

CHAPTER 4

Adequate spectrum for public safety agencies

4.1 This chapter considers the provision of spectrum for PSAs. Case studies and recent policing and emergency incidents are considered to explore the difference in capability of both 10 MHz and 20 MHz and the impact and consequences for PSAs.

4.2 Without exception, witnesses to the inquiry agreed that adequate spectrum for PSAs will enable them to leverage new and emerging technological advances to ensure the greatest protection of the community.¹ However, there was considerable difference in opinion as to what constitutes 'adequate' spectrum for the purposes of a PSMB network. This chapter explores these respective positions and the evidence that underpins them.

Operational scenarios considered by the ACMA

4.3 The ACMA provided evidence that the PSMBSC surveyed the needs and views of PSAs in relation to their potential mobile broadband data demand to the year 2020 and collated those responses into a range of five operational scenarios. The ACMA reported that those scenarios included day-to-day non-emergency use (business-as-usual); various emergency scenarios including natural disasters; and a major inner-metro (worst case) threat response.²

4.4 Mr Cheah, Authority Member of the ACMA, informed the committee that the ACMA's analysis identified a total of 10 MHz of spectrum (5 MHz + 5 MHz) as sufficient to meet the demands of agencies in four of the five scenarios which included business-as-usual, planned major events and natural disaster scenarios.³ Spectrum allocated to PSAs was considered sufficient for all scenarios modelled except for the worst case scenario which the ACMA argued would not be served solely by a PSMB network even if 20 MHz were offered.⁴

4.5 The large scale incidents modelled by the PSMBSC were based on two natural disasters including one based on actual events and the other on an extreme inner-urban threat response. On the worst case scenario, Mr Cheah added that the key issue in such a situation was not having large amounts of 'valuable spectrum unused on standby but, rather, having arrangements in place so that the agencies are able to get access to quickly-scalable communications capacity'.⁵ The ACMA argued that there were other means available to PSAs for serving large amounts of highly-

1 Telstra, *Submission 11*, p. 3; AMTA noted that it was 'vital' for PSAs to have access to the latest technology. AMTA, *Submission 6*, p. 2.

2 Australian Communications and Media Authority, *Submission 7*, p. [3].

3 Mr Chris Cheah, ACMA, *Committee Hansard*, 24 June 2013, p. 8.

4 Australian Communications and Media Authority, *Submission 7*, p. [3].

5 Mr Chris Cheah, ACMA, *Committee Hansard*, 24 June 2013, p. 8.

concentrated and localised traffic such as 4.9 GHz, deployment of cells on wheels (COWs) and the potential for increased use of commercial services.⁶

4.6 In an October 2012 publication regarding its initiatives and decisions, the ACMA noted the following in relation to the provision of spectrum:

Throughout the PSMBSC process, it has been recognised that no amount of spectrum used by a conventional cellular network is likely to satisfy a localised, short-notice spike in 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 try and dimension spectrum provisions around what might be a once-in-a-generation event. Instead, the ACMA has identified other ways to increase capacity that are likely to be more effective in practice.⁷

4.7 The same publication noted that the ACMA did not consider it appropriate to provide high value spectrum for rare contingencies such as worst case events. Mr Cheah of the ACMA noted its opinion in March 2013 that 10 MHz was sufficient for the scenarios modelled including regional disaster responses. He continued that if the ACMA provided double the spectrum for the worst case contingency, 'the evidence shows that in the absence of such an event occurring, the additional 10 MHz of spectrum would be largely underutilised'. Mr Cheah concluded that:

Given the rarity of this event occurring, this could mean that 10 MHz of spectrum in the 800 MHz band would effectively lie fallow permanently.⁸

4.8 The ACMA's allocation of 10 MHz was supported by other witnesses to the inquiry including the Australian Mobile Telecommunications Association (AMTA) which recognised that 10 MHz as likely to exceed the modelled requirements of a nationally interoperable PSMB capability.⁹ AMTA held the view that as the ACMA's modelling showed that 20 MHz would not be sufficient for a 'once-in-a-generation' event, the likelihood of such an event 'means that it would be ineffective and irresponsible to allocate more than 10 MHz of spectrum to cater for such a worst case scenario'.¹⁰

6 Australian Communications and Media Authority, *Submission 7*, p. [3]; Australian Communications and Media Authority, *Spectrum for public safety radiocommunications, Current ACMA initiatives and decisions*, October 2012, p. 14.

7 Australian Communications and Media Authority, *Spectrum for public safety radiocommunications, Current ACMA initiatives and decisions*, October 2012, p. 14.

8 The Australian Communications and Media Authority and the Public Safety Sector—speech by ACMA Authority Member Chris Cheah to the Association of Public-Safety Communications Officials (APCO) Australasia 10th Annual Conference, Adelaide, 13 March 2013, http://www.acma.gov.au/webwr/assets/main/lib550085/apco-mar_2013_chris_cheah_speech.pdf (accessed 10 July 2013).

9 Australian Mobile Telecommunications Association, *Submission 6*, p. 2.

10 Australian Mobile Telecommunications Association, *Submission 6*, p. 6.

Concerns raised with the scenarios considered by the ACMA

4.9 The governments of Western Australia, the ACT, Victoria and NSW highlighted that a PSMB capability must meet both business-as-usual operational needs and support responders effectively when crisis events occur.¹¹ These jurisdictions, as well as the NSW Police Service and the PFA, were consistent in their position that the ACMA's proposed allocation was based on a business-as-usual approach which had not taken into account the growth in demand for PSA services, rapid technological change including the development of PSMB applications, as well as large-scale or major events such as a terrorist incident or serious natural disaster.¹² The involved jurisdictions urged the allocation of an additional spectrum to the current 10 MHz reservation as soon as practicable and no later than 2020.¹³

4.10 In their February 2013 joint submission to the SCPEM and the ACMA, the governments of NSW, ACT, Queensland, South Australia, Tasmania, Victoria and Western Australia identified three factors that would result in a greater PSA demand for business-as-usual mobile broadband including growth in PSA numbers, operational demand for PSA applications, and the likely evolution of PSA mobile broadband applications and their associated users. The following section details these considerations as well as other evidence which raised concerns regarding the ACMA's allocation of 10 MHz of spectrum and the consequences for public safety.

Business-as-usual demands and population growth

4.11 According to the submissions of the WA, ACT, Victorian and NSW governments, experience in the United States of America (USA), Canada and parts of Europe indicates that 10 MHz of spectrum does not provide sufficient bandwidth for incidents that occur 'on a daily basis'.¹⁴

4.12 The PFA raised concerns that the 10 MHz provides for spectrum for day-to-day work when nothing goes wrong.¹⁵ PFA Consultant, Mr Robert Waites argued that 10 MHz will provide agencies who seek to conduct their day-to-day business at the same time with 'insufficient broadband spectrum'. Mr Waites provided an example of New Year's Eve events:

Already if you look at the major events in any capital city in Australia, and I talk personally because I was the commander of the city in Sydney for five years, on New Year's Eve data systems collapse currently. They collapse because of congestion.

11 Western Australian Government, *Submission 4*, p. 1; ACT Government, *Submission 12*, p. 1; Victorian Government, *Submission 15*, p. 1; NSW Government, *Submission 16*, p. 1.

12 Western Australian Government, *Submission 4*, p. 1; ACT Government, *Submission 12*, p. 1; Victoria Government, *Submission 15*, p. 1; NSW Government, *Submission 16*, p. 1; NSW Police Force, *Submission 17*, p. 1; Police Federation of Australia, *Submission 2*, pp. 3 & 6.

