NSW GOVERNMENT | Telco Authority

Response to Productivity Commission Draft Report: Public Safety Mobile Broadband

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Contents

Executive Summary

The NSW Government Telecommunications Authority (Telco Authority) has undertaken a comprehensive review of the Productivity Commission's public safety mobile broadband inquiry draft report. As noted in our original comments to the Commission's issues paper, the Authority views the "first principles" review as an opportunity to undertake a rigorous national costing for the delivery of a public safety mobile broadband (PSMB) capability across a number of different models. This would then help to inform decision making by the States and Territories on which model or mixture of models to deploy.

A nationally interoperable PSMB capability offers a unique opportunity for Australian society, and will be a powerful new tool for public safety officers to carry out their role of protecting the community and delivering vital services. However, given the likely cost of developing such a capability and the long-term nature of the type of investment required, it is essential that the fundamentals are correct from the outset. The Telco Authority considers that there are three fundamental issues when considering a PSMB capability:

- ***Comparisons of the various models on a like for like basis is preferable.*** The costing analysis undertaken by the Productivity Commission does not compare options for equivalent service attributes and functionality. A "first principles" analysis of PSMB needs to ensure that the options that are being compared are truly equivalent. For example, a commercial service is only costed to the service provider, while a dedicated network is costed to the end user. Likewise, the way that a number of models are constructed may not result in the same level of benefits accruing. In order for all decision makers, both at State/Territory and Federal level, to make use of the Commission's analysis, a comparison that can be used to determine which option will offer the best value for money is required.

- ***Any PSMB solution must be mission critical, as defined by public safety agencies***[1]**.** A mission critical network requires certainty that users will be almost instantly connected to the network every time they use it. The Telco Authority understands that the Commission has been advised by carriers that mission critical services can be delivered as part of a commercially provided solution, including with no additional allocation of spectrum being required. It is recommended that the Commission explore this advice further in its final response so that it can satisfy itself that it has fully reflected the costs and risks of the commercial providers' ability to meet this requirement, given the limited information available to date.

[1] Productivity Commission Draft Report on PSMB Study, Page 13

- ***Regardless of which model is considered preferable, there should be sufficient competitive tension in the marketplace to ensure value for money; or that solutions to address a lack of competition are fully considered.*** The Commission has offered a number of potential solutions to Government procurement for a naturally monopolistic asset, such as service disaggregation, benchmarking, leveraging infrastructure and spectrum holdings, and the use of short term contracts. State and Territory Governments have extensive experience in dealing with procurement opportunities similar to those likely to present themselves for PSMB. The Telco Authority requests the Commission to consider that, given the significant uncertainty about their medium to long term requirements, entering into long term contracts, particularly with monopoly providers, may jeopardize agencies' ability to adopt innovative and more cost effective broadband data technologies.

There are several ways to manage risks associated with monopoly providers. Each of these will entail varying degrees or forms of regulatory intervention and/or risk allocation in the public procurement and contracting process. Outside of the direct procurement/contracting process, two readily identifiable alternatives include:

- ***The potential to allocate spectrum, which is a key input into PSMB, in a way that ensures that it can be used flexibly and can be used by more than one service provider if required.*** This approach has precedent. In the 400 MHz band, States and Territories are allocated harmonised government spectrum to manage as a block in the most efficient and effective way that best meets their needs. Land mobile radio services are deployed in a variety of ways, with a mixture of end to end service models and disaggregated delivery models, with the common factor being that public safety agencies retain control over the spectrum in some form.

- The other option that the Commission may want to consider is ***direct regulation of access and/or pricing of providers***. Although the Commission notes that regulation is a blunt and costly instrument, this approach has contemporary precedent, namely the Commonwealth's role in addressing retail communications services market failure in regional and rural areas through its National Broadband Network and Mobile Blackspots programs.

The Productivity Commission does not appear to have acknowledged the large body of work that led to the US and Canadian governments allocating 10MHz of paired spectrum in the 700MHz band. A similar allocation may be necessary for Australia to gain the full benefits of high bandwidth applications during large scale emergencies. It would also provide timely and cost effective access to the same technology options and innovations as those jurisdictions.

The Telco Authority is also concerned that the draft report, in its current form, may not provide a true account of the costs (and benefits) of a PSMB capability, and therefore will be of less relevance to decision makers. There are a number of reasons that have led the Telco Authority to reach this conclusion:

- Several of the underlying assumptions used by the Productivity Commission in its modelling are not supported by the available evidence.

