Your response

Question	Your response
Question 1: (Section 2) Do you have any comments on our assessment of potential use cases, demand and deployment strategies for new uses of mmWave spectrum?	*Is this response confidential? – No* *Intracom Telecom strongly agrees with the refarming proposals of OFCOM for the 24.25-27.5 GHz band.* *We recognize that Ofcom expect spectrum to be useable for a range of cases including regional FWA applications (Paragraph 2.40), and that FWA operators may look to deploy medium power base sites above rooftops to be able to achieve radial range of several kilometres in rural area (Paragraph 2.43), and we agree that such requirements are realistic and from our experience represent real use cases internationally.* *We therefore believe that the use of the refarmed spectrum should not be limited only to mobile 5G services. This band can also be used by other TDD FWA technologies that can peacefully coexist with 3GPP base systems without causing nor receiving interference.* *We believe that optimal spectrum usage can be achieved by ensuring that The 24.25-27.5 band is kept technology neutral and OFCOM should allow the use of technologies that comply with the regulations set for this band. Today there are also other technologies than 3GPP 5G that can make efficient use of the mmW spectrum and lead to high spectral density.* *One of the most important considerations about this consultation is the proposed way that the licenses are allocated in the low density area scheme. Allocating licenses per base station site is not promoting the efficient nor the correct use of spectrum for FWA applications.* *Under the proposed mechanisms, an operator looking to deploy a multi-site FWA across a "wide-area" in an Ofcom defined low-density area, would be required to apply for multiple single-site licenses. Our understanding is that the proposed licensing model would permit this, but we believe this would be administratively inefficient, and could potentially lead to unnecessary allocation of multiple differing channels within any given area despite the user objective of building a single network on a cellular pattern of frequency reuse. We do not consider the allocation per site as the optimum method to increase and maintain spectral efficiency.* *In order to meet the objectives of mmW FWA, the re-use of the same frequency channel needs to be allowed on a **wide area** thus making optimum use of the available spectrum for the FWA network. Making use of spectrum in a wide area enables proper*

	frequency reuse of the same channels since there will not be any co-channel interference from other networks. The benefits of deploying FWA networks in suburban and rural areas is the bridging of the digital divide. Especially in low density areas where most of the underserved properties are located. *Spectrum resources of just two (2) frequency channels are sufficient to deploy wide area networks which can be extended to nation-wide coverage.* Intracom Telecom has extensive know-how and a proven track record of more than forty (40) wide-area broadband mmWave FWA networks in Europe, as well as North America, Africa Middle East and Asia.
Question 2: (Section 2) Do you have any comments on our proposed overall approach to mmWave spectrum (including our aim to make the 26 GHz and 40 GHz bands available for new uses on the same or similar timeframe)?	*Is this response confidential? – No* *We agree that making mmWave spectrum available for new uses has the potential to deliver significant benefits to UK people and businesses. It offers operators the opportunity to acquire very large contiguous blocks of spectrum, which can enable services requiring very high capacity and speeds. We acknowledge the fact that propagation in this part of the spectrum is usually limited to short distances, as it is easily blocked by natural and manmade obstacles such as trees and buildings. Nevertheless there are PtMP FWA technologies that operate at mmW spectrum and achieve long ranges between the base station and the terminal stations (e.g. 11km). Effectively larger areas can be covered by fewer base station sites when compared with 3GPP 5G deployments.* *Regarding the timeframe for the availability of 26 and 40 GHz bands, we would like to comment that making these bands available at the same timeframe by 2024 might delay current opportunities at the 26GHz band since the ecosystem in this band is more mature when compared with the 40GHz band. There is more momentum in the 26GHz band and there is more equipment availability. Today there are FWA solutions that can deliver ultra-broadband speeds at the 26GHz. 40 GHz needs more time to mature in terms of ecosystem and solution availability. Also it is expected that the two frequency bands will serve different but complementary purpose. The 26GHz will be used for deployment of ultra fast and long range access networks whereas the 40GHz will be used to enhance the network capacity in specific areas and short ranges.* *Therefore we propose to move the 26 GHz band availability at an earlier date than 2024. The perfect alignment of the two bands might lead to loss of opportunities for operators that wish to invest now.*

