

# **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 <sup>th</sup> ~ 14 <sup>th</sup> Oct 2021
2.		Khanewal	26 <sup>th</sup> ~ 28 <sup>th</sup> Oct 2021
3.		Abdul Hakeem	1 <sup>st</sup> ~ 3 <sup>rd</sup> Nov 2021
4.		Sargodha	9 <sup>th</sup> ~ 11 <sup>th</sup> Nov 2021
5.		Gujrat	15 <sup>th</sup> ~ 17 <sup>th</sup> Nov 2021
6.		Narowal	15 <sup>th</sup> ~ 17 <sup>th</sup> Dec 2021
7.	Khyber Pakhtunkhwa	Mansehra	25 <sup>th</sup> ~ 27 <sup>th</sup> Oct 2021
8.		Mardan	3 <sup>rd</sup> ~ 4 <sup>th</sup> Nov 2021
9.		Nowshera	8 <sup>th</sup> ~ 9 <sup>th</sup> Nov 2021
10.		Kohat	15 <sup>th</sup> ~ 17 <sup>th</sup> Nov 2021
11.		Charsadda	24 <sup>th</sup> ~ 25 <sup>th</sup> Nov 2021
12.		Battagram	29 <sup>th</sup> ~ 30 <sup>th</sup> Nov 2021
13.	Balochistan	Mastung	18 <sup>th</sup> ~ 21 <sup>st</sup> Oct 2021
14.		Loralai	25 <sup>th</sup> ~ 27 <sup>th</sup> Oct 2021
15.		Dera Allah Yar	8 <sup>th</sup> ~ 10 <sup>th</sup> Nov 2021
16.		Dera Murad Jamali	2 <sup>nd</sup> ~ 4 <sup>th</sup> Nov 2021
17.		Pishin	15 <sup>th</sup> ~ 17 <sup>th</sup> Nov 2021
18.	Sindh	Mirpur Khas	23 <sup>rd</sup> ~ 25 <sup>th</sup> 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%	<b>0.28%</b>	99.15%	Yes	Yes	<b>No</b>	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%	<b>89.84%</b>	99.06%	Yes	Yes	<b>No</b>	Yes
<i>Dera Allah Yar</i>	<b>73.25%</b>	99.62%	91.32%	98.94%	<b>No</b>	Yes	Yes	Yes
<i>Dera Murad Jamali</i>	91.22%	99.12%	<b>89.92%</b>	91.94%	Yes	Yes	<b>No</b>	Yes
<i>Mardan</i>	<b>87.38%</b>	91.76%	93.68%	98.49%	<b>No</b>	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%	<b>87.51%</b>	99.41%	Yes	Yes	<b>No</b>	Yes
<i>Charsadda</i>	<b>79.63%</b>	<b>78.21%</b>	<b>87.47%</b>	98.18%	<b>No</b>	<b>No</b>	<b>No</b>	Yes
<i>Battagram</i>	96.89%	94.16%	<b>70.15%</b>	98.82%	Yes	Yes	<b>No</b>	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%	<b>No</b>	Yes	Yes	Yes
<i>Mirpur Khas</i>	94.29%	98.47%	84.87%	99.24%	Yes	Yes	<b>No</b>	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%	<b>89.87%</b>	N/A	N/A	Yes	<b>No</b>
<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	<b>1.68 Mbps</b>	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	<b>1.98</b>	5.22	9.09	Second	<b>Fourth</b>	Third	First
<i>Loralai</i>	4.89	<b>0.83</b>	6.14	8.52	Third	<b>Fourth</b>	Second	First
<i>Mansehra</i>	10.32	<b>1.95</b>	22.85	11.93	Third	<b>Fourth</b>	First	Second
<i>Dera Allah Yar</i>	5.25	<b>1.04</b>	3.08	10.55	Second	Fourth	Third	First
<i>Dera Murad Jamali</i>	5.50	<b>1.76</b>	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	<b>1.62</b>	24.82	21.82	Third	<b>Fourth</b>	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>	<b>197.21</b>	N/A	N/A	N/A	<b>First</b>	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.



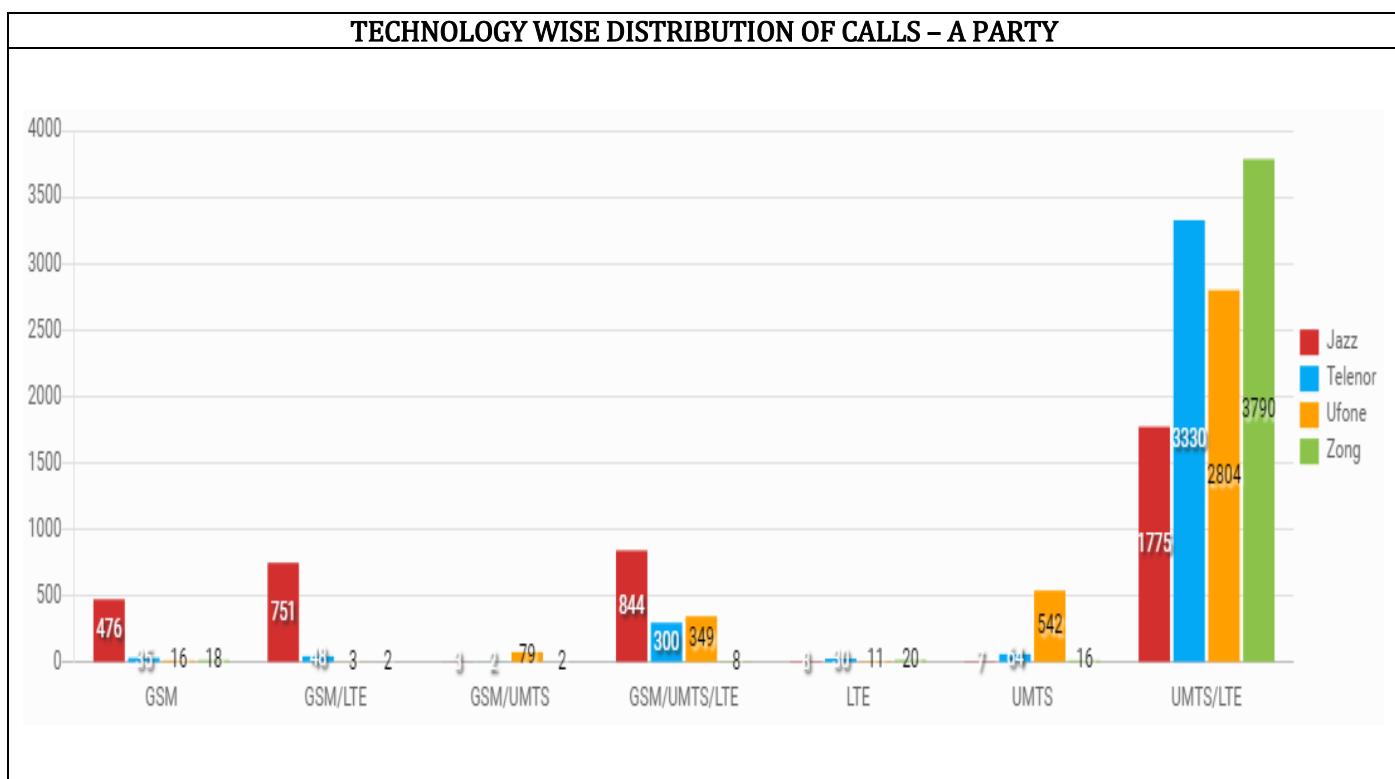
## VOICE SERVICE

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**.

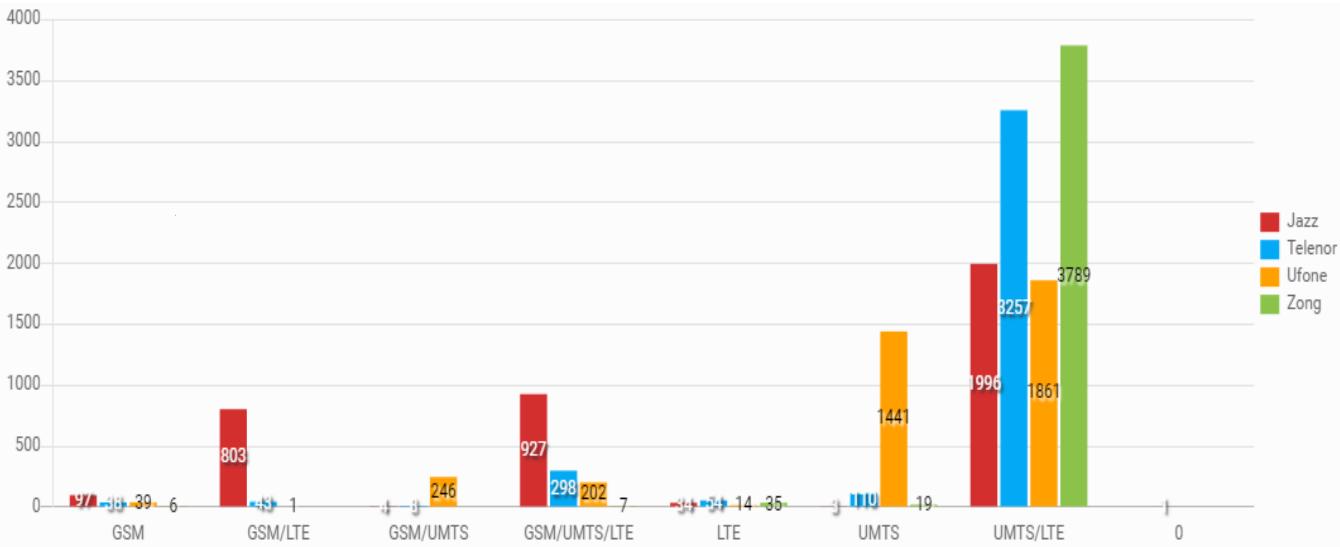
DESCRIPTION	JAZZ	TELENOR	UFONE	ZONG
<i>TOTAL CALLS ATTEMPTS</i>	3864	3809	3804	3856
<i>FAILED CALLS ATTEMPTS</i>	60	120	58	76
<i>ESTABLISHED CALLS ATTEMPTS</i>	3804	3689	3746	3780
<i>DROPPED CALLS ATTEMPTS</i>	12	40	19	13
<i>COMPLETED CALLS ATTEMPTS</i>	3792	3649	3727	3767
<i>CALL SETUP SUCCESS RATE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

**Table5.1: Call Statistics**

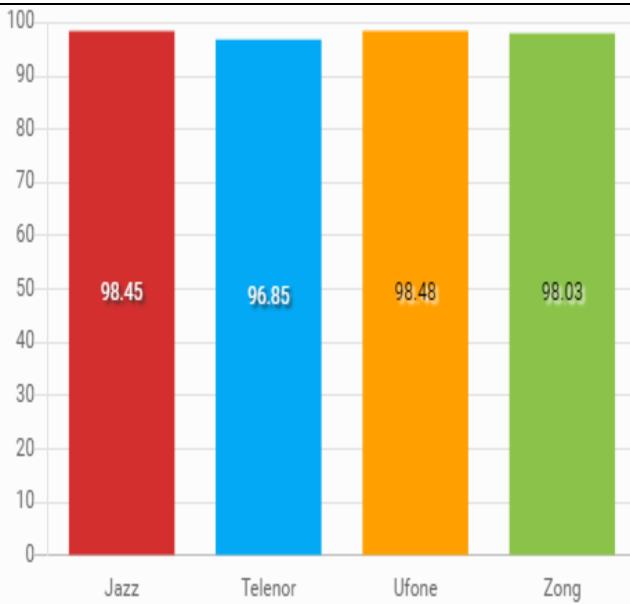
5.2. The overall Call Setup Success Rate and Call Retainability alongwith Mean Opinion Score (MOS), the percentage of mute calls, MOS with respect to Voice CODEC and Technology per band is shown as under:



### TECHNOLOGY WISE DISTRIBUTION OF CALLS – B PARTY



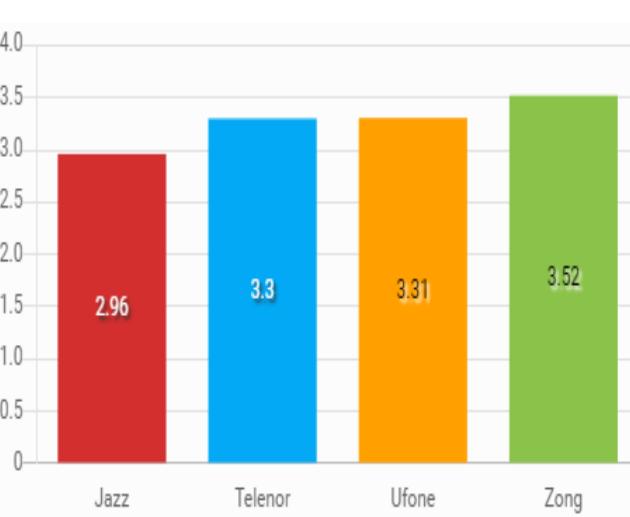
### CALL SETUP SUCCESS RATE



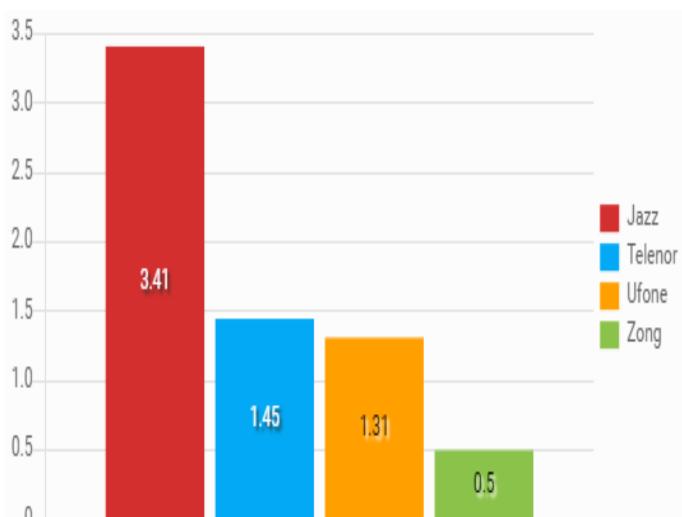
### CALL RETAINABILITY

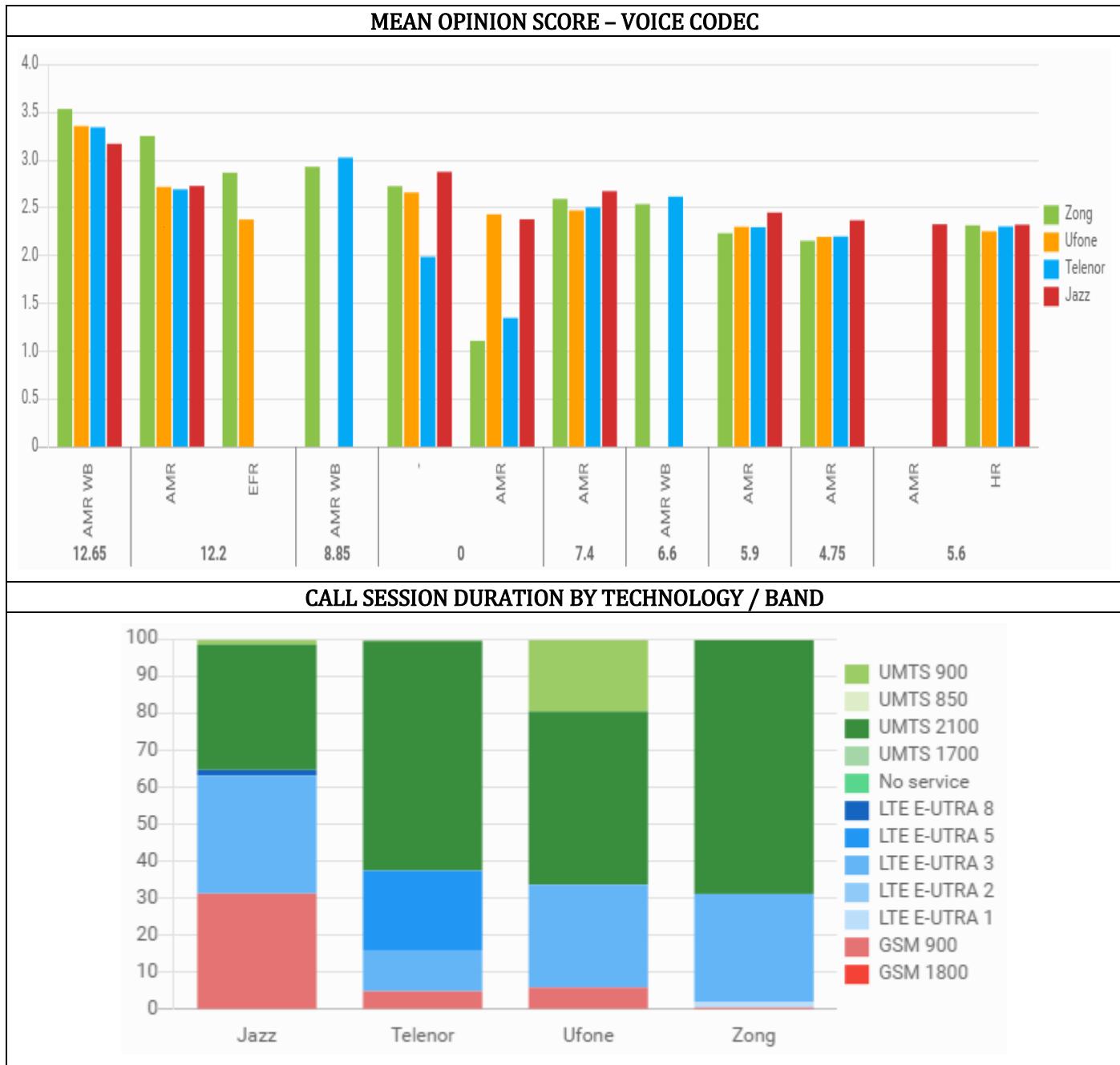


### MEAN OPINION SCORE - AVERAGE



### 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

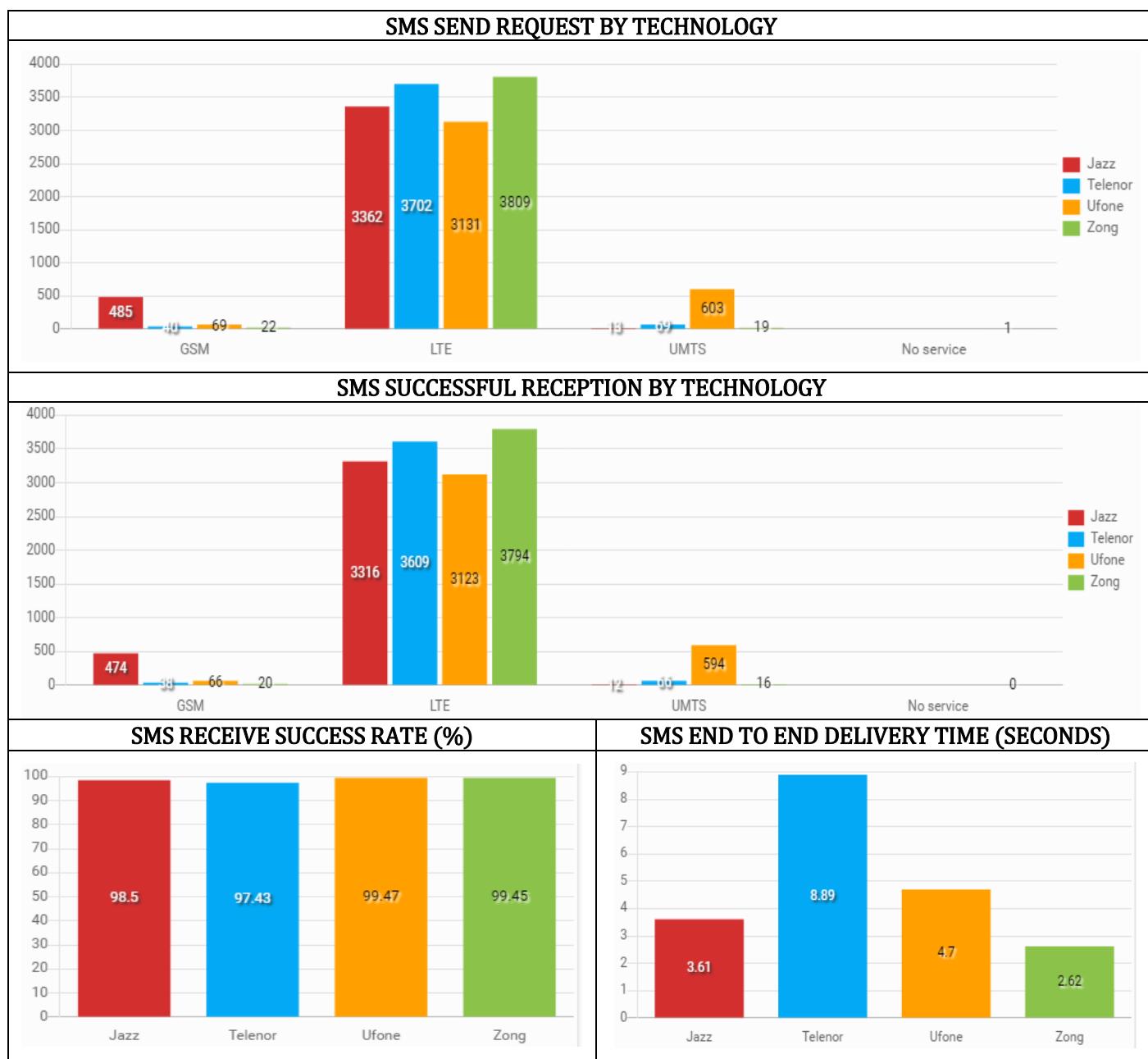
## SMS SERVICE

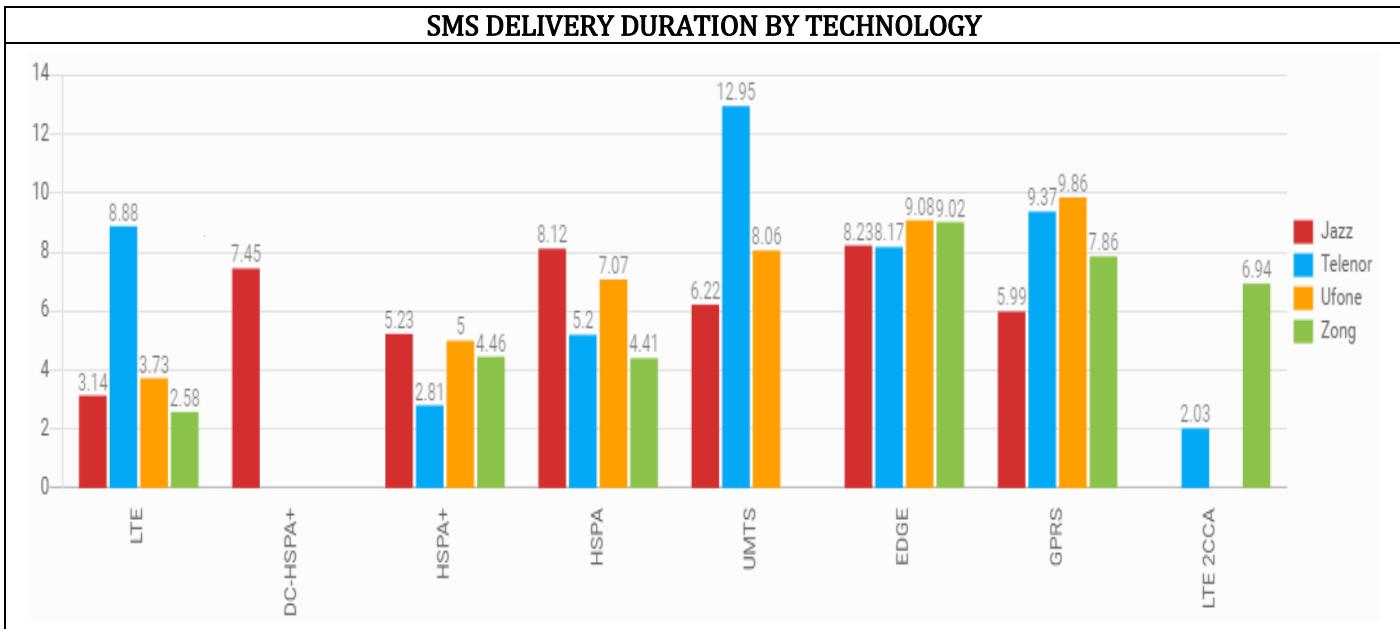
6.1. A total of **15,325 SMS sending attempts** conducted, out of which **15,128 SMS successfully received** at B-Party. The company wise SMS Statistics are shown in **Table6.1: SMS Statistics**

