



Allocation limits advice for the 3.4 GHz and 3.7 GHz spectrum allocation

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1. Executive Summary

The Australian Communications and Media Authority (ACMA) has 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.

Radiofrequency spectrum is a scarce and finite resource that is an essential input for the provision of wireless services, such as mobile services and satellite communications, in downstream markets.

ACCC assessment

The ACCC has conducted its assessment of whether allocation limits are required, and if so, what those limits should be, having regard to the following matters:

- promoting competition in downstream markets for the long-term interests of end-users (LTIE), and encouraging investment in infrastructure including in regional Australia
- supporting the deployment of new and innovative technology, including 5G.

Relevant markets

Market definition is a purposive exercise. The ACCC identified the national mobile services market and the national fixed broadband market as the most relevant downstream markets for the purposes of this assessment. Mobile Network Operators (MNOs) such as Telstra, Optus, and TPG Telecom compete in the national mobile market. Both NBN Co and MNOs supply fixed broadband services, with NBN Co supplying wholesale fixed broadband services.

Operators in the relevant markets invest in infrastructure to provide services. Operators deploy mobile towers to send and receive mobile transmissions such as data and calls. Mobile transmissions are carried between mobile towers and end-users' communication devices (e.g. mobile phones) by spectrum.

Operators typically deploy a mix of spectrum bands in providing services:

- low-band spectrum (<1 GHz) carries mobile transmissions over longer distances and thus provides geographic coverage
- mid-band spectrum (1–6 GHz) is capable of carrying more mobile transmission and thus provides capacity
- high-band spectrum (>6 GHz) is capable of carrying a significant amount of mobile transmission over short distances and thus provides speed.

State of competition

While there is some competition between the MNOs, it is limited. The retail market shares for mobile phone services remain steady, heavily concentrated in retail brands operated by the three MNOs, Telstra, Optus and TPG. Telstra has increased its market share to 44%, with Optus and TPG at 31% and 17% respectively. The Mobile Virtual Network Operators (MVNOs) and other resellers make up the remainder of the market. All the MNOs are advancing the rollout of their 5G networks and services and are heavily advertising the availability of their 5G networks as a point of competition in recent years. Availability of 5G-compatible handsets is now much greater than at the launch of these 5G networks, and 5G

is becoming an important differentiator as the MNOs' flagship brands focus on non-price factors such as speed, coverage, technology, and customer service.

In terms of the national fixed broadband market,¹ the MNOs appear to increasingly focus on supplying wireless broadband services through their own mobile networks, bypassing the need to acquire NBN wholesale fixed broadband services. While the competitive effect of this remains unclear, the ACCC considers it important that infrastructure competition in wireless home broadband access markets is open for new entrants.

3.4 GHz and 3.7 GHz spectrum are considered mid-band spectrum. We consider that holdings in the 3.4, 3.6 and 3.7 GHz bands are substitutable due to similarities in their technical characteristics, the availability of devices capable of transmitting and receiving them, as well as international harmonisation of the wider band.

While MNOs appear to have sufficient 3.4–3.8 GHz spectrum holdings to realise the early benefits of 5G services, the ACCC considers that they will require additional spectrum in these bands in the future to meet increasing data requirements.

Telstra and TPG have also entered into three interrelated agreements described as a Multi-Operator Core Network (MOCN) commercial arrangement: a MOCN Service Agreement, a Spectrum Authorisation Agreement, and a Mobile Site Transition Agreement. Under the proposed Spectrum Authorisation arrangement, Telstra would provide TPG with access to its active network infrastructure in defined regional and urban fringe areas, and Telstra will gain access to TPG's spectrum in the 700 MHz, 850 MHz, 2100 MHz, and 3.6 GHz bands in these areas. Telstra and TPG's agreements have the potential to impact the state of competition in the relevant markets and the proposed Spectrum Authorisation Agreement is the subject of an application for Merger Authorisation to the ACCC.²

Allocation limits are required

The ACCC considers that allocation limits are required for this allocation in order to promote competition in the downstream mobile and fixed broadband markets post-auction.

In the future, MNOs will likely need additional mid-band spectrum to ensure they can cater for the increasing data demands of 5G services. Currently, there are holding imbalances between the MNOs so that in differing areas they may individually have a strong need to acquire spectrum. NBN Co, in particular, has substantial regional holdings and may have an incentive to prevent MNOs acquiring spectrum to deny the possibility of them expanding their fixed wireless services, which compete with broadband products supplied using NBN Co's offerings.

Nature of recommended allocation limits

The ACCC considers that anti-monopolisation limits are required to prevent any party from monopolising the spectrum available through this process. We consider that those limits should be set irrespective of the proposed Spectrum Authorisation between Telstra and TPG Telecom. While the proposed Spectrum Authorisation will significantly increase Telstra's access to spectrum in regional areas, the cumulative effect of this particular allocation is marginal.

¹ This market includes services provided using either fixed line or wireless access technologies.

² Pursuant to s 68A of the Radiocommunications Act 1992 (Cth) (Radiocommunications Act), TPG's grant of authorisation to Telstra to use TPG spectrum within the meaning of s 68(1) is deemed to be an acquisition within the meaning of s 50 of the Competition and Consumer Act 2010 (Cth) (CCA) and is capable of merger authorisation under Part VII.

The ACCC can grant merger authorisation if it is satisfied in all the circumstances that the Spectrum Transaction would not be likely to substantially lessen competition, or if the likely public benefits from the Spectrum Transaction would outweigh any likely public detriment.

