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Subject: Directives on Quality of Services (QoS).

The Bangladesh Telecommunication Regulatory Commission (BTRC), in accordance with the provisions of the Telecommunication Act, is entrusted with the responsibility of setting and monitoring Quality of Service (QoS) standards for all licensed telecom service providers in Bangladesh. These directives have been developed to ensure that subscribers receive reliable, affordable, and high-quality services, while fostering transparency, accountability, and continuous improvement within the sector.

Directives on Quality of Service

1. Applicability:

a. These Directives shall be applicable to operators providing-

i. Fixed Internet Access Services;
ii. Cellular Mobile Phone Services;
iii. Fixed Telephony Services;
iv. Nationwide Telecommunication Transmission Network (NTTN) Services.

b. These Directives shall come into force immediately.

2. Definitions

In these Directives, unless the context otherwise requires:

a. 'Act' means the Bangladesh Telecommunication Regulation Act, 2001.
b. 'ANS Operators' means Access Network Service Operators who have direct access to the subscribers.
c. 'Commission' means the Bangladesh Telecommunication Regulatory Commission (BTRC) as defined in Section 6 of the Act.
d. 'License' means a license issued under the provisions of the Act.
e. 'Licensee' means any entity licensed under the provisions of the Act.
f. 'Operator' would refer to the 'operator' as defined in the Act.
g. 'Quality of Experience (QoE)' means the overall acceptability of an application or service, as perceived subjectively by the end-user. It is the degree of delight or annoyance of the user of an application or service.
h. 'Quality of Service (QoS)' is the totality of characteristics which are observable and/or measurable of a telecommunications service that bear on its ability to satisfy stated and implied needs of the user of the service. These characteristics are expressed through indicators of the performance of a telecommunication network/service and of the degree to which such network/service conforms to the standards as specified in these

Directives for specified parameters.

i. 'Schedule' means the schedules of these Directives, which shall be an integral part of the Directives. Moreover, Schedule 2 defines and describes different parameters which are used in the Directives.

j. 'Service Provider' means any operator to whom these Directives shall apply.

3. Objectives

a. **Service Quality Assurance:** Establish and enforce standards so that subscribers consistently receive the quality of service they expect.

b. **Continuous Monitoring & Evaluation:** Regularly evaluate service quality to maintain benchmarks, drive improvement, and promptly address shortcomings.

c. **Subscriber Protection:** Safeguard subscribers' interests by preventing unfair practices, ensuring equitable treatment, and enabling effective dispute resolution.

d. **Promotion of Competition:** Encourage fair competition among service providers to drive innovation, improve service offerings, and expand choices for subscribers.

e. **Trust & Transparency:** Build trust between subscribers and service providers through transparency, reliable service standards, and enforcement of fair practices.

4. QoS Standards

a. Respective Operators shall comply with the QoS benchmarks outlined in Schedule-1 of these Directives.

b. Service providers shall meet the QoS standards outlined in tables 1, 3, 4, 6 and 7 of Schedule-1.

c. All Key Performance Indicators (KPIs) listed in tables 1, 3, 4, 6 and 8 of Schedule-1 must be calculated by the service providers from the Network Management System/Operation and Maintenance Centre (NMS/OMC) or from PS Core or from standard and appropriate counter.

d. Respective service providers shall conduct regular drive tests and surveys as directed by the Commission. The Commission may outline the nature and procedure of any tests and surveys through directives. Drive test methodology shall be issued by BTRC.

e. Service providers shall provide quarterly assessment reports to the Commission, in the specified format. Licensees shall be responsible for acquiring the requisite test instruments and equipment to meet these obligations. The drive test methodology will be subject to regular review through directives issued by the BTRC, with consultation with the stakeholders.

f. The Commission may verify and assess the performance of service through monthly reporting by operators, inspections, drive tests, sample tests, or other measurement methods by its own officers, employees, or agencies appointed by BTRC, or jointly with service providers. Furthermore, the Commission may instruct service providers to conduct additional specialised types of QoS assessment tests, surveys, and subsequent reports as deemed necessary.

g. Fixed internet service providers are required to adhere to the parameters and service standards, including specified contention ratios for different grades, as issued by the Commission.

h. NTTN operators shall include the DSCP matrix in their SLAs with ANS operators, as mandated by the requirements set forth by the ANS operators.

i. The Commission may use appropriate crowdsourcing techniques for QoS testing of internet services and specify the methodologies, prerequisites, and benchmarking standards for evaluating the performance of internet connections, including download and upload speeds, latency, jitter, packet loss, website loading times etc.

j. The Commission may encourage the service providers to jointly develop speed testing applications employing crowdsourcing methodologies.

k. In the event of any national emergency declared by the Government, the Commission may

temporarily relax the enforcement of these QoS Directives for the affected areas.

