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Australian Communications and Media Authority

The 803–960 MHz band—exploring options for future change

Discussion paper

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5. PSMB in the 800 MHz band

In *Exploring new opportunities*, the potential use of the 800 MHz expansion band for PSMB radiocommunications systems was discussed. This is referred to in the paper as broadband PPDR.

In May 2011, following the release of *Exploring new opportunities*, the minister and the Attorney-General established the PSMBSC. The PSMBSC is working on the development of a new nationally interoperable mobile broadband capability for Australia's PSAs.

On 29 October 2012, the ACMA announced its decision to set aside 2 x 5 MHz paired FDD spectrum for use by PSAs to deploy dedicated PSMB networks.[14] This decision followed input from the PSMBSC and was part of a broader package of measures designed to ensure PSAs are provided with adequate spectrum to meet their data requirements into the future. This chapter provides some background on this decision and outlines the potential licensing and allocation options for this application.

5.1 Background

Radiocommunications networks are a critical component of public safety operations. The requirements of networks for such operations are generally different from other types of networks, including commercial mobile networks. In Australia, the 400 MHz band is used for high-availability, mission-critical, narrowband (mainly voice) radiocommunications. The ACMA recently undertook to replan this band to relieve congestion and provide dedicated government spectrum. The ACMA and the National Coordinating Committee for Government Radiocommunications (NCCGR) are currently working towards implementing these new arrangements.

Additionally, 50 MHz of dedicated public safety spectrum is currently in the process of being made available from the 4.9 GHz band—harmonised for public safety use under ITU Resolution **646**—for the deployment of short-range, high-capacity radiocommunications systems. It is intended that this will support applications such as WiFi-based local area networks (LANs), sensor (including video) linking and data offload to absorb high localised capacity demand in a PSMB network.

The ACMA is working towards assisting PSAs in realising a nationally interoperable PSMB capability. The ACMA is a member of the PSMBSC, which includes members from Commonwealth and state (including public safety) agencies. The PSMBSC first met in June 2011 to investigate how provision of spectrum from the 800 MHz band could help realise a nationally interoperable PSMB capability.

This network is intended to provide responders with a mobile broadband capability to support a range of applications, including video transfer and streaming, database interrogation and real-time mapping. It will be cellular in topology and based on the 3GPP LTE standard.

The intention is that, over time, the PSMB network will be available to a wide coverage area, and where there is no coverage, responders' devices will be able to connect to commercial mobile networks. Planning for this capability has been undertaken with a range of scenarios in mind. Nevertheless, it is accepted that for some major incidents that occur at short notice, the capacity afforded by any conventional cellular network may not be enough to satisfy the demand in the vicinity of those incidents.

[14] See www.acma.gov.au/WEB/STANDARD/pc=PC_600087.

So, regardless of the amount of spectrum provided for PSMB, a contingency will be required to meet extremely high, localised, sudden spikes in demand. This is part of the role that the ACMA sees the 4.9 GHz band playing in contributing to the layered public safety communications network. There are also provisions in the Radiocommunications Act for increased spectrum access by responders during a high-level emergency.

With these factors in mind, and noting the ability for PSAs to access cellular networks and deploy additional mobile base stations if needed, it was appropriate for the ACMA to provide sufficient spectrum for day-to-day and pre-planned use. Another contributing factor was the range of other mechanisms available for additional capacity in extreme circumstances.

There is no single-band solution able to meet all of the mobile communications requirements of PSAs. Instead, with careful planning and adequate resourcing, a layered 'system of systems' approach to public safety communications is the best means of providing the necessary bandwidth to operators, when and where they need it. There are three main layers in this model:

> Wide-area narrowband voice and data using land-mobile topology, predominantly employing the 400 MHz band in Australia.

> Wide-area broadband data using cellular topology (PSMB), potentially using the 800 MHz band and supported by business agreements with commercial carriers in Australia, with supplementary, on-demand coverage and capacity provided by additional deployable base stations.

> Short-range high-capacity data in deployable hotspots, using the 4.9 GHz band in Australia. While propagation distances in the 4.9 GHz band are much shorter than in the 400 and 800 MHz bands, there is much more spectrum available (50 MHz) for public safety use.

Radiofrequency spectrum, particularly below 1 GHz, is extremely valuable and in short supply. However, the value of services provided to the community by PSAs must not be underestimated. Part of the object of the Radiocommunications Act compels the ACMA to 'make adequate provision of the spectrum for use by agencies involved in ... law enforcement or the provision of emergency services'. The challenge for the ACMA is to provide adequate spectrum for PSAs to carry out their duties effectively, while optimising the benefit of the spectrum as a whole to the community. This requires balancing a range of economic and public interest drivers—including public safety—to deliver solutions that best serve the community.

5.1.1 Submissions to *Exploring new opportunities*

In response to *Exploring new opportunities*, the ACMA sought comment on the potential use of the 800 MHz expansion band for PSMB.

