Your response

Question	Your response
Question 1: Have we correctly identified the key changes in the utilities sector that could lead to additional spectrum requirements?	Confidential? N Since being awarded the licence in 2013, the DCC has designed, built, and now manages the telecommunications technology infrastructure that underpins the smart meter roll-out. At scale, the smart metering system will support secure data communication across 100 million devices in 30 million premises, as well as delivering the central systems needed to support faster, more reliable switching.[1] Our core role is to support the energy industry as it completes the smart meter roll-out over the next four years. DCC does this work under licence from the Office for Gas and Electricity Markets (Ofgem). Our network utilises both public cellular technology and private radio in the 400MHz range (with a small region of 450MHz around the Fylingdales military installation). Smart meter data is at the heart of the energy sector transition and critical to achieving net zero targets. With more than 27m smart meters now installed, the smart system is already generating over 1.5bn data transactions every month. We are therefore very interested in new developments that could provide more capacity, faster speeds and protect us from technology obsolescence in the future. Given DCC's remit, we mainly focus our response on the pros and cons of certain spectrum to the smart meter use case. From a smart metering perspective, there are changes or trends that could lead to additional spectrum requirements. These include: • **Coverage reach** - At present, 99.3% of premises in Great Britain are covered by the Smart Meter Wide Area Network (SMWAN) and are therefore capable of having working SMETS2 smart meters. This leaves 0.7% of properties, or approximately 200,000 homes in Great Britain where it is not possible, with the current infrastructures in place, to achieve a SMWAN. As such, these properties are unable to connect gas and electric smart meters via a communications hub (CH) to the DCC network. By improving WAN coverage, we can support smart meter connectivity for all homes and small businesses in Great Britain. • **Capacity constraints** – The spectrum must be able to accommodate the future growth of traffic on the smart metering network as more use cases and devices are introduced. There are two main components to consider: **1) Core capacity requirements** – Meeting increased smart metering traffic from: growth in the number of devices connected; Market wide Half Hourly Settlement data; switching supplier demands and time of use tariffs and firmware upgrades.

[1] Please refer to Our Business & Development Plan | Moving forward, together | Smart DCC

	2) **Re-use potential** – Given the characteristics of the DCC network - its security, reliability and reach - the network will likely play a role in supporting future policy priorities in the energy sector. The critical nature of the network will mean more frequent "Over The Air" Firmware upgrades will be needed to address any security vulnerabilities, operational issues and the addition of new features.
Question 2: What alternative communication solutions might play a role in meeting the future operational communication needs of the utilities sector, alongside or instead of additional spectrum for a private network?	Confidential? N Alternatives to spectrum for a private network include: • **Re-use of existing networks** – There are a broad range of considerations that accompany any technical communication solution. These include the required cybersecurity, resilience and service wrap as a few examples. The design, development and operation aspects should not be underestimated. We would urge Ofcom to explore the potential re-use of existing industry capabilities and expertise to maximise efficacy and lower the costs associated with deployment. The DCC Licence renewal is underway and there is an expectation that re-use will form part of the new period. This therefore could be timely opportunity for exploration of potential re-use of this existing network. • **Public mobile networks (LTE CAT1, M1 and NB-IOT)** – These could be a viable cost effective and relatively quick to deploy option for some use cases with the right level of resilience and security wrapper in place as used for smart metering or even Emergency Service Network (ESN). However, in their current form, such networks do not provide the level coverage, resilience and security needed to perform these services. There is also a risk of congestion and associated performance degradation as traffic grows given the network is communal and supports multiple services. Mobile provider may also unilaterally choose to refarming the spectrum into future incompatible technologies or completely sunset the technology (eg 2G / 3G networks). • **Broadband and LEO satellites** - For some cases (eg smart meters), the locations of devices are fixed mostly in home and business where broadband or WiFi is already available and set to reach most homes in the future in line with the government's ambitions to expand broadband coverage. There will be also some hard-to-reach places for fibre and terrestrial wireless solutions. The use of LEO placed satellites and broadband could potentially offer an alternative solution to existing methods and bridge that gap for these hard-to-reach areas. However, there may be
	technical limitations and a lack of cost efficiencies to operate the smart metering network at scale.

Question 3: Are there any other spectrum bands we should consider for use by utilities?	Confidential? – N We note that the proposal for 400MHz is only limited to NI and use of this band in GB is out of scope of the CFI. However, if there is a future consultation including that frequency band, we would find it of interest as the 400MHz band licensed to Arqiva is currently used in GB to connect circa 10 million smart meters in homes and businesses to the DCC network.
Question 4: Do you have any comments on the three bandwidths we have considered that might be necessary to support a private network for utilities? Please reference our capacity analysis in annex 7 where relevant.	Confidential? – N Our system operates on FDD mode. Based on our experience, we do not consider 2 x 1.4 MHz sufficient to provide the right level of coverage and capacity for smart metering use case without substantial investment on base station infrastructures and network planning and optimisation activities. The minimum band required is 2 x 3 MHz and ideally 2 x 5 MHz which will support most of scenarios based on the currently known future traffic growth, including dense urban areas with a high concentration of devices (up to thousands in some cases). If the private network is to be shared amongst multiple users, further analysis would be required to properly dimension the total capacity required based on the aggregate demand. Traffic separation between the users and prioritisation of services flow within the allocated bandwidth and radio resources would need to be fully understood and any potential issues investigated. The suggested approach for capacity dimensioning was focused mostly on the messages rate and it is worth expanding to cover requirement for Firmware upgrades and handling of alerts.
Question 5: Do you have any comments on our approach to examining each potential candidate spectrum band, including the factors relevant to assessing suitability, and the capacity and coverage analysis provided in annexes 7 and 8?	Confidential? – N From a smart meter perspective, there are few aspects worth factoring on the assessment approach to increase the confidence on the coverage prediction model: • Smart meters devices are deployed indoor with embedded antennas next to the energy meters (limited use of external or elevated antennas) • Indoor attenuation will need to be included in line with OFCOM attenuation models 2604/BMEM/R/3/2.0 (ofcom.org.uk) • The accepted level of signal will depend on the device receiver sensitivity and the fade margin. In general, from a smart metering perspective, our technically preferred bands are the 400/450MHz and 700/800/900MHz due to their propagation characteristics and indoor penetration. 1900MHz

