GENERAL NOTICE NO. 21/2022

PROPOSED DECISION IN TERMS OF SECTION 32 OF THE ESWATINI COMMUNICATIONS COMMISSION ACT, 2013: QUALITY OF SERVICE GUIDELINES, 2022 - INVITATION FOR WRITTEN REPRESENTATIONS

The Eswatini Communications Commission, hereinafter referred to as the Commission, in exercise of its mandate under Section 7(c) of the Eswatini Communications Commission Act, 2013 has developed the Electronic Communications (Quality of Service) Guidelines, 2022.

The purpose of these Guidelines is to:-

1. Review the current parameters and measurements of mobile and internet service operators in Eswatini;
2. Introduce new KPI targets for the current measurements;
3. Introduce new measurements for the existing technologies;
4. Introduce measurements for the Fifth generation (5G) technology;
5. protect the interest of consumers of electronic communications services.
6. Monitor the Quality of Experience

Section 32 of the ESCCOM Act, 2013 provides for stakeholders and interested persons to comment on the Commission's proposed decisions. In this regard, the public is hereby invited to submit their written representations on the Eswatini Communications Commission Quality of Service Guidelines. Representations must be submitted to the Commission no later than 17h00 on 9th December 2022 by post to Eswatini Communications Commission, P.O. Box 7811 Mbabane, hand-delivered or electronically to info@esccom.org.sz

A copy of the Guidelines is also available on the Commission's website at www.esccom.org.sz

Mvilawemphi Dlamini

CHIEF EXECUTIVE

ESWATINI COMMUNICATIONS COMMISSION

Subject: Proposed Electronic Communications (Quality of Service) Guidelines, 2022

Number: 21/2022

Application: Electronic Communications Services Licensees in Eswatini

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INTERPRETATION

In these Guidelines, any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned and, unless the context indicates otherwise:

"Coverage" means the geographic service area where a cell or cluster of cells can communicate with mobile stations/user equipment

"Inkhundla" means the area covered by a local government institution";

"SDCCH" means Stand-alone Dedicated Control Channel.

"SDCCH Congestion" means the probability of failure of accessing a stand-alone dedicated control channel during call set up.

"TCH" means Traffic Channel

"RAT" means Radio Access Technology (Ex. 2G, 3G, and 4G))

"2G" means Public land mobile network of second generation

"3G" means Public land mobile network of Third Generation

"4G" means Public land mobile network of fourth Generation

"5G" means Public land mobile network of Fifth Generation

"Indoor (coverage level)" means Signal level that ensures the accessibility to a network inside a building.

"In-car (coverage level)" means Signal level that ensures the accessibility to a network inside a vehicle.

"Outdoor (coverage level)" means Signal level that ensures the accessibility to a network in an open area/Zone.

"RxLev" means Received signal Level in 2G of a mobile station.

"RSCP (Received Signal Code Power)" means Received Signal Level in 3G of a mobile station

"RSRP (Reference Signal Received Power)" means received signal in 4G of a mobile station

"eMBB" (enhanced Mobile Broadband) defines a minimum level of data transfer rate in 5G of a mobile station.

"URLLC" (Ultra-Reliable Low Latency Communications) in 5G of a mobile station

"mMTC" (massive Machine Type Communications) in 5G of a mobile station

"Mobile station" mean a physical equipment or device through which an end user accesses the services offered by a PLMN via the air interface.

"GERAN" means GSM EDGE Radio Access Network also known as 2G network

"UTRAN" means Universal Terrestrial Radio Access Network also known as 3G network

"EUTRAN" means Evolved Universal Terrestrial Radio Access Network also known as LTE or 4G network

“Quality of Experience (QoE)” - refers to the consumer perception, or experience of the quality of the service offered.

“Quality of Service Guidelines” - refers to a set of standards and measures that define applicable quality measures.

