

INDEPENDENT QUALITY OF SERVICE **SURVEY - CITIES**

FIRST QUARTER 2022

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

INDEPENDENT QUALITY OF SERVICE SURVEY REPORT

INTRODUCTION

1.1. In order to measure the performance and service quality of Cellular Mobile Operators (CMOs), an independent Quality of Service (QoS) Survey has been carried out in Eleven (11) x cities of Punjab, Sindh, Khyber Pakhtunkhwa (KPK) and Balochistan during 1st quarter i.e. January ~ March 2022. The name of cities along with survey dates are mentioned in **Table 1.1: QoS Survey Cities & Dates:**

S. #.	Province	City	Days	Survey Dates
1.	Punjab	Sadiqabad	2	08 ~ 09 February 2022
2.		Kharian	2	14 ~ 15 February 2022
3.		Khanpur	3	14 ~ 16 February 2022
4.		Sialkot	2	07 ~ 08 March 2022
5.		Wazirabad	2	16 ~ 17 March 2022
6.	Sindh	Kotri	3	08 ~ 10 February 2022
7.		Jacobabad	3	15 ~ 17 February 2022
8.		Dadu	3	18,22 & 23 February 2022
9.		Tando Allah Yar	2	22 ~ 23 March 2022
10.	Khyber Pakhtunkhwa	Dera Ismail Khan	3	21 ~ 23 February 2022
11.	Balochistan	Gwadar	4	07 ~ 10 March 2022

Table 1.1: QoS Survey Dates and Samples

DRIVE TEST DETAILS

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

City	4G Signal Strength -100dBm with 90% Confidence Level				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
<i>Khanpur</i>	98.59%	95.37%	66.74%	99.94%	Yes	Yes	No	Yes
<i>Sadiqabad</i>	99.81%	96.50%	73.40%	99.88%	Yes	Yes	No	Yes
<i>Kharian</i>	96.57%	88.68%	84.02%	92.24%	Yes	No	No	Yes
<i>Wazirabad</i>	99.55%	88.65%	95.91%	96.30%	Yes	No	Yes	Yes
<i>Kotri</i>	98.47%	97.42%	63.19%	98.65%	Yes	Yes	No	Yes
<i>Jacobabad</i>	96.88%	88.82%	94.73%	98.91%	Yes	No	Yes	Yes
<i>Dadu</i>	94.53%	93.22%	53.98%	99.90%	Yes	Yes	No	Yes
<i>Tando Allah Yar</i>	98.75%	95.31%	80.18%	99.31%	Yes	Yes	No	Yes
<i>Sialkot</i>	99.23%	98.21%	98.14%	98.98%	Yes	Yes	Yes	Yes
<i>Gwadar</i>	94.30%	89.80%	99.83%	96.92%	Yes	No	Yes	Yes
<i>D.I Khan</i>	95.87%	98.89%	98.15%	97.92%	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								
<i>City</i>	Confidence Level				Compliant (Yes/No)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
<i>Khanpur</i>	100.00%	100.00%	100.00%	100.00%	Yes	Yes	Yes	Yes
<i>Sadiqabad</i>	100.00%	99.75%	99.93%	100.00%	Yes	Yes	Yes	Yes
<i>Kharian</i>	100.00%	100.00%	99.88%	100.00%	Yes	Yes	Yes	Yes
<i>Wazirabad</i>	100.00%	99.91%	99.95%	100.00%	Yes	Yes	Yes	Yes
<i>Kotri</i>	100.00%	100.00%	100.00%	100.00%	Yes	Yes	Yes	Yes
<i>Jacobabad</i>	99.90%	96.84%	100.00%	100.00%	Yes	Yes	Yes	Yes
<i>Dadu</i>	99.93%	100.00%	96.25%	100.00%	Yes	Yes	Yes	Yes
<i>Tando Allah Yar</i>	100.00%	99.99%	100.00%	100.00%	Yes	Yes	Yes	Yes
<i>Sialkot</i>	100.00%	100.00%	100.00%	100.00%	Yes	Yes	Yes	Yes
<i>Gwadar</i>	100.00%	97.80%	99.99%	98.83%	Yes	Yes	Yes	Yes
<i>D.I Khan</i>	99.88%	100.00%	100.00%	100.00%	Yes	Yes	Yes	Yes

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

MOBILE BROADBAND SERVICE

4.1. A total of **26,498** download test attempts made, out of which **19,541** were successful in **11 x surveyed cities.** The company wise average User Data Throughput, 4G/LTE, 3G and 2G signal strength detail is mentioned in **Table4.1: Data Tests Statistics.**

Description	Jazz	Telenor	Ufone	ZonG
<i>TOTAL DATA TEST ATTEMPTS</i>	5388	11339	5358	4413
<i>SUCCESSFUL DATA TEST ATTEMPTS</i>	5162	5091	5002	4286
<i>TEST ATTEMPTS SUCCESS RATIO (%)</i>	95.81	44.9	93.36	97.12
<i>USER DATA THROUGHPUT (Mbps)</i>	6.55	3.044	7.337	7.403
<i>AVERAGE 4G SIGNAL STRENGTH (RSRP) dBm</i>	-81.2	-84.1	-83.6	-79.5
<i>AVERAGE 4G SIGNAL STRENGTH (RSCP) dBm</i>	-68.26	-71.71	-68.81	-67.33
<i>AVERAGE 4G SIGNAL STRENGTH (RXLEV) dBm</i>	-70.24	-76.69	-75.71	-65.46

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 **Table4.2.1: 4G User Data Throughput in Pakistan \geq 2 Mbps & Table4.2.2: 4G User Data Throughput in AJK \geq 2 Mbps.**

<i>City</i>	4G User Data Throughput (Mbps)				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
<i>Khanpur</i>	12.58	3.43	15.03	12.34	Second	Fourth	First	Third
<i>Sadiqabad</i>	11.67	6.55	25.18	16.50	Third	Fourth	First	Second
<i>Kharian</i>	10.70	3.13	1.35	14.26	Second	Third	Fourth	First
<i>Wazirabad</i>	7.72	3.97	12.30	15.19	Third	Fourth	Second	First
<i>Kotri</i>	20.14	6.27	9.38	16.75	First	Fourth	Third	Second

City	4G User Data Throughput (Mbps)				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Jacobabad	16.50	3.24	3.10	14.97	First	Third	Fourth	Second
Dadu	8.57	2.37	19.73	12.75	Third	Fourth	First	Second
Tando Allah Yar	13.84	4.21	9.92	10.78	First	Fourth	Third	Second
Sialkot	9.16	3.84	18.31	15.23	Third	Fourth	First	Second
Gwadar	3.86	2.35	2.09	7.32	Second	Third	Fourth	First
D.I Khan	12.27	2.04	7.90	16.80	Second	Fourth	Third	First

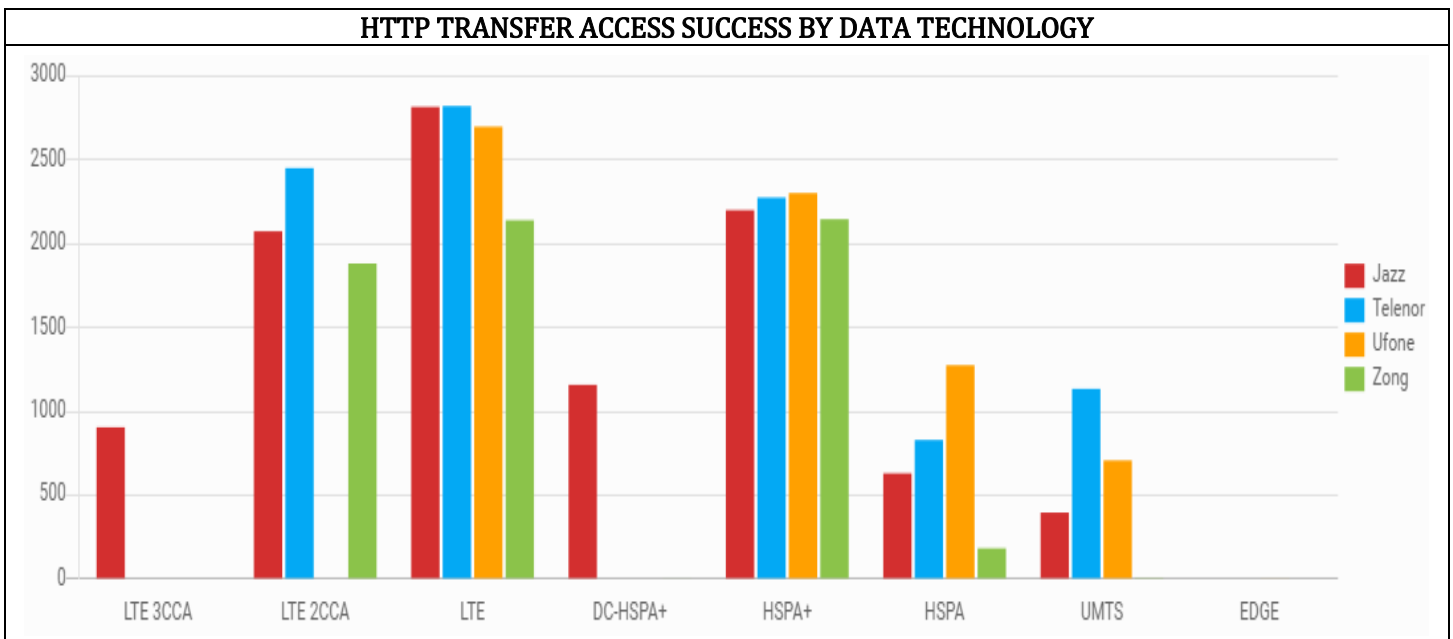
Table4.2.1: 4G User Data Throughput in Pakistan \geq 2 Mbps

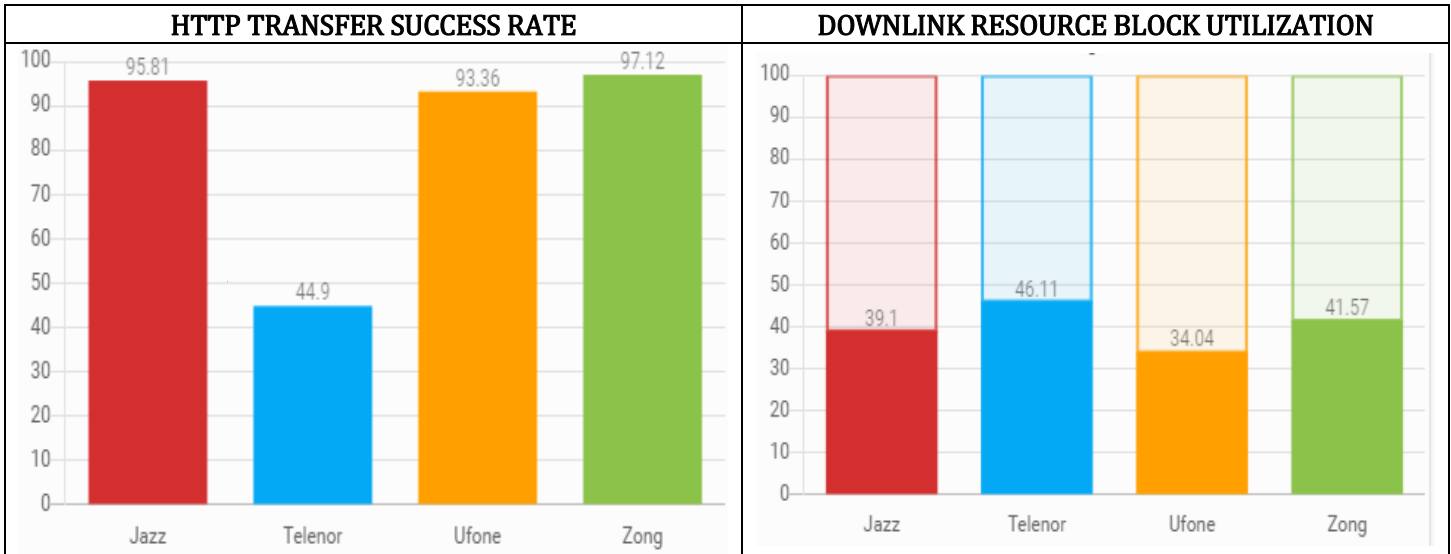
4.3. **3G USER DATA THROUGHPUT.** As per Next Generation Mobile Service (NGMS) licenses awarded, licensees are required to meet **the threshold of minimum of 256Kbps of 3G User Data Throughput.** The results of Data Service QoS KPI i.e. User Data Throughput is shown in **Table 4.3: 3G User Data Throughput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

City	3G User Data Throughput (Kbps)				Operator Position			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Khanpur	3069.50	3810.87	3566.99	1944.04	Third	Second	First	Fourth
Sadiqabad	3213.56	4789.25	3656.23	2046.48	Third	First	Second	Fourth
Kharian	1677.81	1836.83	3685.05	2031.25	Fourth	Third	First	Second
Wazirabad	1249.90	2083.82	5159.92	2332.42	Fourth	Third	First	Second
Kotri	1298.83	2923.11	5706.80	1376.28	Fourth	Second	First	Third
Jacobabad	4119.01	2539.55	2225.21	1057.98	First	Second	Third	Fourth
Dadu	3074.27	2285.97	3856.25	1196.27	Second	Third	First	Fourth
Tando Allah Yar	1054.34	2686.46	2817.79	961.31	Third	Second	First	Fourth
Sialkot	2098.40	2677.96	3386.38	1879.95	Third	Second	First	Fourth
Gwadar	2527.18	3871.15	2756.26	763.26	Third	First	Second	Fourth
D.I Khan	2054.03	939.90	2638.49	2127.99	Third	Fourth	First	Second

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 and Resource Block Utilization have been recorded. The details can be seen in attached graphs.





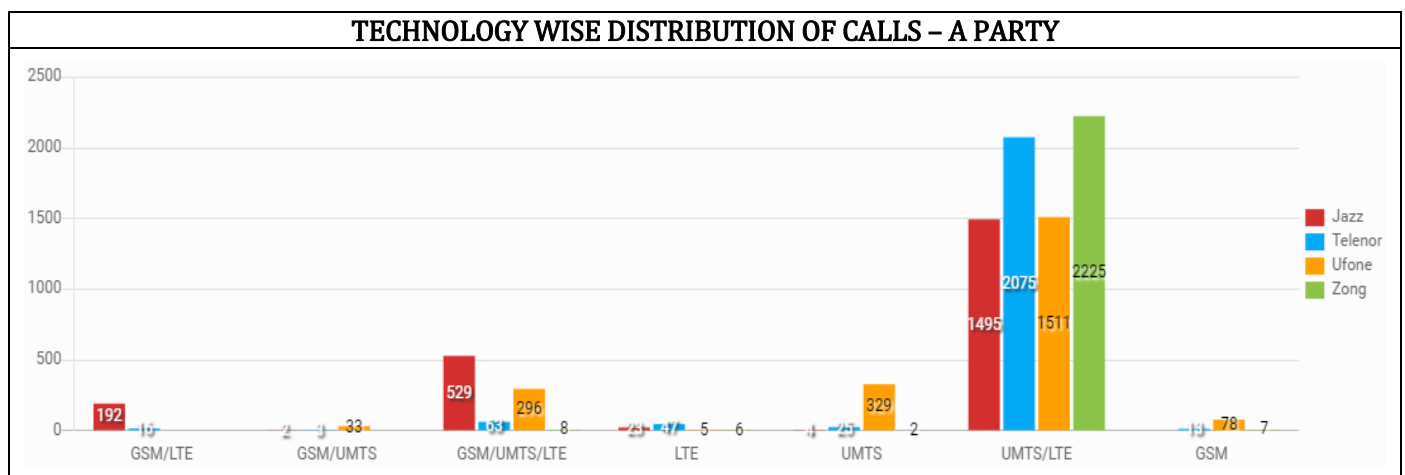
VOICE SERVICE

5.1. A total of **8,987 Call attempts** made and out of which **313 were failed attempts**. In **8,674 successful call attempts**, **72 calls dropped** prior to completion of two minutes duration, whereas, **8,602 calls remained connected** for the complete duration of two minutes. The company wise call statistics is shown in **Table5.1: Call Statistics**.

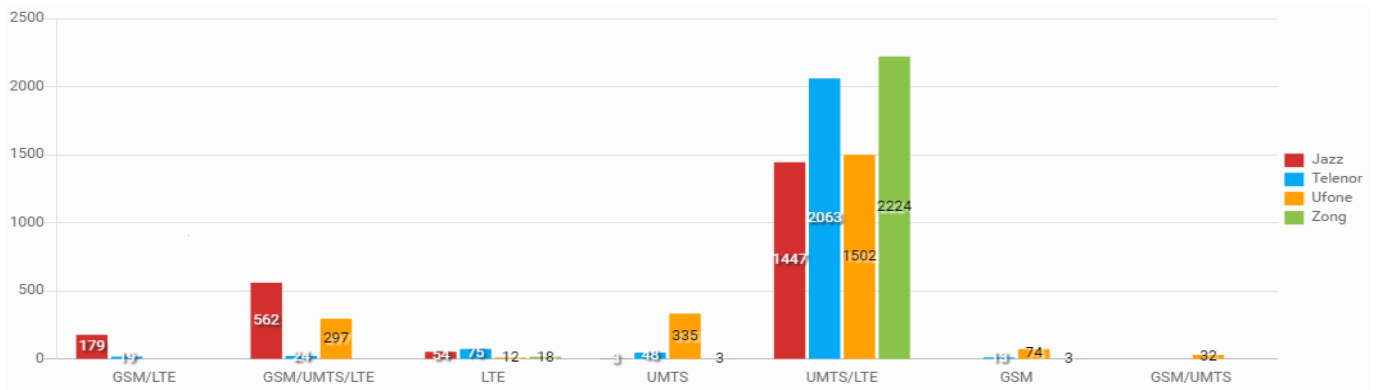
DESCRIPTION	JAZZ	TELENOR	UFONE	ZONG
TOTAL CALLS ATTEMPTS	2245	2242	2252	2248
FAILED CALLS ATTEMPTS	98	126	49	40
ESTABLISHED CALLS ATTEMPTS	2147	2116	2203	2208
DROPPED CALLS ATTEMPTS	18	27	13	14
COMPLETED CALLS ATTEMPTS	2129	2089	2190	2194
CALL SETUP SUCCESS RATE	95.63 %	94.38 %	97.82 %	98.22 %
CALL SETUP TIME	7.95 s	8.48 s	6.87 s	7.91 s
CALL COMPLETION RATE	98.95 %	96.99 %	98.43 %	96.19 %
ISHO SUCCESS RATE	99.62 %	95 %	99.35 %	-
RAB SETUP SUCCESS RATE	100 %	100 %	100 %	99.97 %
MEAN OPINION SCORE	3.11 MOS	3.41 MOS	3.26 MOS	3.47 MOS
MEAN OPINION SCORE EXCESS RATIO - MOS < 1.6	3.73 %	1.11 %	2.32 %	1.61 %
TOTAL SPEECH TEST	21293	21067	21989	21951

Table5.1: Call Statistics

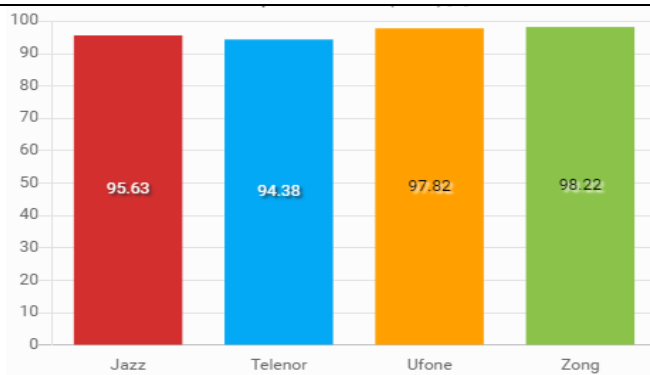
5.2. The overall Call Setup Success Rate and Call Retainability alongwith Mean Opinion Score (MOS), the percentage of mute calls and MOS with respect to Voice CODEC is shown as under:



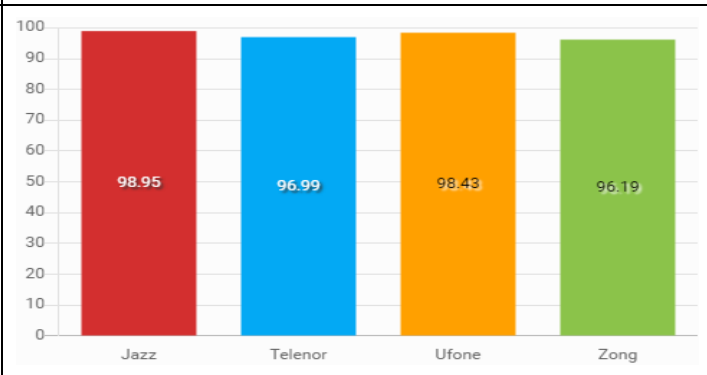
TECHNOLOGY WISE DISTRIBUTION OF CALLS – B PARTY



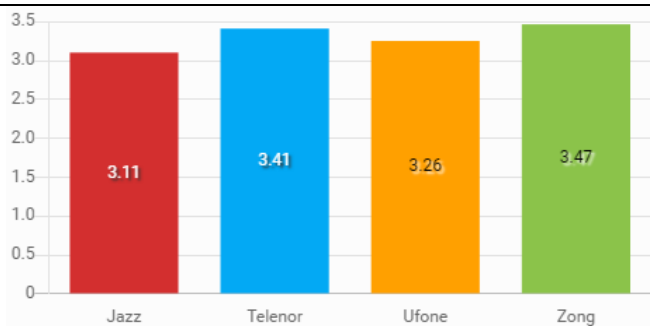
CALL SETUP SUCCESS RATE



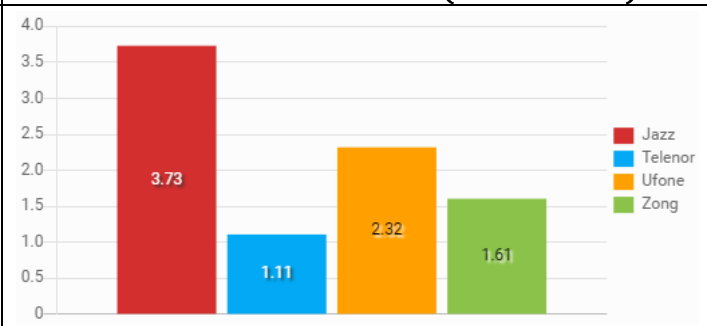
CALL RETAINABILITY



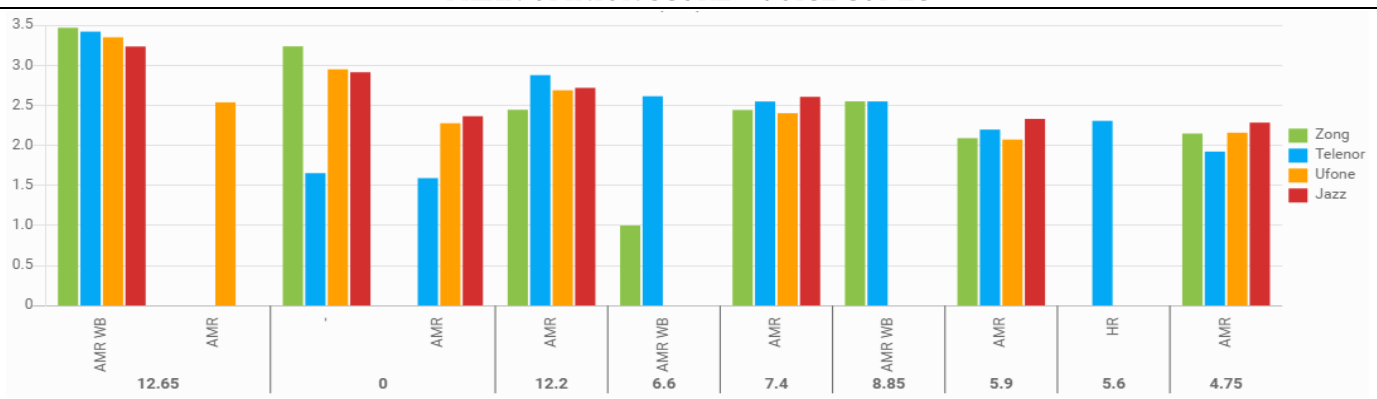
MEAN OPINION SCORE - AVERAGE



MEAN OPINION SCORE < 1.6 (PERCENTAGE)



MEAN OPINION SCORE – VOICE CODEC



5.3. The 7 x QoS KPIs (i.e. Network Accessibility, Call Setup Success Rate, Call Setup Time, Call Completion Rate, Mean Opinion Score, Inter System Handover Success Rate & RAB Setup Success Rate) have been measured while testing voice services in **11 x surveyed cities** of Pakistan. The compliance level of threshold values of voice QoS KPIs is shown in each **Table 5.2.1 & 5.2.2: Voice QoS KPIs Compliance Level**.

VOICE CALLS CITIES- COMPLIANCE (YES/NO)												
Operator	* QoS KPIs	Khanpur	Sadiqabad	Kharian	Wazirabad	Kotri	Jacobabad	Dadu	Tando Allah Yar	Sialkot	Gwadar	D.I Khan
Jazz	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	Yes	Yes	Yes	No	No	No	No	No	No	No	No
	CCT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
	CCR	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
	MOS	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes
	ISHO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Telenor	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	Yes	Yes	Yes	No	No	No	No	No	Yes	No	No
	CCT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	CCR	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	No
	MOS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	ISHO	N/A	N/A	N/A	N/A	Yes	Yes	No	Yes	N/A	N/A	N/A
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ufone	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	No	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
	CCT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	CCR	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
	MOS	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
	ISHO	Yes	Yes	Yes	Yes	N/A	Yes	N/A	Yes	Yes	Yes	Yes
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ZonG	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
	CCT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	CCR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	MOS	Yes	Yes	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	N/A	N/A
	RSSR	Yes	Yes	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 5.2: Voice QoS KPIs Compliance Level

SMS SERVICE

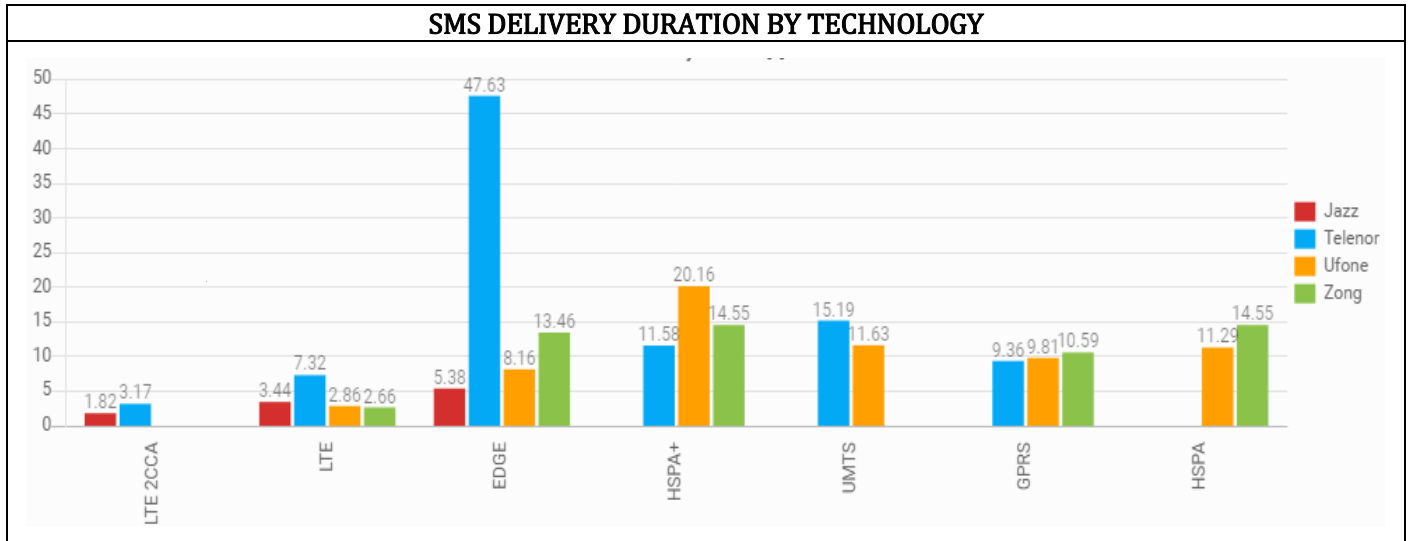
6.1. A total of **15,325 SMS sending attempts** conducted, out of which **15,128 SMS successfully received** at B-Party. The company wise SMS Statistics are shown in **Table6.1: SMS Statistics**

DESCRIPTION	JAZZ	TELENOR	UFONE	ZONG
<i>SMS SEND REQUEST</i>	2074	2072	2078	2077
<i>SMS SUCCESSFULLY TRANSMITTED</i>	2072	2046	2075	2067
<i>SMS SUCCESSFULLY RECEIVED</i>	2045	2032	2069	2067
<i>SMS RECEIVE SUCCESS RATE</i>	98.6 %	98.07 %	99.57 %	99.52 %
<i>END-TO-END DELIVERY TIME</i>	3.44 s	7.44 s	4.73 s	2.67 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, Sindh, Khyber Pakhtunkhwa and Balochistan respectively.

STANDING IN SURVEY

8.1. CMOs have been prioritized/ placed at 1st, 2nd, 3rd & 4th position in each category i.e. Mobile Network Coverage, Mobile Broadband Service and Voice Service based upon the compliance level against each QoS KPI in each category in 11 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.	Jazz	11	11	-	-	1 st
2.	ZonG	11	11	-	-	1 st
3.	Telenor	7	11	4	11	2 nd
4.	Ufone	5	11	6	11	3 rd

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
		1 st	2 nd	3 rd	4 th	1 st	2 nd	3 rd	4 th		
1.	ZonG	4	6	1	-	-	3	1	7	1 st	4 th

2.	Ufone	4	1	3	3	8	2	1	-	2 nd	1 st
3.	Jazz	3	4	4	-	1	1	6	3	3 rd	3 rd
4.	Telenor	-	-	3	8	2	5	3	1	4 th	2 nd

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	64	2	1 st
2.	Ufone	68	7	2 nd
3.	Telenor	58	12	3 rd
4.	Jazz	63	14	4 th

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				
		1 st	2 nd	3 rd	4 th	
1.	Mobile Network Coverage	Jazz & ZonG	Telenor	Ufone	-	
2.	Mobile Broadband	3G	Ufone	Telenor	Jazz	ZonG
		4G	ZonG	Ufone	Jazz	Telenor
3.	Voice	ZonG	Ufone	Telenor	Jazz	

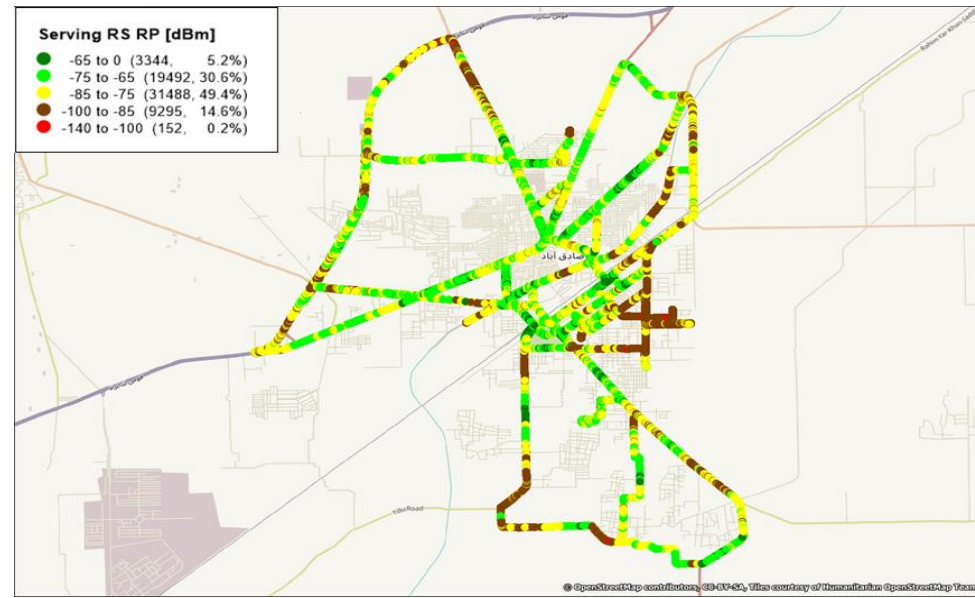
Table 8.4: CMOs Overall Standing in QoS Survey

