

EXPLANATORY STATEMENT

Issued by the Australian Communications and Media Authority

Radiocommunications (Unacceptable Levels of Interference – 2.5 GHz Mid-band Gap) Determination 2012

Radiocommunications Act 1992

Purpose

The purpose of *Radiocommunications (Unacceptable Levels of Interference – 2.5 GHz Mid-band Gap) 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 frequency band 2570-2620 MHz (the **2.5 GHz Mid-band Gap**). 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

Section 69 of the *Radiocommunications Act 1992* (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 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.

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 2.5 GHz Mid-band Gap. The Determination is a legislative instrument for the purposes of the *Legislative Instruments Act 2003*.

Background

The 2500-2690 MHz frequency band is 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 in that frequency band 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 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 (**January 2010 discussion paper**). The January 2010 discussion paper included the ACMA's 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 spectrum bands.

Following consideration of responses received to its January 2010 discussion paper, in October 2010 the ACMA announced its intention to give existing ENG services access to the 2.5 GHz 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 paper, '*Review of the 2.5 GHz band and long-term arrangements for ENG – Response to*

¹ Full discussion paper can be accessed at www.acma.gov.au.

² See ACMA media release 132/2010, 21 October [2010 accessible at www.acma.gov.au](http://www.acma.gov.au).

Submissions' which summarised issues raised in response to the January 2010 discussion paper and set out the ACMA's preliminary response to those issues³.

To provide long term access in the 2.5 GHz Mid-band Gap the ACMA proposed to convert the ENG/TVOB apparatus licences in the 2.5 GHz Mid-band Gap to spectrum licences. To enable the conversion to spectrum licensing the ACMA needs to put in place a spectrum licence technical framework for the 2.5 GHz Mid-band Gap. The technical framework will define a spectrum licensee's rights and obligations and provide an interference management framework for the 2.5 GHz Mid-band Gap.

The Determination is part of a set of legislative instruments to give effect to the spectrum licence framework applicable to the 2.5 GHz Mid-band Gap. The other instruments required for this purpose are listed below:

- > *Radiocommunications (Spectrum Designation) Notice No. 1 of 2012;*
- > *Radiocommunications Spectrum Conversion Plan (2.5 GHz Mid-band Gap) 2012;*
- > *Radiocommunications Advisory Guidelines (Managing Interference from Transmitters – 2.5 GHz Mid-band Gap) 2012;* and
- > *Radiocommunications Advisory Guidelines (Managing Interference to Receivers – 2.5 GHz Mid-band Gap) 2012.*

Operation

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 sets out 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 Mid-band Gap.

Consultation

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

In July 2011, the ACMA set up a number of short-term industry technical liaison groups (**TLGs**) to assist with the development of spectrum licensing technical frameworks including the support of ENG/TVOB services in the 2.5 GHz MHz Mid-band Gap and the introduction of 4th generation broadband mobile/wireless access services in the 2500-2570 MHz and 2620-2690 MHz bands.

³ Response to submissions paper, and submissions received, can be accessed at www.acma.gov.au.

As part of the TLG process for the 2.5 GHz Mid-band Gap, existing licensees providing ENG/TVOB services were 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 radiocommunications advisory guidelines made under section 262 of the Act; and
- > the development of the draft spectrum licence.

The ACMA prepared several papers which outlined its proposed approach to the spectrum licensing framework for the 2.5 GHz Mid-band Gap. These papers were made available by the ACMA to the ENG/TVOB licensees for comment. There were no specific or significant concerns raised by the licensees in relation to the Determination. The ACMA had regard to the views expressed by the ENG/TVOB licensees when preparing the Determination.

The ACMA also undertook wider public consultation in relation to the Determination. On 13 July 2012, the ACMA released draft legislative instruments (including a draft version of the Determination) for comment. These instruments were accompanied by an information paper explaining the draft instruments and providing context to assist interested parties in making a submission. The information paper and draft instruments are available at: <http://www.acma.gov.au>.

Submissions to the consultation were open until 3 September 2012. A total of 4 responses were received. There were no specific or significant concerns raised in the submissions in relation to the Determination.

Regulatory Impact Analysis

The Office of Best Practice Regulation (the **OBPR**) approved the Regulation Impact Statement '*Future Arrangements for the 2.5 GHz radiofrequency band and long-term arrangements for ENG*' on 24 May 2011 (OBPR ID 11300).

Documents Incorporated by Reference

The Determination incorporates the following instruments and documents by reference:

- > DEM-9S, which is the latest 9-second Digital Elevation Model (DEM) referenced in the Geocentric Datum of Australia titled "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 (**GDA94**), which 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 on the GDA94 can be obtained from Geoscience Australia: www.ga.gov.au.
 - > Radio Regulations published by the International Telecommunication Union (**ITU**) as in force from time to time. 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).
 - > The *Australian Spectrum Map Grid 2012* published by the ACMA. Copies can be obtained from the ACMA website at www.acma.gov.au.
 - > Recommendation P.526-11 which is the ITU Radiocommunications Sector Recommendation P.526-11 “Propagation by Diffraction”, published by the ITU, as in force from time to time. The Recommendation can be accessed through the ITU website at: www.itu.int.

