

A woman in a white lab coat is shaking hands with a futuristic robot. The robot has a white and black body with a large, glowing white visor. They are in a modern office with a laptop and a glass of water on a desk. The background is a blurred office space with a patterned wall.

Adoption of 5G in Nigeria

TECHNOLOGICAL & REGULATORY CHALLENGES

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5G GLOBAL INDUSTRY

Economic impact projections

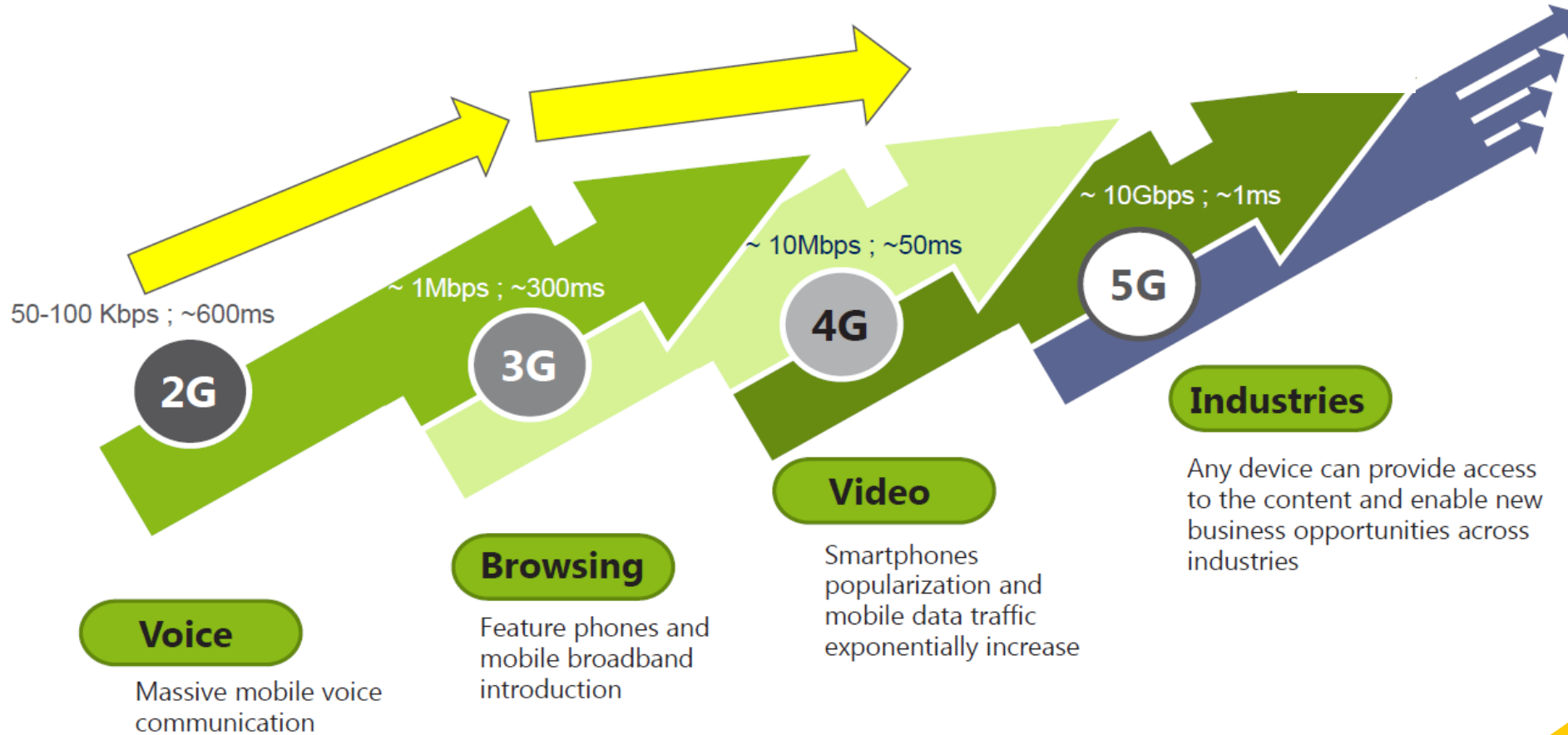
- Enable \$12Trillion dollar worth of economic activity by 2035
 - Manufacturing (3.4Bn)
 - Information & Communications (1.4Bn)
 - Whole Sales & Retail (1.3Bn)
- 16% adoption globally (about 1.4Bn connections)
- 3% of 1Bn connections in SSA by 2025 is projected to be 5G
- 5G will open up new use cases in areas of mobile broadband, internet of things and mission critical applications.

