Your response

Question	Your response
Question 1: Do you agree with our analysis of the case for regulatory intervention and our proposal to license satellite gateways to access 28 GHz spectrum in portions of the band not currently available for satellite gateways? If not, please provide reasons/evidence for your response.	Confidential? – N Amazon applauds Ofcom for its decision to allow satellite gateway use, on a nationwide basis, in the returned 28 GHz spectrum and the four 28 MHz guard bands as described in Sections 3.17 to 3.20 of the Consultation. Amazon also welcomes Ofcom's proposal to make spectrum in the 27.5-30 GHz band ("**28 GHz band**") held by existing spectrum access licensees ("**Spectrum Access Licensees**") available under the existing Satellite (NGSO Earth Station) licence. Ofcom's proposal would increase available spectrum required for satellite services in what is a core band for satellite uplink communications (Earth-to-space), thus simplifying and reducing the administrative burdens of accessing such spectrum.
Question 2: If we decide to proceed with this proposal to license satellite gateways to access 28 GHz spectrum in portions of the band not currently available for satellite gateways, do you agree with our proposal not to adjust Spectrum Access licence fees to reflect locations where we authorise future satellite gateways? If not, please provide reasons/evidence for your response.	Confidential? – N Consistent with our earlier filings on Ofcom's proposals for spectrum pricing in the 28 GHz band, Amazon supports Ofcom's current proposal to maintain a cost-based methodology for NGSO systems. Administrative cost-based fees are appropriate for spectrum access for satellite systems, as this spectrum is shared between different GSO and NGSO stations.
Question 3: Do you have any further views / comments on our proposal to license satellite gateways to access 28 GHz spectrum in portions of the band not currently available for satellite gateways?	Confidential? – N Amazon supports Ofcom's proposal to expand the spectrum available in the 28 GHz band for satellite gateway use. As Ofcom notes in the Consultation, there is growing demand for access to satellite spectrum to serve new customers with new services. NGSO constellations—such as Amazon's Kuiper System—are driving innovation and increased demand in the growing space economy. Consistent with the goals of Ofcom's 2022 *Space Spectrum Strategy*, Amazon respectfully urges Ofcom to continue to consider ways to expand access for satellite systems to other parts of the 28 GHz band where it is feasible to do so. To promote innovation and the intensive use of spectrum in the 28 GHz band, Amazon also urges Ofcom to

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	take measures to ensure that incumbent licensees do not use the licensing process to block the deployment of new services in this band. In particular, Ofcom could promote fairness and certainty in the licensing process by providing additional guidance on how it will assess whether existing or planned deployments will be "materially affected" by NGSO gateway use at new sites. *See* Consultation at Section 4.32(a)(ii)-(iv). Clear and balanced rules here will not only guide prospective license applicants in selecting gateway sites, but will also make the licensing process itself more transparent and efficient.
Question 4: Have we correctly identified the possible uses of the returned spectrum? If not, what other potential uses should we consider?	Confidential? – N Yes. Amazon agrees that Ofcom has correctly identified the possible uses of the returned spectrum in the 28 GHz band. Aligning with other regulators in the region on the growing demand for access to the 28 GHz band by NGSO systems is consistent with Ofcom's goal of spectrum efficiency.
Question 5: As a satellite operator, are you currently constrained by the amount of spectrum available in the 28 GHz uplink and 18 GHz downlink to provide your planned and or existing satellite services to UK consumers and citizens? If so, please explain what constraints exist in each band.	Confidential? – N Amazon's Kuiper System has a flexible payload design, and, with the exception of 18.6-18.8 GHz, will use most of the 17.7-20.2 GHz frequency band for customer terminal downlink communications (space-to-Earth) and much of the 28.35-30 GHz frequency band for customer terminal uplink communications (Earth-to-space). As a Ka-band system, Amazon's Kuiper System gateway station will also use the 27.5-30 GHz frequency band for uplink communications (Earth-to-space) and the 17.7-20.2 GHz frequency band, again with the exception of 18.6-18.8 GHz, for downlink communications (space-to-Earth). The spectrum available in these bands for NGSO FSS use in the UK is more limited than in other jurisdictions, which limits Amazon's capacity to serve customers in the UK. Spectrum constraints exist in both the 28 GHz and 18 GHz bands. For example, Section 5.35 of the Consultation correctly recognizes both the spectrum limitations in the UK and the effects of those limitations on UK customers in noting that "there is an additional 112 MHz of spectrum available for satellite terminals at 28.8365 –

