EXPLANATORY STATEMENT

Approved by the Australian Communications and Media Authority

Radiocommunications Act 1992

Australian Communications and Media Authority Act 2005

Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 2.3 GHz Band) 2024

Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers – 2.3 GHz Band) 2024

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

Radiocommunications (Interpretation – Technical Framework) Determination 2024

Authority

The Australian Communications and Media Authority (**the ACMA**) has made the:

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

under section 262 of the *Radiocommunications Act 1992* (**the Act**) and subsection 33(3) of the *Acts Interpretation Act 1901* (**the AIA**).

Section 262 of the Act provides that the ACMA may make written advisory guidelines about any aspect of radiocommunication or radio emission.

Subsection 33(3) of the AIA relevantly provides that where an Act confers a power to make a legislative instrument, the power shall be construed as including a power exercisable in the like manner and subject to like conditions (if any) to repeal, rescind, revoke, amend or vary any such instrument.

The ACMA has made the *Radiocommunications (Unacceptable Levels of Interference – 2.3 GHz Band) Determination 2024* (**the ULOI Determination**) under subsection 145(4) of the Act and subsection 33(3) of the AIA.

Section 145 of the Act provides that the ACMA may refuse to include details of a radiocommunications transmitter that is proposed to be operated under a spectrum licence in the Register of Radiocommunications Licences (**Register**), maintained by the ACMA under Part 3.5 of the Act. The ACMA may so refuse where it is satisfied that the transmitter could cause an unacceptable level of interference to the operation of other radiocommunications devices under that spectrum licence or any other licence. Subsection 145(4) of the Act provides that the ACMA may determine, by written instrument, what are unacceptable levels of interference for the purposes of section 145 of the Act.

The ACMA has made the *Radiocommunications (Interpretation – Technical Framework) Determination 2024* (**the ITF Determination**) under subsection 64(1)) of the *Australian Communications and Media Authority Act 2005* (**the ACMA Act**).

Subsection 64(1) of the ACMA Act provides that the ACMA may make a written determination defining 1 or more expressions used in specified instruments, being instruments that are made by the ACMA.

Purpose and operation of the instruments

A spectrum licence permits a licensee, subject to specified conditions, to operate radiocommunications devices within a particular spectrum space, defined by a frequency band and a geographic area. Interference occurring between adjacent spectrum licences consists of in-band interference, across the geographic boundaries, and out-of-band interference, across the frequency boundaries. Interference can also occur between spectrum licensed services and services operating under apparatus and class licensing arrangements.

The Act provides a number of means by which the ACMA may manage interference resulting from the operation of a radiocommunications transmitter under a spectrum licence, including the ability to make advisory guidelines under section 262 of the Act and the ability to determine an unacceptable level of interference under subsection 145(4) of the Act.

Advisory guidelines

The ACMA has allocated spectrum licences in the 2302-2400 MHz frequency range (**2.3 GHz band**). The ACMA has previously made two instruments under section 262 of the Act in relation to those licences:

- the *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 2.3 GHz Band) 2013* (**2013 Transmitter Advisory Guidelines**); and
- the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers — 2.3 GHz Band) 2013* (**2013 Receiver Advisory Guidelines**).

The Transmitter Advisory Guidelines and the Receiver Advisory Guidelines are part of a set of instruments made by the ACMA that comprise the technical framework applicable to spectrum licences in the 2.3 GHz band, and revoke and replace the 2013 Transmitter Advisory Guidelines and 2013 Receiver Advisory Guidelines.

The purpose of the Transmitter Advisory Guidelines is to provide guidance to assist in managing the potential for interference to particular radiocommunications receivers, operating under apparatus or class licences, from interference caused by radiocommunications transmitters operating under spectrum licences in the 2.3 GHz band (**2.3 GHz transmitters**), where the 2.3 GHz transmitters operate in adjacent geographic areas, or adjacent frequency bands, to those receivers. The Transmitter Advisory Guidelines also provide guidance on managing interference across the geographic areas of spectrum licences issued in the 2.3 GHz band.

The Transmitter Advisory Guidelines aim to manage the potential for unwanted emissions, blocking and intermodulation products caused by radiocommunications transmitters operating under a spectrum licence interfering with radiocommunications receivers in the circumstances specified in the Transmitter Advisory Guidelines. The Transmitter Advisory Guidelines provide advice regarding the management of interference across the geographical areas of the 2.3 GHz band, or in adjacent frequency bands. Operators of spectrum licensed and apparatus licensed services should use the

Transmitter Advisory Guidelines in the planning of services or the resolution of interference. The ACMA will also take the Transmitter Advisory Guidelines into account when determining whether a spectrum licensee is causing interference to a licensed radiocommunications receiver that is operating in accordance with its licence conditions.

The purpose of the Receiver Advisory Guideline is to provide guidance to assist in managing the potential for interference to particular radiocommunications receivers, operating under a spectrum licence, from interference caused by radiocommunications transmitters operated under an apparatus or class licence, or by 2.3 GHz transmitters, where the transmitters operate in adjacent geographic areas, or adjacent frequency bands, to those receivers. The Receiver Advisory Guidelines also provide guidance on managing interference across the geographic areas of spectrum licences issued in the 2.3 GHz band.

The Receiver Advisory Guidelines aim to manage the potential for in-band and out-of-band interference caused by radiocommunications transmitters operated under an apparatus, class or spectrum licence interfering with radiocommunications receivers in the circumstances specified in the Receiver Advisory Guidelines. The Receiver Advisory Guidelines provide advice regarding the management of interference across the geographical areas of the 2.3 GHz band, or in adjacent frequency bands. Operators of spectrum, apparatus or class licensed services should use the Receiver Advisory Guidelines in the planning of services or in the resolution of interference with radiocommunications receivers operated under spectrum licences in the 2.3 GHz band. The ACMA will also take the Receiver Advisory Guidelines into account when determining whether an apparatus licensee or spectrum licensee or person under a class licence is causing interference to a spectrum licensed radiocommunications receiver that is operating in accordance with its licence conditions.

The Transmitter Advisory Guidelines and Receiver Advisory Guidelines do not limit the actions of a spectrum licensee in negotiating operating or protection arrangements with another licensee.

The Act does not prescribe any consequences for failing to comply with the Transmitter Advisory Guidelines or the Receiver Advisory Guidelines.

ULOI Determination

Section 69 of the Act requires each spectrum licence to include a condition that a radiocommunications transmitter must not be operated under the licence unless the requirements of the ACMA under Part 3.5 of the Act for registration of transmitters have been met.