- The Commission has indicated that the allocation of spectrum is a matter for the Australian Communications and Media Authority (ACMA), and that spectrum should be priced using opportunity cost pricing.

Given the role of spectrum in addressing network access, prioritisation and congestion issues, and that its quantum and type can impact the cost of developing PSMB, the Telco Authority would recommend that the Commission considers how spectrum could be allocated and at what price. The Authority considers that this approach is appropriate as both the Commonwealth Government and the ACMA have indicated a desire to use the outcomes of the Productivity Commission's study to inform any decision on spectrum allocation and pricing.

On the Commission's draft recommendation for the use of opportunity cost pricing, there are various ways in which spectrum for PSMB could be priced, including opportunity cost; market based prices which (due to market imperfections) may not fully reflect spectrum's alternative uses; and the use of Ministerial discounts. Should the Commission choose to make a recommendation as to how spectrum should be allocated and priced in its Final Report, the outcome that best achieves an efficient use of spectrum and recognises the societal benefits of PSMB should be selected.

For the information of the Commission, the ACMA has previously commenced rolling out opportunity cost pricing for government use of spectrum, only to delay the process due to it not achieving its original objectives, as occurred with opportunity cost pricing for harmonised government spectrum. Likewise, there is significant precedent for the application of Ministerial discounts for spectrum allocated to government for safety and community purposes, including spectrum for rail purposes and for PSMB purposes. In addition, there may be significant benefit in exploring other ways in which the efficient use of spectrum can be achieved. In this context, national reforms for harmonised government spectrum has resulted in significant improvement in the management of spectrum, with the NSW Government itself surrendering a number of licences no longer required. Alternatively, emerging technology such as spectrum arbitraging may be considered when allocating spectrum as a way of increasing its efficient use.

The Commission takes a view that a minimalist regulatory approach and careful procurement will be able to resolve issues of potential market failure. The Telco Authority would request that the Commission include in its analysis consideration of the experiences in jurisdictions such as the United Kingdom, where Government sought to commission a service in a limited market, particularly in relation to its land mobile radio services, the changes in the market for the provision of mission critical LTE services to public safety agencies, and the reasons why these outcomes occurred.

The Telco Authority's submission on the draft report deals with the various issues set out above.

Introduction

The Telco Authority was established by the NSW Government to improve efficiency in the operational communications sector (i.e. those agencies that use operational communications to support their core business activities).

The Authority provided a submission to the Commission in relation to its PSMB Inquiry issues paper[2]. This further submission should be considered in conjunction with the issues raised in the initial advice provided to the Commission, particularly in relation to its commentary on network prioritisation, the allocation of spectrum, the definition of mission critical, the public benefits of PSMB and the lessons learnt in international jurisdictions.

Is dedicated spectrum needed for PSMB?

The Commission has indicated in its draft report that the need for dedicated spectrum is not supported by evidence. On the other hand, it concedes that the ability of commercial providers to provide the services Public Safety Agencies (PSAs) require without dedicated spectrum has not been demonstrated[3]. Issues that may give rise to the need for dedicated spectrum are outlined below:

- **Prioritisation** – The Telco Authority explored this issue in great detail in its initial submission, and it is unfortunate that the concerns raised have been dismissed by the Commission as being based on 'sparse' evidence[4]. Network prioritisation is a significant issue for public safety officials who must be able to connect to a network almost instantaneously. This is particularly the case for distress alerts where connectivity is vital and cannot be delayed. On a commercial network, where there are tens of thousands of handsets seeking access to one site, there can be significant instances of congestion (such as at a large public event like New Year's Eve on Sydney Harbour or during a critical incident such as a terrorist attack), which in some cases can spell the difference between life and death. This congestion on the radio air interface (as well as other points in the carrier's network) prevents the required certainty for the initial network access.

  The Commission indicates that it has received advice from carriers that prioritisation can be addressed through technical solutions. The Telco Authority would be interested in how carriers can achieve such an outcome. In this regard, the Telco Authority would welcome the Commission substantiating this advice in its final report.

