Your response

Question	Your response
Question 1: (Section 3) Do you agree with our proposal for a single authorisation approach for new users to access the three shared access bands and that this will be coordinated by Ofcom and authorised through individual licensing on a per location, first come first served basis? Please give reasons supported by evidence for your views.	Confidential? – N Ruckus Networks agrees with Ofcom's approach to licensing in these bands. Furthermore, Ruckus Networks believes that in order to maximise the benefits of 5G, spectrum needs to be available for enterprises at low cost to enable them to benefit from the new services, e.g. IoT, in-building coverage, etc. that can be supported by this new access to mobile-oriented spectrum. This would be in addition to wide area (national) licences available to MNO's. Ruckus Networks agrees with Ofcom's decision to begin enabling new user to access these bands by a traditional coordination approach on a first come first served basis. However, we have noted that in The Netherlands where this same approach has been utilized for the 3410 - 3800 MHz frequency range, there have already been cases where such an approach is not able to accommodate multiple overlapping requests for spectrum in the same geographic area. Ruckus strongly believes that a dynamically coordinated allocation approach would ultimately prove more effective and efficient as demand for these new types of spectrum access increases over time.
Question 2: (Section 3) Are there other potential uses in the three shared access bands that we have not identified?	Confidential? – N Ruckus Networks agrees that Ofcom has identified the main potential uses in these bands. However, we believe that given its proximity to the 3.6 – 3.8 GHz band, the 3.8 - 4.2 GHz band could provide for improved indoor coverage should the relevant user equipment be enabled for this band, and thus disagree with the summary provided in table 1.
Question 3: (Section 3) Do you have any other comments on our authorisation proposal for the three shared access bands?	Confidential? – N Ruckus Networks has no comments to make on this question.
Question 4: (Section 3) What is your view on the status of equipment availability that could	Confidential? – N Ruckus Networks is an infrastructure equipment, i.e. base stations, manufacturer.

support DSA and how should DSA be implemented?	Base station equipment from Ruckus and other infrastructure suppliers supporting DSA is currently available, albeit, operating in different frequency bands, e.g. 3.55-3.7 GHz, thus demonstrating that the coordination mechanisms, protocols, and implementations are viable. Ruckus' existing DSA-enabled base stations could be relatively easily adapted to support DSA access to the 3.4-3.8 GHz frequency range in the UK. However, Ruckus would need to engineer and build a new generation of base stations to support DSA-based operations in the 3.8-4.2 GHz frequency ranges, due to the tuning limitations of existing chipsets and front end modules. With these types of systems, it is the base station that performs the DSA in conjunction with the spectrum coordinator (e.g. CBRS SAS, LSA Controller, etc…), with the user equipment tracking the available network signal, similar to current cellular systems today. However, Ruckus Network is acutely aware that a viable eco-system of User Equipment (Terminal Devices) is also needed in order to make usage of the band commonplace and achieve mass market economies of scale and pricing. Such a large and dynamic ecosystem of client devices exists today in the 3.4 – 3.8 GHz band and will be utilized for new industrial and vertical sector deployments in the CBRS band in the US as well as in the European countries offering local licensing in that frequency range. Ruckus expects that it will take a minimum of 5 years for such a broad hardware ecosystem to form for the 3.8 – 4.2 GHz band given the experience with 3.4 – 3.8 GHz and the limited areas of the world where the spectrum is being contemplated for cellular technologies and services.
Question 5: (Section 4) Do you agree with our proposal for the low power and medium power licence? Please give reasons supported by evidence for your views.	Confidential? – N Ruckus Networks believes that a simple and low-cost licence regime is vital to encourage uptake of this spectrum by many potential users. Higher cost and/or more complex licences are likely to reduce uptake. Whilst Ruckus Networks agrees with Ofcom's approach to low-power licences, we do have concerns over Ofcom's proposal for medium power licences being restricted for rural use only usage. This rural only approach would

	exclude larger industrial sites covering multiple building and where outdoor coverage is also required, e.g. ports, airports, large industrial complexes. Consequently, Ruckus Networks would propose that a licence regime similar to that currently used by Ofcom for 5.8 GHz band FWA systems as a suitable model for these licences. Further, Ruckus believes that a future DSA approach could enable overlapping medium and low power licenses in both urban and rural areas when factors such as building entry/exit losses are considered by the dynamic coordination function.
Question 6: (Section 4) Are there potential uses that may not be enabled by our proposals? Please give reasons supported by evidence for your views.	Confidential? – N As mentioned in our answer to question 5 we believe that Enterprise use should also encompass outdoor and site wide usage and not just single building usage. This would enable use by campuses e.g. universities and large area industrial sites e.g. chemical plants and steel works
Question 7: (Section 4) Do you agree with our proposal to limit the locations in which medium power licences are available? Please give reasons supported by evidence for your views.	Confidential? – N Ruckus Networks recognises that the need to prevent harmful interference is important and one of Ofcom's statutory duties. However, this approach may prove too simplistic and each application should be viewed on a case by case basis especially where large industrial complexes are concerned. We note that Ofcom has made some provision for these cases in Section 4.17 of the consultation.
Question 8: (Section 4) Do you have other comments on our proposed new licence for the three shared access bands?	Confidential? – N Ruckus Networks believes that there is an inherent risk of spectrum remaining fallow if licencees are granted access to all three bands as many users will have applications that are suited to one particular spectrum range. In addition, equipment availability for the three bands covered in this consultation will differ as manufacturers target different use case scenarios.
Question 9: (Section 4) Do you agree that our standard approach to non-technical licence conditions is appropriate? Please give reasons supported by evidence for your views.	Confidential? – N Ruckus Networks agrees with Ofcom's approach to non-technical licence conditions.