The ULOI Determination aims to ensure that high levels of radio emission from radiocommunications transmitters operated under a spectrum licence issued in the 2.3 GHz band are kept within the geographic area and frequency band of the licence so as to not cause an unacceptable level of interference to other radiocommunications.

The ULOI Determination sets out what is meant by an ‘unacceptable level of interference’ in relation to a radiocommunications transmitter operated under a spectrum licence issued in the 2.3 GHz band. If the ACMA is satisfied that the operation of the radiocommunications transmitter could cause interference of the kind set out in the ULOI Determination, the ACMA will be able to refuse to register the radiocommunications transmitter. Refusal to register a radiocommunications transmitter is subject to internal reconsideration and review by the Administrative Appeals Tribunal (see paragraph 285(n) of the Act).

ITF Determination

There are common expressions in the advisory guidelines and the ULOI Determination for the 2.3 GHz band. There are also common expressions used in most other instruments, for different spectrum

licensed bands, made under subsection 145(4) of the Act and advisory guidelines made under subsection 262(1) of the Act.

To improve the readability of these instruments, the ACMA developed the ITF Determination to consolidate the common expressions used for different spectrum-licensed bands. This will allow the band-specific instruments to reference the expressions contained in the ITF Determination as needed.

Generally

A provision-by-provision description of:

- the Transmitter Advisory Guidelines is set out in the notes at **Attachment A**;
- the Receiver Advisory Guidelines is set out in the notes at **Attachment B**;
- the ULOI Determination is set out in the notes at **Attachment C**;
- the ITF Determination is set out in the notes at **Attachment D**.

The Transmitter Advisory Guidelines, Receiver Advisory Guidelines, ULOI Determination and ITF Determination when registered on the Federal Register of Legislation are disallowable legislative instruments under the *Legislation Act 2003* (**the LA**). They are subject to the sunsetting provisions in Part 4 of Chapter 3 of the LA.

Documents incorporated by reference

Subsection 314A(2) of the Act provides that an instrument under the Act may make provision in relation to a matter by applying, adopting or incorporating (with or without modifications) matter contained in any other instrument or writing as in force or existing at a particular time, or from time to time.

The Transmitter Advisory Guidelines incorporate the following documents by reference, as existing from time to time:

- The following recommendations published by the Radiocommunication Sector (**ITU-R**) of the International Telecommunication Union (**ITU**) and available, free of charge, at www.itu.int:
    a. ITU-R Recommendation P.526 *Propagation by diffraction*;
    b. ITU-R Recommendation P.1144 *Guide to the application of the propagation methods of Radiocommunications Study Group 3*;
    c. ITU-R Recommendation SA.363 *Space operation systems*;
    d. ITU-R Recommendation SA.509 *Space research earth station and radio astronomy reference antenna radiation pattern for use in interference calculations, including coordination procedures*;
    e. ITU-R Recommendation SA.609 *Protection Criteria for radiocommunications links for manned and unmanned near-Earth research satellites*;
    f. ITU-R Recommendation SA.1014 *Telecommunications requirements for manned and unmanned deep-space research*;
    g. ITU-R Recommendation SA.1016 *Sharing considerations relating to Deep-Space research*;
    h. ITU-R Recommendation SA.1154 *Provisions to protect the space research (SR), space operations (SO) and Earth exploration satellite services (EES) and to facilitate sharing with the mobile service in the 2 025-2 110 MHz and 2 200-2 290 MHz bands*;

i. ITU-R Recommendation SA.1157 *Protection criteria for deep-space research*;

j. ITU-R Recommendation SA.1743 *Maximum allowable degradation to radiocommunication links of the space research and space operation services arising from interference from emissions and radiations from other radio sources*;

k. ITU-R Recommendation SF.1006 *Determination of the interference potential between earth stations of the fixed-satellite service and stations in the fixed service.*

- Annex 7 to Appendix 7 of the Radio Regulations published by the ITU. The Radio Regulations are available, free of charge, at www.itu.int;
- The following Radiocommunications Assignment and Licensing Instructions (**RALI**) published by the ACMA and available, free of charge, from the ACMA's website at www.acma.gov.au:

  a. RALI FX 3 *Microwave fixed services frequency coordination* (**RALI FX 3**);

  b. RALI FX 21 *Television outside broadcasting services in the bands 1980-2110 MHz and 2170-2300 MHz* (**RALI FX 21**);

  c. RALI MS 31 *Notification Zones for Apparatus Licensed Services Around Radio Astronomy Facilities* (**RALI MS 31**);

  d. RALI MS 32 *Coordination of Apparatus Licensed Services within the Australian Radio Quiet Zone Western Australia* (**RALI MS 32**);

  e. RALI MS 37 *Coordination of spectrum-licensed devices operating in the 2.3 GHz band with SRS earth stations in the 2290-2300 MHz band* (**RALI MS 37**);

- Spectrum Planning Paper 10/01 *Coordination Information for Defence Aeronautical Mobile Telemetry Systems Operating in the 2200 to 2300 MHz Frequency Range*, published by the ACMA and available, free of charge, from the ACMA's website at www.acma.gov.au.

The Transmitter Advisory Guidelines also incorporate the following legislative instruments, as in force from time to time:

- the *Australian Radiofrequency Spectrum Plan 2021* (**Spectrum Plan**);
- the ITF Determination;
- the *Radiocommunications (Interpretation) Determination 2015* (**Interpretation Determination**), or any instrument replacing that determination;
- the *Radiocommunications (Australian Radio Quiet Zone Western Australia) Frequency Band Plan 2023* (**ARQZWA Band Plan**);
- the *Radiocommunications (Mobile-Satellite Service) (1980–2010 MHz and 2170–2200 MHz) Frequency Band Plan 2022* (**MSS Band Plan**);
- the *Radiocommunications (Television Outside Broadcasting) (2010-2110 MHz and 2200-2300 MHz) Frequency Band Plan* (**TOB Band Plan**);
- the ULOI Determination;
- the *Low Interference Potential Devices Class Licence 2015* (**LIPD class licence**).

The Receiver Advisory Guidelines incorporate the following legislative instruments as in force from time to time:

- the ITF Determination;
- the ULOI Determination.

