



Allocation limits advice for 3.4 GHz and 3.7 GHz bands spectrum licence allocation

Consultation paper

March 2022

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1. Introduction

On 14 December 2021, the Australian Communications and Media Authority (ACMA) requested the ACCC provide advice by 1 August 2022 on whether allocation limits should be imposed on the allocation of spectrum licences in the 3.4 GHz and 3.7 GHz bands in metropolitan and regional areas of Australia and, if so, the nature of those limits.

The ACMA is planning to allocate relevant parts of the 3.4–4.0 GHz band through a mixture of spectrum and apparatus licensing arrangements in 2022 and 2023.

As part of this multi-staged process, the ACMA is planning to allocate spectrum licences in the 3.4 GHz and 3.7 GHz bands in 2023. There are a number of planning decisions that the ACMA has yet to make which will likely impact the spectrum to be made available for spectrum licensing in this allocation process.

The ACMA has indicated that 75 MHz (3.4–3.475 GHz) will also become available in some inner metropolitan areas as a result of the freeing up unused spectrum from NBN Co in an ‘urban excise’ process. The ACMA is considering the licencing arrangement for this spectrum and will align the allocation of this spectrum with the relevant process in the 3.7–4.0 GHz band.

The ACMA is currently consulting on a re-allocation declaration regarding the parts of the spectrum to be spectrum licensed. As part of this, the ACMA is consulting on options to further optimise use of the band, which may potentially impact the amount of spectrum available for spectrum licencing in some regional areas.¹ The ACMA expects to make these planning decisions in mid-2022.

The ACCC’s consultation process on the allocation limits advice runs parallel to the ACMA’s consultation on the proposed re-allocation declaration. This means that stakeholders can consider and engage with issues relating to allocation limits in concert with other relevant allocation settings. To enable the consultation processes to inform one another, the ACCC intends to share all submissions and information received with the ACMA. The ACCC will seek submitters’ consent before sharing any confidential submissions or information with the ACMA.

In its letter of request, the ACMA noted that there is likely to be considerable interest in this mid-band spectrum² with demand likely to come from various kinds of operators. The ACMA indicated that, apart from the question of allocation limits, it is also interested in views on the minimum and desirable quantum of spectrum for different use cases and users.

¹ ACMA, *Proposed spectrum re-allocation declaration for the 3.4 GHz and 3.7 GHz bands: Consultation paper*, March 2022. (ACMA consultation paper), available at: <https://www.acma.gov.au/have-your-say>.

² Mid-band spectrum is bands between 1 GHz and 6 GHz.

2. Consultation process

This consultation paper seeks feedback to inform the ACCC's preparation of advice to the ACMA about appropriate allocation limits to apply to the allocation of spectrum licences in the 3.4 GHz and 3.7 GHz bands in metropolitan and regional areas.

The ACCC has included a number of issues for comment throughout this paper and provided a consolidated list of questions at **Appendix A**.

The ACCC will accept submissions from interested parties until 5pm, **29 April 2022**. Submissions received after this time may not be given due consideration.

Submissions should be sent to:

- Steve Williams, Director, Mobiles and Consumer Engagement, Infrastructure Division, ACCC (steve.williams@accc.gov.au), and
- Chris Xie, Mobiles and Consumer Engagement, Infrastructure Division, ACCC (chris.xie@accc.gov.au)

The ACCC will consider all submissions as public submissions and will post them on the ACCC's website. If you wish to submit commercial-in-confidence material, please submit both a public and a confidential version of your submission. The confidential version should clearly identify commercial-in-confidence material and the public version should clearly identify where commercial-in-confidence material has been removed. All public submissions will be published on our website.

The ACCC has published a guideline setting out the process parties should follow when submitting confidential information to the ACCC. The ACCC Information Policy June 2014 sets out the general policy of the ACCC on the collection, use and disclosure of information. A copy of the guideline and policy are available on the ACCC's [website](#).

3. ACCC's approach to this advice

Under the *Radiocommunications Act 1992*, the ACMA is able to impose statutory limits on the aggregate amount of spectrum that may be used by any party as a result of a specific allocation (allocation limits). Before doing so, the ACMA must consult with the ACCC on the need for allocation limits, and the nature of any such limits.³

The ACMA has written to the ACCC seeking advice on the need for allocation limits for the allocation of spectrum licences in the 3.4 GHz and 3.7 GHz bands. In its letter of request, the ACMA noted that its decisions for the allocation process will be guided by the Object of the *Radiocommunications Act 1992*, which is to promote the long-term public interest derived from the use of the spectrum by providing for the management of the spectrum in a manner that:

- (a) facilitates the efficient planning, allocation and use of the spectrum; and
- (b) facilitates the use of the spectrum for:
 - (i) commercial purposes; and
 - (ii) defence purposes, national security purposes and other non-commercial purposes (including public safety and community purposes); and
- (c) supports the communications policy objectives of the Commonwealth Government.

On 1 February 2022, the Minister for Communications, Urban Infrastructure, Cities and the Arts (the Minister) issued a Ministerial Policy Statement (MPS) under subsection 28B(1) of the *Radiocommunications Act 1992*, which sets out the relevant communications policy objectives of the Commonwealth Government with respect to the allocation of spectrum in the 3.4–4.0 GHz band.⁴ The ACMA must have regard to this MPS in performing its spectrum management functions and exercising its spectrum management powers in relation to the 3.4–4.0 GHz band.⁵ The ACCC considers that it is appropriate to have regard to the communications policy objectives set out in this MPS, where relevant, in assessing the need for allocation limits for the purpose of this advice.

Drawing on the communications policy objectives for the allocation of spectrum in the 3.4–4.0 GHz band, the ACCC intends to conduct its assessment of whether allocation limits are required, and if so, what those limits should be, based on the following criteria:

- Promoting competition in downstream markets for the long-term interests of end-users, and encouraging investment in infrastructure including in regional Australia;
- Supporting the deployment of new and innovative technology, including 5G.

³ See subsections 60(5), 60(13A), 102G(1) and 102G(6) of the *Radiocommunications Act 1992*.

⁴ The Minister's MPS is available on the Federal Register of Legislation at: <https://www.legislation.gov.au/Details/F2022N00015>.

⁵ Subsection 28C(1) of the *Radiocommunications Act 1992*.

4. Potential use of, and demand for, 3.4 GHz and 3.7 GHz bands spectrum

4.1. Potential use of the spectrum

The 3.4–4.0 GHz band sits within the broader 3.3-4.2 GHz band that has been internationally harmonised for use by 4G and 5G wireless technologies. The ACMA has previously allocated spectrum in the band for these purposes, such as the auction of spectrum licences in the 3.6 GHz band in metro and regional areas in 2018, and is in the process of administratively issuing area wide apparatus licences (AWLs) in the 3.4–4.0 GHz band in remote areas. The ACCC provided advice on allocation limits in regard to both of these allocations.⁶

The ACMA has also previously issued spectrum licences in the 3.4 GHz band over the period 2000–2004,⁷ and to NBN Co in a process from 2019–2021.⁸

Spectrum in the band is technically suited to supporting a wide range of use cases using 4G and 5G wireless technologies. These use cases include the provision of wide area wireless broadband (WA WBB), local area wireless broadband (LA WBB) and private wireless enterprise deployments.

