

# Chapter 1

## Introduction

### The conduct of the inquiry

1.1 On 3 March 2011, the Senate referred the following matter to the Environment and Communications References Committee (the committee) for inquiry and report by 2 November 2011:

The capacity of communication networks and emergency warning systems to deal with emergencies and natural disasters, with particular reference to:

- a) the effectiveness of communication networks, including radio, telephone, Internet and other alert systems (in particular drawing on the spate of emergencies and natural disasters of the 2010/2011 Australian summer):
  - i. in warning of the imminent threat of an impending emergency,
  - ii. to function in a coordinated manner during an emergency, and
  - iii. to assist in recovery after an emergency;
- b) the impact of extended power blackouts on warning systems for state emergency services, including country fire brigades and landholders or home owners;
- c) the impact of emergencies and natural disasters on, and implications for, future communication technologies such as the National Broadband Network;
- d) the scope for better educating people in high-risk regions about the use of communications equipment to prepare for and respond to a potential emergency or natural disaster;
- e) new and emerging technologies including digital spectrum that could improve preparation for, responses to and recovery from, an emergency or natural disaster; and
- f) any other relevant matters.

1.2 On 2 November 2011, the Senate agreed to an extension of time to report until 23 November 2011.

1.3 In accordance with its usual practice, the committee advertised details of the inquiry in *The Australian* and on the internet. The committee also contacted a range of organisations inviting submissions. The committee received 47 submissions, listed at Appendix 1.

1.4 The committee held two public hearings in Canberra on 8 and 9 August 2011. Details of these public hearings are shown at Appendix 2. The committee thanks all those organisations and individuals who contributed to the inquiry.

## **Background**

### ***Recent natural disasters in Australia***

1.5 As a result of various natural disasters around Australia during the last decade, several state and territory governments have conducted, or are currently conducting, inquiries to examine ways in which the devastating effects of similar events could be avoided or minimised in the future.

1.6 Recent inquiries into natural disasters in Australia include the Australian Capital Territory (ACT) Coroner's inquests and inquiry into the Canberra firestorm in January 2003 and the 2009 Victorian Bushfires Royal Commission (the Royal Commission) examining the deadly fires in that state on 7 February 2009. At present, the Queensland Floods Commission of Inquiry is examining the floods that occurred during December 2010 and January 2011.

1.7 In their final reports, both the ACT Coroner and the Royal Commission made recommendations regarding emergency communications and warning systems.

1.8 The interim report of the Queensland Floods Commission of Inquiry, released on 1 August 2011, also made numerous recommendations pertinent to this inquiry.

1.9 The reports handed down in the ACT, Victoria and Queensland shared common themes about the use and effectiveness of emergency communications. All of the reports emphasised the need for interoperability of emergency service organisation telecommunication systems, and recommended improvements to the way in which the public is warned about an impending emergency (including the timeliness of and information contained within these warnings). These issues are discussed in subsequent chapters of this report.

1.10 A more detailed summary of the inquiries into these recent natural disasters is at Appendix 3.

## **Radiocommunications in Australia**

### ***The Radiocommunications Act 1992***

1.11 The legislative framework for the management of radiofrequency spectrum in Australia, including spectrum plans and frequency band plans, spectrum licensing and apparatus licences, is provided by the *Radiocommunications Act 1992* (the Act).<sup>1</sup>

1.12 The objects of the Act, relevant to emergency communications and the current inquiry, are as follows:

...to provide for management of the radiofrequency spectrum in order to:

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1 See the *Radiocommunications Act 1992*.

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- (a) maximise, by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radiofrequency spectrum;
  - (b) make adequate provision of the spectrum:
    - (i) for use by agencies involved in the defence or national security of Australia, law enforcement or the provision of emergency services; and
    - (ii) for use by other public or community services...<sup>2</sup>

1.13 The Australian Communications and Media Authority (the ACMA) is responsible for the regulation of broadcasting, the internet, radiocommunications and telecommunications.<sup>3</sup> With respect to radiocommunications, the ACMA plans and manages radiofrequency spectrum in Australia. It is also responsible for compliance with licensing requirements and investigating complaints of interference to services.<sup>4</sup>

### ***ESOs' reliance on radiocommunications***

1.14 Emergency Service Organisations (ESOs) rely on radiocommunications for their voice and data communication needs. ESOs use narrowband radiofrequency spectrum for voice (for example two-way radio) communication systems, while broadband radiofrequency spectrum is needed for data communication such as mobile internet to send photographs, videos and maps. Due to the growing range of technologies, capabilities and services available via broadband, ESOs are becoming increasingly reliant on data communications. ESOs particularly rely on radiocommunications during emergency situations.

