

INDEPENDENT QUALITY OF SERVICE **SURVEY IN CITIES OF PAKISTAN**

FOURTH QUARTER 2021

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 eighteen (18) x cities of Punjab, Khyber Pakhtunkhwa (KPK), Balochistan and Sindh. The name of cities along with survey dates are mentioned in **Table 1.1: QoS Survey Cities & Dates:**

S. #.	Province	City	Survey Dates
1.	Punjab	Muzaffargarh	11 th ~ 14 th Oct 2021
2.		Khanewal	26 th ~ 28 th Oct 2021
3.		Abdul Hakeem	1 st ~ 3 rd Nov 2021
4.		Sargodha	9 th ~ 11 th Nov 2021
5.		Gujrat	15 th ~ 17 th Nov 2021
6.		Narowal	15 th ~ 17 th Dec 2021
7.	Khyber Pakhtunkhwa	Mansehra	25 th ~ 27 th Oct 2021
8.		Mardan	3 rd ~ 4 th Nov 2021
9.		Nowshera	8 th ~ 9 th Nov 2021
10.		Kohat	15 th ~ 17 th Nov 2021
11.		Charsadda	24 th ~ 25 th Nov 2021
12.		Battagram	29 th ~ 30 th Nov 2021
13.	Balochistan	Mastung	18 th ~ 21 st Oct 2021
14.		Loralai	25 th ~ 27 th Oct 2021
15.		Dera Allah Yar	8 th ~ 10 th Nov 2021
16.		Dera Murad Jamali	2 nd ~ 4 th Nov 2021
17.		Pishin	15 th ~ 17 th Nov 2021
18.	Sindh	Mirpur Khas	23 rd ~ 25 th Nov 2021

Table 1.1: QOS Survey Dates and Samples

DRIVE TEST DETAILS

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

MOBILE NETWORK COVERAGE

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

4G Signal Strength -100dBm with 90% Confidence Level								
City	Operators				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
<i>Khanewal</i>	98.97%	97.73%	100.00%	99.86%	Yes	Yes	Yes	Yes
<i>Muzaffargarh</i>	98.60%	94.57%	0.28%	99.15%	Yes	Yes	No	Yes
<i>Mastung</i>	93.97%	97.60%	99.69%	97.70%	Yes	Yes	Yes	Yes
<i>Loralai</i>	97.01%	96.28%	99.49%	96.44%	Yes	Yes	Yes	Yes
<i>Mansehra</i>	96.44%	98.39%	89.84%	99.06%	Yes	Yes	No	Yes
<i>Dera Allah Yar</i>	73.25%	99.62%	91.32%	98.94%	No	Yes	Yes	Yes
<i>Dera Murad Jamali</i>	91.22%	99.12%	89.92%	91.94%	Yes	Yes	No	Yes
<i>Mardan</i>	87.38%	91.76%	93.68%	98.49%	No	Yes	Yes	Yes
<i>Sargodha</i>	99.56%	99.45%	95.52%	98.30%	Yes	Yes	Yes	Yes
<i>Gujrat</i>	99.38%	99.63%	87.51%	99.41%	Yes	Yes	No	Yes
<i>Charsadda</i>	79.63%	78.21%	87.47%	98.18%	No	No	No	Yes
<i>Battagram</i>	96.89%	94.16%	70.15%	98.82%	Yes	Yes	No	Yes
<i>Abdul Hakeem</i>	98.09%	93.66%	91.16%	99.43%	Yes	Yes	Yes	Yes
<i>Kohat</i>	89.74%	96.19%	99.75%	97.66%	No	Yes	Yes	Yes
<i>Mirpur Khas</i>	94.29%	98.47%	84.87%	99.24%	Yes	Yes	No	Yes
<i>Nowshera</i>	93.65%	94.64%	97.88%	97.09%	Yes	Yes	Yes	Yes
<i>Pishin</i>	99.03%	95.02%	98.69%	97.41%	Yes	Yes	Yes	Yes
<i>Narowal</i>	95.77%	98.39%	92.17%	94.90%	Yes	Yes	Yes	Yes

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

3.2. **3G SIGNAL STRENGTH.** During the survey, while conducting data test in auto mode, wherever network switched to 3G, the signal strength samples were recorded on survey routes. As per Next Generation Mobile Service (NGMS) licenses awarded, licensees are required to meet **the threshold of -100dBm or above of Received Signal Code Power (RSCP) with 90% confidence level.** The Confidence Level and Compliance of signal strength is shown in **Table 3.2: 3G Signal Strength -100dBm with 90% Confidence Level.**

3G Signal Strength -100dBm with 90% Confidence Level								
City	Operators				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
<i>Khanewal</i>	99.99%	99.96%	99.79%	100.00%	Yes	Yes	Yes	Yes
<i>Muzaffargarh</i>	99.99%	99.41%	100.00%	100.00%	Yes	Yes	Yes	Yes
<i>Mastung</i>	N/A	N/A	100.00%	100.00%	N/A	N/A	Yes	Yes
<i>Loralai</i>	N/A	N/A	100.00%	89.87%	N/A	N/A	Yes	No
<i>Mansehra</i>	N/A	N/A	98.82%	N/A	N/A	N/A	Yes	N/A
<i>Dera Allah Yar</i>	100.00%	N/A	N/A	N/A	Yes	N/A	N/A	N/A
<i>Dera Murad Jamali</i>	N/A	N/A	100.00%	100.00%	N/A	N/A	Yes	Yes
<i>Mardan</i>	99.97%	N/A	99.41%	N/A	Yes	N/A	Yes	N/A
<i>Sargodha</i>	99.97%	100.00%	99.53%	100.00%	Yes	Yes	Yes	Yes
<i>Gujrat</i>	100.00%	100.00%	99.90%	100.00%	Yes	Yes	Yes	Yes
<i>Charsadda</i>	98.52%	N/A	99.99%	N/A	Yes	N/A	Yes	N/A
<i>Battagram</i>	N/A	N/A	99.67%	N/A	N/A	N/A	Yes	N/A

<i>Abdul Hakeem</i>	99.98%	99.98%	100.00%	100.00%	Yes	Yes	Yes	Yes
<i>Kohat</i>	N/A	N/A	100.00%	100.00%	N/A	N/A	Yes	Yes
<i>Mirpur Khas</i>	100%	100%	100%	N/A	Yes	Yes	Yes	N/A
<i>Nowshera</i>	N/A	N/A	100%	N/A	N/A	N/A	Yes	N/A
<i>Pishin</i>	N/A	N/A	100%	100%	N/A	N/A	Yes	Yes
<i>Narowal</i>	99.88%	100.00%	99.91%	100.00%	Yes	Yes	Yes	Yes

Note: N/A shows that during data testing, 4G/LTE network did not fall back on 3G network.

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

MOBILE BROADBAND SERVICE

4.1. A total of **33,589 http download test attempts** made, out of which **25,458 were successful attempts** and rest of the **8040 were failed attempts**. The company wise detail is mentioned in **Table4.1: Data Tests Statistics**.

Description	Jazz	Telenor	Ufone	ZonG
<i>TOTAL DATA TEST ATTEMPTS</i>	8767	6793	7357	10672
<i>SUCCESSFUL DATA TEST ATTEMPTS</i>	6560	6538	6010	6350
<i>FAILED DATA TEST ATTEMPTS</i>	2116	255	1347	4322
<i>TEST ATTEMPTS SUCCESS RATIO</i>	75.61 %	96.25 %	81.69 %	59.5 %
<i>USER DATA THROUGHPUT</i>	4.983 Mbps	1.68 Mbps	6.028 Mbps	7.699 Mbps
<i>AVERAGE 4G SIGNAL STRENGTH (RSRP)</i>	-82.4 dBm	-82.40 dBm	-81.7 dBm	-79.6 dBm
<i>AVERAGE 4G SIGNAL STRENGTH (RSCP)</i>	-69.55 dBm	-69.99 dBm	-69.23 dBm	-68.55 dBm
<i>AVERAGE 4G SIGNAL STRENGTH (RXLEV)</i>	-70.26 dBm	-74.07 dBm	-71.6 dBm	-66.20 dBm

Table4.1: Data Tests Statistics.

4.2. **4G USER DATA THROUGHPUT.** As per Next Generation Mobile Service (NGMS) licenses awarded, licensees are required to meet **the threshold of minimum of 2Mbps of 4G User Data Throughput**. The results of Data Service QoS KPI i.e. User Data Throughput is shown in **Table4.2: 4G User Data Throughput \geq 2 Mbps**.

City	4G User Data Throughput (Mbps)				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
<i>Khanewal</i>	12.11	6.63	N/A	14.61	Second	Third	N/A	First
<i>Muzaffargarh</i>	8.07	11.92	3.67	16.47	Third	Second	Fourth	First
<i>Mastung</i>	8.60	1.98	5.22	9.09	Second	Fourth	Third	First
<i>Loralai</i>	4.89	0.83	6.14	8.52	Third	Fourth	Second	First
<i>Mansehra</i>	10.32	1.95	22.85	11.93	Third	Fourth	First	Second
<i>Dera Allah Yar</i>	5.25	1.04	3.08	10.55	Second	Fourth	Third	First
<i>Dera Murad Jamali</i>	5.50	1.76	7.46	10.84	Third	Fourth	Second	First
<i>Mardan</i>	14.10	2.71	8.01	15.07	Second	Fourth	Third	First
<i>Sargodha</i>	11.75	3.91	19.47	24.20	Third	Fourth	Second	First
<i>Gujrat</i>	9.67	5.46	17.60	18.77	Third	Fourth	Second	First
<i>Charsadda</i>	16.00	4.29	18.19	18.50	Third	Fourth	Second	First
<i>Battagram</i>	11.61	1.62	24.82	21.82	Third	Fourth	First	Second
<i>Abdul Hakeem</i>	7.62	11.24	21.37	19.78	Fourth	Third	First	Second

<i>Kohat</i>	15.81	3.22	3.93	20.59	Second	Fourth	Third	First
<i>Mirpur Khas</i>	10.25	2.42	11.22	10.75	Third	Fourth	First	Second
<i>Nowshera</i>	10.36	4.34	13.24	14.41	Third	Fourth	Second	First
<i>Pishin</i>	6.35	4.12	11.93	9.08	Third	Fourth	First	Second
<i>Narowal</i>	5.72	2.02	14.03	11.86	Third	Fourth	First	Second

Table4.2: 4G User Data Throughput \geq 2 Mbps

4.3. **3G USER DATA THROUGHPUT.** As per Next Generation Mobile Service (NGMS) licenses awarded, licensees are required to meet **the threshold of minimum of 256Kbps of 3G User Data Throughput.** The results of Data Service QoS KPI i.e. User Data Throughput is shown in **Table 4.3: 3G User Data Throughput \geq 256Kbps.**

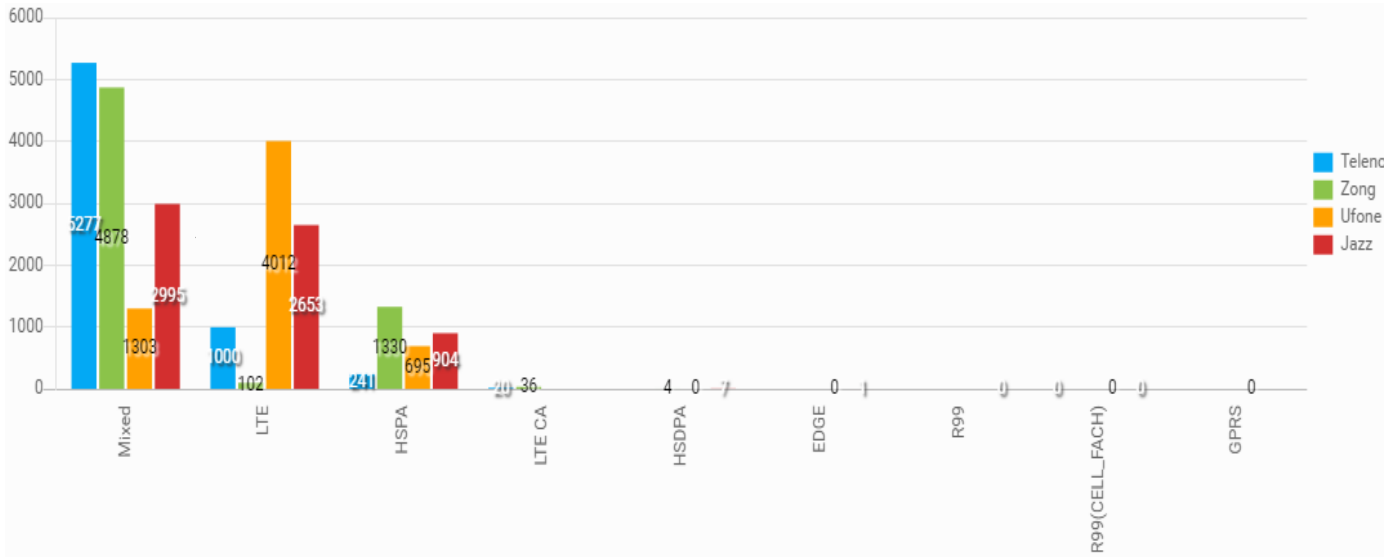
City	3G User Data Throughput (Kbps)				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
<i>Khanewal</i>	2298.14	3093.60	5532.32	1658.83	Third	Second	First	Fourth
<i>Muzaffargarh</i>	1779.01	3986.75	3905.47	1575.25	Third	First	Second	Fourth
<i>Mastung</i>	N/A	N/A	1271.85	N/A	N/A	N/A	First	N/A
<i>Loralai</i>	N/A	N/A	3427.75	1838.13	N/A	N/A	First	Second
<i>Mansehra</i>	N/A	N/A	4169.90	N/A	N/A	N/A	First	N/A
<i>Dera Allah Yar</i>	197.21	N/A	N/A	N/A	First	N/A	N/A	N/A
<i>Dera Murad Jamali</i>	N/A	N/A	1699.99	340.64	N/A	N/A	First	Second
<i>Mardan</i>	1961.57	N/A	3582.60	N/A	Second	N/A	First	N/A
<i>Sargodha</i>	2877.17	2436.63	5032.19	2158.31	Second	Third	First	Fourth
<i>Gujrat</i>	4000.44	1915.29	7833.52	1917.37	Second	Fourth	First	Third
<i>Charsadda</i>	5702.56	N/A	4349.52	N/A	First	N/A	Second	N/A
<i>Battagram</i>	N/A	N/A	2657.03	N/A	N/A	N/A	First	N/A
<i>Abdul Hakeem</i>	3263.81	3934.14	5162.92	1825.31	Third	Second	First	Fourth
<i>Kohat</i>	N/A	N/A	2176.56	312.18	N/A	N/A	First	Second
<i>Mirpur Khas</i>	2821.61	522.37	3142.61	N/A	Second	Third	First	N/A
<i>Nowshera</i>	N/A	N/A	4796.54	N/A	N/A	N/A	First	N/A
<i>Pishin</i>	N/A	N/A	2073.39	1357.33	N/A	N/A	First	Second
<i>Narowal</i>	3182.66	1218.23	5001.33	1736.52	Second	Fourth	First	Third

Note: N/A shows that during data testing, 4G/LTE network did not fall back on 3G network.

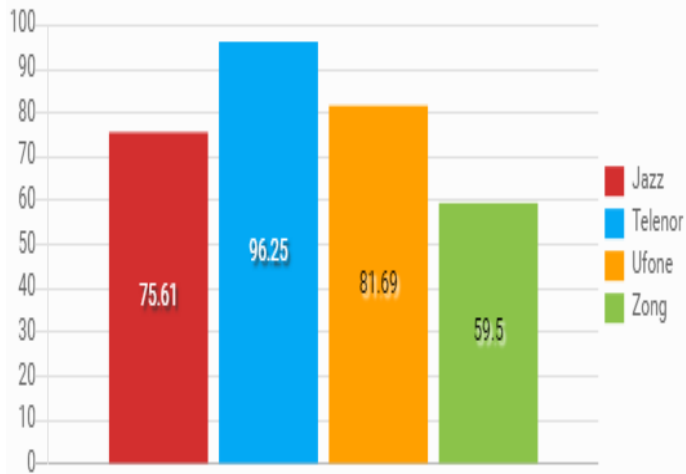
Table4.3: 3G User Data Throughput \geq 256Kbps

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

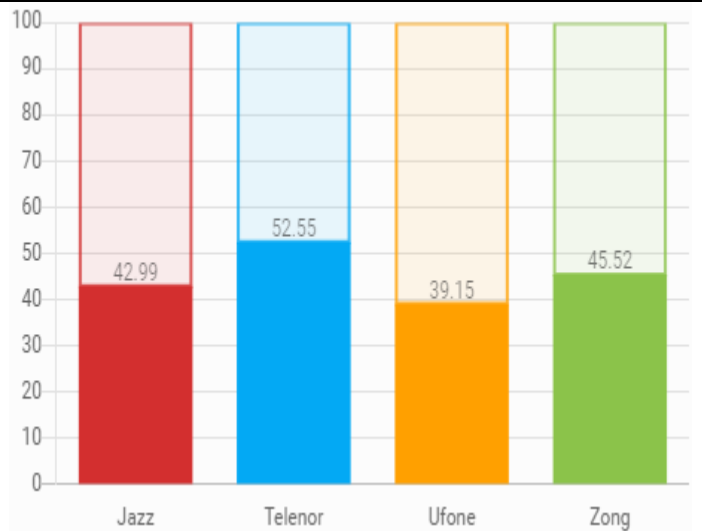
HTTP TRANSFER DOWNLOAD SUCCESS BY TECHNOLOGY



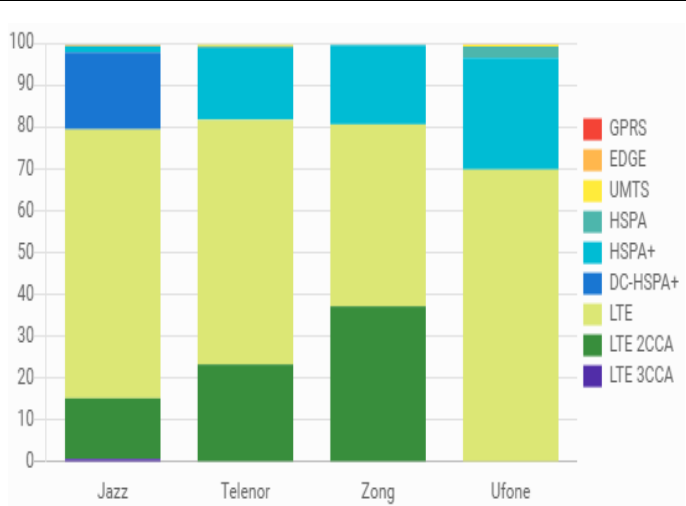
HTTP TRANSFER SUCCESS RATE



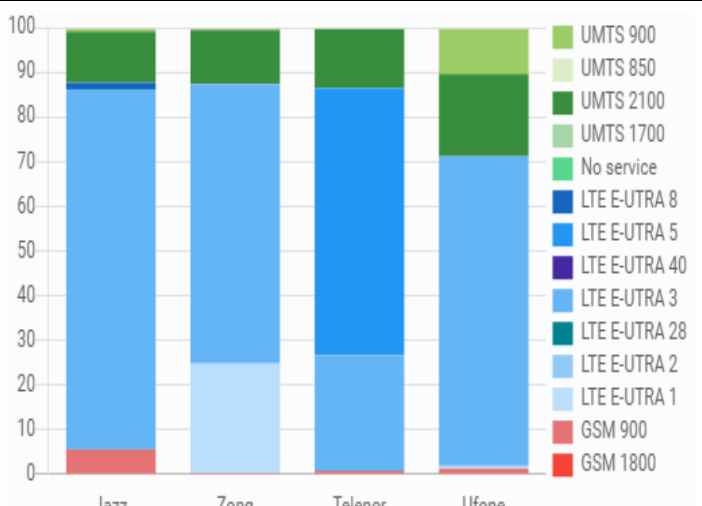
DOWNLINK RESOURCE BLOCK UTILIZATION



DATA SESSION BY TECHNOLOGY / BAND



DATA SESSION DURATION BY DATA TECHNOLOGY



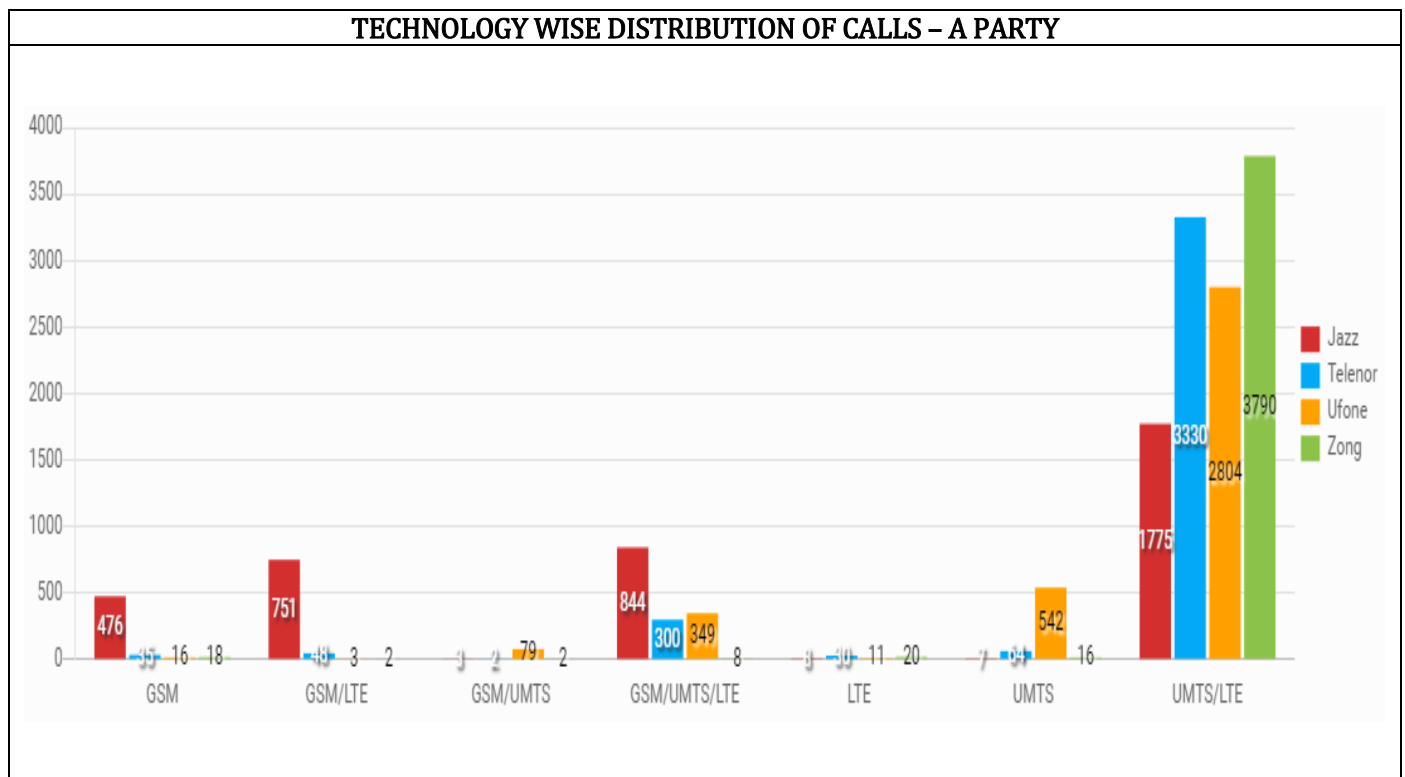
VOICE SERVICE

5.1. A total of **15,333 Call attempts** made and out of which **314 were failed attempts**. In **15,019 successful call attempts**, **84 calls dropped** prior to completion of two minutes duration, whereas, **14,935 calls remained connected** for the complete duration of two minutes. The company wise call statistics is shown in **Table5.1: Call Statistics**.

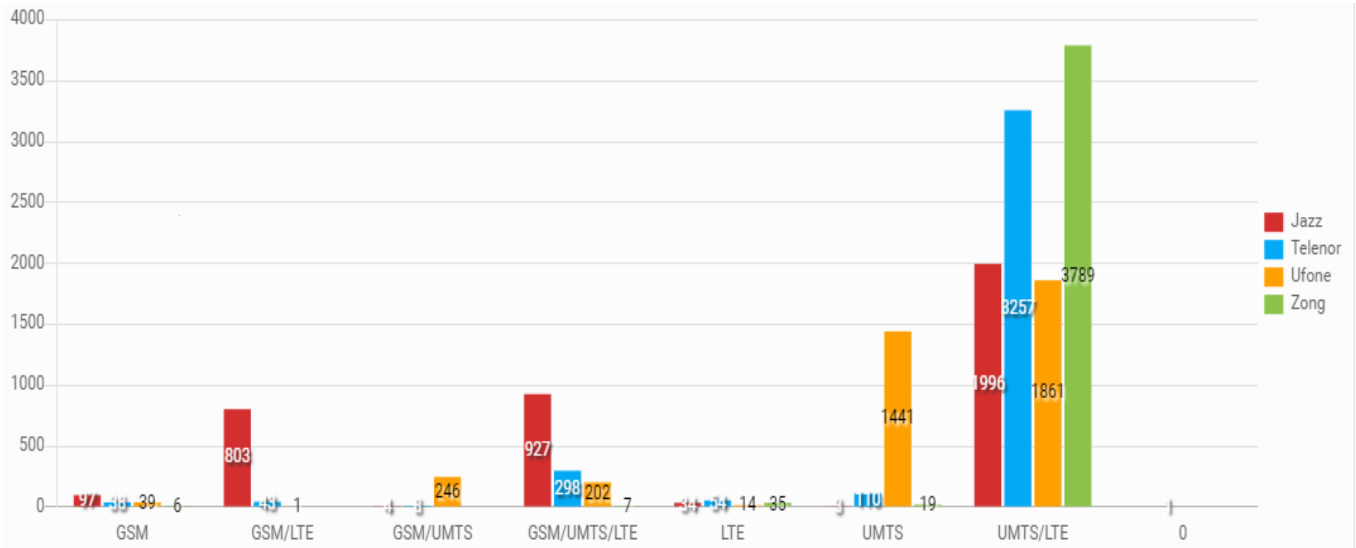
DESCRIPTION	JAZZ	TELENOR	UFONE	ZONG
<i>TOTAL CALLS ATTEMPTS</i>	3864	3809	3804	3856
<i>FAILED CALLS ATTEMPTS</i>	60	120	58	76
<i>ESTABLISHED CALLS ATTEMPTS</i>	3804	3689	3746	3780
<i>DROPPED CALLS ATTEMPTS</i>	12	40	19	13
<i>COMPLETED CALLS ATTEMPTS</i>	3792	3649	3727	3767
<i>CALL SETUP SUCCESS RATE</i>	98.45 %	96.85 %	98.48 %	98.03 %
<i>CALL SETUP TIME</i>	8.11 s	8.44 s	6.51 s	7.54 s
<i>CALL COMPLETION RATE</i>	99.45 %	97.6 %	98.39 %	98.69 %
<i>ISHO SUCCESS RATE</i>	99.47 %	98.29 %	98.94 %	-
<i>RAB SETUP SUCCESS RATE</i>	100 %	99.96 %	99.98 %	99.98%
<i>MEAN OPINION SCORE</i>	2.96 MOS	3.3 MOS	3.31 MOS	3.52 MOS
<i>MEAN OPINION SCORE EXCESS RATIO - MOS < 1.6</i>	3.41 %	1.45%	1.31 %	0.5 %
<i>TOTAL SPEECH TEST</i>	37992	36637	37398	37832

Table5.1: Call Statistics

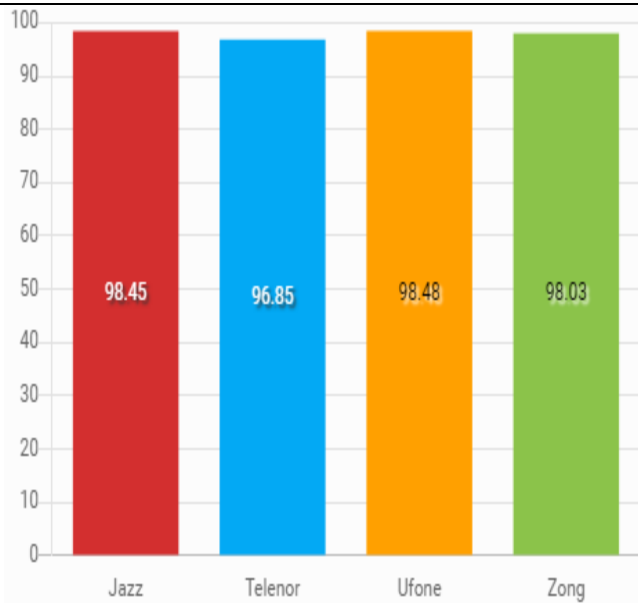
5.2. The overall Call Setup Success Rate and Call Retainability alongwith Mean Opinion Score (MOS), the percentage of mute calls, MOS with respect to Voice CODEC and Technology per band is shown as under:



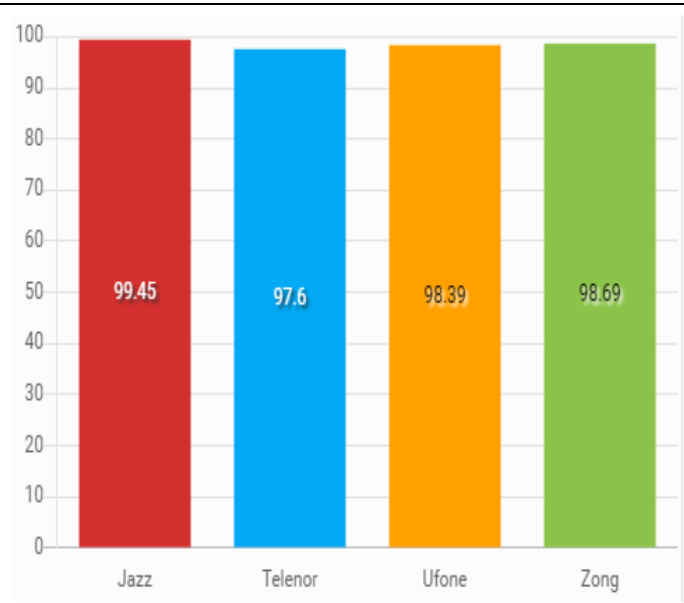
TECHNOLOGY WISE DISTRIBUTION OF CALLS – B PARTY



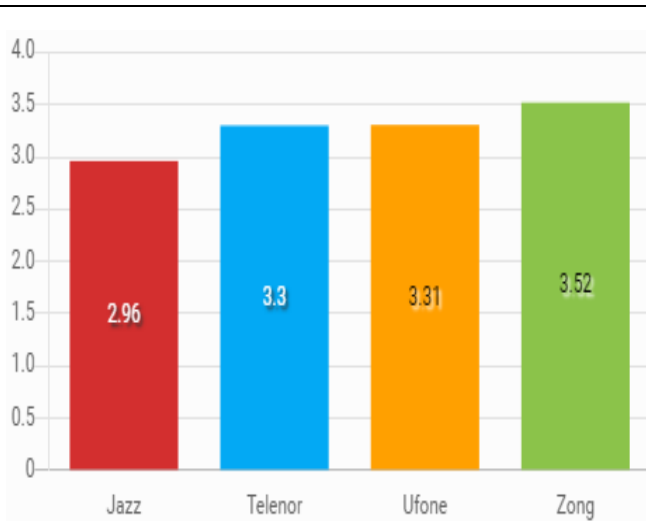
CALL SETUP SUCCESS RATE



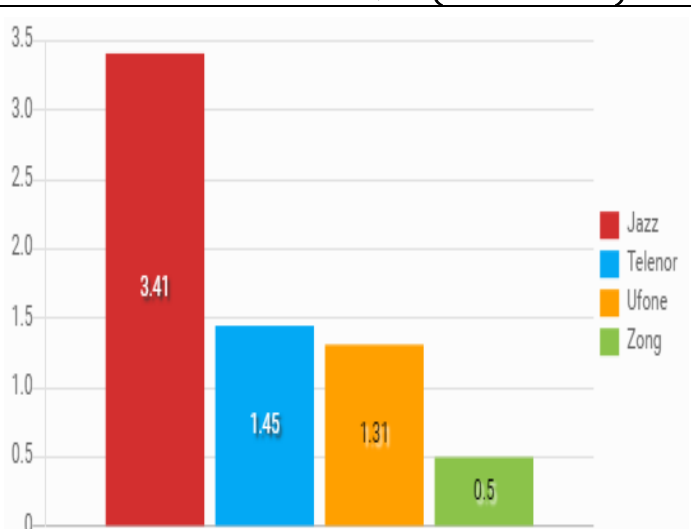
CALL RETAINABILITY

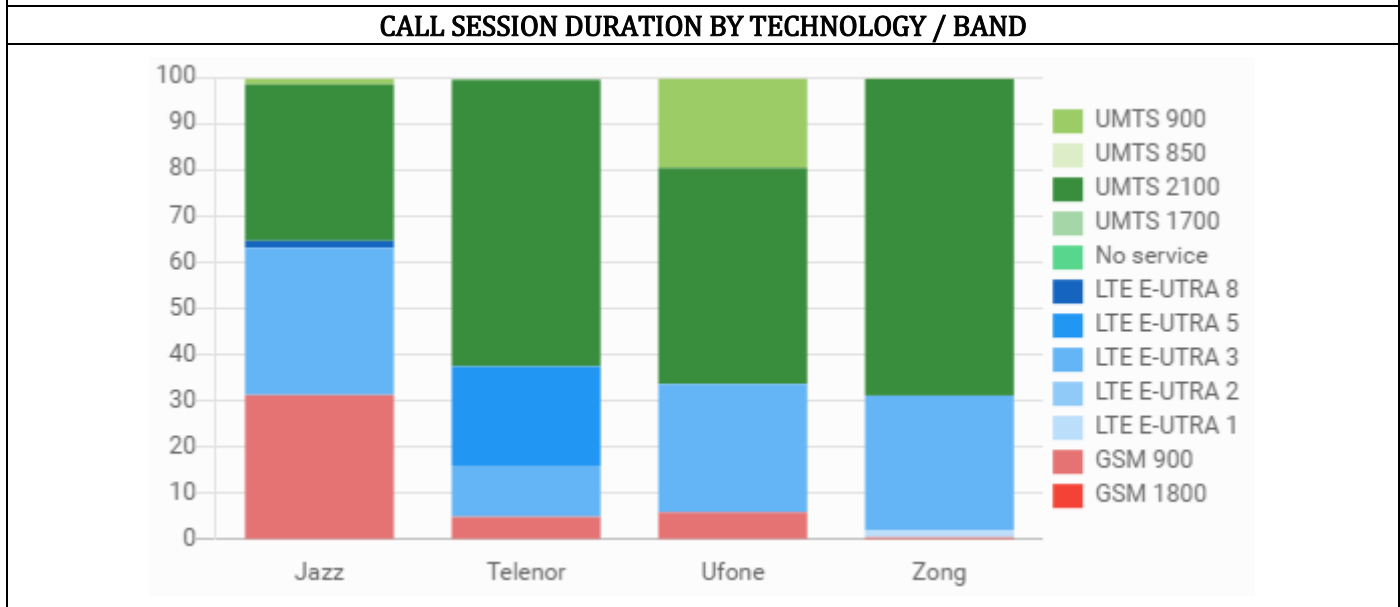
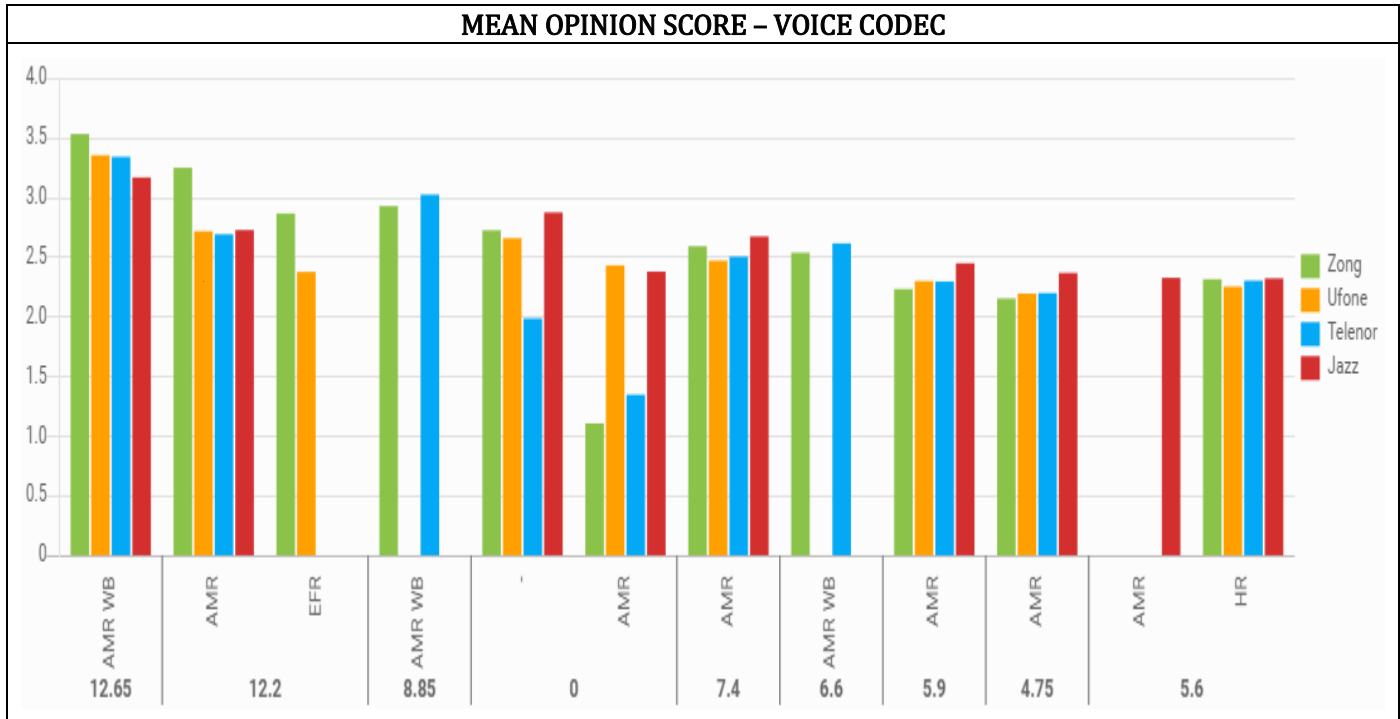


MEAN OPINION SCORE - AVERAGE



MEAN OPINION SCORE < 1.6 (PERCENTAGE)





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 **18 x surveyed cities** of Pakistan. The compliance level of threshold values of voice QoS KPIs in 9 x Cities is shown in each **Table 5.21 & 5.22: Voice QoS KPIs Compliance Level**.

VOICE CALLS CITIES- COMPLIANCE (YES/NO)										
Operator	* QoS KPIs	Khanewal	Muzaffargarh	Mastung	Loralai	Mansehra	Mardan	Sargodha	Gujrat	Kohat
Jazz	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	Yes	No	Yes	Yes	No	No	Yes	No	Yes
	CCT	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
	CCR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	MOS	No	No	No	No	No	No	No	Yes	Yes
	ISHO	No	Yes	N/A	N/A	Yes	Yes	Yes	Yes	Yes
	RSSR	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Yes	Yes
Telenor	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	No	Yes	No	Yes	No	No	Yes	No	No
	CCT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	CCR	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
	MOS	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
	ISHO	N/A	Yes	N/A	Yes	Yes	No	Yes	Yes	Yes
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ufone	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes
	CCT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	CCR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	MOS	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No
	ISHO	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ZonG	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	No	No	No	Yes	Yes	No	Yes	Yes	Yes
	CCT	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
	CCR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	MOS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	ISHO	N/A	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

* Note Voice QoS KPIs: Network Accessibility (NA) > 99%, Service Accessibility (SA) > 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 5.21: Voice QoS KPIs Compliance Level

VOICE CALLS CITIES- COMPLIANCE (YES/NO)										
Operator	* QoS KPIs	Charsadda	Battagram	Abdul Hakeem	Mirpur Khas	Nowshera	Pishin	Narowal	Dera Allah Yar	Dera Murad Jamali
Jazz	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes
	CCT	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes
	CCR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	MOS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
	ISHO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Telenor	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	No	No	Yes	No	No	Yes	No	Yes	Yes
	CCT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	CCR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	MOS	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes
	ISHO	Yes	Yes	N/A	N/A	Yes	Yes	N/A	Yes	N/A
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ufone	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes
	CCT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	CCR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	MOS	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
	ISHO	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	N/A
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ZonG	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	No	Yes	Yes	Yes	No	Yes	No	Yes	No
	CCT	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	CCR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	MOS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	ISHO	N/A	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

* Note Voice QoS KPIs: Network Accessibility (NA) > 99%, Service Accessibility (SA) > 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 5.22: Voice QoS KPIs Compliance Level

SMS SERVICE

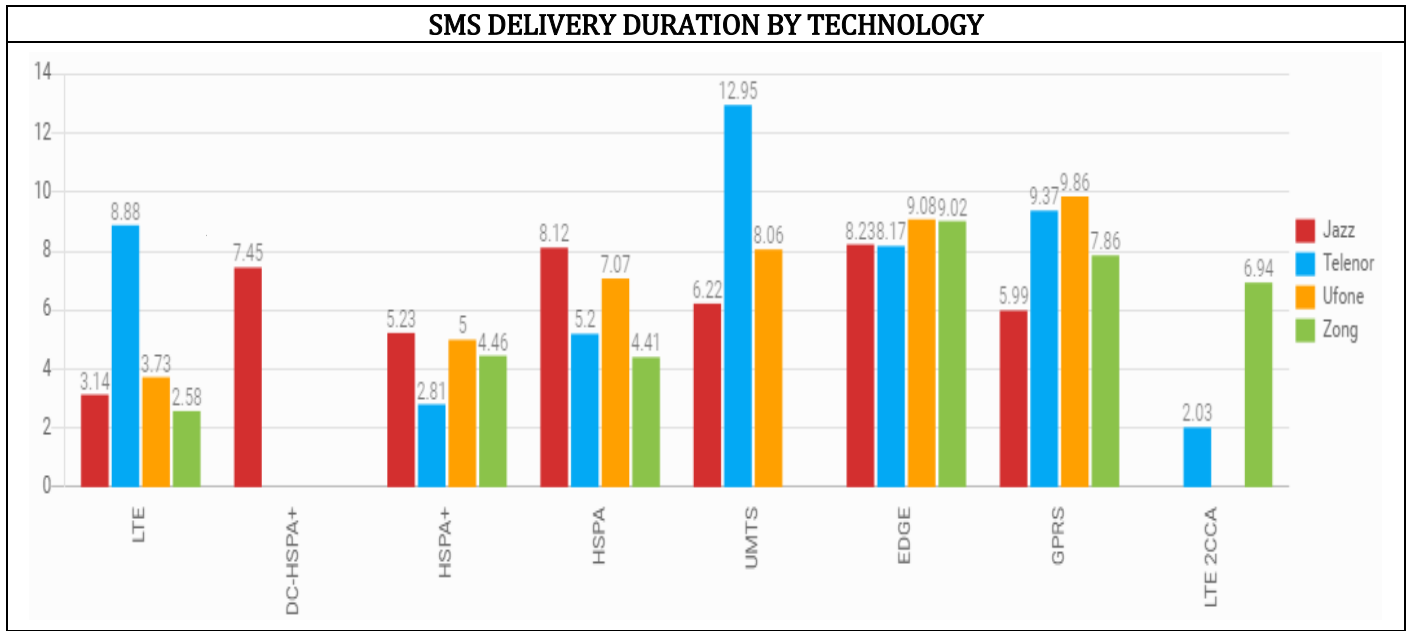
6.1. A total of 15,325 SMS sending attempts conducted, out of which 15,128 SMS successfully received at B-Party. The company wise SMS Statistics are shown in **Table6.1: SMS Statistics**

DESCRIPTION	JAZZ	TELENOR	UFONE	ZONG
<i>SMS SEND REQUEST</i>	3860	3811	3803	3851
<i>SMS SUCCESSFULLY RECEIVED</i>	3802	3713	3783	3830
<i>SMS RECEIVE SUCCESS RATE</i>	98.5 %	97.43 %	99.47 %	99.45 %
<i>END-TO-END DELIVERY TIME</i>	3.61 s	8.89 s	4.7 s	2.62 s

Table6.1: 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.





SURVEY MAPS & GRAPHICAL RESULTS

7.1 The 4G/LTE (RSRP) and 3G (RSCP) Signal Strength samples recorded during drive test on survey routes and plotted on maps. The Signal Strength maps along-with Voice & SMS QoS KPIs survey results in graphical form are shown at **Annex-A, Annex-B, Annex-C & Annex-D** for Cities of Punjab, Khyber Pakhtunkhwa, Balochistan and Sindh 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 **18 x surveyed cities**.

- a. **MOBILE NETWORK COVERAGE.** The categorization of CMOs as per QoS KPI i.e. Signal Strength of 4G/LTE and 3G Networks is shown in **Table 8.1: CMOs Standing in Mobile Network Coverage**.

S. #.	Operator	Compliance Level – Number of Cities				Standing
		Compliant		Non-Compliant		
		4G	3G	4G	3G	
1.	ZonG	18	10	-	1	1 st
2.	Telenor	17	7	1	-	2 nd
3.	Jazz	14	10	4	-	3 rd
4.	Ufone	11	17	7	-	4 th

Table 8.1: CMOs Standing in Mobile Network Coverage

- b. **MOBILE BROADBAND SERVICE.** The categorization of each CMOs, as per the highest to lowest obtained User Data Throughput in 4G/LTE and 3G Networks is shown in **Table 8.2: CMOs Standing in Mobile Broadband Service.**

S. #.	Operator	Highest Throughput – Number of Cities								Standing	
		4G				3G				4G	3G
		1st	2nd	3rd	4th	1st	2nd	3rd	4th		
1.	ZonG	12	6	-	-	-	4	2	4	1st	4th
2.	Ufone	6	6	4	1	15	2	-	-	2nd	1st
3.	Jazz	-	5	12	1	1	5	3	-	3rd	2nd
4.	Telenor	-	1	2	15	1	2	2	-	4th	3rd

Table 8.2: CMOs Standing in Mobile Broadband Service

- c. **VOICE SERVICE.** The categorization of each CMOs, as per the maximum compliant of Voice QoS KPIs is shown in **Table 8.3: CMOs Standing in Voice Service.**

S. #.	Operator	Voice QoS KPIs		Standing
		Compliant	Non-Compliant	
1.	ZonG	98	10	1st
2.	Ufone	113	12	2nd
3.	Jazz	131	18	3rd
4.	Telenor	104	16	4th

Table 8.3: CMOs Standing in Voice Service

- d. **OVERALL STANDING.** The overall standing of each CMOs in different category of services is mentioned in **Table 8.4: CMOs Overall Standing in QoS Survey.**

S. #.	Service	STANDING				
		1st	2nd	3rd	4th	
1.	Mobile Network Coverage	ZonG	Telenor	Jazz	Ufone	
2.	Mobile Broadband	3G	Ufone	Jazz	Telenor	ZonG
		4G	ZonG	Ufone	Jazz	Telenor
3.	Voice	ZonG	Ufone	Jazz	Telenor	

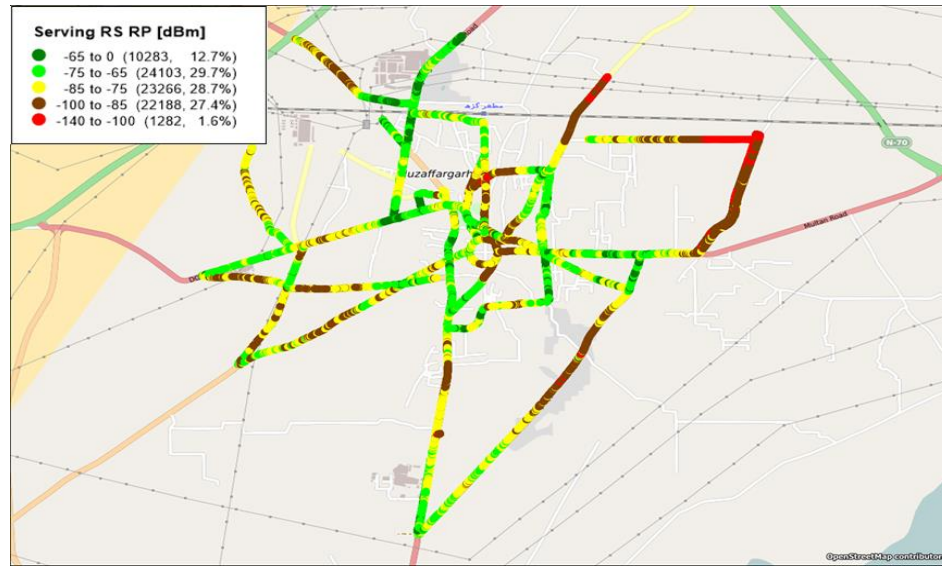
Table 8.4: CMOs Overall Standing in QoS Survey

ANNEX – A

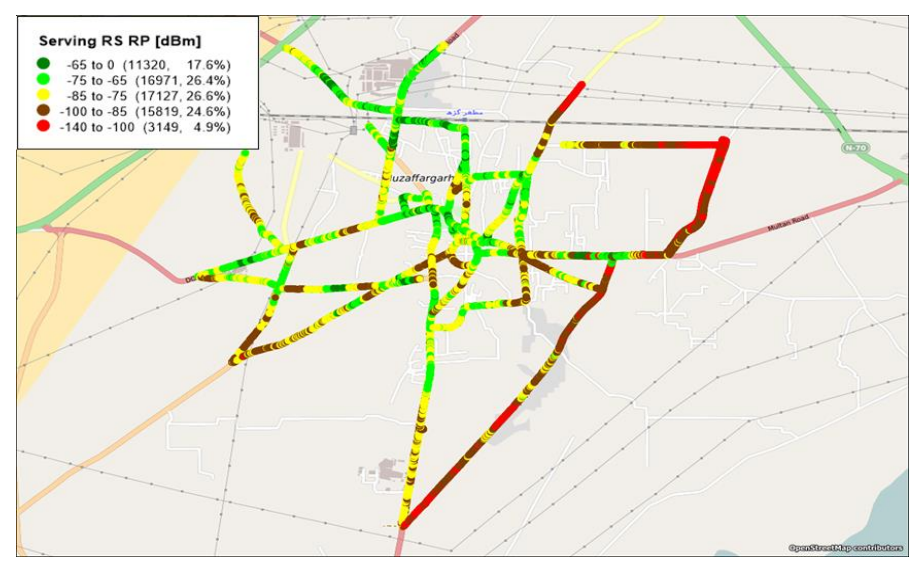
PUNJAB

4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

JAZZ 4G NETWORK COVERAGE – MUZAFFARGARH



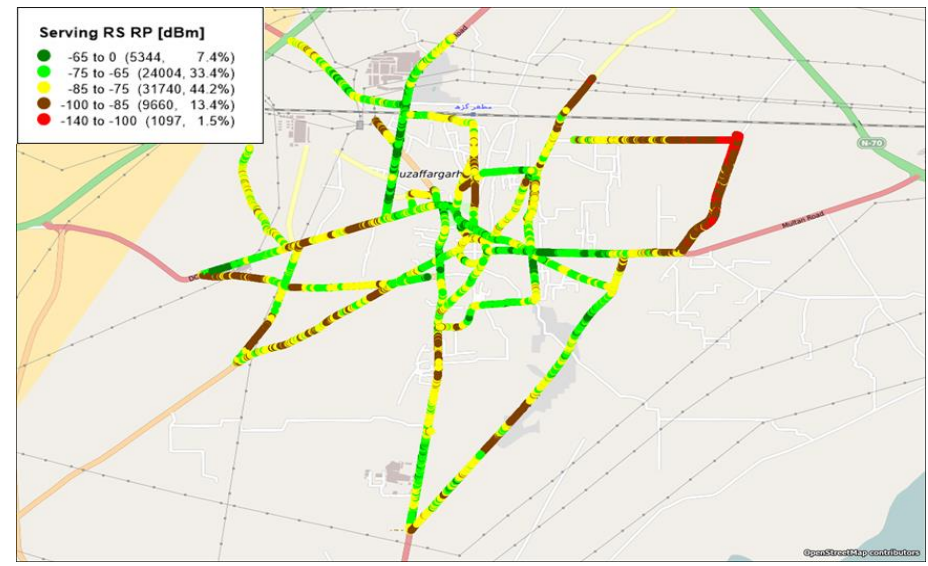
TELENOR 4G NETWORK COVERAGE – MUZAFFARGARH



UFONE 4G NETWORK COVERAGE – MUZAFFARGARH

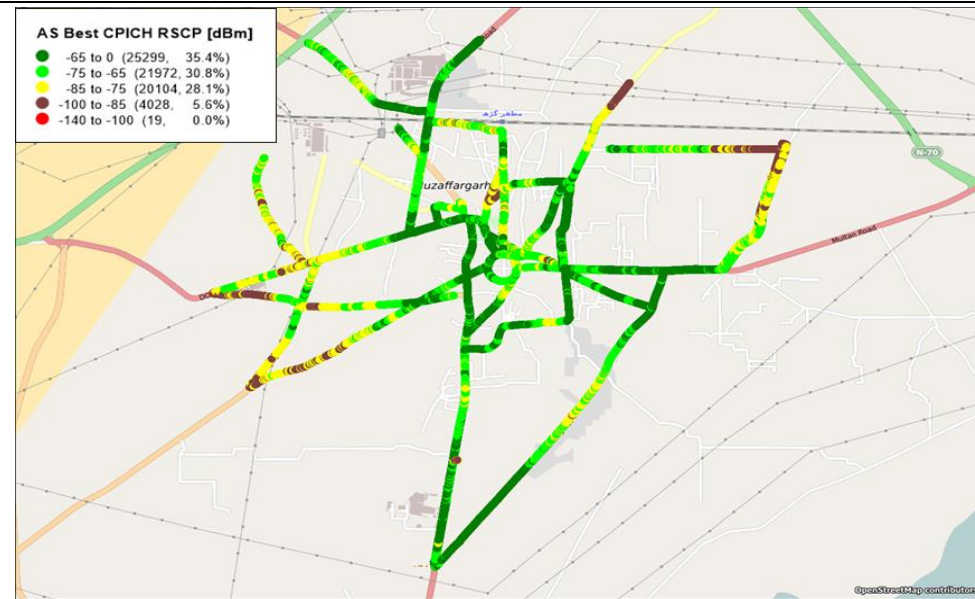
4G NOT AVAILABLE

ZONG 4G NETWORK COVERAGE – MUZAFFARGARH

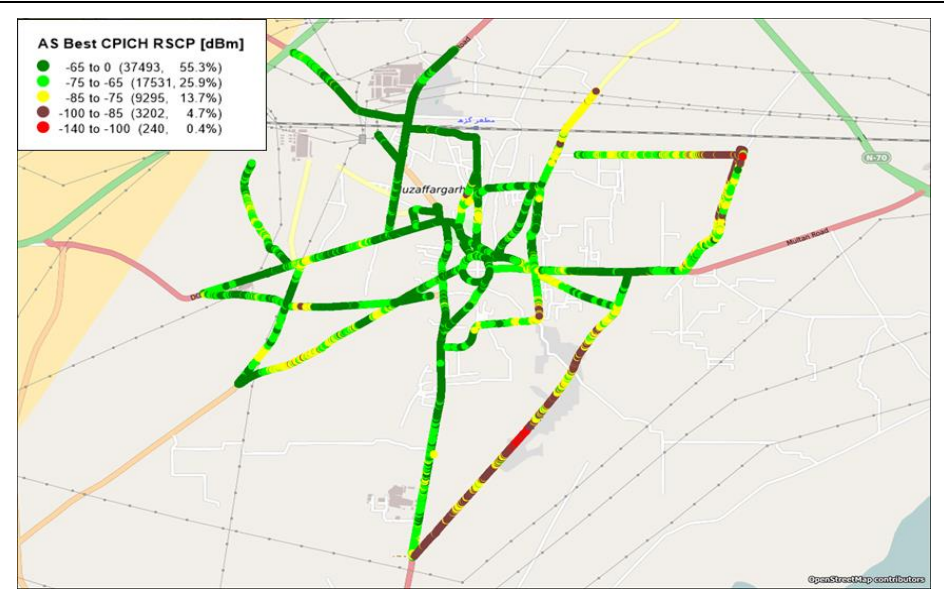


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

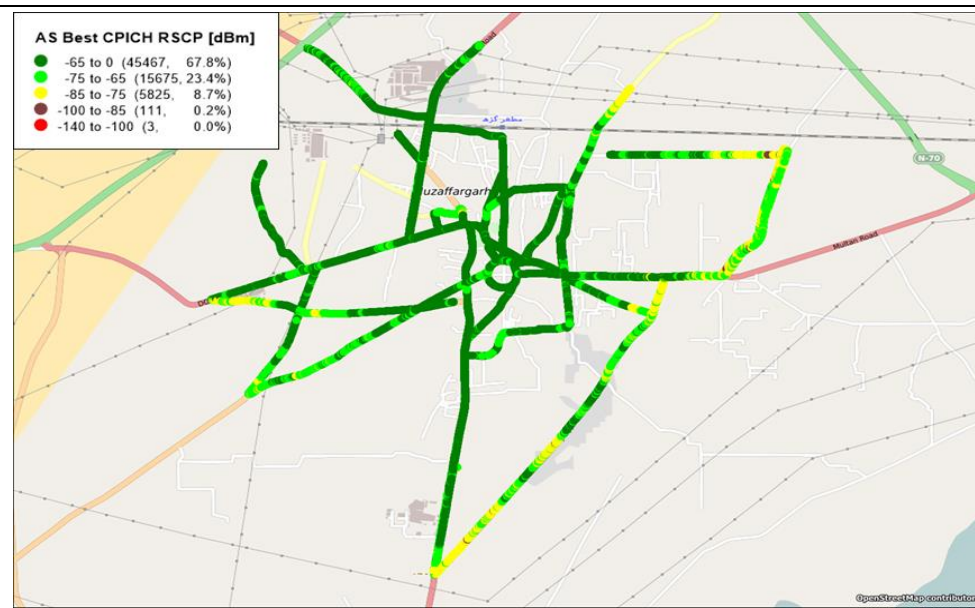
JAZZ 3G NETWORK COVERAGE - MUZAFFARGARH



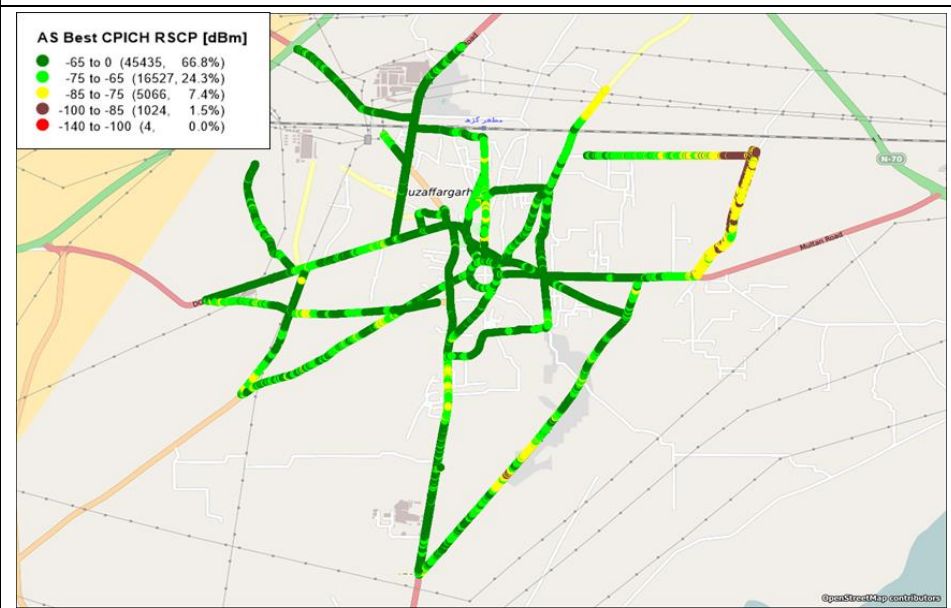
TELENOR 3G NETWORK COVERAGE - MUZAFFARGARH



