JT’s Non-Confidential Response to

JCRA 5G spectrum award process (case T-064)

29th April 2022

1 Introduction

JT (Jersey) Limited (JT) welcomes this opportunity to comment on the latest proposals from the Jersey Competition Regulatory Authority (JCRA or the Authority) for 5G licensing in Jersey. This is a non-confidential response and can be published in full.

JT operates 4G networks in Jersey and Guernsey and has a strong interest in using the 700MHz and 3.5GHz bands for 5G on both islands. We are keen that both bands are made available for 5G use at the earliest possible opportunity in Jersey, as proposed in JCRA's consultation, and we are hopeful that a similar award process for both bands can be implemented in Guernsey.

As context for our comments on JCRA's consultation, we note that the 5G spectrum award process in Jersey, together with Guernsey, was initiated in 2018 by the Channel Islands Competition and Regulatory Authority (CICRA), with a process that was intended to award spectrum licences for both Bailiwicks (i.e. Jersey and Guernsey). As part of the 'original process', CICRA published two sets of consultation documents, setting out its planned approach to the 5G spectrum award:

- a draft statement of intent (in May 2019)
- a final statement of intent and a draft invitation to tender (ITT) (in December 2019).

JT submitted responses to both sets of consultation documents.[1]

Due to the Covid-19 pandemic and concerns over impending national security guidelines relating to 5G equipment and suppliers, the original award process was placed on hold in 2020.

In 2022, JCRA has restarted the 5G spectrum award process solely for Jersey (the 'restarted process'). As such, on 2 March 2022, JCRA published its "Consultation to reassess interest and demand" for 5G spectrum (Document No. JCRA 22/18), to which JT's comments in the remainder of this document refer.

Our response is structured as follows:

- Section 2 summarises JT's overall comments in relation to the proposed restarted process for 5G spectrum award in Jersey
- Section 3 presents formal responses to the questions outlined in the consultation document for the restarted process

[1] JT also made its position clear at a 5G pre-summit arranged by CICRA in Jersey on 5 July 2018 and at a 5G summit held in Guernsey on 26 November 2018

2 Summary of JT's comments

As noted in JCRA's consultation, nearly five years have passed since initial 5G ambitions for the Channel Islands were defined. During this time, 5G spectrum has been awarded to mobile network operators (MNOs) in the UK and in the vast majority of other European markets, and – as also noted by JCRA – over 170 5G networks are now operating globally. As such, the Channel Islands is now lagging behind on 5G availability, and it is essential that 5G spectrum is awarded as soon as possible, to the benefit of citizens and businesses on both islands. Increases in data traffic and resulting network congestion mean that further spectrum is needed to provide the quality of service that customers expect. Consumers already have access to the latest 5G enabled handsets and our data shows that 21% of JT customers are using 5G enabled handsets. Given the urgency of awarding spectrum, we commend JCRA for restarting the 5G award process in Jersey and publishing its consultation. JT strongly recommends that the licensing process should proceed as quickly as possible in Jersey, and we are hopeful that a similar process will restart in Guernsey in due course.

In terms of the mechanism for spectrum award, JT continues to support a comparative selection process for multiple 5G licences in Jersey. This approach served the Channel Islands well for previous mobile licences and was the approach proposed by CICRA in the original 5G process. JT believes that suitable coverage obligations should be attached to the licences, in order to ensure that the spectrum is used efficiently. Licensees should be expected to provide island-wide coverage, as well as a certain level of surrounding sea coverage. Licensees should also be required to deploy spectrum in both the 700MHz and 3.5GHz bands together, in order to provide the combination of coverage (700MHz band) and capacity (3.5GHz band) needed for a comprehensive 5G service, to the benefit of consumers and businesses in Jersey.

All of the available spectrum under consideration in the original process (i.e. both the 700MHz and 3.5GHz bands) should be made available. In particular, in order to realise the full benefits of 5G, MNOs require access to at least 100MHz of contiguous spectrum in the 3.5GHz band. This will require defragmentation of the existing 3.5GHz band plan, and careful co-ordination involving all relevant parties. For the 700MHz band, an assignment of 2×10MHz per operator would align with typical arrangements in other European markets, and would be consistent with JT's planned 5G radio access network (RAN) equipment configuration as an absolute minimum.

The following section provides a more detailed response to the specific questions set out in JCRA's consultation.