We consider that holdings in the 3.4, 3.6 and 3.7 GHz bands are substitutable due to similar technical characteristics and device availability, as well as international harmonisation of the wider band. Therefore, we recommend only a cross-band limit rather than individual band limits.

In both metropolitan and regional areas, we consider a limit of 140 MHz of spectrum between 3.4 and 3.8 GHz is in the LTIE.

At the time of the ACMA's request for advice, we were asked about spectrum allocation limits for the urban excise spectrum. The ACMA has subsequently determined that this spectrum will be allocated via apparatus licences. Therefore, we have not provided advice regarding the urban excise spectrum.

2. Background

2.1. Request for advice and ACCC consultation

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. At the time of its request for advice, the ACMA had yet to make several planning decisions which impact the spectrum to be made available for spectrum licensing in this allocation process. The ACMA made these planning decisions in July 2022 as the ACCC was finalising its advice.

In its letter of request, the ACMA noted that there is likely to be considerable interest in this mid-band spectrum³ 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.

On 2 March 2022, the ACCC released a consultation paper seeking stakeholders' views on a range of issues relevant to its consideration of the advice to the ACMA.⁴ Submissions closed on 29 April 2022.

The ACCC received submissions from Telstra, Optus, TPG Telecom, NBN Co, Pivotal and Cambium Networks.⁵ The ACCC has had regard to all relevant submissions in preparing this advice.

2.2. Rationale for intervention

Radiofrequency spectrum is a scarce and finite resource that is an essential input for the provision of wireless services, such as mobile services and satellite communications, in downstream markets.

Where spectrum demand is likely to be greater than supply, the common approach is to allow the market to determine the allocation through a price-based allocation method, such as an auction.

The ACCC recognises that allowing the market to determine the price of spectrum through an auction means that spectrum is acquired by the highest value bidders, with the expectation that this encourages that spectrum be put to its highest value use, thus promoting allocative efficiency. Spectrum licences are likely to promote dynamic efficiency because licence holders can put the spectrum to a higher value use that emerges over time.

However, allocating spectrum in an auction to the highest bidder can potentially weaken competition in downstream markets. Operators will value spectrum based on both the

³ Mid-band spectrum is bands between 1 GHz and 6 GHz.

⁴ See ACCC, *Allocation limits advice for the 3.4 GHz and 3.7 GHz bands spectrum licence allocation – Consultation paper*, March 2022, at: <https://www.accc.gov.au/regulated-infrastructure/communications/mobile-services/spectrum-competition-limits/request-for-advice-34-ghz-and-37-ghz-spectrum-allocation>.

⁵ Public submissions are available on the ACCC's website at: <https://www.accc.gov.au/regulated-infrastructure/communications/mobile-services/spectrum-competition-limits/request-for-advice-34-ghz-and-37-ghz-spectrum-allocation>.

spectrum's technical and commercial value. In forming these valuations, companies with a strong existing market position will consider the spectrum's value in providing cost-effective services to customers and the value to be gained by keeping it from competitors. This can detrimentally affect competition and the quality and price of services for mobile services customers.

Given this, auction settings such as allocation limits can help promote competition and economic efficiency in markets that rely on spectrum by giving operators an opportunity to acquire sufficient spectrum which, when used with existing holdings, allows them to compete effectively in the downstream markets. When the operators can compete effectively, this promotes good outcomes for consumers, in terms of choice, price and quality of services available.

2.3. ACCC approach to advice

Under the *Radiocommunications Act 1992*, the ACMA can impose statutory limits on the aggregate amount of spectrum that may be used by any party because 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.⁶

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.

Drawing on the Ministerial Policy Statement for the allocation of spectrum in the 3.4–4.0 GHz band, the ACCC has conducted its assessment of whether allocation limits are required, and if so, what those limits should be, having regard to the following matters:

- 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.⁷

2.4. About this advice

This advice sets out the ACCC's recommendation to the ACMA on the allocation limits that should apply to the allocation of spectrum licences in the 3.4 and 3.7 GHz bands and includes the ACCC's reasons and analysis in support of the recommendation.

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

⁷ Radiocommunications (Ministerial Policy Statement – 3.4-4.0 GHz) Instrument 2022 (Cth).

3. Overview of allocation

The ACMA recently consulted 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.⁸ The ACCC's consultation was conducted based on these 3 options.

In July 2022, the ACMA made spectrum planning decisions regarding the 3.4 GHz and 3.7 GHz bands that are set out in the Radiocommunications (Spectrum Re-allocation – 3.4 GHz and 3.7 GHz Bands) Declaration 2022.⁹

Table 1 below sets out the amount of spectrum to be allocated via spectrum licences in each geographic area.

Table 1: Spectrum available as new spectrum licences under the ACMA's Re-allocation Declaration¹⁰

Geographic areas	Available spectrum
Metropolitan areas	100 MHz (3.7–3.8 GHz) ¹¹
Major regional centres 1	100 MHz (3.7–3.8 GHz)
Major regional centres 2	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	160 MHz consisting of: <ul style="list-style-type: none"> • 42.5 MHz (3.4–3.425 GHz) • 67.5 MHz (3.475–3.5425 GHz) • 50 MHz (3.7–3.75 GHz)
Regional area 2	135 MHz consisting of: <ul style="list-style-type: none"> • 35 MHz (3.475–3.51 GHz) • 100 MHz (3.7–3.8 GHz)
Regional WA central	200 MHz consisting of: <ul style="list-style-type: none"> • 100 MHz (3.475–3.575 GHz) • 100 MHz (3.7–3.8 GHz)

⁸ ACMA consultation paper, p. 1.

