



**UGANDA
COMMUNICATIONS
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Communications for All

Spectrum Management Study Overview

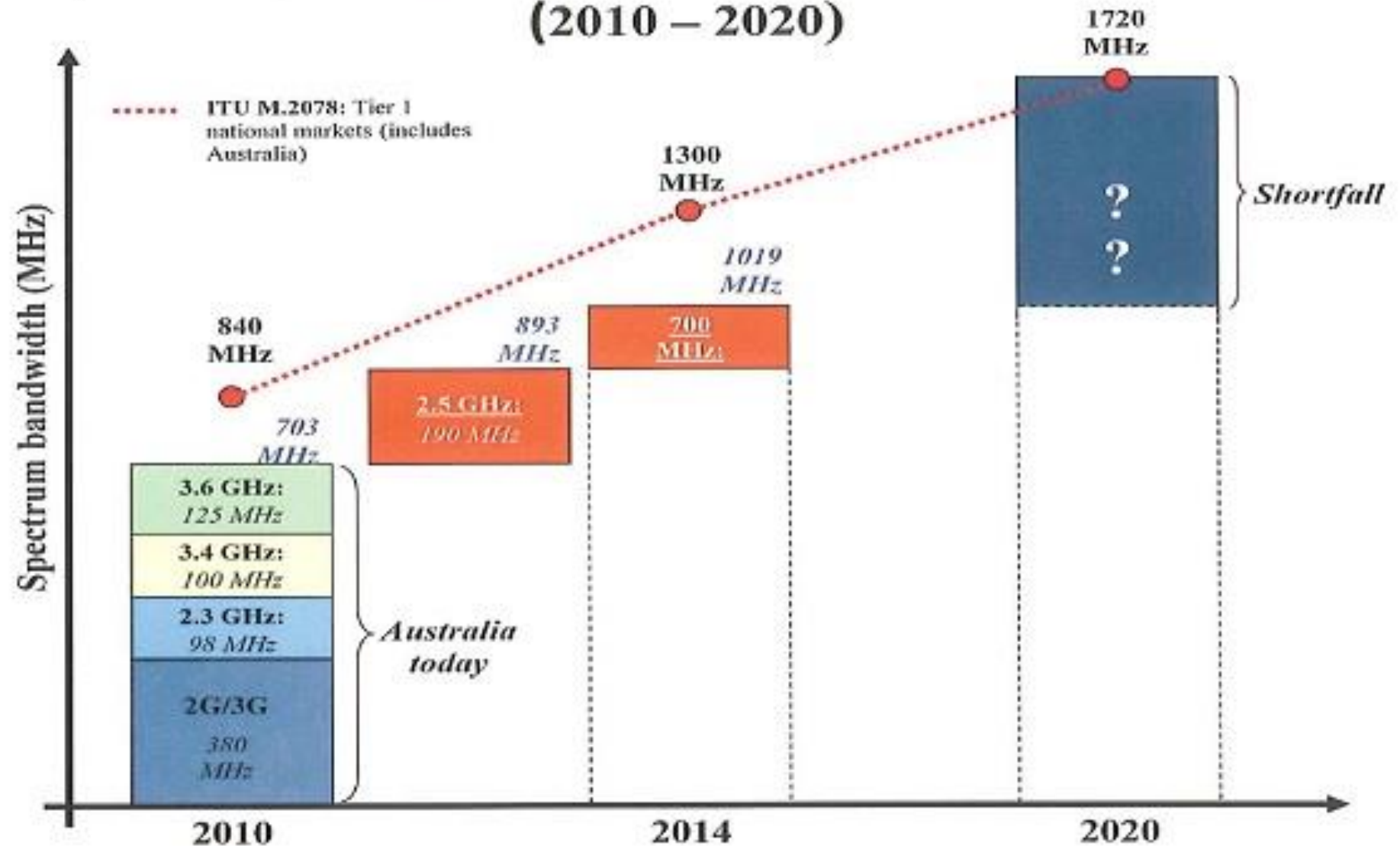
Prof. Martin Cave, Adrian Foster

