QUALITY OF SERVICE (QoS) PARAMETERS

1 Background

The Uganda Communications Commission (UCC) is the regulatory body of the communications sector in Uganda. UCC was established in 1998 to implement the provisions of the Uganda Communications Act (Cap 106 Laws of Uganda). The mandate of UCC includes licensing, monitoring, inspecting, regulating and ensuring general improvement and equitable distribution of communications services in Uganda in accordance with the Act.

One of the functions of the Commission, as spelt out in Section 5 (m) of the Communication Act, is to promote the interests of consumers and operators as regards the quality of communication services and equipment. In addition, Sections 3(i) and 3(m) of the Telecommunications (Licensing) Regulations 2005 outline the importance of Quality of Service (QoS) as:-

- To adopt a consumer-oriented approach that focuses on delivery of quality services at reasonable and affordable costs; and
- To facilitate the introduction of new modern services and the expansion of existing services into modern and innovative quality services delivered at reasonable and affordable costs.

UCC, therefore, in fulfilling its mandate as stipulated in the law cited above, seeks to protect both consumers and operators by empowering:

- Consumers to make informed choices, and;
- Operators to perform more efficiently and in a competitive environment.

Furthermore, UCC seeks to ensure that, to a large extent, customer perceptions and experience are captured regarding Quality of Service.

2 Regulation of QoS under a technology neutral licensing regime

Following the announcement of new Telecom Policy Guidelines in May 2006 and October 2006, the sector was opened up to full competition in the provision of services and infrastructure. Consequently, UCC developed and is currently implementing a new technology neutral licensing regime (effective August 14, 2006 and January 2, 2007).

Under this new licensing regime, UCC focuses on regulation of QoS as perceived by the customer as well as QoS offered (planned/targeted) by the service provider. According to the ITU-T Recommendation G.1000, *''QoS offered by a service provider is the statement of the level of quality offered to the customer by the service provider''*. This is stated in contracts and Service Level Agreements (SLAs). UCC also does recognise standards set by international standardisation organisations, like International Telecommunications Union (ITU) and European Telecommunications Standards Institute (ETSI) - just to mention a few. Service providers are expected to reflect in their SLAs, QoS to be offered in line with UCC standards and QoS specific to deployed technology.

For any future reviews of the QoS parameters, UCC intends to have a two-level approach. Level I will have a technology-neutral approach while Level II will be technology-specific and mainly contributed to by the operator deploying the technology. This means that in Level II, operators will be required to commit themselves (UCC will have to agree to the commitment) to certain levels of QoS, relevant to the chosen technology to be deployed. This will be in addition to the Level I, which will apply to all operators in a general and technological-neutral way.

2.1.1 QoS Parameters

During its 37th Meeting of April 5, 2007, the Commission approved the QoS parameters and definitions as contained in Table I below.

The QoS parameters cater for the network performance (technical indicators) and the end user side (service indicators) but maintaining a certain level of technology neutrality. In addition to these parameters, all operators are required to conform to ITU and UCC recognised standards (including wiring and installation standards).

In order to cater for continuity by the already existing operators/services on the market prior to the new technology neutral licensing regime, QoS parameters for the Public Switched Telephone Network (PSTN), Cellular Mobile network and Internet have also been developed as shown in Table I below. However, these will also apply to new licensees whose scope of service provision includes PSTN, cellular mobile and Internet.

Table 1: Quality of Service Parameters

Licence	Scope	Parameters	Targets
Public Service Provider - *as per new licensing regime*	**All telecommunications services-** e.g., voice and data services, capacity resale services etc	**Billing performance:** Level of accuracy of bills and timeliness in issuing and delivery of bills and number of billing complaints	Bills should be received on at most on a monthly basis for post paid customers Billing complaints[i] should not exceed 2% of total bills issued during the billing period[ii]. 95% of billing complaints should be resolved within 20 working days of receipt of complaint 100% of the billing complaints should be resolved within 30 working days of receipt of the complaint Upon receipt of a billing complaint, the same should be resolved within a maximum of five (5) working days (120 hours).
		Complaint[iii] handling: ratio of complaints attended to in 24hrs/number of complaints received expressed as a percentage	90% of complaints should be resolved within 24hrs 100% of the complaints should be resolved within 120 hours
		Service Activation/provisioning: time taken to provide service from time of request or date of application to time service is activated	At least within seven (7) working days

