Submission to the Parliamentary Joint Committee on Law Enforcement

Inquiry into the spectrum for public safety mobile broadband

13 June 2013

IT'S HOW WE CONNECT

Contents

1 Executive Summary

Introductory comments

Telstra welcomes the opportunity to provide this submission to the Parliamentary Joint Committee on Law Enforcement ("the Committee") in response to its inquiry into the spectrum arrangements for public safety mobile broadband (PSMB).[1]

Telstra believes mobile technologies offer an important opportunity to enhance the delivery of public safety services and the company is proud of the contribution it already makes in this regard, for example through the provision of the Triple Zero service. Telstra is keen to contribute to a policy discussion that seeks to utilise mobile broadband to improve public safety outcomes in a manner that is cost effective and utilises existing investments and infrastructure.

Telstra would welcome the opportunity to further discuss the material in this submission with the Committee.

Key issues

Here is a summary of the key issues identified by Telstra in this submission.

- Telstra believes that the Australian Communications and Media Authority (ACMA) is well placed to advise the Government on the quantity of spectrum required to be reserved for PSMB use.
- Telstra believes that the 800 MHz band is best suited for any PSMB spectrum requirements. The spectrum in the 700 MHz band that was not allocated in the ACMA's recent spectrum auction is not appropriate for this purpose because of the continuing growth in demand for commercial mobile broadband services, it is not compatible with international planning, and offers no significant advantage in terms of how early it can be accessed for public safety use.
- Telstra recommends that the LANES Strategy be adopted as outlined in Attachment 1 to this submission. The LANES Strategy involves integrating the PSMB spectrum into the architecture of a commercial carrier network so that it can form a dedicated and seamless national service for first responders. Such a carrier network can be suitably "hardened" through Government investment to provide additional resilience where required. Telstra considers that such a strategy is the only realistic approach for public safety agencies to be able to effectively overflow traffic to the additional capacity and coverage of a commercial network.
- The LANES strategy also has the advantage of allowing the PSMB capability to be introduced (using partitioned commercial spectrum) before the 800 MHz spectrum is cleared. Indeed, Telstra believes it could commence a PSMB network based on the LANES strategy by 2015, which would provide public safety agencies with substantial additional capacity when required by providing priority access to infrastructure using Telstra's expansive commercial spectrum portfolio (which has a value of several billion dollars and consists of approximately 217 MHz of spectrum in metropolitan and regional areas, and 167 MHz in remote areas).
- Telstra believes that a broader Community Centric Approach to Public Safety and Security Mobile Broadband should be adopted in lieu of the agency model. The current model being pursued by the public safety agencies appears to be focused solely on emergency services organisations and does not consider the broader benefits that the LANES approach can bring to citizens, first responders, the public sector, and industry. The LANES strategy would harden and enhance a commercial network so that benefits of the enhancement flow to a much wider community of users and not only to the emergency services organisations. For example, the majority of citizens who use mobile phones to contact the Triple Zero service for assistance, especially in natural disaster prone areas in

[1] Refer http://www.aph.gov.au/Parliamentary_Business/Committees/Senate_Committees?url=le_ctte/spectrum_mobile_broadband/index.htm

regional and rural Australia, would be able to use the hardened and enhanced commercial network for improved access to this service.

The remainder of this submission sets out Telstra's comments in response to the various points that are considered under the Terms of Reference for the Inquiry.

2 How much broadband spectrum do law enforcement agencies need to be able to communicate safely and effectively during mission-critical events such as natural disasters and potential terrorist incidents?

Telstra refers the Committee to the ACMA advice

Telstra refers the Committee to the in-depth study that was recently undertaken by the Australian Media and Communications Authority (ACMA) into the quantity of mobile broadband spectrum required by public safety agencies.[2] This study was part of the work program undertaken by the Public Safety Mobile Broadband Steering Committee (PSMBSC). The study concludes that a reservation of 2x5 MHz of mobile broadband spectrum in the 800 MHz band, along with 50 MHz of broadband spectrum in the 4.9 GHz band, would be adequate to meet the needs of the agencies.

The details of the public safety agency traffic forecast data and modelling underlying the ACMA study have not been published due to security concerns. As a result, Telstra has been unable to verify the accuracy of the study or form its own estimate of the quantity of spectrum required. Nonetheless, as the ACMA is the regulatory agency responsible for spectrum management, and in the absence of any alternative rigorous analysis, Telstra recommends that the Committee follow the advice of the ACMA to reserve 2x5 MHz of mobile broadband spectrum in the 800 MHz band along with 50 MHz of spectrum in the 4.9 GHz band.

