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 The market opportunity for satellite Direct-to-Device (D2D) services in the UK is significant and poised for growth. As technological advancements converge with increasing consumer demand, the need for improved connectivity becomes more pronounced. This market is particularly compelling in the UK, where a combination of geographic and infrastructural factors create unique challenges and opportunities. One of the primary drivers of this opportunity is the need for enhanced connectivity in remote and rural areas. The UK has vast rural regions where terrestrial infrastructure is either insufficient or entirely lacking. Satellite D2D services can play a crucial role in bridging this gap, offering reliable and consistent connectivity to these underserved areas. This is essential not only for ensuring that all citizens have access to digital services but also for fostering economic growth and development in these regions. Additionally, satellite D2D services offer resilience and redundancy that are increasingly important in today's digital world. Businesses and individuals alike depend on uninterrupted connectivity, and satellite D2D can provide a reliable backup when terrestrial networks fail, whether due to natural disasters, infrastructure problems, or cyberattacks. This added layer of security and continuity is invaluable in a world where connectivity is critical to daily life and business operations. The growing demand for Internet of Things (IoT) applications further enhances the market potential for satellite D2D services. As IoT devices become more widespread across various sectors—including agriculture, logistics, and smart cities—the need for ubiquitous and reliable connectivity grows. Satellite D2D services are uniquely positioned to meet this demand, particularly in areas where traditional networks are unavailable or insufficient, ensuring that IoT devices can operate seamlessly across the country. The benefits of satellite D2D services extend to both individuals and businesses in the UK. For individuals, these services offer enhanced digital inclusion by providing reliable internet access in remote areas, thereby reducing the digital divide. This access to es-

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	sential digital services, such as education, healthcare, and government services, can significantly improve the quality of life for people living in rural regions.
	For businesses, particularly those with critical operations, satellite D2D services provide a reliable communication channel that ensures business continuity even during network disruptions. This not only mitigates risks but also enhances cybersecurity by offering a secure alternative to terrestrial networks. Moreover, the improved connectivity enabled by satellite D2D services can stimulate economic activity in rural areas, facilitating remote work, e-commerce, and access to global markets. This, in turn, can lead to job creation, business growth, and overall economic development in these regions.
	By connecting millions of people in rural and remote areas, these services have the potential to significantly reduce the digital divide, thereby enhancing the quality of life for many. The economic impact could also be profound, with improved connectivity in rural areas potentially adding billions to the UK's GDP over the next decade.
	For businesses, the ability to maintain operations during network disruptions could result in significant cost savings and risk mitigation, potentially saving millions in downtime and lost revenue. Furthermore, by supporting the deployment and operation of emerging technologies like autonomous vehicles, and advanced IoT applications, satellite D2D services could position the UK as a leader in innovation, attracting investment and fostering a competitive edge in the global market.
	These services could play a transformative role in the UK's digital future.
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 Satellite D2D services offer a range of wider citizen and societal benefits that extend beyond the market-driven outcomes. While the market is likely to focus on commercial opportunities, there are critical public goods that could be significantly enhanced by these services, yet may not be fully delivered through market mechanisms alone. One of the most crucial societal benefits is the improvement in the availability and reliability of emergency services, particularly the 999 service in the UK. In emergency situations, timely communication is paramount. However, in many rural and remote areas, ter-

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	restrial networks are either unreliable or non-existent, posing significant risks to public safety. Satellite D2D services could provide a vital communication link in these areas, ensuring that individuals can always reach emergency services, regardless of their location. This enhanced accessibility could be life-saving, particularly in regions where traditional infrastructure is weak or fails due to natural disasters or other crises.
	Another significant societal benefit of satellite D2D services is the potential for enhanced disaster response and management. During natural disasters, terrestrial communication networks are often the first to fail, leaving affected communities isolated and unable to coordinate relief efforts effectively. Satellite D2D services, by their very nature, are less vulnerable to such disruptions and can provide critical communication links during emergencies. This capability can be invaluable in coordinating rescue operations, disseminating information to the public, and managing resources efficiently in disaster-stricken areas.
	Additionally, satellite D2D services have the potential to contribute to national security and public safety by providing a secure and independent communication network that is less susceptible to cyberattacks or physical sabotage. In a world where cyber threats are increasingly sophisticated, having a diversified and resilient communication infrastructure is critical to national security. Satellite D2D services can offer an alternative communication pathway that enhances the robustness of the UK's overall communication network.
	Moreover, satellite D2D services can play a crucial role in enhancing digital inclusion and ensuring that all citizens, regardless of their location, have access to essential services such as education, healthcare, and public administration. In rural and remote areas, where traditional broadband infrastructure may be prohibitively expensive to deploy, satellite D2D services could provide a viable alternative for delivering these critical services.
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	{✂}

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your D2D service complement or compete with services delivered over existing mobile?	
If you have considered launching or expanding a D2D service in the UK: **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?	{✂}
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?	{✂}
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 an-	

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ticipated future growth? What additional infrastructure and/or spectrum would be required? When?	
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?	{✂}
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 In your document, it is rightly pointed out that historically, the Mobile Satellite Services (MSS) spectrum has been divided among various operators to prevent interference between different systems. This is particularly important because terminals in these systems often employ low-power, omni-directional antennas, which are more susceptible to interference if not properly managed. While it may be feasible for narrowband systems to share the same spectrum if specific criteria—such as those outlined in ECC Report 322—were developed or implemented within this band, the landscape is evolving. We anticipate that systems will increasingly transition to wideband operations while still utilizing low-directivity antennas. Given this trend, we strongly believe that segmenting the spectrum remains the most effective and future-proof method for ensuring interference-free sharing between systems as they continue to develop and expand.
Question 10: Could your existing, or proposed, service coexist with other users of the same frequencies within the	Confidential? – N See above

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MSS spectrum bands? If so, how is coexistence achieved? If not, please explain why sharing is not possible.	
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 OQ Technology would prefer to defer actions until the World Radiocommunication Conference (WRC-27). Both Direct-to-Device (D2D) and Mobile Satellite Services (MSS) stand to gain significantly from harmonization at both regional and global levels. At this stage, we believe it may be premature to consider the allocation of new spectrum that does not align with the forthcoming regional allocations anticipated as a result of these international harmonization efforts. By waiting, we can ensure that any spectrum allocations will be more effectively coordinated and compatible with future global and regional plans, thus maximizing the benefits for D2D and MSS systems in the long term.
Question 12: Are there any mobile bands that should be prioritised for satellite based D2D?	Confidential? – N OQ Technology recommends that we align our position with the outcomes of the WRC-27. This approach would ensure that our strategies and decisions are in harmony with the resolutions and agreements established at the conference, which are expected to guide future spectrum allocations and regulatory frameworks. By doing so, we can better align our objectives with the broader international consensus and avoid potential conflicts or misalignments with future global standards.
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?	
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 Although HAPS operate in a manner that is fundamentally distinct from satellites, their operational altitude, which is classified as "high," results in interference scenarios that bear a significant resemblance to those encountered by satellites.

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	Given this similarity in the interference environment, we would recommend addressing HAPS in a manner consistent with the approaches established for satellites. By treating HAPS with the same considerations as satellites, we can ensure a more cohesive and effective management of interference and spectrum utilization in these overlapping operational domains.
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.	

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