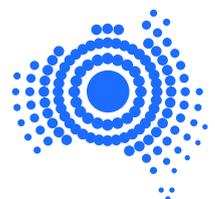


Planning options in the Upper 6 GHz band

Submission of NBN Co

16 July 2024



1. Introduction

nbn welcomes the opportunity to provide information and feedback on the Australian Communications and Media Authority's (**ACMA**) consultation on the future use of the upper 6 GHz band and potential planning arrangements (**Consultation Paper**). The Consultation Paper:

- presents options for domestic planning arrangements to enable RLAN and/or WA WBB use in the band; and
- considers changes to existing RLAN arrangements, such as permitting the operation of standard-power devices.

nbn has a strong interest in the planning arrangements for the upper 6 GHz band as an existing holder of a large number of licences for point-to-point links within this band.

nbn is a Government Business Enterprise established to provide fast, reliable, and affordable broadband infrastructure across Australia. **nbn**'s purpose is to lift the digital capability of Australia, by building, operating and upgrading the **nbn** network, in accordance with:

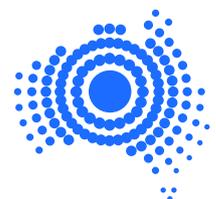
- the expectations of the Government, as set by the Shareholder Ministers' Statement of Expectations; and
- its obligations as the default Statutory Infrastructure Provider (**SIP**) to offer a wholesale high speed broadband service to all Australian homes and businesses (unless there is an alternate nominated SIP).

The **nbn** network has been built using a mix of technologies, matching the most appropriate technology to each community, based on population density, geography and cost. Most premises fall within **nbn**'s fixed-line footprint, with the remainder covered by either **nbn** fixed wireless (**FW**) or satellite networks, where the density of premises is not suitable to a cost-effective fixed line deployment. The FW network is therefore essential to **nbn** meeting its purpose, meeting the expectations of Government and meeting its obligations as the default SIP, taking into account the multi-technology mix model.

As of 8 July 2024, there were approximately 400,000 active FW connections. By the end of 2024 it is anticipated that an expanded FW network footprint will cover approximately 750,000 premises, as a result of the \$750 million FW and Satellite Upgrade Program, that will:

- extend **nbn** FW footprint, enabling approximately 120,000 former satellite-only eligible premises to access **nbn** FW services.
- improve **nbn** FW typical wholesale busy hour speeds.
- deliver faster **nbn** FW wholesale speeds.

The **nbn** FW network delivers substantial public benefits to end users. Fast and reliable broadband drives improved economic and social outcomes for Australia including significant GDP benefits to the Australian economy (particularly in regional and remote areas and in lower socio-economic communities), and a positive impact on individual wellbeing, including:



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- 78% of regional and remote **nbn** users who worked from home or used job search platforms reported the **nbn** network positively impacted their employment outcomes;
- 80% of regional and remote **nbn** users who engaged in education from home reported the **nbn** network positively impacted their education outcomes;
- 77% of regional and remote **nbn** users who accessed telehealth or online medical information, resources or records reported the **nbn** network positively impacted their health outcomes;
- 73% of regional and remote **nbn** users who connect with family, friends and others or access news or community information online reported the **nbn** network positively impacted their social and community connectedness; and
- 87% of regional and remote **nbn** users who work, study, access health or other services online reported having fast internet via the **nbn** network helped them to reduce their emissions.

nbn's upper 6 GHz band holdings are fundamental to the ongoing operation of the FW network, as this band is used to connect our FW towers via point-to-point links to deliver services to all end-users and maintain continued efficiency of the network. **nbn**'s existing use of the upper 6 GHz band for point-to-point links, and the economic and social benefits of the **nbn** FW network should be a primary matter for consideration by the ACMA in considering planning options for the upper 6 GHz band.

2. **nbn**'s existing and future use of the upper 6 GHz band for point-to-point links must be protected

2.1 **nbn**'s existing and future use of upper 6 GHz spectrum

nbn currently holds spectrum in the upper 6 GHz band for a significant number of point-to-point links across the FW network. All of these links are in existing use as an essential component of the FW network, delivering the backhaul to sites as dimensioned to meet the needs of the Fixed Wireless and Satellite Upgrade Program. In the future **nbn** is likely to need further licences in this band for additional point-to-point links, as the demands of customers data consumption continues to grow we also anticipate expansion required on some links.

Maintaining the 6 GHz band for **nbn**'s current and future point-to-point needs and ensuring a suitable technical framework that protects existing use to the maximum extent possible, will promote the long-term public interest derived from use of the spectrum. We expand on this further below.