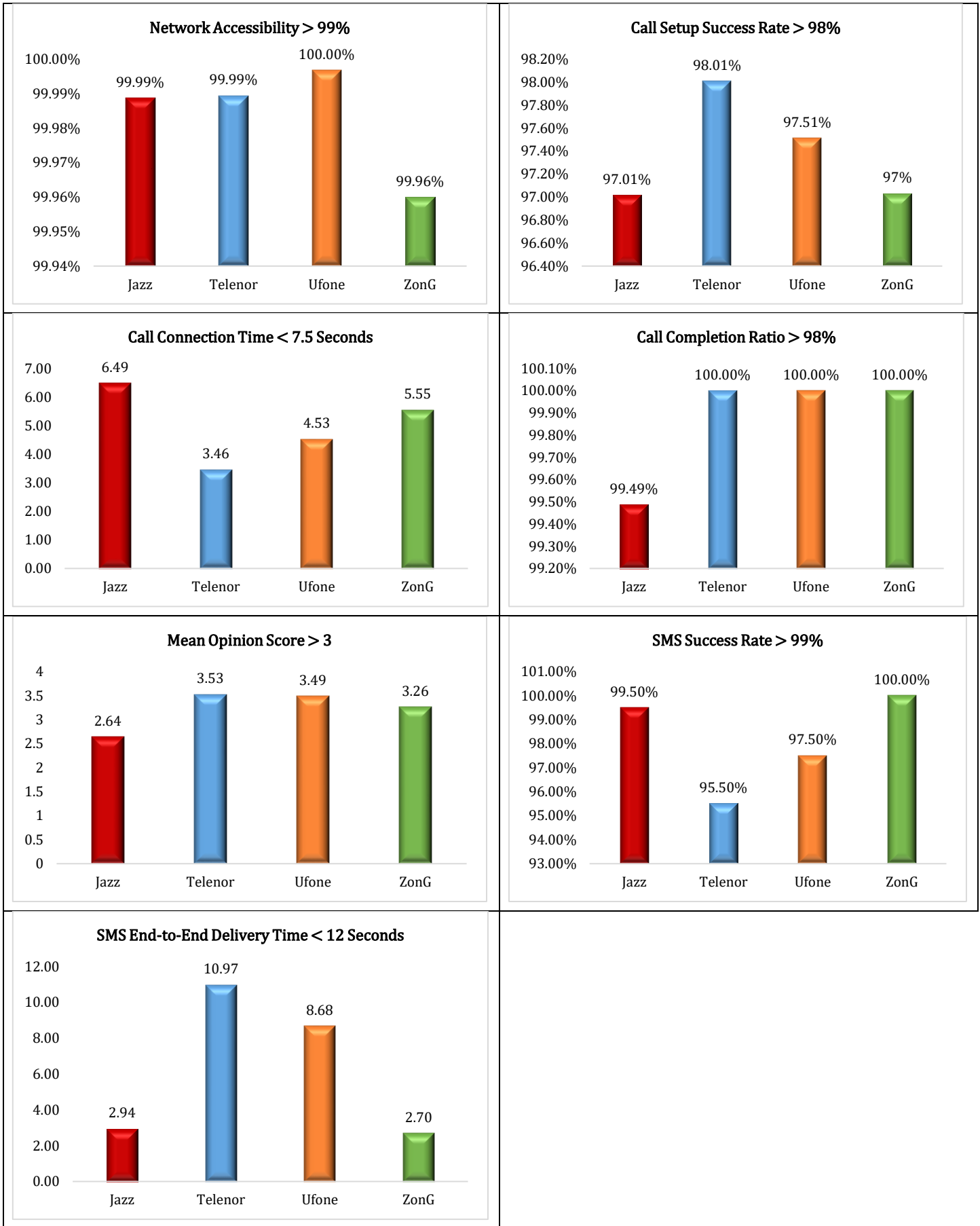
UFONE 3G NETWORK COVERAGE - MUZAFFARGARH



ZONG 3G NETWORK COVERAGE - MUZAFFARGARH

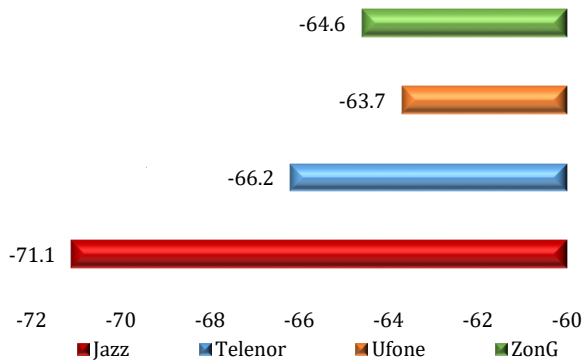


QUALITY OF SERVICE SURVEY RESULTS – MUZAFFARGARH

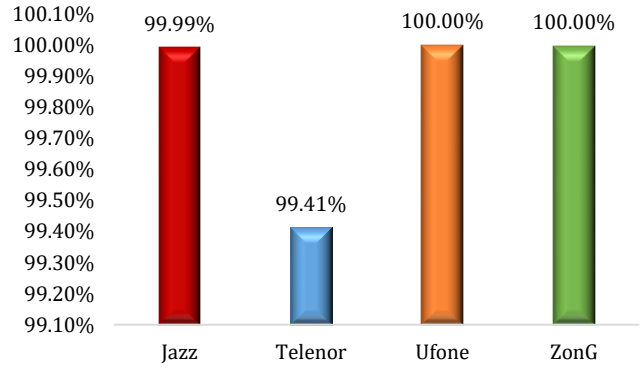


QUALITY OF SERVICE SURVEY RESULTS – MUZAFFARGARH

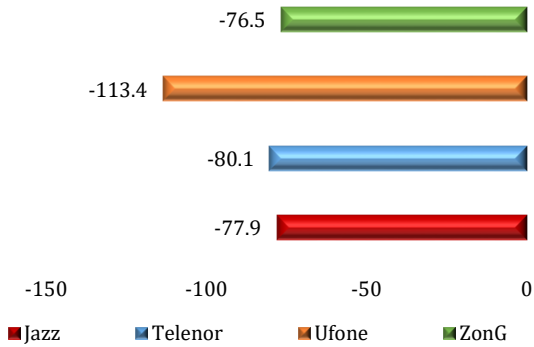
3G Signal Strength (RSCP) > -100dBm



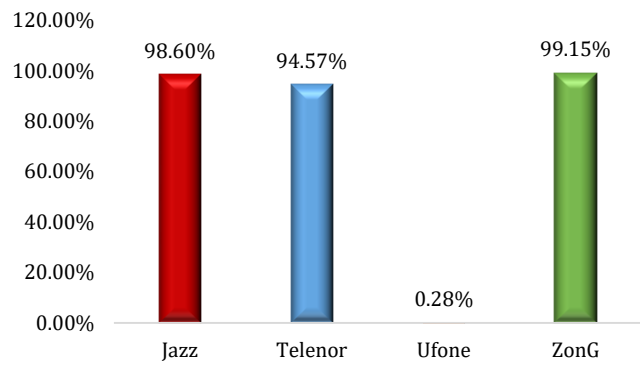
3G Signal Strength (RSCP) Confidencel Level > 90%



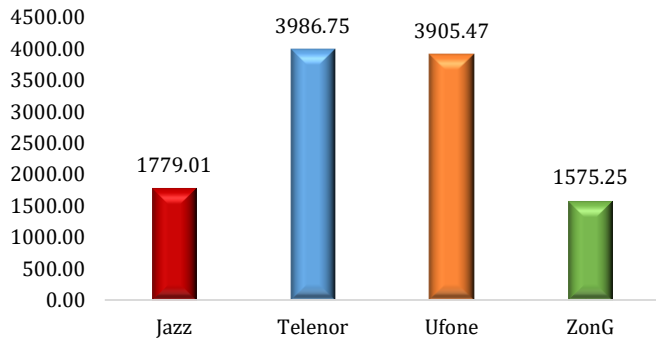
4G Signal Strength (RSRP) > -100dBm



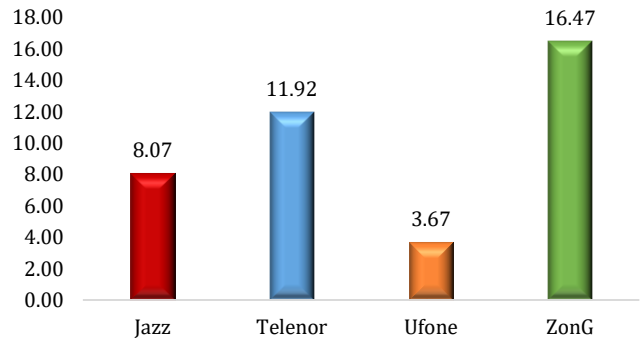
4G Signal Strength (RSRP) Confidencel Level > 90%



User Data Throughput (3G) > 256Kbps

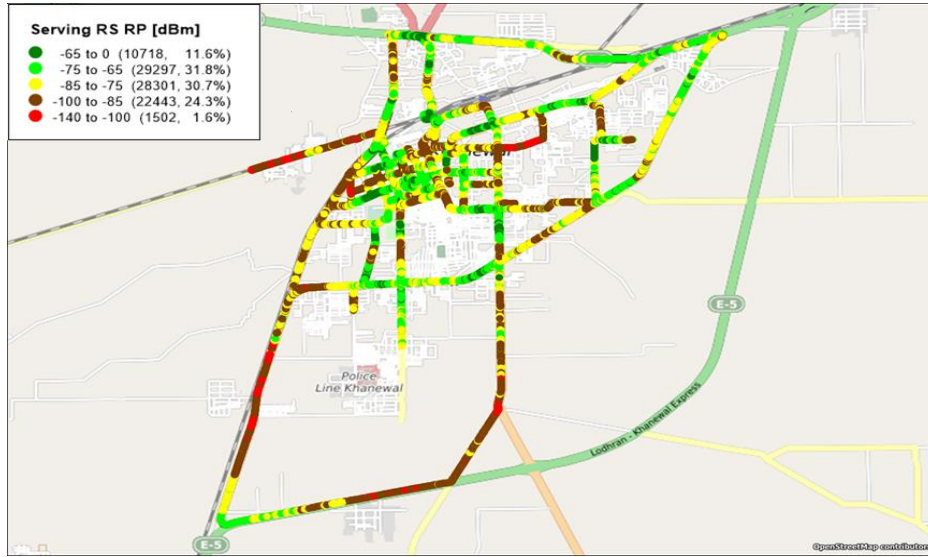


User Data Throughput (4G) > 2Mbps

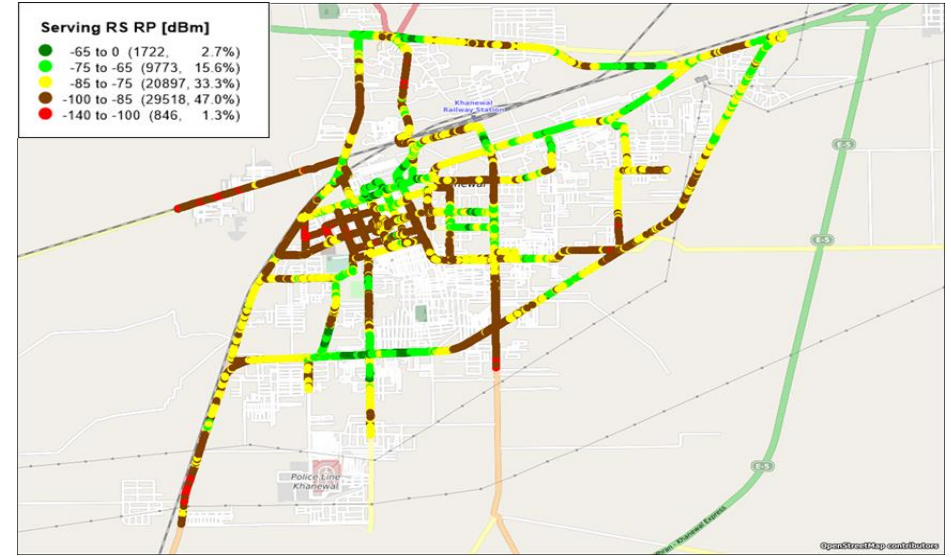


4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

JAZZ 4G NETWORK COVERAGE - KHANEWAL



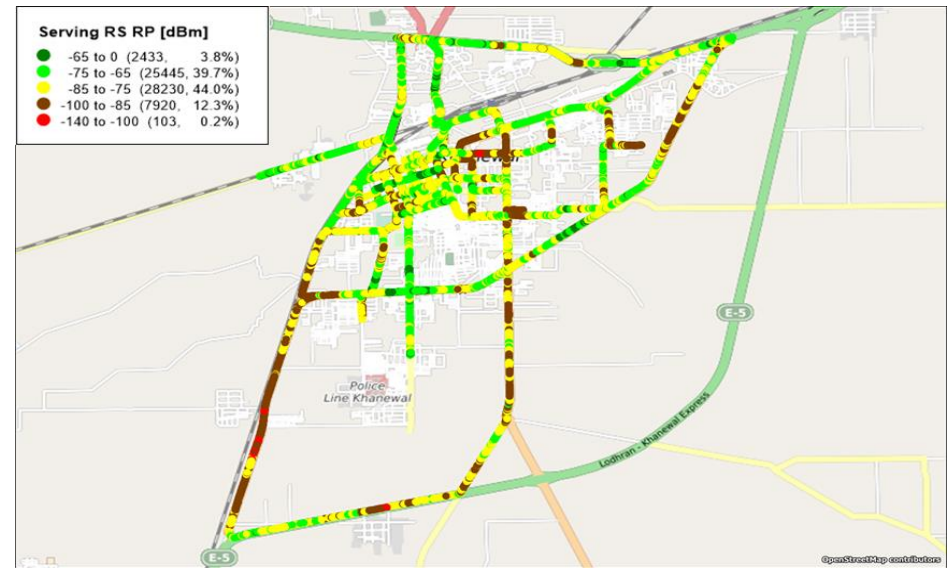
TELENOR 4G NETWORK COVERAGE - KHANEWAL



UFONE 4G NETWORK COVERAGE - KHANEWAL

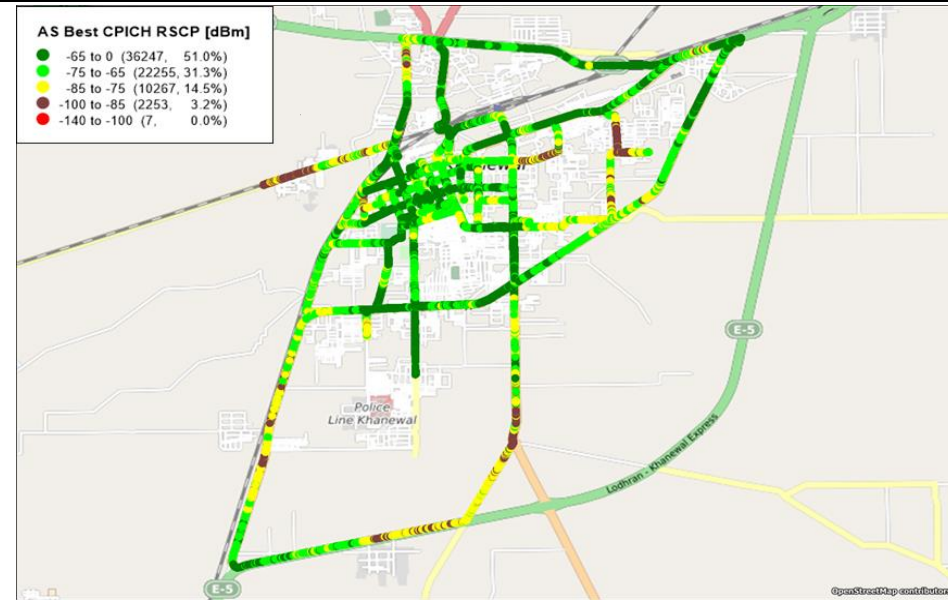
4G NOT AVAILABLE

ZONG 4G NETWORK COVERAGE - KHANEWAL

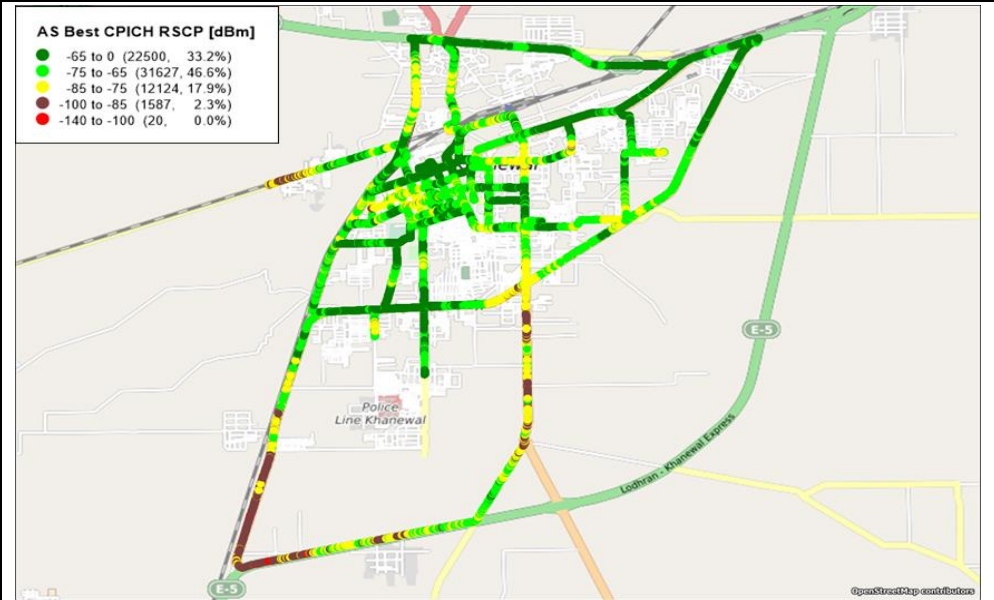


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

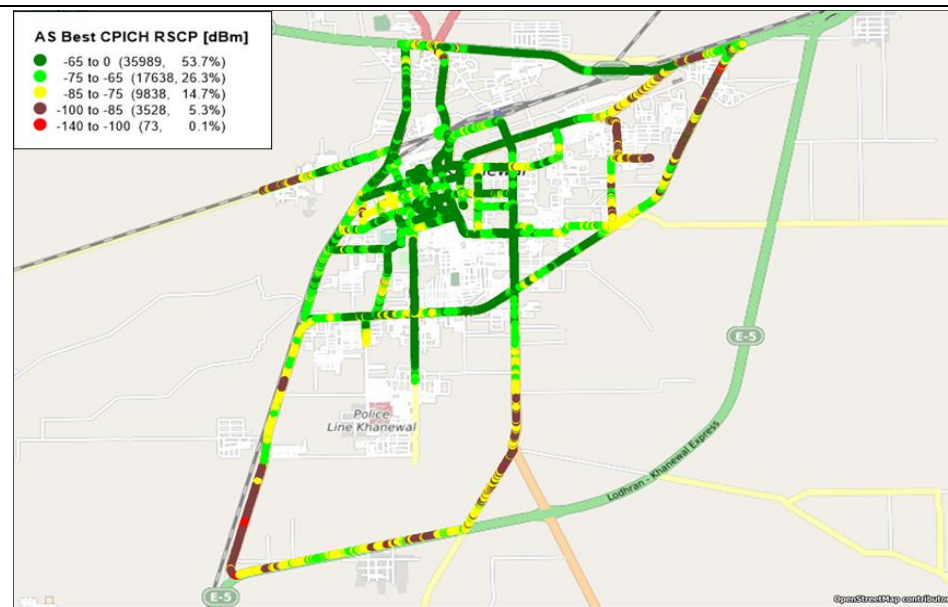
JAZZ 3G NETWORK COVERAGE - KHANEWAL



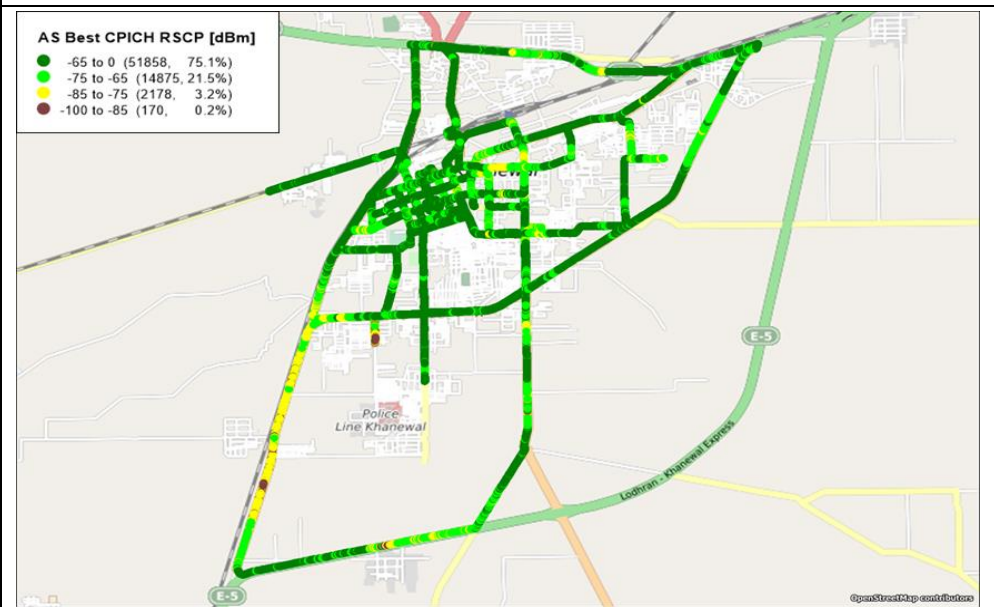
TELENOR 3G NETWORK COVERAGE - KHANEWAL



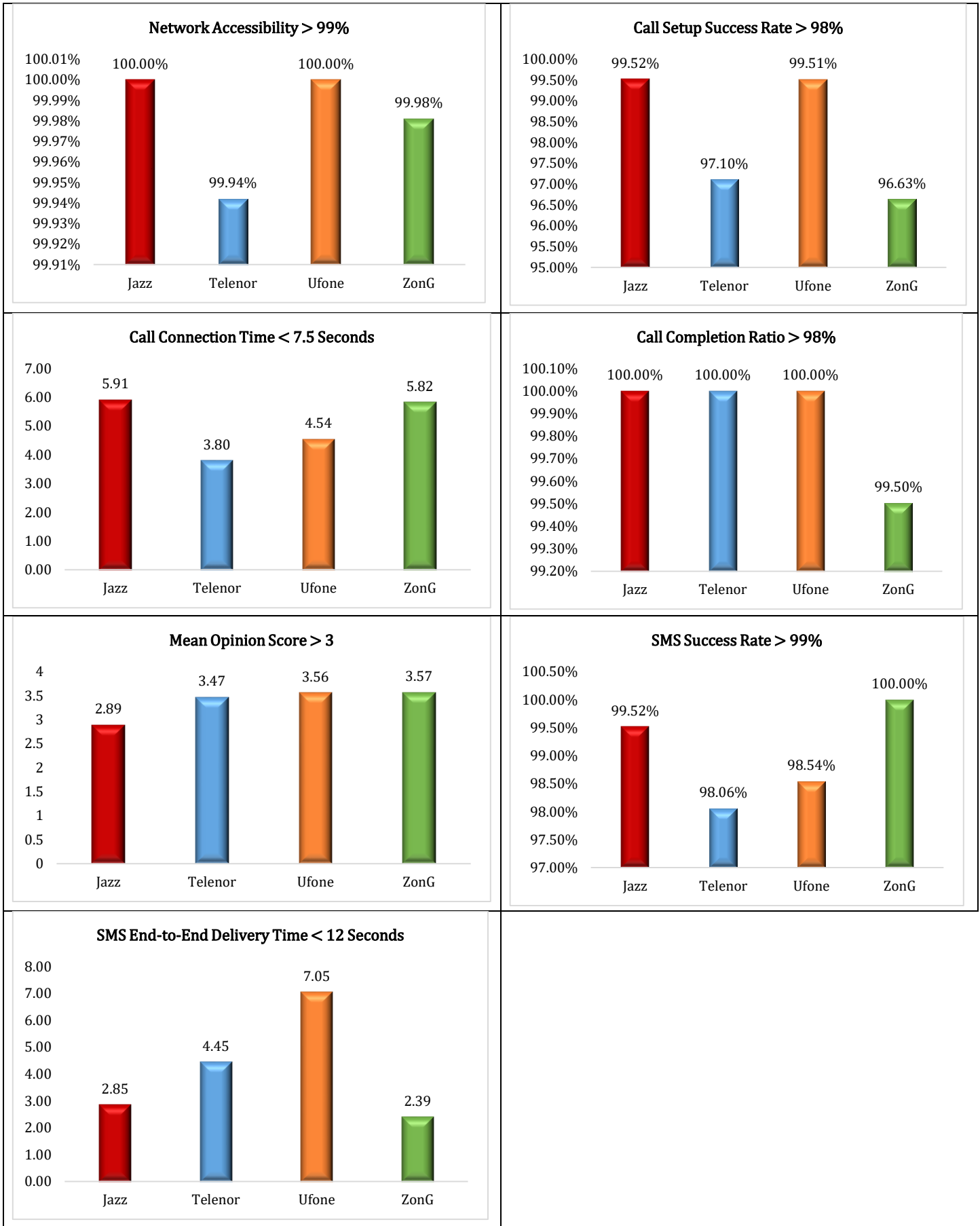
UFONE 3G NETWORK COVERAGE - KHANEWAL



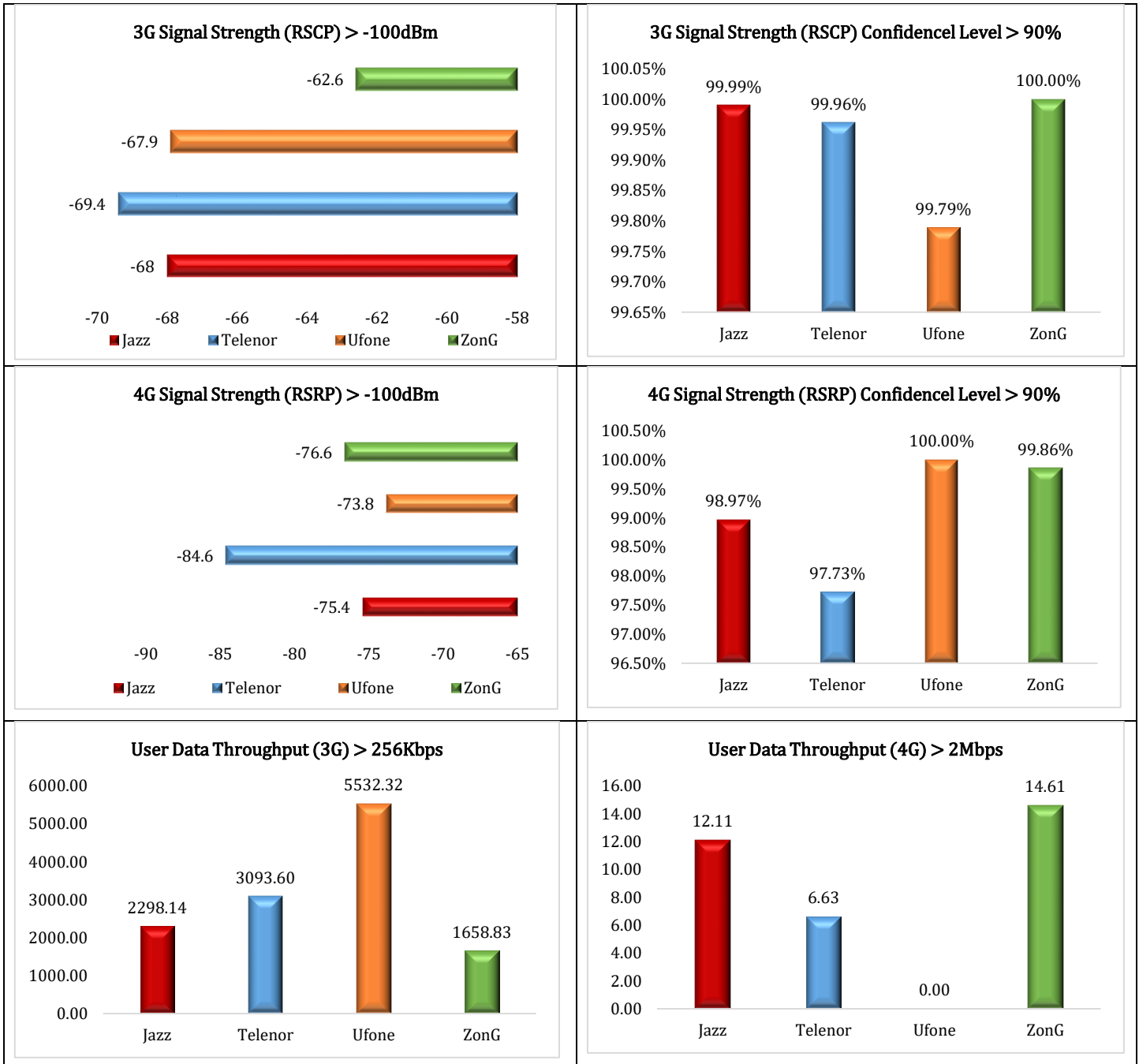
ZONG 3G NETWORK COVERAGE - KHANEWAL



QUALITY OF SERVICE SURVEY RESULTS – KHANEWAL



QUALITY OF SERVICE SURVEY RESULTS – KHANEWAL



4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

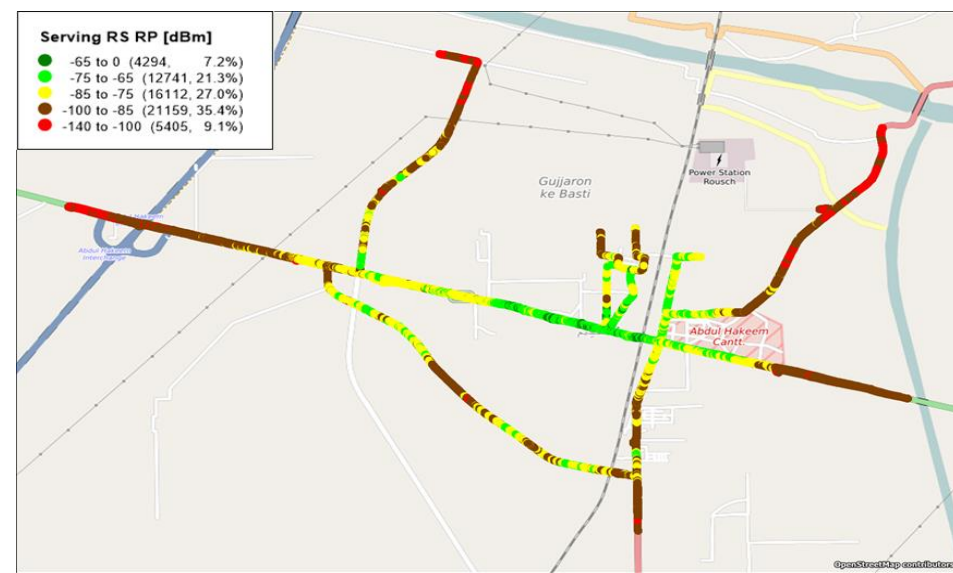
JAZZ 4G NETWORK COVERAGE - ABDUL HAKEEM



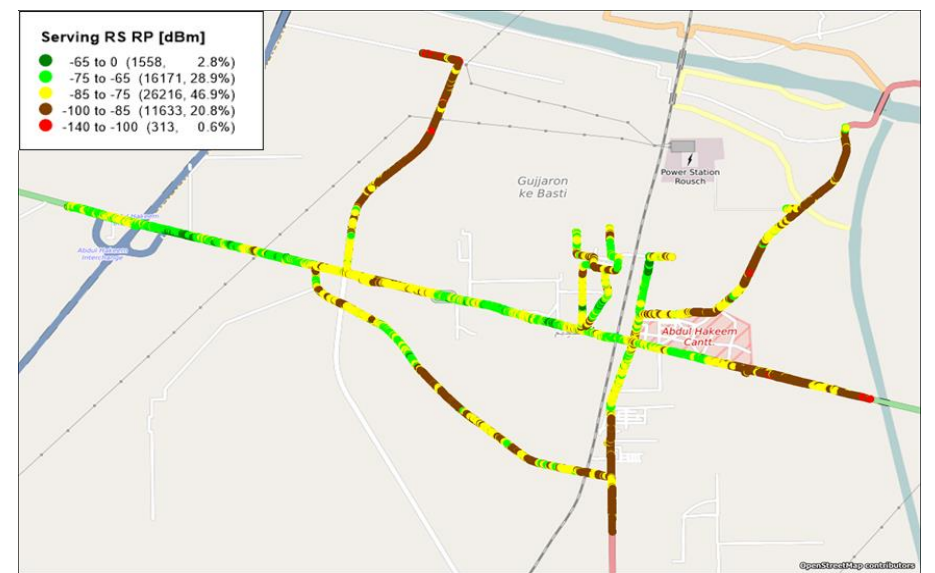
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UFONE 4G NETWORK COVERAGE - ABDUL HAKEEM



ZONG 4G NETWORK COVERAGE - ABDUL HAKEEM

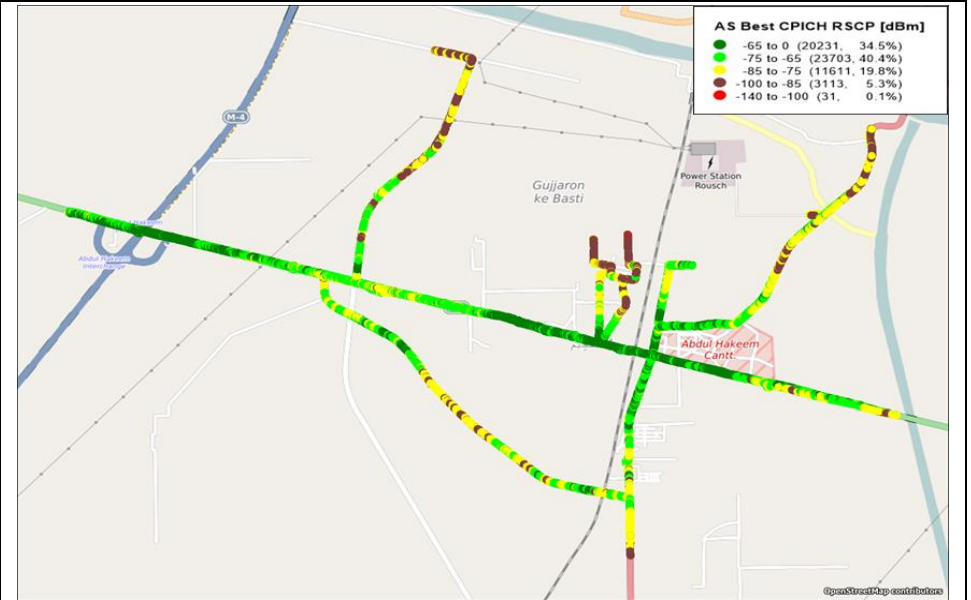


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

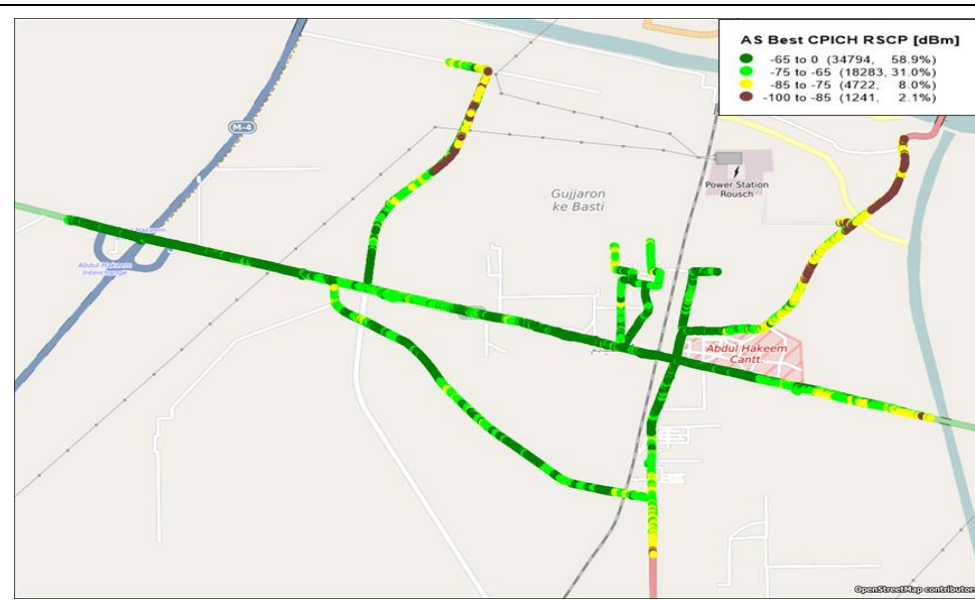
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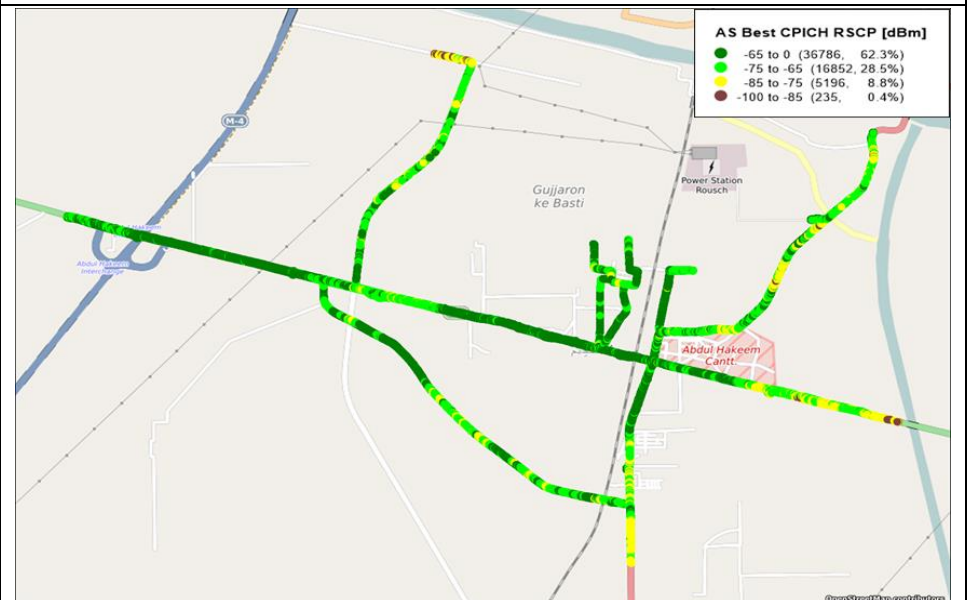
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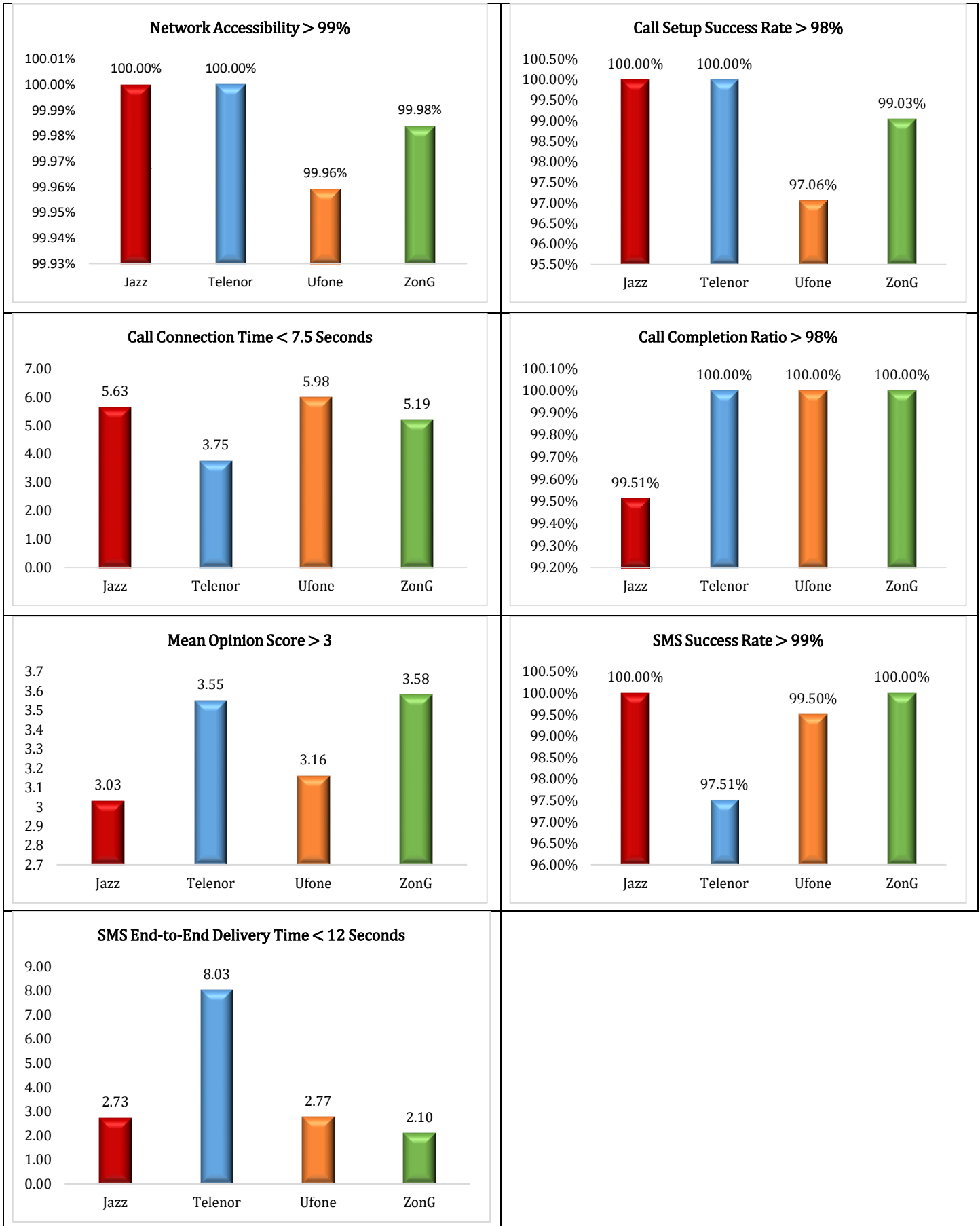
UFONE 3G NETWORK COVERAGE - ABDUL HAKEEM



ZONG 3G NETWORK COVERAGE - ABDUL HAKEEM

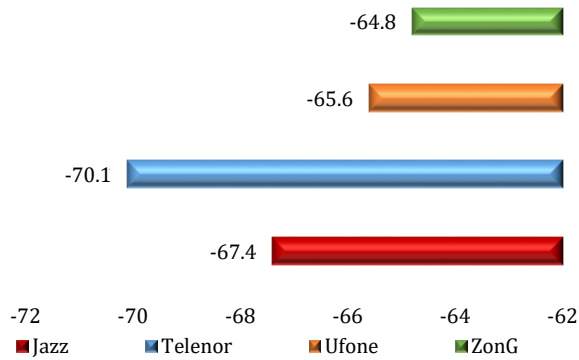


QUALITY OF SERVICE SURVEY RESULTS – ABDUL HAKEEM

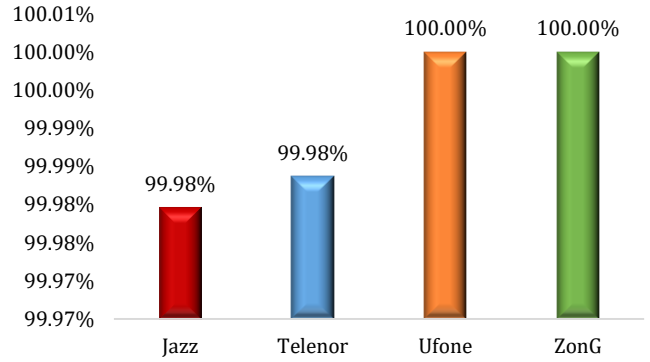


QUALITY OF SERVICE SURVEY RESULTS – ABDUL HAKEEM

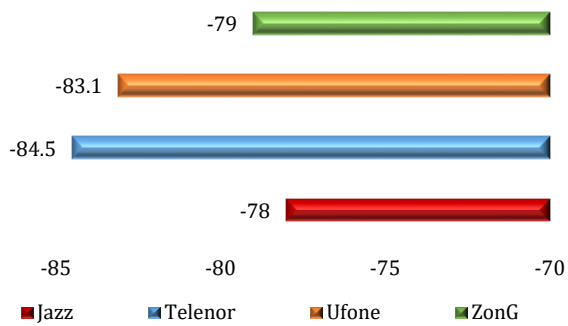
3G Signal Strength (RSCP) > -100dBm



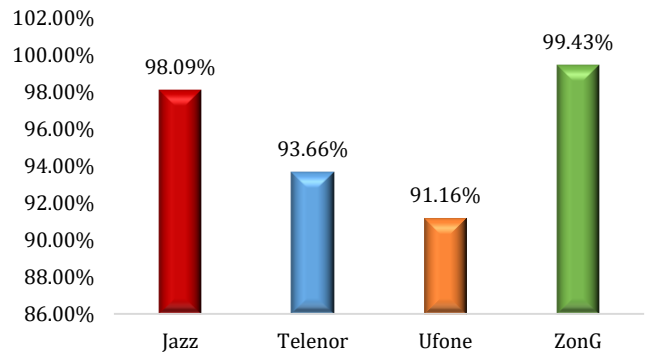
3G Signal Strength (RSCP) Confidencel Level > 90%



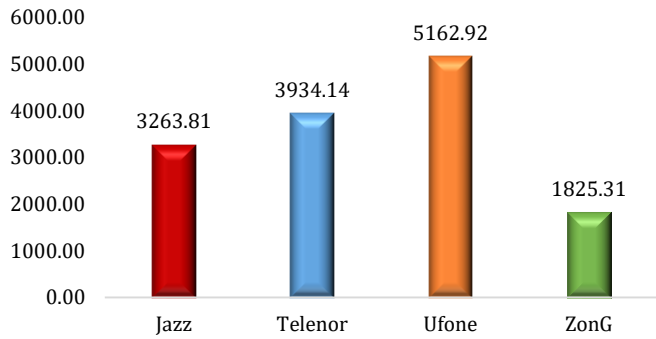
4G Signal Strength (RSRP) > -100dBm



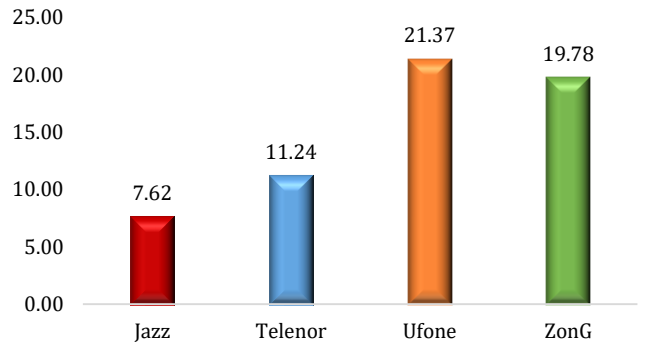
4G Signal Strength (RSRP) Confidencel Level > 90%



User Data Throughput (3G) > 256Kbps

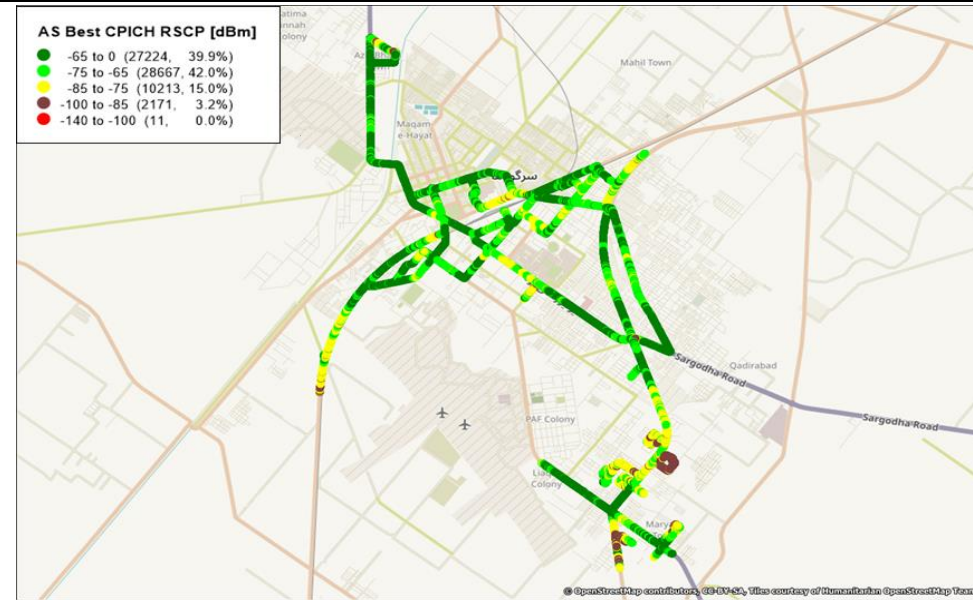


User Data Throughput (4G) > 2Mbps

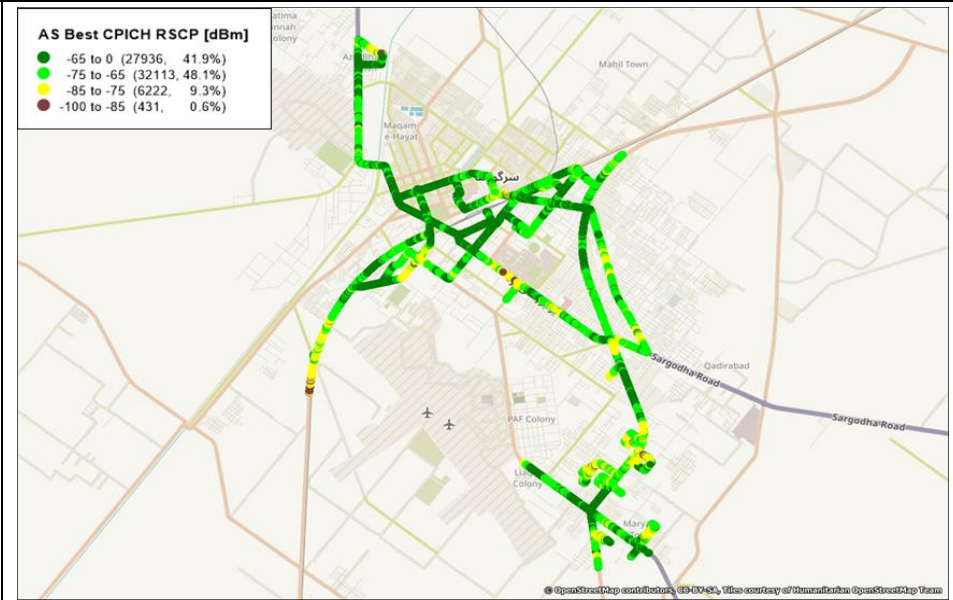


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

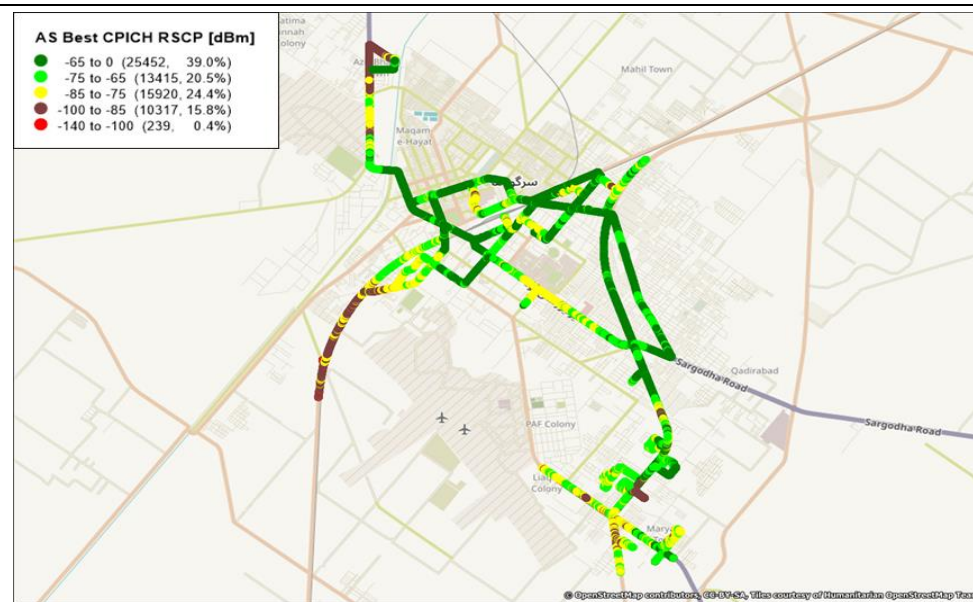
JAZZ 3G NETWORK COVERAGE - SARGODHA



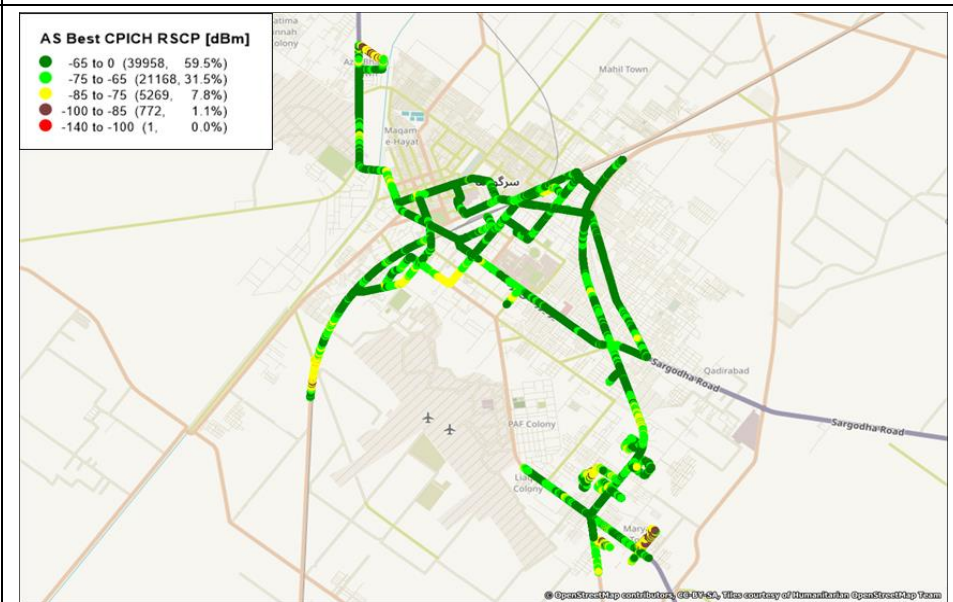
TELENOR 3G NETWORK COVERAGE - SARGODHA



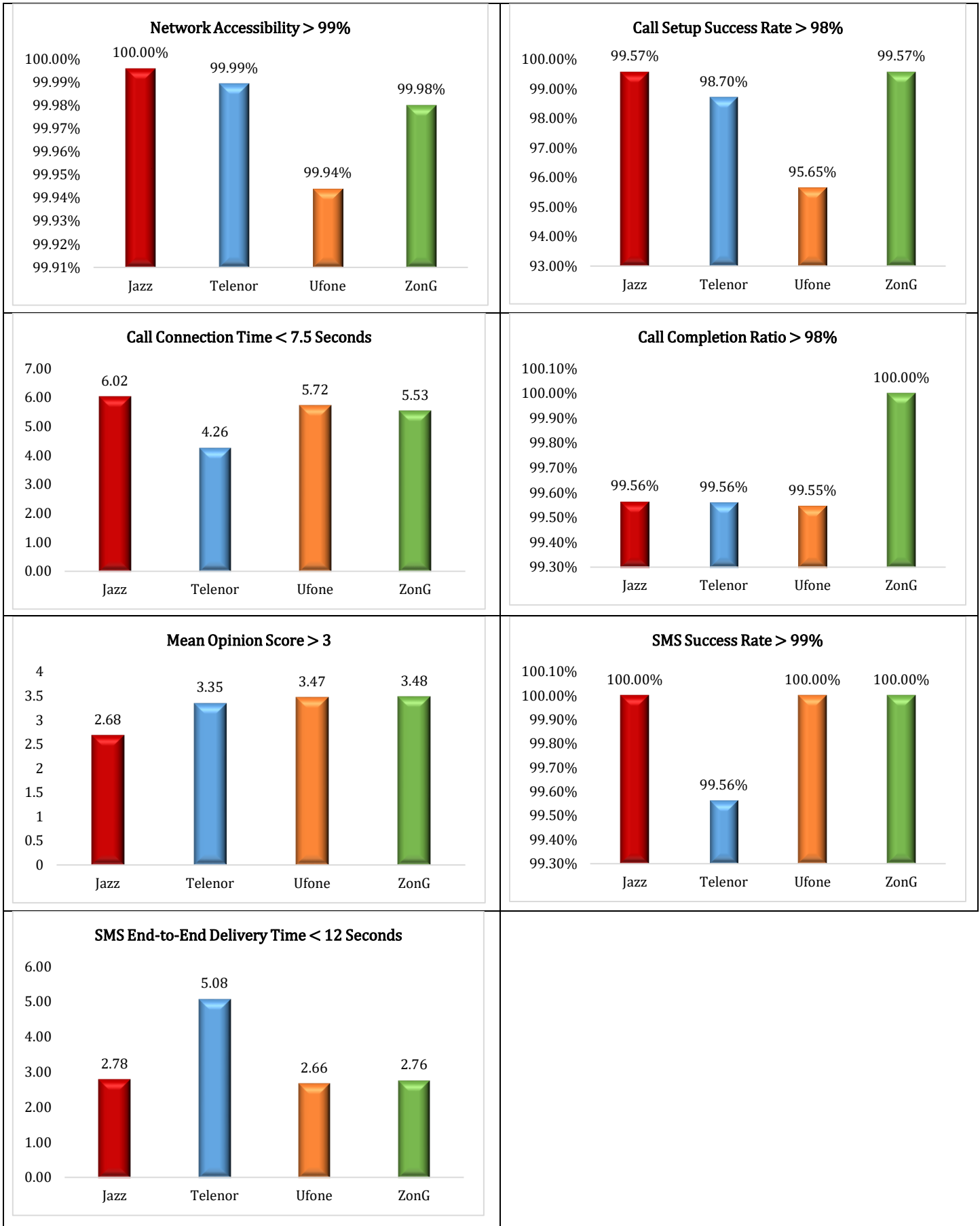
UFONE 3G NETWORK COVERAGE - SARGODHA



ZONG 3G NETWORK COVERAGE - SARGODHA

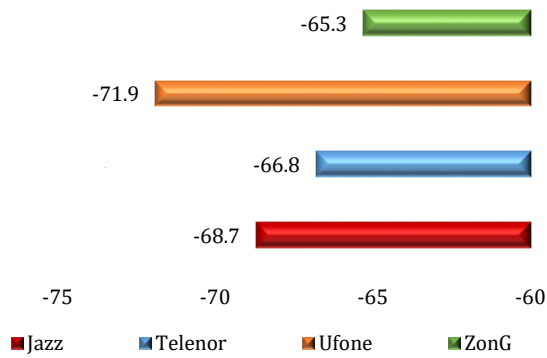


QUALITY OF SERVICE SURVEY RESULTS – SARGODHA

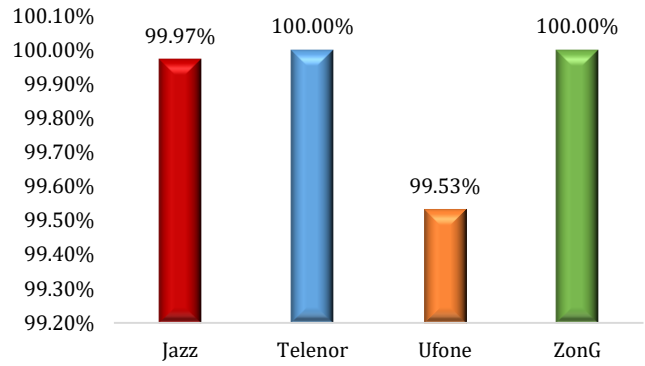


QUALITY OF SERVICE SURVEY RESULTS – SARGODHA

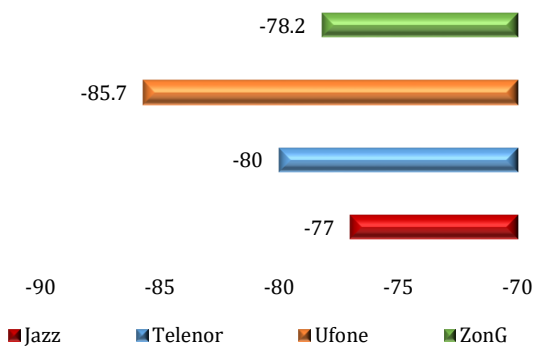
3G Signal Strength (RSCP) > -100dBm



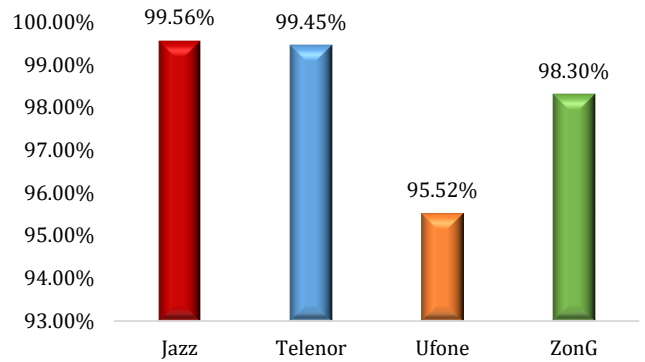
3G Signal Strength (RSCP) Confidencel Level > 90%