Licence	Scope	Parameters	Targets
		Service Level Agreements[iv] (SLAs) with regard to QoS set for infrastructure providers	-
		No QoS for IP telephony where there is no use of numbering	-
Public Infrastructure Provider – *as per new infrastructure licensing regime*	**Infrastructure services** - bandwidth capacity, or the switching, transmission, and distribution facilities provided by a public infrastructure provider to a public service provider or to a private network holder.	**Billing performance:** Level of accuracy of bills and timeliness in issuing and delivery of bills and number of billing complaints	Bills should be received on at most on a monthly basis for post paid customers Billing complaint[v] vis should not exceed 2% of total bills issued during the billing period. 95% of billing complaints should be resolved within 20 working days of receipt of complaint 100% of the billing complaints should be resolved within 30 working days of receipt of the complaint Upon receipt of a billing complaint, the same should be resolved within a maximum of 120 hours.
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Licence	Scope	Parameters	Targets
		or date of application to time service is activated	
		Service Restoration: time taken to restore the service from the time the fault is reported by the customer to the time of restoration	80% of all service restoration requests should be fulfilled within 24 hours 100% of all service restoration requests should be fulfilled within 48 hours
		Service level agreements with regard to QoS set for Public Service Providers (PSPs)	
		Maximum Connection time (based on areas declared by operators): time taken for a customer to access network after paying the connection fee or relevant fees for connection	Five (5) working days within areas where the Public infrastructure Provider has declared to provide services.
		Network Availability /percentage up time: measure of degree to which the access network is operable and point in time and/or time that network resources are valuable to the customer and/or the percentage uptime of the link where bandwidth is accessed from the operator by the customer	Greater than 99%
National Operator Cellular	**Cellular Network-mobile voice services**	**Congestion:** probability of not accessing a traffic	Less than 0.5%

Licence	Scope	Parameters	Targets
Telecommunications Operator		Channel-TCH congestion	
		Call Drop rate: percentage number of calls that are dropped after connection to the system or network during the call duration.	Less than 2%
		Call Block rate: Percentage number of calls that are blocked after call set up.	Less than 2%
		Percentage of good quality calls: Calls within good quality range	Greater than 95% of all the calls made within one hour of the day or night
		Success call rate: Success call is one which terminates with 'no' answer' on voice mail service, announcement that subscriber is not available, with a busy signal, with an announcement that wrong number has been dialled, and in conversation	For the intra network the success call rate should greater than 99%
		Network Availability; time that the network resources are available to the consumer (including the base stations, base transceiver stations(BTS) and the Mobile Switching centres (MSCs)	Greater than 99% for MSCs and BSS and greater than 95% for BTS

Licence	Scope	Parameters	Targets
National Operator	**Public Switched Telephone Network- Fixed voice services**	**Fault recovery**: minimum percentage of faults on the network cleared within 24hrs or 72 hrs for every year	Greater than 90% faults should be cleared within 24hrs Greater than 96% of faults should be cleared within 72 hrs 100% of faults should be cleared within a maximum of five (5) working days
		Call completion rates: ratio of successful call attempts to total call attempts	Atleast 95%
		Grade of service; Probability that a call will not be connected to a system because all trunks are busy: carried traffic/offered traffic	Less than 0.015
		Maximum Connection Time: time taken for a subscriber to access network after paying the connection fee or relevant fees for connection	Wired terminals: Seven (7) working days for rural[vii] and urban[viii] where there is network presence as declared by the operator and verified by UCC Wireless Terminals: Two (2) working days for wireless terminals for rural and urban as declared by the operator and verified by UCC
		Billing performance: Level of accuracy of bills and timeliness in issuing and delivery of bills and number of billing complaints	Bills should be received on at most on a monthly basis for post paid customers Billing complaint[ix] xs should not exceed 2% of total bills issued during the billing period. 95% of billing complaints should be

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National Operator **Cellular Telecommunications Operator** **Internet Access Service Provider**	**Internet Access Services**	**Percentage up time:** measure of degree to which the access network is operable and point in time and/or time that network resources are valuable to the customer and/or the percentage uptime of the link where bandwidth is accessed from the operator by the customer	Greater than 99.9%- percentage time the link is available
		Service activation/provision time: time taken to provide service from time of request or date of application to time service is activated	At least within seven (7) working days except for wireless modes this should be within one working day.
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procedures to UCC and there is evidence of that action (including notifying the affected party of the final action to be taken). Operators are required to put in place complaint handling mechanisms). Resolution will be interpreted by UCC as compliance by the operator with the Act, Licence Agreement, UCC regulations, service level agreement and other provisions for complaint resolution.