INTRODUCTION AND BACKGROUND

In the telecommunications industry, price is no longer the sole factor in purchasing decisions; quality is key. The Quality of Service (QoS) plays an important role to all stakeholders and, particularly, in achieving consumer satisfaction. The measurement of Quality of Service and Quality of Experience (QoE) is, however, becoming increasingly complex to obtain as quality can be compromised by various factors along the value chain such as with the network infrastructure, the devices and/or applications a consumer is using and other factors influencing a consumer’s experience.

As the quality of service is also closely linked to consumer protection, Eswatini Communications Commission introduced Quality of Service Regulations, 2016, to provide transparency on the level of service quality in the telecommunications industry.

As the range of services continues to grow, so does the range of assessments of quality, it is for this reason that the Commission has, in addition to the Quality of Service Regulations, 2016, developed the Quality of Service guidelines, 2022 in order to review the current parameters and measurements and continue to improve customer experience.

Moreover, the Commission is authorised to review the Quality of Service parameters and measurements from time to time through the powers conferred by Section (12) of The Electronic Communications (Quality of Service) Regulations, 2016. The additional guidelines may be cited as The Electronic Communications (Quality of Service) Guidelines, 2022.

The purpose of the guidelines is to;

- Review the current parameters and measurements of mobile and internet service operators in Eswatini;
- Introduce new KPI targets for the current measurements;
- Introduce new measurements for the existing technologies;
- Introduce measurements for the Fifth generation (5G) technology;
- protect the interest of consumers of electronic communications services.
- Monitor the Quality of Experience

These Guidelines are issued in accordance with Section 7 (c) and Section 38 of the Eswatini Communications Commission Act, 2013. The guidelines shall apply in relation to the quality of service for service providers ‘electronic communication services.

MEASUREMENT METHODOLOGY

Different methodologies can be used to evaluate the quality of service of operators including drive tests, network management systems, end user surveys, end to end measurements, churn-rate monitoring, etc. Eswatini Communications Commission has adopted the below methods:

a) **Drive tests** – a method of measuring and assessing the coverage, capacity and quality of service of a mobile radio network, by using a motor vehicle outfitted with drive testing measurement equipment.

   Reporting will be done after analysis of the test traffic acquired per campaign for Drive test units or per week for fixed stationary units based on parameters as seen in Schedule 2 A. The Commission will inform the service providers of the dates of the Drive test Campaign and/or frequency of testing of the stationary test systems/units as determined by the commission.

b) **Network Management system (NMS)** - a set of applications or system designed for monitoring, maintaining, and optimizing a network; used as a source of assessment data for network performance.

   The Service Provider must facilitate access to their NMS to OMC-R raw data (PM files) on an hourly basis for the commission via VPN, Internet or any other means the commission deems appropriate.

c) **End user Surveys** – aimed at assessing the end-user's perception and acceptance of services (Quality of Experience (QoE)

Duty of Service Provider to Customers

1. In addition to the duty of service provider to customers stated on the Electronic Communications (Quality of Service) Regulations, 2016, an electronic communication service provider shall –

   (a) submit to the Commission all modifications made to existing Service Level Agreements for approval.

   (b) notify the customer of the modified Service Level Agreement following the approval granted by the Commission.

Monitoring

3. The Commission shall: -
   (a) monitor the adherence to Quality of Service measurements procedures; and

   (b) direct its officers or agents (third party) to carry out investigations on Quality of Service measurements

Procedures for rectifying violation of Quality of Service requirements (QoS)

4. In case of a violation, a formal notice will be sent to the electronic communication service provider to correct the problem within fourteen (14) days. An applicable sanction will be applied if the problem persists after the stipulated period or reoccurs after an initial notification.

5. In the event that a joint team of the Commission and service provider determines that the violation cannot be resolved within fourteen (14) days, the service provider shall be required to submit a plan to address the same.

6. Any such plan submitted shall be subject to review and approval by the Commission.

7. In the case of a sole electronic communications service provider, where the service is only provided by one electronic communcication service provider in the country, the provider is expected to correct the problem within 4 hours, and if the violation cannot be resolved within 4 hours, the service provider shall be required to submit a plan to address the same which will be reviewed and approved by the Commission.