13 Western Australian Government, *Submission 4*, p. 2.

14 Western Australian Government, *Submission 4*, p. 2; ACT Government, *Submission 12*, p. 2; Victorian Government, *Submission 15*, p. 2; NSW Government, *Submission 16*, p. 2.

15 Police Federation of Australia, *Submission 2*, p. 6.

If you have the same sort of scenario with the emergency services working on New Year's Eve, just in the inner city of Sydney, again, they will not be able to operate.¹⁶

4.13 Mr Waites of the PFA explained that from an operational perspective, the provision of 10 MHz would also mean that many first responders will not be able to get the data they require to make predictions regarding security at public events. Mr Jim Hewitt, Representative of the NCCGR, who noted that most people have 10 to 20 MHz coming into their own homes on their own asymmetric digital subscriber line (ADSL) accounts, explained that every responder who turns up to deal with a public safety incident has to share four to five MHz. Thereafter, once that share is divided up into video streams and moving GIS files (geographical information) which are substantial, the capability is going to get used up quickly. Mr Hewitt provided an example of an industrial fire that occurred in North Canberra in September 2011 whereby:

In that sort of situation you are moving mapping products out to the people in the field. You are designating where roadblocks are going to be. You are designating where plumes of smoke, possibly poisonous smoke, are going. You are designating evacuation areas. Met data is being pumped into those sorts of products. It is all going backwards and forwards from the responders and from our headquarters in Fairbairn.¹⁷

4.14 By contrast, however, Mr Waites of the PFA argued that 20 MHz would enable all responders to get the same sort of data level at all times. Furthermore, he asserted that 20 MHz would enable PSAs to effectively utilise technology such as body cameras which enable the recording of facial recognition, numberplates and building location information. Similarly, the utilisation of body biometrics would enable PSAs to monitor the wellbeing of first responders such as police officers as well as fire officers under stress during emergencies. Without the capacity to apply such technology in a timely way, agencies will not be able to understand the difficulties and stresses that their officers are undergoing.¹⁸

4.15 Assistant Commissioner Peter Barrie of the NSW Police Force explained that there were two key operational capability considerations:

The first and foremost is that to restrict to five plus five will have a significant impact on anything you want to do other than business as usual. That makes it very difficult to rely on that kind of service in terms of response to mission critical events...The second...is perhaps the difference in the quality of images that might be reasonably obtained without massive investment in infrastructure. An image of poor quality is going to be of very limited value to you, for example in the scenario...of the bank robber. In one image you might not be able to see a firearm and in the other image you would quite clearly see the firearm and the nature of it. That can have a

16 Mr Robert Waites, PFA, *Committee Hansard*, 17 June 2013, p. 3.

17 Mr Jim Hewitt, NCCGR, *Committee Hansard*, 24 June 2013, p. 36.

18 Mr Robert Waites, PFA, *Committee Hansard*, 17 June 2013, p. 4.

significant value to us in being able to assess what the capability of that person is and what threat they pose—is it a .22 or is it a more significant firearm of high capacity, but also in terms of our ability to bring in experts into a scene from a virtual perspective. There would be limited value, I would suggest, in bringing a forensic expert in to assess a scene based on a poor quality image. It is certainly going to be difficult to produce that in evidence because there would be some conjecture about what that image actually depicted, and certainly there would be some difficulty in the expert giving a rational position based on what they could see.¹⁹

4.16 Assistant Commissioner Barrie held the view that by considering business as usual and once-in-a-generation events, the ACMA had excluded events that occur in between. He maintained that it is the response to all of the events that occur 'in between' that provides the evidence to support the consistent argument of the police force sustained over the past three years that PSAs require 20 MHz to be able to respond.²⁰

4.17 The PFA argued that business-as-usual activities assume that only a limited number of police response teams and personnel are involved in communications, including between incident control centres and the incident site.²¹ Yet, the business-as-usual mobile demands of PSAs will continue to grow as demand for the services of PSAs increase for reasons including population growth, increased adoption of mobile data services by PSAs and the evolution of PSA mobile broadband applications. The WA Government and other jurisdictions noted that this growth is reflected in international comparisons, particularly in the USA, Canada and parts of Europe.²²

4.18 The jurisdictions argued that there will be a natural growth in the number of PSA units as Australia's population grows and demand for public safety services subsequently increases.²³ In the ten years to 30 June 2007, the average annual population growth rate in Australia was 1.4 per cent while in the 2011–12 financial year, Australia's population increased by 1.6 per cent to approximately 22.68 million.²⁴ The Australian Bureau of Statistics projects that by 2026, the Australian population will have grown to between 25.9 million and 28.7 million.²⁵

19 Assistant Commissioner Peter Barrie, NSW Police Force, *Committee Hansard*, 17 June 2013, p. 15.

20 Assistant Commissioner Peter Barrie, NSW Police Force, *Committee Hansard*, 17 June 2013, pp 15–16.

21 Police Federation of Australia, *Submission 2*, p. 6.

22 Western Australian Government, *Submission 4*, p. 1; ACT Government, *Submission 12*, p. 1; Victorian Government, *Submission 15*, p. 1; NSW Government, *Submission 16*, p. 1.

23 Western Australian Government, *Submission 4*, Attachment 2, p. 6.

24 Western Australian Government, *Submission 4*, Attachment 2, p. 6.

25 Australian Bureau of Statistics cited in Western Australian Government, *Submission 4*, Attachment 2, p. 6.

4.19 While the size of PSAs will grow to meet the needs of the growing Australian population, respective Australian governments may also create new PSAs (in the future) which will need access to the PSMB network.

Development of PSMB applications and capabilities

4.20 Law enforcement and other PSAs are in the early stages of mobile broadband use. Growth factors not only include increasing demand for public safety services but also the take-up of mobile data services as well as the development of new PSMB applications for law enforcement and other emergency services.²⁶ Gibson Quai-AAS noted that once new mobile data services become available in operational environments, 'the demand increases rapidly and often significantly exceeds the original estimates of demand'.²⁷ Similarly, Mr Greg Bouwmeester, Southern Area Sales Manager of Motorola Solutions, explained that a 2012 practical demonstration of spectrum capacity set up by Motorola and the Western Australian Police in Perth proved that once PSAs have the opportunity to see what the technology was capable of, and to look at the applications, their understanding and appreciation of how such capabilities could operate in real circumstances 'tended to evolve and change'.²⁸ Mr Hewitt of the NCCGR further observed that while extensive modelling and engineering can be carried out, it was not until PSAs are in the field that they discover that they have inadequate bandwidth.²⁹

4.21 In their joint submission to the SCPEM and the ACMA in February 2013, the states and territories noted that the data demand figures considered by the ACMA were estimates derived from data provided by PSAs in 2011 which projected their operational requirements for mobile broadband to 2020. The Gibson Quai-AAS report, which drew on the evidence provided by the PSAs, recognised that PSAs were in the early stages of developing operational models and business plans that can leverage off the capabilities of mobile broadband services and particularly services such as video.³⁰ As these projections were likely to evolve and change over time, Gibson Quai-AAS noted that such changes should be taken into account.³¹

4.22 Consideration of projected demand was noted by a 2011 Canadian study which projected public safety data demand 20 years ahead. The study's authors argued

26 Police Federation of Australia, *Submission 2*, p. 5.

27 Gibson Quai-AAS Consulting, *Public Safety Mobile Broadband Demand Requirements*. For Public Safety Mobile Broadband Steering Committee, Final Report, November 2011, p. 26, http://www.dbcde.gov.au/_data/assets/pdf_file/0007/148777/A024-2012_-_Document_1.pdf (accessed 10 July 2013).

