



DRAFT VARIATION TO DIGITAL RADIO CHANNEL PLANS (DRCPs)

DISCUSSION PAPER

Varying Digital Radio Channel Plans for:

- Adelaide RA1 within SA
- Brisbane RA1 within Queensland
- Melbourne RA1 within Victoria
- Perth RA1 within WA
- Sydney RA1 within NSW/ACT

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SUBMISSIONS TO ACMA

Submissions on the matters raised in this discussion paper and draft variations to the DRCPs may be made to ACMA as follows:

By email: digitalradiosubs@acma.gov.au

By mail: Draft Variation to DRCPs
Manager, Broadcast Spectrum Strategy Section
Spectrum Planning Branch
Australian Communications and Media Authority
PO Box 78
BELCONNEN ACT 2616

By fax: (02) 6219 5133

Please quote the following file reference in your reply: ACMA2007/1740

ACMA would prefer submissions to be sent by email or on CD or disk wherever possible.

Any enquiries concerning matters raised in this document should be directed to Mr Alastair Gellatly on (02) 6219 5246.

The closing date for submissions is 5.00pm on Monday, 24 November 2008.

Publication of submissions

ACMA may publish on its website any submissions it receives. However, ACMA will not publish submissions that it considers contain defamatory or irrelevant material.

ACMA prefers to receive submissions that are not claimed to be confidential. However, ACMA accepts that a submitter may sometimes wish to provide information in confidence. In these circumstances, submitters are asked to identify the material over which confidentiality is claimed and provide a written explanation for confidentiality claims.

When can ACMA be required by law to release information

ACMA will consider each claim for confidentiality on a case-by-case basis. If ACMA accepts a confidentiality claim, it will not publish the confidential information unless required to do so by law.

Any submissions provided to ACMA may be released under the *Freedom of Information Act 1982* or Part 7A of the *Australian Communications and Media Authority Act 2005*. ACMA may also be required to release submissions for other reasons, including for the purpose of parliamentary processes or where otherwise required by law (for example, a court subpoena). While ACMA seeks to consult submitters of confidential information before that information is provided to another body or agency, ACMA cannot guarantee that confidential information will not be released through these or other legal means.

SUMMARY OF PRELIMINARY VIEWS

Note: Preliminary views relating to DRCPs are numbered sequentially as they relate to each State and are continued from the highest number used in the previous discussion paper relating to each DRCP. Future DRCP variations will continue this number sequence.

DRCP for Adelaide RA1 (SA)

Preliminary View 5. The output radiation pattern of each technical specification set out in attachments 1.1 and 1.2 to Schedule 1 of the DRCP is proposed to be varied. Over some bearings or sectors, for specified depression angles, the maximum ERP is proposed to be increased to 50 kW ERP.

DRCP for Brisbane RA1 (Queensland)

Preliminary View 5. The output radiation pattern of each technical specification set out in attachments 1.1, 1.2 and 1.3 to Schedule 1 of the DRCP is proposed to be varied. Over some bearings or sectors, for specified depression angles, the maximum ERP is proposed to be increased to 50 kW ERP.

DRCP for Melbourne RA1 (Victoria)

Preliminary View 5. The output radiation pattern of each technical specification set out in attachments 1.1, 1.2 and 1.3 to Schedule 1 of the DRCP is proposed to be varied. Over some bearings or sectors, for specified depression angles, the maximum ERP is proposed to be increased to 50 kW ERP.

DRCP for Perth RA1 (WA)

Preliminary View 5. The output radiation pattern of each technical specification set out in attachments 1.1 and 1.2 to Schedule 1 of the DRCP is proposed to be varied. Over some bearings or sectors the maximum ERP is proposed to be increased to 50 kW ERP.

DRCP for Sydney RA1 (NSW/ACT)

Preliminary View 5. The output radiation pattern of each technical specification set out in attachments 1.1, 1.2 and 1.3 to Schedule 1 of the DRCP is proposed to be varied. Over some bearings or sectors, for specified depression angles, the maximum ERP is proposed to be increased to 50 kW ERP.

INTRODUCTION

Digital radio services are to commence in mainland state capital cities by 1 July 2009¹. Legislation for the introduction of digital radio services was passed by parliament in May 2007 requiring ACMA, amongst other things, to develop Digital Radio Channel Plans.