⁹ ACMA, *Proposed spectrum re-allocation declaration for the 3.4 GHz and 3.7 GHz bands: Outcomes paper*, July 2022.

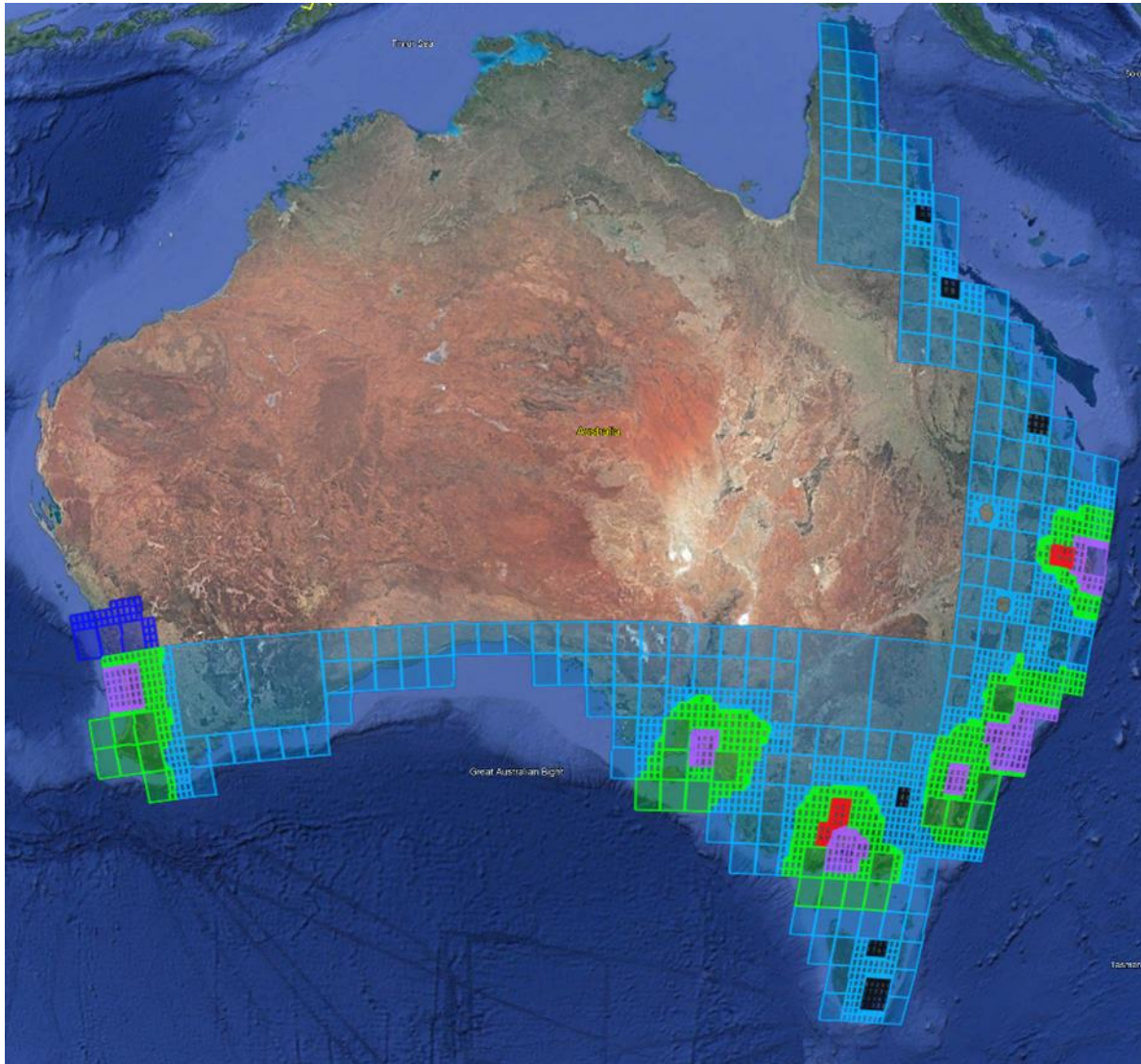
¹⁰ ACCC calculation based on ACMA Outcomes paper.

¹¹ In Hobart, 175 MHz will be available (3.4–3.425 GHz, 3.4925–3.5425 GHz, and 3.7–3.8 GHz), owing to Hobart's historical designation as regional.

The practical effect of this re-allocation will be to bring all spectrum between 3400 and 3750 MHz in Major regional centres 2 and Regional area 1, and 3400 and 3800 MHz in metro areas, Major regional centres 1, Regional area 2, and Regional WA central under spectrum licensing. The ACMA noted that this option could facilitate the complete defragmentation of spectrum licence holdings in the band.¹²

Figure 1 gives an indication of the geographic areas where spectrum licences will be made available.

Figure 1: Indicative map of areas subject to spectrum licensing under ACMA's re-allocation declaration¹³



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

¹² ACMA consultation paper, pp. 21.

¹³ The figure is reproduced from ACMA consultation paper at p. 54.

4. Competition assessment

Our competition assessment involves:

- identifying the relevant downstream markets having regard to the intended use of and demand for the spectrum,
- assessing the state of competition in the relevant downstream markets, and
- analysing any relevant existing holdings that should be taken into account and how the allocation would likely impact the ability of the operators to compete in the relevant market.

These are discussed below.