The ACCC considers that the spectrum may be used for a wide range of purposes, as 4G and 5G networks become increasingly ‘general purpose’. For example, the spectrum could be used by the mobile network operators (MNOs) to provide mobile services using WA WBB, by smaller wireless internet service providers (WISPs) to provide localised fixed wireless services, or by operators or enterprises to deploy private networks that utilise either 4G/5G wireless technology or other proprietary technology.

In addition, the Minister’s MPS for the band notes that one of the communications policy objectives for allocation of spectrum in the 3.4–4.0 GHz band is to support a range of wireless broadband use cases and users, including wide area and customised local services.

The ACCC is seeking stakeholders’ views on the likely intended use of the spectrum subject to allocation in the band, as well as views on what the optimal allocation of spectrum in the band might be for different use cases.

4.2. Available spectrum for allocation by spectrum licensing

The ACMA is currently consulting on a re-allocation declaration for spectrum in the 3.4 GHz and 3.7 GHz bands and proposed 3 options for the parts of the spectrum to be re-allocated as spectrum licences. The ACMA noted that under each option, the total quantum of spectrum available under spectrum and apparatus licensing in regional areas remains broadly consistent, but the location of available spectrum varies.⁹

⁶ The ACCC’s advice to the Minister for Communications on allocation limits in the 3.6 GHz band can be found on the ACCC website at: <https://www.accc.gov.au/system/files/ACCC%20advice%20to%20Minister%20Fifield%20on%203.6%20GHz%20allocation%20limits.pdf>; ACCC’s advice to the ACMA on allocation limits in the 3.4-4.0 GHz band in remote areas can be found on the ACCC website at: https://www.accc.gov.au/system/files/ACCC%20advice%20to%20ACMA%20on%20Allocation%20limits%20for%203.4-4.0%20GHz%20band%20in%20remote%20areas%20-%2012%20Nov%202021%20-%20PUBLIC%20%28002%29_Redacted.pdf.

⁷ These licences were renewed in 2015.

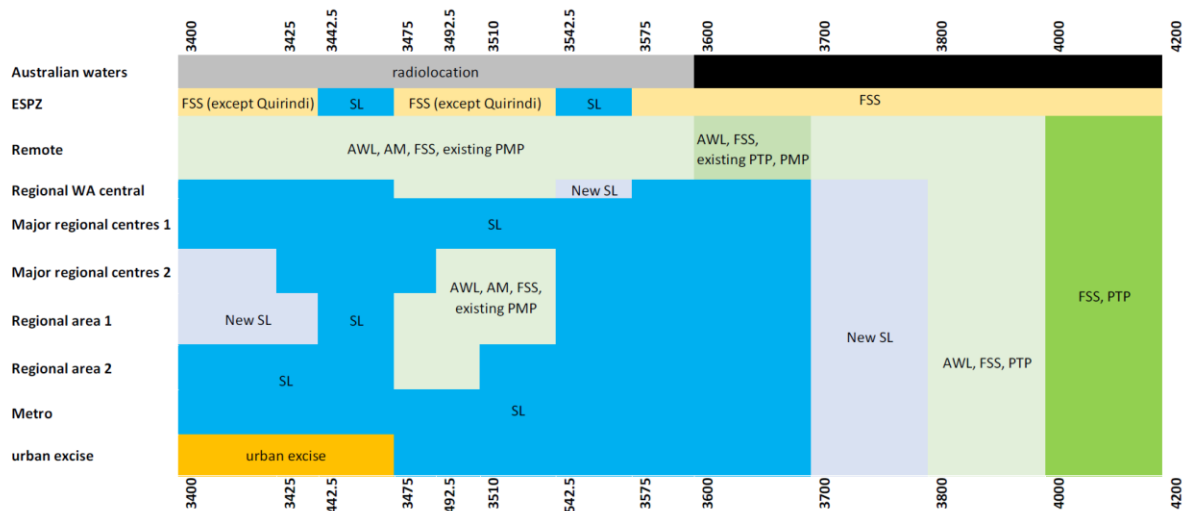
⁸ See the ACMA’s website at: <https://www.acma.gov.au/consultations/2019-08/optimising-3400-3575-mhz-band-consultation-122019>.

⁹ ACMA consultation paper, p. 1.

There is a large amount of spectrum that will likely be allocated via spectrum licensing.

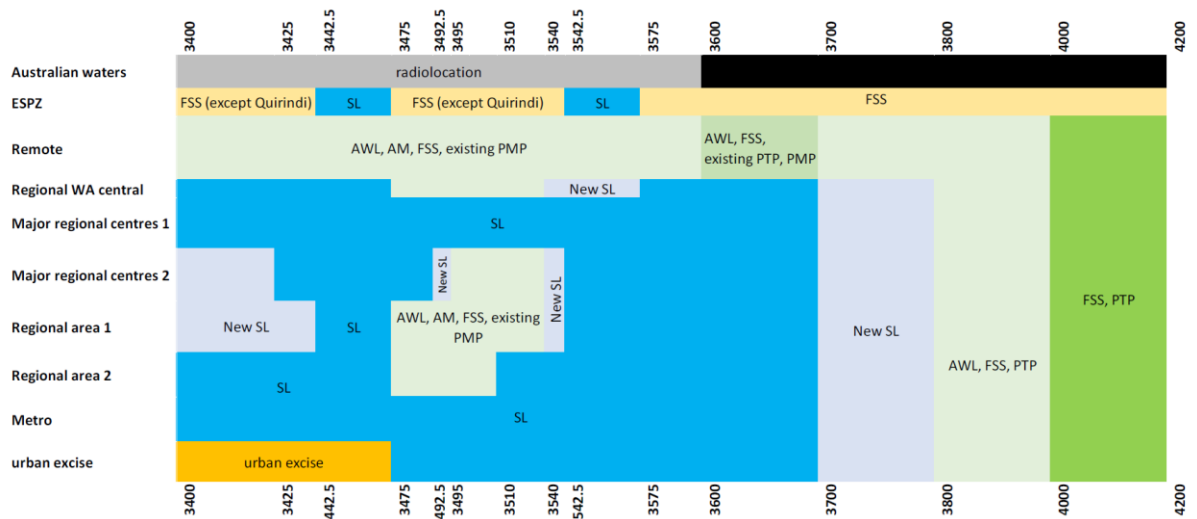
Figures 1–3 below illustrate the spectrum available for spectrum and apparatus licensing under the ACMA’s proposed options, with the available spectrum for spectrum licensing depicted in grey.¹⁰

