Question	Your response
Question 1: Do you agree with our assessment of the business models that could potentially emerge?	Confidential? – No Yes, we agree early trials and commercial deployments of Direct-to-Device (D2D) communication in other countries have established a model where satellite operators provide wholesale services, while mobile network operators (MNOs) offer retail services to end users. Ofcom anticipates that this model will also emerge in the United Kingdom (UK). Ofcom, however, aims to remain neutral on specific business models while ensuring proper spectrum management and competition. For example, other business models' proposals would enable MNOs to offer wholesale D2D services to other MNOs and mobile virtual network operators (MVNOs). Given that Ofcom will remain neutral on specific business models while ensuring proper spectrum management and competition, Lynk believes that requiring satellite operators, however, to enter a commercial relationship with an MNO prior to applying for D2D authorization stifles competition, adds unnecessary regulatory delay in the deployment of satellite networks, and does not meaningfully add any protection for the MNO provisioning

Question	Your response
	D2D in their licensed markets. The D2D market would be best served by permitting satellite operators to obtain D2D authorizations at the time they are ready to seek regulatory approval, regardless of whether the satellite operator has partnered with an MNO. Adopting a rule that limits applicants to only those who have previously entered a commercial relationship with an MNO will create an unjustifiably high barrier to entry for newer or smaller satellite operators and unfairly advantage larger satellite operators who are well-known to potential MNO partners. The compounded risk of high barriers to entry and delayed deployment will dramatically reduce the number of small and new satellite operators who can afford to participate in the D2D marketplace. Having fewer competitors will ultimately harm consumers and the D2D marketplace. Since the relationships between the satellite operators and MNOs are contractual and non-exclusive, each party will likely have multiple partners that will change over the license term, depending on the terms of the contract. Regulators should enable satellite operators to seek approval to operate in the D2D frequencies regardless of whether they have an MNO partner but condition the start (and continuation) of services on securing an MNO for the relevant markets.
Question 1(a): Are there any other business models that you think could deliver benefits for people and businesses in the UK?	Confidential? – No Other D2D business models could deliver benefits for people and businesses in the UK. Where service link (to device) spectrum is awarded to the satellite company, it could provide a direct-to-consumer service, most likely as an additional service to a consumer's

Question	Your response
	current MNO service subscription or as a wholesale service to government and businesses who have operators regularly working in remote areas not traditionally covered by terrestrial networks, e.g., emergency services, offshore workers, etc. Or for national informational alerting services, such as extreme weather warnings. For example, it would require devices that support multiple subscriber SIMs for end users. It could also support legacy 2G services during and after the 2G switch-off. Finally, assuming spectrum authorisation, satellite operators will be able to provide direct-to-consumer (retail) service in the future via Mobile Satellite Services (MSS).
Question 1(b): Are there any business models that could not operate under our proposed approaches?	Confidential? – No No
Question 2: Do you agree with our assessment of the benefits that could be realised through authorisation of D2D services?	Confidential? – No Yes, Lynk agrees with Ofcom's assessment of the benefits that can be realized through D2D services. Ofcom has identified several potential benefits of enabling D2D services, including a) Expanding voice, messaging, and data coverage beyond terrestrial networks, ensuring complete outdoor coverage across the UK as satellite technology develops, b) Offering backup coverage during power outages or network failures caused by natural disasters or severe weather, thereby enhancing mobile network resilience, and c) Improving access to emergency '999' services enabled by these advancements. Lynk's mission is to provide connectivity to all 7.7 billion people everywhere on Earth *via* its patented 3GPP-compliant fronthaul satellite communications system. By partnering with Lynk *via* a simple roaming agreement, an

