

Nokia response:

ACMA's Proposed spectrum re-allocation declaration
for the 3.4 GHz and 3.7 GHz bands

March 2022 consultation paper



About Nokia

We create the technology to connect the world. We develop and deliver the industry's only end-to-end portfolio of network equipment, software, services and licensing that is available globally. Our customers include communications service providers whose combined networks support 6.1 billion subscriptions, as well as enterprises in the private and public sector that use our network portfolio to increase productivity and enrich lives.

With an end-to-end portfolio that is unique in the industry, Nokia can work in partnership with operators to deliver "real 5G". Nokia's in house 5G mmWave Small Cells and AirScale BTS provide in-building and outdoor coverage, while our Microwave Anyhaul, Cloud native RAN, antennas, and 5G cloud-native core are part of approximately half of our agreements to date. Beyond our mobile networks portfolio, Nokia has excellent FP4 network processor-based IP routers and PSE-3 chipset powered optical networking - our customers can use the Nokia Network Services Platform to make this into full-5G-strength software defined connectivity 'smart network fabric' secured by Nokia Security Orchestration, Analytics and Response (Nokia SOAR) to ensure resilient 5G.

Nokia is a global leader in 5G standardization and technology innovation with a strategy specifically designed to support the Australian market. Nokia is proud to be a strong partner in the current roll-out of 5G in Australia, continuing our 120-year presence here.

Nokia has been selected by both Optus and TPG Telecom as a key supplier for the network deployments of 5G, including the required radio modules, as well as a major supplier to nbn for fixed network technology solutions. Nokia is also a supplier to various enterprises which have deployed private wireless networks deployed using apparatus licenses, including for example 27 mines with 10 customers in Australia. Globally Nokia has been selected by more than 150 operators to supply 5G networks.

Through our research teams, including the world-renowned Nokia Bell Labs, we are leading the world to adopt end-to-end 5G networks that are faster, more secure and capable of revolutionizing lives, economies and societies. Nokia adheres to the highest ethical business standards as we create technology with social purpose, quality and integrity.

For more information: <https://www.nokia.com/networks/5g/>

Disclaimer: This response is based on Nokia's current understanding of the market dynamics and various standards bodies; these dynamics are changing and hence our views may update with these changes

Nokia's position

Nokia welcomes the opportunity to respond to Australian Communications and Media Authority's consultation paper on the *Proposed spectrum re-allocation declaration for the 3.4 GHz and 3.7 GHz bands*. As a leading player in the global communications sector, and contributor to the Australian market over many decades, Nokia is well placed to provide insight on market and technology trends, including industry structure and regulatory practice.

Nokia has contributed to ACMA's "Five-Year spectrum outlook 2021-2026" and we will also respond to the latest FYSO which is currently out for consultation. ACMA's FYSO sets a clear signal that all stakeholders should work together to meet the expected demand for spectrum for mobile broadband (public or private) and ensuring the speedy development of 5G.

Global 5G harmonization is happening now, and the 3.3-3.8 GHz spectrum range is at the epicenter of this, being the spectrum for near-term deployment of robust 5G services. The 3.5 GHz range of bands will support a variety of applications, including enhanced Mobile Broadband, Fixed Wireless Access and Industry 4.0, with an ecosystem driven by two 3GPP defined bands: n77 (3300-4200 MHz) and n78 (3300-3800 MHz). Spectrum harmonisation also helps to achieve economies of scale, enables global roaming and reduces equipment design complexity.

The 3300-4200 MHz band offers the unique opportunity for largest amount of spectrum below 6 GHz. The amount of contiguous spectrum that can be made available in the 3300-4200 MHz range offers an interesting opportunity for the exploitation of the innovative capabilities of the latest IMT technologies, with particular reference to the 5G New Radio air interface which will deliver increased capacity and connectivity. 5G New Radio (NR) Band n77 has been defined for 3.3-4.2 GHz covering the proposed range of 3.8-4.2 GHz. With demand also from other regions such as USA and Japan, Nokia expect a quickly evolving ecosystem for Band n77.