Figure 1: Option 1 – current planning decision¹¹



Note: AM = amateur services, AWL = area wide apparatus licences, ESPZ = earth station protection zone, FSS = fixed satellite services, PMP = point-to-multipoint services, PTP = point-to-point services, SL = spectrum licences

Figure 2: Option 2 – incremental modification to planning decision¹²

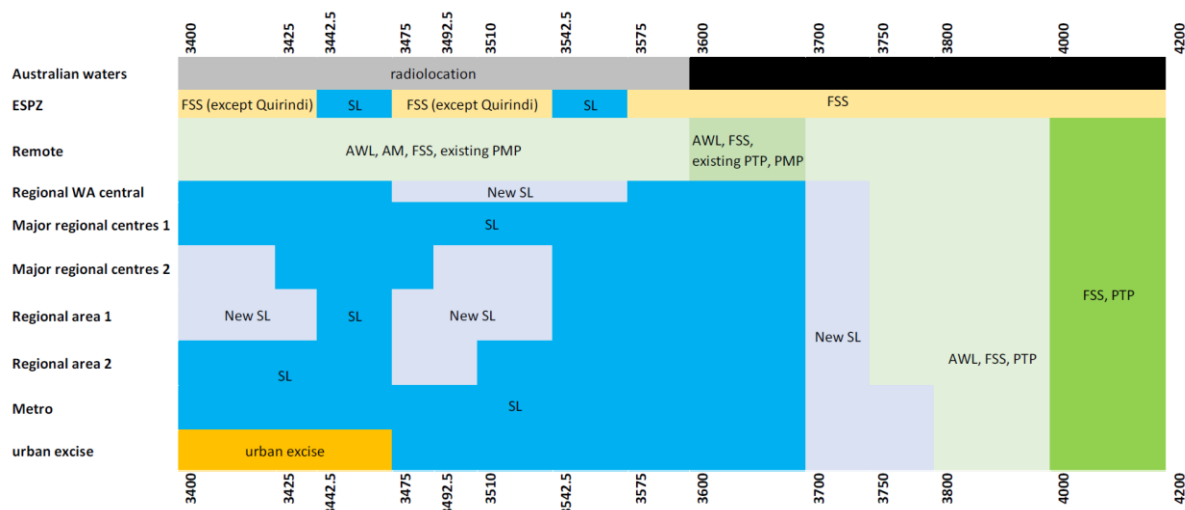


¹⁰ More details on the 3 options are discussed in the ACMA consultation paper, pp. 16–22.

¹¹ The figure is reproduced from ACMA consultation paper, p. 18.

¹² The figure is reproduced from ACMA consultation paper, p. 19.

Figure 3: Option 3 – consolidated planning arrangements¹³



The table below sets out the amount of spectrum to be allocated via spectrum licences in each geographic area proposed under each of the options.

Table 1: Spectrum available as new spectrum licences under the proposed options¹⁴

Geographic areas	Option 1	Option 2	Option 3
Metropolitan areas	100 MHz (3.7–3.8 GHz)	100 MHz (3.7–3.8 GHz)	100 MHz (3.7–3.8 GHz)
Urban excise areas	75 MHz (3.4–3.475 GHz)	75 MHz (3.4–3.475 GHz)	75 MHz (3.4–3.475 GHz)
Major regional centres 1	100 MHz (3.7–3.8 GHz)	100 MHz (3.7–3.8 GHz)	50 MHz (3.7–3.75 GHz)
Major regional centres 2	125 MHz consisting of: <ul style="list-style-type: none"> 25 MHz (3.4–3.425 GHz) 100 MHz (3.7–3.8 GHz) 	130 MHz consisting of: <ul style="list-style-type: none"> 25 MHz (3.4–3.425 GHz) 2.5 MHz (3.4925–3.495 GHz) 2.5 MHz (3.54–3.5425 GHz) 100 MHz (3.7–3.8 GHz) 	125 MHz consisting of: <ul style="list-style-type: none"> 25 MHz (3.4–3.425 GHz) 50 MHz (3.4925–3.5425 GHz) 50 MHz (3.7–3.75 GHz)
Regional area 1	142.5 MHz consisting of: <ul style="list-style-type: none"> 42.5 MHz (3.4–3.4425 GHz) 	145 MHz consisting of: <ul style="list-style-type: none"> 42.5 MHz (3.4–3.4425 GHz) 	160 MHz consisting of: <ul style="list-style-type: none"> 42.5 MHz (3.4–3.425 GHz)

¹³ The figure is reproduced from ACMA consultation paper, p. 20.

¹⁴ ACCC calculation based on ACMA consultation paper.

