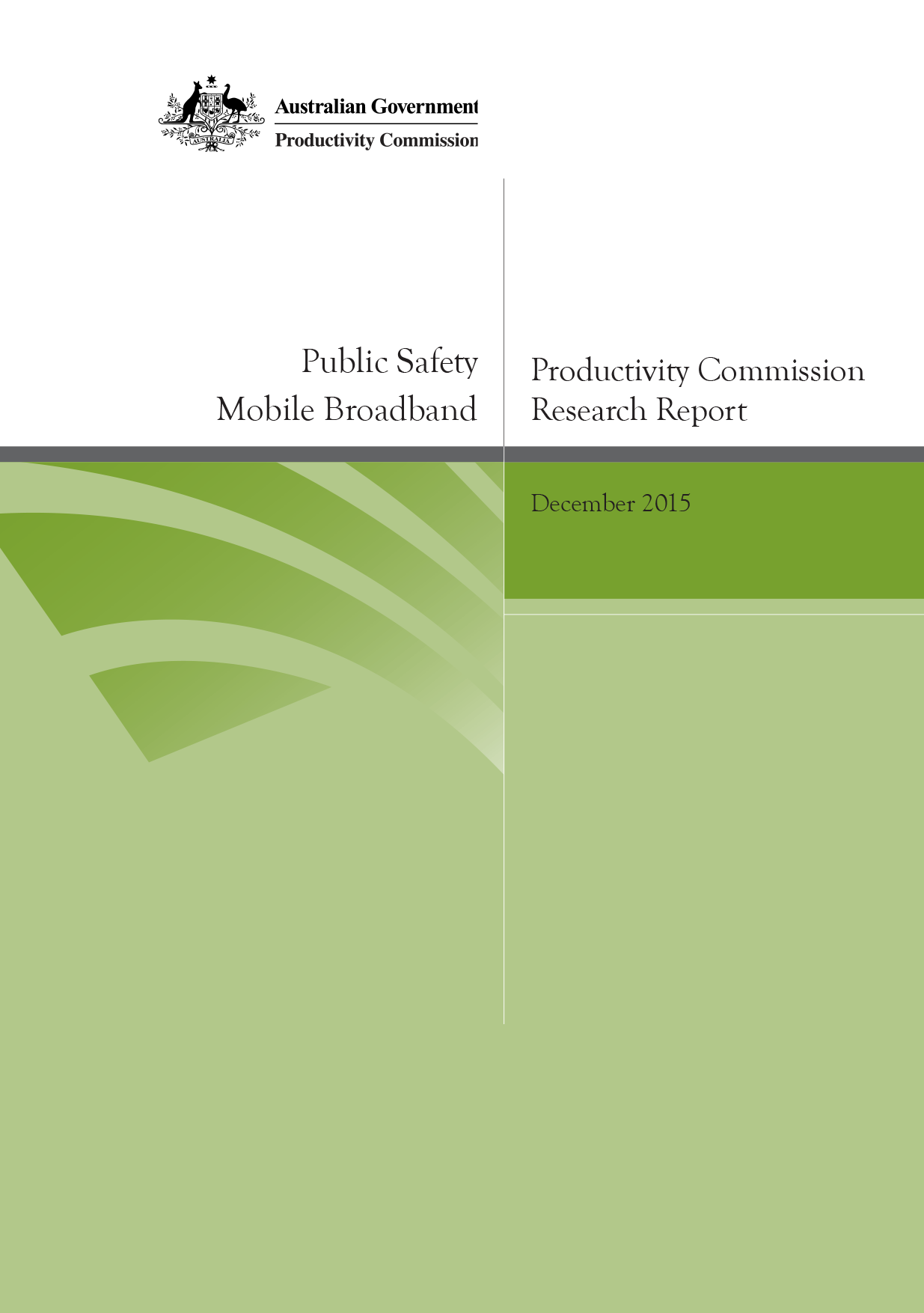
Public Safety Mobile Broadband

Productivity Commission Research Report, December 2015

Commonwealth of Australia 2015

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|  |

# Foreword

Mobile broadband offers significant potential to improve how police, fire, ambulance and other public safety agencies deliver their services, saving lives and property. Live video streaming between a fire crew and central command, for example, enhances situational awareness and facilitates the efficient deployment of resources, driving productivity gains and better officer safety. However, public safety agencies have made only modest use of mobile broadband to date due to concerns that the quality of commercial services is insufficient to support ‘mission critical’ situations.

Against this background, the Commission has been asked to examine the best way to deliver a ‘public safety grade’ mobile broadband capability. The report considers the relative costs, benefits and risks of a range of options, including deploying a dedicated network, relying on commercial networks, or pursuing some combination (or hybrid) of the two.

Our study has found that — on first principles — the most efficient, effective and economical way of delivering a public safety mobile broadband capability is by relying on commercial mobile networks (and spectrum). The technology required to deliver such a capability exists today, although the precise service standards that would be achieved are uncertain. Small-scale pilots would help jurisdictions resolve this uncertainty, gain confidence in a commercial approach and develop a business case for a wider‑scale roll out.