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	28.9485 GHz in CEPT countries that is not currently available in the UK; band plan harmonisation could deliver benefits for the price and availability of satellite services in the UK." Amazon agrees with these findings, and urges Ofcom both to (i) expand spectrum available for NGSO FSS use, and (ii) seek to harmonize spectrum allocations in the UK with other jurisdictions in the region to maximize the utility of its spectrum resources in delivering affordable, high-quality service to customers in the UK. Expanded access to spectrum for satellite ground terminals in the 28 GHz and 18 GHz bands can be critical for satellite systems, even where the spectrum is shared with fixed service (FS) stations. Though coexistence with FS stations may constrain satellite operations, constraints in other frequency bands make spectrum in the 28 GHz band a comparatively attractive option for satellite ground terminal deployment even where shared with FS stations. Further, given the global nature of satellite services, favourable rules in the 28 GHz band globally may incentivize satellite operators to seek access to this band despite country-specific limitations on its use.
Question 6: Do you agree with our initial view that alternative use of the returned spectrum would be an allocation decision for either point-to-point fixed links or land-based satellite terminal use because it is unlikely both services can share and auctioning the spectrum is unlikely to secure optimal use? If not, please provide evidence to support your response.	Confidential? – N Amazon agrees with Ofcom's initial view and reasoning that an auction would not be a suitable approach to awarding licenses for spectrum use in the 28 GHz band. As Ofcom notes in the Consultation, auctions are ill suited to licensing spectrum in the satellite context, where satellite operators are capable of sharing spectrum and typically require access to entire spectrum bands. As Ofcom notes, an auction-based approach could block entry from new operators by limiting the number of operators with access to a band, despite the fact that operators can share spectrum in the 28 GHz band through well-established coordination mechanisms. *See* Consultation at Section 5.11. Whether to coordinate spectrum use among satellite terminals and point-to-point FS links, or to allocate spectrum exclusively to either of these two services, is a more difficult question. In general, Amazon agrees with Ofcom's assessment in the Consultation that the potential for ubiquitous point-to-point FS links and satellite terminals presents challenges in spectrum sharing. On

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	the other hand, coexistence between these services is possible through good faith frequency coordination. Technological innovation has also made sharing between services increasingly feasible: for example, new transceiver designs allow point-to-point FS links to tune to adjacent frequencies to resolve potential interference cases from transmitting satellite earth stations into FS stations. To account for the possibility of sharing between these services and to allow for the greatest use of valuable spectrum in the 28 GHz band, Amazon respectfully suggests that Ofcom consider allocating spectrum in the 28 GHz band for either point-to-point FS links or land-based satellite terminal use on a *primary* basis, but nevertheless allow operations of either service throughout the available bands on a *secondary* basis. This approach would ensure spectrum availability for both services, while encouraging frequency coordination and technological innovation to enable more intensive and efficient use of spectrum. This approach would also promote the growth in satellite terminal deployment globally and in the UK, while at the same time advancing Ofcom's preferred approach to facilitate spectrum sharing when possible. Should Ofcom adopt such a framework, Amazon respectfully urges it to allocate the entire 2 x 224 MHz of spectrum for satellite land-based terminals on a primary basis, as explained more fully below.
Question 7: Do you agree with our initial view to make 112 MHz at 28.8365 – 28.9485 GHz available for land-based satellite terminal use, 2 x 112 MHz for point-to-point fixed links at 27.9405 – 28.0525 GHz and 28.9485 – 29.0605 GHz and defer allocating the remaining 112 MHz of spectrum? If not, what alternative suggestions do you have?	Confidential? – N Amazon respectfully disagrees with Ofcom's initial view on this question. In the Consultation, Ofcom rightly observes that evidence of future demand for FS links in the 28 GHz band is mixed, while demand for FSS links has seen tremendous growth. *See, e.g.,* Consultation at Sections 2.17, 5.10. Further, as the Consultation and Statement recognise, providing additional access to spectrum in the 28 GHz band to enable further growth in the space sector is a key pillar of Ofcom's Space Spectrum Strategy. *See* Consultation at Section 2.17. By providing twice as much spectrum to point-to-point FS links as to land-based satellite terminal use, and leaving fallow one quarter of the available spectrum for future use, Ofcom's proposal seems at odds with both the Space Spectrum

