Australian Government | acma

Australian Communications and Media Authority

Draft spectrum reallocation recommendation for the 3.6 GHz band

Metropolitan and regional areas of Australia

OCTOBER 2017

communicating | facilitating | regulating

Canberra
Red Building
Benjamin Offices
Chan Street
Belconnen ACT

PO Box 78
Belconnen ACT 2616

T +61 2 6219 5555
F +61 2 6219 5353

Melbourne
Level 32
Melbourne Central Tower
360 Elizabeth Street
Melbourne VIC

PO Box 13112
Law Courts
Melbourne VIC 8010

T +61 3 9963 6800
F +61 3 9963 6899

Sydney
Level 5
The Bay Centre
65 Pirrama Road
Pyrmont NSW

PO Box Q500
Queen Victoria Building
NSW 1230

T +61 2 9334 7700 or 1800 226 667
F +61 2 9334 7799

Contents

Contents (Continued)

Executive summary

There is increasing demand for access to the frequency range 3575–3700 MHz ('the 3.6 GHz band') in metropolitan and regional areas of Australia. This pressure is being driven by the increasing need for data and international developments in fixed and mobile wireless broadband technologies, including the identification of the broader 3300–3800 MHz frequency range as a pioneer band for 5G services. In Australia, the 3.6 GHz band is currently used for fixed satellite service (FSS) earth stations, point-to-point links and site-based wireless broadband services that are authorised under apparatus licences. The *Future use of the 3.6 GHz band* consultation process reviewed existing arrangements in the band taking into account international developments. As indicated in the *Future use of the 3.6 GHz band—decisions and preliminary views paper* (the decision paper) to the review, the Australian Communications and Media Authority (the ACMA) has formed the view that the public benefit derived would be maximised by re-allocating the entire 3.6 GHz band in metropolitan and regional areas for spectrum licensing. Spectrum licences give licensees certainty of tenure and the flexibility to deploy different technologies under the same licence.

Based on the outcomes of the above-mentioned review, the ACMA has prepared a draft recommendation to the Minister for Communications that he make a spectrum reallocation declaration, or reallocation declarations, for the 3.6 GHz band in specified metropolitan and regional areas.

Before making such a recommendation to the minister, the ACMA must, under Part 3.6 of the *Radiocommunications Act 1992* (the Act), consult with stakeholders. In particular, under section 153G of the Act, the ACMA must invite comments on the terms of the draft recommendation from potentially affected apparatus licensees.

Attachment A to this discussion paper contains a notice inviting such comments. To help interested parties prepare their comments, this discussion paper outlines the ACMA's proposed recommendations for each of the elements of the draft recommendation (see Table 1) and the background to each of these proposals.

Table 1: Terms of the draft recommendation[1]

Element of draft recommendation	The ACMA's proposed recommendation
Licence type	Spectrum licences
Parts of the spectrum	3575–3700 MHz in metropolitan and regional Australia
Reallocation periods	Two years for the Adelaide, Brisbane, Canberra, Melbourne and Sydney metropolitan areas (Area A) Five years for the Perth metropolitan area (Area B) Seven years for the regional area (Area C)
Reallocation deadline	12 months before the end of the two year reallocation period for Area A

If the minister accepts the ACMA's recommendation and makes a reallocation declaration (or reallocation declarations) for the 3.6 GHz band, the ACMA would conduct a price-based allocation of the spectrum.

In the interests of facilitating an expeditious and efficient reallocation process, this discussion paper also provides information on matters that would be relevant to such an allocation and invites any preliminary comment on those matters in the event that the minister accepts the ACMA's recommendation. These matters include:

- the licence term
- auction methodology
- lot configuration.

If and when a reallocation declaration is made, stakeholders will have additional opportunities to comment on these matters, as part of the consultation process on the allocation instruments.

Licence term

The ACMA would propose the 3.6 GHz band spectrum licences align with the adjacent 3.4 GHz band spectrum licences expiry date of 20 December 2030 and commence following the allocation. This would result in a licence term of approximately 12 years.

Allocation methodology

The ACMA considers that an enhanced simultaneous multi-round ascending (ESMRA) auction would be the most appropriate methodology for the allocation of spectrum in the 3.6 GHz band. This two-stage auction methodology, comprising a price discovery stage with frequency-generic lots and an assignment stage, would be administratively efficient and give prospective licensees flexibility in securing spectrum suited to their business plans.

[1] In this paper, Area A means metropolitan areas, which is equivalent to Areas 1A in the decision paper. Area B in this paper, the Perth metropolitan area, is Area 1B in the decision paper. Area C in this paper is equivalent to Areas 2 and 3 in the decision paper.

Lot configuration
The ACMA would propose to auction lots in 5 MHz segments because the most likely use of the band (5G and 4G/LTE) is optimised for 5 MHz channels.

The ACMA would also propose to divide the geographic area of metropolitan and regional Australia into seven different areas for the purpose of the auction.

1 Introduction

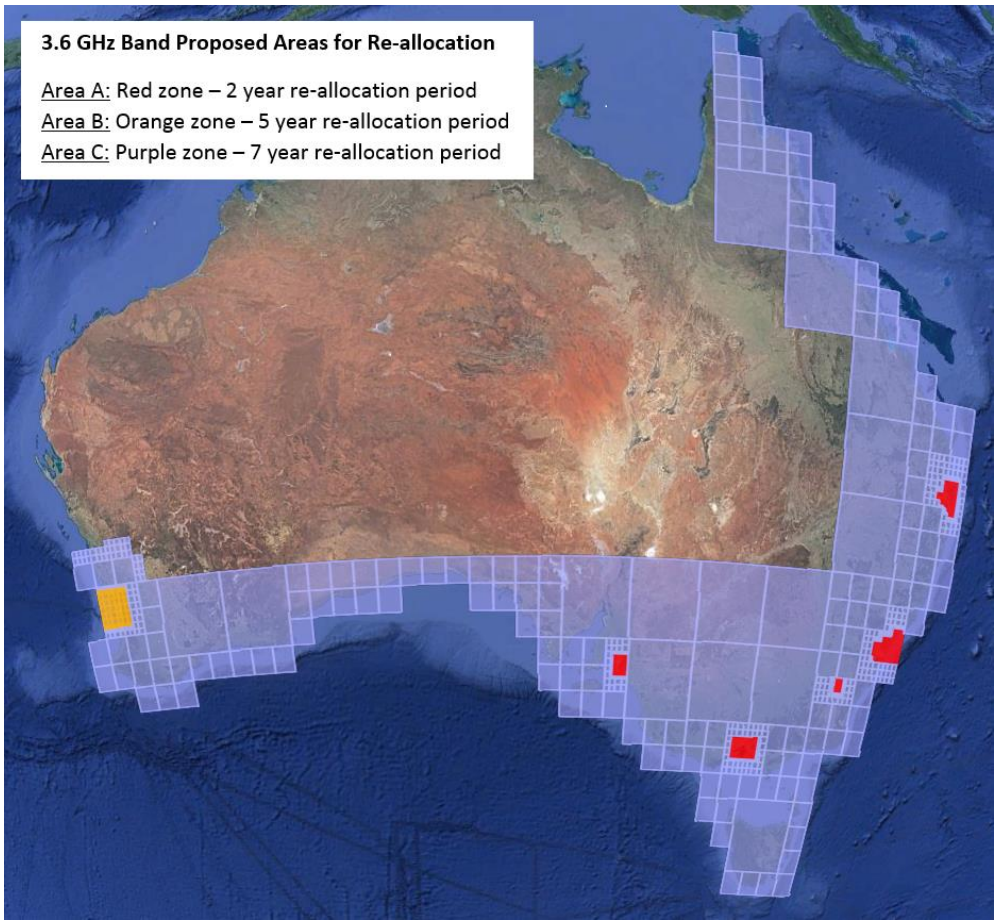
Draft recommendation

Based on the outcomes of the *Future use of the 3.6 GHz band* consultation process, the ACMA has prepared a draft recommendation to the Minister for Communications, seeking that he make a spectrum reallocation declaration, or reallocation declarations, for frequency ranges 3575–3700 MHz (the 3.6 GHz band) in metropolitan and regional Australia.

In this paper, 'metropolitan and regional Australia' is defined by the hierarchical cell identification scheme (HCIS) identifiers listed in the ACMA's written notice (Attachment A).[2] Figure 1 provides an illustrative map of metropolitan and regional Australia as described by the HCIS identifiers.

[2] HCIS is a naming convention developed by the ACMA that applies unique labels to each five-minute arc square cell in the Australian Spectrum Map Grid, derived from the cell's position in a hierarchically arranged group of cells. The hierarchy has four levels, the smallest being HCIS level 1 (approximately 9 km x 9km) and the largest HCIS level 4 (approximately 330 km x 330 km).

Figure 1: Map of metropolitan and regional Australia as described by the HCIS identifiers[3]



In preparing a final recommendation to the minister under section 153F of the *Radiocommunications Act 1992* (the Act), the ACMA must consider any comments received from potentially affected apparatus licensees. If the minister accepts such a recommendation and makes a spectrum reallocation declaration, or reallocation declarations, for the 3.6 GHz band, this would enable the ACMA to allocate the spectrum via a price-based mechanism in accordance with section 60 of the Act.

The purpose of this paper is to provide context and information about current and proposed arrangements in the 3.6 GHz band. This information is intended to assist potentially affected apparatus licensees and other interested stakeholders to provide written comments to the ACMA on the terms of the draft reallocation recommendation.

This paper also invites submissions on other matters relevant to a price-based allocation of spectrum in the 3.6 GHz band, should the minister accept the ACMA's reallocation recommendation. These matters include the allocation methodology that the ACMA proposes to use and the way that spectrum should be configured for allocation.

[3] In this paper, Area A means metropolitan areas, which is equivalent to Areas 1A in the decision paper. Area B in this paper, the Perth metropolitan area, is Area 1B in the decision paper. Area C in this paper is equivalent to Areas 2 and 3 in the decision paper.

The ACMA welcomes views and comments from interested parties on all matters included in this paper.

Background

Previous consultation

In October 2016, the ACMA released the *Future use of 1.5 GHz and 3.6 GHz bands* discussion paper (the October 2016 discussion paper). The paper considered current and possible future use of the 1427–1518 MHz band (the 1.5 GHz band) and the 3575–3700 MHz band (the 3.6 GHz band) both domestically and internationally. As an outcome of the October 2016 consultation, the ACMA made the decision to prioritise the review of the 3.6 GHz band over the 1.5 GHz band.

In June 2017, the ACMA released for public consultation the Future use of the 3.6 GHz band consultation package ('the 3.6 GHz consultation'). This consisted of the following three papers:

- *Future use of the 3.6 GHz band—Options paper* (the options paper)
- *Future use of the 3.6 GHz band—Highest value use assessment: Quantitative analysis* (the HVU paper)
- *Future use of the 3.6 GHz band—Summary of and response to 3.6 GHz submissions*.

The options paper sought industry feedback on a number of options for replanning the 3.6 GHz band and identified an ACMA preferred option, while the HVU paper provided a quantitative assessment of highest value use for the band.

A summary of submissions to the 3.6 GHz consultation, with the ACMA response to submissions and the outcomes of the review, including recommending the band for spectrum licensing, is set out in *the Future use of the 3.6 GHz band—decisions and preliminary views paper* (the decision paper). The decision paper, among other things, outlines that the ACMA proposes to recommend that the minister issue spectrum licences in the 3.6 GHz band.

This discussion paper is the first step in the proposed process to allocate spectrum licences in the 3.6 GHz band.

Legislative context

The ACMA is guided in its spectrum management functions by the objects of the Act, set out in section 3, and the *Principles for spectrum management* (the principles). Key to both the objects of the Act and the principles is the maximisation of the overall public benefit derived from use of the radiofrequency spectrum. The ACMA seeks to achieve this goal through a balanced application of market and regulatory mechanisms.

Objects of the *Radiocommunications Act 1992*

The ACMA's recommendation, set out in this paper, is informed by and consistent with the following objects of section 3 of the Act:

a. Maximise, by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radiofrequency spectrum.

c. Provide a responsive and flexible approach to meeting the needs of users of the spectrum.

e. Provide an efficient, equitable and transparent system of charging for use of the spectrum, taking account of the value of both commercial and non-commercial use of spectrum.

f. Support the communications policy objectives of the Commonwealth Government.

Principles for spectrum management

The ACMA's recommendation also promotes the principles:

> Principle 1—Allocate spectrum to the highest value use or uses.

> Principle 2—Enable and encourage spectrum to move to its highest value use or uses.

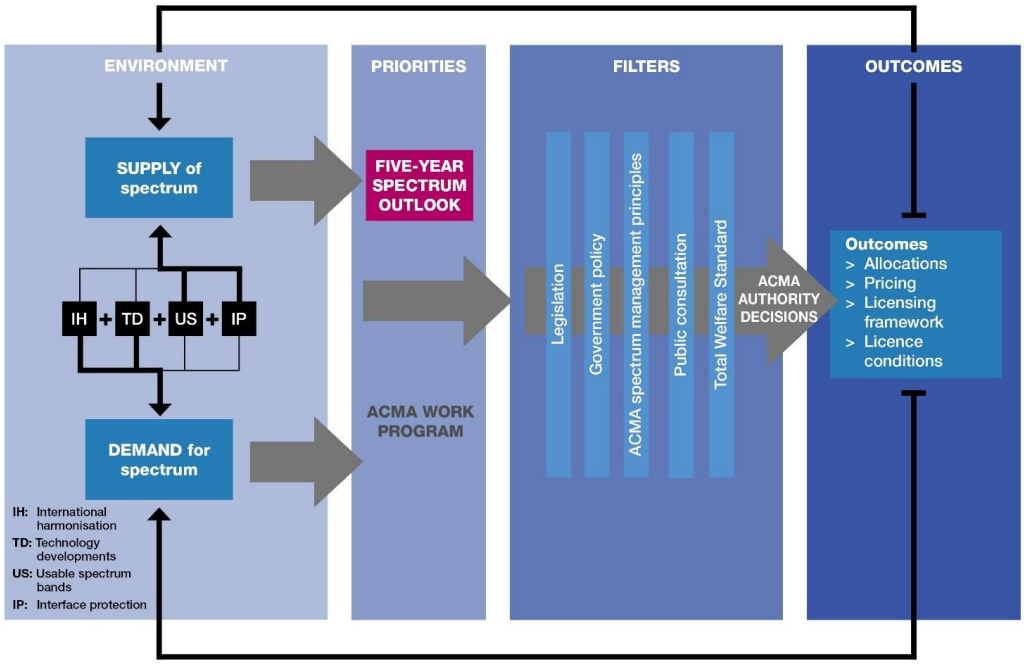
> Principle 3—Use the least cost and least restrictive approach to achieving policy objectives.

> Principle 4—To the extent possible, promote both certainty and flexibility.

> Principle 5—Balance the cost of interference and the benefits of greater spectrum utilisation.

In arriving at regulatory decisions, the ACMA considers a range of factors identified in its spectrum management decision framework (see Figure 2).

Figure 2: Spectrum management decision framework



Reallocation process

Part 3.6 of the Act sets out the processes for the reallocation of encumbered spectrum. A summary is set out at Attachment B.

Under section 153E of the Act, the minister must not make a spectrum reallocation declaration for a particular part or parts of the spectrum unless, during the previous 180 days, the ACMA has given the minister a recommendation under section 153F of the Act for that part or parts of the spectrum.

Before the ACMA makes a recommendation to the minister under section 153F, it must, under subsection 153G(1), prepare a written notice stating that it has prepared a draft version of the recommendation and setting out the terms of the draft recommendation. The ACMA must, as far as practicable, make reasonable efforts to give each potentially affected apparatus licensee a copy of the notice and publish a copy on its website. The notice must invite potentially affected apparatus licensees to give written comments to the ACMA about the draft version of the recommendation. The ACMA must consider those comments in preparing its final recommendation to the minister.

In its recommendation to the minister under section 153F, the ACMA must include:

> the part or parts of the spectrum to be reallocated

> the period that, in the ACMA's opinion, the declaration should specify as the reallocation period.

Parts of the spectrum are defined by their frequency and geographic boundaries.

The reallocation period sets the time frame during which the reallocation process is to be completed. The period must begin within 28 days of the spectrum reallocation declaration being made by the minister and must run for at least two years. During this time, incumbent apparatus licensees may continue to operate devices in accordance with their apparatus licences. At the end of the reallocation period, incumbent licensees' apparatus licences are cancelled (section 153H of the Act).

A reallocation declaration made by the minister under section 153B of the Act must specify:

> the type of licences that should be issued—that is, spectrum or apparatus licences

> the reallocation deadline.

The reallocation deadline sets the date by which the ACMA must have allocated at least one licence for the reallocated spectrum. The reallocation deadline must be at least 12 months before the end of the reallocation period.

The ACMA will include proposals on these matters in its recommendation to the minister.

Spectrum reform

The government is reforming the spectrum management framework within Australia. These reforms will simplify the regulatory framework and support new and innovative technologies and services. The reforms include implementing the recommendations of the government's Spectrum Review report to:

1. Replace the current legislative arrangements with new legislation that removes prescriptive processes and streamlines licensing for a simpler and more flexible framework.
2. Better integrate the management of public sector and broadcasting spectrum to improve the consistency and integrity of the framework.
3. Review spectrum pricing to ensure consistent and transparent arrangements to support the efficient use of spectrum and secondary markets.

On 18 May 2017, the government released a consultation package on reforms to modernise and simplify Australia's spectrum management framework. The comprehensive consultation package included an Exposure Draft of the Radiocommunications Bill and related consultation papers, including approaches for broadcasting spectrum and transitional arrangements. Consultation papers on

government spectrum holdings and spectrum pricing were also released. Consultation closed on 28 July 2017.

Currently, the Radiocommunications Bill and draft transitional and consequential legislation is being finalised before introduction into parliament. The Department of Communications and the Arts (DoCA) stated in the recent consultation package that transition to a new framework would take place over a number of years. In addition, the commencement of the new legislation would occur approximately 12 months after passage of the Bill through parliament.

Given the timeframes associated with the 3.6 GHz band review, the ACMA is proposing to develop new arrangements in this band assuming the existing regulatory regime will apply. It is acknowledged that any new arrangements for the 3.6 GHz band may need to be accommodated under the new legislative framework, once it commences. The ACMA will take into account relevant opportunities offered by the implementation of the new legislative framework, if and when applicable.

Further information on spectrum reform is available from DoCA at spectrumreform@communications.gov.au.

Proposal—terms of the draft recommendation

The ACMA has prepared a draft recommendation (Attachment A) that the minister make a spectrum reallocation declaration or declarations for the 3.6 GHz band.

The ACMA considers that the arrangements proposed in the draft recommendation meet the object of the Act—to 'maximise, by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radiofrequency spectrum'.

Table 2 provides a summary of the terms of the draft recommendation.

