

Response to Ofcom Mobile Data Strategy

Question 1: Have we correctly identified the future characteristics of mobile data demand?

Question 2: Do you agree that there is a prospect of significant continuing growth in demand for mobile data services?

We agree with the key points of your analysis. Mobile data demand will continue to grow. Growth will be driven by two main trends:

- (i) Demand for mobile media etc will drive demand at the top end of the spectrum for new bandwidth suitable for delivering media (and probably unpaired).
- (ii) Demand for M2M and Internet of Things devices, which will require bandwidth at the lower end, where easy propagation means ubiquitous coverage is more readily available.

Question 3: Have we identified all the challenges in realising future growth in citizen and consumer benefits from use of mobile data services and do you have any comments on the nature or the scale of the challenges we have identified?

Question 4: Have we correctly identified all the areas where Ofcom has a role in addressing the challenges of growing demand for mobile data services?

Question 5: Do you agree that the main additional area that our mobile data strategy needs to address is in relation to potential future spectrum options?

Question 6: Is Ofcom doing all that it needs to do in other areas identified as being relevant to the mobile data challenge?

Question 7: Do you agree with our high-level assessment of likely technology and topology trends and their implications for future spectrum use?

We agree with your broad analysis.

We are particularly interested in views on:

a) the potential demand for spectrum above 10 GHz;

We continue to see a strong drive in demand for personal area communications in unlicensed bands in areas such as sensors, wearable technology and local area content distribution and sharing between devices. We understand that devices operating over 10 GHz will have a role in enabling provision of these sorts of products and services.

b) the potential impact of integrating broadcast capability into mobile networks;

We agree that there will be demand for broadcast material to be received on mobile devices. We agree that this points to looking at high frequency bands with wider bandwidth potential. Frequency Division Duplex would provide more efficiency, but Time Division Duplex might provide more spectrum flexibility. We also agree that improved storage capacity of devices might alleviate pressure on spectrum. But in general we see cellular being used as a backhaul for more and more devices paired with cellular through local networks like Blue tooth.

c) whether the technical and commercial challenges of supporting additional frequency bands in mobile devices drives interest towards bands close in frequency to existing bands;

Contiguous bands will always offer lower cost/complexity of user equipment vs aggregation of disparate bands which is technically feasible but at the cost of power and complexity.

d) the relative importance of large contiguous blocks of spectrum versus aggregation of smaller blocks

Question 8: Are there any additional technology or topology trends that we need to consider that could have an effect on spectrum use?

As indicated above we see a massive potential increase in 'tethered' devices as we see an explosion in IoT and wearable technology e.g. plethora of BT-LE devices connected via a smartphone or similar cellular hub.

Question 9: Do you agree with the short list of bands we have identified for more detailed consideration?

We welcome your focus on freeing up spectrum for M2M/ Internet of Things. We appreciate the efforts made so far by Ofcom, in particular on licence exempt White Space, which we think will play a major part. But this is an area where the potential is large and there are various options.

Our basic aim should be to promote the roll out of a ubiquitous communications network which will support IoT.

Given that there are several possible approaches to this, and that various factors (including cost) will determine outcomes, we may need to make available a number of them at the same time, and leave the market to determine which will be the most successful.

There is the additional complexity of needing to ensure to the extent possible that M2M spectrum is harmonised globally.

Some ideas include:

- (i)** Re-allocating spectrum to allow more to be available for IoT, e g through accelerating the suggestion in the Consultation that the 470 Mhz-694 Mhz band might – eventually - be freed up. This could make an important contribution. We note in this context that there are moves in the US to re allocate spectrum currently belonging to broadcasters.
- (ii)** Licensed shared access may need to be explored in addition to licence exempt arrangements.
- (iii)** There could be a role in this area too for traditional licensed spectrum. Although in general cellular licensing approaches may be too expensive to address a mass market IoT requirement, it is becoming feasible to develop an air interface and subscription management model that is lightweight, cheap and easy to use and to operate it in fragments of licensed spectrum that become available on re-farming from GSM to LTE, or on the reduction in GSM traffic or even co-existing with LTE. We should encourage the development, testing and regulation for this, including changing use restrictions on spectrum.

Question 10: Do you agree with our methodology for prioritising potential bands for mobile data use?

Question 11: Do you agree with our provisional assessment and the results of our band prioritisation?

Question 12: Do you agree with the possible timelines we have identified in this section?

Question 13: Do you have any comments on the capacity implications outlined in this section?

Question 14: Do you agree with the next steps we have identified for further domestic work based on the proposed priorities?

Question 15: How do you think we should adjust our support for international harmonisation based on our proposed priorities?