

April 17, 2025

Communications Regulatory Authority
Republic of Lithuania
rrt@rrt.lt

Re: Public Survey on the Prospects for the Use of the Radio Frequency Band 6425–7125 MHz

Dear Sir/Madam,

The Dynamic Spectrum Alliance (“DSA”)¹ respectfully submits these comments in response to the Communications Regulatory Authority (“RRT”) consultation on the “*Prospects for the use of the radio frequency band 6425 – 7125 MHz*”. DSA welcomes RRT’s interest in studying in detail the use of new radio frequency bands, including the 6425 – 7125 MHz range, for the advancement of information and communication technologies and creating the best conditions for innovation in the country.

DSA appreciates the opportunity to participate in the consultation and to present our views and comments. We are available to discuss these comments and provide any additional information.

Respectfully submitted,



Martha SUAREZ
President
Dynamic Spectrum Alliance

¹ The DSA is a global, cross-industry, not for profit organization advocating for laws, regulations, and economic best practices that will lead to more efficient utilization of spectrum, fostering innovation and affordable connectivity for all. Our membership spans multinationals, small-and medium-sized enterprises, as well as academic, research and other organizations from around the world all working to create innovative solutions that will benefit consumers and businesses alike by making spectrum abundant through dynamic spectrum sharing. A full list of DSA members is available on the DSA’s website at www.dynamicspectrumalliance.org/members

DSA COMMENTS TO THE SURVEY ON THE PROSPECTS OF USING THE RADIO FREQUENCY BAND 6425–7125 MHz

A. What would be the need to use the 6425–7125 MHz (U6 GHz) radio frequency band for providing mobile radio communication (IMT) public network services in Lithuania and 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 (1800/2100/2300/2600/3600 MHz) are?

Most of the DSA members participate in both the private 5G and Wi-Fi ecosystems. To date, several European countries have set aside portions of the 3700 - 4200 GHz band for local licensing, allowing enterprises to deploy their own private 5G networks. An EC Decision regarding harmonized spectrum in the 3800-4200 MHz band for private 5G networks is expected later this year.

In principle, if demand presents itself in the future, the U6 GHz band could provide additional local capacity for private 5G networks. As the consultation document notes, most data is consumed indoors. Within enterprises, operators seeking to utilize the 6 GHz band would have the options of using Wi-Fi, private 5G, or both.

Wide area 5G (or future 6G) networks in the upper 6 GHz band are not practical. While the base station power can be increased (up to a point) to establish a downlink connection with an indoor mobile phone or other user equipment, the high average building entry loss in the U6 makes uplink connections impractical. Given the average building entry loss of more than 20 dB, the transmit power of a mobile phone operating inside a building will need to be relatively high in order to create a sufficiently strong uplink signal to establish a stable connection with the base station. It is plainly energy-inefficient to transmit from indoors to outdoors in the U6 GHz band.

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

Under a local licensing regime, the required per operator bandwidth is not a relevant measure.

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?

Private 5G systems would use microcells, picocells, and femtocells.

4. What effective isotropic radiated power (e.i.r.p.) of the 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.

Although the DSA cannot provide a specific e.i.r.p. value, its members believe that for private 5G networks, the e.i.r.p. limit for base stations should be well below 50 dBm/100 MHz.

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

The DSA recognizes that the initial U6 sharing scenario discussed was Wi-Fi indoors and 5G outdoors. Unless Lithuania (and other EU countries) intend to relocate incumbent fixed link operations in the U6 band to one or more other bands, it is hard to see how higher power 5G systems could operate outdoors and coexist with fixed service links. Thus, initially, the DSA sees private 5G systems operating indoors only.

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

Low and medium power private 5G systems, authorized through local licensing, could be deployed indoors within enterprises located in urban, suburban, rural, and industrial areas.

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

Private 5G networks could use a portion of the U6 GHz band within enterprises if use cases emerge. For a number of reasons, wide area and private 6G networks are realistically a decade away, if that, despite being pushed aggressively by infrastructure providers.

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

User devices such as smartphones and tablets, which differ from Fixed Wireless Access terminals, are not expected to be available in volume for several years.

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

A few vendors claim to have base stations available, but at this point it seems that only Fixed Wireless Access would be provided using the IMT spectrum in the 6 GHz band. It is hard to envisage mobile IMT networks deployed in Lithuania before 2030.

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

If the e.i.r.p limits of Wi-Fi and IMT are comparable, then some sort of spectrum sharing mechanism within the U6 is possible. If on the other hand, the e.i.r.p. limit of the IMT is set many orders of magnitude greater than the e.i.r.p. limit of Wi-Fi, then spectrum sharing within the band is not very realistic.

B. What would be the need to use the 6425–7125 MHz (U6 GHz) radio frequency band for wireless access systems in Lithuania, including local radio networks (WAS/RLAN), and 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 (2400–2483.5 MHz, 5150–5350 MHz, 5470–5850 MHz and 5945–6425 MHz)?