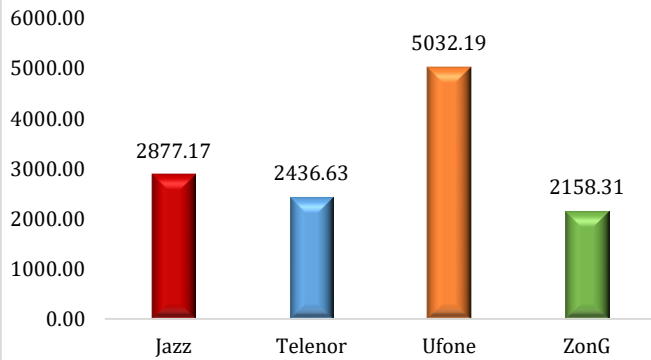
4G Signal Strength (RSRP) > -100dBm



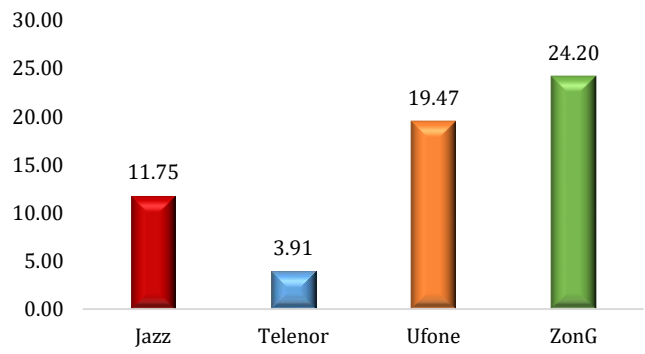
4G Signal Strength (RSRP) Confidencel Level > 90%



User Data Throughput (3G) > 256Kbps

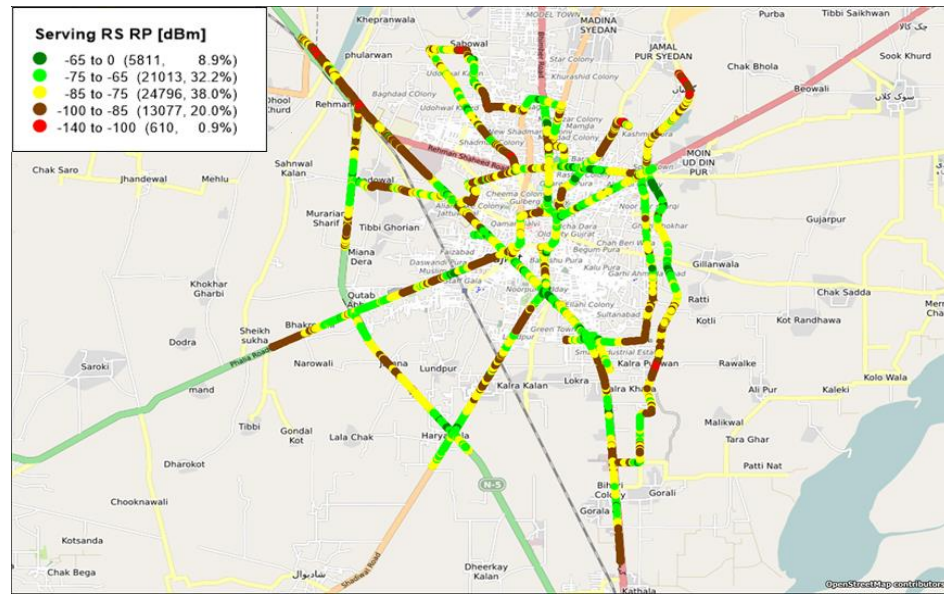


User Data Throughput (4G) > 2Mbps

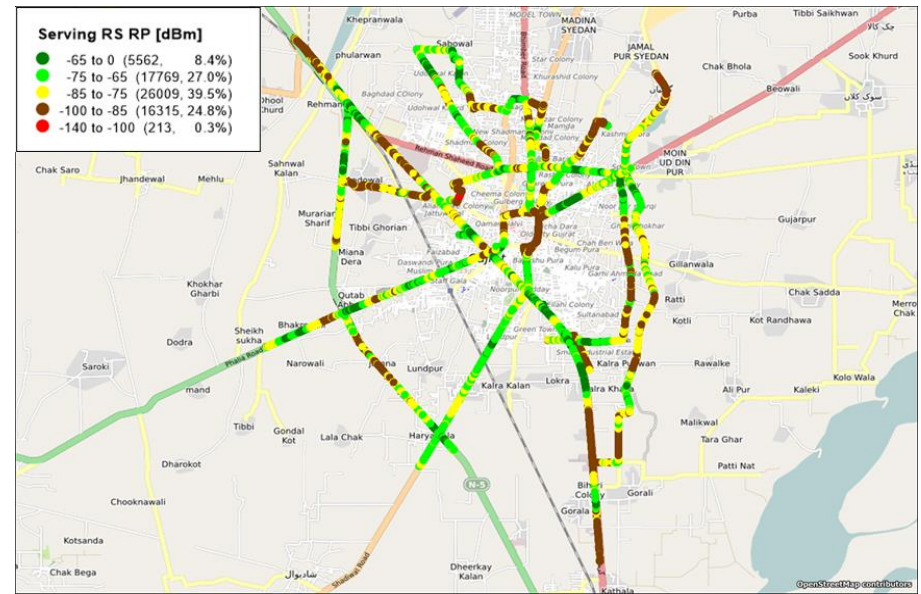


4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

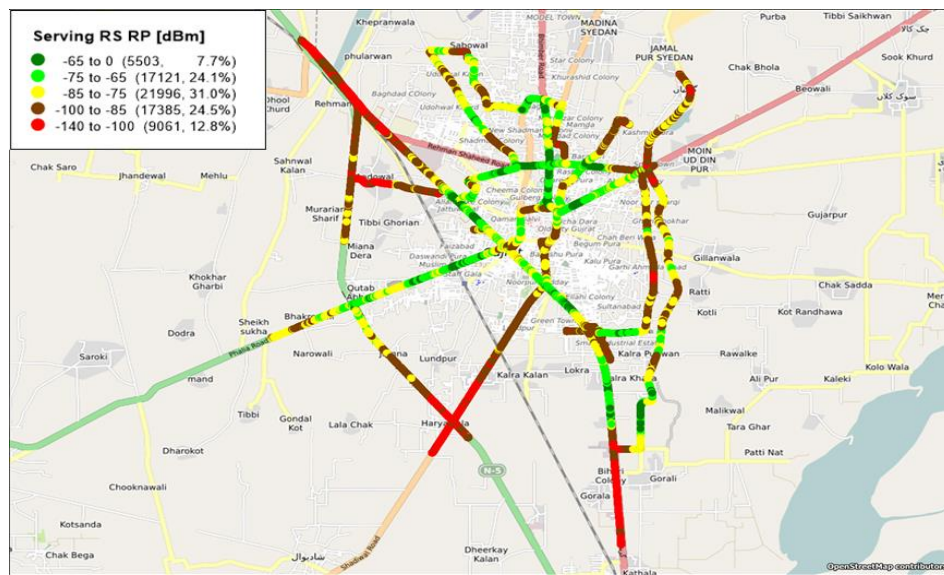
JAZZ 4G NETWORK COVERAGE - GUJRAT



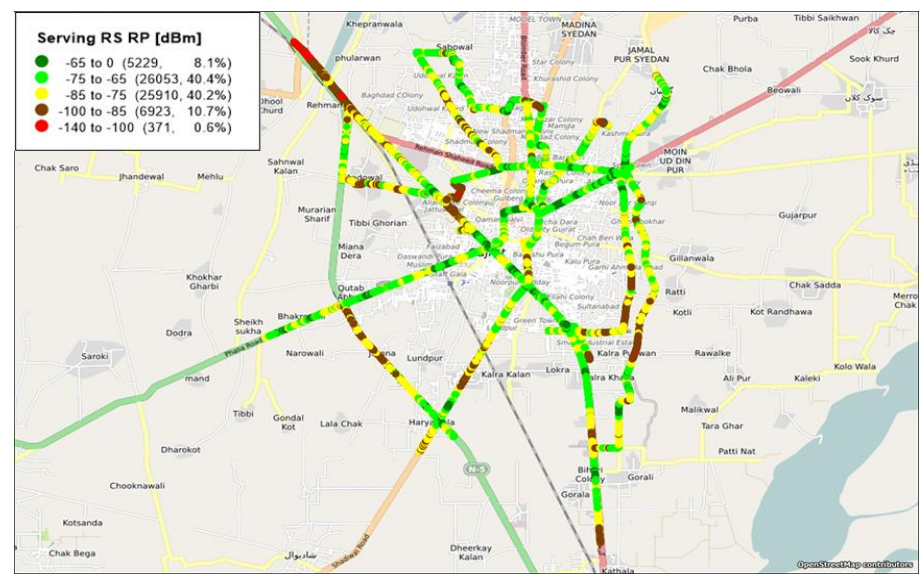
TELENOR 4G NETWORK COVERAGE - GUJRAT



UFONE 4G NETWORK COVERAGE - GUJRAT

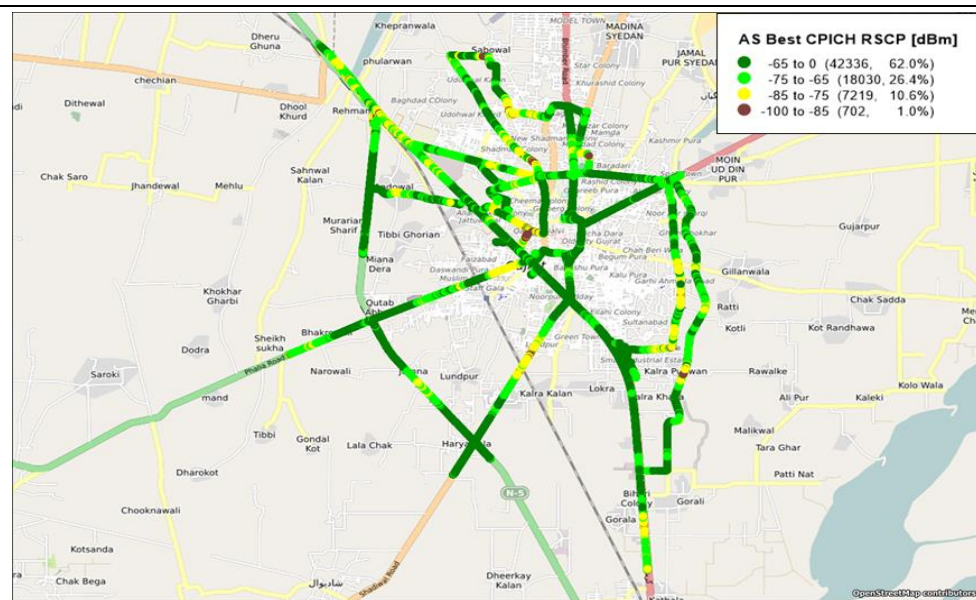


ZONG 4G NETWORK COVERAGE - GUJRAT

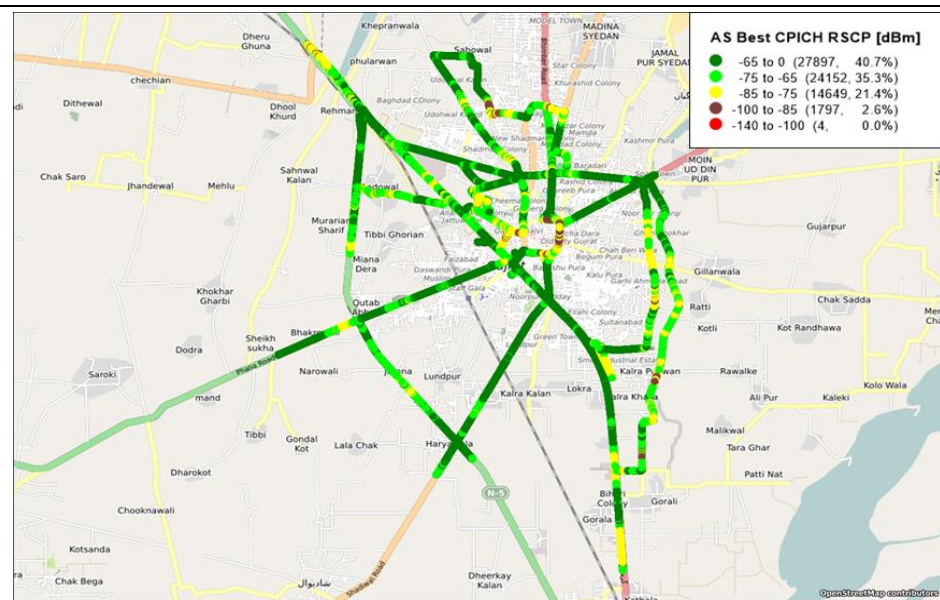


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

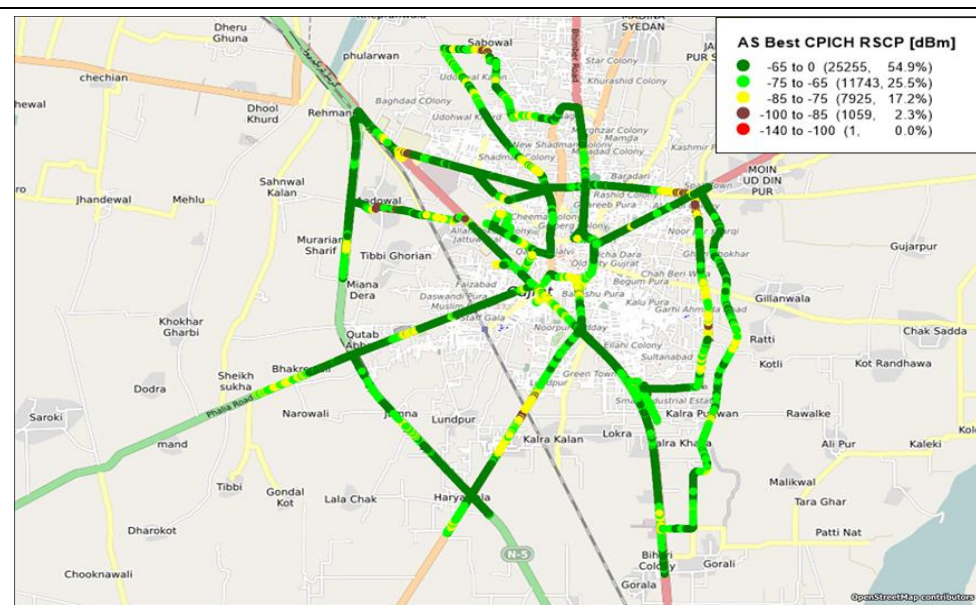
JAZZ 3G NETWORK COVERAGE - GUJRAT



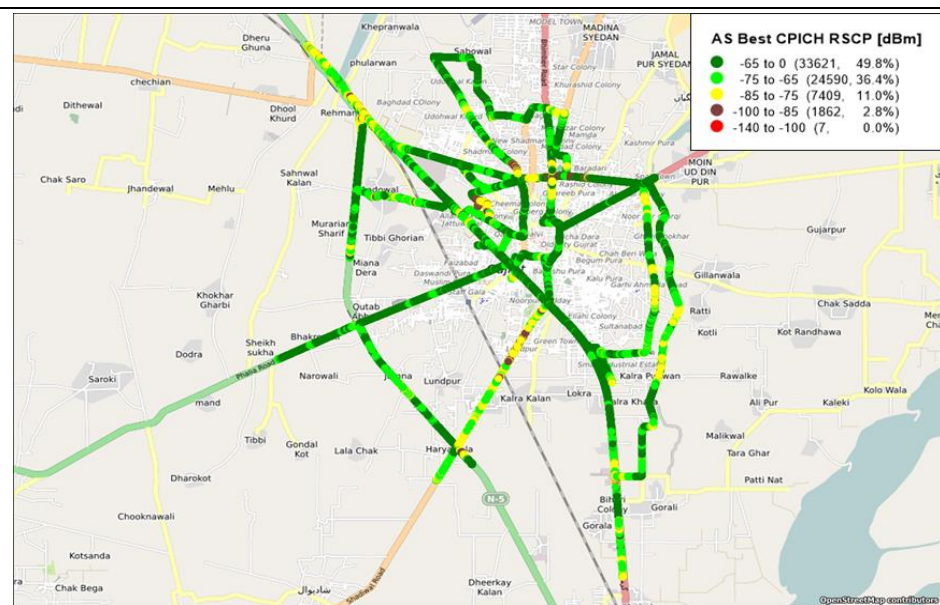
TELENOR 3G NETWORK COVERAGE - GUJRAT



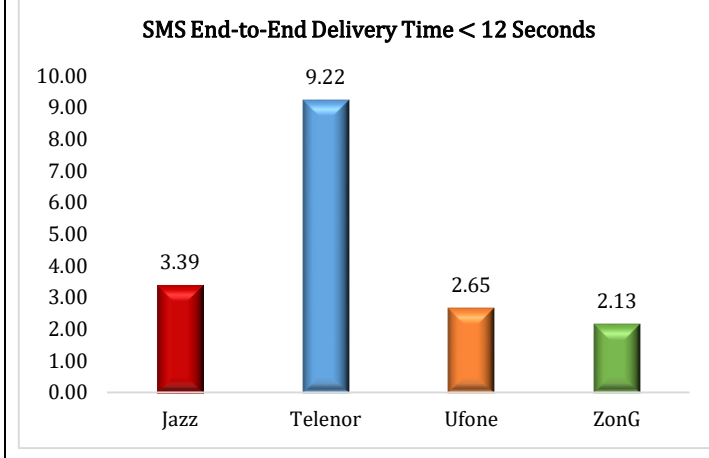
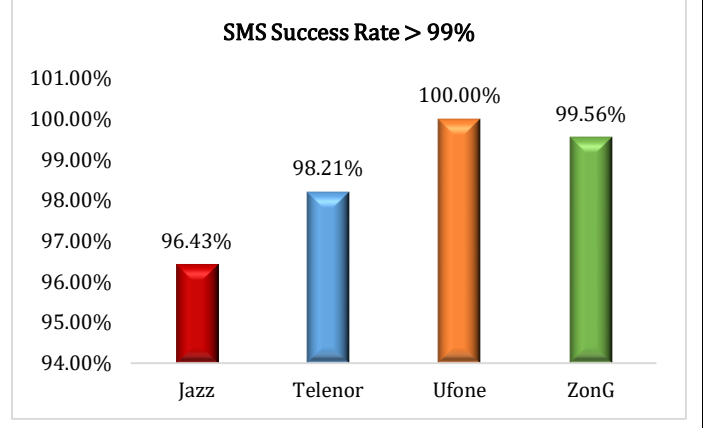
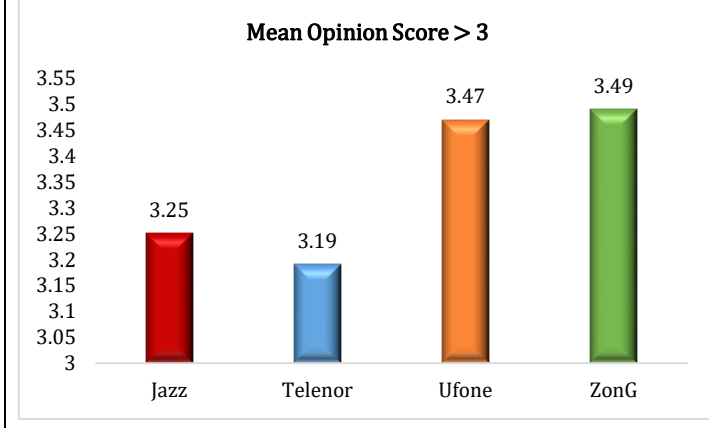
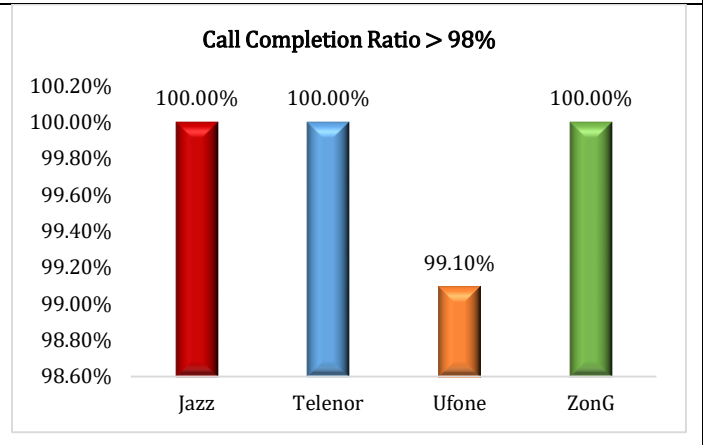
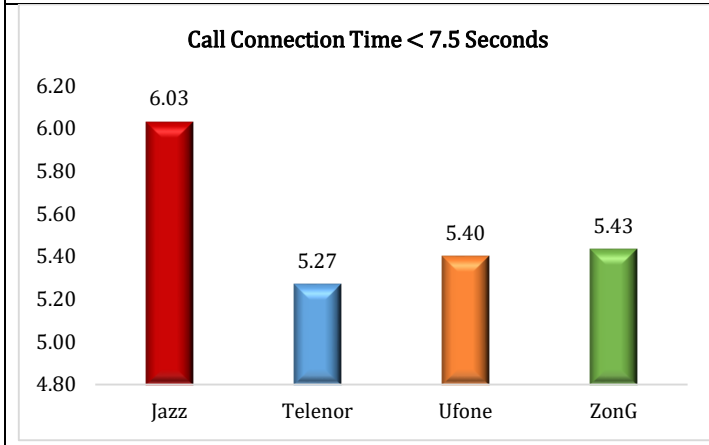
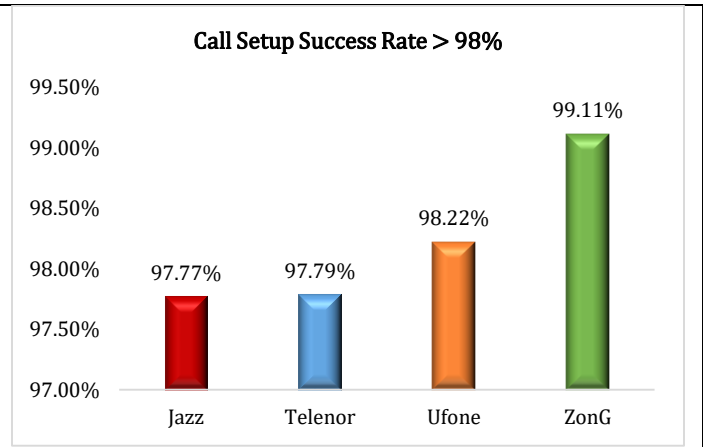
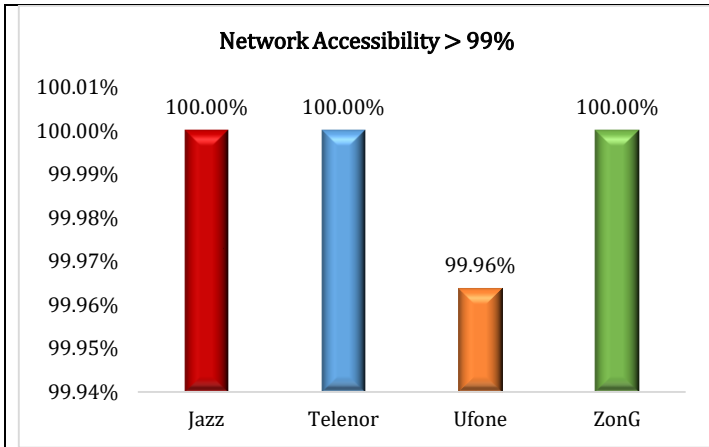
UFONE 3G NETWORK COVERAGE - GUJRAT



ZONG 3G NETWORK COVERAGE - GUJRAT

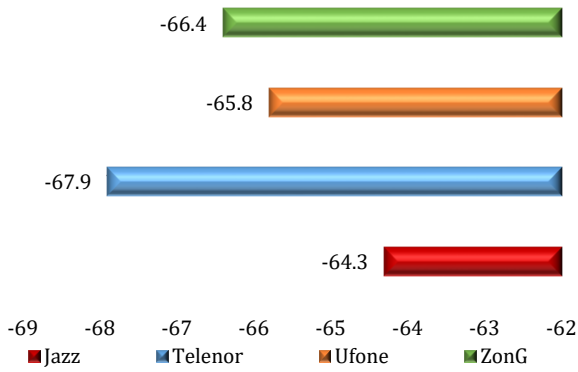


QUALITY OF SERVICE SURVEY RESULTS – GUJRAT

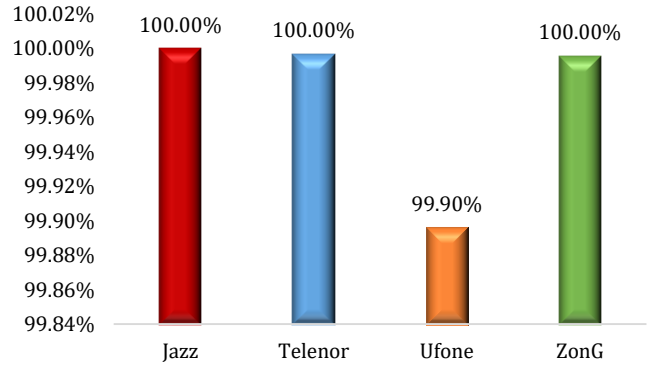


QUALITY OF SERVICE SURVEY RESULTS – GUJRAT

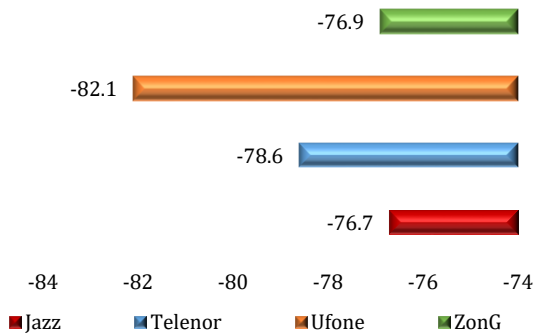
3G Signal Strength (RSCP) > -100dBm



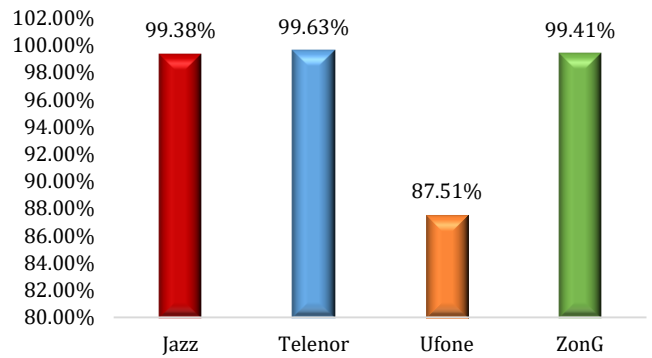
3G Signal Strength (RSCP) Confidencel Level > 90%



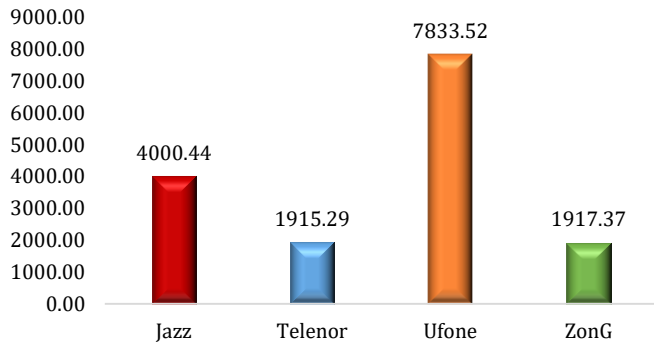
4G Signal Strength (RSRP) > -100dBm



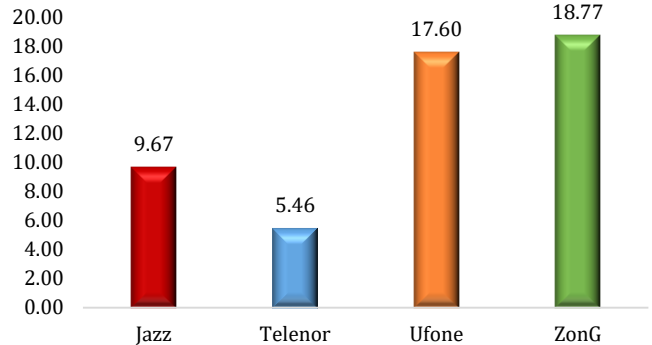
4G Signal Strength (RSRP) Confidencel Level > 90%



User Data Throughput (3G) > 256Kbps

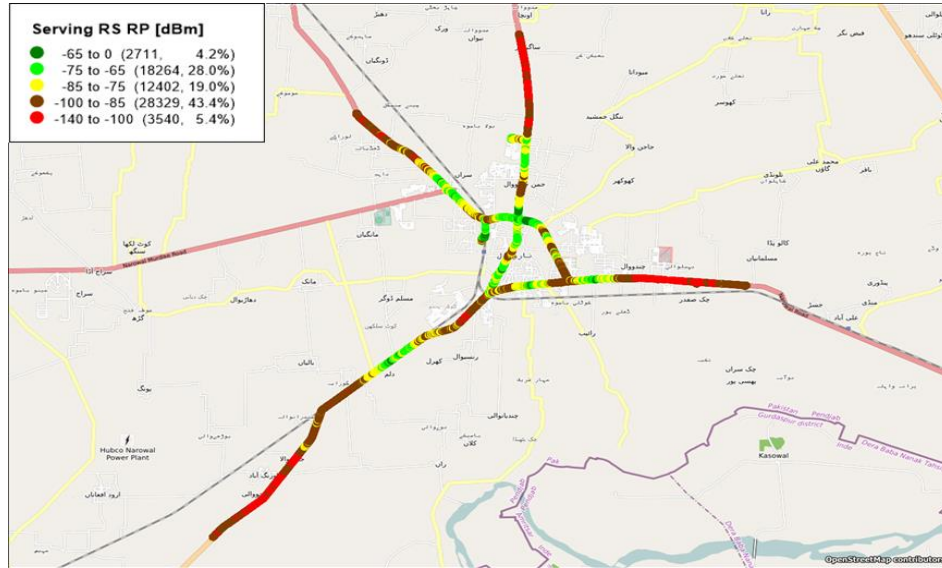


User Data Throughput (4G) > 2Mbps

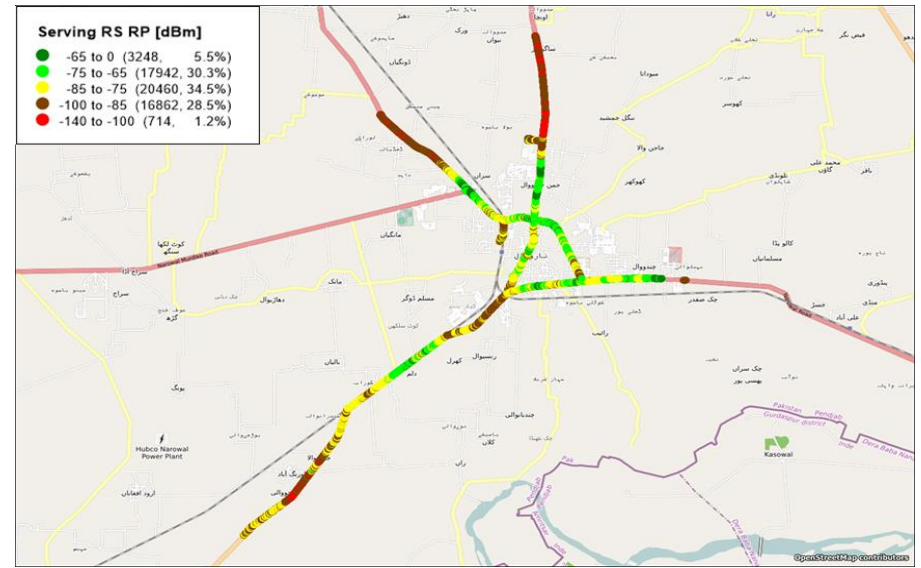


4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

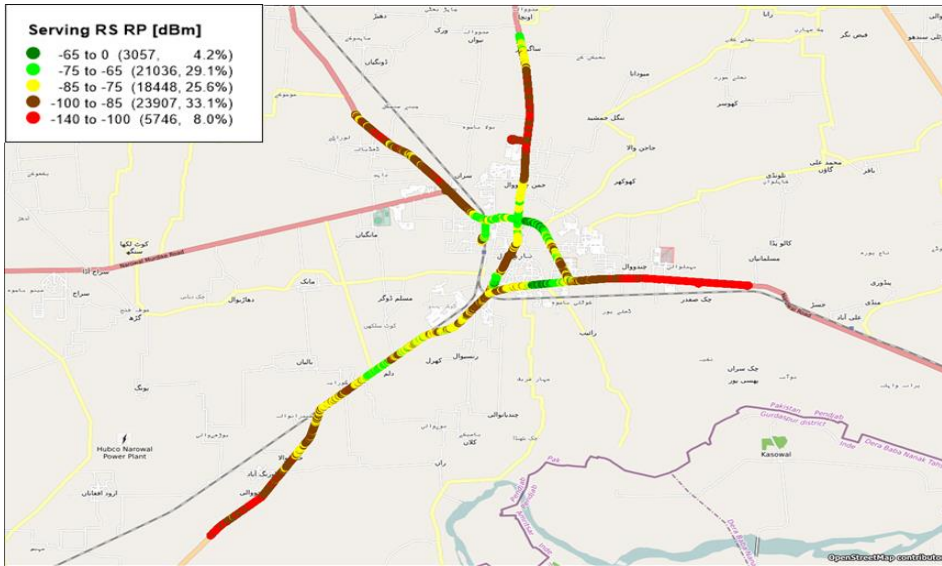
JAZZ 4G NETWORK COVERAGE - NAROWAL



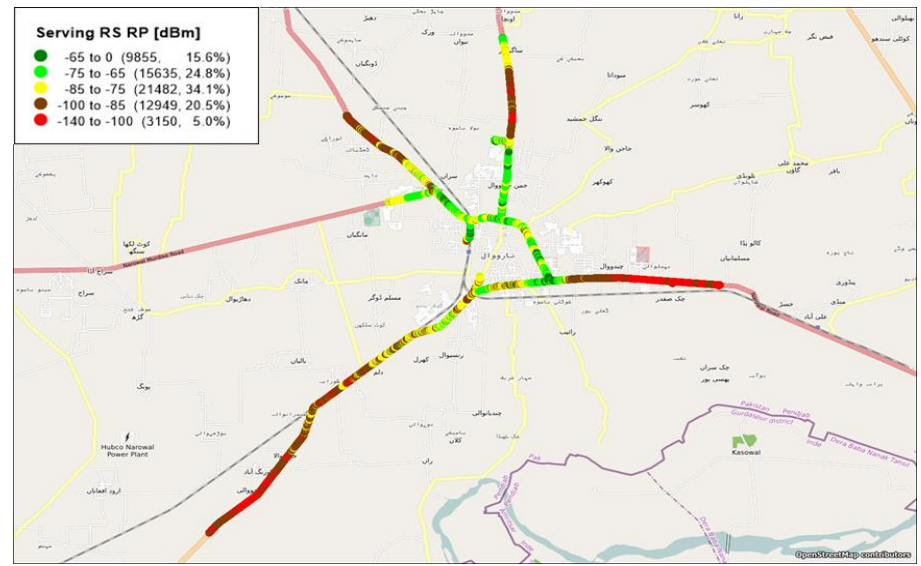
TELENOR 4G NETWORK COVERAGE - NAROWAL



UFONE 4G NETWORK COVERAGE - NAROWAL

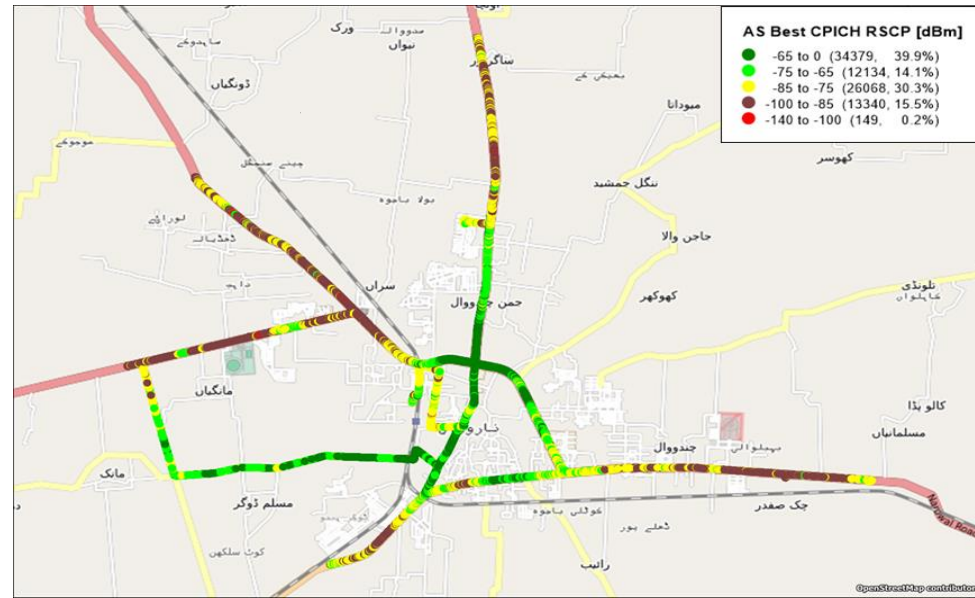


ZONG 4G NETWORK COVERAGE - NAROWAL

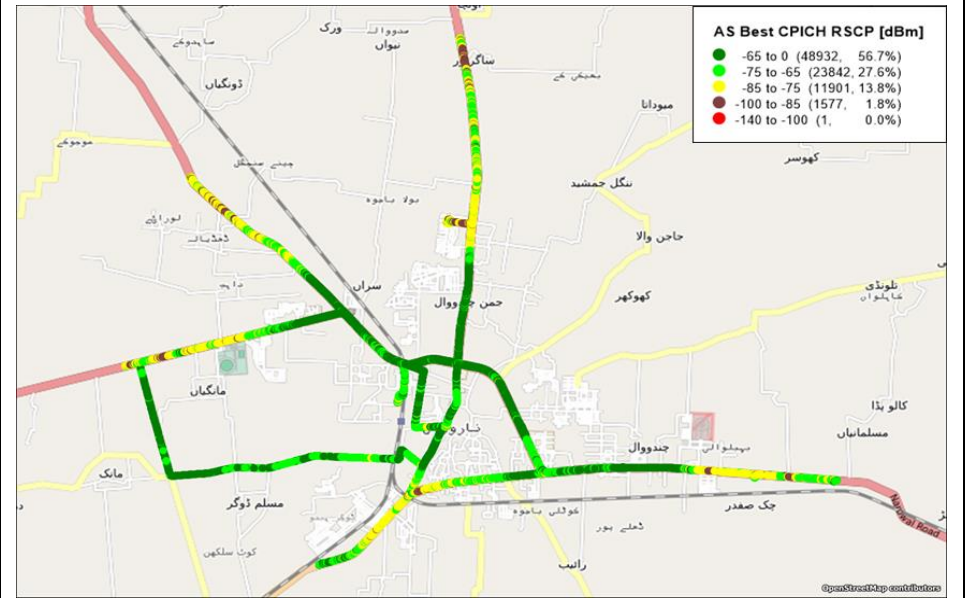


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

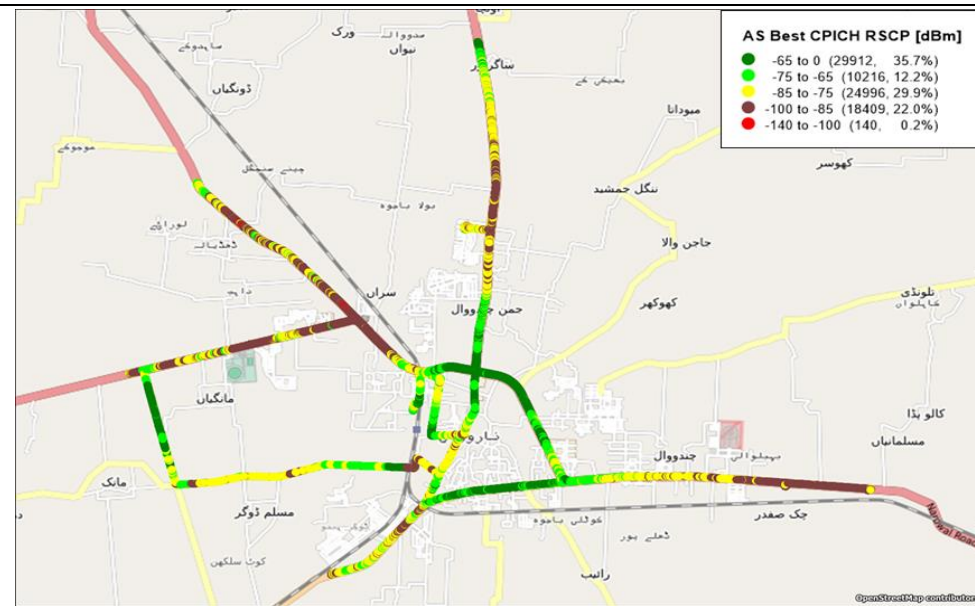
JAZZ 3G NETWORK COVERAGE - NAROWAL



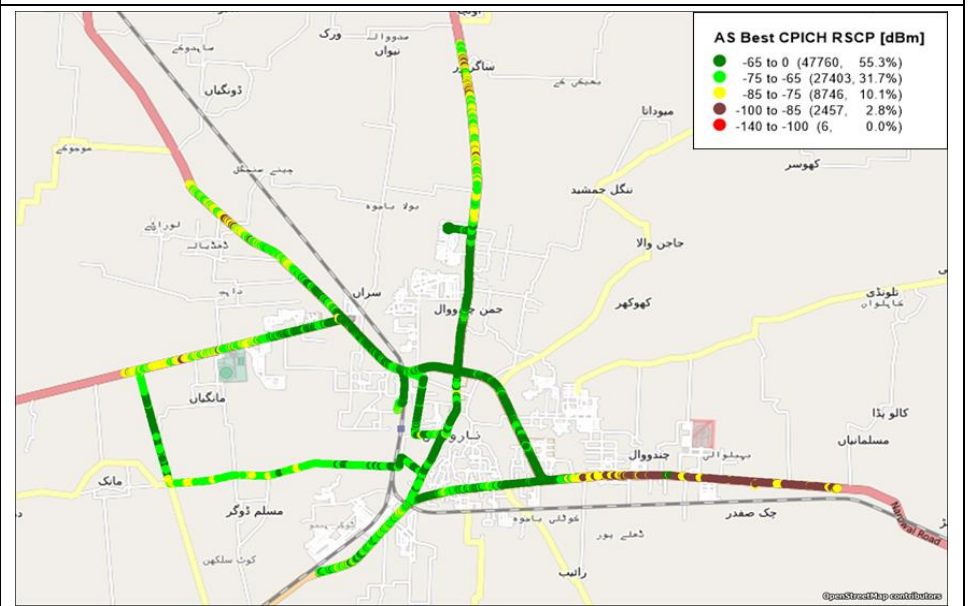
TELEOR 3G NETWORK COVERAGE - NAROWAL



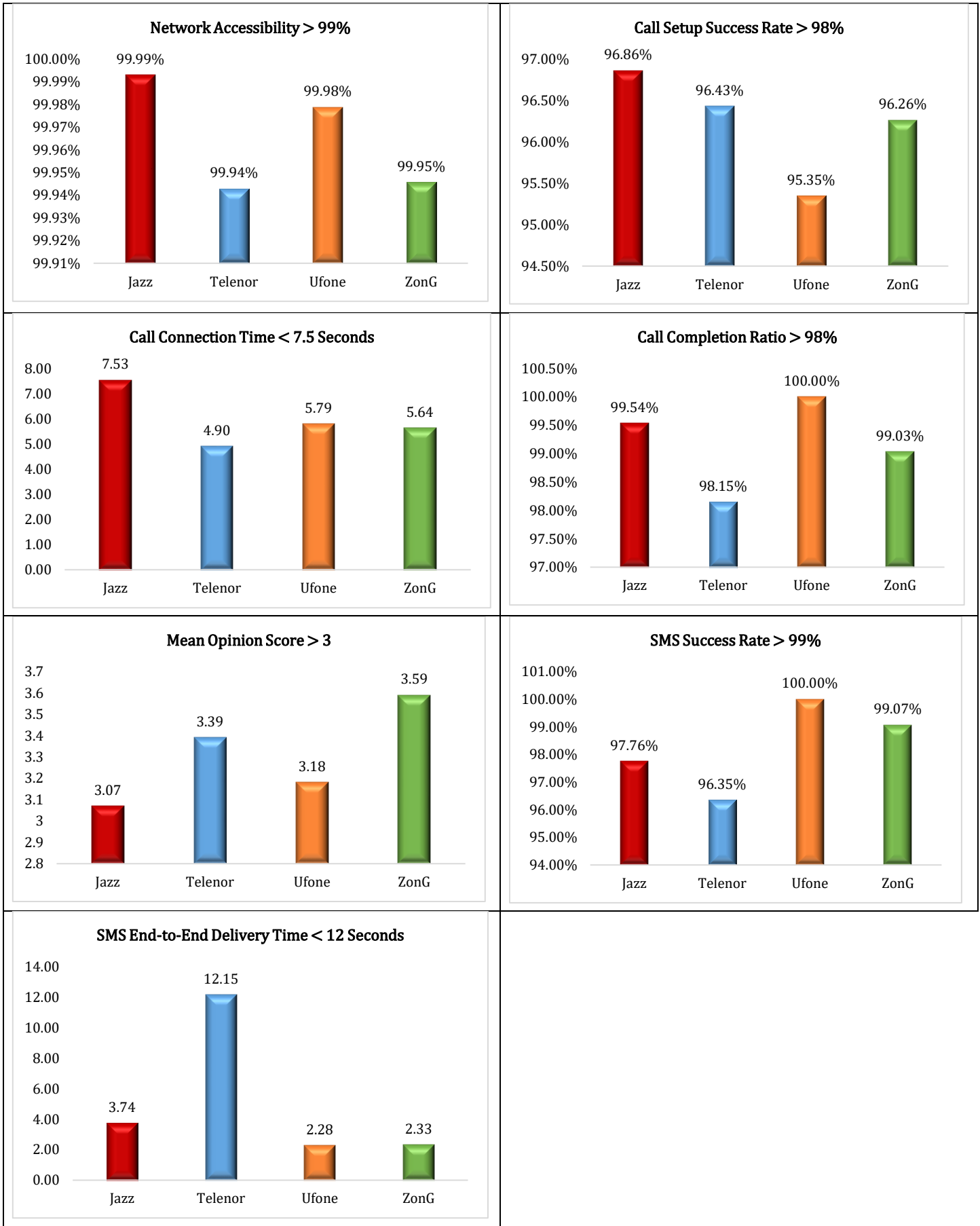
UFONE 3G NETWORK COVERAGE - NAROWAL



ZONG 3G NETWORK COVERAGE - NAROWAL

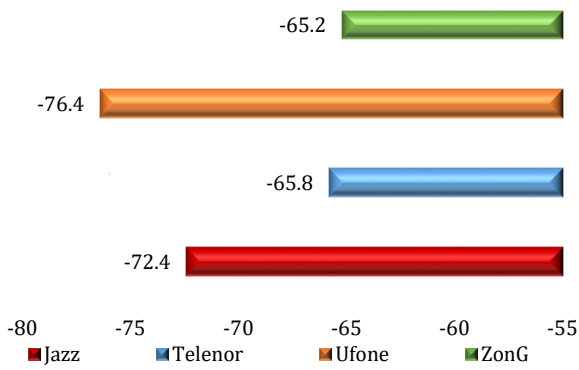


QUALITY OF SERVICE SURVEY RESULTS – NAROWAL

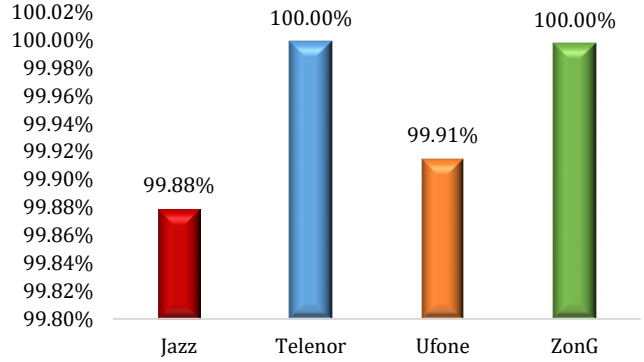


QUALITY OF SERVICE SURVEY RESULTS – NAROWAL

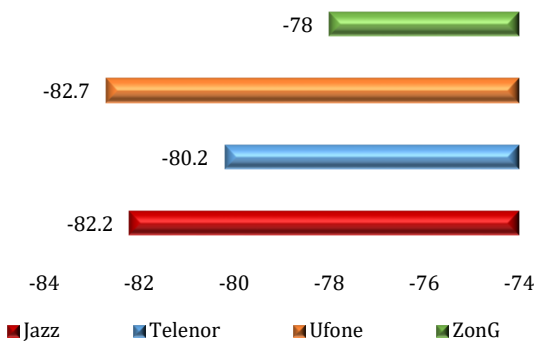
3G Signal Strength (RSCP) > -100dBm



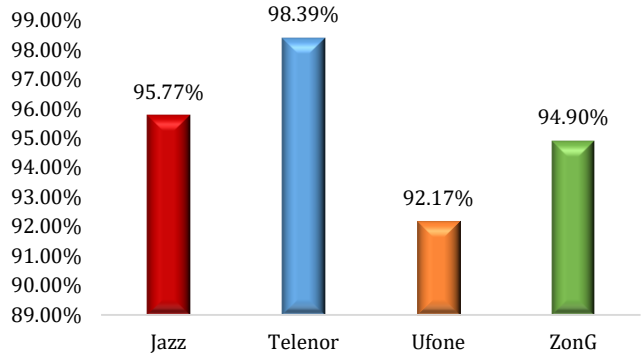
3G Signal Strength (RSCP) Confidencel Level > 90%



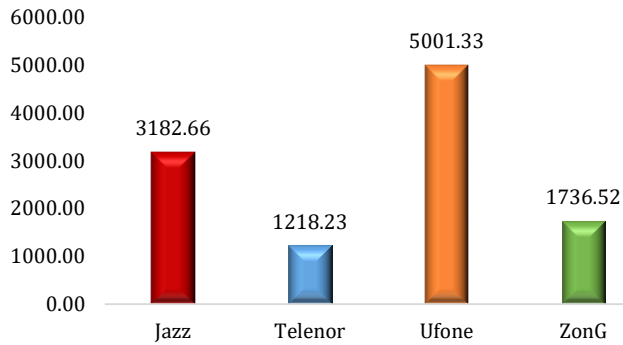
4G Signal Strength (RSRP) > -100dBm



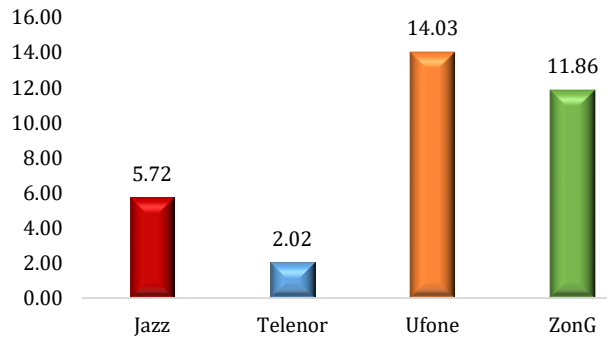
4G Signal Strength (RSRP) Confidencel Level > 90%



