



TELSTRA CORPORATION LIMITED

Response to the ACCC's consultation on Allocation limits advice for 3.4 GHz and 3.7 GHz bands spectrum licence allocation

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Executive Summary

Telstra welcomes the opportunity to respond to the Australian Competition and Consumer Commission's (ACCC) consultation on its allocation limits advice to the Australian Communications and Media Authority (ACMA) for the 3.4 GHz and 3.7 GHz bands in metropolitan and regional areas of Australia (Consultation).

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 and is technically well suited for a wide range of purposes including for use by Mobile Network Operators (MNOs) in delivering 5G, wide-area wireless broadband (WA WBB), localised fixed wireless, or private networks. Given its multi-use application, the ACCC's advice regarding allocation of this finite spectrum is critically important to ensure that the spectrum is allocated in an efficient, pro-competitive manner, that maximizes benefits to Australian consumers.

Telstra considers that the most significant use case (and therefore the highest value source of demand) for this spectrum will be from existing MNOs for delivering 5G services in the national mobile market. Specifically, we anticipate that the 3.4 GHz and 3.7 GHz spectrum will provide significant additional capacity for MNOs to augment their existing holdings and in turn, provide higher quality 5G services across a broader geography.

The benefits of 5G wireless technology are expected to revolutionise the way we work and live through faster speeds, lower latency, and higher network efficiency. A recent Deloitte Access Economics report notes that it will "... represent a leap forward in fundamental telecommunications and will enable the use of technologies such as AI, IoT, AR/VR drones, Edge Computing and autonomous vehicles by mainstream business."¹ Productivity benefits from 5G alone are expected to be large with economic modelling estimating that 5G will increase Australia's Gross Domestic Product (GDP) by \$67 billion² by 2030 and impact a whole range of industries such as health care, financial services, advanced manufacturing, and consumer entertainment.

Australia's mobile market is highly competitive and is characterised by high levels of investment and positive outcomes for customers e.g., faster mobile speeds, increasing plan value year on year. Through previous auctions, all three MNOs already have holdings of mid band spectrum sufficient to support their initial 5G rollout phase, with Optus particularly well positioned in the critical metro markets of Sydney and Melbourne. It is therefore imperative in this auction that all MNO bidders be given the opportunity to grow their service offering through the acquisition of additional spectrum. We consider this is best achieved by the ACCC recommending the setting of allocation limits that give the market participants a primary role in determining the efficient allocation of spectrum.

To help promote competition in all downstream markets for the long-term interest of end users, encourage investment in infrastructure and support the deployment of new and innovative technology including 5G technology, we believe the ACCC should adopt the following approach to allocation limits:

1. Bidders should be able to acquire up to 175 MHz spectrum (across the broader 3.4-3.8 GHz band) in both metro and regional areas (including any existing holdings).

- Such a limit will enable market participants to fully express their need for additional spectrum.
- This proposed limit represents 44% of the total quantity of spectrum available in this band (400 MHz). It is broadly consistent with recent allocations, and sufficient to prevent any one licensee 'monopolising' the spectrum.
- Taking into account the existing allocations of the MNOs, it will enable all three MNOs to acquire larger contiguous blocks of spectrum required to meet customer demand and improve offerings.

¹ Deloitte Access Economics, *5G Unleashed: realising the potential of the next generation of mobile technology*, AMTA, 2022, [26801_Fuji_Text_Updated_Print.pdf \[26801_Fuji\]](#), page 1-52 @ Apogee Preflight (Unknown) (amta.org.au).

² In 2022 AUD \$ dollars.



- It will also promote competitive auction tension through price discovery so that the spectrum can move to its highest value use, thereby reducing the risk of inefficiencies and forgone competitive and consumer benefits owing to unsold or undervalued spectrum.
- 2. Only existing holdings in the 3.4-3.8 GHz band should be considered substitutable spectrum for the purposes of determining allocation limits.**
- All spectrum within the 3.4-3.8 GHz band that is allocated for spectrum licensing is potentially substitutable for purposes of deploying 5G capacity. However, spectrum in other bands is not a good substitute for this spectrum, owing to the prime role of this particular band in the 5G ecosystem and lack of options in other bands (excepting Time Division Duplex (TDD) holdings in 2.3 GHz) to realise larger contiguous bandwidths. Accordingly, allocation limits should be set only in relation to existing and potential (spectrum that is acquired through the upcoming auction) holdings in the 3.4-3.8 GHz band and should not consider holdings of other mobile-capable frequency ranges.
- 3. Incompatible geographic boundaries between both existing and new licences mean that existing holdings in a geographically overlapping area must only contribute to the allocation limit when there is at least a 50% population overlap.**
- An existing holding should not be 'material' in considering the application of an allocation limit in a given geographic area if that holding covers less than half of the population in the new spectrum lot being considered. Failure to make allowances for partial population overlap could lead to a situation where operators have 5G coverage 'holes' in the network and cannot offer good 5G service in these areas.
- 4. Relevance of proposed Telstra and TPG Multi-Operator Core Network (MOCN) arrangements**
- The proposed third party authorisations which would give effect to the network sharing arrangement between Telstra and TPG (Proposed Authorisation), should it proceed, would not give rise to an affiliation between TPG and Telstra as defined in the rules used in recent auctions. This is because the Proposed Authorisation does not involve use or acquisition by Telstra or TPG of any part of the spectrum that may be the subject of the re-allocation declaration for this auction.
 - Telstra intends to propose to the Australian Communications and Media Authority (ACMA) that "use" of spectrum by way of a third party authorisation agreement should only be considered as making up part of the existing holdings of an applicant if the right of use (including any option for renewal) extends for at least six months beyond the licence commencement date for the auctioned spectrum.
 - Imposing auction allocation limits which endure beyond the end of the auction process is likely to prevent or hinder innovative initiatives, such as the Proposed Authorisation, to improve the efficient utilisation of spectrum through secondary market trading and/or shared use.
 - The ACCC should consider the need for allocation limits based on spectrum usage rights as they currently stand, not as they may change if the proposed network sharing arrangement proceeds. The appropriate mechanism for the ACCC to consider the Proposed Authorisation is as part of its review under s.50 of the Competition and Consumer Act 2010 (Cth) (as deemed under s.68A of the Radiocommunications Act).
 - There is substantial precedent internationally where regulators typically have not considered MOCN deals relevant when setting allocation limits such as Canada, Denmark and Finland among others.
 - More generally, we consider that spectrum sharing agreements where no party gains exclusive access to the use of some or all of the pooled spectrum, i.e. all parties generally have equal access to use of the pooled spectrum resource, are not relevant for the purpose of applying allocation limits. Each party in such an agreement should be treated as an individual bidder and only their own holdings should be considered when applying allocation limits.
 - Including such shared spectrum in any assessment of allocation limits is undesirable as it would likely disincentivise parties to enter into spectrum sharing arrangements as well as constraining the pool of spectrum that could potentially be acquired to contribute to network sharing arrangements.



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

1.1. The principal use case and the highest utility of this spectrum will come from 5G mobile services.

As outlined in the ACCC's Consultation, the 3.4-4.0 GHz frequency range sits within the broader 3.3-4.2 GHz band that has been internationally harmonised for use by 4G and 5G wireless technologies. In Telstra's view, the highest value use of the 3.4 GHz and 3.7 GHz bands will be for the operation of 5G mobile services over which access to the internet, voice, messaging services and other associated applications will be supplied.

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. This spectrum is critical to MNOs to ensure they achieve a good mixture of coverage and capacity across their network. Indeed, the GSMA notes that the upper mid bands "offer a good combination of propagation and capacity for cities."³ The IMT-2020 standard sets the requirements for 5G networks, device, and services, including a recommendation that operators ideally acquire at least 100 MHz of aggregate spectrum below 6 GHz. Accordingly, this spectrum provides a vital opportunity for MNOs to realise the IMT-2020 criteria and thereby be positioned to continue to roll out competitive 5G propositions.⁴

Increasing capacity and coverage will enable MNOs to better handle growing data traffic and allow operators an opportunity to develop new and improved services to customers over time. Mobile data use is increasing rapidly year on year. For example, the ACCC reported that the average monthly volume of data downloaded on mobile services has increased by over 23% since the December 2019 reporting period.⁵ In the short term, the key driver in the growth of mobile usage is expected to be from video, including streaming content, video calling, video gaming and streaming from cameras. Such applications are also expected to consolidate in the development of the Metaverse which will amplify and bring together all of the above capabilities. In addition, we note that the use of plans which allow for no data limits on mobiles has increased from a share of less than 5% of all post-paid plans in mid-2019 to over 30% as of mid-2021, and has presumably continued to increase, demonstrating the significant appetite for data.⁶ Access to sufficient spectrum in the critical mid band frequency ranges will ensure users maintain a quality of service that is able to keep pace with growing demand.

Australia is well recognised as a global leader in 5G mobile services. Australian consumers already benefit from some of the lowest mobile data prices in the OECD as well as having amongst the fastest mobile speeds in the world.⁷ The roll out of 5G networks continues at pace, with Telstra's 5G network now covering 77.5% of population and expected to be at 80% by end FY22.⁸ Further, as part of Telstra's T25 strategy, we have recently announced plans for our expanded 5G rollout which will deliver approximately 95 per cent population coverage by FY25 – including a 100,000 square kilometre increase in our 4G and 5G network footprint, substantially increasing regional coverage. Telstra also expects to have 80% of mobile traffic on its 5G networks within this timeframe.⁹

Notwithstanding the strong start that Australian MNOs have made in rolling out 5G services, there is recognition that policy initiatives are needed to ensure an efficient and effective roll out and to thus maximise adoption of 5G. Specifically, the 2022 Deloitte Access Economics report notes that regulatory settings must be such that they, "(e)nsure

³ GSMA, *Estimating the mid-band spectrum needs in the 2025-2030 time frame*, July 2021, , pg. 7

⁴ The ITU's *Minimum technical requirements to meet the IMT-2020 criteria*, M.2410, – and thus the fastest speeds – specify at least 100 MHz of bandwidth per operator. 100 MHz is the aggregate across all bands below 6 GHz. See s.4.13, p.8 of M.2410.

⁵ ACCC, *Internet activity report – for the period ending 31 December 2020*, pg. 7

⁶ ACCC, *Internet activity report – for the period ending 30 June 2021*

⁷ Cable.co.uk, *Worldwide mobile data pricing, 2021*, based on sample of OECD countries, Average price of 1GB (USD)\$ at [mobile_data_price_comparison_data.xlsx \(live.com\)](#); WIK-Consult sample based on Ookla/speedtest.net.au. Sample includes Australia, Sweden, Canada, United Kingdom, Germany, New Zealand, Austria, Ireland and Italy. August 2021

⁸ Telstra, *Financial results for the half year ended 31 December 2021- CEO/CFO Analyst Briefing Presentation and Materials*

⁹ Telstra, *Financial results for the half year ended 31 December 2021- CEO/CFO Analyst Briefing Presentation and Materials*



*spectrum is allocated to its Highest Value Use, using clearly identified factors in the determination of the value.*¹⁰ Similarly, the GSMA notes that to maximise economic development strategies, governments are best served by, *“mak(ing) 3.3 – 3.8 GHz available for 5G use.”*¹¹ Put differently, while allocation limits may be used as a safeguard to ensure each MNO has a critical mass of 5G spectrum, they should not be set in a way that restricts any MNO from securing larger blocks that will enable them to provide the highest quality of 5G to Australians nationwide. We believe that, in Australia, this balance can be found with an allocation limit of 175 MHz across the 3.4-3.8 GHz band.

