BT’s response to Ofcom’s Consultation on:

Space spectrum strategy

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Submitted to Ofcom on 10 May 2016

BT welcomes and supports Ofcom's review of the UK space spectrum strategy, especially its focus on citizen and consumer benefits arising from space applications and services. BT has over 50 years' experience in the development and deployment of satellite systems with a focus on delivering high quality and cost effective services to all customer sectors. BT is technology neutral and only deploys satellite capabilities where it is the most appropriate and cost effective solution for any given customer or market need. We therefore welcome Ofcom's balanced approach in reviewing the needs of the satellite sector alongside those of other technologies.

Our responses to the consultation questions

Question 1: How useful is the interactive data that we have provided on our website and why? How can the presentation and interactivity of the data be improved? How frequently would it be useful for us to update the information and why?

The data presented is interesting, but overall the tool facility is of limited use to a service provider.

One data set that raises some concerns is the earth station location data. BT would like to understand how Ofcom envisages this data set being developed and used. BT would be very concerned if it were suggested that this data set could be used as some form of a planning tool to enable sharing of some satellite bands with terrestrial services, especially in relation to services to small antennas.

Question 2: Do you agree with the industry and technology trends we have identified for the satellite sector? Are there other trends that could have implications for spectrum use?

The summary of satellite technology trends provided is fairly comprehensive. The only satellite-specific element that might be considered missing in the 2025 timeframe is the potential exploitation of the Q/V band. This would provide a significant source of additional spectrum (albeit with certain propagation challenges), provide the opportunity to reduce the footprint, mass and power requirement of key satellite communication payload items, and enable smaller spotbeams to be generated. These advances would support higher spectrum reuse and increase the capacity of individual satellites.

One trend that space systems and applications share with other sectors that is not really addressed in the consultation document, although it underpins several elements, is the trend in ever faster processor speeds and memory capacity (the need to space harden such components notwithstanding). The increased capability in digital signal processing (DSP) could enable more sophisticated satellite payloads with enhanced flexibility and capacity. The emergence of new technologies enabled by enhanced DSP, such as Network Function Virtualisation (NFV), Software Defined Networks (SDN), and Quantum technologies, will impact the satellite communications sector by offering greater flexibility and resource efficiency (including spectrum) as they mature.

It is also worth observing technology trends in adjacent industry sectors that could also have implications for satellite spectrum use. For example, the ever increasing access speeds and reach achievable by copper and wireless technologies (a benefit of DSP enhancements) and pushing fibre deeper into access networks (a consequence of improving economics and increasing demand) is likely to impinge on the market addressable by satellite services over the next ten years as faster services are deployed more widely. Development of new terrestrial wireless standards designed for bit rates and lower power operation, e.g. LTE-M and Low Power Wide Area (LPWA) technologies, could impact on the satellite addressable market in Internet of Things (IoT) applications.

More positively, emerging technologies like NFV and SDN will impact telecoms network architectures and facilitate Network as a Service (NaaS) opportunities that enable operators and end-users to better manage network resources to deliver a dynamic set of services and applications. This could make it more viable and attractive to develop fully integrated end-to-end satellite-terrestrial networks capable of delivering far more versatile and responsive services than are possible with today's satellite infrastructure and business models.

Question 3: Do you agree with the application specific trends we have identified for the satellite sector? Are there other trends that could have implications for spectrum use?

BT broadly agrees with the summary of application trends provided. However, there are a few key aspects of some applications that are not included.

DTH broadcasting convergence with broadband: in terms of end-user behaviours, there is an increasing use of 'companion screens', i.e. the simultaneous use of smartphone and tablet devices to consume secondary content (different camera angles, advertising etc.) associated with a TV programme *while that programme is being viewed on a TV*. Those secondary applications are typically delivered via broadband connections.