International Data Corporation predicts that in three years, 45% of IOT generated data will be stored, processed, analyzed, and acted upon close to or at the edge of networks.

What is 5G?

The latest generation of cellular mobile communications. It succeeds the 4G, 3G and 2G technologies.

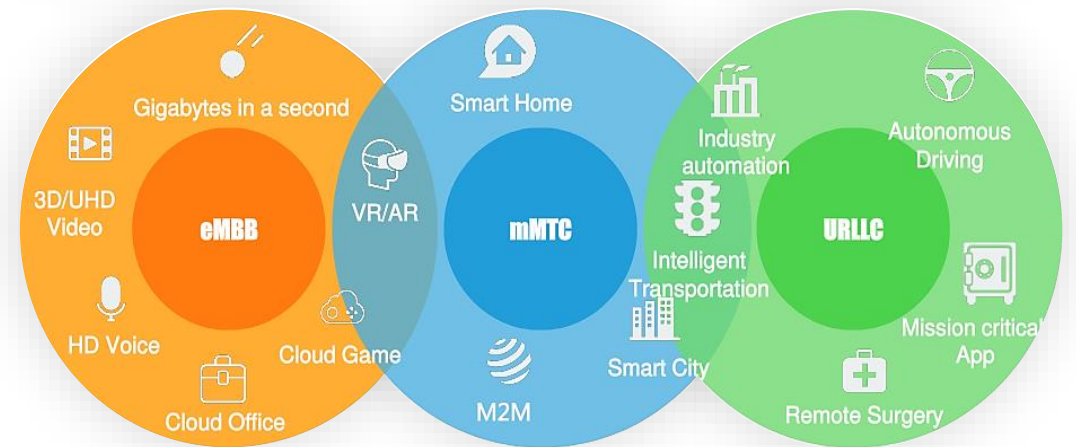
Enabling smooth and timely technology shift with changing business demands



