

Public consultation on the prospects for the use of the 6425-7125 MHz radio frequency band - RTT Lithuania

Nokia response

18 April 2025

Introduction

[Nokia](#) welcomes the opportunity to respond to the Communications Regulatory Authority of the Republic of Lithuania (RTT) consultation on the prospects for the use of the 6425-7125 MHz radio frequency band (upper 6 GHz) and provide our view on how the upper 6 GHz band would provide the most benefits to Lithuanian citizens and industry in the larger context of the European discussions. Hereinafter we express Nokia's views as a B2B technology innovation leader in networking, bringing together the world's people, machines and devices to realize the potential of digital in every industry.

From a European perspective, Nokia is of view that the European Union and its Member States should place the electronic communications network at the center of its digitalization and broader economic strategy, striving to retain a leading position in building, running, and successfully monetizing networks that sense, think and act. The EU should be determined to implement its digital connectivity strategy in a consistent way, avoiding policy initiatives that disturb or weaken the competitiveness and investment capacity of its European telecom operators and equipment suppliers. EU policies towards the 6G era should support a broad and dynamic European harmonised telecom market that retain its competitive position with the rest of the world.

While acknowledging that the individual spectrum roadmaps of the EU Member States may vary, Nokia is of view that the best outcomes can be achieved only with a harmonised approach to the individual spectrum bands, including the upper 6 GHz one. We consider that exclusively licensing for IMT the entire upper 6 GHz band to deliver mobile connectivity to the European society – governments, citizens and industries – will provide the best benefits at EU and individual country level, including socio-economic impact and efficiency in utilization of this band.

From this perspective Nokia encourages RTT to identify the entire upper 6 GHz band at national level for the use of terrestrial IMT and consider assigning and release it to MNOs. The entire upper 6 GHz is needed by the mobile industry to accommodate – in both an economic and sustainable manner – the growing data traffic (providing additional capacity), while also helping to fulfil the increasing demand for superior quality of service (lower latency and higher reliability).

Below we provide our inputs as global equipment provider to the relevant questions based on our technical expertise.

A. What would be the need to use the 6425-7125 MHz (U6 GHz) radio frequency band for the provision of mobile radio communication (IMT) public network services in Lithuania and from when could such a need arise?

1. What is the current need for new radio frequency resources? Please indicate how loaded the available spectrum resources are (1800/2100/2300/2600/3600 MHz)?

Nokia: Nokia is not directly involved at national level as licensee. From our perspective and more specifically according to [statistics from Nordic-Baltic regulators](#), the absolute mobile data traffic (in GBytes) in the Nordic-Baltic countries is continuously growing. Moreover, for the 2018-2023 period, we note that mobile data growth (in percentage) increased by a factor of 2.5 at the regional level, while Lithuanian traffic growth is of ~300%. Equally, according to the RTT's [report](#) on the communication sector of 2023, the 5G technology grew rapidly in Lithuania in the 2021-2023 period both in terms of data transmitted over the 5G mobile networks (29x growth between 2022 and 2023) and in number of installed base stations (5x in 2023 to reach 9407 5G base stations).

We expect that mobile traffic will continue to grow in absolute value driven by the 5G adoption in terms of users and superior consumption, which will lead to capacity crunch by the end of the decade. As mobile networks are planned to accommodate peak traffic (and not average) additional capacity can be ensured by availability of additional spectrum that can be used on top of existing networks, i.e. the upper 6 GHz band reusing the existing C-band infrastructure grid.

2. If you were to use the U6 GHz band, what radio frequency bandwidth would be needed per operator?

Nokia: From a technical perspective at least 200 MHz per operator should be considered for the initial deployments of 6G. This is consistent with the ongoing 3GPP standardization work for 6G that considers bandwidths of 200-400 MHz. The value of the upper mid-bands (from the 6-8 GHz range) resides in their capacity of offering wider bandwidths translated into better performance, including higher throughput. Nokia recommends allocating 200-400 MHz of bandwidth in the upper 6 GHz spectrum band for each mobile operator by 2030, facilitating the timely introduction of 6G.

3. What network infrastructure would you develop in the U6 GHz band (e.g. macro/micro cells, etc.)? Would you densify the existing network infrastructure and how?