5. Compliance to QoS Standards

a. The service providers shall comply with the QoS standards as specified in these Directives. Due to the failure to meet the benchmarks for QoS benchmarks or non-compliance with any provision of these Directives, the Commission may take appropriate administrative actions against the service providers as outlined below:

i. Issue a show-cause notice for any instances of non-compliance with the Directives. After consideration of the operator's reply (if any), the Commission may take legal or administrative action(s).
ii. Issue directives/instructions to the service providers for the enhancement of QoS. Upon identifying any instances of non-compliance through standard drive tests, periodical/system reports or other measurement methods or inspection procedures, BTRC shall issue a notice to the operator, necessitating remedial action.

b. With respect to the drive test of the Cellular Mobile Phone Network and the sample test of Fixed Internet Access Network or Fixed Telephony, the service provider shall:

i. Resolve the shortcomings or deficiencies and submit a compliance report to the Commission within 30 (thirty) days after getting notification from BTRC.
ii. Get approval from BTRC for an extension within 30 (thirty) days from the date of notification if the service provider is unable to resolve the shortcomings or deficiencies within the specified timeframe of 30 days.

c. To rectify the shortfalls identified in the drive tests, the Licensee shall promptly carry out root-cause analysis, implement all necessary remedial measures, periodical/system reports or other measurement methods or inspections and submit a compliance report to BTRC. The compliance report shall include the following:

i. Detailed root-cause analysis of the degraded QoS KPIs, including an inspection of every unusual occurrence or event and patch-wise examination where QoS KPI degradation is observed.
ii. Description of the problematic sector/cells or areas impacting the QoS KPIs, along with the measures taken to address the issue.
iii. Details of the testing to be conducted on the identified sector or areas. Multiple tests will be carried out to confirm the correlation of the identified issues.
iv. The compliance report must include log files and/or any other supporting evidence/OSS (Operations Support System) KPIs if required by the Commission.
v. The analysis and the detailed plan for remedy must be submitted by the service provider within 15 days or within the timeline given in the notice.
vi. In applicable cases, a confirmation report indicating the resolution of all identified shortfalls must be submitted within 60 days from the issuance of the notice.

d. The Commission may undertake follow-up drive tests or sample spot tests or other measurements, detailed/system reports analysis and verification or inspections to assess the QoS KPIs. In the event of any subsequent breaches of the QoS standards, the Commission shall issue a show-cause notice to the concerned operator. Upon receipt of the operator's response, the Commission may enact appropriate

measures to evaluate the extent of non-compliance.

6. Record Keeping

a. Every service provider shall preserve complete and accurate records necessary for determining the QoS parameter specified in Schedule 1 for a minimum of one year following the submission of the report to BTRC.

b. For the KPIs specified in tables 2 and 5 of Schedule-1, the test log and web mapping tab shall be stored, and for the network KPIs specified in tables 1, 3, 4, 6 and 8, the system-generated raw files shall be stored without modification for the duration specified above.

c. The Commission may, if required, direct any of its officers or an agency appointed by the Commission for the purpose of inspecting or auditing the records maintained by the service providers against each parameter under these Directives, or to get such records inspected or audited to ensure compliance with the provisions of these Directives at any time.

7. Reporting

a. Respected service providers shall submit monthly reports to the Commission for each of the QoS KPIs specified in tables 1, 3, 4, 6, 7 and 8 of Schedule-1 within 10 (ten) days after the end of each month in the format specified by BTRC.

b. Respective service providers shall provide quarterly assessment reports of each parameter specified in Table 2 of Schedule 1 to the Commission, in the specified format, within twenty (20) days of the end of each quarter. They are required to conduct and submit performance test reports covering the following areas: (i) drive tests on public roads and highways; (ii) tests on railway routes; and (iii) sample or spot tests at designated hot spots and public gathering areas, such as markets, shopping malls, colleges, universities, bus stations, railway stations, and other administratively important locations, as specified by BTRC from time to time.

