

Terms of Reference on Quality of Service Regulations

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LIST OF ABBREVIATIONS

ECTEL	Eastern Caribbean Telecommunications Authority
NTRC	National Telecommunications Regulatory Commission
QoS	Quality of Service
EC Bill	Electronic Communications Bill
ms	Milliseconds

INTRODUCTION

At the 67th Meeting of the Board of Directors of the Eastern Caribbean Telecommunications Authority, (ECTEL), it was directed that ECTEL, sets out revised Quality of Service standards to be adhered to by Telecommunication Providers.

The New Electronic Communications Bill (hereinafter referred to as the Bill) also envisages a new regime under which the Commission will be responsible for setting the technical standard for electronic communications. This is captured in section 11(c) of the draft Bill as follows:

The functions of the Commission are to:-

11 (c) be responsible for technical regulation and the setting of technical standards of electronic communications and ensure compatibility with international standards;

With this in mind it is envisaged that the Commission will be responsible for the setting, adjustment and amendments to Quality of Service (QoS) Regulations moving them away from the assigned functions of the Minister as currently holds under the Telecommunications Act.

Under section 12 of the draft Bill “Powers of the Commission”, is included by virtue of section 12(e):

“issue codes of practice for the electronic communications sector in accordance with section 34”.

Section 34 “Commission To Issue Codes of Practice”

- (1) In accordance with the recommendation of ECTEL and by notice published in the [Official Gazette] the Commission may issue codes of practice relating to electronic communications services and electronic communications network.
- (2) Codes of practice issued by the Commission under subsection (1)-
 - (a) shall be available for public scrutiny at the office of the Commission during business hours or on the websites operated by ECTEL and the Commission; or

- (b) may be reproduced by ECTEL or the Commission at the request of any member of the public on payment of the prescribed fee.
- (3) A breach of the codes of practice issued by the Commission under subsection (1) is deemed to be a breach of the licence or a frequency authorization, as the case may be.

Section 35 “Directions by the Commission”

- (1) *In accordance with the recommendation of ECTEL, for the purpose of ensuring compliance with this Act, the Commission may, by notice in writing, direct a licensee or frequency authorization holder to take such measures or cease such activities as may be necessary.*
- (2) *A licensee or frequency authorisation holder who fails to comply with a direction of the Commission is deemed to be in breach of the licence or frequency authorization.*

QUALITY OF SERVICE STANDARDS

With the above provisions in mind ECTEL has identified Quality of Service Standards in keeping with international standards to be adhered to by Telecommunication Providers.

A copy of the desired standards identified by ECTEL has been set out below. The National Telecommunications Regulatory Commissions (NTRCs) are encouraged to examine the standards identified by ECTEL and measure them against the services currently being provided in their region. Based on these measurements ECTEL may amend the standard set out below.

Introduction

Quality of Service Standards ensure that consumers have access to high quality telecommunications service by setting basic minimum quality levels for all public telecommunications operators.

These standards define the lower and or upper bounds of acceptability of such technical issues as transmission rates, error rates, call completion rates, etc. and commercial consumer issues such as access to customer help lines, billing integrity and other characteristics that can be measured and improved.

This document recommends quality of service standards for the following services:

- Public Fixed Voice Telecommunications
- Public Mobile Telecommunications/SMS
- Fixed Broadband
- Wireless Broadband
- Domestic Leased Line
- International Leased Line
- Subscriber Television
- Billing Parameters
- Customer Help Lines
- Customer Complaints/Satisfaction
- General Complaints

Quality of Service Performance Standards Indicator

1. Public Fixed Voice Telecommunications

PUBLIC FIXED TELECOMMUNICATIONS	
PROPOSED QoS KPI	Proposed Target Level – Over period of 1 quarter
Availability of Telephone Service	≥ 99.99%
Supply Time for Connection	90% within 5 working days
Fault Repair Time	80% in 24 hours 95% in 48 hours 100% in 72 hours
Service Availability	>99.00%
Call completion success rate	>98%
Fault Rate per Access Line	≤ 3% per 100 lines per month
Reconnection of service after payment of overdue amounts within period (Business Hours)	85% within 3 hours
Advance Notice of planned disruption	Notification of 95% of planned disruptions should be issued within a 36-hour timeframe before the event.
Call Set Up Time (Post dialing delay to ring tone)	National calls @ busy hour 3 seconds; International calls @ busy hour 8 seconds
Customer Care Accessibility	100%
POI Congestion	< 1%
Grade of Service	< 1%

