

BOTSWANACOMMUNICATIONS REGULATORY AUTHORITY

QUALITY OF SERVICE GUIDELINES (2013)

1.0 PREAMBLE

The Botswana Communications Regulatory Authority (herein after referred to as the Authority or the BOCRA) recognises the need to ensure the provision of quality service to consumers of communications services. Pursuant to Section 6 (2) (a) of the Communications Regulatory Authority Act (2012). BOCRA hereby sets the Quality of Service Guidelines to guide Service Providers in the provision of services in the communication sector.

1.1 Quality of Service Guidelines set standards and measures that define applicable quality measures. According to ITU-T Recommendation G.1000; “QoS offered by a service provider is the statement of the level of quality offered to the consumer by the service provider.” This should be distinguished from Quality of Experience (QoE), which refers to the consumer perception, or experience of the quality of service offered. Both the level of quality offered to the consumer and the perceptions or experience of the quality of service offered are critical factors in monitoring quality of service. However, these guidelines do not extend to quality of experience. Quality of experience will continue to be monitored through surveys conducted by BOCRA on a periodic basis.

2.0 DEFINITIONS AND INTERPRETATIONS

2.1 In the event of conflict or ambiguity between the terms defined herein and the terms defined in the Licence or in the Communications Regulatory Authority Act then the following order of precedence shall apply:

- a) The Communications Regulatory Authority Act;
- b) The Communications Regulations;

- c) The Operator Licence; and
- d) The Quality of Service Guidelines.

In these Guidelines, unless the context otherwise requires;

- 2.2 “**Access Service**” means a Service that is provided for communications to or from Network Termination Points that serve End Users;
- 2.3 “**Act**” means the Communications Regulatory Authority Act, 2012;
- 2.4 “**Authority** or **BOCRA**” means the Botswana Communications Regulatory Authority or its successor in title;
- 2.5 “**Average**” or “**Mean**” of a set of numerical values means the result of dividing the sum of the numerical values by the number of values in a given set;
- 2.6 “**Broadband Internet Access Service**” means high speed Internet Access Service that has a downstream capacity of 128Kbs and above;
- 2.7 “**Call completion rate**” means the ratio of the number of completed calls to the number of call attempts;
- 2.8 “**Call set-up time**” means the overall length of time required to establish a circuit switched call between users “voice call”;
- 2.9 “**Call set-up Success Rate**” means the fraction of the attempts to make a call which result in a connection to the dialled number as a percentage to all call attempts.
- 2.10 “**Completed call**” means a call answered by the receiving party or where a call terminates on an answering device;
- 2.11 “**Consumer**” means an individual who buys or uses telecommunications products or services ;
- 2.12 “**Down time**” means the period when the system is unavailable;
- 2.13 “**Dropped call**” means a call that is terminated unexpectedly as a result of technical reasons;
- 2.14 “**Dropped Call Rate (DCR)**” means a fraction of the calls which, due to technical reasons, were cut off before the speaking parties had finished their conversation and before one of them had hung up;
- 2.15 “**End User**” means a Consumer of any communication service who is not a service provider.

- 2.16 **“Fault”** means a state where a network does not meet the service specifications and some repair action is required;
- 2.17 **“Fault repair time”** means the time taken to repair a fault from notification until restoration;
- 2.18 **“Fault report”** means notification of disrupted or degraded service made by an end user to the Service Provider;
- 2.19 **“Fixed Telephony Service”** means a telephone line service which travels through a solid medium, either metal wire or optical fibre;
- 2.20 **“Fixed Wireless Telephony Service”** means a Fixed Telephony Service that requires the use of radio frequencies assigned under individual Licenses to achieve communications at the Network Termination Points of the End Users;
- 2.21 **“Grade of Service”** means the ratio of lost calls to offered calls during busy hours;
- 2.22 **“Handover Success”** means the process of transferring an on-going call or data session from one channel connected to the core network to another;
- 2.23 **“Internet Service”** means a service that provides access to the global system of interconnected computer networks known as the Internet;
- 2.24 **“Internet Protocol (IP)”** means the principal communications protocol used for relaying datagram (packets) across an internetwork using the Internet Protocol Suite.
- 2.25 **“Leased Line Service”** means a service contract between a provider and a customer, whereby the provider agrees to deliver a symmetric telecommunications line connecting two or more locations in exchange for a monthly rent;
- 2.26 **“Licensee”** means a person or an entity licensed by the Authority to provide any communication service;
- 2.27 **“Measurement Method”** means a method of measuring a Parameter that is identified in the Schedule of measurements in these Guidelines;
- 2.28 **“Measurement”** means a numerical value that is obtained by measuring using a Measurement Method;
- 2.29 **“Mobile Telephony Service”** means a Telephony Service that requires the use of radio frequencies assigned under individual Licences to achieve communications at the Network Termination

