INDEPENDENT QUALITY OF SERVICE SURVEY - CITIES

SECOND QUARTER 2022

ENFORCEMENT WIRELESS – II DIRECTORATE
PTA | F-5/1, ISLAMABAD

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 Fourteen (14) x cities of Punjab, Sindh, Khyber Pakhtunkhwa (KPK) and Baluchistan during 2nd quarter i.e. April ~ June 2022. The name of cities along with survey dates are mentioned in **Table 1.1: QoS Survey Cities & Dates**:

S. #.	Province	City	Days	Survey Dates
1.	Balochistan	Ziarat	5	16 ~ 20 May 2022
2.		Mastung	6	23 ~ 27 May 2022 & 3 June 2022
3.		Khuzdar	4	30 ~ 31 May 2022 & 1 ~ 2 June 2022
4.		Sibbi	5	6 ~ 10 June 2022
5.		Usta Muhammad	5	13 ~ 17 June 2022
6.	Punjab	Faisalabad	5	23 ~ 27 May 2022
7.		Gojra	4	30 ~ 31 May 2022 & 1 ~ 2 June 2022
8.		Multan	3	21 ~ 23 June 2022
9.		Khanewal	2	29 ~ 30 June 2022
10.	KPK	Mingora	4	16 ~ 19 May 2022
11.		Batkhela	4	23 ~ 26 May 2022
12.		Mardan	4	30 ~ 31 May 2022 & 1 ~ 2 June 2022
13.		Abbottabad	4	6 ~ 9 June 2022
14.		Haripur	4	13 ~ 16 June 2022

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 were kept in auto detect mode whereas in case of Data Sessions, the mobile handsets were kept both in auto detect as well as locked mode.

MOBILE NETWORK COVERAGE

3.1. **4G / LTE SIGNAL STRENGTH**. During the survey, while conducting data test in technology auto detect mode as well as locked mode, 4G/LTE signal strength samples were recorded on survey routes. As per Next Generation Mobile Service (NGMS) licenses, licensees are required to meet the threshold of -100 dBm or above of Reference Signal Receive Power (RSRP) with 90% confidence level. The Confidence Level and Compliance of signal strength is shown in (i). **Table 3.1: 4G Signal Strength Technology Auto Detect Mode -100 dBm with 90% Confidence Level** & (ii). **Table 3.2: 4G Signal Strength Technology Locked Mode -100 dBm with 90% Confidence Level.**

4G Signal Strength -100dBm with 90% Confidence Level – Technology Auto Detect Mode								
City	Operators				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	**88.02%**	99.78%	**N/A**	97.11%	**No**	Yes	**N/A**	Yes
Mingora	90.11%	99.40%	**87.99%**	96.38%	Yes	Yes	**No**	Yes
Mardan	97.52%	95.46%	98.23%	99.58%	Yes	Yes	Yes	Yes
Faisalabad	99.57%	97.18%	98.40%	99.10%	Yes	Yes	Yes	Yes
Mastung	93.00%	95.74%	99.99%	99.91%	Yes	Yes	Yes	Yes

Gojra	95.10%	91.12%	**88.13%**	**84.10%**	Yes	Yes	**No**	**No**
Multan	99.87%	92.01%	96.83%	98.99%	Yes	Yes	Yes	Yes
Ziarat	**N/A**	97.11%	**85.55%**	98.84%	**N/A**	Yes	**No**	Yes
Khuzdar	**76.44%**	97.48%	97.86%	92.74%	**No**	Yes	Yes	Yes
Usta Muhammad	93.94%	**87.08%**	95.10%	94.02%	Yes	**No**	Yes	Yes
Sibbi	91.31%	**85.64%**	96.26%	95.80%	Yes	**No**	Yes	Yes
Abbottabad	95.88%	97.34%	97.72%	97.42%	Yes	Yes	Yes	Yes
Haripur	95.36%	**88.04%**	95.17%	98.18%	Yes	**No**	Yes	Yes
Khanewal	99.62%	**88.85%**	98.87%	99.72%	Yes	**No**	Yes	Yes

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								
City	**Operators**				**Compliant (Yes/No)**			
	Jazz	**Telenor**	**Ufone**	**ZonG**	**Jazz**	**Telenor**	**Ufone**	**ZonG**
Batkhela	**83.50%**	99.66%	**N/A**	97.62%	**No**	Yes	**N/A**	Yes
Mingora	**88.79%**	99.57%	**89.22%**	97.44%	**No**	Yes	**No**	Yes
Mardan	97.32%	94.04%	97.82%	99.62%	Yes	Yes	Yes	Yes
Faisalabad	99.69%	98.33%	98.65%	99.21%	Yes	Yes	Yes	Yes
Mastung	**89.63%**	98.32%	99.94%	99.62%	**No**	Yes	Yes	Yes
Gojra	96.91%	92.96%	90.82%	91.84%	Yes	Yes	Yes	Yes
Multan	99.84%	95.56%	95.61%	98.25%	Yes	Yes	Yes	Yes
Ziarat	**N/A**	96.29%	67.08%	98.84%	**N/A**	Yes	**No**	Yes
Khuzdar	**80.46%**	98.09%	95.19%	97.67%	**No**	Yes	Yes	Yes
Usta Muhammad	90.96%	86.26%	93.99%	97.13%	Yes	**No**	Yes	Yes
Sibbi	92.08%	91.36%	97.79%	97.79%	Yes	Yes	Yes	Yes
Abbottabad	96.51%	98.11%	97.84%	98.53%	Yes	Yes	Yes	Yes
Haripur	94.80%	**87.89%**	97.93%	97.56%	Yes	**No**	Yes	Yes
Khanewal	99.35%	93.70%	97.38%	99.55%	Yes	Yes	Yes	Yes

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

3.2. 3G SIGNAL STRENGTH IN TECNHOLOGY AUTO DETECT MODE. During the survey, 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. The Confidence Level and Compliance 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								
City	**Operators**				**Compliant (Yes/No)**			
	Jazz	**Telenor**	**Ufone**	**ZonG**	**Jazz**	**Telenor**	**Ufone**	**ZonG**
Batkhela			99.82%				Yes	
Mingora			**N/A**				**N/A**	
Mardan	**N/A**		100.00%		**N/A**		Yes	
Faisalabad			100.00%				Yes	
Mastung			**N/A**	**N/A**			**N/A**	**N/A**
Gojra	100.00%	**N/A**	99.87%		Yes	**N/A**	Yes	
Multan			**N/A**				**N/A**	
Ziarat			97.43%				Yes	
Khuzdar	**N/A**		**N/A**		**N/A**		**N/A**	
Usta Muhammad			100.00%				Yes	
Sibbi			**N/A**	100.00%			**N/A**	Yes

Abbottabad	100.00%	100.00%	100.00%	**N/A**	Yes	Yes	Yes	**N/A**
Haripur	99.97%	**N/A**	**N/A**		Yes	**N/A**	**N/A**	
Khanewal	**N/A**	100.00%			**N/A**	Yes		
Note: N/A means No Fallback to 3G Network								

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								
City	Operators				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	**33.11%**	99.88%	99.87%	99.86%	**No**	Yes	Yes	Yes
Mingora	99.98%	99.99%	99.97%	99.99%	Yes	Yes	Yes	Yes
Mardan	100.00%	100.00%	100.00%	100.00%	Yes	Yes	Yes	Yes
Faisalabad	99.99%	100.00%	99.83%	100.00%	Yes	Yes	Yes	Yes
Mastung	**N/A**	100.00%	100.00%	100.00%	**N/A**	Yes	Yes	Yes
Gojra	98.93%	99.99%	99.78%	100.00%	Yes	Yes	Yes	Yes
Multan	100.00%	99.91%	98.45%	100.00%	Yes	Yes	Yes	Yes
Ziarat	**N/A**	100.00%	99.35%	100.00%	**N/A**	Yes	Yes	Yes
Khuzdar	**N/A**	100.00%	100.00%	99.98%	**N/A**	Yes	Yes	Yes
Usta Muhammad	99.94%	99.81%	100.00%	100.00%	Yes	Yes	Yes	Yes
Sibbi	98.27%	99.99%	100.00%	100.00%	Yes	Yes	Yes	Yes
Abbottabad	100.00%	100.00%	100.00%	100.00%	Yes	Yes	Yes	Yes
Haripur	100.00%	99.92%	100.00%	100.00%	Yes	Yes	Yes	Yes
Khanewal	99.99%	100.00%	99.14%	100.00%	Yes	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 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, 3G and 2G signal strength, Number of Tests, Upload and Download User Data Throughput, Webpage Loading Time and Latency detail is mentioned in **Table4.1: Data Tests Statistics.**

DESCRIPTION				JAZZ	TELENOR	UFONE	ZONG
NUMBER OF DATA SESSIONS				5717	5722	5494	5712
AUTO DETECT MODE	*CAPACITY TEST*	*DOWNLOAD*	*ATTEMPTS*	5643	5639	5436	5647
			SPEED (Mbps)	16.506	5.915	11.428	17.511
		UPLOAD	*ATTEMPTS*	5656	5648	5443	5653
			SPEED (Mbps)	16.220	6.148	19.879	19.144
	DATA TRANSFER TEST	*DOWNLOAD*	*ATTEMPTS*	5715	5721	5490	5710
			SPEED (Mbps)	8.562	5.812	7.999	9.425
		UPLOAD	*ATTEMPTS*	5706	5700	5483	5701
			SPEED (Mbps)	4.696	5.410	7.748	6.348
	BROWSING TEST	*ATTEMPTS*		28402	28390	27335	28381
		LOADING TIME (Seconds)		9.4	10.4	7.4	8.7
	PING TEST	*ATTEMPTS*		169576	167143	157738	170072
		LATENCY (msec)		292	236.6	217.4	245.6

DESCRIPTION					JAZZ	TELENOR	UFONE	ZONG
		AVERAGE 4G SIGNAL STRENGTH (RSRP) dBm			-83.4	-82.7	-80.6	-81.1
		AVERAGE 4G SIGNAL STRENGTH (RSCP) dBm			-79.22	-65.04	-73.65	-65.03
		AVERAGE 4G SIGNAL STRENGTH (RXLEV) dBm			-58.75	-76.24	-69.28	-70.68
LOCKED MODE	*4G*	*DATA TRANSFER TEST*	*DOWNLOAD*	*ATTEMPTS*	2856	2856	2856	2856
				SPEED (Mbps)	12.482	4.446	12.141	14.390
			UPLOAD	*ATTEMPTS*	2826	2824	2824	2824
				SPEED (Mbps)	8.908	4.406	15.991	12.479
		PING TEST	*ATTEMPTS*		64890	68991	68723	65989
			LATENCY (msec)		107.6	87.9	88.7	106.6
		AVERAGE 4G SIGNAL STRENGTH (RSRP) dBm			-82.9	-83.2	-80.7	-80.5
	3G	*DATA TRANSFER TEST*	*DOWNLOAD*	*ATTEMPTS*	3045	3044	3040	3045
				SPEED (Mbps)	2.710	1.935	3.173	1.764
			UPLOAD	*ATTEMPTS*	3018	3018	3014	3015
				SPEED (Mbps)	0.898	1.508	2.332	1.395
		PING TEST	*ATTEMPTS*		56710	67139	66069	73857
			LATENCY (msec)		354.5	506.1	476.1	168.3
		AVERAGE 3G SIGNAL STRENGTH (RSCP) dBm			-71.65	-68.77	-65.43	-66.67

Table 4.1: Data Tests Statistics

4.2. **DOWNLOAD USER DATA THROUGHPUT.** As per Next Generation Mobile Service (NGMS) licenses, licensees are required to meet the threshold of minimum of 2Mbps of 4G/LTE & 256Kbps of 3G Download User Data Throughput. The results of Data Service QoS KPI i.e. Download User Data Throughput is shown in (i). **Table 4.2: Download User Data Throughput Technology Auto Detect Mode [Fixed Duration] ≥ 2Mbps,** (ii). **Table 4.3: Download User Data Throughput Technology Auto Detect Mode [Fixed Size] ≥ 2Mbps**, (iii). **Table 4.4: Download User Data Throughput IN 4G/LTE Technology Locked Mode [Fixed Duration] ≥ 2Mbps &** (iv). **Table 4.5: Download User Data Throughput IN 3G Technology Locked Mode [Fixed Duration] ≥ 256Kbps**.

DOWNLOAD USER DATA THROUGHPUT IN TECHNOLOGY AUTO DETECT MODE (FIXED DURATION)								
City	User Data Throughput [Mbps]				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	11.20	1.82	1.67	17.48	Second	**Third**	**Fourth**	First
Mingora	13.88	1.96	10.83	14.43	Second	**Fourth**	Third	First
Mardan	16.27	3.47	12.93	11.06	First	Fourth	Second	Third
Faisalabad	8.57	6.51	20.01	17.58	Third	Fourth	First	Second
Mastung	18.99	7.83	6.77	14.93	First	Third	Fourth	Second
Gojra	7.49	3.73	16.15	12.45	Third	Fourth	First	Second
Multan	13.14	7.64	22.12	30.58	Third	Fourth	Second	First
Ziarat	**N/A**	9.92	12.84	27.69	**N/A**	Third	Second	First
Khuzdar	26.74	3.94	4.91	16.65	First	Fourth	Third	Second
Usta Muhammad	7.85	5.55	4.31	12.72	Second	Third	Fourth	First
Sibbi	17.44	9.24	6.60	13.67	First	Third	Fourth	Second
Abbottabad	13.45	4.86	11.03	11.41	First	Fourth	Third	Second
Haripur	15.77	4.06	10.97	12.52	First	Fourth	Third	Second
Khanewal	5.47	4.72	8.88	4.62	Second	Third	First	Fourth

Table4.2: Download User Data Throughput Technology Auto Detect Mode [Fixed Duration] ≥ 2Mbps

DOWNLOAD USER DATA THROUGHPUT IN TECHNOLOGY AUTO DETECT MODE (FIXED SIZE)								
City	User Data Throughput [Mbps]				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	5.65	3.58	2.66	10.02	Second	Third	Fourth	First
Mingora	7.75	3.53	8.1	8.77	Third	Fourth	Second	First

DOWNLOAD USER DATA THROUGHPUT IN TECHNOLOGY AUTO DETECT MODE (FIXED SIZE)								
City	User Data Throughput [Mbps]				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Mardan	8.01	4.12	8.93	7.22	Second	Fourth	First	Third
Faisalabad	5.75	6.49	13.23	9.90	Fourth	Third	First	Second
Mastung	9.34	6.39	5.85	7.50	First	Third	Fourth	Second
Gojra	6.02	4.26	11.63	7.82	Third	Fourth	First	Second
Multan	9.36	6.33	13.33	14.77	Third	Fourth	Second	First
Ziarat	**N/A**	8.29	10.97	15.98	**N/A**	Third	Second	First
Khuzdar	12.73	4.43	4.49	6.70	First	Fourth	Third	Second
Usta Muhammad	6.90	5.74	5.12	8.78	Second	Third	Fourth	First
Sibbi	11.72	7.42	6.50	9.01	First	Third	Fourth	Second
Abbottabad	7.78	5.45	8.29	8.38	Third	Fourth	Second	First
Haripur	8.54	5.36	7.92	9.26	Second	Fourth	Third	First
Khanewal	**1.97**	**1.78**	2.36	**1.56**	**Second**	**Third**	First	**Fourth**

Table4.3: Download User Data Throughput Technology Auto Detect Mode [Fixed Size] ≥ 2Mbps

DOWNLOAD USER DATA THROUGHPUT IN 4G/LTE TECHNOLOGY LOCKED MODE (FIXED DURATION)								
City	User Data Throughput [Mbps]				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	4.83	**0.74**	**N/A**	15.37	Second	**Third**	**N/A**	First
Mingora	11.17	**0.82**	10.48	11.40	Second	**Fourth**	Third	First
Mardan	12.47	**1.12**	14.92	9.63	Second	**Fourth**	First	Third
Faisalabad	9.59	5.91	24.62	19.40	Third	Fourth	First	Second
Mastung	14.95	7.12	7.29	8.95	First	Fourth	Third	Second
Gojra	10.04	2.92	19.86	15.68	Third	Fourth	First	Second
Multan	11.22	4.78	18.81	19.37	Third	Fourth	Second	First
Ziarat	**N/A**	9.72	15.59	29.12	**N/A**	Third	Second	First
Khuzdar	29.96	2.71	3.58	11.44	First	Fourth	Third	Second
Usta Muhammad	6.91	7.89	4.24	11.93	Third	Second	Fourth	First
Sibbi	16.47	9.39	6.11	12.06	First	Third	Fourth	Second
Abbottabad	9.28	**1.81**	10.54	9.60	Third	**Fourth**	First	Second
Haripur	13.19	**1.44**	9.74	9.69	First	**Fourth**	Second	Third
Khanewal	10.07	10.58	28.36	9.78	Third	Second	First	Fourth

Table 4.4: Download User Data Throughput 4G/LTE Technology Locked Mode [Fixed Duration] ≥ 2Mbps

DOWNLOAD USER DATA THROUGHPUT IN 3G TECHNOLOGY LOCKED MODE (FIXED DURATION)								
City	User Data Throughput [Kbps]				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	935.76	785.27	1696.89	2141.48	Third	Fourth	Second	First
Mingora	1730.53	1041.41	2810.6	1416.41	Second	Fourth	First	Third
Mardan	2885.47	1543.82	4586.46	918.71	Second	Third	First	Fourth
Faisalabad	3125.88	2294.22	4472.22	3628.77	Third	Fourth	First	Second
Mastung	**N/A**	2227.76	2622.14	784.26	**N/A**	Second	First	Third
Gojra	2315.47	1806.56	5029.68	1449.71	Second	Third	First	Fourth
Multan	3113.37	3059.83	4586.97	1436.97	Second	Third	First	Fourth
Ziarat	**N/A**	3124.7	1517.63	3281.05	**N/A**	Second	Third	First
Khuzdar	**N/A**	1519.73	1982.06	1622.88	**N/A**	Third	Second	First
Usta Muhammad	3548.79	1542.6	2951.21	1020.76	First	Third	Second	Fourth
Sibbi	4205.06	2337.46	2634.34	2077.19	First	Third	Second	Fourth
Abbottabad	1384.41	1413.91	2798.83	725.44	Third	Second	First	Fourth
Haripur	1630.35	1389.18	2593.13	1114.59	Second	Third	First	Fourth
Khanewal	2700.89	2874.25	3499.6	1437.6	Third	Second	First	Fourth

Table 4.5: Download User Data Throughput IN 3G Technology Locked Mode [Fixed Duration] ≥ 256Kbps

4.3. **UPLOAD USER DATA THROUGHPUT.** As per Cellular Mobile Network Quality of Service (QoS) Regulations 2021, licensees are required to meet the threshold of minimum of 512Kbps of 4G/LTE & 64Kbps of 3G of Upload User Data Throughput. The results of Data Service QoS KPI i.e. Upload User Data Throughput is shown in (i). **Table 4.6: Upload User Data Throughput Technology Auto Detect Mode [Fixed Duration] ≥ 512Kbps,** (ii). **Table 4.7: Upload User Data Throughput Technology Auto Detect Mode [Fixed Size] ≥ 512Kbps,** (iii). **Table 4.8: Upload User Data Throughput in 4G/LTE Technology Locked Mode [Fixed Duration] ≥ 512Kbps** & (iv). **Table 4.9: Upload User Data Throughput in 3G Technology Locked Mode [Fixed Duration] ≥ 64Kbps.**

UPLOAD USER DATA THROUGHPUT IN TECHNOLOGY AUTO DETECT MODE (FIXED DURATION)								
City	Auto mode Throughput [Mbps]				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	10968.11	4424.26	1966.04	15772.26	Second	Third	Fourth	First
Mingora	10789.3	3228.92	14860.23	14035.02	Third	Fourth	First	Second
Mardan	12681.92	5273.38	17848.94	14225.66	Third	Fourth	First	Second
Faisalabad	10733.04	6966.78	22034.91	21324.09	Third	Fourth	First	Second
Mastung	12741.05	3330.67	19329.84	20693.37	Third	Fourth	Second	First
Gojra	10891.1	6564.83	24146.49	22020.55	Third	Fourth	First	Second
Multan	17150.9	8020.32	24833.92	34365.2	Third	Fourth	Second	First
Ziarat	**N/A**	10257.88	17401.3	22055.51	**N/A**	Third	Second	First
Khuzdar	10175.93	4826.65	12433.35	14845.75	Third	Fourth	Second	First
Usta Muhammad	20008.45	5962.74	22253.42	15131.94	Second	Fourth	First	Third
Sibbi	18073.23	6630.55	21885.08	15604.36	Second	Fourth	First	Third
Abbottabad	14777.86	6078.9	20064.05	16269.99	Third	Fourth	First	Second
Haripur	15161.85	5439.44	18532.37	15555.69	Third	Fourth	First	Second
Khanewal	17011.26	5252.45	21741.22	9732.95	Second	Fourth	First	Third

Table 4.6: Upload User Data Throughput Technology Auto Detect Mode [Fixed Duration] ≥ 512Kbps

UPLOAD USER DATA THROUGHPUT IN TECHNOLOGY AUTO DETECT MODE (FIXED SIZE)								
City	Auto mode Throughput [Mbps]				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	7423.17	11019.43	5155.98	8371.27	Third	First	Fourth	Second
Mingora	7558.8	9224.86	15354.44	9094.68	Fourth	Second	First	Third
Mardan	7699.22	10893.36	12796.97	8550.89	Fourth	Second	First	Third
Faisalabad	6642.72	11054.16	18173.88	12856.82	Fourth	Third	First	Second
Mastung	10856.14	11034.06	19408.41	13874.1	Third	Second	First	Fourth
Gojra	7536.6	8975.13	14985.84	13233.05	Fourth	Third	First	Second
Multan	10982.58	12042.22	17465.18	18824.31	Fourth	Third	Second	First
Ziarat	**N/A**	12964.81	17829.64	18516.71	**N/A**	Third	Second	First
Khuzdar	10971.75	8333.14	12028.67	12766.49	Third	Fourth	Second	First
Usta Muhammad	11351.63	11423.72	14757.01	13564.67	Fourth	Third	First	Second
Sibbi	11390.73	10715.18	16478.38	15098.5	Third	Fourth	First	Second
Abbottabad	8781.81	11412.5	13417.44	10281.77	Fourth	Second	First	Third
Haripur	8751.37	11039.69	15960.25	10211.5	Fourth	Second	First	Third
Khanewal	13445.87	9793.66	18593.04	7667.97	Second	Third	First	Fourth

Table 4.7: Upload User Data Throughput Technology Auto Detect Mode [Fixed Size] ≥ 512Kbps

UPLOAD USER DATA THROUGHPUT IN 4G TECHNOLOGY LOCKED MODE (FIXED DURATION)								
City	Auto mode Throughput [Mbps]				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	7018.11	2430.92	**N/A**	7934.22	Second	Third	**N/A**	First

Mingora	8712.61	2675.15	15842.3	8373.65	Second	Fourth	First	Third
Mardan	9488.24	3782.08	16772.38	7156.32	Second	Fourth	First	Third
Faisalabad	8329.82	5034.13	22310.63	17171.85	Third	Fourth	First	Second
Mastung	4642.36	5162.52	22780.15	15656.11	Fourth	Third	First	Second
Gojra	13089.54	1729.82	15522.32	12282.72	Second	Fourth	First	Third
Multan	10677.65	6141.92	22270.24	28570.62	Third	Fourth	Second	First
Ziarat	**N/A**	7414.29	16759.8	21429.3	**N/A**	Third	Second	First
Khuzdar	4700.5	3843.47	7464.09	13504.3	Third	Fourth	Second	First
Usta Muhammad	13266.21	6486.56	18558.83	14189.77	Third	Fourth	First	Second
Sibbi	10309.28	6693.46	18721.12	15905.29	Third	Fourth	First	Second
Abbottabad	10728.76	4369.28	17213.92	9998.18	Second	Fourth	First	Third
Haripur	7544.25	3885.67	18092.52	7577.04	Third	Fourth	First	Second
Khanewal	12808.91	4341.51	20180.56	3713.36	Second	Third	First	Fourth

Table 4.8: Upload User Data Throughput Technology Locked Mode [Fixed Duration] ≥ 512Kbps

UPLOAD USER DATA THROUGHPUT IN 3G TECHNOLOGY LOCKED MODE (FIXED DURATION)								
City	Auto mode Throughput [Mbps]				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	131.89	1318.17	1887.26	1209.85	Fourth	Second	First	Third
Mingora	429.5	1174.07	2302.31	1251.05	Fourth	Third	First	Second
Mardan	758.83	1335.13	3066.23	687.31	Third	Second	First	Fourth
Faisalabad	957.05	1604.69	2747.6	2177.93	Fourth	Third	First	Second
Mastung	**N/A**	1618.69	2157.15	639.37	**N/A**	Second	First	Third
Gojra	894.57	1051.61	2833.31	1841.22	Fourth	Third	First	Second
Multan	1090.2	2567.33	3078.48	1806.17	Fourth	Second	First	Third
Ziarat	**N/A**	2347.71	1063.88	2698.37	**N/A**	Second	Third	First
Khuzdar	**N/A**	1088.07	1597.5	994.87	**N/A**	Second	First	Third
Usta Muhammad	1199.86	1397.93	2739.54	1498.66	Fourth	Third	First	Second
Sibbi	1263.89	1853.51	2549.24	1695.29	Fourth	Second	First	Third
Abbottabad	804.89	1273.79	2511.84	375.08	Third	Second	First	Fourth
Haripur	632.33	1362.35	1901.02	561.02	Third	Second	First	Fourth
Khanewal	1331.77	1552.85	1696.35	1362.22	Fourth	Second	First	Third

Table 4.9: Upload User Data Throughput in 3G Technology Locked Mode [Fixed Duration] ≥ 64Kbps

4.4. **WEBPAGE LOADING TIME.** As per Cellular Mobile Network Quality of Service (QoS) Regulations 2021, licensees are required to meet Webpage Loading Time threshold of 5 Seconds. The results of Webpage Loading Time is shown in **Table 4.10: Webpage Loading Time < 5 Seconds.**

WEBPAGE LOADING TIME IN TECHNOLOGY AUTO DETECT MODE IN CITIES								
City	Webpage Loading Time [Seconds]				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	**7**	**7**	**8**	**6**	**No**	**No**	**No**	**No**
Mingora	**7**	**8**	**5**	**6**	**No**	**No**	**No**	**No**
Mardan	**5**	**7**	**5**	**7**	**No**	**No**	**No**	**No**
Faisalabad	**6**	**6**	**5**	**6**	**No**	**No**	**No**	**No**
Mastung	**7**	**6**	**5**	**7**	**No**	**No**	**No**	**No**
Gojra	**6**	**7**	**4**	**6**	**No**	**No**	**Yes**	**No**
Multan	**6**	**6**	**5**	**5**	**No**	**No**	**No**	**No**
Ziarat	**N/A**	**6**	**5**	**5**	**N/A**	**No**	**No**	**No**
Khuzdar	**7**	**7**	**6**	**8**	**No**	**No**	**No**	**No**
Usta Muhammad	**6**	**7**	**5**	**6**	**No**	**No**	**No**	**No**
Sibbi	**6**	**6**	**5**	**6**	**No**	**No**	**No**	**No**

WEBPAGE LOADING TIME IN TECHNOLOGY AUTO DETECT MODE IN CITIES								
City	Webpage Loading Time [Seconds]				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Abbottabad	6	7	5	6	No	No	No	No
Haripur	7	7	5	6	No	No	No	No
Khanewal	7	7	5	7	No	No	No	No

Table 4.10: Webpage Loading Time < 5 Seconds

4.5. **LATENCY.** As per Cellular Mobile Network Quality of Service (QoS) Regulations 2021, licensees are required to meet threshold of 75 milliseconds of 4G/LTE Technology & 150 milliseconds of 3G Technology of Latency. The results of QoS KPI Latency is shown in (i). **Table 4.11: Latency in Technology Auto Detect Mode < 75 milliseconds**, (ii). **Table 4.12: Latency in 4G/LTE Technology Locked Mode < 75 milliseconds** & (iii) **Table 4.13: Latency in3G Technology Locked Mode < 150 milliseconds.**

LATENCY IN TECHNOLOGY AUTO DETECT MODE								
City	Latency (milliseconds)				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	306	246	249	310	No	No	No	No
Mingora	307	247	222	251	No	No	No	No
Mardan	291	236	238	261	No	No	No	No
Faisalabad	374	229	214	238	No	No	No	No
Mastung	247	233	205	273	No	No	No	No
Gojra	328	255	219	246	No	No	No	No
Multan	214	219	199	221	No	No	No	No
Ziarat	561	218	206	209	No	No	No	No
Khuzdar	289	239	225	271	No	No	No	No
Usta Muhammad	119	64	59	95	No	Yes	Yes	No
Sibbi	218	221	200	224	No	No	No	No
Abbottabad	280	255	227	218	No	No	No	No
Haripur	245	245	217	215	No	No	No	No
Khanewal	219	231	195	225	No	No	No	No

Table 4.11: Latency in Technology Auto Detect Mode < 75 milliseconds

LATENCY IN 4G/LTE TECHNOLOGY LOCKED MODE								
City	Latency [milliseconds]				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	97	90	N/A	140	No	No	N/A	No
Mingora	118	90	79	185	No	No	No	No
Mardan	90	95	95	142	No	No	No	No
Faisalabad	75	83	78	78	No	No	No	No
Mastung	137	83	66	60	No	No	Yes	Yes
Gojra	65	99	72	83	Yes	No	Yes	No
Multan	80	78	57	65	No	No	Yes	Yes
Ziarat	N/A	77	59	54	N/A	No	Yes	Yes
Khuzdar	200	78	79	95	No	No	No	No
Usta Muhammad	119	64	59	95	No	Yes	Yes	No
Sibbi	139	87	75	156	No	No	Yes	No
Abbottabad	93	107	83	137	No	No	No	No
Haripur	85	99	73	97	No	No	Yes	No
Khanewal	82	98	55	105	No	No	Yes	No

Table 4.12: Latency in 4G/LTE Technology Locked Mode < 75 milliseconds

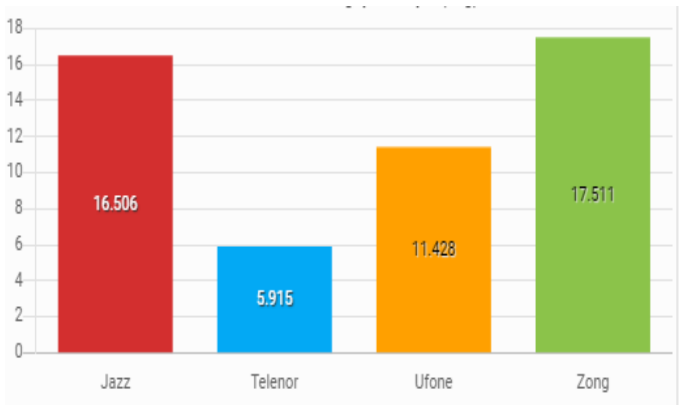
LATENCY IN 3G TECHNOLOGY LOCKED MODE								
City	Latency [milliseconds]				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Batkhela	625	256	462	208	No	No	No	No
Mingora	560	267	457	221	No	No	No	No
Mardan	521	295	407	273	No	No	No	No
Faisalabad	280	598	452	149	No	No	No	Yes
Mastung	N/A	445	490	234	N/A	No	No	No
Gojra	257	564	451	155	No	No	No	No
Multan	214	219	199	221	No	No	No	No
Ziarat	N/A	752	511	92	N/A	No	No	Yes
Khuzdar	N/A	811	515	136	N/A	No	No	Yes
Usta Muhammad	197	534	491	112	No	No	No	Yes
Sibbi	142	680	472	98	Yes	No	No	Yes
Abbottabad	541	356	482	270	No	No	No	No
Haripur	545	348	511	236	No	No	No	No
Khanewal	260	940	530	133	No	No	No	Yes

Table 4.13: Latency in 3G Technology Locked Mode < 150 milliseconds

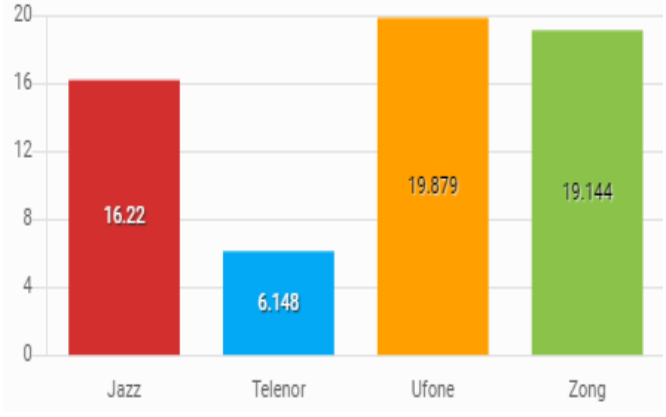
4.6. During the survey, the deployed technologies by Cellular Mobile Operators (CMOs), Success Rate of http Transfer Download Tests and Resource Block Utilization have been recorded. The details can be seen in attached graphs.

TECHNOLOGY AUTO DETECT MODE TESTING

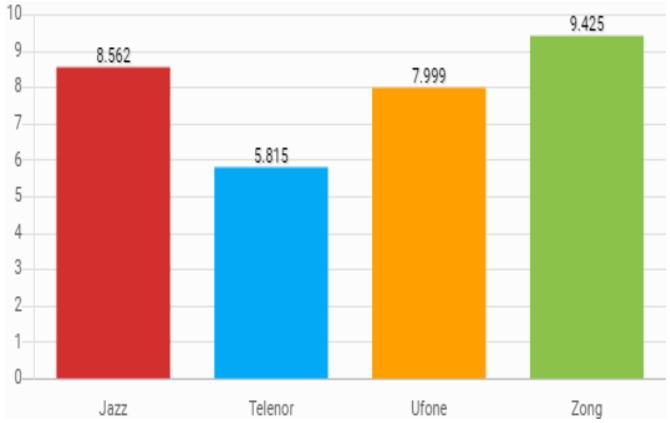
CAPACITY TEST DOWNLOAD SPEED (Mbps)



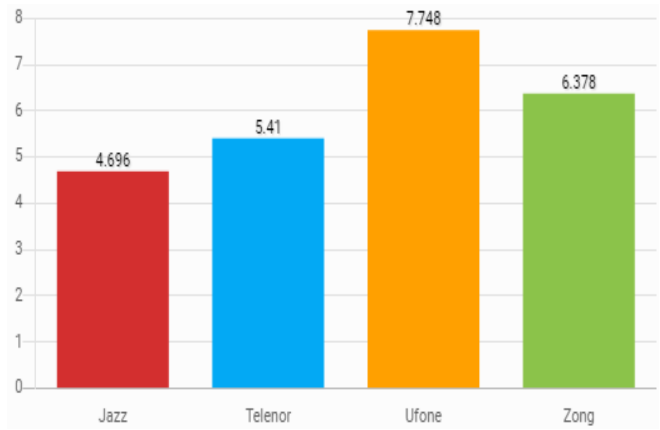
CAPACITY TEST UPLOAD SPEED (Mbps)

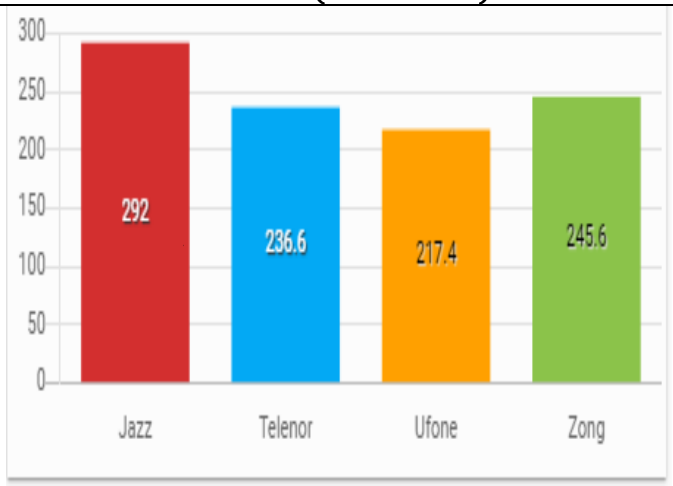
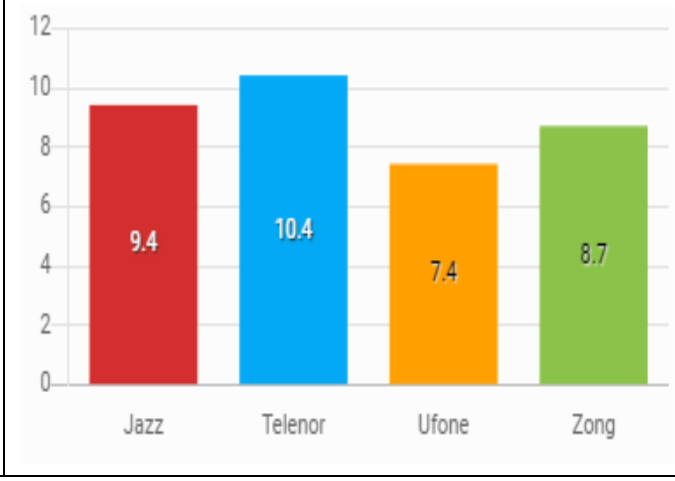


DATA TRANSFER DOWNLOAD SPEED (Mbps)

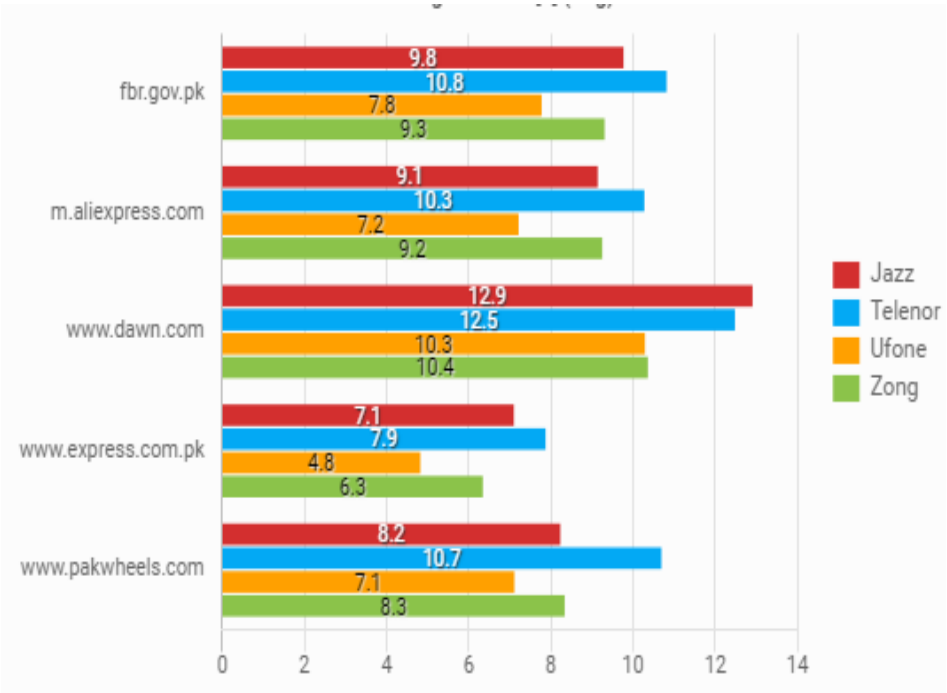


DATA TRANSFER UPLOAD SPEED (Mbps)

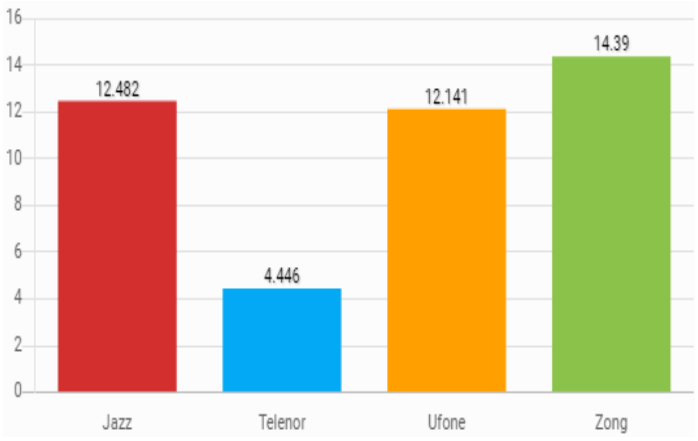
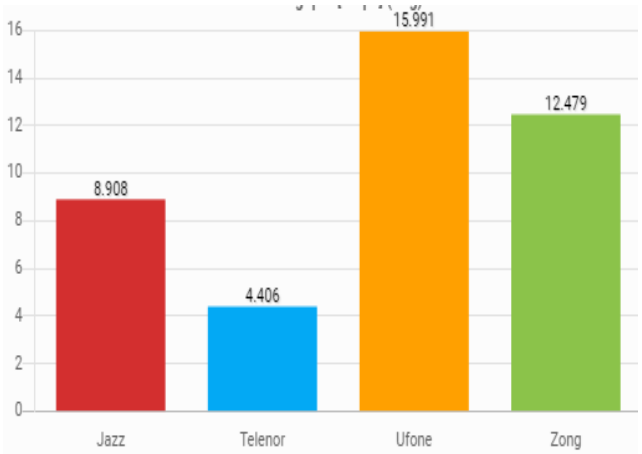


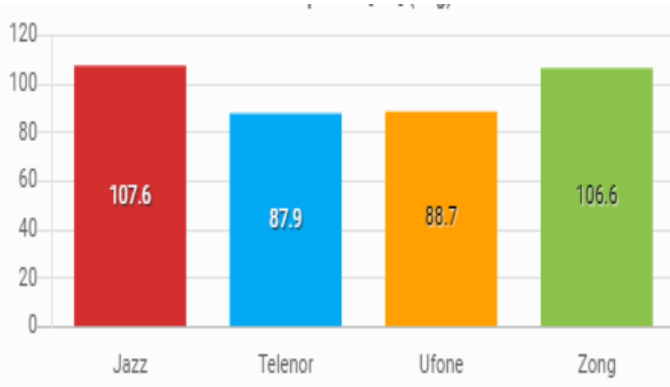
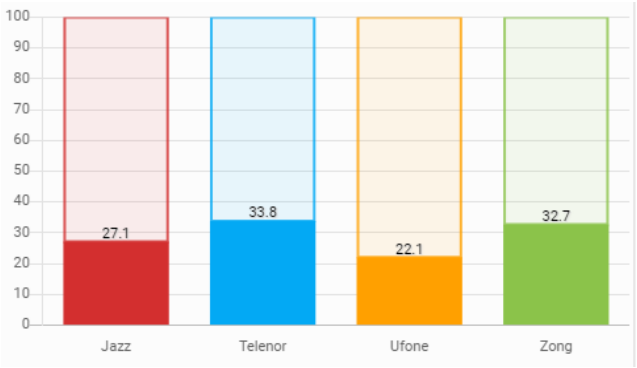
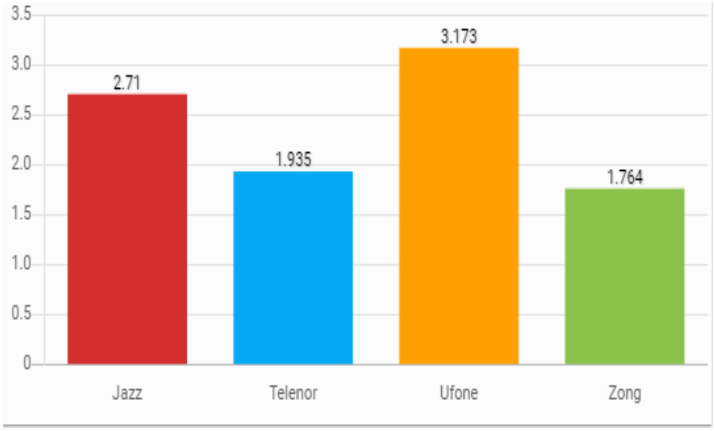
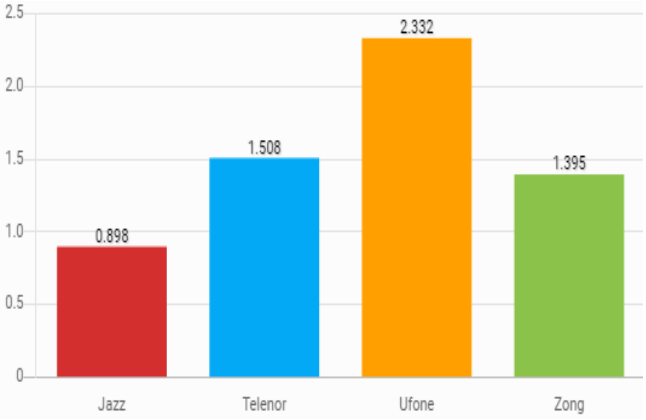
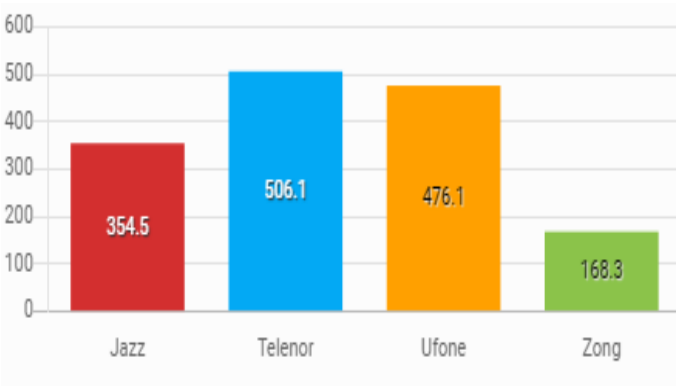
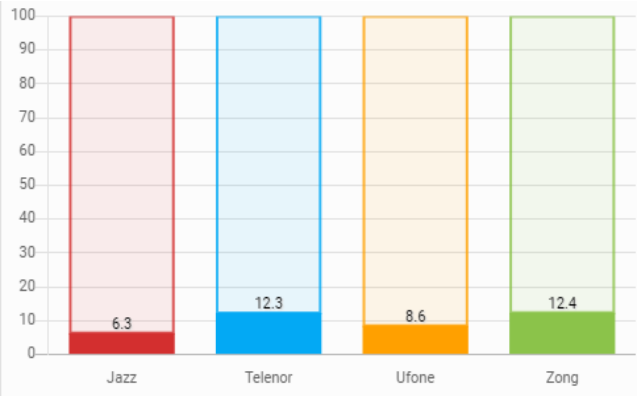
LATENCY (milliseconds)	WEBPAGE LOADING TIME (Seconds)
	

WEBPAGE LOADING TIME PER PAGE (Seconds)



4G/LTE TECHNOLOGY LOCKED MODE

DATA TRANSFER DOWNLOAD SPEED (Mbps)	DATA TRANSFER UPLOAD SPEED (Mbps)
	

LATENCY (milliseconds)	RESOURCE BLOCK USAGE DOWNLOAD
	
3G TECHNOLOGY LOCKED MODE	
DATA TRANSFER DOWNLOAD SPEED (Mbps)	**DATA TRANSFER UPLOAD SPEED (Mbps)**
	
LATENCY (milliseconds)	**RESOURCE BLOCK USAGE DOWNLOAD**
	

VOICE SERVICE

5.1. A total of **21,307 Call attempts** were made and out of which **716 were failed attempts**. In **20,591 successful call attempts**, **217 calls dropped** prior to completion of two minutes duration, whereas, **20,374 calls remained connected** for the complete duration of two minutes. The company wise call statistics is shown in **Table 5.1: Call Statistics.**

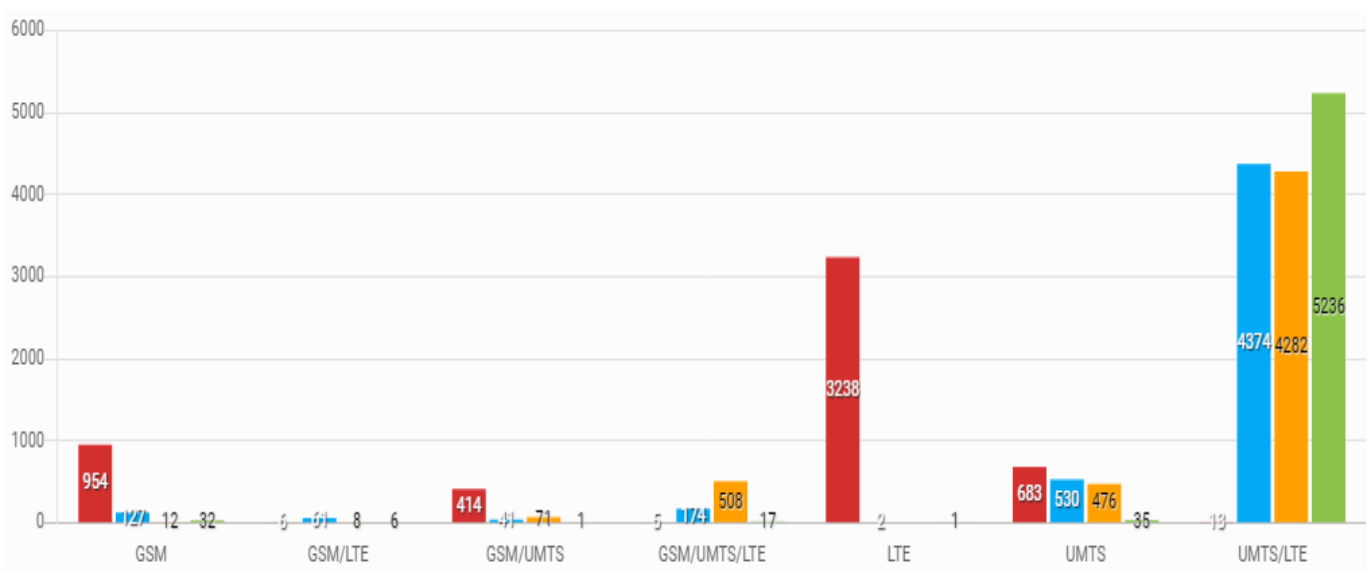
DESCRIPTION	JAZZ	TELENOR	UFONE	ZONG
TOTAL CALLS ATTEMPTS	5313	5309	5357	5328
FAILED CALLS ATTEMPTS	80	445	80	111
ESTABLISHED CALLS ATTEMPTS	5233	4864	5277	5217
DROPPED CALLS ATTEMPTS	23	99	45	50

COMPLETED CALLS ATTEMPTS	5210	4765	5232	5167
CALL SETUP SUCCESS RATE	98.49 %	**91.62 %**	98.51 %	**97.92 %**
CALL SETUP TIME	7.13 s	**9.22 s**	6.4 s	**7.55 s**
CALL COMPLETION RATE	99.52 %	**95.52 %**	98.22 %	**96.56 %**
ISHO SUCCESS RATE	98.75 %	100 %	98.58 %	-
RAB SETUP SUCCESS RATE	100 %	99.95 %	99.97 %	99.9 %
MEAN OPINION SCORE	3.45	3.1	3.36	3.46
MEAN OPINION SCORE EXCESS RATIO – MOS < 1.6	4.48 %	2.94 %	1.52 %	2.46 %
TOTAL SPEECH TEST	52226	48159	52771	52058

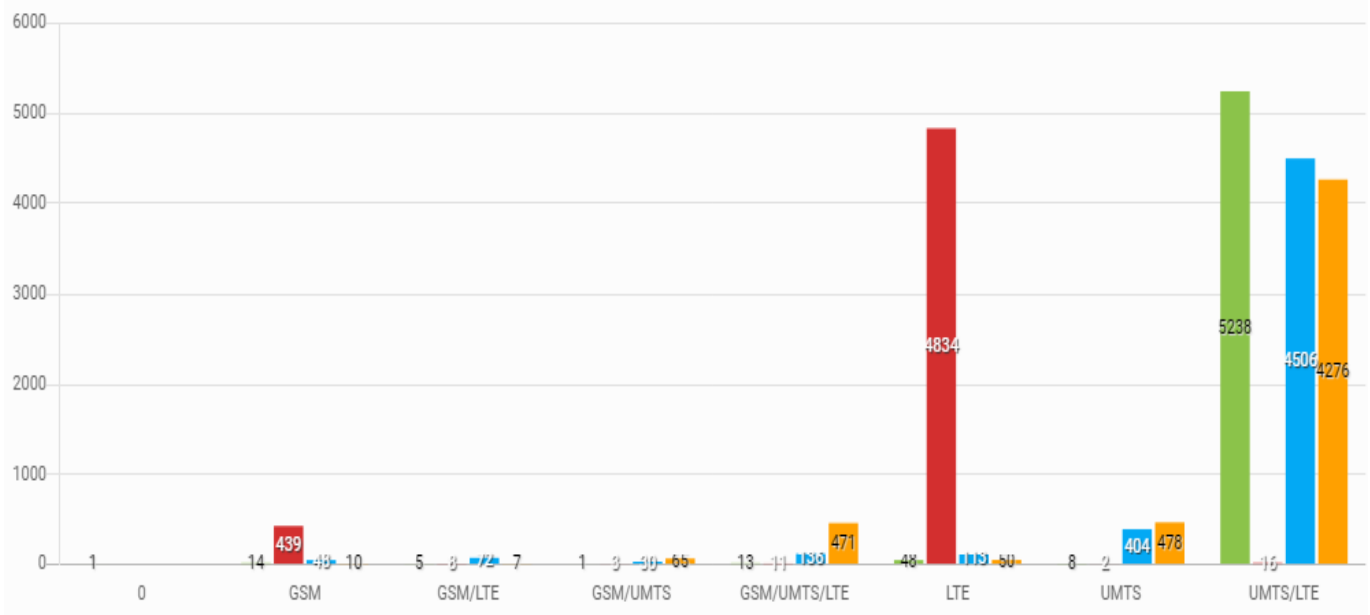
Table5.1: Call Statistics

5.2. The overall Call Setup Success Rate and Call Retainability along with Mean Opinion Score (MOS), the percentage of mute calls and MOS with respect to Voice CODEC is shown as under:

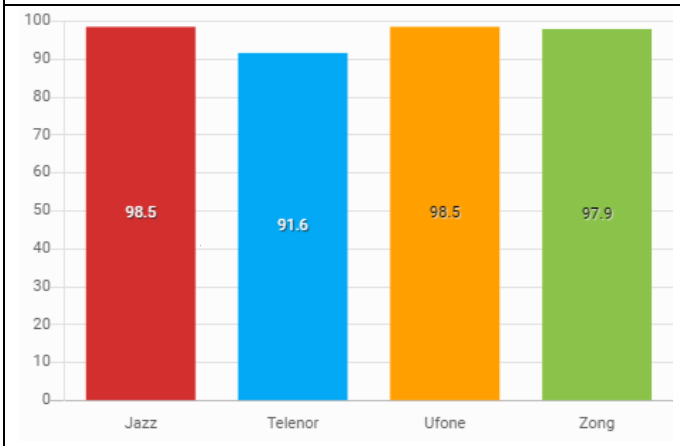
TECHNOLOGY WISE DISTRIBUTION OF CALLS – A PARTY



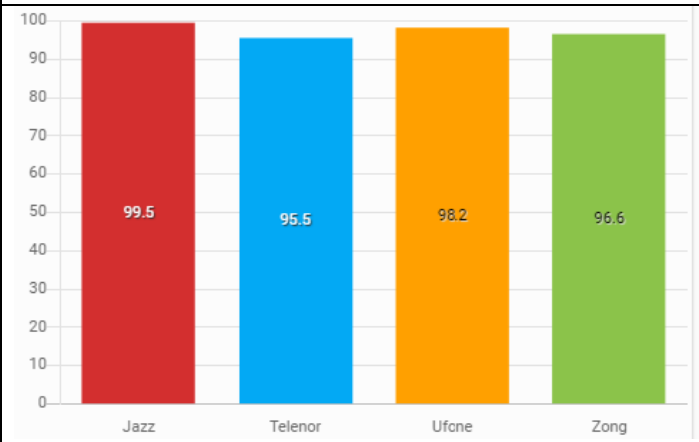
TECHNOLOGY WISE DISTRIBUTION OF CALLS – B PARTY



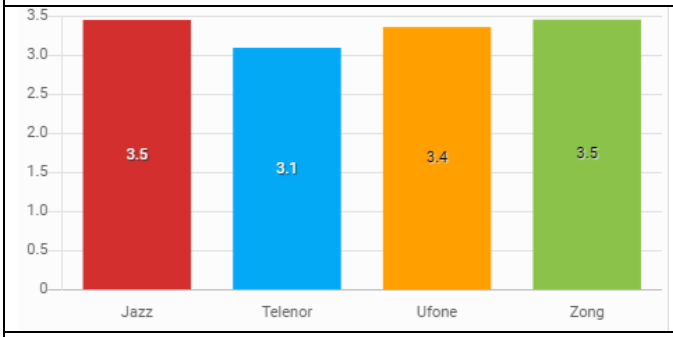
CALL SETUP SUCCESS RATE



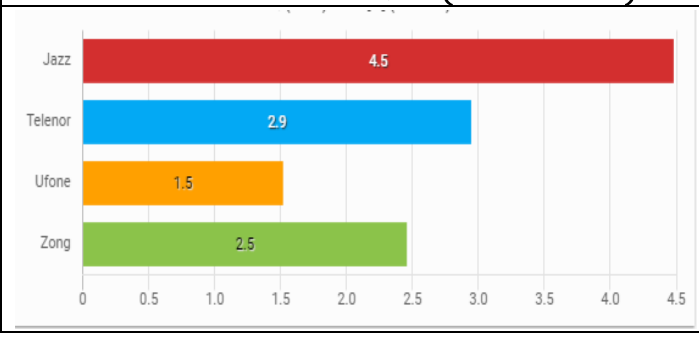
CALL RETAINABILITY



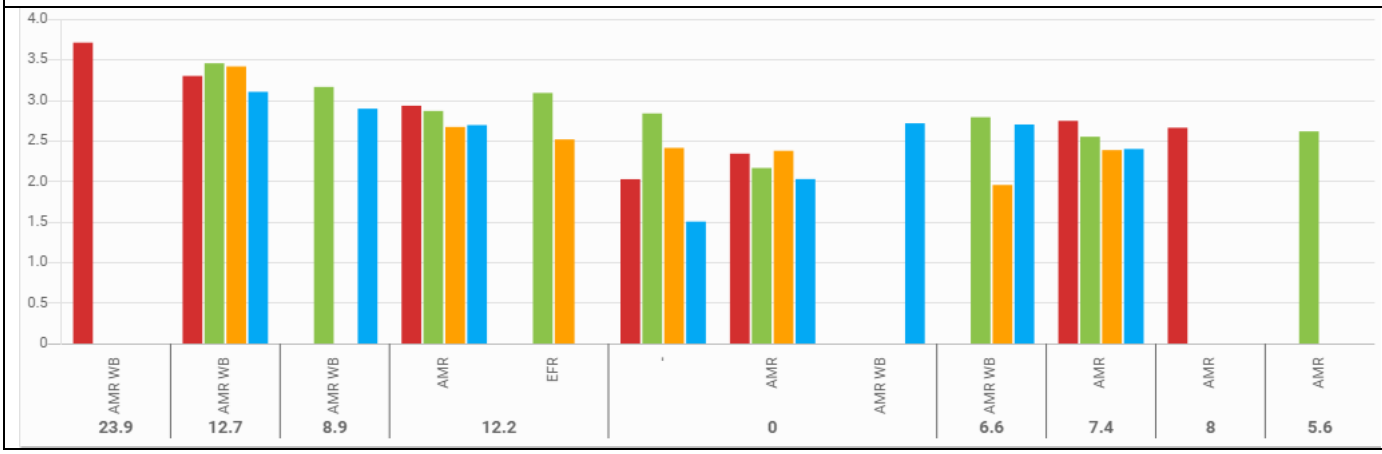
MEAN OPINION SCORE - AVERAGE



MEAN OPINION SCORE < 1.6 (PERCENTAGE)



MEAN OPINION SCORE – VOICE CODEC



5.3. The 7 x QoS KPIs *(i.e. Network Accessibility, Call Setup Success Rate, Call Setup Time, Call Completion Rate, Mean Opinion Score, Inter System Handover Success Rate & RAB Setup Success Rate)* have been measured while testing voice services in **14 x surveyed cities** of Pakistan. The compliance level of threshold values of voice QoS KPIs is shown in each **Table 5.1: Voice QoS KPIs Compliance Level.**

Voice Service Cities - Compliance (Yes/No)															
Operator	**Voice KPIs**	**Batkhela**	**Mingora**	**Mardan**	**Faisalabad**	**Mastung**	**Gojra**	**Multan**	**Ziarat**	**Khuzdar**	**Usta Muhammad**	**Sibbi**	**Abbottabad**	**Haripur**	**Khanewal**
Jazz	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	CSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**	**No**	Yes	Yes	**No**	Yes
	CCT	Yes	Yes	Yes	Yes	Yes	**N/A**	**N/A**	Yes	Yes	**No**	**N/A**	Yes	**No**	**N/A**
	CCR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	MOS	**No**	Yes	Yes	Yes	Yes	Yes	Yes	**No**	Yes	Yes	Yes	Yes	Yes	Yes
	ISHO	Yes	Yes	Yes	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**No**	Yes	**N/A**
	RSSR	Yes	Yes	Yes	Yes	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	Yes	**N/A**	Yes	Yes	**N/A**
Telenor	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**	Yes	Yes	Yes	Yes
	CSSR	**No**	**No**	**No**	Yes	**No**	**No**	**No**	Yes	Yes	**No**	**No**	**No**	**No**	**No**
	CCT	**No**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**	Yes
	CCR	**No**	**No**	Yes	**No**	**No**	**No**	**No**	Yes	**No**	**No**	Yes	Yes	**No**	Yes
	MOS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**	Yes	Yes	Yes	Yes
	ISHO	**N/A**	**N/A**	Yes	**N/A**	Yes	**N/A**	**N/A**	**N/A**	Yes	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ufone	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	CSSR	Yes	Yes	**No**	Yes	Yes	Yes	Yes	Yes	**No**	Yes	**No**	Yes	**No**	Yes
	CCT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	CCR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	MOS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**	Yes	Yes	Yes	Yes	Yes	Yes
	ISHO	**No**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**	**N/A**
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ZonG	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	CSSR	Yes	**No**	**No**	Yes	**No**	Yes	Yes	Yes	**No**	Yes	Yes	Yes	**No**	Yes
	CCT	Yes	Yes	**No**	Yes	Yes	Yes	Yes	Yes	**No**	Yes	Yes	Yes	Yes	Yes
	CCR	Yes	Yes	**No**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**	Yes
	MOS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**	Yes	Yes	Yes	Yes	Yes
	ISHO	**N/A**	**N/A**	**N/A**	**N/A**	Yes	Yes	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

** Note Voice QoS KPIs: Network Accessibility (NA) > 99%, Call Setup Success Rate (CSSR)> 98%, Call Connection Time (CCT) ≤ 7.5 Seconds, Call Completion Ratio (CCR) ≥ 98%, Mean Opinion Score (MOS) > 3, Inter System Hand Over (ISHO) > 98% & RAB Setup Success Rate (RSSR) > 98%*

Table 5.1: Voice QoS KPIs Compliance Level

SMS SERVICE

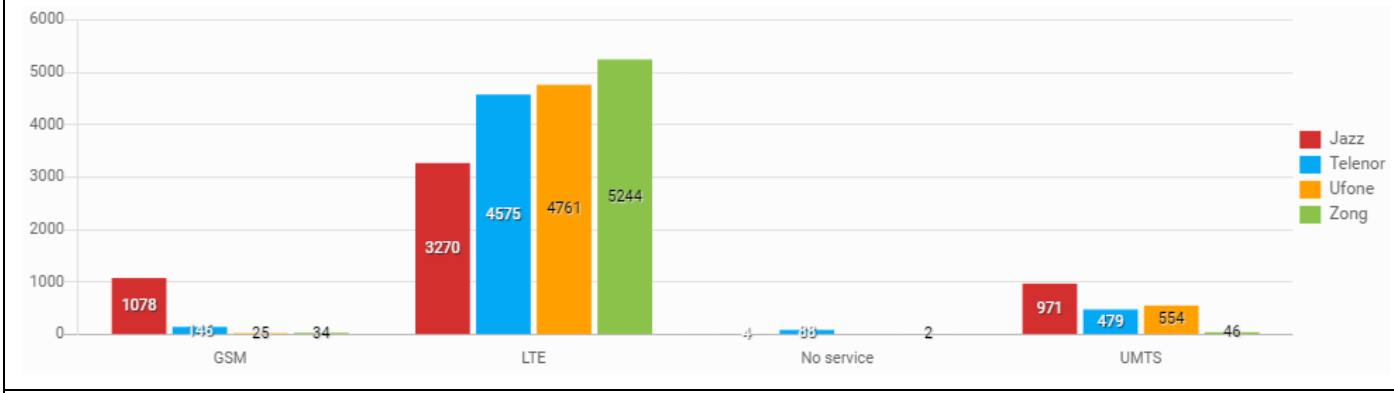
6.1. A total of **21,277 SMS sending attempts** were conducted, out of which **20,854 SMS** were **successfully received** at B-Party. The company wise SMS Statistics are shown in **Table 6.1: SMS Statistics**

DESCRIPTION	JAZZ	TELENOR	UFONE	ZONG
SMS SEND REQUEST	5323	5288	5340	5326
SMS SUCCESSFULLY TRANSMITTED	5301	5105	5326	5305
SMS SUCCESSFULLY RECEIVED	5265	5013	5292	5284
SMS RECEIVE SUCCESS RATE	**98.91 %**	**94.8 %**	99.1 %	99.21 %
END-TO-END DELIVERY TIME	5.59 s	7.82 s	3.57 s	2.81 s

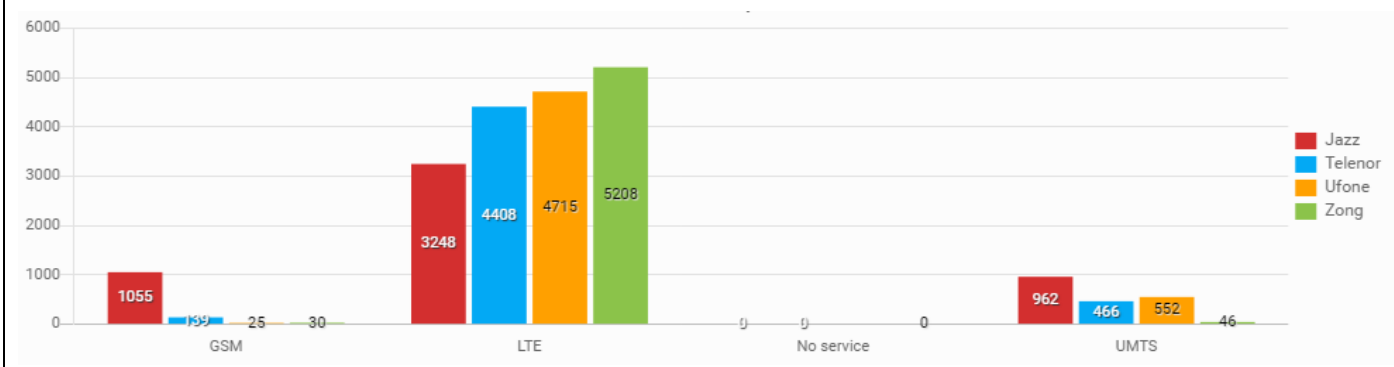
Table 6.1: SMS Statistics

6.2. The SMS Send Request & Successful Reception by Technology, Average Success Rate & End to End Delivery Time and Delivery Duration by Technology are shown in the graphs.

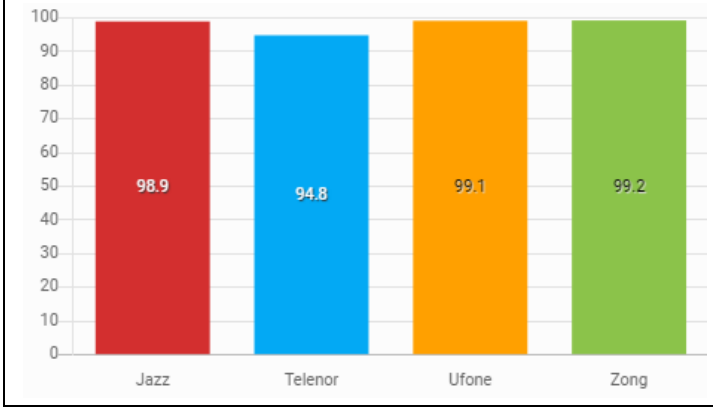
SMS SEND REQUEST BY TECHNOLOGY



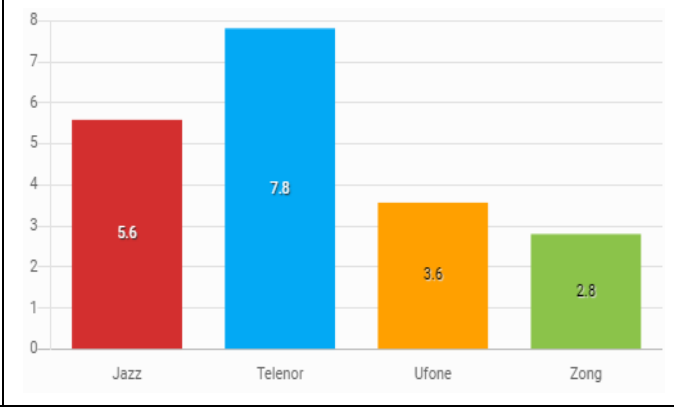
SMS SUCCESSFUL RECEPTION BY TECHNOLOGY



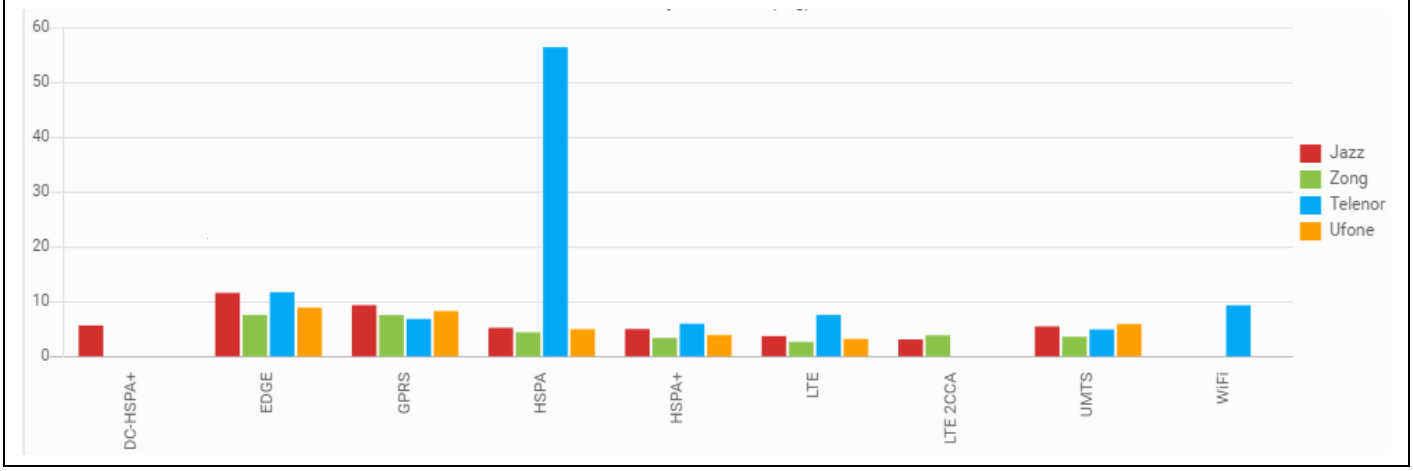
SMS RECEIVE SUCCESS RATE (%)



SMS END TO END DELIVERY TIME (SECONDS)



SMS DELIVERY DURATION BY TECHNOLOGY



SURVEY MAPS & GRAPHICAL RESULTS

7.1 The 4G/LTE (RSRP) and 3G (RSCP) Signal Strength samples recorded during drive test on survey routes, were plotted on maps. The Signal Strength maps along-with Voice, SMS and Data QoS KPIs survey results in graphical form are shown at **Annex-A, Annex-B & Annex-C** for Cities of Punjab, Khyber Pakhtunkhwa and Balochistan respectively.

STANDING IN SURVEY

8.1. CMOs have been prioritized/ placed at 1st, 2nd, 3rd & 4th position in each category i.e. Mobile Network Coverage, Mobile Broadband Service and Voice Service based upon the compliance level against each QoS KPI in each category in 14 x surveyed cities of Punjab, Khyber Pakhtunkhwa and Balochistan.

a. **MOBILE NETWORK COVERAGE.** The categorization of CMOs as per QoS KPI i.e. Signal Strength of 4G/LTE and 3G Networks measured in Technology Auto Detect and Locked Mode is shown in **Table 8.1: CMOs Standing in Mobile Network Coverage – Technology Auto Detect Mode** & **Table 8.2: CMOs Standing in Mobile Network Coverage – Technology Locked Mode**

S. #.	Operator	Compliance Level – Number of Cities Technology Auto Detect Mode						Standing
		Compliant			Non-Compliant			
		4G	3G	Total	4G	3G	Total	
1.	ZonG	13	1	14	1	-	1	1st
2.	Jazz	11	3	14	2	-	2	2nd
3.	Ufone	10	7	17	3	-	3	3rd
4.	Telenor	10	2	12	4	-	4	4th

Table 8.1: CMOs Standing in Mobile Network Coverage – Technology Auto Detect Mode

S. #.	Operator	Compliance Level – Number of Cities Technology Locked Mode						Standing
		Compliant			Non-Compliant			
		4G	3G	Total	4G	3G	Total	
1.	ZonG	14	14	28	-	-	-	1st
2.	Telenor	13	14	27	1	-	1	2nd
3.	Ufone	12	14	26	1	-	1	3rd
4.	Jazz	9	10	19	4	1	5	4th

Table 8.2: CMOs Standing in Mobile Network Coverage – Technology Locked Mode

b. **MOBILE BROADBAND SERVICE.** The categorization of each CMOs in Mobile Broadband Service is as under:

i. User Download Data Throughput. The User Download Data Throughput in Fixed Duration and Fixed Size Testing, as per the highest to lowest obtained results, is shown in **Table 8.3: CMOs Standing in User Download Data Throughput – Technology Auto Detect Mode** & Table **8.4: CMOs Standing in User Download Data Throughput – Technology Locked Mode.**

S. #.	Operator	Highest Download Throughput – Number of Cities								Standing	
		Technology Auto Detect Mode								Fixed Duration	Fixed Size
		Fixed Duration				Fixed Size					
		1st	2nd	3rd	4th	1st	2nd	3rd	4th		
1.	Jazz	6	4	3	-	3	5	4	1	1st	3rd
2.	ZonG	5	7	1	1	7	5	1	1	2nd	1st
3.	Ufone	3	3	4	4	4	4	2	4	3rd	2nd
4.	Telenor	-	-	6	8	-	-	7	7	4th	4th

Table 8.3: CMOs Standing in User Download Data Throughput – Technology Auto Detect Mode

S. #.	Operator	Highest Download Throughput – Number of Cities								Standing	
		4G Locked Mode				3G Locked Mode				4G Fixed Duration	3G Fixed Duration
		Fixed Duration				Fixed Size					
		1st	2nd	3rd	4th	1st	2nd	3rd	4th		
1.	ZonG	5	6	2	1	3	1	2	8	1st	2nd
2.	Ufone	5	3	3	2	9	4	1	-	2nd	1st
3.	Jazz	4	3	6	-	2	5	4	-	3rd	3rd
4.	Telenor	-	2	3	9	-	4	7	3	4th	4th

Table 8.4: CMOs Standing in User Download Data Throughput – Technology Locked Mode

ii. User Upload Data Throughput. The User Upload Data Throughput in Fixed Duration and Fixed Size Testing, as per the highest to lowest obtained results, is shown in **Table 8.5: CMOs Standing in User Upload Data Throughput – Technology Auto Detect Mode** & Table **8.6: CMOs Standing in User Upload Data Throughput – Technology Locked Mode.**

S. #.	Operator	Highest Upload Throughput – Number of Cities								Standing	
		Technology Auto Detect Mode								Fixed Duration	Fixed Size
		Fixed Duration				Fixed Size					
		1st	2nd	3rd	4th	1st	2nd	3rd	4th		
1.	Ufone	9	4	-	1	10	3	-	1	1st	1st
2.	ZonG	5	6	3	-	3	5	4	2	2nd	2nd
3.	Jazz	-	4	9	1	-	1	4	8	3rd	4th
4.	Telenor	-	-	2	12	1	5	6	2	4th	3rd

Table 8.5: CMOs Standing in User Upload Data Throughput – Technology Auto Detect Mode

S. #.	Operator	Highest Upload Throughput – Number of Cities								Standing	
		4G Locked Mode				3G Locked Mode				4G Fixed Duration	3G Fixed Duration
		Fixed Duration				Fixed Duration					
		1st	2nd	3rd	4th	1st	2nd	3rd	4th		
1.	Ufone	10	3	-	-	13	-	1	-	1st	1st
2.	ZonG	4	5	4	1	1	4	6	3	2nd	2nd
3.	Jazz	-	6	6	1	-	-	3	8	3rd	4th
4.	Telenor	-	-	4	10	-	10	4	-	4th	3rd

Table 8.6: CMOs Standing in User Upload Data Throughput – Technology Locked Mode

iii. Webpage Loading Time. The categorization of each CMOs, as per the maximum compliant of Webpage Loading Time QoS KPIs is shown, is shown in **Table 8.7: CMOs Standing in Webpage Loading Time.**

S. #.	Operator	Webpage Loading Time - Number of Cities		Standing
		Compliant	Non-Compliant	
1.	Jazz	-	13	-
2.	Telenor	-	14	-
3.	Ufone	1	13	1st
4.	ZonG	-	14	-

Table 8.7: CMOs Standing in Webpage Loading Time

iv. Latency. The categorization of each CMOs, as per the maximum compliant of Webpage Loading Time QoS KPIs is shown in **Table 8.8: CMOs Standing in Latency.**

S. #.	Operator	Latency - Number of Cities								Standing
		Compliant				Non-Compliant				
		Auto	4G	3G	Total	Auto	4G	3G	Total	
1.	Ufone	1	8	-	9	13	5	14	32	1st
2.	ZonG	-	3	6	9	14	11	8	33	2nd
3.	Jazz	-	1	1	2	14	12	10	36	3rd
4.	Telenor	1	1	-	2	13	13	14	40	4th

Table 8.7: CMOs Standing in Webpage Loading Time

c. VOICE SERVICE. The categorization of each CMOs, as per the maximum compliant of Voice QoS KPIs is shown in **Table 8.8: CMOs Standing in Voice Service.**

S. #.	Operator	Voice QoS KPIs		Standing
		Compliant	Non-Compliant	
1.	Ufone	90	7	1st
2.	Jazz	70	8	2nd
3.	ZonG	76	10	3rd
4.	Telenor	63	24	4th

Table 8.8: CMOs Standing in Voice Service

d. OVERALL STANDING. The overall standing of each CMOs in different category of services is mentioned in **Table 8.9: CMOs Overall Standing in QoS Survey.**

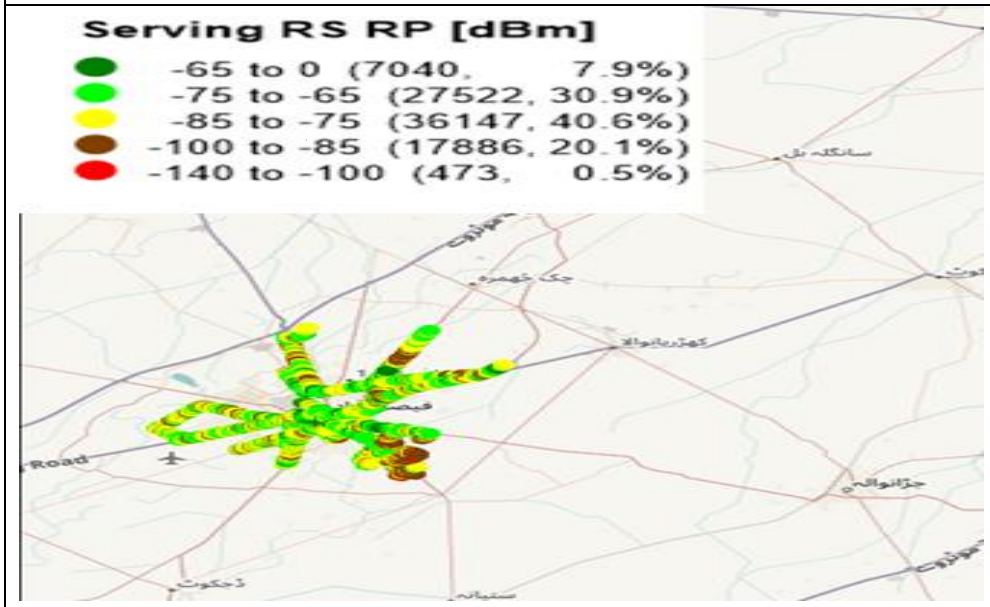
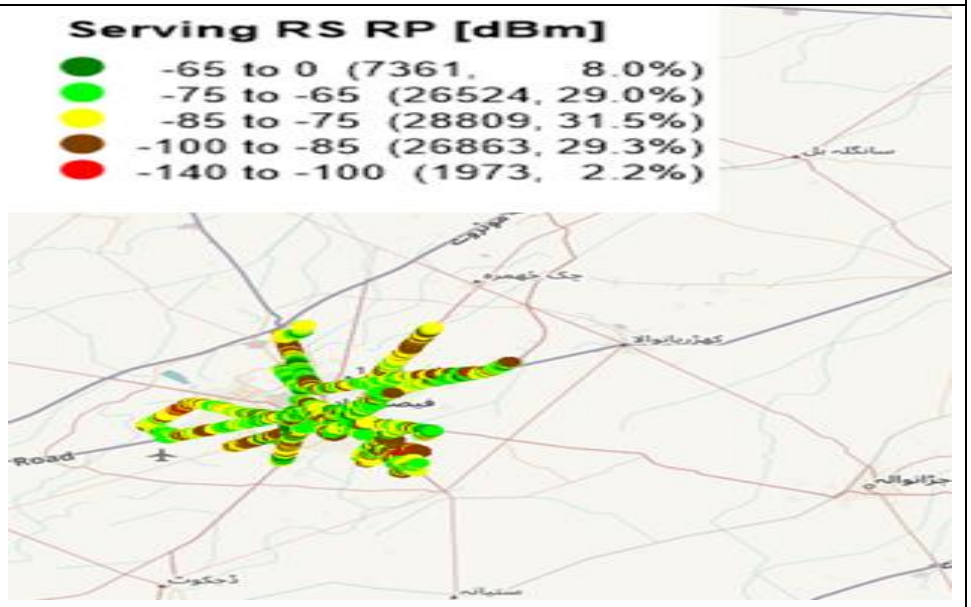
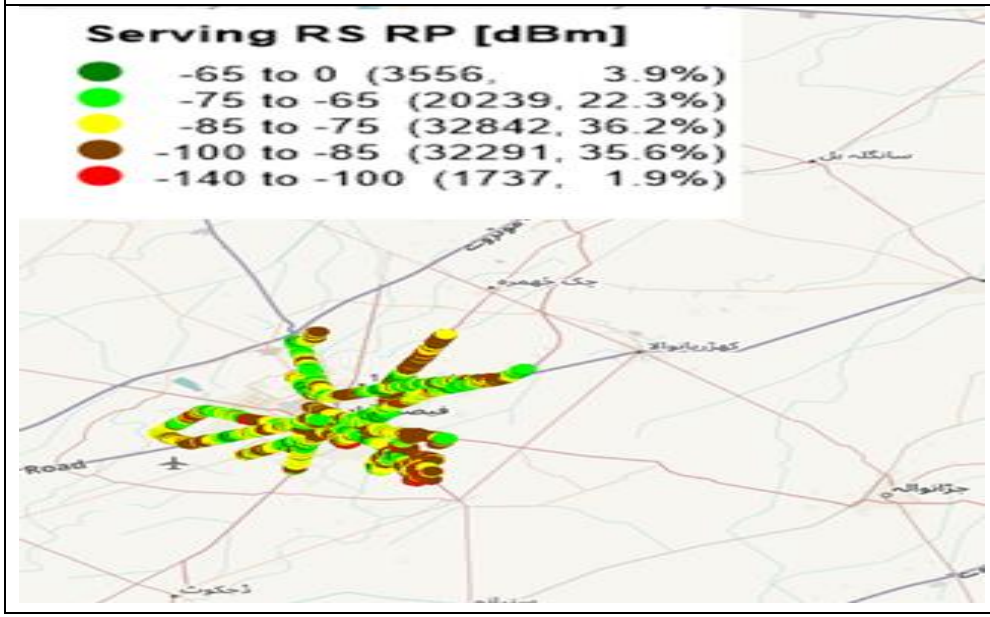
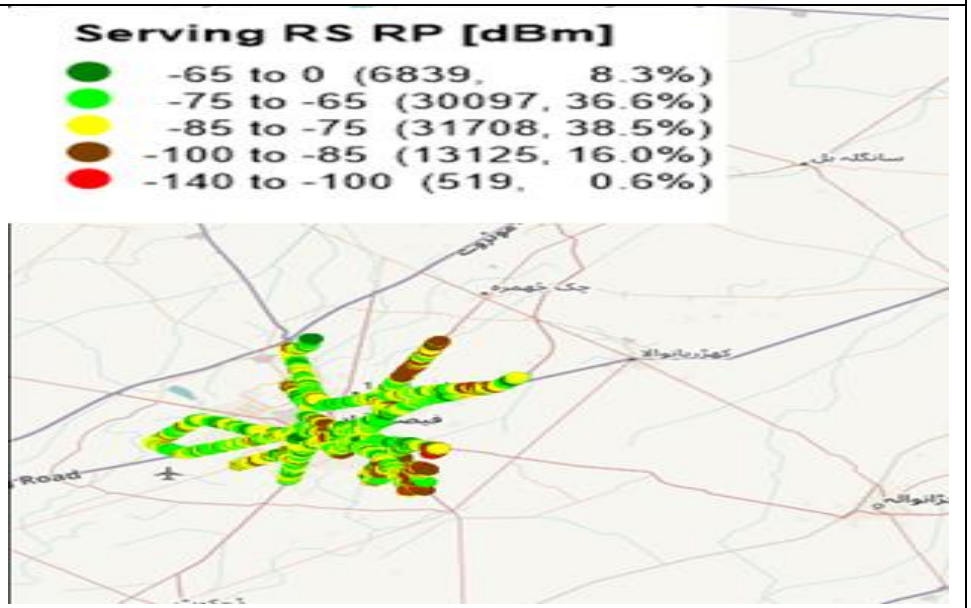
S. #.	Service				STANDING			
					1st	2nd	3rd	4th
1.	Mobile Network Coverage			Auto Mode	ZonG	Jazz	Ufone	Telenor
				Locked Mode	ZonG	Telenor	Ufone	Jazz
2.	Mobile Broadband	Fixed Duration	Download	Auto Mode	Jazz	ZonG	Ufone	Telenor
				4G	ZonG	Ufone	Jazz	Telenor
				3G	Ufone	ZonG	Jazz	Telenor
			Upload	Auto Mode	Ufone	ZonG	Jazz	Telenor
				4G	Ufone	ZonG	Jazz	Telenor
				3G	Ufone	ZonG	Telenor	Jazz
		Fixed Size	Download	Auto Mode	ZonG	Ufone	Jazz	Telenor
			Upload	Auto Mode	Ufone	ZonG	Telenor	Jazz
		Webpage Loading Time			Ufone	No compliance even in single city		
		Latency			Ufone	ZonG	Jazz	Telenor
3.	Voice				Ufone	Jazz	ZonG	Telenor

Table 8.9: CMOs Overall Standing in QoS Survey

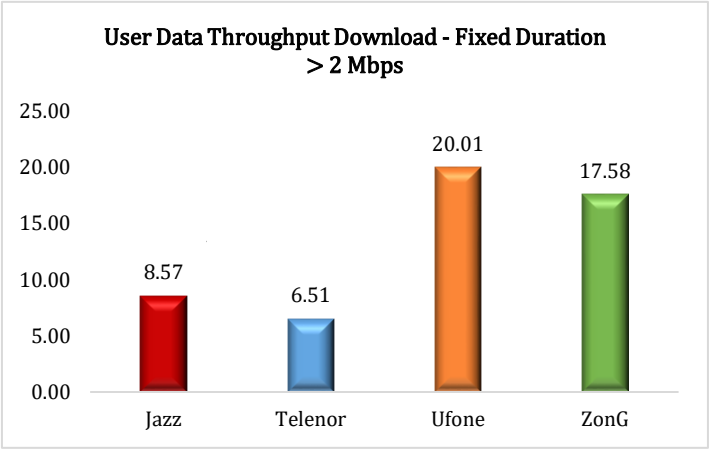
ANNEX – A

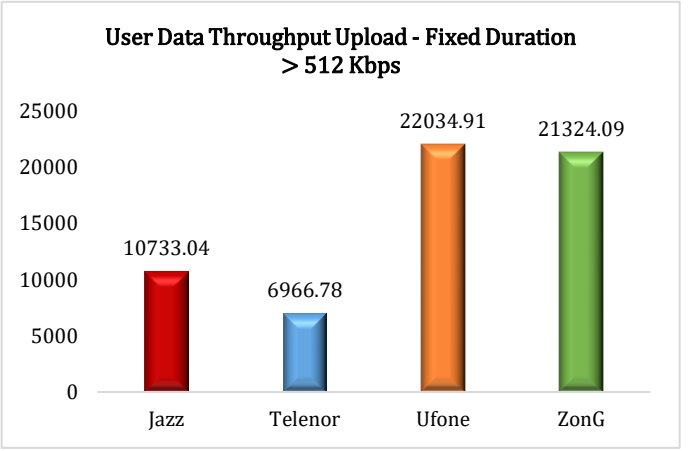
PUNJAB

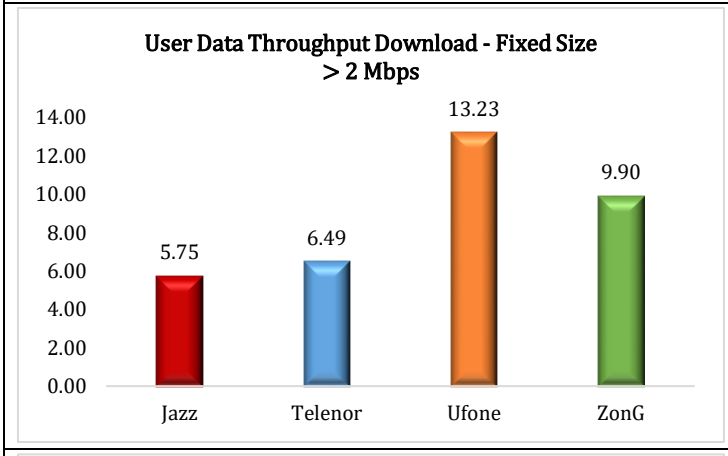
AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

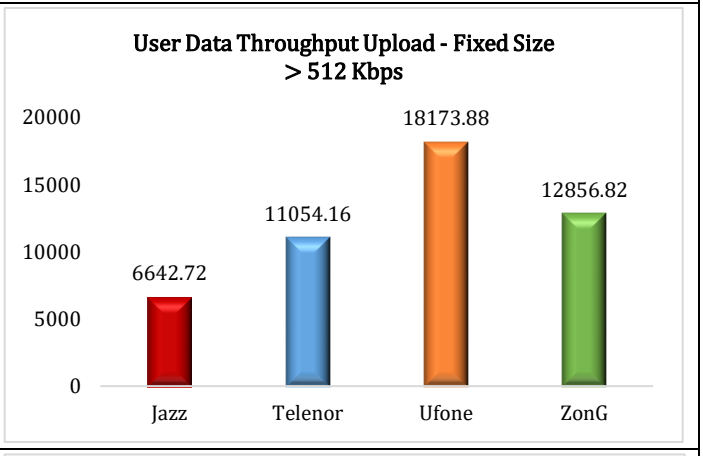
JAZZ 4G NETWORK COVERAGE – FAISALABAD	TELENOR 4G NETWORK COVERAGE – FAISALABAD
	
UFONE 4G NETWORK COVERAGE – FAISALABAD	**ZONG 4G NETWORK COVERAGE – FAISALABAD**
	

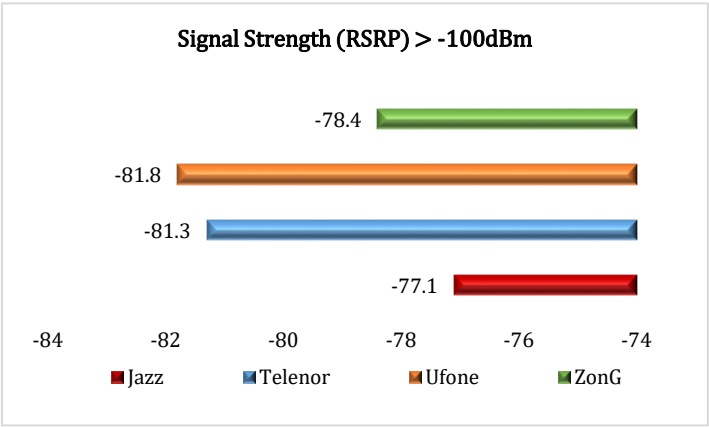
QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – FAISALABAD

