

# **Unveiling the Quality-of-Service Landscape: A Deep Dive into Gambian Telecommunications"**

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# Outline

Introduction-  
Gambia

The telecoms  
market

Key QoS  
Parameters

QoS  
Performance  
Monitoring

Enforcement

# INTRODUCTION - The Gambia

PURA

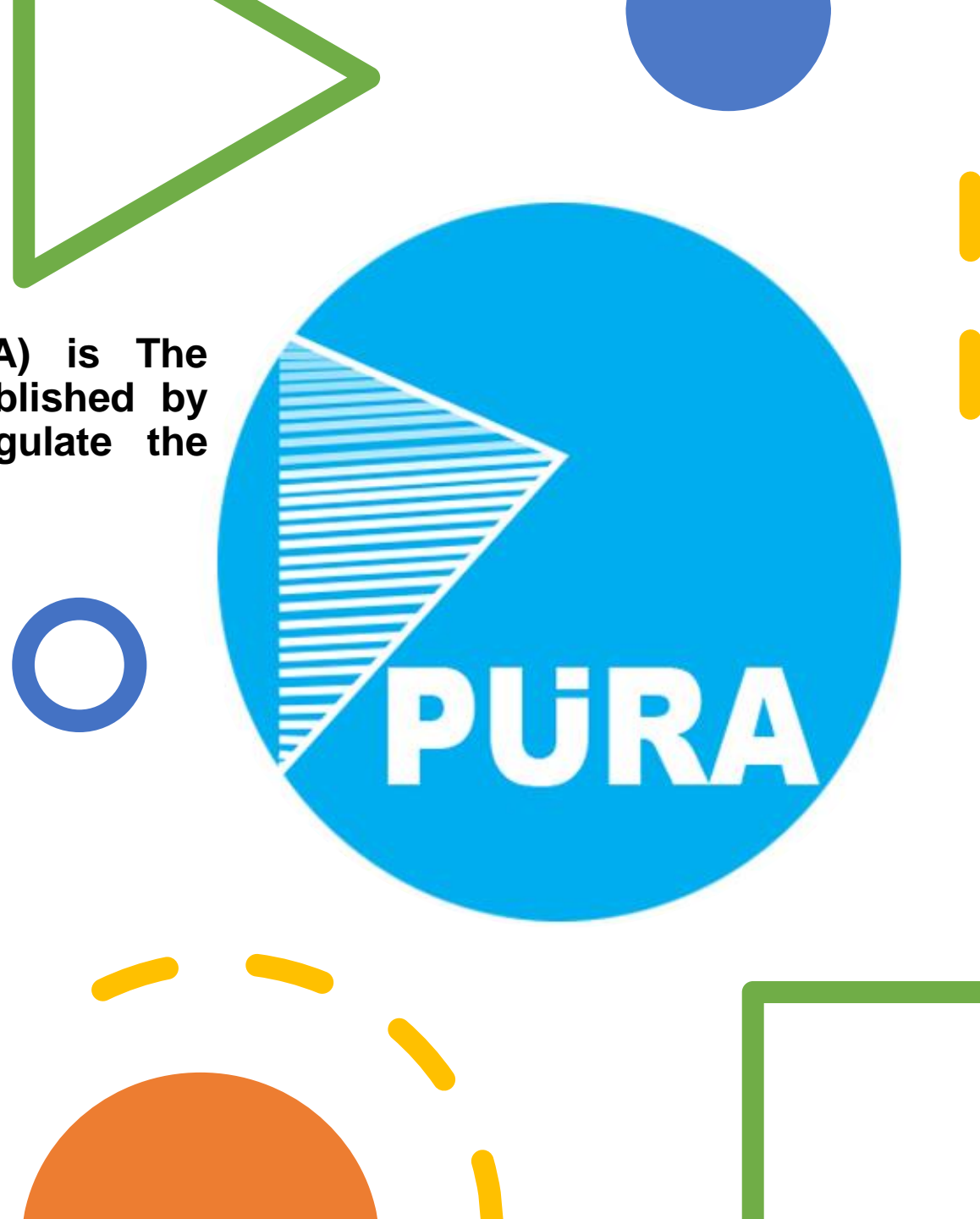
- Is surrounded by Senegal except for its western coast on the Atlantic Ocean.
- It has an area of 10,689 square kilometers (4,127 sq mi) with a population of 2.6 million.
- Banjul is the capital while the largest cities are Serekunda and Brikama.