Table 2: Terms of the draft recommendation

Element of draft recommendation	The ACMA's proposed recommendation
Licence type	Spectrum licences
Parts of the spectrum	3575–3700 MHz in metropolitan and regional Australia
Reallocation periods	Two years for the Adelaide, Brisbane, Canberra, Melbourne and Sydney metropolitan areas (Area A) Five years for the Perth metropolitan area (Area B) Seven years for the regional area (Area C)
Reallocation deadline	12 months before the end of the two year reallocation period for Area A

This discussion paper provides background and context on each of the elements of the proposed recommendation to assist potentially affected apparatus licensees to provide comments to the ACMA. It also contains discussion on other matters relevant to a price-based allocation of spectrum in the band, should the minister accept the recommendation from the ACMA and make a reallocation declaration or reallocation declarations.

Firstly, the paper briefly discusses the features of apparatus and spectrum licensing, and why the ACMA considers spectrum licensing to be the most suitable long-term licensing arrangement in the 3.6 GHz band.

Secondly, the paper discusses options the ACMA considered in developing its recommendation on parts of the spectrum to be reallocated.

Thirdly, the paper includes further detail on matters relevant to the proposed reallocation period and reallocation deadline.

Finally, the paper discusses other matters relevant to the price-based allocation of the spectrum, including the ACMA's preliminary view on preferred allocation methodology and lot configuration. Subject to this consultation, and to the minister accepting the ACMA's proposed recommendation, the ACMA would seek to ensure the auction commences in 2018 and considers it desirable that stakeholders have the opportunity to consider potential allocation issues at an early stage of the process.

2 Licence type

Under section 153B of the Act, the minister may declare that the spectrum is to be reallocated by issuing spectrum or apparatus licences. Under either option, incumbent apparatus licensees would have their licences cancelled at the end of the reallocation period. Under subsection 153F(3), when the ACMA gives the minister a recommendation to make a spectrum reallocation declaration, the ACMA can include a recommendation about any matters it considers appropriate. While the ACMA is not required to make a recommendation to the minister about licence type, it intends to make a recommendation the 3.6 GHz band be spectrum licenced.

Under the Act, it is unlawful to operate a radiocommunications device in Australia unless it is authorised by a radiocommunications licence. The ACMA can issue three types of licences to authorise the use of spectrum:

> class licences
> apparatus licences
> spectrum licences.

The appropriate licence type for a particular part of the spectrum will be determined by a range of factors including, but not limited to:

> the potential uses of that part of the spectrum
> the likely number of possible users
> whether potential users are likely to seek access to one site or a defined access area
> whether all likely future high-value uses can be accommodated in a single technical framework.

The options paper discusses the appropriateness of each licence type in detail. The generic characteristics of each licence type are summarised below.

Class licences provide broad spectrum access arrangements that are open to all users and operate on the basis that users are not provided with protection from interference. The type of services considered likely to be deployed in the 3.6 GHz band require a high level of reliability and a guaranteed quality of service. Generally, this is delivered by granting exclusive rights to blocks of spectrum to an identified licensee. As such, class licences are not suitable to authorise these future services in the band.

Apparatus licences are a form of individual authorisation that can take several shapes. Similar to spectrum licences, they may authorise the licensee to use the specified frequency band anywhere within the geographic and frequency boundaries of the spectrum space. Most commonly, they authorise the licensee to use a specified device in a specified frequency band, generally at a specified location and for a particular type of service. Apparatus licences are the most common kind of licence issued by the ACMA and may only be traded in full.

Spectrum licences authorise the licensee to use the specified frequency band anywhere within the geographic and frequency boundaries of the spectrum space. While spectrum licences are often optimised for a particular use, licensees are free to use them for any service that satisfies the technical framework for the band. Spectrum licences are fully tradeable and can be amalgamated, divided or reassigned, in part or in whole, to third parties, subject to ongoing compliance with the interference management framework established by the ACMA.

As discussed in the decision paper, the ACMA considers spectrum licensing would be the most appropriate licensing arrangement for the 3.6 GHz band.

The 3.6 GHz metropolitan and regional Australia licence type

The ACMA proposes to recommend that any reallocation declaration or declarations made by the minister should state that metropolitan and regional areas of Australia in the 3.6 GHz band (as described in the Written Notice in Attachment A) should be reallocated by issuing spectrum licences.

3 Specified parts of the spectrum

The ACMA may give the minister a recommendation to make a spectrum reallocation declaration for one or more specified parts of the spectrum. Parts of the spectrum may be defined by their frequency range and geographical boundaries.

In determining an appropriate recommendation, the ACMA considers numerous factors. For example, international trends and anticipated future spectrum uses help provide a platform to establish if there is demand for the spectrum. Matters such as the technology to be deployed and current use of a band may influence the amount of spectrum that should be considered for reallocation.

These matters are not exclusive and the ACMA may take other issues into consideration when determining an appropriate recommendation.

Frequency boundaries

The ACMA proposes that the minister's reallocation declaration specifies 125 MHz of spectrum in the frequency range 3575–3700 MHz across metropolitan and regional Australia. As outlined in the decision paper, the anticipated use of the band is for fixed and/or mobile wireless broadband services.

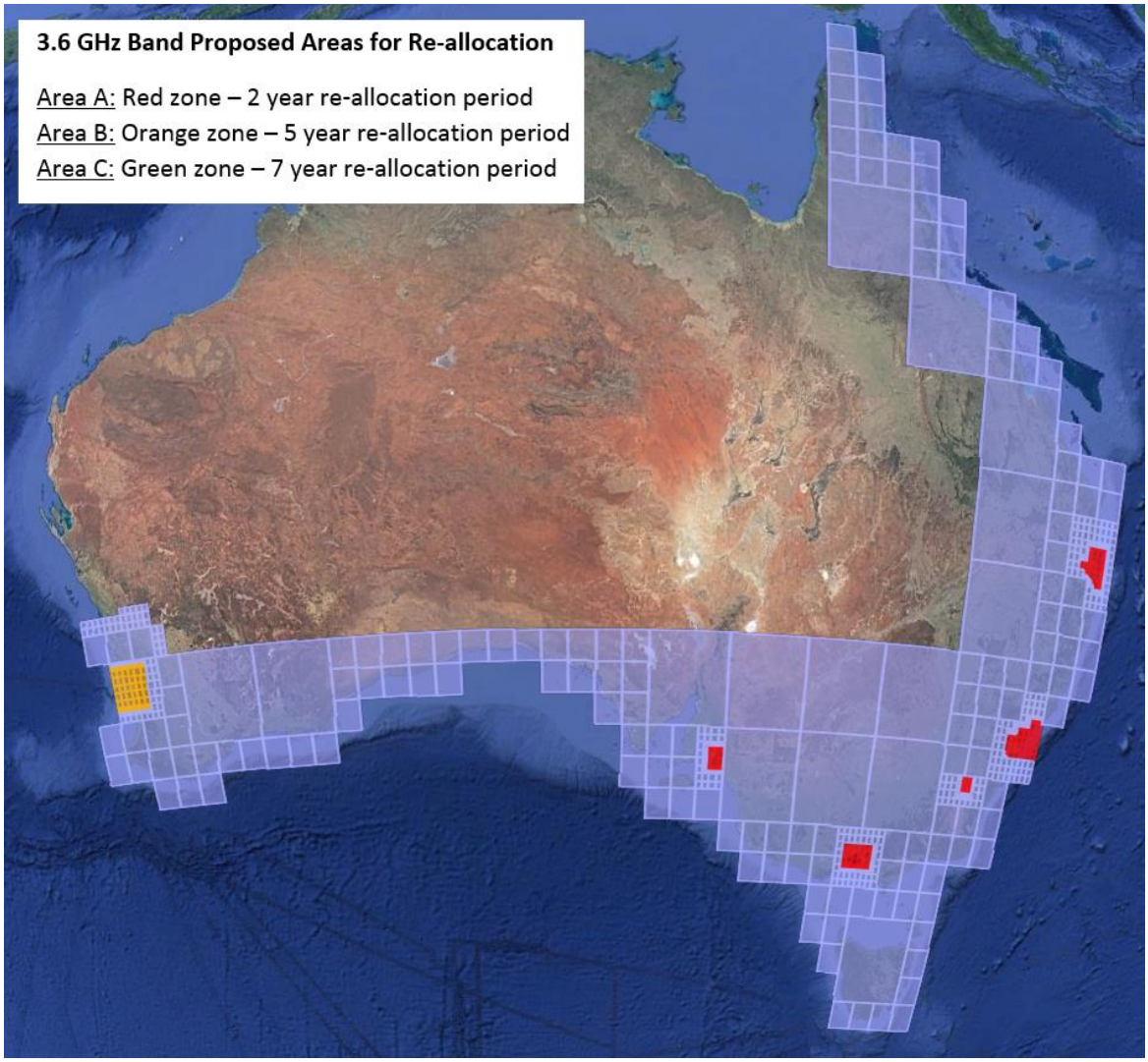
3.6 GHz metropolitan and regional Australia frequency boundaries

In the metropolitan and regional areas of the 3.6 GHz band, the ACMA proposes to recommend the minister declare for reallocation the frequency range 3575–3700 MHz (125 MHz of spectrum).

Geographic boundaries

The ACMA proposes to recommend geographic boundaries as depicted by the areas displayed in Figure 3 below and defined at Attachment C.

Figure 3: Geographic area



The ACMA considers that the geographic areas defined at Attachment C cover the most likely areas of high demand as identified in the options paper. Introducing spectrum licensing in these areas would provide a flexible and practical approach to allocation, and simplify arrangements for current and prospective licensees.

The ACMA is considering four small areas to be excised from Area C. Three of these areas (near Quirindi, Moree and Roma respectively) are proposed sites for possible future earth satellite station protection zones. The fourth and smaller area near Uralla would support the ongoing use of Lockheed Martin's earth station facility. Figures 4 and 5 below show an overview and a detailed view of the four areas. The areas are defined by the HCIS identifiers in Attachment D. If one or more of these areas is determined suitable for a future earth satellite station protection zone, then the relevant area or areas would be defined and excised in the recommendation the ACMA makes to the minister. That is, the area or areas would not become subject to spectrum licensing if the minister accepted the ACMA's recommendation.

Figure 4: Overview map of possible excise areas

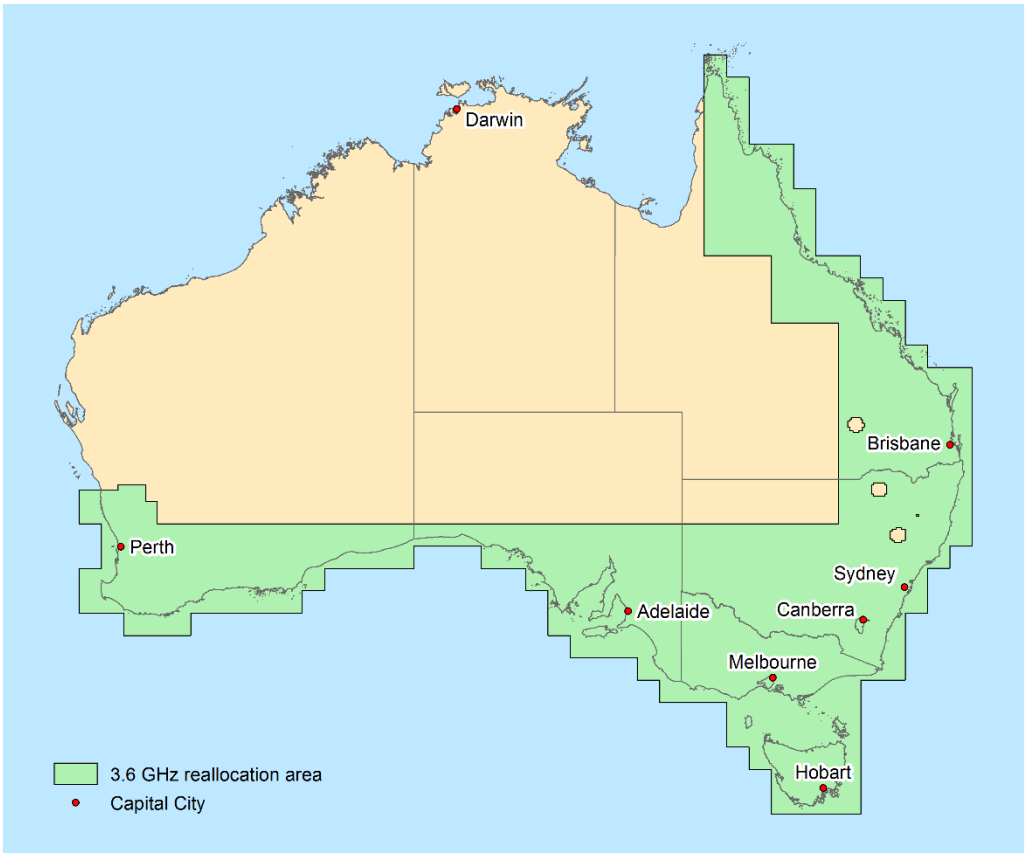
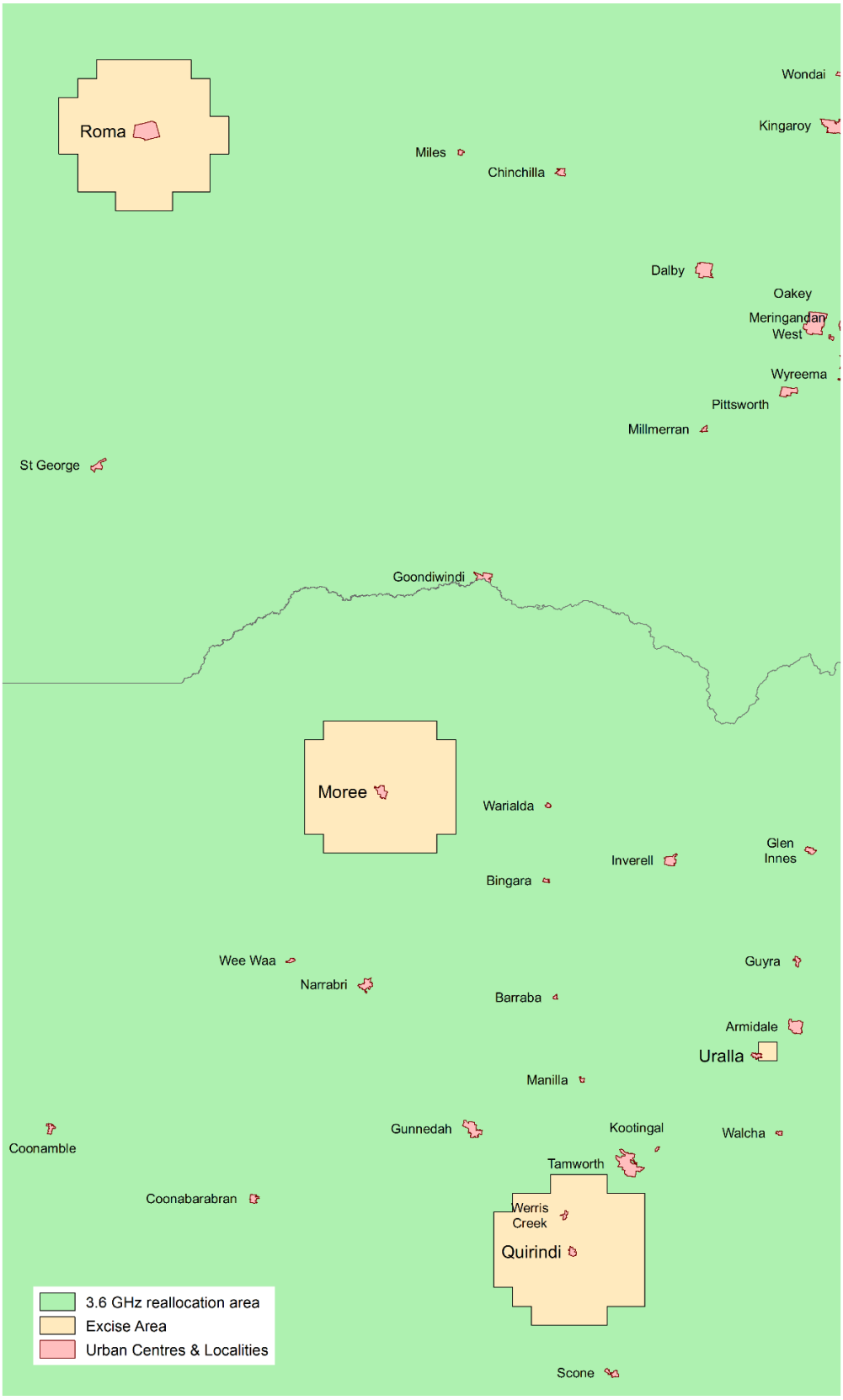


Figure 5: Detailed view of possible excise areas



3.6 GHz metropolitan and regional Australia geographic boundaries

In the metropolitan and regional areas of the 3.6 GHz band, the ACMA proposes to recommend the geographic areas shown in Figure 3, and described by the HCIS identifiers in the Attachment C be included in the reallocation declaration or declarations.

4 Reallocation period and deadline

Where the ACMA gives the minister a recommendation to make a spectrum reallocation declaration, it must specify the period that, in the ACMA's opinion, the declaration should identify as the reallocation period. The reallocation period must begin within 28 days of the declaration being made.

If the minister makes a spectrum reallocation declaration, it must specify the period that is the reallocation period. It must also specify a reallocation deadline. The ACMA must allocate at least one licence before the reallocation deadline or the declaration is taken to be revoked. The reallocation deadline must be at least 12 months before the end of the reallocation period.

Under subsection 153F(3) of the Act, when the ACMA gives the minister a recommendation to make a spectrum reallocation declaration, the ACMA can include a recommendation about any matters it considers appropriate. The ACMA proposes to include in its recommendation to the minister a suggested reallocation deadline.

Reallocation period and deadline

The reallocation period sets the time frame during which the reallocation process is to be completed. Under subsection 153B(4) of the Act, the reallocation period must begin within 28 days of the spectrum reallocation declaration being made by the minister and must run for at least two years. During this time, incumbent apparatus licensees may continue to operate devices under their licences.

Under section 153H of the Act, at the end of the reallocation period any apparatus licensees still in the reallocated spectrum will have their apparatus licences cancelled.

Before recommending a reallocation period, the ACMA considers:

> how long it may reasonably take for incumbent licensees to relocate from the band

> the likely use or uses of the spectrum and when the potential purchasers of spectrum licences would like to start using the spectrum in different areas.

Existing services

There are a substantial number of existing apparatus licenced services operating in the 3.6 GHz band. The proposed reallocation of the band as spectrum licences would affect the ongoing delivery of existing services after the end of the reallocation period. At the end of the reallocation period, existing apparatus licences will be cancelled and licensees will be expected to have ceased operating in the band in order that services can commence under any spectrum licences issued as a result of the auction.

