Draft spectrum re-allocation recommendation for the 850/900 MHz band

Consultation paper

MAY 2020

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

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Written enquiries may be sent to:

Manager, Editorial Services  
PO Box 13112  
Law Courts  
Melbourne VIC 8010  
Email: [info@acma.gov.au](mailto:info@acma.gov.au)

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Executive summary

Submissions are invited on a draft recommendation to the Minister for Communications, Cyber Safety and the Arts (the Minister) to make one or more declarations re-allocating spectrum by spectrum licensing in the following frequency ranges, covering the majority of Australia:

809–825 MHz

854–870 MHz

890–915 MHz

935–960 MHz.

This spectrum is collectively referred to as the 850/900 MHz band in this paper.

The Australian Communications and Media Authority (the ACMA) has considered options to reconfigure the 900 MHz band (frequency ranges 890–915 MHz and 935–960 MHz) to enable it to be utilised for fourth generation (4G) and fifth generation (5G) mobile broadband services.

We have identified (and are progressively clearing) spectrum in the 850 MHz expansion band (frequency ranges 809–824 MHz and 854–869 MHz) with a view to creating up to 2 x 15 MHz of harmonised mobile broadband spectrum. A further 2 x 1 MHz of spectrum (824–825 MHz and 869–870 MHz) is also being cleared.

As indicated in the [*Reconfiguring the 900 MHz band/Allocating the 850 MHz expansion band*](https://www.acma.gov.au/consultations/2019-08/reconfiguring-900-mhz-band-consultation-112019)decision paperreleased in December 2019, we are of the view that:

the best way to achieve reconfiguration of the 900 MHz band is to re-allocate the spectrum and undertake a price-based allocation of spectrum licences in conjunction with an allocation of spectrum in the 850 MHz expansion band

the further 2 x 1 MHz of spectrum (824–825 MHz and 869–870 MHz) should also be re-allocated by issuing spectrum licences to accommodate a future downshift of the spectrum licences in the adjacent 850 MHz band. This would increase the usability of the lower segment of the 900 MHz band.

Before making a recommendation to the Minister to re-allocate spectrum, we must—under Part 3.6 of the *Radiocommunications Act 1992* (the Act)—consult with stakeholders on the recommendation we should make. In particular, under section 153G of the Act, we must invite comments on the terms of the draft recommendation from potentially affected apparatus licensees. The section 153G notice inviting comments accompanies this paper on our website.

To help interested parties prepare their comments, this consultation paper outlines our proposed terms for each element of the draft recommendation and the background to each element.

The proposed terms are summarised in Table 1.

1. Terms of the draft recommendation

| Relevant term | The ACMA’s proposed recommendation |
| --- | --- |
| Licence type | Spectrum licences |
| Parts of the spectrum | 809–825 MHz  854–870 MHz  890–915 MHz  935–960 MHz  covering all of Australia excluding the mid-west Radio Quiet Zone (RQZ). |
| Re‑allocation period | For the frequency ranges 809–825 MHz and 854–870 MHz, the period ending 30 June 2024.  For the frequency ranges 890–915 MHz and 935–960 MHz, the period ending 31 December 2023. |
| Re‑allocation deadline | 31 December 2022 (12 months before the end of the re‑allocation period that ends first in time) |

## Additional matters

If we make a recommendation on these proposed terms and the Minister accepts our recommendation and makes one or more re‑allocation declarations for the 850/900 MHz band, then we propose to conduct a price-based allocation of the spectrum.

In the interests of facilitating an efficient re‑allocation process, this paper also provides information and invites comments on other matters relevant to such an allocation. These matters include:

lot configuration

the licence term

allocation methodology.

Views on these matters would only be relevant if we make the proposed recommendation and the Minister accepts our recommendation. If one or more re‑allocation declarations are made, stakeholders will have additional opportunities to comment on these matters as part of the consultation process on the allocation instruments.

### Lot configuration

We remain of the view to allocate the spectrum in 5 MHz paired lots. The proposed lower lot in the 900 MHz band (890–895 MHz paired with 935–940 MHz) would also be allocated with an additional 2 x 1 MHz lot of spectrum (824–825 MHz paired with 869–870 MHz). We propose that each lot offered should cover the whole of Australia, excluding the RQZ.

We remain of the view that the current configuration is not conducive to optimally efficient carriage of 4G or 5G services, and reconfiguration of the band into 5 MHz paired lots represents the most efficient configuration for the band. 5 MHz paired lots would provide flexibility for bidders to obtain small quantities of spectrum and would enable consolidation into larger holdings if desired. The addition of the 2 x 1 MHz of spectrum attached to the lower 900 MHz lot will potentially assist negotiations between the licensee of the lower 900 MHz lot and adjacent 850 MHz band spectrum licensees (frequency ranges 825–845 MHz and 870–890 MHz) to achieve a timely downshift of the 850 MHz spectrum licences and therefore increase the usability of the lower segment in the 900 MHZ band. This is discussed in greater detail in the *Future use* section of this paper.

### Licence term

Our preferred view is to allocate spectrum licences in the 850/900 MHz band for a term of 15 years (the maximum term permitted under the Act), with the exception of the 2 x 1 MHz lot of spectrum proposed to be allocated with the lower 900 MHz lot. That spectrum is proposed to be allocated for a term of approximately seven years—ending on 17 June 2028—to provide a common expiry date with the adjacent 850 MHz band spectrum licences. This would allow us to facilitate the downshift of 850 MHz spectrum licences at expiry if it is not achieved earlier.

We further propose that spectrum licences in the 850 MHz expansion band commence at the end of the re‑allocation period, on 1 July 2024; and spectrum licences in the 900 MHz band and downshift frequencies commence as soon as possible after the allocation process is complete.

### Allocation methodology

We are considering a range of methodologies for the allocation of spectrum in the 850/900 MHz band. Our preferred option is a sealed bid combinatorial auction format using a pay-your-bid pricing (first-price) rule.

### Spectrum for deploying a public safety mobile broadband network

We note that subject to Council of Australian Governments discussions and further decisions on the matter, the Minister may decide that 2 x 5 MHz of spectrum in the 850 MHz expansion band be held back from the re‑allocation process for the purposes of deploying a public safety mobile broadband network.

# Introduction

The wider 800 MHz (frequency range 803–890 MHz) and 900 MHz (frequency range 890–960 MHz) bands accommodate a range of services and technologies. They are very attractive for a number of services, including mobile broadband services, because the propagation characteristics of these frequencies facilitate relatively wide coverage areas. These characteristics allow a balance between cell sizes (which is relevant to capital expenditure on networks) and the amount of capacity that can be delivered to consumers within a given geographic area. The bands are part of a number of sub-1 GHz bands that are internationally harmonised for mobile broadband services.[[1]](#footnote-2)

In November 2015, we released [*The ACMA’s long-term strategy for the 803-960 MHz band*](https://www.acma.gov.au/publications/2019-12/report/acmas-long-term-strategy-803-960-mhz-band-decision-paper) (the long-term strategy), which outlined a plan to clear the 850 MHz expansion band, and flagged for future consideration the reconfiguration of the 900 MHz band to facilitate deployment of mobile broadband services. The long-term strategy proposed that the frequency ranges 824–825 MHz and 869–870 MHz (2 x 1 MHz) would also be cleared, to facilitate a future downshift of the 850 MHz spectrum-licensed band to maximise the usability of spectrum in the 900 MHz band (the downshift). The downshift would align the 850 MHz spectrum-licensed band (frequency ranges 825–845 MHz and 870–890 MHz) with internationally harmonised LTE bands.

In December 2019, we released the [*Reconfiguring the 900 MHz band/Allocating the 850 MHz expansion band*](https://www.acma.gov.au/consultations/2019-08/reconfiguring-900-mhz-band-consultation-112019)decision paper (the decision paper), concluding its consideration of reform options to enable the reconfiguration of the 900 MHz band. Reconfiguration of the 900 MHz band will enable it to be utilised for 4G and 5G mobile broadband services. The current configuration is not conducive to optimally efficient carriage of 4G or 5G services, which means that large parts of the band are either not being used efficiently, or in some cases, not used at all.

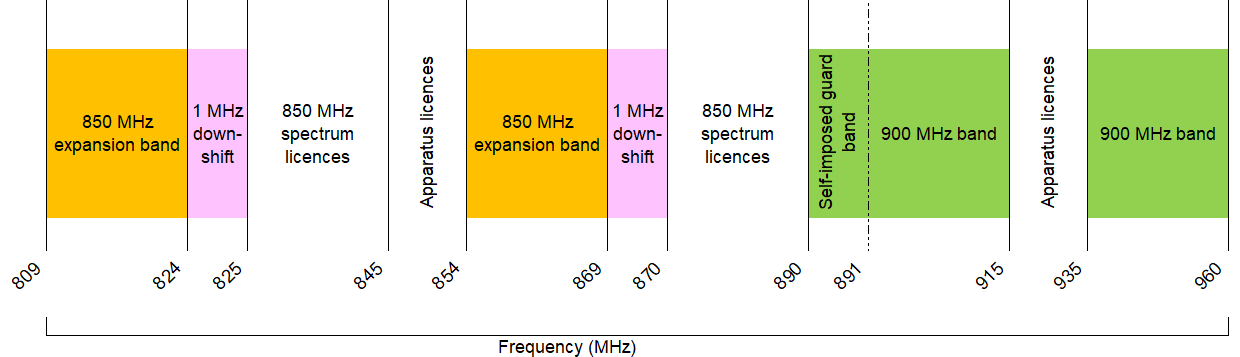
Figure 1 identifies the spectrum proposed for re‑allocation:

the 850 MHz expansion band (frequency ranges 809–824 MHz and 854–869 MHz), in yellow

the 2 x 1 MHz spectrum for facilitating a future downshift of adjacent spectrum licences (frequency ranges 824–825 MHz and 869–870 MHz), in pink[[2]](#footnote-3)

the 900 MHz band (frequency ranges 890–915 MHz and 935–960 MHz), in green.

1. Spectrum proposed for re‑allocation



Note: Not to scale

## Combined allocation

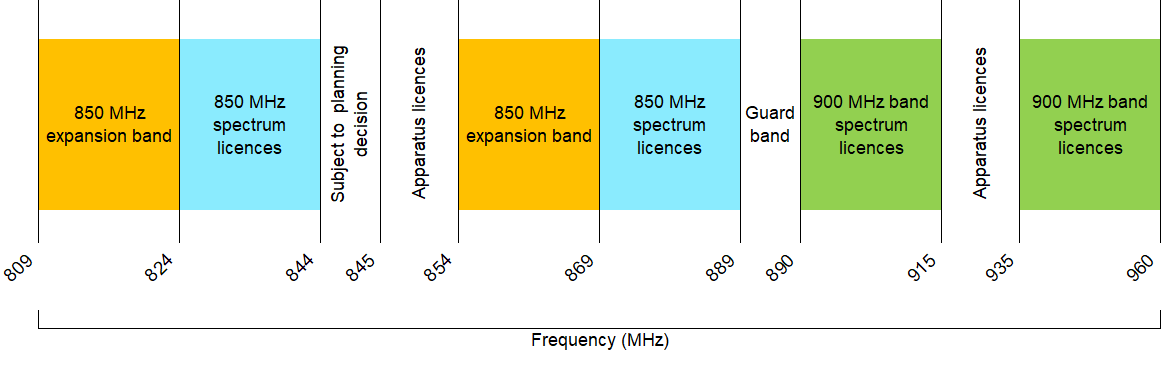
Due to the impending availability of the 850 MHz expansion band, its partial substitutability with the 900 MHz band, and international harmonisation of the band, we have identified a unique opportunity to allocate the 850 MHz expansion band in the same allocation process as the 900 MHz band.

We consider the overall public benefit derived from the allocation and use of the 850/900 MHz band will be maximised by:

* re-allocating the 850 MHz expansion band, the 900 MHz band, and the downshift frequencies by issuing spectrum licences, in order to increase the amount of spectrum that can be used to deliver mobile broadband services
* allocating all 850/900 MHz band spectrum together, as spectrum in the two bands is at least partially substitutable, and a combined allocation will enhance the efficiency of allocation and use of the spectrum by allowing for larger contiguous holdings to be obtained in each band

removing the regulatory impediment to the introduction of a guard band between the 850 MHz spectrum-licensed band and the proposed 900 MHz spectrum-licensed band. This would occur after licences in the 850 MHz spectrum-licensed band have shifted down (see Figure 2). The addition of the 1 MHz guard band between the upper 850 MHz spectrum licences and the proposed lower 900 MHz spectrum licences will reduce inter-band interference and increase the usability of the lower segment of the 900 MHz band.

1. Planned post-downshift arrangements in the frequencies between 809 MHz and 960 MHz



Note 1: Figure 2 assumes the Minister for Communications, Cyber Safety and the Arts accepts our recommendation, and declares all of the spectrum in the 850/900 MHz band for re‑allocation.

The frequency range 844–845 MHz is subject to further planning decisions by the Australian Communications and Media Authority after the downshift is completed.