4.1. Identifying the relevant downstream markets

Defining the relevant downstream markets where 3.4 GHz and 3.7 GHz band spectrum will be used establishes the field of inquiry in which to assess the outcomes of the spectrum allocation and determine whether allocation limits are required to promote competition.

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 5G wireless technologies. The use cases include the provision of wide area wireless broadband, local area wireless broadband and private wireless enterprise deployment.

It 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 MNOs to provide mobile services, by smaller wireless internet service providers to provide localised fixed wireless services, or by operators or enterprises to deploy private networks that utilise either 4G or 5G wireless technology or other proprietary technology.

Demand in a spectrum auction is likely to come from bidders who value the spectrum the most and/or have the best ability to commercialise the spectrum. The bidders with the highest willingness to pay are more likely to win the spectrum. In this case, bidders with the highest willingness to pay are likely to be the three MNOs and NBN Co.

MNOs currently compete in relation to the supply of mobile services. Both NBN Co and MNOs supply fixed wireless access services, with NBN Co supplying wholesale fixed wireless access services.

The mobile services market and the fixed broadband services market are the most relevant downstream markets

All submitters to the ACCC's consultation said that this spectrum allocation was likely to be used for either 5G mobile services or fixed wireless access services or a combination of those two.

TPG Telecom submitted that the main use of the spectrum is to provide capacity to 5G mobile networks (and potentially 6G in the future). This network capacity enables many downstream use cases but is primarily for network operators to provide mobility and fixed wireless access services. It noted that both the MNOs and NBN Co rely on this spectrum band to provide fixed wireless access services.¹⁴

¹⁴ TPG, *Allocation limits advice for the 3.4 and 3.7 GHz band spectrum allocation: Response to ACCC Consultation Paper*, June 2022, p. 4 (TPG submission).

Optus noted that ‘the intended uses for spectrum licence holders will be wide-area wireless broadband services to enable 5G mobile services and fixed wireless access.’¹⁵

Telstra recognised that ‘mid band spectrum has multiple use cases and potential uses beyond MNOs, particularly in relation to fixed wireless access services as an alternative to an NBN fibre connection or NBN fixed wireless service.’¹⁶ Telstra also noted a definitional issue in its submission: when referring to fixed wireless access, it does not include MNO home broadband products in that category.¹⁷

Pivotel noted that the spectrum to be allocated is crucially important for the delivery of 4G/5G/6G services for both mobile coverage and especially in relation to wireless broadband usage, alongside low band spectrum for coverage and mmWave spectrum for very high speed, low latency applications. It noted that the spectrum can also be used for fixed wireless access services, local area wide area broadband and private LTE/5G enterprise usage.¹⁸

Cambium Networks submitted that the relevant applications are purely mobile broadband, based on the spectrum licensing model.¹⁹ NBN Co said the spectrum would be used to deliver fixed wireless access services to increase geographic footprint, capacity, and speeds.²⁰

Market definition is a purposive exercise. In this case, the ACCC has identified the relevant downstream markets in which to conduct the competition assessment as being the national mobile services market and the fixed wireless services market. The wholesale mobile services market where the MNOs supply wholesale services to the mobile virtual network operators (MVNOs) may also be an intermediate relevant market. However, ultimately the impact of the allocation on the ability of the MNOs to attract MVNOs is likely to flow through to affect competition in the retail mobile services market.

4.2. State of competition in relevant downstream markets

The ACCC uses the long-term interests of end-users (LTIE) assessment to consider whether the potential outcomes of a spectrum allocation will promote competition for the benefit of end-users. As part of this assessment, we consider the current state of competition in the relevant markets and how the allocation might impact the future state of competition to determine if any measures are required to safeguard competition.

A key question the ACCC considers in its allocation limits advice is how the allocation of spectrum will impact the ability of operators to compete in relevant markets for the benefit of consumers. In particular, we consider whether any operator’s ability to compete would be constrained if they do not acquire spectrum in the allocation.

¹⁵ Optus, *Allocation limits advice for the 3.4 and 3.7 GHz band spectrum allocation: Response to ACCC Consultation Paper*, June 2022, p. 6 (Optus submission).

¹⁶ Telstra, *Allocation limits advice for the 3.4 and 3.7 GHz band spectrum allocation: Response to ACCC Consultation Paper*, June 2022, p. 7 (Telstra submission).

¹⁷ Telstra submission, pp.12-13.

¹⁸ Pivotel, *Allocation limits advice for the 3.4 and 3.7 GHz band spectrum allocation: Response to ACCC Consultation Paper*, June 2022, pp. 2-3.

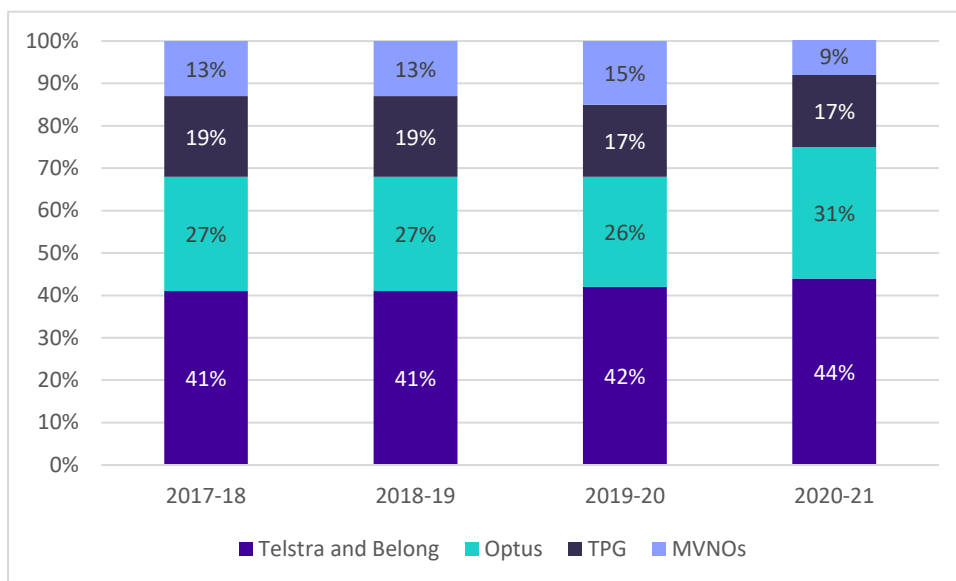
¹⁹ Cambium Networks, *Allocation limits advice for the 3.4 and 3.7 GHz band spectrum allocation: Response to ACCC Consultation Paper*, June 2022, p. 3.

