



nbn Submission to ACMA's Approach to Expiring Spectrum Licences Consultation Paper

7 August 2023

Introduction

Thank you for the opportunity to comment on the ACMA's proposed approach to considering expiring spectrum licences (**ESL**) as set out in the consultation paper dated May 2023 (**ESL Consultation Paper**).

This submission describes the role of spectrum in **nbn**'s fixed wireless (**FW**) network, discusses **nbn**'s regulatory framework which informs **nbn**'s spectrum requirements, and comments on the issues set out in the ESL Consultation Paper.

nbn was established in 2009 as a Government Business Enterprise (**GBE**), to provide fast, reliable and affordable connectivity and to enable Australia to seize the economic opportunities before it and service the best interests of consumers. It remains the principal responsibility of **nbn** to operate, and continue to build and upgrade, the **nbn** network in accordance with the expectations of the Government, as set by the Shareholder Ministers' Statement of Expectations (**SoE**) and its obligations as the default Statutory Infrastructure Provider (**SIP**).

nbn's spectrum requirements have been developed to enable **nbn** to meet these obligations.

The role of spectrum in **nbn**'s fixed wireless network

The **nbn** FW network is critical to meeting **nbn**'s objectives as set by the **SoE** and its obligations as the default **SIP**, taking into account the multi-technology mix model and anticipated future demand for services.

The **nbn** network has been built using a mix of technologies, matching the most appropriate technology to the local community based on population density, geography and cost. Most premises fall within **nbn**'s fixed-line footprint, with the remainder covered by either **nbn** FW or satellite networks.

The FW service is typically used in circumstances where the density of premises is not suited to a cost-effective fixed line deployment. Data travels from a transmission tower serving premises typically as far as 29 kilometres away, to an **nbn** outdoor antenna that has been fitted to the premises by an approved **nbn** installer as well as the internal connection box, collectively the Wireless Network Termination Device (**WNTD**). Unlike a mobile network, where users are generally responsible for their own reception equipment and upgrade frequently, connection to the **nbn** FW network is via the **nbn**-supplied connection equipment, the WNTD. **nbn**'s FW network is dependent on third party providers to design and customise the WNTD for **nbn**'s spectrum holdings and network design requirements. The WNTD typically has a lifespan of 7-10 years with new variants introduced around every 5 years, taking into account both existing (and planned) spectrum holdings.

nbn is currently upgrading its FW network through the implementation of the **nbn** Fixed Wireless and Satellite Upgrade Program. This program involves an investment of \$750 million, of which the Australian Government has contributed \$480 million. The program will expand **nbn**'s FW footprint coverage and improve typical wholesale busy hour speeds as well as peak wholesale speeds. This investment forms part of the Government's and **nbn**'s response to the 2021 Regional Telecommunications Review, which recommended enhancements to **nbn** FW and satellite services given the step-change in demand for data and broadband in rural and regional areas. The benefits of this investment could be up to an additional \$6.1 billion in regional GDP over FY2022-26.¹

The **nbn** FW network will cover approximately 750,000 premises as a result of the Fixed Wireless and Satellite Upgrade Program across rural, regional and outer-metro fringe areas, with approximately 2,400 tower sites. As of 23 July, there were approximately 400,000 active FW connections.

¹ [\\$750 million investment to 5G-enable nbn® Fixed Wireless to deliver faster speeds to regional Australia | nbn \(nbnco.com.au\)](https://www.nbnco.com.au)

The ESL process is of significant interest to **nbn** because **nbn**'s 2.3 and 3.4 GHz band spectrum licences are due to expire in 2030. These spectrum licences are critical to the provision of the **nbn** FW service.

nbn's also holds 28 GHz band spectrum (**mmWave**) which is being deployed as part of **nbn**'s FW upgrade program. The 28 GHz band spectrum is used to extend the range, speed and capacity of the FW network, while reducing latency, to deliver the best possible customer experience on the network. However, while the 28 GHz spectrum is useful as a capacity layer, it will only serve a portion of the users where line-of-sight to the tower is achievable. The ability to use mmWave spectrum successfully will vary by region, topography and vegetation and this is factored into the network capacity design. In some areas we estimate lower than 10% success is likely, while 20-30% may be more typical. The 2.3 GHz and 3.4 GHz band spectrum that **nbn** holds is therefore fundamental to the ongoing operation and coverage of the FW network.

Issues for comment

We have provided our comments below in relation to the issues set out in the ESL Consultation Paper.

