

Consultation Document

5G Private Mobile Networks

A consultation with stakeholders regarding the implementation of Private Mobile Networks using 5G technology in Qatar

The deadline to respond to this consultation is July 21, 2022

June 14, 2022

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1 Introduction

1.1 Background

Private telecommunications networks (often also referred to as ‘enterprise networks’) are an important and established enabler for both the private and Government sectors enabling reliable, flexible and secure voice and data communications.

Historically, private telecommunications networks have used Private Automatic Branch Exchanges for voice communications and Ethernet and Wi-Fi for data. Some convergence has enabled voice calls to be carried via Wi-Fi connectivity to support mobility within a limited area (i.e., campus setting). The technologies that enable private networks have steadily evolved but it is the capability of 5G¹ to carry vast amounts of data, quickly and reliably while supporting a huge number and density of devices, that makes private mobile networks using 5G potentially transformative and of great interest for a wide range of applications.

5G is a radiocommunications technology that promises to deliver “wired performance but without the wires”. It therefore offers the opportunity to transform the way that businesses operate through enhanced and more flexible processes, enhanced productivity and safety, including autonomous or remote operation and integration with artificial intelligence. These benefits are applicable across many commercial sectors including oil and gas, shipping, transport, manufacturing, retail, sports and entertainment, healthcare and hospitality, as well as Government.

1.2 Emerging Market Needs in Qatar

The Communications Regulatory Authority (**CRA**) has recently received a number of requests from entities regarding access to radio spectrum to enable the establishment and operation of 5G private mobile networks in Qatar. With this in mind, and in accordance with CRA’s objective established in the Telecommunications Law² to “encourage the introduction of advanced and innovative information and telecommunications technologies to meet the needs of customers and the public”, CRA now consults with stakeholders to explore how best to facilitate the use of 5G technology in private mobile networks and so support the development of digital Government, as well as the digital transformation, diversification and growth of the Qatari

¹ Fifth-generation of mobile telecommunications technology, required by International Mobile Telecommunications for the year 2020 (IMT-2020) standard to support an all Internet Protocol (IP) network.

² Decree Law No. (34) of 2006 on the promulgation of the Telecommunications Law, Article 2, Objectives.

economy.

1.3 Purpose of this Consultation

In this consultation, CRA is seeking to understand the level of interest in deploying 5G private mobile networks in Qatar, the capabilities available for their delivery and if CRA is required to intervene in any way to support the industry to realize/satisfy the demand for such networks.

Please refer to Section 0 on how to respond to this consultation.

2 Regulatory Considerations

2.1 Current situation in Qatar

Holders of a “License for the Provision of Public Mobile Telecommunications Networks and Services” (i.e., Ooredoo QSC and Vodafone Qatar) can provide 5G private mobile networks in Qatar using existing radio spectrum assigned to them by CRA.

As an alternative to the use of public mobile telecommunications networks and services, an Enterprise³, might wish to own and operate its own private mobile network using 5G technology. From a regulatory perspective, there are two key requirements relating to the ownership and operation of 5G private mobile networks in Qatar:

1. The requirement for a license to own or operate a telecommunications network in accordance with Article 9-3 of the Telecommunications Law;

This requirement has been addressed by the “Class License to Own and/or Operate a Private Network” issued in July 2011 by the Supreme Council of Information and Communication Technology (ictQATAR) and later revised in September 2013 (Private Network Class License). This Class License is published on the CRA web site at:

<https://www.cra.gov.qa/Regulatory-Framework/Licensing/Class-Licenses>

The Private Network Class License is technology neutral, meaning that its scope encompasses the ownership and operation of a 5G private mobile network subject to point 2 which follows below.

2. The requirement for a license to use the radio spectrum in accordance with Article 15 of the Telecommunications Law which states that:

“No person shall operate any radio-communications equipment or make any use of radio frequencies, without a Radio Spectrum License or a radio frequency authorization.”

The requirement for a license to use the radio spectrum is also explicitly stated in Clause 10 “Radio Frequency” of the Private Network Class License which states that:

“If the operation of the Private Network requires the use of radio frequencies, the

³ The term ‘Enterprise’ is used in this document as a convenient means of referring to any organization that may wish to establish a 5G private mobile network and therefore encompasses businesses as well as Government organizations.

Licensee must (prior to the use of such frequencies) obtain from [CRA] a radio frequency license or authorization, if applicable, subject to spectrum availability;

and

“The Licensee must comply with the Applicable Regulatory Framework relating to the use of radio frequency and operation of radio equipment.”