²⁰ nbn, *Allocation limits advice for the 3.4 and 3.7 GHz band spectrum allocation: Response to ACCC consultation*, June 2022, p. 3.

Mobile services market

While there is some competition between the MNOs, it is limited. The retail market is concentrated with the collective market shares of the three MNOs increasing further in 2020-21, as illustrated by figure 2 below. The retail market shares for mobile phone services remain steady, heavily concentrated in retail brands operated by the three MNOs, Telstra, Optus, and TPG. Telstra has increased its market share to 44%, with Optus and TPG at 31% and 17% respectively. The MVNOs and other resellers make up the remainder of the market.

Figure 2: Retail market share of mobile phone services²¹



Note: numbers may not add due to rounding.

As noted in the ACCC's Communications Market Report 2020-21, the retail mobiles market has seen flat or rising prices under the ACCC's advertised price approach but falling feature-adjusted prices calculated using a hedonic index. These results indicate a trend towards a model of 'more-for-more' service offerings, mainly more data for the same or higher prices. This is a key feature at the higher end of the market.

With the MNOs continuing to consolidate their retail plans, the MNOs increased prices on a range of post-paid plans and effectively increased the price of pre-paid plans where expiry periods were reduced, requiring customers to recharge more frequently. For some customers on pre-paid plans, effective price increases came through reductions in the recharge expiry period on some 35- and 42-day pre-paid plans to 28 days. Over a year, this can mean a substantial nominal price rise of 25%, and in some cases 50%.²²

In 2020-21, Telstra increased the prices on its post-paid plans by between \$5 and \$15 per month.²³ It has recently announced that, from this year, its post-paid mobile and mobile broadband data plans will include an annual review and prices may increase by Consumer Price Index each year. In July 2022, Telstra announced that mobile plan pricing will increase

²¹ ACCC, [Communications Market Report 2020-21](#), p. 40.

²² ACCC, [Communications Market Report 2020-21](#), pp. X-XI.

²³ Telstra, [Why we're changing our mobile plans and what you'll get out of it](#), June 2020 (accessed 3 July 2022).

between \$2 and \$4 per month in line with the Consumer Price Index.²⁴ Telstra appears to enjoy a number of advantages, such as a larger geographic network.

While the retail market is concentrated, the MNOs continue to invest to expand network coverage in metropolitan and regional areas and deploy new technologies.

TPG Telecom noted that following the Vodafone-TPG merger in 2020, infrastructure-based competition in the wireless industry has strengthened, evidenced by the billions of dollars of investment made by the mobile industry in 5G upgrades.²⁵

Table 2 below shows that all three MNOs continue to invest in infrastructure to improve their services' geographic coverage and network quality. Between 2020 and 2021, the MNOs collectively added a total of 1,005 new sites across their three networks. A majority of these sites were deployed in Major Cities where TPG Telecom deployed the greatest number of new sites (197), followed by Optus (163). Telstra added the fewest number of new sites in Major Cities (105).²⁶

Table 2: Total number of sites by MNO and Australian Bureau of Statistics Remoteness Area – Major Cities of Australia vs Outside Major Cities of Australia – 2018 to 2021²⁷

	2018	2019	2020	2021
Major Cities of Australia				
Optus	4,691	4,758	4,874	5,037
Telstra	4,737	4,801	5,060	5,165
TPG	4,207	4,268	4,306	4,503
Outside Major Cities of Australia				
Optus	2,644	2,954	3,106	3,201
Telstra	4,692	5,171	5,391	5,601
TPG	1,215	1,340	1,369	1,389
Total				
Optus	7,335	7,712	7,980	8,238
Telstra	9,429	9,972	10,451	10,766
TPG	5,422	5,608	5,675	5,892

Telstra operates slightly more sites than Optus in metropolitan areas but has significantly more sites in regional areas than Optus and TPG Telecom.

Data collected by the ACCC shows that while in recent years the MNOs have continued to invest in network deployment, the focus has shifted to the roll-out of 5G technology with the deployment of 3G and 4G slowing.²⁸ During 2020-21, the MNOs continued to rapidly deploy 5G technology, collectively operating more than 3,800 active sites nationwide.²⁹

The strongest focus of competition between MNOs is on the deployment of their 5G networks. All three MNOs are heavily advertising the availability of their 5G networks as a point of competition in recent years. Availability of 5G-compatible handsets is now much

²⁴ Telstra, [Our plans and pricing are changing](#), (accessed 3 July 2022).

²⁵ TPG submission, p. 6.

²⁶ ACCC, [Mobile Infrastructure Report 2020-21](#), p. 6.