Question 10: (Section 4) Are you aware of any issues regarding numbering resources and Mobile Network Codes raised by our proposals which we have not considered here?	Confidential? – N It appears that Ofcom is proposing to supply network identifiers and potentially end user equipment identifies as needed to support the anticipates new uses. Ruckus Networks would note that these numbering resources should be make available with a low cost and simplicity that corresponds to the local licensing approach. Care should also be taken to ensure that requests for numbering resources are valid and verified so that the allocated resources are put to actual use. It may prove useful for Ofcom to analyze the approach to numbering resources that has been jointly undertaken by the CBRS Alliance and ATIS for these types of new uses in the CBRS band in the US, in order to see if any of the principles may apply in the UK.
Question 11: (Section 5) Do you agree with the proposed technical licence conditions for the three shared access bands? Please give reasons supported by evidence for your views.	Confidential? – N Ruckus Networks agrees with Ofcom's approach to be as technology neutral as possible with these licence conditions as this will allow the most appropriate technology to develop into the required eco-system. However, Ruckus Networks believes that given the usage of the adjacent bands (below 3.8 GHz) the ability to use similar technology is advantageous in promoting an early take up of the opportunities available in the 3.8 – 4.2 GHz spectrum.
Question 12: (Section 5) Are there other uses that these bands could enable which could not be facilitated by the proposed technical licence conditions? Please give reasons supported by evidence for your views.	Confidential? – N Ruckus Networks has no comments to make on this question.
Question 13: (Section 5) Do you agree with our proposed coordination parameters and methodology? Please give reasons supported by evidence for your views.	Confidential? – N Ruckus Networks agrees with Ofcom's approach to coordination parameters and methodology.
Question 14: (Section 5) What is your view on the potential use of equipment with adaptive antenna technology (AAS) in the 3.8-4.2 GHz band? What additional considerations would we need to take into account in the technical conditions and coordination methodology to	Confidential? – N Ruckus Networks has no comments to make on this question.

support this technology and to ensure that incumbent users remain protected?	
Question 15: (Section 5) Do you agree with our proposal not to assign spectrum to new users in the 3800-3805 MHz band and the 4195-4200 MHz band?	Confidential? – N Ruckus Networks agrees with Ofcom's decision not to assign spectrum to new users in the 3800-3805 MHz band and the 4195-4200 MHz band.
Question 16: (Section 6) Do you agree with our fee proposal for the new shared access licence? Please give reasons supported by evidence for your views.	Confidential? – N Ruckus Networks has no comments to make on this question.
Question 17: (Section 7) Do you agree with our proposal to change the approach to authorising existing CSA licensees in the 1800 MHz shared spectrum? Please give reasons supported by evidence for your views.	Confidential? – N Ruckus Networks has no comments to make on this question.
Question 18: (Section 8) Do you agree with our proposal for the Local Access licence? Please give reasons supported by evidence for your views.	Confidential? – N Ruckus Networks welcomes Ofcom's approach to local area licensing of awarded mobile spectrum as outlined in section 8. However, we do have concerns regarding the concept of "incumbent support" as this has the potential of the incumbent "blocking" the available of new entrants to the market place. Generally speaking, there are three primary disincentives for existing license holders to make their spectrum access rights available to others: • the administrative burden on the existing license holder to process the applications for new use, • the loss of future optionality on use of the affected portion of the existing license, and • the motivations to inhibit competition. Ruckus Networks believes it is important to create strong incentives for existing license holders in order to offset these issues. One possibility to ease the administrative burden would be for Ofcom to encourage the formation of one or more license 'marketplaces' or 'brokerages', whereby existing license holders could register the used and unused portions of their licenses along with the operational characteristics and new users could register their needs for spectrum in a certain location/area and the relevant technical

	characteristics. Such a market making service would greatly ease the administrative burden on Ofcom, the existing license holders, and the new users. There are some natural synergies between a dynamic coordination regime and a secondary use market making function. Another possible incentive for the existing license holder is to ensure that the new user's operations count towards the overall coverage figures for the original license holder.
Question 19: (Section 8) Do you have any other comments on our proposal?	Confidential? – N Ruckus Networks has no further comments to make on this question.
Question 20: (Section 8) What information should Ofcom consider providing for potential applicants in the future and why would this be of use?	Confidential? – N Ruckus Networks agrees with Ofcom that operator spectrum usage information is vital for potential new applicants for them to evaluate their options ahead of applying for a licence. Such information would at a minimum include frequency range, coverage area, which MNO's are active in the location and sites of antenna masts.
Question 21: (Section 8) Do you agree with our proposal to have a defined licence period and do you have any comments on the proposed licence term of three years?	Confidential? – N Ruckus Networks disagrees with Ofcom's proposal for three-year licence term and would prefer to see a similar arrangement to that proposed for low and medium power licences with no time limit on licence duration as the short duration of licences will lead to business uncertainty which could lead to organisations not investing in these opportunities.
Question 22: (Section 8) Do you have any other comments on the proposed Local Access licence terms and conditions?	Confidential? – N Ruckus Networks has no further comments to make on this question.
Question 23: (Section 8) Do you agree with our fee proposal for the new local access licence? Please give reasons supported by evidence for your views.	Confidential? – N Ruckus Networks has no further comments to make on this question.