28 Mr Greg Bouwmeester, Motorola Solutions, *Committee Hansard*, 24 June 2013, p. 31.

29 Mr Jim Hewitt, NCCGR, *Committee Hansard*, 24 June 2013, p. 35.

30 Gibson Quai-AAS Consulting, *Public Safety Mobile Broadband Demand Requirements*. For Public Safety Mobile Broadband Steering Committee, Final Report, November 2011, p. 26.

31 Gibson Quai-AAS Consulting, *Public Safety Mobile Broadband Demand Requirements*. For Public Safety Mobile Broadband Steering Committee, Final Report, November 2011, p. 2.

that 10 + 10 MHz was insufficient to support the needs of PSAs in the ten to fifteen year horizon.³² It was observed that:

The result of the modeling, taking into account uncertainty factors, shows that the amount of bandwidth required to satisfy the needs of public safety to conduct their missions during commonly re-occurring major emergency situations with modern tools and applications is greater than 20MHz in the near-to-mid term, and likely to also exceed 20MHz in the long term, despite advances in technology. Clearly even with the full 10 + 10 MHz allocated, the community will need to take measures to efficiently manage broadband data communications carefully during periods of peak demand.³³

4.23 Mr Tony Sheehan, Deputy Secretary of the AGD acknowledged the difficulties in judging what further efficiencies will be achieved in 2015–16 through the lens of 2012–13 technology.³⁴ Similarly, Mr Keith Besgrove, First Assistant Secretary, DBCDE explained that:

The whole purpose of this work is to develop a future capability that does not currently exist in Australia.³⁵

4.24 In an article in *CommsWire* dated 14 March 2013, Mr Graeme Philipson stated that a 'consensus is emerging' that the allocation of 10 MHz of bandwidth in the ACMA's spectrum allocation is 'insufficient' for Australia's emergency services. He argued that more will be needed to handle new applications such as predictive policing which rely on large volumes of data (called Big Data) and high bandwidth applications such as video monitoring to work effectively. The article cites Motorola's Senior Vice President for Government, Mr Bob Schassler who stated that 20 MHz was needed to address the wireless data explosion in emergency services.³⁶

32 Defence Research and Development Canada – Centre for Security Science, *700 MHz Spectrum Requirements for Canadian Public Safety Interoperable Mobile Broadband Data Communications*, 28 February 2011, p. 46, <http://www.citig.ca/Data/Sites/1/action700/700mhztechnicalassessmentofpsrequirementsv09final!public.pdf> (accessed 11 July 2013).

33 Defence Research and Development Canada – Centre for Security Science, *700 MHz Spectrum Requirements for Canadian Public Safety Interoperable Mobile Broadband Data Communications*, 28 February 2011, p. iv.

34 Mr Tony Sheehan, AGD, *Committee Hansard*, 24 June 2013, p. 4.

35 Mr Keith Besgrove, DBCDE, *Committee Hansard*, 24 June 2013, p. 24.

36 Mr Graeme Philipson, 'Enough bandwidth for our emergency services?', *CommsWire*, 14 March 2013, p. 3, http://dpl/Ejournals/CommsWireDaily/No.953_14March2013.pdf (accessed 4 June 2013).

4.25 Mr Schassler was quoted as stating that:

We see a tenfold increase in bandwidth growth in emergency services in the next few years. Public safety and emergency services have a very different usage profile than most other users of high bandwidth. There are hotspots geographically and peaks by time, both of which vary enormously. And upload is as important as download.³⁷

4.26 Deputy Commissioner Phelan of the AFP also emphasised that the growth of PSA requirements in terms of use of broadband spectrum in the future has the potential to reach well beyond the capacity of a 10 + 10 MHz spectrum provision. He explained that:

The amount of information that is going to be available to us in terms of the size of files, the amount of information that is available to transmit, we will need that capability into the future, and if we do not take the opportunity to harvest it now we will be back here in five years time asking someone else to reharmonise another spectrum again so we can find some spectrum just so we can keep the country safe. It seems to me that while we have the opportunity we should be doing it now.³⁸

4.27 The joint states and territories submission to the SCPEM and the ACMA also highlighted the evolution of PSA mobile broadband applications and their associated usage. In 2011, the ACMA estimated that between 2007 and 2014, there would be a 30-fold increase in mobile broadband demand in Australia.³⁹ Drawing on this evidence, the states and territories argued that the PSA's business-as-usual demand profile could increase at the same rate as that for the commercial sector. Moreover:

Even a modest sustained growth rate in data demand would impact on the adequacy of the ACMA's PSMB spectrum decision for PSAs' future needs. If, for example, PSAs' business-as-usual demand profiles increases by 5 per cent per annum, LTE technology advances are unlikely to keep pace with such growth year on year and future bandwidth allocation will be necessary.⁴⁰

4.28 In terms of the rapid growth and usage of mobile technology, Ericsson stated that globally, the number of mobile broadband subscriptions had grown by an estimated 45 per cent over the past twelve months, amounting to around 1.7 billion at present. Furthermore, mobile broadband continues to drive strong traffic growth with mobile data expected to grow at a compound annual growth rate of approximately 50 per cent which will mean that data will grow by twelve times between 2012 and 2018.⁴¹ This evidence was supported by a Deloitte study which noted that the demand

37 Mr Bob Schassler cited in Mr Graeme Philipson, 'Enough bandwidth for our emergency services?', *CommsWire*, 14 March 2013, p. 4, http://dpl/Ejournals/CommsWireDaily/No.953_14March2013.pdf (accessed 4 June 2013).

38 Deputy Commissioner Michael Phelan, AFP, *Committee Hansard*, 17 June 2013, p. 18.

39 The ACMA cited in Western Australian Government, *Submission 4*, Attachment 2, p. 7.

40 Western Australian Government, *Submission 4*, Attachment 2, p. 7.

41 Ericsson, *Submission 3*, p. 3.

for bandwidth will be tested further by exponential growth rates in mobile data usage across the community and the PSAs.⁴²

4.29 Orange Horizons Pty Ltd made the point that while the PSAs have not had experience with the facilities offered by mobile broadband and or any substantive understanding of how it will be used in the future, public carriers have been forecasting on their predicted needs for years. According to Orange Horizons, however, each time they prepare forecasts of usage they have found that the actual demand has far exceeded their initial estimates and that there is no reason to believe that the situation will be different with emergency services.⁴³ At the same time, Orange Horizons noted that present estimates of usage are most likely to be 'well short' of the actual requirements in the years to come'. Furthermore:

It would be a very short-sighted view to limit the amount of spectrum to the proposed 2 x 5 MHz blocks based on meeting current usage without having sufficient spectrum in reserve to meet actual demands in the future; this decision could have a serious impact on future emergency management capabilities.⁴⁴

4.30 As the applications field is very fluid and as the PSMB networks are installed around the world, more specific applications will become available, many of which will involve actual users influencing the software and its effects.⁴⁵ Ericsson noted in this regard that LTE is the first truly global mobile technology and has achieved vast global scale in a few short years since being launched in Norway and Sweden in December 2009. According to Ericsson, it is widely acknowledged that 'LTE is the fastest growing ecosystem, ever'.⁴⁶

4.31 Mr Hewitt of the NCCGR highlighted the rapid changes in demand for data by drawing on the example of hard drives whereby 20 years ago, the expectation was that 'we would never fill one meg hard drive' and yet now terabytes are sitting on our personal computers.⁴⁷ He noted that a similar phenomenon has taken place with regard to data series on mobile phones and so:

Once people understand what they can do with this technology, and the fact that they have a bearer they can use, applications will start popping up all over the place and they will chew the capacity up quickly.⁴⁸

42 Deloitte, Emergency Services Long Term Strategic Plan. International Public Safety Broadband, 23 February 2013, p. 2 available as NSW Government, *Submission 16*, Attachment 2, p. 2.

