Independent Quality of Service Survey in Pakistan – Cities

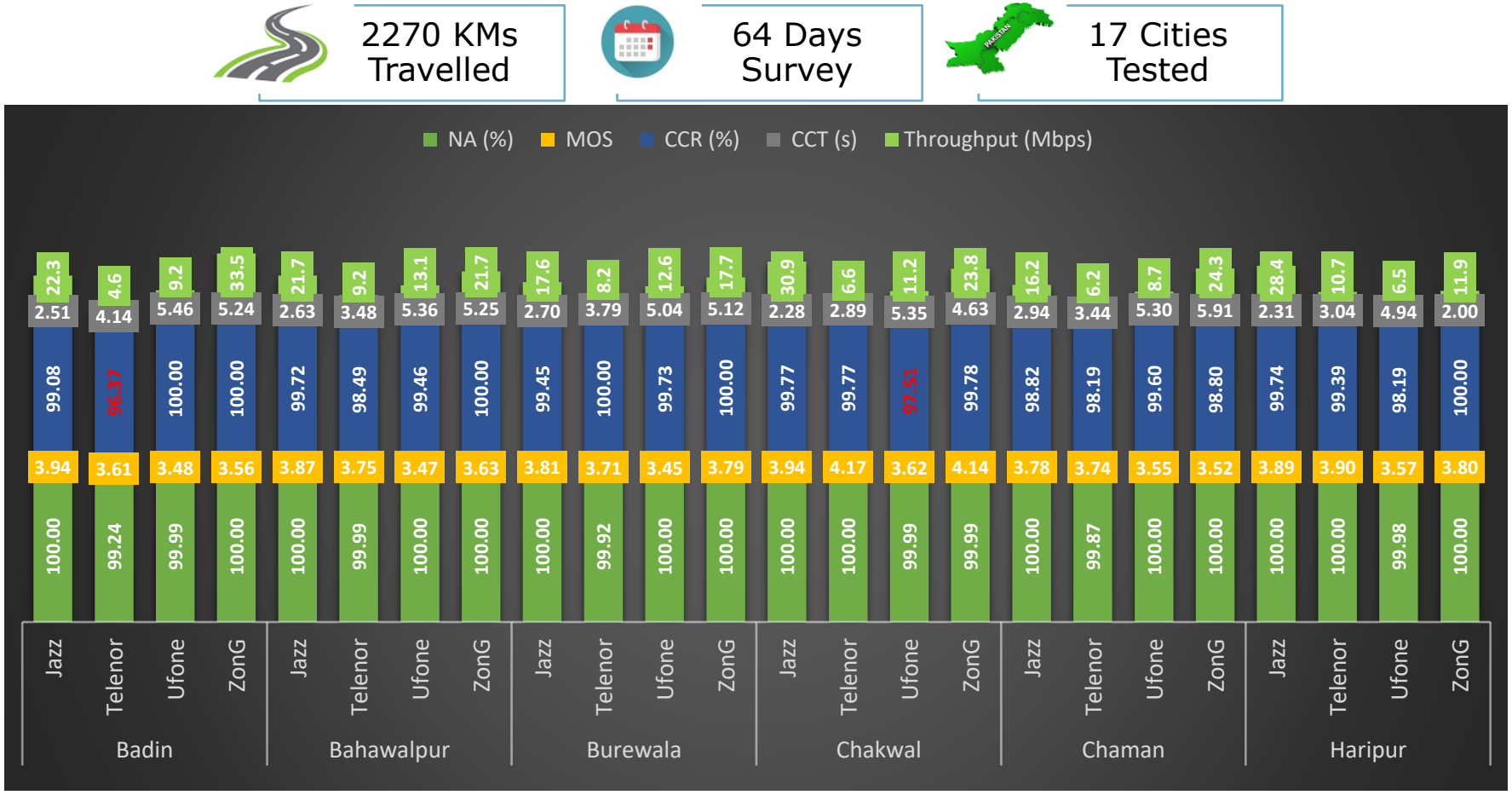
Fourth Quarter 2024

Enforcement Division
PTA | F-5/1, Islamabad

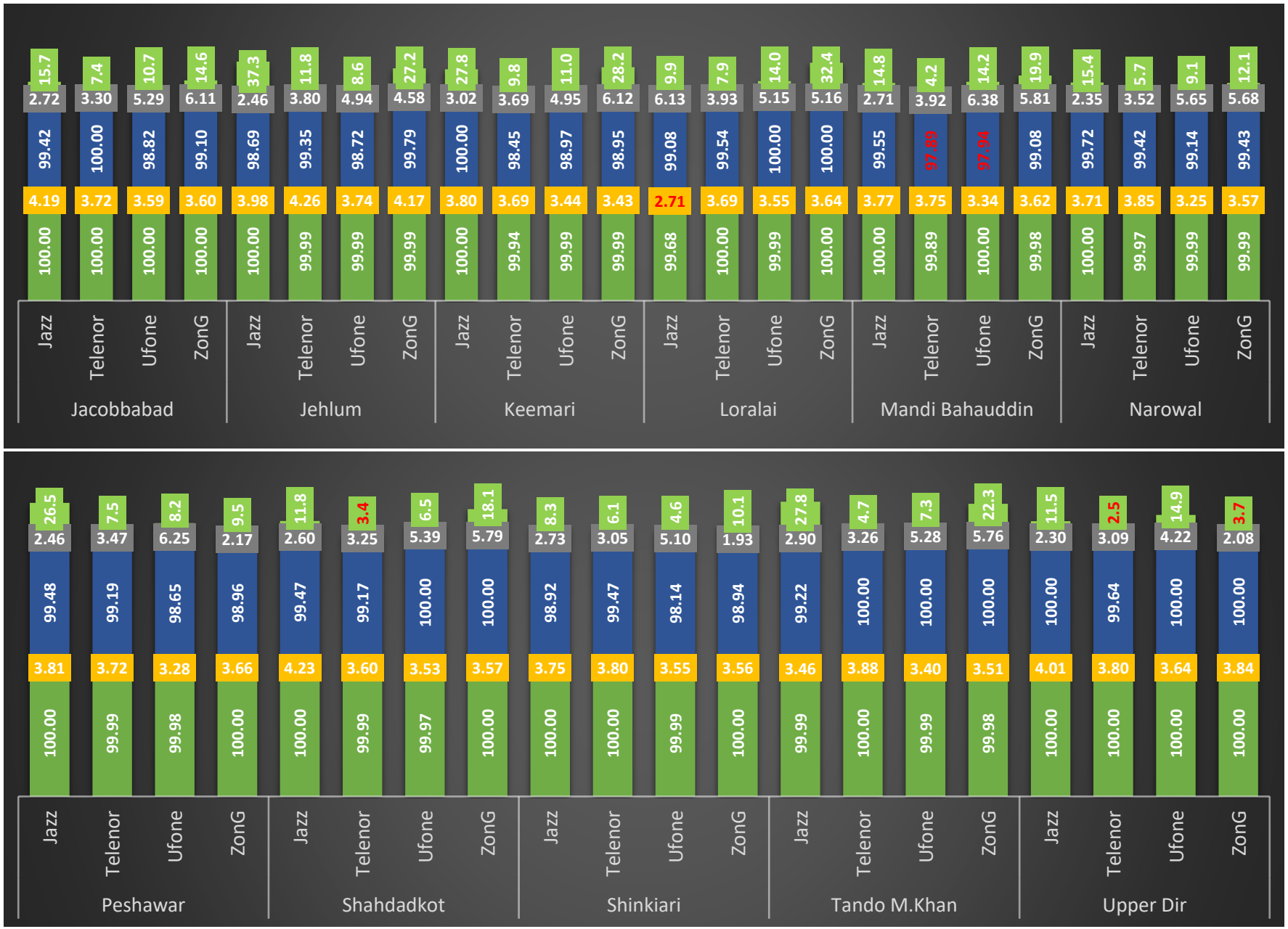
Executive Summary

1. QUALITY OF SERVICE SURVEY

Pakistan Telecommunication Authority (PTA) has carried out independent Quality of Service (QoS) Survey in 17x cities of Pakistan during 4th Quarter 2024. During the survey, the performance of Cellular Mobile Operators (CMOs) has been assessed in accordance with the Cellular Mobile Network QoS Regulations 2021. Survey comprised of approximately 46,000 Voice Calls and SMS while 0.33 million samples were checked to measure the broadband performance of CMOs. Summary of the drive, city wise and overall results are below:



Non-compliant KPIs are highlighted in **Red**



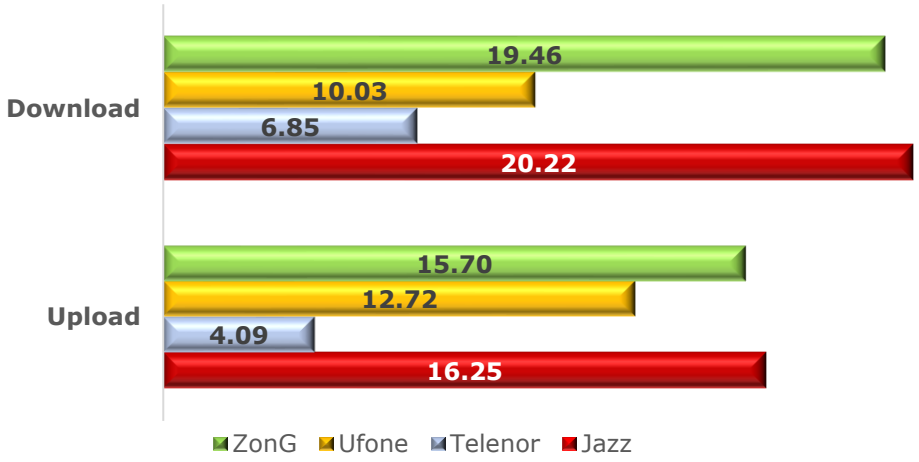
Non-compliant KPIs are highlighted in **Red**

City	Jazz			Telenor			Ufone			ZonG		
	Voice (%)	Data (%)	4G Coverage (%)	Voice (%)	Data (%)	4G Coverage (%)	Voice (%)	Data (%)	4G Coverage (%)	Voice (%)	Data (%)	4G Coverage (%)
Badin	100	75	93.56	50	50	84.71	100	50	99.84	100	75	97.81
