# EXPLANATORY STATEMENT

Approved by the Australian Communications and Media Authority

*Radiocommunications Act 1992*

***Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 700 MHz Band) 2023***

***Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers – 700 MHz Band) 2023***

***Radiocommunications (Unacceptable Levels of Interference – 700 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 – 700 MHz Band) 2023* (**Transmitter Advisory Guidelines**); and
- *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers — 700 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 – 700 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:

- 703 MHz to 748 MHz (**700 MHz lower band**);
- 758 MHz to 803 MHz;

(collectively, the **700 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 – 700 MHz Band) 2012* (**2012 Transmitter Advisory Guidelines**); and
- the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers — 700 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 700 MHz band, and revoke and replace the 2012 Transmitter Advisory Guidelines and 2012 Receiver Transmitter 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 700 MHz band (**700 MHz transmitters**), where the 700 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 700 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 700 MHz band, and 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 700 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 700 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 700 MHz band, and 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 700 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 700 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 700 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:

- a collection of maps depicting predicted coverage areas of digital television broadcasting and retransmission services, titled *Block E predicted areas of digital coverage*, published by the ACMA and available, free of charge, from the ACMA's website at www.acma.gov.au;
- ITU-R Recommendation P.1144 *Guide to the application of the propagation methods of Radiocommunications Study Group 3*, published by the Radiocommunication Sector (**ITU-R**) of the International Telecommunication Union (**ITU**) and available, free of charge, at www.itu.int;
- Radiocommunications Assignment and Licensing Instruction (**RALI**) FX 16 *Frequency assignment requirements for the point-to-multipoint service in the VHF high, 400 MHz and 800 MHz bands* (**RALI FX 16**), published by the ACMA and available, free of charge, from the ACMA's website at www.acma.gov.au;
- RALI FX 22 *Frequency assignment requirements for the fixed service in the 800 MHz band* (**RALI FX 22**), published by the ACMA and available, free of charge, from the ACMA's website at www.acma.gov.au;
- RALI LM 8 *Frequency Assignment Requirements for the Land Mobile Service* (**RALI LM 8**), published by the ACMA and available, free of charge, from the ACMA's website at www.acma.gov.au;
- RALI LM 9 *Frequency Assignment Procedures for Land Mobile Services Adjacent to TV Channels 2, 3 and 6* (**RALI LM 9**), published by the ACMA and available, free of charge, from the ACMA's website at www.acma.gov.au;
- RALI MS 32 *Coordination of Apparatus Licensed Services within the Australian Radio Quiet Zone Western Australia* (**RALI MS 32**), 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 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 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 *Broadcasting Services Act 1992* (**Broadcast Act**);
- the *Radiocommunications (Australian Radio Quiet Zone Western Australia) Frequency Band Plan 2023* (**ARQZWA Band Plan**), or any instrument replacing that band plan;
- the *Radiocommunications (Interpretation) Determination 2015* (**Interpretation Determination**), or any instrument replacing that determination;
- the *Radiocommunications (Low Interference Potential Devices Class) Licence 2015* (**LIPD class licence**);
- the ULOI Determination.

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

The ULOI Determination also incorporates the *Seas and Submerged Lands Act 1973*.

The ULOI Determination also incorporates the *Radiocommunications (Unacceptable Levels of Interference – 700 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.

Under Part 4 of 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 700 MHz band are due to expire in 2029. 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.

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, 700 MHz, 2.5 GHz and 2.5 GHz mid-band gap spectrum-licensed bands*. Consultation closed on 2 December 2022.