User Data Throughput (3G) > 256Kbps



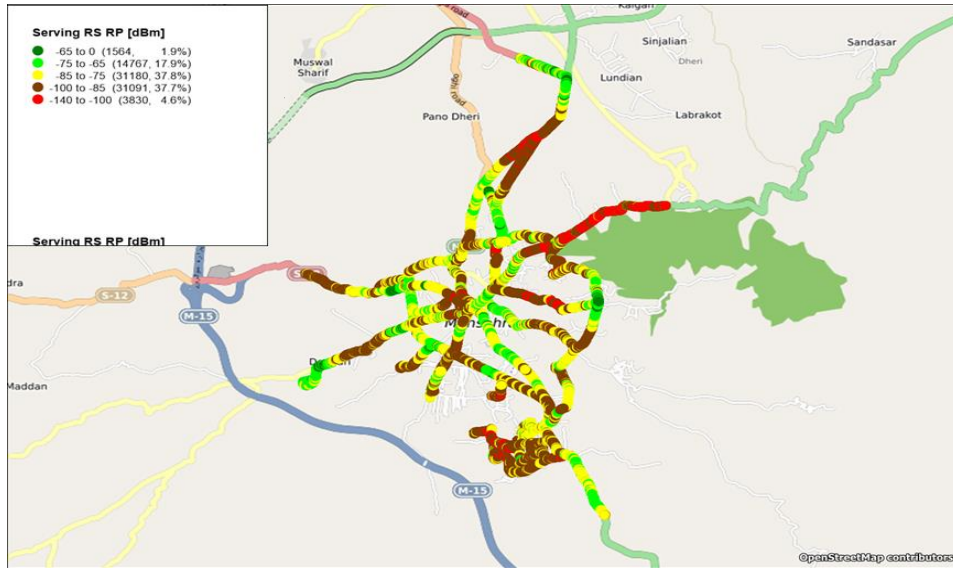
User Data Throughput (4G) > 2Mbps



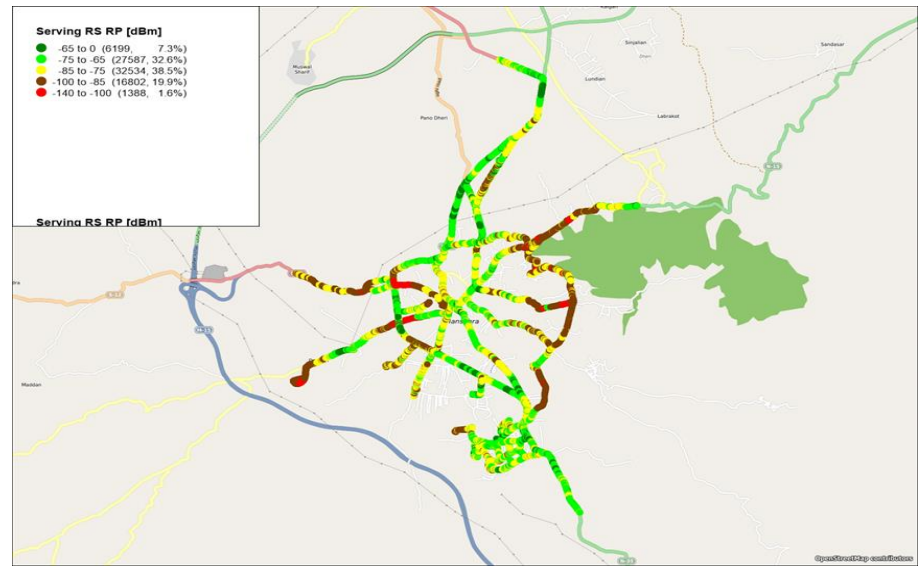
KHYBER PAKHTUNKHWA

4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

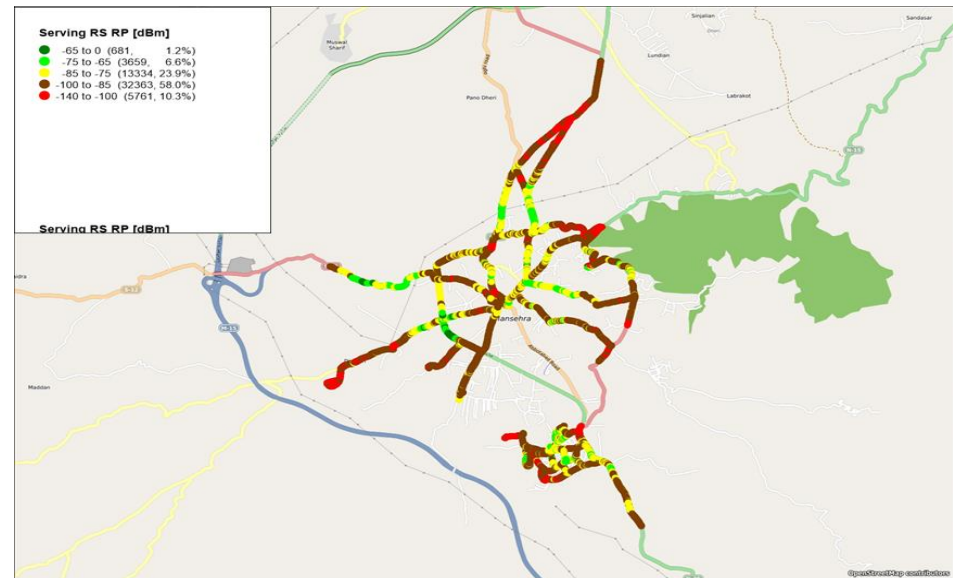
JAZZ 4G NETWORK COVERAGE - MANSEHRA



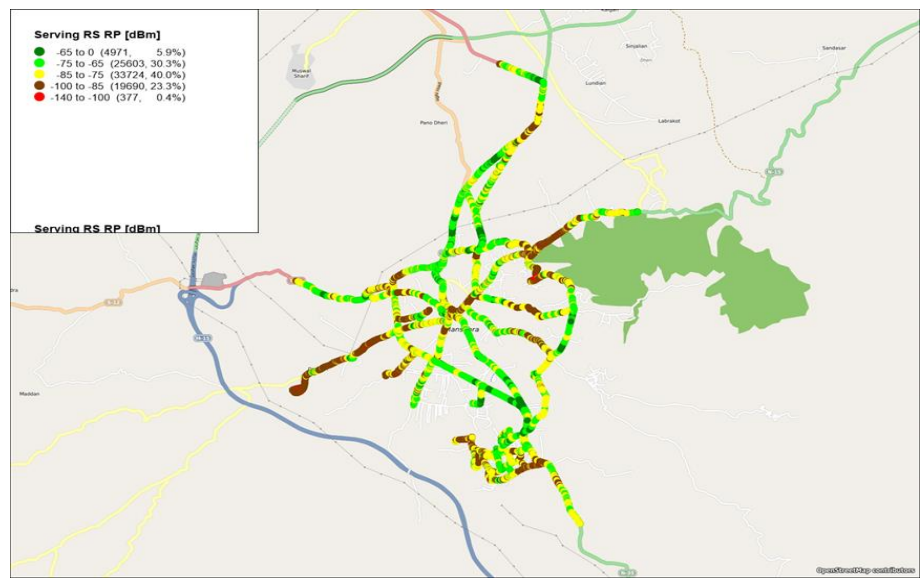
TELENOR 4G NETWORK COVERAGE - MANSEHRA



UFONE 4G NETWORK COVERAGE - MANSEHRA



ZONG 4G NETWORK COVERAGE - MANSEHRA

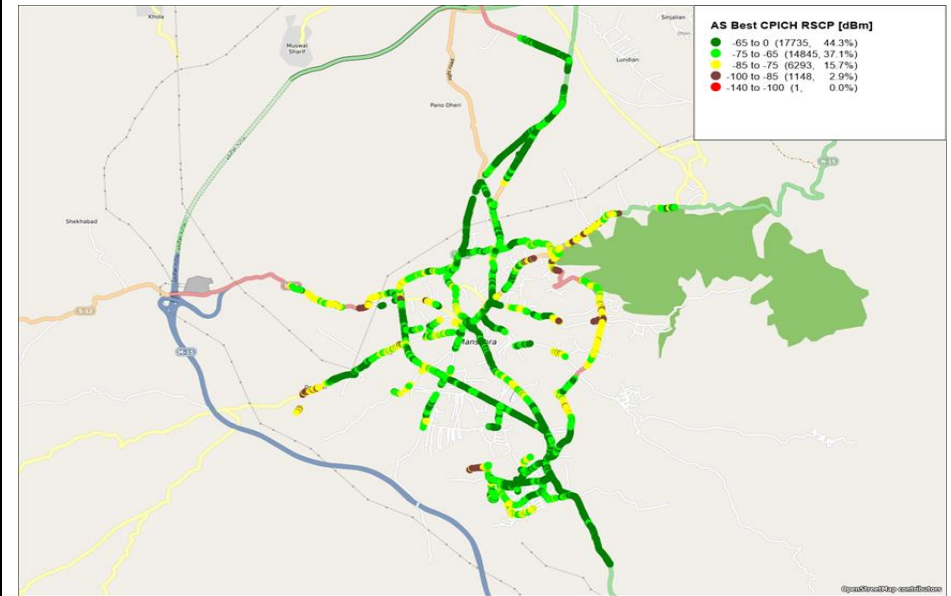


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

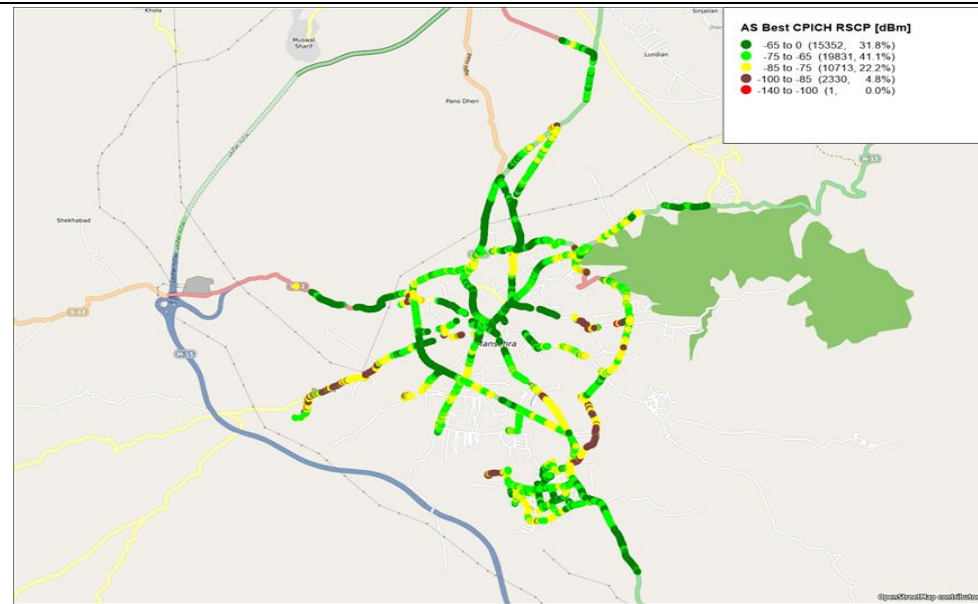
JAZZ 3G NETWORK COVERAGE – MANSEHRA

3G NOT AVAILABLE

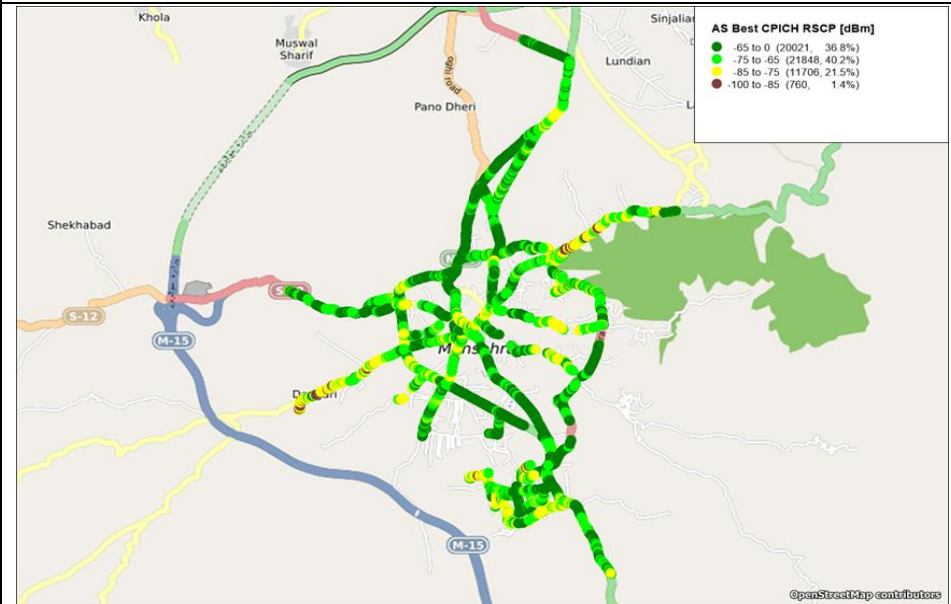
TELENOR 3G NETWORK COVERAGE – MANSEHRA



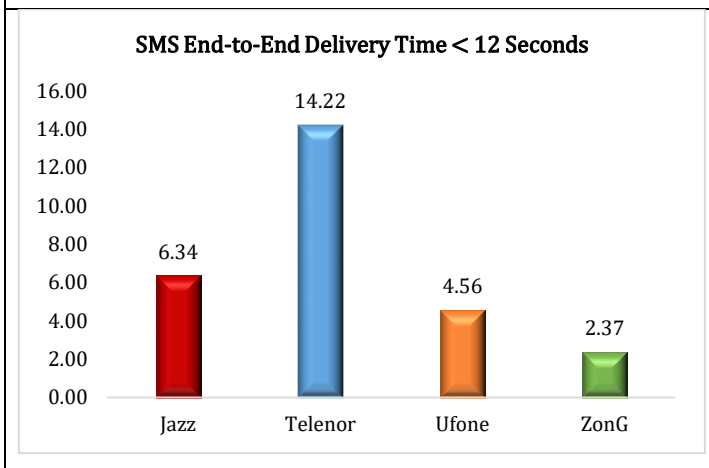
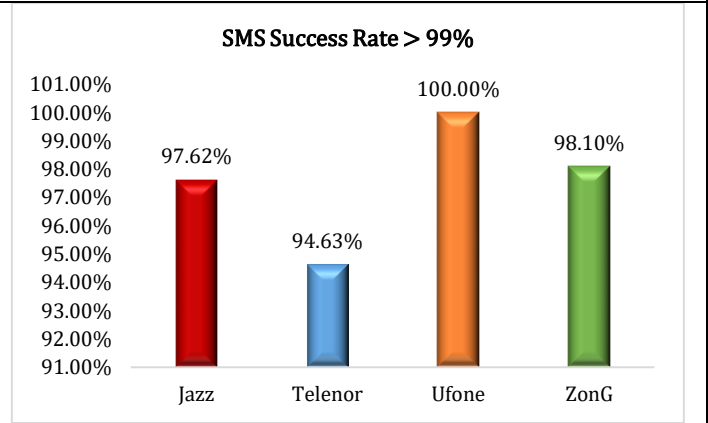
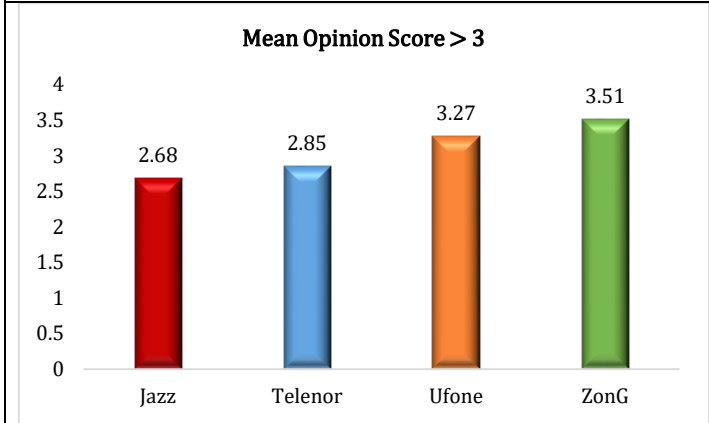
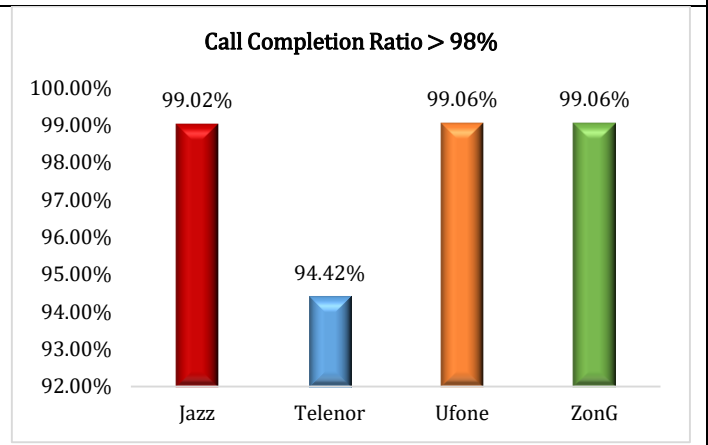
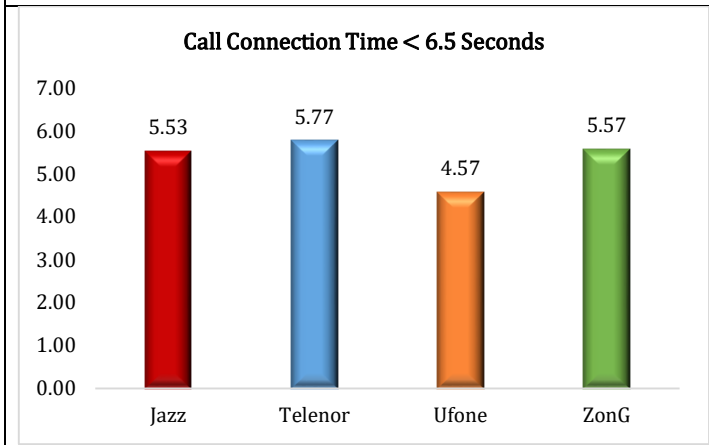
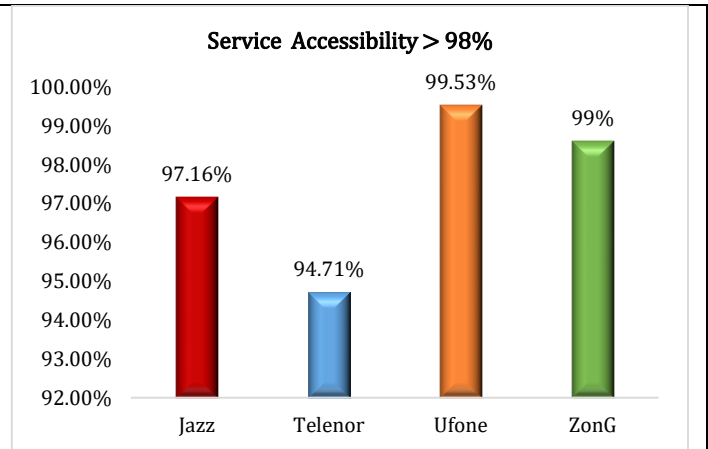
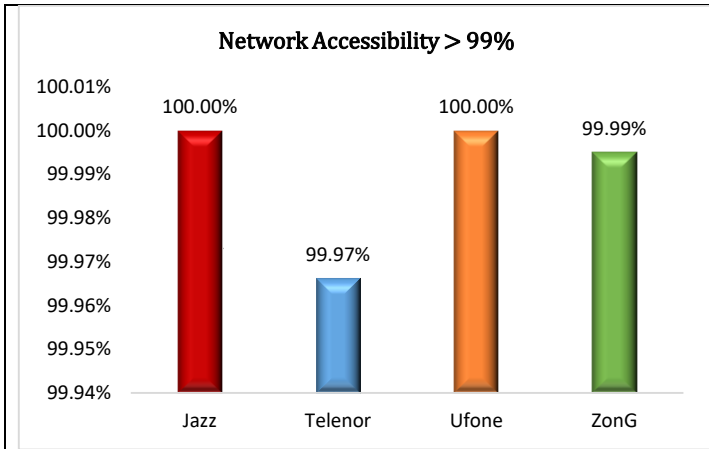
UFONE 3G NETWORK COVERAGE – MANSEHRA



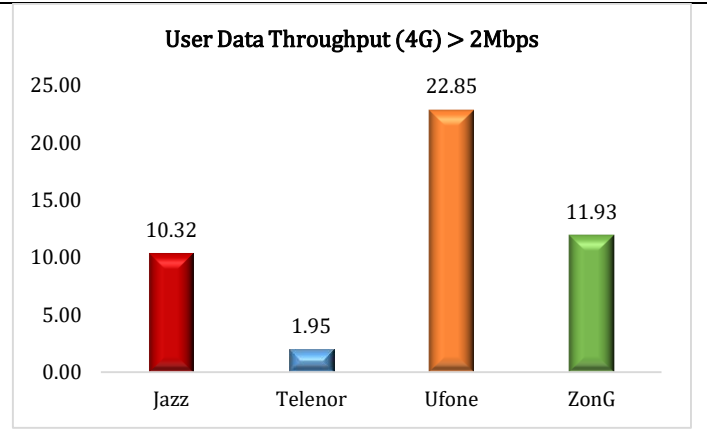
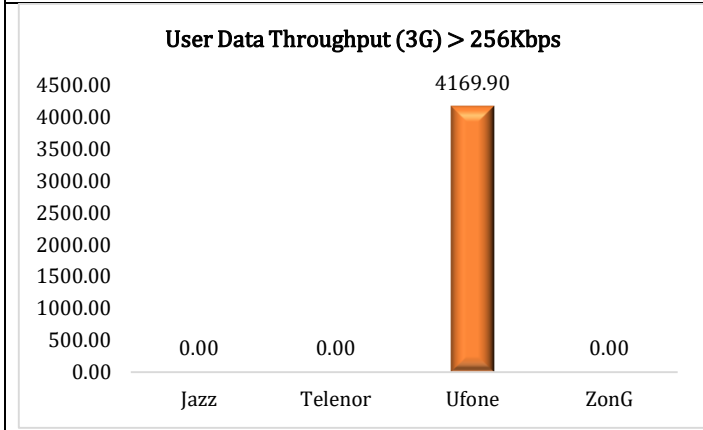
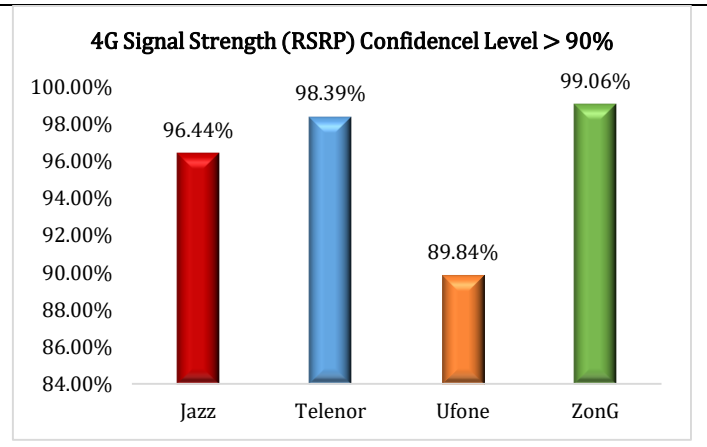
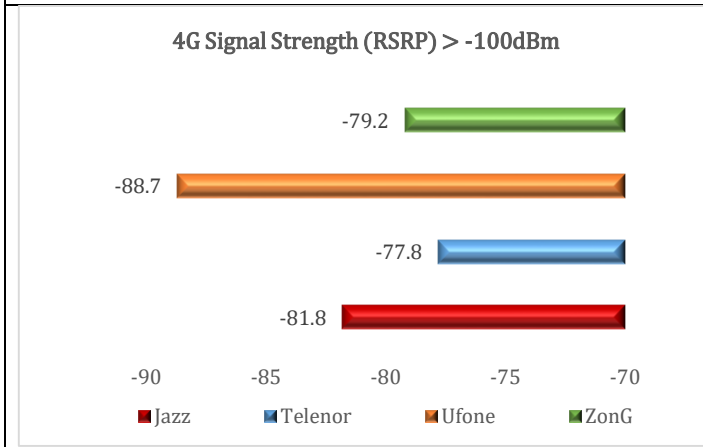
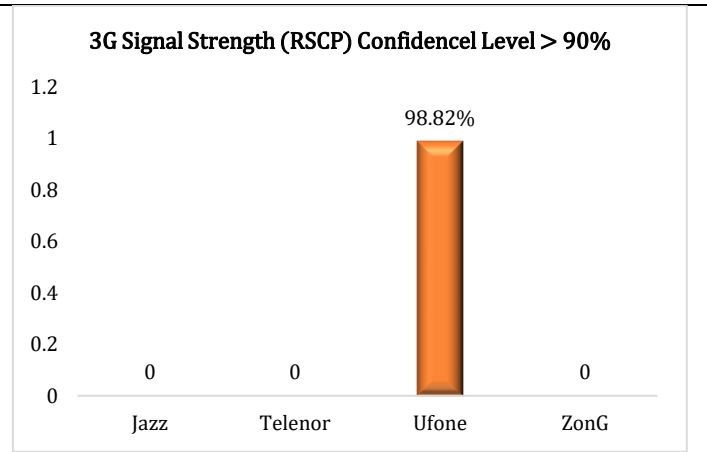
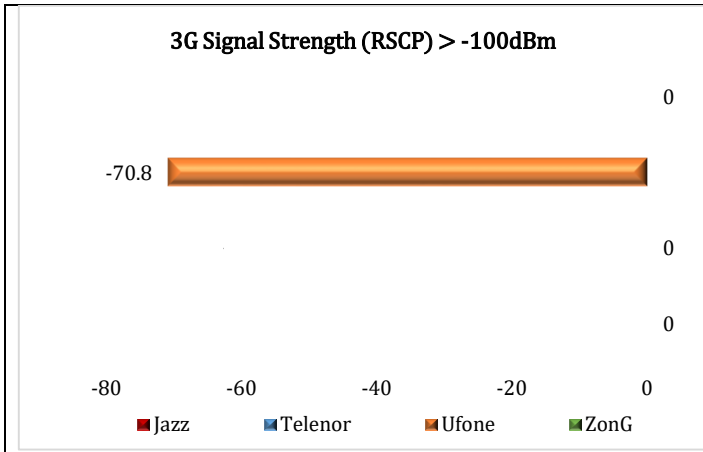
ZONG 3G NETWORK COVERAGE – MANSEHRA



QUALITY OF SERVICE SURVEY RESULTS – MANSEHRA

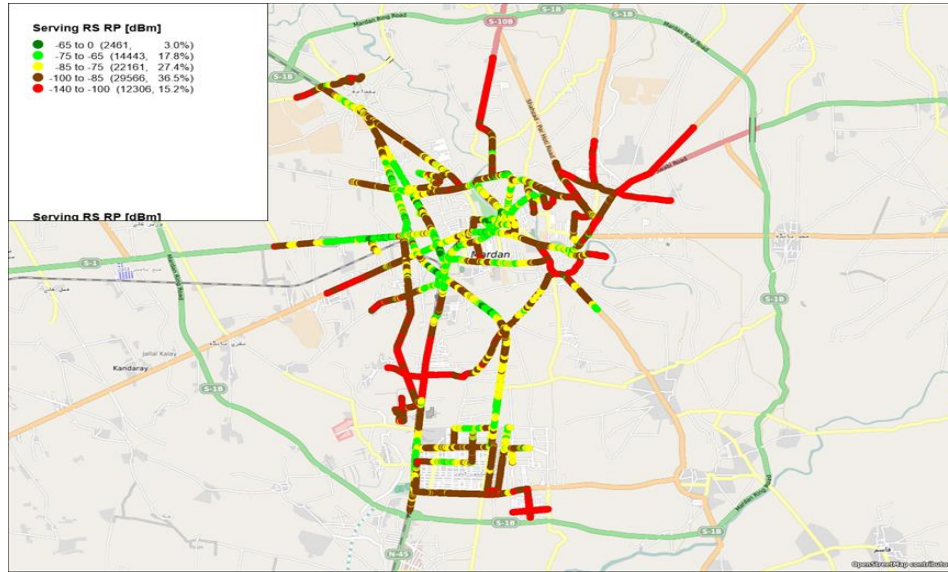


QUALITY OF SERVICE SURVEY RESULTS – MANSEHRA

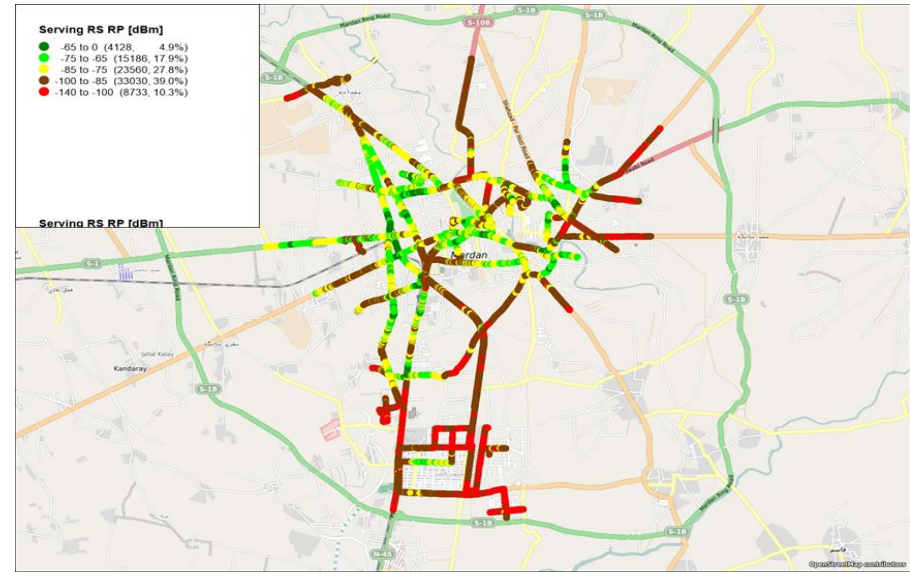


4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

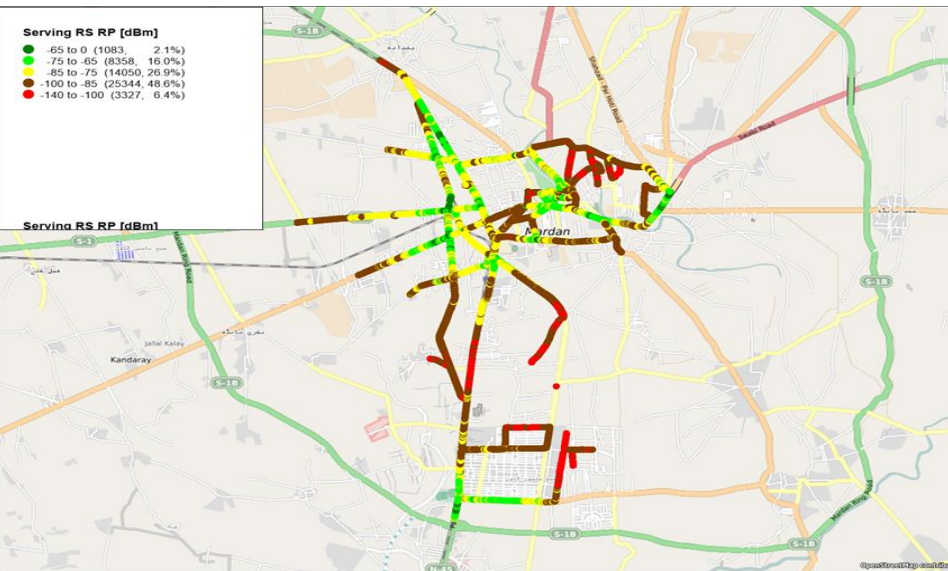
JAZZ 4G NETWORK COVERAGE - MARDAN



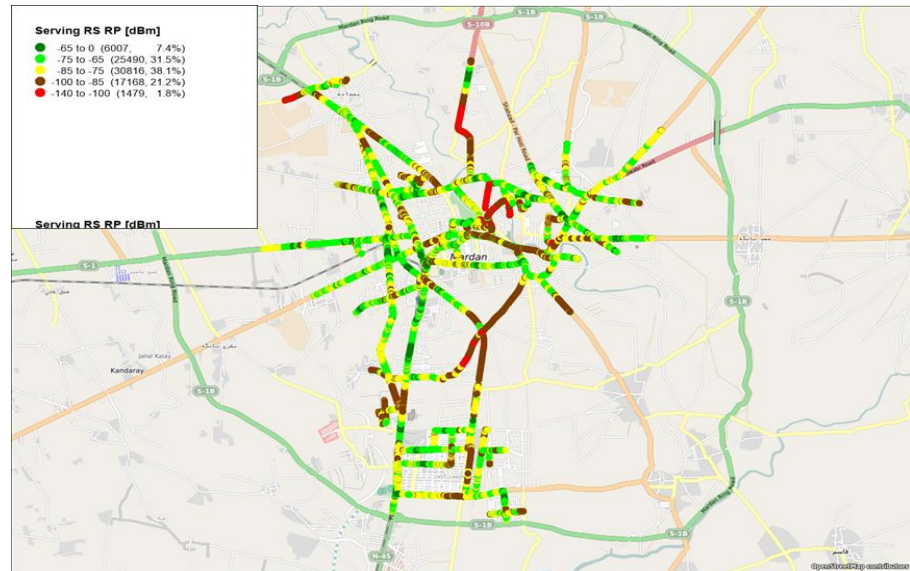
TELENOR 4G NETWORK COVERAGE - MARDAN



UFONE 4G NETWORK COVERAGE - MARDAN

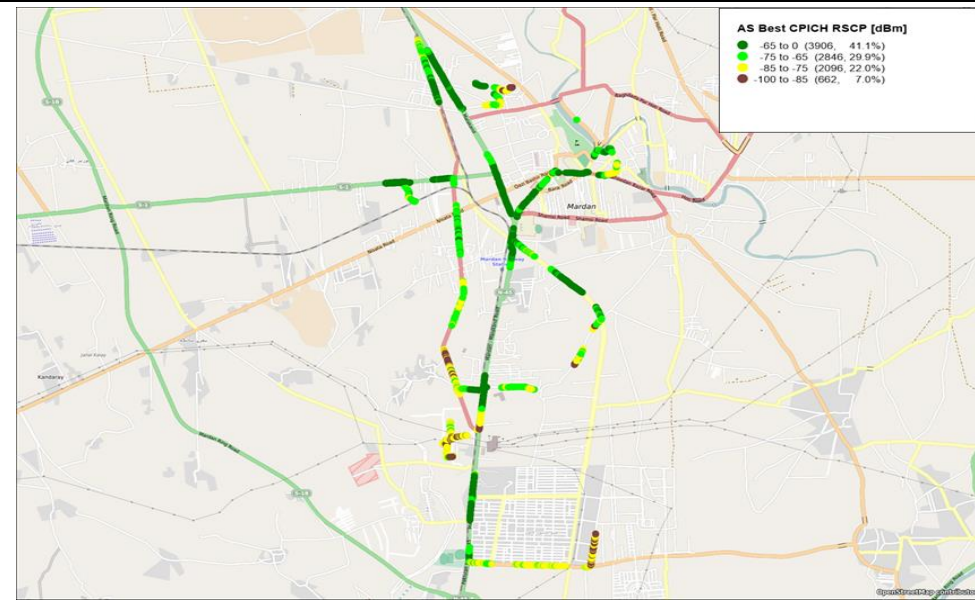


ZONG 4G NETWORK COVERAGE - MARDAN

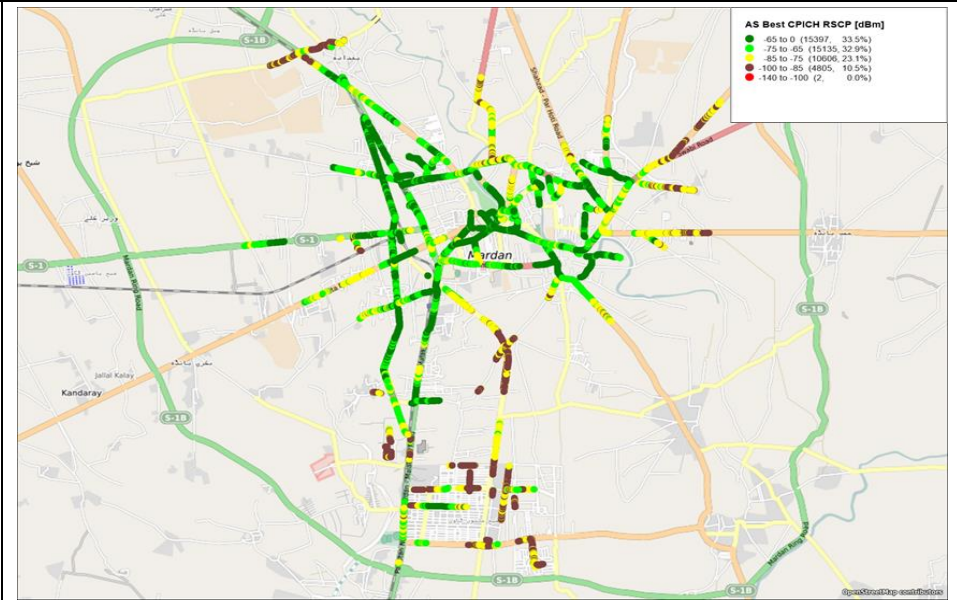


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

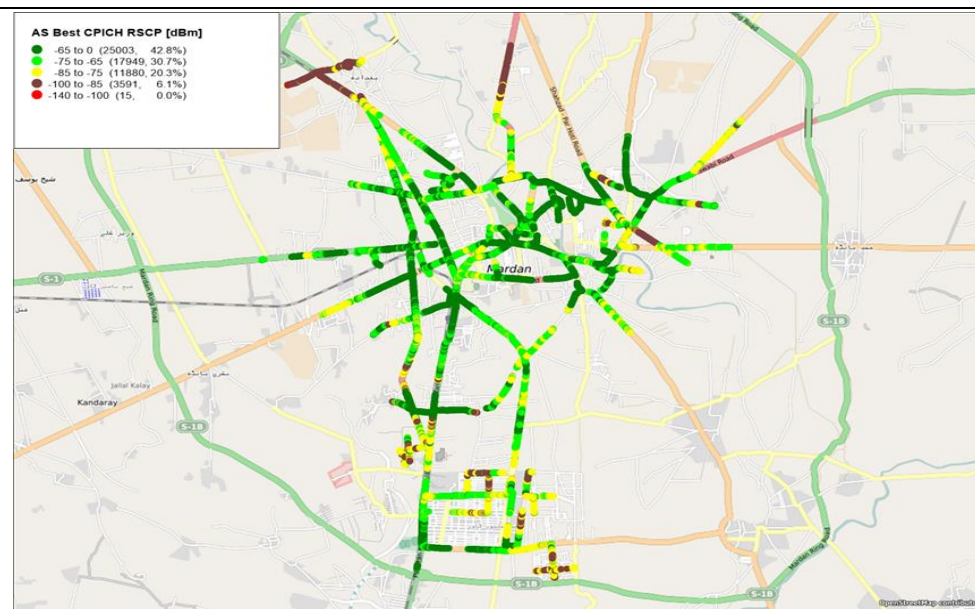
JAZZ 3G NETWORK COVERAGE - MARDAN



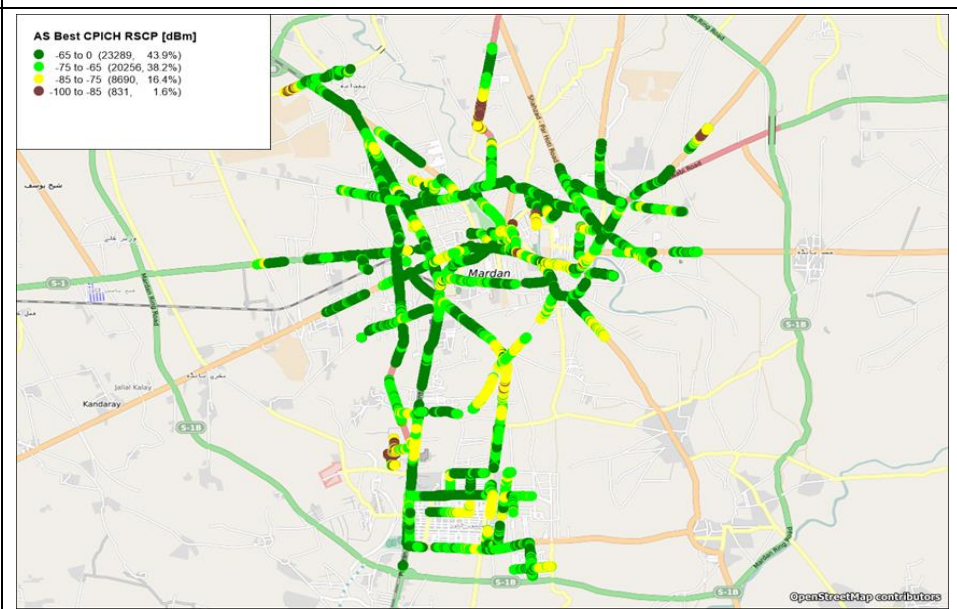
TELENOR 3G NETWORK COVERAGE - MARDAN



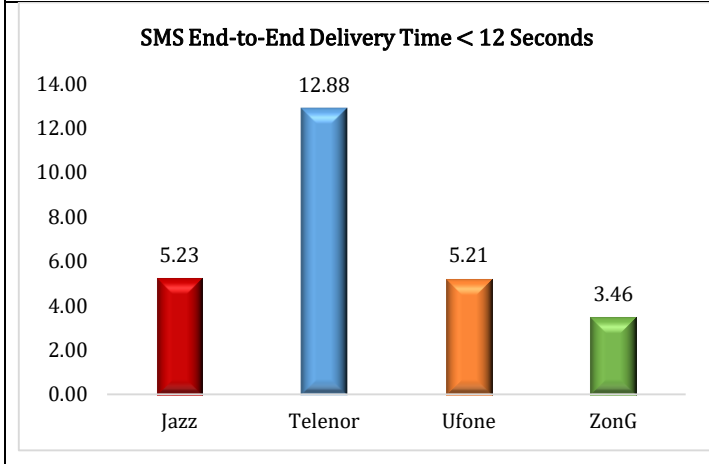
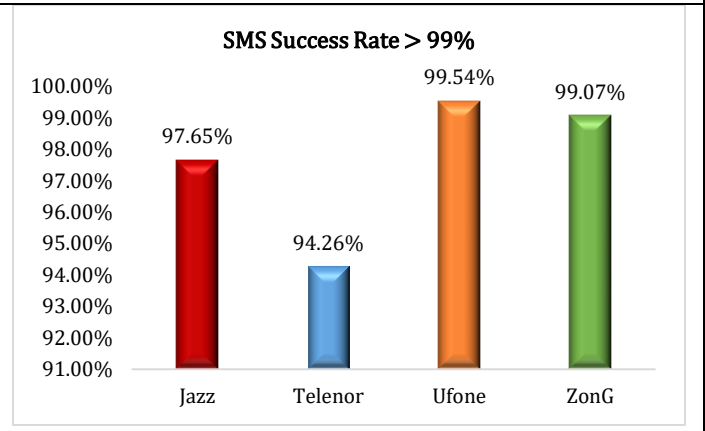
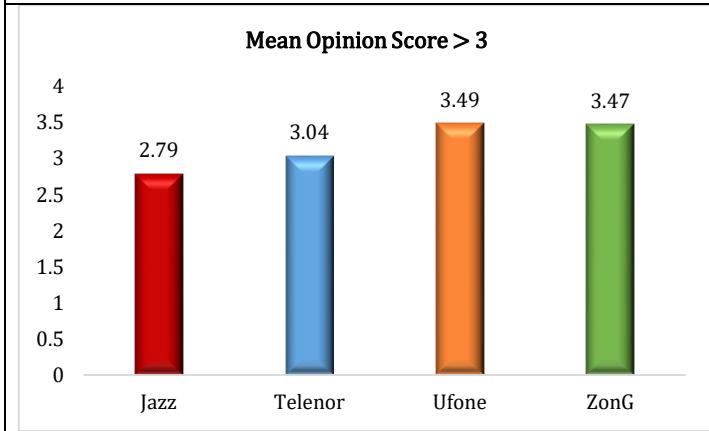
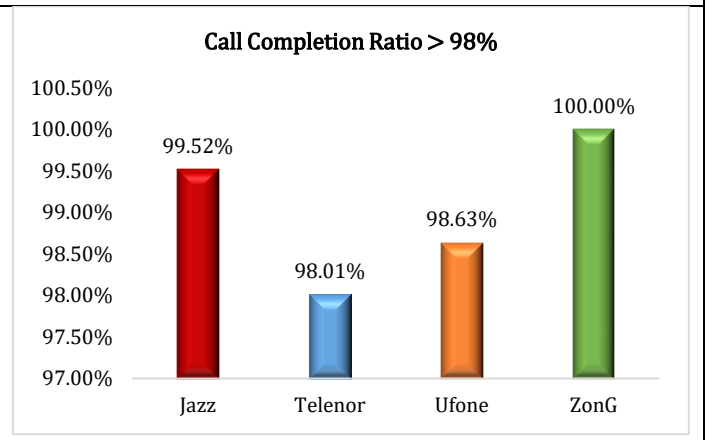
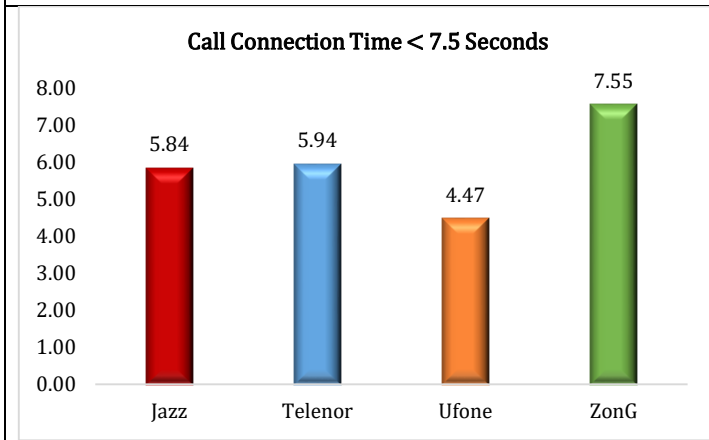
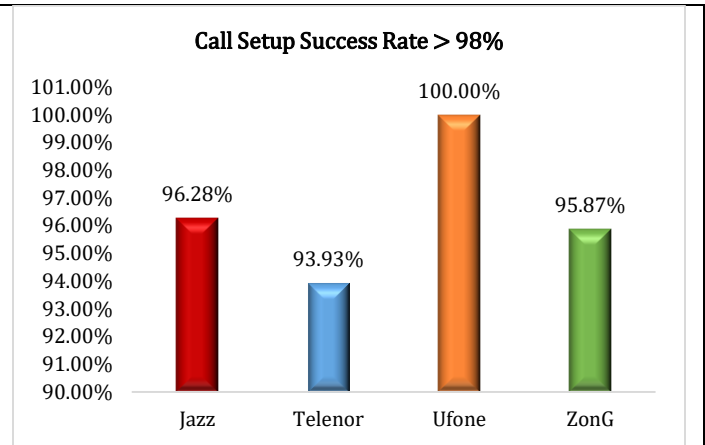
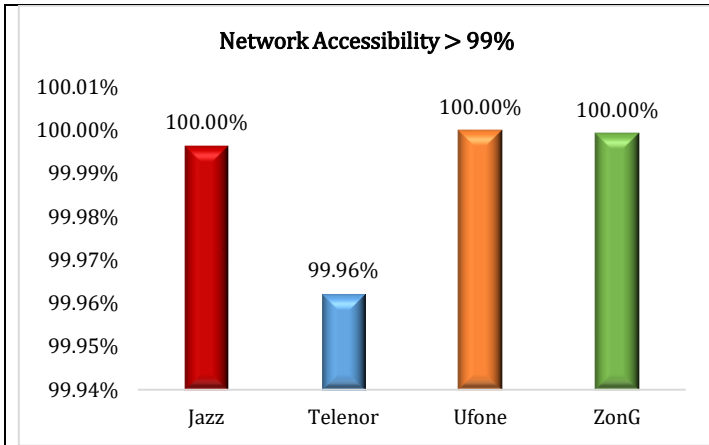
UFONE 3G NETWORK COVERAGE - MARDAN



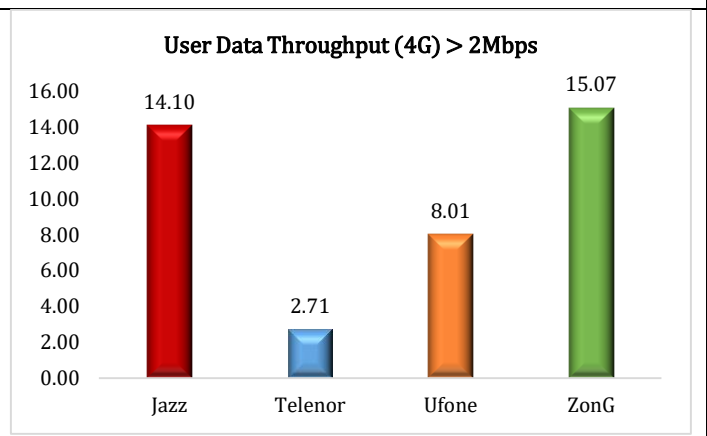
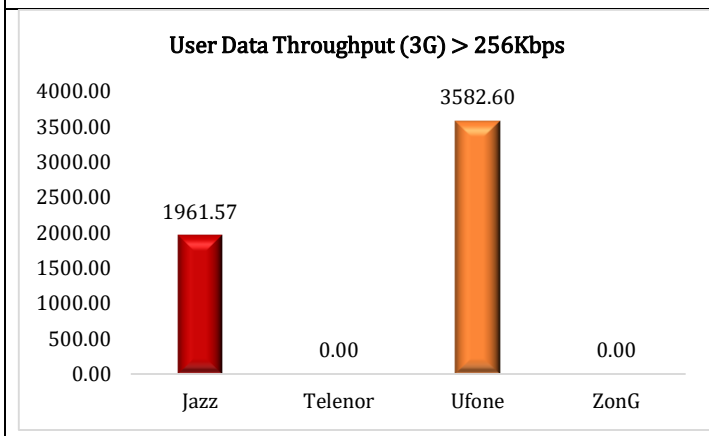
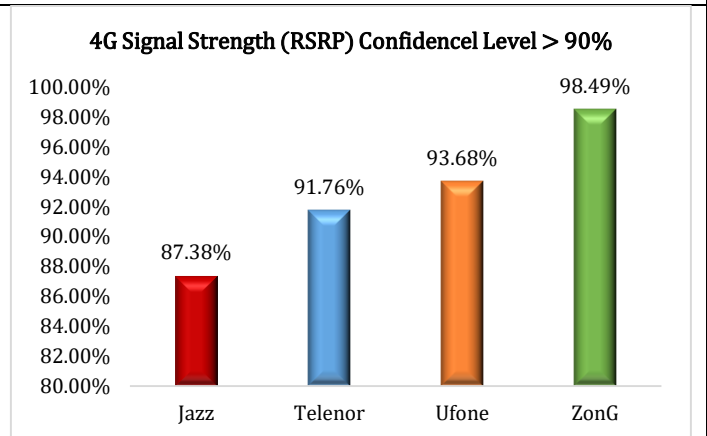
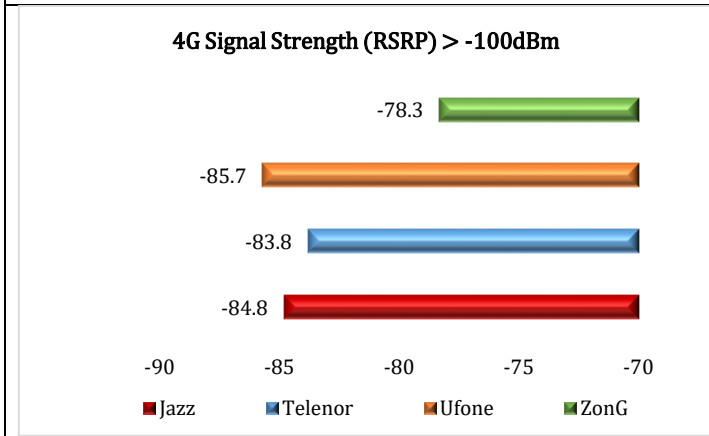
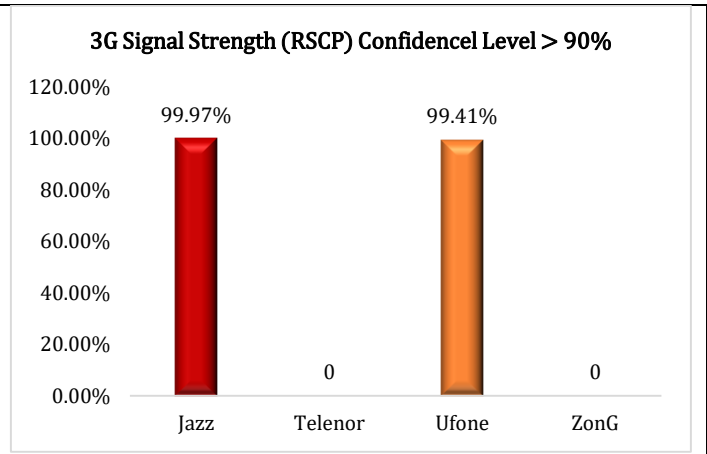
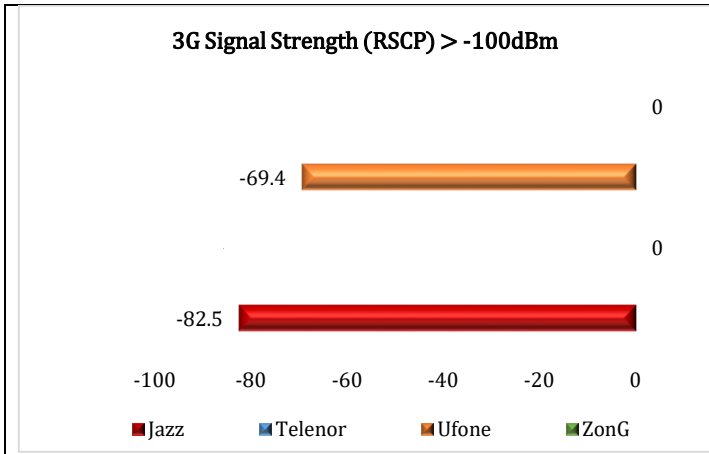
ZONG 3G NETWORK COVERAGE - MARDAN



