

EXPLANATORY STATEMENT

Issued by the Australian Communications and Media Authority

Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers – 800 MHz Band) 2012

Radiocommunications Act 1992

Purpose

The purpose of the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers – 800 MHz Band) 2012* (the Advisory Guidelines) is to provide guidance to assist with the management of interference to radiocommunications receivers operating under spectrum licences issued for the 800 MHz band caused by radiocommunications transmitters operating in adjacent bands and adjacent areas under apparatus licences that are issued on or after 18 June 2013. The Advisory Guidelines are designed to be used by operators of spectrum licensed services and apparatus licensed services in the planning of services or in the resolution of interference.

Legislative provisions

Under section 262 of the *Radiocommunications Act 1992* (the Act), the Australian Communications and Media Authority (the ACMA) may make written advisory guidelines about any aspect of radiocommunication or radio emissions.

Subsection 262(2) of the Act provides a non-exhaustive list of examples of the matters about which advisory guidelines may be made, one of which is ‘interference with radiocommunications’.

The Advisory Guidelines are a legislative instrument under the *Legislative Instruments Act 2003*.

Background

The first 15 year spectrum licences in the 825-845 / 870-890 MHz band (the 800 MHz band) were issued under the Act in 1998.

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 respectively.

The Act provides a number of means by which the ACMA may manage interference that may be caused to a radiocommunications receiver operating under a spectrum licence. One of these includes the ability to make advisory guidelines under section 262 of the Act about interference.

The *Radiocommunications Advisory Guidelines (Management of Interference from Apparatus-licensed Transmitters – 800 MHz Band) 1998* (the 1998 Guidelines) made under section 262 of the Act set out the conditions and criteria for the protection of spectrum licensed radiocommunications receivers operating in the 800 MHz band from apparatus licensed radiocommunications transmitters operating on an in-band or adjacent-band basis or in areas adjacent to the geographic areas of the 800MHz band. Similarly, the *Radiocommunications Advisory Guidelines (Protection of Apparatus-licensed Receivers – 800 MHz Band) 1998* made under section 262 of the Act deals with managing interference in the 800 MHz band in other specific circumstances.

Current spectrum licences in the 800 MHz band will expire on 17 June 2013. To prepare for the re-issue and/or re-allocation of the spectrum in the 800 MHz band, the ACMA conducted a review of the 800 MHz spectrum licensing technical framework. The aim of the review was to:

- > ensure flexibility so that a range of modern technologies can be used in the band, with a particular focus on International Mobile Telecommunications (IMT) technologies;
- > provide conditions that enable continued usage of existing network technologies in the band;
- > provide interference management within the 800 MHz band, and in adjacent bands; and
- > address deficiencies that have come to light during the current licence period.

The review recommended that the 1998 Guidelines be amended to account for the modernisation of mobile communications technologies that has occurred since the publication of the 1998 Guidelines as well as to allow for developments that may be expected to take place during the next spectrum licence period. The recommendations included:

- > re-defining the notional receiver performance level, including the following parameters:
 - > adjacent channel selectivity;
 - > receiver intermodulation response rejection;
 - > receiver blocking levels;
 - > notional antenna and feeder loss combinations;
 - > notional radiofrequency (RF) selectivity; and
 - > spurious response rejection;
- > re-defining the compatibility requirement;
- > providing advice in the guidelines on the management of interference from mobile transmitters operating in the 900 MHz band to mobile receivers operating in the 800 MHz band; and

- > providing advice on the management of interference from studio transmitter links and sound outside broadcast links to 800 MHz spectrum licensed receivers.

The Advisory Guidelines are one of a set of instruments being made by the ACMA to vary the spectrum licensing technical framework applicable to the 800 MHz band according to the review recommendations. The Advisory Guidelines revoke the 1998 Guidelines and implement the above recommendations. The ACMA will also make the *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 800 MHz Band) 2012* and the *Radiocommunications (Unacceptable Levels of Interference – 800 MHz band) Determination 2012*. These instruments will replace the current instruments.

