IT'S HOW WE CONNECT

Submission to the Productivity Commission

Public Safety Mobile Broadband

Response to the Productivity Commission's draft report

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Executive Summary

The Productivity Commission's draft report is an important step in delivering a public safety mobile broadband (PSMB) capability for Australia's public safety agencies (PSAs). Preserving the safety, security and prosperity of Australian communities is an essential role of government and Telstra looks forward to continued participation in delivering this important capability for PSAs.

Leverage the existing assets and expertise of commercial carriers

Telstra supports the Commission's draft finding that the most cost effective way to implement a PSMB capability would be to leverage the existing infrastructure and expertise of commercial carriers. As the Commission has concluded, building and operating a dedicated PSMB network from scratch would be much more complex and is the most expensive option available to the Australian Governments.

Leveraging the existing assets and expertise of public carrier networks offers the dual benefits of earlier implementation and less network investment by government. It also allows the ability to scale capacity to meet the often-unanticipated peak demand requirements of emergency situations. In relation to the dedicated PSMB network model, as well as being the most costly option, the capacity of the network would be limited and could therefore be subject to congestion in major events where multiple police, fire and ambulance officers will be using the service. In contrast, a hybrid option such as Telstra LANES® can provide dedicated capacity and seamless access to additional carrier spectrum in these critical situations, ensuring that PSA personnel maintain their critical communications.

Whether or not a purely commercial or a hybrid option that includes some dedicated capacity is preferred should depend not only on the cost of each option but also on the capability and user benefits that each provides.

Not all implementation options provide the same level of benefits

The Commission's analysis has focussed on the cost effectiveness of the various implementation options and has incorrectly assumed that the benefits derived from a PSMB capability will be the same for all implementation options. This assumption is based on the premise that by specifying the same PSMB capability for all implementation options the 'impact of each option on public safety outcomes (and thus, its benefits) is not expected to vary markedly'.[1]

Telstra does not support this assumption and believes incorporating an assessment of the benefits of the different implementation options would strengthen the Commission's analysis. Differences in benefits (even with the same specification across implementation options) will arise from two sources:

1. The specific features of the various implementation options.

2. The timing of implementing various PSMB options.

Implementation options that include overflow or roaming options necessarily face loss of connectivity during the handover phase between networks. Such loss of connectivity could have significant consequences where PSA personnel are relying on the PSMB in life-threatening situations. Telstra's LANES® solution is an example of a hybrid model using a single network which does not suffer from this drawback.

There will be large variance in the amount of time needed to implement different options. Commercial and hybrid options can be introduced more quickly than a dedicated network, bringing forward the benefits from introducing the PSMB capability.

[1] Productivity Commission, *Public Safety Mobile Broadband: Draft Report*, p. 94.

While a purely commercial model may be the lowest cost option, the increased benefits that flow from hybrid models such as Telstra LANES® need to be weighed against those costs.

A national implementation strategy is necessary

A national approach is necessary to ensure genuine interoperability of the PSMB capability between PSAs and across jurisdictions. Lack of interoperability will compromise the daily activities of PSAs and hamper the communications between PSA personnel deployed in cross jurisdictional circumstances, as often happens in the event of large-scale disaster.

Relying on a set of agreed 'minimum common technical standards'[2] would not be sufficient to ensure full or seamless interoperability between PSAs and across jurisdictions. Introduction of the PSMB capability offers a rare opportunity to overcome the problems of disparate technologies and historical parochial interests and build a truly interoperable system that will improve the coordination of response. However, achieving this outcome will require a nationally co-ordinated approach.

Use of dedicated spectrum

While the draft report finds that the case for using dedicated spectrum to deliver PSMB is weak, there may be some benefit to this approach. Telstra LANES® has been developed to provide some dedicated capacity to PSAs for 'business as usual' use with the ability to provide seamless access to prioritised traffic on the public carrier network to meet peak demand requirements.

Some cost estimates are too low

Some cost input assumptions made by the Productivity Commission are on the low side of reasonable assessments. These include site establishment costs, backhaul transmission costs for new sites and 'hardening' existing commercial sites. The effect of these is likely to further widen the gap between commercial/hybrid options and a dedicated network.