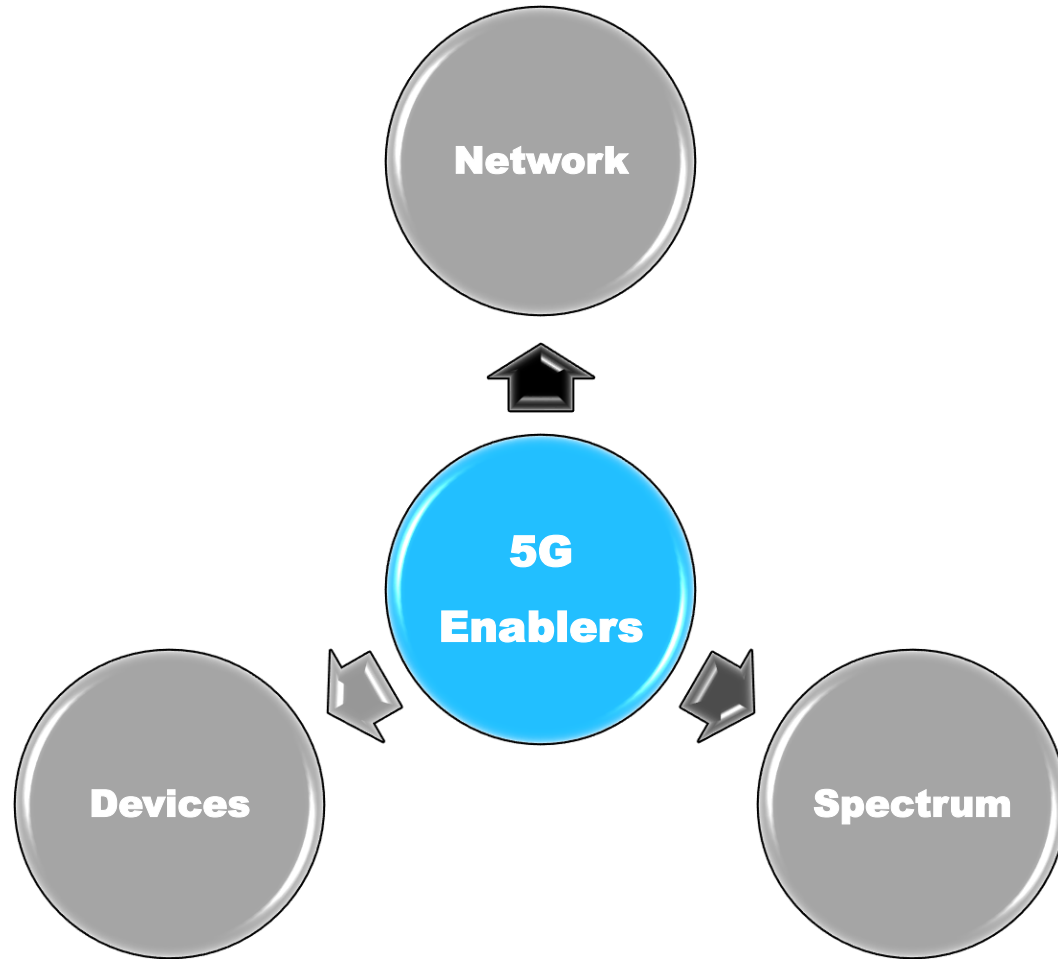


Why 5G?

Latency 1 ms Radio Interface 10-50X ↓ 4G	Peak Data Rate 10G+bps per User 10-100X ↑ 4G	Connections 1000K per Km ² 100X ↑ 4G
Spectrum Efficiency 3X ↑ 4G	Network Energy Efficiency 100X ↑ 4G	User Experience Data Rate 100Mbps per user ↑ 10X 4G



