Fixed Broadband Quality of Service (QoS) Surveys

Network End Surveys

Quarter-04 2025

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1. Executive Summary

Pakistan Telecommunication Authority (PTA) has carried out Quality of Service (QoS) Survey of **50** x unique operators in **29** x major cities of Pakistan during 4th Quarter 2025. During the survey, the performance of fixedline broadband operators have been assessed in accordance with the Fixedline Broadband Regulation, 2022. Operator wise & City wise summary of operators are mentioned below:

66 Locations Tested	**50** Unique Operators	**29** Major Cities	At 44 locations Operators are fully complied
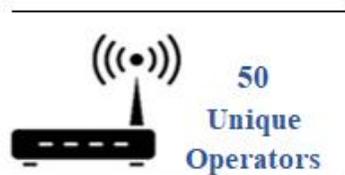
Operator Wise – Compliance Status

Sr No.	Company Name	City	Overall Score	Percentage Compliance (%)	Compliance Status
1	Cyber Internet Services (Pvt.) Ltd.	Abbottabad	6	85.71	➡
2	Enigma Fiber (Pvt.) Ltd	Abbottabad	7	100.00	⬆
3	Air Max (Pvt.) Ltd.	Abbottabad	7	100.00	⬆
4	New Millennium Network (Pvt.) Ltd	Abbottabad	7	100.00	⬆
5	Waylink (Pvt.) Ltd.	Bhimber	7	100.00	⬆
6	Air Touch Wireless ISP Network (Pvt) Ltd	Buner	6	85.71	➡
7	PTCL	Buner	6	85.71	➡
8	Smartsys (Pvt.) Limited	Chakwal	7	100.00	⬆
9	New Pakistan Cable Network	Faisalabad	7	100.00	⬆
10	Sulehria Wireless Internet Services	Faisalabad	7	100.00	⬆
11	SCO	Gamba	7	100.00	⬆
12	SCO	Gulmit-Gojal	7	100.00	⬆
13	Sani Broadband Communication (Pvt.) Limited	Hajira	7	100.00	⬆
14	Classic Broadband	Hajira	5	71.43	⬇

Sr No.	Company Name	City	Overall Score	Percentage Compliance (%)	Compliance Status
15	Air Max (Pvt.) Ltd.	Haripur	7	100.00	⬆
16	Cyber Internet Services (Pvt.) Ltd.	Haripur	7	100.00	⬆
17	Pace Telecom and Broadcasting (Pvt.) Ltd.	Haripur	7	100.00	⬆
18	5GWifi Communication (SMC Pvt.) Limit	Havelian	7	100.00	⬆
19	PTCL	Islamabad	7	100.00	⬆
20	Naya Tel (Pvt.) Ltd.	Islamabad	6	85.71	➡
21	Hajwari Net Zone	Islamabad	6	85.71	➡
22	Net-Cloud Telecom (Pvt.) Ltd	Kabirwala	5	71.43	⬇
23	Netpoint IT & Communication (Pvt) Ltd.	Kahuta	6	85.71	➡
24	Global Connect Synergy (GCS)	Karachi	6	85.71	➡
25	Nation Internet Services (Pvt.) Limited	Karachi	7	100.00	⬆
26	Ultra Link (Pvt.) Limited	Karachi	7	100.00	⬆
27	Sharp Communications (Pvt.) Ltd.	Karachi	7	100.00	⬆
28	Eureka Net (Pvt.) Limited	Karachi	7	100.00	⬆
29	PSEB	Karachi	7	100.00	⬆
30	Mansoorah Telecommunications Company (Pvt.) Ltd.	Khanewal	7	100.00	⬆
31	Instacom (Pvt.) Ltd.	Khanewal	7	100.00	⬆
32	SCO	Khaplu	6	85.71	➡
33	Gerry's Information Technology (Pvt.) Ltd.	Lahore	7	100.00	⬆
34	The Professional Communications (Pvt.) Ltd	Lahore	7	100.00	⬆
35	Sign In Pvt Ltd	Lahore	7	100.00	⬆
36	Play Broadband (Pvt.) Ltd.	Lahore	7	100.00	⬆
37	In Cable Internet (Pvt.) Ltd.	Lahore	7	100.00	⬆
38	Connect Communications (Pvt.) Ltd.	Lodhran	7	100.00	⬆
39	Global Xperts	Mansehra	5	71.43	⬇
40	PTCL	Mansehra	6	85.71	➡
41	Cyber Internet Services (Pvt.) Ltd.	Mian Channu	7	100.00	⬆
42	Nasstec Airnet Networks (Pvt.) Ltd	Mirpur	4	57.14	⬇
43	SCO	Nomal	7	100.00	⬆
44	Naya Tel (Pvt.) Ltd.	Peshawar	7	100.00	⬆

Sr No.	Company Name	City	Overall Score	Percentage Compliance (%)	Compliance Status
45	Cyber Internet Services (Pvt.) Ltd.	Peshawar	6	85.71	⇨
46	PTCL	Peshawar	7	100.00	⬆
47	Connect Communications (Pvt.) Ltd.	Quetta	7	100.00	⬆
48	Brilliant Enterprises Pk (Pvt.) Limited	Quetta	7	100.00	⬆
49	NTC	Quetta	7	100.00	⬆
50	PTCL	Quetta	7	100.00	⬆
51	Cyber Internet Services (Pvt.) Ltd.	Quetta	7	100.00	⬆
52	Sani Broadband Communication (Pvt.) Limited	Rawalakot	7	100.00	⬆
53	SB Communications (Pvt.) Ltd.	Rawalakot	7	100.00	⬆
54	Gamma Links (Pvt.) Ltd	Rawalpindi	6	85.71	⇨
55	Khan Telecommunications (Pvt.) Limited	Rawalpindi	5	71.43	⬇
56	Azan Ali Air Communication Pvt Ltd	Rawalpindi	6	85.71	⇨
57	Net Gate (Pvt.) Limited	Rawalpindi	6	85.71	⇨
58	Dubai Sky Internet (Pvt.) Ltd	Sargodha	7	100.00	⬆
59	Nexgen Telecommunication (Pvt.) Ltd.	Sargodha	6	85.71	⇨
60	Netsol Connect (Pvt.) Limited	Shikarpur	7	100.00	⬆
61	CMPak LDI Ltd	Sukkur	7	100.00	⬆
62	Sky Net Multi Services (Pvt.) Limited	Sukkur	7	100.00	⬆
63	Wancom (Pvt.) Ltd.	Sukkur	5	71.43	⬇
64	Multinet Pakistan (Pvt.) Ltd.	Sukkur	7	100.00	⬆
65	Cyber Internet Services (Pvt.) Ltd.	Sukkur	7	100.00	⬆
66	Click Sat (Pvt.) Limited	Sukkur	7	100.00	⬆