43 Orange Horizons Pty Ltd, *Submission 1*, p. [2].

44 Orange Horizons Pty Ltd, *Submission 1*, p. [2].

45 Orange Horizons Pty Ltd, *Submission 1*, p. [4].

46 Ericsson, *Submission 3*, p. 10.

47 Mr Jim Hewitt, NCCGR, *Committee Hansard*, 24 June 2013, p. 37.

48 Mr Jim Hewitt, NCCGR, *Committee Hansard*, 24 June 2013, p. 37.

4.32 The Association of Public-Safety Communications Officials (APCO) Australasia expressed the view that the communications capability of the general public has, for the first time, exceeded that of the PSAs largely on the basis of the availability of broadband technologies and a willingness to exchange information through various channels on a 'real time always connected basis'. APCO Australasia further highlighted that the environment was one in which the rate of change in technologies, need to share infrastructure and risk allocation as well as the potential use of different procurement models and need to at least keep pace with the communication capabilities of the public will have an impact on the PSAs and their budgets which is yet to be determined.⁴⁹ Similarly, Mr Schassler of Motorola Solutions was cited as acknowledging that once the bandwidth was allocated, it can never be taken back while:

As it is, at the moment our kids have better technology than our emergency services. We need to prioritise public safety, and make sure it doesn't miss out on the mobile and Big Data revolution. Every dollar spent on public safety returns five dollars to the community.⁵⁰

Major urban incidents and 'once-in-a-generation' events

4.33 Submitters voiced concern with the ACMA's analysis of major urban incidents and 'once-in-a-generation' events. In particular, they pointed to the increasing frequency of natural disaster and growing terrorism threat. The WA Government, for example, asserted that spectrum allocation must take into account demand for major urban incidents including the likelihood of a major urban incident such as a terrorist attack, natural disaster (particularly given the growing frequency of such events) or security operation for an international event.⁵¹ The WA Government argued that the ACMA did not provide sufficient spectrum for these types of events on the basis that it is not appropriate to provide high value spectrum for 'rare' contingencies. However, many state and territory jurisdictions did not support the ACMA's view that such incidents were rare contingencies or once-in-a-generation events.⁵² The joint February 2013 submission of states and territories requested that the ACMA revisit its assessment and consider further evidence in relation to natural disasters, terrorist attacks, security operations for international events, and small and medium-scale incidents.⁵³

4.34 Evidence also suggested that, what ACMA considered once-in-a-generation events, in fact occur far more frequently. The National Strategy for Disaster Resilience highlighted that Australian communities face devastating losses caused by

49 APCO Australasia, *Submission 5*, pp 3–5.

50 Mr Bob Schassler cited in Mr Graeme Philipson, 'Enough bandwidth for our emergency services?', *CommsWire*, 14 March 2013, p. 4, http://dpl/Ejournals/CommsWireDaily/No.953_14March2013.pdf (accessed 4 June 2013).

51 Western Australian Government, *Submission 4*, p. 2.

52 Western Australian Government, *Submission 4*, p. 2.

53 Western Australian Government, *Submission 4*, Attachment 2, p. 8.

disasters every year.⁵⁴ COAG's National Disaster Resilience Statement of December 2009 noted the 'increasing regularity and severity of natural disasters'.⁵⁵ Furthermore, the National Framework to Improve Government Radiocommunications Interoperability endorsed by COAG, noted that the 'impacts of climate change and the continuing threat of terrorism are likely to increase the trend towards inter-jurisdictional operations'.⁵⁶ In support of this finding, the AGD noted that in the fifteen years since 1994, inter-jurisdictional responses had been required on average every 2.5 years.⁵⁷

4.35 The PFA and the NSW Police Force observed that the once-in-a-generation scenario has already taken place six times in the last four years.⁵⁸ This evidence was also supported by Deloitte which noted that research has shown that large scale disasters are no longer once-in-a-generation events, but rather 'growing in frequency and severity'.⁵⁹ During various natural disasters which occurred between November 2010 and February 2011, more than 99 per cent of Queensland was disaster-declared while all other states and the Northern Territory experienced severe weather events or other natural disasters such as bushfires.⁶⁰ According to the joint states and territories submission to the SCPEM and the ACMA:

The evidence of increasing frequency and severity of natural disasters appears to be at variance with the ACMA's assessment that demand profiles for such incidents should be excluded from 800 MHz band decisions as such events might only occur in major urban areas "once in a generation".⁶¹

4.36 In relation to terrorism, the Australian Government has recognised the threat of terrorism as a persistent and permanent feature of Australia's security

54 Council of Australian Governments, *National Strategy for Disaster Resilience*, February 2011, Foreword, p. iii, <http://www.em.gov.au/Documents/1National%20Strategy%20for%20Disaster%20Resilience%20-%20pdf.PDF> (accessed 19 June 2013).

55 Council of Australian Governments, *National Strategy for Disaster Resilience*, February 2011, p. iv, <http://www.em.gov.au/Documents/1National%20Strategy%20for%20Disaster%20Resilience%20-%20pdf.PDF> (accessed 19 June 2013).

56 *National Framework to Improve Government Radiocommunications Interoperability, 2010–2020*, National Coordinating Committee for Government Radiocommunications, 2009, p. 2, <http://www.em.gov.au/Documents/Nationa%20Framework%20to%20Improve%20Government%20Radiocommunications.pdf> (accessed 19 June 2013).

57 Mr Tony Sheehan, AGD, *Committee Hansard*, 24 June 2013, p. 1.

58 Mr Vince Kelly, PFA, *Committee Hansard*, 17 June 2013, p. 5; Assistant Commissioner Peter Barrie, NSW Police Force, *Committee Hansard*, 17 June 2013, p. 15.

59 Deloitte, *Emergency Services Long Term Strategic Plan, International Public Safety Broadband*, 26 February 2013, p. 1. Available as NSW Government, *Submission 16*, Attachment 2.

60 Western Australian Government, *Submission 4*, Attachment 2, p. 9.

61 Western Australian Government, *Submission 4*, Attachment 2, p. 9.

environment.⁶² The 2013 National Security Strategy identified terrorism as a 'persistent threat' and key national security risk.⁶³ According to the Victorian Government, ACT Government and other states, however, the threat assessments and respective investment in counter-terrorism capability development and maintenance by Australian governments 'appears inconsistent with the ACMA's determination that it would be inappropriate to provide high value spectrum' for these worst case events.⁶⁴ The jurisdictions further noted that there are other security-related tasks which are expected to impose high demands on mobile broadband including the future G20 security operation. They argued that while it is possible to provide for such events through 'detailed planning and engagement with commercial carriers', an appropriately resourced PSMB network will reduce the reliance upon commercial carriers to 'deploy additional infrastructure to meet demand and mitigate the associated operational risks'.⁶⁵

4.37 The jurisdictions also raised concern that by not considering large-scale incidents, the ACMA had 'effectively disregarded' the demand profiles of small and medium-scale incidents as the revised upper demand limit became those of the business-as-usual and planned event demand profiles. They noted in this regard that:

The demand profiles for small and medium-scale incidents are expected to exceed those of business-as-usual operations but to be less than those of large-scale incidents (i.e. a middle range). Additional data demand of planned events will be able to be more readily addressed through pre-deployment of COWS than is possible during emergencies. The omission of these demand profiles is of concern to jurisdictions as small and medium-scale incidents regularly occur—for example, PSAs respond to numerous small-scale emergencies each year.⁶⁶

4.38 The NSW Police Force explained that this will significantly restrict the capacity of operational communications in responding to a range of common scenarios in a timely and effective manner.⁶⁷ To support their argument further, the jurisdictions cited the findings of a 2011 Canadian PSMB study which concluded that, with spectral efficiency improvements, a 20 MHz allocation could be sufficient for a

62 Australian Government, *Counter-Terrorism White Paper: Securing Australia—Protecting our Community*, 2010, Executive Summary, p. ii, http://www.dpmc.gov.au/publications/counter_terrorism/docs/counter-terrorism_white_paper.pdf (accessed 8 July 2013).