3 Response to the questions outlined in consultation document No. JCRA 22/18

3.1 Question 1: Do you support the Authority's planned approach to restarting the 5G spectrum award process or have views on alternative approaches?

JT supports restarting the award process as soon as possible for Jersey. As the Authority suggests, much of the information we contributed in the original process remains relevant. However, due to the time that has passed since the original process was suspended, certain priorities have changed. In response to this question, we outline below several key points that the Authority should consider when creating its 'Revised 5G Spectrum: Statement of Intent' for the restarted process.

The award process should proceed as soon as possible

JT agrees that the award process should move forward as soon as possible. Given the significant delay since the original proposals were published, the 'two-stage' process for awarding spectrum (as proposed by CICRA in the draft ITT for the original process) is no longer suitable. Accordingly, all of the spectrum under consideration (i.e. in both the 700MHz and 3.5GHz bands) should be made available in the same process for Jersey, as soon as possible, and none of it should be held back for future assignment.

For future 5G expansion, we note that there are several other bands that might become available for 5G use in the Channel Islands, as indicated in Ofcom's spectrum roadmap published on 31 March 2022.[2]

A comparative selection process should be used for the spectrum award, similar to the process used in the Channel Islands for 4G licensing

From the outset of the 5G consultation process, JT's position has been that the spectrum award should involve a comparative selection process for multiple 5G licences (i.e. an ITT for award of spectrum). This was the approach proposed by CICRA in the draft ITT for the original process. We still believe this is the most appropriate approach, noting that it was successfully adopted for the award of 4G spectrum licences in the Channel Islands. We remain firmly of the view that network-led market competition, enabled through licensing of several mobile providers, has served the Channel Islands market well to date, and an ITT process for the award of 5G spectrum will ensure that the process is transparent and objective.

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2 https://www.ofcom.org.uk/__data/assets/pdf_file/0021/234633/spectrum-roadmap.pdf

Suitable coverage/QoS obligations should be attached to licences

To ensure that spectrum is deployed extensively and in an efficient manner, JT supports attaching coverage and quality-of-service (QoS) obligations to the licences, for both the island and the surrounding sea.[3]

We also strongly advocate a requirement for licensees to deploy 700MHz in conjunction with 3.5GHz as the best way to deliver 5G services which benefit consumers and businesses across Jersey. As discussed in our response to Question 7 (see Section 3.7 below), the 700MHz band is needed to provide wide-area indoor/outdoor coverage, while 3.5GHz spectrum is needed to provide high capacity in busier locations, with increased speed and improved quality of connection. Since both bands are needed to provide a comprehensive service, JCRA should require licensees in the upcoming 5G award to deploy both bands (either by direct stipulation, or indirectly through suitable technology-neutral QoS requirements).

Coverage/QoS obligations that are too onerous would have implications for mobile network design, operation and deployment timelines, and could potentially impose significant costs on licensees. It is therefore essential for JCRA to consult industry players on the detailed definition of coverage obligations, to provide MNOs with clear definitions of the proposed requirements,[4] and the data/reasoning behind its proposals. JCRA should also outline the approach that will be taken to demonstrate compliance with proposed coverage obligations.[5]

In particular, any indoor speed targets must be realistic, given that these cannot be achieved through 3.5GHz spectrum (of the 5G spectrum to be awarded, only 700MHz will generally contribute to meeting indoor speed targets).

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3 QoS obligations should be for mobile services: there should be no obligation to provide fixed-wireless access services

4 For example, in the original process CICRA indicated that the coverage obligation includes a "reasonable amount of sea territory around the islands", but did not provide a definition of this sea territory coverage (e.g. x km contour line(s) around the islands). Furthermore, under the minimum base package of spectrum proposed by CICRA in the original process (i.e. 40MHz in the 3.5GHz band), it would not have been realistic to achieve the proposed coverage obligations (10Mbit/s downlink and 2Mbit/s uplink speeds and associated timelines). Not only was the coverage obligation proposed in the original process ambitious, but it exceeded the obligations that national regulatory authorities in other European countries have typically adopted for 5G deployment via 3.5GHz

5 In the original process, CICRA suggested that a crowdsourcing measurement method could be used. JT agrees in principle that a crowdsourcing measurement method could be used to demonstrate compliance. However, given the limitations associated with this measurement method, JT strongly believes that crowdsourced data should be used only as a simple, one-off compliance check on meeting coverage requirements; it is not appropriate for comparing QoS across MNOs in the Channel Islands, as was the case with the last compliance test that CICRA performed following the roll-out of 4G services