Legends:

- ⬆ --- All KPIs are complied

- ⇨ --- Only one KPI is Non-complied

- ⬇ --- More than one KPIs are Non-complied

City Wise – QoS KPIs Compliance Status

City	Operator Name	Network Availability Core Nodes >=99.9%		Network Availability - Access Nodes >=99%		RTT - Local Network Latency <= 40msec		RTT - International Segment – Terrestrial <= 110msec		Bandwidth Utilization<=80%		Jitter<=15msec		Data Throughput		
														DL	UL	-
		Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Obtained	Compliance (Y/N)
Abbottabad	Cyber Internet Services (Pvt.) Ltd.	100.00	Y	100.00	Y	44.9	N	44.45	Y	59.86	Y	6.28	Y	24	23	Y
Abbottabad	Enigma Fiber (Pvt.) Ltd	100.00	Y	100.00	Y	4.2	Y	53	Y	66.67	Y	4.335	Y	19	20	Y
Abbottabad	Air Max (Pvt.) Ltd.	100.00	Y	100.00	Y	2.2	Y	46.95	Y	80.00	Y	3.813	Y	21	22	Y
Abbottabad	New Millennium Network (Pvt.) Ltd	100.00	Y	100.00	Y	2.85	Y	78.4	Y	72.73	Y	10	Y	23	19	Y
Bhimber	Waylink (Pvt.) Ltd.	100.00	Y	100.00	Y	0.45	Y	56.9	Y	77.00	Y	6.18	Y	45	47	Y
Buner	Air Touch Wireless ISP Network (Pvt) Ltd	100.00	Y	100.00	Y	72.35	N	47	Y	60.00	Y	14.94	Y	30	29	Y
Buner	PTCL	100.00	Y	100.00	Y	22.6	Y	70.7	Y	67.56	Y	20.42	N	12	2	Y
Chakwal	Smartsys (Pvt.) Limited	100.00	Y	100.00	Y	3.7	Y	37.05	Y	65.00	Y	0.39	Y	15	13	Y
Faisalabad	New Pakistan Cable Network	100.00	Y	100.00	Y	2.05	Y	35.05	Y	80.00	Y	2.87	Y	15	15	Y
Faisalabad	Sulehria Wireless Internet Services	100.00	Y	100.00	Y	3.65	Y	33.95	Y	72.00	Y	6.38	Y	86	31	Y
Gamba	SCO	100.00	Y	99.37	Y	11.83	Y	44	Y	60.00	Y	3.93	Y	24	13	Y
Gulmit-Gojal	SCO	100.00	Y	99.45	Y	10.5	Y	43	Y	74.00	Y	4.94	Y	24	13	Y
Hajira	Sani Broadband Communication (Pvt.) Limited	100.00	Y	100.00	Y	32.45	Y	59.8	Y	60.00	Y	7.13	Y	12	15	Y
Hajira	Classic Broadband	94.00	N	94.00	N	0.45	Y	50.8	Y	72.00	Y	2.42	Y	16	16	Y

City	Operator Name	Network Availability Core Nodes >=99.9%		Network Availability - Access Nodes >=99%		RTT - Local Network Latency <= 40msec		RTT - International Segment – Terrestrial <= 110msec		Bandwidth Utilization<=80%		Jitter<=15msec		Data Throughput		
														DL	UL	-
		Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Obtained	Compliance (Y/N)
Haripur	Air Max (Pvt.) Ltd.	100.00	Y	100.00	Y	2.45	Y	64.9	Y	62.50	Y	6.62	Y	22	24	Y
Haripur	Cyber Internet Services (Pvt.) Ltd.	100.00	Y	100.00	Y	20.35	Y	43.35	Y	43.85	Y	1.97	Y	19	20	Y
Haripur	Pace Telecom and Broadcasting (Pvt.) Ltd.	100.00	Y	100.00	Y	10.2	Y	51.2	Y	55.56	Y	3.28	Y	14	17	Y
Havelian	5GWifi Communication (SMC Pvt.) Limit	100.00	Y	100.00	Y	5.2	Y	76.2	Y	74.91	Y	5.338	Y	20	21	Y
Islamabad	PTCL	100.00	Y	100.00	Y	5.1	Y	60.35	Y	53.98	Y	0.81	Y	96	95	Y
Islamabad	Naya Tel (Pvt.) Ltd.	100.00	Y	100.00	Y	4.95	Y	39.25	Y	96.46	N	0.18	Y	45	43	Y
Islamabad	Hajwari Net Zone	99.98	Y	99.98	Y	1.15	Y	34.1	Y	94.44	N	1.2	Y	18	17	Y
Kabirwala	Net-Cloud Telecom (Pvt.) Ltd	96.06	N	76.31	N	1.95	Y	45.9	Y	67.37	Y	2.277	Y	12	12	Y
Kahuta	Netpoint IT & Communication (Pvt) Ltd.	99.99	Y	99.99	Y	1.7	Y	36	Y	87.73	N	0.85	Y	14	9	Y
Karachi	Global Connect Synergy (GCS)	100.00	Y	100.00	Y	1	Y	247.5	N	46.00	Y	0	Y	51	54	Y
Karachi	Nation Internet Services (Pvt.) Limited	100.00	Y	100.00	Y	2.5	Y	17.5	Y	79.00	Y	0.25	Y	26	24	Y
Karachi	Ultra Link (Pvt.) Limited	100.00	Y	100.00	Y	1	Y	15.75	Y	80.00	Y	0	Y	21	17	Y
Karachi	Sharp Communications (Pvt.) Ltd.	100.00	Y	100.00	Y	2	Y	17	Y	75.00	Y	0.25	Y	25	28	Y
Karachi	Eureka Net (Pvt.) Limited	100.00	Y	100.00	Y	1	Y	17	Y	80.00	Y	1.75	Y	22	18	Y
Karachi	PSEB	100.00	Y	100.00	Y	1.5	Y	17.5	Y	72.00	Y	0.45	Y	16	13	Y

