Response to Ofcom's consultation on:

Fixed Wireless Spectrum Strategy

Consultation on proposed next steps to enable future uses of fixed wireless links

(Issued by Ofcom on 7 December 2017)

British Telecommunications plc and EE Limited
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Executive Summary

1. BT/EE welcomes this opportunity to comment on Ofcom's Fixed Wireless Spectrum Strategy. We make extensive use of fixed links spectrum, with extensive deployments of microwave and millimetre wave fixed links throughout the UK, predominantly for mobile network base station backhaul (for EE and other MNOs). These fixed links operate in most of the various frequency bands that Ofcom manages, as well as in the 32GHz spectrum that Ofcom awarded by auction that we self-manage.
2. For the "traditional" fixed link bands (i.e. < 40GHz) we would welcome reduced timescales for obtaining licences. We understand that Ofcom sometimes struggles to achieve its goal of 42 days, but even this target we find is often too long compared with the timescales our external customers on occasion require. If Ofcom were able to speed up and ideally further automate the licensing process this would be welcomed. We believe this point has wide industry support as it has been supported within UK Spectrum Policy Forum discussions.
3. BT/EE intends to make increasing use of the higher mmWave bands for mobile base station connections as we continue to evolve our mobile network architecture. We have ongoing trials of V band (60GHz). We have completed trials of E band (70/80 GHz) and are currently completing our vendor selection.
4. BT/EE has no objection to Ofcom's proposal to make the full range of V band (57-66GHz) licence-exempt and to enable point to multipoint / mesh networks in addition to point-to-point use.
5. BT/EE is interested in utilising W band (92 - 115GHz) and D band (130 – 175 GHz) within our future mobile network architecture as the very wide bandwidths available and propagation characteristics of these bands appear suitable for this purpose. BT/EE encourages Ofcom to develop a suitable authorisation regime for W-band and D-band given the essential role these bands could play to realise truly dense and heterogeneous mobile networks within the 5G vision.
    a. We propose that W-band is authorised using an online system that confirms licences immediately they are applied for. This would facilitate rapid deployment of large numbers of base stations if required in future.
    b. We propose that a substantial portion of the D band spectrum should be block allocated to UK national mobile operators for self-management of their assigned blocks (should they request it). This should be feasible given the very large available bandwidth. It could help kick-start the use of this spectrum as it would support operators in their development of innovative solutions and would allow them to manage interference while rapidly deploying mobile network infrastructure without the need to request individual licences.
6. Finally, although spectrum pricing is not addressed in this consultation, we take the opportunity to emphasize that the spectrum pricing policy needs to promote efficient use of the fixed links spectrum while not discouraging its use altogether. We see no reason to increase fees in the traditional fixed links bands (indeed there may be a case to reduce them, particularly in rural areas where demand for spectrum is low). For the higher millimetre wave bands, given the level of demand and available supply, as well as the desirability to promote innovation, we consider that where fees are charged these should be based on cost recovery.

1. Introduction

BT/EE welcomes this opportunity to comment on Ofcom's Fixed Wireless Spectrum Strategy, having contributed to the earlier call for input and given our continued interest in the higher mmWave bands that are the focus of this consultation.

BT/EE makes extensive use of fixed links spectrum bands, with extensive deployments of microwave and millimetre wave fixed links throughout the UK. These fixed links operate in most of the various frequency bands that Ofcom manages, as well as in the 32GHz spectrum that Ofcom awarded by auction that we self-manage. The main application is access network connectivity, predominantly to deliver mobile base station backhaul to national Mobile Network Operators, but we also have some microwave fixed links in the core transmission networks in rural areas. MBNL, EE's JV with Three, similarly makes very extensive use of fixed links spectrum on which the operation of our own national mobile network also relies.

Below we set out BT/EE's future requirements and priorities in relation to fixed links spectrum, as well as our response to the specific questions that Ofcom has posed.

2. Our future fixed Wireless spectrum priorities and requirements

Bands below 40GHz

For the "traditional" fixed link bands (i.e. < 40GHz) our main concern at present is in relation to the timescales for obtaining licences. Ofcom notes on its website that there may be delays in issuing licences due to high volume of work but aims to meet its target timescale of a maximum of 42 days to issue licences. But even this target timescale we find is often too long compared with the timescales our external customers on occasion require and it is not always achieved[1]. If Ofcom were able to generally speed up or further automate the licensing process this would therefore be welcomed. We believe this point has wide industry support as it has been supported within UK Spectrum Policy Forum discussions.

Bands above 40GHz

BT/EE intends to make increasing use of the higher mmWave bands for mobile base station connections as we continue to evolve our mobile network architecture.

We have ongoing trials of V band (60GHz) with University of Salford and the supplier NEC to understand propagation issues and have completed trials of E band (70/80 GHz) and are currently completing our vendor selection.

BT/EE has no objection to Ofcom's proposal to make the full range of V band (57-66GHz) licence-exempt and to enable point to multipoint / mesh networks in addition to point-to-point use.

We are interested in utilising W band (92 - 115GHz) and D band (130 – 175 GHz) within our future mobile network architecture as the very large bandwidths available and propagation characteristics of these bands appear suitable for this purpose. D band is of interest because it could support extremely high capacity fixed links that will be relevant to future 5G developments.