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>	<b>98.5 %</b>	<b>97.43 %</b>	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 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> & 4<sup>th</sup> 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 <sup>st</sup>	
2.	Telenor	17	7	1	-	2 <sup>nd</sup>	
3.	Jazz	14	10	4	-	3 <sup>rd</sup>	
4.	Ufone	11	17	7	-	4 <sup>th</sup>	

**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 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>		
1.	ZonG	12	6	-	-	-	4	2	4	1 <sup>st</sup>	4 <sup>th</sup>
2.	Ufone	6	6	4	1	15	2	-	-	2 <sup>nd</sup>	1 <sup>st</sup>
3.	Jazz	-	5	12	1	1	5	3	-	3 <sup>rd</sup>	2 <sup>nd</sup>
4.	Telenor	-	1	2	15	1	2	2	-	4 <sup>th</sup>	3 <sup>rd</sup>

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	1 <sup>st</sup>
2.	Ufone	113	12	2 <sup>nd</sup>
3.	Jazz	131	18	3 <sup>rd</sup>
4.	Telenor	104	16	4 <sup>th</sup>

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 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>
1.	Mobile Network Coverage	ZonG	Telenor	Jazz	Ufone
2.	Mobile Broadband	3G	Ufone	Jazz	Telenor
		4G	ZonG	Ufone	Jazz
3.	Voice	ZonG	Ufone	Jazz	Telenor

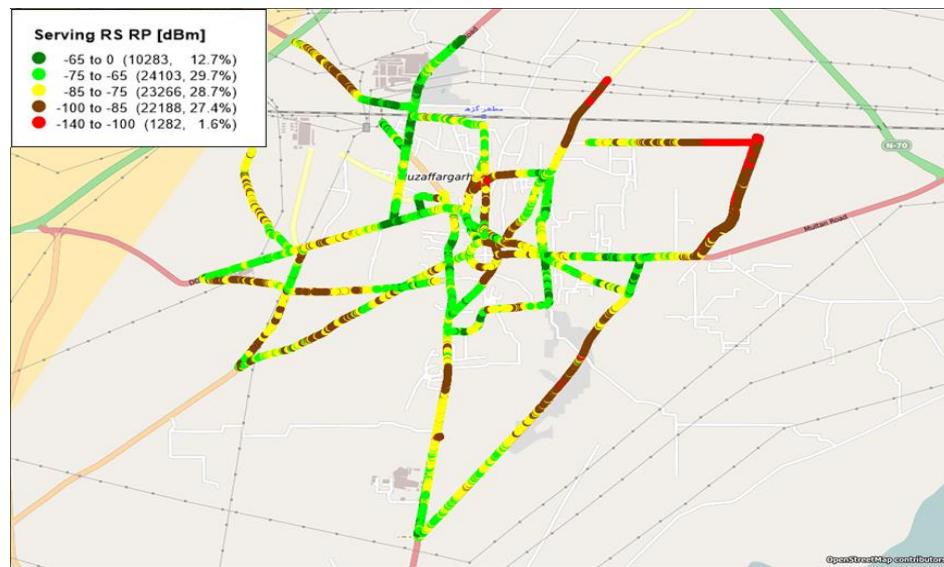
Table 8.4: CMOs Overall Standing in QoS Survey

**ANNEX - A**

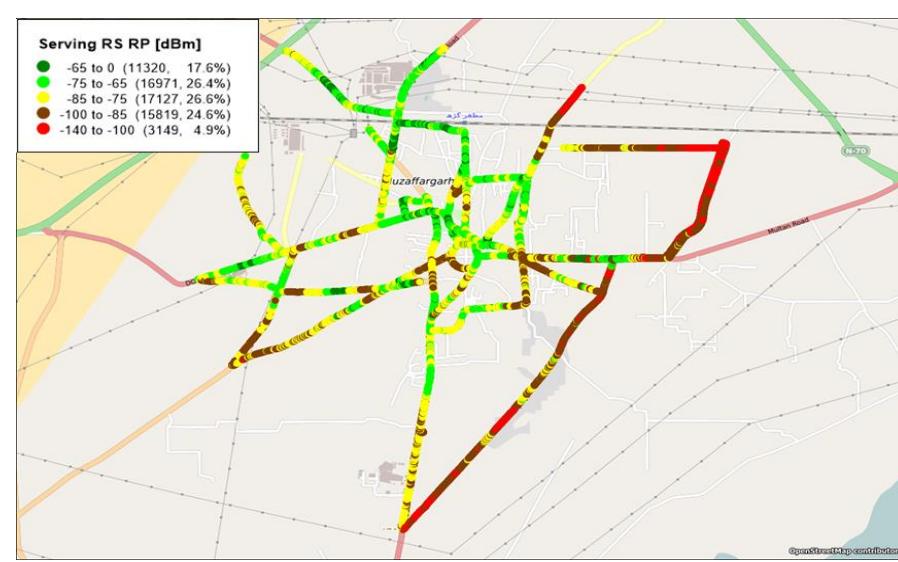
**PUNJAB**

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

JAZZ 4G NETWORK COVERAGE – MUZAFFARGARH



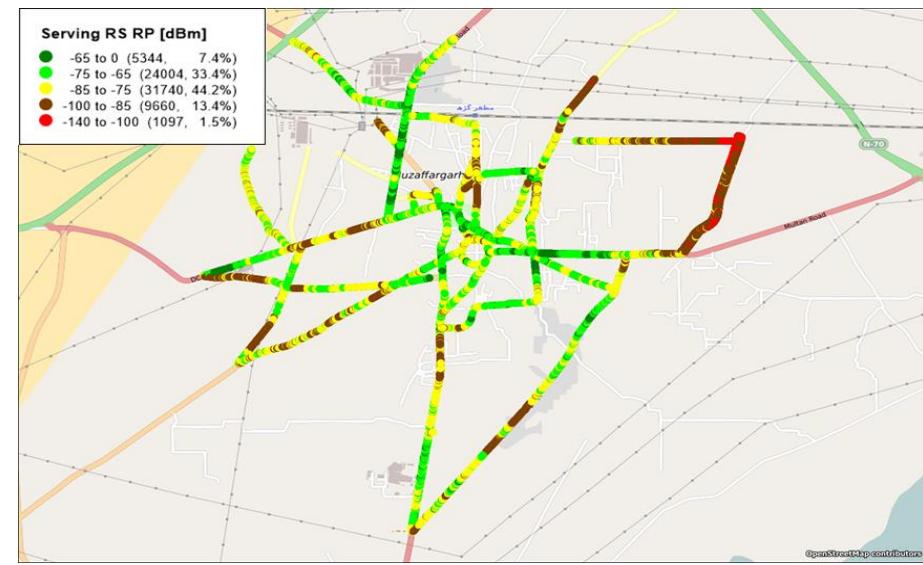
TELENOR 4G NETWORK COVERAGE – MUZAFFARGARH



UFONE 4G NETWORK COVERAGE – MUZAFFARGARH

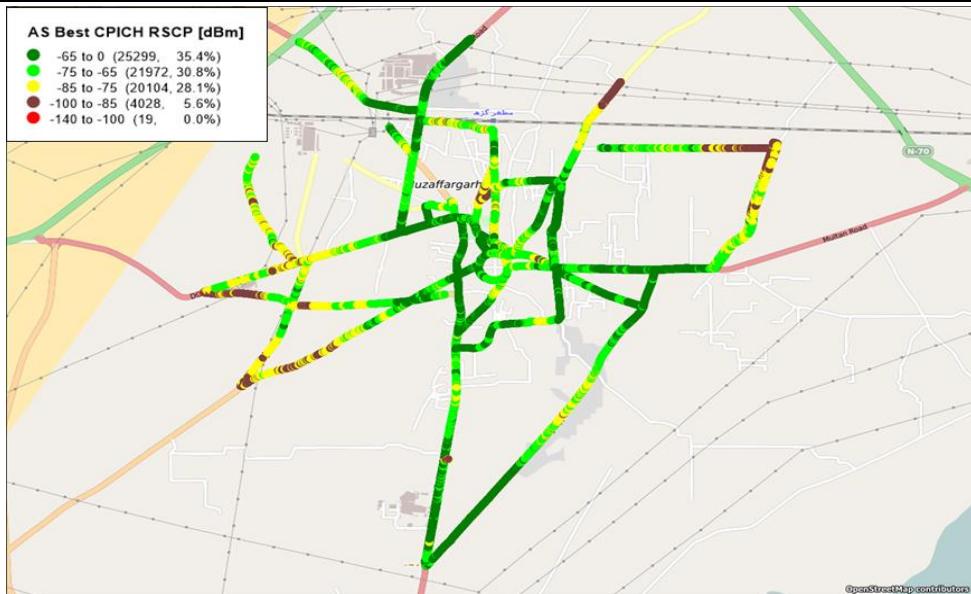
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ZONG 4G NETWORK COVERAGE – MUZAFFARGARH

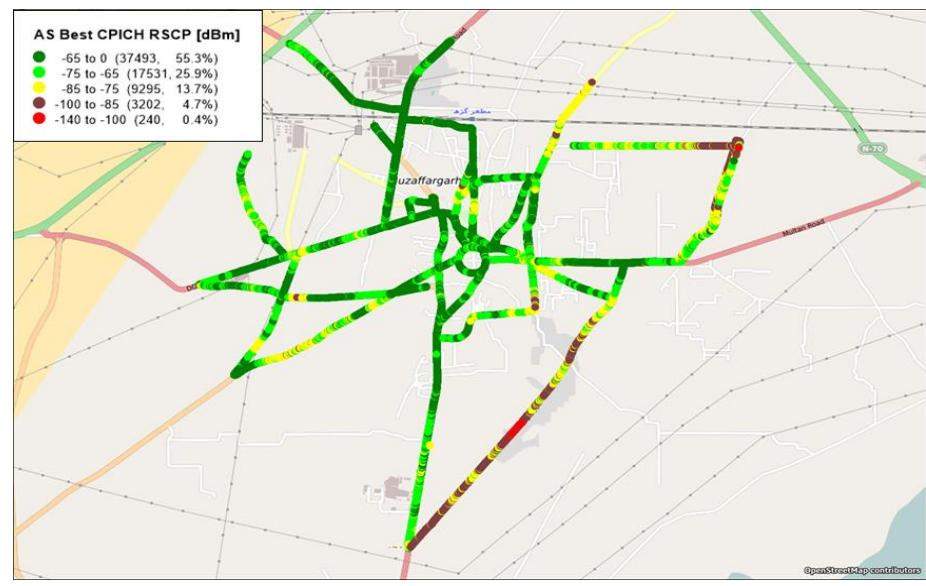


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

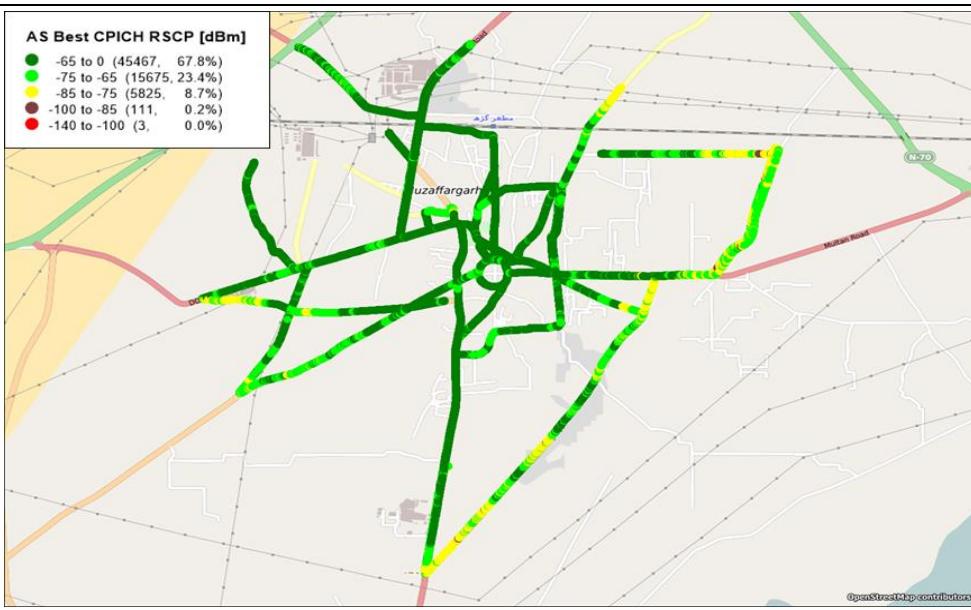
JAZZ 3G NETWORK COVERAGE – MUZAFFARGARH



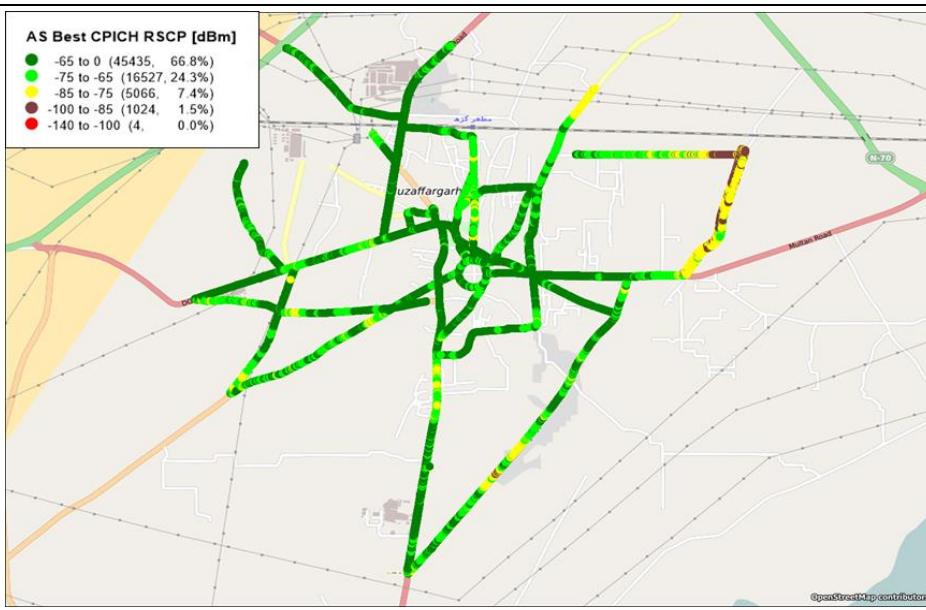
TELENOR 3G NETWORK COVERAGE – MUZAFFARGARH



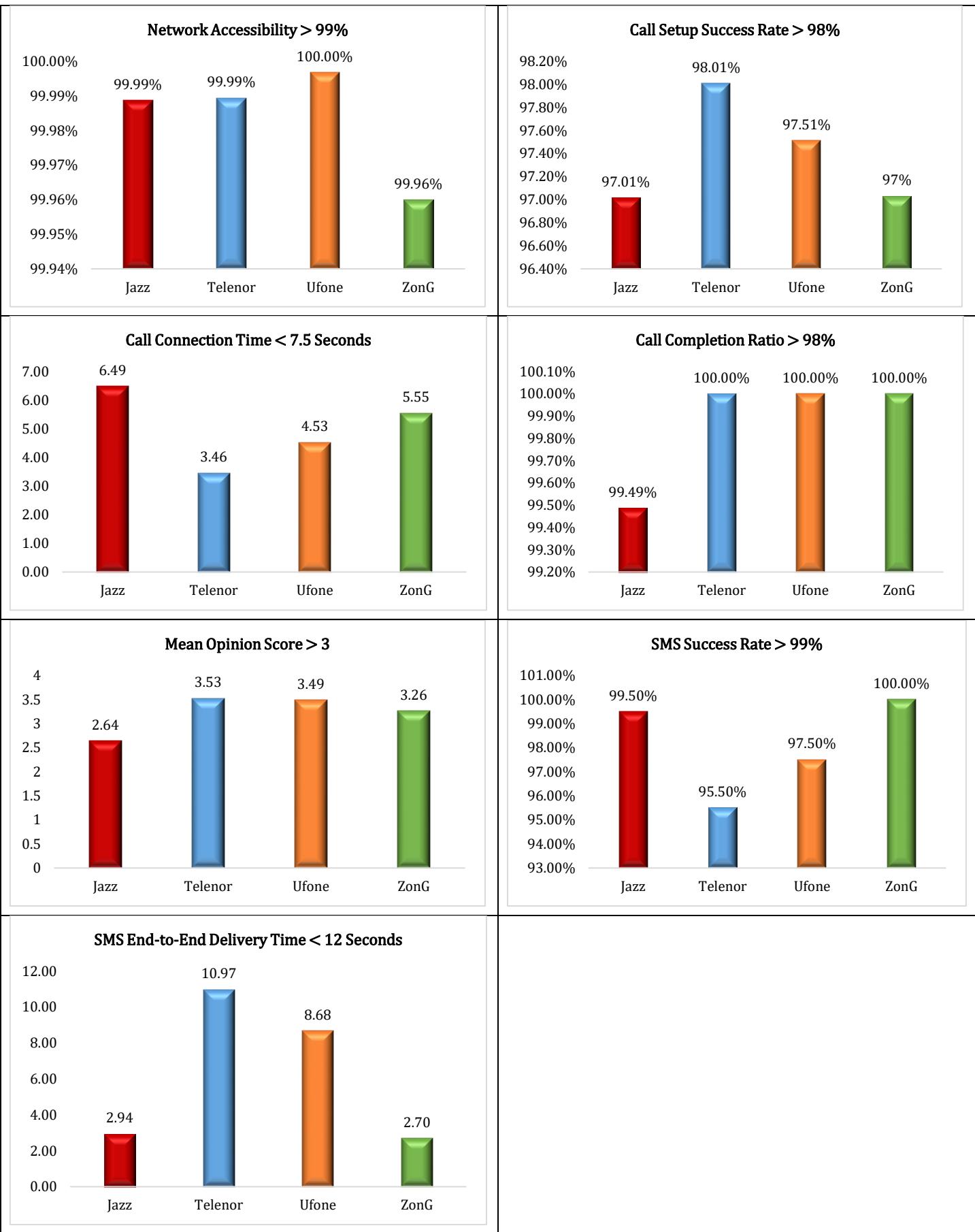
UFONE 3G NETWORK COVERAGE – MUZAFFARGARH