For existing apparatus licensees, remaining in the band beyond the end of the reallocation period would be contingent on obtaining sufficient spectrum at auction or reaching agreement with successful bidders for access to their spectrum. An assessment of the impact the proposed reallocation may have on existing apparatus licensed services would be a matter for individual incumbent licensees. Similarly, the continued delivery of services currently provided in the band after the end of the reallocation period, is something for which existing licensees would need to consider and plan.

Since 2005, a number of spectrum embargoes have been applied to the 3.6 GHz band restricting new apparatus licences being issued in the band for certain geographic areas. Spectrum embargoes are an administrative tool used to facilitate orderly spectrum planning and provide notice of the ACMA's intention to restrict the allocation of new licences in a band, pending its replanning. They also alert incumbents and prospective licensees to the start of a planning process. Embargoes also provide additional time and opportunity for existing users to consider relocating operations to alternative bands if viable. The options paper considers alternatives for the migration of long-term incumbent services out of the band, including relocating to alternative spectrum in some cases and establishing geographic areas such as protection zones for earth satellite services.

Reallocation period

The ACMA has considered two options for the reallocation period:

- seven years—a single period of substantially longer than the minimum of two years required under the Act
- different reallocation periods for different areas.

For the reasons set out in the decision paper, the ACMA considers differential reallocation periods for different areas the most appropriate approach to minimise the effect on incumbent licensees while allowing spectrum licensees earlier access in areas of highest demand. The reallocation periods proposed for each area are:

- two years for the Adelaide, Brisbane, Canberra, Melbourne and Sydney metropolitan areas (Area A)
- five years for Perth (Area B)
- seven years for regional Australia (Area C).

As discussed in the *Licence term* section of Chapter 5, the ACMA proposes that spectrum licences would commence before the end of the reallocation period. This would allow spectrum licensees to operate around incumbent services throughout this period. However, spectrum licensees will be required to afford protection to incumbent services during the reallocation period. At the end of the reallocation period, all apparatus licences would be cancelled. Apparatus licensees would be free to negotiate with any spectrum licensees in the area to continue operating their services after the end of the reallocation period. This could be facilitated using third-party access arrangements under section 68 of the Act, and requires no involvement by the ACMA.

A detailed discussion about the proposed allocation periods is available in the decision paper.

Reallocation deadline

The reallocation deadline sets the date by which the ACMA must have allocated at least one licence in the reallocated spectrum. If no licence is allocated, the reallocation declaration is automatically revoked.

The reallocation deadline must be at least 12 months before the end of the reallocation period.

Early allocation of spectrum licences should allow the maximum time for purchasers to deploy networks in the major metropolitan areas where a two-year reallocation period is proposed. This can be expected to maximise the availability of services to consumers in these areas.

For this reason, the ACMA intends to recommend the reallocation deadline to be 12 months before the end of the two-year reallocation period for metropolitan areas (Area A).

3.6 GHz band reallocation period and deadline

In the 3.6 GHz band, the ACMA proposes to recommend reallocation periods of:

> two years for the Adelaide, Brisbane, Canberra, Melbourne and Sydney metropolitan areas (Area A)

> five years for the Perth metropolitan area (Area B)

> seven years for the regional area (Area C)

with a reallocation deadline of 12 months before the end of the two-year reallocation period for Area A.

5 Other matters relevant to a price-based allocation in the 3.6 GHz band

If the minister declares spectrum in the 3.6 GHz band for reallocation in line with the ACMA's recommendation, the ACMA will conduct a price-based allocation of the reallocated spectrum.

The ACMA has given preliminary consideration to other matters relevant to a price-based allocation of the spectrum in the 3.6 GHz band, including:

- the spectrum licence term
- how the spectrum would be allocated (the allocation methodology)
- how the spectrum would be packaged for allocation (the lot configuration).

Subject to this consultation, and to the minister accepting the ACMA's proposed recommendation, the ACMA would seek to ensure that the allocation of the 3.6 GHz band was undertaken in a timely manner. Therefore, the ACMA is taking this opportunity to invite early comments on these matters.

Licence term

Under subsection 65(3) of the Act, a spectrum licence may be issued for any period up to 15 years. The majority of spectrum licences issued by the ACMA or its predecessors have been for 15 years.

Licence expiry date

The 3.6 GHz band is adjacent in frequency, similar in geographic area, and likely to be used by the same fixed and mobile wireless broadband technologies, as the spectrum-licensed 3.4 GHz band.

The ACMA considers it is appropriate to align the expiry dates of the 3.6 GHz band spectrum licences with the 3.4 GHz band that is already subject to spectrum licensing, so that all spectrum licences in the 3400–3700 MHz frequency range would have a common expiry date. The expiry date of all spectrum licences in the 3.4 GHz band is 13 December 2030. Therefore, if spectrum licences were to be issued in the 3.6 GHz band, the ACMA proposes they would be for a term ending on 13 December 2030. That is, they would be for a term less than 15 years. This common expiry date across all licences in adjacent bands is the same arrangement that the ACMA implemented for directly adjacent bands during the expiring spectrum licence reissue process.[4]

Setting a common expiry date would balance the need to provide sufficient certainty for potential licensees faced with planning and investment decisions, against the desirability of facilitating efficient future administration and use of the wider band, including the potential for trading and consolidation of holdings across the wider band.

The ACMA therefore proposes to align the expiry dates of new spectrum licences in the 3.6 GHz band with existing spectrum licences in the 3.4 GHz band. That is, all

[4] This is an administrative process undertaken by the ACMA concerning reissue or reallocation of spectrum licences at their expiry. Further information is available on the ACMA website.

spectrum licences in the 3400–3700 MHz frequency range would have a common expiry date of 13 December 2030.

Licence commencement

Assuming licences expire in December 2030 in line with spectrum licences in the 3.4 GHz band, then an auction commencing in late 2018 would allow for a licence term of approximately 12 years. The ACMA's preliminary view is for spectrum licences to commence as soon as possible after the auction and allow spectrum licensees to deploy around incumbent licensees where possible (subject to interference mitigation obligations). Spectrum licensees might also choose to provide commercial incentives to apparatus licensees to encourage early relocation outside the band, though the ACMA emphasises that incumbent licensees have the right to continue operation until the end of the reallocation period.

The ACMA acknowledges that this means spectrum licensees will not have unencumbered use of the spectrum for the entire licence term because they will need to operate around incumbent apparatus licensees during the relevant reallocation period. However the ACMA believes that early access to spectrum will enable spectrum licensees to deploy services in many areas where there are no incumbent services. Early commencement of spectrum licences in such areas could benefit consumers with the provision of new services.

3.6 GHz band licence duration

In the 3.6 GHz band, the ACMA's preliminary view is that spectrum licences should commence as soon as possible after the auction, and expire on 13 December 2030, in line with the existing spectrum licences in the 3.4 GHz band.

Allocation methodology

If the minister makes a reallocation declaration specifying that the spectrum be reallocated by issuing spectrum licences, then the ACMA must allocate the spectrum licences in accordance with section 60 of the Act—that is, via auction, via tender or for a predetermined or negotiated price.

When demand is likely to be greater than supply, market-based allocation (that is, by auction or tender) is considered more appropriate than an administrative allocation such as a predetermined or negotiated price, or a 'beauty contest'.[5]

Demand is expected to exceed supply for the 3.6 GHz band spectrum. As such, the ACMA proposes to allocate this spectrum via auction. The auction mechanism is intended to ensure that the available spectrum is allocated to those bidders who value it the most. The assumption is that a bidder's willingness to pay for the spectrum is a measure of the value of the service for which the spectrum will be used if acquired. The ACMA considers that auctions provide the simplest and most transparent method of allocating spectrum where there is competing demand.

[5] In a 'beauty contest' (also known as comparative tender), a committee typically sets a number of criteria, possibly with different weightings. Candidates' offers are then evaluated by a jury that selects the plan that has the best 'mix' of those criteria.

Auctions can be conducted using a wide variety of methodologies, including the English open outcry format (EOO), the simultaneous multi-round ascending (SMRA) formats and formats that enable package bidding (such as the combinatorial clock auction format).

Open outcry auction

The open outcry auction (or English open outcry (EOO) auction) is the most common form of auction used. It is the form of auction typically used, for example, for real estate, fine art and livestock. Participants bid openly against one another for each lot, with each successive bid higher than the previous one, sometimes by a specified increment. When no participant is willing to bid further, the bidder with the highest offer (on or above any reserve price) wins.

This auction format is most suitable when there are a limited number of lots available and when lots are not interdependent or substitutable. That is, it is most suitable when a bidder's valuation of lot one, for example, is independent of that bidder's valuation of lot three. It has been used by the ACMA and its predecessor organisations to auction spectrum in the past when only a small number of lots were on offer, usually lots that remained unsold following a larger auction. It has also been used by the ACMA for the allocation of Low Power Open Narrowcasting licences and the former ABA for FM commercial radio broadcasting licences and commercial television broadcasting licences.[6]

The ACMA has the capability to conduct an auction similar to the EOO but delivered electronically, called the Simple Clock Auction (SCA). SCA, like the EOO, performs best where demand for the lots on offer is largely independent. In an SCA, before each round, the auction manager names a price (the continue price) that the bidder must meet to be eligible to place a bid in the subsequent round. The bidder can accept the continue price (a continue bid) or place a lower bid (an exit bid). If a bid is lower than the continue price—that is, if it is an exit bid—then it is the bidder's final bid. Once a bidder has made an exit bid, the bidder cannot resume bidding on that lot in future rounds.

When there is at most one bidder who bid at least the continue price, the auction ends, the high-bidder wins, and pays the amount of the second-highest bid. This ensures that the winner never pays more than necessary to win.

Simultaneous multi-round ascending auction formats

In simultaneous multi-round ascending (SMRA) auction formats, multiple spectrum lots are offered simultaneously and bids are made on individual lots. These can be contrasted with auctions formats that enable 'package bids', such as the combinatorial clock auction format used by the ACMA in the Digital Dividend auction.

In the standard SMRA auction format, a number of frequency—and geographically—defined lots are open for bidding at the same time. All lots remain open as long as there are acceptable bids placed on any lot. Bidding occurs in a sequence of rounds, with the results (in particular, the amounts of the highest bids) of each round announced to the bidders before the start of the next round. The highest bid on each lot becomes the provisional winning price. The auction continues until there is a round in which there is no bid made for any lot. In this final round, bidders win the lots for which they have the standing high bids and pay the amount of their high bids.

[6] https://www.acma.gov.au/Industry/Spectrum/Radiocomms-licensing/Apparatus-licences/low-power-open-narrowcasting-services-acquire-a-licence-acma

The standard SMRA auction format facilitates switching of demand between lots over successive rounds, and as such can be useful when there is some level of value interdependence between spectrum lots. For example, over multiple rounds a bidder can gather information about the value of individual lots and can change strategy by shifting the bidding to another combination if one becomes too expensive. Ideally, a bidder will have a number of fall-back business cases to facilitate changes or reductions in the geographic area or bandwidth sought.

It is also possible to utilise variations to this standard SMRA auction format. For example, a simple upgrade is to retain the simplicity of bidding on individual lots, but enhance the SMRA auction format by introducing a two-stage approach where the first stage determines the number of lots won in each region, and the second stage assigns the frequency position.

This 'enhanced' SMRA auction format (or ESMRA) would utilise a clock auction structure with frequency-generic lots for each area in the first stage, which would be expected to simplify the bidding process relative to the standard SMRA auction format. The use of generic lots in the clock stage is likely to improve substitution, reduce risk of fragmentation, and also simplify bidding strategy. This approach reduces the exposure risk relative to the standard SMRA auction format. An additional enhancement may be to enable intra-round bids in the clock stage. This method lets bidders avoid ties with continuous price competition, and permits a faster auction with fewer bidding rounds.

If this approach is used, the ACMA would expect to implement an assignment round similar to that used in the Digital Dividend auction. That is, the assignment round would be implemented as a sequence of sealed-bid auctions for each geographic region, using a variant of second-price pricing rule.

This approach may also benefit from the inclusion of a feature that allows a bidder to specify a minimum requirement in a band, similar to what is being proposed by Ofcom in the forthcoming 3.4 GHz band auction in the UK. This protects the bidder from the possibility of winning an uneconomic quantity of spectrum in the band. The approach accommodates a complementarity that is often seen in practice, and is expected to be present in an auction of 3.6 GHz band spectrum. The ACMA would place an upper bound on the minimum that could be specified. A bidder would then be limited to bidding for at least the specified minimum—or zero. In return, the bidder would never be assigned a quantity less than the specified minimum. To address the possibility of unsold lots, there is an option to conduct a follow-up auction for unsold lots before the assignment stage. The minimum requirement is discussed further in the section below pertaining to lot configuration.

Package bidding formats

As noted, there are a number of auction formats that enable bidders to place bids on packages of lots. The most widely known is the Combinatorial Clock auction (CCA) used by the ACMA in the Digital Dividend auction.

The CCA is a two-stage auction with clock stage and assignment stage. The price is determined by an auction 'clock'. Each category of lots to be sold has its own clock indicating its current price. In each round, a bidder is asked to indicate, for each category, the quantity of lots desired at the current price. At the end of the round, the auctioneer counts the number of bids for a lot and reports the demand for each product. The clock price is then increased on any category with excess demand, before the next round starts. This process is repeated until there is no excess demand in any category. There is also a sealed-bid supplementary round that allows bidders to make their best and final offers for all the different combinations of spectrum they

want. The CCA auction used in the 700 MHz and 2.5 GHz auction also featured a final ‘assignment round’.

Pricing in a CCA is complex, as it uses the Vickrey Nearest Minimum Revenue Core pricing rule. The price paid by each winning bidder is based on others’ bids, with safeguards to ensure winners pay a competitive price. The outcome, however, is that what bidders pay is relatively non-transparent, in that it is not possible for bidders to predict how submitted bids will translate into prices paid.

There are other package bidding auction formats. For example, in 2016 the Danish Energy Agency conducted a Combinatorial Multi-Round Auction (CMRA) for the 1800 MHz band. This auction format combines an iterative 'pay-your-bid' approach with package bidding. In the auction, the auctioneer announces prices on all lot categories and bidders can place a set of mutually exclusive package bids based on the prices of each category of lots. Bidders are allowed to submit multiple bids on packages and prices rise on those licenses where there is over-demand. There is no provisional winner in the CMRA and a bidder must be active in each round. The auction stops when there is no further bidding on any lot on offer. Bidders pay the price of the package bid plus the additional amount, which is determined at the frequency assignment stage.

Another option is using a sealed-bid combinatorial auction format. This is a ‘single shot’ auction, where bidders submit bids for all of the possible combinations of lots they are interested in. These bids are mutually exclusive (that is, the auctioneer only selects one bid per bidder). The auctioneer determines the combination of bids that yields the highest value and then announces the successful bidders.

Pricing in such an auction format can be either first price or second price. First price is highly simple, but creates incentives for bidders to shade their bids. Alternatively, second pricing runs into the same issues identified above in the discussion on the CCA (and may also create incentives for bidders to shade their bids). A first price rule is likely to be optimal where simplicity is an objective, or where complexity is a serious issue, making second pricing unsuitable.

The sealed-bid combinatorial auction format is likely to be only suitable in a relatively simple auction where the number of lots on offer is relatively low, so that the number of bids required on the possible combinations of lots is feasibly low. In addition, it is likely to be suitable in scenarios where the benefits of price discovery are limited, and there are large risks associated with open ascending auction formats.

ACMA preliminary preferred view

The best format for any individual auction will depend on the characteristics of the products on offer. The ACMA will choose the auction format that most suits a particular spectrum allocation. In the case of the 3.6 GHz band, the ACMA considers the two-stage ESMRA format outlined above, with a potential minimum bid requirement feature, would likely be the most suitable for the allocation.

The ACMA expects that bidders will consider that individual lots in the band are highly substitutable, necessitating an auction format that enables bidders to switch between lots. Bidding on generic lots reflects this substitutability.

While the standard SMRA is considered to have performed well during the recent 1800 MHz regional auction, there are some known problems that introduce complexities into the auction process, including the exposure risk.

The ACMA does not consider that the CCA is warranted in this context, particularly given its complexity. The ACMA considers that the application of the Danish CMRA to the 3.6 GHz band, which may be offered in a geographically and frequency disaggregated manner, may also be highly complex. Similarly, the combinatorial sealed-bid auction format will not be appropriate given that price discovery is expected to be important for the first 5G band auctioned. This format would also be complex if geographically disaggregated lots were offered.

On balance, the ACMA's preliminary view is that a two-stage ESMRA format as outlined above, with a potential minimum bid requirement feature, is appropriate for the allocation of the 3.6 GHz band. The use of generic lots and an assignment stage will enhance substitutability, simplify strategy, and encourage competition. The clock structure with intra-round bids provides a simple yet powerful way to express demand. The method also lets bidders avoid ties with continuous price competition, and permits a faster auction with fewer bidding rounds. The use of an Ofcom-style minimum bid requirement may protect bidders from the possibility of winning uneconomic quantities in the band.

3.6 GHz band allocation methodology

The ACMA proposes to use an ESMRA auction format to allocate spectrum in the 3.6 GHz band.

Lot configuration

Spectrum needs to be divided into lots before it can be offered to the market. There are two dimensions to lot configuration—bandwidth and geography. In deciding lot configuration for any allocation, the ACMA considers a range of factors, including the level of demand and the technical characteristics of the spectrum.

The objective is to configure the spectrum to promote its efficient allocation and use. In addressing this issue, the ACMA needs to ensure that the lot configuration does not unduly limit or dictate market outcomes or hinder competition between auction participants.

Spectrum demand

As outlined in the decision paper, the anticipated use of the band is for fixed and/or mobile wireless broadband services. If the spectrum is reallocated and auctioned, demand in this auction is likely to come primarily from mobile network operators. These parties are expected to use the spectrum for the deployment of mobile wireless broadband networks. It is possible that fixed wireless broadband providers may also participate in an auction.

Demand from potential bidders is not expected to be regionally homogenous. Some may seek uniform area-wide licences, while others may be interested in more discrete areas, for example to supplement existing holdings.

Frequency lot configuration

If the minister accepts a recommendation to reallocate the frequency range 3575–3700 MHz, then there would be 125 MHz of spectrum on offer across metropolitan and regional Australia. As previously outlined, the anticipated use of the band is wireless broadband. There has been consensus arising from the ACMA's work with industry to date that if the 3.6 GHz band is reallocated, the spectrum should be configured as time division duplex (TDD), which is unpaired. The ACMA expects at this stage that, as with 4G/LTE, 5G will be optimised when using multiples of 5 MHz channels.

The ACMA considers that it would be necessary to offer the spectrum in equal sized lots. This would enable effective substitution through the auction with the use of generic lots. In the clock stage of the ESMRA, the auctioneer specifies the supply of lots in each category and the category's starting price (reserve price). If different sized lots are offered, it would be necessary to set them up as a separate category, which will introduce substitution risk. Where lots are substitutes, bidders will typically want to acquire the lowest priced lot(s), and substitution risk refers to the risk of not being able to switch bids to bid on the most preferred lots at a given price.