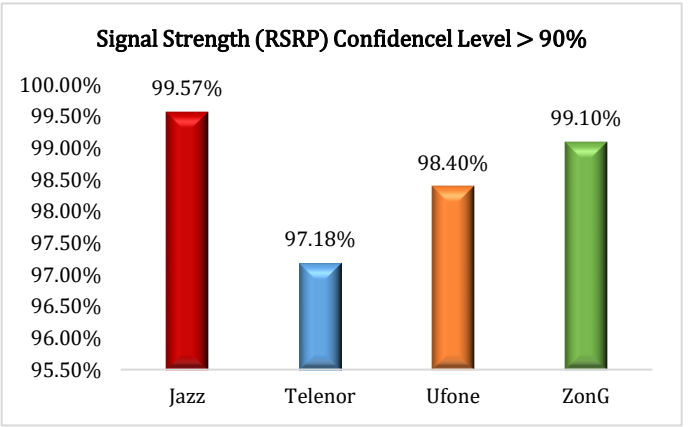


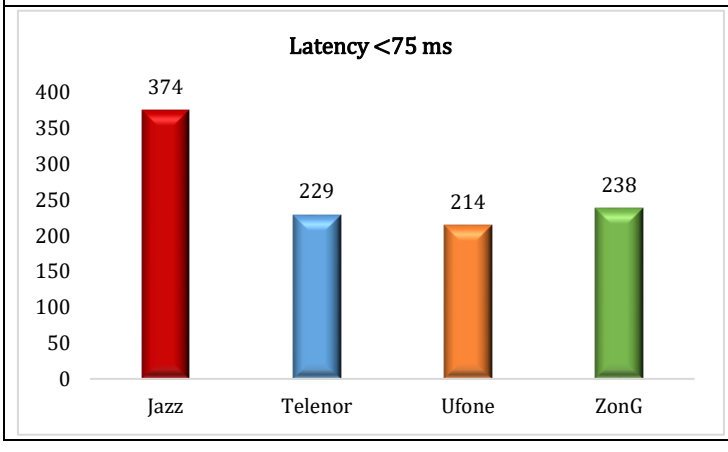


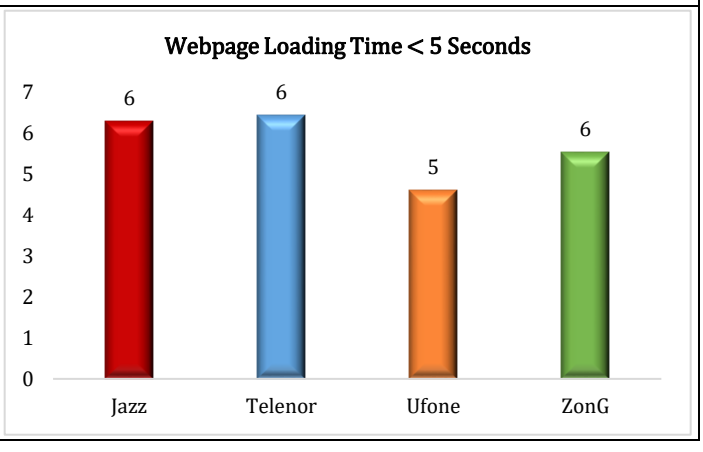












4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

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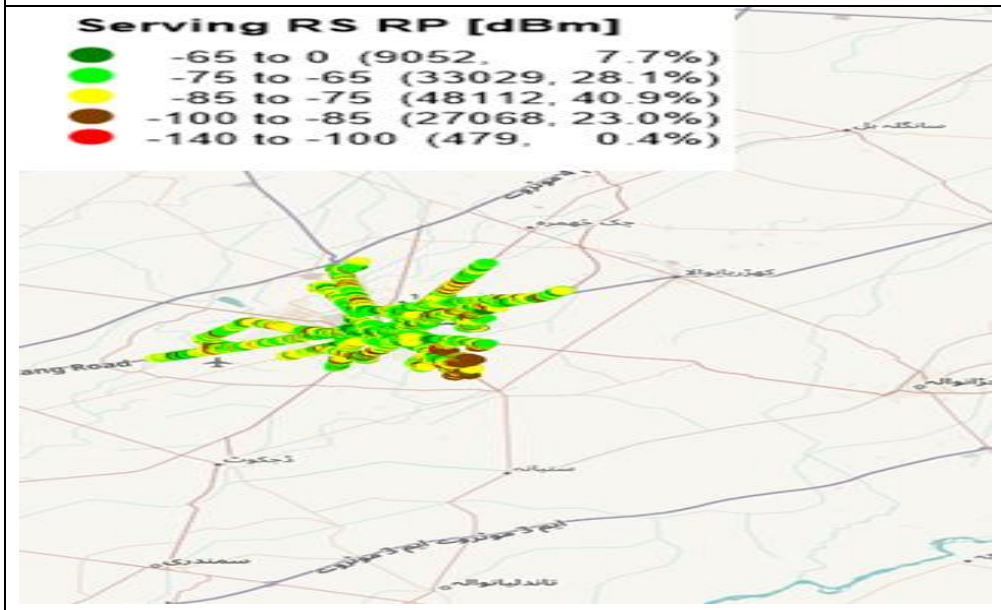
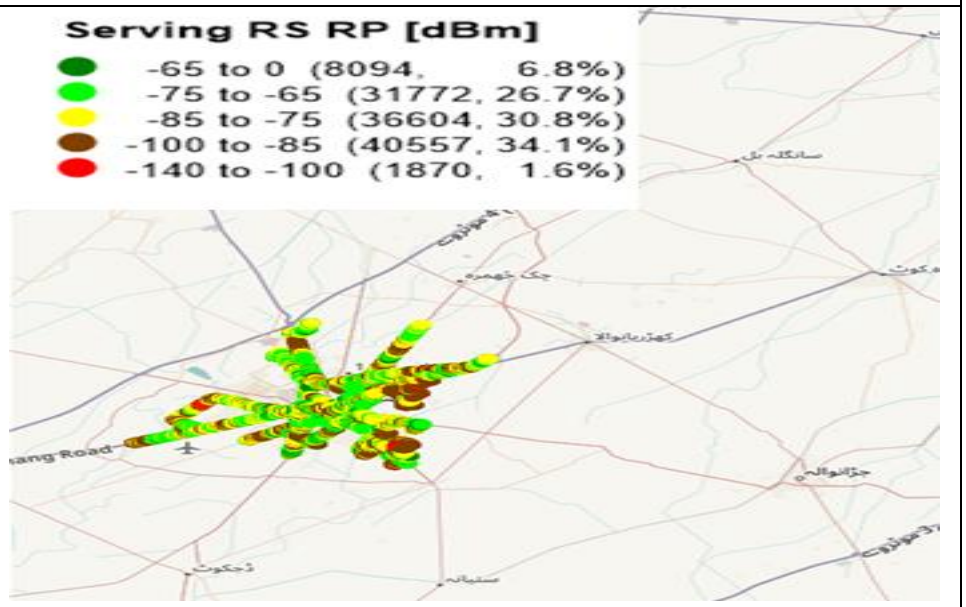
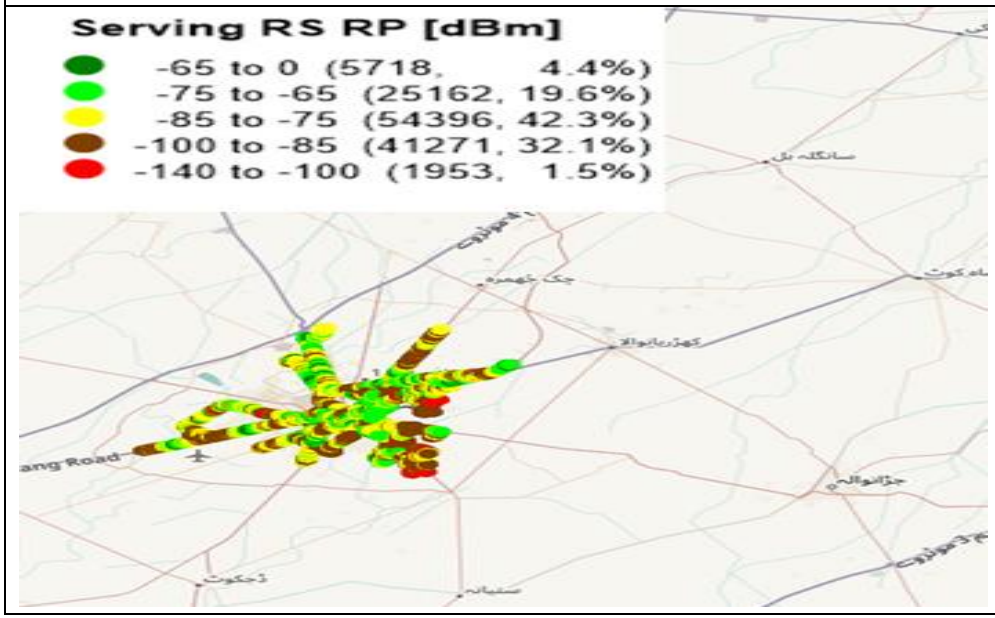
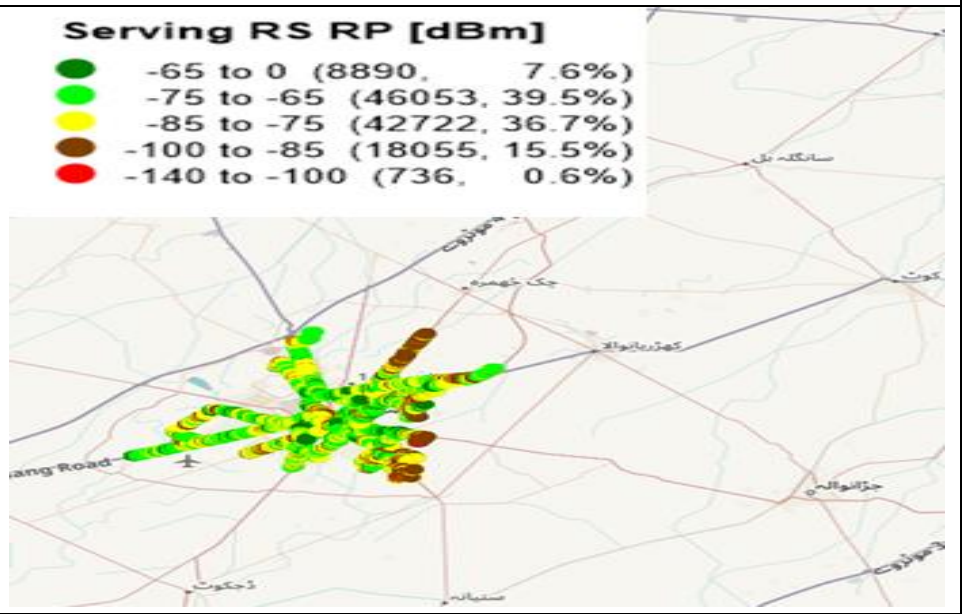
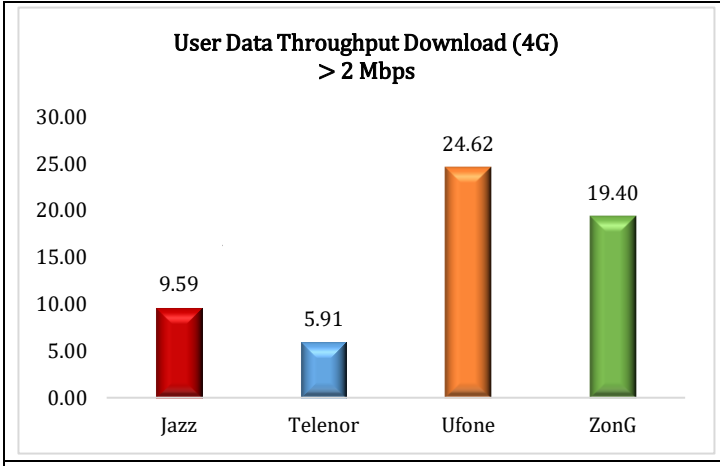
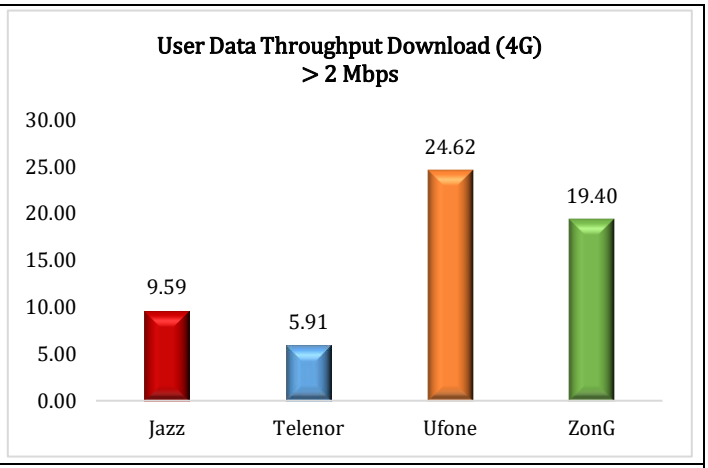
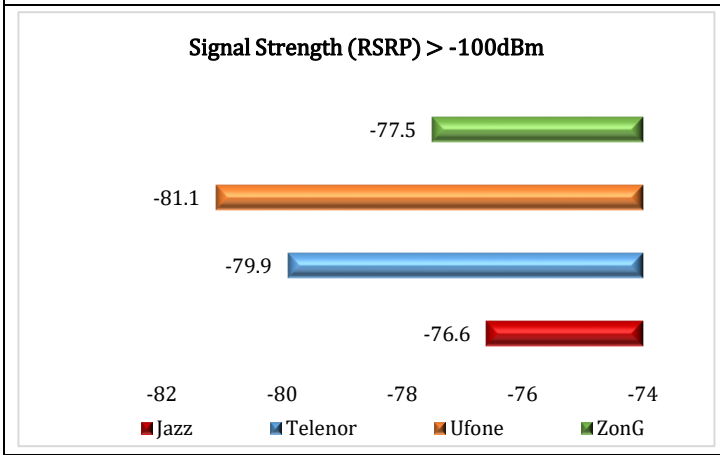
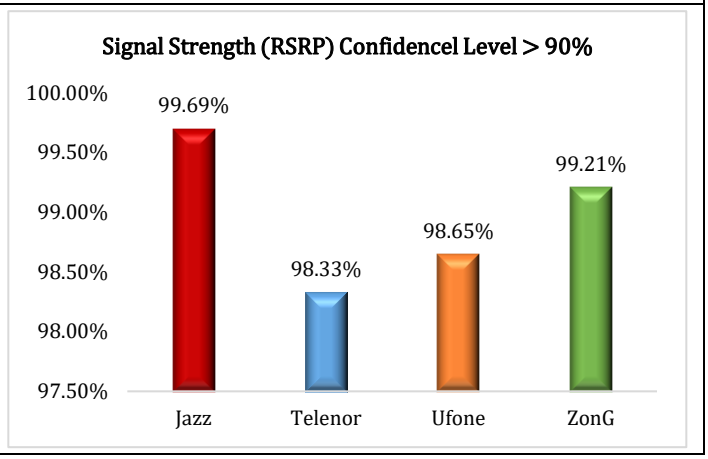
	
UFONE 4G NETWORK COVERAGE – FAISALABAD	**ZONG 4G NETWORK COVERAGE – FAISALABAD**
	

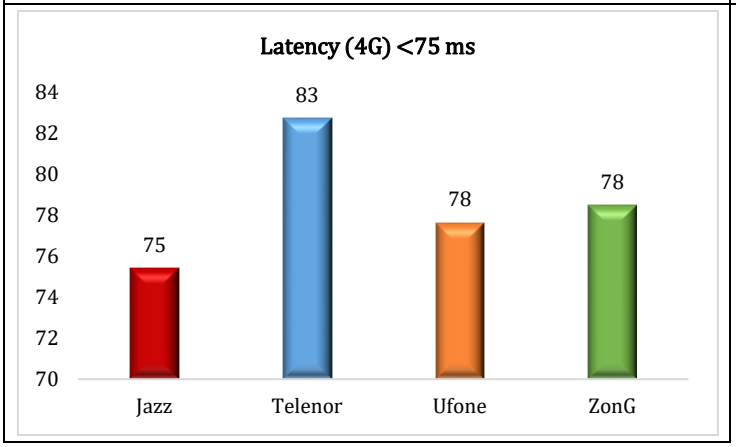
QUALITY OF SERVICE SURVEY RESULTS (4G) – FAISALABAD





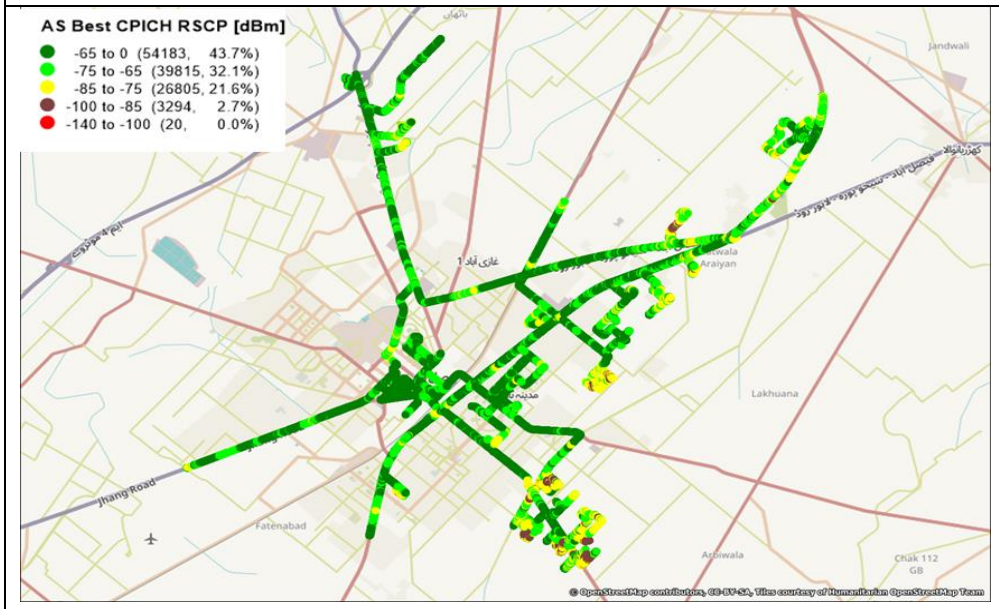




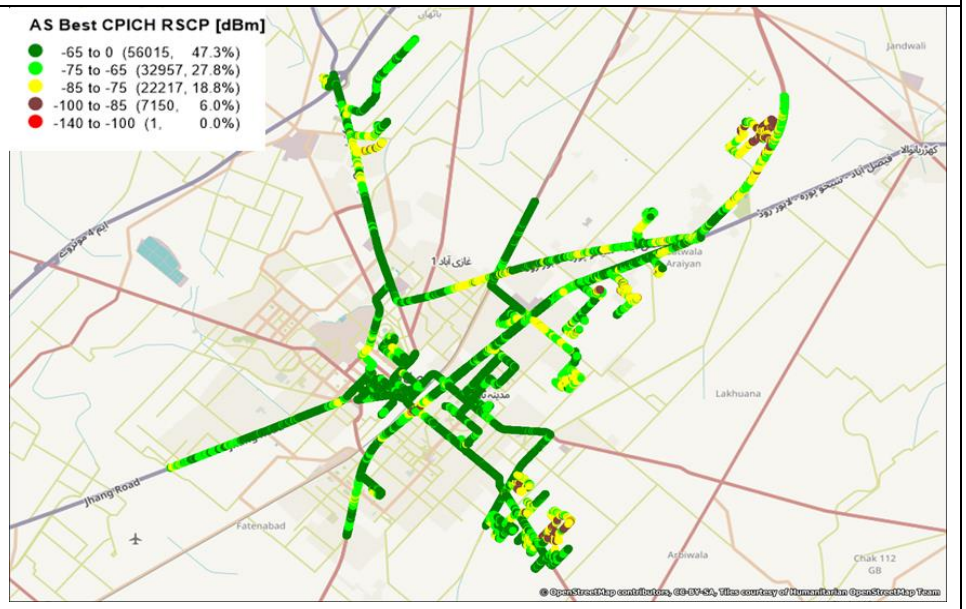


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

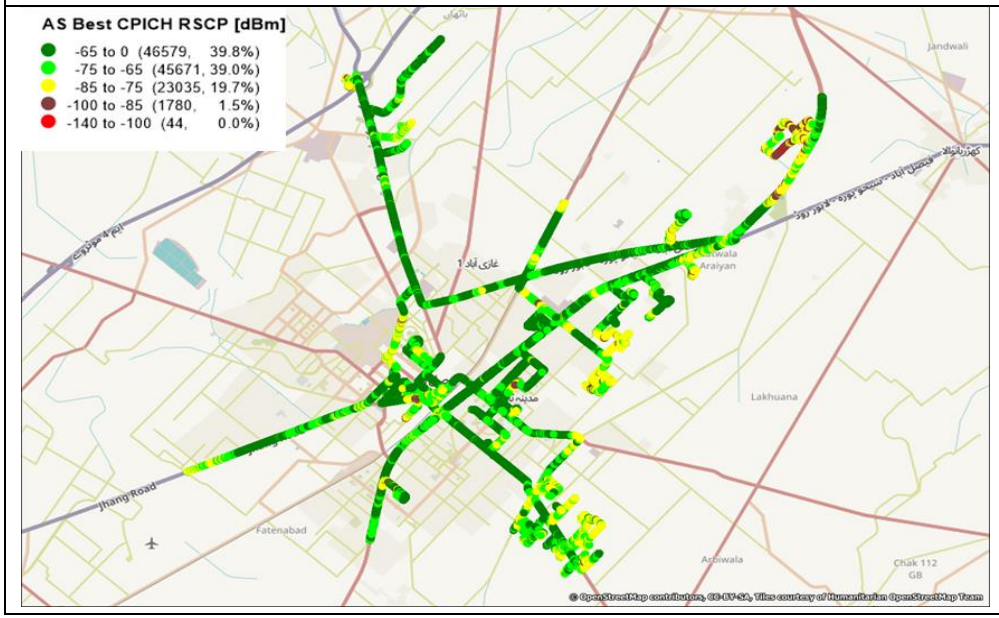
JAZZ 3G NETWORK COVERAGE – FAISALABAD



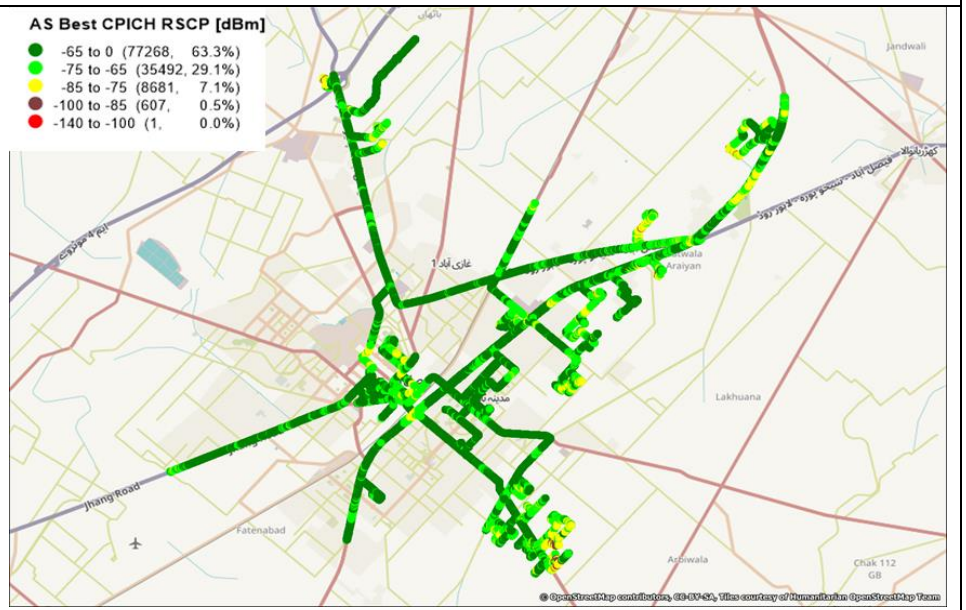
TELENOR 3G NETWORK COVERAGE – FAISALABAD



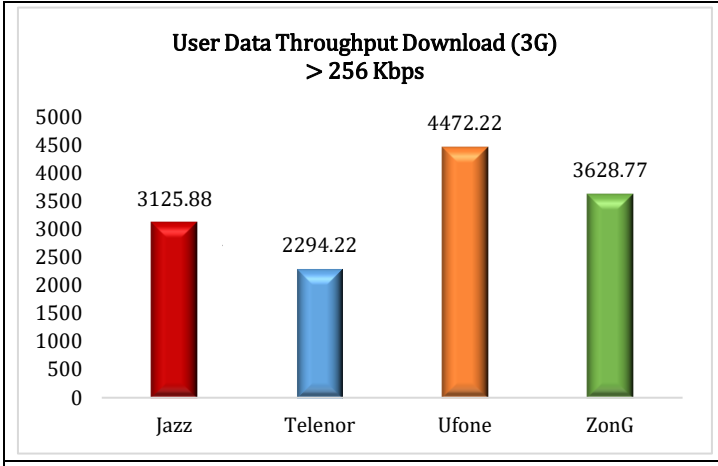
UFONE 3G NETWORK COVERAGE – FAISALABAD

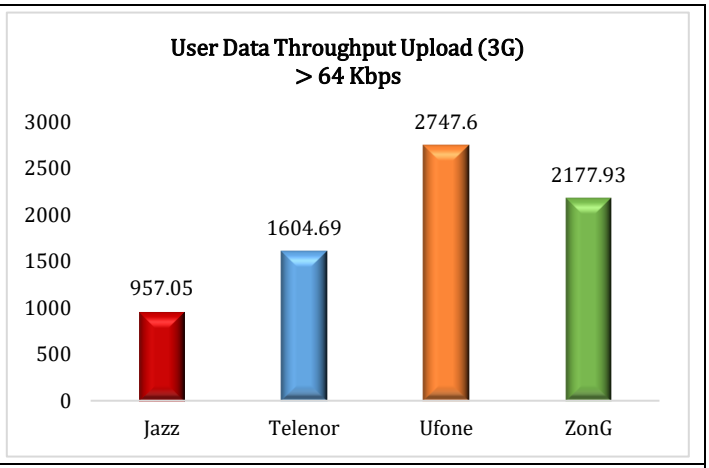


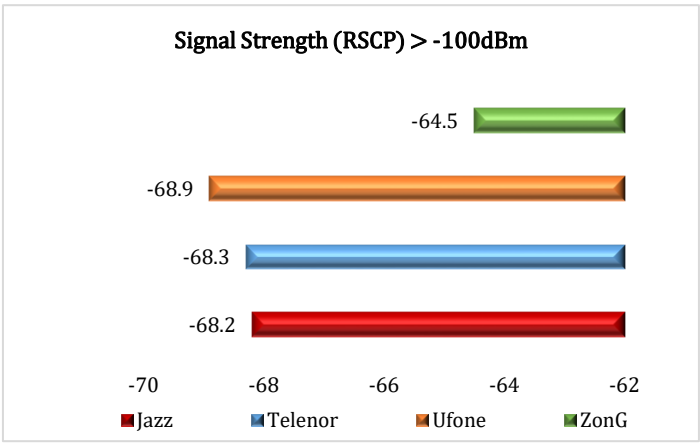
ZONG 3G NETWORK COVERAGE – FAISALABAD

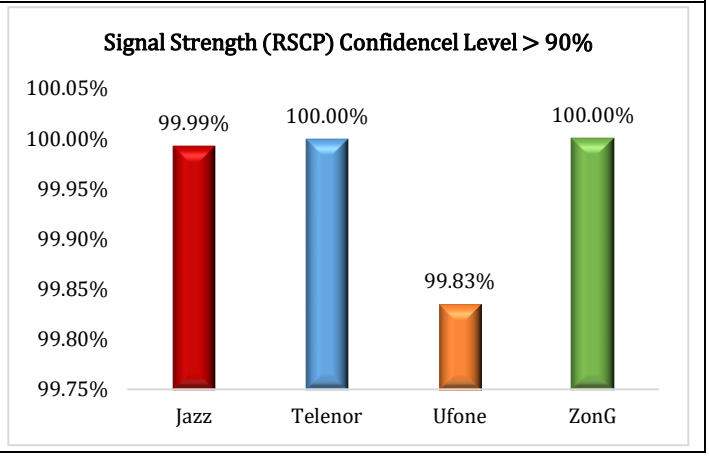


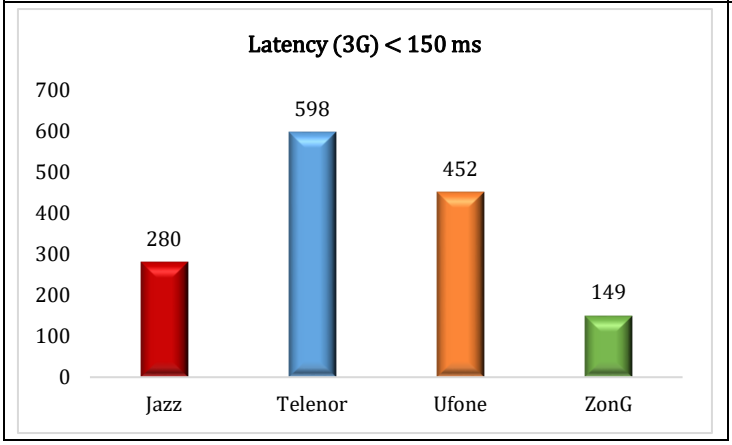
QUALITY OF SERVICE SURVEY RESULTS (3G) – FAISALABAD



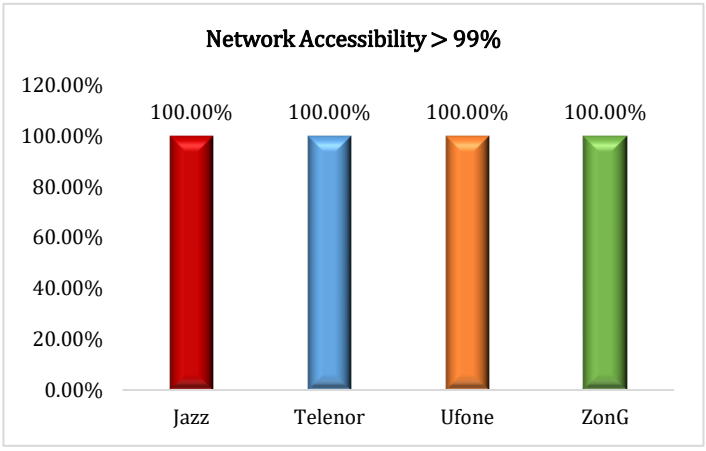


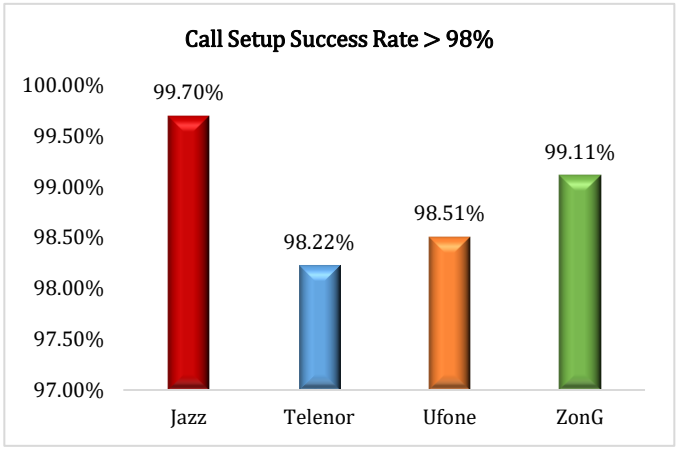


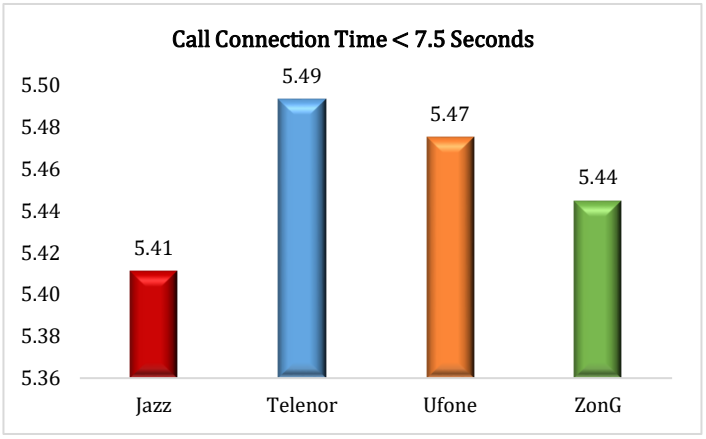


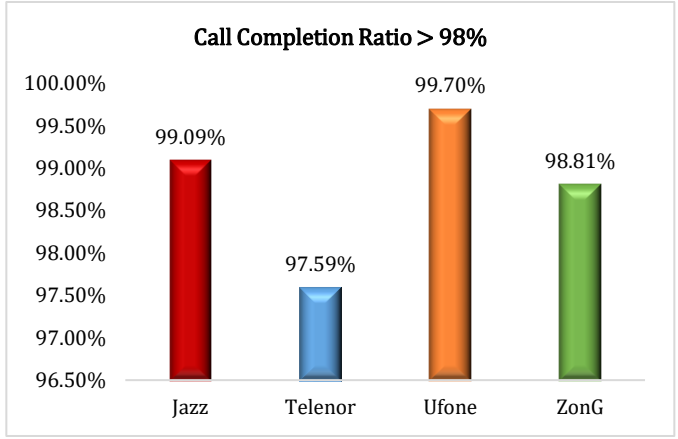


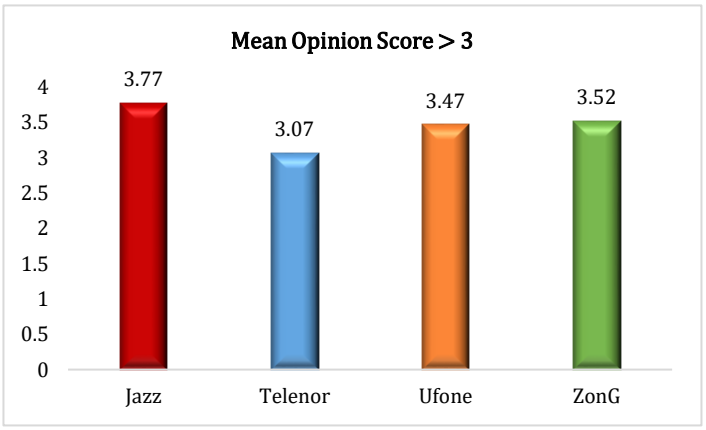
QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – FAISALABAD

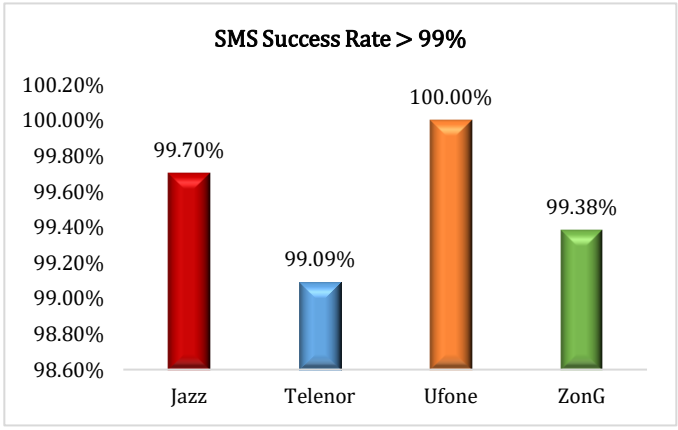


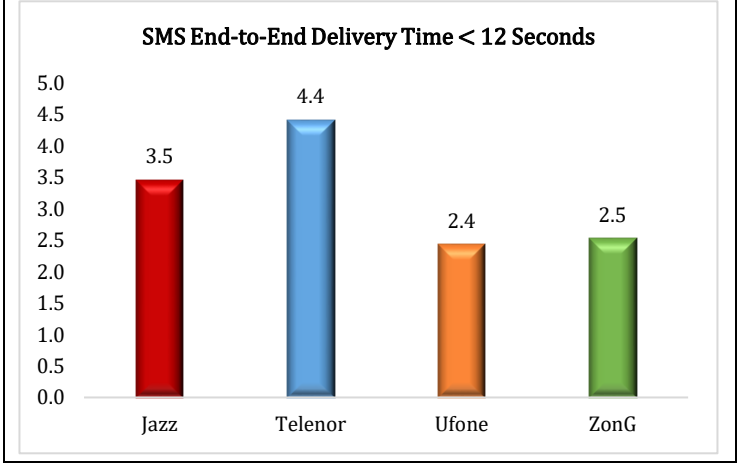






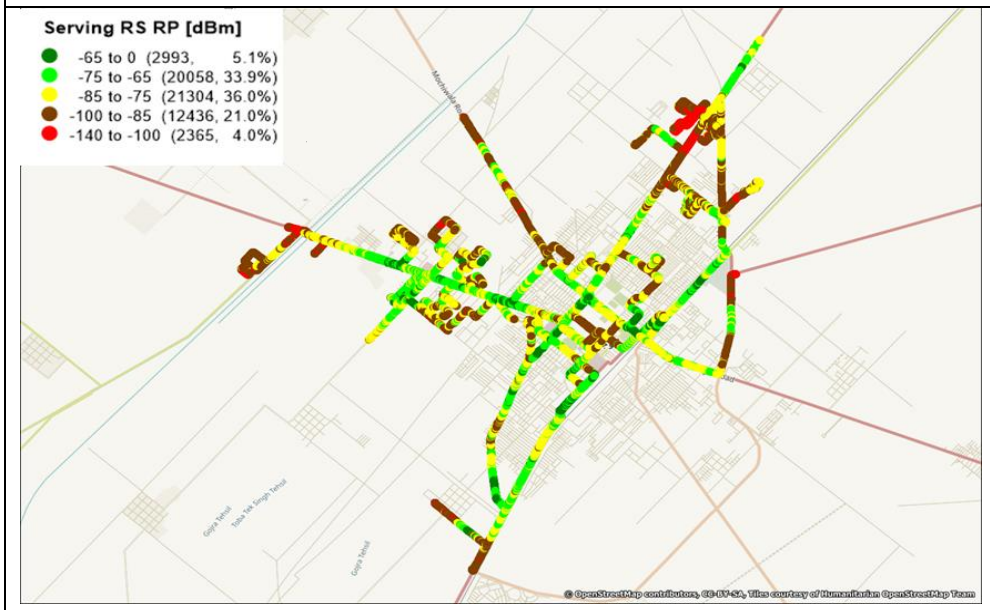




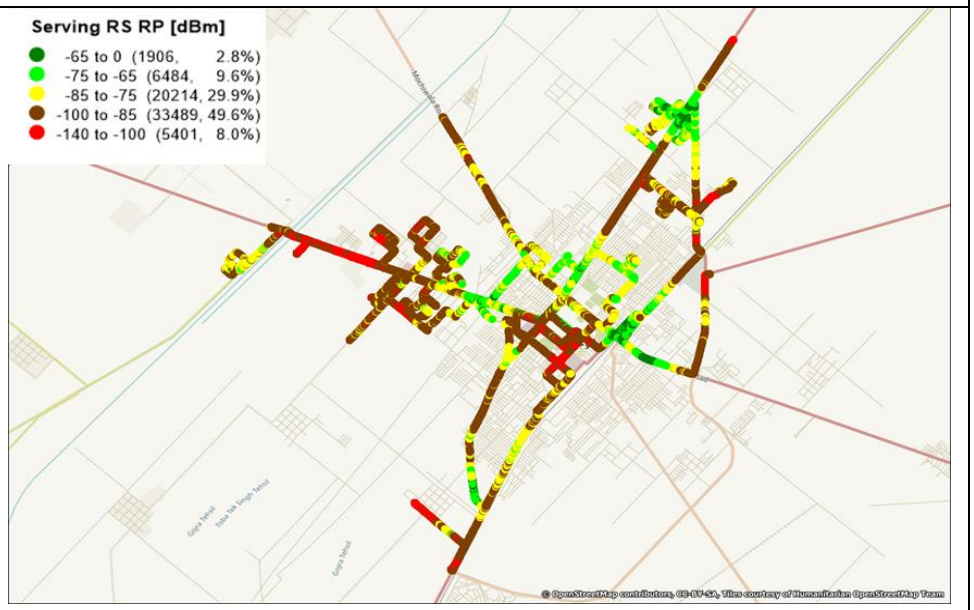


AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

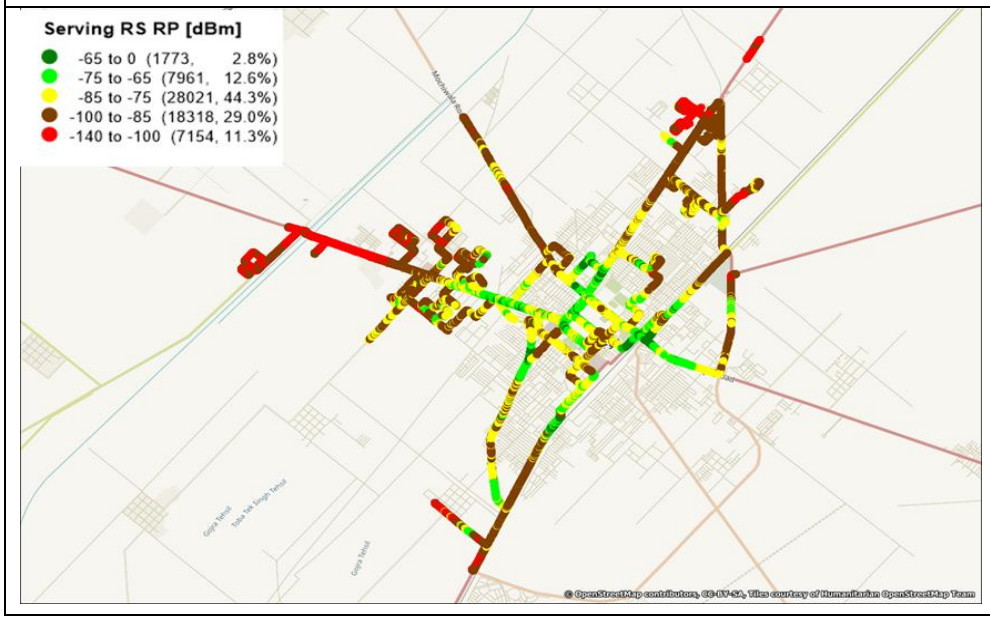
JAZZ 4G NETWORK COVERAGE – GOJRA



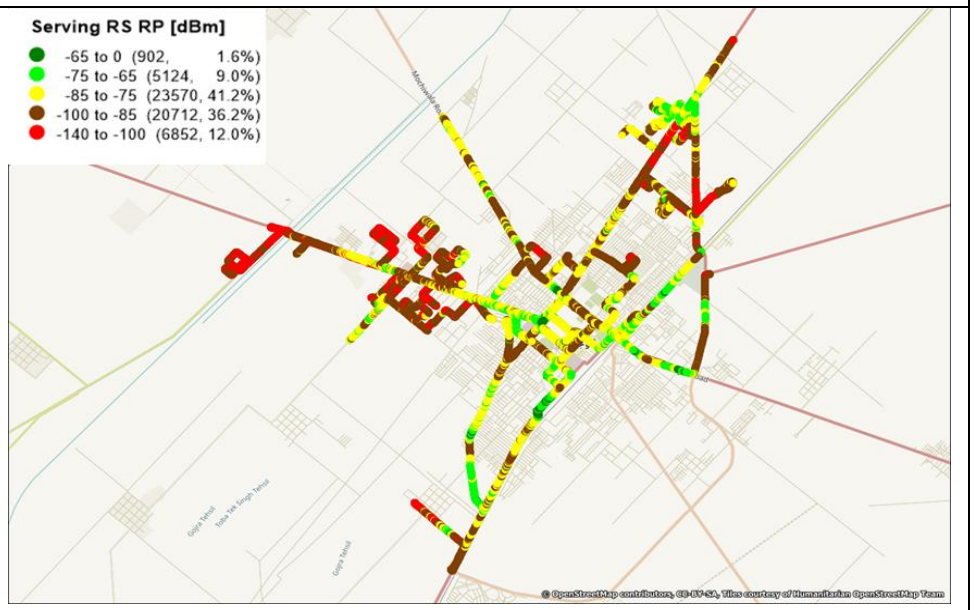
TELENOR 4G NETWORK COVERAGE – GOJRA



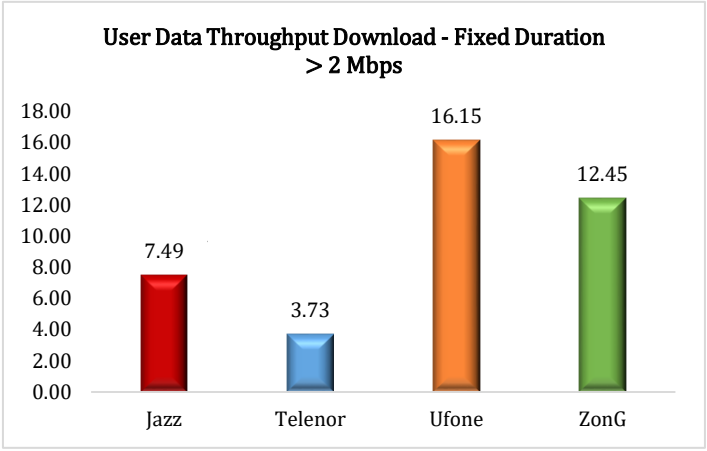
UFONE 4G NETWORK COVERAGE – GOJRA

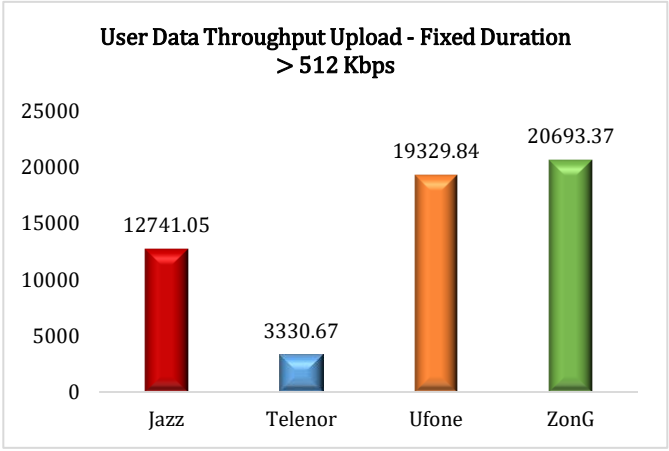


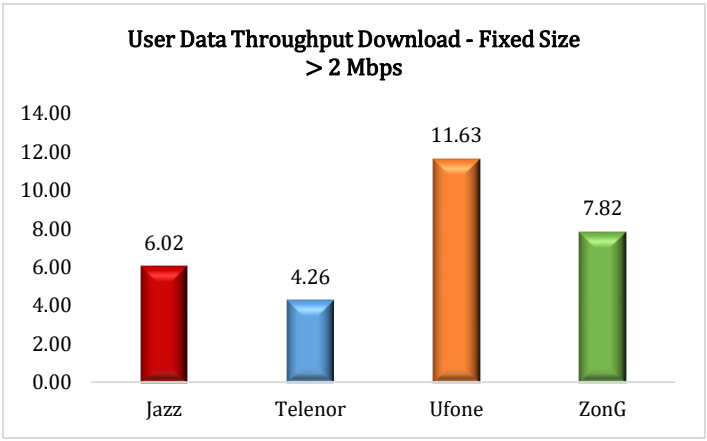
ZONG 4G NETWORK COVERAGE – GOJRA

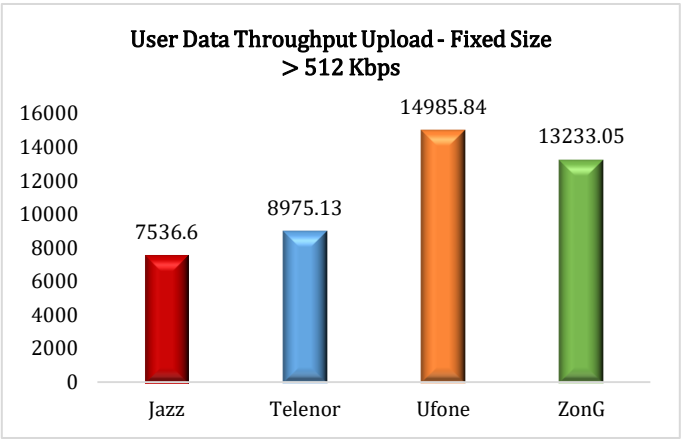


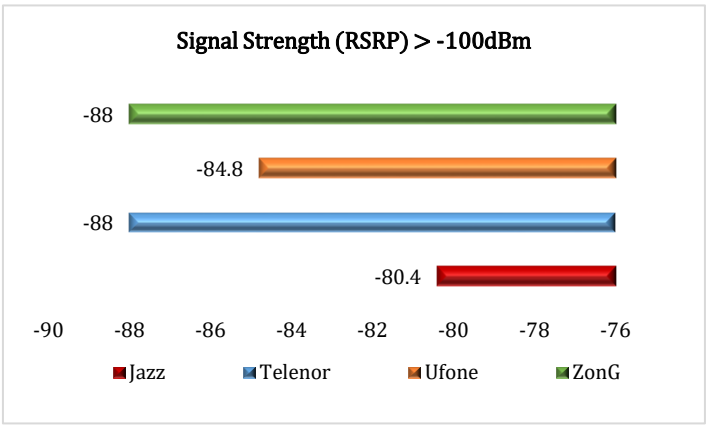
QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – GOJRA

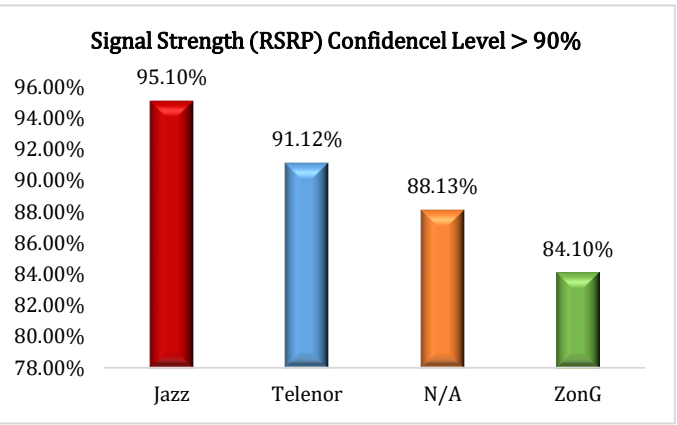


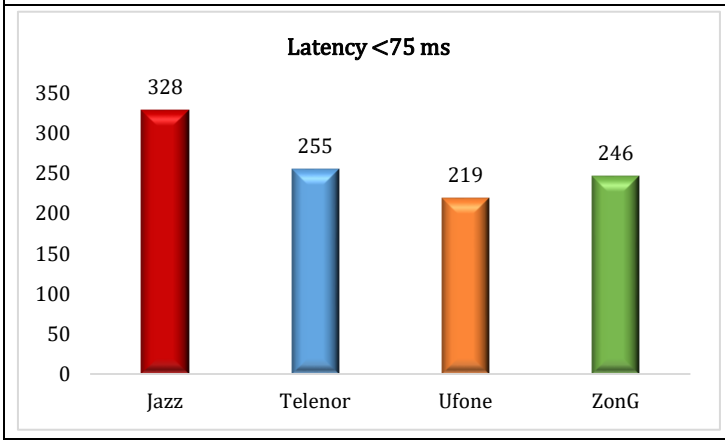


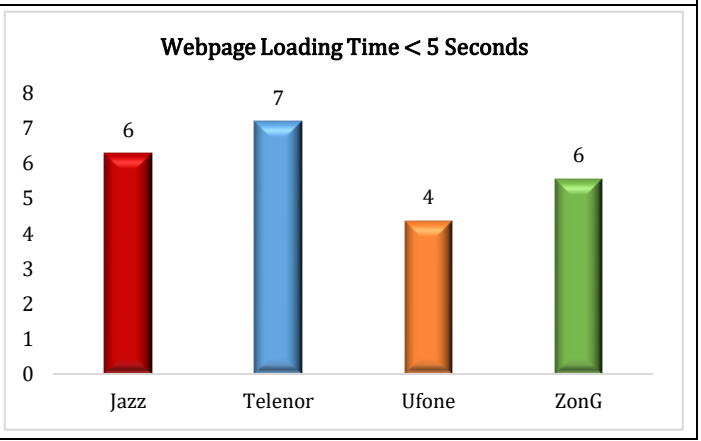






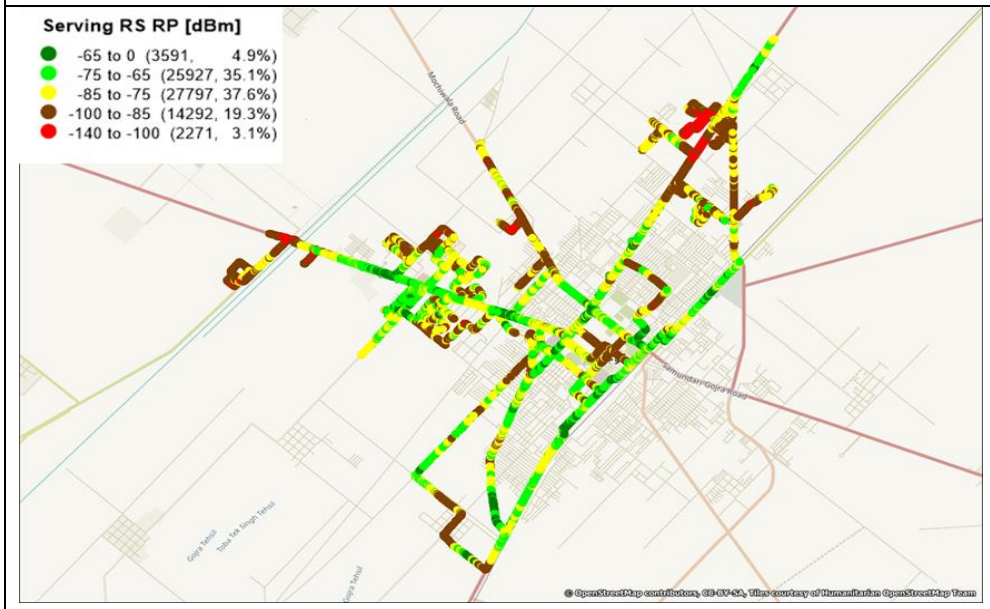




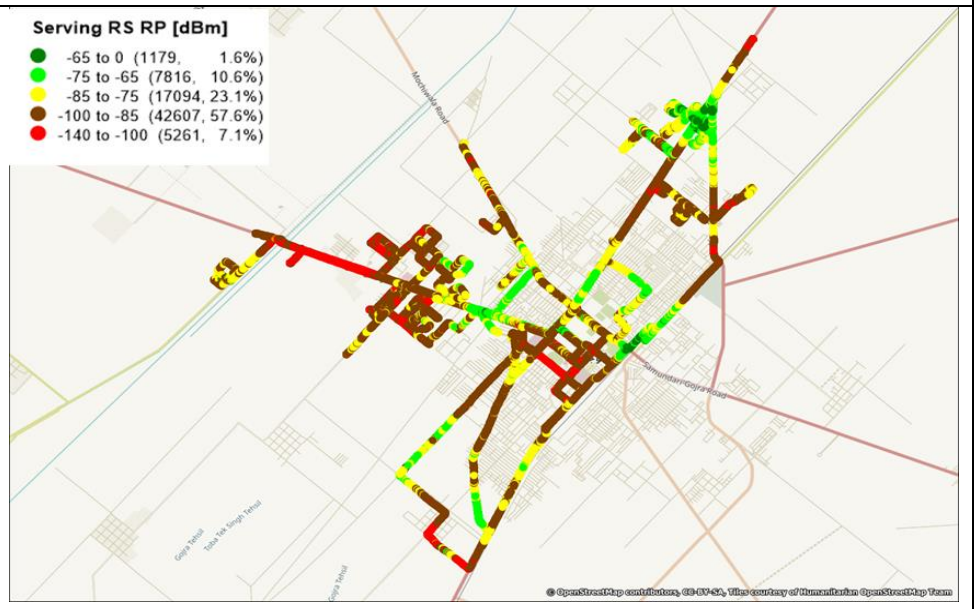


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

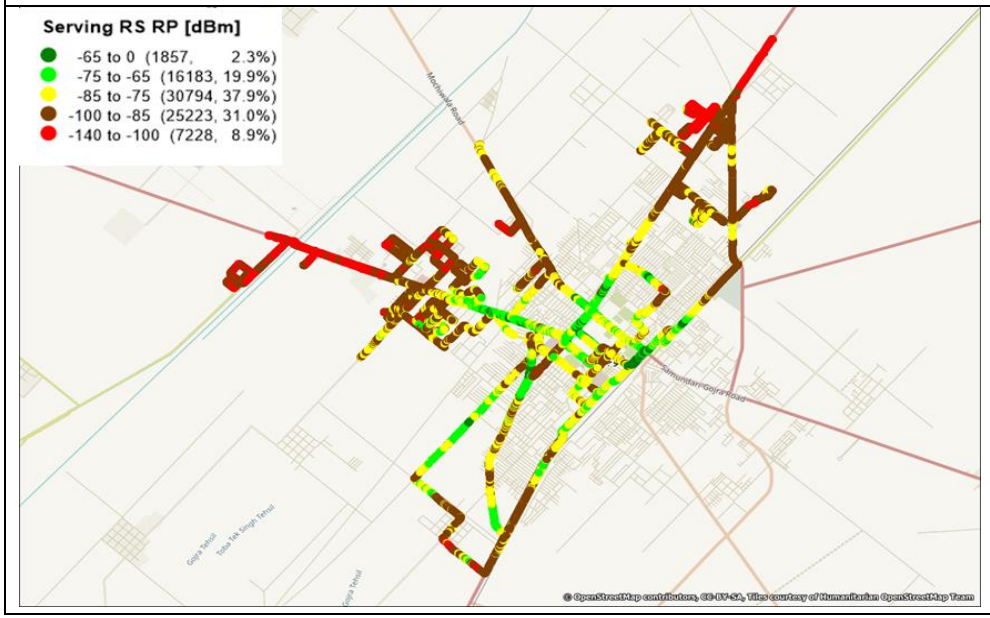
JAZZ 4G NETWORK COVERAGE – GOJRA



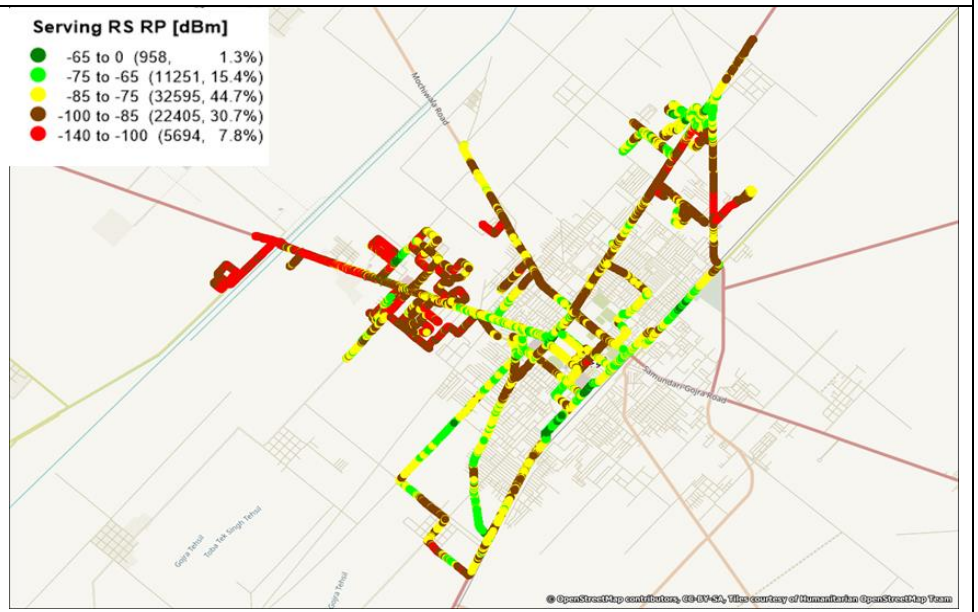
TELENOR 4G NETWORK COVERAGE – GOJRA



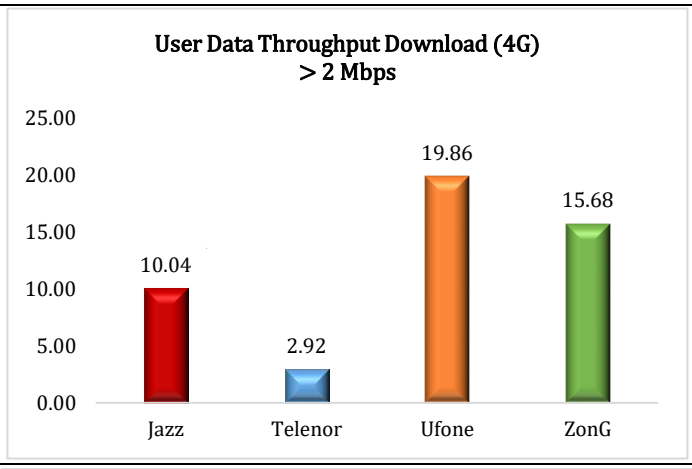
UFONE 4G NETWORK COVERAGE – GOJRA

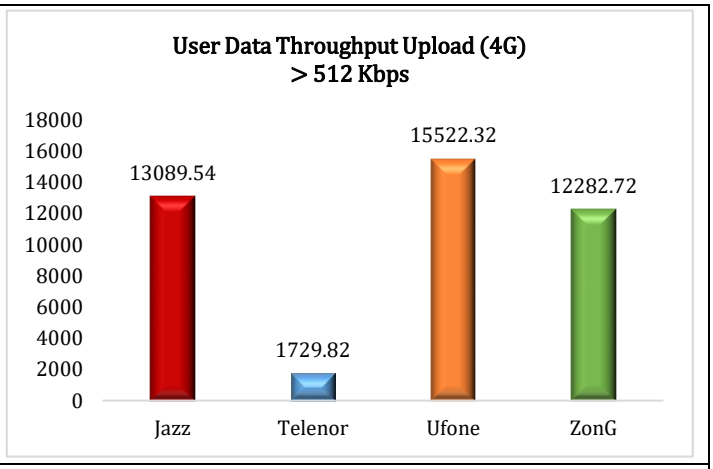


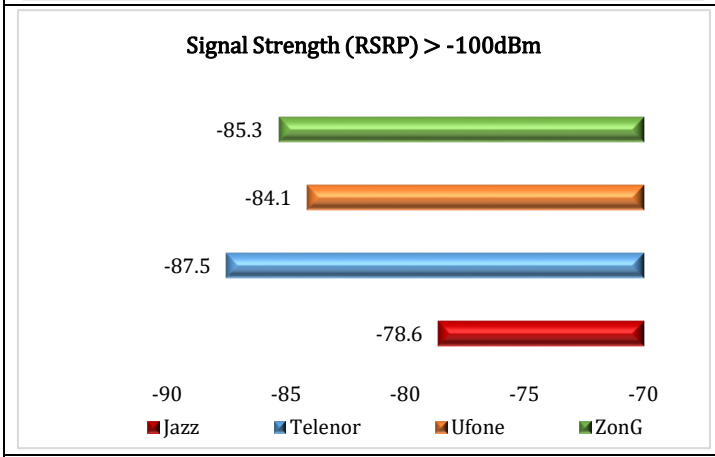
ZONG 4G NETWORK COVERAGE – GOJRA

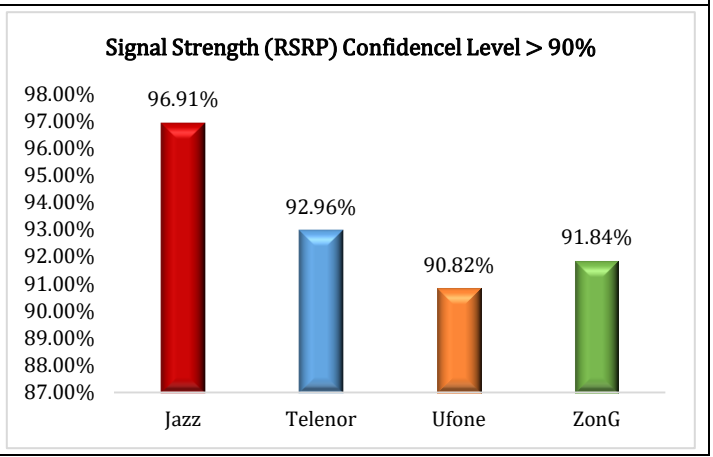


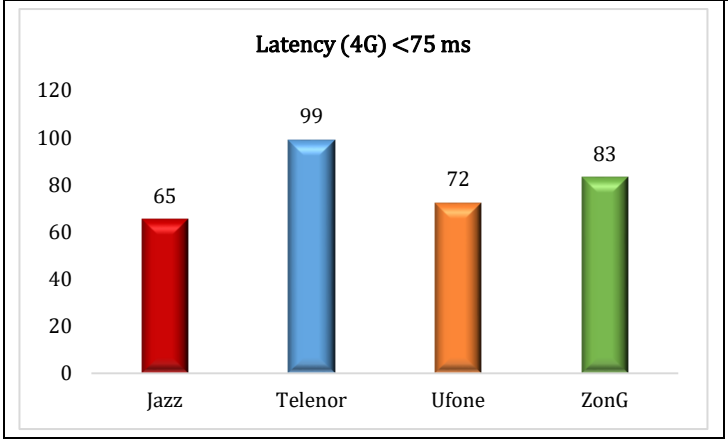
QUALITY OF SERVICE SURVEY RESULTS (4G) – GOJRA





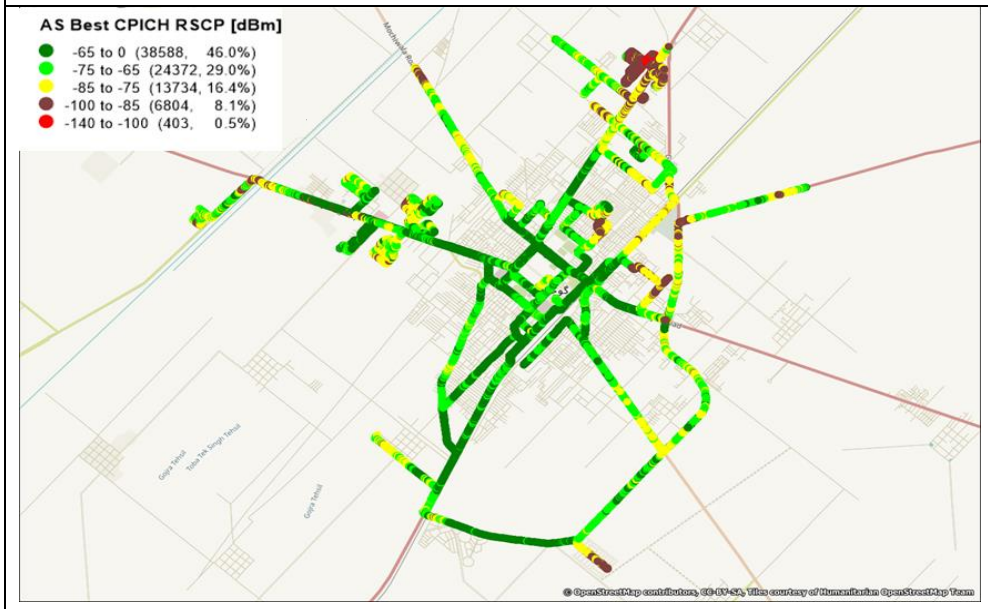




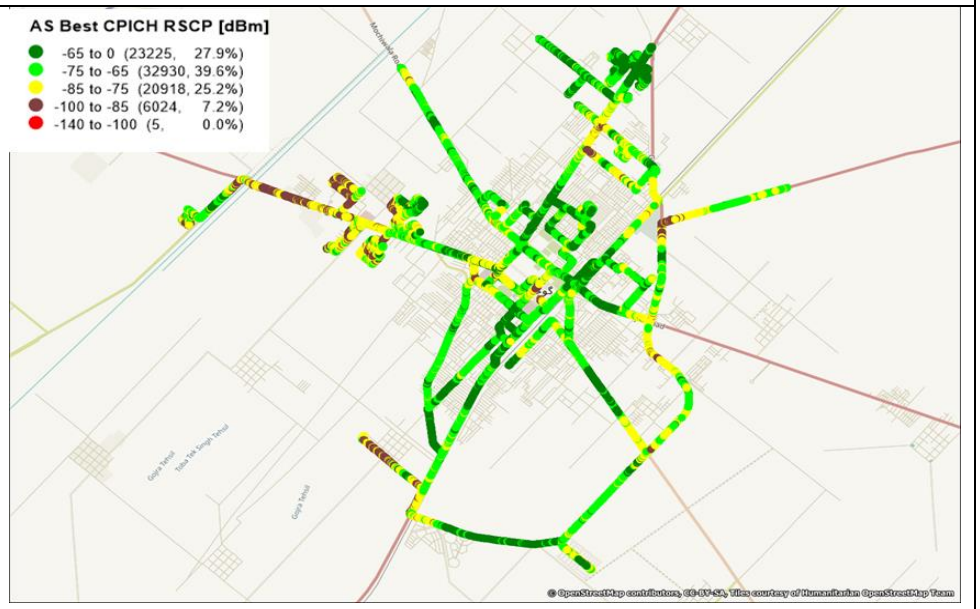


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

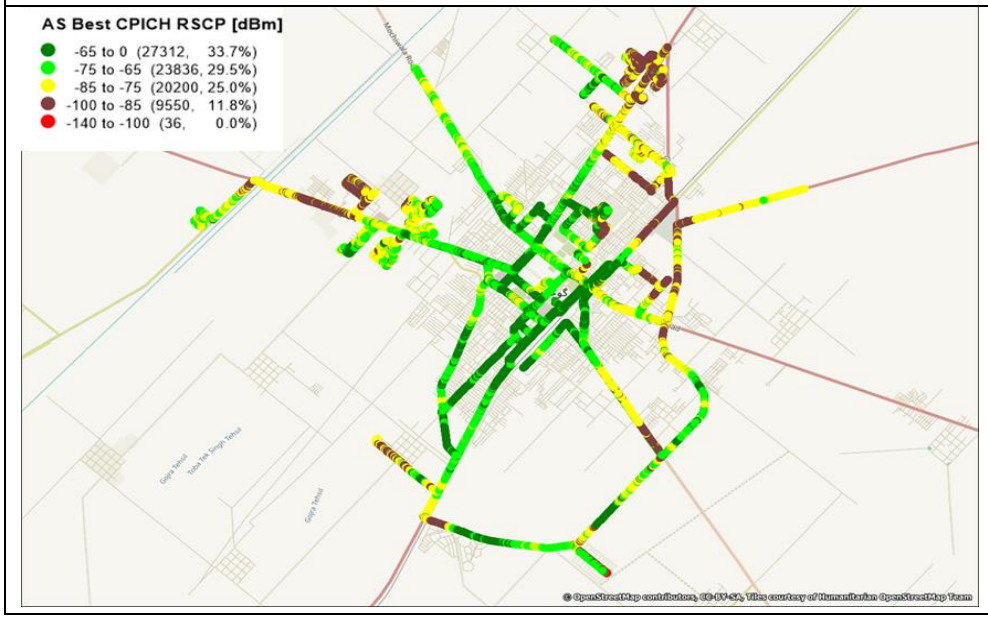
JAZZ 3G NETWORK COVERAGE – GOJRA



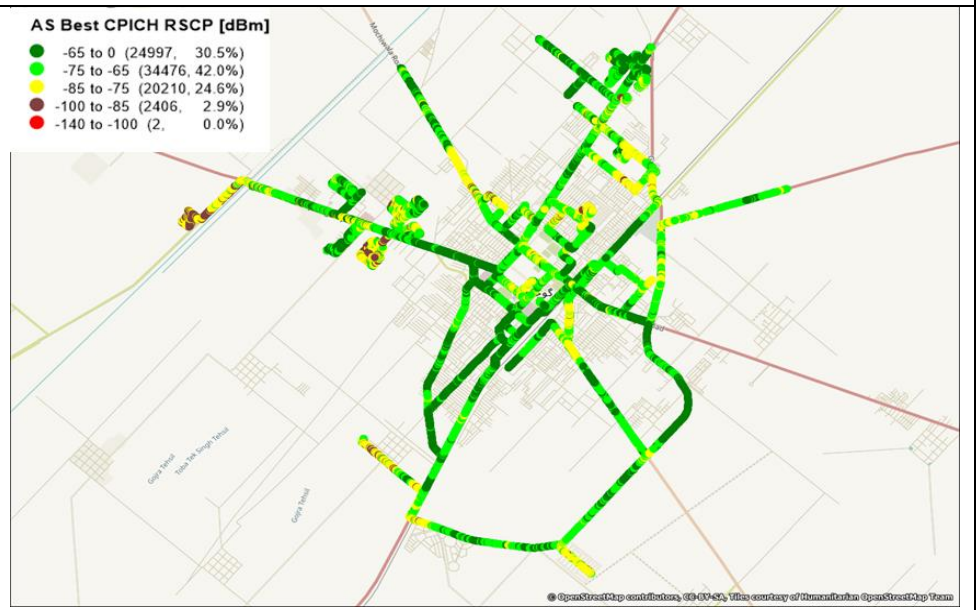
TELENOR 3G NETWORK COVERAGE – GOJRA



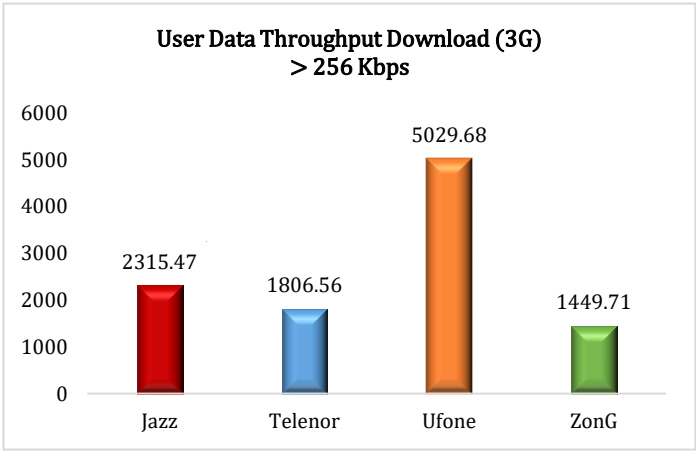
UFONE 3G NETWORK COVERAGE – GOJRA

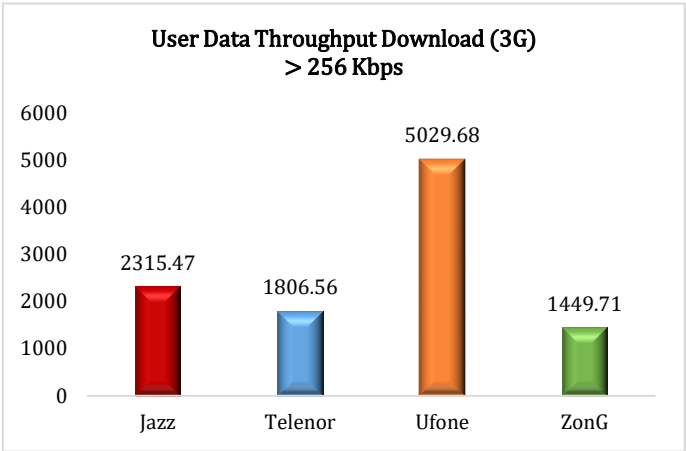


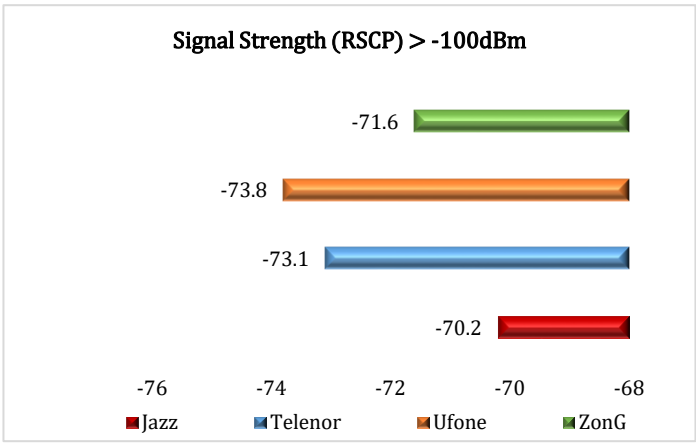
ZONG 3G NETWORK COVERAGE – GOJRA

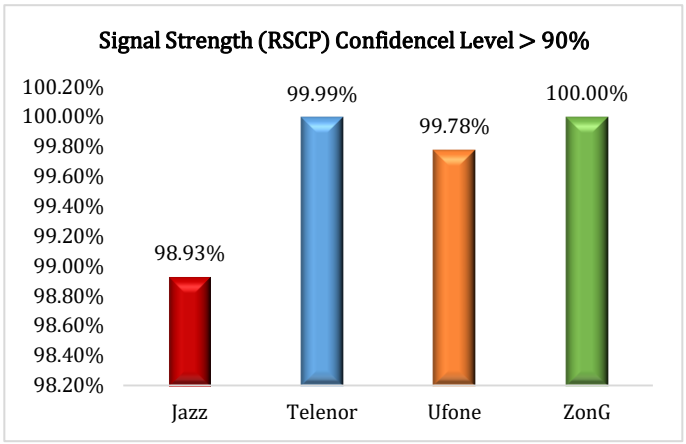


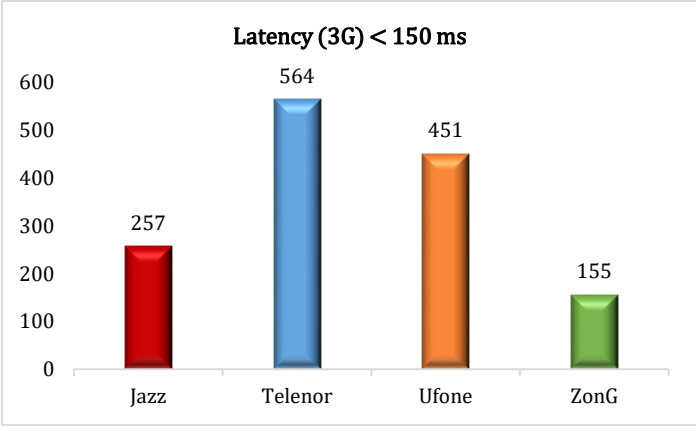
QUALITY OF SERVICE SURVEY RESULTS (3G) – GOJRA



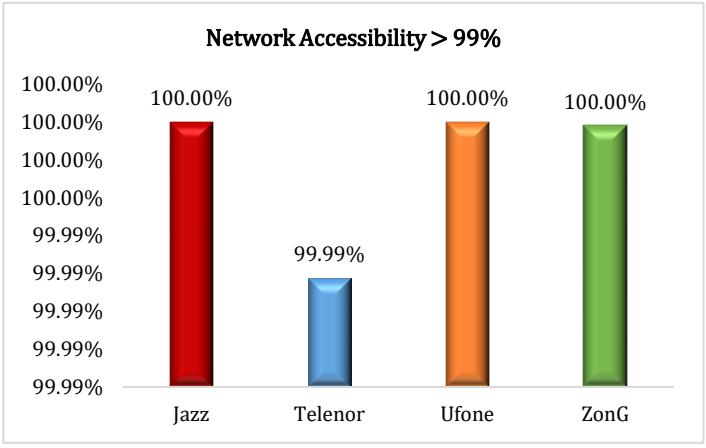


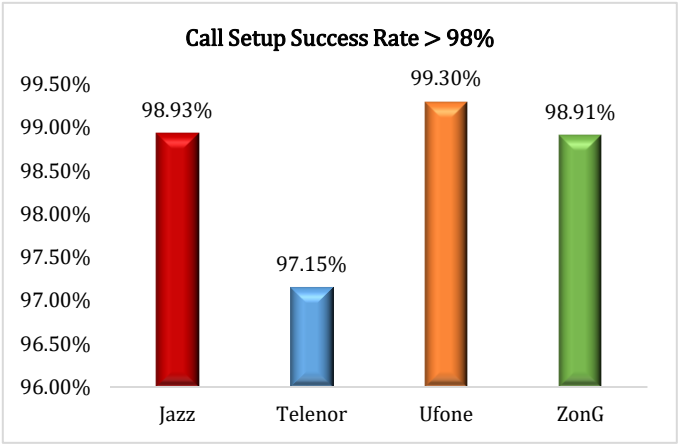


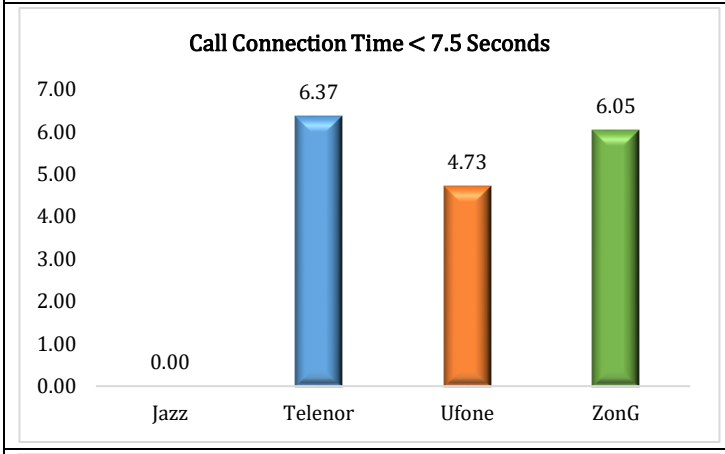


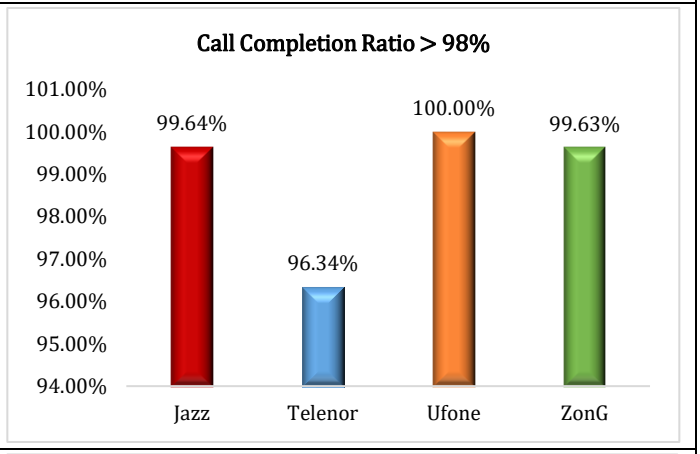


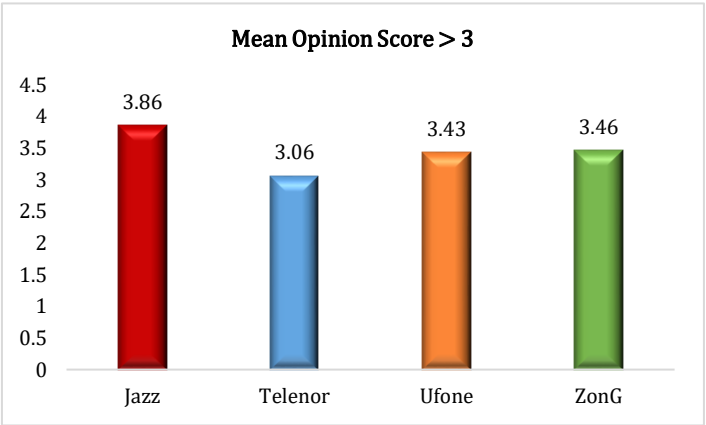
QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – GOJRA

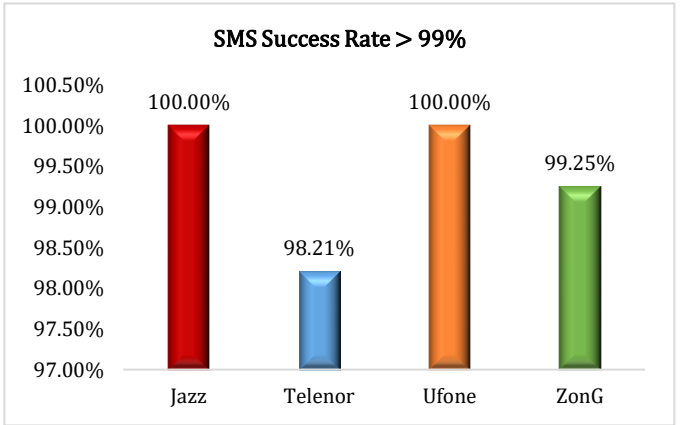


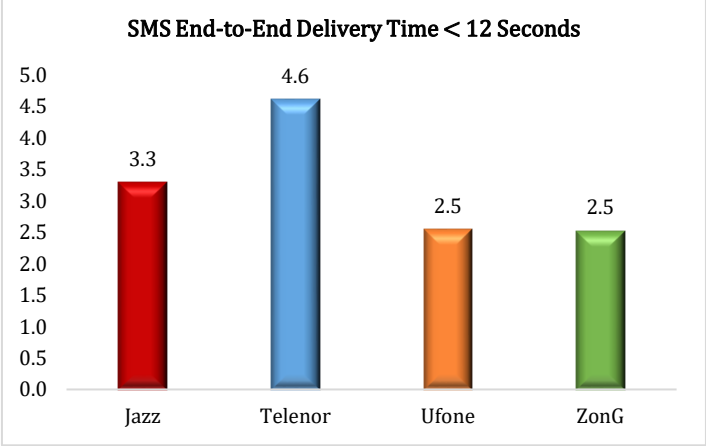






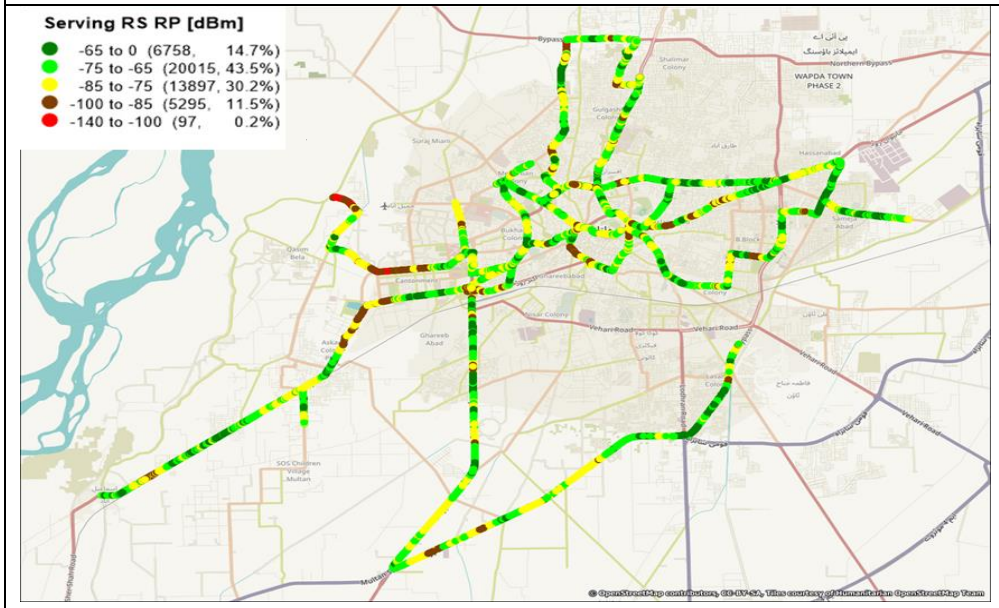




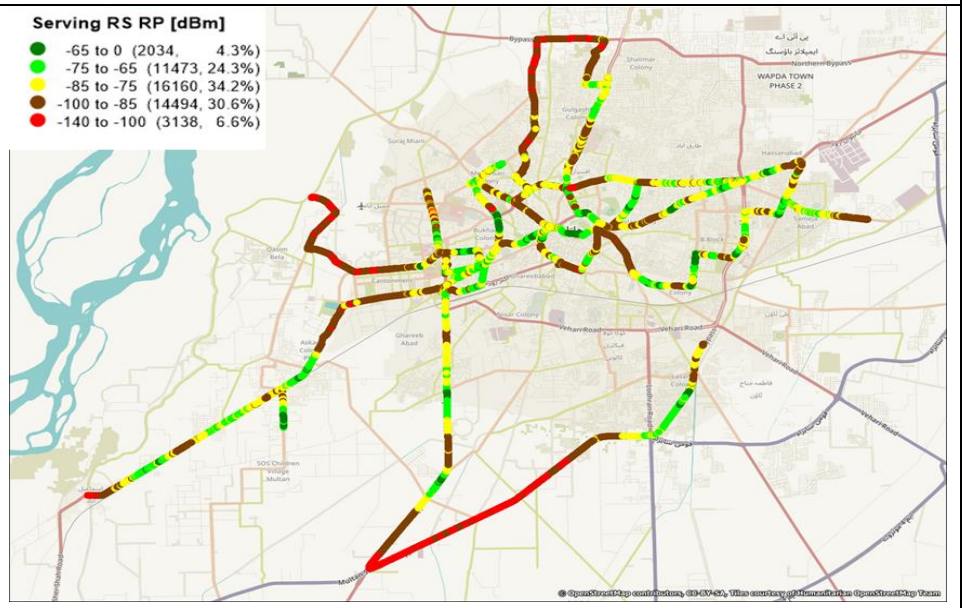


AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

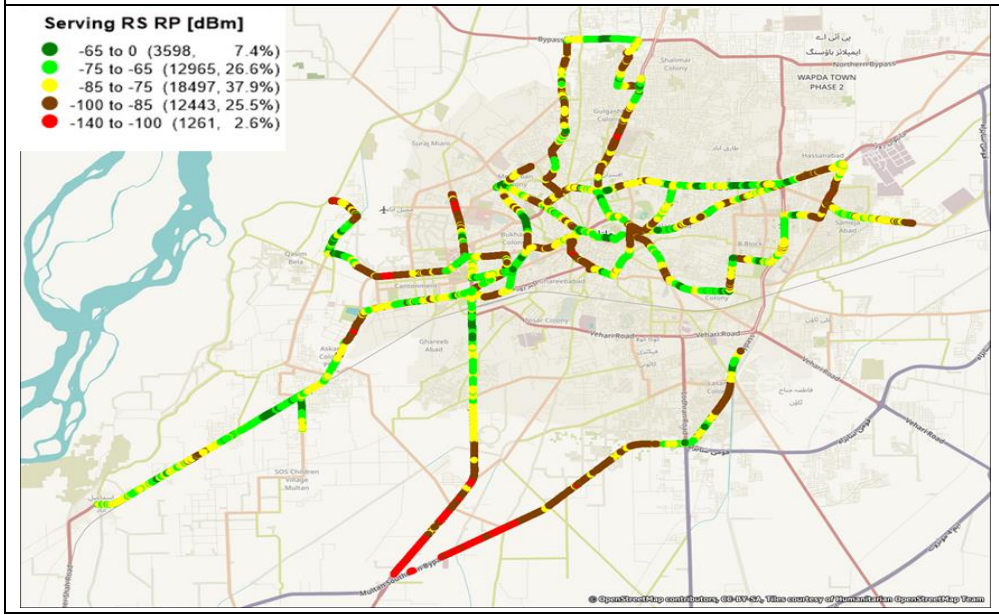
JAZZ 4G NETWORK COVERAGE – MULTAN



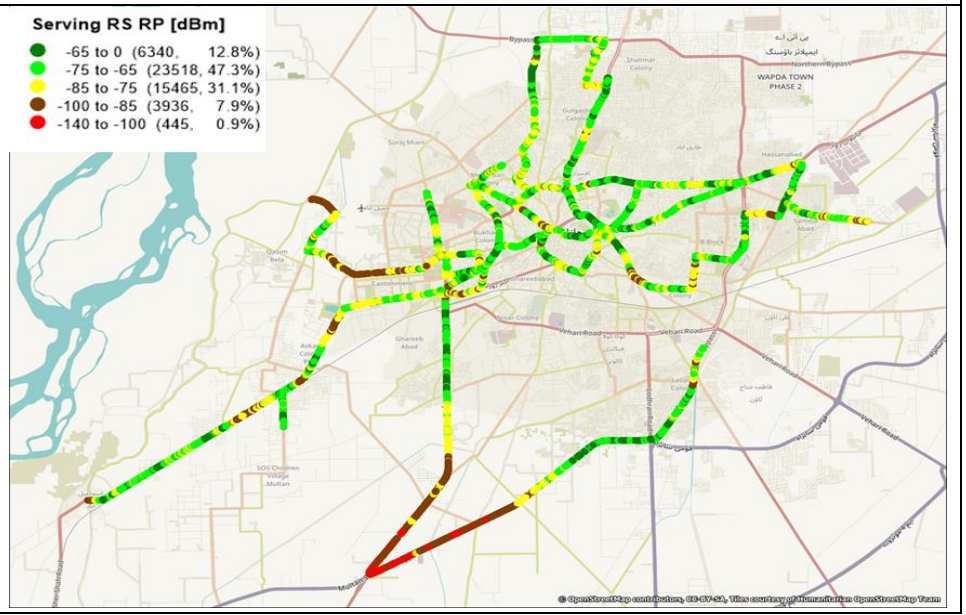
TELENOR 4G NETWORK COVERAGE – MULTAN



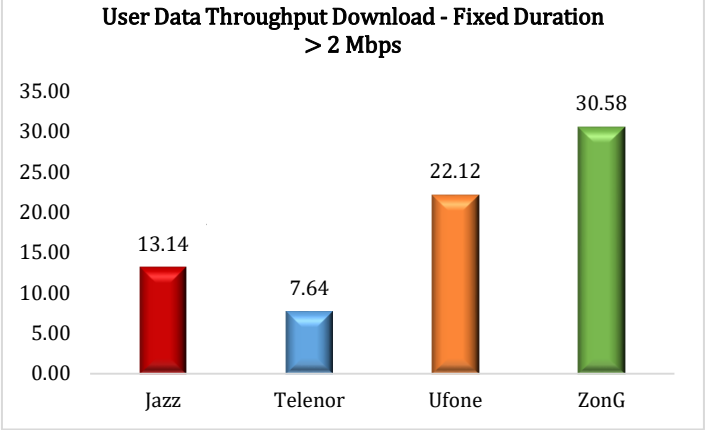
UFONE 4G NETWORK COVERAGE – MULTAN

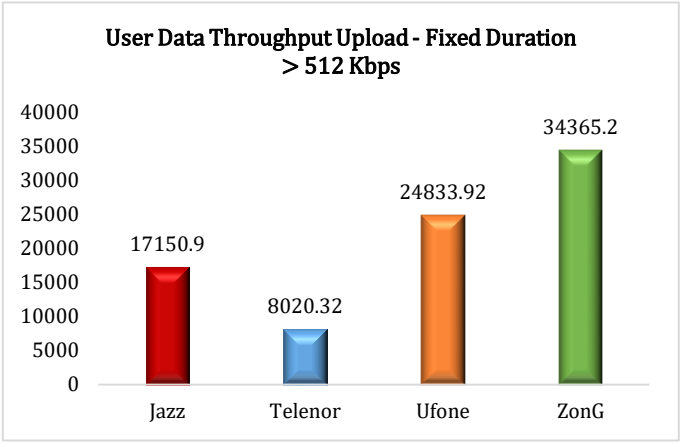


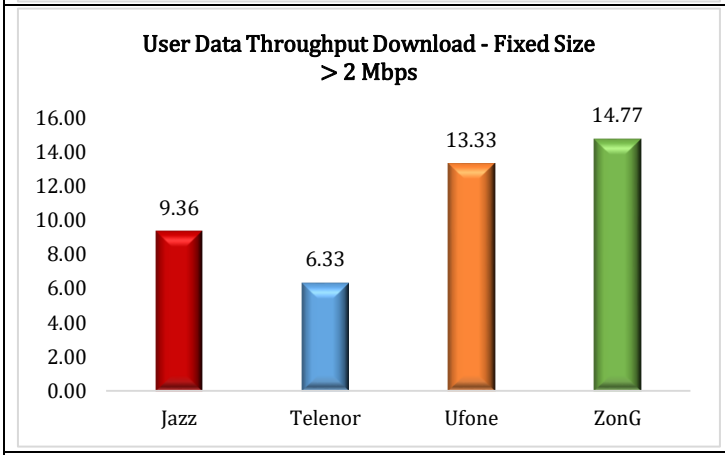
ZONG 4G NETWORK COVERAGE – MULTAN

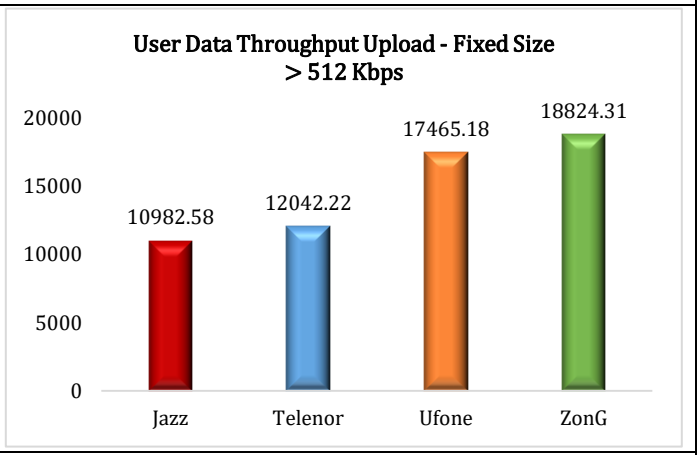


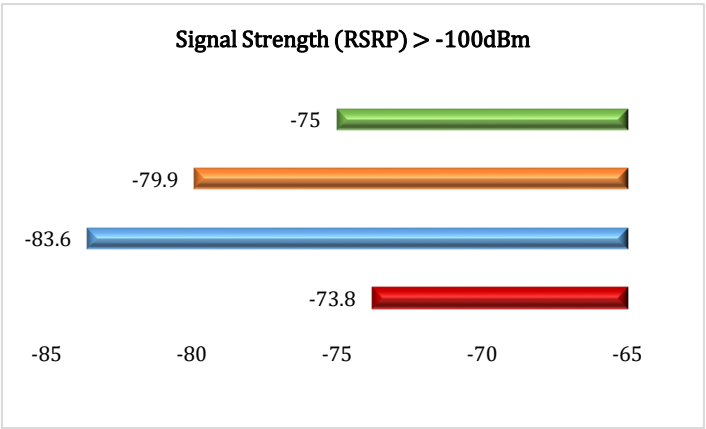
QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – MULTAN