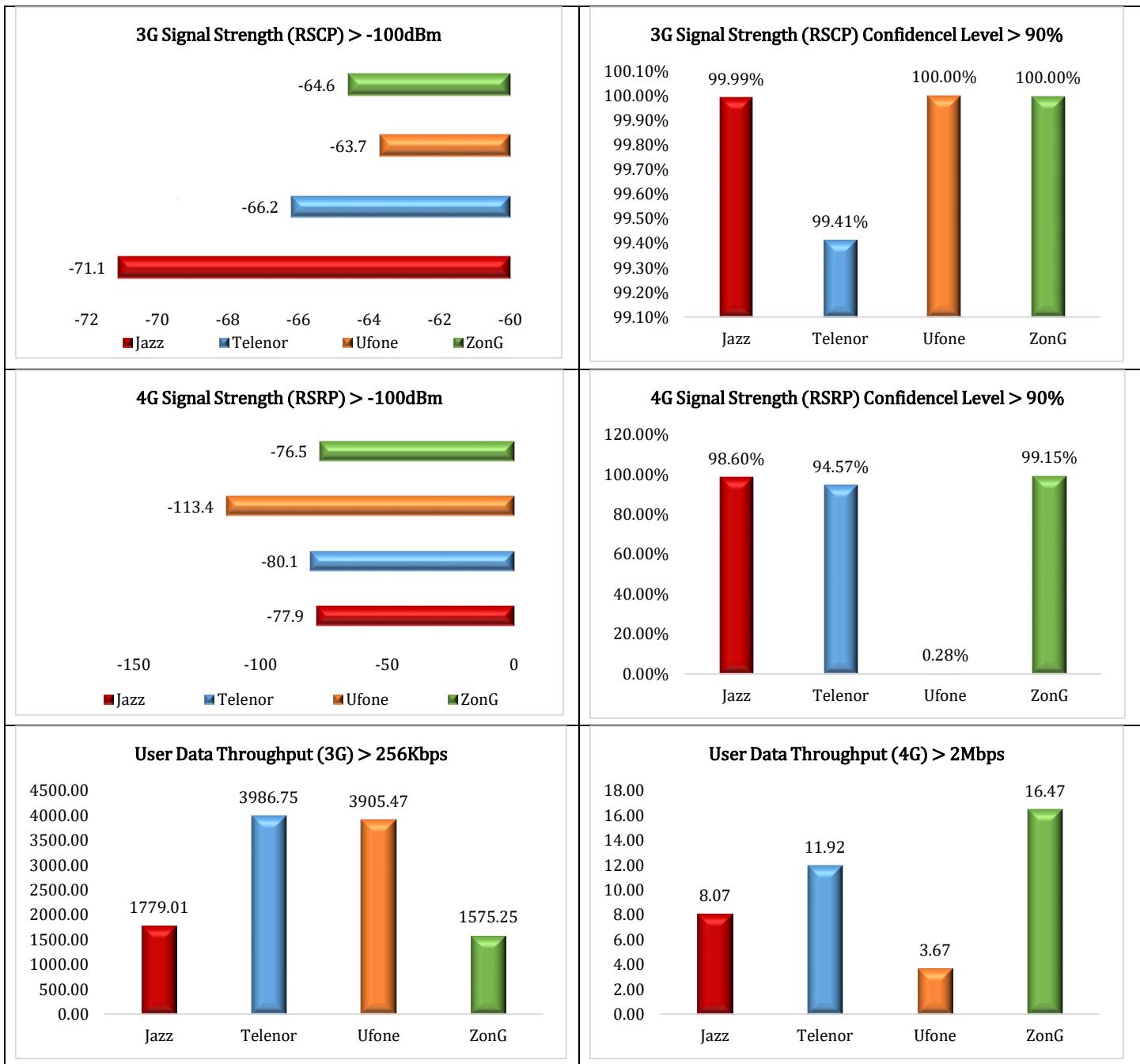
ZONG 3G NETWORK COVERAGE – MUZAFFARGARH



## QUALITY OF SERVICE SURVEY RESULTS – MUZAFFARGARH

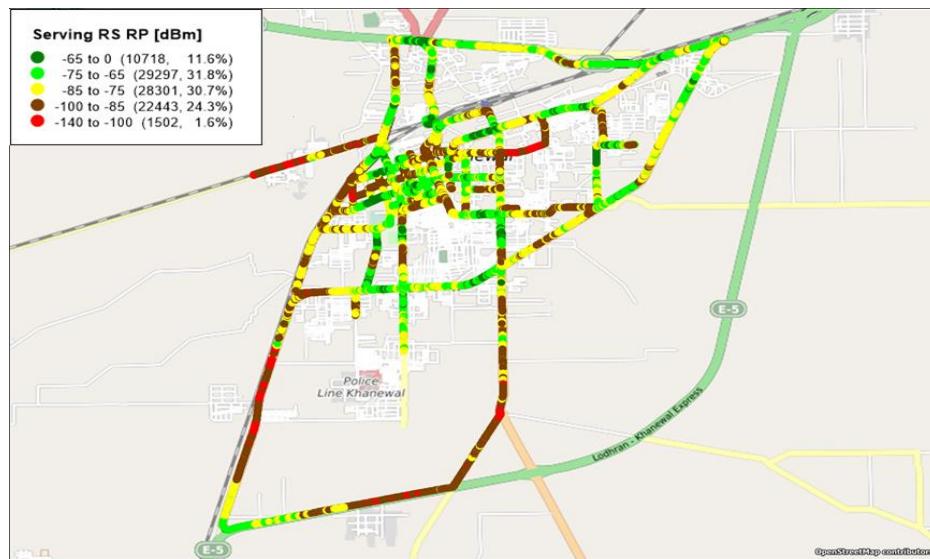


## QUALITY OF SERVICE SURVEY RESULTS – MUZAFFARGARH

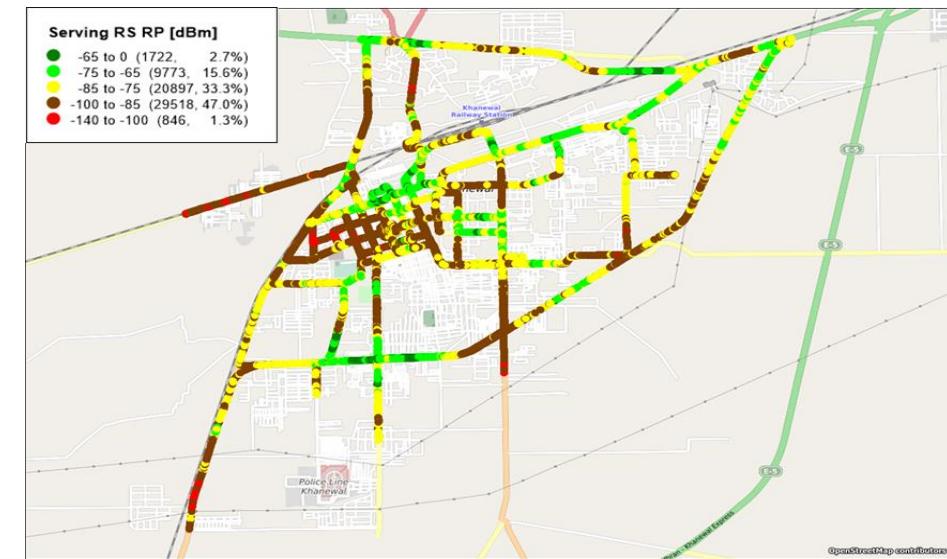


## 4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

JAZZ 4G NETWORK COVERAGE – KHANEWAL



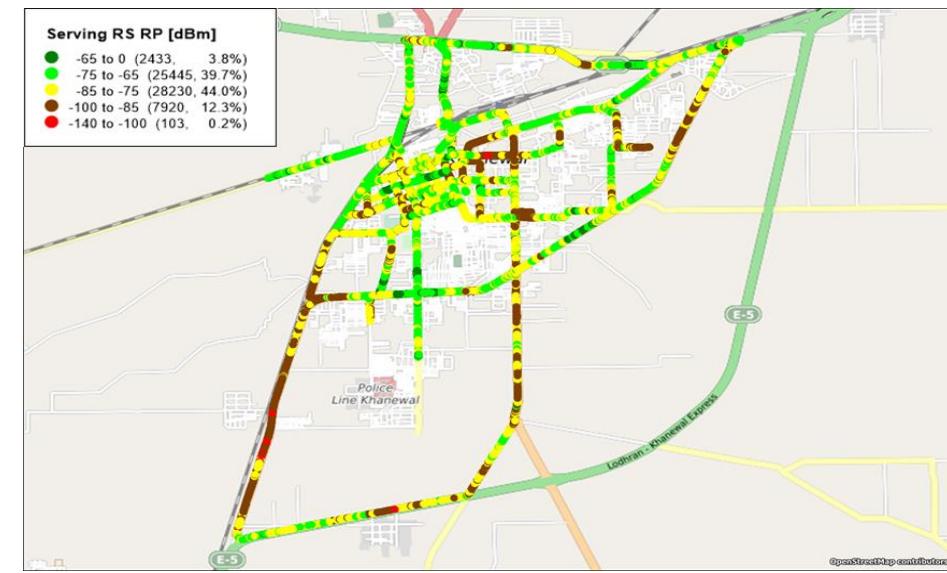
TELENOR 4G NETWORK COVERAGE – KHANEWAL



UFONE 4G NETWORK COVERAGE – KHANEWAL

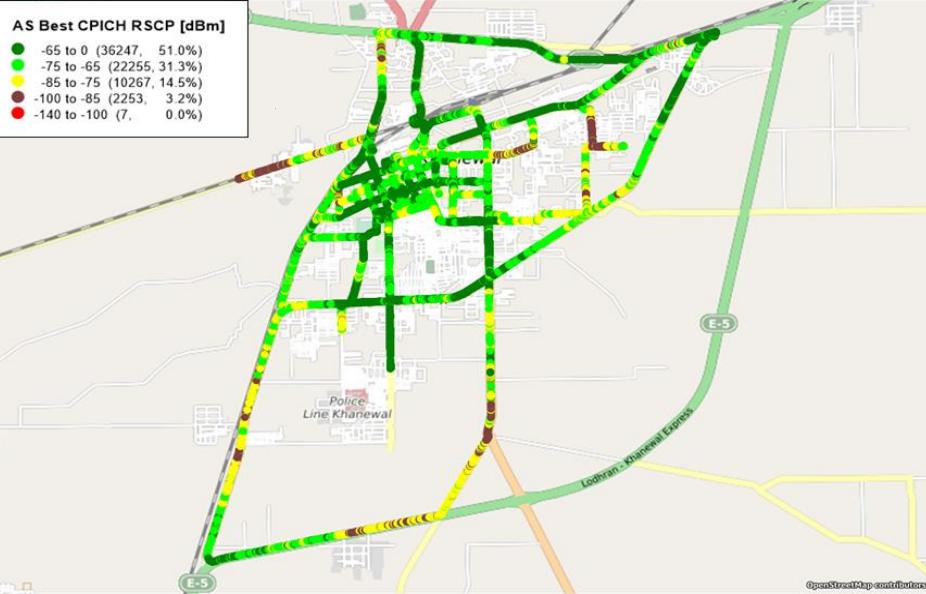
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ZONG 4G NETWORK COVERAGE – KHANEWAL