December 18, 2015

Key trends

Rapidly increasing demand for capacity over radio spectrum

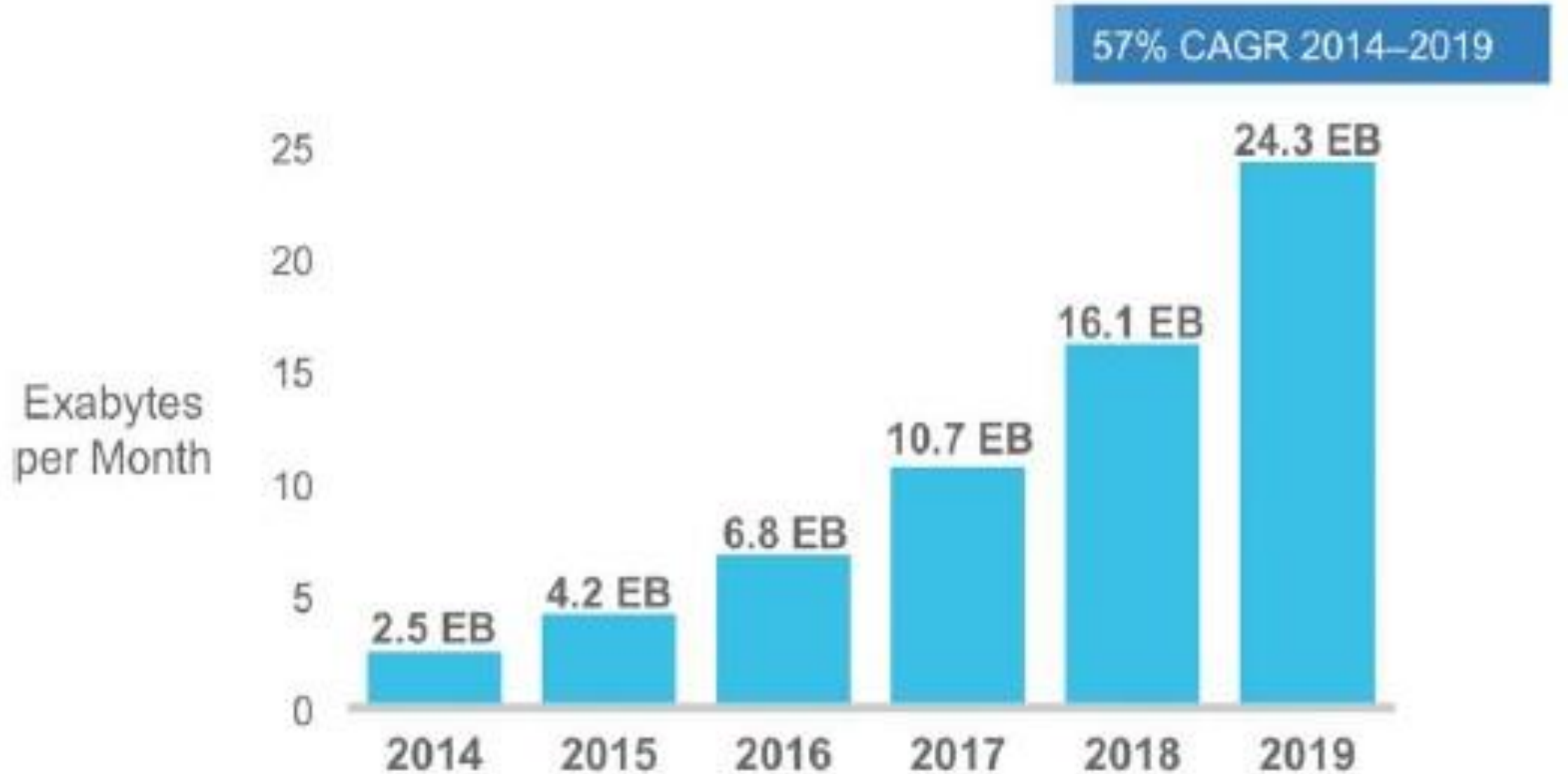
Spectrum demand forecast for mobile broadband (2010 – 2020)