Note 2: Not to scale

## Public safety mobile broadband

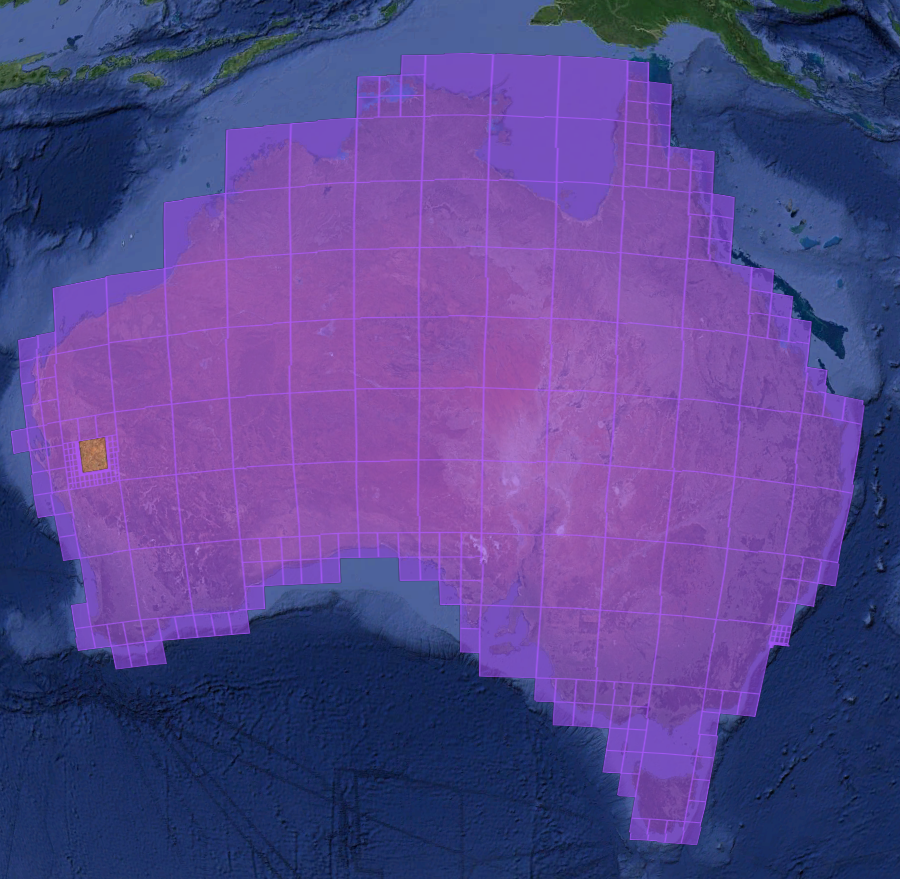
Through Council of Australian Governments (COAG) public safety mobile broadband (PSMB) discussions, there is a request to withhold 2 x 5 MHz of spectrum in the 850 MHz expansion band from allocation, for a PSMB network. Consistent with these negotiations, it is possible that 2 x 5 MHz of the 850 MHz expansion band may not be included in any re‑allocation declaration.

## Draft recommendation

We have prepared a draft recommendation to the Minister for Communications, Cyber Safety and the Arts (the Minister) recommending that the Minister makes one or more spectrum re‑allocation declarations for the re‑allocation of the 850/900 MHz band by issuing spectrum licences across all of Australia, excluding the mid-west Radio Quiet Zone (RQZ).

‘Australia’ (excluding the mid-west RQZ) is described by the hierarchical cell identification scheme (HCIS) identifiers listed in the section 153G notice. Figure 3 provides an illustrative map of the area described by the HCIS identifiers (highlighted in purple).

1. Indicative map of the geographic area of Australia, excluding the mid‑west RQZ



In preparing a final recommendation to the Minister under section 153F of the *Radiocommunications Act 1992* (the Act), the Australian Communications and Media Authority (the ACMA) must have regard to comments received from potentially affected apparatus licensees. If we make the proposed final recommendation to the Minister, and the Minister makes one or more spectrum re‑allocation declarations for the 850/900 MHz band, then we will allocate spectrum in the band through a price-based mechanism, in accordance with procedures to be determined under section 60 of the Act.

This paper provides context and information about current and proposed arrangements in the 850/900 MHz band to assist potentially affected apparatus licensees and other interested stakeholders in commenting on the terms of the draft re‑allocation recommendation. We are also seeking submissions on other matters relevant to a price-based allocation of the 850/900 MHz band, should the Minister act on our proposed re‑allocation recommendation. These matters include the allocation methodology that we may use, the licence terms and how spectrum should be configured for allocation.

We welcome views and comments from interested parties on all matters included in this paper.

## Background

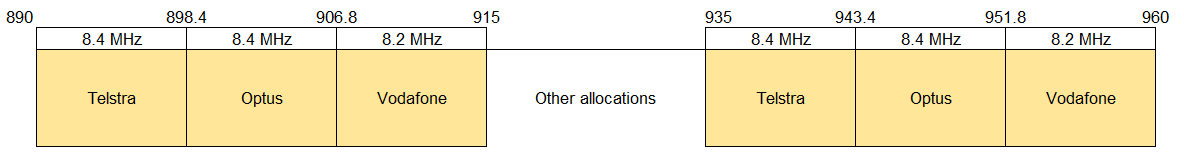
The 850/900 MHz band is one of a number of sub-1 GHz bands that are internationally harmonised for the deployment of mobile broadband services. The wider 800 MHz band and 900 MHz band have been standardised for the provision of mobile broadband services in the United States and Europe, respectively.

We have undertaken consultation on options for the reconfiguration of the 850/900 MHz band since 2011. Outcomes of these consultation processes are outlined in Appendix B.

### Current use

The 900 MHz band is currently apparatus licensed as three frequency division duplex (FDD) pairs. Each pair consists of either 2 x 8.4 MHz or 2 x 8.2 MHz (see Figure 4).

1. Current 900 MHz band allocation and configuration



Note: Not to scale

This band was originally used for 2G mobile telecommunications services but was later re-farmed for the delivery of 3G services.

The 850 MHz expansion band is currently apparatus licensed for land mobile services, fixed point-to-point services and fixed point-to-multipoint services.[[3]](#footnote-4) In accordance with the [long-term strategy](https://www.acma.gov.au/publications/2015-12/report/acmas-long-term-strategy-803-960-mhz-band-decision-paper) and the milestones described in [Radiocommunications Assignment and Licensing Instruction (RALI) MS40](https://www.acma.gov.au/publications/2019-11/guide/rali-ms-40-800-mhz-band-plan), we are progressively clearing apparatus-licensed services from the 850 MHz expansion band.[[4]](#footnote-5) The long-term strategy also set up the process of clearing the 2 x 1 MHz blocks of spectrum into which the downshift of 850 MHz spectrum licences will ultimately occur. Under the long-term strategy, the clearance of spectrum in the 850 MHz expansion band and the downshift frequencies is likely to be completed by 30 June 2024.

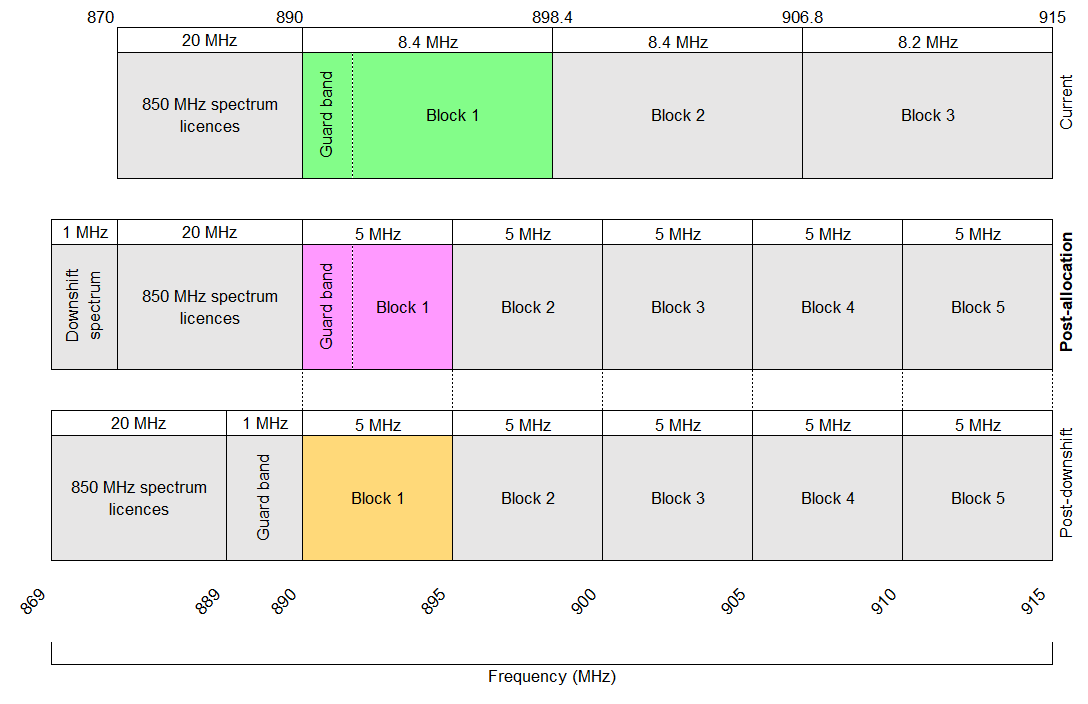
## Future use

We consider the best way to facilitate the spectrum moving to its highest-value use is to introduce spectrum licensing and undertake a combined price-based allocation of spectrum in the 850 MHz expansion band and the 900 MHz band. This will support the efficient delivery of mobile broadband services.

We intend 2 x 1 MHz be allocated to facilitate the boundaries of the spectrum-licensed frequencies in the 850 MHz band shifting down by 1 MHz before the expiry of existing licences in the band (on 17 June 2028). After the downshift is completed, the 850 MHz spectrum licences would occupy the frequency ranges 824–844 MHz and 869–889 MHz.

Through the 850/900 MHz band allocation process, we intend to enable the post‑allocation configuration shown in Figure 5. The current arrangements—in green—show that the 900 MHz Block 1 licensee is required to use part of its licensed frequency as a guard band. The post-allocation arrangements—in pink—will also require the licensee of Block 1 to use part of its licensed frequency as a guard band. The final intended outcome after the downshift of spectrum licences—in orange—is that the guard band would be outside Block 1. This would allow the licensee to utilise the full 5 MHz of its licence.

1. Current, post-allocation and post-downshift arrangements for the upper segment of the 850 MHz spectrum-licensed band and lower segment of the 900 MHz band



Note: Not to scale

We propose the 2 x 1 MHz segment be allocated with the lower frequency segment in the 900 MHz band (Figure 5, Block 1 in pink). We consider that the attachment of the 2 x 1 MHz of ‘downshift’ spectrum to the lower lot of the 900 MHz band may facilitate negotiations between the ‘Block 1’ licensee and licensees in the adjacent 850 MHz spectrum-licensed band to achieve the downshift of the 850 MHz spectrum-licensed band as early as possible. The licensee of the lower lot of the 900 MHz band would be the beneficiary of the downshift (Figure 5, in orange), as that licensee would hold, post-downshift, a 5 MHz lot that will not require an internal guard band.

The addition of an unlicensed 1 MHz guard band between the 850 MHz band spectrum-licensed band and the lower segment of the 900 MHz band will significantly increase the usability of that part of the 900 MHz band (Figure 5, in orange).

## Legislative context and policy environment

One of our key priorities is to manage spectrum efficiently and effectively for the benefit of all Australians.[[5]](#footnote-6) We draw on a range of legislative and administrative tools in executing these functions.

### Guiding legislation

Section 9 of the *Australian Communications and Media Authority Act 2005* (ACMA Act) sets out our spectrum management functions, including to:

manage the radiofrequency spectrum in accordance with the *Radiocommunications Act 1992*.

advise and assist the radiocommunications community.

Consistent with the spectrum management functions set out in the ACMA Act, the object of the Act is to provide for management of the radiofrequency spectrum in order to (among other objectives):

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

make adequate provision of the spectrum for use by agencies involved in the defence or national security of Australia, law enforcement or the provision of emergency services; and for use by other public or community services

provide a responsive and flexible approach to meeting the needs of users of the spectrum

encourage the use of efficient radiocommunication technologies so that a wide range of services of an adequate quality can be provided

support the communications policy objectives of the Commonwealth Government.

The draft recommendation set out in this paper is informed by and is consistent with the object of the Act.

