EXPLANATORY STATEMENT

Issued by the Australian Communications and Media Authority

Radiocommunications (Unacceptable Levels of Interference – 2.5 GHz Band) Determination 2012

Radiocommunications Act 1992

Purpose

The purpose of the *Radiocommunications (Unacceptable Levels of Interference – 2.5 GHz Band) Determination 2012* (the **Determination**) is to set out what is an unacceptable level of interference caused by a transmitter operating under a spectrum licence issued in the 2.5 GHz 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.

Legislative Provisions

The Determination is made under subsection 145(4) of the *Radiocommunications Act 1992* (the **Act**), which provides that the Australian Communications and Media Authority (the **ACMA**) may, by written instrument, determine what are unacceptable levels of interference for the purposes of deciding whether to refuse to register the details of a radiocommunications transmitter for operation under a spectrum licence in the Register of Radiocommunications Licences.

Section 69 of the Act requires each spectrum licence to include a condition which 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.

Background

The 2.5 GHz band is currently used primarily by free to air broadcasters and the Australian Broadcasting Corporation for television outside broadcasting (**TVOB**), including electronic news-gathering (**ENG**). However, broadcasters have faced uncertainty about long-term spectrum arrangements since 2000, when the band was identified internationally for broadband wireless access services (**WAS**).

In January 2010, the ACMA commenced a review of the 2500-2690 MHz frequency band to:

> replan and allocate the 2.5 GHz band to maximise the overall benefit derived from that spectrum; and

- provide incumbent licensees with greater long-term certainty in light of strong emerging demand for the band to be used for competing purposes—for example, for WAS.

In January 2010, the ACMA released a discussion paper, '*Review of the 2.5 GHz band and long-term arrangements for ENG.*'[1] The paper indicated that the ACMA had formed a preliminary view on its preferred approach for the band, which was broadly:

- reallocation of the 2500–2570 MHz and 2620–2690 MHz bands via spectrum licensing, with technical frameworks that are technology flexible but are optimised for WAS;
- conversion of ENG apparatus licences to spectrum licences in the 2570–2620 MHz band; and
- facilitation of ENG/TVOB access to identified alternative bands.

Following consideration of responses received to its January discussion paper, in October 2010 the ACMA announced its intention to give existing ENG services access to the central 2570-2620 MHz band (the **mid-band gap**) and to make the 2500-2570 MHz and the 2620-2690 MHz bands (together the **2.5 GHz band**) available in Australia to support WAS, including 4G mobile broadband.[2] To assist stakeholders in understanding how the ACMA reached a view on appropriate future arrangements in the 2.5 GHz and alternative bands, the ACMA released a Response to Submissions paper which summarised issues raised in response to the January discussion paper and provided the ACMA's preliminary response to those issues.[3]

To enable spectrum in the 2.5 GHz band to support WAS, the ACMA will need to put into place a spectrum licence technical framework for the 2.5 GHz band which, while technology flexible, is optimised for WAS. The technical framework will define a spectrum licensee's rights and obligations and provide an interference management framework for the 2.5 GHz band.

The Determination is part of a set of legislative instruments to give effect to that technical framework. The set of instruments required for this purpose is listed below:

- *Radiocommunications (Spectrum Designation) Notice No. 1 of 2012*;
- *Radiocommunications (Spectrum Re-allocation) Declaration No. 2 of 2011;*
- *Radiocommunications Spectrum Marketing Plan (2.5 GHz Band) 2012*;
- this Determination;

[1] Full discussion paper can be accessed at http://www.acma.gov.au
[2] See ACMA media release 132/2010, 21 October http://www.acma.gov.au
[3] Response to submissions paper, and submissions received, can be accessed at www.acma.gov.au

- *Radiocommunications Advisory Guidelines (Managing Interference from Transmitters – 2.5 GHz Band) 2012*; and
- *Radiocommunications Advisory Guidelines (Managing Interference to Receivers – 2.5 GHz Band) 2012.*

Operation

A spectrum licence permits a licensee, subject to specified conditions, to operate radiocommunications devices within 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.

Interference is generally managed by a set of interference management tools given effect by the Act and implemented by the ACMA. These tools include:

- the core conditions of the spectrum licence;
- a determination made under section 145 of the Act about what constitutes unacceptable interference; and
- advisory guidelines made under section 262 of the Act about managing interference in specific circumstances.

Under subsection 145(1) of the Act, the ACMA may refuse to register a radiocommunications transmitter that is proposed to be operated under a spectrum licence if the ACMA is satisfied that the operation of the transmitter could cause an unacceptable level of interference to other radiocommunications devices. The Determination defines what is meant by an 'unacceptable level of interference' for the purpose of the application of that subsection in relation to a transmitter operating under a spectrum licence issued in the 2.5 GHz band.

