EXPLANATORY STATEMENT

Issued by the Australian Communications and Media Authority

Radiocommunications (Unacceptable Levels of Interference – 1800 MHz Band) Determination 2012

Radiocommunications Act 1992

Purpose

The purpose of the *Radiocommunications (Unacceptable Levels of Interference – 1800 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 1800 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 Licences (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 1800 MHz band.

The Determination is a legislative instrument under the *Legislative Instruments Act 2003.*

Background

The 15 year spectrum licences in the 1710-1785 MHz and 1805-1880 MHz band (the **1800 MHz band**) were issued in two tranches, the first in 1998 and the second in 2000.

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.

Current spectrum licences in the 1800 MHz band will expire on 17 June 2013 (for licences issued in 1998) and on 3 May 2015 (for licences issued in 2000). To prepare for the re-issue and/or re-allocation of spectrum licences in the 1800 MHz band, the ACMA conducted a review of the 1800 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 1800 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 rules in the *Radiocommunications (Unacceptable Levels of Interference — 1800 MHz Band) Determination 1999* 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;
- revise the level of protection defined in the DBC;
- remove the exemption to the DBC for transmitters operating with an effective antenna height of less than 20 metres;
- include requirements for the additional device boundary criterion to be met by high sited transmitters operating in the lower 1800 MHz band;
- use a new digital elevation model (DEM-9S) based on the Geocentric Datum of Australia 1994 (GDA94) datum that is made available by Geoscience Australia[1];
- revise the Effective Isotropic Radiated Power (EIRP) restriction in the 1877.5-1880 MHz sub-band;
- remove the method of registration of a groups of transmitters and receivers through the Roads and Towns Mobile Listing; and
- extend the definition for areas of high mobile use to include Darwin, Hobart and Canberra.

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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 1800 MHz band according to the review recommendations. The Determination revokes the *Radiocommunications (Unacceptable Levels of Interference — 1800 MHz Band) Determination 1999* and implements the above recommendations.

The ACMA has also made the *Radiocommunications Advisory Guidelines (Managing Interference from Spectrum Licensed Transmitters – 1800 MHz Band) 2012*, the *Radiocommunications Advisory Guidelines (Managing Interference to Spectrum Licensed Receivers – 1800 MHz Band) 2012* and the *Radiocommunications Advisory Guidelines (Additional Device Boundary Criteria – 1800 MHz Lower Band) 2012.* These legislative instruments will revoke the *Radiocommunications Advisory Guidelines (Protection of*

[1] The Geocentric Datum of Australia 1994, is the geodetic datum designated as the "Geocentric Datum of Australia (GDA94)" gazetted in the Commonwealth of Australia Gazette No. GN 35 on 6 September 1995. More information can be obtained from Geoscience Australia's website at www.ga.gov.au.

Apparatus-licensed and Class-licensed Receivers – 1800 MHz Band) 1999, the *Radiocommunications Advisory Guidelines (Managing Interference from Apparatus-licensed and Class-licensed Transmitters – 1800 MHz Band) 1999* and the *Radiocommunications Advisory Guidelines (Protection of Mobile Base Receivers – 1800 MHz Lower Band) 1999* 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 1800 MHz band.

Consultation

The ACMA has consulted extensively with stakeholders about the review of the spectrum licensing technical framework for the 1800 MHz band.

In 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 1800 MHz band. Incumbent and prospective licensees for the 1800 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 1800 MHz band. This included consideration of:

> 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 1800 MHz band;
> the draft spectrum licence; and
> the minimum contiguous bandwidth for spectrum licences in the 1800 MHz band.

The ACMA developed three discussion papers which outlined the proposed approach to the spectrum licensing framework for the 1800 MHz band. These papers were provided for

comment by the ACMA to TLG members and they are available on the ACMA website at http://www.acma.gov.au.

The ACMA took into account the views expressed by TLG members when preparing the Determination. The draft Determination was also available for public comment from 27 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 during the public consultation regarding the review recommendations. Only one of the submissions commented on the Determination. That submission sought further clarification on the proposed method of calculating the device boundary criterion in the Determination. The ACMA provided the clarification sought to the submitting party but determined that no changes to the Determination were required.

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 14048.

Documents Incorporated by Reference

The Determination incorporates the following documents by reference:

> DEM-9S, which is the latest 9-second Digital Elevation Model (DEM) referenced in the Geocentric Datum of Australia 1994 (GDA94) titled "*GEODATA 9 Second Digital Elevation Model (DEM-9S) Version 3*" (Australia and New Zealand Land Information Council unique identifier ANZCW0703011541). The model contains modelled terrain height information for Australia, published by Geoscience Australia. Copies of DEM-9S can be obtained from the Geoscience Australia website at www.ga.gov.au.