5G Technology Enablers



- ❖ Low Band (<1G Hz)
- ❖ Mid band (< 6Ghz)
- ❖ mmWave

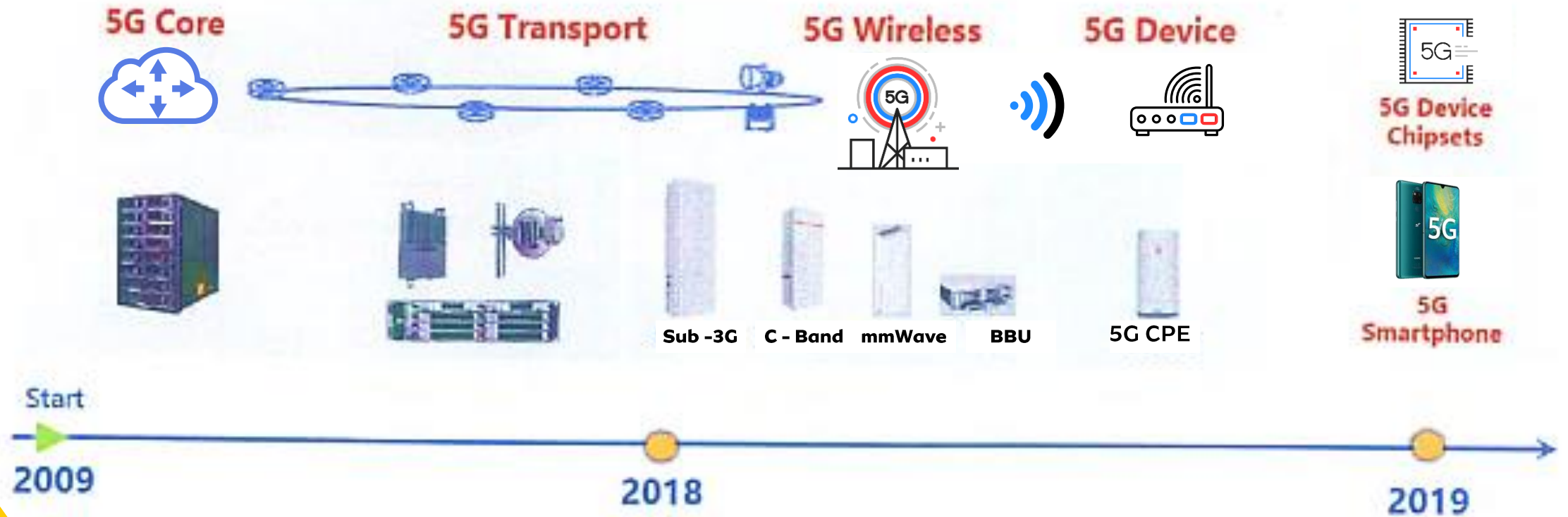


- ❖ Mobile Phones
- ❖ CPEs
- ❖ IOT Devices



- ❖ RAN (NR, Cloud RAN)
- ❖ Core (NFV, SDN))
- ❖ Transport (Fibre, E-band)

E2E Solution Required by 5G is Ready



Globally unique 5G CPE and Balong chips, minimum 3D MIMO AAU, maximum power capability of millimetre wave AAUs, maximum bandwidth and powerful 3D MIMO AAU, minimum size of millimetre wave, bearing 10GE to site, 50GE access ring, and 400GE E2E backbone Cloud-based core network

n28	703 MHz – 748 MHz	758 MHz – 803 MHz	FDD
n34	2010 MHz – 2025 MHz	2010 MHz – 2025 MHz	TDD
n38	2570 MHz – 2620 MHz	2570 MHz – 2620 MHz	TDD
n39	1880 MHz – 1920 MHz	1880 MHz – 1920 MHz	TDD
n40	2300 MHz – 2400 MHz	2300 MHz – 2400 MHz	TDD
n41	2496 MHz – 2690 MHz	2496 MHz – 2690 MHz	TDD
n50	1432 MHz – 1517 MHz	1432 MHz – 1517 MHz	TDD1
n51	1427 MHz – 1432 MHz	1427 MHz – 1432 MHz	TDD
n66	1710 MHz – 1780 MHz	2110 MHz – 2200 MHz	FDD
n70	1695 MHz – 1710 MHz	1995 MHz – 2020 MHz	FDD
n71	663 MHz – 698 MHz	617 MHz – 652 MHz	FDD
n74	1427 MHz – 1470 MHz	1475 MHz – 1518 MHz	FDD
n75	N/A	1432 MHz – 1517 MHz	SDL
n76	N/A	1427 MHz – 1432 MHz	SDL
n77	3300 MHz – 4200 MHz	3300 MHz – 4200 MHz	TDD
n78	3300 MHz – 3800 MHz	3300 MHz – 3800 MHz	TDD
n79	4400 MHz – 5000 MHz	4400 MHz – 5000 MHz	TDD
n80	1710 MHz – 1785 MHz	N/A	SUL
n81	880 MHz – 915 MHz	N/A	SUL
n82	832 MHz – 862 MHz	N/A	SUL
n83	703 MHz – 748 MHz	N/A	SUL
n84	1920 MHz – 1980 MHz	N/A	SUL
n86	1710 MHz – 1780MHz	N/A	SUL
n257	26500 MHz – 29500 MHz	26500 MHz – 29500 MHz	TDD
n258	24250 MHz – 27500 MHz	24250 MHz – 27500 MHz	TDD
n260	27000 MHz – 40000 MHz	27000 MHz – 40000 MHz	TDD

5G SPECTRUM REGION 1

Africa and Europe

- n28, n77/78 and n258 spectrum adopted for **Region 1** after WRC-19.
- Most devices shipped to these regions in the next few years are expected to support them.

