

Regulation Impact Statement Realising the digital dividend

Section 153F recommendation that the
minister make a spectrum reallocation
declaration

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Executive Summary

By the end of 2013, all analog television services in Australia will be switched off. Any (digital) television services remaining in UHF channels 52-69 will be moved to lower channels, leaving a large block of spectrum available for new uses. This block of spectrum, between 694-820 MHz, is commonly referred to as the 'digital dividend band'.

There are three parts to realising the digital dividend:

1. **Switch-off:** Analog television will be switched off region by region, following a timetable determined by the Federal Government.
2. **Restack:** All digital television services remaining in the digital dividend band will be moved down to one of the remaining available television channels (VHF channels 6-12 or UHF channels 28-51).
3. **Reallocation:** Once all television services have vacated channels 52-69, a large block of vacant spectrum will be available for other uses. The ACMA has commenced the process of reallocating the spectrum to be cleared, with a view to conducting an auction of spectrum licences in 2012.

The ACMA is commencing the process of reallocating the digital dividend band. The reallocation process has a number of formal legal steps. The first of these is for the ACMA to recommend that the Minister declare some of the digital dividend for reallocation, so that it can be allocated via a public auction. The recommendation includes details of the exact location and size of the relevant spectrum to be reallocated.

In managing the radiofrequency spectrum, the ACMA is required to maximise the overall public benefit derived from use of the spectrum, by ensuring its efficient allocation and use. In this case, this will be achieved by moving the spectrum to its highest value use. The reallocation recommendation is aimed at achieving this objective.

In summary the terms of the recommendation are as follows:

Term	Recommendation	Benefits
Parts of the spectrum	Two 45 MHz blocks of spectrum, with frequency boundaries 703–748MHz and 758-803MHz The above frequency bands to be re-allocated nationally, excluding part of the Mid West Radio Quiet zone.	Alignment with harmonised Asia-Pacific arrangements will provide benefits for providers, consumers and the economy due to reduced equipment costs, economies of scale and user benefits such as international roaming. National allocation will provide for growing demand over the spectrum licence term and allow the rollout of national networks by spectrum purchasers.
Reallocation period	The re-allocation period will start on 2 November 2011 and will end on 31 December 2014.	This option balances the need to allow sufficient time for incumbents to vacate the band, with the need to make the spectrum available for new uses as early as possible.
Re-allocation Deadline	The re-allocation deadline will be 31 December 2013	This deadline will provide certainty to incumbents and potential bidders.
Licence Type	Spectrum licences	Spectrum licensing will allow more flexibility in the band than the alternative (apparatus licensing)

1. Background and context

1.1. Realising the ‘digital dividend’

By the end of 2013, all analog television services in Australia will be switched off (thereby ending the ‘simulcast period’ of analog and digital services). Any digital television services remaining in UHF channels 52–69 will be moved to lower channels, leaving a large block of spectrum available for new uses. This block of spectrum, between 694–820 MHz, is commonly referred to as the ‘digital dividend band’.

There are three parts to realising the digital dividend—switch-off, restack and reallocation.

1.1.1. Switch-off

The first key step necessary for the realisation of the digital dividend is to convert the delivery of television services from analog to digital transmission.

At most transmission sites, each broadcaster currently uses two television channels—one for its analog signal and a second for its digital signal. Following the closure of analog television services, the channels used to transmit those services will become vacant. This will free up spectrum previously used by those analog channels.

Analog television will be switched off region by region, following a timetable determined by the Australian Government which commenced on 30 June 2010. Ahead of switch-off in each area, arrangements are being made to ensure all viewers will continue to be able to receive television services. Depending on where they live, viewers will receive digital television either from digital terrestrial television transmitters or via the Viewer Access Satellite Television (VAST) satellite service.

The switchover from analog to digital television transmission has been motivated by the superior features of digital transmission as well as the need for Australian free-to-air broadcasters to keep pace with rising audience expectations. For example, digital television provides greatly improved picture and sound quality. Compared to analog technology, digital technology is also able to transmit more television services in the same amount of radiofrequency spectrum, enabling the provision of additional television services through multichannelling. For the Australian community, the benefits accruing from the realisation of the digital dividend are also a key incentive for the switch-off of analog transmissions.

1.1.2. Restack

The second step in realising the digital dividend is the digital channel restack process. This is required to achieve a large contiguous block of spectrum in order to derive the maximum public benefit from the digital dividend.

The digital dividend spectrum corresponds to UHF television channels 52–69. Digital services will remain in channels 52–69, as well as the eight channels in VHF Band III. Restacking digital television services by shifting them from the upper end of the UHF television band and concentrating them in the spectrum below channel 52 will be required in order to clear a contiguous block of spectrum suitable for allocation and re-use. The Minister for Broadband, Communications and the Digital Economy has asked the ACMA to complete this work in all areas of Australia by 31 December 2014.

A Regulation Impact Statement entitled *Clearing the Digital Dividend - Planning principles for restacking digital television channels* was prepared by the ACMA in June 2011 and is available on the Office of Best Practice Regulation’s website at <http://ris.finance.gov.au/2011/06/09/clearing-the-digital-dividend-planning-principles->

[for-restacking-digital-television-channels-australian-communications-and-media-authority-acma/](#).

1.1.3. Reallocation

The final step in the ACMA's work to realise the digital dividend is the reallocation of spectrum that will result from the switchover and restack processes. Once all television services have vacated channels 52–69, a large block of vacant spectrum will be available for other uses, which are expected to include advanced mobile telecommunications. The ACMA intends to reallocate the relevant parts of the spectrum via a price-based allocation process (auction).

The three overlapping processes of switch-off, restack and reallocation all need to be completed in order to realise the digital dividend.

1.2. Key stages in the process to date

1.2.1. Department's digital dividend green paper and consultation

In January 2010, the Department of Broadband, Communications and the Digital Economy (DBCDE) released a green paper on the digital dividend. This provided information on the digital dividend and sought public comment on a range of issues, including potential uses of the dividend spectrum and the costs of the restacking process. The paper and public submissions are available at www.dbcde.gov.au/consultation_and_submissions/digital_dividend/digital_dividend_green_paper.

1.2.2. Government's decision on the size of the digital dividend

On 24 June 2010, the minister announced that the digital dividend would consist of 126 MHz of contiguous spectrum in the frequency range 694–820 MHz. The media release is available at www.minister.dbcde.gov.au/media/media_releases/2010/062.

1.2.3. Minister's direction to the ACMA

On 9 July 2010, the minister made a direction to the ACMA under section 14 of the *Australian Communications and Media Authority Act 2005* (ACMA Act), subsection 25(3) of the *Broadcasting Services Act 1992* (the BSA) and clauses 15 and 29 of Schedule 4 to the BSA. This required, in part, that the ACMA clear the part of the broadcasting service bands (BSBs) comprising the frequencies 694–820 MHz of broadcasting and datacasting services, and that clearance be completed as soon as possible after the final digital television switchover day (currently 31 December 2013).

The purpose of clearing the band is to allow the spectrum to be reallocated by auction, thus moving it to its highest value use. It is likely that mobile telecommunications and data providers will be bidders for the spectrum.

1.2.4. ACMA's 700 MHz digital dividend band discussion paper

On 20 October 2010, the ACMA released a discussion paper, *Spectrum reallocation in the 700 MHz digital dividend band* (digital dividend discussion paper), as part of a public consultation process. This paper provided background information on the digital dividend allocation process and highlighted the key issues the ACMA was considering as it planned for the configuration and allocation of the digital dividend.

Copies of the digital dividend discussion paper and the public submissions are available on the [ACMA website](#).

1.2.5. Spectrum licensing process

Under the *Radiocommunications Act 1992* (the Act), there are two ways that a band can move from an apparatus licensing regime to a spectrum licensing regime:

- > The first is based on *reallocation processes* under Part 3.6 of the Act—the minister makes a spectrum reallocation declaration and spectrum licences are allocated in the band via a price-based process. Most of the existing apparatus licences are automatically cancelled at the end of a set reallocation period, which must be at least two years.
- > The second is based on *designation processes* under section 36 of the Act—the minister makes a designation notice, which designates a band to be allocated via issuing spectrum licences. Any existing apparatus licensees are offered the opportunity to convert their apparatus licences to spectrum licences. If any offer is not accepted—or if there are no apparatus licensees in the band—then the ACMA may proceed to a price-based allocation.¹

The ACMA would generally consider the second option where the relevant spectrum is unencumbered (i.e. vacant). A section 36 designation can also be used where the objective is to offer apparatus licensees an opportunity to convert their apparatus licences to spectrum licences.

By comparison, a section 153B reallocation declaration (in part 3.6 of the Act), provides a process for clearing the band of incumbent licences.

Because Part 3.6 of the Act provides a specific means for clearing apparatus licences from a band so that the spectrum can be reallocated, the ACMA has chosen it as the most appropriate means of achieving its objectives.

1.3. Key stages in the reallocation process

Section 153B of the Act allows the minister to make a declaration that one or more specified parts of the spectrum are subject to reallocation. However, the minister may not such make a declaration unless, during the previous 180 days, the ACMA has given a recommendation under section 153F of the Act in relation to that part, or those parts, of the spectrum.

Before giving the minister a recommendation under section 153F to make a spectrum reallocation declaration, the ACMA must consult with potentially affected apparatus licensees. In the 700 MHz band, these include commercial, national and community broadcasters, television retransmission services and television open narrowcasters.

In its recommendation to the minister, the ACMA must identify the spectrum by frequency and geographical area, and suggest a reallocation period within which the reallocation process is to be completed. It may also specify other items that it chooses to include.

1.3.1. Release draft reallocation recommendation for comment

Under section 153G of the Act, the ACMA must invite each potentially affected apparatus licensee to give written comments about the draft version of the recommendation. On 28 May 2011, the ACMA released the terms of the draft spectrum reallocation recommendation for comment. The deadline for the receipt of comments was 15 July 2011.

¹ The conversion of apparatus licences does not preclude issuing additional spectrum licences.

1.3.2. Final recommendation to the minister

Under subsection 153G(3) of the Act, the ACMA must have regard to any comments from potentially affected apparatus licensees in preparing the final version of the recommendation for the minister.

1.3.3. Minister's spectrum reallocation declaration

After the ACMA makes its final recommendation, the minister will have the power to declare the frequency band and geographical area of the spectrum to be reallocated and the type of licences to be issued under section 153B of the Act. In making the declaration, the minister must have regard to the ACMA's recommendation. The minister is only able to make a declaration within 180 days of receiving the recommendation from the ACMA, and can only make a declaration about spectrum that was included in a recommendation from the ACMA.

The minister will also specify two key points in the process—the reallocation period and the reallocation deadline. The reallocation period is the period during which the ACMA must clear incumbent apparatus licences from the spectrum to be reallocated so that it is available for the new licensees to use.² The reallocation period must begin within 28 days of the minister making the reallocation declaration and must run for at least two years.

Where the reallocation process applies to non-BSB spectrum, at the end of the reallocation period, incumbent apparatus licences would usually be cancelled.³ However, as the digital dividend spectrum is BSB spectrum, which is occupied by television broadcasting services, this automatic cancellation does not always occur. This is because, under the Act, apparatus licences issued to commercial, community and national television broadcasters are 'protected' from this cancellation process.⁴ As a result, apparatus licences for these services must be relocated via the restack process before reallocated spectrum licences can authorise access to that part of the spectrum.