Notifications on Service degradation and outages

8. An Electronic communications service provider shall notify the Commission and affected customers in any locality within an hour for service degradation or outages which may extend beyond an hour.

9. The Service Provider shall include the following information to its customers during

events of service degradation and outages:

(a) Affected Service

(b) Period of disruption

(c) Reason(s) of disruption

(d) Areas of disruption

(e) Possible effect(s) on Consumers

(f) Estimated time for Service Restoration

Network Outage Reports

10. All service providers shall provide the Commission with network outage reports whenever any outage occurs as described below;

a) **Critical Outages** are defined as those affecting the entire network, the core of the network or greater or equal to (=>) 50% of the traffic. The condition includes a critical work stoppage during the customer's normal working hours that affects multiple sites or Core network elements affecting functions of a customer's business.

Examples of critical outages include, but are not limited to:

I. Mobile services – outages affecting core network, transmission, radio access network
II. Fixed services – outages affecting transit, international switches, fiber optic cable affecting the serving ring without redundancy
III. Internet services- outages affecting core routers, network operation centers, international gateway, international exchange points
IV. Data services -

b) **Major Outages** are defined as those affecting a part of the network (or the components of the aggregate part of the network), and influencing less than (<) 50% and above (>) 30% of the traffic.

c) **Minor Outages** are defined as those affecting individual sites, and/or components at the edge level of the network that do not interrupt service or performance. Examples of Minor Outages are those affecting BTS, trunk cable, or E1 transmission link amongst many.

Outage reparation and reporting:

Outage Type	**Reparation Period**	**Inform the Commission**	**Submit the Outage Report to the Commission**
Critical Outages	≤ 1 hour	Immediately	Immediately after the problem is resolved
Major Outages	≤ 4 hours	Immediately	≤ 2days
Minor Outages	≤ 1 day	Immediately	≤ 7 days
Outages affecting Emergency Services riding on the network	≤ 30 minutes	Immediately	Immediately after the problem is resolved

In the event that any of the above-mentioned outages cannot be repaired in the required period, a justification report shall be submitted to the Commission immediately; the outage report shall then be submitted, when the outage is repaired.

Inspection

11. The Commission or any person authorized in writing by the Commission may, upon furnishing reasonable notice, enter upon the premises of the licensee for purposes of ascertaining compliance with these guidelines.

Review

12. The parameters (KPIs and metrics) referred to in Guidelines First, Second, Third and Fourth schedules may be reviewed by the Commission in accordance with international best practice; and
13. The Commission shall conduct audits on all parameters, network interfaces and elements per cell, per Inkhundla, or per region, and at national level, on a daily, weekly or monthly basis as it deems appropriate.

14. The Commission may review the Quality of Service and Quality of Experience targets and parameters under these guidelines from time to time.

QUALITY OF SERVICE MEASUREMENTS

Publishing service quality measurements

15. The Commission shall publish results of service quality measurements for every Inkhundla, Region and National level on a monthly basis and as it deems appropriate.

FIRST SCHEDULE

QUALITY OF SERVICE (QoS) PARAMETERS FOR INTERCONNECTION

Every Service Provider shall meet the following Quality of Service benchmarks for any interconnected service in respect of each specified parameter measured by real calls on any interconnected route and shall submit a monthly report based on daily peak hour conditions

Key Performance Indicator	Definition	Current Target	New Target	Measurement Mechanism	Measurement Methodology	Formula
Interconnection Route Utilization	The percentage of provisioned interconnection route that is carrying traffic	<80%	<80%	Real Traffic	Network Management System	Amount of carried traffic to another network x 100 Total capacity of route to another network
Time to Repair Interconnection route	The duration from a reported interconnection fault to service restoration	<1 Hour	<1 Hour	Real Traffic	Network Management System	Time of Total Service Restoration – Time of Notification of Fault

SECOND SCHEDULE A (Drive TEST)

QUALITY OF SERVICE (QoS) PARAMETER AND THRESHOLD FOR CELLULAR MOBILE SERVICE USING Drive test Methodology

Every cellular mobile Service Provider shall meet the following Quality of Service benchmarks for cellular mobile service in respect of each specified parameter measured by Drive/stationary Test in any Inkhundla per service and Per RAT. Analysis is Based on Test Traffic.

