ACMA, Draft Five-year Spectrum Outlook 2026-31

Submission of NBN Co

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1 Introduction

nbn welcomes the opportunity to provide feedback on the ACMA's Draft Five-year Spectrum Outlook 2026-31, including factors affecting the 5-year outlook and future demand for spectrum, as well as the priorities outlined in the annual work program.

nbn was established in 2009 as a Government Business Enterprise and is a wholly-owned Commonwealth company. The principal responsibility of nbn is to operate and continue to expand, and upgrade, the nbn network operating on a commercial basis in accordance with the Government's Statement of Expectations (**SoE**). nbn's purpose is to elevate Australia by connecting people and powering progress. nbn aims to achieve its purpose by providing fast, reliable and affordable connectivity via wholesale broadband services which meet the current and future needs of Australian households, communities and businesses. As of January 2026, 8.62 million homes and businesses are connected to the nbn network, with 12.53 million premises able to connect.

nbn's spectrum requirements are critical to the operation of our fixed wireless (**FW**) and satellite network which play a fundamental role in enabling nbn to meet its obligations as the default statutory infrastructure provider (**SIP**) across all of Australia under the *Telecommunications Act 1997 (Cth)*, and as set out in its Shareholder Ministers' SoE, taking into account the multi-technology mix model and anticipated future demand for services.

The positive impact of the nbn network on user wellbeing

nbn recently commissioned a research report which found that nbn-enabled internet continues to have a positive impact on user wellbeing is across Australia. For regional and remote nbn users, survey results include the following:[1]

- 73% of regional and remote nbn users say having the nbn network at home has had a positive impact on their satisfaction with life.
- 77% of regional and remote nbn users who worked from home or used job search platforms reported the nbn network positively impacted their employment outcomes in FY25.
- 84% of regional and remote nbn users who engaged in formal or informal education from home via the nbn network reported the nbn network positively impacted their education outcomes in FY25.
- 74% of regional and remote nbn users accessed telehealth or online medical information, resources or records via the nbn network reported the nbn network positively impacted their health outcomes in FY25.

[1] https://www.nbnco.com.au/corporate-information/media-centre/media-statements/social-impacts-of-nbn-report-fy25

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- 74% of regional and remote nbn users who connect with family, friends and others or access news or community information online via the nbn network reported the nbn network positively impacted their social and community connectedness in FY25.
- 64% of regional and remote nbn users who work, study, access health or other services online reported having internet via the nbn network helped them, in their view, reduce their carbon emissions in FY25.

The upgrade paths for regional, rural and remote Australians

nbn continues to upgrade, and improve, nbn's network with the aim of enhancing service quality and consumer experience, improving network reliability and meeting both current and future consumer demand.

The regional benefits that nbn's FW network provides are a key focus, with nbn recently delivering on its commitment to expand the coverage and increase the speed and capacity of its FW network. This was enabled through a $750 million FW and satellite upgrade program, which was supported by $480 million in funding from the Australian Government and an additional $270 million from nbn. As at 30 June 2025, almost 800,000 homes and businesses can access faster speeds on the FW network, benefitting customers across regional Australia, with ~400,000 active fixed wireless services. Having upgraded ~2,300 towers, the FW network now offers increased network capacity of 6.5 Tbps compared to 1.4 Tbps pre-upgrade and peak download speeds up to five times faster than previously available.

For Australians in the nbn satellite footprint, nbn recently announced a partnership with Amazon Kuiper Australia that would enable nbn to resupply a 'Layer 3' residential grade LEO based broadband service on a wholesale basis. However, until such time as the nbn Geostationary Earth Orbit (**GEO**) Satellite products are able to be withdrawn, nbn will need to continue to satisfy its obligations as default SIP in the nbn satellite footprint by supplying services using the nbn Sky Muster network.

- The current nbn GEO Sky Muster Satellites were launched a decade ago and have a finite lifespan. A replacement option is required before the early 2030s, in order to provide existing nbn Ethernet Satellite (Sky Muster) and nbn Sky Muster Plus customers a smooth upgrade path to an alternative product on a new platform, as well as allowing nbn to continue fulfilling its regulatory obligations as a SIP in its satellite serving area.
- The new residential grade nbn LEO Satellite product is intended to replace the nbn Sky Muster and Sky Muster Plus products. However, the nbn Sky Muster Satellite service is subject to the product withdrawal provisions in the Wholesale Broadband Agreement

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(WBA) and nbn's Special Access Undertaking with the ACCC, while the nbn Sky Muster Plus Satellite service is subject to the terms of the Sky Muster Plus Interim Agreement.[2]

2 nbn's feedback on the ACMA's Draft FYSO

Given the need for nbn to continue to operate, and upgrade, our loss-making FW network to meet the Government's SoE, comply with our SIP obligations and meet customer expectations, we have provided submissions on the following areas to inform the ACMA's proposed work program.