Points of the End Users, that permits the End Users to move between different geographic locations without losing communications;

- 2.30 **“Network latency”** means the round trip delay of traffic within the local broadband network from the consumer to the nearest serving internet services provider node, which is based on a standard packet size of 32 bits;
- 2.31 **“Network Termination Point”** means a point at which a Consumer has physical access through terminal devices or other consumer premises equipment to a network of a Service Provider;
- 2.32 **“Operating time”** means the period during which a system is working in a manner acceptable to its operator or user during the reporting period;
- 2.33 **“Packet loss”** means the failure of one or more transmitted packets to arrive at their destination.
- 2.34 **“Parameter”** means a measurable characterization of the quality of an aspect of a Service;
- 2.35 **“Published Measurement”** means a Measurement that is for publication with content and format that are identified in the Schedule of Measurements in these guidelines;
- 2.36 **“Quality of service”** means the degree to which the network conforms to the stipulated norms;
- 2.37 **“Regulations”** means the Regulations as promulgated under the Telecommunications Act;
- 2.38 **“Repeat fault percentage”** means the ratio as percentage of repeat faults to total number of faults in the month;
- 2.39 **“Reporting Area”** means a geographic area for which Measurements are taken and recorded;
- 2.40 **“Reporting Period”** means the time over which QoS Measurements are taken and recorded by a Licensee;
- 2.41 **“Communication Service”** means any applications, content, network or facilities provided by a Licensee for communications between Network Termination Points;

- 2.42 “Service cover period”** means the time agreed that the services shall be operated to the defined performance standard;
- 2.43 “Service Provider”** means any person who provides communications services;
- 2.44 “Target”** means a numerical value that is reached by a Published Measurement identified in these guidelines;
- 2.45 “Telephony Service”** means a Service that is provided substantially for voice communications to or from Network Termination Points that have telephone numbers that are allocated according to the Numbering and electronic addressing plan;
- 2.46 “Voiceband Internet Service”** means any Internet Access Service that provides communications from Network Termination Points and that requires the use of a Telephony Access Service to achieve Communications.

PART 1

3.0 INTRODUCTION

- 3.1** These Guidelines are based on the general obligations and tasks of the Botswana Communications Regulatory Authority as laid down under Section 6 of the Act, which among others include; to
- promote competition in the provision of communication services, ensuring that users derive maximum benefit in terms of choice, price and quality;
 - monitor the performance of the regulated sectors in relation to levels of investment, availability, quantity, quality and standards of services competition, pricing , cost of services , the efficiency of production and distribution of services and any other matters decided upon by the Authority.
- 3.2** The Guidelines create a framework within and by which consumers can engage Operators and BOCRA as a basis for their protection and

information on service standards as Botswana strives to have an informed and educated nation by the year 2016.

4.0 SCOPE

- 4.1** The Authority realises the need to establish a common framework for the measurement, improvement and, where applicable, guaranteed levels of service that can apply to all types of service.
- 4.2** This framework defines the set of parameters, measurement of parameters across service categories, reporting and publishing of parameters and the enforcement measures for non-compliance.
- 4.3** The guidelines shall apply to all Service providers and shall serve as a reference to end users of communications in Botswana.

5.0 OBJECTIVES

The objectives of these guidelines are;

- 5.1** To identify service deficiencies through measurement of the quality of service and require appropriate measures;
- 5.2** To maintain service quality above the minimum acceptable reference point;
- 5.3** To make information (on QoS) available and accessible to afford the Consumer to make informed choices regarding services and service providers;
- 5.4** To enhance competition among service providers through the publication of information on the performance of networks.
- 5.5** To create transparency and standards that can be monitored in services through predetermined Quality of Service norms for all telecommunication services which the service provider is required to provide and the user has a right to expect.