Over time, we expect 5G mobile services will necessarily evolve with applications that can support increased service capacity such as immersive experience augmented and virtual reality (AR/VR), and 4K/8K streaming on mobile. Not only will this transform services for consumers but it will also transform industry applications such as manufacturing, retail, and healthcare for businesses and enterprises. The Deloitte Access Economics report predicts productivity benefits from 5G alone are expected to be large with economic modelling estimating that 5G will increase Australia’s GDP by \$67 billion in 2022 dollars by 2030 and impact a whole range of industries such as health care, financial services, advanced manufacturing, and consumer entertainment. At present though, these applications are still nascent and emerging. Telstra recognises that mid band spectrum has multiple use cases and potential users beyond MNOs, particularly in relation to fixed wireless access (FWA) services as an alternative to a nbn fibre connection or nbn fixed wireless services. There will also be other enterprise services to support applications in manufacturing, logistics, health and transformation.¹² We are of the view that these use cases can be better served either through access to different spectrum bands or through different licensing methods, other than spectrum licences (SL) in the 3.4-3.8 GHz band,¹³ although any prospective licensee is of course free to bid for spectrum licensed (SL) spectrum if they so choose.

1.2. Apparatus licensing is more appropriate for smaller operators

The ACCC is seeking stakeholders’ views on how the spectrum licensing arrangement and the intended use of price-based allocation might affect demand for the available frequencies. The ACCC is concerned that *“...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 largely regional carriers.”*¹⁴

Spectrum licensing and price-based allocation are ideally suited to scenarios where demand for spectrum is high, where the spectrum will be used in a large geographic area, is expected to be used for a long period of time, where investment capital is high and technology is rapidly evolving.¹⁵ Use of price-based allocation allows for price discovery and for efficient allocation of the spectrum, as bidders will only bid to the point that ensures a positive economic return for the deployment and ongoing operation of a mobile and wireless broadband (WBB) service offering. Where large quantities of spectrum over large geographies are made available and demand is likely to be high (as is the case in this allocation) we consider a price-based allocation to be the most appropriate methodology.

At the same time, we acknowledge the policy direction contained in the Ministerial Policy Statement which seeks to accommodate smaller WBB and private enterprise users, fixed link operators and satellite services. These use cases are best served by apparatus licences as they allow operators to purchase spectrum for use in smaller geographic areas, rather than being forced to acquire spectrum for an entire metro or regional area. This also makes such licences more

¹⁰ Deloitte Access Economics, *5G Unleashed Final Report*, https://amta.org.au/wp-content/uploads/2022/03/5G-Unleashed-Final-Report_combined-v2.pdf, 2022, pg. 9

¹¹ GSMA, Public Policy Position, March 2021

¹² It is important to note that all of these applications can also be supported by MNOs using software approaches within 4G and 5G technology that provide ‘partitioned’ or virtual private services. Telstra considers that the ideal outcome from a competition perspective would be to have both dedicated providers of these services with their own spectrum access (using different spectrum bands and licensing models) and MNOs offering specific services to these customers, as a form of cross-platform competition. This would spur innovation by both groups of providers and favour specialisation to achieve differentiation of services targeted at serving customer needs.

¹³ The ACMA proposes to offer “Area Wide Licences” or AWLs in the 3800-4000 MHz range which will enable potential licensees to acquire spectrum for these kinds of services in a more targeted manner.

¹⁴ Consultation Paper, s.4.3, p.9.

¹⁵ In circumstances where technology is rapidly evolving, spectrum licences can be more appropriate. In contrast, apparatus licences can be quite prescriptive, in terms of the type of technology that can be used under the licence.



affordable. The ACMA's plan to reserve spectrum above 3.8 GHz accommodates these use cases and more importantly, it avoids mixing localised deployments in amongst spectrum-licensed frequencies, where the former could cause spectrum denial¹⁶ to the latter. We believe the ACMA's proposal to offer at least 200 MHz of spectrum nation-wide for these types of alternative services is more than enough, and therefore offering spectrum in the 3.4-3.8 GHz range as spectrum licences¹⁷ will not prevent the market entry of alternative service providers.

1.3. Licence term is not a principal determinant of demand for this allocation

As discussed in Telstra's submission to the ACMA's consultation on its draft Reallocation Declaration,¹⁸ we support an initial short licence period with all licences expiring on 13 December 2030 to align licensing terms across the band. The 3.4-3.8 GHz spectrum has great importance to MNOs for deployment of 5G services. Telstra plans to invest in the band for the long term. Ordinarily, Telstra has a strong preference for the maximum available licence term of 20 years to support investment in network equipment using new frequencies. However, in this case any spectrum acquired will be incremental to existing holdings and thus the need to build new infrastructure may be limited. In this case, this means that investment risks are lower for MNOs if the equipment that has been or will be deployed can be retuned to frequencies across the band in the future provided we maintain access to a critical mass of 5G capacity in the band.

Given this risk profile, it is more important that the licence period is aligned with the expiry of our existing licences, so as to give the ACMA the opportunity to undertake a complete band-wide restack in 2030. We are concerned that such a restack may face obstacles in the secondary market, so ensuring there is the contingency in place of an ACMA-led restack in 2030 (through auction design or amendment of core licence conditions upon renewal) provides greater certainty of future defragmentation so as to maximise the future efficiency and utility of the broader band from 2030.

1.4. Urban excise spectrum is partly although not perfectly substitutable for other spectrum in the 3.4-3.8 GHz band

As detailed in our response to the ACMA's Consultation on the Proposed Spectrum Reallocation in 3.4 and 3.7 GHz,¹⁹ urban excise (UE) spectrum will have different technical characteristics imposed on it as well as considerably different geographic licence boundaries to frequency-adjacent spectrum licences covering the same geography. While the ACMA's Technical Liaison Group is yet to conclude its work on defining the technical characteristics for the UE spectrum, it is clear that the utility of this spectrum will be compromised for some classes of applications²⁰ relative to other spectrum in the band due to the interference management mechanisms that will be imposed by the ACMA to protect nbn co's Fixed Wireless Access (FWA) services from interference. Owing to these attributes, Telstra therefore considers it to be an imperfect substitute for other spectrum in the 3475-3800 MHz band. However, in this case, we do not think that means that the UE spectrum should not be considered as part of the substitutable spectrum pool.

The extent to which the utility of the UE spectrum is compromised will be reflected in the price bidders will be willing to pay, as any differences in quality of the spectrum will be accounted for in MNOs' own valuations and be priced

¹⁶ Spectrum denial occurs where a portion of spectrum is unable to be used at certain locations without causing interference to an existing operator. Small localised operators have financial incentives to purchase the minimum geographic area required to accommodate their transmitters at the power levels required to provide reliable service for their users. Where this is localised, such as a university campus, warehouse or manufacturing compound, or hospital, indoor coverage combined with very low power outdoor coverage can afford the operator the ability to purchase very small geographic areas. Conversely, an operator trying to provide good coverage for a wide-area solution (fixed wireless or mobile, inclusive of reasonable indoor coverage to residential premises) must operate at substantially higher power levels. If localised geographic portions of spectrum are sold to private operators for use cases such as hospitals, warehouse/manufacturing compounds, or universities, wide-area operators are forced back several kilometres (or tens of kilometres) to meet the requirement to not cause interference. This results in a "dead-zone" in the wide-area licensee's coverage around the localised operator.

¹⁷ In Telstra's submission to the ACMA's consultation on 3.4 and 3.7 GHz draft Reallocation Proposal, we propose a modification to the ACMA's preferred option, suggesting incumbents should be supported via AWLs in some regional areas at the bottom of the 3.4 GHz band. Therefore the entire 3.4 to 3.8 GHz band would be mostly but not entirely spectrum licensed.

¹⁸ Telstra submission, *ACMA's consultation on 3.4 and 3.7 GHz draft Reallocation proposal*, May 2022, p.18

¹⁹ Telstra submission, *ACMA's consultation on 3.4 and 3.7 GHz draft Reallocation proposal*, May 2022, pg. 13

²⁰ The ACMA's Technical Liaison Group (TLG) is currently working to define limitations that will be imposed on the licensee(s) of UE spectrum, but at a minimum, it will contain very restrictive power levels (measured as the power flux density) at the geographic boundary of the UE spectrum (bordering with nbn co's FWA).



accordingly if the UE spectrum is to be allocated using spectrum licensing. This is the appropriate mechanism by which to factor in the different utility of this spectrum.

Therefore Telstra considers that the UE spectrum should still be considered part of the spectrum pool being offered in the 3.4-3.8 GHz band, as we propose it be spectrum licensed, and therefore be part of the overall assessment of allocation limits. MNOs (and other bidders) will then determine whether they choose to bid on this type of spectrum. This is consistent with the approach taken in the 850/900 MHz auction.²¹

²¹ See Telstra, *Allocation limits advice for the 850 MHz and 900 MHz band spectrum allocation*, pg 15, December 2020. See ACCC, *Allocation limits advice for the 850/900 MHz spectrum allocation*, March 2021, pg. 19



2. Market context for the ACCC's competition assessment

2.1. The relevant downstream markets

Identifying the relevant downstream markets that will be impacted by the allocation of spectrum is key to assessing the need for allocation limits. The ACCC evaluates the impact the allocation will have on investment and competition in the relevant markets. We agree with the ACCC's view that the national retail mobile services market is the most likely relevant downstream market.

The ACCC also identifies the fixed broadband market and the private wireless enterprise market as other possible downstream markets where competition may be promoted,²² noting that it is the ACCC's understanding that these users (in these private wireless enterprise markets) typically prefer apparatus licensing arrangements. Whilst we accept that demand will be generated from these use cases and this may indicate the existence of a possible market, we do not consider these relevant markets for the purpose of setting allocation limits. Importantly, under the ACMA's plan to reserve spectrum above 3.8 GHz, service providers offering either fixed broadband or private wireless enterprise services will have plenty of options to access spectrum, so the allocation of 3.4-3.8 GHz should not have any impact on their ability to launch competitive services.²³ Having designated spectrum available within the band therefore means that there are no specific competition issues that allocation limits would resolve for either fixed broadband or private wireless enterprise operators (we provide further evidence to support this point below).

2.2. National mobile services market

Australia's mobile market is competitive and open, with competition between the three major MNOs (Optus, TPG and Telstra) and many MVNOs delivering strong benefits to consumers. These benefits include high levels of ongoing investment,^{24, 25} generally improving coverage,²⁶ and increased value in mobile plans.²⁷ In its 2020-2021 Communications report, the ACCC observed a shifting paradigm where *"for the MNOs flagship brands, the focus of competition is on non-price factors, particularly with regard to 5G access."*²⁸ Telstra considers that the setting of allocation limits should continue to foster the above dynamic, creating an environment where the competitive process can continue to develop strong outcomes for customers – in terms of value, coverage and quality, particularly in relation to emerging 5G technology.

Historically, a key concern in setting allocation limits has been in relation to asymmetric holdings between MNOs. In this context, Optus holds a significant amount of spectrum (100 MHz) in the 3.4-4.0 GHz range in the key markets of Melbourne and Sydney, where pressure on MNOs to add 5G capacity is greatest. In contrast, Telstra holds only 60 MHz in these markets [REDACTED]

[REDACTED] This asymmetry is not the result of a deliberate investment decision made by Telstra, but rather a consequence of the allocation limits imposed in metro areas in the 2018 auction of 3.6 GHz spectrum.²⁹ The 60 MHz allocation limit in metropolitan areas prevented Telstra from bidding to match Optus' 100 MHz

²² Consultation paper, s.5, p.11.

²³ Telstra have proposed an alternative proposal (Option 3A) in response to the ACMA's *Consultation in its Proposed spectrum re-allocation declaration for the 3.4 GHz and 3.7 GHz bands consultation paper, May 2022*. In it, the proposed AWL in 3750-3800 MHz in regional areas would be converted to SL spectrum. This will provide 100 MHz of contiguous spectrum (as in Option 1 and 2). To partially compensate for the 50 MHz reduction in AWL spectrum above 3750 MHz, we propose that in Major Regional Centres 2 and Regional Area 1 the "New SL" allocation at the lower end of the band be allocated as AWL.

²⁴ ACCC, *Mobile Infrastructure Report*, October 2021

²⁵ There exist persistent challenges to investment in regional/remote areas due to the high infrastructure deployment cost and limited consumer demand. See for example, 2021 Regional Telecommunications Review, pg 21

²⁶ ACCC, *Mobile Infrastructure Report*, October 2021, p.19- 23. Note, the key purpose of the ACCC's analysis was to provide a broad indication of the trend in how each MNO's coverage has changed over time based on the coverage maps provided by the MNOs. These conclusions generally relate to 4G and 5G.