In December 2007 ACMA determined the initial Digital Radio Channel Plans. Completion of the plans at that time was essential to allow licensing processes to commence. However, in finalising the DRCPs, ACMA's Chairman Chris Chapman wrote to industry noting concerns expressed in submissions regarding the potential for inadequate coverage and undertook to work with industry to explore ways in which these concerns could be addressed.

This discussion paper outlines the reasons and assumptions behind ACMA's preliminary views in relation to the five draft DRCP variation instruments. The five draft DRCP variation instruments provide revised output radiation patterns that will generally allow licensees to transmit at greater power than the initial DRCPs allow.

Digital radio overview

Digital radio offers a range of potential improvements over existing analog radio. Like digital television, digital radio technology provides for more efficient use of spectrum. It also potentially allows for a much greater variety of forms of content to be delivered to the consumer's radio receiver.

Other potential strengths of digital radio over analog include better sound quality, reduced impairments due to propagation effects, the ability to pause or rewind, greater ease of tuning (with channels identified by name rather than frequency), the provision of enhanced content including still images (e.g. a CD cover from which a song was played or a station logo or advertising), program associated text (e.g. what song is playing, where it can be purchased, the name of the artist, etc) and other data services such as news, traffic and weather updates.

The policy and legislative framework is based on the Terrestrial - Digital Audio Broadcasting (T-DAB)² technology. T-DAB services require a frequency block of 1.536 MHz bandwidth and, due to the frequency tuning range of currently availability of receivers, T-DAB services world wide operate in either VHF Band III (174-240 MHz) or 'L-Band'³ (1452-1492 MHz). The term *frequency block* is generally used to describe the channels used by T-DAB services to avoid confusion with the term *channel* used in relation to television services which also operate in VHF Band III. Note however, that the legislation uses the term 'frequency channel or channel'. The draft

¹ The current legislation requires digital radio services to commence no later than 1 January 2009. However, a Bill introduced into Parliament on 17 September will, if passed, amend the latest possible start-up day to 1 July 2009

² The S-DAB technology is capable of being used to provide Satellite services.

³ The term 'L-Band' is also used in relation to other types of radiocommunication services (e.g. fixed services and satellite services) and in those contexts the term can also refer to different frequency ranges.

DRCs define a frequency block to be a frequency channel of 1.536 MHz bandwidth, which enables the use of the term 'frequency block' in the context of the DRC instruments.

Each T-DAB transmission has a net payload of approximately 1.15 Mbit/s⁴ and can potentially transmit multiple audio streams, program associated data (e.g. song title and artist) and other data. The original T-DAB technology was capable of supporting many configurations including the ability to support up to nine stereo audio program streams at approximately the same audio quality as current FM radio. Recent changes to the relevant standards have incorporated more efficient audio coding techniques known as Advanced Audio Coding (AAC) and Advanced Audio Coding plus (AAC+). With this change the number of audio program streams that can be carried for the same audio quality level is around three times greater.

⁴ Assuming the median protection level (PL=3) and excluding additional error correction for AAC/AAC+ audio coding. Ref: Table 2.2 of EBU BPN003 February 2003.

LEGISLATIVE BACKGROUND TO DIGITAL PLANNING

The *Broadcasting Legislation Amendment (Digital Radio) Act 2007* amended the *Broadcasting Services Act 1992* (the BSA), the *Radiocommunications Act 1992* (the RA) and the *Trade Practices Act 1974*⁵. The purpose of this legislation was to enact the government's policy framework for the introduction of digital radio. The main provisions of the *Broadcasting Legislation Amendment (Digital Radio) Act 2007* commenced on 29 May 2007.

The above documents are available on the Attorney-General's Department's Comlaw on-line legal database at –

The *Broadcasting Legislation Amendment (Digital Radio) Act 2007*:

<http://www.comlaw.gov.au/ComLaw/Legislation/Act1.nsf/0/13DE92C975E10602CA2572E9007B264F?OpenDocument>

The BSA:

<http://www.comlaw.gov.au/comlaw/management.nsf/lookupindexpagesbyid/IP200401834?OpenDocument>

The RA:

<http://www.comlaw.gov.au/comlaw/management.nsf/lookupindexpagesbyid/IP200401308?OpenDocument>

The *Trade Practices Act 1974*:

<http://www.comlaw.gov.au/comlaw/management.nsf/lookupindexpagesbyid/IP200401339?OpenDocument>

Digital Radio Channel Plans

The key legislative provision in relation to the development of DRCPs is section 44A of the RA which provides for ACMA to prepare DRCPs which are legislative instruments.

