Public consultation on the demand for enhanced internet connectivity and 5G in The Bahamas

Consultation Document

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UTILITIES REGULATION & COMPETITION AUTHORITY
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1. Introduction

The Utilities Regulation and Competition Authority ("URCA") is an independent multi-sector regulator with regulatory oversight of both the Electronic Communications Sector ("ECS") and Electricity Sector ("ES") in The Bahamas. URCA is mandated by the main objectives of the Electronic Communications Sector Policy ("ECS Policy") as set out in section 4 of the Communications Act, 2009 ("Comms Act") to, amongst other things, further the interests of persons in The Bahamas by promoting affordable access to high-quality networks and carriage services in all regions of The Bahamas. URCA is also mandated by the main objectives of the ECS Policy to promote investment and innovation in electronic communications networks and services and to promote the optimal use of radio spectrum.

In an increasingly connected and digitized world, access to reliable, affordable and high quality internet connectivity is becoming ever more important. Moreover, having access to electronic communications services is widely recognized as a catalyst for economic development and better social and cultural inclusion. The importance of reliable, affordable and high quality internet connectivity throughout The Bahamas was also stressed in multiple forums by the Government of The Bahamas.[1]

Facilitating reliable, affordable and high quality internet connectivity has therefore been an ongoing and renewed focus of URCA. URCA is cognizant that reliable, high-speed broadband connectivity and other technological developments, such as the Fifth Generation of International Mobile Communications technology IMT-5G (hereinafter referred to as "5G") could be catalysts for the further development of The Bahamas. Having regard to the foregoing, it is critical that URCA identifies any current demands and uses cases for 5G and other enhanced internet technologies[2] in The Bahamas. Additionally, it is also important for URCA to identify any infrastructure and service gaps that could impede the adoption of such services in The Bahamas and thereafter provide recommendations and next steps as to appropriate measures that may be taken to close such gaps. To this end, URCA is working closely with the Government of The Bahamas and industry stakeholders to ensure that any policies and/or regulations are reflective of and responsive to the rapid technological advancements taking place.

1.1. Context to this Consultation

In accordance with URCA's 2022 Annual Plan as set out in URCA Annual Report 2021 and Annual Plan 2022 URCA 03/2022 ("2022 Annual Plan"), URCA has recently completed a public

[1] See for example: https://thenassauguardian.com/govt-to-launch-free-wi-fi-in-one-park-in-every-constituency/ and the upcoming ECS policy and the Digital Transformation Initiative.
[2] See Section 1.2 for a more detailed discussion on enhanced internet connectivity services.

engagement exercise with the aim of assessing the demand for enhanced internet connectivity, including 5G, services in The Bahamas and identifying current gaps and technological deficiencies with respect to such demands. As part of this exercise, URCA engaged with a wide range of stakeholders, including representatives of various sectors within the Bahamian economy, operators licensed to provide electronic communications services within The Bahamas and members of the general public in The Bahamas, through surveys, interviews, and other methods and measurements. URCA considers that this public engagement exercise has provided URCA with valuable insight on the varying views and observations of fixed and mobile internet services currently available in The Bahamas and the demand and use cases for enhanced internet connectivity, such as 5G services, in The Bahamas.

In this Consultation Document, URCA:

(i) provides a summary overview of the main responses to the stakeholder engagement process to date;

(ii) sets out its preliminary views on the key findings from this engagement process; and

(iii) sets out its proposed next steps.

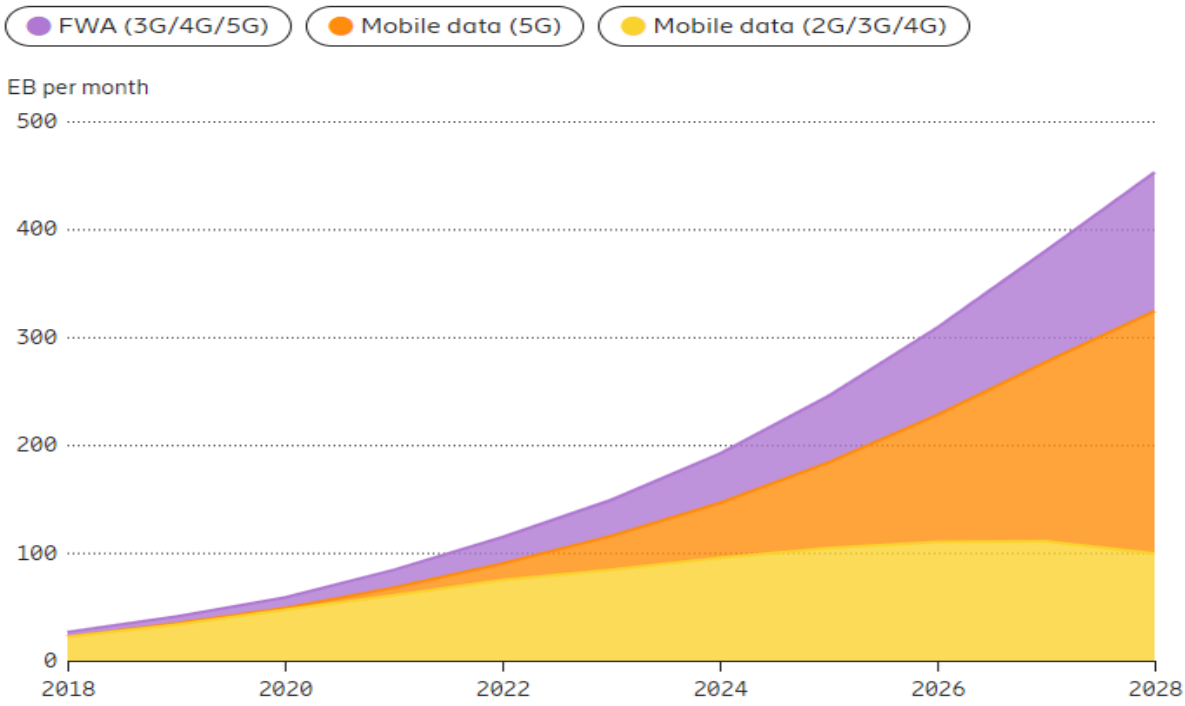
1.2. Introduction to Enhanced Internet Connectivity and 5G Services

In recent years demand for internet services and usage of mobile data services has been growing significantly in The Bahamas and worldwide. This trend is likely to continue going forward, as more devices are connected and more data-intensive services become available.

Anticipated increase in traffic, growth in the number of devices and services, as well as demand for enhanced affordability and user experience will thus likely require enhanced internet connectivity solutions, such as 5G. In this regard, as illustrated below, Ericsson estimates that by the end of 2028 at least 50% of all mobile data delivered will be via 5G networks.[3]

[3] Ericsson (2022). Accessible via: https://www.ericsson.com/en/reports-and-papers/mobility-report/dataforecasts/mobile-traffic-forecast

Figure 1: Global mobile network data traffic, by technology



Source: Ericsson, Mobile data traffic outlook.[4]

Enhanced internet technologies, such as 5G, can be delivered on new or upgraded radio access networks. It is widely considered that enhanced internet technologies may lead to significant improvements in speed and quality of service in comparison to internet technologies currently available in The Bahamas. Enhanced internet connectivity may also allow licensees to operate in a more cost efficient way. Enhanced internet services may be delivered via fixed and mobile network technologies.

Regarding fixed technologies, traditional copper and coaxial cable networks have been replaced over the years by upgraded cable technologies (DOCSIS 3.0, 3.1 and 4.0), and/or by deploying fiber strands increasingly closer to the end user such as Fiber to the Curb ("FTTC"), Fiber to the Building ("FTTB") and Fiber to the Home ("FTTH"). In The Bahamas, the fixed internet service providers are mainly deploying fiber to address the demand for high-speed internet services.[5]

Regarding mobile networks, 5G has been touted to provide substantial improvements over the current mobile technologies, including 3G and 4G /Long-term Evolution (LTE), by offering faster connection speeds, more reliable service, greater capacity and lower latency.

