EXPLANATORY STATEMENT

Approved by the Australian Communications and Media Authority

Radiocommunications Act 1992

Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 1800 MHz Band) 2023

Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers – 1800 MHz Band) 2023

Radiocommunications (Unacceptable Levels of Interference – 1800 MHz Band) Determination 2023

Authority

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

- *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 1800 MHz Band) 2023* (**Transmitter Advisory Guidelines**); and
- *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers — 1800 GHz Band) 2023* (**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 – 1800 MHz Band) Determination 2023* (**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.

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 section 145 of the Act.

Advisory guidelines

The ACMA has allocated spectrum licences in the following parts of the spectrum:

- 1710 MHz to 1785 MHz;
- 1805 MHz to 1880 MHz;

(collectively, the **1800 MHz band**), and 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 – 1800 MHz Band) 2012* (**2012 Transmitter Advisory Guidelines**); and
- the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers — 1800 MHz Band) 2012* (**2012 Receiver Advisory Guidelines**).

The Transmitter Advisory Guidelines and the Receiver Advisory Guidelines are part of a set of legal instruments made by the ACMA that comprise the technical framework applicable to spectrum licences in the 1800 MHz band, and revoke and replace the 2012 Transmitter Advisory Guidelines and 2012 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 1800 MHz band (**1800 MHz transmitters**), where the 1800 MHz 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 1800 MHz 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 1800 MHz 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 1800 MHz 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 1800 MHz 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 1800 MHz band, or in adjacent frequency bands. Operators of spectrum, class or apparatus 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 1800 MHz band. The ACMA will also take the Receiver Advisory Guidelines into account when determining whether an apparatus licensee, class licensee or spectrum licensee 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 emission from radiocommunications transmitters operated under a spectrum licence issued in the 1800 MHz band do not cause an unacceptable level of interference to 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 1800 MHz 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 a 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).

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 Transmitter Advisory Guidelines, Receiver Advisory Guidelines and ULOI Determination 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:

- CEPT Report 41 *Report from CEPT to European Commission in response to Task 2 of the Mandate to CEPT on the 900/1800 MHz bands: Compatibility between LTE and WiMAX operating within the bands 880-915 MHz / 925-960 MHz and 1710-1785 MHz / 1805-1880 MHz (900/1800 MHz bands) and systems operating in adjacent bands*, published by the Electronic Communications Committee (**ECC**) of the European Conference of Postal and Telecommunications Administrations (**CEPT**), and available, free of charge, at docdb.cept.org;

- ECC Report 96 *Compatibility between UMTS 900/1800 and systems operating in adjacent bands*, published by the ECC of CEPT, and available, free of charge, at docdb.cept.org;

- ECC Report 146 *Compatibility between GSM MCBTS and other services (TRR, RSBN/PRMG, HC-SDMA, GSM-R, DME, MIDS, DECT*, published by the ECC of CEPT, and available, free of charge, at docdb.cept.org;

- ECC Report 162 *Practical mechanism to improve the compatibility between GSM-R and public mobile networks and guidance on practical coordination*, published by the ECC of CEPT, and available, free of charge, at docdb.cept.org;

- ITU-R Recommendation P.526 *Propagation by diffraction* (**ITU-R Recommendation P.526**) published by the Radiocommunications Sector (**ITU-R**) of the International Telecommunication Union (**ITU**), and available, free of charge, at www.itu.int;

- ITU-R Recommendation P.1144 *Guide to the application of the propagation methods of Radiocommunications Study Group* 3, published by the ITU-R, and available, free of charge, at www.itu.int;

- ITU-R Recommendation SA.465 *Reference radiation pattern for earth station antennas in the fixed-satellite service for use in coordination and interference assessment in the frequency range 2 to 31 GHz*, published by the ITU-R, and available, free of charge, at www.itu.int;

- ITU-R Recommendation SA.1026 *Aggregate interference criteria for space-to-Earth data transmission systems operating in the Earth exploration-satellite and meteorological-satellite services using satellites in low-Earth orbit*, published by the ITU-R, and available, free of charge, at www.itu.int;