Proposed public interest criteria

The criteria proposed by the ACMA in the ESL Consultation Paper are:

- Criterion 1: facilitates efficiency
- Criterion 2: promotes investment and innovation
- Criterion 3: enhances competition
- Criterion 4: balances public benefits and impacts
- Criterion 5: supports relevant policy objectives

nbn supports the proposed criteria as broadly capturing considerations that will be relevant to the assessment of options for ESL. However, the way each criterion is interpreted will be important, as will the balancing/weighting of these criteria in considering whether licence renewal will promote the long-term public interest.

The ESL Consultation Paper indicates that the ACMA's intends that there will be no hierarchy or relative weighting to the criteria. **nbn** considers that, where there has been substantive investment and substantive existing use of a spectrum licence, the potential impacts of non-renewal on service continuity must be of primary consideration when considering renewal or re-allocation of licences.

The public benefit will generally be maximised by an ESL process that provides a high level of confidence in renewal, unless:

- Spectrum is not being used.
- The relevant spectrum bands are being replanned for a superior alternate use.
- There are substantial competition issues caused by existing allocations.

Further, when considering spectrum held by **nbn** it is necessary to consider the full regulatory background including the policy objectives that **nbn** was established to meet and all relevant legislation pertaining to **nbn** in addition to policy objectives of relevance to the ACMA and its spectrum management role.

Further comments in relation to each proposed criterion are set out below.

Criterion 1: facilitates efficiency

nbn agrees that efficiency is a relevant criterion given that one of the objects of the *Radiocommunications Act 1992 (Cth)* (the **Radcomms Act**) is to promote the public interest derived from the use of spectrum by managing the spectrum in a manner that facilitates the efficient planning, allocation and use of spectrum.

However, it should be explicitly recognised that different considerations arise when considering efficiency in the context of the renewal of an existing spectrum licence, rather than initial allocation. In particular:

- In circumstances where there has been substantive network investment and existing use, licence renewal will almost always be the most economically efficient option, given sunk costs by the existing licence holder.
- Once a licence has been allocated, the fact that licences are tradeable should generally deliver efficiency.

In the case of spectrum held by **nbn**, efficiency also needs to be considered in context of the relevant legislative framework and government policy objectives. **nbn** uses its FW network to meet its SIP obligations and the objectives of the SoE, where FW is the most economically efficient technology. Without its existing 2.3 and 3.4 GHz spectrum holdings, **nbn** would be forced to meet its SIP obligations using alternative, economically inefficient means, such as by incurring significant additional costs to build fixed-line connections to premises currently reliant on the FW network. Consideration of efficiency in respect of **nbn**'s expiring spectrum licences should take into account this relevant contextual background.

Criterion 2: promotes investment and innovation

nbn agrees that the promotion of investment and innovation is a relevant criterion for the ACMA to take into account when considering the public interest in ESL approaches and pricing. Promoting sustainable investment and innovation in the long-term use of spectrum is critical to enhancing productivity, competition and sustainable economic growth within Australia and delivering high quality services into the future. However, in the context of ESLs it is essential that both historic investment, and forward looking investment, are considered under this criterion.

- Where spectrum is currently being used and network investment has already occurred, the sunk costs of existing network investment are already delivering benefits to productivity and service quality. Therefore, if spectrum licences are not renewed with an appropriate technical framework, there will be potential impacts to existing network users, which must be taken into account.
- If spectrum licences are not renewed, there is a risk that some existing telecommunications service providers may not successfully obtain appropriate replacement spectrum and some network services could be lost entirely.
- Even where existing licence holders can acquire appropriate alternative spectrum, this is still likely to involve substantial disruption, inefficiency and significant cost. In the case of telecommunications networks (including **nbn**'s FW network), existing networks will generally have been deployed to make maximum efficient use of existing spectrum holdings, with site locations optimised for coverage and service quality based on existing spectrum holdings.

In **nbn**'s case, the installed WNTD only supports the current spectrum owned and operated by **nbn** with an antenna design that is optimised to maximise gain for these bands. If spectrum licences were not renewed and were instead reallocated via auction this could result in **nbn** acquiring different spectrum to its current holdings. In that event, all current WNTDs may need to be replaced at significant expense, cost and disruption to end users, with each requiring a technician visit to replace the WNTD.

Therefore, when considering which ESL process best supports sustainable investment and innovation in the long-term, consideration must be given to any impacts on the utility of existing network investment that may arise if spectrum licences are not renewed. Wasteful or inefficient duplication of existing infrastructure and investment is not in the public interest.