Access to commercial network resources is essential for delivering a PSMB capability

The ACMA study also indicates the PSMBSC recognises 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 to dimension spectrum provisions around what might be a once-in-a-generation event.[3] The study also notes that, regardless of the quantity of spectrum that might be reserved, a public safety mobile broadband network would still need to be underpinned by the ability to use commercial networks for coverage or supplementary capacity. [4]

The LANES Strategy is the most economic and effective approach to delivering PSMB capability

Telstra agrees with the ACMA view that the design of a public safety mobile broadband network needs to be predicated on using the resources of commercial mobile broadband networks. Telstra contends that the most economic and effective manner in which to provide a truly national PSMB capability is not to attempt to build separate PSMB networks and overflow to commercial networks for coverage and supplementary capacity, but rather to integrate the capability within a commercial network.

Telstra's White Paper *'Delivering 4G/LTE Mobile Broadband for Emergency Services'* (in Attachment 1) explains how a commercial LTE network can be partitioned to provide emergency services users with dedicated capacity using 800 MHz spectrum and also give them priority access to additional capacity using other spectrum in the event of a special event or emergency. Telstra refers to this approach as the "LANES Strategy" because it is analogous to the arrangements on a major highway where dedicated transit lanes provide preferential access for emergency service/public transport vehicles, and traffic in other lanes must give way to emergency vehicles in the event of transit lanes not being available. Such a strategy complements the prioritised voice mobile broadband services already operating on Telstra's Next G® network on behalf of the Commonwealth Government - namely Triple Zero and the Australian Wireless Priority Service System (WPSS) [5].

[2] The ACMA, *Spectrum for public safety radiocommunications - Current ACMA initiatives and decisions*, October 2012
[3] Ibid, p14
[4] Ibid, p10
[5] http://www.ag.gov.au/Publications/Budgets/Budget2009-10/Pages/StrengtheningourNationalSecurity.aspx

Telstra has a substantial portfolio of spectrum assets available upon which it can draw to augment the ACMA 800 MHz allocation and implement the LANES Strategy. These holdings have a value of several billion dollars and consist of approximately 217 MHz of spectrum in metropolitan and regional areas, and 167 MHz in remote areas.

3 Which of the 700 or 800 MHz bands is the most appropriate for law enforcement agencies given the current licensees occupying spectrum?

As explained below, Telstra believes that the 800 MHz band continues to be the most appropriate band for the deployment of a public safety mobile broadband network. The unsold spectrum in the 700 MHz band is not appropriate for this purpose because of the continued growth in demand for commercial mobile broadband services; it is not compatible with international PSMB planning; and it offers no significant advantage in terms of how early it can be accessed.

Demand for additional commercial spectrum

The fact that some of the available 700 MHz spectrum was not allocated in the ACMA's recent spectrum auction does not mean this spectrum will not be needed to meet the demand from commercial mobile networks in the long term. [6]

Consumer demand for mobile broadband continues to grow rapidly. According to the Australian Bureau of Statistics, the volume of data downloaded by mobile handsets increased 38% for the three months ending December 2012 compared to the three months ending June 2012.[7] Ericsson's Mobility Report found that global mobile data traffic doubled between the first quarter of 2012 and the first quarter 2013 and forecasts it to grow by 12 times between 2012 and 2018.[8] It is expected that mobile operators in Australia will need to continue investing significantly in their networks, including the acquisition of further spectrum, to meet this ongoing growth in demand.

International planning considerations

The International Telecommunications Union (ITU) has already adopted Resolution 646 which recommends that advanced public protection and disaster relief (PPDR) solutions in Region 3 (the Asia Pacific, including Australia) should use spectrum within the following frequency ranges:

406.1-430 MHz
440-470 MHz
806-824 paired with 851-869 MHz
4 940 4 990 MHz
5 850-5 925 MHz

This resolution provides clear guidance that, while legacy narrowband systems currently operate within the 440-470 MHz band, PPDR mobile broadband systems in Region 3 should be located in the 806-824/851-869 MHz frequency range. Further, the 3GPP international mobile standards body has now approved this frequency range for LTE use which means that the development of suitable LTE network equipment and user devices (for commercial or PPDR applications) is already in progress. Telstra believes that is important for Australia to be aligned with the recommended internationally harmonised frequency plans and standards in order to maximise the opportunity for reducing costs through global scale and roaming with other countries in the Asia-Pacific region.