CRA has not allocated or assigned any radio spectrum for the self-provision of 5G private mobile networks.

2.2 Current situation in some benchmark countries

The requirements discussed above to have a license to operate a telecommunications network or provide telecommunications services to the public are typical for the GCC and wider region. Further, the requirement to have a license to use radio spectrum is almost ‘ubiquitous’. The sections below discuss a number of developments in benchmark countries which are relevant to the deployment of 5G private mobile networks.

2.2.1 Network and Service licensing

As is the case in Qatar, licensed public mobile network operators and service providers can provide 5G private mobile networks in the GCC and other countries in the region. In addition, the benchmark examples below demonstrate that it is established practice for Enterprises in the region to be able to self-provide **private networks** and that there are examples of licenses having been granted which specifically authorize the provision of data and private network services to the public.

Country	Current situation
Oman	Self-provision of a private network is permitted under an Authorization issued by the regulator (TRA). A Class III license is available from TRA and authorizes a licensee to provide private network services only.
Jordan	Self-provision of a private network is permitted in accordance with the ‘Instructions for Establishing and Connecting Private Communications Networks’, issued by the regulator (TRC).

Saudi Arabia	<p>No license is required for the self-provision of a private telecommunications network.</p> <p>A Class-A IoT-VNO (Internet of Things Virtual Network Operator) license is available from the regulator (CITC) to enable the licensee to procure mobile network capacity on a wholesale basis in order to then provide IoT and M2M data communications services.</p>
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2.2.2 Radio spectrum

CRA is not aware of any examples in the region of regulators licensing radio spectrum to Enterprises for the self-provision of 5G private mobile networks. However, there is evidence of an emerging global trend to do so and the table below highlights some examples.

Country	Examples of radio spectrum assignment for private mobile networks – all of which permit the use of 5G technology
Australia	Area-wide apparatus licenses are assigned in parts of the 26 GHz and 28 GHz bands to enable “uncoordinated ad hoc deployments within the confines of private premises or property”, typically by industry verticals.
Germany	Assignment upon application on an ongoing basis (i.e., first come, first served) of radio spectrum for site specific use in the 3.7 – 3.8 GHz and 24.25 – 27.5 GHz bands.
Japan	Assignment upon application on an ongoing basis of radio spectrum for site specific use in the 4.6 – 4.9 GHz and 28.2 – 29.1 GHz bands.
UK	Assignment upon application on an ongoing basis of radio spectrum for site specific use, in the following spectrum bands: <ul style="list-style-type: none"> • 3.8 – 4.2 GHz • 1781.7 – 1785 / 1876.7–1880 MHz • 2390 – 2400 MHz
USA	The Federal Communications Commission (FCC) auctioned over 2,600 licenses with local scope for spectrum in the 3550 MHz and 3650 MHz frequency bands.

Source: Cullen International

With respect to the above examples, the basis on which the radio spectrum licenses for 5G private mobile networks are granted varies considerably within and between countries, and includes:

- Sharing the band with other technologies, for example, with fixed links;
- Site specific exclusive assignments; and
- Site specific assignments in bands which are already assigned to a licensed public mobile network operator (i.e., the license to use the radio spectrum for the 5G private mobile network is limited to a specific location where the 5G public mobile network operator is not using the spectrum).

In addition to the use of licensed radio spectrum, 5G standardization has developed the 5G NR-U⁴ variant which is intended for operation in 'unlicensed'⁵ radio spectrum; the 5GHz and 6GHz bands are specified in Release 16 of the 5G standard and the 60GHz band is foreseen by the ITU for Release 17.

⁴ 5G New Radio, Unlicensed; The 5G standard delivered with Release 16 specifications which enables 5G operation in 'unlicensed' radio spectrum.

⁵ Note that the Telecommunications Law requires that all radio spectrum use in Qatar is licensed. CRA issues Class Licenses to enable use of the radio spectrum in certain frequency bands without having to apply for an individual radio spectrum license. The term 'unlicensed' is widely used loosely to refer to the use of radio spectrum authorized by Class License or some other form of general authorization.

3 Possible Options

There are a number of different alternative options for the implementation of 5G private mobile networks and CRA is aware that these options are also being considered by regulators and policy makers in other countries. The principal options are presented and discussed in the Qatari context in the table below. It should be noted that the adoption of one option would not automatically exclude the others (i.e., depending on the outcome of this consultation, it may be that more than one option will be supported in Qatar).