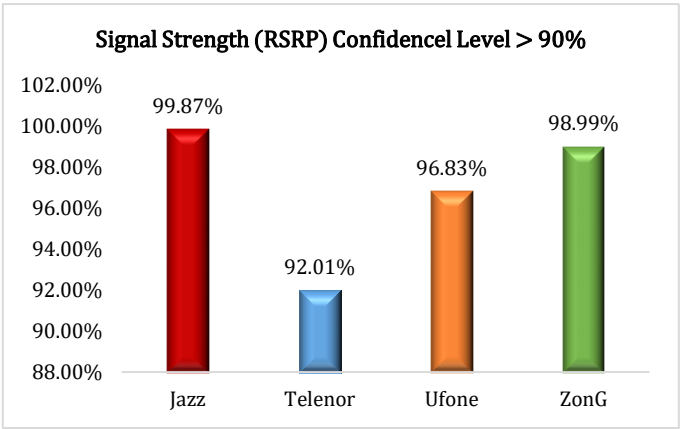


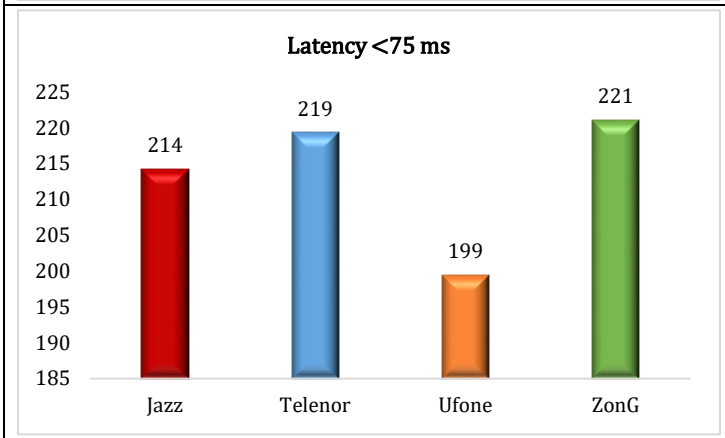


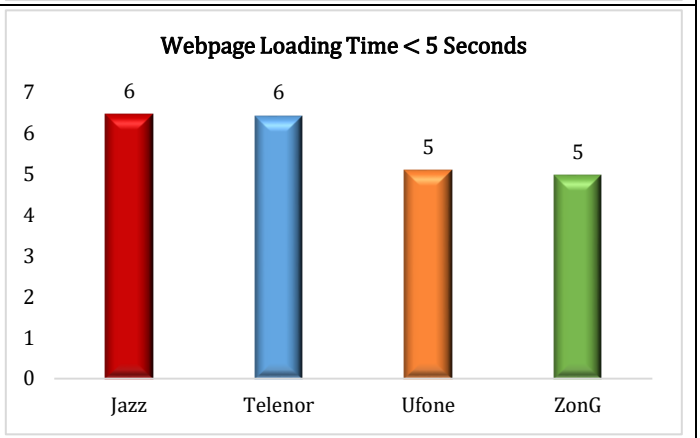






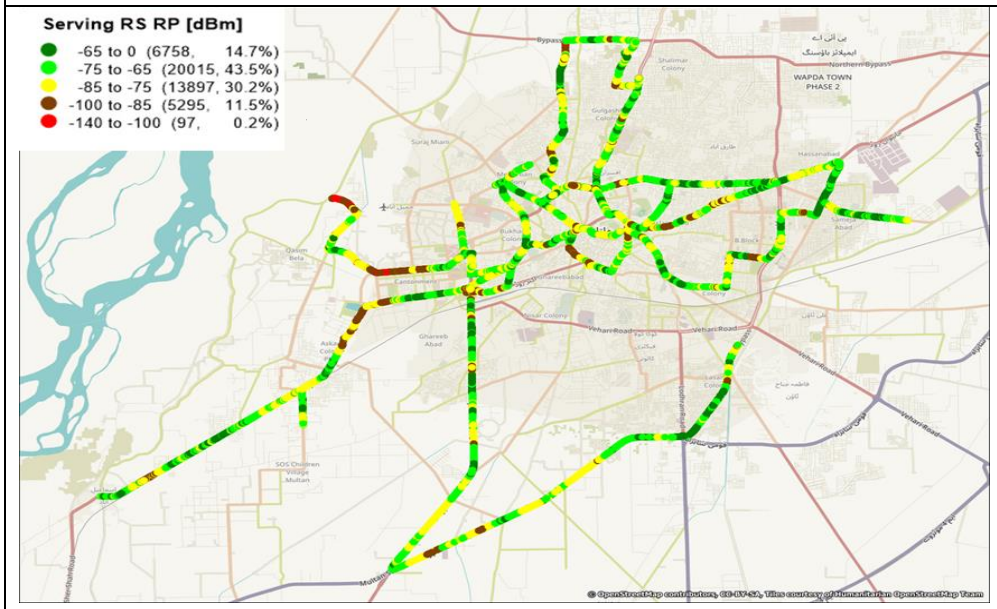




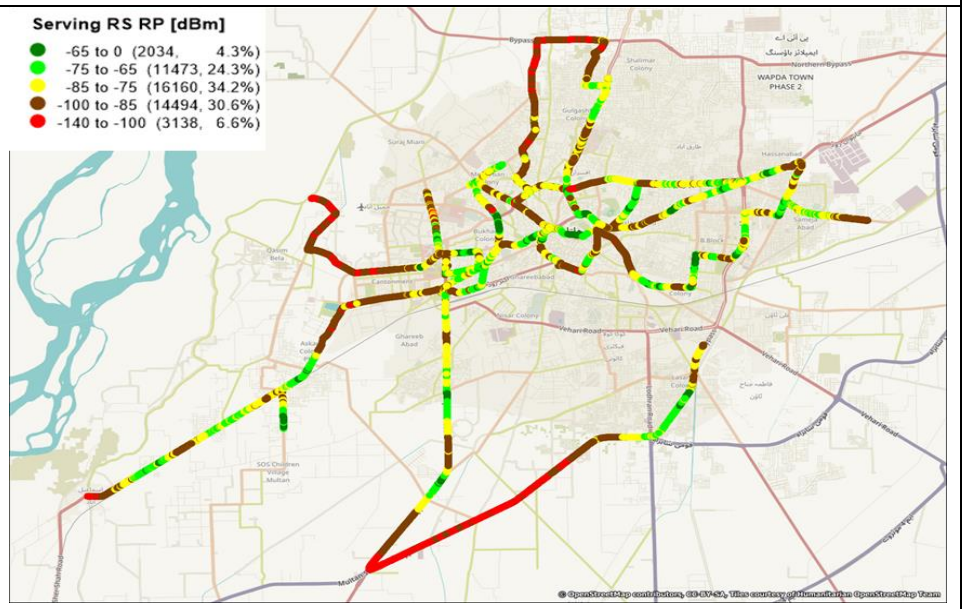


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

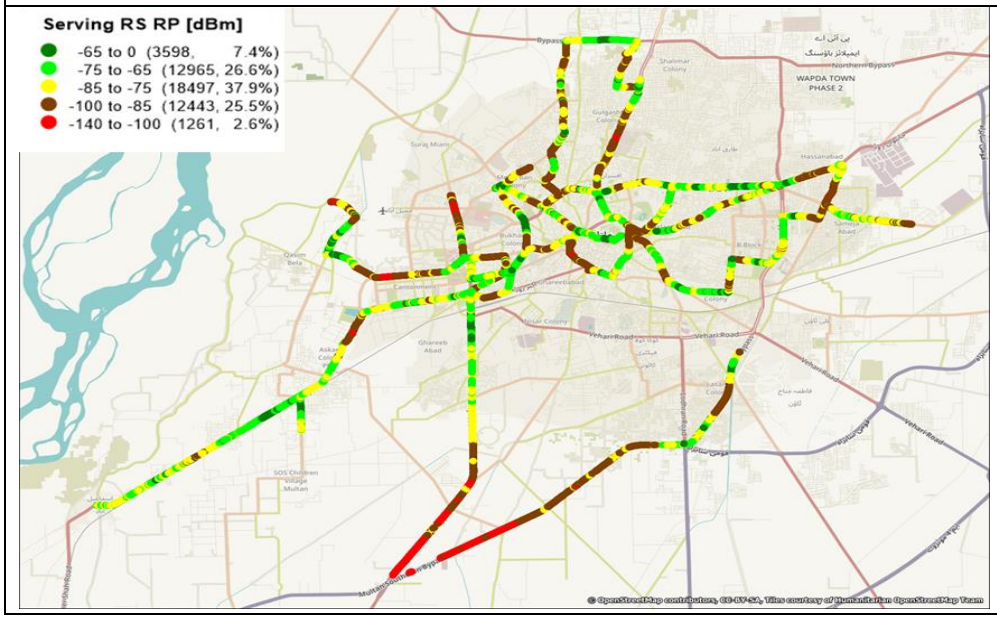
JAZZ 4G NETWORK COVERAGE – MULTAN



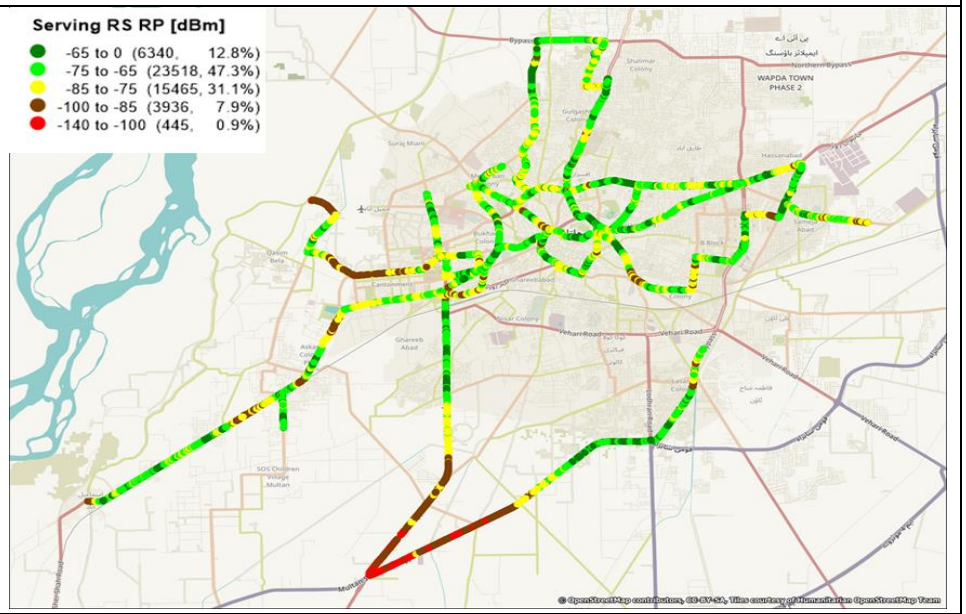
TELENOR 4G NETWORK COVERAGE – MULTAN



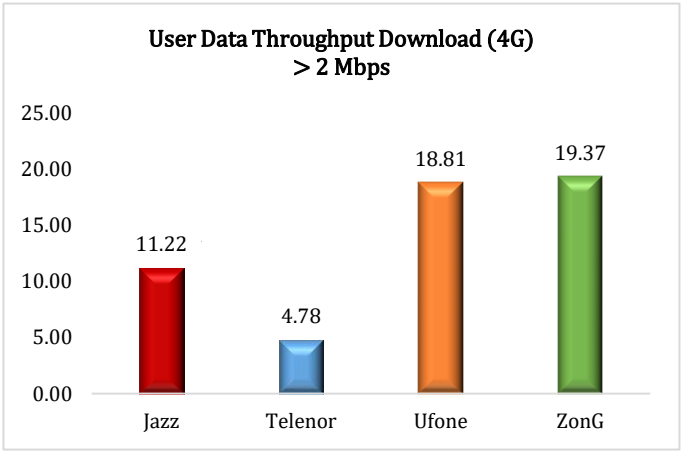
UFONE 4G NETWORK COVERAGE – MULTAN

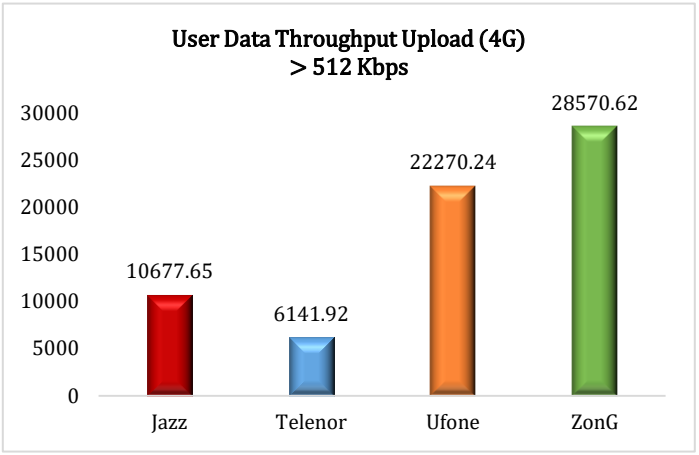


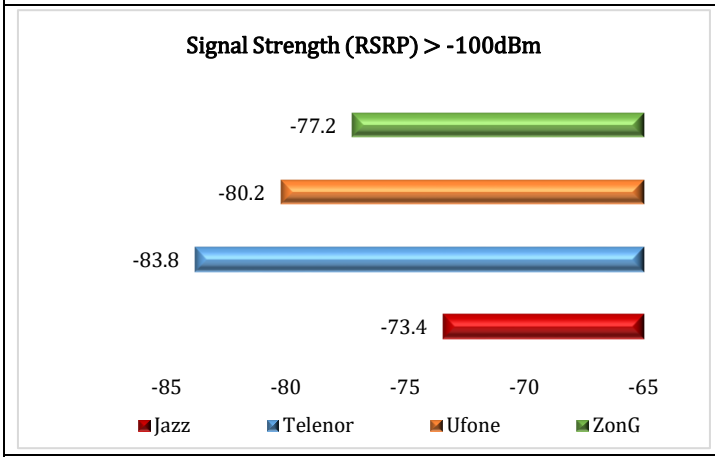
ZONG 4G NETWORK COVERAGE – MULTAN

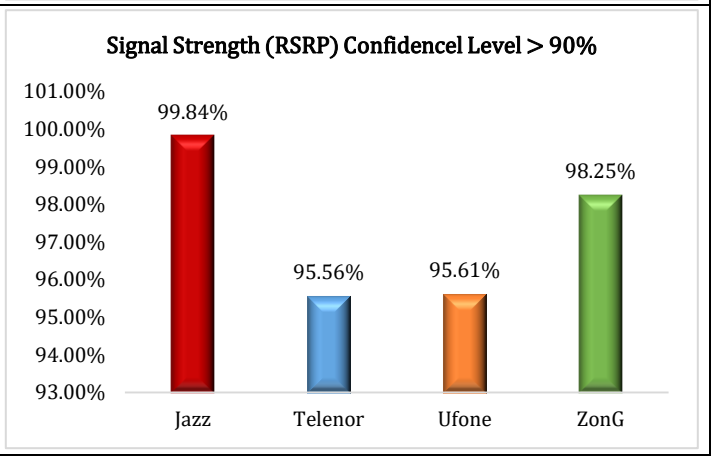


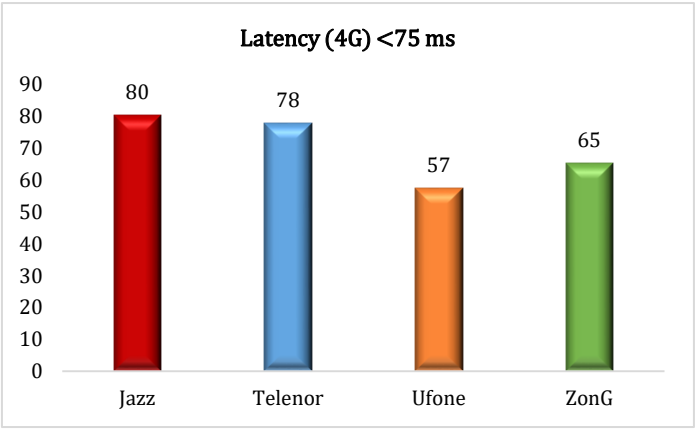
QUALITY OF SERVICE SURVEY RESULTS (4G) – MULTAN





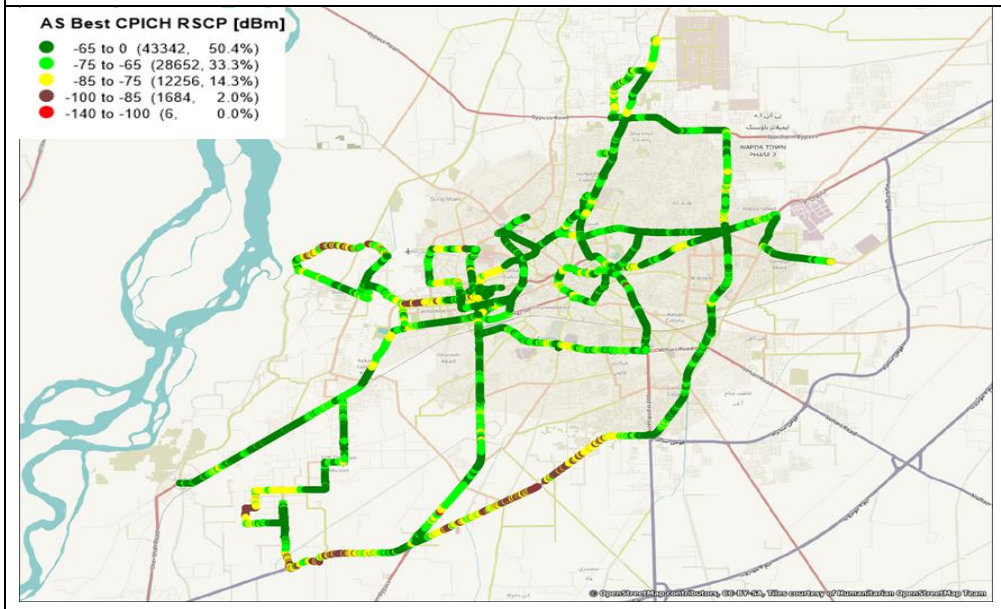




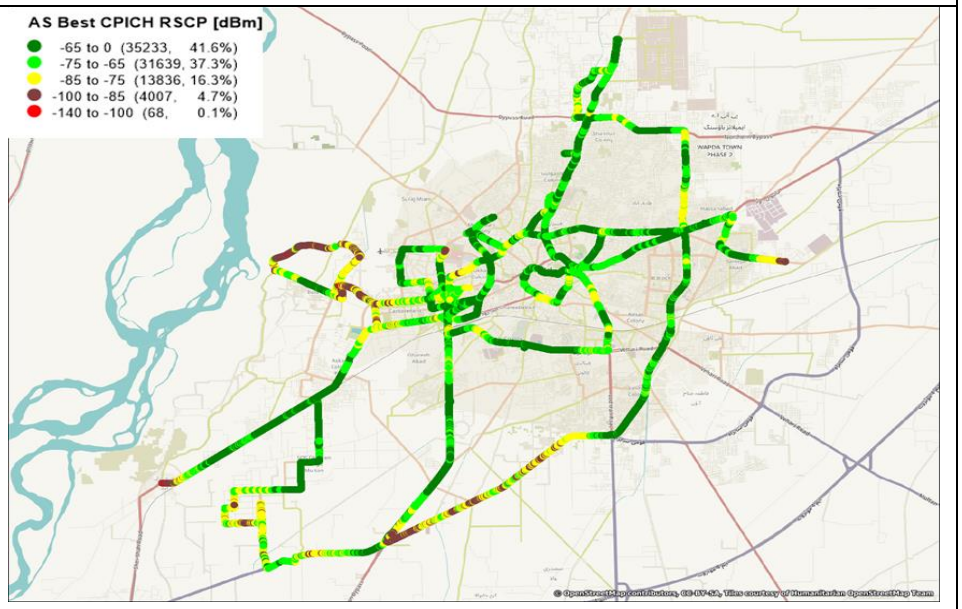


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

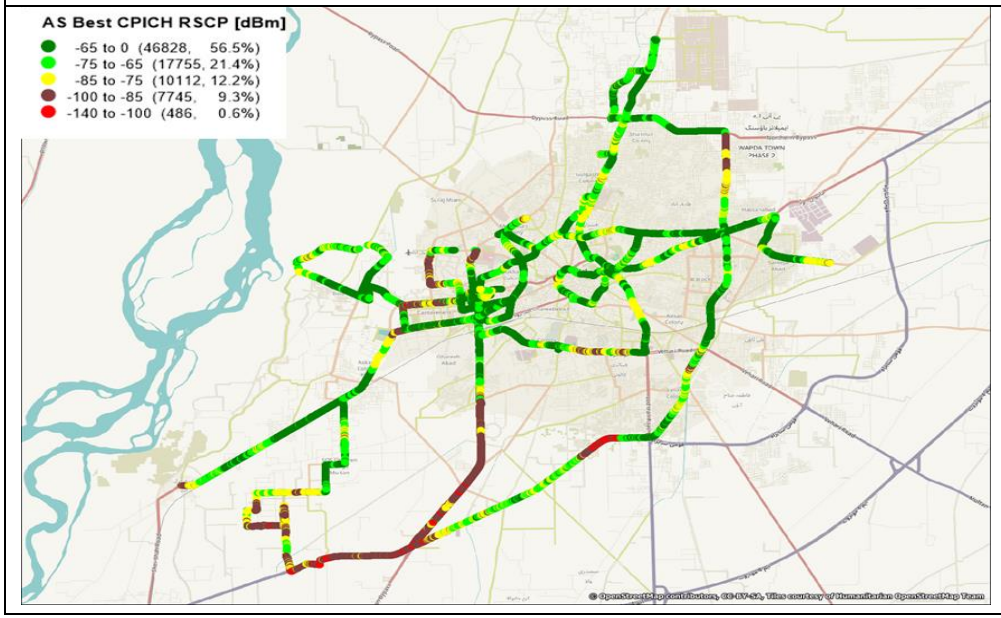
JAZZ 3G NETWORK COVERAGE – MULTAN



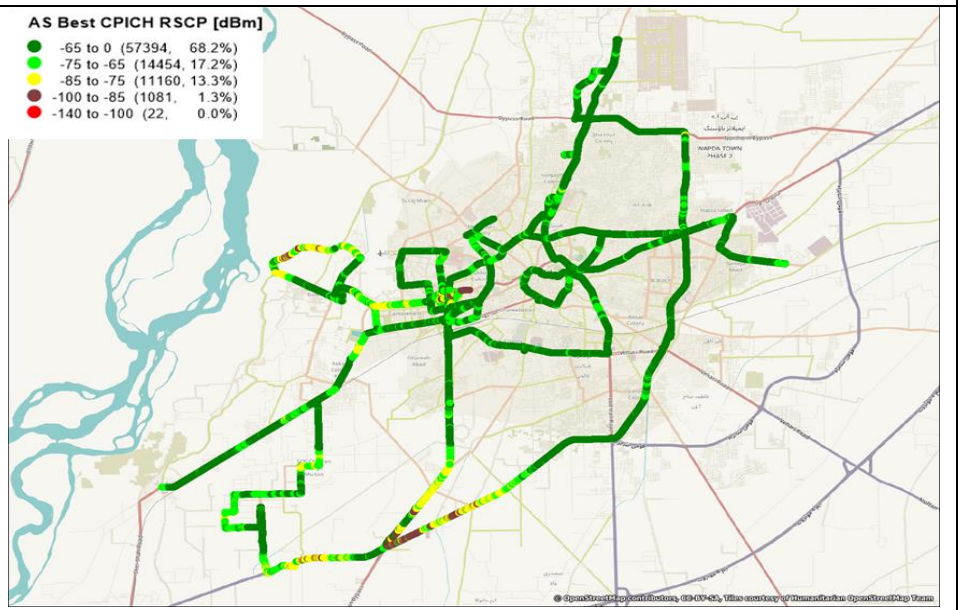
TELENOR 3G NETWORK COVERAGE – MULTAN



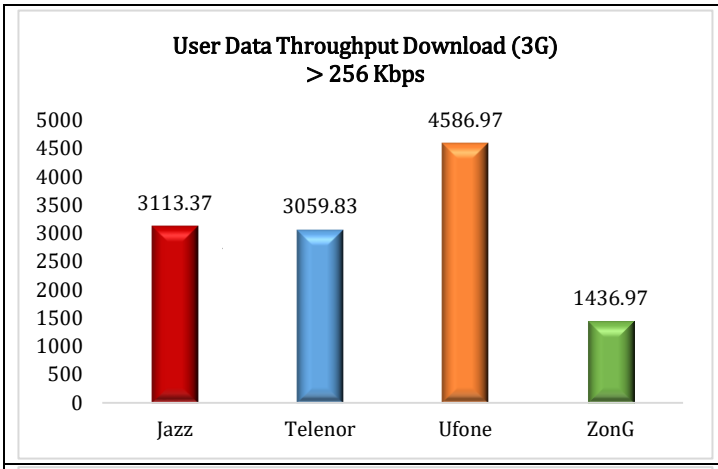
UFONE 3G NETWORK COVERAGE – MULTAN

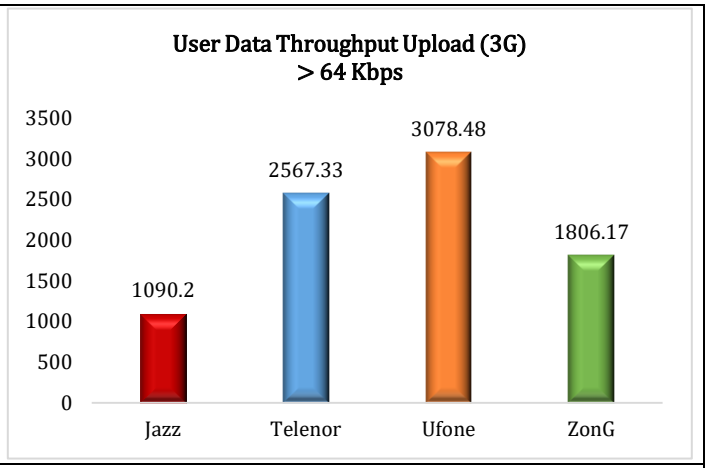


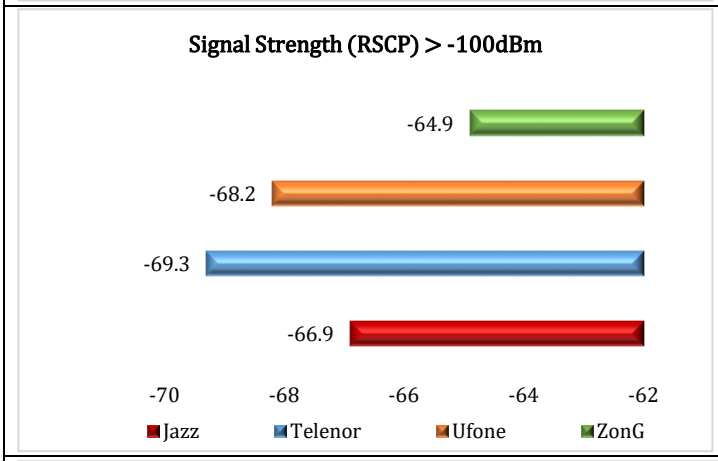
ZONG 3G NETWORK COVERAGE – MULTAN

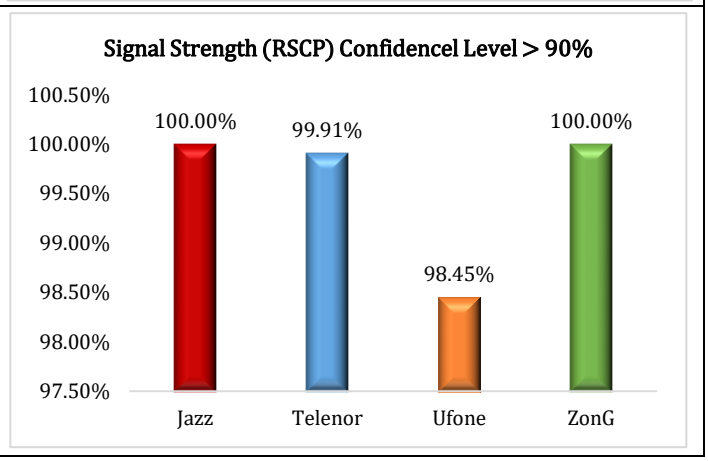


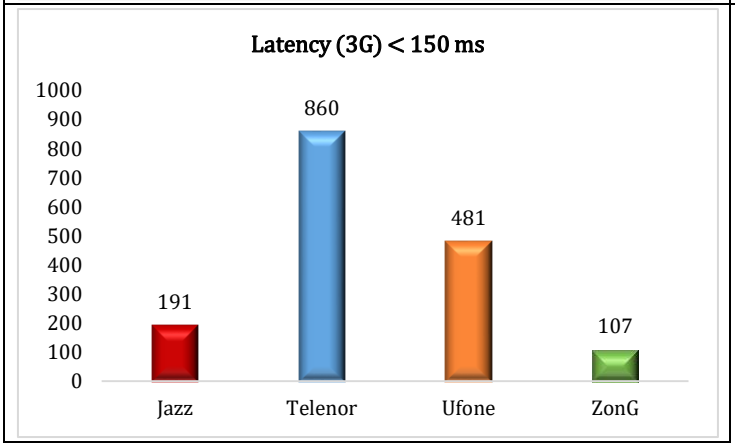
QUALITY OF SERVICE SURVEY RESULTS (3G) – MULTAN



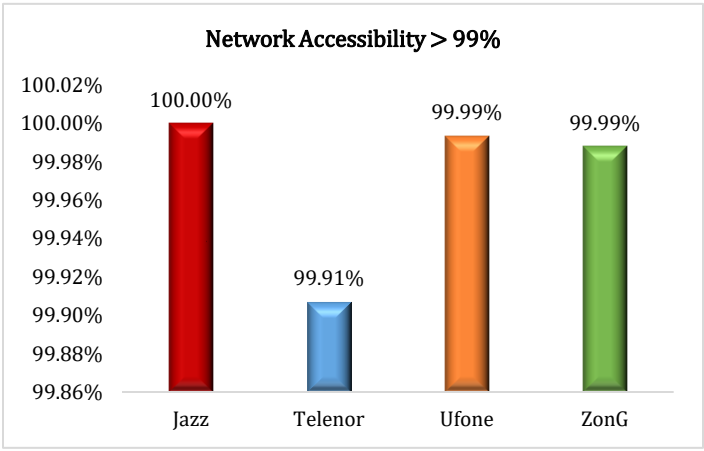


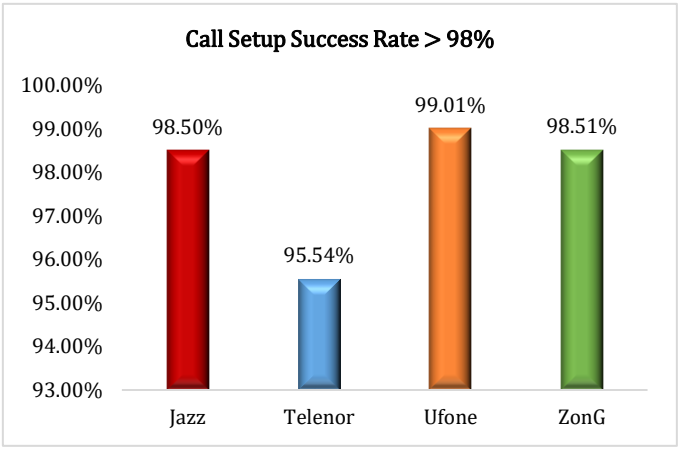


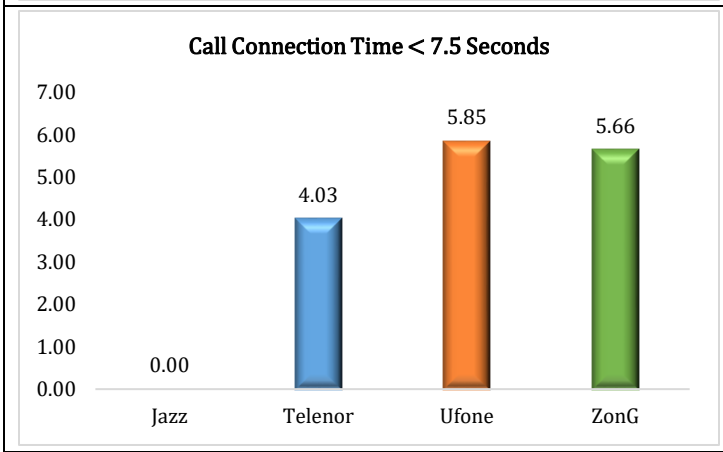


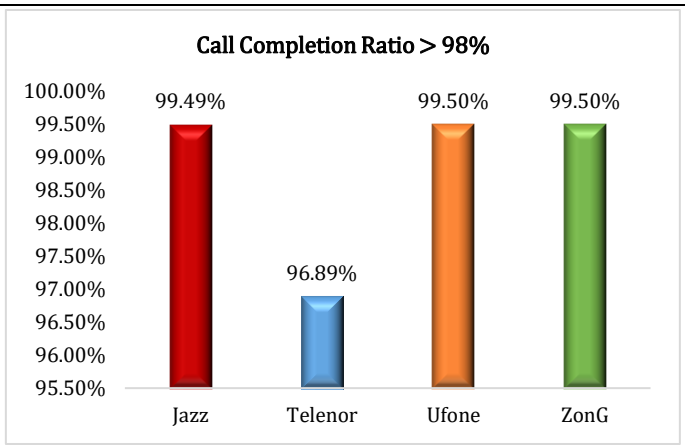


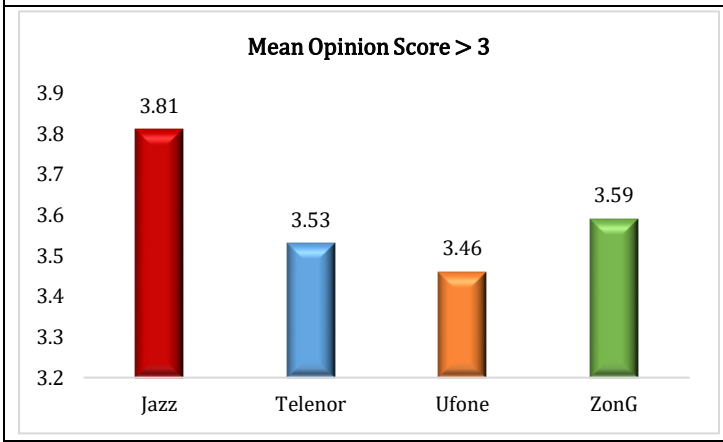
QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – MULTAN

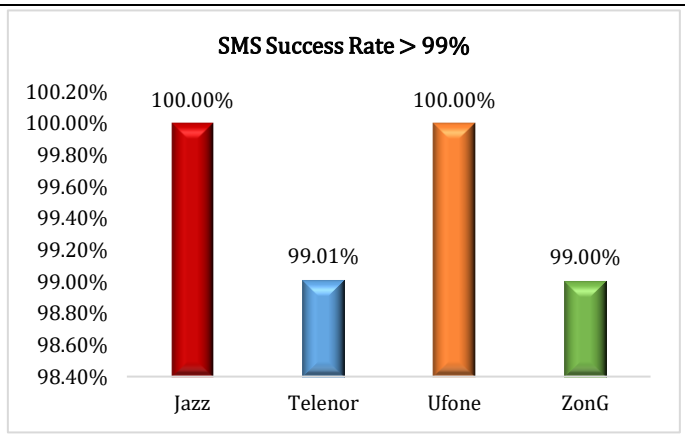


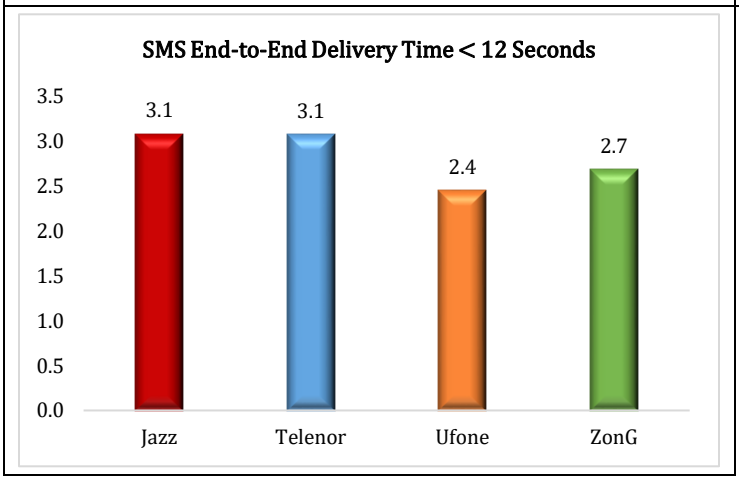






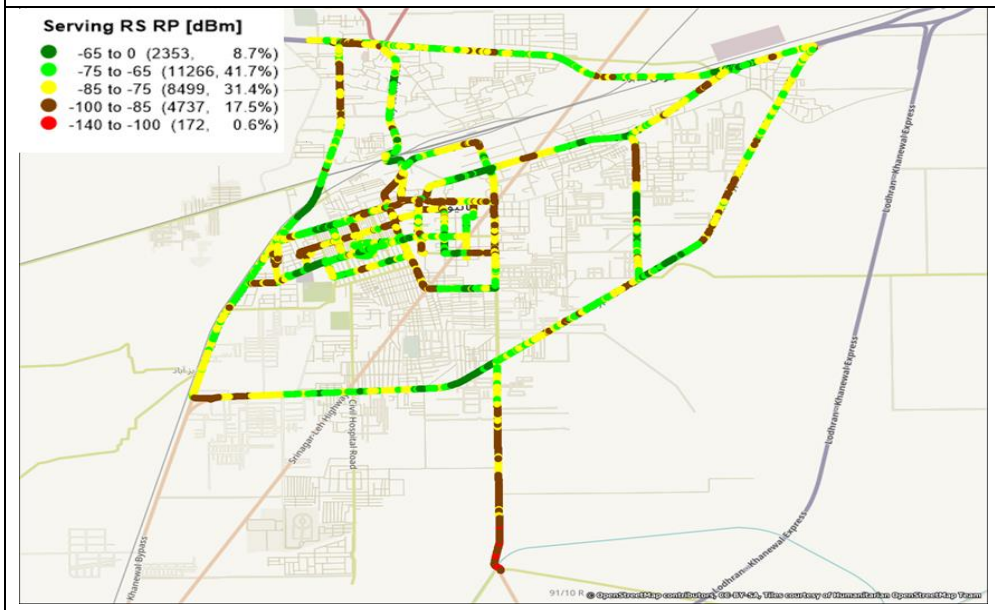




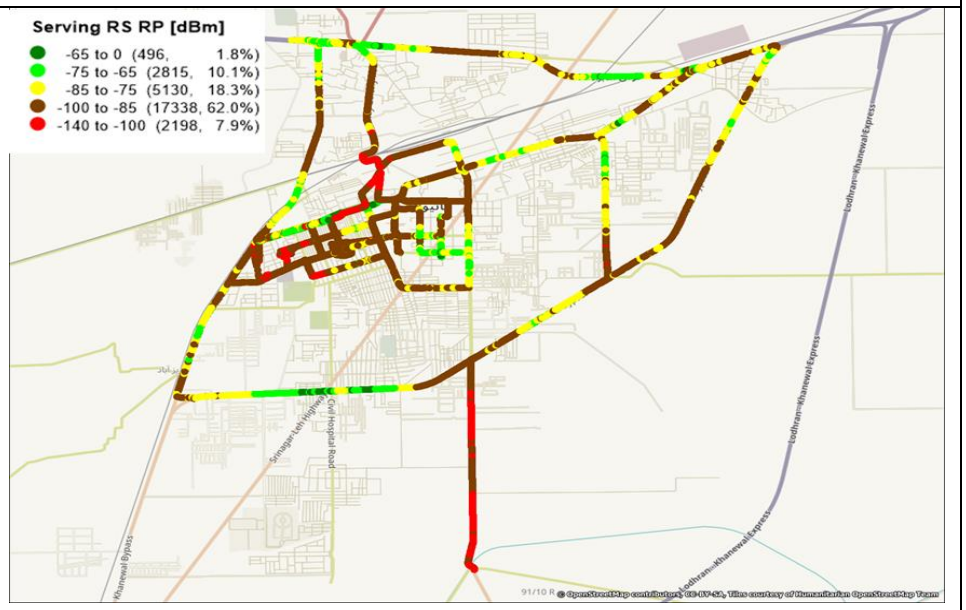


AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

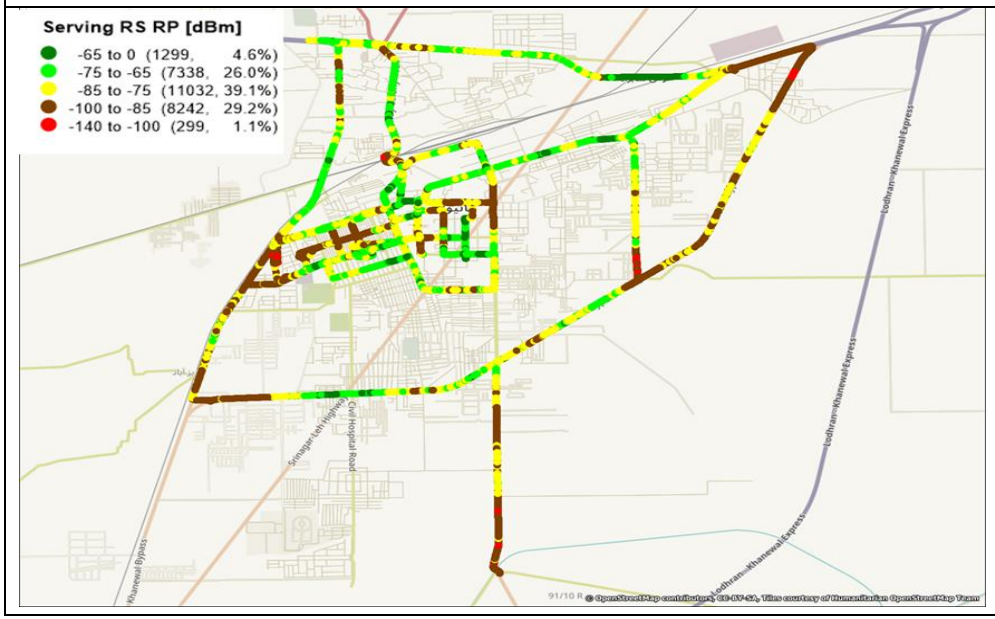
JAZZ 4G NETWORK COVERAGE – KHANEWAL



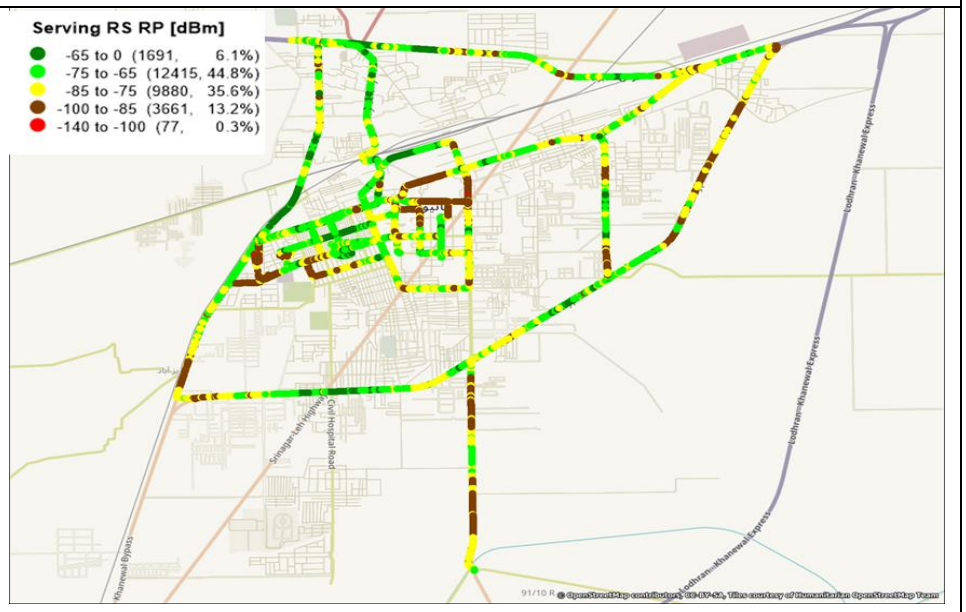
TELENOR 4G NETWORK COVERAGE – KHANEWAL



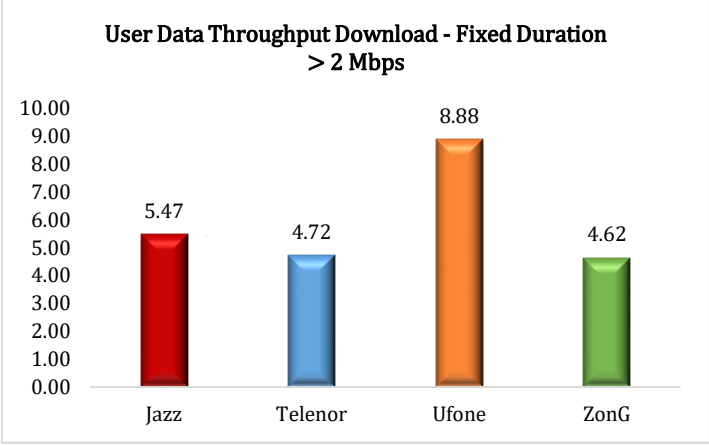
UFONE 4G NETWORK COVERAGE – KHANEWAL

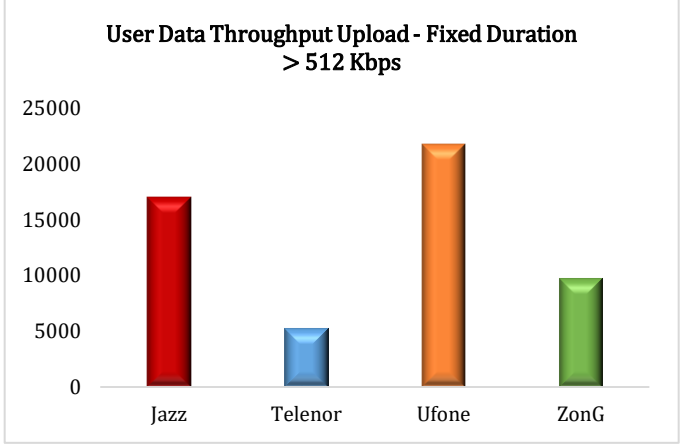


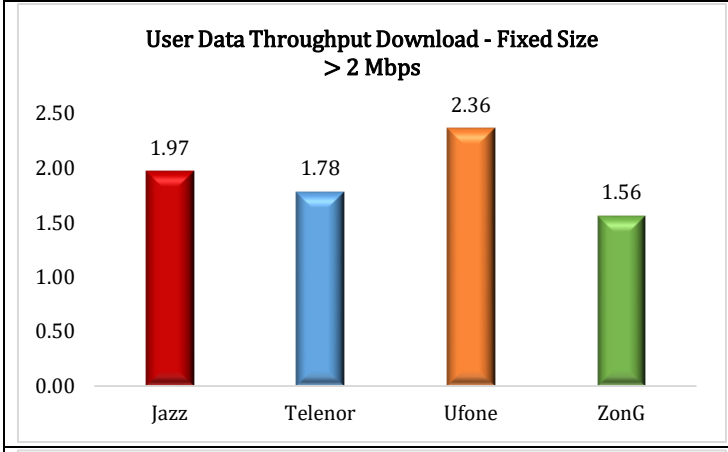
ZONG 4G NETWORK COVERAGE – KHANEWAL

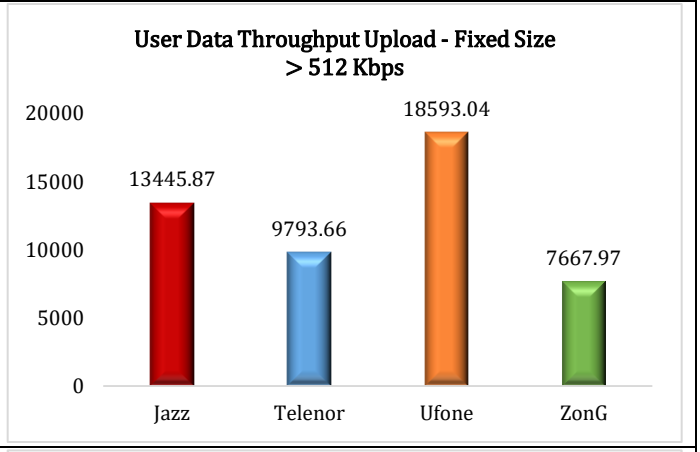


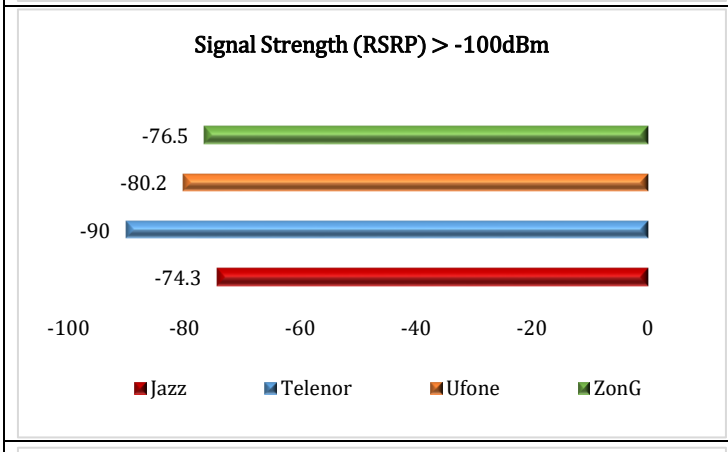
QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – KHANEWAL

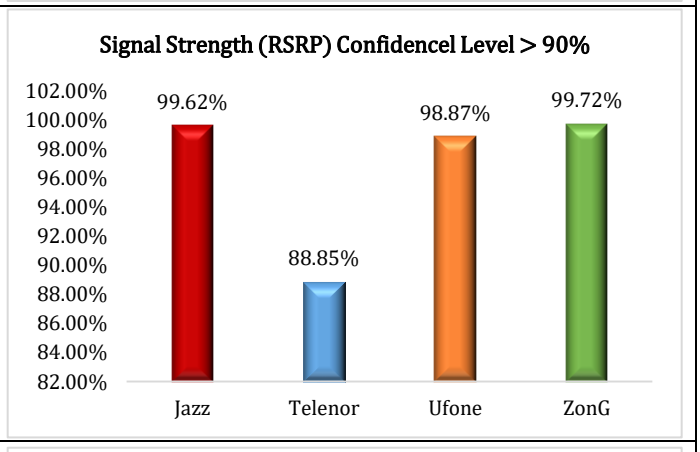


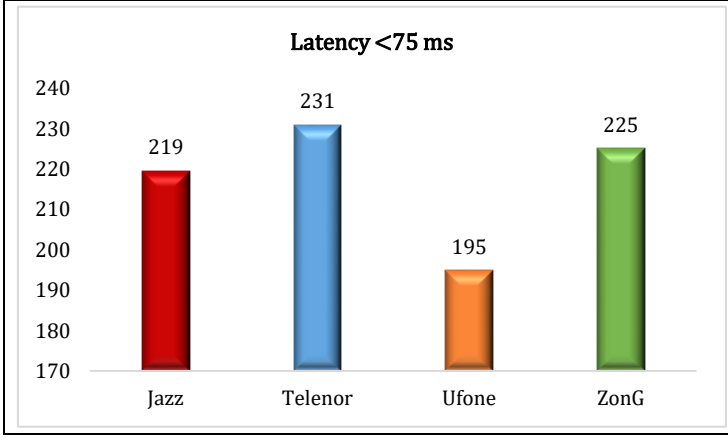


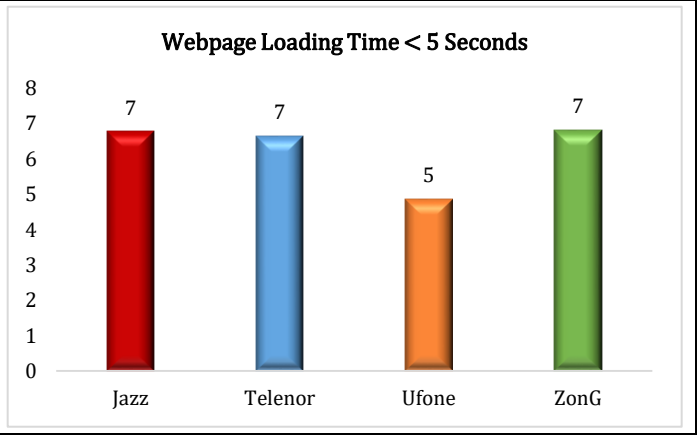






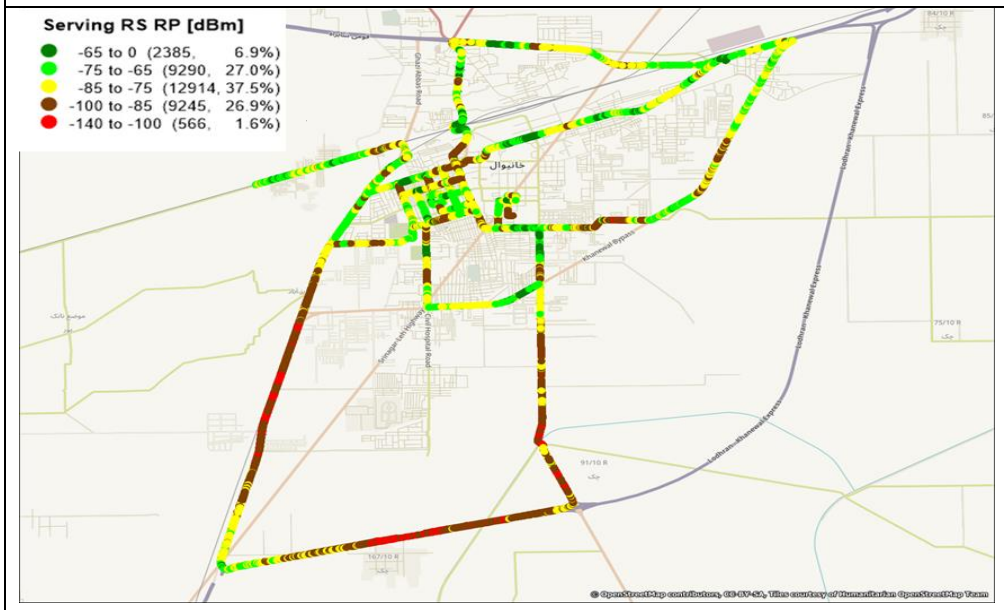




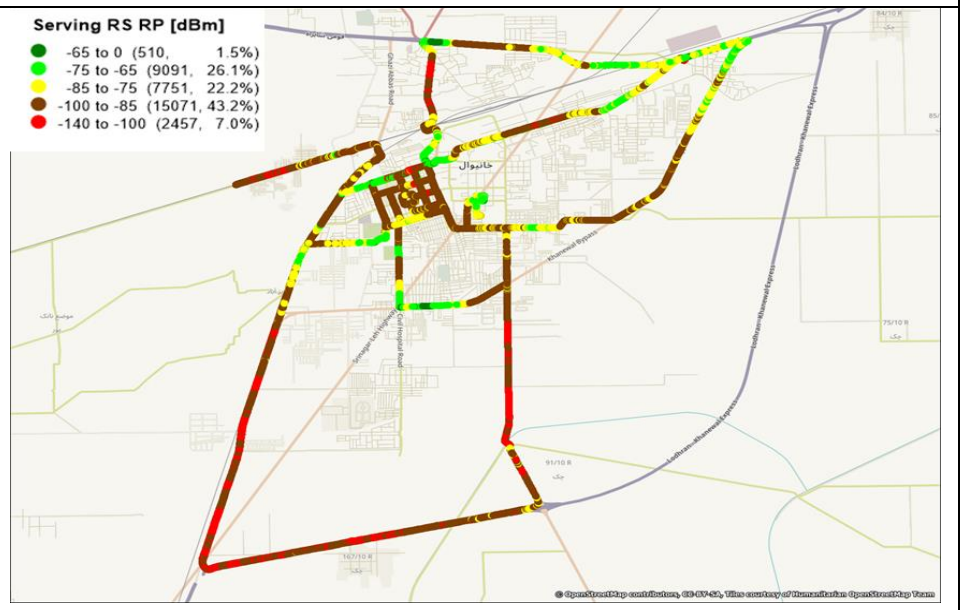


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

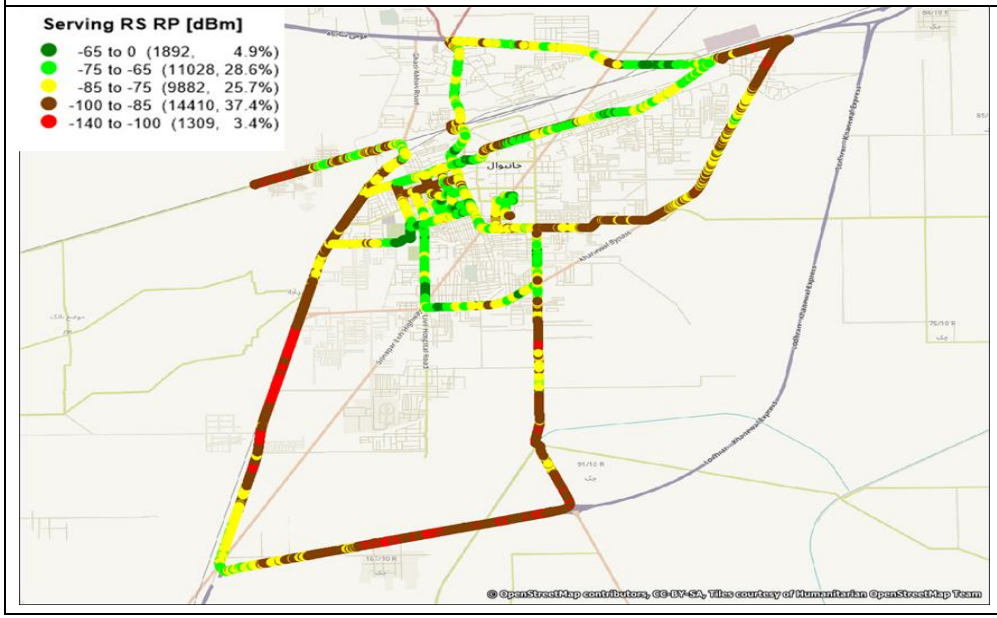
JAZZ 4G NETWORK COVERAGE – KHANEWAL



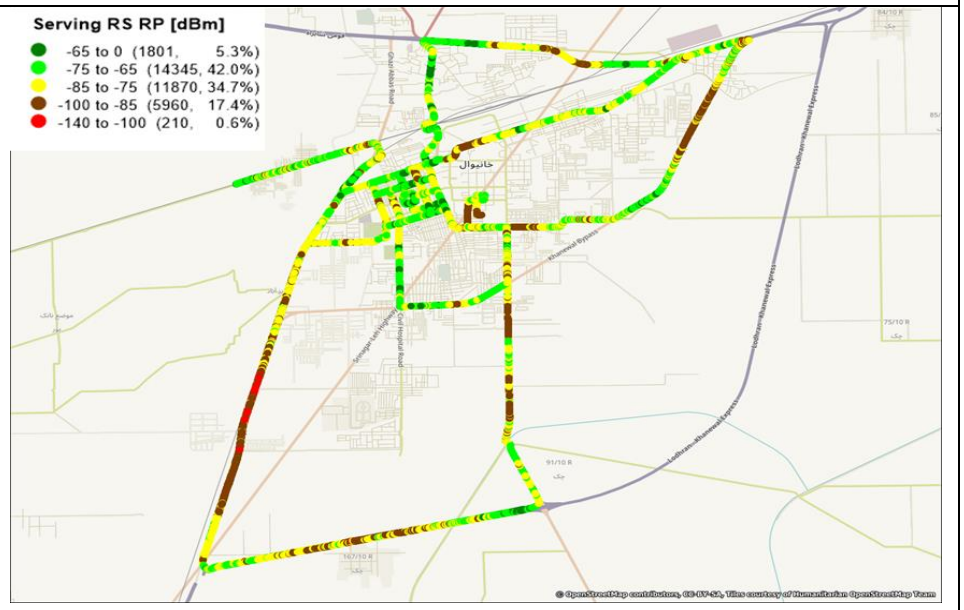
TELENOR 4G NETWORK COVERAGE – KHANEWAL



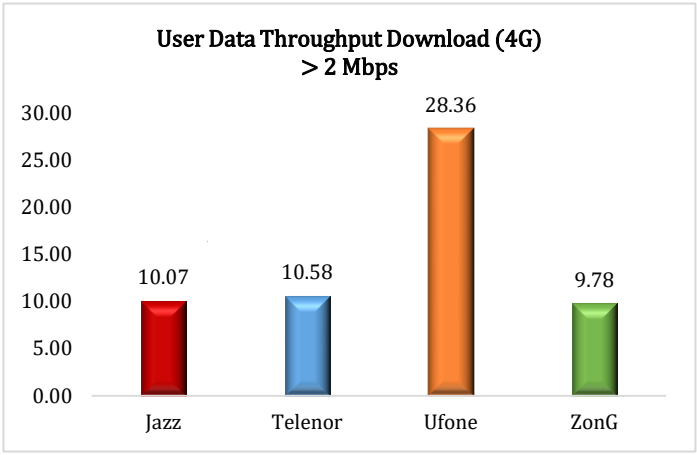
UFONE 4G NETWORK COVERAGE – KHANEWAL

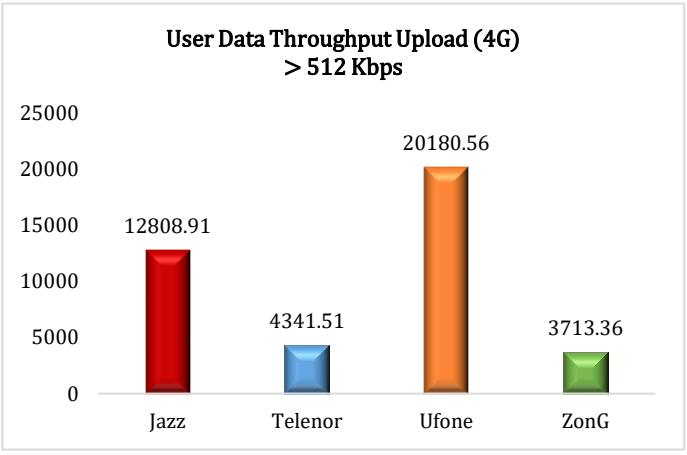


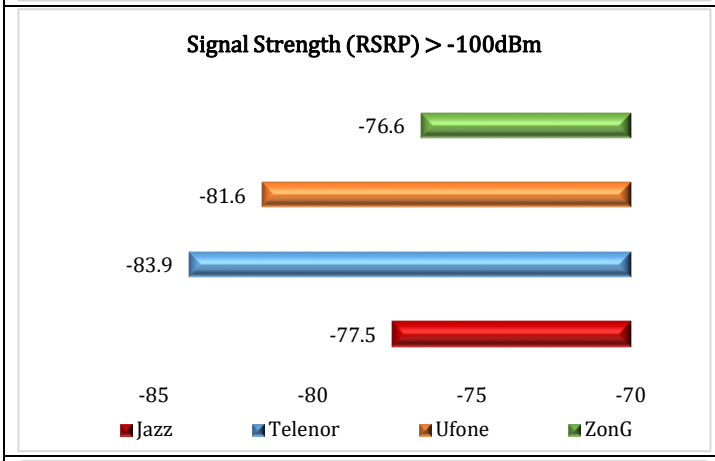
ZONG 4G NETWORK COVERAGE – KHANEWAL

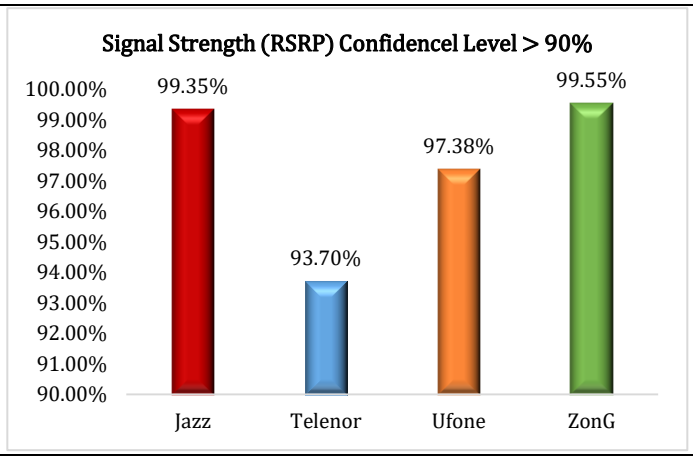


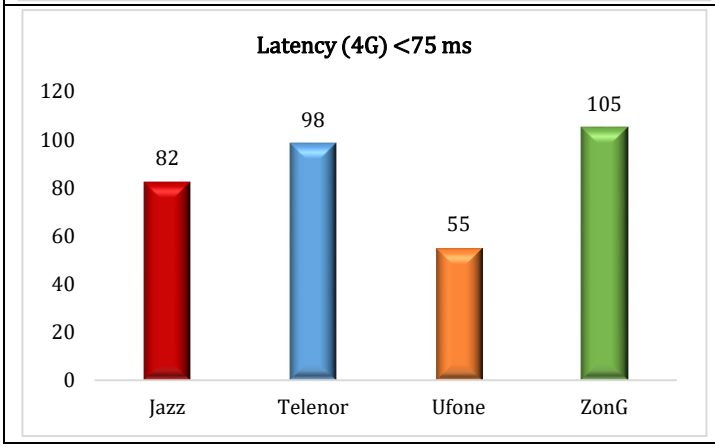
QUALITY OF SERVICE SURVEY RESULTS (4G) – KHANEWAL





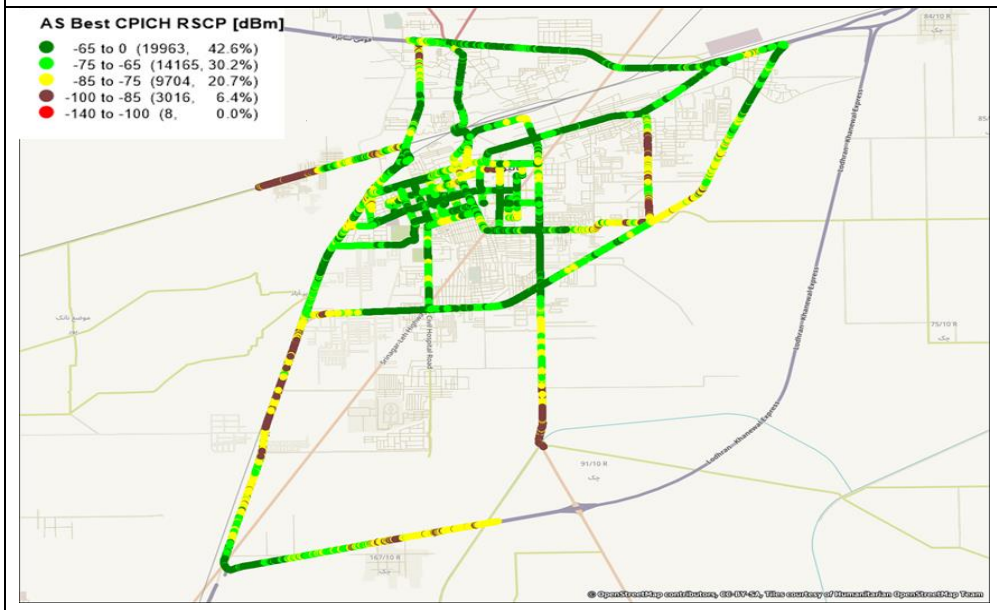




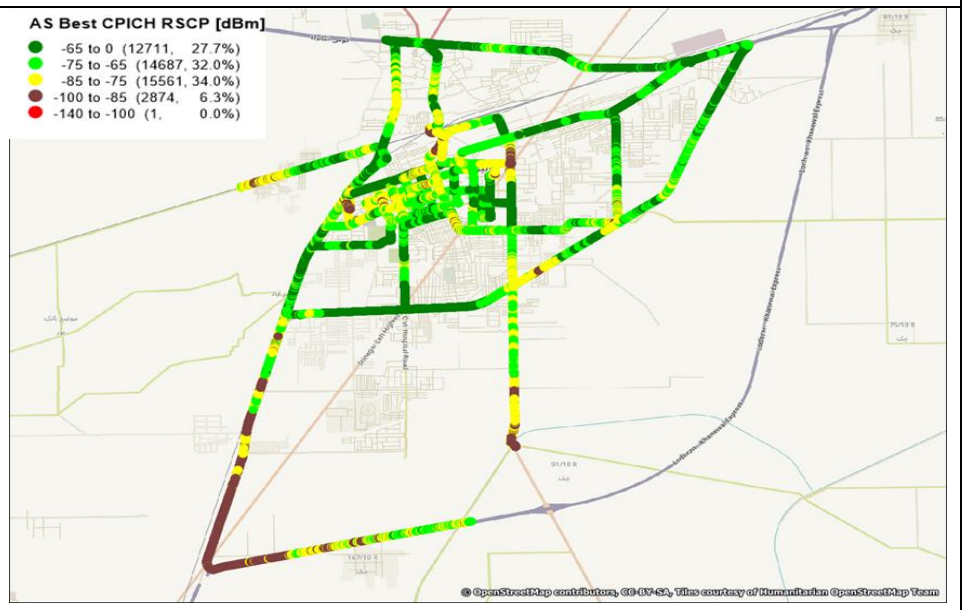


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

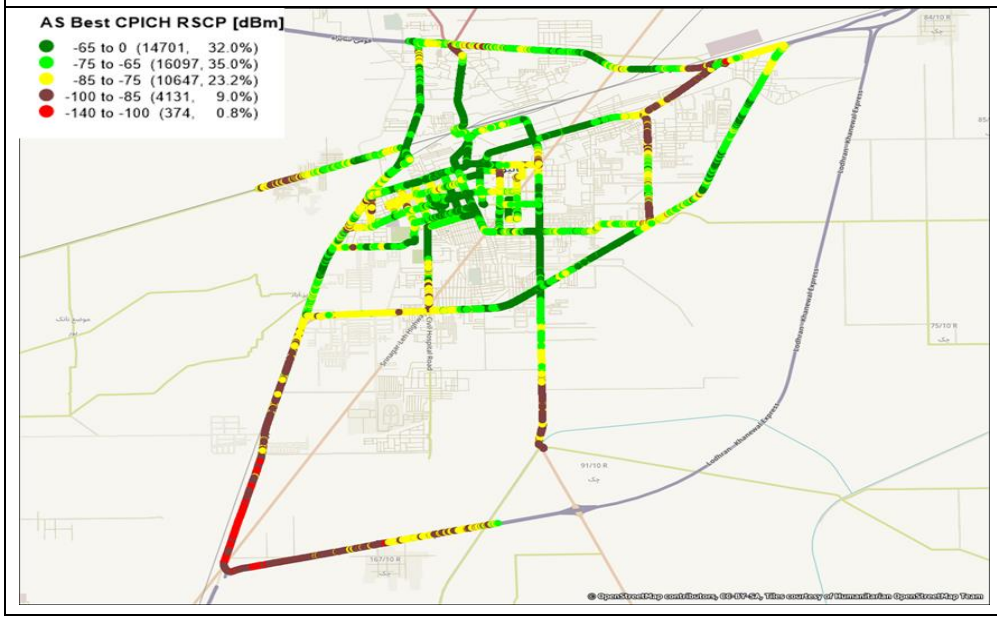
JAZZ 3G NETWORK COVERAGE – KHANEWAL



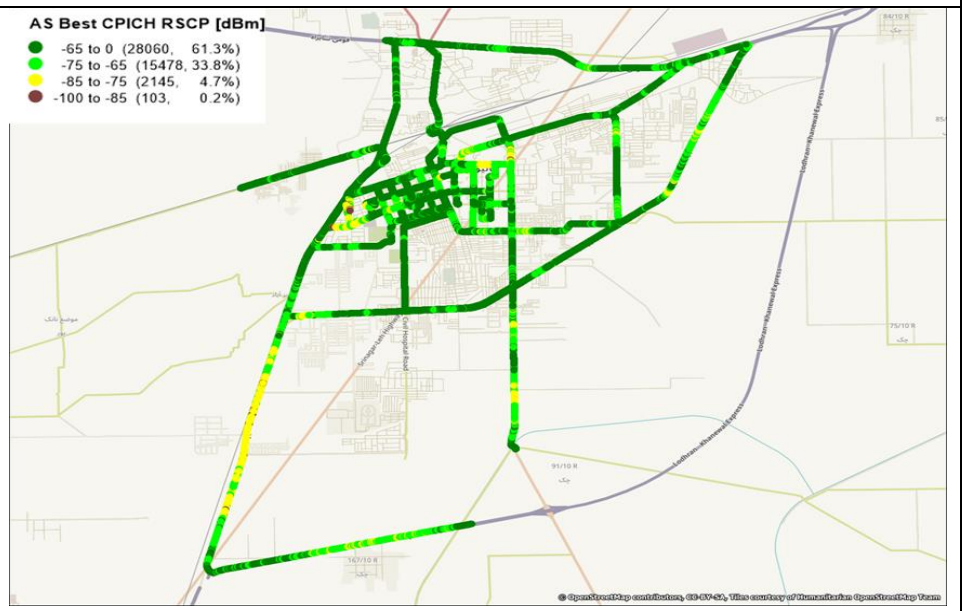
TELENOR 3G NETWORK COVERAGE – KHANEWAL



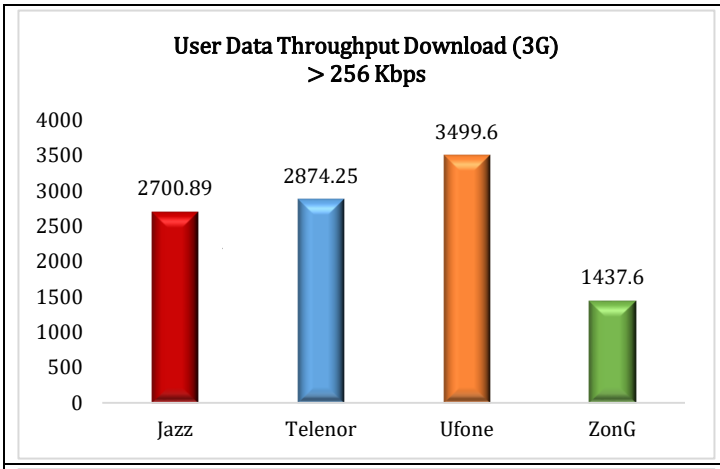
UFONE 3G NETWORK COVERAGE – KHANEWAL

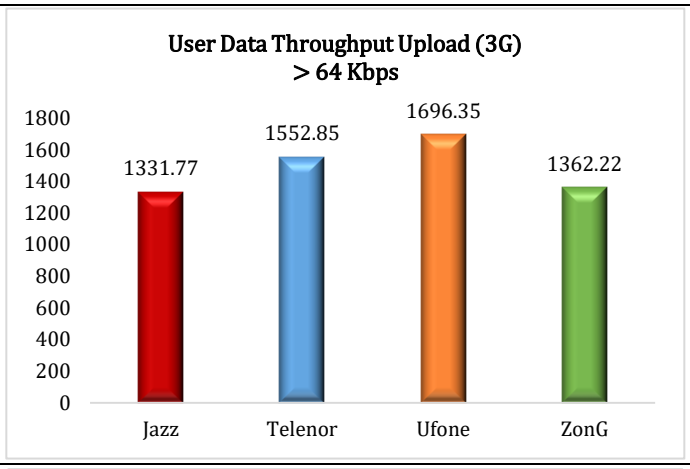


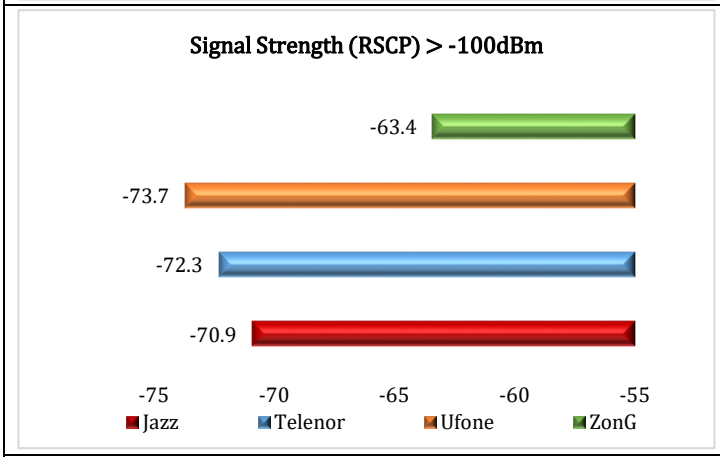
ZONG 3G NETWORK COVERAGE – KHANEWAL

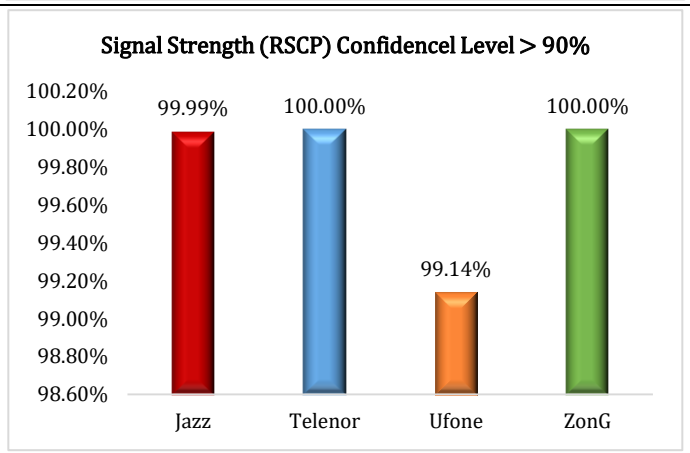


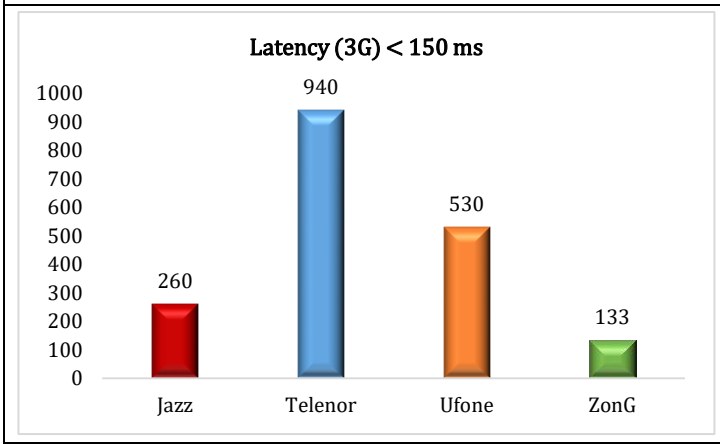
QUALITY OF SERVICE SURVEY RESULTS (3G) – KHANEWAL



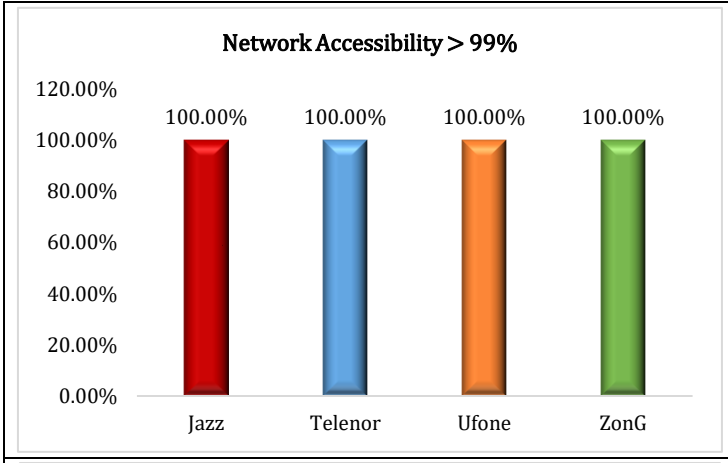


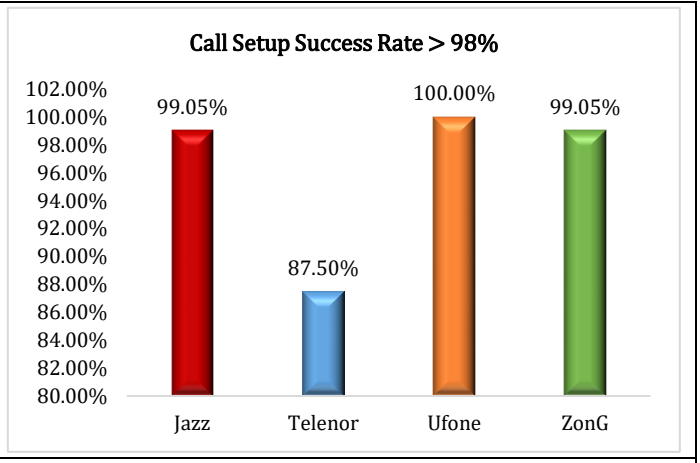


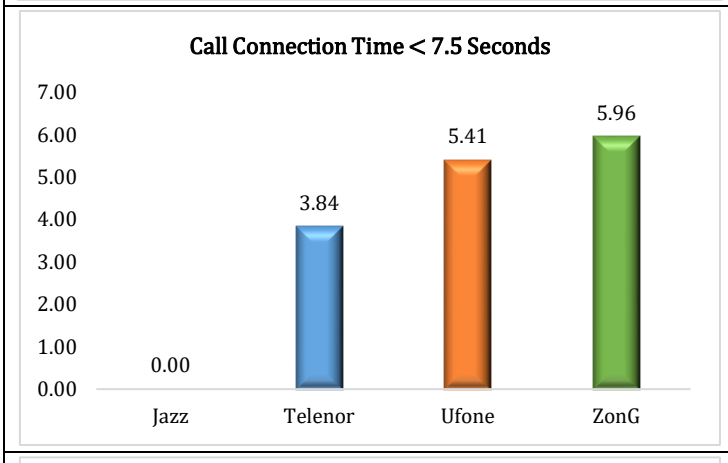


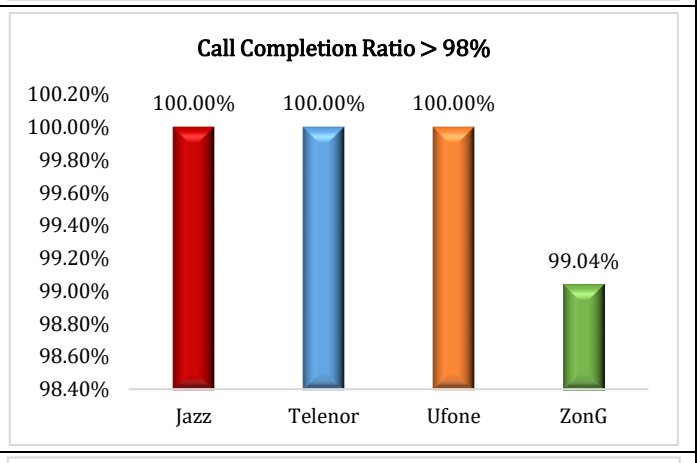


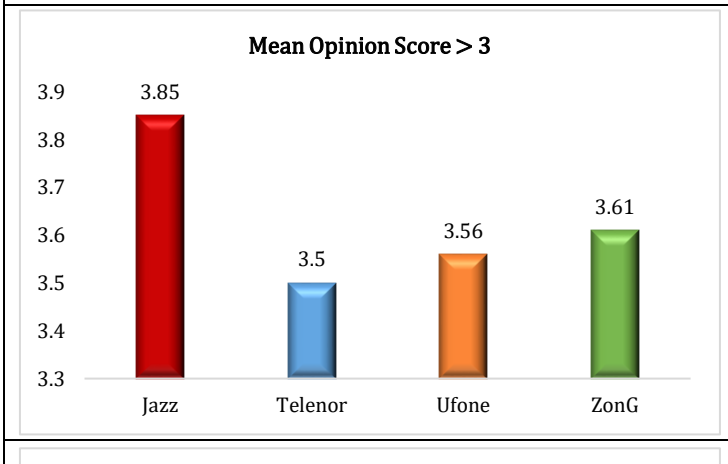
QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – KHANEWAL

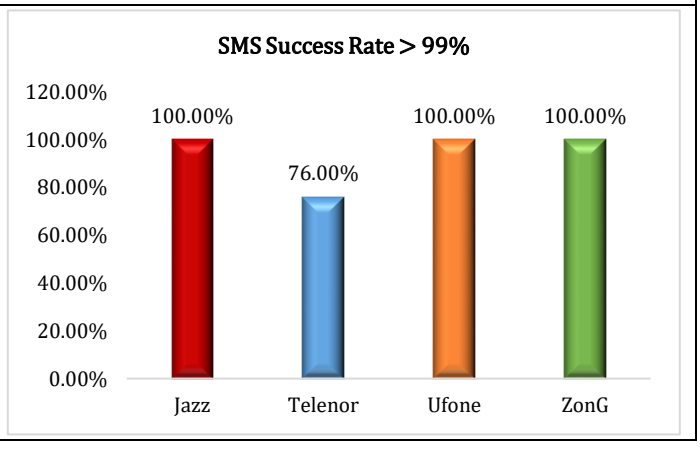


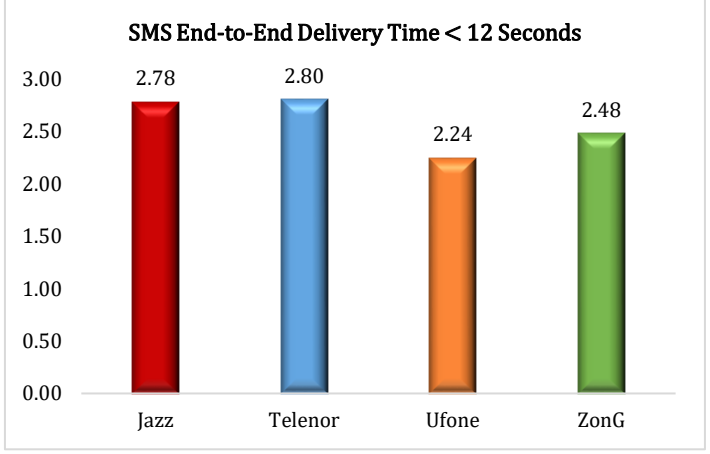










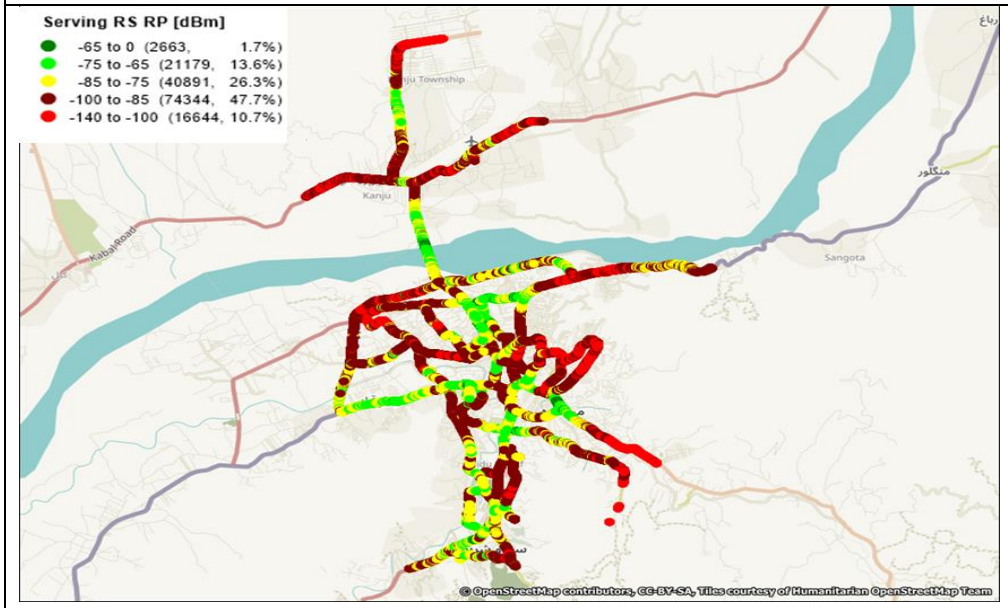


ANNEX – B

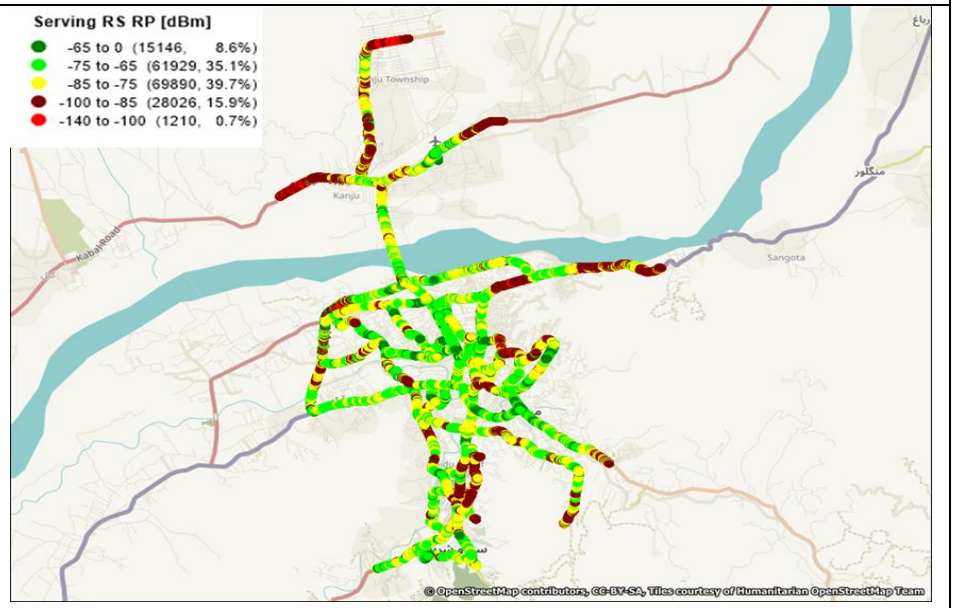
KHYBER PAKHTUNKHWA

AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

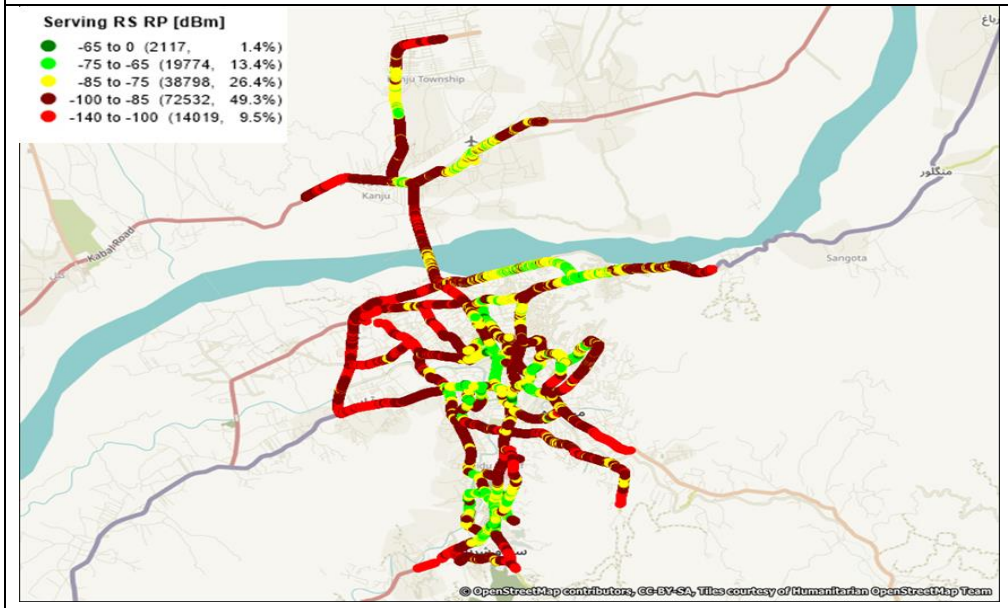
JAZZ 4G NETWORK COVERAGE – MINGORA



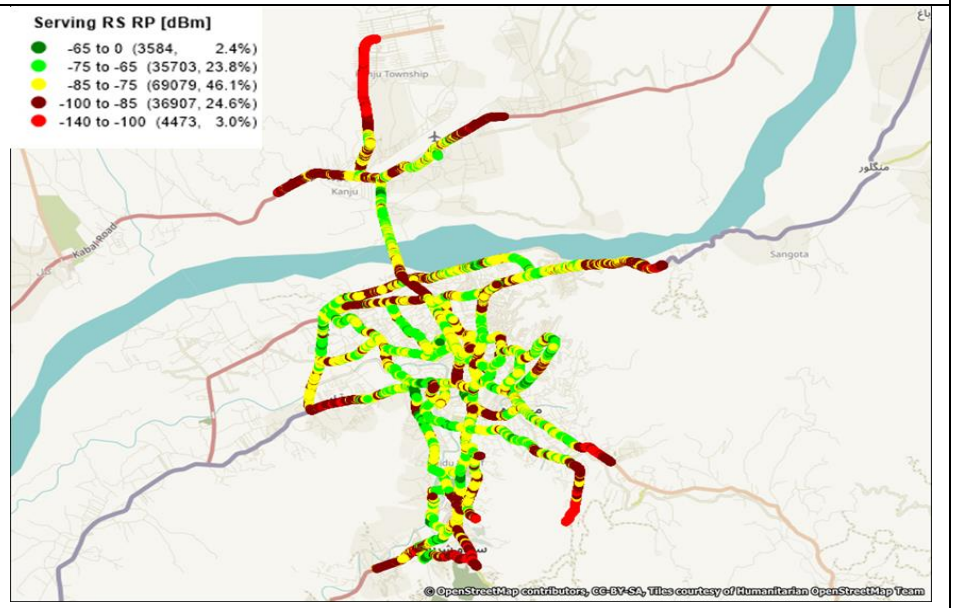
TELENOR 4G NETWORK COVERAGE – MINGORA



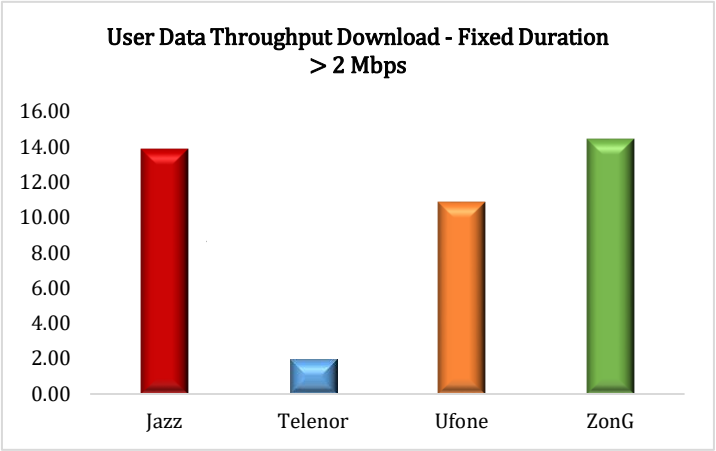
UFONE 4G NETWORK COVERAGE – MINGORA

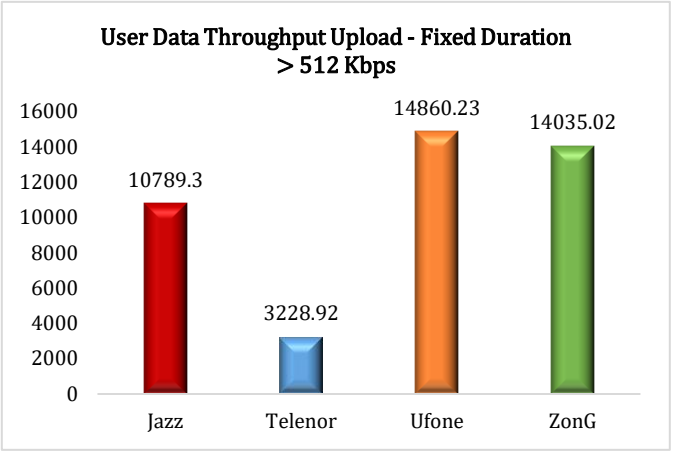


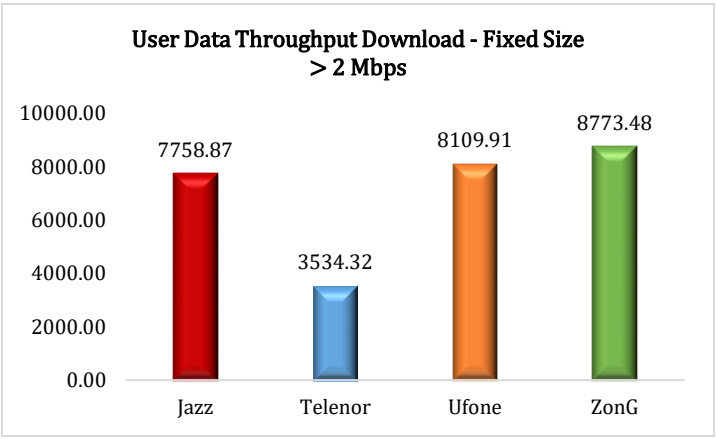
ZONG 4G NETWORK COVERAGE – MINGORA

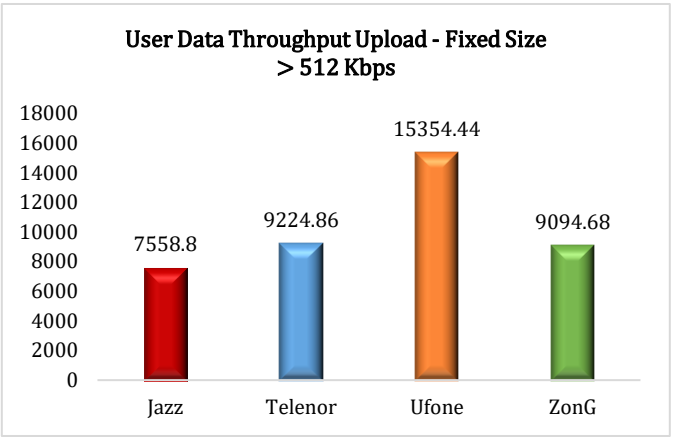


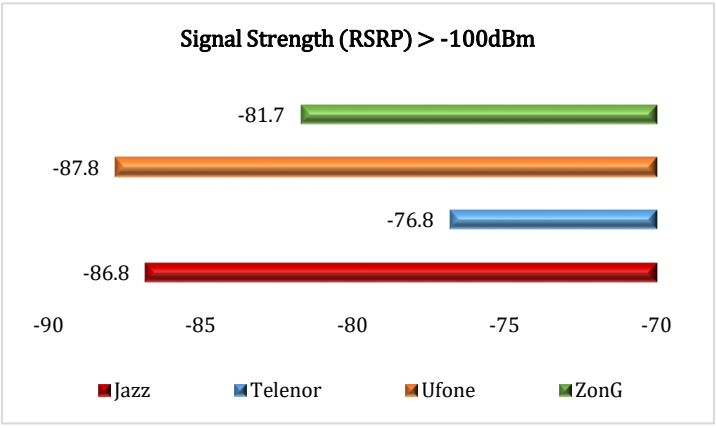
QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – MINGORA

