INDEPENDENT QUALITY OF SERVICE SURVEY REPORT

INTRODUCTION

1.1.   In order to measure the performance and service quality of Cellular Mobile Operators (CMOs), an independent Quality of Service (QoS) Survey has been carried out in three (03) x cities of Azad Jammu & Kashmir (AJK), in Fourth Quarter 2023. The name of cities along with survey dates are mentioned in **Table 1.1: QoS Survey Cities & Dates**:

S. #.	City	Days	Survey Dates
1.	KOTLI	4	21st ~24th November 2023
2.	MUZAFFARABAD	6	31st Oct~1st,6th,7th,8th&10th Nov, 2023
3.	MIRPUR	4	14th ~18th November 2023

Table 1.1: QoS Survey Dates and Samples

DRIVE TEST DETAILS

2.1.   The QoS survey was carried out using Automated QoS Monitoring & Benchmarking Tool i.e. **"SMARTBENCHMARKER**". Drive test teams selected survey routes in such a manner to cover main roads, service roads and majority of sectors/colonies. During the survey, mobile handsets for Voice Calls, SMS and Data Sessions, were kept in Auto Detect and 3G Locked modes.

MOBILE NETWORK COVERAGE

3.1.   **4G SIGNAL STRENGTH**. During the survey, while conducting data test in auto mode, 4G/LTE signal strength samples were recorded on survey routes. As per Next Generation Mobile Service (NGMS) licenses and Cellular Mobile Network Quality of Service (QoS) Regulations 2021, licensees are required to meet **the threshold of -100dBm or above of Reference Signal Receive Power (RSRP) with 90% confidence level.** The Confidence Level and Compliance of signal strength is shown in **Table 3.1: 4G Signal Strength -100dBm with 90% Confidence Level in AJK**

City	4G Signal Strength -100dBm with 90% Confidence Level									
	Confidence Level					Compliant (Yes/No)				
	Jazz	Telenor	Ufone	ZonG	SCOM	Jazz	Telenor	Ufone	ZonG	SCOM
MUZAFARABAD	96.95	97.03	99.69	99.11	92.64	Yes	Yes	Yes	Yes	Yes
MIRPUR	93.73	92.62	94.73	94.62	**81.39**	Yes	Yes	Yes	Yes	**No**
KOTLI	92.82	91.91	93.67	100.00	**86.84**	Yes	Yes	Yes	Yes	**No**

Table 3.1: 4G Signal Strength -100dBm with 90% Confidence Level in AJK

3.1.   **3G SIGNAL STRENGTH**. Special Communication Organization (SCOM) is the only Cellular Mobile Operator (CMO) offering 3G services in Azad Jammu & Kashmir. As per Next Generation Mobile Service (NGMS) licenses and Cellular Mobile Network Quality of Service (QoS) Regulations 2021, licensees are required to meet **the threshold of -100dBm or above of Reference Signal Code Power (RSCP) with 90% confidence level**. The Confidence Level and Compliance of signal strength is shown in **Table 3.2: 3G Signal Strength -100dBm with 90% Confidence Level.**

City	3G Signal Strength -100dBm with 90% Confidence Level	
	Confidence Level	Compliant (Yes/No)
	SCOM	SCOM
MUZAFARABAD	96.57%	Yes
MIRPUR	96.71%	Yes
KOTLI	99.40%	Yes

Table 3.2: 3G Signal Strength -100dBm with 90% Confidence Level in AJK

4.1.　　A series of 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. Technology wise signal strength, number of tests, Upload and Download User Data Throughput, Webpage Loading Time and Latency detail is mentioned in (i) **Table 4.1: Auto Detect Mode Data Tests Statistics** and (ii) **Table 4.2: 3G Locked Mode Data Tests Statistics**.

DESCRIPTION				JAZZ	SCOM	TELENOR	UFONE	ZONG
AUTO DETECT MODE	CAPACITY TEST	DOWNLOAD	ATTEMPTS	999	1002	1000	1000	1004
			SPEED (Mbps)	6.761	6.461	6.867	6.634	14.275
		UPLOAD	ATTEMPTS	1005	1008	1002	1008	1009
			SPEED (Mbps)	7.137	11.843	8.512	11.333	20.718
	DATA TRANSFER TEST	DOWNLOAD	ATTEMPTS	985	990	1011	1008	1007
			SPEED (Mbps)	5.422	5.53	5.082	5.717	7.499
		UPLOAD	ATTEMPTS	979	985	1016	1017	1006
			SPEED (Mbps)	4.105	4.723	4.298	5.342	6.161
	BROWSING TEST	ATTEMPTS		4038	4040	4017	4006	4027
		LOADING TIME (Seconds)		2.45	2.54	2.46	2.26	2.26
	PING TEST	ATTEMPTS		1025	1025	1025	1025	1025
		LATENCY (msec)		**101.44**	74.36	**79.59**	**75.06**	**119.86**
AVERAGE 4G SIGNAL STRENGTH (RSRP) dBm				-84.9	-86.7	-84.7	-82	-81.8

Table 4.1: Auto Detect Mode Data Tests Statistics

DESCRIPTION				SCOM
3G LOCKED MODE	DATA TRANSFER TEST	DOWNLOAD	ATTEMPTS	602
			SPEED (Mbps)	4.725
		UPLOAD	ATTEMPTS	599
			SPEED (Mbps)	1.564
	PING TEST	ATTEMPTS		607
		LATENCY (msec)		94.57
AVERAGE 3G SIGNAL STRENGTH (RSCP) dBm				-74.53

Table 4.2: 3G Locked Mode Data Tests Statistics

4.2.　　**4G USER DATA THROUGHPUT.** As per Next Generation Mobile Service (NGMS) licenses and Cellular Mobile Network Quality of Service (QoS) Regulations 2021, licensees are required to meet **the threshold of minimum of 3 Mbps Download of 4G User Data Throughput.** Similarly, **the threshold of minimum of 768 Kbps (Upload) of 4G User Data Throughput** is also required to be met in AJK. The results of Data Service QoS KPIs i.e. User Data Throughputs are shown in (i) **Table 4.3: 4G User Data Download Throughput in AJK (Fixed Size) > 3 Mbps,** (ii) **Table 4.4: 4G User Data Download Throughput in AJK (Fixed Duration) > 3 Mbps,** (iii) **Table 4.5: 4G User Data Upload Throughput in AJK (Fixed Size) > 768 Kbps** and (iv) **Table 4.6: 4G User Data Upload Throughput in AJK (Fixed Duration) > 768 Kbps.**

City	4G User Data Throughput Download (Mbps) Fixed Size					Operator Position				
	Jazz	Telenor	Ufone	ZonG	SCOM	Jazz	Telenor	Ufone	ZonG	SCOM
MUZAFARABAD	5.01	4.24	5.77	7.04	7.68	Fourth	Fifth	Third	Second	First
MIRPUR	6.63	6.16	6.85	9.69	6.38	Third	Fifth	Second	First	Fourth
KOTLI	5.73	6.09	5.49	8.73	3.56	Third	Second	Fourth	First	Fifth

Table 4.3: 4G User Data Download Throughput in AJK (Fixed Size) ≥ 3 Mbps