Option	Advantages (for Enterprises)	Considerations and current limitations
<p>1. Use the 5G networks and services of the public mobile operators (i.e., maintain the current situation).</p> <p>Using the public mobile network or a slice⁶ on the public mobile network of the public mobile operators (i.e., 5G NR and 5G core, and supporting at least Release 16).</p> <p>Note: This option could also support a hybrid arrangement, for example where a public mobile operator provides the radio network aspects, and the non-radio aspects of the network are self-provided by the Enterprise.</p>	<p>Having the 5G private mobile network provisioned entirely by a public mobile operator should be less demanding of the Enterprise than option 2 below as the Enterprise would rely entirely on services procured from a licensed 5G public service provider to establish its 5G private mobile network, thus enabling the Enterprise to focus its resources on its core business.</p> <p>In the case of the hybrid example, self-provision of the non-radio aspects of the network could give the Enterprise some of the advantages foreseen under option 2 below, i.e., greater</p>	<p>The Enterprise would be entirely reliant on the 5G public network being able to deliver the specific performance and coverage required to support the Enterprise's business needs. Relevant potential issues and limitations may include:</p> <ul style="list-style-type: none"> • Is there coverage at the locations required that can support slicing? • Can the network architecture support the required latency requirements? • Is there sufficient capacity available etc.? • Would the cost of service provision by a 5G public mobile operator align with the Enterprise's expectations?

⁶ A slice is a virtualized and independent logical network created on the 5G public mobile network with performance characteristics that are optimized to address the specific needs of the Enterprise customer.

Option	Advantages (for Enterprises)	Considerations and current limitations
	<p>scope for customization, more control over network management and upgrades, and potentially also higher data security.</p>	<p>The Enterprise would need to be satisfied that the security of any sensitive data would be maintained in the public network.</p> <p>In the case of the hybrid example, the Enterprise would need to provide the necessary expertise required to manage the non-radio aspects of the network.</p>
<p>2. Entirely self-provisioned network</p> <p>Implementing an independent 5G private mobile network on the Enterprise's premises using infrastructure that is owned and operated by the Enterprise (i.e., 5G NR or NR-U and 5G core supporting at least Release 16).</p> <p>In this option, CRA would issue spectrum licenses to the eligible Enterprises who wish to establish and operate 5G private mobile networks.</p> <p>Note: In the event that this option is adopted in Qatar, CRA will establish eligibility criteria, assignment processes and appropriate</p>	<p>The 5G private mobile network can be configured to align with the Enterprise's specific requirements in terms of performance and coverage.</p> <p>Full control over the management of the network, including response times for addressing maintenance issues, repairs and/or upgrades.</p> <p>Full control of the timescales for the implementation and potential evolution of the network according to emerging needs.</p> <p>The potential for higher security by keeping all data within the 5G private mobile network.</p>	<p>The Enterprise will either need to have significant telecommunications networking and IT related expertise in house, or it will need to subcontract aspects of the implementation and management of the 5G private mobile network to a partner. The use of subcontractors is foreseen in the Private Network Class License.</p> <p>Enterprises will have to consider the benefits of this option against the associated costs</p>

Option	Advantages (for Enterprises)	Considerations and current limitations
<p>spectrum licenses to enable Enterprises to access suitable radio spectrum to operate their 5G private mobile networks.</p>		
<p>3. A new licensee dedicated to providing 5G private mobile networks to Enterprises.</p> <p>The provision of 5G private mobile networks and services by a third party licensed under the Telecommunications Law specifically to provide only 5G private mobile networks and services to Enterprises in Qatar.</p> <p>Note 1: The existing public mobile operators (Ooredoo QSC and Vodafone Qatar) would continue to be able to provide 5G private mobile network services.</p> <p>Note 2: In the event that this option is adopted in Qatar, CRA will establish eligibility criteria, assignment processes and appropriate spectrum licenses to enable the new licensee to access suitable radio spectrum for the delivery of their 5G private mobile network</p>	<p>This option is motivated by existing trends and CRA's understanding that regulators and policy makers in other countries are considering making such a license available.</p> <p>This option would offer many of the advantages of both option 1 and option 2, whilst at the same time alleviating some of the potential difficulties associated with self-provision, for example, the Enterprise would not need such well-developed IT and telecommunications networking skills as the network would be deployed and managed by the 5G private mobile network service provider, thus the Enterprise would be able to focus its resources on its core business.</p> <p>Further, a dedicated 5G private mobile network service provider would not be engaged in the provision of consumer orientated 5G public mobile broadband services and therefore</p>	<p>Would the cost of service provision by an operator licensed to provide only 5G private mobile networks and services align with the Enterprise's expectations?</p>

Option	Advantages (for Enterprises)	Considerations and current limitations
services.	would be focused specifically on addressing the needs of its 5G private mobile network customers.	