### Principles for spectrum management

The draft recommendation also promotes the principles for spectrum management, including:

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

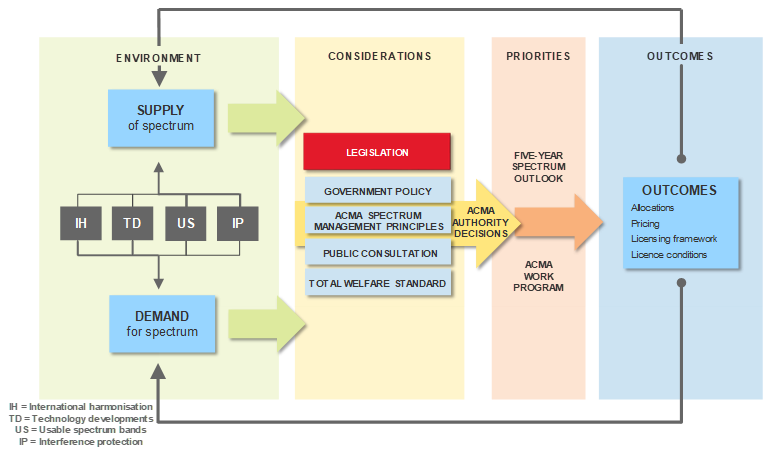
principle 3—use the least cost and least restrictive approach to achieving policy objectives

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, we consider a range of factors identified in our spectrum management decision framework (Figure 6).

The ACMA’s spectrum management decision framework



### Government communications policy objectives

The object of the Act is to provide for management of the radiofrequency spectrum in order to, among other things, support the communications policy objectives of the Australian Government. The government has set the following objectives for the allocation of the 850/900 MHz band:[[6]](#footnote-7)

supporting the deployment of 5G technologies

promoting competitive market outcomes for the long-term benefit of consumers

encouraging investment in infrastructure, including in regional Australia

supporting continuity of services

supporting a national PSMB capability.

In terms of supporting continuity of services, during the replanning process for the 850/900 MHz band, we acknowledged the concerns of incumbent apparatus licensees about service continuity for existing 3G services that rely on the 900 MHz band. The Minister has also noted the concerns regarding service continuity, stating that it is ‘important that our spectrum policy settings do not trigger a disruption in service to existing 3G customers’.[[7]](#footnote-8) The Minister stated that ‘The Government will consult with stakeholders, including incumbents and the Australian Competition and Consumer Commission, on the potential use of allocation limits to achieve the Government’s objectives’.

It was noted in the decision paper that mitigating risks to service continuity by providing incumbent 900 MHz licensees with certainty may be achieved through the use of allocation limits. In the past, when seeking to directly allocate spectrum under section 60 of the Act, the Minister’s power to set spectrum allocation limits has been considered.[[8]](#footnote-9) This approach is referred to in other countries as ‘spectrum set-asides’. As noted in the decision paper, we cannot commit to the Minister taking any particular action in any particular manner, as both the ACMA and the Minister will need to consider each action on the basis of the facts, information and circumstances at the relevant time.

## Re‑allocation process

Part 3.6 of the Act sets out the process for the re‑allocation of encumbered spectrum. The main steps of the process, including allocation, are detailed in Appendix A.

Under the Act, the Minister may make encumbered spectrum available for re‑allocation by declaring parts of the spectrum for re‑allocation by issuing spectrum or apparatus licences. Under section 153E of the Act, the Minister must not make a spectrum re‑allocation 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 in relation to that part, or those parts, of the spectrum.

Before the ACMA may make a recommendation to the Minister under section 153F of the Act, we must, under subsection 153G(1) of the Act, prepare a written notice stating that it has prepared a draft version of the recommendation and set 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 must also publish a copy of the notice on the ACMA’s website. The notice must invite potentially affected apparatus licensees to give written comments to the ACMA about the draft version of the recommendation within a specified period being at least 28 days from the date the notice was given. The ACMA must have regard to any comments received in preparing the ACMA’s final recommendation to the Minister.

The recommendation to the Minister under section 153F of the Act must include:

* the identification of the specified parts of the spectrum to be re-allocated (subsection 153F(1) of the Act)
* a suggested re‑allocation period, at the end of which incumbent apparatus licences would be cancelled (subsection 153F(2) of the Act).

The re‑allocation period must begin within 28 days of the spectrum re‑allocation declaration being made by the Minister and must run for at least two years. During this time, incumbent apparatus licensees may continue to operate radiocommunications devices in accordance with their apparatus licences. At the end of the re‑allocation period, incumbent licensees’ apparatus licences are cancelled (section 153H of the Act).

A re‑allocation declaration made by the Minister under section 153B of the Act must specify:

* for each part of the spectrum specified in the re‑allocation declaration, the geographic areas to which the declaration applies
* for each part of the spectrum specified in the re‑allocation declaration, whether the part should be re-allocated by issuing spectrum or apparatus licences
* the re‑allocation deadline that applies to the declaration.

The re‑allocation deadline sets the date by which we must have allocated at least one licence within the re-allocated spectrum. If no licence is allocated before that date, the re‑allocation declaration is taken to be automatically revoked (see section 153K of the Act). The re‑allocation deadline must be at least 12 months before the end of the re‑allocation period.

We intend to include proposals on these matters in our recommendation to the Minister.

## Proposal—terms of the draft recommendation

We have prepared a draft recommendation that the Minister make one or more spectrum re‑allocation declarations for spectrum in the 850/900 MHz band covering all of Australia, excluding the mid-west RQZ.

We consider that the arrangements proposed in the draft recommendation meet the object of the Act, including furthering the Government’s communications policy objectives for the 850/900 MHz band. A summary of the terms of the draft recommendation is at Table 2.

1. Terms of the draft recommendation

| Relevant term | The ACMA’s proposed recommendation |
| --- | --- |
| Licence type | Spectrum licences |
| Parts of the spectrum | 809–825 MHz  854–870 MHz  890–915 MHz  935–960 MHz  covering all of Australia excluding the mid-west RQZ. |
| Re‑allocation period | For the frequency ranges 809–825 MHz and 854–870 MHz, the period ending 30 June 2024.  For the frequency ranges 890–915 MHz and 935–960 MHz, the period ending 31 December 2023. |
| Re‑allocation deadline | 31 December 2022 (12 months before the end of the re‑allocation period that ends first in time). |

This paper has been prepared to assist potentially affected apparatus licensees and other interested parties to provide comments on the terms of the draft recommendation.

This paper:

briefly discusses the features of class, apparatus and spectrum licensing, and why we consider spectrum licensing to be the most suitable long-term licensing arrangement in the 850/900 MHz band.

outlines our considerations in developing our recommendation on parts of the spectrum to be re-allocated by issuing spectrum licences.

includes further detail on matters relevant to the proposed re‑allocation period and re‑allocation deadline.

discusses other matters relevant to the price-based allocation of spectrum licences.

Subject to this consultation, and to the Minister deciding to make one or more re‑allocation declarations in accordance with our proposed recommendation, we propose an allocation to be conducted in Q4 2021. It may be advantageous for stakeholders to comment on potential allocation issues at this early stage of the process.

# Licence type

Under subsection 153B(6) of the Act, the Minister’s declaration must specify whether spectrum is to be re-allocated by issuing spectrum or apparatus licences. Under either option, incumbent apparatus licensees would have their licences cancelled at the end of the re‑allocation period (see section 153H of the Act).

Under subsection 153F(3) of the Act, when the ACMA gives the Minister a recommendation to make a spectrum re‑allocation declaration, the ACMA may include a recommendation about any matters we consider appropriate. While we are not required to make a recommendation to the Minister about licence type, we intend to recommend that the 850/900 MHz band should be re-allocated by issuing spectrum licences.

Under the Act, it is unlawful to operate a radiocommunications device in Australia unless it is authorised by a radiocommunications licence. We 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:

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 across a defined access area

whether all likely future high-value uses can be accommodated in a single technical framework.

Class licences provide broad spectrum access arrangements that are open to all users and generally operate on the basis that users are not provided with protection from interference. They are made by legislative instrument, authorising anyone who complies with the requirements of that instrument to operate a particular radiocommunications device without the need to apply to the ACMA or be issued an individual licence. These requirements may relate to the type of radiocommunications device that can be used, the technical parameters that apply and for what purposes it may be operated.

Apparatus licences are a type of individual authorisation that may be issued to a person to authorise the operation of a radiocommunications device. Apparatus licences are the most common kind of licence we issue. Most commonly, they authorise the licensee to use a specified device in a specified frequency range, generally at a specified location and to provide a particular type of service. However, they may also authorise operation of a number of devices in an area under a single licence. Apparatus licences are generally issued in response to an application made in the approved form, and are assessed on a case-by-case basis. They may be issued for terms of up to five years and most may be transferred subject to our approval.

Spectrum licences authorise the use of a specified frequency range anywhere within a specified geographic area. While the technical framework for the spectrum band may be optimised for a particular use, licensees are free to operate radiocommunications devices in this spectrum space for any service that satisfies the conditions of the licence and technical framework for the band. Spectrum-licensing arrangements provide a technology-flexible path to upgrading services in response to evolving standards. The maximum term of a spectrum licence is 15 years, and they are tradeable in full or in part.

## Preferred licence type for the 850/900 MHz band

In Australia, mobile broadband services have tended to be deployed under spectrum licences because they provide significant flexibility and certainty for planning and operating communication networks.

Spectrum-licensing arrangements provide longer tenure than apparatus licences. The deployment of mobile networks, including 4G and 5G networks, can be expected to require significant infrastructure investment. We consider that spectrum licensing arrangements would be better suited than apparatus licensing. Longer term spectrum licence arrangements will provide industry with long-term certainty to encourage operators to invest in and deploy telecommunications infrastructure across Australia, including in regional areas, to deliver mobile broadband services. The introduction of spectrum licensing in the 850/900 MHz band would therefore promote the Government’s communications policy objectives for the band.

We also consider that the trading flexibility inherent in spectrum licensing is particularly desirable in the 850/900 MHz band because it facilitates market-driven optimisation of the bands (that is, the 1 MHz downshift), potentially without the need for further regulatory intervention.

In previous consultation processes, incumbent licensees supported the introduction of spectrum licensing in the 900 MHz band. They further supported a combined allocation of the 850 MHz expansion band with the 900 MHz band.

We therefore consider that spectrum licensing is the most appropriate licence type for the allocation of spectrum in the 850/900 MHz band.

### Licence type for the 850/900 MHz band

The ACMA proposes to recommend that the 850/900 MHz band be re-allocated by issuing spectrum licences (as described in the section 153G notice).

# Specified parts of the spectrum

The ACMA may give the Minister a recommendation to make a spectrum re‑allocation 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, we consider a range of 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 re‑allocation.

These matters are not exhaustive and we may take other issues into consideration when determining an appropriate recommendation.

## Frequency boundaries

In Australia, a number of sub-1 GHz frequencies have been spectrum licensed with technical frameworks that are optimised for mobile broadband services: the 700 MHz band (703–748 MHz and 758–803 MHz) and the 850 MHz spectrum‑licensed band (825–845 MHz and 870–890 MHz). The 850/900 MHz band is the only remaining internationally harmonised sub-1 GHz wireless broadband band yet to be spectrum licensed and optimised for mobile broadband services in Australia.

Re‑allocating the 850/900 MHz band would enable contiguity between the 850 MHz expansion band and the adjacent 850 MHz spectrum‑licensed band. We consider it is important to remove regulatory impediments to achieving the downshift of 850 MHz spectrum licences. As the downshift frequencies are currently apparatus licensed, we have included the downshift frequencies in the draft re‑allocation recommendation to facilitate the downshift.

We therefore consider that the whole 850/900 MHz band should be subject to re‑allocation by issuing spectrum licences.

**Frequency boundaries in the 850/900 MHz band**

The ACMA proposes to recommend that the Minister declare for re‑allocation the following frequency ranges:

> 809–825 MHz

> 854–870 MHz

> 890–915 MHz

> 935–960 MHz.

## Geographic areas

A range of factors are relevant in deciding the geographic area(s) that should be re‑allocated, including the expected use of the spectrum and technical characteristics of the band.

We expect that there is likely to be demand for 4G and 5G services throughout Australia. Consumers have an expectation that they will be able to access mobile services wherever they travel in Australia, and sub-1 GHz spectrum is well-suited to providing that wide-area coverage. A geographic area to be proposed for re‑allocation should not impede a roll out of Australia-wide services, particularly given the government’s communications policy objective of encouraging investment in infrastructure, including in regional Australia.

The propagation characteristics of the 850/900 MHz band make it suitable for provision of wide area mobile broadband services. This is reflected in the fact that the current 900 MHz band apparatus licences authorise deployments throughout Australia. In addition, the adjacent 850 MHz band is spectrum licensed on an Australia-wide basis and is used to provide mobile broadband services.

