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

The Australian Communications and Media Authority makes the following guidelines under section 262 of the *Radiocommunications Act 1992*.

Dated: 16 March 2023

Chris Jose
[signed]
Member

Linda Caruso
[signed]
~~Member~~/General Manager

Australian Communications and Media Authority

Part 1 Preliminary

1 Name

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

2 Commencement

This instrument commences at the start of the day after the day it is registered on the Federal Register of Legislation.

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

3 Authority

This instrument is made under section 262 of the Act.

4 Repeal of the *Radiocommunications Advisory Guidelines (Managing Interference from Transmitters – 700 MHz Band) 2012*

The *Radiocommunications Advisory Guidelines (Managing Interference from Transmitters – 700 MHz Band) 2012* [F2012L02546] are repealed.

5 Definitions

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

700 MHz band means the 700 MHz lower band and the 700 MHz upper band.

700 MHz band spectrum licence means a spectrum licence that authorises the operation of radiocommunications devices in the 700 MHz band.

700 MHz lower band means the frequency band 703 MHz to 748 MHz.

700 MHz upper band means the frequency band 758 MHz to 803 MHz.

Act means the *Radiocommunications Act 1992*.

ARQZWA (short for Australian Radio Quiet Zone Western Australia) has the meaning given by the *Radiocommunications (Australian Radio Quiet Zone Western Australia) Frequency Band Plan 2023*, or any instrument made under section 32 of the Act as a replacement of that plan.

broadcasting service has the meaning given by section 6 of the *Broadcasting Services Act 1992*.

in-band means:

(a) for a radiocommunications device operated under a spectrum licence – the part of the spectrum within which the operation of radiocommunications devices is authorised under the licence; or

(b) for a radiocommunications device operated under an apparatus licence that specifies a frequency band – the frequencies within the lower frequency limit and the upper frequency limit specified in the licence; or

(c) for a radiocommunications device operated under an apparatus licence that specifies a specific frequency and bandwidth – the frequencies within that bandwidth, when centred on the specific frequency.

ITU-R Recommendation means a recommendation made by the Radiocommunication Sector of the International Telecommunication Union.

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

out-of-band, for a radiocommunications device, means a frequency other than an in-band frequency.

RALI FX 16 means the Radiocommunications Assignment and Licensing Instruction FX 16 *Frequency assignment requirements for the point-to-multipoint service in the VHF high, 400 MHz and 800 MHz bands*, published by the ACMA.

Note: RALI FX 16 is available, free of charge, on the ACMA website at www.acma.gov.au.

RALI FX 22 means the Radiocommunications Assignment and Licensing Instruction FX 22 *Frequency assignment requirements for the fixed service in the 800 MHz band*, published by the ACMA.

Note: RALI FX 22 is available, free of charge, on the ACMA website at www.acma.gov.au.

RALI LM 8 means the Radiocommunications Assignment and Licensing Instruction LM 8 *Frequency Assignment Requirements for the Land Mobile Service*, published by the ACMA.

Note: RALI LM 8 is available, free of charge, on the ACMA website at www.acma.gov.au.

RALI LM 9 means the Radiocommunications Assignment and Licensing Instruction LM 9 *Frequency Assignment Procedures for Land Mobile Services Adjacent to TV Channels 2, 3 and 6*, published by the ACMA.

Note: RALI LM 8 is available, free of charge, on the ACMA website at www.acma.gov.au.

RALI MS 32 means the Radiocommunications Assignment and Licensing Instruction MS 32 *Coordination of Apparatus Licensed Services within the Australian Radio Quiet Zone Western Australia*, published by the ACMA.

Note: RALI MS 32 is available, free of charge, on the ACMA website at www.acma.gov.au.

TLAP means a television licence area plan, and has the meaning given by subsection 6(1) of the *Broadcasting Services Act 1992*.

unwanted signal means a radio emission from a radiocommunications transmitter that is not a wanted signal.

wanted signal means a radio emission from a radiocommunications transmitter that is intended for reception by a radiocommunications receiver protected by this instrument.

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

(a) ACMA;
(b) apparatus licence;
(c) class licence;
(d) frequency band;
(e) interference;
(f) radiocommunications receiver;
(g) radiocommunications transmitter;
(h) receiver licence;
(i) Register;
(j) spectrum licence.

(2) Unless the contrary intention appears, terms used in this instrument that are defined in the *Radiocommunications (Unacceptable Levels of Interference — 700 MHz Band) Determination 2023* have the same meaning as in that determination.

Note: The term "geographic area" is defined in the *Radiocommunications (Unacceptable Levels of Interference — 700 MHz Band) Determination 2023*.

(3) Unless the contrary intention appears, terms used in this instrument that are defined in:

(a) the *Radiocommunications (Interpretation) Determination 2015*; or

(b) if another instrument replaces that determination – that other instrument;

have the same meaning as in that determination or instrument.

