Submission to Productivity Commission

Issues Paper on Public Safety Mobile Broadband

PUBLIC VERSION

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Contents

Section 1. Executive Summary

1.1 Optus welcomes the opportunity to provide initial comments to the Productivity Commission's (PC's) Issues Paper on Public Safety Mobile Broadband (PSMB) (Issues Paper).

1.2 The PC is examining a complex set of issues to recommend the most cost-effective use of scarce and valuable resources to deliver a robust mobile broadband capability for Australia's Public Safety Agencies (PSAs) by 2020.

1.3 These complexities include considering the costs, risks, benefits of a dedicated PSMB network, versus a PSMB network that relies on commercial networks (Public Land Mobile Networks [PLMN]) or a 'hybrid' option. It also includes consideration of what capability is required, whether this capability is scalable and ensuring the solution is nationally interoperable across both jurisdictions and agencies.

1.4 Since 2010, Optus has participated in a diverse range of forums with PSAs and Government to assist determine how best to deliver a national PSMB capability.

1.5 Optus is a supplier of both fixed and mobile services to PSAs.

1.6 We participate, with the PSAs, the Australian Communications and Media Authority (ACMA) and the Department of Communications (DOC) in: the 'National Emergency Communications Working Group'; the 'Emergency Call Service Advisory Committee'; and the 'Communications Security and Enforcement Roundtable'. Next generation communication capability for PSA's is a key focus of these Committees.

1.7 Optus supports the analytical approach proposed by the PC to undertake a 'first principles' analysis on the most efficient, effective and economical way of delivering a PSMB capability by 2020. It is important that all options are subject to a proper cost-benefit analysis and policy proposals address an identified problem and implement a solution that results in a net benefit to the community.

1.8 It is Optus' view that the PC's analysis consider the following:

(a) Between June 2012 and June 2015, Australian mobile carriers have invested $3662.7 million in mobile spectrum purchases and spectrum access charges for licence re-issue;

(b) For this year, Optus planned capital expenditure across its networks in Australia will grow from AUD $1.4 billion to AUD $1.7 billion to further expand our network, meet the growing demand for data and drive better customer experience across our networks;

(c) The capacity of existing commercial networks to deliver a PSMB capability should be explored against PSA requirements;

(d) It is doubtful that a stand-alone set of infrastructure for PSA use would remain entirely immune from damage in the event of a major catastrophe. It therefore may be difficult to reconcile this fact with the significant expense required to create new infrastructure;

(e) Physical diversity is a higher priority for a PSA network than commercial networks. A PSMB network needs to deliver the most benefit during an emergency situation or an extreme weather event, which are also times where the risk of commercial network

degradation or failure is highest. As such, a PSA network should be able to access more than one commercial network to avoid the consequences of a single point of failure;

(f) There may be a net benefit if a PSMB network is extended beyond the reach of existing commercial networks. If so, this would create an opportunity for a PSMB network to be co-built with commercial partners on an open-access model basis;

(g) The potential need for a PSMB network to extend beyond commercial networks highlights the need to reform the Universal Services Obligation (USO); and

(h) Reform of the USO could release $100 Million per annum of public funding to develop a PSMB capability in currently underserved areas. Such reform would result in a higher net benefit to the community than current USO arrangements.

Section 2. Current Arrangements

Emergency Situations and Disaster response

2.1 Optus builds, operates and maintains fixed, mobile and satellite networks that are actively monitored and managed to ensure efficient and effective operation, including an emergency situation or an extreme weather event.

2.2 Optus' sophisticated network monitoring capability allows us to respond quickly to sudden spikes in traffic loads and maintain network integrity and capacity during peak demand periods created by an emergency event.

2.3 The recent Cyclone Marcia in North Queensland provides an example of how Optus responds to an emergency situation caused by a natural disaster.

2.4 At its peak, the cyclone affected 52 Optus mobile sites and required the use of back-up generators to address power outages and a portable satellite cell to ensure services were rapidly restored. Optus closely monitored how the cyclone affected our mobile and fixed networks and communicated regular updates on the status of restoration efforts via: the Queensland Government's Disaster Management Taskforce; the Premier's office; the Minister for Emergency Services; and local media outlets. A social media strategy was also executed that provided localised updates via Facebook and Twitter.

2.5 Optus supported communities affected by Cyclone Marcia by for example, distributing pre-paid SIMs for local residents, offering satellite loan phones for emergency services and a free mobile phone recharging service. Financial assistance was provided to support affected customers and included free call diversion and extended time frames for bill payment.