Consultation

The ACMA has engaged extensively with stakeholders about its plans to develop a spectrum licensing technical framework for the 2.5 GHz band.

In July 2011, the ACMA set up a short-term industry technical liaison group (the **TLG**) to support the development of a technical framework to support the introduction of 4th generation broadband mobile/WAS in the 2500-2570 MHz and 2620-2690 MHz bands within the 2.5 GHz band.

The TLG was asked to consider and provide advice to the ACMA on technical aspects required for the development of the spectrum licence technical framework. These included:

- the development of the core conditions of the spectrum licensed band in accordance with section 66 of the Act;
- the development of the Determination;
- the development of any associated advisory guidelines made under section 262 of the Act;
- the development of the draft spectrum licence; and
- the development of the minimum contiguous bandwidth for spectrum licences in the 2.5 GHz band.

The ACMA developed three papers which outlined its proposed approach to the spectrum licensing framework for the 2.5 GHz band. These papers were made available by the ACMA to the TLG members for comment. These papers can be found on the ACMA's website.[4] The ACMA had regard to the views expressed by the TLG members when preparing the Determination.

The ACMA has also undertaken public consultation in relation to the Determination. On 11 April 2012, the ACMA released the draft legislative instruments for the digital dividend auction (including the Determination) for comment. These instruments were accompanied by an information paper to explain the draft instruments and provide context to assist interested parties in making a submission.

The information paper was made available on the ACMA's website[5], and was publicised via a media release on 11 April 2012, notices on the ACMA's website and in the Spectrum Auction e-Bulletin publication. On 24 April 2012, the ACMA also held an industry briefing on the draft legislative instruments for the digital dividend auction. This briefing (conducted through an online seminar) outlined key aspects of the ACMA's draft instruments and was aimed at assisting interested parties to make a submission.

Submissions to the consultation were originally due on 9 May 2012, although this was subsequently extended to 14 May 2012. A total of 11 responses were received.

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 in **Attachment B**.

[4] www.acma.gov.au
[5] www.engage.acma.gov.au

Regulatory Impact Analysis

The Office of Best Practice and Regulation (the **OBPR**) advised in August 2011 that the Determination, being an outcome of the 2.5 GHz review, is covered by the existing regulation impact statement (**RIS**) for the 2.5 GHz review (OBPR ID 11300) and that no further RIS is required.

On 17 August 2012, OBPR confirmed that no further RIS is required as OBPR considers these Advisory Guidelines will have only minor and machinery impacts. The OBPR reference for this later assessment is ID 14150.

Documents Incorporated by Reference or Otherwise Referred to

The Determination incorporates the following instruments and documents by reference, or otherwise refers to them:

> The "Digital Elevation Model Interpretation" document published by the ACMA to provide accredited persons and/or licensees with the necessary information to achieve the same output as the ACMA from DEM-9S based on given latitude and longitude points for a single point and in calculation of the device boundary criterion. A copy of this document can be obtained from the ACMA's website at http://www.acma.gov.au.

> The Business Operating Procedure (the **BOP**) titled '*Radiocommunications site data requirements'* which is a document published by the ACMA which provides requirements for creating and managing radiocommunications site data in the ACMA's radiocommunications licensing database ('RADCOM') and via the accredited persons on-line submission system. A copy of this document can be obtained from the ACMA's website

> DEM-9S, which is the "GEODATA 9 Second Elevation Model (DEM-9S) Version 3" (Australia New Zealand Land Information Council unique identifier ANZCW070311541) containing modelled terrain height information for Australia, published by Geoscience Australia as in force from time to time. Copies can be obtained from Geoscience Australia: www.ga.gov.au.

> Geocentric Datum of Australia 1994, which is the geodetic datum designed as the "Geocentric Datum of Australia (GDA94)" gazetted in the Commonwealth of Australia Gazette No. GN 35 on 6 September 1995. More information on the GDA94 can be obtained from Geoscience Australia: www.ga.gov.au.

> Radio Regulations, which are the "Radio Regulations" published by the International Telecommunication Union (the **ITU**), as in force on the day the Determination commences. The ITU Radio Regulations contains Articles, Appendices, Resolutions and Recommendations of the ITU relating to international radiocommunications coordination. This document can be found on the ITU's internet site (www.itu.int).

In accordance with subsection 314A(2) of the Act, a legislative instrument made under the Act may incorporate a matter contained in any other instrument or writing as in force from time to time.

Detailed Description of the Instrument

Further details of the Determination are provided in **Attachment A**.

ATTACHMENT A

DETAILS OF THE *RADIOCOMMUNICATIONS (UNACCEPTABLE LEVELS OF INTERFERENCE – 2.5 GHz BAND) DETERMINATION 2012*

Section 1 Name of Determination

Section 1 provides the citation of the Determination.

