making communications work for everyone

Your response

Question	Your response
Question 1: Have you identified an alternative use for the 14.25-14.5 GHz band which could lead to greater benefits for consumers and citizens than our proposal to extend satellite ESN authorisations? Please provide evidence to support your comments.	*Is this response confidential? –N* While other potential uses of the 14.25-14.5 GHz may exist, the value of allowing FSS user terminals access to the band has been demonstrated in the services available in other countries where FSS services are authorized across all 500 MHz. Furthermore, these services can begin immediately upon expansion of existing ESN licenses and so UK consumers and businesses can reap the benefits without delay. As Ofcom has recognised, access to this additional spectrum is particularly critical for mobile services provided to earth stations in motion ("ESIM"s). ESIMs solve a critical problem of terrestrial-only broadband networks: connecting people and businesses while on the move and out of range of terrestrial wired and wireless networks. Thus, ESIMs are one of the fundamental parts of current and next generation networks connecting business travellers, commuters, tourists, commercial shipping, and energy and natural resource production. ESIMs also play a critical role in connecting government agencies, such as first responders following disasters, when local communications infrastructure is destroyed. Therefore Ofcom's proposal will result in the spectrum being put to a valuable use quickly to the benefit of all in the UK. We further agree with Ofcom's determination that this spectrum will better serve the UK communications market through expansion of satellite services and that it should not be considered for mobile terrestrial use. Ofcom has correctly noted that mobile network operators should fully utilize the spectrum that is currently available or otherwise designated to become available.
Question 2: Do you agree with our proposal to extend access in the 14.25-14.5 GHz band for satellite connectivity, for future broadband, air, sea, energy and transport uses? Please provide evidence to support your comments.	*Is this response confidential? –N* SES fully supports Ofcom's plan to extend satellite user terminal access to the 14.25-14.5 GHz band. As Ofcom notes in Section 3 of its consultation, most of Europe has adopted a harmonised approach allowing FSS access to the full 14.0-14.5 GHz band. These countries have also generally allowed ESIM terminals to operate with both GSO and NGSO FSS systems in the full band. With the reduction and eventual exit of FS services from the 14.25-14.5 GHz band, FSS service providers could expand their offerings to UK citizens and businesses, particularly in the mobility market within the next year or two. The mobility market is benefiting from a staggering array of innovations, all of which require access to spectrum to fully implement. UK citizens and businesses can only access the full benefit of these innovations if service providers can use the full 500 MHz of 14 GHz spectrum that is already available across most of Europe and other parts of the world.

	For example, the maritime market is going through a digital revolution, which will encourage ship operators to move to cloud- based platforms to facilitate the exchange of information between ships and ports. Real-time sensor data gathered from onboard equipment and systems can be leveraged to create virtual models of vessels, allowing onshore engineers to do scenario planning, schedule maintenance more efficiently and identify potential safety concerns. Fuel optimisation systems combine data about engine performance with external information such as weather, to ensure the most efficient use of fuel. All of these technologies require reliable connection, which can only be achieved through access to a variety of spectrum bands, including the full 14 GHz. The average bandwidth consumed by an individual merchant ship is expected to more than triple from 3 Mbps in 2021 to 10 Mbps in 2031. Oil and Gas platforms are expected to see even greater increases in demand – expanding from 7 Mbps in 2021 to 38 Mbps in 2031. However, it is passenger vessels that are expected to have the highest throughput at 168 Mbps per ship by 2031.[1] The demand for satellite capacity is expected to continue growing due to digitalisation of ships, increased crew/passenger communication and normalisation of broadband like speeds out at sea. Consequently, global leased capacity is expected to increase 10 fold from 48 Gbps in 2021 to 542 Gbps by 2031. Such a huge demand for bandwidth can be met by Ku-, Ka- or higher frequency bands. Currently, Ku-band enjoys the largest share of total active VSAT terminals at 58%. It is the preferred band of choice today, as it strikes a good balance between high throughput and reliability.
Question 3: Do you agree with our proposed protection requirements for a) radio astronomy users of 14.47-14.5 GHz; b) remaining fixed link users (at specified frequencies and locations) and c) Crown users?	*Is this response confidential? – N* Generally, we agree with Ofcom's approach to its coexistence analysis as set out in Annex 6 of the consultation. It is appropriate to look at relevant ECC decisions and ITU-R recommendations to establish a baseline operational limit, but it is important to keep in mind that these are typically developed to cover a worst-case scenario with no or very little information on the deployment of links needing protection. When additional deployment information is known, limits can be refined for a more efficient use of the spectrum. Ofcom correctly considers the unique terrain and clutter that would impact services in the UK. By considering these specific parameters, Ofcom's analysis will produce a model that is closer to reality and therefore limit the potential for overly restricting satellite operations.