Of the bands authorized for license-exempt operations, only the 5925-6425 MHz frequency band offers the potential of multiple contiguous 80- and 160 MHz wide channels. Multiple channels are required for channel diversity to minimize network congestion in dense deployments and provide for a good user experience. Due to the installed base of older Wi-Fi equipment, limited size of the band, DFS restrictions, and Wi-Fi's use of a contention-based mechanism for accessing the medium, the other Wi-Fi bands listed primarily support 20 MHz and 40 MHz channels.

If RRT were to make the entire 6 GHz band available for license-exempt use, it would support fourteen 80 MHz channels, seven 160 MHz channels, and three 320 MHz channels for use by Low Power Indoor (LPI) and Very Low Power (VLP) indoor / outdoor devices. Having only the lower 6 GHz band available for license-exempt use will allow for only six 80 MHz channels, three 160 MHz channels, and one 320 MHz channels. Having only the lower 6 GHz band available will make it more difficult to have sufficient bandwidth and channel diversity where there is a dense deployment of users.

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.)?

According to a 2023 release on the Wi-Fi Alliance (WFA) web site, there were 3.8 billion Wi-Fi devices shipping annually, 19.5 billion Wi-Fi devices in use, and 42 billion cumulative Wi-Fi devices. The DSA does not have information on 2024 Wi-Fi sales by generation of technology and by country. Neither does the DSA have information on the installed base of each generation of Wi-Fi.

3. What new services could be offered using the U6 GHz band (or part thereof)?

To date, on multiple college campuses, access to the full 6 GHz band over license-exempt LPI devices has allowed each student attending class in large lecture halls to access HD video over her or his devices concurrently. These types of environments require large channel bandwidths combined with channel diversity. The availability of the entire 1200 MHz of license-exempt spectrum provides both.

The availability of large channel bandwidths and multiple channels enables more video intensive applications such as machine vision for robotics in factories and distribution centers.

AR/VR applications using VLP devices require a minimum throughput and low latency. In a classroom or other setting where there are multiple AR/VR devices operating concurrently, having the entire band available will ensure good user experience for all.

Large public venues, such as sport stadiums, where there is a very high density of users, would greatly benefit from the availability of the entire 6 GHz band being made available for license-exempt use.

Modern digital hospitals run hundreds of diverse applications over Wi-Fi, from voice communications to patient monitoring, clinical imaging, medical training, building management, automated guided vehicles, asset location, and telemedicine and remote consultations, just to name a few. These applications, many of which require high reliability and low latency, need the full 6 GHz band for Wi-Fi to be able to operate also in the future.

4. How much radio frequency spectrum resources are minimally needed for a WAS/RLAN system to satisfy the quality and diversity of the envisaged services? What are the requirements for new services (e.g. virtual/augmented reality devices, etc.)?

The DSA believes that the entire 6 GHz band is required to support LPI and VLP use cases. Having 1180 MHz of spectrum supports channel diversity, which will minimize congestion where there is a dense deployment of users. In general, the less spectrum is available, the more the users' experience will suffer. For some use cases such as AR/VR, a lack of spectrum in a classroom setting where there are multiple users, could greatly degrade the user experience.

5. In what types of locations (e.g. airports, hospitals, universities, residential areas, etc.) is the greatest need for radio frequency resources now?

In use cases where there are dense deployments of Wi-Fi base stations and client devices, the entire 1200 MHz of bandwidth is required to reduce network congestion and provide a good user experience. These enterprise use cases include public venues, educational institutions, healthcare, airports, multi-unit dwellings, distribution centers, hospitality, etc.

6. What maximum effective isotropic radiated power (e.g. 25 mW, 200 mW, 4 W) would you use in the U6 GHz band (or part thereof) and where would you plan to provide radio communication (e.g. outdoors and indoors, only outdoors, only indoors)?

The DSA recommends that the entire U6 GHz band be made available for LPI and VLP operations under the same technical rules as in the 5945-6425 MHz (lower 6 GHz) frequency band. Accordingly, LPI base stations would operate with an e.i.r.p. limit of 23 dBm and VLP devices would operate with an e.i.r.p. limit of 14 dBm. LPI devices would only operate indoors, while VLP devices would operate both indoors and outdoors.

RRT is aware that work is still ongoing regarding the authorization of standard power devices in the lower 6 GHz band. Thus, even though standard power devices can support important enterprise use cases across Lithuania, it is premature at this time to discuss use of standard power devices in the U6. We note that Automated Frequency Coordination (AFC) enables coexistence of incumbent users and outdoor standard power Wi-Fi and is designed to operate across the entire 6 GHz band.

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?

The DSA recommends that the entire U6 GHz band be made available for LPI and VLP operations under the same technical rules as in the lower 6 GHz band as soon as possible. Were RRT to authorize private 5G use in the U6 or portions thereof in the future, enterprise licensees can manage the local coexistence between (LPI and VLP) Wi-Fi and private 5G systems.
