Consultation title	Fixed wireless spectrum strategy: Consultation on proposed next steps to enable future uses of fixed wireless links
Organisation name	Ruckus Wireless UK, Ltd., part ARRIS International, plc

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 Ruckus agrees that the key drivers have been identified by Ofcom in this consultation.
Question 2: Do you agree with our conclusions on spectrum implications and our proposed strategNext 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 Ruckus has nothing to add at the current time.
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? – N Ruckus believes that all current concerns are addressed in this consultation.
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 Ruckus believes that aligning the authorization regime across the whole of the 57-66 GHz spectrum to be licence exempt is a positive step in encouraging use of this spectrum. For many users “light-licensing” carries the administrative burden of licence application, but without the assurance of a fully coordinated link. In the specific case of 60 GHz spectrum, the

	combination of innovative techniques and inherent propagation properties means that the risk of interference either as a victim or an interferer is very low and as a consequence, licence exempt is an appropriate authorisation regime in this case.
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) We would encourage Ofcom to align technical requirements with those of other major regional blocks i.e. work toward a common ECC (CEPT) position whereby equipment requirements are harmonized across the region. Ideally this would also align with other major geographical regions such as the North America. (b) Ruckus believes that given the very low level of current usage in this band the proposed changes will have negligible impact on existing use and are in line with current and future equipment performance and as consequence are appropriate to manage the outdoor interference environment. (c) Ruckus does not believe that at the present time power levels above 55 dBm e.i.r.p. are required.
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**	Confidential? – N (a) Ruckus believes that the goal should be common technical condition across the entire 55-71 GHz spectrum range. This would also align with trends in the US which would assist in generating economies of scale for equipment thus benefiting the UK marketplace and its consumers. In addition, Ruckus believes that by making this spectrum licence exempt it provides an alternative to the licenced/fully coordinated and light-licenced/self-coordinated spectrum at E-band.

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.**	(b) Ruckus believes that the technical parameters in figure 4 are appropriate for this spectrum.
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? – N Ruckus believes that there will be a continued demand for narrow-band low capacity links to satisfy the need for remote monitoring of national infrastructure, e.g. power grids etc. However, Ruckus believes that this demand would be better met by use of UHF spectrum in the 450 MHz range rather than using the centre gaps and guard bands of the 6 GHz bands as envisaged by ECC/REC(14)06. The 450 MHz band has the advantage that equipment is already available as it is used for the scanning telemetry application, unlike the 6 GHz band where no narrowband equipment is currently available nor are there any standards defining the required essential parameters. The standards issue has been raised at both ETSI ATTM TM4, ECC SE19 and Ofcom FWILF but no interest has been shown to date, see section 5.3 of ATTMTM4(16)000033a1r1, ATTMTM4(16)000043r2, and slide 5 of document FWILF17003 for further information. Another influencing factor over the choice of bands for these applications is equipment installation practice and configuration. Equipment installation practice at 1.4 GHz is very different to that typically found at the 6GHz band and above. At 1.4 GHz the radio unit is usually always mounted inside a building or weatherproof cabinet with a coaxial feeder to an antenna (often a shrouded Yagi) on a simple lightweight mast. Whereas at 6GHz the radio is usually a split mount arrangement with the indoor baseband unit feeding the ODU via a coaxial cable at an IF which is mounted directly behind a parabolic antenna requiring a more substantial tower/mast than found in most 1.4 GHz installations. The following quote from a manufacturers submission to an Ofcom (UK)

	consultation regarding the future of 1.4 GHz highlights the concerns that the 6 GHz band is not a suitable alternative. *Although we note, and actively encourage the CEPT activity, in the area of allocation of narrow channel bandwidths within the L6 and U6 GHz bands, we feel that this does not represent a direct replacement for the 1.4 GHz band due to different propagation and antenna characteristics and the loss of capability to provide all indoor solutions resulting from the increased feeder losses.* It has been suggested by some existing 1.4 GHz users that UHF spectrum in the 420 – 470 MHz range would be a more appropriate destination for these links, as noted in the quote below from a user's submission to an Ofcom (UK) call for input. *Utilities use the 1.4 GHz band for links that are likely to be impacted and may need to be migrated. If so, 420-470 MHz channels may be the most suitable alternative for the impacted low data rate 1.4 GHz links.* Whereas equipment practice at 450 MHz is very similar to that currently seen at 1.4 GHz. Although 450 MHz spectrum is also used by Business radio, Ruckus believes that with the move of some applications, e.g. emergency services, to the LTE spectrum, it is feasible that spectrum could be found for narrow band fixed links in this range.
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? – N No current view
Question 9:	Confidential? – N

Do you think we should review our authorisation approach to any other band used for fixed wireless links?	Ruckus believes that the combination of these proposals for the 60 GHz bands and current practice for the other bands meets the requirements of users for the both now and the foreseeable future.
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? – N Ruckus currently does not have any views on W and D bands.
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? – N Ruckus currently does not have any comments on this topic at present.