

Nokia response to ACMA's Review of the 1.5 GHz band June 2022



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 FP5 network processor-based IP routers and PSE- 4 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 the National Broadband Network's 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 214 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 Position

Nokia welcomes the opportunity to respond to Australian Communications and Media Authority *Review of the 1.5 GHz band*. 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 2022-2027" which set 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. ACMA has identified several spectrum bands to address future needs to make 5G a reality for Australia.

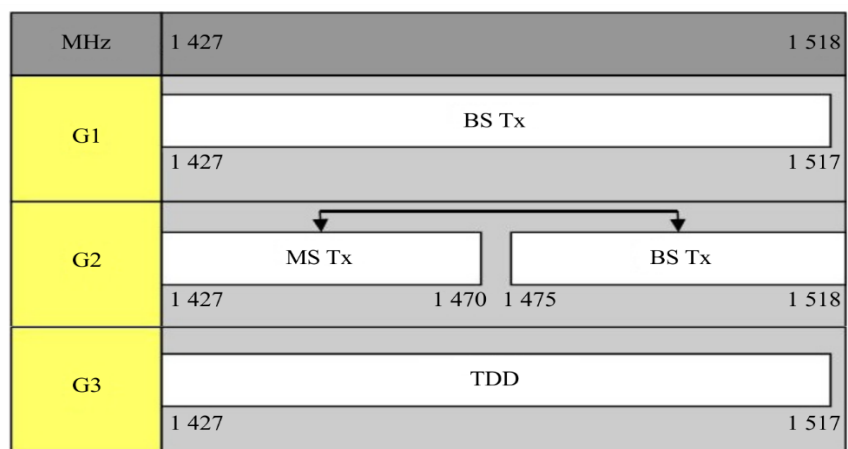
The 1.5 GHz band could be important in addressing longer-term demand for mid-band spectrum in particular support for new wireless broadband (WBB) and mobile-satellite services (MSS). However, Nokia acknowledges that there is a range of spectrum uses across mobile (aeronautical mobile), fixed (both point-to-point and point-multipoint), radio astronomy, and meteorological satellite services along with support services used to meet Universal Service Obligations (USO).

With regards to the USO, Nokia acknowledges that part of the 1.5 GHz band has been used for fixed point-to-point links and to deploy microwave systems for telephony services to meet USO requirements in remote and low-density areas. However, Nokia notes that in the *2021 Regional Telecommunications Review - A step change in demand*, one of the key findings was the urgent need to consider the future of the USO to provide reliable voice services to rural and remote consumers.

While it was acknowledged the USO must be continued, the report identified the need for the USO to consider the long-term performance and delivery of voice services in advance of and beyond 2032, particularly in relation to copper continuity and the High-Capacity Radio Concentrator system. The recommendation was to reform the USO and allow for a 'technology agnostic' approach to USO service delivery, providing it exceeds the existing reliability standards of the current solution. This could therefore allow part of the 1.5GHz band to be considered for WBB and or MSS.

Nokia notes, several options have been considered over the last years in L-band. For the 1452-1492 MHz range of this band, the 3GPP band 32 is considered for Supplemental Down link (SDL). Following the last ITU-R World Radio Conference in 2019 (WRC-19), additional options for the entire 1427-1517 MHz band started to be considered, including not only SDL, but also FDD option (e.g., in Japan) and an all TDD option.

Those options, as defined in the ITU-R Recommendation M.1036, are represented below:



M.1036-04

Nokia equally note corresponding 3GPP bands are available for all these arrangements for both LTE and 5G NR:

- SDL bands b32 (1452-1496 MHz), n75 (1432-1517 MHz), n76 (1427-1432 MHz);
- FDD bands b11 (1427.9-1447.9/1475.9-1495.9 MHz) and b12(1447.9-1462.9/1495.9-1510.9 MHz) in Japan, and the n74 (1427-1470/1475-1518 MHz) for Japan;
- TDD bands b50/n51 (1432-1517 MHz) and b51/n51 (1427-1432 MHz).

If ACMA is to take a decision of the future use of the L-band, Nokia recommends considering the possibility to open up the entire 90 MHz of the band 1427-1517 MHz. In case the decision is to proceed with opening only a part of the spectrum for IMT, decision of how to make best use of it should be taken in accordance with the market demand.

ⁱ <https://www.infrastructure.gov.au/sites/default/files/documents/2021-rtirc-report-a-step-change-in-demand.pdf>