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		Network Availability; time that the network resources are available to the consumer (including the base stations, base transceiver stations(BTS) and the Mobile Switching centres (MSCs)	Greater than 99% for MSCs and BSS and greater than 95% for BTS

Licence	Scope	Parameters	Targets
National Operator	**Public Switched Telephone Network- Fixed voice services**	**Fault recovery**: minimum percentage of faults on the network cleared within 24hrs or 72 hrs for every year	Greater than 90% faults should be cleared within 24hrs Greater than 96% of faults should be cleared within 72 hrs 100% of faults should be cleared within a maximum of five (5) working days
		Call completion rates: ratio of successful call attempts to total call attempts	Atleast 95%
		Grade of service; Probability that a call will not be connected to a system because all trunks are busy: carried traffic/offered traffic	Less than 0.015
		Maximum Connection Time: time taken for a subscriber to access network after paying the connection fee or relevant fees for connection	Wired terminals: Seven (7) working days for rural[vii] and urban[viii] where there is network presence as declared by the operator and verified by UCC Wireless Terminals: Two (2) working days for wireless terminals for rural and urban as declared by the operator and verified by UCC
		Billing performance: Level of accuracy of bills and timeliness in issuing and delivery of bills and number of billing complaints	Bills should be received on at most on a monthly basis for post paid customers Billing complaint[ix] xs should not exceed 2% of total bills issued during the billing period. 95% of billing complaints should be

Licence	Scope	Parameters	Targets
			resolved within 20 working days of receipt of complaint 100% of the billing complaints should be resolved within 30 working days of receipt of the complaint Upon receipt of a billing complaint, the same should be resolved within a maximum of 120 hours
		Complaint Handling: ratio of complaints attended to in 24hrs/number of complaints received expressed as a percentage	90% of complaints should be resolved within 24hrs 100% of the complaints should be resolved within 120 hours
National Operator **Cellular Telecommunications Operator** **Internet Access Service Provider**	**Internet Access Services**	**Percentage up time:** measure of degree to which the access network is operable and point in time and/or time that network resources are valuable to the customer and/or the percentage uptime of the link where bandwidth is accessed from the operator by the customer	Greater than 99.9%- percentage time the link is available
		Service activation/provision time: time taken to provide service from time of request or date of application to time service is activated	At least within seven (7) working days except for wireless modes this should be within one working day.
		Complaint handling: ratio	90% of complaints should be resolved

Licence	Scope	Parameters	Targets
		of complaints attended to in 24hrs/number of complaints received expressed as a percentage	within 24hrs 100% of the complaints should be resolved within 120 hours
		Billing performance: Level of accuracy of bills and timeliness in issuing and delivery of bills and number of billing complaints	Bills should be received on at most on a monthly basis for post paid customers Billing complaint[xi] xiis should not exceed 2% of total bills issued during the billing period. 95% of billing complaints should be resolved within 20 working days of receipt of complaint 100% of the billing complaints should be resolved within 30 working days of receipt of the complaint Upon receipt of a billing complaint, the same should be resolved within a maximum of 120 hours.

[i] *Billing complaint* is when an end user complains about the bill received, the accuracy of the information on the bill, its format, frequency, timeliness, content or other billing matters. Service and infrastructure providers should maintain proper billing mechanisms and/or systems.

[ii] *Billing Period* means the time period within which a bill is issued by the service provider and sent to the customer

[iii] *Complaint* shall mean expression of dissatisfaction by a user or consumer or of a service provided by the infrastructure or service provider. A complaint shall be deemed as resolved once the operator takes the final action with established and known

procedures to UCC and there is evidence of that action (including notifying the affected party of the final action to be taken). Operators are required to put in place complaint handling mechanisms). Resolution will be interpreted by UCC as compliance by the operator with the Act, Licence Agreement, UCC regulations, service level agreement and other provisions for complaint resolution.

[iv] *Service Level Agreement*" means a formal written agreement made between two parties: the service provider and the service recipient which defines the basis of understanding between the two parties for delivery of the service itself. It may, among others, contain a specified level of service, support options, etc. The Committed Information Rate (CIR) shall be defined by the Licensee within the service level agreement. Committed Information Rate" means a specified amount of bandwidth guaranteed by the bandwidth provider under normal operations, measured in bits per second.

In case of maintenance and upgrades on the network operators are required to give prior notice to the Commission and the consumers. Maintenance and upgrades should be done within specified periods as per the licence requirements or existing UCC regulations.

[vii] *Rural*, in this context, refers to any area outside the recognised cities, municipalities and towns by the local government and surrounding areas within a radius of 10km

[viii] *Urban*, in this context, refers to the recognised cities, municipalities and towns by the local government and surrounding areas within a radius of 10km.