

Nokia response to ACMA's Discussion and options
paper on

Exploring RLAN use in the 5 GHz and 6 GHz bands



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

Summary

Nokia welcomes the opportunity to comment the ACMA's Consultation on the use of RLAN in the 6 GHz band. Nokia sees digitization as a cornerstone of the economic development and further progress of the society. Access to spectrum resources is expected to become even more relevant for many industries in the upcoming period and its use to achieve the societal value should be the overarching target. As such, any policy decision should be sufficiently forward-looking to encompass ongoing and future technological developments, including for 5G and its evolution and the associated spectrum needs.

Nokia supports the use of the 5925-6425 MHz band for wireless use with a technology-neutral approach while protecting the incumbent users. Nokia pleads for global/regional harmonised approaches based on standardised technologies.

Nokia's views and recommendations on the 6 GHz spectrum

Nokia undertakes the initiative from ACMA to consult on the potential future use of the 5925-6425 MHz band for license-exempt use by RLAN technologies, while deferring the decision on the upper 6425-7125 MHz for a later phase, in line with the ITU WRC-23 calendar. We encourage ACMA to support studies under the WRC-23 Agenda Item 1.2 with regards to IMT identification of 6425-7125 MHz portion of the 6 GHz band. We see this as an important consideration by ACMA.

As any decision to release spectrum for license-exempt use is an irreversible decision that makes it next to impossible to reclaim any portion of a license-exempt band, given the profusion of licensed-exempt uses and devices, Nokia is of the view that a balanced approach of the 6 GHz band should allow the expansion of the ICT sector in Australia and serve the country's information-communication needs well into the future by providing additional spectrum for both licensed and license-exempt operations in the mid-term.

On the 5925-6425 MHz band, noting that this range is outside of the WRC-23 process, indeed one option is to open it to RLAN (low power, unlicensed use) for indoor use, as evaluated by ACMA. However, it is essential to provide a level playing field framework to both 3GPP (5G NR-U) and IEEE (Wi-Fi) technologies.

The release of 500 MHz in the 5925-6425 MHz band for RLAN operations in Australia could provide extra-capacity to cover the needs of license-exempt technologies by doubling the spectrum available for such operations in the 5 GHz range could use up to roughly 1100 megahertz of license-exempt spectrum in the 2.4 GHz, 5 GHz and 5925-6425 MHz bands for RLAN technologies (e.g. NR-U, Wi-Fi 6/6E and other) and allow the use of wide RLAN channels (of up to 160 MHz per channel) over both 5 GHz and lower 6 GHz bands.

We would like to highlight that while licence-exempt provides an easy access to spectrum resources, it can – at most – provide “best effort” services, assuming a good quality infrastructure (e.g. FWA) is in place. A license-exempt spectrum regime cannot address any of the QoS dependent use cases¹.

Nokia recommends:

- A technology neutral approach with rules that allow for coexistence with incumbents;
- Technical conditions equally allowing for both 3GPP and IEEE deployments;
- Adoption of technical rules that are harmonised to a greater extent with other markets (like the CEPT or the USA) to ensure the development of a harmonised ecosystem.

The 3GPP has defined the 6 GHz unlicensed frequency band (band n96) that is included in the Rel16 specifications for countries following the US FCC’s regulation only. As such, the development of the ecosystem for the 5G new radio unlicensed (NR-U) is undergoing.

EU is currently developing harmonized standards (ETSI BRAN EN 303 687²) for unlicensed operation in the frequency range 5945-6425 MHz, meaning that both WiFi and NR-U can deploy in the same share spectrum on equal terms. Equal access opportunities for NR-U in this shared spectrum allow telecom operators to utilise this additional spectrum as a supplement to their spectrum holdings using the same NR (5G) platform. Further, NR-U can be utilized for industrial communication/automation applications. In all cases the NR-U deployments can be under the control of a NR gNB allowing operators more control over the network.

We also note that Wi-Fi is only a radio access technology and not a broadband network technology and its benefits are circumscribed by the E2E capacity and penetration of the fixed-line infrastructure – in particular, the availability of a combination of high capacity E2E fibre connectivity and high data rate subscriptions/data plan.

Taking into account the above, we encourage ACMA to further consider limiting the unlicensed RLAN operation only to the 5925-6425 MHz band and support studies for IMT identification of the 6425-7125 MHz as per AI 1.2 of WRC-23.

While we take note of ACMA proposal to implement similar decision as OFCOM, we would like to draw attention that approaches in other regions consider different power levels for indoor and outdoor operations.