It is also clear that the 700 MHz band is not recognised by the ITU as a harmonised band for PPDR applications in Region 3. Although Resolution 646 may be further amended at the next ITU World Radio Conference (WRC) in 2015, any change to the frequency ranges in this Resolution is considered to be out-of-scope for the WRC agenda.

[6] 2x15 MHz of spectrum in the 700 MHz band remained unsold at the end of the ACMA's April 2013 auction.
[7] Australian Bureau of Statistics, Internet Activity – Mobile handset subscribers
[8] Ericsson Mobility Report, June 2013

Further, Australian public safety agencies are unable to take advantage of the equipment designed for the large US market because the equipment is not technically compatible with the 700 MHz frequency plan for Region 3. In particular, the 700 MHz frequencies that have been assigned to US public safety agencies for "uplink" and "downlink" communications coincide with frequencies that can only be used for "downlink" mobile communications in the Region 3 plan[9]. This means that devices designed for operation in the US will not work in Australia without substantial and costly customisation.

Telstra is aware of some informal discussions concerning the potential use of the 693-703/748-758 MHz frequency range for PPDR applications in Europe. This frequency range is not compatible with the arrangements in Australia as it is outside the Region 3 plan. It would require at least one additional television broadcasting channel to be cleared, as well as changes to the filtering in 700 MHz mobile networks and devices.

Timeline for access to spectrum

Telstra notes that the spectrum in the 700 MHz band is to be cleared of existing broadcasting and wireless microphone uses by 31 December 2014. This means that it will not generally be available for mobile services until the beginning of 2015. The ACMA has indicated that spectrum in the 800 MHz band can also be cleared (in specified areas) to meet the initial public safety agency requirements from 2015 onwards.[10] So from an access timing perspective, spectrum in the 700 MHz band would seem to offer no significant advantage over the 800 MHz band.

4 How the necessary spectrum for public safety should be secured in a timely manner?

800 MHz spectrum

The ACMA has stated that it intends to implement an area-based apparatus licensing regime to secure access to the 800 MHz spectrum for PSMB infrastructure. In areas where public safety agencies undertake to provide public safety mobile broadband coverage, the ACMA will provide incumbent 800 MHz licensees with two years' notice in which to cease operation on the relevant frequencies.[11] Telstra considers this approach to be reasonable noting that once a business plan has been agreed by the agencies, it is likely that they will require a lead time of at least two years in which to secure necessary financial appropriations, and acquire and roll out the initial infrastructure.

Telstra notes that a commercial partnership to deliver the LANES Strategy would allow a PSMB capability to commence in advance of the 800 MHz spectrum being available.

4.9 GHz spectrum

Telstra notes that the ACMA has already issued a class licence (dated 13 May 2013) for 50MHz of spectrum in the 4.9 GHz band to be used for public safety broadband applications.[12]

In addition to other usage, it is likely that this band will be dynamically deployed, as and where needed, to serve local event 'command post' purposes, such as local video surveillance and distribution, command-and-control of robots, high-capacity data linking (eg. building plans, chemical/pharmaceutical databases, etc), and other such broadband applications.

[9] The Region 3 700 MHz frequency plan has been adopted by Australia, most other Asia-Pacific countries, the majority of South American countries, and is also expected to be adopted by African countries.
[10] The ACMA, *Spectrum for public safety radiocommunications - Current ACMA initiatives and decisions*, October 2012, p19
[11] Ibid, p19
[12] Refer to http://www.acma.gov.au/theACMA/Newsroom/Newsroom/Media-releases/new-spectrum-for-emergency-services

5 What arrangements should be put in place to ensure that, in extreme circumstances, law enforcement agencies can effectively use spectrum of commercial carriers to protect public safety and maintain public order?

A partnership agreement is required

Telstra believes that any realistic deployment of a national PSMB network will require public safety agencies to form a partnership with one or more commercial operators. Telstra contends that the most economic and effective approach is to form a partnership based on the LANES Strategy in Attachment 1 of this submission. Such an approach will allow PSMB agencies to seamlessly gain access to the required network capacity both during major incidents and regular operations. Appropriate contractual arrangements for access to commercial network resources would be built into the partnership agreement for the LANES Strategy.

