The Fifth Generation (5G) Mobile Technology In Nigeria: A Summary Of The New NCC Draft Document For Deployment Of 5G Network.

Introduction

The Nigerian Communications Commission (NCC) in exercise of its functions under the Nigerian Communications Act 2003 (the Act} has developed the Draft Deployment Plan for 5G Technology in Nigeria. The Draft Document has been published on the commission's website, and the commission has invited all the telecommunications operators, industry stakeholders, and every Nigerian citizen to make comments and submissions in respect of the draft document. All submissions are to be addressed and forwarded to the Executive Vice Chairman, Nigerian Communications Commission on or before Monday, 7th day of December 2020. The NCC draft focuses on the Legal and Regulatory framework for 5G Technology deployment, Network Roll-out of 5G services, Security controls, Coverage and Capacity for facilitating the attainment of the goals of the Nigerian National Broadband Plan of 2020-2025 and also the objectives of the National Digital Economy Policy and Strategy of the Federal Government, Spectrum Allocation and Assignment, 5G Technology Standards, Use Cases and Emerging Technology Trends, Digital Economy and Health Safety and Environment.

While the contributions and achievements of the 3G and 4G technologies have been remarkable, the current and continuous increase in development of new technologies and devices with the accompanying new service requirements creates a need for the development of 5G Technology that can meet these requirements. According to NCC, these requirements include faster connectivity, enhanced mobile broadband, and higher data frequency, reduction of latency and revolutionary innovations. Therefore, the introduction of 5G Technology designed to exceed the current 4G networks, will create a communication platform with an effective and cost-efficient network expansion.

This paper summarizes the NCC draft document for deployment of 5G Mobile Technology in Nigeria. The 5G mobile Technology is an improvement on the current 4G technology. It will provide the platform for new and emerging technologies such as Internet of Things (IoT), Artificial Intelligence (AI) and Big Data.

What is 5G Mobile Communications Technology?

5G is the 'User Centric' technology developed to serve the consumer and digitalization of industries. It is the next major phase of mobile telecommunications and wireless systems. 5G Technology is a combination of standards and specifications proposed by the third Generation Partnership project.

Objectives of 5G Mobile Technology

According to the NCC, the draft document outlines strategy that will enable the deployment of 5G Technology in such a manner that 5G Mobile Technology will achieve the following objectives;

1. A robust information and communications in Nigeria
2. To accomplish the Digital Economy Policy of the Federal Government of Nigeria
3. To create new opportunities for growth in the economy and markets by enabling new and dynamic business models.
4. To provide tremendous improvements in interpersonal communications with several innovations and services.
5. To initiate several new changes in mobile connectivity with an enormous capacity to boost productivity and grow the economy
6. To be a system that will bring flexibility to mobile, fixed and broadcast networks that will support more extensive data requirements

Objectives of the NCC Policy on 5G Technology

5G represents a wireless future, defined by the ability to provide best connectivity for people and places. It is poised to change the world due to its exceptional levels of reliability, performance, flexibility and cost-effectiveness. Businesses and agencies will use 5G to connect devices and applications that expand customer engagement, streamline operations and enable agility in ways that have never been possible before. Here are objectives of the NCC Policy on 5G Technology;

1. To accelerate the deployment of 5G Networks in Nigeria
2. Maximize the productivity and efficiency benefits of 5G to the nation
3. To create an enabling environment for additional investment and digital entrepreneurship in the industry
4. To ensure that the operation of 5G networks are in conformity with international standards.
5. To ensure the security of the 5G ecosystem and the protection of data
6. To collaborate with relevant stakeholders to ensure nationwide availability of fibre and other backhaul infrastructure

5G's Use Cases

5G's characteristics that enable the implementation of innovative new technologies and services that can bring radical changes to industry, business and everyday life are;

1. Enhanced Mobile Broadband (eMBB)

Enhanced Mobile Broadband (eMBB) is one of the three primary 5G use cases defined by the 3GPP as part of its SMARTER (Study on New Services and Markets Technology Enablers) project. eMBB is a natural evolution to existing 4G networks that will provide faster data rates and a better user experience than current 4G mobile broadband services. It will go beyond faster downloads to provide an increasingly seamless user experience that will eclipse the quality of service in 4G network. 5G mobile network will be available everywhere, deliver well in a densely populated areas like stadiums or conference centres. It will equally enable services in moving vehicles.