The ACMA received five submissions to the consultation. Four of these commented on the Transmitter Advisory Guidelines, Receiver Advisory Guidelines and ULOI Determination for the 700 MHz band. FreeTV Australia supported the proposed remade instruments. Submissions from the Australian Mobile Telecommunications Association (**AMTA**), Optus and Telstra where generally supportive of the draft instruments for all bands. However, they expressed concern with the inclusion of new Parts 6 and 7 in the Transmitter Advisory Guidelines. As part of their submissions, they proposed removal of these Parts, as they submitted that requiring first-in-time protection of apparatus licensed services operating in the 803 MHz to 809 MHz band could restrict future deployments under 700 MHz band spectrum licences and introduced uncertainty into network rollout investment plans. AMTA proposed provisions using notification requirements rather than protection requirements.

After considering the feedback provided by AMTA, Optus and Telstra, the ACMA decided that the protection measures proposed in new Parts 6 and 7 in the Transmitter Advisory Guidelines were appropriate, as the apparatus licensees in question have a reasonable expectation of protection from interference.

Following consultation, the ACMA also identified a typographical error in paragraph 9(1)(b) of the Transmitter Advisory Guidelines. The error was a missing minus sign before the number 34. This was inserted corrected in the final Transmitter Advisory Guidelines.

**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 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 700 MHz band caused by radiocommunications transmitters operating under spectrum licences issued in the 700 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 700 MHz band caused by radiocommunications transmitters operating under other licences issued in or near the 700 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 700 MHz band. The ULOI Determination only applies in relation to 700 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 – 700 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 – 700 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 Transmitters – 700 MHz Band) 2012***

This section repeals the 2012 Transmitter Advisory Guidelines (F2012L02546).

**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, terms used in the Transmitter Advisory Guidelines that are defined in the Interpretation Determination or the ULOI 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.

Subsection 7(2) explains that the Transmitter Advisory Guidelines have been made to provide guidance on managing interference to radiocommunications receivers operating in or adjacent to the 700 MHz band.

Subsection 7(3) provides that the Transmitter Advisory Guidelines provide guidance for the management of interference to licensed radiocommunications receivers operating in relation to:

- digital television radiocommunications receivers operating below the 694 MHz frequency boundary (Part 3);
- the ARQZWA (Part 4);
- wireless audio devices (Part 5);
- trunked land-mobile radiocommunications receivers operating in the 806 MHz to 809 MHz and 851 MHz to 854 MHz frequency bands (Part 6); and
- fixed link radiocommunications receivers operating in the 804 MHz to 806 MHz and 845 MHz to 851 MHz frequency bands (Part 7).

Subsection 7(4) advises that, when modelling propagation loss in the 700 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 700 MHz 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 700 MHz 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 – Television broadcast services

### Section 8 Background

Section 8 states that television services operate in the 520 MHz to 694 MHz frequency range which is below the 700 MHz lower band. It provides that the core licence conditions in 700 MHz band spectrum licences specify unwanted emission limits when the directly adjacent UHF broadcast channels (channels 49, 50 and 51) are used.

### Section 9 Out-of-band emissions limits from transmitters in the 700 MHz lower band

Subsection 9(1) sets out the unwanted emission limits that apply when UHF broadcast channels 49, 50 and 51 both are and are not in use. A more stringent unwanted emission limit applies across the 674 MHz to 694 MHz frequency band in areas where these channels are in use. The same unwanted emission limits apply below 673 MHz in both cases. Details on the frequency bands covered by UHF broadcast channels 49, 50 and 51 are also provided.

Subsection 9(2) provides that 700 MHz band spectrum licensees are required to implement the more stringent unwanted emission limits within the predicted coverage areas of digital television broadcasting and retransmission services for UHF broadcast channels 49, 50 and 51, as published by the ACMA, including in a TLAP. The ACMA has published maps of the predicted coverage areas, which are available free of charge from the ACMA's website under the name 'Block E predicted areas of digital coverage'.

Subsection 9(3) provides definitions for 'coverage area', in relation to a broadcasting service or retransmission service, and 'retransmission service'.

## Part 4 – The ARQZWA

### Section 10 Background

Section 10 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 the 700 MHz band spectrum licences.