### ***Interoperability of ESO voice radiocommunications***

1.15 At its meeting on 7 December 2009, the Council of Australian Governments (COAG) endorsed the *National Framework to Improve Government Radiocommunications Interoperability*.<sup>5</sup> The framework provides a set of guiding principles and key areas of work to enhance the interoperability of ESO voice radiocommunications over the period to 2020.<sup>6</sup> The framework defines radiocommunications as 'mobile radio networks' that:

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2 *Radiocommunications Act 1992*, s. 3.

3 Australian Communications and Media Authority (ACMA), *About the ACMA's role*, available: [www.acma.gov.au/WEB/STANDARD/pc=ACMA\\_ROLE\\_OVIEW](http://www.acma.gov.au/WEB/STANDARD/pc=ACMA_ROLE_OVIEW) (accessed 19 October 2011).

4 ACMA, *About communications and media regulation*, available: [www.acma.gov.au/WEB/STANDARD/pc=PUB\\_REG\\_ABOUT](http://www.acma.gov.au/WEB/STANDARD/pc=PUB_REG_ABOUT) (accessed 19 October 2011).

5 Emergency Management Australia (Attorney-General's Department), *Implementation of National Interoperability Framework Briefings*, available: [www.ag.gov.au/www/emaweb/emaweb.nsf/Page/FundingandGrants\\_NationalEmergencyManagementProjects\\_NEMP2010-2011\\_ImplementationofNationalIntroperabilityFrameworkbriefings](http://www.ag.gov.au/www/emaweb/emaweb.nsf/Page/FundingandGrants_NationalEmergencyManagementProjects_NEMP2010-2011_ImplementationofNationalIntroperabilityFrameworkbriefings) (accessed 6 October 2011).

6 Emergency Management Australia (Attorney-General's Department), *Implementation of National Interoperability Framework Briefings*, p. 1.

- allow one user to simultaneously talk to many other users, which is critical in broadcasting warnings such as the need to evacuate a collapsing building;
- have a restricted number of users, which makes radio networks less likely to congest in emergency conditions; and
- transmit at relatively high power, which provides a wider area of coverage per cell and which makes radio networks less impacted by power outages.<sup>7</sup>

1.16 The framework states:

Mobile radio is the fundamental basis for communications in emergency situations, a situation that is unlikely to change in the foreseeable future.

However, agencies responding to emergencies are often hampered by low levels of radiocommunications interoperability to effectively communicate with other agencies within their jurisdiction or other jurisdictions.

...

This Framework provides a basis to use current and future opportunities, including the current review of government spectrum allocation to address shortfalls in emergency communications that have existed for over 35 years.

...

The National Framework suggests an indicative ten-year timeframe to allow jurisdictions sufficient time to align technical requirements with their procurement cycles and thus significantly mitigate any cost of change. Most jurisdictions are already either implementing or planning their next technology refresh and all jurisdictions will most likely do so in the Framework's timeframe.<sup>8</sup>

## Possible future spectrum allocations

### *A note on spectrum nomenclature*

1.17 Different nomenclature for spectrum was used by submitters during the course of the inquiry. In particular, submitters frequently referred to 800 MHz spectrum. This

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7 Emergency Management Australia (Attorney-General's Department), *Implementation of National Interoperability Framework Briefings*, p. 1.

8 Council of Australian Governments (COAG), *National Framework to Improve Government Radiocommunications Interoperability: Towards a harmonised radiocommunications environment for public protection and disaster relief 2010–2020*, available: [www.ag.gov.au/www/emaweb/rwpattach.nsf/VAP/\(3A6790B96C927794AF1031D9395C5C20\)-Nationa+Framework+to+Improve+Government+Radiocommunications.pdf/\\$file/Nationa+Framework+to+Improve+Government+Radiocommunications.pdf](http://www.ag.gov.au/www/emaweb/rwpattach.nsf/VAP/(3A6790B96C927794AF1031D9395C5C20)-Nationa+Framework+to+Improve+Government+Radiocommunications.pdf/$file/Nationa+Framework+to+Improve+Government+Radiocommunications.pdf) (accessed 6 October 2011), pp 1 and 2.