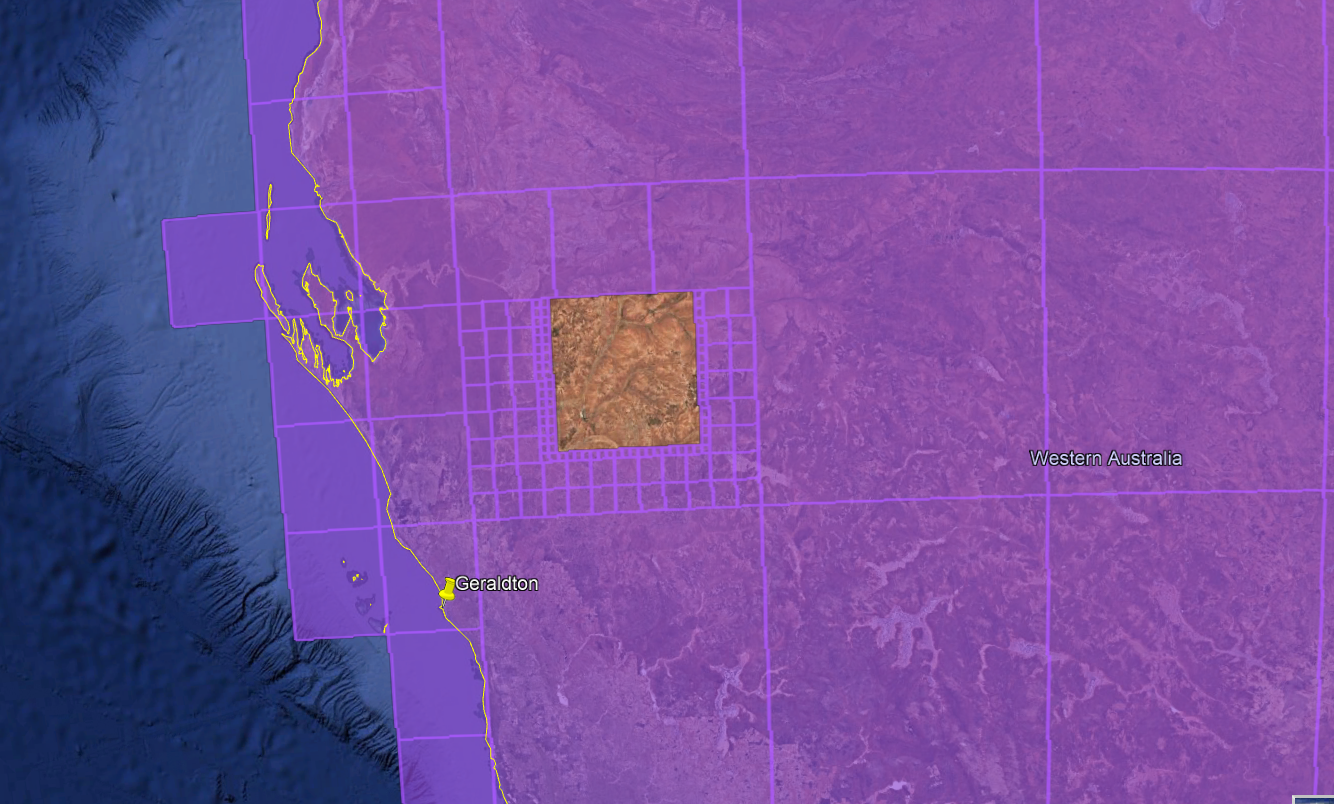
We also note that for the future downshift of the 850 MHz band spectrum licences to occur, it is necessary to align the geographic areas of the 850/900 MHz bands with that of the adjacent 850 MHz spectrum-licensed band.

We consider that the highest value use of the spectrum would be best achieved by re‑allocating the 850/900 MHz band across the whole of Australia.

## Mid-west Radio Quiet Zone

The ACMA maintains the mid-west RQZ in remote Western Australia to provide conditions suitable for radioastronomy research. The mid-west RQZ is located near Boolardy Station, around 300 km north-east of Geraldton, in a sparsely populated area of Australia (Figure 7). In this area, all radio emissions are minimised in order to enable the use of highly sensitive radio telescopes, which operate over a very wide range of frequencies.

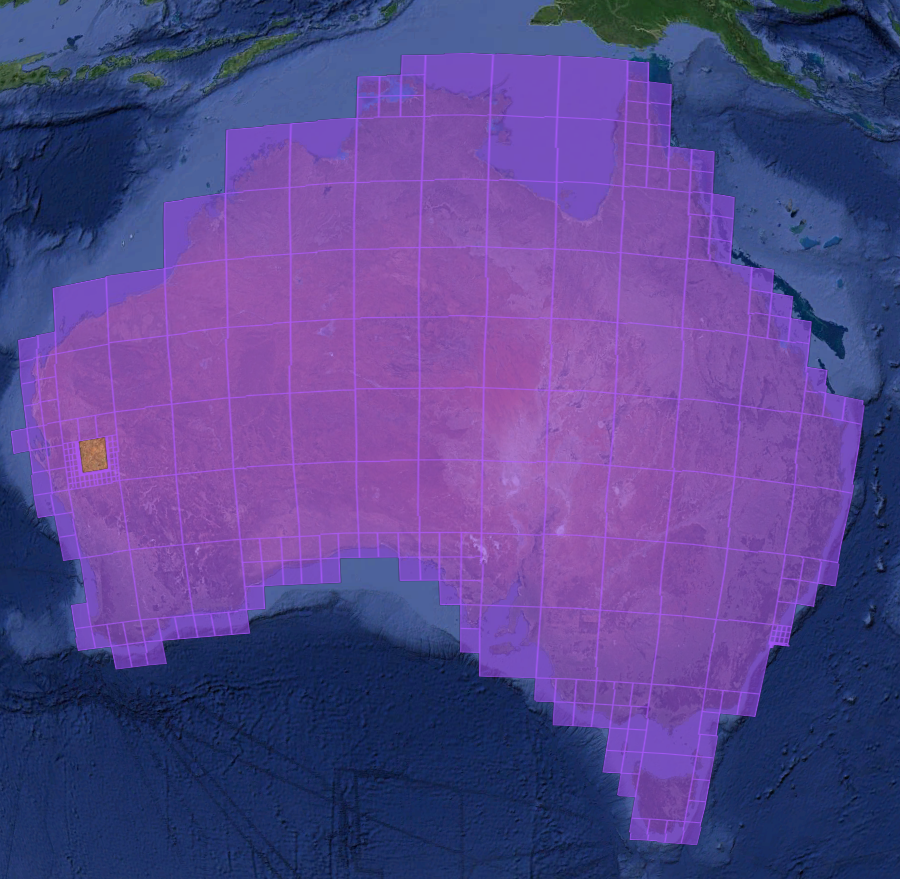
1. Mid-west RQZ



The mid-west RQZ serves an important public interest that requires particular attention to ensure it is protected from interference. Currently, this protection is set out in the [*Radiocommunications (Mid-West Radio Quiet Zone) Band Plan 2011*](https://www.legislation.gov.au/Series/F2011L01520), as well as the ACMA’s Radiocommunications Assignment and Licensing Instruction (RALI) [MS32](https://www.acma.gov.au/publications/2019-08/publication/rali-ms32-mid-west-radio-quiet-zone) and [Embargo 41](https://www.acma.gov.au/publications/2019-10/rules/embargo-41) documents. These policies place an ‘embargo’ on the ACMA issuing new licences for all frequencies from 70 MHz to 25.25 GHz within the inner ‘restricted’ zone of the RQZ, up to a 70km radius from the RQZ centre. The outer ‘coordination’ zone of the RQZ requires new operators of radio emitting devices in this area to coordinate with the CSIRO to ensure that their signal strength is below prescribed power thresholds when measured at the RQZ centre.

We propose to exclude the inner ‘restricted’ zone of the mid-west RQZ from any re‑allocation recommendation to provide continued protection to the site.

1. Indicative map of the geographic area of Australia



**Geographic areas for spectrum licensing in the 850/900 MHz band**

The ACMA proposes to recommend that the 850/900 MHz band be re-allocated across all of Australia, excluding the mid-west RQZ (‘the Australia-wide area’) (Figure 8).

HCIS identifiers for the Australia-wide area can be found in the section 153G notice.

# Re‑allocation period and deadline

When the ACMA gives the Minister a recommendation to make a spectrum re‑allocation declaration, we must specify the period that, in our opinion, the declaration should identify as the re‑allocation period. Under subsection 153B(4) of the Act, the re‑allocation period must begin within 28 days of the declaration being made, and run for at least two years.

The re‑allocation period sets the timeframe during which the re‑allocation process is to be conducted. During this time, incumbent apparatus licensees may continue to operate radiocommunications devices under their licences. Under section 153H of the Act, at the end of the re‑allocation period, any apparatus licensees still in the re‑allocated spectrum will have their apparatus licences cancelled.

If the Minister makes a spectrum re‑allocation declaration, they must specify the re‑allocation period and a re‑allocation deadline. The ACMA must allocate at least one licence for the spectrum subject to re‑allocation before the re‑allocation deadline, or the Minister’s declaration is taken to be revoked. The re‑allocation deadline must be at least 12 months before the end of the re‑allocation period. More detail about the re‑allocation process is at Appendix A.

Under subsection 153F(3) of the Act, when the ACMA gives the Minister a recommendation to make a spectrum re‑allocation declaration, we can include a recommendation about any matters we consider appropriate. We will propose to include a suggested re‑allocation deadline in our recommendation to the Minister.

Before recommending a re‑allocation period, we consider:

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 the spectrum licences will be in a position to utilise the spectrum.

## Existing services in the 850 MHz expansion band and the 2 x 1 MHz downshift frequencies

Existing services in the 850 MHz expansion band and the 2 x 1 MHz downshift frequencies include fixed point-to-point services, point-to-multipoint services and land mobile services.[[9]](#footnote-10) The long-term strategy provides for band clearance to be completed by 30 June 2024, in accordance with the arrangements in RALI MS40.

## Existing services in the 900 MHz band

The 900 MHz band is currently apparatus licensed to Telstra, Optus and VHA in 8.4 and 8.2 MHz blocks (see Figure 4). These licences are currently used to provide 3G mobile broadband services. These licences may be renewed for one year at a time.[[10]](#footnote-11)

## Re‑allocation period

### The 850 MHz expansion band and the downshift frequencies

Given that a clearance process is underway in the wider 800 MHz band and will continue until mid-2024, we do not consider that the minimum two-year re‑allocation period is appropriate for the 850 MHz expansion band and the downshift frequencies.

We consider that incumbent apparatus licensees in the 850 MHz expansion band and the downshift frequencies have made plans based on the expectation that their licences would not be cancelled before the end of the current clearance process set out in the RALI MS40.

If the Minister makes a re‑allocation declaration for the 850 MHz expansion band and the 2 x 1 MHz downshift frequencies, then any apparatus licensees remaining in the band would have their licences automatically cancelled at the end of the re‑allocation period.

We therefore consider the end of the re‑allocation period for the 850 MHz expansion band and the downshift frequencies should align with the predicted end of the clearance process. That is, the re‑allocation period should end on 30 June 2024.

### The 900 MHz band

Based on previous stakeholder consultation, we anticipate that incumbent licensees in the 900 MHz band may be potential participants in any future spectrum licence allocation process. However, as shown in Figure 5, proposed lots do not align exactly with current arrangements. If some, or all the incumbent licensees were successful in acquiring spectrum licences, then they would need time to transition to the new arrangements. However, this time is not expected to be as long as the time for incumbents to relocate from the 850 MHz band. A shorter re‑allocation period may therefore be appropriate in the 900 MHz band.

We therefore consider that the re‑allocation period for the 900 MHz band should end on 31 December 2023.

## Re‑allocation deadline

The re‑allocation deadline sets the date by which the ACMA must have allocated at least one licence in the spectrum subject to a re‑allocation declaration. If no licence is allocated by this date, the re‑allocation declaration is automatically revoked. The re‑allocation deadline must be at least 12 months before the end of the re‑allocation period specified in the relocation declaration.

We intend to recommend the re‑allocation deadline to be set for the 850 MHz expansion band, 2 x 1 MHz downshift frequencies and the 900 MHz band at 12 months before the end of the re‑allocation period that ends first in time, being 31 December 2023. This would make the re‑allocation deadline 31 December 2022. This provides us with the longest possible time to allocate spectrum licences in the 850/900 MHz band but does not preclude an allocation before the deadline, as is currently planned (see Table 5). We note that in accordance with the current [*Five-year spectrum outlook*](https://www.acma.gov.au/publications/2019-09/publication/five-year-spectrum-outlook-2019-23) *2019–23*, subject to the Minister making a re‑allocation declaration, the allocation will occur in Q4 2021.

**Re‑allocation period and deadline**

The ACMA proposes to recommend a re‑allocation period ending on 30 June 2024 for the 850 MHz expansion band and downshift frequencies, and a re‑allocation period ending on 31 December 2023 for the 900 MHz band.

The ACMA proposes to recommend a re‑allocation deadline for the 850 MHz expansion band, the downshift frequencies, and the 900 MHz band of 12 months before the end of the re‑allocation period that ends first in time (12 months before 31 December 2023), namely, 31 December 2022.

# Other matters

If the Minister declares the 850/900 MHz band for re‑allocation Australia-wide in line with our proposed recommendation, then we will conduct a price-based allocation of the re-allocated spectrum.

We have given preliminary consideration to matters relevant to a price-based allocation of the spectrum in the 850/900 MHz band, including:

how the spectrum would be packaged for allocation (the lot configuration)

the spectrum licence term

how the spectrum would be allocated (the allocation methodology).

Subject to this consultation, and to the Minister accepting our final recommendation, we would seek to ensure that the allocation of spectrum licences in the 850/900 MHz band is undertaken in a timely manner. Therefore, we are taking this opportunity to invite early comments on these matters.

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

Our objective is to configure the spectrum to promote its efficient allocation and use. In facilitating this objective, we must ensure that the lot configuration does not unduly limit or dictate market outcomes, or hinder competition between auction participants.