[4]Ericsson (2022). Available at: https://www.ericsson.com/en/reports-and-papers/mobility-report/dataforecasts/mobile-traffic-forecast

[5] For example, in 2021, Cable Bahamas Limited ("CBL") started to replace its Hybrid Fiber-Coaxial ("HFC") cable infrastructure on the island of New Providence with fiber-to-the-home ("FTTH") technology.

Moreover, experts and operators anticipate that, with 5G, operators are able to deliver more data at lower per-GB unit costs as cost efficiencies increase. A high-level comparison of 4G and 5G network performance and requirements is shown in Figure 2 below.

Figure 2: High-level Comparison of 4G and 5G performance capabilities and requirements

	4G	5G
Latency	60 – 98 ms	< 5ms
Peak down/upload speed	1/0.2 Gbps	20 /10 Gbps
Base stations	Cell towers	Small cells
Goal for cell density	200-400 users per cell	100 times greater than 4G
Device density	250 per mi^2	2.5 Mn per mi^2
Mobility	220 mph	310 mph

Source: Own elaboration adapted from TechTarget[6] and Ericsson [7]

Concerning Consumer Security and Data Privacy. 5G may have additional advantages compared to 4G. This is because 5G technology uses 4G's best defensive technology and implements new security protocols which resolve previously unresolved threats. This is the case, for instance, with enhanced user authentication and stronger data encryption.[8]

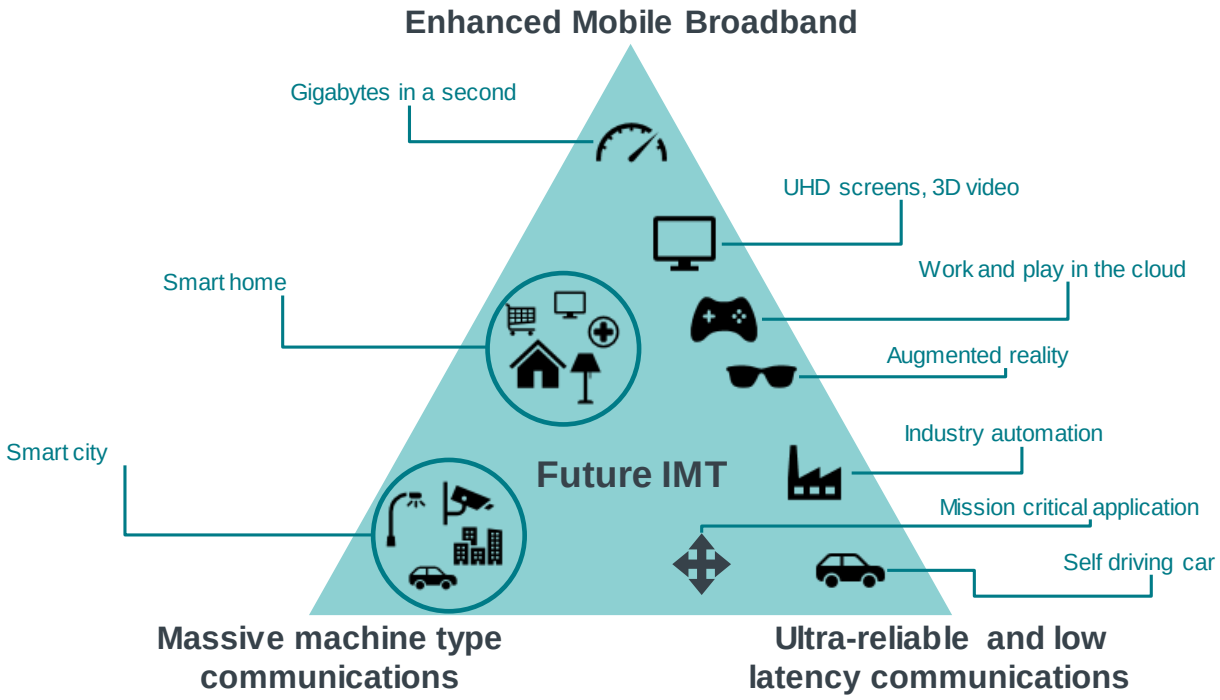
Additionally, 5G networks also enable new use cases and applications in a number of industry sectors worldwide. Figure 3 below illustrates possible new use cases and applications for 5G ranging from self-driving cars to post-disaster communications services.

[6] TechTarget (2022). Accessible via: https://www.techtarget.com/searchdatacenter/tip/Evaluate-5G-networks-vs-4G-for-data-centers

[7] Ericsson (2021). Accessible via: https://www.ericsson.com/49f1c9/assets/local/5g/documents/07052021-ericsson-this-is-5g.pdf

[8] Forbes (2019). Accessible via: https://www.forbes.com/sites/forbestechcouncil/2019/09/23/why-5g-can-be-more-secure-than-4g/?sh=22d89a8057b2

Figure 3: Possible use cases for 5G



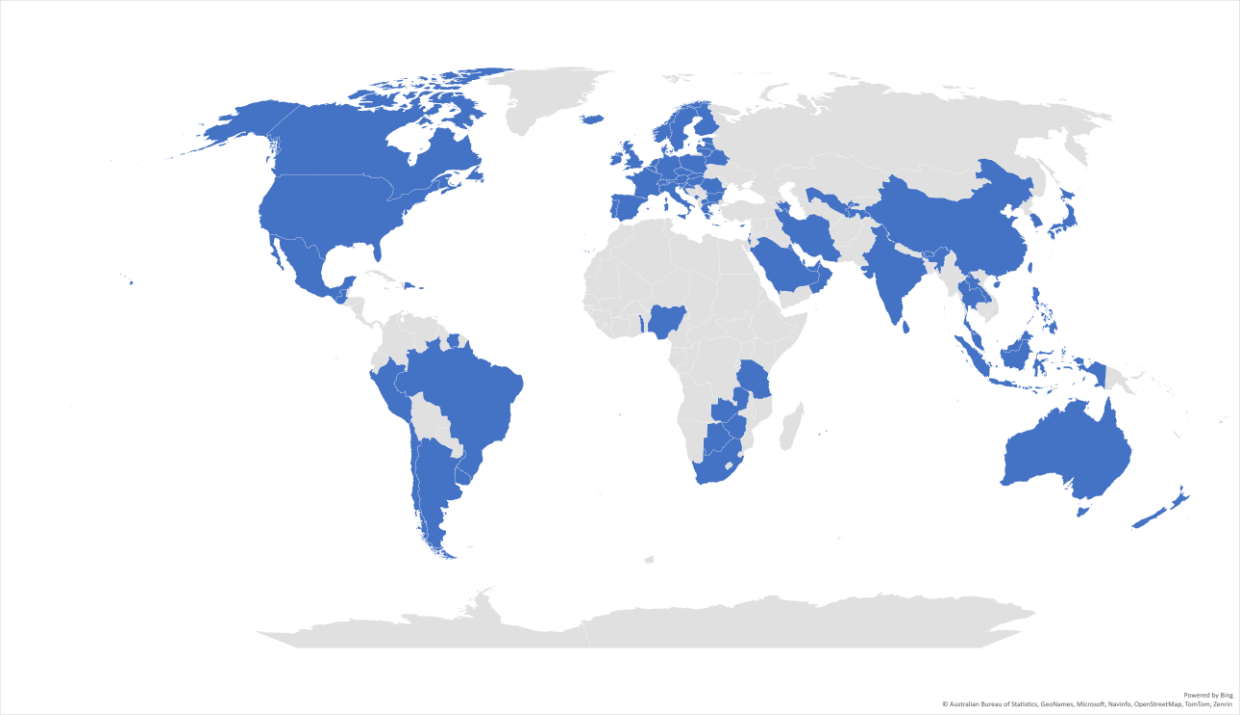
Source: Own elaboration based on information from ITU[9]

Since its initial deployment, 5G networks are available in approximately 90 countries as of March 2023.[10] Initially, access to 5G networks was only available in urban areas in certain Asian, European, Northern and Southern American countries. More recently, mobile operators in a few Central American and regional countries have also rolled out 5G networks, namely the Dominican Republic (ca. 7% coverage), Guatemala (partial coverage of all 22 departments), Mexico (coverage in 31 cities), Puerto Rico (ca. 100% coverage), US Virgin Islands (ca. 70% coverage).[10] Figure 4 below illustrates a world map of countries where 5G is available as of March 2023.