Telstra is already in partnership with Government customers to provide priority access to voice services. The WPSS is an example of this approach.

Additional legislative provisions are not required

Telstra considers that additional legal mechanisms are not required because the "Declarations of emergency" clauses in Part 4.4 of the *Radiocommunciations Act 1992*[13] already make adequate provision for circumstances which are extreme and outside existing agreements.

6 What applications dependent on broadband spectrum will contribute significantly to saving lives and property?

Telstra notes that the ITU report ITU-R M.2033 sets out the various types of PPDR applications that can be supported by existing or future generations of LTE technology.[14] The applications considered in this report are summarised in Table 1 below. Note that legacy narrowband and wideband applications are generally expected, over time, to be subsumed within the aggregate data-stream capacity of a future mobile broadband system.

Narrowband applications	Wideband applications	Broadband applications
• Voice calling including push-to-talk and group calling • Facsimile • Short messages • Emergency alarms • Telemetry including location and sensory information • Database interaction (minimal record size)	• Messages including emails • Direct data communication between handsets • Database interaction (medium record size) • Text file transfer • Static image transfer • Telemetry including location and sensory information Security • Compressed video • Interactive location determination	• Database access including intranet and internet access • Remote control of robotics devices • Live video streaming • High resolution imagery

Table 1: PPDR applications for mobile broadband LTE technology

[13] Refer http://www.comlaw.gov.au/Details/C2012C00818
[14] Available at http://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-M.2033-2003-PDF-E.pdf

Telstra has implemented a broad cross section of these services with Australia's emergency services organisations[15]. Some examples are shown in Figure 1 below.

Figure 1: Telstra delivering solutions to emergency services organisations

7 The impact on law enforcement agencies which utilise the available spectrum in relation to budgets, implementation strategies, current infrastructure and existing technology

There would be a number of serious challenges associated with public safety agencies designing, rolling out and operating a dedicated mobile broadband network that is nationwide and interoperable across state borders. The key reasons are as follows:

- The cost of rolling out such a network would be significant, almost certainly several billion dollars. For example, Telstra understands that the US public safety network is expected to cost approximately $US19 billion, with $US7 billion being funded by the federal government (from spectrum auction proceeds) and the remainder being funded by state governments and private sector investors.
- Telstra understands that individual States and Territories are likely to be required to fund and build their own networks. This approach has the potential to result in a fragmented approach to network implementation and coverage.
- Funding constraints are likely to result in priority being given to the coverage of metropolitan areas. This would leave regional and remote areas underserved, and would fail to enhance the capability of emergency services in these areas to deal with natural disasters such as bush fires and flooding. The consequence will be a "digital divide" between public safety agencies in metropolitan areas and those in regional and remote areas.
- Building and operating large scale LTE networks is a complicated and specialised business. It is not the core business of governments or public safety agencies and they are not resourced to undertake such activity. Telstra considers that there will be a high risk of project failure if the network design, build and operation is not shared with a commercial network provider.

Telstra believes that the only realistic approach to addressing these issues is for the public safety agencies to form a national partnership with a commercial mobile network provider. This would reduce the cost of the project by allowing the public safety agencies to leverage the resources of a commercial

[15] http://www.telstra.com.au/business-enterprise/enterprise-solutions/industries/public-safety/

network, including suitably hardened commercial infrastructure, augmentation with commercial spectrum and nationwide seamless operations management. It would also assist to ensure that the rollout is interoperable across state boundaries and not create a divide between metropolitan, regional and remote Australia. Such an approach is also necessary to provide a seamless user experience when roaming between public safety and commercial spectrum.