ANNEX – A

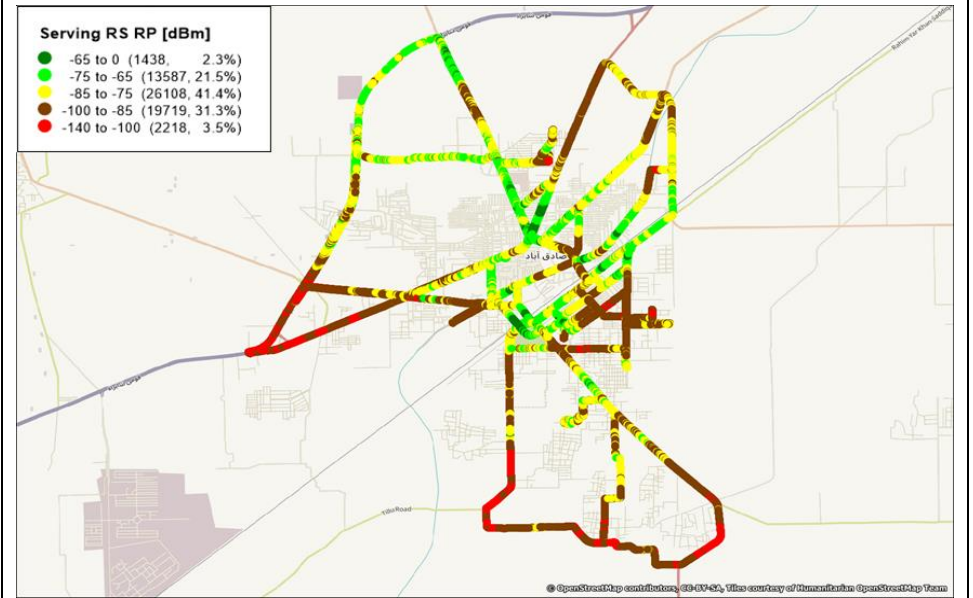
PUNJAB

4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

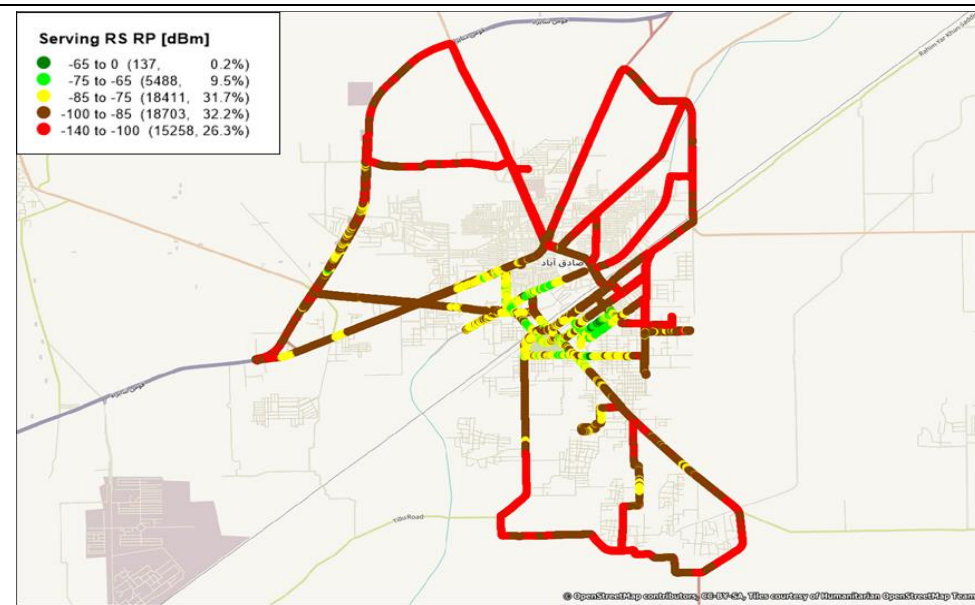
JAZZ 4G NETWORK COVERAGE – SADIQABAD



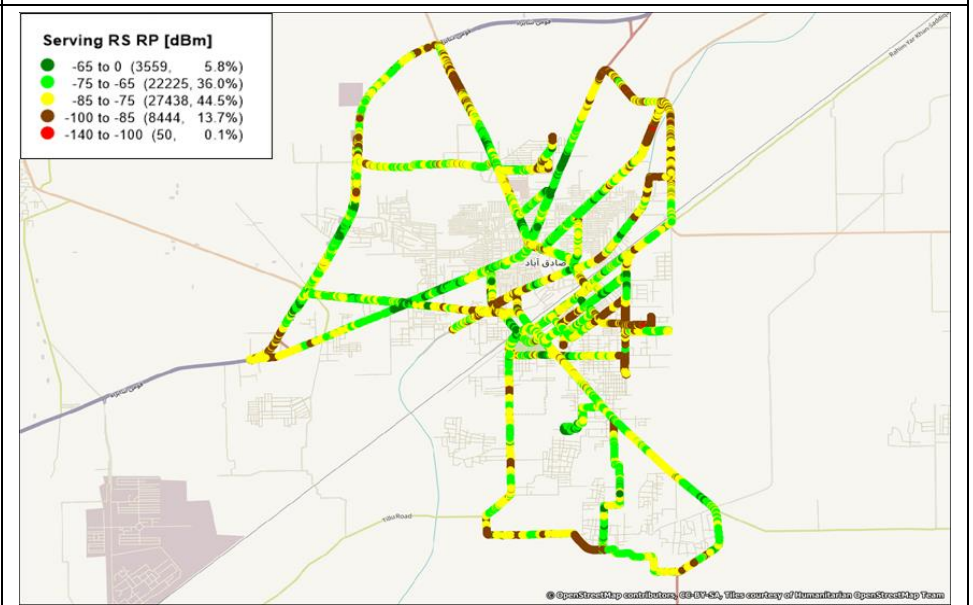
TELENOR 4G NETWORK COVERAGE – SADIQABAD



UFONE 4G NETWORK COVERAGE – SADIQABAD

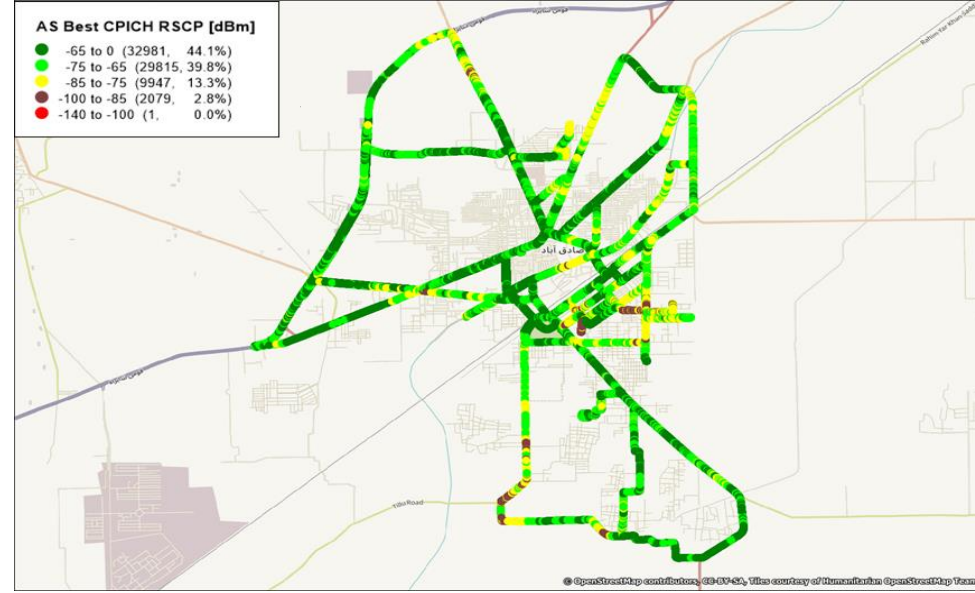


ZONG 4G NETWORK COVERAGE – SADIQABAD

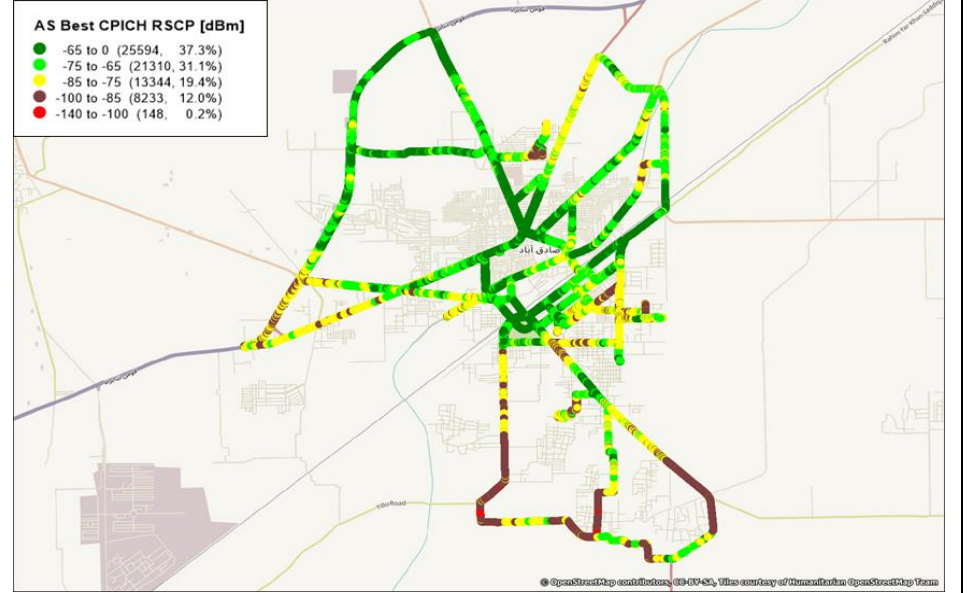


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

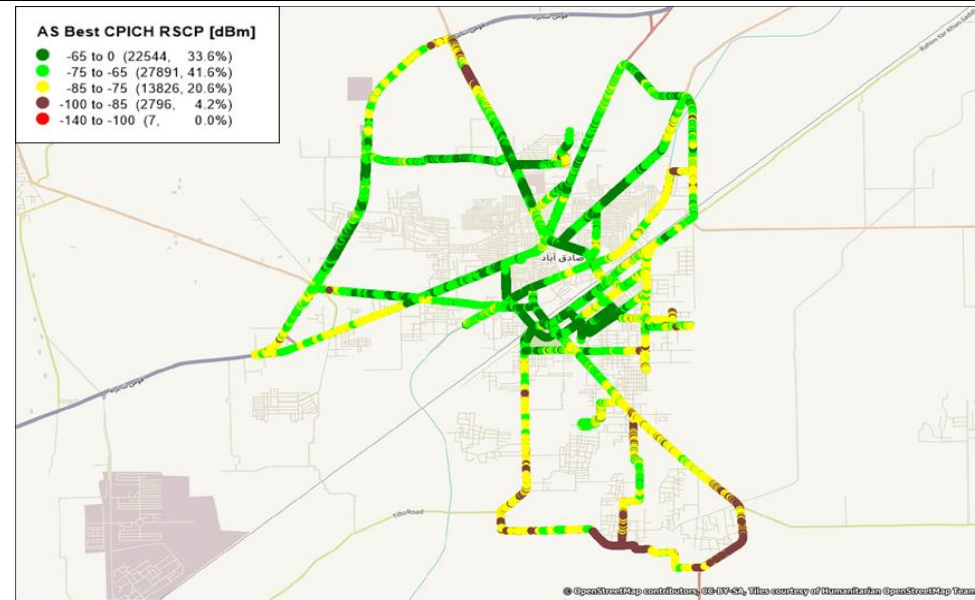
JAZZ 3G NETWORK COVERAGE – SADIQABAD



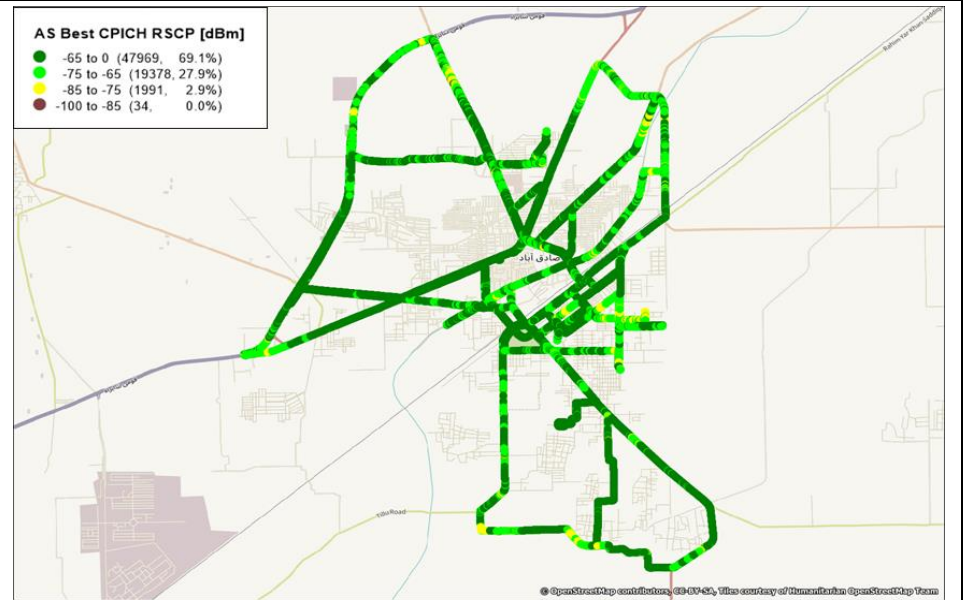
TELENOR 3G NETWORK COVERAGE – SADIQABAD



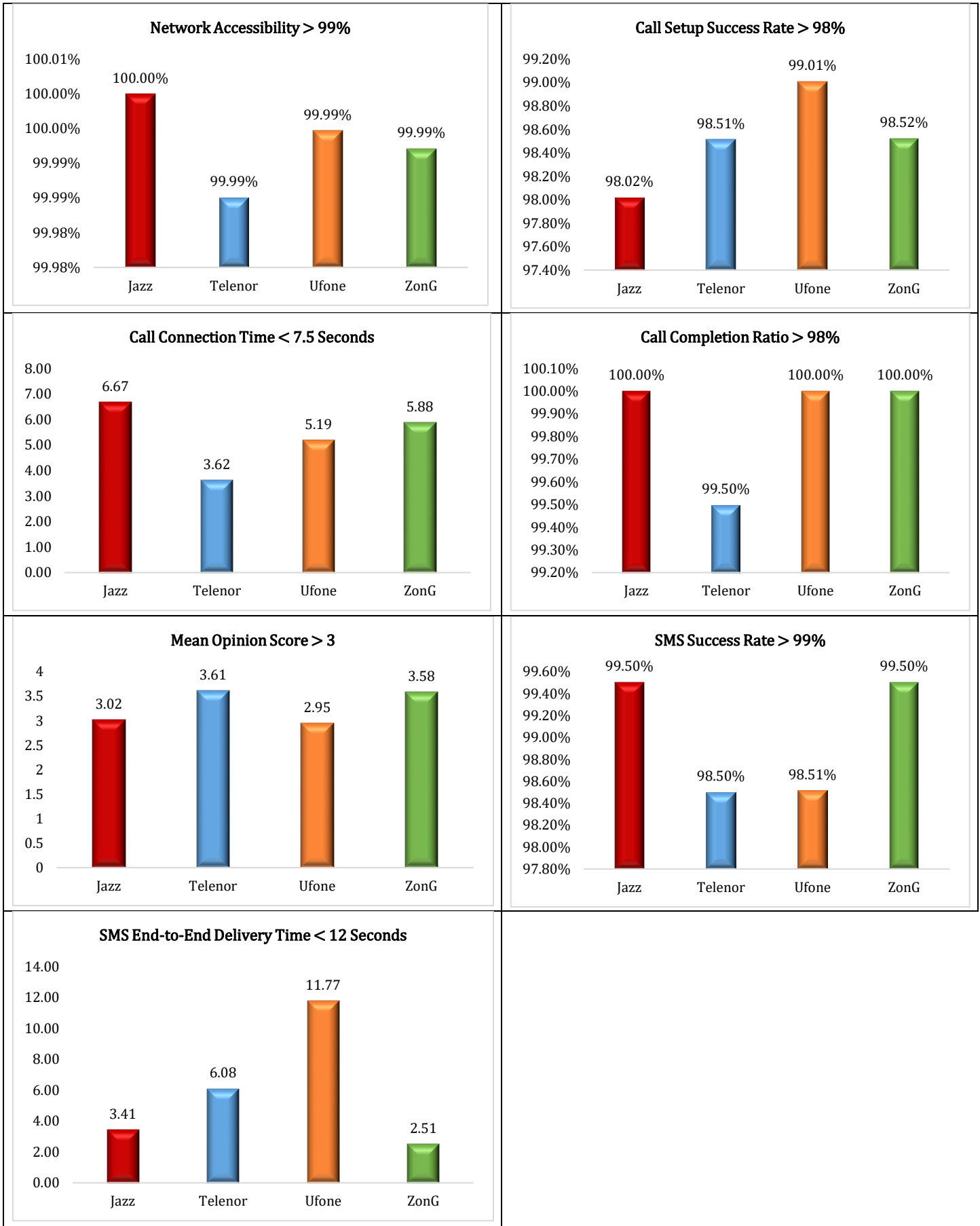
UFONE 3G NETWORK COVERAGE – SADIQABAD



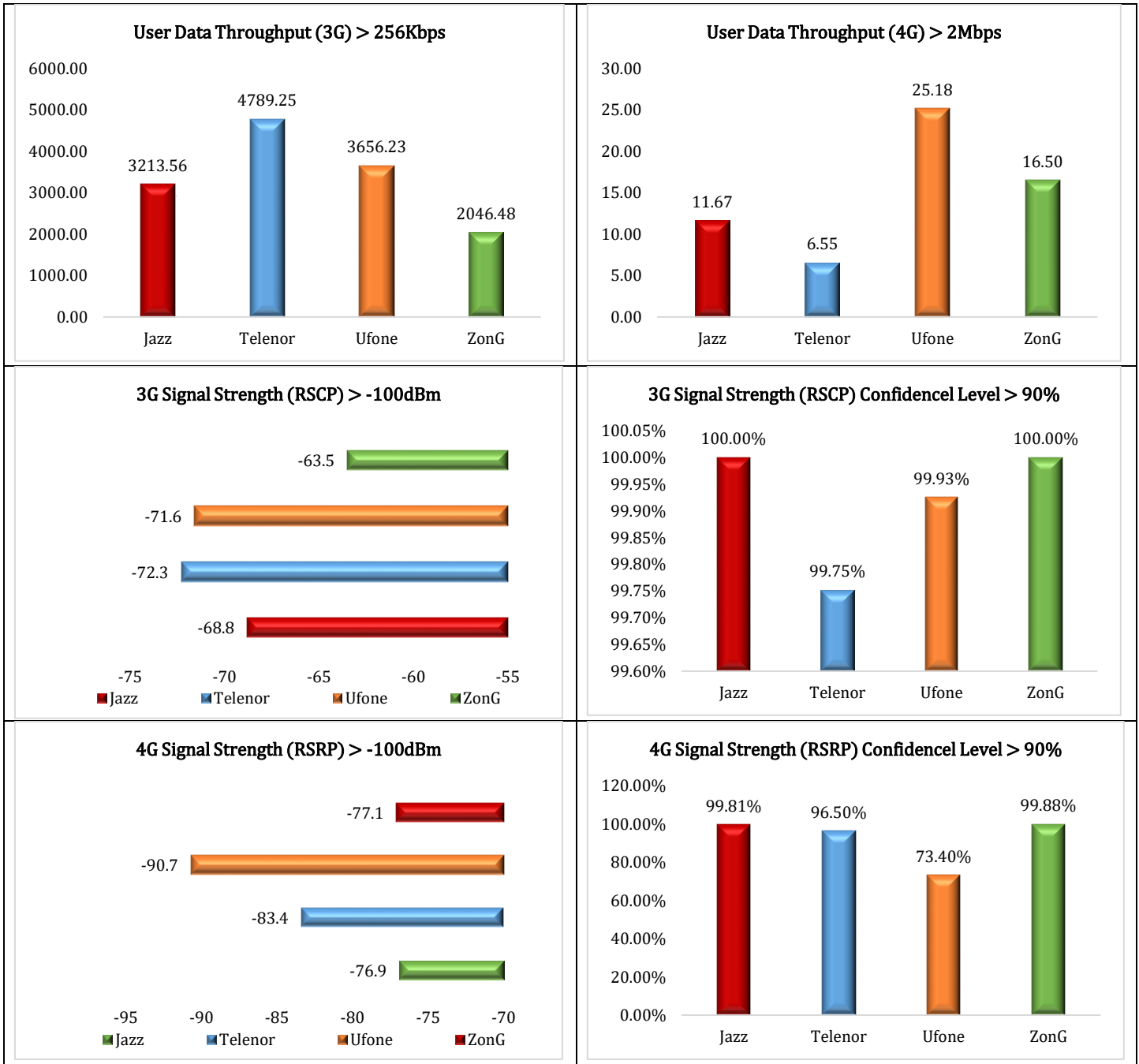
ZONG 3G NETWORK COVERAGE – SADIQABAD



QUALITY OF SERVICE SURVEY RESULTS – SADIQABAD



QUALITY OF SERVICE SURVEY RESULTS – SADIQABAD

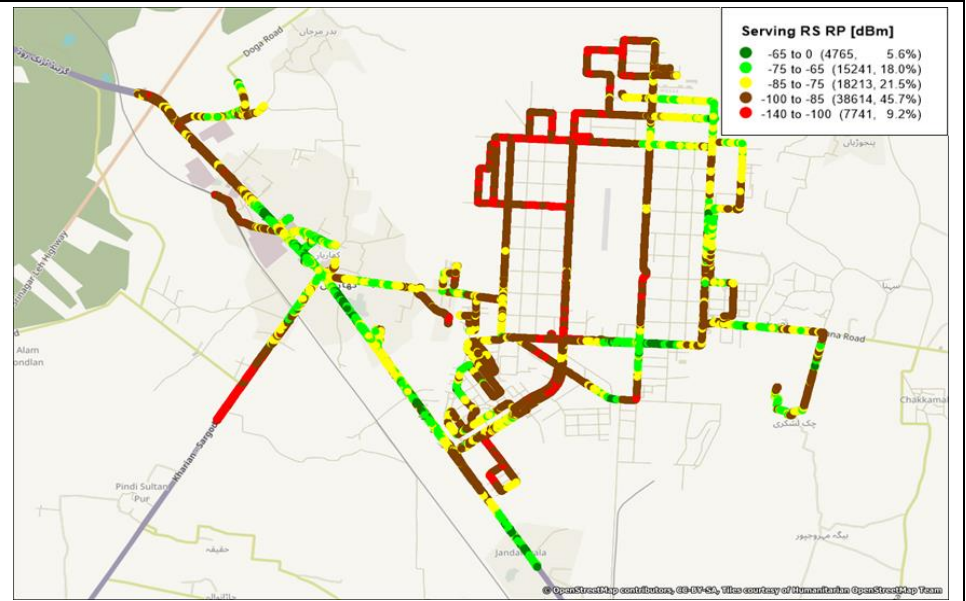


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

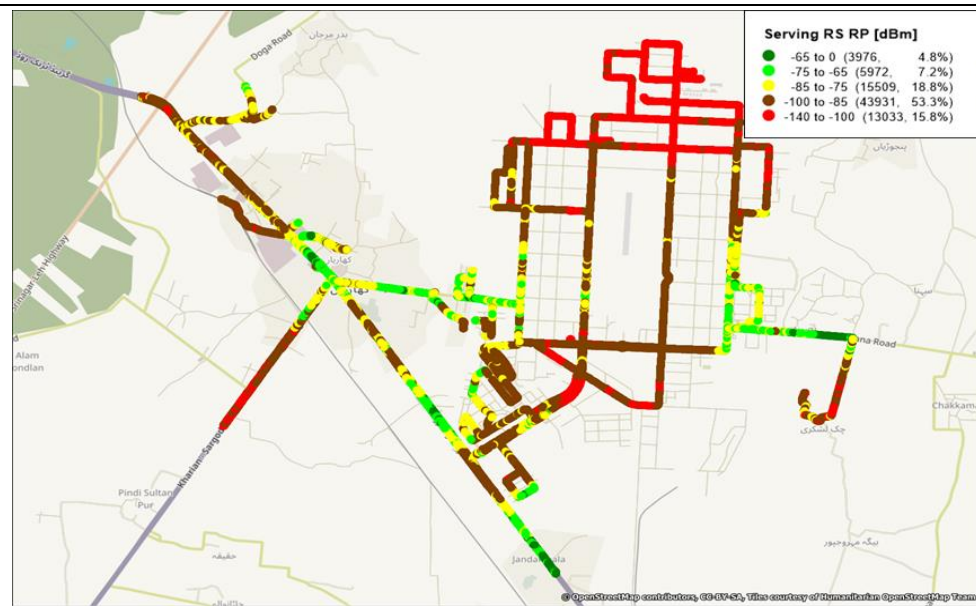
JAZZ 4G NETWORK COVERAGE – KHARIAN



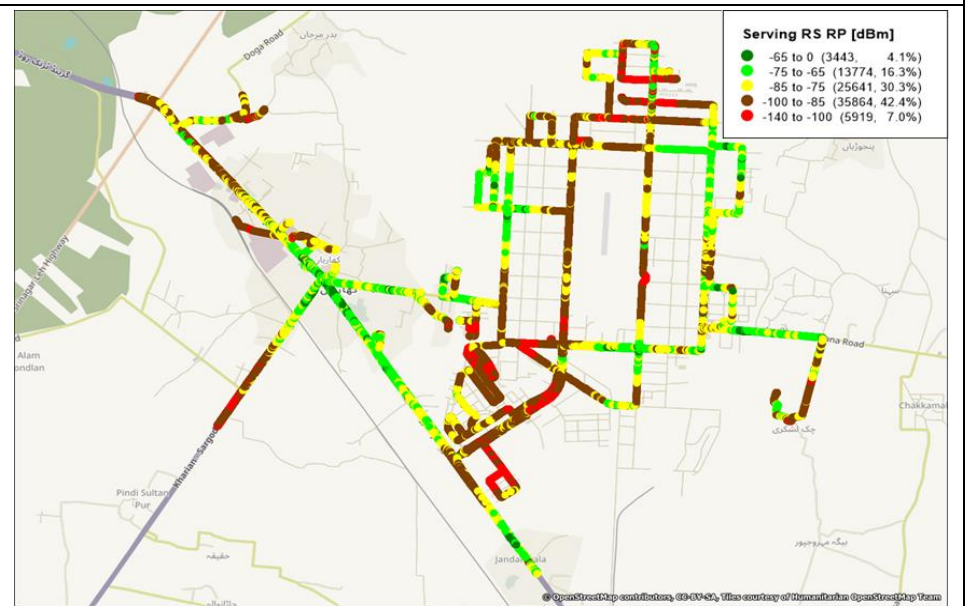
TELEOR 4G NETWORK COVERAGE – KHARIAN



UFONE 4G NETWORK COVERAGE – KHARIAN

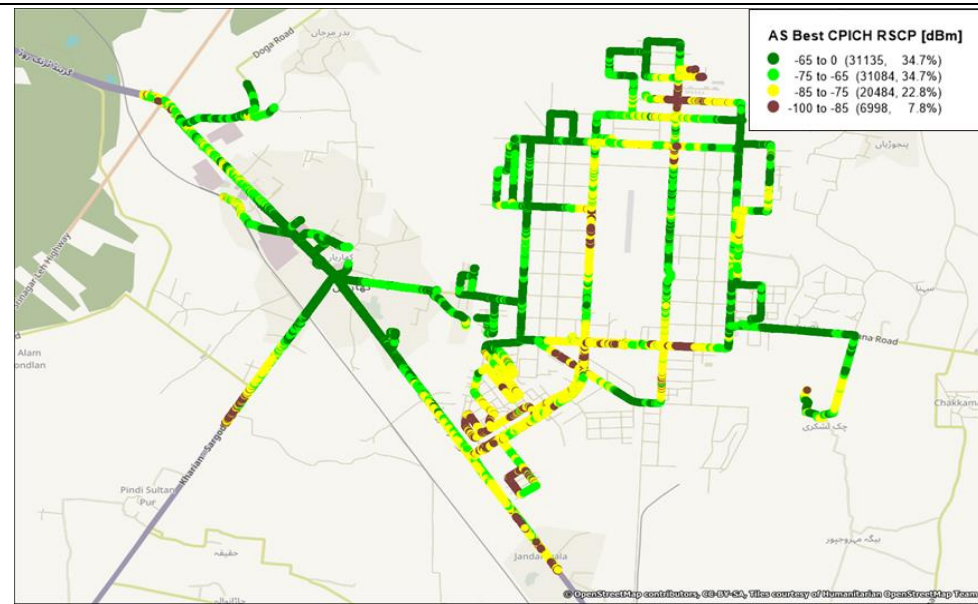


ZONG 4G NETWORK COVERAGE – KHARIAN

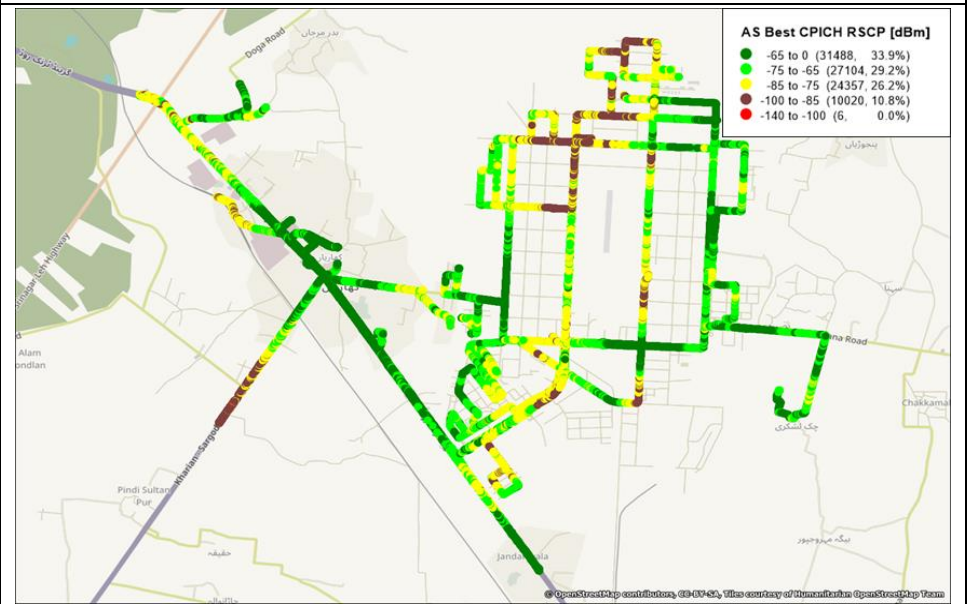


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

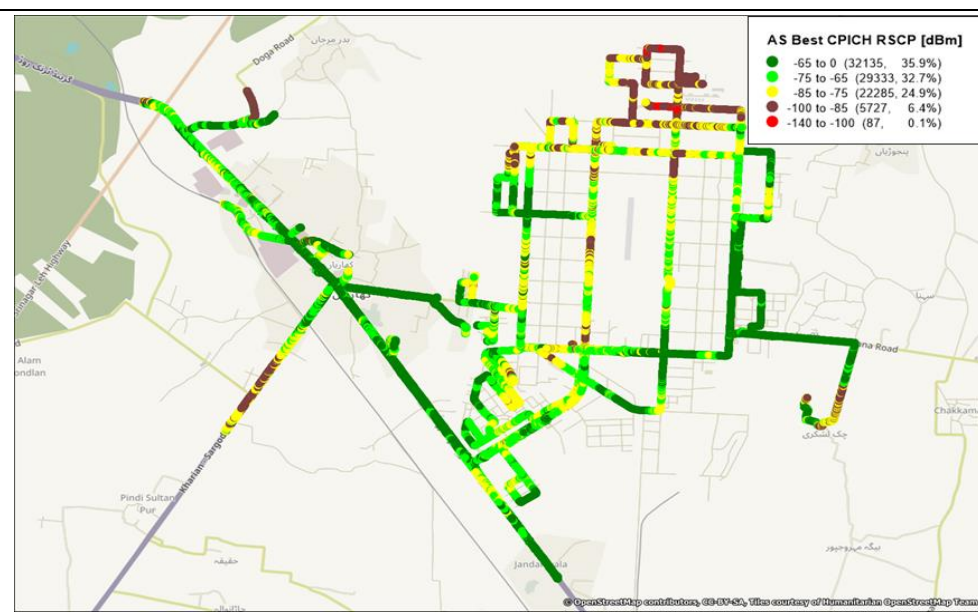
JAZZ 3G NETWORK COVERAGE – KHARIAN



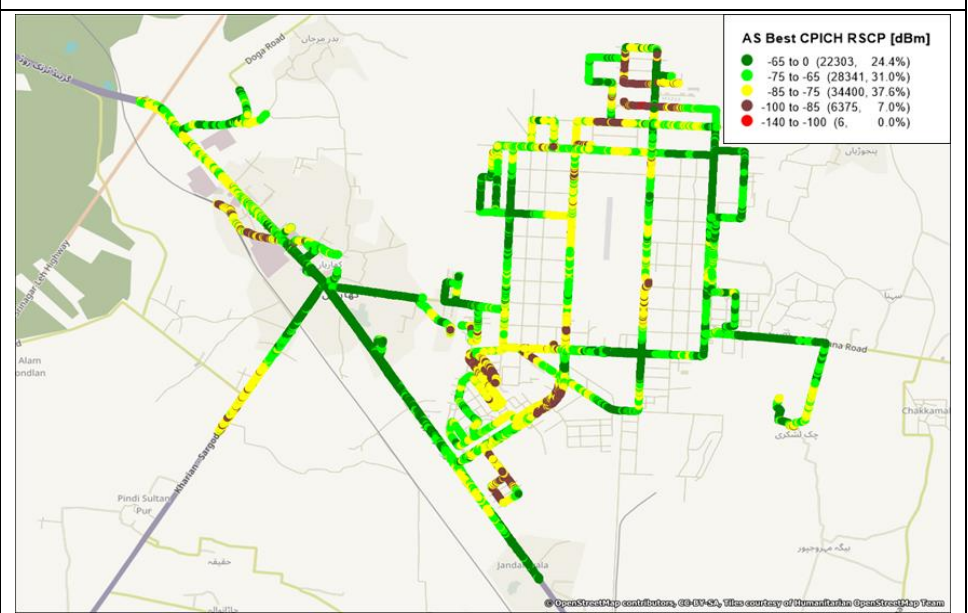
TELENOR 3G NETWORK COVERAGE – KHARIAN