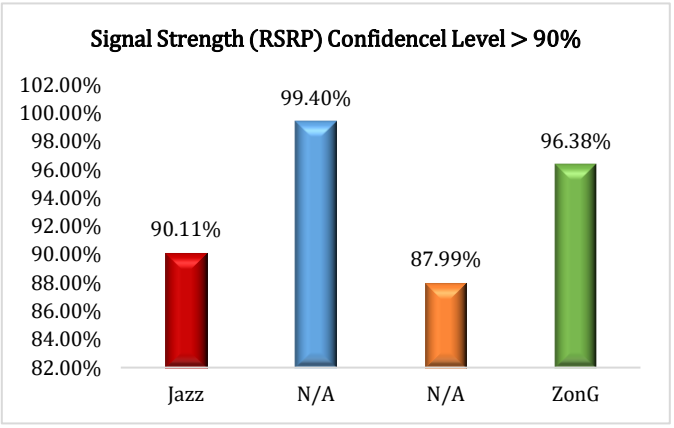


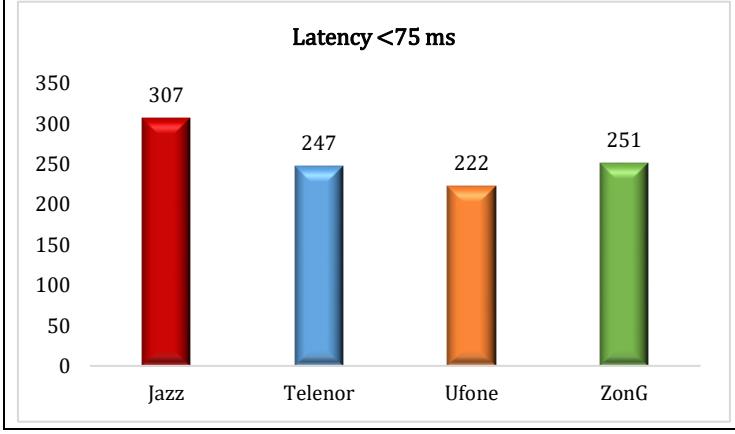


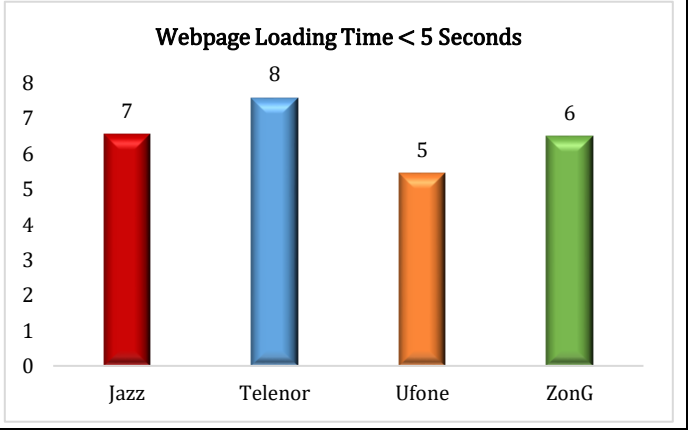






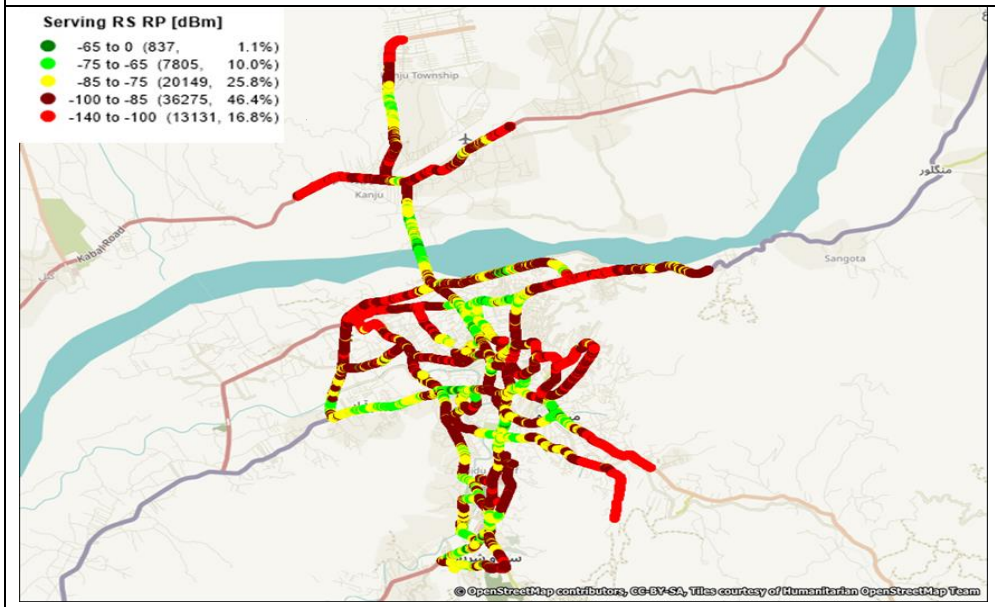




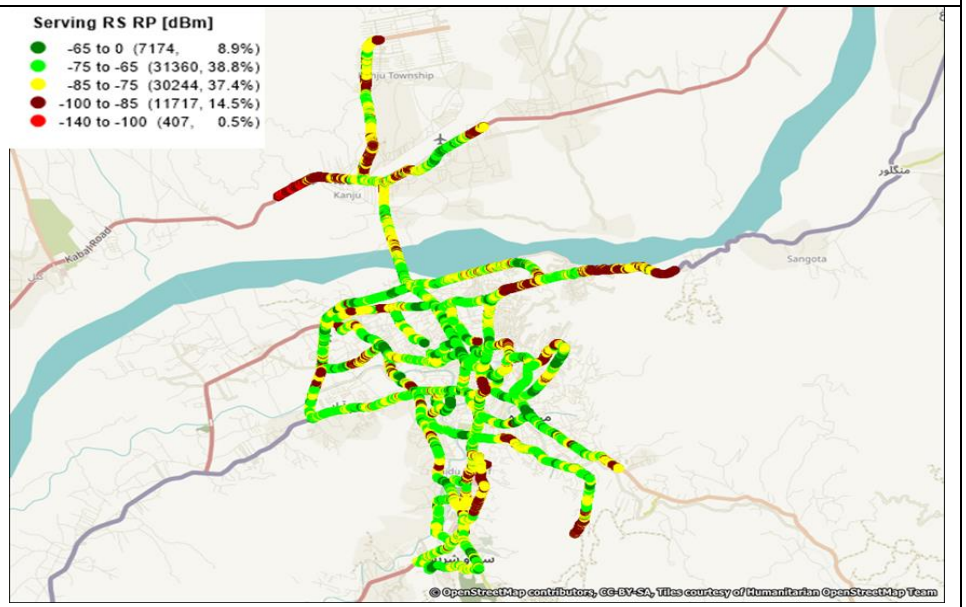


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

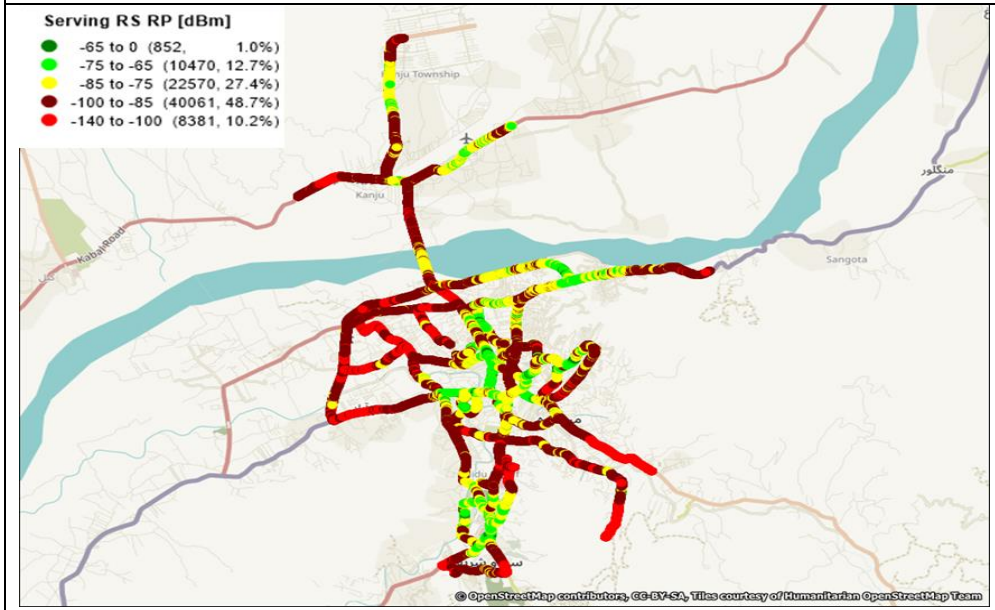
JAZZ 4G NETWORK COVERAGE – MINGORA



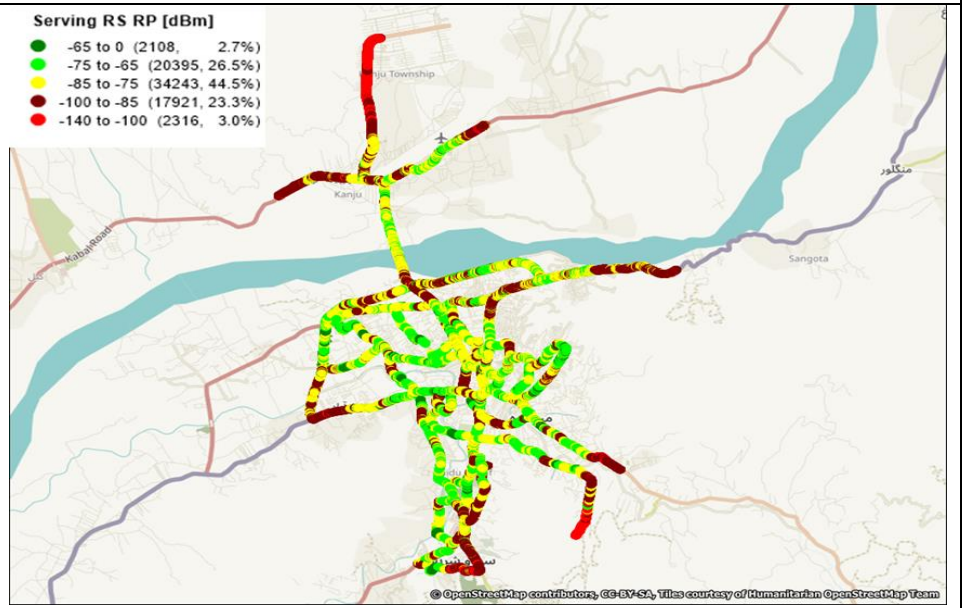
TELENOR 4G NETWORK COVERAGE – MINGORA



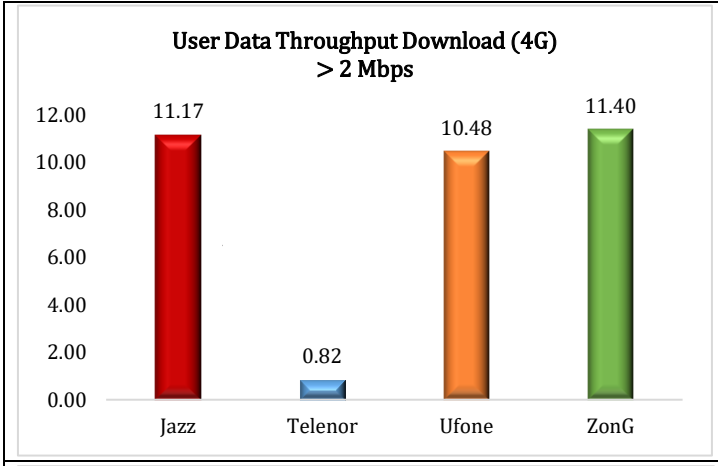
UFONE 4G NETWORK COVERAGE – MINGORA

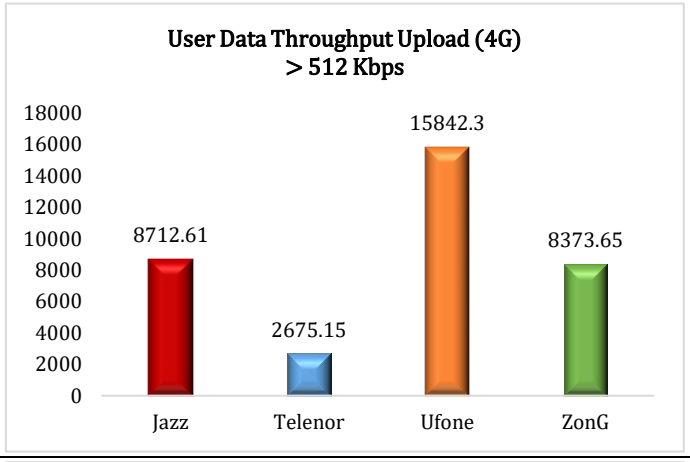


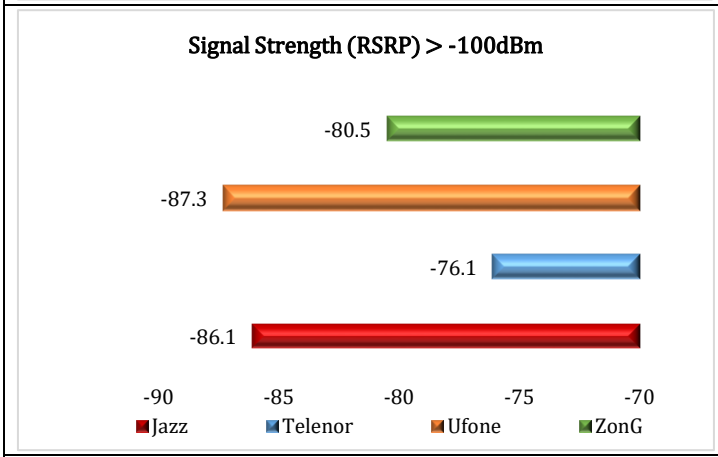
ZONG 4G NETWORK COVERAGE – MINGORA

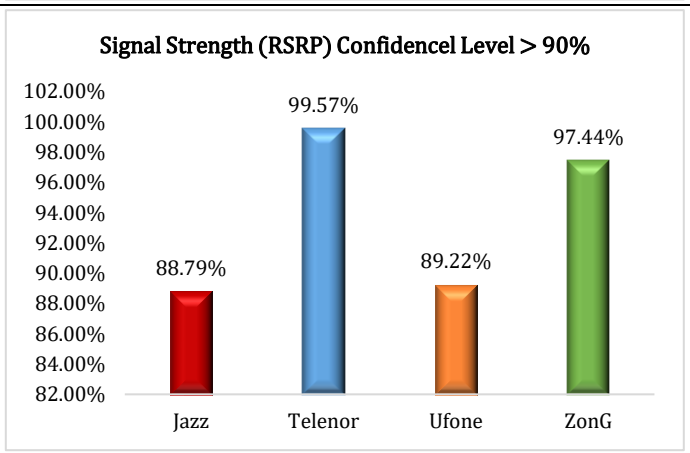


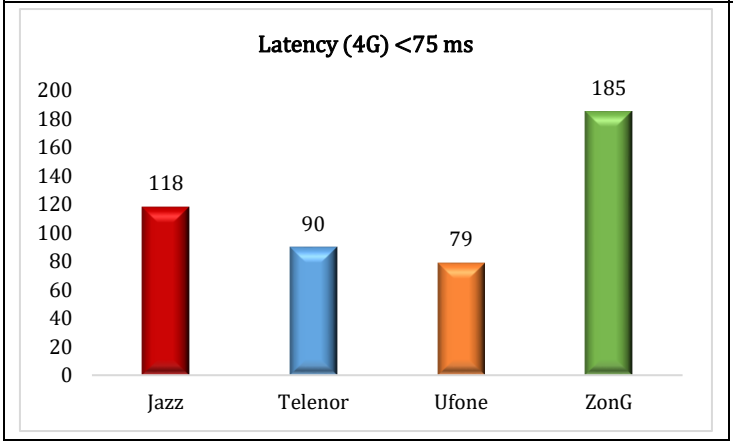
QUALITY OF SERVICE SURVEY RESULTS (4G) – MINGORA





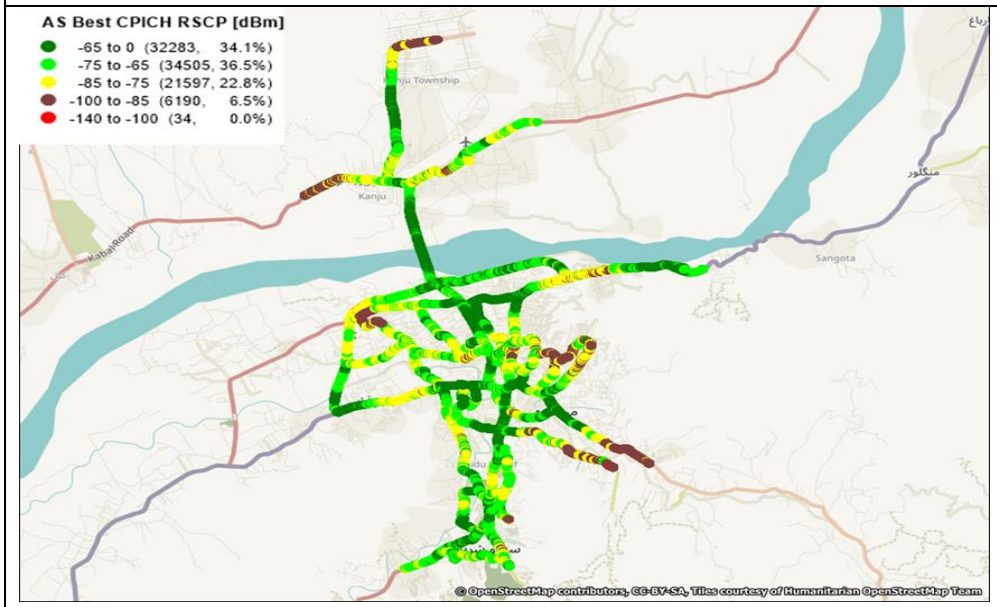




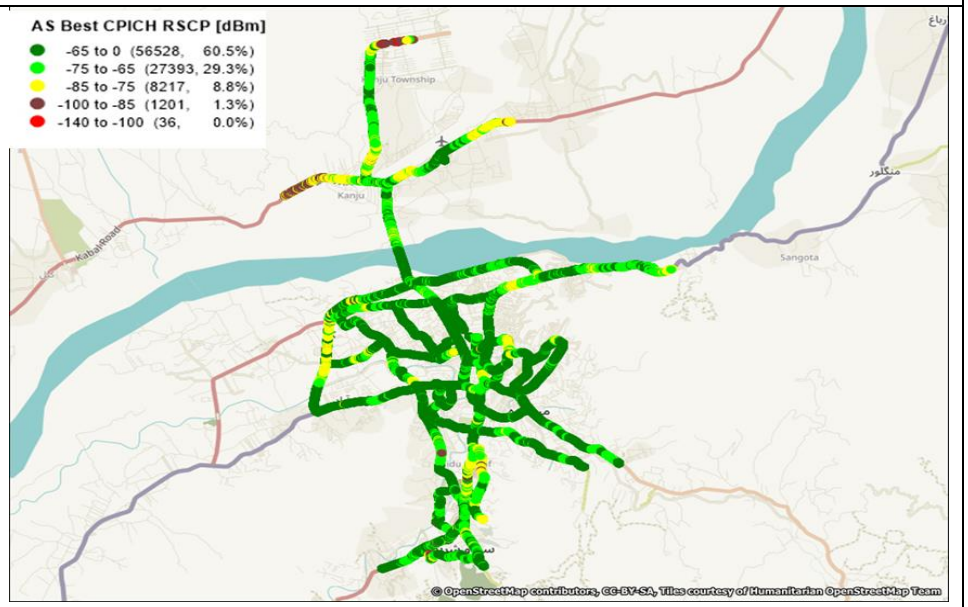


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

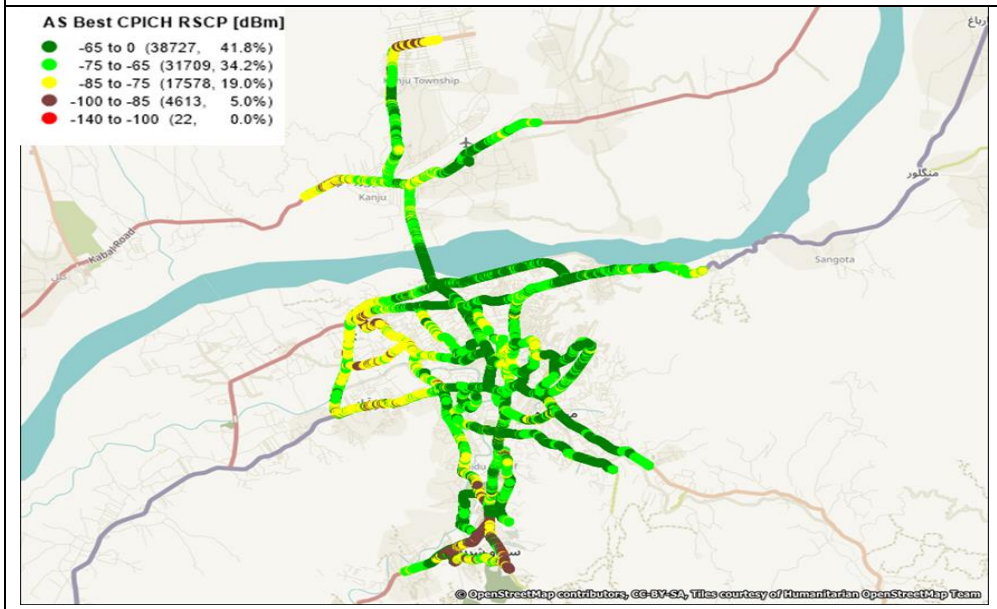
JAZZ 3G NETWORK COVERAGE – MINGORA



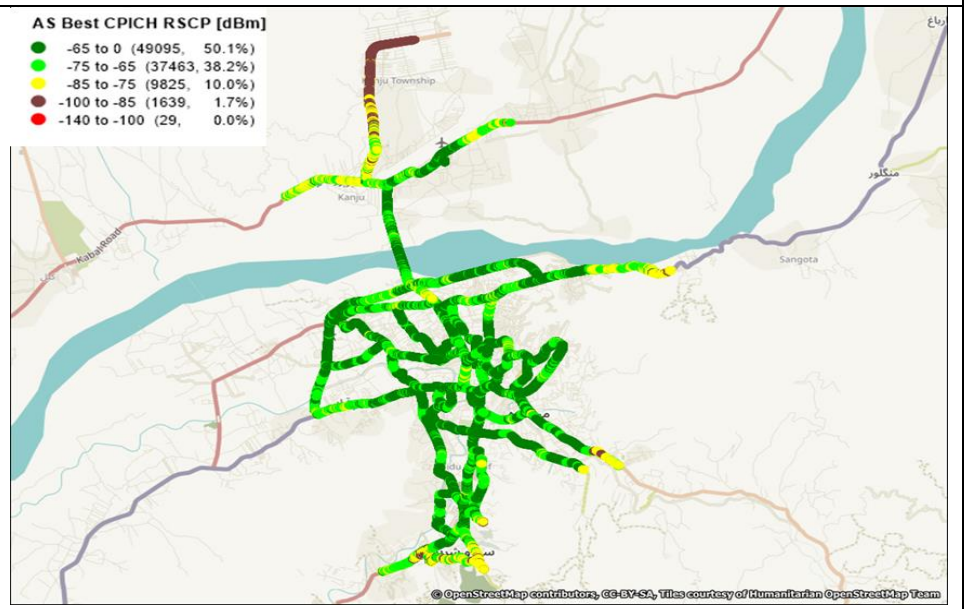
TELENOR 3G NETWORK COVERAGE – MINGORA



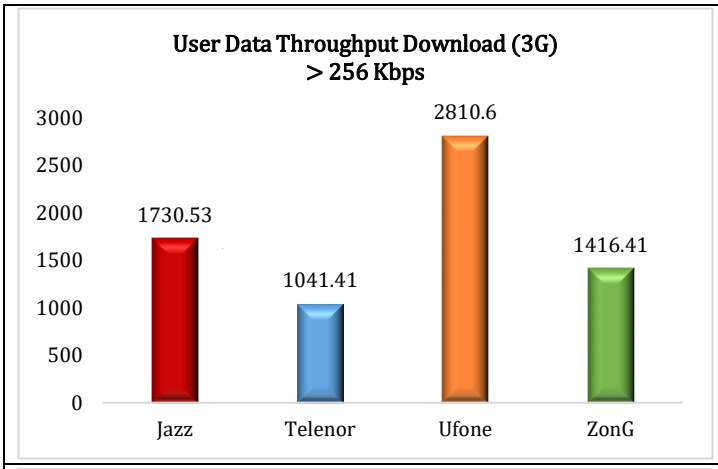
UFONE 3G NETWORK COVERAGE – MINGORA

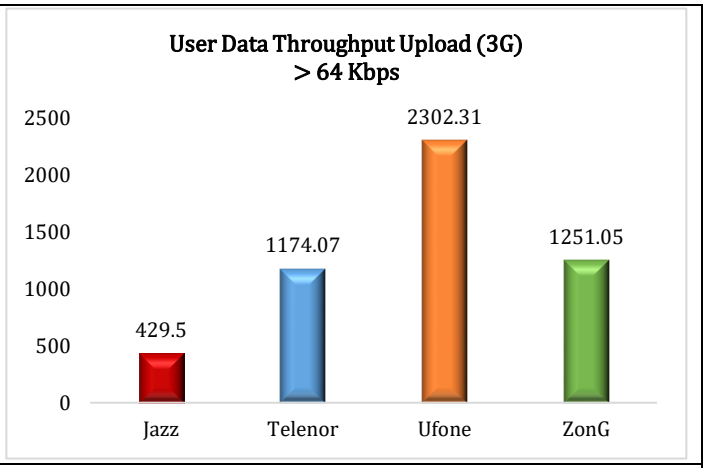


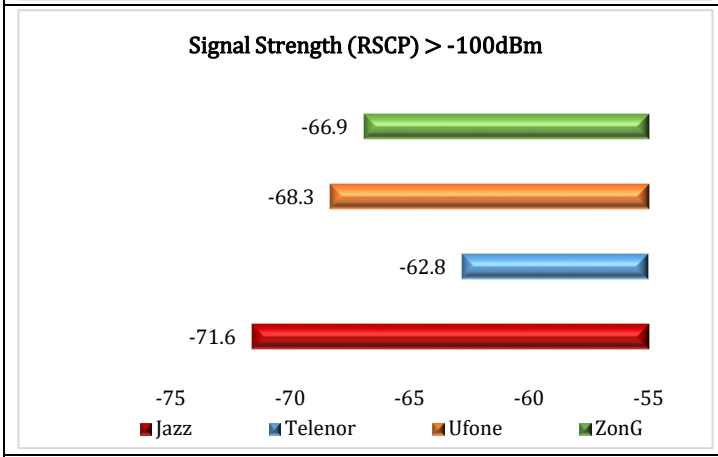
ZONG 3G NETWORK COVERAGE – MINGORA

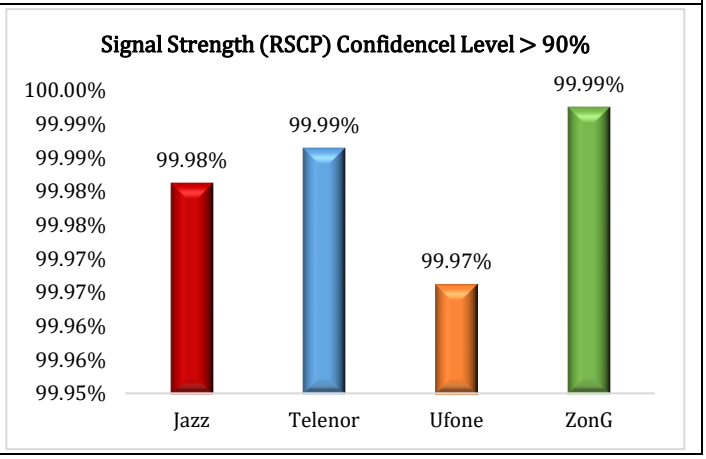


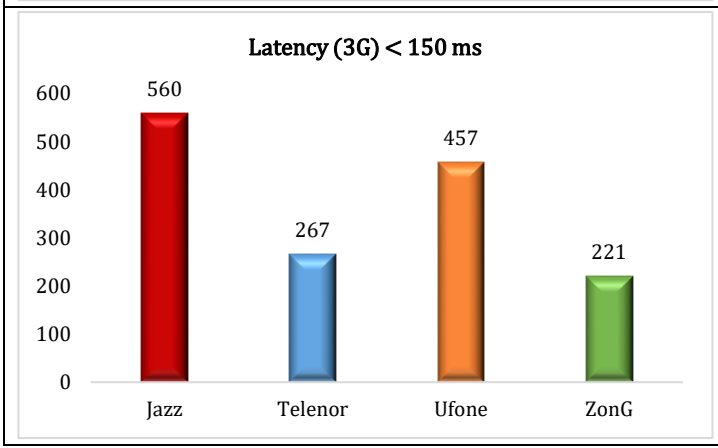
QUALITY OF SERVICE SURVEY RESULTS (3G) – MINGORA



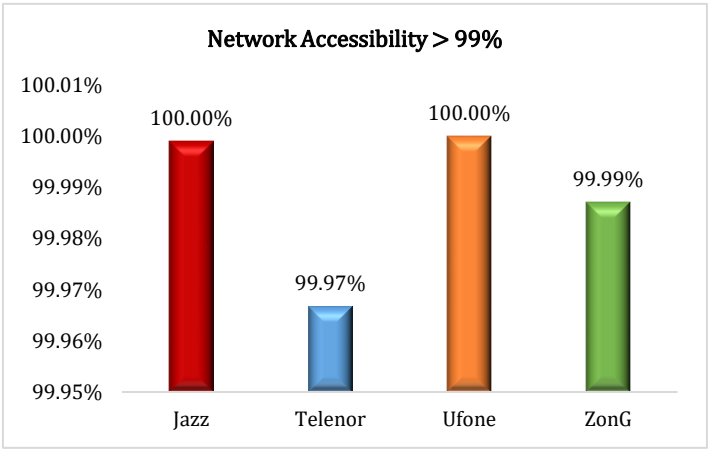


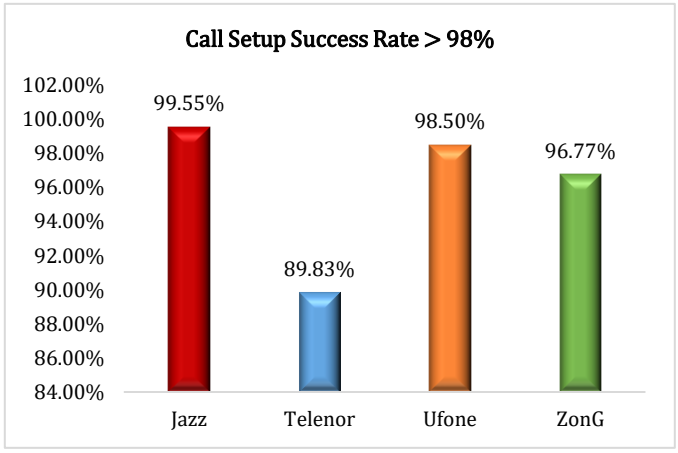


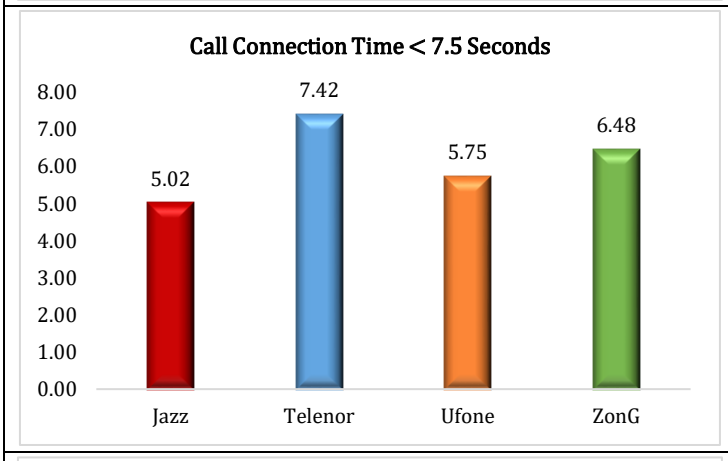


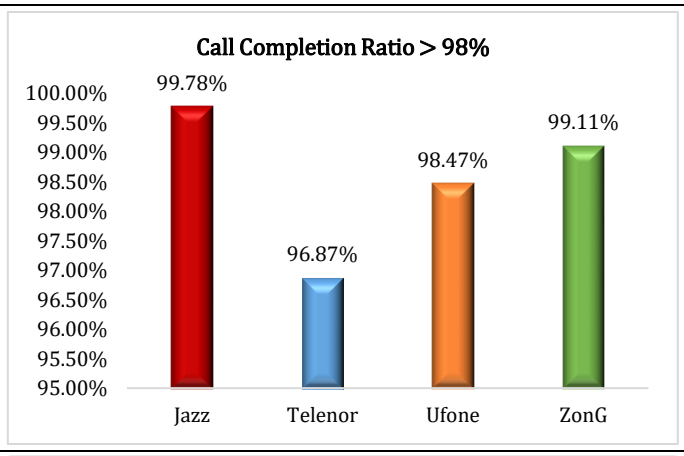


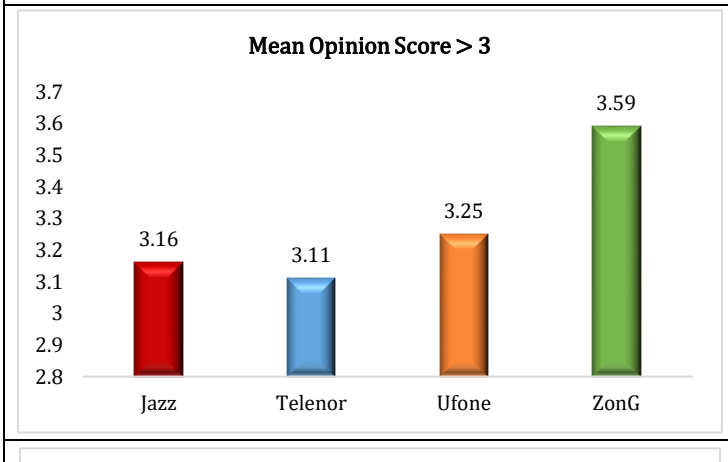
QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – MINGORA

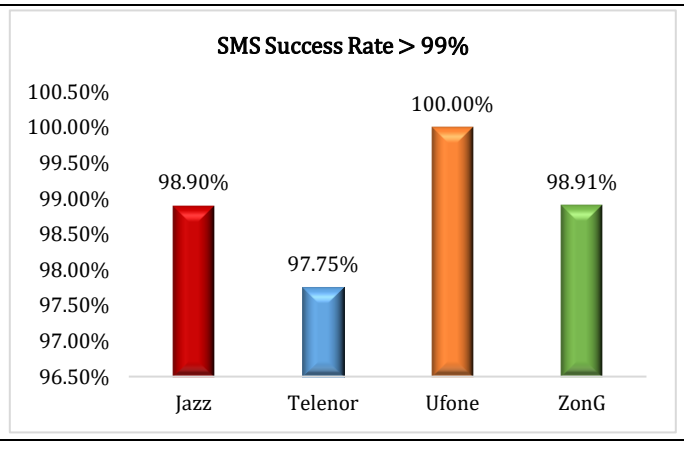


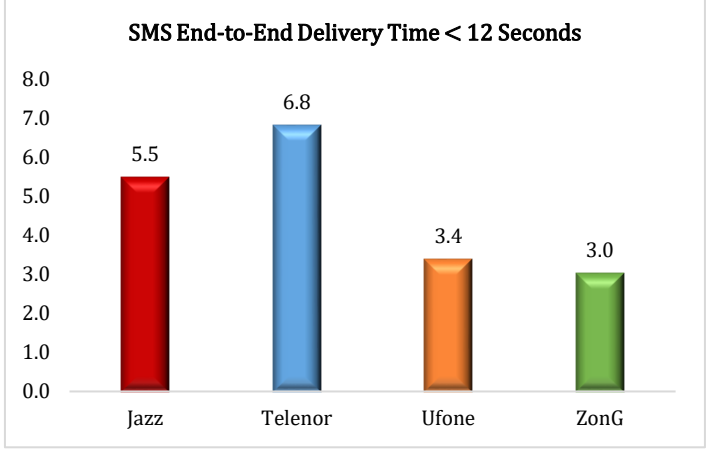






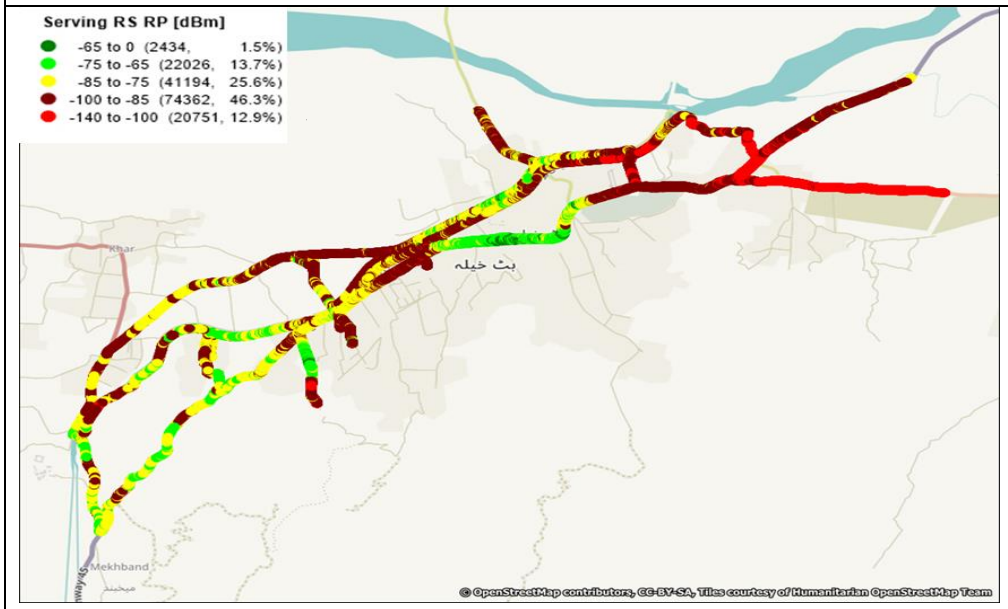




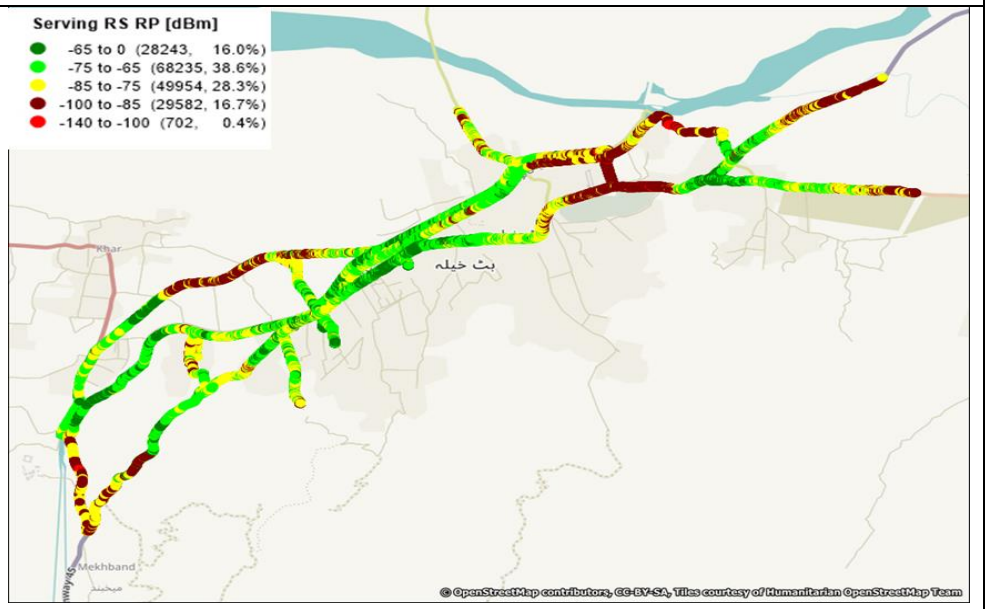


AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

JAZZ 4G NETWORK COVERAGE – BATKHELA



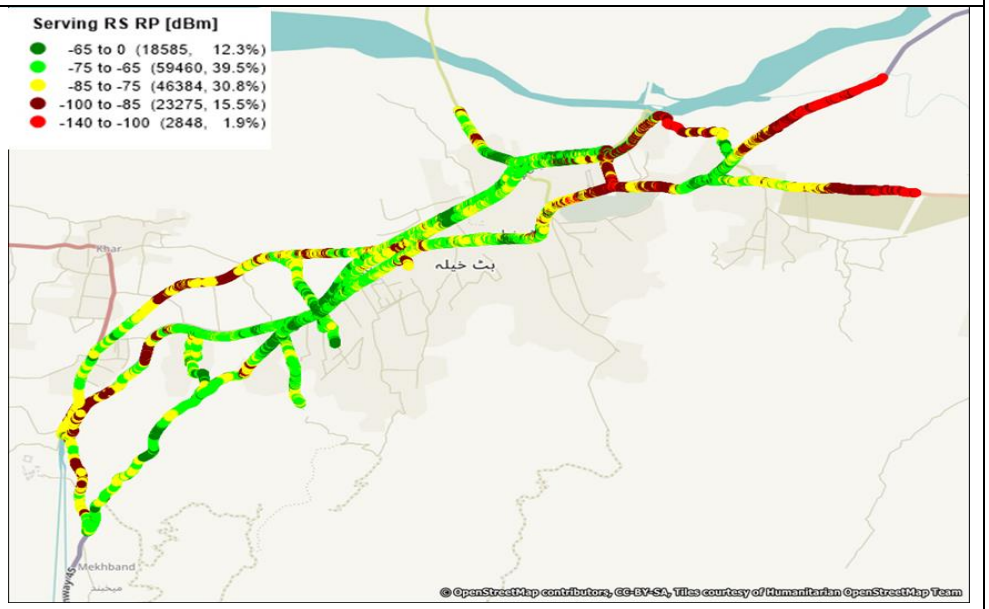
TELENOR 4G NETWORK COVERAGE – BATKHELA



UFONE 4G NETWORK COVERAGE – BATKHELA

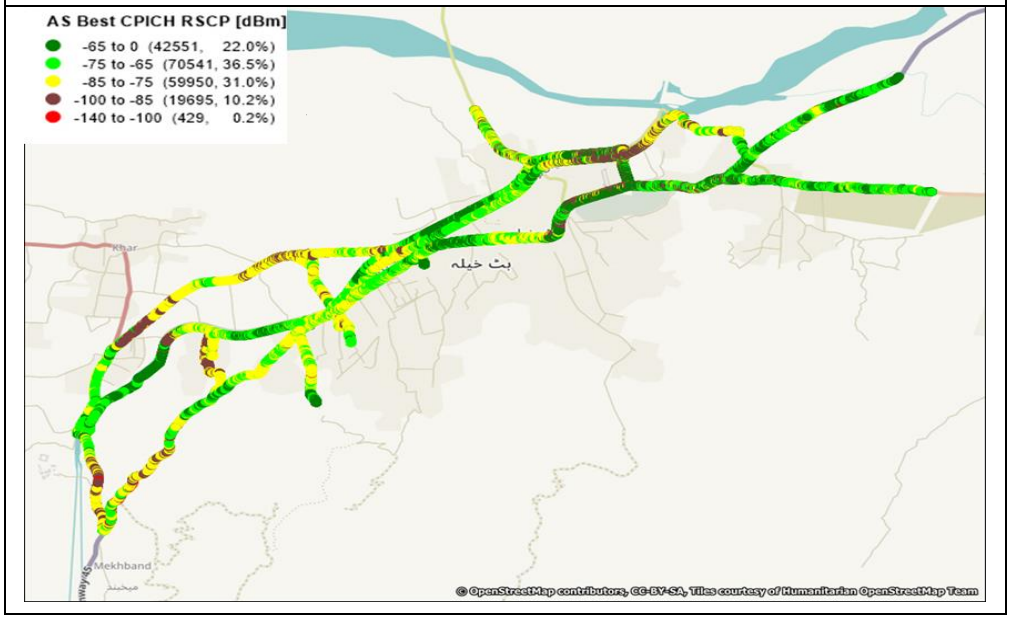
NO COVERAGE

ZONG 4G NETWORK COVERAGE – BATKHELA

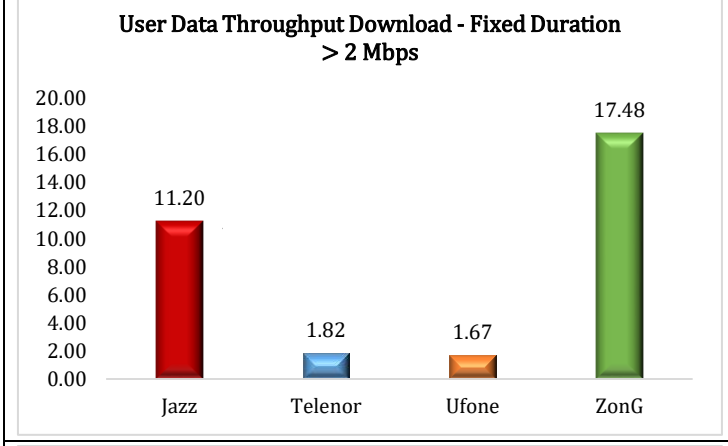


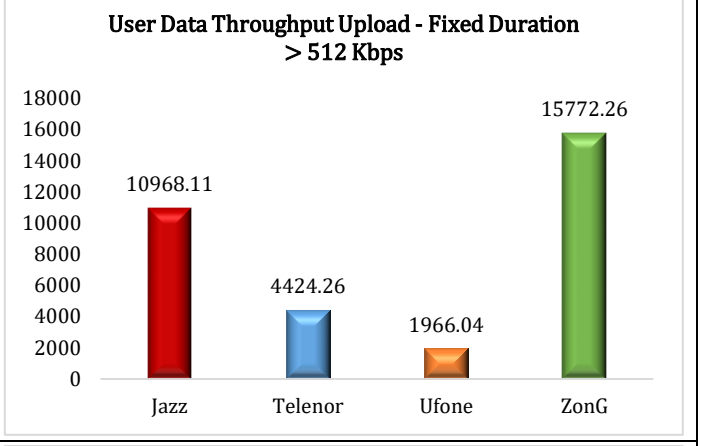
AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

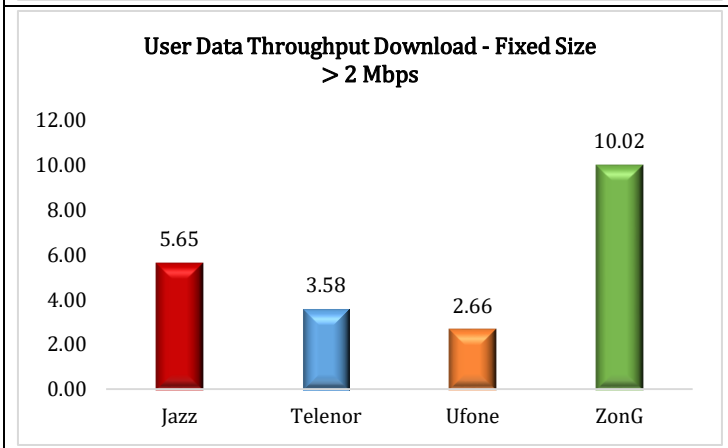
UFONE 3G NETWORK COVERAGE – BATKHELA

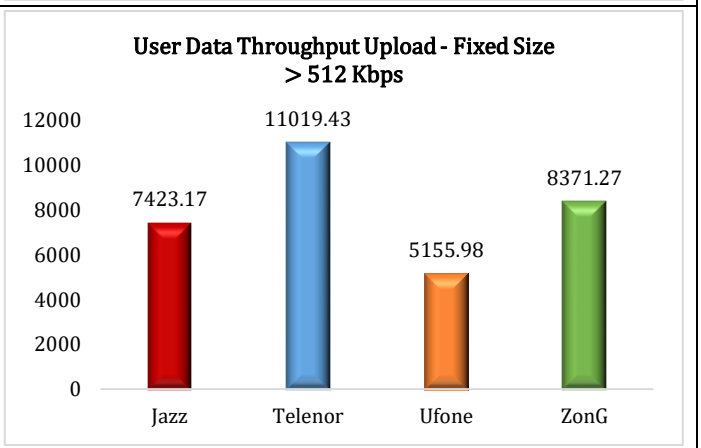


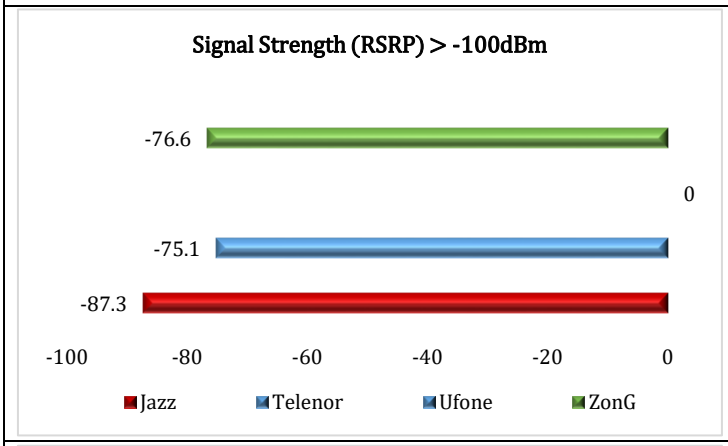
QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – BATKHELA

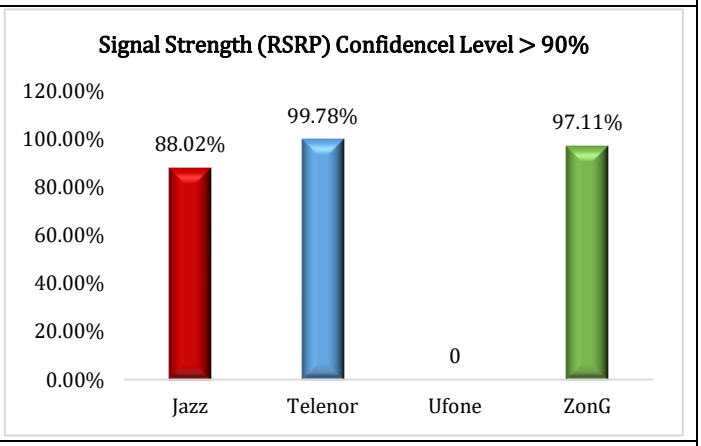


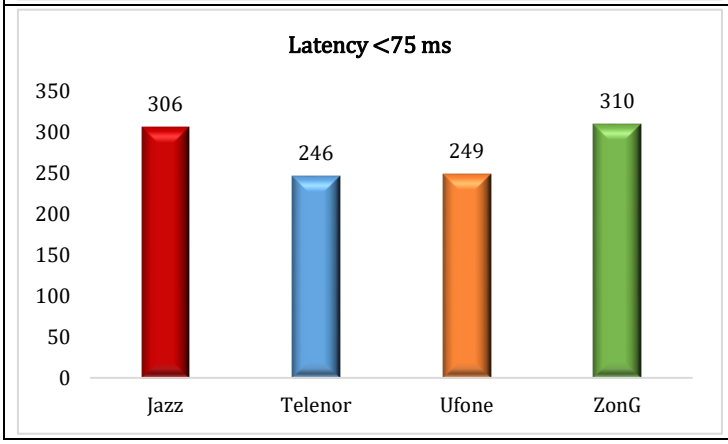


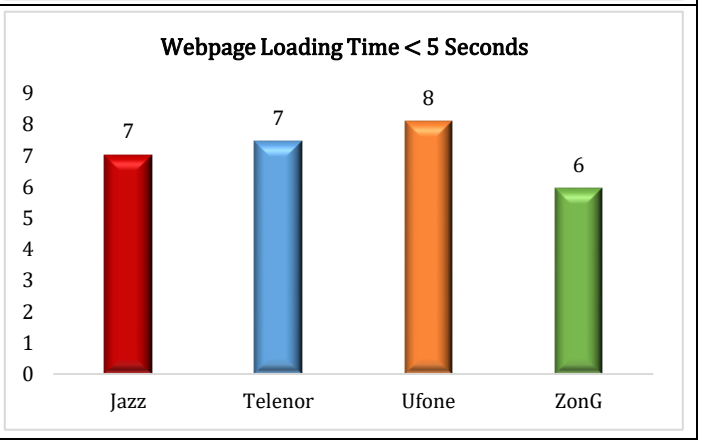






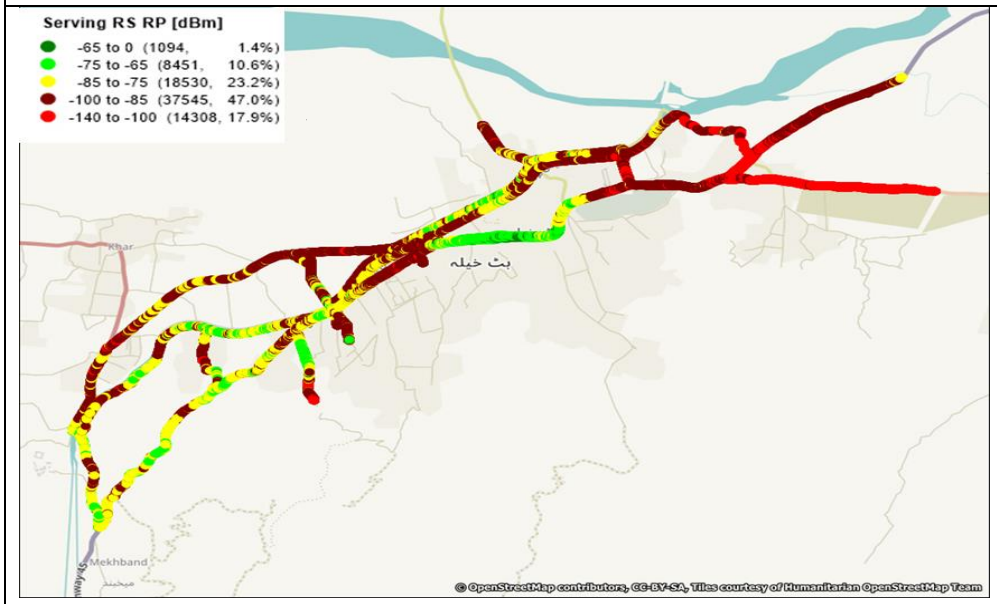




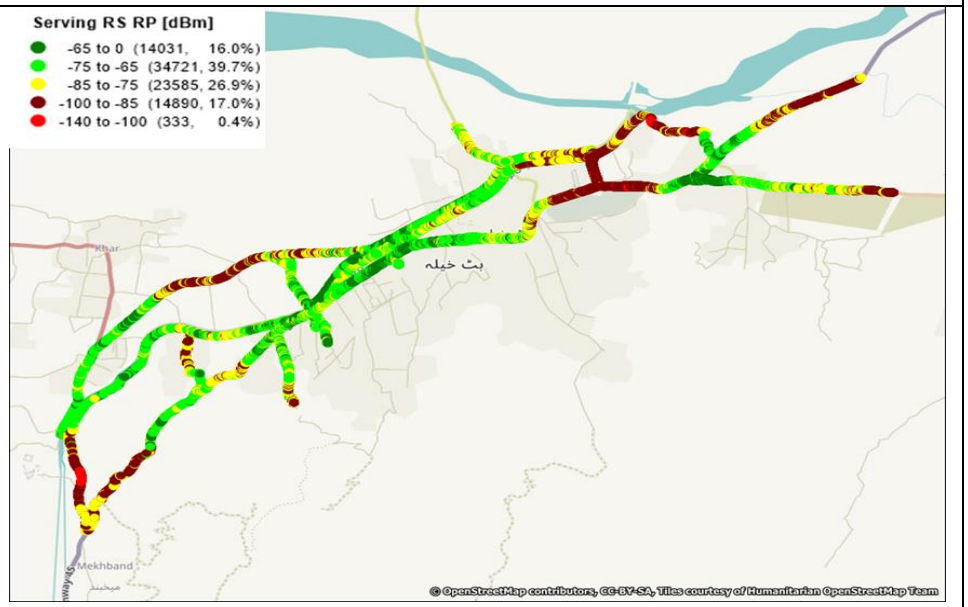


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

JAZZ 4G NETWORK COVERAGE – BATKHELA



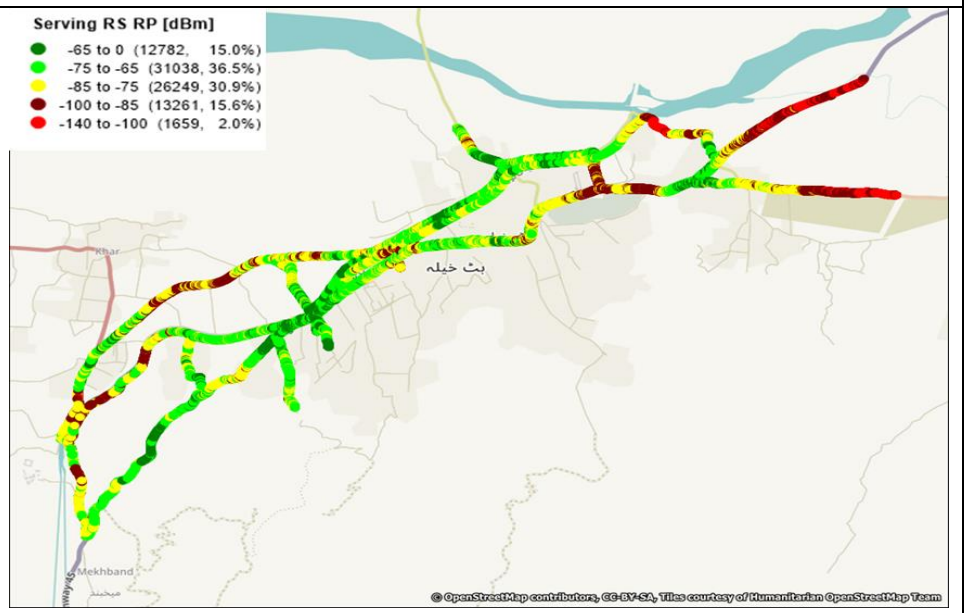
TELENOR 4G NETWORK COVERAGE – BATKHELA



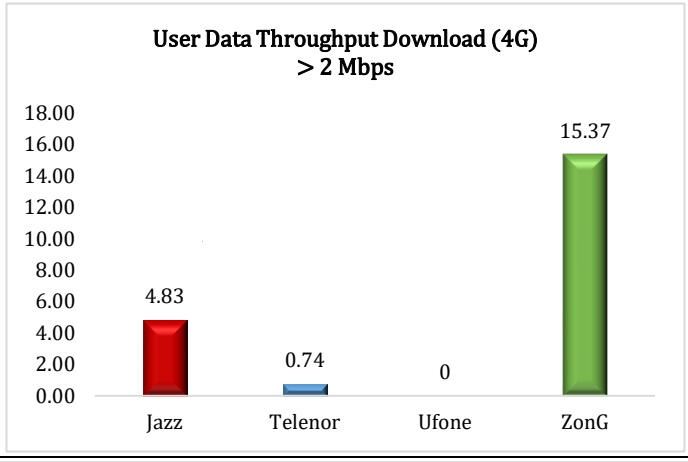
UFONE 4G NETWORK COVERAGE – BATKHELA

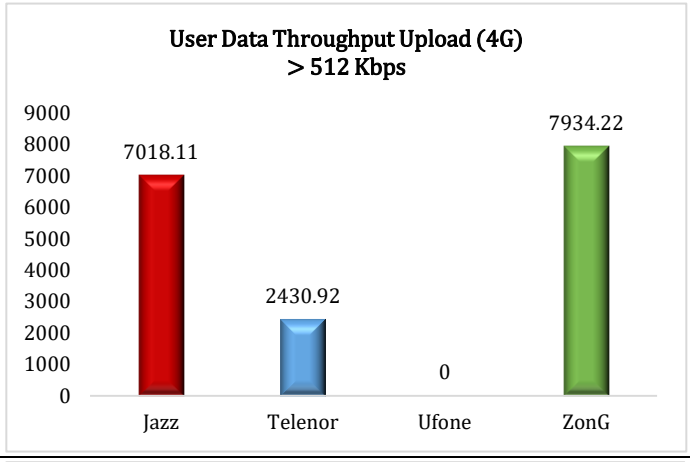
No Coverage

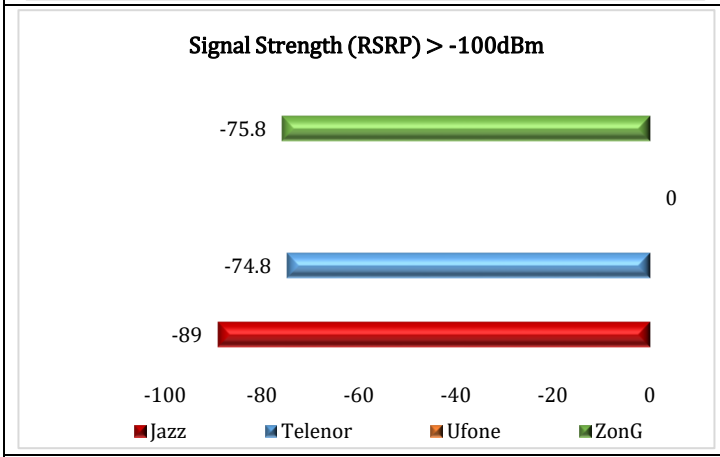
ZONG 4G NETWORK COVERAGE – BATKHELA

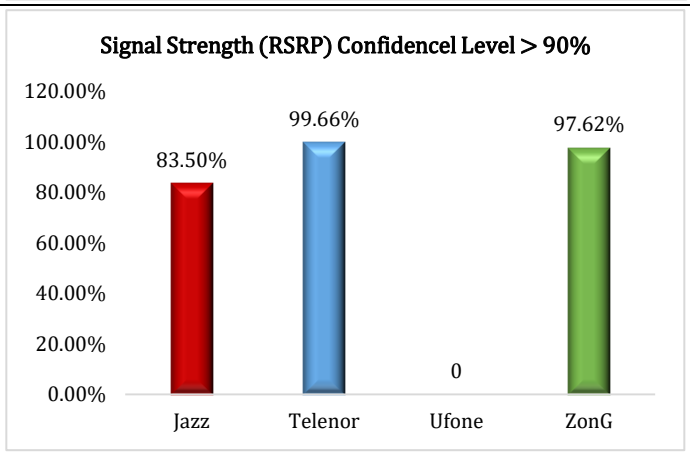


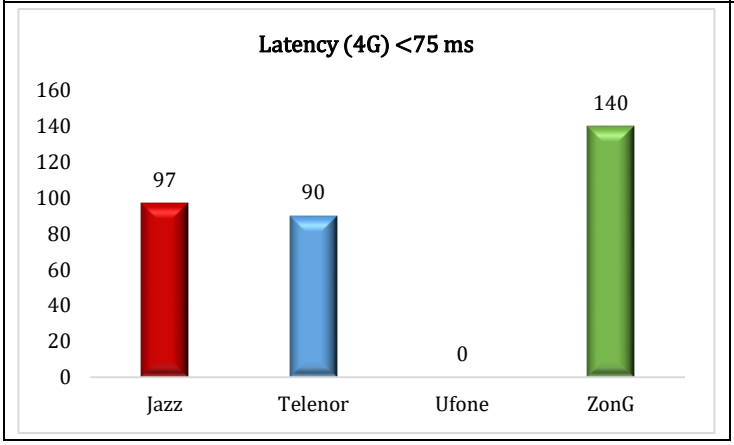
QUALITY OF SERVICE SURVEY RESULTS (4G) – BATKHELA





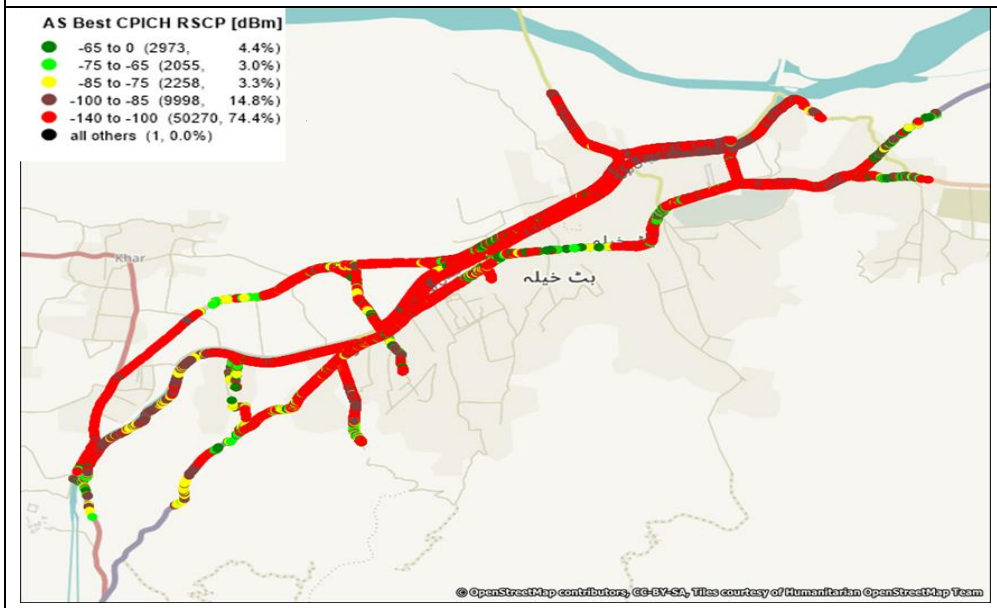




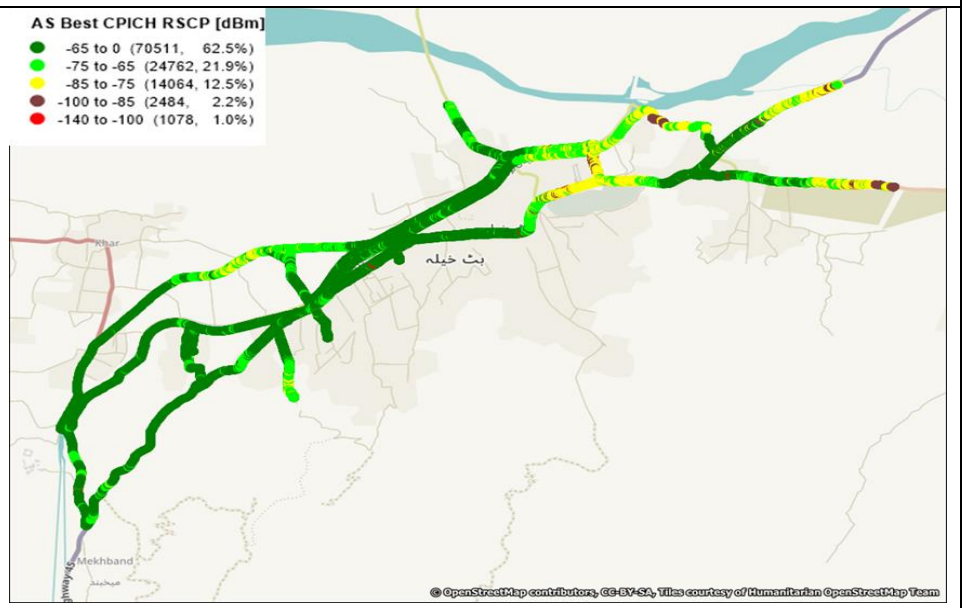


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

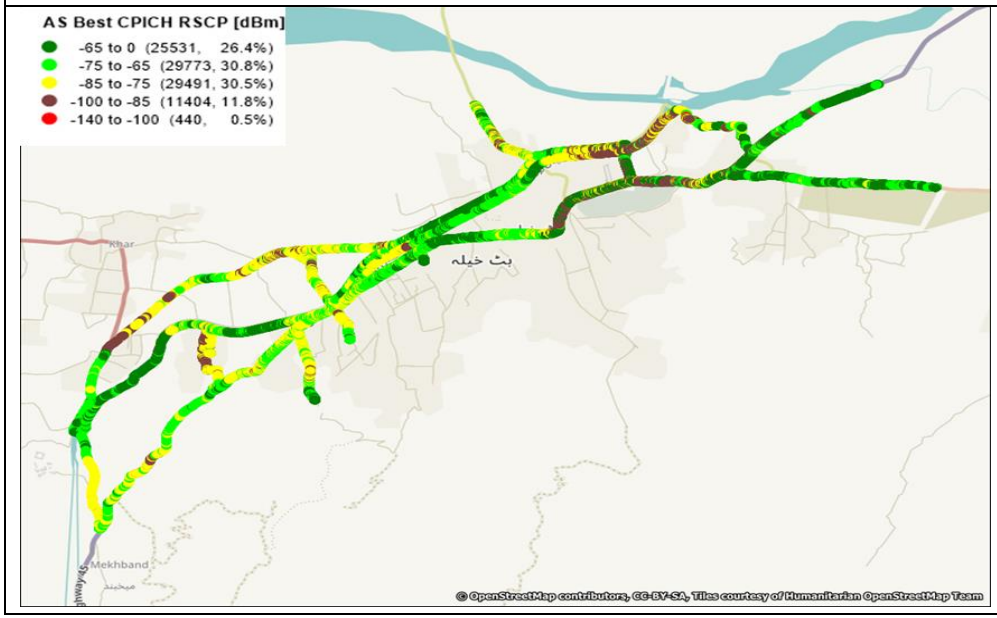
JAZZ 3G NETWORK COVERAGE – BATKHELA



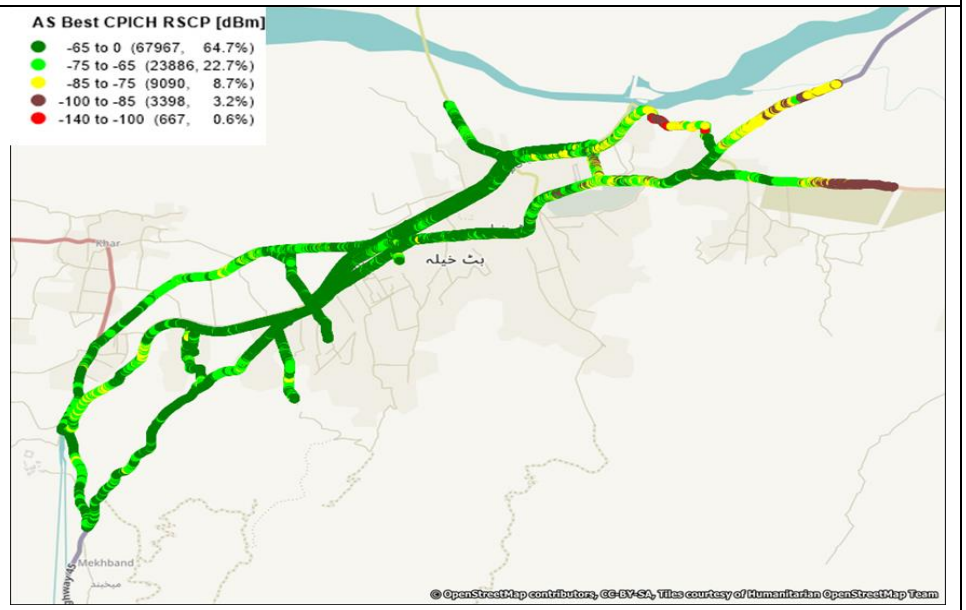
TELENOR 3G NETWORK COVERAGE – BATKHELA



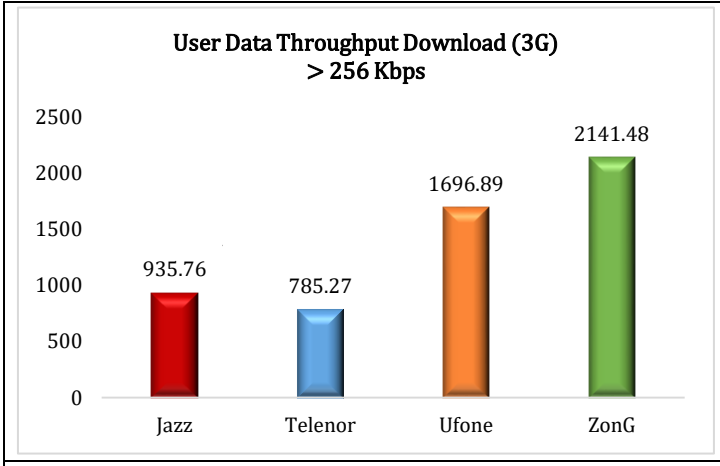
UFONE 3G NETWORK COVERAGE – BATKHELA

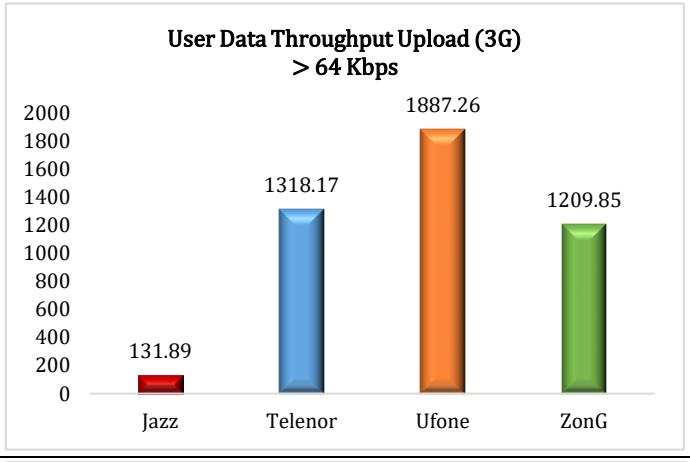


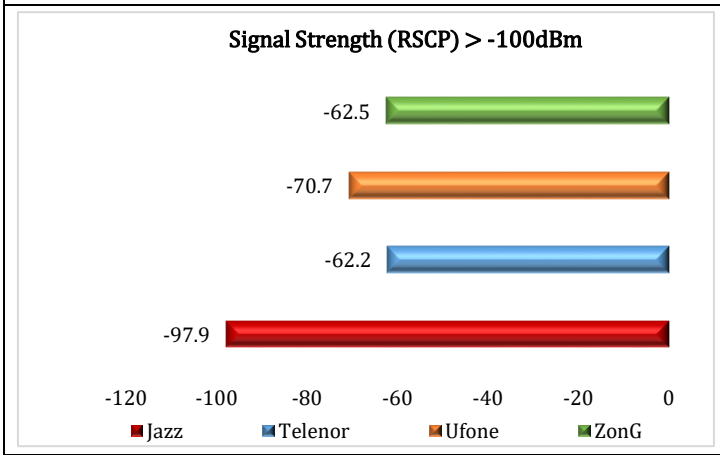
ZONG 3G NETWORK COVERAGE – BATKHELA

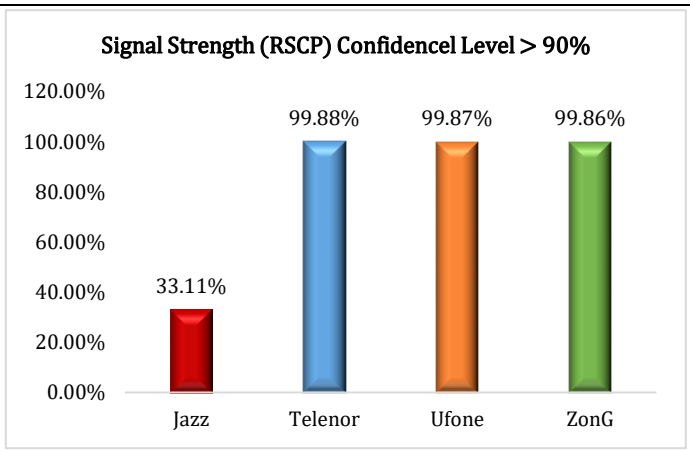


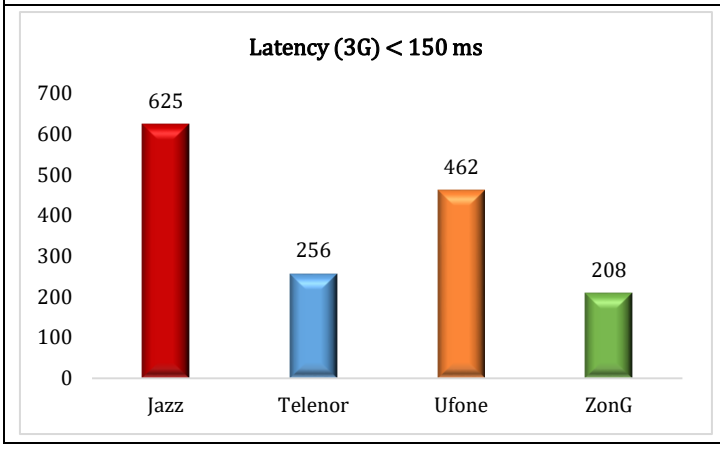
QUALITY OF SERVICE SURVEY RESULTS (3G) – BATKHELA



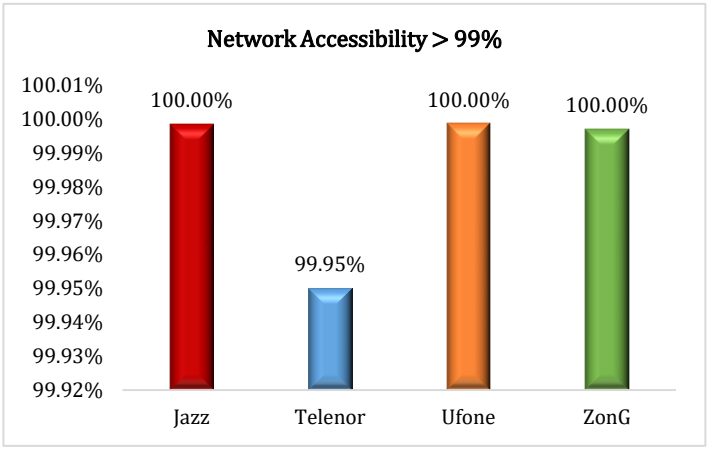


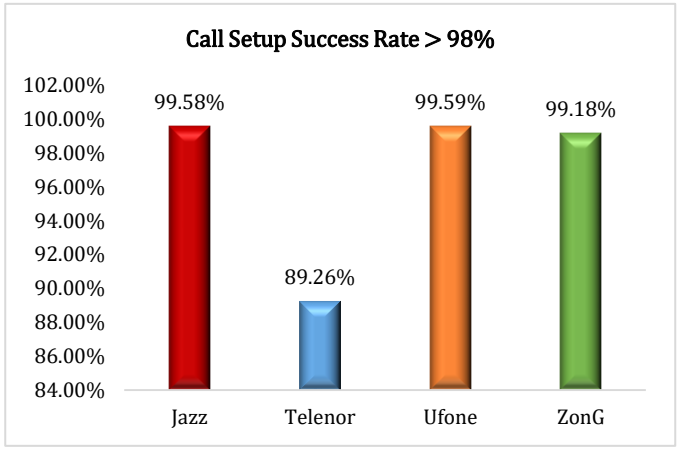


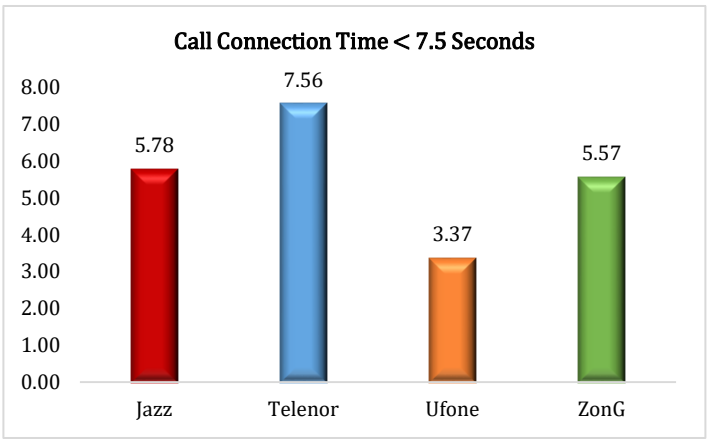


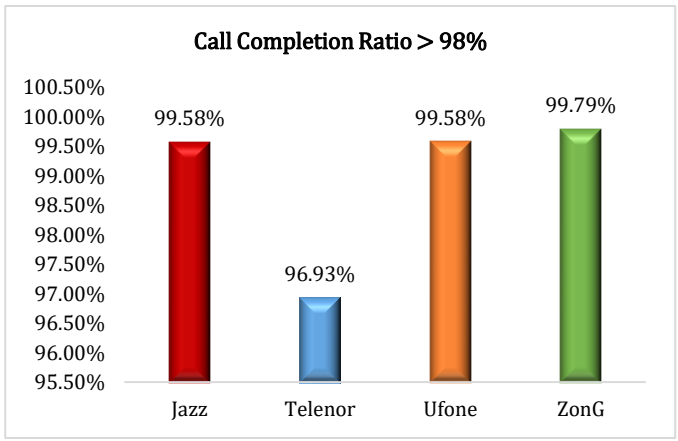


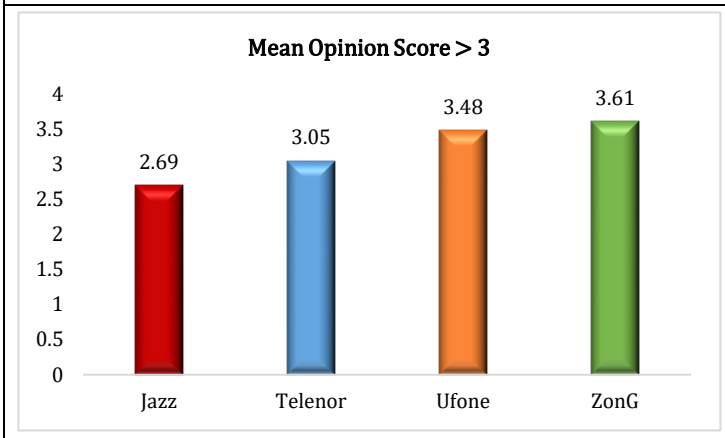
QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – BATKHELA

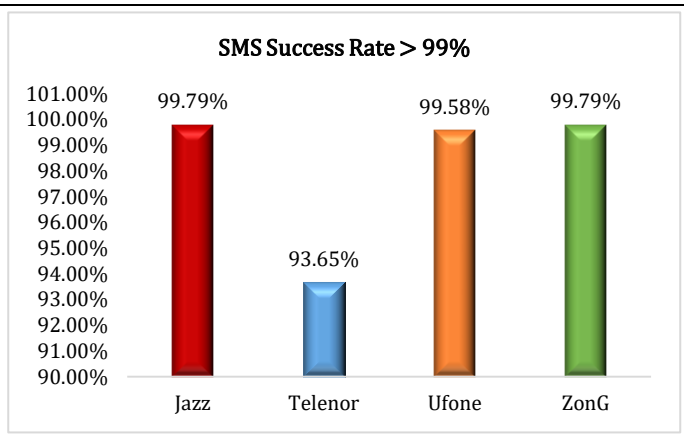


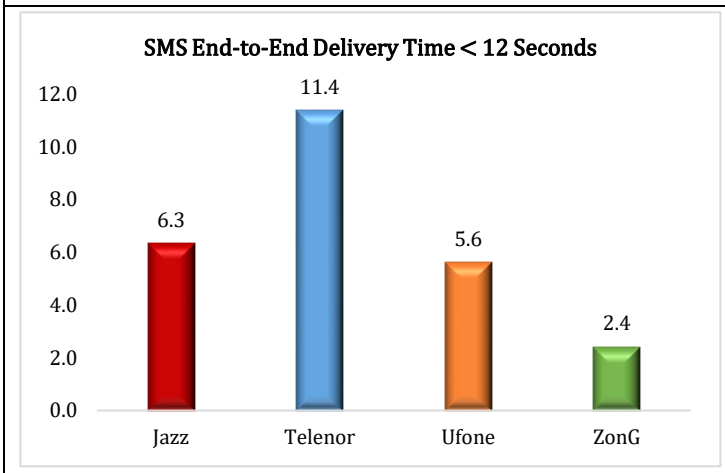






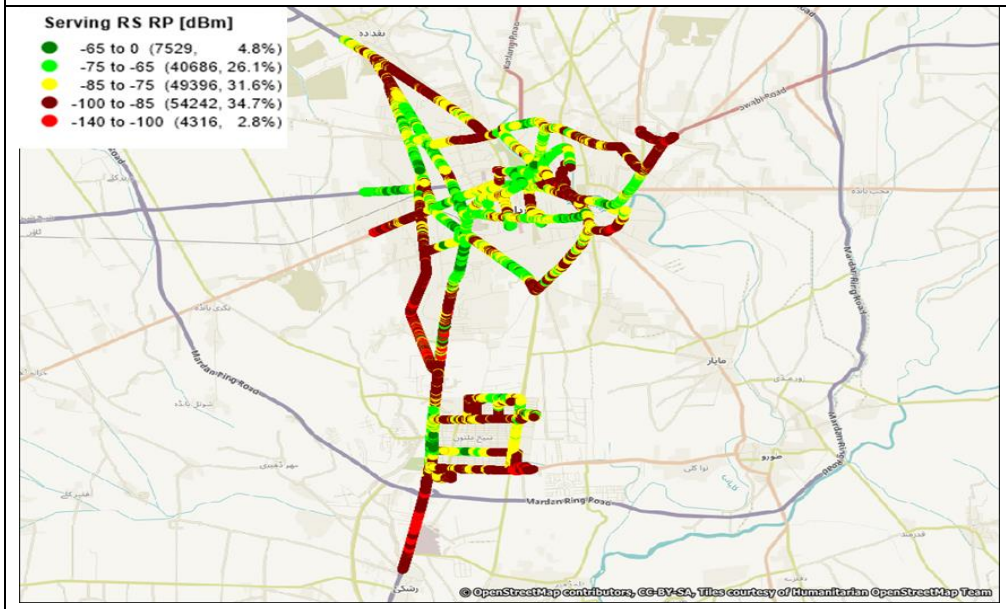




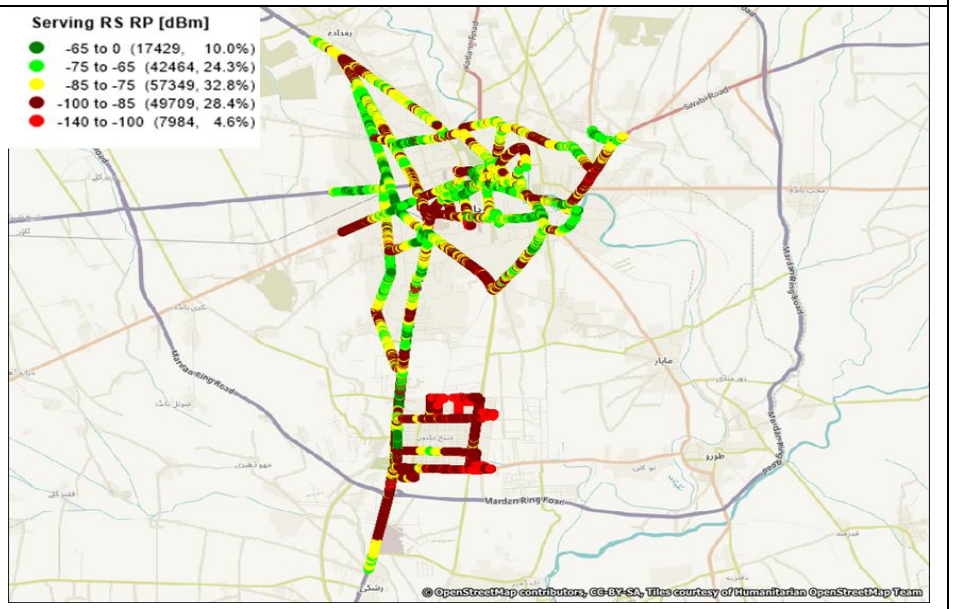


AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

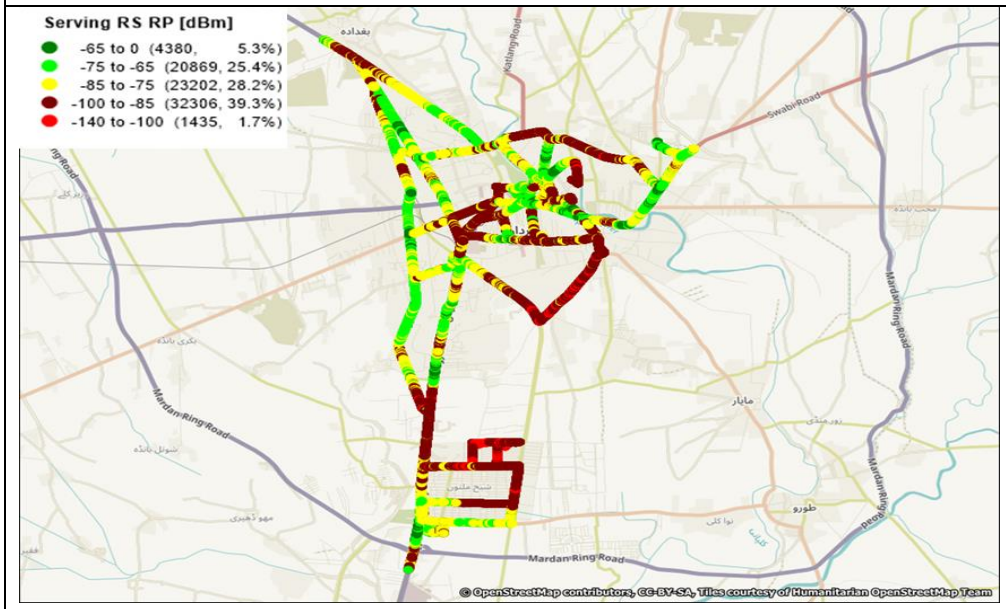
JAZZ 4G NETWORK COVERAGE – MARDAN



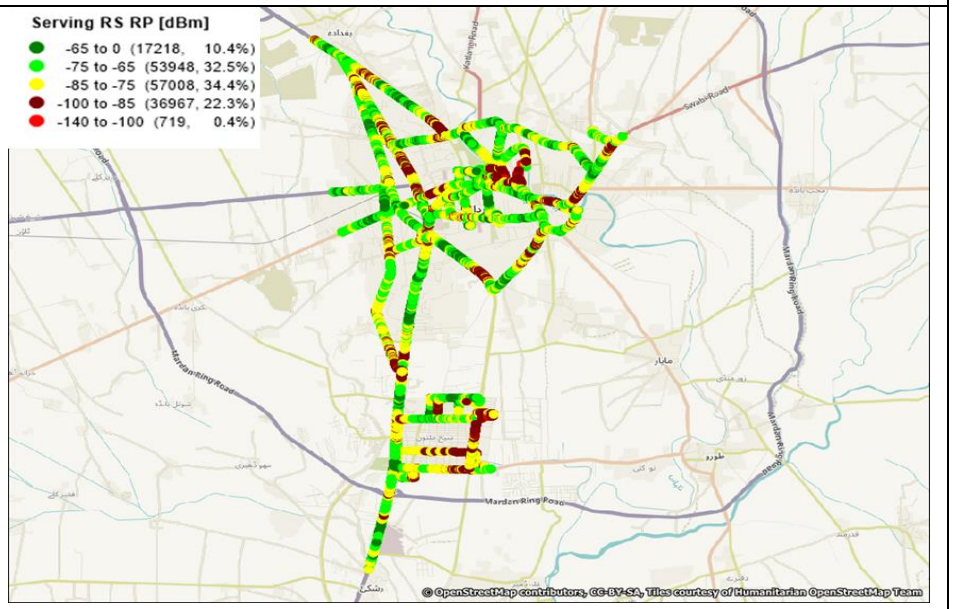
TELENOR 4G NETWORK COVERAGE – MARDAN



UFONE 4G NETWORK COVERAGE – MARDAN

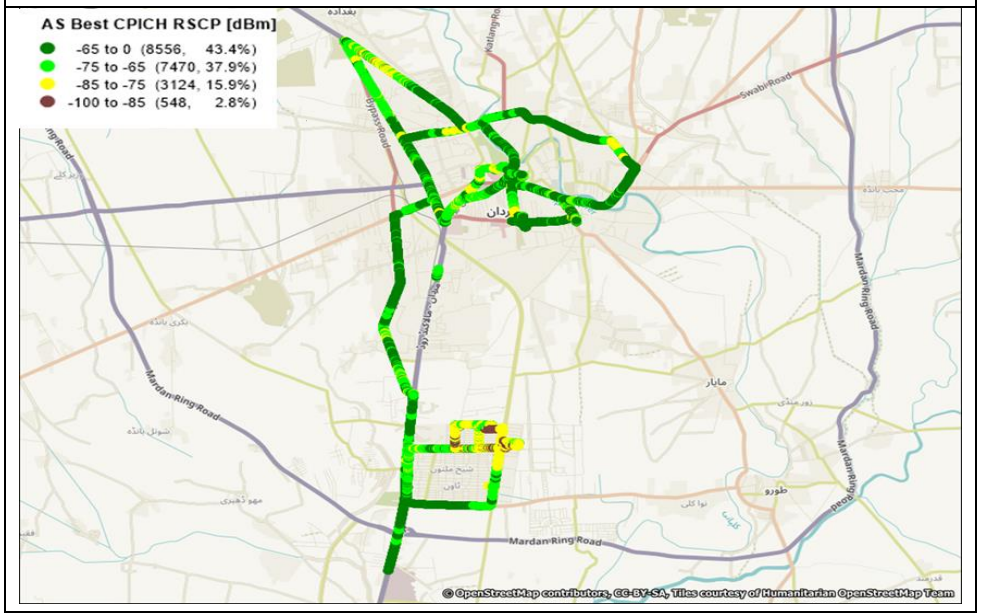


ZONG 4G NETWORK COVERAGE – MARDAN

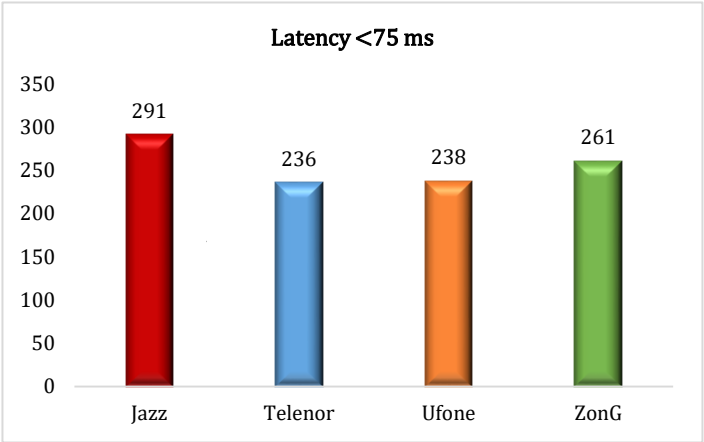


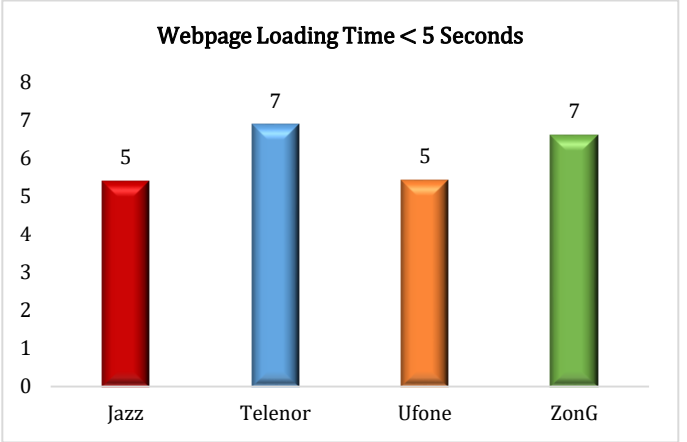
AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

