EXPLANATORY STATEMENT

Issued by the Australian Communications and Media Authority

Radiocommunications (Unacceptable Levels of Interference – 800 MHz Band) Determination 2012

Radiocommunications Act 1992

Purpose

The purpose of the Radiocommunications (Unacceptable Levels of Interference – 800 MHz Band) Determination 2012 (the Determination) is to set out what is an unacceptable level of interference caused by a radiocommunications transmitter operating under a spectrum licence issued in the 800 MHz band for the purposes of section 145 of the Radiocommunications Act 1992 (the Act). The Determination aims to ensure that unacceptable levels of emission from radiocommunications transmitters operated under a spectrum licence are kept within the geographic area and frequency band of the licence.

Legislative Provisions

Section 69 of the Act requires each spectrum licence to include a condition that 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. Section 69 also provides that the condition may exempt radiocommunications transmitters of particular kinds from having to meet those registration requirements.

Part 3.5 of the Act provides for the registration of licences. The Register of Radiocommunications (the Register) is established by section 143 of the Act. Section 144 of the Act stipulates the information which must be included on the Register for each spectrum licence, which includes such details as the ACMA determines, in writing, about radiocommunications devices that are operated under spectrum licences (paragraph 144(1)(e)). These details have been determined in the Radiocommunications (Register of Radiocommunications Licences) Determination 1997.

Under subsection 145(1) of the Act, The ACMA may refuse to include in the Register under paragraph 144(1)(e) details of a radiocommunications transmitter that is proposed to be operated under a spectrum licence, if it is satisfied that operation of the transmitter could cause an unacceptable level of interference to the operation of other radiocommunications devices under that or any other spectrum licence, or any other licence. The Determination is made under subsection 145(4) of the Act for this purpose and sets out what is an unacceptable level of interference caused by a radiocommunications transmitter operating under a spectrum licence issued in the 800 MHz band.
The Determination is 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 devices and devices operating under apparatus and class licensing arrangements respectively. The Act provides a number of means by which the ACMA may manage interference resulting from operation of a radiocommunications transmitter under a spectrum licence.

Spectrum licences in the 800 MHz band will expire on 17 June 2013. To prepare for the re-issue and/or re-allocation of spectrum licences 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 technological 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.

To ensure that the spectrum licensing technical framework remains appropriate for the next spectrum licence tenure period, the review recommended that the **Radiocommunications (Unacceptable Levels of Interference – 800 MHz band) Determination 2000** be amended to:

> revise the device boundary criterion (DBC) method by simplifying the calculation of effective antenna height and through greater resolution provided by use of 360 one-degree radials and line segments of 500 metres;

> use a new digital elevation model (DEM-9S) based on the Geocentric Datum of Australia 1994 (GDA94) datum that is made available by Geoscience Australia¹;

> revise propagation modelling for the upper and lower bands that more accurately reflects the deployment scenarios;

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The Determination is one of a set of legal 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 Determination revokes the Radiocommunications (Unacceptable Levels of Interference – 800 MHz Band) Determination 2000 and implements 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 Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers – 800 MHz Band) 2012. These legislative instruments will revoke the Radiocommunications Advisory Guidelines (Protection of Apparatus-licensed Receivers – 800 MHz Band) 1998 and the Radiocommunications Advisory Guidelines (Management of Interference from Apparatus-licensed Transmitters – 800 MHz Band) 1998 respectively.

Operation

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 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 800 MHz band.

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 for the 800 MHz band. This included consideration of:

> the core conditions of the spectrum licence in accordance with section 66 of the Act;
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 and 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 Determination and released a final response to submissions made by TLG members on 20 February 2012. The draft Determination was also 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 instruments before the final Determination was made by the ACMA. There were two submissions received, including one from an incumbent licensee. Only minor editorial amendments were made to the Determination following consultation.

**Regulatory Impact**

Prior to releasing the draft Determination, 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 Determination does not warrant the preparation of a RIS because it is only likely to have minor and machinery impacts. The reference for the OBPR’s assessment is ID 13994.