Question	Your response
	MNO opens the door to new revenue in untapped markets, gives subscribers peace of mind with ubiquitous connectivity, and provides a potential pathway to economic prosperity for billions. The benefits of D2D are that it will expand mobile services, particularly in unserved and underserved areas, including rural and remote communities, coastal waters, promote competition in the provision of wireless services so that consumers and businesses benefit from greater choice and competitive prices, support increased reliability and resiliency of telecommunications services, and foster investment and the evolution of wireless networks by enabling the development of innovative and emerging applications.
Question 2(a): Are there any other benefits for UK citizens and businesses that could be realised?	Confidential? – No The UK Government, businesses, and citizens will have another path to affordable, resilient communications with the D2D service. Also, the Lynk system does not require a ground station to deliver Wireless Emergency Alerts. This means the Government has a path to deliver information even when ground infrastructure is compromised via natural or man-made disaster.
Question 3: Do you have comments on how emerging D2D technology should support 999 service provision?	Confidential? – No Lynk supports the provisioning of 999 services and Wireless Emergency Alert requirements for D2D providers. Lynk encourages Ofcom to consider a holistic review of the technical constraints and other unique aspects of providing emergency alerting, 999 services, and public

Question	Your response
	safety response services over satellite D2D networks. Today, Lynk provides cell broadcast emergency alerts. The Lynk system creates a common communications platform that supports emergency response by connecting first responders, government agencies, international first responders and agencies, and affected communities around the globe. Lynk has conducted satellite-based data, voice, and text demonstration activities, including Cellular Broadcast, in dozens of countries worldwide, including the UK, and on all seven continents. Lynk's beta service is fully operational in several countries, providing connectivity to previously unconnected people. Lynk and its global partners have demonstrated these and other capabilities that fully validate D2D technology in real-world applications. Specifically, Lynk's space-based cell towers continue to function when disasters occur that damage or disable the terrestrial wireless network allowing the combined MNO-D2D licensee continuity in the provision of life-saving information direct to consumer/public safety mobile devices. For instance, in July 2023, Lynk tested with the United States Government in Hawai'i. Just weeks before the devastating fires on Maui, one of the Helemano Reserve test participants commented that this technology would address the need to communicate with civilians during a natural disaster just weeks before the Maui fire tragedy. In a wildfire emergency, the terrestrial network is disabled and destroyed via numerous cell towers, and no cellular network exists. The Lynk system will provide connectivity in such instances. Lynk's architecture does not require ground infrastructure to deliver life-

Question	Your response
	saving communications like SMS texting and Wireless Emergency Alerts today. Given that one of the primary benefits of D2D is the ability to provide communications in currently unserved and underserved areas, the ability to provide emergency communications will help alleviate and address concerns that many satellite networks have historically been unable to comply with 999 requirements due to technical infeasibility in the past. Lynk recommends that Ofcom adopt rules that enable MNOs to provision and utilize D2D to satisfy their resiliency obligations and emergency response and preparedness requirements where appropriate for 999 service. Lynk believes it's critical that before any operator makes D2D available for emergency communications to first responders or the public, both the satellite and terrestrial operators proposing to make the service available undertake sufficient and demonstrable real-world testing of the capability. Such real-world testing should be conducted in coordination with public safety licensees to evaluate the risk of interference and procedures to detect, identify, and eliminate interference should it occur. Also, this issue is more significant than between carriers and D2D providers. It should include public safety, the disability community, multilingual, and emergency communications professionals for the industry to get this essential service right by a take-your-time approach. Presently, Lynk supports a U.S. interim requirement that 9-1-1 calls be routed to a Public Safety Answering Point (PSAP) using location-based routing or an emergency call centre. The provider also must transmit location information and the user's phone number to