Bahawalpur	75	75	97.44	75	75	87.34	100	75	91.00	100	75	97.93
Burewala	100	75	97.75	75	75	78.27	100	75	96.34	100	75	98.55
Chakwal	100	75	96.48	75	75	68.26	75	75	99.59	100	50	98.79
Chaman	100	50	91.88	75	50	65.57	100	50	93.57	100	50	97.29
Haripur	100	75	92.29	75	75	77.18	100	75	97.95	100	50	97.67
Jacobbabad	100	50	89.28	75	75	79.23	100	100	98.54	75	75	96.82
Jehlum	100	75	98.40	75	100	84.03	100	75	97.93	100	75	90.96
Keemari	75	75	82.55	75	75	84.24	75	50	96.73	75	75	93.66
Loralai	50	50	89.56	75	50	88.67	75	50	97.41	100	75	96.14
Mandi Bahauddin	75	75	90.07	50	75	74.82	50	75	95.08	75	75	93.14
Narowal	100	75	88.58	75	50	89.48	75	75	90.70	100	75	91.00
Peshawar	100	75	93.51	100	50	87.83	75	50	90.33	100	50	93.27
Shahdadkot	100	50	94.86	100	50	91.78	100	75	93.50	100	75	97.71
Shinkiari	100	50	93.36	100	50	99.51	100	50	84.39	100	50	94.51
Tando M.Khan	100	75	74.17	100	50	91.58	100	50	94.79	75	75	98.66
Upper Dir	100	50	96.40	100	25	89.62	100	50	99.12	100	25	79.34

Voice compliance is the collective compliance of 4x KPIs i.e. MOS, CCT, CSSR and CCR
Data compliance is the collective compliance of 4x KPIs i.e. Automode Download, Upload, Latency and Webpage Loading Time.