## Frequency bandwidth configuration

### Spectrum demand

We consider that spectrum in the 850/900 MHz band would be principally used for the delivery of wide-area services such as mobile broadband. Mobile network operators currently hold spectrum licences in the adjacent 850 MHz band. The 850/900 MHz band may be attractive to adjacent licensees due to the opportunity to acquire larger, contiguous spectrum holdings in the sub-1 GHz space.

We therefore consider that demand may come from existing mobile network operators and/or new market entrants to the telecommunications industry for the deployment of mobile broadband networks.

### Bandwidth configuration options

If the Minister accepts our proposed recommendation to re-allocate the 850/900 MHz band for spectrum licensing, there would then be 82 MHz of spectrum on offer throughout Australia. Should the Minister decide to set aside 2 x 5 MHz of spectrum for a PSMB network in accordance with the negotiations underway through COAG, there would be 72 MHz of spectrum on offer throughout Australia.

We consider that the highest value use for the 850/900 MHz band will be for the deployment of mobile broadband services. Therefore, this spectrum will be optimised for mobile broadband use.

Based on current standards, we consider that to achieve the optimal configuration for mobile broadband services, the band should be configured consistently with 5 MHz‑based frequency division duplex (FDD) blocks.[[11]](#footnote-12) Available channel sizes for the deployment of internationally harmonised 4G networks include 1.4 MHz, 3 MHz, 5 MHz and multiples of 5 MHz thereafter. While some mobile technology standards provide for channels smaller than 5 MHz, efficiency suffers, and the level of throughput adds little to the overall capacity of a network.

Subject to any allocation limits, participants in the allocation process are likely to seek to acquire multiple contiguous 5 MHz lots. They may also seek to acquire further spectrum after allocation through trading, as the efficiency of network deployment increases the wider the channel deployed. This is referred to as aggregation benefits, or complementarities.

As a result of these aggregation benefits, it may be possible to configure the lots as multiples of 5 MHz, for example in 2 x 10 MHz or 2 x 15 MHz lots. This configuration would result in three or four lots of spectrum available at auction. However, we consider that this configuration may preclude a more efficient outcome, including an outcome that may include four or more winning bidders. Further, we consider that larger lots may preclude a potential bidder from participating in the auction if it is seeking smaller spectrum holdings.

We consider that the 2 x 1 MHz lot of downshift frequencies (Lot 4 in Table 3) should be allocated with the lower lot in the 900 MHz band (Lot 5 in Table 3) in order to facilitate the future downshift of 850 MHz spectrum licences.

### Proposed bandwidth lot configuration

In previous consultation on the long-term strategy and the decision paper, we proposed spectrum in the 900 MHz band be configured into 5 MHz paired lots. We further suggested that spectrum in the 850 MHz expansion band should also be configured into 5 MHz paired lots in accordance with the latest 3GPP standards.

Based on the results of previous consultations and the considerations outlined above, we remain of the view that spectrum across the 850/900 MHz band should be offered as paired 5 MHz lots. The downshift frequencies should be allocated with the lot on the lower end of the 900 MHz band (Lot 5). Table 3 outlines the proposed frequency lot configuration for the 850/900 MHz band.

On balance, we consider this to be the most effective configuration as it would facilitate the efficient deployment of both 4G and 5G networks.

1. Proposed frequency bandwidth configuration

| Lot number | Frequency range (MHz) | Channel size (MHz) | Band |
| --- | --- | --- | --- |
| 1\* | 809–814 | 5 | 850 MHz expansion |
| 854–859 | 5 |
| 2\* | 814–819 | 5 | 850 MHz expansion |
| 859–864 | 5 |
| 3\* | 819–824 | 5 | 850 MHz expansion |
| 864–869 | 5 |
| 4\*\* | 824–825 | 1 | Downshift frequencies |
| 869–870 | 1 |
| 5\*\* | 890–895 | 5 | 900 MHz |
| 935–940 | 5 |
| 6 | 895–900 | 5 | 900 MHz |
| 940–945 | 5 |
| 7 | 900–905 | 5 | 900 MHz |
| 945–950 | 5 |
| 8 | 905–910 | 5 | 900 MHz |
| 950–955 | 5 |
| 9 | 910–915 | 5 | 900 MHz |
| 955–960 | 5 |

\* Should spectrum be set aside for a PSMB network, one of these lots may not be included in the re‑allocation process.

\*\* We propose to allocate lots 4 and 5 together. It is expected that the 2 x 1 MHz lot may be used by the licensee of Lot 5 to facilitate the downshift as illustrated previously.

**ACMA’s preferred view**

On balance, the ACMA remains of the view that spectrum across the 850/900 MHz band should be offered in paired 5 MHz lots. The ACMA proposes to allocate Lot 4 (2 x 1 MHz) with Lot 5 to facilitate a future downshift of spectrum licences in the adjacent 850 MHz spectrum‑licensed band.

We invite comments from stakeholders on this preliminary view.

## Geographic lot configuration

We have used a number of different approaches to define spectrum lots according to geographic regions. The approaches have varied from offering geographically disaggregated lots (lots covering discrete areas, such as each metropolitan city or a defined regional area), through to a single lot covering all of the geographic areas available for allocation.

Our approach to defining the geographic areas of lots will be informed by the potential bidders’ expected use of the spectrum. For example, if likely bidders are seeking to provide services across a national market, then it may be appropriate to offer nationwide lots. Alternatively, if some bidders are interested in only deploying networks in a few areas, then it may be preferable to define lots on a regionally disaggregated basis, in order to allow them to purchase the spectrum in areas consistent with their business plan. Our approach to determining geographic lot configuration is further informed by the Government’s stated policy objectives of promoting competitive market outcomes and encouraging infrastructure investment.

We anticipate that the bidders are likely to replicate the coverage of current networks and roll out additional coverage where people work, live or travel. Consistent with it being a national market, the current use of the 900 MHz-based networks is effectively nation-wide. Relevantly, when considering the downstream market for the purposes of advising the Minister on allocation limits, the ACCC typically refers to the mobile services market as a national market.[[12]](#footnote-13) However, it remains a possibility that regionally-focused suppliers may be interested in participating in the allocation. If so, regionally disaggregated lots may be appropriate.

In considering how spectrum should be configured into lots for sale, we also take into account the propagation characteristics of the spectrum. In the case of the 850/900 MHz band, the propagation characteristics are such that signals are transmitted over wide areas without significant attenuation of that signal. This means that operation of devices deployed close to the edge of the geographical boundary of a licence may create a significant risk of unacceptable interference to the adjacent licensee. Management of this risk may mean that licensees simply cannot operate close to such a boundary, resulting in areas without service coverage or ‘dead zones’.

In addition, a high level of regional disaggregation can introduce significant complexity to the allocation, with bidders being required to formulate valuations and bidding strategies for a large number of lots. There is also some risk that prospective licensees may not acquire all geographic areas crucial to their business plans.

We must therefore balance the flexibility that might arise from offering regionally disaggregated lots at an allocation, with the risk of dead zones (and consequent consumer detriment) near licence boundaries and increased allocation complexity.

We have considered three geographic configuration options for the allocation of the 850/900 MHz band. All options cover a relatively large geographic area. We do not consider options with smaller geographical areas are feasible in the 850/900 MHz band. Given the propagation characteristics of the spectrum, small areas would create a risk of significant technical inefficiency if a bidder acquired geographically non-contiguous lots, with the potential for a number of dead zones.

### Option 1: A single Australia-wide lot

A single Australia-wide lot would cover the geographic area of the entirety of Australia with the exception of the mid-west RQZ.

Due to the propagation characteristics of the 850/900 MHz band, the cost of building and maintaining mobile networks over large areas may be significantly reduced (for example, by reducing the number of base stations required to service a large area compared to providing a similar service using higher frequency bands). In addition, to manage the risk of unacceptable interference to adjacent licensees, an Australia-wide lot would eliminate the risk of licensees creating dead zones in their licensed areas.

Under a regionally disaggregated lot configuration, there is a risk a prospective licensee may only win a subset of their desired lots at a $/MHz/pop price beyond what they are willing to pay for that subset, as the $/MHz/pop price of their bids was likely to be predicated on obtaining the desired set of lots. An Australia-wide lot, therefore, reduces regional exposure risk for bidders wishing to deploy a nationwide network.

However, prospective licensees seeking to provide services in a particular geographic area would be forced to acquire a lot that also covered unwanted areas. This may mean that those unwanted areas are denied services. There is also a possibility that Australia-wide lots may discourage some potential licensees from participating in the allocation process because their commercial interest relates only to discrete geographic areas.

### Option 2: Large geographic areas

The spectrum could also be divided into a few relatively large geographic areas for allocation, such as areas approximating states and territories. Such an option would suit prospective licensees who were interested in only a localised deployment of their services. For example, if a prospective licensee only wanted to deploy services in South Australia, they would be able to purchase spectrum only in South Australia.

Creating several large lots, however, would increase region-based exposure risk for potential bidders who are seeking national coverage because they may not be successful in acquiring lots across all desired areas. This may affect network rollout and provision of services to the end user. This risk is considered significant in the 850/900 MHz band, where a number of prospective licensees are expected to seek to deploy services on a national basis.

Lots covering large geographic areas are likely to create dead zones at the edges of the geographic boundaries, due to interference management measures. However, boundaries may be placed away from major population centres in order to mitigate the impact of dead zones on consumer service delivery.

This option would also increase complexity in the allocation due to the larger number of lots on offer.

### Option 3: Smaller geographic areas

The spectrum could also be divided into a somewhat larger number of smaller lots for allocation, such as separate metropolitan and regional areas. For example, state and territory capital cities could be offered as separate lots, with remaining areas divided into something approximating states and territories. For example, this would enable a bidder to seek spectrum holdings in Brisbane, regional Queensland, Sydney, Canberra and regional New South Wales.

Like Option 2, prospective licensees would have the option to only bid for the lots with those geographic areas that align with their commercial interest. This option may facilitate deployment of services in discrete areas, such as regional-only services.

It may, however, result in potential bidders seeking only those lots with dense populations—such as in capital city areas—which may result in reduced service delivery in regional areas. This option also increases region-based exposure risk for potential bidders seeking to cover an entire state or all of Australia.

While this option may facilitate deployment of services in particular areas, it may create a risk of reduced service deployment in some areas and a greater number of dead zones around geographic boundaries.

This option would also increase complexity in the allocation due to the larger number of lots on offer.

**ACMA’s preferred view**

On balance, the ACMA’s preferred view is that a single Australia-wide lot excluding the mid-west RQZ would be the most appropriate configuration for the 850/900 MHz band allocation. The ACMA considers this configuration would allow future users of this spectrum to make best technical and economic use of the 850/900 MHz band.

We welcome submissions from stakeholders on the most appropriate geographic configuration for the spectrum.

## 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 and our predecessor agencies have been for 15 years.

In considering spectrum licence terms, we also have regard to the expiry dates of licences in adjacent spectrum-licensed bands, if any. Where possible, we would generally seek to align expiry dates with such adjacent bands to facilitate options for defragmentation or licence consolidation at licence expiry.

Longer licence terms maximise investment certainty for licensees in the band. The provision of mobile broadband services, as is expected in the 850/900 MHz band, requires significant infrastructure investment. As such, a long licence term may be appropriate because it maximises the period over which licensees can be assured of obtaining a return on that investment.

In the case of spectrum licences in the 850/900 MHz band, spectrum licences in the adjacent 850 MHz band expire in 2028. If expiry of 850/900 MHz band spectrum licences were aligned with expiry of the adjacent 850 MHz band spectrum licences, then this would likely result in a maximum potential spectrum licence term of less than seven years. We consider this licence term insufficient to provide prospective licensees with the required certainty of tenure for deployment of mobile broadband services within this spectrum.

An exception to this proposed approach relates to the downshift frequencies.[[13]](#footnote-14) We intend for the downshift of the 850 MHz band spectrum licences to occur by the time the licences expire in 2028 at the latest. The licence term of the downshift frequencies should align with the expiry of 850 MHz band spectrum licences to facilitate the downshift (if it has not been achieved through commercial negotiation prior to this date).

On balance, we consider that licences in the 850/900 MHz band should be issued for the maximum possible term of 15 years. Licences for the 2 x 1 MHz downshift frequencies should be issued with an expiry of 17 June 2028.

### Licence commencement

In determining the most appropriate commencement date for a spectrum licence, we would consider the extent of incumbency in the band.

As noted above, a spectrum licence can be issued for a term of up to 15 years. During a re‑allocation period, incumbent apparatus licensees may continue to operate. A spectrum licence issued before the end of the re‑allocation period will usually be subject to a condition that it may only operate if it can do so without causing interference to apparatus licensees in the band. If there are a number of apparatus licences in the area covered by a spectrum licence, then this requirement may have the practical effect of precluding the spectrum licensee from operation in those encumbered areas until the end of the re‑allocation period.

Under these circumstances, and on the assumption of a 15-year spectrum licence term, if the term commenced before the end of the re‑allocation period, then the ‘usable term’ of the spectrum licence would be less than 15 years. This could be seen as a spectrum licensee having to pay for a licence period that they are not able to fully use.