BT/EE encourages Ofcom to develop a suitable authorisation regime for W-band and D-band given the essential role these bands could play to realise truly dense and heterogeneous mobile networks within the 5G vision.

[1] By way of example, two recent licence applications took 49 days and two others requested over 42 days ago remain outstanding at the time of writing.

a. We propose that W-band is authorised using an online system that confirms licences immediately they are applied for. This would facilitate rapid deployment of large numbers of base stations if required in future.

b. We propose that a substantial portion of the D band spectrum should be block allocated to the UK national mobile operators for self-management of their assigned spectrum blocks (should they request it, and subject to periodic reviews to verify progress of deployments). This should be feasible given the very large available bandwidth and could help kick-start the use of this spectrum as it would support operators in their development of innovative solutions and would allow them to manage interference while rapidly deploying mobile network infrastructure without the need to request individual licences. If there is evidence of demand from other parties beyond the national MNOs, assignments could be made on a first come first serve basis and block assignments also considered if suitably justified to Ofcom (again reviewed on a regular basis to verify progress of deployments). Such an approach was used successfully in the past in the 38GHz band in the early stages of its exploitation.

Spectrum fees

Spectrum pricing is not addressed in this consultation but has been the subject of previous consultation. We are content that the matter remains on hold while other policy issues impacting fixed links spectrum are resolved, such as bands for 5G. However, we take the opportunity to highlight the desirability that the future spectrum pricing regime promotes efficient use of the fixed links spectrum while not discouraging its use altogether. We see no reason to increase fees in the traditional fixed links bands (indeed there may be a case to reduce them, particularly in rural areas). For the higher millimetre wave bands, given the balance of demand and supply and the desirability to promote innovation, we consider that where fees are charged these should be based on cost recovery.

2. Responses to the consultation questions

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?

We agree with Ofcom's assessment of key drivers of future fixed link demand. In particular the requirements arising from implementation of 5G and mobile network densification will introduce specific requirements in terms of required bandwidths and network topologies for which higher mmWave bands may be particularly suitable.

Question 2:
Do you agree with our conclusions on spectrum implications and our proposed strategy/next 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.

We agree with Ofcom's assessment and strategy for each of the fixed link bands. In particular we support the need to initiate change where there is a clear benefit to do so in the interests of the UK and deriving greatest benefit from the use of spectrum. In particular we support the early clearance of the 3.6-3.8GHz band for 5G and encourage Ofcom to support this process, including efforts to accommodate displaced fixed links in other spectrum where feasible.

BT/EE has no objection to Ofcom's proposal to make the full range of V band (57-66GHz) licence-exempt and to enable point to multipoint / mesh networks in addition to point-to-point use.
We welcome the intention to authorise W-band and D-band (our views on how W-band and D-band should be authorised are set out in section 2 above).

Question 3:
Do you agree with the items we've 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.

Yes, we agree with the list of items that Ofcom has identified for further consideration and provide our views on these matters in our responses to the specific questions on these items.

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?

We are content with this proposal.

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?

We have no comments on the proposed new technical conditions.

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?

We have no comments on impact or views on the appropriateness of the proposed technical conditions.

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?

We have no such requirements to highlight.

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 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.

We do not yet have firm views on the main use cases or the appropriate technical parameters for the 66 – 71 GHz band, other than agreement that the band should be licence-exempt (consistent with international discussions). In principle we would agree that the technical parameters could be similar to those of either of the adjacent licence-exempt band. We may provide further views at a later stage.

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.

Our use of low capacity fixed link applications has declined and we have in the past experienced interference problems in the 1.4GHz band, leading us to avoid new deployments. We do not presently foresee significant growth in demand for low capacity fixed links. If the 1.4GHz band were to no longer be available we would consider whether use of other bands, including potential new low capacity channels ta 6GHz as mentioned by Ofcom, would be suitable.

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.

We don't see any particular benefits to issuing block assignments in this band, and we would prefer that the bands are authorised on a conventional basis with individual links licensed on a first come first served basis.

Question 9:

Do you think we should review our authorisation approach to any other band used for fixed wireless links?

We have not identified any other fixed link bands for which the authorisation regime should be changed.

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?

As set out in section 2 above, we consider that both these bands would be an important resource to facilitate 5G network deployments where high density of cells may need to be deployed in rapid timescales with extremely high bandwidth requirements. We envisage such deployments would be primarily outdoor use.

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.

We set out our views on this question in section 2 above. For W-band we believe that this will be a likely expansion band for the fully licensed part of the E-band. Therefore we propose that a similar licensing regime is applied, and that assignments are granted with an online application system with licences issued on demand. This will support rapid planning and deployment of systems.

For D-band we propose that block allocations are made available to enable MNOs to deploy ultra-dense networks, and to support innovation.

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.

We currently use XPIC to enable optimisation of single channel usage and increase overall data rate. Furthermore we are investigating the possibility of deploying multi-band solutions.

TDD operation is interesting, noting the issues about the current band-plans and usage, and we would be interested in exploring TDD for W-band, as this would align well with the data centric traffic of ultra-dense networks. There is also future potential for full-duplex however it seems like there is much to do before we could implement such solutions.

The use of increasingly higher-order modulation and ever wider RF channels is not necessarily the answer as the impact on system gain is significant, affecting the achievable link length for a given configuration (antenna size, availability etc.)

End