8. Publications

a. The Commission may publish the following records:
i. Compliance reports are reported to the Commission by the service providers in accordance with these Directives.
ii. Results of the drive test or any other measurement method, inspection of the system, or audit undertaken by the Commission or its authorised agency.
iii. Results of the customer satisfaction surveys undertaken by BTRC through its website or through appropriate media, or other methods.

b. Every service provider shall publish, for the information of the customers, its performance against the benchmark of the QoS parameter specified in these Directives.
c. The Commission may publish the ranking of the service providers in terms of QoS based on different evaluation processes such as customer survey, results of the inspection or audit, drive test (or any other measurement method) etc. This publication aims to raise public awareness, create conditions for a competitive environment, and encourage service providers to deliver better quality of services.
d. The Commission may produce a comprehensive Network Performance Score (NPS) report. The principal of NPS may be outlined by the Commission.

9. Interpretation

In case of any doubt regarding the interpretation of any of the provisions of these Directives, the clarification of the Commission shall be final and binding.

10. Penalties

a. If any service provider fails to maintain the standards of QoS (with justification) or to submit required reports or to comply with any provisions outlined in these Directives, it shall be liable for breaching these Directives. Furthermore, the submission of inaccurate, misleading or incomplete information to the Commission shall similarly be deemed as a violation of these Directives.

b. Violation and/or breach of any provisions of these Directives shall be liable for an administrative fine under the Bangladesh Telecommunication Regulation Act 2001.

11. Miscellaneous

a. The Commission may issue clarifications and supplements to these directives from time to time.

b. The Commission may amend these Directives from time to time by Gazette notification.

Schedule-1

Table 1

QoS Benchmarks for Cellular Mobile Phone from NMS/OMC/PS Core

Sl. No.	QoS Parameters	Benchmarks (Granularity level and Threshold Value)	Averaged (defined* BH) over a measurement period of
1	**Voice KPI**		
1.1	2G Call Setup Success Rate	Network level ≥ 99%, District level ≥ 98%, Upazilla ≥ 98%	One Month
1.2	CSFB Success Rate	Network level ≥ 98%	One Month
1.3	4G - VoLTE Call Setup Success Rate	Network level ≥ 99%	One Month
1.4	4G - VoLTE+GSM Combined Voice Setup Success Rate	Network level ≥ 99%, District level ≥ 98%, Upazilla ≥ 98%	One Month
1.5	2G Call Drop Rate	Network level ≤ 1 %, District level ≤ 1.5%, Upazilla ≤ 1.5%	One Month
1.6	4G - VoLTE drop/Abnormal Release Rate	Network level ≤ 0.5 %	One Month
1.7	4G - VoLTE+GSM Combined Abnormal Release Rate	Network level ≤ 1%, District level ≤ 1.5%, Upazilla ≤ 1.5%	One Month
2	**Data KPI**		
2.1	4G - RRC Success Rate	Network level ≥ 99%, District level ≥ 98.5%, Upazilla ≥ 98.5%	One Month
2.2	4G – Avg. UE throughput DL	Network level ≥ 3.5 Mbps, District level ≥2.5 Mbps	One Month
2.3	4G - Counter Mobile Data NRR-LTE ERAB Non-Retainability (%)	Network level ≤ 0.5%	One Month
3	**SMS KPI**		
3.1	Completion Rate	Network level ≥ 98%	One Month (average of daily values, not BH)
4	**Operational KPI**		

4.1	Accumulated Down Time of BTSs, eNodeBs and beyond	Network level ≤ 1 %	One Month (BH not applicable)

** **BH**: Busy Hour average value means the average of six (06) busiest hours (continuous around the busiest hour) of the day.*

*** Considering Hill-Tract Districts, Sundarbans Areas and border areas, a maximum of 05 Districts may be exempted from compliance for a particular month.*

*** A MNO shall have to maintain the Upazilla level benchmark at least in two-thirds of the Upazillas in any reporting month.*