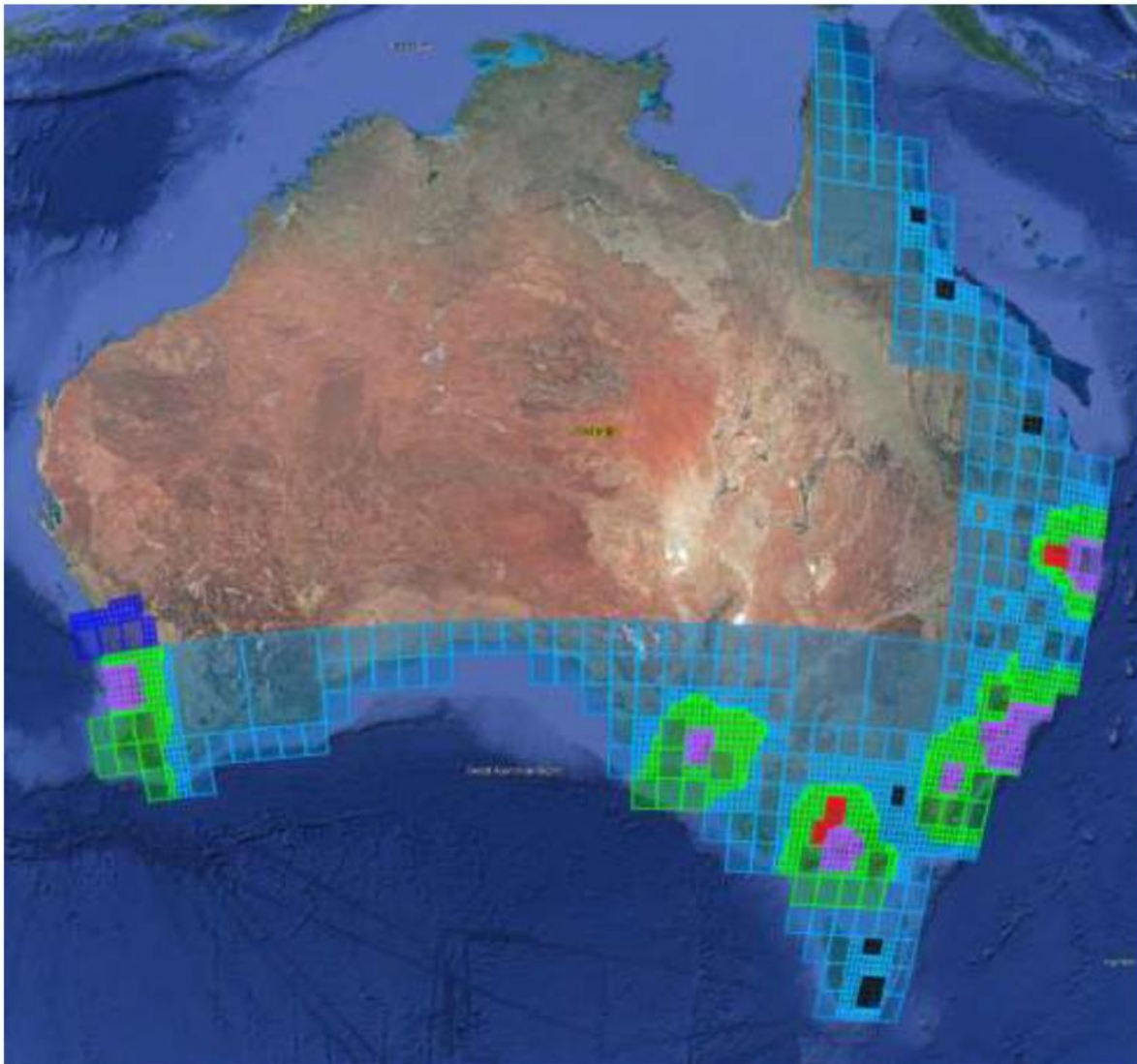
	<ul style="list-style-type: none"> • 100 MHz (3.7–3.8 GHz) 	<ul style="list-style-type: none"> • 2.5 MHz (3.4925–3.495 GHz) • 100 MHz (3.7–3.8 GHz) 	<ul style="list-style-type: none"> • 67.5 MHz (3.475–3.5425 GHz) • 50 MHz (3.7–3.75 GHz)
Regional area 2	100 MHz (3.7–3.8 GHz)	100 MHz (3.7–3.8 GHz)	85 MHz consisting of: <ul style="list-style-type: none"> • 35 MHz (3.475–3.51 GHz) • 50 MHz (3.7–3.75 GHz)
Regional WA central	132.5 MHz consisting of: <ul style="list-style-type: none"> • 32.5 MHz (3.5425–3.575 GHz) • 100 MHz (3.7–3.8 GHz) 	135 MHz consisting of: <ul style="list-style-type: none"> • 2.5 MHz (3.54–3.5425 GHz) • 32.5 MHz (3.5425–3.575 GHz) • 100 MHz (3.7–3.8 GHz) 	150 MHz consisting of: <ul style="list-style-type: none"> • 100 MHz (3.475–3.575 GHz) • 50 MHz (3.7–3.75 GHz)

The ACMA indicated that its preliminary preferred option is Option 3, which is reflected in the proposed terms of the re-allocation declaration. The practical effect of this proposed re-allocation would be to bring all spectrum between 3400 and 3750 MHz in regional areas, and 3400 and 3800 MHz in metro areas under spectrum licensing. The ACMA noted that this option would facilitate the complete defragmentation of spectrum licence holdings in the band.¹⁵

Figure 4 gives an indication of the geographic areas where spectrum licences will be made available under Option 3.

¹⁵ ACMA consultation paper, pp. 21.

Figure 4: Indicative map of areas subject to spectrum licensing under ACMA's proposed re-allocation declaration¹⁶



Note: purple = metropolitan, red = major regional centres 1, black = major regional centres 2, light blue = regional area 1, green = regional area 2, dark blue = regional WA central

4.3. Demand for the spectrum

In addition to the availability of spectrum, there are a number of factors that may affect actual demand for the spectrum.

First, the ACCC considers that licensing arrangements and the allocation method are likely to have a significant impact on actual demand for the spectrum. While the spectrum could technically be used for a wide range of use cases, the use of spectrum licensing arrangements and the intended use of price-based allocation may have the effect of restricting actual demand for spectrum to larger operators such as the MNOs, NBN Co and potentially some larger regional carriers.

¹⁶ The figure is reproduced from ACMA consultation paper at p. 54.

This is particularly the case given the ACMA is also intending to allocate parts of the spectrum in the 3.4–4.2 GHz band via apparatus licensing arrangements in a future process, which may attract more demand from smaller operators.

The ACCC is seeking stakeholders' views on how the spectrum licensing arrangement and the intended use of price-based allocation impact demand for the spectrum for this allocation.

Second, the ACMA is consulting on a number of allocation settings, including the intended term for spectrum licences in the 3.4 GHz and 3.7 GHz bands. The ACMA identified a number of options ranging from a short duration (licences to expire at the end of 2030) to long duration (the maximum 20-year licence term). We welcome stakeholders' views on the impact of licence term on the likely demand for the spectrum from various interested parties, and how it may impact the use of the spectrum. The ACCC is generally of the view that the longer the licence term, the greater the need for allocation limits to address any potential competition issues that may arise.

Finally, the ACMA is consulting on the appropriate licensing arrangements for the 'urban excise' spectrum in parts of Adelaide, Brisbane, Canberra, Melbourne, Sydney and Perth. The ACMA's preliminary preferred option is allocate spectrum licences between 3400 and 3475 MHz in these areas which is reflected in all three options discussed above.

The ACCC understands that the urban excise areas are relatively small compared to existing 3.4 GHz and 3.6 GHz metro boundaries and will be encumbered with additional restrictions compared to those licences. We are seeking stakeholder views as to the relative utility of the urban excise spectrum to other licences likely to be issued at this allocation (such as new spectrum licences in the 3.7 GHz band in metro areas), and how this is likely to impact demand at the auction if the urban excise spectrum is to be allocated as spectrum licences in the same allocation process.

Questions

1. What are the likely intended uses of spectrum in the 3.4 GHz and 3.7 GHz bands in metro and regional areas?
2. If you intend to acquire the spectrum to deploy wireless services:
 - a) In which geographic areas do you intend to use the spectrum?
 - b) What do you consider is the optimal allocation of 3.4–4.0 GHz spectrum to support your likely intended uses? What is the minimum allocation necessary?
3. How is the spectrum licensing arrangement and the intended use of price-based allocation likely to impact your demand for spectrum at this allocation?
4. How is the term of the spectrum licences likely to impact your demand for spectrum at this allocation?
5. How is the differing utility of the urban excise spectrum likely to impact your demand for spectrum at this allocation?

5. Relevant downstream markets

In formulating its advice, the ACCC assesses the relevant downstream markets that will be impacted by the allocation of the spectrum. The ACCC evaluates the impact the allocation would have on investment and competition in the relevant downstream markets.

Given the expected use of the spectrum identified in Chapter 4, the ACCC's preliminary view is that the retail mobile services market and the fixed broadband market are likely the most relevant downstream markets.