The reallocation deadline must be set at least 12 months before the end of the reallocation period.⁵ The reallocation deadline is significant because if the ACMA does not successfully allocate at least one licence before the reallocation deadline, the declaration will be revoked and the entire reallocation process will need to be restarted.

Once the minister has made a declaration, the ACMA must prepare a written notice stating that the declaration has been made. This notice must be provided to each affected apparatus licensee and published in newspapers circulating in capital cities.

1.3.4. Release draft allocation instruments for comment

The ACMA must make a number of instruments in order to conduct the auction of the digital dividend. These include a marketing plan under section 39A, an allocation procedures determination under section 60, and technical framework instruments under sections 145 and 262 of the Act. These are collectively referred to as the 'allocation instruments'.

The two main allocation instruments are the marketing plan and the allocation procedures determination. The marketing plan sets out the product to be offered at

² Section 153B(4) of the Act.

³ Section 153H(2) of the Act.

⁴ Paragraph 153H(1)(c) of the Act—protected apparatus licences are those issued under sections 101A, 101B, 101C, 102 and 102A.

⁵ Section 153B(5) of the Act.

auction, and the allocation procedures determination sets out in detail the substantive elements of the chosen allocation method.

Section 40 of the Act states that the ACMA may invite representations on the draft marketing plan. Section 17 of the *Legislative instruments Act 2003* requires that there be appropriate consultation on the making of legislative instruments, subject to exceptions under section 18 of the same Act.

1.3.5. Publish allocation instruments

Following appropriate consultation, the ACMA will make final versions of the allocation instruments. These will be made available to the public, as well as being published on the Federal Register of Legislative Instruments.

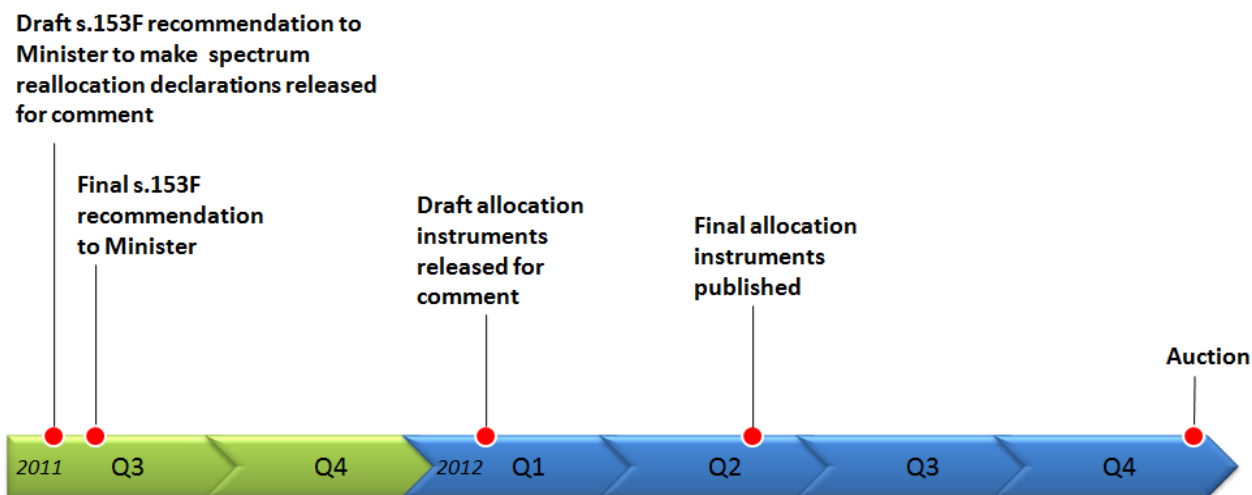
1.3.6. Engage with prospective bidders and hold spectrum auction

Once the allocation instruments have been finalised, the ACMA will be in a position to invite interested parties to register as bidders for the auction. Information sessions will also be held to advise participants of the auction process and give them an opportunity to trial the computer systems that will be used for the auction.

According to current timeframes, the ACMA expects to hold the spectrum auction in the second half of 2012. After completion of the auction process, the ACMA will proceed to issue invoices for the winning bids. Upon payment, the ACMA will prepare and send out the spectrum licence documents to successful bidders.

Figure 1 outlines the approximate timings for key stages in the reallocation process.

Figure 1 Key events in the reallocation of the digital dividend (approximate timings)



This Regulation Impact Statement (RIS) covers the ACMA's recommendation to the minister under section 153F of the Act (referred to in paragraph 1.3.2 above).

Subsequent aspects of the reallocation process may require separate Regulation Impact Statements. A Regulation Impact Statement will be prepared for these matters at the time the decisions are made, if required.

2. Identifying the problem

2.1. The problem

This band of spectrum is of high value due to its particular characteristics relative to other bands, most notably its abilities to operate across large distances and penetrate buildings.

Section 3 of the Act requires the ACMA to 'maximise, by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radiofrequency spectrum'.

To maximise the public benefit derived from the use of the valuable digital dividend band, the ACMA must:

- > move or cancel those licences that currently exist in the specified frequency range
- > reallocate the spectrum to its highest value use.

The primary problem being addressed through this reallocation recommendation is the need to move the spectrum to its highest value use while ensuring that the relevant processes align with the specific requirements of the Act, associated legislation and the ministerial direction.

2.2. Future demand for spectrum

There has been increasing pressure to make more spectrum available for a variety of uses, including wireless access services (WAS).

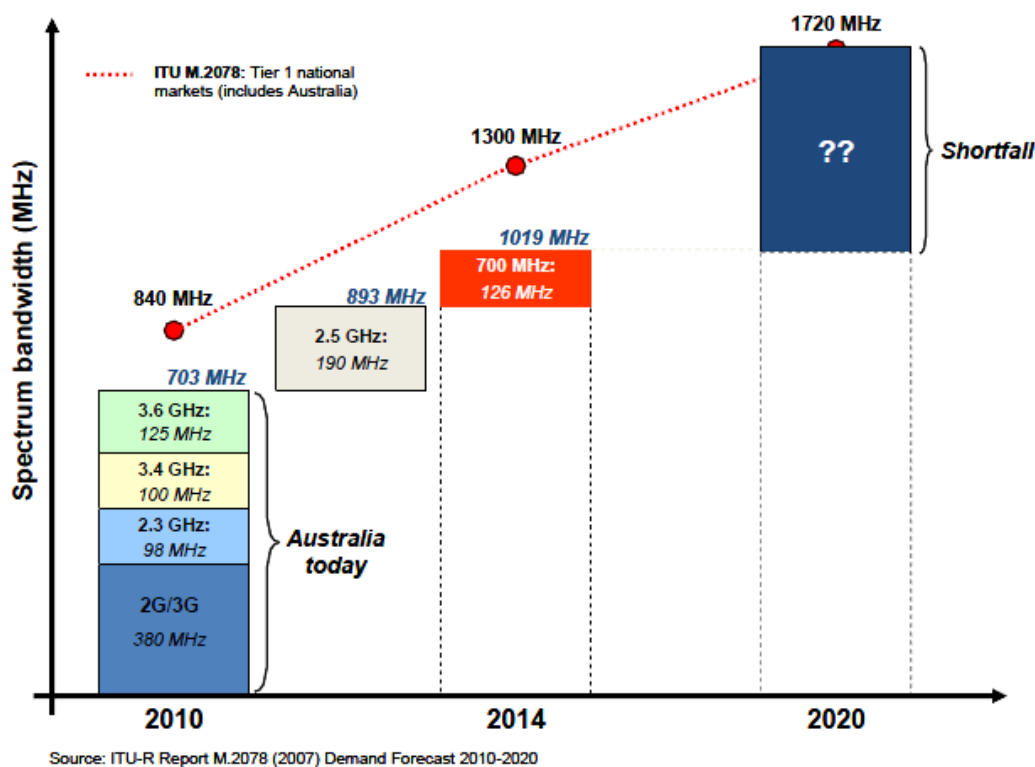
WAS is being deployed globally as an alternative to fixed-telecommunications networks, digital subscriber line technologies, cable and satellite. WAS technologies are particularly attractive to service providers who do not have the capacity to build extensive fixed-wireline infrastructure. Consumer demand for mobility and wireless access to broadband are also increasing at a rapid rate and this is projected to continue for the foreseeable future. WAS supports a variety of applications, many of which are key economic drivers. For example, the growth in demand for voice telephony and simple short message services is expected to continue.

New devices capable of accessing the internet with enhanced features such as improved cameras, colour screens, battery life and storage capabilities are becoming increasingly available, which will also drive the development of applications.

International Telecommunication Union (ITU) studies analysing the future demand for spectrum to support mobile services predicts a rise in the bandwidth required. This was represented graphically (see Figure 2) by the Australian Mobile Telecommunications Association (AMTA) in its submission to the ACMA's January 2010 *Review of the 2.5 GHz band and long-term arrangements for ENG* discussion paper.⁶

⁶ The discussion paper can be accessed online at www.acma.gov.au/webwr/assets/main/lib311275/2.5ghz_discussion_paper_ifc01-10.pdf.

Figure 2 Spectrum demand forecast for mobile broadband (2010–20), based on ITU forecast figures



Source: AMTA submission to the ACMA's January 2010 discussion paper.

Figure 2 clearly demonstrates a growing demand for spectrum bandwidth required to provide WAS. Although some of the spectrum allocated for WAS in Australia is currently unused or under-used, the ITU data and other international trends suggest that demand in Australia will continue to rise, so that demand may soon exceed available spectrum.

2.3. The 700 MHz digital dividend band

The characteristics and potential uses of the digital dividend band mean that it is considered 'waterfront property', and is expected to be in high demand from new users.

The 700 MHz digital dividend spectrum is located in the ultra-high frequency (UHF) band of the radiofrequency spectrum. UHF spectrum, especially below 1 GHz, has signal propagation characteristics for deploying a wide range of communications services, making it highly valued.

These propagation characteristics make the digital dividend spectrum useful for delivering a range of mobile and fixed services such as mobile telecommunications networks (telephony and broadband). The demand for increased communications capacity of mobile networks has led to suggestions that the digital dividend be allocated for such purposes.⁷ The wide signal coverage of the 700 MHz band could enable these mobile services to be delivered much more cost-effectively, particularly to rural and remote locations in Australia. The wider signal coverage available would mean that fewer base stations are needed to support a network, significantly reducing

⁷ Access Economics, *Economic Contribution of Mobile Telecommunications in Australia*, June 2010, p. v.

the implementation costs for operators and consequently the flow-on costs for consumers.

The outcome of previous public consultations conducted by the ACMA and DBCDE has supported the desirability of the 700 MHz band for use in mobile telecommunications services. For example, respondents to a 2006 ACMA discussion paper on potentially suitable spectrum for WAS indicated that the current UHF broadcasting services band frequencies (520–820 MHz) would be well-suited to mobile services.⁸

In early 2010, the DBCDE received a wide range of responses to its digital dividend green paper.⁹ The stakeholders who responded included broadcasters, electricity distribution network owners, equipment manufacturers and related bodies, government agencies and emergency service providers, Indigenous broadcasters and representatives, internet service providers, the telecommunications industry and wireless audio device users and suppliers.¹⁰

The stakeholders noted a number of potential uses for the digital dividend spectrum, including wireless broadband services, mobile broadband and/or communications services, public safety and security, services for regional and remote Australia (for example, e-health, National Broadband Network, public safety) and smart meters and smart grids.

