

Regulation Impact Statement

Release of the 1800 MHz band in remote areas

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Executive summary

There is demand from a wide variety of industries to gain immediate access to spectrum in the 1800 MHz band in remote areas of Australia. This demand is predominantly limited to particular 'hotspots', such as populated towns (Mt Isa, Alice Springs) and mining areas like the Pilbara. Demand is driven by the availability of Long Term Evolution (LTE) technology and equipment in the 1800 MHz band to provide ultra-fast broadband to mobile devices. In addition the band is increasingly being internationally recognised as a mobile band and this means that there is the opportunity for industry to benefit from economies of scale in equipment able to be used in the band. For example, mobile telecommunication carriers would be able to deliver 4G services to remote areas; and the mining industry could employ automated mining operations to assist in safety and improve efficiency.

However, the current regulatory arrangements limit the ability for prospective users to access the 1800 MHz band for mobile services. Within remote Australia the band has been used as a fixed services band to deliver communication between two fixed points. These are mainly used for railway signalling or carrying backhaul services as part of the universal service obligations (USO) of telecommunications carriers, allowing telecommunications to be accessed in remote communities.

The Australian Communications and Media Authority's (the ACMA's) spectrum management framework is governed by the object in section 3 of the *Radiocommunications Act 1992* (the Act). The ACMA also takes account of its *Principles for spectrum management* (the principles), which provide guidance on how the ACMA promotes the object of the Act. The key theme of both the object and the principles is to maximise the overall public benefit derived from use of the radiofrequency spectrum.

With demand for access to the 1800 MHz band to deliver mobile services in remote areas continuing to increase, it is timely for the ACMA to review the current regulatory arrangements within the band. This review will allow the ACMA to determine whether the current use of the band is the highest value use; or whether the highest value use would be better facilitated by changed arrangements. In considering the overall highest value of the use of the band, the ACMA will also consider how to best respond to the increased demand for access to the band. Importantly, the ACMA needs to balance the demand of aspirant licensees with the needs of existing services within the band and minimise any unnecessary impact on these services. The ACMA has placed an embargo on the band in order to preserve future planning options while arrangements are reviewed.

The ACMA has investigated options that would respond to the demand for access to the 1800 MHz band to deploy mobile services and take account of the needs of both existing and prospective users. The options available are:

- 1) Maintain the status quo: retain the existing embargo on new services in the band
- 2) Amend the embargo and licence both new fixed and mobile services
- 3) Amend the embargo and licence new mobile services as the primary use of the band, making existing and future fixed services secondary users.

The ACMA has assessed these options in light of its [Principles for spectrum management](#) and the object of the Act. After consultation with stakeholders, the ACMA is of the view that Option 3 would provide the best outcome for both existing and prospective licensees and has the highest net benefit of the options examined. Moreover it would increase the extent to which the benefits associated with mobile broadband are enjoyed by the Australian economy and consumers. Implementing the proposed arrangements would ensure that remote communities benefit from the earlier availability of 4G services. In addition, industries such as the mining sector would be able to deploy 'smart infrastructure' and machine to machine technology for automated operations. This would improve safety and efficiency. At the same time, the option would minimise the impact on existing fixed links, recognising the continuing utility of these services and the anticipated concentration of demand for mobile broadband to 'hotspots'.

Fixed services would still be able to continue provided they would not cause interference to mobile broadband services. It is anticipated that mobile services would only be deployed in 'hotspots' and this would limit the impact upon fixed services. In addition existing licensees have the option to continue operating fixed services using suitable alternative bands or transferring to other technologies such as fibre cables.

The ACMA also considered how best to allocate licences in remote areas. It concluded that administrative assignments would be the most effective regulatory method to meet stakeholder demand for access to the 1800 MHz band to allow mobile services to be deployed. To ensure efficient use of the spectrum and provide an orderly assignment process, prospective applicants would be assigned to specific parts of the band. These assignment priorities are designed to ensure spectrum availability to all prospective licensees. Assignment priorities are used as a spectrum management tool by the ACMA in numerous bands; they are appropriate when (as in the present case) demand for spectrum in any area is not expected to exceed supply.

The ACMA considers its proposed regulatory and licensing arrangements would:

- > Provide capacity to meet anticipated demand for access to LTE technology.
- > Provide industry with opportunities to benefit from international harmonisation and equipment economies of scale.
- > Allow for an increase in the economic and social benefits associated with mobile services to be realised.¹

The ACMA intends to review the licensing arrangements in 2017 to see if they are have achieved the intended goal of improving spectrum use.

¹ Centre for International Economics, [The economic impacts of mobile broadband on the Australian economy, from 2006 to 2013](#) report commissioned by the ACMA.

Glossary

Word	Definition
\$/MHz/Pop	A means by which the ACMA prices the value of spectrum. This is a multiplication of the dollar amount charged for spectrum access, the range of frequency covered (in MHz) and the number of people potentially in the area of the licence.
4G	Fourth generation or 4G is an LTE technology that provides mobile ultra-broadband Internet access to mobile devices.
apparatus licence	An apparatus licence authorises the use of a particular frequency range in a particular geographic location for a period of up to 5 years.
spectrum licence	A spectrum licence authorises the use of a particular frequency band within a particular geographic area for a period of up to 15 years. The geographic area can vary in size up to and including the entire country.
backhaul	Backhaul is a generic term for the interconnection between a radiocommunications site and an external major network. It can be provided by many means of connection. For example a Public Mobile Telephony site is connected via backhaul to the telecommunication company's network so that communication is possible to the wider world. Such a backhaul service is not directly accessed by a subscriber connecting to the service.
cellular	A cellular network is a network of radiocommunications services distributed over land areas called cells. Each cell is serviced by a site operating on a particular frequency range <i>different from its neighbouring cells</i> . Each frequency range is reused by other non-adjacent cells. Therefore frequencies are reused and wide area coverage is achieved efficiently in terms of total required frequency range.
co-primary status	When used in this paper, co-primary status has the same meaning as primary status, with the addition that co-primary

Word	Definition
	services are entitled to protection from other co-primary services.
embargo	A spectrum embargo is a notice of intent by the ACMA to restrict the allocation of new licences in a particular frequency range to support replanning of that frequency range in the near future. Spectrum is still able to be accessed upon application for an exemption to the embargo.
Fixed Service / Fixed link	<p>When used in this paper, a Fixed Service means the operation of a radiocommunications service to allow communications between two locations that do not move, i.e. those points are fixed at a particular location on or near the surface of the Earth.</p> <p>When used in this paper, a fixed link is a specific link used to provide interconnection between two locations that do not move. A fixed service is made up of one or more fixed links.</p> <p>Fixed services/links are used in the 1800 MHz band for backhaul by mobile carriers or signaling on railways.</p> <p>Fixed in this paper does not refer to a telephone or similar device for voice based communications.</p>
HCIS	The hierarchal cell identifier scheme (HCIS) is a naming convention developed by the ACMA that applies unique labels to each five minute arc square cell in the Australian Spectrum Map Grid , derived from the cell's position in a hierarchically arranged group of cells.
international harmonisation	International harmonisation is the desirable outcome where radiocommunications services operate throughout the world with similar technical specifications. This facilitates lower cost equipment due to the economies of scale in the manufacture of such similar equipment.
International Telecommunication Union	The International Telecommunication Union (ITU) is a specialised agency of the United Nations that is responsible for issues that concern information and

Word	Definition
	communication technologies. The ITU coordinates the shared global use of radio spectrum and assists in the development and coordination of worldwide technical standards.
Long Term Evolution (LTE)	Long Term Evolution technology is a technology standard for wireless communication high-speed data for mobile phones and data terminals (such as mobile phones and tablets)
Machine-to-machine (M2M)	Machine-to-machine is technology that allows communications between devices of the same type for the purposes of monitoring or providing sensor capabilities
Mobile Service	When used in this paper, a Mobile Service means the operation of a radiocommunications service to allow communications between two locations that move, i.e. those points are mobile and are not limited to a particular points on or near the surface of the Earth.
Mobile Broadband	Mobile Broadband is another term for wireless internet access.
primary status	When used in this paper, primary status means a radiocommunications service is operating within a particular frequency range as specified in the Australia Radiofrequency Spectrum Plan; and that service is required to not cause interference to other services. That service is also afforded protection from interference from other non-primary services.
Public telephone service licence	A public telephone service (PTS) licence is a type of apparatus licence issued by the ACMA authorising the operation of one or more stations for the provision of a public mobile telecommunications service.
PMTS class B licence	A PMTS Class B licence is a type of licence issued by the ACMA authorising the operation of one or more stations for the provision of a public mobile telecommunications service in a set of particular frequencies. This includes parts of the 1800 MHz band discussed in this paper.
Radiocommunications Assignment and Licensing Instruction	A Radiocommunications Assignment and Licensing Instruction (RALI) is a technical document that outlines

Word	Definition
	frequency assignment and information pertaining to coordination and interference management. These instructions must be adhered to before a licence will be issued.
secondary status	When used in this paper, secondary status means a radiocommunications service is operating within a particular frequency range as specified in the Australia Radiofrequency Spectrum Plan and that service is required to not cause interference to other services. That service is not afforded protection from interference from services with primary status in that frequency range.
smart infrastructure	Smart infrastructure refers to a system of infrastructure that can monitor, analyse, communicate and act based on information captured from sensors. Some smart infrastructure systems will utilise radiocommunications to communicate with the wider world.
Smart meter	A smart meter is a particular type of smart infrastructure and usually refers to an electronic device that records consumption of electrical energy and communicates this information back to the utility provider's central system via radiocommunications means.
Universal Service Obligations (USO)	Universal Service Obligation (USO) is the obligation to ensure that standard telephone services, payphones and prescribed carriage services are reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business. This can be delivered by numerous means including fixed links, satellite and cable services.