[2] Productivity Commission, *Public Safety Mobile Broadband: Draft Report*, p. 210.

1. Introduction

The Productivity Commission's draft report is an important step in delivering a PSMB capability for Australia's public safety agencies. Preserving the safety, security and prosperity of Australian communities is an essential role of government and Telstra looks forward to continued participation in delivering this important capability for PSAs. Telstra has been an active participant in the public policy debate on how to best implement a PSMB capability for several years. This has included demonstrating that commercial network providers are capable of developing and implementing an effective, flexible solution responsive to the needs of PSAs.

2. Leverage the existing assets and expertise of commercial carriers

Telstra supports the Commission's draft finding that the most cost effective way to implement a PSMB capability based on LTE technology would be to leverage the existing infrastructure and expertise of commercial carriers. Building and operating a dedicated network from scratch would be much more costly and complex. It would also take longer to implement. Leveraging the existing assets and expertise of commercial mobile carriers offers the dual benefits of earlier implementation and less network investment. It also includes the ability to scale capacity to meet the often-unanticipated peak demand requirements of emergency situations.

While the Commission's draft finding favours a commercial implementation option, Telstra believes that a hybrid approach would provide better value for money. The reasons are as follows:

- **Coverage:** Building a dedicated PSMB network to match the coverage footprint of existing commercial mobile broadband networks will be excessively expensive. Even if the initial build could be funded, the dedicated network operator will not face the same commercial pressure to continue network expansion and capacity augmentation that exists for commercial carrier operators. Telstra's mobile data network coverage is unparalleled in Australia, extending across 2.3 million km^2 on land and over 1 million km^2 out to sea, utilising 8,200 network sites. Telstra's current LTE (or 4G) network extends to 94% of the Australian population. Over three years Telstra expects to invest more than $5 billion into our mobile network and will continue to expand 4G coverage to reach 99% of the population[3] – matching the Commission's PSMB coverage target.

- **Timeliness:** Building a dedicated PSMB network would necessarily be a complex and time consuming task. It is more complex than simply deploying mobile broadband equipment at existing land mobile radio (LMR) base stations – it also requires new sites, backhaul links, core network infrastructure and operational systems to be established. A PSMB capability would be delivered more quickly by an approach that leverages commercial mobile infrastructure which has already been built.

- **Reliability:** Commercial carrier networks already have a high degree of reliability and security and this can be further strengthened if desired by PSAs. Such networks already offer significant redundancy due to their scale, the large number of existing base stations and extensive backhaul networks. It is not clear if dedicated networks offer any greater degree of robustness in the event of a major disaster or emergency.

- **Interoperability:** Deploying an integrated commercial PSMB capability will enable a seamless and standardised national approach that can provide for interoperability across all PSAs within

[3] http://www.telstra.com.au/aboutus/media/media-releases/telstra-financial-results-2015.xml

states and interstate and other agencies such as national security agencies, Australian Defence Force, utilities and local governments.

- **Capacity:** A hybrid approach that uses some dedicated capacity and also allows for prioritisation of traffic on the public carrier network provides the advantage of allowing capacity to be seamlessly 'scaled' to meet the demands of particular circumstances without having to provision for peak demands. A dedicated PSMB network would need to be provisioned to meet the peak demands of a natural disaster or other extreme event. This approach would necessarily have a high opportunity cost as there is no option to use existing alternative capacity. The hybrid approach allows dedicated capacity to be provisioned for day-to-day activity while ensuring additional capacity is inherently available where and when it is needed.

- **Sustainability:** Commercial network operators face competitive pressures to continually enhance their networks and introduce new features and capabilities as technology evolves. The operator of a dedicated PSMB network would not face these pressures and would find it difficult to fund the ongoing investment required. Leveraging the large competitive ecosystem of commercial mobile broadband network equipment, devices and applications is likely to deliver far more choice and at a lower cost for PSAs over its lifetime. Implementing a hybrid approach that is integrated into a commercial network will more likely result in the new features and capabilities being introduced to the PSMB capability in a timely manner.