1). VOICE SERVICE

Key Performance Indicator	Definition	Current Target	New Target	Measurement Mechanism	Measurement Methodology	Formula
Call Connection(setup) success Rate	Percentage of successfully connected calls	>99%	>99%	Test Traffic	Drive Test	Number of successfully connected call attempts x 100 /Total number of attempts

Call Drop Rate	The percentage of calls connected to intended recipients that ended or release without the intervention of any of the users	<2%	<2%	Test Traffic	Drive Test	Number of calls dropped x 100 / Total number of attempts
Call (TCH) Blocking Rate	The percentage of calls not connected to intended recipients that ended without the intervention of caller	<1%	<1%	Test Traffic	Drive Test	Number of calls blocked x 100 / Total number of attempts

1(a). MOS Value in conformance to ITU Recommendation ITU – T P.863) for Voice quality

Key Performance Indicator	Definition	Current Target	New Target	Measurement Mechanism	Measurement Methodology	Formula
Minimum Quality Required for voice Calls	Numerical indication of the perceived quality of received media after comprehension and/or transmission	>3.5	>3.5	Test Traffic	Drive Test	ITU Recommendation on Voice Quality testing. (ITU – T P.863

2). SMS SERVICE

Key Performance Indicator	Definition	Current Target	New Target	Measurement Mechanism	Measurement Methodology	Formula
SMS Delivery Success Rate	Percentage of successfully delivered messages to the intended recipient	>99%	>99.5%	Test Traffic	Drive Test	Number of successfully delivered SMS to intended recipient x 100/ Total number of SMS sent
SMS Delivery Time	The duration from when an SMS is sent to the time of receiving the SMS by the intended recipient	<5s	<5s	Test Traffic	Drive Test	Time SMS received – time SMS sent

3). Radio Coverage 2G

Parameter – Type (Level) of Radio Coverage	Current Target	New Target	Good Coverage Rate	Percentage of Population to be covered
Indoor	>75dBm	Rxlev > -95dBm	>90%	95%
Incar	>85dBm	Rxlev > -85dBm	>95%	
Outdoor	>95dBm	Rxlev > -75dBm	>98%	

3(a) Radio Coverage 3G

Parameter – Type (Level) of Radio Coverage	Current Target	New Target	Good Coverage Rate	Percentage of Population to be covered
Indoor	>75dBm	RSCP > -85 dBm	>90%	90%
Incar	>85dBm	RSCP is between (-95 dBm and -85dBm)		
Outdoor	>95dBm	RSCP < -100dBm		

3(b) Radio Coverage 4G

Parameter – Type (Level) of Radio Coverage	Current Target	New Target	Good Coverage Rate	Percentage of Population to be covered
Indoor	>75dBm	RSRP > -95dBm	>90%	70%
Incar	>85dBm	RSRP> -90dBm	>95%	
Outdoor	>95dBm	RSRP > -80dBm	>98%	

4). DATA SERVICE 3G(3G+)