In addition, consideration should be given to any impact renewal uncertainty will have on investment incentives/risk towards the end of licence terms. In particular, renewal uncertainty could delay improvements in service quality to the detriment of end users. The industry as a whole may find it difficult to raise capital for network investment leading up to licence expiry if there is a high degree of uncertainty that licences will be renewed with an appropriate technical framework.

Criterion 3: enhances competition

nbn agrees that enhancing competition is a relevant criterion for the ACMA to take into account when considering the public interest in ESL approaches and pricing. However, as the ACMA has acknowledged in the ESL Consultation Paper, spectrum is only one input and there are many other market dynamics that may support or limit competition.

When considering competition, it is important to consider telecommunications as a whole, including all incumbent spectrum holdings, not just holdings across the particular bands of the ESL.

In the case of **nbn**, consideration of criterion 3 should also include acknowledgement of **nbn**'s unique role in the market as a wholesale only provider, giving all RSP's access to services in a non-discriminatory manner. In this way **nbn** has a special role in facilitating competition in relevant downstream markets.

Criterion 4: balances public benefits and impacts

nbn agrees that the public benefit from existing use and the potential impact of non-renewal on the availability of those services, is a key matter to be taken into account when considering ESL process and pricing. Indeed, in many cases, when assessing options for ESL that promote the public interest, continuity of service (and the potential impact of non-renewal on end users) will be the most significant factor to consider. Where there has been investment in network infrastructure and spectrum is currently being used to deliver services, spectrum licences should generally be renewed unless there is a very clear case that a substantial public benefit will arise from non-renewal that outweighs potentially significant impacts to consumers and businesses from reallocation.

Criterion 5: supports relevant policy objectives

nbn supports Criterion 5 as one of the proposed public interest criteria. Our submission below discusses the importance of ensuring all relevant policy objectives are taken into account in considering the renewal of spectrum licences, particularly for **nbn** given our unique – and central – position within Australia's telecommunications landscape.

The ESL Consultation Paper notes that part of the object of the Radcomms Act is to promote the long-term public interest by providing for spectrum management that supports the communications policy objectives of the government. Accordingly, the ACMA may consider the extent to which options support applicable policy objectives when forming views on the public interest. The ESL Consultation Paper goes on to note that there are a range of government policy objectives to which it will have regard when considering the public interest, including those outlined in the Ministerial Policy Statement (**MPS**) in relation to the 3.4–4 GHz band, and in the Minister's SoE to the ACMA.

nbn agrees that the objectives of the Radcomms Act, the MPS, and the ACMA SoE should all be considered under this criterion. However, in considering the renewal of **nbn**'s spectrum licences, it will be critical to ensure all relevant policy objectives are taken into account, including those underpinning the establishment and ongoing operation of **nbn** as a Commonwealth GBE, with its own SoE and regulatory obligations designed to ensure Australians have access to fast, reliable and affordable broadband wherever they live or work. It is not clear from the ESL Consultation Paper whether this is the ACMA's intention, so we wish to highlight here the broader policy objectives and regulatory obligations to which the ACMA should have regard as part of the ESL process specifically in relation to spectrum held by **nbn**.

A summary of the relevant regulatory context pertaining to **nbn** is set out below. Of course, other spectrum holders may have their own relevant regulatory context that may also need to be considered as part of Criterion 5. However, this submission is merely from the perspective of **nbn** and its relevant expiring spectrum licences.

The legislation underpinning nbn

NBN Co was incorporated in 2009 and prescribed as a GBE later that year. The purpose was to design, build and operate a wholesale-only national broadband network across Australia, in order to address several perceived issues affecting the telecommunications industry at that time, including: a lack of investment in high-speed ubiquitous broadband infrastructure; a lack of effective retail competition; and a lack of uniform national wholesale pricing.

Following the incorporation of NBN Co, the regulatory framework governing **nbn** was established via the *National Broadband Network Companies Act 2011* and the *Telecommunications Legislation Amendment (National Broadband Network Measures—Access Arrangements) Act 2011*. This legislation amended and added to the existing telecommunications regulatory framework in the *Telecommunications Act 1997* and the *Competition and Consumer Act 2010*, to give effect to **nbn**'s wholesale-only mandate and the delivery of open and equivalent access to RSPs.