QUALITY OF SERVICE SURVEY RESULTS – MARDAN

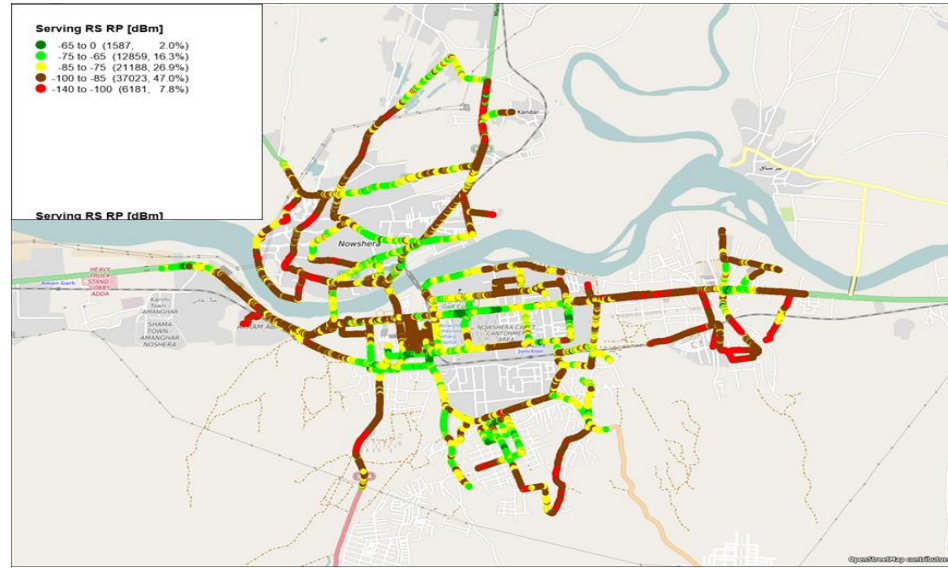


QUALITY OF SERVICE SURVEY RESULTS – MARDAN

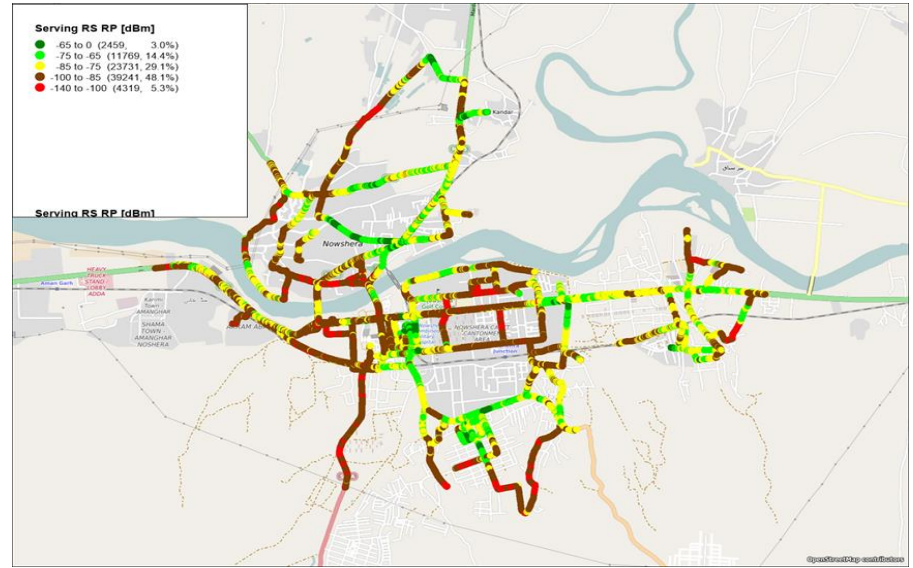


4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

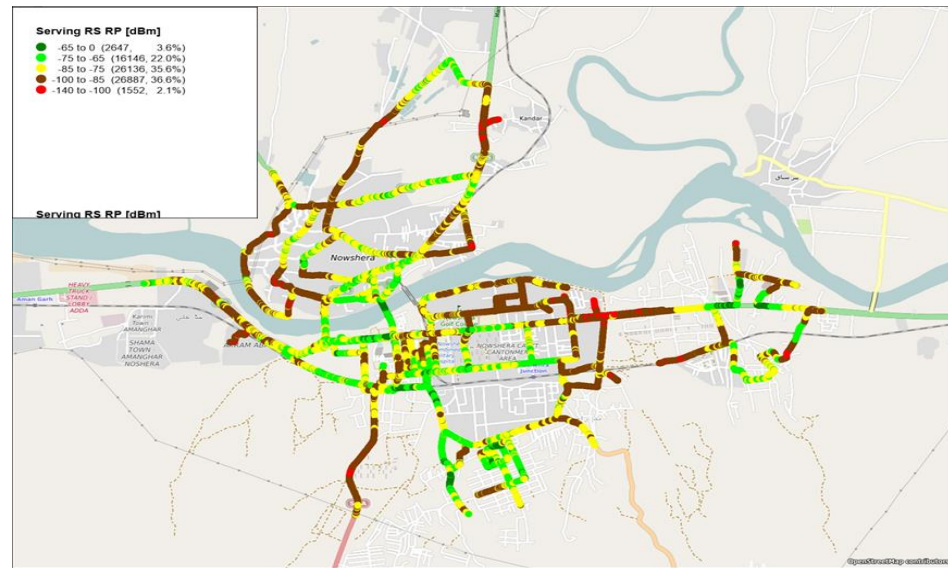
JAZZ 4G NETWORK COVERAGE - NWSHEHRA



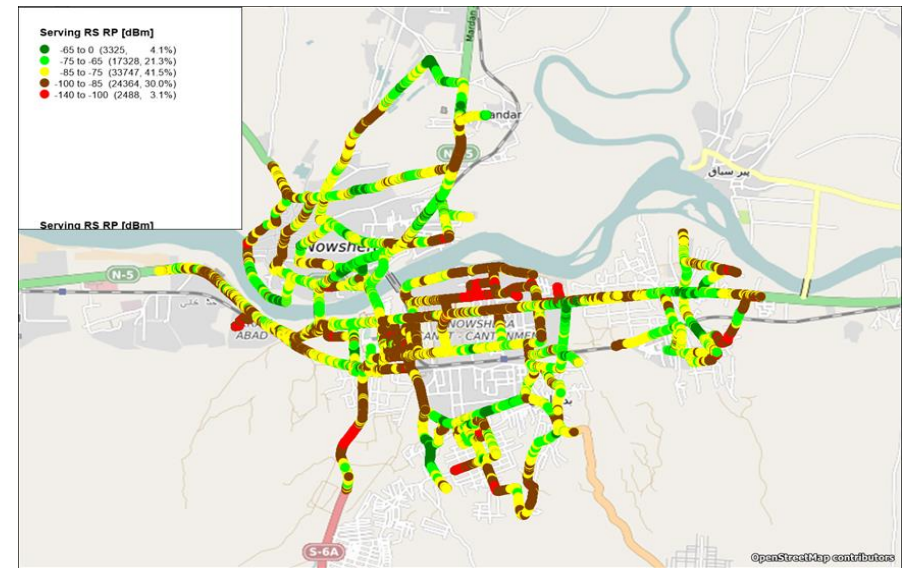
TELEOR 4G NETWORK COVERAGE - NWSHEHRA



UFONE 4G NETWORK COVERAGE - NWSHEHRA

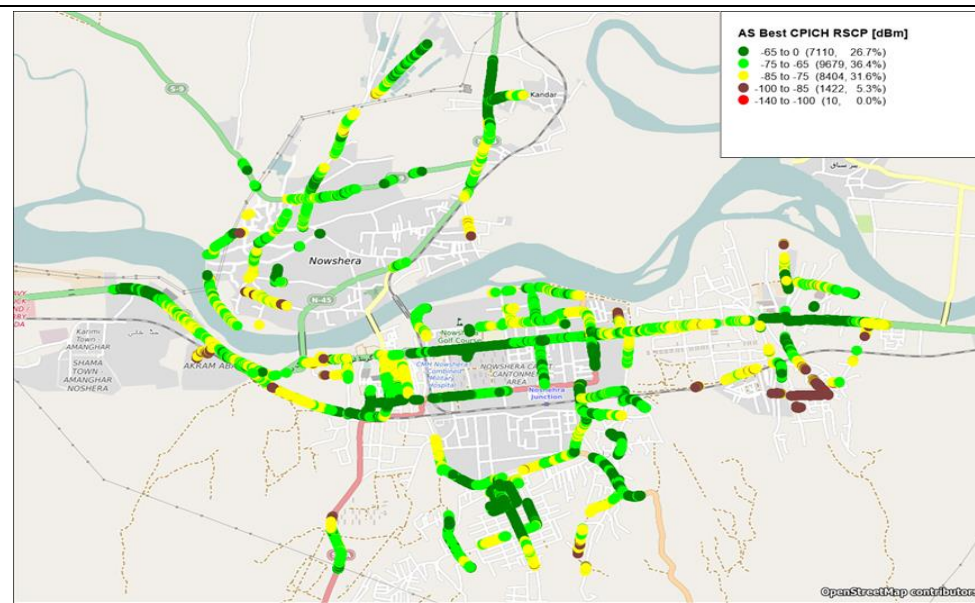


ZONG 4G NETWORK COVERAGE - NWSHEHRA

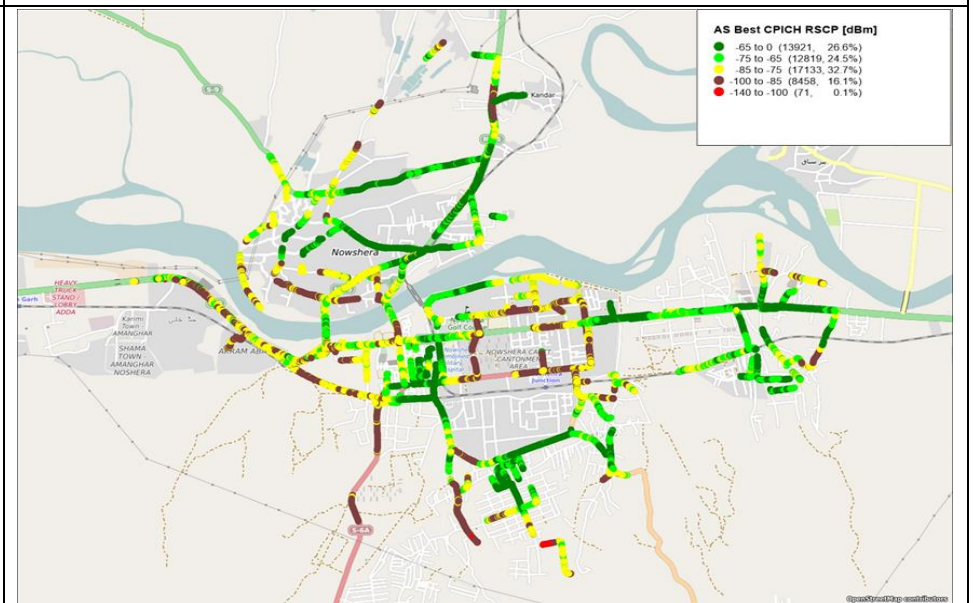


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

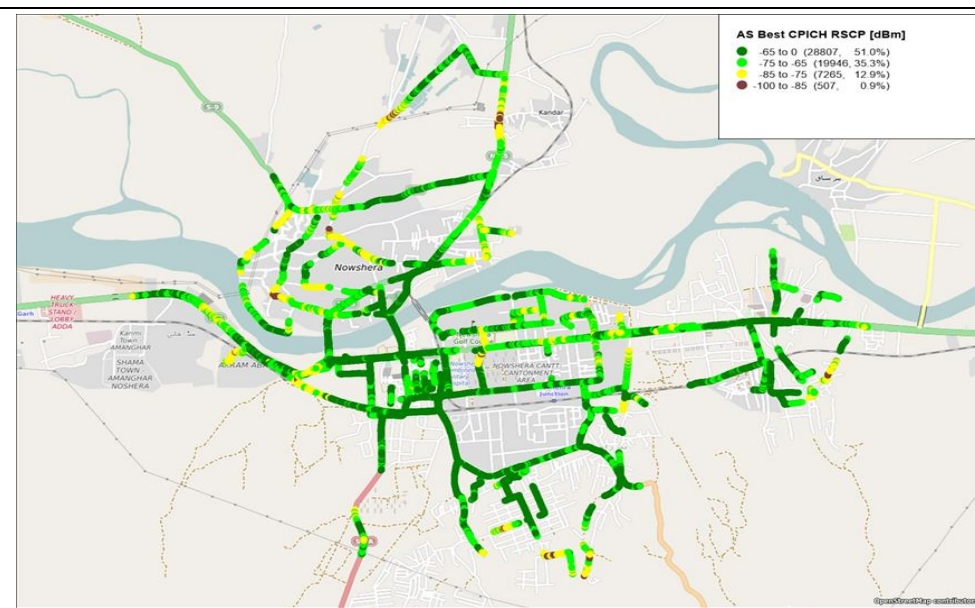
JAZZ 3G NETWORK COVERAGE - NWSHEHRA



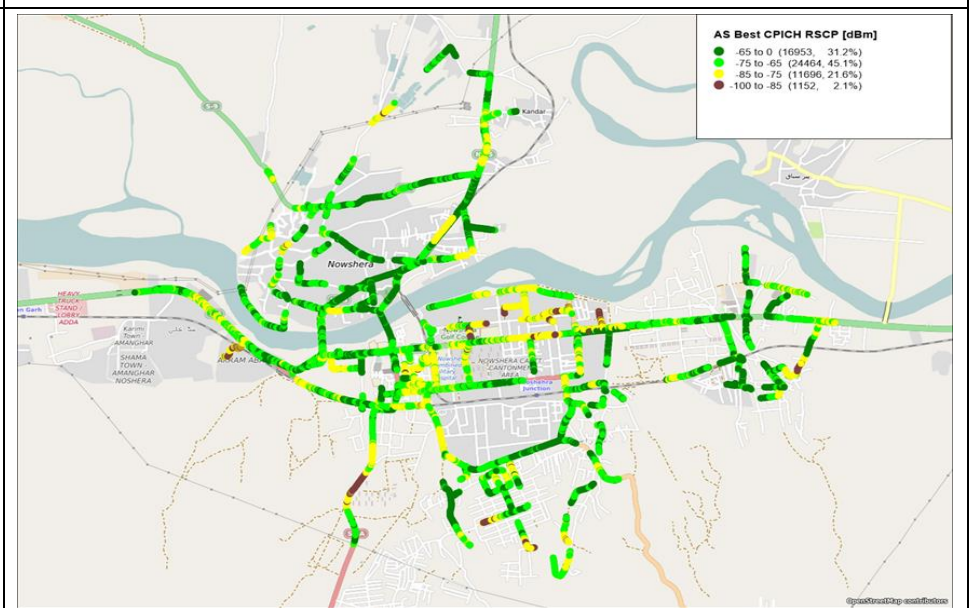
TELENOR 3G NETWORK COVERAGE - NWSHEHRA



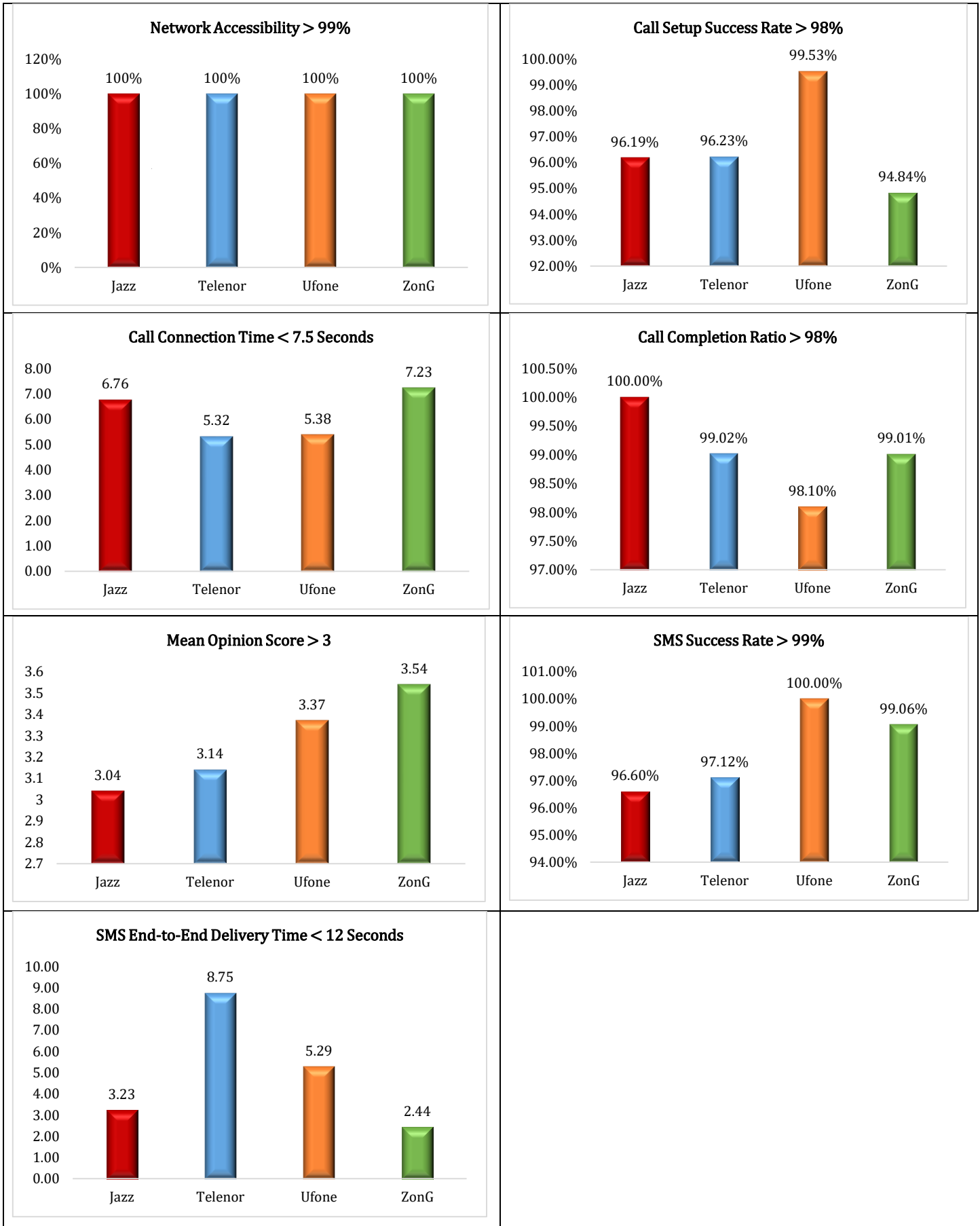
UFONE 3G NETWORK COVERAGE - NWSHEHRA



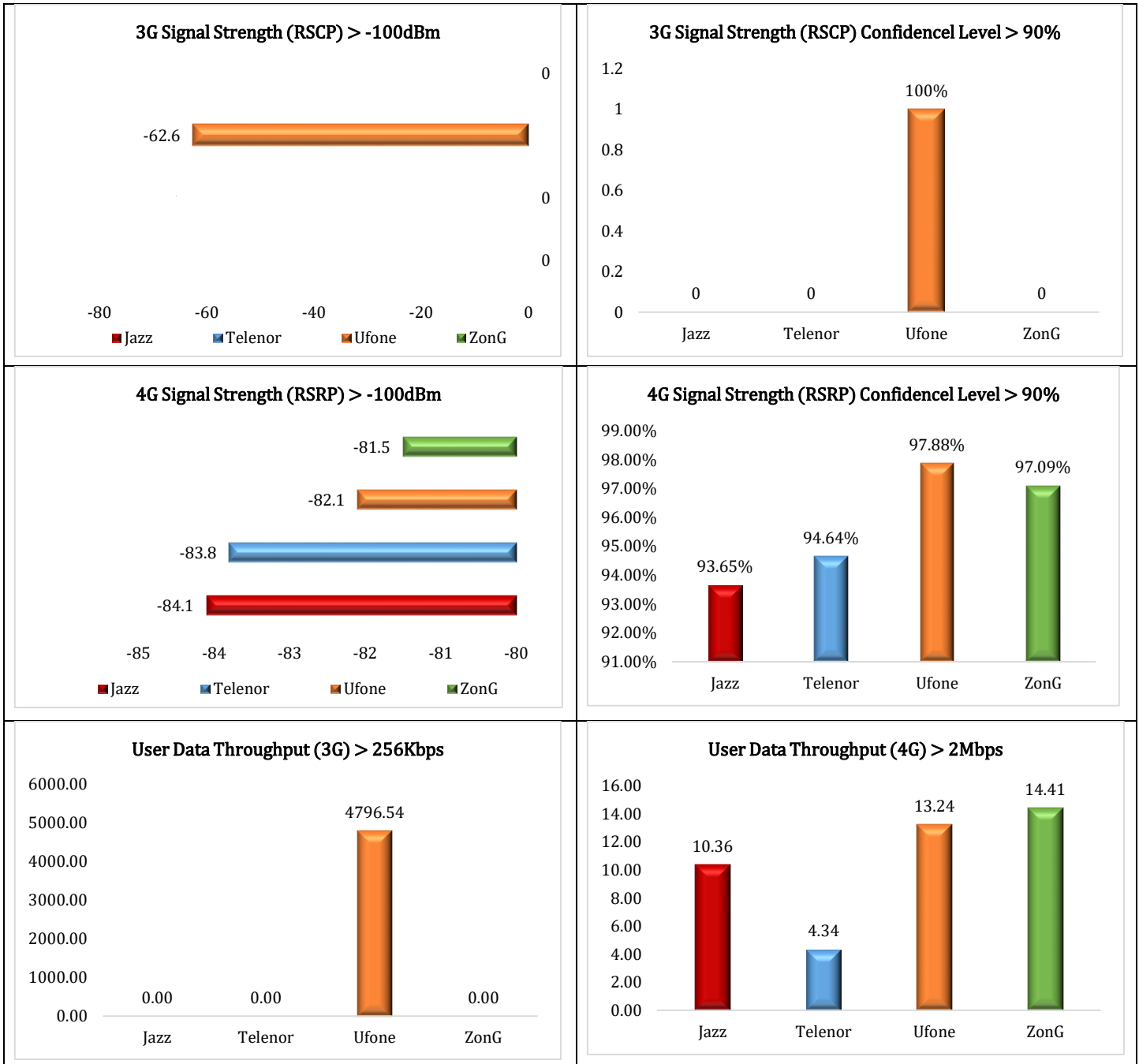
ZONG 3G NETWORK COVERAGE - NWSHEHRA



QUALITY OF SERVICE SURVEY RESULTS – NOWSHEHRA

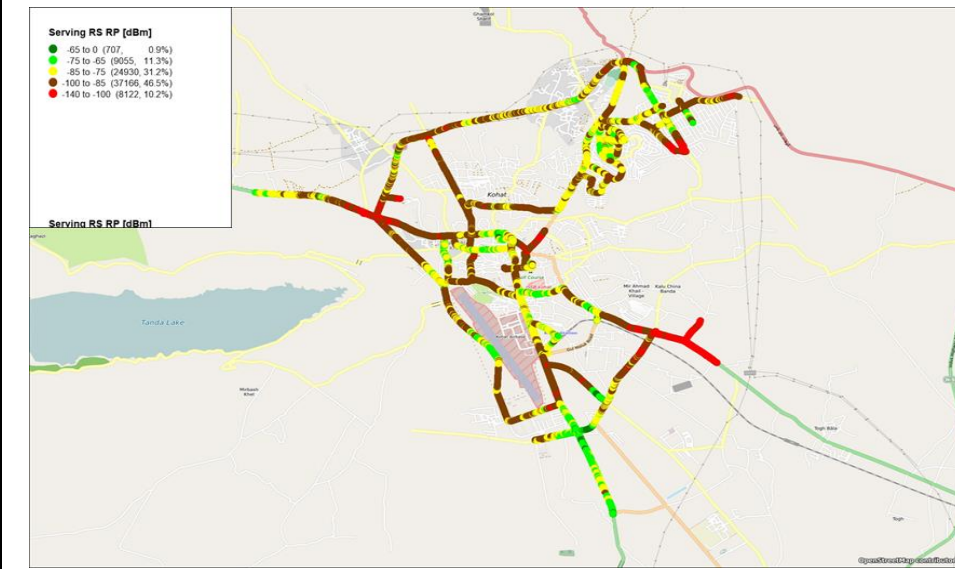


QUALITY OF SERVICE SURVEY RESULTS – NOWSHEHRA

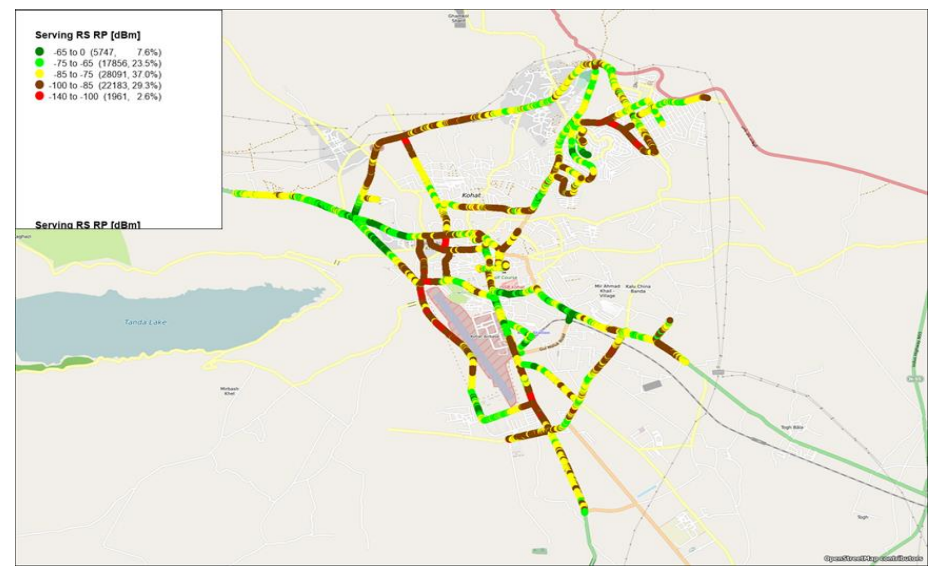


4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

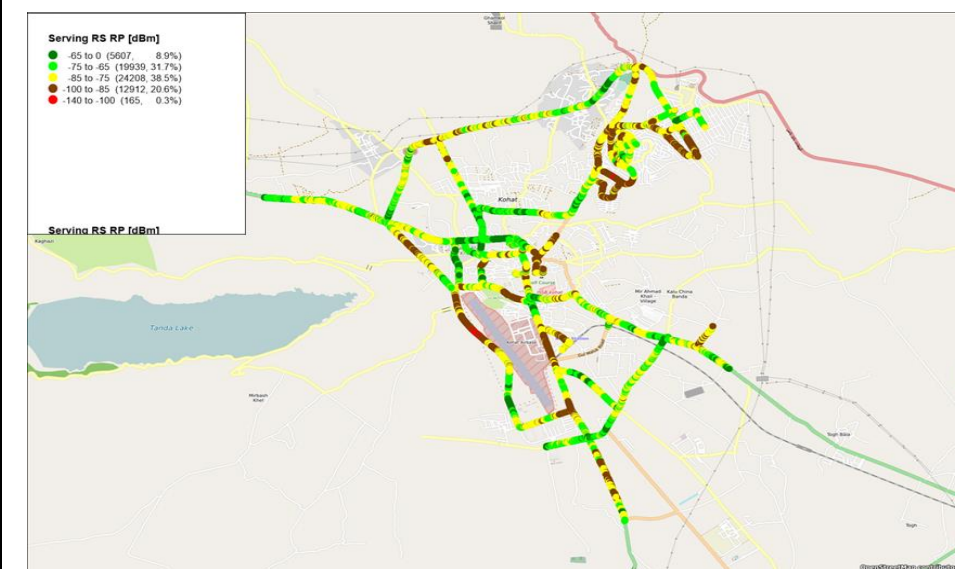
JAZZ 4G NETWORK COVERAGE - KOHAT



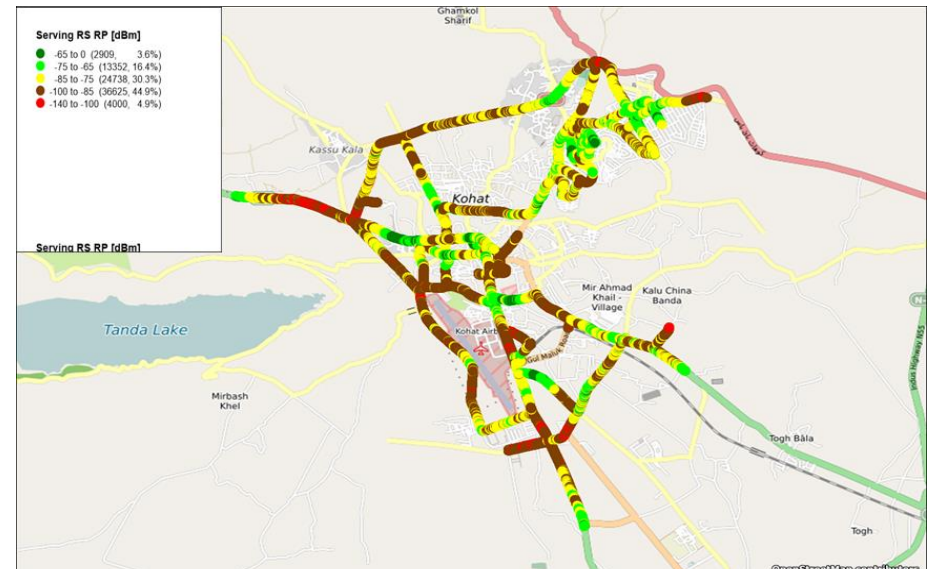
TELENOR 4G NETWORK COVERAGE - KOHAT



UFONE 4G NETWORK COVERAGE - KOHAT

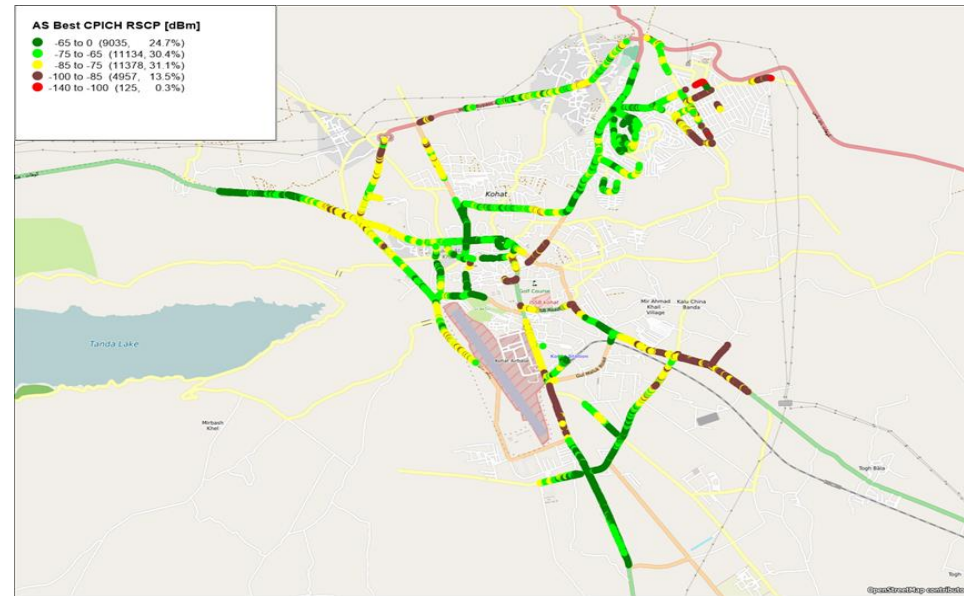


ZONG 4G NETWORK COVERAGE - KOHAT

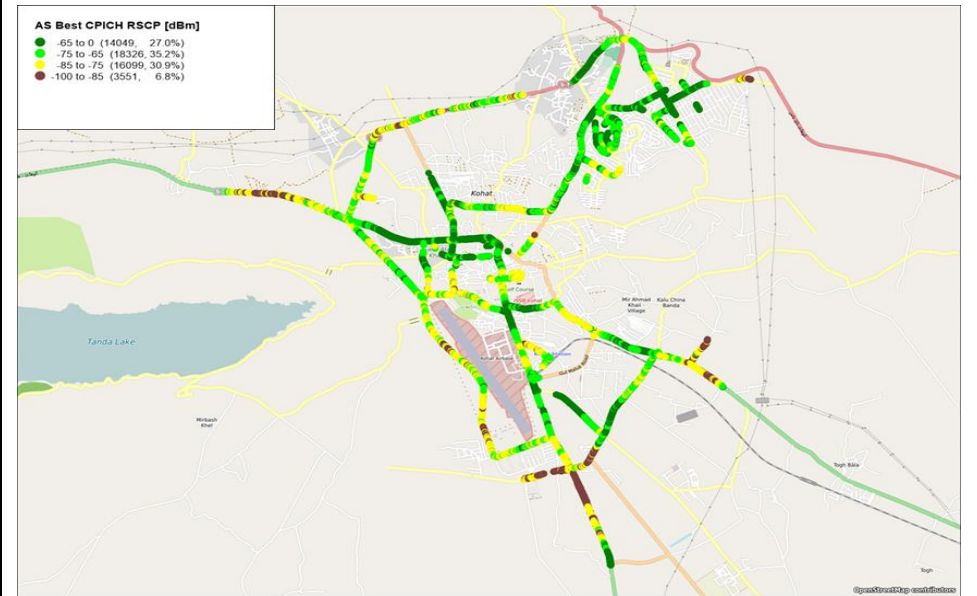


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

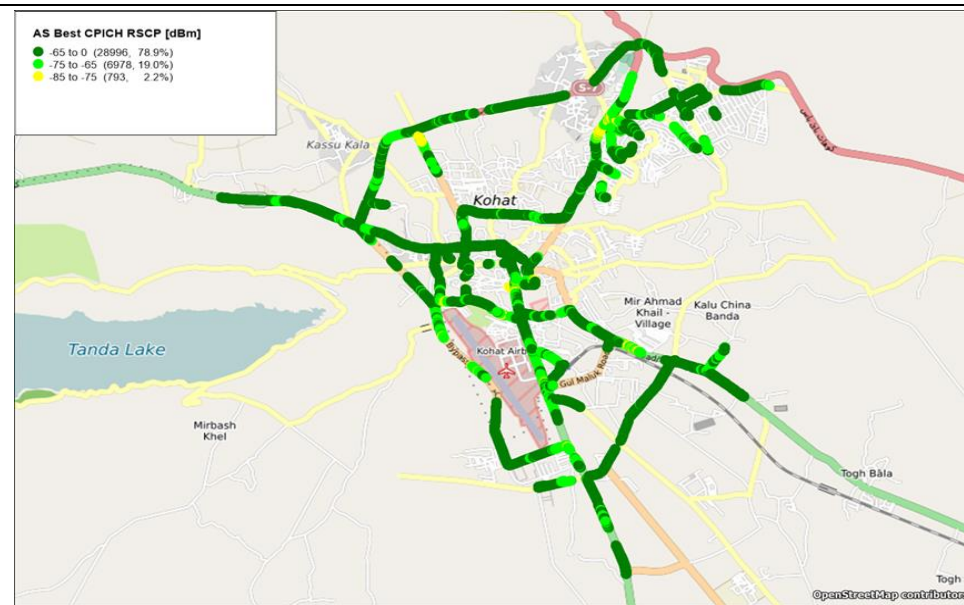
JAZZ 3G NETWORK COVERAGE - KOHAT



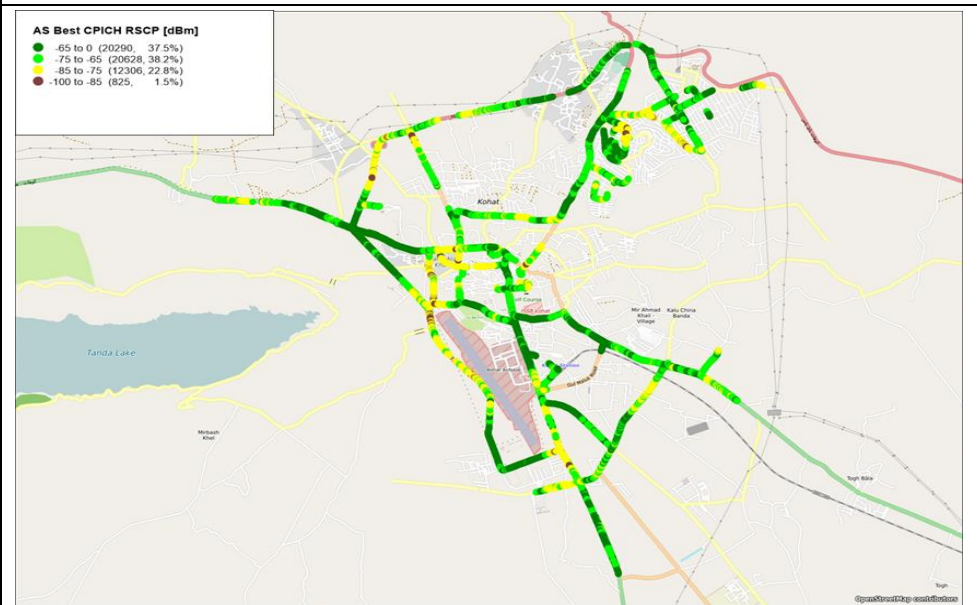
TELENOR 3G NETWORK COVERAGE - KOHAT



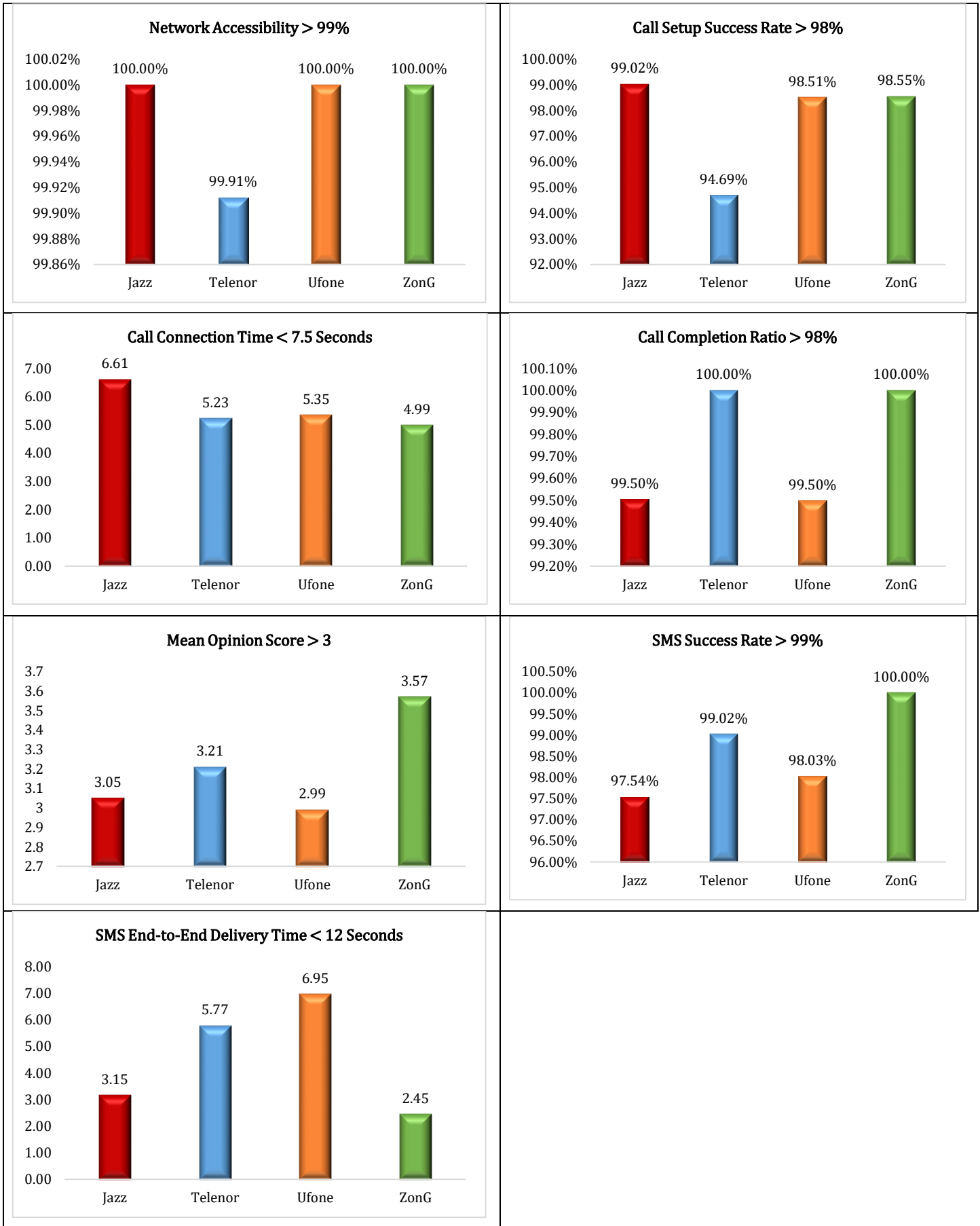
UFONE 3G NETWORK COVERAGE - KOHAT



ZONG 3G NETWORK COVERAGE - KOHAT

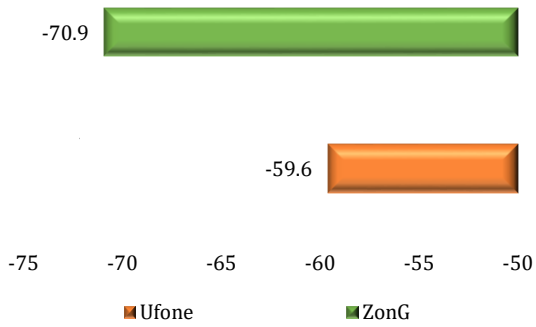


QUALITY OF SERVICE SURVEY RESULTS – KOHAT

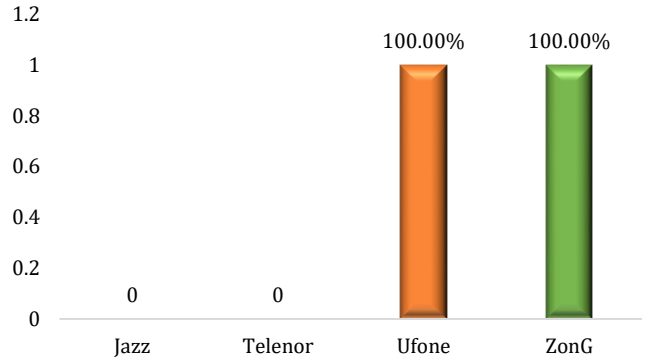


QUALITY OF SERVICE SURVEY RESULTS – KOHAT

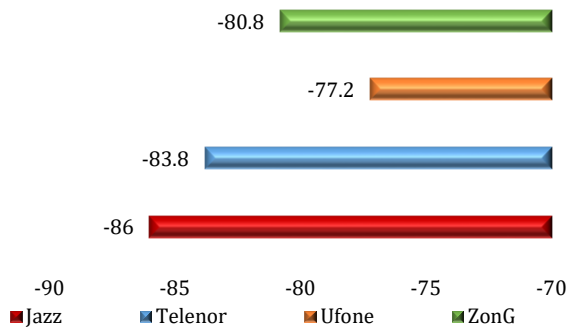
3G Signal Strength (RSCP) > -100dBm



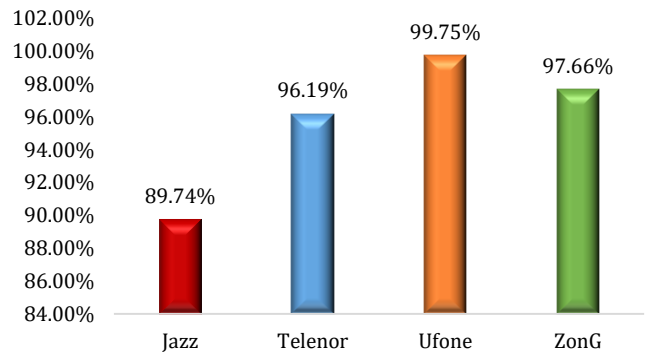
3G Signal Strength (RSCP) Confidencel Level > 90%



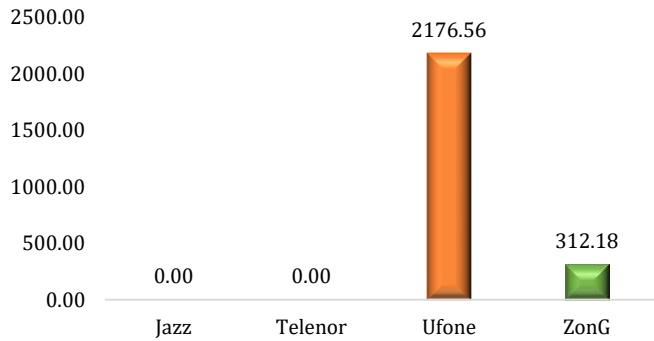
4G Signal Strength (RSRP) > -100dBm



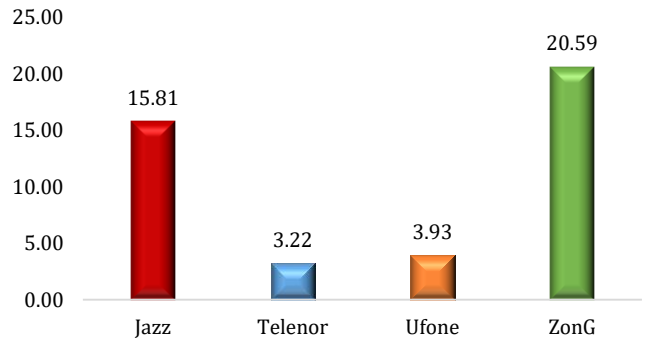
4G Signal Strength (RSRP) Confidencel Level > 90%



User Data Throughput (3G) > 256Kbps

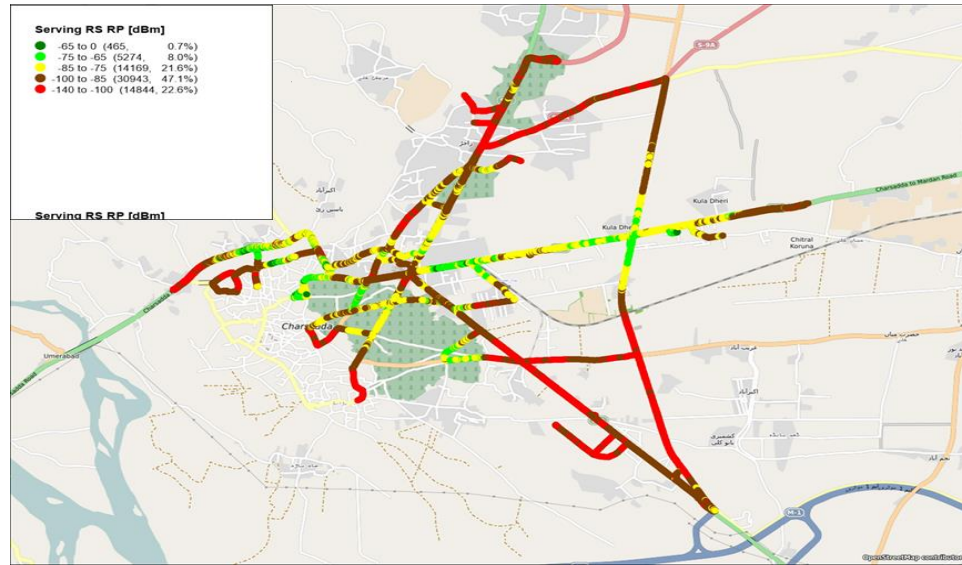


User Data Throughput (4G) > 2Mbps

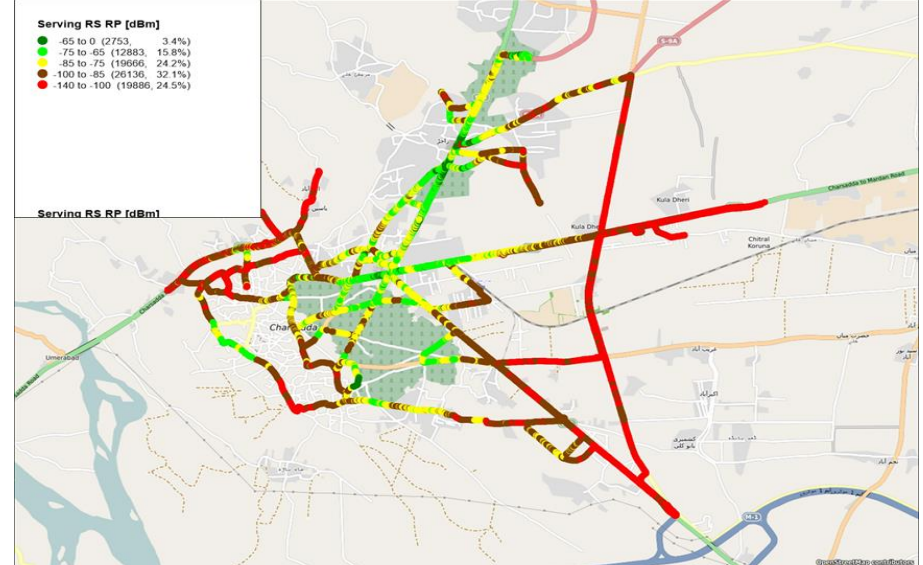


4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

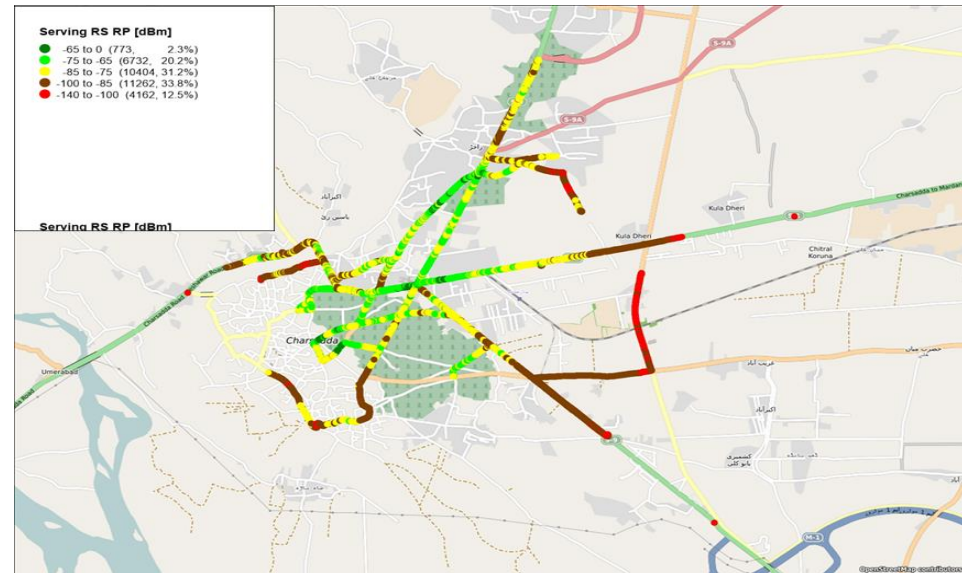
JAZZ 4G NETWORK COVERAGE - CHARSADDA



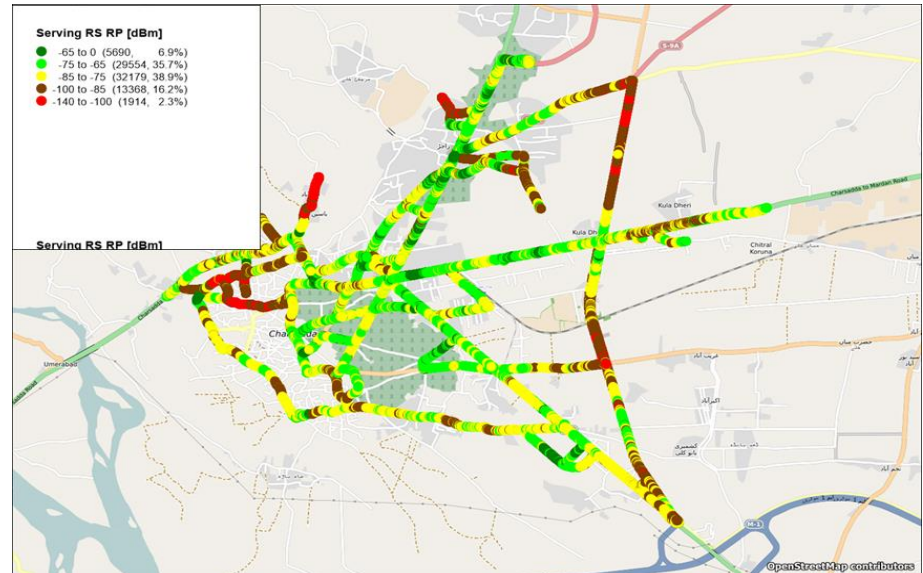
TELENOR 4G NETWORK COVERAGE - CHARSADDA



UFONE 4G NETWORK COVERAGE - CHARSADDA

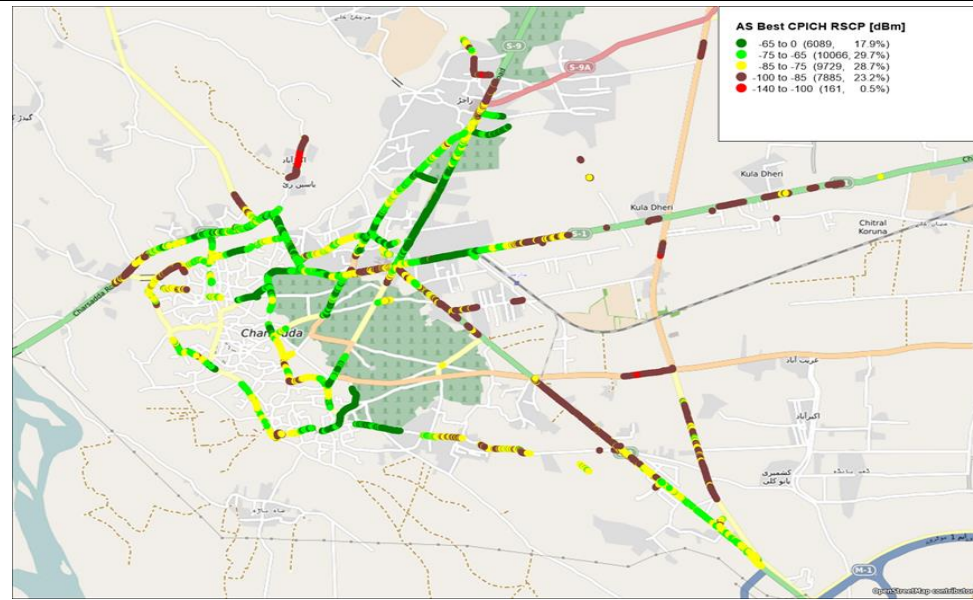


ZONG 4G NETWORK COVERAGE - CHARSADDA

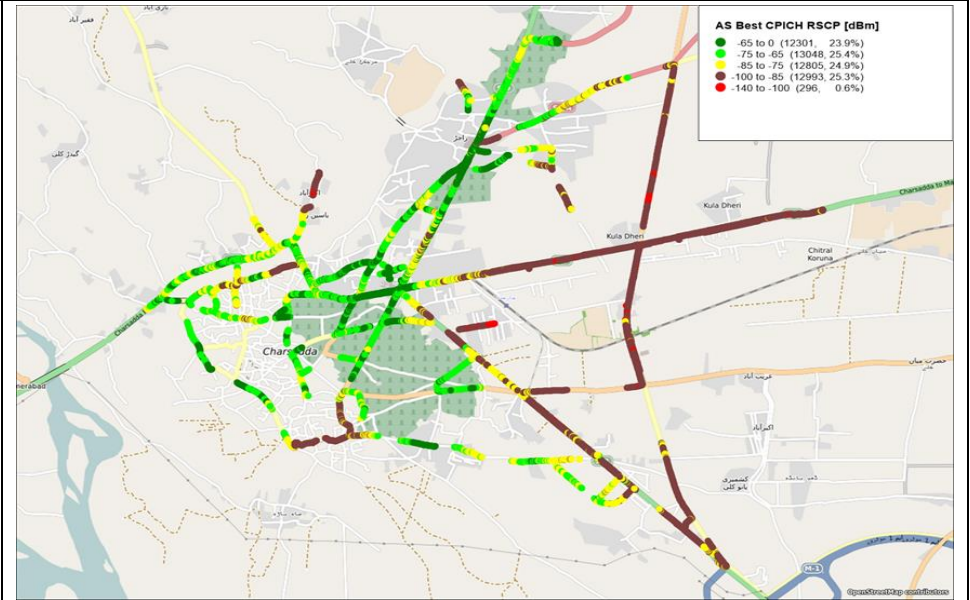


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

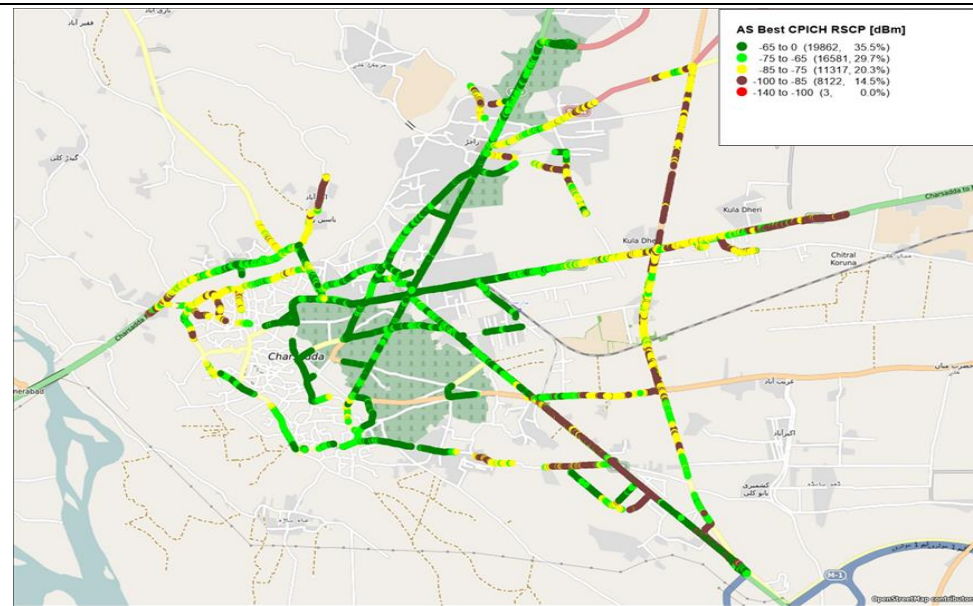
JAZZ 3G NETWORK COVERAGE - CHARSAKDA



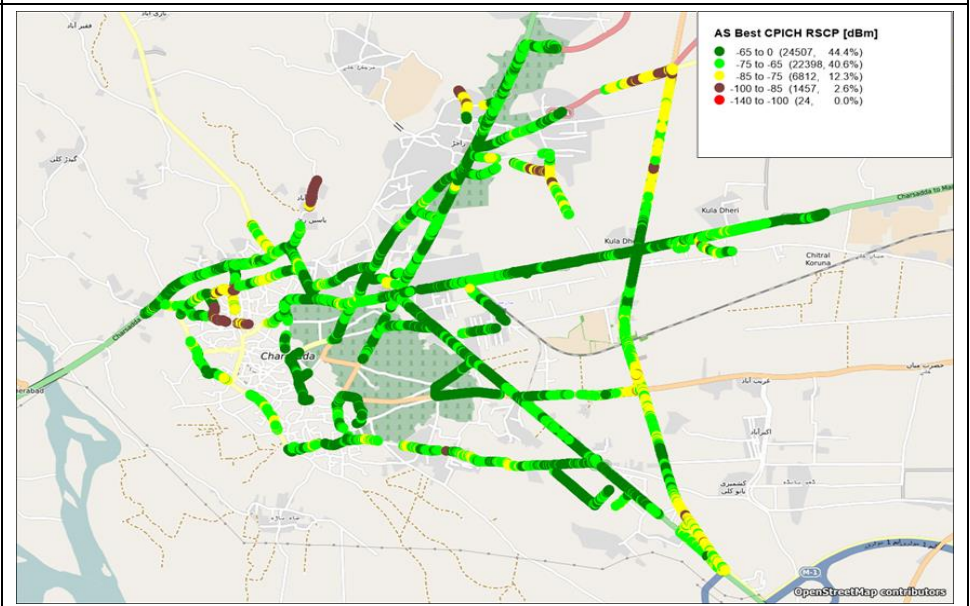
TELENOR 3G NETWORK COVERAGE - CHARSAKDA



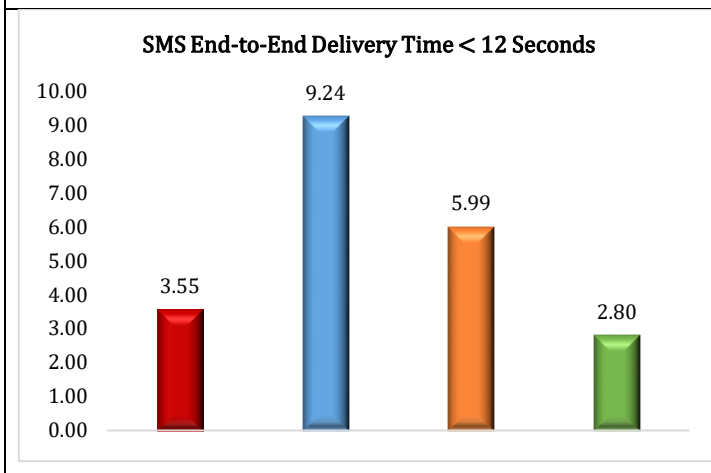
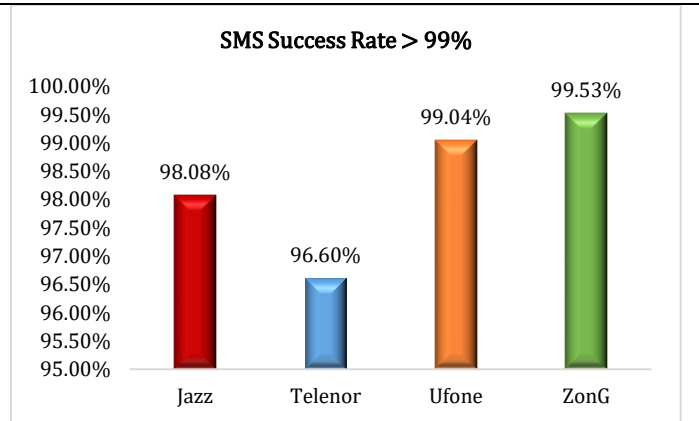
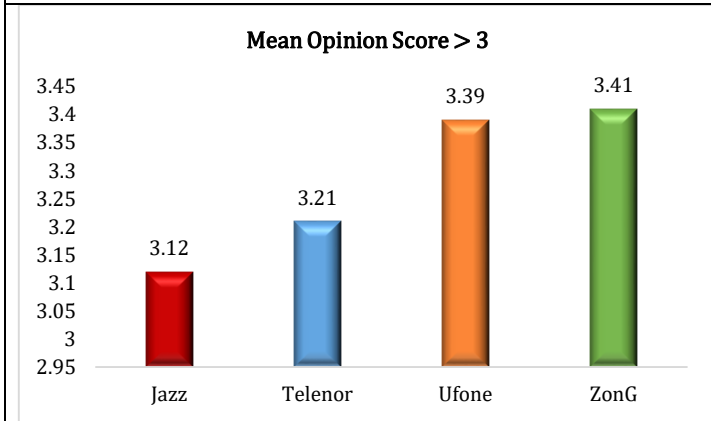
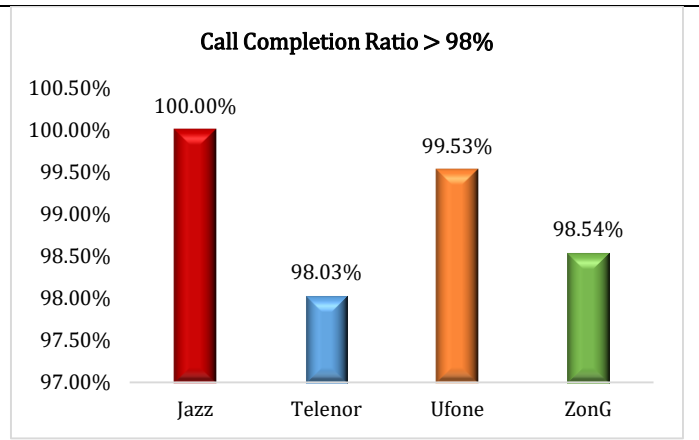
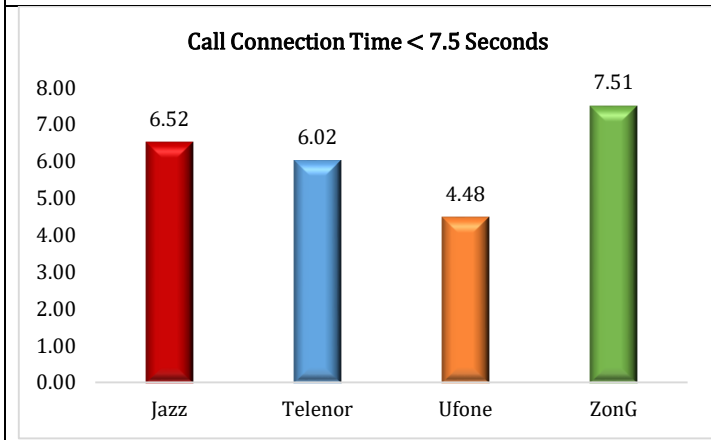
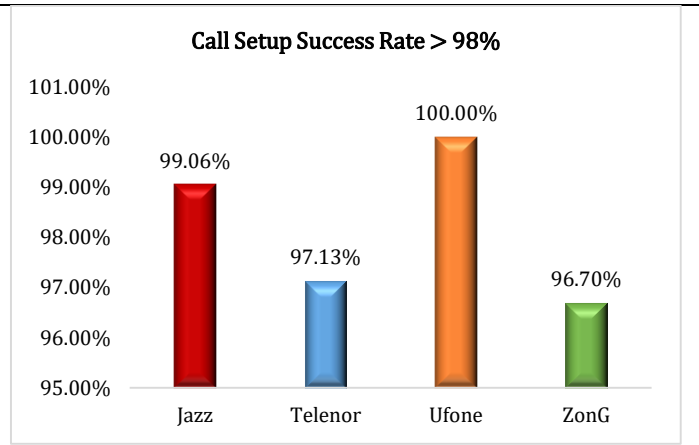
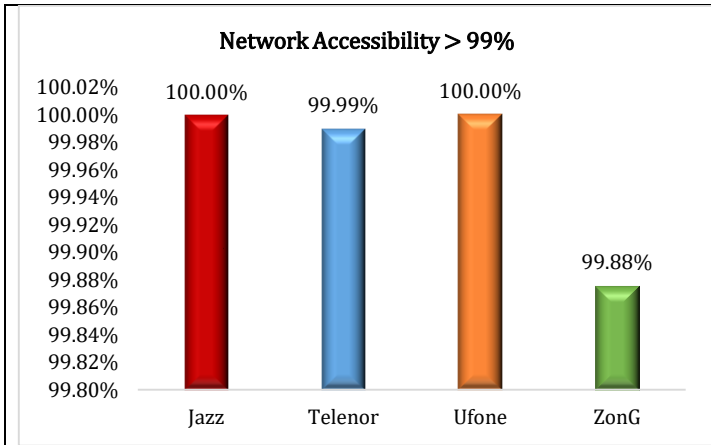
UFONE 3G NETWORK COVERAGE - CHARSAKDA