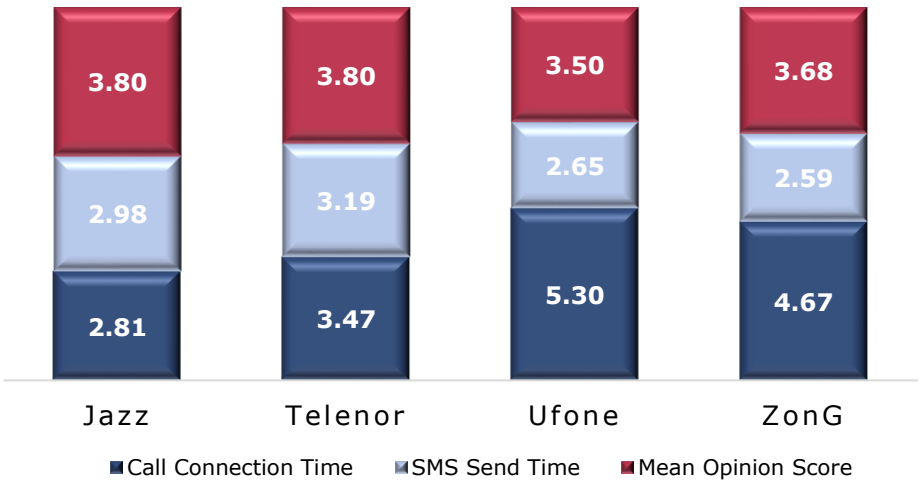
Average Status - Overall Cities

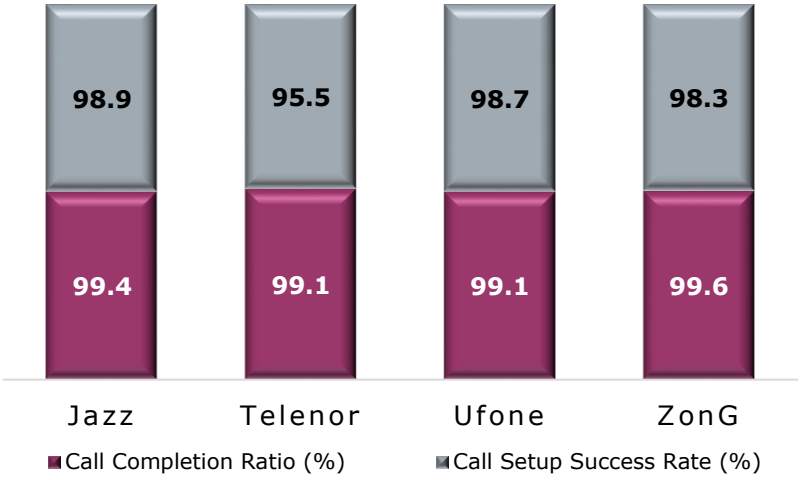
Throughput (Mbps)



Latency (ms)

Jazz	55 ms
Telenor	46 ms
Ufone	39 ms
ZonG	32 ms





2. RANKING

Based upon the compliance level of each KPI in surveyed cities against threshold defined in QoS Regulations, CMOs have been ranked between 1st to 4th position in Mobile Network Coverage, Mobile Broadband, Voice and SMS Services as shown below:

Cellular Mobile Operator	Coverage	Mobile Broadband							Voice	SMS
		Throughput				Latency		Browsing		
		Auto Mode		3rd Party App		Auto Mode	3rd Party App	Auto Mode		
		↓	↑	↓	↑					
Jazz	3rd	1st	2nd	1st	2nd	4th	2nd	1st	1st	4th
Zong 4G	2nd	1st	1st	2nd	1st	3rd	2nd	2nd	1st	1st
Ufone 4G	1st	2nd	3rd	3rd	3rd	1st	1st	4th	2nd	2nd
Telenor	4th	3rd	4th	4th	4th	2nd	1st	3rd	3rd	3rd

Quality of Service Survey

1. KEY PERFORMANCE INDICATORs (KPIs)

All CMOs are required to meet or exceed the benchmark of QoS KPIs as provided as per Cellular Mobile Network Quality of Service (QoS) Regulations 2021. To ensure accurate benchmarking, PTA is collecting and analyzing a statistically significant sample of minimum 200 calls and data sessions, enabling the evaluation of critical performance parameters.

2. SURVEY CITIES

Quality of Service Survey was conducted in 17x cities of Khyber Pakhtunkhwa, Punjab, Sindh and Balochistan during October and December 2024. Survey routes were selected in a manner to cover the maximum population area of the respective surveyed cities. The names of cities along with survey dates are mentioned in Table 1.1: QoS Survey Cities & Dates:

S. #.	City	Province
1	Peshawar	Khyber Pakhtunkhwa
2	Haripur	
3	Shinkiari	
4	Upper Dir	
5	Bahawalpur	Punjab
6	Burewala	
7	Chakwal	
8	Jhelum	
9	Mandi Bahaudin	
10	Narowal	
11	Chaman	Balochistan
12	Loralai	
13	Badin	Sindh
14	Jacobabad	
15	Keemari	
16	Shahdatkot	
17	Tando Muhammad Khan	

Table 1.1: QoS Survey Dates and Samples

3. TEST STATISTICS

During the survey, Quality of Services tests were conducted in the areas of Voice, Mobile Broadband (Throughput, Latency and Web Browsing) and Short Messaging Service (SMS). Service-wise tests conducted for each CMO are shown in Table 2.1: Test Statistics.

Service	Jazz	ZonG	Telenor	Ufone
3rd Party App (Throughput + Latency)	41076	39690	40218	40566
Automode (Throughput + Latency)	25658	25459	25604	25728
Webpage Loading	17634	14259	16349	17327
Voice Calls	5761	5724	5778	5787
SMS	5753	5689	5756	5773

Table 2.1: Test Statistics

4. NETWORK COVERAGE – 4G

During the survey, while conducting data test in technology auto detect mode, 4G/LTE signal strength samples were recorded on survey routes. City wise compliance of 90% Confidence Level of signal strength is shown in Table 4.1: 4G Signal Confidence Level- Technology Auto Detect Mode.