Licences should be technology neutral

JT's view is that licence obligations should not dictate the type of network/technology that MNOs might deploy for 5G (e.g. non-standalone (NSA) or standalone (SA)). Rather, in the currently competitive Jersey market, each MNO should be left to select the best architecture and deployment to satisfy its network and subscriber requirements, being cognisant of equipment cost and performance optimisation opportunities. It is highly likely that MNOs will choose to deploy 5G-SA technology at a point in time when clear benefits over 5G-NSA technology are proven and aligned to customer demand, and there is no need for regulatory intervention on this matter. Licences should therefore be technology neutral.

Likewise, QoS obligations (e.g. to provide a certain minimum speed over a defined area by a certain date) should be technology neutral, so that licensees can meet their obligations through any spectrum band (i.e. including previously licensed mobile spectrum as well as newly awarded 5G spectrum in the 700MHz and 3.5GHz bands).

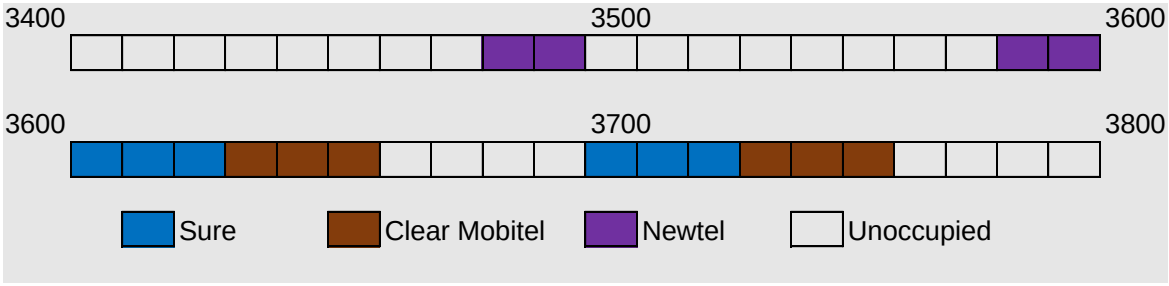
The 3.5GHz band should be defragmented to allow contiguous 100MHz assignments

For network performance and cost optimisation reasons, JT believes it is essential to make 100MHz of 3.5GHz spectrum available to each MNO. This will enable citizens and businesses in Jersey to benefit from the fastest 5G speeds and the best network performance, and is consistent with spectrum awards in other European markets. The need for at least 100MHz in the 3.5GHz band is discussed further under Question 7 (see Section 3.7 below).

The existing band plan in the 3400–3800MHz range in Jersey is shown in Figure 1 below. Existing spectrum assignments mean that two 80MHz contiguous blocks are currently available in the lower half of the band (i.e. 3660–3700MHz and 3760–3800MHz) and two 40MHz contiguous blocks are available in the upper half of the band (i.e. 3400–3480MHz and 3500–3580MHz).

The existing spectrum assignments are based on a frequency-division duplexing (FDD) configuration (i.e. paired spectrum), which is out of step with European harmonisation of this band for 5G technology, which uses unpaired spectrum for a time-division duplexing (TDD) deployment. Since all available 5G radio technology in the 3.5GHz band uses a TDD configuration, the existing assignments necessitate a replanning and defragmentation process to be undertaken, which will require close collaboration from Jersey's MNOs. There is a risk of 5G roll-out being delayed, or initial services being sub-optimal, unless all stakeholders participate in the process in a timely way. Defragmentation of the 3.5GHz band (i.e. reallocating Newtel/Clear/Sure spectrum) is essential in allowing contiguous assignments of up to 100MHz.

Figure 1: Current 3.5GHz band plan and occupancy in Jersey [Source: Ofcom,[6] 2022]



Clarification of (future) spectrum being made available

JT understands that the block from 3400–3410MHz is not available for mobile communications in the UK, since it is allocated to radiolocation (for defence use). JT requests clarity from JCRA regarding whether this block is available in Jersey, and, if so, whether there are any constraints on its use that MNOs need to be aware of (e.g. in relation to incoming or outgoing interference between Jersey and the UK).