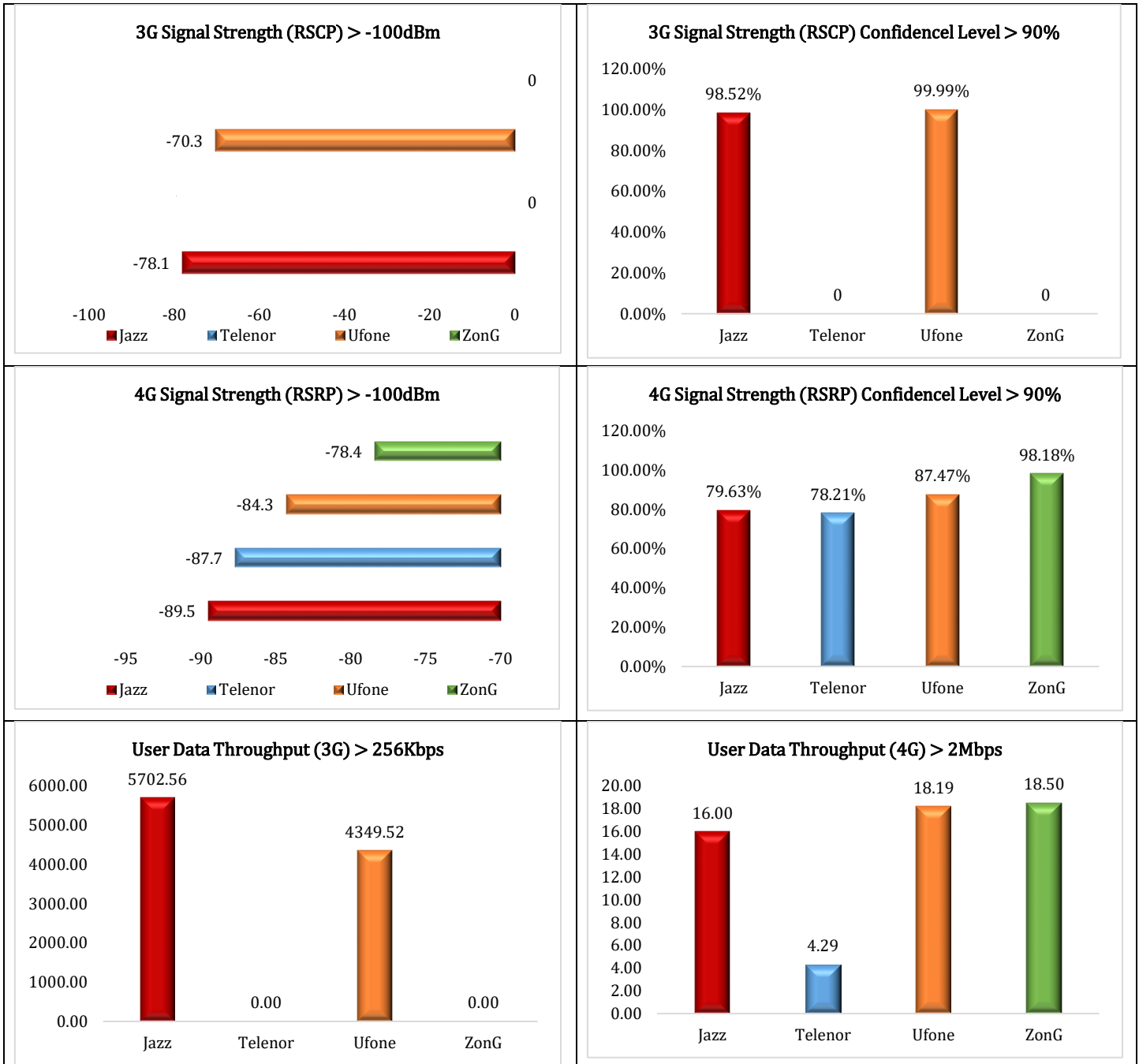
ZONG 3G NETWORK COVERAGE - CHARSAKDA



QUALITY OF SERVICE SURVEY RESULTS – CHARSAKDA

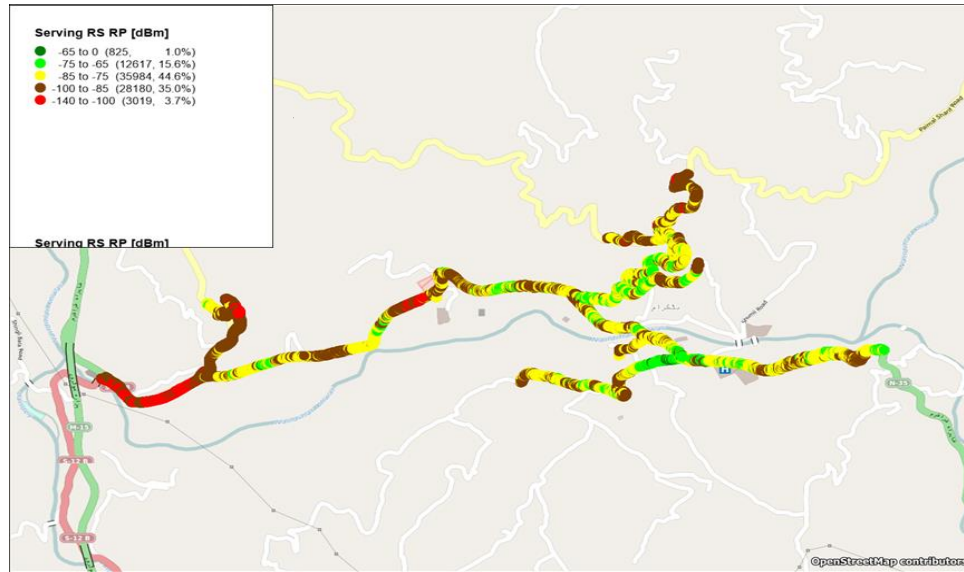


QUALITY OF SERVICE SURVEY RESULTS – CHARSAKDA

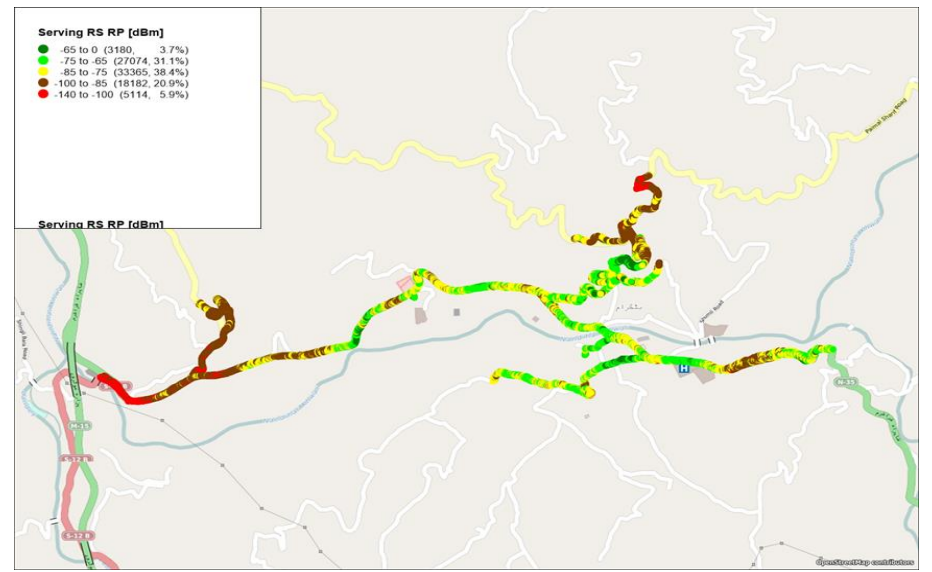


4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

JAZZ 4G NETWORK COVERAGE - BATTAGRAM



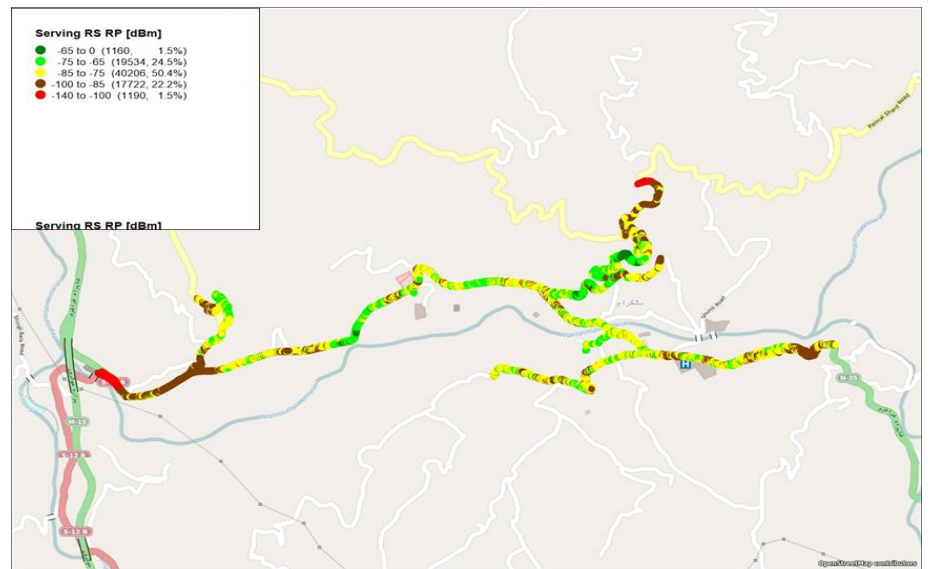
TELENOR 4G NETWORK COVERAGE - BATTAGRAM



UFONE 4G NETWORK COVERAGE - BATTAGRAM

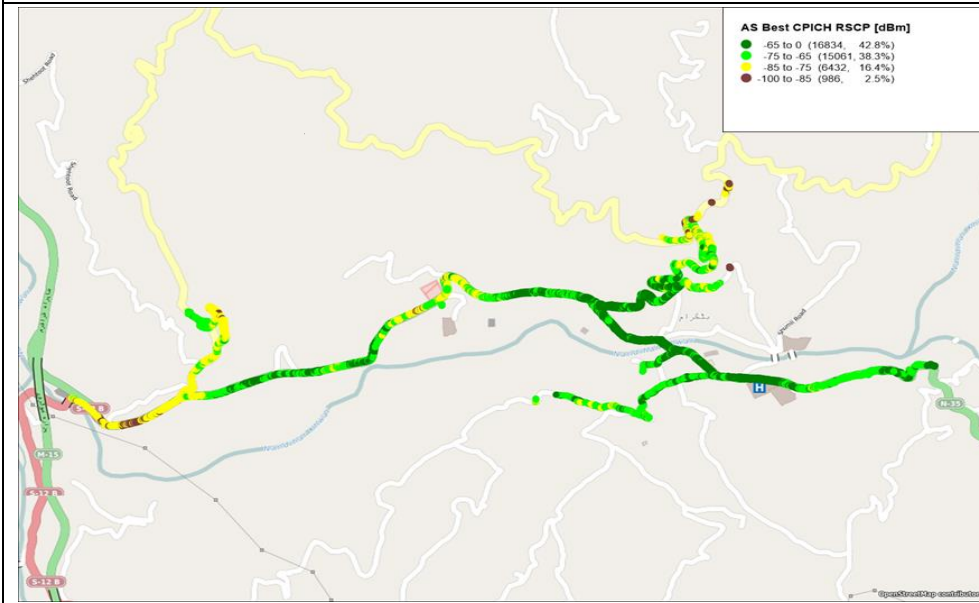
4G NOT AVAILABLE

ZONG 4G NETWORK COVERAGE - BATTAGRAM

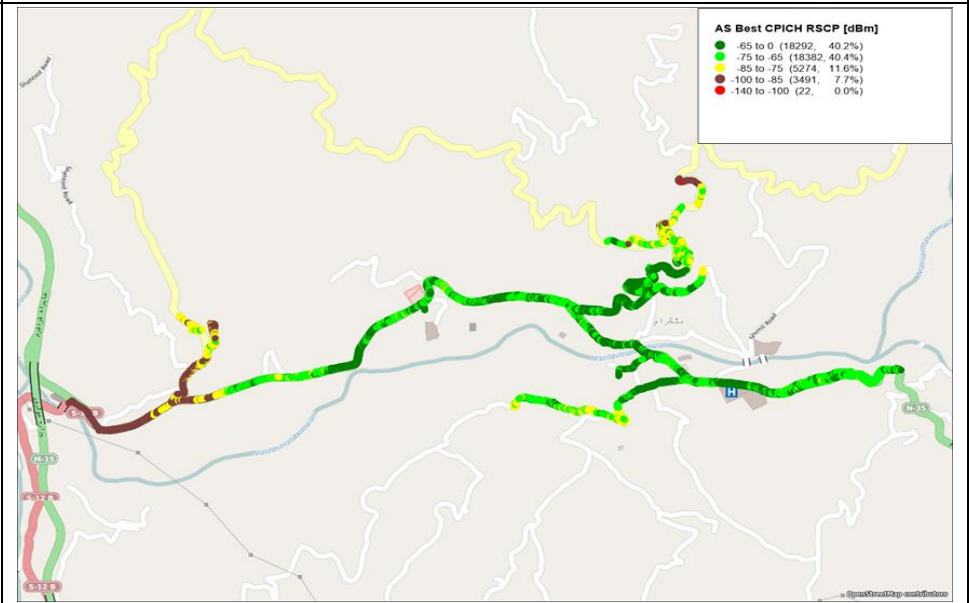


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

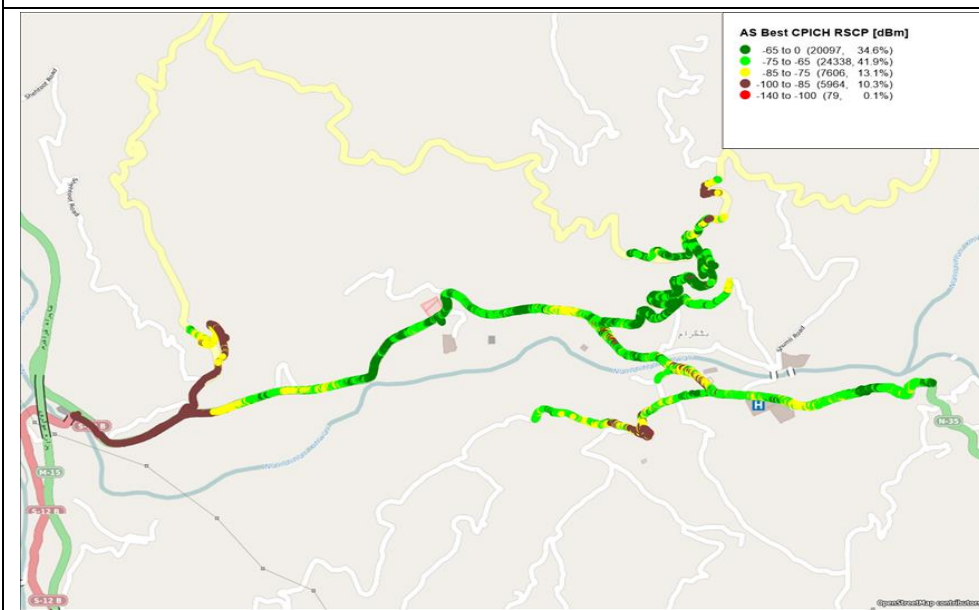
JAZZ 3G NETWORK COVERAGE - BATTAGRAM



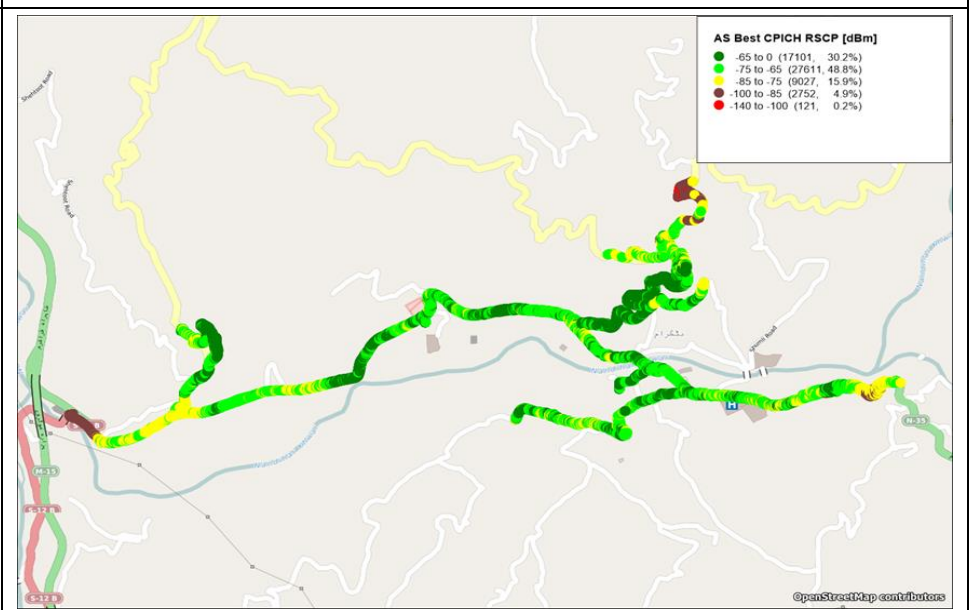
TELENOR 3G NETWORK COVERAGE - BATTAGRAM



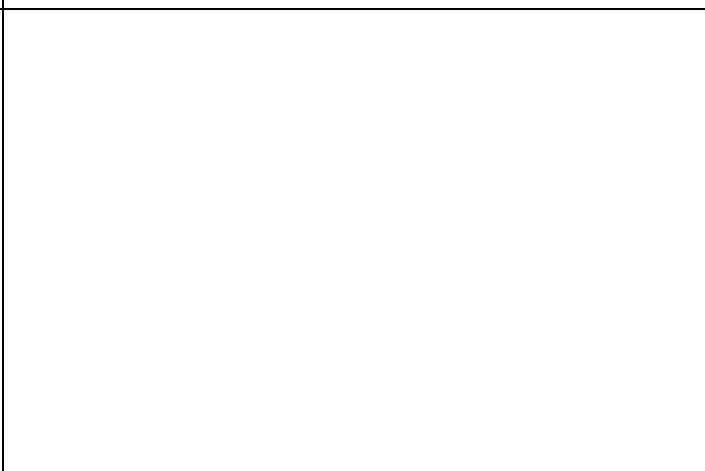
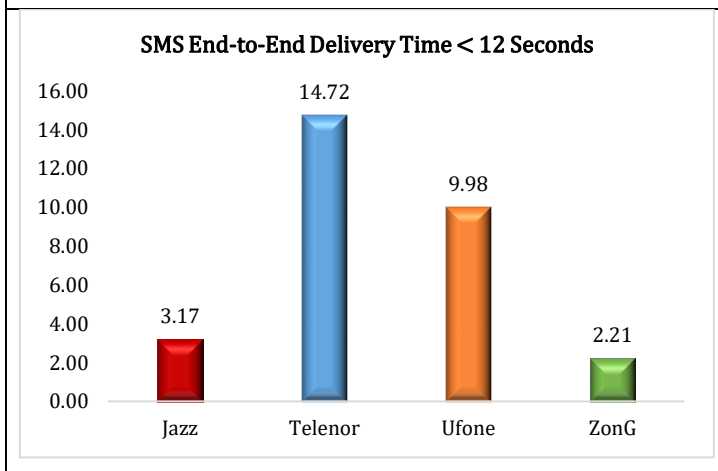
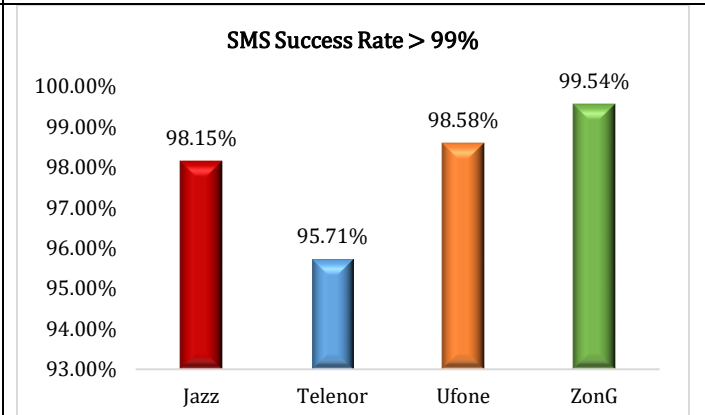
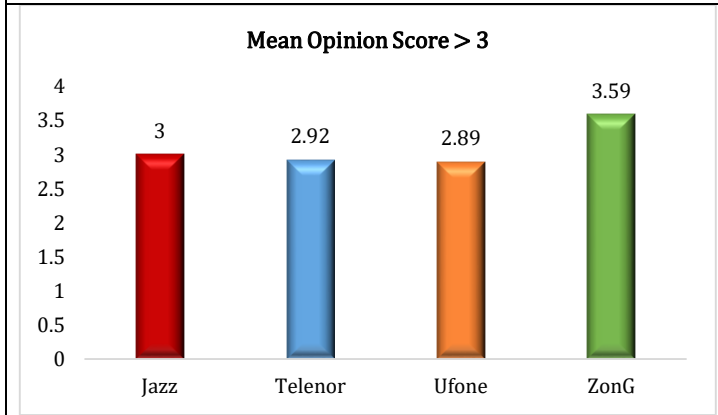
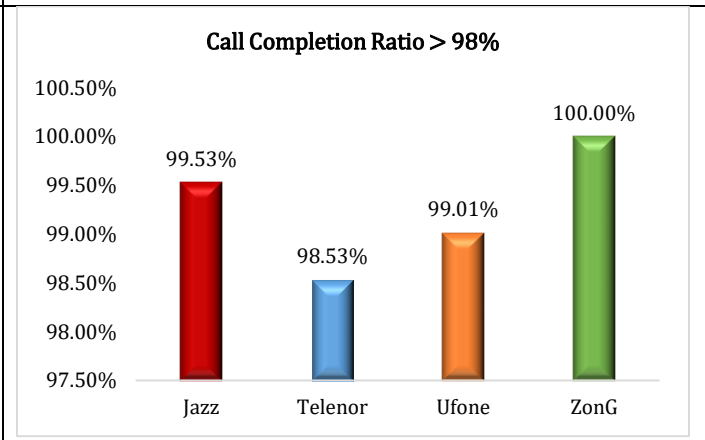
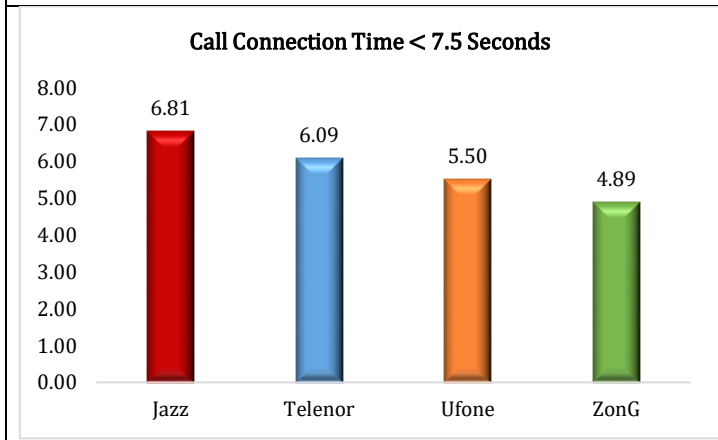
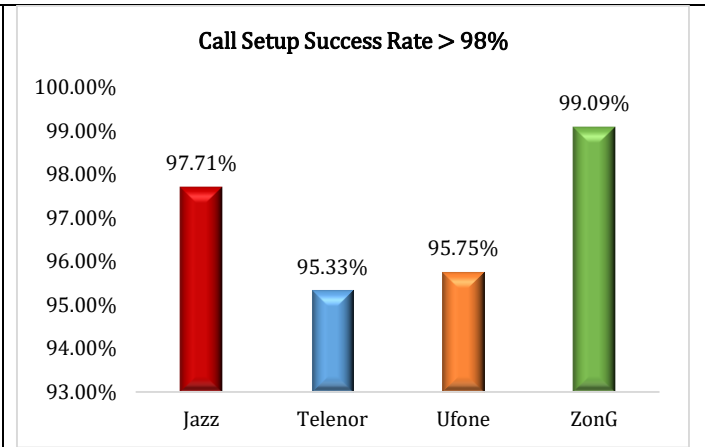
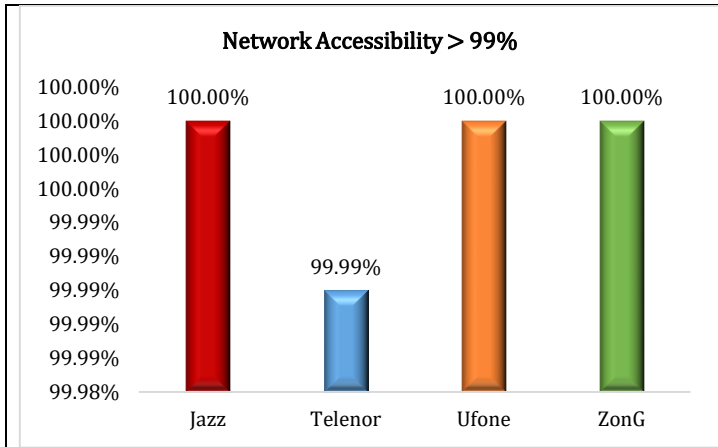
UFONE 3G NETWORK COVERAGE - BATTAGRAM



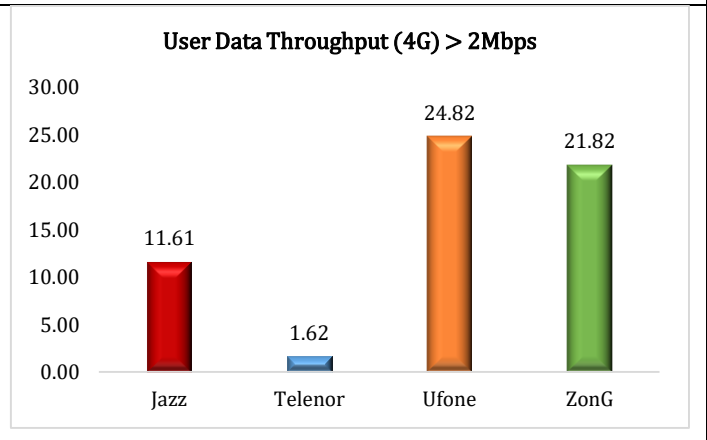
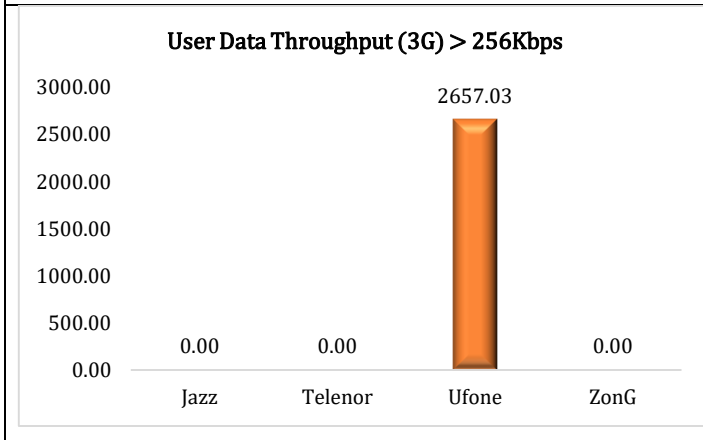
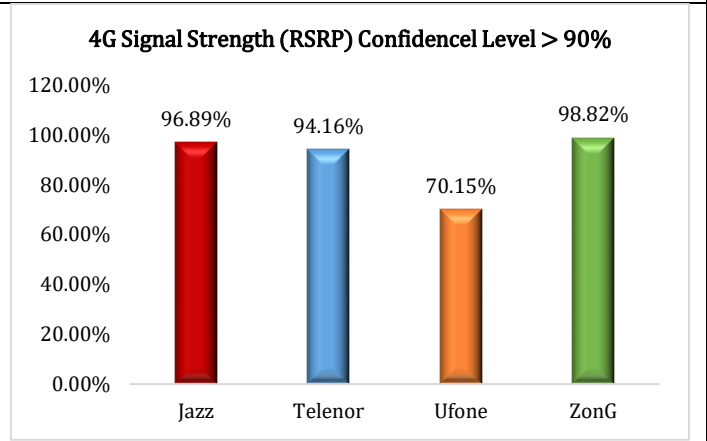
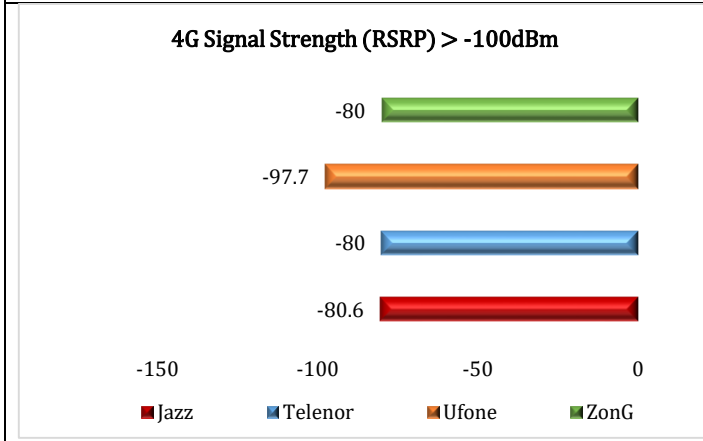
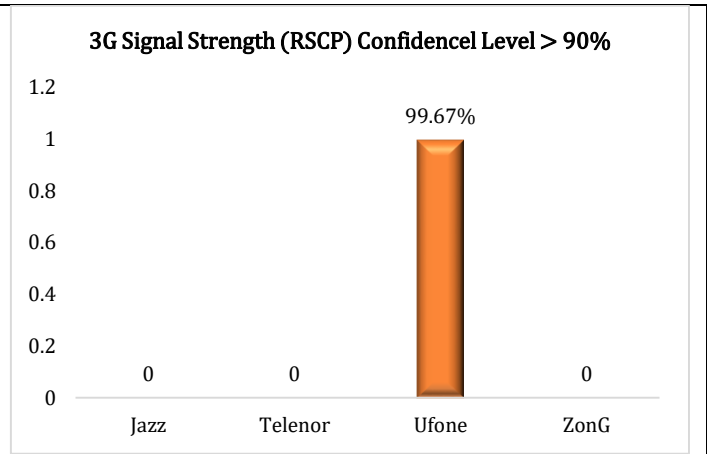
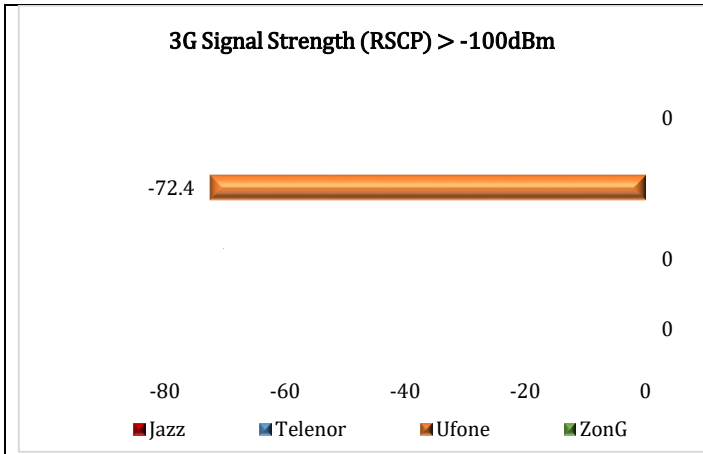
ZONG 3G NETWORK COVERAGE - BATTAGRAM



QUALITY OF SERVICE SURVEY RESULTS – BATTAGRAM



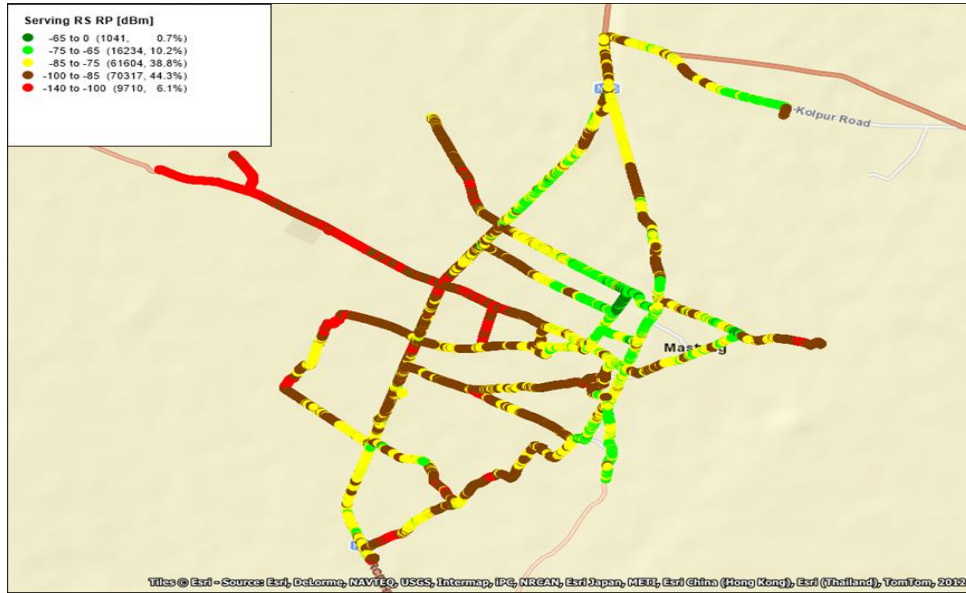
QUALITY OF SERVICE SURVEY RESULTS – BATTAGRAM



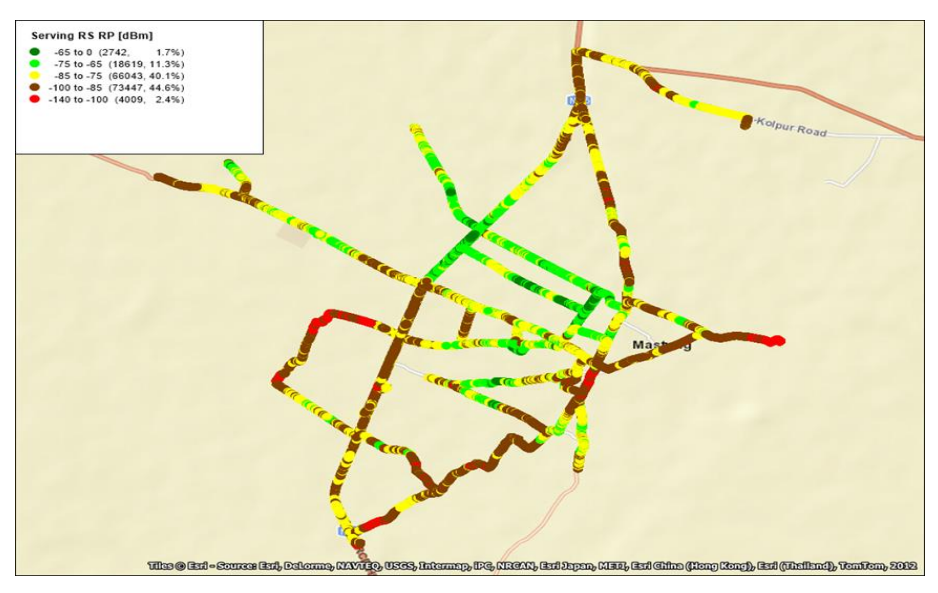
BALUCHISTAN

4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

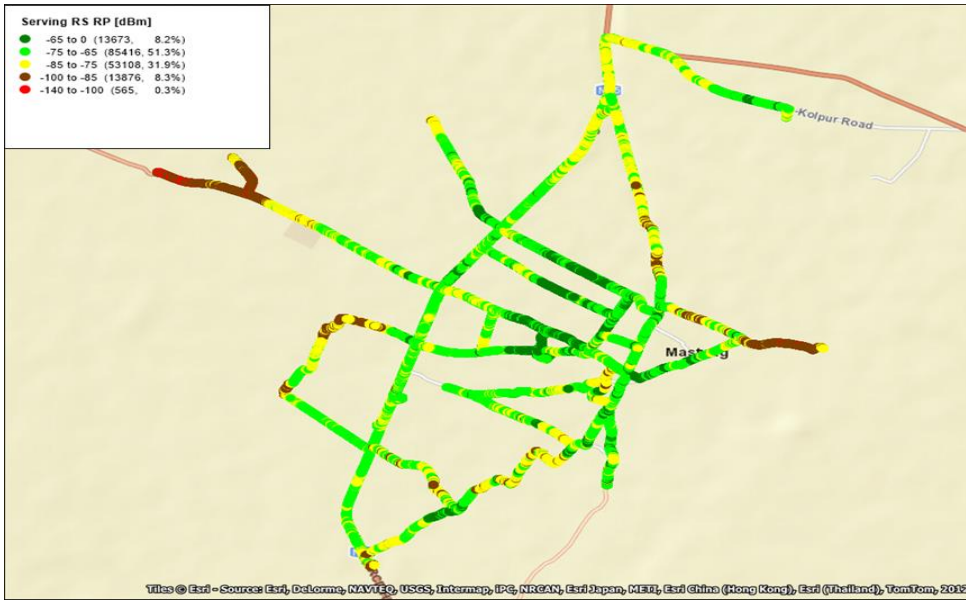
JAZZ 4G NETWORK COVERAGE - MASTUNG



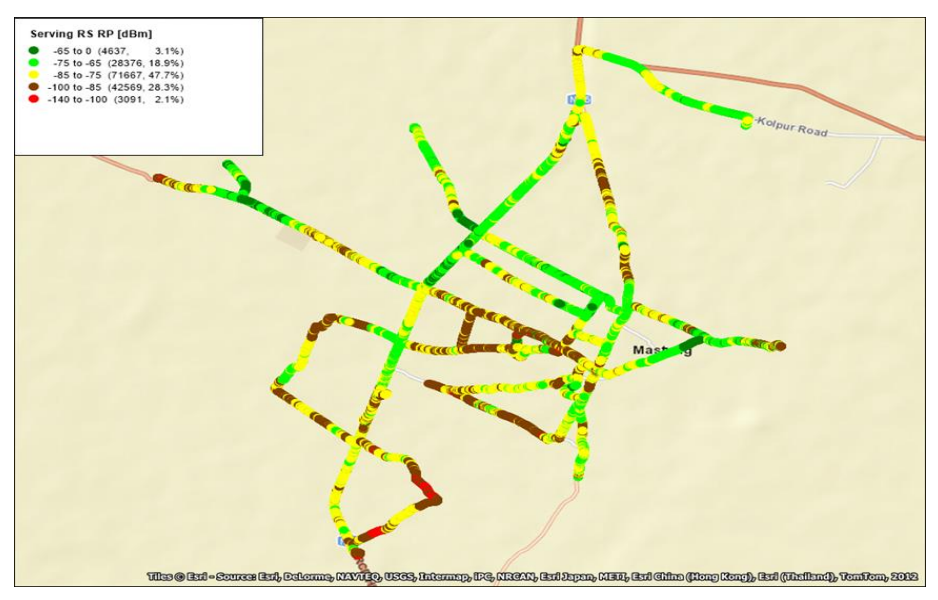
TELENOR 4G NETWORK COVERAGE - MASTUNG



UFONE 4G NETWORK COVERAGE - MASTUNG



ZONG 4G NETWORK COVERAGE - MASTUNG



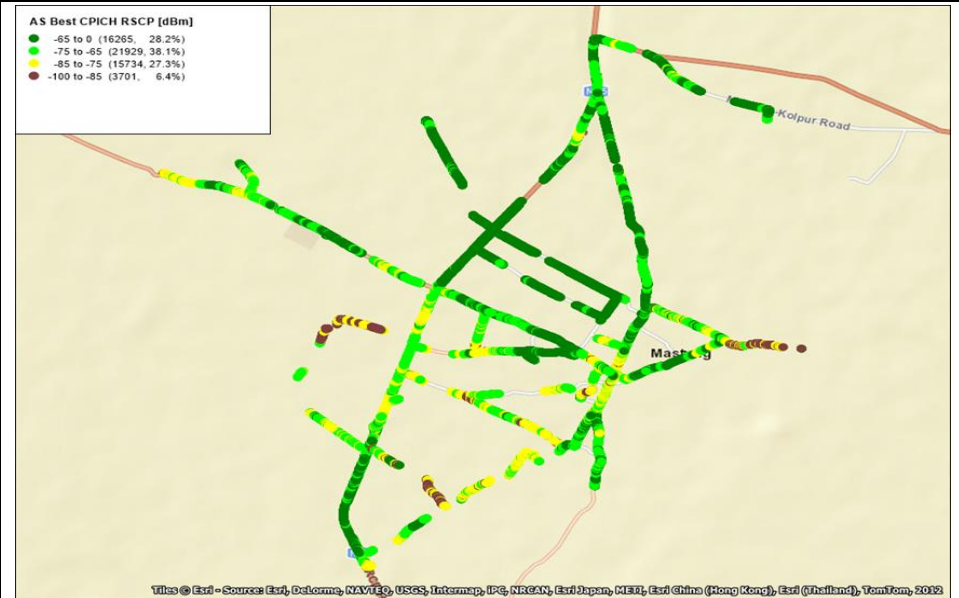
3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

JAZZ 3G NETWORK COVERAGE – MASTUNG

3G NOT AVAILABLE

TELENOR 3G NETWORK COVERAGE – MASTUNG

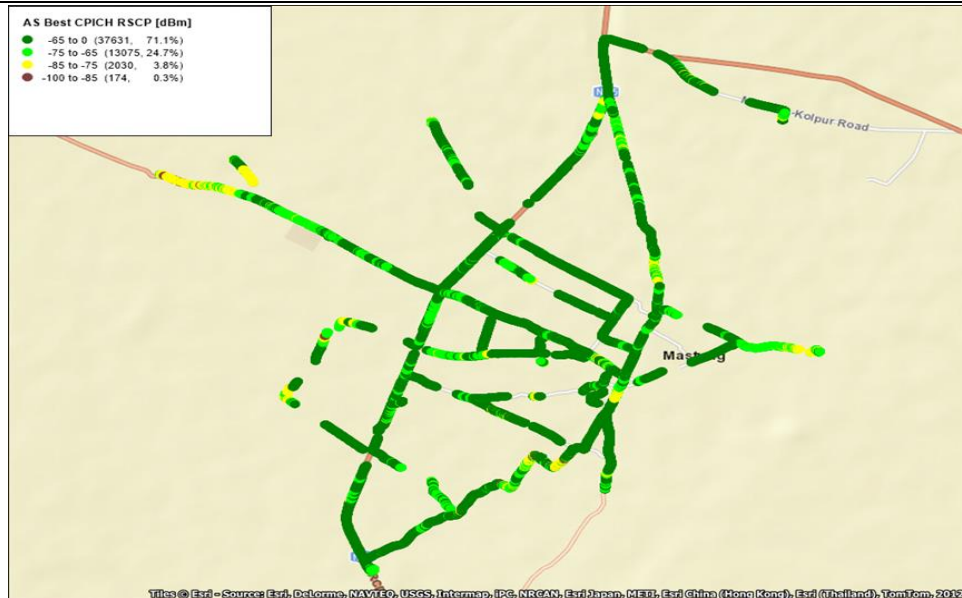
AS Best CPICH RSCP [dBm]
 ● -65 to 0 (16265, 28.2%)
 ● -75 to -65 (21929, 38.1%)
 ● -85 to -75 (15734, 27.3%)
 ● -100 to -85 (3701, 6.4%)



Titles © Esri - Source Esri, DeLorme, NAVTEQ, USGS, Intermap, IPC, NRCAN, Esri Japan, MEIT, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

UFONE 3G NETWORK COVERAGE – MASTUNG

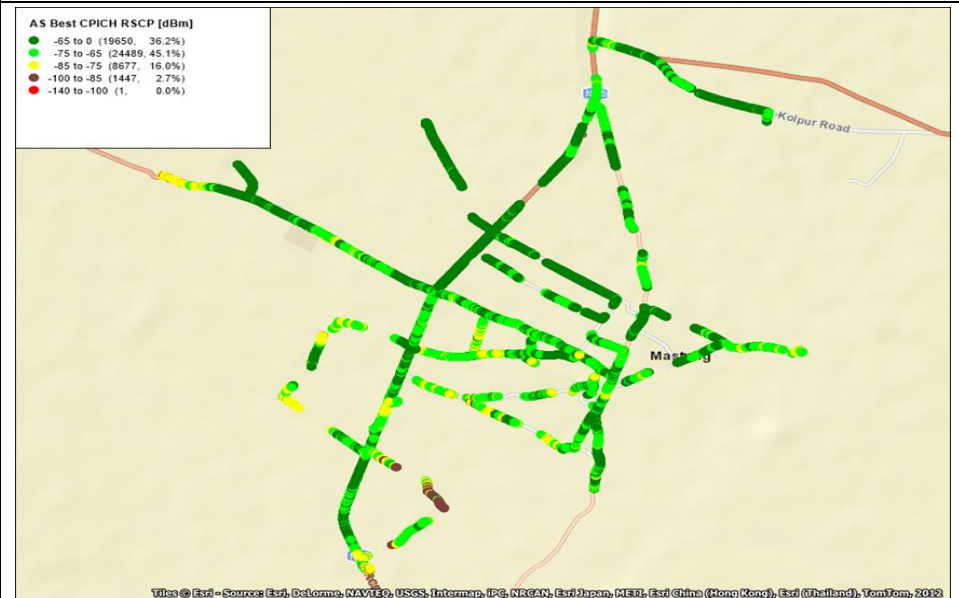
AS Best CPICH RSCP [dBm]
 ● -65 to 0 (37631, 71.1%)
 ● -75 to -65 (13075, 24.7%)
 ● -85 to -75 (2030, 3.8%)
 ● -100 to -85 (174, 0.3%)



Titles © Esri - Source Esri, DeLorme, NAVTEQ, USGS, Intermap, IPC, NRCAN, Esri Japan, MEIT, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

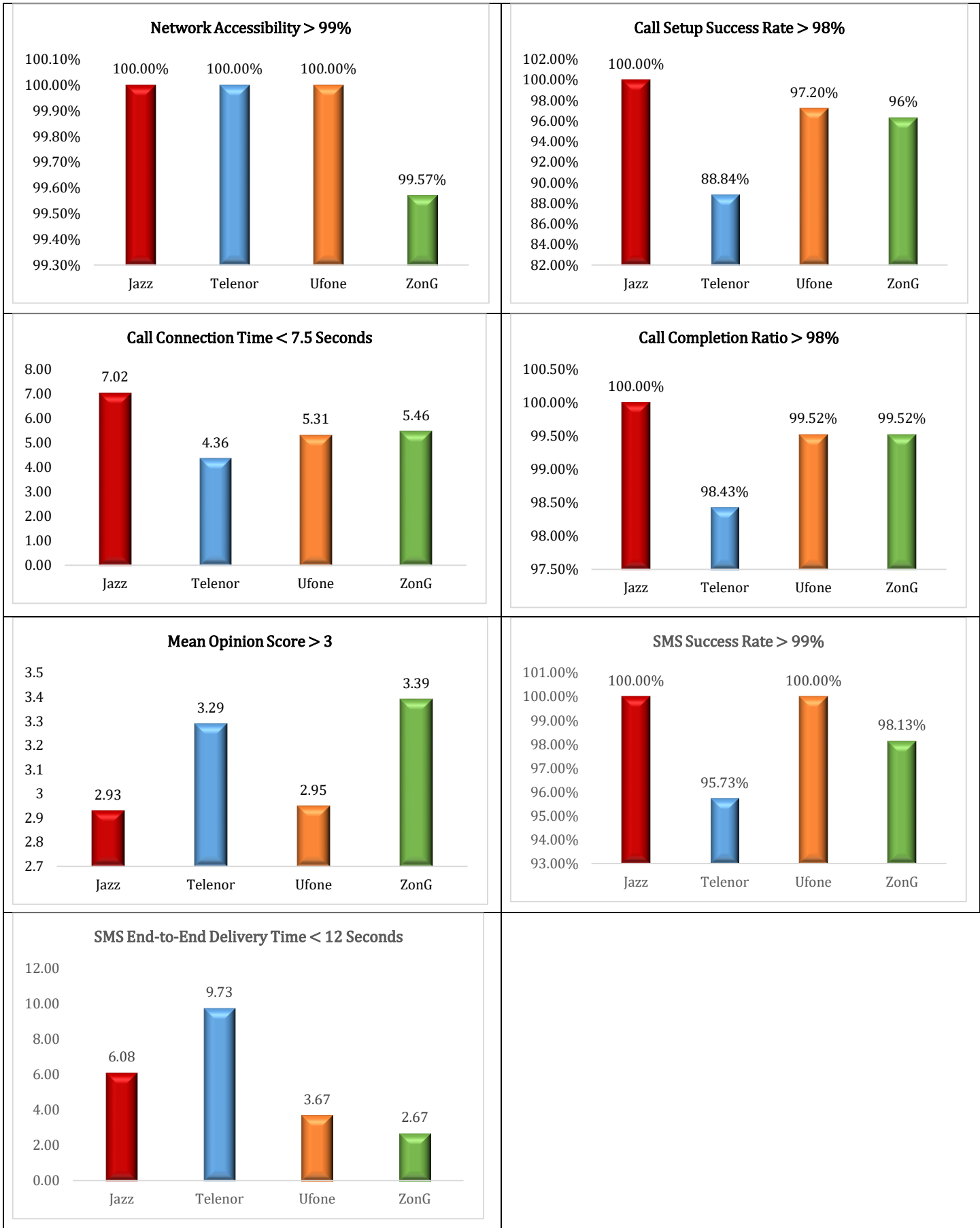
ZONG 3G NETWORK COVERAGE – MASTUNG

AS Best CPICH RSCP [dBm]
 ● -65 to 0 (19650, 36.2%)
 ● -75 to -65 (24489, 45.1%)
 ● -85 to -75 (8677, 16.0%)
 ● -100 to -85 (1447, 2.7%)
 ● -140 to -100 (1, 0.0%)



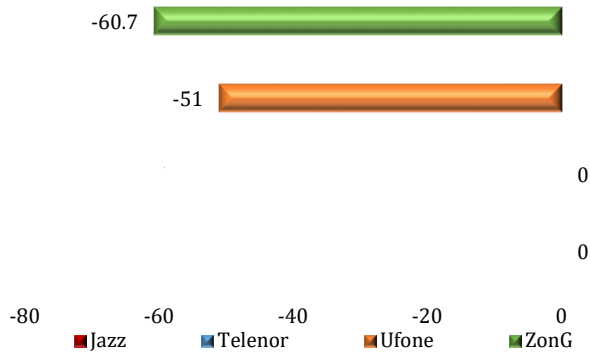
Titles © Esri - Source Esri, DeLorme, NAVTEQ, USGS, Intermap, IPC, NRCAN, Esri Japan, MEIT, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

QUALITY OF SERVICE SURVEY RESULTS – MASTUNG

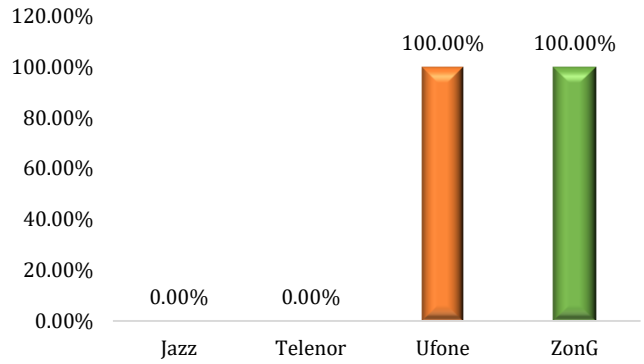


QUALITY OF SERVICE SURVEY RESULTS – MASTUNG

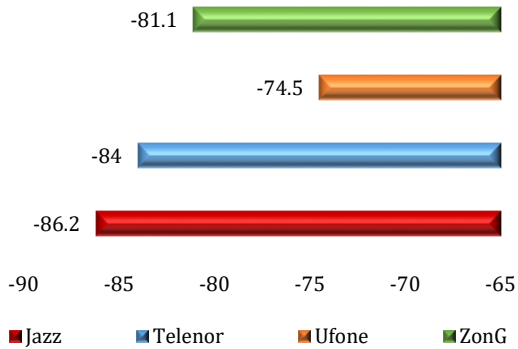
3G Signal Strength (RSCP) > -100dBm



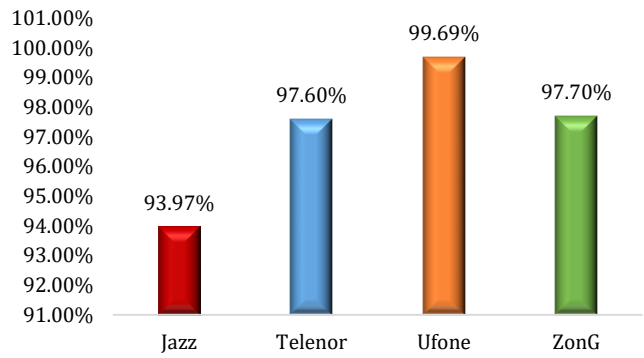
3G Signal Strength (RSCP) Confidencel Level > 90%



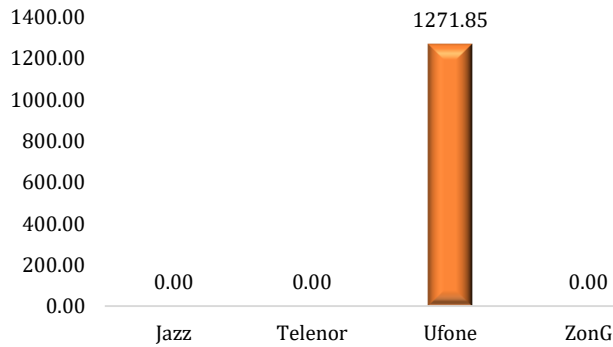
4G Signal Strength (RSRP) > -100dBm



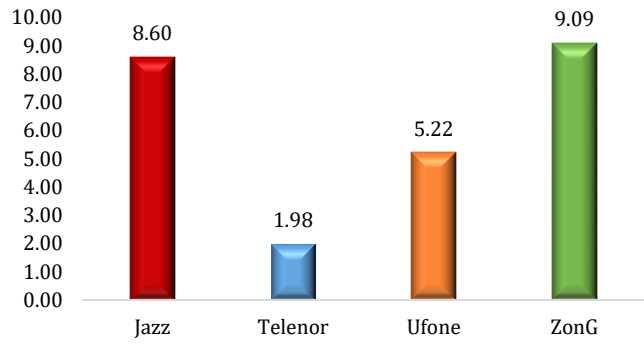
4G Signal Strength (RSRP) Confidencel Level > 90%