Section 2 Commencement

This section provides that the Determination commences on the day after it is registered.

Section 3 Purpose

This section states the purpose of the Determination, which is to set out the technical rules defining what will be considered unacceptable levels of interference when a licensee applies to the ACMA to register a transmitter for operation in the 2.5 GHz band. The unacceptable level of interference is defined so as to ensure that high emission levels from spectrum-licensed radiocommunications are contained within the geographic area and frequency bands of the licence. 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 unacceptable interference under subsection 145(1) of the Act.

Note 2 indicates that the ACMA may register a transmitter even if it could cause unacceptable interference as defined in the Determination in certain circumstances. The note refers to an information paper, titled *Registration of radiocommunications devices under spectrum licences*, which is available from the ACMA's website, which provides guidance to licensees on when the ACMA may choose to exercise this discretion.

Note 3 indicates that the ACMA will also take into consideration two Advisory Guidelines made under section 262 of the Act when determining if a transmitter is likely to cause unacceptable interference and explains where these guidelines can be obtained.

Section 4 Interpretation

Section 4 provides definitions for terms used in the Determination.

Section 5 Emission designator

This section clarifies that for the purposes of determining the emission designation of a transmitter for the purposes of registration, the occupied bandwidth of the transmitter should be used as the bandwidth. The designation of a radiocommunications transmitter's emission is relevant for the coordination and identification of radio emissions and is also used when

determining whether two or more fixed transmitters are a group of radiocommunications transmitters under section 6 and is a registration requirement.

Section 6 Group of radiocommunications transmitters

This section defines what 'a group of radiocommunications transmitters' is for the purpose of the Determination. A group of radiocommunications transmitters consists of two or more fixed transmitters at a common site that have common features. Definition of radiocommunications transmitters as a group may make registration of devices easier for licensees.

Section 7 Group of radiocommunications receivers

This section defines what 'a group of radiocommunications receivers' is for the purpose of the Determination. A group of radiocommunications receivers consists of two or more fixed receivers, located at a common site, that have certain features in common. Definition of radiocommunications receivers as a group may make registration of devices easier for licensees.

Section 8 Unacceptable level of interference

This section provides the technical definition of what will be deemed unacceptable levels of interference for the purpose of interference management in the 2.5 GHz band. A radiocommunications transmitter producing emissions that are found to cause unacceptable levels of interference to other services will, in most circumstances, not be registered on the Register of Radiocommunications Licenses for operation under a spectrum licence in the band, in accordance with 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 become subject to further compliance action under the Act.

Under section 8, a transmitter is taken to be causing unacceptable 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 the geographic and frequency boundaries of the licence; or
- if any part of 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 the Schedules to the Determination; or
- the device boundary of the transmitter cannot be calculated in accordance with Schedule 2 to the Determination; or
- the operation of the transmitter would exceed a specified level of emissions above the horizon; or
- the device operates in the lower 2.5 GHz frequency band (i.e. the band 2500-2570 MHz) with an effective antenna height greater than 10m.

Subsection 8(2) provides that the level of interference is not unacceptable at part of a transmitter's device boundary that is outside the geographic area of a licence, so long as it is:

(a) in a geographic area that is outside the *Australian Spectrum Map Grid 2012* (ASMG);

(b) is connected to a radial referred to in Part 1 of Schedule 2; and

(c) does not cross the geographic area of another licence.

Subsection 8(2) provides that if, in the calculation of the device boundary, a point lies outside the ASMG (outside Australia) that has not been declared for reallocation by spectrum licensing and does not encroach on the licence area of another spectrum licensee, then the device is not declared to be causing unacceptable interference.

The ASMG is used to identify geographic areas of spectrum licences. In accordance with paragraph 66(1)(c) of the Act, a condition specifying the geographic area within which operation of radiocommunications devices is permitted under the licence, is a core condition of a spectrum licence.

The ASMG incorporates both geographic coordinates (latitude/longitude) and grid coordinates (zones/eastings/northings). These coordinates are specified under the Geocentric Datum of Australia 1994 (GDA94). The ASMG now provides a hierarchical cell identification scheme, which is intended to provide greater clarity, flexibility and certainty in identifying the geographic area of spectrum licences for the purposes of issue or trading.

Further details about the ASMG can be found in the ACMA information paper, *The Australian spectrum map grid 2012*, available from the ACMA website www.acma.gov.au.

A note to this section indicates that low power transmitters are exempt from the registration requirement. These devices are exempt because they have a low interference potential and the spectrum licence contains a clause exempting them from the registration requirement.