- 5.6 To guide Operators in the desired measure on Quality of Service.
- 5.7 To protect the interests of consumers of telecommunication service and enhance consumer satisfaction.

6.0 KEY PRINCIPLES

6.1 This Section highlights applicable key principles paramount to Quality of Service;

6.1.1 Speed: (service provisioning): The time taken by the service provider to provide service after application must be defined.

6.1.2 Accuracy: Information published or availed to consumers must be accurate.

6.1.3 Reliability: The information provided must be reliable and the source of such information must be acknowledged.

6.1.4 Flexibility: The Service Provider must ensure that the network accommodates churn without undue restriction.

6.1.5 Availability: The Service Provider must ensure that the network is up and running at all times.

6.1.6 Accessibility: The Service Provider must ensure access to information and services regardless of barriers such as distance and cost.

6.1.7 Performance: The network or network portion must be able to provide the functions related to communications between users.

6.1.8 Performance measures: relate to the objective performance delivered by the service under specific load conditions where that performance is not specified by the service itself.

6.1.9 Transparency: There must be openness, communication, and accountability. Operations must be such that it is easy to see what actions are performed.

6.1.10 Non-discrimination: Service Providers are expected to supply the same product/service to all consumers on similar terms and conditions and at the same service quality regardless of destination of the customer.

PART II**7.0 OBLIGATIONS OF A LICENSEE TO PROVIDE QUALITY OF SERVICE.**

7.1 In executing their services the Service Providers shall ensure that;

7.1.1 Performance of their services meets or exceeds levels of performance as set forth in these guidelines;

7.1.2 Consumers are provided with information to enable them to make informed decisions;

7.1.3 Consumers are informed of any significant outages that affect service provision.

7.2 The Service Provider shall;

7.2.1 Establish and maintain efficient information services to assist a consumer with queries relating to the services;

7.2.2 Provide to consumers equal access to the same quality of service and in accordance with the tariff and QoS standard approved by BOCRA;

7.2.3 Not intentionally interrupt or suspend provision of any type of service without first notifying the Authority in writing and having provided reasonable notice to persons affected by such interruption or suspension.

7.3 In addition to the terms and conditions of the Licence the Service Provider shall;

7.3.1 Improve service quality, by identifying service deficiencies and making appropriate changes;

7.3.2 Maintain service quality, while considering environmental and operating conditions;

7.3.3 Avail information to ensure informed subscriber choice of services and Licensees; and

7.3.4 Improve the operation and performance of interconnected networks.

8.0 PRINCIPLES FOR DEVELOPING QUALITY OF SERVICE STANDARDS.

8.1 BOCRA shall, when developing quality of service standards, ensure that;

8.1.1 The parameters related to quality of service are clearly defined and measurable;

8.1.2 Information about the standards relating to quality of service are sufficient, comparable and accessible;

8.1.3 Communications infrastructure and services are compatible with international standards;

8.1.4 Practices increasing the user satisfaction and decreasing user complaints are encouraged;

8.1.5 Discrimination, relating to the quality of the service offered, between similar users is avoided; and

8.1.6 The special needs of persons living with disabilities are considered.

9.0 QUALITY OF SERVICE STANDARDS.

9.1 The quality of service standards under these Guidelines may be determined based on;

9.1.1 Parameters, defining the applicable quality of service measurements for specific services;

9.1.2 Methods of measuring service performance against predetermined parameters;

9.1.3 Measurable service characteristics of parameters determined by BOCRA; and

9.1.4 Any applicable targets for parameters identified by BOCRA from time to time.

Part III

10.0 MEASUREMENTS, REPORTING AND RECORD KEEPING

10.1 For each parameter a Licensee shall perform the following:

10.1.1 MEASUREMENTS

10.1.1.2 Each service parameter shall be reported for a service as set out in schedule 2;

10.1.1.3 Measurement method and publishable measurements shall be clearly outlined and shall conform to Schedule 1;

10.1.1.4 Measurement shall be taken according to measurement methods defined for that particular parameter.

10.1.2. REPORTING PERIODS

10.1.2.1 The reporting periods over which measurements are to be taken shall be 3 (three) months ending March, June, September and December of each year.