- The renewal of our 2.3 and 3.4 GHz expiring spectrum licences (**ESLs**) at a fair price which would incorporate a public benefit discount to the benchmark-derived market prices to recognise the absence of any higher-value alternative use and the delivery of substantial public benefits on a loss-making basis to meet mandated SIP obligations. We have also provided a summary of our concerns and recommendations regarding the ACMA's benchmark-derived market price.
- The uplift in the efficiency and values of 5G upgrades using the 2.3 GHz band for all licence holders which would result from optimising the use of the 2300 – 2302 MHz frequency range.
- The allocation of the 3.4 GHz spectrum that were unsold at the 2023 3.4 / 3.7 GHz auction.
- The reliance by nbn on the use of the upper 6 GHz (6585–7125 MHz) for fixed point-to-point links to support our FW network which should inform the areas in which wide area wireless broadband (**WA WBB**) can be used to minimise this impact and the need for transitional arrangements for those remaining impacted links to accommodate the costly and resource intensive nature of any alternate arrangements.
- The need for the investigation into the utility and feasibility of Automated Frequency Coordination (**AFC**) to permit the operation of higher power radio local area networks (wi-fi networks) in the 6 GHz band to balance the risks to point-to-point links and indoor wi-fi networks.
- A review of the Uralla, Moree and Roma Earth Station Protection Zones (**ESPZs**) to enable more efficient spectral usage in nbn's FW network.

[2] The WBA and Sky Muster Plus Interim Agreement are the contractual vehicle that nbn uses to supply its wholesale customers. To allow time for retail service providers (**RSPs**) to plan for this migration, nbn is consulting on the proposed product withdrawal and will provide RSPs with up to 30 months' notice of the date of withdrawal, to allow RSPs to work with end users and provide them with the opportunity to upgrade to the proposed nbn LEO Satellite service.

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ESLs

nbn supports the ACMA's view that renewal of the expiring spectrum licences (ESLs)[3] used by nbn is in the public interest and that for those regional Australians relying on nbn's FW network 'no better use for this spectrum' can be identified.[4]

We acknowledge that the ACMA does not intend for benchmark-derived market values to account for any public interest discounts, noting that these have historically been made available via ministerial direction.[5] However, the application of benchmark-derived pricing to nbn's ESLs does not sufficiently account for the unique characteristics of nbn's FW use of spectrum, including the absence of any higher-value alternative use and the delivery of substantial public benefits on a loss-making basis to meet mandated SIP obligations. In these circumstances, we consider that a public benefit discount to the benchmark-derived market prices would be appropriate to ensure a fair pricing outcome for nbn's ESLs.

A summary of our concerns and recommendations regarding the ACMA's revised approach to determining a benchmark-derived market price is as follows:

Concerns	Proposals
Asymmetric risk: high prices harm consumers, regional investment and the economy more than conservative pricing outcomes.	**Adopt a conservative ESL pricing approach** reflecting asymmetric risk, declining spectrum prices and current industry conditions.
CPI indexation may overstate values given flat/declining profitability and ARPU during the current licence term. Proposed framework does not reflect **declining spectrum values**, lower profitability/ARPUs, or higher cost of capital.	Use an **industry-appropriate indexation** method (e.g., MSR index or band-specific trends) rather than CPI; final value after consultation on revised benchmarking dataset.
Benchmarking remains **subjective**: comparator selection includes outliers/non-comparable markets, inflating results.	**Exclude outliers/non-comparable countries** and clearly justify inclusion/exclusion of awards in benchmarking.
2.3 GHz pricing parity to 2.6 GHz lacks evidence; band is less desirable due to immature ecosystem and regulatory constraints on TDD benefits.	**Recognise 2.3 GHz is less desirable** than 2.6 GHz and reflect this in pricing.
PPP-only conversion (vs spot or hybrid) does not reflect how the industry interacts with international markets and inputs	**Use a combined PPP and spot (market) approach** to convert award prices to AUD to better reflect operators' cost base.
	Provide instalment options to mitigate incorrect pricing risk while maintaining certainty.
	Align payment timing (full or first instalment) across all renewed licences in the same band to **provide certainty**.

