

The background of the slide features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic visual effect.

Emerging ICT needs - a Practitioners Perspective

Broadband in Africa (Opportunities & Challenges)

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Introduction

Telecommunications is an enabler to deliver services:

- Voice communication
- Data communication (Messaging, internet, email, private leased circuits, etc.)

The rest is Technology - How BEST to Deliver.

- Technology Advantages (efficiencies, speed, costs, security, etc.).
- Limiting factors - Availability of the technology (coverage, fibre foot print, etc.)

Growing Demand to Transmit Higher Data Volumes:

- Voice has not changed much in centuries.
- Growing demand for higher data speeds is driving technological innovation.
- Broadband (Remains an Evolving Market Demand)

ITU Standardization Sector defines Broadband as a “Transmission Capacity that is faster than 1.5 Mbps or 2.0 Mbps”.

Broadband in Africa

Broadband, Driving Factors:

- Higher Bandwidth (Increasing Throughput - Speed of Data Transfer)
- Quality of Service (for High Definition Services, e.g. HD Voice, HD Video, etc.)
- Lower Latency (faster response times from the Network, e.g. Call setup times)
- Network Efficiencies (Higher Network Capacity & Quality - limited Resources)

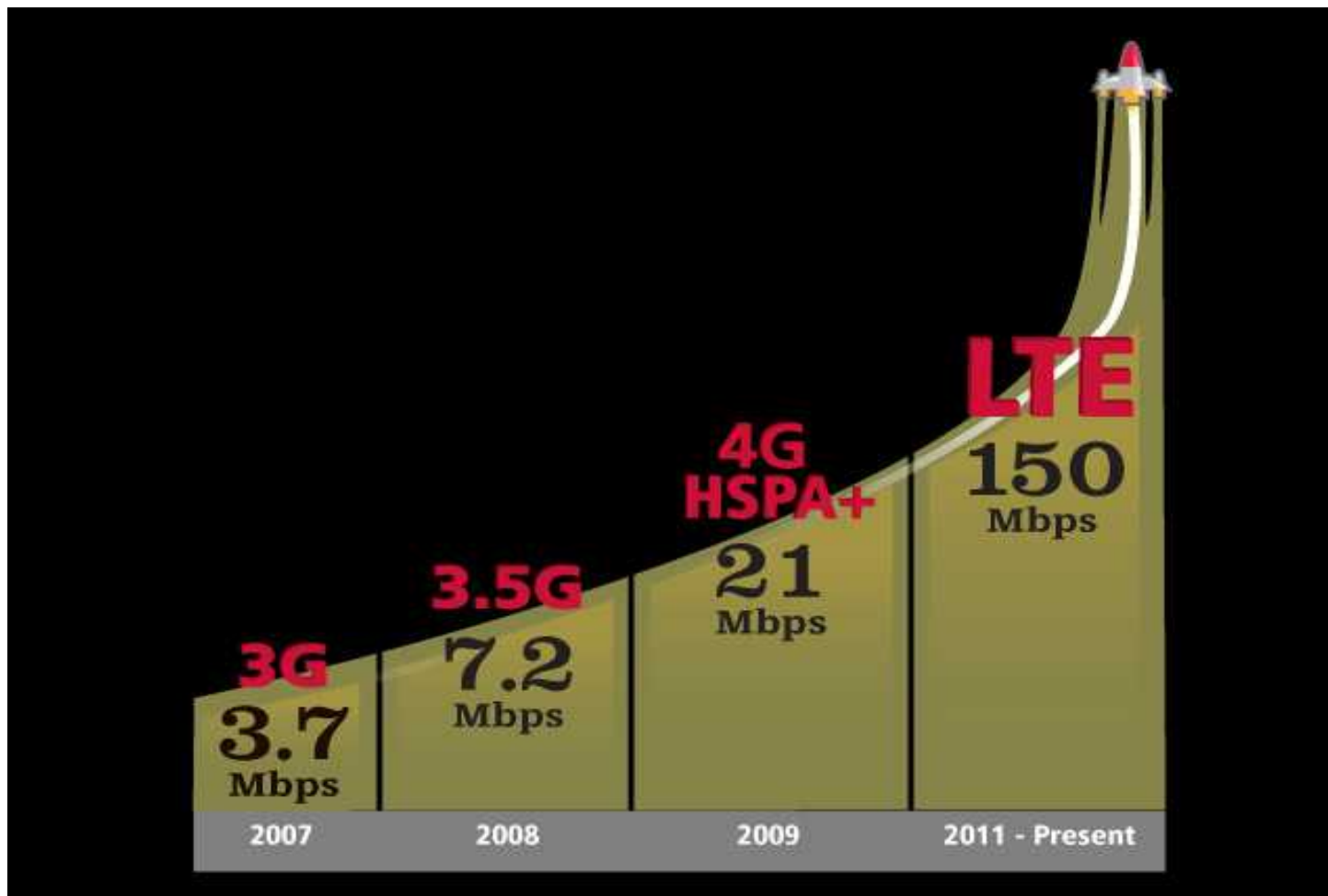
4G LTE & Broadband - What Advantages does 4G have over 3G?