[2] http://www.pc.gov.au/__data/assets/pdf_file/0005/192677/sub030-public-safety-mobile-broadband.pdf
[3] Productivity Commission PSMB Draft Report, September 2015, page 23
[4] Productivity Commission PSMB Draft Report, September 2015, page 23

The Commission has recommended that any issues with such technology could be addressed through a pilot PSMB capability. The Telco Authority is concerned that given the present uncertainty around the potential solutions, a pilot may lead to the deployment of a technology and service that ultimately does not work as required, resulting in lost time and resources.

- **Interoperability** – interoperability in this context relates to a device being able to work not just anywhere in the state, but also neighbouring jurisdictions. This is important as first responders are often required to travel interstate to respond to a major incident and provide emergency assistance to other PSAs.

  Carriers operate their various commercial networks on different bands and segments of spectrum. In order for a PSMB capability to be fully nationally interoperable it will need to operate across contiguous and compatible segments of spectrum that will support LTE technology and align with 3GPP band plan and channel arrangements. If different states and territories were to buy a PSMB service from different commercial providers without dedicated spectrum they will be required to operate their service in the bands on which the carrier owns spectrum. Unfortunately, this means that each state and territory would operate in different bands and segments, placing a number of significant technological impediments to interoperability, a key requirement of the Terms of Reference set for the Commission.

  While it is acknowledged that that some devices are multiband and multichannel technology, the fact remains that not all devices support all bands and this remains an impediment to interoperability depending on the final configuration deployed in each state and territory.

The Telco Authority considers that it is within the Terms of Reference for the Commission to make a recommendation on the allocation of spectrum for PSMB purposes, a position also taken by the Commission itself[5]. The Authority also takes the view that there is no impediment to the Commission recommending the allocation of dedicated spectrum for PSMB regardless of the preferred delivery model it recommends, if it is deemed appropriate. This includes for a full commercial offering, where PSMB would be operated on extended and hardened commercial network(s), so as to allow for interoperability and prioritisation.

[5] Public Safety Mobile Broadband Draft Report (section 7.3) – Productivity Commission 2015

Comparison of models for the delivery of PSMB

The Telco Authority has concerns around the modelling undertaken by the Commission in its consideration of various PSMB scenarios.

A particular concern is that while a dedicated service has been costed for the price to the end user, a commercial public offering has only been costed based on the incremental cost to the mobile network operator. This incremental cost does not take into account the price that the end user would pay for the service. Costs that would be charged to the end user could include, for example, the cost of specialist services, costs of equipment upgrades and refreshes, and the premium that a commercial service provider would impose on the service as profit. As PSMB will be a service ultimately paid for by the States and Territories, the end user price to the ultimate customers is the only valid point of reference for comparison purposes.

As discussed in our response to the Issues Paper, the Telco Authority has undertaken a detailed costing of a number of public and private delivery models for a PSMB capability in NSW. The Authority's findings, which are still being validated, are based upon international precedents for highly redundant data services used by public safety agencies. The Telco Authority's analysis, which is based on the cost to the end user for each model, results in a different outcome to that achieved by the Productivity Commission which has only calculated the cost to the community for certain models. For this reason, it is recommended that the Commission estimate the cost to the end user as well as the cost to the community as a whole given that this is the information jurisdictions will use when determining how best to deliver PSMB.

This recommendation by the Telco Authority is supported by the Terms of Reference. The Terms of Reference for the Commission require it to investigate the most cost effective option taking into account the total costs and benefits. Given this, the Telco Authority considers that a full costing of the total cost to the end user is an appropriate measure, and the only one that is in line with the Terms of Reference.

General spectrum issues

Spectrum is critical for PSMB to work effectively. Issues such as congestion, priority and interoperability are more easily addressed through proper spectrum management, that is, by allocating sufficient quantum in appropriate segments. This is because during incidents and emergencies frontline personnel must be able to communicate with each other, irrespective of the cost of the spectrum licence to government. In determining how spectrum could be allocated, there are a number of events over the past few years that may be informative, such as the Commonwealth's previous decision to award spectrum for PSMB purposes and the subsequent conversations and consideration of the appropriate amount and type of spectrum that would be required that followed the decision.

In addition, there are several international experiences that may be informative, such as in the United States and Canadian markets, which have many similarities to Australian in terms of geographical size and diversity and inter-governmental arrangements.