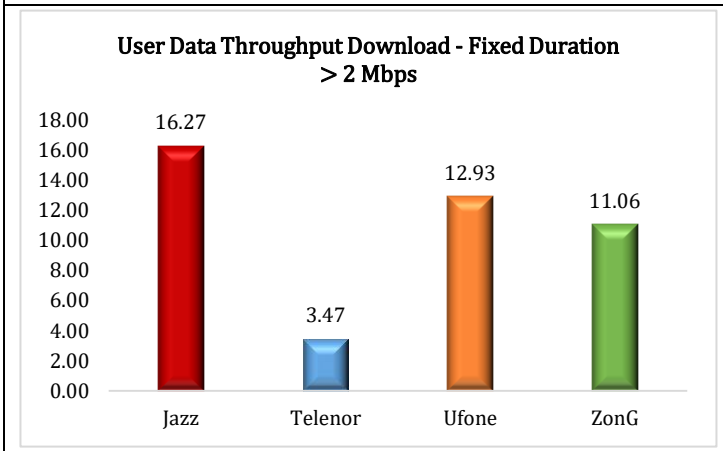
UFONE 3G NETWORK COVERAGE – MARDAN

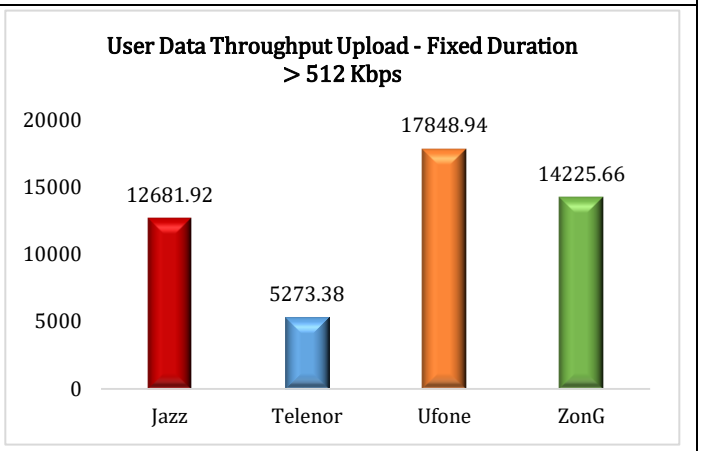


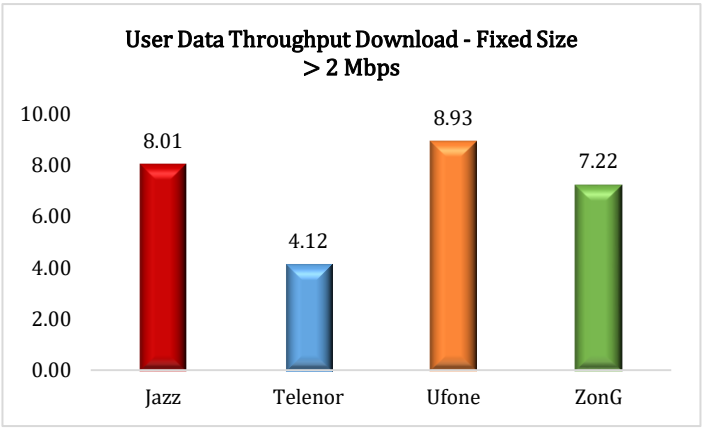
QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – MARDAN

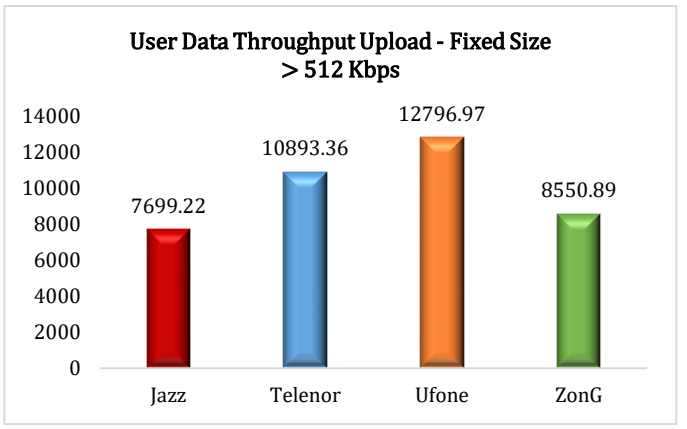


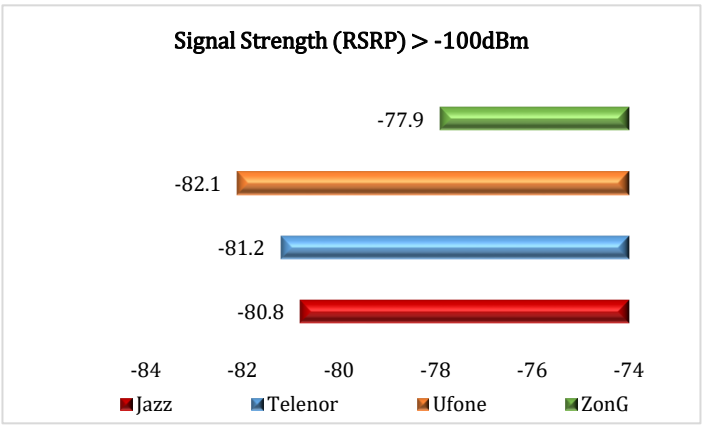


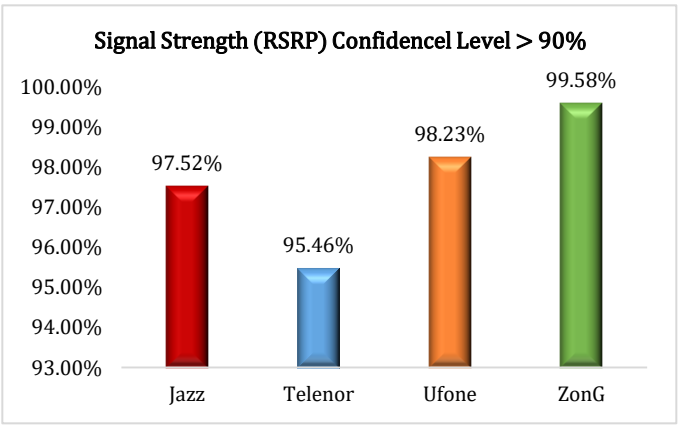






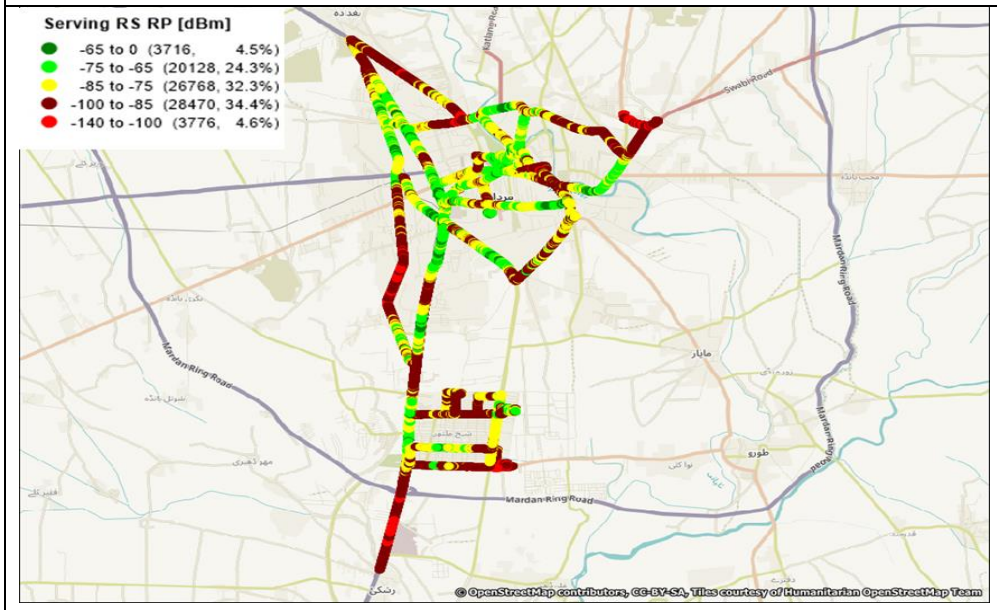




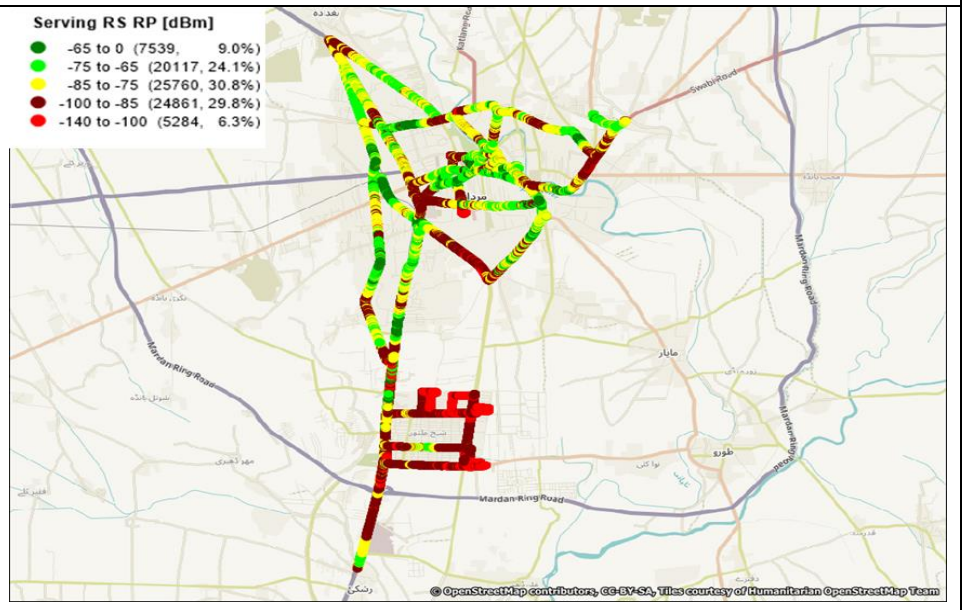


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

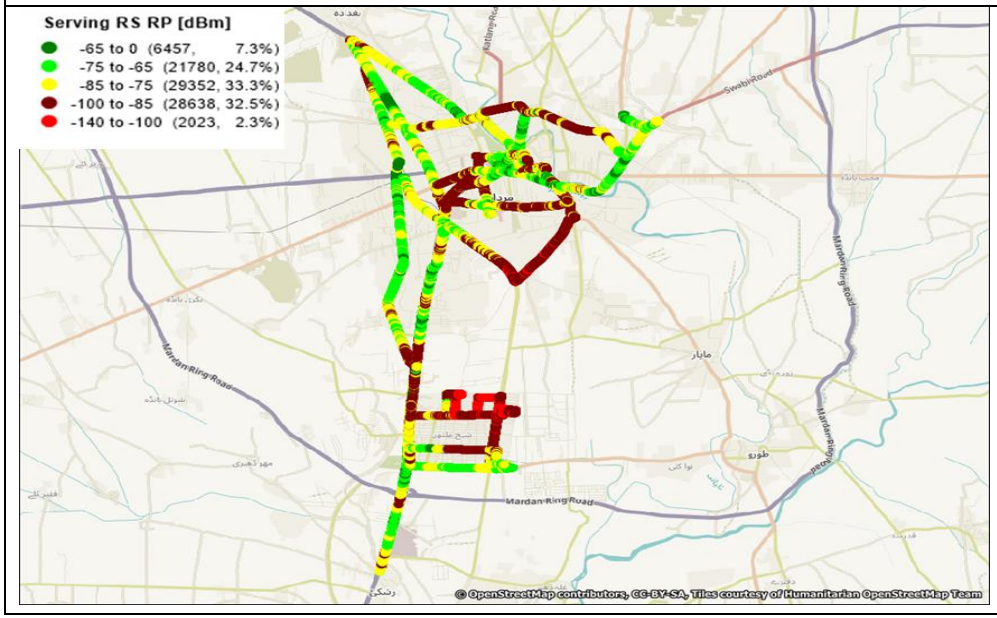
JAZZ 4G NETWORK COVERAGE – MARDAN



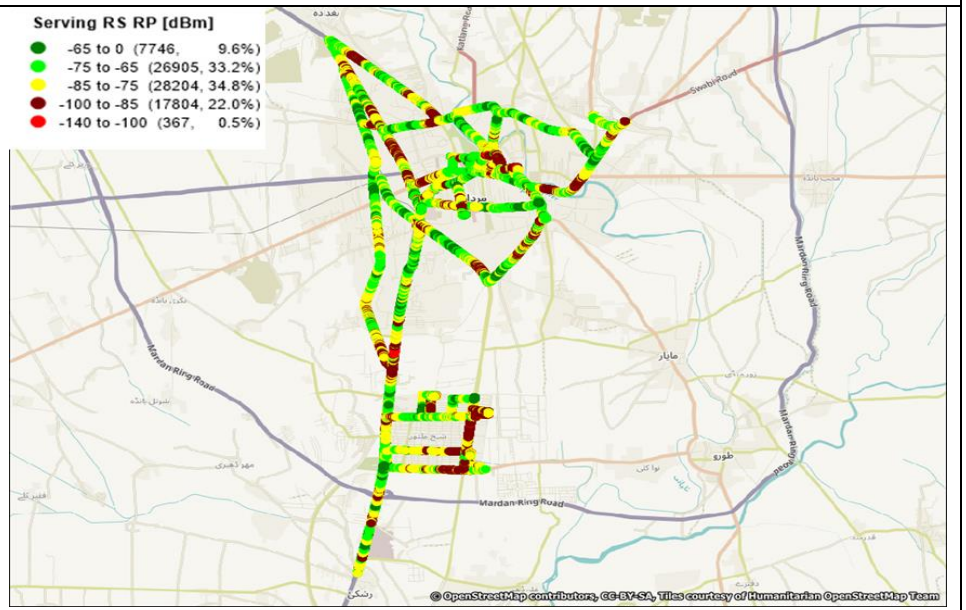
TELENOR 4G NETWORK COVERAGE – MARDAN



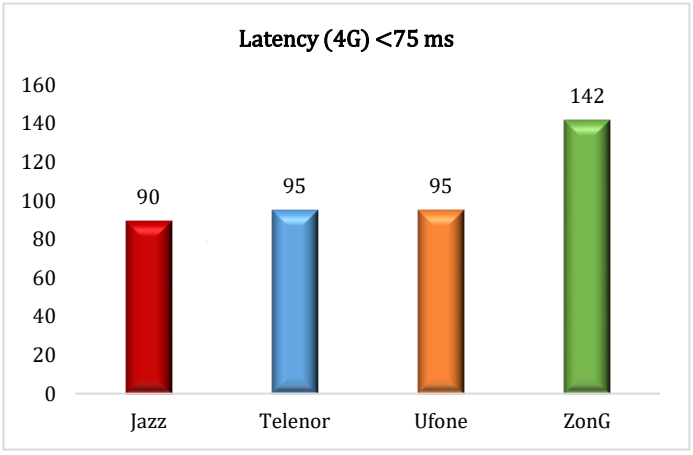
UFONE 4G NETWORK COVERAGE – MARDAN

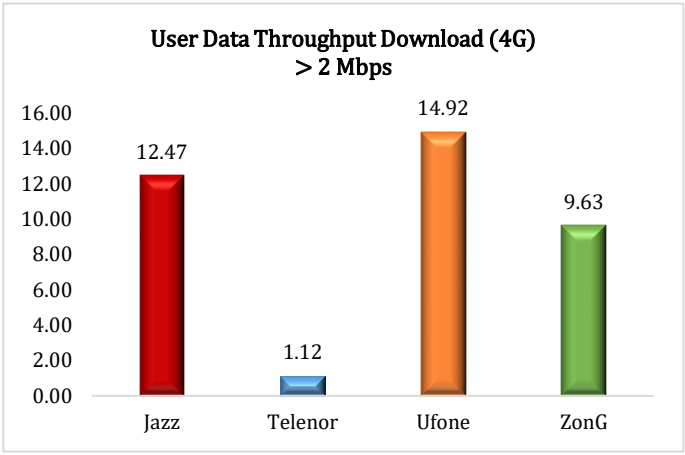


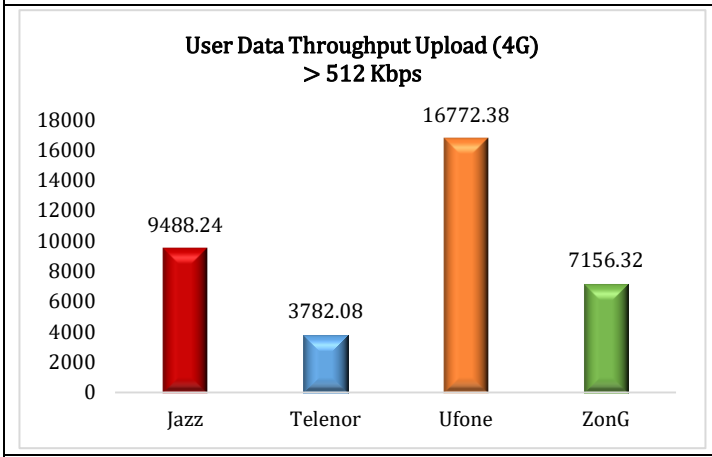
ZONG 4G NETWORK COVERAGE – MARDAN

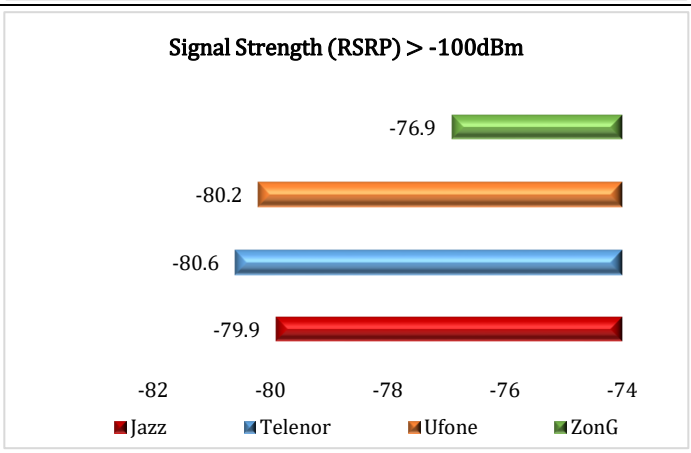


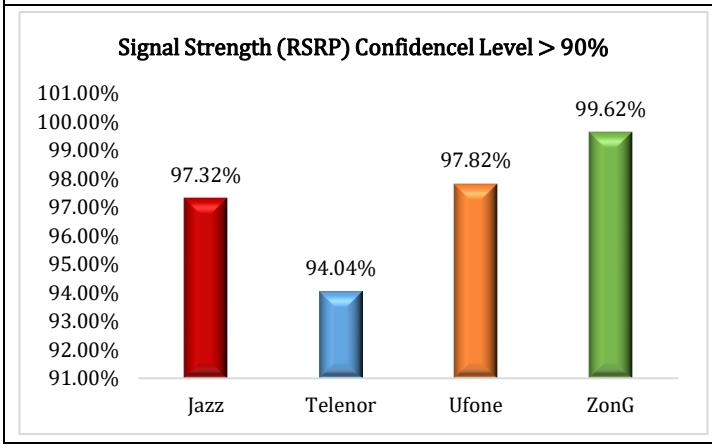
QUALITY OF SERVICE SURVEY RESULTS (4G) – MARDAN





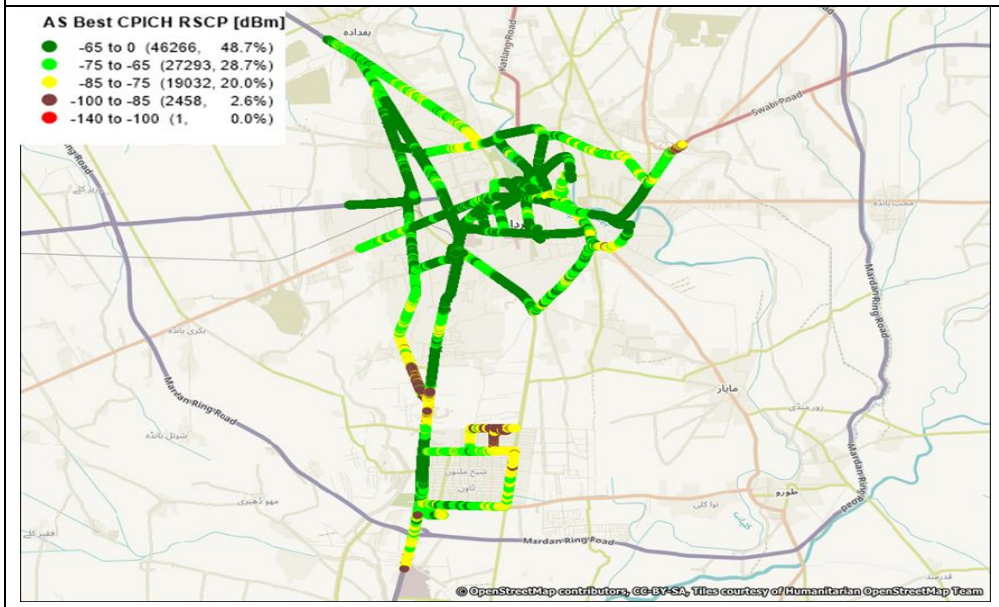




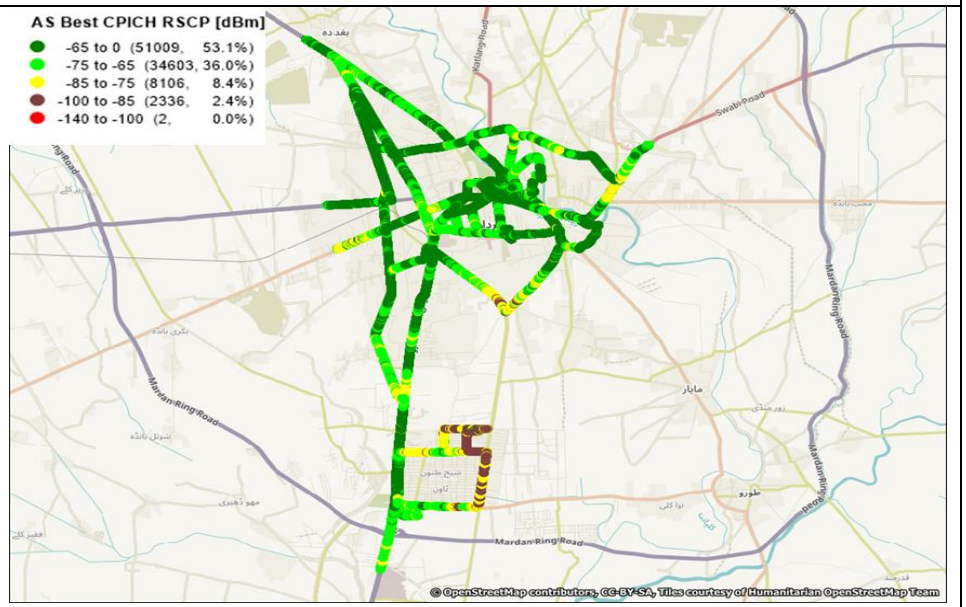


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

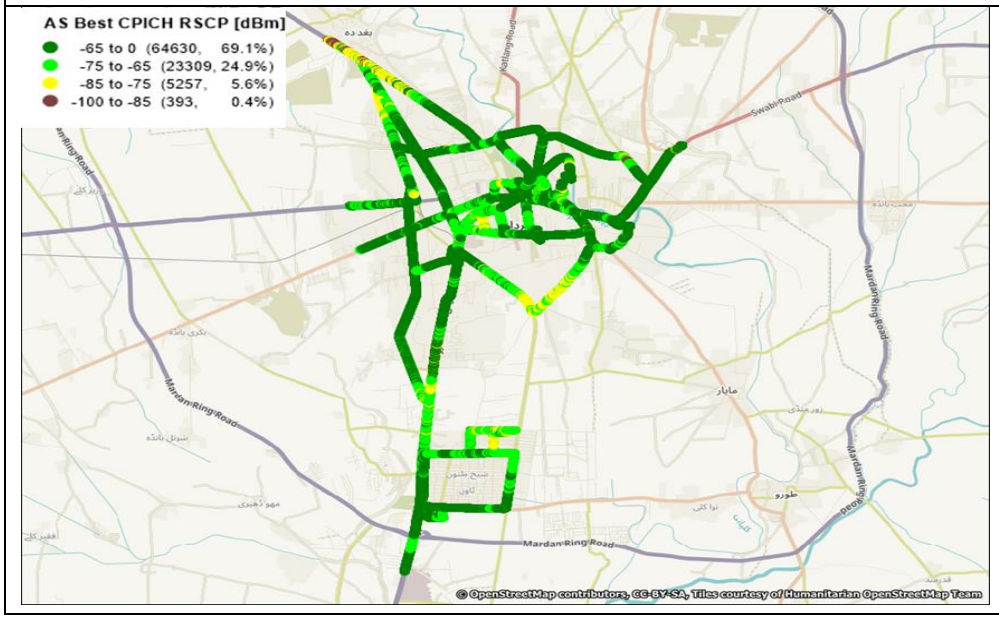
JAZZ 3G NETWORK COVERAGE – MARDAN



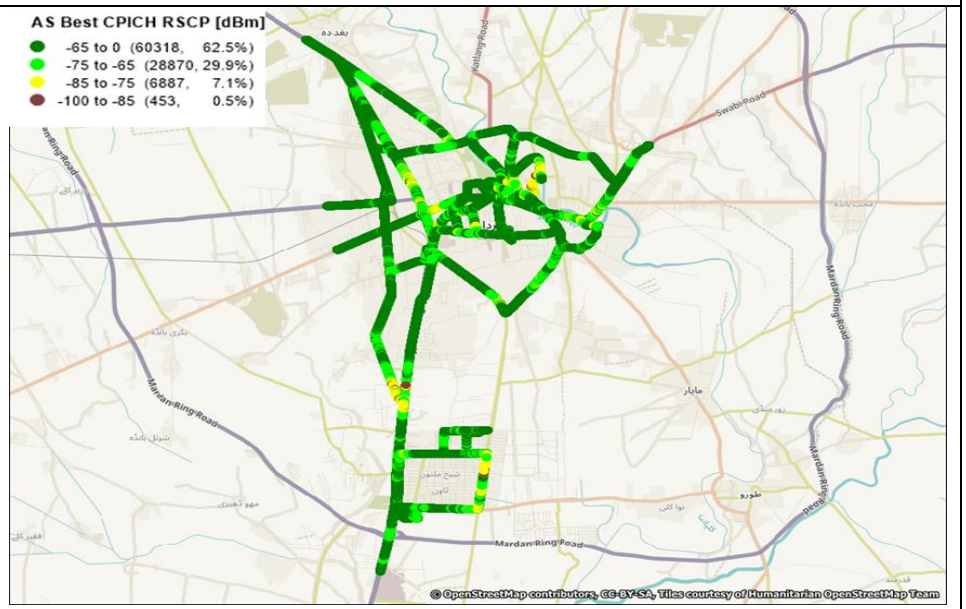
TELENOR 3G NETWORK COVERAGE – MARDAN



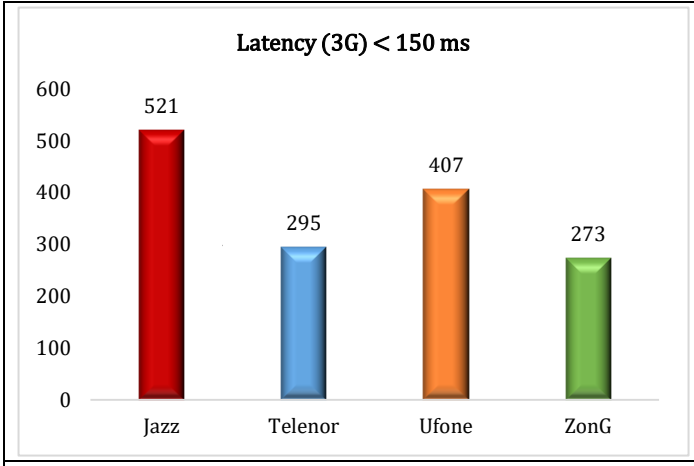
UFONE 3G NETWORK COVERAGE – MARDAN

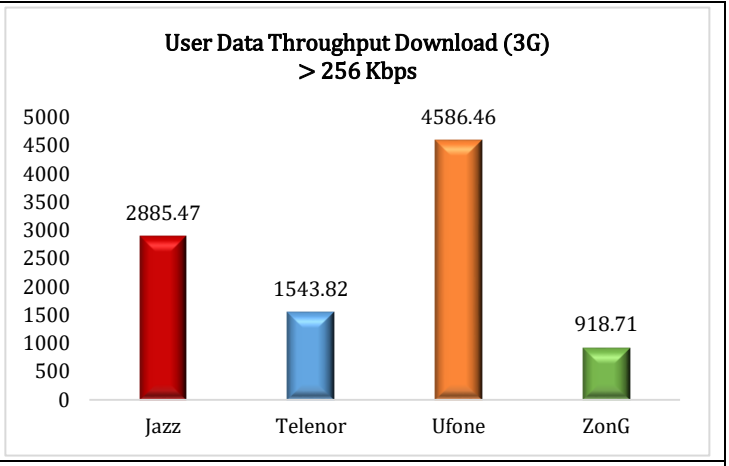


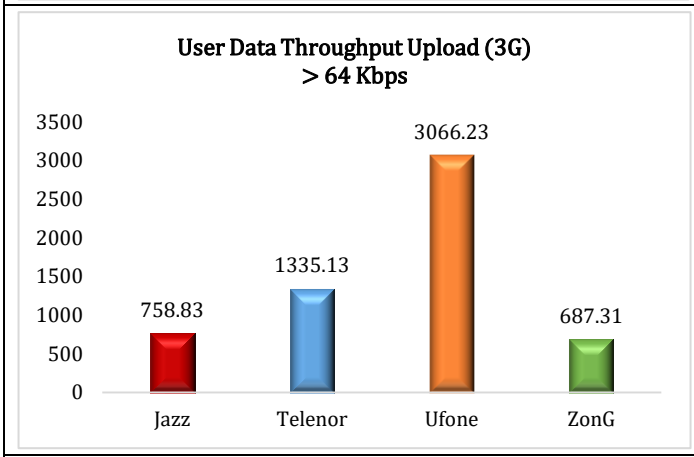
ZONG 3G NETWORK COVERAGE – MARDAN

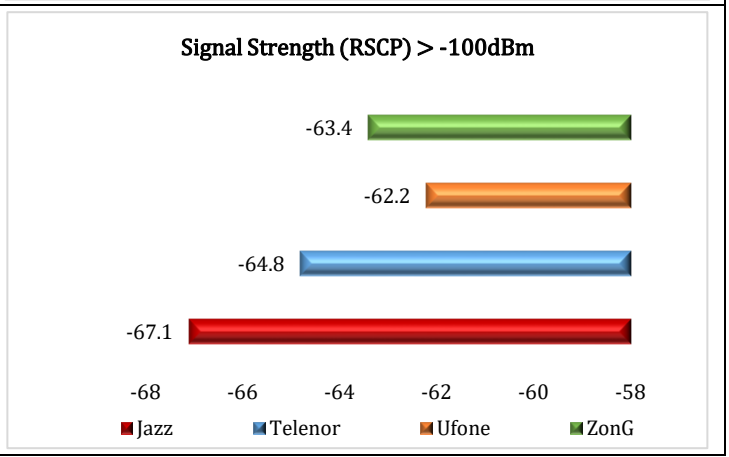


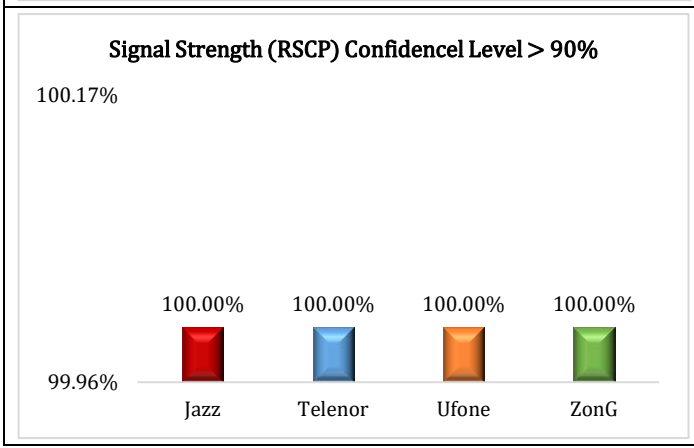
QUALITY OF SERVICE SURVEY RESULTS (3G) – MARDAN



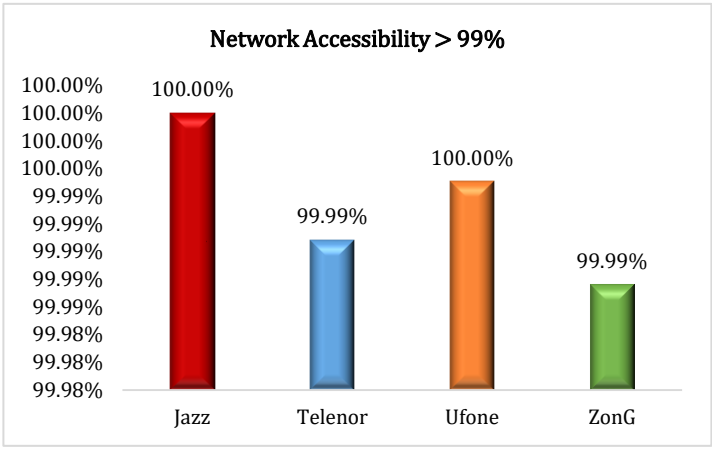


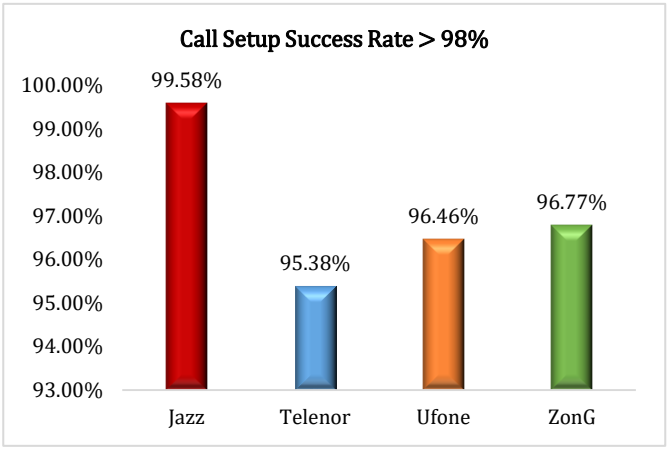


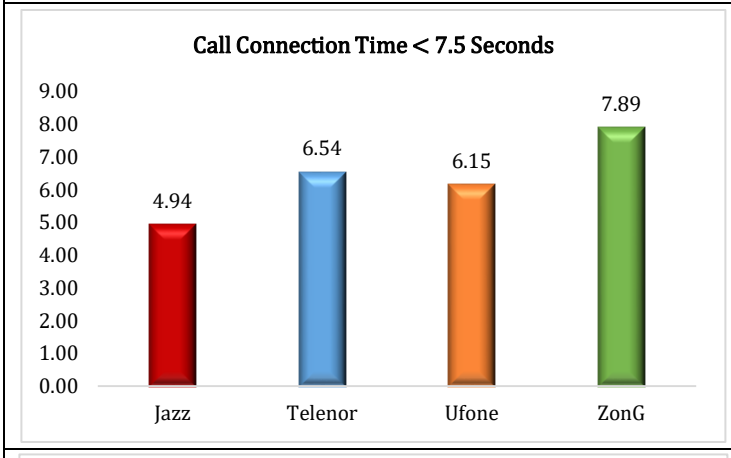


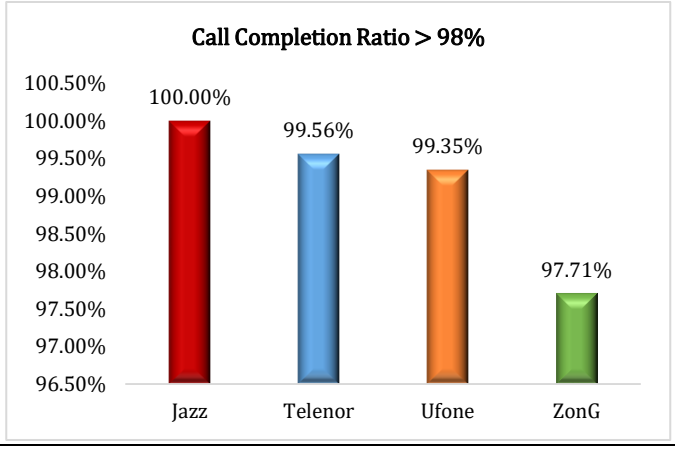


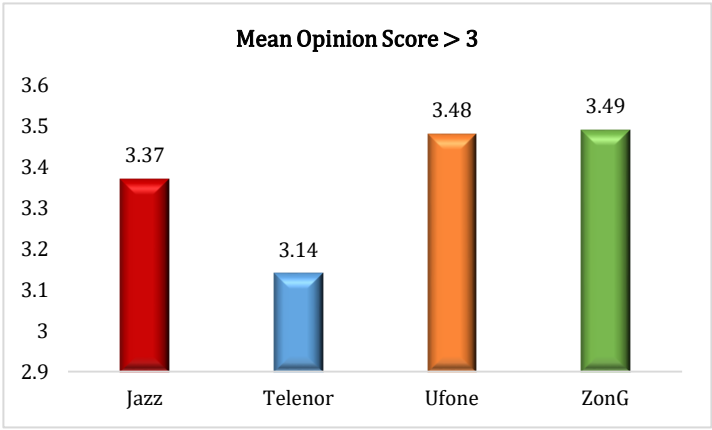
QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – MARDAN

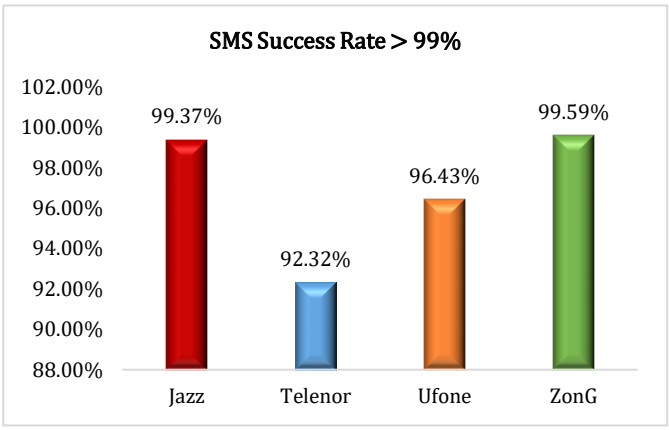


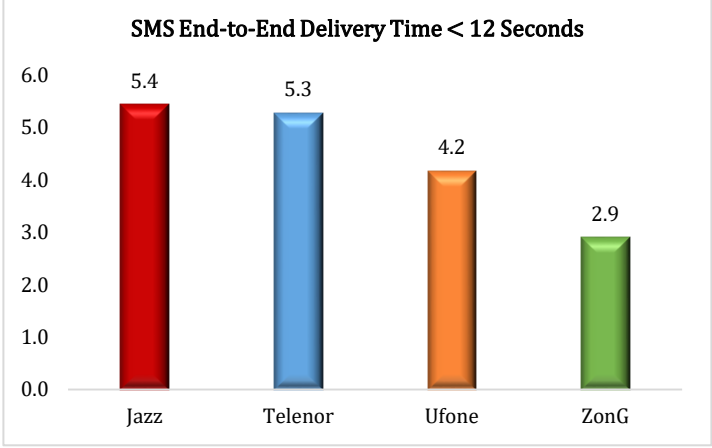






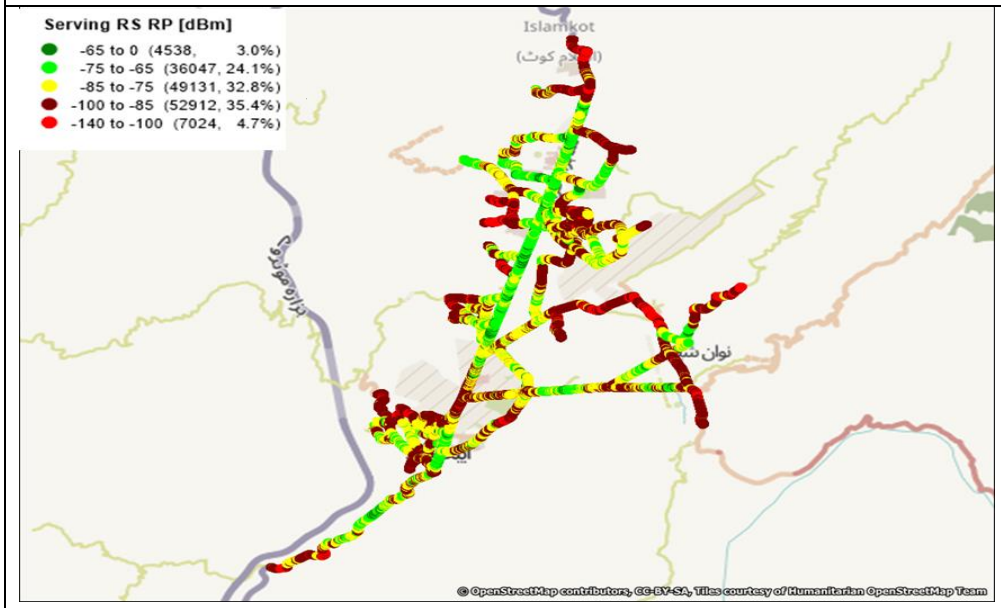




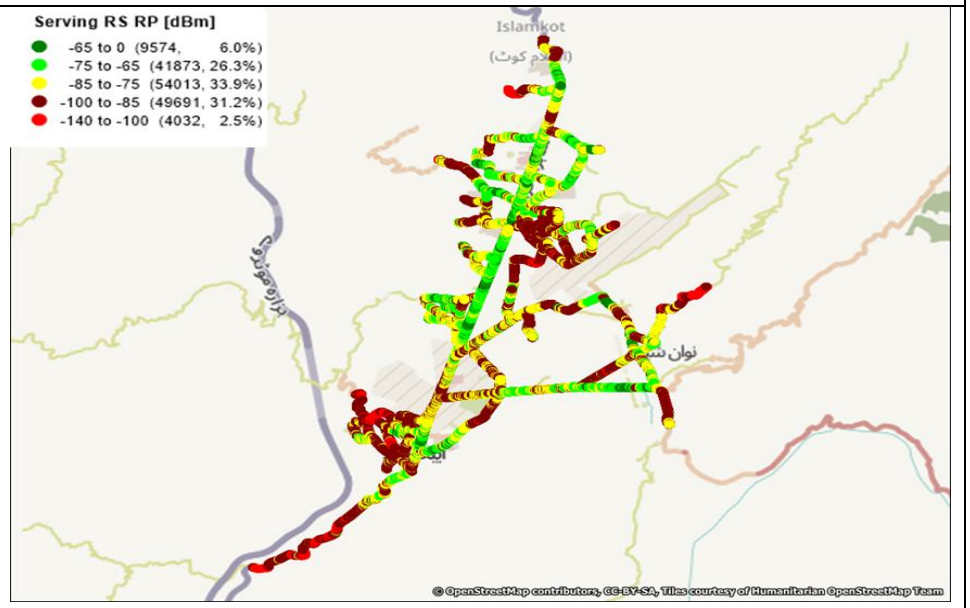


AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

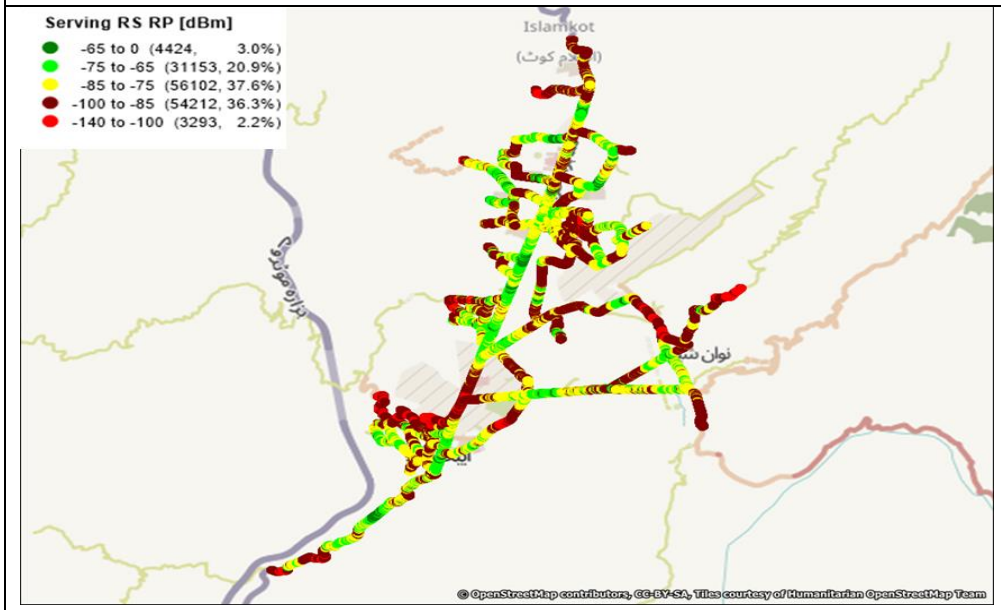
JAZZ 4G NETWORK COVERAGE – ABBOTTABAD



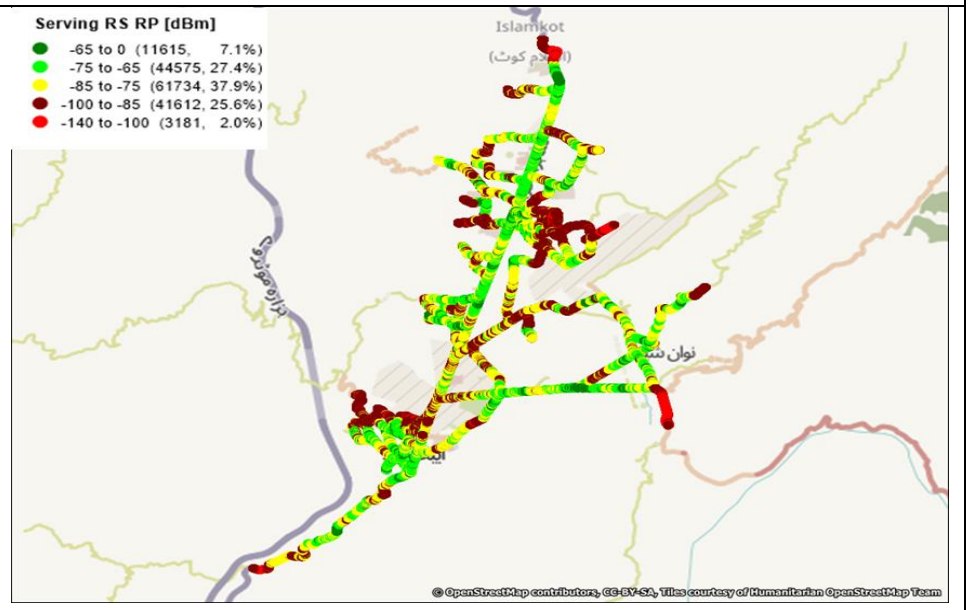
TELENOR 4G NETWORK COVERAGE – ABBOTTABAD



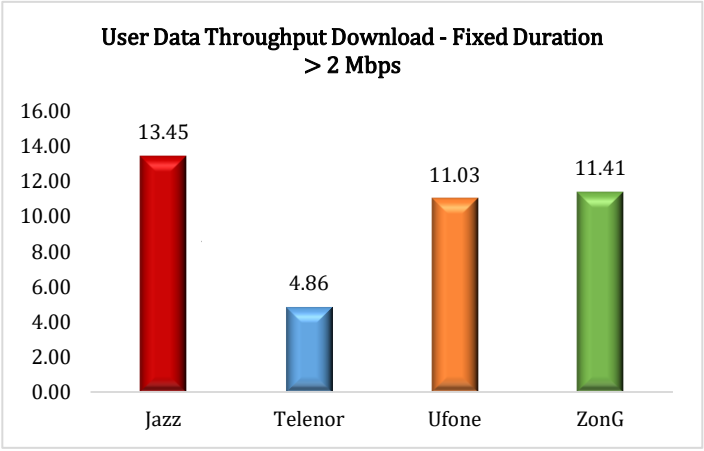
UFONE 4G NETWORK COVERAGE – ABBOTTABAD

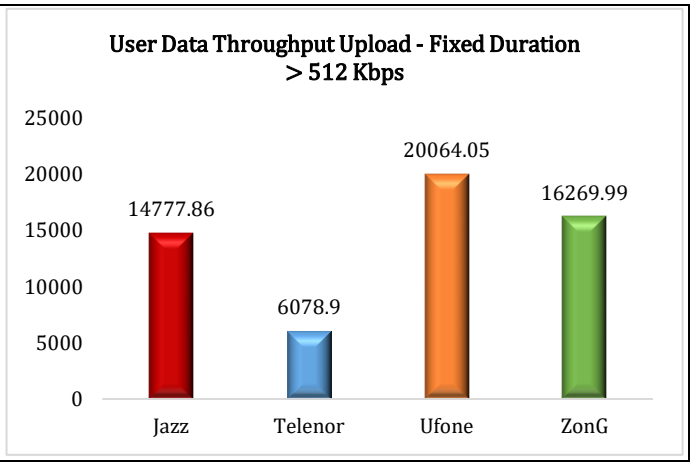


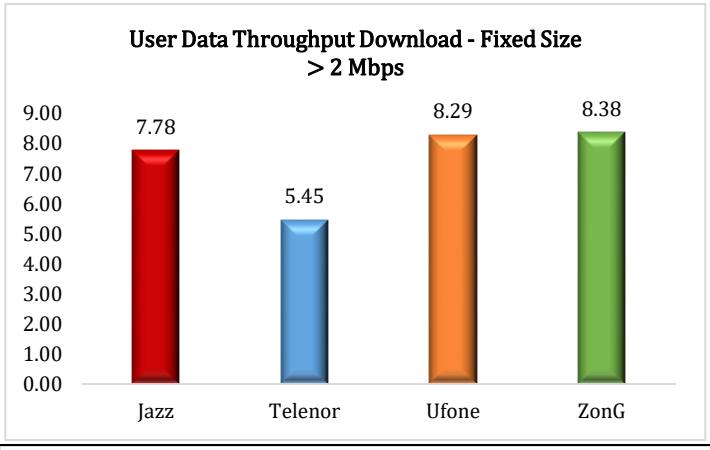
ZONG 4G NETWORK COVERAGE – ABBOTTABAD

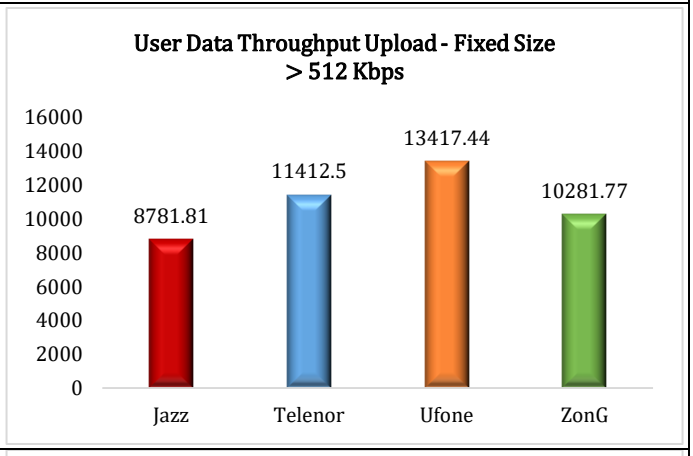


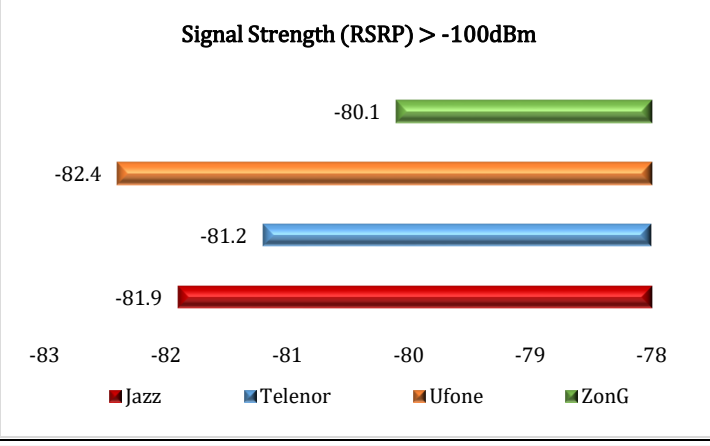
QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – ABBOTTABAD

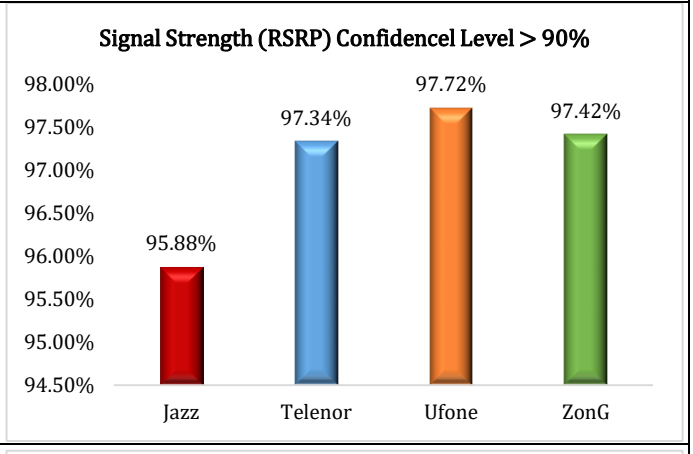


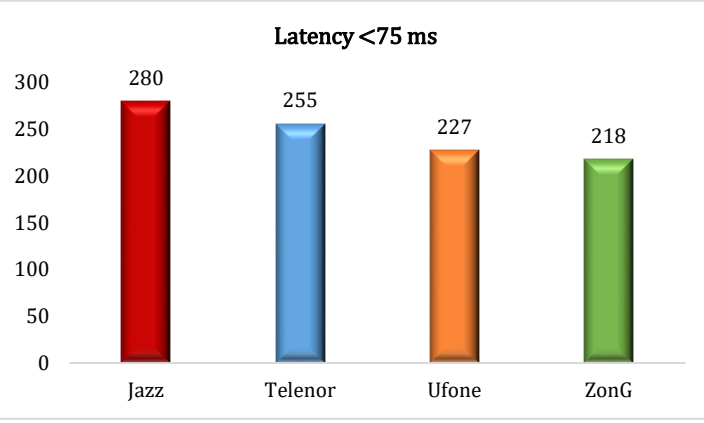


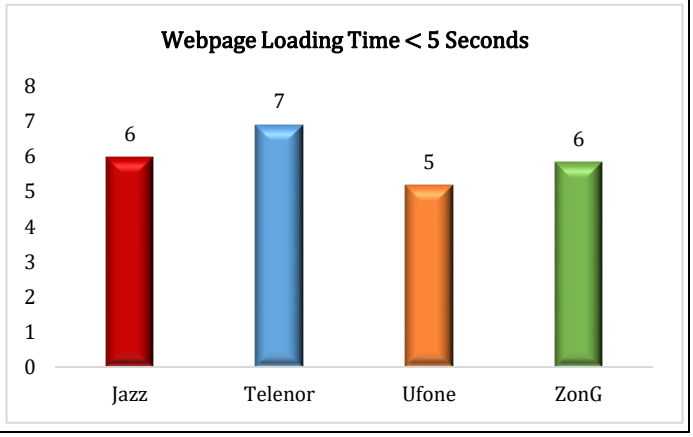






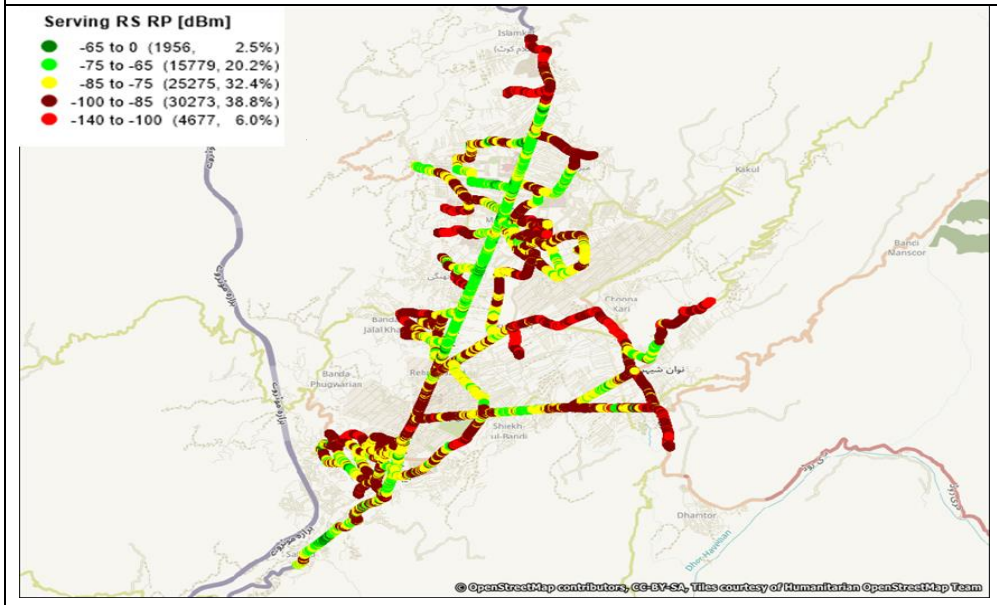




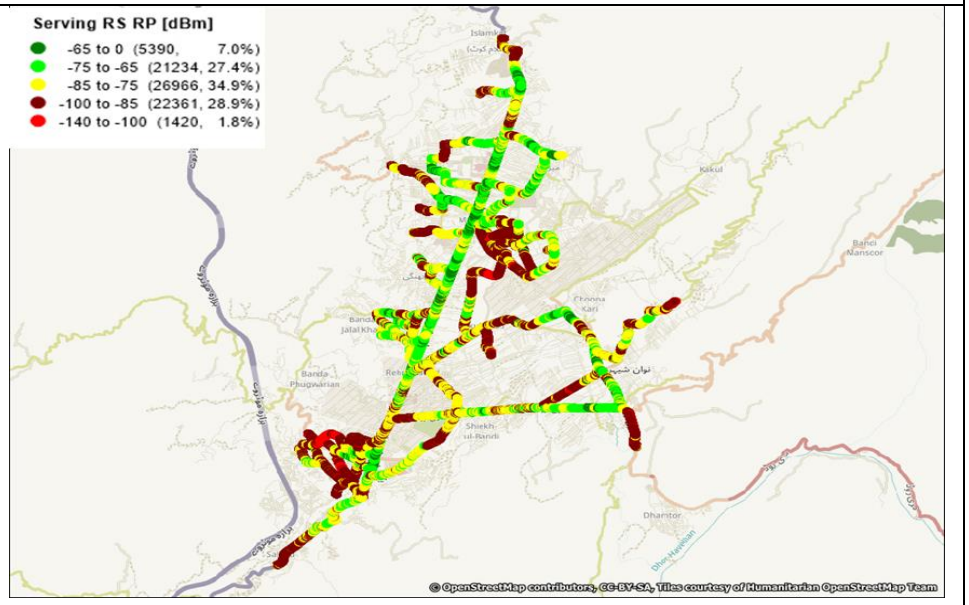


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

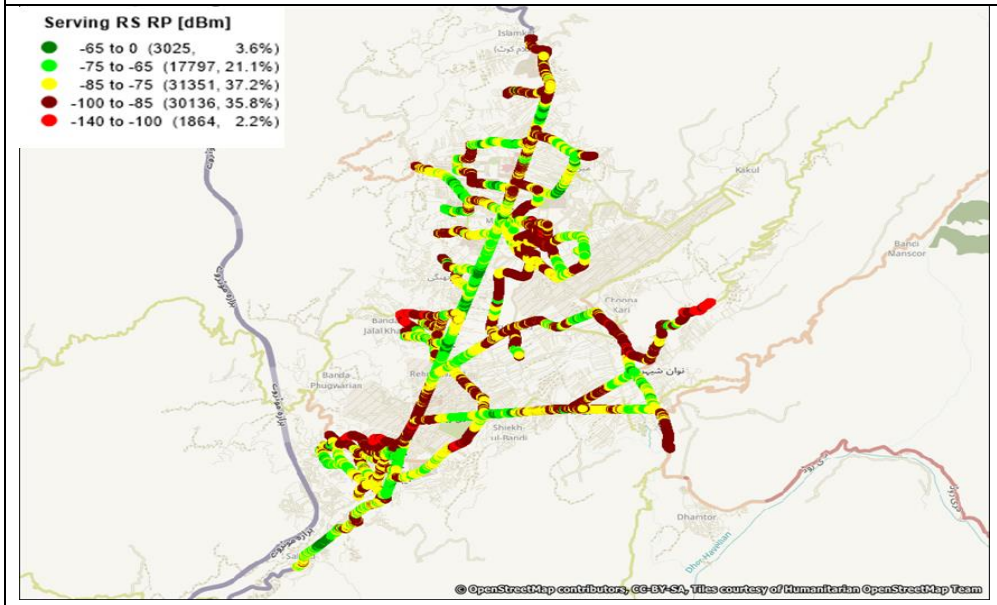
JAZZ 4G NETWORK COVERAGE – ABBOTABAD



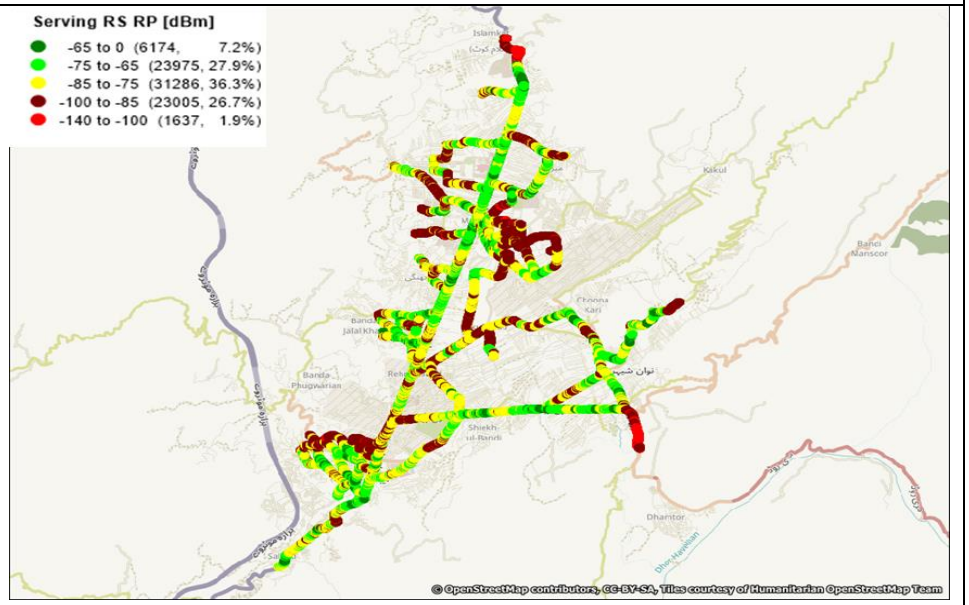
TELENOR 4G NETWORK COVERAGE – ABBOTABAD



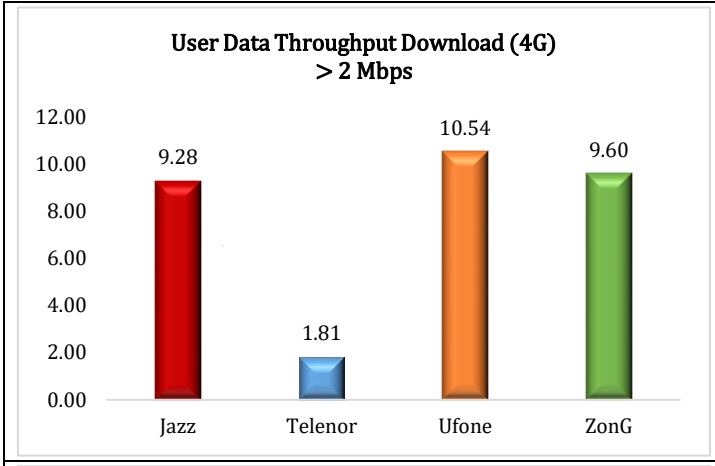
UFONE 4G NETWORK COVERAGE – ABBOTABAD

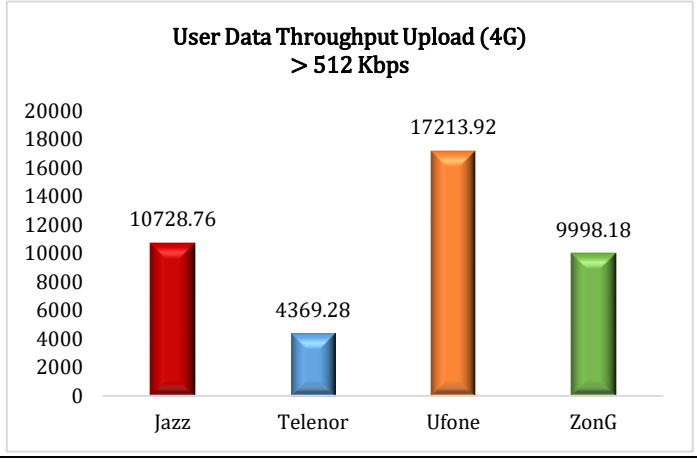


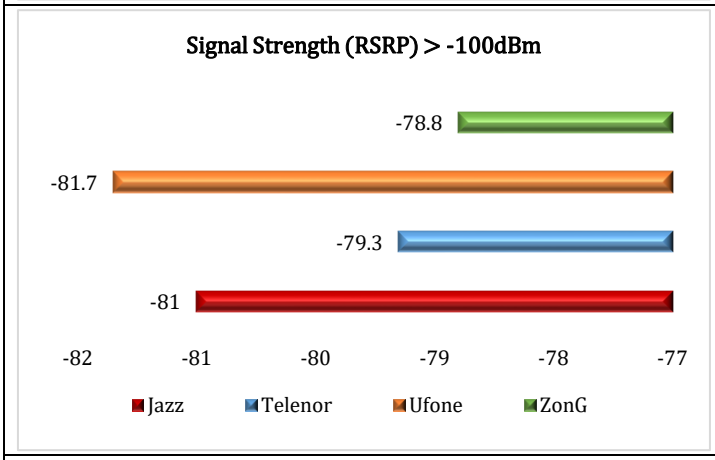
ZONG 4G NETWORK COVERAGE – ABBOTABAD

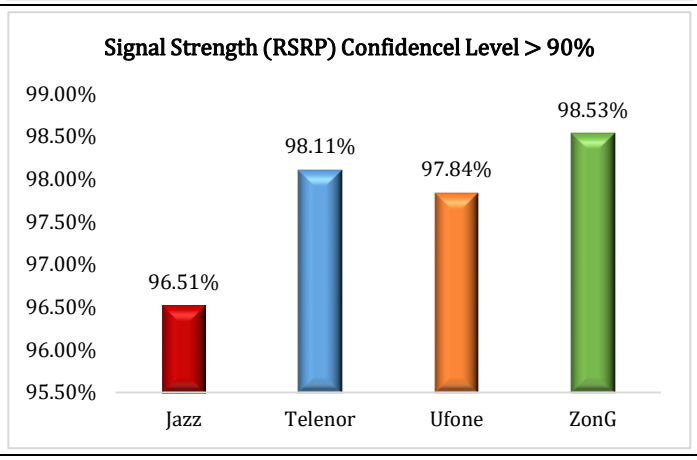


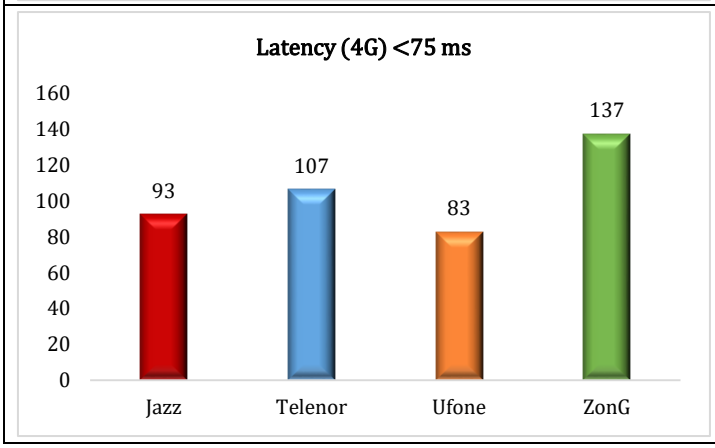
QUALITY OF SERVICE SURVEY RESULTS (4G) – ABBOTTABAD





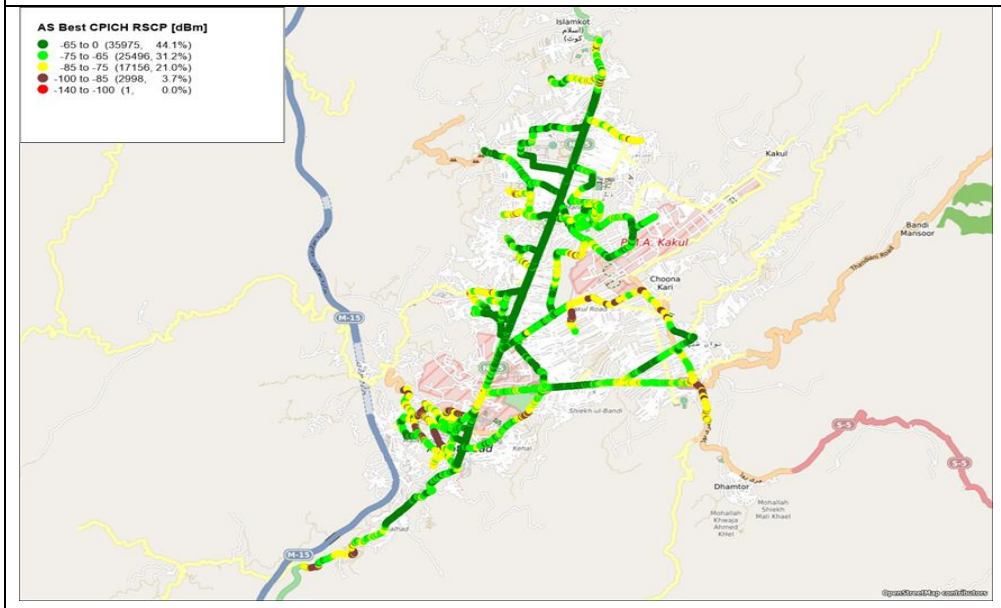




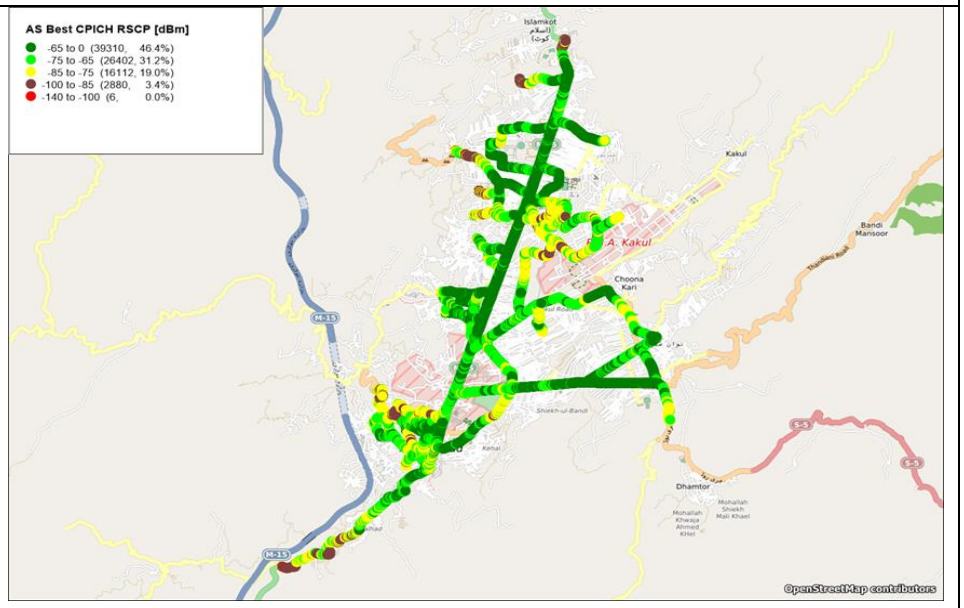


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

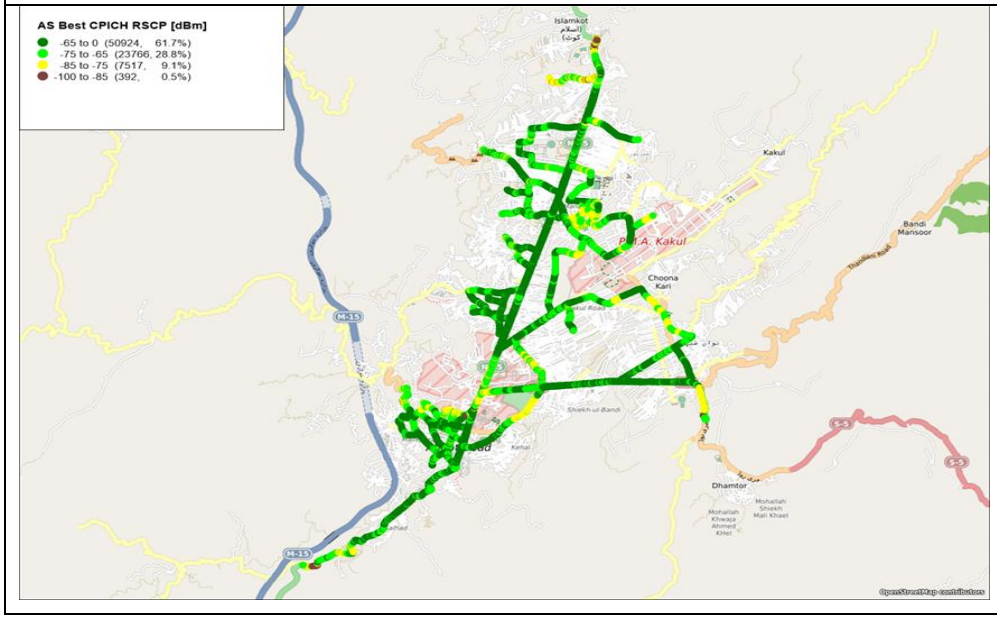
JAZZ 3G NETWORK COVERAGE – ABBOTTABAD



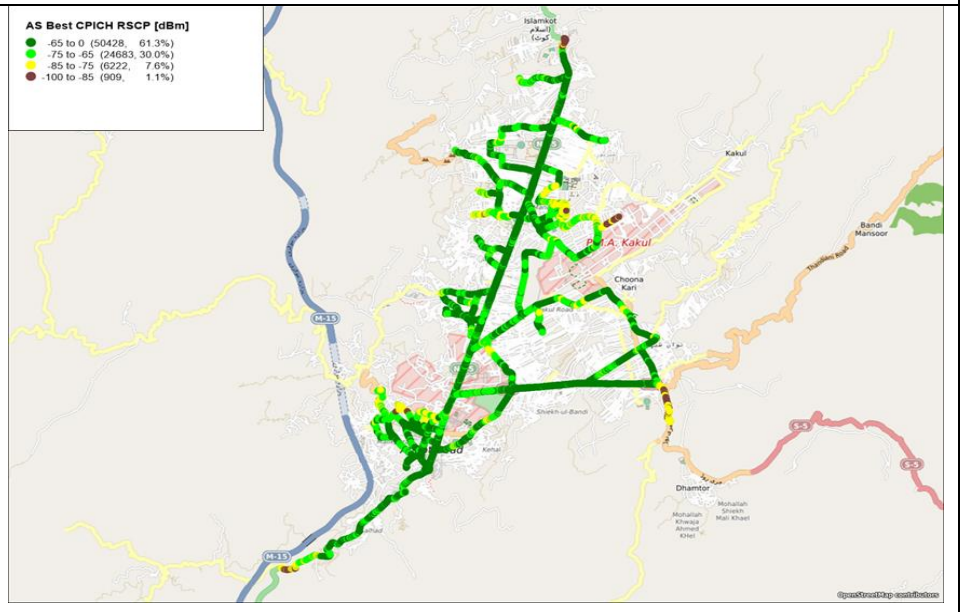
TELENOR 3G NETWORK COVERAGE – ABBOTTABAD



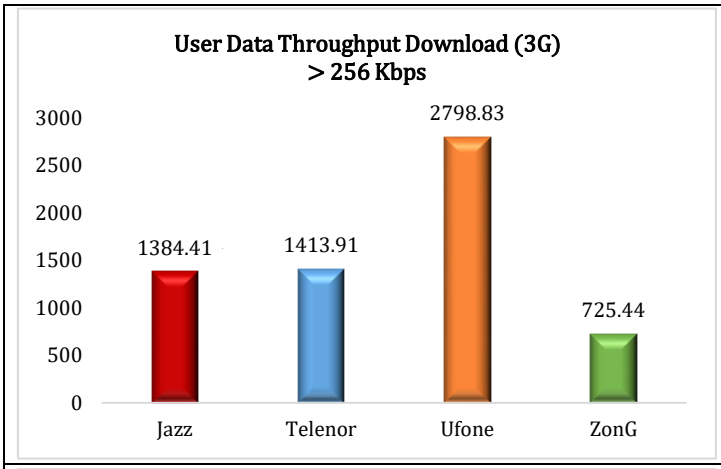
UFONE 3G NETWORK COVERAGE – ABBOTTABAD

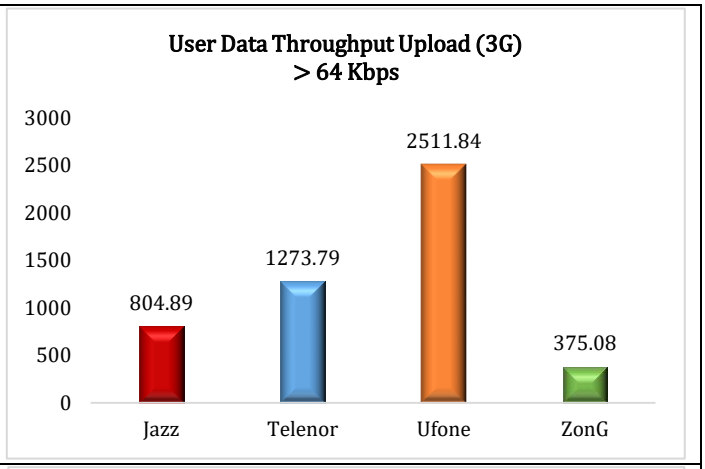


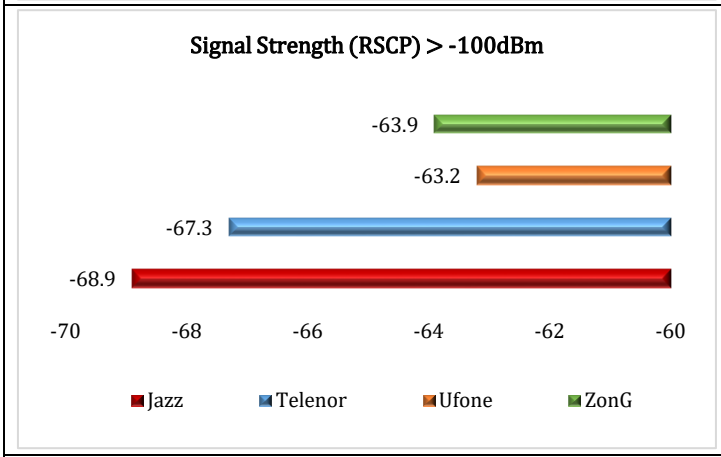
ZONG 3G NETWORK COVERAGE – ABBOTTABAD

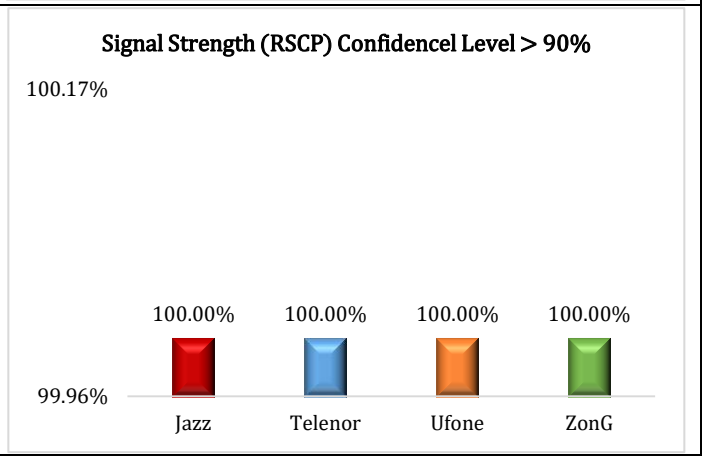


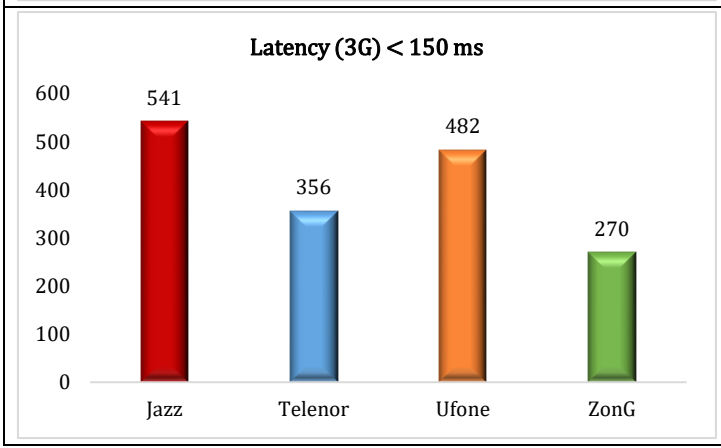
QUALITY OF SERVICE SURVEY RESULTS (3G) – ABBOTTABAD



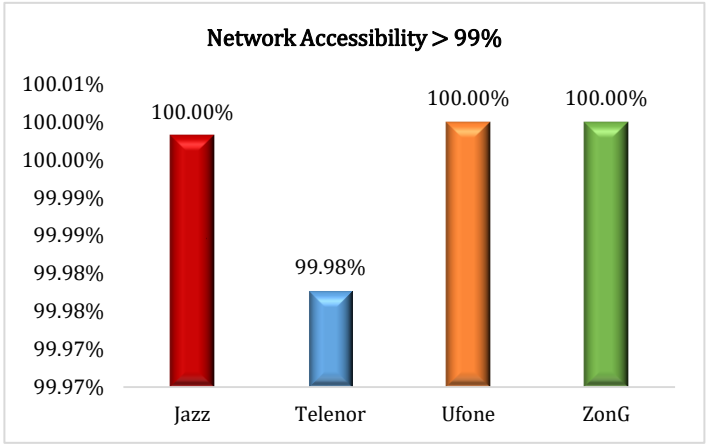


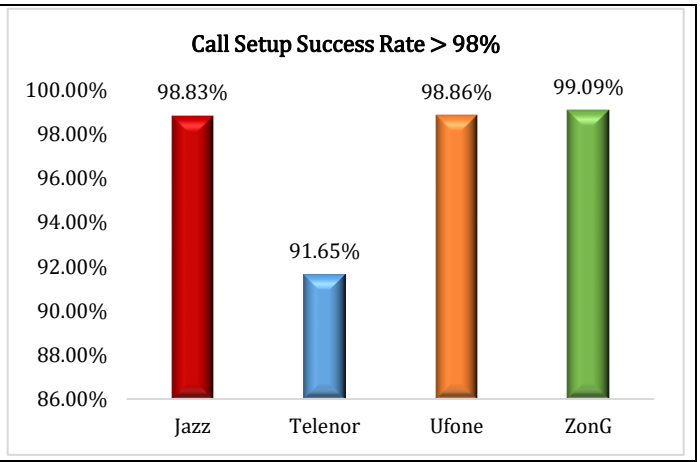


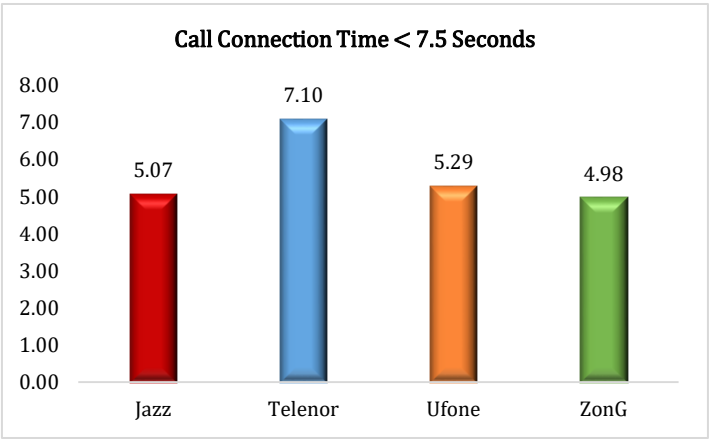


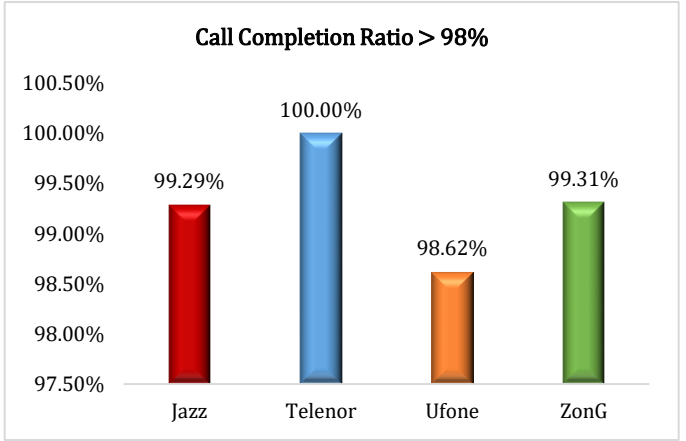


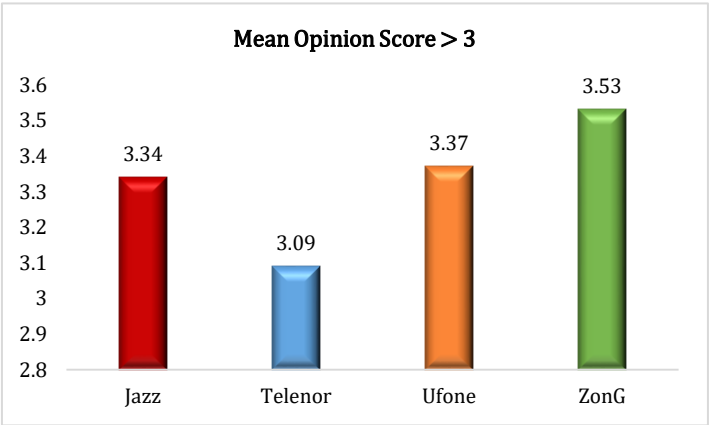
QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – ABBOTTABAD