The existing DRCPs are available on the Federal Register of Legislative Instruments (www.frli.gov.au). In particular see

<http://www.comlaw.gov.au/ComLaw/legislation/legislativeinstrumentcompilation1.nsf/browseview?openform&VIEW=current&ORDER=bytitle&CATEGORY=legislativeinstrumentcompilation-Ra>

Consultation

The discussion paper has been prepared as part of the process for consulting on the draft variation to DRCPs.

Subsection 44A(6) of the RA requires that before varying a DRCP, ACMA must:

⁵ The minor amendment to the *Trade Practices Act 1974* does not affect the frequency planning or licensing of digital radio services.

- (a) publish a draft of the variation on the ACMA's Internet site; and
- (b) invite members of the public to make submissions to the ACMA about the variation within a specified period of at least 30 days; and
- (c) consider any submissions the ACMA receives from members of the public within that period.

Digital Radio Multiplex Transmitter licences

The licensing framework for digital radio is established under a multiplex transmitter licence category system. ACMA can only issue digital radio multiplex transmitter (DRMT) licences to qualified companies. Only licensed commercial radio⁶, community radio, national radio and restricted datacasting services may be transmitted using a DRMT licence. A DRMT licence remains in force for 15 years.

The RA defines three categories of DRMT licence, categories 1, 2 and 3. By considering the various provisions and standard access entitlements relating to these categories of licence and considering also that initially the category 1 or category 2 licences (which include capacity for digital commercial radio broadcasters) will be declared as 'foundation' licences, a DRMT licence will provide the following multiplexer capacities:

- Category 1 – provides capacity for up to *seven* commercial broadcasters, each accessing one ninth of the total multiplex capacity. Community broadcasters may, through the digital community radio broadcasting representative company share *two* ninths of the total multiplex capacity;
- Category 2 – provides capacity for up to *five* commercial broadcasters, each accessing one ninth of the total multiplex capacity. Community broadcasters may, through the digital community radio broadcasting representative company share *two* ninths and the ABC and SBS may each access *one* ninth of the total multiplex capacity; and
- Category 3 – provides for the ABC and SBS to share the total capacity of the multiplex. The split of capacity between the national broadcasters is not defined by the legislation; however conditions on the licence may be set in the Regulations.

Section 43D of the BSA provides that digital commercial radio broadcasting licensees are subject to special licence conditions relating to digital radio commercial broadcasting services. These include the provision of a cap on the amount of multiplex capacity that can be used by a digital commercial radio broadcasting licensee to replicate the majority of the content of an analog commercial radio broadcasting service.

On 5 July 2008 ACMA issued all of the Foundation Category 1 DRMT licences that are specified in the five DRCPs affected by the variations covered in this discussion paper.

⁶ A 6 year moratorium on the issuing of new commercial radio broadcasting licences that could be used to provide a digital commercial radio broadcasting service in a licence area under subsection 36(1) of the BSA applies from the digital radio start-up day that is declared by ACMA for that licence area (see section 35C of the BSA).

No applications had been received as of 13 October 2008 for the Category 3 DRMT licences specified in these five DRCPs.

PLANNING APPROACH

Minimum signal level considerations

A key issue for broadcasters planning their networks and frequency planners determining channel plans is the minimum signal level that is needed to achieve adequate coverage.

A number of factors influence the minimum signal level. Examples are whether the target receiver is a mobile receiver or a portable receiver⁷ and, if the receiver is portable, whether it operates outdoors or indoors. A further factor is the 'location availability' required for the digital radio signal. Location availability is a statistical concept associated with modelling radiofrequency signals. Analogue signals have been planned on the basis of 50% location availability at the edge of coverage. This means that within a small area (for example 200m by 200m) 50% of locations would receive more than the predicted signal level. Note that at locations closer to the transmitter the location availability increases. Due to the abrupt failure characteristic of digital signals much higher location availability is typically required. Mobile reception is often planned for a 99% location availability and portable reception for 95% location availability.