While most Australian premises fall within the **nbn** fixed-line footprint, it was always intended that a proportion of premises would be served by wireless and satellite technologies, allowing **nbn** to achieve Australia-wide coverage using the most appropriate technology for a given location. In this way, the **nbn** FW network and our associated spectrum licences are a critical part of the nation's digital backbone, ensuring hundreds of thousands of premises in rural, regional, and outer metro-fringe locations have access to fast, reliable and affordable broadband, consistent with the purpose underpinning the establishment of the **nbn** over a decade ago.

Statement of Expectations

nbn is guided by a SoE issued by its Shareholder Ministers from time to time. The current SoE was issued in December 2022, and emphasises **nbn**'s role in delivering on the Government's commitments to "increase access to faster, more reliable broadband" for Australia. The SoE describes **nbn**'s purpose and objectives as follows:

"The enduring purpose of the NBN is to provide fast, reliable and affordable connectivity to enable Australia to seize the economic opportunities before it and service the best interests of consumers. It is essential to enabling access to key services, maximising employment and educational opportunities, and driving productivity and economic growth. NBN Co will enhance Australia's digital capability by delivering services to meet the current and future needs of households, communities and businesses, and promote digital inclusion and equitable access to affordable and reliable broadband services. NBN Co will operate on a commercial basis, drive a culture of efficiency and innovation that yields results, and meet the highest standards of transparency, governance and accountability."

Following this description of **nbn**'s purpose and objectives, the SoE includes several broad categories of expectations, including:

- enhancing digital capability and productivity;
- promoting equitable access;
- improving connectivity for regional and remote Australians; and
- operating commercially (including managing trade-offs between commercial objectives and meeting obligations and policy expectations).

In turn, these broad categories contain numerous, more detailed expectations, including:

- to promote take-up and utilisation;
- to upgrade and improve the network;

- to promote competition and innovation;
- to improve service and consumer experience;
- to promote access to broadband services and connect First Nations Australians;
- to improve services and address access challenges in regional and remote areas; and
- to work to optimise the delivery of baseline voice and broadband.

In many respects, the SoE is framed without reference to a particular technology. Rather, the Government’s expectations are directed to **nbn** as the national wholesale-only access network which, in practice, comprises fixed-line, fixed wireless and satellite access technologies. Where relevant, however, the SoE does refer to particular **nbn** tech-types. It includes several references to the Government’s expectations for the **nbn** FW network, centred around the efficient implementation of the **nbn** FW upgrades in order to provide all premises in the footprint with access to wholesale download speeds of up to 100Mbps and typical wholesale busy hour speeds of at least 50Mbps. These FW-specific expectations support several of the more general expectations noted above, including improving connectivity for regional and remote Australia, and upgrading and improving the **nbn** to support Australia’s digital capability and productivity.

FW and Satellite Upgrade Program

The enduring importance of **nbn**’s FW network is underscored by the ongoing investments being made in the network, in accordance with the SoE and supported by Government funding, to ensure the network continues to meet customers’ needs for higher broadband speeds and more data.

As mentioned above, **nbn** is currently implementing the **nbn** Fixed Wireless and Satellite Upgrade Program, a \$750 million investment of which the Australian Government has contributed \$480 million. This program will extend the **nbn** FW footprint and uplift FW speeds. In particular, it will:

Extend **nbn** FW: Expand the **nbn** FW footprint by up to 50%, enabling approximately 120,000 former satellite-only eligible premises to access **nbn** FW services.

Improve **nbn** FW typical wholesale busy hour speeds: Network improvements are expected to allow the network to achieve ‘typical wholesale busy period speeds’ of at least 50Mbps (download).

Deliver faster **nbn** FW wholesale speeds: Once launched, **nbn** proposes all homes and businesses in the expanded **nbn** FW footprint will be able to order Fixed Wireless Home Fast via their RSP, which has a peak wholesale download speed range of 100-130Mbps, and a peak wholesale upload speed range of 8-20Mbps. Additionally, it is anticipated 85% of the expanded footprint will also be able to order Fixed Wireless Superfast, which has a peak wholesale download speed range of 200-325Mbps.

nbn expects that, by the end of 2024, the upgrades we are making across the **nbn** FW network will enable around 750,000 homes and business to enjoy better broadband.