Table 2

QoS Benchmarks for Cellular Mobile Phone Service for Drive Test			
Sl. No.	**QoS Parameters**	**Benchmarks (Avg.)**	
1.	**Voice KPI**		
1.1	Call Setup Success Rate -auto mode	≥ 98%	
1.2	Call Drop Rate- auto mode	≤2%	
1.3	CS Call Setup Time	≤ 7 sec	
1.4	CSFB Call setup time	≤ 8 sec	
1.5	Call Setup Time (VoLTE and beyond)	≤ 3 sec	
1.6	MOS (Auto-mode for VoLTE Supported network)	≥ 3.5	
2.	**Data KPI**		
2.1	4G/LTE Data Throughput	DL ≥ 10 Mbps	UL ≥ 2 Mbps
2.2	Latency	≤ 70 msec	
3.	**Service Coverage KPI (scanner)**		
3.1	2G/GSM RxLevel (for > 90% samples)	Outdoor: ≥ -85dBm	**Indoor: ≥ -100 dBm
3.2	4G/LTE RSRP (for > 90% samples)	Outdoor: ≥ -110 dBm	**Indoor: ≥ -115 dBm
Note:	1. Spot tests will be conducted to verify user experience at that location, following the methodologies set forth by BTRC. It will be used to instruct MNOs to undertake corrective measures in appropriate cases, and shall not be a non-compliance criterion. 2. For the Indoor test (including coverage), reference values shall be used to Instruct MNOs to take corrective measures; these shall not be a non-compliance criterion. 3. Data throughput and latency shall be measured in the drive-test through domestic high-speed FTP downloads.		

Table 3

QoS Benchmarks for Fixed Telephony Service			
Sl. No.	**QoS Parameters**	**Benchmarks**	**Averaged over a measurement period of**
1.	Call Drop Rate	≤ 1 %	One Month
2.	Call Setup Success Rate	≥ 99%	One Month
3.	Call Setup Time	≤ 6 sec	One Month

Table 4

QoS Benchmarks for Fixed Internet Access Services (to be measured in a data network system)

Sl. No.	QoS Parameters	Benchmarks	Averaged over a measurement period of
1.	Ping Round Trip Time [ms]	≤ 25 ms (local)	One Month
2.	Throughput	Download Data Throughput ≥ 100% of subscribed speed Upload Data Throughput ≥ 100 % of subscribed speed (as per package)	One Month
3.	Packet Loss (%)	≤ 1%	One Month
4..	Network Availability (Access Nodes)	Grade-A ≥ 99%	One Month
		Grade-B ≥ 98%	
		Grade-C ≥ 97%	
5.	MTTR	Grade-A ≤ 4 hours	One Month
		Grade-B ≤ 6 hours	
		Grade-C ≤ 8 hours	
***Note:**	1. The local network is defined as the connectivity from the switching centre of The ISP to the NIX.		
	2. Benchmarks of above MTTR, subject to not having dependencyon upstream and NTTN.		

Table 5

QoS Benchmarks for Fixed Internet Access Services (Sample/ Spot Test to be measured at the user-end)

Sl. No.	QoS Parameters	Benchmarks (Avg.)
1.	Speed	Download Data Speed ≥ 95% of subscribed speed Upload Data Speed ≥ 95% of subscribed Speed (as per package)
2.	Packet Loss (%)	≤ 1 %
3.	Jitter	≤ 15 sec
4.	Web Page Loading Time	≤ 3 sec
*** Note:**	1. Web page loading time for loading of Facebook, Google, YouTube homepage etc.	
	2. A sample or Spot test would be carried out during ideal network conditions.	

Table 6

QoS Benchmarks for NTTN Operators			
Sl. No.	**KPI Name**	**Threshold**	**Average of**
1.	**Capacity Lease**		
1.1	Maximum IPPM Packet Loss	0.01%	Monthly
1.2	Maximum End-to-End Delay (Latency) (to be measured for distance up to 70 Km)	5 ms	Monthly
1.3	Maximum Jitter (to be measured for distance up to 70 Km)	3 ms	Monthly
1.4	Availability (Up Time)		Monthly
	Grade- A	99.91 % - 99.95 %	
	Grade- B	99.90 %	
	Grade- C	99.50 %	
	Grade- D	99.00 %	
	Grade- E	97.00 %	
1.5	Convergence during fault case (switching time)	≤ 50 ms	Quarterly