[3] ESLs refers to those due to expire between 2028 and 2032 in the 700 MHz, 850 MHz 1800 MHz, 2 GHz, 2.3 GHz, 2.5 GHz, 2.5 GHz mid-band gap, and 3.4 GHz bands.
[4] Page 12 of 'Expiring spectrum licences, stage 4, Preferred views on ESL frequency bands and licensing arrangements, and response to submissions, December 2025' (**Preferred Licensing Arrangements Paper**)
[5] 'Public interest discounts have been made available in certain circumstances previously via ministerial direction. These include a 50% discount for 2 x 10 MHz of spectrum for rail communication use of the 1800 MHz band as part of the previous ESL process, and for NBN Co's spectrum licence conversion in 2021.', 'Expiring spectrum licences, stage 3, Preliminary views paper 4: Pricing for ESLs' APRIL 2025, UPDATED 23 MAY 2025 (**Stage 3 Preliminary Pricing Paper**)

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Optimisation of 2300 – 2302 MHz frequency range

We note that the ACMA has proposed to not progress this work stream and re-evaluate it as part of the next Draft FYSO. We consider that optimisation of existing spectrum holdings including the 2300 – 2302 MHz frequency range would increase the public benefit derived from spectrum. We consider that the issues that would need to be considered are quite narrow in scope and we request that the ACMA reconsider whether this workstream could be included as part of the annual work program. We would be happy to provide further information to assist the ACMA. We note that this work could also form part of the technical framework update for the 2.3 GHz band as part of the ESL process.

nbn's 2.3 GHz spectrum license frequency band lower limit is 2302 MHz, precluding the channel edge extending to 2300 MHz. As part of nbn's 5G deployments, 50 MHz bandwidth carriers would have to be provisioned as 40 MHz carriers or 100 MHz carriers provisioned as 90 MHz carriers, making 10 MHz of spectrum unusable. Whilst technical features to block specific resource block allocation could alleviate that bandwidth reduction to 47 MHz or 97 MHz, this is a suboptimal allocation of spectrum resulting in lower end user throughput and ongoing reliance on vendor support in the radio access network and design complexity on WNTD provisioning.

Investigation into the utility and feasibility of AFC in the 6 GHz band

Our key interests regarding the ACMA's consideration of AFC in part of the 6 GHz band area are as follows:

- nbn is one of the primary holders of point-to-point apparatus licences in both the lower and upper 6 GHz band (5925 MHz – 6425 MHz and 6425 MHz – 7110 MHz frequency range respectively) with ~ 280 links nationally, however there are often multiple channels registered per link. Given this, nbn is primarily concerned with the protection of, and implications for, the deployed infrastructure that form a critical part of nbn's fixed wireless network.
- Wi-fi networks play an important role in shaping how end users experience the internet at home or work. Noting this focus, nbn supports the existing planning arrangements for the band with the recent updates to LIPD and believes any further changes to the planning arrangements should adequately assess the potential for negative impacts to wi-fi networks as used for in-home / indoor connectivity.

The Draft FYSO indicates that the ACMA intends to follow up with a further consultation paper in Q2 2026 exploring the utility and feasibility of AFC to permit the operation of higher power RLAN devices in the 6 GHz band.

We consider that further consultation is needed to define an RLAN licensing approach that:

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- preserves incumbent licence rights and avoids giving 'standard-power' RLANs interference protection;
- requires the AFC to reconcile daily and allocate no channels when the RRL is unavailable;
- sets maximum power based on Australian incumbent/deployment studies;
- determines band and geographic segmentation to protect sufficient spectrum for high-speed indoor Wi-Fi and manage incumbent risk (including possible regional/rural exclusions);
- avoids overly localised requirements that constrain globally produced equipment;
- establishes robust AFC technical, accreditation, audit, registry, and enforcement arrangements—covering key authorisation parameters, audit trails, inclusion in the National Site Archive, and a single interference complaint/investigation pathway with SLAs; and
- assesses the risk that allowing multiple AFC systems increases accreditation/audit overhead and complexity for ACMA and reliable interaction with the RRL.