The Statutory Infrastructure Provider regime

The SIP legislation commenced in July 2020 and is designed to ensure all Australian premises have reasonable access to broadband services. The SIP legislation does this by identifying a SIP for every premises across Australia, and requiring the SIP to connect premises to a “qualifying telecommunications network” that is capable of supporting services with peak speeds of at least 25/5Mbps.

nbn is the default SIP, which means it is the SIP for the whole of Australia, except in very limited geographic areas where another carrier has been declared to be the SIP (for example, when a non-**nbn** carrier has contracted to install telecommunications network infrastructure in a new development).

nbn's FW network is fundamentally important to our ability to meet our obligations as the default SIP. The legislation requires SIPs to connect premises to a fixed-line network in the first instance but, if that is not reasonable, to connect premises to a fixed wireless or satellite network instead. Consistent with the SIP legislation, **nbn** connects premises in the fixed-line, FW and satellite footprints to its fixed-line, FW and satellite networks respectively. Once our FW upgrade program is completed, the FW network will cover approximately 750,000 premises, and we will use this network to fulfil our SIP obligations within the expanded footprint.

Without the **nbn** FW network, all of these 750,000 premises in the FW footprint would need to be served with an alternative technology. These premises were not served by fixed line technologies due to the significant cost and time that it would take to connect them and our existing Sky Muster satellites would have limited capacity to serve this many additional premises.

It is also worth noting that the SIP legislation requires a SIP's operating fixed-line and fixed wireless networks to support the provision of voice services as well as broadband. In this way, **nbn**'s FW network is important for ensuring the provision of both voice and broadband services to premises in rural, regional and peri-urban areas across Australia, further adding to the importance of this network for supporting regional connectivity.

Other policy objectives or obligations that may arise in the future

Other relevant policy objectives and obligations may emerge over time, and the scope of Criterion 5 must be flexible enough to take these into account if and when they do.

For example, the Minister for Communications has recently flagged the Government's continued focus on universal service delivery and the possibility of reform in this space, driven by new and emerging technologies and business models which may be able to deliver connectivity in better, more effective ways. Minister Rowland told CommsDay (published on 30 May 2023):

"There is long-standing industry and community interest in better, more forward-looking delivery of the USO, both in terms of service outcomes and efficiency, and reform in this area is something I take seriously. ...

I am not suggesting any relaxation of government focus on universal service. Quite the opposite and this remains one of my highest priorities. Clearly, there are substantial shifts driven by private sector innovation and investment which must be taken into account to ensure that government policy most efficiently and effectively delivers the regional, rural and remote connectivity Australia needs and deserves".

To the extent these considerations translate into new policy objectives and regulatory requirements for universal service delivery, it is likely they will also need to form part of the ACMA's considerations regarding ESLs.

Proposed 4-stage approach to undertaking the ESL process

nbn supports the 4 stage process proposed by the ACMA.

In relation to the proposed information gathering phase, **nbn** would appreciate the opportunity to provide feedback specifically on the nature of the information requested and timeframes, particularly if the ACMA is intending to use compulsory information request powers. Early engagement from ACMA with industry will be essential to ensure that the information collected is relevant and consistent to the extent this is practicable, while also minimising disruption to business. In the case of **nbn**, as a wholesale-only network, the level of information that we have access to regarding end users may not always be of the same nature as information that a Mobile Network Operator (**MNO**) has access to.

We support the proposed timing of the ACMA's process, and in particular the consultation on ACMA's preliminary views (Stage 3) in Q4 2024. We agree that there is utility in consulting concurrently in respect of all ESL bands.

As noted above, renewal uncertainty has a negative impact on investment incentives/risk and as a result can delay improvements in service quality to the detriment of end users. From **nbn**'s perspective, early availability of the ACMA's preferred view on spectrum renewal and pricing will assist in making forward-looking investment

decisions, provided that those preferred views and policy on planning, licensing and pricing do provide for renewal confidence and are sufficiently detailed and specific.

Band-specific issues to be considered

Fragmentation in the 3.4 GHz band has been an ongoing issue that the ACMA and industry have been working to resolve for many years.

nbn is optimistic that resolution of this issue will occur prior to licence expiry. However, if fragmentation has not been resolved by 2030, **nbn** would support the ACMA collaborating with industry on a restacking of the band where necessary. The ability to do this is part of the benefit gained from having the spectrum auctioned in the 3.4 GHz band in 2023 align with the expiry date of existing licences in the band.

Proposed approaches to valuing spectrum

We understand that the ACMA will consult on preliminary views on pricing and payment arrangements as part of stage 3 and will take into account matters relevant to domestic and (if relevant) international pricing information. **nbn** supports this approach. However, we have noted below our high level views on some of the potential considerations raised in the ESL Consultation Paper.