The ULOI Determination incorporates the following recommendations, published by the ITU-R, by reference, as existing from time to time and available, free of charge, at www.itu.int:

- ITU-R Recommendation P.525-4 *Calculation of free-space attenuation*;

- ITU-R Recommendation P.526-15 *Propagation by diffraction*;
- ITU-R Recommendation P.2108-0 *Prediction of clutter loss*.

The ULOI Determination also incorporates the following HCIS identifiers: IW3E, IW3I, IW3M, IW6A, IW6E, KX9, LX7, LX8, LX9, describing areas in the Australian Spectrum Map Grid for sections of the Gulf of St Vincent and Bass Strait.

The ITF Determination also incorporates the following documents by reference, as existing from time to time:

- 3 Second SRTM Derived Digital Elevation Model (DEM) Version 1.0 (**DEM-3S**), created by Geoscience Australia, and available free of charge from its website at www.ga.gov.au (Geoscience Australia has also published a smoothed variation of DEM-3S. This smoothed variation contains different elevation data than DEM-3S and is not to be used for the purposes of the ULOI Determination);
- the Australian Spectrum Map Grid 2012, published by the ACMA, and available, free of charge, from the ACMA's website at www.acma.gov.au;
- the *Digital Elevation Model Interpretation*, published by the ACMA, and available, free of charge, from the ACMA's website at www.acma.gov.au;
- the Radio Regulations published by the ITU (**Radio Regulations**). The Radio Regulations contain Articles, Appendixes, Resolutions and Recommendations of the ITU, relating to international radiocommunications coordination. The Radio Regulations are available, free of charge, at www.itu.int.

The ULOI Determination also incorporates the ITF Determination, as in force from time to time.

The ULOI Determination also incorporates the 2013 ULOI Determination. The effect of the 2013 ULOI Determination is saved in relation to radiocommunications transmitters included in the Register before the commencement of the ULOI Determination, and is incorporated as in force at the time each such transmitter was included in the Register.

Subsection 65(1) of the ACMA Act provides that an instrument under subsection 64(1) of the ACMA Act define an expression by applying, adopting or incorporating (with or without modifications) matter contained in any other instrument or writing as in force or existing at a particular time, or from time to time.

The ITF Determination also incorporates the designation of the Geocentric Datum of Australia in Commonwealth of Australia *Gazette* GN 35, dated 6 September 1995 (**GDA94**), as existing on that date. Gazette GN 35 is available, free of charge, from the Federal Register of Legislation at www.legislation.gov.au.

The ITF Determination also incorporates the following Acts and legislative instruments, as in force from time to time:

- *Seas and Submerged Lands Act 1973*;
- the Spectrum Plan;
- the ARQZWA Band Plan;
- the LIPD class licence.

Each of the Transmitter Advisory Guidelines, Receiver Advisory Guidelines and ULOI Determination refers to the Act, the AIA and the LA, without incorporating them by reference.

Each of these Acts and legislative instruments is available, free of charge, from the Federal Register of Legislation (www.legislation.gov.au).

Consultation

Before the Transmitter Advisory Guidelines, Receiver Advisory Guidelines, ITF Determination and ULOI Determination were made, the ACMA was satisfied that consultation was undertaken to the extent appropriate and reasonably practicable, in accordance with section 17 of the LA.

Under Part 4 of Chapter 3 of the LA, the 2013 Transmitter Advisory Guidelines, 2013 Receiver Advisory Guidelines and the 2013 ULOI Determination were due to 'sunset' on 1 April 2024. The ACMA analysed the instruments and identified that they were a necessary and useful part of the regulatory framework. Spectrum licences in the 2.3 GHz band are due to expire in 2030. Given this, the ACMA decided to remake the 2013 Transmitter Advisory Guidelines, the 2013 Receiver Advisory Guidelines and the 2013 ULOI Determination to ensure the spectrum licence technical framework would be in place for the remainder of the spectrum licences' duration. The ACMA proposed to remake the instruments with some changes. The ACMA also proposed to make the ITF Determination.

A draft version of each instrument was released for public consultation on 15 September 2023, together with the consultation paper *Proposal to remake instruments for the 2.3 GHz spectrum-licensed band*. Consultation closed on 13 October 2023.

The ACMA received four submissions to the consultation from AMTA, Ericsson, Optus and Telstra. These submissions where generally supportive of the draft instruments. They also identified a few editorial changes and corrections.

After considering the feedback provided, the ACMA decided to adopt most of the editorial changes and corrections identified.

Regulatory impact assessment

A preliminary assessment of the proposal to remake the 2013 Transmitter Advisory Guidelines, 2013 Receiver Advisory Guidelines and 2013 ULOI Determination was conducted by the Office of Impact Analysis (**OIA**) (formerly the Office of Best Practice Regulation (**OBPR**)), based on information provided by the ACMA, for the purposes of determining whether a Regulation Impact Statement (**RIS**) would be required. OIA advised that a RIS would not be required because the proposed regulatory changes are minor or machinery in nature (OIA reference number OBPR23-05416).

Statement of compatibility with human rights

Subsection 9(1) of the *Human Rights (Parliamentary Scrutiny) Act 2011* requires the rule maker in relation to a legislative instrument to which section 42 of the LA applies (disallowance), to cause a statement of compatibility with human rights to be prepared in respect of that legislative instrument.

The statement of compatibility set out below has been prepared to meet that requirement.

Overview of the instruments

Section 262 of the Act permits the ACMA to make advisory guidelines about any aspect of radiocommunication or radio emissions. The purpose of the Transmitter Advisory Guidelines is to provide information and guidance to assist with the management of interference to radiocommunications receivers operating under apparatus, class and spectrum licences in or adjacent

to the 2.3 GHz band caused by radiocommunications transmitters operating under spectrum licences issued in the 2.3 GHz band.

The purpose of the Receiver Advisory Guidelines is to provide information and guidance to assist with the management of interference to radiocommunications receivers operating under spectrum licences in the 2.3 GHz band caused by radiocommunications transmitters operating under other licences issued in or near the 2.3 GHz band.

Section 69 of the Act requires each spectrum licence to include a condition which specifies that a radiocommunications transmitter must not be operated under the licence unless the requirements of the ACMA under Part 3.5 of the Act for registration of transmitters have been met.

Under subsection 145(1) of the Act, the ACMA may, if it is satisfied that the operation of a radiocommunications transmitter could cause an unacceptable level of interference to other radiocommunications devices, refuse to register the transmitter. The ULOI Determination sets out what is meant by an 'unacceptable level of interference' in relation to a radiocommunications transmitter operated under a spectrum licence issued in the 2.3 GHz band. The ULOI Determination only applies in relation to 2.3 GHz band spectrum licensees.