If governments decide to put in place a public safety mobile broadband capability there are implementation challenges. Competitive procurement will be essential to deliver value for money and to reduce the risk of being locked in to a single supplier. And interoperability between jurisdictions and agencies is within reach, but will depend on jurisdictions agreeing to common interoperability protocols and making arrangements for sharing information and network capacity among agencies.

The study has benefited from input and submissions from many stakeholders in the government, public safety and business sectors. We are grateful to all those who have given their time to share their experiences and expertise with the Commission.

Jonathan Coppel  
Presiding Commissioner

December 2015

# Terms of reference

**Public Safety Mobile Broadband**

I, Joseph Benedict Hockey, Treasurer, pursuant to Parts 2 and 4 of the *Productivity Commission Act 1998,* hereby request that the Productivity Commission (the Commission) undertake a study into the best way to secure a mobile broadband capability to meet the long term needs of Australia's public safety agencies (PSAs): the police, fire, ambulance and emergency services.

### Background

A robust and effective mobile broadband capability is a critical enabler for Australia's PSAs.

Since June 2011, the Commonwealth has worked with jurisdictions and PSAs - through the Council of Australian Governments (COAG) Public Safety Mobile Broadband (PSMB) Steering Committee - to consider how best to deliver a strong PSMB capability. On 19 April 2013, COAG transferred responsibility for PSMB from the Steering Committee to COAG Senior Officials and, in doing so, noted the need for PSAs to have adequate capabilities to respond efficiently and effectively when disasters occur.

Delivering a PSMB capability is complex and involves using scarce and valuable resources, such as radiocommunications spectrum, to further the public interest. To inform this work and ensure the best path forward, the Commonwealth considers it appropriate to undertake a rigorous analysis of the most efficient, effective and economical means of developing Australia's PSMB capability.

### Scope of the study

The Commission is to undertake a 'first principles' analysis of the most efficient, effective and economical way of delivering this capability by 2020, to coincide with the nationally agreed framework to improve government radio communications, including interoperability.[[1]](#footnote-2) Particular regard should be given to:

1. The most cost-effective combination of private and public inputs, services and expertise to deliver the capability. This should include an assessment of the relative costs, benefits and risks of:
   1. deploying a dedicated PSMB network
   2. an approach that is fully reliant on commercial networks, and/or
   3. a combination of the two.
2. The ability for the capability to:
   1. be nationally interoperable, within and across agencies and jurisdictions
   2. operate in both metropolitan and regional Australia
   3. integrate voice communications that are traditionally carried on narrowband networks
   4. maintain integrity and security of communications
   5. ensure accessibility, priority and sufficient capacity for PSAs, particularly during periods of peak demand and during a localised incident
   6. be resilient and maintain continuity of service including under adverse operating circumstances
   7. consider the sustainability of arrangements in the context of rapidly changing technology and increased demand, including convergence of voice and data services
   8. be cost-effective, in terms of both capital and operating cost
   9. be nationally available by or before 2020, and
   10. be compatible with a variety of end-user devices.
3. Relevant domestic and international reports and experiences (e.g. work underway through the Asia Pacific Telecommunity Wireless Group (AWG), International Telecommunication Union (ITU), 3rd Generation Partnership Project (3GPP) and implementation of similar capability in other countries) that may be applicable to Australia.

In conducting the analysis, the Commission is to have regard to the Australian Communications and Media Authority's (ACMA) role as the independent national regulator and technical expert on communications matters, with final decision-making responsibility for allocation of and conditions of access to spectrum. The Commission should also, where practicable, have regard to the Government's broader review of the spectrum policy and management framework.

Based on information provided by PSAs about their operational requirements, the ACMA has previously conducted an engineering analysis into the spectrum requirements for a PSMB capability. This analysis was carried out within parameters established by the Public Safety Mobile Broadband Steering Committee (PSMBSC) and the Terms of Reference for that committee. However, spectrum alone will not achieve a PSMB capability as infrastructure and supporting networks with compatible end-user equipment are required. The Commission's analysis is concerned with an overall consideration of the most efficient, effective and economical way of delivering this capability, including a re-evaluation of user needs and project requirements given the passage of time.

### Process

The Commission is to consult broadly, including with industry and non-government stakeholders, state and territory governments, and PSAs and relevant Commonwealth agencies.

The Commission will produce a draft and a final Report, both of which will be published. The final Report is to be provided to the Government within nine months of the receipt of these Terms of Reference.