1. Introduction

There is increasing demand for access to spectrum in the 1710–1785 MHz and 1805–1880 MHz frequency ranges (the 1800 MHz band) from various industry sectors to deploy mobile services, including in remote areas. This is driven by the availability of emerging LTE, including 4G, technologies to industry and the public for mobile telecommunications and ultra-fast broadband in the 1800 MHz band. The band is increasingly being recognised internationally as a mobile band, meaning that access to 1800 MHz band spectrum would allow industry to take advantage of economies of scale in equipment manufacture.

Under current arrangements the band is generally used as a fixed service band in Australia. The existing regulatory arrangements for the band do not support the deployment of mobile services in remote areas on a large scale, as desired by industry. The band is currently under embargo arrangements restricting new services.

Given the increasing demand from industry and the public for mobile services, it is timely for the ACMA to review regulatory arrangements applying to the band. This review will determine whether existing arrangements are facilitating the highest value use of the band and maximising the benefits of 1800 MHz band spectrum use to the Australian economy and consumers.

One element of undertaking the review of the band is developing a spectrum management strategy for the band in remote areas of Australia. This is intended to address demand for access to the band and identify suitable future regulatory arrangements. These arrangements also need to consider the existing use and users of the band and provide appropriate options to minimise potential impact on these services.

The ACMA commenced [consultation](#) in 2012 with interested stakeholders to identify appropriate regulatory approaches to balance the needs of both existing and prospective licensees in the 1800 MHz band. The consultation process has been undertaken by the ACMA using both formal and informal mechanisms. This has included releasing targeted issue papers as well as engaging with stakeholders both on an individual and round table basis. The intent of this consultation process was to ensure that proposed regulatory arrangements are fit for purpose, taking into account the best available information and views from both existing and potential users of the band as well as other interested parties.

This Regulation Impact Statement (RIS) discusses options to alleviate the demand for access to the 1800 MHz band for mobile services in remote areas. The RIS also considers the impact of these options on existing services. The options presented explain different regulatory approaches to enable mobile services to be deployed in remote areas, taking into account the incumbent fixed services operating in the band, and which of these options provides the highest net benefit.

It is important to note that matters regarding access and allocation of 1800 MHz band spectrum in regional areas are outside the scope of this RIS.

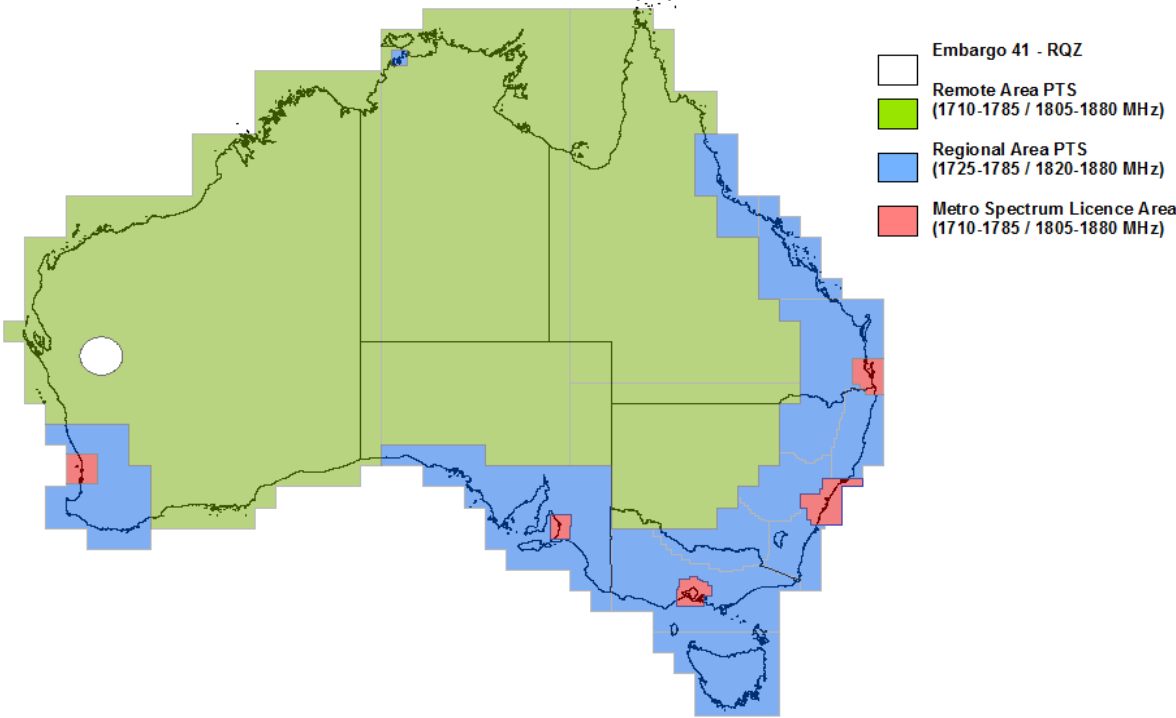
2. Background

2.1 Current licensed arrangements in the 1800 MHz band

In Australia the 1800 MHz band is subject to two different licensing arrangements. In major metropolitan areas and some regional areas, the band is spectrum licensed.² In other regional and remote areas the band is subject to apparatus licensing arrangements. These arrangements are illustrated in Figure 1.

Figure 1 Areas subject to spectrum and apparatus licences in the 1800 MHz band

Band (MHz)	Metropolitan	Regional	Remote
1710–1725 / 1805–1820	Spectrum	Spectrum	Apparatus
1725–1785 / 1820–1880	Spectrum	Apparatus	Apparatus



2.2 Current use of the 1800 MHz band

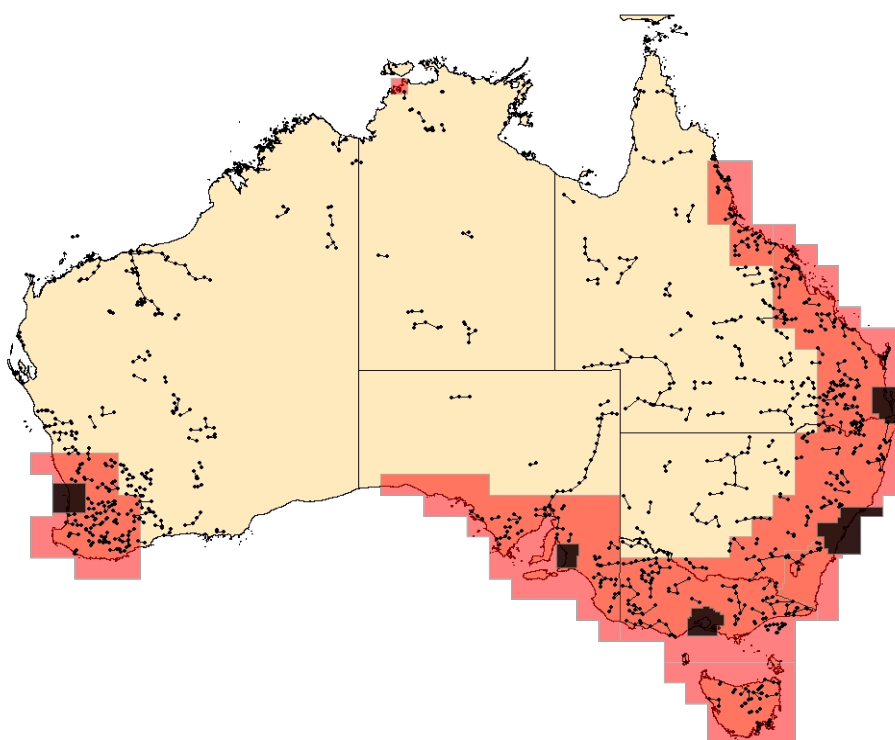
The band is generally used in remote areas for the deployment of fixed services under apparatus licences and coordinated with the requirements set out in a [Radiocommunications Assignment and Licensing Instruction](#) (RALI). RALIs provide

² A spectrum licence can be issued for up to 15 years and provides a licensee with exclusive use of a frequency range in a specified geographic area to deploy services in accordance with the defined technical framework for the band.

advice on frequency assignment policy and coordination procedures with the view to minimising interference and maximising spectrum efficiency.³

Figure 2 shows the number of existing fixed links in the 1800 MHz band operating within the different geographic areas – regional and remote. The regional areas are shaded in red and the metropolitan spectrum licensed areas are shaded in black. In remote areas, there are around 600 fixed service apparatus licences in the band.

