

Consultation title	Fixed wireless spectrum strategy: Consultation on proposed next steps to enable future uses of fixed wireless links
Organisation name	NOKIA AMNS XHAUL

Response

<p>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.</p> <p>Do you have other comments to make/points to raise with us on these issues?</p>	<p>Confidential? – N</p> <p>We believe that all the major points have been identified. We would like to point out that what indicated here with “multi-band working” (also known as Bands and Carriers Aggregation - BCA) is a technique that may bring significant advantages, not yet totally exploited, when properly implemented. Therefore, we would suggest to take BCA into careful consideration as it can have significant implications in spectrum usage.</p>
<p>Question 2: Do you agree with our conclusions on spectrum implications and our proposed strategy/next steps for each band?</p> <p>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?</p> <p>Please provide as much detail as possible to support your answer.</p>	<p>Confidential? – N</p> <p>Below 20 GHz</p> <ul style="list-style-type: none"> • Lower and Upper 6 GHz are valuable bands for long haul applications. New deployment of Long Haul in this band should be allowed and existing Fixed service should be protected • Bands in the range from 11 to 18GHz are valuable bands to be exploited inside BCA concept (one of the most popular BCA is the 18 GHz aggregated with EBand) • BCA may also be used to exploit “in-band” channel aggregation with further advantages, such as the aggregation of two or more channels to reach the necessary capacity when the single channel size is not available. This might not be available either because there is not enough contiguous spectrum, or because not considered in normal frequency arrangement, or because even if a wider channel could be used a single carrier emission cannot fit the link

requirements (quality/availability) because poor system gain or poor signature when a wide channel is concerned.

It is not excluded the need to aggregate two or more different (in size) channels and engineer the link in such a way to fit, at the best, the connection requirements. This means that it is not the single channel which should fulfil the radio link design requirements, but the aggregated channels.

20 GHz and 45 GHz

- 26 GHz. OFCOM action is welcome (consultation in due course)
- Merging 38 GHz with 42GHz for 5G: it may worth to point out that 38GHz is currently massively populated by fixed service, as reported in figure 2 of the consultation. Backup solution for BH should be provided
- The above bullet on BCA, with all the provided considerations, can be applied here as well
- Even if in principle Self-backhauling could be used, it is today not clear what would be the actual implementation and effectiveness in terms of capacity offload. For this reason, we are sceptical in considering the Self-backhauling as a possible enabler for reducing the likelihood of spectrum scarcity in 20-40 GHz range for the provision of backhaul.

Bands above 45 GHz

- We fully support your view in focusing on promoting the 66-71 GHz portion of the band for 5G in the UK, rather than the wider 66-76 GHz frequency range. 71-76 GHz is precious for fixed service application.
- In addition to stand alone BH application of 70/80 GHz, as mentioned above, we would like to

	<p>stress importance of this band as part of BCA coupling it with a lower frequency band.</p> <p>In addition to that, we agree that W band might be, in some cases, a possible complement for 70/80 GHz band or can be used in a BCA solution with 70/80 GHz.</p> <ul style="list-style-type: none"> • The above bullet on BCA, with all the considerations provided, can be applied here as well • We believe that it is today premature to consider which regulatory framework would be better for D band. In principle, considering as a possible future application a dense network in urban environment, we see an approach like the “block assigned license” the most suitable • Considering frequency bands 52 GHz and 55 GHz, we do not see any interest in investing on it for Fixed service application, because such bands do not have any key differentiator with respect to traditional bands currently available below 42 GHz. • We agree with the proposed common authorisation approach in 57 - 64 GHz and in 64-66 GHz in allowing point to multipoint/mesh technologies on a licence exempt basis.
<p>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.</p>	<p>Confidential? – N</p> <p>We agree with the identified items</p>
<p>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?</p>	<p>Confidential? – N</p> <p>We agree with the proposal of making available the entire 57 – 66 GHz band on a licence exempt, for fixed outdoor application, provided that the equipment will fulfil proper technical conditions that would facilitate outdoor use cases, particularly small cell backhauling, fixed wireless access and new network topologies. We agree with the proposal to maintain for</p>

	<p>wideband data transmission (SRD) the limit of maximum EIRP of 40 dBm for operation in a non-fixed outdoor installation, as today.</p>
<p>Question 5:</p> <p>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?</p> <p>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?</p> <p>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?</p>	<p>[redacted]</p>
<p>Question 6:</p> <p>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.</p> <p>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?</p>	<p>Confidential? – N</p> <p>6a: Nokia is monitoring with interest this band (66-71 GHz) but we believe it is premature to make a decision and define already technical parameters, considering that both V and E band (the two adjacent bands) are still not exploited at their potential.</p> <p>6b: Due to different propagation conditions, further studies should be considered for SRD as well.</p>

<p>Please provide as much detail to your answer as possible and your considerations on the co-existence aspects.</p>	
<p>Question 7: Do you agree that there is a continued need for future low capacity fixed link applications?</p> <p>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.</p> <p>Please provide clear evidence to support the reasons for your views.</p>	<p>Confidential? – N</p> <p>7: N/A.</p>
<p>Question 8:</p> <p>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.</p>	<p>Confidential? – N</p> <p>See above answer #2.</p>
<p>Question 9:</p> <p>Do you think we should review our authorisation approach to any other band used for fixed wireless links?</p>	<p>Confidential? – N</p> <p>A revision of the E-band approach may be done in the future, according to the V-band outdoor fixed operations introduction. As mentioned in Ans@ 2, licence exemption is the preferred authorisation approach for 64-66 GHz portion of the V-band.</p>
<p>Question 10:</p> <p>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?</p> <p>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.</p>	<p>[redacted]</p>

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

Partially answered above. BCA is the most innovative technique on top of existing ones (packet compression, high QAM...). In addition to those, the use of wider channels like 112MHz in traditional bands (up to 42 GHz), also in cross-polar operation, should be favoured.

Other techniques considered (e.g. in IEEE 802.11ay) include flexible channelization and Multi User MIMO as well.