1.6	Fiber MTTR (Non-Service Affecting, Maximum)	Metro-6 hours Rural-8 hours	Monthly
1.7	Fiber MTTR (Service Affecting, Maximum)	Metro-4 hours Rural-6 hours	Monthly
1.8	Maximum Bandwidth Utilization (under failover scenario)	Upgradation Trigger-70% Execution- 90%	Monthly
2.	**Dark Fiber**		
2.1	Fiber MTTR (Non-Service Affecting, Maximum)	Metro-6 hours Rural-8 hours	Monthly
2.2	Fiber MTTR (Service Affecting, Maximum)	Metro-4 hours Rural-6 hours	Monthly
2.3	Fiber Loss (Per KM for each link)	≤0.38dB/Km at 1310nm ≤0.30dB/Km at 1550nm	Monthly
2.4	Availability (Up Time)[4]		
	Grade-A	99.50 %	Monthly
	Grade-B	99.00 %	
	Grade-C	98.50 %	
	Grade-D	98.00 %	
	Grade-E	97.50 %	
*Note:	1. Availability or uptime requirements to be met per hop, between adjacent POPs, or active nodes.		
	2. ANS and NTTN will collaborate to measure the convergence parameter during fault cases.		
	3. The same benchmark for maximum bandwidth utilization shall also apply to the B-party in the case of a handover scenario		
	4. Grades for Dark Fiber Connectivity will be defined by BTRC or through the SLA between NTTN and fiber service receiver. 3. The same benchmark for maximum bandwidth utilization shall also apply to the B-party in the case of a handover scenario		

Table 7

QoS Benchmarks for Complaint Management			
Sl. No.	**QoS Parameters**	**Benchmarks**	**Averaged over a period of**
1.	Resolution of complaints (except network-related issues)	100% within 28 days	One Month
2.	Complaint Handling		
2.1	Promptness in answering calls for assistance in Customer Care	90 % within 40 sec 100 % within 90 sec	One Month
2.2	Promptness in resolving customer complaints	90 % within 05 working days	One Month
3.	IVR (Interactive Voice Response) time	≤ 15 sec	One Month
Note: KPIs listed in Table 7 shall be applicable for all ANS operators.			

Table 8

QoS KPI for Reporting (only for monthly reporting. This table shall be used only for monitoring, not for compliance check)

Cellular Mobile Service KPI (NMS/OMC/PS Core)

Sl. No.	**Name of Parameters**	**Measurement Unit**

1	**Accessibility**	
1.1	BH Overall network CSSR	%
1.2	BH 2G CSSR	%
1.3	BH 4G-VoLTE CSSR	%
1.4	BH 4G-VoLTE+GSM Combined Voice Setup Success Rate	%
1.5	BH CSSR below i) 90%, ii) 70% iii) 60%	%, worst cell count
1.6	BH 4G RRC Success Rate	%
1.7	BH RRC Success Rate below i) 90%, ii) 70% iii) 60%	%, worst cell count
1.8	BH Paging Success Rate (Core)	%
1.9	BH ERAB Setup Success Rate	%
1.10	BH ERAB Setup Success Rate below i) 90%, ii) 70% iii) 60%	%, worst cell count
2	**Retainability**	
2.1	BH Overall network Call Drop Rate	%
2.2	BH 2G Call Drop Rate	%
2.3	BH 4G-VoLTE drop/Abnormal Release Rate	%
2.4	BH 4G Mobile Data NRR - LTE ERAB Non-Retainability	%
2.5	BH 4G SRVCC Success Rate	%
2.6	BH Handover Success Rate	%

3	**Network Integrity**		
3.1	BH 4G LTE PRB Utilization per eNodeB > 80%, 90%		%, count of eNodeBs
3.2	BH 4G UE throughput UL		Mbps
3.3	BH CQI/ RSRQ		% of bad samples under a certain threshold (as 3GPP standard)
Note:	1.	Results to be averaged over a period of month.	
	2.	Results to be submitted separately for Network, District and Upazilla Level, as per the instructions of the BTRC.	
	3.	In addition, a report on the worst 50 cells based on CSSR, ERAB, and RRC success rates shall be submitted monthly to identify and address underperforming areas.	