The simple answer is that a 4G-LTE network will have a higher data transfer rate, with better network efficiencies.

Benefits Beyond Speed:

- Better Audio Quality - CS networks offer narrow band Vs 4G wide-band audio.
- Unified Communication & Collaboration - Presence, Chat, Video Conferencing.
- Improved Network Administration - Dynamic & Efficient Sharing of IP Resources.

4G LTE - Opportunity for Broadband



4G LTE - Opportunity for Broadband

Technology Opportunities:

- Support for HD Services (Voice over LTE - VoLTE, Video over LTE - ViLTE, End-to-End QoS Management, Guaranteed Bit Rates - GBR, etc).
- Improved Network Efficiencies - for Higher Speed, Capacity & Quality:
 - Spectrum Efficiency (60 Mbps, using 10MHz - FDD & 120Mbps with Carrier Aggregation).
 - Increased DL, UL & Cell-Edge Throughput (Adaptive Modulation, MIMO, Rx Diversity).
 - Lower Latency from reduction of network nodes.
 - Self Optimised Networks (ANR, Faster UE Cell Reselection Saves Dropped Calls, etc.)
 - Voice Service Continuity (CSFB to 3G and 2G Networks).
 - Longer Battery Life for Users
- LTE RAN is Designed for numerous Spectrum Band Plans, with Multi-Carrier Support in Base Band Unit (BBU). Band 20 (800 MHz) and Band 7 (2600 MHz) adopted for Africa.

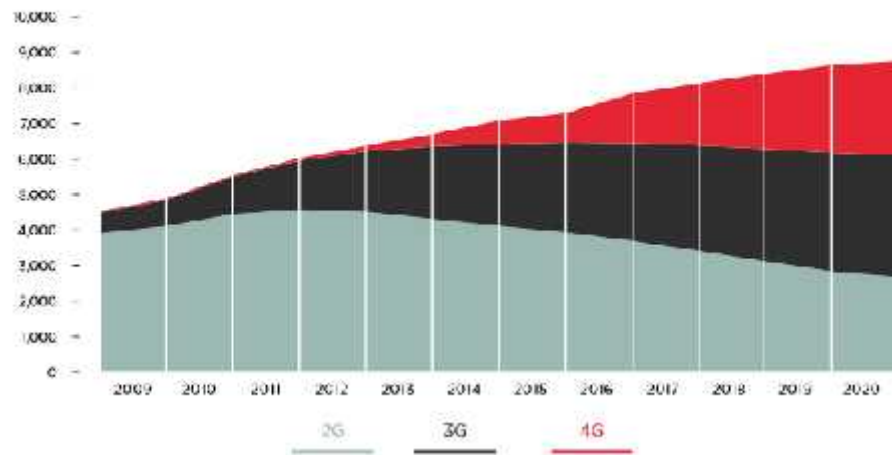
Ref: Annexure A - Detailed LTE Band Plans (for FDD and TDD).

4G LTE - Opportunity for Broadband

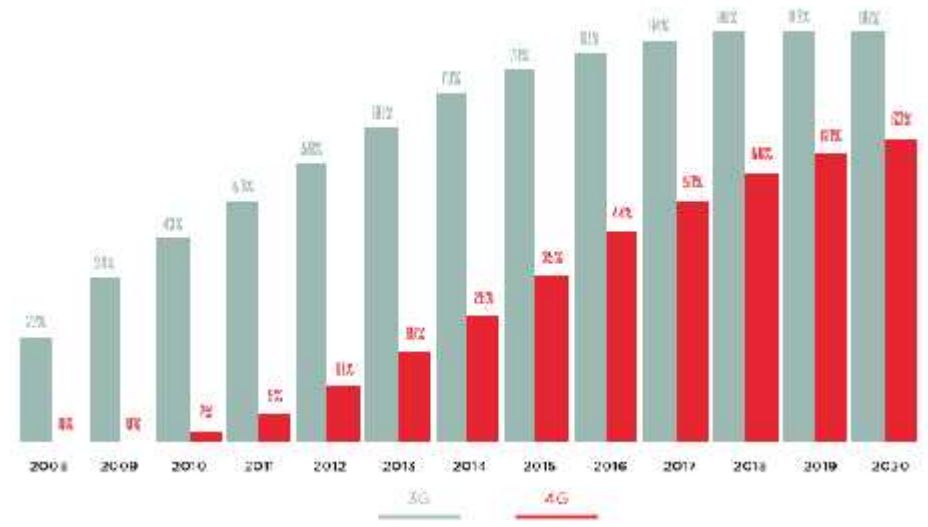
Market Opportunities:

- Low Penetration - Opportunity for Growth
 - Sub-Saharan Africa has the lowest mobile penetration, with 12% CAGR in 2014.
 - Rapid Shift to Mobile Broadband expected by 2020 (GSMA).