Demonstrations of dedicated capacity, prioritised traffic and priority access to the network

The effectiveness of a PSMB capability that leverages an existing public carrier network has already been demonstrated on a number of occasions and is being pursued by other nations such as the United Kingdom. In Australia, the Telstra LANES® product[4] was trialled in Queensland and Western Australia in 2013 and in 2014 for the G20 summit in Queensland. At the 2015 AFL Grand Final, a further trial of Telstra LANES® with Emergency Services demonstrated the ability of a commercial mobile carrier to provide PSAs with a standards based solution for priority access to the network as well as preferential and uninterrupted broadband performance during a network congestion event.[5] These trials have shown that a commercial mobile carrier can provide exclusive access to a partitioned spectrum allocation, a guaranteed preferential service on the public carrier network, and seamless mobility between a partitioned spectrum allocation and the public carrier network.

Telstra has retained the Telstra LANES® service in Melbourne and invites the Commission to review the PSS Mobile Broadband capability including the opportunity to validate that the service:

- Is purely open 3GPP standards based;

- Has the ability to provide seamless connectivity across dedicated PPDR spectrum and carrier LTE spectrum; and,

- Has the ability to prioritise access to the PSAs.

Whether or not a purely commercial or hybrid model is preferred should depend not only on the cost of each option but also on the capability and user benefits that they provide.

3. Not all implementation options provide the same level of benefits

The Commission's analysis has focussed on the cost effectiveness of the various implementation options and has inaccurately assumed that the benefits derived from a PSMB capability will be the same

[4] Telstra's LTE Advanced Network for Emergency Services (LANES®) product.
[5] https://exchange.telstra.com.au/2015/10/05/lanes-trial-for-emergency-services-at-the-afl-grand-final/

for all implementation options. This assumption is based on the premise that by specifying a PSMB capability that has the same specification for all implementation options the 'impact of each option on public safety outcomes (and thus, its benefits) is not expected to vary markedly'.[6]

Differences in benefits (even with the same specification across implementation options) will arise from two sources:

1. The specific features of the various implementation options; and,

2. The timing of implementing various PSMB options.

The risk of supplier lock in does not necessarily distinguish commercial and hybrid solutions from dedicated network solutions.

Variation in benefits caused by features of the implementation options

PSMB options that do not rely on roaming or 'overflow' from dedicated to commercial networks (and back again) will provide higher benefits than options that do because there is no need to transition between networks. Telstra LANES® is an example of a hybrid deployment option that allows seamless connectivity between dedicated and shared capacity.

PSMB options that include such overflow or roaming options necessarily face loss of connectivity, and hence situational awareness, as devices reselect and re-authenticate to the new network. Such loss of connectivity requires a device to register on a particular network and this can take anywhere from a few seconds to a few minutes each time a device changes network. During this time of transition from one network to the next, all services that were being delivered will be dropped and will need to be re-established on the new network. If a device loses a network even momentarily it will begin scanning for other networks. This could occur during situations such as entering a building or a car park and during this time it is not possible for the critical services to be accessed.

In addition to the time taken for the device to identify and authenticate to the new network, it may also be necessary to re-authenticate to particular services or applications. Application sessions require negotiation with the carrier's security and access systems, the agencies' security systems (firewalls) and application access control, authentication of users (may be multi-factor), and in the case of police may involve national systems such as Crimtrac. Accordingly, any PSMB model that involves the loss of connectivity in transition between networks has unattractive operational consequences that reduce the benefits accruing from the PSMB capability.

Lastly, when 'roaming' or connected to a spill-over network, the user has access only to the services that are available on the roamed network. Each roaming partner has a different set of features and so the user experience will be different on each roaming partner's network. This could lead to the implementation of services based on the lowest network capability to ensure a consistent (but inferior) user experience.

Variation in benefits caused by timing

There will be large variance in the amount of time needed to implement different options. Commercial and hybrid options can be introduced more quickly than a dedicated network - a clear benefit.

While a purely commercial implementation model may be the cheapest option, hybrid options of implementation may offer greater value for money. The increased cost of hybrid options such as Telstra LANES® needs to be weighed against the increased benefits that such options provide.

[6] Productivity Commission, *Public Safety Mobile Broadband: Draft Report*, p. 94.