This may have implications for how prospective spectrum allocation participants value the spectrum on offer. For example, if prospective spectrum licensees knew they must coexist with incumbent apparatus licensees for the first two years of the spectrum licence term, then they might value the licence as if it had a term of 13 years rather than 15 years at auction, depending on the extent of incumbency.

Determining the value of a spectrum licence with a shorter usable term may be less challenging if the degree of incumbency is uniform across all the spectrum that is to be spectrum licensed. If incumbency issues are not uniform, then one spectrum licence may have a usable term of 13 years while another has a usable term of 15 years. This may create challenges for prospective spectrum allocation participants in establishing the market value of a licence.

Where the degree of incumbency is not uniform, we consider that it may be appropriate for a spectrum licence to commence at the end of the re‑allocation period. At a minimum, we consider that spectrum licences should commence when the majority of incumbent apparatus licensees can be expected to have relocated from the band and the ‘usable term’ is close or equal to the actual licence term.

As the degree of incumbency differs between the 850 MHz expansion band and the 900 MHz band, we consider it appropriate to propose two different licence commencement dates for licences issued in the two bands.

#### The 850 MHz expansion band

In the case of the 850 MHz expansion band, the clearance schedule in the long-term strategy and RALI MS40 is such that the incumbent apparatus licences will likely only be partially cleared by mid-2021, and fully cleared by 30 June 2024. The downshift frequencies (proposed to be allocated with the lower 900 MHz band lot) will also likely not be cleared of incumbent apparatus licensees until 30 June 2024.

We are working towards an allocation of spectrum licences in Q4 2021. Due to the extent of incumbency in the 850 MHz expansion band, we do not suggest that spectrum licences should commence immediately after allocation, as spectrum licensees may not be able to commence deployment in the band until after the clearance process has concluded, expected in mid-2024.

Further, we consider that licence commencement in 2024 would result in the expiry of licences in 2039 (should spectrum licences be issued for a 15-year period). This would facilitate a potential future alignment of expiry dates with licences in the adjacent 850 MHz spectrum-licensed band.

On balance, our preliminary view is for spectrum licences in the 850 MHz expansion band to commence on 1 July 2024. We may consider requests for early access from spectrum licensees who are able to satisfy to us that special circumstances justify the issuing of apparatus licences (as permitted by subsection 153P(2) of the Act) in parts of the band that are cleared prior to the licence commencement date.

#### The 900 MHz band and the downshift frequencies

There is no equivalent clearance schedule for the 900 MHz band. Incumbency in the band is limited to Optus, Telstra and VHA (Figure 4). As noted above, based on previous stakeholder consultation, we anticipate that these incumbent licensees in the 900 MHz band may be potential participants in any future spectrum licence allocation process.

Given the limited incumbency of the band and the possibility that incumbent licensees may be potential participants in any future spectrum licence allocation, we consider that it may be possible for successful 900 MHz band licensees to commence services in the band soon after the allocation process. This would be facilitated if new spectrum licences commenced immediately after allocation.

As the downshift frequencies are proposed to be allocated with the lower segment of the 900 MHz band, we consider that licence commencement for that spectrum should align with that of the 900 MHz band. Any service deployment within the downshift frequencies would be subject to the degree of incumbency within those frequencies.

On balance, our preliminary view is that spectrum licences in the 900 MHz band and the downshift frequencies should commence as soon as possible after the conclusion of the allocation process, rather than at the end of the re‑allocation period.

**ACMA’s preferred view**

On balance, the ACMA’s preferred view is that spectrum licences in the 850/900 MHz band should be issued for the current maximum term of 15 years. This is with the exception of a licence for the downshift frequencies, which the ACMA considers should be issued for a term that expires on 17 June 2028 (aligning with the expiry date of the existing spectrum licences in the adjacent 850 MHz band).

The ACMA further considers that it may be appropriate for spectrum licences in the 850 MHz expansion band to commence at the end of the re‑allocation period, on 1 July 2024, and for spectrum licences in the 900 MHz band and downshift frequencies to commence as soon as possible after the allocation process is complete.

We welcome stakeholder views on licence terms and commencement dates for 850/900 MHz band spectrum.

## Allocation methodology

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

As noted above, in allocating spectrum, the ACMA is guided by the object of theAct, the most relevant parts being to:

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

support the communications policy objectives of the Australian Government.

When demand is likely to be greater than supply, market-based allocation (by auction or tender) is considered more appropriate than allocation by a pre-determined or negotiated price. Market-based allocation has been shown to facilitate the efficient allocation of spectrum in contexts where demand is expected to be significant, but it is uncertain which parties represent the highest value users. Market-based allocation is intended to ensure that the available spectrum is allocated to those bidders who value it the most.[[14]](#footnote-15)

We consider that there is likely to be significant demand for spectrum in the 850/900 MHz band. We consider that it is likely that participants in the allocation will include mobile network operators seeking to deploy mobile broadband services in the spectrum, such as the incumbent apparatus licensees in the 900 MHz band. We therefore consider that a market-based allocation will be appropriate for the 850/900 MHz band allocation.

We further consider that auctions provide a simple and transparent method of allocating spectrum where there is competing demand either in the aggregate or for individual lots. Auctions can be conducted using a wide variety of methodologies. Methodologies which could be used for an 850/900 MHz allocation are the simple clock auction (SCA), simultaneous multi-round ascending (SMRA) auction, two-stage auction with generic lots and package bidding formats such as the combinatorial clock auction and the sealed bid combinatorial auction.

### Option 1: Simple clock auction

In a simple clock auction (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 bids at least the continue price or all bidders have exited, 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.

The SCA performs best where demand for the lots on offer is largely independent. The SCA is most suited where bidders are unlikely to consider the products on sale to be substitutable or complementary to one another.

### Option 2: Standard simultaneous multi-round ascending auction

In simultaneous multi-round ascending (SMRA) auctions, multiple spectrum lots are offered simultaneously, and bids are made on individual lots. These can be contrasted with auction formats that enable ‘package bids’, such as the combinatorial clock auction format used by the ACMA in the digital dividend auction in 2013.

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.

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.

### Option 3: Two-stage auction with generic lots

It is also possible to utilise variations to the standard SMRA auction format. For example, a simple change 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.

We used a two-stage auction for the allocation of 3.6 GHz spectrum in late 2018.[[15]](#footnote-16) This format involves the allocation of frequency-generic lots for each area in the first stage (known as the allocation stage), followed by an assignment stage that determines the specific frequency ranges awarded to each winning bidder from the first stage.

The two-stage auction with generic lots simplifies the bidding process relative to the standard SMRA auction format. The proposed two-stage auction with generic lots has no concept of a ‘standing high bidder’ or of ‘holding lots’. For a given product, the price will continue to increase for each round while demand exceeds supply. During a round, bidders may bid on all products available in the auction, subject to any allocation limits and eligibility requirements. At the end of a round, the auction system processes all bids from all bidders. If demand exceeds supply for any product, the auction continues to the next round. The primary stage concludes when there is no excess demand across all products.

The next stage, an assignment stage, determines the specific frequency ranges awarded to each winning bidder from the first stage. While there is no requirement for a bidder to bid during the assignment stage, this stage gives bidders the opportunity to submit additional bids, at prices they choose, to express their preferences for particular frequency assignments for each region. In the 3.6 GHz band auction, the assignment prices for the winning frequency range option were calculated using a form of second-price rule referred to as nearest Vickrey core pricing.[[16]](#footnote-17)

The use of generic lots in the primary stage is likely to improve substitution, reduce risk of fragmentation, and simplify bidding strategy. This approach reduces the exposure risk relative to the standard SMRA auction format and generally results in a faster auction with fewer bidding rounds.

### Option 4: Package bidding formats

There are a number of auction formats that enable bidders to place bids on packages of lots, known as combinatorial formats. The combinatorial clock auction (CCA) format used by the ACMA in the digital dividend auction is a well-known example of a combinatorial format.

#### Combinatorial clock auction

The combinatorial clock auction (CCA) is a two-stage auction with a clock stage and an 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. A bidder can indicate the quantity of lots they desire in one product subject to their demand in the other product.

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 format that was used in the 700 MHz and 2.5 GHz (digital dividend) auction also featured a final ‘assignment round’.

In the clock stage, the CCA format uses complex second-price rules, which can consequently introduce incentives to bid strategically and possibly disadvantage weaker bidders. The price paid by each winning bidder is based on others’ bids, with safeguards to ensure winners pay a competitive price. Further, 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.

#### Combinatorial multi-round auction

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 can submit multiple bids on packages and prices rise on those lot categories 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.

#### Sealed-bid combinatorial auction

The sealed bid combinatorial auction (SBCA) format requires bidders to submit bids for all the possible combinations of lots they are interested in, in ‘one shot’. That is, they submit all bids at once, with a single price associated with each bid. The bids are mutually exclusive (the auctioneer only selects one bid per bidder). The combination of bids that yields the highest value are the successful bids and after that is determined, the auctioneer announces the successful bidders.

Pricing in such an allocation can be either first price, where the winning bidder pays their bid, or second price, where the winning bidder pays the highest value that other bidders were willing to pay for the spectrum. First price provides for a simple pricing rule, but creates incentives for bidders to shade their bids, where a bidder places a bid that is below their true valuation. Alternatively, second pricing runs into the same issues identified above in the discussion on the CCA (creating incentives for strategic bidding and disadvantage weaker bidders). 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 SBCA 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 possible combinations of lots requiring bids 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.

### Exposure risk

In the case of the 850/900 MHz allocation, consideration of exposure risk and strategic demand reduction will be important in selecting the most appropriate format.

In non-combinatorial auction formats, including the SMRA and the two-stage auction noted above, bidders can be exposed to winning only a subset of their required spectrum at prices beyond their willingness to pay. Exposure risk is a concern where there are strong complementarities between products on offer.

In the case of the 850/900 MHz band, the complementarities between the lots on offer are expected to be very strong. That is, the value of acquiring contiguous holdings is high, so bidders will consider blocks more valuable when acquired together than separately. There are also relatively few lots on offer.

The exposure problem increases in significance if there is both low overall supply in an allocation, and the minimum efficient scale is relatively large. This highlights the exposure in the 900 MHz and 850 MHz contexts, because there is a relatively low supply of highly complementary spectrum:

in the 900 MHz band, there is expected to be 2 x 26 MHz on offer[[17]](#footnote-18)

in the 850 MHz expansion band, there is expected to be 2 x 10 MHz on offer.[[18]](#footnote-19)

If lots in the 850 MHz expansion band and 900 MHz band are configured into 2 x 5 MHz blocks, there will be seven 2 x 5 MHz lots in total available in the 850/900 MHz band for allocation.[[19]](#footnote-20)

In both bands, we consider that the minimum efficient scale for some bidders will be 2 x 10 MHz of spectrum. In effect, this means that bidder demand is likely to exhibit increasing returns to scale from one to two lots of 2 x 5 MHz blocks, which means they would place a higher $/MHz/pop value on 2 x 10 MHz than 2 x 5 MHz. We further anticipate that bidder demand may exhibit constant or increasing returns to scale between two lots and three lots of 2 x 5 MHz blocks.

Frequency lot configuration of 2 x 5 MHz blocks means that bidders are exposed to the risk of paying an inflated price for the less desirable amount of spectrum. For example, bids may be based on a bidder’s $/MHz/pop valuation for a 2 x 10 MHz or 2 x 15 MHz lot, but the bidder may only acquire a 2 x 5 MHz subset of that bid. Depending on the auction format and allocation limits, this could potentially occur in both the 850 MHz expansion band and the 900 MHz band.

We therefore consider that there may be significant exposure risk in the 850/900 MHz auction.

### Strategic demand reduction

Under an SMRA or a two-stage auction with generic lots, bidders can face strong incentives to reduce their spectrum demand in order to pay lower prices overall. Bidders may find that it is in their mutual interest that aggregate demand is reduced while prices are still relatively low.

This risk of strategic demand reduction is partially a function of relative supply and demand. This means it may occur where there are few bidders, compared to the amount of spectrum on offer.

We must determine the format for the allocation of spectrum licences well before we are aware of the number of bidders seeking to acquire spectrum in a band. At this early stage, we do not have certainty about the number of bidders in the 850/900 MHz allocation, but we consider that the market will likely be thin and therefore demand reduction is a risk.

### Preliminary analysis on allocation methodology

The flexibility to provide for incumbents’ service continuity without compromising the broader spectrum allocation will differ depending on the chosen auction format.

#### Non-combinatorial auction formats

Due to the complementarity of contiguous lots and substitutability of the lots on offer across the 850/900 MHz band, we consider that using a non-combinatorial auction format (that is, SCA, SMRA or two-stage auction with generic lots) would generate significant exposure risk.

The SCA format is only suitable when the products on offer are largely independent of one another. The SCA only allows for one product to be auctioned at a time, which means it is prone to significant exposure risk where the products available are complements or substitutes, as is the case in the 850/900 MHz band. As such, the SCA is considered an unsuitable format for this allocation.