Further to this, introducing two (or more) separate frequency-based categories of lots would be likely to introduce bidding and strategic complexity. Bidding complexity will result from bidders having to place demand for separate lot sizes. A less complex lot configuration reduces the likelihood that bidders will attempt to engage in strategic bidding behaviour, which may result in bids being placed on lots that are not necessarily a true reflection of what bidders are prepared to pay. Box 1 below explains this in more detail.

Assuming all lots are the same bandwidth, and that 4G/LTE and 5G use are optimised by using multiples of 5 MHz, there are two apparent options for lot configuration in the 3.6 GHz band allocation:

> 25 x 5 MHz lots, or

> 5 x 25 MHz lots.

25 x 5 MHz lots

There is a range of possible users for the 3.6 GHz band. A lot configuration with smaller lots would enable more users to potentially obtain spectrum in the allocation, particularly those interested in relatively small amounts of spectrum (i.e. less than 25 MHz).

Offering the band in 25 x 5 MHz lots not only enables bidders to obtain small lots (which may be attractive for smaller bidders), it also allows for the band to be split in a large number of ways. For example, an auction may reveal the most efficient allocation to be for a split between three bidders of 40 MHz, 40 MHz and 45 MHz. This would not be possible under a lot structure with large lots.

However, a 25 x 5 MHz lot structure increases the frequency-based exposure risk. In the proposed ESMRA auction format it is possible to utilise a minimum bid requirement capability to (at least partially) mitigate against frequency-based exposure risk. This functionality allows bidders to protect themselves against winning economically insufficient amounts of spectrum (that is, one possible element of the exposure risk). This is discussed in greater detail in Box 1.

Box 1: Minimum bid requirement

As noted, the ACMA would propose to use an ESMRA auction with generic lots and an assignment round. However, in such an auction format bidders face a frequency-based exposure risk—bidders would be exposed to winning amounts of spectrum they may consider to be insufficient and uneconomical. To help mitigate against this risk, the ACMA is considering whether to allow bidders to express a minimum bid requirement (MBR). This MBR feature allows a bidder to reduce demand from the minimum requirement to zero if the price exceeds the bidder's specified price point. There is no risk that the bidder will win an uneconomic quantity. Ofcom is proposing to use a similar facility in its forthcoming 3.4 GHz band allocation.

One of the key issues associated with an auction format that enables bidders to express a minimum requirement is that it is very possible that there will be unsold spectrum. The ACMA proposes to have a follow-up clock auction of any spectrum unsold after the initial clock round and prior to the assignment round.

The ACMA considers the main risk associated with the MBR is that it may introduce strategic bidding and complexity. For example, bidders may be able to use the MBR to impose externalities on competitors without facing appropriate risk for their strategic behaviour. However, the ACMA would take this risk into consideration in setting a maximum MBR and try to minimise the likelihood of such strategic behaviour.

At this stage, 5G standards are not yet set, and so it is not possible to conclusively determine what quantum of spectrum the MBR cap would need to be set at in order to completely mitigate the frequency-based exposure risk. For example, the ACMA considers that bidders' demands in the 4G/LTE context feature increasing returns to scale between 2 x 5 MHz and 2 x 10 MHz, and subsequently show decreasing returns to scale beyond 2 x 10 MHz. As such, bidders are only 'exposed' in the 4G context when acquiring a single 2 x 5 MHz lot.

Given that 5G technology makes it possible to utilise large contiguous bandwidths, it is possible that the nature of the demand for spectrum will be different relative to 4G. Potentially this means that bidders could consider larger portions of spectrum to be insufficient.

Question: The ACMA welcomes stakeholders' views on the desirability of having an MBR feature for the 3.6 GHz band auction, should it be conducted, and if so what might be an appropriate MBR?

5 x 25 MHz lots

The other alternative is to offer five lots, each 25 MHz in size. This approach would significantly reduce (or perhaps even eliminate) the exposure risk, and would therefore eliminate the need for the MBR. In turn, not needing the MBR would mean the strategic behaviour facilitated through the use of this tool would not be present. By eliminating the need for the MBR, and also mitigating frequency-based exposure risk, the allocation would likely be less strategically complex for bidders.

However, the disadvantage of this option is that it limits the expression of demand into increments of 25 MHz (i.e. 25 MHz, 50 MHz, 75 MHz, 100 MHz and 125 MHz). There are fewer combinations of possible allocations, and as such, it may eliminate the potential to achieve the efficient allocation (for example, the efficient allocation may indeed be, say, 40 MHz/40 MHz/45 MHz). Contrary to the objective of setting lot configurations, such a limitation risks dictating market outcomes and/or hindering competition between auction participants.

ACMA preliminary preferred view

On balance, the ACMA's preliminary view is that it would be appropriate to allocate the 3.6 GHz band with a frequency lot configuration of 5 MHz. This could be accompanied by the use of minimum bid requirements (MBR) feature in the auction. Table 3 outlines the proposed frequency lot configuration for the 3.6 GHz band.

Table 3: Proposed frequency lot configuration

Channel	Frequency range	Bandwidth
1	3575–3580 MHz	5 MHz
2	3580–3585 MHz	5 MHz
3	3585–3590 MHz	5 MHz
4	3590–3595 MHz	5 MHz
5	3595–3600 MHz	5 MHz
6	3600–3605 MHz	5 MHz
7	3605–3610 MHz	5 MHz
8	3610–3615 MHz	5 MHz
9	3615–3620 MHz	5 MHz
10	3620–3625 MHz	5 MHz
11	3625–3630 MHz	5 MHz
12	3630–3635 MHz	5 MHz
13	3635–3640 MHz	5 MHz
14	3640–3645 MHz	5 MHz
15	3645–3650 MHz	5 MHz
16	3650–3655 MHz	5 MHz
17	3655–3660 MHz	5 MHz
18	3660–3665 MHz	5 MHz
19	3665–3670 MHz	5 MHz
20	3670–3675 MHz	5 MHz
21	3675–3680 MHz	5 MHz
22	3680–3685 MHz	5 MHz
23	3685–3690 MHz	5 MHz
24	3690–3695 MHz	5 MHz
25	3695–3700 MHz	5 MHz
25 channels	**3575–3700 MHz**	**125 MHz**

3.6 GHz band lot configuration

If the 3.6 GHz band is reallocated, the ACMA proposes to divide spectrum in the 3.6 GHz band in 25 lots, each with 5 MHz bandwidth.

Geographic areas

The following section outlines the considerations relating to the decision over the geographic areas for lot configuration in the 3.6 GHz band.

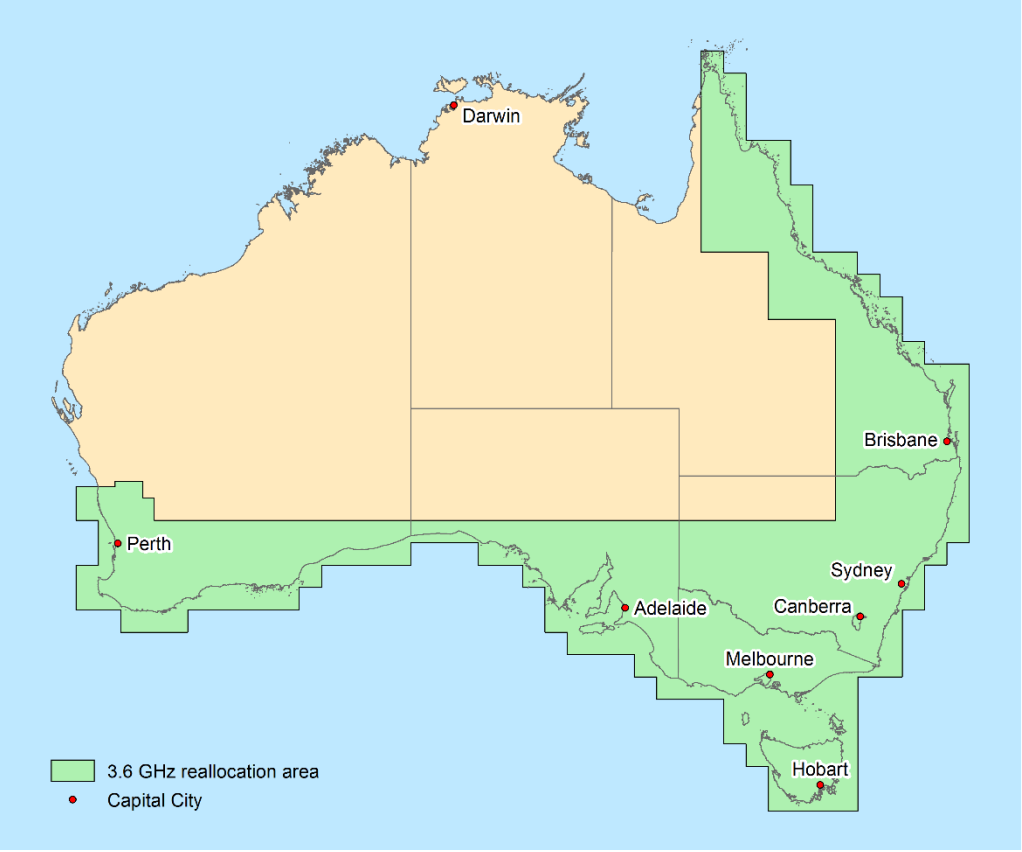
In the past, the ACMA has allocated spectrum in either single region-wide market areas/national lots or in a geographically disaggregated manner (referred to as 'defined area lots').

In the 3.6 GHz context, a region-wide lot would cover the geographic area shown in Figure 6. This option would:

> reduce the complexity of the auction

> eliminate region-based exposure risk, fragmentation risk, and the technical inefficiencies associated with licence boundaries.

Figure 6: Map showing region-wide lot



A region-wide lot, however, may not be optimal when there is regionally heterogeneous demand, as it is likely to be the case in the 3.6 GHz band. This is because potential bidders in the 3.6 GHz auction have regionally disaggregated holdings in closely substitutable bands, such as the 3.4 GHz band, and there may also be interest from regional bidders. Region-wide lots would limit the expression of this regionally heterogeneous demand, and would therefore risk reducing the efficiency of the allocation and use of the spectrum.

A defined-area lot configuration would enable prospective licensees to bid in line with their potentially regionally heterogeneous demand. This may facilitate targeted deployment of services for specific areas, or different levels of capacity in different

areas reflecting differences in customer bases. Crucially, it would also enable bidders to package lots to obtain licences for multiple regions or all of the regions that are spectrum licensed.

Defined-area lots would, however, create a number of risks in the auction, including:

> increasing the complexity of the auction

> introducing region-based exposure and fragmentation risk

> introducing potential technical inefficiencies associated with licence boundaries.

It is also possible to have a lot configuration for an allocation that mixes region-wide and defined-area lots (referred to as a 'hybrid approach'). For example, 10 x 5 MHz lots could be region-wide lots, while the remaining bandwidth is broken up into defined-area lots. This approach was used by the ACMA in the 2001 auction of 2 GHz spectrum.[7] However, this approach limits substitutability in the auction, as bidders may not be able to switch from a group of defined-area lots to a region-wide lot based on a change in relative prices (this is known as the substitution risk). As such, the ACMA does not propose further consideration of hybrid approaches.

The ACMA considers it is possible that there will be some level of demand for heterogeneity across the regions of Australia. As such, it is proposing to adopt defined-area lots configuration in the 3.6 GHz band. The defined areas would facilitate the expression of this demand without preventing parties from bidding on multiple lots and then aggregating those into large areas at licence issue. However, the ACMA notes that offering 3.6 GHz as defined-area lots may introduce some risks relative to region-wide lots. For example, auction complexity is likely to increase, while there may be some region-based exposure and disaggregation risks.

Geographic lots configuration—detailed consideration of 3.6 GHz band allocation

There are many ways to draw the boundaries for the geographic lots on offer. The ACMA has allocated spectrum in a disaggregated manner on a number of occasions, including the:

> 3.4 GHz band auction in 2000[8]

> 2 GHz auction in 2001[9]

> 2.5 GHz band auction in 2013[10]

> 1800 MHz regional auction in 2016[11].

The ACMA expects there may be high demand for spectrum in metropolitan areas and significant regional centres. One approach to disaggregation would be to use the same geographic areas originally offered in the 3.4 GHz band—see Figure 7.

[7] 'Market areas maps' document in the applicant pack for the ACMA 2 GHz Third generation mobiles auction, p. 1.

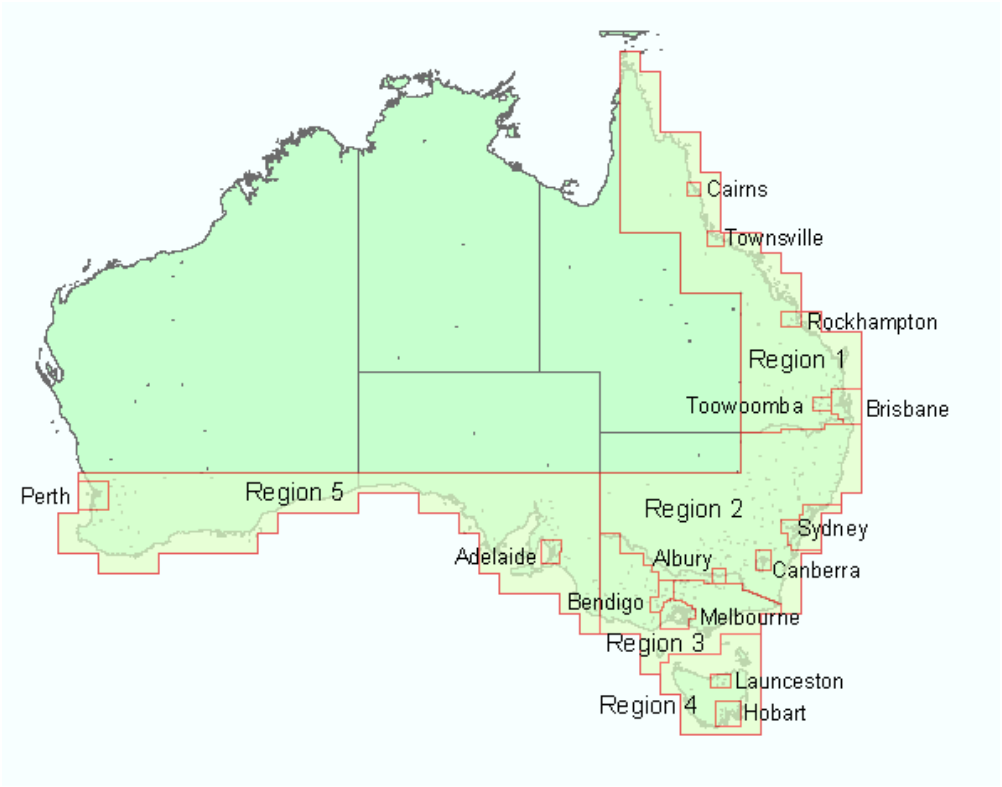
[8] Area Maps in the applicant pack for the ACMA 3.4 GHz auction.

[9] 'Market areas maps' document in the applicant pack for the ACMA 2 GHz Third generation mobiles auction, p. 1.

[10] Lot configuration in the Auction Guide for the ACMA Digital Dividend auction, p. 28.

[11] 'Applicant information paper' document for the ACMA 1800 MHz regional auction, Figure 1, p. 22.

Figure 7: Map of geographic areas for 3.4 GHz band allocation in 2000



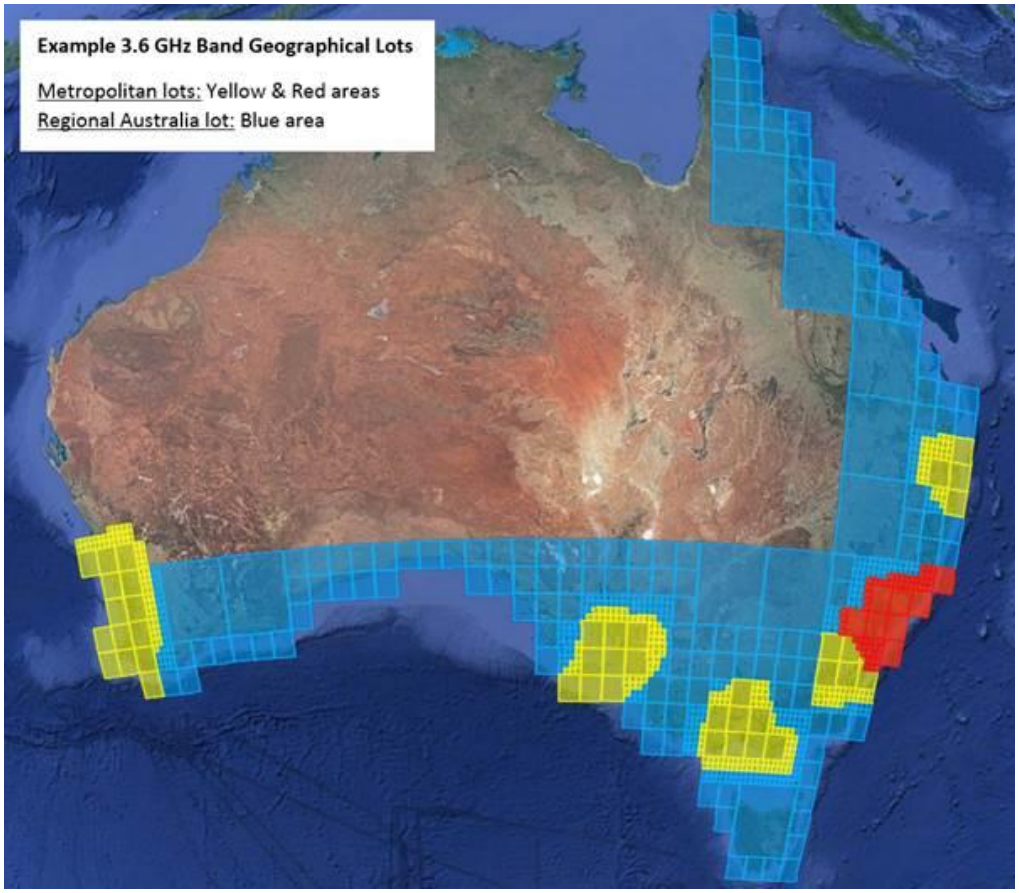
However, the ACMA is concerned that the lot configuration used in the 3.4 GHz band may not be optimal from a technical standpoint. Geographically disaggregated spectrum introduces the risk of 'dead zones' along licence boundaries. This is because there are restrictions on how (and if) a licensee can deploy services the closer they are to a geographical boundary. Therefore, the closer a geographical boundary is to significant population centres (or other areas licensees would like to deploy services), the greater the negative effect on licensees. The size of dead zones are typically larger for Time Division Duplex (TDD) based technologies than they are for Frequency Division Duplex (FDD) technologies.