Upper 6 GHz (6585–7125 MHz)

nbn has a strong interest in the implementation of the future 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 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. 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 that expansion will be required on some links across the available frequency bands. It is typically only feasible to migrate to fibre backhaul in limited circumstances but this is also evaluated as part of network design.
- 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.

The Draft FYSO proposes that in Q4 2026, the ACMA will consult on the proposed licensing approach which may include a re-allocation declaration and definition of licence areas for use by WA WBB from 6585 to 7100 MHz. It is not proposed to develop the apparatus licensed

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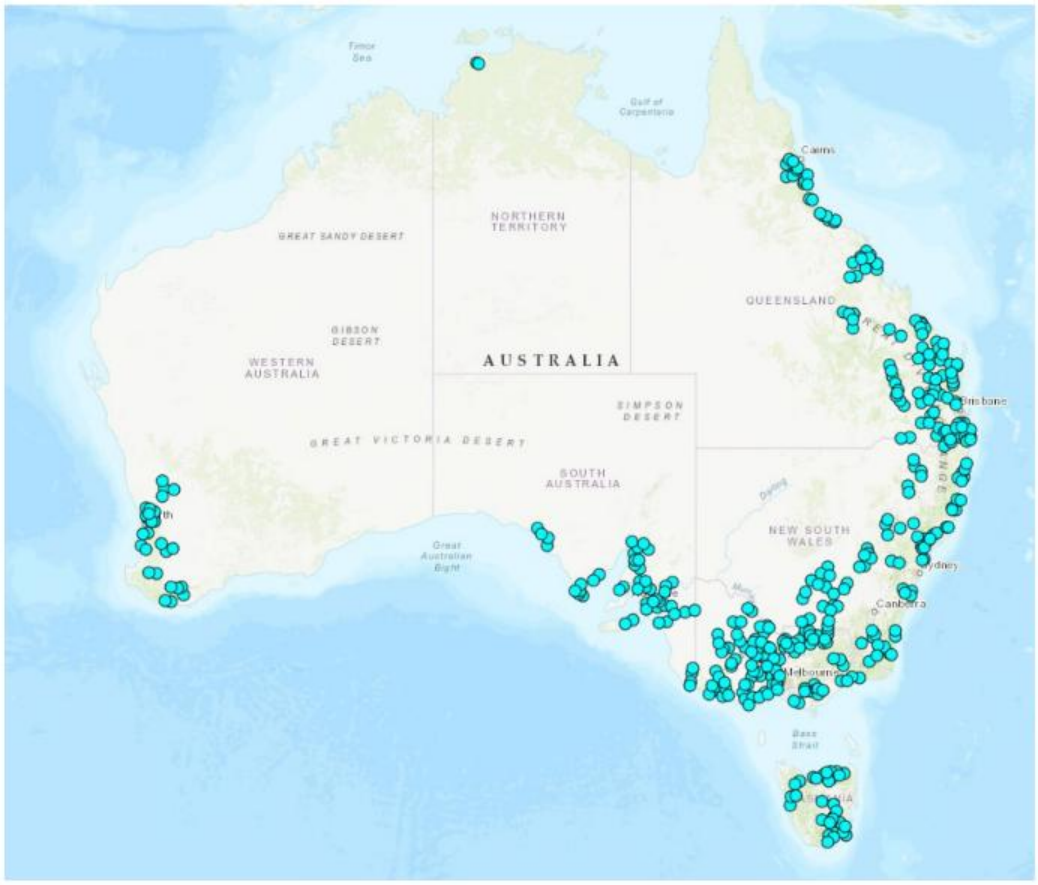
framework for WBB services outside defined areas in the 2026–27 FYSO period with initial demand for WA WBB expected to be greatest in defined areas.

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.

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



The ACMA has not yet consulted on the geographic boundaries of the 'defined areas' but proposes in the Outcomes Paper that this could be the same areas subject to spectrum licensing in the 3750 – 3800 MHz band. nbn currently has **[C-i-C]** **[C-i-C]** in this area in the 6585 to 7100 MHz range.

We note that our current 6 GHz upper band links are unable to be retuned to the lower 6 GHz band since all the hardware (excluding the antenna) associated with the link would need to be replaced.

