Your response

Question	Your response
Question 1: What is the market opportunity for D2D services? What is the nature of the benefits that could be delivered to people and business in the UK and what do you estimate the magnitude of the benefits to be?	Confidential? – N Direct-to-Device ("D2D") services have the potential to facilitate innovation and improve connectivity, even in the most remote parts of the UK, in line with Ofcom's Plan of Work for 2024/25. D2D services supported by innovative partnerships between satellite and Mobile Network Operators ("MNOs"), in addition to D2D services using MSS spectrum, present a secure communication option for government, defence, and emergency response use cases. D2D also presents an opportunity for Ofcom to create a flexible, pro-competitive, and resilient regulatory framework that allows space-based services to innovate beyond what is currently possible while ensuring that harmful interference does not hinder incumbent services.
Question 2: Are there any wider citizen or societal benefits that D2D services could deliver that the market might not deliver? What is the nature of these benefits and why might the market fail to deliver them? For example, what role could D2D have in improving the availability of 999 services in the UK?	Confidential? – N Yes. D2D can be especially valuable in emergency situations occurring outside of the coverage areas of terrestrial systems or following natural or man-made disasters that compromise terrestrial networks. D2D not only enables customers to contact emergency services, but also emergency response services to communicate with each other, push critical alerts and post-disaster information to customers, and locate customers in need of assistance. Thus, the availability of D2D services can improve safety and emergency response services (and, consequently, quality of life) for users throughout the UK, including in the hardest to reach areas. The expanded coverage enabled by D2D services can also broaden access to more rural locations for tourism, business, and government use, providing wider economic benefits.

Question 3: Subject to suitable regulatory frameworks being in place, do you have an interest in offering D2D services or expanding an existing service, in the UK? Which customer segments, devices and use cases would be served? Would your D2D service complement or compete with services delivered over existing mobile?	Confidential? – N Amazon is exploring options for D2D services and is seeking to develop the most versatile technical solutions for D2D offerings. Certainly, the value proposition is for D2D services to complement the use case of existing terrestrial mobile wireless service because D2D offers service beyond the reach of existing terrestrial mobile networks.
If you have considered launching or expanding a D2D service in the UK:	Confidential? – N See response to Question 3, above.

Question	Your response
Question 4: What technology and network architecture do you consider appropriate to use to deliver D2D services? For example, what altitude and how many HAPS, LAPS or satellites would be required to deliver an initial service? **We're aware that different technologies and network architectures will have different costs, performance, and spectrum efficiency trade-offs.**	
Question 5: What capacity (e.g., Mbps/Km$_2$/MHz) and quality of service (e.g., latency) could be delivered with the D2D service you are proposing? What percentage of the UK landmass could be covered, and would coverage be provided indoors?	Confidential? – N See response to Question 3, above.

Question 6: To inform our future policy development, which spectrum band would you like to deploy the service in? How much bandwidth would be required to provide the service at launch?	Confidential? – N To inform Ofcom's future policy developments, Amazon respectfully urges Ofcom to look beyond limiting D2D operations to specific spectrum bands and instead permit, via a footnote to the UK Frequency Allocation Table ("UKFAT"), D2D operations in all spectrum bands allocated for terrestrial mobile wireless services and all geographic areas where applicants can demonstrate compliance with applicable terrestrial service rules and protection requirements. As Ofcom recognises in the *Call for input*, new technologies are enabling space-based mobile connectivity solutions, and various satellite operators are announcing plans to offer D2D services. Given the promise of this new model of connectivity, and the rate of its change and growth, Ofcom should fashion rules for D2D services that can accommodate change and innovation as satellite and terrestrial operators develop new and better models for providing D2D services. Amazon, therefore, urges Ofcom to adopt broad and flexible rules, rather than rules that limit eligibility. Amazon also encourages Ofcom to consider future rules that promote a flexible, pro-competitive, and resilient framework for D2D services that allows spacebased services to innovate while ensuring that harmful interference does not hinder incumbent services.

Question	Your response
	As noted in Section 5.19 of the *Call for input*, the Federal Communications Commission ("FCC") adopted a framework for regulating D2D services in the United States that permits a satellite operator to provide a D2D service if it has leased spectrum from the incumbent terrestrial MNO, among other methods. While Amazon commends the FCC for looking forward to enabling operations in D2D services, were Ofcom to proceed in a broader and more sustainable manner, it could avoid an unnecessary and multi-year hurdle for the next generation of D2D services seeking access in new ways and in different frequency bands. Amazon, therefore, urges Ofcom to encourage competition and innovation by broadly enabling D2D services across all frequencies allocated for terrestrial mobile services and all geographic areas, so long as applicants can demonstrate compatibility with existing terrestrial licensees. Doing so will ensure that sufficient spectrum is made available to accommodate the expected large numbers of end-user devices, and thus meet the growing demand for D2D service.

