



nbn's submission on allocation limits advice for 3.4 GHz and 3.7 GHz bands spectrum licence allocation

9 May 2022

Final



Thank you for the opportunity to provide feedback to inform the ACCC's preparation of advice to the ACMA about appropriate allocation limits to apply to the allocation of spectrum licences in the 3.4 GHz and 3.7 GHz bands in metropolitan and regional areas.

nbn's spectrum requirements and strategies have been developed to enable it to meet the Government's Statements of Expectations, the Statutory Infrastructure Provider (**SIP**) regime and our role as default SIP for Australia. This includes the Federal Government's expectation that **nbn** will assist in reliably and affordably meeting the current and future broadband needs of households and businesses, including regional and remote areas in Australia, and continue to upgrade the network technologies to support Retail Service Providers (**RSPs**) to meet demand from end users and improve customer experience.¹

As more Australians are changing the ways they work, with more people working from home due to the COVID-19 pandemic, **nbn's** fixed wireless (**FW**) and satellite network services play a critical role in meeting the digital connectivity needs and lifting the digital capability for all Australians. As of 28 April 2022, there were approximately 382,000 and 110,000 active FW and satellite services respectively.²

Our interest in **the proposal to make available 3.4 and 3.7 GHz spectrum licences** falls within the following categories:

- **Protecting nbn's existing outer metro 3.4 GHz spectrum holdings from interference.** This spectrum is the only spectrum that **nbn** has available for **nbn's** FW network to service the outer metro fringe areas of Sydney, Melbourne, Adelaide, Perth, and Brisbane. We consider that the ACMA needs to continue to balance the need to protect **nbn's** existing and planned services and ensure **nbn** is not unreasonably constrained in its ability to deploy new technologies in future with the utility of the urban / inner metro excise spectrum.
- **Defragmenting 3.4 GHz regional spectrum licences.** The acquisition of spectrum and subsequent trading with other spectrum owners as required will ensure that existing regional spectrum holdings can be more efficiently utilised and facilitate more carrier aggregation technology solutions.

nbn is required by legislation to operate as a wholesale only, open access, non-discriminatory operator. In doing so, **nbn** has developed wholesale products that RSPs use as inputs to their own retail products. This is intended to level the playing field in the Australian telecommunications industry, enhancing competition and innovation, and providing greater choice for customers across the country.

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To provide the ACCC with context, our interest in the opportunity to acquire 3.4 – 4.0 GHz frequency range spectrum generally also falls within the following categories:

¹ See NBN Co Ltd Statement of Expectations 26 August 2021 at <https://www.nbnco.com.au/content/dam/nbn/documents/about-nbn/policies/soe-shareholder-minister-letter-2021.pdf>

² <https://www.nbnco.com.au/corporate-information/about-nbn-co/corporate-plan/weekly-progress-report>



- **Delivering all FW network customers the up to 250 Mbps capability.** Acquiring additional spectrum for our FW geographic areas [C-i-C] [C-i-C] to address the estimated 15% of FW network customers, that will be unable to access the up to 250 Mbps capabilities, to be provided as part of the \$750m FW network investment. [C-i-C] [C-i-C]
- **Long-term customer experience requirements.** Acquiring additional spectrum for the expanded FW footprint more generally required, given the projected increase in traffic volume, the increase in FW customers and the need to meet growing customer experience requirements. The new version 4 WNTDs to be rolled out [C-i-C] [C-i-C] are compatible with this spectrum and the need to have an ecosystem that is compatible with acquired spectrum is critical to meeting demand in a timely and cost effective manner. Given the proposed long term tenure of these licenses, we also need to consider our future capacity requirements as part of our business case for acquiring spectrum in the upcoming allocations.
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3.4 GHz regional spectrum licences

We are investigating the business case for acquiring additional 3.4 GHz regional band spectrum which is a key dependency to defragmenting our existing regional spectrum licensed holdings. The planned uplift to the FW network that would be enabled through this initiative is in line with the objective of supporting digital connectivity and investment in regional Australia and supporting the deployment of new and innovative technology as set out in the relevant Ministerial Policy Statement,³ as detailed below:

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- *When?* nbn has equipment capable of retuning to the target spectrum ranges remotely in many cases and we would seek to deploy any acquired spectrum as soon as possible. We support the spectrum licences commencing immediately enabling the usage subject to operating around or reaching commercial agreements with incumbents during the reallocation period.

Cross-band limits

We understand that 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 submit that if any limits are placed on the quantum of 3.4/3.7 GHz band spectrum licences that a single operator may acquire, the quantum should be informed by the substitutability of all sub-6 GHz band spectrum holdings with more weighting placed on low band (sub-1 GHz) holdings and spectrum holdings that use FDD configuration (these include the 1800 MHz, 2100 MHz and 2600MHz bands in addition to the sub-1 GHz bands) to recognise the comparatively superior performance characteristics. We have set out factors evidencing this substitutability below:

³ <https://www.infrastructure.gov.au/department/media/news/ministerial-policy-statement-34-40-ghz-spectrum-band> The 4 communications policies specified in the MPS cover: supporting the deployment of new and innovative technology, including 5G; supporting a range of use cases and users; supporting digital connectivity and investment in regional Australia; and promoting competitive markets.



- Mid-band (1 – 6 GHz) spectrum is commonly used to provide more capacity rather than coverage. While mid-band and high-band (> 6 GHz) spectrum is not generally considered suitable as a coverage layer (due to inferior propagation characteristics meaning that it is more susceptible to terrain and clutter related losses weakening the signal) and therefore not substitutable for low-band spectrum, the opposite does not apply.
- Low-band spectrum is effective for delivering capacity over FW and mobile networks and can be used to deliver both coverage and capacity simultaneously. This is particularly the case in regional areas. It is more common to provide more capacity for end users as a layer in a multi-layer network using carrier aggregation technology or dual-connectivity to make use of multiple spectrum channels and bands.
- For operators without sub-1 GHz band spectrum such as **nbn**, achieving the required network coverage must be prioritised over capacity in using spectrum holdings. That is, the ability for spectrum holdings to provide capacity is compromised given the competing objective of obtaining the required coverage.
- Carrier aggregation and dual connectivity (i.e. delivering a network to a device using two different spectrum band holdings) are now widely deployed across MNO and FW networks and commonly available on all 3GPP compatible devices (such as Apple iPhone, Samsung Galaxy etc).
- The implications of time division duplex (TDD) and frequency division duplex (FDD) configuration of different spectrum bands in terms of uplink performance, a feature which is significantly more important for customer experience since the COVID-19 pandemic. The practical need to observe frame ratio synchronisation in TDD spectrum to avoid interference with other spectrum users means that only 20% of time domain resources are available for uplink transmission, this means that where TDD spectrum is relied upon to deliver a given uplink service level, the operator will need to hold 2.5 times the amount of spectrum in TDD configuration compared with an operator who can take advantage of FDD spectrum holdings to deliver the service. As an example, 2 x 40 MHz of paired spectrum in 1800 MHz (as deployed on the eastern and south-western parts of regional Australia) allows 40 MHz of dedicated uplink spectrum in just one band. In comparison, a TDD operator would need to find as much as 200 MHz (which might otherwise have been considered an excessive quantum of spectrum if not viewed in this context) of TDD spectrum to achieve similar uplink results.

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