Operation

The Advisory Guidelines provide guidance on the management and settlement of interference to radiocommunications receivers operating under spectrum licences in the 800 MHz band which is caused by radiocommunications transmitters operating under apparatus licences in adjacent bands or adjacent areas. The Advisory Guidelines should be used by operators of spectrum licensed services and apparatus licensed services in the planning of services or the resolution of interference.

Consultation

The ACMA has consulted extensively with stakeholders about the review of the spectrum licensing technical framework for the 800 MHz band.

On 18 July 2011, the ACMA established an advisory body known as a Technical Liaison Group (TLG) to support the review of the technical framework in the 800 MHz band. Incumbent and prospective licensees for the 800 MHz band were invited to participate in the TLG process.

The TLG was tasked to consider and provide advice to the ACMA on technical aspects required for the development or review of the technical framework. This included:

- > the core conditions of the spectrum licence in accordance with section 66 of the Act;
- > the radiocommunications advisory guidelines made under section 262 of the Act for the 800 MHz band;
- > the draft spectrum licence; and
- > the minimum contiguous bandwidth for spectrum licences in the 800 MHz band.

The ACMA developed four discussion papers which outlined the proposed approach to the spectrum licensing framework for the 800 MHz band. These papers were provided for comment by the ACMA to TLG members. These papers may be found on the ACMA website at <http://www.acma.gov.au>.

The ACMA took into account the views expressed by TLG members when preparing the draft Advisory Guidelines and released a final response to submissions made by TLG members on 20 February 2012. The draft Advisory Guidelines were available for public comment from 19 June 2012 to 27 July 2012 in order to give all interested parties a further opportunity to comment on the draft technical framework before the final Advisory Guidelines were made by the ACMA. There were two submissions received, including one from an incumbent licensee. The ACMA took into account both submissions. Only minor editorial changes were made to the Advisory Guidelines after consultation.

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 (disallowance) of the *Legislative Instruments Act 2003* applies to cause a statement of compatibility to be prepared in respect of that legislative instrument. This statement is provided in **Attachment B**.

Regulatory impact

Prior to releasing the draft Advisory Guidelines, the ACMA consulted with the Office of Best Practice Regulation (the OBPR) on the requirement for a Regulation Impact Statement (RIS) for this legislative instrument. The OBPR advised that the Advisory Guidelines do not warrant the preparation of a RIS because the instrument is only likely to have minor and machinery impacts. The reference number for the OBPR's assessment is ID 13994.

Documents incorporated by reference

The Advisory Guidelines incorporate the following documents by reference:

- > The *Radiocommunications Assignment and Licensing Instruction FX11 - Studio to transmitter links and sound outside broadcasting services in the 900 MHz band* (RALI FX 11) which is a document published by the ACMA that sets out licensing procedures for fixed service low capacity single frequency services used mainly by broadcast services for studio to transmitter links and sound outside broadcast links allocated in the segment 845-852 MHz of the 900 MHz of the 900 MHz Band Plan. A copy of this document, as in force from time to time, may be obtained from the ACMA's website at <http://www.acma.gov.au>.

- > The *Radiocommunications Assignment and Licensing Instruction No. LM 8 - Frequency assignment requirements for the land mobile service* (RALI LM 8) which is a document published by the ACMA that provides frequency assignment policy and coordination procedures for single and two frequency land mobile systems employing angle and digital

modulation methods. A copy of this document, as in force from time to time, may be obtained from the ACMA's website at <http://www.acma.gov.au>.