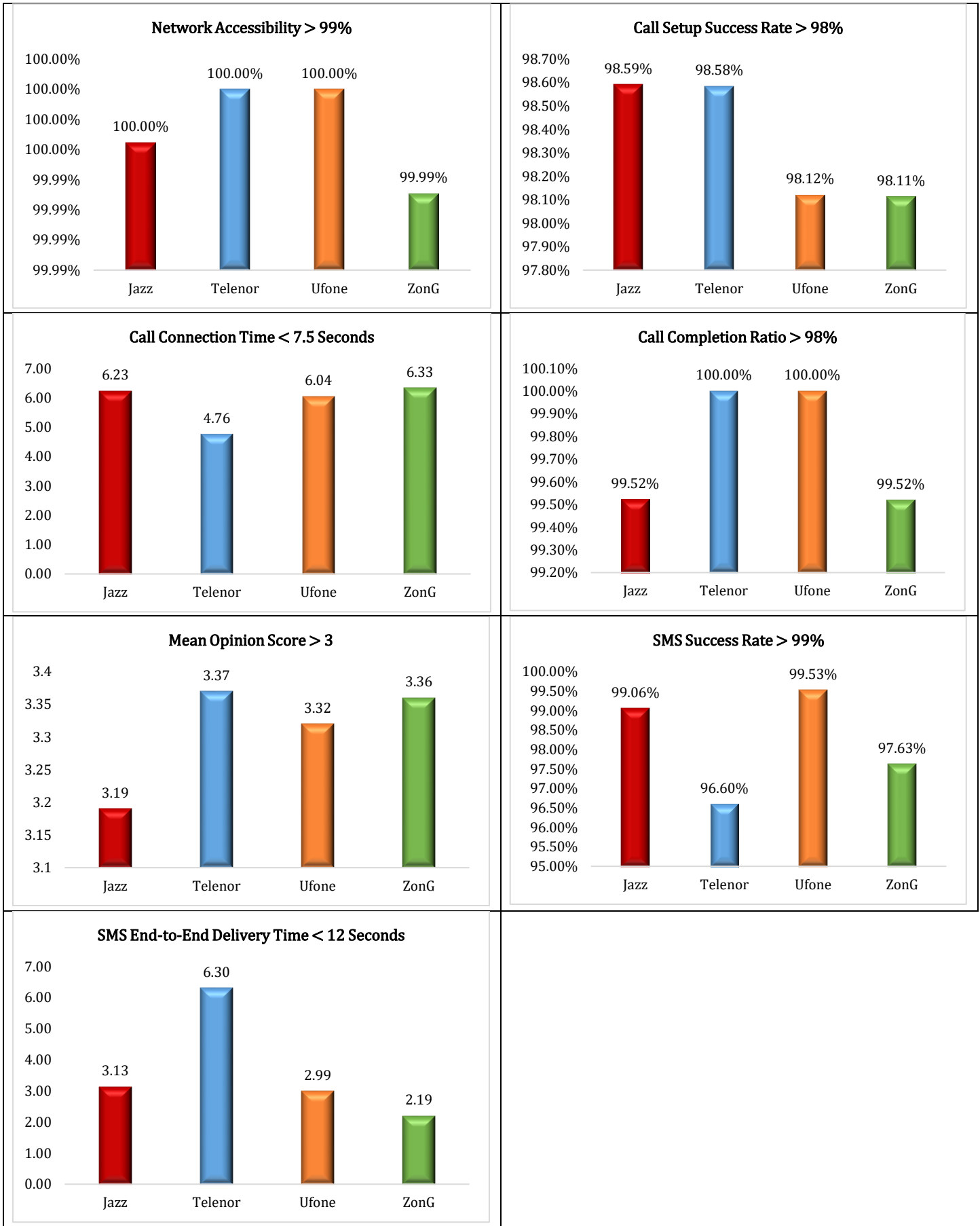
UFONE 3G NETWORK COVERAGE – KHARIAN



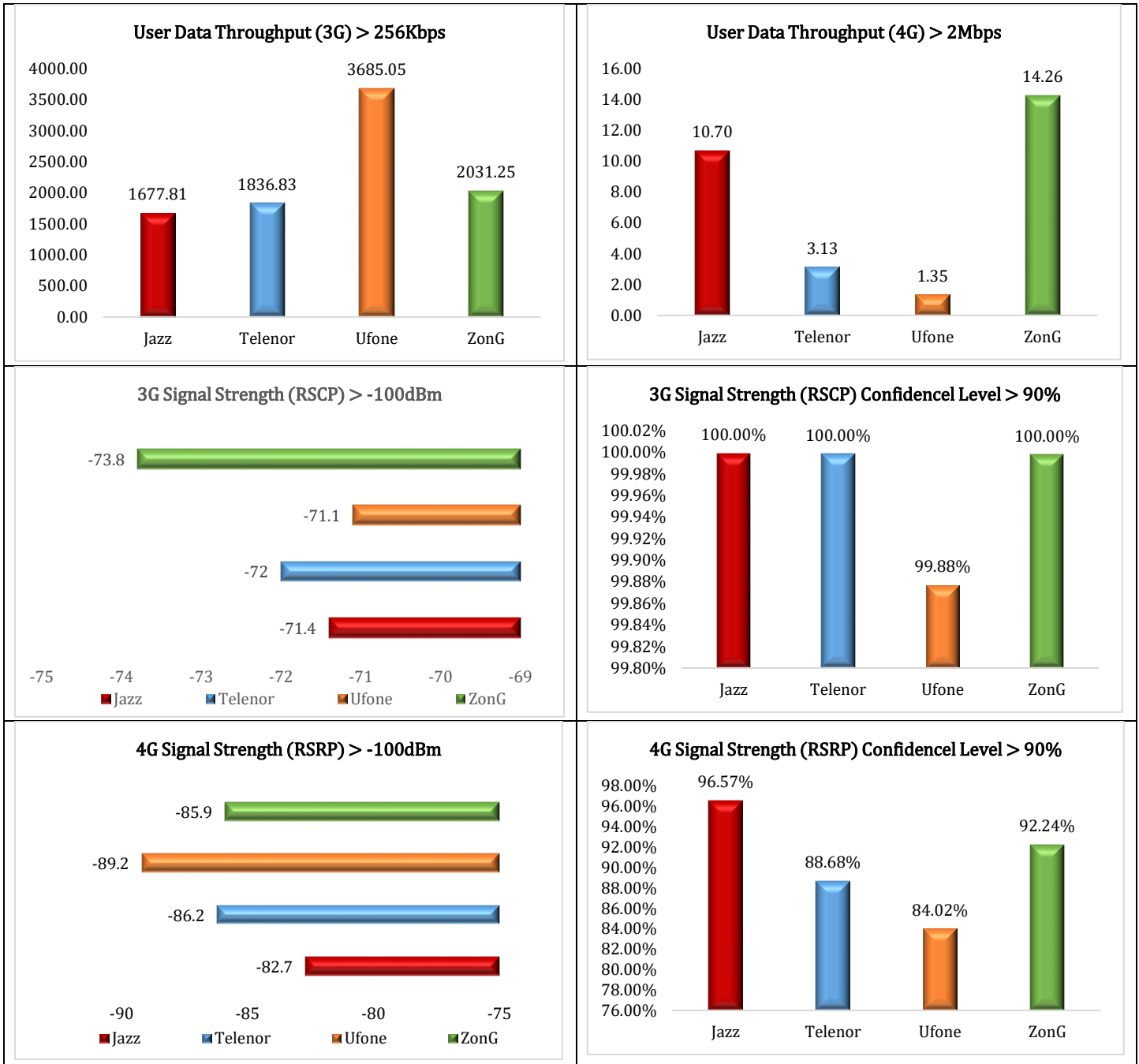
ZONG 3G NETWORK COVERAGE – KHARIAN



QUALITY OF SERVICE SURVEY RESULTS – KHARIAN

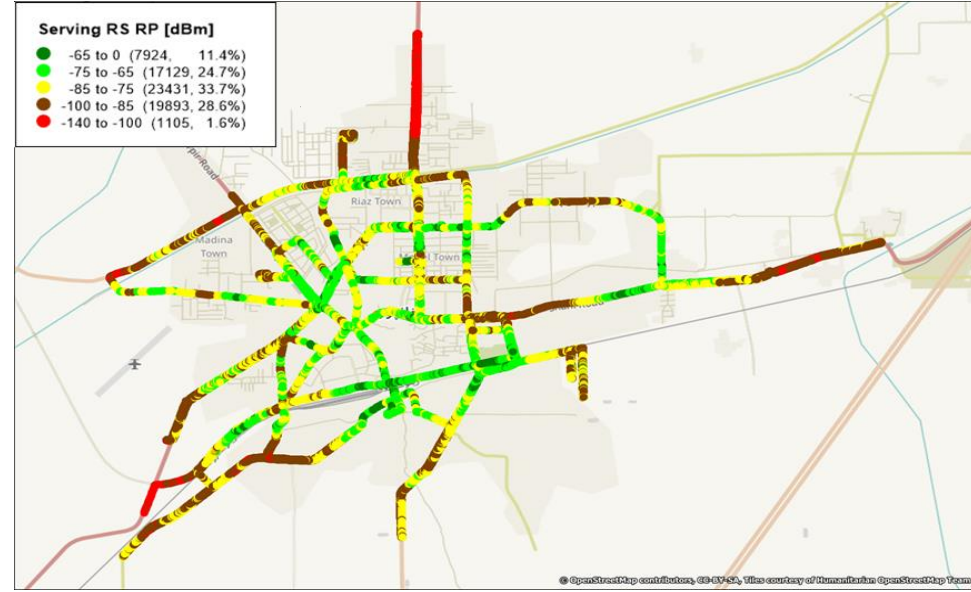


QUALITY OF SERVICE SURVEY RESULTS – KHARIAN

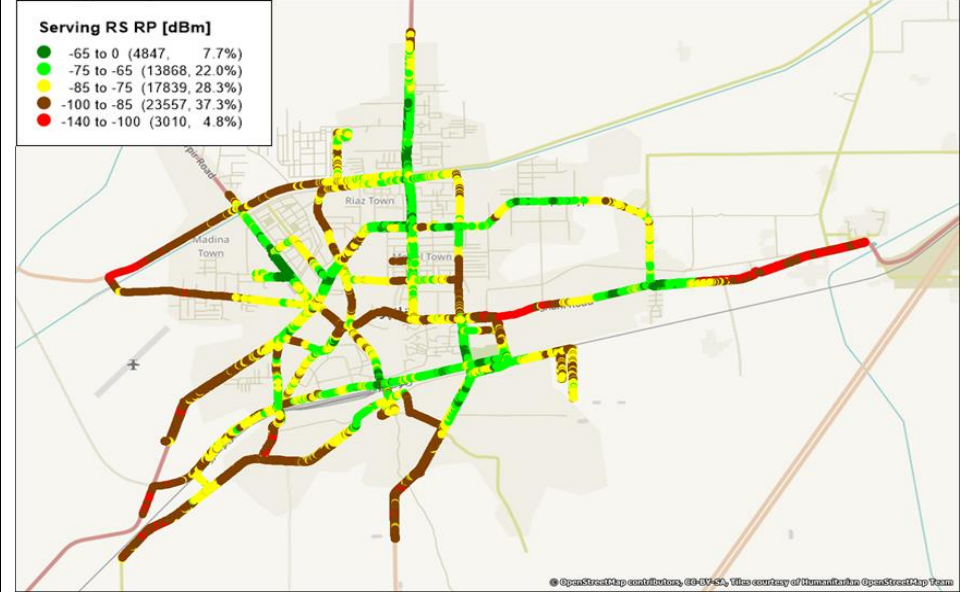


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

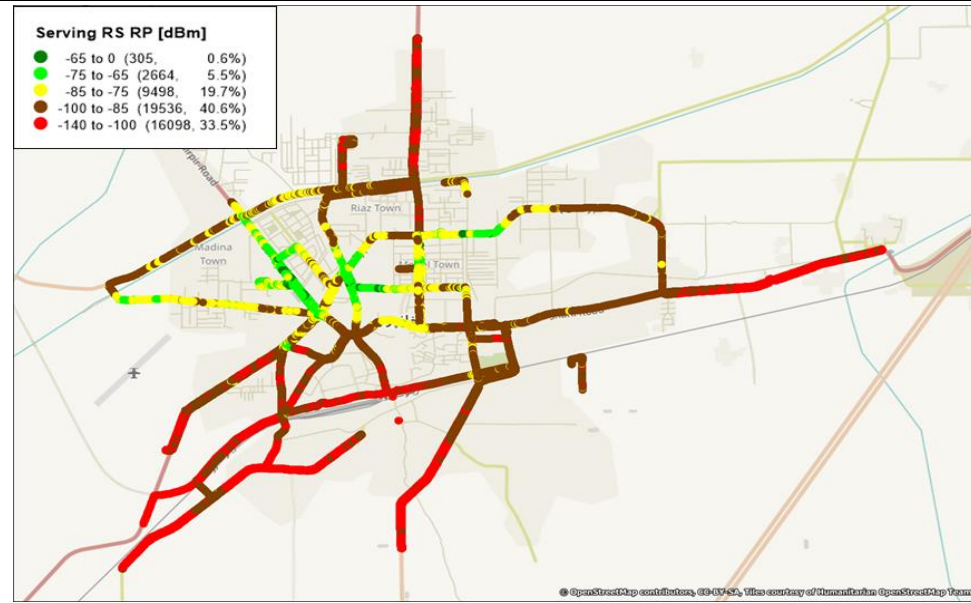
JAZZ 4G NETWORK COVERAGE – KHANPUR



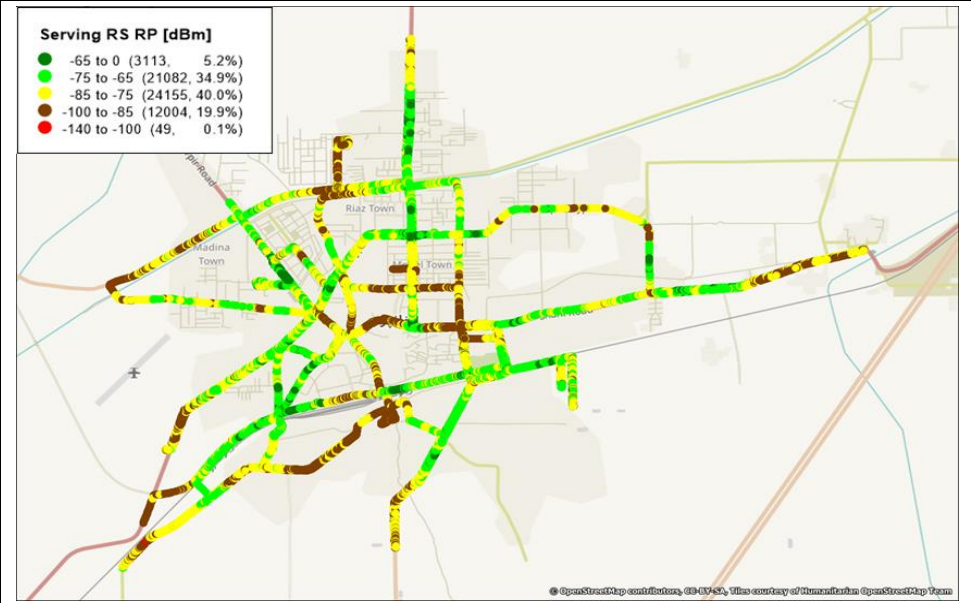
TELEOR 4G NETWORK COVERAGE – KHANPUR



UFONE 4G NETWORK COVERAGE – KHANPUR

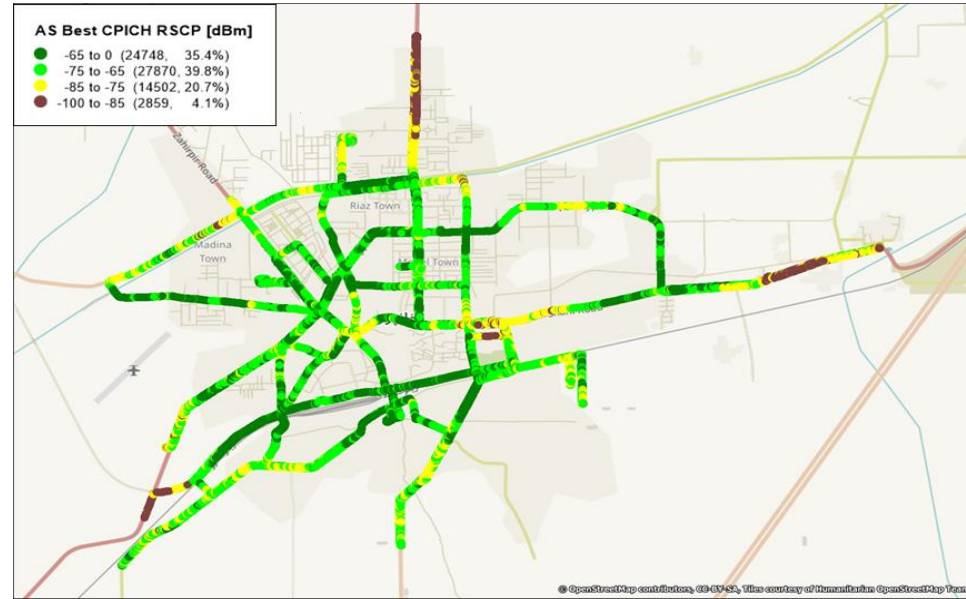


ZONG 4G NETWORK COVERAGE – KHANPUR

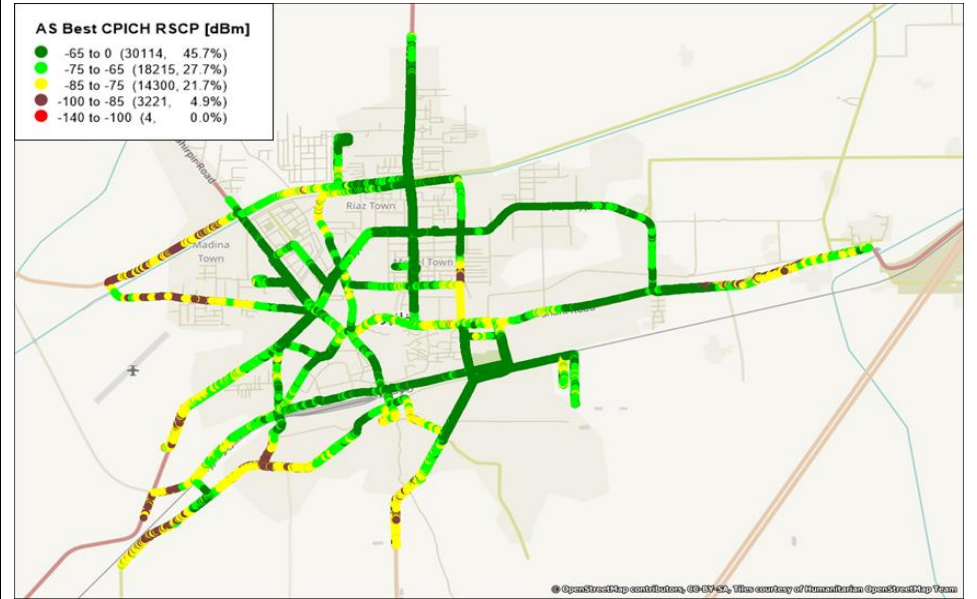


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

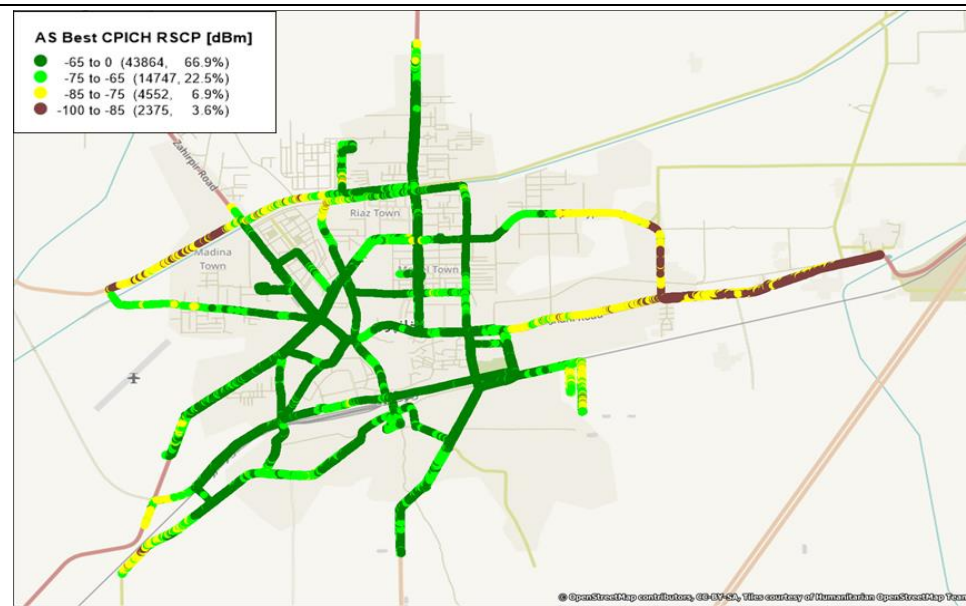
JAZZ 3G NETWORK COVERAGE – KHANPUR



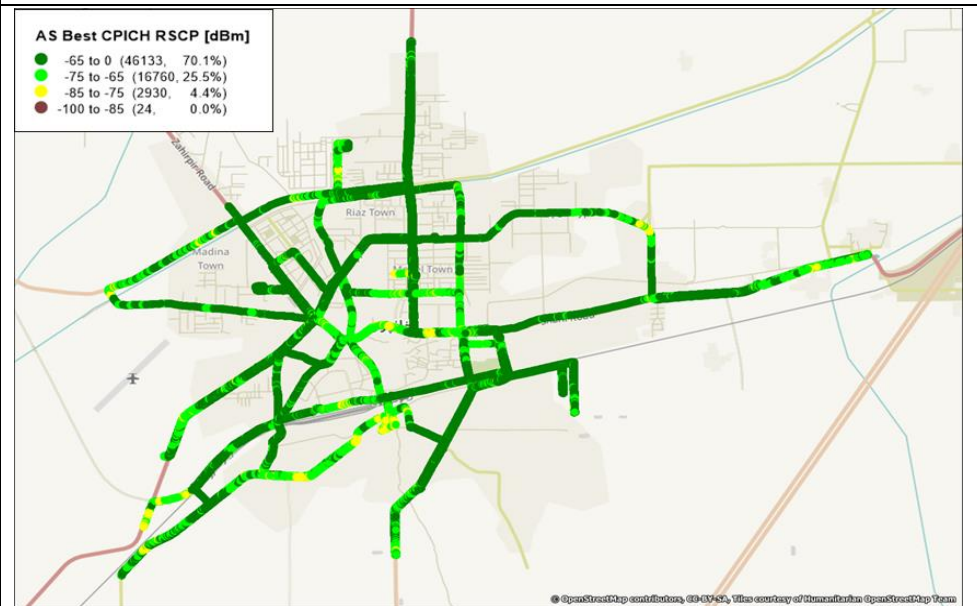
TELENOR 3G NETWORK COVERAGE – KHANPUR



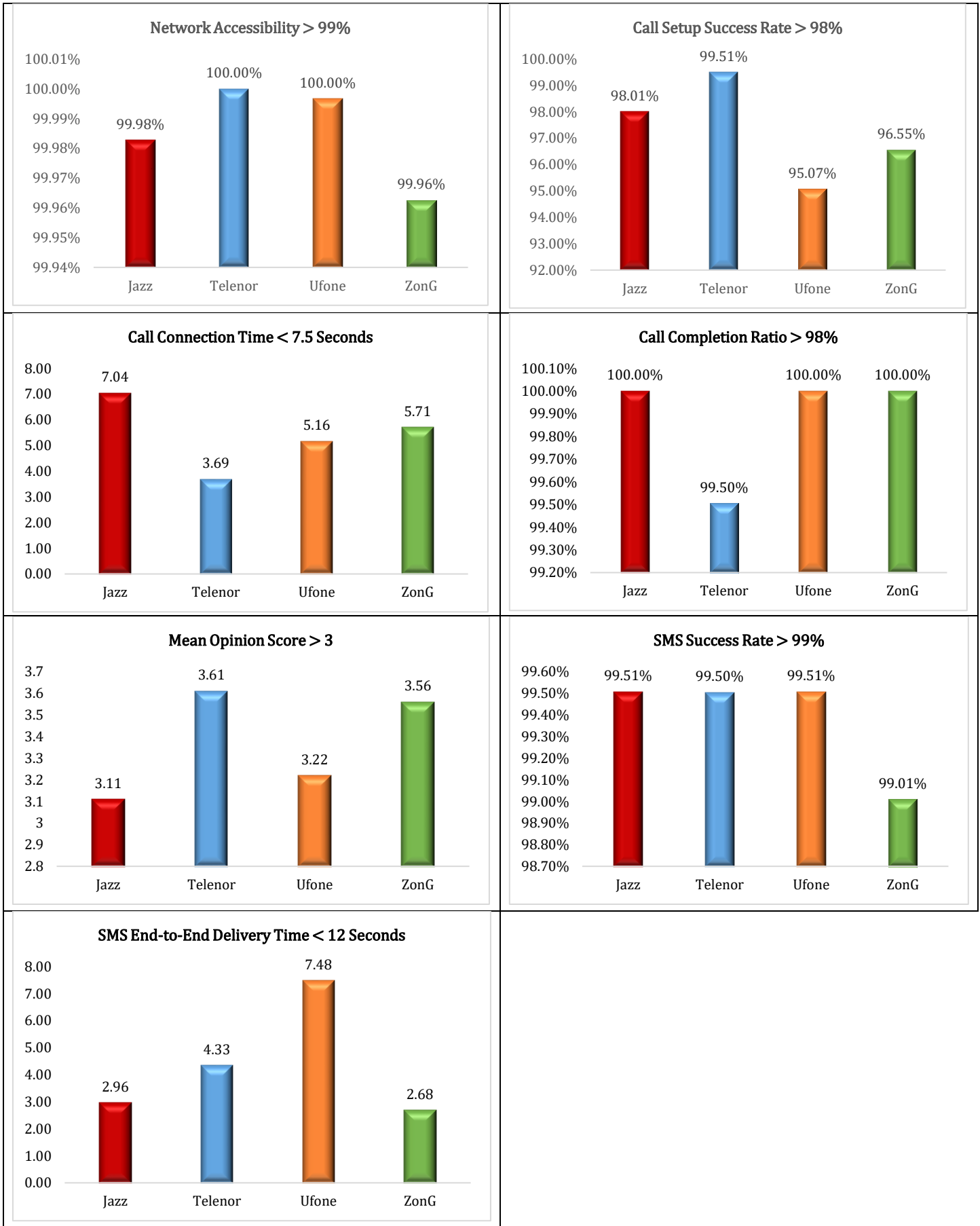
UFONE 3G NETWORK COVERAGE – KHANPUR



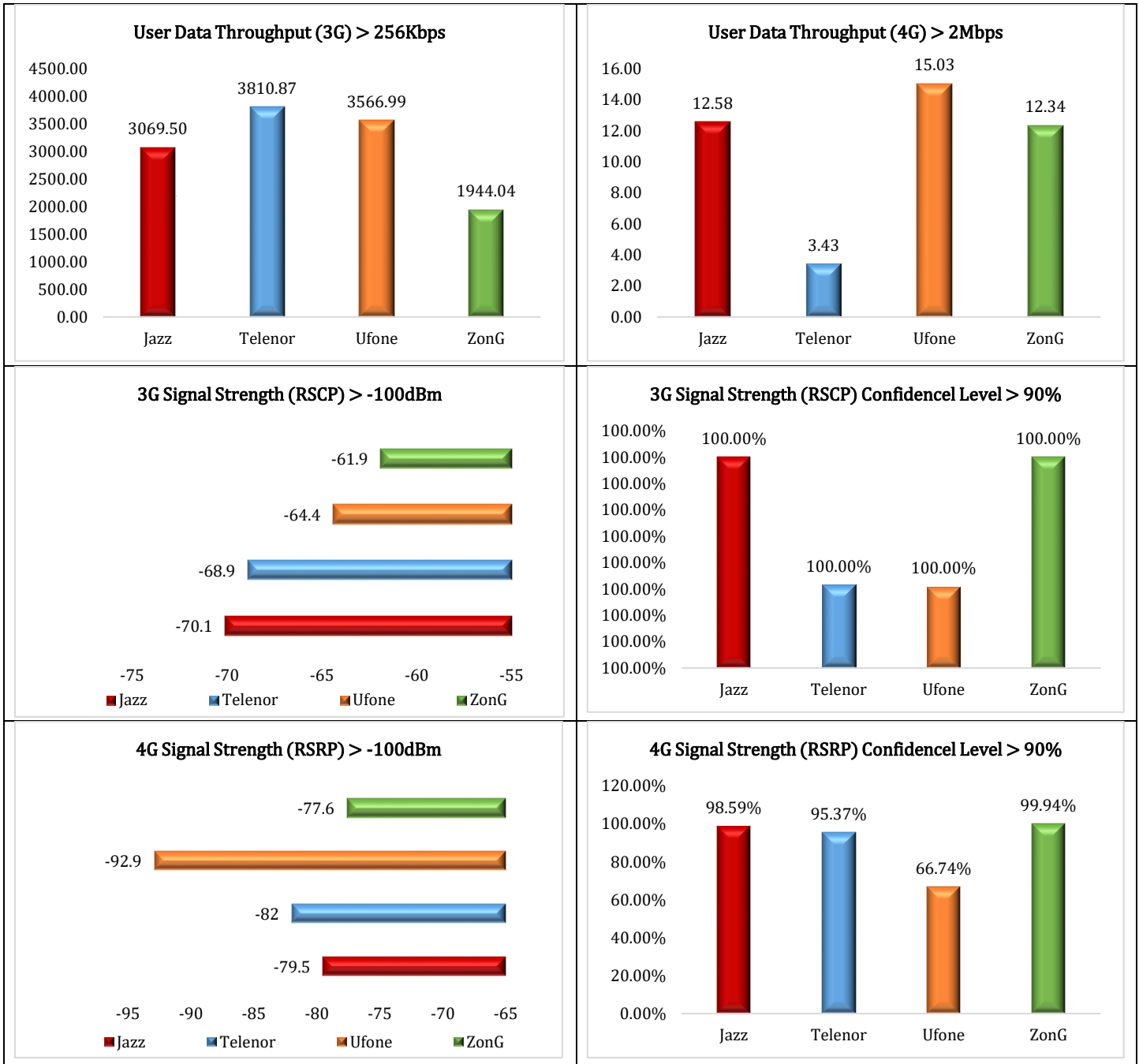
ZONG 3G NETWORK COVERAGE – KHANPUR



QUALITY OF SERVICE SURVEY RESULTS – KHANPUR

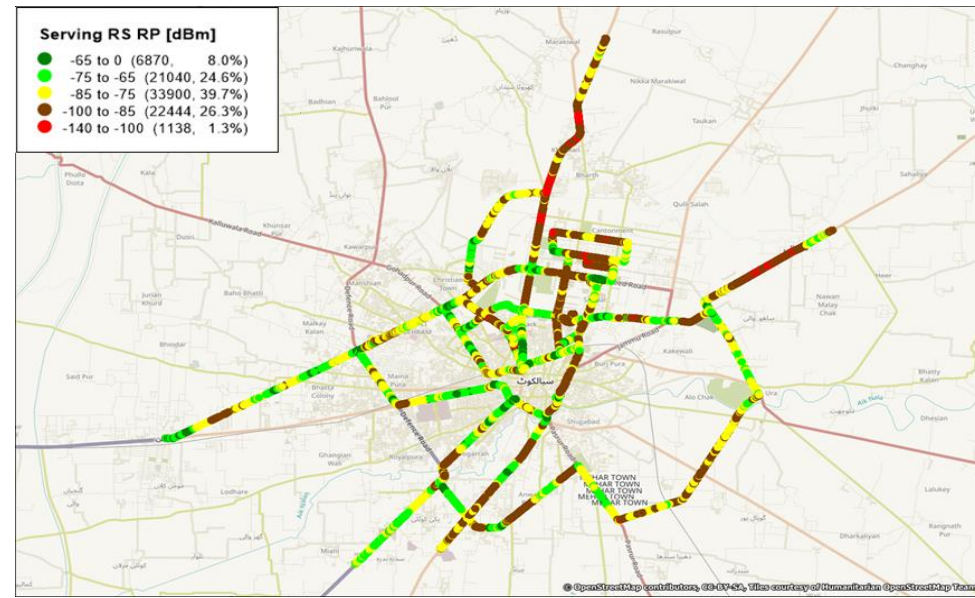


QUALITY OF SERVICE SURVEY RESULTS – KHANPUR

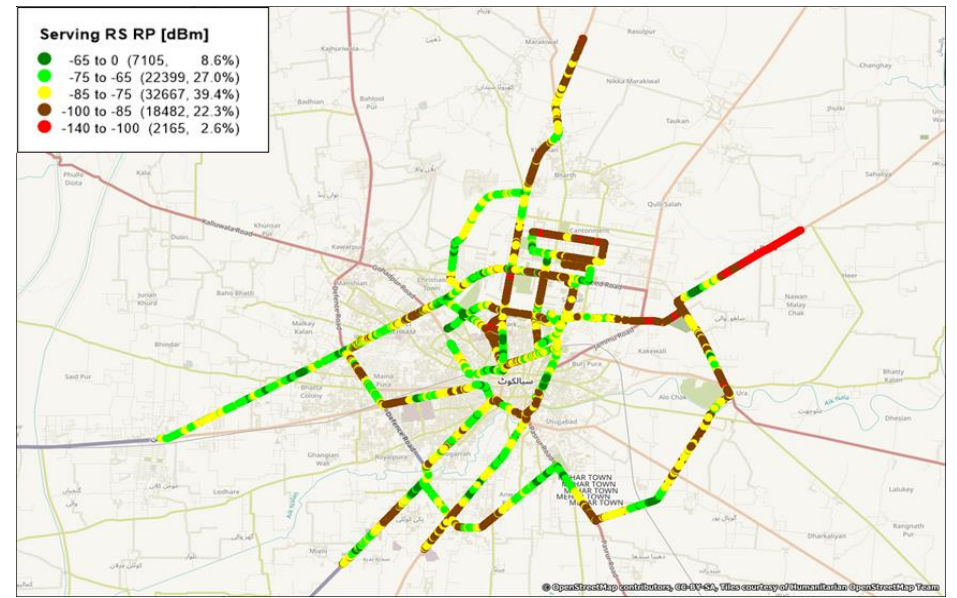


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

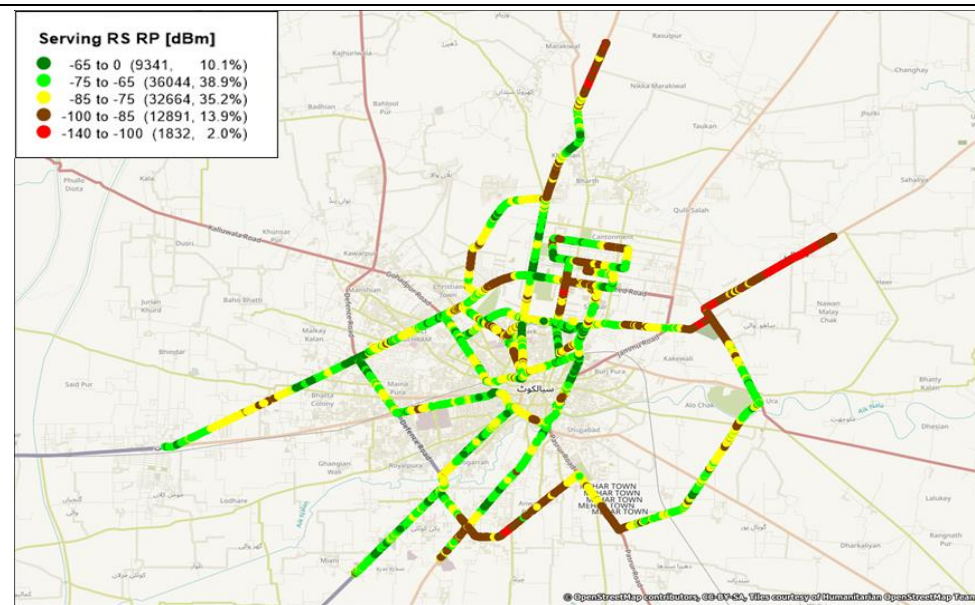
JAZZ 4G NETWORK COVERAGE – SIALKOT



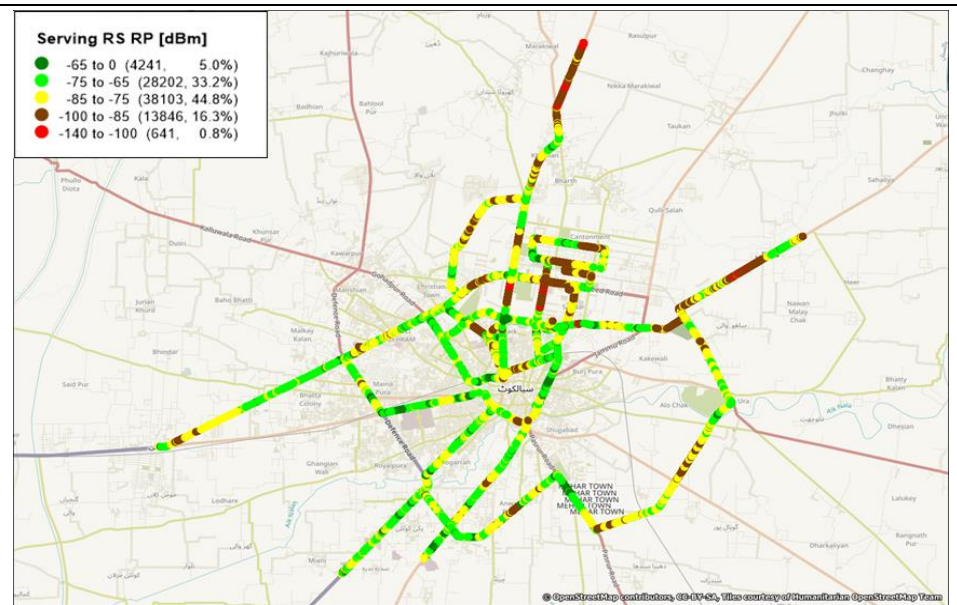
TELENOR 4G NETWORK COVERAGE – SIALKOT



UFONE 4G NETWORK COVERAGE – SIALKOT

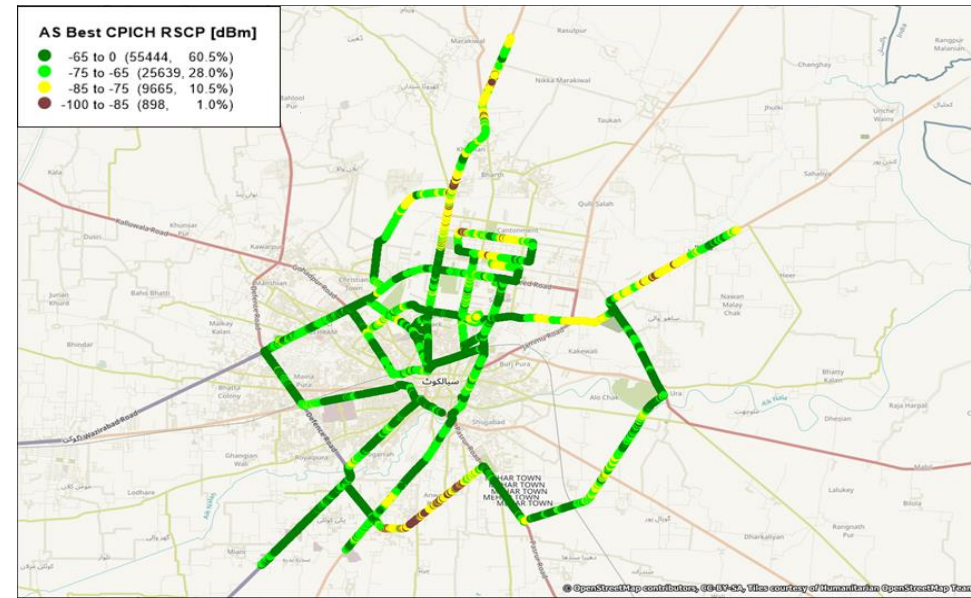