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There would be significant costs and resources including from a time and personnel perspective involved in upgrading equipment / infrastructure to use other point to point bands where available noting that they typically provide lower availability and reliability due to their link budgets. Where other point to point links are unavailable that meet both performance and capacity requirements, then costs could increase substantially in considering other network technologies.

The allocation of 3.4 GHz lots unsold in the 2023 3.4/3.7 GHz auction

We encourage the ACMA to progress an allocation process of 3.4 GHz lots that were unsold as part of the 2023 3.4 /3.7 GHz auction. Specifically, the following spectrum:

- Regional New South Wales (NSW) Middle in the 3495 – 3510 MHz frequency range,
- Regional South Australia (SA) Middle in the 3495 – 3510 MHz frequency range, and
- Regional Victoria (VIC) Middle in the 3485 – 3490 MHz frequency range.

The Unsold Lots are subject to the *Radiocommunications (Spectrum Re-allocation – 3.4 GHz and 3.7 GHz Bands) Declaration 2022*, and we encourage the ACMA to progress the allocation in a timely manner so that the spectrum can be allocated within the required timeframe under this instrument. This would also enable the lots to be allocated prior to the renewal of the relevant ESLs resulting in a more efficient process.

Review of the Uralla, Moree and Roma Earth Station Protection Zones (ESPZs)

The ESPZs located at Uralla, Moree and Roma significantly constrain nbn's ability to use the 3.4 GHz band, particularly across 3400–3442.5 MHz and 3475–3542.5 MHz, both *within* and *around* these locations. These arrangements lead to inefficient spectrum use and materially constrain nbn's ability to deliver the highest speed tiers and capacity to fixed wireless (FW) services in these regional locations.

<u>The impact on nbn's spectrum use within ESPZs</u>

ACMA has reserved the relevant frequency ranges for satellite earth-station protection and has not made them available for wireless broadband (WBB) deployment within the ESPZ boundaries.

- nbn's spectrum in these areas is limited to 35 MHz (3442.5–3475 MHz and 3542.5–3545 MHz), significantly less than the 145 MHz owned by nbn in the surrounding 3.4 GHz licence area.
- **[C-i-C] [C-i-C]**

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In surrounding areas outside ESPZs

Even outside the ESPZ boundaries, deployment in the 3400–3442.5 MHz and 3475–3542.5 MHz ranges is severely constrained by MS44 coordination requirements, which are significantly more restrictive than S145 constraints.

- Although nbn holds 145 MHz (3400–3545 MHz) across the surrounding spectrum licence areas, only 35 MHz (3442.5–3475 MHz and 3542.5–3545 MHz) is realistically deployable under MS44 constraints
- **[C-i-C] [C-i-C]**

We encourage the ACMA to review the MS44 restrictions noting that we do not have detailed visibility of the specific operators or operational status of each satellite earth station protected under MS44 at Uralla, Moree and Roma. The factors supporting a review of the restrictions include those set out below.

- **Potentially conservative technical assumptions.** The MS44 coordination requirements appear to be based on conservative, worst-case interference assumptions. Based on observations from past device registration behaviour, the practical impact of these constraints suggests they may be more restrictive than necessary. In particular, registration issues have been noted at distances beyond what would typically be expected, indicating that deployment characteristics of modern transmitters may not have been fully reflected when the MS44 criteria were established.

- **Long-term underutilisation of mid-band spectrum.** The current restrictions have resulted in sustained underutilisation of 3.4 GHz spectrum in regional centres, which is inconsistent with policy objectives relating to regional connectivity and efficient spectrum use. They also prevent deployment of contiguous mid-band channels, as effective transmission is blocked across two large spectrum segments.

- **High priority for review consistent with ACMA's optimisation agenda.** ACMA has acknowledged the need to periodically review and optimise RALI requirements to reflect evolving technologies and usage models. Given the material constraints MS44 imposes on 3.4 GHz use, there is a strong case for prioritising a review of MS44 to ensure it remains appropriate in the context of broader 3.4 GHz optimisation activities and contemporary 4G and 5G deployment practices.

- **Scope for more proportionate protection mechanisms.** If protection of satellite earth-station receivers remains necessary, there may be scope to adopt more proportionate and practical protection measures, such as reduced ESPZ boundaries, narrower protected frequency ranges, and / or updated interference criteria informed by modern satellite receiver performance.

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We would be happy to discuss our submission further with the ACMA.

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