²⁷ ACCC, *Mobile Infrastructure Report*, October 2021, p5 - 15, ACCC, *Communications Market Report 2020-2021*, p. 27-32

²⁸ ACCC, *Communications market report*, 2020-21, pg. 7

²⁹ [Radiocommunications \(Spectrum Licence Limits—3.6 GHz Band\) Direction 2018 \(legislation.gov.au\)](https://www.legislation.gov.au)



holdings. While we do not think this was the right decision, the stated premise was to ensure that at least three operators could gain a critical mass of spectrum. That goal has now been achieved.³⁰ All three MNOs have launched 5G in Australia and all now have well established 5G services in the market. Therefore, with the increase in spectrum available in this auction, the ACCC should shift its focus to allowing all MNOs the opportunity to acquire larger spectrum holdings to further support the deployment of 5G services.

Quality of mobile services in terms of upload and download speeds is principally determined by the quantum of spectrum an MNO holds, relative to factors such as the number and type of mobile services using its network in particular locations and the density of its network. Telstra is concerned that if the ACCC were to set allocation limits too low, MNOs may be prevented from offering the highest quality 5G service to their customers and the acceleration of 5G innovation would be significantly hampered. For these reasons, Telstra considers that a more relaxed cap will allow MNOs to acquire enough spectrum to offer the highest quality services to their end customers.

2.3. Fixed broadband market

The ACCC considers that the allocation of spectrum in the 3.4 GHz and 3.7 GHz bands will potentially influence how MNOs, nbn co and other wireless providers (such as Wireless Internet Service Providers (WISPs)) can compete in the fixed broadband market. The ACCC considers that MNOs could use the spectrum to enhance the quality of their 5G fixed wireless product in metropolitan and potentially regional areas. The ACCC also notes that nbn co and smaller scale fixed wireless operators could also use this spectrum to improve their fixed wireless services.³¹

In understanding the impact on competition in relation to the fixed broadband market, there are two key competition issues which the ACCC should consider in setting allocation limits:

- a) whether MNOs can use the spectrum on offer to provide a competitive rival to nbn co in the fixed broadband market and if so, whether using the spectrum in the 3.4 GHz and 3.7GHz bands is the appropriate means of achieving this competitive outcome; and
- b) whether other wireless providers (such as WISPs) would be better off securing AWL spectrum in the 3.8-4.0 GHz range,³² in which case an allocation limit does not need to be constructed to cater for anticipated demand from such players for spectrum in the 3.4-3.8 GHz range.

We elaborate on these two points in the following paragraphs.

2.4. Fixed and mobile spectrum use cases cannot be mixed without consequence

We agree with the ACCC that the allocation of spectrum in these bands may influence how operators provide services, and we acknowledge the utility of mid band spectrum for fixed wireless services. However, we are concerned that the ACCC may be incorrectly forming a view that fixed wireless and mobile services can simply be mixed in the same spectrum without consequence. We caution that mixing different use cases in the same spectrum can result in inefficient or wasteful use of scarce and valuable spectrum, and that to the greatest extent possible, these use cases should not be

³⁰ Footnote to the Regulation Impact Statement (Attachment A to the Explanatory Statement) : – [Radiocommunications \(Spectrum Licence Limits—3.6 GHz Band\) Direction 2018 \(legislation.gov.au\)](#) -- “MNOs that are unable to acquire sufficient 3.6 GHz spectrum at the auction could be disadvantaged in terms of their ability to deploy a 5G network contemporaneously with their competitors. This could result in one or two MNOs having first mover advantage in the 5G market and the remaining MNOs being unable to compete on 5G services initially. If only a small number of MNOs are able to offer 5G services, it could negatively impact consumers in terms of service, quality and price for 5G services and fail to maximise overall public benefits.”

³¹ Consultation, pg. 13

³² Telstra submission, *ACMA’s consultation on 3.4 and 3.7 GHz draft Reallocation proposal, May 2022*. In this submission, Telstra have proposed a Modified Option 3A. In this Option, Telstra recommends that additional to the 3800-4000 MHz dedicated allocation, incumbents that were unable to easily use this dedicated allocation would be able to retune as follows: in Major Regional Centres 2, incumbents be given access to AWLs in 3400-3425 MHz (25 MHz total) and in Regional Area 1, incumbents be given access to AWLs in 3400-3442.5 MHz (42.5 MHz).



mixed unless very strict technical controls to prevent interference between adjacent radio networks are imposed by the network operators.

Where FWA operators are interleaved with MNOs (i.e., FWA operators are on adjacent frequencies to MNOs in the same geographic area, or FWA operators are on the same frequencies to MNOs in an adjacent geographic area), there is a risk of interference where the operators are using different uplink:downlink ratios, as their networks cannot be fully synchronised. The only possible solutions to resolve the interference are either 1) one of the operators changes their uplink:downlink ratio resulting in inefficient use of the spectrum for that operator,³³ or 2) a “guard band” (unused spectrum of around 10 MHz) is introduced, which also results in inefficient use of the spectrum.

Spectrum utility is increased when it is contiguous, as this enables larger channels. Within a band, every channel requires some channel-edge filtering (ranging from around 200 kHz upwards depending on the technology) to avoid causing interference to neighbouring operators, even when those operators are synchronised. The larger the channel, the smaller the channel-edge filtering is as a percentage of the channel. Thus, the data-carrying capacity of the channel increases with the channel size, and hence the spectrum is used more efficiently where larger contiguous channels are deployed.³⁴

2.5. Fixed wireless broadband services from non-mobile providers are better served by securing Area Wide Licences (AWL) in the 3.8 – 4.0 GHz band to provide rival nbn services

Given the difficulties deploying mobile broadband and FWA in adjacent bands described above, we consider that fixed wireless broadband providers (such as WISPs) would be best off securing AWL spectrum in the 3.8-4.0 GHz range to support their fixed broadband solutions. Doing so obviates the need to construct an allocation limit that could reduce supply of 5G spectrum for MNOs in the critical 3.4 GHz and 3.7 GHz bands.

Within the wider 3.4-4.0 GHz band, there is 200 MHz of spectrum above 3.8 GHz that can readily be used for FWA use cases. This is plenty of spectrum to meet the needs of such providers. Indeed, it is larger than the total amount of spectrum proposed for reallocation within the 3.4 GHz and 3.7 GHz bands.

As the ACCC notes,³⁵ the Ministerial Policy Statement for the band states 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. We note that FWA can be accommodated within the wider 3.4-4.0 GHz band via the proposed AWL allocation above 3.8 GHz. This avoids compromising the 3.4 GHz and 3.7 GHz bands with further FWA offerings (beyond those already deployed by nbn co) and hence, avoids diluting the utility of the band.

2.6. Private wireless enterprise market

The ACCC also identifies a possible downstream private wireless enterprise market. As noted above, we do not consider this to be a relevant market. Furthermore, even if the ACCC determines that this market exists, we consider that such use cases are adequately catered for by the ACMA’s proposal of 200 MHz of spectrum between 3.8-4.0 GHz.

If the ACCC were to identify private wireless enterprise as a possible downstream market, we consider there are four key features of this market pertinent to the ACCC’s competition assessment:

- The market should be characterised as emerging:

³³ Assuming that although operators made a deliberate technical decision on uplink:downlink ratio to optimise their service, they can consider using a different ratio to synchronise. And note that it might not even be possible for a licensee with a non-3GPP technology to synchronise with an MNO

³⁴ This is why MNOs are also keen to defragment spectrum where individual MNOs are interleaved, as it allows the MNO to deliver higher data speeds than using the same quantum of spectrum divided up into smaller channels.

³⁵ Consultation paper, s.4.1, p.5



- There has previously been limited interest in spectrum from private wireless enterprise network operators in prior auctions. There is no evidence of a step change in demand from these operators to indicate a changing position.
- Area-wide licences have been offered in the 24 GHz and 28 GHz bands since late 2020. The licensees are the MNOs, nbn and niche operators including Field Solutions Group, Pentanet, Ace Internet, Pivotal, Bitwave Networks, Jettech, and On Q. Demand for these licences have been limited.
- Such a view is confirmed by the GSMA which concludes that almost 75% of the benefits of mid band spectrum will come from enhanced mobile broadband and FWA and related applications in the next decade.³⁶ Other uses such as that envisaged by private wireless operators are likely to come later, i.e., after 2030. In that sense, it is better not to unnecessarily restrict supply of spectrum in favour of applications that will generate maturity later in the decade and beyond. In the short term, we consider that MNOs will deliver greater public benefit that will in turn, promote competition, support investment and innovation.
- While the use of this spectrum is likely to be beneficial in supporting many enterprise use-cases, there are also alternative, less scarce spectrum bands that can be considered for these types of technologies and applications, such as mmWave spectrum.
- The relevant technologies for servicing the broadband connectivity needs of enterprise customers will continue to develop and compete - with each technology likely to have its own strengths and weaknesses and targeting different sectors and uses.³⁷
- Finally, there are likely to be low barriers to entry. This is also amplified by the ACCC's view that providers in the private wireless enterprise market typically prefer apparatus licensing.³⁸

Many regulators in Europe have considered the issue of allocating spectrum for private wireless use, and most concluded it should be accommodated in spectrum above 3800 MHz, not in the core 3400-3800 MHz preferred for MNO 5G deployments. One early exception was Germany, which in 2018 released only 280 MHz (+ 20 MHz low power) for national mobile networks, reserving 100 MHz at 3700-3800 MHz for industry use.³⁹ This now looks like a mistake. Three of the four German operators ended up with only 50-70 MHz blocks of high-power spectrum each, while one secured 90 MHz. This outcome is obviously inferior to most other European countries, where leading operators typically have at least 80-100 MHz and often up to 150 MHz. Our understanding is that industry take-up of the reserved 100 MHz in Germany has been limited.

³⁶ GSMA, *The Socio-Economic Benefits of Mid-Band 5G Services*, pg. 6

³⁷ ACCC, *Communications Sector Market Study Final Report*, 5 April 2018, p. 89

³⁸ Consultation paper, s.5, p.11.

³⁹ Press release, 21 September 2020, [Pressemitteilung \(bundesnetzagentur.de\)](https://www.bundesnetzagentur.de/Pressemitteilung)



3. Current spectrum holdings

3.1. Substitutable spectrum lies within the 3.4 – 3.8 GHz band only

In the Consultation, 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.

We partly agree with this but contend that spectrum only within the 3.4-3.8 GHz band is substitutable for IMT use, as this is the spectrum range proposed by the ACMA to be spectrum licensed. The ACMA proposes to allocate spectrum above 3.8 GHz via AWLs which are apparatus licences. Apparatus licences of the kind being proposed, do not provide the same tenure or property rights that a spectrum licence offers, and therefore cannot be considered substitutable for a spectrum licence for mobile network deployment. Also, spectrum above 3.8 GHz is more impacted by incumbent non-MNO use compared to spectrum below 3.8 GHz, and is therefore less suitable for MNO use unless it too was completely cleared and reallocated for spectrum licensing.

3.2. Spectrum holdings in other mid band frequency ranges are not substitutable

The Consultation notes that mid band spectrum in the 1800 MHz, 2100 MHz, 2300 MHz and 2500 MHz bands are being used in the deployment of wireless broadband, including 5G. This is correct but their near-term usefulness for 5G deployment is limited and, with the exception of the 2300 MHz band, they do not offer the same large bandwidths available as spectrum between 3.4-3.8 GHz band. Accordingly, Telstra does not consider that these bands are sufficiently substitutable with the spectrum available in this auction for them to be relevant for any competition analysis. We elaborate on our reasons below.

First, all these bands (apart from 2300 MHz) are in the frequency division duplex (FDD) configuration, which have very different technical performance and characteristics to TDD bands. The widest carrier that can be deployed in these FDD bands is typically 20 MHz, much less than what can be deployed in the 3.4-3.8 GHz band where, for example, Optus has already deployed 100 MHz wide 5G carriers. Therefore, these other bands (apart from 2300 MHz) are not capable of providing the peak speed experience for end users that is possible using carriers of up to 100 MHz at 3.4-3.8 GHz.