4G Signal Confidence Level- Technology Auto Detect Mode								
City	Confidence Level (%)				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Badin	93.56	**84.71**	99.84	97.81	Yes	**No**	Yes	Yes
Bahawalpur	97.44	**87.34**	91	97.93	Yes	**No**	Yes	Yes
Burewala	97.75	**78.27**	96.34	98.55	Yes	**No**	Yes	Yes
Chakwal	96.48	**68.26**	99.59	98.79	Yes	**No**	Yes	Yes
Chaman	91.88	**65.57**	93.57	97.29	Yes	**No**	Yes	Yes
Jehlum	92.29	**77.18**	97.95	90.96	Yes	**No**	Yes	Yes
Loralai	**89.28**	**79.23**	98.54	96.14	**No**	**No**	Yes	Yes
Peshawar	98.40	**84.03**	97.93	93.27	Yes	**No**	Yes	Yes
Tando M. Khan	**82.55**	**84.24**	96.73	98.66	**No**	**No**	Yes	Yes
Jacobbabad	90.06	**88.67**	97.41	96.82	Yes	**No**	Yes	Yes
Shahdadkot	90.07	**74.82**	95.08	97.71	Yes	**No**	Yes	Yes
Mandi Bahauddin	**88.58**	**89.48**	90.70	93.14	**No**	**No**	Yes	Yes
Narowal	93.51	**87.83**	90.33	91.00	Yes	**No**	Yes	Yes
Keemari	94.86	91.78	93.50	93.66	Yes	Yes	Yes	Yes
Upper Dir	93.36	99.51	**84.39**	**79.34**	Yes	Yes	**No**	**No**
Shinkiari	**74.17**	91.58	94.79	94.51	**No**	Yes	Yes	Yes
Haripur	96.40	**89.62**	99.12	97.67	Yes	**No**	Yes	Yes
N/A indicates 4G services not available.								

Table 4.1: 4G Signal Confidence Level 90%- Technology Auto Detect Mode

5. NETWORK COVERAGE – 3G

During the survey, 3G signal strength samples were also recorded on survey routes, wherever network switched to 3G while keeping the mobile handset in technology auto detect mode. City wise compliance of 90% Confidence Level of signal strength is shown in Table 5.1: 3G Signal Confidence Level - Technology Auto Detect Mode.

3G Signal Confidence Level - Technology Auto Detect Mode								
City	Confidence Level (%)				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Badin	N/A	100	N/A	N/A	N/A	Yes	N/A	N/A
Bahawalpur	N/A	90.97	**73.56**	N/A	N/A	Yes	**No**	N/A
Burewala	N/A	100	100	N/A	N/A	Yes	Yes	N/A
Chakwal	N/A	N/A	100	100	N/A	N/A	Yes	Yes
Chaman	N/A	**73.55**	99.03	100	N/A	**No**	Yes	Yes
Jehlum	100	100	100	N/A	Yes	Yes	Yes	N/A
Loralai	99.81	100	N/A	N/A	Yes	Yes	N/A	N/A
Peshawar	N/A	100	100	100	N/A	Yes	Yes	Yes
Tando M. Khan	N/A	N/A	100	N/A	N/A	N/A	Yes	N/A
Jacobbabad	N/A	100	100	N/A	N/A	Yes	Yes	N/A
Shahdadkot	N/A	100	100	100	N/A	Yes	Yes	Yes
Mandi Bahauddin	N/A	N/A	100	100	N/A	N/A	Yes	Yes
Narowal	100	100	99.25	93.18	Yes	Yes	Yes	Yes
Keemari	N/A	**55.96**	N/A	**72.32**	N/A	**No**	N/A	**No**
Upper Dir	N/A	N/A	99.99	99.90	N/A	N/A	Yes	Yes
Shinkiari	100	94.01	99.94	100	Yes	Yes	Yes	Yes
Haripur	N/A	100	100	100	N/A	Yes	Yes	Yes
N/A indicates services did not fallback to 3G and remained connected to 4G services.								

Table 5.1: 3G Signal Confidence Level - Technology Auto Detect Mode

6. MOBILE BROADBAND SERVICE – DATA SPEED

Automode Testing. In order to measure the performance of Mobile Broadband Services, Data Download and Upload tests were performed. During the test, a File of 10GB was downloaded and uploaded for 3 minutes duration. The Download and Upload Speed Results are shown in Table 6.1: Download Data Throughput and Table 6.2: Upload Data Throughput.

Download Data Throughput >4Mbps								
City	Download Data Throughput [Mbps]				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Badin	22.34	4.60	9.23	33.51	Second	Fourth	Third	First
Bahawalpur	21.67	9.19	13.08	21.65	First	Fourth	Third	Second
Burewala	17.64	8.21	12.57	17.68	Second	Fourth	Third	First
Chakwal	30.91	6.63	11.21	23.81	First	Fourth	Third	Second
Chaman	16.16	6.17	8.74	24.28	Second	Fourth	Third	First
Jehlum	37.34	11.82	8.64	27.15	First	Third	Fourth	Second
Loralai	9.89	7.89	14.02	32.37	Third	Fourth	Second	First
Peshawar	26.53	7.53	8.24	9.45	First	Fourth	Third	Second
Tando M. Khan	27.77	4.71	7.31	22.33	First	Fourth	Third	Second
Jacobbabad	15.69	7.37	10.66	14.57	First	Fourth	Third	Second
Shahdadkot	11.76	**3.37**	6.51	18.09	Second	**Fourth**	Third	First
Mandi Bahauddin	14.75	4.15	14.16	19.88	Second	Fourth	Third	First
Narowal	15.39	5.72	9.11	12.12	First	Fourth	Third	Second
Keemari	27.81	9.82	11.03	28.18	Second	Fourth	Third	First
Upper Dir	11.46	**2.45**	14.93	**3.71**	Second	**Fourth**	First	**Third**

Download Data Throughput >4Mbps								
Shinkiari	8.32	6.13	4.60	10.13	Second	Third	Fourth	First
Haripur	28.36	10.70	6.46	11.89	First	Third	Fourth	Second