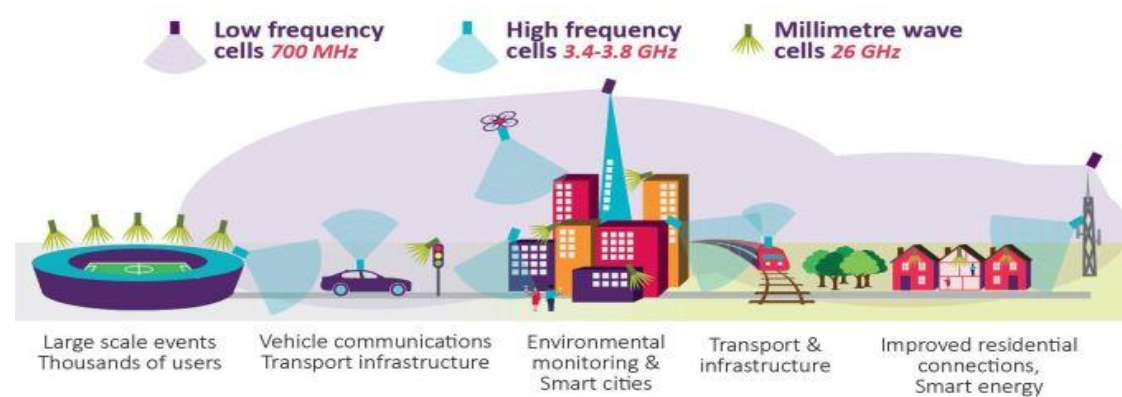
As Nigerian regulator develops policies for 5G, specific spectrum decisions will be taken

Spectrum

5G NR (New Radio) Frequency Ranges

N7	FDD	700 MHz
N28	FDD	2.6 GHz
N41	TDD	2.6 GHz
N71	FDD	600 MHz
N77	Mm Wave	3.3 – 4.2 GHz
N78	Mm Wave	3.3 – 3.8 GHz
N79	Mm Wave	4.4 – 5.0 GHz
N257	Mm Wave	26.5 – 29.5 GHz
N258	Mm Wave	24.25 – 27.5 GHz

- On C band:
 - n78 (3.5G) and
 - millimeter wave n258 (26G)



5G Trial Spectrum	Bandwidth	Comments
3.5GHz & 26GHz	3.5G (20, 50, 80, 100) & 26G (800) MHz	Bandwidth limitation on 3.5G is as a result of spectrum availability



SA network architecture

- ✓ **VoNR** (Voice Over 5G)
 - ✓ 20MHz bandwidth on 3.5GHz (n78)

NSA network architecture

- ✓ **4.5Gbps** Download Speed.
 - ✓ 800MHz bandwidth on 26GHz (n258)

NSA network architecture

- ✓ **2Gbps** Download Speed.
 - ✓ 100MHz bandwidth on 3.5GHz (n78)

ACHIEVEMENTS | 5G TRIAL IN NIGERIA

- I. 5G POC in West Africa,
- II. 5G millimeter wave POC in Africa,
- III. VoNR call (Voice Over 5G), including voice and video calls in Africa