### Section 11 Protection requirements

Section 11 requires licensees in areas adjacent to the ARQZWA to coordinate proposed stations with reference to the methods and limits set out in RALI MS 32.

## Part 5 – Wireless audio devices

### Section 12 Background

Section 12 provides information on the use of wireless audio devices operated under class and apparatus licences in frequencies adjacent to the 700 MHz band.

### Section 13 Protection requirements

Section 13 sets out that wireless audio devices are not provided protection from radiocommunications transmitters operating under a 700 MHz band spectrum licence and must not cause interference to other primary services, such as those operating under a 700 MHz band spectrum licence.

## Part 6 –Trunked land mobile receivers

### Section 14 Background

Subsection 14(1) notes that after 1 July 2024, the ACMA's policy is for trunked land mobile services to operate in a paired band where the base station radiocommunications receivers use the 806 MHz to 809 MHz frequency band, and mobile station radiocommunications receivers use the 851 MHz to 854 MHz frequency band. This places land mobile receivers in the 806 MHz to 809 MHz spectrum adjacent to the 700 MHz band.

Subsection 14(2) provides that the protection of trunked land mobile radiocommunications receivers from spectrum licensed radiocommunications transmitters is on a first-in-time basis. The ACMA intends that any existing apparatus licensed receiver, licensed prior to the registration of a spectrum licensed transmitter in the Register, will receive protection in accordance with the Advisory Guidelines.

### Section 15 Protection requirements

Subsection 15(1) provides that coordination of radiocommunications transmitters operating under a 700 MHz band spectrum licence is not required with land mobile station radiocommunications receivers operating in the 851 MHz to 854 MHz frequency range. This is because the frequency separation between these devices is sufficient to enable coexistence.

Subsection 15(2) provides that the protection requirements for base station radiocommunications receivers operating in the 806 MHz to 809 MHz frequency range are specified in RALI LM 8. These relate to a minimum wanted to unwanted signal level ratio and a blocking level.

Subsection 15(3) provides information on the antenna pattern, intermediate frequency bandwidth and selectivity performance of a base station radiocommunications receiver that may be assumed when assessing interference. It points to RALI LM 8 for details on the relevant performance levels.

## Part 7 – Fixed service receivers

### Section 16 Background

Subsection 16(1) describes the arrangements for fixed service receivers that operate in frequencies adjacent to the 700 MHz band, which may be affected by radiocommunications transmitters operated under 700 MHz spectrum licences.

Subsection 16(2) states that RALI FX 22 specifies the arrangements for point-to-point links and RALI 16 specifies arrangements for point-to-multipoint services in the frequency bands 804 MHz to 806 MHz and 845 MHz to 851 MHz. It provides that the protection of fixed service receivers from spectrum licensed radiocommunications transmitters is on a first-in-time basis. The ACMA intends that any existing apparatus licensed receiver, licensed prior to the registration of a spectrum licensed transmitter in the Register, will receive protection in accordance with the Transmitter Advisory Guidelines.

### Section 17 Protection requirements

Subsection 17(1) provides that coordination of radiocommunications transmitters operating under a 700 MHz band spectrum licence is not required with fixed service receivers operating in the 845 MHz to 851 MHz frequency band. This is because the frequency separation between these devices is sufficient to enable coexistence.

Subsection 17(2) provides that spectrum licensees are to protect fixed point-to-point link receivers operating in the 804 MHz to 805.5 MHz frequency band to the levels detailed in RALI FX 22.

Subsection 17(3) provides that spectrum licensees are to protect fixed point-to-multipoint service receivers operating in the 805.5 MHz to 806 MHz frequency band according to the protection ratio and usable sensitivity level detailed in RALI FX 16.

## Attachment B

# Notes to the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers — 700 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 — 700 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 the *Radiocommunications Advisory Guidelines (Managing Interference to Receivers – 700 MHz Band) 2012***

This section repeals the 2012 Receiver Advisory Guidelines (F2012L02544).