Source: ITU-R Report M.2078 (2007) Demand Forecast 2010-2020

Key trends

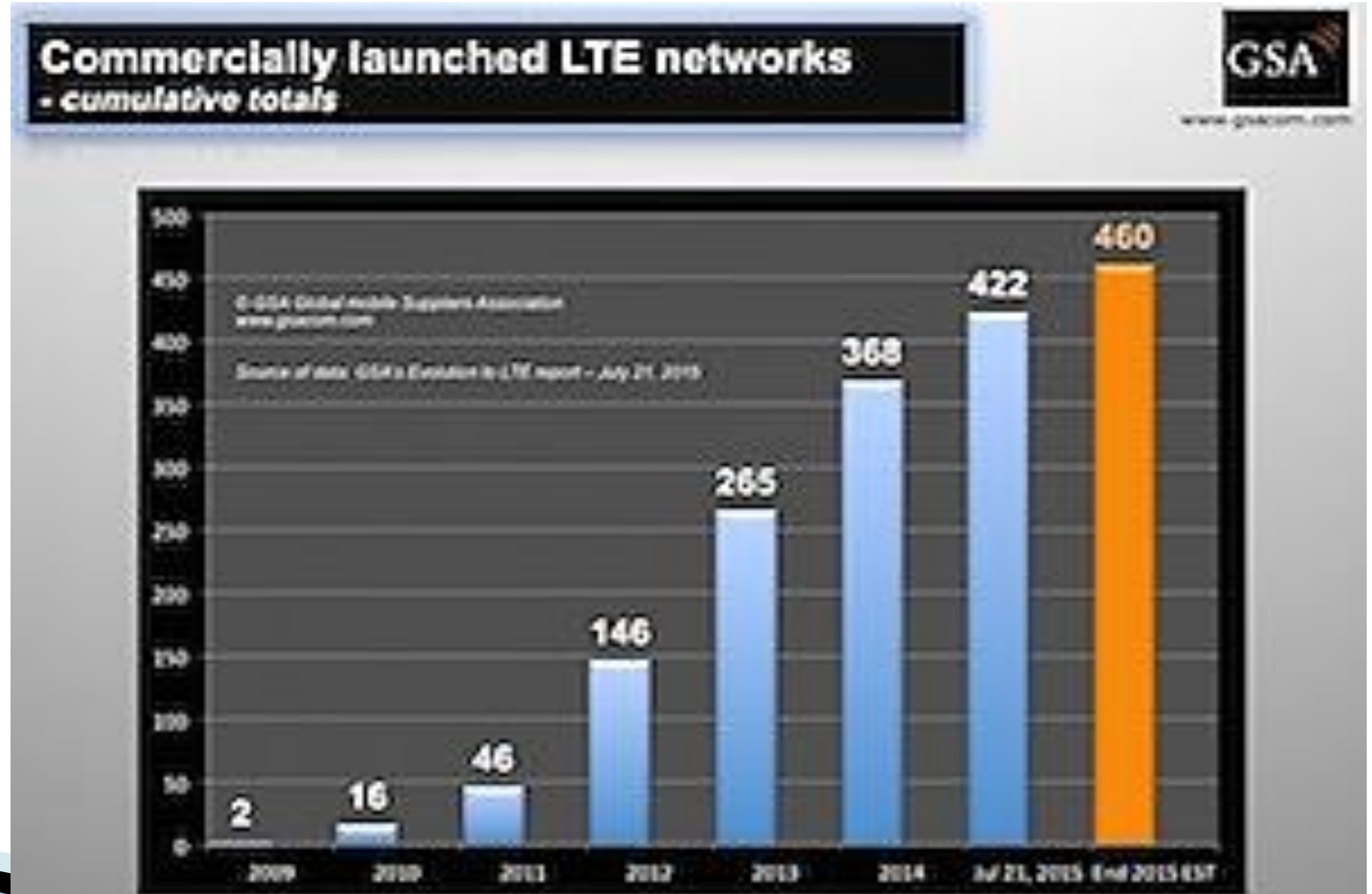
Global Mobile Traffic Data Traffic 2014–2019



