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* mmWave has a variety of use cases, which can be categorised in three main markets: - **Public networks**: Densification with mmWave small cells to boost network capacity in hotspots. Rakuten has already developed tens of thousands of Airspan's outdoor mmWave solutions to provide Gbps speeds in busy areas of Japan, and as of 2022 is now beginning to deploy indoor mmWave for private enterprise and venues.. - **Private Networks**. A booming market currently based in sub-6GHz frequencies (3.8 – 4.0GHz). mmWave opens up new use cases here which industry has proved very keen to trial. The only major barrier is the lack of devices (CPEs, UEs) supporting mmWave Stand Alone (SA). - **FWA**. A key use case for mmWave is Fixed Wireless Access (FWA), and we are glad to see this in the consultation. By opening up the relevant spectrum bands in the UK, Ofcom will help telecoms operators to provide gigabit-capable connectivity to the very hardest-to-reach areas. This is crucial given around 4% of premises cannot viably be connected through traditional fibre solutions.
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)?	mmWave spectrum has the advantage of providing wider bandwidth, which translates into higher throughput, but also means coverage is reduced. We welcome the opening of the 26 and 40 GHz bands in the UK. To ensure that industry successfully takes up mmWave, it is important that these frequencies are aligned with companies' technology roadmaps.

Examples of this alignment include:

- 26GHz is being used mainly by MNOs (Rakuten, Verizon) using a 5G NSA (Non-Standalone) architecture
- The ecosystem is not ready yet for 40GHz. It will be ready after 26GHz has been established.
- 26GHz is not well suited to use in private networks because it does not support SA. Devices (UEs, CPEs) are not yet available in the market, but may be in 2023.
- The Current Shared Access Licence from Ofcom in mmWave (24.25-26.5 GHz) is not supported by the majority of 5G technology. 5G is above all focused on frequencies over 26.5GHz.

For the reasons outlined in the body of the consultation document, the aim of harmonising the availability of 26GHz and 40GHz spectrum is reasonable. Making devices available which can support both bands in the same timeframe may be challenging, but it is good to have an inclusive plan which manufacturers can build development programmes around.

- Standardisation is present today, with 26GHz covered by 3GPP n258 and 40GHz covered by 3GPP n259.
- 5GNR chipset support for n258 infrastructure is expected to be available in mid-2023 for indoor applications. Support for n259 is not so clear. For the UE side, there is support for both n258 and n259 although the availability date for devices has yet to be confirmed.
- 5GNR SA support for mmWave is expected to become commercially available during 2023.
- 66-71GHz will not be standardised until 3GPP release 17, so the timeframe for device availability has yet to be confirmed.

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 assume this applies only for outdoor use cases, since indoor usage should see equal treatment for both high and low density areas. Propagation of mmWave is very limited and is blocked by walls and glass, and therefore indoor deployments will not create any interference with outdoor deployments. When looking at outdoor deployments we would recommend focusing on two approaches. **First,** high density areas should use hot spots or possibly FWA. **Second**, in low density areas, FWA should be prioritised. It is important in both scenarios that effective radiated power (EIRP) is not limited, otherwise coverage will be reduced and the use cases will not be economically viable. 64dBm of EIRP is our recommended average outdoor power to make these use cases attractive.
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 approach seems to be well considered, but as an equipment supplier, we would be able to work with whatever is proposed. One comment about frequency allocation we would like to make is that it would be ideal to have 100MHz boundaries (e.g. 800MHz as opposed to 850MHz), but we understand this is dependent on spectrum availability. For reference, RAN devices will be able to tune to 1GHz in the near future. Please note that 3GPP works with maximum bandwidths of 400MHz for the 26GHz band.
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* Nothing to comment.

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? – No* The approach is more directed towards spectrum 'owners', but appears to be well considered. Care should be taken to ensure that new devices using the spectrum achieve adequate performance, to maximise efficiency (this of course applies to 26GHz).
Question 7: (Section 4) Do you agree with our proposed methodology for identifying and defining high density areas?	*Is this response confidential? – No* Each country has its own definition of high density areas - for instance it is different in Japan, the UK and Australia. We agree that defining it by population metrics and usage traffic works well. We recommend adding a factor based on activity (i.e. how active users are) would also help to identify high density areas.
Question 8: (Section 4) Do you agree with our proposed cut-off point of 40 high density areas?	*Is this response confidential? – No* Nothing to 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 (delete as appropriate)* In general, a reduction in possible sources of interference is a positive from the radio perspective as it simplifies design. The application of Point-to-Point in mmWave (e.g. Backhaul) would naturally have a narrow beam width, so problems can be avoided through adequate filter design etc. However, this also adds cost.
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? – No* Nothing to 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* A simpler design for co-existence is likely to reduce product costs.
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? – No* Nothing to 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? – No* Nothing to 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? – No (delete as appropriate)* Nothing to 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* One general comment in section 8 is the power assigned for low/high density areas. Please note that our current mmWave product used in Rakuten networks to cover dense urban areas hotspots is EIRP 51dBm, providing coverage of 300m. EIRP (Tx Power + Antenna Gain) is critical to making a use case successful. If Ofcom limits the EIRP too much for outdoor use, there won't be a use case that can reasonably be met. In our experience, EIRP for mmWave for outdoor use should go from 50dBm up to 64dBM (with FWA in rural areas).

Question 16: (Section 9) Do you have any comments on our initial thinking in relation to auction design?	*Is this response confidential? – No* Nothing to 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? – No* Nothing to 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? – No* Nothing to comment.

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