The ACCC considers the retail mobile services market a national market. This is because mobile coverage is a point of differentiation between mobile service providers. An MNO's network coverage in regional Australia influences demand for its services in metropolitan areas. Additionally, due to national uniform pricing, competition in metropolitan areas affects the prices and inclusions of services available to consumers outside of metropolitan areas.

The fixed broadband market consists of both fixed line and wireless service providers, including satellite operators. Fixed wireless services primarily provide consumers and businesses with broadband internet at a fixed location via a wireless access technology. Fixed wireless services compete with other broadband services such as fibre and satellite. From end-users' perspective, fixed broadband services are increasingly becoming technology-neutral. The roll out of 5G networks enables mobile service providers to offer similar services to those available via a fixed line service. However, the roll out of 5G networks to date has largely been in metropolitan areas with limited coverage in regional areas.

Other downstream markets may also be potentially relevant. As noted in Chapter 4, the spectrum could be technically used by private network or other operators to provide connectivity for industry uses. This means that the private wireless enterprise market may also be impacted by the allocation. However, the ACCC understands that these users typically prefer apparatus licence arrangements. It is unclear whether there would be material demand from these users for the spectrum licences in the 3.4 GHz and 3.7 GHz bands likely to be offered in a price-based allocation process.

Questions

6. What are the relevant downstream markets for the purpose of assessing the impact of the 3.4 GHz and 3.7 GHz bands allocation on competition?
7. Are there likely to be future relevant markets that have not been identified?

6. State of competition in relevant markets

In assessing the state of competition in the relevant markets identified, the ACCC considers a range of factors such as market concentration, demand and supply substitutes and the price, range and quality of services on offer. A key question the ACCC asks in assessing the impact of the allocation on competition is whether a service provider would be constrained from competing in these markets if they were not given a reasonable opportunity to acquire sufficient spectrum.

6.1. National mobile services market

The national mobile services market is dominated by the three MNOs – Telstra, Optus and TPG Telecom (TPG). As at 30 June 2021, the MNOs accounted for 91% of the total mobile phone services in operation¹⁷. The remaining 9% of services is the collective market share of the mobile virtual network operators (MVNOs).

MVNOs acquire wholesale mobile services from the MNOs to provide retail services to end users. As the MVNOs rely on the MNOs' mobile infrastructure to provide services, their ability to differentiate themselves on network-related features such as network quality and coverage is limited. Instead, the MVNOs compete by offering lower prices, different product inclusions and more flexible plan features to attract specific segments of the market.

In recent years, the MNOs have progressively rolled out retail sub brands namely GoMo (Optus), Belong (Telstra) and Felix (TPG). These sub brands are owned by the MNOs and generally offers plans that are lowest cost and have less adds on/inclusions than the MNOs own brand plans. The MNOs' sub brands generally compete with MVNOs for consumers that are more likely to be price sensitive. Sub brands allow MNOs to maintain their own brands as more premium options with higher prices and greater product inclusions. The merger between TPG and Vodafone Hutchison Australia in 2020 and Optus' acquisition of Amaysim in 2021 has also led to some major independent MVNOs now being owned by the MNOs.

The MNOs compete heavily on several non-price factors amongst themselves, such as geographic coverage and network quality. These non-price factors in particular play a significant role in the decision-making process consumers and businesses face when deciding on a service provider. Expanding coverage and improving network quality and performance involves building new infrastructure and upgrading existing equipment to new technologies. In recent years, the competitive focus of the MNOs has shifted to the roll out of their 5G networks.

The allocation of spectrum licences in the 3.4 GHz and 3.7 GHz bands could provide the MNOs with the opportunity to acquire additional mid-band spectrum. This additional spectrum could potentially be used by the MNOs to increase their network capacity for 4G and 5G services in metropolitan and regional areas, thus enabling them to improve the quality of their services.

6.2. Fixed broadband market

Nationally, fixed broadband services are predominately provided over the government owned, wholesale-only National Broadband Network (NBN) via a variety of access technologies. NBN Co uses fixed wireless technology to service customers in specific geographic areas.

¹⁷ ACCC, *ACCC Communications Market Report 2020-21*, December 2020, pp. 27–28.

At a more local level, there are several smaller-scale fixed line networks that provide fixed broadband services to residential and business premises. For the most part, these networks compete with the NBN to service new estates including apartment buildings. There are also smaller scale fixed wireless networks, known as Wireless Internet Service Providers or WISPs, that provide fixed broadband services within their coverage areas.

While the MNOs have also been offering broadband products delivered by mobile networks (that are intended to be used only at fixed locations) for many years, the advent of 5G technology has enabled MNOs to have a stronger presence in the fixed broadband market. This is because with 5G technology, mobile networks can deliver broadband services at a comparable cost and quality to that of fixed line networks. This trend is likely to continue further as the 5G rollout progresses.

The allocation of spectrum in the 3.4 GHz and 3.7 GHz bands will potentially influence how effectively MNOs, NBN Co and other wireless service providers can compete in the fixed broadband market in metropolitan and regional areas. For example, MNOs could use the spectrum to enhance the quality of their 5G fixed wireless product in metropolitan and potentially regional areas. NBN Co and smaller scale fixed wireless operators could also use this spectrum to improve their fixed wireless services within their coverage areas.

6.3. Private wireless enterprise market

A key aspect of the enterprise market is the provision of connectivity to industry for delivery of a range of services and applications. Many of these services are provided by location-based or local-area wireless networks. As discussed in Chapters 4 and 5, many users that may use the spectrum to provide services in this market are likely to prefer apparatus licensing arrangements, which means it is unclear whether there will be demand from these users for spectrum licences in the 3.4 GHz and 3.7 GHz band allocation. It is therefore unclear whether the allocation would likely have material impact on competition in this market. As set out in Chapters 4 and 5, the ACCC is seeking stakeholders' views on the impact of the spectrum licensing arrangement on demand and the downstream markets that should be considered relevant for this allocation.

Questions

8. Do you have any comment on the state of competition in the relevant downstream markets that you consider should be taken into account? What do you think are the key competition issues arising from the 3.4 GHz and 3.7 GHz bands allocation in these downstream markets?

9. How would the allocation of spectrum licences in the 3.4 GHz and 3.7 GHz bands in metropolitan and regional areas impact competition and investment in these markets?

7. Current spectrum holdings

In assessing whether allocation limits are necessary to promote competition in the relevant markets, the ACCC considers it appropriate to have regard to current spectrum holdings that are substitutable to the spectrum to be allocated. The ACCC has done so previously in its advice on allocation limits for the 3.6 GHz auction in 2018 and the 850/900 MHz auction in 2021.¹⁸

7.1. Substitutability of existing holdings

The ACCC's preliminary view is that for the purposes of providing advice on allocation limits on the auction of licences in the 3.4 GHz and 3.7 GHz bands, existing spectrum in the broader 3.4–4.0 GHz band should be considered substitutable.