- ITU-R Recommendation SA.1027 *Sharing criteria for space-to-Earth data transmission systems in the Earth exploration-satellite and meteorological-satellite services using satellites in low-Earth orbit*, published by the ITU-R, and available, free of charge, at www.itu.int;

- ITU-R Recommendation SA.1158 *Feasibility of frequency sharing in the 1 670-1 710 MHz band between the meteorological-satellite service (space-to-Earth) and the mobile-satellite service (Earth-to-space)*, published by the ITU-R, and available, free of charge, at www.itu.int;

- ITU-R Recommendation SA.1160 *Interference criteria for data dissemination and direct data readout systems in the Earth exploration-satellite and meteorological-satellite services using satellites in the geostationary orbit*, published by the ITU-R, and available, free of charge, at www.itu.int;

- ITU-R Recommendation SA.1161 *Sharing and coordination criteria for data dissemination and direct data readout systems in the Earth exploration-satellite and meteorological-satellite services using satellites in geostationary orbit*, published by the ITU-R, and available, free of charge, at www.itu.int;

- 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;

- Radiocommunications Assignment and Licensing Instruction (**RALI**) FX 3 *Microwave fixed services frequency coordination* (**RALI FX 3**), published by the ACMA and available, free of charge, from the ACMA's website at www.acma.gov.au;

- RALI MS 31 *Notification zones for apparatus licensed services around radio astronomy facilities* (**RALI MS 31**), published by the ACMA and available, free of charge, from the ACMA's website at www.acma.gov.au;

- RALI MS 34 *Frequency coordination and licensing procedures for apparatus licensed PTS in the 1800 MHz bands* (**RALI MS 34**), published by the ACMA and available, free of charge, from the ACMA's website at www.acma.gov.au.

The ULOI Determination 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 its website at www.acma.gov.au;

- ITU-R Recommendation P.526;

- the Radio Regulations.

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

- the *Australian Radiofrequency Spectrum Plan 2021* (**spectrum plan**);
- the *Radiocommunications (Cellular Mobile Telecommunications Devices) Class Licence 2014*, or any instrument replacing that class licence;
- the *Radiocommunications (Cordless Communications Devices) Class Licence 2014*, or any instrument replacing that class licence;

- the *Radiocommunications (Interpretation) Determination 2015* (**Interpretation Determination**), or any instrument replacing that determination;
- the *Radiocommunications Equipment (General) Rules 2021*, or any instrument replacing specified parts of those rules;
- the ULOI Determination.

The Receiver Advisory Guidelines also incorporate the ULOI Determination, as in force from time to time.

The ULOI Determination also incorporates the the *Seas and Submerged Lands Act*, as in force from time to time.

The ULOI Determination also incorporates the *Radiocommunications (Unacceptable Levels of Interference – 1800 MHz Band) Determination 2012* (**2012 ULOI Determination**). The effect of the 2012 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.

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 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.

In July 2020, the ACMA set up a short-term industry technical liaison group (**TLG**) to support the review of the 1800 MHz band technical framework, to assist with the introduction of 5th generation wireless broadband services in the 1800 MHz band (**1800 MHz technical framework review**).

The TLG was asked to consider and provide advice to the ACMA on technical aspects required for the review of the spectrum licence technical framework in the 1800 MHz band. These included:

- identifying relevant reference technologies;
- the review of the core conditions of the spectrum licensed band in accordance with section 66 of the Act; and
- the review of the 2012 ULOI Determination.

The ACMA prepared a TLG paper, which was reviewed by TLG members, which summarises the TLG discussions on the review of the spectrum licensing framework in the 1800 MHz band and the TLG proposals for amending the spectrum licensing framework in the 1800 MHz band. This paper can be found on the ACMA's website.