- > The spectrum planning report SPP 2011-08 prepared by the ACMA, entitled 'Compatibility Evaluation between 800MHz IMT Services and 900MHz Global Systems for Mobile Communications (GSM) Services' which identifies the interference situations that occur between IMT systems deployed in the 800 MHz band (825-845 MHz and 870-890 MHz) and GSM / IMT systems deployed in the 900MHz band (890-915 MHz and 935-960 MHz). This describes the management strategies used to manage such interference and provides a means of determining the isolation required between IMT base transmitters and GSM base receivers to minimise interference between these systems due to receiver blocking and intermodulation. Copies of this document may be obtained from the ACMA's website at <http://www.acma.gov.au>.

Detailed description of the Advisory Guideline

Details of the Advisory Guideline are set out in **Attachment A**.

DETAILS OF THE *RADIOCOMMUNICATIONS ADVISORY GUIDELINES (MANAGING INTERFERENCE TO SPECTRUM LICENSED RECEIVERS – 800 MHZ BAND) 2012*

Section 1 – Name of Advisory Guidelines

This section provides that the name of the instrument is the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers – 800 MHz Band) 2012*.

Section 2 - Commencement

This section provides that the Advisory Guidelines commence on 18 June 2013.

Section 3 – Revocation

This section revokes the *Radiocommunications Advisory Guidelines (Managing Interference from Apparatus-licensed Transmitters – 800 MHz Band) 1998*. Revocation will take effect on 18 June 2013.

Section 4 – Purpose

This section states that the purpose of the Advisory Guidelines is to assist in managing interference to spectrum licensed radiocommunications receivers operating in the 800 MHz band on an in-band and out-of-band basis from radiocommunications transmitters operating under an apparatus licence in adjacent band or adjacent areas, and that are issued on or after 18 June 2013. This section also indicates that the Advisory Guidelines should be referred to in the planning of services in the 800 MHz band as well as the settling of any interference dispute that may arise between spectrum licensees and any licensees in adjacent licence areas and bands.

Section 5 – Interpretation

This section provides definitions for the terms used in the Advisory Guidelines. Some terms used in the instrument have the same meaning as in the *Radiocommunications (Unacceptable Levels of Interference – 800 MHz Band) Determination 2012* or in the Act.

Part 1 - Background

This Part provides some basic information about spectrum licences and the modes of interference occurring across frequency boundaries and geographical boundaries. It describes the components of the 800 MHz technical framework that are used to manage interference, which consist of:

- core conditions applying to spectrum licences and made in accordance with section 66 of the Act;
- the determination on unacceptable levels of interference made in accordance with section 145 of the Act; and
- the advisory guidelines on managing interference to and from spectrum licensed services in specific circumstances made in accordance with section 262 of the Act.

It also noted that the Advisory Guidelines have been made to provide guidance in the resolution of cases of interference occurring to spectrum licensed radiocommunications receivers and caused by radiocommunications transmitters operated under apparatus licences operating in the 800 MHz band.

Part 2 - Managing in-band and out-of-band interference from area adjacent and frequency adjacent services respectively

Section 2.1 – In-band interference

This section explains the methods through which in-band interference to a radiocommunications receiver operated under a spectrum licence is managed.

Where the interference is from a radiocommunications transmitter operating under a spectrum licence then it is managed through the core conditions of the spectrum licence and the device boundary criteria set out in the relevant section 145 determination for the frequency band in which the spectrum licence operates. Where the interference is from an adjacent apparatus licensed radiocommunications transmitter (where the apparatus licence is issued on or after 18 June 2013), then it is managed using the same criteria.

Interference caused in a radiocommunications receiver operated under a spectrum licence and caused by a radiocommunications transmitter operated under another spectrum licence is managed through the core conditions of the spectrum licence and the device boundary criteria set out in the relevant section 145 determination for the frequency band of the licence.

Section 2.2 – Out-of-band interference

This section sets out what constitutes out-of-band interference in a radiocommunications receiver operated under a spectrum licence. Out-of-band interference can occur when radiocommunications transmitters are either near 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 also 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 the definition of a notional receiver performance level and a compatibility requirement for coordination with apparatus 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 radiocommunications transmitter side.