Key Performance Indicator	Current Target	New Target	Measurement Mechanism	Measurement Methodology	Formula
HTTP tests					
Internet connection Success Rate	>98%	>99%	Test Traffic	Drive Test	Number of successful connections made) x 100/ (Total number of connections requested)
Internet Connection Setup time	<5s	<5s	Test Traffic	Drive Test	Time service is resolved/successful – initial request time
Average DL Speed (3G)		>3 Mbps	Test Traffic	Drive Test	speed taken to download a file/page from the internet
Average DL Speed (3G+ or HSDPA)		>5 Mbps	Test Traffic	Drive Test	speed taken to download a file/page from the internet
Internet Connection Setup time	<5s	<5s	Test Traffic	Drive Test	Time service is resolved/successful – initial request time
Packet loss		<5%	Test Traffic	Drive Test	(Number of lost packets) / x 100 (Number of received packets).
Jitter		<50 ms	Test Traffic	Drive Test	average of the time difference between each packet sequence
FTP tests					
Internet connection failure Rate	< 2%	< 2%	Test Traffic	Drive Test	(Number of failed internet connection attempts) x 100/ (Total number of attempts)
FTP DL speed (3G) (file size 5MB)		> 5 Mbps	Test Traffic	Drive Test	speed taken to download a file/page from the internet
Packet loss		<5%	Test Traffic	Drive Test	(number loss FTP received) x 100- / (total number of FTP packets received)
Jitter		<50ms	Test Traffic	Drive Test	average of the time difference between each packet sequence
Internet Connection Setup time	<5s	<5s	Test Traffic	Drive Test	Time service is resolved/successful – initial request time

5) DATA SERVICE 4G

Key Performance Indicator	Current Target	New Target	Measurement Mechanism	Measurement Methodology	Formula
Internet connection failure Rate	<2%	<2%	Test Traffic	Drive Test	(Number of failed internet connection attempts) x 100 / (Total number of attempts)
Internet session drop rate	<1%	<1%	Test Traffic	Drive Test	Number of internet sessions dropped x 100/Total number of attempts

Packet loss		<5%	Test Traffic	Drive Test	(Number of lost packets) / x 100 (Number of received packets).
Jitter		<50 ms	Test Traffic	Drive Test	average of the time difference between each packet sequence
Average DL Speed	>5 Mbps	>20 Mbps	Test Traffic	Drive Test	Average speed taken to download a file/page from the internet
Average UL Speed	>1 Mbps	>4 Mbps	Test Traffic	Drive Test	Average speed taken to upload a file/page to the internet

SECOND SCHEDULE B (USING NMS)

QUALITY OF SERVICE (QoS) PARAMETER AND THRESHOLD FOR CELLULAR MOBILE SERVICE USING NMS Methodology

Every cellular mobile Service Provider shall meet the following Quality of Service benchmarks for cellular mobile service in respect of each specified High level KPI computed from processing PM files OMC-R counters of Service providers' Network elements made available to the commission as at when due per cell, per vendor and per RAT. Analysis is Based on Real Traffic.

In addition, Service Providers shall submit a monthly report based on daily peak hour conditions; where appropriate and at the request of the commission.

1) 2G (GERAN)

ITU-T QoS Category	**Key Performance Indicator**	**Threshold Observation Period**	**Current Threshold Per Cell**	**New Threshold Per Cell**
NETWORK AVAILABILITY	Downtime for Cell	Per Day	< 4 Hours	< 4 Hours
VOICE SERVICE ONLY				
SERVICE ACCESSIBILITY	SDCCH Congestion	Per Day BH	< 1 %	< 1 %
	Call Block Rate	Per Day	< 1%	< 1%
SERVICE RETAINABILITY	Call Drop Rate	Per Day	< 2%	< 2%
	Call Completion Rate	Per Day	> 98%	> 99%

2) 3G (UTRAN)

ITU-T QoS Category	**ESCCOM KPI Name**	**Threshold Observation Period**	**Current Threshold Per Cell**	**New Threshold Per Cell**
NETWORK AVAILABILITY	Downtime for Cell	Per Day	< 4 Hours	< 4 Hours
VOICE SERVICE ONLY				
SERVICE ACCESSIBILITY	Voice Call Blocking Rate	Per Day BH	< 1 %	< 1 %
	Voice Call Setup Success Rate	Per Day	> 98%	> 99%
SERVICE RETAINABILITY	Voice Call Drop Rate	Per Day	< 2%	< 2%
	Voice Call Completion Rate	Per Day	> 98%	> 99%
DATA SERVICE ONLY				