Under Part 4, Chapter 3 of the LA, the 2012 Transmitter Advisory Guidelines, 2012 Receiver Advisory Guidelines and the 2012 ULOI Determination were due to 'sunset' on 1 April 2023. The ACMA analysed the instruments and identified that they were necessary and useful part of the regulatory framework. The spectrum licences in the 1800 MHz band are due to expire in 2028. Given this, the ACMA decided to remake the 2012 Transmitter Advisory Guidelines, the 2012 Receiver Advisory Guidelines and the 2012 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 took the 1800 MHz technical framework review into account when preparing the draft Transmitter Advisory Guidelines, draft Receiver Advisory Guidelines and draft ULOI Determination. A draft version of each instrument was released for public consultation on 4 November 2022, together with the consultation paper *Automatic sunsetting of legislative instruments: Proposal to remake instruments for the 700 MHz, 1800 MHz, 2.5 GHz and 2.5 GHz mid-band gap spectrum-licensed bands*. Consultation closed on 2 December 2022.

The ACMA received 5 responses. All 5 responses supported the draft instruments with no proposed changes.

Regulatory impact assessment

A preliminary assessment of the proposal to remake the 2012 Transmitter Advisory Guidelines, 2012 Receiver Advisory Guidelines and 2012 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 change is minor or machinery in nature (OIA reference number OBPR22-03576).

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 LI Act 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 1800 MHz band caused by radiocommunications transmitters operating under spectrum licences issued in the 1800 MHz 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 1800 MHz band caused by radiocommunications transmitters operating under other licences issued in or near the 1800 MHz 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 1800 MHz band. The ULOI Determination only applies in relation to 1800 MHz band spectrum licensees.

Human rights implications

The ACMA has assessed whether the Transmitter Advisory Guidelines, Receiver Advisory Guidelines 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 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 and ULOI Determination do not engage any of those rights or freedoms.

Conclusion

Each of the Transmitter Advisory Guidelines, Receiver Advisory Guidelines and ULOI Determination is compatible with human rights as it does not raise any human rights issues.

Attachment A

Notes to the *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 1800 MHz Band) 2023*

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 – 1800 MHz Band) 2023*.

Section 2 Commencement

This section provides for the Transmitter Advisory Guidelines to commence on the day after the day they are registered on the Federal Register of Legislation.

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 – 1800 MHz Band) 2012*

This section repeals the *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 1800 MHz Band) 2012* (F2012L02048).

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.

This section also provides that unless the contrary intention appears, certain terms used in the Transmitter Advisory Guidelines that are defined in the Interpretation Determination, or another instrument that replaces that determination, have the same meaning as in those instruments.

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. It describes how interference is managed, and specifies the provisions of the Act relevant to interference management.

The Transmitter Advisory Guidelines have been made to provide guidance in the resolution of cases of interference occurring to licensed radiocommunications receivers, caused by radiocommunications transmitters operated under 1800 MHz band spectrum licences.

Subsection 7(2) provides that the Transmitter Advisory Guidelines provide guidance for the management of interference to licensed radiocommunications receivers operating in relation to:

- apparatus licensed point to point fixed service receivers (Part 3);
- apparatus licensed meteorological-satellite services (space-to-earth) (Part 4):
- apparatus licensed cordless communications devices (Part 5);
- apparatus licensed public mobile telecommunications services (Part 7).

Subsection 7(3) provides that the Transmitter Advisory Guidelines provide advice for:

- the protection of spectrum licensed radio astronomy service receivers (Part 6); and
- the coexistence arrangements between public mobile telecommunications service networks and GSM-R networks (Part 8).

Subsection 7(4) advises that, when modelling propagation loss in the 1800 MHz 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 1800 MHz band.

Subsection 7(5) states that the ACMA will take the Transmitter Advisory Guidelines into account in determining whether interference has occurred from a radiocommunications transmitter operating under a spectrum licence in the 1800 MHz band to a radiocommunications device operating under another licence.

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

Part 3 – Point to point fixed service receivers

Section 8 Background

Section 8 describes the arrangements for point to point fixed service receivers that operate in and around the 1800 MHz band, which may be affected by radiocommunications transmitters operated under spectrum licences in the 1800 MHz band.

Section 9 Point to point receiver categories

Section 9 sets out the 2 different categories for point to point fixed service receivers. A point to point fixed service receiver operated under an apparatus licence issued before 18 June 2013 is a ***Category 1 receiver***. A point to point fixed service receiver operated under an apparatus licence issued on or after 18 June 2013 is a ***Category 2 receiver***. The 2012 Transmitter Advisory Guidelines commenced on 18 June 2013; additional protection is afforded to those receivers operated under apparatus licences issued before that date.