	will suffer more propagation attenuation and does not have a good indoor penetration. Any use of 700/800/900MHz bands will need to take into consideration co-existence with the DCC Home Area Network (HAN) using Zigbee Sub-GHz band particularly if we are planning to increase the transmit power of the base station as suggested in the proposal.
Question 6: Do you have any comments on our overview of the 400 MHz band in NI? Please consider the specific factors we have discussed in your response.	Confidential? – N N/A- The scope of the DCC Smart Metering program is GB and does not extend into NI.
Question 7: Do you have any comments on our overview of the 450 MHz band in GB and NI? Please consider the specific factors we have discussed (including the coexistence analysis in annex 9) in your response.	Confidential? – N DCC uses mostly 400MHz band in the North of GB. 412-413MHz uplink, paired with downlink channels at 422-423MHz. To mitigate the risk of interference with RAF Fylingdales radar, we use a different frequency channel in the nearby area. Base station: Tx: 453.5-455.5MHz; RX: 412-413MHz Communication Hub (device): Tx: 412-413 MHz; RX: 453.5-455.5MHz To enable the above, DCC developed a new Communication Hub and deployed a radio module on Long Range Radio (LRR) Arqiva base station operating on this band. For smart metering in the North of England, 450MHz could help expand capacity in densely populated areas in addition to our existing 400MHz bands from Arqiva. We note that the proposed range 450-470MHz covers the above channels in use by DCC in the area close to RAF Flyingdales to connect around ~250k Communication Hubs. Any plan for use of this band will need to take into consideration the risk of interference and the mitigations required.
Question 8: Do you consider that changes in the spectrum environment for the 450 MHz band mean that there is a case for re-examining whether this band should be reconfigured in the UK to align with the harmonised band plan?	Confidential? – N In general, we would welcome the use of 450MHz band for utilities due to its propagation characteristics to target the hard-to-reach areas and indoor places. Due to the constrained bandwidth within this band, we consider that harmonisation of the band will increase the benefits, support the development of the overall eco-system and maximise use. However, we do not believe this will be without impact on the current users of this spectrum.

	Taking a time and geographically phased approach to any reconfiguration of this band will facilitate the early adoption and deployment while minimising the impact on the current users.

Question 9: Do you have any comments on our overview of the 700 MHz band in GB and NI? Please consider the specific factors we have discussed in your response.	Confidential? – N The 700MHz band could be advantageous for smart metering in the future given its propagation characteristics and suitability for indoor coverage. A private network may help reduce the risk of public providers withdrawing service, re-farming spectrum into future technologies or existing spectrum becoming congested due to an increase in traffic. This has been seen with the existing 2G/3G networks. To maximise future possibilities and mitigate risks the DCC is currently designing and testing a new Communication Hub based on LTE CAT 1 IOT. The RF part and antenna for the solution are designed to operate on 700/800MHz bands though initially optimised for 800 MHz LTE 28 band (Vodafone). DCC has also designed ESIM capability which allows us to manage the asset life of smart meters across our ecosystem and have flexibility to use different MNO PLMN in future. The possibility of having a private 700Mhz network and the development of technologies that use this alternative spectrum could mitigate the risks associated with being reliant on public providers for continuation of the national smart metering network.
Question 10: Do you have any comments on our overview of the 800/900 MHz band in NI? Please consider the specific factors we have discussed in your response.	Confidential? – N N/A - The scope of the DCC Smart Metering program is GB and does not extend into NI. We note that the proposal for 400MHz is only limited to NI and use of this band in GB is out of scope of the CFI. However, if there is a future consultation including that frequency band, we would find it of interest due to its importance in connecting circa 10 million smart meters in homes and businesses to the DCC network.
Question 11: Do you have any comments on our overview of the 1900 MHz band in GB and NI? Please consider the specific factors we have discussed in your response.	Confidential? – N 1900MHz will not offer the coverage footprint required for smart metering system without substantial investment in the infrastructure. We do not have a product readily available for Band 39.

Question 12: Which band(s) do you consider we should examine further with a view to developing consultation proposals to enable their use in a private network, if this were needed? Please reference the factors we have considered where appropriate and provide separate answers for GB and NI if relevant.	Confidential? – N From a smart metering perspective in GB, we consider the below bands appropriate for developing consultation proposals to enable their use in a private network: 1) 450MHz 2) 700MHz due to their good propagation characteristics especially for indoor coverage and suitable for smart meter user case. These bands will improve coverage, including addressing some or all of: • the No-WAN connectivity issues • provide higher network capacity to improve the quality of the network • support future growth of traffic to accommodate new use cases • and mitigate the risk of discontinuity of service from the public Connectivity Service Providers.