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 connectivity between satellite networks and mobile handsets has been seen as a potential coverage solution since the 1990s. However, attempts at providing direct-to-device solutions at scale have failed over several technology cycles. Today, these technical challenges associated with incorporating D2D into an unmodified mobile handset are on the verge of being overcome. These developments have seen the significant barrier of handset scale largely removed. A cycle of activity on D2D has seen 3GPP standards development, new spectrum coexistence discussions and service launches from some vendors on top of significant investments from mobile operators in the space sector. The Mbyte costs of satellite capacity have also been reduced. However, questions remain on the market role that D2D will play in advancing global connectivity. This is a coverage technology that can potentially be applied to the 5% of the global population which does not live within a mobile footprint – it does not solve the larger usage gap (those living within a mobile footprint but not using it) which is 38% of the global population. D2D may also provide IoT solutions requiring non-population footprint and enhanced reliability, but satellite connectivity still comes at a premium cost over terrestrial. Current D2D offerings are low-bandwidth and do not offer comparable service to terrestrial mobile, although this is expected to improve to some extent. In the UK, although the D2D opportunity could potentially serve 7% of its landmass, without any geographic exclusion zone, this represents 0.3% of the population currently not covered in the UK (coverage gap). The GSMA acknowledges that the additional coverage offered by D2D could benefit these difficult-to-reach areas and potentially boost these areas of the economy.

Question	Your response
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 The role that D2D can play in enhancing connectivity can only be fully exploited if the regulatory frameworks give market players confidence that all rights are protected. The GSMA and our members are keen to see D2D develop as a robust means of providing services to customers and not a distorted playing field or technical risk.
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? – Y / N N/A
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.**	Confidential? – Y / N N/A
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? – Y / N N/A

Question	Your response
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? – Y / N N/A
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? – Y / N N/A
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? – Y / N N/A
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? – Y / N N/A
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 We note that the new proposed MSS bands for WRC-27 AI1.14 overlap with IMT bands and that is of concern to the mobile operators and the IMT community.

| 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

It's unclear to the GSMA whether D2D services will be available in a shorter time-frame. If authorisations for D2D operating in IMT bands are given prior to WRC-27, there must be a requirement that previous agreement is sought between the satellite operator |
|---|---|

Question	Your response
	and the mobile operator which holds a licence for that spectrum in the country.

The advances in technology are welcome to many in the mobile industry. However, several technical, regulatory and spectrum issues must be considered role in the development of D2D.

WRC-27 will look at certain technical conditions required for D2D. These will include looking at how satellite and mobile can use the same spectrum in bands from 700 MHz to 2700 MHz, and consideration of new mobile satellite bands which may be integrated into mobile handsets. At a national level, licensing mechanisms will require renovation and new definitions for regulatory frameworks governing hybrid NTN services will need to be developed.

The suitability of many aspects of mobile, satellite and spectrum regulation needs to be tested against D2D technologies. A clear definition of potential interference scenarios will be required both at the ITU, including the work of WRC-27, and subsequently in national regulatory frameworks. For D2D using mobile bands, these must consider:

- The safe coexistence between an MNO and the satellite service provider which it uses to provide D2D satellite connectivity within the MNO licensed area.
- The safe coexistence of an MNO operating in a neighbouring location to an MNO using a satellite D2D provider.

Beyond the definition of co-existence measures at the ITU, the roles of each of these elements of the service will need to be defined in national frameworks. Their ability to disrupt each other will need to be understood and the measures to resolve interference will also need to be laid out by national authorities.

Mobile satellite services may start to bear greater resemblance to mobile services with the new technology developments. This needs to be understood by regulators and competition issues raised by this include the need for a level regulatory playing field. **Satellite services are typically licensed with lighter regulatory and financial burden on the service provider, so 'same service, same rules' rights will require scrutiny.**

Question	Your response
Question 12: Are there any mobile bands that should be prioritised for satellite based D2D?	Confidential? – Y / N
Question 13: Are there existing systems that you consider could be subject to an increased risk of harmful interference	Confidential? – Y / N
Question	**Your response**
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? – Y / N N/A
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? – Y / N N/A

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