5G

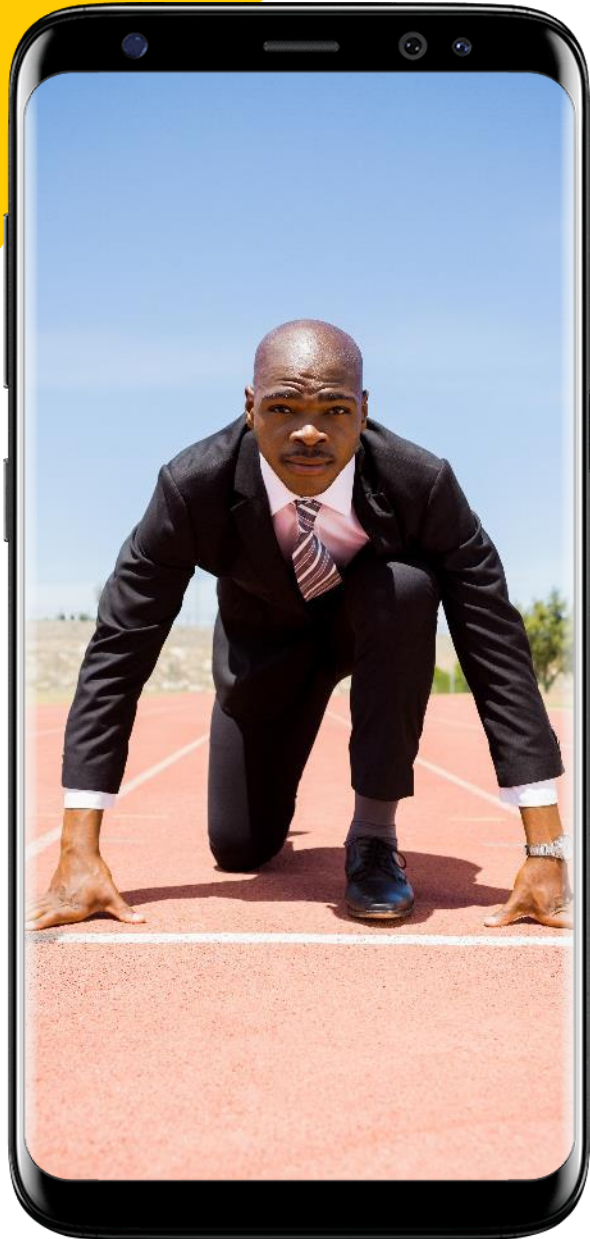
Trial done

in Nigeria

NOV 19 – FEB '20



Challenges...



01

Spectrum strategy, mop-up and allocation

Regulatory bodies will have to strike a balance between use of Sub 6G for existing technologies and licensing them for 5G as well as approval of new spectrum .

02

5G study and Framework

As with all new technologies, we must leverage learnings from first adopters in addition to trials, study and evaluation involving all stake holder

03

Synergy of governmental agencies

Co-operation and the declaration of telecom as a critical national infrastructure are vital for the success of the national broadband strategy.

04

Device availability and affordability

Average cost of 5G compatible devices today ~ \$1000. this is expected to reduce significantly with time. In line with national broadband strategy, encouraging in country device manufacturing will help reduce the cost of 5G devices in Nigeria

...Challenges



05

Cost of deployment

Mobile networks will have to deploy new and/or modernize existing network infrastructure; and coverage impacted by spectrum allocated.

06

Awareness

Pockets of resistance due to limited knowledge about this new technology

07

Infrastructure maturity

Low level of development of supporting infrastructure to drive the 5G use cases

08

Global Politics

The US ban on Huawei products. Huawei being major equipment manufacturer and pioneer of the technology

Driving Force in Building 5G



Build a brand

Reduce costs

Open new blue ocean



01

02

03

04

05

06

National strategy

Industry driven

User experience



Q&A

Thank you!



Acronyms and abbreviations

AR	Augmented Reality
CPE	Customer Premises Equipment
eMBB	enhanced Mobile Broadband
FWA	Fixed Wireless Access
GSMA	GSM Association
HD	High definition
IoT	Internet of Things
mMTC	Massive machine-type communications
NBC	National Broadcasting Commission
NCC	Nigerian Communications Commission
NFMC	Nigerian Frequency Management Council
NR	New Radio
NSA	Non Stand Alone
NVF	Network Virtual Function
OEM	Original Equipment Manufacturer
RAN	Radio Access Network
SA	Stand Alone
SDN	Software Defined Network
UHD	Ultra High definition
URLLC	Ultra-reliable low-latency communications
VR	Virtual Reality
WRC	World Radio communication Conference



COMPUTER PROFESSIONALS
(REGISTRATION COUNCIL OF NIGERIA)
(ESTABLISHED BY ACT NO. 49 OF 1993)



2020 VIRTUAL IT PROFESSIONALS' ASSEMBLY

THEME:
**ADOPTION OF
5G IN NIGERIA:**
THE TECHNOLOGICAL AND REGULATORY CHALLENGES

 **THUR. 9TH JULY, 2020**

REGISTER ONLINE  <http://www.cpnita.ng>

REGISTRATION
FEE:
₦10,000

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