



Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters — 850/900 MHz Band) 2021

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

Dated: 19 August 2021

Chris Jose
[signed]
Member

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[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 – 850/900 MHz Band) 2021*.

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 *Radiocommunications Act 1992*.

4 Revocation

The *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 800 MHz band) 2012* (F2012L01775) are revoked.

5 Definitions

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

850 MHz band means the following frequency bands:

- (a) 814 MHz to 845 MHz;
- (b) 859 MHz to 890 MHz.

850 MHz Upper Sub-band means the frequency band 859 MHz to 890 MHz.

900 MHz band means the following frequency bands:

- (a) 890 MHz to 915 MHz; and
- (b) 935 MHz to 960 MHz.

900 MHz base station radiocommunications receiver: see subsection 14(1).

900 MHz Lower Sub-band means the frequency band 890 MHz to 915 MHz.

Act means the *Radiocommunications Act 1992*.

RALI FX 16 means the Radiocommunications Assignment and Licensing Instruction FX 16 *Frequency assignment requirements for the point to multipoint service in the 400 MHz and 800/900 MHz bands*, published by the ACMA.

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

SOB link means a Sound Outside Broadcast link.

unwanted signal means any radio emission from any radiocommunications transmitter that is not communicating with the radiocommunications receiver used for a service protected by this instrument.

wanted signal means a radio emission from a radiocommunications transmitter designed for communication between the transmitter and radiocommunications receiver used for a service 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) Register;
- (i) spectrum licence; and
- (j) spectrum plan.

- (2) Unless the contrary intention appears, terms used in this instrument that are defined in the *Radiocommunications (Unacceptable Levels of Interference — 850/900 MHz Band) Determination 2021* have the same meaning as in that determination.

Note: The following term that is used in this instrument is defined in the *Radiocommunications (Unacceptable Levels of Interference — 850/900 MHz Band) Determination 2021*:

- 850/900 MHz band.

- (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) land mobile service;
- (b) radionavigation; and
- (c) 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.

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 850/900 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 receivers may suffer interference from a spurious emission, and from blocking and intermodulation caused by a spectrum licensed radiocommunications transmitter.
- (2) A spurious emission is a by-product of a radiocommunications transmitter's radio emissions and includes broadband noise, harmonics, intermodulation products, transient signals and other emissions. Blocking occurs when a high level off-tune signal overloads a radiocommunications receiver's front-end and causes a degradation in the quality of the wanted output signal. Intermodulation products can be generated in-band in the input stages of receivers in the presence of two or more high level signals at the receiver input.

8 Purpose

- (1) The purpose of this instrument is to manage interference 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 850/900 MHz band:
 - (c) outside the parts of the spectrum specified in the *Radiocommunications (Spectrum Re-allocation – 850/900 MHz Band) Declaration 2020*; or
 - (d) outside the named area specified in the *Radiocommunications (Spectrum Re-allocation – 850/900 MHz Band) Declaration 2020*.
- (2) This instrument has been made to guide the management of these types of interference to licensed radiocommunications receivers operating in the following circumstances:
 - (a) apparatus licensed trunked land-mobile radiocommunications receivers operating in the following frequency bands (Part 3):
 - (i) 806 MHz to 809 MHz;
 - (ii) 820 MHz to 825 MHz;
 - (iii) 851 MHz to 854 MHz; and
 - (iv) 865 MHz to 870 MHz;
 - (b) apparatus licensed fixed link radiocommunications receivers operating in the frequency band 845 MHz to 851 MHz (Part 4);
 - (c) spectrum licensed base station receivers operating in the 900 MHz band (Part 5); and
 - (d) apparatus licensed aeronautical navigation services operating above 960 MHz (Part 6).

Note: In relation to subparagraphs (2)(a)(ii) and (iv), the ACMA's policy is for trunked-land mobile services to cease being operated in 820 MHz to 825 MHz, and 865 MHz to 870 MHz, by 1 July 2024. See the ACMA paper, *The ACMA's long-term strategy for the 803-960 MHz band*, available, free of charge, on the ACMA's website: www.acma.gov.au.

- (3) Protection criteria and coordination arrangements recommended by these guidelines are specified in RALI FX 22 and RALI LM 8.

Note: RALI FX 22 and RALI LM 8 are available, free of charge, on the ACMA website: www.acma.gov.au.

- (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 International Telecommunication Union – Radiocommunications Sector (**ITU-R**). It advises users on the most appropriate methods for particular applications, as well as the limits, required input information, and output for each of these methods. It is recommended that the most recent version of propagation models defined by the ITU-R should be considered when modelling propagation in the 850/900 MHz band.

Note 1: The ITU-R Recommendation P.1144 *Guide to the application of the propagation methods of Radiocommunications Study Group 3* is available, free of charge, on the International Telecommunication Union's website: www.itu.int.

Note 2: The use of other published propagation methods applicable to the 850/900 MHz band may also be suitable.

- (5) The ACMA will take this instrument into account in determining whether interference has occurred from a radiocommunications transmitter operating under a spectrum licence in the 850/900 MHz band to a radiocommunications device operating under another licence, in the absence of separate criteria agreed between affected licensees.
- (6) This instrument does not prevent a licensee negotiating other protection arrangements with another licensee.

Part 3 Trunked land-mobile receivers

9 Background

- (1) After 1 July 2024, the ACMA's policy is for trunked land-mobile services to operate in a paired band where 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 these two bands in spectrum lower-adjacent to the 850 MHz band after the commencement of spectrum licences in the 850/900 MHz 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 any existing apparatus licensed receiver, licensed prior to the registration of a spectrum licensed 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: www.acma.gov.au.

