

UK Broadband's response to Ofcom's consultation on the future role of spectrum sharing for mobile and wireless data services.

UK Broadband welcomes the opportunity to provide views on the future role of spectrum sharing.

Question 1: How is demand for indoor wireless data connection speeds and capacity likely to develop over the next 5–10 years?

We concur with the projections of the Aegis/ Quotient study that considerable bandwidth is likely to be required in the next 5-10 years to satisfy demand for Wi-Fi. The number of users and devices requiring access to Wi-Fi in individual locations will likely continue to grow and the services they use will doubtless require ever increasing amounts of capacity to access. We note the capabilities and capacity provided by the 802.11ac standard. We believe further system enhancements will continue as both consumers and businesses use Wi-Fi as the access technology of choice in homes and offices.

Question 2: Will an extension of the 5 GHz band be required if Wi-Fi is to play a sustainable role in meeting the growing demand for indoor wireless connectivity?

Yes, we believe that extension of the use of this band would be useful for indoor Wi-Fi usage and we would support such a development.

Question 3: Are there other types of indoor wireless applications which will require access to alternative spectrum other than that provided by the licence exempt 2.4 and 5 GHz bands used by Wi-Fi?

We believe that a growing number of household, medical, retail and other applications are likely to require access to spectrum outside of 2.4 and 5GHz. Much innovation is driven from America and Asia. Such applications should be able to utilise the most appropriate spectrum to enable them to be delivered, while maximizing the global economies of scale and scope. Spectrum should not be an inhibiting factor.

Question 4: What role do you think Wi-Fi will play in providing wireless broadband connectivity outdoors over the coming 5-10 years?

In recent years, we have seen a certain amount of off-loading from 3G and, to some extent, 4G mobile networks on to Wi-Fi networks. This has been done to ease congestion on mobile networks and to provide greater bandwidth than has generally been available to users for bandwidth- hungry applications.

However, this is not an optimal situation for mobile network operators and service providers because it means that they lose touch with and control of their customers for the periods during which they have migrated onto Wi-Fi. Nor is it optimal for users – they would not, if weren't necessary, choose continually to log into and out of alternative wireless networks. Users would prefer a seamless experience. We note there are standard technologies that can deliver this seamless experience but UK operators have been slow to deploy them.

We believe that as LTE small cells increase in prevalence, mobile network operators will choose to retain customers on their mobile networks and start to move away from Wi-Fi offloading. We also think it likely that we will see reverse-offloading, where Wi-Fi traffic migrates to TD-LTE small cells. Wi-Fi network operators are likely to choose managed spectrum over unmanaged.

Question 5: Will the increased deployment of Wi-Fi access points outdoors create a risk of reduced quality of service performance over the longer term and, if so, will approaches to co-ordinate access point performance be able to mitigate this risk?

Yes. We think that improved co-ordination and interference-management methods may be of some benefit but, ultimately, Wi-Fi network operators may choose to move to managed spectrum for outdoor use.

Question 6: Will improved approaches to accessing spectrum in licence exempt bands be needed in the longer term to maintain the quality of service achievable for outdoor public mobile broadband and/or M2M services? If so, which approaches are most likely to be adopted and how likely do you think they are to be successful in improving access to spectrum?

Yes. For outdoor use or any public or semi-public environment, co-ordination would be required in a way that is not necessary for indoor use. Consumers and businesses should be able to leverage Wi-Fi capability with minimum restrictions. However, to overcome capacity and interference challenges in public and semi-public environments, co-ordination will increasingly be required.

Question 7: Which frequency bands are most likely to be best suited to providing geographical shared access, including via a geolocation database approach, for use by mobile broadband, for example small cells and M2M applications?

We agree with Ofcom that frequency bands where the primary user is using the spectrum in limited geographical areas are likely to be most suited to spectrum sharing with small mobile broadband cells. We would not recommend geo-location technology to be applied in the UK to any frequency band which is already embedded into devices (such as mobile phones) on a multi-national basis, i.e. those bands already allocated for 2G, 3G or LTE use. It would not be appropriate to allow geographical shared access in bands where the current licensed user is already using it for mobile services. It would therefore not be appropriate, for example, to allow (further¹) geographic shared access in the 3.5 or 3.6GHz bands.

Geographical shared access would be better deployed where it is used to allocate spectrum for use for services *other than* those for which it is already being used.

Question 8: Would access to these bands best be realised through licensing or licence exemption?

It is UK Broadband's view that it is preferable for spectrum use to be co-ordinated on a licensed basis.

¹ UK Broadband's allocated frequency in the 3.6 GHz band is already used on a co-primary basis with satellite operators.

Question 9: Do you believe that tiered shared access to a range of spectrum bands has a role in meeting demand for mobile and wireless data and, if so, which applications and devices do you think will be particularly suited to this access model?

We think that tiered shared access could potentially be used to meet demand for mobile and wireless data, but only in bands which are only used for this purpose, to avoid problems caused by complexity and interference.

Question 10: Do you believe DSA could play an important future role in the future in enabling a better quality of service and low barriers to spectrum access alongside conventional licensed and LE spectrum approaches?

We believe that DSA might well afford some benefits regarding quality of service in licence exempt bands. As Wi-Fi usage increases, it will likely be a useful tool. We also agree that it will be easier to apply this technique in bands where there are no legacy devices already in use. However, Ofcom should take care not to introduce system requirements that do not enable the UK to take full advantage of global economies of scale nor that limit the development of the market or the services provided to users.

We note particularly the discussion in CEPT on LSA for the 2.3GHz band. This is LTE band 40 and is already used by operators in Asia Pacific to provide both fixed and mobile LTE services. Many mainstream device manufacturers, including Samsung and Apple, have already included the band in their devices. Ofcom must ensure that UK consumers are fully able to take advantage of these devices.

Question 11: What barriers still remain to the realisation of cost-effective sensing appropriate for low-cost consumer devices and what activities are ongoing to try to address them?

In our view, the main barriers are the economies of scale and scope that would be required and establishing cost effective chip manufacture. These both require there to be a clear market for this technology.

Question 12: Over what timescales could DSA become a mass market proposition?

We expect this to happen in a time frame of 3-5 years.

Question 13: What role should Ofcom play, if any, to support the development of DSA and relevant technologies?

We believe that Ofcom should take a leading role in this area and should make efforts to collaborate with its counterpart organisations in Europe and across the world in order to address the barriers mentioned above.