This approach is consistent with that taken in the ACCC's advice on allocation limits for the 2018 3.6 GHz auction, which concluded that a cross-band limit which included existing 3.4 GHz holdings was appropriate.¹⁹

Planning and licensing in the wider 3.4–4.0 GHz band has a complex history, with arrangements in different segments and areas being developed and introduced at different times. This has resulted in fragmented existing holdings across the band. As a result, the 3.4–4.0 GHz band is used by a number of incumbent users, including providers of WA WBB services and LA WBB services, as well as apparatus-licensed point-to-multipoint (PMP) users and amateur and fixed satellite services (FSS) users.

Of particular note are users in the band that hold spectrum licences used for the provision of wireless broadband. These users are the MNOs (Optus, Telstra, and TPG) and NBN Co.²⁰ This includes existing licences in the band which were issued over time for a range of purposes, but that are now able to be used for the provision of wireless broadband.

Table 2 below outlines existing 3.4–4.0 GHz spectrum holdings in metropolitan areas.²¹

¹⁸ Previous ACCC advice on spectrum allocation limits can be found here: <https://www.accc.gov.au/regulated-infrastructure/communications/mobile-services/spectrum-competition-limits>.

¹⁹ The ACCC's advice to the Minister for Communications on allocation limits in the 3.6 GHz band can be found on the ACCC website at: <https://www.accc.gov.au/system/files/ACCC%20advice%20to%20Minister%20Fifield%20on%203.6%20GHz%20allocation%20limits.pdf>.

²⁰ This includes spectrum licences initially assigned to AKAL Pty Ltd (now Optus), and Mobile JV Pty Ltd (now TPG), and licences initially assigned to Dense Air Australia Pty Ltd, which were transferred to TPG in 2021.

²¹ Existing holdings in Table 2 are indicative only and include metropolitan licences in the 3.4 GHz and 3.6 GHz bands. Due to differing geographic boundaries, these licences differ in exact population and geographic coverage. This issue is discussed further below.

Table 2: Indicative existing spectrum holdings in metro areas in the 3.4–4.0 GHz band

	Sydney	Melbourne	Brisbane	Perth	Adelaide	Canberra
Optus	100 MHz	100 MHz	67.5 MHz	65 MHz	72 MHz	67.5 MHz
Telstra	60 MHz	60 MHz	62.5 MHz	62.5 MHz	63 MHz	62.5 MHz
TPG	65 MHz	65 MHz	95 MHz	95 MHz	90 MHz	95 MHz
NBN Co	0 MHz	0 MHz	0 MHz	2.5 MHz	0 MHz	0 MHz

As shown in Table 2, Optus has the largest holdings in the band in Sydney and Melbourne and TPG has the largest holdings in the rest of the metropolitan areas. Telstra has the lowest holdings amongst the MNOs across all metropolitan areas. NBN Co has minor holdings in Perth only.

Existing holdings in regional areas are more fragmented than in metropolitan areas, making analysis of comparable existing holdings more difficult. Table 3 outlines some indicative existing holdings in regional areas.²² While the MNOs have holdings in regional areas to varying extents, NBN Co appears to have the largest holdings in regional areas.

Table 3: Indicative existing spectrum holdings in regional areas in the 3.4–4.0 GHz band

	Optus	Telstra	TPG	NBN Co
3.4 GHz regional areas	0 – 65 MHz	0 MHz	0 MHz	65 – 140 MHz
3.4 GHz major regional centres	0 MHz	32.5 MHz	0 MHz	67.5 – 142.5 MHz
3.6 GHz regional areas (including regional centres)	0 – 35 MHz	50 – 80 MHz	20 – 45 MHz	0 MHz

A more detailed compilation of existing spectrum licence holdings is available at **Appendix B**.

In addition to existing 3.4–4.0 GHz licences, the ACCC is seeking stakeholder views on whether there are other holdings in metro and regional areas that should be taken into account on the basis that they are substitutable to the spectrum to be allocated in the 3.4 GHz and 3.7 GHz bands for the intended use cases.

²² Existing holdings in Table 3 are indicative only. Due to differing geographic boundaries, these licences differ in exact population and geographic coverage, and may not be the exclusive licence for an area (ie. a 3.4 GHz licence in Bendigo may overlap a 3.6 GHz licence in the larger Regional Victoria area).

Over time, spectrum is becoming increasingly technology-agnostic, and applicable to a range of use cases dependent only upon the propagation characteristics required for the deployment.

There are a number of mid-band spectrum bands that are being used for the deployment of wireless broadband, including 5G. For example, collectively the MNOs and NBN Co also hold mid-band spectrum licences in the 1800 MHz, 2000 MHz, 2300 MHz and 2500 MHz bands. We are interested in the degree to which these mid-band holdings can be considered substitutable with those being issued at this allocation, and if so, whether they should be taken into account in assessing allocation limits for the purpose of this advice.

7.2. Misalignments in geographic boundaries

In its letter of request, the ACMA noted the significant geographic misalignment in existing licence holdings in the 3.4–4.0 GHz band.

Spectrum licences in the 3.4 GHz band (3.4–3.575 GHz) were progressively allocated over the period 2000-2004. These licences were allocated in metro and regional areas, and following renewal in 2015, are due to expire in 2030.

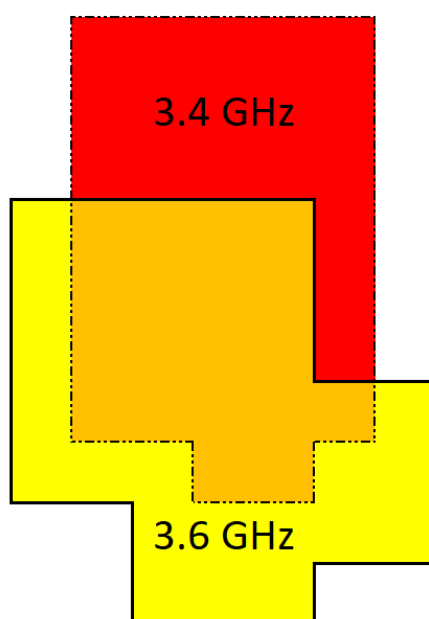
Spectrum licences in the 3.6 GHz band (3.575–3.7 GHz) were auctioned in 2018. These licences were also auctioned in metropolitan and regional areas, albeit with significantly different geographic boundaries to the boundaries in the 3.4 GHz band. These licences also expire in 2030.

NBN Co also holds spectrum licences in the 3.4 GHz band as a result of an ACMA process that occurred between 2019 and 2021 to optimise the utility of the band for current and future users. This process included converting existing NBN Co apparatus licences in specified areas to spectrum licences, and facilitating the defragmentation of Optus and NBN Co licences in the band. NBN Co also surrendered some spectrum in specified urban areas (the Urban Excise spectrum in mainland capitals).

The misalignment between the boundaries for various licences in the wider 3.4–4.0 GHz band makes it difficult to accurately depict existing spectrum holdings in a simple manner.