User Data Throughput (3G) > 256Kbps

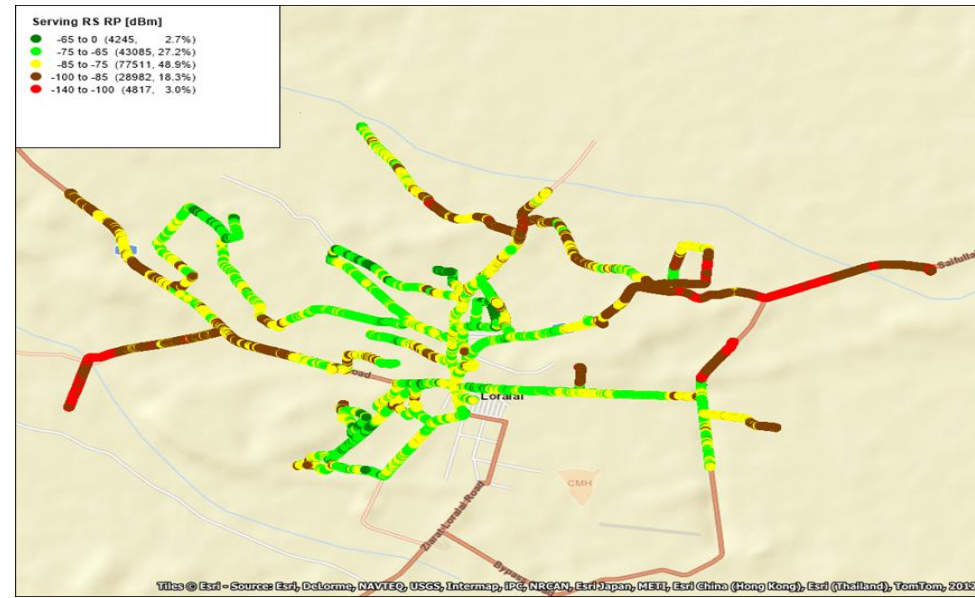


User Data Throughput (4G) > 2Mbps

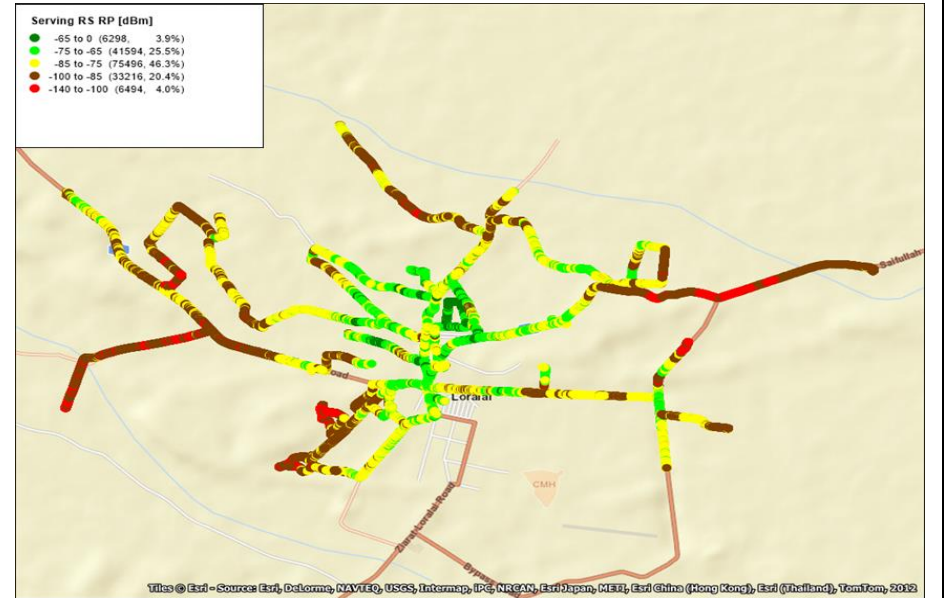


4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

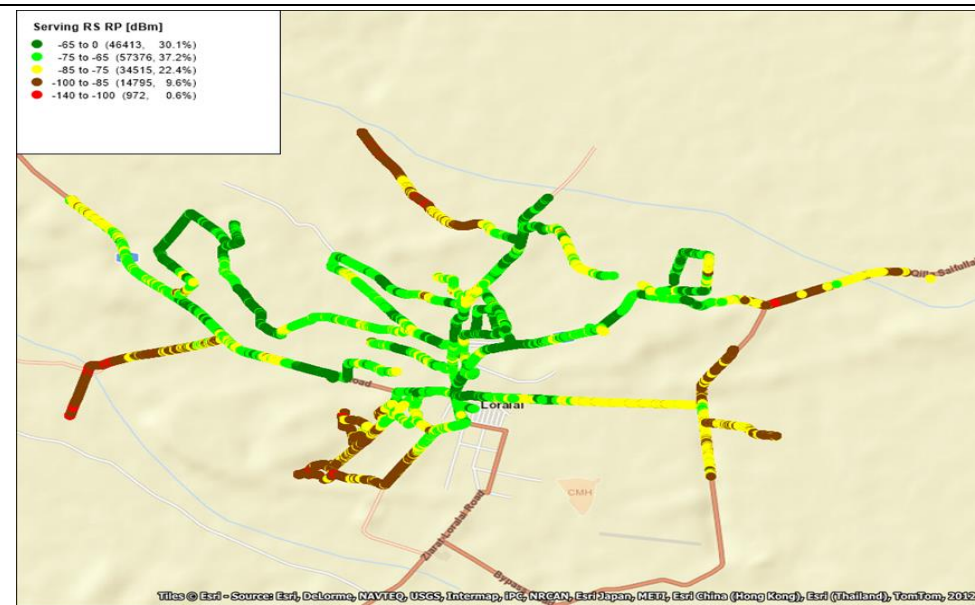
JAZZ 4G NETWORK COVERAGE - LORALAI



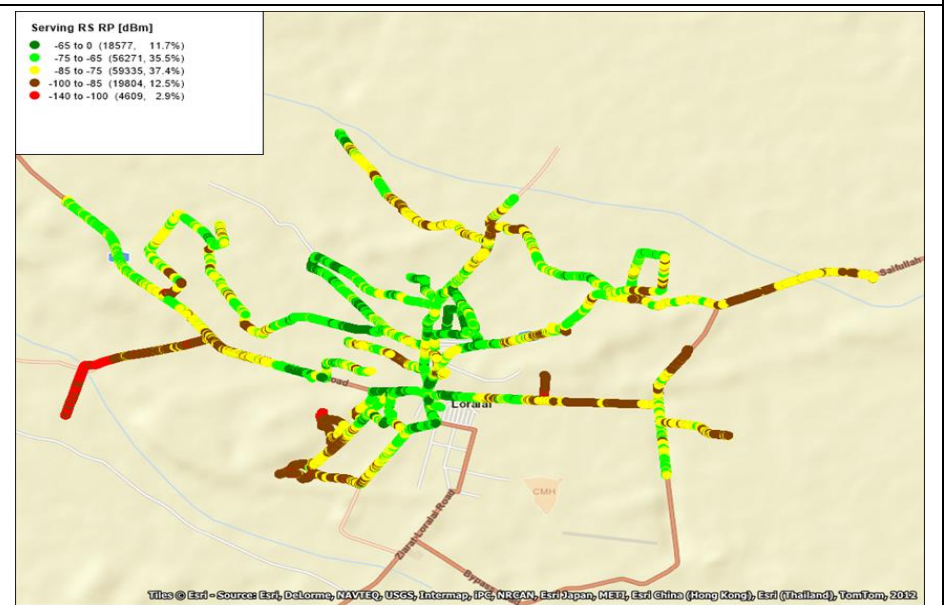
TELENOR 4G NETWORK COVERAGE - LORALAI



UFONE 4G NETWORK COVERAGE - LORALAI



ZONG 4G NETWORK COVERAGE - LORALAI

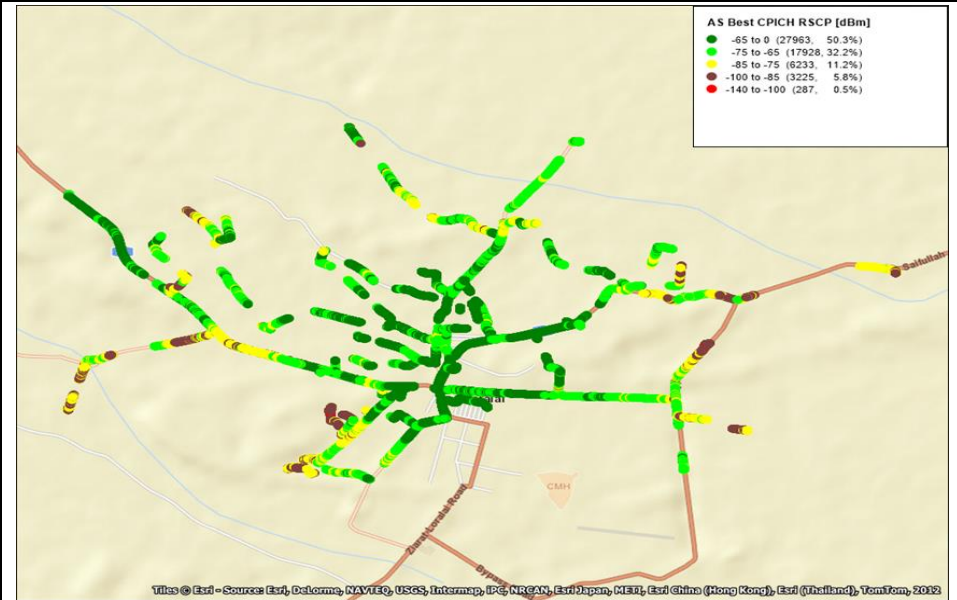


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

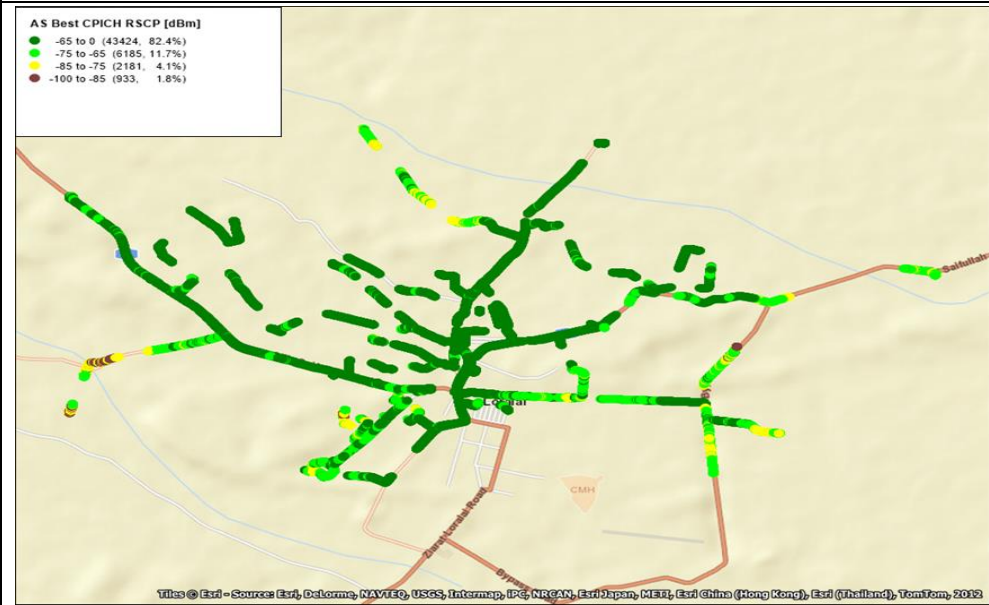
JAZZ 3G NETWORK COVERAGE - LORALAI

3G NOT AVAILABLE

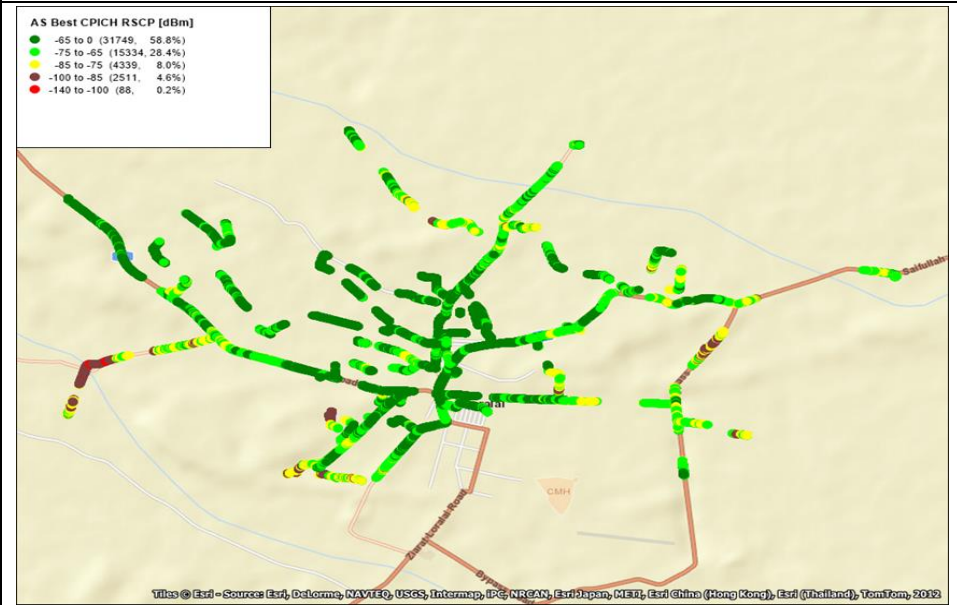
TELENOR 3G NETWORK COVERAGE - LORALAI



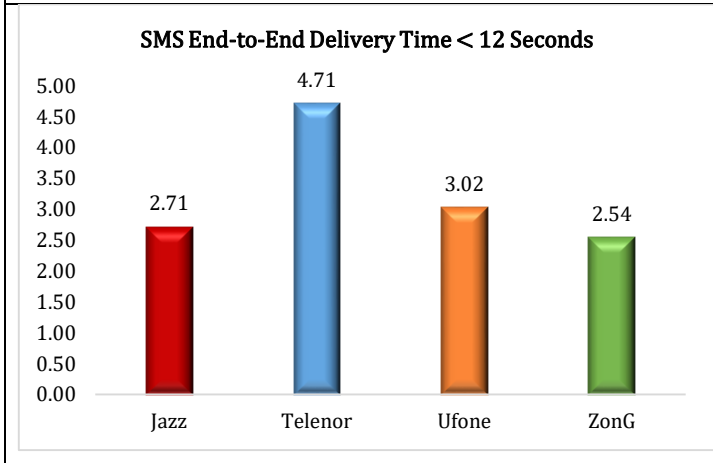
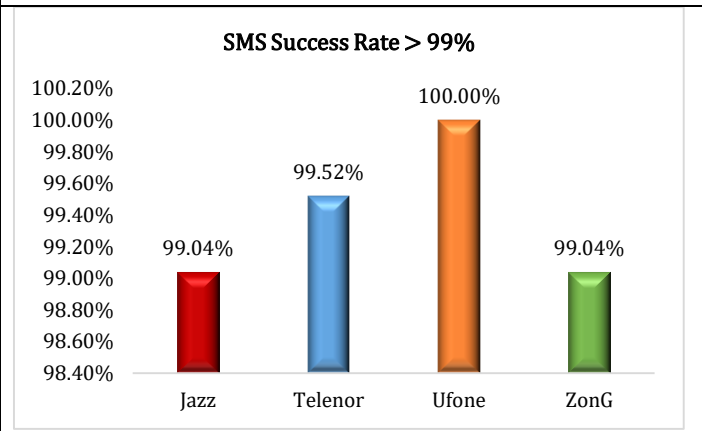
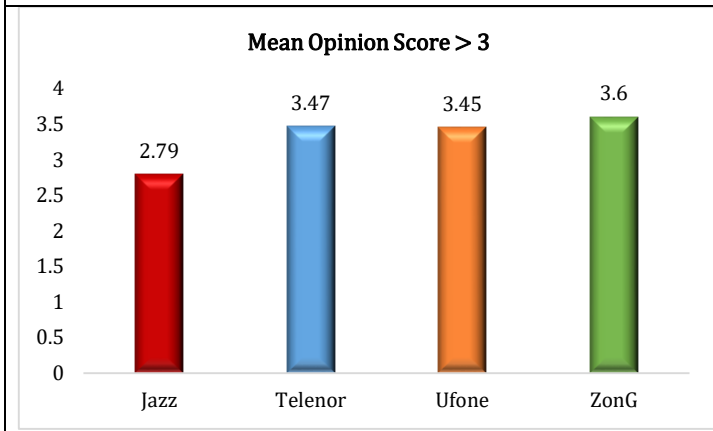
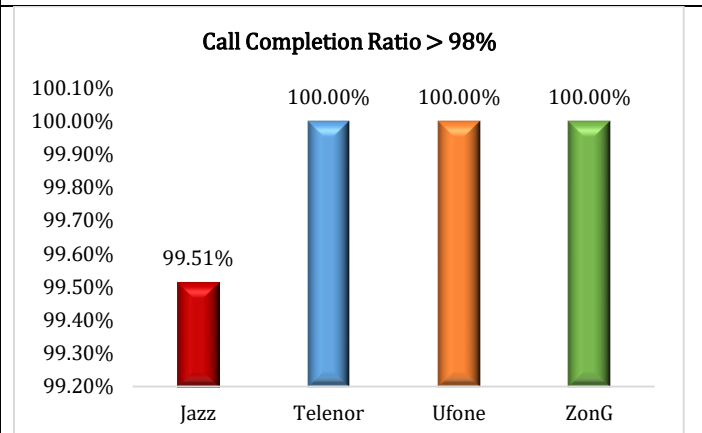
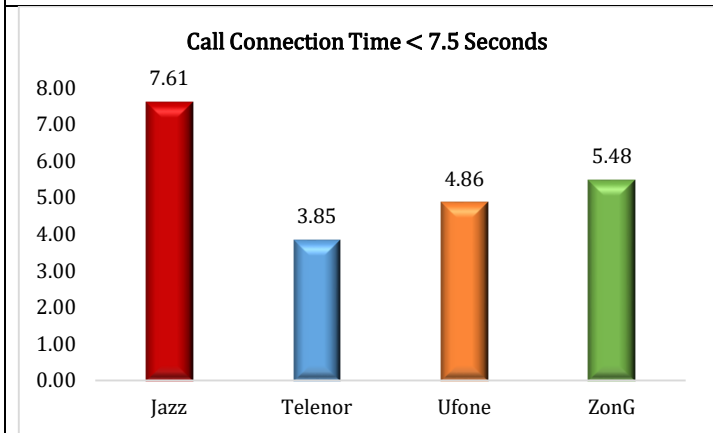
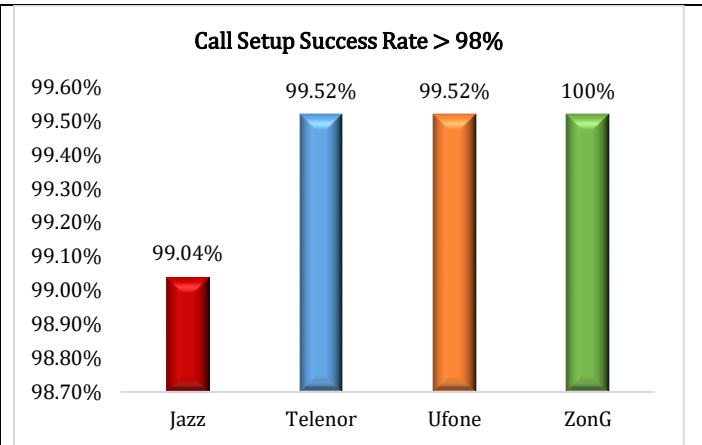
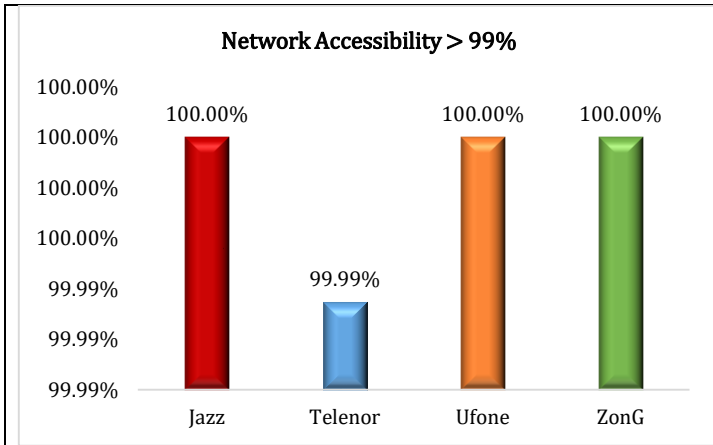
UFONE 3G NETWORK COVERAGE - LORALAI



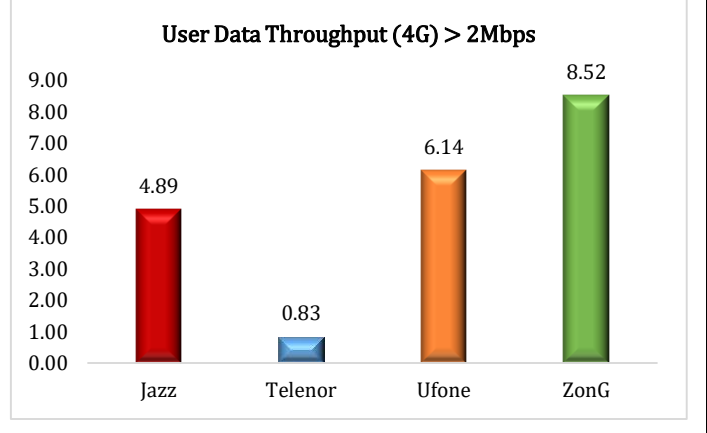
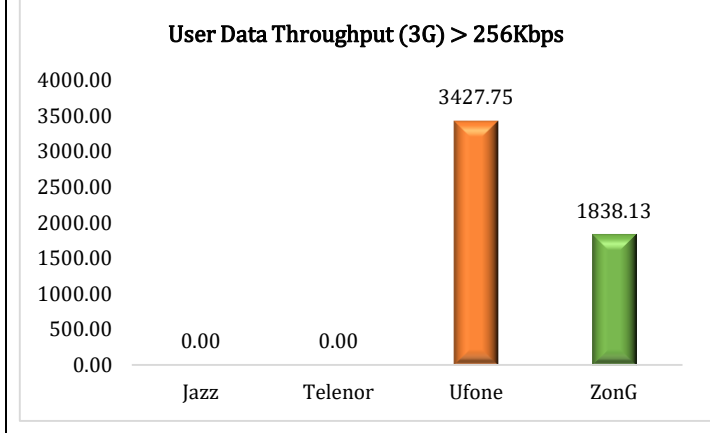
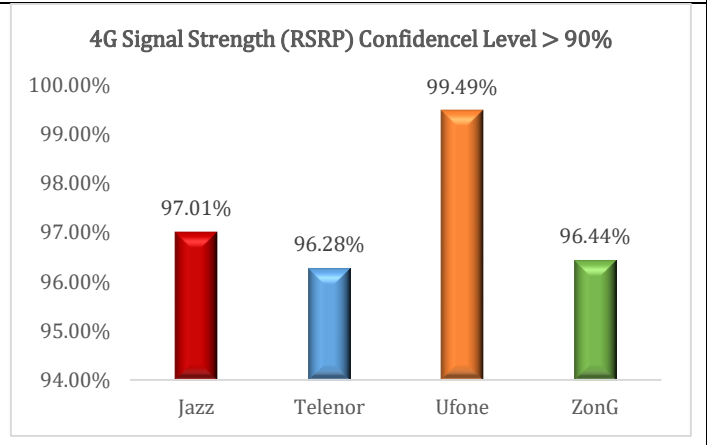
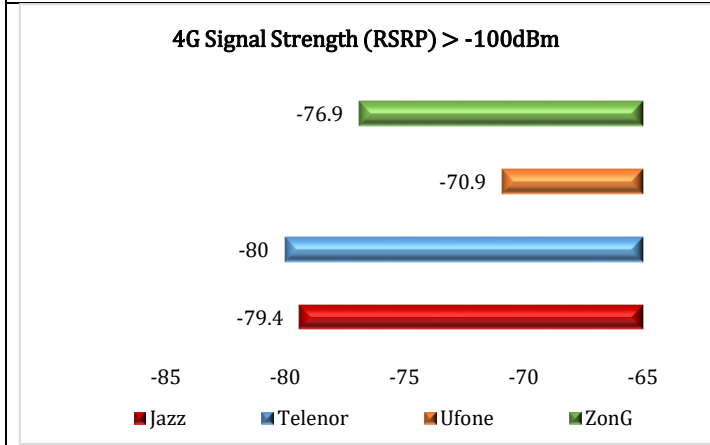
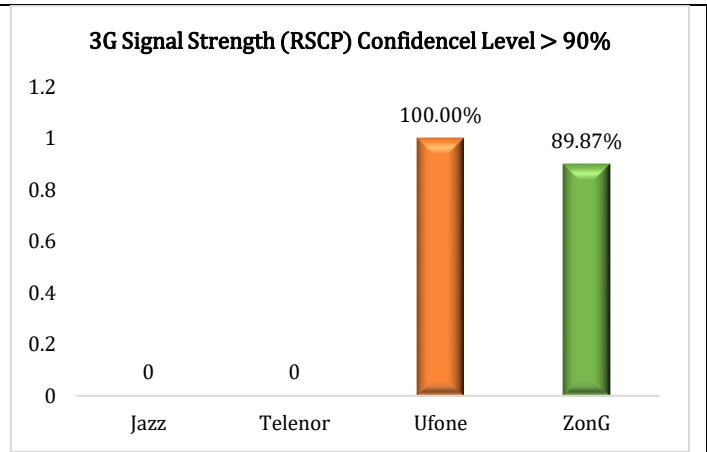
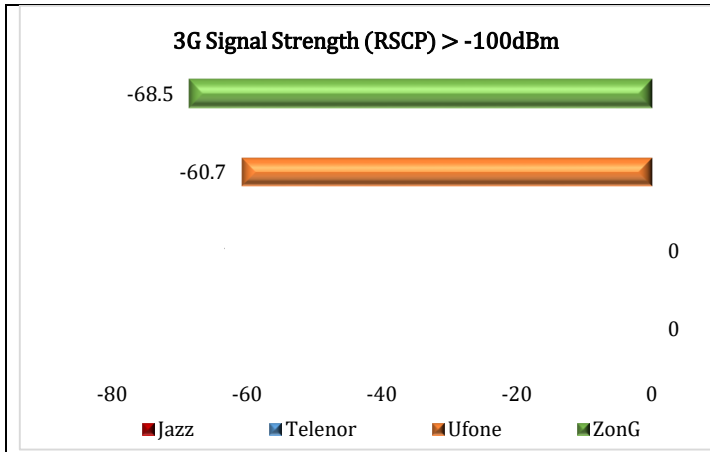
ZONG 3G NETWORK COVERAGE - LORALAI



QUALITY OF SERVICE SURVEY RESULTS – LORALAI

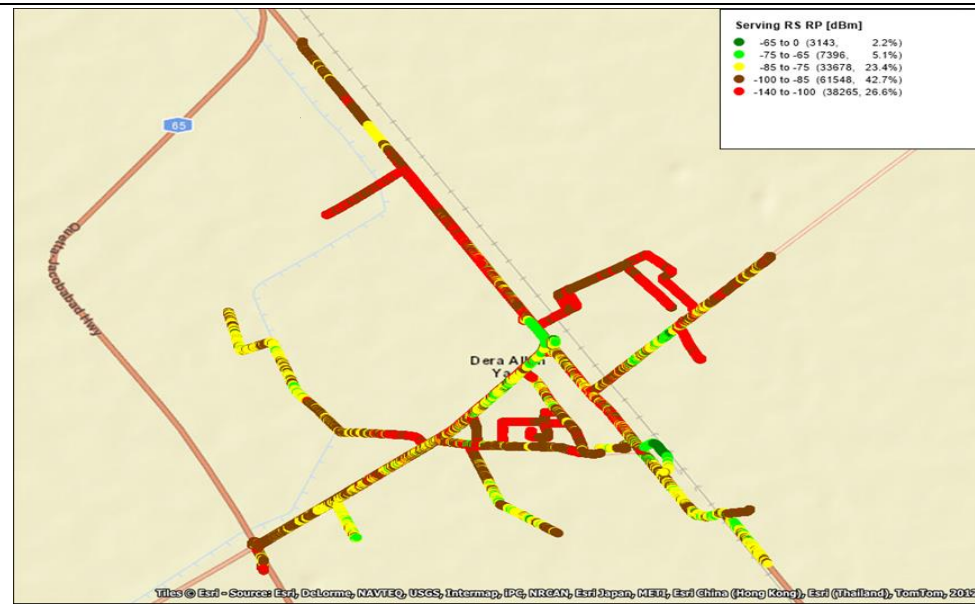


QUALITY OF SERVICE SURVEY RESULTS – LORALAI

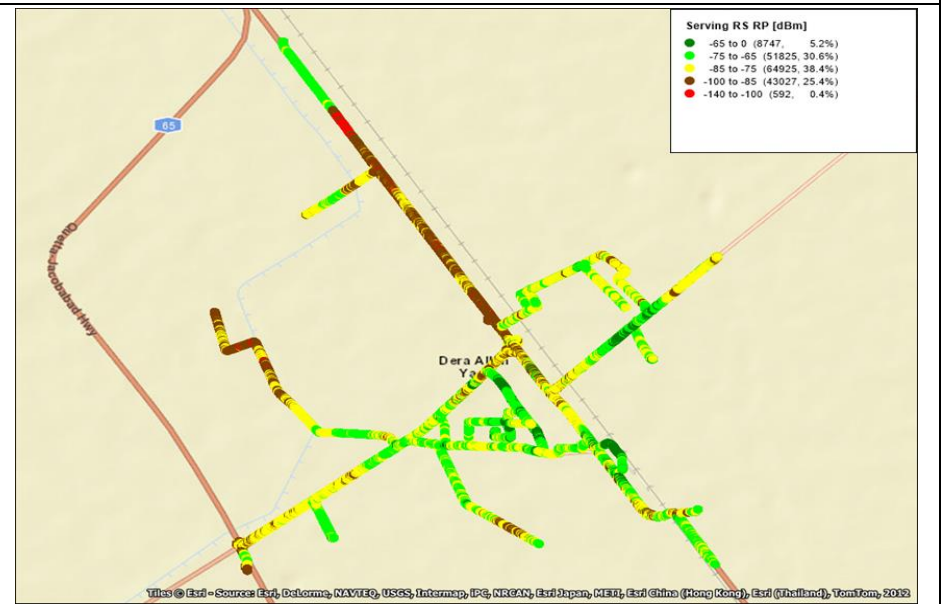


4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

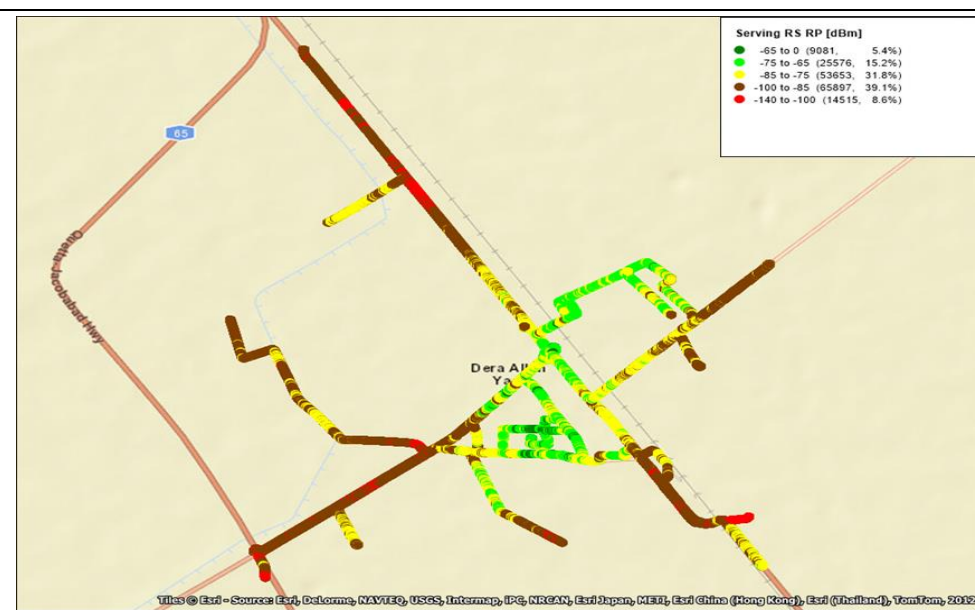
JAZZ 4G NETWORK COVERAGE - DERA ALLAH YAR



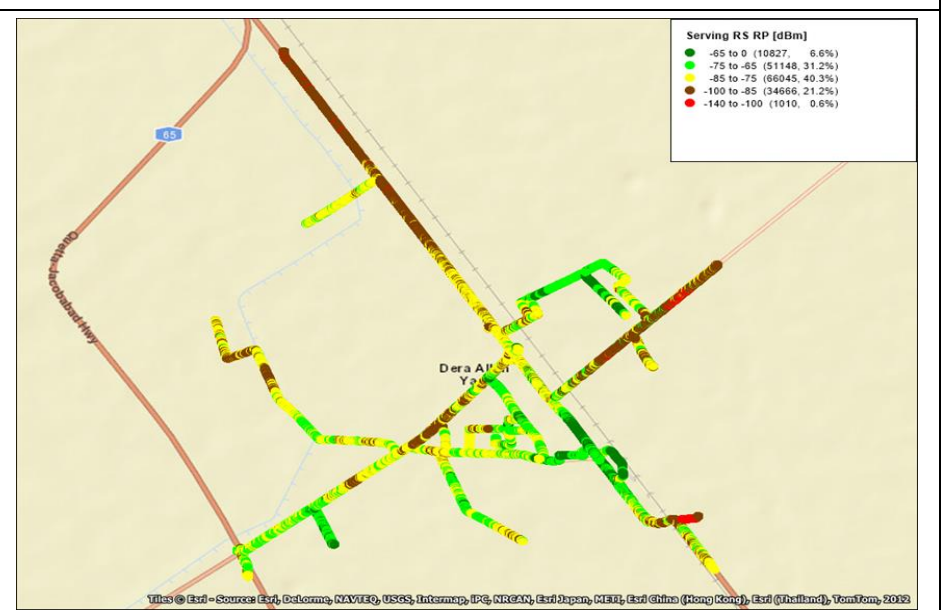
TELENOR 4G NETWORK COVERAGE - DERA ALLAH YAR



UFONE 4G NETWORK COVERAGE - DERA ALLAH YAR

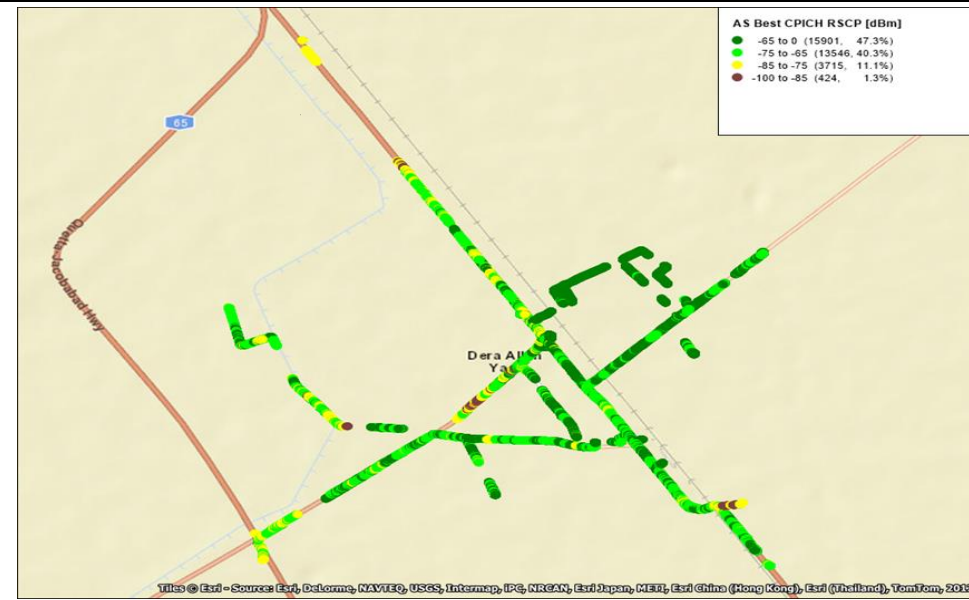


ZONG 4G NETWORK COVERAGE - DERA ALLAH YAR

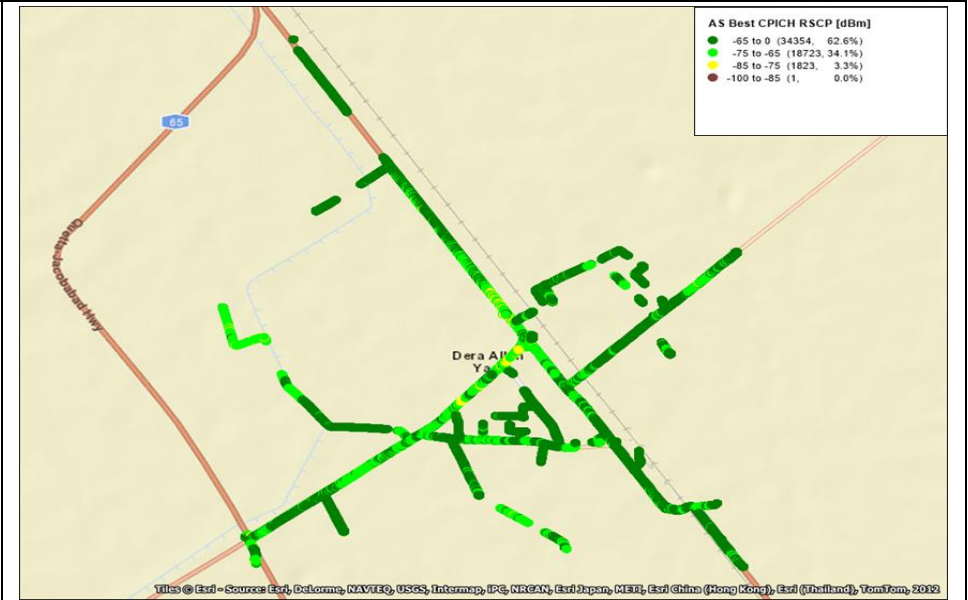


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

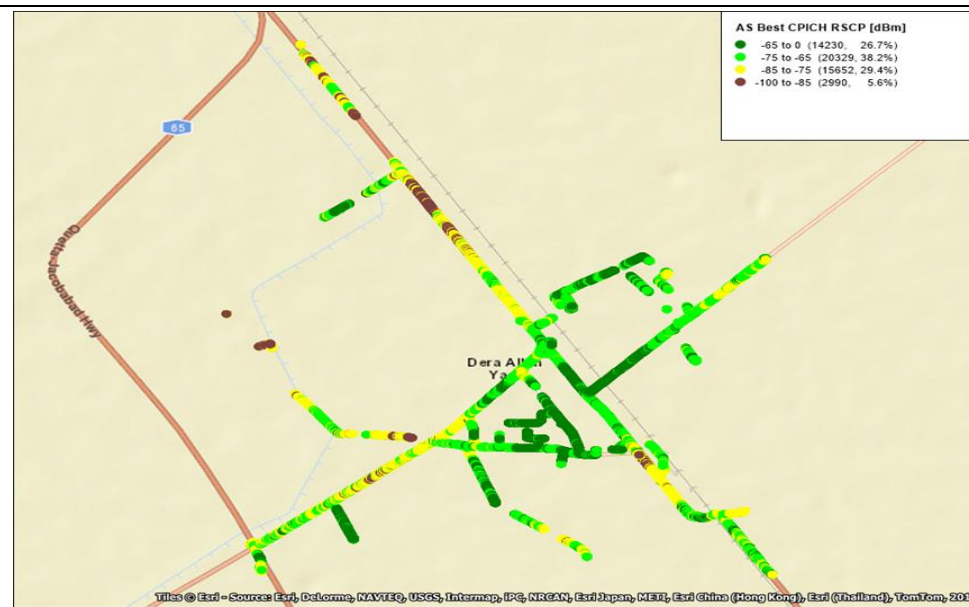
JAZZ 3G NETWORK COVERAGE - DERA ALLAH YAR



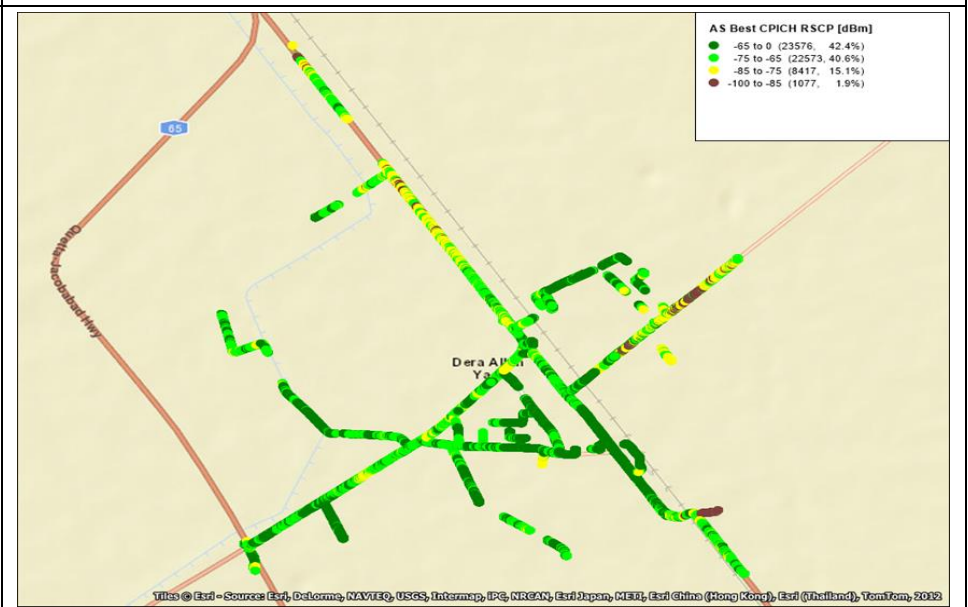
TELENOR 3G NETWORK COVERAGE - DERA ALLAH YAR



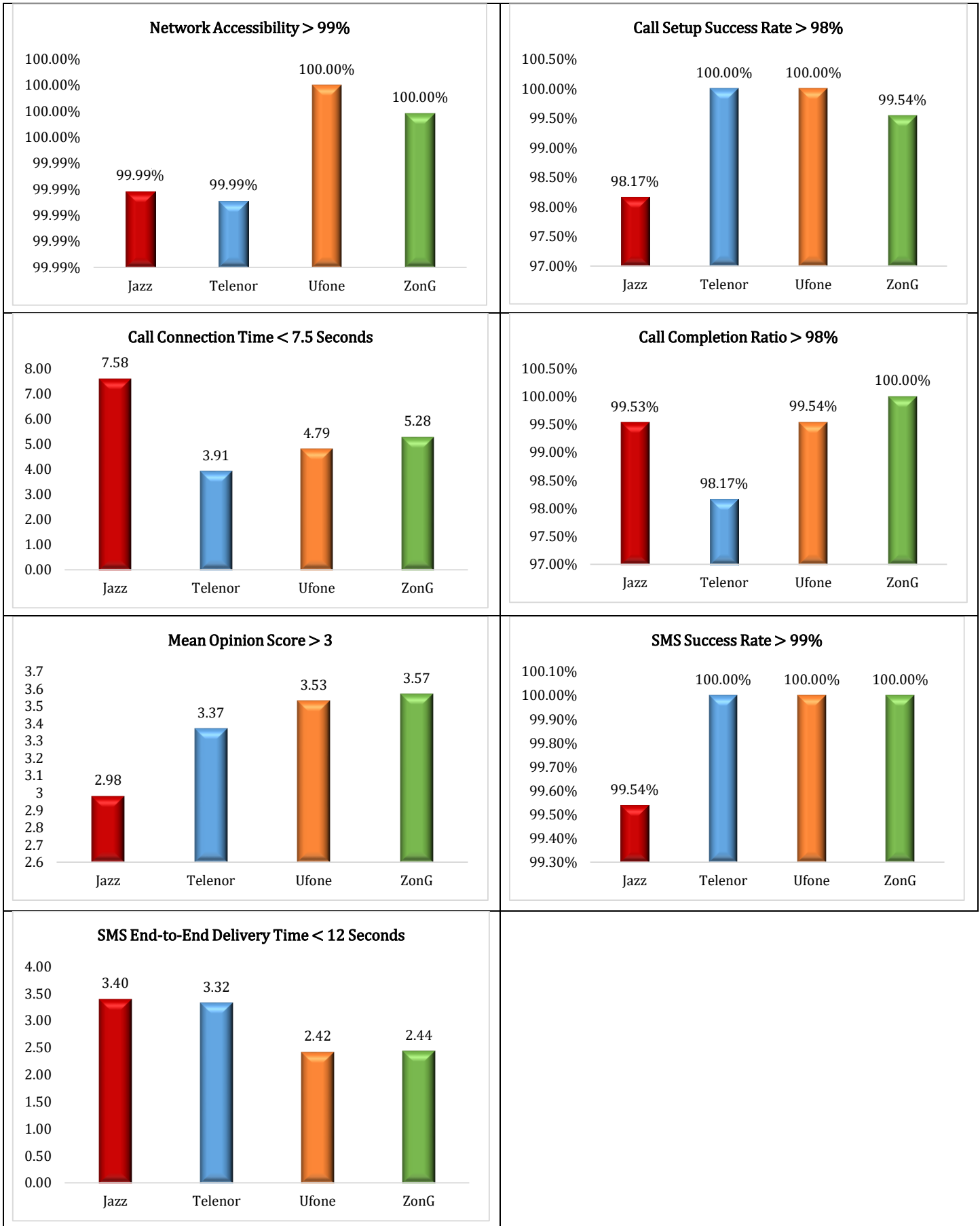
UFONE 3G NETWORK COVERAGE - DERA ALLAH YAR



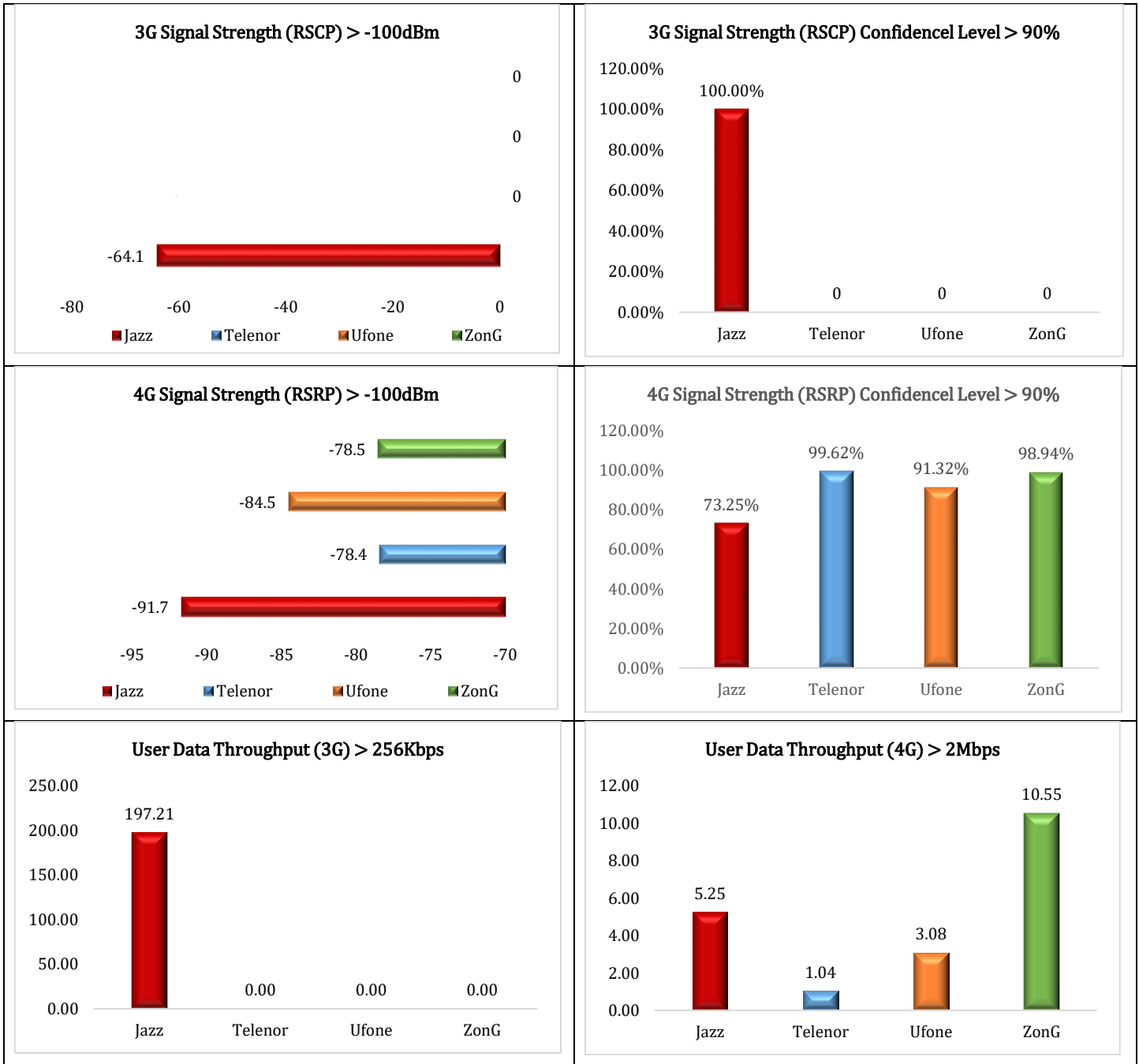
ZONG 3G NETWORK COVERAGE - DERA ALLAH YAR



QUALITY OF SERVICE SURVEY RESULTS – DERA ALLAH YAR



QUALITY OF SERVICE SURVEY RESULTS – DERA ALLAH YAR



4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

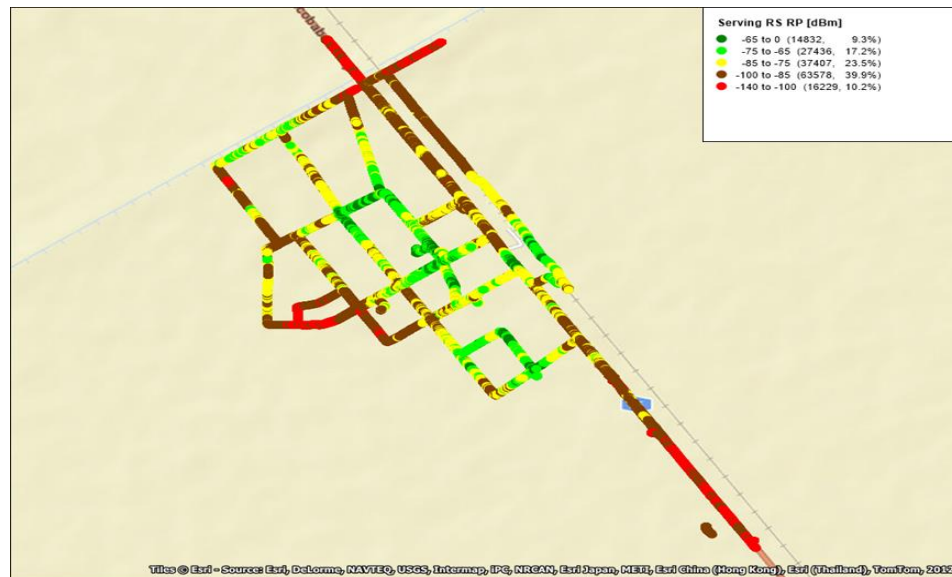
JAZZ 4G NETWORK COVERAGE – DERA MURAD JAMALI



TELENOR 4G NETWORK COVERAGE – DERA MURAD JAMALI



UFONE 4G NETWORK COVERAGE – DERA MURAD JAMALI



ZONG 4G NETWORK COVERAGE – DERA MURAD JAMALI

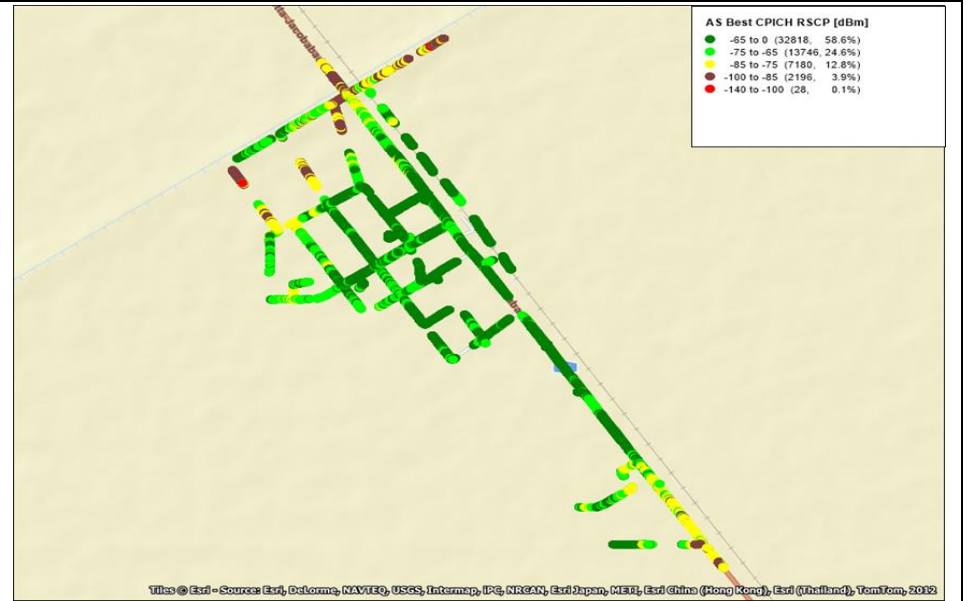


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

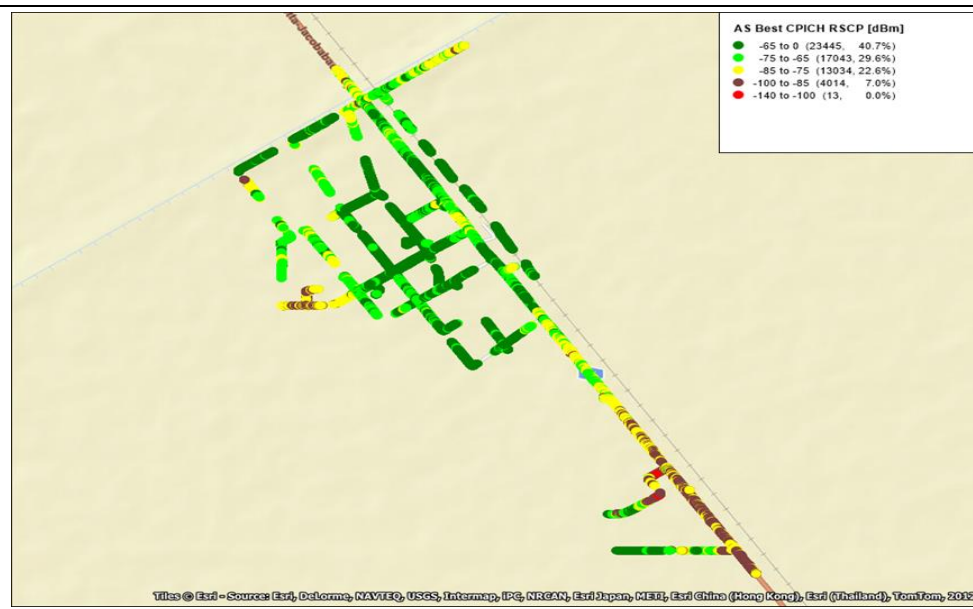
JAZZ 3G NETWORK COVERAGE – DERA MURAD JAMALI



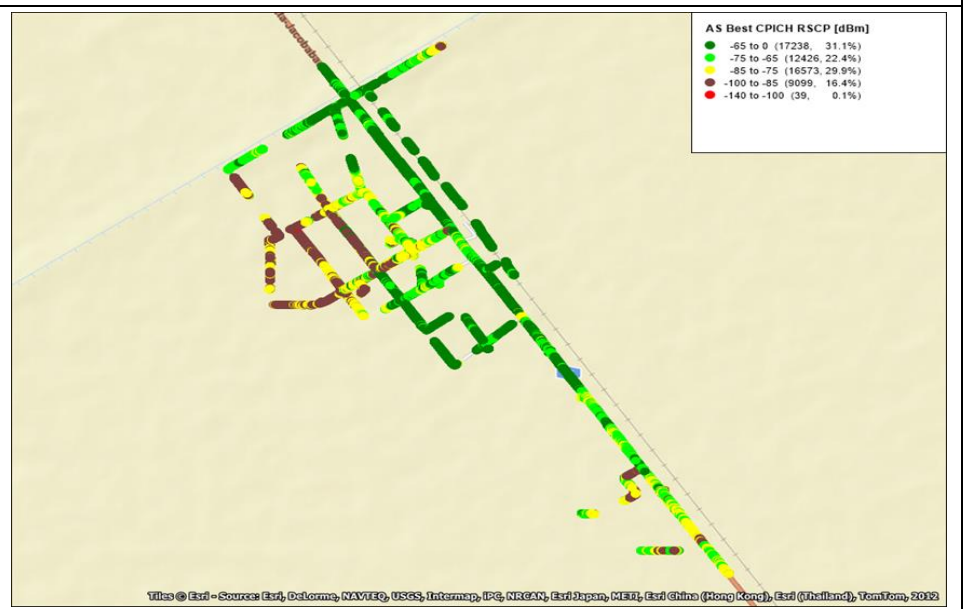
TELENOR 3G NETWORK COVERAGE – DERA MURAD JAMALI