The majority of respondents saw merit in the introduction of PSMB systems in the 800 MHz expansion band with those from the PSMB sector stating that a minimum 2 x 10 MHz was required. Some said that 2 X 15 MHz would be ideal in high-density areas. However, incumbent users of the 850–865 MHz segment expressed concerns that their services would need to be relocated. Respondents from the land mobile service sector supported the introduction of narrowband services supporting PSAs as outlined in ITU Resolution **646** to ease congestion in the 400 MHz band.

CMTS sector respondents suggested that a PSMB capability would be better and more efficiently provided via agreements with commercial networks with quality of service provisions to provide certainty of connection. However, if this was deemed unviable and an exclusive allocation made, CMTS sector respondents believed it should align with the frequency range specified in ITU Resolution **646**.

5.2 Proposal for PSMB in the 800 MHz band

On 29 October 2012, the ACMA announced its decision to set aside 10 MHz of spectrum, as a 2 x 5 MHz paired assignment, for the deployment of nationally interoperable PSMB networks.[15] The full details of this decision, including a technical analysis of the decision and an outline of the ACMA's approach to spectrum for public safety applications, are in *Spectrum for public safety radiocommunication—Current ACMA initiatives and decisions*.

Throughout the process, it has been recognised that no amount of spectrum used by a conventional cellular network would be enough to satisfy the localised, short-notice demand that might result from a major incident, such as a terrorist attack in a central business district or major urban centre. Furthermore, it would be highly economically inefficient to make provision for what might be a once-in-a-generation event.

Scenarios resulting in extremely high levels of capacity demand could be satisfied using:

> 4.9 GHz equipment and/or additional cells on wheels (COWS)—noting that 1:1 frequency reuse is feasible under LTE and/or

> additional offload to commercial networks—noting that such arrangements will necessarily underpin the capability.

The abovementioned provisions in the Radiocommunications Act will further safeguard the ability of PSAs to access more spectrum to meet high demand that might occur in extreme circumstances.

Considering the additional capacity that these measures will provide during a major emergency, it is appropriate that 5 MHz of dedicated paired spectrum (that is, 5 + 5 MHz in a frequency division duplex or FDD arrangement) be set aside to enable deployment of a PSMB capability. This will also allow some headroom for expansion. This decision has been largely based on the evidence gathered by the PSMBSC.

The location of the spectrum identified for PSMB depends on the outcomes of other elements of the review of the 803–960 MHz band. However, the ACMA prefers that this spectrum is identified in a lower-adjacent segment to any new spectrum for CMTS. Further, it is necessary for the spectrum identified for PSMB to fall within 3GPP standardised frequency bands. The potential frequencies identified for PSMB are further discussed in Chapter 9. The final decision on the location of this spectrum is subject to sharing studies and will be made in the decision phase of the review.

5.3 Options for future licensing and allocation of PSMB services in the 800 MHz band

The ACMA has decided that it will enable the use of 2 x 5 MHz of spectrum for dedicated PSMB networks in the 800 MHz band. Feedback from the PSMBSC is that deployment of networks using this spectrum will be phased over a number of years, commencing in 2015 in some areas, and that coverage will not be extended to all population areas. To that end, it would be inappropriate for incumbent users of this spectrum to be displaced in geographic areas where there is not yet, or will not be, any dedicated PSMB coverage.

With this in mind, it is appropriate that the ACMA recommend an area apparatus licence regime to authorise access to this spectrum for PSMB purposes. In areas where PSAs undertake to provide PSMB coverage, the ACMA will provide incumbent licensees two years' notice to cease operation on these frequencies. Feedback from

[15] See www.acma.gov.au/WEB/STANDARD/pc=PC_600087.

the PSMBSC is that access to spectrum could be required in some areas, but not others. Incumbent users of these frequencies (when known) will be advised accordingly.

5.4 Comments on the identification of spectrum for PSMB

Given the timelines associated with the PSMBSC process, a decision on the quantum of spectrum to be made available to support a PSMB capability has been made by the ACMA. As discussed above, the ACMA has decided to set aside 2 x 5 MHz of spectrum for dedicated PSMB networks in the 800 MHz band.

Comment is sought on issues related to implementing this 2 x 5 MHz of spectrum earmarked for PSMB. Specifically, comment is sought on implementing the licensing and allocation model discussed in section 5.3 and how the spectrum identified for PSMB may be able to be used by other services in areas where there is no immediate requirement for PSMB. For example, the lower paired segment of the spectrum earmarked for PSMB is likely to be in the 803–820 MHz band that will be cleared as part of the restack of digital television. In areas where this lower segment is not required for PSMB, there may be opportunities for other services. Further, while the upper paired segment is currently used by other services, there may be opportunities for new services in areas where this segment is not required for PSMB and is not already occupied.

15. Comment is sought on issues related to implementing the 2 x 5 MHz of spectrum earmarked for PSMB.
16. Comment is sought on the types of services that could potentially utilise the spectrum identified for PSMB in areas where it is not required for PSMB.