However, the majority of submissions suggested that the characteristics of digital dividend spectrum were highly attractive for use in the deployment of mobile telecommunications services, particularly long-term evolution (LTE) networks.

2.4. Issues for consideration in realising the digital dividend

To realise the digital dividend, the ACMA was first required to consider whether to use the *reallocation processes* under Part 3.6 of the Act or the *designation processes* under section 36 of the Act in order to move the digital dividend band to a spectrum licensing regime.

Given that demand for digital dividend spectrum is expected to exceed supply, the ACMA has decided to follow the spectrum reallocation process set out in Part 3.6 of the Act. This will enable the spectrum to move to its highest value use. Part 3.6 of the Act requires the ACMA to recommend to the minister the part or parts of the spectrum that will be subject to reallocation processes, culminating in a price-based allocation. This will be a subset of the spectrum 694–820 MHz that is the subject of the minister's restack direction to the ACMA.

2.5. Issues for consideration in reallocating the digital dividend band

As the ACMA has decided to use the reallocation processes set out in Part 3.6 of the Act, it now needs to decide precisely what parameters to include in its section 153F recommendation to the minister. Under section 153B of the Act, the main parameters of the recommendation are:

- > the frequency boundaries of the spectrum to be reallocated

⁸ ACMA, [Strategies for Wireless Access Services: Spectrum Access Options](#), discussion paper, December 2006.

⁹ DBCDE, [Digital dividend green paper](#), January 2010.

¹⁰ DBCDE, *Digital dividend*, Consultations and submissions, www.dbcde.gov.au/consultation_and_submissions/digital_dividend, accessed 29 July 2010.

- > the geographical boundaries of the spectrum to be reallocated
- > the relevant reallocation period and reallocation deadline
- > the type of licence to be used in reallocating the spectrum

2.5.1. Frequency boundaries

There are three main issues relevant to configuring the frequency boundaries of the digital dividend spectrum for spectrum licensing:

- > the requirement for any necessary guard bands or a mid-band duplex gap on the frequency boundaries (to address possible interference issues)
- > the desirability of aligning the frequency boundaries with international arrangements
- > the possible accommodation of low-interference potential devices in some parts of the digital dividend spectrum under other licensing arrangements.

In determining the most appropriate arrangements and the level of international harmonisation, other considerations are also relevant. These include objectives under the Act to:

- > promote spectrum efficiency
- > provide adequate spectrum for government and other users.

2.5.2. Geographical boundaries

In recommending geographical boundaries, the ACMA has two options available to it:

- > reallocation of the entire band Australia-wide (national allocation)
- > reallocation of the entire band in some parts of Australia, and part or none of the band (non-national allocation) in other parts.

In deciding whether to recommend a national or non-national allocation of the digital dividend band, the ACMA must take into account a number of factors, including:

- > likely demand by bidders for spectrum
- > technical characteristics of the band
- > likely future uses for the spectrum and international trends
- > current incumbent use.

2.5.3. Reallocation period and reallocation deadline

Under the Act, the ACMA's recommendation must specify a reallocation period.¹¹ The reallocation period must begin within 28 days of when the minister makes the declaration and must run for at least two years.¹²

The spectrum reallocation declaration must also specify a time as the reallocation deadline. This time must be at least 12 months before the end of the reallocation period.

In suggesting a reallocation period, the ACMA must consider how long it will take to clear incumbents from the band, as well as the likely use of the spectrum and when interested parties would like to start using the spectrum.

¹¹ Section 153F(2) of the Act.

¹² Section 153B(4) of the Act.

2.5.4. Types of licence

Under the Act, the ACMA can issue three types of licences to authorise the use of spectrum:

- > apparatus licences
- > class licences
- > spectrum licences.

Apparatus licences authorise the licensee to use a specified device at a specified location in a specified frequency band. Class licences authorise the use of low-interference potential equipment that meets a standard set of criteria. Spectrum licences authorise the licensee to use the specified frequency band anywhere within the geographical and frequency boundaries of the spectrum space.

The appropriate licence type and allocation process for a particular part of the spectrum will be largely determined by the potential uses of that part of the spectrum.

3. Objectives of the section 153F recommendation to the minister

The ACMA must comply with the minister's direction to clear the digital dividend band. In reallocating spectrum, the ACMA is guided by the objectives set out in the Act and its own Spectrum Management Principles. In the case of the digital dividend allocation, the primary relevant objective is to 'maximise, by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radiofrequency spectrum'.¹³

¹³ Section 3(a) of the Act.

4. Options for achieving the objective

4.1. Options for consideration

The Act requires the ACMA to specify certain matters in a section 153F recommendation:

- > one or more *parts of the spectrum* to be reallocated
- > the period that, in the ACMA's opinion, the declaration should specify as the *reallocation period*.

The ACMA can also include other matters in its recommendation. For this section 153F recommendation, it has considered the inclusion of the following matters:

- > a *reallocation deadline*
- > the *type of licences* to be issued.

The following sections of this paper set out the options available to the ACMA for each element of its recommendation and the likely impact of these options on stakeholders.

Decisions made on these matters will impact a range of stakeholders. Primarily, these are:

- > incumbent licensees, including:
 - > apparatus licence holders
 - > class licensees (such as wireless audio equipment users)
- > potential bidders for the new spectrum licences.

4.2. Parts of the spectrum

Parts of the spectrum are defined by their frequency and geographical boundaries. These matters are addressed in more detail below.

4.3. Frequency boundaries

Three main issues are relevant in configuring the frequency boundaries of the digital dividend spectrum for spectrum licensing:

- > the requirement for any necessary guard bands or a mid-band duplex gap on the frequency boundaries
- > the desirability of aligning the frequency boundaries with international arrangements
- > the possible accommodation of low-interference potential devices in some parts of the digital dividend spectrum under other licensing arrangements.

4.3.1 Guard bands and mid-band gap

As discussed above, it is considered that the most likely use for the digital dividend spectrum will be the delivery of mobile telecommunications services. If this is so, these services will require guard bands in order to avoid harmful interference to services in neighbouring bands. Similarly, duplex arrangements may dictate that it is necessary to set aside a mid-band gap.

Due to their primary purpose of providing buffers for potential interference, it is unlikely that spectrum in the guard bands and mid-band gap will be in high demand. In addition, the restrictions imposed on this spectrum are likely to preclude technology-flexible use by licensees. The ACMA has needed to consider whether to exclude any guard bands and mid-band gap from the parts of the digital dividend that will be spectrum-licensed.

4.3.2 International harmonisation

In determining the frequency boundaries of the digital dividend, the potential for alignment with international arrangements is an important consideration.

There are substantial advantages to Australian communications manufacturers, service providers and end users in arrangements that are internationally harmonised. The major advantage is the economies of scale that make manufacturing equipment for both users and providers cheaper. Harmonisation may also facilitate user features such as global roaming. The ACMA is therefore looking to international digital dividend developments in determining its configuration for the digital dividend spectrum.

The major digital dividend band plans currently in existence are the European and US plans. Due to the original arrangements for European broadcasting services, the European digital dividend (790–862 MHz) is in a substantially different frequency range to Australia's, meaning there is only a limited overlap (790–820 MHz) between the European and Australian digital dividends. It is therefore unlikely that Australia would be able to achieve significant advantages by attempting to partially align with this plan.

The US digital dividend (698–806 MHz) aligns more closely with the frequency range that will be available in Australia. However, the ACMA considers that the plan implemented in the US is not an efficient use of spectrum because it contains interleaved small blocks of spectrum, requiring more guard bands (and consequently making less spectrum available) than a single contiguous block and making handset design more complex. It would also be undesirable to unilaterally implement a modified version of the US plan, since this would effectively constitute a unique digital dividend plan, contrary to the objective of harmonising arrangements.

The ACMA has therefore focused its efforts for international harmonisation on countries within ITU Region 3 (Asia–Pacific and part of the Middle East). While many of these countries have not yet decided on the size and configuration of their digital dividend, the band under widest consideration (698–806 MHz) falls entirely within Australia's digital dividend (694–820 MHz). This band has been the subject of AWG (Asia Pacific Telecommunity Wireless Group – formally AWF) discussions for harmonisation of arrangements for frequency use since March 2008. As noted below, the proposed international digital dividend band plan for ITU Region 3 has been endorsed in principle, and the overall direction has been agreed upon. This band plan represents the best solution for Australia.

Table 1 Summary of digital dividend band arrangements

Area	Range of digital dividend	Advantages/disadvantages
Australia	694–820 MHz	
Europe	790–862 MHz	Little overlap with Australian frequency range
United States	698–806 MHz	Overlapping frequency range but inefficient arrangements
Asia-Pacific and part of the Middle East	Likely 698–806 MHz	Similar frequency range and decision made by AWG on harmonised arrangements.

The 9th meeting of the AWG in September 2010 led to the adoption of harmonised arrangements for both paired and unpaired configurations. The paired arrangement will use conventional duplex and will consist of 2x45 MHz blocks with a mid-band gap of 10 MHz. For both the paired and unpaired arrangements there are provisions for guard bands of 5 MHz at the bottom and 3 MHz at the top of the band. As the digital dividend spectrum in Australia commences at 694 MHz, this arrangement provides a 9 MHz guard band with adjacent UHF television broadcasting services.

The ACMA is also monitoring international developments for the spectrum above the 698–806 MHz band covered by the AWG plan. In particular, although the spectrum in the frequency band 806–820 MHz forms part of Australia’s digital dividend, the AWG has not included this spectrum in the harmonised plan. As an international consensus is not yet available on the future of the band 806–820 MHz, the ACMA is likely to allocate this spectrum separately from the rest of the digital dividend. For example, the ACMA is monitoring the progress of further developments within the ITU and considering whether this spectrum could be included in the 900 MHz band plan review (covering 820–960 MHz).

4.3.3 Low-interference potential devices in the spectrum

The ACMA notes that wireless microphones and similar equipment have been operated in parts of the digital dividend spectrum under the Radiocommunications (Low Interference Potential Devices) Class Licence 2000 for a number of years. As part of the broader reconfiguration of the band, the ACMA is working with the wireless microphone community (including the Australian Wireless Audio Group) to make suitable provision for the operation of such equipment in the future. The ACMA is also monitoring international developments in wireless audio equipment.

The ACMA expects that current class licensing arrangements for wireless microphones will continue in the band below 694 MHz. However, the deployment of some equipment in specific television markets may become problematic as television channel arrangements change during the restack process. To mitigate any local deployment issues, the ACMA suggests that equipment with as wide a tuning range as possible should be the first choice for users, as tuneable equipment is more likely to retain its utility through the restack period and beyond.

The ACMA has been working closely with the wireless microphone industry to ensure a smooth transition to the new arrangements following restack. The bandwidth changes have been known to this industry for some considerable time.