**Documents Incorporated by reference**

The Determination incorporates the following documents by reference:


The Radio Regulations published by the International Telecommunications Union (ITU), as in force from time to time. Copies of the Radio Regulations can be obtained from the ITU at www.itu.int.

Detailed Description of the Determination

Details of the instrument are set out in Attachment A.

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 Attachment B.
DETAILS OF THE RADIOCOMMUNICATIONS (UNACCEPTABLE LEVELS OF INTERFERENCE – 800 MHZ BAND) DETERMINATION 2012

Section 1 – Name of Determination
This section provides that the Determination is to be cited as the Radiocommunications (Unacceptable Levels of Interference – 800 MHz Band) Determination 2012.

Section 2 - Commencement
This section states that the Determination will commence on 18 June 2013. This is the same day on which the new spectrum licences to be issued in the 800 MHz band will commence.

Section 3 – Revocation
This section revokes the Radiocommunications (Unacceptable Levels of Interference – 800 MHz Band) Determination 2000. Revocation will have effect on 18 June 2013.

Section 4 – Purpose
This section provides that Determination is made for the purposes of section 145 of the Act and sets out the technical rules defining what is considered to be an unacceptable level of interference caused by a radiocommunications transmitter operating under a spectrum licence in the 800 MHz band. The unacceptable level of interference is defined so as to ensure that high emission levels from spectrum licensed radiocommunications transmitters are contained within the geographic area and frequency boundaries of the licence under which the transmitter operates. There are three notes that clarify and provide further information about the purpose of the Determination.

Note 1 explains that the ACMA may refuse to register a device under a spectrum licence if it believes it will cause an unacceptable level of interference under subsection 145(1) of the Act.

Note 2 refers to an information paper, titled “Registration of radiocommunications devices under spectrum licences”, which is available from the ACMA’s website. The information paper provides further guidance to licensees on the registration of transmitters under Part 3.5 of the Act.

Note 3 indicates how the ACMA will consider the two Advisory Guidelines made under section 262 of the Act about managing interference to spectrum licensed receivers and from spectrum licensed transmitters in the 800 MHz band, when managing interference disputes.
Section 5 – Interpretation
This section provides definitions for the terms used in the Determination.

Section 6 – Emission designator
This section clarifies that for the purposes of determining the emission designator of a radiocommunications transmitter’s emission in accordance with Appendix 1 of the ITU Radio Regulations, references to necessary bandwidth for a given class of emission in the Radio Regulations are taken to be references to the occupied bandwidth of the transmitter. The emission designator of a radiocommunications transmitter’s emission is relevant when determining whether two or more fixed transmitters are a group of radiocommunications transmitters under section 7 of the Determination.

Section 7 – Group of radiocommunications transmitters
This section specifies when two or more fixed radiocommunications transmitters will be considered to be part of a group of radiocommunications transmitters under the Determination. A group of radiocommunications transmitters consists of two or more fixed transmitters located at a common site that have common features. Individual radiocommunications transmitters in a group do not need to be registered individually. Under Schedule 2, the device boundary for a group of radiocommunications transmitters is calculated as if for a single radiocommunications transmitter.

Section 8 – Group of radiocommunications receivers
This section specifies when two or more fixed radiocommunications receivers will be considered to be part of a group of radiocommunications receivers under the Determination. A group of radiocommunications receivers consists of two or more fixed receivers, located at a common site that have common features. The location of a group of radiocommunications receivers is calculated in accordance with Schedule 1 as if it were a group of radiocommunications transmitters.

Section 9 – Unacceptable level of interference
This section provides what is an unacceptable level of interference for the purposes of interference management in the 800 MHz band. A radiocommunications transmitter producing emissions that do not meet the requirements of the Determination will, in most circumstances, be refused registration by the ACMA under subsection 145(1) of the Act. Licensees who operate such devices without registration will be in breach of section 69 of the Act and may be subject to further compliance action under the Act.