J.B. HOCKEY

Treasurer

**[Received 25 March 2015]**

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# Abbreviations

2G Second generation

3G Third generation

3GPP 3rd Generation Partnership Project

4G Fourth generation

5G Fifth generation

ACCC Australian Competition and Consumer Commission

ACMA Australian Communications and Media Authority

APT Asia-Pacific Telecommunity

ARP Allocation and Retention Priority

BAU Business as usual

bps Bits per second

BSS Business Support System

CAD Computer Aided Dispatch

CBA Cost–benefit analysis

CBD Central business district

COAG Council of Australian Governments

COW Cell on wheels

ESN Emergency Services Network

GB Gigabyte

GHz Gigahertz

GPS Global Positioning System

GRN Government Radio Network

GSM Global System for Mobile Communications

GWN Government Wireless Network

HF High frequency

HSDPA High-Speed Downlink Packet Access

IC Industry Commission

IoT Internet of Things

IP Internet protocol

IT Information technology

ITU International Telecommunication Union

ITU-R International Telecommunication Union radiocommunications sector

kbps kilobits per second

LMR Land mobile radio

LTE Long Term Evolution

M2M Machine‑to‑machine

MAPL Maximum allowable propagation loss

MB Megabyte

Mbps Megabits per second

MDN Mobile Data Network

MDT Mobile Data Terminal

MFB Metropolitan Fire Brigade

MHz Megahertz

MIMO Multiple Input Multiple Output

MVNO Mobile Virtual Network Operator

NBN National Broadband Network

NCCGR National Coordinating Committee for Government Radiocommunications

NPV Net present value

OECD Organisation for Economic Co‑operation and Development

OSS Operations Support System

P25 Project 25 digital radio

PC Productivity Commission

PLMN Public Land Mobile Network

PPDR Public protection and disaster relief

PSA Public safety agency

PSMB Public safety mobile broadband

PSMBSC Public Safety Mobile Broadband Steering Committee

PTT Push to talk

QoS Quality of service

RAN Radio access network

SA1 Statistical Area Level 1

SA2 Statistical Area Level 2

SES State Emergency Service

SIM Subscriber Identity Module

SMS Short Message Service

TETRA Terrestrial Trunked Radio

UHF Ultra High Frequency

USIM Universal Subscriber Identity Module

VHF Very High Frequency

WCDMA Wideband Code Division Multiple Access

WLAN or Wi‑Fi Wireless local area network

# Glossary

|  |  |
| --- | --- |
| Capacity | The volume of data that can be transmitted over a mobile communications network at a given point in time |
| Commercial approach | Delivery of public safety mobile broadband over one or more mobile carrier networks |
| Coverage | The geographic area or population over which a mobile network can be accessed to a given standard (such as from within buildings or via a vehicle radio) |
| Dedicated approach | Delivery of public safety mobile broadband over a dedicated network only |
| Dedicated network | A Public Land Mobile Network that is built and operated specifically for the use of public safety agencies |
| Dedicated spectrum | Spectrum set aside for use on a dedicated public safety mobile broadband network |
| Delivery option | A specific way of delivering public safety mobile broadband (within a deployment approach) |
| Deployment approach | A broad way of delivering public safety mobile broadband, such as through a dedicated network, commercial network(s), or a combination (hybrid) |
| Geotype | A class of geographical area that, for the purpose of quantitative analysis, is deemed to have certain characteristics relating to the demand and supply of PSMB |
| Hybrid approach | Delivery of public safety mobile broadband over some combination of dedicated network(s) and mobile carrier network(s) |
| Interoperability | The ability of public safety personnel in different agencies or jurisdictions to communicate over a mobile communications network(s) |
| Land Mobile Radio | A type of mobile communications network that provides voice and narrowband data communications, usually for the exclusive use of public safety agencies |
| Mobile carrier network | A mobile broadband network, operated by a commercial entity, that delivers services to customers |
| Mobile communications network | Any communications network where permanent infrastructure has been deployed to allow users to wirelessly send and receive voice or data communications |
| Mobile Virtual Network Operator | A company that resells services from mobile carriers directly to consumers |
| Network accessibility | The ability of users to establish a connection to a mobile communications network, even when it is congested |
| Overflow | The ability for public safety mobile traffic to be carried over a mobile carrier network once the capacity of a dedicated network has been reached |
| Prioritisation | The ability to give some voice or data traffic preference over other traffic |
| Public Land Mobile Network | Any mobile communications network under the control of a single operator |
| Public safety mobile broadband | Mobile broadband services that meet specific capacity, coverage and quality of service standards for public safety |
| Radio | Any device that can wirelessly send and receive information over a mobile communications network |
| Resilience/ reliability | The ability of a mobile communications network to provide and maintain an acceptable level of service, including in adverse circumstances |
| Ruggedise | To make end‑user devices resistant to heat, pressure or water |
| Security | The prevention and/or rectification of disruption and interception of communications over a network |
| Spectrum | Radiofrequency spectrum used to transmit and receive information over a mobile communications network |
| Standalone network | A communications network that is not integrated with any other network |

1. This is outlined in the COAG-endorsed National Framework to Improve Government Radiocommunications Interoperability 2010-2020. [↑](#footnote-ref-2)