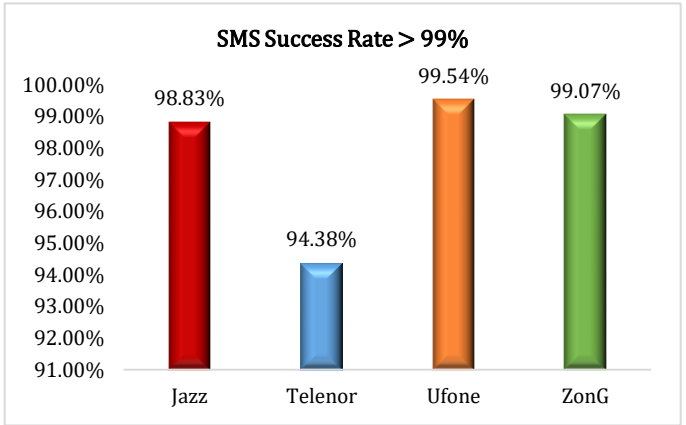


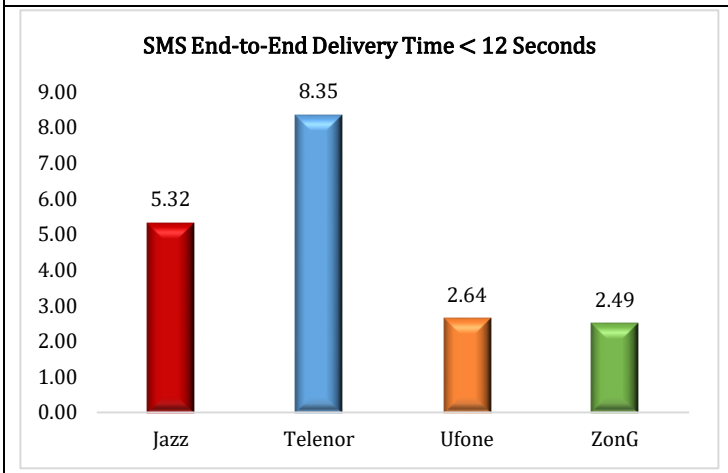






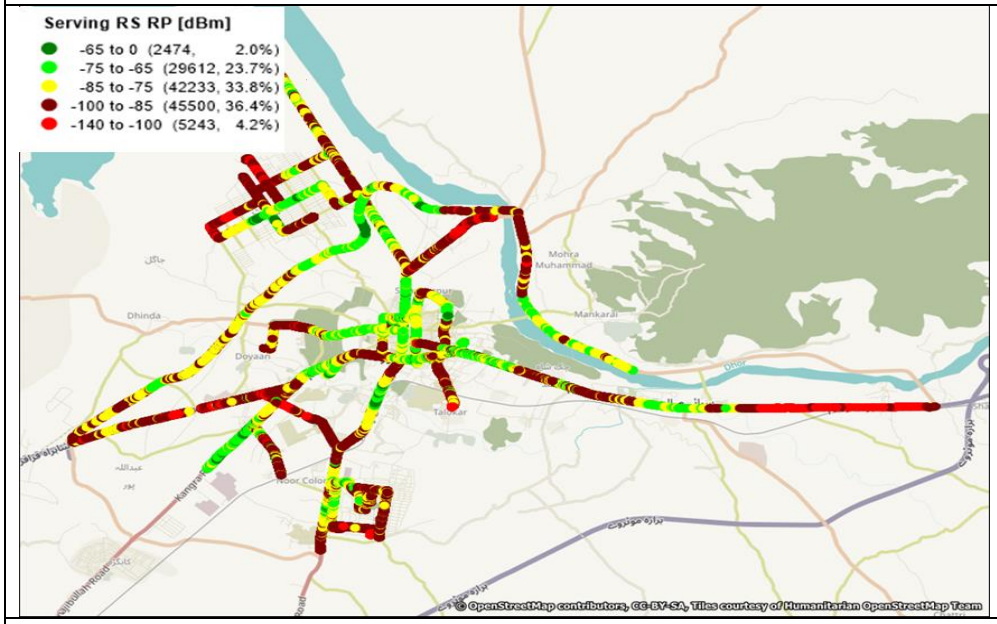




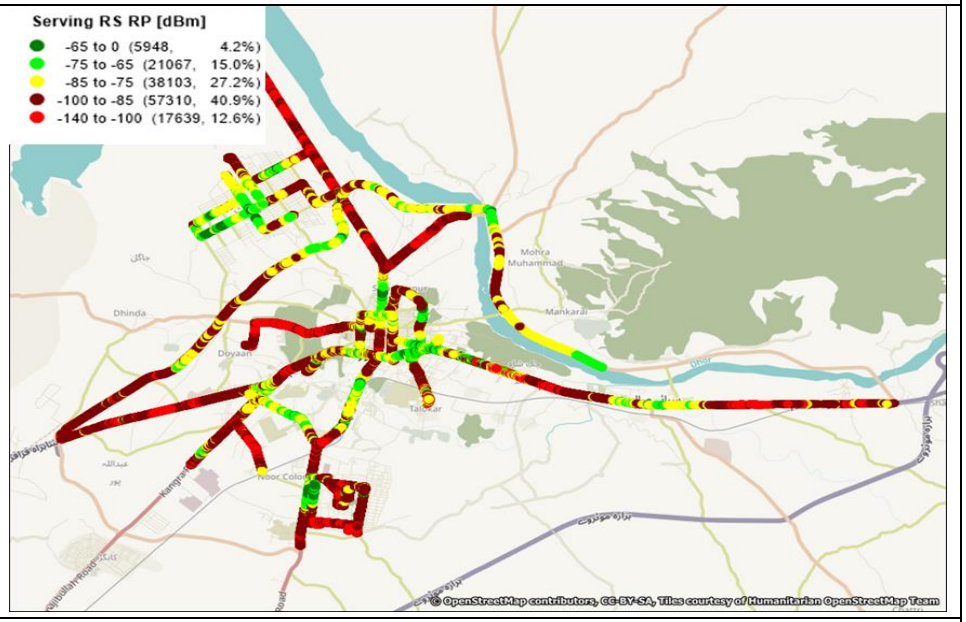


AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

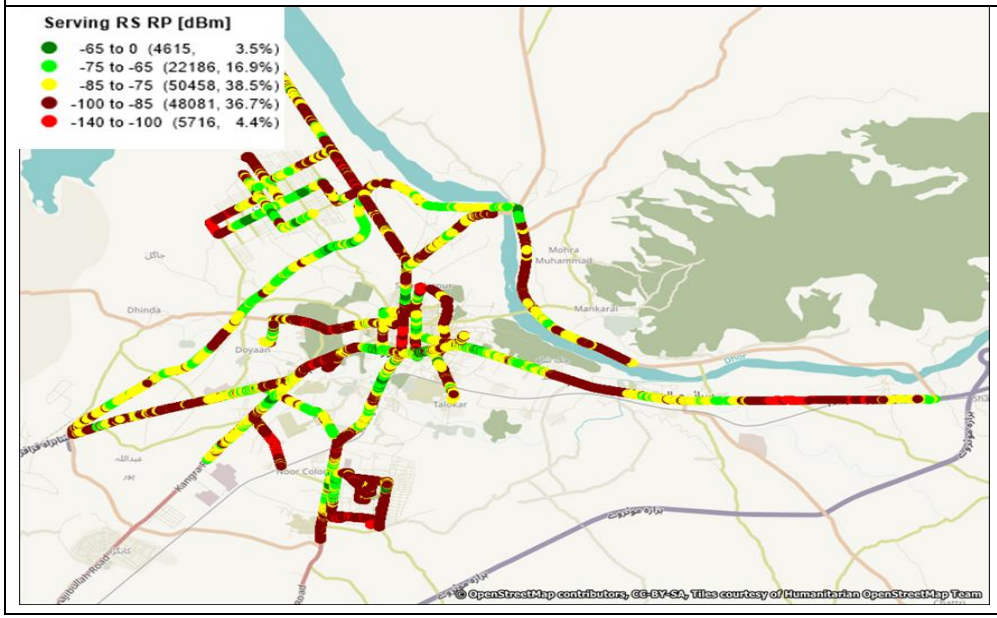
JAZZ 4G NETWORK COVERAGE –HARIPUR



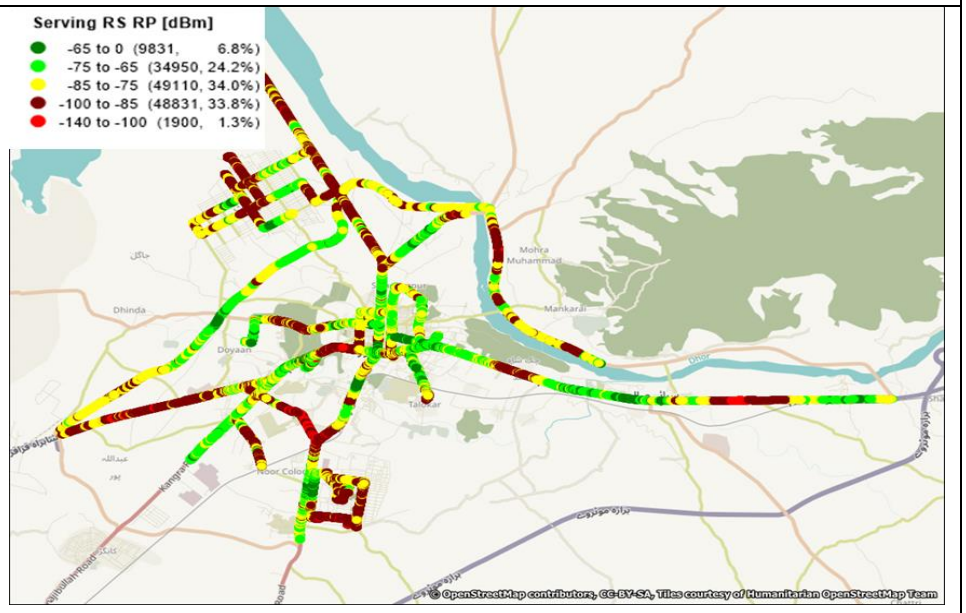
TELENOR 4G NETWORK COVERAGE – HARIPUR



UFONE 4G NETWORK COVERAGE – HARIPUR

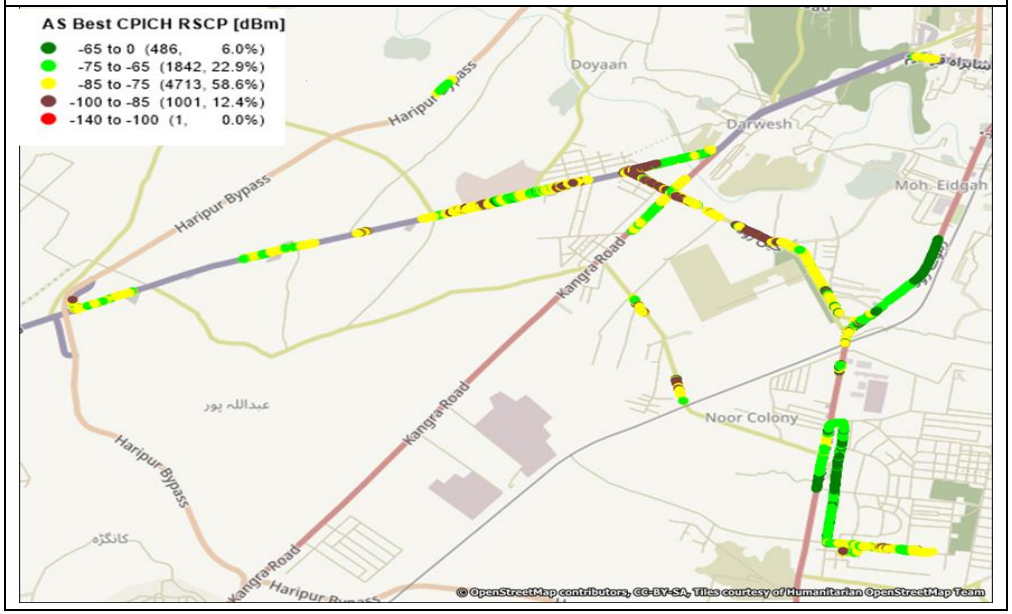


ZONG 4G NETWORK COVERAGE – HARIPUR

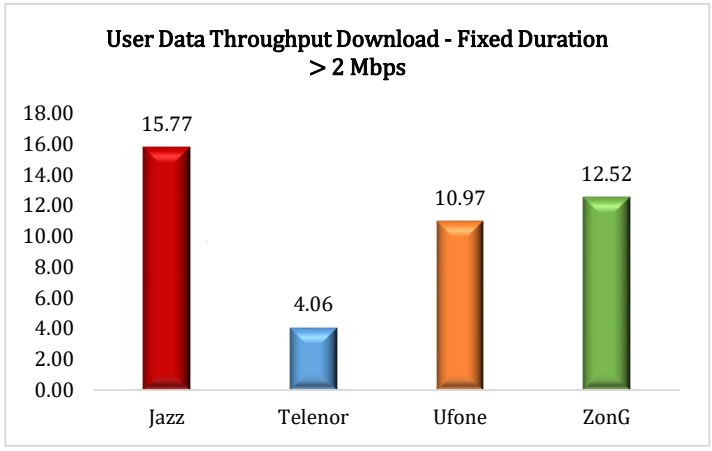


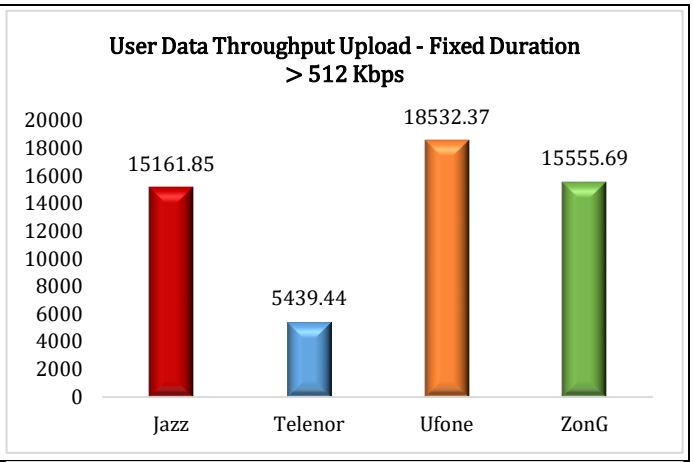
AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

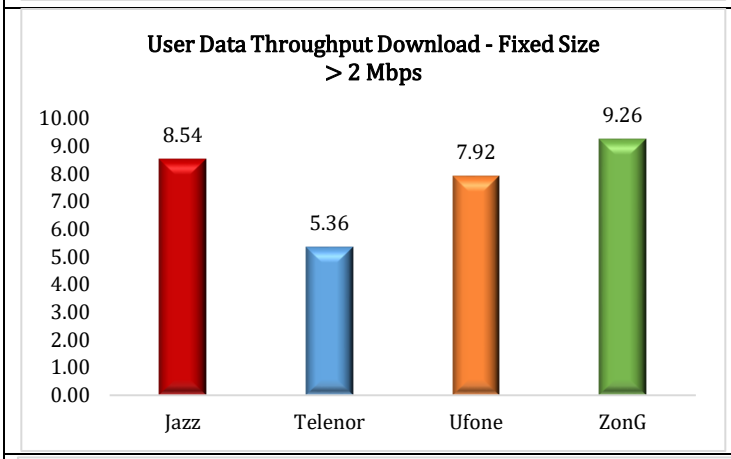
JAZZ 3G NETWORK COVERAGE – HARIPUR

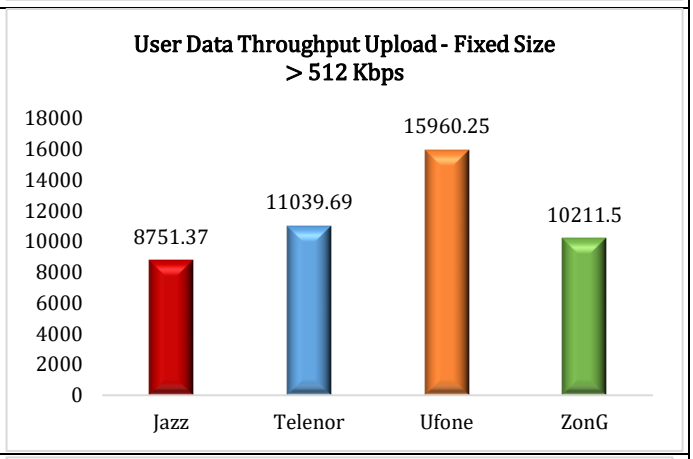


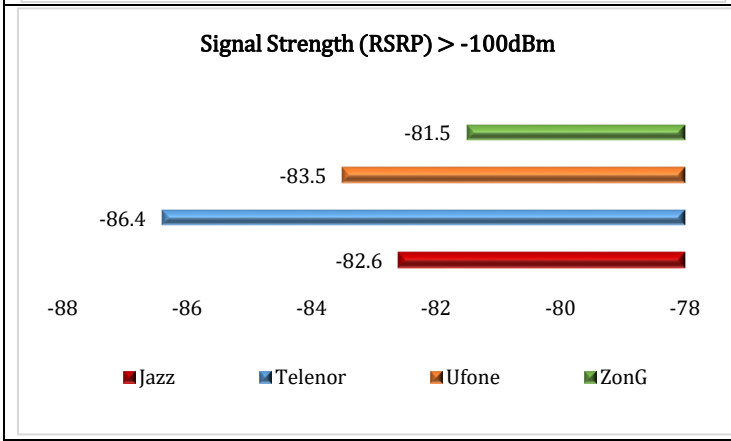
QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – HARIPUR

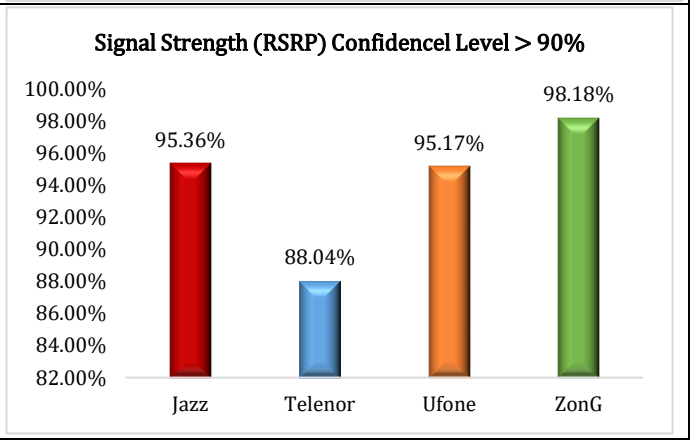


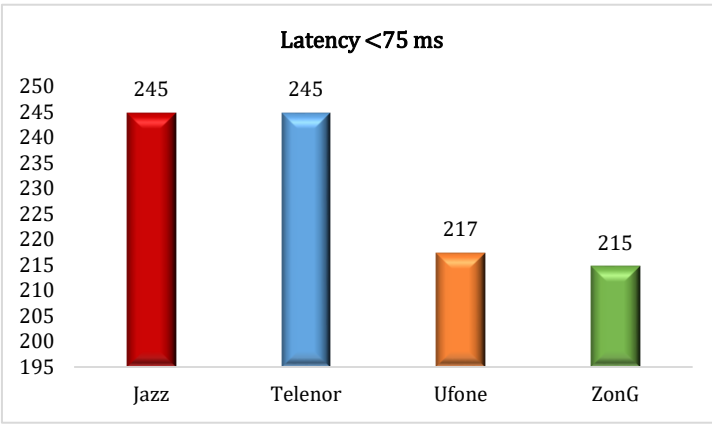


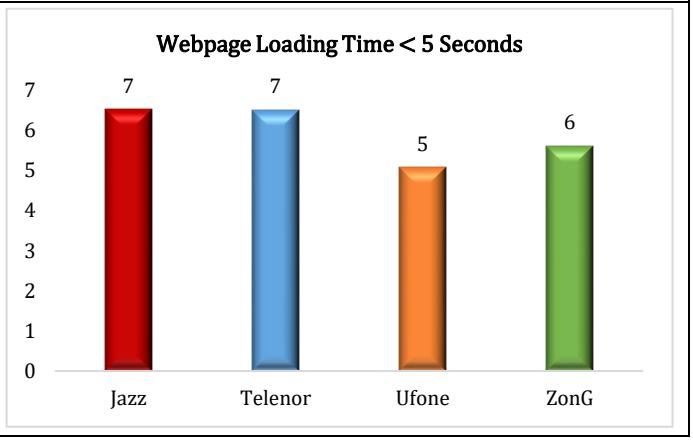






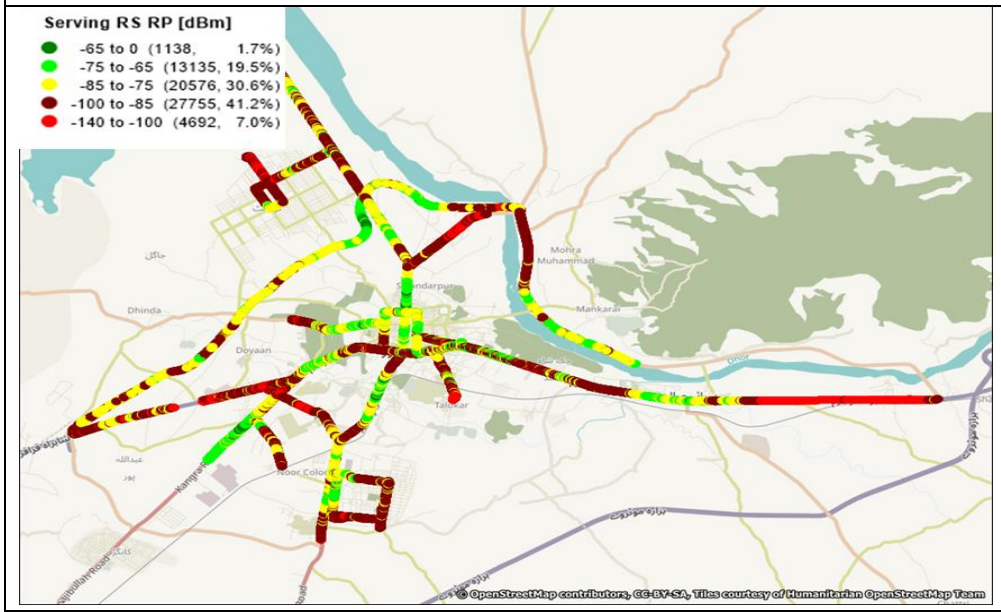




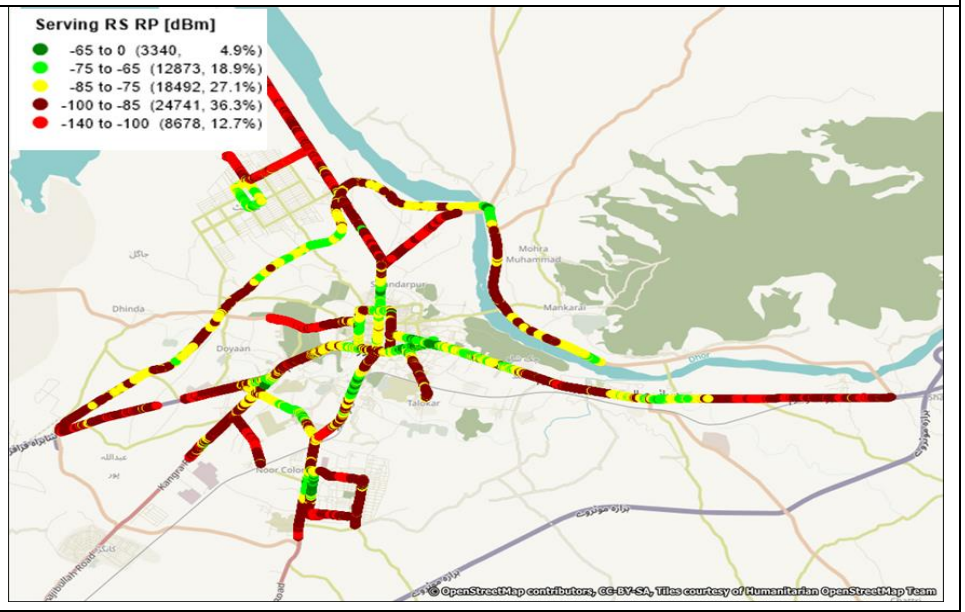


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

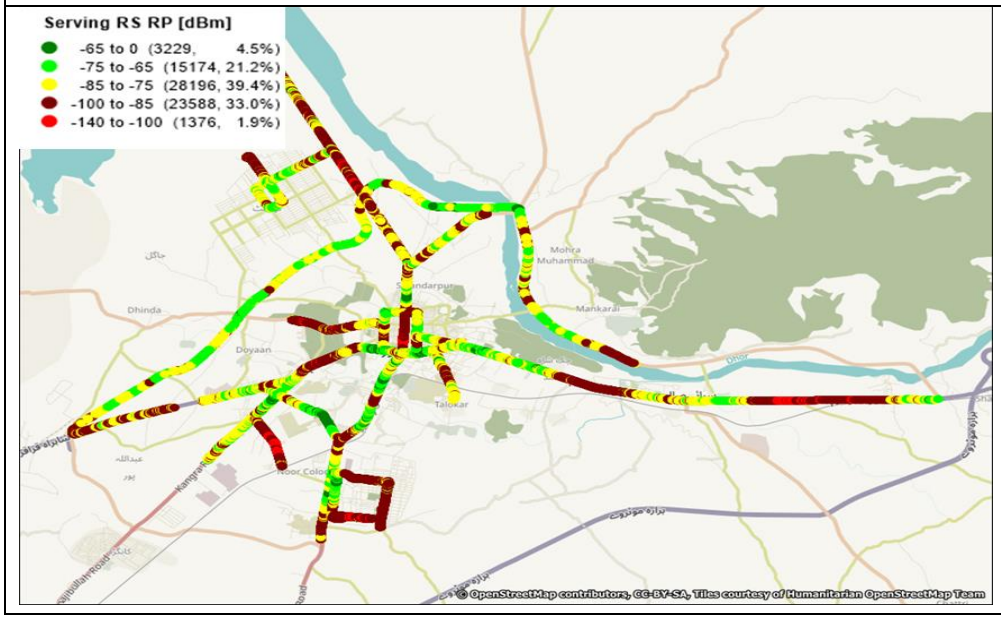
JAZZ 4G NETWORK COVERAGE – HARIPUR



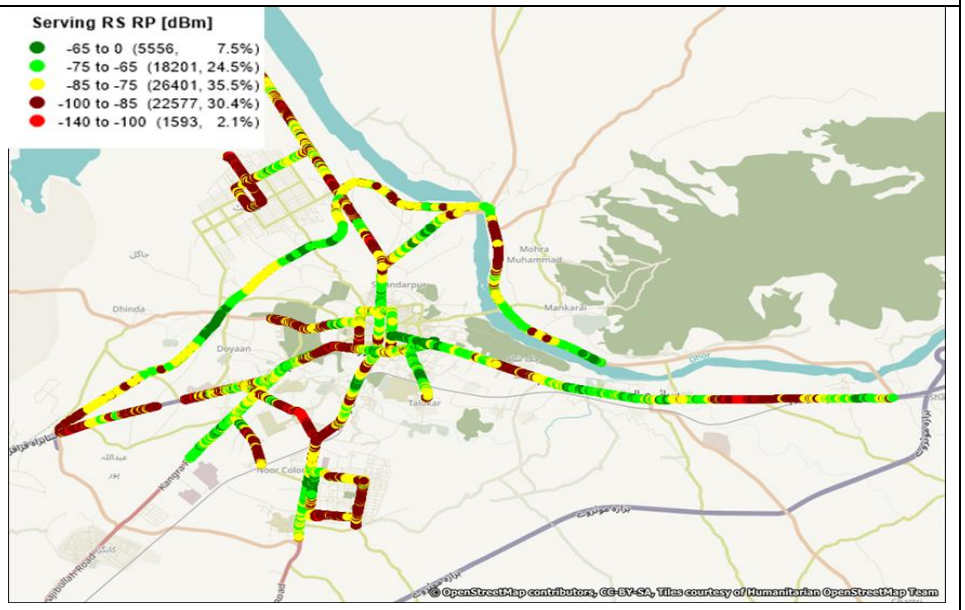
TELENOR 4G NETWORK COVERAGE – HARIPUR



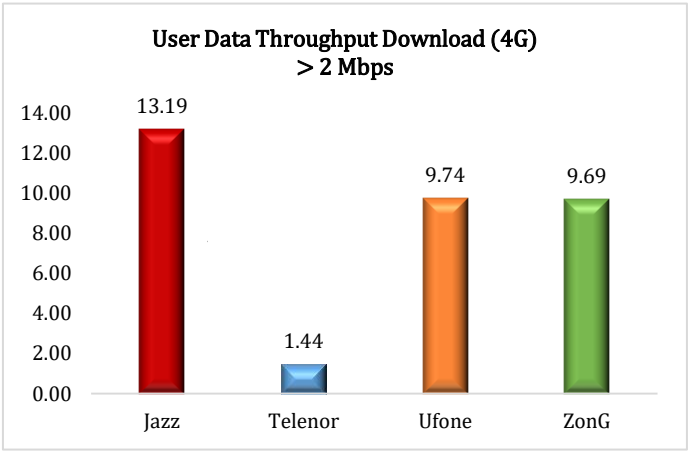
UFONE 4G NETWORK COVERAGE – HARIPUR

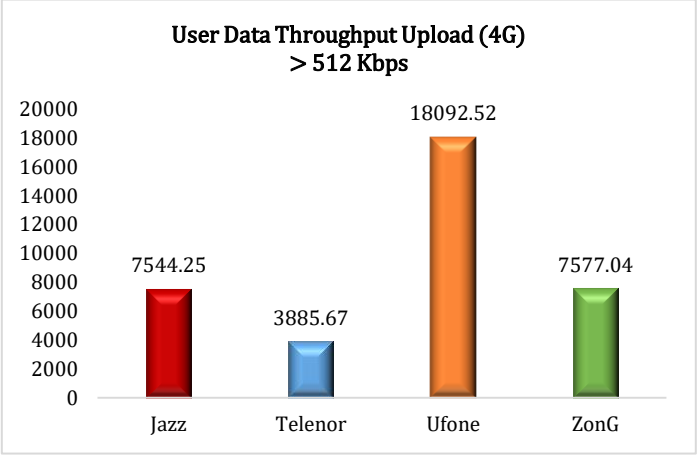


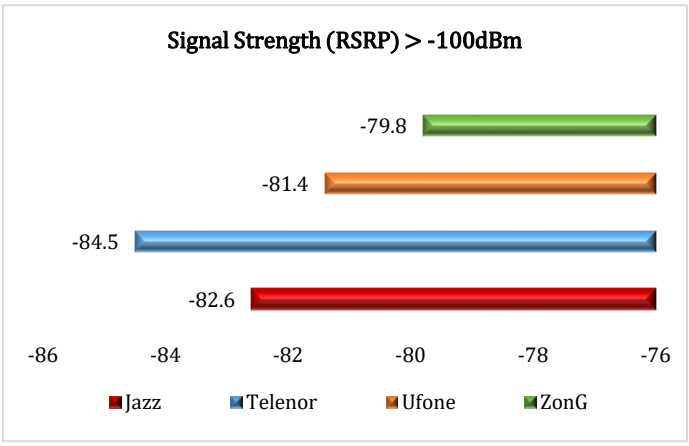
ZONG 4G NETWORK COVERAGE – HARIPUR

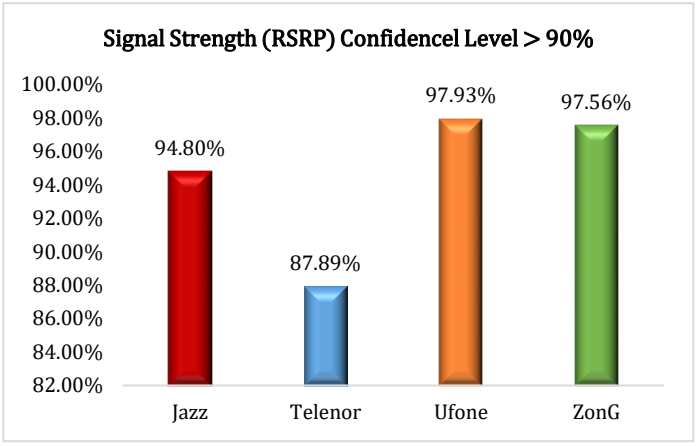


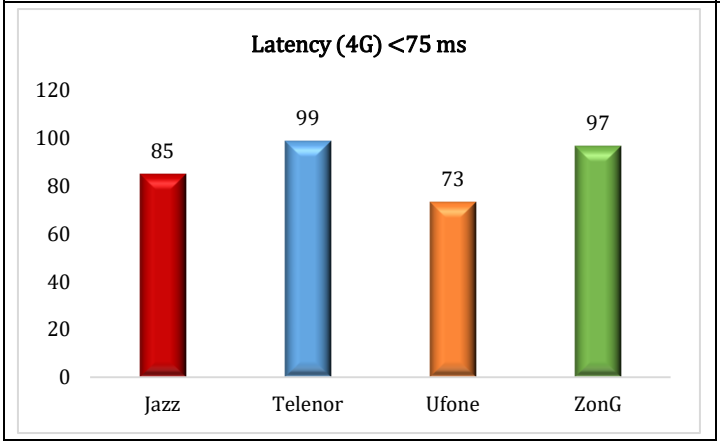
QUALITY OF SERVICE SURVEY RESULTS (4G) – HARIPUR





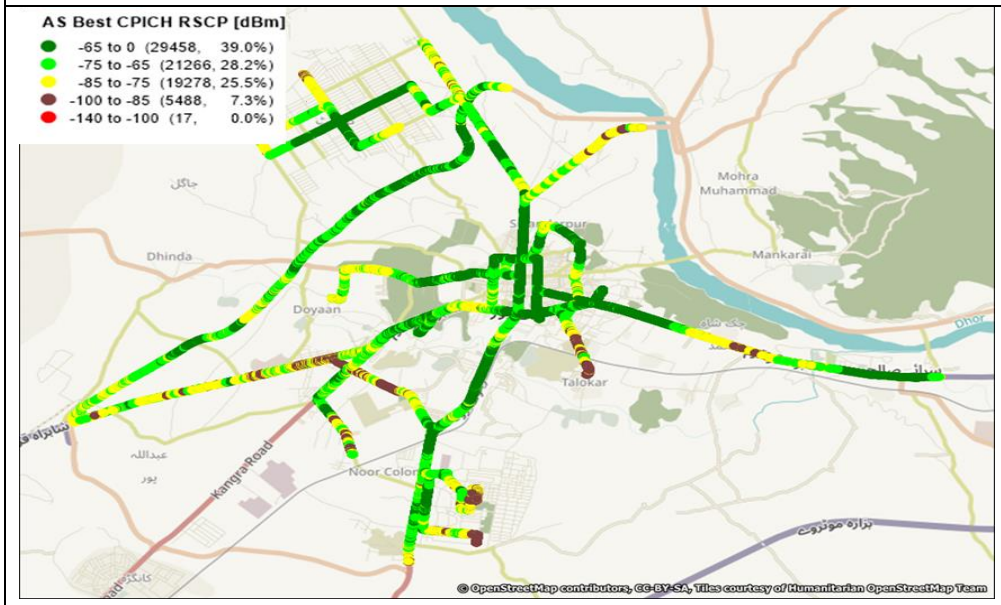




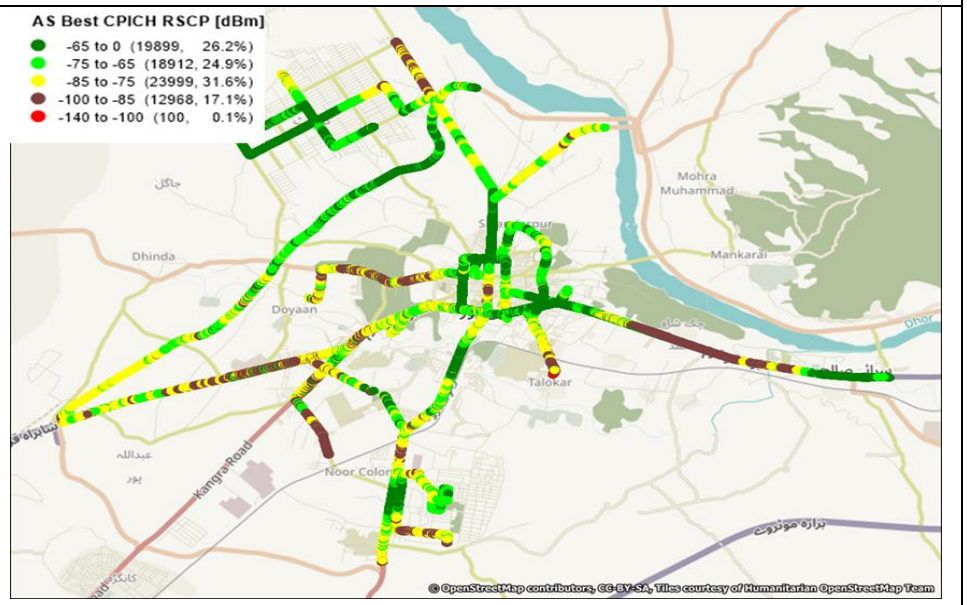


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

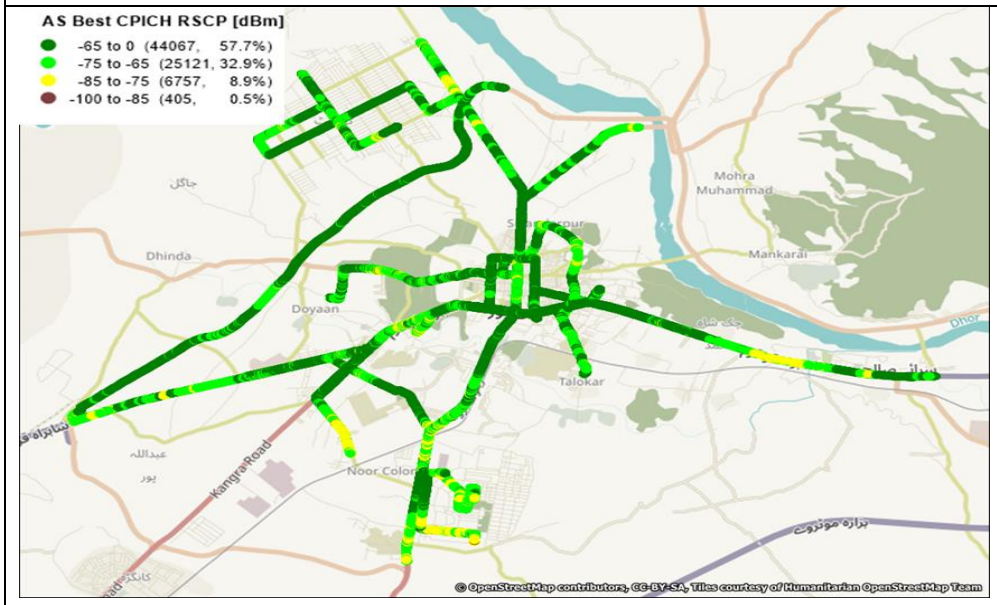
JAZZ 3G NETWORK COVERAGE – HARIPUR



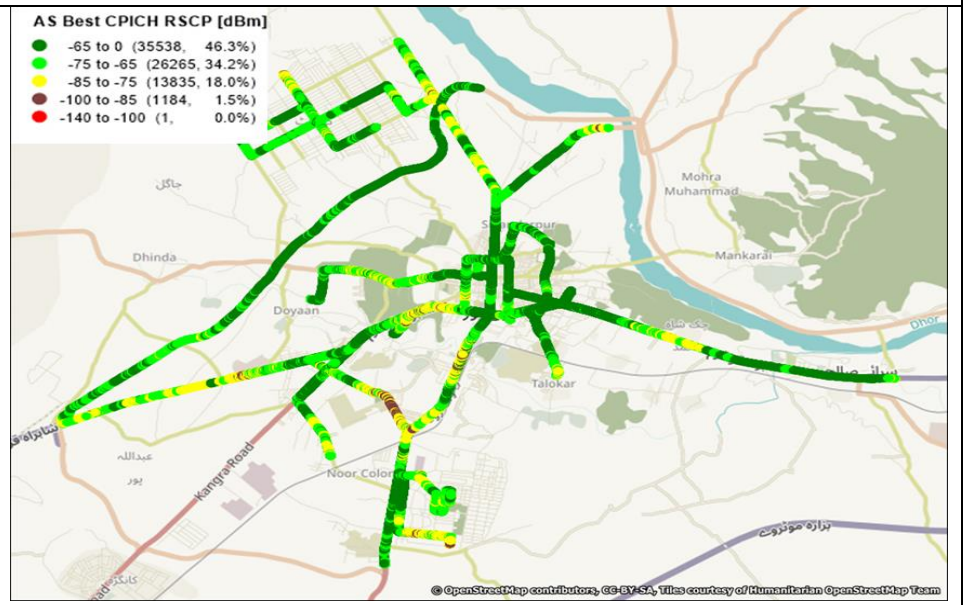
TELENOR 3G NETWORK COVERAGE – HARIPUR



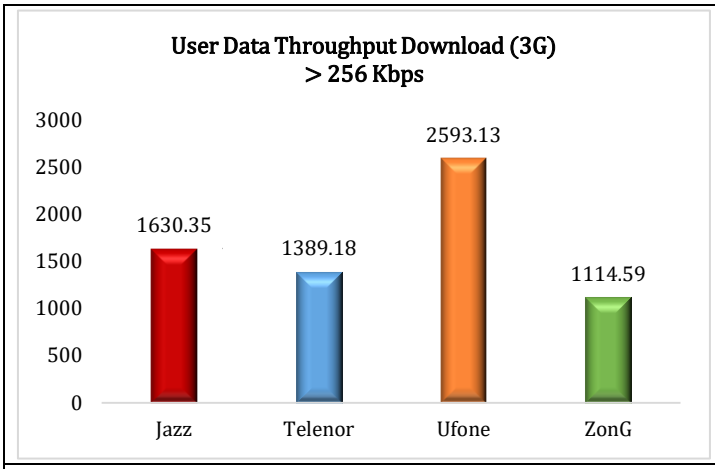
UFONE 3G NETWORK COVERAGE – HARIPUR

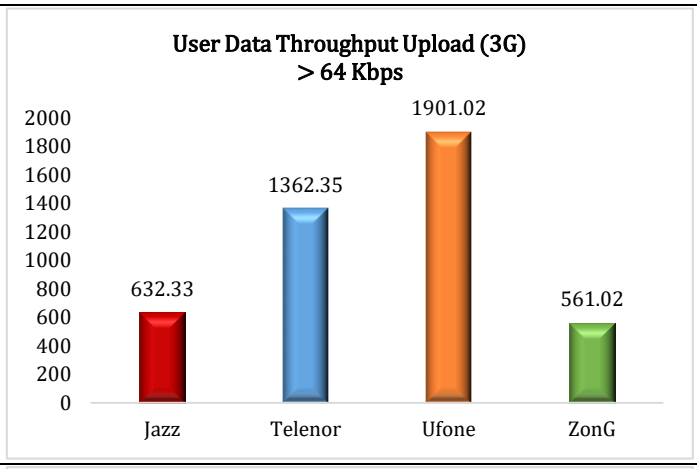


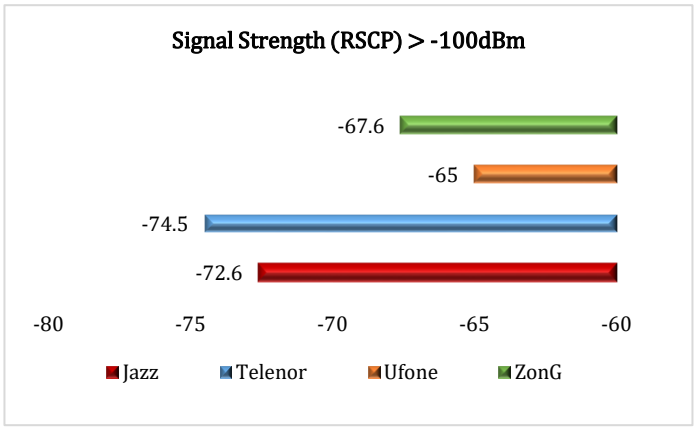
ZONG 3G NETWORK COVERAGE – HARIPUR

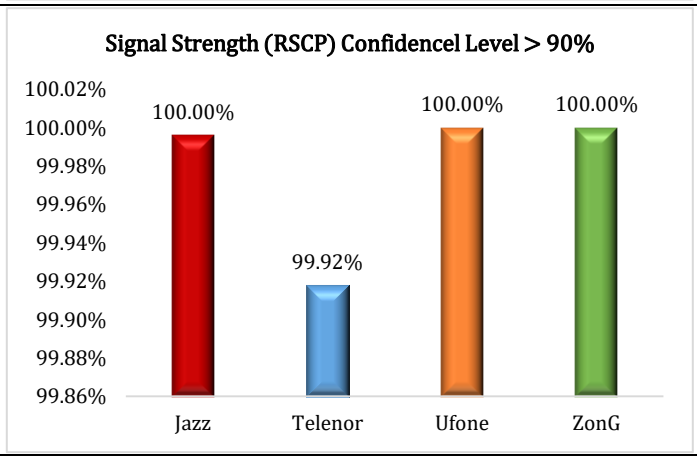


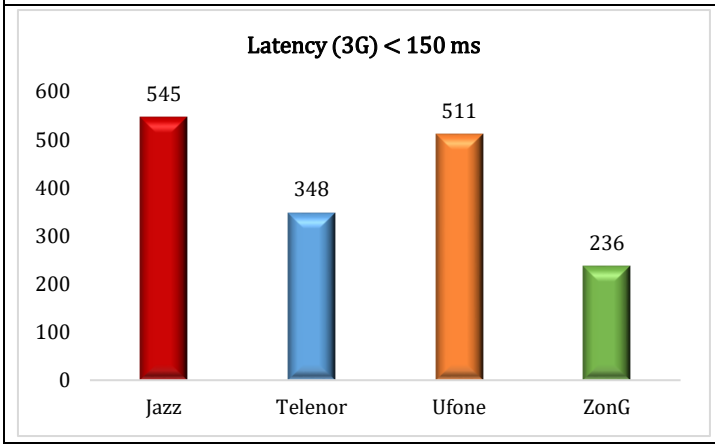
QUALITY OF SERVICE SURVEY RESULTS (3G) – HARIPUR



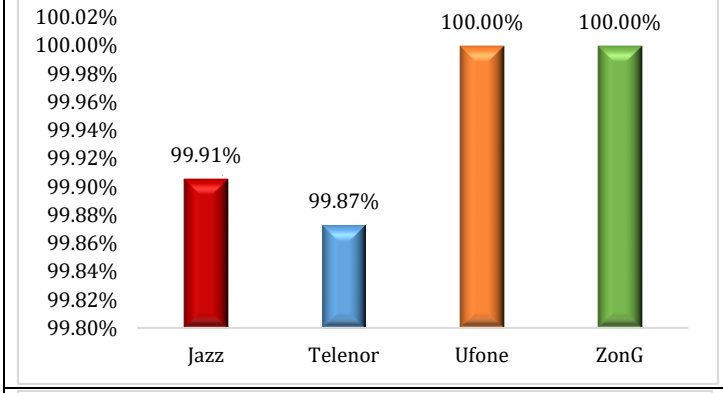


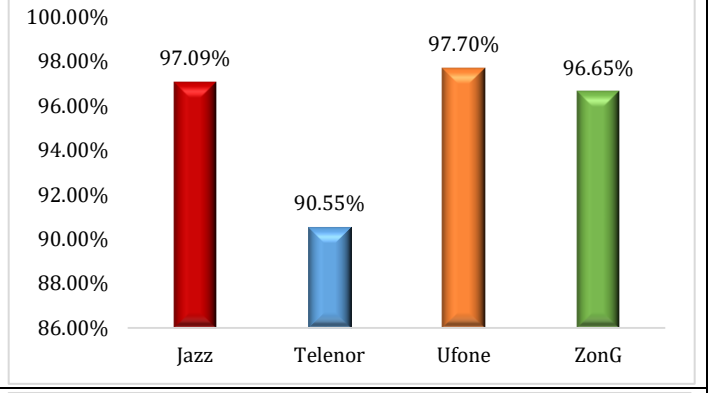


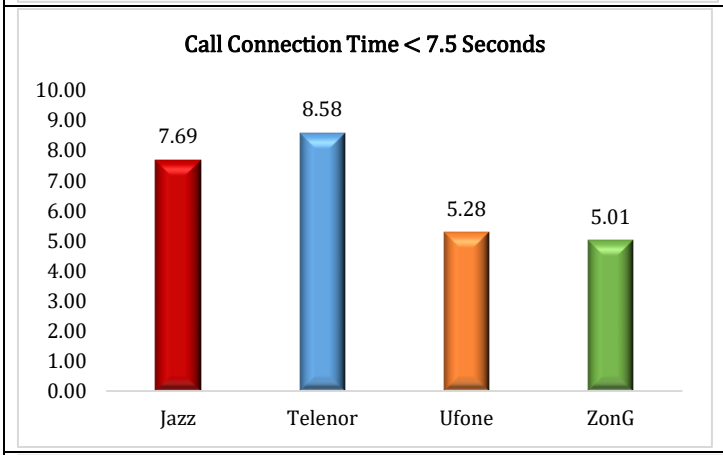


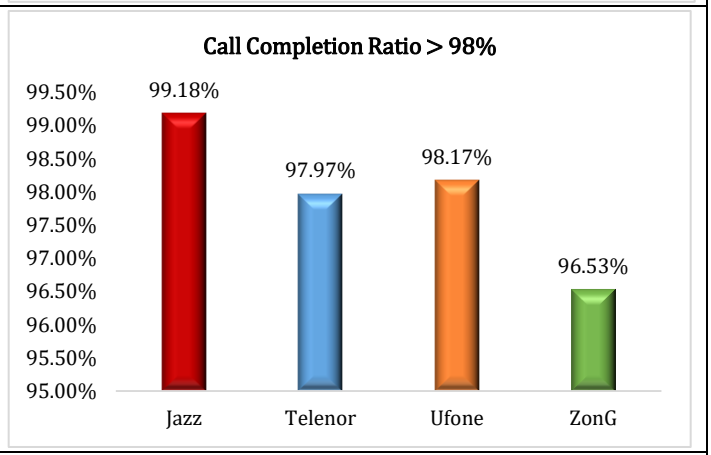


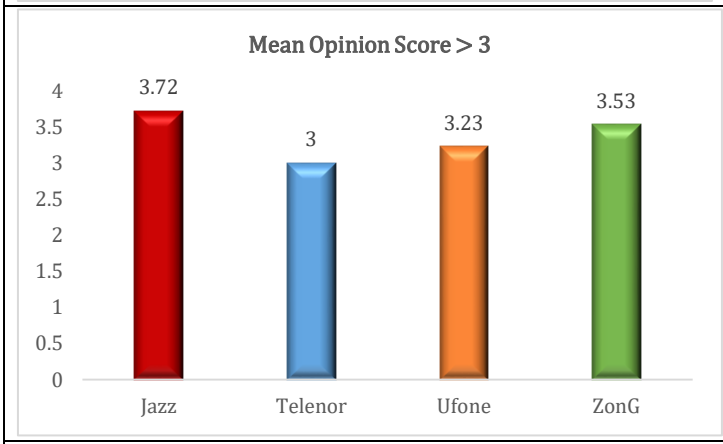
QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – HARIPUR

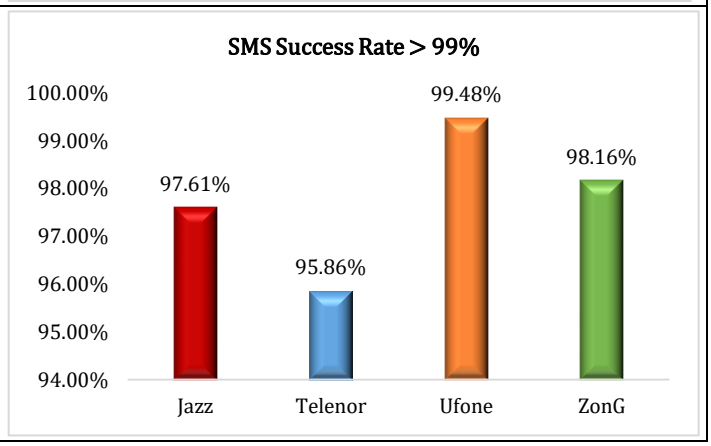


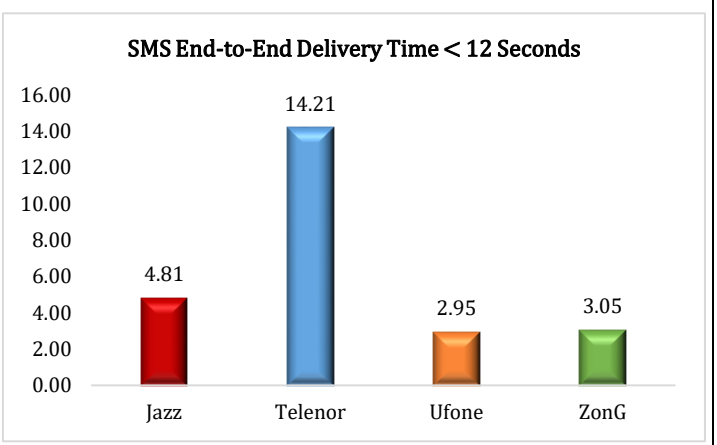








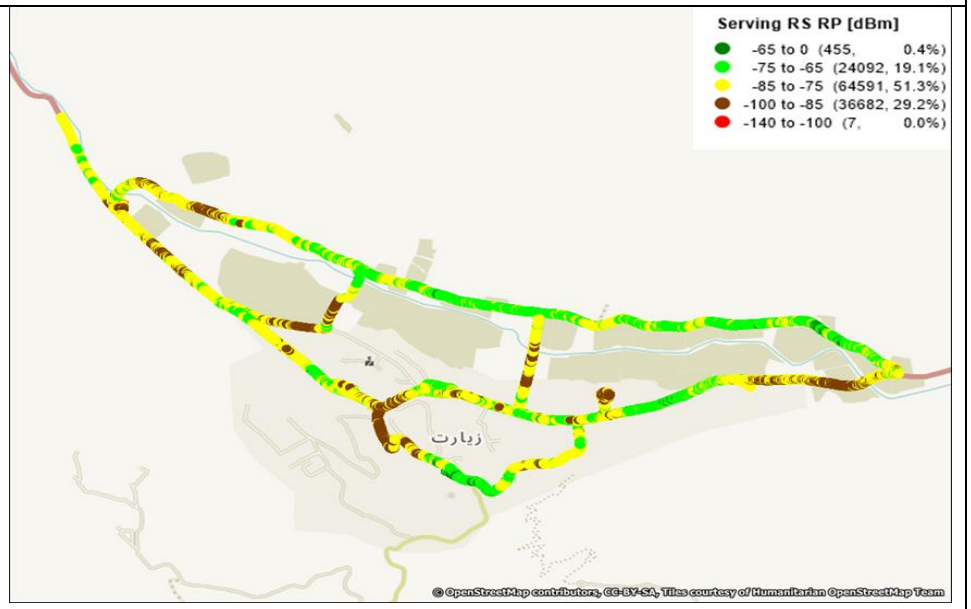
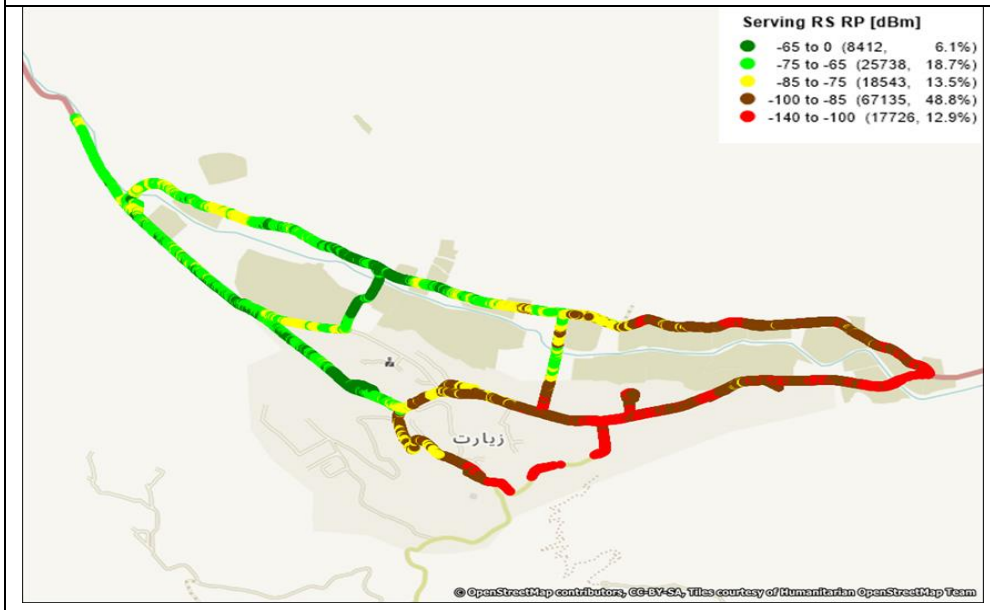
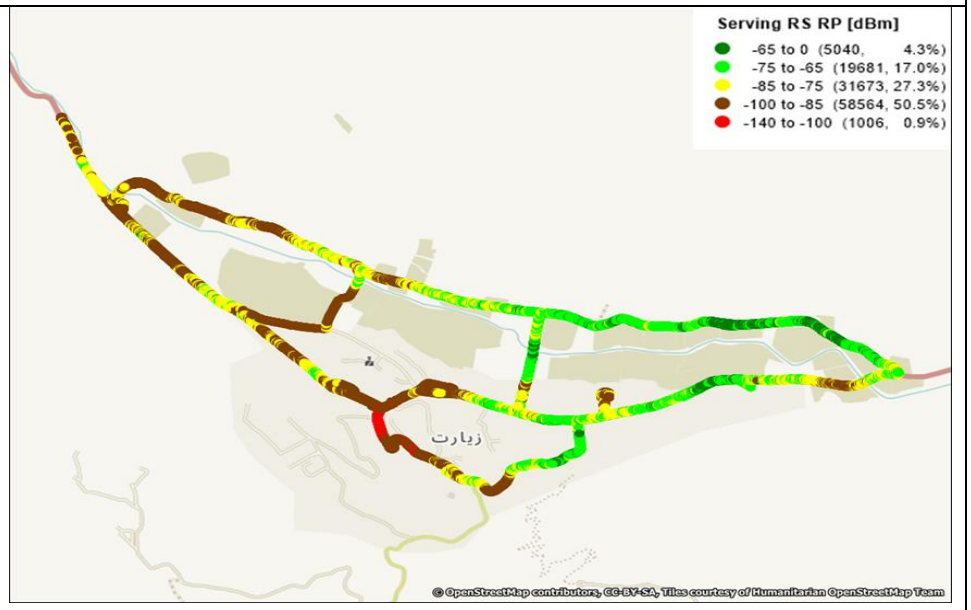




ANNEX – C

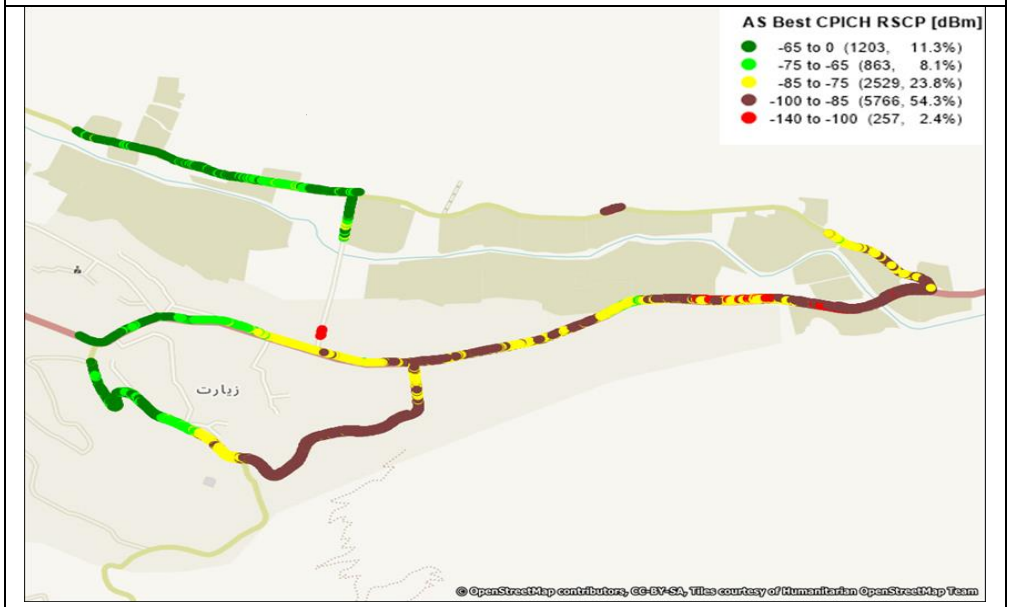
BALOCHISTAN

AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

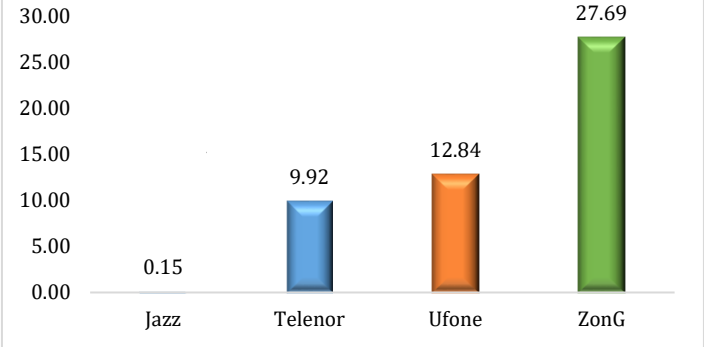
JAZZ 4G NETWORK COVERAGE – ZIARAT	TELENOR 4G NETWORK COVERAGE – ZIARAT
No Coverage	
UFONE 4G NETWORK COVERAGE – ZIARAT	**ZONG 4G NETWORK COVERAGE – ZIARAT**
	

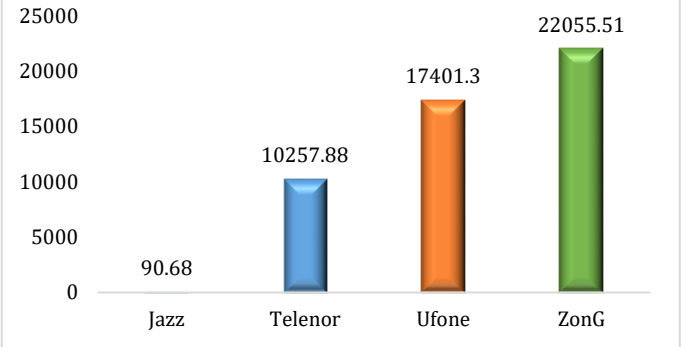
AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

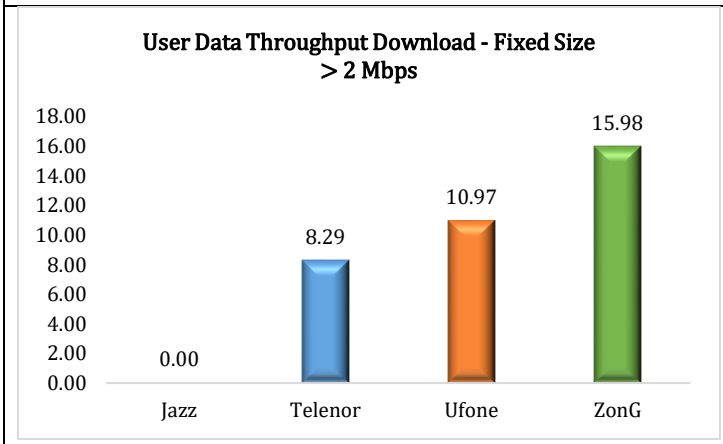
UFONE 3G NETWORK COVERAGE – ZIARAT

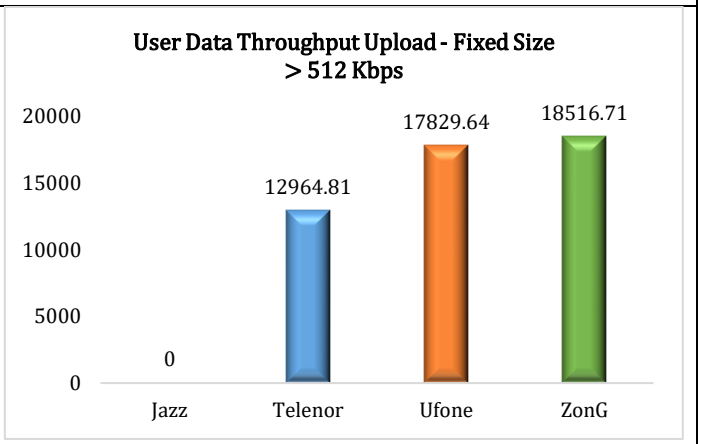


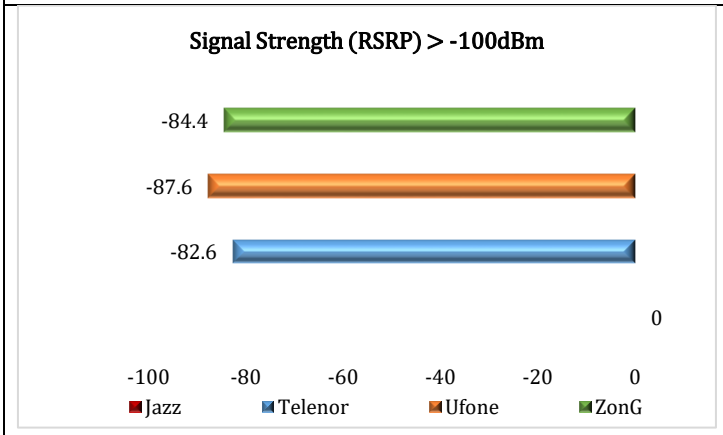
QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – ZIARAT

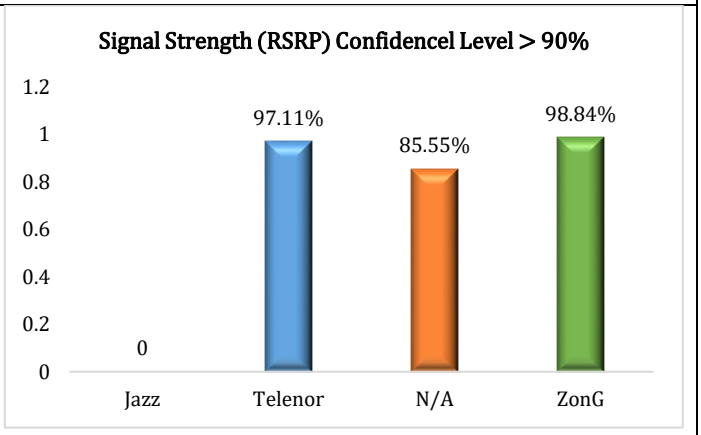


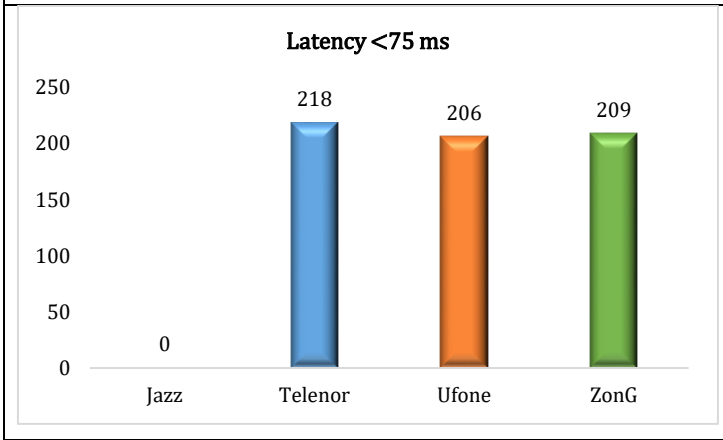


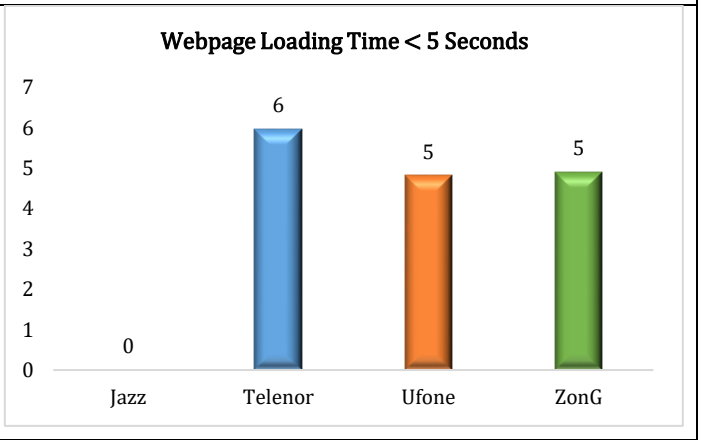












4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

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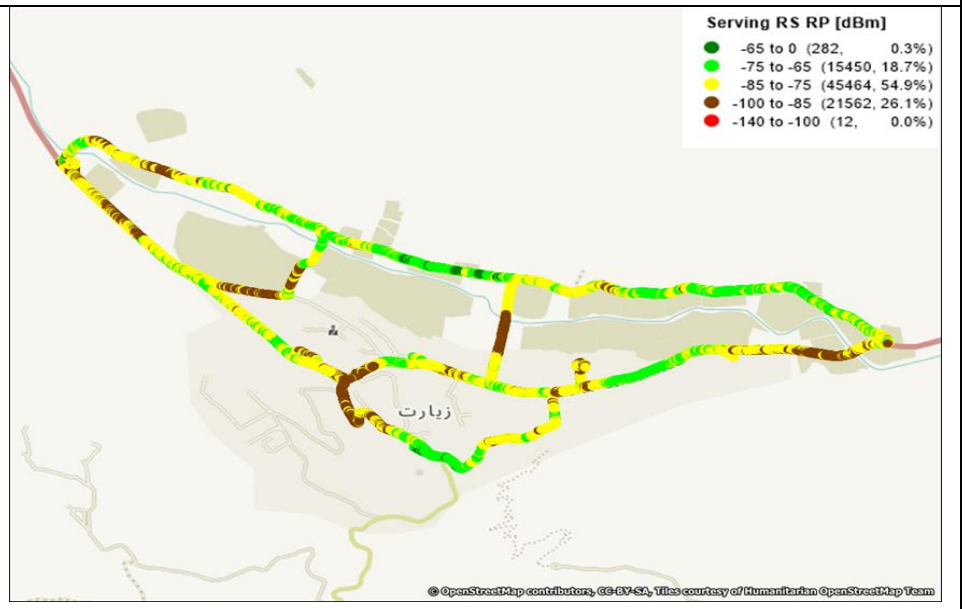
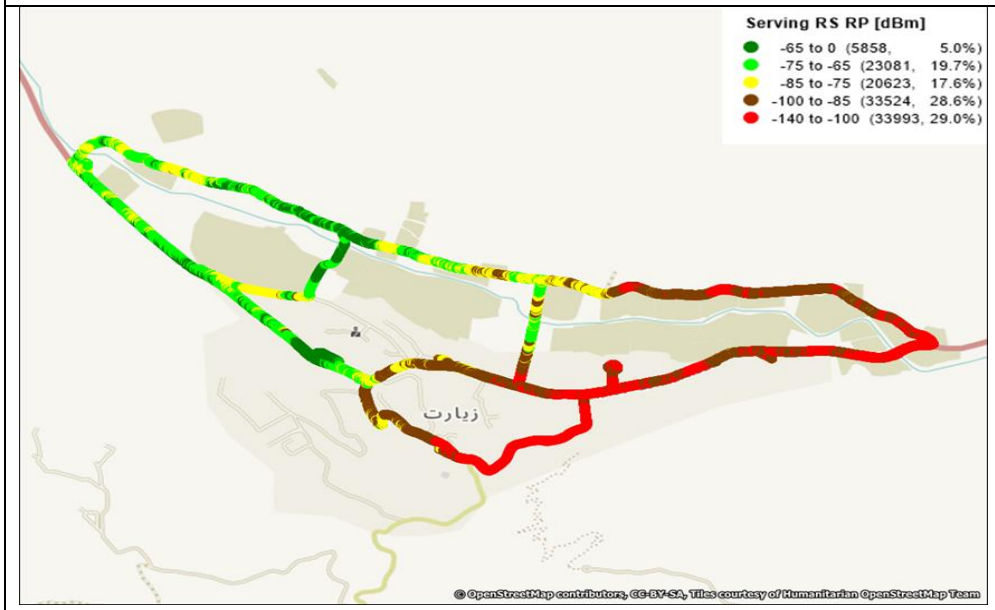
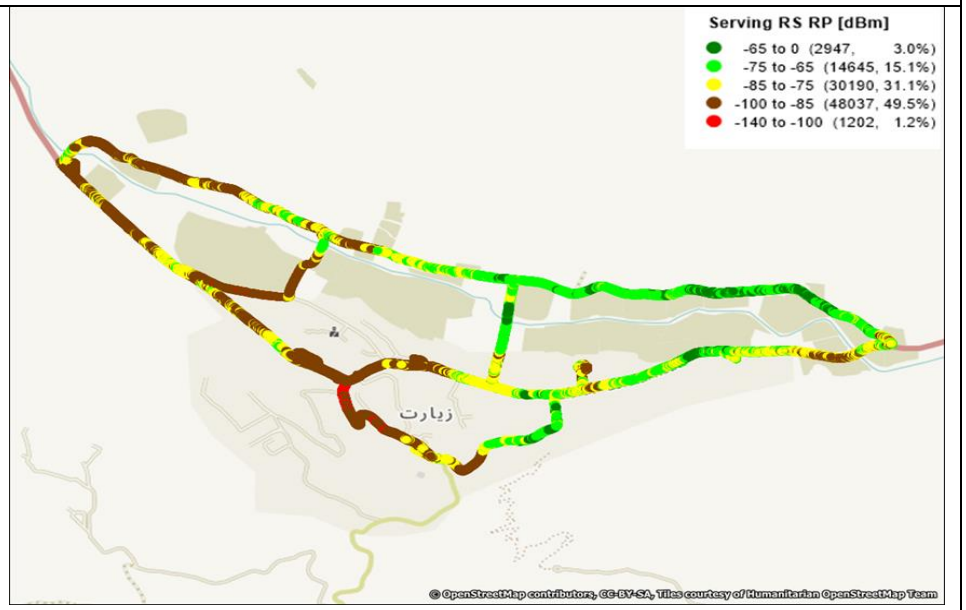
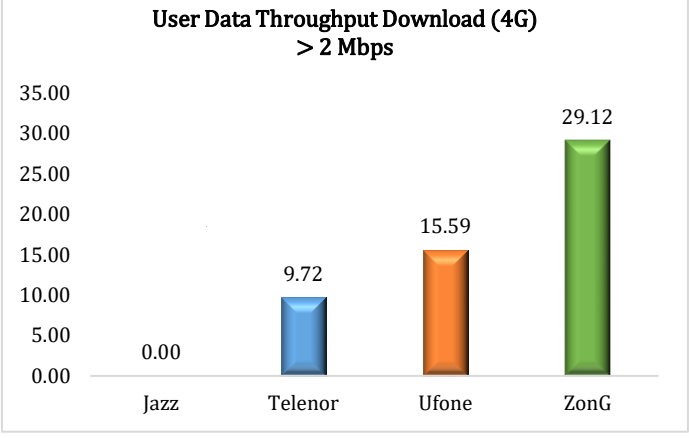
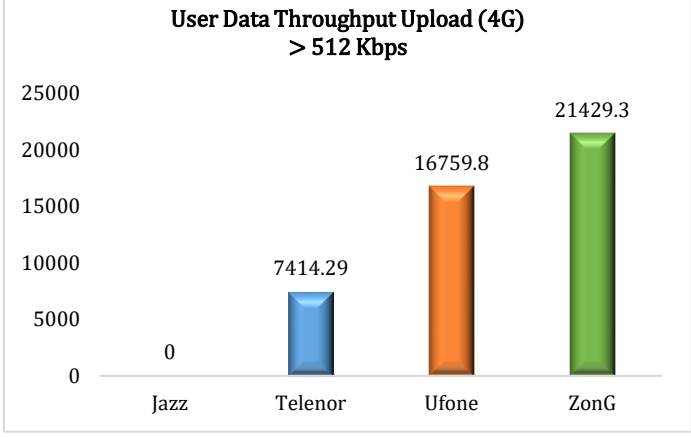
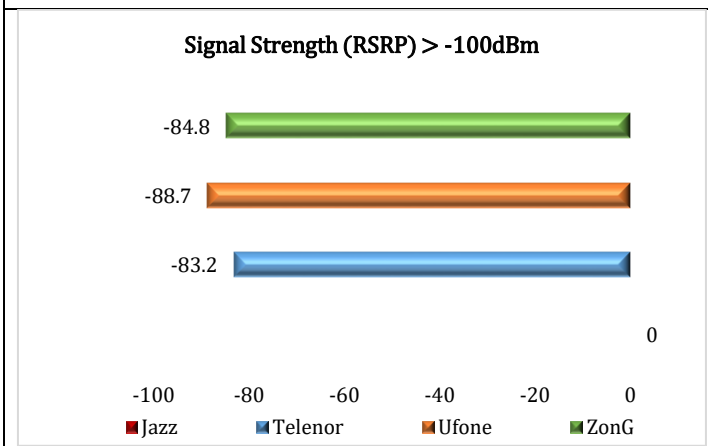
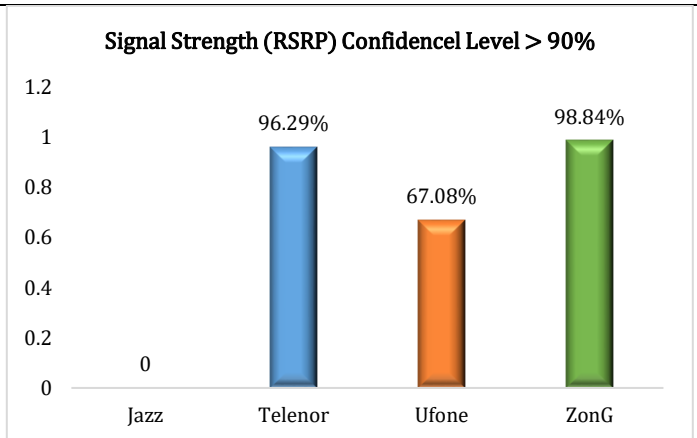
No Coverage	
UFONE 4G NETWORK COVERAGE – ZIARAT	**ZONG 4G NETWORK COVERAGE – ZIARAT**
	

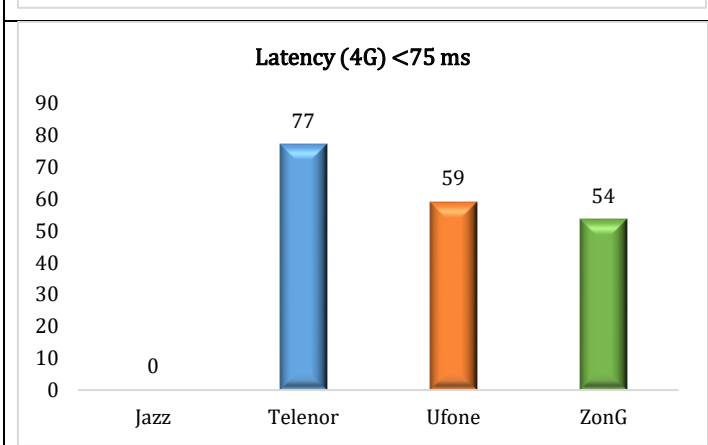
QUALITY OF SERVICE SURVEY RESULTS (4G) – ZIARAT



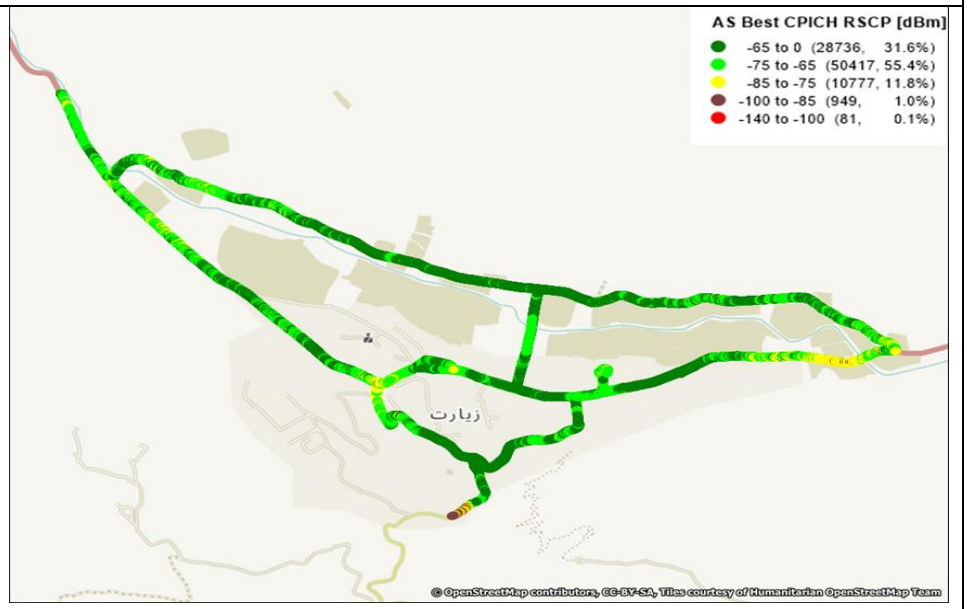
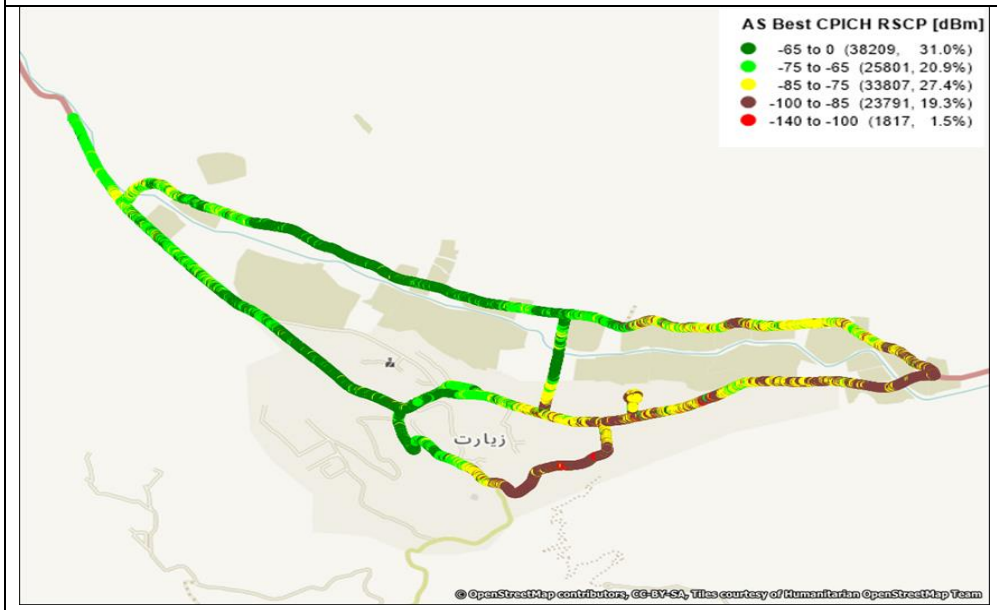
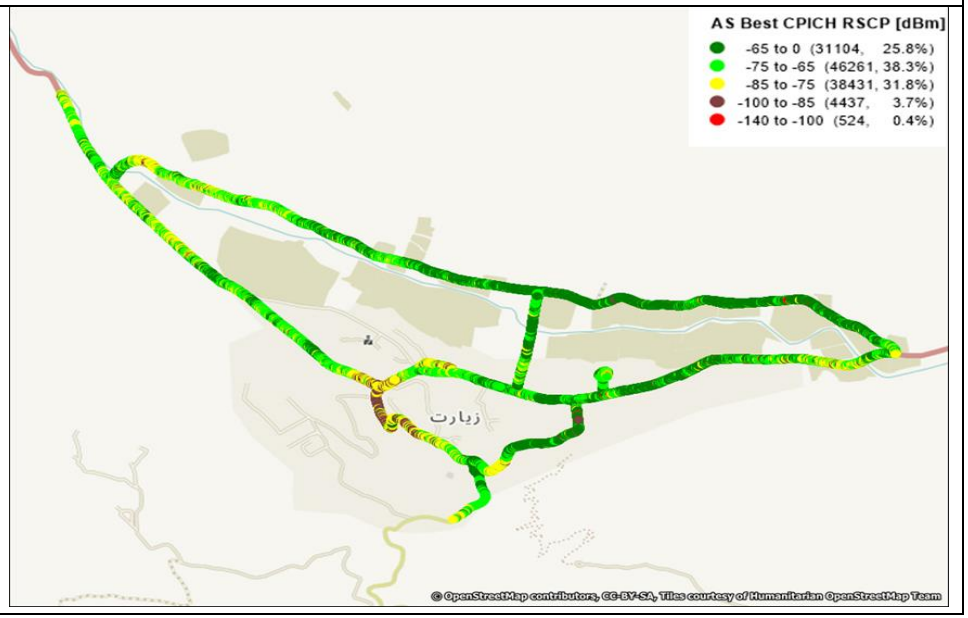




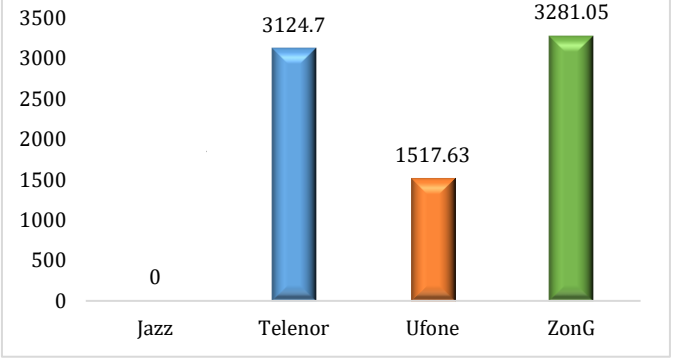


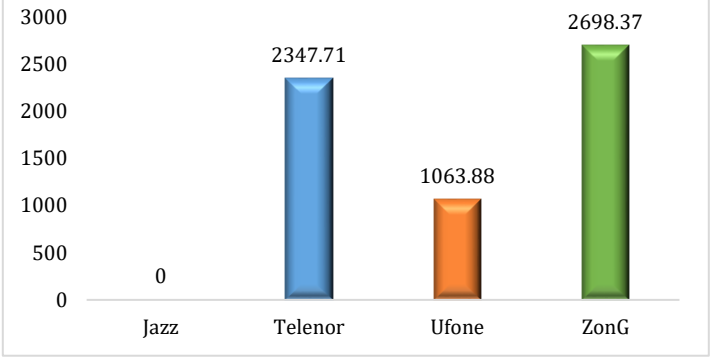


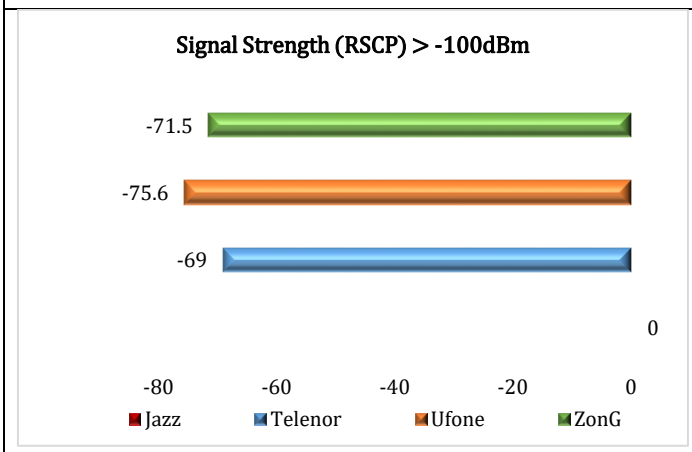
3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

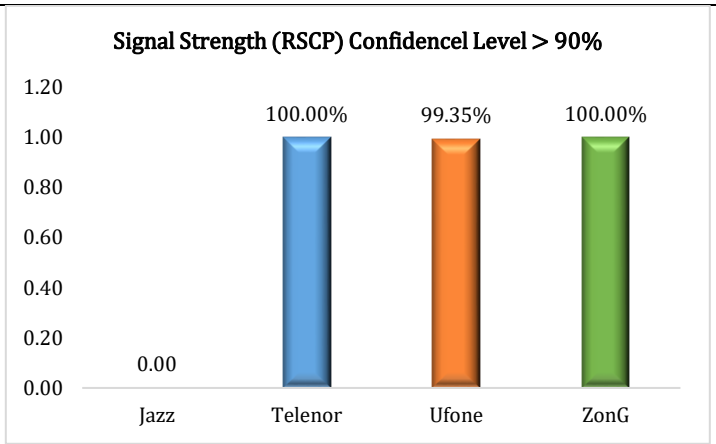
JAZZ 3G NETWORK COVERAGE – ZIARAT	TELENOR 3G NETWORK COVERAGE – ZIARAT
No Coverage	
UFONE 3G NETWORK COVERAGE – ZIARAT	**ZONG 3G NETWORK COVERAGE – ZIARAT**
	

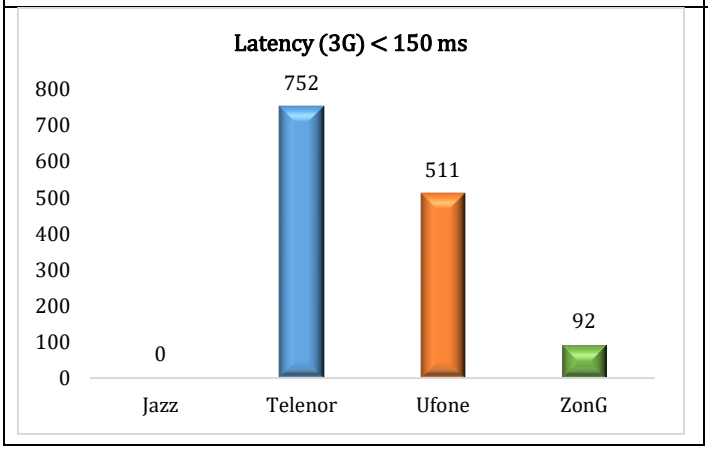
QUALITY OF SERVICE SURVEY RESULTS (3G) – ZIARAT



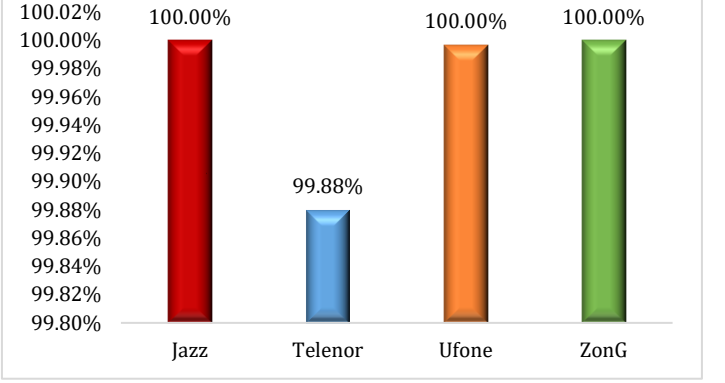


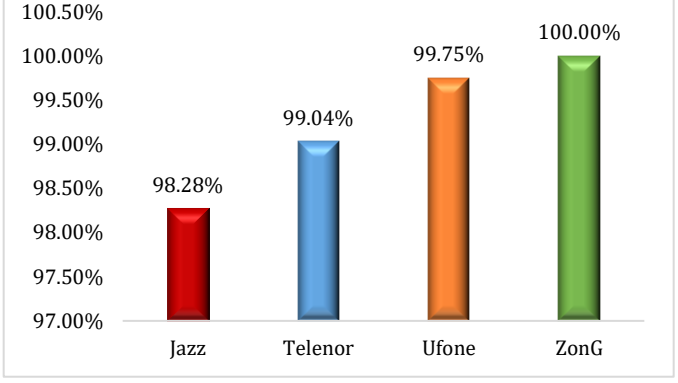


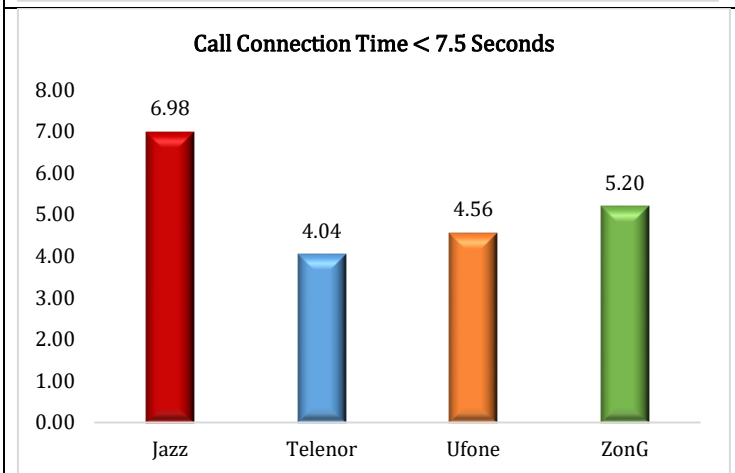


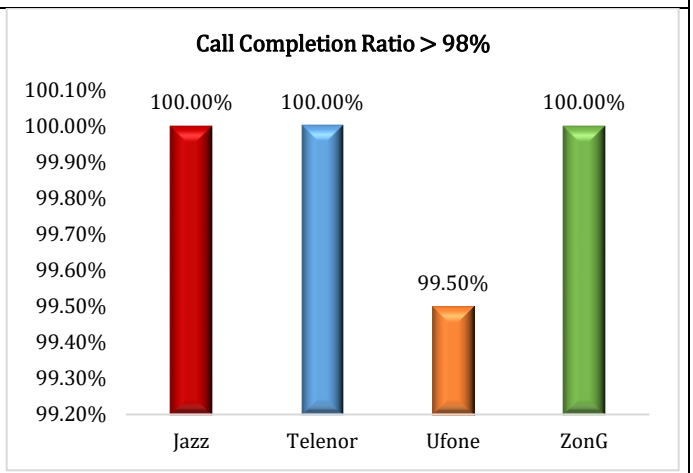


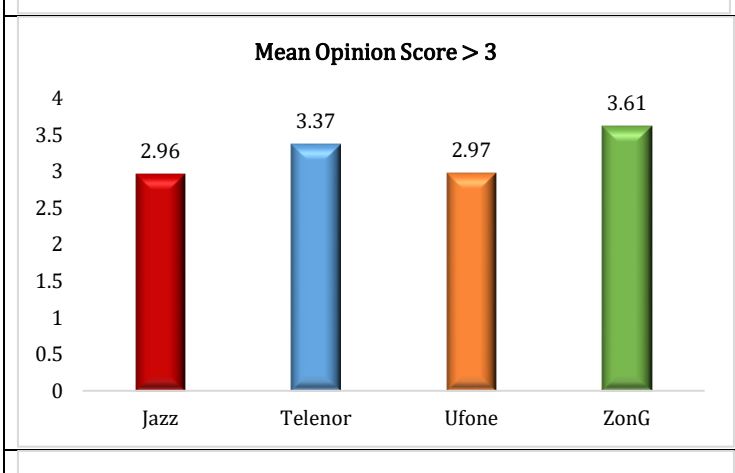
QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – ZIARAT