ZONG 4G NETWORK COVERAGE – SIALKOT

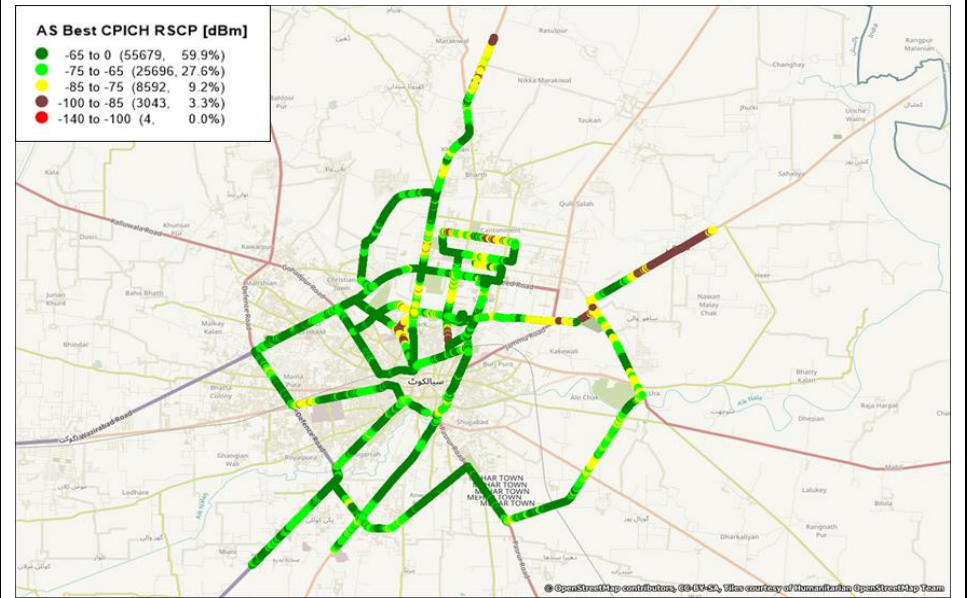


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

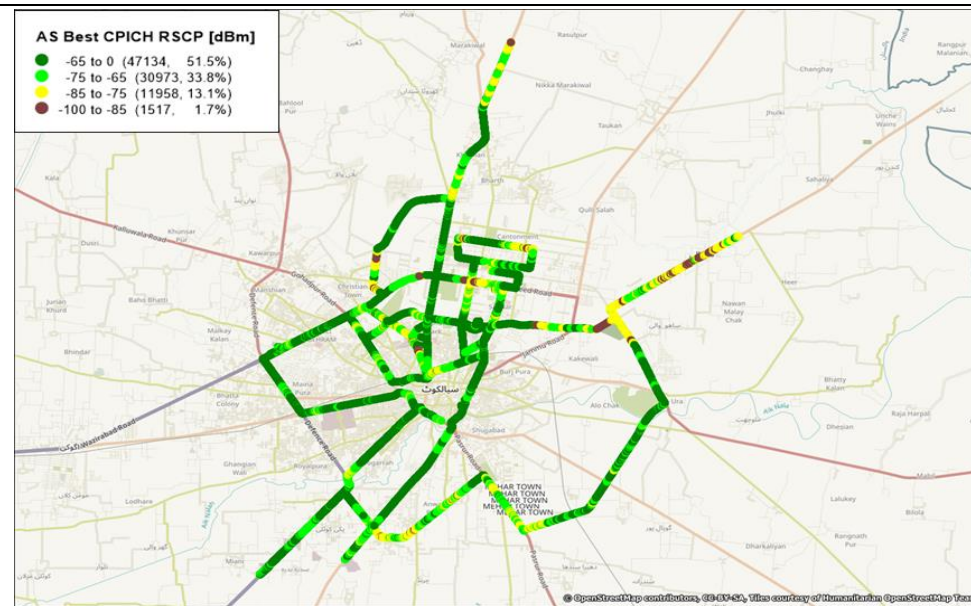
JAZZ 3G NETWORK COVERAGE – SIALKOT



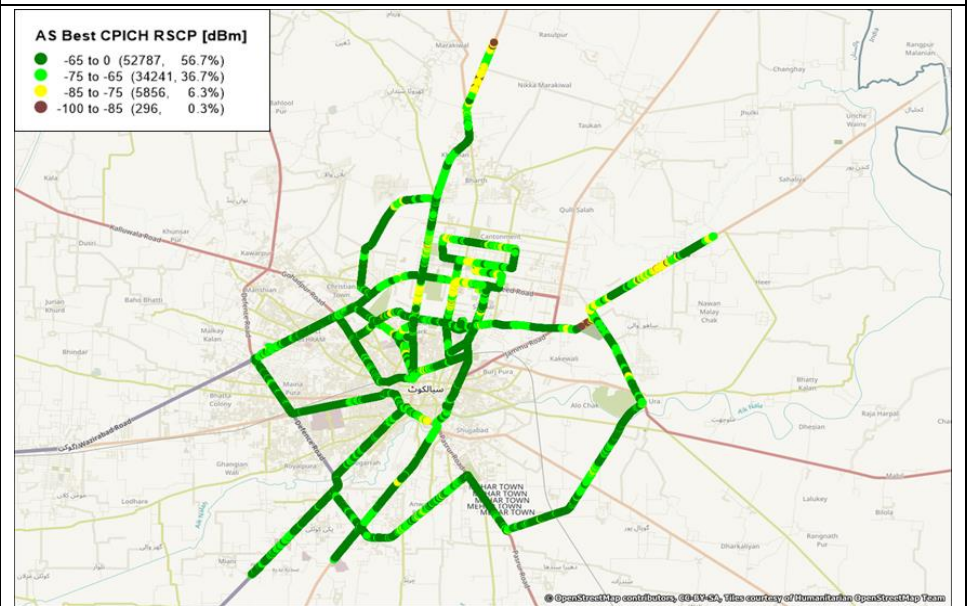
TELENOR 3G NETWORK COVERAGE – SIALKOT



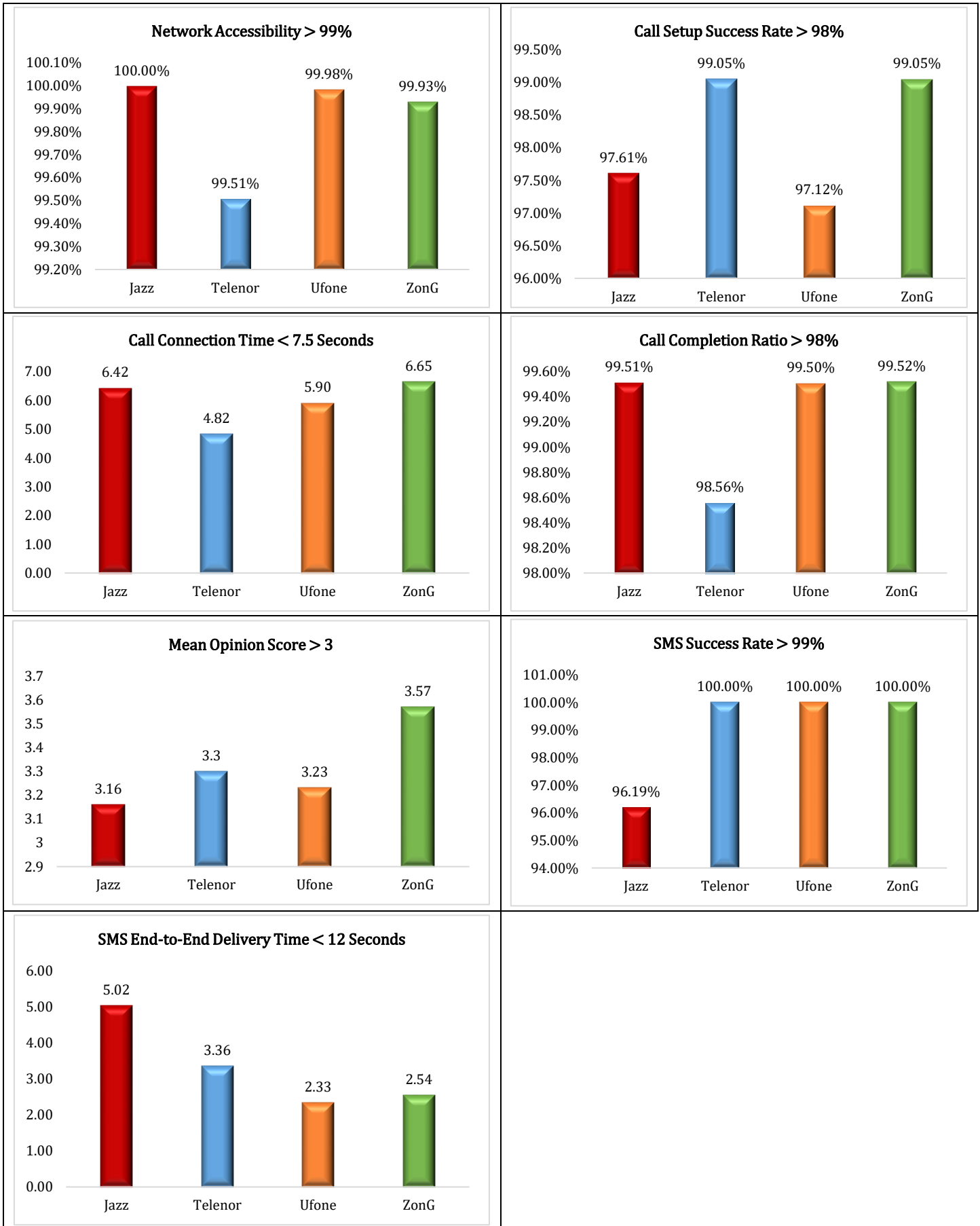
UFONE 3G NETWORK COVERAGE – SIALKOT



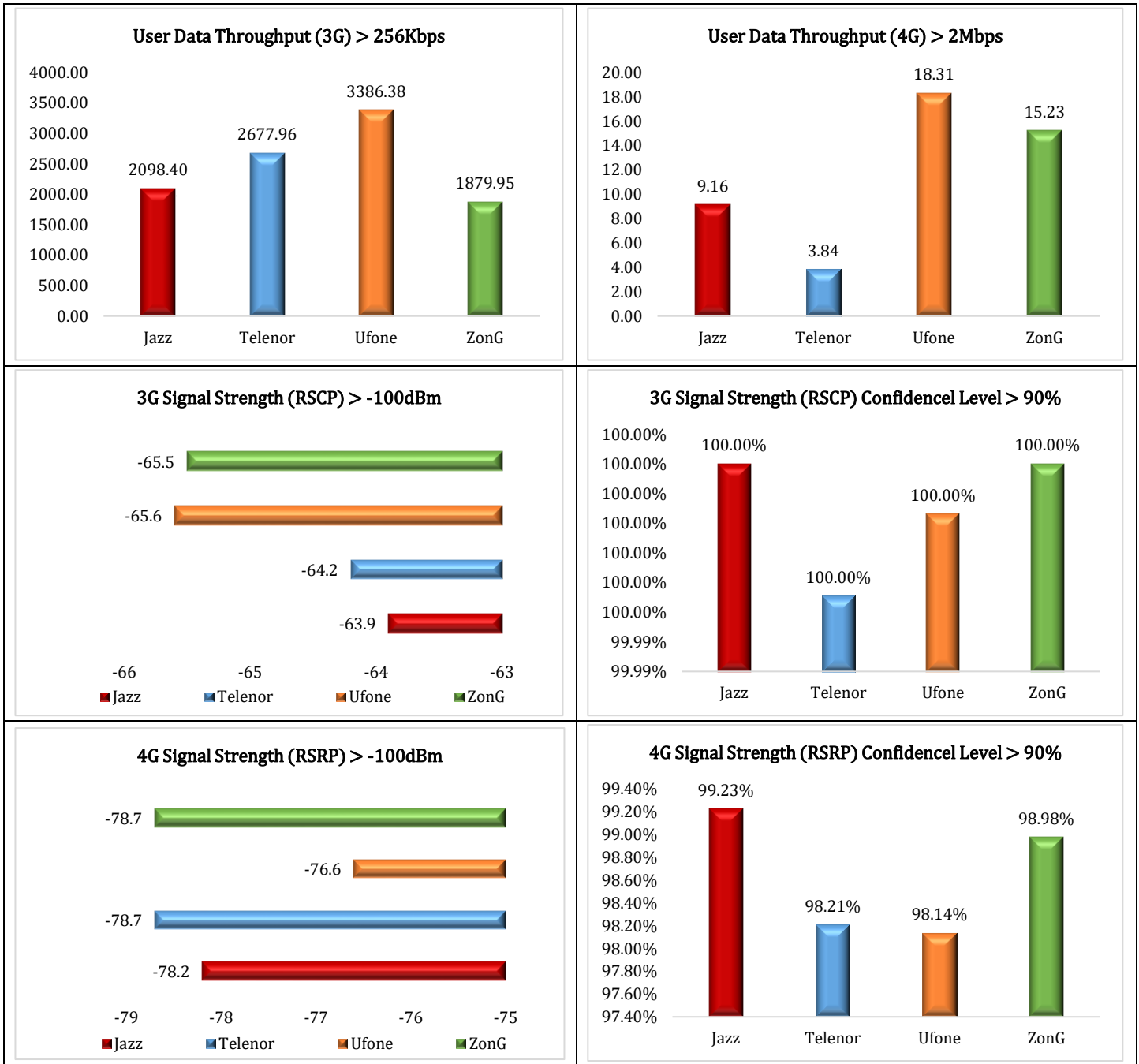
ZONG 3G NETWORK COVERAGE – SIALKOT



QUALITY OF SERVICE SURVEY RESULTS – SIALKOT

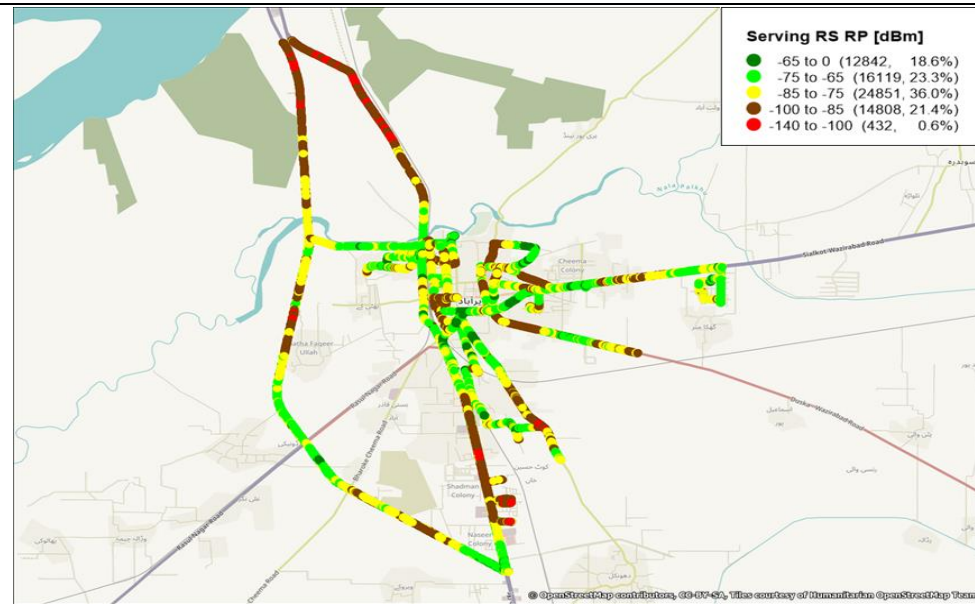


QUALITY OF SERVICE SURVEY RESULTS – SIALKOT

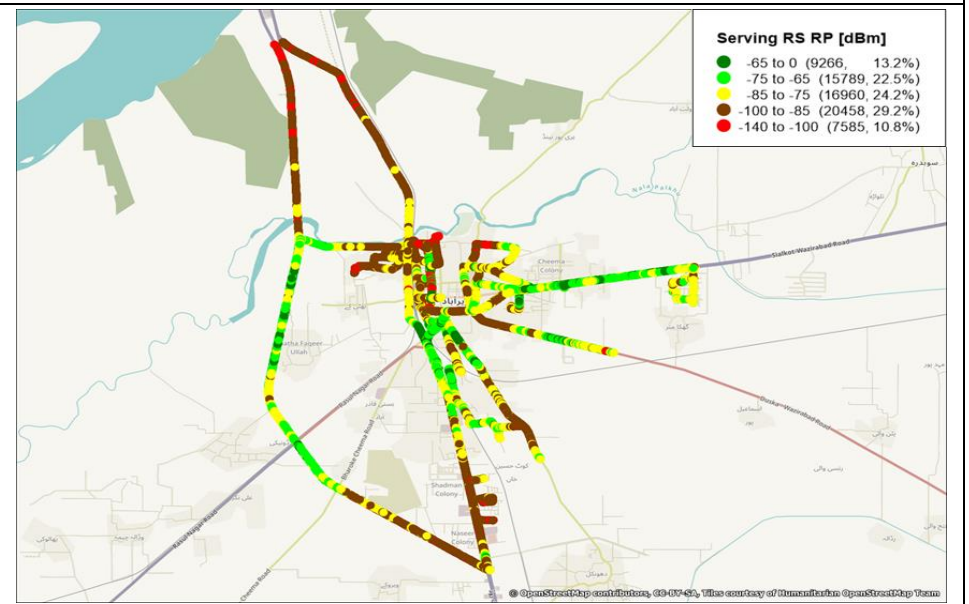


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

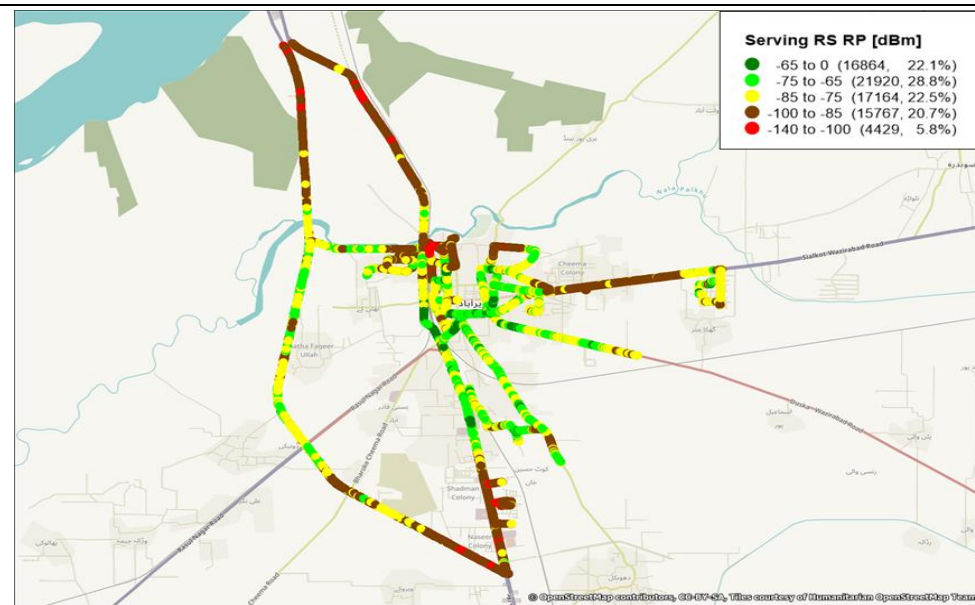
JAZZ 4G NETWORK COVERAGE – WAZIRABAD



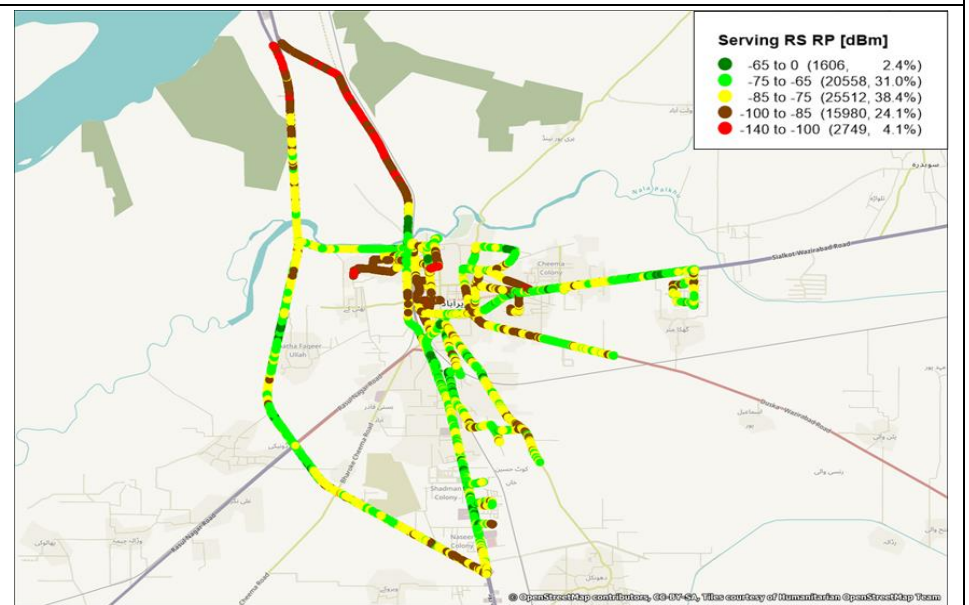
TELENOR 4G NETWORK COVERAGE – WAZIRABAD



UFONE 4G NETWORK COVERAGE – WAZIRABAD

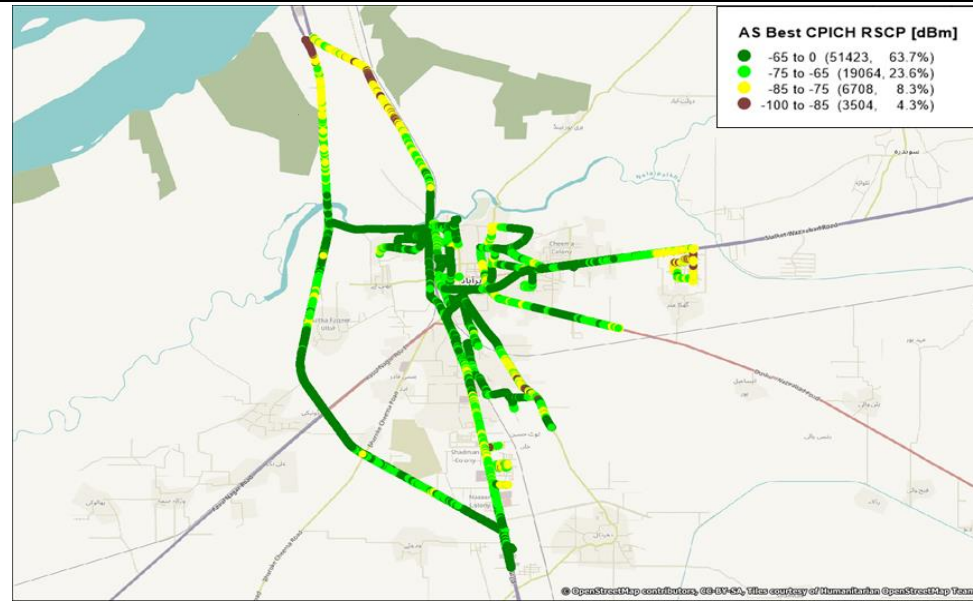


ZONG 4G NETWORK COVERAGE – WAZIRABAD

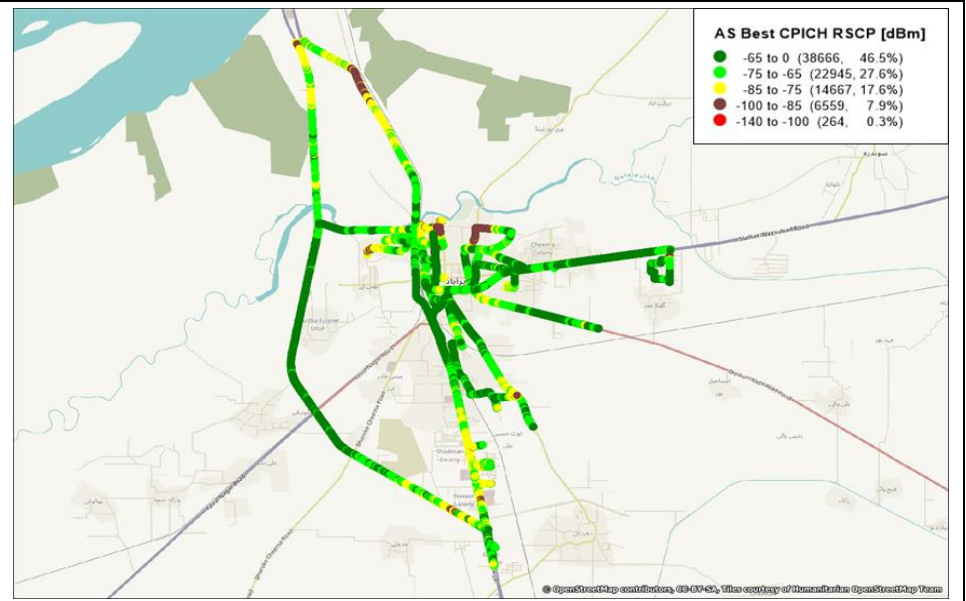


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

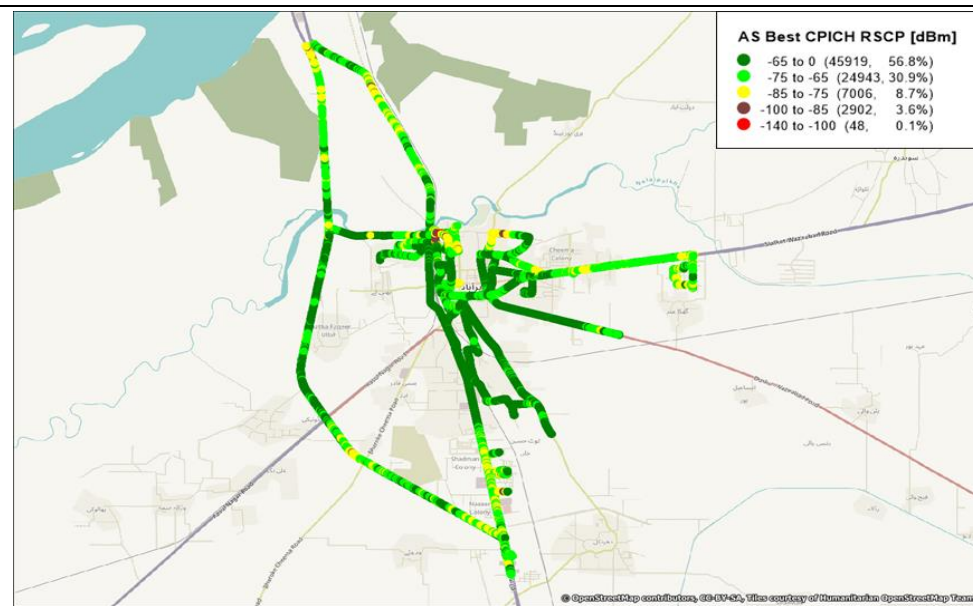
JAZZ 3G NETWORK COVERAGE – WAZIRABAD



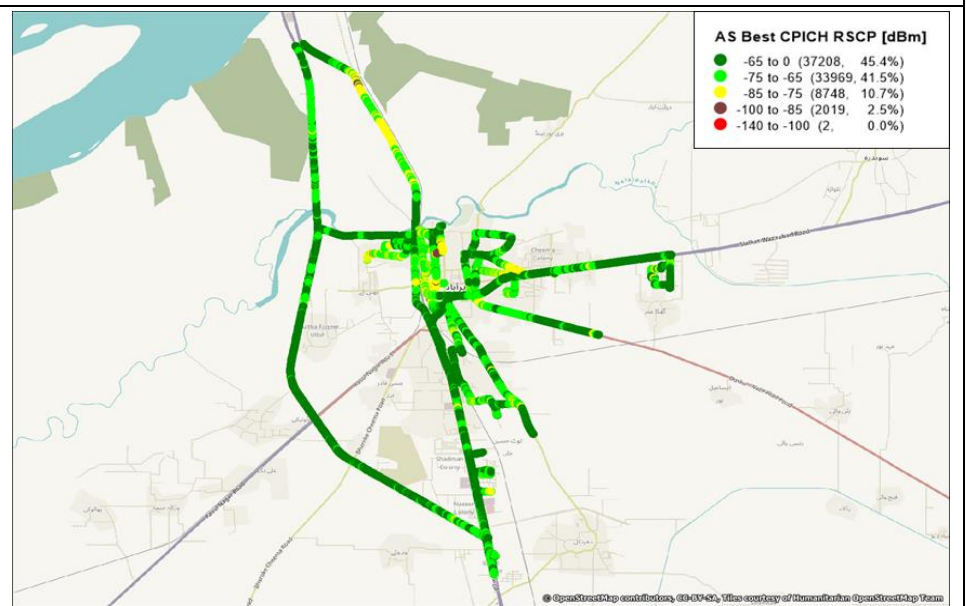
TELENOR 3G NETWORK COVERAGE – WAZIRABAD



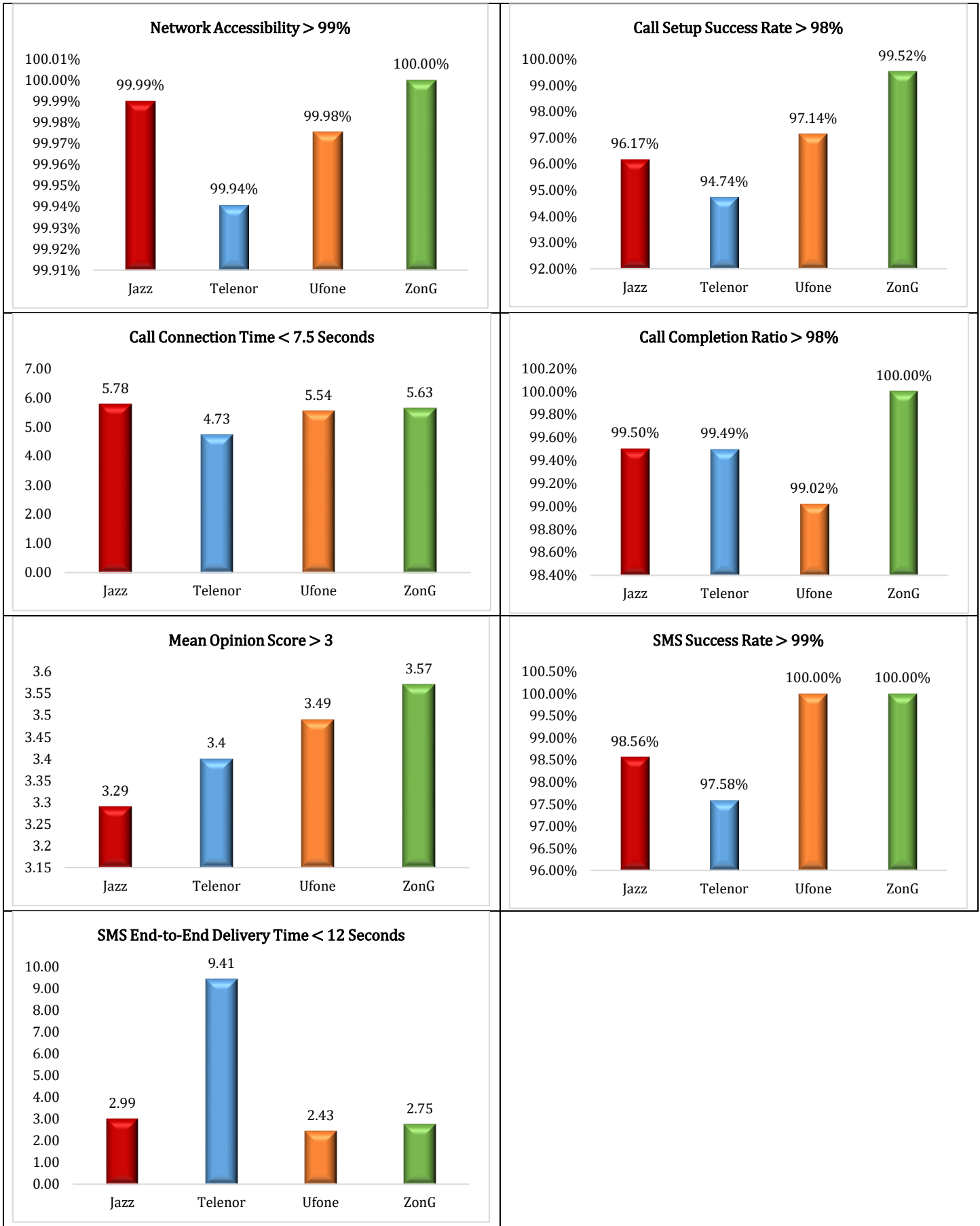
UFONE 3G NETWORK COVERAGE – WAZIRABAD



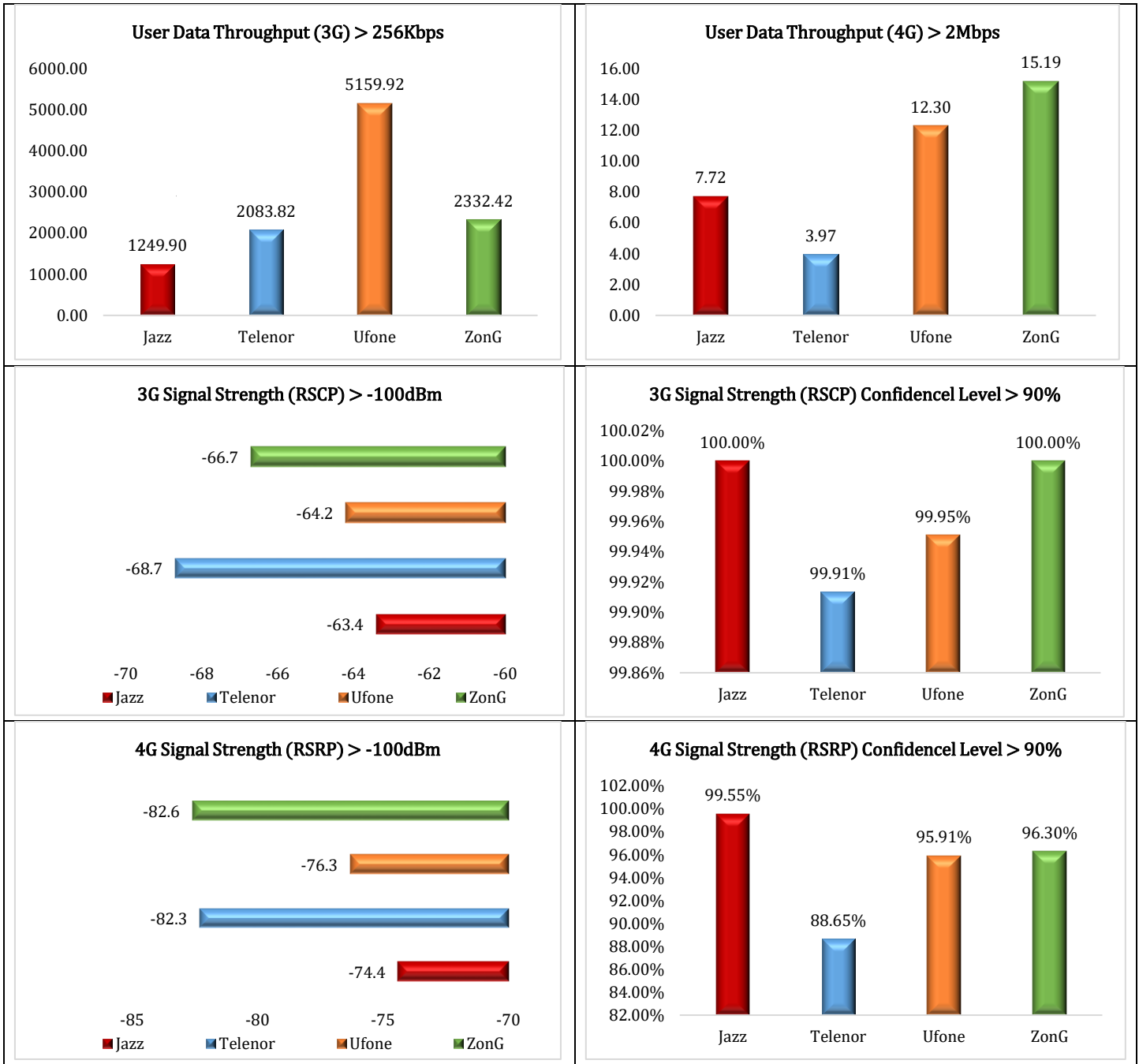
ZONG 3G NETWORK COVERAGE – WAZIRABAD



QUALITY OF SERVICE SURVEY RESULTS – WAZIRABAD



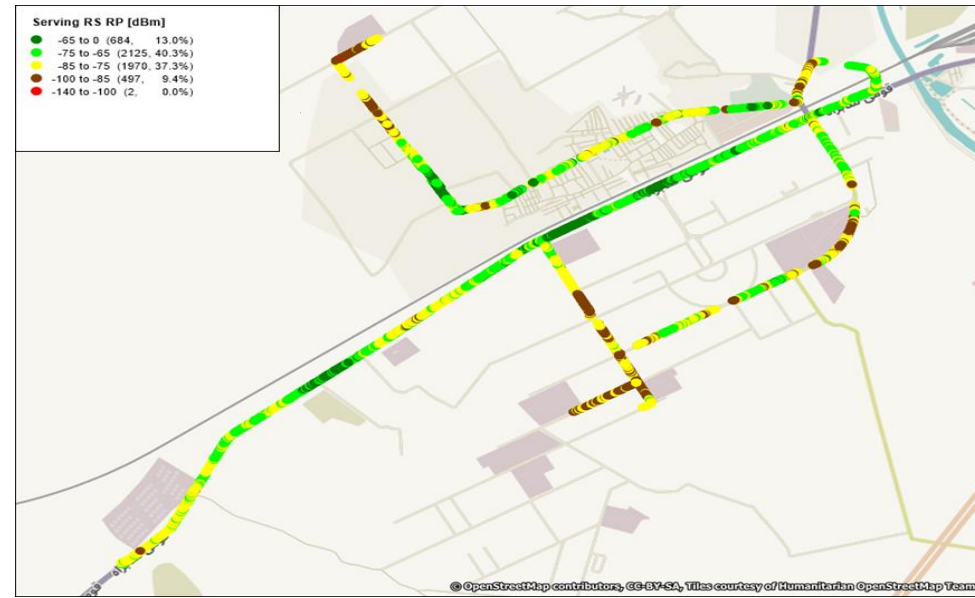
QUALITY OF SERVICE SURVEY RESULTS – WAZIRABAD