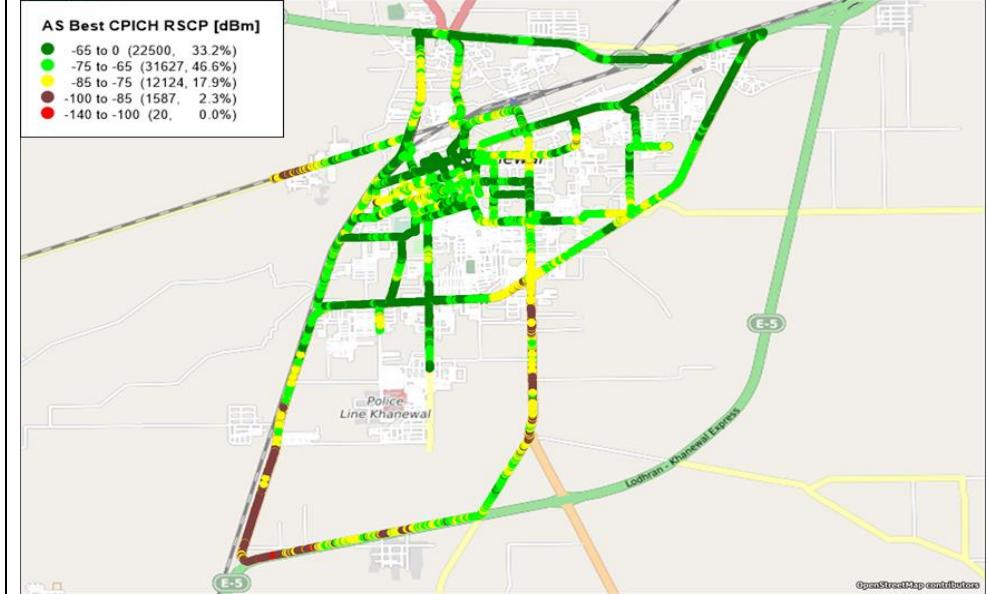


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

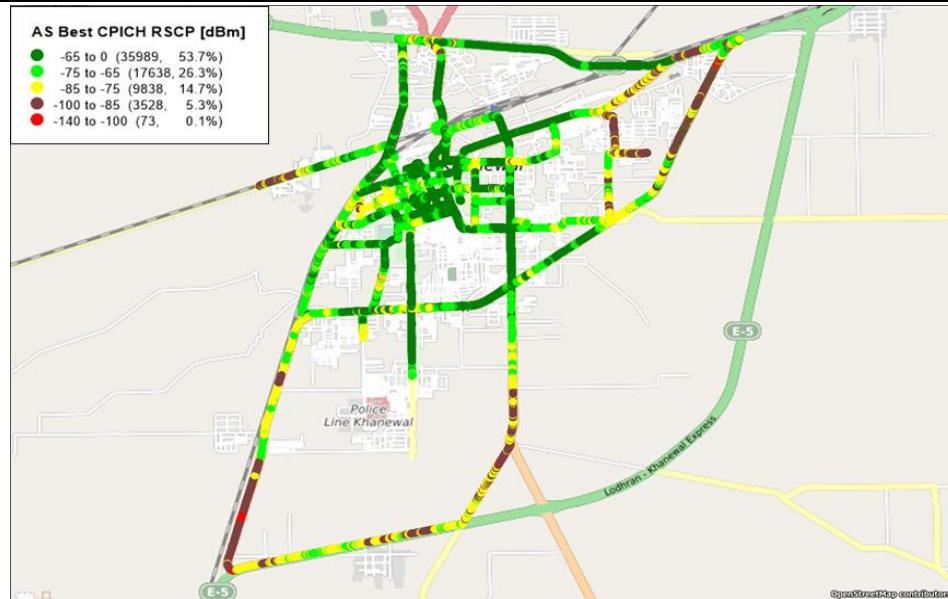
JAZZ 3G NETWORK COVERAGE – KHANEWAL



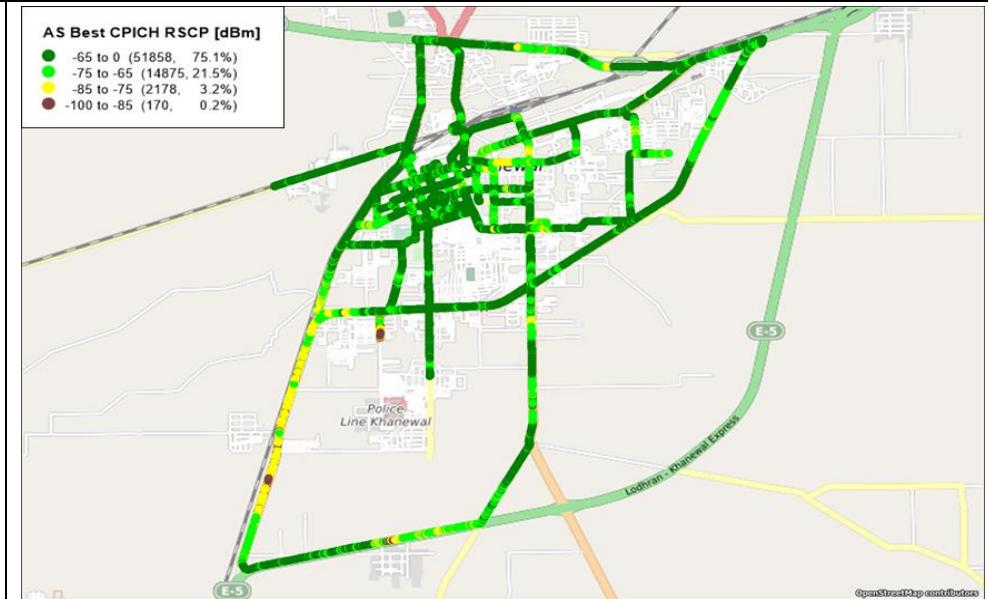
TELENOR 3G NETWORK COVERAGE – KHANEWAL



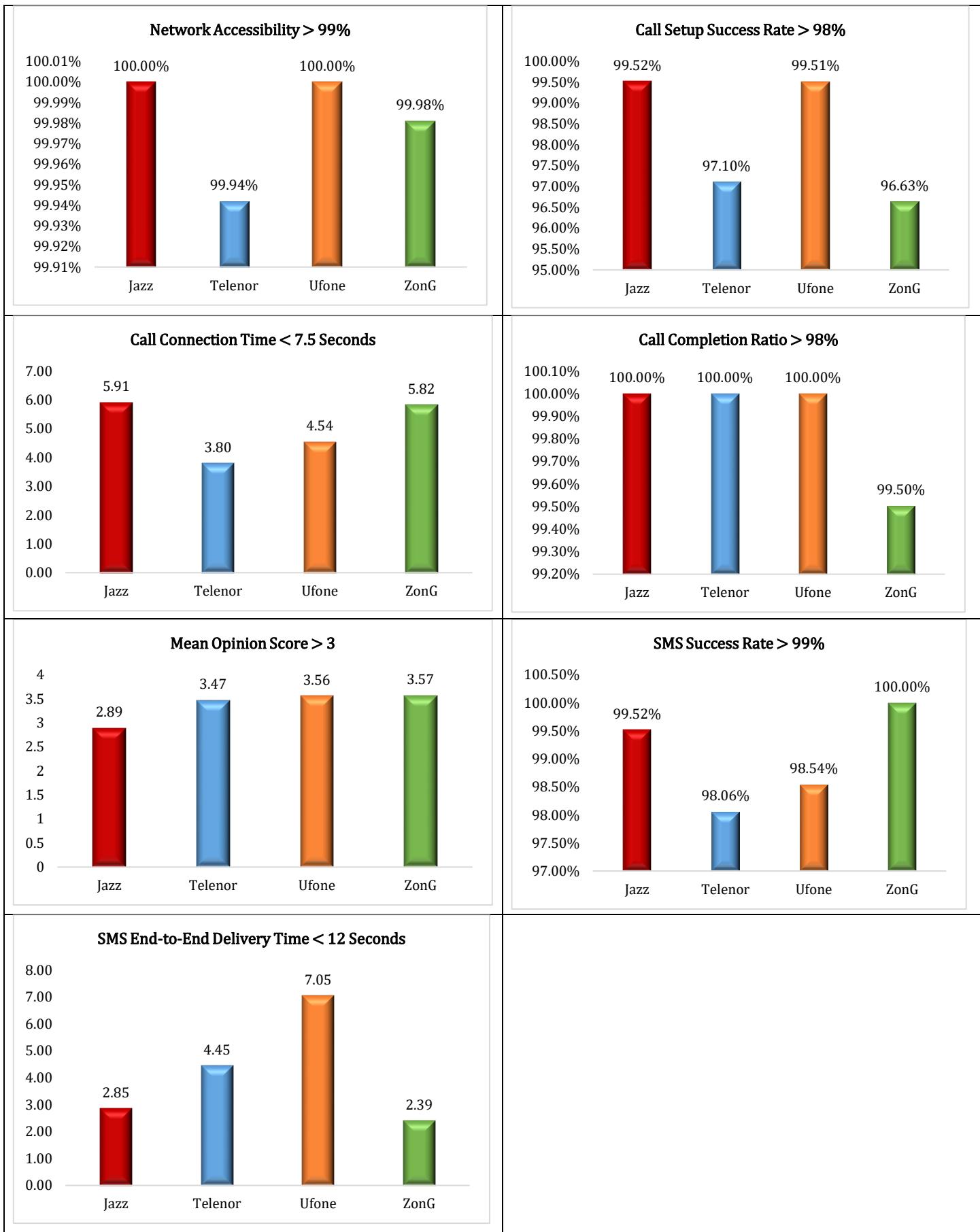
UFONE 3G NETWORK COVERAGE – KHANEWAL



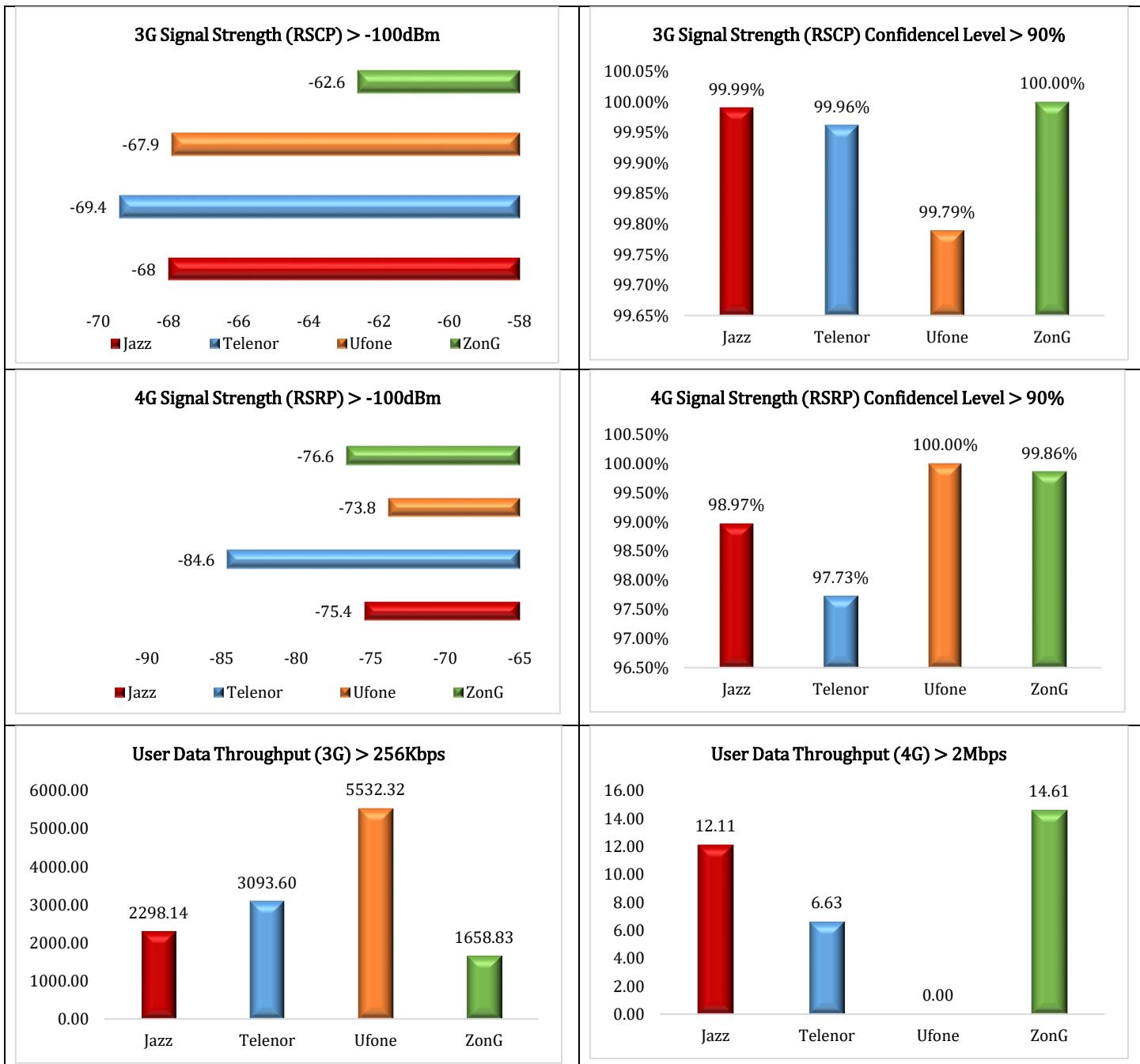
ZONG 3G NETWORK COVERAGE – KHANEWAL



## QUALITY OF SERVICE SURVEY RESULTS – KHANEWAL

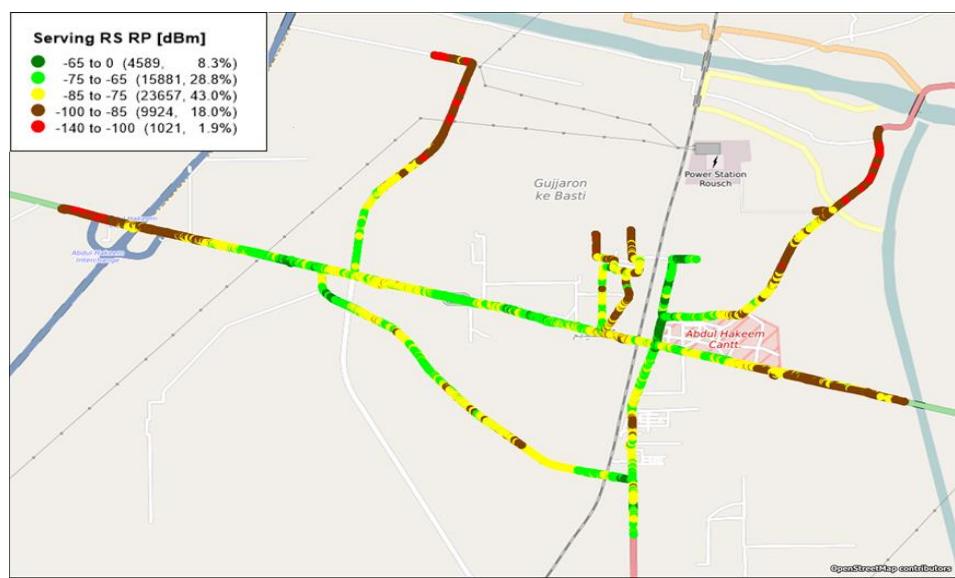


## QUALITY OF SERVICE SURVEY RESULTS – KHANEWAL

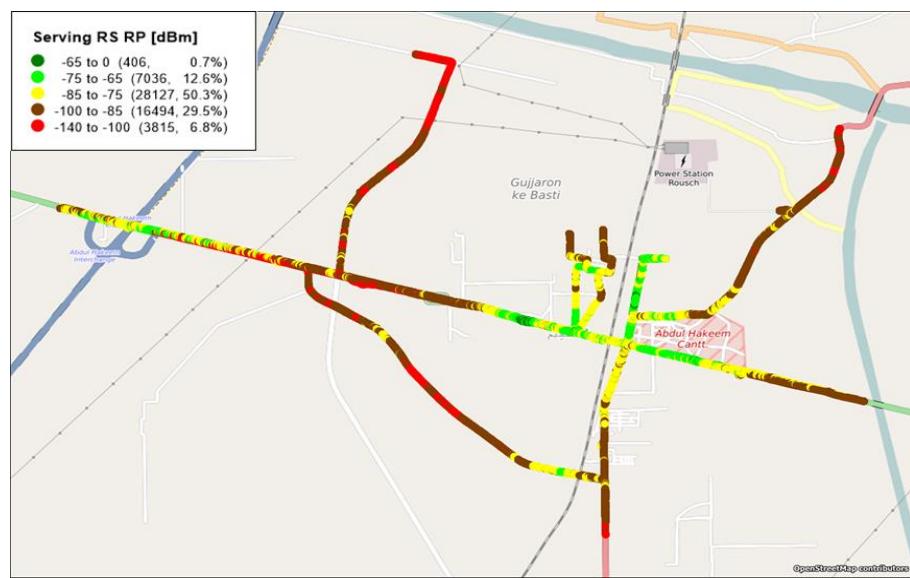


## 4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

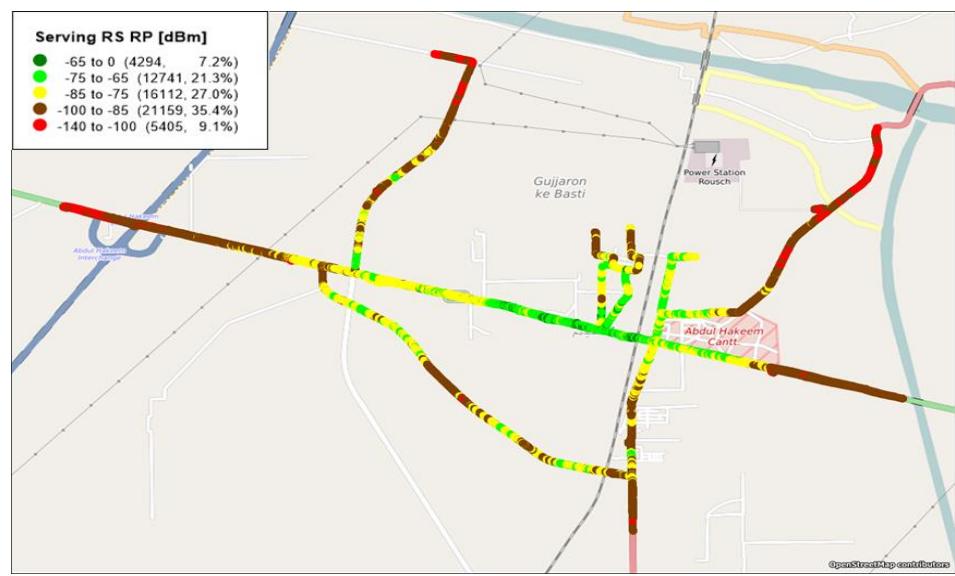
JAZZ 4G NETWORK COVERAGE – ABDUL HAKEEM



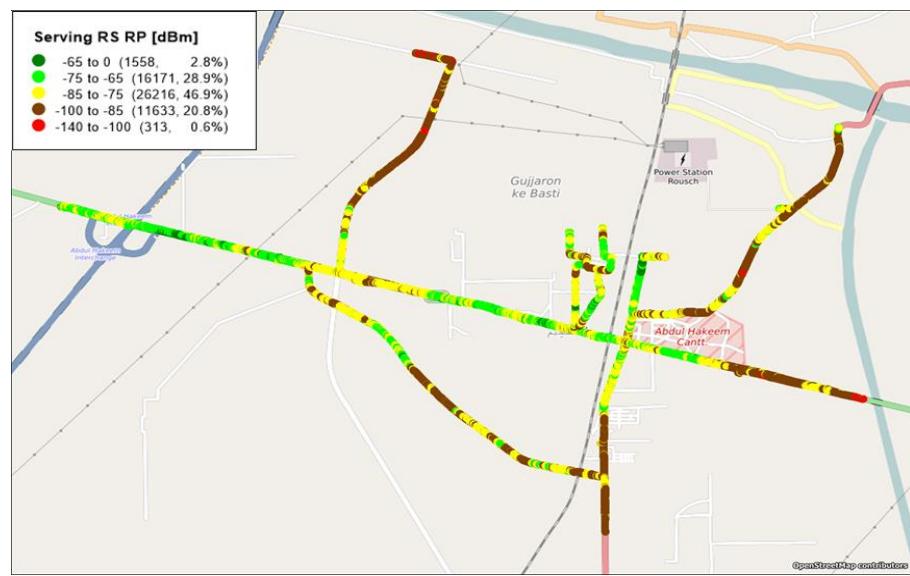
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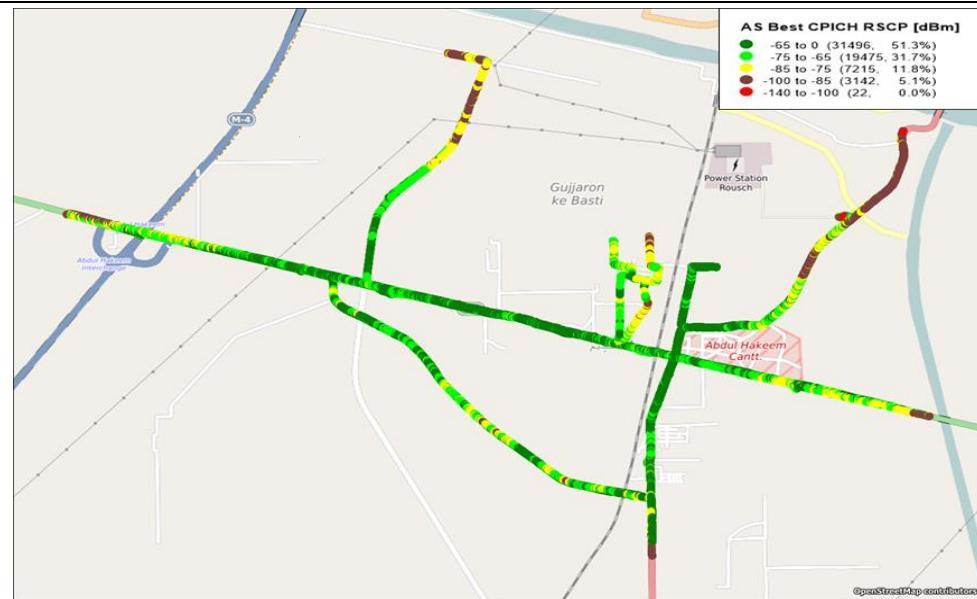


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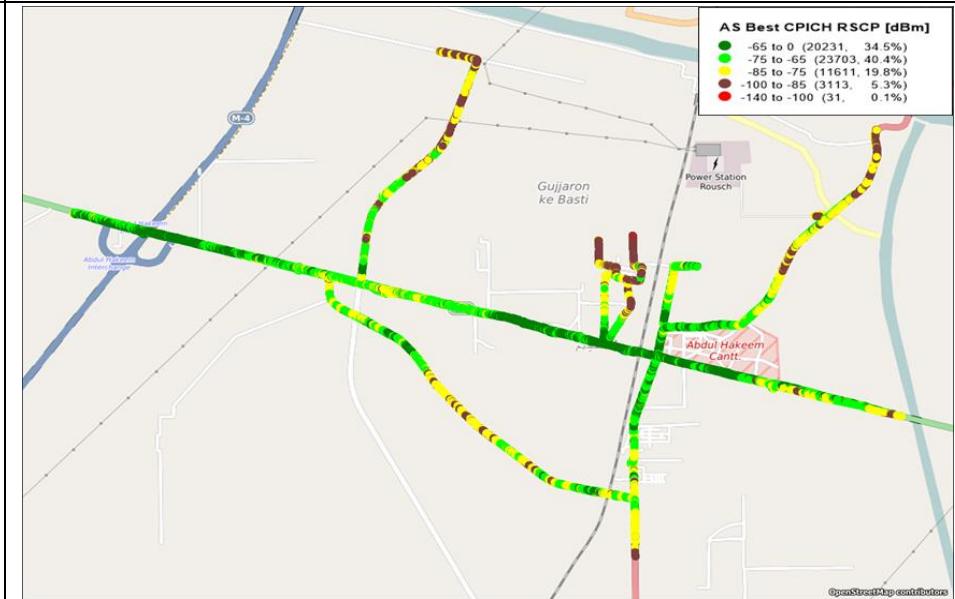


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

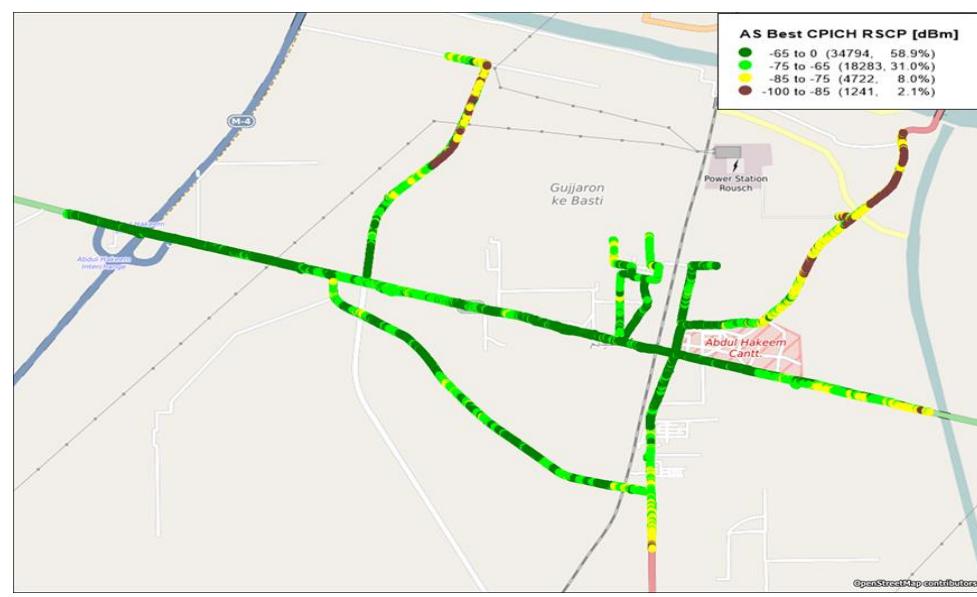
JAZZ 3G NETWORK COVERAGE – ABDUL HAKEEM



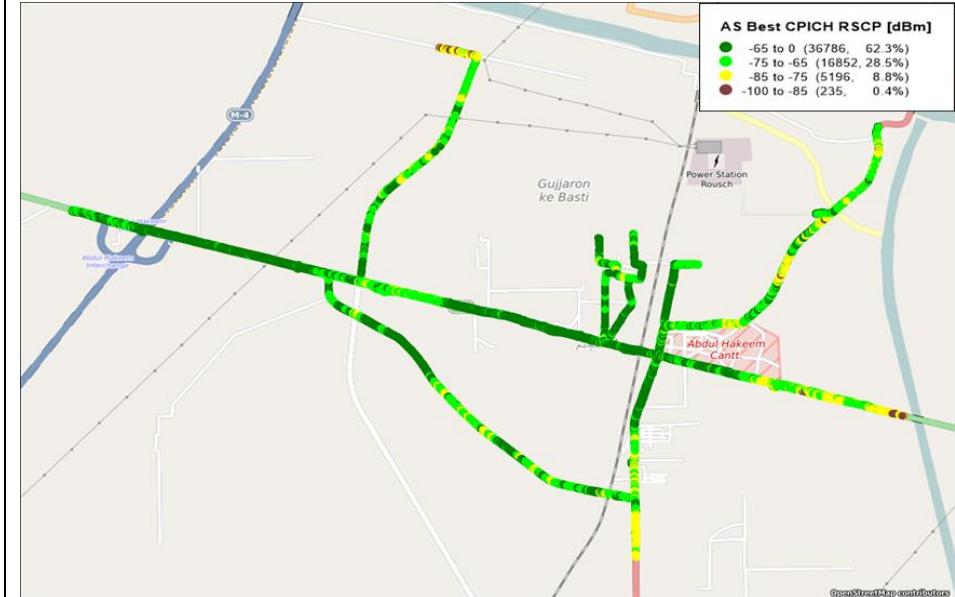
TELENOR 3G NETWORK COVERAGE – ABDUL HAKEEM



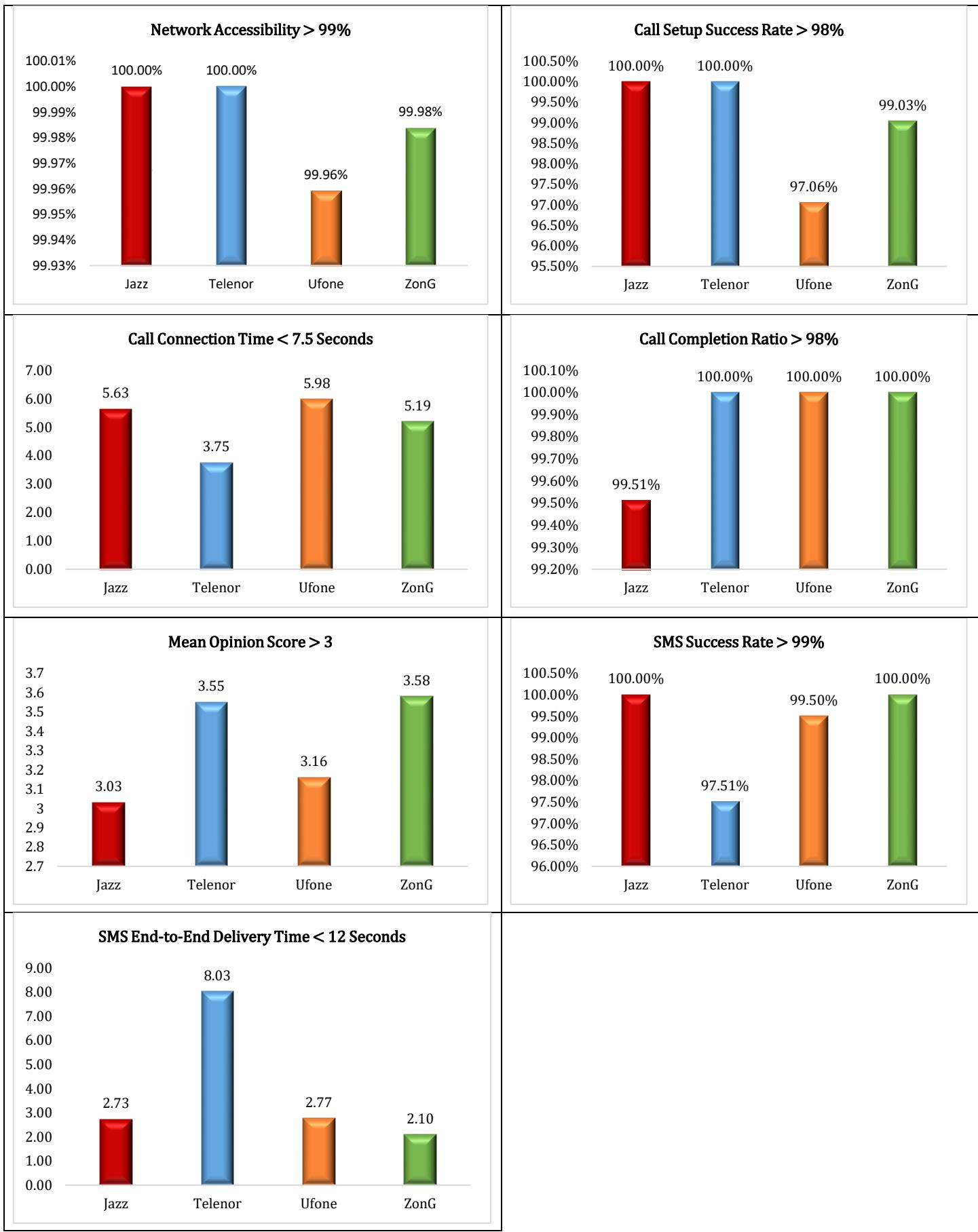
UFONE 3G NETWORK COVERAGE – ABDUL HAKEEM