Note: The following terms that are used in this instrument are defined in Schedule 1 to the *Radiocommunications (Interpretation) Determination 2015:*

(a) spurious emission.

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

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

6 References to other instruments

In this instrument, unless the contrary intention appears:

(a) a reference to any other legislative instrument is a reference to that other legislative instrument as in force from time to time; and

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

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

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

Note 3: See section 314A of the Act.

Part 2 Overview

7 Background

(1) In parts of the 700 MHz band, spectrum licensed radiocommunications transmitters operate in frequency bands directly adjacent to frequency bands for apparatus licensed radiocommunications receivers of different services. Apparatus licensed radiocommunications receivers may suffer interference from a spurious emission, and from blocking and intermodulation caused by a spectrum licensed radiocommunications transmitter.

(2) This instrument has been made to provide guidance on the management of interference from radiocommunications transmitters operated under a 700 MHz band spectrum licence by providing for the protection of radiocommunications receivers that:

(a) are operated under a receiver licence; or

(b) receive, or are intended to receive, radiocommunications from radiocommunications transmitters operated under transmitter licences;

in or adjacent to the 700 MHz band.

(3) This instrument also provides guidance on the management of interference from radiocommunications transmitters operated under a 700 MHz band spectrum licence to radiocommunications receivers operating in the following circumstances:

(a) digital television radiocommunications receivers operating below the 694 MHz frequency boundary (Part 3);

(b) in the ARQZWA (Part 4);

(c) in relation to wireless audio devices (Part 5);

(d) trunked land mobile radiocommunications receivers operating in the frequency bands 806 MHz to 809 MHz and 851 MHz to 854 MHz (Part 6);

(e) fixed link radiocommunications receivers operating in the frequency bands 804 MHz to 806 MHz and 845 MHz to 851 MHz (Part 7).

(4) As radio waves propagate in different ways because of factors such as frequency, terrain, atmospheric conditions and topography, there are several ways to predict path loss. The ITU-R Recommendation P.1144 “Guide to the application of the propagation methods of Radiocommunications Study Group 3” provides a guide on the application of various propagation methods developed internationally by the Radiocommunication Sector of the International Telecommunication Union. It advises on the most appropriate methods for particular applications, as well as the limits, required input information and output for each of these methods. The most recent version of propagation models defined by the Radiocommunication Sector of the International Telecommunication Union should be considered when modelling propagation in the 700 MHz band.

Note 1: ITU-R Recommendation P.1144 is available, free of charge, on the International Telecommunication Union’s website at www.itu.int.

Note 2: The use of other published propagation methods applicable to the 700 MHz band may also be suitable.

(5) The ACMA may take this instrument into account in determining whether a radiocommunications transmitter operated under a 700 MHz band spectrum licence is causing interference to an apparatus licensed or class licensed radiocommunications receiver operating in circumstances set out in this instrument.

(6) This instrument does not prevent a person negotiating and implementing other protection requirements with other persons.

Part 3 Television broadcast services

8 Background

Digital television broadcasting and retransmission services operate in the band 520 MHz to 694 MHz. Ultra high frequency (***UHF***) broadcast channels 49, 50 and 51 are adjacent to the 700 MHz lower band. The core conditions of the 700 MHz band spectrum licence require radiocommunications transmitters to comply with specific emission limits outside the band in areas where these channels are used.

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

(1) A limit of -40 dBm/MHz is to apply to out-of-band emissions from radiocommunications transmitters operating in the 700 MHz lower band in areas where these transmitters co-exist with digital television receivers in the coverage areas of digital television broadcasting or retransmission services operating on UHF broadcast channels 49, 50 and 51. Specifically, the out-of-band requirements for radiocommunications transmitters in the 700 MHz lower band are as follows:

(a) -40 dBm/MHz (averaged over a 7 MHz television channel bandwidth) in the frequency band 673 MHz to 694 MHz when operating in an area (identified in maps published by the ACMA as referred to in subsection (2)) designated for use of UHF broadcast channels 49, 50 and 51;

(b) -34 dBm/MHz (averaged over a 7 MHz television channel bandwidth) in the frequency band 673 MHz to 694 MHz when operating in any other area;

(c) -40 dBm/MHz (averaged over a 7 MHz television channel bandwidth) below the frequency of 673 MHz in any area;

where the corresponding UHF broadcast channels are as follows:

UHF Broadcast Channel	Lower Edge Frequency (MHz)	Centre Frequency (MHz)	Upper Edge Frequency (MHz)
49	673.0	676.5	680.0
50	680.0	683.5	687.0
51	687.0	690.5	694.0

(2) Licensees of 700 MHz band spectrum licences are required to implement these out-of-band limits in those areas identified by a series of maps (based on broadcasting service planning performed by the ACMA) depicting predicted coverage areas of digital television broadcasting and retransmission services, as published by the ACMA, including in a TLAP. These maps, titled *Block E predicted areas of digital coverage*, identify those areas in which the -40 dBm/MHz limit must be adhered to over the 673 MHz to 694 MHz frequency band.