Spectrum above 694 MHz will be progressively cleared through the switchover period until December 2013 and subsequent restack period, and device deployment by new users is likely to occur beyond that time. As part of its planning processes for that band, the ACMA will examine whether it will be possible to determine a specific allocation for wireless microphones or make suitable sharing arrangements.

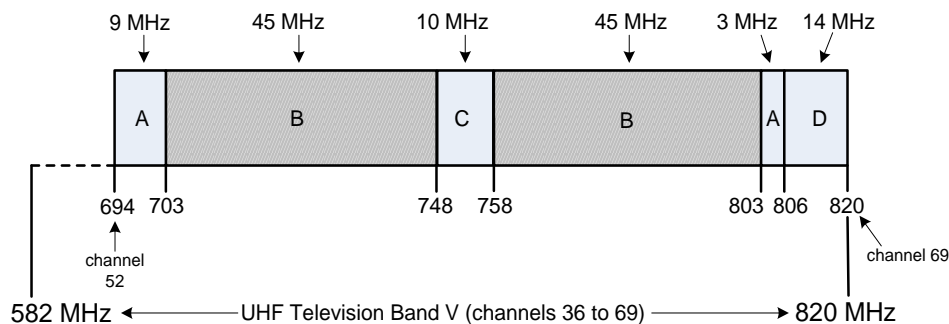
4.3.4 Preferred Option – Optimise band for international harmonisation and technology flexible applications

The recommended frequency boundaries are depicted below:

Figure 3 Proposed 700 MHz spectrum reallocation

700 MHz frequency boundaries

In the 700 MHz band, the ACMA plans to recommend that the minister specify the frequency bands 703–748 MHz and 758–803 MHz—that is, 2x45MHz of spectrum—be reallocated.



- A= guard bands
- B= paired bands (the subject of reallocation)
- C= mid-band gap
- D= extension band

The choice of frequency boundaries will impact on not only how much spectrum is for sale, but also how this spectrum can be used, the quality of signal, and the cost of sourcing consumer equipment. The preferred option will optimise the 700 MHz band for international harmonisation and technology-flexible applications, thereby providing significant advantages for industry and consumers. The ACMA’s consultation on the future use of this band has indicated that the strongest demand is from the telecommunications sector. As set out at paragraph 4.3.2, there are substantial advantages to Australian communications manufacturers, service providers and end users in arrangements that are internationally harmonised. The major advantage is the economies of scale that make manufacturing equipment for both consumers and providers cheaper.

Section 3 of the Act requires the ACMA to ‘maximise, by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radiofrequency spectrum’. The objective of this reallocation is to move the spectrum to its highest value use, and the ACMA considers this option best suited to meeting this objective.

4.4. Geographical boundaries

In recommending geographical boundaries, the ACMA has two options available to it:

- > reallocation of the specified frequencies Australia-wide (national allocation)

- > reallocation of the specified frequencies, or parts of the specified frequencies, across certain parts of Australia (non-national allocation).¹⁴

In deciding whether to recommend a national or a non-national allocation of the 700 MHz band, the ACMA has considered:

- > likely demand by bidders for spectrum
- > technical characteristics of the band
- > likely future uses for the spectrum and international trends
- > current incumbent use.

4.4.1. Reallocation of the specified frequencies Australia-wide

In the 700 MHz band, there is demand for spectrum in metropolitan areas, regional areas and parts of remote Australia. Responses to the digital dividend discussion paper from the telecommunications industry, equipment manufacturers and the energy industry all supported digital dividend spectrum being made available across Australia under spectrum licences without any exclusions (a national allocation).

The propagation characteristics of the 700 MHz band provide excellent in-building penetration and wide coverage, and can be used to transmit signals over further distances than can higher frequencies. The characteristics of this band make it highly valued for deploying a wide range of communications services; however, it is most likely that LTE mobile services will be deployed in the reallocated 700 MHz band.

The higher efficiency of LTE networks means that it is likely that carriers will roll out the technology in order to deliver better services. It would be most cost effective to do so wherever they have existing base station sites in remote and rural areas, so as to utilise existing infrastructure. Submissions to the digital dividend discussion paper from the telecommunications industry noted its intention to deliver LTE frequency division duplex (FDD) broadband services across Australia. Carriers have indicated they intend to replicate the coverage of current networks and roll out additional coverage where people work, live or travel.

Given stakeholder preferences for a national allocation, the lower amount of spectrum available in this band (compared to 2.5 GHz) and the optimal bandwidth of 2x20 MHz for LTE, there are no strong arguments in favour of offering lower amounts of spectrum in regional/remote areas, or excising these areas from the reallocation.

Spectrum in the digital dividend is currently occupied by providers of television broadcasting services and users of low-interference potential devices, such as wireless microphones operating under a class licensing system. Commercial, national and other television broadcasting services will be relocated below 694 MHz through the restack process, which is intended to create a large contiguous block of spectrum. Class-licensed low-interference potential devices must relocate into the guard bands and mid-band gap that will be created by the new arrangements in this band. Exclusion of part of Australia would not assist either group of incumbent users.

4.4.2. Reallocation of the specified frequencies, or parts of the specified frequencies, across certain parts of Australia

One option is for the ACMA to recommend reallocation of the specified frequencies across certain parts of Australia only (non-national allocation). This would involve excising all remote areas from the scope of its recommendation to the minister.

¹⁴ For example, the ACMA could reallocate the entire 2x70 MHz in metropolitan areas, with less spectrum allocated for spectrum licensing in regional and remote areas. Under this approach, spectrum in regional and remote areas, if not reallocated for spectrum licensing, would continue to be available for apparatus licensing.

Advantages of excising remote areas

The main advantage of excising remote areas from the spectrum licence reallocation of the digital dividend is that the spectrum would remain available for allocation under apparatus or class licensing for innovative local purposes. While it may be impractical to issue spectrum licences for very small geographic licence areas, apparatus licensing is designed to suit the purposes of specific installations. For example, some submissions to the green paper suggested that the spectrum in remote areas should be made available for community broadband networks in small towns. Spectrum licensing might not be efficient for such a purpose because it is better suited to larger licence areas. Excising spectrum in remote areas from the reallocation process in order to make it available on a case-by-case basis under apparatus or class licensing may address these issues.

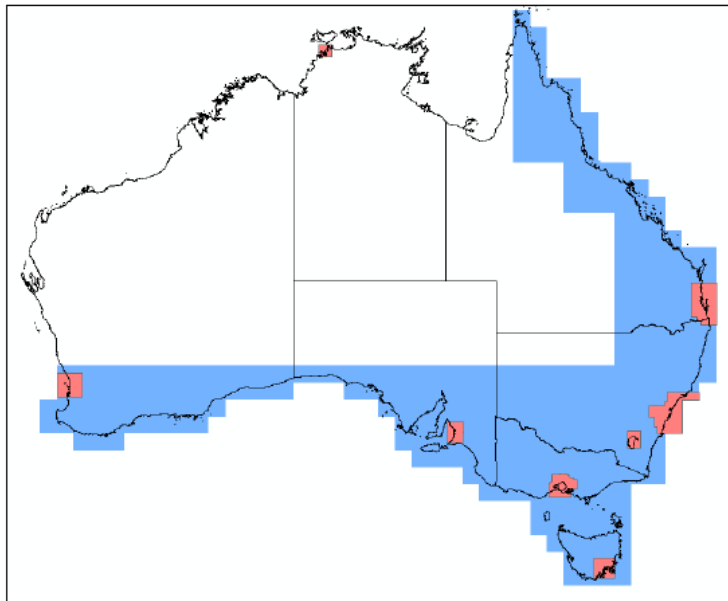
There is some evidence to suggest that where national spectrum licences have been issued, licensees have focused their deployment of services in metropolitan and regional areas, leaving under-used spectrum in remote parts of their licence.¹⁵ This may be attributable to the low commercial attractiveness of remote regions due to their sparse populations, long distances from larger regional or urban centres, and high infrastructure investment costs.

If a decision was made to exclude remote areas from the reallocation, it would then be necessary to consider the scope of the areas classified as 'remote'. It is relevant to note that the term already has a number of possible meanings in the context of the communications and media industries. The ACMA therefore emphasises that it has not defined or identified areas that would be classified as 'remote' parts of Australia in relation to the digital dividend spectrum at this time. However, areas that could possibly fall within this description would include large parts of central Australia and regions that are very sparsely populated.

For example, Figure 4 illustrates one hypothetical geographic split between remote and other parts of Australia, with metro areas shaded pink, regional areas shaded blue and non-shaded areas representing 'remote' areas. This map broadly reflects spectrum licences allocated in bands for WAS applications, although there are alternative bases on which such a division might be accomplished. For example, remote areas might be classified by population density or other census data.

¹⁵ *ibid.*

Figure 4 Hypothetical definition of remote areas for the 700 MHz band reallocation



Disadvantages of excising remote areas

While there are advantages to excising remote areas from the 700MHz reallocation, there are also disadvantages; for example, there may be demand specifically for digital dividend spectrum in remote areas.

Spectrum in the 700 MHz band has propagation characteristics that make it particularly suitable for mobile telecommunications services due to its ability to provide wider signal coverage than higher frequency bands. Combined with new technologies, this could lower the costs of infrastructure rollout significantly. Digital dividend spectrum in remote parts of inland Australia might therefore appear more attractive for the rollout of mobile services compared to previously allocated bands.

There has also been a recent increase in demand from current spectrum users of WAS bands wishing to acquire access to spectrum in regional and remote areas to boost existing services. An example of this is in the 2 GHz band, allocated for 3G mobile services, where the ACMA recently received applications for apparatus licences to operate 3G services at an extensive range of sites in remote and regional Australia.¹⁶

Mid West Radio Quiet Zone

Another potential candidate for excision from the geographic scope of the reallocation is the Mid West Radio Quiet Zone (RQZ).¹⁷ The RQZ is located near Boolardy Station, about 200 kilometres east of Meekatharra in a very sparsely populated area of Australia.

The ACMA maintains the RQZ in remote Western Australia to provide conditions suitable for radioastronomy research. In this area, all radio emissions are minimised in order to enable the use of highly sensitive radio telescopes, which operate over a very wide range of frequencies. This includes frequencies in the digital dividend. The RQZ

¹⁶ ACMA, *Spectrum released to improve mobile telecommunications in regional and remote Australia*, media release, 14 July 2010, www.acma.gov.au/WEB/STANDARD/pc=PC_312216.