²⁷ ACCC, [Mobile Infrastructure Report 2020-21](#), p. 6.

²⁸ ACCC, [Mobile Infrastructure Report 2020-21](#), pp. 6-10.

²⁹ ACCC, [Communications Market Report 2020-21](#), p. 37.

greater than at the launch of these 5G networks, and 5G is becoming an important differentiator as the MNOs' flagship brands focus on non-price factors such as speed, coverage, technology, and customer service. Given the importance of 5G, an MNO not being able to provide a quality 5G network will erode competitive vigour in this market.

Fixed broadband services market

The ACCC considers that MNOs may be incentivised to use the spectrum available in this auction to supply fixed wireless services to bypass the NBN network. All MNOs agreed with this proposition, although Telstra raised concerns about the impact of mixing different use-cases within the same spectrum band.

In particular, TPG has noted its intent to more than double its fixed wireless customer base in 2022.³⁰ Telstra noted at its Investor Day in November 2021, that it is feasible to offer a fixed wireless access service to about 10-15% of the broadband market.³¹ Telstra also noted that it would specifically target areas where the NBN network "does not provide what the customer wants".³²

MNOs' fixed wireless service offerings provide features and pricing comparable or cheaper than fixed line products they provide over the NBN. Some MNOs also directly market their fixed wireless access products as comparable or alternatives to their retail NBN fixed broadband services.³³

Optus positions its 5G home product as a premium product with two tiers: 100 Mbps, which for the majority of Australian premises, is the maximum NBN speed available; and 'uncapped' which offers a typical busy period speed of >200 Mbps.³⁴ Despite this premium positioning, Optus's fixed wireless product is the same price (currently \$79/month) as the NBN product at the same speed for the first six months.³⁵ After six months, the NBN 100 Mbps product increases to \$99/month, a \$20 per month premium over the wireless product. The Optus premium home broadband packages include Netflix as an offer on all relevant products (usually \$16.99 retail).

Telstra also offers a 100 Mbps product for fixed wireless, with just a single plan priced at \$85/month with downloads capped at 1 terabyte. Telstra's NBN services are priced at a premium to the rest of the market. This means that while Telstra charges \$110 for an NBN 100 Mbps product, its 100 Mbps fixed wireless product is considerably cheaper at \$85/month. Telstra also offers a content streaming service bundled with its package.

TPG's home broadband wireless product is priced cheaper than Telstra or Optus's and provides a lower speed service. It offers 50 Mbps for \$65 and 100 Mbps for \$70 with unlimited data. Both plans are \$5 cheaper per month with an ongoing Vodafone mobile contract.³⁶

Currently, retail competition in home wireless broadband services is largely occurring in major metropolitan cities and, in particular, dense inner-city areas. This may change in the future as the 5G rollout moves into regional and more sparsely populated areas.

³⁰ TPG, Results for Full Year Ended 31 December 2021, p. 2.

³¹ Telstra, Investor Day Transcript, November 2021, pp. 9, 30.

³² R Clark, [Telstra weaponizes 5G against NBN](#), LightReading, 19 January 2021.

³³ TPG, [TPG Home Wireless Broadband](#), accessed 6 July 2022; Vodafone, [5G Home Internet](#), accessed 6 July 2022.

³⁴ Optus, [Enjoy fast 5G internet, now with Netflix included](#), accessed 7 July 2022.

³⁵ This price excludes the cost of the modem (\$576) which is rebated if a customer stays connected for 36 months. If a customer disconnects earlier, the customer must pay pro rata for the modem.

³⁶ TPG continues to market mobile services using the Vodafone brand.

It is yet to be seen how NBN Co as a wholesale-only provider responds to developments at the retail level involving the supply of fixed wireless broadband products by its vertically integrated customers. The ACCC considers it important that infrastructure competition in wireless home broadband access markets is open for new entrants.

The ACCC also notes that Telstra’s copper-based ADSL network is approaching the end of its life. While the number of active connections on Telstra’s ADSL network, for example, has fallen substantially, some 278,000 services remain in operation as at June 2021.³⁷ Telstra may also have incentives to consider shifting these customers to other services such as NBN broadband or on its fixed wireless access service in order to provide better quality services at lower cost.

4.3. Existing spectrum holdings

Operators in the relevant markets invest in infrastructure to provide services. Operators deploy mobile towers to send and receive mobile transmissions such as data and calls. Mobile transmissions are carried between mobile towers and end-users’ communication device (e.g. mobile phone) by spectrum.

Operators typically deploy a mix of spectrum bands in providing services:

- low-band spectrum (<1 GHz) carries mobile transmissions over longer distances and thus provides geographic coverage
- mid-band spectrum (1–6 GHz) is capable of carrying more mobile transmission and thus provides capacity
- high-band spectrum (>6 GHz) is capable of carrying a significant amount of mobile transmission over short distances and thus provides speed.

The ACCC considers that MNOs have sufficient 3.4-3.8 GHz spectrum to realise the early benefits of 5G services in the short-term. We have noted in previous allocations that, based on advice provided to the ACCC, 60 MHz of 3.4, 3.6 and 3.7 GHz mid-band spectrum is sufficient to realise the benefit of early 5G services over 4G services.³⁸

As shown in Table 3 below, all MNOs have this amount in all capital cities. All MNOs are progressing the rollout of their respective 5G networks in metro areas, although Telstra leads Optus and TPG by some margin. Table 4 below shows regional spectrum holdings for MNOs and NBN Co.