Second, these bands are already heavily utilised for mobile services (mainly 4G); they are not empty bands, 'sitting on the shelf', so cannot be considered a viable alternative for any licensee seeking spectrum in the 3.4-3.8 GHz band. Also, while these bands might eventually be migrated to 5G, the device ecosystem for 5G is not as well developed for these frequencies as it is in 3.4-3.8 GHz. Accordingly, these bands are not "substitutable" because they are not available as an alternative in the short and medium term.

Third, the other mid band holdings are not immediately adjacent to the 3.4-3.8 MHz band being auctioned. If MNOs holding other mid band spectrum are limited in their ability to acquire larger contiguous holdings of 3.4-3.8 GHz spectrum based on their existing holdings in these other mid bands, their ability to acquire the larger contiguous bandwidths needed to support a competitive 5G service may be compromised relative to rivals not holding such spectrum.

If any of these other bands are to be considered as substitutable to spectrum in the 3.4-3.8 GHz range, the only band which potentially is relevant is the 2300 MHz band. This is because it is in the TDD configuration and because it offers up to 100 MHz of bandwidth as a single carrier.



4. Accounting for geographic boundary misalignments

4.1. Variations in geographic boundaries for both existing, and potentially, new licences should be considered in determining the operation of any allocation limit.

Telstra broadly supports the approach adopted by the ACMA in both the 850/900 MHz and 3.6 GHz auctions where any misalignments in geographic boundaries across existing and new licences were accommodated in the setting of allocation limits based on the relative population sizes of the overlap of existing licences with the new licences. Population percentage thresholds where previously adopted determined whether an existing spectrum holding in one geographic area which partially overlaps was considered 'material' and therefore should be counted as an existing holding in the new licence area.

In the 3.6 GHz auction, this population threshold was set at 15% and in the 850/900 MHz auction, this threshold was set at 25% (adjusted from the initial proposal that the threshold be set at 20%). These thresholds were acceptable in both auctions because the amount of overlap between any existing and new licence areas where boundaries were misaligned were no worse than the thresholds set; therefore they did not negatively impact any bidder.

The proposed allocation will create new geographic areas that bear no resemblance to any previously allocated spectrum lots, particularly with the boundaries running through the middle of regional areas in Australia (e.g. the ACMA proposed "Regional Area 1") which do not align with any previous 3.4 GHz or 3.6 GHz boundaries. Therefore, the amount of population overlap between any existing holdings and these new lots will be much higher than 25% in many instances. Therefore, we contend that it is unreasonable to deem an existing spectrum holding to be 'material' if it covers less than 50% of the population of the spectrum lot being considered. An allocation limit that did not make allowance for such an overlap would deny a bidder from acquiring spectrum to serve the other 50% of the population in that licence area, which could effectively deny that population from receiving higher quality services or more competition from providers. That is not in the best interests of competition or end users.

Therefore, we consider it appropriate for the ACCC to recommend a population percentage threshold of 50% in any overlap area (as a percentage of the population in the target licence area) at which an existing spectrum holding is deemed to be material in the context of setting allocation limits in the 3.4 GHz and 3.7 GHz bands.



5. Setting allocation limits that promote competition in downstream markets, encourage investment in infrastructure and support deployment of new and innovative technology

5.1. Bidders should not be able to hold more than 175 MHz spectrum across the 3.4-3.8 GHz band in both metro and regional areas (including existing holdings).

The spectrum on offer is best suited for 5G and mobile broadband and as such, demand is likely to come principally from MNOs. However, the extent of auction participation and the outcomes in downstream markets, for investment and the deployment of new technologies including 5G will be heavily influenced by the quantum and nature of allocation limits.

Telstra believes that an allocation limit of 175 MHz in both metro and regional areas (including bidders' existing holdings in the 3.4-3.8 GHz bands) should be adopted for the following reasons:

1. All three MNOs already have holdings in the 3.4-4.0 GHz range sufficient to support their initial 5G rollouts, with Optus particularly well positioned in Sydney and Melbourne, so more flexible allocation limits are appropriate. Instead of adopting restrictive limits, the ACCC should adopt a precautionary cap of 44% of total substitutable spectrum holdings and leave it to the market to find the efficient distribution of spectrum. This will maximise auction tension by encouraging multiple rivalrous bidders, enhance competitive auction bidding and limit any inefficiencies in the form of unsold, or undervalued spectrum.
2. Higher allocation limits will enable MNOs to improve their 5G offerings and innovations. To more fully exploit the capability of 5G technology, some MNOs may want larger holdings of 5G spectrum to raise the peak and average throughput or to raise the quality of their 5G services and applications.
3. A limit of 175 MHz means that no bidder will be entitled to hold more than 44% of new and existing spectrum in the 3.4-3.8 GHz bands. This limit will prevent any single operator from monopolising the band. It is broadly consistent with limits imposed in previous allocations for 5G, e.g., the 26 GHz mmWave band, and by regulators in overseas jurisdictions.
4. A uniform allocation limit across both metro and regional areas ensures that a lack of sufficient spectrum will not constrain metropolitan and regional customers from gaining access to the benefits of 5G technology and the same level of experience.

We discuss each of these points below.

5.2. The ACCC should adopt a precautionary cap of 44% of total substitutable spectrum holdings.

We consider such an approach will provide the necessary safeguards to promote competition whilst leaving it to the market to find the efficient distribution of spectrum.

5.2.1. All MNOs already have holdings of spectrum sufficient to support their initial 5G rollouts meaning restrictive limits are unnecessary.

All three MNOs enter this auction with holdings of mid band spectrum sufficient to support their initial 5G rollouts, with Optus particularly well placed in key metropolitan centres of Sydney and Melbourne.

- Optus- Within the 3.4-3.8 GHz band, Optus already has sufficient spectrum to operate a 100 MHz 5G network in Sydney and Melbourne. In other metropolitan areas, Optus can operate a 60 MHz network. Optus currently holds up to 67.5 MHz of 3.4 GHz spectrum in Regional WA and up to 35 MHz of 3.6 GHz spectrum in other regional areas.
- TPG - Similarly, TPG also has significant amounts of spectrum in metro areas – up to 95 MHz in the areas of Brisbane, Perth, Adelaide, and Canberra, and 60 MHz in Sydney and Melbourne. TPG has up to 45 MHz of spectrum in regional areas. Note that TPG increased its holdings of 3.6 GHz spectrum in metro areas by virtue of a secondary market trade from Dense Air.



- Telstra - Telstra's existing holdings allow it to operate a 60 MHz network in each of Sydney, Melbourne, Brisbane, Perth, Adelaide, and Canberra. [REDACTED]

[REDACTED] In regional areas, Telstra has 32.5 MHz of 3.4 GHz spectrum in major regional centres and up to 80 MHz of 3.6 GHz spectrum in other regional areas (including regional centres).

Whilst there is clearly asymmetry in these holdings, we do not consider that this warrants regulatory intervention in the form of very tight allocation limits. We consider that an allocation limit of 175 MHz will be appropriate to promote competition, investment and innovation in this spectrum.

In the 3.6 GHz allocation, the ACCC found that, "*competition would be best promoted by ensuring that all MNOs have an opportunity to acquire spectrum in the 3.4-3.7 GHz band to deploy early 5G services, and in ensuring that the new entrant TPG has the ability to acquire sufficient spectrum to launch a strong entry and compete effectively with the incumbents in the short run and long run.*"⁴⁰ Considering this, the ACCC opted to recommend very low allocation limits to ensure multiple operators were successful in each region. The allocation limits ultimately set by the Minister in metro areas, even though more relaxed than the ACCC recommendation, were still so tight that there was zero auction tension, no price discovery and the spectrum sold at reserve price. In hindsight, it is clear that the allocation limits were too tight, as one of the winning bidders Dense Air made no effort to deploy and subsequently traded the spectrum they acquired to TPG.

The spectrum awarded to the MNOs in the 3.6 GHz band auction was critical to the early deployment of 5G. The spectrum being auctioned in the 3.4 GHz and 3.7 GHz band has similar characteristics, however the market dynamic in which this auction is taking place is considerably different. The roll out of 5G mobile networks has begun in Australia with all MNOs committing significant resources into deployment. The ACCC's Mobile Infrastructure report already shows significant investment with all MNOs investing heavily in 5G sites. Between 2020-2021, Optus more than doubled its total number of 5G sites from 426 to 1010. TPG began its deployment adding 163 new sites in major cities of Australia. Telstra increased its 5G sites from 797 in 2020 to 2695 sites.⁴¹ It is important now to let the market determine its own efficient distribution of spectrum to support continued rollout of 5G services.

5.2.2. Adopting allocation limits of 175 MHz still allows the ACCC to impose safeguards that protect against potential hoarding.

The adoption of a precautionary cap of 44% is sufficient for the ACCC to provide safeguards for industry participants. One of the issues the ACCC has raised in the past is the risk of monopolisation. If it is considered necessary to maintain safeguards against risk of monopolisation of spectrum holdings, these should be set at conservative thresholds. As we have considered in prior submissions, there is no evidence of any market participants hoarding or monopolising spectrum. Telstra is not aware of any evidence that any MNO is failing to deploy 5G technology over their spectrum holdings in an efficient and competitive manner, nor are there any indications that MNOs are or may seek to hoard spectrum for anti-competitive purposes. In fact, the ACCC Mobile Infrastructure Report, which considers the total number of 5G sites deployed by MNOs and the radio frequency spectrum deployed, found that MNOs are predominately using the 3.5 and 3.6 GHz bands to deploy these services.

In addition, on numerous occasions MNOs have passed up the opportunity to purchase available spectrum, providing evidence that MNOs do not hoard spectrum or purchase it just for the sake of excluding rivals, but are rational bidders who stop bidding when their internal valuations are reached. For example, in the 3.6 GHz auction in regional areas, no bidders acquired the maximum amount of spectrum permitted under their allocation limit in every region. In the Omnibus auction in 2017, no bidder purchased all the spectrum they could have, even though there were no allocation limits for the 3.4 GHz lots, the 2.1 GHz lots, or the 2.3 GHz lots. In the 700 MHz auction in 2013, spectrum remained unsold

⁴⁰ ACCC, *Allocation limits advice for the 3.6 GHz spectrum allocation*, 2018, pg. 5

⁴¹ ACCC *Mobile Infrastructure Report*, 2021, p. 10 & *Mobile Infrastructure Report 2021 Output Tables*, Table 13: Total number of 5G sites by MNO - 2020 to 2021



despite allocation limits allowing MNOs to purchase more. Adopting a high but precautionary cap allows the ACCC to limit the potential for such an occurrence.

5.2.3. Adopting more flexible (higher) allocation limits will allow the market to find the efficient distribution of spectrum.

The table below sets out each MNO's existing holdings (within the 3.4-4.0 GHz band) and the amount of spectrum each MNO could acquire if the ACCC adopted an allocation limit of 175 MHz in both regional and metro areas.

Geographic lots—name	Category	Existing Holdings (3.4-4.0 GHz)			Amount of spectrum bidder could acquire		
		TPG	Telstra	Optus	TPG	Telstra	Optus
Sydney	Metro	65	60	100	110	115	75
Melbourne	Metro	65	60	100	110	115	75
Brisbane	Metro	95	62.5	67.5	80	112.5	107.5
Perth	Metro	95	62.5	65	80	112.5	110
Adelaide	Metro	90	63	72	85	112	103
Canberra	Metro	95	62.5	67.5	80	112.5	107.5
	Regional	20-45	50-82.5	30-67.5	130-155	92.5-125	110-145

Table 1: Existing holdings vs. Amount of spectrum MNOs could potentially acquire if allocation limits were set at 175 MHz

Specifically:

- Optus could buy up to 75 MHz in the key Sydney and Melbourne markets and up to 110 MHz in the other capital cities. In the regional areas, Optus could buy up to 145 MHz of spectrum.
- TPG could buy up to 110 MHz in metro areas and up to 155 MHz in regional areas.
- Telstra could buy up to 115 MHz in metro areas and 125 MHz in regional areas.
- Any new entrant could also purchase up to the allocation limit of 175 MHz.