Figure 2 Fixed links in the 1800 MHz band



Fixed services operating in remote areas in the 1800 MHz band support the following types of services:

- > rail communications on private rail networks
- > aviation data and communications
- > provision of backhaul services.

Fixed link licences in remote Australia are predominantly held by Telstra and are used for backhaul purposes, including some fixed links used as part of its USO requirements. Other licensees include BHP Billiton, Rio Tinto and Queensland Rail Networks (use the band by Rail includes for railway signalling and communications). Some of the 1800 MHz band is used to provide services that have safety aspects, or are referred to as essential services such as USO.

³ More information on RALI's is available on [the ACMA website](#)

2.3 Future of fixed services

In October 2010, the ACMA published the discussion paper [Changes to Channel Arrangements for Fixed Point-to-Point Links in the Lower Microwave Bands](#), which sought comment on proposed changes to arrangements for services in frequency bands below 5 GHz.

The premise of the paper was that the use of frequency bands below 5 GHz would increasingly come under pressure from the mobile service over time. The paper therefore proposed changes to fixed service allocations that were intended to increase flexibility in the bands to meet the changing needs of both existing and potential users while minimising disturbance to existing licensees. In particular, the paper:

- > identified the 1800 MHz band as being subject to increasing demand to accommodate technological advances and other purposes; and
- > indicated that further restrictions on fixed-link deployments would likely occur as a consequence of replanning activities to support the introduction of new services and expansion of other services in shared bands.

Since 2011, an embargo has applied to the 1800 MHz band ([Embargo 62](#)) stating that no further apparatus licences are to be issued in the frequency band. Spectrum embargoes are an administrative tool used to facilitate orderly spectrum planning and provide a notice of intention by the ACMA to restrict the allocation of new licences in a band, pending its replanning. They also alert existing and prospective licensees to the start of a planning process. In addition, embargoes provide time and opportunity for existing users to consider relocating operations from the 1800 MHz band to alternative bands if viable. Some of the alternative bands for the migration of fixed links include 6 GHz, 6.7 GHz, 7.5 GHz and 8 GHz bands.

It is possible to apply for an exemption to the embargo. To date the ACMA has received exemption applications only for licences to provide mobile services. This tends to support the ACMA's starting assumption that the current arrangements for the band as a fixed service band are no longer optimal and should be reviewed.

In addition to the embargo, a condition has been applied to all existing apparatus licences in the 1800 MHz band stating that the ACMA would undertake a review of arrangements in the band with a possible outcome being the development of arrangements enabling the introduction of new services in the band.

3. Problems

The spectrum management legislative and regulatory framework administered by the ACMA requires active monitoring of possible future requirements and uses of spectrum. This includes ensuring that the spectrum is put to its highest value use, and if this changes over time, that the spectrum is able to move to its new highest value use. In doing this, the ACMA aims to provide both certainty and flexibility to incumbent and prospective licensees. Further information on the legislative and regulatory framework is outlined in Chapter 4.

As described below, recent international and domestic changes in demand for spectrum mean that current regulatory and licensing arrangements for 1800 MHz band spectrum in remote areas may be preventing the spectrum from moving to its emerging new highest value use.

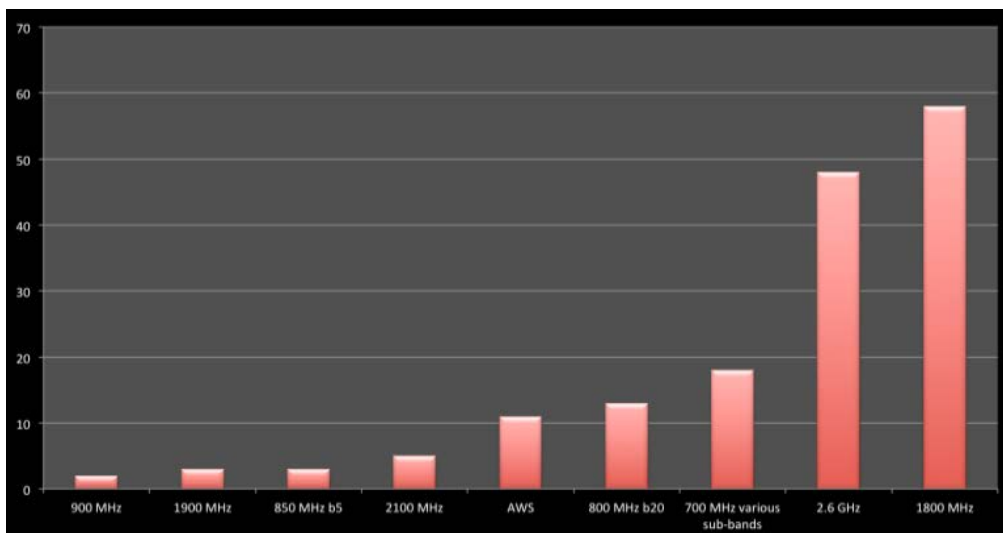
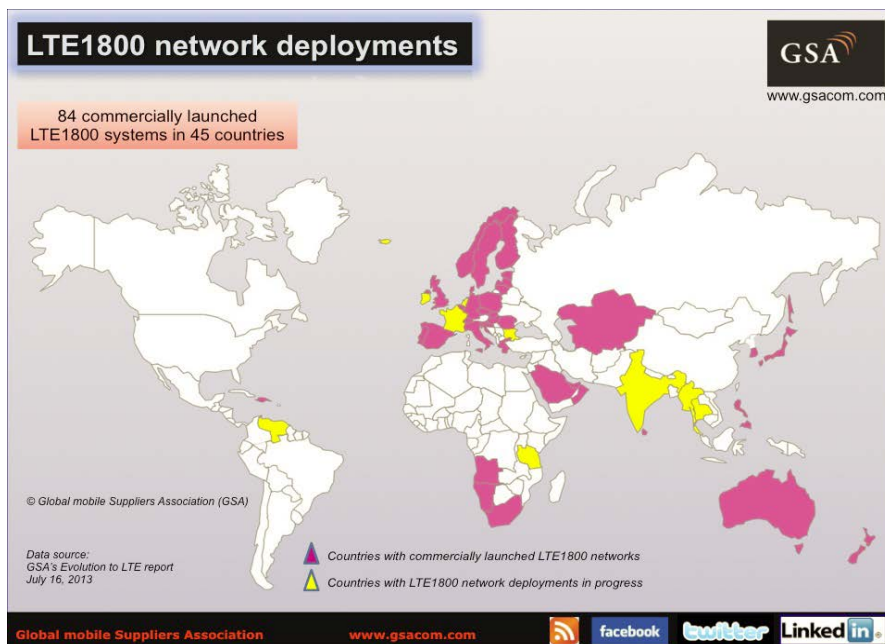
3.1 International arrangements and trends

Globally, consumer and industry demand for access to mobile services is increasing at a rapid rate and is projected to continue for the foreseeable future. ITU studies analysing the future demand for spectrum to support mobile services predict a rise in the bandwidth required to support these services.

At the international level, in response to these increasing demands the use of the 1800 MHz band is changing from fixed to mobile services. As this occurs there are increased opportunities for industry to take advantage of increased international harmonisation and equipment economies of scale. The technical properties of the 1800 MHz band are linked to these changes. The band is suitable for the deployment of 4G and smart infrastructure technologies based on the technical framework and immediate availability of equipment in the band. This sets the 1800 MHz band apart from other spectrum bands in which LTE mobile broadband services are expected to be deployed (700 MHz, 800 MHz and 2 GHz).