The SMRA auction format offers bidders the flexibility to switch their demand during the auction, but the format does not guarantee that bidders would obtain contiguous spectrum holdings. Due to the strong complementarity of lots within each band, this could be considered an unacceptable level of exposure risk. Fragmentation of spectrum holdings could occur within an individual band or across the two bands.

The two-stage auction with generic lots may mitigate some of the risk of non-contiguous holdings but introduces additional exposure risk of obtaining smaller undesirable subsets within categories. For example, bidders may bid on the basis of a 2 x 10 MHz valuation and obtain only 2 x 5 MHz, for which they would prefer to pay a lower $/MHz/pop price. It may also be difficult to substitute between categories as excess demand is likely to be very low in each category and all bids are binding, further inhibiting flexibility for bidders and making an inefficient outcome more likely.

The exposure risk inherent in the abovementioned auction formats may be mitigated through lot aggregation. For example, the spectrum may be aggregated into three lots in the following configurations:

2 x 10 MHz or 2 x 15 MHz in the 850 MHz expansion band

2 x 15 MHz in the 900 MHz band, with the likely inclusion of the downshift frequencies

2 x 10 MHz in the 900 MHz band.

However, lot aggregation may preclude the participation of more than three potential bidders. Further, there would only be three non-generic lots available that would have to be bid on separately, removing any potential benefits that the features of a two-stage auction with generic lots could provide. Regardless of whether lots are aggregated, these formats may still be susceptible to strategic demand reduction if there are relatively few bidders in the auction

#### Combinatorial auction formats

Combinatorial or package bidding formats eliminate the exposure risk that bidders acquire non-contiguous lots across the 850/900 MHz band, as bidders bid on combinations of lots they wish to acquire.

The pricing and auction rules in a CCA are highly complex and less transparent, and the format can be unfavourable to weaker bidders (like new market entrants). Pricing in a CCA is dependent on other bids placed. In addition, there are issues relating to the extent to which the CCA provides incentives for truthful bidding, which may reduce the justification for the added complexity.

The SBCA format works well where there are exposure or strategic demand risks associated with open ascending auction formats (such as with the SMRA format or the two-stage auction with generic lots). In the SBCA, bidders place bids for only the combinations that they want. The one-shot nature of SBCA also manages the risk of strategic demand reduction.

The SBCA format is likely to be suitable in a relatively simple auction where the number of lots on offer is reasonably low so that the number of possible combinations of lots requiring bids is also low. This is expected to be case in the 850/900 MHz band. The SBCA format is also suitable where the products on offer are highly complementary, such as the lots proposed in the 850/900 MHz band.

We acknowledge that there is no price discovery in a SBCA. However, we consider that it is possible that price discovery is of reduced importance in the 850/900 MHz band because of the complementarities between lots and the relatively small quantum of spectrum on offer. As it is possible that likely participants in the allocation include current users of the spectrum, or equivalent spectrum, there is less need for price discovery as potential bidders are already aware of the capabilities and therefore likely market value of the spectrum.

On balance, our preliminary view is that the SBCA format is appropriate for the allocation of the 850/900 MHz band for the following reasons.

#### Supports efficient allocation objectives

The SBCA format requires a bidder to bid for every combination of lots they are interested in acquiring. For example, if a bidder values spectrum in the 900 MHz band more highly than spectrum in the 850 MHz expansion band, they would be able to express that in their bids. Due to the combinatorial nature of bidding in this format, the exposure risk is eliminated.

Further, we consider that the SBCA supports other objectives of an efficient allocation through the auction. The SBCA mitigates the risk of strategic demand reduction both through its use of package bidding and its one-shot approach, which prevents bidders from modifying demand during the auction. Using a pay-your-bid pricing (first-price) rule within the SBCA format also provides for a simple and transparent allocation that would enhance the efficiency of allocation, rather than the inherent complexity of second pricing in a combinatorial format.

#### Supports service continuity objectives

The SBCA format is also likely to be best placed to accommodate other constraints that may be necessary for the allocation. For example, as noted in the *Government communications policy objectives* section, continuity of services is considered an important objective of the allocation. To achieve this objective under this format, identified parties could be provided with a reservation of an amount of spectrum, rather than a specific lot (as would be required under an open ascending format). To achieve this, the winning set of bids could be determined as being the highest value combination of bids that includes these spectrum reservations. If such constraints are required, the SBCA format would therefore provide flexibility for the market to determine spectral position of the reserved lots. This would enhance competition in the auction and reduce the likelihood of tacit collusion or demand reduction.

Interested parties should note the *Government communications policy objectives* section earlier in this consultation paper when considering the analysis of auction formats above.

**ACMA’s preferred view**

The ACMA’s preferred view is to use the SBCA format, using a pay-your-bid (first-price) rule to allocate the 850/900 MHz band.

We welcome stakeholder views on the most appropriate allocation methodology for the 850/900 MHz band.

# Next steps

The section 153G notice invites written comments from potentially affected apparatus licensees and other interested stakeholders by **8 July 2020** on our proposal to recommend that the Minister make one or more re‑allocation declarations for the 850/900 MHz band. The terms of the draft recommendation are outlined in Table 4.

1. Terms of the draft recommendation

|  |  |
| --- | --- |
| Relevant term | The ACMA’s proposed recommendation |
| Licence type | Spectrum licences |
| Parts of the spectrum | 809 MHz–825 MHz  854 MHz–870 MHz  890 MHz–915 MHz  935 MHz–960 MHz  covering all of Australia excluding the mid-west Radio Quiet Zone. |
| Re‑allocation period | For the frequency ranges 809–825 MHz and 854–870 MHz, the period ending 30 June 2024.  For the frequency ranges 890–915 MHz and 935–960 MHz, the period ending 31 December 2023. |
| Re‑allocation deadline | 31 December 2022 (12 months before the end of the re‑allocation period that ends first in time). |

At the end of the consultation period, we will consider comments received in preparing any recommendation to the Minister under section 153F of the Act. In making a re‑allocation declaration, the Minister must have regard to our recommendations. The Minister is only able to make a declaration within 180 days of receiving the recommendation from us.

If the Minister decides to make one or more spectrum re‑allocation declarations, we would commence a process to allocate spectrum licences. At that time, we would release further information about the process and would undertake further consultation on draft instruments to support the allocation. This would include a marketing plan prepared under section 39A of the Act and allocation procedures determined under section 60 of the Act. We may also convene a technical liaison group to provide information to assist in the development of the technical framework for the 850/900 MHz band.

Subject to this consultation and the Minister making one or more spectrum re‑allocation declarations, we are planning to commence an allocation process in Q4 2021. Consultation on the allocation rules, marketing plan and other technical instruments would be undertaken in accordance with this timing. Table 5 shows an indicative timetable for the major milestones relevant to the allocation of the 850/900 MHz band.

1. Indicative timetable

| Action | Date |
| --- | --- |
| Consult on a draft recommendation to the Minister on the potential re‑allocation of the 850/900 MHz band in accordance with section 153G of the Act | Q2/Q3 2020 |
| Subject to the outcome of the consultation, write to the Minister recommending re‑allocation of the 850/900 MHz band in accordance with section 153F of the Act | Q3 2020 |
| Commence technical liaison group to develop spectrum licence technical framework\* | Q4 2020 |
| Release draft allocation rules, marketing plan and other technical instruments for public comment\* | Q2 2021 |
| Commence allocation process\* | Q4 2021 |

\* These steps are subject to the outcome of consultation in accordance with section 153G of the Act and contingent on the Minister issuing one or more spectrum re‑allocation declarations.

# Invitation to comment

## Making a submission

The ACMA invites comments on the issues set out in this consultation paper.

[Online submissions](https://www.acma.gov.au/have-your-say) can be made by uploading a document. Submissions in PDF, Microsoft Word or Rich Text Format are preferred.

Submissions by post can be sent to:

The Manager

Major Spectrum Allocations Section

Australian Communications and Media Authority

PO Box 78

Belconnen ACT 2616

**The closing date for submissions is COB, Wednesday 8 July 2020.**

Consultation enquiries can be emailed to [SpectrumAllocations@acma.gov.au](mailto:SpectrumAllocations@acma.gov.au).

#### Publication of submissions

The ACMA publishes submissions on our website, including personal information (such as names and contact details), except for information that you have claimed (and we have accepted) is confidential.

Confidential information will not be published or otherwise released unless required or authorised by law.

#### Privacy

View information about our policy on the [publication of submissions](https://www.acma.gov.au/publication-submissions), including collection of personal information during consultation and how we handle that information.

Information on the *Privacy Act 1988,* how to access or correct personal information, how to make a privacy complaint and how we will deal with the complaint, is available in our [privacy policy](https://www.acma.gov.au/privacy-policy).

# Appendix A—Spectrum re‑allocation process

The ACMA proposes to follow the re‑allocation process for the allocation of spectrum in the 850/900 MHz band. This includes making encumbered spectrum available for re‑allocation as set out in Part 3.6 of the Act and allocating spectrum licences as set out in section 60 of the Act.

## Main steps in the re‑allocation process

The main steps in the re‑allocation process are shown in Figure 9.

1. The re‑allocation process

Step 1: Draft recommendation and invitation to comment

The first step in the spectrum re‑allocation process is for the ACMA to prepare a draft recommendation in accordance with section 153F of the Act, setting out the spectrum that we believe should be re-allocated. We must identify the spectrum and suggest a re‑allocation period within which the re‑allocation process is to be completed. We may also specify other relevant items that we choose to include.

In accordance with section 153G of the Act, we must undertake a consultation process with potentially affected apparatus licensees. 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, we would also undertake wider 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, we may prepare a final recommendation under section 153F of the Act and provide it to the Minister. In preparing a final recommendation, we must have regard to the views received during the public consultation period.

Step 3: Spectrum re‑allocation 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 re-allocated and the type of licences to be issued. In making a re‑allocation declaration, the Minister must have regard to our recommendation. The Minister is only able to make a declaration within 180 days of receiving the recommendation from us.

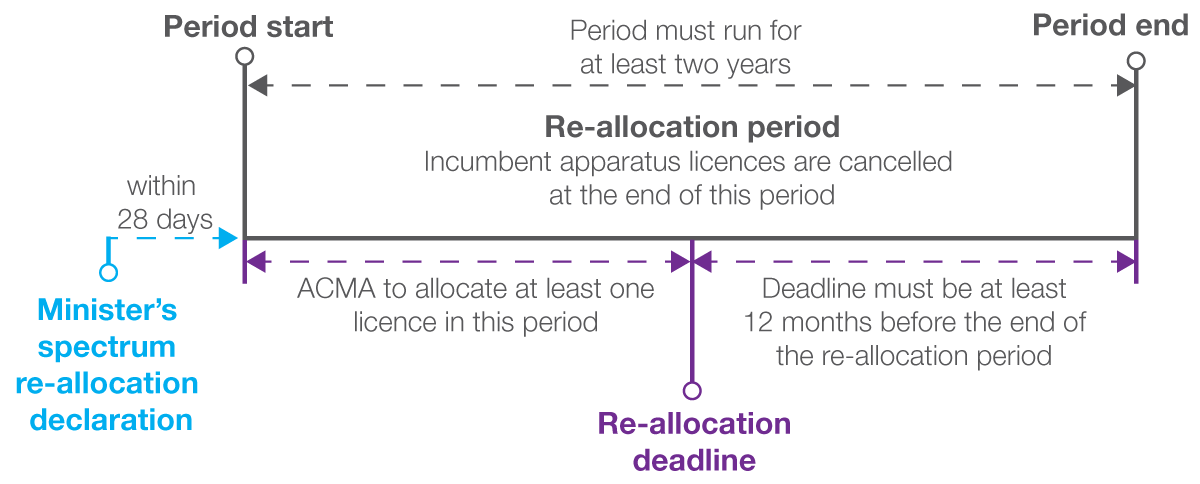
A re‑allocation declaration must set out:

* re‑allocation period
* re‑allocation deadline
* spectrum to be re-allocated

whether the spectrum will be re-allocated by the issue of spectrum or apparatus licences.

The Minister can only make a declaration about a part or parts of spectrum that was or were included in a recommendation from the ACMA. Figure 10 shows how the re‑allocation period and re‑allocation deadline interact.

1. The re‑allocation period and deadline



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

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

Step 4: Draft allocation instruments

We must make a number of instruments in order to conduct an allocation of spectrum. These include a marketing plan under section 39A of the Act and an allocation procedures determination under section 60.

Generally, a marketing plan sets out information about the spectrum that is available and describes the licence conditions that are proposed to be included on the spectrum licences issued. It might specify the type of allocation method that will be employed and how the spectrum will be apportioned into lots. We may prepare 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. This is usually included in the marketing plan.

The allocation procedures determination sets out, in greater detail, the elements of the chosen allocation method. For example, the procedures will detail the allocation method and, if that method is an auction, the auction method and auction rules, including any registration requirements, fees associated with the auction, starting prices, and methods of payment. If the Minister directs the ACMA to do so, the allocation procedures may also impose allocation limits.

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

* A determination made under subsection 145(4) of the Act—determining unacceptable levels of interference for radiocommunications transmitters proposed to be operated under the spectrum licences.