Commercial Radio Australia, in its October 2007 submission to the initial draft DRCPs proposed, and after careful consideration, ACMA adopted in finalising those DRCPs the following minimum field strengths:

- *Mobile (Car)* devices, minimum median field strength of 63 dBuV/m. (Location availability: 99%, Standard deviation: 5.5 dB)
- *Indoor Suburban* devices, minimum median field strength of 70 dBuV/m. (Location availability: 95%, Standard deviation: 7.0 dB)
- *Indoor Urban* devices, minimum median field strength of 76 dBuV/m. (Location availability: 95%, Standard deviation: 7.0 dB)

Adopting 70 dBuV/m as the planning level permitted for *Urban Centres and Localities* (UCLs) at the designated BSA radio area⁸ boundary may result in a reception environment similar to FM radio. That is, where it is practicable to achieve this level, good coverage is likely to be available within the designated BSA radio area for all types of receivers and car radio reception would be possible for some distance outside the designated BSA radio area.

Interference considerations

The introduction of digital radio services in VHF Band III spectrum poses a number of interference risks. Because the band is extensively used for analog and digital television services, a key principle for ACMA in undertaking its planning is to provide adequate

⁷ The term mobile receiver corresponds to a radio mounted in a car or other vehicle with an external antenna. A portable receiver generally refers to a 'bench top' or 'kitchen radio' that would operate on mains power and have a telescopic antenna.

⁸ In general terms the designated BSA radio area is equivalent to the licence area of the majority of commercial radio broadcasting licensees operating in the area (see section 5 of the RA).

protection to the reception of television services. Interference to digital television services in particular could compromise the objective of converting television transmissions from analog mode to digital mode.

In Adelaide, Brisbane, Melbourne, Perth and Sydney the use of spectrum within television channel 9A is specified in the DRCPs. This requires consideration of the interference potential to:

- adjacent channel (channel 9 and channel 10) analog television services which cover the same general area; and
- co-channel television services – which are primarily distant digital television services operating on channel 9A.

Refer to the preliminary views relevant to each area for discussion regarding the interference issues specific to each area. The engineering report accompanying this discussion paper provides greater detail on the specific interference considerations.

Adjacent Channel Interference

In the initial DRCPs the maximum effective radiated power (ERP) level was capped at 12.5 kW to assist in managing the potential for adjacent channel interference. It is proposed, in varying the DRCPs, to remove this cap and allow the DRMT licensees to control the potential for adjacent channel interference through the selection of their transmitter site and the design of their transmission antenna's radiation pattern in both the horizontal and vertical planes. It is these parameters, when taken together with the maximum ERP that control the potential for adjacent channel interference.

Rules governing the protection of other services from interference, and resolution of any such interference, are to be included in a proposed variation to the *Broadcasting Services (Technical Planning) Guidelines 2007* (TPGs). The public comment period for the variation to the TPGs is expected to be concurrent with the comment period for the variation to the DRCPs.

For the above reasons the issue of adjacent channel interference is not discussed further in this discussion paper, however the accompanying Engineering Reports do analyse the potential interference based on a possible implementation of the proposed technical specifications.

Overspill considerations

In developing the draft variation to the DRCPs, ACMA has set an objective that where practicable the signal level in Urban Centres and Localities (UCLs) beyond the boundary of a designated BSA radio area should be limited to less than 70 dB μ V/m, the minimum target signal level for indoor reception in an suburban environment.

It should be noted that limiting the signal level from the main transmitter to less than 70 dB μ V/m in UCLs beyond the designated BSA radio area boundary is likely to result in mobile grade coverage being available beyond the boundary.

ADELAIDE RA1 DIGITAL RADIO CHANNEL PLAN

Preliminary View 5

The output radiation pattern of each technical specification set out in attachments 1.1 and 1.2 to Schedule 1 of the DRCP is proposed to be varied. Over some bearings or sectors, for specified depression angles, the maximum ERP is proposed to be increased to 50 kW ERP.

Assessment of proposed output radiation pattern

Detailed engineering assessment was undertaken to assess options for improving the coverage potential for Adelaide digital radio services. The initial step was to analyse the ERP required to adequately cover the designated BSA radio area and to assess the ERP level that would result in unacceptable levels of signal overspill. This analysis is contained in Appendix 4 of the Adelaide Engineering Report. It should be noted that this analysis assumed no ERP constraints due to co-channel or adjacent channel interference. Subsequent analyses considered the additional constraints to limit co-channel interference and signal overspill. This later work also considered the role that the vertical radiation pattern of the antenna could play in controlling co-channel interference and signal overspill.