Table 3: 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 ³⁹	0 MHz	0 MHz	0 MHz	2.5 MHz	0 MHz	0 MHz

³⁷ Telstra, [Response to the ACCC’s Wholesale ADSL declaration inquiry](#), 10 September 2021.

³⁸ ACCC, [Allocation limits advice for the 3.6 GHz spectrum allocation](#), July 2018, p. 3.

³⁹ NBN Co, in some parts of some metropolitan areas, has up to 75 MHz in the 3.4 GHz band. NBN Co has surrendered parts of its 3.4 GHz licences in metropolitan areas. The ACMA has decided that this urban excise spectrum will be allocated by apparatus licences. ACMA Outcomes paper, p. 1.

Note: Indicative holdings are based on the geographic boundaries of the 3.4 GHz spectrum band.

Table 4: Indicative existing spectrum holdings in regional areas in the 3.4–4.0 GHz band

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

In particular, Telstra stated that additional spectrum in the 3.4 GHz and 3.7 GHz bands will complement spectrum already auctioned or otherwise allocated in the 3.6 GHz band, which has been used by MNOs in the roll out of their 5G networks.⁴⁰

However, MNOs also stated that spectrum available in this auction will be critical to providing quality 5G services in the medium to long-term. MNOs are likely going to need additional spectrum to ensure they can cater for increasing data and coverage demands for 5G services in the future.⁴¹ There are also holding imbalances between MNOs: in some areas some MNOs appear to have a strong need to be able to acquire spectrum, while in some other areas they appear to have a large amount.⁴² NBN Co, in particular, has substantial spectrum holdings in regional areas.

The ACCC considers that holdings in the 3.4, 3.6 and 3.7 GHz bands are substitutable due to their similar technical characteristics and device availability, as well as international harmonisation of the wider band.

Other potentially relevant spectrum bands canvassed in our consultation paper included other mid-band spectrum, and 2.3 GHz band spectrum in particular. We do not consider 1800 MHz, 2100 MHz, and 2.6 GHz band spectrum substitutable because they do not offer the same large bandwidths available as 3.4-3.8 GHz spectrum.

The 2.3 GHz band has similar propagation characteristics, vendor availability and technical frameworks as the 3.4–3.8 GHz band. However, the 5G equipment ecosystem is not as developed for 2.3 GHz as it is for the 3.4–3.8 GHz band. Additionally, due to existing geographic asymmetries of holdings, including 2300 MHz as substitutable in this allocation may prevent affected operators from acquiring geographically contiguous spectrum in the 3.4 and 3.7 GHz bands. Where there are different licensees in two adjacent areas at the same frequency, the effective licence area may be smaller due to coordination requirements.

Therefore, the ACCC considers that relevant substitutable spectrum bands for this allocation are 3.4, 3.6 and 3.7 GHz.

⁴⁰ Telstra submission, p. 6.

⁴¹ TPG submission, p. 5.

⁴² Optus submission, p. 13.

4.4. Third-party authorisations

Spectrum licences are tradeable assets. In addition, under section 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 a third-party authorisation.

[c-i-c] [c-i-c]⁴³

Telstra and TPG have entered into but not yet implemented three interrelated agreements described as a Multi-Operator Core Network (MOCN) commercial arrangement: a MOCN Service Agreement, a Spectrum Authorisation Agreement, and a Mobile Site Transition Agreement.

Telstra and TPG have sought ACCC Merger Authorisation for the use by Telstra of spectrum held by TPG, which is deemed to be an acquisition for the purposes of section 50 of the *Competition and Consumer Act 2010* (the Spectrum Transaction). Under the broader MOCN commercial arrangement, Telstra would provide TPG with access to its active network infrastructure in defined regional and urban fringe areas, and Telstra would gain access to TPG's spectrum in the 700 MHz, 850 MHz, 2100 MHz, and 3.6 GHz bands in these areas.

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.

The ACCC can grant Merger Authorisation if it is satisfied in all the circumstances that the Spectrum Transaction would not be likely to substantially lessen competition, or if the likely public benefits from the Spectrum Transaction would outweigh any likely public detriment. The ACCC currently intends to make a determination by 17 October 2022.

⁴³ [c-i-c][c-i-c]

5. Allocation limits

In the previous section, the ACCC considered that the most relevant downstream markets for the purposes of determining 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 are the mobile services market and the fixed wireless access services market. In these markets, the focus of competition is and will increasingly be on the roll out of 5G networks across Australia.

This section presents the ACCC's views on why allocation limits are required for the 3.4 GHz and 3.7 GHz bands spectrum licence allocation.

Allocation limits are required

The ACCC considers it is in the LTIE to set allocation limits for the 3.4 GHz and 3.7 GHz spectrum licence allocations. All submitters to our consultation process, except for NBN Co (which did not provide a view one way or the other), supported the notion that an allocation limit should be set in the forthcoming auction.

Optus, Telstra and TPG each arguably have a critical mass of C-Band spectrum needed to supply 5G services. We have noted in previous allocations that 60 MHz of mid-band spectrum is likely to be required to enable each of the MNOs to realise the benefit of early 5G services over 4G services.⁴⁴ All MNOs have this amount in key areas. As such, we have not identified a potential foreclosure concern immediately arising out of this auction. All MNOs are progressing the rollout of their respective 5G networks, although Telstra's rollout is geographically more advanced than Optus' and TPG's.

Despite this, we consider it is likely to be in the LTIE for the ACCC to recommend the setting of a limit on the amount of spectrum a person may acquire at the auction. A limit will provide the best opportunity to maximise competition in the downstream mobile and fixed broadband markets post-auction.