Nokia: Technical studies and field tests using pre-commercial equipment – macro-cellular radios – have demonstrated the U6 GHz band's feasibility to providing capacity and coverage, and multi-GB performance when reusing the existing C-band (~3.5 GHz) infrastructure. Equally, several studies and economic analysis provided by the mobile industry showed that full-power U6 deployment on existing macro-sites would provide the bulk of incremental capacity in an economic and environmental sustainability

manner. From this perspective, the existing 5G network grid should be reused as much as possible as we move towards 5G-Advanced and 6G. The trade-off between extreme densification and deployment of additional capacity with new mid-band is in favour of mid-bands.

4. What effective isotropic radiated power (e.i.r.p.) of base stations would you use (e.g. up to 50 dBm/100 MHz, between 50–60 dBm/100 MHz, between 60–83 dBm/100 MHz, etc.)? Please justify this need.

Nokia: Nokia recommends Administrations to consider a minimum bandwidth of 200 MHz carriers per operator. [Field trials](#) we carried together with Telia in Finland in U6 GHz using 60 MHz carrier – as limited by the trial licence (see [ECC PT1\(24\)173](#)) – using 75 dBm/60 MHz. We recommend regulators to favour same power spectral density – that is EIRP of ~80 dBm/200 MHz – to allow operators achieving multi-GB connectivity both outdoor and indoor with U6 band.

5. Where would you plan to provide radio communication (e.g. outdoors and indoors, only outdoors, only indoors)?

Nokia: Nokia trials and tests demonstrate that both outdoor and indoor capacity and coverage can be provided using U6 band for IMT/MFCN. This is aligned with studies and trial result provided by the industry in the ECC (draft) Report 366.

6. In which areas would you plan to provide services using the U6 GHz band (e.g. urban, suburban, rural, industrial areas, etc.)?

Nokia: Whether to address the capacity crunch or the initial launch of 6G, we expect that the additional licensed spectrum from the upper 6 GHz will be initially used in urban and suburban areas where the majority of people live and work. Based on our global expertise these areas with fast growing traffic will be those requiring more capacity to support the peak traffic where/when it happens. Additional demand will likely rise also from new type of usage scenarios, e.g. fixed wireless access (FWA) or industrial use cases for which extreme capacity is needed.

The 6 GHz band is expected to be deployed wherever the customers consume mobile data and where the networks will require additional capacity. With sufficient spectrum per operator – that is 200 MHz per MNO – users will get good quality of service, high throughput and superior data rates. Additionally, as mobility is what mobile customers expect, the same quality of service is expected to follow them on the major routes, at their secondary home, everywhere where they are used to have mobile broadband connectivity.

7. What new services could be offered using the U6 GHz band (or part of it)?

Nokia: We expect the obvious initial service to be using the U6 GHz band to be the enhanced mobile broadband (eMBB) as mobile traffic will continue to grow. The 700 MHz of spectrum in this band will address – in both an economic and sustainable manner – the three-times growth of data traffic by 2028 compared to 2023 (providing

additional capacity), while also helping to fulfil the increasing demand for superior quality of service (lower latency and higher reliability). Equally, massive machine-type communications (mMTC), and ultra-reliable low-latency communications (URLLC) are expected to remain the main drivers for additional capacity prior to the introduction of 6G starting 2030.

This will also be the case if U6 will be use as primary initial band for 6G. Additionally, FWA can make use of this spectrum. Furthermore, 6G new use cases such as Dependable Real-Time Communication with interactive applications, XR, Metaverse, compute off-load (incl. AI/ML capabilities), real time Digital Twin, remote-X, industrial control, etc., are expected to be deployed by using this band.

8. When would you start deploying networks in the U6 GHz band?

Nokia: Nokia is committed to supply the market demand for network equipment to ensure that upper 6 GHz can deliver critical capacity for the growing data demand.

9. How many and what kind of base stations would you plan to build in the first 5 years of operation?

Nokia: Nokia is committed to provide base station based on MNOs needs for different deployments.

10. Which of the mechanisms for sharing the U6 GHz band (see the draft ECC report) would be most favorable for using IMT and WAS/RLAN together?