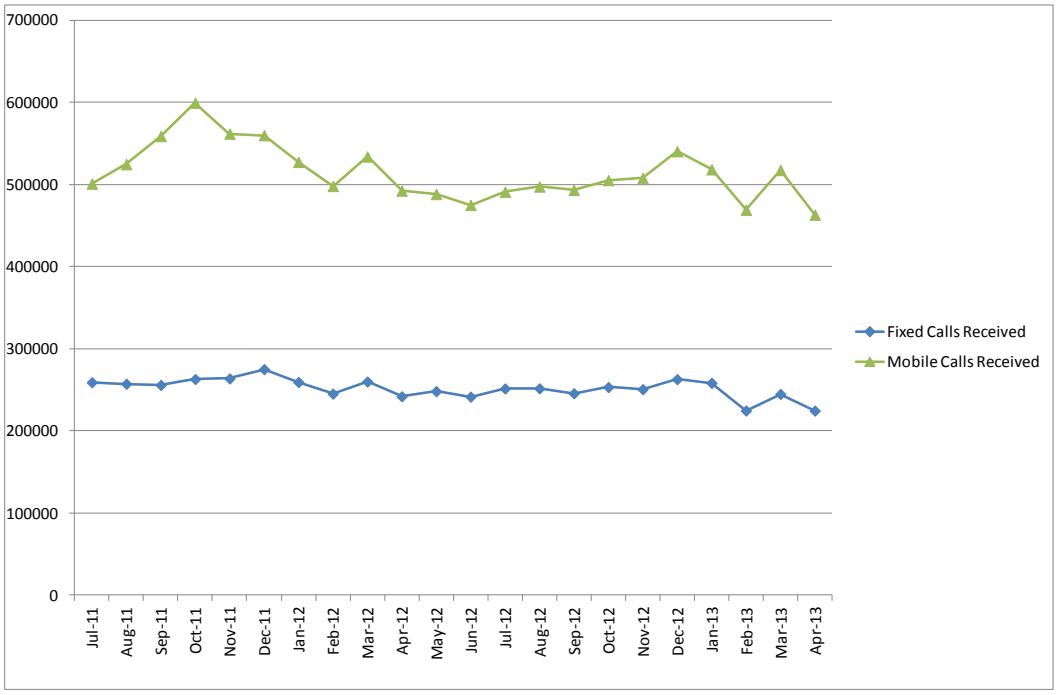
More detail about Telstra's proposed approach to delivering such a partnership solution is discussed in Attachment 1 of this report.

8 Any other related matters

Community Centric Approach to Public Safety and Security Mobile Broadband

The Productivity Commission notes that[16] *"Police services are the principal means through which State and Territory governments pursue the achievement of a safe and secure environment for the community. This is through the investigation of criminal offences, response to life threatening situations, provision of services to the judicial process and provision of road safety and traffic management. Police services also respond to more general needs in the community — for example, working with emergency management organisations and a wide range of government services and community groups, and advising on general policing and crime issues. Additionally, police are involved in various activities which aim to improve public safety and prevent crime."*

The Productivity Commission outlines the role of law enforcement and specifically police services in the above definition. A key element of the definition is the role that police services play in the pursuit of a safe and secure environment for the community. Since the introduction of Telstra's Next G® network, the first mobile broadband network in Australia, there has been an unprecedented explosion in the utilisation of mobile broadband services by consumers, small business, enterprise and government via technologies such as smart phones and iPad style devices.



[16] The Productivity Commission, Report on Government Services 2013

Chart 1: Number of Triple Zero Calls Received – Mobile versus Fixed

Correspondingly there has also been a shift in the manner in which the community interacts with Australian law enforcement agencies and broader emergency services. In November 2002 mobile phones became the mainstay of emergency calls for assistance overtaking traditional land lines calls for assistance. Chart 1 exhibits in today's terms the fundamental shift in the culture of the Australian community with mobile calls now representing more than twice the quantity of fixed line Triple Zero calls for police, ambulance and fire services in Australia.

In parallel, Australia has seen an unprecedented number of natural disasters that have claimed more lives than in the previous years. For example, the tragedy of the 2009 summer was the Victorian bushfires, Australia's greatest natural disaster, which claimed 210 lives and in which 2,029 houses were lost. Then in 2011 the Queensland floods saw the loss of many lives and widespread destruction of property.

As a consequence of these natural disasters and their significant loss of life and property the Australian Governments have forged ahead to harness the power of the mobile broadband networks to provide information to the citizens to allow them to make more informed decisions in relation to their own personal safety and risks. The Emergency Alert system has sent over 7 million messages in response to campaigns waged by the Triple Zero agencies in Australia.

In addition, emergency services agencies have utilised the power of the social media to deliver information to communities. The most prominent example is the Queensland Police Service that used social media as a channel to deliver clear factual information on the nature of the disasters and provide advice to the community at large in Queensland.

Today Australian society has embraced mobile broadband communications as its primary communications media and method of interacting with the emergency services. Hence it is imperative that any endeavour that is focussed on mobile broadband for public safety and security embraces all dimensions of the law enforcement and emergency services business process, from the citizen to the first responder and beyond.