Table 6.1: Download Data Throughput

Upload Data Throughput ≥ 1Mbps								
City	Upload Data Throughput [Mbps]				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Badin	17.83	2.10	12.56	23.75	Second	Fourth	Third	First
Bahawalpur	14.64	4.24	13.49	16.66	Second	Fourth	Third	First
Burewala	15.90	3.45	12.46	14.68	First	Fourth	Third	Second
Chakwal	20.53	4.76	15.06	20.05	First	Fourth	Third	Second
Chaman	17.60	3.80	11.57	17.98	Second	Fourth	Third	First
Jehlum	20.47	5.49	14.11	19.26	First	Fourth	Third	Second
Loralai	11.66	2.41	13.59	20.28	Third	Fourth	Second	First
Peshawar	19.59	5.03	12.14	5.41	First	Fourth	Second	Third
Tando M. Khan	15.90	2.72	6.31	18.12	Second	Fourth	Third	First
Jacobbabad	15.03	3.11	15.18	18.97	Third	Fourth	Second	First
Shahdadkot	13.02	1.48	11.08	19.87	Second	Fourth	Third	First
Mandi Bahauddin	14.75	4.15	14.16	19.88	Second	Fourth	Third	First
Narowal	14.55	5.35	12.15	20.54	Second	Fourth	Third	First
Keemari	24.03	5.69	15.16	17.90	First	Fourth	Third	Second
Upper Dir	9.27	2.06	12.92	2.57	Second	Fourth	First	Third
Shinkiari	10.65	6.25	10.87	5.73	Second	Third	First	Fourth
Haripur	20.77	7.37	13.51	5.18	First	Third	Second	Fourth

Table 6.2: Upload Data Throughput

3rd Party Application. Upload and Download Throughputs were tested using a 3rd Party Network Testing Application. The Download and Upload Speed Results are shown in Table 6.3: Download Data Throughput and Table 6.4: Upload Data Throughput respectively.

3rd Party App Download Data Throughput >4Mbps								
City	Download Data Throughput [Mbps]				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Badin	29.06	7.08	9.39	48.21	Second	Fourth	Third	First
Bahawalpur	41.24	13.66	18.80	34.09	First	Fourth	Third	Second
Burewala	30.52	12.97	21.20	27.37	First	Fourth	Third	Second
Chakwal	47.03	7.16	14.64	41.52	First	Fourth	Third	Second
Chaman	23.46	8.59	13.44	27.35	Second	Fourth	Third	First
Jehlum	54.87	12.84	12.72	41.02	First	Third	Fourth	Second
Loralai	16.17	10.05	17.29	48.64	Third	Fourth	Second	First
Peshawar	39.24	7.48	10.87	13.07	First	Fourth	Third	Second
Tando M. Khan	32.36	6.27	11.19	35.37	Second	Fourth	Third	First
Jacobbabad	31.82	9.70	12.81	25.80	First	Fourth	Third	Second
Shahdadkot	20.58	4.86	10.19	28.59	Second	Fourth	Third	First
Mandi Bahauddin	41.42	4.30	15.26	29.09	First	Fourth	Third	Second
Narowal	34.02	5.77	15.09	28.64	First	Fourth	Third	Second
Keemari	32.57	10.72	11.80	32.78	Second	Fourth	Third	First
Upper Dir	15.994	4.897	18.095	3.054	Second	Third	First	Fourth
Shinkiari	18.99	7.27	9.44	16.92	First	Fourth	Third	Second
Haripur	41.63	12.48	9.28	10.82	First	Second	Fourth	Third

Table 6.3: 3rd Party App Download Data Throughput

3rd Party App Upload Data Throughput ≥ 1Mbps								
City	Upload Data Throughput [Mbps]				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Badin	21.07	3.29	13.87	29.48	Second	Fourth	Third	First
Bahawalpur	20.44	4.67	16.41	24.88	Second	Fourth	Third	First
Burewala	18.57	4.50	15.96	22.10	Second	Fourth	Third	First
Chakwal	24.83	5.32	15.55	35.18	Second	Fourth	Third	First
Chaman	13.05	4.39	16.16	14.14	Third	Fourth	First	Second
Jehlum	24.32	7.66	14.16	25.68	Second	Fourth	Third	First
Loralai	17.08	3.59	9.46	28.73	Second	Fourth	Third	First
Peshawar	26.88	5.28	11.01	6.12	First	Fourth	Second	Third
Tando M. Khan	17.15	3.98	12.76	23.85	Second	Fourth	Third	First
Jacobbabad	22.70	3.20	17.39	24.37	Second	Fourth	Third	First
Shahdadkot	16.02	1.30	14.10	26.02	Second	Fourth	Third	First
Mandi Bahauddin	21.53	4.67	15.98	24.81	Second	Fourth	Third	First
Narowal	23.15	5.76	14.89	28.39	Second	Fourth	Third	First
Keemari	25.57	5.46	20.24	21.38	First	Fourth	Third	Second
Upper Dir	13.002	2.953	12.938	1.725	First	Third	Second	Fourth
Shinkiari	17.38	6.82	10.48	7.04	First	Fourth	Second	Third
Haripur	26.23	8.06	11.08	4.08	First	Third	Second	Fourth
N/A indicates 3G/4G services not available.								

Table 6.4: 3rd Party App Upload Data Throughput

7. MOBILE BROADBAND SERVICE – LATENCY

Latency, while not a traditional KPI (non-service KPI), is a vital metric for Mobile Broadband Performance, as it directly affects user experience. During the survey, Network Latency was measured by calculating the ping between different websites and 3rd Party Test servers. Results are shown in Table 7.1: Automode Latency and Table 7.2: 3rd Party App Latency.

Latency In Automode Testing								
City	Latency [milliseconds]				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Badin	**101**	**132**	**97**	**83**	**No**	**No**	**No**	**No**
Bahawalpur	**119**	**106**	**92**	**80**	**No**	**No**	**No**	**No**
Burewala	**121**	**121**	**108**	**104**	**No**	**No**	**No**	**No**
Chakwal	**89**	**100**	74	**109**	**No**	**No**	Yes	**No**
Chaman	**99**	**83**	**132**	**115**	**No**	**No**	**No**	**No**
Jehlum	**87**	69	69	69	**No**	Yes	Yes	Yes
Loralai	**560**	**109**	**148**	**93**	**No**	**No**	**No**	**No**
Peshawar	**90**	**90**	**97**	**135**	**No**	**No**	**No**	**No**
Tando M. Khan	**97**	**92**	**79**	**108**	**No**	**No**	**No**	**No**
Jacobbabad	**104**	**94**	74	**80**	**No**	**No**	Yes	**No**
Shahdadkot	**112**	**115**	**113**	**91**	**No**	**No**	**No**	**No**
Mandi Bahauddin	**135**	**95**	**94**	**86**	**No**	**No**	**No**	**No**
Narowal	**151**	**77**	**110**	**92**	**No**	**No**	**No**	**No**
Keemari	**91**	69	**87**	**77**	**No**	Yes	**No**	**No**
Upper Dir	**148**	**108**	**110**	**336**	**No**	**No**	**No**	**No**
Shinkiari	**150**	**78**	**109**	**178**	**No**	**No**	**No**	**No**
Haripur	**79**	72	73	**254**	**No**	Yes	Yes	**No**