The objective of spectrum management by the ACMA, including in the context of ESL, should be to maximise the benefit to the community derived from the use of the spectrum. Pricing must be approached from this perspective.

Spectrum management provided by the ACMA does benefit spectrum users and it is reasonable that the ACMA seeks to recover the efficient cost of spectrum management as part of the ESL process. Where spectrum is already allocated to its highest value use, there is no efficiency benefit from charging for spectrum renewal above this cost recovery.

Where prices for renewal are set too high there are risks to public benefit derived from spectrum. Amounts that are paid for spectrum may reduce the resources available to invest in network upgrades and improvements, which over time could result in reduced service quality. Further, if spectrum renewal is charged at a price that is above the reasonable returns that could be expected from the use of the spectrum, there is a risk that some spectrum licence holders may choose not to renew licences and services in some areas could decline.

In the case of telecommunications services in Australia, the ACMA should be particularly cautious when setting charges for spectrum in regional and remote areas. Because of Australia's geography and terrain regional and remote areas are already extremely costly areas to supply telecommunications services. As long as spectrum is being used to supply services of value to the public in regional areas, prices for renewal of regional and remote spectrum licences should ideally be set at the administrative cost recovery level. This will support ongoing network investment which is contributing to the communications policy objectives of the Government, including supporting digital connectivity and investment in regional Australia.

The **nbn** FW network is currently operated at a loss and provides substantial benefits to end users, particularly in regional Australia and in urban fringe areas that are often underserved by other communications infrastructure. Further, as a regulated wholesale-only network provider, **nbn**'s pricing is constrained. The provision of the **nbn** FW network in accordance with the SIP legislation and SoE forms part of the Government's communications policy objectives and therefore the loss-making nature of this network are relevant matters that should be taken into account in setting prices for **nbn**'s spectrum licences at renewal.

In terms of the specific pricing matters referenced in the ESL Consultation Paper:

- **nbn** strongly rejects the idea that spectrum charges for renewal should be set at a premium to take into account the benefit of certainty to the licence holder (Auction Avoidance Pricing). The provision of continuity of service for network end users and supporting ongoing confidence in network investment are public benefits that favour renewal over reallocation and should be an objective of good regulatory administration. Spectrum users should not be asked to pay a premium for regulatory certainty. If Auction Avoidance Pricing means that prices would be set above the economically efficient price then it would effectively amount to extracting a monopoly rent from existing spectrum holders based on sunk costs of existing infrastructure. This would not be supported by the objectives of the Act. As noted above, there are real risks of reduced public benefit if prices are set too high.
- **nbn** does support public interest pricing in some circumstances. For example, as noted above, to support the Government's public policy objectives of supporting digital connectivity and investment in regional Australia.
- **nbn** agrees that it is appropriate for pricing to take into account licence conditions and restricted use.

We note that consultation in Stage 3 will include consideration of payment arrangements. **nbn** submits that ideally, payment terms should include an option for payment in instalments rather than a single lump sum payment. This is particularly the case where spectrum licences are issued for an extensive duration. We note that payment by instalments was previously provided for some auctions. For example, in the 26 GHz auction, the then Minister directed the ACMA to provide winning bidders with the election of paying upfront or by instalments.

Proposed approach to examining use under existing spectrum licences?

nbn agrees with the ACMA that consideration of existing use will be an important factor in the ESL process and is of relevance to many of the proposed criteria, including efficiency, public benefits and impacts, competition and investment and innovation. We also agree that consideration of existing use can involve multiple dimensions including:

- overall spectrum utilisation;
- use cases and the services provided;
- investment and innovation; and
- service coverage.

However, for fixed services such as **nbn**'s FW network, service coverage is a less relevant metric than it is for mobility use cases. We note the suggestion that the ACMA may seek to set standardised assumptions for how propagation modelling is undertaken to facilitate comparison of service coverage. However, we would assume that such modelling would be of greatest utility in relation to mobile networks rather than fixed networks.

nbn supports the proposal to analyse spectrum use across all spectrum licences, including those not due to expire between 2028 and 2032. We agree that consideration of all spectrum holdings is relevant to providing a complete factual background to the ACMA necessary to consider options under the ESL process, including service continuity and the potential impacts of non-renewal.

In relation to geographic coverage, **nbn**'s view is that it is preferable not to take an approach that is too granular, particularly in regional areas. An approach based on existing licence area boundaries will generally provide the most relevant information.