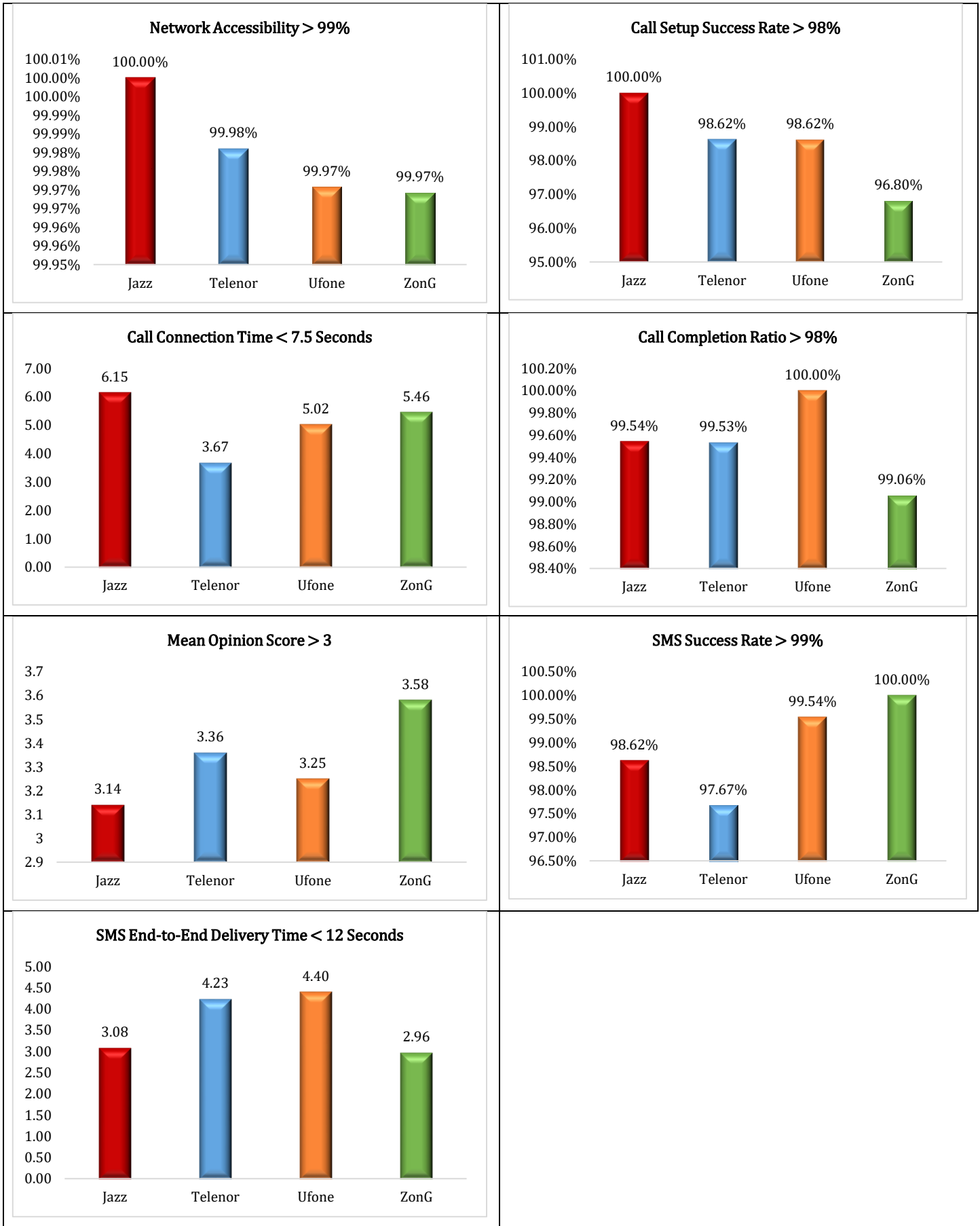
UFONE 3G NETWORK COVERAGE – DERA MURAD JAMALI



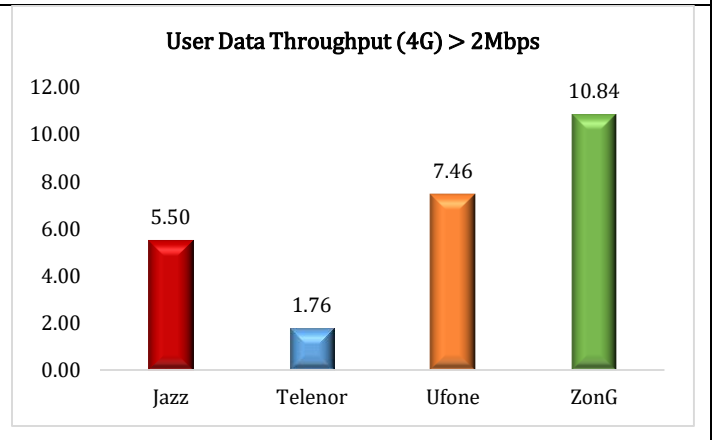
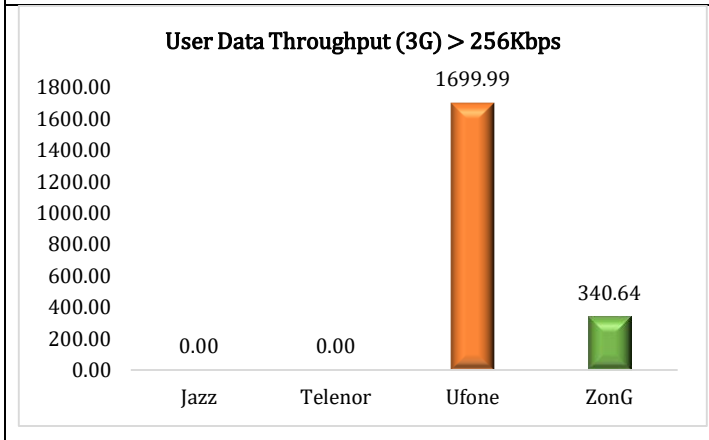
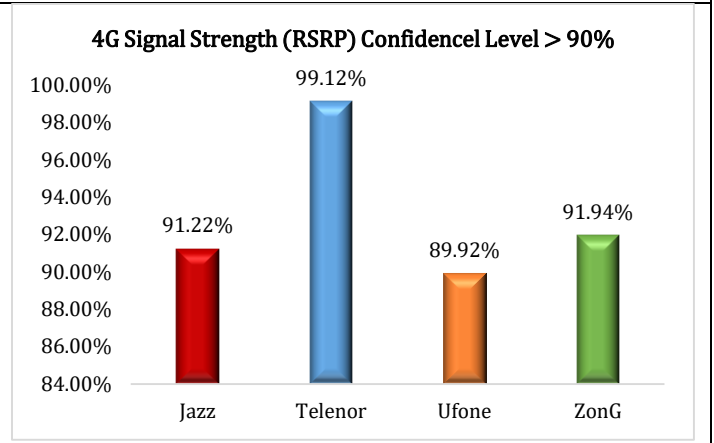
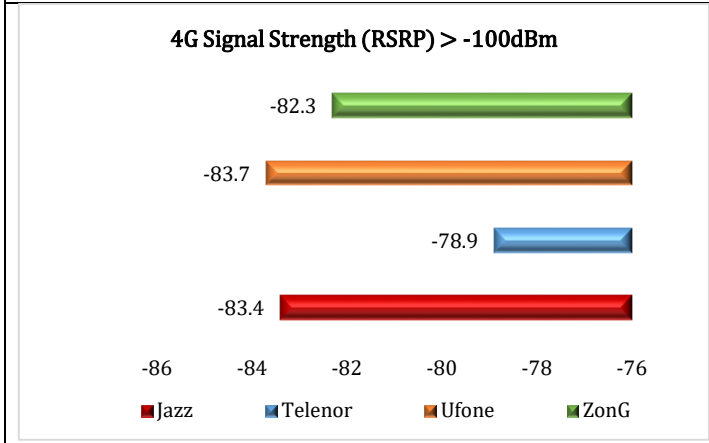
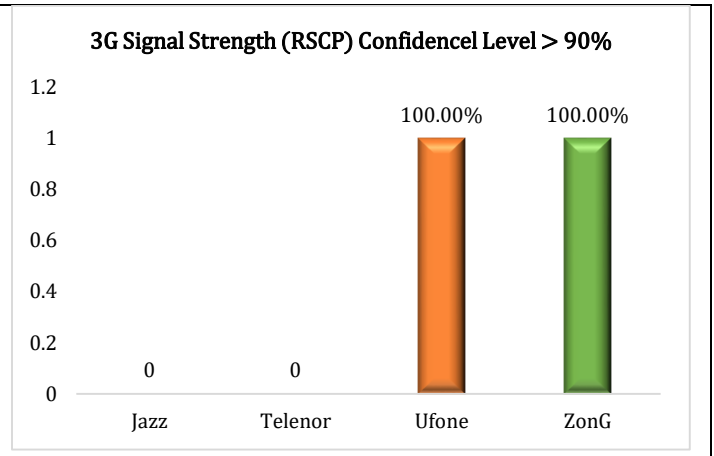
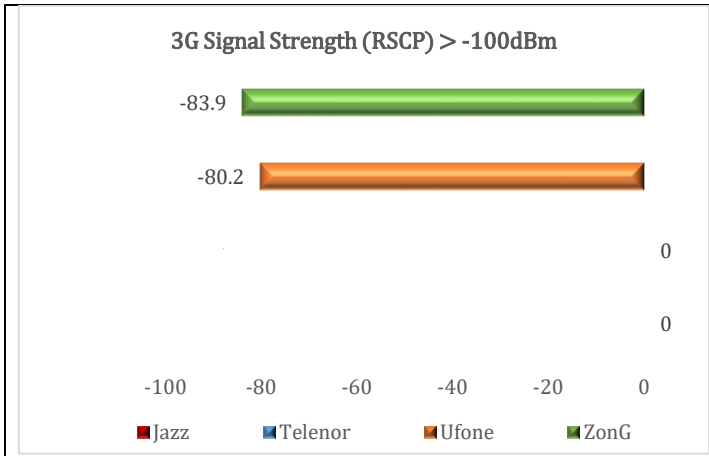
ZONG 3G NETWORK COVERAGE – DERA MURAD JAMALI



QUALITY OF SERVICE SURVEY RESULTS – DERA MURAD JAMALI

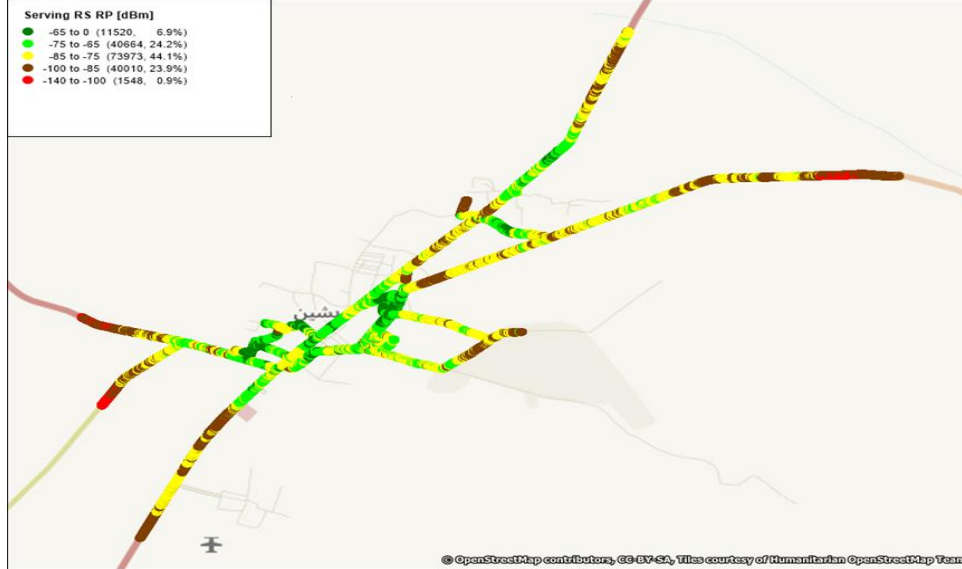


QUALITY OF SERVICE SURVEY RESULTS – DERA MURAD JAMALI

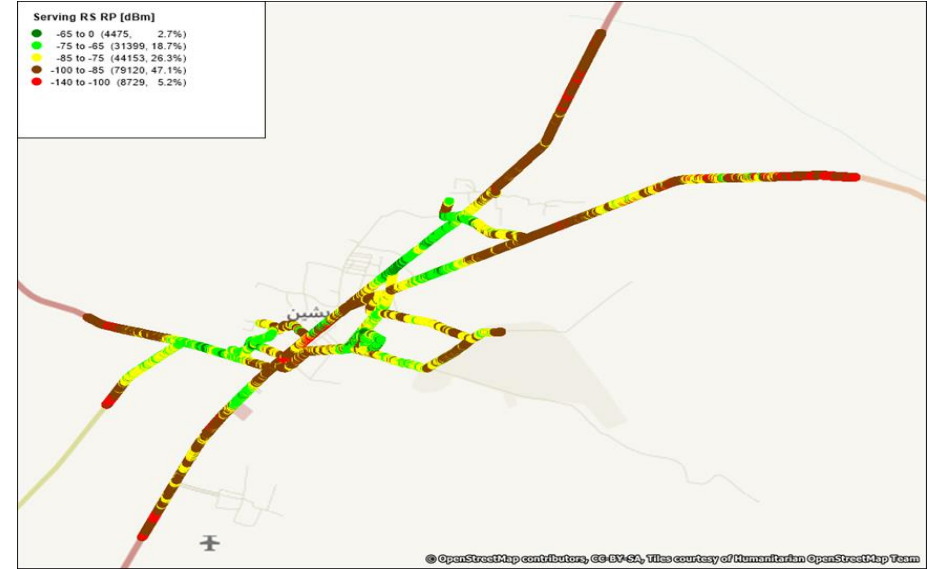


4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

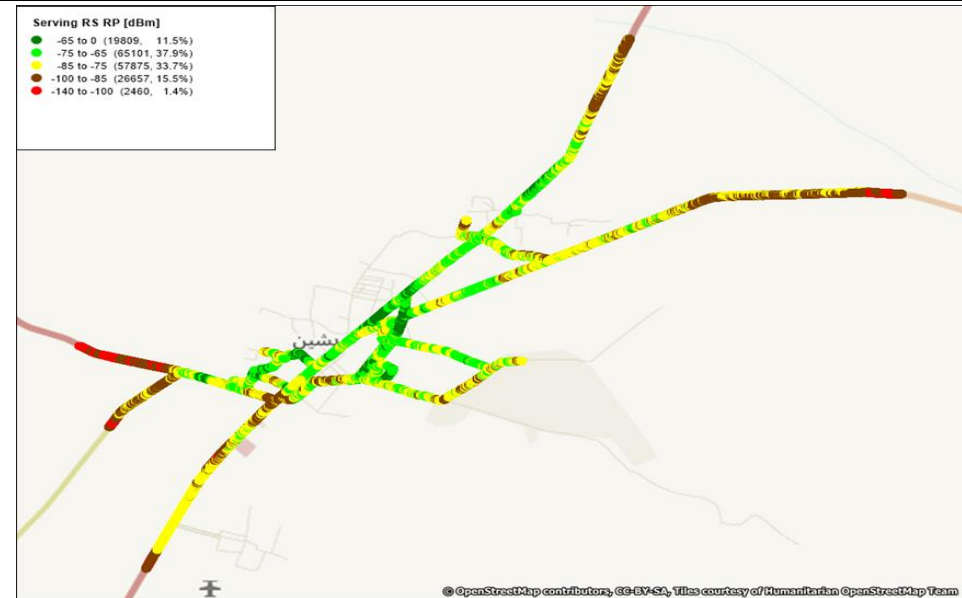
JAZZ 4G NETWORK COVERAGE - PISHIN



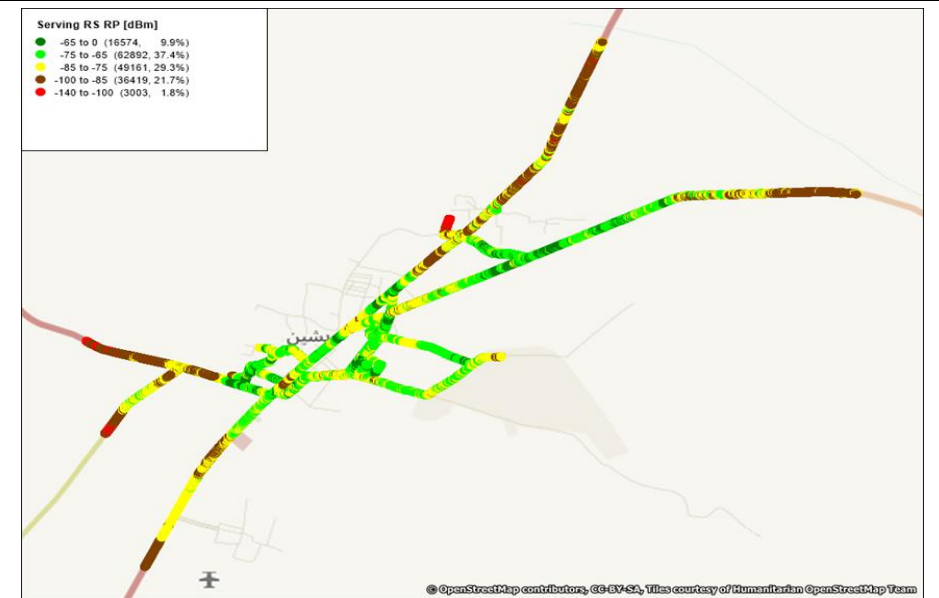
TELENOR 4G NETWORK COVERAGE - PISHIN



UFONE 4G NETWORK COVERAGE - PISHIN

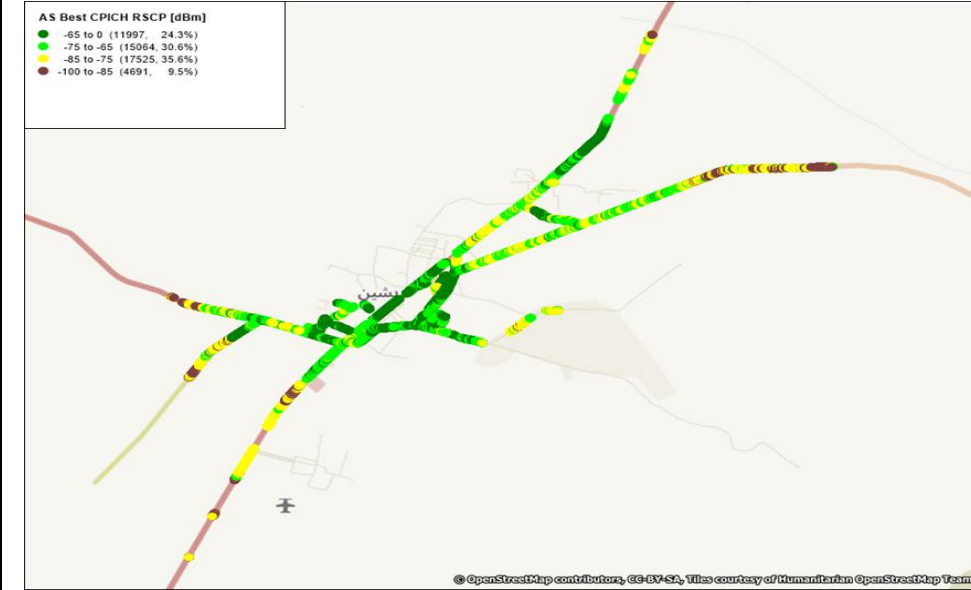


ZONG 4G NETWORK COVERAGE - PISHIN

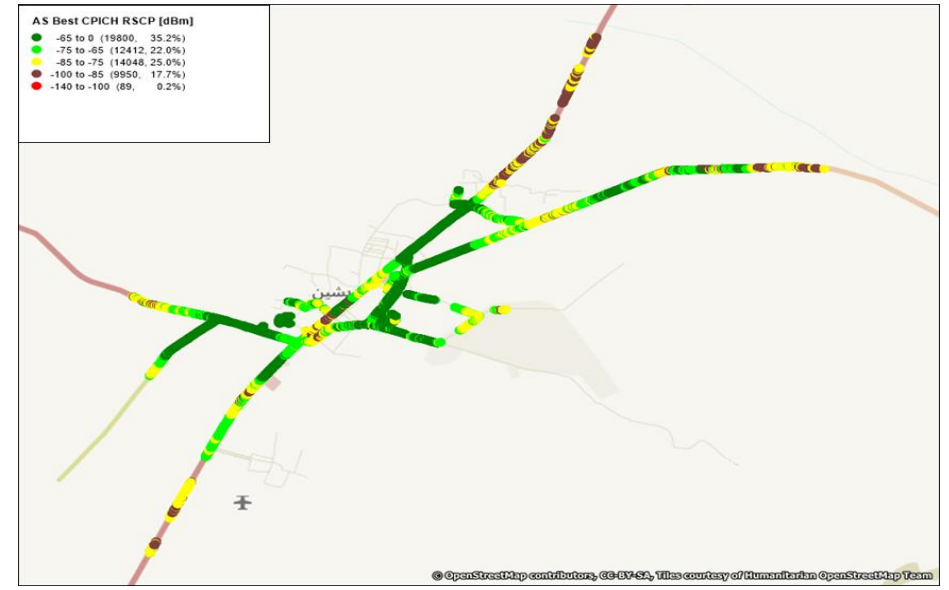


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

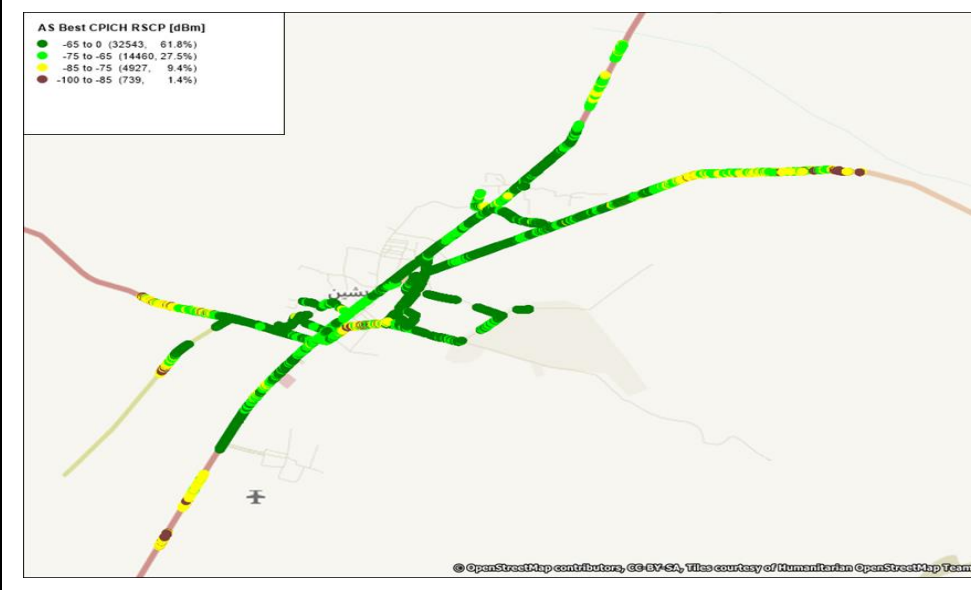
JAZZ 3G NETWORK COVERAGE - PISHIN



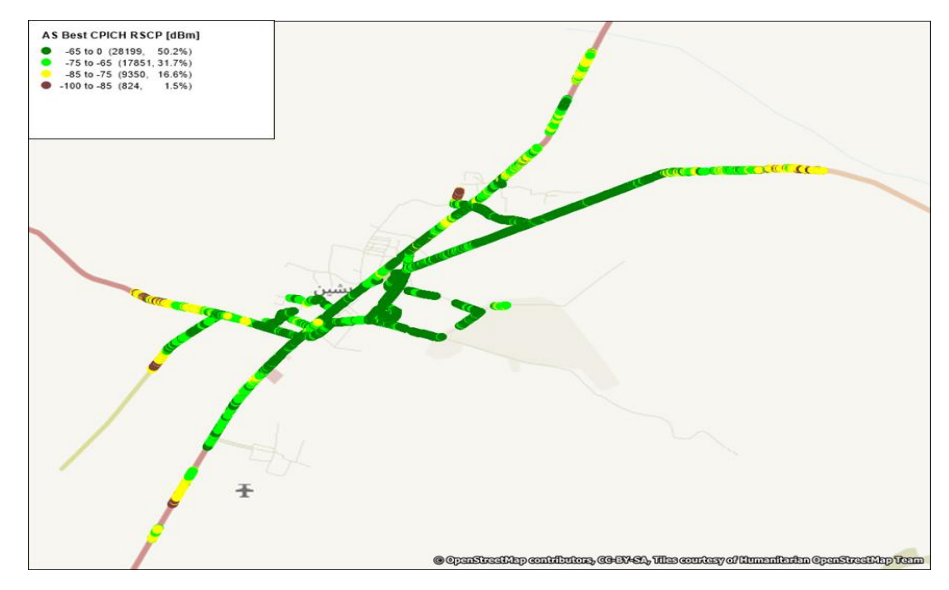
TELENOR 3G NETWORK COVERAGE - PISHIN



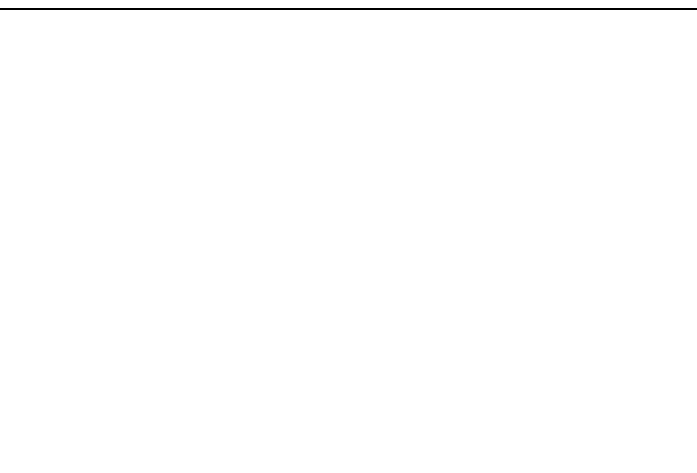
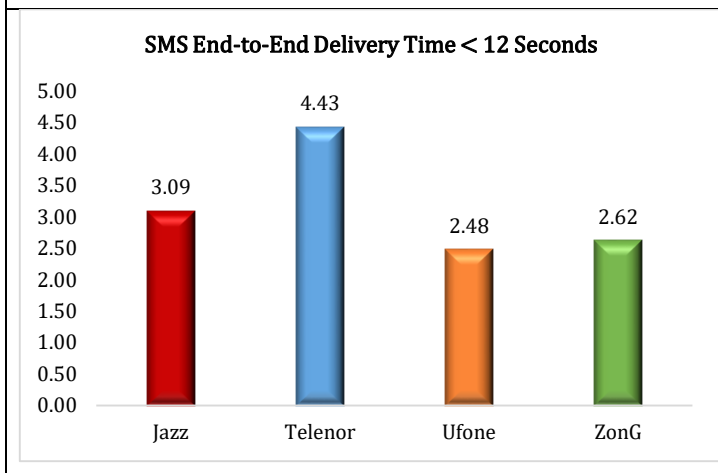
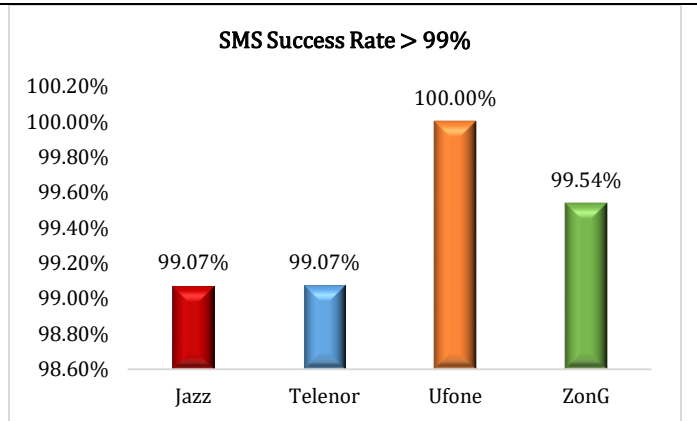
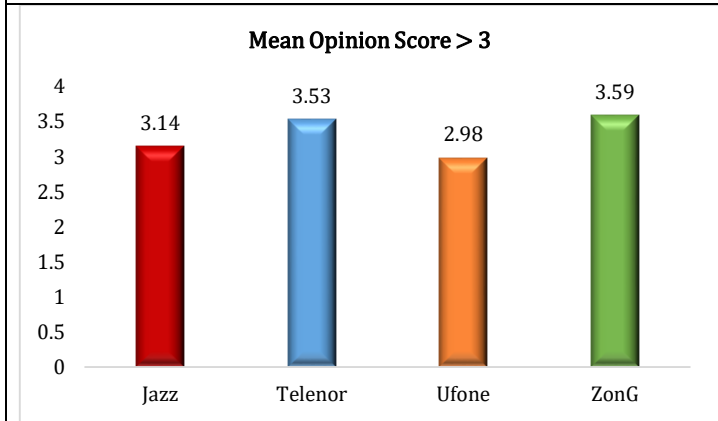
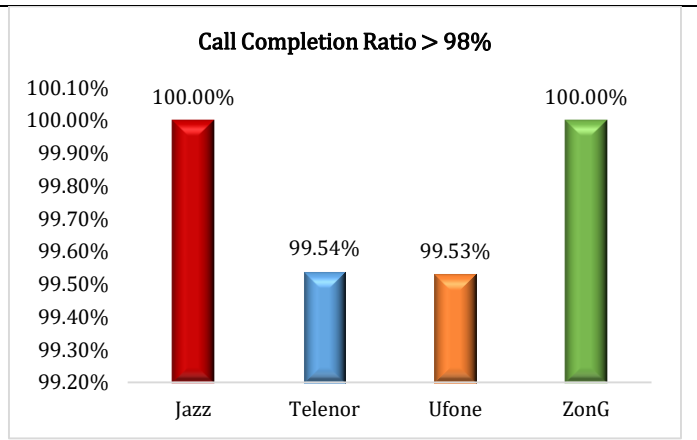
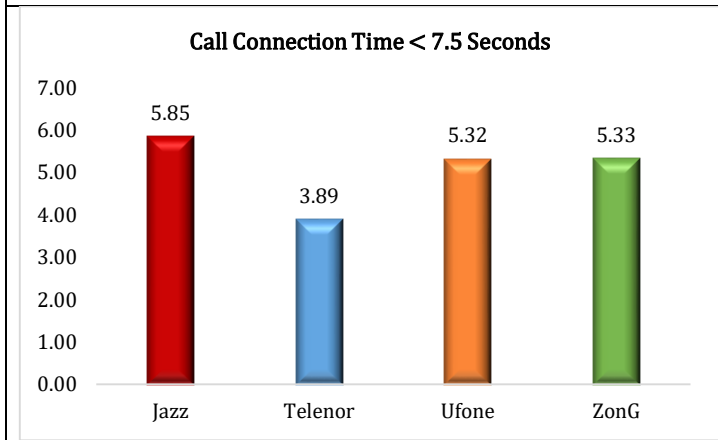
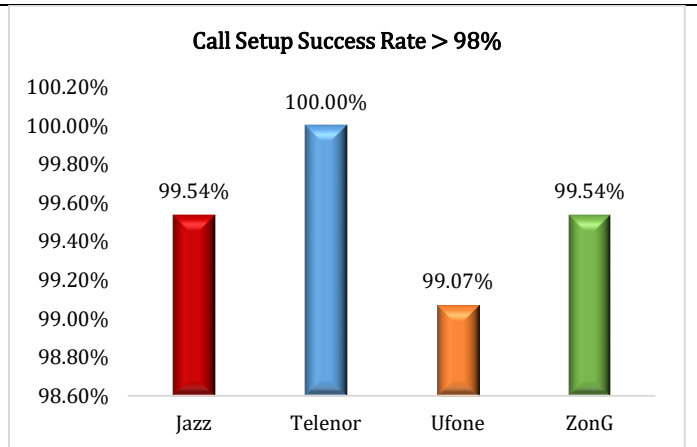
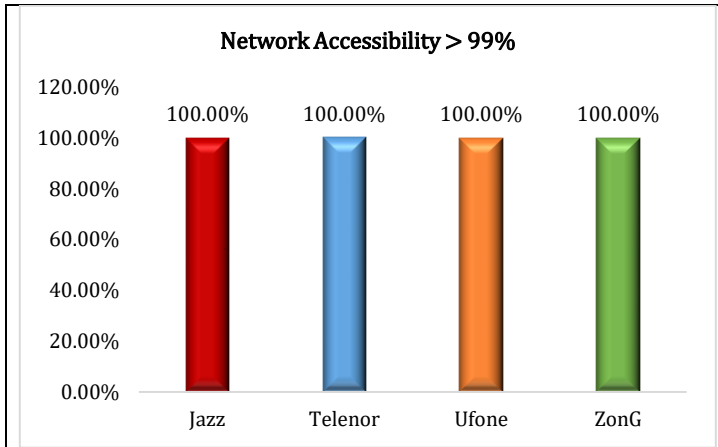
UFONE 3G NETWORK COVERAGE - PISHIN



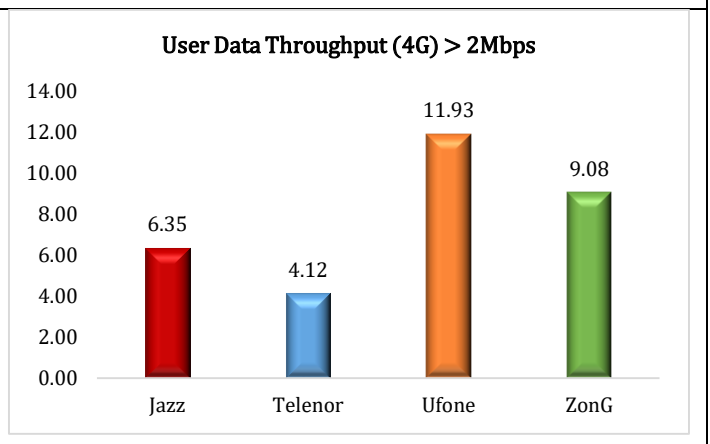
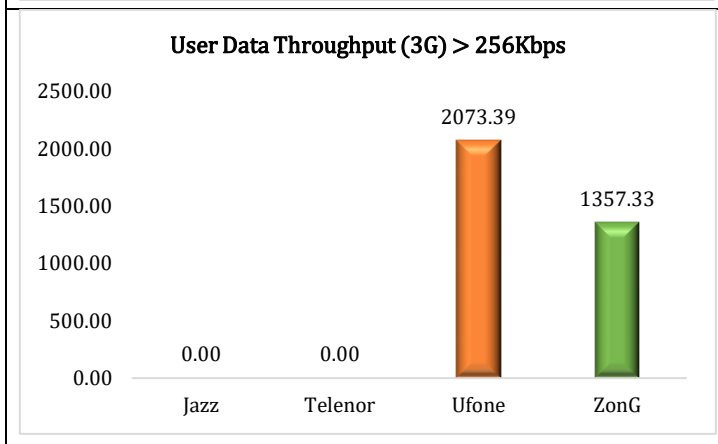
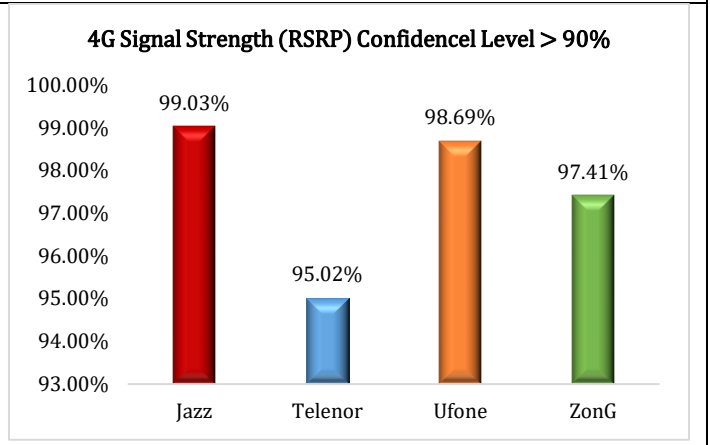
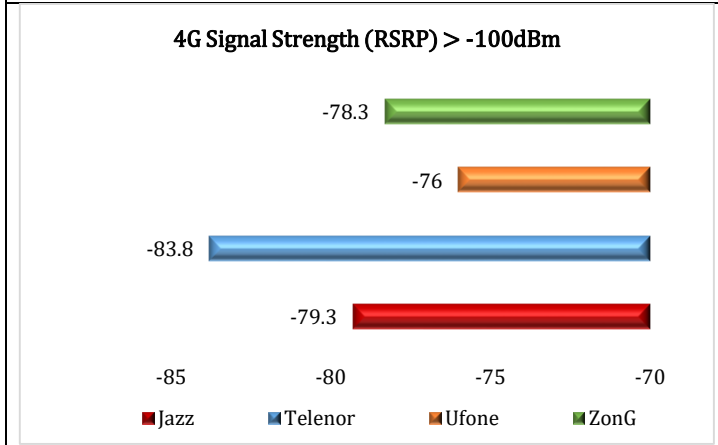
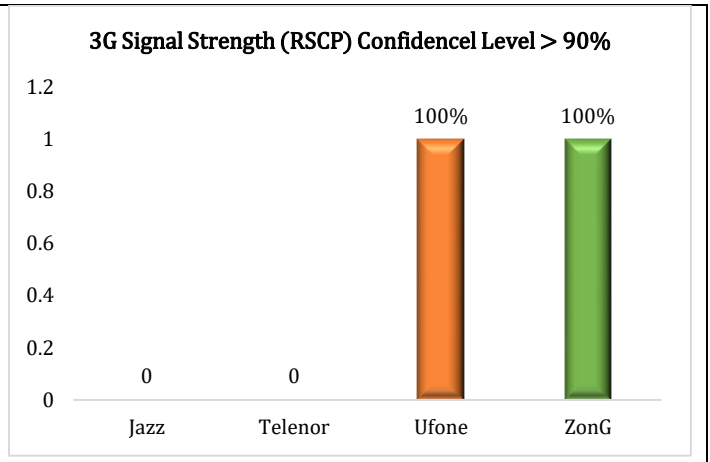
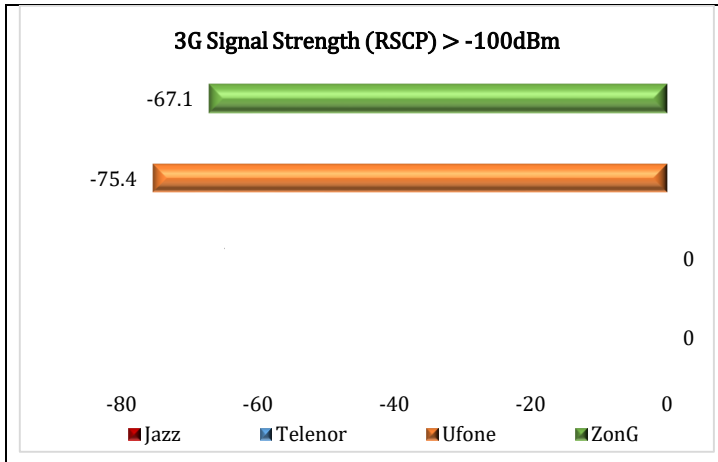
ZONG 3G NETWORK COVERAGE - PISHIN



QUALITY OF SERVICE SURVEY RESULTS – PISHIN



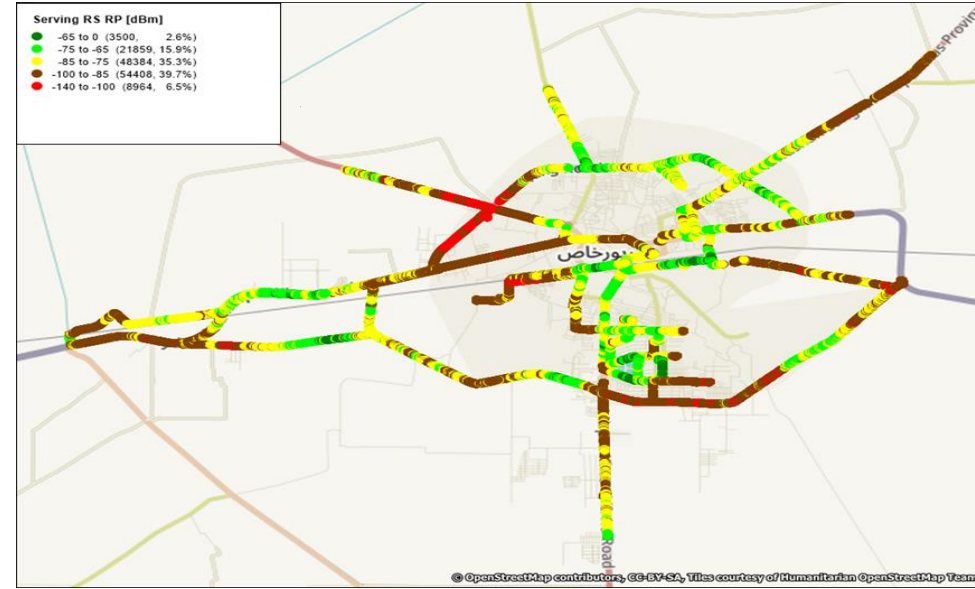
QUALITY OF SERVICE SURVEY RESULTS – PISHIN



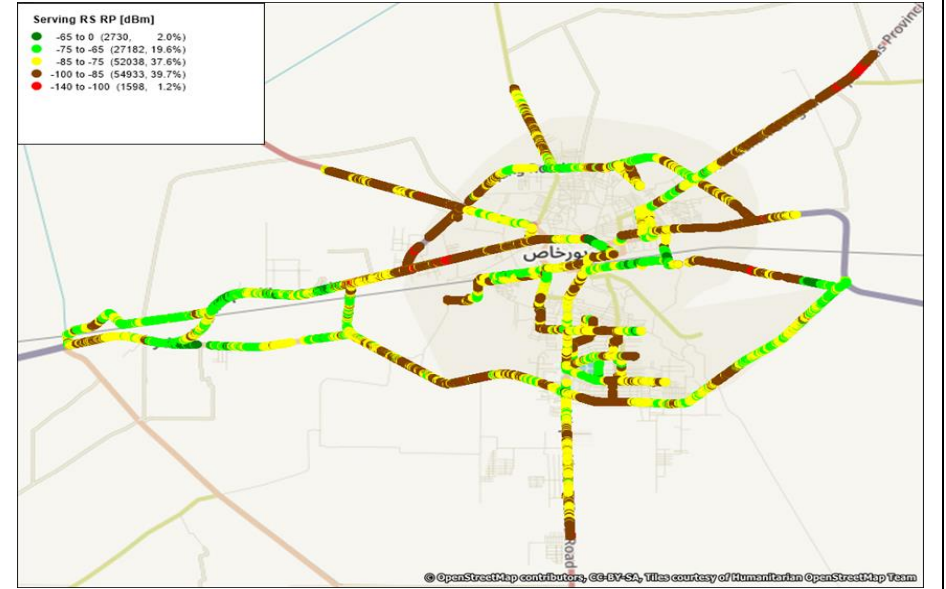
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4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

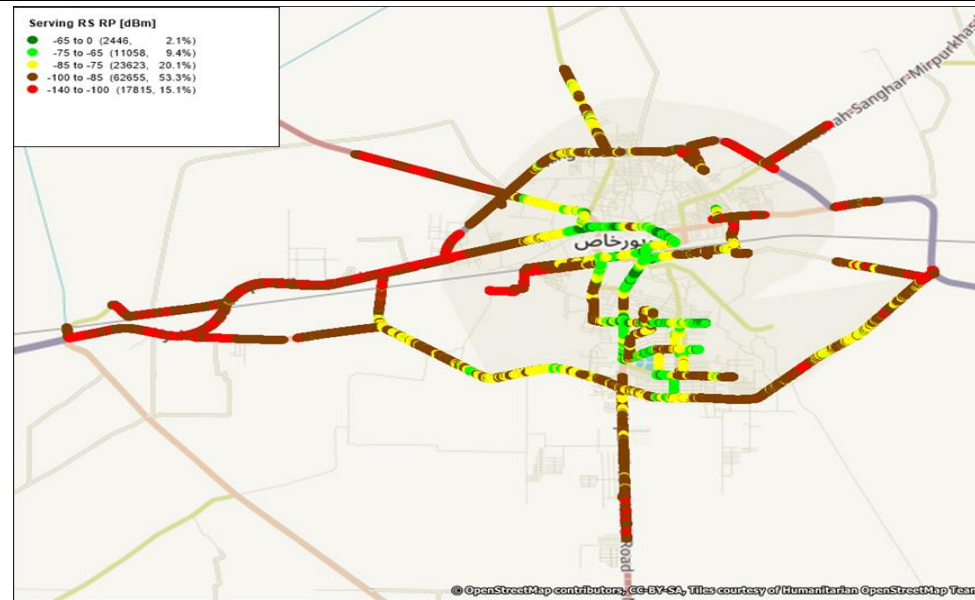
JAZZ 4G NETWORK COVERAGE - MIRPUR KHAS



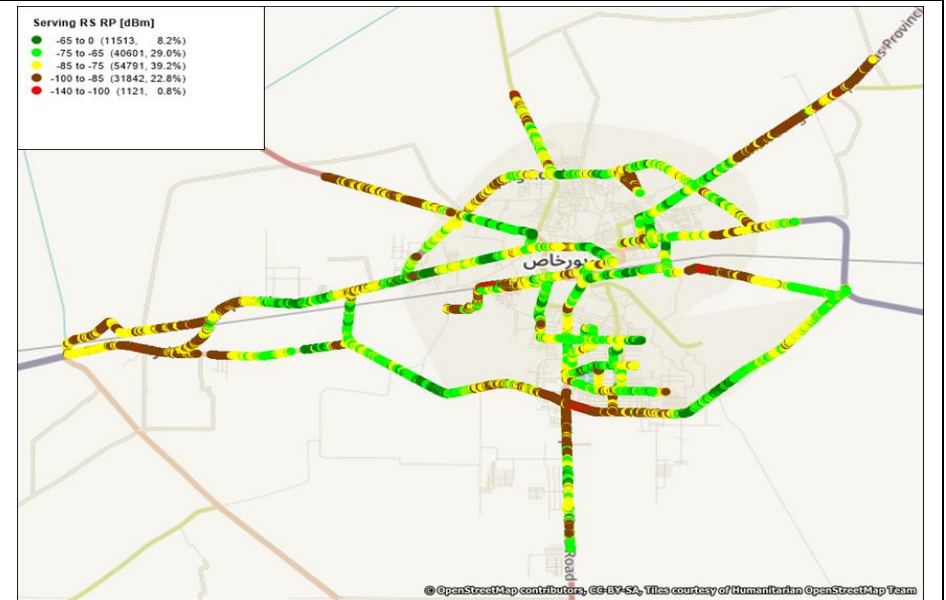
TELEOR 4G NETWORK COVERAGE - MIRPUR KHAS



UFONE 4G NETWORK COVERAGE - MIRPUR KHAS

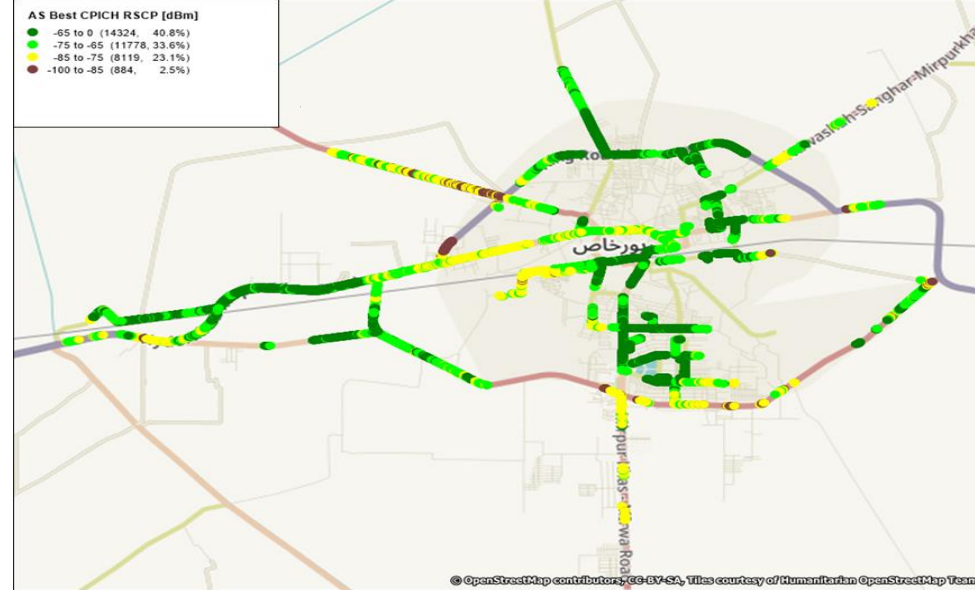


ZONG 4G NETWORK COVERAGE - MIRPUR KHAS

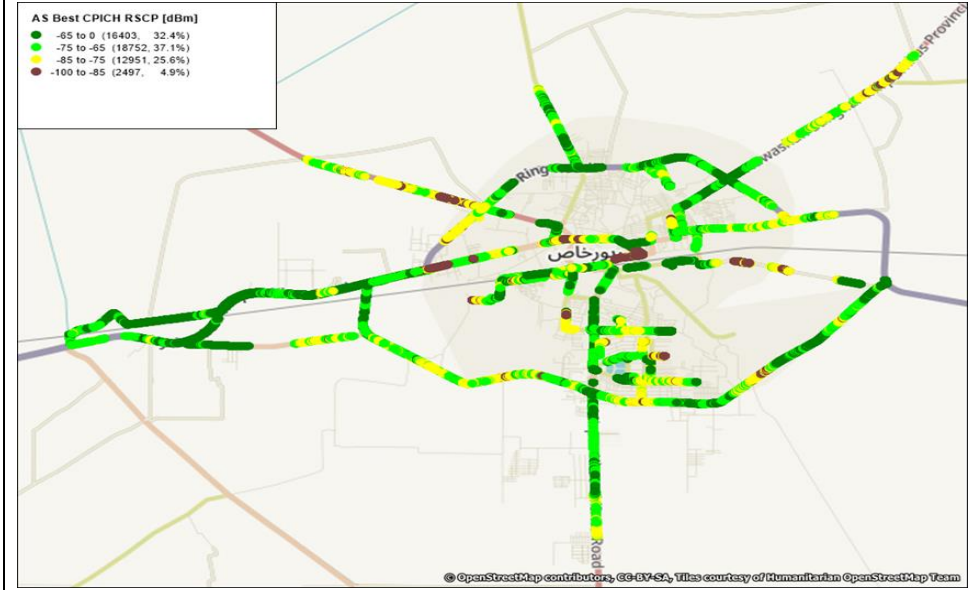


3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

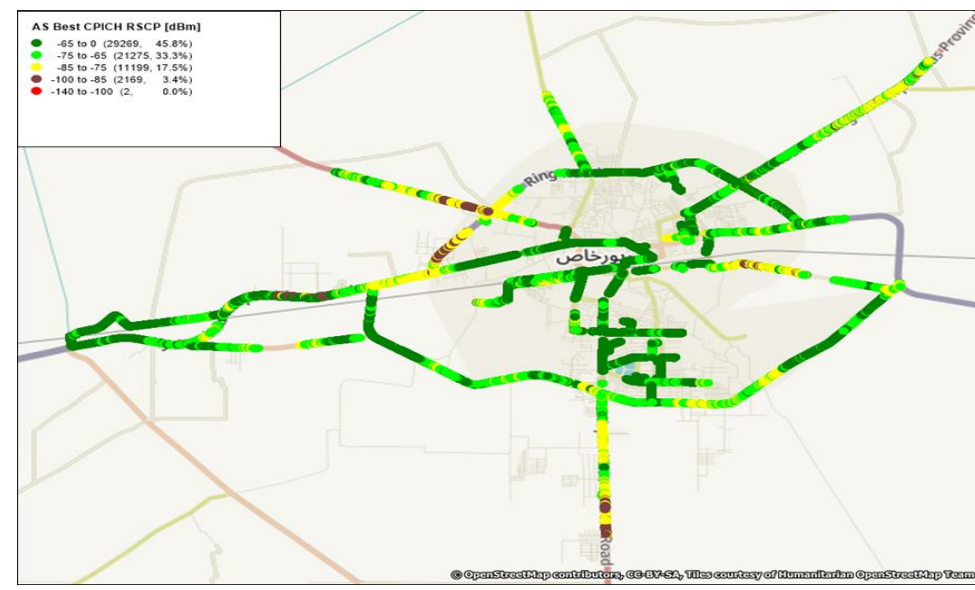
JAZZ 3G NETWORK COVERAGE - MIRPUR KHAS



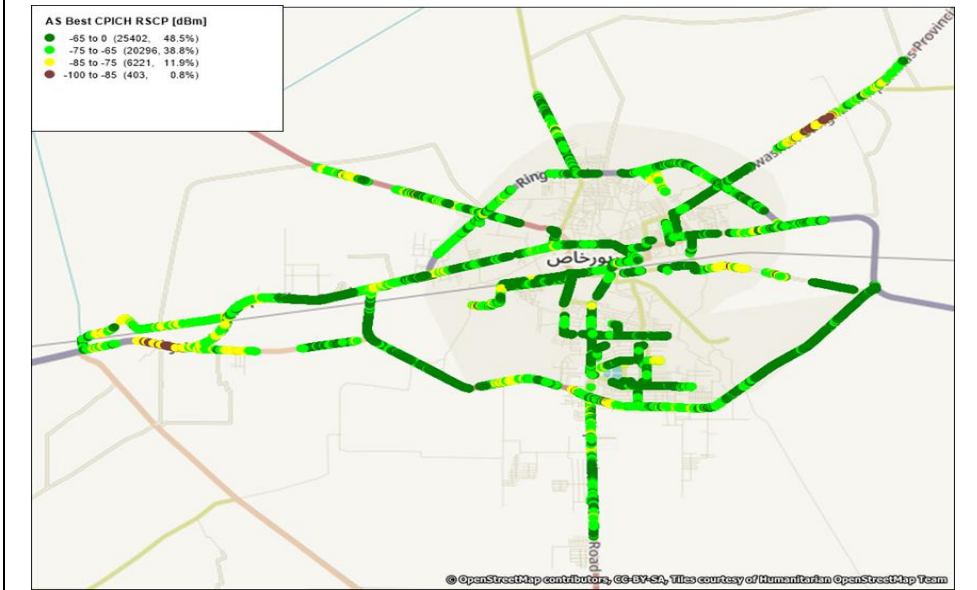
TELENOR 3G NETWORK COVERAGE - MIRPUR KHAS



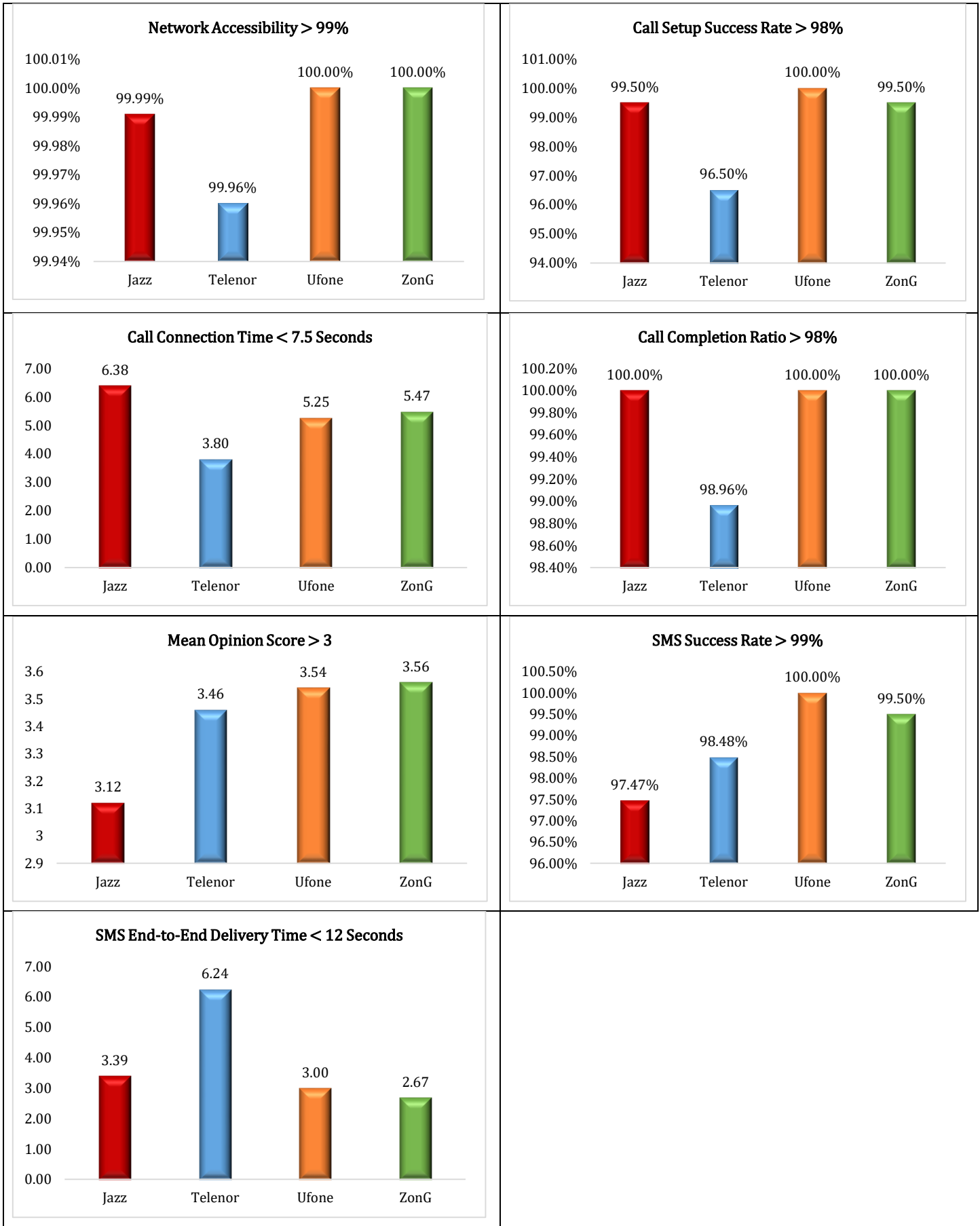
UFONE 3G NETWORK COVERAGE - MIRPUR KHAS



ZONG 3G NETWORK COVERAGE - MIRPUR KHAS



QUALITY OF SERVICE SURVEY RESULTS – MIRPUR KHAS



QUALITY OF SERVICE SURVEY RESULTS – MIRPUR KHAS