Table 7.1: Automode Latency

Latency in 3rd Party App Testing								
City	Latency [milliseconds]				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Badin	32	52	31	27	Yes	Yes	Yes	Yes
Bahawalpur	28.6	59.3	64.3	23.3	Yes	Yes	Yes	Yes
Burewala	32.0	70.8	60.0	25.9	Yes	Yes	Yes	Yes
Chakwal	27.1	50.0	24.4	17.7	Yes	Yes	Yes	Yes
Chaman	31.8	58.2	51.4	31.4	Yes	Yes	Yes	Yes
Jehlum	27.8	35.4	31.7	20.5	Yes	Yes	Yes	Yes
Loralai	**431.5**	61.5	62.6	46.1	**No**	Yes	Yes	Yes
Peshawar	32.1	42.3	27.2	23.6	Yes	Yes	Yes	Yes
Tando M. Khan	27	44	30	24	Yes	Yes	Yes	Yes
Jacobbabad	33.8	38.2	34.7	**82.9**	Yes	Yes	Yes	**No**
Shahdadkot	34.5	46.8	41.8	25.9	Yes	Yes	Yes	Yes
Mandi Bahauddin	42.8	39.2	43.5	25.7	Yes	Yes	Yes	Yes
Narowal	43.6	28.9	51.4	20.3	Yes	Yes	Yes	Yes
Keemari	25	36	24	18	Yes	Yes	Yes	Yes
Upper Dir	32.4	58.7	25.2	44.5	Yes	Yes	Yes	Yes
Shinkiari	26.7	30.7	32.6	49.5	Yes	Yes	Yes	Yes
Haripur	21.0	23.5	28.3	32.6	Yes	Yes	Yes	Yes

Table 7.2: 3rd Party App Latency

8. MOBILE BROADBAND SERVICE – WEB PAGE LOADING

Web Page Loading Time is an important Quality of Experience (QoE) metric, which, although not a traditional service KPI (non-service), provides valuable insights into the performance of CMOs in delivering seamless web browsing experiences. Results of testing are shown in Table 8.1: Web Page Loading Time.

Webpage Loading Time in Technology Auto Detect Mode								
City	Webpage Loading Time [seconds]				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Badin	3.97	**5.49**	**5.51**	3.04	Yes	**No**	**No**	Yes
Bahawalpur	0.52	0.08	0.10	0.09	Yes	Yes	Yes	Yes
Burewala	0.41	0.09	0.06	0.12	Yes	Yes	Yes	Yes
Chakwal	0.57	0.12	**8.01**	**6.24**	Yes	Yes	**No**	**No**
Chaman	**5.16**	**7.45**	**6.86**	**5.28**	**No**	**No**	**No**	**No**
Jehlum	0.57	0.11	**7.58**	**5.86**	Yes	Yes	**No**	**No**
Loralai	**5.66**	**7.11**	**7.37**	4.35	**No**	**No**	**No**	Yes
Peshawar	4.99	**7.27**	**7.05**	**7.20**	Yes	**No**	**No**	**No**
Tando M. Khan	4.84	**5.64**	**5.75**	4.47	Yes	**No**	**No**	Yes
Jacobbabad	**5.74**	0.09	0.08	0.63	**No**	Yes	Yes	Yes
Shahdadkot	**5.60**	0.12	0.10	0.65	**No**	Yes	Yes	Yes
Mandi Bahauddin	0.44	0.11	0.10	0.12	Yes	Yes	Yes	Yes
Narowal	3.82	**6.66**	1.28	4.09	Yes	**No**	Yes	Yes
Keemari	3.97	**5.18**	**5.15**	3.87	Yes	**No**	**No**	Yes
Upper Dir	**7.09**	**7.48**	**7.08**	**7.40**	**No**	**No**	**No**	**No**
Shinkiari	**7.07**	**8.03**	**8.05**	**6.79**	**No**	**No**	**No**	**No**
Haripur	4.94	**7.02**	**7.27**	**6.70**	Yes	**No**	**No**	**No**
N/A indicates 3G/4G services not available.								

Table 8.1: Web Page Loading Time

9. VOICE SERVICE

5 x QoS KPIs (i.e. Network Accessibility, Call Setup Success Rate, Call Setup Time, Call Completion Rate and Mean Opinion Score) have been measured while testing voice services in the surveyed cities. Compliance in each surveyed city is shown in Table 9.1: Voice QoS KPIs Compliance Level, Table 9.2: Voice QoS KPIs Compliance Level and Table 9.3: Voice QoS KPIs Compliance Level

CMO	KPI	Badin	Bahawalpur	Burewala	Chakwal	Chaman	Jehlum
Jazz	NA	100%	100%	100%	100%	100%	100%
	CSSR	100%	**97.58%**	98.39%	99.78%	100%	98.71%
	CCT	2.51	2.63	2.70	2.28	2.94	2.46
	CCR	99.08%	99.72%	99.45%	99.77%	98.82%	98.69%
	MOS	3.94	3.87	3.81	3.94	3.78	3.98
Telenor	NA	99.24%	99.99%	99.92%	100%	99.87%	99.99%
	CSSR	**90.19%**	**93.00%**	**93.67%**	**97.96%**	**88.40%**	**97.45%**
	CCT	4.14	3.48	3.79	2.89	3.44	3.80
	CCR	**96.37%**	98.49%	100.00%	99.77%	98.19%	99.35%
	MOS	3.61	3.75	3.71	4.17	3.74	4.26
Ufone	NA	99.99%	100%	100%	99.99%	100%	99.99%
	CSSR	99.55%	99.73%	99.73%	98.22%	100%	98.95%
	CCT	5.46	5.36	5.04	5.35	5.30	4.94
	CCR	100%	99.46%	99.73%	**97.51%**	99.60%	98.72%
	MOS	3.48	3.47	3.45	3.62	3.55	3.74
ZonG	NA	100%	100%	100%	99.99%	100%	99.99%
	CSSR	100%	99.16%	98.92%	99.55%	98.04%	98.74%
	CCT	5.24	5.25	5.12	4.63	5.91	4.58
	CCR	100%	100%	100%	99.78%	98.80%	99.79%
	MOS	3.56	3.63	3.79	4.14	3.52	4.17
** Note Voice QoS KPIs: Network Accessibility (NA), Call Setup Success Rate (CSSR), Call Connection Time (CCT), Call Completion Ratio (CCR), Mean Opinion Score (MOS) *Non-Compliant KPI's are highlighted"*							