These limits, while sufficient to protect competition, will allow each operator flexibility to pursue larger allocations that may enable them to provide differentiated services. Specifically, they will enable operators to weight the comparative merits of investing in spectrum versus other elements of the mobile value chain. The ability to differentiate in this way is important, as it means consumers will have real choice in each market. For example, some MNOs may choose to differentiate their service by offering higher quality services, whilst others may seek to differentiate based on price alone. These different strategies can lead to positive outcomes for customers as end customers are able to make choices aligned to their own preferences. Such a view was adopted by Ofcom in its decision which affirmed that differentiation between rivals is not necessarily a cause for concern and may indeed be a healthy part of competition. This led to Ofcom adopting a safeguard cap (rather than tight spectrum allocation limits) in the award of the 800 MHz and 2.6 GHz auction.⁴²

⁴² See Ofcom, *Second consultation on assessment of future mobile competition and proposals for the award of 800 MHz and 2.6 GHz spectrum and related issues*, Jan 2012, para 4.39. https://www.ofcom.org.uk/data/assets/pdf_file/0025/55276/combined-award-2.pdf. Such an approach was also reflected in subsequent decisions. See Ofcom, paras 7.45 and 7.46, *Award of the 2.3 GHz and 3.4 GHz bands*, November 2014, [2_3_and_3_4_GHz_award_Nov2014_condoc.pdf](#)



5.2.4. Setting a lower limit will not promote competition, encourage investment, or promote different technologies to the same extent.

If lower limits were imposed, competition in downstream markets would not be promoted, investment in infrastructure would not be encouraged and the deployment of new and innovative technology including 5G would not be supported.

The spectrum on offer will augment each MNOs' existing holdings. There is considerable sunk cost in deploying a 5G network. Purchasing spectrum in this auction will allow MNOs to capitalise on their 3.4-3.6 GHz investments and use it more efficiently by improving the customer experience, increasing speeds and geographies, leading to pro-competitive outcomes for customers.

In general, the tighter the allocation limits the ACMA imposes, the worse off end users will be. If for example, allocation limits were set at a cap of 33% of total substitutable holdings (approximately 130 MHz), this would create a high risk of spectrum going unsold,⁴³ and therefore the benefits of competition, investment and innovation would be significantly reduced as compared to setting allocation limits at 175 MHz. Whilst under low allocation limits it is still possible that you may have three MNOs bidding for spectrum in certain areas, the benefits to the end customer would be constrained as speed and capacity would be unnecessarily restrained, with the ACMA in effect capping the experience potential in impacted areas.

5.2.5. Adopting less restrictive allocation limits will promote a competitive auction.

Adopting less restrictive allocation limits will promote a competitive auction, with little risk of unsold spectrum. It will also support vigorous bidding to ensure price discovery and the highest value use of the spectrum is revealed. In contrast, should the ACCC decide to recommend a lower allocation limit there is a high risk that there would be no auction tension in many areas (due to either a reduced number of bidders, or less spectrum some bidders could acquire), spectrum would sell at reserve price, there would be no price discovery, and some spectrum may remain unsold. With overly restrictive limits, spectrum is left unsold because it is being rationed. In such circumstances, allocative efficiency is not achieved. Either speculators will take up the spare lots and then allocative efficiency can be achieved on the secondary market (but the Commonwealth Treasury (and public) loses out and the speculators get to extract the windfall margin privately) or there are unsold lots and there has to be a second auction. In turn, for so long as spectrum remains unused in the hands of the ACMA or speculators, this would lead to poor competitive outcomes as consumers will ultimately have less choice and poorer quality of service (discussed below), and less investment as MNOs would not have access to critical spectrum to build their networks and grow nor innovate. Such an outcome would clearly be an inferior option and should not be recommended by the ACCC.

Such a dynamic was most recently observed in the 3.6 GHz auction where the most competitive bidding occurred in regional areas where a more relaxed cap (80 MHz) was adopted. In this auction, some lots sold at high prices compared to global benchmarks. In metro areas where more restrictive allocation limits of 60 MHz was set, no auction tension was observed and spectrum sold at reserve price.

5.3. Higher allocation limits support higher quality of service and spur innovation.

Spectrum is an input to quality of service thus, higher allocations of spectrum will allow MNOs to deploy higher quality of services. While the latency improvements that come with 5G are independent of the bandwidth of spectrum used, the peak and average throughput an MNO is able to deliver to customers will generally be higher with more bandwidth.

⁴³An allocation limit of 130 MHz would potentially result in aggregate demand from the MNOs of 390 MHz – less than the 400 MHz total, therefore creating the risk of spectrum going unsold. A cap of 140 MHz would only result in excess demand of 20 MHz, while a cap of 150 MHz would only result in excess demand of 50 MHz or only 12.5% of the entire 400 MHz allocated.



The greater an MNO's 3.4-3.8 GHz spectrum holdings, the greater the peak and average throughput customers can attain. By way of example, the GSA expect that a 100 MHz channel bandwidth could deliver a peak data rate of 3 Gbit/s and an average data rate of 0.78 Gbit/s (see *Table 2: Theoretical 5G data rates per channel bandwidth*). The peak data rates have an approximately linear relationship with channel bandwidths therefore adopting higher allocation limits will allow MNOs the opportunity to significantly increase their holdings and in turn, their peak data rate and average data rate.⁴⁴

To be clear, MNOs may not need 100 MHz of 5G spectrum to be competitive, depending on their service offering. However, acquiring more spectrum provides a way to differentiate themselves, for example giving them flexibility to offer higher service levels, improve reliability, explore new techniques such as network slicing, or improving their ability to ramp up capacity. The ACMA's allocation limit should enable such competitive differentiation, or otherwise it will restrict the choice of services available to consumers.

Channel bandwidth	Peak data rate	Average data rate
10 MHz	0.3 Gbit/s	0.078 Gbit/s
20 MHz	0.6 Gbit/s	0.156 Gbit/s
40 MHz	1.2 Gbit/s	0.312 Gbit/s
50 MHz	1.5 Gbit/s	0.39 Gbit/s
60 MHz	1.8 Gbit/s	0.468 Gbit/s
80 MHz	2.4 Gbit/s	0.624 Gbit/s
100 MHz	3 Gbit/s	0.78 Gbit/s
200 MHz	6 Gbit/s	1.56 Gbit/s

Table 2: Theoretical 5G data rates per channel bandwidth⁴⁵

Such a dynamic was observed most recently in the United States. After the last C-Band auction, Verizon secured between 190-240 MHz in C-band spectrum. This enabled Verizon to significantly improve their 5G download speeds. In a study of average 5G download speeds for T-Mobile, Verizon and AT&T, Verizon experienced a significant improvement of approximately 15 megabits (Mbps) per second to its overall speeds nationwide after the C-band launch. An Opensignal study which looked at mid band 5G download speeds showed that the gap between the carriers closed following the deployment of the C-Band spectrum, with Verizon closing the speed gap significantly with T-Mobile (225.5 Mbps vs. 211.8 Mbps).⁴⁶ This shows the significance of mid band spectrum in improving the customer experience. Acquisition of sufficient mid band spectrum for Verizon restored their competitiveness vs T-Mobile, which has most of 2500 MHz band on a TDD basis.

The benefits of the C-band spectrum are also seen in South Korea which is consistently viewed as a 5G powerhouse. In 2018, South Korea auctioned off 280 MHz of 3.5GHz auction, with SK Telecom and KT Corp each winning 100 MHz of the 3.5 GHz spectrum with LG Uplus obtaining 80 MHz of this critical spectrum.⁴⁷ South Korea's strong performance in initial 5G performance is predominately attributed to the country's significant deployment of the 3.4-4.0 GHz spectrum.

⁴⁴ An MNO, however, can still achieve a higher average throughput for customers if it is able to divide the spectrum it holds between fewer customers or densifies their network (which incurs significant capital cost). Smaller MNOs with lower market share in any area will be able to achieve similar average throughput for customers with less spectrum than an MNO with higher market share. Over time, new spectrum re-allocations enable MNOs which may be increasing their market share to choose to acquire more spectrum or densify their network, or both.

⁴⁵ GSA, *The future of IMT in the 3300-4200 MHz frequency range*, June 2017, p 18.

⁴⁶ [Verizon's C-Band Spectrum Launch Improves 5G Download Speeds \(tessco.com\)](#)

⁴⁷ [South Korea wraps 5G auction for 3.5, 28 GHz | Fierce Wireless](#)



As such, South Korea ranks No.1 with 449 Mbps in 5G median download speeds, based on speed tests conducted during February-March 2021 by Speedcheck.⁴⁸

In the short term, MNOs will be able to significantly improve the customer experience and speed of 5G mobile services. Growing capacity and coverage will enable MNOs to better handle growing data traffic and allow operators an opportunity to develop new and improved services to customers over time. Growth in mobile data is rapidly increasing year on year. Monthly volume of data downloaded on mobile services has increased steadily over the last two years – with the ACCC reporting that average monthly volume of data downloaded on mobile services has increased by just over 23% since the December 2019 reporting period.⁴⁹ In the short term, the key driver in the growth of mobile usage is expected to be from video, including streaming content, video calling, video gaming and streaming from cameras. Access to sufficient spectrum in these critical mid bands will ensure users maintain a quality of service that is able to keep pace with growing demand in the short term.

5.3.1. An ACCC recommendation of 175 MHz is consistent with ACCC precedent in allocations in prior auctions and international decisions

Setting allocation limits at 175 MHz is equivalent to 44% of the total 400 MHz in the 3.4-3.8 GHz range. The ACCC has recommended allocation limits of a similar magnitude in its advice in prior spectrum allocations.

For example:

- Ahead of the 26 GHz auction, the ACCC recommended an allocation limit be set such that no bidder could obtain more than 1000 MHz in any geographic area. The rationale was that it would promote competition and other communications policy objectives because it would reduce the risk that spectrum would be monopolised as a result of the allocation and would provide an opportunity for a number of operators to acquire a sizeable contiguous allocation of spectrum to deploy effective 5G services. This limit amounted to approximately 42% of total spectrum in the 26 GHz band.⁵⁰ The 26 GHz auction saw 5 bidders win lots.
- In the 850/900 MHz auction, the ACCC recommended a limit of 80 MHz on all sub -1 GHz holdings, or 40% of the total amount of low-band spectrum. In regional areas, the Minister set the cap to 90 MHz (45%). There was auction tension and sufficient price discovery in the auction.

On the other hand, as discussed in Section 5.2.1, the allocation limits as set in the 3.6 GHz auction in 2018 were 60 MHz in metro and 80 MHz in regional areas, and the relevant spectrum range to determine existing holdings was a total of 300 MHz from 3400-3700 MHz.⁵¹ The low limit adopted in metro areas resulted in no auction tension and the spectrum selling at reserve price. Further, one of the successful metro bidders in this auction (Dense Air) did not use the acquired spectrum to deploy network services and instead subsequently traded this spectrum to TPG – who also separately acquired spectrum in this auction. This is an example of the risks in setting an allocation limit too low.

An allocation limit in the 40-50% range is also supported by recent international examples of mid band auctions. For example:

- In the 2019 Austrian auction of 390 MHz in the 3.4-3.8 GHz band, caps permitted bidders to acquire between 150 MHz and 190 MHz in each region. The maximum amount acquired by a bidder in any region was 140 MHz, with significant purchases made by smaller operators.⁵²

⁴⁸ [South Korea leads the 5G race and lays out the blueprint for the rest of the world \(speedcheck.org\)](https://www.speedcheck.org)

⁴⁹ ACCC, *Internet activity report – for the period ending 31 December 2020*, pg. 7

⁵⁰ ACCC, *Allocation limits advice for the 26 GHz spectrum allocation*, May 2021

⁵¹ *Radiocommunications (Spectrum Licence Limits—3.6 GHz Band) Direction 2018*.