JT notes that in the original process there was no mention of plans to award the unpaired block of spectrum in the 700MHz centre gap (more specifically, 738–758MHz). As part of the revised ITT it would be helpful if JCRA could clarify whether or not this block is available for MNO use in Jersey.

Similarly, JT would welcome clarity from JCRA on the potential availability in Jersey of other 5G spectrum that might also be made available in the UK, such as in the 26GHz and/or other millimetric wave bands. Information on further 5G spectrum that might be available in Jersey, and the timing of the availability of additional bandwidth, is highly relevant to JT and other network providers that intend to invest in 5G deployment.

3.2 Question 2: Please comment on the relevance of these key influencing factors or provide others that you believe the Authority should be taking into account in developing a Revised 5G Spectrum: Statement of Intent

Impact of delay

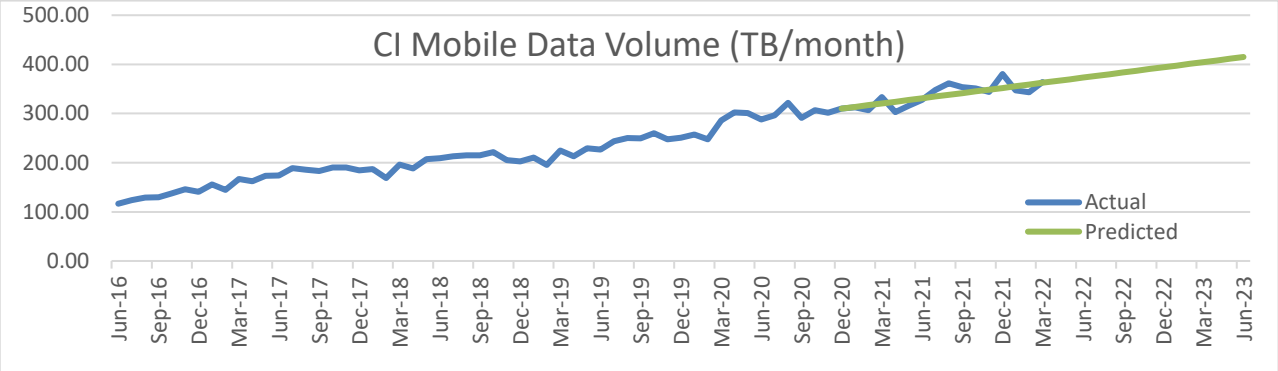
Total mobile data traffic in Jersey has grown significantly in the last few years (see **Error! Reference source not found.** below). JT has completed its planned process of 4G network upgrades using its existing spectrum. Any further capacity upgrades will be dependent on new spectrum becoming available for 5G use. Without this new spectrum, and assuming traffic levels continue to increase (which all indications suggest they will),

6 https://www.ofcom.org.uk/manage-your-licence/radiocommunication-licences/mobile-wireless-broadband/jersey-licences

the network will become more congested. The average speed currently experienced by JT's customers is now decreasing as a result of capacity limitations.

Since JT has already completed its 4G upgrade programme, the only way to improve network performance (in the absence of new 5G spectrum assignments) would be to build more sites. As well as being expensive and potentially having an adverse environmental impact, this would contradict the Government of Jersey's stated aims of avoiding the proliferation of network infrastructure on the island. Furthermore, building more sites would not replicate all of the network performance improvements that can be achieved with additional spectrum. Accordingly, the only viable option for increasing peak speeds (for example) is to assign new 5G spectrum.

Figure 2: Mobile data traffic in CI including growth prediction



Given that several years have elapsed since the 5G award process first began, it is crucial that all the spectrum under consideration in both the 700MHz and 3.5GHz bands is awarded as soon as possible. This spectrum has now been awarded in the UK and many other leading countries, including the vast majority of European markets, and Jersey is now lagging well behind. Any additional delays will have a detrimental effect not only on the services available to consumers on the island, but also for Jersey consumers roaming as they will not be able to use 5G services on other networks. In addition, it could have a detrimental impact on the prospects for attracting new corporate clientele and investment in Jersey. JCRA should do its utmost to ensure that the restarted process avoids any further unjustified delay to MNOs' ability to provide the level of service expected by Jersey's inhabitants, meet growing traffic demand, and attract new business to the island.