63 Department of the Prime Minister and Cabinet, *Strong and Secure: A Strategy for Australia's National Security*, January 2013, pp i – ii, http://www.dpmc.gov.au/national_security/docs/national_security_strategy.pdf (accessed 8 July 2013).

64 Victorian Government, *Submission 5*, Attachment 2, p. 11; ACT Government, *Submission 12*, Attachment 2, p. 11.

65 Western Australian Government, *Submission 4*, Attachment 2, p. 11; ACT Government, *Submission 12*, Attachment 2, p. 11; NSW Government, *Submission 16*, Attachment 1, p. 11.

66 Western Australian Government, *Submission 4*, Attachment 2, p. 12.

67 NSW Police Force, *Submission 17*, p. 1.

PSA response to small-scale incidents such as severe multi-vehicle accidents, train derailments and aircraft emergency landings.⁶⁸

Motorola Solutions and Western Australia Police LTE mobile network

4.39 As previously noted, the Gibson Quai-AAS report found that once new mobile data services become available in operational environments, 'the demand increases rapidly and often significantly exceeds the original demand estimates.'⁶⁹ In light of this evidence, the committee considered the importance of operational testing. It drew on the evidence from Motorola Solutions which, in cooperation with the Western Australian Police, established a single-site LTE mobile network in Perth in mid-2012.

4.40 Motorola secured a temporary licence for the 700 MHz spectrum band from North America in Midland, Perth to run a field demonstration of its emergency service network equipment. Motorola Solutions explained that as PSAs were still trying to understand the usability of the technology, what it enabled and how it could be used in an operational sense, the demonstration provided an opportunity to set up a live network to run scenarios with equipment based on input given from PSAs.⁷⁰ The emergency scenarios including bush fires, floods, car accidents and other incidents and the staged area was approximately 1.5 kilometres from the site (or tower) because it represented the middle of the cell coverage, a typical type of scenario rather than on the edge of the cell coverage under the maximum bandwidth.⁷¹

4.41 Mr Greg Bouwmeester, Southern Area Sales Manager for Motorola Solutions explained the tests:

We ran a number of predictions based on the site in Mainlands, which were run both at 10 megahertz and at five megahertz. It was operated at a particular loading. The assumption on those plots is that you are constantly streaming data at about 700 kilobits per second—the sort of bandwidth you would require when transmitting video. We were able to demonstrate running that video at the various bandwidths. What you find is that when you switch from a 10 megahertz bandwidth—or a 10 plus 10, a 20 megahertz; I need to be careful with my terminology here—you have a bigger pipe. You can send more data. In the last scenario we ran, which was a multi-agency scenario, where we had video going between police, fire and ambulance, when we chose to switch it down to five megahertz, effectively the capacity dropped down and you started having images freezing or not coming through.⁷²

68 Western Australian Government, *Submission 4*, Attachment 2, p. 12.

69 Gibson Quai-AAS Consulting, *Public Safety Mobile Broadband Demand Requirements*. For Public Safety Mobile Broadband Steering Committee, Final Report, November 2011, p. 26, http://www.dbcde.gov.au/data/assets/pdf_file/0007/148777/A024-2012_-_Document_1.pdf (accessed 10 July 2013).

70 Mr Greg Bouwmeester, Motorola Solutions, *Committee Hansard*, 24 June 2013, p. 28.

71 Mr Greg Bouwmeester, Motorola Solutions, *Committee Hansard*, 24 June 2013, p. 28.

72 Mr Greg Bouwmeester, Motorola Solutions, *Committee Hansard*, 24 June 2013, p. 28.

4.42 ZDNet reported that:

In a single scenario, the company demonstrated multiple users accessing varying degrees of video streaming from different locations over an LTE network. With more users on the network, congestion became a major issue.

For this reason, the company said that, not only should emergency services have their own dedicated network, it should also utilise 20MHz of spectrum (as has been done in the US) rather than just 10MHz.⁷³

4.43 Motorola Solutions noted that where PSAs are trying to run video and related applications either greater bandwidth or more sites is required. However, Mr Bouwmeester explained that:

By having a 10 plus 10, you have access to that bandwidth and you can actually achieve these things. If you reduce to five plus five, either you will not get the bandwidth through or you will have to put more sites in.⁷⁴

4.44 Mr Bouwmeester also noted that if an incident is in a localised area then having multiple sites does not necessary provide greater capacity if PSAs are accessing only one site. He asserted that where fifteen agencies or applications are accessing one site, whether or not they have another site next door makes no difference, as they are still limited in the capacity that they can use.⁷⁵

4.45 The PFA provided four maps of the exercise.⁷⁶ Maps 1 and 2 depicted 20 subscribers and 15 subscribers at 5 MHz + 5 MHz whereas maps 3 and 4 depicted 20 and 15 subscribers at 10 + 10 MHz. Mr Waites of the PFA explained that 20 subscribers is not unusual for a major traffic accident. For example, police, fire and ambulance officers will attend an accident such as the rollover of a petrol tanker or chemical tanker. During such an event, 20 first responders will be trying to access data from their own service databases (or gazeteer) which contain relevant information such as maps, details about chemicals, utilities and related matters which are required to respond effectively and safely. The maps revealed that a total of 20 MHz (10 + 10 MHz) makes what Mr Waites described as a 'massive difference' to those responding, both in the area of coverage and in terms of the power of coverage.⁷⁷

4.46 The demonstrations revealed a 'noticeable jump in quality' when public safety agencies were allocated a 10 MHz + 10 MHz chunk of bandwidth, as opposed to 5 MHz + 5 MHz. Of the results, Mr Starr argued that:

73 Josh Taylor, 'Motorola pushes for extra spectrum for emergency services, *ZDNet*, 11 October 2012, <http://www.zdnet.com/au/motorola-pushes-for-extra-spectrum-for-emergency-services-7000005649/> (accessed 31 May 2013).

74 Mr Greg Bouwmeester, Motorola Solutions, *Committee Hansard*, 24 June 2013, p. 28.

75 Mr Greg Bouwmeester, Motorola Solutions, *Committee Hansard*, 24 June 2013, p. 28.

76 Police Federation of Australia, Additional information received at 17 June 2013 public hearing, http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Committees?url=le_ctte/spectrum_mobile_broadband/submissions.htm.