⁵² See <https://www.rtr.at/TKP/presse/pressemitteilungen/pressemitteilungen/PI19092018TK.en.html> and

https://www.rtr.at/TKP/was_wir_tun/telekommunikation/spectrum/procedures/5G_Frequenzvergabe_3_4-3_8GHz/5G-Auction-Outcome.de.html (English translation)



- In Ireland, for the 3.4-3.8 GHz auction in 2017, a 150 MHz cap was adopted, which equated to ~43% of the 350 MHz available spectrum. This cap ensured a minimum of three networks won spectrum.⁵³
- For the award of 380 MHz in the 3.4-3.8 GHz band, Denmark conducted a pre-award that guaranteed each of the country's three networks 80 MHz. It then held an auction for the residual 140 MHz, divided into 8 blocks of 10 MHz and a single block of 60 MHz with an obligation to serve private networks. Bidders were capped at 180 MHz total, i.e., 41% of available spectrum.⁵⁴
- In the most recent C-band auction at 3400 MHz in the United States, the FCC imposed a cap of 40 MHz out of 100 MHz, i.e. 40%. Notably, this cap allowed for the possibility that Verizon could lift its overall holdings in many areas to 190-240 MHz, out of a total of 400 MHz (not including CBRS), i.e., between 47.5% and 60%. The effect of the cap was to ensure a minimum of three winners in each area in the 3400 MHz auction. The FCC did not include a cap in the previous C-Band auction in which Verizon acquired between 140 and 200 MHz in all markets and a total of 160 MHz (population-weighted).
- In Germany, no caps were imposed on the auction of 300 MHz of 3.4-3.7 GHz spectrum. Four MNOs were successful, each winning between 50 MHz and 90 MHz.⁵⁵

5.4. Minimising the metro/regional divide through investment and continuity of experience.

Having uniform allocation limits will promote continuity of user experience and encourages investment across all of Australia, an important objective of the Government.

As illustrated above, channel width is a key determinant of user experience. A uniform allocation limit across both metro and regional areas ensures that a lack of sufficient spectrum will not constrain metro and regional customers from gaining access to the benefits of 5G technology and the same level of experience.⁵⁶ If such an approach is not adopted, 5G services for regional customers may be lower quality than what would be available in metropolitan areas and regional customers may miss out on the benefits of 5G. Setting an allocation limit of less than 175 MHz in regional areas will be less likely to promote competition, investment and innovation and will create a 5G digital divide between metropolitan and regional customers.

At present, MNOs have considerably less 3.4-3.6 GHz spectrum in regional areas than in metropolitan areas with most of the spectrum held by nbn co for the delivery of FWA services. However, as discussed throughout this submission, given the importance of this spectrum in delivering 5G mobile services, adopting higher allocation limits improves the likelihood that all MNOs will bid in regional areas. Setting allocation limits at 175 MHz will maximise competitive tension as it will allow MNOs who are already active in the regional telecommunications market to obtain additional spectrum if they determine that they require it. It would also provide any other bidder without existing holdings in regional areas the opportunity to acquire spectrum and invest in network. This is consistent with the Government's objective of encouraging investment in infrastructure in regional areas, and providing regional Australians with access to high quality 5G networks. If only one or two MNOs are permitted to bid for spectrum, there is a significant risk that some spectrum will remain unsold. Without that competition, spectrum could be allocated to uses that are not the highest value, sacrificing economic efficiency. The peak speeds available for regional customers may be considerably lower than metropolitan areas, and it would be more difficult for MNOs to provide as high average speeds meaning that 5G services for regional customers may be lower quality than what would be available in metropolitan areas.

To account for these risks and support a more uniform user experience between metro and regional customers, Telstra recommends the ACCC advise an allocation limit that provides greater scope to MNOs to operate a network of equivalent quality in both metropolitan and regional areas. Such an approach is warranted particularly given the

⁵³ Commission for Communications Regulation, 2017 [ComReg-1738.pdf](#)

⁵⁴ [Energistyrelsen, Annex A - Minister's Decision \(ens.dk\)](#), [Annex A - Minister's Decision \(ens.dk\)](#)

⁵⁵ [Key Elements for the rollout of digital infrastructures and Identification of Demand for nationwide assignments in the 2 GHz and 3.6 GHz bands \(bundesnetzagentur.de\)](#)

⁵⁶ The total user experience for customers depends on many factors. Whilst channel width is a key determinant of user experience, the total user experience for customers depend on a number of factors including network density and regional investment (e.g. in backhaul).



potential benefits 5G technology is expected to bring to regional customers. For example, many of the use cases of 5G are particularly pertinent for customers living in regional Australia. Over the next decade, 5G is expected to play a critical role in smart farming and agriculture through new smart farming technologies, like drones, autonomous agriculture vehicles, robotics, AI and IoT, that leverage fast, high capacity private and public networks.⁵⁷ In addition, it is expected that 5G will support a range of industrial and commercial outcomes, including manufacturing, telemedicine and freight and logistics management solutions. Realising these benefits will lead to significant benefit over the long term – the Bureau of Communications, Arts and Regional Research has estimated that 5G will add \$1,300 to \$2000 in GDP per person after the first decade of roll out.⁵⁸

⁵⁷ [How 5G will improve smart farming and precision agriculture in Australia - Retail World Magazine](#)

⁵⁸ The Hon Paul Fletcher MP, Media Release, Supporting Australia's 5G future, 29 September 2020, [Supporting Australia's 5G future | Ministers for the Department of Infrastructure](#)



6. Third party authorisation

The Consultation Paper notes that Telstra and TPG have recently announced a proposed network sharing arrangement, which includes a proposed authorisation for use of certain bands of spectrum (700 MHz, 850 MHz, 2100 MHz and 3.6 GHz) in certain regional areas (**Proposed Authorisation**). The Proposed Authorisation provides for Telstra to use certain TPG spectrum in the defined coverage area for the purposes of pooling and providing access for TPG (and Telstra) to the combined pool. The Proposed Authorisation is time limited and has the potential for early termination by TPG for the purposes of using this spectrum for its own purposes. Importantly, the proposed arrangement is subject to regulatory approval.

The ACCC has asked how it should take into account Telstra and TPG's proposed network sharing arrangement (including the Proposed Authorisation) when assessing the need for and nature of allocation limits.

As a matter of principle we consider that network sharing arrangements which include the non-discriminatory pooling of spectrum (via a MOCN, MORAN or neutral hosting arrangements that were recently endorsed by the Government in its response to the 2021 Regional Telecommunications Inquiry⁵⁹) should not be considered when assessing the need for and quantum of allocation limits

Our view is that spectrum sharing agreements where no party gains exclusive access to the use of some or all of the pooled spectrum, i.e. all parties generally have equal access to use of the pooled spectrum resource, are not relevant for the purpose of applying allocation limits. Each party in such an agreement should be treated as an individual bidder and only their own holdings should be considered when applying allocation limits. This is consistent with the approach taken in recent spectrum auction determinations which provide for persons to be considered as associates if there is an agreement between them for one party to use the spectrum held by another party, i.e. where the spectrum is not used by multiple parties.

Including such shared spectrum in any assessment of allocation limits is undesirable as it would likely disincentivise parties to enter into spectrum sharing arrangements as well as constraining the pool of spectrum that could potentially be acquired to contribute to network sharing arrangements.

Where parties propose trading and/or shared use of spectrum, the ACCC will still have the opportunity to separately consider any competition impacts under the section 50 provisions in the Competition and Consumer Act (Cth) (CCA). We consider this to be the appropriate mechanism by which to assess and manage any competitive concerns about the sharing of spectrum.

6.1. The Proposed Authorisation should not be considered as part of the ACCC's assessment of allocation limits

Telstra submits that it would not be appropriate for the Proposed Authorisation to be considered as part of the ACCC's assessment of the need for and nature of allocation limits, for the following reasons:

- First, the Proposed Authorisation does not give rise to an affiliation between TPG and Telstra, if the rules used in recent auctions were to apply to this auction. It does not involve use or acquisition by Telstra or TPG of any part of the spectrum that may be the subject of the relevant re-allocation declaration for this auction.
- Second, imposing auction allocation limits which endure beyond the end of the auction process is likely to prevent or hinder innovative initiatives, such as the Proposed Authorisation, to improve the efficient utilisation of spectrum through secondary market trading and/or shared use.

⁵⁹ Australian Government response to the 2021 Regional Telecommunications Independent Committee report, 30 March 2022



- Third, the ACCC should consider the need for allocation limits based on spectrum usage rights as they currently stand, not as they may change if the proposed network sharing arrangement proceeds. The appropriate mechanism for the ACCC to consider the Proposed Authorisation is as part of its review under section 50 of the Competition and Consumer Act 2010 (Cth) (CCA) (as deemed under section 68A of the Radiocommunications Act).
- Finally, where similar MOCN agreements exist elsewhere in the world, regulators typically do not take them into account when setting spectrum allocation limits.

Each of these points is explained below.

6.2. The Proposed Authorisation does not give rise to an affiliation between TPG and Telstra

Allocation limits for recent spectrum auction processes have operated to ensure that no person or 'relevant group of persons' is able to use more than a specified amount of spectrum within the band the subject of the auction.⁶⁰ The definition of 'relevant group of persons' has included 'a person and all associates of that person.'⁶¹ There is no need to depart from the form of the determinations used in recent spectrum auctions regarding associates, which provided that persons are associates if there is a 'relevant agreement' between them that is either or both:

- for the use by one party to the agreement of spectrum licensed to another party to the agreement under a spectrum licence for a part of the spectrum referred to in the re-allocation declaration;*
- relates to the acquisition of a spectrum licence for a part of the spectrum referred to in the re-allocation declaration.⁶²*

The Proposed Authorisation does not make TPG and Telstra associates under this definition because it does not involve a 'relevant agreement' for either the use or the allocation by Telstra or TPG of relevant spectrum. The Proposed Authorisation provides for Telstra to use certain spectrum already held by TPG in the defined coverage area for the purposes of pooling and providing access by TPG (and Telstra) to the combined pool. It is not an agreement for the use by Telstra or TPG of any part of the spectrum that is the subject of the relevant re-allocation declaration for this auction. Nor does it relate to acquisition of a spectrum licence for part of that spectrum.

Assuming the rules which determine association between applicants/bidders remain consistent with recent auctions, Telstra and TPG should not be construed as associates and should not be part of a 'relevant group of persons' for the purpose of determining allocation limits. It therefore would not be appropriate for the ACCC to treat spectrum subject to the Proposed Authorisation as spectrum jointly held by Telstra and TPG as a 'relevant group of persons' for the purpose of considering allocation limits. The identification of whether applicants or bidders in the spectrum auction are affiliated with one another is an exercise properly conducted when applying the relevant auction rules, rather than being predetermined as part of the allocation limits advice.

6.3. Efficient utilisation of spectrum should be encouraged

The Proposed Authorisation is derived from competitive commercial tension in the market and arises in the context of seeking greater efficiency and utilisation of active infrastructure.

In principle, allowing the market to negotiate spectrum use post auction is an important part of ensuring efficient allocation and use of spectrum. This in turn can deliver significant benefits, including by facilitating the deployment of

⁶⁰ See *Radiocommunications (Spectrum Licence Allocation – 850/900 MHz Band) Determination 2021* (Cth) s 14(1); *Radiocommunications (Spectrum Licence Allocation – 26 GHz Band) Determination 2020* s 12.

⁶¹ See *Radiocommunications (Spectrum Licence Allocation – 850/900 MHz Band) Determination 2021* (Cth) s 15(4)(a); *Radiocommunications (Spectrum Licence Allocation – 26 GHz Band) Determination 2020* s 13(3)(a).

⁶² See *Radiocommunications (Spectrum Licence Allocation – 850/900 MHz Band) Determination 2021* (Cth) s 15(1)(c); *Radiocommunications (Spectrum Licence Allocation – 26 GHz Band) Determination 2020* s 13(1)(c).



next generation technology.

Where parties propose trading and/or shared use of spectrum post auction, the ACCC will separately have an opportunity to consider the potential impact of this under the CCA. Any proposed secondary market activity that may take place after the auction should only be taken into account in setting allocation limits for the auction if it is agreed prior to or during the auction and is in respect of the spectrum being auctioned, consistent with the rules on applicant/bidder affiliation in recent auctions.