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	Strategy and the findings and statements in this Consultation. Amazon instead supports Option 4, which would allocate the entirety of the spectrum in the 28 GHz band for satellite user terminals. This option would best meet the spectrum demands of the growing satellite industry and create the necessary flexibility between satellite gateway stations and customer terminals for Ka-band satellite systems to offer service to customers in the UK. Further, consistent with the discussion above, Ofcom could ensure broad and continued spectrum access in the 28 GHz band for FS point-to-point links by permitting use on a secondary basis. Through frequency coordination between services, this approach would allow point-to-point FS links to opportunistically access the full 2x224 MHz of FDD paired spectrum, advancing Ofcom's shared spectrum goals and putting the frequencies in the 28 GHz band to more intense use. Alternatively, Ofcom could consider an approach that combines features of Options 3 and 4. Under this approach, Ofcom might instead allocate the upper 224 MHz of spectrum to satellite terminals and the lower 224 MHz of spectrum to FS links. Notably, this approach would capture the value of harmonization with CEPT countries: as Ofcom notes, "there is an additional 112 MHz of spectrum available for satellite terminals at 28.8365 – 28.9485 GHz in CEPT countries that is not currently available in the UK." *See* Section 5.35; *see also* ECC/DEC(05)01. Amazon acknowledges that this approach would create an unpaired configuration for FS links which, at present, may not have wide utility. One solution to this issue may again be secondary access for FS point-to-point links in the upper 224 MHz of spectrum. The best solution to this difficulty, however, may be to adopt Amazon's suggested approach, which is to adopt Option 4 while providing FS point-to-point links with secondary access to the full 2x224 MHz for FDD links.
Question 8: Do you agree with our assessment of how the returned spectrum may be authorised for fixed links	Confidential? – N Yes.

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and GSO and NGSO land-based satellite terminals? If not, please provide evidence to support your response.	
Question 9: Do you have a view on demand for point-to-point fixed links in Northern Ireland and London in the frequency range 28.1925 – 28.3045 GHz paired with 29.2005 – 29.3125 GHz and our proposed approach that, if we were to decide to make this spectrum available for fixed links, would be to authorise this as Ofcom managed spectrum licensed on a first come first served basis?	Confidential? – N. No.
Question 10: Do you have further views / comments that you wish to make in respect of this consultation?	Confidential? – N Amazon applauds Ofcom's work in promoting growth and innovation in the communication sector by expanding spectrum access in the 28 GHz band for satellite services. While outside the scope of the present Consultation, *see* Section 3.28, Amazon agrees with commenters emphasizing the need for expanded spectrum access for Earth stations in motion (ESIM), which will promote innovation and meet growing demand for new land, aviation, and maritime uses. Amazon respectfully urges Ofcom to move swiftly in commencing a further consultation on these important issues.

Please complete this form in full and return to 28ghz@ofcom.org.uk.