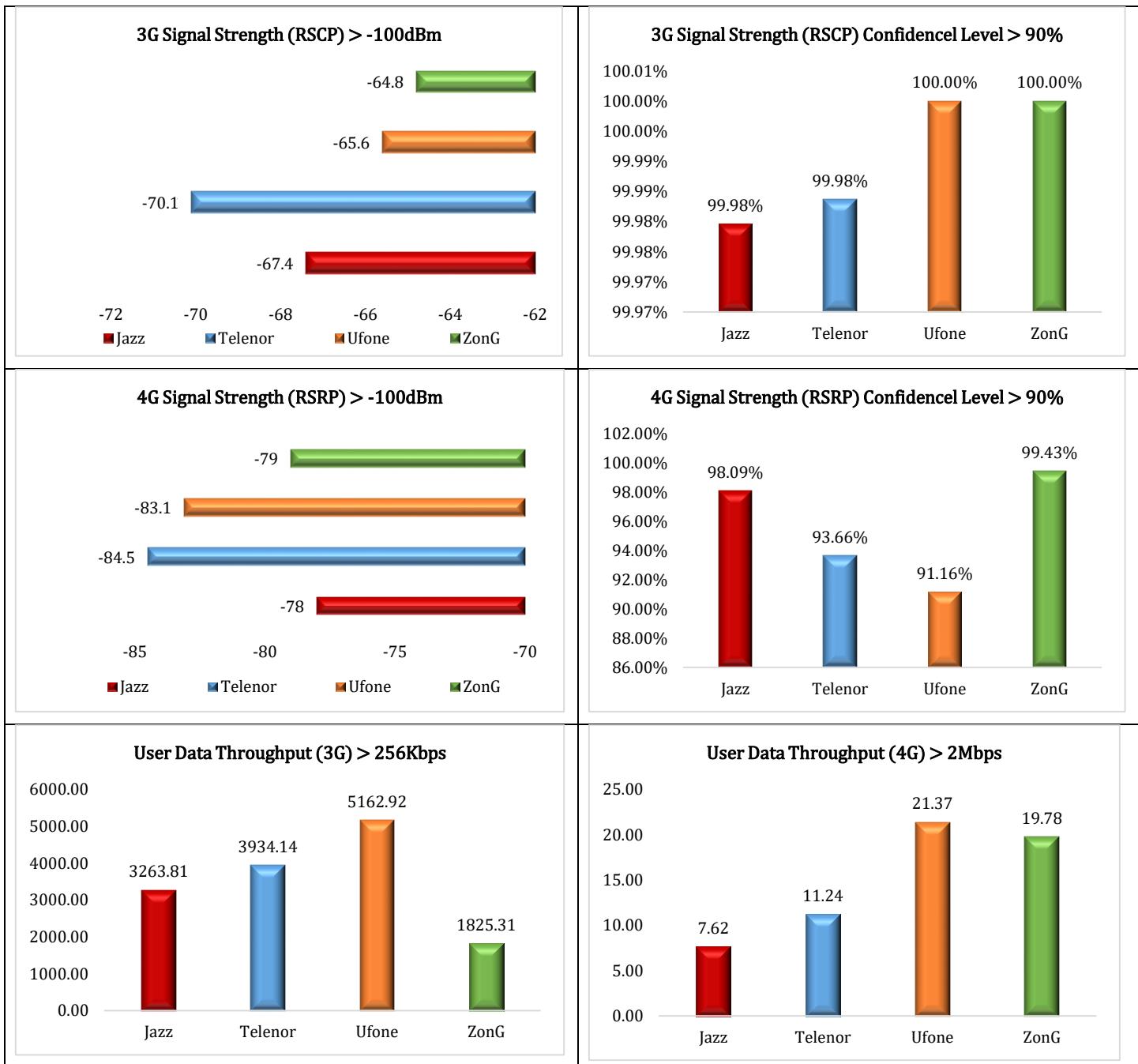
ZONG 3G NETWORK COVERAGE – ABDUL HAKEEM



## QUALITY OF SERVICE SURVEY RESULTS – ABDUL HAKEEM

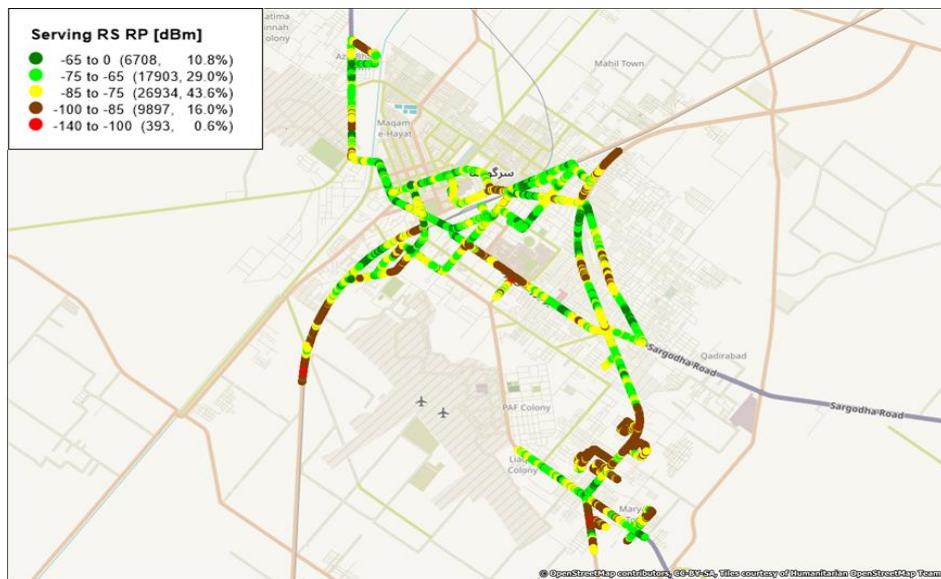


## QUALITY OF SERVICE SURVEY RESULTS – ABDUL HAKEEM

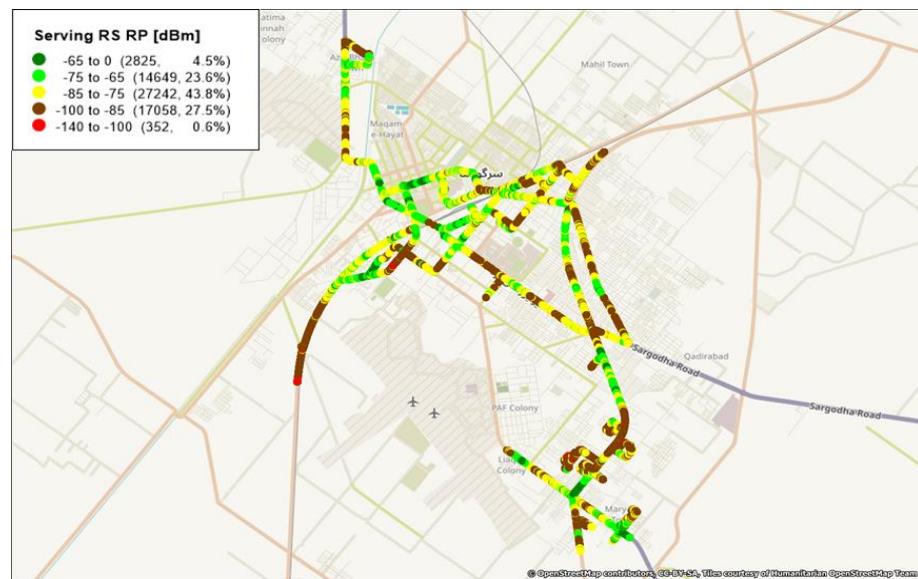


## 4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

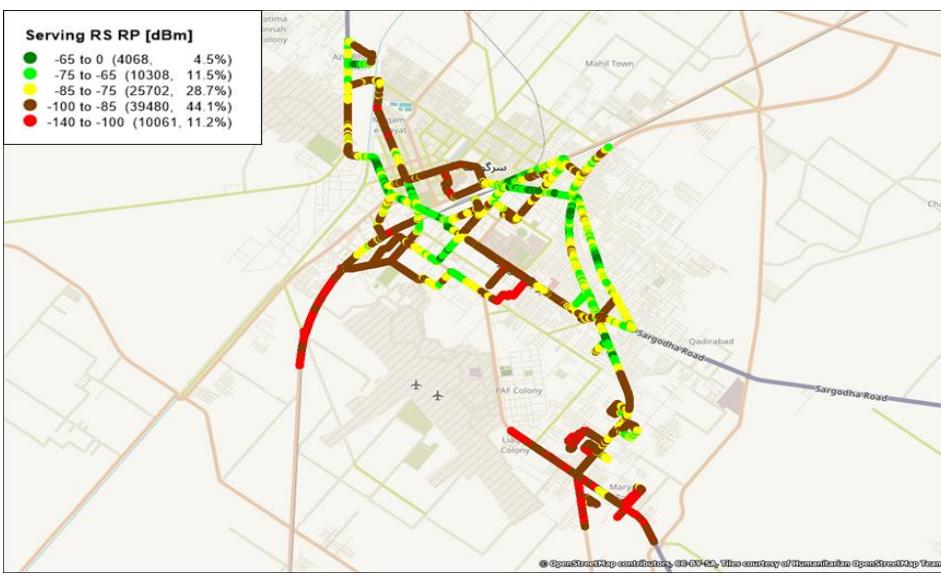
JAZZ 4G NETWORK COVERAGE – SARGODHA



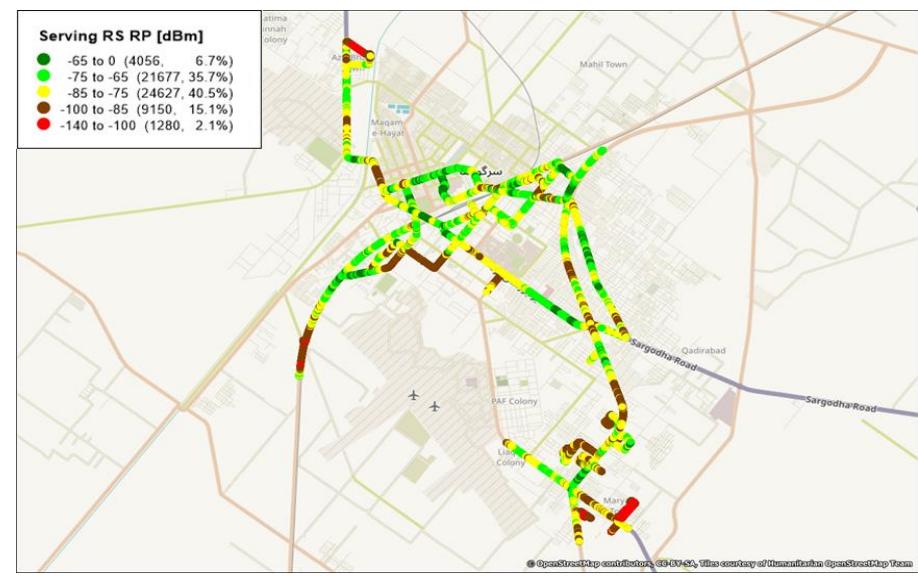
TELENOR 4G NETWORK COVERAGE – SARGODHA



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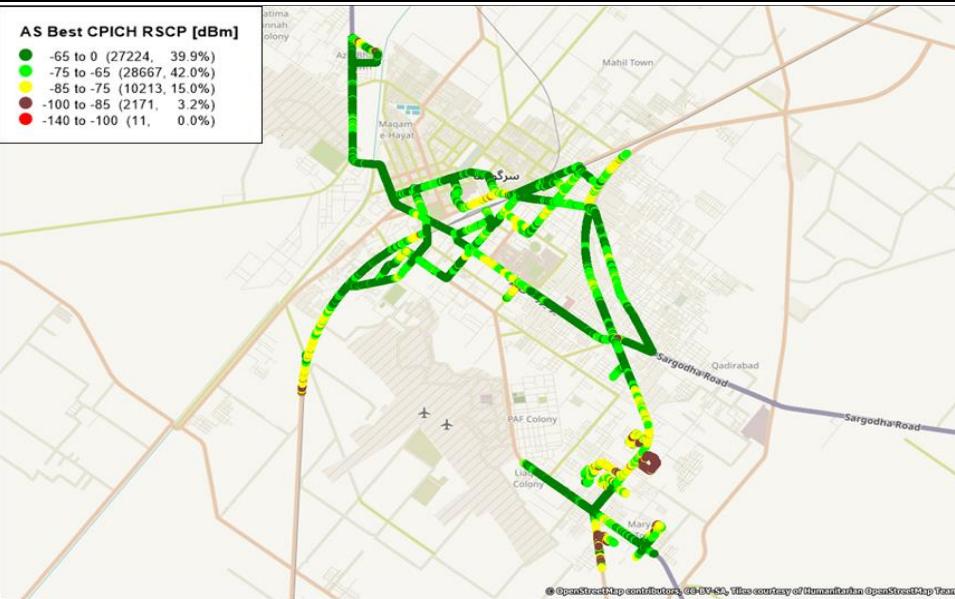


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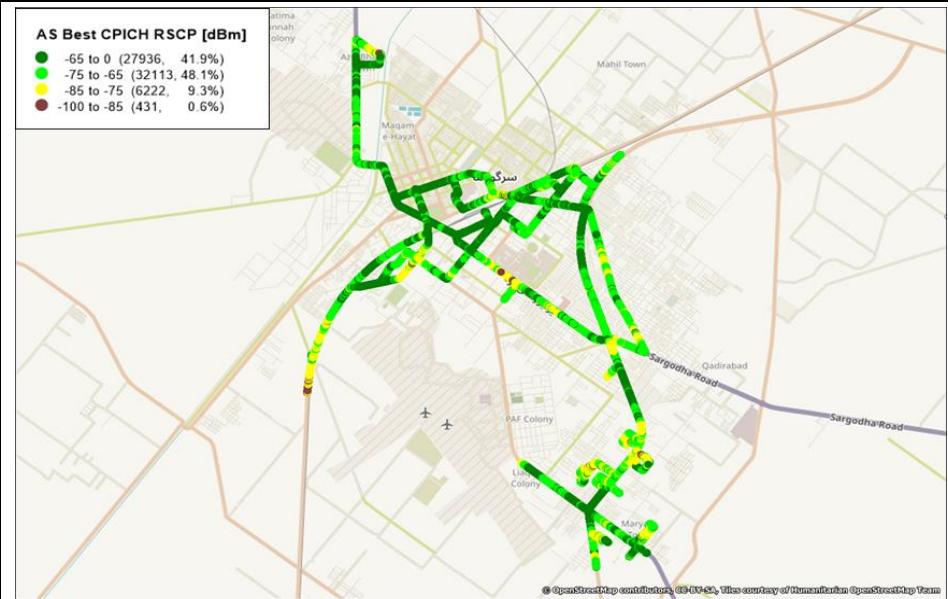