10.2.2 The Service Provider shall submit the measurement to BOCRA within 30 (Thirty) days after the end of the reporting period;

10.1.2.3. The Service Provider shall submit any additional requirement/ information requested by BOCRA within 14 (fourteen) days of request.

10.1.3 REPORTING FORMAT

10.1.3.1 The Service Provider shall provide reports for the type and nature of service it provides in such manner as BOCRA may prescribe from time to time.

10.1.4 REPORTING AREAS

10.1.4.1 The Reporting areas shall be homogeneous for all the operators.

10.1.5 RECORD KEEPING

10.1.5.1 Unless otherwise directed by BOCRA, the Service Provider shall retain Quality of Service data as well as measurements and related records that a Service provider collects for a minimum period of twenty-four (24) months after the end of the reporting period.

11.0 PUBLICATION OF MEASUREMENTS BY BOCRA

11.1 BOCRA shall, publish the measurements as submitted by the Licensees as well as the prescribed quality of service parameters.

11.2 The notice published under paragraph **11.1** above shall specify measurement and reporting intervals for quality of service parameters prescribed by BOCRA.

11.3 Published parameters will be classified into three categories of measurements indicating the quality levels as follows:

11.3.1 Consumer interface: this will be applicable to all services and have the same targets for all services.

11.3.2 Network infrastructure: this will be applicable to all services but likely to have different targets for different services.

11.3.3 Service: specific to particular services and might have their own targets.

12.0 DESCRIPTION OF CONTENT AND FORMAT OF PUBLICATION

12.1 Publication shall be made in a tabular format detailing the following:

12.1.1 Reporting period,

12.1.2 Reporting area,

12.1.3 Parameter,

12.1.4 Set target,

12.1.5 Measurement as submitted by the Licensee,

12.1.6 Performance of the Licensee,

12.1.7 The name of the service; and

12.1.8 Explanatory notes/remarks by the Licensee.

13.0 INSPECTIONS AND INVESTIGATIONS.

13.1 BOCRA shall inspect or investigate matters relating to the measurement of quality of service of the Licensee from time to time to ensure compliance.

14.0 BREACH

14.1 The Licensee shall be deemed to be in breach of the Guidelines if any of the following is committed;

14.1.2 The Licensee fails to perform the measurement, reporting and record keeping tasks;

14.1.3 The Licensee fails to reach a Target of the set parameter;

14.1.4 The Licensee fails to submit and/or publish information requested/required by BOCRA within the prescribed timeframe and in the prescribed format; and

14.1.5 The Licensee knowingly and intentionally submits or publishes false or misleading information relating to Quality of Service.

15.0 ENFORCEMENT

15.1 Where there is a contravention of the Guidelines by a Licensee BOCRA may Subject to the provisions the Act As read with the Operator Licences;

15.2.1 require the Licensee to implement a remedial plan to improve the quality of the specific services and report on the progress on such terms and conditions as BOCRA may prescribe;

15.2.2 require the Licensee to publish and or provide additional information of the quality of the specific service;

15.2.3 impose such penalty and or sanction as it may determine.

16.0 AMENDMENT OF GUIDELINES

16.1 These Guidelines may be amended by BOCRA from time to time taking into consideration the key principles as set out in these guidelines and any other consideration that may be relevant as provided for by the Act, Regulations or the Service Providers Licence.

16.2 Any amendment to the Guidelines shall be done in consultation with the stakeholders.

16.3 Implementation of the amended Guidelines shall only be done after Ninety (90) days' notice of such amendment to all Service Providers

SCHEDULES:

SCHEDULE 1: MEASUREMENTS METHODS AND PUBLISHED PARAMETERS

Parameter name	Measurement method	Published Measurements
<p>Account complaint rate which includes the following:</p> <ul style="list-style-type: none"> - Charging for calls more than once. - Charging for SMS messages more than once. - Charging for rented services at incorrect rates. - Charging for SMS messages at incorrect rates. - Charging for calls at incorrect rates. - Charging for rented services without successful supply. - Charging for calls without successful setup. - Charging for SMS messages without successful transmission. - Charging for calls beyond their durations. - Not crediting recharge payments to the account. - Not crediting bill payments to the account. - Failed attempts to make recharge payments. - Failed attempts to determine the account balance. - Losing credited amounts from the account. - And any other complaint related to the account. 	<p>An account is a statement of money owed or paid that is read or otherwise accessed by a consumer; the services provided to the consumer may be prepaid or postpaid.</p> <p>An account complaint is a complaint that an account is inaccurate. This occurs when, for instance, incorrect call data are used, calls are charged at an incorrect rate, services are billed incorrectly, call discounts, credits or debits are handled incorrectly, or the total charge including tax is calculated incorrectly.</p> <p>An account complaint should not be confused with a request for information about accounts or tariffs, or with a service fault report. An account complaint may be submitted by phone, by personal contact at a consumer service centre or in written form.</p> <p>The number of account complaints received during the Reporting Period divided by the average number of complaints for the Licensee during the same period. Complaints will be divided into Postpaid and prepaid.</p>	<p>Percentage of account complaints made by consumers in the Reporting Period, rounded up to the nearest percentage point.</p>
<p>Account complaint resolution time.</p>	<p>The time to resolve an account complaint is the elapsed time (not the working time) from when the complaint is received by a Licensee to when the cause for the complaint has been removed.</p> <p>The Measurements include all account complaints (average) resolved during the Reporting Period for the Reporting Area.</p>	<p>Mean time in days taken to correct inaccurate accounts for the service in the Reporting Period, rounded up to two numerically significant figures.</p>
<p>Disconnection complaint rate includes:</p> <ul style="list-style-type: none"> - Blocking SMS messages to or from certain numbers or networks. - Falsely stopping services for alleged non-payment. - Stopping services after credit expiry. - And any other complaint related to service disconnection 	<p>A disconnection is any way of preventing a consumer from using a service; it may not require physical unplugging of connections. A disconnection complaint is a complaint that a disconnection is unjustified. This occurs when, for instance, calls to or from the telephone number of a consumer are made unsuccessful by deliberate acts of the Licensee.</p> <p>A disconnection complaint should not be confused with a request for disconnection or transfer or with a fault report. A disconnection complaint may be submitted by phone, by personal contact at a consumer service centre or in written form.</p> <p>The number of disconnection complaints received during the Reporting Period divided by the average number of complaints for the Licensee during the same period.</p>	<p>Percentage of service disconnection complaints in the Reporting Period, rounded up to the nearest percentage point.</p>
<p>Disconnection complaint resolution time.</p>	<p>The time to resolve a disconnection complaint is the elapsed time (not the working time) from when the complaint is received by a Licensee to when the cause for the complaint has been removed.</p> <p>The average of times to resolve disconnection complaints, and the number of disconnection complaints resolved.</p>	<p>Mean time in days taken to correct unjustified disconnections in the Reporting Period, rounded up to two</p>

		numerically significant figures
Miscellaneous complaint rate.	<p>A miscellaneous complaint is a complaint other than a disconnection complaint, an account complaint or a fault report. A miscellaneous complaint may be submitted by phone, by personal contact at a consumer service centre or in written form.</p> <p>The number of miscellaneous complaints received during the Reporting Period should be divided by the average number of complaints for the Licensee during the same period.</p>	Percentage of complaints other than Disconnection complaints, account complaints and fault reports in the Reporting Period, rounded up to the nearest percentage point.
Miscellaneous complaint resolution time.	<p>The time to resolve a miscellaneous complaint is the elapsed time (not the working time) from when the complaint is received by a Licensee to when the cause for the complaint has been removed.</p>	Mean time in days taken to resolve complaints other than disconnection complaints, account complaints and fault reports in the Reporting Period, rounded up to two numerically significant figures.
Fault report rate.	<p>A fault report is a report of disrupted or degraded service that is notified by the consumer to the identified point of contact of the Licensee. A fault report may be submitted by phone, by personal contact at a consumer service centre or in written form. Faults that are due to other networks or to consumer equipment behind Network Termination Points, and fault reports that are not valid are excluded.</p> <p>Faults reported for single physical connections should be counted as one fault, regardless of the number of channels activated or affected. Multiple analogue lines sharing the same physical path to a consumer should be regarded as a single physical connection.</p> <p>The number of valid fault reports received during the Reporting Period divided by the average number of reported faults for the service during the same period. Also, separate numbers of fault reports received during the Reporting Period should be provided as Measurements for classes of fault reports, separated according to the classification scheme developed and used by the Licensee or otherwise as directed by BOCRA.</p> <p>Fault reports should be assumed to be valid unless there is a specific reason to consider that they are not valid. Fault reports for which the faults are found to be cleared when tested should be counted as valid unless the Licensee has reason to believe that the faults did not occur. Multiple consumer reports about the same fault should be regarded as separate fault reports.</p>	Percentage of valid fault reports in the Reporting Period, rounded up to the nearest percentage point.
Fault repair time.	<p>The fault repair time is the elapsed time (not the working time) from when a valid fault report is received by a Licensee to when the service has been restored to normal working order.</p> <p>The Measurements should include all faults cleared during the Reporting Period for the Reporting Area, but exclude those traced to other networks or to consumer equipment behind Network Termination Points where the Licensee has not been told that the faults have been cleared.</p>	Means time in days taken to clear faults in the Reporting Period, rounded up to two numerically significant figures.
Call centre answer success ratio.	<p>A successful call centre call is a call to a call centre that, following a successful call setup, is answered by a person within 40 seconds. The call centre services covered are those for operator assistance calls, directory assistance calls and emergency calls. Any calls answered wholly automatically (by key pad systems with recordings, for instance) are excluded.</p> <p>The number of successful calls through the call centre divided by the</p>	Percentage of calls answered fast enough by call centers, rounded down to the nearest percentage point.