Broadband quality of experience: there is a trend for increasing sustained throughput per user / household during the busiest period of the day. This is driven by the increasing consumption of unicast and multicast video content, simultaneous applications (e.g. multiple video streams) and the downloading of ever larger files (software updates, games etc.). The observed trends will change the market perception of what a broadband service should provide, i.e. ever faster headline speeds and a *per-user* (as opposed to per connection) sustained data rate during busy periods and rapid massive file transfer, all of which will lead to higher data consumption per month. Current satellite platforms struggle to deliver a comparable customer experience to terrestrial platforms in terms of performance and price and increasing market expectations will make it harder still.

Broadband for businesses: businesses are driving 'big data' applications and are demanding higher and higher bandwidths, even if only for relatively short periods of time. Satellite platforms will need to evolve to be able to respond to massive, but intermittent and geographically distributed, bandwidth demand.

Question 4: Do you agree with the industry and technology trends we have identified for the space science sector? Are there other trends that could have implications for spectrum use?

No response.

Question 5: Do you agree with the application specific trends we have identified for the space science sector? Are there other trends that could have implications for spectrum use?

No response.

Question 6: Do you agree with the applications we have identified as having particular potential for growth in consumer and citizen benefits?

BT broadly supports the application areas identified, with the caveat that some market opportunities may be adversely impacted by developments in adjacent technology areas as discussed in our replies to questions 2 and 3.

Question 7: Do you agree with the three priorities that we have proposed for our strategy? Are there other priorities that are as important, or more important, for citizens and consumers and why?

BT supports the objective of providing greater benefits to UK citizens and consumers and broadly agrees with the three priority areas identified. We would also suggest broadening the objective relating to broadband to encompass broadband business services (in the UK and beyond the UK).

Question 8: Are there other areas where spectrum liberalisation could enable better satellite broadband services and what specific actions should we be considering?

None identified.

Question 9: Do you agree that existing bands are likely to provide sufficient capacity for considerable growth in satellite broadband and that we do not need to prioritise the identification of new bands? Do you have any comments on the analysis we have undertaken of supply and demand?

BT is comfortable with the analysis presented in the consultation document and broadly supports the underlying assumptions used. We agree that the scenarios modelled demonstrate that there is plenty of capacity in terms of spectrum and orbital slot resources to support considerable growth in the UK satellite broadband market, even when considering the potential evolution of the universal service ambition. Actual demand will depend on the quality of experience that is offered (e.g. peak-time sustained throughput) and pricing options (relative to both throughput speed and monthly data caps).

Question 10: To what extent does the proliferation of filings for 'paper satellites' create costs or barriers that hinder the provision of satellite services to UK citizens and consumers?

No response.

Question 11: Are there other actions we should be considering that could enable greater benefits from satellite broadband?

No response.

Question 12: Do you agree that existing bands are likely to provide sufficient capacity for considerable growth in earth observation data downlink and that we do not need to prioritise the identification of new bands? Do you have any comments on the analysis we have undertaken of supply and demand scenarios?

No response.

Question 13: What other specific actions should we be considering to facilitate earth observation data downlink?

No response.

Question 14: To what extent will access to suitable spectrum for TT&C enable greater use of small satellites and why? Do you agree with the specific actions we have identified and what else should we be considering?

No response.

Question 15: What other actions should we be considering to support long term predictability of access to sensing bands?

No response.

Question 16: Are there other actions we should be considering that could enable greater benefits from earth observation?

No response.

Question 17: Are there any improvements we should consider in how we enable existing benefits to continue, whilst exploring sharing / new uses?

The ability to rapidly deploy satellite broadband user terminals is contingent on having a well understood and stable propagation environment without the need to coordinate individual user terminals with other users of the same spectrum. Any requirement for customer installations to operate in a shared frequency environment would add significant costs to deployment in terms of planning processes and potentially complex installations. Therefore, BT would support maintaining the current regime for the deployment of High Density FSS networks.

Question 18: Do you agree that the applications we identify do not need to be a particular focus for regulatory action in the short to medium term?

BT agrees that the additional application areas identified are not in need of short to medium-term regulatory action.