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

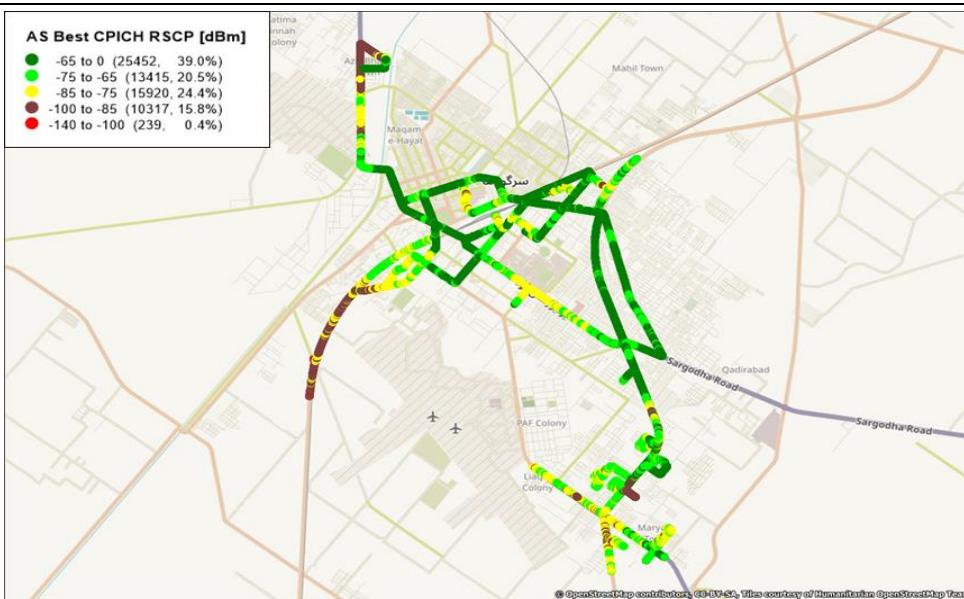
JAZZ 3G NETWORK COVERAGE – SARGODHA



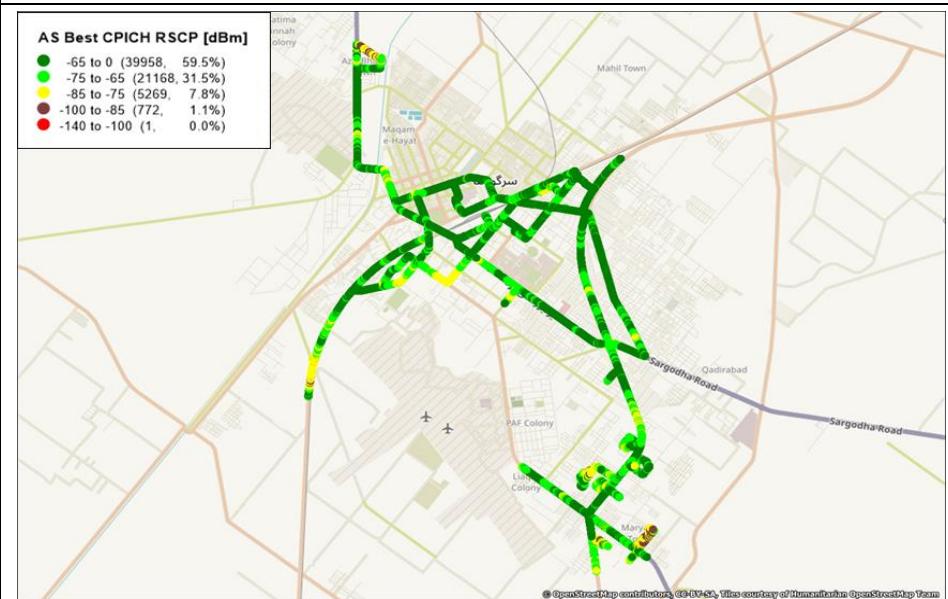
TELENOR 3G NETWORK COVERAGE – SARGODHA



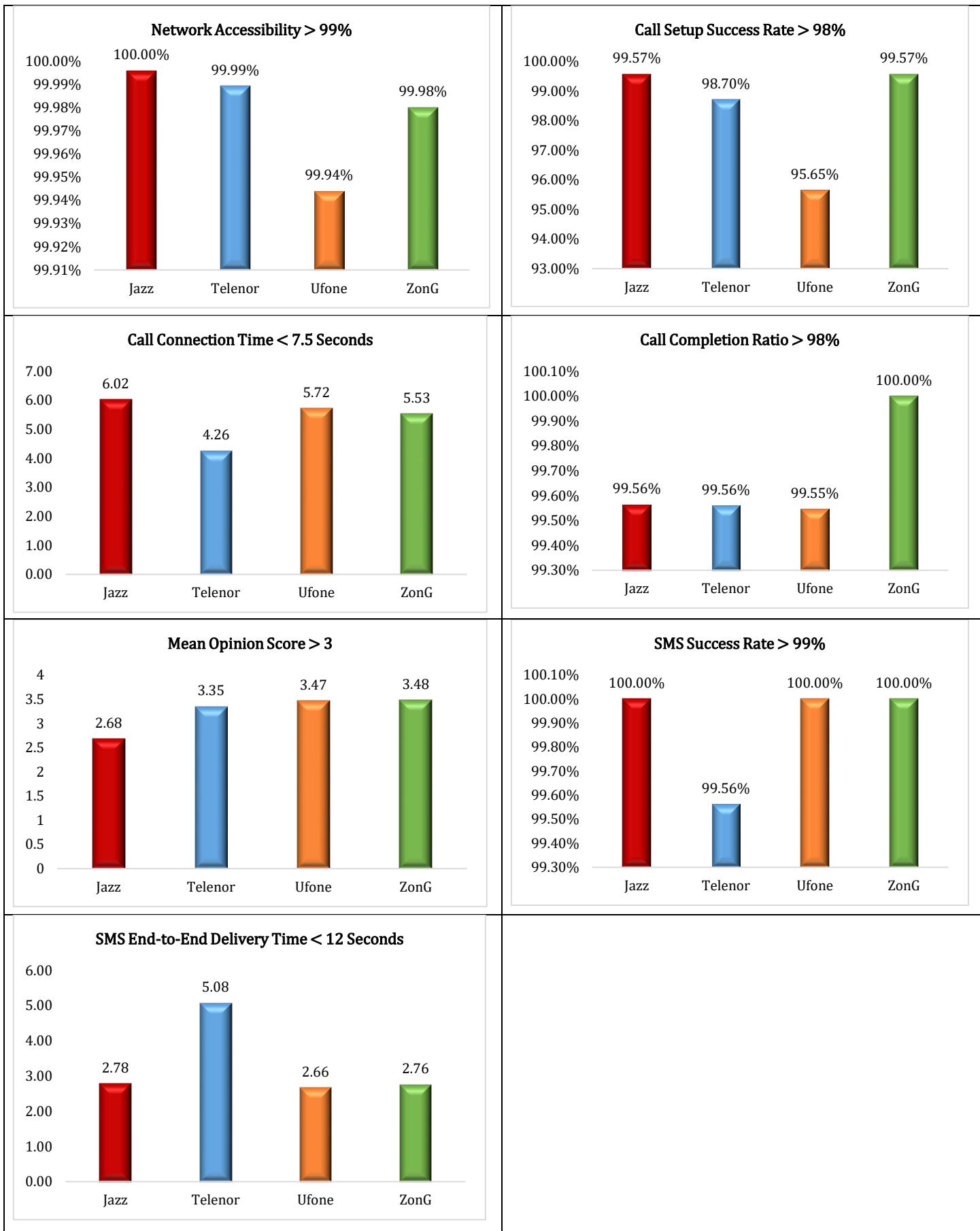
UFONE 3G NETWORK COVERAGE – SARGODHA



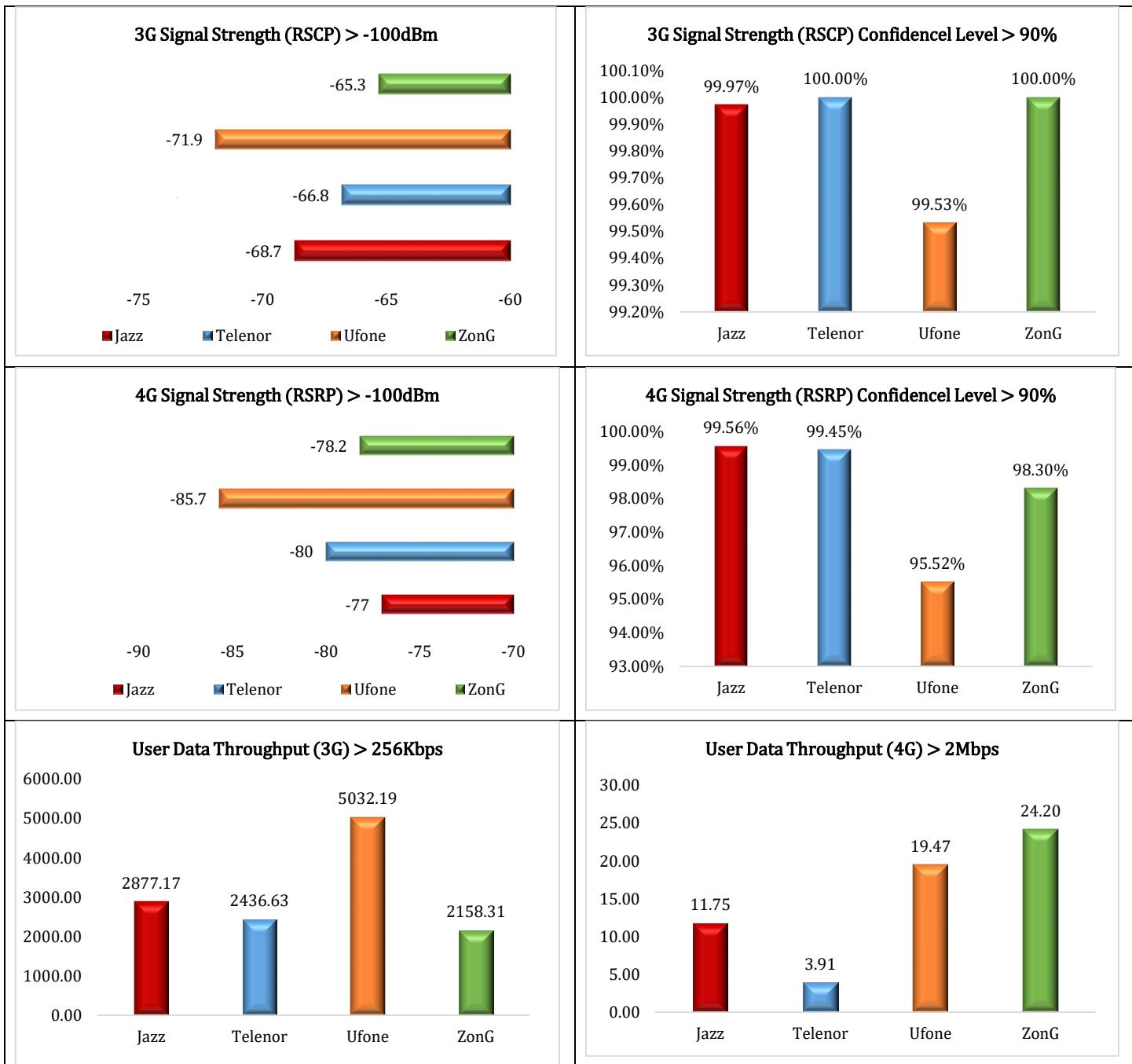
ZONG 3G NETWORK COVERAGE – SARGODHA



## QUALITY OF SERVICE SURVEY RESULTS – SARGODHA

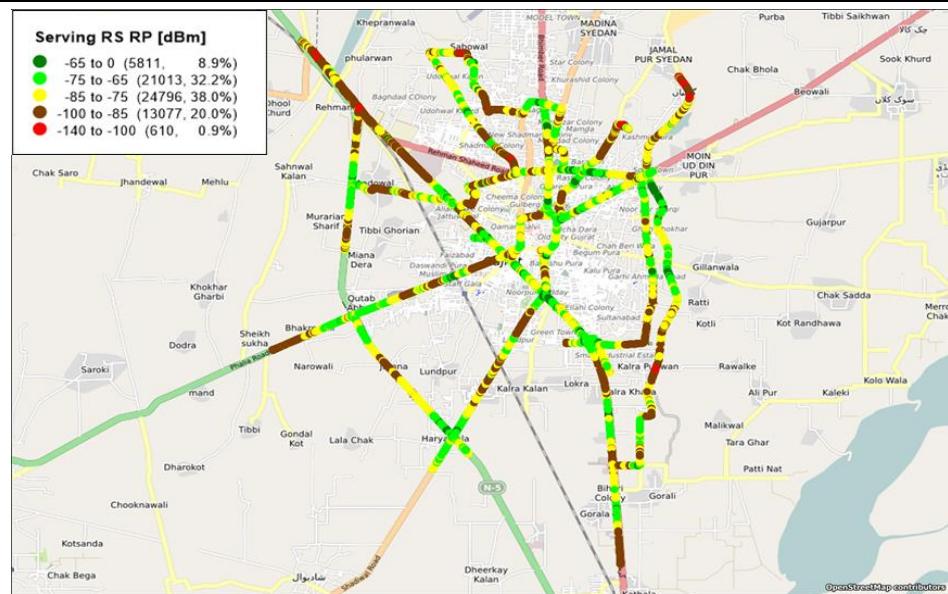


## QUALITY OF SERVICE SURVEY RESULTS – SARGODHA

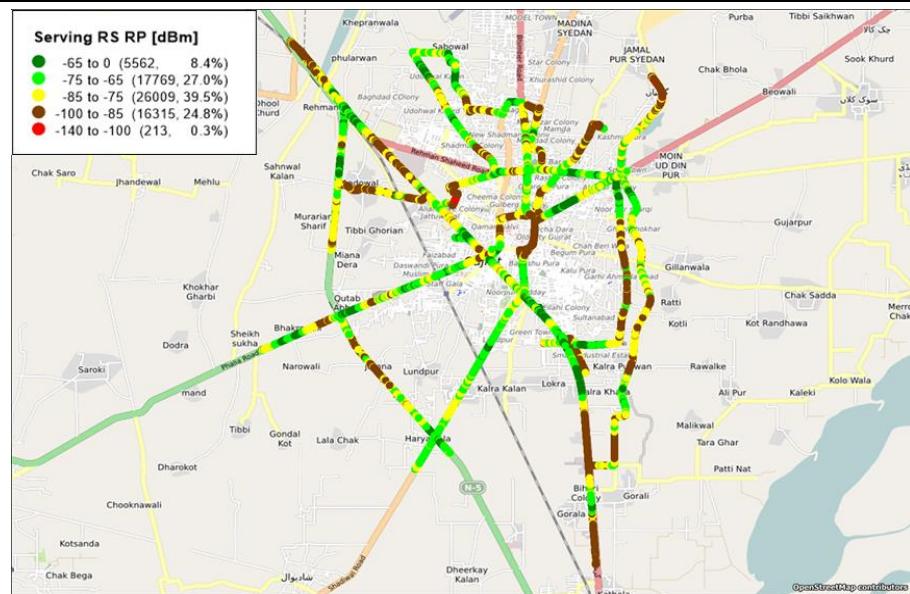


## 4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

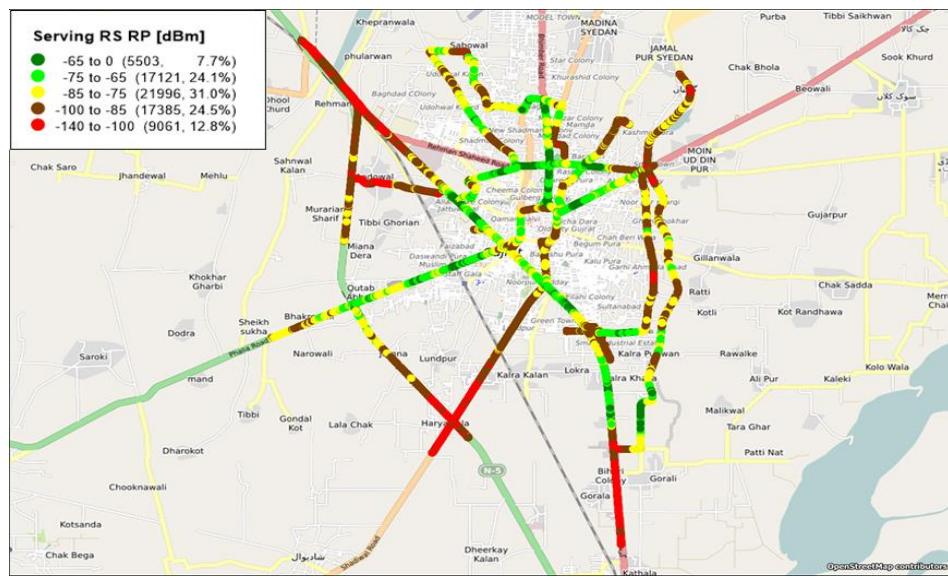
JAZZ 4G NETWORK COVERAGE – GUJRAT



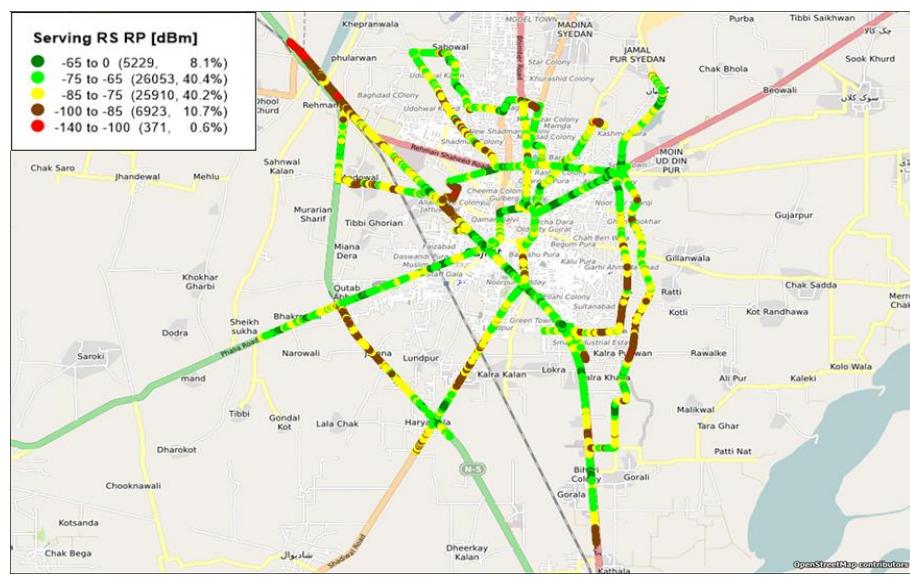
TELENOR 4G NETWORK COVERAGE – GUJRAT



UFONE 4G NETWORK COVERAGE – GUJRAT

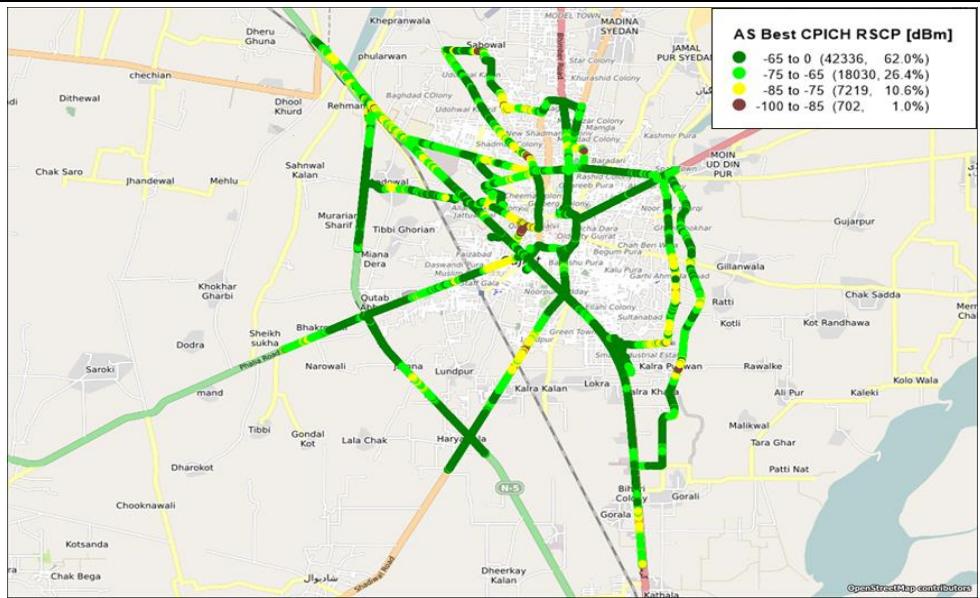


ZONG 4G NETWORK COVERAGE – GUJRAT

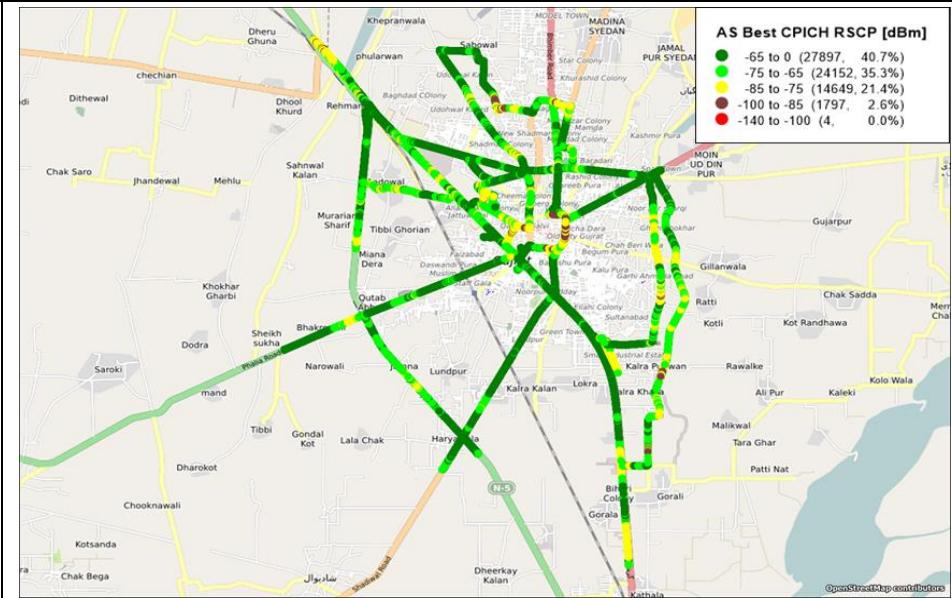


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

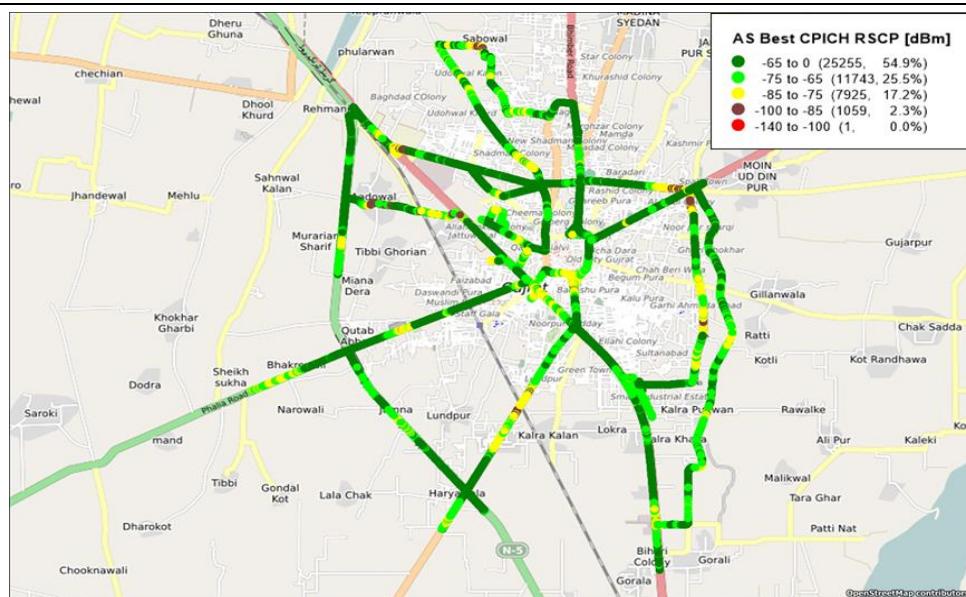
JAZZ 3G NETWORK COVERAGE – GUJRAT