Note 1: Implementation of the -40 dBm/MHz limit may be achieved through user equipment design and/or network operation and deployment measures.

Note 2: The maps titled *Block E predicted areas of digital coverage* are available, free of charge, from the ACMA website at www.acma.gov.au.

(3) In this section:

coverage area, in relation to a broadcasting service or retransmission service, means the area within which radiocommunications transmitters make that service available.

retransmission service means a service to which section 212 of the *Broadcasting Services Act 1992* applies.

Part 4 The ARQZWA

10 Background

The site located in remote central Western Australia identified for radio astronomy use is protected from interference by the establishment of the ARQZWA across the radiofrequency spectrum from 70 MHz to 25.25 GHz. The location of the site, and the definition of the ARQZWA, can be found in the *Radiocommunications (Australian Radio Quiet Zone Western Australia) Frequency Band Plan 2023*. An area within 70 km of the site has been excluded from the geographic area of the 700 MHz band spectrum licences.

11 Protection requirements

Licensees of 700 MHz band spectrum licences in areas adjacent to the ARQZWA should coordinate proposed stations using the methods and limits set out for apparatus licensees in RALI MS 32.

Part 5 Wireless audio devices

12 Background

The operation of wireless audio devices is typically authorised by the *Radiocommunications (Low Interference Potential Devices Class) Licence 2015*. Additional spectrum options for the operation of wireless audio devices are detailed in RALI LM 9. They include the issue of land mobile apparatus licences in the 520 MHz to 694 MHz, 748 MHz to 758 MHz and 803 MHz to 814 MHz frequency bands. These additional options are intended to apply in situations not covered by the class licence and when operation of wireless audio devices will not cause interference to others licensed services.

13 Protection requirements

As detailed in *Radiocommunications (Low Interference Potential Devices Class) Licence 2015* and RALI LM 9, the operation of a wireless audio device in and adjacent to the 700 MHz band, is on the basis that it does not cause interference to a primary service, such as a service operating under a 700 MHz band spectrum licence, and a radiocommunications receiver in relation to a wireless audio device will not receive protection from that service.

Part 6 Trunked land mobile receivers

14 Background

(1) After 1 July 2024, trunked land mobile services are to operate such that 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.

(2) Protection of trunked land mobile radiocommunications receivers from spectrum licensed radiocommunications transmitters is on a first-in-time basis. The ACMA intends that an apparatus licensed radiocommunications receiver, licensed prior to the registration of a spectrum licensed radiocommunications transmitter in the Register, will receive protection in accordance with this instrument.

Note: The Register is established under section 143 of the Act and is available, free of charge, on the ACMA's website at www.acma.gov.au.

15 Protection requirements

(1) Coordination with land mobile station radiocommunications receivers is not required. The frequency separation between the 700 MHz upper band and the 851 MHz to 854 MHz frequency band is considered sufficient to enable coexistence.

(2) The protection requirements for base station radiocommunications receivers operating in the 806 MHz to 809 MHz frequency band for the percentage of time specified in RALI LM 8, are:

(a) a wanted signal to unwanted signal level ratio at the receiver input not less than the wanted to unwanted ratio specified in RALI LM 8; and

(b) a blocking level at the receiver input not exceeding the blocking level specified in RALI LM 8.

(3) The radiofrequency selectivity performance of the base station radiocommunications receiver may be assumed to be at least equal to the performance of a cavity filter with a response as specified in RALI LM 8 tuned to the operating frequency of that receiver. The base station receiver intermediate frequency bandwidth may be assumed to be that specified in RALI LM 8. The base station receiver antenna may be assumed to have a response equivalent to the notional antenna specified in RALI LM 8.

Part 7 Fixed service receivers

16 Background

(1) Fixed service receivers, including point-to-point links and point-to-multipoint link services, operate in the frequency bands 804 MHz to 806 MHz and 845 MHz to 851 MHz.

(2) RALI FX 22 specifies the arrangements for all fixed point-to-point links and RALI FX 16 specifies arrangements for point-to-multipoint services in the frequency bands 804 MHz to 806 MHz and 845 MHz to 851 MHz. Protection of fixed link radiocommunications receivers from spectrum licensed radiocommunications transmitters is on a first-in-time basis.

17 Protection requirements

(1) Coordination with fixed service receivers operating in the 845 MHz to 851 MHz frequency band is not required. The frequency separation between the 700 MHz upper band and the 845 MHz to 851 MHz frequency band is considered sufficient to enable coexistence.

(2) Spectrum licensees are to ensure that authorised radiocommunications transmitters 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.

(3) Spectrum licensees are to ensure that authorised radiocommunications transmitters 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.