[9]International Telecommunication Union (2022). Accessible via: https://www.itu.int/en/mediacentre/backgrounders/Pages/5G-fifth-generation-of-mobile-technologies.aspx

[10] According to the Telegeography database consulted in March 2023.

Figure 4: World map of countries with live 5G networks



Source: Own analysis, based on Telegeography data (retrieved in March 2023)

Typically, 5G relies on a large number of small(er) cells in the radio access network (RAN), compared to previous mobile networks technologies, which relied on a combination of cell towers and smaller base stations (in urban areas). This implies that with the transition to 5G, the RAN needs to be densified and network layers have to be updated, which in turn requires investment across all network elements.[11] Further, to address the increased data traffic on each cell site and to ensure low latency, enhanced mobile backhaul solutions need to be introduced by means of deploying fiber to cell sites. On top of this, there is a need for additional incremental spectrum beyond what is currently allocated to 3G and 4G technologies. In this regard, it is important to note that spectrum allocated for use in older generations of mobile technologies such as 3G may prevent such spectrum from being reassigned for use in providing 5G services as mobile operators will likely continue to offer 3G services to their customers for the foreseeable future.

Consequently, URCA acknowledges that instead of an immediate change in network configuration, mobile operators are likely to follow a gradual transition to 5G. This means that they may, over time, transition to deploying 5G, for example, by installing the smaller cells needed in targeted (urban) areas or by introducing 5G RANs that rely on a 4G core network (also known as 'non-standalone' 5G roll-out). This will allow devices to access both 4G and 5G networks simultaneously using the same spectrum.

[11] GSMA (2019): https://www.gsma.com/futurenetworks/wiki/5g-era-mobile-network-cost-evolution/

This gradual transition may permit operators to spread investment costs over a larger period of time, allowing mobile operators to assess how the demand for 5G evolves over time. URCA recognizes that the implementation of 5G in The Bahamas will require a significant amount of time and investment to upgrade the existing mobile networks and infrastructures of the two mobile operators in The Bahamas.

As discussed further in Section 1.3 below, URCA is also cognizant that there may need to be some amendments and/or additions to the existing regulatory framework in The Bahamas to facilitate 5G, including but not limited to, assessing the need to issue additional spectrum, ensuring all mobile operators have access to fiber backhaul connectivity on reasonable terms, and/or facilitating site sharing where feasible.

1.3. Objective of the Overall Public Consultation Process

Given the significant efforts required to deploy 5G and the aforementioned benefits of 5G, URCA is conducting this consultation to better understand and develop an evidence base for the current and expected demand for enhanced internet connectivity and 5G-enabled services in The Bahamas.

It is important to note that URCA considers this consultation process as the first step in URCA's overall plan to assess and enable 5G in The Bahamas, as shown in the infographic (Figure 5) below.

As set out above, the objective of this exercise (and of any actions resulting from it) is to develop a more in-depth and evidence-based understanding of the current and potential future **demand and use cases for enhanced internet connectivity and 5G services** in The Bahamas. The outcome of this consultation process will then form as a basis for discussions with the licensees and/or Government on how to **establish the most efficient way to allow meeting this demand/enabling the use cases** in The Bahamas. This may include, amongst other things, assessing the incremental investments/network upgrades required by licensees and identifying geographic locations within The Bahamas where 5G deployment should be focused on in the primary stages.

As part of this, it will also be important to identify **any regulatory and/or policy measures required** to enable the deployment of enhanced internet connectivity and, in particular 5G, in The Bahamas. In doing so, URCA will prioritize any regulatory or policy action that is essential for any 5G deployment, such as, for example, assigning 5G spectrum. These requirements will be identified in due course, in collaboration with the relevant stakeholders i.e. the Government, the licensees and URCA. In parallel, URCA will consider, in ongoing dialogue with the licensees, the most suitable implementation options and technical solutions to address the emerging demand in The Bahamas.

In this context, URCA will work with the operators also to assess in more detail the incremental costs of deploying 5G and/or any other suitable enhanced internet technology in The Bahamas (especially in the geographic areas where it is deemed uneconomic to do so) and any potential bottlenecks for doing so commercially. This, in turn, will allow URCA to identify ways to best address any such barriers to deploy 5G and/or any other suitable enhanced internet technologies in The Bahamas.

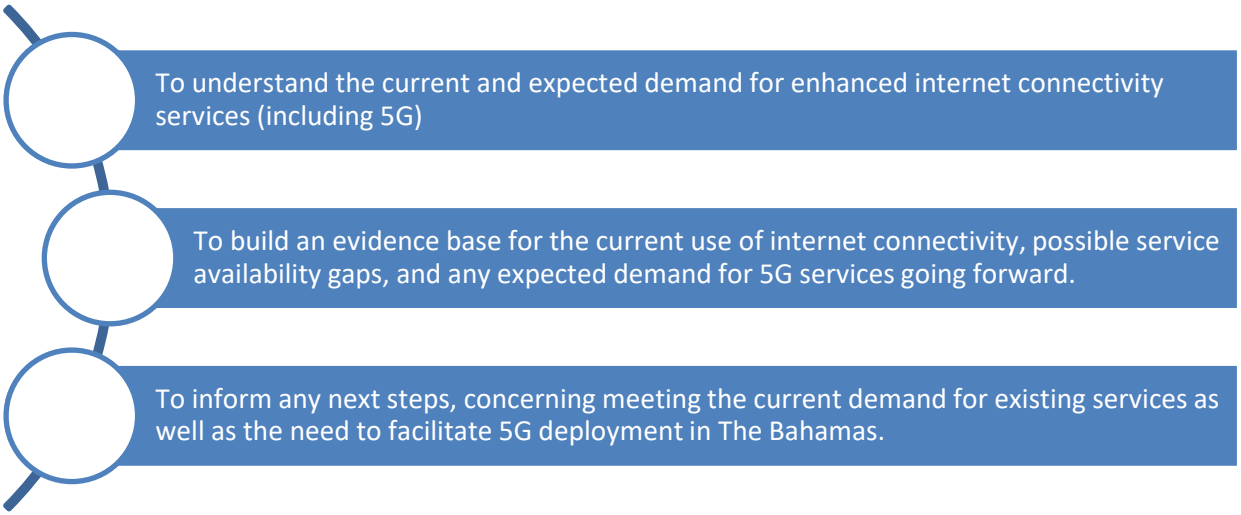
Figure 5: Key steps in URCA's plan to assess and enable 5G services in The Bahamas

1.3.1. Objective of this Consultation Document

In the last trimester of 2022, URCA initiated the first step in the process described in Figure 5 above, the assessment of 5G use cases and demand for 5G in The Bahamas. URCA commenced this exercise by organizing focus groups with representatives of various sectors/industries within the Bahamian economy, randomly administering a survey to members of the general public and requesting information from licensed operators in The Bahamas.

In this Consultation Document, URCA now presents its findings and insights obtained from the engagment with stakeholders and sets out its recommendation and next steps. URCA invites all interested persons to respond to this Consultation Document. Figure 6 below illustrates URCA's objectives in conducting this consultation process.

Figure 6: URCA's objectives with this Consultation Document



1.4. How to respond to this Consultation Document

URCA invites responses to this Consultation Document from all stakeholders and interested person. Please note that responses to this Consultation Document must be submitted to URCA on or before 5 p.m. on Monday, 5 June 2023.

Written responses or comments on this Consultation Document should be sent to URCA's Director of Electronic Communications, either:

- by hand, to URCA's office at Frederick House, Frederick Street, Nassau; or
- by mail to P.O. Box N 4860, Nassau, Bahamas; or
- by fax, to (242) 393-0153; or
- by email, to info@urcabahamas.bs.

Persons may obtain copies of this document by downloading it from the URCA website at www.urcabahamas.bs.

URCA reserves the right to make all responses available to the public by posting responses online on its website. If a response is marked confidential, reasons should be given to facilitate evaluation by URCA of the request for confidentiality. URCA may publish or refrain from publishing any document or submission, in its sole discretion.