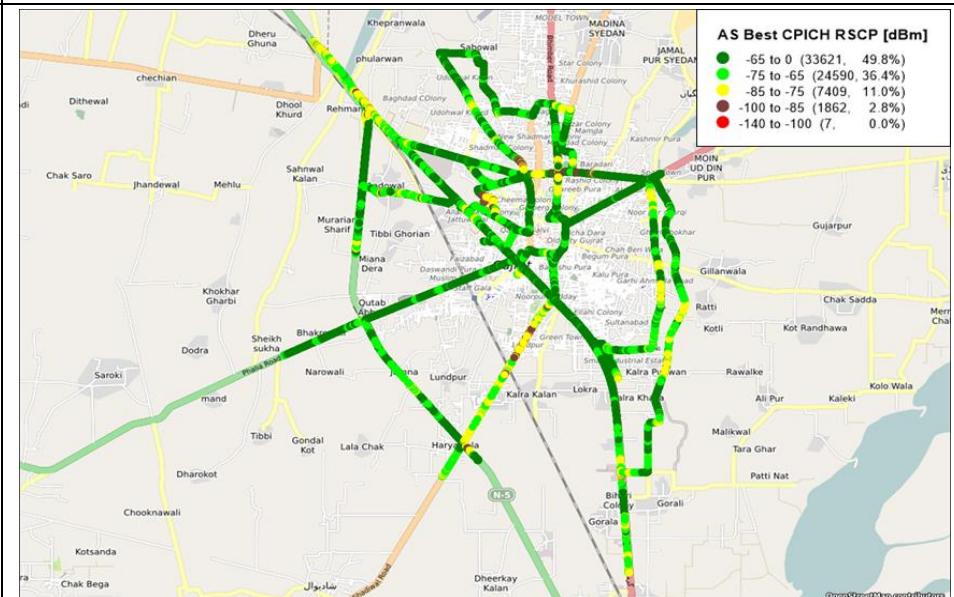
TELENOR 3G NETWORK COVERAGE – GUJRAT



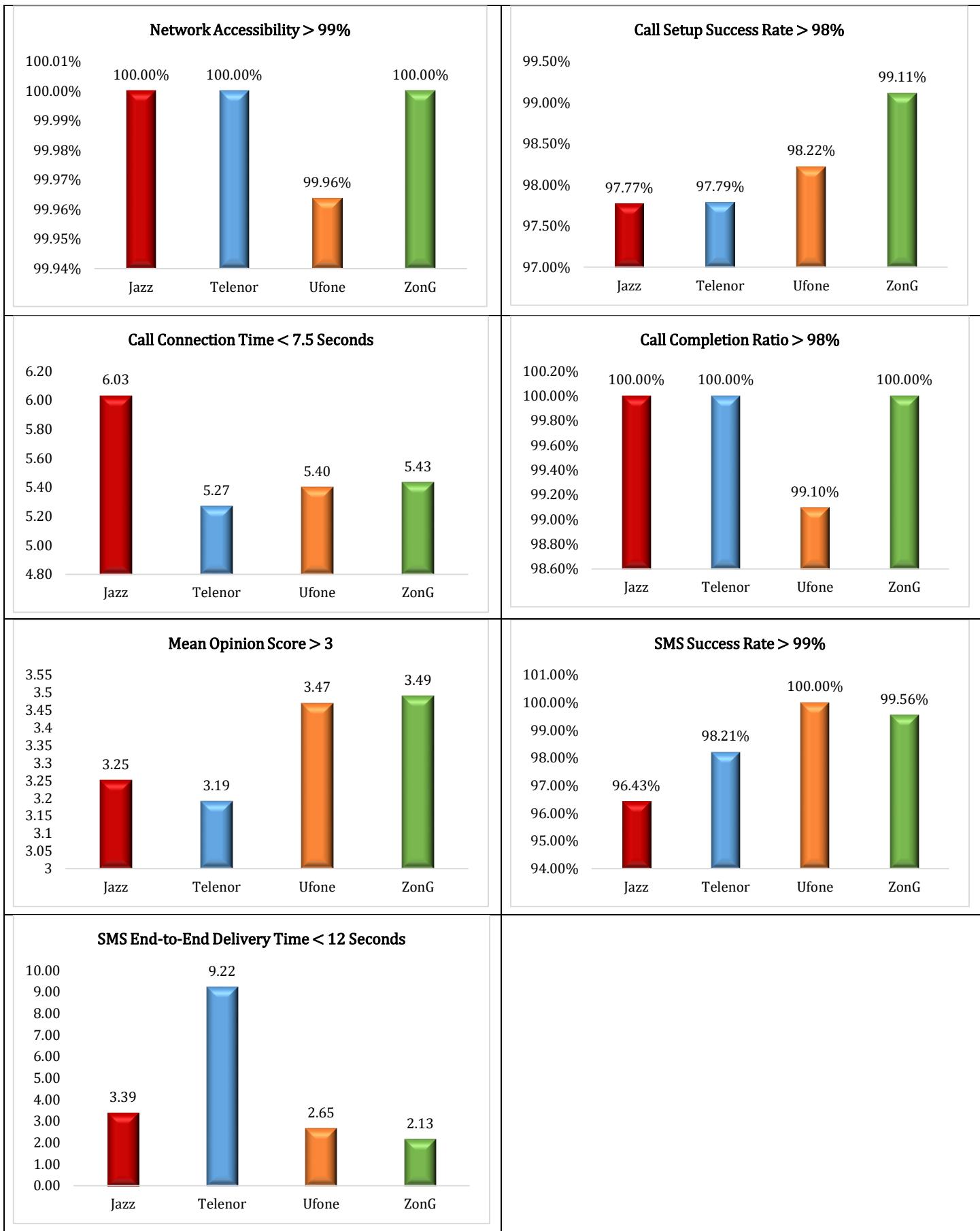
UFONE 3G NETWORK COVERAGE – GUJRAT



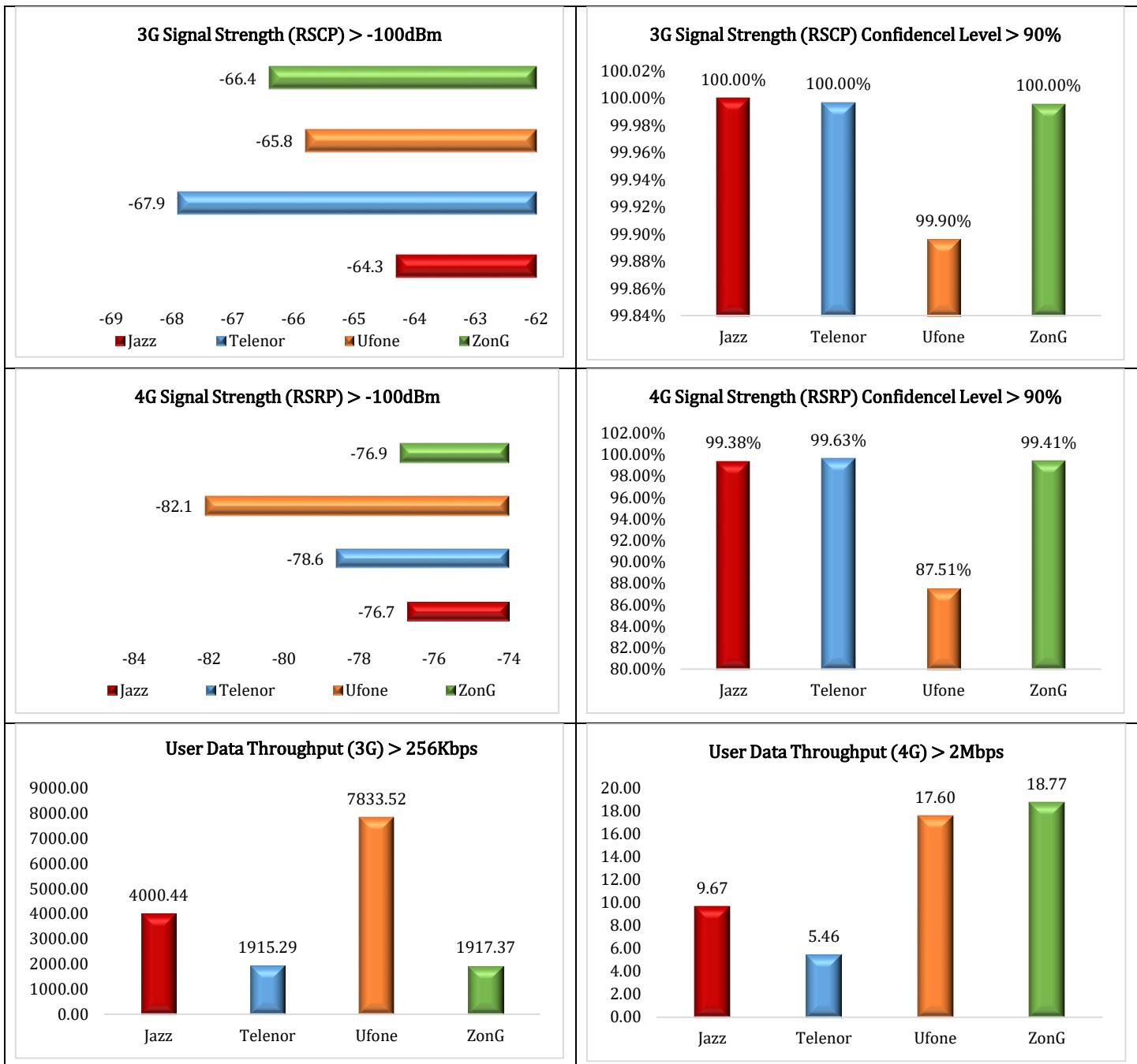
ZONG 3G NETWORK COVERAGE – GUJRAT



## QUALITY OF SERVICE SURVEY RESULTS – GUJRAT

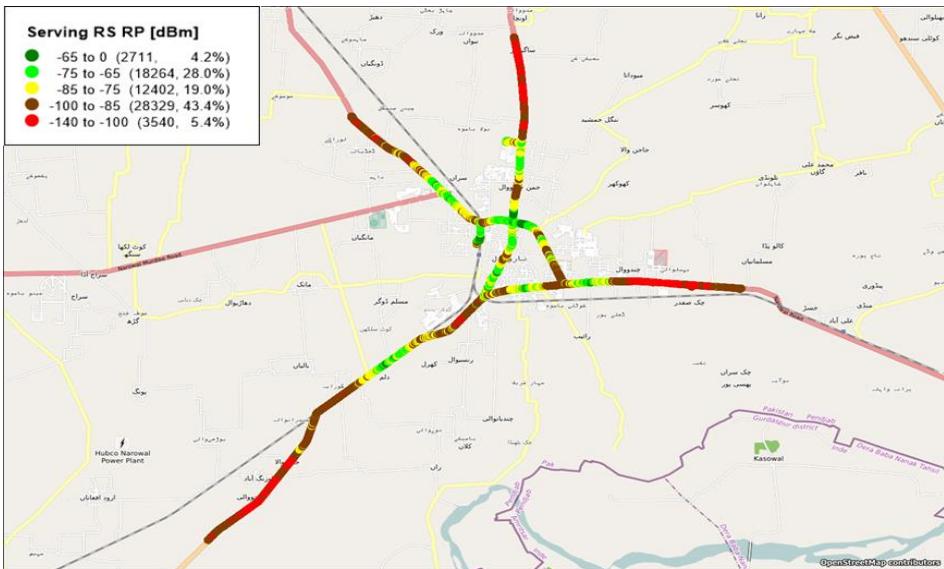


## QUALITY OF SERVICE SURVEY RESULTS – GUJRAT

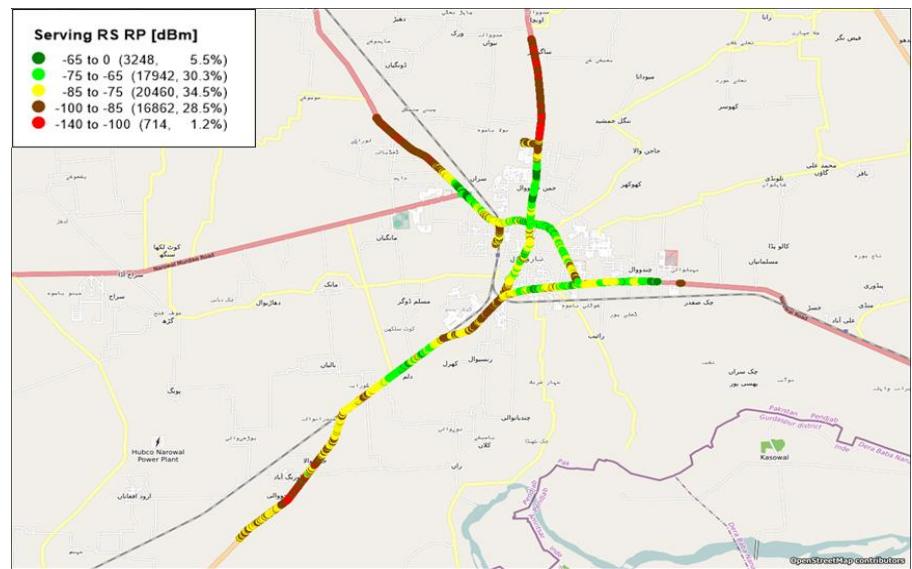


## 4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

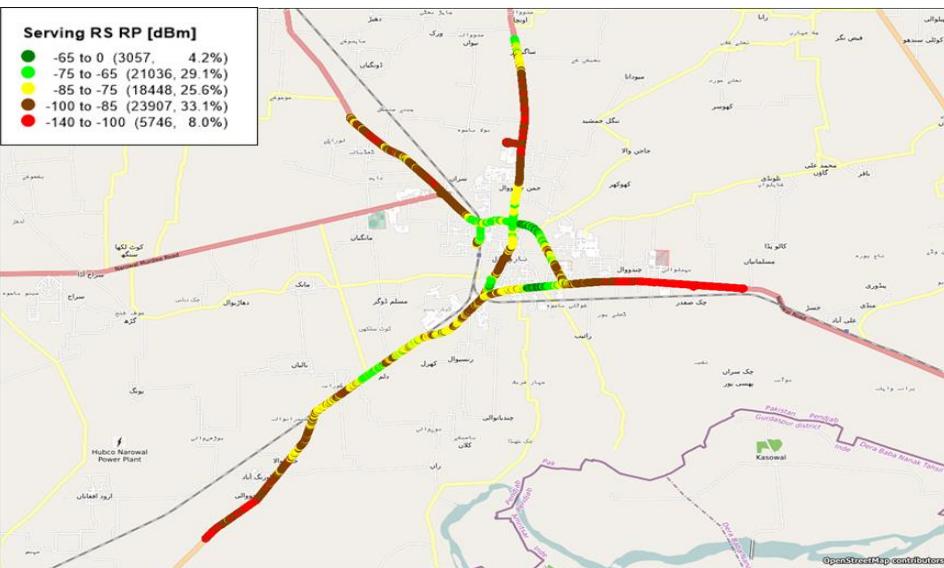
JAZZ 4G NETWORK COVERAGE – NAROWAL



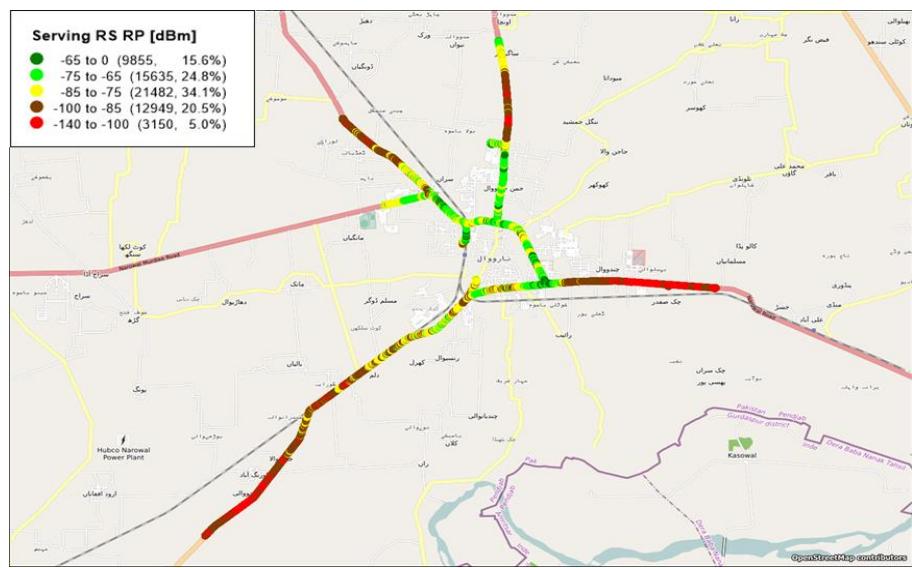
TELENOR 4G NETWORK COVERAGE – NAROWAL



UFONE 4G NETWORK COVERAGE – NAROWAL



ZONG 4G NETWORK COVERAGE – NAROWAL

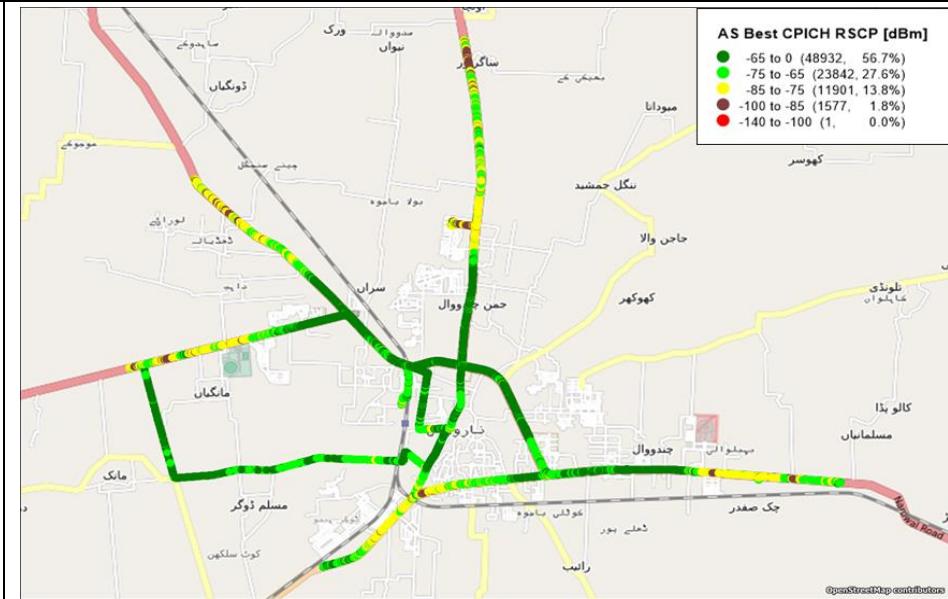


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

JAZZ 3G NETWORK COVERAGE – NAROWAL



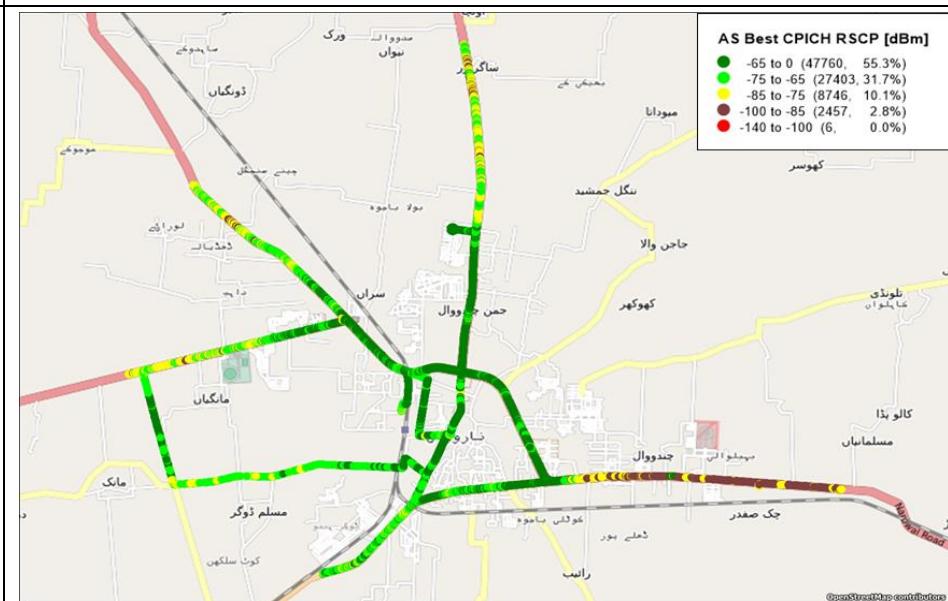
TELENOR 3G NETWORK COVERAGE – NAROWAL



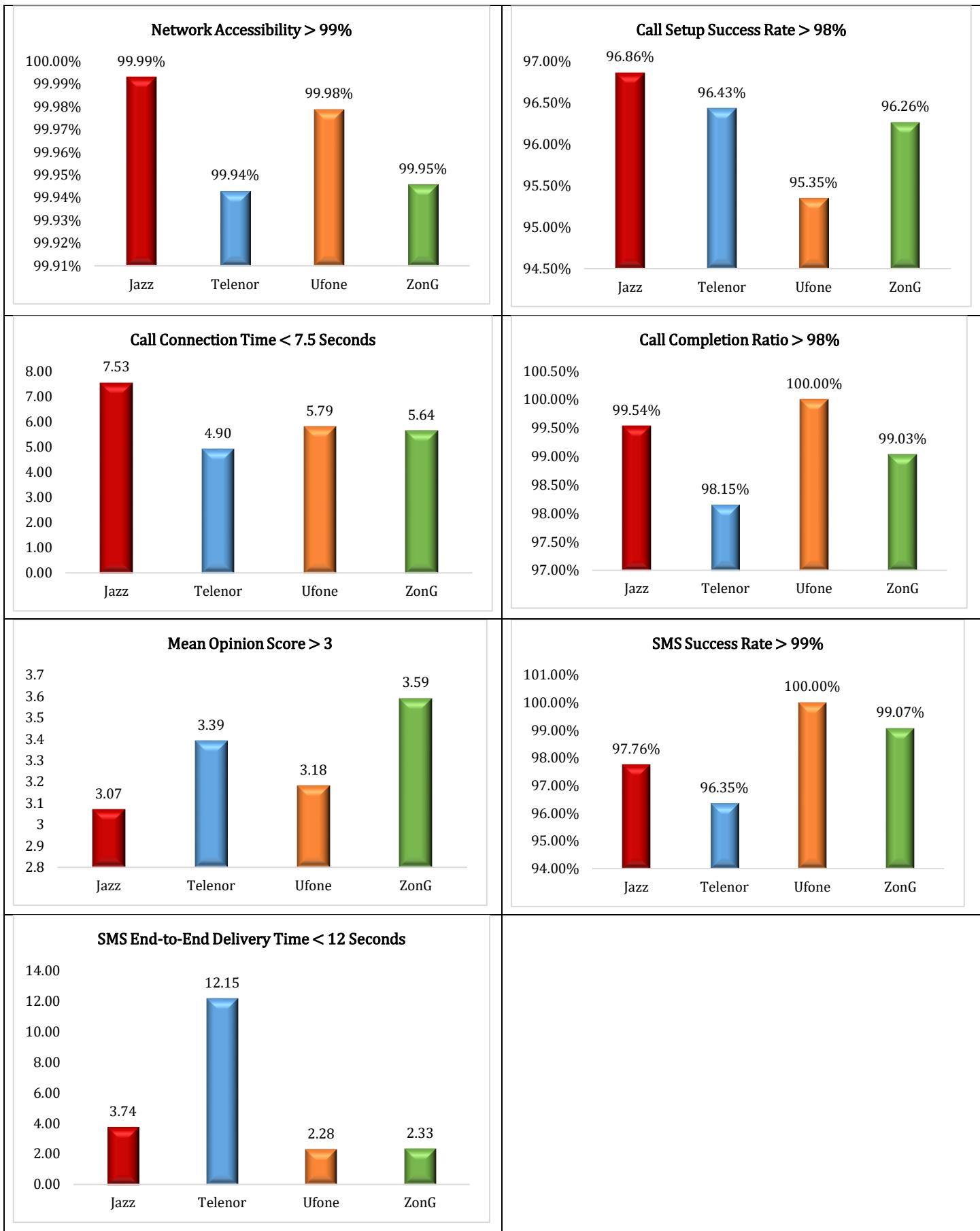
UFONE 3G NETWORK COVERAGE – NAROWAL



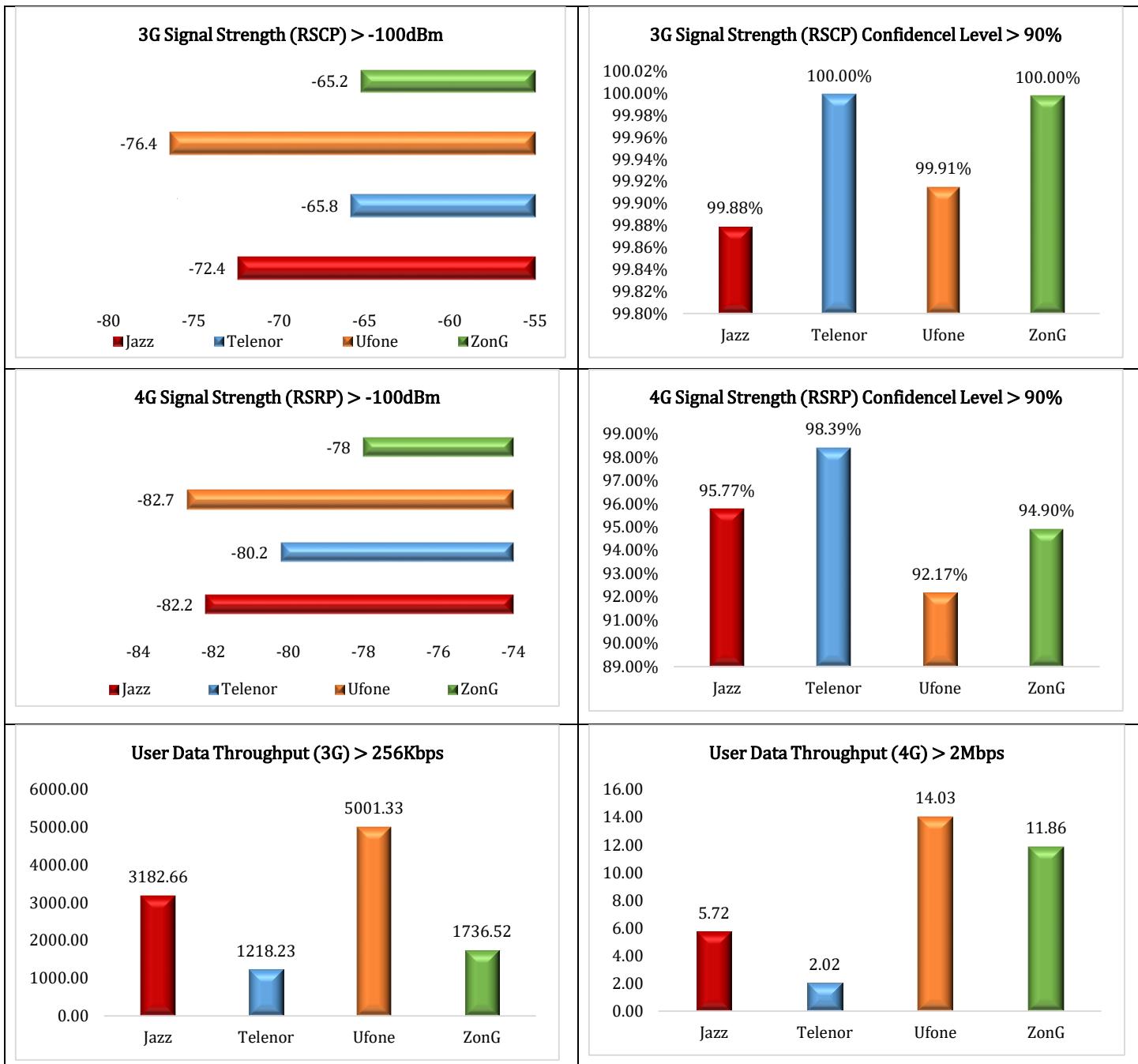
