

<i>Islamabad to Kohat</i>	78.17	77.61	90.12	75.61	No	No	Yes	No
<i>Mianwali to Bakhar</i>	65.04	67.08	68.17	60.61	No	No	No	No
<i>Islamabad to D.I Khan</i>	77.71	72.74	79.77	65.65	No	No	No	No
<i>T.M Panah to Jalalpur Pirwala</i>	83.21	67.41	64.11	79.10	No	No	No	No
<i>Kot Sabzal to Multan</i>	95.00	82.80	77.94	92.23	Yes	No	No	Yes
<i>Chakdara to Kalam</i>	80.57	98.57	87.64	81.16	No	Yes	No	No
<i>Khuazakhela to Behsam</i>	71.32	76.37	85.96	57.26	No	No	No	No
<i>Peshawer to DG Khan</i>	75.28	87.58	88.12	76.21	No	No	No	No

Table 3.1: 4G Signal Strength Technology Auto Detect Mode -100 dBm with 90% Confidence Level

4G Signal Strength -100dBm with 90% Confidence Level – Technology Locked Mode								
Road Name	Confidence Level (%)				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
<i>Zhob to Quetta</i>	75.44	85.19	85.68	84.17	No	No	No	No
<i>Lahore to Sargodha</i>	95.84	89.11	84.95	83.62	Yes	No	No	No
<i>Lahore to Rawalpindi</i>	95.39	88.07	95.34	97.68	Yes	No	Yes	Yes
<i>Lahore to Multan</i>	94.85	84.89	82.01	94.28	Yes	No	No	Yes
<i>Islamabad to Kohat</i>	77.78	80.88	80.58	81.81	No	No	No	No
<i>Mianwali to Bakhar</i>	67.48	66.69	51.28	58.92	No	No	No	No
<i>Islamabad to D.I Khan</i>	75.76	65.39	60.60	61.77	No	No	No	No
<i>T.M Panah to Jalalpur Pirwala</i>	87.27	64.25	63.16	83.07	No	No	No	No
<i>Kot Sabzal to Multan</i>	95.20	87.02	69.78	91.2	Yes	No	No	Yes
<i>Chakdara to Kalam</i>	82.03	98.20	85.72	87.65	No	Yes	No	No
<i>Khuazakhela to Behsam</i>	53.58	74.10	62.38	62.72	No	No	No	No
<i>Peshawer to DG Khan</i>	78.0	83.88	77.13	78.91	No	No	No	No

Table 3.2: 4G Signal Strength Technology Locked Mode -100 dBm with 90% Confidence Level

3.2. **3G SIGNAL STRENGTH IN TECHNOLOGY AUTO DETECT MODE.** During the survey, while conducting data tests, the signal strength samples were recorded on survey routes, wherever network switched to 3G while keeping the mobile handset in technology auto detect mode and also in technology locked mode. As per Next Generation Mobile Service (NGMS) licenses, licensees are required to meet the threshold of -100 dBm or above of Received Signal Code Power (RSCP) with 90% confidence level. Road wise compliance of 90% confidence level of signal strength is shown in (i). **Table 3.3: 3G Signal Strength Technology Auto Detect Mode -100 dBm with 90% Confidence Level** (ii). **Table 3.4: 3G Signal Strength Technology Locked Mode -100 dBm with 90% Confidence Level.**

3G Signal Strength -100dBm with 90% Confidence Level – Technology Auto Detect Mode								
Road Name	Confidence Level (%)				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
<i>Quetta to Zhob</i>	94.90	98.84	98.72	65.06	Yes	Yes	Yes	No
<i>Zhob to Quetta</i>	89.02	94.77	96.84	82.14	No	Yes	Yes	No
<i>Lahore to Sargodha</i>	N/A	N/A	100.0	95.49	N/A	N/A	Yes	Yes
<i>Lahore to Rawalpindi</i>	N/A	59.7	95.07	64.63	N/A	No	Yes	No
<i>Lahore to Multan</i>	N/A	100.0	97.63	N/A	N/A	Yes	Yes	N/A
<i>Islamabad to Kohat</i>	92.52	100.0	80.06	58.85	Yes	Yes	No	No
<i>Mianwali to Bakhar</i>	20.41	57.89	72.70	64.04	No	No	No	No
<i>Islamabad to D.I Khan</i>	77.64	81.65	77.25	67.20	No	No	No	No
<i>T.M Panah to Jalalpur Pirwala</i>	N/A	90.81	N/A	85.29	N/A	Yes	N/A	No
<i>Kot Sabzal to Multan</i>	N/A	96.61	91.61	100.0	N/A	Yes	Yes	Yes
<i>Chakdara to Kalam</i>	86.25	100.0	99.17	70.77	No	Yes	Yes	No
<i>Khuazakhela to Behsam</i>	85.92%	100.0	74.14	63.86	No	Yes	No	No