¹⁷ An RQZ is an area within which emissions from radiocommunications stations are restricted, with a view to minimising the strength of radio emissions within the zone.

forms the foundation of Australia's bid to host the proposed Square Kilometre Array (SKA) telescope.¹⁸

The RQZ serves an important public interest that requires particular attention to ensure it is protected. Currently, this protection is set out in the ACMA's Radiocommunications Assignment and Licensing Instruction (RALI) MS32 and Embargo 41 documents.¹⁹ These place an embargo on the ACMA assigning new licences for all frequencies from 100 MHz to 25.25 GHz within the inner 'restricted' zone of the RQZ, up to a 150 kilometre radius from the RQZ centre. The outer 'coordination' zone of the RQZ requires new operators of radio emitting devices in this area to coordinate with the CSIRO to ensure that their signal strength is below prescribed power thresholds when measured at the RQZ centre.²⁰

There are several options available to the ACMA to incorporate protections for the RQZ in the digital dividend reallocation. These include:

- > excising the RQZ from geographic areas covered by the 700 MHz band reallocation process
- > offering new 700 MHz band spectrum licences that include the RQZ, but also include conditions that duplicate the restrictions set out in Embargo 41, the proposed radio astronomy band plan and RALI MS32
- > designing a licence in the 700 MHz band reallocation that closely covers the area of the RQZ and assigning this licence to CSIRO, which manages the radio astronomy facilities in the RQZ.²¹

Public Safety Agencies

In its consultation on configuration and allocation of digital dividend spectrum, the ACMA received submissions from Public Safety Agencies arguing that some of the 700MHz band should be set aside for their use. In subsequent discussions with Government about the requirements of Public Safety Agencies for a reliable and resilient mobile broadband capability, the need for an allocation of spectrum in the 800MHz band is being actively pursued as a whole of government decision.

4.4.3 Preferred Option - National allocation

The geographic boundaries chosen will impact on size of the subsequent networks, the utilisation of the spectrum in different locations, and also the services available in rural and remote locations. The preferred option will mean that nation-wide networks can be built by the eventual purchasers. Due to the characteristics of the 700 MHz band this network will likely offer improved coverage at a lower cost relative to current networks. In the ACMA's opinion, it will provide an administratively simpler means for providers to attain extended service coverage (for example, in regional and remote communities).

Section 3 of the Act requires the ACMA to 'maximise, by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radiofrequency spectrum'. The objective of this reallocation is to move the spectrum to its highest value use, and the ACMA considers this option best suited to meeting this objective.

¹⁸ www.ska.gov.au

¹⁹ [Embargo 41](#) and [RALI MS32](#)

²⁰ The specific power threshold limit for emissions in the 700 MHz band is described in the [RALI MS32](#).

²¹ This lot would be for the exclusive purpose of radioastronomy research activities and would bar commercial services.

4.5. Reallocation period and reallocation deadline

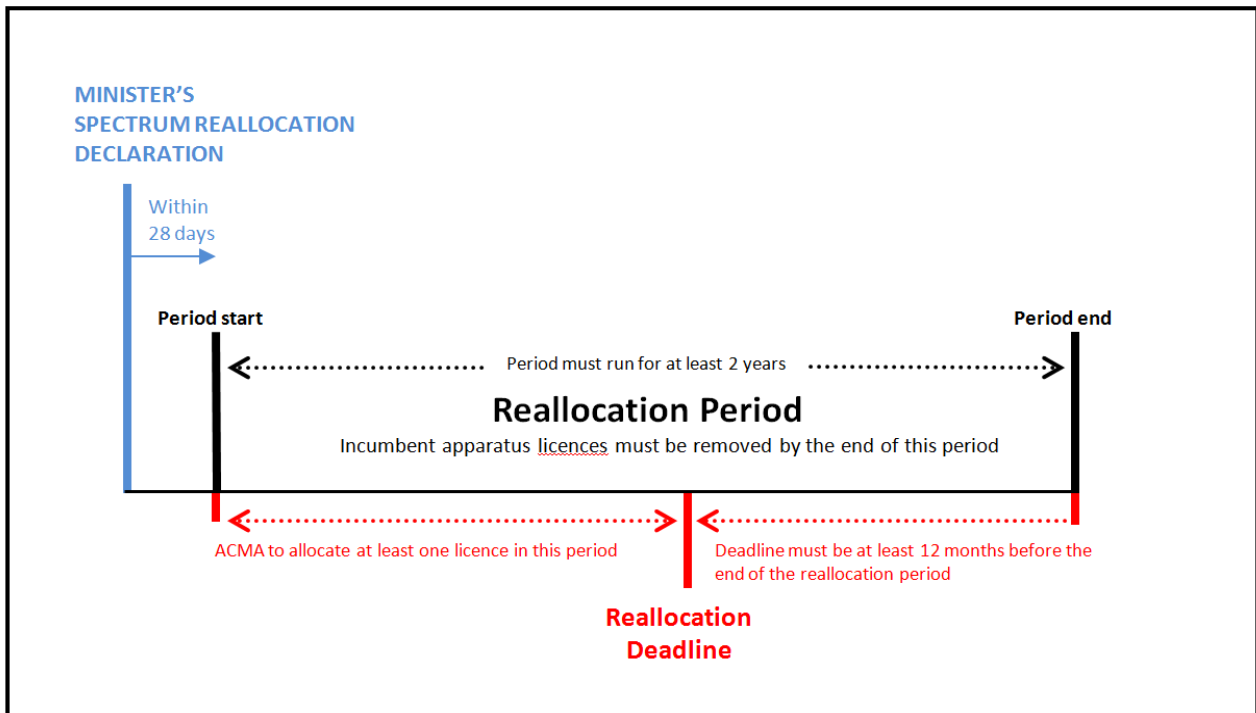
The Act requires that the ACMA's recommendation specify a reallocation period.²² The reallocation period sets the time frame during which the reallocation process is to be completed. Under section 153B(4) of the Act, the reallocation period must begin within 28 days of the minister making the spectrum reallocation declaration and must run for at least two years. During this time incumbent apparatus licensees may continue to operate their service.

The spectrum reallocation declaration must also specify a time as the reallocation deadline. This time must be at least 12 months before the end of the reallocation period. This constraint is shown in Figure 4.

At the end of the reallocation period, if the incumbent licensees have not acquired a licence through a price-based allocation process (such as an auction), the apparatus licensee must vacate the spectrum or come to a commercial agreement with the spectrum licensee to continue operation.

²² Section 153F(2) of the Act.

Figure 5 Reallocation period



In suggesting a reallocation period, the ACMA must consider:

- > how long it will take to clear incumbents from the band (which may be influenced by the time required to relocate essential services delivered by incumbents to other bands or technical arrangements)
- > the likely use of the spectrum and when interested parties would like to begin using it.

It would generally be desirable to align the end of the clearance process with the entry of new spectrum licensees, in order to minimise the period during which the spectrum is unused.

The reallocation deadline sets the date by which the ACMA must have allocated at least one licence for the reallocated spectrum. If no licences have been allocated by that date, the minister's section 153B spectrum reallocation declaration is taken to have been revoked.

The reallocation deadline must be at least 12 months before the end of the reallocation period. To provide as much flexibility as possible in the allocation process, the ACMA may choose to recommend a reallocation deadline that falls only the minimum 12 months prior to the end of the reallocation period

This reallocation deadline would not limit the ACMA's ability to conduct an auction at an earlier date. If the minister elects to declare the 700 MHz band for reallocation, the ACMA intends to auction the spectrum as soon as possible. A conservative reallocation deadline would mitigate any risk that unforeseen delays may cause the spectrum reallocation declarations to expire, requiring the ACMA and the minister to repeat the existing process in order to make a new spectrum reallocation declaration.

The majority of the licences within the 700 MHz band are protected broadcasting services licences. These licences will not be cleared by the reallocation declaration,

but by the restack process. This is an essential step in realising the digital dividend and is required to achieve a large contiguous block of spectrum suitable for allocation and re-use. The restack process will transfer digital television services from the proposed digital dividend band (694–820 MHz) to the spectrum below 694 MHz (that is, the UHF television channels below channel 52).²³

The government has identified a target date of 31 December 2014 for completing the restack process.

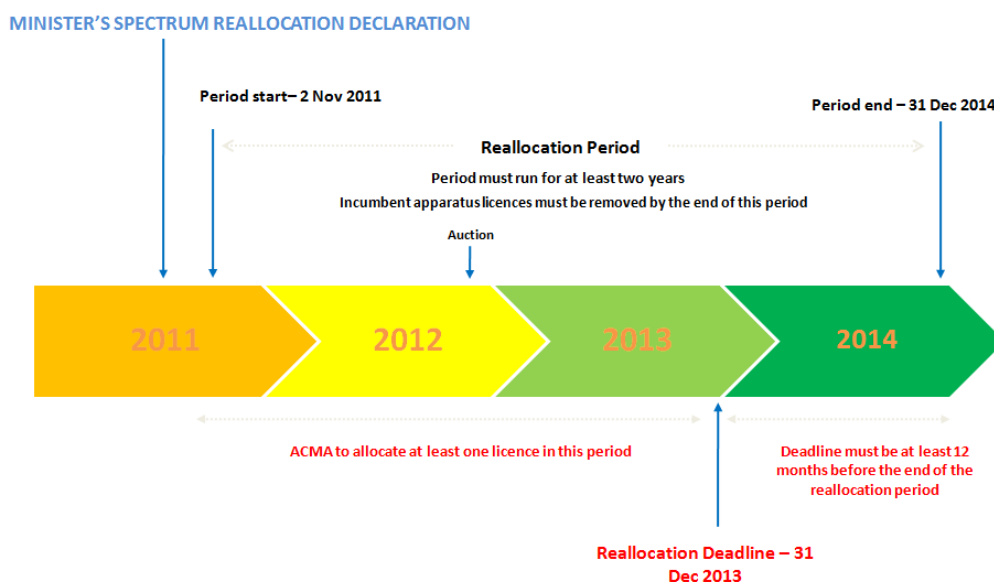
In submissions to the digital dividend discussion paper, potential new users of the band indicated that 700 MHz spectrum should be made available as soon as possible.

The precise choice of start date is less critical and may vary somewhat between recommendation and ministerial declaration, given the minister has 180 days to consider a recommendation from the ACMA and the reallocation period must commence within 28 days of his making a declaration. In the interests of certainty for incumbents, however, the ACMA considers an earlier start date to be preferable to a later one.

4.5.1 Preferred Option –Reallocation period to end on 31 December 2014. Reallocation deadline of 31 December 2013.

The ACMA’s preferred option is that 31 December 2014 is the date for the end of the reallocation period, with a reallocation deadline of 31 December 2013. This timeline is depicted in Figure 6 below.

Figure 6 700 MHz reallocation timeline



²³ Further information about the restack process, including the discussion paper *Clearing the digital dividend: Planning objectives and principles for restacking digital television channels*, can be found on the [ACMA website](http://www.acma.gov.au).

4.6. Licence type

The minister's reallocation declaration must specify whether the apparatus licences that are to be cancelled will be replaced by new apparatus licences or spectrum licences.²⁴

In making this decision, the ACMA is guided by two main factors:

- > the most likely uses of the band
- > the specific characteristics of spectrum and apparatus licences.

The digital dividend spectrum is located in the UHF band of the radiofrequency spectrum. UHF spectrum, especially below 1 GHz, has signal propagation characteristics that make it highly valued for deploying a wide range of communications services.

These propagation characteristics suggest that services that use LTE technology, such as mobile telephony and broadband, will most likely be deployed in the digital dividend. This view is generally supported by stakeholders.²⁵ As mobile broadband services are rapidly evolving, with new products emerging from year to year, the ACMA believes it is important to ensure licensing is flexible enough to withstand changes in demand for services.

An apparatus licence authorises the licensee to use a specified device or type of device at a particular location in the frequency band. This makes apparatus licences suitable for licensees who are seeking to deploy services in a specific way and place, and for a particular purpose.