Source: Cisco VNI Mobile, 2015

Key trends

Global commercially launched LTE Networks - 460 as of Sept. 2015

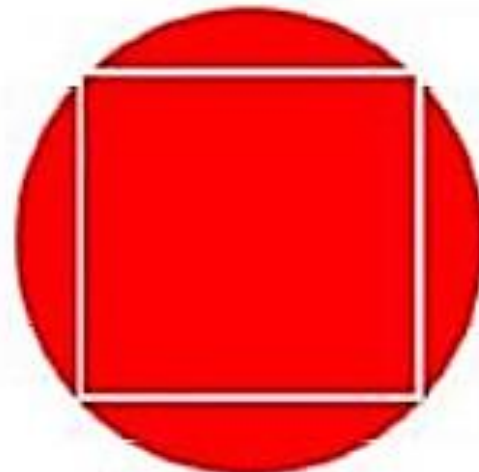


Key trends

Reducing Network Costs – 700 MHz Availability

Use of 700 MHz compared to higher frequency bands

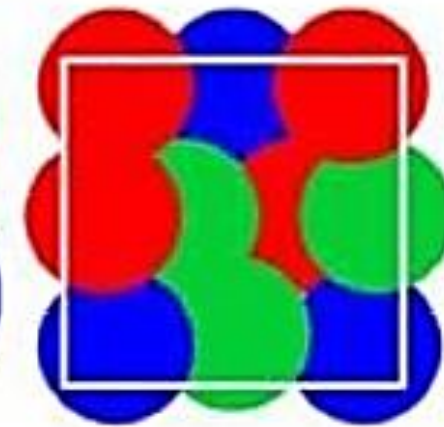
	700 MHz Propagation	1800 MHz Propagation	2400 MHz Propagation
Total Network Cost per cell	\$150,000	\$600,000	\$1,500,000
Network Cost per Customer	\$85	\$180	\$1820
# Months to network cost breakeven	9 Months	36 Months	91 Months



700 MHz Coverage



1800 MHz Coverage



2400 MHz Coverage

Key issues

Sector Profitability – LT profitability = investment in new technology and services

As of Dec. 31, 2014	Total			
	Ushs'000			
Total Revenues Four Main Operators	UGX 2,233,136,655			
Mobile Revenues ¹	UGX 1,884,776,605			
EBIT Ushs	UGX 63,427,006			
Corporate Taxes Paid ³	UGX 115,889,448			
Mobile Subscribers	UGX 19,965,318			
ARPU/Mth ²	UGX 7,693			
Spectrum Fees ⁴	UGX 38,219,115			
VAT	UGX 129,663,000			
Excise	UGX 170,431,000			
1 Mobile Revenues Net of Other Revenue, Equipment Sales, Fixed Line, and Mobile Banking Revenues				
2 Corporate Taxes paid = taxes on a cash paid basis.				
3 ARPU = Mobile Revenues divided by Mobile Subscribers				
4 Spectrum Fees Source UCC				

Project Deliverables

D1. Inception report

D2. Spectrum utilisation report

D3. Valuation of spectrum and allocation methodology report

D4. Workshop report

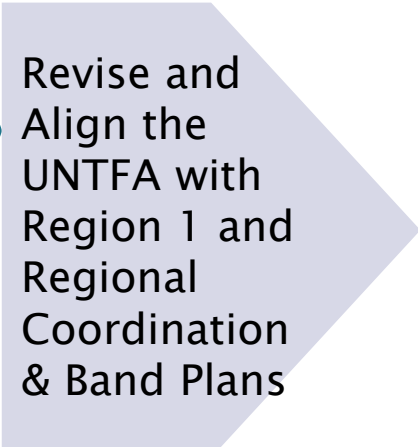
D5. Overall composite report

Action Plan – 5 year outlook

Short-term Action Year 1



- Develop Priority UCC Regulatory Spectrum Policies:
- Spectrum Management Principles and Policy
 - Spectrum Planning Framework
 - Spectrum Management Fees Methodology and Spectrum Fees



Revise and update the UNTFA to align with WRC-15 and regional coordination

- Develop Band Plans reflecting spectrum policy, authorization, and pricing
- IMT
 - Fixed Links