Schedule-2

Description of Parameters

1. Fixed Internet Access Service KPI

a. **'Fixed Internet Access Service'** means a connectivity of communication bandwidth service that has a minimum downstream capacity as defined by the respective authorities from time to time. It refers to the provision of high-speed internet connectivity to residential, commercial, and institutional users. This service enables users to access the internet utilising various technologies such as DSL (Digital Subscriber Line), cable modem, fiber-optic, wireless, or satellite connections to deliver internet access.

b. **Network Latency (Ping Round Trip Time):** Average (Round_trip_time) for successful ping tasks only, i.e. which is more than zero to travel across the network from the end user to NIX and back to the end user.

c. **Packet Loss:** This indicator measures the percentage of the data packets transmitted from the source that fail to arrive at their destinations. It is computed based on the average of the sampling measurements between the end user and NIX.

d. **Jitter:** Jitter is the variation between the maximum delay and minimum delay within a specific time window. The difference between the delays of the selected packets. The node processing delay (including queuing delay) is the main factor of jitter.

e. **Speed:** This indicator measures the speed of uploading and downloading data measured in units of megabits per second, Mbps between the end user and NIX.

f. **Grade of Service:** GoS refers to the quality of internet services provided by ISPs, based on factors like speed, reliability, latency, and customer support. A higher GoS signifies better performance, with fewer disruptions, while a lower GoS indicates service quality issues. According to the respective GoS directives of BTRC, ISPs are classified into three grades: Grade-A, Grade-B, and Grade-C, with Grade-A representing the highest quality and Grade-C the lowest.

Note: The Monthly value of these QoS parameters will be computed by averaging the daily NBH value of the whole month. The basic measurement setup consists of a Test-Device and a Test-Server with specified software and hardware. Test calls have to be established between the Test-Device and Test-Server, and measurements must be made for the respective QoS parameters. Details of test methodology will be defined by BTRC through administrative order from time to time.

2. Cellular Mobile Phone Service KPI

a. **'Cellular Mobile Phone Service'** refers to the provision of wireless telecommunications services which enable users to make and receive voice calls, send text messages, and access internet services over cellular networks. Cellular Mobile Phone service providers deploy networks using technologies such as GSM (Global System for Mobile Communications), 4G LTE (Long Term Evolution), 5G and potentially newer technologies as they emerge.

b. **Call Drop Rate:** The Probability that a successful established call attempt is ended unintentionally. It is the percentage of calls that are unexpectedly terminated or disconnected before completion. It measures the reliability of a network by quantifying the frequency at which calls are prematurely ended due to factors such as signal loss, network congestion, or technical issues.

   Formula: Call Drop Rate (%) = (Total Number of Dropped Calls / Number of Successfully established Calls) x 100%.

c. **Call Setup Success Rate:** The Probability of having continuous access to the network so that the end customer successfully accesses the mobile service when requested. It is the percentage of attempted calls that are successfully established and connected without any significant delay or failure. It is the key indicator of the performance and reliability of a network. It is measured as the ratio of established calls to total call attempts.

   Formula: Call Setup Success Rate (%) = (Call Attempt - Call Attempt Failure)/Call Attempt multiplied by 100.

d. **Call Setup Time:** It is the time measured between Call Attempt to Call Alerting.

e. **CSFB:** Circuit Switched Fallback is a mechanism in LTE (4G) networks that enables the fallback of voice calls to legacy 2G networks when initiating or receiving voice calls. It ensures voice service continuity in areas where LTE coverage is insufficient for voice calls, allowing seamless voice communication for users.

f. **CSFB Success Rate : Based on MT calls.**

g. **CSFB Call Setup Time:** It is the time measured between Call Attempt to Call Alerting when call from 4G/LTE network falls back to 2G Network.

h. **Data Throughput:** This parameter is intended to measure the user-perceived throughput, representing the average data rates experienced by the test mobile equipment during the testing session.

i. **Latency:** Latency is the amount of time taken by a packet to reach the receiving endpoint after being transmitted from the sending point. It is the round-trip time for data packets from mobile handsets to any local/global/designated server decided by BTRC and back to the sending endpoint.

j. **Accumulated Down Time of BTSs and eNodeBs:** BTSs and eNodeBs accumulated downtime (not available for service) shall basically measure the downtime of the BTSs and eNodeBs, including its transmission links/circuits during the period of a month, but excludes all planned service downtime for any maintenance or software upgrade. However, for this type of planned service maintenance, downtime of each individual BTS/eNodeB exceeding more than 1 hour on each occasion is to be taken into account for calculation.

k. **Service Coverage:** It is the strongest value of Rx Level/RSRP/SS-RSRP at a given location, for a

given operator.

l. **MOS:** The degree of speech quality that a listener perceives at the terminal with a talker at the other end can be found from MOS value. Measurement will be based on POLQA Algorithm (ITU-T P.863).