In the future, MNOs will likely need additional 3.4-3.8 GHz spectrum to ensure they can cater for the increasing data demands of 5G services. Currently, there are holding imbalances between the MNOs so that in differing areas they individually have a strong need to acquire spectrum. NBN Co, in particular, has substantial regional holdings and may have an incentive to prevent MNOs from acquiring spectrum to deny the possibility of them expanding their fixed wireless access services to compete with NBN's offerings.

The ACMA has not yet decided the length of the licence terms. Given licence terms can be as long as 20 years (with the further possibility of renewal), setting an anti-monopolisation limit is likely still necessary even though there are no immediate competition concerns. That limit would prevent any party from monopolising all the spectrum in this allocation. Such a limit helps to ensure that no single MNO can acquire and hold key 5G spectrum for a long period to the potential detriment of competition in downstream markets.

It is possible that the spectrum valuations of some bidders are much higher than its competitors. Without an allocation limit, it is possible and likely that one party would be able to monopolise the spectrum in this allocation, starve competitors of essential input, and erode competitive vigour in the relevant markets.

⁴⁴ ACCC, [Allocation limits advice for the 3.6 GHz spectrum allocation](#), July 2018, p. 3.

Allocation limits should be set irrespective of [c-i-c] [c-i-c] the proposed Telstra/TPG Telecom spectrum authorisation

There is a question of how the ACCC should consider [c-i-c] [c-i-c] the proposed third-party authorisation in its advice on how to set the limits in this forthcoming auction.

We recognise that 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.

However, for the reasons stated below, we consider that the ACMA should set the limits irrespective of [c-i-c] [c-i-c] the proposed Telstra/TPG spectrum authorisation.

[c-i-c] [c-i-c]

The ACCC notes that it has been asked to lodge its advice on spectrum allocation limits to the ACMA by 1 August 2022, which is before the ACCC will make a decision on the proposed Telstra/TPG spectrum authorisation.

Further, taking the proposed spectrum authorisation into account in setting limits risks a sub-optimal allocation of spectrum if the arrangement is ultimately not pursued. If the ACCC considers Telstra and TPG's combined holdings in 3.4-3.7 GHz [c-i-c] [c-i-c] in setting limits, the likely result is that Telstra and TPG would be limited in the amount of spectrum that they could bid for in regional areas.

If the spectrum authorisation does not proceed, including if it is subsequently opposed by the ACCC (or, upon review, by the Australian Competition Tribunal) or is otherwise withdrawn by parties, the amount of spectrum that Telstra and TPG would have been able to acquire would be sub-optimal (lower) due to the assumptions the ACCC would have taken in considering the appropriate spectrum allocation limits.

In addition, if the spectrum authorisation proceeds, TPG is likely to have demand for regional spectrum for its own purposes, and not solely for monetisation via the spectrum authorisation. Limiting TPG from acquiring spectrum in regional areas due to its potential to be shared with Telstra for the use in the MOCN is not likely to be in the LTIE. Doing so restricts TPG from continuing to compete in the areas affected, further shrinking the area in which there are three infrastructure competitors.

While we consider that Telstra and TPG should be permitted to bid separately from a competition perspective, we recognise that the ACMA may have other concerns about Telstra and TPG bidding separately regarding auction integrity.

Anti-monopolisation limits should be set

In other spectrum allocations on which the ACCC has advised on setting the limits, there were competition issues which necessitated a more restrictive allocation limit. This is not the case with this auction.

However, MNOs will need to cater for increases in data demands from consumers and businesses in the medium to long-term. With 5G services, increased data demand is likely to come from demand for general internet access, video streaming, games, and social networking. Assuming that MNOs long-term 3.4 to 3.6 GHz spectrum requirements are not met by current holdings, MNOs will benefit from bidding for additional spectrum in this forthcoming auction. To facilitate the LTIE, it is necessary to set allocation limits to ensure

that all MNOs have an opportunity to participate in the auction and acquire spectrum to cater for projected increases in demand.

We consider that a restrictive allocation limit is not necessary. Setting an overly restrictive limit can mean that MNOs are unable to acquire the spectrum required in order to cater for increasing data demand in the medium to long-term. Artificially reducing the expressible demand for spectrum through overly restrictive limits may mean that spectrum is not being used in a value maximising/allocatively efficient way. Limiting the amount of spectrum available for MNOs may mean that they are not able to best facilitate the economic and social benefits arising from above mentioned digital services.

Currently the MNOs' fixed wireless access services are set at lower prices and provide comparable speeds and data inclusions to their NBN resale products. Given NBN Co's substantial regional spectrum holdings, it is likely to be in the LTIE to set the allocation limit in such a way that creates an opportunity for MNOs to obtain regional spectrum to provide them the opportunity to expand their fixed wireless offerings. Consumers could benefit from lower broadband prices if MNOs use spectrum acquired in this auction to expand their fixed wireless services.

We consider that holdings in the 3.4, 3.6 and 3.7 GHz bands are substitutable due to similar technical characteristics and device availability, as well as international harmonisation of the wider band. Therefore, we consider a cross band limit is appropriate for this allocation.

In metro and regional areas, we consider a limit of 140 MHz of spectrum between 3.4 and 3.8 GHz is in the LTIE. We consider that such a limit will provide opportunities for all MNOs to acquire additional spectrum in both metro and regional areas to supplement existing holdings. Such a limit would also enable MNOs the flexibility to make greater investments in their services that may enable them to provide higher quality (for example, in terms of network speeds and coverage) and provide differentiated services.