Question 3: (Section 3) Do you agree with our approach of specifying high and low density areas in the UK, and authorising new uses differently in those areas?	*Is this response confidential? – No* *We agree with the basic concept of dividing the country into low density and high density areas. We totally agree that the wide area licences that will be allocated in the high density areas alongside with the local area licences will be a benefit for the operators maximising spectrum utilisation.* *In order to efficiently allow implementation of FWA networks we believe there should be a mechanism in low-density areas to permit contiguous multi-site or wide-area licencing.* ***Thus we encourage Ofcom to expand the use of wide area licensing into the low density areas too,** which could be on a first-come first served basis in common with the local licencing Shared Access licences. This will make the use case of FWA feasible. Assigning wide area licensing scheme with blocks of MHz will allow licensees to manage their own re-use distances and remove the need to coordinate with other users within an area. This enables an operator to invest without the risk of incurring future costs in managing potential co-channel interference to and from other users. In addition area licenses would also support the potential deployment on macro cells both by MNOs and FWA operators.*
Question 4: (Section 3) Do you agree with our overall authorisation approach in high density areas for the 26 GHz band (i.e. to grant Shared Access licences on a first come, first served basis for the bottom 850 MHz of the 26 GHz band, (24.25-25.1 GHz), and to auction citywide licences for the rest of the 26 GHz band (25.1-27.5 GHz))?	*Is this response confidential? –No* *The fact that it is proposed by Ofcom to grant Shared Access licenses on a first come , first served basis for the bottom 850 MHz of the 26 GHz band, (24.25-25.1 GHz), and to auction citywide licences for the rest of the 26 GHz band (25.1-27.5 GHz) makes the use case of deploying mmW FWA networks more difficult to materialize. This proposal effectively limits the valuable spectrum that can be used for FWA which is one of the major use cases in the 26 GHz band. We propose the full band of 24.25-27.50 GHz should be allocated for wide area use like 5G deployments that supports mobility or Fixed Wireless Access deployments based on proprietary technologies than can provide long range ultra-broadband connections.*
Question 5: (Section 3) Do you agree with our overall authorisation approach in low density areas for the 26 GHz band (i.e. to grant Shared Access licences on a first come, first served basis)?	*Is this response confidential? –No* *Regarding the first come, first served spectrum allocation we suggest taking specific measures that will mitigate the risk of inefficient allocation. The measure that we opt for is spectrum caps (i.e. restrictions on the amount of spectrum that each applicant could acquire). In addition we believe that frequency resources of 200MHz are sufficient to support ultrahigh broadband fixed services. Technology advances of today offer spectrum efficiency of more than 60bits/Hz/sec per base Stations. Thus, Base Station can offer more than 12Gbps Aggregate capacity using 200MHz of spectrum resources. Also a rule should be established about enforcing the owners to use the allocated spectrum or lease it or lose it, assisting the telecommunications authority to mitigate for lock out cases.*

