Question	Your response
Question 1: Do you agree with our assessment of the business models that could potentially emerge?	Confidential? – No. In para 2.10, the Consultation document suggests that "*D2D services in mobile bands will be likely to use constellations of satellites in Low Earth Orbit (LEO), rather than single satellite in Geostationary (GEO) orbits*", and adds in para 2.11 that "[*b*]*y operating at low altitude these satellites can deliver a stronger, more reliable mobile signal on the ground, and coverage and capacity of the network can be increased over time by adding more satellites*". But this would not necessarily be the case. To the contrary, the quality of the D2D signal will depend on many factors and will not be categorically better under either a LEO or GEO architecture. Moreover, in many cases it will be possible to provide requisite signal strength and quality under both types of architecture. At the same, both types of architectures have their own peculiarities and offer different trade-offs that defy any categorical conclusion that either architecture will be a better fit for every application or customer. Viasat also notes that it cannot be assumed that increasing the number of satellites in a non-geostationary ("NGSO") system will, in and of itself, improve coverage or capacity. Indeed, other characteristics of NGSO system design limit coverage and capacity, including the number of gateway stations, the capabilities of earth stations, the ability to effectively reuse spectrum, and the need to avoid interference into co-frequency and adjacent operations (to name a few). As Ofcom recognizes in para 2.11 of the Consultation document "*low earth orbit constellations can create a more complex radio environment and must*

Question	Your response
	be carefully managed to avoid interference to other spectrum users." In short, it would be a mistake to assume that increasing the number of NGSO satellites will necessarily increase capacity—particularly when such increases would exacerbate issues arising from the overconsumption of frequency and orbital resources by NGSO operations.
Question 1(a): Are there any other business models that you think could deliver benefits for people and businesses in the UK?	Confidential? – No Viasat urges Ofcom to recognize that, in many cases, different entities operate the space segment and ground segment elements that support the provision of service to end users. Thus, one entity may operate a satellite network or system authorized by a country other than the UK, and another entity may seek authority to provide services using capacity over that network or system in the UK. Ofcom should take this into account in designing and implementing an authorization approach.
Question 1(b): Are there any business models that could not operate under our proposed approaches?	Confidential? – Y / N
Question 2: Do you agree with our assessment of the benefits that could be realised through authorisation of D2D services?	Confidential? – No. Viasat agrees that D2D services generally have the potential to provide significant benefits to the UK and its citizens. However, these benefits may be limited where such services are provided in terrestrial IMT spectrum, including because such spectrum may not be able to effectively support D2D connectivity in many areas/use cases without adversely impacting co-frequency and adjacent services (and, by extension, the public). In contrast, D2D services can be supported within existing MSS allocations without giving rise to such interference risks. For example, Viasat is using L-band spectrum allocated for MSS to support the provision of satellite SOS services for Google Pixel 9 devices (3GPP Rel.17 Band 255), and SOS, tracking, and messaging on other Release 17 smartphones and consumer devices.

Question	Your response
Question 2(a): Are there any other benefits for UK citizens and businesses that could be realised?	Confidential? – Y / N
Question 3: Do you have comments on how emerging D2D technology should support 999 service provision?	Confidential? – No. Viasat supports Ofcom's efforts to ensure that the introduction of D2D services in IMT spectrum supports, and does not undermine, the availability and provision of 999 service (e.g., by avoiding interference that could compromise such availability for terrestrial IMT networks).
Question 4: Are there any mobile spectrum bands not in scope of our proposals that you think we should consider?	Confidential? – No. No. To the contrary, Viasat believes the scope of mobile spectrum bands discussed in the Consultation document is overinclusive. Taking a step back, Viasat agrees with Ofcom that before any IMT band is made available for D2D authorization, Ofcom should understand the nature of the interference risks proposed by introduction of D2D and take appropriate steps to mitigate those risks. Among other things, it is important for Ofcom to understand potential interference impacts on terrestrial IMT and adjacent-band MSS services that could arise from the provision of D2D services in terrestrial IMT spectrum. At a minimum, coexistence studies are needed to better understand the potential impacts of D2D operations on MSS operations in L- and S-bands. Along with, Ofcom should adopt appropriate licensing conditions to ensure that D2D services provided in IMT spectrum do not cause interference into terrestrial IMT and adjacent-band MSS services or undermine the ability of terrestrial and satellite operators to develop and deploy innovative service offerings. These conditions should safeguard domestic operations, as well as those in neighbouring countries. Ofcom should also perform appropriate technical analysis to ensure that it fully understands the risks posed by systems seeking access to the UK market, including to provide D2D services in IMT spectrum, and can mitigate those risks (if that is possible) as a condition of authorization. In this regard, Viasat notes that such satellite networks/systems are likely to be notified by their home