	number of all call centre calls .	
Call setup success ratio.	<p>A successful call setup is a call attempt to a valid number, properly dialed following dial tone, where called party busy tone, ringing tone or answer signal is recognised at the Network Termination Point of the calling user.</p> <p>The number of successful calls setups divided by the number of all call setups.</p>	Percentage of calls successfully set up, rounded down to the nearest percentage point.
Call setup time	<p>The call setup time is the time from when the address information required for setting up a call is received by the network to when the called party busy tone or ringing tone or answer signal is received by the calling party. Unsuccessful call setups are excluded.</p> <p>The average number of call setup to the number of all setup times,</p>	Mean time in seconds taken to setup successful calls, rounded up to two numerically significant figures.
<p>Answer-seizure ratio. This parameter measures the service effectiveness.</p>	<p>An answered call is a call that, following a successful call setup, is successful in returning an answer signal.</p> <p>The number of answered calls divided by the number of call setups.</p> <p>The calls should be from traffic-weighted locations inside the Reporting Area to traffic weighted locations inside or outside the Reporting Area during the Busy Time for the Service. The weighting of the traffic should be based on appropriate figures specific to the Service for which the Measurements are provided.</p>	Percentage of calls answered, rounded down to the nearest percentage point.
SMS message transmission success ratio.	<p>A successful SMS message transmission is an SMS message transmission in which the message is transmitted completely without errors between the Network Termination Points.</p> <p>The number of successful SMS message transmissions divided by the total number of SMS message transmitted.</p> <p>The transmissions should be from traffic-weighted locations inside the Reporting Area to traffic weighted locations inside or outside the Reporting Area during the Busy Time for the Service. The weighting of the traffic should be based on appropriate figures specific to the Service for which the Measurements are provided.</p> <p>If a test transmission is to be regarded as successful it must be completed even when the receiving Network Termination Point is unavailable during transmission.</p>	Percentage of SMS message Transmissions completed successfully, rounded down to the nearest percentage point.
Internet session login success ratio.	<p>A successful internet session login is a call to an internet point of presence that, following a successful call setup, establishes an internet session within 40 seconds from when the call is answered.</p> <p>The number of successful internet session logins divided by the total number of internet session logins.</p>	Percentage of internet sessions established successfully, rounded down to the nearest percentage point.
Internet data transmission success ratio.	<p>A successful internet data transmission is an internet data transmission in which the data is transmitted completely without errors between the Network Termination Points.</p> <p>The number of successful internet data transmissions divided by the total number of internet datatransmissions..</p> <p>This quality of service parameter assesses network packet loss.</p>	Percentage of internet data transmissions completed successfully, rounded down to the nearest percentage point.
Internet data transmission time.	<p>The internet data transmission time is the time from when the internet data is sent to the network to when the internet data is received by the receiving party. Unsuccessful internet data transmissions are excluded.</p> <p>The transmissions should be from traffic-weighted locations inside the Reporting Area to traffic-weighted locations inside or outside the Reporting Area during the Busy Time for the Service. The weighting of the traffic should be based on appropriate figures specific to the Service for which the Measurements are provided.</p> <p>This quality of service parameter assesses network packet delay, through the mean, and network packet jitter, through the standard deviation.</p>	Mean time in milliseconds taken to complete successful internet data transmissions, rounded up to two numerically significant figures.