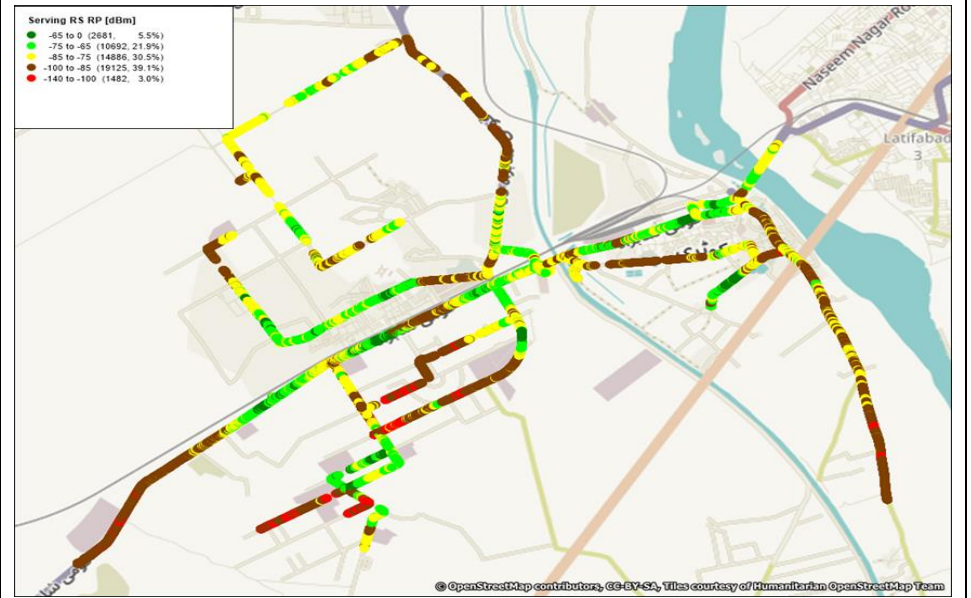
SINDH

4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

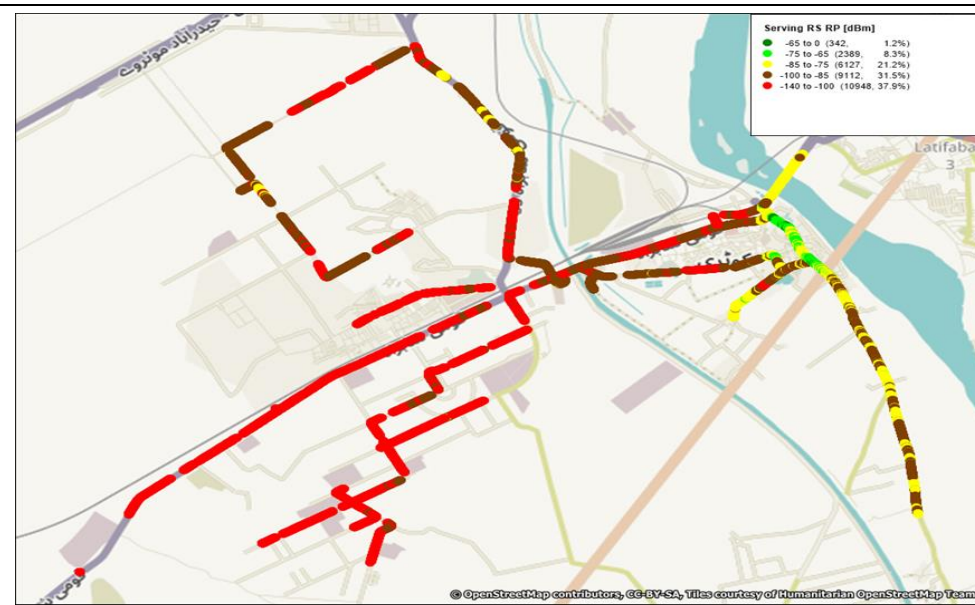
JAZZ 4G NETWORK COVERAGE – KOTRI



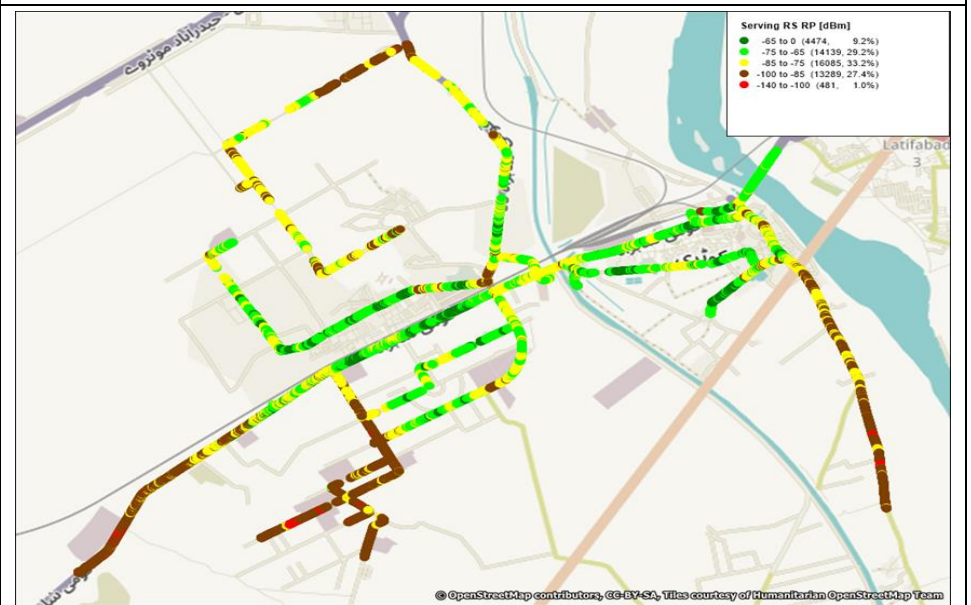
TELENOR 4G NETWORK COVERAGE – KOTRI



UFONE 4G NETWORK COVERAGE – KOTRI

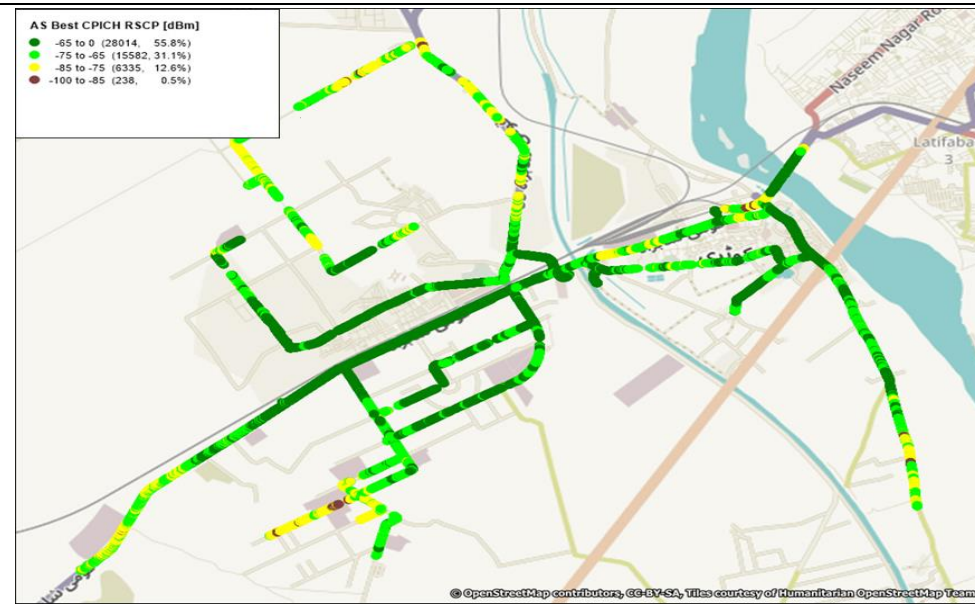


ZONG 4G NETWORK COVERAGE – KOTRI

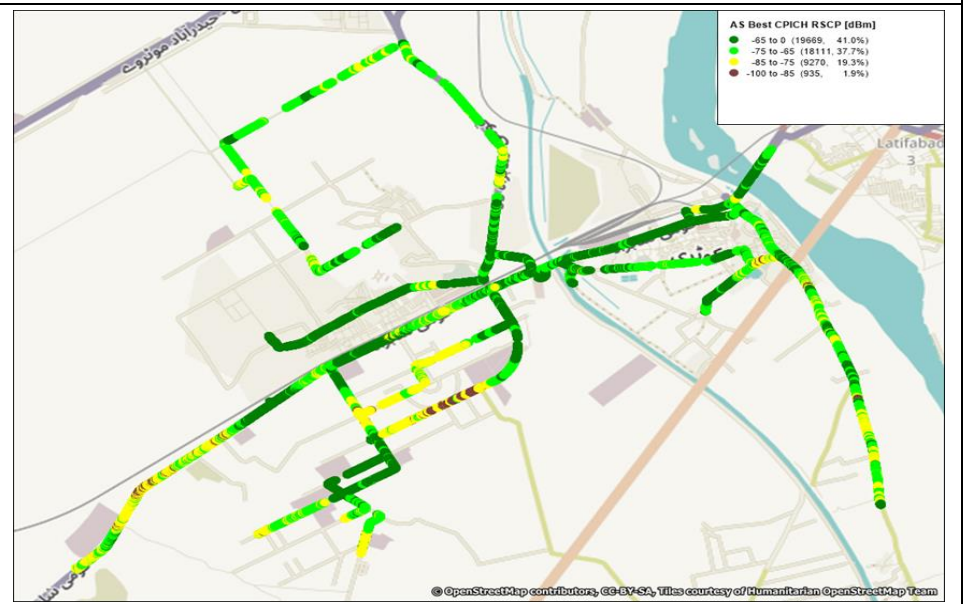


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

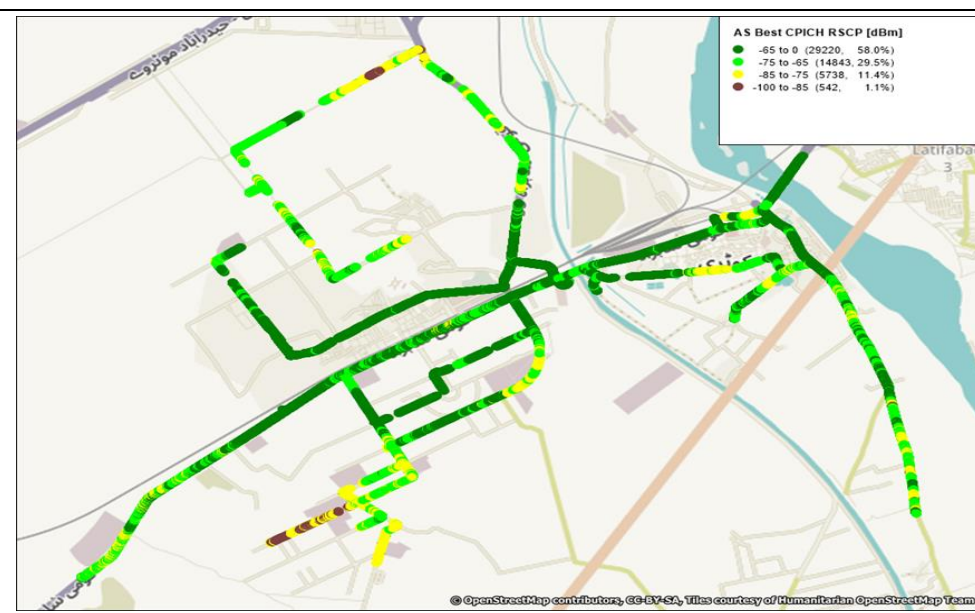
JAZZ 3G NETWORK COVERAGE – KOTRI



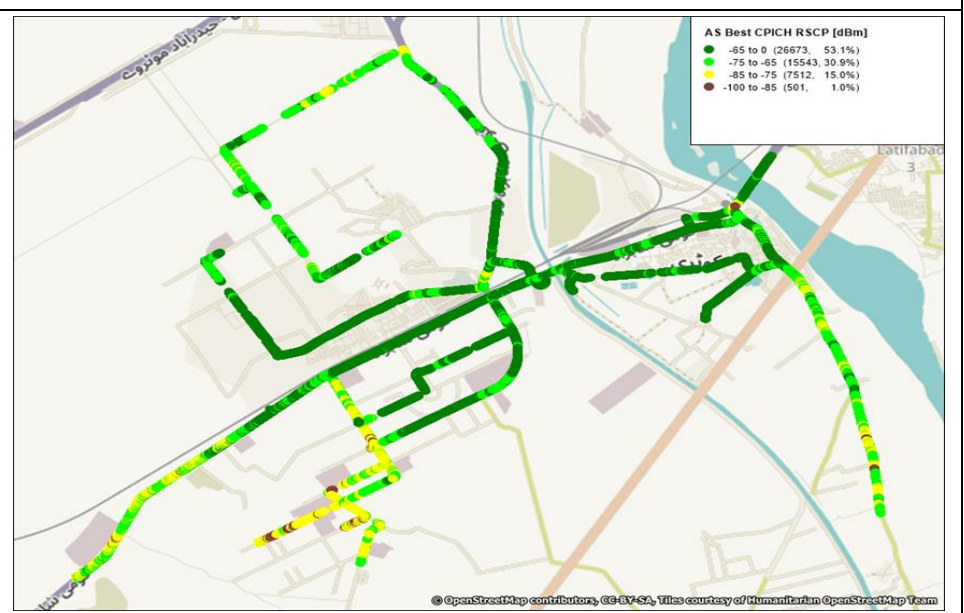
TELENOR 3G NETWORK COVERAGE – KOTRI



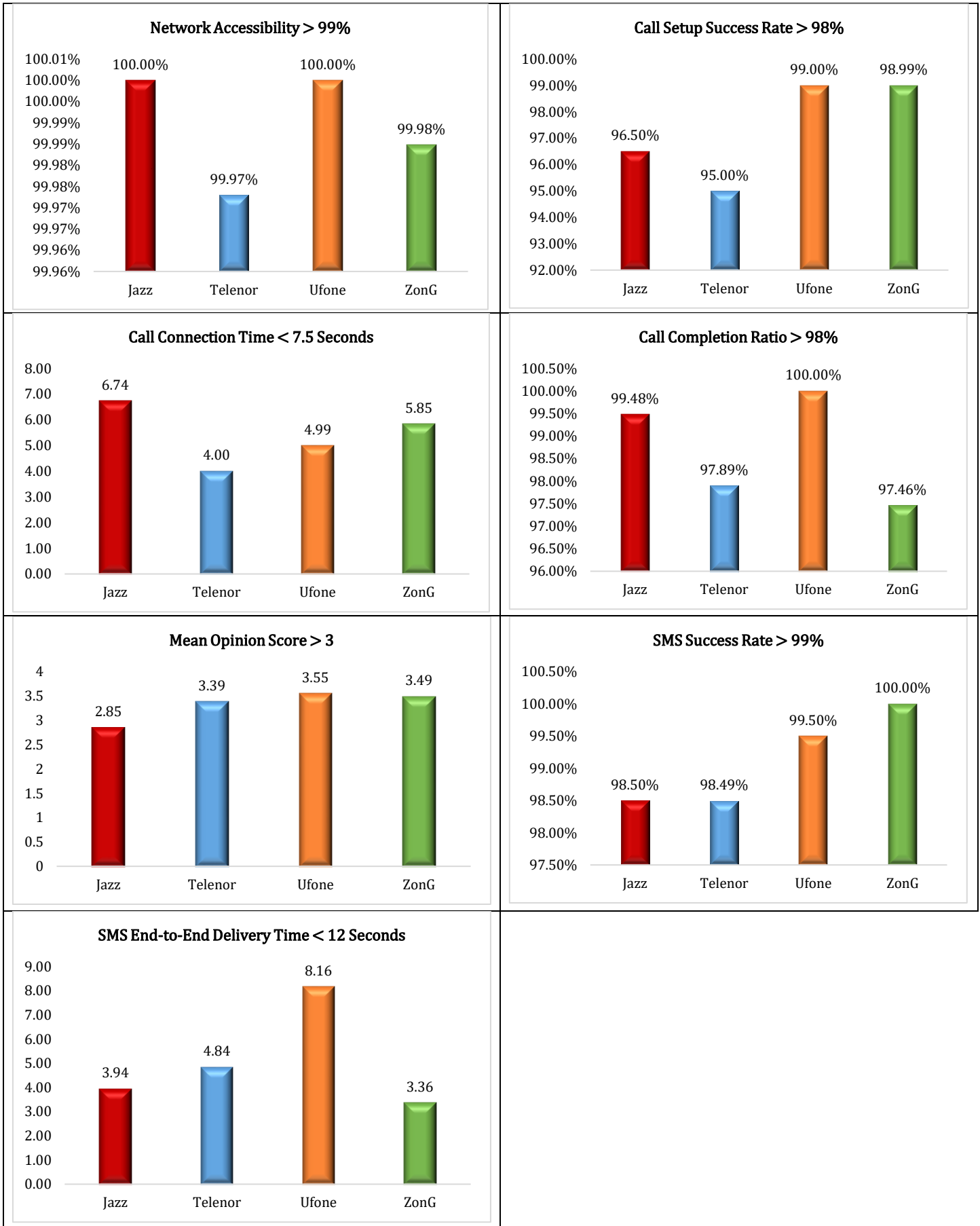
UFONE 3G NETWORK COVERAGE – KOTRI



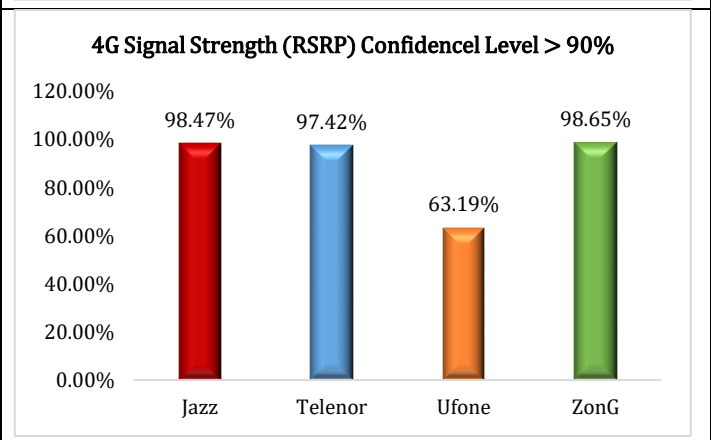
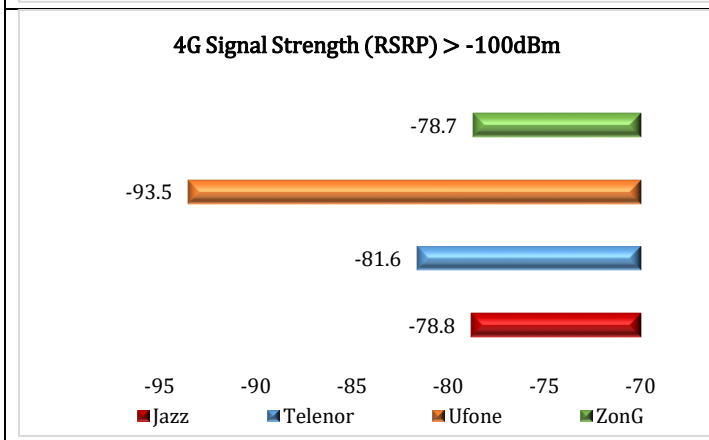
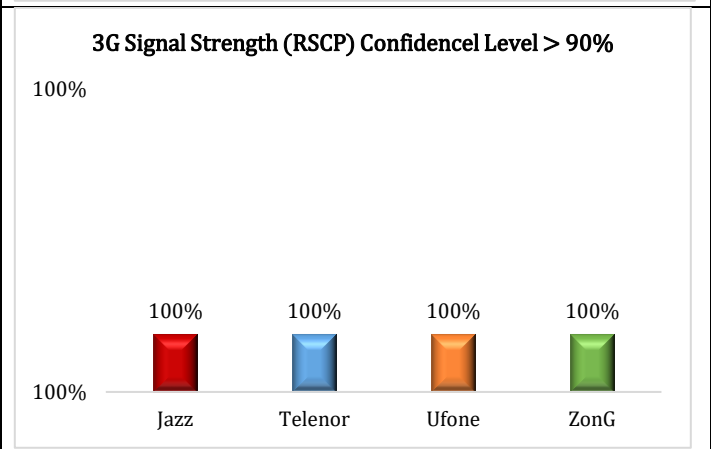
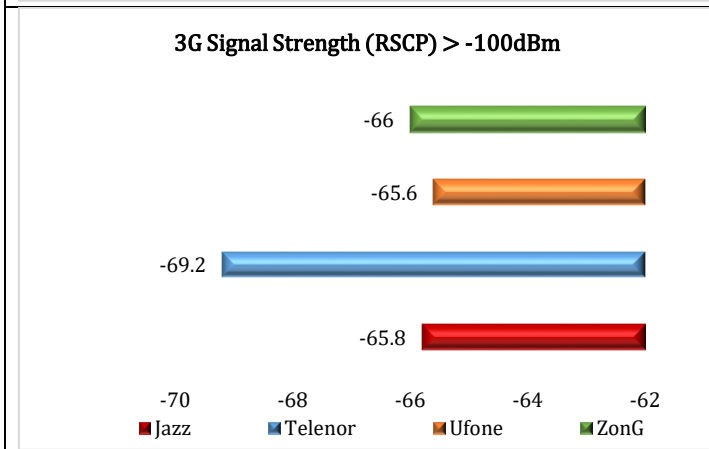
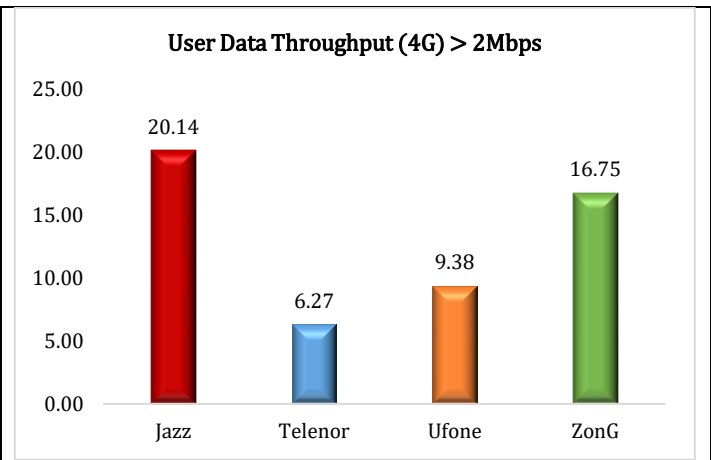
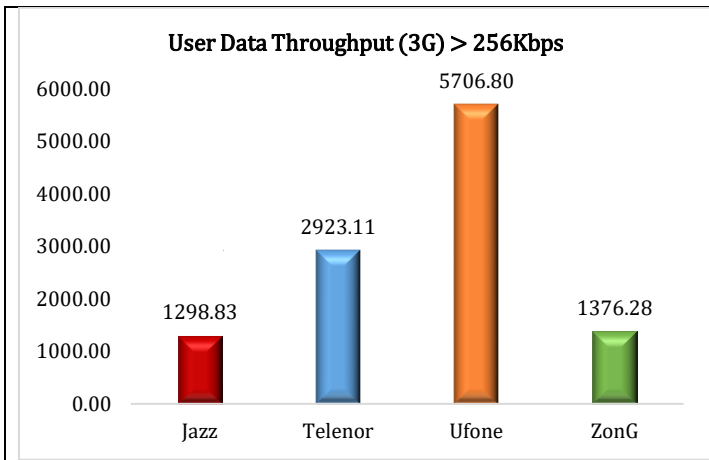
ZONG 3G NETWORK COVERAGE – KOTRI