<i>Peshawer to DG Khan</i>	79.91	92.47	92.82	52.41	No	Yes	Yes	No
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Table 3.3: 3G Signal Strength Technology Auto Detect Mode -100 dBm with 90% Confidence Level

3G Signal Strength -100dBm with 90% Confidence Level – Technology Locked Mode								
<i>Road Name</i>	Confidence Level (%)				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
<i>Quetta to Zhob</i>	98.63	99.6	99.1	93.50	Yes	Yes	Yes	Yes
<i>Lahore to Sargodha</i>	99.02	99.46	97.87	99.75	Yes	Yes	Yes	Yes
<i>Lahore to Rawalpindi</i>	99.08	99.63	99.86	99.37	Yes	Yes	Yes	Yes
<i>Lahore to Multan</i>	99.36	90.83	89.99	100.00	Yes	Yes	No	Yes
<i>Islamabad to Kohat</i>	91.21	98.16	97.17	93.87	Yes	Yes	Yes	Yes
<i>Mianwali to Bakhar</i>	75.06	88.53	84.71	91.23	No	No	No	Yes
<i>Isamabad to D.I Khan</i>	86.37	92.19	91.03	87.68	No	Yes	Yes	No
<i>T.M Panah to Jalalpur Pirwala</i>	99.12	96.08	59.59	99.96	Yes	Yes	No	Yes
<i>Kot Sabzal to Multan</i>	93.65	98.31	94.2	99.78	Yes	Yes	Yes	Yes
<i>Chakdara to Kalam</i>	97.20	99.95	95.48	98.77	Yes	Yes	Yes	Yes
<i>Khuazakhela to Behsam</i>	81.41	97.2	83.69	79.12	No	Yes	No	No
<i>Peshawer to DG Khan</i>	81.84	97.99	98.09	97.01	No	Yes	Yes	Yes

Table 3.4: 3G Signal Strength Technology Locked Mode -100 dBm with 90% Confidence Level

MOBILE BROADBAND SERVICE

4.1. **DATA SESSIONS IN TECHNOLOGY AUTO DETECT MODE & LOCKED MODE.** A series of Mobile Broadband/Data tests including Capacity Tests, Data Transfer Tests, Web Browsing and Ping were carried out wherein Key Performance Indicators (KPIs) of Upload and Download User Data Throughput (i.e. Speed), Webpage Loading Time and Latency have been measured. In Fixed Duration Testing, a File of 10GB was downloaded and Uploaded for 3 minutes duration whereas in Fixed Size Testing, a File of 5MB and 2MB was completely downloaded and uploaded respectively. In order to measure Webpage Loading Time, different national webpages were checked and in case of Latency international and national host were pinged to measure Round Trip Time (RTT)/Latency. The 4G/LTE and 3G signal strength, Number of Tests, Upload and Download User Data Throughput, Webpage Loading Time and Latency detail is mentioned in **Table 4.1: Data Tests Statistics.**

DESCRIPTION				JAZZ	TELENOR	UFONE	ZONG	
AUTO DETECT MODE	CAPACITY TEST	DOWNLOAD	ATTEMPTS	2314	2175	2317	2247	
			SPEED (Mbps)	24.454	6.037	13.107	23.142	
		UPLOAD	ATTEMPTS	2320	2178	2321	2250	
			SPEED (Mbps)	18.531	6.311	15.122	16.37	
	DATA TRANSFER TEST	DOWNLOAD	ATTEMPTS	2270	2089	2048	2228	
			SPEED (Mbps)	10.06	5.236	8.028	10.25	
		UPLOAD	ATTEMPTS	2337	2194	2337	2260	
			SPEED (Mbps)	7.746	6.075	8.222	9.063	
	BROWSING TEST	ATTEMPTS			11643	10923	11634	11277
		LOADING TIME (Seconds)			6.69	7.85	6.91	6.65
	PING TEST	ATTEMPTS			4690	4411	4693	4542
		LATENCY (msec)			259.91	251.97	280	241.8
AVERAGE 4G SIGNAL STRENGTH (RSRP) dBm				-84	-86.3	-85.1	-85	
AVERAGE 3G SIGNAL STRENGTH (RSCP) dBm				-82.58	-80.97	-82.61	-93.04	