> Geocentric Datum of Australia 1994 (GDA94) gazetted in the Commonwealth of Australia Gazette No. GN 35 on 6 September 1995.

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

- The *Australian Spectrum Map Grid 2012* published by the ACMA. Copies can be obtained from the ACMA website at www.acma.gov.au.

- The *Radiocommunications Advisory Guidelines (Additional Device Boundary Criteria — 1800 MHz Lower Band) 2012*. Copies are available from the ComLaw website at www.comlaw.gov.au.

Detailed Description of the Instrument

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**.

ATTACHMENT A

DETAILS OF THE RADIOCOMMUNICATIONS (UNACCEPTABLE LEVELS OF INTERFERENCE – 1800 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 – 1800 MHz Band) Determination 2012*.

Section 2 - Commencement

This section states that the Determination commences on 18 June 2013.

Section 3 – Revocation

This section revokes the *Radiocommunications (Unacceptable Levels of Interference — 1800 MHz Band) Determination 1999.* Revocation will have effect on 18 June 2013.

Section 4 – Purpose

This section states that the purpose of the Determination is to set 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 1800 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 bounds 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.

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 three Advisory Guidelines made under section 262 of the Act about managing interference to spectrum licensed receivers and from spectrum licensed transmitters in the 1800 MHz band when managing interference disputes.

Section 5 – Interpretation

This section provides definitions for the terms used in the Determination and provides that unless otherwise specified, the range of numbers that identify a frequency band in the Determination includes the higher but not the lower number.

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 differently to the device boundary 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 1800 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 the licence condition referred to in section 69 of the Act and may be subject to further compliance action under the Act.

Under paragraphs 9(a)-(g) of the Determination, a spectrum licensed radiocommunications transmitter is considered to have caused 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; or
- the device boundary of the transmitter lies outside the geographic area of the licence[2]; or
- the device boundary for the transmitter cannot be calculated in accordance with Part 1 of Schedule 2 of the Determination; or
- the transmitter operates in the 1800 MHz Lower band, within an area of high mobile use and does not conform to the effective antenna height restrictions as specified in paragraph 9(d) of the Determination[3]; or
- any part of the additional device boundary of the transmitter lies outside the geographical area of the licence, the transmitter operates outside an area of high mobile use and does not conform to the effective antenna height criteria specified in paragraph 9(e) of the Determination. The additional device boundary criteria are calulcated in accordance with the *Radiocommunications Advisory Guidelines (Additional Device Boundary Criteria — 1800 MHz Lower Band) 2012*; or
- the transmitter is a mobile transmitter operating in the 1800 MHz band with a horizontally radiated power from the device greater than 39 dBm EIRP within the occupied bandwidth of the transmitter; or
- the transmitter is a fixed transmitter operating in any portion of the frequency band 1877.5 MHz - 1880 MHz with a horizontally radiated power greater than 50 dBm EIRP per 30 kHz.

[2] The device boundary is a theoretical boundary calculated around the device using the methodology set out in Schedule 2 of the Determination.
[3] Areas of high mobile use are specified in Schedule 4.

Two notes are included to section 9. In particular, Note 1 provides that the restrictions on emission levels in the frequency band 1877.5-1880 MHz are in place to manage interference to cordless communications devices operating in the adjacent 1880 MHz -1900 MHz band.

Section 10 – Accuracy

This section specifies the level of accuracy required when calculating the values of the parameters that are in Schedules 1, 2, and 3 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 or group of transmitters is used to determine the device boundary of a transmitter in Part 1 of Schedule 2 as well as the additional device boundary described in the *Radiocommunications Advisory Guidelines (Additional Device Boundary Criteria — 1800 MHz Lower Band) 2012*.

Notes 1 and 2 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 while note 2 refers to the ACMA published document "Business Operating Procedure – Radiocommunications site data requirements*"* (available on the ACMA website) which assists licensees in meeting location measurement error requirements for radiocommunications sites.

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 Schedule 2. 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 radiocommunications receivers used in the 1800 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 of Schedule 2 is an iterative process and involves testing whether the DBC specified in Part 2 of Schedule 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 endpoints of each of the radials must be within the geographic area of the licence under which the transmitter operates for the transmitter 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 represents 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 – Areas of high mobile use

This Schedule provides a description of areas of high mobile use. These areas define where deployment constraints regarding the height of transmitters apply, as specified under paragraphs 9(d) and (e) of the Determination. The aim is to restrict the registration of transmitters which have an effective antenna height of greater than 10m in the 1800 MHz lower band in the defined areas of high mobile use, while relaxing the restriction outside these areas.

ATTACHMENT B

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 – 1800 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 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 devices 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 – 1800 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 1800 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.