Under subsection 64(1) of the ACMA Act, the ACMA may make a written determination defining 1 or more expressions used in other specified instruments. The ITF Determination defines common expressions in the Receiver Advisory Guidelines, Transmitter Advisory Guidelines and the ULOI Determination for the 2.3 GHz band. Many of these are also common expressions used in other instruments, for different spectrum licensed bands, made under subsection 145(4) of the Act and advisory guidelines made under subsection 262(1) of the Act.

Human rights implications

The ACMA has assessed whether the Transmitter Advisory Guidelines, Receiver Advisory Guidelines, ITF Determination and ULOI Determination are compatible with human rights, being the rights and freedoms recognised or declared in the international instruments listed in subsection 3(1) of the *Human Rights (Parliamentary Scrutiny) Act 2011*.

Having considered the likely impact of the Transmitter Advisory Guidelines, Receiver Advisory Guidelines, ITF Determination and ULOI Determination and the nature of the applicable rights and freedoms, the ACMA has formed the view that the Transmitter Advisory Guidelines, Receiver Advisory Guidelines, ITF Determination and ULOI Determination do not engage any of those rights or freedoms.

Conclusion

The Transmitter Advisory Guidelines, Receiver Advisory Guidelines, ITF Determination and ULOI Determination are compatible with human rights as they do not raise any human rights issues.

Attachment A

Notes to the *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 2.3 GHz Band) 2024*

Part 1 – Preliminary

Section 1 Name

This section provides for the Transmitter Advisory Guidelines to be cited as the *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 2.3 GHz Band) 2024*.

Section 2 Commencement

This section provides for the Transmitter Advisory Guidelines to commence on 31 March 2024.

The Federal Register of Legislation may be accessed free of charge at www.legislation.gov.au.

Section 3 Authority

This section identifies the provision of the Act that authorises the making of the Transmitter Advisory Guidelines, namely section 262 of the Act.

Section 4 Repeal of the *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 2.3 GHz Band) 2013*

This section repeals the *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 2.3 GHz Band) 2013* (F2013L02143).

Section 5 Definitions

This section defines a number of key terms used throughout the Transmitter Advisory Guidelines.

A number of other expressions used in the Transmitter Advisory Guidelines are defined in the Act and the ITF Determination.

This section also provides that unless the contrary intention appears, certain terms used in the Transmitter Advisory Guidelines are defined in the Interpretation Determination and the Spectrum Plan.

This section also provides that, in the Transmitter Advisory Guidelines, 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.

Section 6 References to other instruments

This section provides that in the Transmitter Advisory Guidelines, unless the contrary intention appears:

- a reference to another legislative instrument is a reference to that other legislative instrument as in force from time to time; and
- 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.

Part 2 – Overview

Section 7 Background

Subsection 7(1) provides basic information about spectrum licences and the modes of interference occurring across frequency boundaries and geographic areas of spectrum licences.

Subsection 7(2) explains that the Transmitter Advisory Guidelines have been made to provide guidance on managing interference to licensed radiocommunications receivers operating in relation to:

- point to point fixed services operating on frequencies below the 2.3 GHz band (Part 3);
- space research service, space operations service and earth exploration-satellite service receivers operating in the 2200 MHz to 2300 MHz band (Part 4);
- mobile services operating on frequencies below the 2.3 GHz band (Part 5);
- television outside broadcast services operating in the 1980-2010 MHz, 2010-2110 MHz, 2170-2200 MHz and 2200-2300 MHz frequency bands (Part 6);
- radiocommunications receivers tuned to radiocommunications transmitters operating under the LIPD class licence in the 2300 MHz to 2483.5 MHz frequency band (Part 7).

Subsection 7(3) notes that the Guidelines also provide advice regarding:

- protection of radio astronomy services operating on a fortuitous basis (Part 8); and
- managing interference across the geographic boundaries of 2.3 GHz spectrum licences (Part 9).

Subsection 7(4) notes that, when modelling propagation loss in the 2.3 GHz band, ITU-R Recommendation P.1144 provides a guide on the application of various propagation methods. These methods were developed internationally by the ITU-R. ITU-R Recommendation P.1144 advises users on the most appropriate propagation methods for particular applications, as well as the limits, required input information, and output for each of the methods. The subsection recommends that the most recent version of the propagation models defined by the ITU-R should be considered when modelling propagation in the 2.3 GHz band.

Subsection 7(5) states that the ACMA will take the Transmitter Advisory Guidelines into account in determining whether a radiocommunications transmitter operated under a 2.3 GHz band spectrum licence is causing interference to a radiocommunications receiver operating under another licence.

Subsection 7(6) notes that the Transmitter Advisory Guidelines do not prevent a person negotiating and implementing other protection requirements with other persons.

Part 3 – Point to point fixed service receivers

Section 8 Background

Section 8 provides background information on point-to-point fixed service receivers operating in bands adjacent to the 2.3 GHz band. A reference to RALI FX 3 is made for guidance on channel arrangements and frequency assignment criteria for point-to-point fixed services. Since RALI FX 3 is under constant review, users of the RALI are advised to consult the most current version when planning systems and managing interference.

Section 9 Point to point receiver protection requirements

Section 9 provides that the protection requirements for point-to-point licences are provided in RALI FX 3. Spectrum licensees are to provide the same level of in-band and out-of-band protection to point-to-point licences as would be provided for apparatus licensed radiocommunications transmitters used for fixed services.

Part 4 – Space services

Section 10 Background

Section 10 outlines the use of the 2200-2300 MHz band by space research, space operations and earth exploration-satellite services. Details of the relevant earth stations to protect are contained in the Register. Direct liaison is encouraged between spectrum licensees and both space receive station operators and earth receive station operators during the system planning phases of new services when they are nearby each other.

Section 11 Protection requirements

Section 11 states that the protection requirements for earth receive stations are set out in Annex 7 to Appendix 7 of the Radio Regulations. Additional in-band protection requirements for earth receive stations in the 2.3 GHz band are set out in ITU-R Recommendation SF.1006. Protection requirements for earth receive stations used for the purposes of the space research service in the 2290-2300 MHz frequency band are set out in RALI MS 37.

Additional information on the protection and coordination requirements for earth receive stations used for the purpose of the space research service is provided in the form of references to various ITU-R Recommendations.