City	Operator Name	Network Availability Core Nodes >=99.9%		Network Availability - Access Nodes >=99%		RTT - Local Network Latency <= 40msec		RTT - International Segment – Terrestrial <= 110msec		Bandwidth Utilization<=80%		Jitter<=15msec		Data Throughput		
														DL	UL	-
		Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Obtained	Compliance (Y/N)
Khanewal	Mansoorah Telecommunications Company (Pvt.) Ltd.	100.00	Y	99.98	Y	1.7	Y	38.8	Y	54.40	Y	0.619	Y	39	30	Y
Khanewal	Instacom (Pvt.) Ltd.	100.00	Y	99.72	Y	2.4	Y	42.3	Y	79.20	Y	0.994	Y	23	12	Y
Khaplu	SCO	100.00	Y	99.39	Y	13	Y	47	Y	90.00	N	3.33	Y	23	14	Y
Lahore	Gerry's Information Technology (Pvt.) Ltd.	100.00	Y	100.00	Y	1.75	Y	34.4	Y	76.69	Y	1	Y	11	11	Y
Lahore	The Professional Communications (Pvt.) Ltd	100.00	Y	100.00	Y	3.9	Y	85.25	Y	3.66	Y	1.2	Y	9	10	Y
Lahore	Sign In Pvt Ltd	100.00	Y	100.00	Y	3.15	Y	37.7	Y	1.92	Y	0.95	Y	8	8	Y
Lahore	Play Broadband (Pvt.) Ltd.	100.00	Y	100.00	Y	7.2	Y	49.45	Y	58.40	Y	5.95	Y	11	11	Y
Lahore	In Cable Internet (Pvt.) Ltd.	100.00	Y	100.00	Y	5	Y	33.2	Y	60.80	Y	1	Y	10	11	Y
Lodhran	Connect Communications (Pvt.) Ltd.	100.00	Y	99.95	Y	19.1	Y	36.65	Y	46.00	Y	4.559	Y	26	26	Y
Mansehra	Global Xperts	100.00	Y	100.00	Y	35.15	Y	76.5	Y	88.47	N	76.17	N	18	17	Y
Mansehra	PTCL	100.00	Y	100.00	Y	15.2	Y	53.45	Y	63.89	Y	31.6	N	10	11	Y
Mian Channu	Cyber Internet Services (Pvt.) Ltd.	100.00	Y	100.00	Y	29.95	Y	42.05	Y	66.40	Y	7.519	Y	12	12	Y
Mirpur	Nasstec Airnet Networks (Pvt.) Ltd	100.00	Y	100.00	Y	4.3	Y	248	N	100.00	N	43.5	N	43	47	Y
Nomal	SCO	100.00	Y	99.24	Y	9.495	Y	42	Y	49.00	Y	5.78	Y	23	13	Y
Peshawar	Naya Tel (Pvt.) Ltd.	100.00	Y	100.00	Y	4	Y	50	Y	69.00	Y	1	Y	354	308	Y

City	Operator Name	Network Availability Core Nodes >=99.9%		Network Availability - Access Nodes >=99%		RTT - Local Network Latency <= 40msec		RTT - International Segment – Terrestrial <= 110msec		Bandwidth Utilization<=80%		Jitter<=15msec		Data Throughput		
														DL	UL	-
		Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Obtained	Compliance (Y/N)
Peshawar	Cyber Internet Services (Pvt.) Ltd.	100.00	Y	100.00	Y	5	Y	119	N	64.00	Y	1	Y	95	94	Y
Peshawar	PTCL	100.00	Y	99.88	Y	2.5	Y	41	Y	51.00	Y	7.5	Y	-	-	-
Quetta	Connect Communications (Pvt.) Ltd.	99.90	Y	99.83	Y	24	Y	35.9	Y	50.00	Y	1.355	Y	93	95	Y
Quetta	Brilliant Enterprises Pk (Pvt.) Limited	100.00	Y	100.00	Y	0.4	Y	28.9	Y	78.00	Y	0.91	Y	54	48	Y
Quetta	NTC	99.90	Y	99.82	Y	2	Y	39	Y	72.00	Y	1.865	Y	430	557	Y
Quetta	PTCL	99.96	Y	99.81	Y	7.1	Y	33.8	Y	20.58	Y	5.55	Y	23	41	Y
Quetta	Cyber Internet Services (Pvt.) Ltd.	100.00	Y	100.00	Y	7.3	Y	39.2	Y	50.00	Y	1.523	Y	29	30	Y
Rawalakot	Sani Broadband Communication (Pvt.) Limited	100.00	Y	100.00	Y	4.8	Y	44.45	Y	60.00	Y	7.6	Y	17	15	Y
Rawalakot	SB Communications (Pvt.) Ltd.	100.00	Y	100.00	Y	1.95	Y	52.6	Y	60.00	Y	0.328	Y	16	15	Y
Rawalpindi	Gamma Links (Pvt.) Ltd	99.95	Y	99.95	Y	8.4	Y	41.55	Y	92.00	N	2.15	Y	62	68	Y
Rawalpindi	Khan Telecommunications (Pvt.) Limited	99.47	N	100.00	Y	1.95	Y	41.95	Y	84.44	N	0.4	Y	10	10	Y
Rawalpindi	Azan Ali Air Communication Pvt Ltd	100.00	Y	100.00	Y	2.9	Y	34.4	Y	96.84	N	1.05	Y	9	9	Y
Rawalpindi	Net Gate (Pvt.) Limited	100.00	Y	100.00	Y	2.2	Y	42.6	Y	97.42	N	1.95	Y	10	7	Y
Sargodha	Dubai Sky Internet (Pvt.) Ltd	100.00	Y	100.00	Y	3.3	Y	70	Y	72.00	Y	1	Y	49	48	Y