**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, terms used in the Receiver Advisory Guidelines that are defined in the Interpretation Determination or the ULOI Determination have the same meaning as in those instruments.

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, which is to provide protection to radiocommunications receivers operated under spectrum licences in the 700 MHz band from interference caused by radiocommunications transmitters operated under an apparatus, class or 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 700 MHz 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 700 MHz band receivers, caused by radiocommunications transmitters operated under another class, apparatus or 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 operators of spectrum, class and apparatus licensed services in planning services and for the resolution of interference with radiocommunications under spectrum licences in the 700 MHz band.

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

## 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 700 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 criterion 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 700 MHz band, caused by apparatus licensed 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) provides that application of the device boundary criterion is used to manage in-band interference. It also states that emission limits are used to manage out-of-band interference, but these do not provide protection along the frequency boundaries of a spectrum licence. Because of the nature of out-of-band interference, emission limits cannot be used to provide protection from out-of-band interference for radiocommunications devices that are located near each other. A note is included to

indicate that radiocommunications devices that are located near each other include devices located at multi-operator sites.

Subsection 8(4) explains that the ACMA does not intend to act in relation to in-band interference to a 700 MHz band receiver caused by a radiocommunications transmitter operated under a class licence where the operation complies with all 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 the 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 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 a 700 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 radiocommunications receivers that are mobile devices.

**Section 12 Managing interference from frequency adjacent digital television transmitters**

Section 12 explains that appropriate mitigation techniques should be employed by spectrum licensees to manage any potential interference to a 700 MHz receiver from digital television transmitters in the 520 MHz to 694 MHz frequency range. A note is included to indicate that information on the location and characteristics of the digital television transmitters is provided in the Register and that information is available on the ACMA's website.

**Part 4 – Minimum level of receiver performance**

**Section 13 Notional receiver performance**

Section 13 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 14 Compatibility**

Section 14 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 transmitter licensee must ensure that the transmitter meets the compatibility requirement in Schedule 2. If operated under a class licence, it must comply with the conditions of the class licence.

Subsection 14(2) provides that a fixed receiver is specified if it:

- operates under a 700 MHz spectrum licence;
- has at least the notional level of receiver performance set out in Schedule 1;
- was included in the Register, before:
    - for a fixed radiocommunications transmitter registered in relation to 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.

**Schedule 1 Notional receiver performance level**

Schedule 1 provides spectrum licensees with information regarding the notional receiver performance level for operating under a spectrum licence in the 700 MHz band. The 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 700 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 700 MHz band should not exceed. 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 – 700 MHz Band) Determination 2023*

**Section 1 Name**

This section provides for the ULOI Determination to be cited as the *Radiocommunications (Unacceptable Levels of Interference – 700 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 – 700 MHz Band) Determination 2012***

This section repeals the 2012 ULOI Determination (F2012L02543).

**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 ULOI Determination.

**Section 8 Group of radiocommunications transmitters**

Section 8 defines what 'a group of radiocommunications transmitters' is for the purpose of the ULOI Determination. 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 ULOI Determination. 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 an unacceptable level of interference for the purpose of interference management in the 700 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 700 MHz 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 the maximum permitted level of radio emissions from the radiocommunications transmitter outside the geographic and frequency boundaries of the licence; or
- subject to two exceptions 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.

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 the geographic area of another 700 MHz band spectrum licence.

Subsection 10(3) 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 the land outside the geographic area of the licence that is permanently above the Australian territorial sea baseline.

In either 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(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 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 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.

**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 700 MHz band spectrum licence before the ULOI Determination commenced. For such a transmitter, a level of interference caused by the 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 and device boundary criterion**

This Schedule sets out the technical procedure for calculating the 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 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 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 Schedule 2. 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 Schedule 2, 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 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. 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.

*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 radiocommunications 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.