2. Public Mobile Telecommunications

PUBLIC MOBILE TELECOMMUNICATIONS	
Proposed QoS KPI	Proposed Target Level – Over period of 1 quarter
Supply Time for Connection	On demand for pre-paid. Within 3 hours for postpaid
Call Completion Success Rate	>95%
Service Availability	>99.00%
Response Time for Operator Service	80% within 10 seconds 90% within 15 seconds
Reconnection of service after payment of overdue amounts within period	95%
Advance Notice of planned disruption	Notification of 95% of planned disruptions should be issued within a 36-hour timeframe before the event.
Drop Call Rate (during peak periods)	< 2%
Blocked call rate (during peak periods)	SDCCH congestion <1% TCH congestion <2%
Service Coverage (> 90% populated coverage)	In door \geq -75 dBm In-Vehicle \geq -85 dBm Outdoor – in city \geq -95 dBm
POI Congestion	< 0.5%
Prepaid Credits Complaints	<0.5% complaint over 1000 pre- paid credit top-ups
Call Set Up Time (Post dialing delay to ring tone)	National calls @ busy hour 5 seconds; International calls @ busy hour 10 seconds
Handover Success Rate (%)	>95%
Traffic Channel Congestion Ratio (for Busy Hour)	\leq 2%
Customer Care Accessibility	100%
Net Neutrality	All traffic on the internet should be treated equally and that internet service providers should not degrade or give preferential treatment to certain services.
Advanced Notice of Rate change	Notice to be publicized in two weekly newspapers, over a two week period using a quarter page Ad

Note: It is to be noted that all the measurements of performance parameters should be carried out during the “Time Consistent Busy Hour (TCBH)”. TCBH is defined as “the one hour period starting at the same time each day for which the average traffic of resource group is greatest over the days under consideration”. ITU recommends analysis of 90 days to establish TCBH. <http://www.nta.gov.np/en/2012-06-0405-30-21/cellular-mobile>

3. SMS Service

SMS SERVICE	
Proposed QoS KPI	Proposed Target Level – Over period of 1 quarter
SMS Service availability	>99%
SMS end-to-end delivery time	<5 sec, for 99% conditions: The receiving mobile equipment should be ON, have coverage and have adequate storage.
SMS Completion Ratio	>95%
SMS Promotion	ALL persons receiving SMS promotional text must have expressly given authorization that they are interested in receiving promotions from a specific entity.

- SMS Promotion: Consumers who receive SMS marketing promotions must consent to receiving the promotions from the specific advertiser. Therefore the network provider must have a list of numbers from the specific advertiser to whom marketing promotions can be sent and not just send promotions to random numbers. Exceptions to this requirement would be calls or texts from the consumers provider such as text related to billing, top-ups etc., informational notices and healthcare-related calls.

4. Fixed Broadband Service

FIXED BROADBANDSERVICE	
Proposed QoS KPI	Proposed Target Level – Over period of 1 quarter
Service Availability	>99.00%
Supply Time for Connection	90% within 5 working days
Fault Repair Time	95% within 24 hours 100% within 72 hours
Fault Rate per Access Line	≤ 3% per 100 lines per month
Ratio of Packet Loss (Upload and Download)	≤ 3% Packet loss
Average Throughput for Packet data	>90% of the subscribed speed
Latency	< 150ms for Audio; <250 ms for Data < 75 ms for Data (interactive)
Drop Rate	<1%
Jitter	< 30 ms
Reconnection of service after payment of overdue amounts within period (Business Hours)	85% within 3 hours
Advance Notice of planned disruption	Notification of 95% of planned disruptions should be issued within a 36-hour timeframe before the event.
Customer Care Accessibility	100%
Net Neutrality	All traffic on the internet should be treated equally and that internet service providers should not degrade or give preferential treatment to certain services.

5. Wireless Broadband Service

WIRELESS BROADBAND SERVICE	
Proposed QoS KPI	Proposed Target Level – Over period of 1 quarter
Service Availability	>99.00%
Supply Time for Connection	95% within 3 working days
Fault Repair Time	95% within 24 hours
Ratio of Packet Loss (Upload and Download)	≤ 5% Packet loss
Average Throughput for Packet data	>90% of the subscribed speed
Latency	< 150ms for Audio; <250 ms for Data < 75 ms for Data (interactive)
Drop Rate	<1%
Jitter	< 30 ms
Signal Strength	≥-75 dBm
Net Neutrality	All traffic on the internet should be treated equally and that internet service providers should not degrade or give preferential treatment to certain services.

