

Nokia response to Radio Spectrum Management
Discussion document

On 3.3 GHz Regional & non- national use in New
Zealand



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 New Zealand market.

Nokia is also a supplier to various enterprises which have deployed private wireless networks. 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 views and recommendations

More Spectrum for national use (Question 1)

Nokia welcomes the decision of RSM to allocate the remaining 10 MHz to 5G national use. 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. Spectrum harmonisation helps to achieve economies of scale, enables global roaming and reduces equipment design complexity. 3GPP has developed two bands supporting the 3.5GHz ecosystem: band n78 covering 3.3-3.8GHz and band n77 covering 3.3-4.2GHz. Goal should be for 3.3-3.8 GHz spectrum to be widely deployed and available to all. For this reason, Nokia recommends enabling a licensing framework that supports sustained investment and widespread network deployment to ensure the utility of 3.3-3.8GHz spectrum in New Zealand is maximised.

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. Nokia supports the availability of largest contiguous frequency range within the 3300-4200 MHz.

The ability of mobile operators to fulfil the market demand for 5G services cost effectively will largely depend on the availability of wide and contiguous frequency blocks. The Global Suppliers Association (GSA where Nokia is member) has suggested that the largest possible contiguous frequency blocks be made available for IMT within the 3300-4200 MHz range at the national level. This is because the assignment of contiguous blocks to mobile operators will lead to significant benefits in terms of spectrum efficiency, signalling overhead, physical layer flexibility, latency performance, base station radio unit implementation and UE implementation.

At least 100 MHz contiguous blocks in the 3300-4200 MHz range are being made available per operator in several leading countries. This target should be achieved in all markets. Spectrum availability should grow further over time considering the steadily increasing market adoption of a growing number of use cases with more and more requirements (higher throughput and lower latency in the first place). GSA believes that additional mid-band spectrum may therefore be required for MNOs in leading markets by 2023-2025; the 3300-4200 MHz range may represent a valuable opportunity in this respect

Allocation for regional and local use (Question 2-8)

Nokia agrees with RSM approach related to 3.3-3.4GHz. regional use has shown some importance in some rural communities and we clearly support the use of spectrum for local use for any type of stakeholders (CSP or enterprise).

Nokia consider that option 1 and 2 are the best way forward in terms of deployment, synchronization and potential interference management if any. these options allow clear option and cooperation between stakeholders and use. As indicated by RSM, a detailed technical analysis would be needed following this consultation to define the exact sharing criteria.

We support a synchronized approach to be applied. equipment will need to be synchronized within the 3.3 GHz band and use a similar synchronization structure to 5G NR operating in the 3.5 GHz band. Transmitter adjacent channel leakage ratios, and receiver adjacent channel selectivity, will need to have 3GPP-like performance.

Production and automation industry have gathered with Communication Service Providers (CSPs) and the vendor community in 5G-ACIA¹ to express requirements for industrial use of 3GPP technologies. Networks need to be tailored to industry needs in terms of performance, availability and reliability, privacy and security, and meeting their operational requirements. Specifically, stringent performance requirements in terms of guaranteed bandwidth and low latency at very high availability levels e.g. in wireless production control make access to licensed spectrum necessary.

Important of standards (Q9)

Nokia see large economical value in the possibilities for enterprises/CSP to invest into local use networks using 3GPP technologies on their premises/areas. Additional investment into local networks by private enterprises can significantly speed up the overall 5G take-up. Nokia encourages RSM to ensure that the spectrum use 3GPP technologies to ensure an optimal use of the whole spectrum in a sustainable manner.

Authorization (Q10-13)

While we recognise the importance of regional use, we believe that local and indoor are the most promising uses in the short/medium terms. In general, We recommend that RSM increase the information available to potential interested parties in order to understand the spectrum process and administrative requirements. A simple, transparent authorisation process is critical for 5G success.

¹ <https://5g-acia.org/>

Nokia support individually licensed spectrum on a per location base for local private industrial use. Access to licensed spectrum for local private industrial use shall not preclude any usage scenarios in terms of how such private networks are implemented. Within the German national IT summit process, industry and administration have created a paper on such usage models including standalone private, industrial networks, shared local access networks to private networks implemented as 5G networks slices.

For local use and in particular for use on own premises the proposed mechanism of first come – first served seems appropriate. Charging licences by the amount of spectrum should prevent spectrum hoarding. Nokia suggest, however, to reconsider the approach of scaling licence cost linearly with the area of the intended application. While this is a simple and transparent mechanism, it may make sparse use over wide areas e.g. in agriculture, forestry or mining, very costly and thus unattractive. Licence fees could consider property rights in a way that on private property there typically is less needed to provide spectrum access for multiple private enterprise type parties