In contrast, spectrum licensing is technology-flexible and technology-neutral. Instead of authorising the use of a specific device, spectrum licences authorise the licensee to use the specified frequency band anywhere within the geographic and frequency boundaries of the spectrum space. Spectrum licences give licensees the freedom to choose how they deploy devices within their spectrum space, the nature of the service they wish to deliver and the technology that they use.²⁶

Spectrum licences grant a spectrum access right for a fixed non-renewable term of up to 15 years.

Responses to the digital dividend discussion paper indicate support for spectrum licences that operate for a period of 15 years.²⁷ One of the main factors supporting long-term spectrum licences is the suitability of the digital dividend for the deployment of LTE technologies, which will require investment in infrastructure to service emerging technologies. This means long-term licence certainty would be needed to encourage investment in infrastructure. The spectrum licence term of 15 years (compared with an apparatus licence term of only five years) is beneficial to potential purchasers of spectrum because they will have a significantly longer time to roll out a network and recoup their investments on the large capital outlays required to build such networks.

4.6.1 Preferred Option – Issue spectrum licenses

²⁴ Section 153B(6) of the Act.

²⁵ Refers to stakeholders responding to question 12 of the *Spectrum reallocation in the 700 MHz digital dividend band* discussion paper, 20 October 2010.

²⁶ Provided that the device is compatible with the core conditions of the licence and the technical framework for the bands.

²⁷ In response to question 21 of the *Spectrum reallocation in the 700 MHz digital dividend band* discussion paper, 20 October 2010.

The type of license offered will impact on the types of services that the eventual purchaser can offer with the spectrum. The preferred option chosen by the ACMA – issue spectrum licenses - will allow more flexibility in the use of the band than apparatus licenses.

4.7. Impact of decisions on specific stakeholders

It is important to note that the minister's direction requires the ACMA to clear the digital dividend so that it can be reallocated for new uses. The ACMA does, however, have some discretion as to how it achieves this objective.

For protected broadcasting services such as national, commercial or community broadcasting services, clearing the digital dividend will involve identifying a new transmission frequency below channel 52 and moving to that channel under rules determined through broadcasting legislation:

For broadcasting and broadcasting-like services that are not protected—such as narrowcasters or datacasters—services that currently transmit in the frequencies subject to the recommendation, and that are not otherwise moved to other frequencies, will be affected by the recommendation's terms. Services that fall outside those frequencies but within the overall digital dividend of 694–820 MHz will not be renewed on expiry.

The ACMA does not have the discretion to allow broadcasting and datacasting licences to remain in the digital dividend spectrum.

4.7.1 Apparatus licence holders

Non-impacted apparatus licensees

Ordinarily, all apparatus licences would be cancelled at the end of a reallocation period as specified in a reallocation declaration (section 153H of the Act). However, the digital dividend spectrum reallocation process is not typical, as the apparatus licences to be cleared are located in the broadcasting services bands. The interaction of the *Broadcasting Services Act 1992* with the *Radiocommunications Act 1992* means that many of the apparatus licences affected by the reallocation declaration are protected and the declaration will have no effect on them.

Specifically, transmitter licences (a type of apparatus licence) to which holders of commercial, community or national broadcasting licences are automatically entitled are protected. Protected licences were issued under sections 101A, 101B, 101C, 102 and 102A of the Act. Services in the band will be affected in the ways described above as a result of parallel decision-making processes; the vast majority of licensees are aware of the arrangements and expecting notification of them.

Impacted apparatus licensees

Apparatus licences that were issued other than under sections 101A, 101B, 101C, 102 and 102A will automatically be cancelled at the end of the reallocation period (pursuant to section 153H).

Self-help retransmission licensees

Self-help retransmission licensees are not 'protected'. However, these licensees would or should be aware that government policy and existing law will result in either these services being converted by the commercial broadcasters (and restacked if necessary) or moved to the government-funded VAST service.

4.7.2 Potential bidders for future spectrum licences

The decision on which parts of the spectrum will be reallocated will not represent a regulatory burden to industry. Anyone will be free to participate in the auction, and the

decisions that prospective bidders make will be subject to their own commercial drivers and discretion. The precise impact of the reallocation on purchasers will depend on who purchases it, how much they purchase, what other spectrum holdings they currently have, and the use to which they put the spectrum. Prior to and during an auction, participants will make decisions about whether they will participate, and if so, how they will participate, based on their own commercial drivers. One of the main benefits of holding an auction is that the market can decide on the highest value use of the spectrum, which will in turn maximise the public benefit derived from use of the spectrum.

Commercial allocation by auction will enable the spectrum to be put to its highest value use and encourages the efficient use of the spectrum, as users would only purchase what they need and derive maximum use and value out of what they purchase.

While the ACMA cannot predetermine the outcome of the auction (and hence cannot assess with any certainty the precise impact on potential purchasers) the following section provides an overview of potential impacts based on information available to the ACMA.

Telecommunications industry participants

The ACMA has undertaken public consultation on the digital dividend allocation (refer below), which has included receiving feedback from potential bidders for future spectrum licences. A strong theme in the responses was the need for more spectrum to be made available for new and emerging technologies such as LTE. The telecommunications industry in particular favours the national allocation of this band for spectrum licensing.

The auction will be an open process, and anyone who meets the entry requirements can compete to purchase spectrum in the band. While it is conceivable that the telecommunications industry may win some spectrum at this auction, given the suitability of the bands for delivering LTE services, there is no requirement for spectrum acquirers to be in the telecommunications industry and/or to use the spectrum for a telecommunications use.

If a telecommunications carrier/s were to purchase spectrum at the auction, it would be expected to be of significant benefit to them, as it is located in the UHF band of the radiofrequency spectrum. UHF spectrum, especially below 1 GHz, has signal propagation characteristics that make it highly valued for deploying a wide range of communications services. The propagation characteristics are such that spectrum in the 700 MHz band is suited to providing coverage over a wide area and with high building penetration while higher frequency spectrum (such as 2.5 GHz spectrum), with its abundant bandwidth but poorer in-building and distance propagation, is suited to providing high data capacity in more densely populated, high demand areas.

Depending on what other spectrum a successful telecommunications bidder already has, the 700 MHz band could complement their services in higher frequency bands (for example, by providing the distance capacity while the lower frequency provides data capacity in densely populated areas).

Given that estimates of the direct contribution of mobile telecommunications to the Australian economy were estimated to be in the order \$6.7 billion or 0.61 percent of total GDP in 2008–09²⁸, it is expected that the availability of more spectrum for use by

²⁸ Access Economics, Economic Contribution of Mobile Telecommunications in Australia, in Australian Mobile Telecommunications Association, Submission to the ACMA Review of the 2.5 GHz band and long-

mobile telecommunications carriers would be beneficial to the industry and the broader economy. It will provide the industry with the opportunity to expand business models, increasing the diversity in services offered to consumers. There are also benefits to the economy arising from equipment availability due to international harmonisation of the band for WAS. The cost for potential spectrum licensees will be the cost required to secure access to these bands through the planned price-based allocation process.

The indirect, or flow-on, benefits of mobile telecommunications are even greater than the industry's direct contribution, with indirect benefits estimated to be in the order of \$10.7 billion²⁹ estimated for 2008–09. With greater spectrum made available to support mobile telecommunications and broadband services, the industry's contribution to the Australian economy is expected to grow. Access Economics predicts that an environment that enables the effective deployment of such services will add an estimated 1.5% to Australia's GDP within a few years, and over ten years, inject a boost of \$80 billion and an additional 70,000 jobs into the economy³⁰.

If the entire 90 MHz of spectrum available in this band was purchased by telecommunications carriers, it would represent less than a 10% increase in spectrum used for telecommunications services. While this is not a significant increase, the value of this band relative to other bands (due to its better propagation characteristics) would represent a benefit to the industry.

The decision to have a reallocation period ending on 31 December 2014 aligns with the government's stated timeline for the clearance of the bands, as well as the ACMA's auction timetable. While some bidders (including telecommunications providers) may wish to have access to the spectrum earlier than this, the ACMA needs to set realistic dates that take into account the length of time needed to clear the bands of broadcasting services.

During the auction preparation, the ACMA will consider whether progressive authorisation—providing access to new spectrum licensees in particular geographical locations as the spectrum becomes available—is feasible. This would help to alleviate any industry concern about the delayed availability of the spectrum. However, the ACMA is not currently able to comment on how feasible such an option is.

The consultation undertaken has not disclosed an appetite for excising any of the band. Submissions by telecommunications carriers have indicated that they would like this spectrum to be made available on a national basis, as soon as possible.

Other potential purchasers

As set out above, there is no requirement to be a telecommunications carrier in order to participate at the auction. Other industries could participate in the auction and use the spectrum to deliver services. For example, energy network providers could purchase spectrum to use in meeting their communications needs. Broadcasters could purchase spectrum to deliver digital television services. Smaller Internet Service Providers could purchase spectrum to deliver services to their customers.

term arrangements for ENG, 19 March 2010, p. 11,
http://www.acma.gov.au/webwr/_assets/main/lib311275/ifc01-2010_amta.pdf

²⁹ Access Economics, Economic Contribution of Mobile Telecommunications in Australia, in Australian Mobile Telecommunications Association, Submission to the ACMA Review of the 2.5 GHz band and long-term arrangements for ENG, 19 March 2010, p. 12,
http://www.acma.gov.au/webwr/_assets/main/lib311275/ifc01-2010_amta.pdf

³⁰ IBID, p 12

It is relevant to note that competition limits are not the subject of this RIS. The Minister has the power to direct the ACMA to impose limits on the amount of spectrum a bidder may purchase at the auction. A decision on this matter has not yet been taken. The ACMA has not considered the impact of this proposal on competition in downstream markets, as it is outside of its remit and would more appropriately be the subject of any competition limits proposal.

4.7.3 The Australian public

The ACMA's objectives, as set out in the Act and its own Spectrum Management Principles, are to maximise the overall public benefit derived from using the radiofrequency spectrum.

With the exponential rise in the use of mobile technology in Australia, there is increasing demand for the use of fast and reliable mobile broadband services. According to the Australian Bureau of Statistics (ABS), mobile wireless (excluding mobile handset connections) was the fastest growing internet access technology, increasing to 3.5 million services by June 2010.³¹

There is widespread recognition that mobile broadband services are an economic enabler, and the provision of these services, technologies and applications in the wider community is in the public interest. End users now expect to have access to services with increased speeds and data allowances, putting pressure on network operators to meet demand and leading to requests from operators for access to greater amounts of spectrum.

Smartphones and tablets have been a significant catalyst for this increase in demand, with applications becoming increasingly prevalent. A range of other multimedia devices including e-book readers, game consoles, MP3 players, cameras and remote healthcare monitoring devices are placing additional demands on spectrum capacity in the medium to long term.

The need for faster and more accessible mobile broadband services means that there will also be increased demand for new telecommunications technologies, such as LTE services.

The use of a non-national geographic allocation would lessen the availability of new technologies and services to many consumers who reside or work outside the main Australian metropolitan areas. If telecommunications carriers were to be successful in acquiring spectrum, it would be expected that there would be numerous benefits to Australian citizens and consumers through the resultant increased availability in competitive mobile telecommunications service offerings, as well as the benefits of regional harmonisation in this band, such as global roaming. Increased availability of high speed wireless broadband would provide productivity gains within the Australian economy. However, how those benefits are actually realised will be dependent upon how purchasers of the spectrum use what they have bought. The use of the spectrum by purchasers will be subject to their own commercial drivers and discretion.