2.6 Optus closely engages with PSAs during an emergency as a member of the 'Emergency Taskforce' that each State and Territory Government establishes. The taskforces coordinate responses across a range of utilities and government services when an emergency occurs. Optus' input to an established taskforce includes updates on how our networks have been impacted, status of network rectification, and ensuring support for PSAs and affected customers is aligned with their needs.

Determining PSA capability requirements

2.1 A past challenge in determining a PSMB capability has been the inability to consolidate the needs of each PSA's across multiple agencies and jurisdictions.

2.2 Without sufficiently defined and detailed requirements and capabilities it is near impossible to properly assess potential network solutions and the extent to which one or more Public Land Mobile Networks (PLMNs) could satisfy those requirements.

2.3 Determining the scope of a PSMB requirement is a critical step that will create an incentive to develop a range of innovative technical options and ensure that cost estimates are accurate.

2.4 In is important to note that the PSAs set their capability requirements for the current tender for a new PSMB capability in the UK.[1]

[1] https://www.gov.uk/government/publications/the-emergency-services-mobile-communications-programme/eight-organisations-go-forward-to-next-stage-of-bidding-to-run-new-network.

2.5 Optus recommends the PC develop a range of scenarios and an accompanying detailed requirement definition for a PSMB network that would enable the best technical solutions to be identified and potentially costed.

2.6 The other key factor in delivering a PSMB capability is that continuity of service is paramount.

2.7 A telecommunications network can provide service continuity by network redundancy or network diversity or a combination of both.

2.8 Network redundancy is where the physical supply is duplicated. That is, if a network element fails, the secondary or back-up network element can be used to support services.

2.9 Network diversity can be provided by a single network provider, but it is more common for multiple and different infrastructure providers to be engaged.

2.10 Relying on a single supplier or network provides little support for common cause failures and therefore puts service continuity at risk. Such failures could have a number causes, including engineering (for example loss of power, failure of equipment) or extreme weather events (for example, floods, bushfires or cyclones).

2.11 It should be noted that end-to-end network redundancy is prohibitively expensive in a PLMNs and that only the most critical core network elements are duplicated and on 'hot standby'. Access points (base stations), base station backhaul (transmission) and most core network elements are not duplicated.

2.12 That is why the impact of common cause failures is considerably reduced by introducing network diversity, where the supply is duplicated and delivered via a separate network that has diverse and separate paths.

2.13 Network diversity is best provided by employing standalone networks from different telecommunications providers that each use a dedicated, disparate and geographically dispersed network infrastructure.

International Standards

2.14 Optus also recommends that the development of a PSMB capability is aligned with international standards on the basis that Australia:

(a) lags behind international developments in the adoption of policy directions and technical frameworks for next generation emergency communication services which are well established in North America and Europe; and

(b) is a technology taker, not maker.

Procurement Trends

Singapore

2.15 A PSMB concept broadly fits within the global trend for Government's to develop a policy approach to 'smart cities' where technology is the enabler to improve efficiencies in all facets of safety and service delivery.[2]

2.16 For example, the Singapore Government recently announced that its 'Smart Nation' vision has entered the 'build' phase with a focus on infrastructure and services that will serve as a framework for future development.

2.17 The immediate focus will be centred on video analytics for public safety, traffic management and urban services. The Internet of Things (IOT) and sensor technology is another area of priority, primarily for logistics and healthcare.

2.18 Optus' parent company Singtel has been working closely with the Singapore government in an advisory capacity and developing solutions for this initiative.

2.19 Optus will leverage off the expertise being developed by SingTel in Singapore to enhance its capability as a provider of a range of fixed and mobile 'smart city' solutions.

Australia

2.20 Optus has observed an increased propensity for State and Territory PSAs to invest in network redundancy to ensure they have 'failover' capable of supporting emergency service provision in both operational and disaster scenarios.

2.21 Redundant solutions have typically focussed on diverse carrier routes and services inclusive of alternate carriage technologies, for example, fixed versus wireless or mobile versus satellite. PLMNs, to some extent, adopt similar diversity solutions.

2.22 Recent examples of this approach include state government tenders for 'Fixed Wireless Access Network (WAN)' and 'Wireless Network Backhaul'.

2.23 In both instances the respective agencies were seeking redundant supply at all sites within their jurisdiction as well as achieving ongoing commercial tension through competitive contestability instead of following the more traditional government single supply approach.

