Device boundary and device boundary criterion

(subsections 6(1), 8(1) and 8(2), section 9 and subsection 10(3))

1 Device boundary of a radiocommunications transmitter

- (1) The **device boundary** of a single radiocommunications transmitter is established as follows:

Step 1: Calculate the device boundary criterion at each $m \times 100$ metre increment along each of the n -degree radials, where:

m is each of the integers from 2 through 1010; and

n is each of the integer degrees from 0 (true north) through 359.

Step 2: For each radial, find the latitude and longitude of the first point on the radial, moving away from the location of the radiocommunications transmitter (that is, with the lowest value of m) where either:

- (a) the device boundary criterion, $RP - MP$, is less than or equal to 0; or
 (b) m is equal to 1010.

This point is the **end point** of the radial.

Step 3: The end point of each radial is the **device boundary** of the radiocommunications transmitter connected to that radial.

Note: $RP - MP$ (the device boundary criterion) is calculated under item 2 of this Schedule.

- (2) For a group of radiocommunications transmitters the **device boundary** is calculated as if for a single radiocommunications transmitter. However, the radiated power (**RP**) for a group of radiocommunications transmitters is taken:
- (a) to be equal for each bearing σ_n ; and
 (b) to have a value that is equal to the maximum horizontally radiated power, in any direction, of any of the radiocommunications transmitters in the group.

Note: σ_n is the bearing of the n^{th} -degree radial for the group of radiocommunications transmitters.

2 Device boundary criterion

The **device boundary criterion** is the value of the mathematical expression:

$$RP - MP$$

where:

MP is $PL(l_{mn}, L_{mn}) + LOP - G_r$;

RP is the horizontally radiated power, measured in dBm EIRP per 5 MHz, for each bearing, σ_n ;

Note 1: For a radiocommunications transmitter with AAS, the **RP** at bearing σ_n is defined as the sum of the gain of the antenna towards the horizontal plane and towards azimuth σ_n (dB) and the total radiated power (dBm). This allowance is based on the assumption that beam pointing angles and/or power can be controlled dynamically to ensure **RP** is not exceeded.

Note 2: For **RP** for a group of radiocommunications transmitters, see subitem 1(2) of this Schedule.

G_r	is the nominal radiocommunications receiver antenna gain, including feeder loss set to 0 dBi;
LOP	is the level of protection. For radiocommunications transmitters that incorporate an AAS, the LOP is -91.5 dBm per 5 MHz. For all other radiocommunications transmitters, the LOP is -99.5 dBm per 5 MHz;
$PL(l_{mn}, L_{mn})$	is the propagation loss (dB) (calculated under item 3 of this Schedule) of the m^{th} increment on the n^{th} radial.

3 Calculation of propagation loss for device boundary criterion

- (1) Subject to this item, the propagation loss for a radiocommunications transmitter, at the m^{th} increment on the n^{th} radial ($PL(l_{mn}, L_{mn})$) is calculated using:
 - (a) for a transmitter connected to an antenna that is located more than 6 metres above ground level – the method and parameters set out in section 2.2 of Recommendation ITU-R P.525-4 and section 4.5.2 of Recommendation ITU-R P.526-15; or
 - (b) for a transmitter connected to an antenna that is located 6 metres above ground level, or lower – the method and parameters set out in section 2.2 of Recommendation ITU-R P.525-4 and section 3.2 of Recommendation ITU-R P.2108-0.
- (2) For the purposes of using the method set out in section 4.5.2 of Recommendation ITU-R P.526-15:
 - (a) the height of the nominal radiocommunications receiver is taken to be 5 metres above ground level; and
 - (b) the height of the transmitter above ground level is the height of the antenna for the transmitter; and
 - (c) the height of a profile point is the average ground height of that point.

Note: The procedure for determining the average ground height is provided in item 2 of Schedule 2 of the *Radiocommunications (Interpretation – Technical Framework) Determination 2024*.
- (3) For the purposes of using the method set out in section 4.5.2 of Recommendation ITU-R P.526-15:
 - (a) the path profile in that method must be developed at 100 metre increments along each radial; and
 - (b) the average ground height is worked out at each increment along the path profile.

Note: The procedure for determining the average ground height is provided in item 2 of Schedule 2 of the *Radiocommunications (Interpretation – Technical Framework) Determination 2024*.
- (4) For the purposes of using the method set out in section 3.2 of Recommendation ITU-R P.2108-0:
 - (a) the percentage of locations is 0.08%, and the correction is applied at only one end of the path; and
 - (b) if the loss calculated using the method is less than 0 dB, the calculated loss value is taken to be 0 dB; and
 - (c) if the loss calculated using the method is greater than 8 dB, the calculated loss value is taken to be 8 dB.

4 Antenna height

- (1) In paragraph (b) of subitem 3(2), the height of the antenna for the transmitter, is the vertical height in metres of the phase centre of the transmitter's antenna measured with an error of less than 5 parts in 100 and relative to the point:
 - (a) located on the line of intersection between the external surface of the structure supporting the antenna and the surface of the ground or sea; and
 - (b) having the lowest elevation on that line.
- (2) For a group of radiocommunications transmitters, the height of the antenna for the group is the greatest of the heights of each individual transmitter in the group, calculated as in subitem (1).