The Global Mobile Suppliers Association, an organisation that promotes mobile phone equipment standards worldwide, has recently highlighted the significant expansion in LTE equipment availability for the 1800 MHz band in the international market. The 1800 MHz band is the most widely used band for LTE deployments globally with LTE networks deployed in the band in over 40 countries. Moreover, the number of products that use LTE in the 1800 MHz band has tripled in the last year. Figure 3 provides an illustration of the current global use and networks using LTE in the 1800 MHz bands.

Figure 3 LTE deployments and networks in the 1800 MHz band



> Source: GMSA Evolution to LTE Report 2013

The 1800 MHz band has also been identified in the United States and Canada as an infrastructure band. The US and Canada have both allocated spectrum to be used for smart infrastructure deployments, primarily smart energy networks and automated systems. As a result, Australian infrastructure industries can leverage the international market for LTE capable equipment to deploy in their own respective energy, water, gas, mining or transport industries. Thus, access to the 1800 MHz band in remote Australia would benefit various industry sectors in Australia and, ultimately, citizens and consumers, who would enjoy the flow on economic and social benefits from international harmonisation and equipment economies of scale.

The ACMA has also been approached by equipment vendors such as Huawei and NEC highlighting the availability to Australian companies of LTE equipment in the 1800 MHz band.

3.2 Demand for spectrum to support mobile services

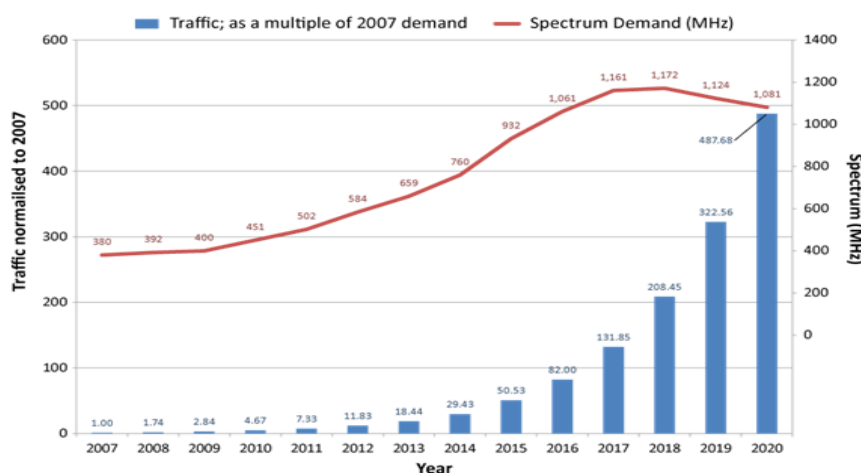
The growth of mobile broadband communications is having an enormous, and increasing, impact of the Australian economy. To illustrate this point, the ACMA released outcomes of a research report highlighting that in 2013, mobile broadband led to an estimated increase in Australia’s economic activity of \$33.8 billion. Of this, \$26.5 billion was attributed to time savings for businesses using mobile broadband.⁴

Spectrum capacity, both in Australia and internationally, is under pressure from the rapid expansion of mobile data applications and the increasing volume of data that is downloaded. Revenue growth from data use is now outpacing revenue growth from voice use. Transmission and reception of data uses a higher amount of bandwidth than traditional voice use.

Smartphones and smart devices (such as tablets) are a major driver in mobile data use. Demand for increased data rates in turn produces demand for increased bandwidth and increased spectrum occupancy. Demand for spectrum is also influenced by growing affordability of mobile broadband, combined with the consumer trend of increased data use.

However, many future applications that will derive their data from mobile services are currently unknown. It is likely that new applications will continue to emerge and therefore the pressure on spectrum will continue to increase as new technologies appear over time. Figure 4 outlines the ACMA’s expectations for data and spectrum demands through to 2020 as outlined in the ACMA discussion paper [Towards 2020—Future spectrum requirements for mobile broadband](#).

Figure 4 Expectations for spectrum demand and traffic out to 2020



The blue bar chart represents data demand based on industry assumptions to 2015 and ACMA trending to 2020. The red curve is the ACMA’s anticipated level of spectrum demand to meet the needs of mobile broadband.

⁴ [The economic impacts of mobile broadband on the Australian economy, from 2006 to 2013](#) report was commissioned by the ACMA and undertaken by the Centre for International Economics

The increasing demand for mobile services demonstrated by developments in technology and consumer take up for smart phones, tablets and other portable, internet connected devices, has increased pressure to make spectrum available for these types of services and devices. As at June 2013, there were an estimated 31.09 million mobile voice and data services in operation in Australia.⁵

The ACMA also expects that demand will increase over time for spectrum to support services such as automated meter reading, e-health applications and mobile-connected vehicles such as driverless trucks. While these are relatively new technologies, rapid growth is expected. As previously outlined, the ACMA has been actively approached from industries looking to employ these technologies.

3.3 Pressure to introduce mobile services in the 1800 MHz band in remote areas

Since 2012 the ACMA has undertaken extensive consultation to identify prospective services and technologies expected to be deployed in the 1800 MHz band and the demand and particular needs identified by various industries.

Increasing pressure for access to spectrum has been noted from the following sectors:

- > telecommunications operators—to deploy next generation communications services (such as 4G for smartphones)
- > railway authorities—to build a national Global System for Mobile Communications – Railway (GSM-R) network to support safety communications and signalling systems. GSM-R is an international standard for wireless railway communications and applications.
- > mining companies—to facilitate autonomous mining and transport systems
- > energy retail providers—to enable the deployment of mobile LTE technology to use for smart meters for monitoring purposes.

This pressure from industry is likely to have been influenced by the growing accessibility of LTE equipment for the band. This is increasingly important for infrastructure users, such as the mining and energy sectors, who would be able to benefit from equipment economies of scale in the band.

Recent correspondence from stakeholders highlights the interest from the mining sector in accessing spectrum in the 1800 MHz band in parts of remote Australia to deploy automated mining operations. Automated mining operations are considered to increase levels of both safety and productivity at mining sites. The ACMA has had ten different mining organisations or suppliers notify their interest in the 1800 MHz band. The kinds of services that are expected to be deployed include:

- > mobile phone and broadband services
- > smart meters and networks for monitoring
- > automated operational systems, including transport and other infrastructure.

⁵ ACMA, [Communications report 2012–13](#), November 2013, p. 22.

3.4 Regulatory and licensing arrangements

The current regulatory and licensing arrangements in the 1800 MHz band are not optimised to enable mobile services to be deployed in the band in remote areas. There are several reasons for this.

First, there is currently an administrative embargo on further apparatus licences in the band, meaning additional apparatus licences would only be issued in special circumstances. Although the embargo was only introduced as a temporary measure to facilitate review of existing regulatory arrangements in the band, it would need to be amended before any wholesale introduction of mobile services into the band.

Second, fixed and mobile services currently enjoy co-primary status in the band. If the co-primary status of both fixed and mobile services is retained, the benefits offered by the introduction of mobile services in the band cannot be realised to the fullest extent. That is, coexistence of both fixed and mobile services will constrain the ability of the band to move to its highest value use in the longer term.

Third, there are large numbers of existing fixed services in the band, which would limit the ability to deploy mobile services as long as coordination arrangements in the band require protection of fixed links from interference. This means that the deployment of mobile services would be constrained as a result of the fixed services currently operating in the band.

3.5 Conclusions

The changes in the international and domestic environment described at 3.1 and 3.2, above, help to explain the increasing demand for access to the 1800 MHz band in remote Australia to deploy mobile services using LTE technology. In particular, the rising demand for a diverse range of mobile broadband applications combined with the immediate availability of equipment is driving demand for access to 1800 MHz band spectrum in remote areas.

The increased demand for additional spectrum to deploy LTE technologies and increased pressure to access the 1800 MHz band is evidenced by the number of stakeholders contacting the ACMA seeking access to the band. These factors indicate that the current use of the 1800 MHz band may no longer represent the band's potential highest value use. In addition, the ACMA is not currently able to respond to the pressure from stakeholders for access to the 1800 MHz band to deploy mobile services. This means that use of the band cannot naturally shift towards an emerging higher value use.

4. Objectives

Many current uses of spectrum enjoy continuing growth and new services are continually being developed. Both the growth in demand for existing services and the changing uses of spectrum need to be supported within what is a finite resource, which is largely already assigned to existing users. The challenge for spectrum managers is to facilitate changes in spectrum use in an environment where the rate of technology change is intensifying. Meeting these challenges require careful planning and the need to make balanced decisions about spectrum use.