Radiocommunications advisory guidelines made under section 262 of the Act—which assist licensees to coordinate with other radiocommunications services and may be incorporated into spectrum licence conditions.

Subject to the Minister making a re‑allocation declaration, we would develop the technical framework and draft the instruments for the allocation of the 850/900 MHz band.

Step 5: Final allocation instruments

After consultation, we would make final versions of the allocation instruments. These instruments are legislative instruments and therefore must be published on the [Federal Register of Legislation](https://www.legislation.gov.au/).

Step 6: Allocation

Once the allocation instruments are made and come into effect, we would be in a position to invite interested parties to register to participate in the allocation. If a computer system and/or software is used for the allocation process, registered bidders would have an opportunity to trial it.

After completion of the allocation process, we would issue invoices for the amount of winning high bids. On payment, we would prepare and send out the spectrum licences to successful bidders.

# Appendix B—Process to date

In May 2011, the ACMA commenced a review of the 803–960 MHz band with the release of the *900 MHz band—Exploring new opportunities* paper. We proposed that substantial improvements could be made to the configuration of the band to facilitate introduction of new and emerging technologies.

The release of the *Exploring* *new opportunities* paper coincided with the release of our *Towards 2020—Future spectrum requirements for mobile broadband* (Towards 2020)paper. The papers were complementary and considered medium and long-term options to fulfil the need for additional spectrum for mobile broadband services.

In December 2012, we released *The 803–960 MHz band: Options for future change paper* (future options paper), which sought input on a range of broad themes, including:

options for expanding the 800 MHz band to include spectrum in the upper part of the digital dividend that was not included in the 700 MHz band allocation (that is, expanding the scope from 820–960 MHz to 803–960 MHz)

consideration of the technical and licensing arrangements in the digital cellular mobile telephony service segments (890–915 MHz paired with 935–960 MHz, referred to as the 900 MHz GSM band)

opportunities for facilitating new technologies or expanding existing services in underutilised parts of the 803–960 MHz band

consideration of the overall structure of the 803–960 MHz band.

Following careful consideration of the 32 submissions received in response to the future options paper, we published [*The ACMA's long-term strategy for the 803–960 MHz band*](https://www.acma.gov.au/publications/2019-12/report/acmas-long-term-strategy-803-960-mhz-band-decision-paper) (the long-term strategy) was released in November 2015.

The key planning decisions identified in the long-term strategy relevant to the 850/900 MHz band included making the 850 MHz expansion band available and optimising the technical frameworks to reflect latest 3GPP standards (presuming the band would be allocated in 5 MHz blocks). The implementation plan contained in the long-term strategy actioned the clearance of the 850 MHz expansion band as well as frequency ranges 824–825 MHz and 869–870 MHz (to accommodate a possible future downshift) of existing services by 30 June 2024.

Concurrent with the process described in the implementation plan, we would work separately with incumbent licensees in the bands to enable the 900 MHz band (the GSM band) to be used efficiently for current and emerging technologies, and downshift the entire spectrum-licensed 850 MHz band (frequency ranges 825–845 MHz and 870–890 MHz) by 1 MHz, to be directly frequency-adjacent to the 850 MHz expansion band.

We indicated that the implementation of a 1 MHz downshift of the 850 MHz band and the reorganisation of the existing 900 MHz band required further consideration by the ACMA, government and industry for which no decisions were conveyed in the long-term strategy paper.

From 2017 to 2019, we undertook several consultations to determine the most appropriate way forward for 900 MHz band spectrum. In April 2019, we released a [consultation paper](https://www.acma.gov.au/sites/default/files/2019-08/IFC-11-2019-Consultation-paper-Reconfiguring%20the%20900%20MHz%20band.docx) and invited stakeholders to comment on two possible options for the allocation of spectrum in the 850/900 MHz band, in order to reconfigure the band while concurrently enabling licensees to mitigate risks to consumer services. The options included:

clearing the 900 MHz band for re‑allocation by issuing spectrum licences but delaying the date by which incumbent apparatus licensees would clear the band to mid-2024

converting existing apparatus licences in the 900 MHz band to spectrum licences (a 2 x 5 MHz block to each of the three incumbent 900 MHz licensees) and allocating the remaining spectrum by issuing spectrum licences in combination with the 850 MHz expansion band.

Following consideration of submissions, we released our [*Reconfiguring the 900 MHz band/Allocating the 850 MHz expansion band decision paper*](https://www.acma.gov.au/consultations/2019-08/reconfiguring-900-mhz-band-consultation-112019) (the [decision paper](https://www.acma.gov.au/sites/default/files/2019-12/Reconfiguring%20the%20900%20MHz%20band_decision%20paper.docx)) in December 2019. The decision paper noted that in the recent consultation process, we identified a set of reform objectives to inform any allocation option. To be considered an effective reform process, the reconfiguration of the band should:

* result in the band being spectrum licensed
* facilitate the 1 MHz downshift in the 800 MHz spectrum licences by allocating the 2 x 1 MHz that is below the 800 MHz spectrum licences (thereby removing a key regulatory impediment to achieving the downshift)
* result in the band being configured in 5 MHz channels
* result in licensees being charged a market price, or a price informed by relevant market outcomes
* enable licensees to mitigate risks to the continuity of consumer services

support a move to larger contiguous bandwidths.

In the decision paper, we remain of the view that the best way to reconfigure the 900 MHz band is through a band clearance and price-based allocation by spectrum licence, offered in combination with the 850 MHz expansion band. This process would support deployment of 4G and 5G mobile broadband services and facilitate an outcome for larger contiguous spectrum holdings.

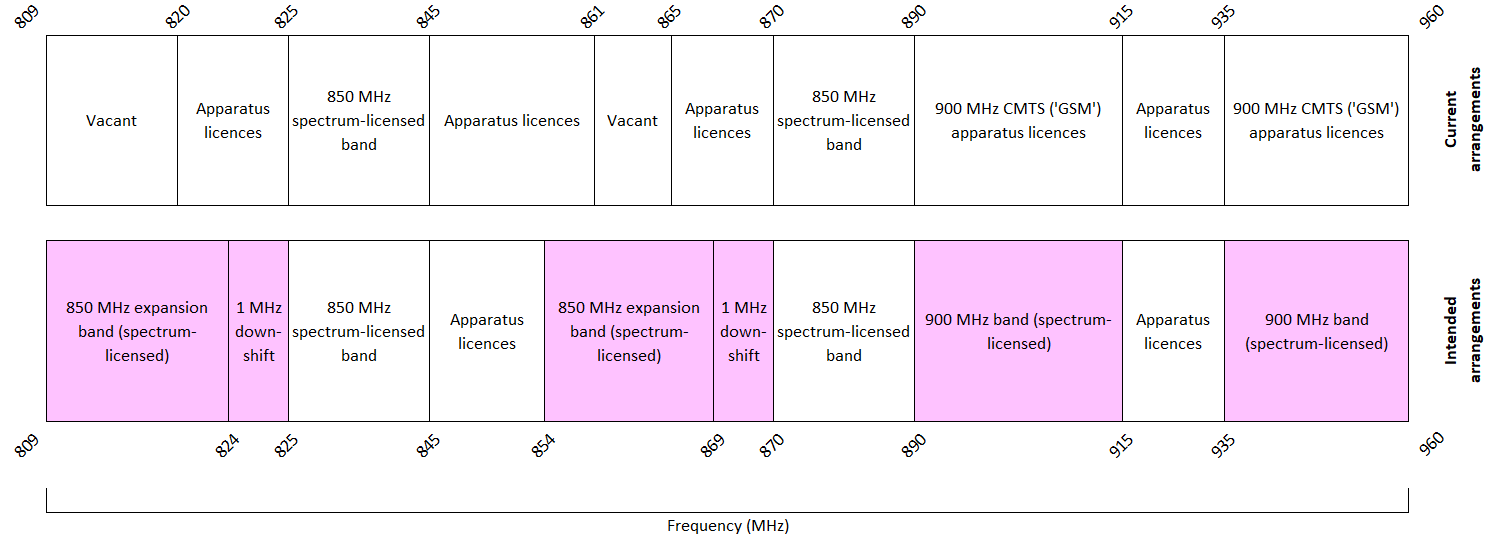
The decision paper noted:

the addition of a 1 MHz guard band between the 800 MHz band base-transmit segment and the 900 MHz band base-receive segment would significantly increase the usability of the lower segment in the 900 MHz band, which could only be achieved via a downshift of the existing 800 MHz band spectrum licences

the long-term strategy set up the process of clearing two blocks of 1 MHz of spectrum into which the downshift would ultimately occur. In order to allocate these two blocks of 1 MHz as a spectrum licence, as part of this approach for reconfiguring the 900 MHz band, the ACMA would attach the 2 x 1 MHz lot to the lower 2 x 5 MHz lot in the 900 MHz band.

The intended arrangements of the 850/900 MHz band as a result of the decision paper are illustrated in Figure 11.

1. Comparison between current arrangements in the 850/900 MHz band and intended arrangements



Note: Not to scale

Parts of the spectrum that the decision paper noted should be re-allocated by issuing spectrum licences are highlighted in pink.

1. International Mobile Telecommunications (IMT) and standardised (through the 3rd Generation Partnership Project, or 3GPP) for 2nd, 3rd and 4th generation mobile technologies. [↑](#footnote-ref-2)
2. This spectrum will be referred to in this paper as the ‘downshift frequencies’. [↑](#footnote-ref-3)
3. Cordless telephone services also operate in the band under class licensing arrangements. [↑](#footnote-ref-4)
4. The purpose of this RALI is to set out spectrum policy arrangements for radiocommunications services in the frequency range 803–890 MHz (known as the 800 MHz Band). RALI MS 40 is an administrative band plan. [↑](#footnote-ref-5)
5. ACMA, *Corporate plan 2019*–*20*. [↑](#footnote-ref-6)
6. Department of Infrastructure, Transport, Regional Development and Communications, [*Communications policy objectives for the allocation of the 850 and 900* *MHz bands*](https://www.communications.gov.au/documents/communications-policy-objectives-allocation-850-and-900-mhz-bands), May 2020*.* [↑](#footnote-ref-7)
7. See the Minister’s media release ‘[Pathway to deliver more low-band spectrum](https://minister.infrastructure.gov.au/fletcher/media-release/pathway-deliver-more-low-band-spectrum)’, 19 December 2019. [↑](#footnote-ref-8)
8. See, for example, the [*Draft ministerial direction on unsold 700 MHz spectrum*](https://www.communications.gov.au/have-your-say/draft-ministerial-direction-unsold-700-mhz-spectrum)*.*  [↑](#footnote-ref-9)
9. ACMA, [RALI MS 40](https://www.acma.gov.au/publications/2019-11/guide/rali-ms-40-800-mhz-band-plan), Section 153G notice. [↑](#footnote-ref-10)
10. ACMA, [Embargo 64](https://www.acma.gov.au/sites/default/files/2019-10/Embargo%20No%2064.pdf). [↑](#footnote-ref-11)
11. As an alternative to the reconfiguration of the 900 MHz band into paired 5 MHz blocks, licensees under the current configuration have previously suggested the deployment of narrowband Internet of Things (NB-IoT) in the ‘remaining’ 3.2/3.4 MHz paired (that is, the spectrum leftover after 2 x 5 MHz is put to use for 3G/4G). We consider this to be an inefficient use of this spectrum. Anticipated traffic demand for NB-IoT could be met with a much smaller allocation and the 5 MHz block-based configuration is no barrier to deploying NB-IoT technologies if operators wish to do so. [↑](#footnote-ref-12)
12. See, for example, the ACCC’s [*Allocation limits advice for the 3.6 GHz spectrum allocation Public version July 2018*](https://www.accc.gov.au/system/files/ACCC%20advice%20to%20Minister%20Fifield%20on%203.6%20GHz%20allocation%20limits.pdf). [↑](#footnote-ref-13)
13. The frequency ranges 824–825 MHz and 869–870 MHz. [↑](#footnote-ref-14)
14. This is true where bid prices are a proxy for the value of the service for which the spectrum will be put to use. The assumption is that those that value spectrum most would go on to create the highest social and economic value with that spectrum. [↑](#footnote-ref-15)
15. The auction format used in the 3.6 GHz allocation was referred to as the enhanced simultaneous multi-round ascending (ESMRA) auction. [↑](#footnote-ref-16)
16. Vickrey pricing selects the highest value frequency assignment but bidders pay the next highest value bid by others for that assignment, that is, the second price. Nearest Vickrey core pricing modifies this approach to ensure that there is not a bidder/group of bidders who bid more for the frequency assignment than the price paid by the winning bidder(s). [↑](#footnote-ref-17)
17. This includes 2 x 1 MHz downshift frequencies. [↑](#footnote-ref-18)
18. One 2 x 5 MHz lot may be excluded from the re-allocation subject to a PSMB request. [↑](#footnote-ref-19)
19. One of these 2 x 5 MHz lots (the lower segment of the 900 MHz band) will be attached to 2 x 1 MHz lot of downshift frequencies (see Table 3, lots 4 and 5). [↑](#footnote-ref-20)