There is a risk of market failure and exploitation if the provider of a service also has control of the spectrum. In such circumstances public safety agencies would not be able to seek an alternative service provider as there would be no spectrum available for them to use. Essentially they would be locked in to one supplier over a long term period creating uncertainty about what services will be provided in the future and at what price, combined with an inability to seek alternative solutions. The Commission has recommended that robust procurement will be able to address these issues. However, it is a feature of markets where there is a limited number of suppliers (such as a monopoly or duopoly) that market power rests with the supplier and that regulatory intervention is often necessary. The Telco Authority would welcome the addition of further advice from the Commission on examples where similar contractual arrangements to those it proposes for PSMB have been successful in its final report.

Commentary on the UK experience

The Telco Authority provided comprehensive advice to the Commission in its original response around the experiences of the UK Government in its management of spectrum for public safety mission critical communications. This was in line with the Terms of Reference for the Inquiry which asked the Commission to consider international experiences. The submission from the Authority focussed on independent advice from Frontier Economics on the UK outcomes. Given the previous experiences of the UK Government, together with its 'early adopter' status for PSMB, the opportunities and weaknesses in that jurisdiction may be highly informative to the Commission. This is particularly the case in relation to the current state of the market for the provision of a PSMB capability and its evolution over the procurement process.

The Telco Authority engaged Frontier Economics to consider how best to maximise competition and efficiency in the delivery of PSMB[6] based on the lessons that emanate from the UK's experiences for land mobile radio and PSMB. Frontier provided advice on issues surrounding the engagement of a commercially provided communications solution in a monopolistic market and the importance of dealing with issues such as the disaggregation of the market, not being able to control all of the inputs for the solution and the risks and uncertainty associated with long term contracting arrangements.

[6] Frontier Economics: Maximising competition and efficiency in the delivery of PSMB – Telco Authority May 2015

Tellingly, in applying the lessons learnt in the UK, Frontier found that market power is most likely to be a problem if the Federal Government were to call for tenders for a single supplier to supply the PSMB for the whole of Australia. In addition, any disaggregation of services (whether by the states or within states) will require the party that coordinates the contracting to also be the party that controls access to the relevant spectrum[7].

Finally, Frontier Economics notes in relation to the market failure in the UK, which is largely due to the uncertainty of requirements, 'in a world in which uncertainty is present to a non-trivial degree, parties to a contract cannot know the future. Because of bounds to their rationality, they cannot allow for all possible contingencies in a contract, and because people behave opportunistically, long-term contracting is dangerous'[8]. We would request that the Productivity Commission considers what options may be available to address this issue.

Underlying assumptions used by the Productivity Commission in its modelling

The Telco Authority is concerned that the Productivity Commission has made a number of inappropriate assumptions in its modelling of the costs of various PSMB delivery options. These assumptions will have a significant impact on the costing of certain options, providing an analysis that will have no comparison to the actual implementation of a capability by the various States and Territories.

Land mobile radio networks will continue until at least 2020 due to planned refreshes, meaning that a viable mission critical voice service will continue to run alongside a PSMB capability

The Terms of Reference for the Productivity Commission Inquiry require the Commission to consider the integration of voice communications that are traditionally carried on narrowband networks for the delivery of a capability by 2020, as well as the sustainability of existing arrangements in the context of rapidly changing technology and the convergence of voice and data services[9].

The Commission has made an assumption that land mobile radio services will continue over the medium to longer term (possibly as long as 2029). This impacts on the costing of various solutions and fails to recognise the benefits of convergence (and no longer being required to operate two separate networks) for certain models.

[7] Frontier Economics: Maximising competition and efficiency in the delivery of PSMB – Telco Authority May 2015
[8] Frontier Economics: Maximising competition and efficiency in the delivery of PSMB – Telco Authority May 2015
[9] Public Safety Mobile Broadband Terms of Reference, the Hon J Hockey MP, 25 March 2015

The Commission's assumption is based on the current status of the land mobile radio networks in certain jurisdictions such as Queensland which has deployed the Government Wireless Network (GWN) in that State's south-east region. This is, however, not a true reflection of current situation across the board or a reflection of whether agencies will seek to realise substantial cost benefits by migrating to a single PSMB offering for both voice and data services at an earlier time. Taking the Queensland example, the GWN does not cover the majority of the State where other, more mature solutions are deployed.

The Commission has also incorrectly assumed that standards and services for voice over LTE will be some way off. In response to this, the Telco Authority notes that the United Kingdom Government is intending to operate mission critical voice over LTE in a very short timeframe (i.e. by 2018 at the latest).