[1] Euroconsult Report, Prospects for Maritime Satellite Communications: Sector dynamics, analysis and forecasts addressing the Maritime Satcom market, Q1 2022, 10th Edition.

(a) Radio Astronomy

Having recognized the value of strictly defining the coexistence environment, Ofcom should allow FSS aeronautical service providers to use the 14.47-14.5 GHz band while protecting Radio Astronomy sites with existing technology.

Aeronautical transmissions and the potential for interference are managed through two main mechanisms: (1) software operating in the antenna system installed on the aircraft allows for satellite acquisition, self-monitoring, transmission muting and geofencing; (2) the Network Control and Monitoring Centre (NCMC) monitors and controls the aero terminal to ensure compliance with defined exclusion zones.

Rather than prohibit FSS aero services from using the 14.47-14.5 GHz band across the UK, Ofcom can provide the latitude, longitude and affected frequency for each Radio Astronomy location. With this information the NCMC can apply the aero terminal antenna pattern at different skew angles to ensure that power spectral density limits at the Radio Astronomy sites are not exceeded and do not cause interference.

Maritime and land-based ESIMs also should not be subject to the same frequency limits with respect to Radio Astronomy because they operate under a primary FSS allocation, so they should be allowed to coordinate with impacted Radio Astronomy stations that are operating on a secondary basis.

(b) Remaining Fixed Links

SES encourages Ofcom to apply the PFD mask adopted in EC report 271 for aeronautical services as the baseline to protect the locations where receiving Fixed Service stations are deployed. EC report 271 reflects more recent studies on the impact of both GSO and NGSO aero operations on fixed links, otherwise, Ofcom's current proposal may render aeronautical services impractical in the 14.25-

14.5 GHz band. With additional information such as location and pointing direction of the receiving terrestrial station, Ofcom can establish more refined limits thereby allowing more spectrum use by FSS operators without sacrificing interference protection for terrestrial operations. The PFD mask is developed to cover a worst-case alignment scenario where information of the pointing direction is not known, hence with this additional information, the PFD mask could be applied in certain directions and for other directions a more relaxed PFD limit can be developed which would result in a more efficient spectrum sharing environment.

With respect to maritime and land-based ESIMs, SES again supports Ofcom's incorporation of terrain and clutter in its coexistence analysis; however, Ofcom should make clear that the defined PFD limits apply only at the defined coordinates.

	These protection areas should also be time limited. As Ofcom notes, the on-going protection is intended to be temporary, but no time period is defined in the consultation. SES recommends that any fixed services that continue in the 14.25-14.5 GHz band should be transitioned out of the band no later than 31 December 2023. This will provide certainty to FSS service providers that they will have general access to the whole of the UK by a date certain. (c) Crown users: SES has no comment on Ofcom's proposal to protect the limited Crown use in the band.
Question 4: Do you agree with our proposed authorisation approach and draft licence conditions for a) ESN licences, and b) other licensees wishing to take advantage of enhanced satellite connectivity (i.e. aircraft, ships, unmanned aircraft systems).	*Is this response confidential? –N* As discussed above, SES encourages Ofcom to allow FSS aero terminals to operate in 14.47- 14.5 GHz band as long as they are capable of muting transmissions when they would cause interference to a Radio Astronomy site as defined by geographic coordinates identified by Ofcom. If Ofcom accepts this recommendation, license conditions 2.1(b) and the revision to 2.3(f) will need to be revised accordingly. Similarly, condition 2.5(k) should be revised to reflect the primary allocation of fixed and maritime operations relative to Radio Astronomy as discussed above.
Question 5: Do you have any other comments on our proposals?	*Is this response confidential? – Y / N (delete as appropriate)*

Please complete this form in full and return to 14ghz@ofcom.org.uk.