6. Domestic Leased Line Services

DOMESTIC LEASED LINE SERVICES	
Proposed QoS KPI	Proposed Target Level – Over period of 1 quarter
Supply Time for Connection	≥90% completed on agreed day (as per the terms and conditions of the service)
Fault Repair Time	95% within 24 hours
Service Availability	≥99.70%

7. International Leased Line Services

INTERNATIONAL LEASED LINE SERVICES	
Proposed QoS KPI	Proposed Target Level – Over period of 1 quarter
Supply Time for Connection	90% completed on agreed day (as per the terms and conditions of the service)
Fault Repair Time	90% within agreed repair time.
Service Availability	≥96.00%

8. Subscriber Television Service

SUBSCRIBER TELEVISION SERVICE	
Proposed QoS KPI	Proposed Target Level – Over period of 1 quarter
Installation time of service after application	< 5 working day
Signal to Noise Ratio (DVB-C)	26 dB for min 64 QAM 32 dB for min 256 QAM
Operating Margin (Noise Margin) – DVB-C	Higher than 4 dB
Maximum and Minimum Carrier Levels (DVB-C)	47 dB micro volts min for 64 QAM 67 dB micro volts max for 64 QAM 54 dB micro volts min for 256 QAM 74 dB micro volts max for 256 QAM
MER (DVB-C)	30 dB (64 QAM) min 34 dB (256 QAM) min
Complaints by subscribers of “No Signal”	90% redress in 48 hours 100% redress in 72 hours
All installation and service related complaints (except those related to billing)	90 % in 48 hours 100% in 72 hours
Notice to consumers of preventive maintenance of not more than 24 hours	A minimum of 36 hour notice to consumers
Change in regulated subscription package(s)	Not less than 6 months’ notice to regulator and consumers from date of enrollment of subscriber to package
Removal of channels from regulated subscription package(s)	Not less than 15 days prior notice to regulator and consumers (published in local newspapers and on TV screen)

Noise Margin – the margin between the signal to noise ratio (SNR) leading to quasi error free (QEF) operation after Reed Solomon Decoder (BER < 2 x 10⁻⁴ before Reed Solomon Decoding) and the SNR of the system.

Higher than 4 dB is as per IS 13420 (Part I):2002, IEC 60728-1(2001), para 5.11.1.2 page 54.

MER as clarified in ETSI: Technical Report: Measurement guidelines for DVB Systems.

Maximum and minimum carrier levels are as IS 13420 (Part 1):2002 IEC 607278-1 “Cabled distribution system for sound and television signals – Part 1 measurement and system performance.

9. Billing Parameters

Billing Parameters	
Proposed QoS KPI	Proposed Target Level
Billing Accuracy (valid accuracy-related complaints)	≤ 1 complaint per 1000 bills over billing cycle
Percentage of billing related errors cleared within a month	>99%
Period of all refund/payments due to customers from the date of resolution of complaints as in the above	<4 weeks

10. Customer Help Lines

Customer Help Lines	
Proposed QoS KPI	Proposed Target Level
Response time to the customer for assistance	% of calls answered by operator (voice to voice): Within 10 seconds 80% Within 15 seconds 95%
Line Shifting or relocation*	< 5 working days
Service disconnection**	>99%
Period of all refund / payments due to customers from the date of resolution of complaints as in the above	< 4 weeks
Response time to the customer for assistance	% of calls answered by operator (voice to voice): Within 10 seconds 80% Within 20 seconds 95%

*Subject to technical feasibility & upon clearance of all payable dues.

**Time taken to disconnect service technically but it does not take into account the time for the adjustment of relevant dues/fee.

11. Customer Complaints/Satisfaction

CUSTOMER COMPLAINTS / SATISFACTION	
Proposed QoS KPI	Proposed Target Level
Complaints with the provision of the service	<5%
Complaints with the billing performance	<1%
Complaints with help services	<5%
Complaints with network performance, reliability and availability	<5%
Satisfied with maintainability	<5%
Overall customer satisfaction	>95%
Customer satisfaction with offered supplementary services	>95%

The percentages are to be using the number of complaints being submitted to Service Providers in a given category as a percentage of the number of subscribers to the network.

12. General Complaints

The number of general service related (not billing) complaints per 1000 subscribers over period specified.

Fault and Repair Parameters	Benchmarks	Average over a period
No of fault incidences per month per 100 subscribers	<3	1 month
Fault incidences repaired in;		
24 hours	90%	1 day
48 hours	95%	2 days
72 hours	99%	3 days
More than 72 hours	100%	More than 3 days

QUESTIONS TO BE ADDRESSED

Questions to the NTRC

1. Do you regularly receive information from providers as to the level of service being offered to consumers?
2. Based on the information available from providers if any, are the standards outlined above currently being met, surpassed or do they fall below the current standards?
3. If they surpass the current standard, by how much do they surpass those standards?
4. If they fall below such standards how far below the international standards do they fall?
5. How easy was it to gain information from the providers?
6. Have you had any customer complaints in relation to the QoS?
7. How are customer complaints about the QoS handled?
8. Do you agree that the NTRC is best placed to amend and update these Codes of Practice?
9. Are there any other issues which you may wish to raise in relation to the QoS Regulations?
10. Are there other service categories for which you would like Quality of Service KPIs to be developed for example Subscriber Television, etc.?