The ACMA plans and manages spectrum use in Australia. This includes monitoring compliance with licensing requirements and investigating complaints of interference to services. The ACMA runs a continual program of critical evaluation of demand and spectrum access requirements across all sectors to better understand the complex and dynamic interaction of social, economic and technical factors that drive spectrum requirements.

The ACMA's spectrum management framework includes the object of the Act and the *Principles for spectrum management* (the principles). The key theme of both the object and the principles is to maximise the overall public benefit derived from use of the radiofrequency spectrum.

The matters discussed in this paper directly relate to paragraphs (a), (c), (e) and (f) of the object of the Act, which are to provide for the management of the radiofrequency spectrum in order to:

- (a) Maximise, by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radiofrequency spectrum.
- (c) Provide a responsive and flexible approach to meeting the needs of users of the spectrum.
- (e) Provide an efficient, equitable and transparent system of charging for use of the spectrum, taking account of the value of both commercial and non-commercial use of spectrum.
- (f) Support the communications policy objectives of the Commonwealth Government.

The ACMA's review of the 1800 MHz band is also informed by and is consistent with [the ACMA's Principles for Spectrum Management](#):

- Principle 1—Allocate spectrum to the highest value use or uses
- Principle 2—Enable and encourage spectrum to move to its highest value use or uses
- Principle 3—Use the least cost and least restrictive approach to achieving policy objectives
- Principle 4—To the extent possible, promote both certainty and flexibility
- Principle 5—Balance the cost of interference and the benefits of greater spectrum utilisation.

The Principles aim to be consistent with good regulatory process as they provide guidance and directions that will assist the ACMA in its decision making.

As previously highlighted, there is increased demand for access to the 1800 MHz band in remote areas. The current regulatory arrangements in the band do not enable this to occur. To ensure that it is promoting the objects of the Act and the Principles outlined above, the ACMA is reviewing the licensing and regulatory arrangements across the band. The policy objective of this review, expressed at its broadest and simplest, would be ensure that the 1800 MHz band is able to be used by its highest value use in remote areas of Australia and the public benefit derived from the band is being maximised (object (a); Principles 1 and 2).

Any change in licensing and regulatory arrangements would also need to take account of other relevant parts of the object and the principles, for example:

- They should allow a responsive and flexible approach to meeting the needs of users of the spectrum;
- The spectrum charging arrangements should take account of the object at (e);
- Any relevant communications policy objectives of the Commonwealth government should be supported;
- The approach taken to achieving the policy objective should be the least-cost and least-restrictive;
- The ACMA should seek to maximise both certainty and flexibility, and strike an appropriate balance between managing interference and maximising spectrum utilisation.

To further assist with developing efficient and effective regulation, the ACMA adheres to the Australian Government's best practice regulation processes. This includes considering the various policy options and making an assessment of the costs and benefits associated with each option. The aim is to ensure that the highest net benefit is derived from the policy option chosen. This is performed in a transparent and accountable manner to help reduce the regulatory burden upon business, communities and individuals.

This RIS document is a vital element of the process.

5. Options that may achieve the objectives

As outlined in chapter 3 there are problems surrounding the regulatory arrangements and current use of the 1800 MHz band in remote areas. Principally these arrangements constrain the deployment of what is now considered to be the highest value use of the band – mobile services.

However, it is anticipated that deployment of mobile services in remote Australia would be limited to specific areas, mainly larger population centres or mining 'hotspots' for the use of M2M technology. This emphasises the importance of identifying future arrangements for the band that maintain an appropriate balance between the needs of existing services and users and allow the introduction of mobile services. These arrangements include identification of an appropriate licensing type and an allocation mechanism to allow equitable access to the band.

In light of this the ACMA has identified three options to encourage and enable 1800 MHz band spectrum to move to its highest value use in remote Australia. The options available are:

- 1) Maintain the status quo (no new services)
- 2) Licence both new fixed and mobile services (as co- primary services)
- 3) Licence new mobile services (as primary service, making fixed services secondary).

Provided below is a very brief overview of the impact of each of the options. Further information on the impact of the regulatory changes required for each option, including identifying appropriate licensing and allocation approaches, is provided in chapter 6.

5.1 Options

Option 1 – Status quo: No new services

Embargo 62 would remain in place. The existing coordination arrangements in the 1800 MHz band, which are optimised for fixed services, would continue. This option would not allow any new apparatus licences, for either fixed or mobile services, to be issued in the 1800 MHz band in remote Australia, except under specific embargo exemption requests.

Option 2 – New fixed and mobile services (co-primary)

Embargo 62 would be amended to release the 1800 MHz band for the issuing of new fixed and mobile services licences. Coordination arrangements in the 1800 MHz band would be available for both fixed and mobile services. This would enable the ACMA to issue apparatus licences in the 1800 MHz band to facilitate the deployment of new services in remote Australia.

Option 3 – New mobile services only (fixed services secondary)

Embargo 62 would be amended to release the 1800 MHz band for new mobile services only. That is, coordination arrangements in the 1800 MHz band would be optimised for mobile services. The status of fixed links would be changed from primary

to secondary to facilitate the change in use of the band from fixed to mobile services over time. This option would make spectrum available for mobile services in remote Australia, while permitting the continued operation of fixed links to the extent they do not interfere with mobile services.

6. Impact analysis

The information provided in the preceding chapters demonstrates there is evidence that the highest value use of the 1800 MHz band spectrum has changed over time in remote areas. The ACMA has identified and considered options to facilitate use of the 1800 MHz band in remote areas of Australia moving to its highest value use.

This section provides analysis of each of the options outlined in chapter 5, including a detailed explanation and a table outlining the cost/benefit assessment of each option. This section also examines any impact on the existing users of the band (predominantly fixed services). In assessing these options the ACMA has taken into consideration its spectrum management framework. It has also sought to identify the option that provides the highest net benefit in order to achieve best practice regulation.

Finally, this section considers licensing types and allocation mechanisms that would be appropriate if the preferred option is to be implemented

The ACMA notes that the extent of information that is available to quantify costs and benefits is limited. Private valuations for spectrum are sensitive commercial information that the ACMA does not have access to. In addition, the ACMA is not able to access companies' revenue gained from either fixed or mobile services. This makes it difficult to produce a reliable estimate of the costs/benefits of existing services compared to future and emerging demand.

However, the ACMA has made an assessment, based on its best available knowledge, of potential costs for licensees redeploying fixed services. The ACMA estimates that licensees would incur an upfront cost of approximately \$1 million to replace and/or retune equipment. This cost is offset by the removal of the embargo which will enable licensees to gain access to the band. That is, aspirant licensees would no longer be required to apply for embargo exemptions and incur the associated delay costs before any licence is issued.

It is also important to note that the ACMA intends to implement licensing of fixed and mobile services on a co-existence basis. That is, incumbent fixed services would be able to continue operating should they choose to do so. Therefore, the ACMA expects that the requirement to redeploy will be limited.

These costs have been reflected in the assessment of regulatory costings (see table 2 in chapter 8)

6.1 Options

Option 1 – Status quo (no new licences except under specific embargo exemption requests)

Under this option, existing fixed-link licensees would not be required to relocate from the band. This option would therefore benefit the current fixed link licensees. However they would be unable to obtain further licences except via embargo exemption applications.

The existing coordination arrangements in the 1800 MHz band are optimised for fixed services. Under this option, there would be no arrangements to allow for the

introduction of mobile services in the 1800 MHz band. This would result in an underutilisation of spectrum in a band identified internationally for mobile broadband services. The only way that new licensees could obtain access to the spectrum would be by applying for an embargo exemption, which places an administrative burden upon them.

The ACMA does not consider that this option provides any additional benefits to Government, business or consumers. For example, this option:

- Limits competition for mobile telecommunications services in remote areas;
- Limits benefits that may be realised by consumers from increased competition and availability of services;
- Prevents new technologies being deployed and limits or prevents the expansion of other services;
- Leads to an underutilisation of spectrum and associated inefficiencies;
- Prevents the band from moving to its highest value use; and
- Does not meet the Principles for spectrum management or the objects of the Act.

Costs

- No costs to Government as no change has been made
- Delay costs for business associated with access to spectrum suitable for 4G and smart infrastructure technologies
- Limits competition and consumer choice in remote Australia.

Benefits

- Continued operation of existing fixed services.

Option 2 – Licence both new fixed and mobile services

Under this option, existing fixed-link licensees would not be required to relocate from the band. Coordination arrangements in the 1800 MHz band, currently optimised for fixed services, would be amended to allow for the introduction of mobile services in the band. The embargo would be amended so that the ACMA could consider applications for both new fixed services and mobile services.

