

## MICROSOFT COMMENTS OFCOM'S CONSULTATION ON IMPROVING CONSUMER ACCESS TO MOBILE SERVICES AT 3.6 TO 3.8 Ghz

30 November 2016

### ***Question 1: Do you have any comments on the use of the 3.6 to 3.8 GHz band by existing services?***

Microsoft agrees with Ofcom's assessment that the 3.6 to 3.8 GHz band has a relatively low intensity of use by fixed service links and space-to-earth fixed satellite services across the UK. There are 35 fixed links across the UK, with approximately half operating in and around London and the southeast. There are 5 sites under Recognized Spectrum Access for Receive Only Earth Stations and 14 sites under Permanent Earth Station licenses. No information was provided as to the number of consumers and businesses currently served by these fixed links and satellite services.

### ***Question 2: Do you agree with our identification of a trend towards the use of mobile in the 3.6 to 3.8 GHz band?***

Microsoft agrees with Ofcom that in many countries around the world a portion of - or the entire - 3.6 to 3.8 GHz band has either been allocated to mobile services or is under consideration for allocation to mobile services.

### ***Question 3: Do you agree with our high level proposal to make 116 MHz within the 3.6 to 3.8 GHz band available for mobile and 5G services, bearing in mind our statutory duties and the high level trends we have identified?***

Microsoft agrees with Ofcom's high-level proposal to make additional spectrum available within the 3.6 to 3.8 GHz band for mobile and 5G services. Several projections indicate a continued increasing demand for mobile data services, driven by mobile video. Meeting this increased demand will require making more efficient use of existing spectrum, in addition to spectrum refarming. Spectrum in the 3.6-3.8 GHz band is well suited for mobile services, be they 4G, 5G, or license-exempt use. The trends in market demand speak to the need for Ofcom to take actions to increase the amount of spectrum available for mobile services.

In May 2008, the European Commission (EC) adopted Commission 2008/411/EC, which seeks to harmonize the conditions for the availability and efficient use of the 3.4 to 3.8 GHz band for terrestrial systems capable of providing electronic communications services in the EU. The rationale for such harmonization is that it will lead to economies of scale for mobile client devices and infrastructure.

The EC decision was implemented later that year in the UK under the '3400-3800 MHz Frequency Band (Management) Regulations 2008'. Subsequent EC decisions specify that spectrum licenses used for these electronic communication services in the 3.6-3.8 GHz band correspond to TD-LTE spectrum access technology in the UK. Statutory Instrument 2016 No. 495 – 'The 1452-1492 MHz and 3400-3800 MHz Frequency Bands (Management) Regulations 2016 – states that Ofcom must designate and make available on a non-exclusive basis the 3.4-3.8 GHz frequency band for terrestrial electronic communications networks, in compliance with the technical parameters for high power TD-LTE mobile networks.

***Question 4: Do you agree with our general approach regarding spectrum currently licensed to UK Broadband?***

Microsoft agrees that it makes sense to review the conditions on UK Broadband's use of the 3605 to 3689 MHz band and, over time, to harmonize the rules that apply with the future rules promulgated for mobile services in the remainder of the band. It should be relatively easy for mobile services as both UK Broadband's mobile services and the mobile services in the remaining 3.6-3.8 GHz band will use TD-LTE. Ofcom should consider shifting UK Broadband's spectrum holding down 5 MHz in frequency to 3600- 3684 MHz. As UK Broadband holds a license for 3580-3600 MHz, there should not be a need for a guard band. There may be a need, though, for some technical rules to ensure that the uppermost channel of UK Broadband's fixed service and the adjacent mobile service can coexist. Alternatively, as a practical matter, the issue might be addressed by starting the new mobile service band at 3690 MHz, thus leaving a 6 MHz guard band.