Table 9.1: Voice QoS KPIs Compliance Level

CMO	KPI	Loralai	Peshawar	T. M.Khan	Jacobbabad	Shahdadkot	Mandi Bahaudin
Jazz	NA	99.68%	100%	99.99%	100%	100%	100%
	CSSR	**97.31%**	99.74%	99.61%	99.71%	100%	98.00%
	CCT	6.13	2.46	2.90	2.72	2.60	2.71
	CCR	99.08%	99.48%	99.22%	99.42%	99.47%	99.55%
	MOS	**2.71**	3.81	3.46	4.19	4.23	3.77
Telenor	NA	100%	99.99%	100%	100%	99.99%	99.89%
	CSSR	**96.88%**	98.14%	99.62%	**95.65%**	98.90%	**94.04%**
	CCT	3.93	3.47	3.26	3.30	3.25	3.92
	CCR	99.54%	99.19%	100%	100%	99.17%	**97.89%**
	MOS	3.69	3.72	3.88	3.72	3.60	3.75
Ufone	NA	99.99%	99.98%	99.99%	100%	99.97%	100%
	CSSR	**97.31%**	**97.37%**	99.23%	98.84%	98.66%	**96.89%**
	CCT	5.15	6.25	5.28	5.29	5.39	6.38
	CCR	100%	98.65%	100%	98.82%	100%	**97.94%**
	MOS	3.55	3.28	3.40	3.59	3.53	3.34

CMO	KPI	Loralai	Peshawar	T. M.Khan	Jacobbabad	Shahdadkot	Mandi Bahaudin
ZonG	NA	100%	100%	99.98%	100%	100%	99.98%
	CSSR	100%	99.48%	**95.04%**	**97.09%**	98.13%	**96.23%**
	CCT	5.16	2.17	5.76	6.11	5.79	5.81
	CCR	100%	98.96%	100%	99.10%	100%	99.08%
	MOS	3.64	3.66	3.51	3.60	3.57	3.62
** Note Voice QoS KPIs: Network Accessibility (NA), Call Setup Success Rate (CSSR), Call Connection Time (CCT), Call Completion Ratio (CCR) , Mean Opinion Score (MOS) *Non-Compliant KPI's are highlighted"*							

Table 9.2: Voice QoS KPIs Compliance Level

CMO	KPI	Narowal	Keemari	Upper Dir	Shinkiari	Haripur
Jazz	NA	100%	100%	100%	100%	100%
	CSSR	98.87%	**97.50%**	98.93%	98.66%	99.24%
	CCT	2.35	3.02	2.30	2.73	2.31
	CCR	99.72%	100%	100%	98.92%	99.74%
	MOS	3.71	3.80	4.01	3.75	3.89
Telenor	NA	99.97%	99.94%	100%	100%	100%
	CSSR	**96.66%**	**96.04%**	98.23%	98.94%	**90.16%**
	CCT	3.52	3.69	3.09	3.05	3.04
	CCR	99.42%	98.45%	99.64%	99.47%	99.39%
	MOS	3.85	3.69	3.8	3.80	3.90
Ufone	NA	99.99%	99.99%	100%	99.99%	99.98%
	CSSR	**97.48%**	**97.50%**	99.65%	99.47%	98.47%
	CCT	5.65	4.95	4.22	5.10	4.94
	CCR	99.14%	98.97%	100%	98.14%	98.19%
	MOS	3.25	3.44	3.64	3.55	3.57
ZonG	NA	99.99%	99.99%	100%	100%	100%
	CSSR	98.04%	**94.06%**	100%	99.73%	99.50%
	CCT	5.68	6.12	2.08	1.93	2.00
	CCR	99.43%	98.95%	100%	98.94%	100%
	MOS	3.57	3.43	3.84	3.56	3.80
** Note Voice QoS KPIs: Network Accessibility (NA), Call Setup Success Rate (CSSR), Call Connection Time (CCT), Call Completion Ratio (CCR) , Mean Opinion Score (MOS) *Non-Compliant KPI's are highlighted"*						

Table 9.3: Voice QoS KPIs Compliance Level

10. SMS SERVICE

2 x SMS QoS KPIs (i.e. Success Rate and Delivery Time) have been measured while testing SMS services in the surveyed cities. The compliance in each surveyed city is shown in Table 10.1: SMS QoS KPIs Compliance Level.

Operator	**Jazz**		**Telenor**		**Ufone**		**ZonG**	
SMS KPI	**SR**	**DT**	**SR**	**DT**	**SR**	**DT**	**SR**	**DT**
Badin	Yes	Yes	**No**	Yes	Yes	Yes	Yes	Yes
Bahawalpur	Yes	Yes	Yes	Yes	Yes	Yes	**No**	Yes
Burewala	Yes	Yes	**No**	Yes	**No**	Yes	**No**	Yes
Chakwal	**No**	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chaman	**No**	Yes	**No**	Yes	Yes	Yes	**No**	Yes
Jehlum	**No**	Yes	**No**	Yes	Yes	Yes	Yes	Yes
Loralai	**No**	Yes	**No**	Yes	**No**	Yes	Yes	Yes

Peshawar	Yes	Yes	**No**	Yes	**No**	Yes	Yes	Yes
Tando M. Khan	Yes	Yes	Yes	Yes	**No**	Yes	Yes	Yes
Jacobbabad	**No**	Yes	Yes	Yes	Yes	Yes	**No**	Yes
Shahdadkot	**No**	Yes	Yes	Yes	**No**	Yes	Yes	Yes
Mandi Bahauddin	**No**	Yes	**No**	Yes	**No**	Yes	**No**	Yes
Narowal	**No**	Yes	**No**	Yes	**No**	Yes	**No**	Yes
Keemari	**No**	Yes	**No**	Yes	Yes	Yes	**No**	Yes
Upper Dir	**No**	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shinkiari	**No**	Yes	Yes	Yes	**No**	Yes	Yes	Yes
Haripur	**No**	Yes	**No**	Yes	**No**	Yes	Yes	Yes
**SMS QoS KPIs: Success Rate (SR), Delivery Time (DT)*								

Table 10.1: SMS QoS KPIs Compliance Level

11. SURVEY STANDING - MOBILE NETWORK COVERAGE

The categorization of CMOs in Mobile Network Coverage i.e. Signal Strength of 4G/LTE and 3G Networks (in case of fallback) measured in Technology Auto Detect Mode is shown in Table 11.1: CMOs Standing in Mobile Network Coverage – Technology Auto Detect.