2.2 Point-to-point links are an essential component of the **nbn** FW network

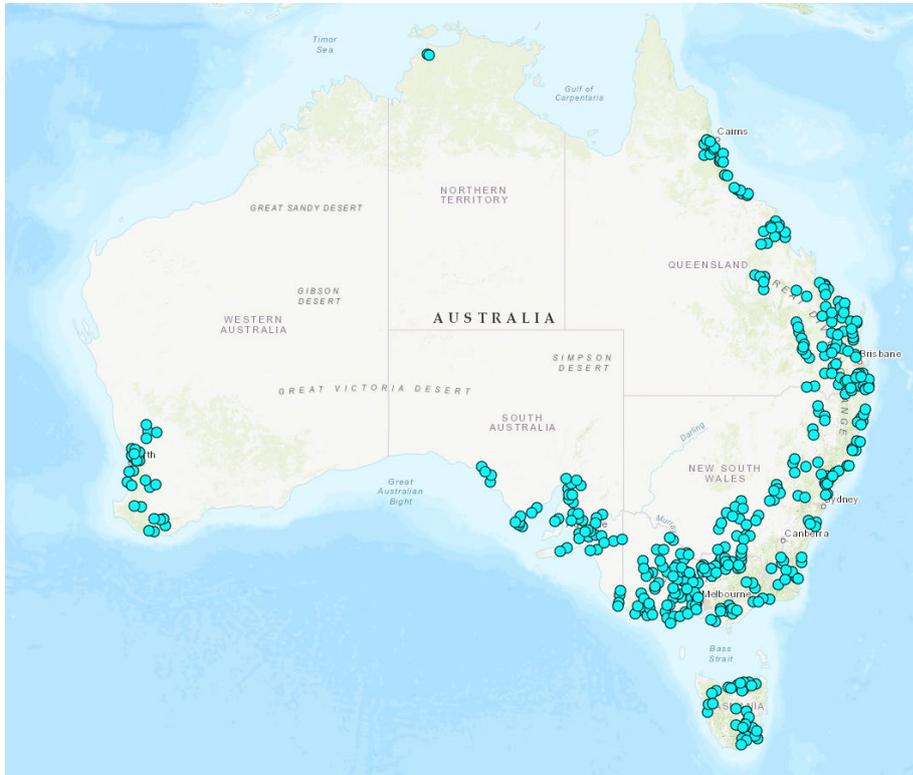
The existing use of the upper 6 GHz by **nbn** is extensive, particularly where longer links are required. Point-to-point links are chosen where the cost to build or lease fibre has proven prohibitively expensive and as such there are limited further alternatives. While higher



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frequency point-to-point links are feasible the link budgets offer lower availability and reliability, particularly over the longer distances in our more regional footprint.

Figure 1: Location of nbn point-to-point links in the upper 6 GHz band



2.3 WA WBB cannot readily co-exist with point-to-point links

Sharing studies performed under WRC-23 Agenda Item 1.2 concluded that site-by-site co-ordination would be required to avoid potential interference between WA WBB and fixed point-to-point links. As such, the ACMA has indicated that any introduction of WA WBB is likely to require the clearance of co-channel point-to-point links in areas allocated for WA WBB.

2.4 Clearance of point-to-point links from the upper 6 GHz band is not supported

Allocation of the upper 6 GHz band for WA WBB in areas where point-to-point is in use would cause considerable expense and disruption to industry, especially **nbn** and other existing users of this spectrum band, and would not be consistent with maximising the long term public interest derived from the use of the band, given the substantial public benefits of the FW network.

There is currently no easily substitutable alternative spectrum to move **nbn**'s existing point-to-point links to, due to **nbn**'s already deployed radio equipment and the performance requirements of the link designs in use.



2.5 RLAN can co-exist with point-to-point links with a suitable technical framework

Unlike WA WBB, coexistence between RLAN and fixed point-to-point links is feasible with a suitable technical framework.

In Australia RLAN currently coexist with fixed point-to-point services, subject to the very low power (VLP, 14 dBm total power) and low power indoor (LPI, 24 dBm total power) provisions currently set out in the LIPD class licence for the 5 GHz and lower 6 GHz bands. However, as noted in the Consultation Paper there is an ongoing discussion in relation to the potential to permit higher power/EIRP RLAN use. Some international arrangements enable the operation of RLAN at standard power levels in coexistence with point-to-point services, by implementing additional interference management mechanisms, such as AFC systems.

Any power increases proposed for RLAN co-existence in Australia would need to be supported by robust and suitable modelling to ensure it doesn't introduce interference to our widely deployed point-to-points. As noted in the Consultation Paper, the number of RLAN devices in operation will increase over time, so the aggregate power contributed by these devices will also increase. Future projections of device proliferation will need to be considered when assessing coexistence scenarios involving any prospective new service.

However, in principle, if the relevant studies are completed to demonstrate no increase to aggregate interference, **nbn** welcome the assessment of AFC for standard power and exploration of the outdoor/indoor split as perhaps a less burdensome approach to enabling 'standard power' for RLANs indoors.

3. Response to Questions in the Consultation Paper

3.1 What are your views on the 4 broad planning options identified for the upper 6 GHz band?

ACMA has set out 4 broad planning options for feedback. **nbn**'s comments on each option are set out below.