Internet data transmission capacity.	<p>The internet data transmission capacity is the percentage of the internet data transmission rate advertised for the service that is obtained by continuous transmission.</p> <p>The internet data transmission rate obtained for the service and the internet data transmission rate advertised for the service are averaged over traffic-weighted locations for the source and destination of transmissions.</p> <p>They are rates at the IP level in the stack, not at any lower level in the stack.</p>	Percentage of advertised internet data transmission rate obtained in practice, rounded down to the nearest percentage point.
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SCHEDULE 2: TARGETS

Table 1—Fixed Wireline Telephony Services

PARAMETER NAME	TARGET
Fault incidence	3% per month
Grade of Service	2% per month
Dial tone Delay	0.95 probability $\leq 600\text{mSec}$ mean $\leq 400\text{mSec}$
Call Completion rate	95%
Standard of billing performance	2% complaints per month
Provision of telephone	5 days
Fault repair time Mean Time to Repair	2 working days
Response time to consumer assistance	98%
Resolution of billing complaints	5days
Consumer care	95%
Percentage of repeated faults	$<1\%$
Unsuccessful voice call setup ratio	$\leq 10\%$ of attempted setups
Dropped voice call ratio	$\leq 5\%$ of successful setups

TABLE 2--Fixed Wireless Telephony Services

PARAMETER NAME	TARGET
Fault incidence	3% per month
Grade of Service	2%

Call Completion rate	95%
Standard of billing performance	2% complaints per month
Provision of telephone	5 days
Fault repair time Mean Time to Repair	1 working days
Resolution of billing complaints	7days

Table 3—Mobile Telephony Services

PARAMETER NAME	TARGET
Fault incidences (network faults)	4% in a period
Accumulated down time of isolation. Outage.	≤24hrs
Call Drop Rate	2%
Call set-up Success Rate	98%
Service coverage	
- In-door	-75dBm 85%
- In-vehicle	-85dBm 80%
- Out-door	-95dBm 90%
Network availability	99%
Fault clearance.	2hrs-90%, 12hrs-95%, 24hrs-99% 1 day (100%)
Standard of complaint handling	7 days
Response time to consumer assistance	95%
Resolution of billing complaints	7 days
Percentage of billing complaints	≤0.1% per 100 bills issued
Service supply time	5days
SMS transmission ratio	96%
Handover Success Rate	95%
Congestion	2%
Unsuccessful text message transmission ratio	4%

Table 4—Voiceband Internet Services

PARAMETER NAME	TARGET
Service activation time (the time between service application submission to service access)	6 hours
Service accessibility – time to access	30 seconds
Probability of accessing the ISP node in the <ul style="list-style-type: none"> - First attempt - Second attempt - Third attempt - Fourth attempt 	60% 70% 90% 100%
ISP node unavailability in a month not to exceed	30minutes
Grade of service on link connecting PSTN node to the ISP node	1%
Complaints handling	90%-24hrs 100%-120hrs
Billing complaints	Monthly – 2%
Service availability	98%

Table 5—Broadband Internet Services

PARAMETER NAME	TARGET
Service activation time	5 days
Service accessibility – time to access	30 seconds
Probability of accessing the ISP node in the: <ul style="list-style-type: none"> First attempt Second attempt Third attempt 	90% 98% 100%
ISP node unavailability in a month not to exceed	40min
Up time	98%
Percentage of Billing complaints	2% per period
Billing complaints resolution	95%-7days 99%-14days

Fault report	4% per period
Fault repair time	1day
Internet data transmission time	≤150millisecond

Table 6—Leased Line Services

PARAMETER NAME	TARGET
Latency	Not exceed 300msec on optical fibre communication links between Botswana and furthest node abroad. Not to exceed 800msec on satellite links between Botswana and furthest node abroad.
Packet loss	Not to exceed 1%
Availability	Not less than 98%
Complaints rate	1% per period
Complaints resolution	7days
Fault report rate	4% per period
Fault repair time	1day
Service supply time	5days