URCA will conduct **one (1) round of consultation** with interested parties and stakeholders. URCA will then review the responses and comments received on this Consultation Document within the prescribed timeline for responding to this Consultation Document. All comments and submissions received within the prescribed timeline may be published on URCA's website. Upon completion of this consultation process, URCA will publish its Statement of Results within thirty (30) calendar days following the end of the consultation period, unless extenuating circumstances dictate otherwise (in which case URCA will duly notify the public). URCA will give full reasons for its decisions.

Copyright and all other intellectual property that form any part of a response to this consultation will be assumed to be licensed to URCA for its use during this consultation process.

1.5. Legal Framework

This subsection sets out the legal framework that governs URCA's power to conduct this consultation process.

Section 4 of the Comms Act provides, *inter alia*, that the electronic communications policy has as one of its main objectives, to further the interest of persons in The Bahamas in relation to the ECS by promoting affordable access to high quality networks and carriage services in all regions of The Bahamas.

Section 5 of the Comms Act provides that all regulatory measures shall be made with a view to implementing the electronic communications policy objectives. Regulatory measures, inter alia, should be efficient and proportionate to their purpose and in traduced in a manner that is transparent, fair and non-discriminatory.

Section 11 of the Comms Act requires URCA to allow persons with sufficient interest a reasonable opportunity to comment on a proposed regulatory measure which, in the opinion of URCA:

(i) is of public significance; or
(ii) whose rights or interests may be materially adversely affected or prejudiced by the proposed regulatory measure. URCA must also give due consideration to those comments prior to introducing the regulatory measure.

Section 13 of the Comms Act establishes that a regulatory measure is likely to be of public significance if it relates to a regulated sector and can lead to:

(i) a major change in the activities carried on by URCA under the Comms Act or any other enactment;
(ii) a significant impact on persons carrying on activities in a regulated sector; and/or
(iii) significant impact on the general public in The Bahamas or in a part of The Bahamas.

URCA therefore considers that the cumulative effect of the foregoing statutory provisions requires URCA to conduct this consultation process regarding the ongoing public consultation/engagement process on the demand for enhanced internet connectivity/5G and any potential decision URCA issues in relation thereto.

1.6. Structure of the remainder of this document

The remainder of this Consultation Document is structured as follows:

Section 2: Outlines the approach adopted by URCA with respect to the public consultation/engagement process;

Section 3: Presents the key findings of the engagement process conducted so far; and

Section 4: Summarizes preliminary conclusions and describes possible next steps for URCA to act on the key findings from the engagement process conducted so far.

Sections 3 and 4 also contain consultation questions that interested persons are invited to respond to as part of this public consultation process.

2. Approach Adopted by the URCA

Given the importance of this matter, URCA considers that it is essential to engage with a wide range of stakeholders and therefore has, in this particular instance, adopted a more extensive approach than the standard process for its public consultations. In particular, as indicated in the previous section, URCA has chosen to obtain input from members of the general public and representatives of various sectors/industries within the Bahamian economy. In this regard, URCA took the following actions:

1) Organized several, extensive focus group discussions with various industry groups;
2) Conducted an end user survey; and
3) Issued a 'Call for Input' to the three key providers of electronic communication services in The Bahamas.

Each of these processes are discussed in more detailed below.

URCA wishes to thank all stakeholders for their participation and contributions over recent months and looks forward to continuing this dialogue with all interested parties.

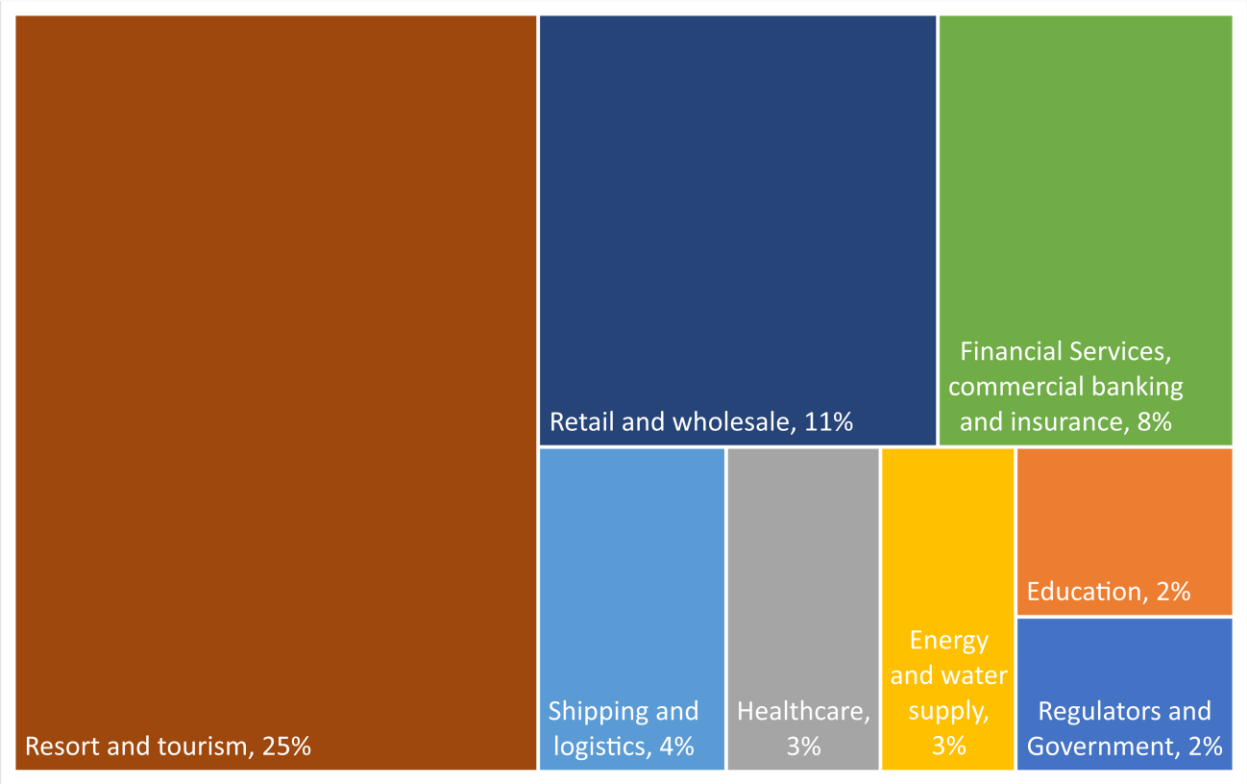
2.1. Industry Focus Group Discussions

In November and December 2022, URCA held nine (9) focus group meetings with 52 representatives of certain key sectors of the Bahamian economy and society, identified by URCA, to discuss, amongst other things, the current demands and use cases for enhance internet connectivity in The Bahamas. In total, there were fifty-two (52) persons who participated in the focus group meetings either in-person or virtually from New Providence, Grand Bahama, Eleuthera, Abaco, Acklins, and Andros. Each of these focus group meetings were moderated by Mr. André Foster and facilitated by The Counsellor Limited ("TCL").

The following sectors were represented by one or more person(s) during the focus group meetings:

1) business development services or incubators;
2) education providers;
3) energy suppliers;
4) financial service providers, commercial banks and insurance companies;
5) central and local government, regulators;
6) healthcare providers;
7) hospitality and tourism stakeholders;
8) retail business / grocers (online and physical shops);
9) shipping, logistics and importers; and
10) wholesale business.

Figure 7: Sectors represented in focus groups and their contribution to the total GDP of The Bahamas



Source: Own analysis based on Bahamas National Statistical Institute (2018 data). Resort and tourism includes real estate.

During the focus group meetings, all participants were invited to explain their current internet connectivity demand and experience, as well as express their views on potential use cases for enhanced connectivity services going forward. In particular, they were asked to:

1) Provide an overview of their current use of internet connectivity services:
   - the current Internet Service Provider;
   - the type, frequency and location of internet connectivity services procured;
   - the importance and key features of internet connectivity for their business and work;
   - any preferences on technologies for internet access services;
   - their satisfaction with the quality of service and customer care received; and
   - any constraints resulting from the internet connectivity currently available to them.
2) Provide an indication of anticipated changes in their demand for internet connectivity services in the near future:
   - the types of connectivity services anticipated to be essential in the future; and
   - expectations about future internet connectivity services.
3) Illustrate potential use cases for enhanced internet connectivity services in their sector; and

4) Make recommendations on how to best allow meeting current and expected future demand for enhanced internet connectivity services.