Any new apparatus licensees – whether fixed or mobile - would be required to coordinate with existing fixed services before commencing operation. New services would not be permitted to operate if they interfered with the existing fixed service.

This option allows operators to potentially deploy some LTE services in remote Australia. This option therefore to some extent:

- > Enables increased utilisation of the 1800 MHz band in remote Australia;
- > Reduces delay costs with respect to the deployment of LTE services; and
- > Facilitates competition amongst mobile operators in remote Australia.

However, given the extensive deployment of existing fixed links (as shown in Figure 2), this approach would significantly restrict the roll out of new services to remote Australia. It would therefore undermine the effectiveness of releasing the band for mobile services.

Existing services in the band enjoy a first-in-time coordination benefit with respect to any new services. The introduction of new services, using different communications standards, would not therefore not impact on existing services. However, new services could not be licensed if they were assessed as potentially causing interference to existing services.

Coexistence between fixed links and mobile services is possible through the development of appropriate coordination criteria. However, this would be a spectrally inefficient solution for the following reasons:

- > The channelling arrangements for fixed services do not align with those for mobile services;
- > The duplex split of the lower and upper bands for the services are different; and
- > Coordination may be required with co-channel and adjacent channel fixed link licences.

While mobile services are expected to be confined to particular 'hotspots', deployment of mobile services would be severely restricted where fixed links are deployed. This could result in limited rollout of services in some of these remote locations.

This option would increase, but not maximise, the public benefit derived from use of the spectrum. because demand for mobile services including broadband, smart networks and remote automation systems in the band would not be able to be fully met because the deployment of mobile services would be limited by the existence of fixed services.

Costs

- Administrative costs to business and Government to identify fixed links
- Compliance costs involved in coordinating new mobile and fixed-link services

Benefits

- Provides some relief for demand for LTE services
- Possible short term arrangement
- Reduces delay costs relating to the deployment of LTE services to some extent
- Provides for limited expansion of some mobile services to remote consumers and commercial operations

Option 3 – Licence new mobile services only

Under this option, mobile services would be given primary status in the 1800 MHz band and the status of fixed services would be changed to secondary. Coordination arrangements in the 1800 MHz band, currently optimised for fixed services, would be amended to support the introduction of mobile services in the band. The embargo would be amended so that the ACMA could consider applications for mobile services.

New mobile licensees would not be required to coordinate with existing fixed services because fixed services would have a secondary status in the band. Fixed links could continue to operate, but would be required to accept the risk of interference from

mobile services. Alternatively, fixed link licensees might choose other options like moving to a different band. These options are further discussed in section 6.2 below.

The ACMA notes that because demand for licences for mobile services is expected to be largely located in 'hot spots', many fixed links may be able to continue operation largely unaffected by mobile services. The underlying principle being served here is that if there is no demand for mobile services in an area, then fixed links will remain the 'highest value use' for the spectrum in that area.

Option 3 is expected to maximise the potential for the 1800 MHz band to move to (or remain at) its highest value use in remote areas. This supports Principle 1 of the ACMA's spectrum management principles. Making additional spectrum available for mobile services is also consistent with responding to the ITU's forecast for future demand for spectrum to support mobile services. It would also provide immediate access for the deployment of LTE equipment and 4G technologies services including mobile broadband, smart networks and remote automation systems in remote Australia. This would enable the realisation of the economic benefits associated with improvements in technology for both industry and consumers.

Costs

- Administrative costs to business and Government to identify fixed links
- Possible relocation costs for holders of existing fixed links (relocation is not the only option available to licensees – see section 6.2)

Benefits

- Aligns with international trends and arrangements
- Leverages immediate availability and commercial benefits of LTE equipment
- Provides competitive mobile telecommunications
- Addresses demand for LTE services
- Reduces delay costs relating to the deployment of LTE services
- Maximises public benefit and encourages spectrum to be used for its highest value use

6.2 Preferred option

Option 3 is the preferred regulatory outcome to be implemented in the 1800 MHz band in remote Australia. This option aligns with the objectives outlined by the ACMA in its spectrum management framework (the objects of the Act and the principles) and best practice regulation processes. Importantly, the preferred option maximises the overall public benefit derived from use of the radiofrequency spectrum. It ensures:

- > Advantages can be realised by leveraging the economic and social benefits from international harmonisation and equipment economies of scale.
- > Realisation of the greatest net benefit of the three options considered.
- > The possible increase in competition for mobile services due to the availability of spectrum for new and existing operators.
- > Maximisation of the public benefit derived from the use of spectrum in the 1800 MHz band through the delivery of services other than just fixed services.

6.3 Existing services

The ACMA has also considered options available to existing fixed link licensees if option 3 is implemented.

The proposed introduction of mobile services in the 1800 MHz band in remote Australia would have some impact on existing licensees of fixed services. Existing licensees would need to consider whether their business case was best supported through continuing to deliver in the 1800 MHz band or seeking alternative arrangements. Fixed service licensees have a variety of alternatives. In summary these are:

- 1) relocation to a different band
- 2) use of a different technology, for example fibre cable
- 3) remaining in the 1800 MHz band as a secondary service, or
- 4) ceasing to operate.

The best approach is a business decision and may vary on a case by case basis. The costs relating to the relocation of services to alternative bands will vary. This cost will be greatest where additional sites or upgrades to existing towers are required. Depending on the age and location of the equipment, fixed links could require an upgrade before they can be moved to another band. They may even need to be decommissioned rather than moved. However, upgrades are considered to be a cost that is regularly incurred in normal business operations. Alternatively, current fixed services could continue to be delivered by using a different technology, for example fibre cable.

It is important to note that it is possible fixed linked services could remain in operation in the 1800 MHz band in remote Australia provided there are no interference concerns.

As previously noted, it is anticipated that the sparse population in remote areas and the expected use by the mining sector will mean that the deployment of mobile services would be focused on certain locations or 'hot spots'. For example, it is expected that demand will be focussed on larger towns such as Alice Springs, or areas with a high density of mining operations like the Pilbara. This would limit the impact on a number of existing fixed services and is expected to enable them to continue operating in some areas.

Important Note:

There are no reporting obligations in the Act requiring a licensee to provide detailed information surrounding business costs or benefits.

As a result, it is difficult for the ACMA to quantify the impact of any regulatory proposal on business. The ACMA's analysis is therefore informed by stakeholders in their responses to particular proposals and/or options put forward by the ACMA.

A brief overview of the possible costs and impacts for incumbent licensees for each of these alternatives is provided below.

> *Relocation to a different band*

Based on consultation and previous work undertaken by the ACMA, the estimated cost of relocating each link would be in the range of \$200,000-\$267,000. This assumes that the licensee needs to replace antennas and radio to support the relocation. It is

anticipated that the number of links in the band that would be required to relocate to a different band would be limited because of the expected highly localised deployment of mobile services in remote areas. This would have no impact upon the delivery of current fixed services as they are still able to operate. It is expected that if required, relocation to a different band would be the option employed by the majority of existing licensees.

> Use of a different technology

As with the relocation option, the cost for each fixed link would vary on a case-by-case basis. Factors affecting costs include the distance that needs to be covered and whether existing technology can be used or it is necessary to install new technology. For example, if there was a current optic fibre cable running along the same path as the fixed link, migrating to that existing cable would impose a significantly smaller cost than installing a new cable. The ACMA does not have detailed information on the costs of introducing wired technologies such as optic fibre.

However, the ACMA has previously undertaken an installation of new fibre infrastructure in some of its own work. As an indicative guide, the cost imposed was approximately \$182,000–\$205,000 for approximately 6 kilometres. It is important to note that this cost is for a full installation of new technology. It is anticipated that incumbent licensees would look to employ existing infrastructure which would cost significantly less. Also the distance required is a vital factor in deciding the best technology to implement. If a licensee chose to undertake this option current services would still be able to operate and be delivered.

> Remaining as a secondary service

Secondary status means that the service may be required to cease operation if the service cannot be successfully coordinated with the primary service. This presents the least cost approach for fixed services. Licensees can choose to remain in the band unless they are required to cease operation due to interference potential. Given that the demand for mobile services is expected to be relatively localised, it is likely that many fixed services could remain in the band indefinitely under secondary status.

> Ceasing to operate

As with all options, the decision to cease operation of a fixed link is a business decision.

The option to decommission or cease to operate a fixed link would impose a minimal cost on the incumbent licensee. The main costs associated with this option would be if the licensee needs to dismantle an antenna. As there are existing fixed links in the 1800 MHz band and other bands that are currently not in operation, this possibility would be considered an ongoing business cost. The ACMA does not have data on this ongoing cost.