The initial engineering analysis indicated that the minimum signal level required for indoor suburban reception can be achieved with 50 kW ERP in most parts of the designated BSA radio area except within the UCLs of Angaston, Carrickalinga, Gumeracha, Lyndoch, Normanville and Yankalilla. It will not be practical to provide adequate indoor reception in these locations from the main transmitter site, however, parts of these areas may have adequate signals for mobile reception, although achieving any useable coverage may be problematic for Angaston, Carrickalinga, Normanville and Yankalilla which have very obstructed signal paths.

The analysis also indicated that transmission at 50 kW ERP in some directions is more than adequate to cover the designated BSA radio area and may result in greater than desired signal levels outside of the designated BSA radio area. The proposed output radiation pattern, therefore includes reduced ERP towards the North West and East. The proposed output radiation pattern specifies a different (reduced) maximum ERP that may be radiated at angles above a specified depression angle over a specified sector. This approach will allow the DRMT licensees to maximise their coverage within the licence area (at angles below the specified depression angle) while limiting the ERP above the specified depression angle and consequently the level of signal overspill.

Analysis of the potential for co-channel interference indicates that it is necessary to restrict the ERP below 50 kW towards the coverage area of a channel 9A digital television service serving Western Victoria. The proposed output radiation pattern restricts the maximum ERP that may be radiated at angles above a specified depression angle over a specified sector in order to limit the potential for interference.

Conclusion

ACMA considers the proposed output radiation pattern as specified in the draft variation instrument provides the maximum potential for DRMT licensees to cover their

designated BSA radio area using the currently available spectrum. The proposed output radiation pattern adequately protects co-channel television services from interference and limits signal overspill into neighbouring designated BSA radio areas as far as is practicable.

BRISBANE RA1 DIGITAL RADIO CHANNEL PLAN

Preliminary View 5

The output radiation pattern of each technical specification set out in attachments 1.1, 1.2 and 1.3 to Schedule 1 of the DRCP is proposed to be varied. Over some bearings or sectors, for specified depression angles, the maximum ERP is proposed to be increased to 50 kW ERP

Assessment of proposed output radiation pattern

Detailed engineering assessment was undertaken to assess options for improving the coverage potential for Brisbane digital radio services. The initial step was to analyse the ERP required to adequately cover the designated BSA radio area and to assess the ERP level that would result in unacceptable levels of signal overspill. This analysis is contained in Appendix 4 of the Brisbane Engineering Report. It should be noted that this analysis assumed no ERP constraints due to co-channel or adjacent channel interference. Subsequent analyses considered the additional constraints to limit co-channel interference and signal overspill. This later work also considered the role that the vertical radiation pattern of the antenna could play in controlling co-channel interference and signal overspill.

The initial engineering analysis indicated that the minimum signal level required for indoor suburban reception can be achieved with 50 kW ERP in most parts of the designated BSA radio area except Beenleigh, Upper Mt Gravatt and Woodford. It will not be practical to provide adequate indoor reception in these locations from the main transmitter site, however, parts of these areas may have adequate signals for mobile reception. Additionally, the analysis indicated that Beaudesert would only just be adequately covered if an ERP of 50 kW could be achieved.

The analysis also indicated that transmission at 50 kW ERP in some directions is more than adequate to cover the designated BSA radio area and may result in greater than desired signal levels outside of the designated BSA radio area. The proposed output radiation pattern, therefore includes reduced ERP towards the West (including the UCL of Rosewood) and to the South (including the UCL of Mt Tamborine). The proposed output radiation pattern specifies different (reduced) maximum ERP that may be radiated at angles above a specified depression angle over a specified sector. This approach will allow the DRMT licensees to maximise their coverage within the licence area (at angles below the specified depression angle) while limiting the ERP above the specified depression angle and consequently the level of signal overspill.

Analysis of the potential for co-channel interference indicates that it is necessary to restrict the ERP below 50 kW towards the coverage area of channel 9A digital television services serving Roma, Upper Namoi and Wide Bay. The proposed output radiation pattern restricts the maximum ERP that may be radiated at angles above a specified depression angle over a specified sector in order to limit the potential for interference. Analysis of a practical antenna design indicates that the severity of the ERP restriction to the North to protect Wide Bay is in practice likely to prevent licensees achieving the maximum permitted ERP in other directions. It is not practicable to change the channel of the Wide Bay ABC9A digital television service to

an alternative channel prior to the switch off of analog television services due to the limited availability of suitable channels.