Once the focus group discussions were completed, the TCL Group analyzed the discussions held across the various groups and presented the key findings in a summary report to URCA.

2.2. End User Survey

URCA also engaged TCL to randomly administer a survey instrument designed by URCA to the general public. TCL conducted the survey, analysed the results, and presented the key findings in a summary report to URCA.

The end user survey covered the following key topics:

1) Current use of internet connectivity services:
   - the current Internet Service Provider and plan subscribed to;
   - the importance of internet connectivity to them;
   - any preferences on technologies for Internet access services;
   - their satisfaction with the quality of service received; and
   - any constraints resulting from the internet connectivity current available to them.
2) Anticipated changes in their demand for internet connectivity services in the near future:
   - the types of connectivity services anticipated to be essential in the future; and
   - expectations about future internet connectivity services.
3) Understanding of 5G services and potential demand for them.

Approximately 530 end users were surveyed across New Providence, Grand Bahama and the Family Islands by means of telephone interviews during November and December 2022.[12]

2.3. Call for Input from Operators

On 25 October 2022, the three main operators in The Bahamas, The Bahamas Telecommunications Company Ltd. ("BTC"), Cable Bahamas Ltd. ("CBL"), and BE ALIV Ltd. "(Aliv"), were invited to submit their views, in writing, on the current and expected demand for enhanced internet connectivity services (including 5G) in The Bahamas. In particular, they were asked to set out:

[12] URCA notes that the end user survey was mostly undertaken to obtain high-level insights in the views of end users on their current and future use of internet connectivity services.

1) potential use cases for enhanced internet connectivity services, elaborating on technology requirements to enable these use case, sectors and groups targeted with those potential use cases, as well as an estimation of the timeframe needed to adopt them in the Bahamian market context;
2) key gaps in the current network capacity, capabilities and geographic coverage in The Bahamas to facilitate the provisioning of the key use cases for enhanced internet connectivity relevant to The Bahamas;
3) any other enablers/requirements to facilitate the provisioning of the key use cases for enhanced internet connectivity relevant to The Bahamas;
4) any risks/drawbacks to The Bahamas of not being able to enable, on a ubiquitous bases, the use cases they identified; and
5) an overview of potential benefits to licensed operators in The Bahamas from the deployments of enhanced internet technologies (such as 5G).

URCA received two submissions in response to its Call for Input: A submission by BTC and a joint submission by CBL and Aliv.

3. Key Observations

Generally, URCA observed some common themes across all three stakeholder groups, in particular from both the industry/sector representatives that participated in the focus group meetings and the end users, which are summarized below. Further details on the key observations from each stakeholder group are then set out in Sections 1.3.1 to 1.3.3.

- Basic internet connectivity is important for end users, the industry, as well as public sector participants. It is especially important for end users in the Family Islands where, in some instances, reliable connectivity has been a challenge since Hurricane Dorian in 2019.

- Current (mobile and fixed) internet connectivity services available are commonly considered sufficient to meet prevailing demand for internet connectivity in The Bahamas, if provided to an adequate quality of service and customer care standard.

- The general view is that the focus for now should be to improve the delivery of current services, both in terms of geographic availability and quality of service/experience. All participants in the focus groups agreed that priority should be given to extend the availability of reliable internet services to remote areas and the Family Islands, as well as ensuring high quality of service across all islands.

- While some 5G use cases were identified in the focus groups, URCA onserved that there was some uncertainty with respect to the demand for enhanced connectivity/5G in the Bahamas expressed by the participants in the focus groups and those persons that completed the survey. URCA notes that this uncertainty may be due to, amongst other things, a lack of information on potential 5G use cases among stakeholders.

- Lastly, there is a general interest in continuing the dialogue between the industry, operators and URCA, with a potential dual function:

    - Engagement with operators on meeting current demand for connectivity services; and

    - Enhancing understanding of trends within the electronic communications sector elsewhere, and possible implications/opportunities for The Bahamas going forward.

3.1. Industry Focus Groups

URCA notes and welcomes the wide interest across various industry and sectors within the Bahmian economy and society to engage on this matter and thanks all participants for their extensive and constructive feedback received during the focus group meetings. The lack of referencing to a particular comment or any issue raised during any of the the focus group meetings in this document should not be interpreted to mean that URCA has not considered such comment or issue.

Overall, participants in the focus groups meetings view internet connectivity as an important input to their operations and the economy as a whole, which has become even more important since the Covid-19 pandemic and the general digitalization trend. The participants expect that the increasing reliance upon internet connectivity to continue in the future.

Generally, the participants indicated that existing electronic communications services, if optimized, are sufficient for most of their day-to-day operational needs, as of now and in the near future. While many participants expressed intrigue into the potential of 5G and mentioned some speculative use cases, there were no clear or strong use cases emerging for 5G arising from the focus group meetings.

URCA notes that many participants expressed concern with respect to the apparent failure of the three main operators in The Bahamas to deliver high quality, reliable service to meet the demands of their repsective businesses and/ or mandates. Many of the participants also expressed a strong desire for improved customer service, increased affordability, increased transparency in customer communications, and more resilient service delivery by BTC, and CBL.

URCA notes that the prevailing focus in the discussions during the focus group meetings was on fixed network based connectivity services, and particularly fiber connectivity, rather than fixed-wireless access or mobile connectivity services. URCA observed that most of the participants meet their connectivity needs based on dedicated connectivity services (multi-sites) from both BTC and CBL. Wireless solutions seem to be less used, although in some instances mobile connections (e.g., through MiFi devices) are used to complement fixed services such as for remote working or in case of fixed service outages.

The participants expressed a strong desire for better service delivery nationwide, particularly in the Family Islands where network coverage gaps remain, and the need for (reliable and fast) connectivity is urgent. There is a relatively high degree of dissatisfaction with the current service level, in terms of reliability, quality of service, customer support or care and thus value for money. In this context, some participants claimed that the cost of internet, especially for businesses, is too high in The Bahamas.

This may, in part, be related to many of the participants purchasing connectivity from both BTC and CBL as redundancy in the event of a loss of service.

Generally, URCA notes that most of the participants expressed a preference for the focus to be on resolving issues on current internet connectivity services, before upgrading to a new technology. A summary of the issues raised by participants in the focus group meetings on each of these points, with respective examples, is presented in Figure 8 below.

Figure 8: Themes raised by the industry focus groups and examples of the issues

Issue identified by industry groups	Examples provided
Reliability of service	Services outages, lack of stable connection during demand peaks
Customer care	Deficient post-sale maintenance, technical support and troubleshooting
Speed of service	Slow connection, especially in geographic locations where fiber is unavailable
Compensation for loss of service	Insufficient compensation received in exchange for loss of service given the amount of business lost when service is down
Affordability	Low value for money, business users having to purchase redundancy connectivity

Participants also added that existing use cases such as businesses relying on cloud-based solutions, the general increase in the numbers of SMEs in The Bahamas and online/hybrid education models already require additional internet bandwidth, but there was a consensus that this on its own would not require the deployment of 5G technology. While many participants are intrigued by the likely potential of 5G and identified a few potential use cases for it in The Bahamas, these were not identified across the board by all participating industries. The potential use cases identified and relatable to 5G are summarized in Figure 9 below.

Figure 9: Potential use cases, by sector, that are relatable to 5G raised in the industry focus groups

Sector	Potential use cases
	**Tourism.** Expectation that demand from North American tourists will increase the need for 5G services and WiFi zones. Specific reference was made to Nassau Cruise Port where, as part of the ongoing redevelopment, a WiFi zone/5G-based private network is being considered.