Risk of supplier lock-in can be mitigated and applies to all PSMB options

Contrary to the Commission's view, a commercial approach is no more susceptible to supplier lock-in than a dedicated network approach. There is significant risk of lock-in to equipment vendors for the dedicated network option. As the Commission notes, there are a number of ways of mitigating the risk of lock-in. One of these is ensuring that the PSMB capability deployed uses an open standards-based solution. Telstra LANES® solution is based entirely on the open 3GPP LTE standard.

4. A national implementation strategy is necessary

A national approach is necessary to ensure genuine interoperability of the PSMB capability between PSAs and across jurisdictions. Lack of interoperability will compromise the daily activities of PSAs and hamper the communications between PSA personnel deployed in cross jurisdictional circumstances, as often happens in the event of large-scale disasters.

Relying on a set of agreed 'minimum common technical standards'[7] would not be sufficient to ensure full, nor seamless, interoperability between PSAs and across jurisdictions. Introduction of the PSMB capability offers a rare opportunity to overcome the problems of disparate technologies and historical parochial interests and build a truly interoperable system that will improve the coordination of response. However, achieving this outcome will require a nationally co-ordinated approach.

This Commission has the rare opportunity to help lay the foundations of a national PSMB capability that addresses the limitations and lack of interoperability of PSA LMR networks that currently prevail throughout Australia. Such an approach is not new. Australia has a number of national PSA services for example Triple Zero Service, the National Automated Fingerprint Identification System (NAFIS)[8] and Community Alert Information Systems (Emergency Alert).

A national governance forum comprising public and private sector representatives would help to progress the establishment of a national PSS mobile broadband capability. Funding and related implementation matters can remain the province of the States and Territories if required. However, a collegiate national approach would offer the best opportunity for the development of a truly interoperable PSMB capability.

5. Use of dedicated spectrum

While the draft report finds that the case for using dedicated spectrum to deliver PSMB is weak, there may be some benefit to this approach in highly-dense urban areas.

Telstra LANES® has been developed to provide some dedicated capacity to PSAs for 'business as usual' use, with the ability to provide seamless access to prioritised traffic on the public carrier spectrum in order to meet peak demand requirements. This would reduce the quantum of required PPDR spectrum from 20 MHz - 50 MHz in a private network model to the minimum of 10 MHz (2 x 5 MHz) in a hybrid as additional LTE spectrum is provided by the carrier.

A number of submissions to the Productivity Commission on this matter have advocated use of the unsold 700 MHz spectrum as being suitable for use in delivering PSMB on the basis that the 700 MHz band is being used in the United States. However this advocacy is built on the misconception that the

7 Productivity Commission, *Public Safety Mobile Broadband: Draft Report*, p. 210.
8 http://www.crimtrac.gov.au/our_services/BiometricServices.html

700 MHz band is structured the same in the United States as it is in Australia. This is not the case and the unsold 700 MHz spectrum is not appropriate for PSMB.

PSMB devices designed for the US 700 MHz plan cannot be used in Australia because their uplink frequencies conflict with the downlink frequencies of the Asia Pacific plan (Chart 1). The US devices would have to be modified for use in Australia. Asia Pacific band regional harmonisation results in interoperability between Asia Pacific countries.

