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Freshwave's response to Ofcom's consultation "Mobile networks and spectrum - Meeting future demand for mobile data" dated 9th February 2022

Freshwave welcomes the opportunity to respond to the above consultation ('the Mobile Spectrum Demand Consultation').

Freshwave invests expertise and capital in digital infrastructure. We are a leading network service provider, bringing together mobile operators, public authorities and real estate providers to extend high quality coverage and capacity in thousands of locations across the UK, including within 2000+ buildings.

The small cell and distributed antenna systems Freshwave designs, deploys and manages extend coverage and increase the capacity of the existing mobile networks and are built with the collaboration of the mobile network operators (MNOs).

We support Ofcom's objective to capture stakeholder views on future mobile demand and the measures needed to ensure sufficient capacity in the longer term.

We note there are no specific questions in the consultation so we have set out our views below following the structure of the consultation document.

Section 1 - Overview

We agree that demand for mobile services is likely to continue to grow exponentially, driven not only by consumer usage but increasingly by machine usage.

Any shortage of capacity is, and will continue to be, most acute in urban areas where there is already heavy use of all available spectrum, so we have focussed our response on those areas. There is generally plenty of spectrum in rural areas, although it's often not economically viable to deploy it there.

Use of mmWave from a densified network of small cells will indeed help increase capacity. In the meantime MNOs can use a densified network of mid-band small cells where needed, such as in the City of London[1].

Section 2 – Introduction and background

Private networks are a good solution for many private use cases such as manufacturing, however access to suitable spectrum is crucial. Wi-Fi is often a good alternative to mobile, such as in homes, but is less spectrally efficient than mobile and not well-suited to mobility or sharing with large numbers of devices.

[1] https://news.cityoflondon.gov.uk/city-of-london-invests-in-world-leading-wireless-network/#:~:text=CTIL%20will%20build%204G%20mobile,expected%20to%20become%20available%20in

Section 3 - The growth of UK demand for mobile data

MNO competition has helped drive innovation and kept prices low. However we believe a certain amount of collaboration between MNOs, subject to compliance with competition rules, can help reduce costs and improve capacity. We will explore this in the sections below.

In our view Voice over Wi-Fi will not make a significant impact on alleviating spectrum demand due to variable quality of service and the fact that voice does not need much spectrum. For heavy data usage Wi-Fi congestion is already an issue.

Section 4 - Mobile data traffic is expected to keep growing, but the pace is uncertain

Continued growth in spectrum demand will be driven by new services for consumers on existing devices (especially those that stream video content), new devices such as extended reality (XR) headsets, and new uses of the spectrum such as fixed wireless access (FWA) and machine to machine communications.

Future growth in demand is hard to predict. On the one hand there's only so much data that a person can consume watching video on a small screen, on the other hand new devices and uses could overtake video streaming demands. Another consideration is perhaps increasing uplink traffic which current networks are not dimensioned for. Overall we consider the medium growth scenario is the most likely.

Section 5 - Substantial growth in network capacity will be needed to meet future demand

The only ways of increasing capacity are indeed i) greater efficiency of spectrum use, ii) deploying more spectrum, and iii) network densification.

Regarding spectrum efficiency, Dynamic Spectrum Sharing (DSS) will help in the short term but we believe won't make a significant difference in the long term. Freshwave is actively involved in research deployment of massive MIMO technology for new 5G use cases and we see potential there for mid-band macro sites.

Regarding spectrum deployment, use of existing spectrum holdings will increase capacity, however MNOs are already using almost all of their spectrum in urban areas. The use of mmWave spectrum will significantly improve capacity so we look forward to Ofcom's future consultation on this. We agree with Ofcom that this spectrum will need to be deployed via small cells rather than from macro sites. Of the other bands mentioned, the 600 MHz band will have minimal impact in rural areas but will improve coverage and capacity in rural areas. The upper 6 GHz band could add significant capacity in urban areas and has better propagation characteristics than mmWave. In all cases international consensus is crucial to promote the availability of base stations, small cells and devices at reasonable prices.

Finally we believe network densification is likely to have the greatest impact on capacity. As Ofcom points out, the UK is somewhat behind some other countries on densification. Additionally, more sites are needed if mmWave is to be deployed. However densification can start now using existing mid-band spectrum, and is already happening in some urban areas. We agree with Ofcom that meeting future demand will require some degree of densification for all of the growth scenarios.

MNOs traditionally focus on their macro sites when planning coverage and capacity, adding spectrum as it becomes available. Densification using small cells will require a change of approach. Some MNOs have already started this journey. Access to sites such as street assets, fast planning approval and the availability of backhaul are all essential. Freshwave is pioneering open access agreements with local authorities such as Croydon[2], enabling access to assets for the deployment of small cells and other infrastructure.

Ofcom rightly raises indoor coverage as important. We agree that outdoor-in solutions for indoor coverage are spectrally inefficient and often give a poor quality of service. Indoor-in solutions, using their own backhaul and small cells or distributed antenna systems (DAS), are a hugely significant part of

[2] https://news.croydon.gov.uk/more-areas-to-benefit-from-councils-ground-breaking-4g-deal/

network densification. In this regard it should be noted that whilst repeaters enhance indoor coverage, they do nothing to increase overall capacity but merely spread the existing capacity over a larger area.

The UK MNOs have already agreed the Joint Operator Technical Specifications for Neutral Host In-Building (JOTS NHIB) to enable sharing of infrastructure and thereby reduce deployment and maintenance costs.

Freshwave is working with the MNOs to deploy compatible multi-operator in-building networks[3]. We believe further cost savings would be achievable via spectrum sharing indoors, reducing the number of small cells required.

[3] https://www.mobilenewscwp.co.uk/News/article/virgin-media-o2-becomes-first-network-use-jots-make-live-calls