Question	Your response
Question 7: What take-up profile do you assume in your planning? For example, the number of active devices, monthly calls made, and data transferred per device. What is the roadmap for enhancing your network to meet anticipated future growth? What additional infrastructure and/or spectrum would be required? When?	Confidential? – N See response to Question 3, above.
Question 8: What are the use cases and the benefits these services would deliver? What technology, network infrastructure and frequencies would be required to deliver the service? What are the advantages of using this MSS spectrum compared to other bands?	Confidential? – N Given the nascency of D2D services, Ofcom should embrace an approach of regulatory flexibility that can accommodate the evolving technology, ongoing licensing, and future secondary networks that will evolve to comprise a robust D2D ecosystem. To that end, enabling D2D services in all frequency bands allocated for terrestrial mobile wireless services, so long as licensees meet fundamental technical guardrails to protect incumbent terrestrial services, will balance regulatory flexibility and certainty for all stakeholders— even if the spectrum bands suitable for D2D services change over time. As Ofcom notes, MSS spectrum can already be utilized to provide new D2D services. However, additional spectrum bands should also be made available for D2D applications to avoid delaying or limiting critical expanded coverage.

Question	Your response
Question 9: What current, or future, technology developments will offer the opportunity for more efficient use of MSS spectrum? E.g., more spectrally efficient, or greater ability to share spectrum.	Confidential? – N D2D operations could utilize frequency-division duplexing ("FDD") or time-division duplexing ("TDD") to make more efficient use of MSS spectrum. However, as discussed above, a broader approach to making spectrum available for D2D services would foster technological innovation and development into the future. ("FDD")("FDD) Allowing D2D services in any frequency band allocated to terrestrial mobile wireless service would provide maximum compatibility between D2D and terrestrial operations. Importantly, as regulators around the globe permit D2D operations, it would also provide satellite operators greater flexibility to scale their D2D operations internationally.

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Question 10: Could your existing, or proposed, service coexist with other users of the same frequencies within the MSS spectrum bands? If so, how is coexistence achieved? If not, please explain why sharing is not possible.	Confidential? – N See response to Question 3, above. Amazon's D2D offerings are in development. Certainly, spectrum compatibility with existing incumbent operators in frequency bands allocated to the MSS, as well as with terrestrial operators in frequency bands allocated to the MS, is paramount in our design.
Question 11; Do you expect D2D services to be available prior to WRC-27? What services and benefits do you think an authorisation prior to WRC-27 might bring to UK consumers and businesses?	Confidential? – N Amazon respectfully urges Ofcom to base new rules for D2D services on the outcome of WRC-27. Any services introduced prior to the next WRC are likely to be limited bandwidth services for messaging. While these services are an important milestone, we expect any D2D service offering 5G experience are likely to come after the Conference.
Question 12: Are there any mobile bands that should be prioritised for satellite based D2D?	Confidential? – N As stated above, Ofcom should not limit D2D services to specific frequency bands. Because Ofcom could establish entry criteria that create appropriate safeguards, Ofcom should consider allowing D2D services in all spectrum bands allocated to terrestrial mobile wireless service and in all geographic areas where D2D applicants can demonstrate compliance with existing terrestrial service rules and protection requirements. In Section 3.15-3.17, the *Call for input* discusses several satellite operators that have demonstrated capabilities and/or announced D2D service plans in the UK. But as the *Call for input* notes in Section 1.6, "technological developments and new standards have the potential to enable greater use of D2D services

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going forward." Limiting the D2D framework to a handful of frequency bands pursued by a handful of existing operators, risks stifling technological innovation and delaying availability of D2D services to consumers in these early days of development.

Instead, Amazon urges Ofcom to consider adding a footnote to the UKFAT authorizing D2D operations in all spectrum bands allocated for terrestrial mobile wireless services and in all geographic areas where applicants can demonstrate compliance with existing terrestrial service rules and protection requirements. Doing so would promote Ofcom's vision of "enable[ing] wireless services in the wider economy and support[ing] investment and innovation in secure, strong networks."

Question 13: Are there existing systems that you consider could be subject to an increased risk of harmful interference from the introduction of satellite based D2D using mobile bands? If yes, are there specific mobile bands that you consider should be avoided to reduce this risk?	Confidential? – N As discussed above, rather than limiting the frequency bands eligible for D2D services, Ofcom should protect incumbent services from harmful interference by requiring D2D applicants to demonstrate compliance with existing terrestrial service rules and protection requirements of D2D services.
Question 14: Do you have any views on how spectrum for D2D services should be authorised? Does this vary by band, or type of NTN? Please explain the reasoning behind your preference.	Confidential? – N Amazon urges Ofcom to consider D2D operations in all spectrum bands authorized for terrestrial mobile wireless services and in all geographic areas. To facilitate that approach, Amazon supports rules forD2D services that prevent harmful interference to services in spectrum bands and in geographic areas adjacent to those in which D2D service has been, or will be, deployed. Applicants should be required to submit a showing that they will comply with existing protection requirements. However, the means via which protection is achieved may vary. Ofcom should be open to various methods of mitigating and preventing harmful interference, including allowing satellite operators to partner with multiple terrestrial licensees that, when considered together, act as a geographic area-exclusive licensee. Alternatively, applicants themselves could propose innovative solutions for managing harmful interference. By adopting a flexible approach, Ofcom could promote innovation while protecting incumbents. Any specific concerns regarding co-channel or out-of-band interference into adjacent areas could be addressed on a case-bycase basis through the licensing process.

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Question 15: Are there any other points that you think would be useful in our considerations? In providing your response, please provide as much evidence as possible.	Confidential? – N Amazon notes that the design and development phase of NGSO systems can occur years in advance of deployment and is highly dependent on all flexible-use spectrum. To the extent that Ofcom concludes that it should issue D2D rules prior to WRC-27, Amazon respectfully urges Ofcom to consider broad and flexible rules, rather than rules that limit eligibility.

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