Nokia: The 700 MHz of spectrum in the upper 6 GHz band is needed to facilitate the successful initial deployment of 6G in Europe, in both an economic and sustainable manner. As WAS/RLAN has been already allocated 500 MHz of spectrum in the 6 GHz band ([ECC Decision \(20\)01](#)), we do not foresee the need for the U6 GHz band to be shared with Wi-Fi. Several contributions to the draft ECC Report 366 demonstrate that the WAS/RALN can already provide for Gbit connectivity with its existing bands (2400–2483.5 MHz, 5150–5350 MHz, 5470–5850 MHz, and 5945–6425 MHz).

While acknowledging the discussions on the potential shared use of upper 6 GHz in the CEPT, Nokia is of view that Administrations should preserve the possibility for MFCN to deployed mobile technology with standard power macro base stations by reusing existing infrastructure. Any reduction in MFCN power would negatively impact the successful deployment of mobile networks, rendering this spectrum inefficiently used. Equally, non-traditional options such as indoor/outdoor separation or spectrum sensing mechanisms and database sharing solutions, while possibly theoretical appealing may lead in practice to challenges in deployments and therefore limited successful implementations. Concerns with such solutions range from complexity of solutions considered, implementation and running costs, breakdown of roles between governments and stakeholders, to the net benefit of such deployments to the two technologies.

- B. What would be the need to use the 6425–7125 MHz (U6 GHz) radio frequency band for wireless access systems in Lithuania, including radio local area networks (WAS/RLAN), and when could such a need arise?

Nokia: In our view, no additional spectrum from upper 6 GHz is necessary for WAS/RLAN, as spectrum is not the bottleneck of the Wi-Fi services. Higher throughputs required for such services can be easily provided through optimization of access points configurations (densification) and upgrading to newer standards such as Wi-Fi 6/6E. Upgrades to Wi-Fi 6E will take advantage of the underutilized lower 6 GHz band. However, considering the license-exempt regime of the WAS/RLAN services, we acknowledge that upgrading Wi-Fi routers to newer generations of the IEEE 802.11 standards – to make a more efficient spectrum use – is uncoordinated, driven by the fulfilment of individual connectivity needs of many different users. The use of the upper 6 GHz by Wi-Fi requires compatible equipment. However, forecasted shipments of Wi-Fi 6E and 7 tri-band equipment makes difficult to foresee a rapid adoption rate of such access point equipment that would lead to a congestion of the already existing spectrum in the lower 6 GHz band.

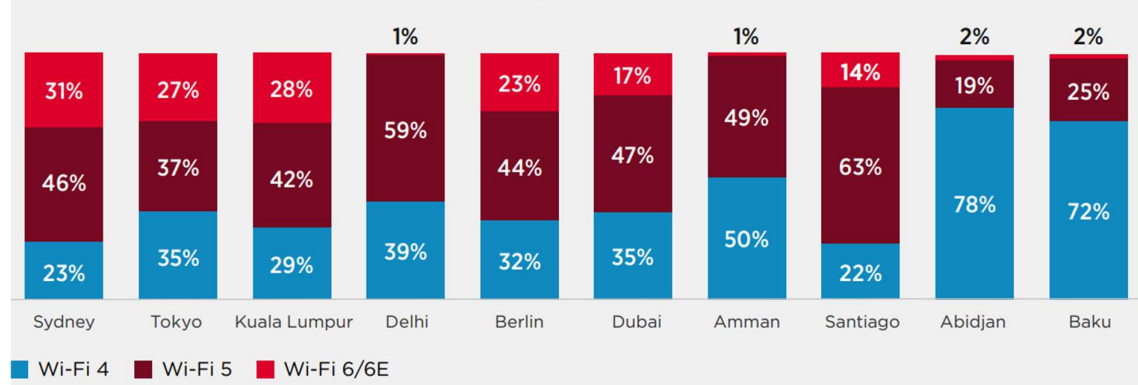
1. What is the current need for new radio frequency resources? Please indicate how loaded the available spectrum resources are (2400–2483.5 MHz, 5150–5350 MHz, 5470–5850 MHz and 5945–6425 MHz)?
2. What is the current distribution of WAS/RLAN device standards used on the market (e.g. WiFi-5, WiFi-6/6E, WiFi-7, etc.)?
3. What new services could be offered using the U6 GHz band (or part of it)?
4. How much radio frequency spectrum resources are minimally needed for the WAS/RLAN system to meet the quality and diversity of the expected services? What are the requirements for new services (e.g. virtual/augmented reality devices, etc.)?
5. What types of locations (e.g. airports, hospitals, universities, residential areas, etc.) currently have the greatest demand for radio frequency resources?