Telstra observes that the current agenda which has been established for PSMB would appear to be only focussed on a single facet of the law enforcement/emergency services framework - namely the internal operations of the police, ambulance and fire services. The broader holistic policy that embraces the community and individual citizens does not appear to have been incorporated into the current deliberations of the relevant public sector forums.

Telstra believes that it is in Australia's national interest that the Government and public sector embrace a broader policy framework that embraces citizens, emergency services officers, the broader community and industry coupled with a contemporary 21st century approach to a national PSMB network. Such an approach would not only benefit the first responders, but all the community, industry and allied government agencies that rely on mobile broadband networks during emergencies/disasters from Emergency Alert and Triple Zero to first responder communications including with second responders such as utilities and Defence personnel.

The pervasive nature of mobile broadband technology binds citizens, private and public sectors. This is especially so in Australia were mobile broadband technology has been embraced by society, industry, the public sector and Government. Any response to an emergency or disaster will undoubtedly involve the utilisation of mobile broadband services between all sectors of our society.

Figure 2 attempts to portray a potential disaster at a petroleum installation and depicts some of the different parties that utilise mobile broadband services throughout the event - from the petroleum worker who calls Triple Zero for assistance and continues to provide vital information to the first responders, through to allied organisations and citizens that respond to events as they unfold. The utilisation of a carrier based national PSMB network as outlined by the LANES strategy would ensure that all parties to the incident have access to mobile broadband communications and critical information.

COMMUNITY CENTRIC APPROACH TO PUBLIC SAFETY

This visual below depicts an emergency scenario involving a petroleum installation common in many major capital city in Australia. It outlines the broader mobile broadband communications between citizens, private and public sectors.

Fast initial response

When a refinery worker reports a suspected arson, Telstra's Triple Zero service rapidly refers the call to the appropriate Emergency Communications Centre. Here, fire service personnel notify police and ambulance to coordinate a multi-agency response.

A complete operating picture

Using a smartphone, the safety officer at the refinery can video call, as well as transmit photos and critical data, to help incident commanders make accurate decisions. As he talks, a storage tank explosion adds to the emergency.

Accurate unfolding footage

A helicopter streams high-quality video directly to field teams, response partners and the control centre. With visibility impaired by smoke on the ground, this invaluable information helps keep emergency personnel safe and informed.

Rapid containment measures

With public utility companies connected to the same network, ESOs can rapidly instruct them to cut power to the refinery to prevent dangerous secondary electrical fires.

Prompt expert advice

Firefighters containing the blaze need advice on LPG from a chemical expert. The Incident Control Centre (ICC) arranges for a direct call to the smartphone of the unit's fire officer. He's able to rapidly confirm their approach and proceed without delay.

Comprehensive citizen warning

To protect citizens from toxic fume inhalation, the ICC invokes their Telstra Emergency Alert system, which automatically contacts citizens in the affected area via phone in their homes and via SMS alert to mobiles, instructing them how to evacuate.

Calm, efficient evacuation

Telstra VAN provides traffic and situational data to forward response units and police vehicles, enabling them to better respond to the incident.

Rapid triage

As casualties are transported to hospital, ambulance officers enter patient data and transmit it to the hospital. This saves valuable time and double entry, and helps ensure that information is consistent and legible.

Effective suspect apprehension

Hours later officers in a rural town are able to apprehend a suspect using information provided across the Telstra Next IP® network.

Figure 2: A community approach to public safety communications

Telstra observes that Australia is still struggling to deliver what might be termed a Public Safety Radio Network (PSRN), based on legacy land mobile radio network technology. The ACMA has provided new spectrum in the 400MHz range to the emergency services agencies to contribute to achieving interoperability in the radio domain. However, a truly national interoperable PSRN appears to be many years away as a consequence of differing technologies, versions of equipment and different operating procedures and processes existing across Australia.

In order to ensure that the wider Australian public will benefit from the reality of a truly national and interoperable PSMB network rather than capability, Telstra strongly recommends that Australian governments seriously consider adopting a nationwide partnership approach, based on the LANES strategy, with a commercial network to achieve this outcome.

9 Attachment 1: Telstra Whitepaper - Delivering 4G/LTE Mobile Broadband for Emergency Services

Please see the attached PDF document.