Given the 3.4 GHz band lot areas were optimised for FDD technologies and TDD technologies are the most likely technologies to be deployed in the 3.6 GHz band (as indicated in the options paper), the impact of the smaller 3.4 GHz band lot areas on a licensee's ability to deploy services will be greater. As a result, this lot configuration is not considered to be appropriate for the 3.6 GHz band.

The ACMA has also considered defining lots that mirror areas of current 3.4 GHz band spectrum licences. However, the ACMA considers this lot configuration is not appropriate for the same technological reasons described above. Similarly, the metropolitan lot configuration defined in other bands such as the 2 GHz and 2.5 GHz bands are optimised for use by FDD technologies and are also considered unsuitable.

A possible option for the geographic disaggregation of the 3.6 GHz band in order to minimise inefficiencies associated with geographical boundaries, would be to define metropolitan lots that are similar to the combination of Area 1 and Area 2 as defined in the options paper. Some minor amendments are proposed to these areas to ensure, as far as practical, significant regional population centres are located in the order of 20km or more from a geographical boundary. The proposed lot areas are defined in Attachment E and displayed in Figure 8.

Figure 8: Map of proposed geographic lot boundaries[12]



These areas are large enough to minimise the effect of dead zones in and around major metropolitan areas. Though it is noted that the effects of dead zones would still be encountered as a licensee approaches the geographical boundary (unless the licensee also holds the adjacent area's lot on the same frequency). It is further noted that the ACMA proposes to separate Canberra and Sydney areas into two lots. This is not expected to have a significant effect on the ability of licensees to deploy services in the respective metropolitan areas. However, it may create more dead zones near the boundary between these locations.

The costs associated with geographic disaggregation increase in line with the level of disaggregation. For this reason, it would not be possible to offer the spectrum at auction at a very granular level of regional disaggregation. This would require a very highly disaggregated lot configuration, which would significantly increase auction complexity, exposure and fragmentation risk, and technical inefficiencies associated with lot boundaries.

If the option of defining metropolitan lots as proposed in Figure 8 and Attachment E were to be adopted, the remaining regional area could then either form one large lot, or be broken into smaller lots. By choosing the geographical boundaries carefully, the

[12] Each metropolitan area in Figure 8 would have two reallocation periods; two years as specified for Area A and five years for Area B, with seven years for the remainder of each metropolitan area. Area C would have a single reallocation period of seven years.

ACMA believes it could be possible to subdivide this area in such a way that the inefficiencies associated with geographical boundaries were minimised.

Overall, the ACMA considered five options for geographic lot configuration in the 3.6 GHz band:

1. one region-wide lot:
   - one single area
2. one metropolitan lot and one regional lot:
   - one metropolitan lot covering all metropolitan areas
   - one regional lot covering the remaining spectrum licensed area
3. one metropolitan lot and four regional lots:
   - one metropolitan lot covering all metropolitan areas
   - four regional lots (Regional Western Australia and South Australia, Regional Victoria and NSW, Regional Queensland, and Tasmania)
4. six metropolitan lots and one regional lot:
   - six metropolitan lots (Adelaide, Brisbane, Canberra, Melbourne, Perth, Sydney)
   - one regional the remaining spectrum licensed area
5. six metropolitan lots and four regional lots:
   - six metropolitan lots (Adelaide, Brisbane, Canberra, Melbourne, Perth, Sydney)
   - four regional lots (Regional Western Australia and South Australia, Regional Victoria and NSW, Regional Queensland, and Tasmania).

1 One region-wide lot

As outlined above, this option:

- would reduce the complexity of an auction
- eliminate region-based exposure risk, fragmentation risk, and the technical inefficiencies associated with licence boundaries.

However as noted, it is very possible that there is regionally heterogeneous demand for 3.6 GHz spectrum. A single region-wide lot would not facilitate the expression of this regionally heterogeneous demand, and would therefore risk reducing the efficiency of allocation and use of the spectrum.

2 One metropolitan and one regional lot

This approach would facilitate the expression of geographically heterogeneous demand across metropolitan and regional Australia.

The disadvantage of this option is that if mobile network operators had divergent demand for spectrum across metropolitan regions or different parts of regional Australia, this approach would not facilitate the expression of this demand.

3 One metropolitan lot and four regional lots

This approach would be appropriate if there was little difference in the level of demand by bidders across metropolitan regions, but differences in demand between regional areas.

Given there would be only five geographic lots, auction complexity, exposure and fragmentation risks, may be relatively low, although higher than under options 1 and 2.

4 Six metropolitan lots and one regional lot

This approach would facilitate the expression of geographically heterogeneous demand both between metropolitan and regional Australia, and across the different metropolitan regions. This may be appropriate for parties interested in flexibility to bid differently on different metropolitan areas. However, given regional Australia would be configured as a single lot, it would not enable the expression of differences in demand between regional areas or cater for regional bidders.

Relative to options 1 and 2, this approach would result in a somewhat more complex auction, given that bidders would have to track demand across seven regions. The greater disaggregation increases region-based exposure and fragmentation risks. There would be a small risk associated with boundary dead zones.

5 Six metropolitan lots and four regional lots

This approach would facilitate the expression of a high level of geographically heterogeneous demand across Australia. This approach may be useful if bidders have divergent demand for spectrum across metropolitan regions, and there was expected to be some regionally disaggregated demand in regional areas. However, this approach would increase the complexity of the auction, while also increasing region-based exposure and fragmentation risks and could lead to boundary dead zones.

ACMA preliminary preferred position

On balance, the ACMA preliminary preference is a lot configuration consistent with option 4 and listed in Table 4. As noted, the ACMA needs to ensure that the lot configuration does not unduly limit or dictate market outcomes or hinder competition between auction participants. This objective should be achieved through enabling bidders to express demand in regions consistent with their business plans, which requires a relatively disaggregated geographic lot configuration. The ACMA considers that the risks associated with complexity of an auction are relatively minor, and that bidders should be able to manage the exposure and fragmentation risks through the auction.

The ACMA considers that differences in demand between bidders are likely to be greatest between metropolitan areas, given the size of metropolitan populations, and differences in holdings of substitute spectrum (3.4 GHz). The ACMA also considers there could be differences in demand between metropolitan and regional areas given the differences in customer bases between the mobile network operators in regional Australia, and the possible participation of regional bidders.

However, the ACMA does not consider that there are sufficient differences in demand between regional areas to warrant multiple regional lots as provided for under Option 5, noting the increase in auction complexity, exposure risk and dead zones this could entail.

Table 4: Defined areas

Defined area	
1	Adelaide
2	Brisbane
3	Canberra
5	Melbourne
6	Perth
6	Sydney
7	Regional Australia

Attachment E provides the HCIS identifiers and an illustrative map for these defined areas.

3.6 GHz band lot configuration—geographic area

If the 3.6 GHz band is reallocated, the ACMA proposes to offer the lots in seven defined areas, made up of six metropolitan areas and one regional area, as described in Attachment E.

6 Next steps

The notice in Attachment A invites written comments from potentially affected apparatus licensees and other interested stakeholders by **27 November 2017** on the ACMA's proposal to recommend to the minister that he make a reallocation declaration for the 3.6 GHz band.

The terms of the draft recommendation are outlined in Table 5.

Table 5: Terms of the draft recommendation

Element of draft recommendation	ACMA proposal
Licence type	Spectrum licences
Parts of the spectrum	3575–3700 MHz in metropolitan and regional Australia
Reallocation periods	Two years for the Adelaide, Brisbane, Canberra, Melbourne and Sydney metropolitan areas (Area A) Five years for the Perth metropolitan area (Area B) Seven years for the regional area (Area C)
Reallocation deadline	12 months before the end of the two year reallocation period for Area A

At the end of the consultation period, the ACMA will consider comments received in preparing the final version of the recommendation to the minister under section 153F of the Act.

In making a reallocation declaration, the minister must have regard to the ACMA's recommendation. The minister is only able to make a declaration within 180 days after receiving the recommendation from the ACMA.

If the minister decides to make a spectrum reallocation declaration or declarations, the ACMA would commence a process for an auction of spectrum licences. At that time, the ACMA would release further information about the auction process and would undertake further consultation on draft instruments to support the auction. This would include a marketing plan prepared under section 39A of the Act and auction rules determined under section 60.

At this time, if the minister decides to make a spectrum reallocation declaration or declarations, the ACMA is planning to commence an auction in October 2018. Consultation on the auction rules, marketing plan and other technical instruments would be undertaken in accordance with this timing.

7 Invitation to comment

Making a submission

The ACMA invites comments on the terms of the draft reallocation recommendation and any other issue raised in this paper. Submissions should be made:

By email: SpectrumLicensingPolicy@acma.gov.au

By mail: The Manager
Spectrum Licensing Policy Section
Spectrum Management Policy Branch
Australian Communications and Media Authority
PO Box 78
Belconnen ACT 2616

The closing date for submissions is 27 November 2017.

Effective consultation

The ACMA is working to enhance the effectiveness of its stakeholder consultation processes, which are an important source of evidence for its regulatory development activities. To assist stakeholders in formulating submissions to its formal, written consultation processes, it has developed *Effective consultation—a guide to making a submission*. This guide provides information about the ACMA's formal written public consultation processes and practical guidance on how to make a submission.

Publication of submissions

In general, the ACMA publishes all submissions it receives. The ACMA prefers to receive submissions that are not claimed to be confidential. However, the ACMA accepts that a submitter may sometimes wish to provide information in confidence. In these circumstances, submitters are asked to identify the material over which confidentiality is claimed and provide a written explanation for the claim.

The ACMA will consider each confidentiality claim on a case-by-case basis. If the ACMA accepts a claim, it will not publish the confidential information unless authorised or required by law to do so.

Release of submissions where authorised or required by law

Any submissions provided to the ACMA may be released under the *Freedom of Information Act 1982* (unless an exemption applies) or shared with other Commonwealth Government agencies or other parties under Part 7A of the *Australian Communications and Media Authority Act 2005*. The ACMA may also be required to release submissions for other reasons including for the purpose of parliamentary processes or where otherwise required by law (for example, under a court subpoena). While the ACMA seeks to consult submitters of confidential information before that information is provided to another party, the ACMA cannot guarantee that confidential information will not be released through these or other legal means.

Privacy

The *Privacy Act 1988* imposes obligations on the ACMA in relation to the collection, security, quality, access, use and disclosure of personal information. These obligations are detailed in the *Australian Privacy Principles*.

The ACMA may only collect personal information if it is reasonably necessary for, or directly related to, one or more of its functions or activities.

The purposes for which personal information is being collected (such as the names and contact details of submitters) are to:

> contribute to the transparency of the consultation process by clarifying, where appropriate, whose views are represented by a submission

> enable the ACMA to contact submitters where follow-up is required or to notify them of related matters (except where submitters indicate they do not wish to be notified of such matters).

The ACMA will not use the personal information collected for any other purpose, unless the submitter has provided their consent or the ACMA is otherwise permitted to do so under the Privacy Act.

Submissions in response to this paper are voluntary. As mentioned above, the ACMA generally publishes all submissions it receives, including any personal information in the submissions. If a submitter has made a confidentiality claim over personal information that the ACMA has accepted, the submission will be published without that information. The ACMA will not release the personal information unless authorised or required by law to do so.

If a submitter wishes to make a submission anonymously or use a pseudonym, they are asked to contact the ACMA to see whether it is practicable to do so in light of the subject matter of the consultation. If it is practicable, the ACMA will notify the submitter of any procedures that need to be followed and whether there are any other consequences of making a submission in that way.

Further information on the Privacy Act and the ACMA's privacy policy is available at www.acma.gov.au/privacypolicy. The privacy policy contains details about how an individual may access personal information about them that is held by the ACMA, and seek the correction of such information. It also explains how an individual may complain about a breach of the Privacy Act and how the ACMA will deal with such a complaint.

Attachment A—Written notice

Australian Government | acma

Australian Communications and Media Authority

communicating | facilitating | regulating

NOTICE

26 October 2017

Notice under section 153G of the Radiocommunications Act 1992

PROPOSED RE-ALLOCATION OF THE 3.6 GHz FREQUENCY BAND

The Australian Communications and Media Authority (the ACMA) has prepared a draft recommendation to the Minister for Communications (Minister) that he make one or more spectrum re-allocation declarations under section 153B of the *Radiocommunications Act 1992* (the Act).

In this notice, the range of numbers that identifies a frequency band includes the higher but not the lower number.

Terms of the draft recommendation or recommendations

The terms of the draft recommendation or recommendations are that the frequency bands between 3575-3700 MHz in three specified areas - metropolitan Australia, regional Australia, and Perth ('the specified spectrum') - be re-allocated by issuing spectrum licences. Each of these areas is defined by the hierarchical cell identification scheme (HCIS) description set out in Table 1.

The terms of the draft recommendation or recommendations also propose that:

i. In relation to the spectrum re-allocation for the metropolitan Australia area comprising Adelaide, Brisbane, Canberra, Melbourne and Sydney (Area A):
   a. the spectrum re-allocation declaration, should it be made, apply to all of the specified spectrum in that area;
   b. that the re-allocation period run for two years in that area; and
   c. the re-allocation deadline be 12 months before the end of the two year Area A re-allocation period.

ii. In relation to the spectrum re-allocation for the Perth area (Area B):
   a. the spectrum re-allocation declaration, should it be made, apply to all of the specified spectrum in that area;
   b. that the reallocation period run for five years in that area;
   c. the re-allocation deadline be 12 months before the end of the two year Area A re-allocation period.

iii. In relation to the spectrum re-allocation for the regional Australia area (Area C):
   a. the spectrum re-allocation declaration, should it be made, apply to all of the specified spectrum in that area;
   b. that the re-allocation period run for seven years in that area;
   c. the re-allocation deadline be 12 months before the end of the two year Area A re-allocation period.

Invitation to comment

The ACMA invites potentially-affected apparatus licensees to give the ACMA written comments about the terms of the draft recommendation, as set out in this notice, by close of business on **27 November 2017**.

The ACMA's Discussion Paper on the draft recommendation is available on the ACMA website under 'Issues for Comment'.

Comments should be sent to:

By email: SpectrumLicensingPolicy@acma.gov.au

By mail: The Manager
Spectrum Licensing Policy Section
Spectrum Management Policy Branch
Australian Communications and Media Authority
PO Box 78
Belconnen ACT 2616

Table 1 HCIS identifiers for metropolitan, Perth and regional Australia

The HCIS coordinates below can be converted into a Placemark through a facility on the ACMA website: http://www.acma.gov.au/theACMA/convert-hcis-area-description-to-a-placemark.

Area	Sub-area name	Length of re-allocation period	HCIS
Area A	Adelaide	2 years	IW3O, IW3P, IW6C, IW6D, IW3J5, IW3J6, IW3J8, IW3J9, IW3K4, IW3K5, IW3K6, IW3K7, IW3K8, IW3K9, IW3L4, IW3L5, IW3L6, IW3L7, IW3L8, IW3L9, IW3N2, IW3N3, IW3N5, IW3N6, IW3N8, IW3N9, IW6B2, IW6B3, IW6B5, IW6B6, IW6B8, IW6B9, IW6F2, IW6F3, IW6F5, IW6F6, IW6G1, IW6G2, IW6G3, IW6G4, IW6G5, IW6G6, IW6H1, IW6H2, IW6H3, IW6H4, IW6H5, IW6H6
	Brisbane	2 years	NT8K, NT8L, NT9A, NT9B, NT9E, NT9F, NT9I, NT9J, NT9M, NT9N, NU3B, NT5P8, NT5P9, NT6M7, NT6M8, NT6M9, NT6N7, NT6N8, NT6N9, NT6O7, NT6O8, NT8D2, NT8D3, NT8D5, NT8D6, NT8D8, NT8D9, NT8G7, NT8G8, NT8G9, NT8H2, NT8H3, NT8H5, NT8H6, NT8H7, NT8H8, NT8H9, NT8P1, NT8P2, NT8P3, NT8P4, NT8P5, NT8P6, NT9C1, NT9C2, NT9C4, NT9C5, NT9C7, NT9C8, NT9G1, NT9G2, NT9G4, NT9G5, NT9G7, NT9G8, NT9K1, NT9K2, NT9K4, NT9K5, NT9K7, NT9K8, NT9O1, NT9O2, NT9O4, NT9O5, NT9O7, NT9O8, NU3A2, NU3A3, NU3A5, NU3A6, NU3C1, NU3C2, NU3C4, NU3C5, NU3C7, NU3C8, NU3F1, NU3F2, NU3F3, NU3G1, NU3G2
	Canberra	2 years	MW4D3, MW4D6, MW4D9, MW4H3, MW4H6, MW4H9, MW4L3, MW5A, MW5B1, MW5B2, MW5B4, MW5B5, MW5B7, MW5B8, MW5E, MW5F1, MW5F2, MW5F4, MW5F5, MW5F7, MW5F8, MW5I1, MW5I2, MW5I3, MW5J1, MW5J2
	Melbourne	2 years	KX3J, KX3K, KX3L, KX3N, KX3O, KX3P, KX6B, KX6C, KX6D, LX1I, LX1J, LX1M, LX1N, LX4A, LX4B, KX6F1, KX6F2, KX6F3, KX6F4, KX6F5, KX6F6, KX6G1, KX6G2, KX6G3, KX6G4, KX6G5, KX6G6, KX6H1, KX6H2, KX6H3, KX6H4, KX6H5, KX6H6, LX1K1, LX1K4, LX1K7, LX1O1, LX1O4, LX1O7, LX4C1, LX4C4, LX4C7, LX4E1, LX4E2, LX4E3, LX4E4, LX4E5, LX4E6, LX4F1, LX4F2, LX4F3, LX4F4, LX4F5, LX4F6, LX4G1, LX4G4
	Sydney	2 years	MV9K, MV9L, MV9O, MV9P, MW3D, NV7C, NV7D, NV7E, NV7F, NV7G, NV7H, NV7I, NV7J, NV7K, NV7L, NV7M, NV7N, NV7O, NV7P, NW1A, NW1B, NW1C, NW1D, MV9D9, MV9G7, MV9G8, MV9G9, MV9H3, MV9H6, MV9H7, MV9H8, MV9H9, MW3C2, MW3C3, MW3C5, MW3C6, MW3C9, NV4N6, NV4N9, NV4O4, NV4O5, NV4O6, NV4O7, NV4O8, NV4O9, NV4P4, NV4P5, NV4P6, NV4P7, NV4P8, NV4P9, NV7A7, NV7A8, NV7A9, NV7B3, NV7B6, NV7B7, NV7B8, NV7B9
Area B	Perth	5 years	BV1E, BV1F, BV1G, BV1H, BV1I, BV1J, BV1K, BV1L, BV1M, BV1N, BV1O, BV1P, BV2E, BV2F, BV2I, BV2J, BV2M, BV2N, BV4A, BV4B, BV4C, BV4D, BV4E, BV4F, BV4G, BV4H, BV5A, BV5B, BV5E, BV5F, BV1A4, BV1A5, BV1A6, BV1A7, BV1A8, BV1A9, BV1B4, BV1B5, BV1B6, BV1B7, BV1B8, BV1B9, BV1C4, BV1C5, BV1C6, BV1C7, BV1C8, BV1C9, BV1D4, BV1D5, BV1D6, BV1D7, BV1D8, BV1D9, BV2A4, BV2A5, BV2A6, BV2A7, BV2A8, BV2A9, BV2B4, BV2B5, BV2B6, BV2B7, BV2B8, BV2B9, BV4I1, BV4I2, BV4I3, BV4I4, BV4I5, BV4I6, BV4J1, BV4J2, BV4J3, BV4J4, BV4J5, BV4J6, BV4K1, BV4K2, BV4K3, BV4K4, BV4K5, BV4K6, BV4L1, BV4L2, BV4L3, BV4L4, BV4L5, BV4L6, BV5I1, BV5I2, BV5I3, BV5I4, BV5I5, BV5I6, BV5J1, BV5J2, BV5J3, BV5J4, BV5J5, BV5J6