Under paragraphs 9(a) – (e) of the Determination, a spectrum licensed radiocommunications transmitter is considered to have caused an unacceptable level of 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 of the geographic and frequency boundaries of the licence;

• 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 Schedule 2 of the Determination;

• the device boundary for the transmitter cannot be calculated in accordance with Part 1 of Schedule 2 of the Determination;

• the transmitter does not conform to the effective antenna height restrictions specified in paragraph 9(d) of the Determination; or

• in the case of a mobile transmitter operating in the 800 MHz band – the horizontally radiated power from the device is greater than 30dBm EIRP per 1MHz.

Section 10 – Accuracy
This section specifies the level of accuracy required when calculating the values of the parameters that are in Schedules 1, 2, 3, 4 and 5 of the Determination.

Schedule 1 – Location of a transmitter
This Schedule specifies how the location of a radiocommunications transmitter and a group of radiocommunications transmitters is to be determined. The provisions explain that the location of a radiocommunications transmitter is the location of the phase centre of the antenna or, for a group of radiocommunications transmitters, the centre point between the phase centre of each antenna within the group. The location is to be specified in latitude and longitude with reference to the GDA94.

The location of a transmitter is used to determine the device boundary of a transmitter in Part 1 of Schedule 2. There are two notes that clarify the process for determining the location of transmitters in accordance with the Schedule.

Note 1 indicates that the ACMA issues site identifiers for established radiocommunications locations (sites) available in the Register which can be accessed via the ACMA website.

Note 2 indicates that the ACMA provides advice in the document “Business Operating Procedure – Radiocommunications site data requirements” to assist licensees in meeting location measurement error requirements for radiocommunications sites. A copy of this document may be obtained from the ACMA’s website at http://www.acma.gov.au.

Schedule 2 – Device boundaries
This Schedule sets out the technical procedure for calculating the device boundary of a radiocommunications transmitter or group of radiocommunications transmitters. The device boundary is a theoretical boundary calculated around a radiocommunications transmitter, or group of
radiocommunications transmitters, using the methodology set out in Schedule 2. Calculation of the device boundary is relevant for applying section 9 of the Determination. Under paragraph 9(b) of the Determination, a transmitter is taken to cause an unacceptable level of interference if any part of its device boundary lies outside the geographic area of the spectrum licence. Under paragraph 9(c), if the device boundary of a transmitter cannot be calculated in accordance with Schedule 2, it is taken to cause unacceptable levels of interference.

Part 1 of Schedule 2 details the steps to be followed in calculating the device boundary for a single radiocommunications transmitter. For a group of radiocommunications transmitters, the device boundary is to be calculated by considering the group as if it were a single transmitter.

Part 2 of Schedule 2 defines the device boundary criterion (DBC), which is the mathematical expression used in the calculation of a device boundary in accordance with Part 1 of the Schedule. This mathematical function consists of the radiated power of the device (transmitter) minus the maximum power function. The DBC has functional dependencies which include the horizontally radiated power of the device, the level of protection for standard receivers used in the 800 MHz band, the nominal receiver antenna gain and the propagation loss over the radiocommunications path for each radial and increment combination.

The calculation of the device boundary in Part 1 is an iterative process and involves testing whether the DBC specified in Part 2 is met at increasing distances (of 500 metre increments) from the radiocommunications transmitter along radial lines spaced around the centre location of the transmitter. The latitude and longitude of the first point on a radial where the DBC is less than or equal to zero is considered to be the furthest point of the device boundary on this radial. The end points of each of the radials must be within the geographic area of the licence under which the transmitter operates to be taken not to cause unacceptable interference.

Part 3 of Schedule 2 provides the propagation model for determining the propagation loss component of the DBC set out in Part 2 of Schedule 2. The propagation model is Modified Hata as published in the ERC Report 68, which was published by the European Conference of Postal and Telecommunications Administrations (CEPT) in 2000 and revised in 2002. The dependencies in this equation include distance from the centre location of the radiocommunications transmitter to the point representing the radial / increment combination, the transmit frequency of the device and the effective antenna height.