10 Trunked Land-Mobile Base Station Receivers

- (1) The protection requirements for base station radiocommunications receivers operating in:
 - (a) before 1 July 2024 – the 820 MHz to 825 MHz frequency band; and
 - (b) the 806 MHz to 809 MHz frequency band;for the percentage of time specified in RALI LM 8, are:
 - (c) 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
 - (d) a blocking level at the receiver input not exceeding the blocking level specified in RALI LM 8.
- (2) 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.

11 Trunked Land-Mobile Mobile Receivers

- (1) The protection requirements for mobile radiocommunications receivers operating in:
 - (a) before 1 July 2024 – the 865 MHz to 870 MHz frequency band; and
 - (b) the 851 MHz to 854 MHz frequency band;for the percentage of time and percentage of locations specified in RALI LM 8, are:
 - (c) 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
 - (d) a blocking level at the receiver input not exceeding the blocking level specified in RALI LM 8.
- (2) The mobile radiocommunications receiver intermediate frequency bandwidth may be assumed to be that specified in RALI LM 8.

Part 4 Fixed service receivers

12 Background

- (1) Fixed services receivers, including point-to-point links and point-multipoint link services, operate in the frequency bands 804 MHz to 806 MHz and 845 MHz to 851 MHz, adjacent to the 850/900 MHz band. SOB links also operate in this band, predominately in the 845 MHz to 846.5 MHz segment.
- (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 range 804 MHz to 851 MHz. Protection of fixed link radiocommunications receivers from spectrum licensed radiocommunications transmitters is on a first-in-time basis. The ACMA intends that any existing apparatus licensed fixed link receiver, licensed prior to the registration of a spectrum licensed transmitter in the Register, will receive protection in accordance with this instrument. A SOB link is typically operated on a temporary, transportable basis. Given the ad hoc nature of their operation, a SOB link is operated on a “no interference/no protection” basis in the 845 MHz to 851 MHz frequency band with regard to fixed links of the primary service planned in the spectrum plan, other SOB links and spectrum licensed services that operate in the 850/900 MHz band.

Note The phrase “no interference/no protection” refers to a service operating on the basis that it does not cause interference to a primary service and will not receive protection from that service. SOB link apparatus licences that authorise operation in the 845 MHz to 851 MHz frequency band are subject to a special licence condition. The condition requires that no interference may be caused to any radiocommunications station, or any service operating on a primary basis.

13 Protection requirements

- (1) Spectrum licensees are to ensure that authorised radiocommunications transmitters protect fixed point-to-point link receivers to the level detailed in section 4.2.2 and section 6.2.2 of RALI FX 22.
- (2) Spectrum licensees are to ensure that authorised radiocommunications transmitters protect fixed point-to-multipoint service receivers according to the protection ratio and usable sensitivity level detailed in RALI FX 16.

Part 5 900 MHz base station receivers

14 Background

- (1) Spectrum licensed base station receivers in the 900 MHz Lower Sub-band (**900 MHz base station radiocommunications receivers**) are in parts of the spectrum immediately adjacent to spectrum licensed base station transmitters in the 850 MHz Upper Sub-band (**850 MHz spectrum licensed radiocommunications transmitters**).
- (2) Protection of 900 MHz base station radiocommunications receivers from 850 MHz spectrum licensed radiocommunications transmitters requires cooperation between the licensees below and above the 890 MHz boundary, and requires licensees to participate, in good faith, in the implementation of mitigation measures set out in Part 3, section 16 of the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers – 850/900 MHz Band) 2021*. In the absence of such cooperation and participation, the ACMA intends for coordination of devices and licences to occur on a first-in-time basis.

Note The ACMA is allocating spectrum licences in the 850/900 MHz band in a way that will allow the 850 MHz band (including the 850 MHz Upper Sub-band) to be downshifted by 1 MHz, making its upper boundary 889 MHz, before 17 June 2028. This is expected to partially alleviate coexistence problems between 850 MHz and 900 MHz services operating either side of 890 MHz. This instrument assumes the downshift has not occurred. More information about the ACMA's policy for the downshift can be found, free of charge, on the ACMA's website: www.acma.gov.au in the paper *The ACMA's long-term strategy for the 803-960 MHz band decision paper*.

15 Protection requirements

The protection requirements for 900 MHz base station radiocommunications receivers are specified in section 16 of the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers – 850/900 MHz Band) 2021*.

Part 6 Systems operating under the Aeronautical Radionavigation Service

16 Background

- (1) Many aeronautical services operate in the 960 MHz to 1215 MHz frequency band, above the 900 MHz spectrum licensed band upper boundary at 960 MHz. Many of these are transponder-based, using discrete frequency pairs (namely 1030 MHz and 1090 MHz). The scope of this instrument is limited to compatibility with services operating within 20 MHz above the 960 MHz boundary, which in Australia is exclusively used by distance measuring equipment and tactical air navigation systems.
- (2) The radiocommunications transmitters below 960 MHz, which have been used as base stations for 2G, 3G and 4G public mobile telecommunications services, have operated under apparatus licences for many years, without causing interference to aeronautical services above 960 MHz. The section 17 protection requirement is intended to ensure ongoing protection of aeronautical services from interference from radiocommunications transmitters below 960 MHz, used as base stations for 4G and 5G (and future generation) public mobile telecommunications services, operated under spectrum licences.

17 Protection requirements

A spectrum licensed radiocommunications transmitter that is a base station, and that operates in the 900 MHz band, must protect existing stations appearing in the Register in the 960 MHz to 980 MHz frequency band under the licence type “aeronautical system” to a level of -129 dBW/MHz at the antenna connector, assuming an antenna gain of 9 dBi in any direction if gain and azimuth is not otherwise specified in the Register.