Area	Sub-area name	Length of re-allocation period	HCIS
Area C	Regional Australia	7 years	CV, DV, IV, JV, JW, KQ, KV, KW, LR, LV, LW, LY, MS, MT, MU, AU9, AV9, AW3, BU7, BU8, BV3, BV6, BV7, BV8, BV9, BW1, BW2, BW3, BW5, BW6, CW1, CW2, CW3, CW4, DW1, DW2, DW3, EV1, EV2, EV3, EV4, EV5, EV6, EV7, FV1, FV2, FV3, FV4, FV5, GV1, GV2, GV3, GV6, HV1, HV2, HV3, HV4, HV5, HV6, HV8, HV9, HW3, HW6, IW1, IW2, IW4, IW5, IW7, IW8, IW9, JX1, JX2, JX3, JX5, JX6, KO1, KO4, KO5, KO7, KO8, KP1, KP2, KP4, KP5, KP6, KP7, KP8, KP9, KX1, KX2, KX4, KX5, KX8, KX9, KY2, KY3, KY6, LP4, LP7, LQ1, LQ2, LQ4, LQ5, LQ7, LQ8, LX2, LX3, LX5, LX6, LX7, LX8, LX9, LZ1, LZ2, LZ3, MR1, MR4, MR5, MR7, MR8, MR9, MV1, MV2, MV3, MV4, MV5, MV6, MV7, MV8, MW1, MW2, MW6, MW7, MW8, MW9, MX1, MX2, MX3, MX4, MX7, MY1, MY4, MY7, MZ1, NS4, NS7, NS8, NS9, NT1, NT2, NT3, NT4, NT7, NU1, NU2, NU4, NU5, NU6, NU7, NU8, NU9, NV1, NV2, NV3, NV5, AU6I, AU6J, AU6K, AU6L, AU6M, AU6N, AU6O, AU6P, BU4H, BU4I, BU4J, BU4K, BU4L, BU4M, BU4N, BU4O, BU4P, BU5E, BU5F, BU5G, BU5H, BU5I, BU5J, BU5K, BU5L, BU5M, BU5N, BU5O, BU5P, BU9A, BU9B, BU9E, BU9F, BU9I, BU9J, BU9M, BU9N, BV2C, BV2D, BV2G, BV2H, BV2K, BV2L, BV2O, BV2P, BV4M, BV4N, BV4O, BV4P, BV5C, BV5D, BV5G, BV5H, BV5K, BV5L, BV5M, BV5N, BV5O, BV5P, IW3A, IW3B, IW3C, IW3D, IW3E, IW3F, IW3G, IW3H, IW3I, IW3M, IW6A, IW6E, IW6I, IW6J, IW6K, IW6L, IW6M, IW6N, IW6O, IW6P, KX3A, KX3B, KX3C, KX3D, KX3E, KX3F, KX3G, KX3H, KX3I, KX3M, KX6A, KX6E, KX6I, KX6J, KX6K, KX6L, KX6M, KX6N, KX6O, KX6P, LX1A, LX1B, LX1C, LX1D, LX1E, LX1F, LX1G, LX1H, LX1L, LX1P, LX4D, LX4H, LX4I, LX4J, LX4K, LX4L, LX4M, LX4N, LX4O, LX4P, MV9A, MV9B, MV9C, MV9E, MV9F, MV9I, MV9J, MV9M, MV9N, MW3A, MW3B, MW3E, MW3F, MW3G, MW3H, MW3I, MW3J, MW3K, MW3L, MW3M, MW3N, MW3O, MW3P, MW4A, MW4B, MW4C, MW4E, MW4F, MW4G, MW4I, MW4J, MW4K, MW4M, MW4N, MW4O, MW4P, MW5C, MW5D, MW5G, MW5H, MW5K, MW5L, MW5M, MW5N, MW5O, MW5P, NT5A, NT5B, NT5C, NT5D, NT5E, NT5F, NT5G, NT5H, NT5I, NT5J, NT5K, NT5L, NT5M, NT5N, NT5O, NT6A, NT6B, NT6C, NT6D, NT6E, NT6F, NT6G, NT6H, NT6I, NT6J, NT6K, NT6L, NT6P, NT8A, NT8B, NT8C, NT8E, NT8F, NT8I, NT8J, NT8M, NT8N, NT8O, NT9D, NT9H, NT9L, NT9P, NU3D, NU3E, NU3H, NU3I, NU3J, NU3K, NU3L, NU3M, NU3N, NU3O, NU3P, NV4A, NV4B, NV4C, NV4D, NV4E, NV4F, NV4G, NV4H, NV4I, NV4J, NV4K, NV4L, NV4M, NW1E, NW1F, NW1G, NW1H, NW1I, NW1J, NW1K, NW1L, NW1M, NW1N, NW1O, NW1P, BV1A1, BV1A2, BV1A3, BV1B1, BV1B2, BV1B3, BV1C1, BV1C2, BV1C3, BV1D1, BV1D2, BV1D3, BV2A1, BV2A2, BV2A3, BV2B1, BV2B2, BV2B3, BV4I7, BV4I8, BV4I9, BV4J7, BV4J8, BV4J9, BV4K7, BV4K8, BV4K9, BV4L7, BV4L8, BV4L9, BV5I7, BV5I8, BV5I9, BV5J7, BV5J8, BV5J9, IW3J1, IW3J2, IW3J3, IW3J4, IW3J7, IW3K1, IW3K2, IW3K3, IW3L1, IW3L2, IW3L3, IW3N1, IW3N4, IW3N7, IW6B1, IW6B4, IW6B7, IW6F1, IW6F4, IW6F7, IW6F8, IW6F9, IW6G7, IW6G8, IW6G9, IW6H7, IW6H8, IW6H9, KX6F7, KX6F8, KX6F9, KX6G7, KX6G8, KX6G9, KX6H7, KX6H8, KX6H9, LX1K2, LX1K3, LX1K5, LX1K6, LX1K8, LX1K9, LX1O2, LX1O3, LX1O5, LX1O6, LX1O8, LX1O9, LX4C2, LX4C3, LX4C5, LX4C6, LX4C8, LX4C9, LX4E7, LX4E8, LX4E9, LX4F7, LX4F8, LX4F9, LX4G2, LX4G3, LX4G5, LX4G6, LX4G7, LX4G8, LX4G9, MV9D1, MV9D2, MV9D3, MV9D4, MV9D5, MV9D6, MV9D7, MV9D8, MV9G1, MV9G2, MV9G3, MV9G4, MV9G5, MV9G6, MV9H1, MV9H2, MV9H4, MV9H5, MW3C1, MW3C4, MW3C7, MW3C8, MW4D1, MW4D2, MW4D4, MW4D5, MW4D7, MW4D8, MW4H1, MW4H2, MW4H4, MW4H5, MW4H7, MW4H8, MW4L1,

Area	Sub-area name	Length of re-allocation period	HCIS
			MW4L2, MW4L4, MW4L5, MW4L6, MW4L7, MW4L8, MW4L9, MW5B3, MW5B6, MW5B9, MW5F3, MW5F6, MW5F9, MW5I4, MW5I5, MW5I6, MW5I7, MW5I8, MW5I9, MW5J3, MW5J4, MW5J5, MW5J6, MW5J7, MW5J8, MW5J9, NT5P1, NT5P2, NT5P3, NT5P4, NT5P5, NT5P6, NT5P7, NT6M1, NT6M2, NT6M3, NT6M4, NT6M5, NT6M6, NT6N1, NT6N2, NT6N3, NT6N4, NT6N5, NT6N6, NT6O1, NT6O2, NT6O3, NT6O4, NT6O5, NT6O6, NT6O9, NT8D1, NT8D4, NT8D7, NT8G1, NT8G2, NT8G3, NT8G4, NT8G5, NT8G6, NT8H1, NT8H4, NT8P7, NT8P8, NT8P9, NT9C3, NT9C6, NT9C9, NT9G3, NT9G6, NT9G9, NT9K3, NT9K6, NT9K9, NT9O3, NT9O6, NT9O9, NU3A1, NU3A4, NU3A7, NU3A8, NU3A9, NU3C3, NU3C6, NU3C9, NU3F4, NU3F5, NU3F6, NU3F7, NU3F8, NU3F9, NU3G3, NU3G4, NU3G5, NU3G6, NU3G7, NU3G8, NU3G9, NV4N1, NV4N2, NV4N3, NV4N4, NV4N5, NV4N7, NV4N8, NV4O1, NV4O2, NV4O3, NV4P1, NV4P2, NV4P3, NV7A1, NV7A2, NV7A3, NV7A4, NV7A5, NV7A6, NV7B1, NV7B2, NV7B4, NV7B5

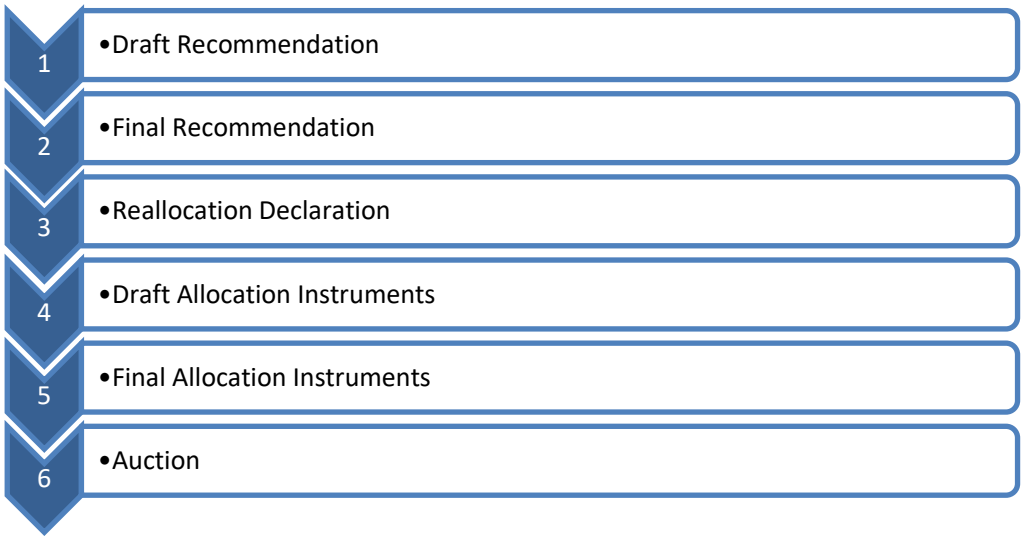
Attachment B—
Spectrum reallocation process

The ACMA proposes to follow the spectrum reallocation process as set out in Part 3.6 of the Act (intended for the reallocation of encumbered spectrum) for the allocation of the 3.6 GHz band spectrum.

Main steps in the reallocation process

The main steps in the reallocation process under Part 3.6 of the Act are set out in Figure 9.

Figure 9: The reallocation process



Step 1—Draft recommendation and invitation to comment

A first step in the spectrum reallocation process is for the ACMA to prepare a draft recommendation in accordance with section 153F of the Act, setting out the spectrum that the ACMA believes should be reallocated. The ACMA must identify the spectrum by frequency and geographic area, and suggest a reallocation period within which the reallocation process is to be completed. It may also specify other items that the ACMA chooses to include.

In accordance with section 153G of the Act, the ACMA must undertake a consultation process with potentially-affected apparatus licensees, including incumbent apparatus licensees, who will be the most directly affected by the proposed reallocation. The licensees must be provided with a notice setting out the terms of a draft of the recommendation and invited to comment on those terms. In addition, the ACMA will undertake wide public consultation so that all interested parties are able to comment on the draft recommendation. The consultation period will last for at least 28 days.

Step 2—Final recommendation to the minister

After consulting on the draft recommendation, the ACMA may prepare a final recommendation under section 153F of the Act and provide it to the minister. In preparing a final recommendation, the ACMA must consider views received during the public consultation period.

Step 3—Spectrum reallocation declaration

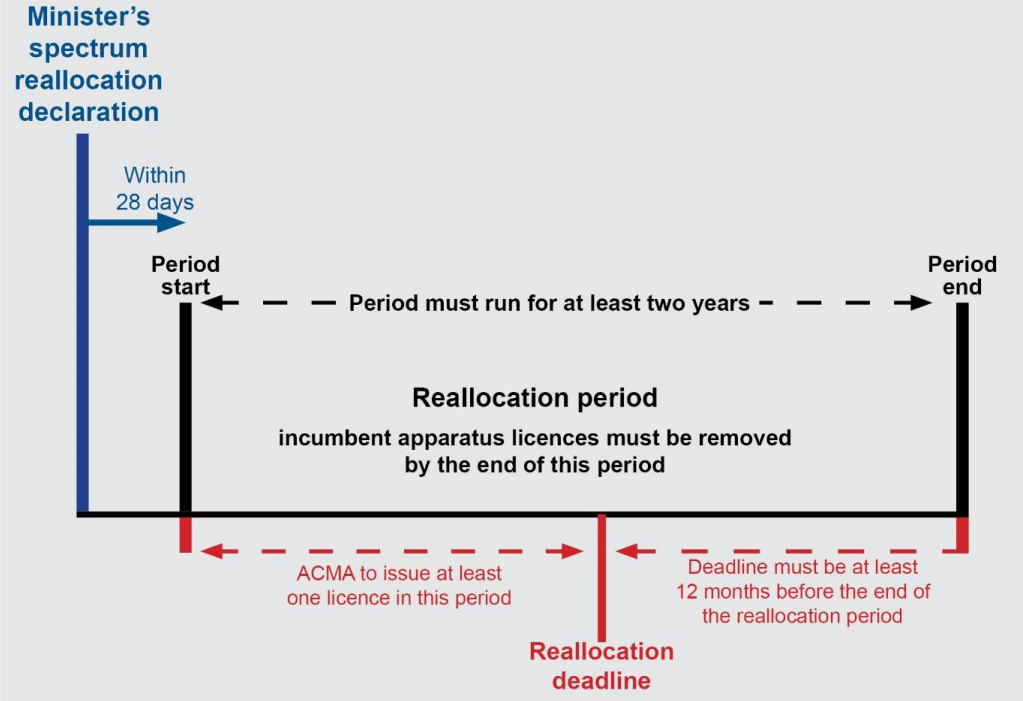
After the ACMA makes a final recommendation, the minister, pursuant to section 153B of the Act, will have the power to declare the frequency band or bands and geographic area of the spectrum to be reallocated and the type of licences to be issued. In making a reallocation declaration, the minister must 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. A reallocation declaration will set out:

- the reallocation period
- the reallocation deadline
- the spectrum to be reallocated
- whether spectrum or apparatus licences will be issued.

The minister can only make a declaration about spectrum that was included in a recommendation from the ACMA.

Figure 10 shows how the reallocation period and reallocation deadline interact.

Figure 10: The reallocation period and deadline



The reallocation period is the period at the end of which incumbent apparatus licences are cancelled, leaving the spectrum available for use by new licensees. The reallocation period must begin within 28 days of the reallocation declaration being made by the minister and must run for at least two years.

In accordance with subsection 153B(5) of the Act, the reallocation deadline must be at least 12 months before the end of the reallocation period. The reallocation deadline is significant because if the ACMA does not allocate at least one licence before this deadline, the reallocation declaration is automatically revoked.

Step 4—Draft allocation instruments

The ACMA must make a number of instruments in order to conduct an auction of spectrum. These include a marketing plan under section 39A of the Act and an allocation procedures determination under section 60. These instruments would set out the results of the ACMA's work on the configuration and allocation of the 3.6 GHz band spectrum. In particular, they would specify the legal rights and obligations that will be conferred by the spectrum licences, including the maximum emission limits and other operating conditions for the spectrum set by the technical framework.

Generally, a marketing plan sets out information about the spectrum that is available and describes high-level procedures for the auction. For example, it might specify the type of auction method that will be employed, how the spectrum will be apportioned into lots and how much spectrum will be reserved for community or public services. A marketing plan can be accompanied by a draft sample spectrum licence defining the area and frequency band of the licence and setting out licence conditions, including emission limits, relevant technical advisory guidelines and statutory obligations.

The allocation procedures determination sets out, in greater detail, the elements of the chosen allocation method. For example, the procedures will detail the auction method and auction rules, registration requirements, fees associated with the auction, reserve prices, deposits payable and methods of payment. If the minister directs the ACMA to do so, the allocation procedures may also impose competition limits, such as a limit on the amount of spectrum that may be purchased by a particular entity. The minister may direct the ACMA on the imposition of competition limits.

There are a number of instruments that implement the technical framework for a band. These may comprise:

- a determination made under subsection 145(4) of the Act—for unacceptable levels of interference
- radiocommunications advisory guidelines made under section 262 of the Act—which assist licensees to coordinate with other radiocommunications services.

Subject to the minister making a reallocation declaration, the ACMA will develop the 3.6 GHz band technical framework and draft the instruments.

Step 5—Final allocation instruments

After consultation, the ACMA would make final versions of the allocation instruments. These will be published on the Federal Register of Legislative Instruments.

Step 6—Auction

Once the allocation instruments were finalised, the ACMA would be in a position to invite interested parties to register as bidders for the auction. Registered bidders would have an opportunity to trial the computer systems and/or software that will be used for the auction.

After completion of the auction process, the ACMA would issue invoices for the winning bids. On payment, the ACMA would prepare and send out the spectrum licence documents to successful bidders.

Attachment C—HCIS identifiers for defined areas

This attachment defines the areas the ACMA is proposing to recommend the minister declare for spectrum licensing. The HCIS descriptors for each area are contained in Table 6. Figure 11 provides an illustration of the proposed areas.

The Australian Spectrum Map Grid (ASMG) is used to define geographical areas over which spectrum licences are issued. The Hierarchical Cell Identification Scheme (HCIS) is a naming convention developed by the ACMA that applies unique 'names' to each of the cells that make up the ASMG. The ASMG and HCIS are described in detail in the document *The Australian spectrum map grid 2012*.