If allocation limits were to be imposed because of parties negotiating efficient trading and/or sharing arrangements, to capture proposed future arrangements post-auction that otherwise would not cause the parties to be associates in the auction, this would discourage parties from entering into these arrangements. This could potentially hinder innovation and deployment of new and innovative technology solutions for the benefit of end users.

6.4. The Proposed Authorisation is not yet in effect, and will only come into effect if regulatory approvals are granted

At this stage, the Proposed Authorisation is subject to (and conditional on) regulatory approvals. As the ACCC is aware, the parties intend to seek authorisation from the ACCC pursuant to Part VII, Division 1 of the CCA. The ACCC will only authorise the proposed transaction between Telstra and TPG (including the Proposed Authorisation) if it is satisfied that it either:

- will not substantially lessen competition; or
- will deliver public benefits that outweigh any lessening of competition.

The Proposed Authorisation will only come into force if regulatory approval is granted.

Presently, and until the regulatory approval condition is satisfied, Telstra is not authorised to use the TPG spectrum that would be the subject of the Proposed Authorisation under the proposed network sharing arrangements. Indeed, Telstra may never be authorised to use this spectrum if regulatory approvals are not forthcoming.

Therefore, it would not be appropriate for any part of the TPG spectrum that is subject of the Proposed Authorisation to be considered as part of the spectrum that Telstra can use, for the purposes of determining allocation limits.

Even if this proposed future arrangement were to be considered relevant, it should not be assumed that it would result in any party 'using' more than its existing licensed amount of spectrum. The Proposed Authorisation provides for Telstra to use certain TPG spectrum for the purposes of pooling and providing access to the shared RAN infrastructure using the combined pool. Competition at the retail level will determine relative use of the combined pool. The ACCC could not safely assume that the Proposed Authorisation (if and when it comes into effect) would necessarily result in either party using more than its currently licensed amount. It would certainly be wrong to assume that the Proposed Authorisation would allow Telstra to use all of the spectrum to which it applies.

6.5. The appropriate time for consideration of the Proposed Authorisation is in the CCA authorisation process

As noted above, Telstra and TPG intend to seek ACCC authorisation for the proposed transaction, including the Proposed Authorisation.

This means that, if it does come into force, the Proposed Authorisation would have been determined to either not substantially lessen competition and/or deliver public benefits which outweigh any competitive detriment.

Telstra considers that the Proposed Authorisation will in fact enhance competition, by allowing TPG to materially enhance its network coverage and service offering. Telstra also believes that it will deliver significant public benefits, including by supporting the deployment of new and innovative technology. In short, the Proposed Authorisation is



consistent with the criteria applied by the ACCC when considering allocation limits.⁶³

Telstra considers that the ACCC need not, and should not, consider the potential impacts of the Proposed Authorisation as part of its consideration of allocation limits for the allocation of spectrum licences in the 3.4 GHz and 3.7 GHz bands. It would be inappropriate for the reasons set out above. It would also be unnecessary, given that any potential impacts on competition and/or the public interest will be considered as part of the CCA authorisation process.

6.6. Where similar MOCN agreements exist elsewhere in the world, regulators typically do not take them into account when setting spectrum allocation limits.

MOCN deals are not unique to Australia and have typically been used across the world for a number of years to help achieve significant cost savings for operators and increased geographical coverage for users. Below we discuss examples in Canada, Denmark, Finland, Hong Kong and Sweden where regulators typically have not considered them when setting allocation limits.

Canada

There are three nationwide MNOs in Canada: Rogers, Bell and TELUS. While Rogers has a fairly strong foothold in all provincial markets, generally, Bell has larger market share in regional markets in the eastern and northern provinces and territories whereas TELUS has a larger market share in the western provinces and territories. Bell and TELUS have a long-standing network sharing (including spectrum sharing) arrangement in place which was devised to “speed the build-up of the network and provide the widest reach, particularly to remote and rural regions⁶⁴” The two companies achieve coverage outside their own core regions through a MOCN agreement, which covers 3G and 4G technologies.

Innovation, Science and Economic Development Canada (ISED) has continued to allow both companies to bid separately in spectrum auctions subject to the same individual spectrum caps as imposed on the other nationwide operator, Rogers. When approving Bell & TELUS application for subordination of AWS-3 licences, ISED noted that “[the] application will have no impact on either company’s overall spectrum holdings or distribution, but will enable Bell and TELUS to enhance spectrum efficiency of the joint network and maximizes the benefits that Canadians derive from the use of this spectrum”⁶⁵

There are also other active MOCN agreements between:

- Bell, TELUS and SaskTel in Saskatchewan;
- Bell (previously MTS) and Rogers in Manitoba; and
- Rogers and Thunder Bay Tel in Ontario.

In all cases, there have been no restrictions preventing these operators from bidding independently in spectrum auctions, and then pooling spectrum later.⁶⁶

Denmark

TT-Netværket (TTN) is a joint venture between Telenor and Telia set up in 2012 to implement a nationwide MOCN spanning 2G, 3G and 4G technologies. In 2020, it successfully trialled a MOCN for 5G technology.

⁶³ ACCC Consultation Paper, p 4.

⁶⁴ TELUS CEO Darren Entwistle in 2008

⁶⁵ Innovation Science Economic Development Canada (ISED), *Subordination of spectrum licences between Bell Mobility Inc. and TELUS Communications Inc.*, Decision

⁶⁶ <https://www.cbc.ca/news/science/bell-and-telus-team-up-to-overhaul-wireless-network-1.709483#:~:text=Bell%20and%20Telus%20said%20a,move%20a%20win%20for%20consumers>, <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11605.html>, <https://www.bce.ca/investors/financial-reporting/2019-Q3/2019-q3-transcript.pdf>, Plum Consulting, *Review of efficiency gains with Multi-Operator Core Network (MOCN) technology*, 2016 <https://plumconsulting.co.uk/review-efficiencies-multi-operator-core-network-mocn-technology/>



The rules for spectrum auctions since 2012 have prohibited the parent companies of MOCN JVs from bidding in the same auction as their subsidiary JV. However, both parent companies can bid if their subsidiary JV is not bidding in the auction. Even when both parent MNOs bid, the spectrum cap of each parent is simply that of an individual bidder. Past auction results show that Telenor and Telia have bid through their JV (TTN) in some auctions but have bid directly by themselves in others.⁶⁷

Finland

Suomen Yhteisverkko is the joint venture between DNA and Telia established in 2014 to operate a 2G, 3G, and 4G MOCN. The MOCN covers rural areas which make up 50% of the Finland's area but only 15% of the population.

There have been no rules prohibiting DNA and Telia from bidding separately in spectrum auctions since the formation of the MOCN. Each company bidding, regardless of whether a member of the MOCN, has been subject to the same individual bidder spectrum cap.

Hong Kong

Genius Brand Limited is a joint venture between Hong Kong Telecommunications Limited (HKT) and Hutchison Telephone Company Limited (HTCL) set up in 2011 to deploy a 4G MOCN.

In Hong Kong's most recent spectrum auction in 2021, HKT and HTCL won spectrum such that their combined spectrum won exceeded the spectrum caps in the auction as shown Table 3. Therefore, we can conclude that HKT and HTCL did not have their combined bids subject to individual spectrum caps.⁶⁸

⁶⁷ Pápai, Zoltán; McLean, Aliz; Nagy, Péter; Szabó, Gábor; Csorba, Gergely Conference Paper *The impact of network sharing on competition: the challenges posed by early versus mature 5G ITS Online Event*, 14-17 June 2020 <https://www.econstor.eu/bitstream/10419/224870/1/Papai-et-al.pdf>, Centre on Regulation in Europe, *Implementing co-investment and network sharing*, May 2020 https://cerre.eu/wp-content/uploads/2020/07/cerre_implementing_co-investment_and_network_sharing-26.05.2020.pdf, Plum Consulting, *Review of efficiency gains with Multi-Operator Core Network (MOCN) technology*, 2016 <https://plumconsulting.co.uk/review-efficiencies-multi-operator-core-network-mocn-technology/>

<https://plumconsulting.co.uk/review-efficiencies-multi-operator-core-network-mocn-technology/>
⁶⁸ Plum Consulting, *Review of efficiency gains with Multi-Operator Core Network (MOCN) technology*, 2016 <https://plumconsulting.co.uk/review-efficiencies-multi-operator-core-network-mocn-technology/>, HKT Annual Report 2020 <https://www1.hkexnews.hk/listedco/listconews/sehk/2021/0331/2021033101080.pdf>, <https://www.commsupdate.com/articles/2011/08/22/huawei-wins-sole-provider-contract-for-hutchison-and-pccw-joint-lte-network/>, Ofca, *Auction of Radio Spectrum in the 2.5/2.6 GHz band for the provision of wireless broadband services*, https://www.ofca.gov.hk/filemanager/ofca/en/content_810/20130506.pdf, https://www.ofca.gov.hk/filemanager/ofca/en/content_810/20121221_IM.pdf



	700MHz	2.6GHz
HKT	2x10MHz	2x25MHz
HTCL	2x10MHz	2x5MHz
Total	2x20MHz	2x30MHz
Spectrum cap	2x15MHz	2x25MHz

Table 3: Spectrum won by HKT and HTCL in Hong Kong’s 2021 auction

Sweden

Sweden has three major MOCN agreements:

- 3GIS is a joint venture between Hi3G and Telenor set up in 2001 to operate a 3G MOCN. Since both operators owned spectrum when the agreement was signed, the arrangement was approved to span up to only 70% of sites. It operates mainly in rural areas and the urban area of Karlskrona.
- SUNAB is a joint venture between Telia and Tele2 set up in 2001 after Telia did not win any spectrum in the 2G auction in 2000. It runs a MOCN for the operators’ nationwide 3G networks.
- Net4Mobility is a joint venture between Tele2 and Telenor set up in 2009 to operate a 4G MOCN. In 2019, the agreement was extended to include 5G.

The rules for the various spectrum auctions since the formation of the MOCNs have dictated that a parent company of a MOCN JV cannot bid in the same auction as their subsidiary JV. However, both parent companies can bid if their JV is not bidding in the auction. Each parent company has been bound by the same individual spectrum cap as other completely independent operators. Although parent companies of a particular joint venture could bid in the same spectrum auction, in some auctions, some parent companies have chosen to bid through their joint venture as part of their strategy (notably Net4Mobility).⁶⁹

6.7. Other third-party authorisations in place for licences in the 3.4-4.0 GHz band or other mid bands

The ACCC has also asked whether there are any other third party authorisations in place for licences in the 3.4-4.0 GHz band or other mid bands.



⁶⁹ <https://www.econstor.eu/bitstream/10419/224870/1/Papai-et-al.pdf>, https://cerre.eu/wp-content/uploads/2020/07/cerre_implementing_co-investment_and_network_sharing-26.05.2020.pdf, <https://plumconsulting.co.uk/review-efficiencies-multi-operator-core-network-mocn-technology/>, PTS, *Open invitation to apply for licences to use radio transmitters in the 700 MHz band* <https://www.pts.se/globalassets/startpage/dokument/legala-dokument/beslut/2018/radio/700-ai-bb-engelska/2.-appendix-1---open-invitation.pdf>



[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Telstra intends to make the case to the ACMA (which determines the relevant rules) that “use” of spectrum by way of a third party authorisation agreement should only be considered as making up part of the existing holdings of an applicant if the right of use (including any option for renewal) extends for at least six months beyond the licence commencement date for the auction spectrum.

[REDACTED]

[REDACTED]

To discover any other third party authorisations that may be held by applicants, the ACMA could add a simple requirement in the auction determination and the auction application form requiring applicants to disclose any authorisations that have been granted in their favour for the use of spectrum that is determined to be relevant for the allocation limit, as well as their term, and a similar obligation could be applied for the duration of the auction. This information would be shared by the ACMA with all auction participants.



7. Appendix – Answers to 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?

In Telstra's view, the highest utility and therefore the most likely intended use of the spectrum in the 3.4 GHz and 3.7 GHz bands spectrum is for the operation of 5G mobile services over which access to the internet, voice, messaging services and other associated applications will be supplied in both metro and regional areas. See Section 1 for further detail.