Conclusion

ACMA considers the proposed output radiation pattern as specified in the draft variation instrument provides the maximum potential for DRMT licensees to cover their designated BSA radio area using the currently available spectrum. The proposed output radiation pattern adequately protects co-channel television services from interference and limits signal overspill into neighbouring designated BSA radio areas as far as is practicable.

MELBOURNE RA1 DIGITAL RADIO CHANNEL PLAN

Preliminary View 5

The output radiation pattern of each technical specification set out in attachments 1.1, 1.2 and 1.3 to Schedule 1 of the DRCP is proposed to be varied. Over some bearings or sectors, for specified depression angles, the maximum ERP is proposed to be increased to 50 kW ERP.

Assessment of proposed output radiation pattern

Detailed engineering assessment was undertaken to assess options for improving the coverage potential for Melbourne digital radio services. The initial step was to analyse the ERP required to adequately cover the designated BSA radio area and to assess the ERP level that would result in unacceptable levels of signal overspill. This analysis is contained in Appendix 4 of the Melbourne Engineering Report. It should be noted that this analysis assumed no ERP constraints due to co-channel or adjacent channel interference. Subsequent analyses considered the additional constraints to limit co-channel interference and signal overspill. This later work also considered the role that the vertical radiation pattern of the antenna could play in controlling co-channel interference and signal overspill.

The initial engineering analysis indicated that the minimum signal level required for indoor suburban reception can be achieved with 50 kW ERP in most parts of the designated BSA radio area except Sorrento, Eastern UCLs such as Warburton, Wesburn and Yarra Junction, and North Western UCLs such as Bacchus Marsh, Gisborne and Woodend. It will not be practical to provide adequate indoor reception in these locations from the main transmitter site, however, parts of these areas may receive a sufficient signal for mobile reception.

The analysis also indicated that transmission at 50 kW ERP in some directions is more than adequate to cover the designated BSA radio area and may result in greater than desired signal levels outside of the designated BSA radio area. The proposed output radiation pattern, therefore includes reduced ERP towards the North East, East to South East, and towards Geelong. The proposed output radiation pattern specifies a different (reduced) maximum ERP that may be radiated at angles above a specified depression angle over a specified sector. This approach will allow the DRMT licensees to maximise their coverage within the licence area (at angles below the specified depression angle) while limiting the ERP above the specified depression angle and consequently the level of signal overspill.

Analysis of the potential for co-channel interference indicates that it is necessary to restrict the ERP below 50 kW towards the coverage area of channel 9A digital television services serving Lileah, Upper Murray, and Western Victoria. The proposed output radiation pattern restricts the maximum ERP that may be radiated at angles above a specified depression angle over a specified sector in order to limit the potential for interference.

Conclusion

ACMA considers the proposed output radiation pattern as specified in the draft variation instrument provides the maximum potential for DRMT licensees to cover their designated BSA radio area using the currently available spectrum. The proposed output radiation pattern adequately protects co-channel television services from interference and limits signal overspill into neighbouring designated BSA radio areas as far as is practicable.

PERTH RA1 DIGITAL RADIO CHANNEL PLAN

Preliminary View 5

The output radiation pattern of each technical specification set out in attachments 1.1 and 1.2 to Schedule 1 of the DRCP is proposed to be varied. Over some bearings or sectors the maximum ERP is proposed to be increased to 50 kW ERP.

Assessment of proposed output radiation pattern

Detailed engineering assessment was undertaken to assess options for improving the coverage potential for Perth digital radio services. The initial step was to analyse the ERP required to adequately cover the designated BSA radio area and to assess the ERP level that would result in unacceptable levels of signal overspill. This analysis is contained in Appendix 4 of the Perth Engineering Report. It should be noted that this analysis assumed no ERP constraints due to co-channel or adjacent channel interference. Subsequent analyses considered the additional constraints to limit co-channel interference and signal overspill.