City	Operator Name	Network Availability Core Nodes >=99.9%		Network Availability - Access Nodes >=99%		RTT - Local Network Latency <= 40msec		RTT - International Segment – Terrestrial <= 110msec		Bandwidth Utilization<=80%		Jitter<=15msec		Data Throughput		
														DL	UL	-
		Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Compliance (Y/N)	Obtained	Obtained	Compliance (Y/N)
Sargodha	Nexgen Telecommunication (Pvt.) Ltd.	100.00	Y	99.90	Y	3.3	Y	38.75	Y	93.00	N	1	Y	69	69	Y
Shikarpur	Netsol Connect (Pvt.) Limited	100.00	Y	100.00	Y	1.9	Y	23.95	Y	24.00	Y	2.17	Y	13	13	Y
Sukkur	CMPak LDI Ltd	100.00	Y	100.00	Y	18.9	Y	43.55	Y	32.00	Y	2.31	Y	5	5	Y
Sukkur	Sky Net Multi Services (Pvt.) Limited	100.00	Y	100.00	Y	9.9	Y	30.35	Y	76.33	Y	0.94	Y	5	5	Y
Sukkur	Wancom (Pvt.) Ltd.	100.00	Y	100.00	Y	9.55	Y	119.05	N	85.00	N	1.02	Y	14	15	Y
Sukkur	Multinet Pakistan (Pvt.) Ltd.	100.00	Y	100.00	Y	6.55	Y	37.25	Y	61.05	Y	10.43	Y	5	6	Y
Sukkur	Cyber Internet Services (Pvt.) Ltd.	100.00	Y	100.00	Y	10.45	Y	22.85	Y	80.00	Y	0.93	Y	24	25	Y
Sukkur	Click Sat (Pvt.) Limited	100.00	Y	100.00	Y	9.6	Y	26.7	Y	48.00	Y	0.52	Y	14	13	Y

Note: Red Highlighted KPIs are non-complied.

2. Background

The **Fixedline Quality of Service (QoS)** surveys for fixedline operators are conducted to assess the performance, reliability, and user satisfaction of fixed-line broadband services across Pakistan. This survey aims to understand how well service providers meet the regulatory benchmarks and consumer expectations for internet speed, connectivity stability, and customer support. As fixed-line broadband plays a crucial role in both personal and business communication, ensuring high-quality service is critical for the continued growth of digital infrastructure.

These Surveys across Pakistan are governed by the "Fixed Broadband Quality of Service Regulations, 2022." The regulations were enacted to set **Key Performance Indicators (KPIs)** that BSPs must meet to ensure reliable and high-quality fixed broadband services across Pakistan. These KPIs serve as measurable benchmarks to assess the service quality delivered to customers, including aspects such as network uptime, data throughput, latency, jitter, packet loss, and customer service responsiveness.

3. Scope

QoS surveys are crucial tools for measuring the performance of broadband networks in Pakistan, ensuring service providers adhere to high standards, and continually improving the availability and quality of internet services for consumers. These surveys cover all fixed broadband technologies in use, such as xDSL, DSL, copper and fiber optics technologies. The regulations apply to all BSPs operating in Pakistan, requiring them to maintain **minimum service standards** at various levels of their networks—from access nodes to core nodes.

These surveys also provide critical data on network performance, helping identify gaps and inefficiencies in service delivery. This helps regulatory authorities enforce service standards and ensure BSPs meet the requirements for customer satisfaction.

By regularly testing and publishing the results of broadband services, the PTA promotes **transparency.** BSPs are held accountable for their network performance, fostering competition and driving improvements in broadband services.

By gauging factors such as **download/upload speeds,** network latency, and customer service efficiency, the surveys enable BSPs to improve their networks, which directly impacts the **user experience.**

4. Methodology

The **Quarter 04 2025 surveys** started from Oct 1, 2025 till Dec 20, 2025. In the surveys, **50 x major BSPs** are inspected, operating in **29 x cities** across Pakistan. These cities are selected based on their high subscriber density, ensuring that the surveys focused on areas where the quality of service would have the most significant impact. The surveyed cities include:

i.	Abbottabad	xi.	Islamabad	xxi.	Mirpur
ii.	Bhimber	xii.	Kabirwala	xxii.	Nomal
iii.	Buner	xiii.	Kahuta	xxiii.	Peshawar
iv.	Chakwal	xiv.	Karachi	xxiv.	Quetta
v.	Faisalabad	xv.	Khanewal	xxv.	Rawalakot
vi.	Gamba	xvi.	Khaplu	xxvi.	Rawalpindi
vii.	Gulmit-Gojal	xvii.	Lahore	xxvii.	Sargodha
viii.	Hajira	xviii.	Lodhran	xxviii.	Shikarpur
ix.	Haripur	xix.	Mansehra	xxix.	Sukkur
x.	Havelian	xx.	Mian Channu		

The surveys are conducted by the **Enforcement Division team** of the PTA at the **Network Operation Centers (NOCs)** of each BSP. This method allowed for real-time assessments of network performance across various parameters, offering a detailed insight into the performance of fixed broadband networks at a deeper, technical level.

5. Parameters Monitored and Survey Results

Following key network performance parameters are checked during the surveys:

   i. Bandwidth Utilization
   ii. Network Availability
        a) Core Nodes
        b) Access Nodes
   iii. Network Latency / Round Trip Time (RTT)
        a) Local Network Latency
        b) International Segment – Terrestrial
   iv. Jitter
   v. Data Throughput (Download & Upload)

Below mentioned are details of Network level parameters measurement details along with survey results:

i. Bandwidth Utilization

This measures how effectively the network's capacity is being used. It is the ratio of peak utilization of bandwidth to the total bandwidth available.

Benchmark:

The bandwidth utilization should be < **80%**

Measurement

BSPs are required to run "Daily" MRTG (Multi Router Traffic Grapher) Graphs at 5-minute average during peak hours. The highest bandwidth utilization is the peak utilization level for each month. BASPs are required to run "Monthly" MRTG Graphs to obtain average bandwidth utilization for each month for their network. BSPs should closely monitor their links and the loading level shall not exceed.