Part 5 – Mobile services

Section 12 Background

Section 12 provides information on mobile services that operate in 2200-2290 MHz band. Currently, the only mobile services in operation in the band are aeronautical mobile telemetry (**AMT**) services at specific locations as provided in the Spectrum Planning Paper 10/01 *Coordination Information for Defence Aeronautical Mobile Telemetry Systems Operating in the 2200 to 2300 MHz Frequency Range*.

Section 13 Protection requirements

Section 13 provides that a spectrum licensed transmitter operating in the 2.3 GHz band will not be deemed to cause unacceptable interference to an apparatus licensed fixed receive station used for AMT services in the 2200-2290 MHz frequency band, if it is operated in accordance with the conditions of the licence.

Part 6 –TOB services

Section 14 Background

Section 14 states that arrangements for the licensing and frequency coordination of TOB services in the 1980 MHz to 2110 MHz and 2170 MHz to 2300 MHz frequency bands are provided in RALI FX 21. Under the MSS Band Plan, existing TOB services in certain circumstances are required to cease operation in the 1980 MHz to 2010 MHz and 2170 MHz to 2200 MHz frequency bands by 1 March

2026 in metropolitan areas and other designated areas, and by 1 March 2024 elsewhere. The TOB Band Plan provides that the 2010 MHz to 2110 MHz and 2200 MHz to 2300 MHz frequency bands may be used for the purposes of TOB services.

Section 15 Protection requirements

Section 15 provides that a radiocommunications transmitter operated under a 2.3 GHz band spectrum licence is required to protect TOB services in accordance with RALI FX 21, if the transmitter was registered in the Register after the date of issue of the TOB apparatus licence. Only TOB receivers with site details recorded in the Register will be afforded protection. In planning for the operation of radiocommunications transmitters under a 2.3 GHz spectrum licence, spectrum licensees should consult the procedures set out in RALI FX 21.

Part 7 – Class licensed services

Section 16 Background

Section 16 provides that the LIPD class licence permits the operation of a number of different types of radiocommunications transmitters in the 2400-2483.5 MHz band. Transmitters operated under the LIPD class licence must not cause interference to other radiocommunications services and are not offered protection from other services.

Section 17 Protection requirements

Section 17 provides that spectrum licensed radiocommunications transmitters operating in the 2.3 GHz band are generally taken not to cause unacceptable interference to a radiocommunications receiver tuned to a radiocommunications transmitter operating under the LIPD class licence if it is operated in accordance with the conditions of the spectrum licence.

Part 8 – Radio Astronomy services

Section 18 Background

Subsection 18(1) provides information on the use of various frequency bands by radio astronomy services under Australian footnote reference AUS87 in the Spectrum Plan.

Subsection 18(2) describes the site located in remote central Western Australia which has been established for radio astronomy use and has been protected by the establishment of the ARQZWA by the ARQZWA Band Plan. The ARQZWA has been established across the radio spectrum from 70 MHz through to 25.25 GHz. An area within 70 kilometres of the site has been excluded from the geographic area of 2.3 GHz spectrum licences.

Section 19 Protection requirements

Subsections 19(1) and (2) state that, when deploying systems, spectrum licensees should have regard to radio astronomy services operating under footnote AUS87 of the Spectrum Plan. RALI MS 31 is referenced as it contains details on the notification procedure to follow before deploying systems. Since RALI MS 31 is subject to constant review, licensees are advised to consult the most current version to ensure the most up-to-date information and notification procedures are used. Details on the location of radio astronomy receivers operating in spectrum in, or close to, the 2.3 GHz band are contained in footnote AUS87 of the Spectrum Plan. When considering radio astronomy sites contained in footnote AUS87, the most current version of the Spectrum Plan should be consulted to determine if any sites have been removed from or included in this list.

Subsection 19(3) provides that spectrum licensees in areas adjacent to the ARQZWA should coordinate proposed stations with reference to the methods and limits set out in RALI MS 32.

Part 9 – Spectrum licensed receivers

Section 20 Background

Section 20 provides background information on the primary mechanism for managing interference across spectrum licence geographical boundaries, which is through the ULOI Determination. The unacceptable levels of interference specified in that determination control levels of emissions across a geographical boundary rather than coordinating with individual stations. Since Time Division Duplex (**TDD**) technologies are considered the most likely to be deployed in the 2.3 GHz band, it is noted that at times it may be necessary for licensees operating radiocommunications transmitters in the 2.3 GHz band to negotiate with adjacent area spectrum licensees when deploying services in order to avoid causing harmful interference.

Section 21 Recommended preliminary coordination procedures

Section 21 provides that in order to best manage interference across geographical boundaries it is recommended that when planning services, spectrum licensees operating radiocommunications transmitters in the 2.3 GHz band should, in addition to meeting the requirements of the ULOI Determination, coordinate with radiocommunications receivers that are registered in the Register and operating under spectrum licences in geographic areas adjacent to their licence area to avoid harmful interference. If this preliminary coordination indicates interference may occur, it is recommended that the licensee either replan their systems or negotiate with the affected spectrum licensee to find a resolution.

Attachment B

Notes to the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers — 2.3 GHz Band) 2024*

Part 1 – Preliminary

Section 1 Name

This section provides for the Receiver Advisory Guidelines to be cited as the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers — 2.3 GHz Band) 2024*.

Section 2 Commencement

This section provides for the Receiver Advisory Guidelines to commence on 31 March 2024.

The Federal Register of Legislation may be accessed free of charge at www.legislation.gov.au.

Section 3 Authority

This section identifies the provision of the Act that authorises the making of the Receiver Advisory Guidelines, namely section 262 of the Act.

Section 4 Repeal of the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers – 2.3 GHz Band) 2013*

This section revokes the 2013 Receiver Advisory Guidelines (F2013L02150).

Section 5 Definitions

This section defines a number of key terms used throughout the Receiver Advisory Guidelines.

A number of other expressions used in the Receiver Advisory Guidelines are defined in the Act and the ITF Determination.

This section also provides that, in the Receiver Advisory Guidelines, 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.

Section 6 References to other instruments

This section provides that in the Receiver Advisory Guidelines, unless the contrary intention appears:

- a reference to another legislative instrument is a reference to that other legislative instrument as in force from time to time; and
- 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.

Part 2 – Overview

Section 7 Background

Subsections 7(1) and 7(2) provide basic information about spectrum licences and the modes of interference occurring across frequency boundaries and geographical areas of spectrum licences. They describe how interference is managed under the Act.