While spectrum licences are very clear on where the holder of a licence is permitted to operate equipment within Australia, difficulties can arise when assessing the aggregate holdings of relevant parties where the multiple licences they hold are not congruous either with each other or with the new licences being issued. Figure 5 illustrates a hypothetical example of the issue:

Figure 5: Hypothetical example of overlapping spectrum licences



In the above example, an entity holds 30 MHz in the 3.4 GHz band across the geographic area with the dashed outline, and 20 MHz in the 3.6 GHz band across the geographic area with the solid outline. The red area represents the licence area exclusive to the 3.4 GHz licence, while the yellow area represents where the entity holds only 3.6 GHz spectrum. The orange area represents the *geographic* overlap between these two distinct licences.

The hypothetical entity therefore holds 50 MHz in the orange area, 30 MHz in the purely red area, and 20 MHz in the purely yellow area. For the purposes of allocation limits, it must be determined how an allocation limit will operate in practice if the new geographic lot covers areas with different existing holdings.

For example, if a cross-band limit of 100 MHz was imposed and the boundaries chosen reflected the dashed 3.4 GHz boundaries area, the hypothetical entity would be restricted to bidding on a maximum of 50 MHz based on its total overlapping holdings in orange. Following the allocation, the entity would then hold only 80 MHz in the red area, less than what the limit allows.

On the other hand, making an allowance for this scenario and allowing the entity to bid for 70 MHz in the dashed 3.4 GHz area would increase its total holdings in the orange area to 120 MHz, exceeding the allocation limit.

This is the case whether the new licence follows the geographic boundaries of the (above hypothetical) 3.4 GHz licence, the 3.6 GHz licence, or some subset or superset of the two. This issue arises in both metro and regional areas.

Where this issue has arisen in the past, for example in the recent 850/900 MHz band auction,²³ allowances have been made based on the relative population sizes of the existing and new licences.

²³ See ACMA website at: <https://www.acma.gov.au/spectrum-allocation-and-auction-summary-850900-mhz-band-2021>

The ACCC would be interested in stakeholders' views on the most appropriate way of considering overlapping or non-congruous licence areas for the purpose of determining how to apply any allocation limits, should they be considered necessary.

7.3. Third party authorisation

Spectrum licences are tradeable assets. Under s.68 of the *Radiocommunications Act* 1992, licensees of spectrum licences may authorise other persons to operate radiocommunications devices under their licence. This arrangement is known as third party authorisation.

There is no requirement for either the owner or third party to notify the ACMA of any such an arrangement. Under s.68A of the *Radiocommunications Act* 1992, authorisation of a person to operate radiocommunications devices under a spectrum licence is explicitly taken to be an acquisition of an asset for the purposes of s.50 of the CCA.

On 21 February 2022, Telstra and TPG announced a significant proposed network sharing agreement.²⁴ Under this arrangement, Telstra would provide TPG with access to its active network infrastructure in defined regional and urban fringe areas. In return, Telstra would gain access to TPG's spectrum in the 700 MHz, 850 MHz, 2100 MHz and 3.6 GHz bands²⁵ in these areas, presumably by way of a third party authorisation arrangement.

Within the defined areas, this is likely to lead to a material increase in the amount of spectrum Telstra would be able to deploy on its network.

If implemented, the agreement would run for an initial ten years, with the option for TPG to request two contract extensions of five years each.

Third party authorisations, such as that likely envisaged in the proposed Telstra/TPG network sharing arrangement, are therefore a relevant consideration for the ACCC in providing advice on allocation limits, as they enable parties to use more spectrum than their existing licences suggest.

The value of spectrum is in its use for the purpose of deploying services in the downstream markets. For this reason, where the owner of a spectrum licence is different to the practical beneficiary of the spectrum, existing holdings may not be an accurate indicator of parties' ability to compete in the relevant markets. Further, significant asymmetries in holdings may not be as obvious where third party authorisations are in place.

The ACCC is seeking information on third party authorisations in the 3.4–4.0 GHz band and other mid-band spectrum. The ACCC is also interested in stakeholders' views on whether, and if so, how any third party authorisation arrangements, including what the proposed Telstra/TPG network sharing agreement involves, should be taken into account in assessing the need for and nature of allocation limits.

Questions

10. Should existing spectrum holdings in the 3.4–4.0 GHz band be considered in the ACCC's assessment of allocation limits?

11. Should existing spectrum holdings in bands other than the 3.4–4.0 GHz band (i.e. other mid-band licences) be considered in the ACCC's assessment of allocation limits?

²⁴ Telstra, *Telstra and TPG Telecom sign landmark network sharing agreement for regional Australia*, February 2022. Available here: https://cdn-api.markitdigital.com/apiman-gateway/ASX/asx-research/1.0/file/2924-02488765-3A587711?access_token=83ff96335c2d45a094df02a206a39ff4

²⁵ Communications Day, *Telstra, TPG see network share deal as a win-win-win*, 22 February 2022.

12. How should the variations in geographic boundaries for both existing and, potentially, new licences be taken into account in determining the operation of any allocation limit?

13. How should the ACCC take Telstra and TPG's proposed network sharing arrangement into account when assessing the need for and nature of allocation limits? Are there other third party authorisations in place for licenses in the 3.4–4.0 GHz band or other mid-bands?

8. The need for allocation limits?

While price-based allocation mechanisms, such as auctions, are widely used to allocate spectrum when demand is expected to exceed supply, unconstrained auctions do not always lead to an efficient allocation and use of spectrum resources. Allocation limits are important tools to help ensure that spectrum allocations promote competition in downstream markets that rely on spectrum as an essential input, thereby promoting the long-term public interest derived from the use of spectrum as a scarce resource. Allocation limits have been regularly imposed in the past to address competition concerns that may arise from spectrum allocations.

In an unconstrained auction, the bidders may have incentives to acquire more spectrum than they need, since the value they place on the spectrum includes both the value of using the spectrum as well as the value in keeping their competitors from acquiring the relevant spectrum. This could lead to anti-competitive outcomes in downstream markets which rely on the spectrum as an essential input and undermine the public benefit that could be derived from the use of the spectrum.

In the past, the ACCC has recommended both the imposition of allocation limits that apply within a particular band, as well as allocation limits that apply across bands that are considered substitutes of each other i.e. cross-band limits. The former is appropriate in circumstances where there are no existing holdings in substitutable bands and the key competition concern is to prevent the monopolisation of spectrum within that band following the allocation. The ACCC recommended this approach in advice to the Minister for Communications on the 26 GHz allocation in 2020.²⁶

A cross-band limit is appropriate in circumstances where some potential bidders already have substantial holdings in substitutable bands. In these cases, an in-band limit may not be sufficient to address competition issues arising from actual and potential asymmetry of spectrum holdings in a particular range of bands. As such, a cross-band limit that takes into account existing holdings in substitutable bands may be more appropriate. The ACCC recommended the use of cross-band limits in its advice to the Minister for Communications for the 3.6 GHz band allocation in 2018 and the 850 MHz expansion band and 900 MHz band allocation in 2021.²⁷

As discussed in Chapter 7, there are existing holdings in the 3.4–4.0 GHz band which are substitutable for the spectrum subject to allocation. The ACCC's preliminary view is that should there be a need for allocation limit for this allocation, it is likely that a cross-band limit is more appropriate than an in-band limit. A relevant question is whether the cross-band limit should be imposed on the 3.4–4.0 GHz band range, or whether it should be extended to cover other mid-band spectrum. This would, as noted in Chapter 7, depend on whether other mid-bands should be considered substitutable bands for the 3.4–4.0 GHz band for the intended use of the spectrum.