Bandwidth Utilization = (Peak Utilization level of the network / Total bandwidth available) x 100%
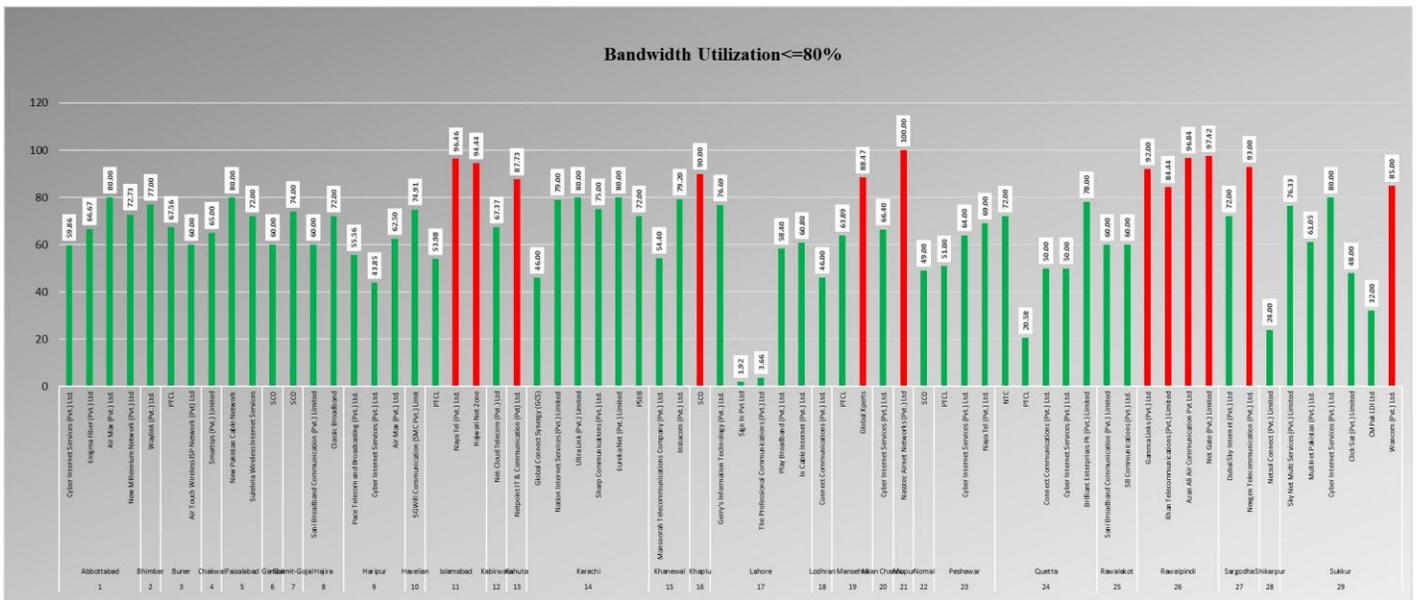
Results

Bandwidth utilization for most of the operators is compiled and is below 80%.

ii.   Network Availability

Network Availability is the measure of the degree to which the network (Access and Core) is operable and not in a state of failure or outage at any point of time.

It measures the total downtime of the network, including the ATM/IP switches, multiplexers, routers, e-mail facilities (if provided) and connection to Internet backbone over a month. All scheduled downtime for the purposes of maintenance and upgrading of the network system will be excluded from the calculation.

Benchmark

Network Availability for:

a) Access Nodes should be > 99% and for;

b) Core Nodes should be > 99.9%

Measurement

Network Availability = (Total operational minutes - Total minutes of service downtime) / (Total operational minutes) x 100%

a) Network Availability – Core Nodes

Core Nodes include BRAS, Metro Ethernet Switches, routers etc. along with their Operational Minutes and Down Time Minutes.

Network Availability Core Nodes >=99.9%

Results

Majority of operators comply with KPI i.e. Network Availability of Core Node. However,

Classic Broadband, Net cloud Telecom and Khan Telecommunications are not complied with KPI's threshold.

b) Network Availability – Access Nodes

Access Nodes include MSAGs/MSANs, DSLAMs, ONUs, etc. along with their Operational Minutes and Down Time Minutes.
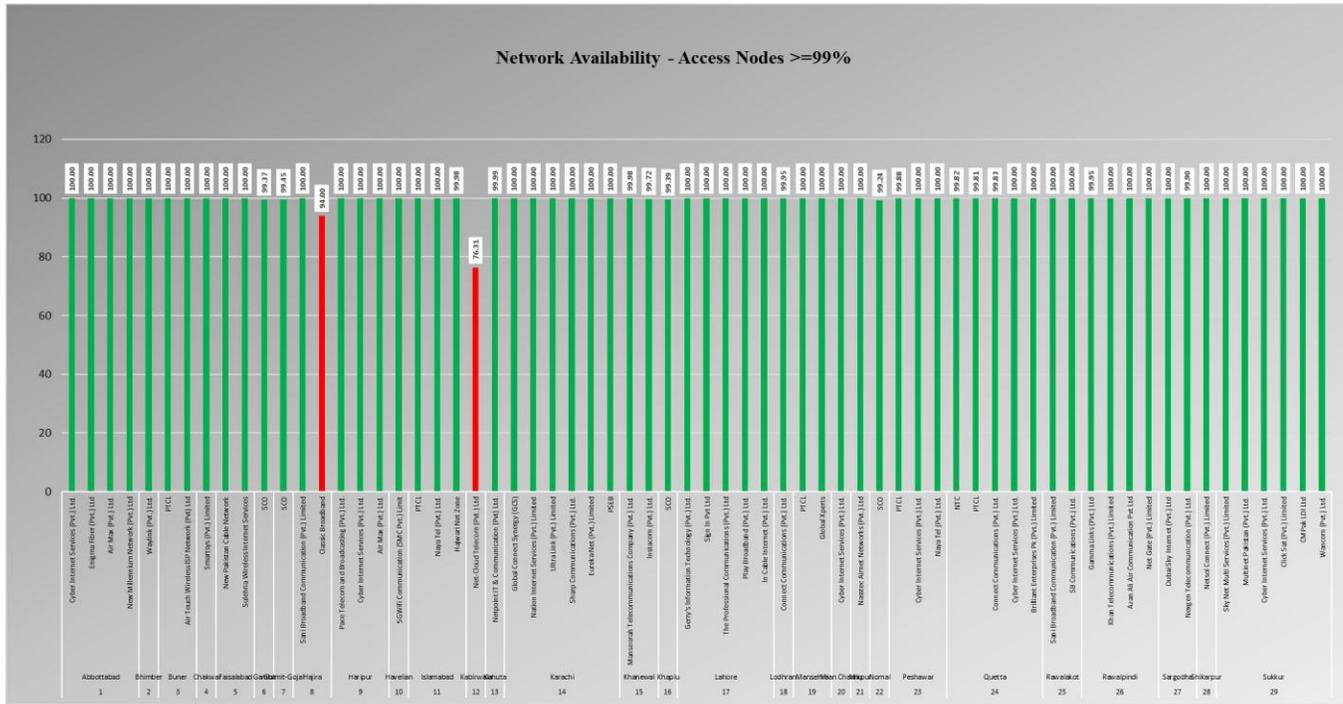
Results

Majority of operators comply with KPI i.e. Network Availability of Access Node. However, Classic Broadband and Net cloud Telecom do not comply with the KPI threshold.

iii. Network Latency / Round Trip Time (RTT)

Latency or Round Trip Time (RTT) is the measure of duration of round trip for a data packet between specific source and destination. It is used to measure the delay on a network at a given time. The greater the latency within a network, the longer it takes packets to reach their destination.