2.24 There has been a similar approach adopted in the United Kingdom (UK).

United Kingdom

2.25 The current tender in the UK for the supply of a 4G LTE broadband voice and data service, known as the 'Emergency Services Network' (ESN) is relying on commercial network capability, ensuring network resilience and redundancy, and creating competitive tension.

2.26 The UK Government has stated that:

> "Intense competition between bidders for the contracts to run the new Emergency Services Network (ESN) is offering the prospect of significant cost savings for the taxpayer" [3]

[2] Options include establishing fibre access points for PSA and other government agencies access around metro areas with the specific purpose of setting up a command post in advent of an emergency.

2.27 Optus also understands that the UK Government has issued a tender for 'Extended Area Wireless Services' that requires commitment to 98% in-building and 90% geographic coverage as well as 'a government initiative to improve rural mobile coverage'.

2.28 As discussed below, Optus considers there is scope for a new PSMB capability in Australia to extend existing mobile networks to underserved areas, funded via release of the Government's contribution to USO funding.

[3] https://www.gov.uk/government/publications/the-emergency-services-mobile-communications-programme/eight-organisations-go-forward-to-next-stage-of-bidding-to-run-new-network

Section 3. Policy Framework

Overview

3.1 Optus supports the PC's approach to undertake a 'first principles' analysis on the most efficient, effective and economical way of delivering PSMB capability by 2020.

3.2 As part of this approach, Optus offers some comments around the framework, policy and governance structures of providing a PSMB capability and some of the risks and opportunities this presents.

3.3 It is vital PSAs have access to the latest technology in relation to mobile communications services, to both operate on a day-by day basis and to respond to an emergency situation or an extreme weather event.

3.4 It is also vital to ensure that the implementation of any policy recommendations maximise the net benefit to the community. It is Optus' view that a PSMB capability should not duplicate existing commercial outcomes.

3.5 Benefits of a PSMB capability are likely to be maximised where gaps in commercial outcomes can be identified and proposals are put forward to effectively address these gaps.

3.6 Optus also believes that there are strong policy justifications to leverage existing partnerships and co-operation between commercial carriers and PSAs in providing a PSMB capability.

Existing commercial networks (PLMNs) should be utilised

3.7 The PC notes that mobile networks are capital intensive, involve large fixed costs and ongoing operating costs.

3.8 Optus concurs with this assessment and adds that mobile networks require significant and ongoing capital expenditure in order to extend their reach and to enhance their capability in order to maintain or improve their commercial competitiveness.

3.9 There are three existing commercial mobile networks that cover 98%+ of the Australian population. Optus has wide coverage for both its mobile voice services and its 3G and 4G mobile broadband network.

3.10 In the year ending March 2015, Optus invested $1.4 billion in capital expenditure across its fixed, mobile and satellite networks with additional investment in mobile spectrum, of approximately $720 million.

3.11 As a result of these investments, at end of April 2015, Optus' 4G Plus network covers 86% of the Australian population. 4G is now live on 3,383 mobile sites, of which 2,107 have been upgraded using recently acquired spectrum in the 700 MHz band. Optus' 3G network covers 98.5% of the Australian population.

3.12 Optus plans to increase its capital expenditure to $1.7 billion in financial year 2016 - further extending the coverage of its superfast 4G Plus mobile broadband network.

3.13 Considering the significant investment Optus and other mobile network operators have made[4], there would appear to be little justification for replicating the large network footprint of existing commercial networks. There would need to be significant benefits not obtainable through the use (or hybrid use) of existing commercial networks.

3.14 Also, it is doubtful that a stand-alone set of infrastructure for PSA use would remain entirely immune from damage in the event of a major catastrophe. It therefore may be difficult to reconcile this fact with the significant expense required to create new infrastructure.

3.15 A back-of-the-envelope estimate shows that such a proposal would:

(a) be prohibitively expensive;

(b) represent inefficient duplication of network infrastructure; and

(c) likely involve building a network which would remain idle the vast majority of the time.

3.16 The most immediate cost to be faced when building a PSMB network is the high fixed cost nature of mobile networks in Australia. The benefit of a PSMB network would be that it covers both the areas currently served by commercial networks; plus areas deemed not commercial. Clearly if it did not add extra benefits above the use of commercial networks there would be no prima facie case for such a network.