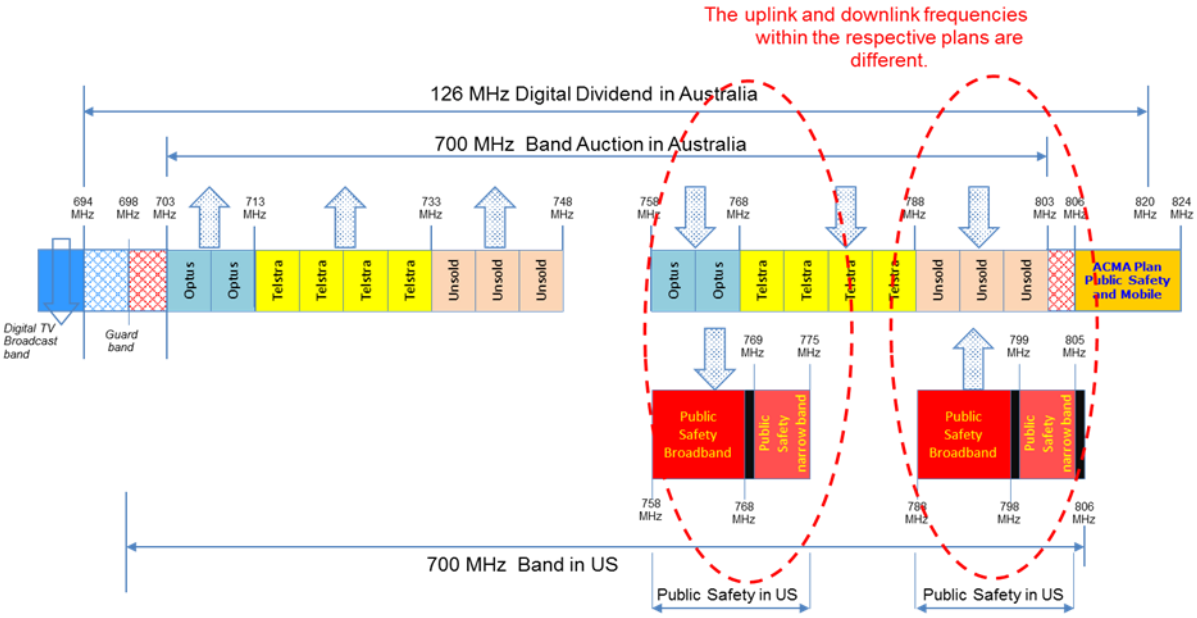

Chart 1: 700 MHz: Asia Pacific Region Band Plan & US Public Safety Band

If any spectrum is to be reserved specifically for PSMB use in Australia, it must be harmonised with the International Telecommunications Union (ITU) public protection and disaster relief (PPDR) spectrum allocation for use in Region 3 (Asia-Pacific region). This is necessary to ensure Australia can benefit from global device supply and to help assist interoperability in disaster and other emergency situations across the region.

Spectrum identified as suitable for allocation to PPDR use by the ACMA is in Band 27, which is already supported by common handsets such as the iPhone 6s. Contrast this position with that of the United States where FirstNet is struggling to gain access to handsets that are compatible with the network's spectrum:

> According to FirstNet's acting Chief Technology Officer Jeff Bratcher, the organization "would love" iPhones to support the network's Band 14 spectrum, but says implementing the technology is a "chicken and egg discussion."
>
> The device manufacturers really won't put a frequency band in unless they have the volume of quantity needed to support that," Bratcher continued. "Because it's limited space on all our phones."
>
> The lack of Band 14-capable devices then makes it more difficult to promote the band, as users have limited options to choose from, many of which don't meet the myriad requirements needed by first responders.[9]

[9] http://www.fiercewireless.com/tech/story/firstnet-cto-optimistic-smartphone-partnerships/2015-10-19

Further consideration of harmonised spectrum for PSMB is on the agenda of the ITU World Radio Conference to be held in November 2015. It would be prudent to wait for the outcome of that conference before making any commitment to identifying specific spectrum for PSMB use in Australia.

If any spectrum is to be allocated specifically for PSMB use in Australia, it must be harmonised with the International Telecommunications Union (ITU) PPDR spectrum allocation for Region 3. This is necessary to ensure Australia can benefit from global device supply and help assist interoperability in disaster and other emergency situations across the region.

It should also be noted that devices are already entering the Australian market that support the ACMA proposed Band 27 spectrum allocation for PPDR.

6. Some cost estimates are too low

While generally agreeing with the approach the Productivity Commission has taken to cost modelling, Telstra considers that some costs estimates are too low. These include site establishment costs, backhaul transmission costs for new sites and 'hardening' existing commercial sites.

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The effect of these is likely to further widen the gap between commercial/hybrid options and a dedicated network.

7. Regulation

Telstra strongly supports the Commission's view that regulatory intervention to 'encourage' service delivery is undesirable. Telstra also strongly disagrees with suggestions from some participants that there is a role for nbn to provide backhaul services to facilitate a PSMB capability.

The existing regulatory regime to facilitate and promote competition is sufficient and has resulted in significant investment in infrastructure and competition based on technology, network coverage and quality, customer service and price. Telstra believes it is vital that government policy does not undermine the strong investment incentives delivered by the highly competitive mobile market.