Your response

Question	Your response
Question 1: Do you agree with our proposals to add the 6425-7070 MHz band to the Shared Access framework?	Confidential? – N Nokia acknowledges the Ofcom's pioneering in opening several frequency bands for Shared Access Licensing as early as 2019. However, to our knowledge, despite of the availability of more than 400 MHz of mid bands (1.8 GHz, 2.3 GHz and 3.8-4.2 GHz) and over 2 GHz in high bands (26 GHz) for both indoor and outdoor usage, the number of licensees in these bands remains modest and there is no evidence to indicate lack of spectrum availability. Moreover, with the opening of the 5925-6425 GHz for licence-exempt use in early 2021, 500 MHz of supplementary spectrum have been made available for licence-exempt operations to allow for additional low/medium power usages for outdoor/indoor applications. As such, Nokia is of the view that - at this stage - providing additional ~600 MHz of spectrum in the upper 6 GHz band under the shared access framework is neither necessary, nor justified by the market demand. Below we highlight some aspects that we took into consideration: • **Market demand:** The number of existing licensees under the Shared Access framework does not justify the need for opening of supplemental mid-bands. Making additional frequencies available for services with already limited demand would lead to inefficient spectrum use, restricting the ability of the market to see a significant uptake in any of the existing or future available frequency ranges. Moreover, a reduced market demand per frequency band will not have an impact on the ecosystem to create sufficient demand for a consistent ecosystem. Moreover, under the SA licensing scheme, market players have already access to up to 400 MHz in the 3.8-4.2 GHz band which provides similar technical characteristics to the 6425-7070 MHz band, for indoor use. To this end, we question the benefits of adding the upper 6 GHz spectrum under the SA framework and if a quantitative analysis has been considered to evaluate/justify potential demand for supplemental spectrum. • **Timing:** With the 6425-7125 MHz subject to a decision in WRC-23 in the near future, the inclusion of this band into the SA framework might not give market players (private and/or public) incentives to invest in long-term solutions. Assuming an IMT identification of the upper 6 GHz band at WRC-23, investments under the SA framework will be short-sighted and users, in the likely case where coexistence is proven not to be feasible, will need to migrate their operations from this band; in the unlikely case that the IMT identification will not happen, equal access to the band with license-exempt users will not motivate licences

	applications under the SA framework. In both scenarios nothing can justify an appetite for investments in short-to-medium term solutions or in licences that are likely to have a limited lifetime. Quoting Ofcom's consultation, "MNOs have said that regulation needs to better support investors by giving them greater long-term certainty and clearer signals of the opportunity to make returns from future investments. They have argued that the regulatory approach in the mobile sector needs to shift from a narrow focus on price to encouraging investment". • **Equipment availability:** Ofcom's discussion paper mentions that Wi-Fi equipment for the upper 6 GHz band are widely available. Our analysis indicates that the ecosystem is not as mature as Ofcom assumes, and equipment prices are rather high, which will consequently lead to significant deployment costs. Moreo-ver, such equipment are likely targeting mass market use rather than businesses, which may also lead to low adoption for indus-tries. • **Deployment cost:** As mentioned previously, our market analysis shows high prices for Wi-Fi equipment using the upper 6 GHz band as compared to standard Wi-Fi equipment. For small-scale enterprise deployments the cost remains an important factor to consider. In addition, the uncertainty around the short/me-dium-term future of the band should also be taken into consid-eration when deciding investments in deployment of such net-works. Last but not least, Nokia is of the view that the upper 6 GHz band, having similar propagation characteristics to the 3.4-3.8 GHz band, can address further development of the IMT services. As such, the 6425-7070 MHz range is ideal to supplement mid-band spectrum needs for macro deployments in the 2025-2030 period. Recent studies[1] provide qualitative and quantitative analysis on the need of spectrum in the Upper 6 GHz band to address additional services that require wide-area capacity and coverage, in urban and sub-urban areas, as well as the use of FWA. For the above-mentioned reasons, Nokia sees the upper 6 GHz band as the last resource within the mid-band range that would help in responding to the growth of 5G traffic in the near future and by helping to provide additional capacity at a low cost per bit.
Question 2: Do you have any comments on potential uses for this licence?	Confidential? – N The SA framework by being open to all interested stakeholders can accommodate various type of usages. However, from the data published in Ofcom's website, the number of licences[2] that have been authorised under SA framework doesn't justify the need for additional ~600 MHz of spectrum in the upper 6 GHz band. With a generic look into business needs for access to spectrum and based on the expertise that Nokia has in the private wireless

[1] https://www.gsma.com/spectrum/wp-content/uploads/2021/07/Estimating-Mid-Band-Spectrum-Needs.pdf
[2] as of April 2022, 159 low power and 255 medium power at 3800-4200 MHz and only one at 26 GHz

	networks' domain, we note that enterprises are looking to secure their investments, guarantee long-term spectrum availability, and in many cases require higher operating power both indoors and outdoors. In the case of the 6425-7070 MHz frequency range, we fail to see the benefits of using it under a shared access license framework when the spectrum in the 5925-6425 MHz is available under the same technical conditions (i.e., power level) and is free of charge. From a technical perspective, we cannot identify use cases that cannot be addressed already with Wi-Fi in the lower 6 GHz band.
Question 3: Do you have any comments on our proposed licence conditions, licence fee or minimum separation distance?	Confidential? – N With a generic view on SA technical licence conditions for enterprise uses, it is important to highlight the fact that several industrial use cases require higher power levels as well as the flexibility to provide not only indoor but also outdoor coverage of their own premises. While Ofcom is in general looking for technology-neutral licensing framework, we note that the consultation points towards the use of Wi-Fi technology and equipment under the shared access scheme. Nokia is a proponent of the technology neutral approach for spectrum, which encourages the use of the more spectrum-efficient technologies. However, as indicated previously, we do not see a need to expand the SAL into the upper 6 GHz frequency range, as current demand does not justify such action, especially in such short-term notice prior to WRC-23. With specific view on the possible use of the 6425-7125 MHz band by IMT – as considered under AI 1.2 at WRC-23 – studies have examined coexistence scenarios between IMT and incumbent services and have indicated that such coexistence is feasible.
Question 4: Do you have any comments on our technical analysis?	Confidential? – N We would like to note that in assessing the coexistence with incumbent services, Ofcom references the broad alignment of the results of their analysis with the results of ECC Report 302, which was made for the lower 6 GHz RLANs. Furthermore, Ofcom concludes that due to the similarities between the lower and the upper 6 GHz bands, the protection criteria for FL would not be exceeded. We wanted to highlight to Ofcom that although indeed, there are similarities in the upper and lower 6 GHz bands (at least in terms of propagation characteristics), the parameters in the ECC Report 302 should be revisited, as they don't account for the fact that the lower 6 GHz has now become available for RLANs. For example, the ratio of the 6 GHz factor in the studies for the upper 6 GHz should have a different value now that an additional 500 MHz

	of spectrum in the lower 6 GHz have been made available. Furthermore, the busy hours after then COVID-19 pandemic have dramatically changed (compared to the pre-pandemic use) and those differences have not been reflected in the RF activity factor of the study. Furthermore, CEPT SE19 is currently discussing updates regarding the protection of FS in the band and may result in changes, which would not have been taken into consideration at the time of ECC Report 302. Therefore, we would like to note that reference to coexistence with incumbents based on alignment of the analysis results with ECC Report 302, does not adequately justify that coexistence is feasible. As a result, to the extent of our knowledge, there is not yet a study available to consider the updated (or more suitable) parameters of RLANs and FS, from which it can be confidently concluded that coexistence is feasible.