Section 10 Point to point receiver protection requirements

Section 10 sets out the protection requirements for point to point fixed service receivers.

Subsection 10(1) provides that spectrum licensees in the 1800 MHz band should plan their radiocommunications transmitters in accordance with RALI FX 3.

Subsection 10(2) provides that Category 1 receivers are to be protected from in-band and out-of-band interference according to RALI FX 3.

Subsection 10(3) provides that Category 2 receivers are to be protected from out-of-band interference according to RALI FX 3. Category 2 receivers are not to be protected from in-band interference from a radiocommunications transmitter authorised by a spectrum licence in the 1800 MHz band.

Part 4 – Meteorological-satellite services (space-to-earth)

Section 11 Background

Section 11 outlines the use of the spectrum below 1710 MHz by the meteorological-satellite (**Met-Sat**) service. It details the type of interference that may occur to this service from radiocommunications transmitters operated in the 1800 MHz band.

Section 12 Protection requirements

Section 12 sets out the protection requirements for Met-Sat service earth station radiocommunications receivers operating below 1710 MHz, by incorporating ITU-R Recommendation SA.1026 and ITU-R Recommendation SA.1160.

Section 13 Additional information on meteorological-satellite service protection

Section 13 provides a list of ITU-R Recommendations that provide additional information on the prediction of appropriate co-ordination distances, propagation models, threshold co-ordination levels and Earth station receiver and antenna characteristics, which may assist in assessing compliance with interference criteria. The section also provides further information about other possible issues and resources which may assist in assessing compliance with interference criteria.

Part 5 – Cordless communications devices

Section 14 Background

Section 14 provides information on cordless communications devices that operate adjacent to the 1800 MHz band, in the 1880 MHz to 1900 MHz frequency band. These devices are authorised for operation under a class licence made under the Act, and must comply with equipment rules made under the Act.

Section 15 Protection requirements

Section 15 sets out that a spectrum licensed transmitter will not be deemed to cause unacceptable interference to cordless communications devices if it does not cause an unacceptable level of interference, as defined in the ULOI Determination, and if it complies with all core conditions of the spectrum licence.

Part 6 – Radio astronomy service receivers

Section 16 Background

Section 16 provides background information on the use of various bands by radio astronomy services under Australian footnote AUS87 of the spectrum plan. One of these bands overlaps with part of the 1800 MHz band.

This use is on a 'fortuitous' basis, which means the use is not specifically planned in the spectrum plan and protected by the ACMA. However, due to the highly sensitive nature of radio astronomy equipment, the ACMA has requested that all spectrum users, including spectrum licensees, have regard to this service when deploying systems.

Details on the location of radio astronomy receivers operating in the spectrum in or close in frequency to the 1800 MHz 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 on the Federal Register of Legislation should be consulted to determine if any sites have been removed from or included in this list.

Section 17 Protection requirements

Section 17 requests that, when deploying systems, spectrum licensees have regard to radio astronomy services mentioned in footnote AUS87 of the spectrum plan. RALI MS 31 contains details on the notification procedure to follow before deploying systems that might affect these radio astronomy services.

Part 7 – Public mobile telecommunications services

Section 18 Background

Section 18 provides background information on the use of the 1800 MHz band by the Public Telecommunications Service (**PTS**) outside areas subject to spectrum licensing in the 1800 MHz band. This use is authorised under two kinds of transmitter licences:

- PMTS Class B – which authorises the use of terrestrial systems; and
- PMTS Class C – which authorises the use of systems onboard aircraft.

Section 19 Protection requirements – PMTS Class B

Section 19 details the protection requirements for receivers operating under a PMTS Class B licence.

For purposes of managing interference from transmitters operating under a spectrum licence, consideration of the different interference mechanisms is required. Two types of services operated under the PMTS Class B licence are identified in this section:

- receivers operating in the **1800 MHz lower band** (1710 MHz to 1785 MHz), typically being base station receivers; and

- receivers operating in the **1800 MHz upper band** (1805 MHz to 1880 MHz), typically being user terminals (i.e. mobile and nomadic devices).