SERVICE ACCESSIBILITY	Data Access Success Rate	Per Day	>99%	>99%
SERVICE RETAINABILITY	Data Drop Rate	Per Day	< 1%	< 1%
SERVICE INTEGRITY	Data DL Throughput	Per Day		> 3 Mbps
	Data DL HS Throughput	Per Day		> 5 Mbps

3) 4G (EUTRAN)

ITU-T QoS Category	**ESCCOM KPI Name**	**Threshold Observation Period**	**Current Threshold Per Cell**	**New Threshold per cell**
NETWORK AVAILABILITY	Downtime for Cell	Per Day	< 4 Hours	< 4 Hours
VOICE SERVICE ONLY (For Service Providers offering VoLTE (IMS based)-SRVCC mode)				
SERVICE ACCESSIBILITY	VoLTE session setup failure Rate	Per Day BH	< 2 %	< 2 %
	VoLTE session setup success Rate	Per Day	> 98%	> 99%
SERVICE RETAINABILITY	VoLTE session Cut-off Rate	Per Day	< 2%	< 2%
	VoLTE session Completion Rate	Per Day	> 98%	> 99%
DATA SERVICE ONLY				
SERVICE ACCESSIBILITY	Data Service Access Success Rate	Per Day	>99%	>99%
SERVICE RETAINABILITY	Data Service Drop Rate	Per Day	< 1%	< 1%
SERVICE INTEGRITY	Minimum Average Data DL Speed Rate	Per Day	> 5 Mbps	> 20 Mbps
	Minimum Average Data UL Speed Rate	Per Day	> 1 Mbps	> 4 Mbps

Service Providers using CSFB mode for voice calls in 4G are exempted from 4G Voice KPIs.

4) 5G

Category	**5G performance requirement type**	**Minimum KPI requirement**
eMBB	Peak Data Rate	Downlink: 20 Gbps
		Uplink: 10 Gbps
eMBB	Peak Spectral Efficiency	Downlink: 30 bits/sec/Hz
		Uplink: 15 bits/sec/Hz
eMBB	Data rate experienced by User	Downlink: 100 Mbps
		Uplink: 50 Mbps
eMBB	Area Traffic Capacity	Downlink: 10 Mbits/sec/m2 in indoor hotspot (eMBB test environment)
eMBB, URLLC	Latency (User Plane)	• 4 ms for eMBB
		• 1 ms for URLLC
eMBB, URLLC	Latency (User Plane)	• 20 ms

		(10 ms encouraged)
mMTC	Connection Density	1 x 106 devices/Km2
eMBB	Average Spectral Efficiency	(All the below figures are in units of bits/sec/Hz/TRxP)
		Indoor hotspot: DL:9/ UL:6.75
		Dense Urban: DL: 7.8/ UL: 5.4
		Rural: DL: 3.3/UL: 1.6
eMBB	Energy Efficiency	• Efficient data transmission (Loaded case) : To be demonstrated by "average spectral efficiency".
		• Low energy consumption (no data case): This test case should support high sleep ratio/long sleep duration.
URLLC	Reliability	1 x 10-5 probability of transmitting layer-2 PDU of 32 bytes in size within 1 ms (in channel quality of coverage edge for Urban Macro-URLLC test environment.)
eMBB	Mobility	• Dense Urban: up to 30 Km/h
		• Rural: up to 500 Km/h
eMBB, URLLC	Mobility Interruption Time	0 ms
IMT-2020	Bandwidth (Maximum Aggregated System)	• At least 100 MHz
		• Up to 1 GHz for operation in high frequency bands i.e. above 6 GHz

THIRD SCHEDULE

QUALITY OF SERVICE (QoS) PARAMETERS FOR BASIC TELEPHONE SERVICE

Every basic telephone Service Provider shall meet the following Quality of Service benchmarks for basic telephone service in respect of each specified parameter measured by test calls or Performance Management System in any locality and shall submit a monthly report based on peak hour conditions; where applicable.