QUALITY OF SERVICE SURVEY RESULTS – KOTRI

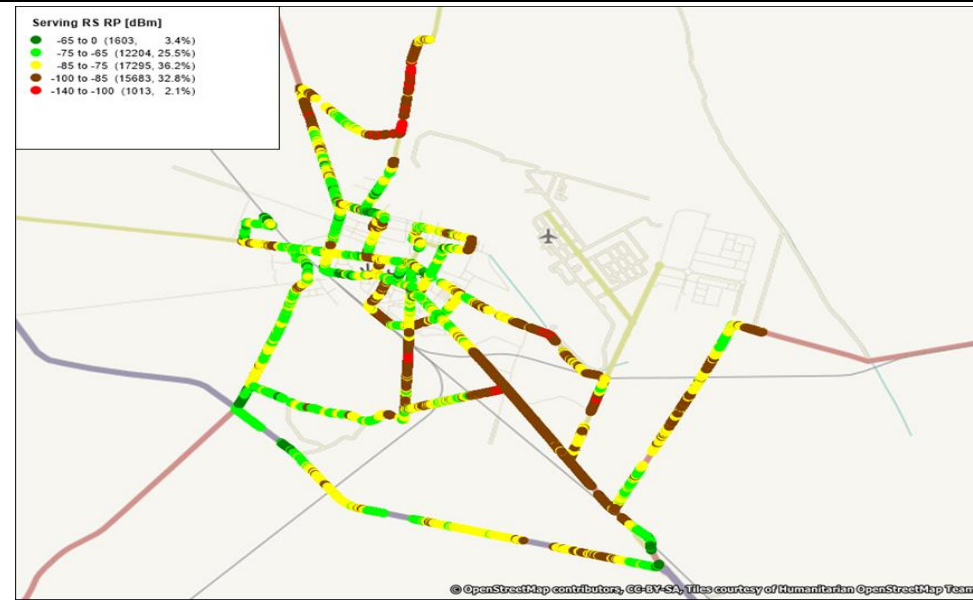


QUALITY OF SERVICE SURVEY RESULTS – KOTRI

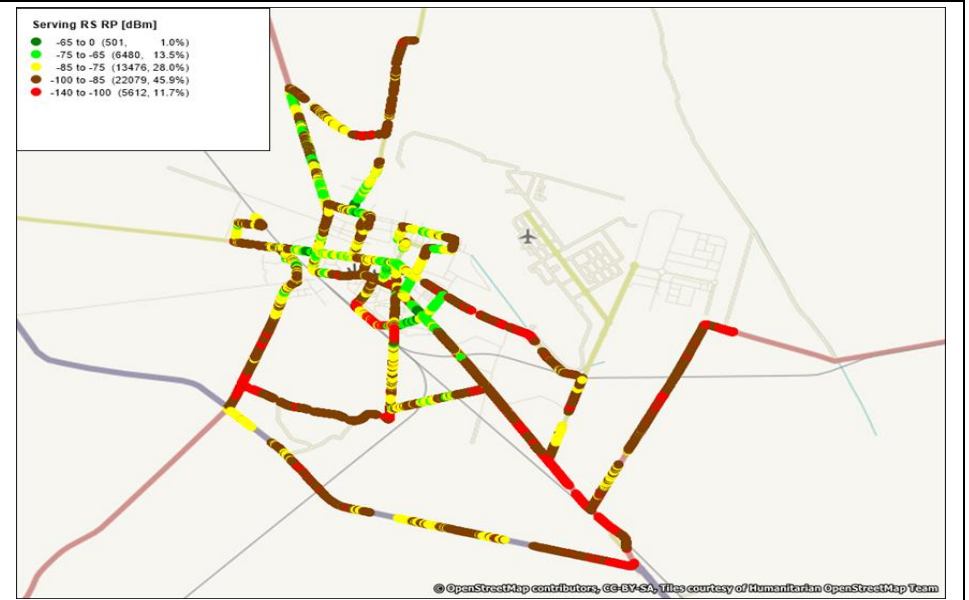


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

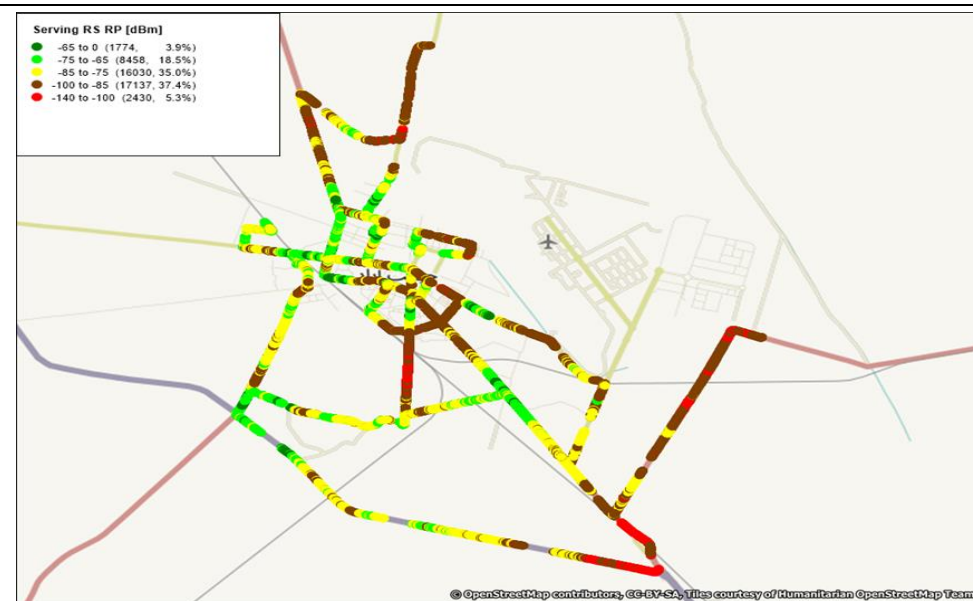
JAZZ 4G NETWORK COVERAGE – JACOBABAD



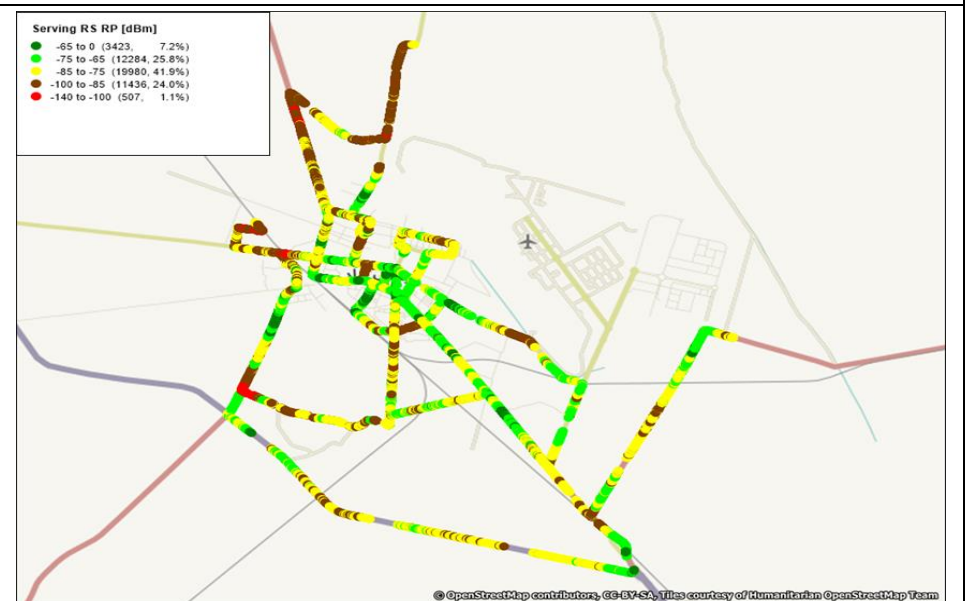
TELENOR 4G NETWORK COVERAGE – JACOBABAD



UFONE 4G NETWORK COVERAGE – JACOBABAD

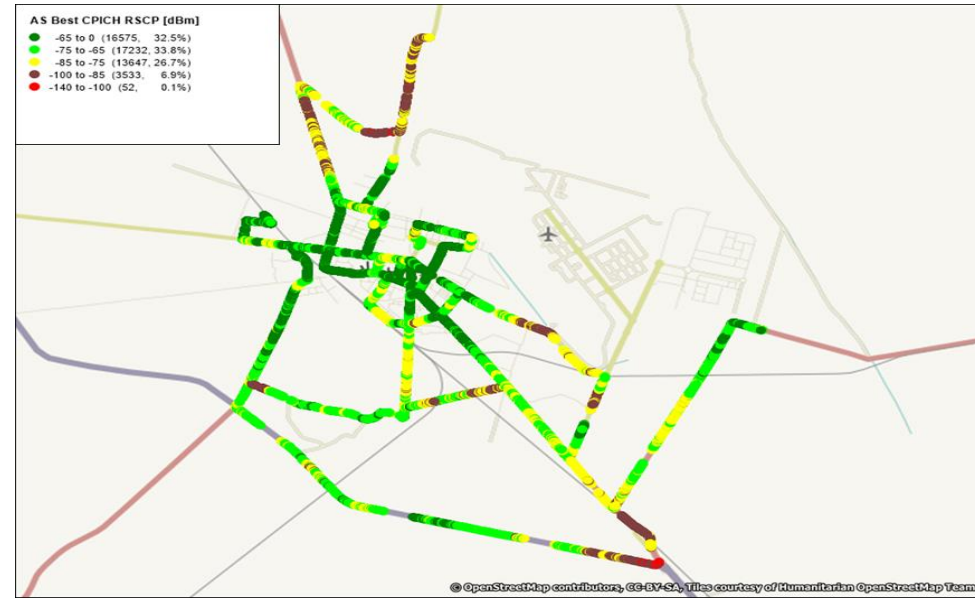


ZONG 4G NETWORK COVERAGE – JACOBABAD

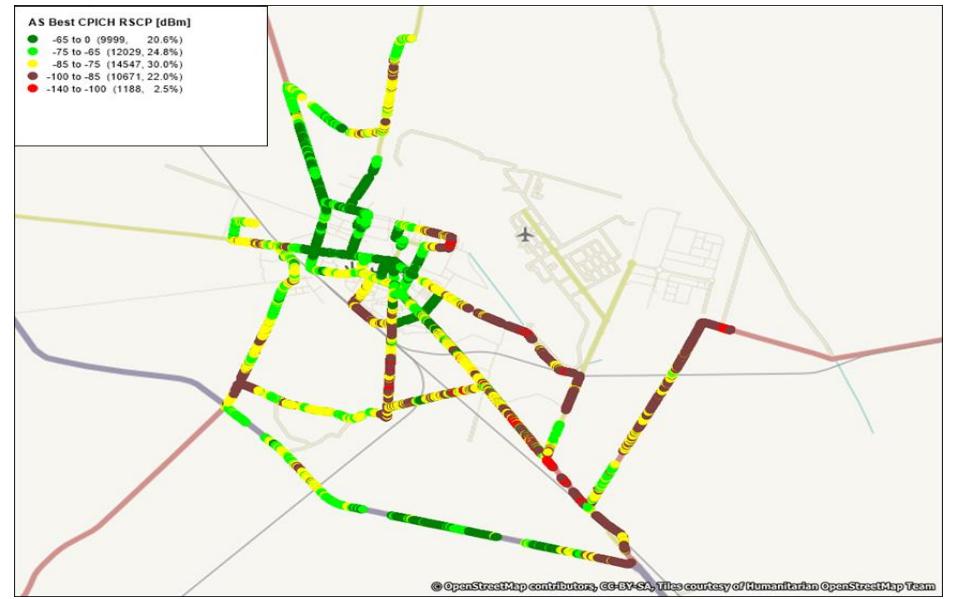


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

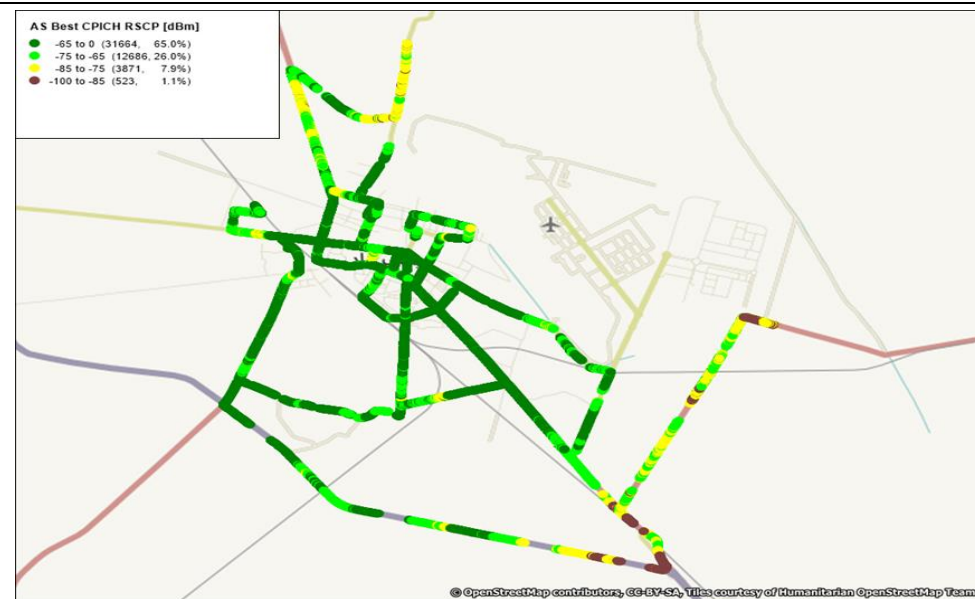
JAZZ 3G NETWORK COVERAGE – JACOBABAD



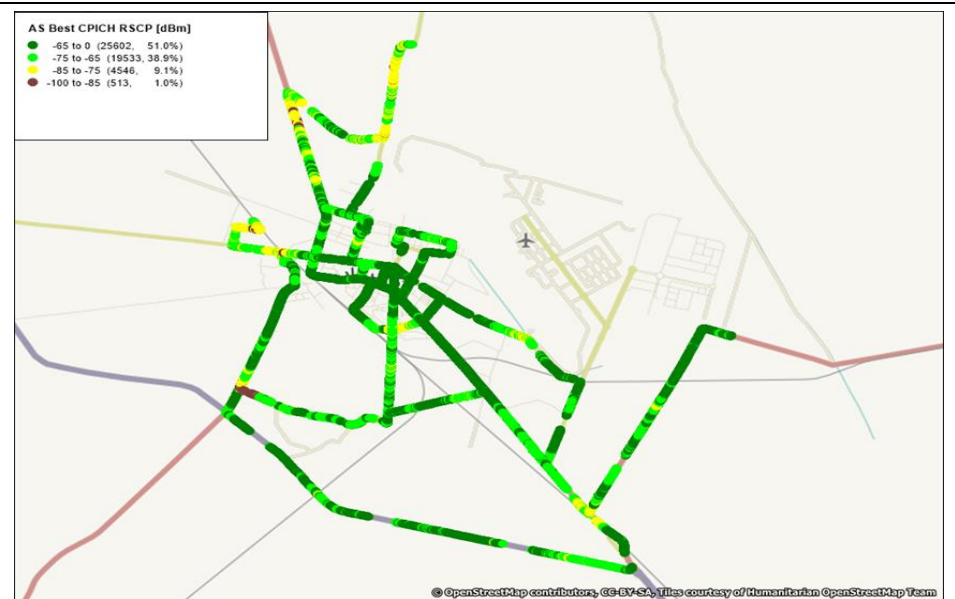
TELENOR 3G NETWORK COVERAGE – JACOBABAD



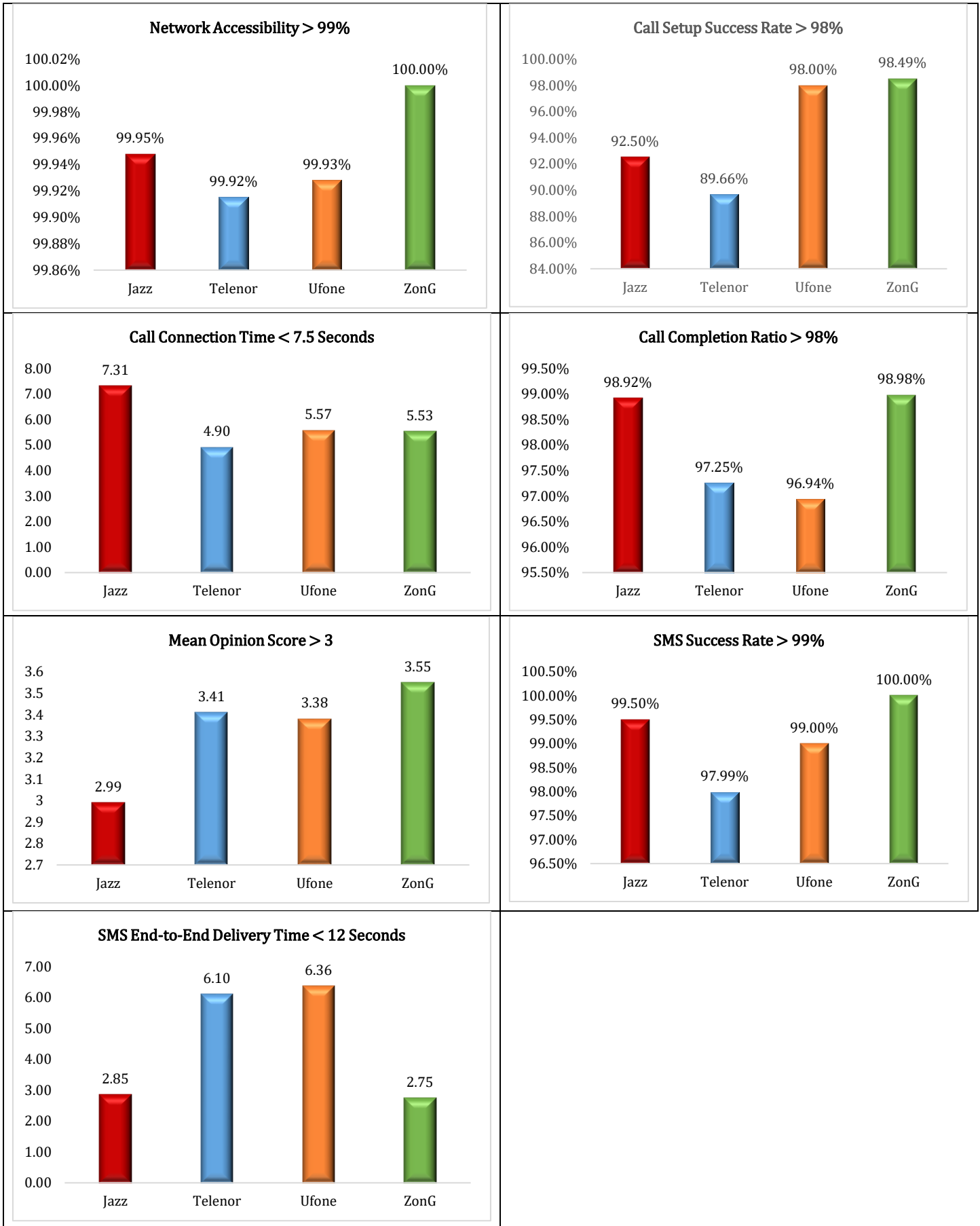
UFONE 3G NETWORK COVERAGE – JACOBABAD



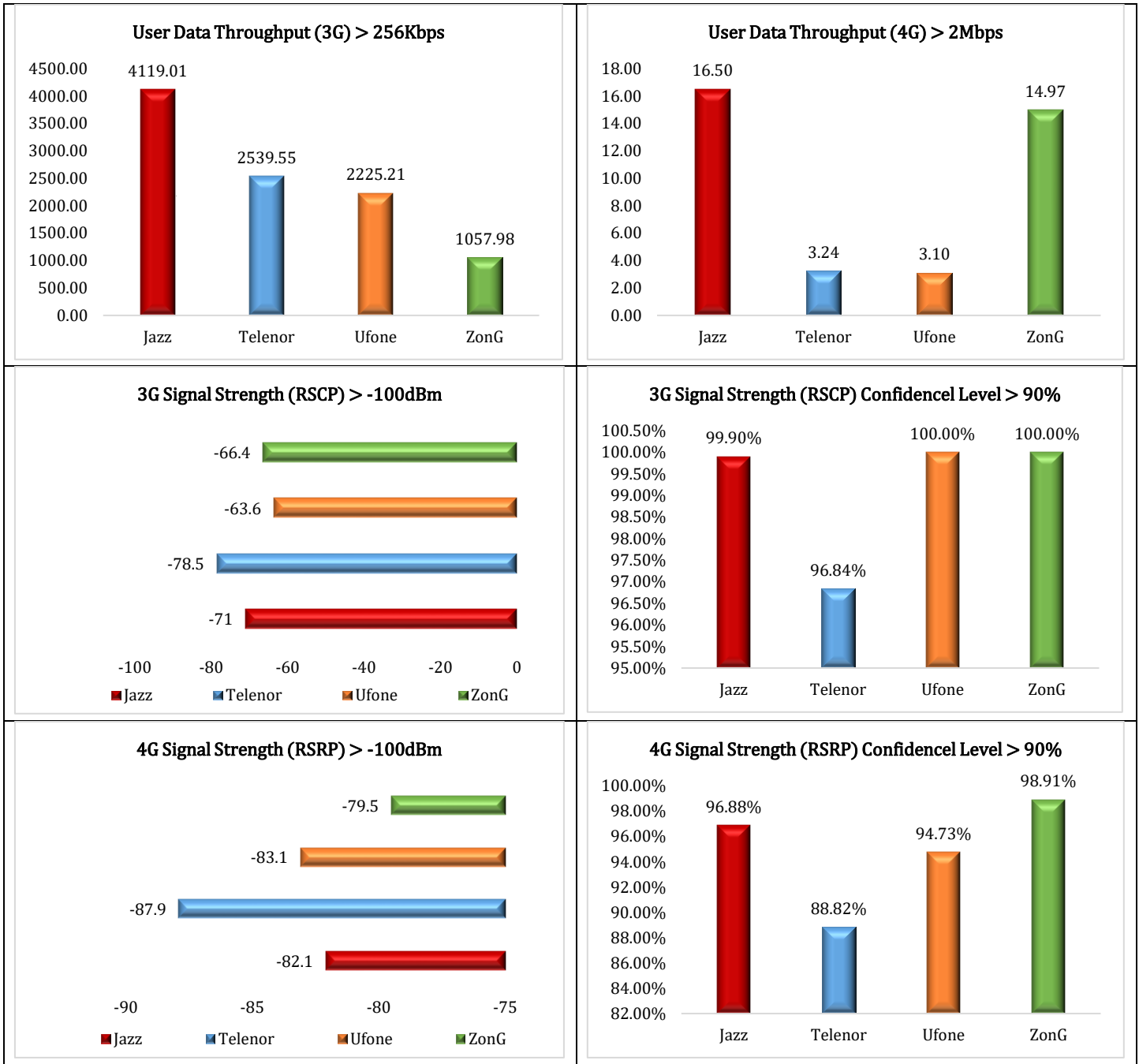
ZONG 3G NETWORK COVERAGE – JACOBABAD



QUALITY OF SERVICE SURVEY RESULTS – JACOBABAD

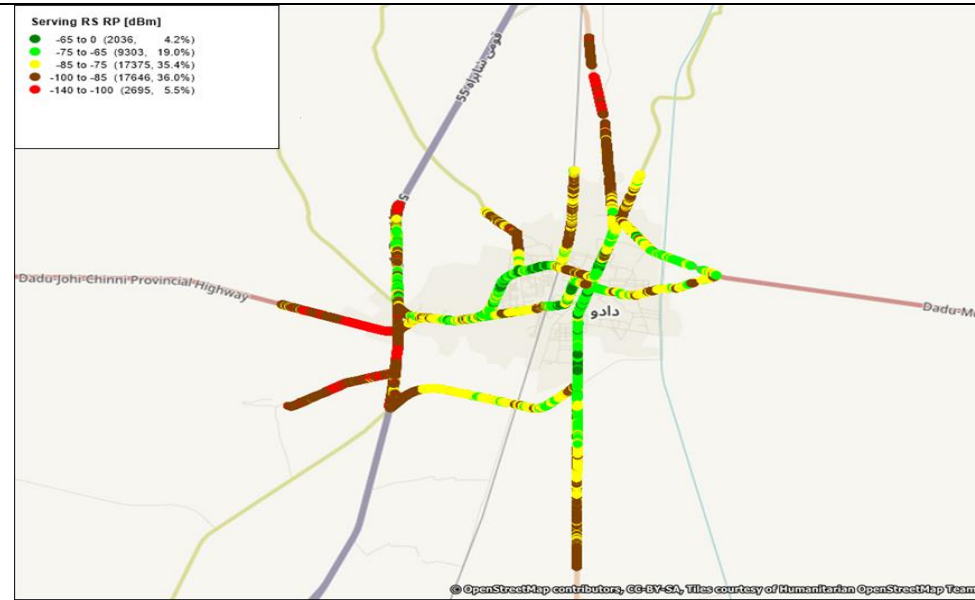


QUALITY OF SERVICE SURVEY RESULTS – JACOBABAD

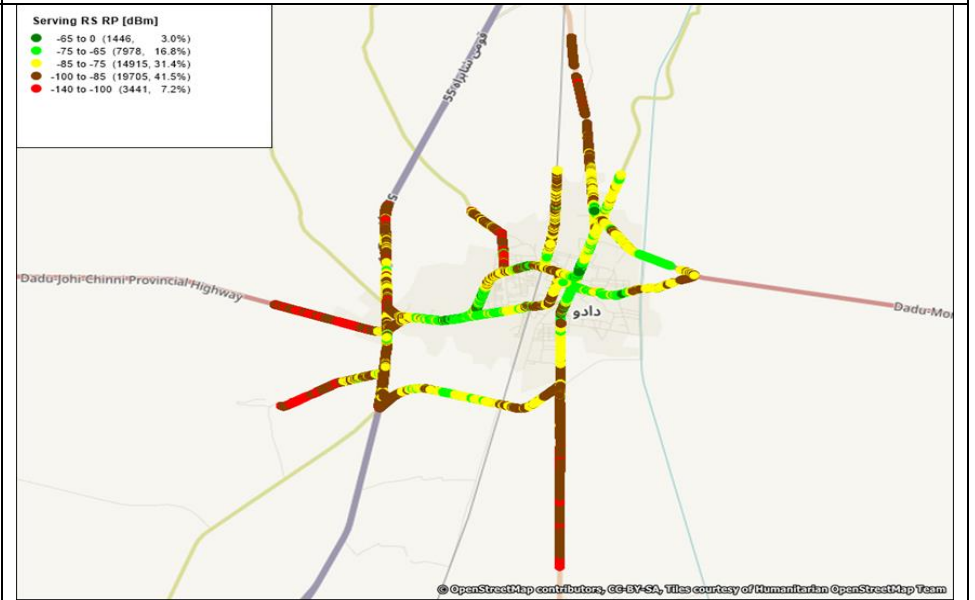


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

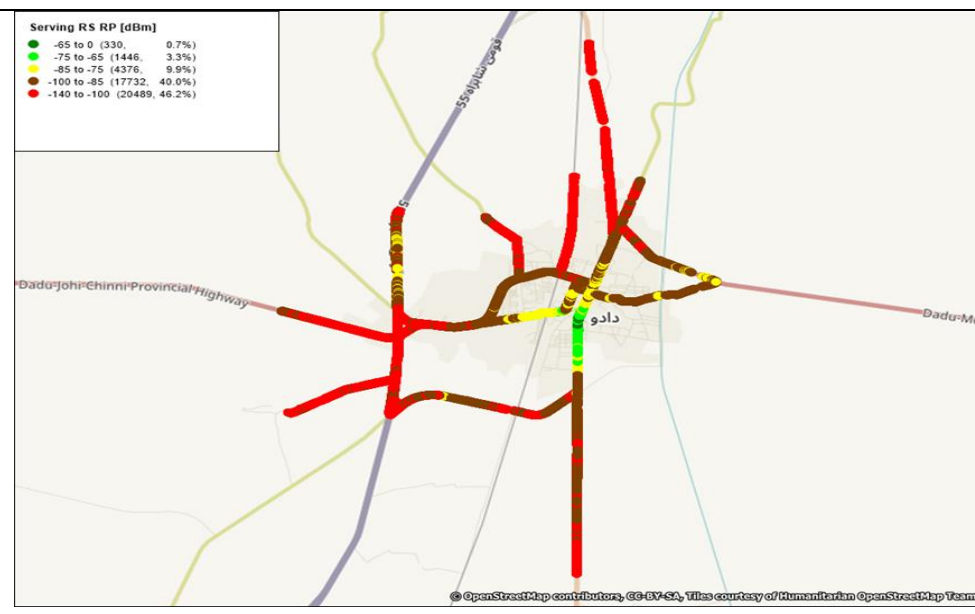
JAZZ 4G NETWORK COVERAGE – DADU



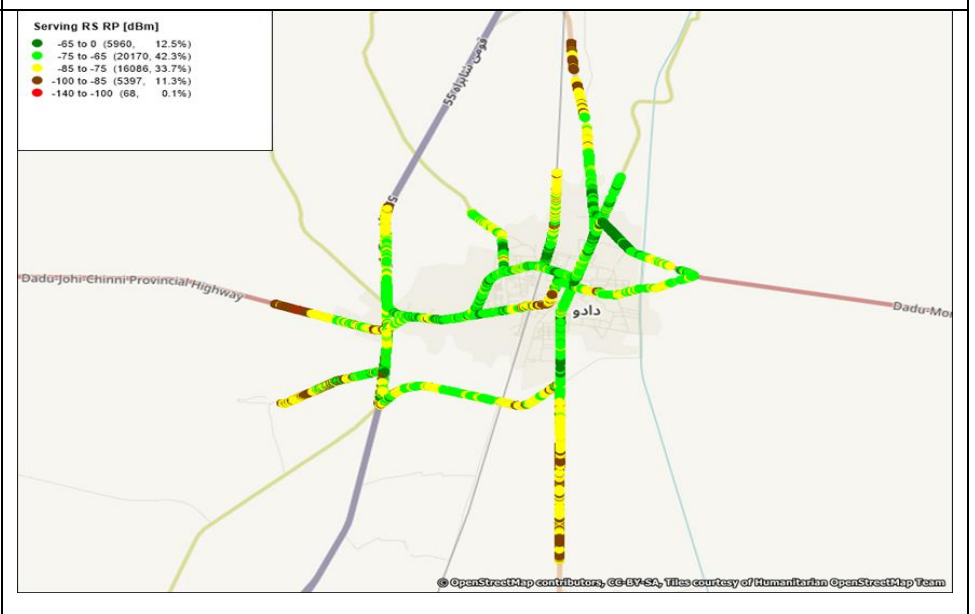