An assessment of the impact on current services is also a business decision. If the service is considered essential there are other options to continue operation (that is, relocation or use of a different technology).

In summary, the ACMA considers that fixed services would be able to continue operation following implementation of the ACMA's preferred approach to the 1800 MHz band in remote areas. They could either relocate, use a different technology or

remain in the 1800 MHz band as a secondary service. If licensees choose to cease to operate, costs would be largely limited to the possible need to dismantle an antenna.

6.4 Licensing arrangements

The ACMA has considered licensing types and allocation mechanisms that would be appropriate if its preferred option is implemented.

Identifying suitable licensing arrangements for mobile services

The Act provides for the issue of radiocommunications licences authorising the operation of devices under a spectrum, apparatus or class licence. The licensing arrangement applied in a radiofrequency band is dependent on a number of factors, including whether there are existing operators in the band, timing considerations for implementation of services or arrangements, and optimal licence duration.

Class licences usually authorise ubiquitous devices and provide no protection from interference. They are therefore not considered suitable for mobile services. The most suitable licensing arrangement would therefore be either a spectrum or an apparatus licence.⁶

Stakeholders have identified that immediate access to the 1800 MHz band in remote Australia is very important. This has informed the ACMA's consideration of appropriate licensing arrangements in the band. In order to allow immediate access to the band, the most efficient licensing arrangement to apply is apparatus licensing. A move to spectrum license the band would delay full access to the band by mobile service operators by at least two years due to legislative arrangements in the Act. Moreover, under spectrum licensing arrangements, existing services would be required to vacate the band and would not be able to operate as a secondary service. A limited exception would apply if;

- 1) the spectrum licences were configured for both fixed and mobile use; and
- 2) the existing licensees were successful in obtaining all the spectrum they were currently using in any price-based allocation.

Otherwise they could only continue to operate under a third party arrangement made with the spectrum licensee. If no arrangements can be reached with the spectrum licensee, then existing licensees must cease operation.

In all the circumstances, spectrum licensing is considered to be considerably slower than apparatus licensing, more administratively cumbersome, and would also carry a risk that existing licensees may need to vacate the band even though the spectrum they are using is not required for mobile services. Conversely, on the present facts, none of the benefits of spectrum licensing relative to apparatus licensing – notably, their much longer maximum tenure and the greater scope they give for secondary trading – would outweigh the speed and simplicity of apparatus licensing on demand, or the ability of apparatus licensing (under the preferred option) to leave existing licensees in place until and unless their clearance is strictly necessary to allow mobile broadband use in an area. For all these reasons, the ACMA does not consider spectrum licensing would be an efficient model.

⁶ Information regarding the different licence types and their optimal conditions for implementation is provided on the ACMA's website [here](#).

As outlined previously, apparatus licensing provides options for the continuation of existing services provided that appropriate coordination arrangements are in place.

Mobile services are able to be authorised in the band via the issue of public telecommunications service (PTS) apparatus licences. PTS apparatus licences have been issued in the 1800 MHz band in the past. These arrangements were already supported by the current apparatus licence tax of \$0.01/MHz/Pop included in the *Radiocommunications (Transmitter Licence Tax) Determination 2003 (No. 2)*. Licences would therefore be able to be issued immediately, which would meet the timing needs of aspirant licensees.

The ACMA therefore considers that PTS apparatus licences are an appropriate licensing arrangement for mobile services use of the 1800 MHz band in remote areas.

6.5 Allocation mechanisms

Apparatus licences can be allocated via two mechanisms – an administrative process using an administratively set price or a price-based allocation (PBA) process, such as an auction. There are a range of advantages and disadvantages to both methodologies, including costs, delays and complexity. A decision on which approach is appropriate will depend on the level of demand, the particular characteristics of the band and the technologies to be deployed.

Identifying a suitable allocation mechanism

The ACMA considers that the price paid by bidders at an auction generally provides a more accurate indication of true market value of the spectrum than administratively set prices, the ACMA also recognises that there will be occasions when auctioning spectrum is not possible or desirable.

Where demand for spectrum is likely to exceed the available supply, auctions are likely to be the most efficient process. Otherwise, administrative allocation provides a quick, simple and well understood method of allocating licences. Administrative – or ‘over the counter’ - allocations are therefore the default method of issuing apparatus licences where supply is expected to exceed demand.

In addition, auctions take longer to deliver than administrative allocations and aspirant licensees consider that rapid access to the 1800 MHz band is important. The anticipated sporadic deployment of mobile services in remote areas means that in the vast majority of locations, the supply of spectrum is likely to be greater than the demand. The ACMA therefore considers that it is unlikely that auction processes would deliver the most efficient outcome in the band. Issuing PTS apparatus licences using an administrative allocation is likely to be the most efficient outcome. This will meet the objective of providing effective regulatory arrangements to encourage and enable the spectrum to move to its highest value use while minimising costs and restrictions.

A risk with an administrative allocation is that two prospective licensees may apply for the same spectrum in the same area. To manage this risk and make the most efficient use of the spectrum, the ACMA may use the spectrum management tool of ‘priority assignments’. Under this approach, the ACMA assigns the known or anticipated applicants to specific parts of the spectrum. These assignments are based on a plan that seeks to optimise spectrum availability for all relevant parties. The plan is developed with the consent of all interested parties. Provided the priority assignments

address the needs of all applicants, the approach provides an orderly assignment process and gives applicants certainty of access to spectrum.

In the event that preferred assignment allocations are not available to an applicant, alternative spectrum in other sections of the band may be offered, if it is available.

The ACMA proposes to use this tool in the 1800 MHz band. Further information on priority assignments is provided in the section on implementation and review (chapter 9).

7. Consultation

The 1800 MHz consultation ([1800 MHz—a shared strategy](#)) considered both long- and short-term arrangements for the band. The aim of the consultation was to establish licensing and regulatory arrangements that will meet the needs of current and prospective licensees, both now and in the future. The ACMA developed a series of issues papers that proposed arrangements to address regulatory and licensing issues.

The first issues paper [Regional and remote apparatus licences in the 1800 MHz band](#), proposed the release of the 1800 MHz band for PTS apparatus licensing to facilitate the deployment of mobile services throughout remote Australia. The paper outlined the current use of the band and explained how incumbent licensees may be impacted by the introduction of the ACMA's proposed changes. Also outlined were options to coordinate the introduction of PTS apparatus licences with existing fixed link services in the 1800 MHz band. In consulting with stakeholders, the ACMA proposed assignment priority options for remote areas.

The paper also sought comment on the use of population estimates that are based on the Local Government Area boundaries and whether a move to HCIS would be a more efficient means to calculate population estimates.

The second issues paper [Spectrum licences in the 1800 MHz band](#) sought comment on licensing arrangements for remote areas. The ACMA considered that remote areas of Australia would be able to be allocated via the issue of apparatus licences, both now and into the future.

The ACMA received 14 responses to Issues Paper 1 and eight responses to Issues Paper 2. These responses were from a wide range of stakeholders including the mobile telecommunications industry, the mining sector, government and radiocommunications specialists. The ACMA considered all submissions when finalising arrangements.

A summary of the key discussion points and responses from stakeholders is provided below.

- > *Demand for 1800 MHz spectrum in regional and remote Australia*
 - Respondents generally agreed that the ACMA's assessment of demand was accurate. However, some respondents noted that the current use of the band for backhaul service using fixed links was not sufficiently recognised.
 - Oil and gas companies may also have a future interest in this band.
- > *Status of fixed links*
 - In most cases, those stakeholders with current fixed links in the band were of the view that fixed services should continue to operate with their current primary status. They argued strongly that fixed links in the 1800 MHz band are used to provide essential communications and safety services in remote areas.
 - Most respondents were supportive of changing the status of fixed services to secondary, which would require fixed services to make adjustments to coordinate with incoming PTS services. Respondents argued this was the best

way to facilitate the deployment of new LTE services without unnecessarily affecting existing fixed links.

- Respondents considered that clearing fixed links from the band would create undue operating costs for current licensees, but many supported the long-term relocation of most of these services to other bands or their replacement with alternative technologies such as optical fibre links. Those fixed services that would not limit the deployment of new services could remain indefinitely.
- There was support for a staged, and perhaps geographically-differentiated transitional approach to address these issues.