Question	Your response
	facilitate dispatch and call-back capabilities at the receiving PSAP. Likewise, Lynk believes that Ofcom should consider instituting a similar requirement as the U.S. for meeting 999 requirements in the UK under its General Conditions of Entitlement (General Conditions) A3 requirements that provides for the availability of public communications services at all times with uninterrupted access to emergency organisations free of charge and providing the availability of caller location information to emergency organisations where technically feasible. Moreover, when contacting emergency services via D2D service, service providers must "include the ability to make voice calls, as defined by the General Conditions." Lynk believes that Ofcom should consider a waiver to the General Conditions and embrace a take-your-time approach that allows for D2D technology to mature, especially in the context of emergency services, as it would provide for this nascent service to mature from texting to ubiquitous voice, allowing for it to reach its full potential of saving lives in emergencies in underserved and unserved areas of the UK. Initially, new D2D services may be intermittent due to the build out of LEO constellations to support ubiquitous communications, during this period store and forward communication services on a best effort to allow users to alert emergency services to their situation and location would be better than waiting for full service availability. D2D holds the promise of delivering emergency communications for governments, the public, and private citizens when terrestrial networks are not available. Lynk believes the

Question	Your response
	UK would be served by early and frequent dialog with potential D2D providers to understand the timelines and technology—its advantages and limitations—to deliver 999 services. The services and requirements will grow over time and a policy framework to maximise the technology over this growth curve will save lives.
Question 4: Are there any mobile spectrum bands not in scope of our proposals that you think we should consider?	Confidential? – No Lynk provides global 2G, 4G, and 5G services using the 698-960 MHz bands, which encompasses a considerable portion of the current Ofcom's spectrum bands. Lynk also provides the flexibility to include additional spectrum bands, such as those contemplated in this consultation, based on MNO partner requirements for D2D service.
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 At this time, Lynk has not determined whether deployment in the supplementary downlink spectrum offers any challenges compared to other bands. However, Lynk will continue to explore all opportunities to serve end users through their spectrum and service needs.
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, Lynk agrees with Ofcom's proposal, as Lynk can provide service in a limited geographic scope to the UK mainland and territorial seas. Lynk's patented technology does not require a traditional satellite ground station; instead, it relies on traditional MNO terrestrial network nodes for routing traffic. As such, Lynk can provide offshore service to territorial seas and the exclusive economic zone.

Question	Your response
	Moreover, Lynk has developed a comprehensive interference mitigation analysis (Interference Analysis) as part of the company's commercial application to the U.S. Federal Communications Commission (FCC).[1] The Interference Analysis includes a description of how beams can be deployed from satellites to provide cellular coverage on the Earth in a manner that is compatible with existing terrestrial frequencies. Fundamentally, the deployment plan would follow a procedure similar to, or identical to, a typical terrestrial cellular build-out planning procedure. Since MNOs with license/authority to deploy the spectrum are directly partnering with D2D providers, there is a high degree of accountability when mitigating internal interference to the terrestrial and space network since harmful interference would degrade the service. As a result, regulators should feel at ease that MNOs will continue to use their spectrum to deploy their services – either through terrestrial or space networks – in a way that minimizes or mitigates interference scenarios within their jurisdiction. Regulatory borders (internal or external to a given country) can be managed like they are today in the terrestrial regime by conforming to existing Power Flux Density (PFD) thresholds at or beyond the border (whatever it may be). These operational constraints can be codified into the space network and verified by MNO partners. Specific sections of the Interference Analysis of relevance would be "Section III. A. PFD of Lynk's Service Link" (Pages 11-12)[2] that highlights the proposal to conform the cell edge condition to not exceed the PFD limits already

[1] *See* Lynk UHF Interference Mitigation Analysis (Interference Analysis), FCC File ID: SAT-LOA-20210511-00064, https://licensing.fcc.gov/cgi-bin/ws.exe/prod/ib/forms/attachment_menu.hts?id_app_num=137811&acct=803602&id_form_num=12&filing_key=-461013.

[2] *Id.* Section III. A. Power Flux Density of Lynk's Service Link at 11-12.