Loss of pan-CI requirements

Although the restarted process means a loss of timing alignment across the Bailiwicks of Jersey and Guernsey, JT welcomes progress on the award of 5G spectrum in Jersey, and we agree that the focus should be on meeting present and future connectivity needs in Jersey in a timely fashion. Given the delays experienced, it is important that the spectrum award process moves forward quickly in Jersey, independent of Guernsey.

However, JT would like to stress the benefits associated with having the same spectrum assigned in both Guernsey and Jersey (see our response to Question 5 (Section 3.5) for more detail). As such, JT hopes that JCRA will encourage the Guernsey Competition and Regulatory Authority (GCRA) to align any future 5G spectrum assignments with those assigned in Jersey at the end of this restarted process.

Loss of early-mover advantage

JT agrees that the focus of the restarted process should be on offering consumers and businesses new mobile services via the latest mobile handsets now widely available in the market, rather than establishing Jersey's reputation as an early 5G adopter. Indeed, this early-adopter goal is now no longer possible, as Jersey will be a late 5G adopter. Because network equipment and consumer devices that use 5G technology are now readily available[7], 5G launch can be accelerated compared to the timetable that would have been possible when the original process was begun. However, JT notes that further delay could actually damage Jersey's reputation as a location to do business, given how many markets globally have now launched 5G. This supports the earlier points made under '*Impact of delay*' regarding the importance of awarding 5G spectrum in Jersey as soon as possible.

Evolving high-risk vendor (HRV) requirements

Due to the impending legal requirement to remove HRV equipment from the 2G/3G/4G/5G estate, JT is currently going through a process of re-procuring 2G/3G/4G network equipment, which is both costly and time consuming. Since 5G RAN equipment requirements depend on the spectrum and bandwidth to be used, JT cannot finalise its 5G RAN procurement process until we know what 5G spectrum we will be awarded.

Once RAN equipment has been procured, JT will liaise with its new vendor to ensure efficient installation across all sites. To avoid significant unnecessary additional expense and inefficiencies resulting from two separate procurements and installations (one to replace 2G/3G/4G equipment and another to install 5G equipment), the spectrum award needs to take place in parallel with the HRV replacement. This is another reason to minimise any delays in awarding spectrum.

Recognition of deployment challenges

As well as increased costs and potential deployment delay resulting from evolving HRV requirements, there will be other challenges associated with upgrading JT's network to 5G.

For example, the existing backhaul network from JT's sites needs to be upgraded to accommodate growing data traffic volumes anticipated with 5G. In addition, new antennas will need to be deployed in line with the new spectrum and these may have additional

[7] JT data shows that 21% of it's customers are using 5G enabled handsets

construction requirements at existing sites (e.g. site strengthening for mMIMO technology). Upgrading infrastructure (e.g. existing rooftop sites or towers) or building of new sites requires planning permission, which, based on the current processes in Jersey, is time consuming; it can sometimes take 12 months for an application to be approved.

JT would welcome support from the JCRA to help streamline the planning application process to meet the needs of 5G. JT believes that a new, streamlined and coordinated approach to planning permission from all MNOs wishing to use existing sites for 5G is the way forward, which will improve the situation both for MNOs and for the planning office.

Guernsey has such a streamlined process, as there is an exemption from planning permission requirements for any "development in relation to minor equipment by suppliers of electricity and telecommunications services", according to The Land Planning and Development (Exemptions) Ordinance of 2007.[8] The exemption applies to any development carried out on behalf of a telecoms licensee, if it is necessary for maintenance, replacement of equipment or for providing telecoms services to the public, and provided that any replacement is not significantly different in terms of its design, size and appearance from the equipment it replaces.

In the UK, a new Electronic Communication Code (ECC) was introduced in December 2017. This simplified the planning process for MNOs by giving them the right to install and maintain electronic communications apparatus on public land, and apply for a court order to allow this on private land if permission is not otherwise granted. The new ECC also allows MNOs to construct 'permitted developments' (certain types of masts, poles and cabinets) without needing to apply for planning permission.[9]

JT advocates introducing exemptions to the current planning permission process in order to minimise deployment challenges, increase the rate of network upgrades and thus speed up service improvements for customers.