RALI MS 34 sets out the licensing and protection arrangements for PMTS Class B licences. Since RALI MS 34 is subject to continual review, licensees are advised to consult the most current version when planning systems and managing interference.

PMTS Class B radiocommunications receivers operating in the 1800 MHz lower are afforded:

- the same level of in-band protection as if they were operating under an 1800 MHz spectrum licence;
- the same level of out-of-band protection as if they were operating under an 1800 MHz spectrum licence, from transmitters with an effective antenna height less than or equal to 10 metres;
- the level of out-of-band protection specified in RALI MS 34, from transmitters operating with an effective antenna height greater than 10 metres. Such protection is offered on a 'first in time' basis. This means that radiocommunications receivers that operate under an apparatus licence that is issued before the registration of a spectrum-licensed transmitter in the Register will receive protection in accordance with the Advisory Guidelines.

PMTS Class B receivers operating in the 1800 MHz upper band are afforded the same protection as mobile, nomadic and other devices which are generally exempt from having to comply with the registration requirements in Part 3.5 of the Act (see subsection 69(2) of the Act), under the conditions of the spectrum licence under which the device operates. The ACMA would not regard interference from a spectrum licensed radiocommunications transmitter to a mobile station receiver operating in the 1800 MHz band as unacceptable, provided the transmitter is operated in accordance with all conditions of the licence and did not cause an unacceptable level of interference, as defined in the ULOI Determination.

Section 20 Protection requirements – PMTS Class C

Section 20 sets out the protection requirements for receivers operating under a PMTS Class C licence.

PMTS Class C licences are issued on the basis that they do not cause interference and they cannot claim protection from interference. PMTS Class C licences are afforded the same protection from radiocommunications transmitters operating under a spectrum licence as they are afforded from other apparatus licensed services. That is, the ACMA would not regard interference from a spectrum licensed radiocommunications transmitter to a mobile station receiver operating in the 1800 MHz band as unacceptable, provided the transmitter is operated in accordance with all conditions of the licence and did not cause an unacceptable level of interference, as defined in the ULOI Determination.

Part 8 – Co-existence arrangements for GSM-R networks

Section 21 Background

Section 21 provides background information on the use of the Global System for Mobile Communications – Railway (**GSM-R**), and how the GSM-R might interact with nearby public mobile telecommunications services. Spectrum licences, and other licences, in the 1800 MHz band may be used for both GSM-R and public mobile telecommunications services.

Section 22 Co-existence recommendations

Section 22 includes a recommendation that spectrum licensees consider co-existence with GSM-R networks when planning their networks. The section sets out a number of specific matters that licensees should be aware of in relation to co-existence between public mobile telecommunications networks and GSM-R networks. The list of matters is not exhaustive.

Attachment B

Notes to the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers — 1800 MHz Band) 2023*

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 — 1800 MHz Band) 2023*.

Section 2 Commencement

This section provides for the Receiver Advisory Guidelines to commence on the day after the day they are registered on the Federal Register of Legislation.

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 other guidelines

This section repeals the 2012 Receiver Advisory Guidelines (F2012L02047) and the *Radiocommunications Advisory Guidelines (Additional Device Boundary Criteria – 1800 MHz Lower Band) 2012* (**2012 Additional Criteria Guidelines**) (F2012L02046). The substantive provisions of the 2012 Additional Criteria Guidelines have been included in the ULOI Determination.

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.

This section also provides that unless the contrary intention appears, certain terms used in the Receiver Advisory Guidelines that are defined in the ULOI Determination have the same meaning as in that 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 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 1800 MHz band. They are also intended to provide protection to radiocommunications receivers operated under spectrum licences in the 1800 MHz band from interference caused by radiocommunications transmitters operated under an apparatus, class or spectrum licence. The management of, and protection from, interference is facilitated by the minimum level of receiver performance requirements set out in the Receiver Advisory Guidelines.