	**Security and defense.** Expectation that 5G would enable body-worn cameras, CCTVs, drones, Artificial Intelligence (AI)-devices to be used in the security and defense sector.
	**Logistics.** Expectation that the automation of processes will require high speed delivery over mobile networks. This seems to be especially the case for some automated processes, smart lockers or package delivery tracking.
	**Financial services and payments.** Expectation that, in line with global trends, cash usage will decline while online payments will increase. Online banking, biometric payments and cloud-based services will require reliable network connectivity.
	**Other sectors.** Expectation that education will become more hybrid and remote working will increase implying higher bandwidth is needed for virtual meetings. At home, people will connect more devices (smart homes) and access telemedicine services.

It is important to note that all of the above use cases were presented as potential or speculative only at this point in time. Therefore, further analysis and discussions with the relevant stakeholders would be required to better understand each potential use case, the timelines of its implementation and how it could be facilitated.

Moreover, the industry groups raised questions around the affordability of 5G services if deployed in The Bahamas. In particular, given the expected investment needs, there was a concern that 5G services, if implemented, may be cost prohibitive to end users/businesses in The Bahamas. This should be accounted for when evaluating the case and demand for 5G.

Consultation Question 1:

- **Do you agree with the key observations raised within the industry discussion groups, as summarized above? Should you disagree, please provide a detailed explanation of your view, including supporting evidence where available.**
- **Do you have additional issues/observations on the potential demand for/use cases of 5G/enhanced internet connectivity you would like to raise to URCA's attention? If so, please provide a detailed explanation of these issues/observations, including supporting evidence where available.**

3.2. End User Survey

Approximately 530 end users were surveyed across New Providence, Grand Bahama and the Family Islands by means of telephone interviews conducted by TCL.

The end user survey confirmed the high take-up of mobile data services via smartphones by residential customers, as well as fixed broadband services[13]. Survey respondents reported that reliable internet service via mobile phones and fixed line is equally important to them.

In relation to **use cases**, respondents currently use their internet access for various purposes across mobile and fixed, namely for:

- surfing the web,
- video calling / conferencing,
- online shopping,
- watching videos, and
- live streaming.

Mobile internet services are also very frequently used to access mobile messaging apps, maps and GPS, online education, e-government websites or e-health services as well as for playing video games.

Regarding **customer satisfaction**, the majority of the survey respondents did not feel that their existing mobile or fixed internet services constrains them. Fixed and mobile users are overall (80% or above) satisfied with their current download speed, the reliability of the service, and the network coverage. These results do not vary significantly across mobile and fixed services, although different issues are reported by respondents as explained below.

Dissatisfied survey respondents mainly reside in the Family Islands or in New Providence. [14] For those end users that are dissatisfied, the key issues stated were the download speed, internet reliability and coverage. In particular, some mobile data users in the sample complained about the lack of service coverage (i.e., not receiving any mobile data service) in the Family Islands.

[13] Of all surveyed end users, 88% reported using smartphone-based internet and 54% using fixed broadband services. These take-up levels are lower than those reported by URCA in the past. For example, in URCA' Annual Report 2021, URCA reported a fixed broadband penetration rate of 20.9% (in terms of total population), equating to a penetration rate of ca. 70% (in terms of total households). In an end user survey run in the context of the Retail Cellular Mobile Market Review (2022), URCA found that 98% of respondents said they hold a smartphone or tablet with the ability to access the Internet and/or send email. URCA notes that the end user survey was mostly undertaken to obtain high-level insights in the views of end users on their current and future use of internet connectivity services.

[14] Rather than in Grand Bahama, for example.

In relation to both fixed and mobile internet services, a number of survey respondents complained about the low-speed of their internet services and they also reported frequent drops of service and intermittent/high-latency internet for example during streaming.

The survey results also show that consumers in the Family Islands are not satisfied with their services, which may be linked to coverage issues persisting since the passing of Hurricane Dorian in 2019.

On **new technologies**, only about half of the respondents (for both mobile and fixed services) indicated that they heard about 5G services. Of those, the majority perceived that increased speed compared to those currently available is the main advantage of the new technologies. Respondents do not expect significant changes in the services or applications they would access online in the near future. For example, only some end users expect to access e-health services or to use a smart home device; and there is no expected change in the consumption of video, 3D or augmented reality.

Overall, from its review of the end user survey, URCA reiterates that internet access is very important to end users in The Bahamas. The majority of end users are satisfied with current download speeds, network coverage and reliability of their internet access service. End users located in the Family Islands and New Providence make up the largest proportion of those respondents dissatisfied across the categories mentioned (i.e., lack of coverage, low speed, high latency). Therefore, going forward, URCA sees a continued need to focus on enhancing the availability of mobile and fixed internet services in the remote parts of The Bahamas, such as the Family Islands, to ensure that reliable internet access is available throughout the entire Bahamas, at the required quality of service standards. In relation to 5G services, the surveyed users indicate limited awareness and interest in 5G new use cases, with current services being considered sufficient to meet end users' known demand for internet-access.

Consultation Question 2:

- **Do you agree with the key observations on the current demand for internet connectivity from end users in The Bahamas, and their expected demand for enhanced internet connectivity, as summarized above? Should you disagree, please provide a detailed explanation for your view, including supporting evidence where available.**
- **Do you have additional issues/observations on the potential demand for/use cases of 5G/enhanced internet connectivity for end users you would like to raise to URCA's attention? If so, please provide a detailed explanation of these issues/observations, including supporting evidence where available.**

3.3. Operators Submissions

URCA welcomes the submissions by CBL/Aliv and BTC and wishes to continue facilitating a dialogue between operators and the stakeholders involved in this consultation.

URCA notes that both submissions from BTC and CBL/Aliv are predominantly focused on supply side matters (i.e., need for more spectrum, device ecosystem, investment costs) and therefore provided only limited insights on the expected demand for enhanced internet connectivity services or potential use cases in The Bahamas.

In line with the overall focus of this consultation, URCA focuses below on the issues raised by the operators concerning the demand side only.

CBL/Aliv's Submission

CBL/Aliv requested that URCA treat their response to the Call For Input confidentially. Thus, the following provides a high-level summary of their response. CBL/ Aliv confirmed the complexity and large investment needs for deploying 5G and the current unknown demand for it. Within their response, CBL/Aliv set out various possible, future 5G use cases/applications in The Bahamas within the public sectors as well as in the areas of education and tourism. Concerning network upgrades and expanding coverage, CBL/Aliv stress the need to increase capacities due to growing data demand, regardless of 5G implementation.

BTC's Submission

BTC notes that the tourism sector, shipping companies and government may be the initial target group for 5G services. BTC also acknowledges that 5G mobile broadband will allow mobile operators to deliver more data capacity, at a lower cost. In BTC's view, using 5G as the key technology to increase mobile broadband capacity is likely to be applicable in the medium term, while new applications and use cases would take longer to materialize.

BTC considers the following to be measures that would be required to enable 5G deployment in The Bahamas:

- Greater spectrum needs that could be met by increasing carrier capacities;
- Increased needs of cell sites backhaul due to higher traffic levels and upgrades to coverage beyond New Providence;
- Availability of affordable 5G capable devices;
- The need to lower licensing and regulatory fees, reducing customs duties of necessary network equipment and on devices as well as access to stable supply of electricity;
- Sharing networks facilities and the licensing of a third mobile network operator will reduce operators' return on 5G investments.

Consultation Question 3:

- **Do you agree with the key observations raised within the operator submissions, as summarized above? Should you disagree, please provide a detailed explanation of your view, including supporting evidence where available.**
- **Do you have additional issues/observations on the potential demand for/use cases of 5G/enhanced internet connectivity you would like to raise to URCA's attention? If so, please provide a detailed explanation of these issues/observations, including supporting evidence where available.**

4. Preliminary Conclusions and Next Steps

Considering all contributions from the different stakeholders summarized above, URCA identifies below a set of preliminary conclusions and related next steps to address the emerging issues. URCA then also sets out the proposed next steps in the overall process, as outlined in Section 1.3 above.

4.1. Preliminary Conclusions

URCA's preliminary conclusions cover two main topic areas:

1) the demand for 5G and enhanced connectivity, which is the main focus of this consultation process; and

2) prevailing concerns on the quality of service and service availability of existing internet connectivity services, which emerged during the consultation process.