Option 1: Maintain existing arrangements, with potential reconsideration at a later date.

nbn is not opposed to maintaining existing arrangements with reconsideration at a later time, particularly given the additional "mid-band" spectrum recently made available for WA WBB and the additional spectrum recently made available for RLAN in the lower 6 GHz band. **nbn** is not aware of any pressing need for the ACMA to make an urgent decision to reallocate the upper 6 GHz band.

Option 2: Introduce arrangements to enable RLAN access to some or all of the upper 6 GHz band, via a variation to the LIPD Class Licence.

If the ACMA does decide to make the upper 6 GHz band available for new terrestrial technologies, **nbn** supports the introduction of arrangements to enable RLAN access to some



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or all of the upper 6 GHz band, with a suitable technical framework that ensures no interference.

Reliable and high performing Wi-Fi is an important aspect of the in-premise networks through which customers access the **nbn**'s network. As noted by the ACMA in the Draft FYSO 2023-28, "RLAN technology, specifically wi-fi, has become an integral part of everyday modern life and wi-fi use continues to expand, with more diverse devices using these networks". It is important for the ACMA to ensure adequate spectrum is available to accommodate next generation Wi-Fi devices and to allow for the increasing traffic being carried over Wi-Fi networks.

As noted in section 2.5 above, RLAN is inherently better able to share with other services, including the point-to-point links (such as those held by **nbn**) and also FSS, as demonstrated with the introduction of RLAN into the lower 6 GHz band. However, any power increases proposed for RLAN co-existence would need to be supported by robust and suitable modelling to ensure it doesn't introduce interference to point-to-point links.

Option 3: Introduce arrangements to enable WA WBB access to some or all of the upper 6 GHz band, using apparatus and/or spectrum licensing. There would be no arrangements introduced for RLANs.

nbn does not support the allocation of upper 6 GHz spectrum to WA WBB given WA WBB cannot readily co-exist with point-to-point links (as discussed in section 2.2 above).

We note that there are also significant concerns in the satellite industry about the impact of the introduction on WA WBB on the use of the upper 6 GHz band by FSS satellite systems. While WRC-23 adopted "expected EIRP" limits, which are intended to control the aggregate interference to FSS satellites, we understand there are some doubts about whether those limits will provide adequate protection to FSS satellite receivers. The ability for WA WBB systems to share with FSS earth stations is also a concern, which has parallels to the situation in the 3.6 GHz band, where earth stations have gradually been required to terminate operations to accommodate WA WBB.

Option 4: Introduce arrangements to enable both RLAN and WA WBB access to different frequency segments within the upper 6 GHz band.

nbn is not opposed to Option 4, subject to the WA WBB segment being set to avoid any impact to existing point-to-point links. However, we believe more evidence is needed to determine the quantum of spectrum needed for WIFI/RLANs. There is a long-term requirement to support ever faster in home experiences and any segmentation that risks precluding positive in home experience should be avoided.



3.2 If we decide to divide the band into different RLAN and WA WBB segments, should the WA WBB segment be a multiple of 100 MHz or align with the 160/320 MHz wi-fi channel raster?

As noted above, more evidence is needed to determine the quantum of spectrum needed for WIFI/RLAN respectively. However, in general, we support the ACMA's preliminary view that segmentation based on the 160/320 MHz wi-fi channel raster is preferable to segmentation based on WA WBB being multiples of 100 MHz.

3.3 Of the segmentation options based on wi-fi channels (options 1–3 in this paper), what is the preferred option and why?

As noted above, more evidence is needed to determine the quantum of spectrum needed for WIFI/RLAN respectively. However, in general, given the incompatibility of WA WBB with existing point-to-point services, we support Option 3 as being the most compatible with the desirable planning outcomes identified by the ACMA.

3.4 Is it appropriate to limit our consideration of hybrid options for accommodating multiple services to frequency segmentation only?

The ACMA has indicated a preliminary view that geographic segmentation using large areas (for example, metro/regional/remote) is not a viable planning option, on the basis that the level of demand for both RLANs and WA WBB applications in each geotype is expected to be similar. However, from **nbn**'s perspective, geographic segmentation could potentially be beneficial in order to protect existing services in the upper 6 GHz band, taking into account the differing co-existence abilities of WA WBB and RLAN.

In the case of **nbn**, we note that our existing point-to-point links are largely confined to outer metropolitan and regional areas (see Figure 1). Therefore, a metropolitan allocation to WA WBB would cause significantly less disruption to **nbn** than a regional or remote allocation to WA WBB. Given that the desirable planning outcomes identified by the ACMA for this band includes "to maintain regulatory arrangements to the extent possible for existing services within the upper 6 GHz band when optimising its utility", the ACMA may wish to consider whether geographic segmentation between WA WBB and RLAN might produce a more optimal outcome for existing services.

In relation to other "non-traditional sharing models", we agree with the ACMA's preliminary view that there are a number of issues that would need to be resolved before a non-traditional sharing model could become viable in Australia. While studies are ongoing, further international harmonisation and equipment standardisation would be needed to ensure compatible 'off-the-shelf' equipment.