Section 2.3 - Recording radiocommunications receiver details in the Register

This section explains that for the purposes of the Advisory Guidelines, the details of a spectrum-licensed radiocommunications receiver must be entered in the register of radiocommunications licences (the Register) established under section 143 of the Act, for it to be afforded protection from an apparatus licensed service. Protection is based on first-in-time basis where the date of registration of the spectrum licensed radiocommunications receiver must be before the date on which the apparatus licence under which the radiocommunications transmitter operates is issued.

Section 2.4 – Mobile devices

This section explains that Schedule 3 of the Advisory Guidelines contains advice on the management of interference to 800 MHz mobile radiocommunications receivers and the probability of interference from 900 MHz mobile transmitters operating in the adjacent band, particularly when these devices are within range of each other.

Part 3 – Minimum Level of Receiver Performance

Section 3.1 – Notional Receiver Performance

This section explains the basis for the definition of the notional receiver performance level. The degree of interference seen in a radiocommunications receiver is dependent on the quality of the receiver and emissions from radiocommunications transmitters should not have to be reduced below a point where the performance of a receiver is the main cause of the interference problem. It also states that a registered radiocommunications receiver should meet the notional receiver performance level set out in Schedule 1, in order to obtain protection in accordance with the Advisory Guidelines.

Part 4 – Compatibility Requirement

Section 4.1 – Compatibility

This section explains what is required for applying the compatibility requirement for the protection of a spectrum licensed radiocommunications receiver from an apparatus licensed radiocommunications transmitter operating in an adjacent band. An apparatus licensed transmitter is required to adhere to the compatibility requirement specified in Schedule 2 of the Advisory Guideline in relation to those spectrum licensed receivers that:

- meet the notional receiver performance level set out in Schedule 1;
- are registered in the Register on a date prior to the date the apparatus licence under which the transmitter operates is issued; and
- operate at effective antenna heights below the limits for the 800 MHz upper band and 800 MHz lower band set out in section 4.1.

Section 4.2 – Apparatus licensed services near the lower band

This section explains that spectrum licensed radiocommunications receivers operating in the 800 MHz lower band may have to be protected from interference from apparatus licensed services operating in the immediately adjacent bands. These services include trunked land mobile transmitters in the 820-825 MHz band and studio transmitter links/sound outside broadcast links in the 845-852 MHz band.

Section 4.3 – Apparatus licensed services near the upper band

This section explains that spectrum licensed radiocommunications receivers operating in the 800 MHz upper band may have to be protected from interference from apparatus licensed services operating in the immediately adjacent bands. These services include trunked land mobile transmitters in the 865-870 MHz band and GSM Mobile transmitters in the 890-915 MHz band.

Schedule 1 – Notional receiver performance level

This Schedule defines the notional receiver performance level for spectrum licensed radiocommunications receivers. Such receivers should meet this performance level in order to minimise interference from apparatus licensed radiocommunications transmitters. The notional receiver performance level consists of requirements for the following:

- Adjacent channel selectivity performance which is the measure of the ability of a receiver to receive a wanted signal without exceeding a specified degradation in output quality due to the presence of an unwanted adjacent channel signal.
- Intermodulation response rejection performance, which is the measure of the ability of a receiver to receive a wanted signal in the presence of two or more unwanted signals with a specific amplitude and frequency relationship to the wanted signal frequency.
- Receiver blocking performance, which is the measure of the ability of a receiver to receive a wanted signal in the presence of a high level unwanted interferer on frequencies other than those of the adjacent channels.
- Receiver spurious response performance which is the measure of the ability of the receiver to discriminate between the wanted signal and an unwanted signal at any frequency, outside the frequency band of the licence, to which the receiver responds.

The notional receiver performance level assumes:

- A standard receiver sensitivity for modern mobile communications devices.
- A representative combination of antenna gain and feeder/branching losses.
- A radiofrequency selectivity, between the output of the antenna and the outermost connector of the radio equipment, equal to that specified in Schedule 1.