Question 6: (Section 3) Do you agree with adopting a similar approach to authorising the 40 GHz band as our proposals for the 26 GHz band, if we were to decide to re-allocate the 40 GHz band?	*Is this response confidential? – Yes / No (delete as appropriate)* *No comment*
Question 7: (Section 4) Do you agree with our proposed methodology for identifying and defining high density areas?	*Is this response confidential? – Yes / No (delete as appropriate)* *No comment*
Question 8: (Section 4) Do you agree with our proposed cut-off point of 40 high density areas?	*Is this response confidential? – Yes / No (delete as appropriate)* *No comment*
Question 9: (Section 5) Do you agree with our proposal to clear the fixed links in and around high density areas from the 26 GHz band?	*Is this response confidential? – No* *Regarding the low-density areas we agree with Ofcom that there is no need to clear all the fixed links. In this case the location of the links is sparsely scattered in the low density areas and the possibility of interfering with new networks is reduced. In low density areas deployments by new users will be highly localised, and there should be sufficient spectrum available.*
Question 10: (Section 5, Annex 8) Do you agree with our estimates of the cost of migrating fixed links into alternative spectrum bands?	*Is this response confidential? – Yes / No (delete as appropriate)* *No comment*
Question 11: (Section 6) Do you agree with the proposed approaches we have outlined to manage coexistence between new 5G users and the different existing users in the 26 GHz band? In particular, do you have any views on our proposals to limit future satellite earth stations in this band to low density areas only, and to end access to this band for PMSE users with five years' notice?	*Is this response confidential? –No* *We are in agreement with the proposed approaches to manage coexistence between new users (5G or other purpose-built technologies) and existing users in the 26GHz band. We believe that limiting future satellite earth stations to low density areas will not pose any threat since a) the deployments in low density area are expected to be sparse b) satellite earth stations are likely located in isolated remote areas c) exclusion zone can be defined around the satellite earth stations.*

Question 12:(Section 7) Do you agree with our initial assessment on which option for enabling the 40 GHz band for new uses would best achieve our objectives?	*Is this response confidential? – Yes / No (delete as appropriate)* *No comment*
Question 13: (Section 7, Annex 8) Do you agree with our analysis of the impact on existing 40 GHz licensees, including our estimates of the cost of moving fixed links under the options involving revocation (options 2, 3 and 4)?	*Is this response confidential? – Yes / No (delete as appropriate)* *No comment*
Question 14: (Section 8) Do you have any comments on our high-level Shared Access proposals (including technical and non-technical licence conditions and proposed approach to setting fees)?	*Is this response confidential? – Yes / No (delete as appropriate)* *No comment*
Question 15: (Section 8) Do you agree with the overall approach we have set out to coordination and coexistence between new Shared Access users in the 26 GHz band and existing users?	*Is this response confidential? –No* *We would like to comment on the restriction of height (10 meters) for low power radios to be deployed only at the 26 GHz. The 10m height creates a barrier to operators that would like to deploy FWA solutions with mmW technology and which inherently needs Line-Of-Sight connections from the base station to the terminal stations. The 10 meter limit will restrict the radios to be deployed inside the building clutter whereas FWA networks need higher base station sites in order to reach their subscribers. Long range connections will not be able to be established.* *In low-density and rural areas, available infrastructure for implementation of FWA and other technologies may not be compliant with this 10 metre limit Examples include:* *(i) Water towers which are widely used for radio deployments may only permit installations at the top section above 10m,* *(ii) tower based deployments within which the first 10 metres or more are hidden by local tree clutter, or terrain to minimise visual impacts on the horizon.* *(iii) Large lattice masts with wide-bases and raked legs do not always present useable mounting space below 10m as installs may need to be higher on the tower when the tower dimensions have narrowed and the slant of the legs becomes less pronounced.* *It could be considered that the high site installation may sterilise this frequency channel. However, we believe that this frequency sterilisation is not necessarily a problem. We are proposing to*

	take provisions for wide area licences so as frequency resources can be reused optimally by the same operator in order to provide efficiently ultra-broadband fixed services over a wide geographic area.
Question 16: (Section 9) Do you have any comments on our initial thinking in relation to auction design?	*Is this response confidential? – Yes / No (delete as appropriate)* *No comment*
Question 17: (Section 10) Do you have any comments on the licence duration options we have considered in this section for new licences for the 26 GHz and 40 GHz bands that we would auction?	*Is this response confidential? – Yes / No (delete as appropriate)* *No comment*
Question 18: (Section 11) Do you agree with our assessment of potential competition concerns and that it may be appropriate to impose a competition measure such as a 'precautionary cap'?	*Is this response confidential? – Yes / No (delete as appropriate)* *No comment*

Please complete this form in full and return to mmwave.allocation@ofcom.org.uk