> Priority assignments

- All respondents supported the introduction of assignment priorities to promote an orderly release of spectrum to the market.
- Several respondents observed that investment in the band would be hampered if there was insufficient certainty provided around access to spectrum in the longer term—that is, what regulatory arrangements are planned after the initial release of spectrum.
- Several respondents suggested that after a reasonable period of time (one to five years) prospective licensees should be able to seek access to spectrum prioritised for another user, if it remains unused.
- Respondents requested clarification of what was meant by ‘infrastructure’, ‘rail’ and ‘other’ in the ACMA’s priority assignment models.
- Telecommunications sector respondents argued for the models that assigned more spectrum to the three mobile carriers, while all other respondents argued for models that provided more spectrum for other users.

> Preferred licence type for prospective operators

- There was general support for apparatus licensing as the preferred and most appropriate licence type for services in remote areas. Most respondents were of the view that spectrum use is most likely to be limited to distinct geographic locations rather than across the full remote area. Apparatus licensing would be able to meet these requirements.
- Some stakeholders would like to see further developments in shared spectrum access arrangements to meet demand rather than a single licensing arrangement.

Overall the consultation on remote areas showed limited concern from respondents. The majority of issues raised have been addressed through the proposed arrangements or via further discussions with relevant stakeholders. For example, apparatus licences would be considered the preferred long term licensing arrangement for remote areas to provide a level of certainty for prospective licensees.

Also it is important to note that the ACMA will continue the consultation process after the 1800 MHz band is released in remote areas and intends to review the arrangements to ensure that the band is being used for its highest value use.

8. Regulatory offsets

The table below was developed using the Commonwealth regulatory burden measure compliance costing tool. The ACMA has considered the regulatory burden to business, community organisations and/or individuals using the Regulatory Burden Measurement framework. The ACMA considers the proposal to be deregulatory and therefore there are no regulatory offsets required. These have been agreed by the Office of Best Practice Regulation. The analysis provided relies on indicative information and estimates based on figures sourced from various documents. It should be therefore regarded as indicative only.

The numbers provided are based on an assumption that some licensees may need to redeploy fixed links and incur an upfront cost. The ACMA has estimated, based on discussions with licensees and previous experience and work undertaken by the ACMA, that the upfront cost would be in the vicinity of \$1 million. This would be predominantly due to the purchase of equipment and labour.

The ACMA does not have access to the exact number of affected licensees and has made an estimate that approximately 25% of licensees in the band would be required to redeploy. This figure has taken into account particular fixed links that may be difficult to access (for example those links in national parks) and is considered a worst-case scenario. Moreover, the majority of fixed link equipment in the band is nearing the end of its useful life. That is, the equipment would need to be replaced within the 10 year timeframe irrespective of the regulatory change.

In addition, the numbers assume that 23 businesses - three mobile telecommunication carriers and twenty businesses from other industries such as the mining, energy and rail sectors - apply for a licence when the embargo is amended. The estimated number of businesses reflects businesses who have applied for embargo exemptions in the past and prospective businesses who have expressed interest in accessing the 1800 MHz band in remote areas. If the embargo was retained, these businesses would have incurred compliance costs to apply for an exemption. (The application for exemption is the direct cost to business of applying for an exemption from Embargo 62.)

Table 2: Regulatory Burden and Cost Offset Estimate

Average annual regulatory costs (from business as usual)				
Change in costs (\$)million	Business	Community organisations	Individuals	Total change in costs
Total by sector	(\$0.008)	\$0	\$0	(\$0.008)
Cost offset (\$)million	Business	Community organisations	Individuals	Total, by Source

Average annual regulatory costs (from business as usual)

Agency	\$0	\$0	\$0	\$0
Are all new costs offset? <input type="checkbox"/> Yes, costs are offset <input type="checkbox"/> No, costs are not offset <input checked="" type="checkbox"/> Deregulatory, no offsets required				
Total (Change in costs - Cost offset) (\$) = (\$0.008)				

9. Implementation and review

The ACMA intends amending Embargo 62 in remote areas to make the band available for the issue of PTS apparatus licences on a coexistence basis with fixed services. For the 1800 MHz band, RALI MS34 details the channel arrangements and assignment instructions for PTS services. These are designed to take into account prospective licensees' existing spectrum holdings in the band and provide spectral efficiency. Further information on the assignment of spectrum for remote areas is provided below.

In order to facilitate efficient use of the spectrum and provide an orderly assignment process, prospective applicants would be assigned to specific parts of the band. In the event the preferred assignment allocations are not available to the respective applicant, alternative spectrum in other sections of the band may be sought. These assignment priorities are designed to ensure spectrum availability to all prospective licensees. Assignment priorities are used extensively as a spectrum management tool by the ACMA in numerous bands.

This section provides relevant information on how the ACMA would implement the proposed regulatory changes for the 1800 MHz band in remote areas


9.1 Priority assignments

The ACMA will amend RALI MS34 to introduce an assignment order for remote areas of the 1800 MHz band. When prospective licensees apply for PTS apparatus licences, the ACMA will issue those licences in accordance with the assignment order.

As there are smaller population in remote areas, demand for mobile telecommunications in remote areas is somewhat limited and most remote communities (including mining sites) could be serviced by a single mobile carrier. Mining operations and other infrastructure users are expected to use the band in remote areas in the very near future. An allocation of 2x30 MHz maximises the amount of spectrum available to infrastructure services and rail safety and communications.

In addition, stakeholders considered this to be an adequate quantum of spectrum during consultation. Figure 5 provides an overview of the priority assignments for remote areas.

Figure 5 - Assignment priorities for remote areas

Frequency	Channel (2x5 MHz)	Remote Channel (2x5 MHz)
1710 / 1805 MHz  1785 / 1880 MHz	1	Telstra 2x15 MHz
	2	
	3	
	4	VHA 2x15 MHz
	5	
	6	
	7	Optus 2x15 MHz
	8	
	9	
	10	Infrastructure 2x25 MHz
	11	
	12	
	13	
	14	Rail 2x5 MHz
	15	

9.2 Review of arrangements

The ACMA will review the PTS arrangements in 2017 and consider the extent to which the band is being used for its highest value use. In order to assess use and whether the arrangements have met the anticipated demand, the review will consider, among other things:

- > the number of services deployed in the band,
- > the maturity of international LTE equipment and standards and
- > the extent to which different industries have planned, developed and deployed networks of national significance.

It is anticipated that the PTS apparatus arrangements would be suitable to continue in the longer term.

10. Conclusion

There is growing evidence that mobile services (including 4G and LTE technologies) should be considered the highest value use of the 1800 MHz band in remote areas. Internationally the band is moving towards a mobile service with countries such as Canada and the US identifying the band for mobile use. Furthermore, the 1800 MHz band is the most widely used band worldwide which provides economies of scale for industry to access equipment.

The use of spectrum evolves over time as new technologies and innovations develop. As part of its spectrum management framework, the ACMA takes into account these developments. This is to ensure that spectrum is able to be used by the highest value use or uses. An example of this is the increasing demand for mobile services to gain access to bands under 5 GHz. This places pressure on existing services, especially fixed services which can be delivered through different means.

The ACMA considers that the highest value use of the 1800 MHz band in remote Australia has changed fixed to mobile services. Stakeholder demand, emerging technologies and international trends support this view.

Existing arrangements in the band limit opportunities to operate mobile services. The ACMA considered three options to enable the 1800 MHz band to move to its highest value use in remote Australia:

- 1) Maintain the status quo: no new services in the band
- 2) Licence both new fixed and mobile services (both co-primary services)
- 3) Licence new mobile services only as the primary use for the band, making existing and future fixed services secondary.

In considering these options the ACMA took into account its spectrum management framework (the objects of the Act and principles) and also the best practice regulation process in order to identify the option that has the highest net benefit.

The option that provides the highest net benefit would be to amend the current embargo on remote areas and licence the band for mobile services (option 3). This option allows business and the community to realise the economic and social benefits accruing from leveraging international harmonisation and equipment economies of scale of LTE equipment in the band. This option also managed the impact on incumbent users of the band because existing services are able to continue to operate, either in the band as a secondary service or via other means if desired.

To ensure that the benefits associated with changing the purpose of the band to support mobile services can be realised, the status of the fixed services operating in the band would need to change to secondary status. Based on the ACMA's consultation process regarding both the short and longer term planning and regulatory arrangements for the 1800 MHz band, the ACMA proposes the following framework for implementation in remote areas:

- > Amend Embargo 62 to allow the issue of PTS apparatus licences in remote areas of Australia in the 1800 MHz band;

- > Undertake a review on the effectiveness of these arrangements in 2017.

Precise and accurate information on the potential benefits and likely costs for industry is not available to the ACMA. However implementing the proposed arrangements would ensure that remote communities would benefit from the earlier availability of 4G services. In addition, industries such as the mining and energy sectors would be able to deploy smart infrastructure for automated operations and gain the safety and productivity advantages associated with these technologies.