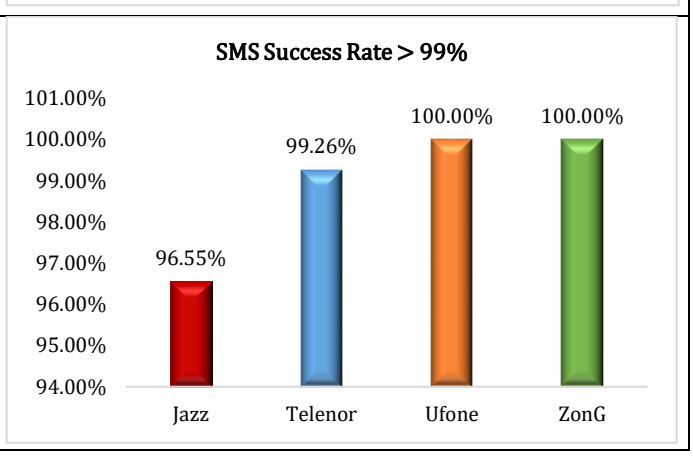


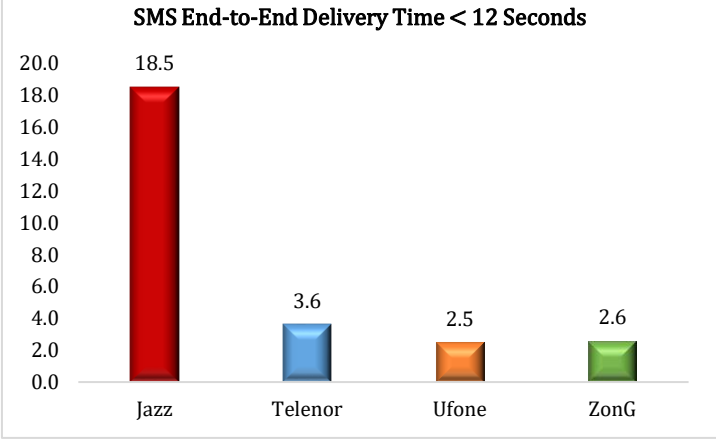






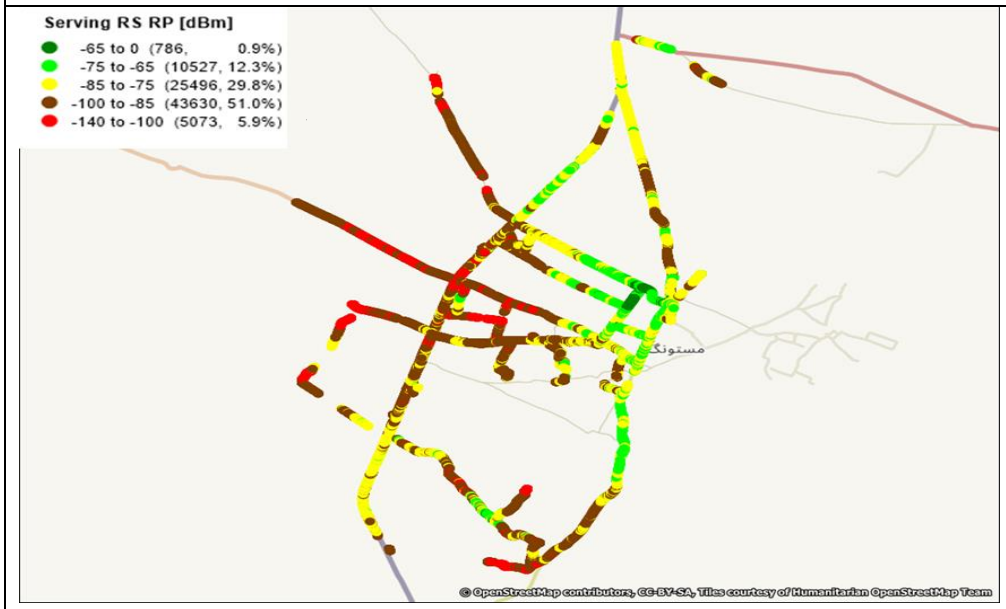




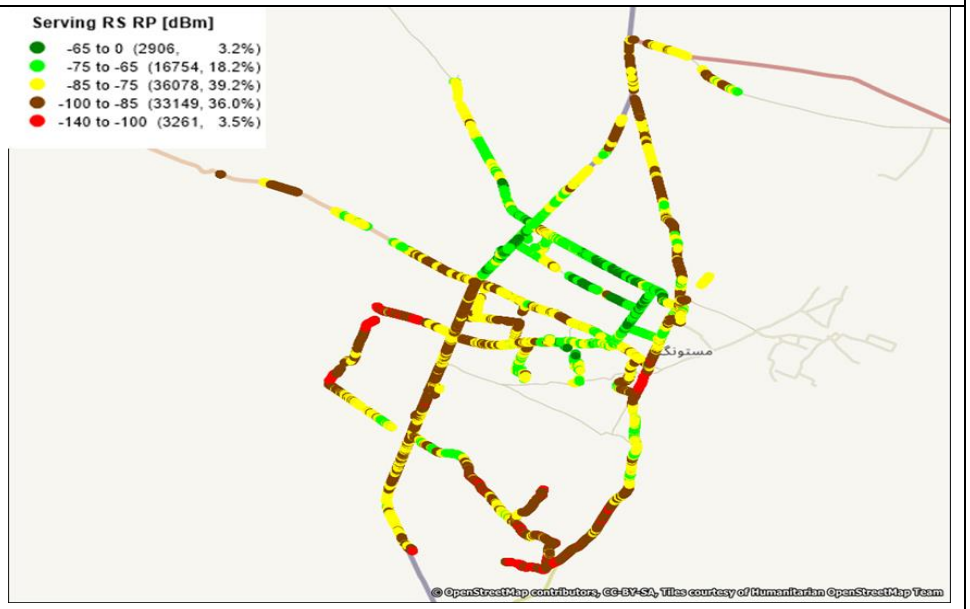


AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

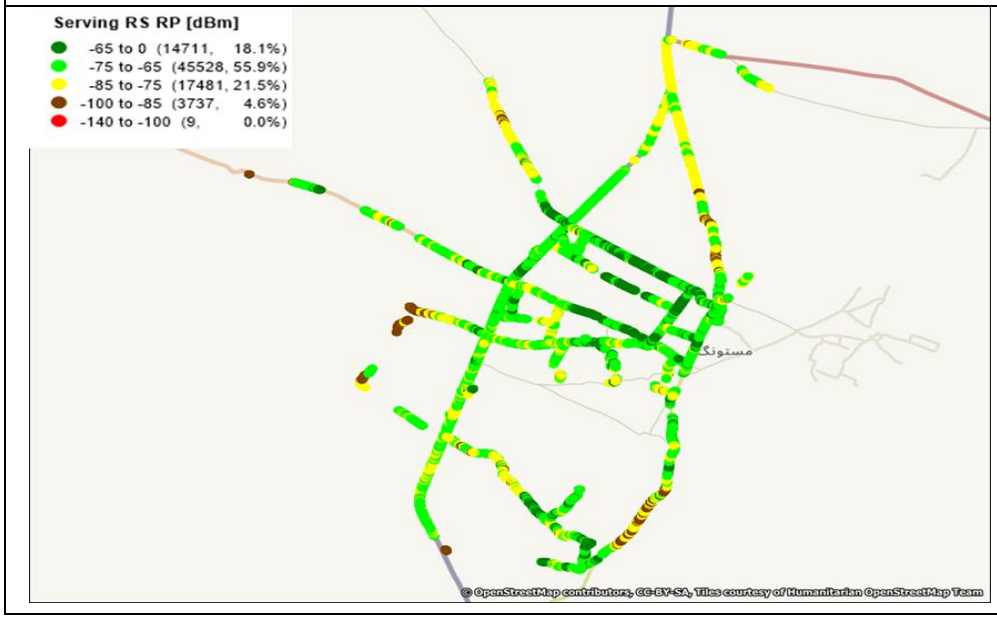
JAZZ 4G NETWORK COVERAGE – MASTUNG



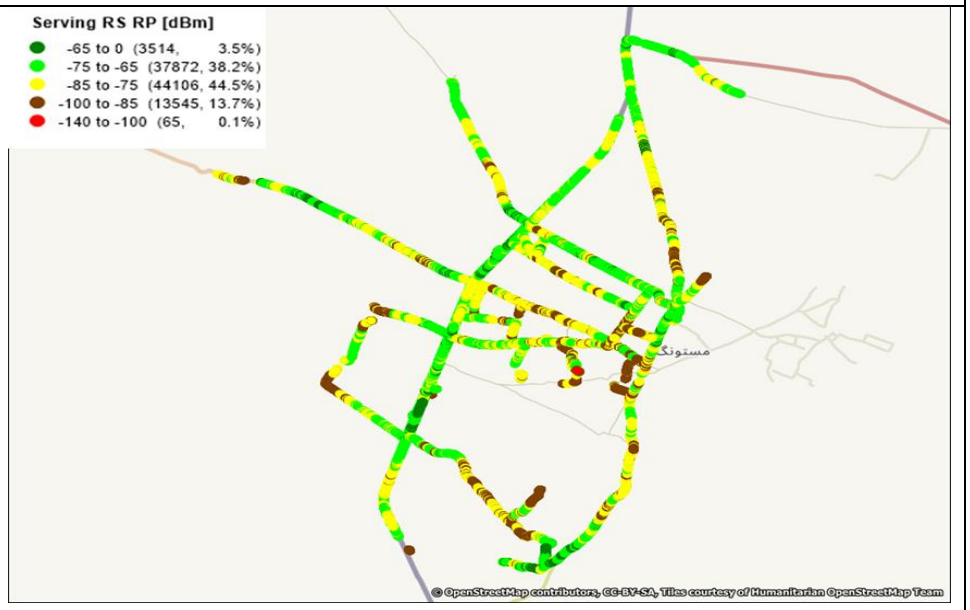
TELENOR 4G NETWORK COVERAGE – MASTUNG



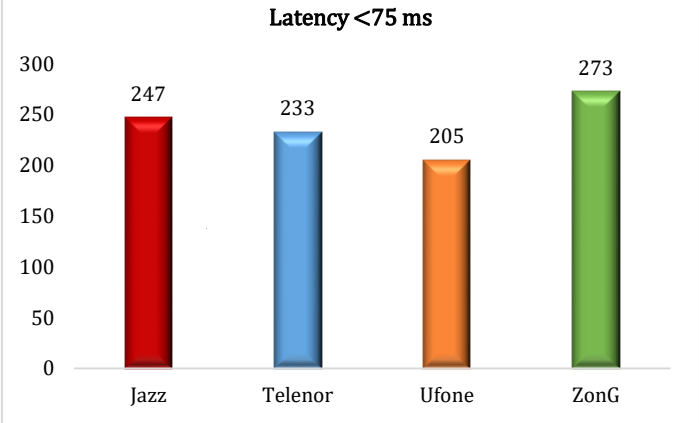
UFONE 4G NETWORK COVERAGE – MASTUNG

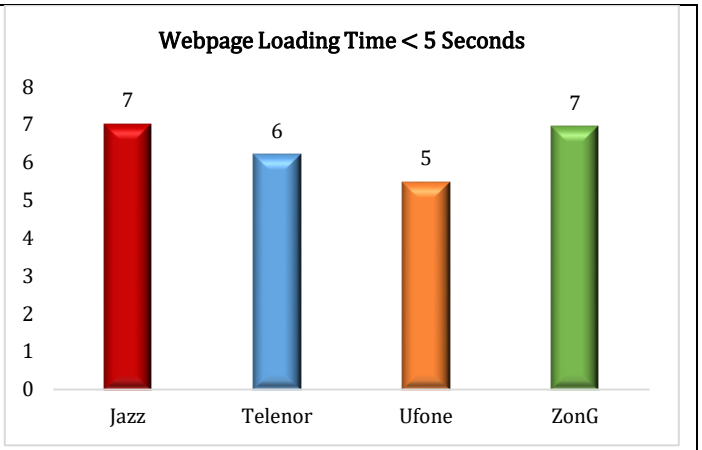


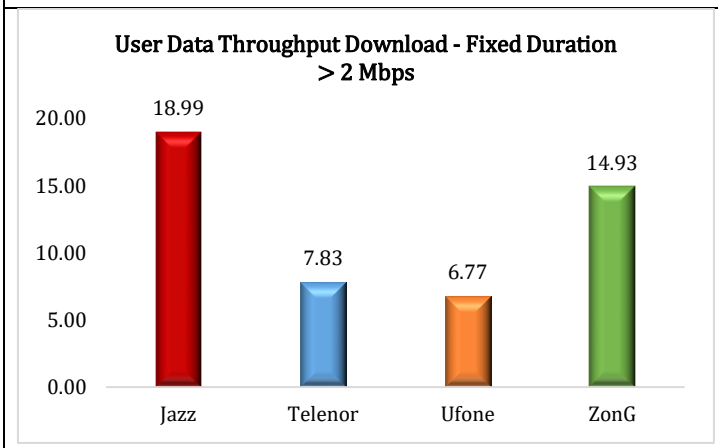
ZONG 4G NETWORK COVERAGE – MASTUNG

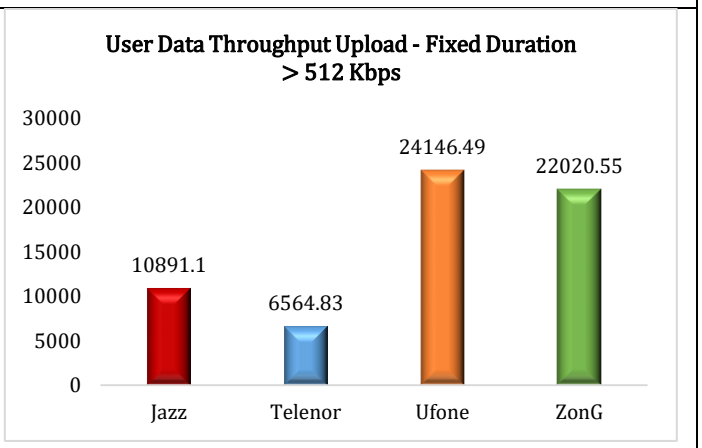


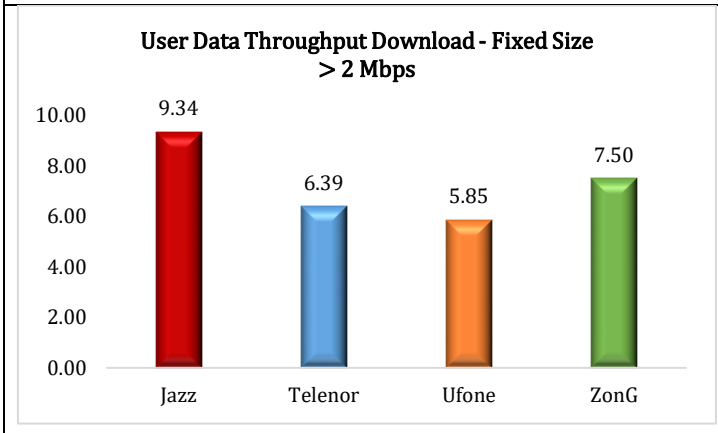
QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – MASTUNG

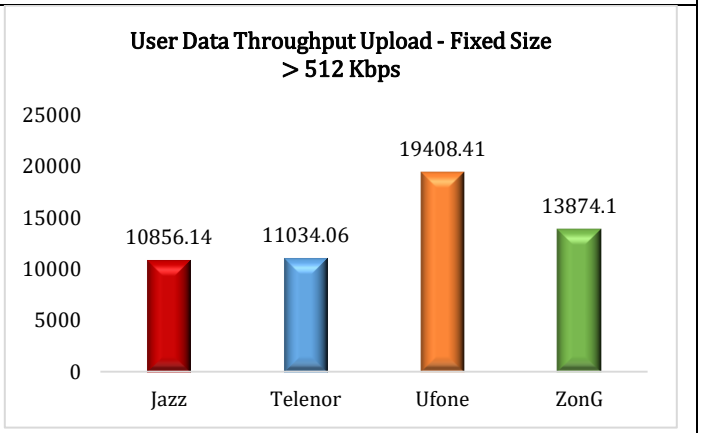


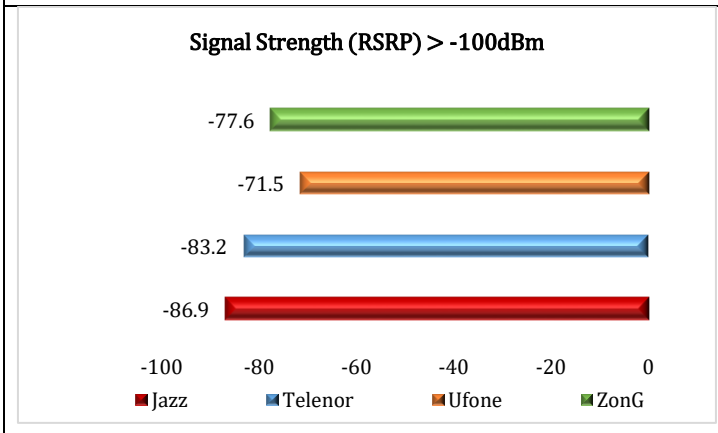


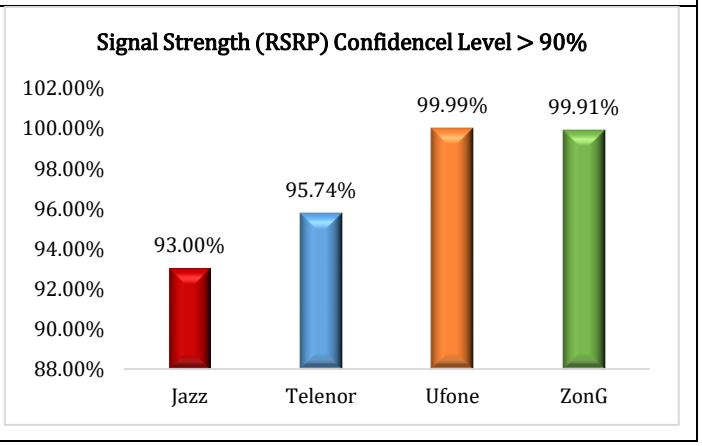






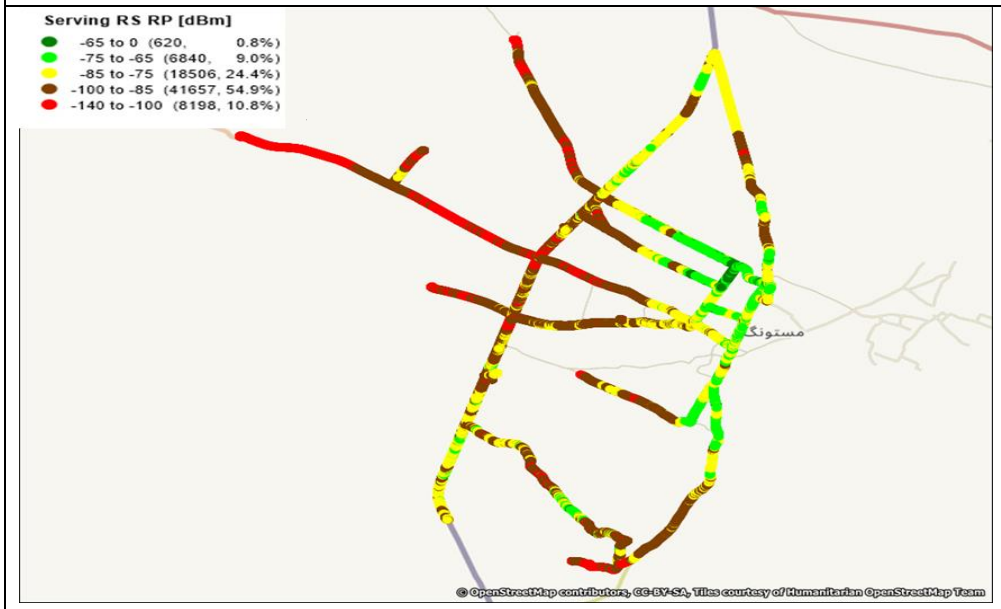




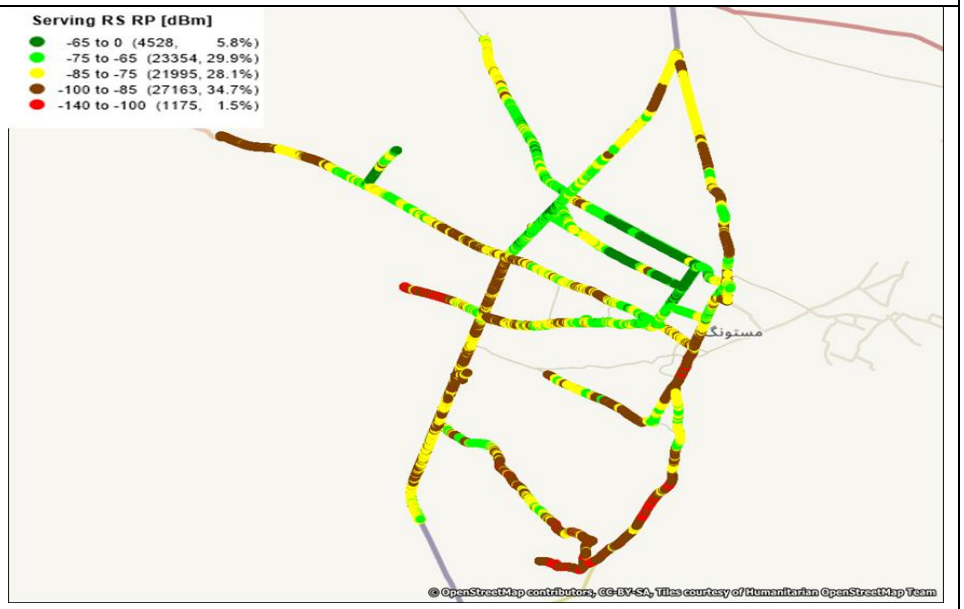


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

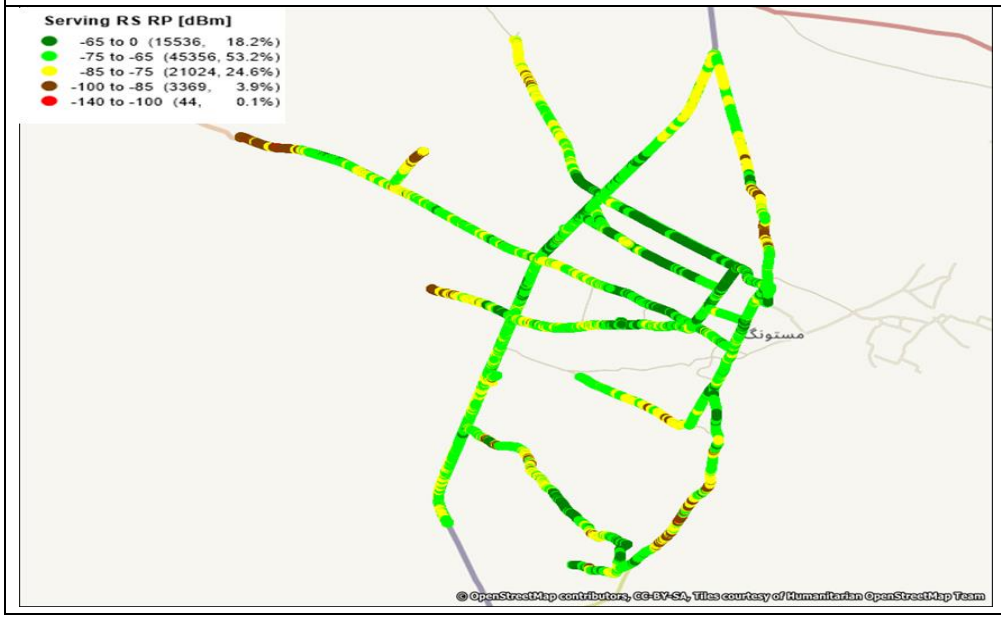
JAZZ 4G NETWORK COVERAGE – MASTUNG



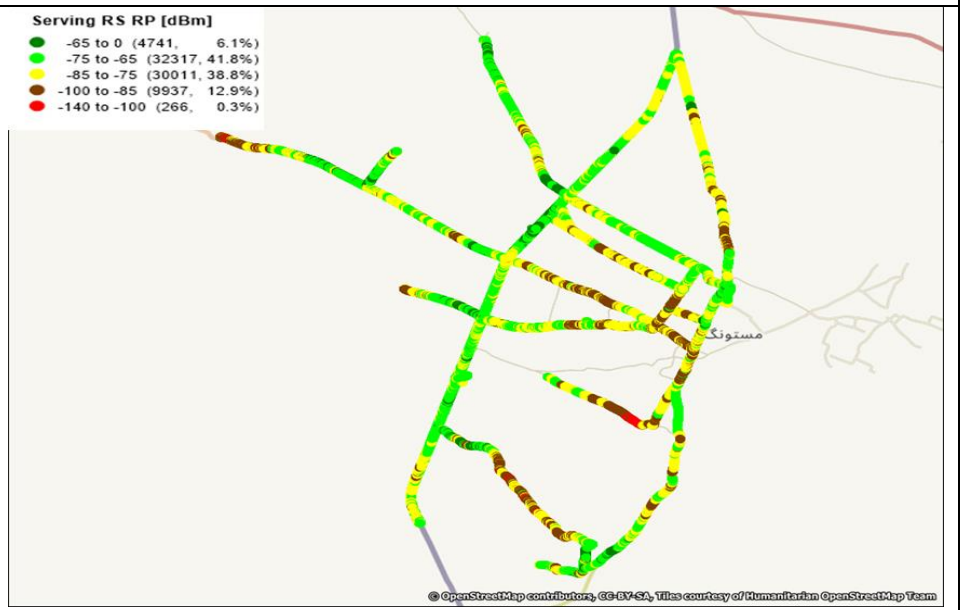
TELENOR 4G NETWORK COVERAGE – MASTUNG



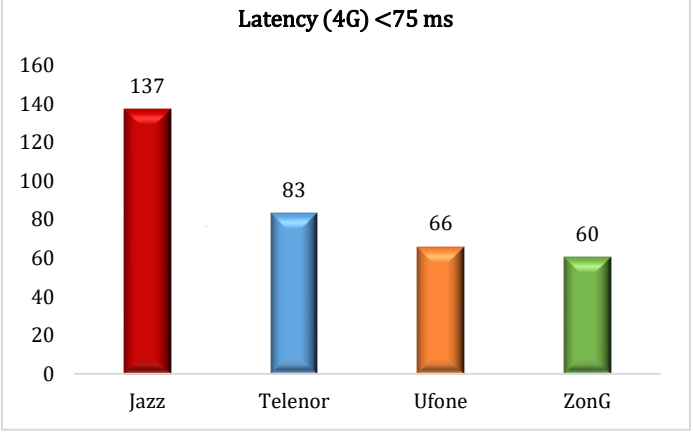
UFONE 4G NETWORK COVERAGE – MASTUNG

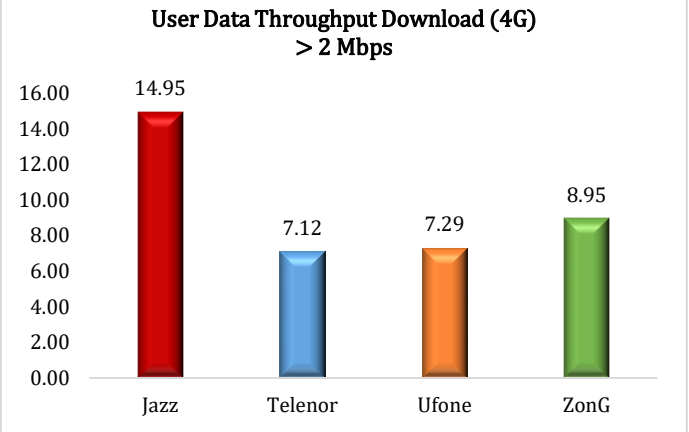


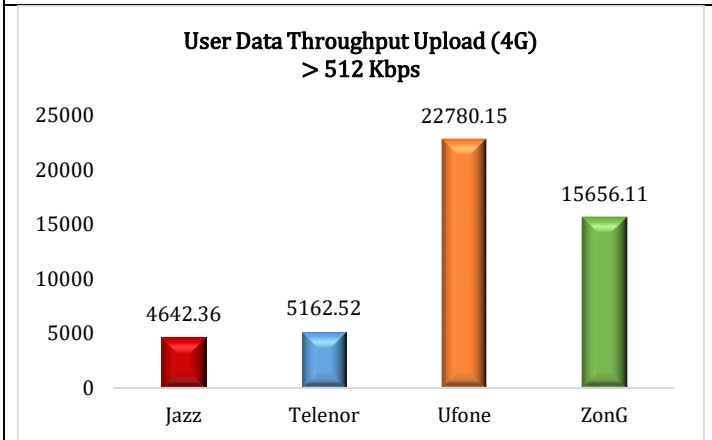
ZONG 4G NETWORK COVERAGE – MASTUNG

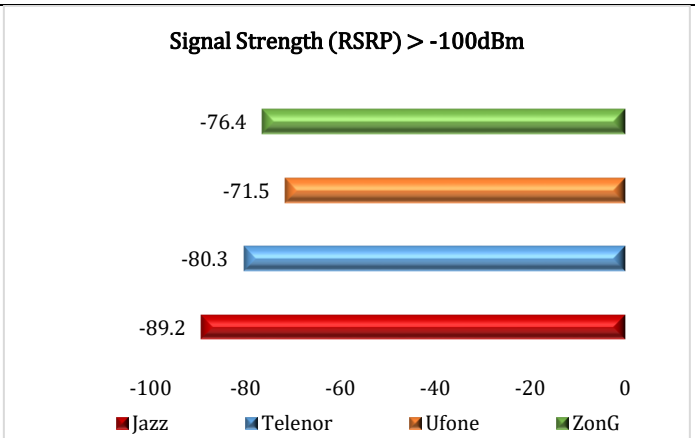


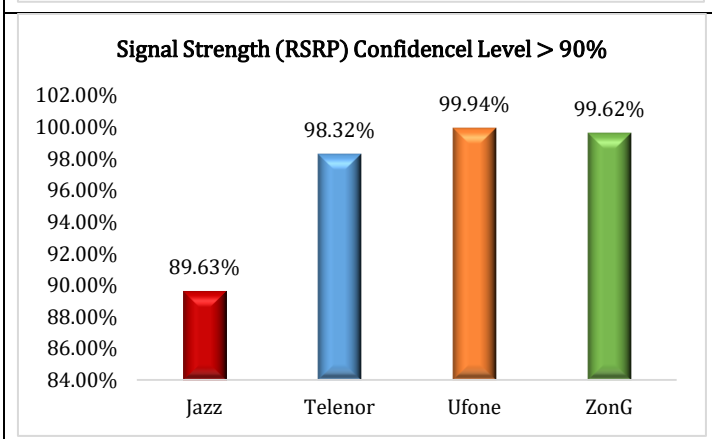
QUALITY OF SERVICE SURVEY RESULTS (4G) – MASTUNG



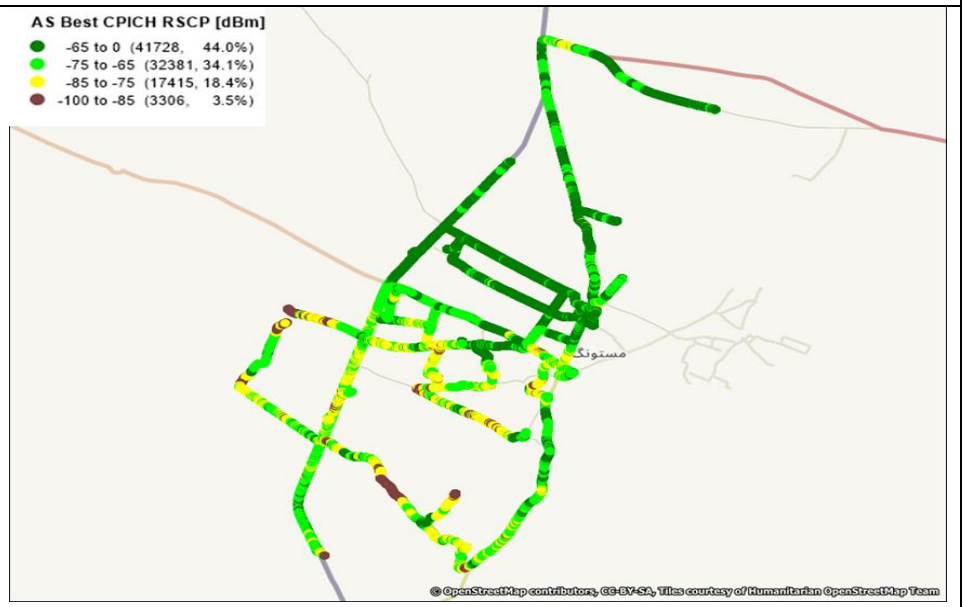
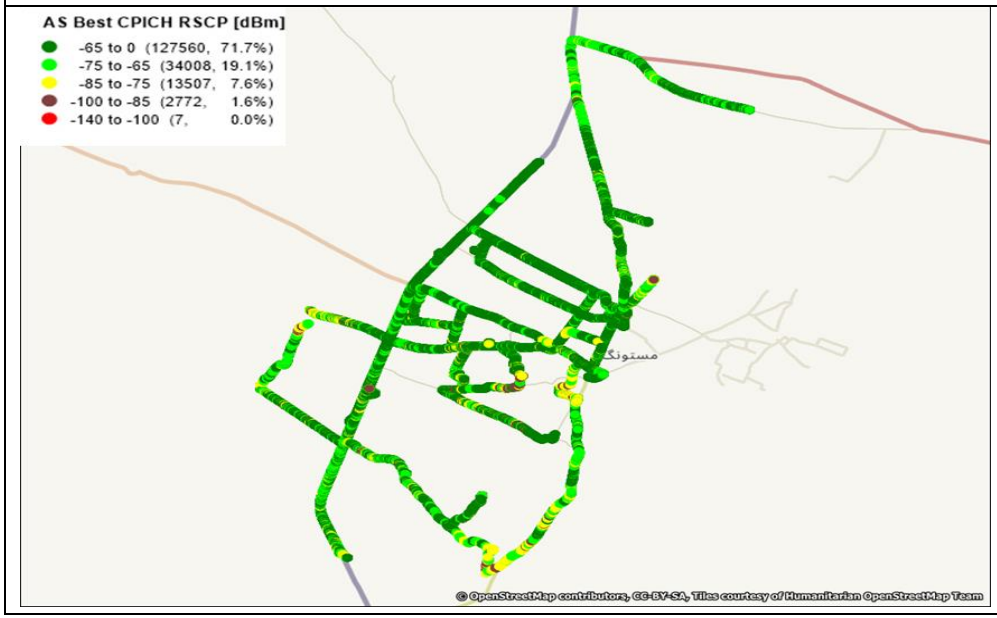
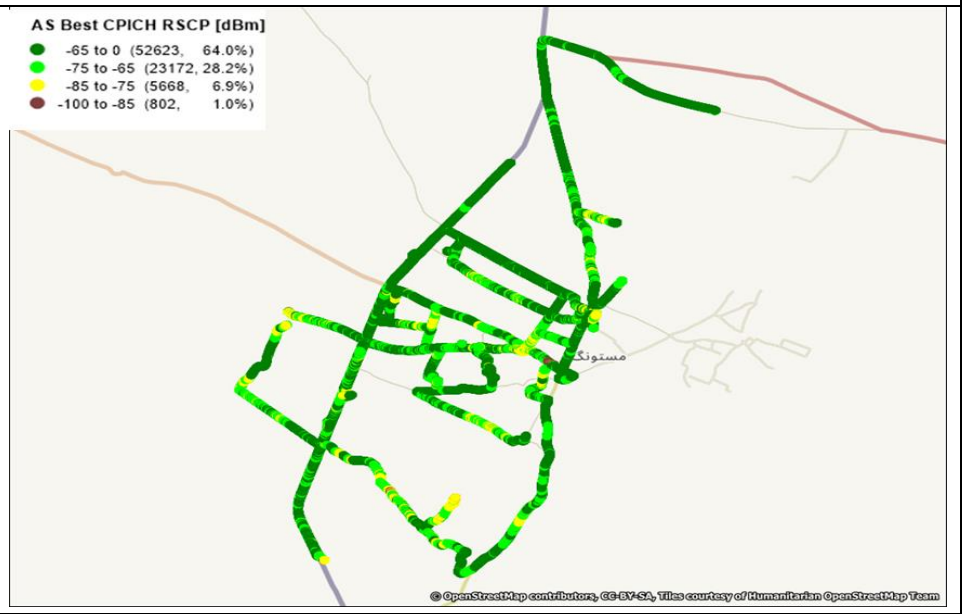




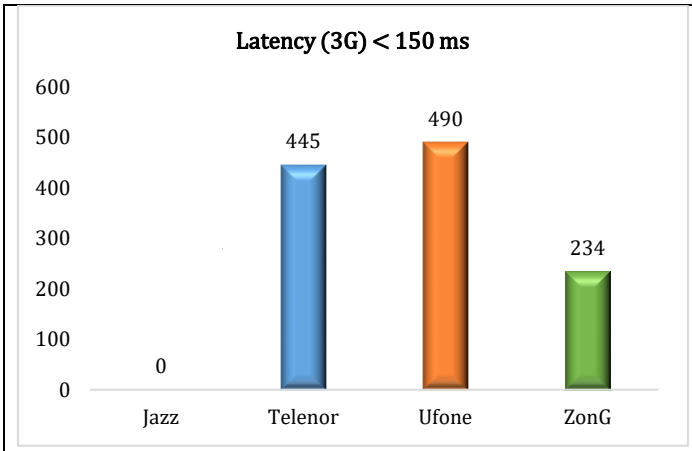


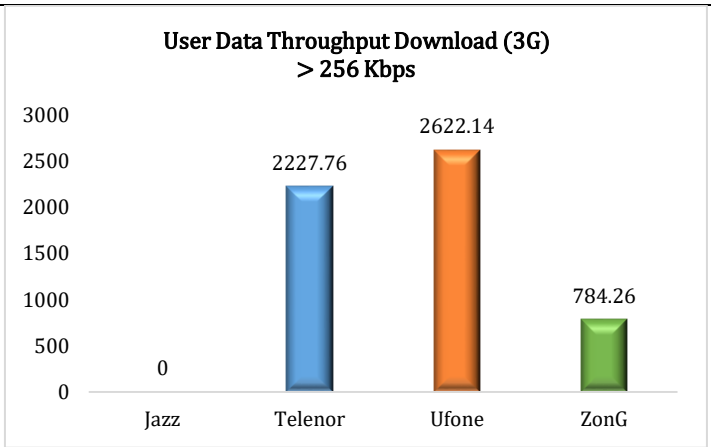


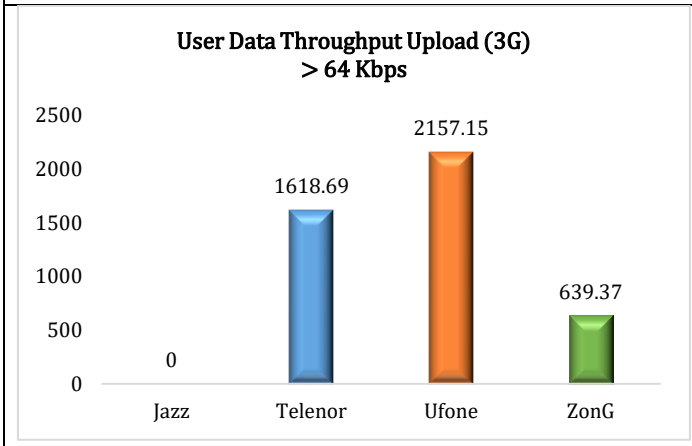
3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

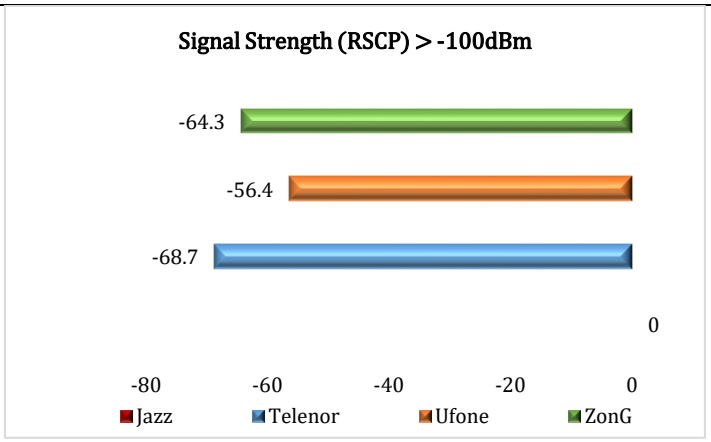
JAZZ 3G NETWORK COVERAGE – MASTUNG	TELENOR 3G NETWORK COVERAGE – MASTUNG
No Coverage	
UFONE 3G NETWORK COVERAGE – MASTUNG	**ZONG 3G NETWORK COVERAGE – MASTUNG**
	

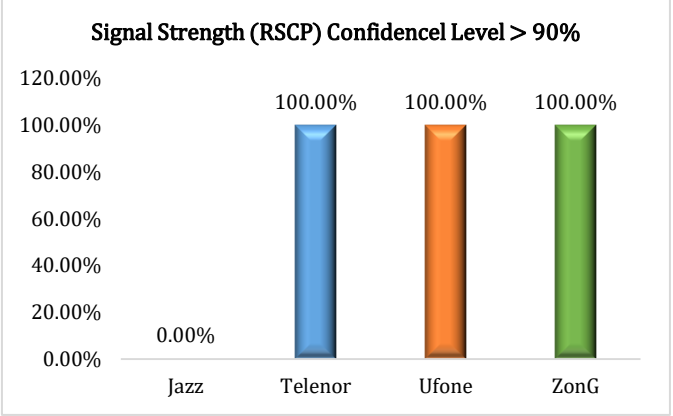
QUALITY OF SERVICE SURVEY RESULTS (3G) – MASTUNG



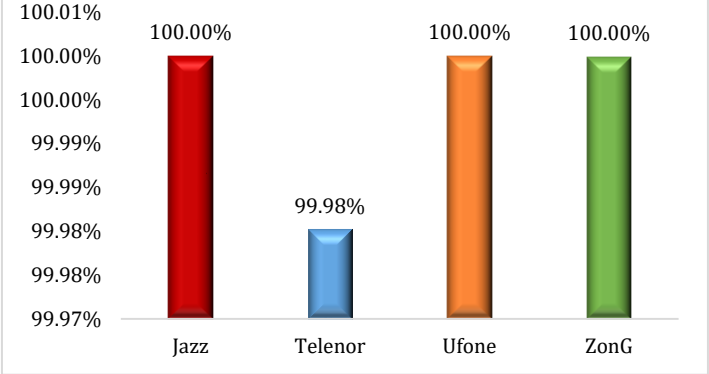


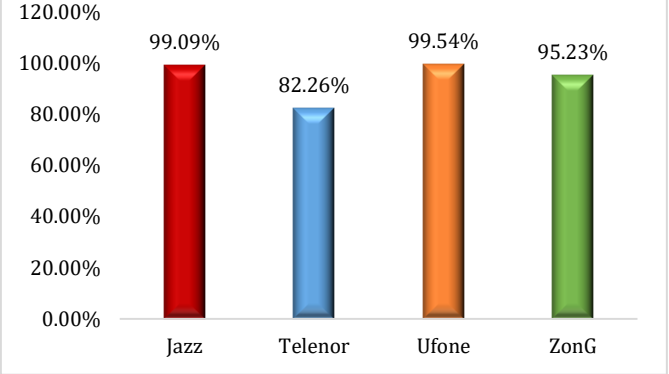


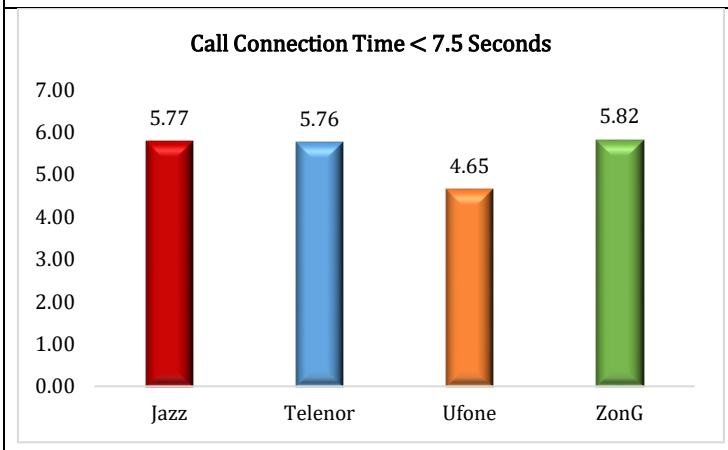


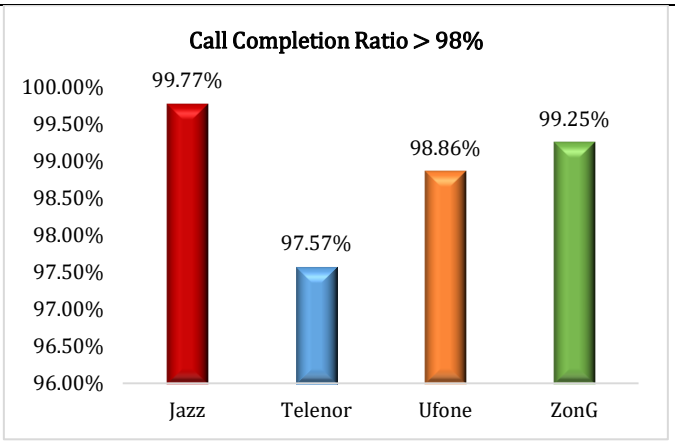


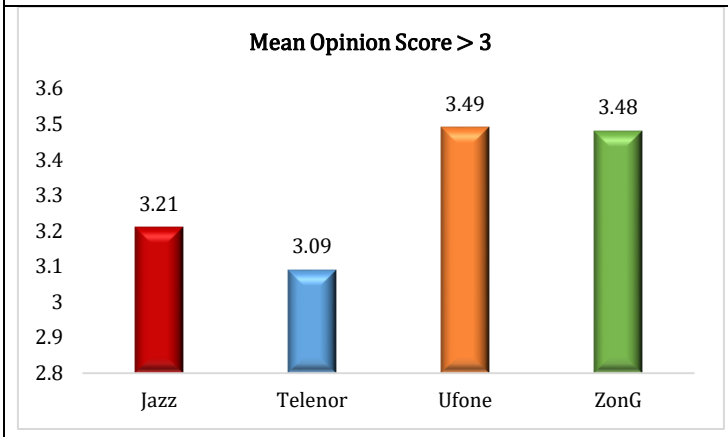
QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – MASTUNG

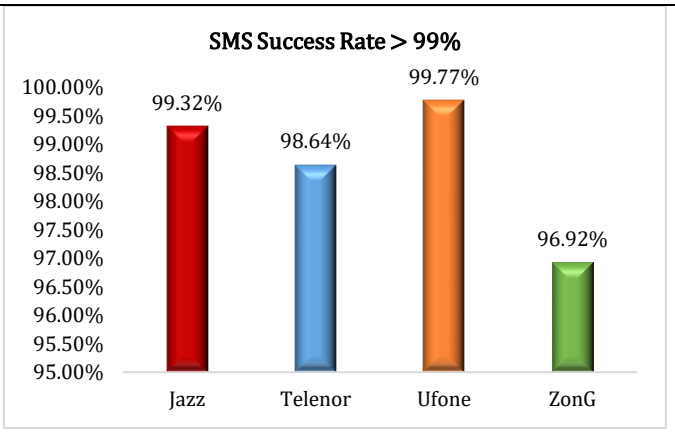


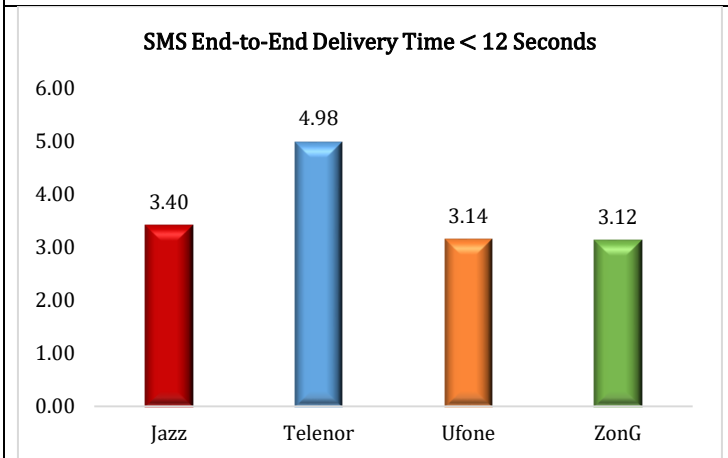






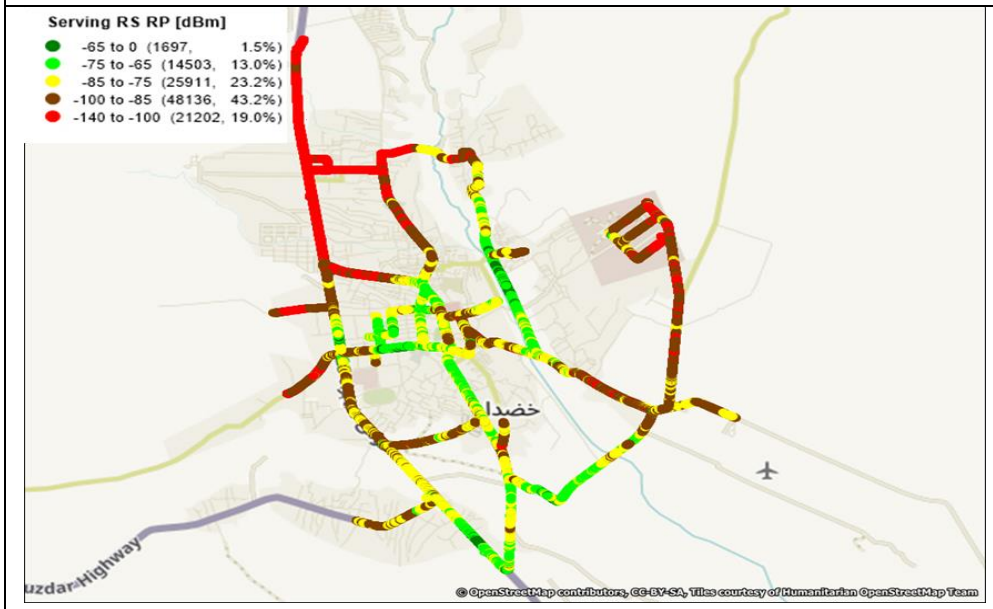




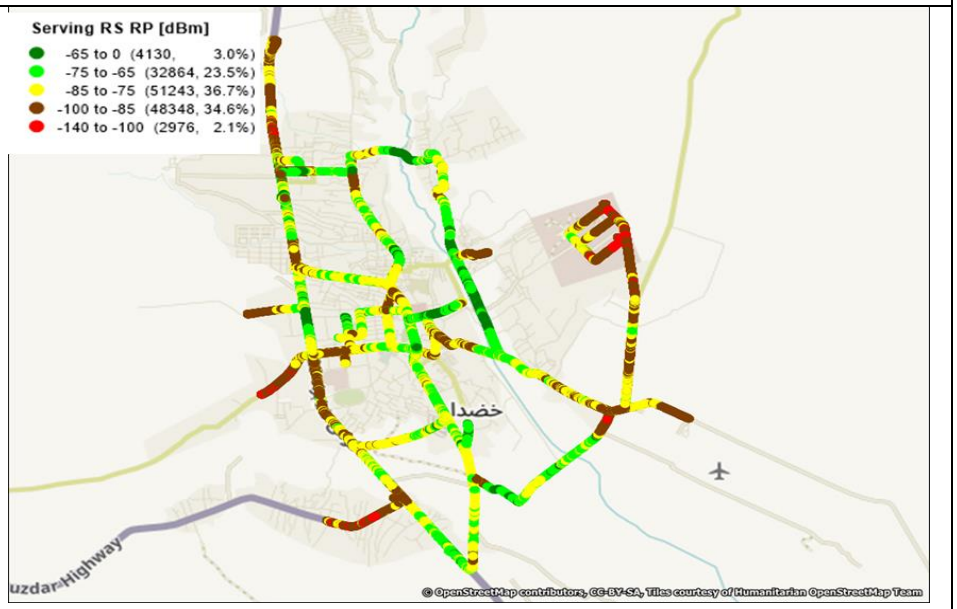


AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

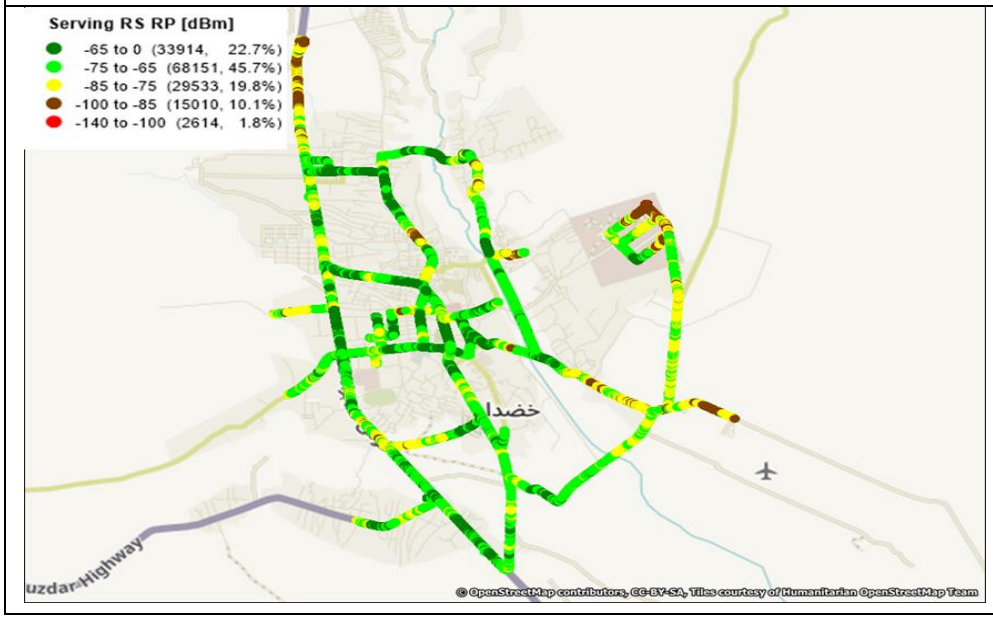
JAZZ 4G NETWORK COVERAGE – KHUZDAR



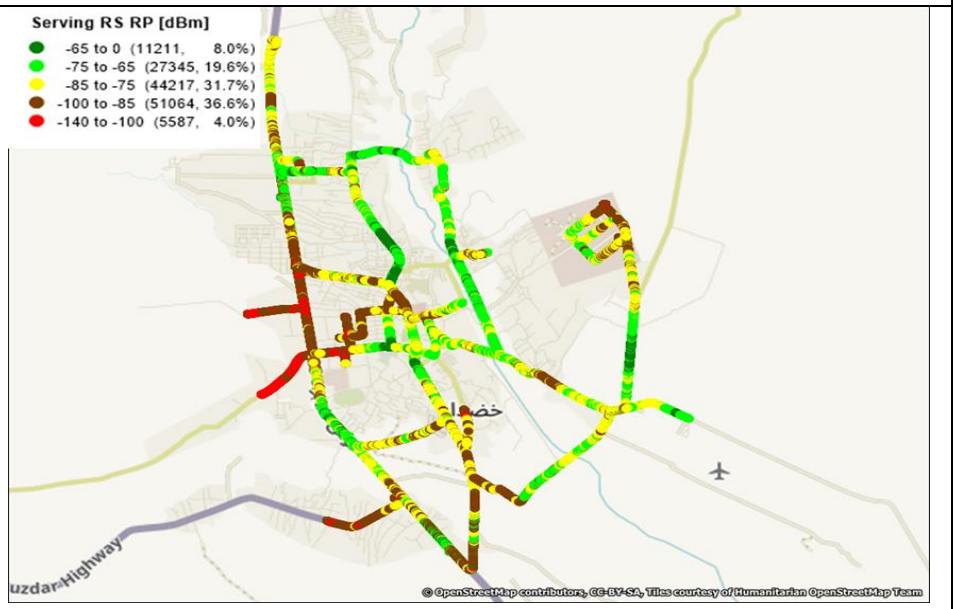
TELENOR 4G NETWORK COVERAGE – KHUZDAR



UFONE 4G NETWORK COVERAGE – KHUZDAR

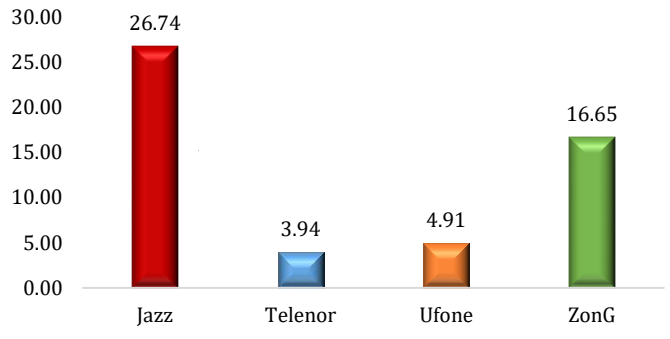


ZONG 4G NETWORK COVERAGE – KHUZDAR



QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – KHUZDAR

User Data Throughput Download - Fixed Duration
> 2 Mbps



User Data Throughput Upload - Fixed Duration
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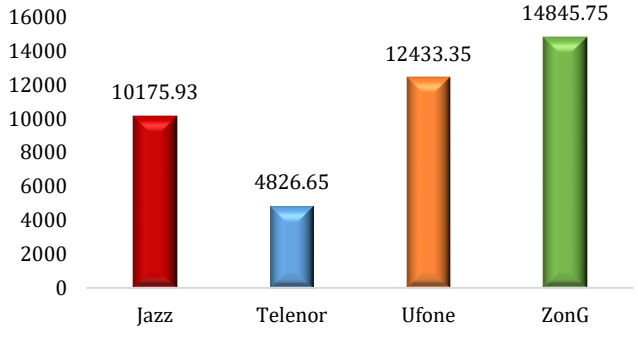

User Data Throughput Download - Fixed Size
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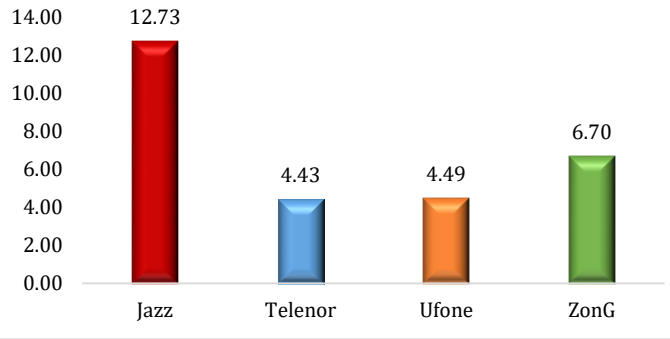

User Data Throughput Upload - Fixed Size
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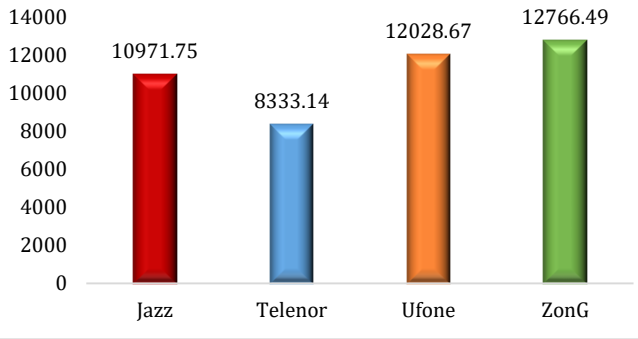
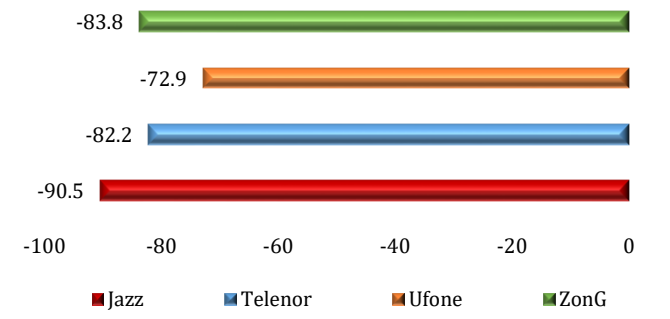
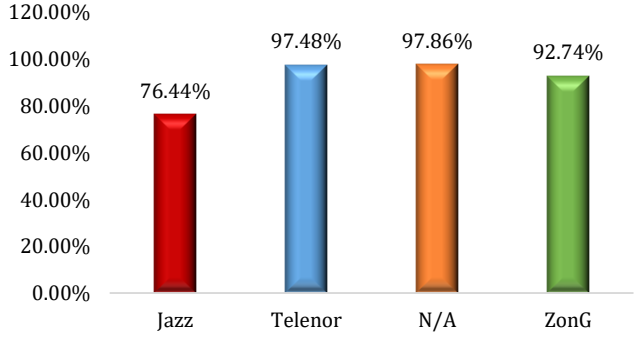


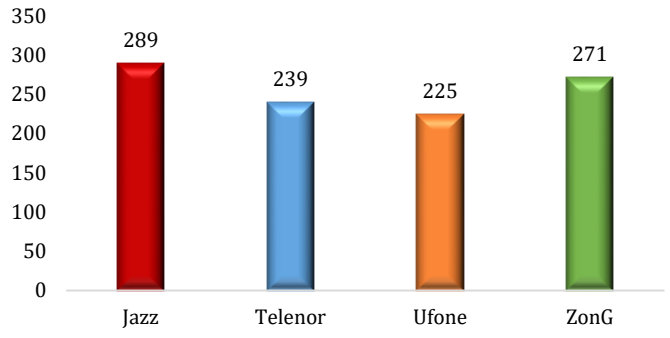
Signal Strength (RSRP) > -100dBm



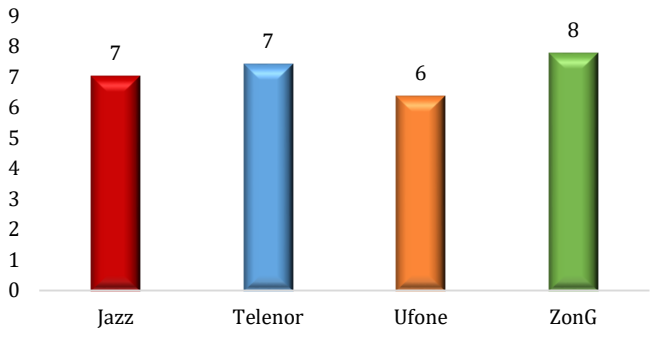
Signal Strength (RSRP) Confidencel Level > 90%



Latency <75 ms

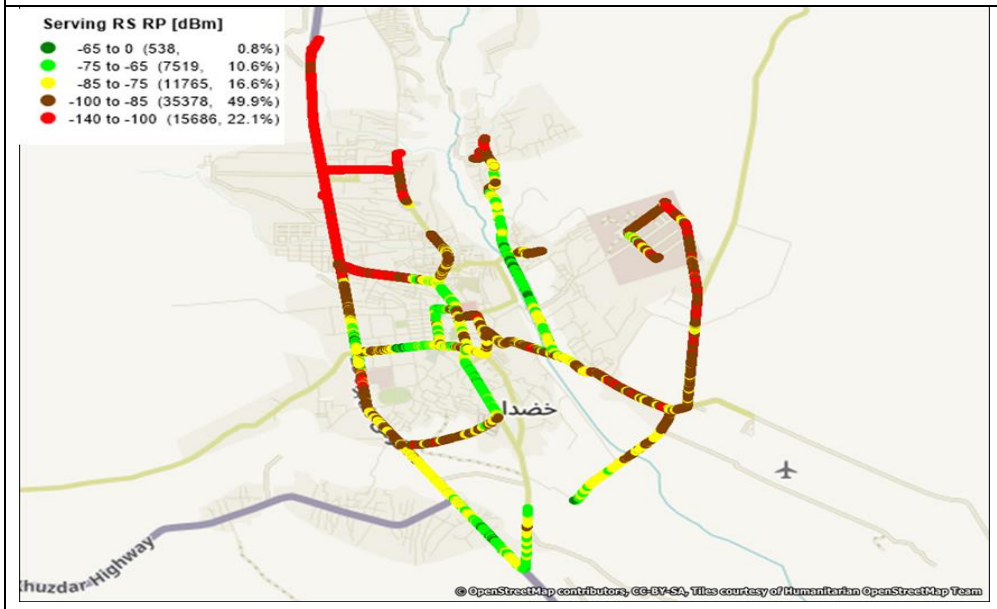


Webpage Loading Time < 5 Seconds

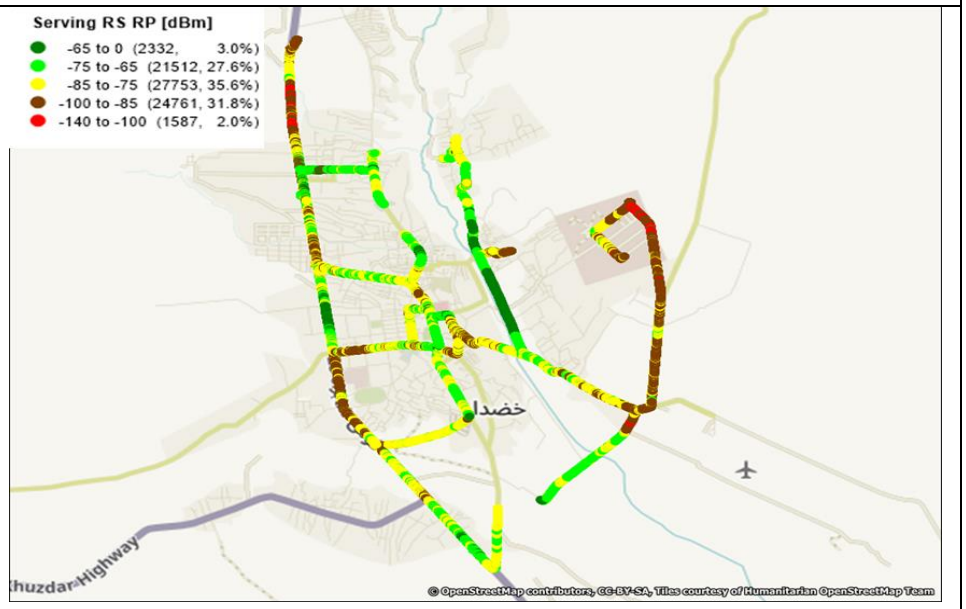


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

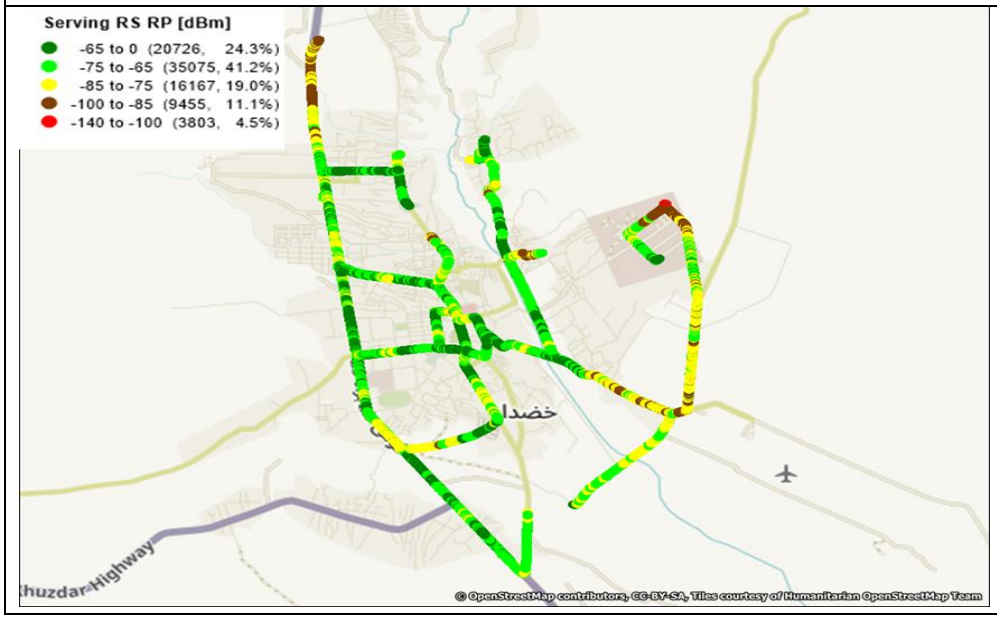
JAZZ 4G NETWORK COVERAGE – KHUZDAR



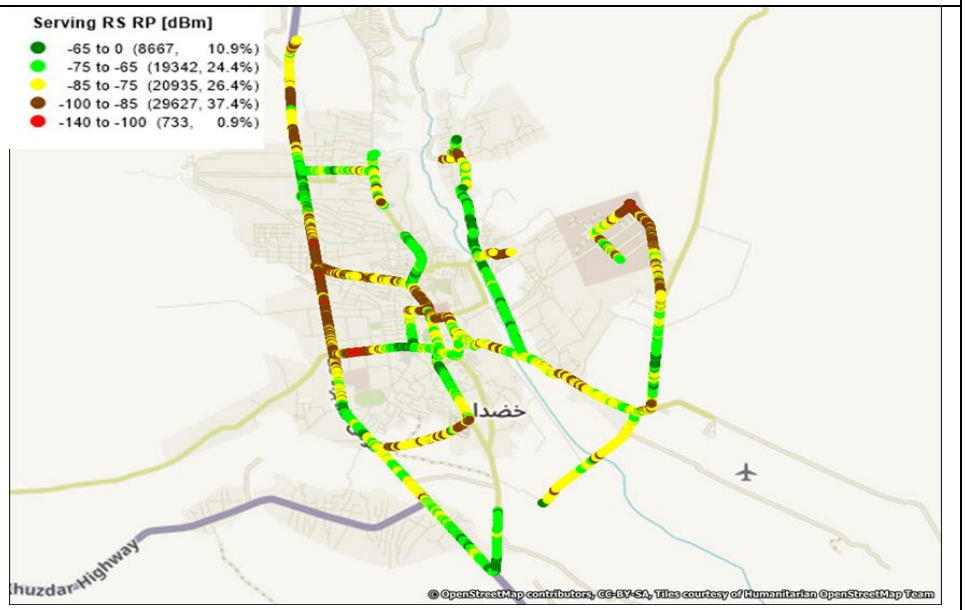
TELENOR 4G NETWORK COVERAGE – KHUZDAR



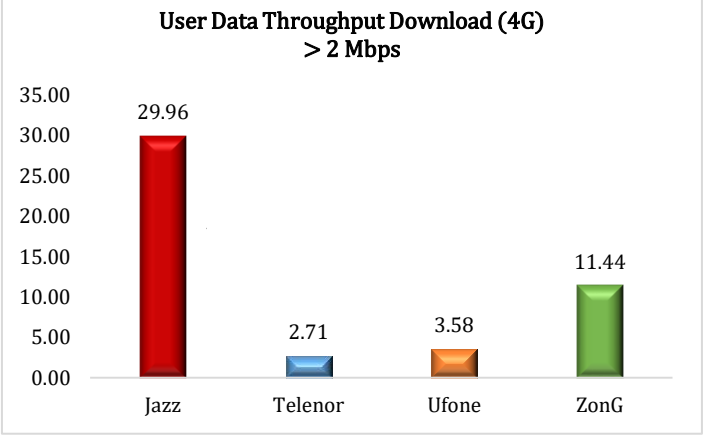
UFONE 4G NETWORK COVERAGE – KHUZDAR

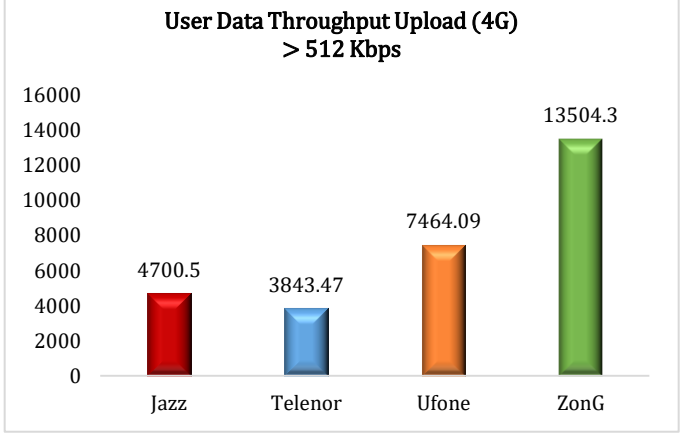


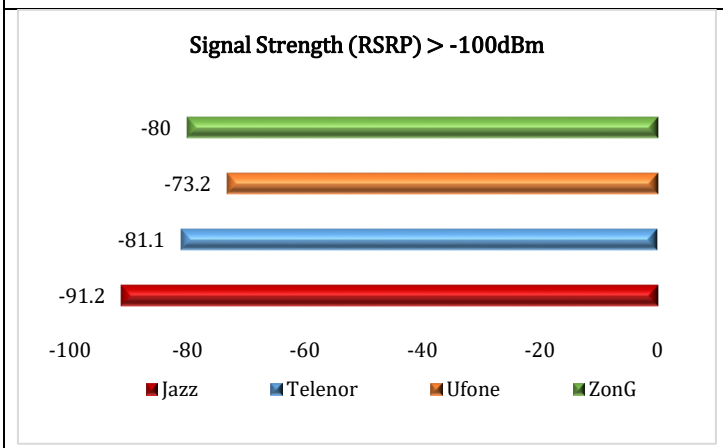
ZONG 4G NETWORK COVERAGE – KHUZDAR

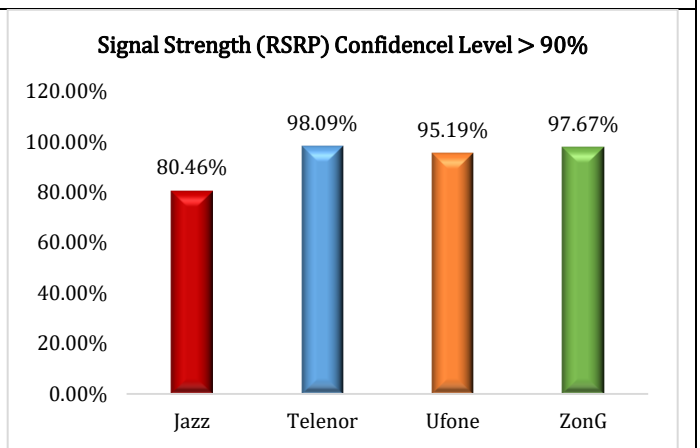


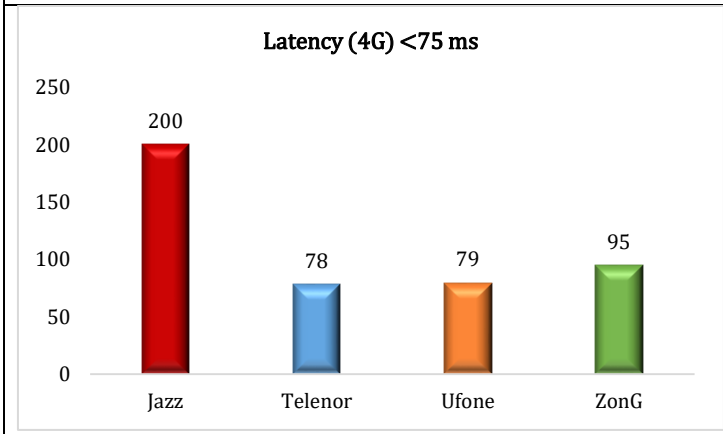
QUALITY OF SERVICE SURVEY RESULTS (4G) – KHUZDAR



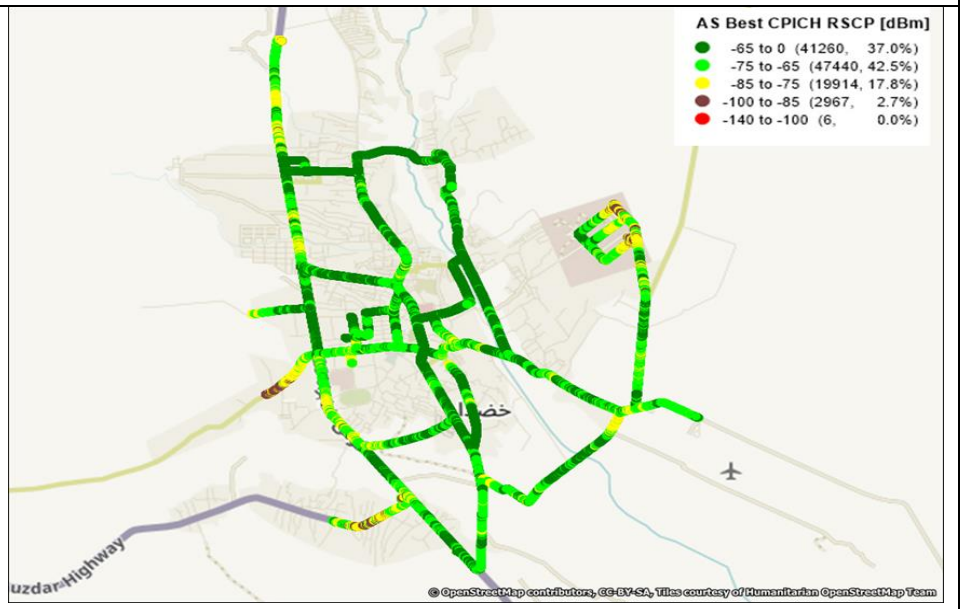
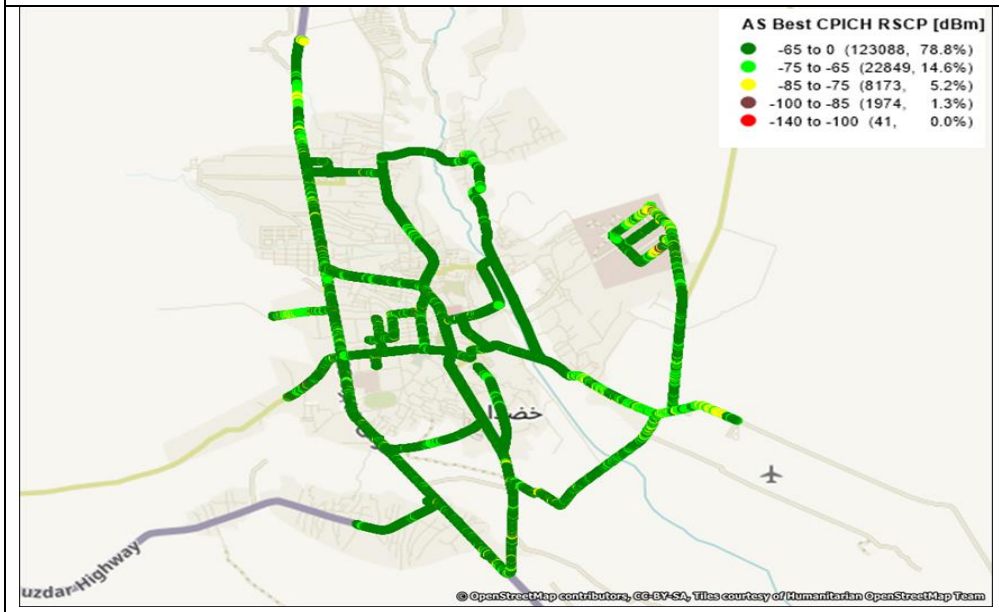
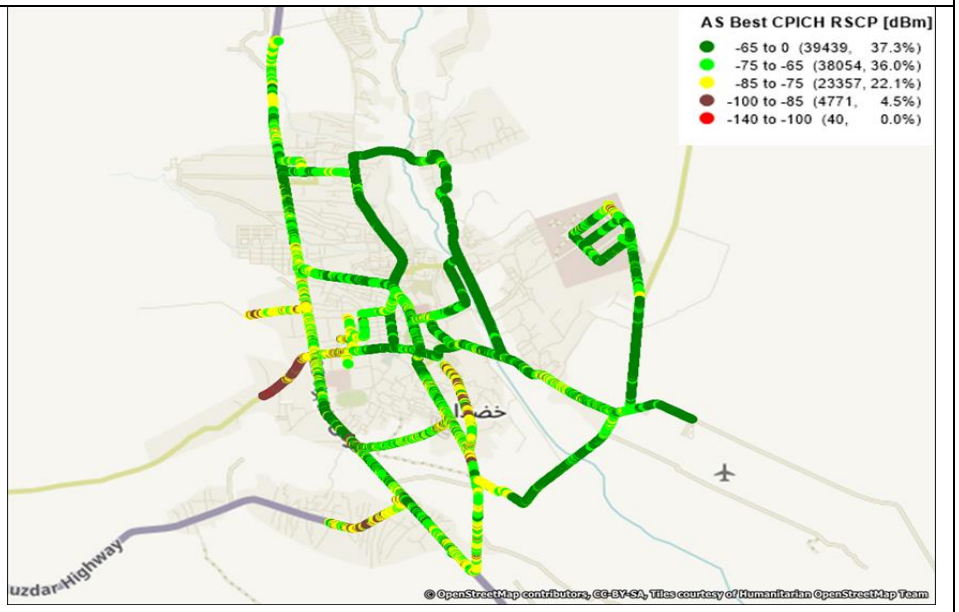




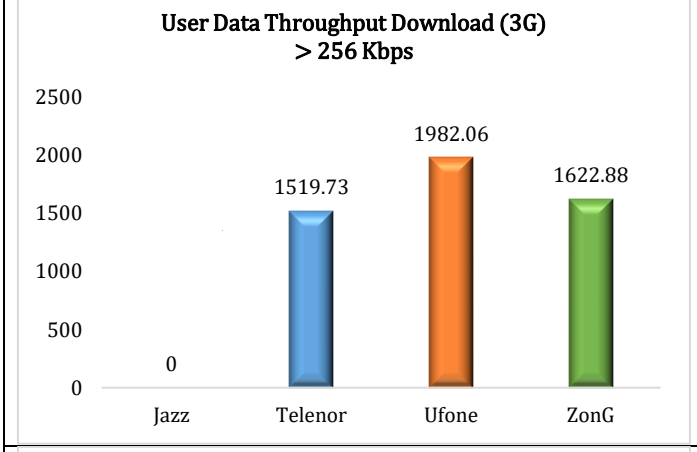


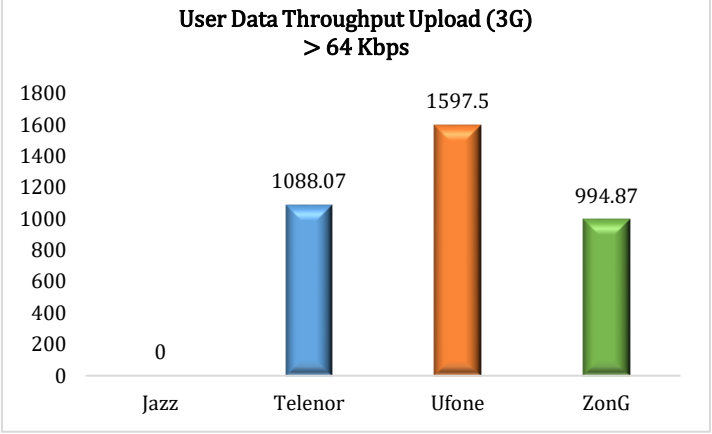


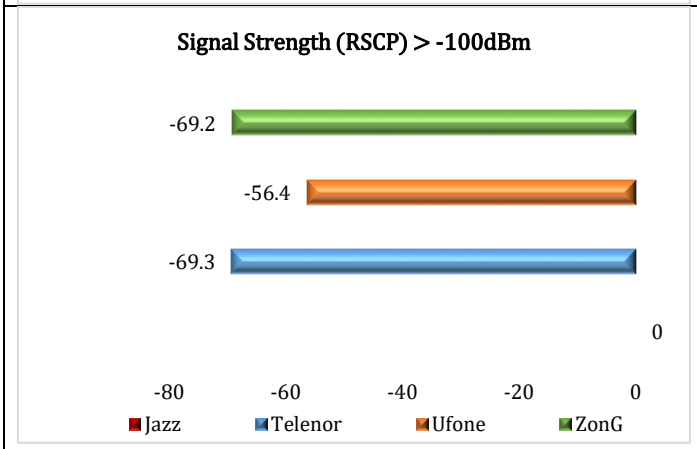
3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

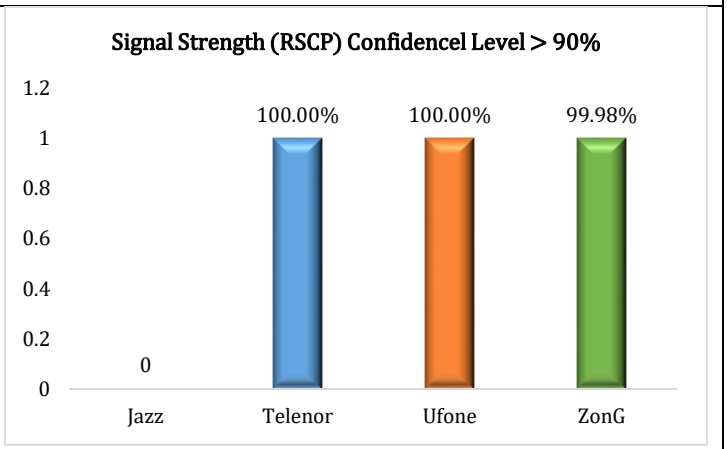
JAZZ 3G NETWORK COVERAGE – KHUZDAR	TELENOR 3G NETWORK COVERAGE – KHUZDAR
No Coverage	
UFONE 3G NETWORK COVERAGE – KHUZDAR	**ZONG 3G NETWORK COVERAGE – KHUZDAR**
	

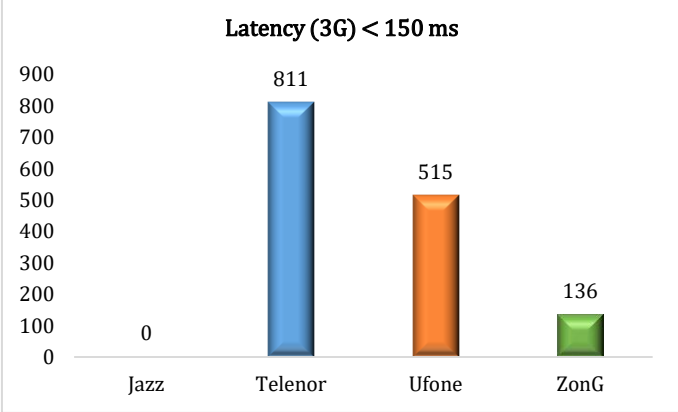
QUALITY OF SERVICE SURVEY RESULTS (3G) – KHUZDAR



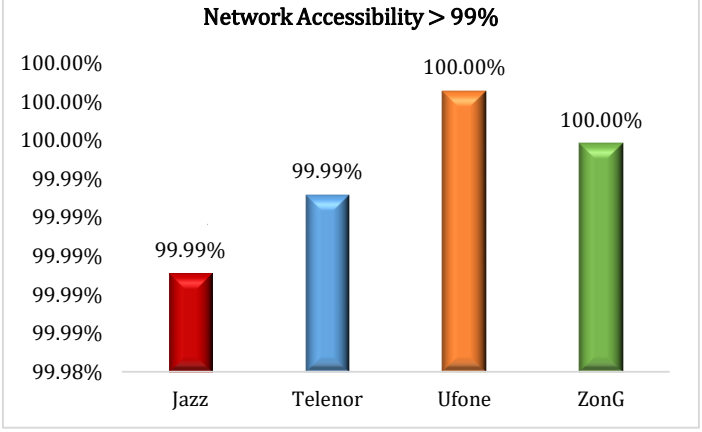


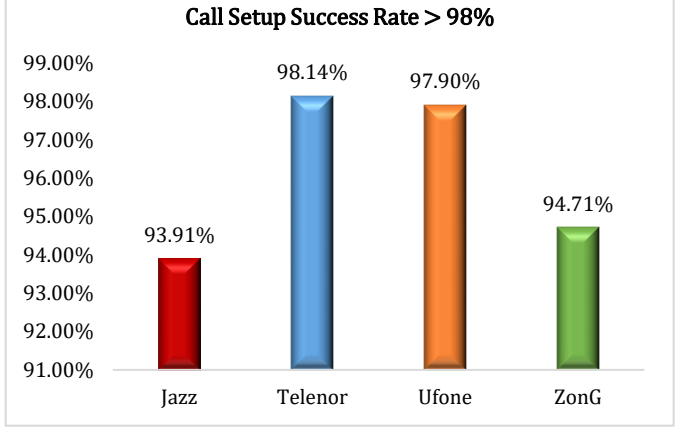


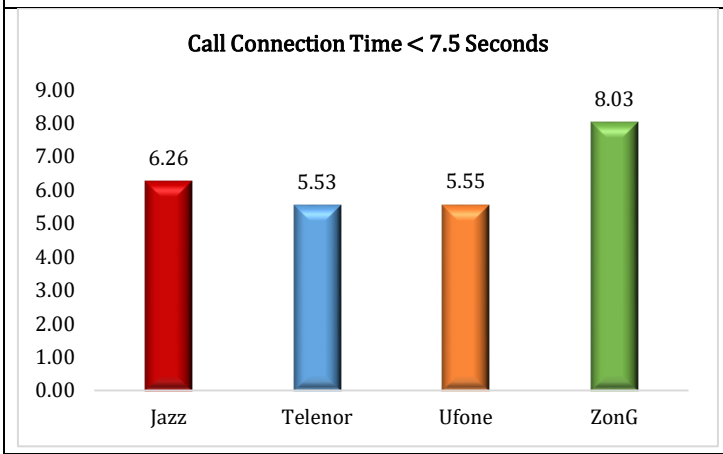


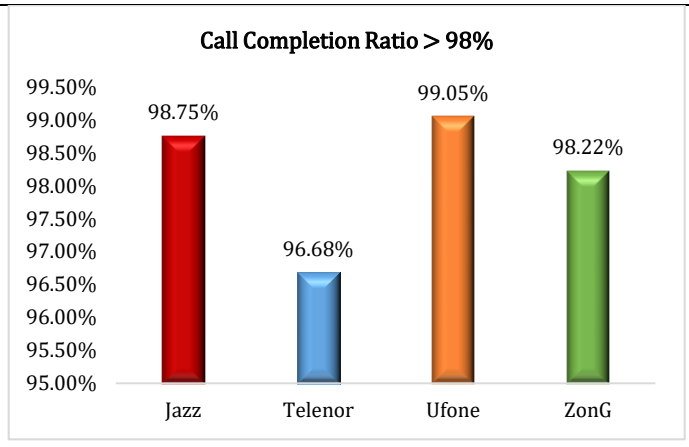


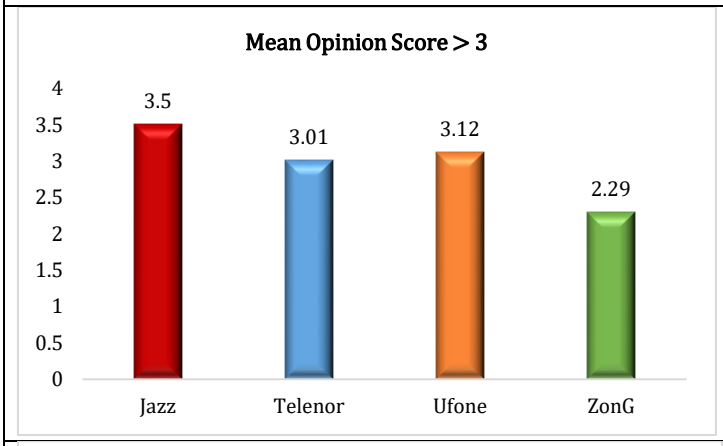
QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – KHUZDAR

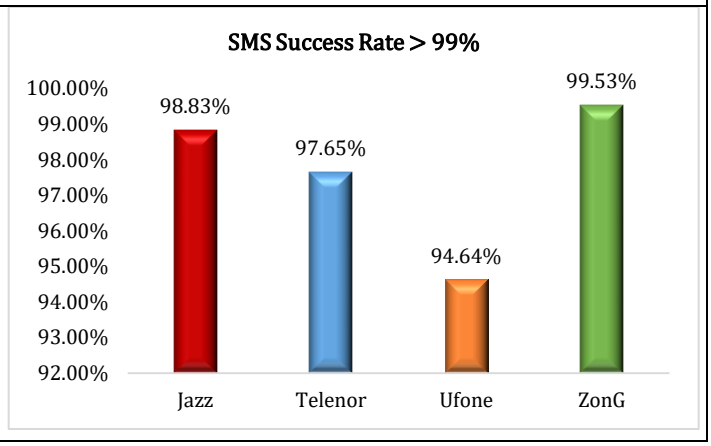


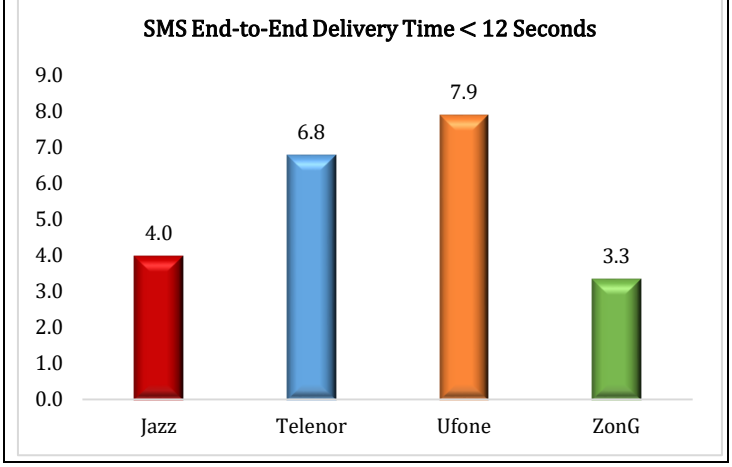






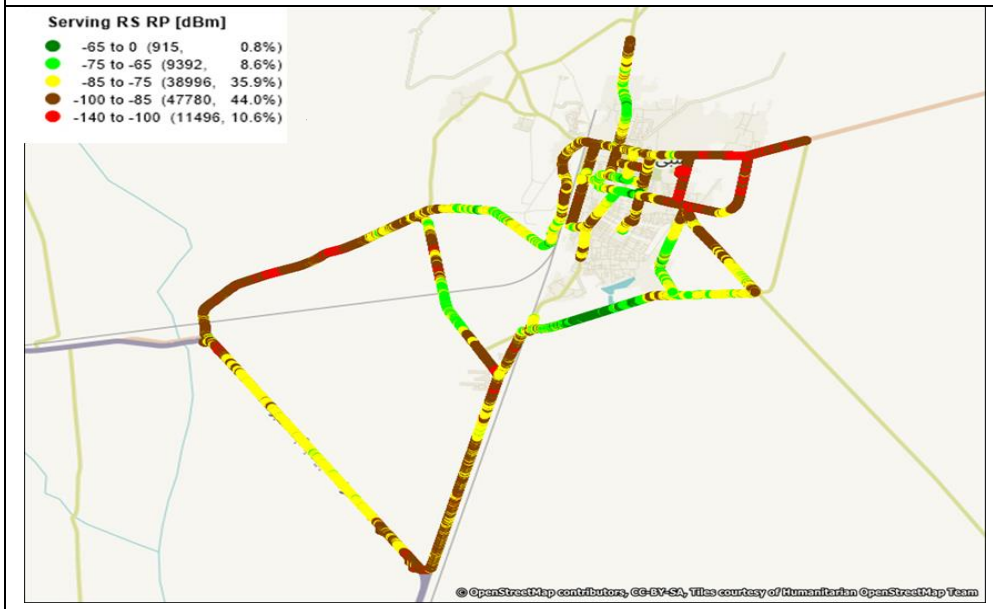




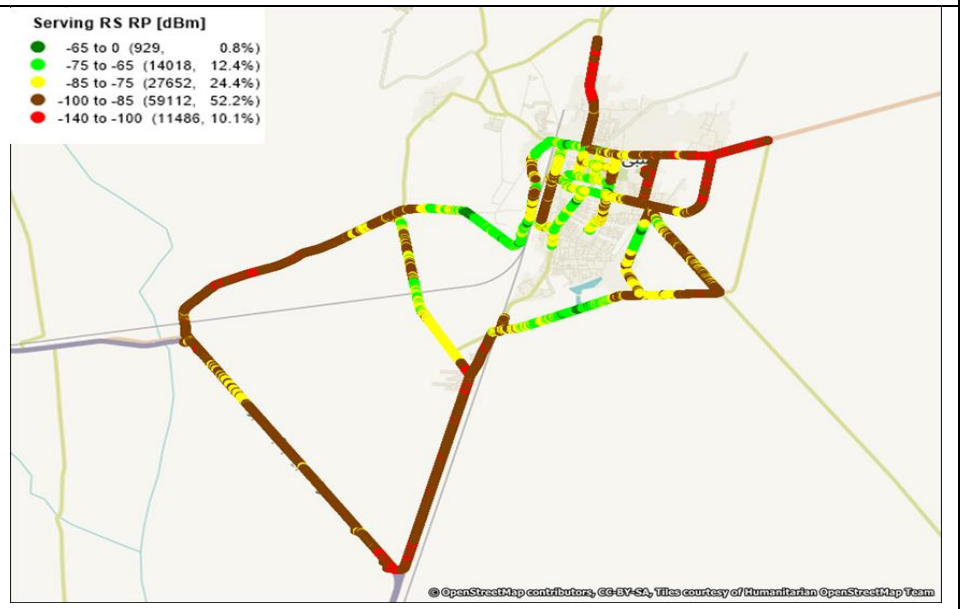


AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

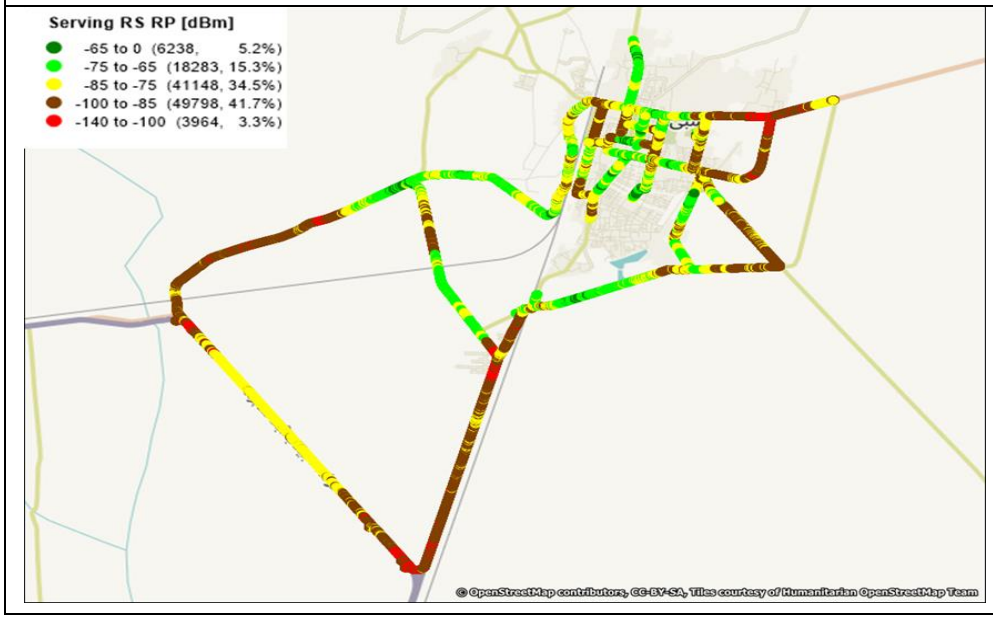
JAZZ 4G NETWORK COVERAGE – SIBBI



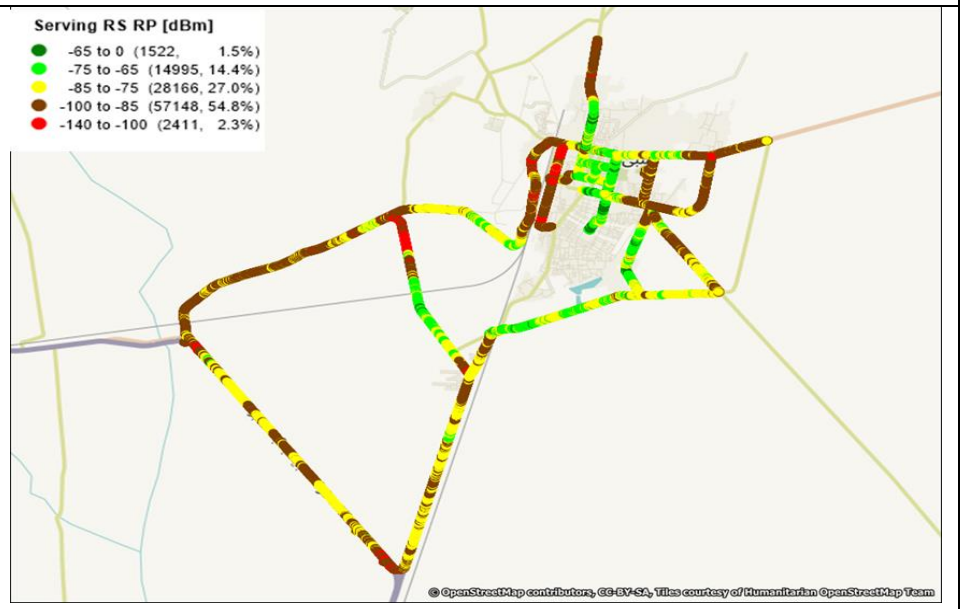
TELENOR 4G NETWORK COVERAGE – SIBBI



UFONE 4G NETWORK COVERAGE – SIBBI

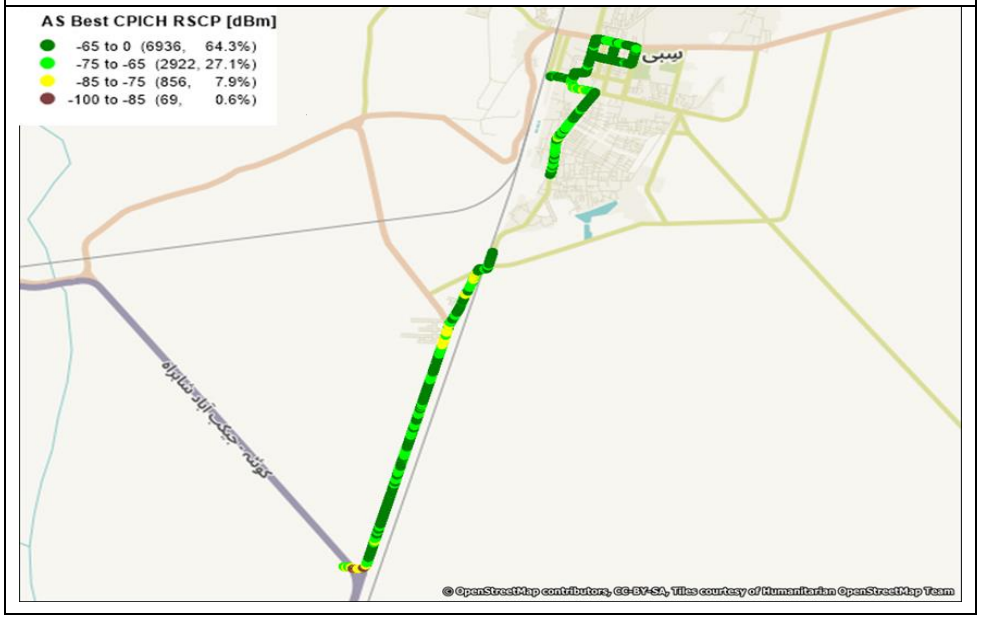


ZONG 4G NETWORK COVERAGE – SIBBI

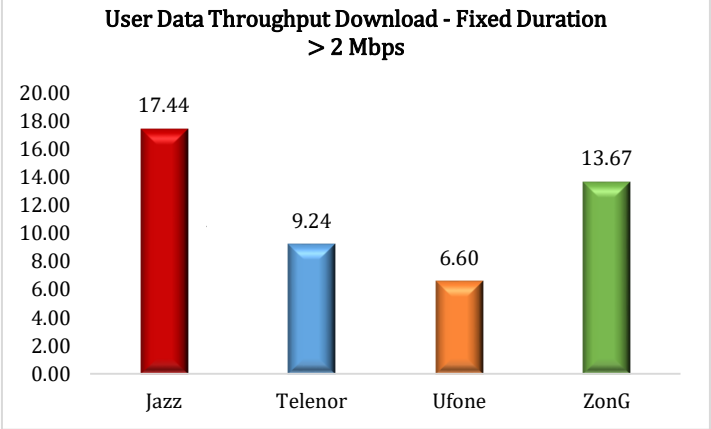


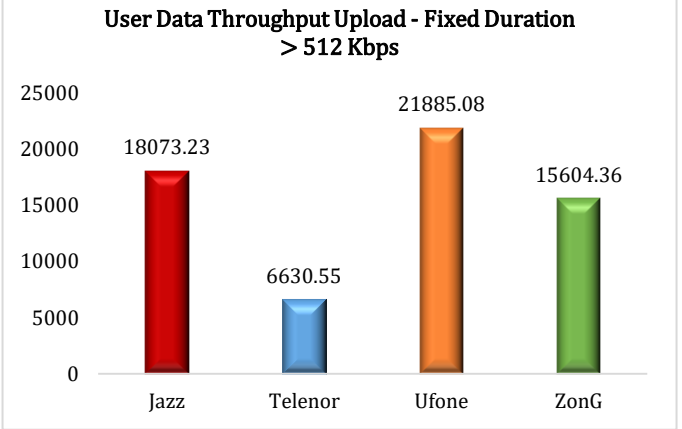
AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