Key Performance Indicator	**Definition**	**Current Target**	**New Target**	**Measurement Mechanism**	**Measurement Methodology**	**Formula**
Service availability		> 99 %	>99 %			As measured in Data Networks
Time to Repair (TTR)	The duration from a reported fault to restoration	<8 Hours	< 6 hours	Complaints	Trouble Ticket system	Sum of duration of each repair time in hours for all the fault incidences in a day
Call Connection Success Rate	Percentage of successfully connected calls	>99%	>99%	Real Traffic or Test Traffic	Performance Monitoring System or Test Stations	Number of successfully connected call attempts x 100 / Total number of attempts
Call Drop Rate	The percentage of calls connected to intended recipients that ended or release without the intervention of any of the users	<2%	<2%	Real Traffic and/or Test Traffic	Performance Monitoring System or Test Stations	Number of calls dropped x 100 Total number of attempts

Voice Service Access Delay (Call Setup Time)	The duration from when a call is made to the time of receiving a ring back tone	< 10 sec	< 7 sec	Test Traffic	Test Stations	Maximum time taken for Voice service connection in all cases
Voice Quality (Mean Opinion Score {MOS})	Numerical indication of the perceived quality of received media after comprehension and/or transmission	> 3.5	> 3.5	Test Traffic	Test Stations	ITU Recommendation on Voice Quality testing. (ITU – T P.863)

FOURTH SCHEDULE

QUALITY OF SERVICES (QoS) PARAMETERS FOR INTERNET SERVICE

Every Internet Service Provider shall meet the following Quality of Service benchmarks for Internet service in respect of each specified parameter measured by test calls in any locality and shall submit a monthly report based on peak hour conditions.

Key Performance Indicator	**Definition**	**Current Target**	**New Target**	**Measurement Mechanism**	**Measurement Methodology**	**Formula**
Minimum Data Speed (HTTP Mean Bit Rate)	The average data transfer rate measured throughout the entire session of the service	≥2Mbps	≥2Mbps	Real Traffic and/or Test Traffic	Performance Monitoring System or Test Stations or Drive Test System	Average HTTP Throughput
Data Service Availability	The availability of data service in the network	> 99.9%	> 99.9%	Real Traffic	Performance Monitoring System	As measured in Data Networks
Data Service Access Time (HTTP Setup Time)	The time it takes for a standard web page to start loading. The time period needed to access the service successfully, from starting up the dial-up connection to the point of time when the content is sent/received (ITU-T E.804)	<5 sec	<5 sec	Real Traffic and/or Test Traffic	Performance Monitoring System/Test Stations or Drive Test System	In all cases (Time Content Received – Time Content Requested)
Packet loss	measurement of the number of sent data packets that do not arrive at their destination.		≤ 5%	Real Traffic and/or Test Traffic	Performance Monitoring System/Test Stations or Drive Test System	(Number of lost packets) / x 100 (Number of received packets).
Jitter	the variation in the time between data packets arriving, caused by network congestion, or route changes.		<50 ms	Real Traffic and/or Test Traffic	Performance Monitoring System/Test Stations or Drive Test System	average of the time difference between each packet sequence
Data Access Success Rate (HTTP Access Success Rate)	The percentage of attempted HTTP connections that are successful	>99%	>99%	Real Traffic and/or Test Traffic	Performance Monitoring System/Test Stations or Drive Test System	(Number of successful connections made) x 100 (Total number of connections requested)
Data Service Drop Rate (HTTP Drop Rate)	Numerical indication of the perceived quality of received media after comprehension and/or transmission	<1%	<1%	Real Traffic and/or Test Traffic	Performance Monitoring System/Test Stations or Drive Test System	(Number of connection lost)/ (Total number of connections made) x 100