Subsections 7(4) and 7(5) provide that the Receiver Advisory Guidelines should be used by operators of spectrum, class and apparatus licensed services in planning services and for the resolution of interference with radiocommunications under spectrum licences in the 1800 MHz 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 1800 MHz band, caused by spectrum licensed transmitters, is managed. If interference is from an adjacent spectrum licensed radiocommunications transmitter, it is managed through the core conditions of the licence and application of the device boundary criteria and deployment constraints 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 1800 MHz band, caused by apparatus licensed transmitters, is managed. If interference is caused by an apparatus-licensed radiocommunications transmitter issued on or after 18 June 2013, the interference is managed as if the transmitter is operated under a spectrum licence. This means that the device boundary criteria that apply to spectrum-licensed radiocommunications transmitters are treated as though they apply to those apparatus licensed radiocommunications transmitters.

Subsection 8(3) provides that an 1800 MHz receiver will not be afforded protection from in-band interference caused by an apparatus-licensed radiocommunications transmitter issued before 18 June 2013, in the 1800 MHz frequency band.

Subsection 8(4) has the effect that an 1800 MHz receiver will not be afforded protection from in-band interference caused by a class-licensed radiocommunications transmitter, operating in accordance with the relevant conditions of the 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

Subsection 10 explains that a receiver will not be afforded protection unless the details of the receiver are included in the Register. In order to meet the compatibility requirement in Part 5 of the Receiver Advisory Guidelines, a fixed radiocommunications receiver operated under an 1800 MHz band spectrum licence must have its details included in the Register.

Section 11 Mobile devices

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

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 receiver is in part dependent on the quality of the receiver itself. Emissions from a 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 to the Receiver Advisory Guidelines.

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 sets out the compatibility requirements to be met for a fixed radiocommunications transmitter operated under an apparatus licence or registered under a spectrum licence, in relation to a fixed radiocommunications receiver, to receive protection from interference under the Receiver Advisory Guidelines. The fixed radiocommunications receiver must:

- be operated under a spectrum licence in the 1800 MHz band; and

- have at least the notional level of receiver performance set out in Schedule 1; and
- be included in the Register:
    - for a fixed radiocommunications transmitter registered in relation to a spectrum licence – before the date of registration of the transmitter in relation to the spectrum licence; or
    - for a fixed radiocommunications transmitter operated under an apparatus licence – before the date of issue of the apparatus licence the transmitter is operated under; and
- satisfy one of the following:
    - the receiver is operated in the 1800 MHz lower band;
    - the receiver is operated in the 1800 MHz upper band, and has an effective antenna height less than or equal to 10 metres;
    - the receiver is operated in the 1800 MHz upper band, has an effective antenna height greater than 10 metres, does not operate within 10 MHz of a frequency adjacent spectrum licence that authorises the operation of devices in the same area as the spectrum licence that authorises the operation of the receiver, and is not in an area of high mobile use.

The 'areas of high mobile use' are defined in the ULOI Determination.

Generally speaking, before other steps are taken to afford protection to radiocommunications receivers protected under the Receiver Advisory Guidelines, transmitters operated under spectrum licences are expected to reduce their out-of-band emissions to the levels set out in Schedule 3.

Schedule 1 Notional receiver performance level

Schedule 1 provides spectrum licensees with information regarding the notional performance of receivers operating under a spectrum licence in the 1800 MHz band. The Schedule provides information relating to:

- receiver adjacent channel selectivity;
- receiver intermodulation response rejection;
- receiver blocking;
- spurious response immunity.

Spectrum-licensed radiocommunications receivers operating in the 1800 MHz band should meet this performance level to minimise interference from radiocommunications transmitters operating under other types of licences.

Schedule 2 Compatibility requirement

Schedule 2 outlines, for the purpose of assessing compatibility with other radiocommunications services, the maximum unwanted signal level that a radiocommunications service in the 1800 MHz band should not exceed. It also provides that logarithmic scaling should be used to find a maximum unwanted signal level in alternative bandwidths.

Schedule 3 Additional out-of-band emission limit

Schedule 3 outlines the additional out-of-band emissions limits for radiocommunications transmitters operating under a spectrum licence in the 1800 MHz band. This includes transmitters that are used as part of a point to point service and are subject to the additional device boundary criteria. This the additional radiofrequency filtering is required to protect radiocommunications receivers in the 1800 MHz band, referred to in section 13.