Question	Your response
	administrations under International Telecommunication Union ("ITU") Radio Regulations ("RR") No. 4.4. 1. Viasat invites Ofcom monitor notifications under ITU RR No. 4.4 to understand the interference risks posed by networks/systems that claim the right to operate under this provision. Where such networks/systems could pose such risk to UK national satellite filings or frequency assignments recorded in the Master International Frequency Register ("MIFR"), including those which are intended to support provisioning of MSS services in the bands adjacent or close to the terrestrial IMT bands planned for D2D services, Ofcom should enter appropriate objections and, at a minimum, deny market access for such services. 2. Should Ofcom consider notifying a satellite network/system under ITU RR No. 4.4 to the Radiocommunication Bureau, it should itself conduct technical analysis to ensure that such satellite network/system would not pose an interference risk to other services operating in the same and adjacent bands before allowing such a satellite network/system to operate under ITU RR No. 4.4. 3. Market access authorizations should be withheld or conditioned without approval until there is a complete interference analysis and review of that analysis from potentially impacted operators.
Question 5: Does deployment in supplementary downlink spectrum (SDL) present any challenges in comparison to other bands? Is there interest in deploying in this spectrum?	Confidential? – No The use of SDL spectrum would present additional challenges in comparison to other bands. For this reason, Viasat suggests that Ofcom postpone consideration of 1452-1492 MHz ("1.4 GHz") SDL band until relevant technical studies, including coexistence studies are performed in the ITU. Notably: 1. SDL technical assumptions were based on specific deployment assumptions and these should be reviewed, i.e. SDL is only valid for LTE (4G) and no 5G beam forming antenna were used. Therefore, there is a need to study IMT systems with 5G characteristics. 2. The need for uplink spectrum in addition to 1.4 GHz downlink spectrum eliminates SDL concept as such. There is a need to study alternative duplex mode.

Question	Your response
	• Using the 1.4 GHz as a downlink would require utilizing another MS band as uplink eliminating SDL and turning it to FDD band. • Using 1.4 GHz in TDD requires further additional careful studies in ITU.
Question 6: Do you agree with our proposal to limit this authorisation to the UK mainland and territorial waters? If not, please explain why.	Confidential? – No Yes, Viasat supports Ofcom's proposal to limit D2D authorizations in terrestrial IMT spectrum to the UK mainland and territorial waters.
Question 7: Do you agree that our proposed technical conditions for D2D satellite emissions will protect mobile services delivered by other operators in adjacent areas and in adjacent spectrum?	Confidential? – Y / N
Question 8: Do you agree with out high-level co-existence assessment for other services in adjacent spectrum to D2D?	Confidential? – Y / N Viasat respectfully disagrees with Ofcom's high-level coexistence assessment for the 1400 MHz (1452-1492 MHz) and 2100 MHz (1920-1979.7 MHz and 2110.3-2169.7 MHz) frequency bands (see, conclusion in para A4.20 of the Consultation document). This assessment materially understates the risks posed by potential D2D operations in those bands. As Viasat has explained, detailed interference and coexistence studies (among other types of technical analysis) are needed *before* Ofcom can fully understand the risks posed by D2D operations—including to existing MSS services in the L band (above 1518 MHz) and S band (1980-1995 MHz and 2170-2185 MHz). These studies have not been completed to date. Indeed, to ensure protection of MSS services it is necessary to apply a single entry I/N protection criterion of minus 12.2 dB (see ITU-R Recommendations M.1183, M.1234), which must be met at least 99.9% of the time (see ITU-R Recommendations M.1037, M.1476 and

Question	Your response
	International Maritime Organization Resolution A.1001(25)). Additional information and studies are also needed to ensure that aggregate out-of-band emissions of IMT user equipment uplinking to D2D satellites in terrestrial IMT band protect services in adjacent bands. Viasat notes that many of the coexistence issues related to the use of D2D over terrestrial IMT MS spectrum are being addressed in the preparatory work for the WRC-27 under Agenda Item 1.13 ("AI 1.13")[1] and Ofcom is recommended to proceed with national authorization after the Conference has concluded on appropriate technical and regulatory conditions avoiding creating a framework which will not be stable and hinder investment in innovative technologies.
Question 9: Are there other services co-channel or in adjacent spectrum that you think we should take into account when assessing coexistence? If so, please provide evidence of the nature of interference and what level of protection you consider is necessary.	Confidential? – Y / N See Answer on Question 8.
Question 10: Do you agree with our preferred authorisation approach (option 2)? If not, please set out your reasoning.	Confidential? – No Viasat urges Ofcom, when deciding on the most appropriate authorization approach for D2D service over terrestrial IMT bands, to ensure protection of current use of MSS services and their ability to innovate in L-band above 1518 MHz and S-band (1980-1995 MHz and 2170-2185 MHz) if authorizing such D2D service over terrestrial IMT bands in the bands adjacent or close to these MSS bands.
Question 11: Are there any alternative authorisation options, not discussed here,	Confidential? – Y / N

[1] See ***Resolution 253 (WRC-23)*** *"Studies on possible new allocations to the mobile-satellite service for direct connectivity between space stations and International Mobile Telecommunications (IMT) user equipment to complement terrestrial IMT network coverage",* here https://www.itu.int/dms_pub/itu-r/oth/0c/0a/R0C0A0000100013PDFE.pdf.

Question	Your response
that you believe are worth considering?	
Question 12: Do you agree with the proposed conditions?	Confidential? – No Viasat supports the idea expressed in the para 6.18 of the Consultation document that once Ofcom identifies which terrestrial IMT bands are most promising for provisioning D2D services, it might need to impose additional technical conditions to protect other spectrum users after performing additional technical studies. As mentioned above, Viasat supports the need for further technical studies, including coexistence assessment, to protect including MSS L-band above 1518 MHz and S-band (1980-1995 MHz and 2170-2185 MHz), if Ofcom decides to authorise D2D service over adjacent terrestrial IMT bands. Therefore, Viasat recommends that Ofcom proceed with national authorization after WRC-27 has concluded on appropriate technical and regulatory conditions under AI 1.13, avoiding creating a framework which will not be stable and hinder investment in innovative technologies.
Question 13: Do you have any other comments on the proposals set out in this document?	Confidential? – No Viasat recommends Ofcom continuing consideration of other important issues and risks associated with implementation of D2D services in terrestrial IMT spectrum, such as, for example, competition aspects and coexistence between two satellite systems/networks operating under ITU RR No. 4.4.

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