77 Mr Robert Waites, PFA, *Committee Hansard*, 17 June 2013, p. 3.

A purpose-built broadband network gives the coverage and capacity required, but also the ability to control and prioritise traffic.⁷⁸

4.47 Motorola Solutions has consistently argued that the 700 MHz spectrum should be reserved for public safety organisations as video streaming becomes increasingly important for dealing with crisis situations.⁷⁹

Resourcing law enforcement

4.48 Evidence to the committee from law enforcement underscored the importance of accessing accurate, timely and coherent audio and visual information. This concern was clearly demonstrated in two images provided by Motorola Solutions (below). The images reveal the difference between 10 and 20 MHz from the perspective of law enforcement operations.

Figure 4.1: 10 MHz of Spectrum and 20 MHz of Spectrum

10 MHZ OF SPECTRUM	20 MHZ OF SPECTRUM
	
SITUATIONAL AWARENESS	STRATEGIC DECISION ENABLING

Source: Motorola Solutions, Submission 10, p. [5].

78 Mr Gary Starr cited in Brett Winterford, 'Five-year delay on 800 MHz emergency networks', *itnews*, 12 October 2012.

79 Spandas Lui, 'Motorola: Save the 700 MHz spectrum for public safety', *Australian Reseller News*, 2 March 2011, http://www.arnnet.com.au/article/378447/motorola_save_700mhz_spectrum_public_safety/ (accessed 5 June 2013).

4.49 Mr Bouwmeester from Motorola Solutions explained that the quality of the image will dependent on bandwidth and data throughput. Furthermore:

The best way to explain the five versus 10 is in relation to the size of a pipe that you can put stuff down. If you have a pipe of a particular size and you have full access to that, yes, you can put high-quality video or image through. The reality, in the real world, is that you do not have one single user on a pipe; you have multiple users. The demonstration there was to say: if I had a pipe of a defined size—let us say it was a five-megahertz pipe—and I had lots of data going through it and I wanted to try and transmit that image, in five megahertz, because I am restricted by that pipe, I can only get that sort of resolution. If I had a bigger pipe, I could send a higher resolution image.⁸⁰

4.50 Mr Bouwmeester noted that regardless of the size of the pipe, it can overload and overflow will occur and users may be kicked off. The underlying premise, however, is that if the pipe is small to start with then capacity will be exceeded significantly faster.⁸¹

4.51 Police agencies noted that the information provided of such a scene could be critical to determining how best to respond. Mr Waites from the PFA explained that the difference for policing operations between the two images was that of facial technology, the ability to identify the weapon as well as to recognise who had it and what they were doing with it. Mr Waites noted that:

The same sort of detail does not exist in the left-hand side. In fact, the left-hand side could be somebody doing anything. Unless you are already aware of some other information, you would not really be able to recognise exactly what that was, whereas on the right, you certainly can.⁸²

4.52 Mr Waites further highlighted that access to such information would ensure that there was no 'unnecessary reaction in the wrong way'. Without the detail made available in the photograph on the right, it would be difficult to determine whether the most appropriate response would be immediate action rather than 'contain and negotiate'.⁸³

Costs including infrastructure considerations

4.53 Another matter considered by the committee was the costs associated with the decision to allocate 10 MHz rather than 20 MHz of spectrum. In particular, it was noted that there may be greater infrastructure costs associated with a 10 MHz allocation. For example, the NSW Police Force expressed concern that the ACMA's multi-layered proposal provides added capacity through additional infrastructure

80 Mr Greg Bouwmeester, Motorola Solutions, *Committee Hansard*, 24 June 2013, p. 29.

81 Mr Greg Bouwmeester, Motorola Solutions, *Committee Hansard*, 24 June 2013, p. 29.

82 Mr Robert Waites, PFA, *Committee Hansard*, 17 June 2013, p. 3.

83 Mr Robert Waites, PFA, *Committee Hansard*, 17 June 2013, p. 3.

which is costly and inconsistent with the operating environment of public safety agencies.⁸⁴

4.54 In their joint submission to the SCPEM and the ACMA of February 2013, the ACT, NSW, Queensland, South Australia, Victoria and WA governments noted that, in relation to the option of network 'densification', there would be a significant cost trade-off in designing, building and operating a PSMB 10 MHz spectrum network compared to a network on a greater allocation of spectrum.⁸⁵ The jurisdictions argued that the estimated increase in network costs (to achieve equivalent capacity with a network dimensioned on 20 MHz of spectrum) is likely to be substantially more than the commercial value of the additional spectrum and would represent a significant cost shift from the Commonwealth to the states and territories.⁸⁶

4.55 Evidence from the Western Australian Government estimated an increase in capital and operating costs to provide, in the greater central business district area only, comparable total data capacity through a 10 MHz network rather than a 20 MHz network. The jurisdictions provided the following indicative cost differentials to make the point while noting that they are subject to refinement following further planning.

Figure 4.2: Indicative cost differentials over 15 years – selected jurisdictions

Jurisdiction	Indicative cost differential over 15 years (increase in costs for a 10 MHz network in comparison with a 20 MHz network)
ACT	40 per cent – 50 per cent
NSW	23 per cent
Queensland	25 per cent – 50 per cent
WA	20 per cent

Source: Western Australian Government, *Submission 4*, Attachment 2, p. 16.

4.56 The jurisdictions further explained that the indicative cost differentials for a 10 MHz network do not necessarily assume that jurisdictions will attain an equivalent data capacity throughout the entire coverage area to that of a 20 MHz network. They argued that to achieve an equivalent data capacity, the number of network sites would have to be approximately doubled and additional costs could be greater.⁸⁷

4.57 Mr Sheehan of the AGD acknowledged that the potential for greater costs in the construction of a dedicated capability in relation to a 10 MHz spectrum allocation

84 NSW Police Force, *Submission 17*, p. 1.

85 Public Safety Mobile Broadband, Joint States and Territories Submission to the SCPEM and the ACMA, Further Evidence from Jurisdictions, February 2013 submitted as Western Australian Government, *Submission 4*, Attachment 2, pp 5 and 16.

86 Western Australian Government, *Submission 4*, Attachment 2, p. 5.

87 Western Australian Government, *Submission 4*, Attachment 2, pp 16–17.

as opposed to 20 MHz was understood but noted that the ACMA was best placed to canvas cost questions.⁸⁸

4.58 The ACMA recognised that as a spectrum allocation grows, fewer base stations are needed. At the same time, however, it highlighted that as high value spectrum below 1 GHz is scarce, a trade off where spectrum is sacrificed to save on infrastructure should be avoided.⁸⁹ Furthermore, the ACMA highlighted that:

...the argument that spectrum and cell size can be traded against each other only applies to appropriate *dense* network topologies, ie. networks with reasonably closed spaced base stations, and not...large cell typology.⁹⁰

4.59 However, the states and territories held the view that the estimated increase in network costs (to achieve equivalent capacity with a network dimensioned on 20 MHz of spectrum) is likely to be 'substantially more than the commercial value of the additional spectrum' which would represent a 'significant cost shift from the Commonwealth to the States and Territories'.⁹¹ In terms of costs, Ericsson noted that the construction of physical infrastructure by way of towers and the sites themselves represent 80 per cent of the overall radio network costs compared to the 20 per cent on equipment.⁹² According to the jurisdictions, an approach requiring greater infrastructure density is suitable for market-oriented organisations such as commercial carriers which generate financial profits from their use of spectrum which can be reinvested in additional infrastructure and whose networks are designed for average usage throughout the network. In contrast, PSAs are focused on providing public services in order to protect lives and property and require, according to the jurisdictions, networks designed for peak usage in concentrated areas with a critical grade of service that exceeds that of commercial entities. Furthermore:

PSAs do not generate profits that can be reinvested in additional infrastructure. Any additional investment would need to come from State and Territory Governments and would involve diverting investment away from other community services that also produce a public benefit.⁹³