# WHO WE ARE

The Public Utilities Regulatory Authority (PURA) is The Gambia's independent multi-sector regulator established by the Government under PURA Act 2001, to regulate the following sectors:

- Broadcasting
- Electricity
- Telecommunications
- Transportation
- Water & Sewage
- Postal
- Other public utilities, if deemed necessary





## **Ccurrent regulated Sectors:**

- Telecommunication
- Electricity
- Water and sewage
- Downstream Petroleum
- Broadcasting

The Authority reports to the Ministry of Finance and economic Affairs, and coordinates with line ministries responsible for each regulated sector in executing its functions.

# Overview of the telecom Market Status

**GSM market  
constitutes of  
4 players.**

**2.9 million  
active  
subscribers.**

**Mobile usage  
penetration  
rate is 120%**

**3G  
penetration  
rate is 51%**

**4G  
penetration  
rate is 21%**



# Current Digital Finance Status

**80% of the population are unbanked.**

**Mobile money penetration rate is 16%.**

**Two operators have mobile money services since 2016.**




# Telecoms - Quality of Service Monitoring

The Gambia Context





# QoS Legal Instrument



## ❖ IC Act 2009

- ❖ Provides legislative framework for establishing QoS standards and obligations for licensees

## ❖ Enforcement Regulation 2010

- ❖ Sets penalties for non-compliance.

## ❖ QoS guideline 2022

- ❖ Specifies minimum QoS targets
- ❖ Standard key performance indicators and reporting requirements

# Our Measurement Method

CDR-based QoS Measurement

CDRs contain detailed information about each call/session

Relevant OMC counters are extracted from CDRs

OMC counters allow calculating various QoS metrics



Key QoS  
Metrics  
from OMC  
Counters

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Call Setup Success Rate

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Call Drop Rate

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Call Setup Time

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Speech Quality

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Throughput

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Packet Loss Rate

# System Setup for CDR-based QoS Measurement

PURA INSTALL SERVERS IN  
OPERATORS PREMISES



RAW DATA CONSISTING OF  
COUNTER RECORDS IS  
PUSHED AUTOMATICALLY  
TO PURA SERVERS.



THE MEASUREMENT PERIOD  
IS ON AN HOURLY (24/7)  
BASIS



THE RAW DATA RECORDS  
MUST BE TRANSFERRED IN  
.CSV FORMAT



LICENSEES SHALL PROVIDE  
THE UP-TO-DATE UPDATED  
2G,3G AND 4G CELLS  
MAPPING BY THE 5TH OF  
EACH MONTH IN EXCEL  
FORMAT.



# Key QoS Parameters

# KPIs for 2G Network @ busy hour

Parameter	Target value
Cell Availability	$\geq 96\%$
Call Setup Success Rate	$\geq 96\%$
Call Drop Rate	$\leq 2\%$
Handover Success Rate	$\geq 96\%$
Call Success Rate	$\geq 96\%$
SDCCH Availability Rate	$\geq 96\%$
TCH Availability Rate	$\geq 96\%$
SDCCH congestion rate	$\leq 2\%$
TCH Congestion Rate	$\leq 2\%$
TCH Drop Rate	$\leq 2\%$

KPIs for 3G  
Network @  
busy hour

Parameter	Target value
Data Availability	≥ 96%
Cell Availability	≥ 96%
CS RRC Call Setup Success Rate	≥ 96%
CS Radio Access Bearer Call Setup Success Rate	≥ 96 %
CS Voice Call Setup Success Rate	≥ 96 %
CS Voice Call Drop Rate	≤ 2%
CS HO 3G-2G	≥ 96 %
PS RRC Call Setup Success Rate	≥ 96%
PS Radio Access Bearer Call Setup Success Rate	≥ 96%
PS Call Setup Success Rate	≥ 96%
PS Call Drop Rate	≤ 2%
PS HO 3G-2G	≥ 96 %
Soft Ho Success Rate	≥ 96 %