Detailed Description of the instrument

Further details of the Determination are provided 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**.

NOTES ON SECTIONS

Section 1 - Name of Determination

Section 1 provides that the Determination is to be cited as the *Radiocommunications (Unacceptable Levels of Interference – 2.5 GHz Mid-band Gap) Determination 2012*.

Section 2 - Commencement

This section provides that the Determination commences on the day on which the *Radiocommunications Spectrum Conversion Plan (2.5 GHz Mid-band Gap) 2012* commences. This provision ensures that the commencement of the Determination coincides with the process for converting existing apparatus licences in the band to spectrum licences.

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 radiocommunications transmitters for operation in the 2.5 GHz Mid-band Gap. 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 bands 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 is satisfied that it will cause unacceptable 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 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 (named in Note 3) about managing interference 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. The section also 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 5 - Emission designator

This section clarifies that for the purposes of determining the designation of a radiocommunications transmitter's emission in accordance with 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 designation of a radiocommunications transmitter's emission is relevant for the coordination and identification of radio emissions and is also used when determining whether 2 or more fixed transmitters are a group of radiocommunications transmitters under section 6.

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 located at a common site that have common features. The identification of radiocommunications transmitters as a group may make registration of devices easier for licensees as each transmitter in a group does not need to be registered individually.

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. The location of a group of radiocommunications receivers is calculated in accordance with Schedule 1 of the Determination as if it were a group of radiocommunications transmitters.

Section 8 - Unacceptable levels of interference

This section provides what is an unacceptable levels of interference for the purpose of interference management in the 2.5 GHz Mid-band Gap. A radiocommunications transmitter producing emissions that are found to cause unacceptable levels of interference to other devices will, in most circumstances, not be registered on the Register 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 cause 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
- except where subsection 8(2) applies, any part of the device boundary of the transmitter lies outside the geographic area of the licence⁴; or

⁴ 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 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.

Subsection 8(2) provides that the level of interference is not unacceptable in relation to a 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 boundary of the *Australian Spectrum Map Grid 2012* (ASMG)⁵; and
- (b) connected to a radial referred to in Part 1 of Schedule 2 and does not cross the geographic area of another licence.

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) which are specified under GDA94.

Subsection 8(2) provides for the special case where the device boundary of a transmitter, calculated under Schedule 2 of the Determination, lies in a geographic area that is outside the boundary of ASMG – for example, where the device boundary extends to a point out at sea off the coast of Australia. In this circumstance, the level of interference caused by the transmitter is not taken to be unacceptable if the device boundary is connected to a radial referred to in Schedule 2 and does not cross the geographic area of another licence.

A note to this section indicates that under subsection 69(2) of the Act, the ACMA intends to exempt from the registration requirement certain radiocommunications transmitters. 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 the level of accuracy required when calculating the values of parameters that are in Schedules 1, 2 and 3 of the Determination.

⁵ 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.

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 Schedule explains that the location of the transmitter is the location of the phase centre of the antenna of the transmitter, 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.

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 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 when applying section 8 of the Determination. Under paragraph 8(1)(b) of the Determination, and subject to subsection 8(2), 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), a transmitter is 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 details the steps involved in calculating the device boundary. For a group of radiocommunications transmitters, the device boundary is to be calculated by considering the group as if it were a single transmitter. Note 1 clarifies that it is not necessary to calculate a device boundary for low power devices that are exempt from the registration requirement under the conditions of the spectrum licence under which the device operates.

Part 2 of Schedule 2 defines the device boundary criterion which is the mathematical expression used to calculate a device boundary in accordance with Part 1. 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 the Schedule for each segment along each radial.

The calculation of the device boundary in Part 1 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.

Part 3 of Schedule 2 provides the mathematical expression for determining the propagation loss component of the expressions for determining the device boundary criterion in Part 2. These mathematical expressions have been derived from the cascaded knife edge diffraction model specified in section 4.4.2 of the ITU Radiocommunications Sector Recommendation P.526-11 "Propagation by Diffraction".

Schedule 3 – Ground and effective antenna height

Part 1 of Schedule 3 specifies the procedure for calculating the effective antenna height of a radiocommunications transmitter for the purposes of the Determination, taking account of average ground height above sea level and antenna height above ground level. 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 sets out the procedure for calculating the average ground height, taking account of the height of the cell in the digital elevation model (DEM-9S) 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 radiocommunications 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 provides the mathematical formula for Vincenty's Formulae, which are used in the calculation of the coordinates (in latitude and longitude) of the points along the radials about the radiocommunications 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. These formulae enable location calculations to be performed over the GRS80 ellipsoid as referenced by GDA94 to a high degree of accuracy using an iterative routine. The geocentric datum to be used in these calculations is GDA94.

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 Mid-band Gap) 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 a spectrum licence, in the Register of Radiocommunications Licences established under section 143 of the Act.

The purpose of the *Radiocommunications (Unacceptable Levels of Interference – 2.5 GHz Mid-band Gap) 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 Mid-band Gap (**2570-2620 MHz**). 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.