Question	Your response
	set by the FCC for terrestrial services with respect to adjacent service areas (40 dBuV/m as set forth in 47 CFR §22.983(a)). "Section III. B., Interference Analysis, Cell Size Adjusted via Satellite Transmit Power" (Page 13-14) and "Section III. C. Example Spot Beam Simulation" (Page 14-21)[3] show how the satellite spot beams from D2D providers can be adjusted in transmit power to conform a beam to a circular cell on the earth and prevent excessive PFD overflow into adjacent areas. "Section V. Co-Channel Interference Analysis" (Pages 23-50) of the Interference Analysis[4] illustrates a detailed analysis of the probability of harmful interference from D2D provider services on the existing terrestrial spectrum. Further, Pages 34-50 illustrate a specific case study for a real-world network in the Bahamas which deploys a heterogenous network of multiple frequency bands.[5] The concept of geospatial and spectral orthogonality regarding beam deployment to avoid harmful interference is described here and supported with a real-world example. In particular, the analysis shows the use of co-channel spectrum in the 850 MHz band between the terrestrial network and the space network, which is highlighted in Figure 24 on Page 44.[6] The use of this spectrum would be deployed from the spacecraft on beams in locations that are well planned out in practice, but Pages 44-49 also demonstrate that the Bahamas network is robust to harmful interference even in the event of co-channel overlap in the 850 band between the terrestrial and space network.[7]

[3] *Id.* Section III. B., Interference Analysis, Cell Size Adjusted via Satellite Transmit Power, at 13-14; Section III. C. Example Spot Beam Simulation at 14-21.
[4] *Id.* Section V. Co-Channel Interference Analysis at 23-50.
[5] *Id*. at 34-50.
[6] *Id*. at Figure 24 at 44.
[7] *Id.* at 44-49.

Question	Your response
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? – No Yes, we agree with the proposed technical conditions for D2D satellite emissions that will protect mobile services delivered by mobile operators in adjacent areas in the adjacent spectrum. It is currently in line with what Lynk would expect, as the Minimum elevation angle of transmission elevation of 20 degrees is not an issue for Lynk's current satellites. Minimum elevation restrictions should be lower for the initial constellation rollouts, with it increasing as more satellites are available, hence not requiring lower elevations. Also, the current frequencies we support are within Ofcom's "Green" risk areas. Regarding Ofcom's proposed power limits for D2D satellite unwanted emissions and out-of-area emissions in mobile downlink spectrum. Lynk recommends conforming with Canadian ISED requirements for in-band PFD limits for out-of-area emissions at Table 4.2, page 20: 700-800 MHz -116 dBW / MHz / m2 1900, 2100 MHz -106 dBW / MHz / m2
Question 8: Do you agree with our high-level co-existence assessment for other services in adjacent spectrum to D2D?	Confidential? – No Yes, Lynk agrees with Ofcom's high-level coexistence assessment for other services in the adjacent spectrum to D2D.

Question	Your response
	Lynk agrees that Ofcom's analysis is high-level. Ofcom, however, will consider whether a further detailed coexistence assessment is necessary once we identify which mobile band(s) are most interesting to prospective D2D providers based on responses to this consultation or requests for a D2D authorization in the future. Lynk offers for consideration that the coexistence assessment fails to include beam dimensions and steering (physical and electronic) and is relevant as a mitigating factor. Lynk also recommends that the Adjacent-block PFD limits established by ISED be changed to: -120 dBW/MHz/m^2 for 700 & 800MHz -113.6 to -114.5 for 1900 and 2100 MHz
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? – No No
Question 10: Do you agree with our preferred authorisation approach (option 2)? If not, please set out your reasoning.	Confidential? – No Ofcom's preferred authorization, option 2, is a discretionary exemption for mobile handsets that connect to D2D services provided by an MNO whose wireless telegraphy licence has been varied to include coordination clauses for the provision of D2D services. This request would include details of the frequencies to be used, evidence of compliance with proposed technical conditions, and proof of a commercial agreement with the Satellite Operator that mandates compliance with these conditions. At the outset, Lynk agrees with Ofcom that D2D should rapidly leverage existing UE to offer mobile wireless connectivity in unserved or underserved areas. Hence, MNO customers