3.3 Question 3: Please provide information on yourself or your organisation, and explain your interest in the awarding of 5G spectrum in Jersey

JT launched the island's first mobile service in 1987 as Jersey Telecom. JT is a leading MNO in Jersey; in Q1 2022 JT had nearly 50 000 4G connections (a market share of almost 53%).[10] JT is also the island's fixed-line incumbent, and has rolled out full fibre to every

8 https://gov.gg/CHttpHandler.ashx?id=3433&p=0

9 Further reforms to the ECC were consulted on in 2021 to facilitate faster and more collaborative negotiations between operators and site providers. In November 2021, the UK government said that it would introduce primary legislation that will make changes to the ECC as soon as Parliamentary time allows. See https://www.gov.uk/government/consultations/consultation-on-changes-to-the-electronic-communications-code

10 Source: GSMAi

premises. JT offers a range of services and bundles, to individuals and businesses in both Jersey and Guernsey.

JT believes that there is a strong and vibrant mobile services environment in Jersey, with significant economic and social benefits to citizens, businesses and visitors. We believe that the award of 5G spectrum should aim to build on these established benefits, thus enabling existing MNOs to deliver even faster mobile broadband (MBB) services while also allowing the public and private sector to develop new products and services for Jersey. JT is not solely interested in 5G because of its ability to deliver faster MBB services: the award of 5G spectrum will also ensure that customer QoS can be maintained despite rapid growth in mobile data traffic (as explained in our response to Question 2 earlier). As an established operator which offers 2G/3G/4G, 5G is the next evolutionary step for JT, in terms of providing improved coverage and speeds.

3.4 Question 4: Taking into account the key influencing factors explained in this document, or others that you believe should be taken into account, please state if you are interested in applying for local 5G spectrum through the planned Restarted Process

JT is interested in applying for 5G spectrum in both bands (700MHz and 3.5GHz). We re-iterate that it is crucial for both bands to be awarded together, for all available spectrum in both bands to be awarded at the same time, and for this award to take place as soon as possible.

3.5 Question 5: Considering the specific subject of pan-Channel Islands 5G spectrum alignment, please explain any particular challenges you anticipate if this is not achieved

As explained in our response to Question 3 earlier, it is imperative that the spectrum award process proceeds quickly in Jersey, independent of the timeline for spectrum award in Guernsey.

However, JT anticipates several challenges if future 5G spectrum assignments in Guernsey were to differ from those in Jersey. Crucially, JT would require different 5G RAN equipment across the two Bailiwicks, if the spectrum assigned to JT in Guernsey was different from that in Jersey. As well as complicating the procurement processes, this would also have ramifications for network engineers in terms of potential differences in equipment spares, and installation and maintenance procedures between the islands. In addition to inefficiencies related to physical equipment, different spectrum assignments could result in interference between Jersey and Guernsey.

As such, JT believes it will be important for JCRA to advocate for Guernsey's future spectrum award to align with the outcome of Jersey's award.

3.6 Question 6: If interested in 5G spectrum, please state the services you would initially envisage providing or would like seen provided by others

JT plans to launch commercial 5G services in selected locations as soon as spectrum assignments are confirmed by JCRA and spectrum licences issued by Ofcom. In the meantime, JT is actively investing in its network in readiness for 5G services in Jersey, and is working with potential vendor partners to prepare for the launch of commercial services.

JT initially intends to roll out a 5G-NSA service, which will potentially evolve to 5G-SA in line with market demand. As such, JT intends to roll out 5G new radio on existing base-station sites. JT has no plans to build new sites for 5G in the short term, and existing sites are already shared to the greatest extent possible for legacy technologies. While JT is committed to sharing sites as far as possible in the context of 5G, practical issues associated with site size/loading might impose some limitations on site sharing opportunities. This approach to 5G deployment is consistent with that of MNOs in the UK (for example, the launch of 5G-NSA services by BT-EE in May 2019), and is also aligned with many MNOs worldwide.

The 700MHz and 3.5GHz bands are both important in the context of delivering 5G services, which could include higher-speed MBB services, along with specific 5G services such as the Internet of Things (IoT), services to verticals and broadband to the home (5G fixed-wireless access (FWA)). Globally, operators that have launched 5G services to date have generally focused on enhanced MBB (eMBB) services (e.g. BT-EE), with some also offering FWA (e.g. Three UK).

JT's initial focus will be on offering eMBB services to its consumer and business consumers. In Jersey, high-speed MBB services are already widely available on 4G networks, and JT's 4G network offers exemplary speed and QoS. Significant economic and social benefits have been delivered by the 4G network in Jersey through rapid roll-out, high-speed services and good coverage. JT believes it is important that 5G licensing builds on this successful 4G market. In due course, JT expects to provide comprehensive 5G MBB coverage across the island and surrounding sea.