Benchmark

Network Latency in Segment	Threshold
Local Network Latency	=40 msec
International Segment – Terrestrial	=110 msec

Measurement

The RTT test shall be conducted using **"ping"'** based on a minimum standard packet size of 32 bytes, and should be measured up to the edge node of the network, connected to the Internet cloud or any other server decided by the Authority.

a) Round Trip Time (RTT) – Local Network

For calculating the Local Network Latency, obtain IP address of BSP's BRAS and run command "ping xxxx.xxxx.xxxx.xxxx –n 100" in DOS Prompt / mode. (xxxx here refers the IP address of the BRAS).
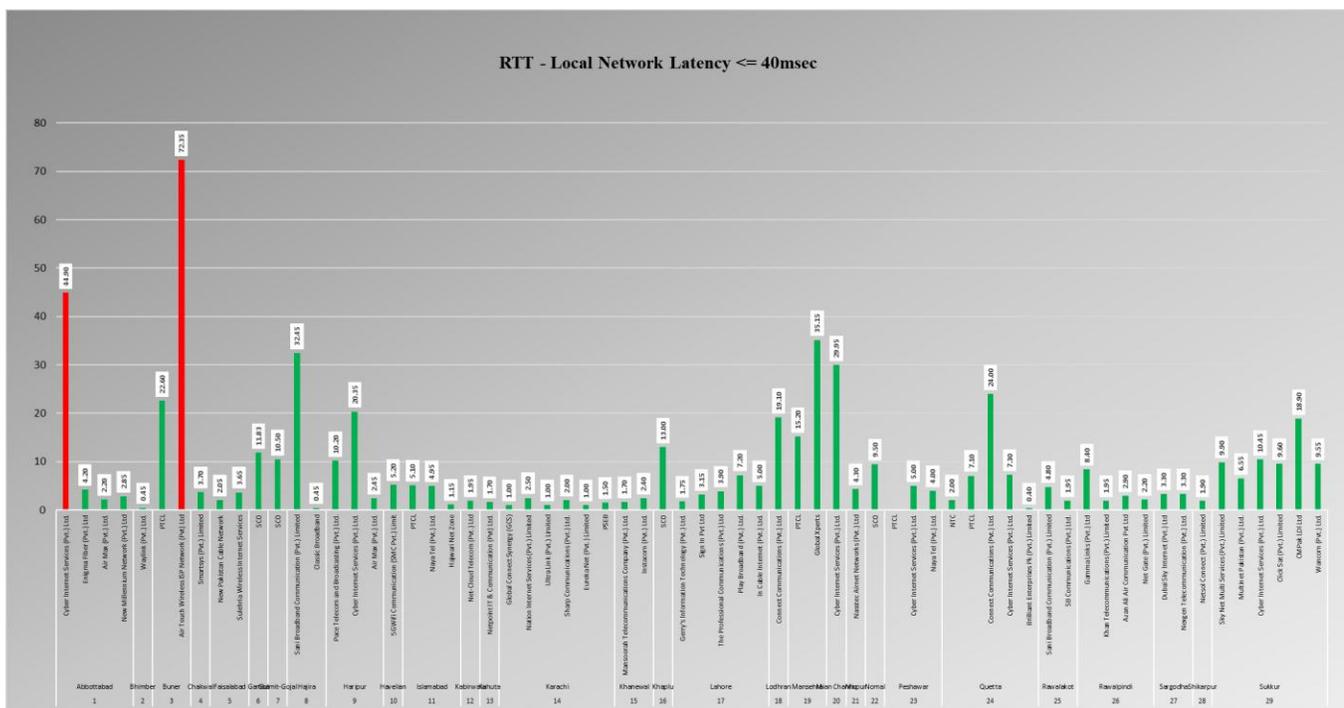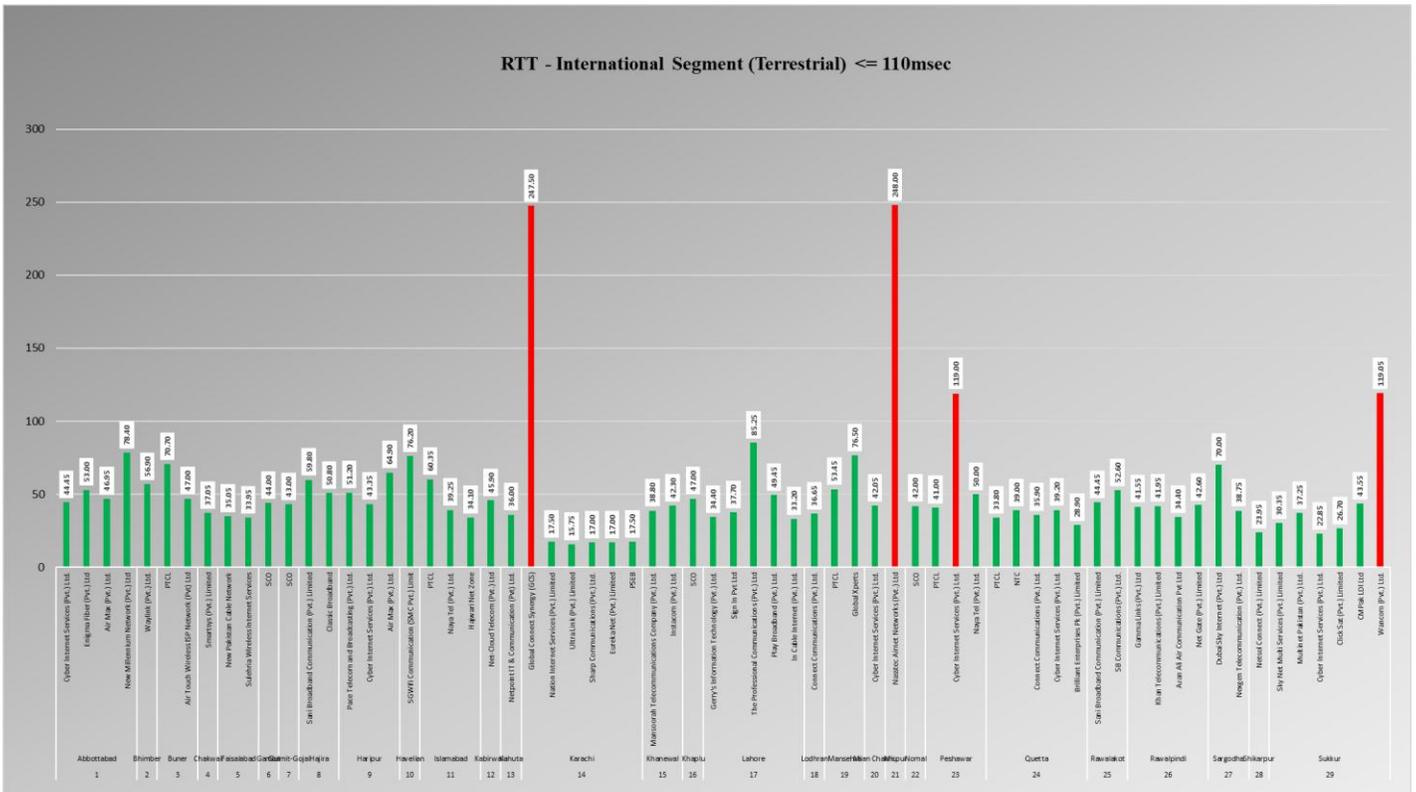