Section 9 Accuracy

Section 9 specifies that values of parameters estimated for the purpose of Schedules 2 and 3 must be estimated with a level of confidence of not less than 95 percent that the true or actual value of the parameter of a radiocommunications transmitter will be below the requirement specified in Schedules 2 and 3 of the Determination. That is to say, an estimate must have a likelihood of 95 percent or greater of being within the requirement for the parameter.

Schedule 1 – Location of a transmitter

This Schedule defines the location of a radiocommunications transmitter (and for a group of radiocommunications transmitters) in terms of the location of the centre of the antenna or antennas specified in latitude and longitude for use in determining unacceptable levels of interference under section 8. There are two notes to this section.

Note 1 indicates that site identifiers for frequently used existing radiocommunications sites are available from the ACMA.

Note 2 indicates the existence of the ACMA Business operating procedure, or BOP which provides advice for determining the location and measurement error of a transmitter site, which is available on the ACMA's website.

Schedule 2 – Device boundaries and device boundary criteria

This Schedule sets out the technical procedure for calculating the device boundary of a radiocommunications transmitter or group of radiocommunications transmitters, which is relevant for the application of section 8 of the Determination. Under paragraph 8(1)(b) of the Determination, a transmitter is taken to cause an unacceptable level of interference if its device boundary exceeds the geographic boundary of the spectrum licence. Under paragraph 8(1)(c) of the Determination, a transmitter is also taken to cause an unacceptable level of interference if the device boundary of the transmitter cannot be calculated in accordance with Part 1 of this Schedule.

Part 1 of Schedule 2

Part 1 of the Schedule details the steps involved in calculating the device boundary. The calculation is an iterative process and involves testing whether the device boundary criterion specified in Part 2 is met at increasing distances (of 500 metre increments) from the 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 device boundary criterion 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 radial must be within the geographic boundary of the licence to be deemed not to cause unacceptable interference.

There are two notes to Part 1 of this Schedule.

Note 1 indicates that it is not necessary to calculate a device boundary for low power devices that are exempt from the registration requirement.

Note 2 indicates that the device boundary criterion is calculated as in Part 2 of this Schedule.

Part 2 of Schedule 2

Part 2 provides the device boundary criterion which is the mathematical expression used to calculate a device boundary in accordance with Part 1 of this Schedule. The mathematical expression consists of the horizontally radiated power of the device minus the path loss function. The device boundary criterion has function dependencies which include the horizontally radiated power, the receiver level of protection and the propagation loss set out in Part 3 of this Schedule for each segment along each radial.

Part 3 of Schedule 2

Part 3 provides the mathematical expression for determining the propagation loss component of the expression for determining the device boundary criterion in Part 2.

Schedule 3 – Ground and effective antenna height

Part 1 of Schedule 3

Part 1 of this Schedule specifies the procedure for calculating effective antenna height for the purpose of the Determination, taking account of average ground height above sea level and antenna height above ground. The effective antenna height of a spectrum-licensed radiocommunications device is used to calculate the propagation loss component of the device boundary criterion. The device boundary criterion is set out in Part 2 of Schedule 2. The device boundary criterion is the mathematical expression used to calculate a device boundary. The process for calculating a device boundary is set out in Part 1 of Schedule 2.

Part 2 of Schedule 3

Part 2 of this Schedule sets out the procedure for calculating the average ground height, taking account of the height of the cell in the digital elevation model corresponding to the location determined from the latitude and longitude of the m^{th} increment along the n^{th} radial about the location of the transmitter and the surrounding cells.

These heights are calculated with reference to a digital elevation model sourced from Geoscience Australia and are made available to all spectrum licensees to ensure consistency in application of the propagation loss calculations.

Part 3 of Schedule 3

Part 3 provides the mathematical formula for Vincenty's Formula, which is used in the calculation of the coordinates (in Latitude and Longitude) of the points along the radials about the transmitter in Part 1. These coordinates are used in Part 2 to obtain the average ground height for that point for use in Part 1. This simplification of Vicenty's Formulae performs location calculations over the GRS80 ellipsoid as referenced by the Geocentric Datum of Australia 1994 to a high degree of accuracy using an iterative routine. The geocentric datum to be used in these calculations is the Geocentric Datum of Australia 1994.

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 – 2.5 GHz 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

The legislative instrument is made under subsection 145(4) of the *Radiocommunications Act 1992* (the **Act**) which provides that the Australian Communications and Media Authority (the **ACMA**) may, by written instrument, determine what are unacceptable levels of interference for the purposes of deciding whether to refuse to register the details of a radiocommunications transmitter for operation under spectrum licence in the Register of Radiocommunications Licences.

The purpose of the *Radiocommunications (Unacceptable Levels of Interference – 2.5 GHz Band) Determination 2012* (the **Determination**) is to set out what is an unacceptable level of interference caused by a transmitter operating under a spectrum licence issued in the 2.5 GHz 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* (the **LIA**) 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 LIA.

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.