Your response

Question	Your response
Question 1: Do you have comments on the overall approach to the review?	Confidential? – N Overall, we support Ofcom's proposed approach but urge Ofcom to follow the principle of technology neutrality in its decisions. In addition, there needs to be a balance considered for many of the proposals including the impact on long-term certainty for investors and users. These factors need to be considered as Ofcom moves forward with its proposed approach on spectrum management.
Question 2: Have we captured the major trends that are likely to impact spectrum management over the next ten years?	Confidential? – N While a significant amount of major trends are captured, there are a couple of trends not reflected; namely the very real threat of aggregate interference from the wide-spread deployment of 5G and beyond devices and the multi-dimensional nature of spectrum management that needs to be considered as there are further terrestrial and non-terrestrial deployments of a range of innovative technologies. This means that the interference environment could be significantly impacted than the one Ofcom describes in this consultation.
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? – N Based on our experience, we are certain that any technology leap in the use of radio spectrum has disruptive implications on spectrum management. Accordingly, it would be expected that spectrum management should be flexible enough, and preferably dynamically evolving, in order to keep the pace with technology advancement. Nonetheless,

	such dynamism and flexibility should be provided with sufficient legal certainty. Spectrum regulators are very aware that in order to attract investments in the telecommunications market, operators and vendors require the existence of a steady or at least predictable regulatory framework. Particularly, with regards to some of the technologies identified in Annex 6, we would like to provide the following insights. Recent advances in the computational field applied to spectrum management seem to suggest that the traditional use of spectrum, in which assignments are exclusive and static, is becoming obsolete. Automated spectrum management tools including Artificial Intelligence used for machine learning applications, may indeed help to implement a more efficient use of the spectrum and may even potentially seek out for dynamic frequency assignment mechanisms, nonetheless, the implementation of such mechanisms should be necessarily studied on a case-by-case basis. Different services and different applications will require different spectrum management approaches, so, one-fit-to-all solutions won't be generally suitable. Telecommunications technologies have not evolved in perfect parallelism, and therefore the ability to adapt to a dynamic spectrum approach will vary from one technology to another, and also from platform to platform. Some radiocommunication services are tightly dependent on a constant availability of specific spectrum ranges, which is the case of satellite-based networks, where space technologies are not only limited by power availability but also by spatial restrictions. Satellite technologies have developed greatly in the last years, including the capability to reutilize spectrum hundreds of times, nevertheless, the physics involved in space communications are not always surmountable. In conclusion, when seeking deep automatization in spectrum management, and particularly in dynamic frequency assignments schemes using AI tools, it's important that spectrum regulators consider the broad variety of radiocommunication technologies and

	platforms, as well as their own particular features and limitations. Regarding next generation networks, including 6G and future developments, EchoStar agrees with OfCOM's view that 6G is expected to follow the continued development of 5G technology over the next 10 years, and is convinced that evolving generations of telecommunication networks will continue to have a common factor – they will be structured as a network of networks. As such, they will rely on multiple technologies and platforms, both terrestrial and space borne. International organizations, including the ITU and 3GPP, have clearly envisaged the integration of satellite technologies in the implementation of 5G, and have started to develop the technical standards for such integration, and particularly for the interoperability among terrestrial and satellite technologies. In such environment, spectrum management actions will need to focus on a balanced approach in order to provide spectrum resources to the different platforms that will comprise a next generation network. Satellite technologies, including geostationary and non-geostationary systems, will play a role in the implementation of 5G and consequently in 6G, and therefore, spectrum for satellite applications must remain available, not only with regards to existing allocations, but also to consider additional allocations in order to guarantee growing demands. We concur with OFCOM that in due time, regulators will need consider whether their authorization tools remain appropriate for making spectrum available in a more dynamic/intelligent fashion, but we are convinced that any spectrum management approach will need to be able to accommodate diverse technologies and platforms and to differentiate their specific spectrum needs in their corresponding timeframes.
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? – N No comment.

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? – N No comment.
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? N No comment.
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? – N If this approach is pursued, Ofcom must ensure that current users continue to have access to adequate spectrum. Failure to do so will harm current users and negatively impact investment in telecommunications systems as it will signal a certain amount of uncertainty.
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? – N a) increase realism in coexistence analysis at a national and international level? We support increased realism in coexistence analysis as it would allow for more efficient use of spectrum. For example, at WRC-19, Resolution 750 limit for GSO in the V-band was reopened (from WRC-2007) and a new limit was defined where the limit for elevation angles less than 80 degrees was driven in studies by the Sensor I1 in RS.1861. RS.1861 is now being reopened in WP7C to add new sensors and to remove old sensors that will no longer be used. Contribution 7C/81, shows the deletion of Sensor I1 by the same administration that put in the study using Sensor I1 against the GSO

limit. Had there been a check for realism, the new limit would've been derived for the protection of a real sensor.

b) encourage spectrum users to be more resilient to interference?

In general, we support an increased resiliency to interference however this must be balanced with cost and labor. There is an added cost to filters, better receivers, etc. that should be taken into account when considering protection levels and an increased financial burden of resiliency. Additionally, our customers don't typically replace terminals on a regular basis. Older terminals should be grandfathered from new requirements.

c) ensure an efficient balance between the level of interference protection given to one service and the flexibility for others to transmit?

The balance should be looked at on a case by case basis. There are international rules for coordination for GSO/GSO and GSO/NGSO. Work is also currently underway in Working Party 5D to develop an ITU-R Recommendation to assist administrations to mitigate interference from FSS earth stations into IMT stations operating in 24.65-25.25 GHz and 27-27.5 GHz. Operator to operator level coordination would allow for increased flexibility without the need for government intervention.

Do you have any comments on which of these will be the most important?

(a) and (c) are the most important to recognize the benefits of spectrum efficiency.

Question 9: Are there any other issues or potential future challenges that should be considered as part of this strategy?	Confidential? N No comment.
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? – N Yes.
Question 11: Is there anything else we should be considering doing, or doing differently, to promote our objectives?	Confidential? – N Continued focus on a technology neutral approach and a recognition of long-term planning and investment by users of the spectrum are critical to Ofcom's continuing success.