**Schedule 3 – Effective antenna height and average ground height**

Part 1 of Schedule 3 explains how the effective antenna height of a radiocommunications transmitter is calculated for the purposes of the Determination. The effective antenna height is a component necessary to the calculation of the propagation loss component of the DBC described in Part 2 of Schedule 2.
Part 1 of Schedule 3 specifies the use of DEM-9S as the digital elevation model for terrain heights. The effective antenna height of a radiocommunications transmitter is dependent on the structure height of the device, the height of the terrain in the DEM cell in which the device is located and the average ground height of cells in the DEM at the point representing the radial/increment combination.

Part 2 of Schedule 3 sets out the procedure for calculating the average ground height as used in Part 1 of Schedule 3, for the point or location representing the radial/increment combination. Average ground height at this location is determined by averaging the terrain heights of cells within a 3x3 matrix around the radial/increment combination point.

Part 3 of Schedule 3 defines Vincenty’s Formulae to be used in the calculation of distance in calculating a device boundary. Vincenty’s Formulae enable the calculation of the coordinates (in latitude and longitude) of a far-end location based on the known coordinates (in latitude and longitude) of a central location, azimuth angle and the distance between these points. These formulae allow location calculations over the GRS80 ellipsoid (which is the ellipsoidal parameters specific to GDA94) to a high degree of accuracy using an iterative routine. The datum to be used in these calculations is the GDA94.

**Schedule 4 – Propagation loss - Maximum Power (MP) Function – 800 MHz Lower band**

This Schedule defines the propagation loss equations to be used in the 800 MHz Lower band (825 – 845 MHz) for the purposes of calculating the device boundary of a radiocommunications device operating in the 800 MHz Lower band. In Schedule 4, the ERC Report 68 Modified Hata (published by the European Conference of Postal and Telecommunications Administrations (CEPT)) equations have been simplified using parameters of the system model for calculating the device boundary, for the purposes of the Determination.

**Schedule 5 - Propagation loss- Maximum Power (MP) Function – 800 MHz Upper band**

This Schedule defines the propagation loss equations to be used in the 800 MHz Upper band (870 - 890 MHz) for the purposes of calculating the device boundary of a radiocommunications device operating in the 800 MHz Upper band. In Schedule 5 the ERC Report 68 Modified Hata equations have been simplified using parameters of the system model for calculating the device boundary, for the purposes of the Determination.
Statement of Compatibility with Human Rights
Prepared in accordance with Part 3 of the Human Rights (Parliamentary Scrutiny) Act 2011

Radiocommunications (Unacceptable Levels of Interference – 800 MHz Band) Determination 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 69 of the Radiocommunications Act 1992 (the Act) requires each spectrum licence to include a condition which requires that a radiocommunications transmitter must not be operated under the licence unless the requirements of the Australian Communications and Media Authority (the ACMA) under Part 3.5 of the Act for registration of transmitters have been met. Section 69 also provides that the condition may exempt radiocommunications transmitters of particular kinds from having to meet those registration requirements.

Under subsection 145(1) of the Act, the ACMA may refuse to include in the Register of Radiocommunications Licences (the Register), details of a radiocommunications transmitter that is proposed to be operated under a spectrum licence, if it is satisfied that the operation of the transmitter could cause an unacceptable level of interference to the operation of other radiocommunications device operated under a licence. Under subsection 145(4) of the Act, the ACMA may determine what are unacceptable levels of interference for the purposes of deciding whether to refuse to register a transmitter that is proposed to be operated under a spectrum licence.

The Radiocommunications (Unacceptable Levels of Interference – 800 MHz band) Determination 2012 (the Determination) sets out what is an unacceptable level of interference caused by a radiocommunications transmitter operating under a spectrum licence issued in the 800 MHz band. The Determination aims to ensure that high levels of emission from transmitters operated under a spectrum licence are kept within the geographic area and frequency band of the licence.

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 Determination is a legislative instrument that is subject to disallowance under section 42 of the Legislative Instruments Act 2003.

Human Rights Implications

The Determination does not engage any of the applicable rights or freedoms.

Conclusion

The Determination is compatible with human rights as it does not raise any human rights issues.