Attachment C

Notes to the *Radiocommunications (Unacceptable Levels of Interference – 1800 MHz Band) Determination 2023*

Section 1 Name

This section provides for the ULOI Determination to be cited as the *Radiocommunications (Unacceptable Levels of Interference – 1800 MHz Band) Determination 2023*.

Section 2 Commencement

This section provides for the ULOI Determination to commence on the day after the day it is registered on the Federal Register of Legislation.

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 – 1800 MHz Band) Determination 2012*

This section repeals the *Radiocommunications (Unacceptable Levels of Interference – 1800 MHz Band) Determination 2012* (F2012L02045).

Section 5 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.

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 6 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 7 Emission designator

Section 7 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 the emission designation of a radiocommunications transmitter using the Radio Regulations, a reference to "necessary bandwidth" in those Regulations for a given class of emission is taken to be a reference to the occupied bandwidth of the transmitter. 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 section 8 of the instrument.

Section 8 Group of radiocommunications transmitters

Section 8 defines what 'a group of radiocommunications transmitters' is for the purpose of the instrument. 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.

Section 9 Group of radiocommunications receivers

Section 9 defines what 'a group of radiocommunications receivers' is for the purpose of the instrument. A group of radiocommunications receivers consists of two or more fixed receivers 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.

Section 10 Unacceptable level of interference

Section 10 provides the technical definition of what will be deemed unacceptable levels of interference for the purpose of interference management in the 1800 MHz band. A radiocommunications transmitter producing emissions that are found to cause unacceptable levels of interference to other services will, in most circumstances, not be registered on 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 ($412,500 on the current value of a penalty unit) where the radiocommunications device is a radiocommunications transmitter. The maximum civil penalty is 300 penalty units ($82,500 on the current value of a penalty unit) 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 10(1), a radiocommunications transmitter operated under a spectrum licence is taken to be causing unacceptable interference if:

- the operation of the transmitter breaches the core conditions of the licence relating to the maximum permitted level of radio emissions from the radiocommunications transmitter outside the geographic and frequency boundaries of the licence; or
- subject to an 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 Schedules 1, 2 and 3 to the ULOI Determination; or
- the device boundary of the transmitter cannot be calculated in accordance with item 1 of Schedule 2 to the ULOI Determination; or
- the transmitter operates in the 1800 MHz lower band, is 'high sited' and operates within an 'area of high mobile use' (defined in Schedule 4); or
- the transmitter operates in the 1800 MHz lower band, is 'high sited', and has an occupied bandwidth less than 10 MHz from a frequency adjacent spectrum licence with a geographic area that includes the location of the transmitter; or

- subject to an exception identified below, any part of the 'additional device boundary' of the transmitter lies outside the geographic area of the licence, where the transmitter operates in the 1800 MHz lower band, is 'high sited', and operates outside an 'area of high mobile use'. The 'additional device boundary' is, like the device boundary, a theoretical boundary calculated around the device using the methodology set out in Schedules 1, 2 and 3 to the ULOI Determination.

Subsection 10(2) provides that a level of interference mentioned in paragraph 10(1)(b) is not unacceptable in relation to a part of the device boundary that lies outside the geographic area of the licence, where the part of the device boundary is connected to a radial that:

- is mentioned in item 1 of Schedule 2; and
- does not cross over land outside the geographic area of the licence that is permanently above the Australian territorial sea baseline.

In this case, the fact that the device boundary is located outside of the geographic area of the licence does not mean that the transmitter is taken to be causing unacceptable interference. (The transmitter may, however, be taken to be causing unacceptable interference for other reasons.)

Subsection 10(3) provides that a level of interference mentioned in paragraph 10(1)(f) is not unacceptable in relation to a part of the additional device boundary of a transmitter where:

- the additional device boundary of the transmitter is wholly within the geographic area of one or more spectrum licences other than the licence under which the transmitter would operate; and
- the occupied bandwidth of the transmitter is wholly within the frequency bands within which operation of devices is authorised under each of those spectrum licences; and
- the licensee of the licence under which the transmitter would operate either is the licensee of those other licences, or has a written agreement with the licensees of those other licences about the transmitter's additional device boundary falling within the geographic area of their licences.