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?

[REDACTED]

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?

Given we expect the likely intended uses of spectrum in the 3.4 GHz and 3.7 GHz bands to be for the operation of 5G mobile services and MNOs to be the primary bidders, we consider that spectrum licensing and the intended use of price-based allocation is likely to support efficient allocations of spectrum through a price discovery process.

We agree with the ACCC's view that small operators such as WBB or private enterprise users, fixed link operators and satellite services are more aptly served by apparatus licences as they allow operators to purchase smaller geographic areas, rather than being forced to acquire an entire metro or regional area. This in turn, makes licensing more affordable and more suitable to these use cases.

4. How is the term of the spectrum licences likely to impact your demand for spectrum at this allocation?

The licence term is not a principal determinant of our demand. However, as reflected in Telstra's ACMA submission⁷⁰ we support a short licence period (with all licences expiring on 13 December 2030). An initial licence period of 7 years poses lower investment risk on this occasion given that this spectrum will be incremental to MNO's existing holdings and much of the investment capital necessary is already sunk. See Section 1.3 for further detail.

5. How is the differing utility of the urban excise spectrum likely to impact your demand for spectrum at this allocation?

Our initial view is that this spectrum has compromised utility relative to other spectrum available in this allocation. The market, via price, should reflect its utility accordingly. See Section 1.4 for further discussion.

⁷⁰ Telstra submission, *ACMA's consultation on 3.4 and 3.7 GHz draft Reallocation Proposal*, May 2022



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?

We consider the relevant downstream market for the purpose of assessing the impact of the 3.4 GHz and 3.7 GHz bands on allocation will be the national market for mobile services.

Whilst we accept that demand will be generated from other use cases such as fixed broadband and private wireless enterprise and this may indicate the existence of a possible market, we do not consider these relevant markets for the purpose of setting allocation limits. These use cases are better served by the ACMA's proposal to reserve spectrum capacity for AWL licences in the 3.8-4.0 GHz range and therefore should not be a primary consideration for the ACCC in setting allocation limits. See Section 2 for further discussion.

7. Are there likely to be future relevant markets that have not been identified?

Technology is continually evolving and there is always the potential for high use and utility spectrum to facilitate new use cases and therefore new markets emerge however, we consider the primary use case (and thus demand) will be from 5G mobile services.

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?

Australia's national mobile market is competitive and open, with competition between the mobile operators delivering strong benefits to consumers.⁷¹ These benefits include Australia having amongst the lowest mobile data prices in the OECD⁷² and Australia having amongst the fastest mobile speeds in the world (nearly double the global average).⁷³ It is important that any decision by the ACMA to impose allocation limits promotes the ongoing competitiveness of the Australian mobile market, and does not inappropriately restrict access to this mid-band spectrum.

Historically, a key concern in setting allocation limits has been in relation to asymmetric holdings between MNOs. In this context, Optus holds a significant amount of spectrum (100 MHz) in the 3.4-4.0 GHz bands in the key markets of Melbourne and Sydney, where pressure on MNOs to add 5G capacity is greatest. In contrast, Telstra holds only 60 MHz in these markets in long-term spectrum licences. [REDACTED]

[REDACTED] This asymmetry is not the result of a deliberate investment decision made by Telstra, but primarily a consequence of the allocation limits imposed in metro areas in the 2018 auction of 3.6 GHz spectrum.⁷⁴ However, all three MNOs have now launched 5G in Australia and all now have well established 5G services in the market. Therefore, with the increase in spectrum available in this auction, the ACCC should shift its focus to allowing all MNOs the opportunity acquire larger spectrum holdings to further support the deployment of 5G services.

Quality of mobile services in terms of upload and download speeds is principally determined by the quantum of spectrum an MNO holds. Telstra is concerned that if the ACCC were to set allocation limits too low, MNOs may be prevented from offering the highest quality 5G service to their customers and the acceleration of 5G innovation would be significantly

⁷¹ See e.g., ACCC, Communications Market Report, December 2020, p 1 - https://www.accc.gov.au/system/files/20-47RPT_Communications_Market_Report_FA.pdf

⁷² [Cable.co.uk](https://www.cable.co.uk) reports Australia with the seventh lowest mobile data prices in 2021 among OECD members (after Israel, Italy, Chile, France, Turkey and Poland).

⁷³ <https://www.speedtest.net/global-index> and <https://www.speedtest.net/insights/blog/5g-speeds-australia-q1-2021/>

⁷⁴ Radiocommunications (Spectrum Licence Limits—3.6 GHz Band) Direction 2018 ([legislation.gov.au](https://www.legislation.gov.au))



hampered. For these reasons, Telstra considers that a more relaxed cap will allow MNOs to acquire enough spectrum to offer the highest quality services to their end customers.

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?

We consider that the allocation of spectrum licences in the 3.4 GHz and 3.7 GHz bands in metropolitan and regional areas will positively impact both competition and investment in the identified markets. Specifically, it will allow MNOs to further improve their service offering and continue to innovate. In addition, we expect that such an allocation would also encourage investment leading to potential new sites and enhanced backhaul to carry traffic across both metropolitan and regional areas. We discuss in detail these important impacts in Section 5.

In addition, accommodating smaller WBB and private enterprise users, fixed link operators and satellite services through apparatus licences will promote competition and investment for these use cases. The ACMA's proposal to offer at least 200 MHz of spectrum nation-wide for these types of alternative services will continue to support the market entry of these alternative service providers. This in turn will spur competition and innovation for these alternate use cases.

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

We consider that existing spectrum holdings in the 3.4-3.8 GHz band are substitutable and should be considered relevant in the ACCC's assessment of allocation limits. The spectrum from 3.8- 4.0 GHz is not relevant because it will be offered as Area Wide Licences and is therefore not substitutable with spectrum licences. See Section 3 for further discussion.

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

No. The other 'mid' spectrum bands (1800 MHz, 2100 MHz and 2600 MHz) have different technical characteristics to the unpaired allocation in this auction. See Section 3 for further discussion.

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?

The ACCC notes that the misalignment between the boundaries for various licences in the wider 3.4-4.0 GHz band makes it difficult to depict existing spectrum holdings in a simple manner. In this circumstance, it is appropriate for the ACCC to recommend a population percentage threshold of 50% in the overlap area (as a percentage of the population in the given licence area) at which an existing spectrum holding is deemed to be material in the context of setting an allocation limit for that licence area where boundaries are misaligned. This is discussed further in Section 4.

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 licences in the 3.4–4.0 GHz band or other mid-bands?

Telstra and TPG's proposed network sharing arrangement should not be considered when assessing the need for and nature of allocation limits for the following reasons:

- First, the Proposed Authorisation does not give rise to an affiliation between TPG and Telstra. It does not involve use or acquisition by Telstra or TPG of any part of the spectrum that may be the subject of a relevant re-allocation declaration.



- Second, imposing auction allocation limits which endure beyond the end of the auction process is likely to prevent or hinder innovative initiatives, such as the Proposed Authorisation, to improve the efficient utilisation of spectrum through secondary market trading and/or shared use.
- Third, the ACCC should consider the need for allocation limits based on spectrum usage rights as they currently stand, not as they may change if the proposed network sharing arrangement proceeds. The appropriate mechanism for the ACCC to consider the Proposed Authorisation is as part of its review under s 50 of the Competition and Consumer Act 2010 (CCA) (as deemed under s 68A of the Radiocommunications Act).
- Finally, there is substantial precedent internationally where regulators typically have not considered MOCN deals relevant when setting allocation limits.

See Section 6.

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?

Telstra believes that an allocation limit of 175 MHz in both metro and regional areas (including bidders' existing holdings in the 3.4-3.8 GHz band) is appropriate in this circumstance for the reasons set out below:

- First, all three MNOs already have holdings to support their initial 5G rollouts, with Optus particularly well positioned in Sydney and Melbourne, so more flexible allocation limits are appropriate. Instead of adopting restrictive limits, the ACCC should adopt a precautionary cap of 44% of total substitutable spectrum holdings and leave it to the market to find the efficient distribution of spectrum. This will maximise auction tension by encouraging multiple rivalrous bidders, enhance competitive auction bidding and limit any inefficiencies in the form of unsold, or undervalued spectrum.
- Second, higher allocation limits will enable MNOs to improve their 5G offerings and innovations. To more fully exploit the capability of 5G technology, some MNOs may want larger holdings of 5G spectrum to raise the peak and average throughput or to raise the quality of their 5G services and applications.
- Third, a limit of 175 MHz means that no bidder will be entitled to hold more than 44% of new and existing spectrum in the 3.4-3.8 GHz bands. This limit will prevent any single operator from monopolising the band. It is broadly consistent with limits imposed in previous allocations for 5G, e.g., the 26 GHz mmWave band, and by regulators in overseas jurisdictions.
- Finally, having uniform allocation limit across both metro and regional areas ensures that a lack of sufficient spectrum will not constrain metro and regional customers from gaining access to the benefits of 5G technology and the same level of experience.

Allocation limits at this level would promote competition and encourage investment in infrastructure, including in regional Australia. In the short term, MNOs will be able to significantly improve the customer experience and speed of 5G mobile services in both metropolitan and regional areas. Growing capacity and coverage will enable MNOs to better handle growing data traffic and allow operators an opportunity to develop new and improved services to customers over time. Access to sufficient spectrum in these critical mid bands will provide greater scope for MNOs to provide a quality of service that is able to keep pace with growing demand in the short term.

At present, MNOs have considerably less 3.4-3.6 GHz spectrum in regional than in metropolitan areas with most of the spectrum held by nbn co for the delivery of FWA services. However, as discussed throughout this submission, given the importance of this spectrum in delivering 5G mobile services, adopting high allocation limits improves the likelihood that all MNOs will bid in regional areas. Setting allocation limits at 175 MHz will maximise competitive tension as it will allow MNOs who are already active in the regional telecommunications market to obtain additional spectrum if they determine that they require it. It would also provide any other bidder without existing holdings in regional areas the opportunity to



acquire spectrum and invest in network. This is consistent with the Government's objective of encouraging investment in infrastructure in regional areas, and providing regional Australians with access to high quality 5G networks. If only one or two MNOs are permitted to bid for spectrum, there is a significant risk that some spectrum will remain unsold. Without that competition, spectrum could be allocated to uses that are not the highest value, sacrificing economic efficiency. The peak speeds available for regional customers may be considerably lower than metropolitan areas, and it would be more difficult for MNOs to provide as high average speeds. Therefore, applying uniform allocation limits mitigates this risk and supports competition and investment in these areas.

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?

An intra band limit approach is appropriate in this auction. All spectrum within the 3.4-3.8 GHz band that is allocated for spectrum licensing is potentially substitutable for purposes of deploying 5G capacity. However, spectrum in other bands is not a good substitute for this spectrum, owing to the prime role of this particular band in the 5G ecosystem and lack of options in other bands (excepting Optus's holdings at 2.3 GHz) to realise larger contiguous bandwidths. Accordingly, allocation limits for this allocation should be set only in relation to existing and potential (spectrum that is acquired through the upcoming auction) holdings in the 3.4-3.8 GHz band and should not consider holdings of other mobile-capable frequency ranges.

Telstra believes that an allocation limit of 175 MHz in both metro and regional areas (including bidders' existing holdings in the 3.4-3.8 GHz band) is appropriate in this circumstance. For the reasons set out in this submission, we consider that the same limit should apply to both regional and metro areas.

As spectrum is an input to quality of service, we consider that higher allocations of spectrum will allow MNOs to deploy higher quality of services. While the latency improvements that come with 5G are independent of the bandwidth of spectrum used, the peak and average throughput an MNO is able to deliver to customers will generally be higher with more bandwidth. This will help promote competition, investment and innovation in the national mobile services market. We discuss these impacts more generally in Section 5.

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

Telstra intends to make the case to the ACMA (which determines the relevant rules for affiliation of applicants and bidders in the auction) that "use" of spectrum by way of a third party authorisation agreement should only be considered as making up part of the existing holdings of an applicant if the right of use (including any option for renewal) extends for at least six months beyond the licence commencement date for the auction spectrum.