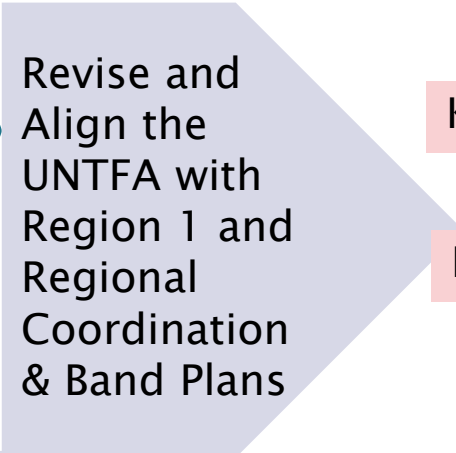
- UCC to Develop Internal Capacity
- Policy Development
 - Spectrum Master Plans – 5 year plans
 - Market Analysis and Annual Reporting
 - Spectrum Valuation and Pricing – Business Modeling and AIP
 - Spectrum Monitoring, Measurement and Analysis

Medium to Long-term Action 2 to 3 Years



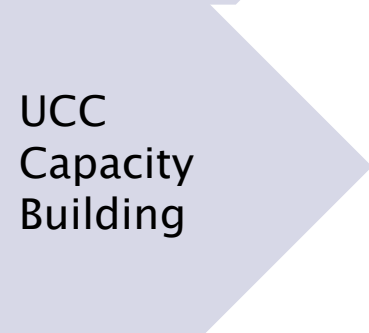
Develop Priority UCC Regulatory Spectrum Policies:

- Refarming Framework and Mechanisms
- Spectrum Authorization – include market based methods – neutral licensing and spectrum sharing



Keep the UNTFA updated and regional coordination

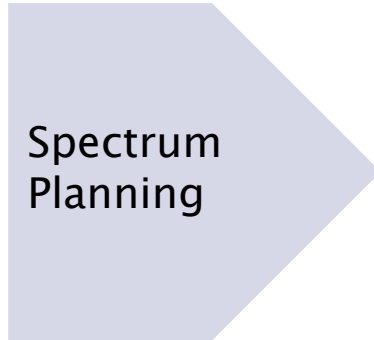
Develop Band Plans reflecting spectrum policy, authorization, and pricing



UCC to Develop Internal Capacity

- Policy Development
- Spectrum Master Plans – 5 year plans
- Market Analysis and Annual Reporting
- Spectrum Valuation and Pricing – Business Modeling and AIP
- Spectrum Monitoring, Measurement and Analysis

Medium to Long-term Action 2-3 Years



Conduct Spectrum Demand and Supply Studies
Consider Future Spectrum Use and Opportunistic Spectrum Allocations

Implementation illustration

Introduce market-based assignment

Start auctions for scarce spectrum

- Plan and study likely to commence with 700 MHz in medium term (WRC-15 IMT)
- Ensure competitive tension by allowing participation subject to spectrum caps (15MHz) to address market power

Promote Spectrum Sharing

- Adopt Spectrum Sharing Licensing and Technical Guidelines to ensure efficient optimal.

Improve incentives from administrative fees

Study AIP & commence opportunity cost analysis and business modelling

- Study introduction of AIP for scarce spectrum and build capacity in spectrum opportunity cost analysis and business modelling

Cost-recovery and spectrum usage fees

- Revise fees to include spectrum management cost recovery and spectrum usage with incentives

Other reforms

- Adopt Spectrum, Competition, Licensing & QoS, Interconnection & Access, Tariffs, Dispute Resolution Regulations

Public sector use

Engage

- Engage public sector users in dialogue, consider spectrum audit over time

Implementation illustration

Allocations

Improve access to mobile spectrum start aligning allocations to WRC-15

- 450–470 MHz
- 470 – 698 MHz Allocated to BROADCASTING
- 698–799 MHz Allocation to MOBILE according to results of WRC-15.
- 1427MHz–1518MHz Allocation to MOBILE according to results of WRC-15
- 3600 – 3700 MHz Allocation to MOBILE depending on results of next WRC-18/19

Planning

Improve planning for ensuring spectrum is used efficiently in high value uses

- Update the Uganda National Table of Frequency Allocation for WRC-15 using the recommendations and allocation process provided in the Allocations Report
- Spectrum Demand and Supply Studies to determine and evaluated spectrum use and utilization below 5 GHz.
- UCC Spectrum Planning:
 - Broadband – promoting broadband and harmonizing regulatory treatment;
 - Competition – sustainable competition across all ICT sectors;
 - Spectrum – flexible market-oriented spectrum assignment
 - Public Safety and Disaster Recovery Security

Spectrum Master Plan – Band Planning 2016–2020

2016

2017

2018

2019

2020