Subsection 10(4) provides that section 10 does not apply in relation to a radiocommunications transmitter to which section 12 applies.

Section 11 Accuracy

Section 11 specifies that, unless otherwise specified, the value of a parameter in Schedules 1, 2 and 3 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. That is to say, an estimate must have a likelihood of 95 percent or greater of being within the requirement for the parameter.

Section 12 Transitional – radiocommunications transmitter registered before commencement of this instrument

Section 12 applies to a radiocommunications transmitter included in the Register in relation to a spectrum licence in the 1800 MHz band before the ULOI Determination commenced. For such a transmitter, the level of interference caused by a relevant transmitter is unacceptable if it would have been unacceptable under the 2012 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.

Schedule 1 Location

This Schedule sets out how to work out the location of a radiocommunications transmitter (and the location of a group of radiocommunications transmitters), in terms of the location of the centre of the antenna or antennas specified in latitude and longitude.

Schedule 2 Device boundary, device boundary criterion, additional device boundary and additional device boundary criterion

This Schedule sets out the technical procedure for calculating the device boundary, and the additional device boundary, of a radiocommunications transmitter or group of radiocommunications transmitters, for the purposes of section 10 of the ULOI Determination.

Item 1 of Schedule 2

Item 1 of the 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 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 Schedule 1). 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 the 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 2

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 2

Item 3 provides the methodology for determining the propagation loss component for determining the device boundary criterion in item 2. This item uses the Modified Hata propagation model from 'ERC Report 068' published by the European Conference of Postal and Telecommunications Administrations (or CEPT) in 2000, and revised in 2002, which details the method and parameters to be used to calculate the propagation loss. CEPT reports are available, free of charge, at https://docdb.cept.org/home. This Part also details how relevant parameters, which are used in the calculation of propagation loss, are to be determined.

Item 4 of Schedule 2

Item 4 of the Schedule details the steps involved in calculating the additional device boundary. This is done in the same way as for the device boundary in Item 1, except in it is in relation to the additional device boundary criterion in Item 5.

Item 5 of Schedule 2

Item 5 provides the additional device boundary criterion, which is the mathematical expression used to calculate an additional device boundary in accordance with item 4 of Schedule 2. The mathematical expression consists of the horizontally radiated power of a device minus the path loss function. The additional 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 6 of Schedule 2, for each segment along each radial.

Item 6 of Schedule 2

Item 6 provides the methodology for determining the propagation loss component for determining the additional device boundary criterion in item 5. This item uses the ITU-R Recommendation P.526: *Propagation by diffraction* published by the ITU which details the method and parameters to be used to calculate the propagation loss. ITU-R Recommendation P.526 is available, free of charge, at www.itu.int. This item also details how relevant parameters, which are used in the calculation of propagation loss, are to be determined.

Schedule 3 Effective antenna height and average ground height

Item 1 of Schedule 3

Item 1 of Schedule 3 specifies the procedure for calculating effective antenna height for the purpose of the ULOI Determination, taking account of average ground height above sea level and antenna height above ground. The effective antenna height of a spectrum-licensed radiocommunications device is used to calculate the propagation loss component of the device boundary criterion and additional device boundary criterion. The device boundary criterion is set out in item 2 of Schedule 2. 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 Schedule 2. The additional device boundary criterion is set out in item 5 of Schedule 2. The additional device boundary criterion is the mathematical expression used to calculate an additional device boundary. The process for calculating an additional device boundary is set out in item 4 of Schedule 2.

Item 2 of Schedule 3

Item 2 of Schedule 3 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 3

Item 3 sets out 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 transmitter in item 1. These coordinates are used in item 2 to obtain the average ground height for that point for use in item 1. 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.

Schedule 4 Areas of high mobile use

Schedule 4 defines the areas of high mobile use for the purposes of working out whether a radiocommunications transmitter would cause an unacceptable level of interference.