Questions to Providers:

1. Do you think the NTRCs are best placed to update the Quality of Service Regulations?
2. If not please explain why.
3. Do you provide customers with information about the QoS?
4. Will you be able to meet these proposed QoS Standards?
If not, please explain why?

5. Would you like to make any suggestion towards improving the QoS being offered to customers and how they may be improved?
6. Do you take issue with any of the QoS matters addressed above?
If yes, please state why?

Questions to Service Users

1. Have you as a customer received quality of service below or above the standards set out here?
2. If it was below what did you do about it?
3. How was your complaint handled?
4. Were you satisfied with how it was handled and the outcome?
5. Are you aware that if you are not satisfied about how your complaint was handled you may complain to your National Telecommunications and Regulation Authority (NTRC).
6. Do you know where or how to find your local NTRC?
7. What are your views on allowing the NTRC on the advice of ECTEL to set the QoS Standards?
8. What are your views on the current quality of service standards being proposed?
9. Would you like to see higher standards in some of the areas mentioned above?
10. If yes in which areas would you like to see higher standards?
Please also explain why.
11. Are there any recommendations or proposals you would like to make in relation to the proposed QoS Standards?

QUALITY OF SERVICE DEFINITIONS

The following are the definitions of some parameters of Quality of Service (QoS) being measured.

Call Completion Rate

The ratio of successfully completed calls to the total number of attempted calls (ITU-T E600/2.13). That is, the ratio of the number of completed call attempts to the total number of call attempts, at a given point of a network.

Call Setup Success Rate

Number of the unblocked call attempts divided by the total number of call attempts.

Or $(1 - \text{Blocking Probability}) \times 100\%$

Call Set-up time

The call set-up time will be calculated for all successful call attempts in the network during the network busy hour on the busiest day of each week during the reporting period.

A successful call attempt refers to a call from a calling party who is successfully switched through to the called party, or receives busy tone when the called party is engaged speaking.

Call Drop Rate

The Call Drop Rate is the number of dropped calls divided by the total number of call attempts.

Or $(1 - \text{Call Completion Ratio}) \times 100\%$

Note: A dropped call is a call that is prematurely terminated before being released normally by either the caller or called party.

Post Dialing Delay

In GSM network, is the average time between pressing send button (after pressing correct digits) and getting a ring back tone. This is also called “Call Setup Time” or time to connect a call.

Handover Success Rate

This is the ratio of the number of successfully completed handovers to the total number of initiated handovers. This ratio can be expressed as a percentage.

Customer Care Accessibility

100% Call Completion Rate means that all calls to the center must be answered by a customer care personnel or a machine to put a customer on hold for some time (the line must never be busy at any time). Alternatively, all calls to the center must go through.

Packet Loss:

Packet loss is the percentage of packets lost to the total packets transmitted between two designated CPE/Router Ports.

Network Latency:

Latency is the measure of duration of a round trip for a data packet between specific source and destination Router Port/Customer Premises Equipment (CPE).

Jitter

Packets from the source will reach the destination with different delays. This variation in delay is known as jitter and can seriously affect the quality of streaming audio and/or video.

Fault Repair/ Restoration Time

Means the time taken to restore an existing customer's service to operational level from the time that a problem or fault is reported. Faults due to the customer premises equipment which is owned by customer such as computer hardware and software shall be excluded from the measurement of performance against this benchmark.

Service availability

This is the measure of the degree to which the service or is operable and not in a state of failure or outage at any point of time for all users.

Response Time for Operator Services

The duration from the instant when the address information required for setting up a call is received by the network to the instant the human operator answers the calling user to provide the service requested. The services covered are the services for operator controlled and assisted calls that are accessed with special access codes. Access to emergency services is excluded.

Fault Rate per Access Line

This is a measure of the faults per access line. Access lines are the distribution circuits from the exchange to the distribution point, including the fiber, copper, access multiplexers and any other access equipment where applicable.

Call Congestion Rate

Traffic Channel Congestion during busy hour should be equal or less than two per cent (2%). Call Congestion Rate is the probability of failure of accessing a traffic channel during call setup.

Grade of Service:

Grade of Service (GoS) is defined as “the probability of call failure over the junctions between switches due to non-availability of junctions”.

POI congestion:

POI congestion is defined as “The ratio of calls failed over the PoI (between two operators/licensees) due to unavailability of free circuits to the total call requests for seizure of PoI circuit”