The HCIS coordinates in the table below can be converted into a Placemark file (viewable in Google Earth) through a facility on the ACMA website: www.acma.gov.au/theACMA/convert-hcis-area-description-to-a-placemark.

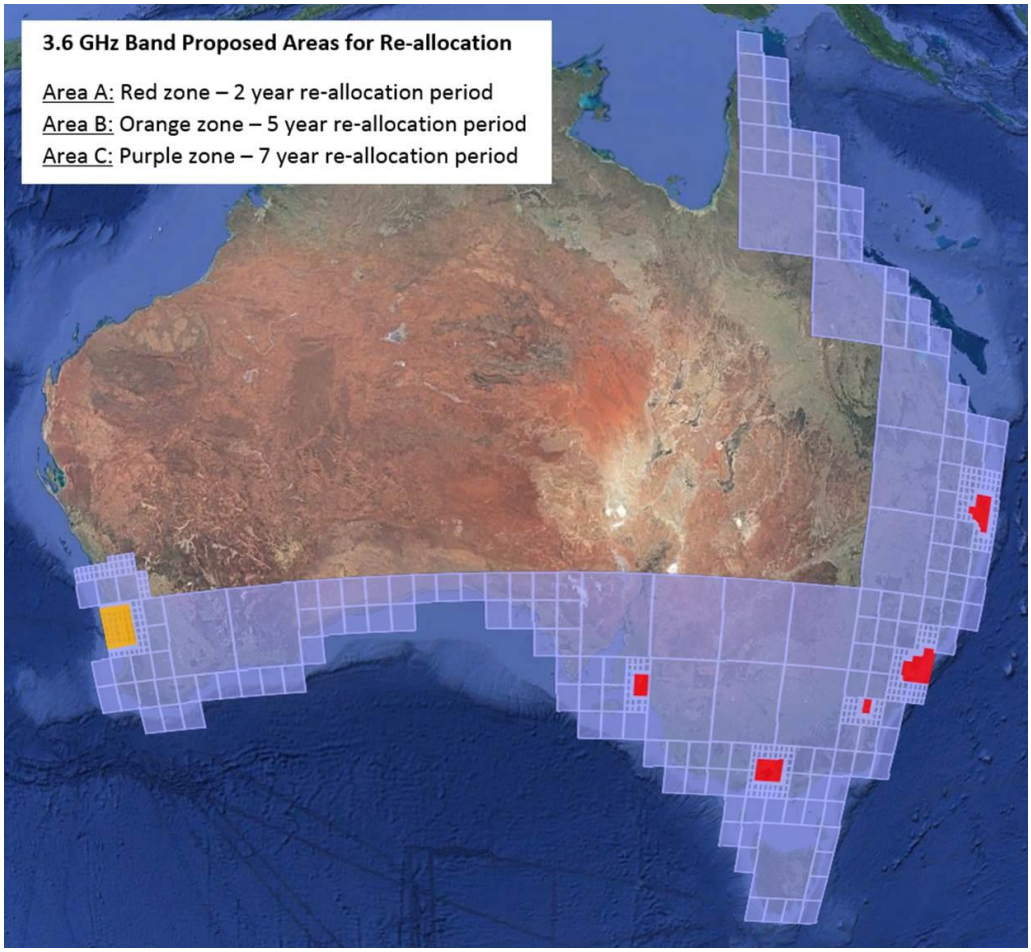
Table 6: HCIS description of proposed defined areas

Area	Sub-area name	Length of re-allocation period	HCIS
Area A	Adelaide	2 years	IW3O, IW3P, IW6C, IW6D, IW3J5, IW3J6, IW3J8, IW3J9, IW3K4, IW3K5, IW3K6, IW3K7, IW3K8, IW3K9, IW3L4, IW3L5, IW3L6, IW3L7, IW3L8, IW3L9, IW3N2, IW3N3, IW3N5, IW3N6, IW3N8, IW3N9, IW6B2, IW6B3, IW6B5, IW6B6, IW6B8, IW6B9, IW6F2, IW6F3, IW6F5, IW6F6, IW6G1, IW6G2, IW6G3, IW6G4, IW6G5, IW6G6, IW6H1, IW6H2, IW6H3, IW6H4, IW6H5, IW6H6
	Brisbane	2 years	NT8K, NT8L, NT9A, NT9B, NT9E, NT9F, NT9I, NT9J, NT9M, NT9N, NU3B, NT5P8, NT5P9, NT6M7, NT6M8, NT6M9, NT6N7, NT6N8, NT6N9, NT6O7, NT6O8, NT8D2, NT8D3, NT8D5, NT8D6, NT8D8, NT8D9, NT8G7, NT8G8, NT8G9, NT8H2, NT8H3, NT8H5, NT8H6, NT8H7, NT8H8, NT8H9, NT8P1, NT8P2, NT8P3, NT8P4, NT8P5, NT8P6, NT9C1, NT9C2, NT9C4, NT9C5, NT9C7, NT9C8, NT9G1, NT9G2, NT9G4, NT9G5, NT9G7, NT9G8, NT9K1, NT9K2, NT9K4, NT9K5, NT9K7, NT9K8, NT9O1, NT9O2, NT9O4, NT9O5, NT9O7, NT9O8, NU3A2, NU3A3, NU3A5, NU3A6, NU3C1, NU3C2, NU3C4, NU3C5, NU3C7, NU3C8, NU3F1, NU3F2, NU3F3, NU3G1, NU3G2
	Canberra	2 years	MW4D3, MW4D6, MW4D9, MW4H3, MW4H6, MW4H9, MW4L3, MW5A, MW5B1, MW5B2, MW5B4, MW5B5, MW5B7, MW5B8, MW5E, MW5F1, MW5F2, MW5F4, MW5F5, MW5F7, MW5F8, MW5I1, MW5I2, MW5I3, MW5J1, MW5J2
	Melbourne	2 years	KX3J, KX3K, KX3L, KX3N, KX3O, KX3P, KX6B, KX6C, KX6D, LX1I, LX1J, LX1M, LX1N, LX4A, LX4B, KX6F1, KX6F2, KX6F3, KX6F4, KX6F5, KX6F6, KX6G1, KX6G2, KX6G3, KX6G4, KX6G5, KX6G6, KX6H1, KX6H2, KX6H3, KX6H4, KX6H5, KX6H6, LX1K1, LX1K4, LX1K7, LX1O1, LX1O4, LX1O7, LX4C1, LX4C4, LX4C7, LX4E1, LX4E2, LX4E3, LX4E4, LX4E5, LX4E6, LX4F1, LX4F2, LX4F3, LX4F4, LX4F5, LX4F6, LX4G1, LX4G4
	Sydney	2 years	MV9K, MV9L, MV9O, MV9P, MW3D, NV7C, NV7D, NV7E, NV7F, NV7G, NV7H, NV7I, NV7J, NV7K, NV7L, NV7M, NV7N, NV7O, NV7P, NW1A, NW1B, NW1C, NW1D, MV9D9, MV9G7, MV9G8, MV9G9, MV9H3, MV9H6, MV9H7, MV9H8, MV9H9, MW3C2, MW3C3, MW3C5, MW3C6, MW3C9, NV4N6, NV4N9, NV4O4, NV4O5, NV4O6, NV4O7, NV4O8, NV4O9, NV4P4, NV4P5, NV4P6, NV4P7, NV4P8, NV4P9, NV7A7, NV7A8, NV7A9, NV7B3, NV7B6, NV7B7, NV7B8, NV7B9
Area B	Perth	5 years	BV1E, BV1F, BV1G, BV1H, BV1I, BV1J, BV1K, BV1L, BV1M, BV1N, BV1O, BV1P, BV2E, BV2F, BV2I, BV2J, BV2M, BV2N, BV4A, BV4B, BV4C, BV4D, BV4E, BV4F, BV4G, BV4H, BV5A, BV5B, BV5E, BV5F, BV1A4, BV1A5, BV1A6, BV1A7, BV1A8, BV1A9, BV1B4, BV1B5, BV1B6, BV1B7, BV1B8, BV1B9, BV1C4, BV1C5, BV1C6, BV1C7, BV1C8, BV1C9, BV1D4, BV1D5, BV1D6, BV1D7, BV1D8, BV1D9, BV2A4, BV2A5, BV2A6, BV2A7, BV2A8, BV2A9, BV2B4, BV2B5, BV2B6, BV2B7, BV2B8, BV2B9, BV4I1, BV4I2, BV4I3, BV4I4, BV4I5, BV4I6, BV4J1, BV4J2, BV4J3, BV4J4, BV4J5, BV4J6, BV4K1, BV4K2, BV4K3, BV4K4, BV4K5, BV4K6, BV4L1, BV4L2, BV4L3, BV4L4, BV4L5, BV4L6, BV5I1, BV5I2, BV5I3, BV5I4, BV5I5, BV5I6, BV5J1, BV5J2, BV5J3, BV5J4, BV5J5, BV5J6

Area	Sub-area name	Length of re-allocation period	HCIS
Area C	Regional Australia	7 years	CV, DV, IV, JV, JW, KQ, KV, KW, LR, LV, LW, LY, MS, MT, MU, AU9, AV9, AW3, BU7, BU8, BV3, BV6, BV7, BV8, BV9, BW1, BW2, BW3, BW5, BW6, CW1, CW2, CW3, CW4, DW1, DW2, DW3, EV1, EV2, EV3, EV4, EV5, EV6, EV7, FV1, FV2, FV3, FV4, FV5, GV1, GV2, GV3, GV6, HV1, HV2, HV3, HV4, HV5, HV6, HV8, HV9, HW3, HW6, IW1, IW2, IW4, IW5, IW7, IW8, IW9, JX1, JX2, JX3, JX5, JX6, KO1, KO4, KO5, KO7, KO8, KP1, KP2, KP4, KP5, KP6, KP7, KP8, KP9, KX1, KX2, KX4, KX5, KX8, KX9, KY2, KY3, KY6, LP4, LP7, LQ1, LQ2, LQ4, LQ5, LQ7, LQ8, LX2, LX3, LX5, LX6, LX7, LX8, LX9, LZ1, LZ2, LZ3, MR1, MR4, MR5, MR7, MR8, MR9, MV1, MV2, MV3, MV4, MV5, MV6, MV7, MV8, MW1, MW2, MW6, MW7, MW8, MW9, MX1, MX2, MX3, MX4, MX7, MY1, MY4, MY7, MZ1, NS4, NS7, NS8, NS9, NT1, NT2, NT3, NT4, NT7, NU1, NU2, NU4, NU5, NU6, NU7, NU8, NU9, NV1, NV2, NV3, NV5, AU6I, AU6J, AU6K, AU6L, AU6M, AU6N, AU6O, AU6P, BU4H, BU4I, BU4J, BU4K, BU4L, BU4M, BU4N, BU4O, BU4P, BU5E, BU5F, BU5G, BU5H, BU5I, BU5J, BU5K, BU5L, BU5M, BU5N, BU5O, BU5P, BU9A, BU9B, BU9E, BU9F, BU9I, BU9J, BU9M, BU9N, BV2C, BV2D, BV2G, BV2H, BV2K, BV2L, BV2O, BV2P, BV4M, BV4N, BV4O, BV4P, BV5C, BV5D, BV5G, BV5H, BV5K, BV5L, BV5M, BV5N, BV5O, BV5P, IW3A, IW3B, IW3C, IW3D, IW3E, IW3F, IW3G, IW3H, IW3I, IW3M, IW6A, IW6E, IW6I, IW6J, IW6K, IW6L, IW6M, IW6N, IW6O, IW6P, KX3A, KX3B, KX3C, KX3D, KX3E, KX3F, KX3G, KX3H, KX3I, KX3M, KX6A, KX6E, KX6I, KX6J, KX6K, KX6L, KX6M, KX6N, KX6O, KX6P, LX1A, LX1B, LX1C, LX1D, LX1E, LX1F, LX1G, LX1H, LX1L, LX1P, LX4D, LX4H, LX4I, LX4J, LX4K, LX4L, LX4M, LX4N, LX4O, LX4P, MV9A, MV9B, MV9C, MV9E, MV9F, MV9I, MV9J, MV9M, MV9N, MW3A, MW3B, MW3E, MW3F, MW3G, MW3H, MW3I, MW3J, MW3K, MW3L, MW3M, MW3N, MW3O, MW3P, MW4A, MW4B, MW4C, MW4E, MW4F, MW4G, MW4I, MW4J, MW4K, MW4M, MW4N, MW4O, MW4P, MW5C, MW5D, MW5G, MW5H, MW5K, MW5L, MW5M, MW5N, MW5O, MW5P, NT5A, NT5B, NT5C, NT5D, NT5E, NT5F, NT5G, NT5H, NT5I, NT5J, NT5K, NT5L, NT5M, NT5N, NT5O, NT6A, NT6B, NT6C, NT6D, NT6E, NT6F, NT6G, NT6H, NT6I, NT6J, NT6K, NT6L, NT6P, NT8A, NT8B, NT8C, NT8E, NT8F, NT8I, NT8J, NT8M, NT8N, NT8O, NT9D, NT9H, NT9L, NT9P, NU3D, NU3E, NU3H, NU3I, NU3J, NU3K, NU3L, NU3M, NU3N, NU3O, NU3P, NV4A, NV4B, NV4C, NV4D, NV4E, NV4F, NV4G, NV4H, NV4I, NV4J, NV4K, NV4L, NV4M, NW1E, NW1F, NW1G, NW1H, NW1I, NW1J, NW1K, NW1L, NW1M, NW1N, NW1O, NW1P, BV1A1, BV1A2, BV1A3, BV1B1, BV1B2, BV1B3, BV1C1, BV1C2, BV1C3, BV1D1, BV1D2, BV1D3, BV2A1, BV2A2, BV2A3, BV2B1, BV2B2, BV2B3, BV4I7, BV4I8, BV4I9, BV4J7, BV4J8, BV4J9, BV4K7, BV4K8, BV4K9, BV4L7, BV4L8, BV4L9, BV5I7, BV5I8, BV5I9, BV5J7, BV5J8, BV5J9, IW3J1, IW3J2, IW3J3, IW3J4, IW3J7, IW3K1, IW3K2, IW3K3, IW3L1, IW3L2, IW3L3, IW3N1, IW3N4, IW3N7, IW6B1, IW6B4, IW6B7, IW6F1, IW6F4, IW6F7, IW6F8, IW6F9, IW6G7, IW6G8, IW6G9, IW6H7, IW6H8, IW6H9, KX6F7, KX6F8, KX6F9, KX6G7, KX6G8, KX6G9, KX6H7, KX6H8, KX6H9, LX1K2, LX1K3, LX1K5, LX1K6, LX1K8, LX1K9, LX1O2, LX1O3, LX1O5, LX1O6, LX1O8, LX1O9, LX4C2, LX4C3, LX4C5, LX4C6, LX4C8, LX4C9, LX4E7, LX4E8, LX4E9, LX4F7, LX4F8, LX4F9, LX4G2, LX4G3, LX4G5, LX4G6, LX4G7, LX4G8, LX4G9,

Area	Sub-area name	Length of re-allocation period	HCIS
			MV9D1, MV9D2, MV9D3, MV9D4, MV9D5, MV9D6, MV9D7, MV9D8, MV9G1, MV9G2, MV9G3, MV9G4, MV9G5, MV9G6, MV9H1, MV9H2, MV9H4, MV9H5, MW3C1, MW3C4, MW3C7, MW3C8, MW4D1, MW4D2, MW4D4, MW4D5, MW4D7, MW4D8, MW4H1, MW4H2, MW4H4, MW4H5, MW4H7, MW4H8, MW4L1, MW4L2, MW4L4, MW4L5, MW4L6, MW4L7, MW4L8, MW4L9, MW5B3, MW5B6, MW5B9, MW5F3, MW5F6, MW5F9, MW5I4, MW5I5, MW5I6, MW5I7, MW5I8, MW5I9, MW5J3, MW5J4, MW5J5, MW5J6, MW5J7, MW5J8, MW5J9, NT5P1, NT5P2, NT5P3, NT5P4, NT5P5, NT5P6, NT5P7, NT6M1, NT6M2, NT6M3, NT6M4, NT6M5, NT6M6, NT6N1, NT6N2, NT6N3, NT6N4, NT6N5, NT6N6, NT6O1, NT6O2, NT6O3, NT6O4, NT6O5, NT6O6, NT6O9, NT8D1, NT8D4, NT8D7, NT8G1, NT8G2, NT8G3, NT8G4, NT8G5, NT8G6, NT8H1, NT8H4, NT8P7, NT8P8, NT8P9, NT9C3, NT9C6, NT9C9, NT9G3, NT9G6, NT9G9, NT9K3, NT9K6, NT9K9, NT9O3, NT9O6, NT9O9, NU3A1, NU3A4, NU3A7, NU3A8, NU3A9, NU3C3, NU3C6, NU3C9, NU3F4, NU3F5, NU3F6, NU3F7, NU3F8, NU3F9, NU3G3, NU3G4, NU3G5, NU3G6, NU3G7, NU3G8, NU3G9, NV4N1, NV4N2, NV4N3, NV4N4, NV4N5, NV4N7, NV4N8, NV4O1, NV4O2, NV4O3, NV4P1, NV4P2, NV4P3, NV7A1, NV7A2, NV7A3, NV7A4, NV7A5, NV7A6, NV7B1, NV7B2, NV7B4, NV7B5

Figure 11: Map of proposed defined areas



Attachment D—HCIS identifiers for possible excise areas

This attachment defines the areas the ACMA is considering for possible future earth satellite station protection zones. The names and HCIS descriptors for each area are contained in Table 7. Figures 12 and 13 provide illustrations of an overview and detailed view of the proposed excise areas.

The Australian Spectrum Map Grid (ASMG) is used to define geographical areas over which spectrum licences are issued. The Hierarchical Cell Identification Scheme (HCIS) is a naming convention developed by the ACMA that applies unique 'names' to each of the cells that make up the ASMG. The ASMG and HCIS are described in detail in the document *The Australian spectrum map grid 2012*.

The HCIS coordinates in the table below can be converted into a Placemark file (viewable in Google Earth) through a facility on the ACMA website: www.acma.gov.au/theACMA/convert-hcis-area-description-to-a-placemark.