Question	Your response
	would not need to purchase new devices or equipment or recertify UE devices for D2D services. We assume that Ofcom plans to maintain UE's existing terrestrial technical requirements. Lynk agrees that the existing technical requirements in the relevant SRSP and RSS in each frequency band would be sufficient for UE for D2D. Lynk has provided both analytical and empirical evidence of this through link budget analysis, licence filings, and in-field test data/results for two-way text, voice, and data communications. Moreover, Lynk utilises LEO satellites to provide coverage to existing terrestrial MNO devices via Lynk satellite cell towers in space. Lynk invented the use of 2G, 3G, 4G, 5G, and NB-IoT direct from satellite to standard unmodified handsets. It enables the deployment of mobile coverage everywhere on the planet. Lynk leverages a network on the edge architecture where phones on the Earth see each Lynk satellite in the same way that they see a terrestrial mobile base station. Lynk's D2D service is compatible with more than 99% of the cellular devices manufactured worldwide over the past 30 years. Lynk's testing over the U.S. notably yielded connection attempts from smartphones, feature phones, IoT devices, cars, and tractors. Other D2D systems cannot provide service for many of these devices. Some proposed D2D services will only be able to provide D2D service to specific devices built or modified to enable them. We are aware that the need for additional certification depends on the country's regulatory framework and the nature of the devices involved. If satellite D2D services use standard IMT handsets in the United States, these devices would already fall under existing type approval requirements and currently do not

Question	Your response
	mandate additional certification. The FCC has adopted a more streamlined approach by licensing devices as earth stations by rule without requiring additional certification, provided these devices adhere to existing equipment authorisations. However, devices specially designed or modified for satellite operations may need to undergo further regulatory scrutiny. Thus, modifying the existing wireless telegraphy licence with D2D frequency bands would be pro forma in Lynk's case. Lynk does not believe additional certification is necessary to ensure compliance with technical specifications, such as power limitations and frequency coordination, to avoid harmful interference with MNOs and other services. However, devices specially designed or modified for satellite operations may need to undergo further regulatory scrutiny. Since seamless integration with existing terrestrial systems is possible without hardware modifications, additional certification should not be necessary. Ofcom, however, believes that its approach will ensure that users connecting to D2D services in compliance with the coordination clauses are protected and that it will allow it to address interference concerns through direct enforcement and ensure timely resolution of any issues, as MNOs can control access to the D2D service. Ofcom believes this solution is proportionate to the risks of harmful interference and minimizes stakeholder burdens. Lynk believes the authorisation of the approach is unnecessary for the above reasons. Ultimately, it will take up to three months for Ofcom approval. Hence, the deployment of the Lynk D2D type solution is delayed. However, option two provides the best route of the three presented.

Question	Your response
Question 11: Are there any alternative authorisation options, not discussed here, that you believe are worth considering?	Confidential? – No Lynk believes that Ofcom should consider implementing a streamlined authorisation process for option two. Under this carve-out, Ofcom would adopt a "license by rule" approach similar to what the FCC has done in the United States for terrestrial devices that communicate with a satellite network for D2D purposes. Terrestrial devices connecting to the D2D network under an MNO leasing agreement, which operate within the existing technical parameters of their equipment authorisation and the terrestrial licencee's licence parameters, should be eligible for this process. If these devices can demonstrate through prior deployments and testing that additional certification is unnecessary to ensure compliance with technical specifications—such as power limitations and frequency coordination—this would help avoid harmful interference with MNOs and other services. In such cases, these devices should be licensed as earth stations by rule, without further regulatory delays or the need for additional approval.
Question 12: Do you agree with the proposed conditions?	Confidential? – No We agree with the proposed conditions and reaffirm option two as the best alternative. Lynk believes that streamlined regulatory requirements facilitating rapid go-to-market opportunities best serve this nascent market. UE devices that are subject to type approval without direct usage fees allow for D2D market growth. D2D is a nascent service that requires a regulatory approach that does not include fees and other targeted regulatory obligations and certifications to be imposed on it.

Question	Your response
Question 13: Do you have any other comments on the proposals set out in this document?	Confidential? – No No

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