3.17 The PC has identified several components of mobile network costs. Optus notes that the costs estimated only relate to two types of capital costs - radio access network equipment; and backhaul transmission costs. The other cost elements would increase this estimate.

3.18 The cost assessment also does not include the cost of spectrum. Any public body would be required to purchase the spectrum, or consistent with first principles, reflect the opportunity cost of its use (i.e. depriving commercial use of spectrum).

3.19 Spectrum likely to be used, be it 900MHz, 800MHz or 750MHz, would likely range in value between $1/MHz/Pop to $1.36/MHz/Pop. If the PSA network required 15MHz of paired spectrum, this would reflect an additional capital expenditure of between $351 million and $486 million.[5]

3.20 Nor does this include operational costs of running and maintaining the network.

3.21 Operational costs include, for example:

(a) staff to operate, maintain, fault fix and plan and develop the network;

(b) customer care;

(c) property costs for base stations and other fixed infrastructure;

(d) power/electricity costs to run the network;

(e) transmission and backhaul/trunk leases; and

(f) regulatory and other compliance costs.

[4] Between June 2012 and June 2015, Australian mobile carriers have invested approximately $3662.7 million in spectrum purchases and spectrum access charges for licence re-issue.

[5] Assuming population of 23.8 million.

3.22 In order to consider a stand-alone emergency network, benefits greater than these estimates must be shown - and these benefits must be in addition to those obtainable through the use of commercial networks.

Network diversity and competition needs in providing alternative critical infrastructure

3.23 In addition to the commercial costs and benefits of network design and operations, it is vital that an assessment takes into account appropriate levels of risk mitigation and physical network diversity for PSMB networks.

3.24 Optus believes it is important to ensure appropriate regulatory and policy initiatives are in place which is designed to encourage competition and network diversity for a new PSMB capability across Australia.

3.25 As highlighted in the PC's Terms of References, a PSMB network must be resilient and maintain continuity of service under adverse operating circumstances.[6] The Issues Paper identifies the need for the PSMB to operate during large scale emergency incidents. It is noted that:

> *During these incidents demand for communications is expected to be very high in localised areas, and there is uncertainty about timing and location of such events, making them more challenging to plan for. Moreover, in some instances the emergency incident itself may destroy or impair the communications infrastructure or capacity (even if well planned),* ***so the level of network resilience provided is important****. [emphasis added].*[7]

3.26 As discussed in Section 2, there are two benefits arising from an approach that encourages network diversity and competitive supply in providing alternative critical infrastructure:

(a) Competitive network diversity for PSA's will ensure that governments are achieving value for money and maximising efficiencies where possible; and

(b) Use of multiple networks minimise the risks of a single point of failure. In the context of PSA networks, this risk is very real and is largest at times when the use of the PSA network is in its greatest demand. If the PSA network is a standalone network, it will likely suffer exactly the same risk and impairments as the PLMNs in the same area.

3.27 There are many possible ways to achieve network diversity to assist risk mitigation as well as foster competition amongst service providers. A multifaceted approach and consideration of direct and indirect policy settings is important.

3.28 While the probability of network failure is relatively small, the costs can be quite high.

3.29 For example, the 2012 Warrnambool Telstra Exchange fire saw an immediate network impact on fixed line services and Telstra's mobile network. The fire also affected elements of Optus' mobile network - resulting in a loss of nine 2G mobile sites. However, Optus' 3G mobile network was unaffected by the exchange fire and remained fully operational. The presence of Optus' network meant the critical Triple Zero calls were available for all mobile subscribers via the Optus network. In the absence of other network providers 3G network, such calls would not have been possible.

3.30 While this is a localised incident, it does highlight the significant impact a simple fire can have on the ability to use communications networks to make vital emergency communications. If

[6] Productivity Commission's Issues Paper on Public Safety Mobile Broadband, April 2015, p. i.v
[7] Productivity Commission's Issues Paper on Public Safety Mobile Broadband, April 2015, p.6

the PSMB relied upon a mobile network of any one provider, there is a risk that a one-off event could render the network inoperable.

3.31 Optus further notes that the time during which the maximum benefit of PSMB capability is likely to occur is during times of emergency and events in which network outages are highlight likely. There would be public benefits from designing a high level of resilience in any PSMB structure, noting that resiliency costs money and hence there is always a trade-off between resiliency and cost.

3.32 In summary, Optus considers there is merit in both direct and indirect measures by Federal and State and Territory Governments to ensure telecommunications needs for PSAs are sourced from a range of suppliers.