Table 7: Definition of possible excise areas

Area name	HCIS
Moree	MU5G, MU5H, MU5L, MU5C8, MU5C9, MU5D7, MU5D8, MU5D9, MU5K1, MU5K2, MU5K3, MU5K4, MU5K5, MU5K6, MU5K8, MU5K9, MU6A7, MU6E1, MU6E2, MU6E4, MU6E5, MU6E7, MU6E8, MU6I1, MU6I2, MU6I4, MU6I5, MU6I7
Quirindi	MV3G, MV3H, MV3K, MV3L, MV3C8, MV3C9, MV3D7, MV3F3, MV3F5, MV3F6, MV3F8, MV3F9, MV3J2, MV3J3, MV3J5, MV3J6, MV3J9, MV3O1, MV3O2, MV3O3, MV3P1
Roma	MT4H, MT4K, MT4L, MT4F9, MT4G2, MT4G3, MT4G4, MT4G5, MT4G6, MT4G7, MT4G8, MT4G9, MT4J3, MT4J6, MT4O1, MT4O2, MT4O3, MT4O6, MT4P1, MT4P2, MT4P3, MT4P4, MT4P5, MT5E4, MT5E7, MT5I1, MT5I2, MT5I4, MT5I5, MT5I7, MT5M1
Uralla	NU7K4

Figure 12: Overview map of possible excise areas

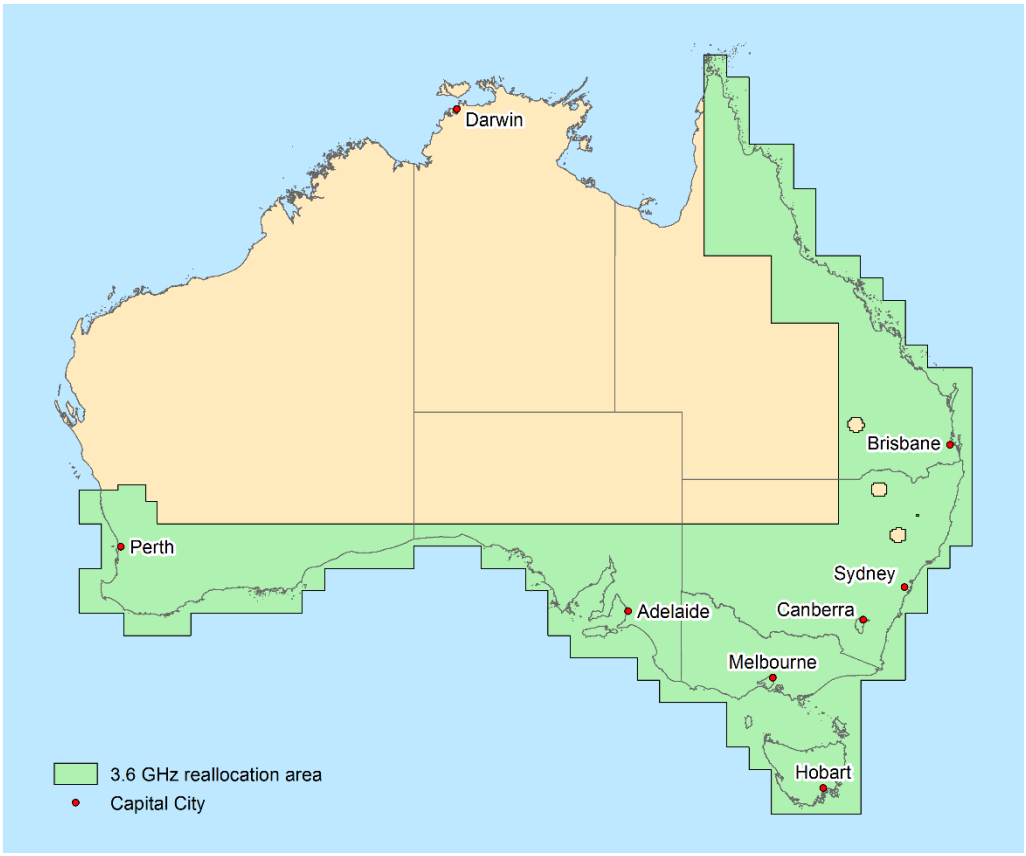
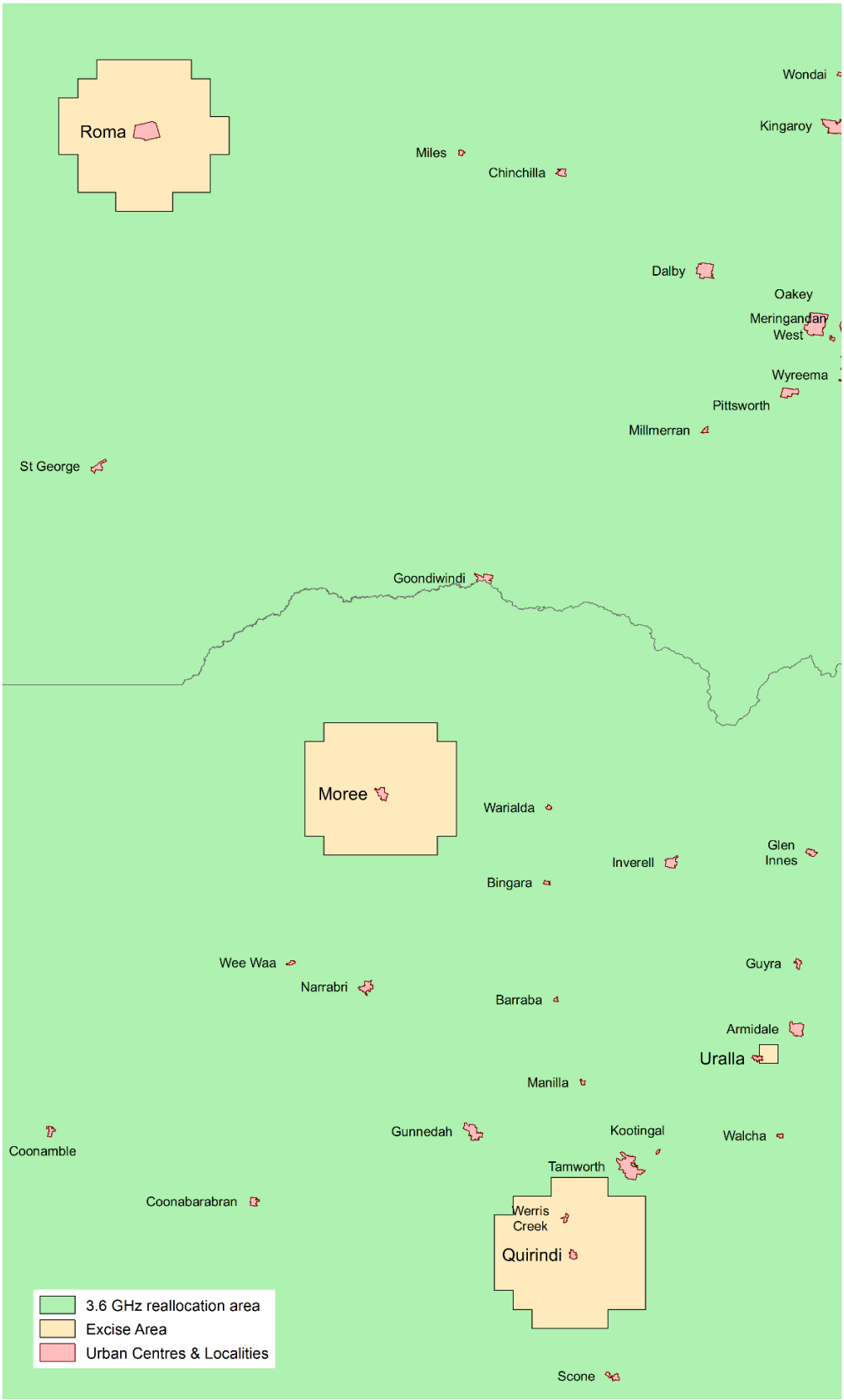


Figure 13: Detailed view of possible excise areas



Attachment E—HCIS identifiers for proposed lot areas

This attachment defines the geographical areas associated with the ACMA preliminary proposed lot configuration for the 3.6 GHz band. The lot names and HCIS descriptors for each area are contained in Table 8. Figure 14 provides an illustration of the proposed lot areas.

Each metropolitan area in Figure 14 would have two reallocation periods: two years as specified for Area A and five years for Area B, with seven years for the remainder of each metropolitan area. Area C would have a single reallocation period of seven years

The Australian Spectrum Map Grid (ASMG) is used to define geographical areas over which spectrum licences are issued. The Hierarchical Cell Identification Scheme (HCIS) is a naming convention developed by the ACMA that applies unique 'names' to each of the cells that make up the ASMG. The ASMG and HCIS are described in detail in the document *The Australian spectrum map grid 2012*.

The HCIS coordinates in the table below can be converted into a Placemark file (viewable in Google Earth) through a facility on the ACMA website: www.acma.gov.au/theACMA/convert-hcis-area-description-to-a-placemark.

Table 8: Definition of preliminary proposed lot areas

Lot Identifier	Lot name	HCIS
1	Adelaide	IW2, IW3, IW5, IW6, IW7, IW8, IW9, JW1, JW4, IV8K, IV8L, IV8N, IV8O, IV8P, IV9I, IV9J, IV9K, IV9L, IV9M, IV9N, IV9O, IV9P, IW1P, IW4D, IW4H, IW4K, IW4L, IW4N, IW4O, IW4P, JV7M, JV7N, JV7O, JV7P, JV8M, JW2A, JW2B, JW2E, JW2F, JW2G, JW2I, JW2J, JW2K, JW2M, JW2N, JW2O, JW5A, JW5B, JW5C, JW5E, JW5F, JW5I, JW5J, JW5M, JW7A, JW7B, JW7C, JW7D, JW7E, JW7F, JW7G, JW7I
2	Brisbane	NT6, NT8, NT9, NU3, NT4G, NT4H, NT4K, NT4L, NT4O, NT4P, NT5B, NT5C, NT5D, NT5E, NT5F, NT5G, NT5H, NT5I, NT5J, NT5K, NT5L, NT5M, NT5N, NT5O, NT5P, NT7C, NT7D, NT7G, NT7H, NT7K, NT7L, NT7O, NT7P, NU2B, NU2C, NU2D, NU2F, NU2G, NU2H, NU2L
3	Canberra	MW1, MW4, MW5, MW2A, MW2B, MW2E, MW2F, MW2G, MW2I, MW2J, MW2K, MW2L, MW2M, MW2N, MW2O, MW2P, MW3M, MW6A, MW6E, MW6F, MW6G, MW6H, MW6I, MW6J, MW6K, MW6L, MW6M, MW6N, MW6O, MW6P, MW7A, MW7B, MW7C, MW7D, MW7E, MW7F, MW7G, MW7H, MW7I, MW7J, MW7K, MW7L, MW8A, MW8B, MW8C, MW8D, MW8E, MW8F, MW8G, MW8H, MW8I, MW8J, MW9A, MW9B, MW9C, MW9D, MW9E, MW9F, MW9G, MW9H

Lot Identifier	Lot name	HCIS
4	Melbourne	KW9, KX2, KX3, KX5, KX6, LX1, LX4, LX5, KW8H, KW8I, KW8J, KW8K, KW8L, KW8M, KW8N, KW8O, KW8P, KX1P, KX4D, KX4H, KX4L, KX4P, KX8A, KX8B, KX8C, KX8D, KX8E, KX8F, KX8G, KX8H, KX9A, KX9B, KX9C, KX9D, KX9E, KX9F, KX9G, KX9H, LW7A, LW7B, LW7C, LW7E, LW7F, LW7G, LW7I, LW7J, LW7K, LW7M, LW7N, LW7O, LW7P, LX2E, LX2I, LX2M, LX2N, LX2O, LX2P, LX3M, LX6A, LX6B, LX6E, LX6F, LX6I, LX6J, LX6M, LX6N, LX7A, LX7B, LX7C, LX7D, LX7E, LX7F, LX7G, LX7H, LX8A, LX8B, LX8C, LX8D, LX8E, LX8F, LX8G, LX8H, LX9A, LX9B, LX9E, LX9F
5	Perth	AU9, AV9, AW3, BU7, BU8, BV1, BV2, BV4, BV5, BV7, BV8, BW1, BW2, BW5, AU6I, AU6J, AU6K, AU6L, AU6M, AU6N, AU6O, AU6P, BU4H, BU4I, BU4J, BU4K, BU4L, BU4M, BU4N, BU4O, BU4P, BU5E, BU5F, BU5G, BU5H, BU5I, BU5J, BU5K, BU5L, BU5M, BU5N, BU5O, BU5P, BU9A, BU9B, BU9E, BU9F, BU9I, BU9J, BU9M, BU9N, BV3A, BV3B, BV3E, BV3F, BV3I, BV3J, BV3M, BV3N, BV6A, BV6B, BV6E, BV6F, BV6I, BV6J, BV6M, BV6N, BV9A, BV9B, BV9E, BV9F, BV9I, BV9J, BV9M, BV9N, BW3A
6	Sydney	MV6, MV8, MV9, NV3, NV4, NV5, NV7, NW1, MV2P, MV3L, MV3M, MV3N, MV3O, MV3P, MV5D, MV5H, MV5L, MV5P, MV7D, MV7H, MV7L, MV7P, MW2C, MW2D, MW2H, MW3A, MW3B, MW3C, MW3D, MW3E, MW3F, MW3G, MW3H, MW3I, MW3J, MW3K, MW3L, MW3N, MW3O, MW3P, MW6B, MW6C, MW6D, NV1I, NV1J, NV1K, NV1L, NV1M, NV1N, NV1O, NV1P, NV2B, NV2C, NV2D, NV2F, NV2G, NV2H, NV2I, NV2J, NV2K, NV2L, NV2M, NV2N, NV2O, NV2P, NV3I, NV3J, NV3K, NV3L, NV3M, NV3N, NV3O, NV3P

Lot Identifier	Lot name	HCIS
7	Regional Australia	CV, DV, KQ, KV, LR, LV, LY, MS, MT, MU, BW6, CW1, CW2, CW3, CW4, DW1, DW2, DW3, EV1, EV2, EV3, EV4, EV5, EV6, EV7, FV1, FV2, FV3, FV4, FV5, GV1, GV2, GV3, GV6, HV1, HV2, HV3, HV4, HV5, HV6, HV8, HV9, HW3, HW6, IV1, IV2, IV3, IV4, IV5, IV6, IV7, JV1, JV2, JV3, JV4, JV5, JV6, JV9, JW3, JW6, JW8, JW9, JX1, JX2, JX3, JX5, JX6, KO1, KO4, KO5, KO7, KO8, KP1, KP2, KP4, KP5, KP6, KP7, KP8, KP9, KW1, KW2, KW3, KW4, KW5, KW6, KW7, KY2, KY3, KY6, LP4, LP7, LQ1, LQ2, LQ4, LQ5, LQ7, LQ8, LW1, LW2, LW3, LW4, LW5, LW6, LW8, LW9, LZ1, LZ2, LZ3, MR1, MR4, MR5, MR7, MR8, MR9, MV1, MV4, MX1, MX2, MX3, MX4, MX7, MY1, MY4, MY7, MZ1, NS4, NS7, NS8, NS9, NT1, NT2, NT3, NU1, NU4, NU5, NU6, NU7, NU8, NU9, BV3C, BV3D, BV3G, BV3H, BV3K, BV3L, BV3O, BV3P, BV6C, BV6D, BV6G, BV6H, BV6K, BV6L, BV6O, BV6P, BV9C, BV9D, BV9G, BV9H, BV9K, BV9L, BV9O, BV9P, BW3B, BW3C, BW3D, BW3E, BW3F, BW3G, BW3H, BW3I, BW3J, BW3K, BW3L, BW3M, BW3N, BW3O, BW3P, IV8A, IV8B, IV8C, IV8D, IV8E, IV8F, IV8G, IV8H, IV8I, IV8J, IV8M, IV9A, IV9B, IV9C, IV9D, IV9E, IV9F, IV9G, IV9H, IW1A, IW1B, IW1C, IW1D, IW1E, IW1F, IW1G, IW1H, IW1I, IW1J, IW1K, IW1L, IW1M, IW1N, IW1O, IW4A, IW4B, IW4C, IW4E, IW4F, IW4G, IW4I, IW4J, IW4M, JV7A, JV7B, JV7C, JV7D, JV7E, JV7F, JV7G, JV7H, JV7I, JV7J, JV7K, JV7L, JV8A, JV8B, JV8C, JV8D, JV8E, JV8F, JV8G, JV8H, JV8I, JV8J, JV8K, JV8L, JV8N, JV8O, JV8P, JW2C, JW2D, JW2H, JW2L, JW2P, JW5D, JW5G, JW5H, JW5K, JW5L, JW5N, JW5O, JW5P, JW7H, JW7J, JW7K, JW7L, JW7M, JW7N, JW7O, JW7P, KW8A, KW8B, KW8C, KW8D, KW8E, KW8F, KW8G, KX1A, KX1B, KX1C, KX1D, KX1E, KX1F, KX1G, KX1H, KX1I, KX1J, KX1K, KX1L, KX1M, KX1N, KX1O, KX4A, KX4B, KX4C, KX4E, KX4F, KX4G, KX4I, KX4J, KX4K, KX4M, KX4N, KX4O, KX8I, KX8J, KX8K, KX8L, KX8M, KX8N, KX8O, KX8P, KX9I, KX9J, KX9K, KX9L, KX9M, KX9N, KX9O, KX9P, LW7D, LW7H, LW7L, LX2A, LX2B, LX2C, LX2D, LX2F, LX2G, LX2H, LX2J, LX2K, LX2L, LX3A, LX3B, LX3C, LX3D, LX3E, LX3F, LX3G, LX3H, LX3I, LX3J, LX3K, LX3L, LX3N, LX3O, LX3P, LX6C, LX6D, LX6G, LX6H, LX6K, LX6L, LX6O, LX6P, LX7I, LX7J, LX7K, LX7L, LX7M, LX7N, LX7O, LX7P, LX8I, LX8J, LX8K, LX8L, LX8M, LX8N, LX8O, LX8P, LX9C, LX9D, LX9G, LX9H, LX9I, LX9J, LX9K, LX9L, LX9M, LX9N, LX9O, LX9P, MV2A, MV2B, MV2C, MV2D, MV2E, MV2F, MV2G, MV2H, MV2I, MV2J, MV2K, MV2L, MV2M, MV2N, MV2O, MV3A, MV3B, MV3C, MV3D, MV3E, MV3F, MV3G, MV3H, MV3I, MV3J, MV3K, MV5A, MV5B, MV5C, MV5E, MV5F, MV5G, MV5I, MV5J, MV5K, MV5M, MV5N, MV5O, MV7A, MV7B, MV7C, MV7E, MV7F, MV7G, MV7I, MV7J, MV7K, MV7M, MV7N, MV7O, MW7M, MW7N, MW7O, MW7P, MW8K, MW8L, MW8M, MW8N, MW8O, MW8P, MW9I, MW9J, MW9K, MW9L, MW9M, MW9N, MW9O, MW9P, NT4A, NT4B, NT4C, NT4D, NT4E, NT4F, NT4I, NT4J, NT4M, NT4N, NT5A, NT7A, NT7B, NT7E, NT7F, NT7I, NT7J, NT7M, NT7N, NU2A, NU2E, NU2I, NU2J, NU2K, NU2M, NU2N, NU2O, NU2P, NV1A, NV1B, NV1C, NV1D, NV1E, NV1F, NV1G, NV1H, NV2A, NV2E

Figure 14: Map of preliminary proposed lot areas