TELENOR 4G NETWORK COVERAGE – DADU



UFONE 4G NETWORK COVERAGE – DADU

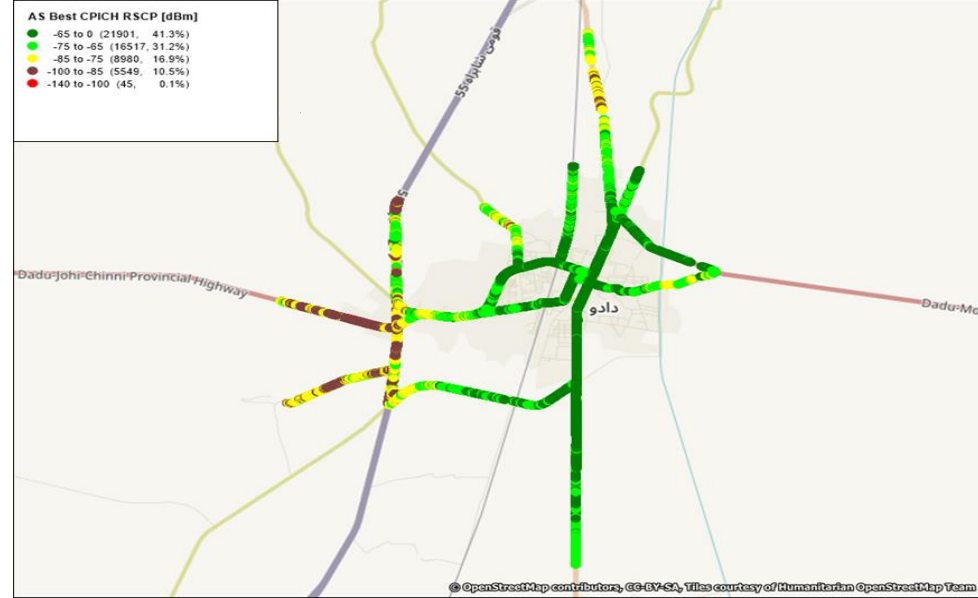


ZONG 4G NETWORK COVERAGE – DADU

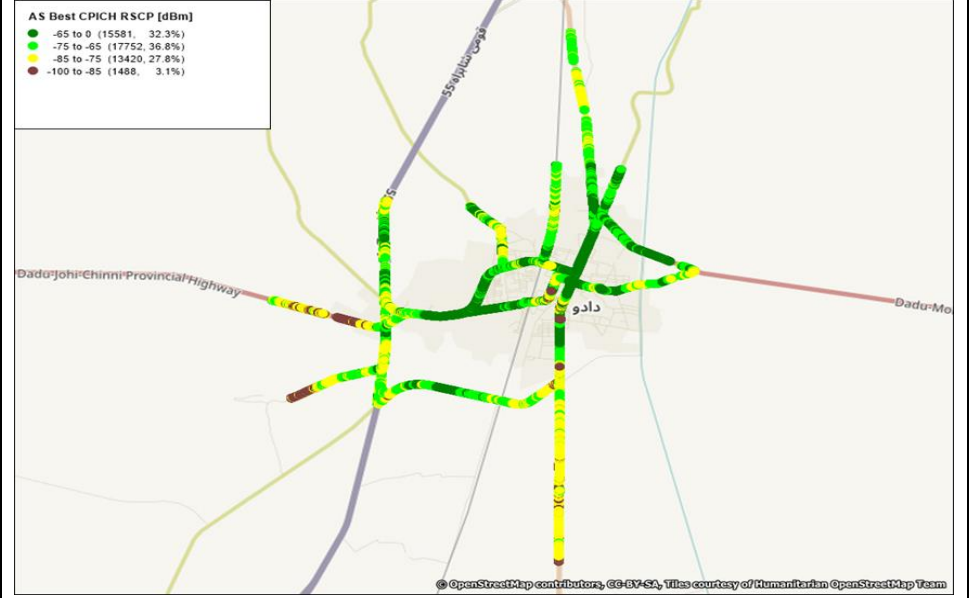


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

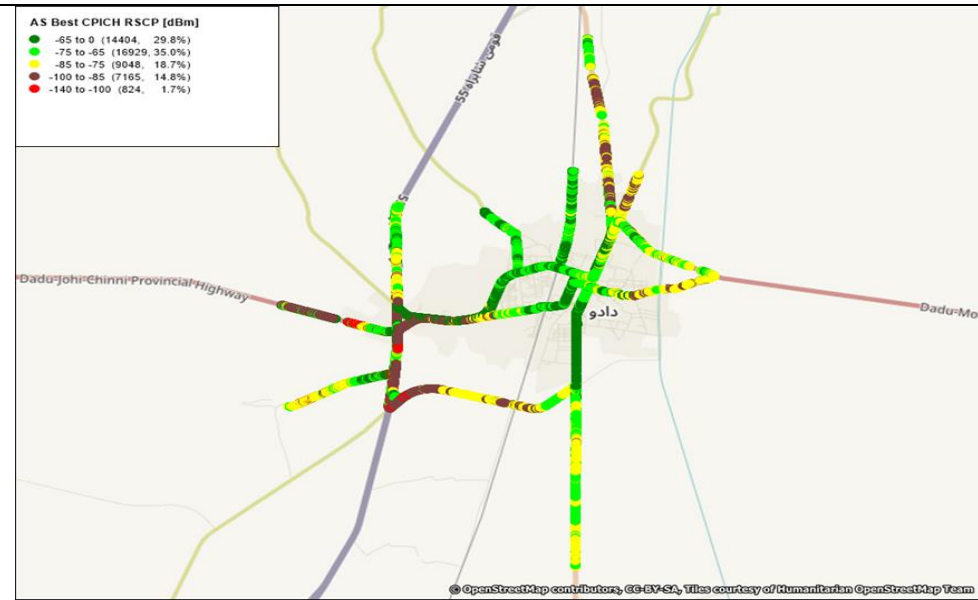
JAZZ 3G NETWORK COVERAGE – DADU



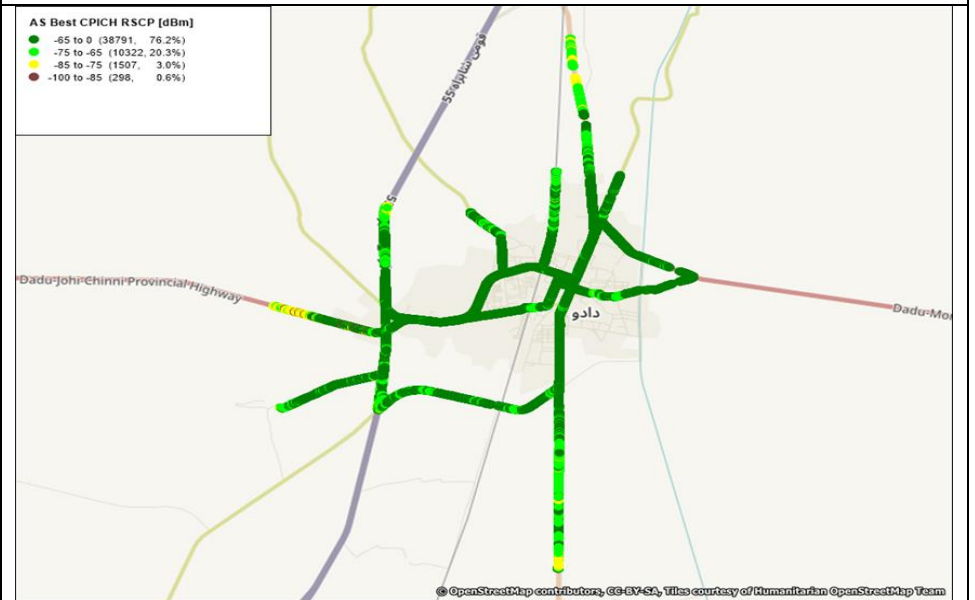
TELENOR 3G NETWORK COVERAGE – DADU



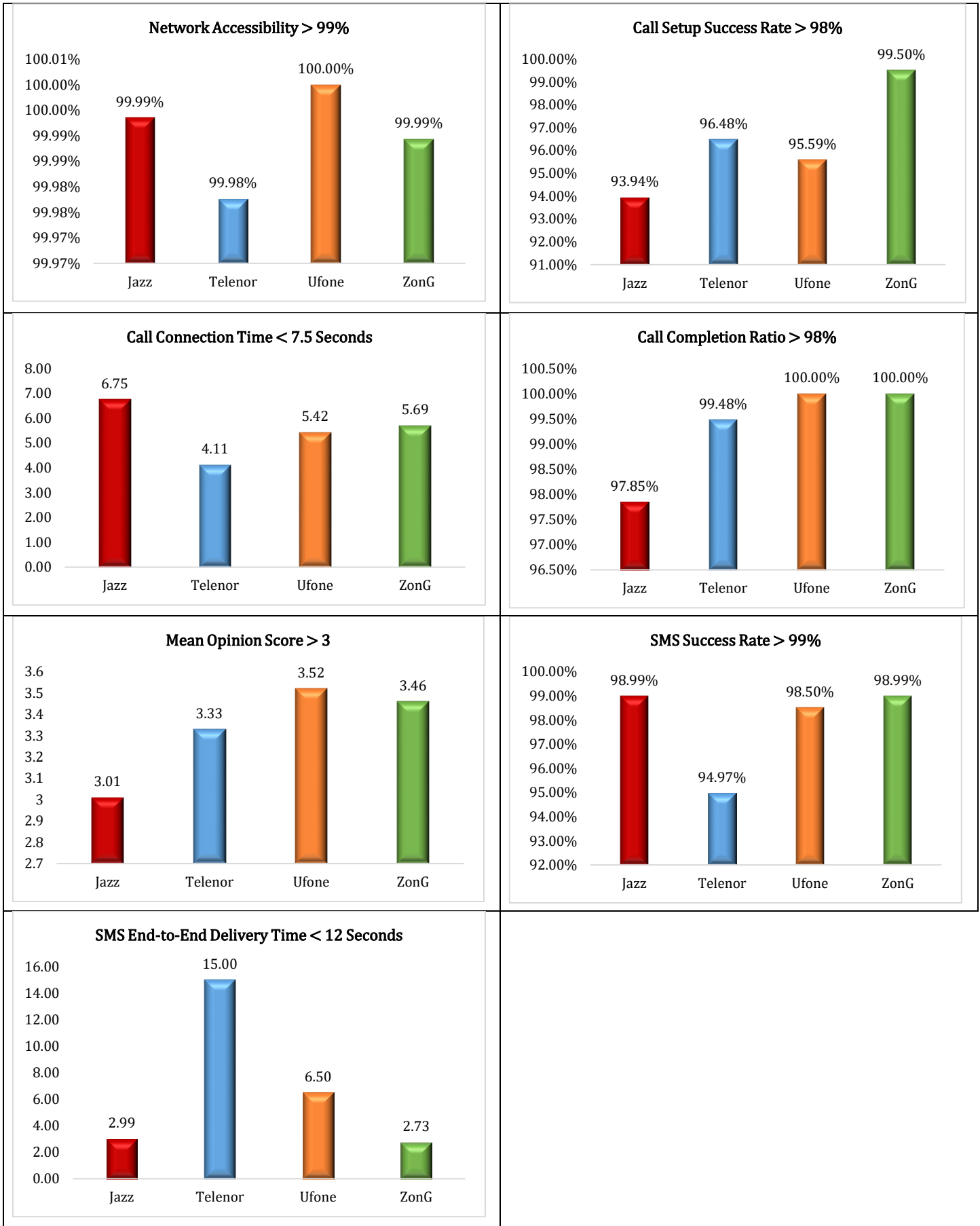
UFONE 3G NETWORK COVERAGE – DADU



ZONG 3G NETWORK COVERAGE – DADU



QUALITY OF SERVICE SURVEY RESULTS – DADU

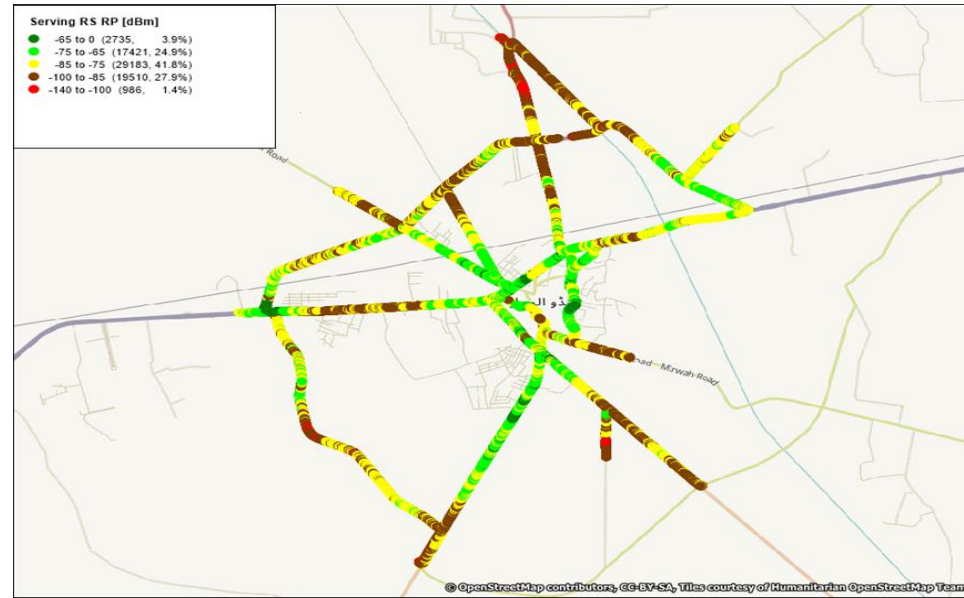


QUALITY OF SERVICE SURVEY RESULTS – DADU

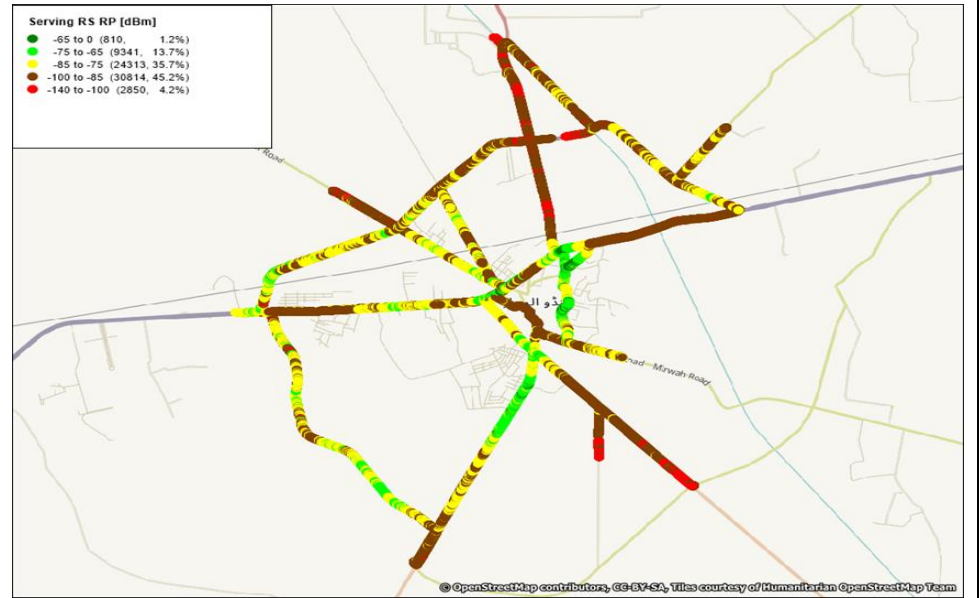


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

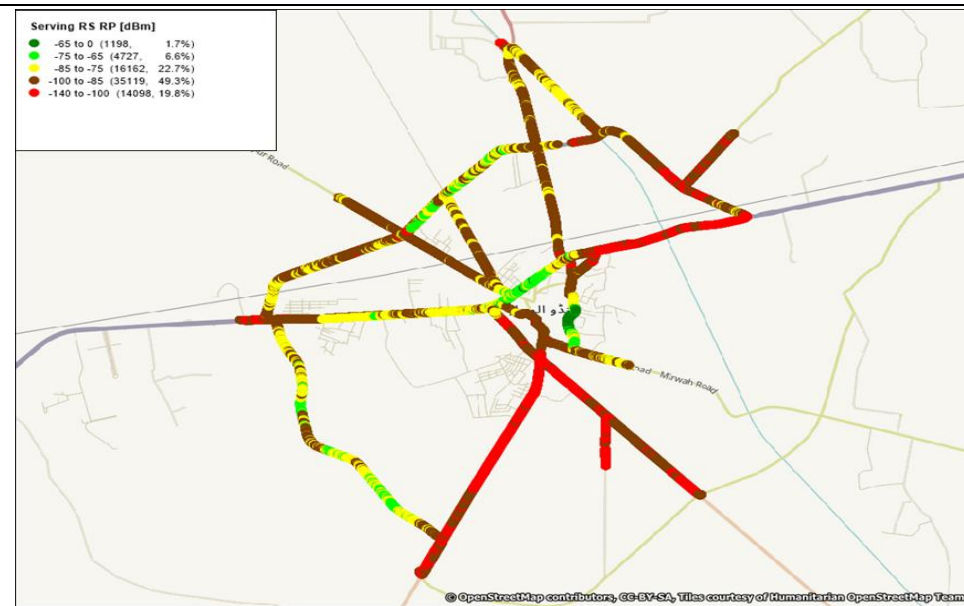
JAZZ 4G NETWORK COVERAGE – TANDO ALLAH YAR



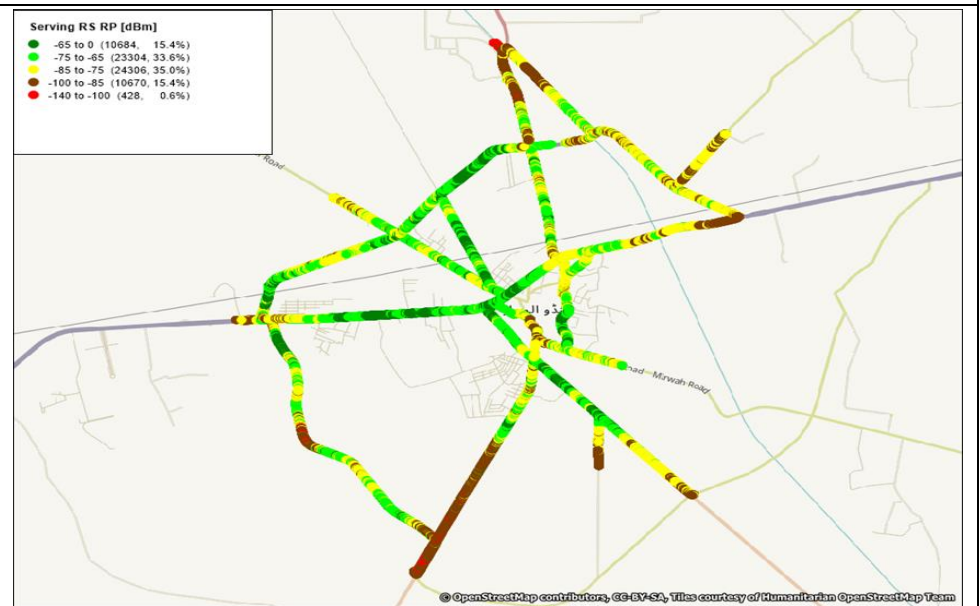
TELENOR 4G NETWORK COVERAGE – TANDO ALLAH YAR



UFONE 4G NETWORK COVERAGE – TANDO ALLAH YAR

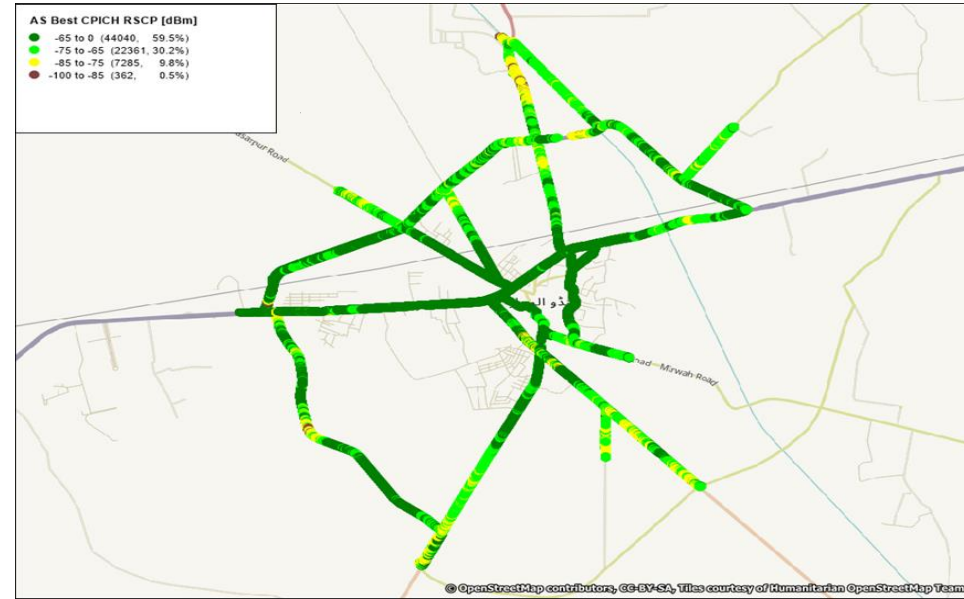


ZONG 4G NETWORK COVERAGE – TANDO ALLAH YAR

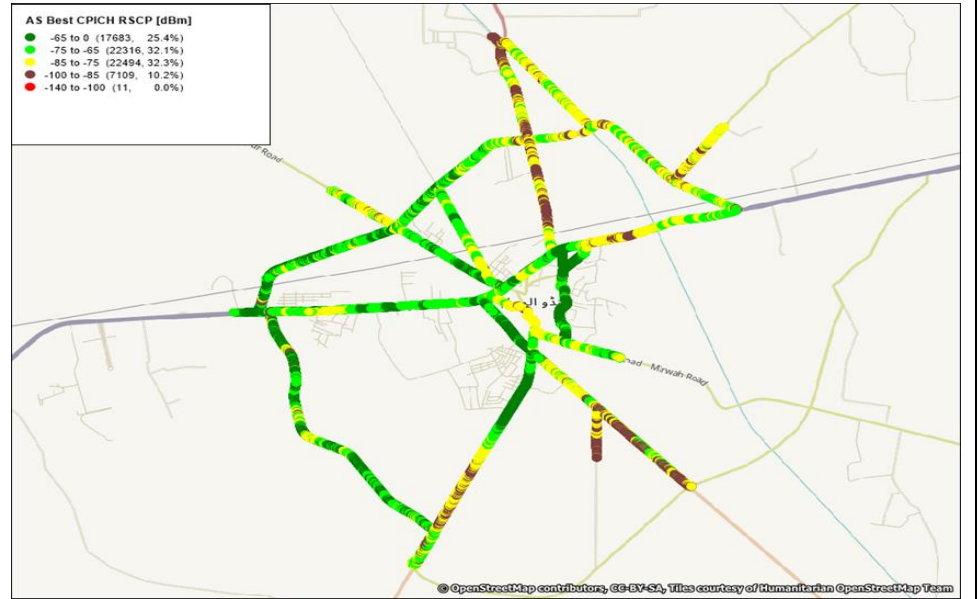


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

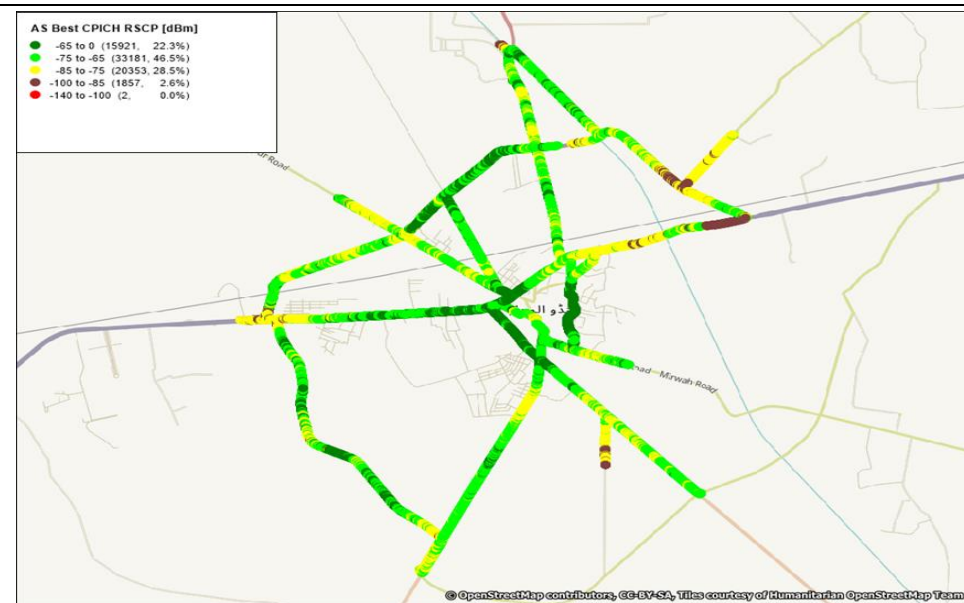
JAZZ 3G NETWORK COVERAGE – TANDO ALLAH YAR



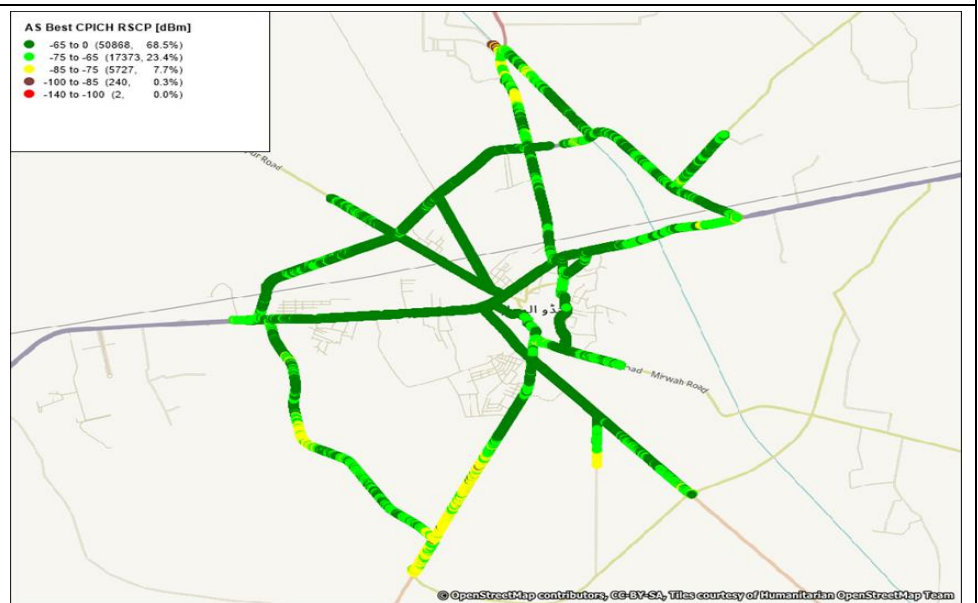
TELEOR 3G NETWORK COVERAGE – TANDO ALLAH YAR