KPIs for 4G  
Networks @  
busy hour

Parameter	Target value
Data Availability	$\geq 95\%$
Cell Availability	$\geq 99\%$
RRC Call setup success Rate	$\geq 98\%$
RRC Drop Rate	$\leq 5\%$
EPS Radio access bearer call Setup success Rate	$\geq 98\%$
EPS Radio access bearer Drop Rate	$\leq 2\%$
Call setup success rate	$\geq 98\%$
CS Fall Back Success Rate	$\geq 98\%$
Ho Success Rate (4G)	$\geq 97\%$
Inter Rat Ho Success Rate	$\geq 96\%$
Cell DL Throughput	$\geq 10\text{Mbs}$
Cell UL Throughput	$\geq 1\text{Mbs}$



# ENFORCEMENT

Failure to meet the minimum standard of each of the KPIs as specified by the Authority, a fine will be imposed per month as stipulated the guideline





# 2G Enforceable KPIs

<b>PARAMETERS</b>	<b>Target Value</b>
Cell Availability	<b><math>\geq 96\%</math></b>
Call Setup Success Rate	<b><math>\geq 96\%</math></b>
Call Drop Rate	<b><math>\leq 2\%</math></b>
Handover Success Rate	<b><math>\geq 92\%</math></b>


# 3G Enforceable KPIs

<b>PARAMATERS</b>	<b>Target Value</b>
Cell Availability	$\geq 96$
CS voice call setup success rate	$\geq 96$
CS voice call drop rate	$\leq 2$
PS call setup success rate	$\geq 96$
PS call drop rate	$\leq 2$
Soft Ho Success Rate	$\geq 96$



# 4G Enforceable KPIs

PARAMETERS	TARGET VALUE
Cell Availability	$\geq 99$
EPS Radio access bearer Drop Rate	$\leq 2$
Call setup success rate	$\geq 96$
CS Fall Back Success Rate	$\geq 96$
Ho Success Rate (4G)	$\geq 96$
Cell Dl Throughput	10Mbps
Cell Ul Throughput	1Mbps



How to  
Calculate  
Fine for  
KPIs

**U = unit fine per KPI  
in each technology**

- **N= Number of failed KPIs  
in each Region**

$$\text{Fine} = U * N$$

# How to Calculate Fine for 2G KPIs

**U = unit fine  
per KPI =  
D400,000.00**

**Fine = U\*N  
Fine=400000\* 8  
=3,200,000**

**N= Number of  
failed KPIs in  
each Region**

	ACCESSIBILITY	RETAINABILITY	MOBILITY	
Threshold	>=95%	>=95%	<=2%	>=95%
REGION	Call Setup Success Rate @ BH	Call Success Rate @ BH	Call Drop Rate @ BH	HO Success @ BH
GBA	96.59%	96.05%	0.55%	98.88%
CRR	95.86%	94.92%	0.97%	95.14%
LRR	95.27%	94.59%	0.71%	97.29%
NBR	90.99%	90.02%	1.07%	95.32%
URR	95.03%	94.07%	1.01%	97.69%
WCR	93.31%	92.18%	1.22%	94.80%

# How to Calculate Fine for 3G KPIs

**U = unit fine  
per KPI =  
D200,000.00**

**Fine = U\*N**  
**Fine=200000\* 6**  
**=1,200,000**

**N= Number of  
failed KPIs in  
each Region**

	ACCESSIBILITY		RETAINABILITY		MOBILITY
Threshold	>=95%		>=95%	<=2%	>=95%
REGION	CS voice Call Setup Success Rate @ BH	PS Call Setup Success Rate @ BH	CS voice Call Drop Rate @ BH	PS Call Drop Rate @ BH	Soft HO Success Rate @ BH
GBA	98.83%	98.74%	0.20%	8.98%	99.92%
CRR	NO 3G COVERAGE IN THIS REGION				
LRR	99.46%	98.16%	0.17%	36.28%	99.97%
NBR	99.13%	99.16%	0.20%	27.10%	99.97%
URR	96.06%	63.97%	0.26%	27.12%	99.96%
WCR	98.27%	98.42%	0.37%	17.73%	99.91%

# Reporting and Publication

QoS Monitoring Tool extract and process the raw data



Generate QoS KPI reports on:

hourly,

daily,

weekly,

monthly

yearly



**Publication:** The generated comparison reports of some KPIs are published every three (3) months in all the local new papers and PURA website.



# CONCLUSION



PURA has established technical and legal mechanism for monitoring and enforcement of QoS to ensure that consumers are protected.



Monitoring is designed to benchmark ITU recommended standards and internal best practices.



However, there is growing need for proactive monitoring of end-to-end QoS

Thank you for listening

THE END