In Europe, the ECC decision (20)01 provides the power limits and limitations for two categories of devices that can be used indoor-only (low power indoor LPI), and indoor and outdoor (very low power VLP)

¹ 3GPP justification in NR-U work item [RP-192926](#) and 3GPP technical reports [TR 38.889](#) (NR-U) and [TR 36.889](#) (LAA)

² In line with ECC decision (20)01 on the harmonized use of the frequency band 5945-6425 MHz for Wireless Access Systems including Radio Local Area Networks (WAS/RLAN).

respectively. In some cases, specific conditions of operation are attached. Those limits and the conditions attached were defined based on coexistence studies conducted in the [ECC Report 302/](#) [ECC Report 316](#).

On the other hand, FCC defined another category of devices with higher power (referred to as “standard-power”). The LPI devices in FCC’s rules also operate at higher power compared to CEPT’s regulations for LPI devices.

If Australia wants to consider adopting rules that allow higher standard-power operations in the 5925-6425 MHz range, Nokia recommends ACMA to evaluate the use of a database solution that can improve coordination between services, minimizing the required separation and risk for interference, reducing restriction zones, and optimizing thus the use of the spectrum. Solutions like Automated Frequency Coordination (AFC), for example, as the FCC is implementing in the USA in the 6 GHz band can have as benefit the use of the band with higher (standard) power by the unlicensed users. The use of higher power under the control of an AFC shall assure the protection of the incumbents in the 5925-6425 MHz frequency band.

We note that in Europe, for the frequency band 5925-6425 MHz, the CEPT conducted detailed sharing and compatibility studies between Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) and the existing FS/ FSS services, based on the specific regional FS allocations and assumptions (see [ECC Report 302](#) and [ECC Report 316](#)).

Similar studies have been conducted in the USA and conclusions are available in the FCC’s rules (see FCC’s [Order](#)).

Views on the 6425-7125 MHz band:

Nokia would like to further comment on the upper part of the 6 GHz (6425-7125 MHz) band in the context of the ITU process of the WRC-23 under Agenda item 1.2, aiming at identifying this portion of spectrum for terrestrial component of IMT:

- 7025-7125 MHz (globally);
- 6425-7025 MHz (Region 1).

Studies are on-going both in 3GPP for the potential use of the 6 GHz range for LTE and 5G new radio NR , and in ITU-R for a potential IMT identification at WRC-23 with the least restrictive conditions for the band usage (e.g. highest possible output power targeting macro cell usage). 3GPP has started a new study on IMT parameters for 6.425-7.025GHz, 7.025-7.125GHz and 10.0-10.5GHz in response to the LS from ITU-R.

Nokia believes in the potential of the 6425-7125 MHz band to become an IMT band, providing a good compromise for coverage and capacity for citywide high-speed capacity. With the identification of the upper 6 GHz band for IMT and licensed operation, significant economic benefits and boost of the 5G NR

development for additional use cases such as industrial use case is expected to arise. We therefore appeal to ACMA to take into consideration the international context and to support the ITU-R studies for this range and defer the decision on the upper 6GHz band for a later stage, in accordance with future WRC-23 decisions.

Moreover, we note a momentum within the mobile industry to set 6 GHz as priority for future IMT spectrum, with both vendors and operators supporting organizations (incl. GSMA, ETNO, Ericsson, Huawei, Nokia, ZTE, Lenovo, OPPO, VIVO, Xiaomi, etc.). This gives a clear indication that the 5G NR ecosystem for this band will develop and benefit from global economies of scale and interested countries such as Russia³ and China⁴ plan tests of 6 GHz band for licensed use in 2021.

To conclude, Nokia supports a balance approach in the 6 GHz frequency range between the licence-exempt and licensed use of the band. Allocating the range 5925-6425 MHz for license-exempt use and securing the 6425-7125 MHz for licensed use will allow satisfying all demands in the short and long term from both RLAN and IMT technologies.

³ <https://iz.ru/1082264/anna-ustinova-aleksei-ramm/chastotnaia-nedostatochnost-dlia-5g-predlozhili-novyi-diapazon-6ggtc>

⁴ IMT-2020 Promotion Group of China, 6 GHz IMT Opportunity for Society Webinar, Dec 15th, 2020; https://na.eventscloud.com/file_uploads/b08325f6e2bf9dcdf55f79395aab555b_6GHzWebinarPresentation.pdf