MOS	Excellent	Good	Fair	Poor	Bad
Score	5	4	3	2	1

m. **Completion Rate of SMS:** Number of successfully delivered SMS from SMSC multiplied by 100 and divided by the number of successfully submitted SMS to SMSC, excluding subscriber behaviour. Subscriber behavior related failures (absent subscriber, Exceeded Memory capacity, IMSI detachment, busy MS while receiving another SMS, Barred subscriber, Deregister in HLR, Error in MS, No credit and invalid destination numbers) shall be excluded from calculation as it is beyond the control of the service providers.

n. **PRB Utilization:** PRB (Physical Resource Block) utilization measures how efficiently radio resources are used in wireless networks like LTE or 5G. A PRB is a chunk of radio spectrum allocated for data transmission between the base station (eNodeB or gNodeB) and user equipment (UE). This metric helps network operators evaluate and optimize resource allocation, aiming to enhance network performance, data throughput, and user experience. Techniques such as dynamic resource allocation, adaptive modulation, interference management, and load balancing are used to improve PRB utilization and overall network efficiency.

Formula: PRB Utilization (%) = (Total Used PRB / Total allocated PRB) x 100%.

o. **VoLTE:** "VoLTE" stands for Voice over Long-Term Evolution. Voice over LTE means voice calls are established, maintained and released using IMS (Internet Protocol (IP) Multimedia Subsystem). It's a technology standard used for making voice calls over LTE networks, which are commonly referred to as 4G networks. Traditional voice calls typically use older circuit-switched networks, while VoLTE leverages the Internet Protocol (IP) networks used for data transmission, allowing for improved voice quality, faster call setup times, and the ability to use data services during voice calls.

p. **RRC Success Rate:** RRC (Radio Resource Control) Success Rate measures the percentage of successful RRC connection establishment attempts over the total number of attempts made by user equipment (UE) to connect to the network. It reflects the network's ability to efficiently handle connection requests and is a key indicator of radio network performance.

Formula: RRC Success Rate (%) = (Successful RRC Connection Attempts/Total RRC Connection Attempts) x 100

q. **Paging Success Rate:** Paging Success Rate measures the percentage of successfully delivered paging messages to mobile devices (UEs) over the total number of paging attempts initiated by the network.

Formula: Paging Success Rate (%) = (Successful Paging Responses/ Total Paging Attempts) x 100

r. **Uplink RSSI**: RSSI (Received Signal Strength Indicator) in the uplink direction refers to the total received power (including both the desired signal and interference/noise) measured at the base station from a user device (UE).

Path Loss Path loss refers reduction in power density of a radio signal as it propagates through space from the transmitter to the receiver.

Formula Path loss (dBm) = Transmit Power (dBm)−Received Power (dBm)

s. **Drop/Abnormal Release Rate:** Drop Rate/ Abnormal Release Rate measures thepercentage of

active calls or sessions that are unintentionally terminated due to network issues, rather than being ended normally by the user or application.

Formula: Drop/Abnormal Release Rate (%) = (Abnormal Call/Session Releases/ Total Established Calls/Sessions) x 100

t. **ERAB Non-Retainability Rate:** ERAB Non-Retainability Rate in LTE measures the percentage of established E-RABs (E-UTRAN Radio Access Bearers) that fail to be retained (are abnormally released) before the intended session ends, specifically focusing on the busy hour — the time of day with the highest traffic load.

Formula: ERAB Non-Retainability Rate (%) = (Abnormal ERAB Releases (after successful setup)/ Successfully Established ERABs) x 100

u. **SRVCC** – Single Radio Voice Call Continuity: SRVCC is a feature that enables the seamless handover of an ongoing voice call from an LTE (VoLTE) network to a legacy Circuit-Switched (CS) network, without dropping the call.