4.1.1. 5G and Enhanced Connectivity

Some key takeaways in relation to 5G demand can be drawn from stakeholders consulted to-date (that is focus group participants, end users and operators). Currently, there is a limited understanding of the 5G potential, especially among residential users. More generally, there is limited established demand for 5G services from both residential and non-residential end users. Operators are concerned that ubiquitous 5G is currently not economically viable due to the high capital costs it would require and the limited or uncertain demand. These points are summarized in Figure 10 below.

Figure 10: Prevailing themes around 5G emerging from the different stakeholders consulted to-date

Issues raised on 5G / enhanced connectivity	End users	Industry stakeholders	Operators
Limited known demand/uses cases for 5G now	✓	✓	✓
Ubiquitous 5G is currently not economically viable			✓
Limited awareness of 5G potential	✓	✓	

While the prevailing feedback is that it is premature to speak of demand for 5G in the Bahamian context to date, there are some differences between the three stakeholder groups consulted so far.

A minority of **residential users** are aware of or expresses clear interest in 5G or enhanced connectivity services. Existing mobile and fixed services meet the prevailing demand and current use cases of most users. This is reflective of the main use cases of mobile and fixed services reported by residential end users being: surfing the internet, watching videos and live streaming, video conferences and messaging apps (just for mobile users). It is URCA's view that 5G or enhanced internet connectivity is not required for such use cases. URCA notes that exisiting internet services available in The Bahamas, if optimized, can meet the demands of consumers with respect to such use cases.

Among the **participants in the focus groups**, some respondents are prospectively interested in 5G, although it is recognized that most use cases are very localized and incipient at this stage. While demand may have not materialized yet, the industry points to some use cases for 5G in the future indicating that there is an appetite more generally to engage in further discussions around 5G in the near future.

Operators are cognizant of the complex and large investment needs for deploying 5G and the current unknown demand for it. While operators may envisage investing in 5G in the short-medium period (3-5 years), this would mainly be with the view to support existing data needs (i.e., enabling larger capacity or more cost-efficient delivery of mobile data). 5G investments related to enabling new use cases may take a considerably longer time to emerge and roll out in The Bahamas due to the magnitude of investments.

A summary of the prospective use cases raised by end users, the industry and operators are listed in Figure 11 below.

Figure 11: Prospective use cases emerging from the different stakeholders consulted to-date

Prospective use cases identified for 5G / higher bandwidth or speed	End users	Focus Group participants	Operators
5G as complement to fiber/fixed		✓	✓
Tourism		✓	✓
Remote work post COVID-19		✓	
Telemedicine	✓	✓	
Education		✓	
VR/entertainment/gaming		✓	✓
Smart homes and smart meters	✓	✓	
Financial services		✓	✓

Security		✓	
Logistics / shipping industry		✓	✓
Government			✓

Having regard to the foregoing, at this stage and in the short term, the demand for 5G is expected to be limited in The Bahamas and, if anything, it would be circumscribed to specific and prospective use cases in certain industries. URCA notes that this may, in part, be driven by the limited awareness of 5G in The Bahamas. As part of the next steps, URCA considers how to address this going forward.

Given the feedback received to-date, URCA's focus going forward will be on monitoring developments and requests from such targeted demand amongst industry groups. For specific sectors that will require high-speed connectivity in the form of 5G (e.g., tourism, national security, and logistics), URCA's priority will be enabling and facilitating these use cases. It will do so by engaging further with the relevant stakeholders in order to better understand their needs. Further, URCA will seek to mitigate any supply, policy and/or regulatory barriers preventing these use cases to materialize on a commercial basis. Next steps are discussed in detail in Section 4.2.

4.1.2. Quality of Service and Service Availability

In addition to the feedback on the demand for 5G and enhanced connectivity services, consulted stakeholders have raised several concerns around the their existing internet connectivity services. The prevailing themes in the user feedback can be grouped under two topic areas:

1) **Service availability.** Fixed and mobile network reach and internet connectivity in the Family Islands and more remote areas are issues for residential and business users. Service coverage issues have been exacerbated by Hurricane Dorian in 2019. Examples of the issues experienced by residential users are provided in Section 3.2.

2) **Quality of service.** Stable and reliable internet connectivity as well as customer support is insufficient for many business users.[15] A summary of the issues raised is provided in Section 3.1.

Given this feedback, URCA observed a clear need for further engagement with key stakeholders to improve current service delivery and availability. Where issues are ultimately identified, URCA will suggest a framework to address them. Therefore, URCA's next steps will target existing services in two key areas. First, promoting the availability of good, reliable and affordable internet connectivity throughout The Bahamas and, second, promoting improved quality of

[15] URCA notes that a number of residential users also raise QoS issues, relating to the low-speed and the high-latency of their internet services. Dissatisfied users mainly reside in the Family Islands and New Providence.

service and customer support for those users that already have access to the service. Next steps are discussed in detail in Section 4.2.

Consultation Question 4:
Do you agree with URCA's preliminary conclusions from the public engagement process as set out above? Should you disagree, please provide a detailed explanation for your view.

4.2. Next Steps proposed as a result of this Consultation

Following from the discussion in Section 4.1, URCA proposes a set of specific next steps for its own action. Note that these next steps reflect only the first stage in URCA's overall plan to assess and enable 5G in The Bahamas, which consults on use cases and demand for 5G, as set out in Section 1.3. In section 4.3 below, URCA sets out next steps for the overall plan towards 5G.

- The main focus for URCA, the Government of The Bahamas and the Operators will need to be on improving current service delivery and availability. In particular, there is a need to:
    - ensure availability of good, reliable and affordable internet connectivity throughout the country; and
    - enhance quality of service/experience for all end users**.**

- In parallel, for specific sectors that may require enhanced internet connectivity in the form of 5G (e.g., tourism, security, logistics), the priority will be to enable and facilitate the demand for 5G by mitigating any supply and regulatory barriers to their take-up.

Given the above, URCA proposes a set of specific next steps / actions:

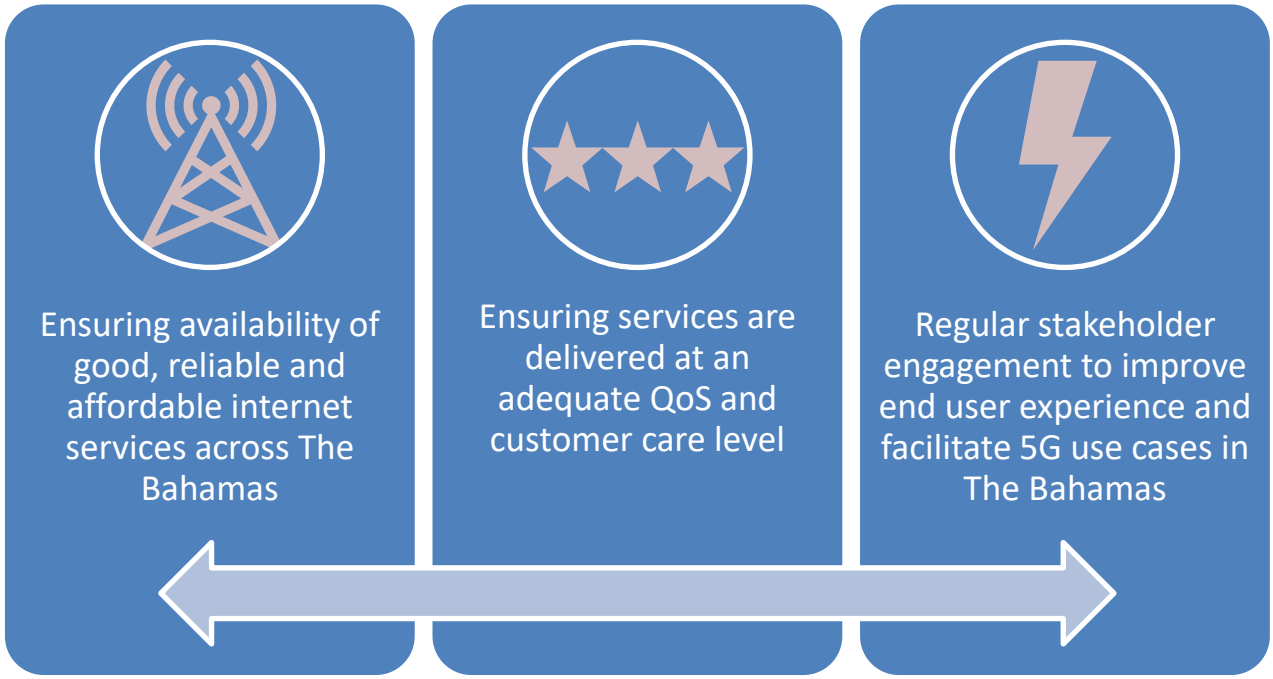
1) **Review of the universal service regulatory framework and investment incentives to roll out internet access services in remote areas.** URCA sees a need to address the issues relating to the availability of internet services throughout all islands of The Bahamas. This will require targeting prevailing coverage gaps and ensuring a minimum level of connectivity at affordable prices also in the more remote islands. A key component of this will be URCA's upcoming review of the current universal service regulatory framework and to establish whether operators have incentives to invest in networks in more remote areas.