Nokia has long been an advocate of opening the entire 3.5 GHz range of bands, from 3.3 to 4.2 GHz, for 5G use. Indeed, the speed of 5G network deployment in the mid-bands, such as 3.5 GHz, can be significantly faster due to its propagation characteristics, which generally permit the reuse of the existing macro site grid that uses 1.8 GHz spectrum. Nokia has also noted in past submissions that the ACMA continue to investigate the potential future use of 3800-4200 MHz for private wireless networks. Through discussions with various stakeholders, Nokia are seeing a strong demand from Enterprise customers wishing to deploy 5G private wireless solutions either standalone or through a carrier depending on their use case and buying preference. Spectrum is used by different sectors like mining and energy companies.

Therefore, Nokia welcomes ACMA's proposal to allocate remote areas of the 3.4-4.0 GHz bands in 2022 using apparatus licensing, with additional allocations to occur in 2023 in regional and metropolitan areas through a mixture of spectrum and apparatus licensing. However, it should be noted that Nokia expect demand for new spectrum will be particularly high in regional area 2 and

major regional centre zones and suggest the ACMA ensure spectrum in these areas remains available for future private enterprise and innovative use cases.

Planning arrangements in 3400–3575 MHz and 3700–3800 MHz

Nokia supports ACMA's preferred Option 3 as it provides for consolidated spectrum licence arrangements between 3400–3800 MHz in metropolitan areas and between 3400–3750 MHz in all regional areas as well as consolidating AWL arrangements in regional areas into a contiguous band.

This approach also aligns the entire band and benefits existing and new licensees by enabling the uninhibited deployment of 5G services and the use of mMIMO technology without performance compromise. From an equipment vendor perspective, harmonised solutions are preferred for any service to encourage larger scale deployments and economies of scale. This puts Australia under a framework consistent with other regions of the world and aligned with the outputs of 3GPP, positioning Australia to leverage the global 5G ecosystem to the greatest possible degree.

Option 3 also generally reflects Nokia's previous consultations including its submission to the September 2020 *Re-planning of the 3700–4200 MHz band Options paper* which recommended extending the amount of contiguous spectrum available for spectrum licensing in major metropolitan centres as well as making more spectrum available for AWLs in both regional and remote areas within the 3700–4200 MHz band¹. Under Option 3, Nokia supports the ACMA's view that available spectrum can be more efficiently used and more AWL operators may gain access to larger contiguous channels.

However, regardless of whether the consolidated AWL arrangements sit within the upper or lower band in regional areas, Nokia expect demand for new spectrum will be particularly high in regional area 2 and major regional centre zones noting that large portions of this band are currently allocated to NBN Co in these areas. Therefore, Nokia suggest the ACMA continue to develop policies to ensure spectrum in these areas remains available for future private enterprise and innovative use cases as highlighted in the *Ministerial Policy Statement for the 3.4–4.0 GHz band (MPS)* which highlights that “4G and 5G equipment availability in this band may provide opportunities for private enterprise applications, wireless internet service providers and other innovative operators.”

As Nokia has expressed in previous consultations, this will facilitate a wide range of use cases including WISP, public mobile telecommunications services, enterprise and campus style private networks, such as mine sites, agricultural uses or industrial uses. Wireless Broadband services and P2P are important technologies for some critical sectors of the Australian economy.

¹ <https://www.acma.gov.au/consultations/2020-07/planning-options-3700-4200-mhz-band-consultation-222020#submissions>

Nokia see large economical value in the possibilities for enterprises to invest into private wireless networks using 3GPP technologies on their premises. Additional investment into private networks by private enterprises can significantly speed up the overall 5G take-up.

In fact, the Australian Mobile Telecommunications Association (AMTA) *5G Unleashed: Realising the Potential of the Next Generation of Mobile Technology* report² highlights that “while businesses recognise the importance of 5G for accelerating business growth (62%) while 30% of businesses are not planning to take up 5G-enabled technologies or don’t know. In addition, 59% of businesses surveyed had no strategy for exploiting 5G.”

We expect that the digitization of the industries will continue to grow and, as such, their demand for spectrum to increase over time across the different sectors. Their spectrum needs will depend on the use cases in terms of coverage, capacity and performances and will be addressed by a combination of local access and wide national coverage, via private networks and public ones. It is therefore important to consider an efficient mechanism to ensure the best usage of the scarce spectrum resources and encourage cooperation between CSPs and industries.