This proposal will have positive impacts on sectors across the Australian community and economy, resulting from access to new and improved wireless communications services.

Summary

Overall, the proposed recommendation represents a balance between the needs of future spectrum users, who have a strong desire to quickly access spectrum vital to

³¹ ABS, 8153.0—*Internet Activity, Australia, Dec 2010*, www.abs.gov.au/ausstats/abs@.nsf/mf/8153.0/.

their business, and the needs of incumbents, who will need time to prepare for vacation and pursue alternative arrangements.

5. Consultations

5.1. Statutorily required notices

Section 153G of the Act requires that all potentially affected apparatus licensees be provided with a written notice outlining the terms of the ACMA's draft section 153F recommendation and given at least 28 days to comment. The Act defines any licensee located in the band as an affected licensee. Therefore, the ACMA must provide a notice and an opportunity to comment even to those 'protected licensees' upon whom the recommendation has no effect or impact.

The ACMA has undertaken the following to invite comments from potentially affected apparatus licensees:

- > A 'framing letter' has been sent to *all* licensees within the entire 126 MHz of spectrum, providing background and context for its program of realising the digital dividend, and foreshadowing the forthcoming 153F process.
- > The required section 153G notice has been sent to all potentially affected apparatus licensees within the 2x45 MHz to be reallocated, providing them with six weeks in which to comment on the proposal.
- > The section 153G notice has been published in a national newspaper, as required by that section.
- > A copy of the framing letter and section 153G letter has been sent to peak bodies and industry/community representatives who represent potentially affected apparatus licensees, seeking their assistance in informing their members of the terms of the draft.

On 28 May 2011, the ACMA published the terms of its draft recommendations for the 700 MHz and 2.5 GHz bands. Potentially-affected licensees within the designated bands were invited to comment on the terms of the recommendations which set out the following for each band:

- > Geographic and frequency boundaries
- > Reallocation period
- > Reallocation deadline
- > Licence type

The ACMA received nine submissions in response to the invitation to comment on the terms of the draft recommendations. Copies of submissions are available on the ACMA's website.

The submissions received can be broadly summarised according to the terms of the draft recommendations, as follows:

5.1.1. Geographic and frequency boundaries of the 700 MHz and 2.5 GHz bands

There was general support for the recommendation to align the digital dividend band configuration with the harmonised ITU Region 3 arrangements. Broadcasters were supportive of the proposal to use the extra guard band at the lower frequency boundary to reduce the risk of interference with their services.

Stakeholders in the mining sector expressed concern over the proposed size of the excise area from the RQZ. However, this concern appears to be due to misunderstanding over the way in which this area is defined. In any event it is noted that apparatus licensing would be permissible inside the excised area (subject to coordination with the RQZ entity and adjacent spectrum licensees)

5.1.2. Low Interference potential devices in the 700 MHz band

There was general support for the proposal to use the guard bands and the mid-band gap to relocate class-licensed low interference potential devices. Wireless audio equipment users and suppliers were encouraged by the possibility of implementing proposals for usage of the mid-band gap to accommodate continued use of their devices within the band.

5.1.3. Reallocation period

Stakeholders in the 700 MHz band sought assurance that the proposed reallocation period was sufficient to accommodate for any slippage in the restack schedule or unanticipated consequences caused as a result of the restack process.

5.1.4. Licence duration

One free-to-air television broadcaster suggested allowances be made for a review of the spectrum allocation within a ten year timeframe to accommodate for a possible transition to new technologies.

5.1.5. Other comments

Other comments received did not comment on the specific terms of the recommendations but sought further clarification as to how the proposed reallocation would affect the particular operator's ability to continue retransmission of broadcasting services.

5.2. Previous consultations

The ACMA undertook extensive public consultation in preparing the recommendation. The purpose of these consultations was to offer the general public the opportunity to shape and inform the ACMA's thinking on various configuration and allocation issues for the digital dividend reallocation.

The consultation process comprised:

- > the release of the *Spectrum reallocation in the 700 MHz digital dividend band* discussion paper in October 2010
- > hosting the Digital Dividend Tune-up (an ACMA mini-conference for stakeholders) in November 2010.

5.3. Spectrum reallocation in the 700 MHz digital dividend band discussion paper

On 20 October 2010, the ACMA released the *Spectrum reallocation in the 700 MHz digital dividend band* discussion paper for public consultation. It provided background information on the digital dividend allocation process and highlighted the key issues that the ACMA was considering as it planned for the configuration and allocation of the digital dividend, including:

- > the future uses of the band
- > international harmonisation
- > frequency and geographical boundaries
- > packaging the spectrum for sale
- > licence design
- > the timing of the allocation

> the reallocation period and reallocation deadline.

The ACMA received 45 submissions in response to the digital dividend discussion paper. Copies of public submissions are available on the [ACMA website](#).

The submissions received can be broadly categorised according to the issues raised in the discussion paper, as follows:

5.3.1. International harmonisation

There was widespread support for international harmonisation with the Region 3 arrangements. This would give Australian network operators earlier access to standardised equipment and provide economies of scale benefits in sourcing network equipment and customer handsets. The launch of mobile broadband services could also be brought forward and costs to consumers reduced. Other benefits included enhanced international roaming, protection for radio navigation satellite service (RNSS)/GPS receivers and improved access to future upgrades/development.

This position also found support from the Australian Industry Group and the subscription broadcasting industry, who felt that harmonised arrangements would assist in addressing interference issues experienced by digital television receivers. Wireless audio users submitted that, if the mid-band gap and guard bands were set aside for low-interference potential devices, harmonisation would help to reduce the costs of obtaining new equipment.

5.3.2. Remote areas

All stakeholders emphasised that it was important for wireless (mobile or fixed) broadband to be available in remote areas, even if there was less demand or commercial incentive. Suggested services included mobile broadband (LTE), internet backhaul, last-mile WAS, smart metering, telemetry, vehicle tracking services, e-health applications and public safety communications.

The telecommunications industry, equipment manufacturers and the energy industry generally supported all digital dividend spectrum being made available across Australia under spectrum licences without any exclusions. The telecommunications industry stated its intention to deliver LTE services throughout Australia, noting growing demand for mobile broadband in regional and remote areas, the suitability of the 700 MHz band for expanding coverage, and the difficulties of coordination at licence boundaries (for example, spectrum-apparatus licence boundary).

Some stakeholders supported the excision of remote and even some regional areas to allow creation of local WAS networks. The emphasis was on avoiding unused spectrum being 'locked away' by spectrum licensees. Indigenous representatives sought the excision of areas served by Remote Indigenous Broadcasting Services and self-help TV transmissions, as well as provision for community networks/NBN.

5.3.3. Radio Quiet Zone

There was general support among stakeholders for excising the RQZ.

5.3.4. Geographic lot dimensions

The telecommunications industry and equipment manufacturers stated an intention to deploy LTE FDD broadband services across Australia, replicating the coverage of current networks and rolling out additional coverage where people work, live or travel. As a result, they generally supported only national lots.

Other stakeholders noted that large geographic areas and blocks of spectrum were likely to be the most attractive to potential auction bidders.

5.3.5. Frequency lot dimensions

There was general support for the deployment of LTE-based wireless broadband services in the digital dividend spectrum, whether mobile or fixed. Most stakeholders saw this as the highest value use, although some sought special purpose allocations.

Most stakeholders supported paired configuration of the spectrum in accordance with the AWG plan.

5.3.6. Licence commencement

There was general agreement that 700 MHz spectrum should be made available as soon as possible, whether or not 2.5 GHz spectrum had been released. However, broadcasters insisted that certain conditions were met before the release of spectrum.

Broadcasters felt that the licences should not commence until interference issues with digital television receivers had been resolved.

5.3.7. Licence type and duration

It was generally agreed that spectrum licences should operate for the full 15-year term in order to justify the capital investment required and maximise competition/revenue at the auction. Some stakeholders suggested amending the Act to permit even longer terms. There was concern that differing licence durations could create disaggregation issues similar to those existing in the 1.8 GHz band.

5.4. Digital Dividend Tune-up

On 3 November 2010, the ACMA held a one-day Digital Dividend Spectrum Tune-up seminar at the Australian National Maritime Museum in Sydney.

The seminar gave stakeholders a valuable opportunity to learn more about the issues raised in the digital dividend discussion paper. The ACMA raised significant issues that would drive the configuration and allocation of the digital dividend, including:

- > the reallocation process
- > clearing the digital dividend spectrum
- > an update on the APT Wireless forum
- > auction design.

A range of speakers from industry were invited to present their perspectives on digital dividend-related issues. Following the presentation, attendees could ask questions and share their views. These sessions fostered open discussion between attendees, ACMA staff and industry professionals.

PowerPoint and/or audio presentations are available on the [ACMA website](#).

6. Conclusion and recommended option

The options considered most likely to achieve the stated objectives are listed below. These recommended options have been incorporated into the ACMA's recommendation to the minister to make a spectrum reallocation declaration.

In concert these decisions will be most likely to maximise the public benefit derived from using the radiofrequency spectrum by ensuring the efficient allocation and use of the spectrum.

6.1. Parts of spectrum—frequency boundaries

The ACMA is recommending frequency boundaries that align with regionally and internationally harmonised spectrum agreements for the 700 MHz band.

International harmonisation:

- > facilitates uniform technology standards for equipment and services across a large international market area
- > enables Australia, traditionally a 'technology-taker' country with a relatively small population, to join these large market areas
- > opens up substantial advantages to Australian equipment manufacturers, service providers and end users through 'economies of scale' benefits that large market areas offer. (Both infrastructure equipment and end user devices can be obtained more cheaply, which in turn influences the cost of services to the end user.)
- > enables greater international roaming capacity (for mobile communications) and portability of equipment in general.

Aligning Australia's frequency boundaries in the 700 MHz band with band plan arrangements adopted across international regions that suit a range of mobile communications technologies will allow Australia to reap considerable benefits.

6.2. Parts of spectrum—geographic boundaries

Given the likely demand by bidders for spectrum and the technical characteristics of the bands, the ACMA considers that a national allocation will facilitate the most efficient allocation and use of the spectrum.

The area covered by the 700 MHz band draft recommendation includes the whole of Australia to the outer boundary defined by the geographic coordinates and map in **Attachment A**, with the exception of the RQZ. The exclusion of the RQZ, including specific coordinates of the area to be excised, is discussed at **Attachment B**.

6.3. Reallocation period and reallocation deadline

Taking into account the considerations discussed in paragraph 4.5, the ACMA considers that 31 December 2014 is the most appropriate recommended date for the end of the reallocation period, with a reallocation deadline of 31 December 2013.

6.4. Licence type

The ACMA will recommend that the minister specify that spectrum licences replace the existing apparatus licences.

Based on the choices that spectrum licensees have about how they deploy devices within their spectrum space, the nature of the service they wish to deliver and the technology that they use, the ACMA considers that the greater flexibility offered by spectrum licences for planning and operating communication networks is desirable for the allocation of this spectrum.