Global connections by technology
(Millions, excluding M2M)



Global mobile broadband population coverage



http://www.gsamobileeconomy.com/GSMA_Global_Mobile_Economy_Report_2015.pdf

4G LTE - Opportunity for Broadband

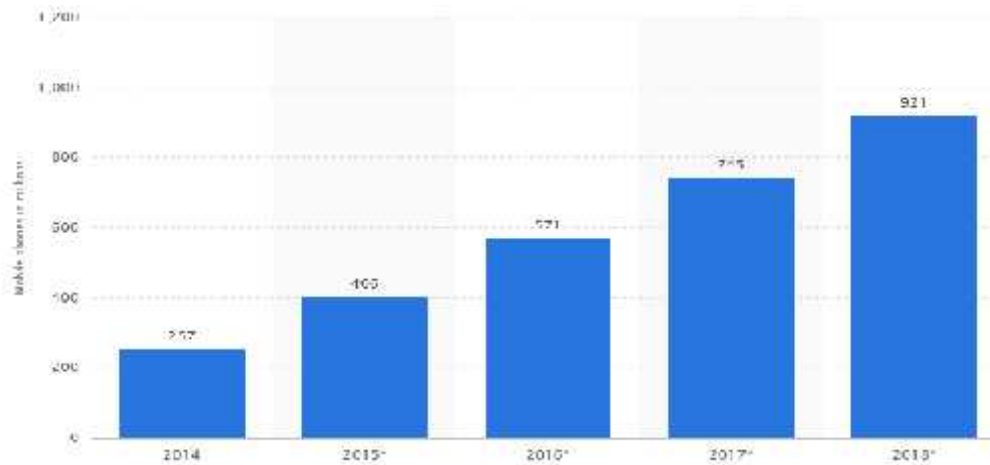
Market Opportunities:

- Handset Costs - Still to Come Down:
 - Biggest Barrier to Entry of 4G LTE (Handsets Cost ~ US\$ 100 - US\$ 700).
 - The Sweet-Spot in pricing, expected to be between ~ US\$ 25 - US\$ 50, for Africa. Handset Manufacturers are already working to meet this goal.

http://www.gsamobileeconomy.com/GSMA_Global_Mobile_Economy_Report_2015.pdf

- 4G LTE Handsets Expected to more than double in 3 Years (by 2018).

<http://www.statista.com/statistics/503375/4g-lte-mobile-phones-in-use-worldwide/>



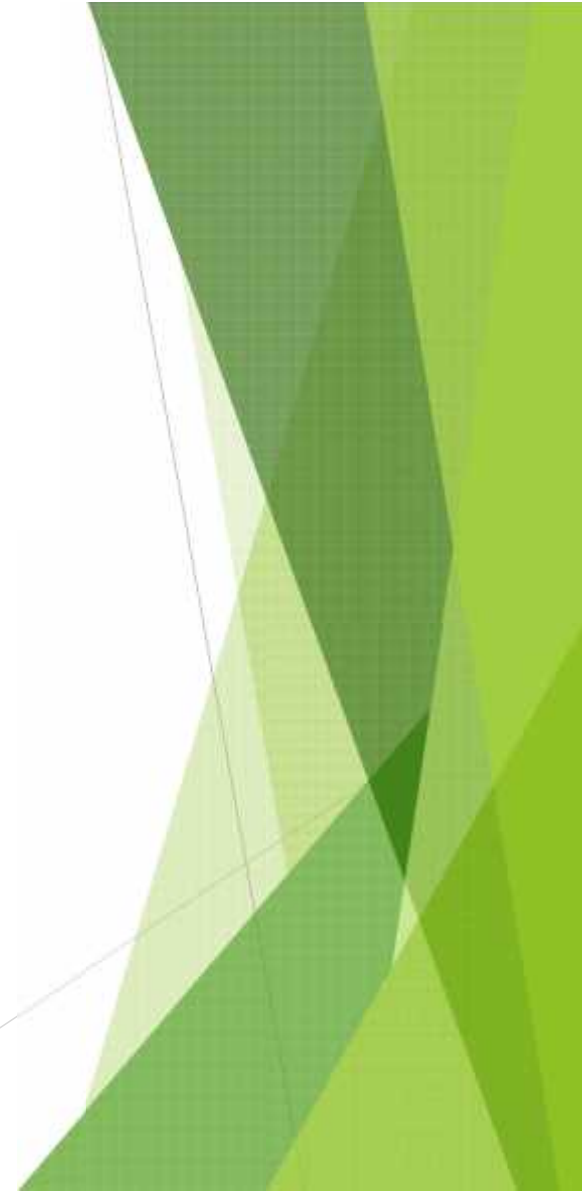
4G LTE - Challenges

Challenges to Overcome:

- Developing Business Case in a Mature, Competitive Market from GSM.
 - High Network Rollout Costs (Expensive New Network Technology).
 - Low Market Uptake (Expensive Handsets) but Promising Growth
 - Slow Coming Profitability - Constraining Aggressive Rollout:
 - Biggest Value Driver for Mobile Network Growths is Coverage.
 - Competitive Product Positioning (4G-LTE Data Vs 3G & 2G Data - Price Sensitivity).
- Transmission Infrastructure Limitations:
 - High LTE throughput per Site - Demands High Transmission Bandwidth (10s -100s Mbps)
 - Limited Fibre Optic Footprint - Microwave transmission is limiting for Backhaul.
- Consumer Literacy - Adapting to Higher 4G-LTE Speeds, New Charging Models, etc.
- Local Content for Broadband & Internet Consumption - Expensive IBH.
- LTE Standardization, Government Policy (Licensing, Regulation, Legislation, etc.).
 - Require Adoption for Broadband - Presently tailored Around Traditional 2G Models.

Thank You

The End
Any Questions??



Annexure A - FDD Spectrum, 1/2

FDD LTE Bands & Frequencies					
LTE Band Number	Uplink (MHz)	Downlink (MHz)	Width of Band (MHz)	Duplex Spacing (MHz)	Band Gap (MHz)
1	1920 - 1980	2110 - 2170	60	190	130
2	1850 - 1910	1930 - 1990	60	80	20
3	1710 - 1785	1805 - 1880	75	95	20
4	1710 - 1755	2110 - 2155	45	400	355
5	824 - 849	869 - 894	25	45	20
6	830 - 840	875 - 885	10	35	25
7	2500 - 2570	2620 - 2690	70	120	50
8	880 - 915	925 - 960	35	45	10
9	1749.9 - 1784.9	1844.9 - 1879.9	35	95	60
10	1710 - 1770	2110 - 2170	60	400	340
11	1427.9 - 1452.9	1475.9 - 1500.9	20	48	28
12	698 - 716	728 - 746	18	30	12
13	777 - 787	746 - 756	10	-31	41
14	788 - 798	758 - 768	10	-30	40
15	1900 - 1920	2600 - 2620	20	700	680
16	2010 - 2025	2585 - 2600	15	575	560

Annexure A - FDD Spectrum, 2/2

FDD LTE Bands & Frequencies					
LTE Band Number	Uplink (MHz)	Downlink (MHz)	Width of Band (MHz)	Duplex Spacing (MHz)	Band Gap (MHz)
17	704 - 716	734 - 746	12	30	18
18	815 - 830	860 - 875	15	45	30
19	830 - 845	875 - 890	15	45	30
20	832 - 862	791 - 821	30	-41	71
21	1447.9 - 1462.9	1495.5 - 1510.9	15	48	33
22	3410 - 3500	3510 - 3600	90	100	10
23	2000 - 2020	2180 - 2200	20	180	160
24	1625.5 - 1660.5	1525 - 1559	34	-101.5	135.5
25	1850 - 1915	1930 - 1995	65	80	15
26	814 - 849	859 - 894	30 / 40		10
27	807 - 824	852 - 869	17	45	28
28	703 - 748	758 - 803	45	55	10
29	n/a	717 - 728	11		
30	2305 - 2315	2350 - 2360	10	45	35
31	452.5 - 457.5	462.5 - 467.5	5	10	5

Annexure A - TDD Spectrum

TDD LTE Bands & Frequencies		
LTE Band Number	Allocation (MHz)	Width of Band (MHz)
33	1900 - 1920	20
34	2010 - 2025	15
35	1850 - 1910	60
36	1930 - 1990	60
37	1910 - 1930	20
38	2570 - 2620	50
39	1880 - 1920	40
40	2300 - 2400	100
41	2496 - 2690	194
42	3400 - 3600	200
43	3600 - 3800	200
44	703 - 803	100

Ref: <http://www.radio-electronics.com/info/cellulartelecomms/lte-long-term-evolution/lte-frequency-spectrum.php>