4.60 The ACMA is reported to have advised the PSAs that in order to ensure the data capacity required to support operations on a 10 MHz spectrum allocation, owners will need to increase the density of their fixed network sites and that a balance between the size of spectrum allocations and infrastructure investments is required.⁹⁴ The joint submission of the states and territories recognised, however, that any approach requiring greater infrastructure density would be better suited to commercial

88 Mr Tony Sheehan, AGD, *Committee Hansard*, 24 June 2013, p. 4.

89 Australian Communications and Media Authority, *Submission 7*, p. [8].

90 Australian Communications and Media Authority, *Supplementary Submission 7*, p.[3].

91 Western Australian Government, *Submission 4*, Attachment 2, p. 5.

92 Ericsson, *Submission 3*, p. 10.

93 Western Australian Government, *Submission 4*, Attachment 2, p. 18.

94 Western Australian Government, *Submission 4*, Attachment 2, p. 14.

organisations which generate profit from their use of spectrum. Furthermore, while commercial networks are designed for average use throughout the network, PSA networks are designed for peak usage in concentrated areas.⁹⁵ The jurisdictions also noted that:

Across the same coverage area, increasing fixed infrastructure density with a 10 MHz allocation can result in a comparable total data capacity as a greater allocation (e.g., in comparison to a 20 MHz allocation, through the doubling of network sites). However, multiple PSA responders at the point of operational need in a specific cell (or part of the cell) will not necessarily have access to the equivalent level of data capacity as they would with a greater spectrum allocation.⁹⁶

4.61 According to the jurisdictions, the Gibson Quai-AAS spectrum calculations across all demand profiles assume that PSA responders and demand were evenly distributed across the coverage area. However, the operational experience of PSAs indicates that responders more commonly operate in a cluster or series of clusters around the most critical point(s) of response. During mission-critical operations where the primary response of PSAs is concentrated around a relatively small area such as a train crash site, a greater allocation of spectrum is likely to better meet the operational needs of PSAs even if the infrastructure density has been increased. To achieve the equivalent total data capacity as a 20 MHz network site, two 10 MHz sites covering the same area would be required. According to the jurisdictions:

This would however, mean that the total data capacity is divided between 6, as opposed to 3, cell sectors, which reduces the amount of data accessible by responders at any given point. From a PSMB network perspective the clustering of responders around the incident site may well occur within a single cell sector—if this does occur responders could have immediate access to only 50 per cent of the data capacity with a 10 MHz network compared to a 20 MHz network.⁹⁷

4.62 Motorola Solutions made the point that while additional towers involve costs, there are other considerations including environmental impact as the community will resist densely populated towers.⁹⁸ Moreover, Motorola noted that if 5 + 5 MHz were allocated to PSAs, as a technology manufacturer, the company would actually sell more equipment.⁹⁹

4.63 The PFA argued that, while the Radiocommunications Act requires the ACMA to consider the needs of PSAs for the mission critical work they perform to protect life and property in times of disaster and emergencies, it is exactly when their

95 Western Australian Government, *Submission 4*, Attachment 2, p. 5.

96 Western Australian Government, *Submission 4*, Attachment 2, p. 14.

97 Western Australian Government, *Submission 4*, Attachment 2, p. 14.

98 Mr Paul Thompson, Motorola Solutions, *Committee Hansard*, 24 June 2013, p. 29.

99 Mr Greg Bouwmeester, Motorola Solutions, *Committee Hansard*, 24 June 2013, p. 29.

needs are most acute in the performance of this function that the spectrum proposed will be half of what is needed.¹⁰⁰ The PFA further argued that:

We believe that it is precisely the PSA needs in time of emergencies and natural disasters that the Act is directed at, and where the ACMA proposal falls seriously short.¹⁰¹

4.64 Similarly, the Victorian Government, NSW Government, ACT Government and WA Government argued that due consideration should be given to the concerns of jurisdictions when the overall value of spectrum for PSMB is calculated. Such concerns include:

- the higher level of operational risks to PSAs should spectrum allocation be insufficient;
- the opportunity costs of additional investments by state and territory governments in building a PSMB capability with a lower spectrum allocation; and
- the public safety benefit that a PSMB capability will provide to all Australians.¹⁰²

4.65 Another matter raised during the inquiry which was the subject of competing claims was that of contiguous spectrum. Mr Hewitt of the NCCGR informed the committee that contiguous spectrum was required by PSAs.¹⁰³ However, according to the ACMA, multi-carrier aggregation (notionally pairing a lower and higher band) is supported by the LTE standard. Yet, the ACMA noted that achieving multi-carrier aggregation would require 'additional complexity in the handset and base stations'.¹⁰⁴

Extraordinary access to additional spectrum

4.66 The ACMA raised the possibility of providing extraordinary access to additional spectrum under section 27 and Part 4.4 of the Radiocommunications Act. However, such a prospect raises questions regarding the resourcing of PSAs. The ACMA noted for example that under such an eventuality, PSAs would need to ensure that they have procured suitable equipment and infrastructure including handsets with appropriate chipsets and additional transmit and receive cards installed in base stations in order to enable the operation of additional spectrum.¹⁰⁵

4.67 The jurisdictions and law enforcement agencies raised concerns that the extreme circumstances provisions in the Radiocommunications Act are untested and unlikely to be able to provide surge capacity in the first few hours of response to a

100 Police Federation of Australia, *Submission 2*, p. 3.

101 Police Federation of Australia, *Submission 2*, p. 3.

102 Victorian Government, *Submission 15*, p. 2; NSW Government, *Submission 16*, p. 2; ACT Government, *Submission 12*, p. 2; Western Australian Government, *Submission 4*, p. 2.

103 Mr Jim Hewitt, NCCGR, *Committee Hansard*, 24 June 2013, p. 36.

104 Australian Communications and Media Authority, *Supplementary Submission 7*, p. 27.

105 Australian Communications and Media Authority, *Submission 7*, p. [6].

sudden-onset emergency when that capacity is most needed.¹⁰⁶ The NSW Police Force further noted that the legislative provisions are not a realistic mitigation strategy for addressing network capacity issues arising from periods of peak demand.¹⁰⁷

International experience

4.68 Motorola Solutions highlighted that the allocation of 20 MHz (10 + 10 MHz) is the standard globally while the PFA noted that 20 MHz for law enforcement is the prevailing minimum.¹⁰⁸ Similarly, Mr Hewitt of the NCCGR held that, based on overseas cases where such systems are currently being deployed, the universal understanding was that 20 MHz is the 'absolute minimum' that PSAs need to run a system effectively.¹⁰⁹ A number of European countries, for example, have concluded that a 10 MHz spectrum allocation will not provide sufficient bandwidth for incidents that occur on a daily basis and have either allocated or are considering the allocation of greater spectrum accordingly.¹¹⁰ At the same time, it should be noted that countries such as the USA and Canada commenced with an allocation of 5 + 5 MHz for PSMB but had to revisit the allocation and provide a total allocation of 10 + 10 MHz 'based on subsequent analysis of operational requirements'.¹¹¹

United States

4.69 Motorola Solutions noted that early in the development of LTE and a spectrum allocation to public safety organisations, the USA allocated what it thought to be an adequate amount of spectrum for LTE public safety broadband communications. The USA allocated 5 MHz (for uplink) + 5 MHz (for downlink). However, as the specifications for LTE were further developed and public safety agencies became more aware of the capabilities of LTE, the limitations of the 5 MHz + 5 MHz allocation became apparent.¹¹² Similarly, the PFA and various jurisdictions gave evidence that the allocated 10 MHz fell short of what they needed to communicate effectively.¹¹³ According to Motorola Solutions, after years of lobbying,

106 Western Australian Government, *Submission 4*, Attachment 2, p. 4; NSW Police Force, *Submission 17*, p. 3

107 NSW Police Force, *Submission 17*, p. 3.

108 Motorola Solutions, *Submission 10*, p. [4]; Police Federation of Australia, *Submission 2*, p. 4.

109 Mr Jim Hewitt, NCCGR, *Committee Hansard*, 24 June 2013, p. 35.

110 Deloitte, *Emergency Services Long Term Strategic Plan, International Public Safety Broadband*, 26 February 2013, p. 1. Available as NSW Government, *Submission 16*, Attachment 2.