Subsection 7(3) outlines the purpose of the Receiver Advisory Guidelines. Their purpose is to provide protection to radiocommunications receivers operated under spectrum licences in the 2.3 GHz band

from interference caused by radiocommunications transmitters operated under an apparatus or class licence or another spectrum licence. They are also intended to assist in the management of in-band and out-of-band interference by providing compatibility requirements for registered fixed receivers operated under a spectrum licence issued for the 2.3 GHz band. The management of, and protection from, interference is facilitated by the minimum level of receiver performance requirements set out in the Receiver Advisory Guidelines.

Subsection 7(4) states that the Receiver Advisory Guidelines are intended to provide guidance on the management and settlement of interference to 2.3 GHz band receivers, caused by radiocommunications transmitters operated under an apparatus or class licence or another spectrum licence issued under the Act. The ACMA intends to take the guidelines into account in determining whether interference has occurred, in the absence of separate protection arrangements agreed between the affected licensees.

Subsection 7(5) provides that the Receiver Advisory Guidelines should be used by licensees, and authorised third parties, under spectrum and apparatus licences in planning services and in the resolution of interference with radiocommunications under spectrum licences in the 2.3 GHz band.

Subsection 7(6) notes that the Receiver Advisory Guidelines do not prevent a person negotiating other protection arrangements with another person.

Part 3 – Managing interference from other services

Section 8 In-band interference

Subsection 8(1) explains the methods through which in-band interference to a radiocommunications receiver operated under a spectrum licence in the 2.3 GHz band, caused by adjacent spectrum licensed transmitters, is managed. Such interference is managed through the core conditions of the licence and application of the device boundary criterion specified in the ULOI Determination.

Subsection 8(2) explains the methods through which in-band interference to a radiocommunications receiver operated under a spectrum licence in the 2.3 GHz band, caused by apparatus licensed radiocommunications transmitters, is managed. In this case it is managed as if the transmitter is operated under a spectrum licence. This means that the device boundary criterion that applies to spectrum licensed radiocommunications transmitters is treated as though it applies to those apparatus licensed radiocommunications transmitters.

Subsection 8(3) states that application of the device boundary criterion manages in-band interference. The device boundary criterion incorporates emissions limits that provide reasonable protection within the geographic area of a spectrum licence.

Subsection 8(4) explains that interference management frameworks, if any are required, for radiocommunications devices operated under a class licence are contained in the relevant class licence.

Section 9 Out-of-band interference

Section 9 explains what constitutes out-of-band interference to a radiocommunications receiver operated under a spectrum licence, and how it can be managed through compatibility requirements for receivers.

Out-of-band interference can occur when radiocommunications transmitters are operated near each other, whether in frequency or distance. It may consist of intermodulation products, harmonic signals,

parasitic signals or other spurious signals generated at site or arriving at the radiocommunications receiver.

Out-of-band interference may extend for significant frequency separations on either side of a spectrum licence and its severity may depend on the quality of the radiocommunications receiver. For these reasons, out-of-band interference is managed through interference management procedures based on a compatibility requirement in Part 5 for radiocommunications receivers. A minimum level of receiver performance is specified in Part 4, in conjunction with a compatibility requirement for co-ordination with other licensed services. The use of a performance standard for spectrum licensed radiocommunications receivers ensures that the burden of mitigating interference is not solely placed on the operator of the radiocommunications transmitter.

Section 10 Recording radiocommunications receiver details in the Register

Section 10 explains that a 2.3 GHz receiver will not be afforded protection from apparatus licensed or spectrum licensed radiocommunications transmitters unless the details of the receiver are included in the Register, before the relevant apparatus licence was first issued or before the details of the spectrum licensed transmitter were included in the Register. Accordingly, in order to meet the compatibility requirement in Part 5 of the Receiver Advisory Guidelines, a receiver operated under a 2.3 GHz band spectrum licence must have its details included in the Register. A note is included to indicate that Part 5 is also relevant.

Section 11 Mobile devices

Section 11 explains that the compatibility requirement in Part 5 is not applicable to radiocommunications receivers that are mobile devices.

Part 4 – Minimum level of receiver performance

Section 12 Notional receiver performance level

Section 12 explains why a notional receiver performance level is needed. The level of interference experienced by a radiocommunications receiver is in part dependent on the quality of the receiver itself. Emissions from a radiocommunications transmitter should not have to be reduced below a point where the performance of the receiver is the main cause of the problem. As a result, it is necessary to establish a benchmark performance level for radiocommunications receivers.

The benchmark performance level is set out in Schedule 1.

This section also provides that a receiver will need to meet the notional receiver performance level to gain protection from interference from a radiocommunications transmitter.

Part 5 – Compatibility requirement

Section 13 Compatibility

Subsection 13(1) sets out the compatibility requirement to be met for a fixed radiocommunications transmitter operated under an apparatus licence or a spectrum licence, in relation to a fixed radiocommunications receiver specified in subsection 13(2), in order for the receiver to be afforded

protection from interference under the Receiver Advisory Guidelines. The fixed transmitter licensee must ensure that the transmitter meets the compatibility requirement in Schedule 2.

Subsection 13(2) provides that a fixed receiver is specified if it:

- operates under a spectrum licence; and
- has at least the notional level of receiver performance set out in Schedule 1; and
- was included in the Register, before:
    - for a fixed radiocommunications transmitter operated under a spectrum licence – the fixed transmitter was included in the Register; and
    - for a fixed radiocommunications transmitter operated under an apparatus licence – the apparatus licence was issued.

Subsection 13(3) provides that a radiocommunications transmitter operated under a class licence must comply with the conditions of the class licence.

Schedule 1 Notional receiver performance level

Schedule 1 provides spectrum licensees with information regarding the notional receiver performance level under a spectrum licence in the 2.3 GHz band. This schedule provides information relating to:

- adjacent channel selectivity;
- receiver intermodulation response rejection;
- receiver blocking; and
- receiver antenna and feeder losses.

Spectrum-licensed radiocommunications receivers operating in the 2.3 GHz band should meet this performance level to minimise interference from and improve coexistence with radiocommunications transmitters operating under apparatus licences. The notional receiver performance levels are based on technical specifications for 5G base stations detailed in 3GPP 38.104 *NR; Base Station (BS) radio transmission and reception*. Copies of the technical standard 3GPP 38.104 are available, free of charge, from the 3GPP website at www.3GPP.org.