Results

Majority of operators comply with KPI i.e. Round Trip Time for Local Network. However Cyber Net, and Air Touch wireless do not comply with KPI threshold value.

b) Round Trip Time (RTT) – International Segment (Terrestrial)

For Calculating the International Segment – Terrestrial Segment: Run the following command "ping www.google.com –n 100" or any international known server as decided by the PTA team.

RTT - International Segment (Terrestrial) <= 110msec

Results

Majority of operators comply with KPI i.e. Round Trip Time for International Segment (Terrestrial Network). However, Global Connect, Nasstec Airnet, Cybernet and WanCom do not comply and are exceeding their KPI threshold value.

iv. Jitter (msec)

A jitter is a variation in latency. High amounts of jitter cause packets to be delivered out of sequence. In a specific time, window, jitter refers to the variation between the maximum delay and minimum delay.

Benchmark

The Jitter should be **< 15 msec**

Measurement

The Jitter shall be calculated using **'ping'**. The minimum samples shall be 100. If RTT avg is the average RTT, derived out of 100 samples, and RTT 1, RTT 2….RTT 100 are the RTT for individual packets then jitter shall be calculated as follows:

Jitter (msec) = X (RTTavg-RTTk)/100 (magnitude shall be used without *+/-' signs)

Jitter<=15msec
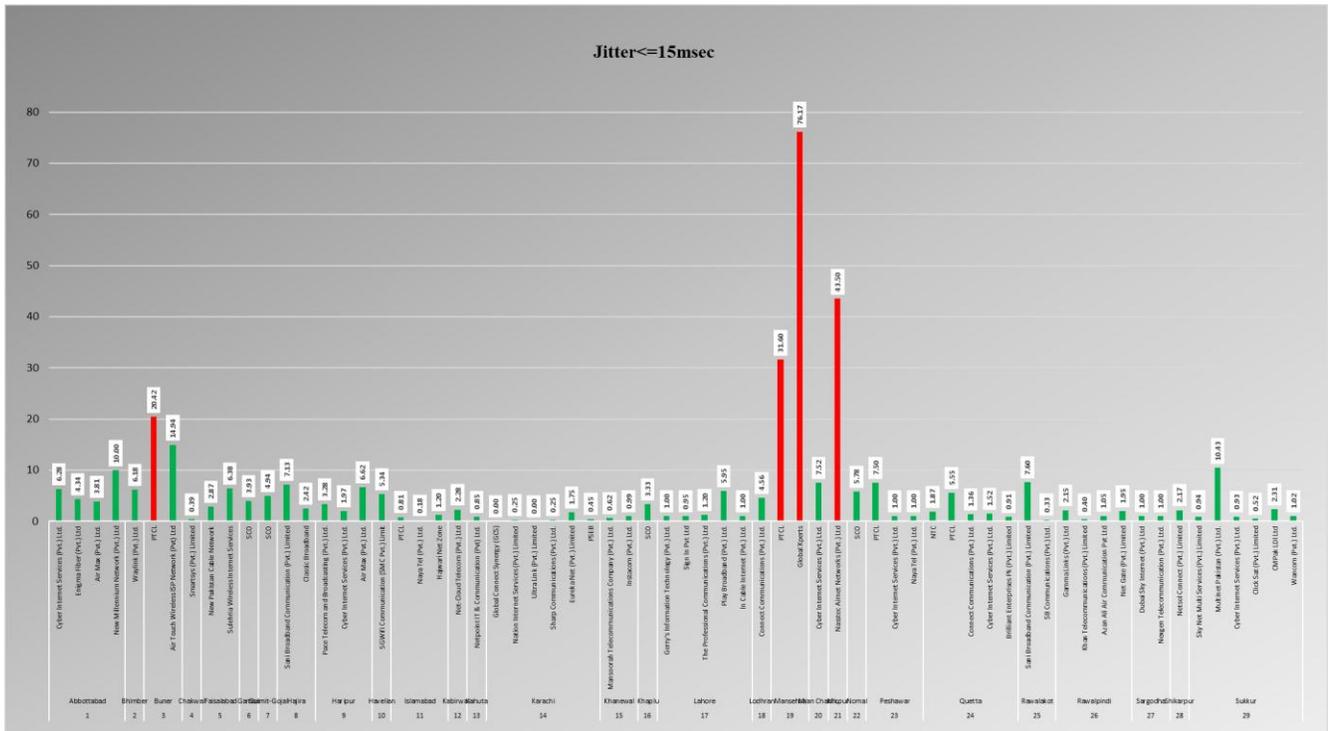
Results

Majority of operators comply with KPI i.e. Jitter. However, PTCL, Global Xperts and Nasstec Airnet do not comply and are exceeding their KPI threshold value.