In line with the objectives of the Act, the ACMA considers spectrum licensing as the option most likely to ensure the efficient allocation and use of the spectrum, and maximise the overall public benefit derived from using it.

7. Implementation and review

7.1. Timeframes and implementation steps

As noted previously, the ACMA will now present its recommendation to the minister to make a section 153F spectrum reallocation declaration. If the minister makes this declaration based on this recommendation, the ACMA will draft the allocation instruments in preparation for the spectrum auction.

7.2. Assessing the effectiveness of the ACMA's options

In determining the terms of its recommendation to the minister, the ACMA has conducted extensive consultation with affected stakeholders.

As noted in paragraph 1.3.4, there will be further consultation with stakeholders once the allocation instruments have been drafted. The ACMA will also engage with potential bidders in the lead-up to the spectrum auction in the second half of 2012.

8. Attachments

Attachment A—Outer boundary of Australia

The datum used for coordinates in this document is the Geocentric Datum of Australia 1994.

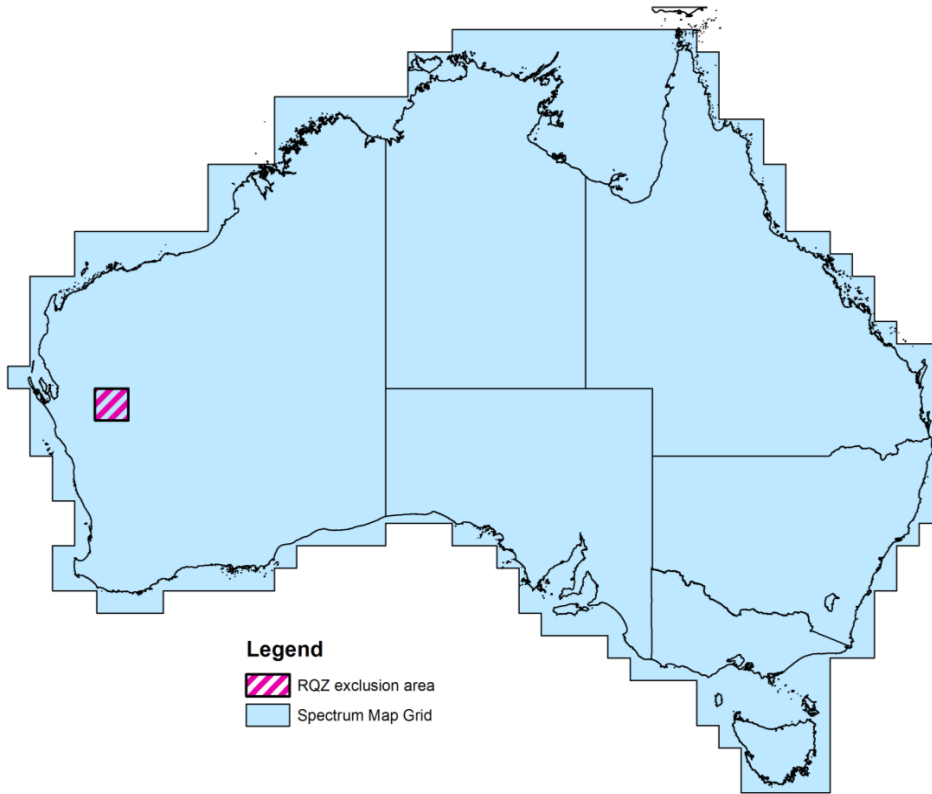
	South	East
1	24.998757	112.001377
2	24.998744	113.001346
3	23.998738	113.001340
4	22.998729	113.001347
5	21.998721	113.001338
6	20.998713	113.001332
7	20.998705	114.001326
8	20.998698	115.001297
9	19.998688	115.001319
10	18.998681	115.001312
11	18.998673	116.001310
12	18.998666	117.001309
13	18.998658	118.001306
14	18.998650	119.001304
15	18.998642	120.001301
16	18.998630	121.001292
17	17.998630	121.001289
18	16.998626	121.001281
19	15.998622	121.001274
20	15.998616	122.001271
21	15.998607	123.001262
22	15.998601	124.001256
23	14.998601	124.001255
24	13.998599	124.001249
25	12.998597	124.001244
26	12.998592	125.001239
27	12.998586	126.001234
28	12.998581	127.001229
29	12.998576	128.001224
30	12.998571	129.001218
31	12.998580	130.001200
32	11.998567	130.001205
33	10.998568	130.001202
34	10.998567	131.001191
35	10.998568	132.001181
36	9.998561	132.001184
37	9.998558	133.001177
38	9.998554	134.001170
39	9.998550	135.001162
40	9.998546	136.001154
41	9.998543	137.001145
42	9.998539	138.001137
43	9.998535	139.001128
44	9.998532	140.001118
45	9.998528	141.001108
46	9.998510	142.001113
47	9.998506	143.001104

	South	East
48	10.998494	143.001114
49	10.998513	144.001081
50	11.998507	144.001084
51	12.998499	144.001091
52	13.998493	144.001090
53	13.998490	145.001081
54	13.998488	146.001070
55	14.998483	146.001074
56	15.998478	146.001078
57	15.998474	147.001067
58	16.998469	147.001072
59	17.998465	147.001078
60	18.998465	147.001089
61	18.998456	148.001071
62	18.998451	149.001058
63	19.998451	149.001064
64	19.998441	150.001050
65	20.998438	150.001056
66	20.998432	151.001042
67	21.998429	151.001049
68	22.998434	151.001058
69	22.998420	152.001041
70	23.998428	152.001046
71	23.998411	153.001033
72	23.998405	154.001018
73	24.998402	154.001025
74	25.998401	154.001033
75	26.998397	154.001041
76	27.998398	154.001049
77	28.998397	154.001059
78	29.998395	154.001068
79	30.998395	154.001078
80	31.998395	154.001088
81	31.998405	153.001103
82	32.998404	153.001116
83	32.998415	152.001132
84	33.998414	152.001145
85	34.998416	152.001158
86	34.998426	151.001172
87	35.998427	151.001188
88	36.998431	151.001203
89	37.998434	151.001218
90	37.998444	150.001236
91	37.998457	149.001255
92	38.998459	149.001268
93	39.998464	149.001286
94	40.998469	149.001304

	South	East
95	41.998475	149.001323
96	42.998481	149.001343
97	43.998488	149.001364
98	43.998499	148.001382
99	43.998511	147.001401
100	43.998522	146.001418
101	43.998534	145.001436
102	42.998527	145.001413
103	41.998522	145.001384
104	41.998531	144.001408
105	40.998524	144.001387
106	40.998536	143.001403
107	39.998529	143.001383
108	38.998522	143.001358
109	38.998534	142.001379
110	38.998546	141.001393
111	38.998557	140.001407
112	37.998545	140.001384
113	37.998562	139.001401
114	36.998554	139.001381
115	36.998567	138.001396
116	36.998578	137.001408
117	36.998590	136.001420
118	35.998576	136.001402
119	35.998595	135.001413
120	34.998583	135.001401
121	33.998570	135.001397
122	33.998586	134.001398
123	32.998580	134.001383
124	32.998595	133.001387
125	32.998608	132.001394
126	31.998594	132.001397
127	31.998606	131.001396
128	31.998614	130.001404
129	31.998623	129.001413
130	32.998642	129.001419
131	32.998653	128.001427
132	32.998664	127.001435
133	32.998675	126.001445
134	32.998686	125.001456

	South	East
135	33.998699	125.001467
136	33.998715	124.001479
137	34.998719	124.001489
138	34.998731	123.001496
139	34.998749	122.001505
140	34.998756	121.001505
141	34.998769	120.001510
142	34.998788	119.001513
143	35.998793	119.001533
144	35.998806	118.001537
145	35.998819	117.001541
146	35.998832	116.001543
147	34.998831	116.001528
148	34.998841	115.001532
149	34.998846	114.001528
150	33.998836	114.001511
151	32.998821	114.001492
152	32.998823	115.001497
153	31.998805	115.001478
154	30.998801	115.001459
155	30.998798	114.001458
156	29.998789	114.001441
157	28.998773	114.001422
158	28.998787	113.001428
159	27.998776	113.001417
160	26.998768	113.001394
161	25.998754	113.001362
162	25.998767	112.001389
163	24.998757	112.001377

Figure 7 Outer boundary of Australia with RQZ excision marked



Attachment B—Radioastronomy services in the Mid West Radio Quiet Zone

There is an embargo on issuing new apparatus licences in the 100 MHz–25.5 GHz frequency range around Boolardy Station, approximately 300 kilometres north-east of Geraldton, Western Australia. The ACMA maintains the Mid West Radio Quiet Zone (RQZ) to preserve the current ‘radio-quietness’.³² The area has very low levels of radiofrequency energy because of its sparse population and remote location. The RQZ facilitates the development and use of new radioastronomy technologies at that location, and supports Australia’s bid to host the Square Kilometre Array (SKA).

The SKA is a proposed radio telescope with a collecting area of one square kilometre. It is expected to have 50 times the sensitivity of the best radioastronomy telescopes currently in use. The broad mission of the SKA, which is expected to operate until 2050, is to address fundamental questions in research on the origin and evolution of the universe. In 2006, the International SKA Steering Committee announced that Australia and South Africa had been short-listed as potential sites for the SKA. The final decision is currently scheduled for some time in 2012.

Two key administrative instruments provide protections for the RQZ. Embargo 41 applies to the issuing of licences in the following frequency ranges:

- > 100–230 MHz within a 150 kilometre radius
- > 230 MHz–25.25 GHz within a 100 kilometre radius of the proposed SKA site.

Radiocommunications Assignment and Licensing Instruction (RALI) MS32 sets out processes to coordinate apparatus-licensed services with the RQZ. It also provides criteria to assess proposed assignments located within a coordination zone of up to 260 kilometres from the proposed SKA site.

These two instruments have the effect of providing an inner ‘restricted zone’ and an outer ‘coordination zone’. Access to apparatus licences in these zones will usually be subject to consultation with the manager of the radioastronomy facilities and the development of appropriate technical solutions to minimise interference to radioastronomy services.

In order to continue to protect the RQZ and support the SKA bid, spectrum licences in areas around the RQZ will also be subject to a licence condition designed to prevent harmful interference to radioastronomy services at the site.

The ACMA also intends to exclude the proposed SKA site at the centre of the RQZ from all new spectrum licences that are granted on a nationwide basis. This will preserve options for apparatus licensing of radioastronomy receivers at the centre of the site.

In the case of the spectrum under discussion in this paper, the ACMA proposes to excise the area described below from its recommendation to the minister that he declare the spectrum for allocation by issuing spectrum licences.

The area, the core part of the RQZ, is bounded by the following coordinates:

³² For more information on the Mid West Radio Quiet Zone, see the [ACMA website](#).

Row	South	East
1	25.998719	115.918031
2	25.998712	116.668032
3	25.998708	117.418029
4	26.665385	117.418042
5	27.415393	117.418053
6	27.415394	116.668053
7	27.415397	115.918054
8	26.665393	115.918047
9	25.998719	115.918031

The datum used for coordinates in this document is the Geocentric Datum of Australia 1994. This area is illustrated in the map in Figure 8 below.

Figure 8 Areas to be excised from reallocation recommendation