It is essential that the Commission fully considers the costs and benefits of a converged voice and data PSMB capability, as well as the costs of maintaining legacy systems, as required by the Terms of Reference. This is particularly the case for those scenarios where a business grade data service is accompanied by a mission critical Land Mobile Radio (LMR) voice service in regional and remote areas. This is because under this model three different networks will be required, a converged network in metro areas, as well as a business grade data and small mission critical standalone voice network. A different level of benefits will be realised compared to a single fully converged mission critical voice and data service. These include the benefits of an earlier decommissioning of LMR networks and a reduction of the costs associated with running two separate services, substantially improved voice quality and coverage, as well as the lost benefits to rural and regional communities that will have to rely on business grade data services.

For NSW, the Telco Authority has developed a long-term technology roadmap as part of its work for the whole of government NSW Government Operational Communications Strategy. The NSW approach envisages the commencement of a PSMB service for data from 2018 and the commencement of voice services prior to 2020. This is in line with the expectations for a PSMB capability as set out in the Commission's Terms of Reference in that it will include a convergence of voice and data services and be operational by 2020.

That a mission critical availability level of 99.9% is sufficient, and that a definition of what is mission critical does not need to go beyond an availability percentile

The Commission has indicated in the draft report that an availability level of 99.9% is acceptable, and that it is not necessary to define how that level of availability should be achieved. The Commission has undertaken its modelling on that basis. The Commission has incorrectly assumed that PSMB will primarily be used for data services, with voice services continuing to be provided via more resilient LMR networks well into the future.

This position does not take into account that jurisdictions such as NSW are aiming to have a converged PSMB voice and data service operational by 2020 and will require mission critical availability of at least 99.99%.

The difference between 99.9 and 99.99% availability is significant. In real terms, this could mean that a service is unavailable for several extra hours each year, a situation that would be unacceptable to public safety agencies as outages are more likely to occur when the network is needed most (i.e during incidents or emergencies).

It is also important to understand that the concept of mission critical is more than merely a defined availability measure. By definition, an availability of 99.99-99.999% requires a level of redundancy to be built in to the network, as well as sufficient proactive and reactive maintenance.

While the Commission contends that it is not necessary to itemise or account for the costs of the services and resources to make a PSMB capability highly available (i.e. 99.99-99.999% availability), it is common practice across the sector for these matters to be spelt out in service agreements and other contractual arrangements, and included in the price of the services to end-users as well as key performance indicators. Carriers and other critical communications service providers may be in a position to provide their schedule of fees to assist the Commission in its modelling.

That a dedicated network is generally an agency built, owned and operated network; and that a dedicated network has limitations on its ability to scale up and upgrade

The Commission has based a number of recommendations and findings in relation to a dedicated network on the assumption that a dedicated network is a network built, owned and operated by government. The Telco Authority disagrees with this assumption.

A dedicated network can be either agency built or could be built, owned, and/or managed by a range of service providers including carriers, mission critical communications services providers, and communications infrastructure construction and maintenance service providers, etc. on a fee for service basis, providing a number of opportunities for non-government solutions.

In relation to the ability of a dedicated network to scale up and upgrade, this could be significantly reduced if the dedicated network:

- Were to have the capacity to overflow to commercial networks in periods of peak demand; or
- Is part of a larger communications offering by a commercial service provider or providers, whether a carrier or otherwise; or

- Is configured to use spectrum in the 700 MHz band thereby gaining leverage and procurement opportunities from the much larger and innovative North American operational communications product market.

That only small extensions will be required for a commercial network and that other non-mission critical grade services will suffice for regional areas.

The Telco Authority understands that services such as advanced partitioned networks will only work on 4G networks, meaning that a significant expansion of all the carriers' 4G networks would be required to offer that type of service with a footprint that is similar to that of existing agency LMR networks (and meet a likely demand by PSAs that coverage be similar).

Roaming across networks in a multi-carrier solution is possible and viable

At a basic level, the models that consider the inclusion of a number of different commercial networks assume that roaming will be offered by the various carriers. The experience in Australia to date indicates that roaming for this type of proposed dedicated service is not supported by the majority of carriers. In addition, the current technology supporting roaming does not provide seamless communications, with existing calls and data transmission stopped or paused as a user switches from one network to another.