v. Data Throughput

The download data throughput is the data transmission rate that is achieved for downloading specified test files between a remote web site and a user's computer in order to check the actual download speed available to the subscriber.
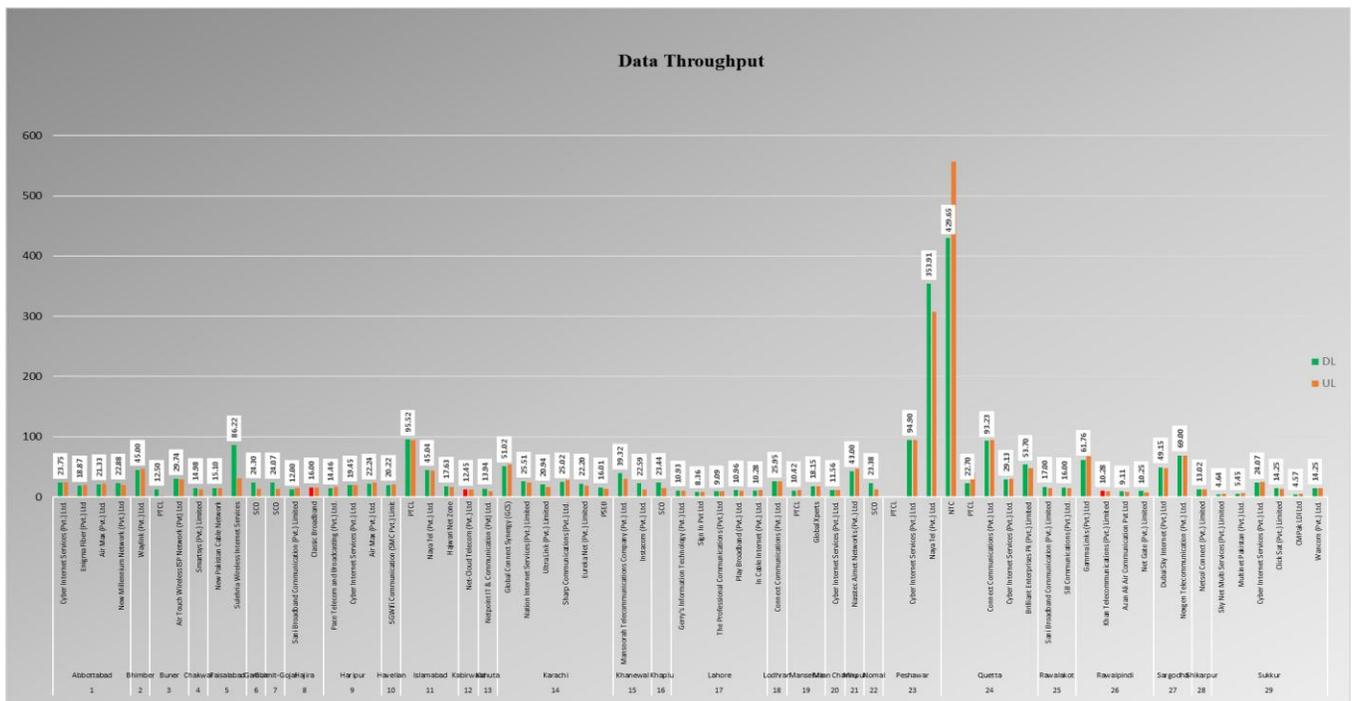
Benchmark

For Fixed Broadband Services checked at network end, the data throughput shall meet the minimum thresholds as defined below:

Download Data Throughput ≥ 4 Mbps

Upload Data Throughput ≥ 2 Mbps

Measurement

Data throughput shall be measured at the network end using standardized throughput testing tools. Measurements shall be conducted during peak & off-peak hours to reflect actual network performance.

Data Throughput

Results

All surveyed operators have met the prescribed Broadband Data Throughput benchmark, and no non-compliance was observed for this KPI.

6. KPIs Analysis

- **Bandwidth Utilization**

  Network of some of BSPs is found to be congested due to high bandwidth utilization especially during peak hours, which results in lower internet speeds for subscribers, affecting overall service quality and user experience.

- **Network Availability**
  - For **Access Nodes**, network availability is below the threshold for Classic Broadband and Net Cloud Telecom.
  - For **Core Nodes**, network availability is below the threshold for Classic Broadband, Net Cloud Telecom and Khan Telecommunication.

- **Latency**
  - On the **local segment**, high latency was observed in the networks of Cyber Net, and Air Touch wireless.

- On the **international segment**, latency was found to be significantly high for Global Connect, Nasstec Airnet, Cybernet and WanCom indicating inefficiencies in international routing and network performance.

- **Jitter**

   High for PTCL, Pace Telecom, Global Xperts and Nasstec Airnet, impacting real-time services such as video conferencing and online gaming.

- **Data Throughput**

   All surveyed operators were found to be compliant with the prescribed Broadband Data Throughput benchmark, with no instances of non-compliance recorded for this KPI.

7. Conclusion

Based on the KPI assessment, it is observed that most Broadband Service Providers (BSPs) are compliant with the prescribed benchmarks for bandwidth utilization, network availability, latency, jitter, and data throughput. The data throughput measurements indicate that all surveyed BSPs meet the minimum throughput requirements as per the broadband definition. Overall bandwidth utilization for the majority of operators remains below the defined threshold of 80%; however, congestion during peak hours has been observed for some BSPs, which adversely affects service quality and user experience.

With respect to **network availability**, while most BSPs meet the required benchmarks, certain operators have failed to comply. Network availability for **core nodes** is below the threshold for Classic Broadband, Net Cloud Telecom, and Khan Telecommunication, whereas **access node availability** remains below the benchmark for Classic Broadband and Net Cloud Telecom, indicating reliability concerns in their networks.

Analysis of **network latency** shows that most BSPs are within acceptable limits. However, elevated local latency has been observed for Cybernet and Air Touch Wireless, while international segment latency exceeds the defined threshold for Global Connect, Nasstec Airnet, Cybernet, and WanCom, suggesting inefficiencies in routing and international connectivity.

Similarly, **jitter performance** is largely compliant across the industry, except for PTCL, Global Xperts, and Nasstec Airnet, where values exceed the benchmark, potentially impacting real-time services.

In view of the above, the non-compliant BSPs have been identified against each KPI parameter. These operators are required to take **appropriate corrective measures**, including capacity augmentation, routing optimization, and improvement of network resilience, to ensure sustained compliance with PTA-defined KPIs and to maintain acceptable quality of service for end users.