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800 MHz spectrum is currently being considered by the ACMA as part of its review of the "900 MHz band".<sup>9</sup>

1.18 This report uses "700 MHz band" to refer to 694–803 MHz spectrum and "800 and 900 MHz bands" to refer to 803–890 MHz together with 890–960 MHz spectrum.<sup>10</sup>

### *The "digital dividend"*

1.19 The switchover from analog to digital free-to-air television in Australia (due to be completed by 31 December 2013) will result in radiofrequency spectrum previously used for analogue television becoming vacant.<sup>11</sup> This spectrum, from 694 to 820 MHz, is referred to as the "digital dividend" and falls largely within the 700 MHz band.<sup>12</sup>

1.20 Following public consultation in response to a green paper, the Federal Government announced on 24 June 2010 that '126 MHz of contiguous spectrum in the frequency range 694 to 820 MHz inclusive' would be released.<sup>13</sup> The government plans to auction the digital dividend spectrum during the second half of 2012 'allowing successful bidders ample time to plan and deploy the next generation networks that are likely to utilise the spectrum'.<sup>14</sup>

1.21 The process for releasing the digital dividend spectrum involves:

- switchover—converting free-to-air television services from analogue to digital signals. Once this conversion is complete, the analogue signals will be switched off and the parts of the spectrum formerly used for analogue transmissions will become available for alternative uses.

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9 ACMA, *900 MHz Review Project Plan*, available: [www.acma.gov.au/webwr/assets/main/lib312085/900%20mhz%20review%20project%20plan.pdf](http://www.acma.gov.au/webwr/assets/main/lib312085/900%20mhz%20review%20project%20plan.pdf) (accessed 3 October 2011), p. 3 and ACMA, *The 900 MHz band—Exploring new opportunities: Initial consultation on future arrangements for the 900 MHz band*, May 2011, available: [www.acma.gov.au/webwr/assets/main/lib312085/900mhz\\_review\\_exploring\\_new\\_opportunities.pdf](http://www.acma.gov.au/webwr/assets/main/lib312085/900mhz_review_exploring_new_opportunities.pdf) (accessed 5 October 2011), p. 7.

10 There is a 3 MHz guard band between 803–806 MHz.

11 Department of Broadband, Communications and the Digital Economy (DBCDE), *Digital dividend*, available: [www.dbcde.gov.au/consultation\\_and\\_submissions/digital\\_dividend](http://www.dbcde.gov.au/consultation_and_submissions/digital_dividend) (accessed 27 September 2011).

12 DBCDE, *Digital dividend*, available: [www.dbcde.gov.au/consultation\\_and\\_submissions/digital\\_dividend](http://www.dbcde.gov.au/consultation_and_submissions/digital_dividend) (accessed 27 September 2011).

13 DBCDE, *Digital dividend*, available: [www.dbcde.gov.au/consultation\\_and\\_submissions/digital\\_dividend](http://www.dbcde.gov.au/consultation_and_submissions/digital_dividend) (accessed 27 September 2011).

14 Senator the Hon Stephen Conroy, Minister for Broadband, Communications and the Digital Economy, *media release*, 24 June 2010.

- re-stack—clearing digital broadcasting services from the digital dividend frequency range and reorganising them more efficiently in the remaining broadcasting spectrum below 694 MHz. This will enable the 694–820 MHz spectrum to be made available to new users. The restack is expected to be completed by the end of 2014.
- re-allocation—packaging and auctioning of the digital dividend spectrum for new services.<sup>15</sup>

1.22 The ACMA is responsible for allocating the digital dividend spectrum. As part of this process, the ACMA conducted consultation on the configuration and allocation of the digital dividend spectrum between October and December 2010.<sup>16</sup> The purpose of this consultation 'was to obtain input from stakeholders on issues that would influence the ACMA's approach to the configuration and allocation of the band'.<sup>17</sup>

1.23 The draft recommendations in the ACMA's *Draft spectrum reallocation recommendations for the 700 MHz digital dividend and 2.5 GHz bands: information paper* stated '[t]wo 45 MHz blocks of spectrum, with frequency boundaries 703–803 MHz' would be reallocated between 2 November 2011 and 31 December 2014.<sup>18</sup> The digital dividend spectrum from 806–820 MHz would 'be considered under [the ACMA's] 900 MHz review'.<sup>19</sup>

1.24 On 27 May 2011, the ACMA announced it would proceed with an auction of new spectrum licences in the 700 MHz band (and the 2.5 GHz band) in late 2012.<sup>20</sup> The ACMA has not yet announced the exact date for the auction, or the number of allocations to be auctioned.<sup>21</sup>

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15 DBCDE, *Digital dividend*, available: [www.dbcde.gov.au/consultation\\_and\\_submissions/digital\\_dividend](http://www.dbcde.gov.au/consultation_and_submissions/digital_dividend) (accessed 27 September 2011).