***Question 5: Do you agree with our assumptions, methodology, and conclusions with regards to potential coexistence between mobile and existing fixed links and satellite earth stations? Please refer to annex 5 for further details.***

Our understanding is that Statutory Instrument 2016 No. 495 allows for high-power TD-LTE macro cell use. In its coexistence analysis, Ofcom's key assumption is that the 3.6-3.8 GHz band will be used by a mixture of macro and small cells. Based on the assumption of macro cell deployment in the spectrum band, and possibly using a worst-case scenario, Ofcom conclusions regarding the potential coexistence between mobile and existing fixed links and satellite earth stations appear notionally correct.

***Question 6: Do you have a view on any of the two options we identified?***

With respect to the 35 fixed links operating in the 3.6-3.8 GHz band across the UK, Microsoft agrees that the businesses and consumers currently served could potentially be served in the future through fixed links in other spectrum bands. Here, the removal option makes most sense, assuming there is some compensation to assist the fixed licensees with relocation to other spectrum bands so that the affected consumers and businesses can receive comparable service and experience minimal disruption during the transition period.

In its 2014 'Mobile Data Strategy Statement', Ofcom said it would analyze feasibility and costs of mobile broadband sharing with earth stations across 3.6-4.2 GHz. Based on Ofcom's analysis, assuming the deployment of both macro and small cells, generically speaking, the separation distances between the fixed satellite service downlinks and mobile services would preclude the retain option in the 3.6-3.8 GHz band.

That said, though, as there are only 19 sites nationwide, hypothetically there may be ways to apply different sharing strategies on a station-by-station basis to make the retain option practicable at some locations. The knowledge and experience gained through such an approach may be directly applicable when Ofcom turns its attention to shared use in the remaining 3.8-4.2 GHz band.

**Question 7: Do you have any quantitative evidence on the costs and benefits associated with the options? This include costs for existing users and/or consumers of existing services associated with potential changes, and benefits to UK consumers in gaining access to mobile services in this band.**

No.

**Question 8: Do you have any other suggestions that would allow widespread 5G availability using the 3.6 to 3.8 GHz band across the UK while allowing certainty for at least some existing users to continue to provide the benefits currently provided by use of the 3.6 to 3.8 GHz band?**

Although 5G remains to be defined, Microsoft views 5G as providing supplemental capacity to networks where there is existing wide area broadband coverage. Meeting the bandwidth requirements currently under consideration for 5G services will require large channel sizes. In the consultation, Ofcom did not mention any proposed channelization plan for the 3.6-3.8 GHz band and the number of licenses it intends to issue. The larger channel size required for 5G-like use in the 3.6-3.8 GHz band and the implied fewer number of mobile license holders may have to be balanced with any competition concerns.

**Question 9: Do you have any comments in relation to these proposals?**

Microsoft supports Ofcom making available more licensed, licensed-exempt, and shared spectrum for mobile use. As radio wave propagation differs across different spectrum bands, some mobile data use cases are better suited to certain bands than others. For this reason, there is a need for additional low-, mid-, and high-band spectrum for use under sufficiently flexible regulatory approaches appropriate to the specific circumstances.

In the United States, Microsoft advocated for a three-tier access approach for the frequency range 3550-3700 MHz. The uppermost tier consists of federal Department of Defense license holders and grandfathered space-to-earth fixed satellite service ground stations. The middle tier, referred to as priority access (PA), consists of general license holders. The lowest tier, referred to as general authorized access (GAA), is licensed-by-rule but contains many elements of licensed-exempt-like use. Operators within a given tier cannot cause harmful interference to operators in higher tiers and must accept interference from them. Access to the spectrum will be controlled in near real time through a software-based spectrum access system (SAS) that utilizes a geolocation database and cognitive radio technologies. Also included was a concept of 'use-or-share' where a GAA user could access a PA licensee's channel at times and locations where it is not in use. The focus is on small cells to provide additional broadband capacity.

While such a shared access approach makes sense for the 3550-3700 MHz band in the United States given the licensees and their protection requirements, Microsoft did not advocate for such an approach in this consultation because the underlying rules prescribe high power TD-LTE for the 3.6-3.8 GHz spectrum band. But given our understanding of the more complex UK spectral landscape in the 3.8-4.2 GHz band, a shared spectrum approach using a SAS may need to be considered.