Schedule 2 Compatibility requirement

Schedule 2 outlines, for the purpose of assessing compatibility of fixed receivers operated in the 2.3 GHz band with other radiocommunications services, the maximum unwanted signal level that a radiocommunications transmitters should not exceed for a 5 MHz bandwidth. It also provides that logarithmic scaling should be used to find a maximum unwanted signal level in alternative bandwidths.

Attachment C

Notes to the *Radiocommunications (Unacceptable Levels of Interference – 2.3 GHz Band) Determination 2024*

Section 1 Name

This section provides for the ULOI Determination to be cited as the *Radiocommunications (Unacceptable Levels of Interference – 2.3 GHz Band) Determination 2024*.

Section 2 Commencement

This section provides for the ULOI Determination to commence on 31 March 2024.

The Federal Register of Legislation may be accessed free of charge at www.legislation.gov.au.

Section 3 Authority

This section identifies the provision of the Act that authorises the making of the ULOI Determination, namely subsection 145(4) of the Act.

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

This section repeals the *Radiocommunications (Unacceptable Levels of Interference – 2.3 GHz Band) Determination 2013* (F2013L02155)).

Section 5 Purpose

This section states that the purpose of the ULOI Determination is to set out the technical rules defining what is considered to be an unacceptable level of interference caused by a radiocommunications transmitter operating under a spectrum licence in the 2.3 GHz band. The unacceptable level of interference is defined so as to ensure that high emission levels from spectrum licensed radiocommunications transmitters are contained within the geographic area and frequency bands of the licence under which the transmitter operates. There are 2 notes that clarify and provide further information about the purpose of the Determination.

Section 6 Definitions

This section defines a number of key terms used throughout the ULOI determination.

A number of other expressions used in the ULOI determination are defined in the Act and the ITF Determination.

This section also provides that, in the ULOI determination, 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.

Section 7 References to other instruments

This section provides that in the ULOI Determination, unless the contrary intention appears:

- a reference to another legislative instrument is a reference to that other legislative instrument as in force from time to time; and
- 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.

Section 8 Unacceptable levels of interference

Section 8 provides the technical definition of what will be taken to be an unacceptable level of interference for the purpose of interference management in the 2.3 GHz band. A radiocommunications transmitter producing radio emissions that are found to cause unacceptable levels of interference to other radiocommunications services will, in most circumstances, not be registered in the Register for operation under a spectrum licence in the band, in accordance with subsection 145(1) of the Act. Licensees who operate such devices without registration will be in breach of the condition included in the licence because of section 69 of the Act and may become subject to further compliance action under the Act.

It is an offence, and subject to a civil penalty, to operate a radiocommunications device otherwise than as authorised by a spectrum licence (see Part 3.1 of the Act). The maximum penalty for the offence is 2 years imprisonment for an individual, or 1500 penalty units ($469,500 on the current value of a penalty unit of $313) where the radiocommunications device is a radiocommunications transmitter. The maximum civil penalty is 300 penalty units ($93,900 on the current value of a penalty unit of $313) where the radiocommunications device is a radiocommunications transmitter. Operation of a radiocommunications device is not authorised by a spectrum licence if it is not in accordance with the conditions of the licence (subsection 64(2) of the Act).

Under subsection 8(1), a radiocommunications transmitter operated under a 2.3 GHz band spectrum licence is taken to be causing unacceptable interference if:

- the operation of the transmitter breaches the core conditions of the licence relating to unwanted emissions outside the 2.3 GHz band or outside the licence area; or
- subject to the exception identified below, any part of the 'device boundary' of the transmitter lies outside the geographic area of the licence. The 'device boundary' is a theoretical boundary calculated around the device using the methodology set out in Schedule 1 and definitions in the ITF Determination; or
- the device boundary of the transmitter cannot be calculated in accordance with item 1 of Schedule 1. This could apply to a mobile device for example.

Subsection 8(2) provides that a level of interference mentioned in paragraph 8(1)(b) is not unacceptable in relation to a part of the device boundary that lies outside the geographic area of the licence, for any radials that extend beyond the licence area that only pass over the Australian territorial sea baseline. The exceptions to this are radials that cross define sections of the Gulf of St Vincent and Bass Strait (as defined by the HCIS identifiers IW3E, IW3I, IW3M, IW6A, IW6E, KX9, LX7, LX8 and LX9). This is because there is a strong risk of interference to and from services deployed in Adelaide and the Yorke Peninsula, as well as, between Victoria and Tasmania due to frequent and long periods of ducting.

Subsection 8(3) provides that this section does not apply in relation to a radiocommunications transmitter to which section 10 applies.

Section 9 Accuracy

Section 9 specifies that, 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 the ULOI Determination. That is to say, an estimate must have a likelihood of 95 percent or greater of being within the requirement for the parameter. This level of accuracy is intended to align with 3GPP 37.141 *NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing*. Copies of the technical standard 3GPP 37.141 are available, free of charge, from the 3GPP website at www.3GPP.org.

Section 10 Transitional – radiocommunications transmitter registered before commencement of this instrument

Section 10 applies to a radiocommunications transmitter included in the Register in relation to a 2.3 GHz band spectrum licence before the ULOI Determination commenced that would be taken to cause an unacceptable level of interference under section 8. For such a transmitter, a level of interference caused by the transmitter is unacceptable if it would have been unacceptable under the 2013 ULOI Determination, as in force at the time the relevant transmitter was included in the Register. This preserves the rights of spectrum licensees who have already had transmitters included in the Register. This section allows such transmitters to be modified provided that this would not result in an increase to the old device boundary on any radial.

Schedule 1 Device boundary and device boundary criterion

Schedule 1 sets out the technical procedure for calculating the device boundary of a radiocommunications transmitter or group of radiocommunications transmitters, for the purposes of the ULOI Determination.

Item 1 of Schedule 1

Item 1 of this Schedule details the steps involved in calculating the device boundary. The calculation is an iterative process and involves testing whether the device boundary criterion specified in item 2 of this Schedule is met at increasing distances (of 100 metre increments) from the transmitter along radial lines spaced around the centre location of the transmitter (worked out in accordance with this Schedule). The latitude and longitude of the first point on a radial where the device boundary criterion is less than or equal to zero is considered to be the furthest point of the device boundary on this radial. There are 360 radials for each transmitter, meaning there are 360 points that form the device boundary.

If the end point of any radial in relation to a transmitter is outside the geographic area of the licence, then unless a specified exception applies, the transmitter will be taken to cause an unacceptable level of interference.