The universal availability of fibre to the premises (FTTP) in Jersey, with guaranteed speeds up to 1Gbit/s, means that there is no obvious business case or any clear need for a 5G-FWA service. However, IoT may be a significant driver of demand for 5G services on the island in the mid to longer term. In the longer term, more-advanced 5G use cases (e.g. autonomous machines for agriculture and construction, augmented reality/virtual reality (AR/VR) for enhanced tourism experiences, and improved mobile financial services based on 5G features of ultra-reliable low-latency communication (URLLC)[11]) can also be supported, further enabled by a migration to 5G-SA, and network slicing functionality.

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11 It should be noted that local low latency will be achievable, but given the distance there will be some intrinsic delay when communicating with mainland UK

3.7 Question 7: If planning to provide 5G services, please state your ideal spectrum allocation requirement for providing them

JT requires a minimum of 2×10MHz in the 700MHz band and a contiguous 100MHz assignment in the 3.5GHz band – bandwidth configurations that are supported by the industry globally – to deploy a world-class 5G network and unlock the true potential of 5G for Jersey.

700MHz spectrum has good propagation characteristics and has the potential to be deployed immediately within the existing sub-1GHz network grid that JT has rolled out for its existing mobile networks. This means that JT can rapidly achieve wide-area 5G coverage, without the need to build any additional sites. We believe that this ability to re-use existing sites is an important requirement for reducing the potential environmental impact of 5G, and accelerating the pace of roll-out (provided challenges associated with planning requirements for upgrading sites have been resolved).

JT believes that all of the available 2×30MHz spectrum in the 700MHz band should be awarded for MNO use. JT is aware of past discussions on spectrum needs for public protection and disaster relief (PPDR) or public safety LTE (PS-LTE). However, JT believes that any consideration of PPDR/PS-LTE should be considered in a separate process, given the bespoke nature of the PPDR service requirements.

The 3.5GHz spectrum will provide additional capacity for 5G where this is most needed, such as in more densely populated locations where mobile traffic levels are highest.

Industry bodies and vendors recommend that 100MHz of contiguous spectrum in the 3.5GHz band provides the most efficient use of spectrum for 5G – for example, as indicated in a paper published by the Global mobile Suppliers Association (GSA).[12] The paper also highlights several key benefits of a 100MHz contiguous block of 3.5GHz spectrum compared to smaller or non-contiguous blocks:

- 100MHz of 3.5GHz can provide up to a 2.7× increase in capacity per cell over a 50MHz block, while maintaining a 100Mbit/s cell edge throughput
- An MNO would require 64% more base stations with a 60MHz carrier in a dense urban setting compared to a 100MHz contiguous carrier
- Combining non-contiguous blocks results in loss of useable spectrum, reducing the spectral efficiency
- A contiguous 100MHz block has ~50% lower physical layer signalling overhead requirements than 2×50MHz blocks, increasing the spectral efficiency
- A contiguous 100MHz block requires fewer guard bands (assuming networks need to be synchronised) than 2×50MHz blocks, leaving more spectrum available for mobile devices.

12 https://gsacom.com/paper/5g-spectrum-awards-april-2019/

In addition, we note that mobile handsets work most efficiently with contiguous spectrum (vs. aggregating across non-contiguous spectrum blocks/bands). Furthermore, given the high cost associated with installing 3.5GHz equipment (i.e. the high cost of mMIMO antenna and radio equipment, as well as site strengthening costs) it may not be cost effective for MNOs to deploy smaller contiguous blocks of spectrum.

3.8 Question 8: Are there any further points you would like to make or information you believe valuable and relevant to the Authority for taking into consideration during this consultation process?

As mentioned in our response to Question 1 earlier, JT advocates for a comparative selection process (i.e. an ITT process), as proposed by CICRA in the original process. As was the case in the 4G licensing process, applications should be ranked such that the winner of the selection procedure is able to choose from the available spectrum band packages. We also support the use of the performance bond guarantee mechanism that was used in the 4G licencing process. By making financial commitments we believe it provided certainty on investment and roll out commitments, we therefore support the JCRA using the same mechanism in the 5G award process. In addition, any financial commitments should be supported with an agreed process to confirm achievement of those commitments as well as the mechanism for the financial bonds to be returned.