Consultation title	Fixed wireless spectrum strategy: Consultation on proposed next steps to enable future uses of fixed wireless links
Organisation name	***Siklu Communications***

Response

Question 1: Do you agree that we have identified the key drivers likely to have a significant impact on the spectrum demand for fixed wireless links? If not, please provide further detail and evidence to support your answer. **Do you have other comments to make/points to raise with us on these issues?**	Confidential? – ¥/N ***Siklu believes Ofcom's list is essentially comprehensive and complete.*** ***We do wish to highlight another trend we are seeing in the UK, which might in future have significant impact on spectrum demand: Council-owned networks for unified municipal applications. Wireless links are already playing an important role in extending council-owned fibre. Such networks are used to service facilities and community anchor institutions, as well as connect surveillance cameras, variable messaging signs, public WiFi, and link continuously growing number of devices and applications to enable, enhance and streamline city/town functions.***
Question 2: Do you agree with our conclusions on spectrum implications and our proposed strategy/next steps for each band? **Are there any other considerations of significance that you feel we should have included or do you have other comments to make/points to raise with us on these issues?** **Please provide as much detail as possible to support your answer.**	Confidential? – ¥/N ***Siklu believes Ofcom's list is essentially comprehensive and complete.*** ***In addition, we encourage Ofcom to review the demarcation between the E-band self-coordinated block and fully-coordinated blocs, as outlined in our response to Question 9.***
Question 3: Do you agree with the items we have identified for further consideration? Are there any other significant areas that you believe should be included? If so, please include all necessary evidence to support your view.	Confidential? – Y/N ***No comment***

Question 4: Do you agree with our proposal to change the authorisation regime in the 64 – 66 GHz band to licence exempt to create a common authorisation approach across the 57 – 66 GHz band for fixed outdoor installation use and that this would be a benefit to UK citizens and consumers?	Confidential? – ¥/N ***Siklu supports Ofcom's proposal to extend the authorisation regime of 57-64GHz all the way to 66GHz.*** ***The 65GHz band (64-66GHz) features reduced oxygen absorption compared with the 60GHz band, thus enabling link distances almost comparable to those achievable in E-band. Siklu believes that providing a licence-exempt alternative to the existing self-coordinated and fully-coordinated E-band, would offer the public a wider variety of options, and open the door to a new innovative use cases (e.g., smart city networks, affordable broadband access to both business and residential customers, etc.).*** ***Moreover, some months ago the FCC allocated 64-71GHz as a licence-exempt band. Therefore, making the 64-66GHz band licence-exempt in the UK, is an important step in aligning the regulations in the USA and UK. This of course would bring more choice of equipment to the UK, and at a lower cost (due to economy of scale) – facilitating new applications and use cases.***
Question 5: **a) Do you agree with the proposed new technical conditions in Table 6 to facilitate equipment intended for fixed outdoor installation in the 57 – 66 GHz band? Please provide evidenced views /alternatives if you disagree with our proposal. Do you consider any additional conditions should be mandated as part of a licence exemption to manage the interference environment?** **b) Do you agree with our assessment that the proposed changes in technical conditions will have minimal impact on existing use and are appropriate to manage the future outdoor interference environment?** **c) Are there likely to be any fixed outdoor installation use cases that will require operation at eirp levels above 55 dBm? If so, please provide evidence of how the coexistence with the different outdoor users could be ensured?**	Confidential? – ¥/N ***a) Siklu strongly supports Ofcom's proposal to permit fixed outdoor installation, as per Table 6. We believe the specified technical limits strike a good compromise between the capabilities of V-band beam-steering antenna technology (essential for mass deployment), and the need to provide good interference suppression that would promote efficient use of the spectrum in this band.*** ***b) Siklu agrees with this assertion, and in support, encloses a technical analysis entitled "Deployment scenarios and interference analysis using V band beam-steering antennas".*** ***c) At present, Siklu does not see a need to increase the maximum EIRP constraint to more than 55dBmi.***