16 ACMA, *Consultation on the configuration and allocation of digital dividend spectrum*, available: [www.acma.gov.au/WEB/STANDARD/pc=PC\\_312285](http://www.acma.gov.au/WEB/STANDARD/pc=PC_312285) (accessed 27 September 2011).

17 ACMA, *Draft spectrum reallocation recommendations for the 700 MHz digital dividend and 2.5 GHz bands: information paper*, May 2011, p. 1.

18 ACMA, *Draft spectrum reallocation recommendations for the 700 MHz digital dividend and 2.5 GHz bands: information paper*, May 2011, p. 4.

19 ACMA, *Draft spectrum reallocation recommendations for the 700 MHz digital dividend and 2.5 GHz bands: information paper*, May 2011, p. 6.

20 ACMA, 'ACMA moves ahead with auction of spectrum in the 700 MHz (digital dividend) and 2.5 GHz bands', Media release 50/2011, 27 May 2011.

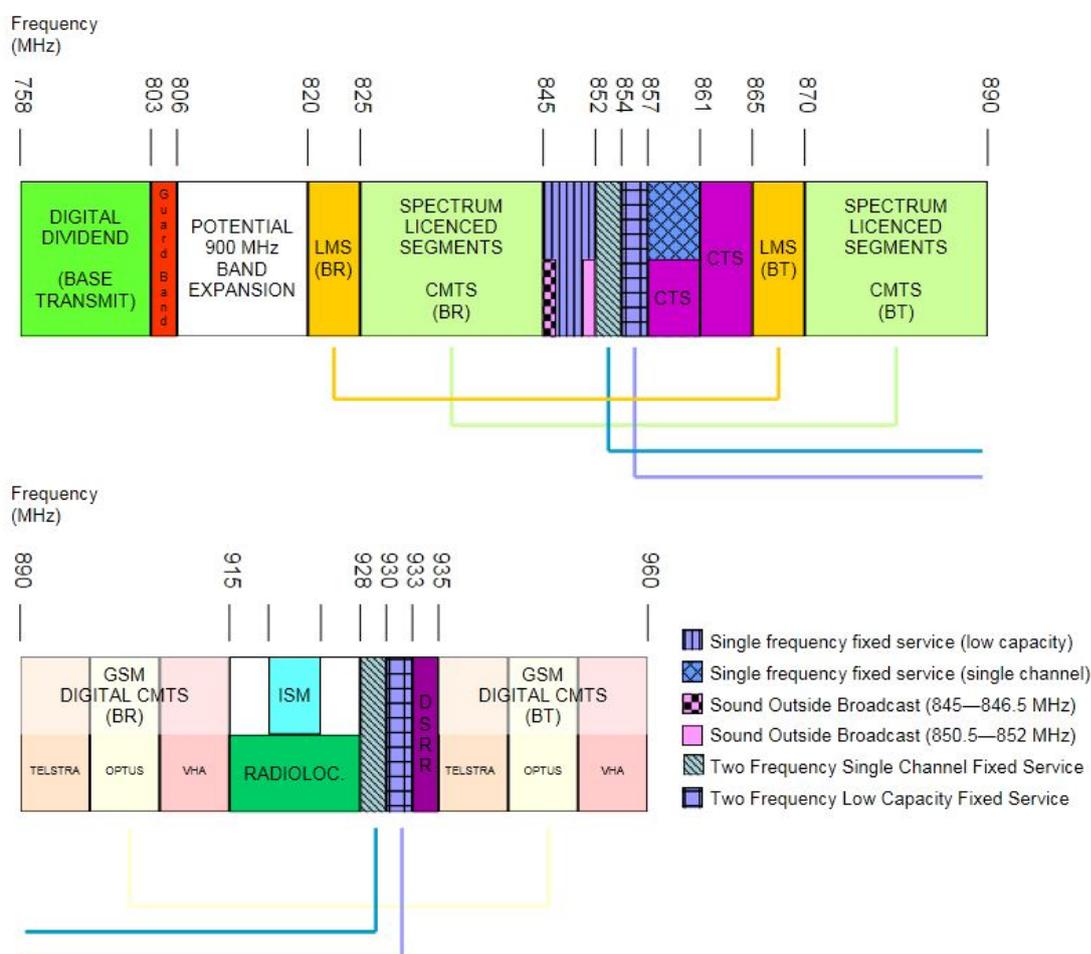
21 ACMA, *Radiofrequency spectrum auctions list*, available: [www.acma.gov.au/WEB/STANDARD/pc=PC\\_364](http://www.acma.gov.au/WEB/STANDARD/pc=PC_364) (accessed 6 October 2011).