In either case, the ACCC understands there will be complications in imposing a cross-band limit due to the significantly different geographic boundaries of the licence areas for existing holdings. In addition, the ACMA has yet to decide on the geographic boundaries of the

²⁶ A copy of the ACCC's advice on allocation limits for the 26 GHz band allocation is available on the ACCC website at: <https://www.accc.gov.au/regulated-infrastructure/communications/mobile-services/spectrum-competition-limits/request-for-advice-26-ghz-spectrum>.

²⁷ A public version of the ACCC's advice on allocation limits for the 3.6 GHz band allocation is available on the ACCC website at: <https://www.accc.gov.au/regulated-infrastructure/communications/mobile-services/spectrum-competition-limits/request-for-advice-36-ghz-spectrum>. A public version of the ACCC's advice on allocation limits for the 850 MHz expansion band and 900 MHz band allocation is available on the ACCC website at: <https://www.accc.gov.au/regulated-infrastructure/communications/mobile-services/spectrum-competition-limits/request-for-advice-850-900-mhz-spectrum>

spectrum licences on offer. These factors are important to the operation of a cross-band limit and would need to be considered in assessing the feasibility of a cross-band limit in this allocation.

Questions

14. Do you think allocation limits are necessary for the 3.4 GHz and 3.7 GHz band spectrum allocation? Relevantly, would allocation limits promote competition and encourage investment in infrastructure, including in regional Australia?

15. If so, do you think a cross-band limit or an in-band limit would be more appropriate? What do you think the quantum of the allocation limit should be? Do you think different allocation limits should apply to metropolitan and regional areas? How would the application of these allocation limits affect the relevant downstream markets?

16. Are there other factors that you consider the ACCC should consider in assessing the possible allocation limits to apply?

Appendix A: Consolidated list of questions

1. What are the likely intended uses of spectrum in the 3.4 GHz and 3.7 GHz bands in metro and regional areas?
2. If you intend to acquire the spectrum to deploy wireless services:
 - a. In which geographic areas do you intend to use the spectrum?
 - b. What do you consider is the optimal allocation of 3.4–4.0 GHz spectrum to support your likely intended uses? What is the minimum allocation necessary?
3. How is the spectrum licensing arrangement and the intended use of price-based allocation likely to impact your demand for spectrum at this allocation?
4. How is the term of the spectrum licences likely to impact your demand for spectrum at this allocation?
5. How is the differing utility of the urban excise spectrum likely to impact your demand for spectrum at this allocation?
6. What are the relevant downstream markets for the purpose of assessing the impact of the 3.4 GHz and 3.7 GHz bands allocation on competition?
7. Are there likely to be future relevant markets that have not been identified?
8. Do you have any comment on the state of competition in the relevant downstream markets that you consider should be taken into account? What do you think are the key competition issues arising from the 3.4 GHz and 3.7 GHz bands allocation in these downstream markets?
9. How would the allocation of spectrum licences in the 3.4 GHz and 3.7 GHz bands in metropolitan and regional areas impact competition and investment in these markets?
10. Should existing spectrum holdings in the 3.4–4.0 GHz band be considered in the ACCC's assessment of allocation limits?
11. Should existing spectrum holdings in bands other than the 3.4–4.0 GHz band (i.e. other mid-band licences) be considered in the ACCC's assessment of allocation limits?
12. How should the variations in geographic boundaries for both existing and, potentially, new licences be taken into account in determining the operation of any allocation limit?
13. How should the ACCC take Telstra and TPG's proposed network sharing arrangement into account when assessing the need for and nature of allocation limits? Are there other third party authorisations in place for licenses in the 3.4–4.0 GHz band or other mid-bands?
14. Do you think allocation limits are necessary for the 3.4 GHz and 3.7 GHz band spectrum allocation? Relevantly, would allocation limits promote competition and encourage investment in infrastructure, including in regional Australia?
15. If so, do you think a cross-band limit or an in-band limit would be more appropriate? What do you think the quantum of the allocation limit should be? Do you think different allocation limits should apply to metropolitan and regional areas? How would the application of these allocation limits affect the relevant downstream markets?

16. Are there other factors that you consider the ACCC should consider in assessing the possible allocation limits to apply?

Appendix B: Current spectrum licensed holdings of operators in Australia

These values are *indicative only*. Due to differing geographic boundaries, these licences differ in exact population and geographic coverage. This table reflects total holdings by the associated operator, and some licences tallied here are listed under different client names in the Register of Radiocommunications Licences.

Total spectrum holding	MAJOR CITIES (Sydney, Melbourne, Adelaide, Perth, Brisbane)				REGIONAL (including Canberra, Darwin and Hobart)			
	Telstra	Optus	TPG	NBN Co	Telstra	Optus	TPG	NBN Co
3.6 GHz (125 MHz)	30 to 60		65 to 95		50 to 80	30 to 35	20 to 45	
3.4 GHz (175 MHz)	0 to 32.5	65 to 100		0 to 2.5	0 to 32.5	0 to 67.5		65 to 142.5 ²⁸
2.5 GHz (2 x 70 MHz)	80	40			80	40		
2.3 GHz (98 MHz)		70 to 98			0 to 98	0 to 98		0 to 98

²⁸ NBN hold up to 175 MHz in some very small areas. In parts of regional WA, NBN do not hold any 3.4 GHz spectrum.

2 GHz (2 x 60 MHz)	30 to 40	40	40 to 50		20 to 40	10 to 40	10 to 40	
1800 MHz (2 x 75 MHz)	30 to 40	30	50 to 60		70 to 80	40 to 50	20 to 70	
900 MHz²⁹ (2 x 25 MHz)	16.8	16.8	16.4		16.8	16.8	16.4	
800 MHz³⁰ (2 x 20 MHz)	20 to 30		20		30		10	
700 MHz (2 x 45 MHz)	40	20	30		40	20	30	

Source: ACMA Register of Radiocommunications Licences. For exact licence conditions see https://web.acma.gov.au/rrl/register_search.main_page

²⁹ 900 MHz here reflects the current (2022) planning arrangement under nationwide apparatus licences.

³⁰ 800 MHz here does not include the 850 MHz expansion band allocated in 2021.