2) **Quality of service (QoS) regulation/monitoring.** URCA sees a need to ensure that internet and dedicated connectivity services are being delivered at an adequate quality of service and customer care level to all end users in The Bahamas. This will be in part addressed by URCA's ongoing review of the QoS Framework. However, URCA sees a need for further direct discussions between the businesses, public sector clients and the operators to discuss prevailing issues and to identify workable solutions.

3) **Ongoing, regular stakeholder discussions.** URCA sees merits in establishing a regular forum with representatives from the business community, public sector and the operators to discuss the current service delivery/experience (QoS levels and customer care) and how to facilitate meeting any existing and/or upcoming 5G use cases in The Bahamas.

Figure 12 below summarizes the three priority areas for URCA. Each of these areas are discussed in more detail in the following sub-sections.

Figure 12: Summary of the main areas for URCA's next steps



4.2.1. Ensuring availability of good, reliable and affordable internet services across The Bahamas

Feedback from end users and industry groups identified outstanding issues with internet connectivity, especially in the remote areas of the country and in the Family Islands affected by Hurricane Dorian in 2019.

URCA, jointly with Government, is conducting a review of the Electronic Communications Sector (ECS) Policy which will set out the Government's priorities for the sector over the next three years and thus guide URCA in its decision making. As part of this review and, as set out in the existing Annual Plan, URCA has started the **review of its universal service regulatory framework** to ensure, amongst others, broadband internet services are available throughout The Bahamas (and on reasonable terms).

Therefore, URCA will use the feedback collected as part of this consultation, amongst other information and evidence, to inform its universal service framework review. Further, URCA will also consider the impact that the evolution of internet technologies (such as 5G) may have on the delivery of any universal service obligation. For example, 5G is expected to bring substantial improvements in terms of speed of mobile data services and therefore may now constitute an option to meet certain universal service obligations (USO) requirements, as an alternative to current fixed broadband technologies and services.

4.2.2. Ensuring services are delivered at an adequate quality of service and customer care level

While residential users are broadly satisfied with the QoS of the existing services[16], industry groups have extensively reported outstanding issues with their current fixed connectivity services that, in some instances, constrain their ability to meet their connectivity needs. A selection of recommendations collected from the industry groups include:

- Imposing and enforcing stricter key performance indicators (KPIs) on customer service/care and connectivity standards.
- Establishing a monitoring and reporting system with respect to various issues raised by end users that URCA periodically publishes to highligh the issues raised by end users and flag those that remain outstanding.
- Imposing a stricter penalty scheme for operators for non-compliance with their QoS and other obligations.

URCA notes that the current **Quality of Service (QoS) Regulation**[17], which sets the standards for quality of services for both fixed and mobile services and metrics against which these standards will be measured, is currently undergoing a review. In particular the review of this regulation will need to consider the applicable points raised by the end users in this consultation to design effective and proportional solutions.

The industry group discussions have flagged prevailing issues on the quality of service delivered and customer care offered to business users and government agencies. These are often end users purchasing business connectivity services upon terms and conditions that are separately agreed upon with the operators.

[16] As noted above, a number of respondents to the end user survey raise QoS issues, relating to the low-speed and the high-latency of their internet services. Dissatisfied users mainly reside in the Family Islands and New Providence. This feedback will be considered in the context of the review of the QoS regulation as explained below.

[17] Quality of Service Regulations for Electronic Communications Networks and Services in The Bahamas, ECS 42/2016. Available here: https://www.urcabahamas.bs/wp-content/uploads/2017/03/Quality-Of-Service-Regulations-For-Electronic-Communications-Networks-And-Services-In-The-Bahamas.pdf

In light of the extensive feedback received during the focus group discussions, URCA sees a need to have **more focused discussions between these customer groups (i.e., business users and public sector) and the operators to exchange views/experiences on the current service delivery and offerings, target areas for improvement, and jointly find workable solutions to these prevailing issues to allow meeting the end user needs**. In this regard, URCA contemplates this dialogue, in the form of, for example, regular round-table discussions, so that commercial solutions to the prevailing issues can be found and implemented.

URCA notes that in case the above fails to address the prevailing concerns by business/public end users, URCA may initiate more formal investigations into the market for business connectivity services and any need to regulate these services going forward.

4.2.3. Stakeholder engagement to identify and facilitate 5G use cases in The Bahamas

As explained above, URCA will prioritize ensuring availability of stable and reliable internet connection throughout the country. This is in light of the finding that 5G demand is at a nascent stage in The Bahamas. While some initial use cases have been identified by industry groups, more focused discussions around each of them is required to obtain a better understanding of the actual demand for them going forward. Therefore, in parallel to the actions that URCA suggests to undertake on existing services, URCA proposes to continue monitoring the needs for new services to be rolled out.

In this context, URCA's key objective is to ensure that dialogue continues among all relevant stakeholders. To this end, **URCA plans to establish and chair a forum** inviting participants from the industry, government, and operators to discuss emerging 5G use cases, expected demand, potential benefits and how to facilitate these use cases. In particular, these forums will need to identify 5G use cases that have a demand in The Bahamas, their location, and what is the most efficient way of enabling them (i.e. which network upgrades and architecture will address most efficiently those 5G needs). For example, if demand for 5G going forward was found to be present in specific geographic areas or industries, investment efforts could also be targeted at this specific customer demand, for example, through the roll out of private 5G networks.[18] More generally, these forums will also serve to raise awareness and disseminate knowledge around use cases and possible benefits of 5G.

[18] Private 5G networks are not typically used by consumers for voice and mobile data services but use network elements and resources used to provide dedicated and secure services to private enterprises such as factories, plants, large infrastructures. Source: https://5gobservatory.eu/5g-private-networks/

Further, URCA is considering setting up an **awareness campaign on enhanced broadband services**, that would, inter alia, inform potential users of the possible use cases of 5G, disseminate sector knowledge on 5G technology advances and provide up-to-date information on the forums held. This could take the form of an informative website, similar to the initiative launched in Europe by the European Commission.[19] As and when 5G pilot projects are being rolled out, this website would also serve as a central repository collecting ongoing 5G projects in the country.

Consultation Question 5:
Do you agree with URCA's proposed next steps set out above? Should you disagree, please provide a detailed explanation for your view.

4.3. Next Steps for the Overall Process

This consultation is the first step in URCA's overall plan to assess and enable 5G in The Bahamas, by seeking to develop a more in-depth and evidence-based understanding of the current and potential future demand and use cases for enhanced internet connectivity and 5G services in The Bahamas.

The outcome of this consultation process will then form as a basis for discussions with the operators and/or Government on how to establish the most efficient way to meet this demand/enable the use cases in The Bahamas. This may include, amongst others, assessing the incremental investments/network upgrades required by the operators (taking into account the network sharing and joint build out opportunities under OpenRAN/5G), and identify any regulatory and/or policy measures required to enable the deployment of 5G in The Bahamas.

In this regard, URCA will organize 5G working groups, in due course, involving representatives of URCA, the Government and the operators in order to identify and address any outstanding regulatory and policy issues, in order to develop a roadmap to 5G deployment in The Bahamas.

[19] https://5gobservatory.eu/