Schedule 2 – Compatibility requirement

This Schedule defines the compatibility requirement for managing interference from adjacent frequency apparatus licensed radiocommunications transmitters to spectrum licensed radiocommunications receivers. The compatibility requirement should be evaluated at the minimum wanted signal level for the stated availability, which effectively sets a grade of service for the wanted path in a Rayleigh fading or multipath environment.

Rayleigh fading is fading of a wanted signal that occurs due to motion of an outstation terminal with respect to a base station terminal in a propagation environment where there are multiple radio paths between the radiocommunications transmitter and radiocommunications receiver as a result of reflections and diffractions from clutter and obstacles. This type of fading occurs where the predominant propagation mode is non line-of-sight multipath.

Schedule 3 – Managing interference from 900 MHz Mobile Transmitters to 800 MHz Mobile Receivers

This Schedule explains that there is potential interference from 900 MHz mobile transmitters operating in the 890-915 MHz frequency to those 800 MHz mobile receivers operating in the 870-890 MHz frequency band. This interference is addressed in the Advisory Guidelines because of the minimum frequency separation that exists between these services (there being no external guard band) and the expectation that they may operate in close proximity to each other.

This Schedule refers to studies conducted by the 3rd Generation Partnership Project (3GPP) standards organisation into capacity reductions in mobile networks due to interference from mobile devices in this mode. The report found that for non-synchronised operation the reductions in capacity to the interfered mobile service were not significant. These studies are described in full in the 3GPP Report TR 25.942 “Radio frequency System Scenarios”. This report may be obtained from the 3GPP website at <http://www.3gpp.org>. Further information on the studies can be found in the ACMA publication SPP 2011-08 which is a spectrum planning report available [on the ACMA website](#).

Schedule 4 - Managing interference from Studio Transmitter Links and Sound Outside Broadcast Links to 800 MHz Spectrum Licensed Receivers

This Schedule explains the case of studio transmitter links (STL) and sound outside broadcast link (SOB) transmitters operating in the 845-852 MHz frequency and the potential interference that may be caused by such transmitters to spectrum licensed receivers operating in the 825-845 MHz

frequency. The ACMA studies have indicated that there is potential interference in this mode when the devices are operated within near vicinity, such as when these systems operate on the same site. Apparatus licensees operating STL/SOB transmitters are advised that in order to avoid potential interference to spectrum licensed receivers they should ensure that their systems are compliant with the compatibility requirement and that they conform to the conditions of RALI FX 11.

Statement of compatibility with human rights

Prepared in accordance with Part 3 of the *Human Rights (Parliamentary Scrutiny) Act 2011*

Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers – 800 MHz Band) 2012

This legislative instrument is compatible with the human rights and freedoms recognised or declared in the international instruments listed in section 3 of the *Human Rights (Parliamentary Scrutiny) Act 2011*.

Overview of the Legislative Instrument

Section 262 of the *Radiocommunications Act 1992* (the Act) provides that the Australian Communications and Media Authority (the ACMA) may make advisory guidelines about any aspect of radiocommunication or radio emissions.

The purpose of the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers – 800 MHz Band) 2012* (the Advisory Guidelines) is to provide guidance to assist with the management of interference to radiocommunications receivers operating under spectrum licences issued for the 800 MHz band caused by radiocommunications transmitters operating in adjacent bands and adjacent areas under apparatus licences that are issued on or after 18 June 2013.

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 (disallowance) of the *Legislative Instruments Act 2003* applies to cause a statement of compatibility to be prepared in respect of that legislative instrument.

The Advisory Guidelines are a legislative instrument that is subject to disallowance under section 42 of the *Legislative Instruments Act 2003*.

Human Rights Implications

The Advisory Guidelines do not engage any of the applicable rights or freedoms.

Conclusion

The Advisory Guidelines are compatible with human rights as they do not raise any human rights issues.