	Operator	**Compliance Level – Number of Cities Technology Auto Detect Mode**						**Standing**
		Compliant			**Non-Compliant**			
		4G	**3G**	**Total**	**4G**	**3G**	**Total**	
1.	Ufone	16	13	29	1	1	2	1st
2.	ZonG	16	9	25	1	1	2	2nd
3.	Jazz	13	4	17	4	0	4	3rd
4.	Telenor	3	11	14	14	2	16	4th

Table 11.1: CMOs Standing in Mobile Network Coverage – Technology Auto Detect Mode

12. SURVEY STANDING - MOBILE BROADBAND SERVICE

The categorization of each CMOs in Mobile Broadband Service is as under:

i. Download Data Throughput (Auto Mode). The Download Data Throughput, as per the highest to lowest obtained results, is shown in Table 12.1: CMOs Standing in Download Data Throughput – Auto Mode Testing.

S. #	**Operator**	**Highest Download Throughput – Number of Cities (Automode)**				**Standing**
		1st	**2nd**	**3rd**	**4th**	
1.	ZonG	8	8	1	-	1st
2.	Jazz	8	8	1	-	1st
3.	Ufone	1	1	12	3	2nd
4.	Telenor	-	-	3	14	3rd

Table 12.1: CMOs Standing in Download Data Throughput– Auto Mode Testing

ii. Upload Data Throughput (Auto Mode). The Upload Data Throughput, as per the highest to lowest obtained results, is shown in Table 12.2: CMOs Standing in Upload Data Throughput – Auto Mode Testing.

S. #	Operator	Highest Upload Throughput – Number of Cities (Automode)				Standing
		1st	2nd	3rd	4th	
1.	ZonG	9	4	2	2	1st
2.	Jazz	6	9	2	-	2nd
3.	Ufone	2	4	11	-	3rd
4.	Telenor	-	-	2	15	4th

Table 12.2: CMOs Standing in Download Data Throughput– Auto Mode Testing

iii. Webpage Loading Time. The categorization of each CMOs, as per the maximum compliant of Webpage Loading Time, is shown in Table 12.3: CMOs Standing in Webpage Loading Time.

S. #	Operator	Webpage Loading Time – Number of Cities		Standing
		Compliant	Non-Compliant	
1.	Jazz	11	6	1st
2.	ZonG	10	7	2nd
3.	Telenor	7	10	3rd
4.	Ufone	6	11	4th

Table 12.3: CMOs Standing in Webpage Loading Time

iv. Latency (3rd Party App). The categorization of each CMOs, as per the maximum compliant of cities in terms of Latency, is shown in Table 12.4: CMOs Standing in Latency (3rd Party App).

S. #	Operator	Latency - Number of Cities		Standing
		Compliant	Non-Compliant	
1.	Ufone	17	-	1st
2.	Telenor	17	-	1st
3.	Jazz	16	1	2nd
4.	Zong	16	1	2nd

Table 12.4: CMOs Standing in Latency (3rd Party App)

v. Latency (Automode). The categorization of each CMOs, as per the maximum compliant of cities in terms of Latency, is shown in Table 12.5: CMOs Standing in Latency (Automode).

S. #	Operator	Latency - Number of Cities		Standing
		Compliant	Non-Compliant	
1.	Ufone	4	13	1st
2.	Telenor	3	14	2nd
3.	ZonG	1	16	3rd
4.	Jazz	-	17	4th

Table 12.5: CMOs Standing in Latency (Automode)

vi. Download Data Throughput (3rd Party App). 3rd Party App Download Throughput, as per the highest to lowest obtained results, is shown in Table 12.6: CMOs Standing in Download Throughput – 3rd Party App.

S. #	Operator	Highest Download Throughput – Number of Cities				Standing
		1st	2nd	3rd	4th	
1.	Jazz	10	6	1	0	1st
2.	ZonG	6	9	1	1	2nd
3.	Ufone	1	1	13	2	3rd
4.	Telenor	0	1	2	14	4th

Table 12.6: CMOs Standing in Download Throughput – 3rd Party App

vii. Upload Data Throughput (3rd Party App). 3rd Party App Upload Throughput, as per the highest to lowest obtained results, is shown in Table 12.7: CMOs Standing in Upload Throughput – 3rd Party App.

S. #	Operator	Highest Upload Throughput – Number of Cities				Standing
		1st	2nd	3rd	4th	
1.	ZonG	11	2	2	2	1st
2.	Jazz	5	11	1	-	2nd
3.	Ufone	1	4	12	-	3rd
4.	Telenor	-	-	2	15	4th

Table 12.7: CMOs Standing in Upload Throughput – 3rd Party App

13. SURVEY STANDING – VOICE & SMS SERVICE

The categorization of each CMOs, as per the maximum compliant of Voice and SMS QoS KPIs are shown in (i) Table 13.1: CMOs Standing in Voice Service & (ii) Table 13.2: CMOs Standing in SMS Service

S.#	Operator	Voice QoS KPIs		Standing
		Compliant	Non-Compliant	
1.	ZonG	81	4	1st
2.	Jazz	81	4	1st
3.	Ufone	78	7	2nd
4.	Telenor	74	11	3rd

Table 13.1: CMOs Standing in Voice Service

S. #	Operator	SMS QoS KPIs		Standing
		Compliant	Non-Compliant	
1.	ZonG	27	7	1st
2.	Ufone	25	9	2nd
3.	Telenor	24	10	3rd
4.	Jazz	22	12	4th

Table 13.2: CMOs Standing in SMS Service