The initial engineering analysis indicated that the minimum signal level required for indoor suburban reception can be achieved with 50 kW ERP in most parts of the designated BSA radio area except the North West coast including Joondalup, Yanchep and Two Rocks and the South East including Jarrahdale. It will not be practical to provide adequate indoor reception in these areas from the main transmitter site, however, parts of these areas may receive a sufficient signal for mobile reception.

The analysis also indicated that transmission at 50 kW ERP would not result in signal overspill outside of the designated BSA radio area. However, as there is minimal population to the East of the transmitter site the output radiation pattern is reduced over the Eastern sector to assist in future re-use of the spectrum.

Analysis of the potential for co-channel interference (refer to the September 2007 Engineering Report accompanying the initial draft DRCPs) indicates that it would be necessary to restrict the ERP to levels below 50 kW towards the coverage area of channel 9A digital television services planned to serve Geraldton and Southern Cross.

Commercial digital television services in remote and regional WA are to be delivered by multi-channelling the two existing services GWN and WIN together with a third service to be provided by a GWN/WIN joint venture company. This means that only one of the five commercial digital channels planned for each location will be in use.

Given the significant constraint of the ERP limits required to protect planned but not operating digital television channels for Geraldton and Southern Cross, ACMA proposes to vary the Commercial DCP for WA Part 2 – Remote and Regional WA to remove channel 9A as an allotted channel for Geraldton and replace it with an alternative channel allotment. It is also proposed to increase the maximum ERP permitted for the Southern Cross service to overcome any interference that might occur on the fringe of its coverage area. A separate discussion paper relating to the DCP variation covers these proposals in more detail.

In developing the output radiation pattern proposed in the variation of the DRCP for Western Australia, it is assumed that the DCP variation is approved. If the DCP

variation is not approved then it will not be possible to proceed with the DRCP variation.

Conclusion

ACMA considers the proposed output radiation pattern as specified in the draft variation instrument provides the maximum potential for DRMT licensees to cover their designated BSA radio area. The proposed output radiation pattern limits signal overspill into neighbouring designated BSA radio areas as far as is practicable.

SYDNEY RA1 DIGITAL RADIO CHANNEL PLAN

Preliminary View 5

The output radiation pattern of each technical specification set out in attachments 1.1, 1.2 and 1.3 to Schedule 1 of the DRCP is proposed to be varied. Over some bearings or sectors, for specified depression angles, the maximum ERP is proposed to be increased to 50 kW ERP.

Assessment of proposed output radiation pattern

Detailed engineering assessment was undertaken to assess options for improving the coverage potential for Sydney digital radio services. The initial step was to analyse the ERP required to adequately cover the designated BSA radio area and to assess the ERP level that would result in unacceptable levels of signal overspill. This analysis is contained in Appendix 4 of the Sydney Engineering Report. It should be noted that this analysis assumed no ERP constraints due to co-channel or adjacent channel interference. Subsequent analyses considered the additional constraints to limit co-channel interference and signal overspill. This later work also considered the role that the vertical radiation pattern of the antenna could play in controlling co-channel interference and signal overspill.

The initial engineering analysis indicated that the minimum signal level required for indoor suburban reception can be achieved with 50 kW ERP in most parts of the designated BSA radio area except the Richmond/Windsor area. It will not be practical to provide adequate indoor reception in this area from the main transmitter site, however, parts of this area may receive a sufficient signal for mobile reception.

The analysis also indicated that transmission at 50 kW ERP in some directions is more than adequate to cover the designated BSA radio area and may result in greater than desired signal levels outside of the designated BSA radio area. This particularly applies to elevated areas to the West, including Hazelbrook, Woodford and Kurrajong as well as Helensburgh to the South. Due to the elevation of these areas it is difficult to constrain overspill, however, restrictions required to protect co-channel digital television services to the West and South West will assist in reducing the level of overspill.

Analysis of the potential for co-channel interference indicates that it is necessary to restrict the ERP below 50 kW towards the coverage area of channel 9A digital television services serving Bathurst, Canberra and Manning River. The proposed output radiation pattern restricts the maximum ERP that may be radiated at angles above a specified depression angle over a specified sector in order to limit the potential for interference.

Conclusion

ACMA considers the proposed output radiation pattern as specified in the draft variation instrument provides the maximum potential for DRMT licensees to cover their licence areas using the currently available spectrum. The proposed output radiation pattern adequately protects co-channel television services from interference and limits signal overspill into neighbouring designated BSA radio areas as far as is practicable.