Question 6: **a) What are the use cases and technical parameters envisaged for the 66 - 71 GHz band? Are they likely to be similar to those in the 57 – 66 GHz band? If so, what are your views on extending the same or similar technical conditions as described above for the 57 - 66 GHz band (both existing wideband data transmission (SRD) and new fixed outdoor technical conditions) to the 66 – 71 GHz band to facilitate both fixed and mobile use cases.** **b) Please provide your view on whether the technical parameters of wideband data transmission (SRD) as shown in Figure 4 are suitable to facilitate mobile/portable equipment including use outdoor? If you do not consider they are suitable, what alternative technical parameters do you think should be considered?** **Please provide as much detail to your answer as possible and your considerations on the co-existence aspects.**	Confidential? – ~~Y~~/N ***a) Siklu supports regulating the 66-71GHz band for indoor as well as fixed outdoor use, and subjecting it to the same technical requirements of the 57-64GHz band.*** ***The 66-71 GHz band has lower oxygen absorption compared with traditional V-band, enabling longer link distances, on par with E-band. Keeping this band license-exempt will provide an alternative to the existing self-coordinated and fully-coordinated E-band. This is likely to encourage better use of the spectrum. It would also help further align regulations in the USA and in the UK, to the benefit of the UK market.*** ***Many of the emerging smart city applications depend on gigabit capacity: connectivity for intelligent transportation systems, free Wi-Fi hotspots, 4KHD security network keeping citizens safe, and broadband connections to municipal anchors, such as hospitals, libraries, schools and more. Other applications include high-speed business connectivity and gigabit residential access. All these would be facilitated with the additional spectrum.*** ***Last but not least, Siklu recommends leaving a small guard-band between the 66-71GHz band and E-band, to account for the different licensing schemes.*** ***(b) Siklu consider that the technical requirements shown in figure 4, are suitable for both indoor and outdoor use. These strike a good balance between the beam-forming capabilities facilitated by WiGig, and the need to provide good interference suppression that would promote efficient use of the spectrum in this band.***

Question 7: Do you agree that there is a continued need for future low capacity fixed link applications? **If so, please provide information to support your view and what alternatives you would consider appropriate should the upper 1.4 GHz band no longer be available.** **Please provide clear evidence to support the reasons for your views.**	Confidential? – Y/N ***No comment***
Question 8: **Do you consider there is merit in considering making the bands 52 GHz and 55 GHz available under alternative authorisation approach(es) such as block assignment? If so, what would you consider to be the best approach(es)? Please provide detailed views to support your response.**	Confidential? – Y/N ***No comment***
Question 9: **Do you think we should review our authorisation approach to any other band used for fixed wireless links?**	Confidential? – ~~Y~~/N ***Siklu encourages Ofcom to re-examine the demarcation in E-band, between the self-coordinated block and the fully-coordinated block.*** ***In December 2013, Ofcom partitioned the E-band spectrum into two blocks: the lower 2x2GHz were designated as fully-coordinated, while the higher 2x3GHz as self-coordinated. Ofcom further decided to reserve licence allocation in the higher 2x1GHz tranche of the fully-coordinated block, in order to maintain the option to re-assess its decision based on future usage of the spectrum.*** ***Four years on, Siklu believes that the actual utilisation of the self-coordinated block is far greater than that of the fully-coordinated block, and that this trend will only increase in future. Siklu therefore believes that the E-band spectrum would be better utilised if the reserved trache were to be re-allocated to the self-coordinated block, such that the self-coordinated block constitutes the higher 2x4GHz, and the fully-coordinated block constitutes only the low 1GHz in each sub-band.***

Question 10: **a) How do you envisage W band and D band will be used for mobile backhaul provision and the likely timescales? Please provide as much detail as possible on deployment scenarios and whether this would include indoor use. Are there any other types of applications (other than mobile backhaul) that could be suited for these bands?** **b) What are your views on the most appropriate authorisation approach for the W and D bands? Please provide as much detail and technical evidence as possible in your answer.**	Confidential? – Y/N ***No comment***
Question 11: Which capacity enhancing technique(s) are you using or planning to use? Please provide detail / evidence and clearly explain why and how each technique is planned to be used and if you consider there are any other aspects that should be considered.	Confidential? – ~~Y~~/N ***There is a very high re-use factor in mmWave. As such, Siklu does not believe that traditional capacity-enhancing techniques, such as cross-polarisation transmission are of practical use.*** ***On the other hand, Siklu considers TDD transmission as capacity enhancing. This is because modern communication networks are often inherently asymmetric, and TDD handles asymmetry more efficiently than does FDD. Moreover, TDD does not generally generate more interference compared with FDD. Therefore, Siklu recommends that TDD is viewed as capacity enhancing, and as such, is not excluded in future regulation of mmWave bands.***