Nokia: In the context of the European discussions in CEPT, the WAS/RLAN proponents indicated their interest to deploy Wi-Fi equipment in densely populated areas, where traditionally the mobile networks are equally present and highly used. Given the license-exempt nature of the WAS/RLAN open public networks, we note that they cannot guarantee secure connectivity of the users.

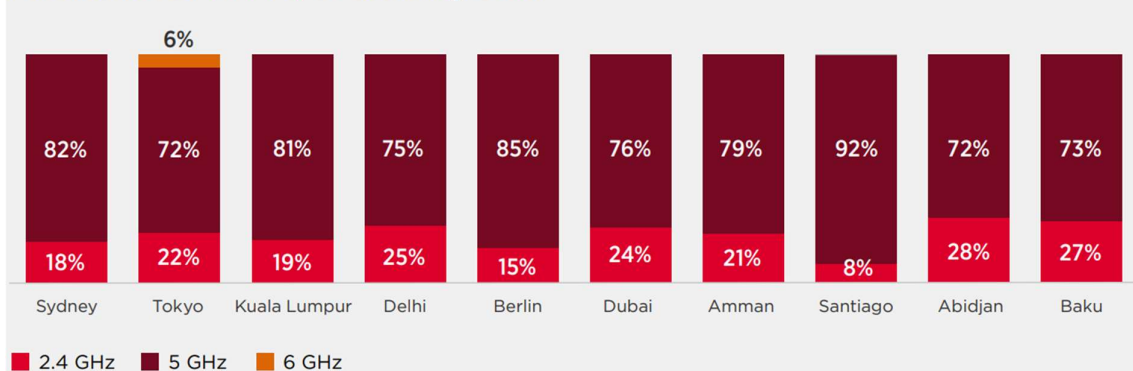
6. What maximum effective isotropic radiated power (e.i.r.p.) would you use (e.g. 25 mW, 200 mW, 4 W) in the U6 GHz band (or part thereof) and where would you plan to provide radio communication (e.g. outdoors and indoors, outdoors only, indoors only)?
7. Would it be relevant to use the entire U6 GHz band for the WAS/RLAN system for a defined period (e.g. until 2030, 2032) indoors and/or outdoors on a non-interference basis, with the proviso that the equipment may be required to be switched off in the future?

Nokia: We note that some Administrations evaluate the option of opening the U6 GHz for WAS/RLAN systems for a defined period of time, assuming a natural churn rate of 'legacy' equipment that would use the band. Nokia is of view that such optimism is not backed up by the reality, as indicated in the [GSMA mobile evolution in 6 GHz band](#) report. Based on Speedtest Intelligence data provided by Ookla, GSMAi analysed the distribution of Wi-Fi technology by generations – Wi-Fi 4, Wi-Fi 5, and Wi-Fi 6/6E – and the use of the frequency bands by the Wi-Fi 6/6E, as presented in the graphs below:

Distribution of Wi-Fi scans by technology



Distribution of Wi-Fi 6/6E scans by band



The Wi-Fi scan by technology shows that:

- In most cities across the world Wi-Fi 4 and Wi-Fi 5 are still the most used Wi-Fi generations, indicating a low displacement rate of legacy technologies. Assuming that Wi-Fi 6E/7 will be deployed in the following years in European countries, there is little evidence that such equipment will become legacy and replaced in the 2030-2032 timeframe, leading to pollution of the upper 6 GHz band. This will render the band unusable for the initial rollouts in the urban areas that are the targeted by both technologies.
- In the sparsely cases of Wi-Fi 6/6E deployments in the same cities across the world, the measurements from Ookla show little usage of the 6 GHz suggesting it is largely underused and that Wi-Fi 6/6E rely mainly on 5 GHz resources.

Moreover, we note that several operators¹ in Europe have launched dual band (2.4 GHz and 5 GHz) Wi-Fi 7 offers, also suggesting that the 6 GHz band is not needed to achieve multi-Gbps connectivity.

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¹ <https://boutique.orange.fr/informations/livebox-7/>
<https://www.tim.it/assistenza/assistenza-tecnica/guide-manuali/tim-hub-pro>