2. Internet of Things (IoT)

Internet of Things devices have sensors and software that enable the collection and exchange of data via the internet. IoT objects can be

controlled remotely to allow direct integration with computer systems, which may results in economic benefit and improved efficiency for users. According to NCC's Draft Document, IoT Technology can be applied to innovations in various sectors such as;

Agriculture: Here, sensors can monitor soil, plant conditions, and deploy unnamed agricultural equipment, water sprinklers, or drones carrying seeds, fertilizer, or insecticide as required.

Transportation: IoT can be used for traffic control, fleet management, remote vehicle diagnostics, and even remote control of vehicles to gather, process, and respond to information rapidly in real time.

Manufacturing: This includes automation and real-time monitoring of manufacturing processes.

Business: Business Intelligence, Big Data Analytics, Supply Chain Management, Process Automation, and many more business-critical concepts will benefit from 5G and IoT.

Retail: In retail, IoT can augment inventory management, customer tracking and engagement, consumer data gathering, and customer self-service.

Energy: It will enhance their grid optimization, energy distribution, predictive maintenance, and remoter asset management and monitoring.

3. Mission Critical Services (MCS)

They are digital services that require an extremely high level of reliability and ultra-low latency, with very little room for error or loss of connectivity. 5G's characteristics will enable and enhance the deployment and operation of MCS.

4. Virtual and Augmented Reality (VAR)

This can be used for various purposes including education, training, design, marketing, engineering, troubleshooting, maintenance, simulation, healthcare, and many more.

Legal and Regulatory Framework for 5G Mobile Technologies

According to NCC, The unique and game-changing capability of 5G technology creates a need for a regulatory framework that will encourage operators to deploy services in compliance with the law and within the approved Policy framework. This regulatory framework will support both the deployment of 5G networks and take-up of 5G services. Key features of this framework will include the availability, allocation and timely assignment of

radio spectrum, more favourable conditions for small cell deployments, investment incentives.

The adoption of net neutrality will go a long way in providing legal certainty concerning 5G applications. Key benefits of net neutrality include equitable access to information, prevention of unfair, anti-competitive and discriminatory pricing practices, freedom of speech and promotion of innovation.

In order to ensure an efficient regulatory framework for deployment of 5G technology, the Commission has an obligation to ensure the continuous development of a fit for purpose and flexible regulatory framework that keeps pace with the developments in the 5G telecommunications technologies. The Commission shall develop a regulatory framework that is, positioned to address unique challenges of 5G infrastructure deployment such as investment barriers, lowering the cost of infrastructure deployment, encouraging long-term capital investment in digital infrastructure and supporting coverage enhancements in collaboration with the relevant agencies of government.

Network Roll-Out

The current race to deploy 5G networks is targeted at providing citizens with the benefits of the technology while at the same time enabling the activation of the digital economy. The Commission's activities towards facilitating roll-out of 5G services shall be based on creating an enabling environment for deployment of 5G technology. The Commission has an obligation to enable the utilization of the 5G deployments as part of the nation’s broadband penetration plan, promote strategic collaborations among relevant stakeholders for the setting up of testbeds and research hubs for 5G innovation.

Security of 5G networks

5G networks in comparison to the existing networks and generations of the communications technology are fundamentally different. While all the previous generations mostly relied on hardware components which often get outdated very quickly, the 5G technology largely relies on the software and cloud infrastructure to "virtualize" network functions. Cloud services will play very critical roles in the 5G technology, and both the virtualization and 'cloudification' of network functions will unlock a myriad of new possibilities for managing and securing networks. The increasing relevance of software in 5G is a key reason why the security of 5G is very critical.

Coverage and Capacity

5G network has the potential of facilitating the attainment of the goals of the Nigerian National Broadband Plan 2020-2025 and also the objectives of the National Digital Economy Policy and Strategy of the Federal Government. This capacity can only be achieved by ensuring that more locations in the country are provided with coverage. To ensure 5G coverage to the nation, the Commission will integrate 5G networks in the attainment of the national broadband plan; ensure that 5G networks are deployed to provide the recommended levels of connectivity and coverage. The commission shall meet the approved quality of service metrics and encourage demand-driven deployment by ensuring the inclusion of high consumption areas for data in the network roll-out and coverage plan for the 5G deployment.