SRVCC Success Rate (%) = (Successful SRVCC Handovers/ SRVCC Attempted Handovers) x 100

N. B.: As and when required, BTRC may issue additional definition or formula for the KPIs.

3. Fixed Telephony Service KPI

a. **'Fixed Telephony Service'** refers to the provision of landline telephone services to residential and business customers using traditional wired infrastructure. It involves the installation of telephone lines and equipment at fixed locations, typically within homes or office buildings, allowing users to make and receive calls to and from other fixed-line phones, mobile phones, and international numbers. a communication service based on phone lines installed at a fixed location connected over telecommunications networks.

b. **Call Setup Success Rate:** (Call Attempt - Call Attempt Failure)/Call Attempt multiplied by 100.

c. **Call Drop Rate:** Call Abnormal Release / (Call Normal Release + Call Abnormal Release) multiplied by 100.

d. **Call setup time:** It is the time measured between Call Attempt to Call Alerting.

N. B.: All KPIs are to be computed from NMS/OMC data by the service providers. Monthly value of these QoS parameters will be computed by averaging the daily CS NBH value of the whole month.

4. NTTN Service provider KPI

a. **'Nationwide Telecommunication Transmission Network Service'** refers to a network infrastructure established to facilitate the transmission of telecommunications services throughout the country. NTTNs are typically large-scale, high-capacity networks designed to carry traffic over long distances. These networks play a crucial role in connecting various regions and enabling services to the ANS operators, Licensed Telecommunication Operators and other authorized users.

b. **Maximum IPPM Packet Loss:** It will be measured from IP Performance Matrix as the one-way IP packet loss across transmission paths.

c. **Maximum End-to-End Delay (Latency):** It will be measured as the transmission delay time for distance up to 70 Km.

d. **Maximum Jitter:** It will be measured for distance up to 70 Km.

e. **Availability/Up time:** It is the availability in percentage of the effective connectivity between hop/pop/active nodes.

f. **Convergence during fault case (switching time):** To be measured during individual switching instances for fault cases.

g. **Fiber MTTR (Non-Service Affecting, Maximum):** Time required to restore the fiber link once fault is detected when the service is not affected by such fault.
h. **Fiber MTTR (Service Affecting, Maximum):** Time required to restore the fiber link once fault is detected when the service is affected by such fault.
i. **Maximum Bandwidth Utilization:** Bandwidth utilization of particular fiber link under failover scenario.
j. **Grade of Service**: GoS refers to the quality of services provided by NTTN operators, based on factors such as reliability, retainability, and customer support etc. A higher GoS signifies better performance with fewer disruptions, while a lower GoS indicates service quality issues. According to the GoS directives of BTRC, NTTNs are classified into five grades: Grade-A to Grade-E, with Grade-A representing the highest quality and Grade-E the lowest.

N.B.: All KPIs are to be computed from NMS data of the NTTN/MNO operators. Daily/Monthly/Quarterly value of these QoS parameters will be computed and reported quarterly by NTTN operators.

5. Billing Accuracy and Complaint Handling KPI

a. **Resolution of complaints:** This indicator measures the percentage of billing/charging-related complaints resolved by the service provider within the timeframe, measured from the day the complaint was received to the time the complaint was resolved.

   Formula: Total number of billing-related complaints resolved within the timeframe *100% / Total number of complaints received within the reporting month.
   A billing-related complaint is any complaint related to the service provider's billing made or charges imposed on customers.

b. **Promptness in answering calls for assistance in Customer Care:** Number of calls answered by human operator within the timeframe *100% / Total number of calls to customer care hotline opting for human operator assistance in the reporting month.

c. **Promptness in resolving customer complaints:** This indicator measures the percentage of customer complaints resolved by the service provider within the specified timeframe, measured from the day the complaint was received to the time the complaint was resolved.

   Formula: Total number of complaints resolved within the timeframe * 100% / Total number of complaints received within the reporting month.

d. **IVR (Interactive Voice Response):** IVR time is how long a caller spends using an automated phone menu before speaking to a person or getting the information they need.

   Formula: IVR Time = End Time - Start Time, where the start time is the moment a caller begins interacting with the IVR system and end time is the moment the caller gets connected to a live agent or receives the needed information.

02-09-2025
Brigadier General Shafiul Azam Parvez
Director General

Distribution (Not in the order of seniority):

1. Managing Director/ Chief Executive Officer, All MNO Operators;
2. Managing Director/ Chief Executive Officer, All PSTN Operators;
3. Managing Director/ Chief Executive Officer, All IPTSP Operators;

4. Managing Director/ Chief Executive Officer, All NTTN Operators and
5. Managing Director/ Chief Executive Officer, All ISP Operators.