Your response

Question	Your response
Question 1: Do you have comments on the overall approach to the review?	Confidential? – Y / N In general, the review lists the areas of improvement. The approach to the review appears robust, however the continued "specific activities" on the impacts of Space, particularly those relating to satellite communications and IoT are of paramount importance. Democratised access to space will not only increase the use of frequencies across multiple bands in the next decade exponentially, but also enable a more economically, socially, and environmentally sustainable future. Therefore, it is suggested that additional focus be put on the space component of both this and subsequent future reviews.
Question 2: Have we captured the major trends that are likely to impact spectrum management over the next ten years?	Confidential? – Y / N In general, yes. However, it is worth mentioning that both terrestrial, satellite and hybrid networks are going to be used for Internet of Things (IoT) purposes. Currently, there are no/few regulatory definitions for mega-constellations for internet broadband, space based IoT or 5G adoption services. Currently, missions in the USA and China are seeking to monitor spectrum allocation and geolocation through institutional and commercial satellite missions. It is not known if the UK plans to conduct it's own mission of this variety (ESA – ELAINE concept mission yet to be confirmed). The importance of being a major player as a sovereign nation in what is still a very nationalistic industry, cannot be underplayed. The growing markets for location-based services, spectrum monitoring, and allocation could reach well in excess of $200bn by the end of the decade. Within these markets, both commercially and institutionally, lies the ability to have a seat at the table during global discussions on allocation and application uses.

Question 3: Could any of the future technologies we have identified in Annex 6, or any others, have disruptive implications for how spectrum is managed in the future? When might those implications emerge?	Confidential? – Y / N As a satellite operator, we see such implications: 1) Popular frequency bands are getting more and more crowded. Better spectrum sharing and coordination techniques/missions to monitor allocations should be implemented as soon as possible. 2) Currently, regulatory documents (ITU and national) lack a definition of IoT services, sometimes there is a confusion what frequencies and standards are best to use for either terrestrial, or space based IoT. Also, there should be a distinction between different kinds (for example, smart home and industrial applications) of IoT services, because different IoT applications require very different data rates / frequencies, the implementations and standards used are also different.
Question 4: Do you agree that there is likely to be greater demand for local access to spectrum in the future? Do you agree with our proposal to consider further options for localised spectrum access when authorising new access to spectrum?	Confidential? – Y / N N/A.
Question 5: Do you agree with the actual and perceived barriers identified for innovation in new wireless technologies, and our proposed ways of tackling those?	Confidential? – Y / N We believe that the satellite industry has to be firmly addressed here. As a satellite operator, we see perceive a huge increase in demand for technology demonstration missions. The same approach of easier access to the spectrum for standardized communication could also be used for satellite industry.
Question 6: Do you agree with Ofcom's proposals to improve our outreach and reporting activities, and spectrum information tools? • **Are there additional ways that Ofcom could better engage with existing and future users and providers of wireless communications?** • **Please explain any specific areas where you believe more or better provision of information could provide value to stakeholders**	Confidential? – Y / N Yes, we agree. Suitable methods of engaging with users are mentioned, however more elaboration is needed. In general, as a spectrum user we would like to know/see that the regulator has frequency licensing scheme which is as automated and efficient as possible. All the information on how to become licensed should be available online and made public. Also, it should be easy to understand which frequency allocations are suitable for applications, how crowded those allocations

	are, and importantly how to select a specific frequency range which creates the least interference with existing users.
Question 7: Do you agree that it is important to make more spectrum available for innovation before its long-term use is certain? Do you have any comments about our proposed approach to doing this?	Confidential? – Y / N Technological innovation is currently at such a pace that there are several emerging technologies requiring specific and uncommon frequency allocations and several many in orbit demonstration (IOD) satellite missions. These missions can now also be launched into orbit within just a few months from their project kick-off, such is the capability of modern satellite manufacturers and launch services. Therefore, there is a very real and current perception that the current spectrum and its usual regulatory timeline can (and do) slow down technological advancements. Thus, we agree that a good scheme for technology innovation spectrum use, is vital for timely innovation to avoid this aspect of communication utilising technologies becoming the bottleneck for other industries.
Question 8: Do you agree that it is important to encourage spectrum users to be 'good neighbours' to ensure more efficient use of the spectrum? Do you agree with our proposals to: **a) increase realism in coexistence analysis at a national and international level?** **b) encourage spectrum users to be more resilient to interference?** **c) ensure an efficient balance between the level of interference protection given to one service and the flexibility for others to transmit?** **Do you have any comments on which of these will be the most important?**	Confidential? – Y / N Yes, we agree that spectrum sharing should be efficient, and it is every user's responsibility. a) Yes, we agree with both conditions that realistic characteristics of equipment shall be used, and in parallel coexistence, conditions have to be up to date. However, for example within the small satellite industry, sometimes it is difficult to define exact orbit parameters in advance, because small satellites are often a secondary payload on rockets. Thus, a better and easier scheme for refining the details of the orbit in the later stages of the project could be implemented (both on national and international level). b) In general, yes, however it strongly depends on the actual technical characteristics proposed. This is because interference resilient equipment can be a barrier to entry given its expense. which could stop newcomers and start-ups from developing new technologies, stifling innovation. c) Yes, as stated in the previous point, the balance between interference

	resiliency and the flexibility to transmit is very important. This balance ensures competitiveness and faster technology development which drives growth.
Question 9: Are there any other issues or potential future challenges that should be considered as part of this strategy?	Confidential? – Y / N Working both nationally and internationally on shortening regulatory timelines for the small satellite industry. Currently, even with some changes from ITU, small LEO satellites are treated in the same manner as large GEO satellites, despite LEO satellites being able to be launched into orbit in only a few months (not years like most GEO activities). This is a widely known issue which impedes technology development. Further work must be done here.
Question 10: Do you agree that continued use of our existing spectrum management tools (as set out in sections 4-7) will be relevant and important for promoting our objectives in the future, in light of future trends?	Confidential? – Y / N N/A. As a relatively new company to the UK, we cannot comment on this issue fully. However as an established satellite manufacturer and service provider, we would be willing to engage further on this point, to provide feedback in the future.
Question 11: Is there anything else we should be considering doing, or doing differently, to promote our objectives?	Confidential? – Y / N N/A.