4 Questions

Stakeholders are invited and encouraged to provide justified views and comments related to any aspect of the above options. However, CRA would also be pleased to receive inputs in response to the following specific questions. Please provide full details with each answer.

For Enterprises:

1. What benefits do you perceive and what concerns do you have regarding each of the three possible options discussed in Section 3 of this document?
2. Which of the three options discussed in this document do you prefer and why?
3. Would you consider using the services of a new licensee dedicated to the provision of 5G private mobile networks and services (i.e., option 3 above) if such a licensee was available in Qatar? What benefits would you foresee arising from such a licensee compared to the current 5G public mobile operators (option 1)?
4. Would you prefer an alternative deployment option to those mentioned in this document (i.e., an approach that is not mentioned in this document)? Please describe your preferred alternative.
5. When do you wish or plan for your 5G private mobile network to be operational?
6. If you wish to self-provide a 5G private mobile network, which radio spectrum bands do you consider to be most useful for your intended application and what bandwidth would you require?
7. Do you have any views on how spectrum for 5G private mobile networks should be licensed to Enterprises?
8. Is there any additional support that you would require from CRA? If so, please tell us what you require.

For licensed public mobile network operators and service providers:

9. What benefits do you perceive and what concerns do you have regarding each of the three possible options discussed in Section 3 of this document?
10. Are you currently offering 5G private mobile network services to enterprises in Qatar? If not, do you plan to do so in the future (please specify in which areas and the timeframes).

11. How many 5G private mobile networks have you deployed in Qatar? Please provide a list of customers.
12. In which areas of Qatar is your 5G public mobile network currently able to provide network slicing?
13. Do you plan to expand the network slicing capabilities to other areas (please state in which areas and by when)?
14. What would be the impacts on you and on the market in general if option 2, and/or 3 were available in Qatar?
15. Would you deploy a 5G private mobile network solution exclusively for a specific customer (i.e., independent of your 'national' 5G public mobile network), if this is what is required by the customer?
16. What are your views on the licensing of radio spectrum to enterprises for 5G private mobile networks, or to a possible future licensee authorized to provide 5G private mobile networks and services only? Do you have any preferences or suggestions for how this might be achieved, for example by making assignments in new spectrum bands not currently licensed to the existing 5G public network operators and service providers or through sharing mechanisms in existing and new bands?

5 How to Respond to the Consultation

5.1 Consultation procedures

Stakeholders and interested parties are invited to provide their views and comments on any aspect of this consultation and to respond to the specific questions raised herein. When responding, interested parties are asked to make clear reference to the paragraph and/or question number and to provide background, context and supporting information. This will enable CRA to understand why the submitted opinions are held by the respondent and take better account of the underlying reasoning.

All submissions received in response to this consultation will be carefully considered by CRA. However, it should be noted that nothing included in the consultation document is final or binding, and CRA is under no obligation to adopt or implement any comments or proposals submitted.

Responses to this consultation (and questions about this consultation) should be submitted by email to: raconsultation@cra.gov.qa. The subject reference in the email should be stated as “Consultation on 5G private mobile networks”. It is not necessary to provide a hard copy of the responses.

The deadline to respond to this consultation is July 21, 2022.

5.2 Consultation Response Template

Responses to this consultation **must** be in the template format (table) provided below. Responses that are not in this template format may be disregarded.

Respondent: [Name of company, organization, or individual].

Clause or question reference	Responses and Comments
[If relevant, please specify the number of the question or the number of the clause/paragraph of the consultation]	[Please provide your responses and comments in relation to the question or clause/paragraph mentioned in the first column]

document]	
...	...
...	...

5.3 Publication of Comments

In the interests of transparency and accountability, CRA may publish the responses to this consultation on its website at (www.cra.gov.qa). All responses will be processed and treated as non-confidential unless confidential treatment has been requested by the respondents.

In order to claim confidentiality of information in submissions, respondents must provide a non-confidential version of such material in which all information considered confidential has been redacted and replaced with “[CONFIDENTIAL]” or “[CONFIDENTIAL INFORMATION]”.

A comprehensive justification must be provided for each section of a response that respondents wish to be treated as confidential. Furthermore, respondents cannot request confidentiality for the entire response or whole sections of the response.

While CRA will endeavour to respect the wishes of respondents, in all instances the decision to publish responses (in full or in part) will be at the sole discretion of CRA.

By responding to this consultation, respondents will be deemed to have waived all copyright and/or intellectual property rights over the material provided.

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