5G Technology Standards

The global collaborations supporting the development of the 5G standards will be driven by market needs and be developed by the standards bodies using the bottom-up approach. Governments will be able to contribute to these developments by collaboration with the relevant private sector organs. The critical strategy that will be engaged to drive the Commission's contribution to the technology and standards growth of 5G in Nigeria include the following:

1. To engage the relevant stakeholders in the private sector and the academia to contribute to the standards and ensure that Nigeria's needs are captured in these standards.
2. To support SMEs and the academia in generating innovative technologies and applications and promote the take-up and commercialization of their ideas.
3. To partner with relevant agencies such as TETFUND, and the Digital Bridge Institute for the setting up of 5G testbeds at DBI campuses that will facilitate research in the 5G technology and contribute to the advancement of the 5G standards.
4. To promote the involvement of SMEs in 5G standards development.
5. To enable and encourage the participation of relevant stakeholders at ITU events and harness the contribution from these stakeholders in putting together the position of the country at these meetings.
6. To support the development of intellectual property in the 5G communications technology space by funding research and technology trials with the academia and SMEs

Use Cases and Emerging Communication Trends

A vital advantage of 5G technology is the number of use cases it will enable and the emerging technologies it will facilitate. The technology will support the development of new applications, which will connect devices and allow innovative applications and business models due to its software virtualization abilities. Examples of new technology areas to be facilitated by 5G include enhancements in application areas such as Internet of Things (IoT), Artificial Intelligence (AI), Robotics, Drones, Advanced Communication Systems, Cloud, 3D Printing, Mixed Reality, Simulation / Imaging and Gamification. These application areas will impact and create new improvements in areas such as Manufacturing, Transportation, Public Services, Health and Social Works, Agriculture, Energy, Logistics, Media and Entertainment, Mining and Quarrying, Machinery and Equipment, Automotive, Education, Information and Communication, Urban Infrastructure, Consumer experience, Sports, Semiconductor Technologies etc. The Commission is expected to work with relevant agencies to ensure that all devices connected to the networks are configured with the required security protocols

Digital Economy

Nigeria, with a population distribution having 70% of the citizens being less than 30years presents an opportunity which if not properly managed, can result in a substantial national challenge in the years ahead. The best approach at maximizing this population distribution is by equipping the youths with the right digital skills to help them become job creators and not job seekers.

The Commission will collaborate with relevant agencies such as NITDA and the start-up ecosystem to facilitate the advancement of digital literacy among the youth. The Commission will drive the Nigerian National Broadband Plan by working with relevant agencies to ensure that broadband is deployed to crucial demand drivers such as tech hubs and research institutions. It will also invest in programs that support digital literacy training and skill acquisition for the youths in the country.

Health Safety and Environment

Health and Public safety are very critical concerns associated with the deployment of Radio frequency-based technologies. The World Health Organization and other relevant International agencies have developed and published guidelines for the safe deployment and operation of these technologies. 5G technology falls within these technologies as such there is a need for continuous awareness and enlightenment to assure the public of the safety of the technology so as to encourage its uptake and prevent the

conspiracy theorists from spreading false information and fear among the public.

The Commission shall ensure that all equipment to be installed for the deployment of 5G meet the approved health protection certifications through the appropriate regulatory frame works. The commission will engage regular public awareness campaigns to keep the public up to date with health and safety related information on the 5G technology. It will ensure that deployment and installation of 5G equipment conforms to international best practices in respect of public safety.

Conclusion

5G is the fifth generation mobile network. It is a new global wireless standard after 1G, 2G, 3G, and 4G networks. 5G enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects and devices. 5G wireless technology is meant to deliver multi-Gbps peak data speeds, ultra-low latency, more reliability, massive network capacity, increased availability, and a more uniform user experience to more users. To achieve this, the NCC through its Draft Document for deployment of 5G network in Nigeria has outlines strategies that Nigeria will adopt to facilitate the deployment of 5G Technology. The document has made provisions for critical strategies that will be engaged to enable the nation derive maximum benefits from the technology, while promoting public-private participation.