## The ACMA's 900 MHz band review

1.25 In May 2011, the ACMA commenced the public part of its review of the 900 MHz band. The review will examine spectrum from 806 to 960 MHz excluding 825–845 paired with 870–890 MHz (these segments are currently allocated to the cellular mobile telephone service (CMTS) under spectrum licensing).<sup>22</sup> This is known as the "900 MHz band review" even though it includes consideration of portions of the 800 MHz band.

1.26 Current spectrum allocations in the 800 and 900 MHz bands in Australia are shown in Figure 1.

**Figure 1—Assignments in the 800 and 900 MHz bands (September 2010)**



Source: courtesy of the ACMA.

22 ACMA, *900 MHz Review Project Plan*, available: [www.acma.gov.au/webwr/assets/main/lib312085/900%20mhz%20review%20project%20plan.pdf](http://www.acma.gov.au/webwr/assets/main/lib312085/900%20mhz%20review%20project%20plan.pdf) (accessed 3 October 2011), p. 3 and ACMA, *The 900 MHz band—Exploring new opportunities: Initial consultation on future arrangements for the 900 MHz band*, May 2011, available: [www.acma.gov.au/webwr/assets/main/lib312085/900mhz\\_review\\_exploring\\_new\\_opportunities.pdf](http://www.acma.gov.au/webwr/assets/main/lib312085/900mhz_review_exploring_new_opportunities.pdf) (accessed 5 October 2011), p. 7.

1.27 According to the ACMA, the purpose of the review is threefold:

- ...parts of the band are unused or lightly used due to allocations to outmoded technologies. The [800 and 900 MHz bands are] 'prime spectrum' because of its ability to carry signals over long distances, penetrate buildings and carry large amounts of data. It is therefore important to make it possible for the band to transition to its highest value use to achieve the maximum public benefit.
- This band sits just above the broadcasting services bands historically used for high powered television services. Recent Australian Government decisions to put to market the so-called "digital dividend" spectrum (694–820 MHz) raises issues around the manner in which the adjoining spectrum is currently used and allocated. This is particularly the case because...the current draft plan for a harmonised [International Telecommunication Union] Region 3<sup>23</sup> digital dividend arrangement only extends to 803 MHz with a 3 MHz guard band extending to 806 MHz, where as the Australian digital dividend extends to 820 MHz. This arrangement provides a unique opportunity to consider expanding the [800 and 900 MHz bands] to facilitate new services.
- The 890–915 MHz paired with 935–960 MHz segments are currently allocated to the digital cellular mobile telephone service (CMTS). The bands are currently planned for [global system for mobile], whereas internationally there is a move to "refarm" this spectrum to better facilitate 3G and 4G technologies. Domestically, current users of the band are already implementing 3G technologies in these segments. Therefore, it is timely to review whether current arrangements are still appropriate as services migrate towards newer technologies.<sup>24</sup>

1.28 As part of the review of 800 and 900 MHz bands, the ACMA is considering 'the possibility of using the 900 MHz expansion band [between 806–820 MHz] for public protection and disaster relief (PPDR) radiocommunication systems'.<sup>25</sup> The ACMA explains:

Through the [Asia-Pacific Telecommunity Wireless Group (AWG)], the Asia-Pacific Telecommunity [(APT)] is currently investigating possible harmonisation of frequency bands for PPDR radiocommunication systems in [ultra high frequency] bands. In particular, the APT is considering the 806–824 MHz paired with 851– 869 MHz bands for harmonised PPDR

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23 The International Telecommunication Union (ITU) defines Region 3 as Asia and Australasia.

24 ACMA, *The 900 MHz band—Exploring new opportunities: Initial consultation on future arrangements for the 900 MHz band*, May 2011, pp 5–6.