UFONE 3G NETWORK COVERAGE – TANDO ALLAH YAR

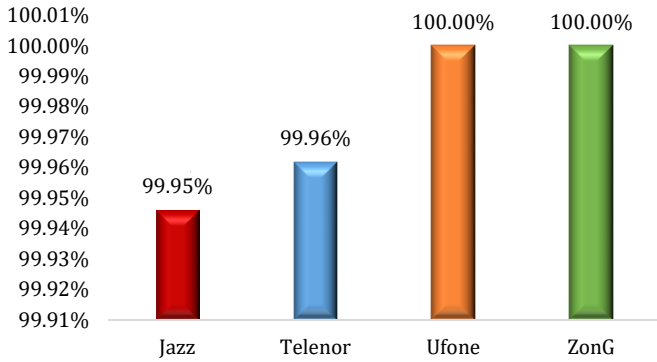


ZONG 3G NETWORK COVERAGE – TANDO ALLAH YAR

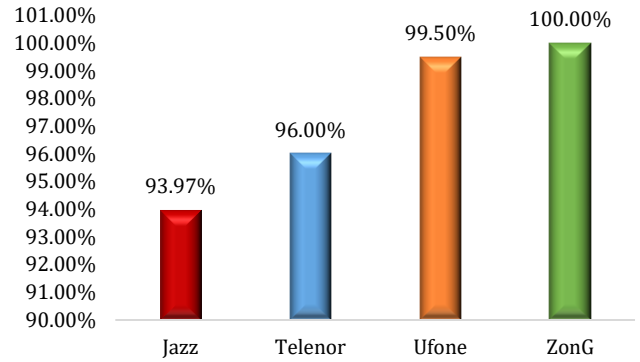


QUALITY OF SERVICE SURVEY RESULTS – TANDO ALLAH YAR

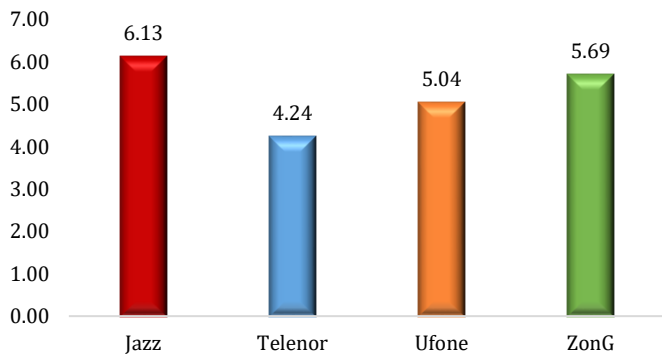
Network Accessibility > 99%



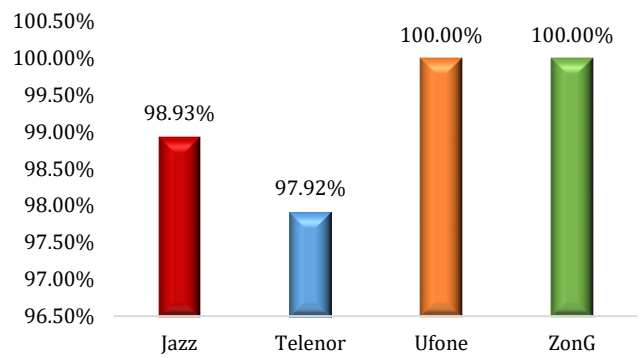
Call Setup Success Rate > 98%



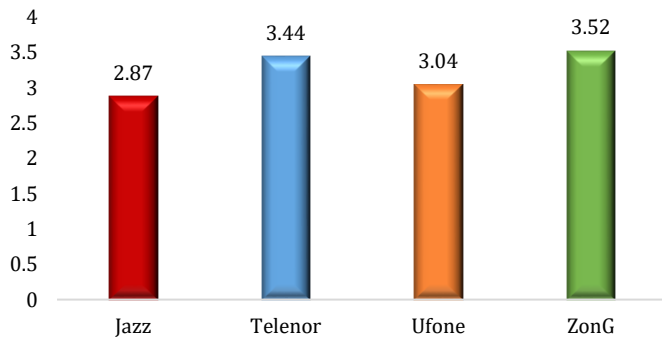
Call Connection Time < 7.5 Seconds



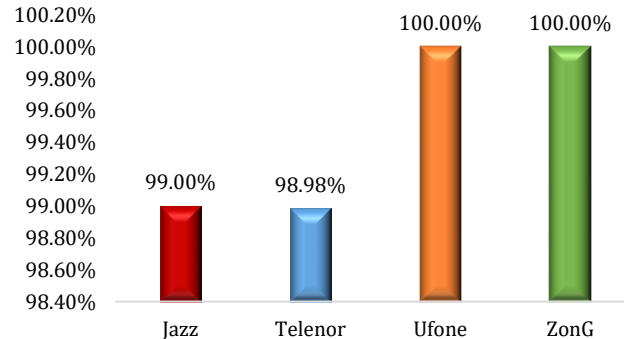
Call Completion Ratio > 98%



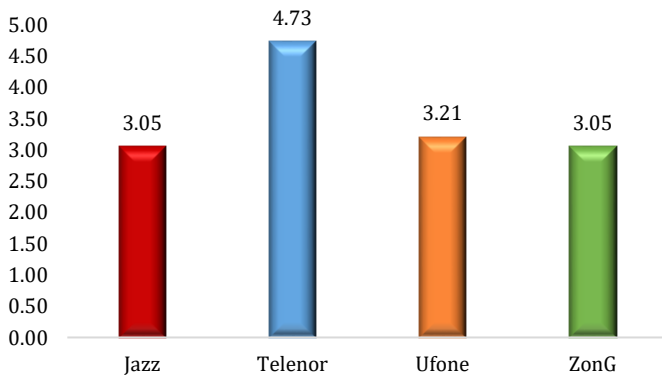
Mean Opinion Score > 3



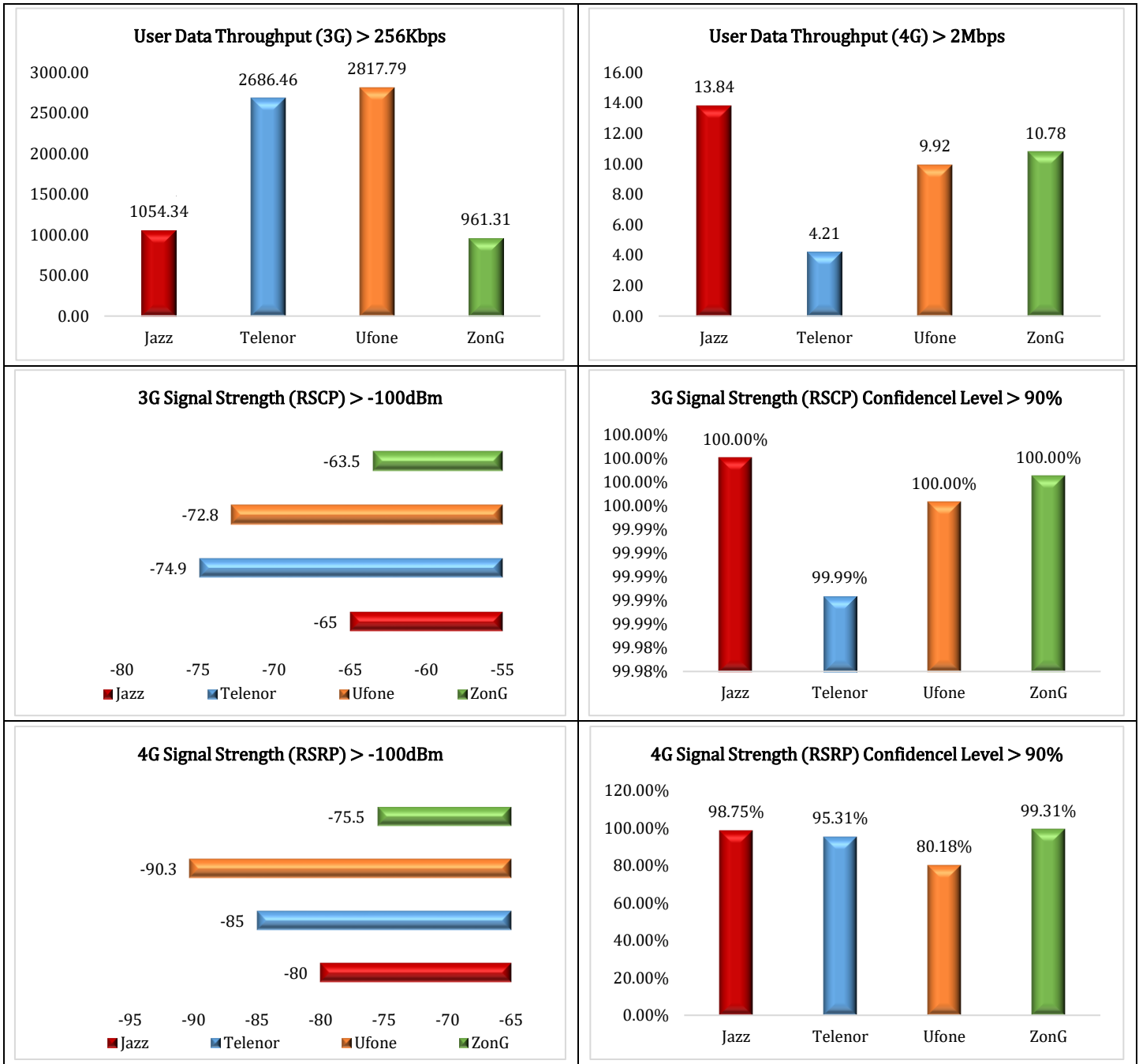
SMS Success Rate > 99%



SMS End-to-End Delivery Time < 12 Seconds



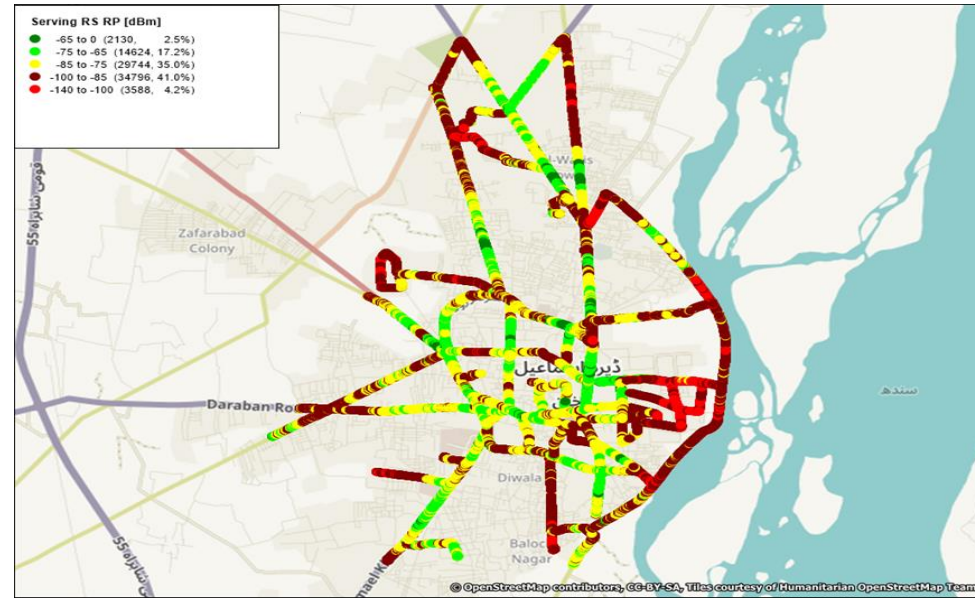
QUALITY OF SERVICE SURVEY RESULTS – TANDO ALLAH YAR



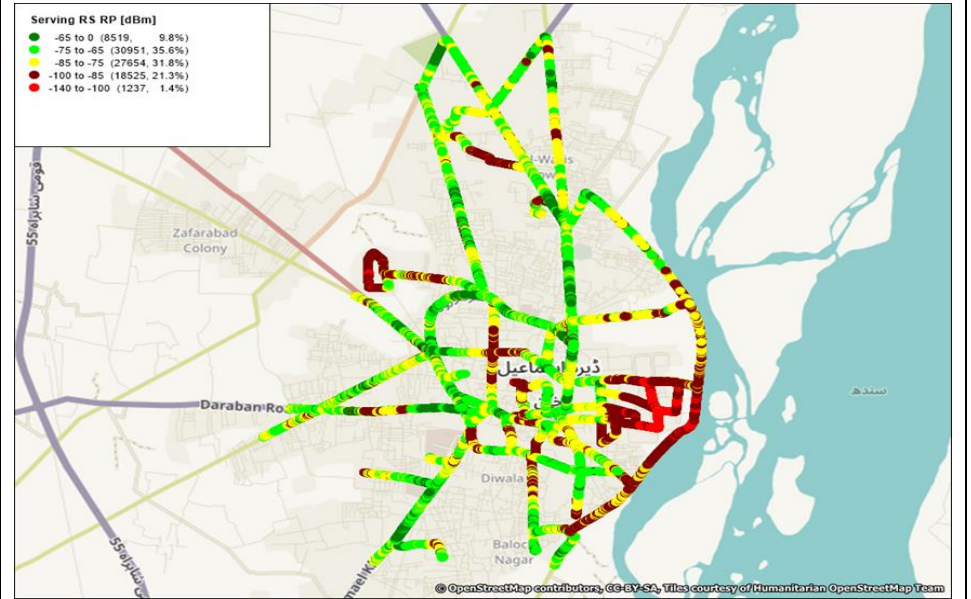
KHYBER PAKHTUNKHWA

4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

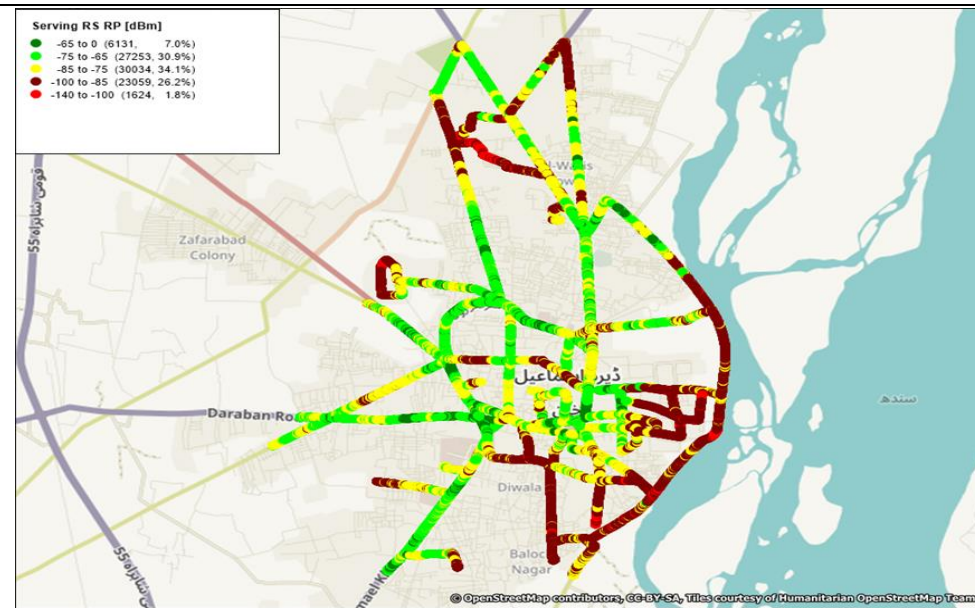
JAZZ 4G NETWORK COVERAGE – DI KHAN



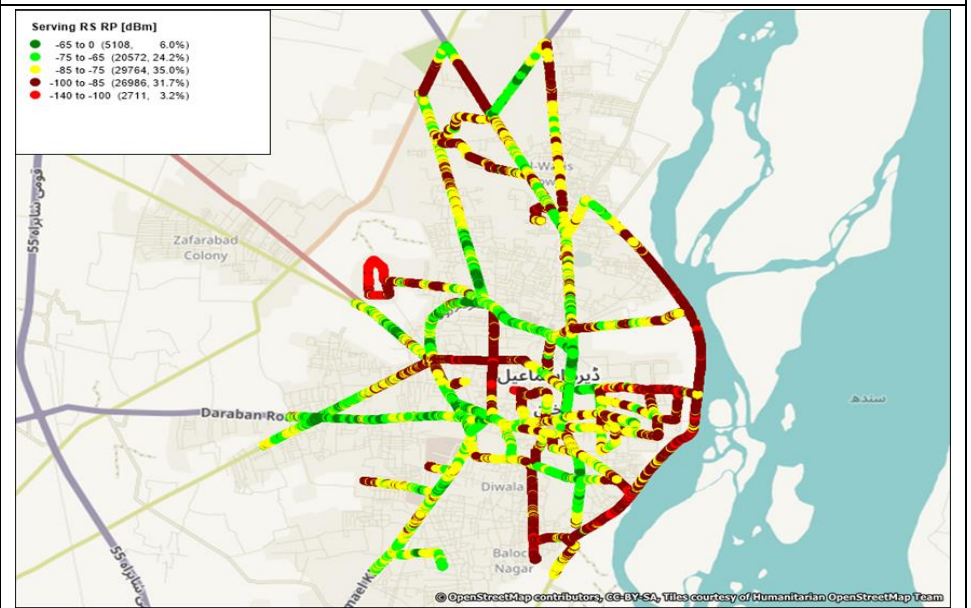
TELENOR 4G NETWORK COVERAGE – DI KHAN



UFONE 4G NETWORK COVERAGE – DI KHAN

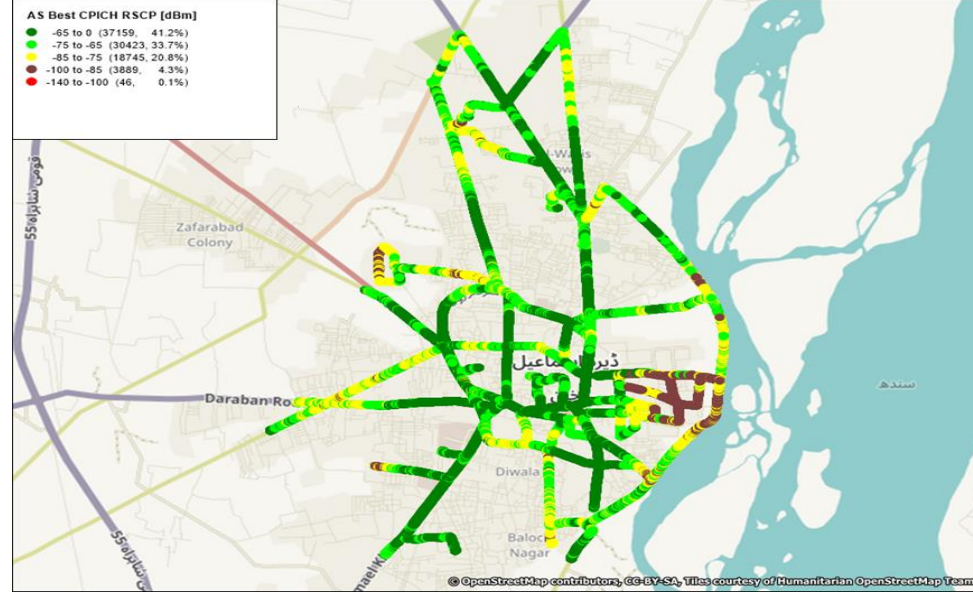


ZONG 4G NETWORK COVERAGE – DI KHAN

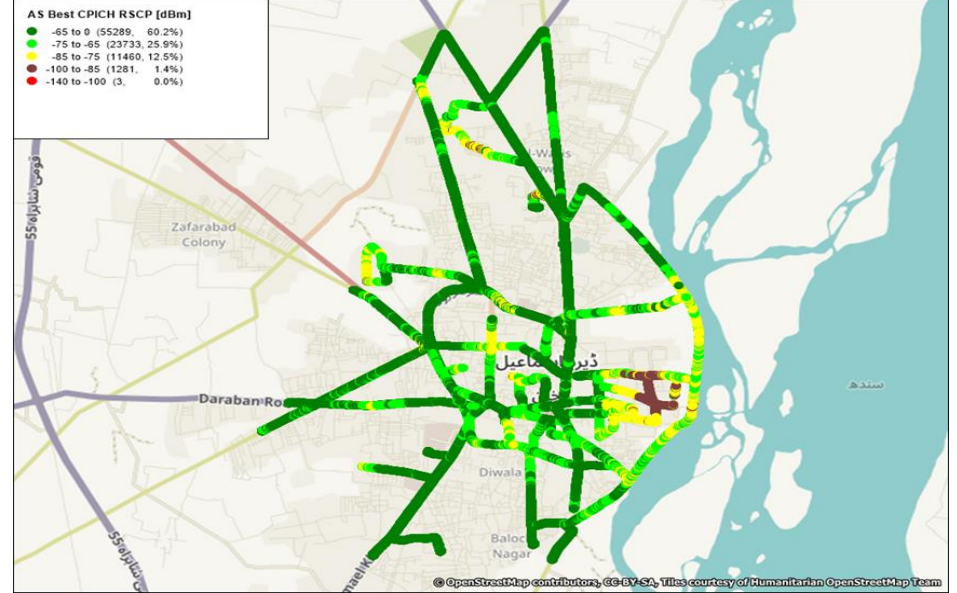


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

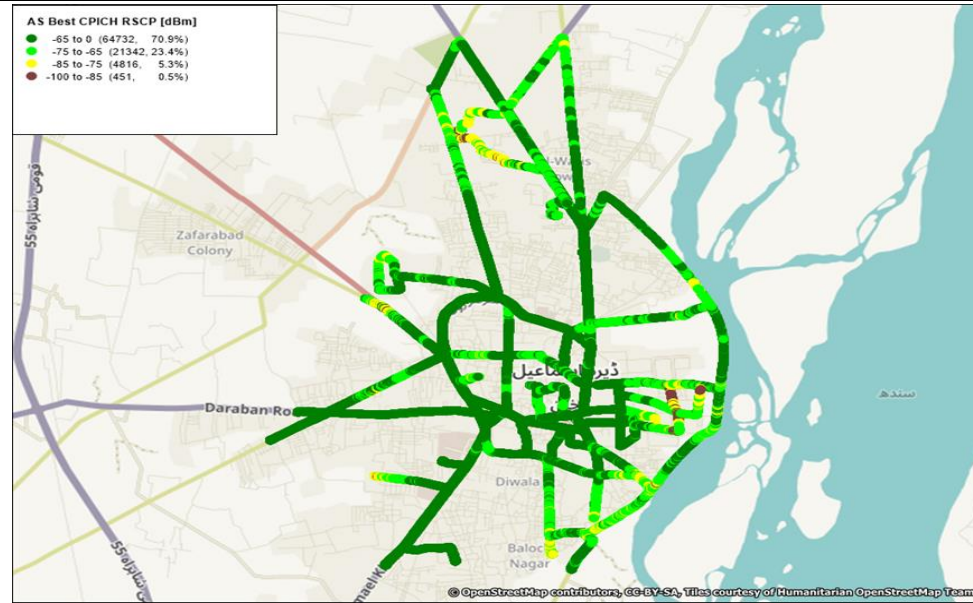
JAZZ 3G NETWORK COVERAGE – DI KHAN



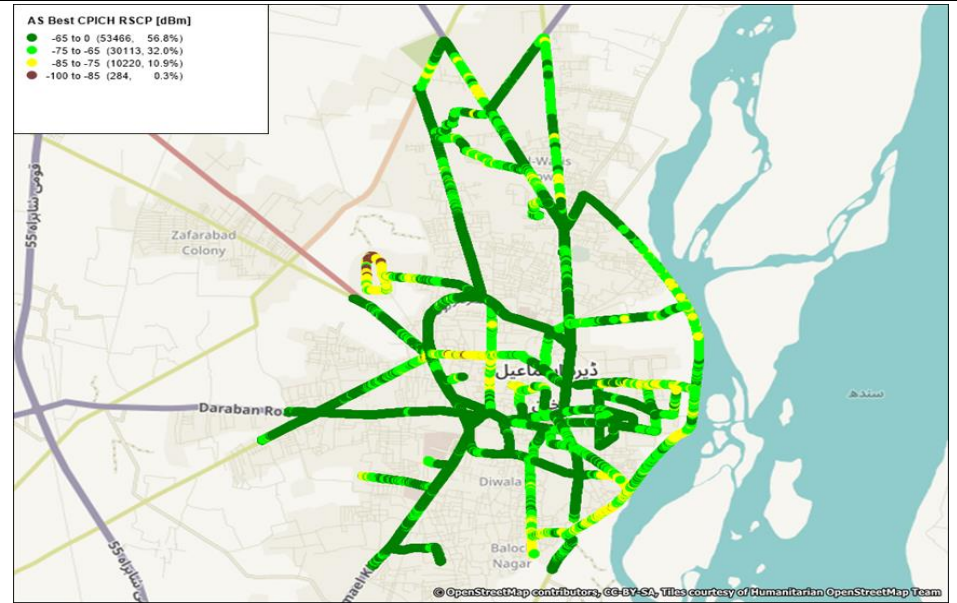
TELENOR 3G NETWORK COVERAGE – DI KHAN



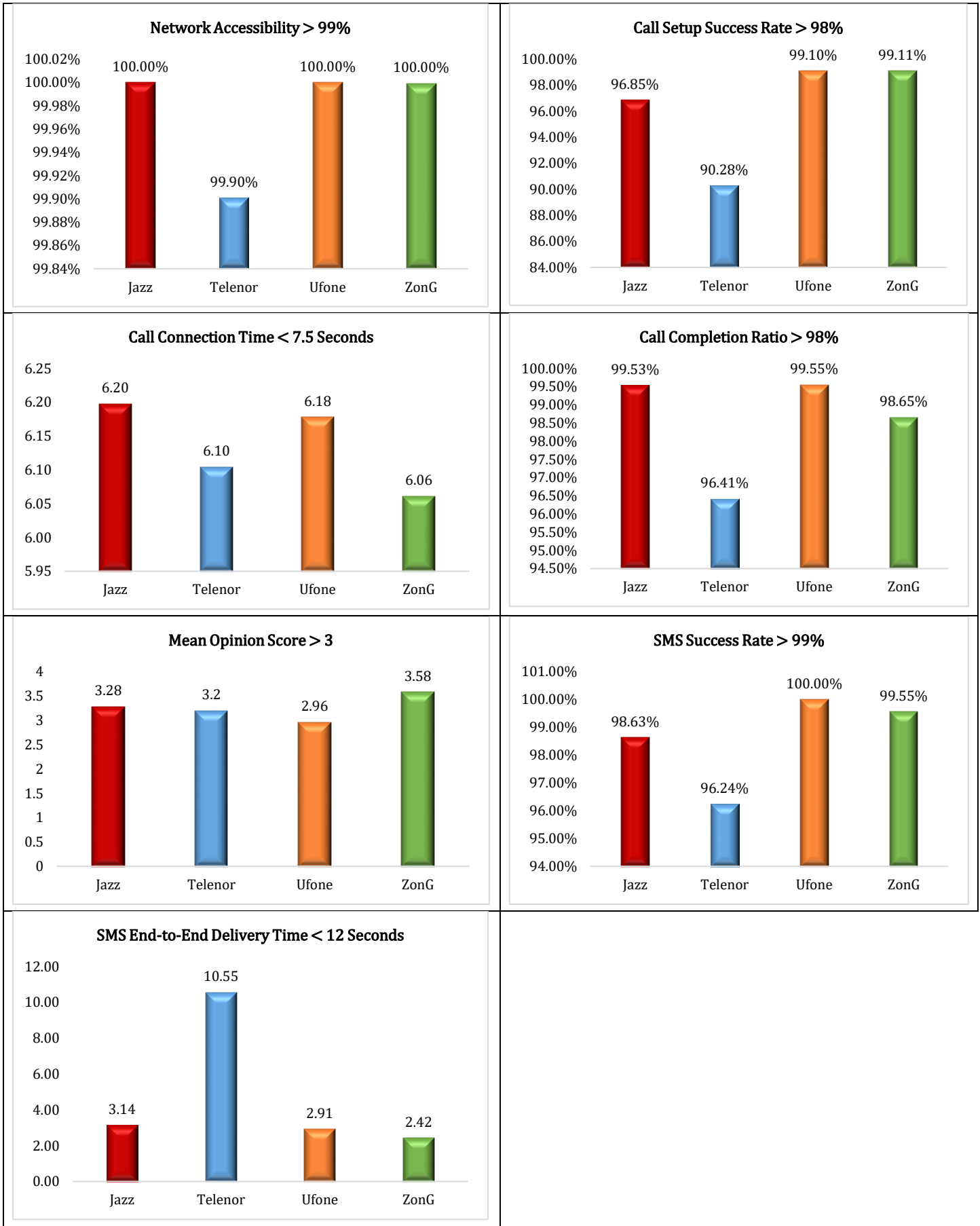
UFONE 3G NETWORK COVERAGE – DI KHAN



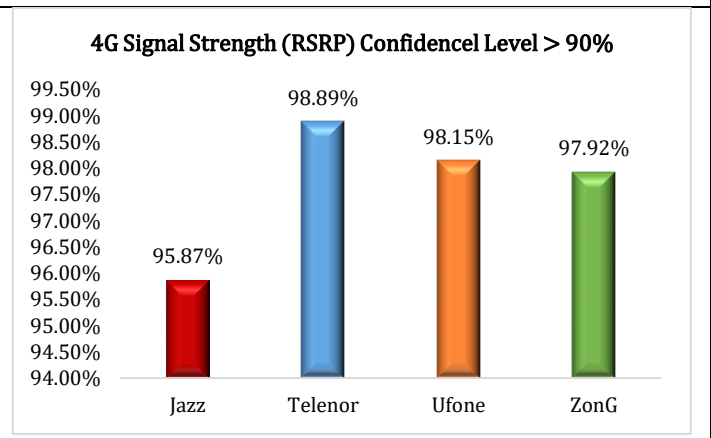
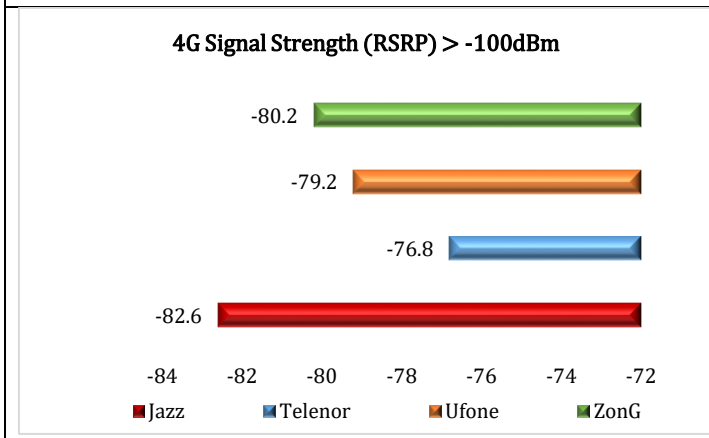
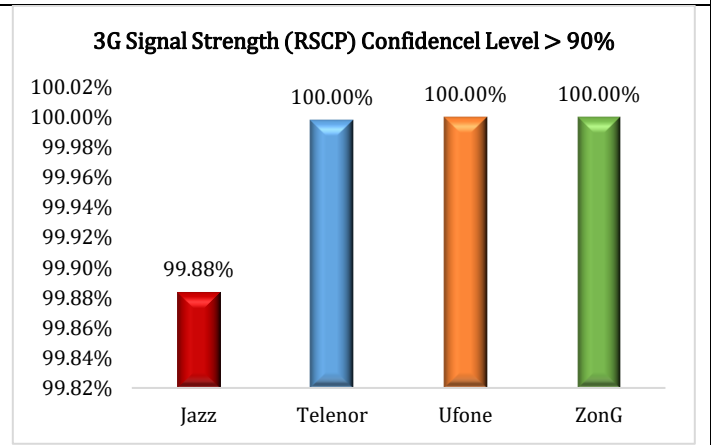
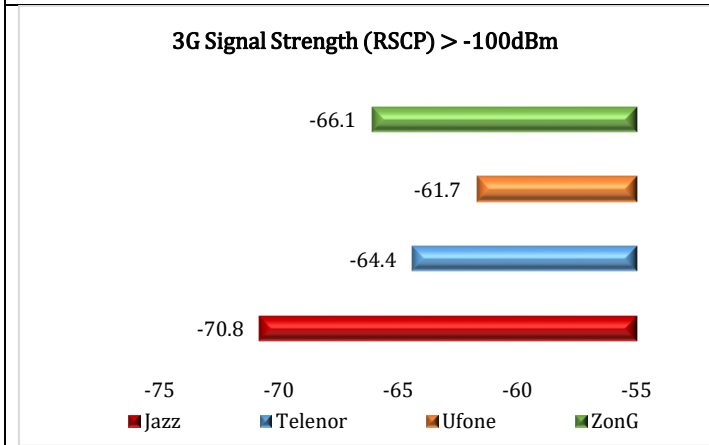
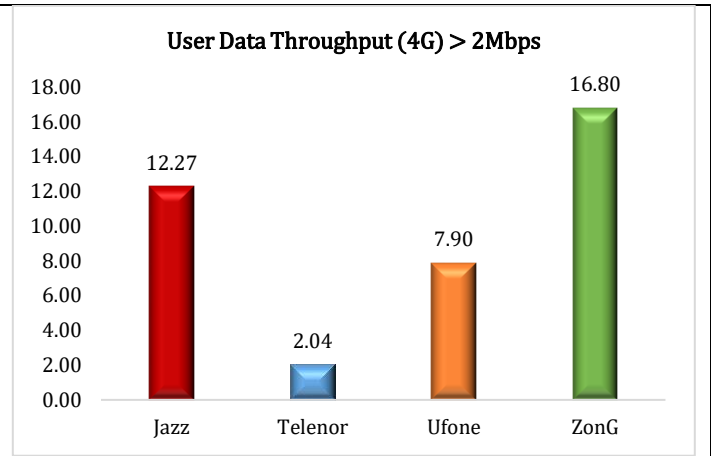
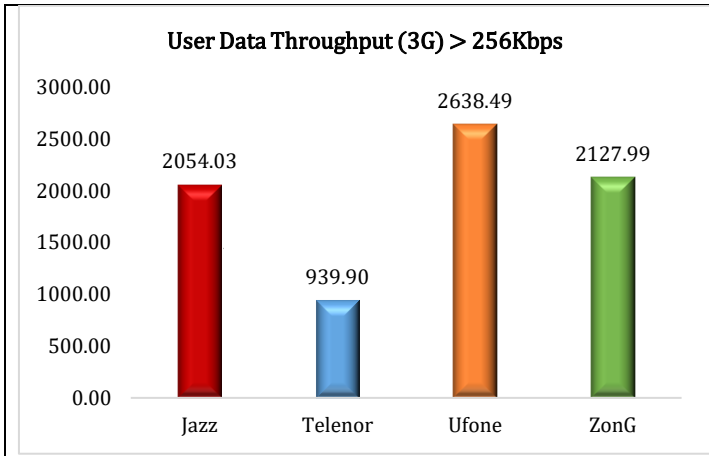
ZONG 3G NETWORK COVERAGE – DI KHAN



QUALITY OF SERVICE SURVEY RESULTS – DI KHAN



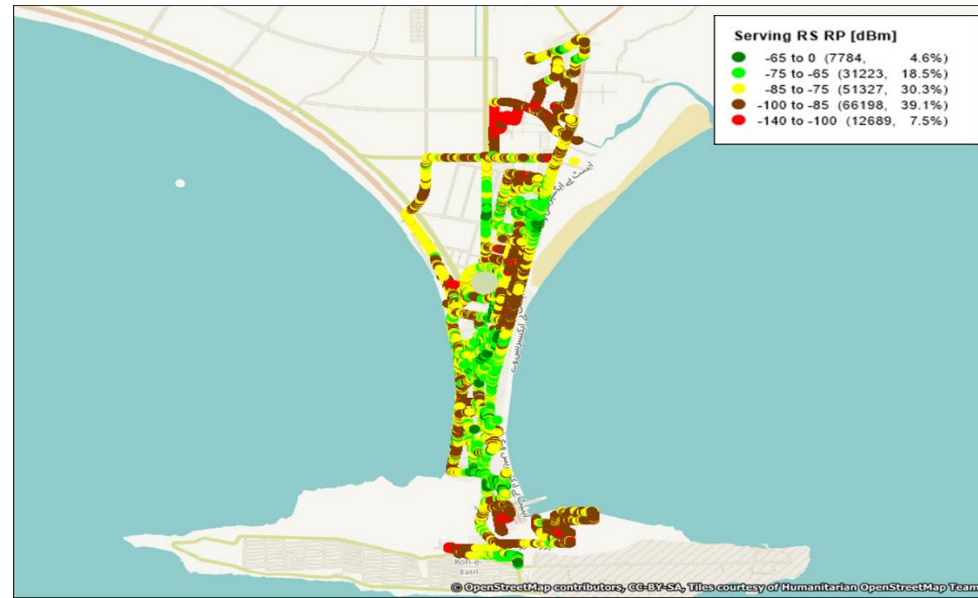
QUALITY OF SERVICE SURVEY RESULTS – DI KHAN



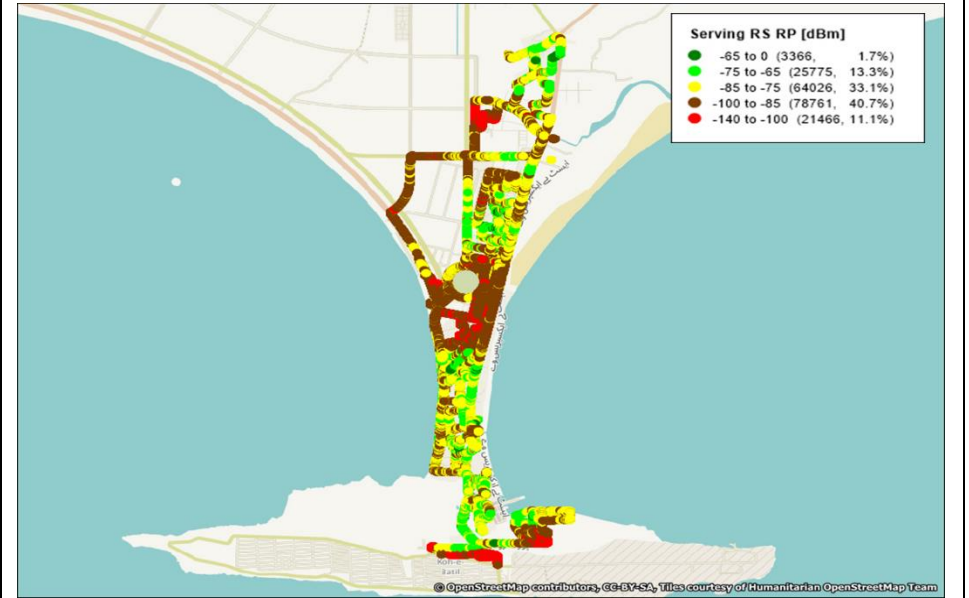
BALUCHISTAN

4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

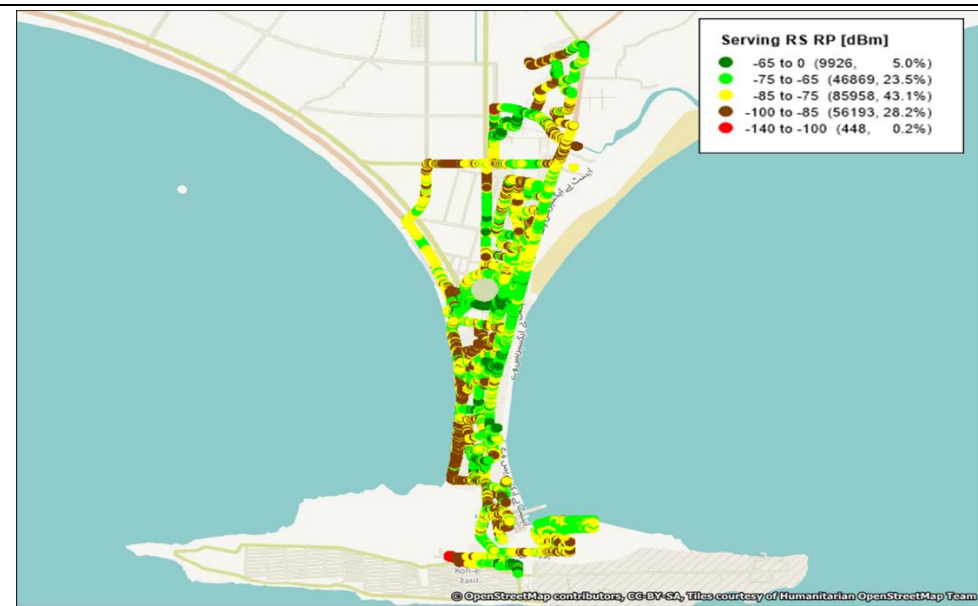
JAZZ 4G NETWORK COVERAGE – GAWADAR



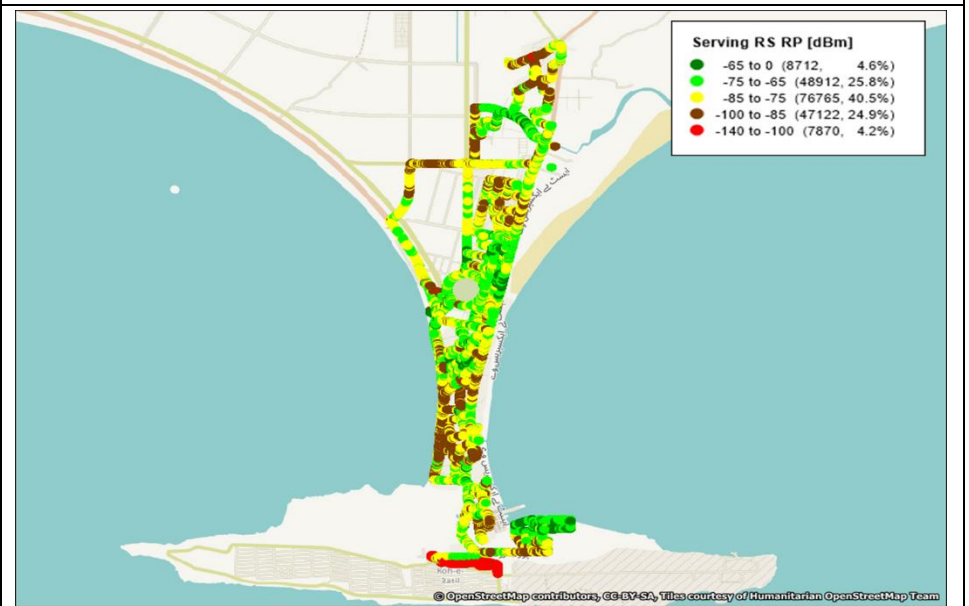
TELENOR 4G NETWORK COVERAGE – GAWADAR



UFONE 4G NETWORK COVERAGE – GAWADAR

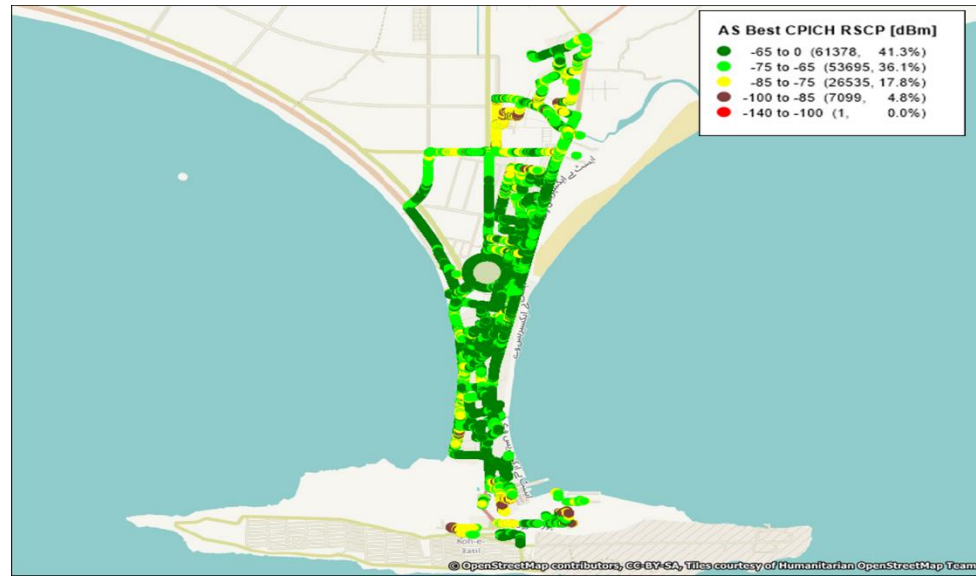


ZONG 4G NETWORK COVERAGE – GAWADAR

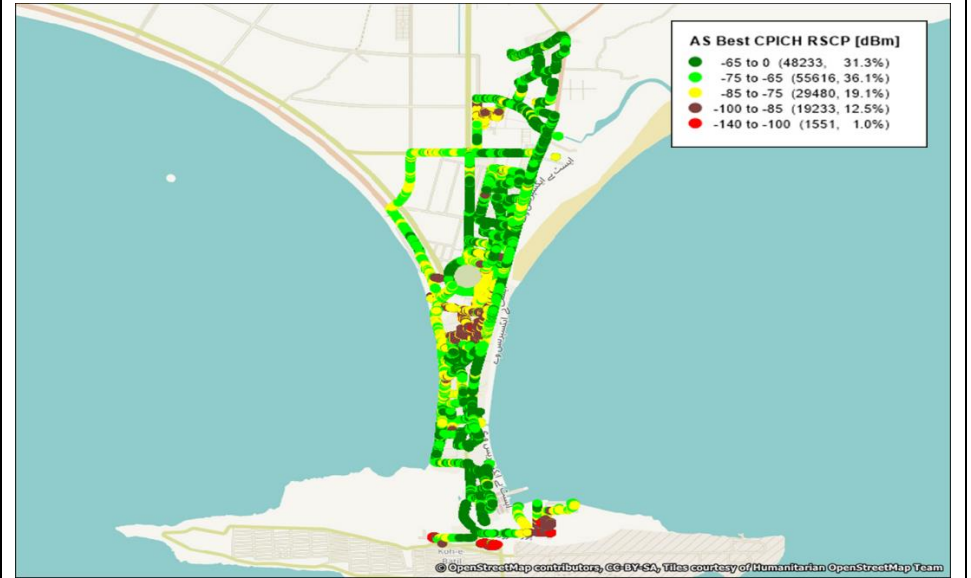


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

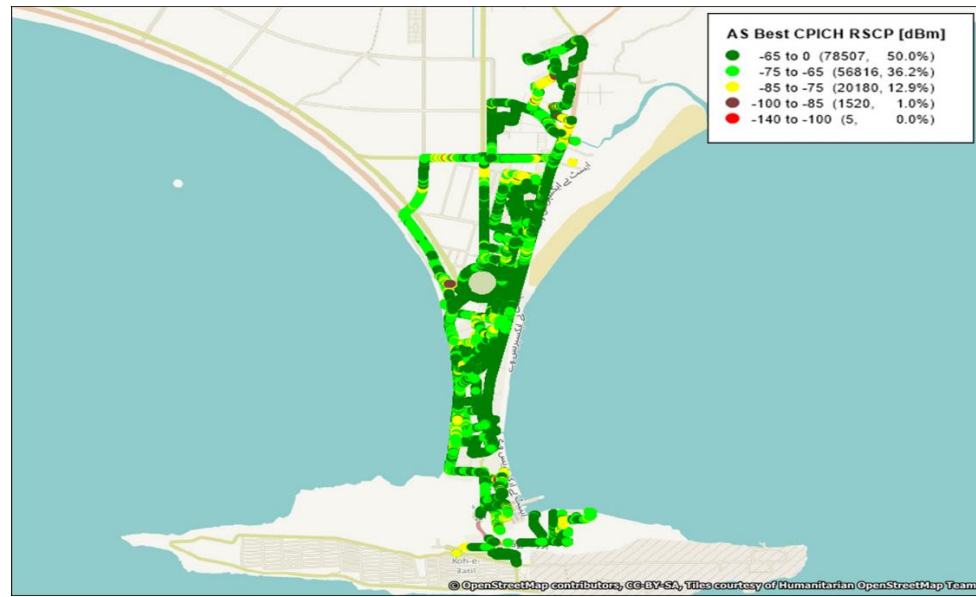
JAZZ 3G NETWORK COVERAGE – GAWADAR



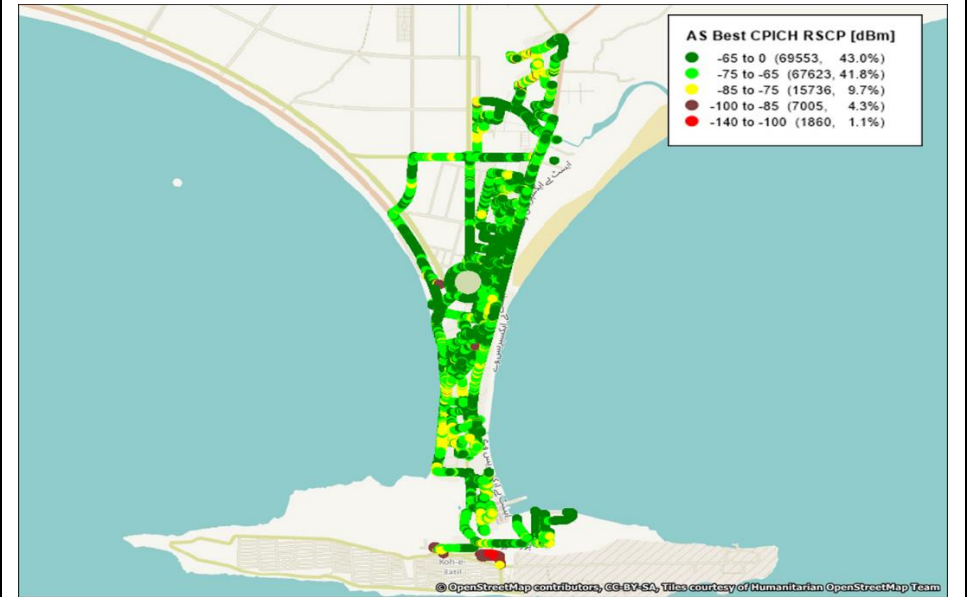
TELENOR 3G NETWORK COVERAGE – GAWADAR



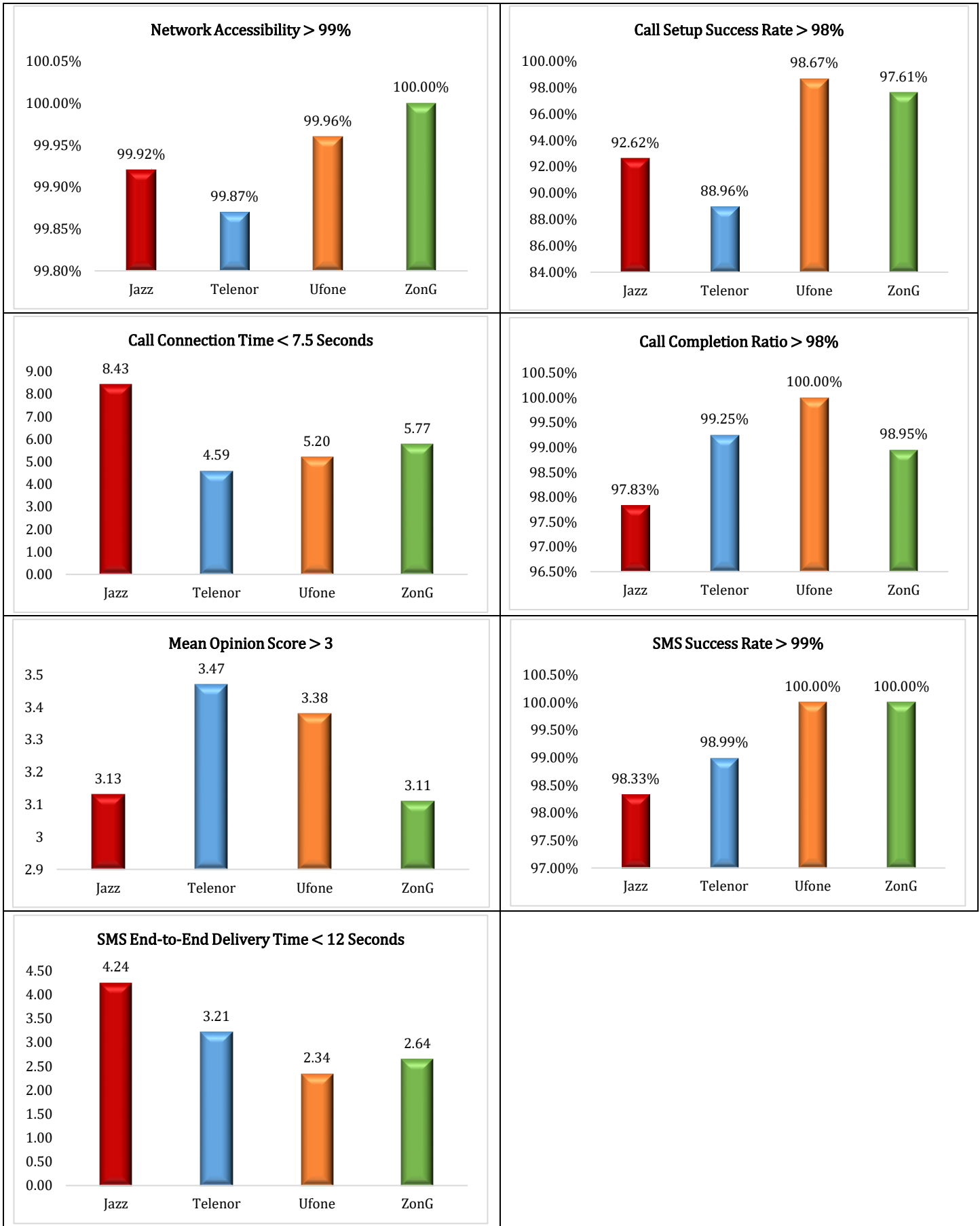
UFONE 3G NETWORK COVERAGE – GAWADAR



ZONG 3G NETWORK COVERAGE – GAWADAR



QUALITY OF SERVICE SURVEY RESULTS – GAWADAR



QUALITY OF SERVICE SURVEY RESULTS – GAWADAR