111 Deloitte, *Emergency Services Long Term Strategic Plan, International Public Safety Broadband*, 26 February 2013, p. 1; Motorola Solutions, *Submission 10*, p. [4].

112 Motorola Solutions, *Submission 10*, p. [4].

113 Police Federation of Australia, *Submission 2*, p. 4; Western Australian Government, *Submission 4*, Attachment 2, p. 7.

an additional allocation for use by public safety agencies was provided with the USA allocating a total of 10 MHz + 10 MHz of spectrum to PSBB.¹¹⁴

4.70 However, evidence to the committee from the ACMA suggested that Australia differed to the USA, Europe and Canada in terms of population density and the number of first responders.¹¹⁵ Mrs Cahill of the ACMA further argued that the approach taken in Australia and the model applied to identify the spectrum needs of PSAs is specific to Australian conditions which do not provide for like-for-like comparisons.¹¹⁶ Yet, Orange Horizons challenged this evidence by noting that Australia's major cities rank in size as comparable to many of the larger cities in the United States which means that 'the demand for mobile broadband in our cities will be similar'. It noted that as data requirements are a result more of population density than national population, a similar location in Australia to the USA would be justified.¹¹⁷ Orange Horizons stated that where Australia diverges from the USA is in relation to data usage given that in Australia, most jurisdictions are state-based, requiring the need for data to be shared over larger areas and provided to state operation centres. According to Orange Horizons, this wider area of operations will result in a higher data usage in many areas as it is operated in parallel with other operational areas and agencies.¹¹⁸

Canada

4.71 Canada is following the lead of the USA and allocated 5 + 5 MHz. An ensuing public safety campaign generated debate on increasing the allocation of an additional 5 MHz + 5 MHz. The conclusions of a paper developed by Defence Research and Development Canada indicated support for the allocation of 10 MHz + 10 MHz of 700 MHz spectrum for PSMB and the Canadian Government is currently considering a proposal to increase the allocation to 20 MHz.¹¹⁹

Europe

4.72 In Europe, a working group has been established under the European Conference of Postal and Telecommunications Administrations to consider the allocation of spectrum for public protection and disaster relief mobile broadband. According to the Western Australian Government, the working group concluded that a minimum of 15 MHz (7.5 + 7.5 MHz) was required for everyday scenarios with at least 20 MHz (10 + 10 MHz) necessary for large-scale planned events.¹²⁰ Motorola

114 Motorola Solutions, *Submission 10*, p. [4].

115 Mrs Maureen Cahill, ACMA, *Committee Hansard*, 24 June 2013, p. 11.

116 Mrs Maureen Cahill, ACMA, *Committee Hansard*, 24 June 2013, p. 11. Mrs Maureen Cahill, ACMA, *Committee Hansard*, 24 June 2013, p. 11. Mrs Maureen Cahill, ACMA, *Committee Hansard*, 24 June 2013, p. 11.

117 Orange Horizons Pty Ltd, *Submission 1*, p. [2].

118 Orange Horizons Pty Ltd, *Submission 1*, p. [2].

119 Motorola Solutions, *Submission 10*, p. [4]; Western Australian Government, *Submission 4*, Attachment 2, p. 7.

120 Western Australian Government, *Submission 4*, Attachment 2, p. 7.

Solutions noted that a separate study for the German Federal Ministry of Economics and Technology found that a spectrum allocation of 15 MHz + 10 MHz was needed.¹²¹

Committee view

4.73 The committee acknowledges the concerns of a number of states and territories and their law enforcement bodies that if spectrum allocation is insufficient, there are high operational risks involved to PSAs which may impact the safety and security of the Australian public.¹²² Conversely, the committee recognises the substantial public safety benefit that could be derived from a PSMB capability which is efficient and provides for all Australians. In this regard, the committee welcomes the comments from Mr Cheah of the ACMA that if the actual demand from a real world PSMB network proved to be materially higher than predicted then the ACMA would be prepared to reopen consideration of the issue.¹²³

4.74 The committee appreciates that the ACMA undertook a process with PSAs in 2012 to identify their spectrum requirements. As part of this process, agreement was reached regarding the methodology that would be applied and PSAs contributed data to inform the process which led the ACMA to identify 10 MHz as sufficient in four out of five emergency scenarios.¹²⁴ However, the committee also recognises that the PSAs are in the early stages of developing systems and understanding their requirements in this fast growing area. Such developments have led various jurisdictions and law enforcement authorities to recognise that 10 MHz is inadequate for the purposes of responding to natural disasters and other emergencies in an effective and timely manner both now and into the future. As the ACMA consistently highlighted that it has taken an evidence-based approach¹²⁵ to determining the spectrum allocation requirements of PSAs in 2012, available evidence before the committee (which is also currently under the consideration of the ACMA) upholds a position underpinned by evidence that 10 MHz is inadequate and that at 20 MHz is the absolute minimum required.

4.75 The ACMA argued that the appropriate allocation of spectrum to PSAs does not constitute a once-in-a-lifetime opportunity because spectrum is repurposed every 15 years.¹²⁶ However, the committee recognises that the allocation of sufficient and appropriate spectrum to PSAs to enable the deployment and growth of a dedicated mission-critical mobile broadband capability is a once-in-a-lifetime opportunity. The risks of reverse engineering a solution based on the limited availability of spectrum

121 Motorola Solutions, *Submission 10*, p. [4]; Western Australian Government, *Submission 4*, Attachment 2, p. 7.

122 Western Australian Government, *Submission 4*, p. 2.

123 Mr Chris Cheah, ACMA, *Committee Hansard*, 24 June 2013, p. 9.

124 Mr Chris Cheah, ACMA, *Committee Hansard*, 24 June 2013, p. 11.

125 ACMA, *Submission 7*, p. [5]; Mr Chris Cheah, ACMA, *Committee Hansard*, 24 June 2013, pp 8, 9, 11, 13.

126 Dr Andrew Kerans, ACMA, *Committee Hansard*, 24 June 2013, pp 13–14.

should be avoided. Such technology will underpin the next generation of policing operations into the next decade and beyond. To this end, the committee recognises that it is reasonable to expect that PSAs will require 20 MHz of spectrum to provide for a national PSMB network under a fifteen year licence. The committee recognises that 20 MHz of spectrum will meet current PSA requirements while providing for expected growth in and demand for PSAs services into the future.

4.76 Furthermore, in order to meet additional PSA demands for spectrum into the future, the committee takes the view that such agencies should be provided priority access to an additional 10 MHz spectrum for public safety purposes.

4.77 PSA priority access could be achieved through the introduction of a licence condition. Alternatively, contractual arrangements could be negotiated with the commercial purchaser or the provisions for declarations of emergency in the Radiocommunications Act may be relied upon.