25 ACMA, *The 900 MHz band—Exploring new opportunities: Initial consultation on future arrangements for the 900 MHz band*, May 2011, p. 34.

'Public protection and disaster relief (PPDR) radiocommunication systems are those used by agencies and organisations dealing with maintenance of law and order, protection of life and property, and emergency situations on a day-to-day basis. Additionally, these systems are used by agencies and organisations dealing with serious disruptions to the functioning of society, which pose a significant, widespread threat to human life, health, property, or the environment' (see ACMA, *The 900 MHz band—Exploring new opportunities: Initial consultation on future arrangements for the 900 MHz band*, May 2011, p. 33.

across some countries in Region 3. These segments are already allocated for PPDR systems in some Region 3 countries, including Korea. The PPDR systems currently used internationally in this segment are based on narrowband technologies. It has been proposed that the AWG also consider developing harmonised plans to enable broadband technologies based on work currently underway in [the Third Generation Partnership Project].

Parts of the band are also used for PPDR systems in the US. The 806–809 MHz paired with 851–854 MHz segments are designated for use by local, regional and state public safety agencies under guidelines developed by the National Public Safety Planning Advisory Committee (NPSPAC). The 809–815 MHz paired with 854–860 MHz segments and the 815–816 paired with 860–861 MHz segments are designated for public safety using non-cellular specialised mobile radio.

Should the expansion of two-frequency services using the 900 MHz expansion band be pursued, there is potential for PPDR systems to use the band. An allocation to PPDR in this band would be particularly attractive if it is designated as a harmonised frequency band for PPDR radiocommunications across other Region 3 countries.<sup>26</sup>

1.29 The future use of the digital dividend (700 MHz band) or spectrum in the 800 and 900 MHz bands for PPDR radiocommunications was explored at length during the inquiry. This issue is discussed in Chapter 2.

### ***Public Safety Mobile Broadband Steering Committee***

1.30 The Public Safety Mobile Broadband Steering Committee was established in May 2011 by the Attorney-General's Department and the Department of Broadband, Communications and the Digital Economy (DBCDE) to:

- report to commonwealth, state and territory ministers and the Standing Council for Police and Emergency Management (SCPPEM) on the most effective and efficient way for Australia's public safety agencies to obtain a reliable and robust mobile broadband capability that meets the operational requirements of ESOs, and the potential for allocation of radio-frequency in this regard; and
- work with the Australian Communications and Media Authority (ACMA) as part of its review of the 805–890 MHz frequency range to identify a suitable amount of spectrum necessary to meet foreseeable operational needs.<sup>27</sup>

1.31 The Steering Committee is co-chaired by deputy secretaries from the Attorney-General's Department and DBCDE. Membership comprises senior

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26 ACMA, *The 900 MHz band—Exploring new opportunities: Initial consultation on future arrangements for the 900 MHz band*, May 2011, pp 33–34.

27 Attorney-General's Department, *Public Safety Mobile Broadband Steering Committee: Terms of Reference*, available: [www.ag.gov.au/www/agd/agd.nsf/Page/National\\_security](http://www.ag.gov.au/www/agd/agd.nsf/Page/National_security) (accessed 19 October 2011), p. 1.

representatives from these departments, the ACMA and state and territory public safety agencies including (but not limited to) the:

- Australia New Zealand Policing Advisory Agency (ANZPAA);
- Australasian Fire and Emergency Service Authorities Council (AFAC);
- Council of Ambulance Authorities;
- National Counter-Terrorism Committee; and
- National Emergency Management Committee.<sup>28</sup>

1.32 The Steering Committee will report to COAG through SCPEM by 29 February 2012.<sup>29</sup>

### **Issues raised during the inquiry**

1.33 Various issues were raised during the course of the inquiry, including:

- the availability of spectrum for use by emergency service organisations (ESOs) for dedicated broadband PPDR radiocommunications, specifically spectrum in the 700 MHz band versus the 800 and 900 MHz bands;
- the use and effectiveness of warnings in emergency situations, including the role of television and radio broadcasters, and community preparedness and responsibility; and
- the resilience and redundancy of communications infrastructure in emergency situations.

1.34 Each of these issues is discussed in greater detail in the following chapters of this report.

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28 Attorney-General's Department, *Public Safety Mobile Broadband Steering Committee: Terms of Reference*, p. 2.

29 Attorney-General's Department, *Public Safety Mobile Broadband Steering Committee: Terms of Reference*, p. 3.