For a group of radiocommunications transmitters the device boundary is calculated as if for a single radiocommunications transmitter. However, the radiated power for a group of radiocommunications transmitters is taken to be equal for each bearing and 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.

Item 2 of Schedule 1

Item 2 provides the device boundary criterion, which is the mathematical expression used to calculate a device boundary in accordance with item 1 of this Schedule. The mathematical expression consists of the horizontally radiated power of a device minus the path loss function. The device boundary criterion has function dependencies which include the horizontally radiated power, the receiver level of protection and the propagation loss set out in item 3 of this Schedule, for each segment along each radial.

Item 3 of Schedule 1

Item 3 provides the methodology for determining the propagation loss component for determining the device boundary criterion in item 2 of this Schedule. This item refers to specific ITU-R Recommendations which detail the method and parameters to be used to calculate the propagation loss. This item also details how relevant parameters, which are used in the calculation of propagation loss, are to be determined.

Item 4 of Schedule 1

Item 4 specifies the procedure for calculating the height of the antenna for a transmitter or group of transmitters. The height of the antenna for a transmitter is used to calculate the propagation loss component of the device boundary criterion as detailed in item 3 of this Schedule. The device boundary criterion is set out in item 2 of this Schedule. The device boundary criterion is the mathematical expression used to calculate a device boundary. The process for calculating a device boundary is set out in item 1 of this Schedule.

Attachment D

Notes to the *Radiocommunications (Interpretation – Technical Framework) Determination 2024*

Section 1 Name

This section provides for the ITF Determination to be cited as the *Radiocommunications (Interpretation – Technical Framework) Determination 2024*.

Section 2 Commencement

This section provides for the ITF Determination to commence on 31 March 2024.

The Federal Register of Legislation may be accessed free of charge at www.legislation.gov.au.

Section 3 Authority

This section identifies the statutory provision that authorises the making of the ITF Determination, namely subsection 64(1) of the *Australian Communications and Media Authority Act 2005*.

Section 4 Schedule 1 – Dictionary

This section provides that the Dictionary in Schedule 1 defines a number of expressions used in the ITF Determination, instruments made under subsection 145(4) of the Act and advisory guidelines made under subsection 262(1) of the Act. This excludes terms in the Dictionary that are already defined in instruments made under subsection 145(4) of the Act and advisory guidelines made under subsection 262(1) of the Act.

A number of other expressions used in the ITF determination are defined in the Act.

Section 5 References to other instruments

This section provides that in the ULOI Determination, unless the contrary intention appears:

- a reference to another legislative instrument is a reference to that other legislative instrument as in force from time to time; and
- 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.

Section 6 Accuracy

Section 6 specifies that, unless otherwise specified, the value of a parameter in Schedule 2 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 the ITF Determination. That is to say, an estimate must have a likelihood of 95 percent or greater of being within the requirement for the parameter. This level of accuracy is intended to align with 3GPP 37.141 *NR, E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing*. Copies of the technical standard 3GPP 37.141 are available, free of charge, from the 3GPP website at www.3GPP.org.

Schedule 1–Dictionary

Schedule 1 defines expressions used in the ITF Determination, instruments made under subsection 145(4) of the Act and advisory guidelines made under subsection 262(1) of the Act.

Item 1 of Schedule 1

Item 1 of this Schedule sets out definitions of expressions for each instrument the dictionary applies to. These are common terms used in most if not all instruments made under subsection 145(4) of the Act and advisory guidelines made under subsection 262(1) of the Act.

Item 2 of Schedule 1

Item 2 of this Schedule provides that the designation of a radiocommunications transmitter's emission is to be worked out using the methods set out in the Radio Regulations, made by the ITU. It also provides that, for the purposes of determining this designation, the occupied bandwidth of the transmitter should be used as the bandwidth. The designation of a radiocommunications transmitter's emission is relevant for the coordination and identification of radio emissions and is also used when determining whether two or more fixed transmitters are a group of radiocommunications transmitters under item 3 of this Schedule.

Item 3 of Schedule 1

Item 3 of this Schedule defines what 'a group of radiocommunications transmitters' is. A group of radiocommunications transmitters consists of two or more fixed transmitters at a common site that have common features. Including radiocommunications transmitters within a group may make registration of devices easier for licensees.

Item 4 of Schedule 1

Item 4 of this Schedule defines what 'a group of radiocommunications receivers' is. A group of radiocommunications receivers consists of two or more fixed receivers, located at a common site, that have certain features in common. Inclusion of radiocommunications receivers within a group may make registration of devices easier for licensees.

Item 5 of Schedule 1

Item 5 of this Schedule sets out how to work out the location of a radiocommunications transmitter, a group of radiocommunications transmitters, a radiocommunications receiver, and a group of radiocommunications receivers, in terms of the location of the centre of the antenna or antennas specified in latitude and longitude. It also defines the error allowed in determining location.

Schedule 2–Effective antenna height, average ground height and Vincenty's Direct Formulae

Schedule 2 sets out parameters and formulae in relation to the effective antenna height of a fixed transmitter.

Item 1 of Schedule 2

Item 1 of this Schedule specifies the procedure for calculating effective antenna height for a fixed transmitter, taking account of average ground height above sea level and antenna height above ground or sea. The effective antenna height of a spectrum-licensed radiocommunications transmitter is used to calculate the propagation loss component of the device boundary criterion. The device boundary criterion is set out in a determination of unacceptable interference made under subsection 145(4) of the Act. The device boundary criterion is the mathematical expression used to calculate a device boundary of a radiocommunications transmitter.

Item 2 of Schedule 2

Item 2 of this Schedule sets out the procedure for calculating the average ground height of a point on any radial from the location of a radiocommunications transmitter. It does so by taking account of the height of the cell in the digital elevation model corresponding to that point, and the surrounding cells.

These heights are calculated with reference to a digital elevation model sourced from Geoscience Australia.

Item 3 of Schedule 2

Item 3 of this Schedule sets out simplified versions of Vincenty's Direct Formulae, which are used in the calculation of the coordinates (in latitude and longitude) of the points along the radials about the radiocommunications transmitter in item 1 of this Schedule. These coordinates are used in item 2 of this Schedule to obtain the average ground height for that point for use in item 1 of this Schedule. This simplification of Vincenty's Direct Formulae performs location calculations over the GRS80 ellipsoid as referenced by the GDA94 to a high degree of accuracy, using an iterative routine.