Use of spectrum in urban areas

With regards to the use of spectrum in urban areas (urban excise spectrum), Nokia acknowledges that the ACMA is wanting to support three broad use cases: Wide-area Wireless Broadband (WA WBB); Macro cell local area WBB (LA WBB) and Restricted cell LA WBB.

As Industry 4.0 starts to become the norm, more and more countries for example Germany, are issuing local, private licenses of premium 5G spectrum to enterprises. Nokia see regulators in key industrial nations adopting similar approaches. In the US, deployments of industrial wireless networks are possible in the Citizens Broadband Radio Service (CBRS) band. In the Saudi Arabia, for example, the regulator CITC is investigating how to split the 3.8-4.2 GHz portion of the band between mobile service providers and vertical users. The option CITC is investigating the migration of the FSS stations from the 3.8-4.0 GHz part of the band and release it to MNOs, while proposing a light licensing regime under shared use of the 4.0-4.2 GHz portion for verticals. Other countries like China and Korea are also investigating ways to use the upper part of this spectrum range.

As such, Nokia supports Option A which is to:

- Develop spectrum licence arrangements for the 3400–3475 MHz band in urban excise areas.
- Develop apparatus licence arrangements for WBB in the 3800–4000 MHz frequency range, incl. support for both macro cell and restricted cell local-area wireless broadband.

In addition, the ACMA is seeking comment on whether to adopt a top-down approach or a segmentation approach to efficiently allocate spectrum for both macro cell LA WBB and restricted cell LA WBB operators. Nokia agrees with the segmentation approach as its likely to lead to more

² https://amta.org.au/wp-content/uploads/2022/03/5G-Unleashed-Final-Report_combined-21-March-2022.pdf

orderly and efficient use of the spectrum, allow different licence approaches to be used in each segment and the fact it has been adopted in some other jurisdictions (for example, in some European countries). Nokia also supports the allocation of 150 MHz within the macro cell LA WBB and 50 MHz within the restricted cell LA WBB.

Re-allocation period

Regulators should clear the band of incumbents as much and as quickly as possible to enable the full potential of 5G. Nokia acknowledges that under the preferred Option, 31 PMP licences operating in the 3475–3542.5 MHz frequency range would be affected and given they were required to retune as part of the implementation of outcomes from the 3400 MHz decision Nokia agrees with the ACMA's proposal of a 5-year re-allocation period.

This will allow the continuation of these services as well as reservation of spectrum to relocate into in the 3750–4000 MHz frequency range at any time during this period. However, if there is an option to reduce the re-allocation period to a lesser timeframe, Nokia would support this option to ensure we unlock this important frequency range for 5G, there is no impositions or existing incumbent services that would devalue this band.

License term and duration

Nokia supports the ACMA's proposal to end licence terms on 13 December 2030 for the 3.4 GHz band in regional areas and urban excise areas to align with expiration of spectrum licences in the broader 3.4 GHz band, including in remote areas to facilitate potential replanning or defragmentation activity. From then on, particularly for the mid-band, the duration of spectrum licenses should be long enough (e.g. 10 years or more) to give the wireless industry the necessary timeframe to continuously invest in the latest and most spectrum-efficient infrastructure.

However, it should also be noted that investment cycles of vertical industries differ from cycles of the telecom industry: cycles for media and entertainment are typically shorter, ranging between 2–3 years, for automotive industry 7–8 years, energy, manufacturing and mechanical industries 25 years, and for oil & gas from 10 to 25 years. Partly due to this difference, vertical industries may prefer to deploy their own networks. Furthermore, the timing for investing in wireless communications depends solely on their own business plans. Vertical industries require the assurance that for their networks there will be a continuity of service, without unjustified price increases, spectrum re-farming or technology upgrades over their planned life span.

In summary, the duration of licenses should be long enough to give industry the necessary timeframe to continuously invest in the latest and most spectrum-efficient infrastructure. Longer license durations, possibility of extensions or shorter durations offer investors more certainty for continuously investing in state-of-the-art technology. Transparent renewal conditions such as prior notice, timing and conditions of renewal are essential to allow operators and innovators to continuously invest in the networks.