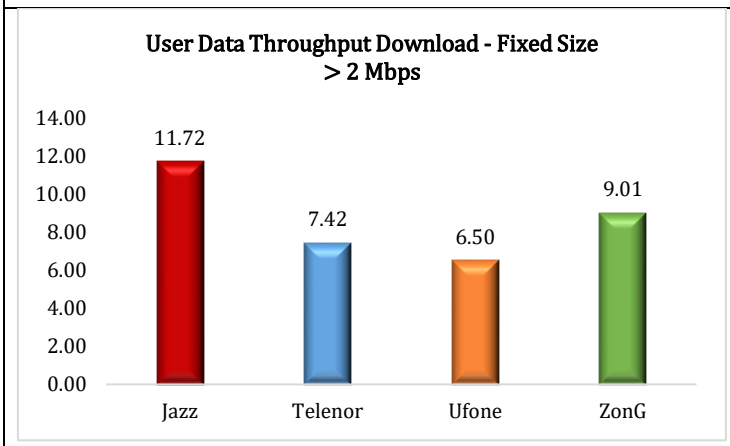
ZONG 3G NETWORK COVERAGE – SIBBI

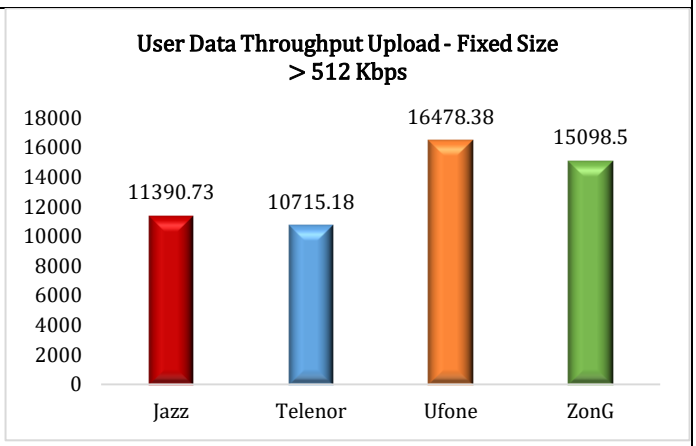


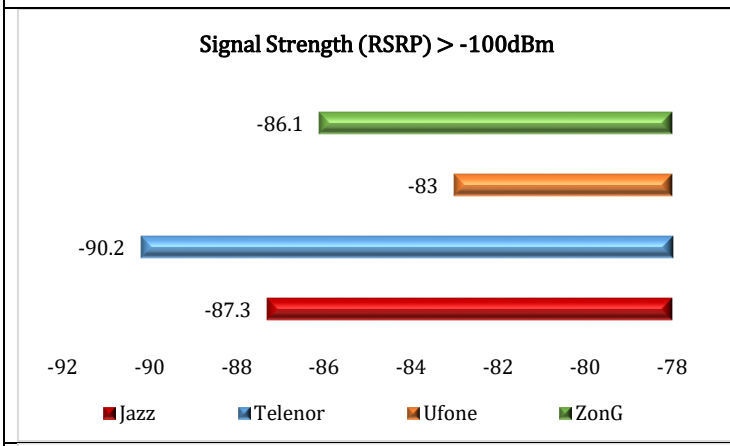
QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – SIBBI

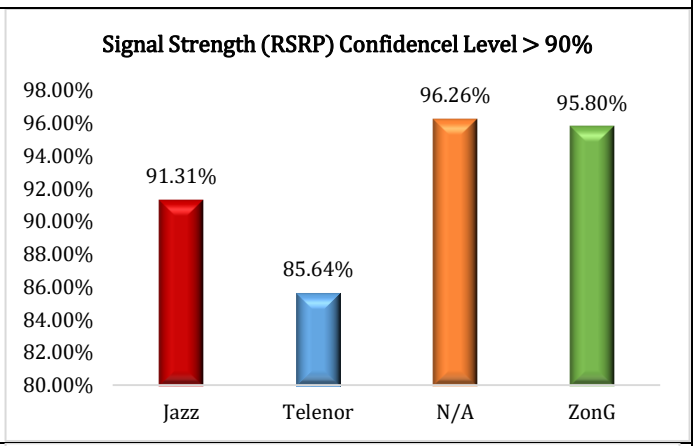


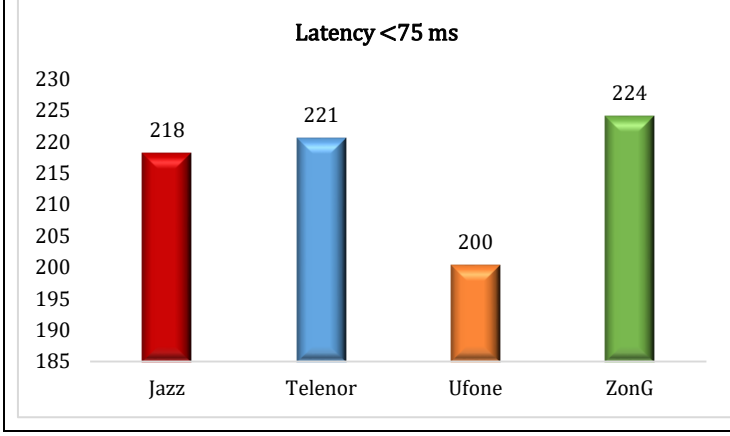


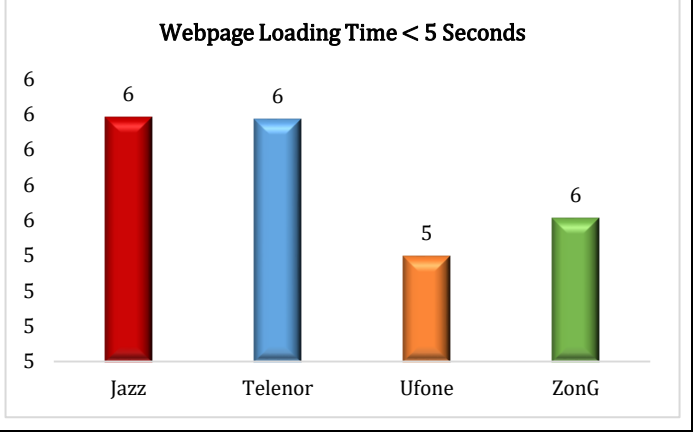






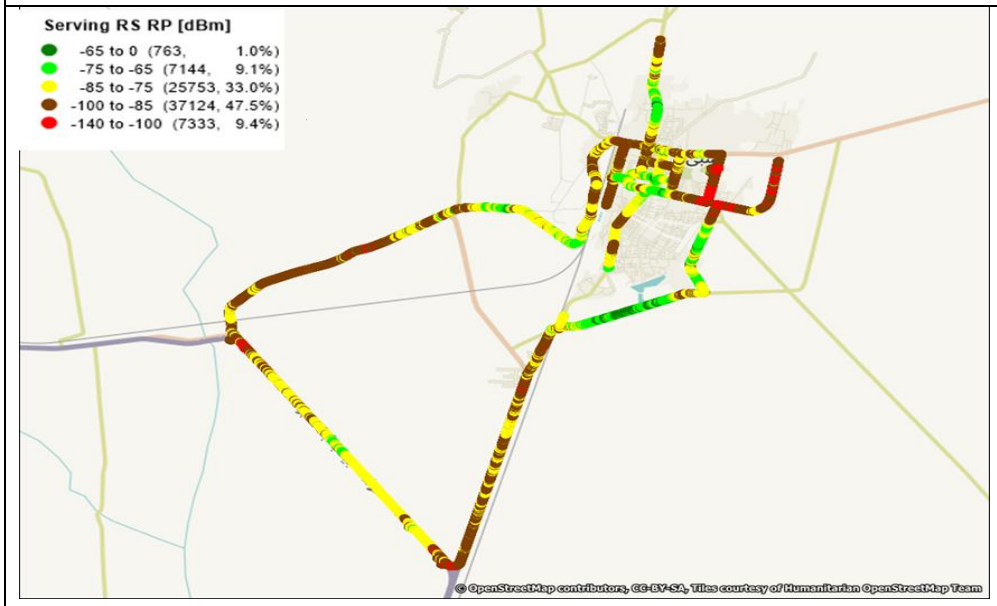




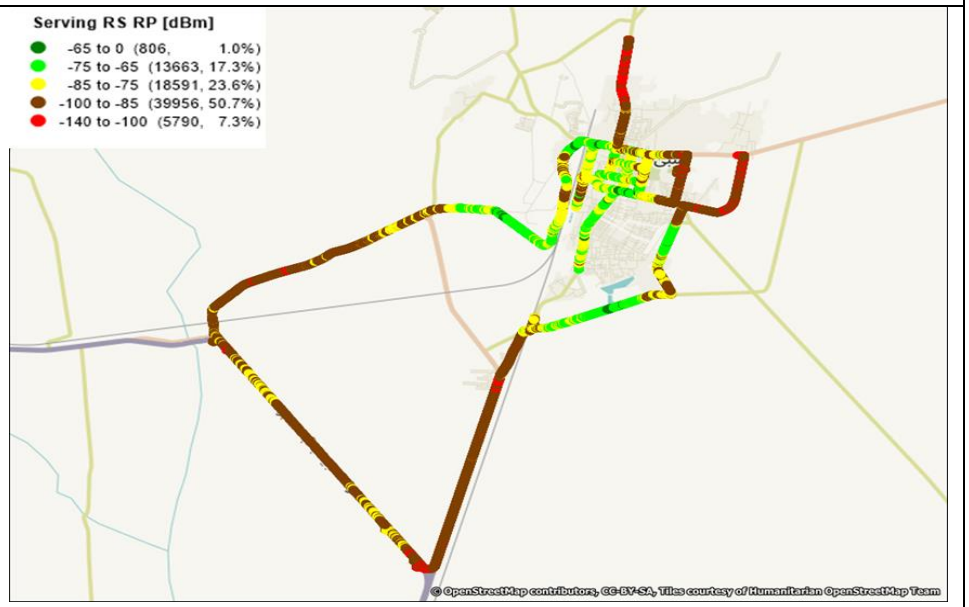


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

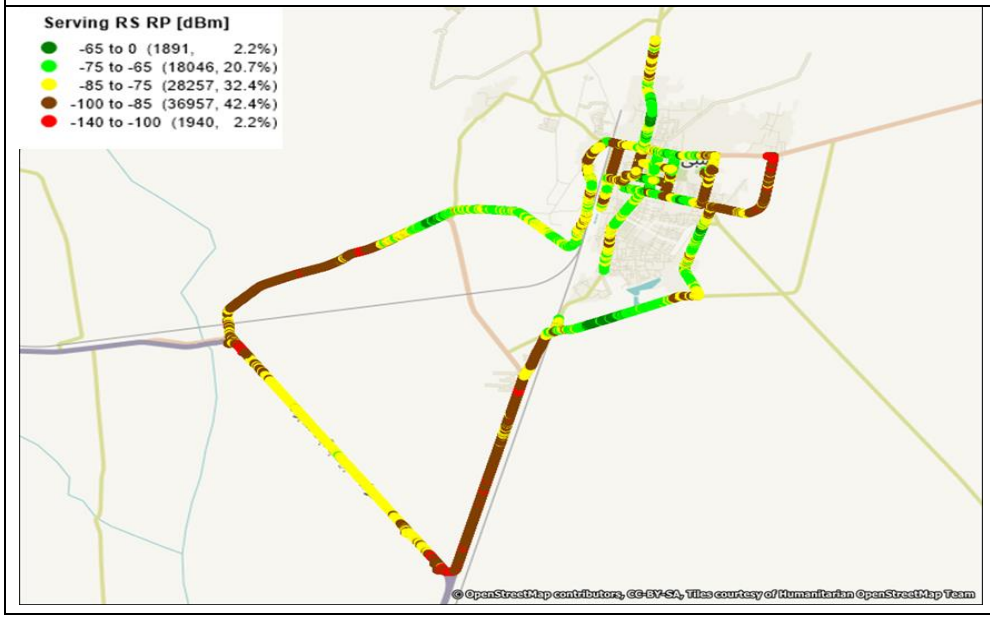
JAZZ 4G NETWORK COVERAGE – SIBBI



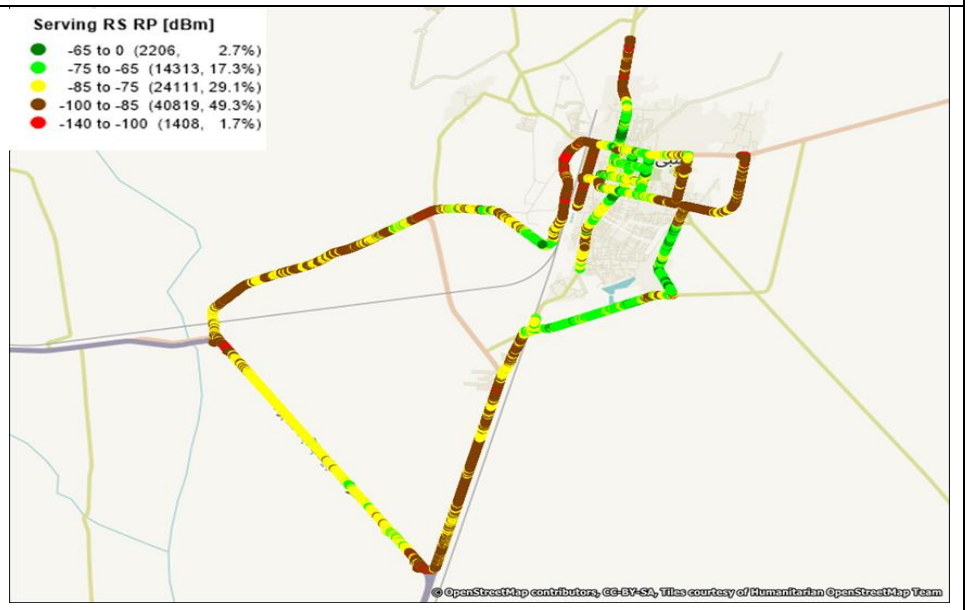
TELENOR 4G NETWORK COVERAGE – SIBBI



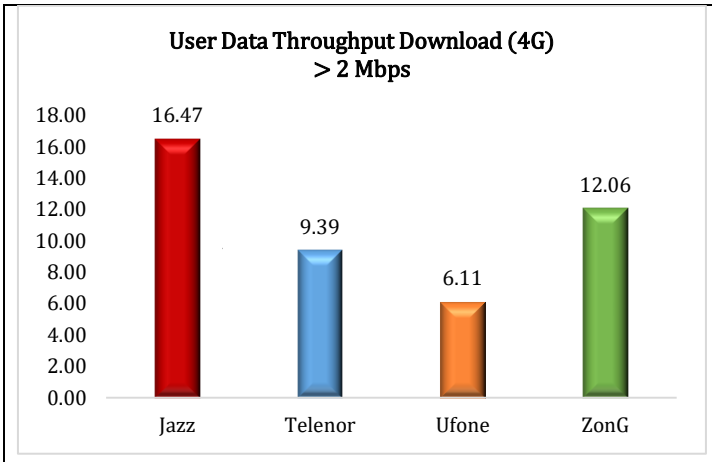
UFONE 4G NETWORK COVERAGE – SIBBI

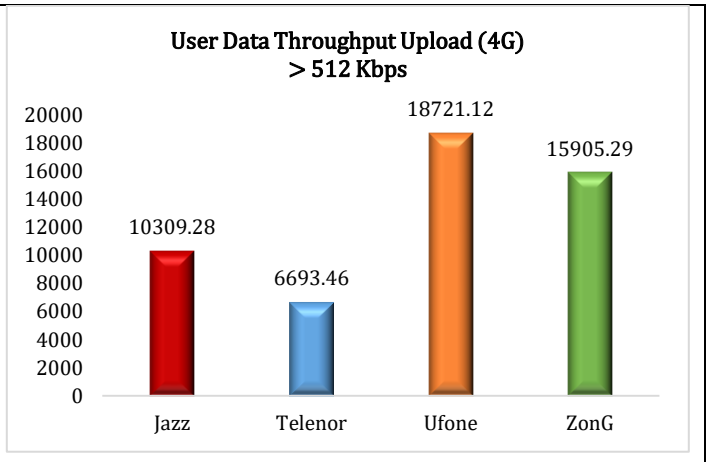


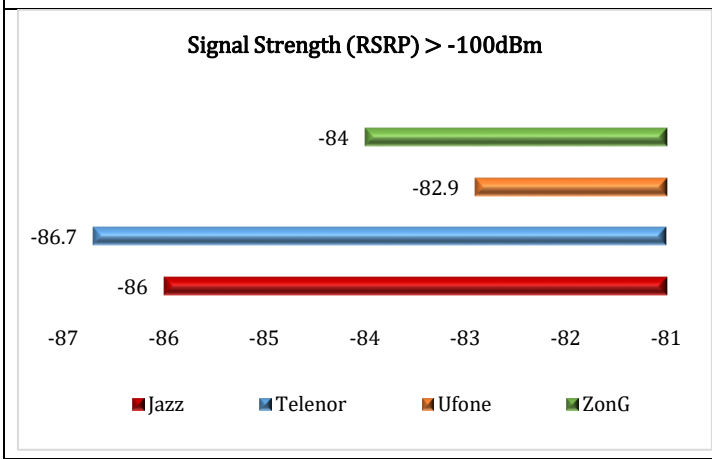
ZONG 4G NETWORK COVERAGE – SIBBI

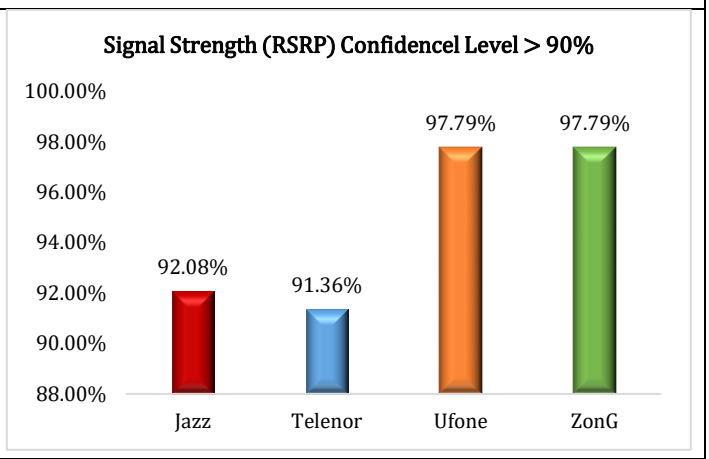


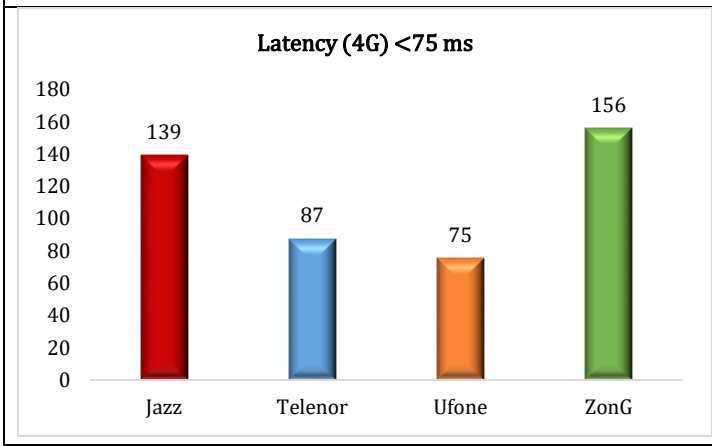
QUALITY OF SERVICE SURVEY RESULTS (4G) – SIBBI





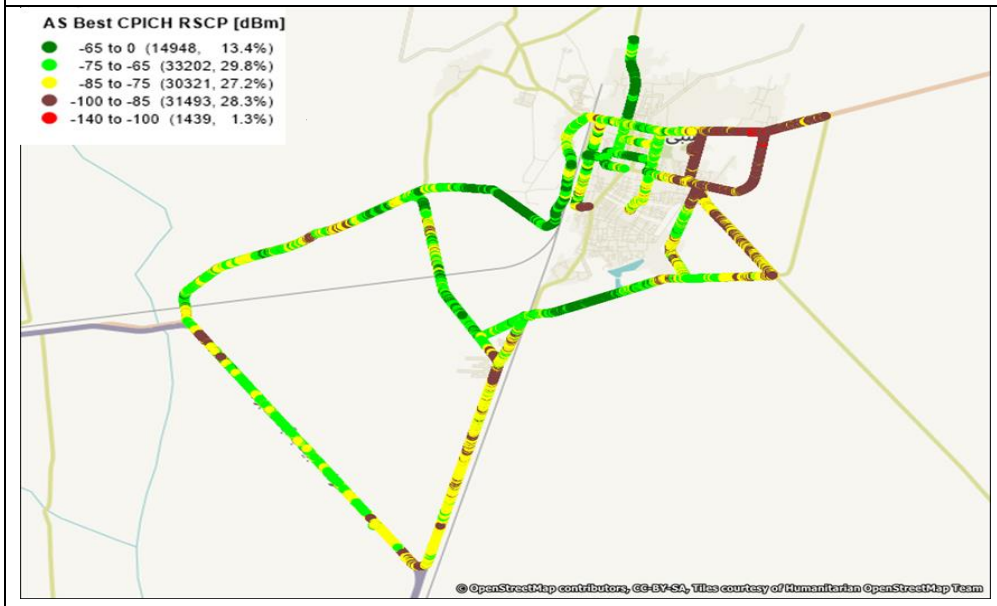




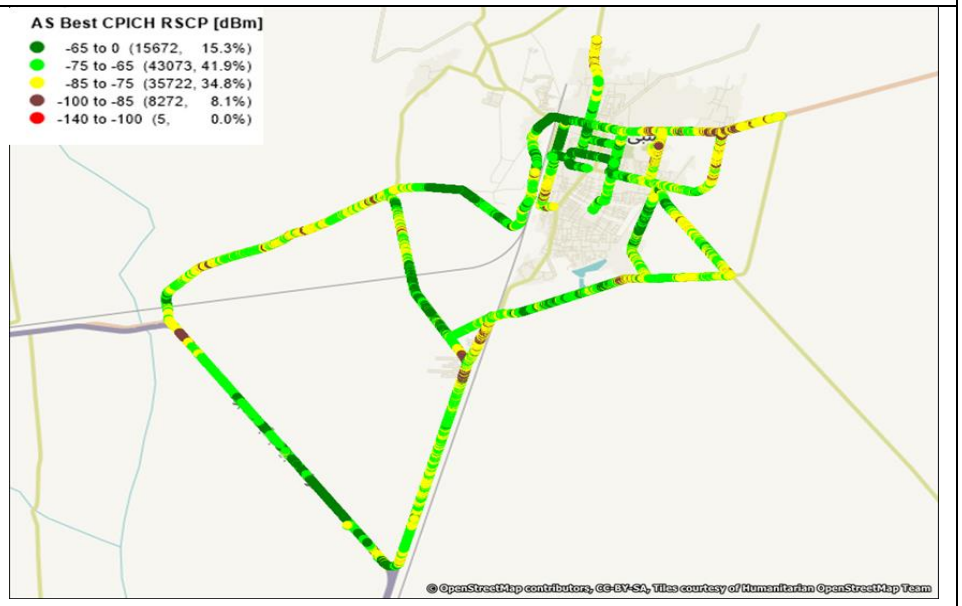


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

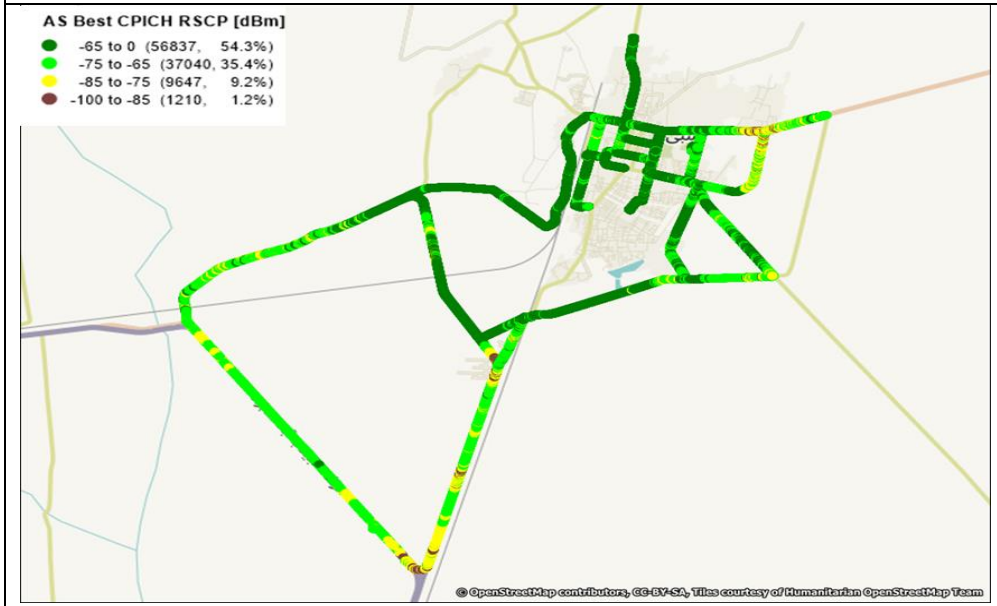
JAZZ 3G NETWORK COVERAGE – SIBBI



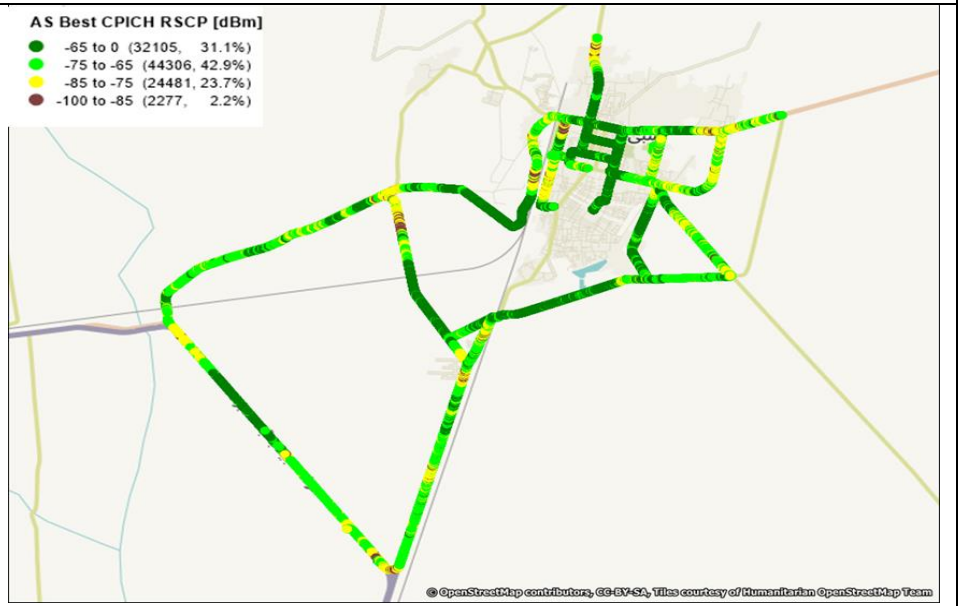
TELENOR 3G NETWORK COVERAGE – SIBBI



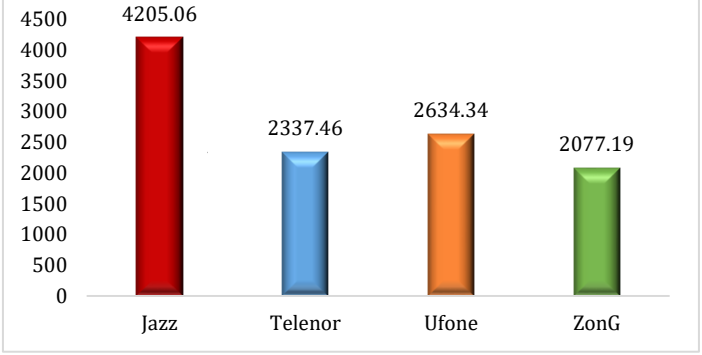
UFONE 3G NETWORK COVERAGE – SIBBI

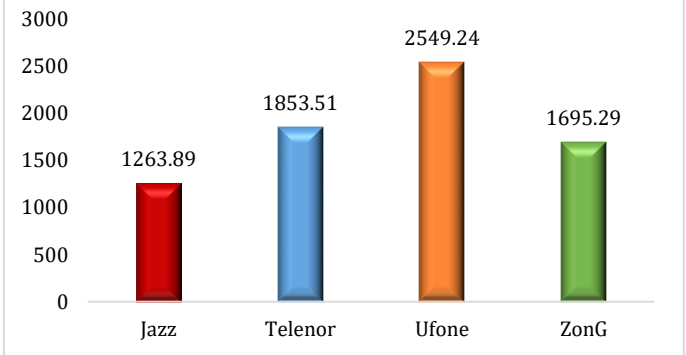


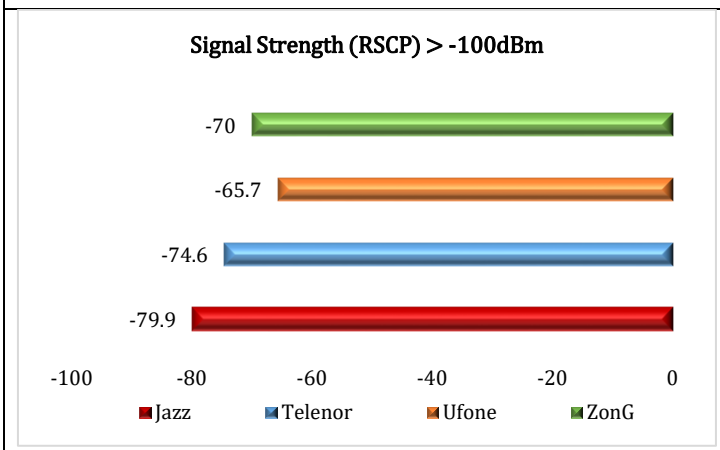
ZONG 3G NETWORK COVERAGE – SIBBI

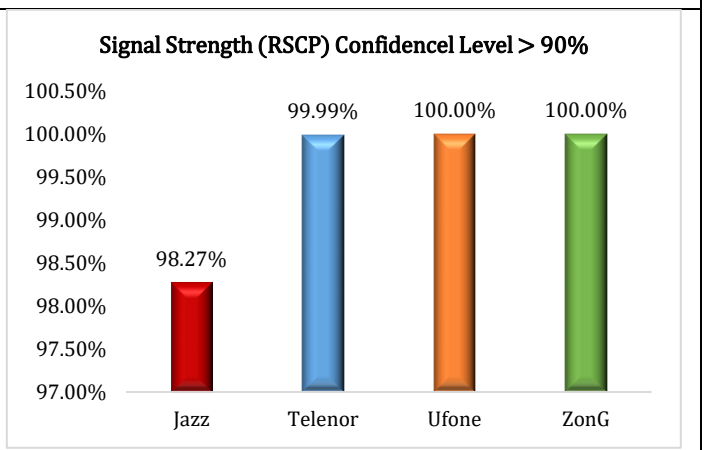


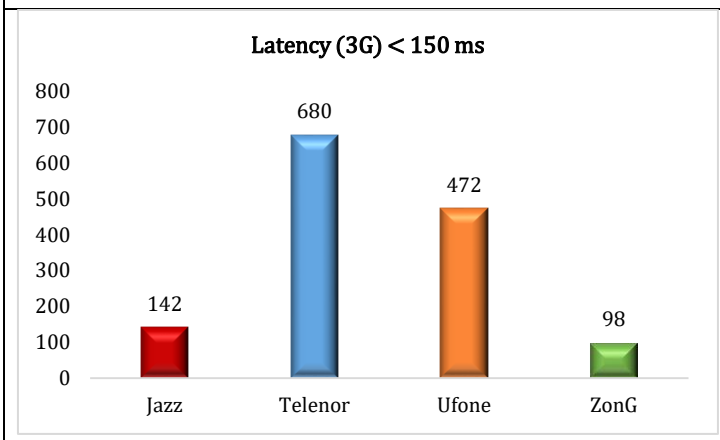
QUALITY OF SERVICE SURVEY RESULTS (3G) – SIBBI



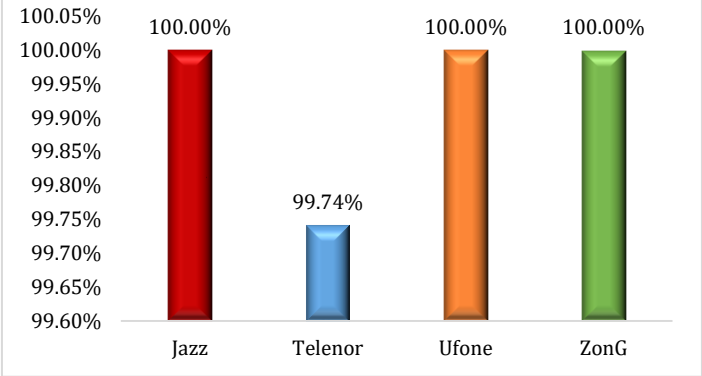


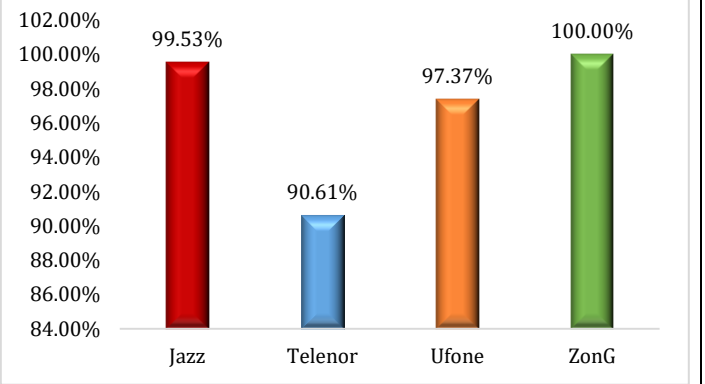


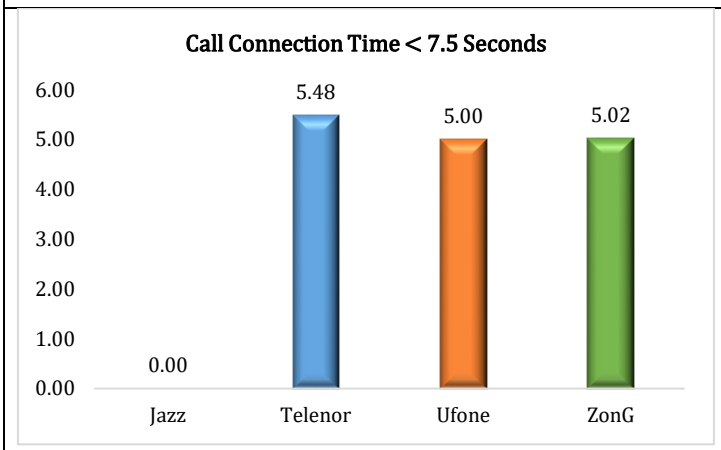


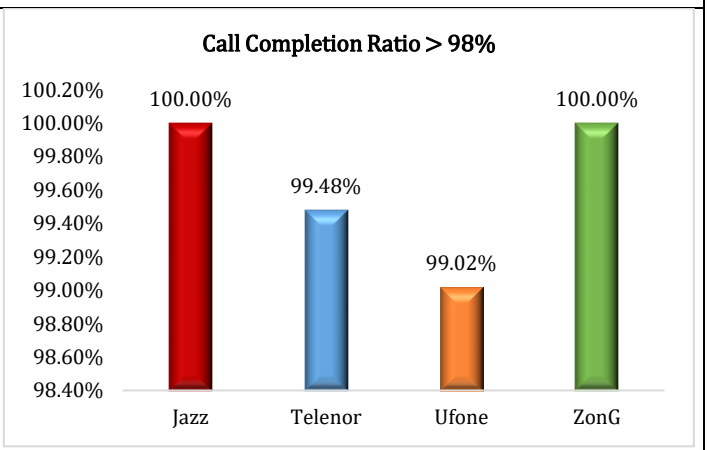


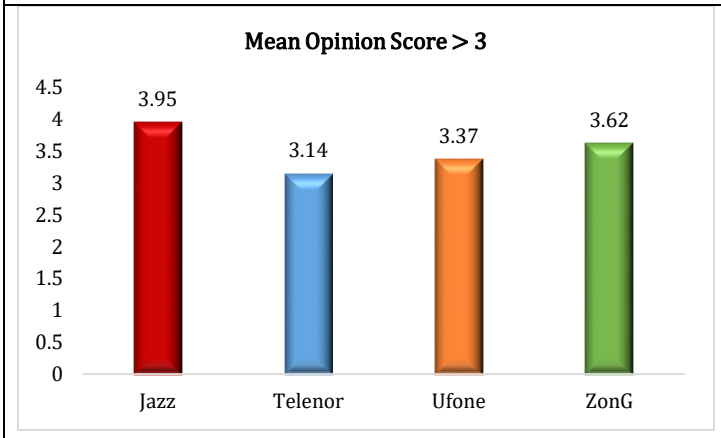
QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – SIBBI

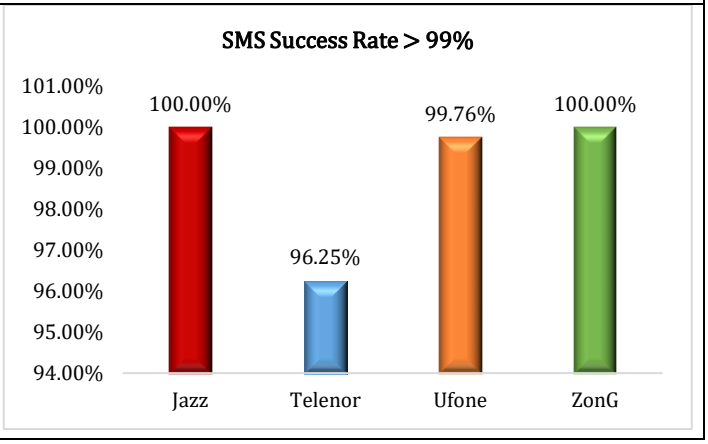


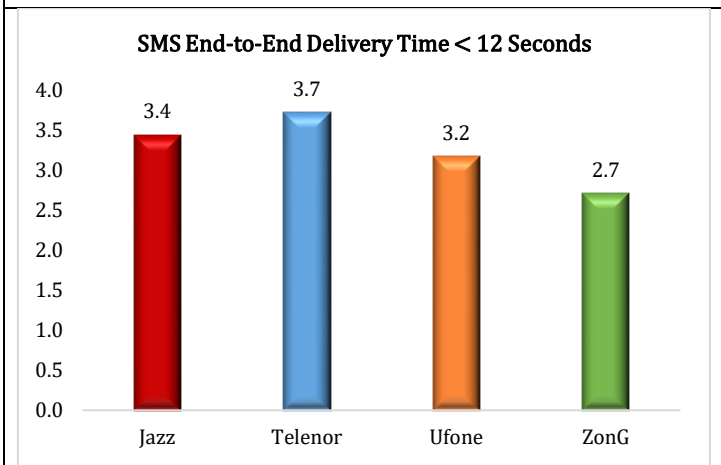






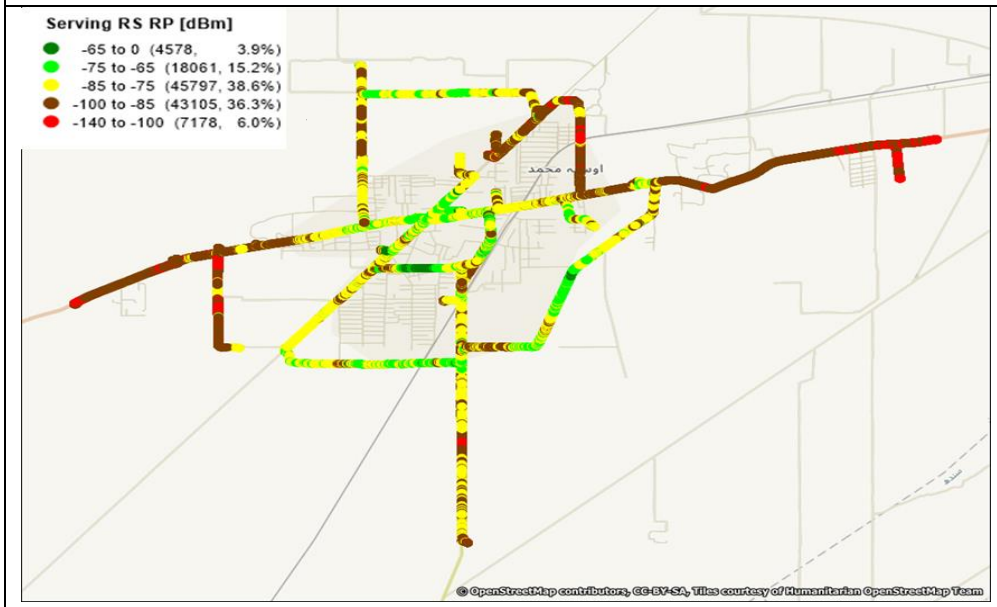




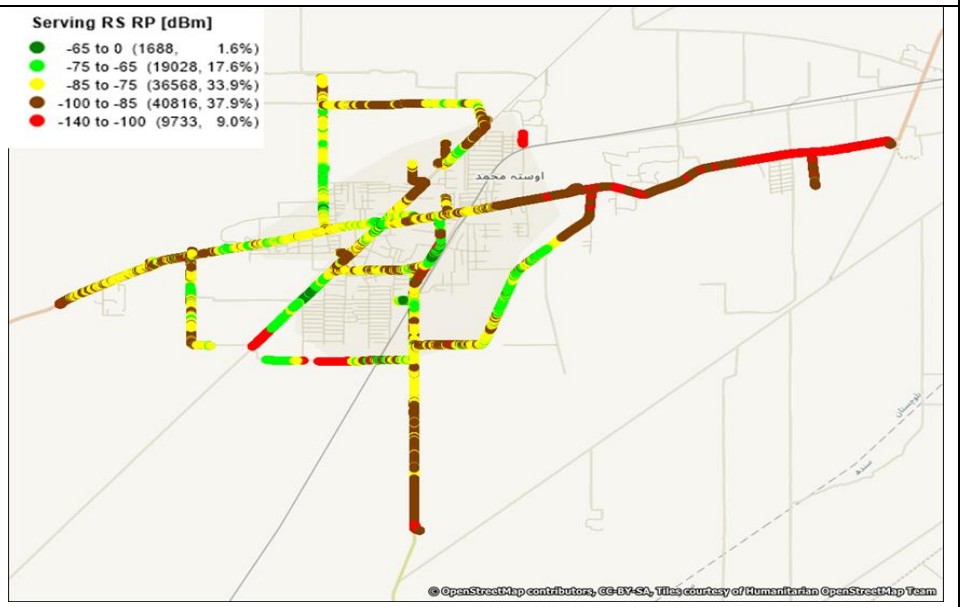


AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

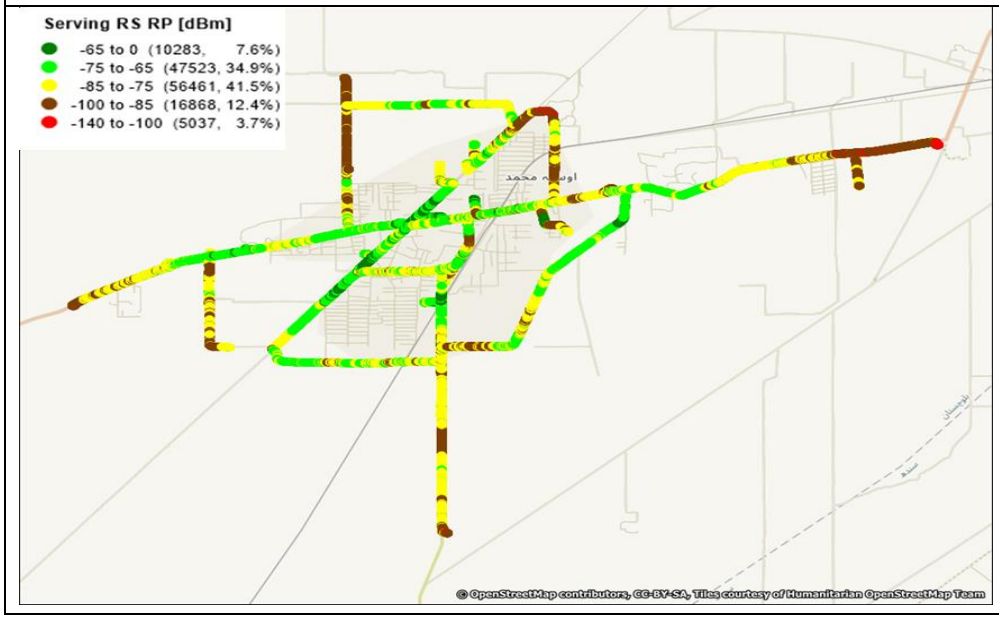
JAZZ 4G NETWORK COVERAGE – USTA MUHAMMAD



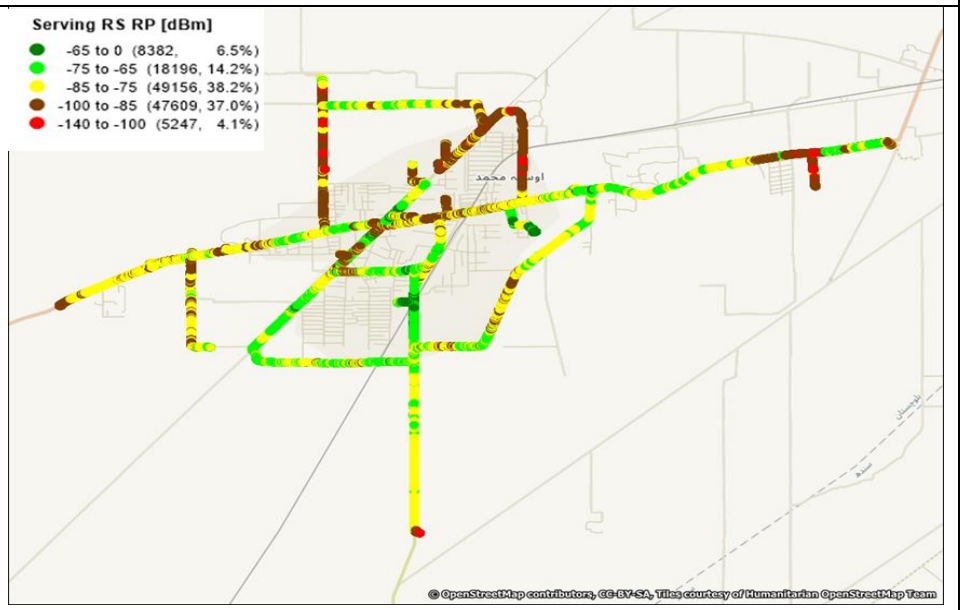
TELENOR 4G NETWORK COVERAGE – USTA MUHAMMAD



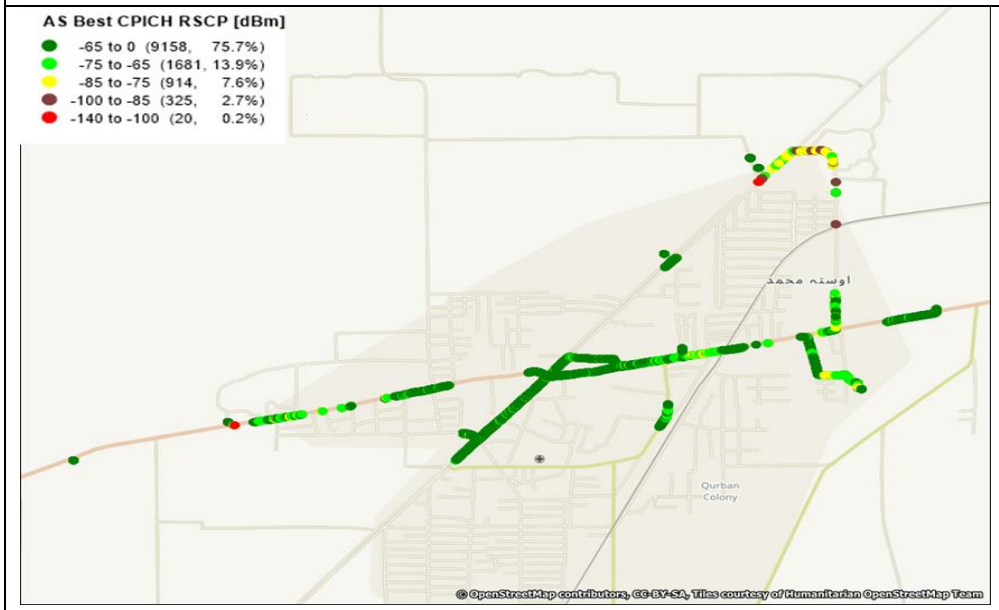
UFONE 4G NETWORK COVERAGE – USTA MUHAMMAD



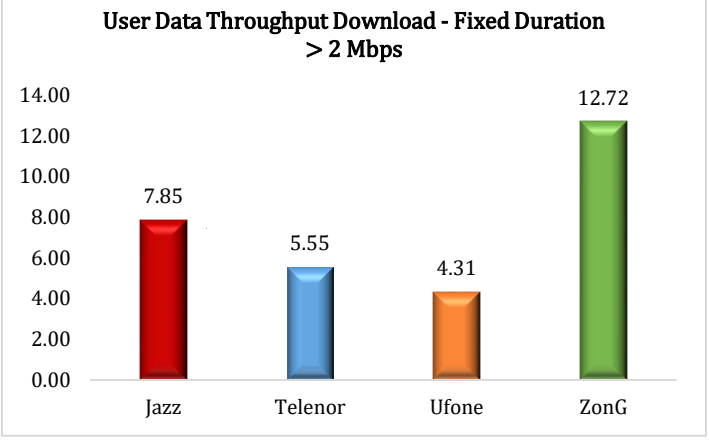
ZONG 4G NETWORK COVERAGE – USTA MUHAMMAD

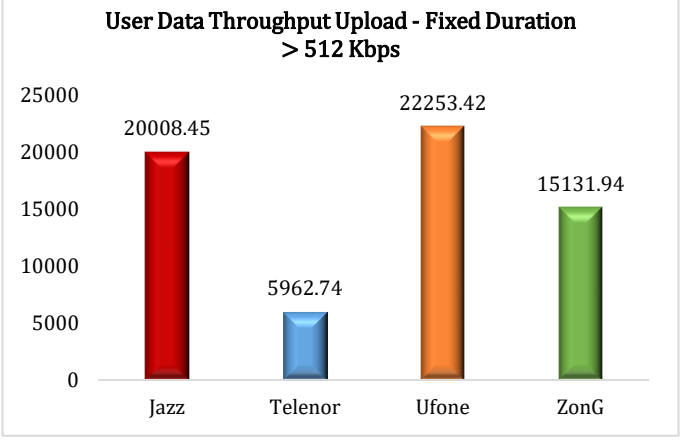


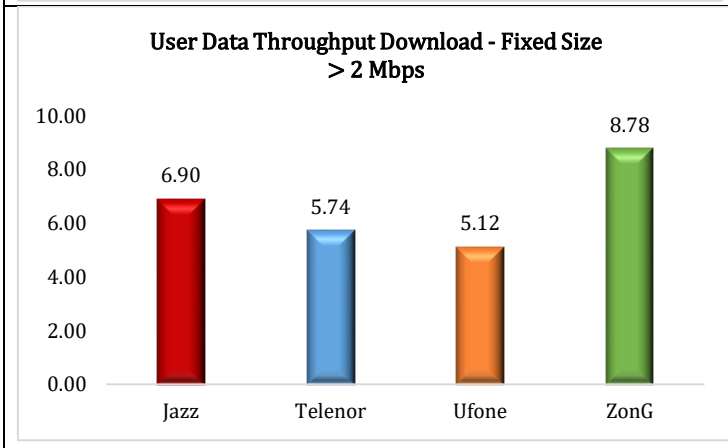
AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH

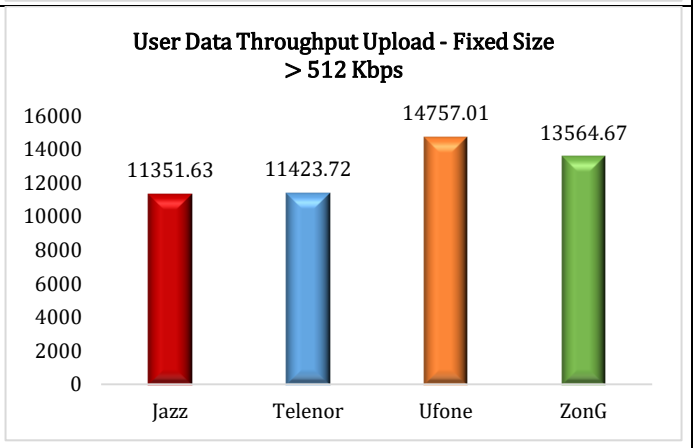
UFONE 3G NETWORK COVERAGE – USTA MUHAMMAD	ZONG 3G NETWORK COVERAGE – USTA MUHAMMAD
	

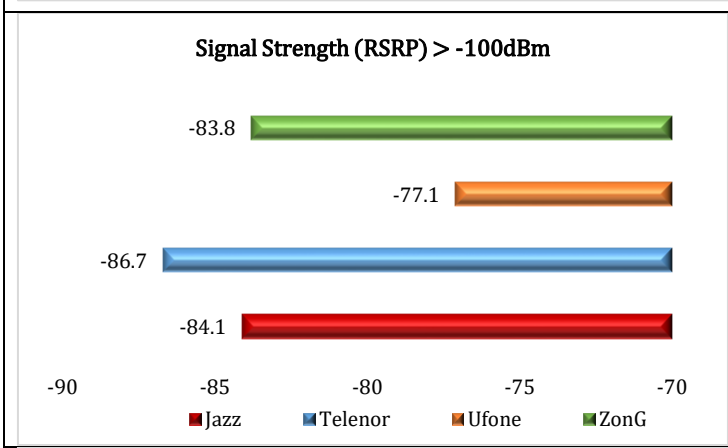
QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – USTA MUHAMMAD

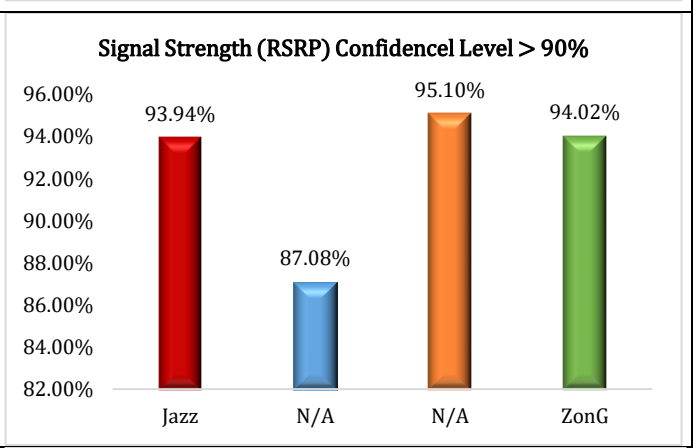


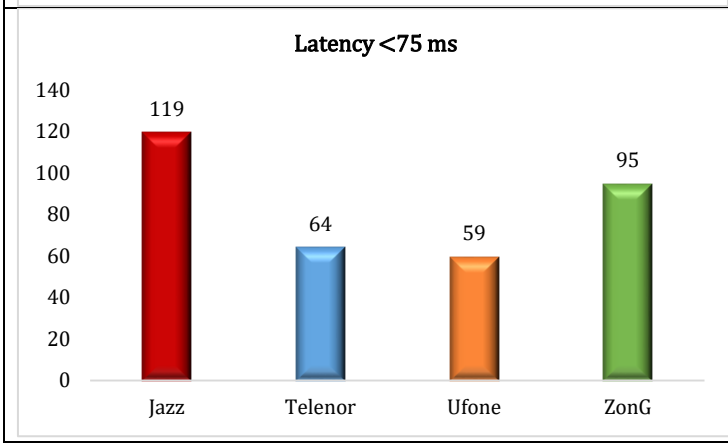


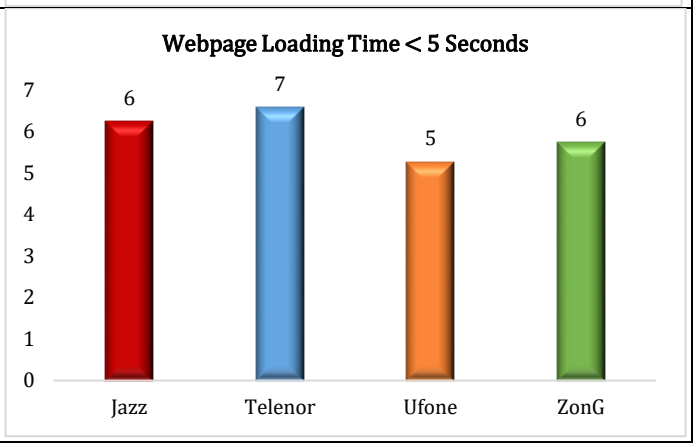






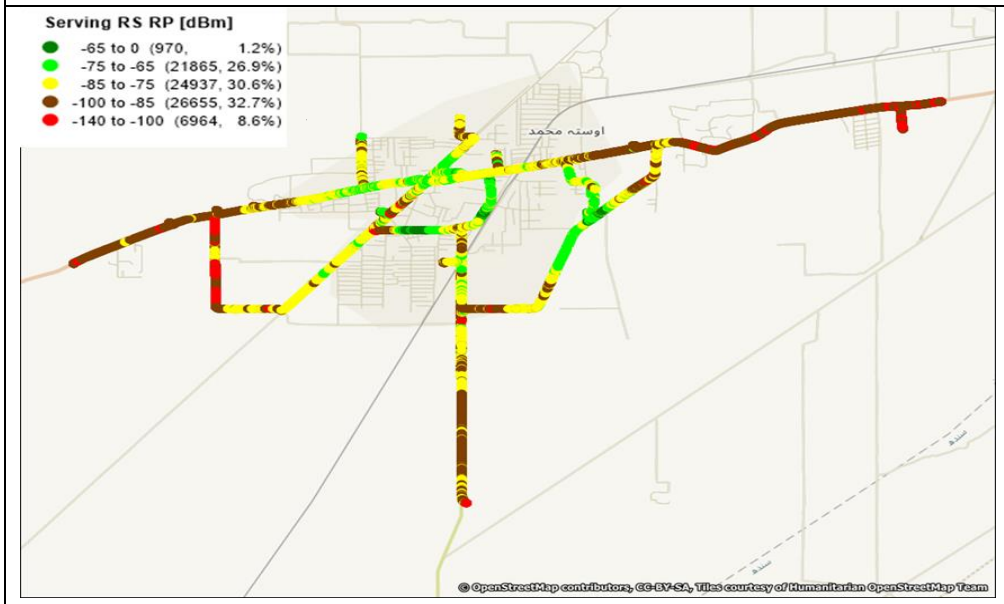




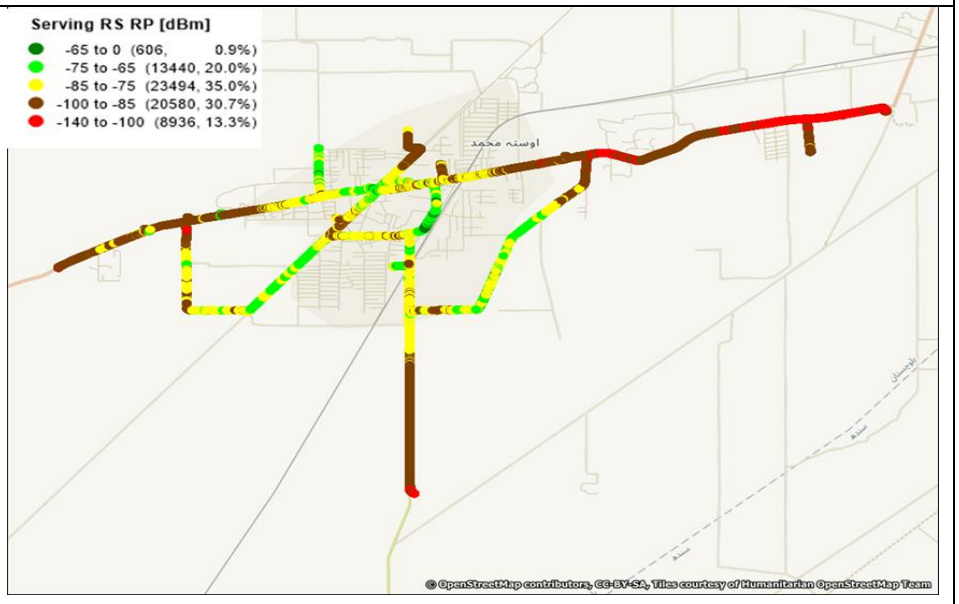


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

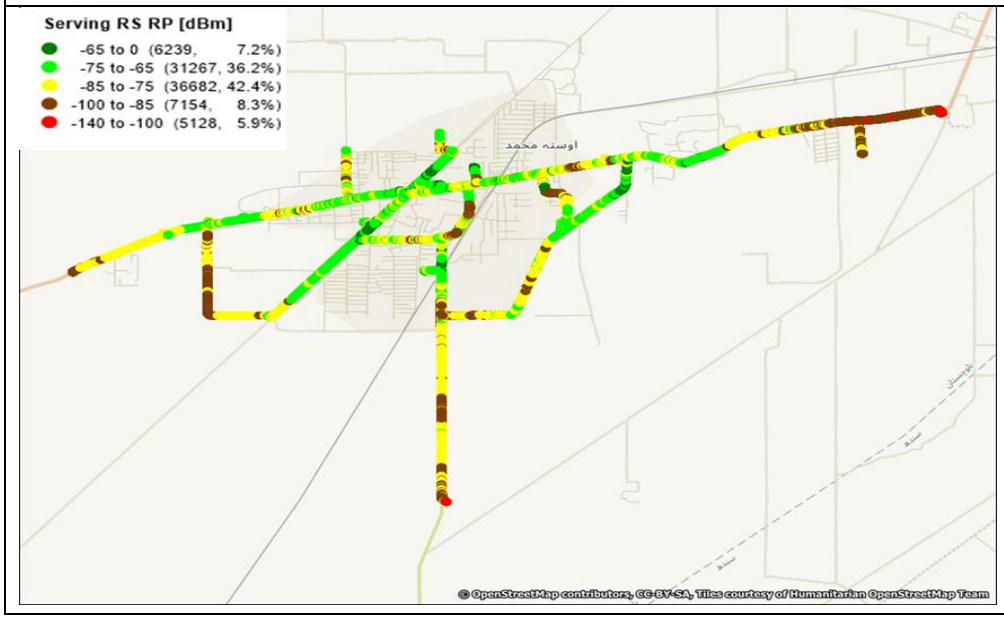
JAZZ 4G NETWORK COVERAGE – USTA MUHAMMAD



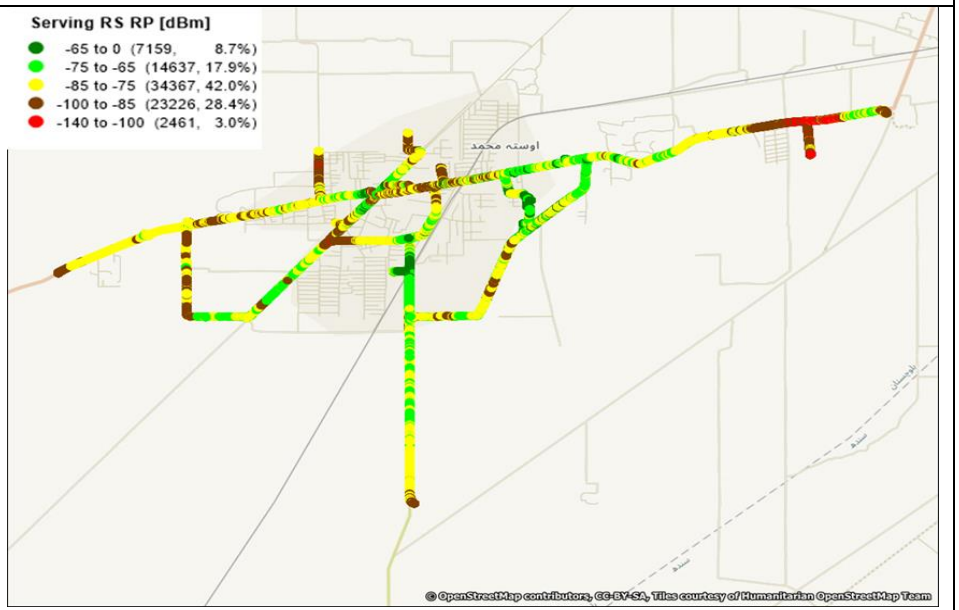
TELENOR 4G NETWORK COVERAGE – USTA MUHAMMAD



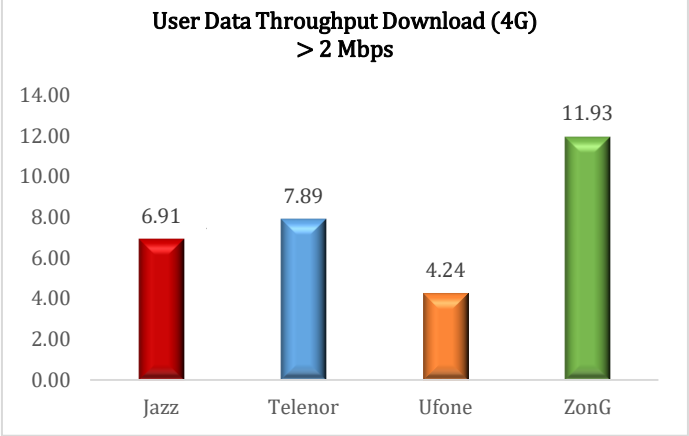
UFONE 4G NETWORK COVERAGE – USTA MUHAMMAD

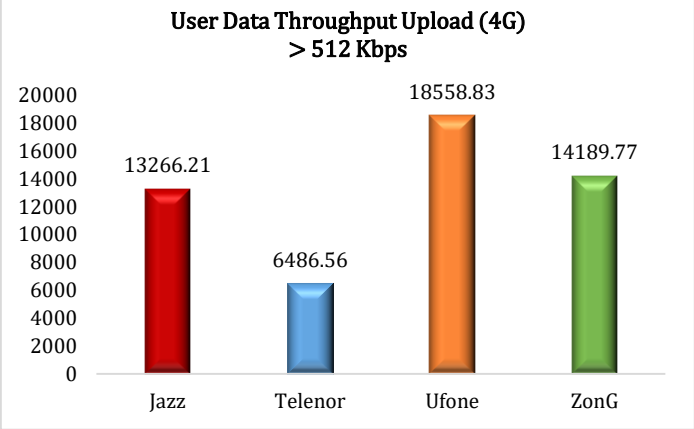


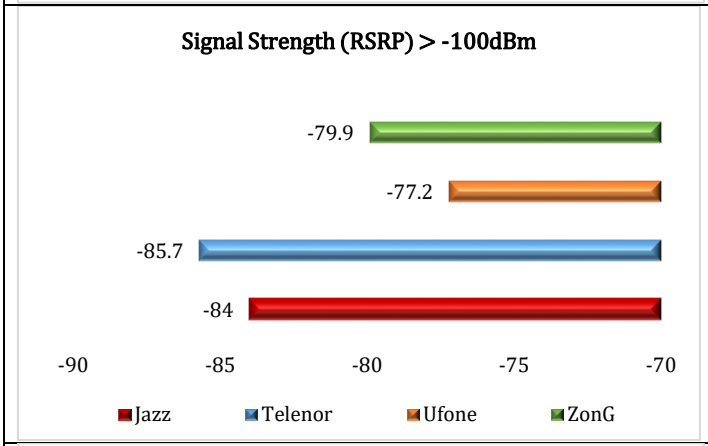
ZONG 4G NETWORK COVERAGE – USTA MUHAMMAD

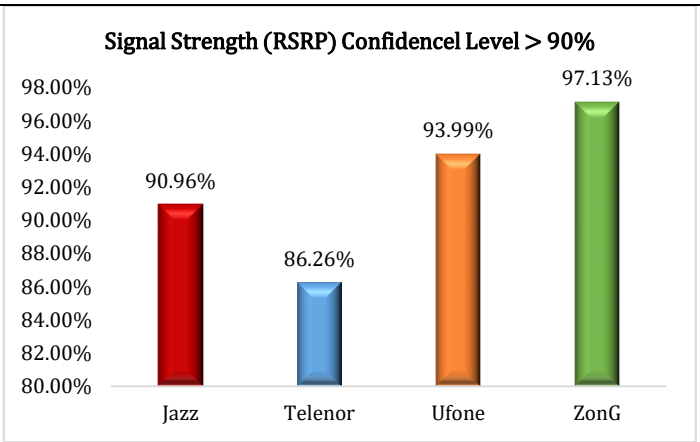


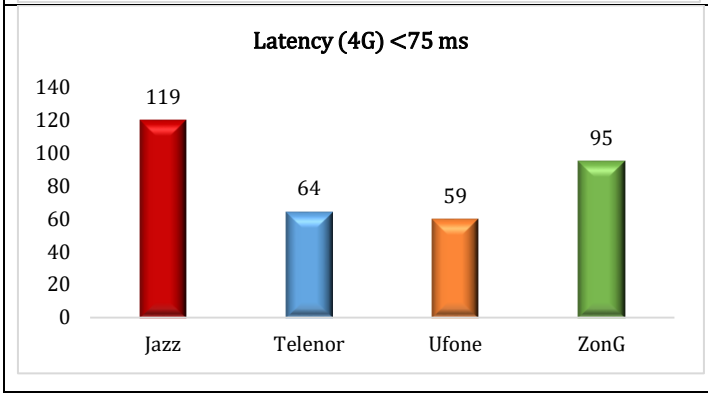
QUALITY OF SERVICE SURVEY RESULTS (4G) – USTA MUHAMMAD





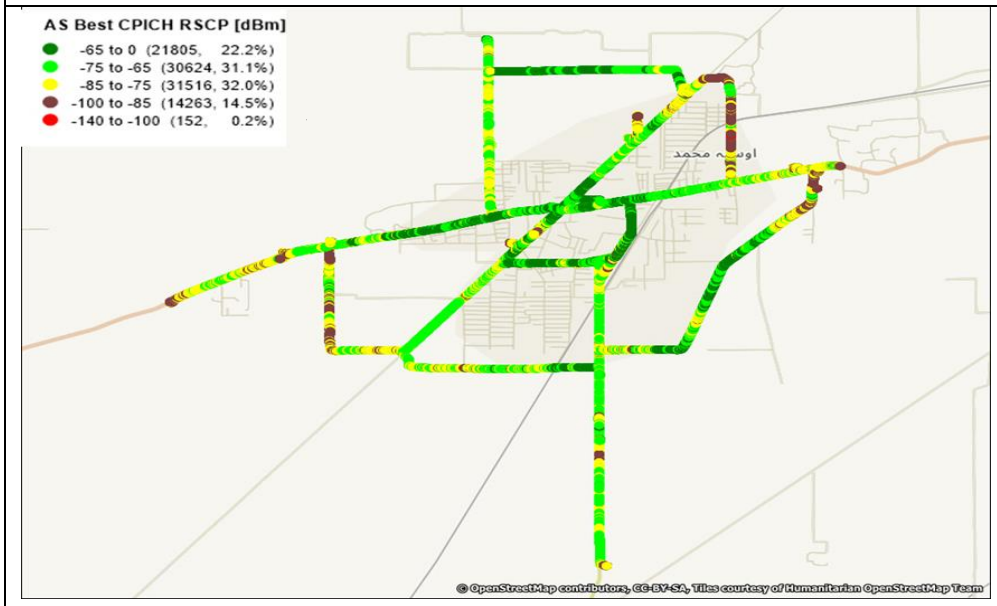




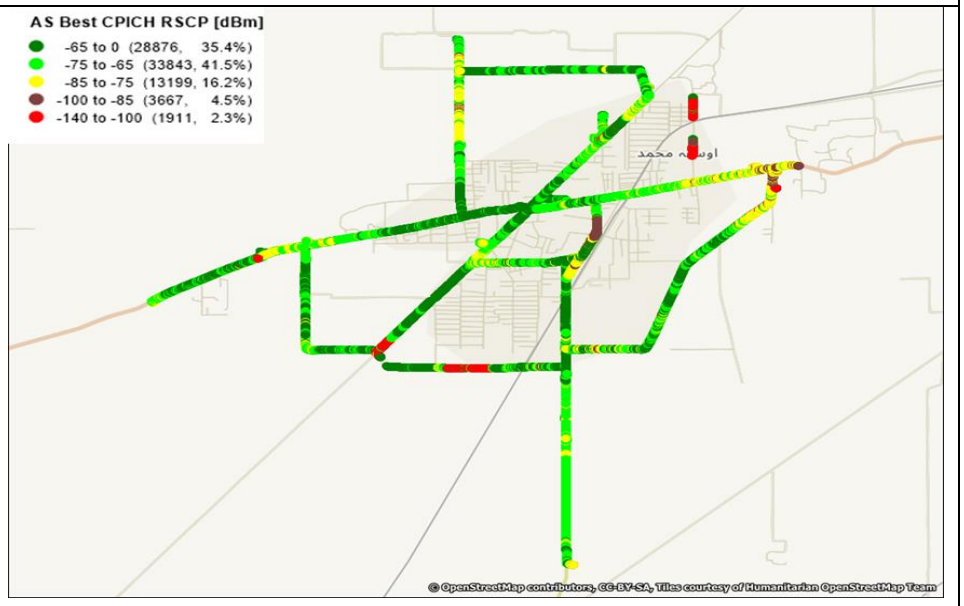


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

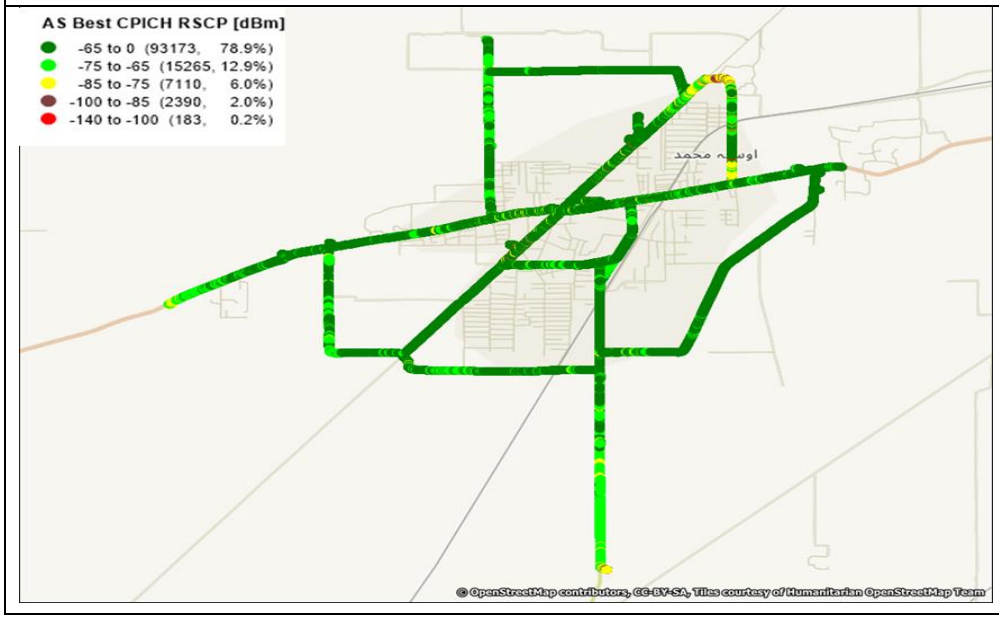
JAZZ 3G NETWORK COVERAGE – USTA MUHAMMAD



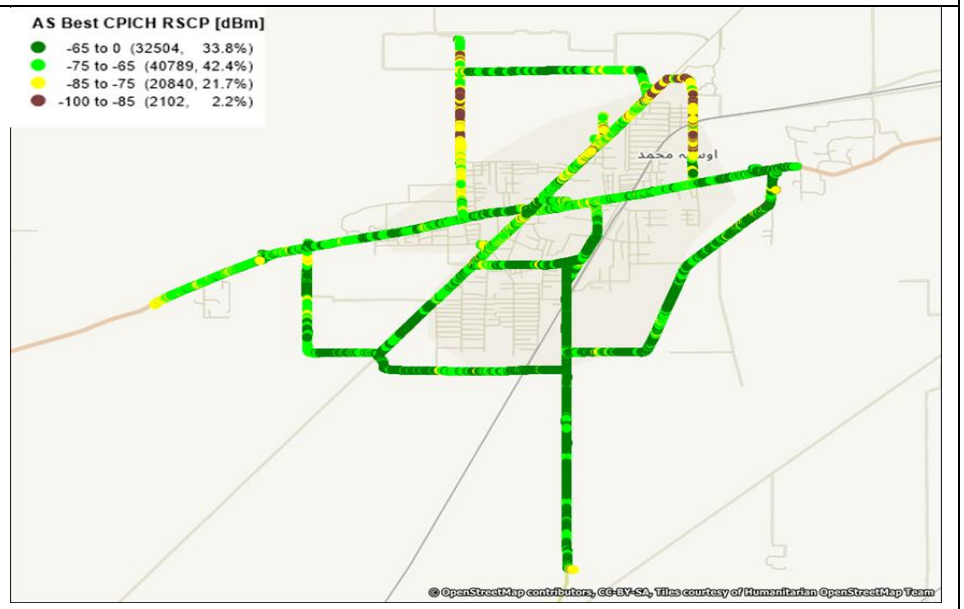
TELENOR 3G NETWORK COVERAGE – USTA MUHAMMAD



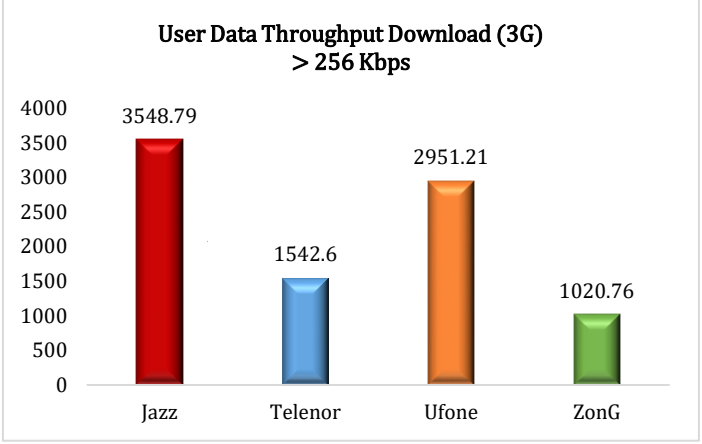
UFONE 3G NETWORK COVERAGE – USTA MUHAMMAD

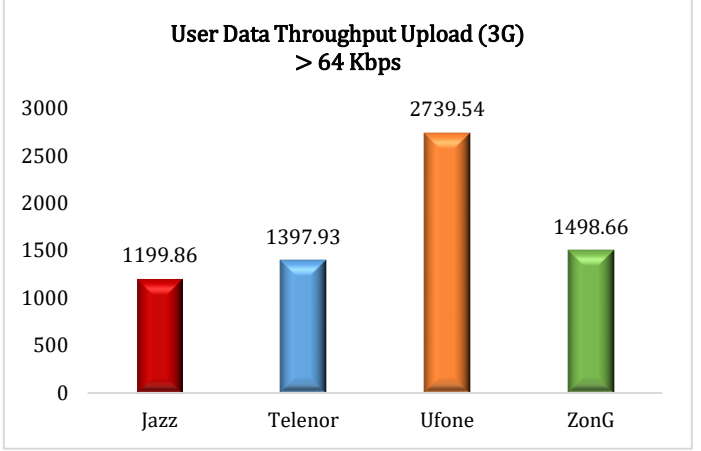


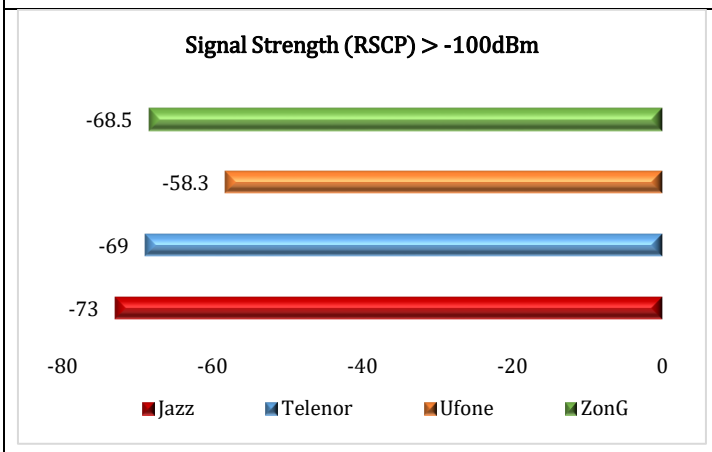
ZONG 3G NETWORK COVERAGE – USTA MUHAMMAD

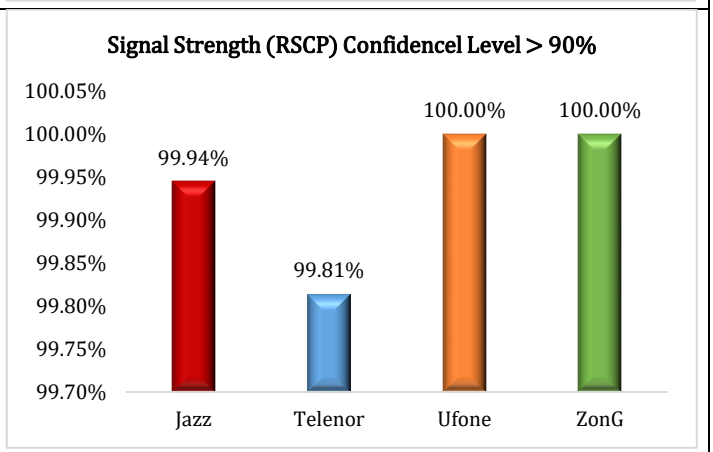


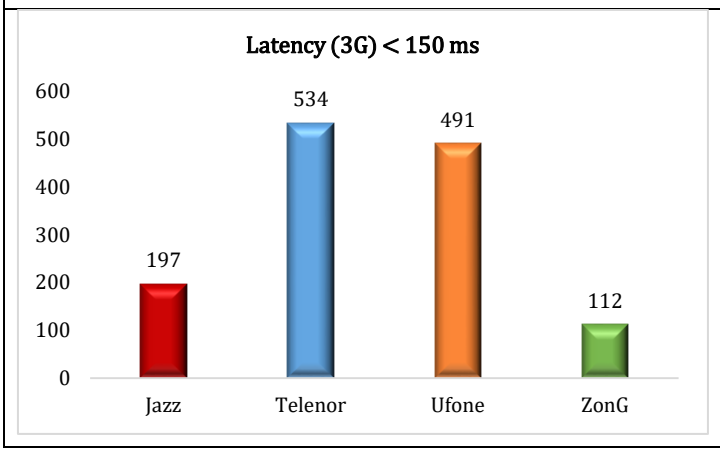
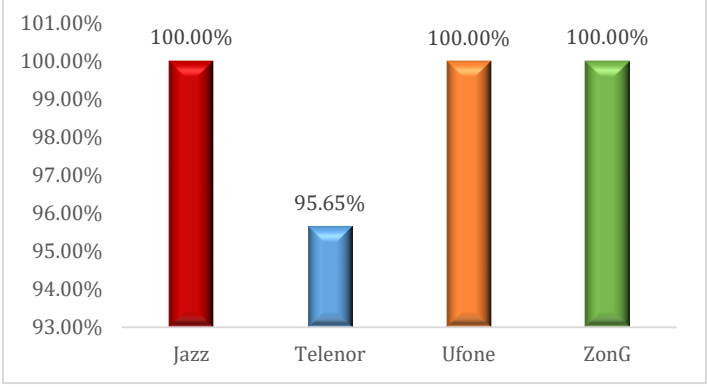
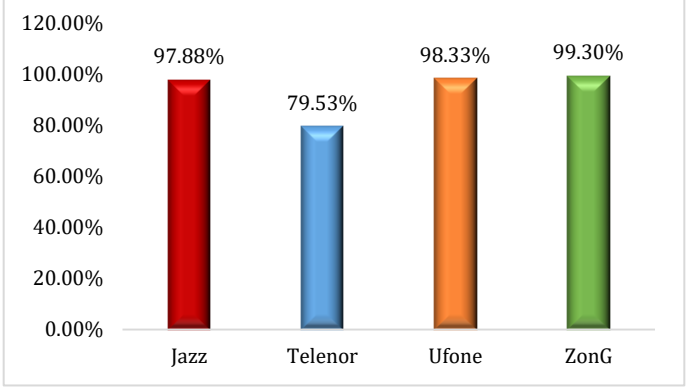
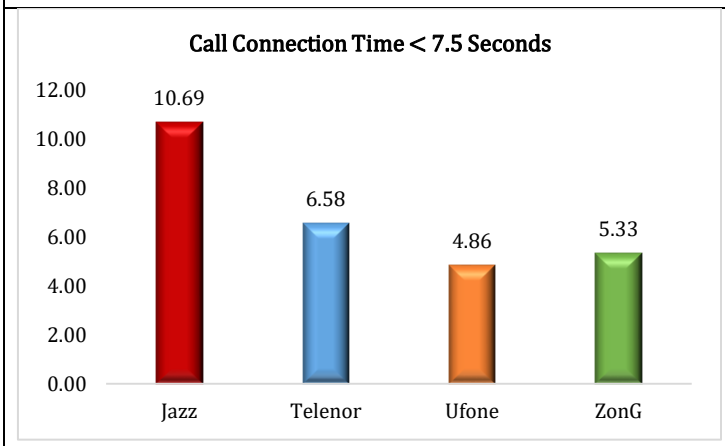
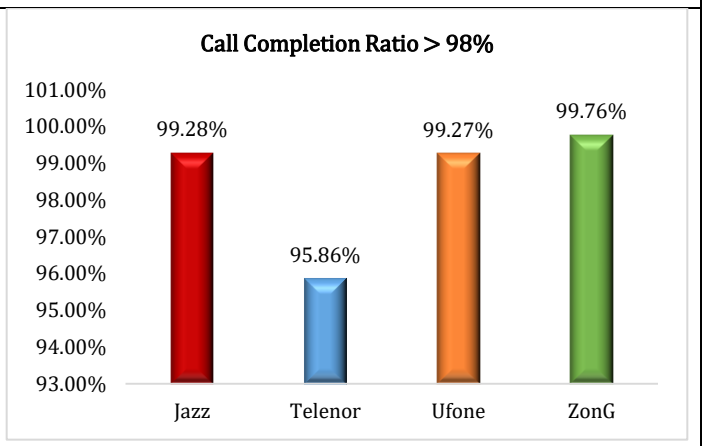
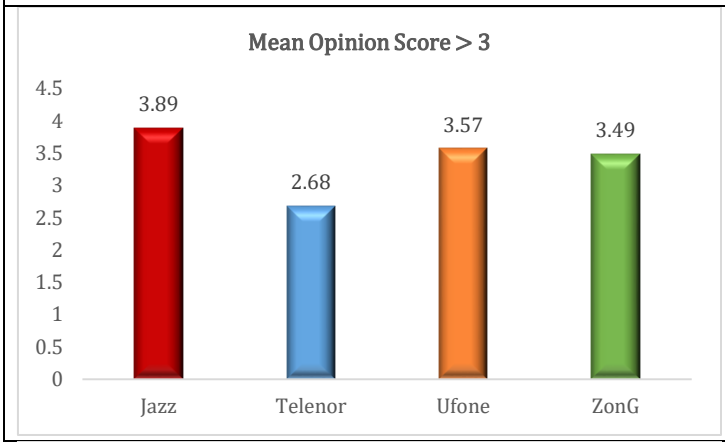
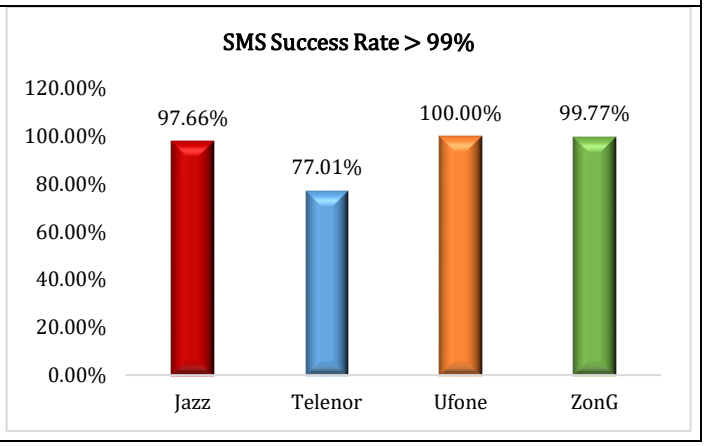
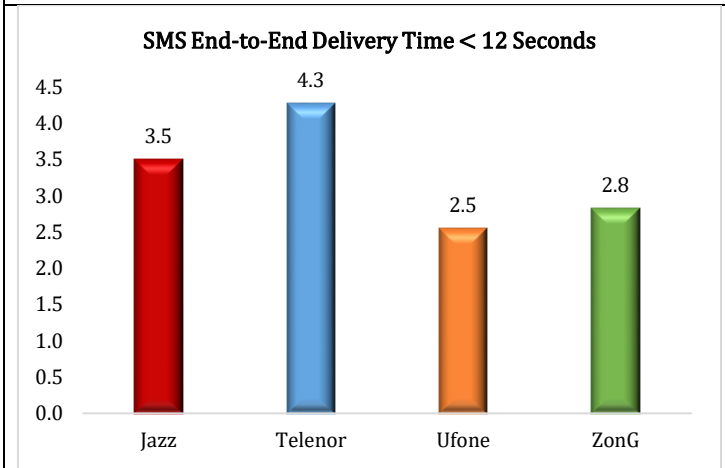
QUALITY OF SERVICE SURVEY RESULTS (3G) – USTA MUHAMMAD











QUALITY OF SERVICE SURVEY RESULTS (VOICE & SMS) – USTA MUHAMMAD