Existing government funding should be utilised

3.33 There are likely to be strong public benefits of having an efficient and effective PSMB network.

3.34 The operation of such a network will incur substantial capital and operating costs, irrespective of the mix between public and private provision.

3.35 It is possible that the largest benefits of a PSMB network will flow from areas which are not adequately covered with commercial mobile networks.

3.36 Optus considers that a relevant policy question to ask is how to encourage efficient and effective extensive of PSMB network capabilities into these under-served regions?

3.37 Optus sees significant benefits in examining the extent to which existing government rural telecommunications programmes could be re-tasked and/or reoriented to support supporting a PSMB capability. Optus notes that ongoing Universal Service Obligation (USO) provides over $330 million of subsidy to Telstra to maintain rural networks – of which the government contributes $100 million annually.

3.38 Whilst the concept of a USO to ensure customer needs are met has widespread industry support, the arrangements to deliver this have been subject to widespread debate and criticism overtime.

3.39 In 2008 The Regional Telecommunications Review, undertaken by the Glasson Committee noted that:

> "*There is substantial controversy about the current USO arrangements and the Committee notes that nearly all stakeholders dislike the current arrangements. ACMA referred to the USO arrangements as a 'broken concept*." [8]

3.40 The Glasson Committee also outlined in some detail the failings of the USO arrangements. In summary it found:

(a) Limited consumer understanding of the USO which was considered to be 'vague' and subject to limited enforcement mechanisms. The committee indicated that in its consultations with the community it has found a poor awareness of the USO arrangements and an even poorer understanding of how they operate;

[8] Regional Telecommunications Review, undertaken by the Glasson Committee, 2008, p 182

(b) That the current arrangements undermine competition since they fund a single supplier. In turn this provides limited incentives for Telstra, as the universal service provider, to improve its performance in high cost areas where it faces no competition;

(c) Funding arrangements that operate as an effective tax on consumers and as such are 'inefficient and not well structured'.

(d) A cost and funding structure which discourages or even precludes the use of alternative and more efficient technologies. There is no obligation on Telstra to use the least cost technology. Further, there is no requirement to ensure that contributions received from Government and industry is invested in the provision of universal services.

3.41 Following on from these well-established views of the existing USO regime, Optus has proposed in other forums potential reforms to the USO regime that would benefit regional end-users.

3.42 Optus has put forward the following arrangements that could be considered as a basis for reform:

(a) NBN infrastructure should be the primary mechanism for ensuring customer connectivity. This should apply to each of the NBN platforms: fibre; fixed wireless and satellite;

(b) To ensure that the standard telephone service is delivered over the NBN infrastructure an Retail Service Provider (RSP) could be designated as retail providers of last resort (this could be Telstra or another RSP);

(c) To the extent that NBN infrastructure cannot provide an adequate standard telephone service (STS) capability to a customer then the service could be provided over copper or mobile networks (if available);

(d) NBN Co should take ownership of the Telstra copper outside the fibre footprint.

(e) Current Government funding for the USO ($100M p/a) could be used to improve mobile coverage within the more remote and underserved areas of Australia, thereby providing additional funding to subsidies such as the Australian Government's Mobile Black Spots Programme.

(f) More importantly NBN Co will likely have stronger incentives than Telstra to ensure that the USO can be delivered by its alternate platforms, enabling it to decommission the copper more quickly and reduce its costs to serve;

(g) Separate industry funding for the USO would not be required as the costs of supply will be included in access charges.

3.43 In the context of extending the reach of PSMB networks into underserved areas, Optus sees merit in (e) above. That is, current government funding of $100 million per year could be used to improve mobile network coverage in remote areas for both PSA and commercial network operator use.

3.44 There would be clear public benefits from this approach. The use of USO funding in this manner could assist either a stand-alone PSA network, or the annual operating costs incurred by public service agencies for use of a commercial network.

Section 4. Governance

4.1 Optus also supports the PC recommending a review of or propose a preferred option for the governance of emergency services in Australia with a key objective being determining where the responsibility for a PSMB capability would lie.

4.2 This would include establishing a view on the respective roles of TUSMA, the Department of Communications, the Australian Communications and Media Authority, the Triple Zero operator and the National Broadband Network.

4.3 It will also be important to link how the recommendations will interact with and take account of the current Department of Communications 'Review of the National Triple Zero (000) Operator' and other developments in next generation communication options for emergency communications.