ZONG 3G NETWORK COVERAGE – NAROWAL



## QUALITY OF SERVICE SURVEY RESULTS – NAROWAL



## QUALITY OF SERVICE SURVEY RESULTS – NAROWAL

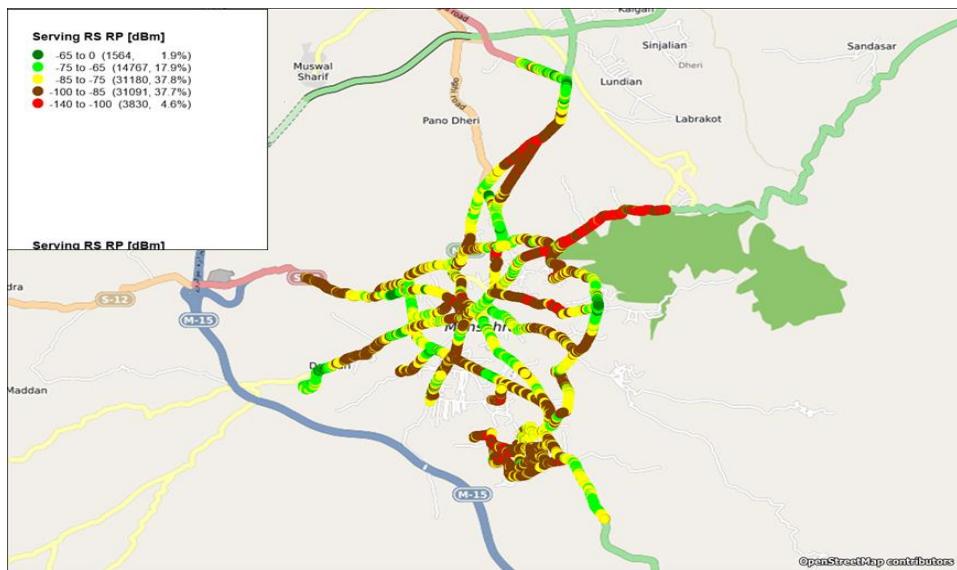


**ANNEX – B**

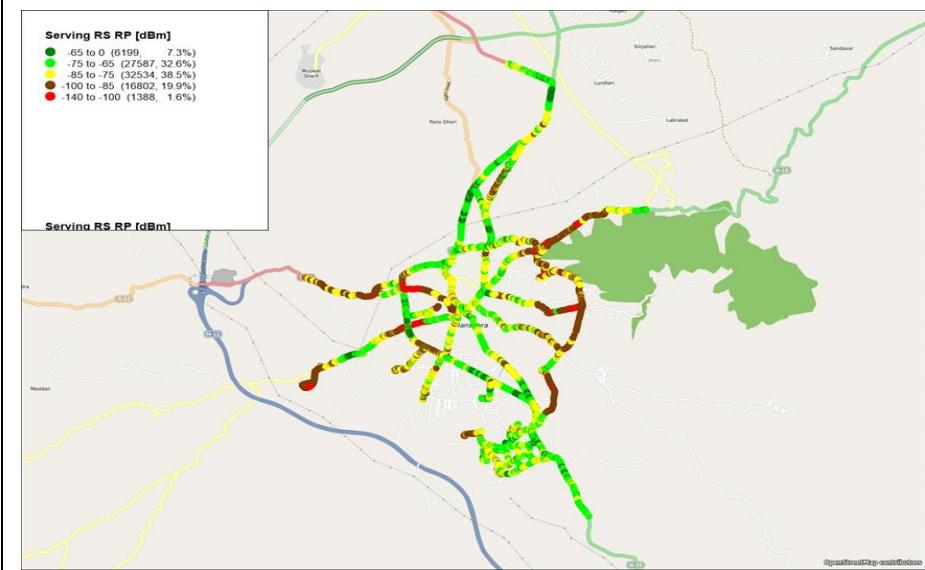
**KHYBER PAKHTUNKHWA**

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

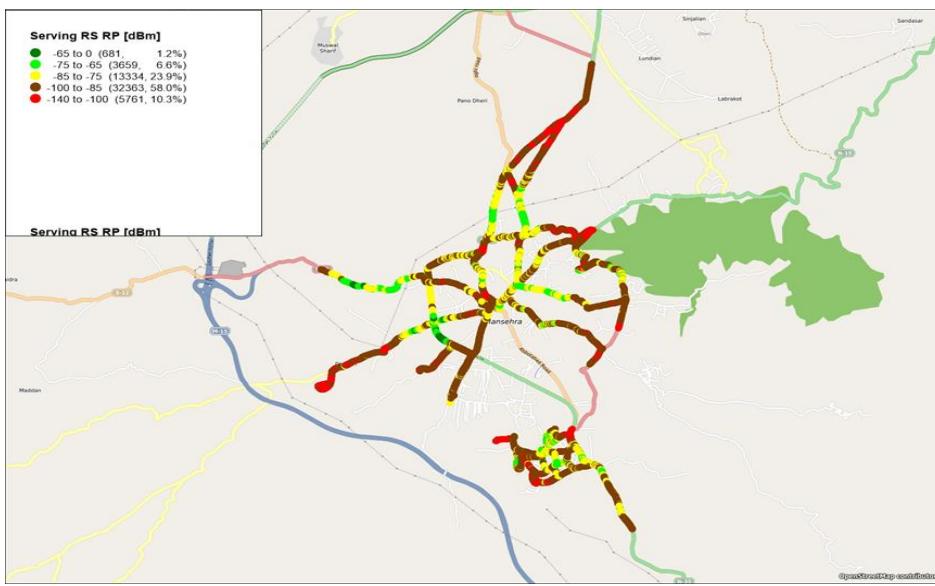
JAZZ 4G NETWORK COVERAGE – MANSEHRA



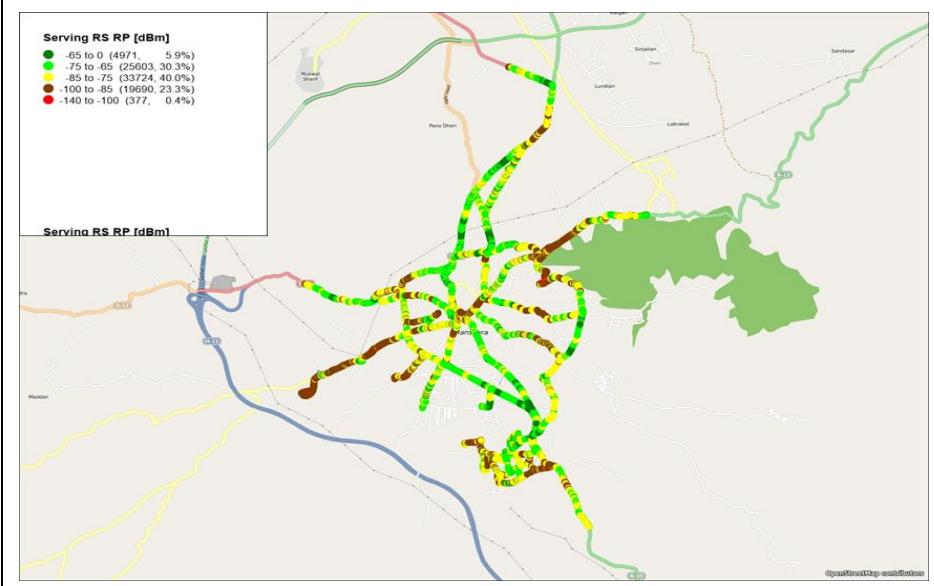
TELENOR 4G NETWORK COVERAGE – MANSEHRA



UFONE 4G NETWORK COVERAGE – MANSEHRA



ZONG 4G NETWORK COVERAGE – MANSEHRA

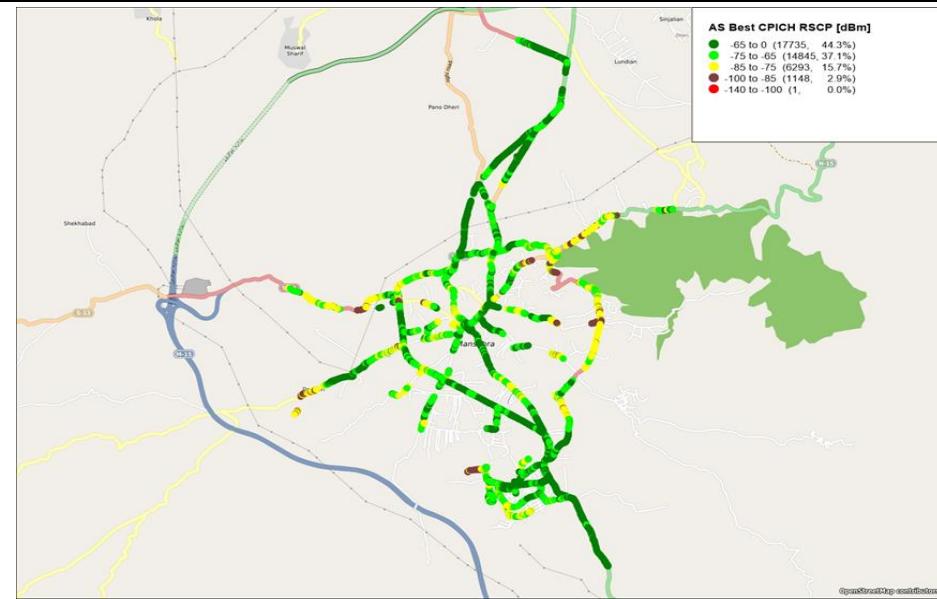


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

JAZZ 3G NETWORK COVERAGE – MANSEHRA

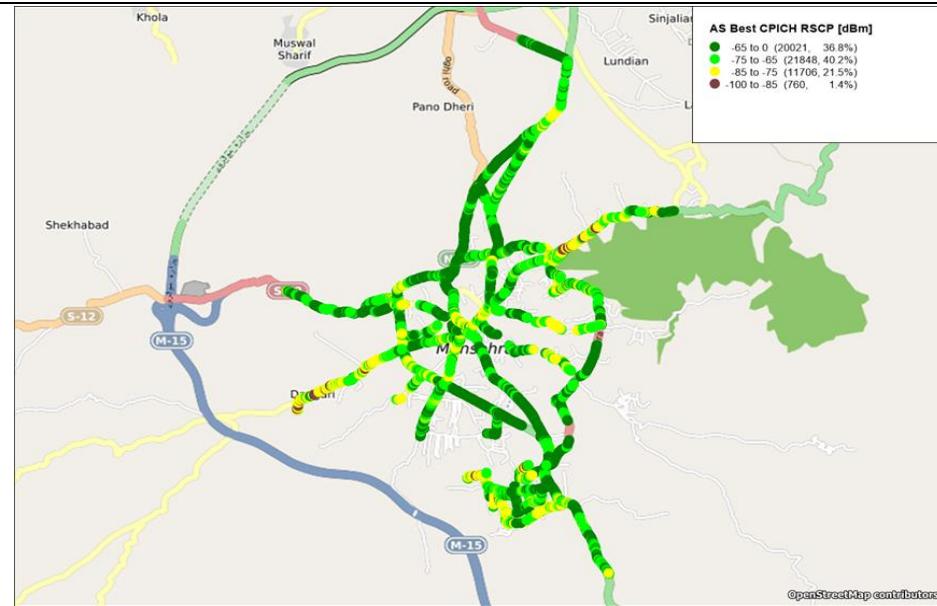
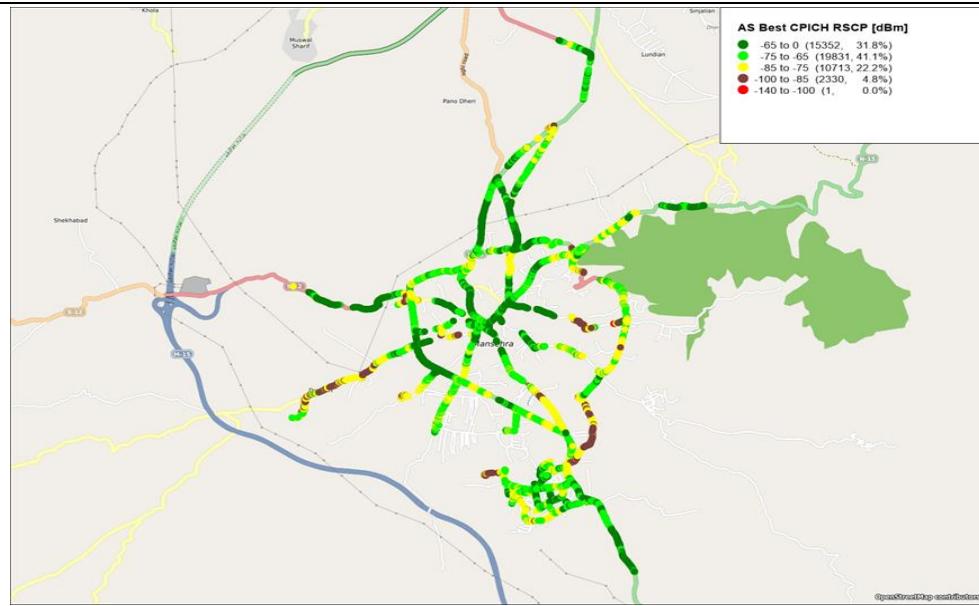
**3G NOT AVAILABLE**

TELENOR 3G NETWORK COVERAGE – MANSEHRA

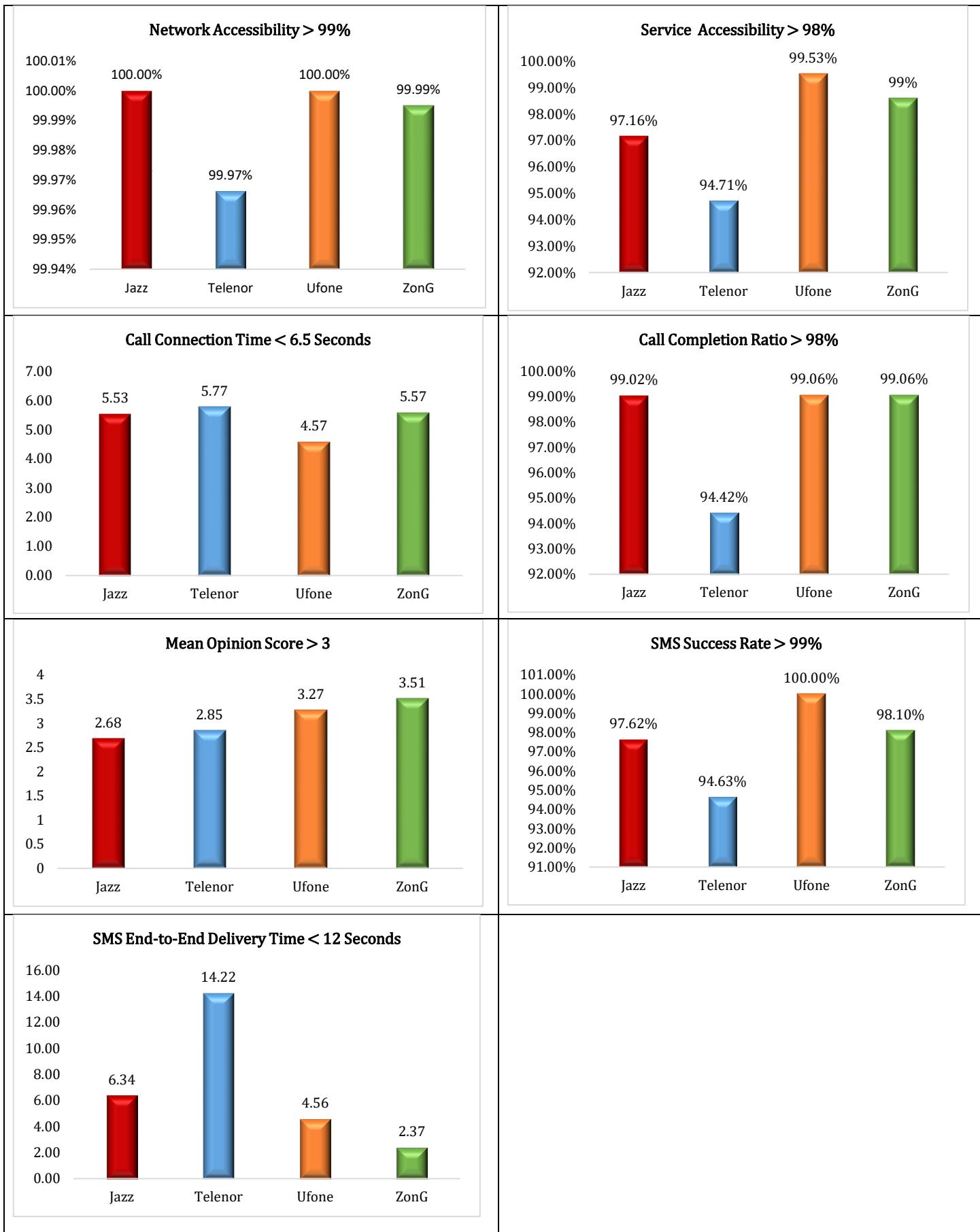


UFONE 3G NETWORK COVERAGE – MANSEHRA

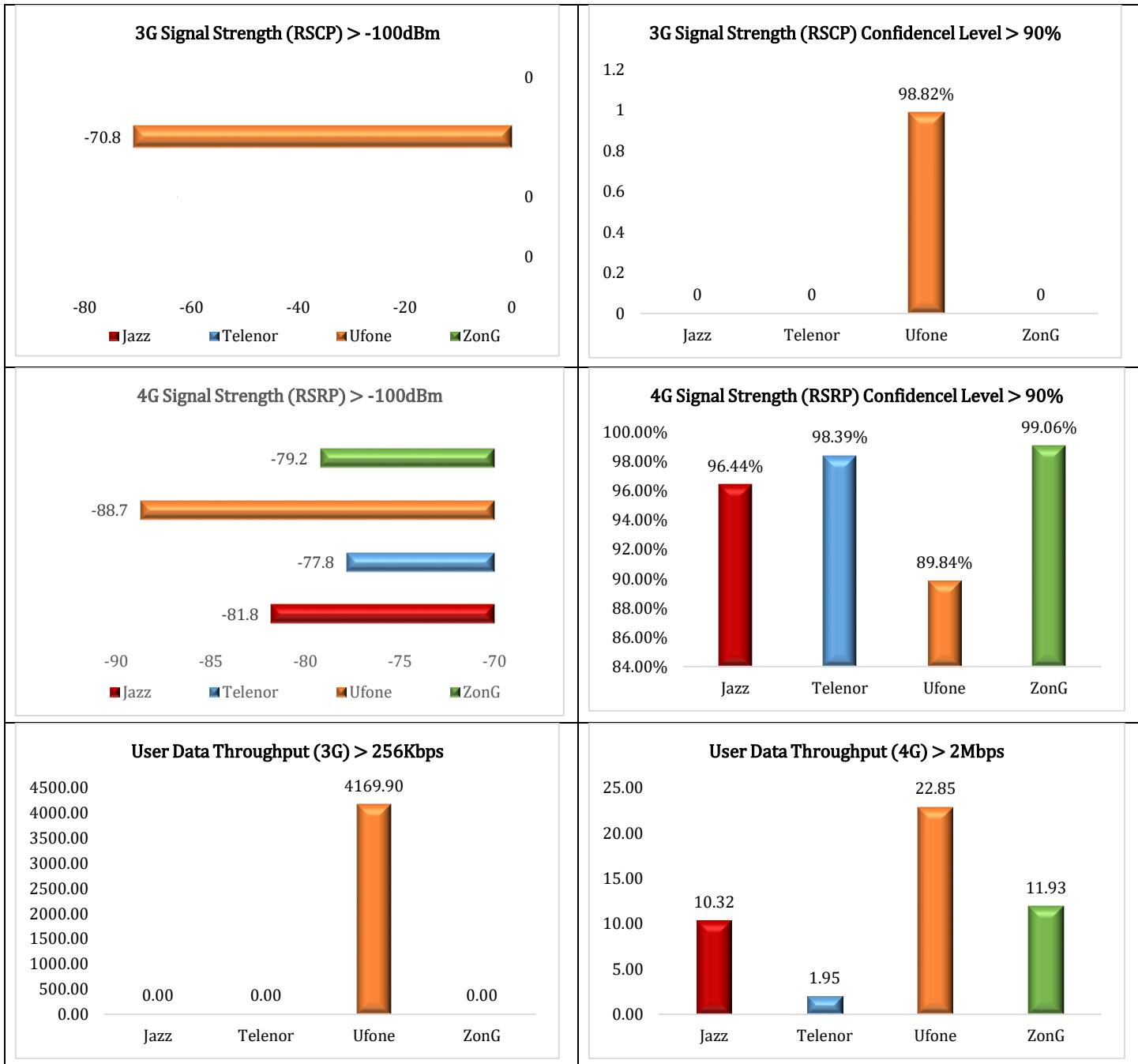
ZONG 3G NETWORK COVERAGE – MANSEHRA



## QUALITY OF SERVICE SURVEY RESULTS – MANSEHRA

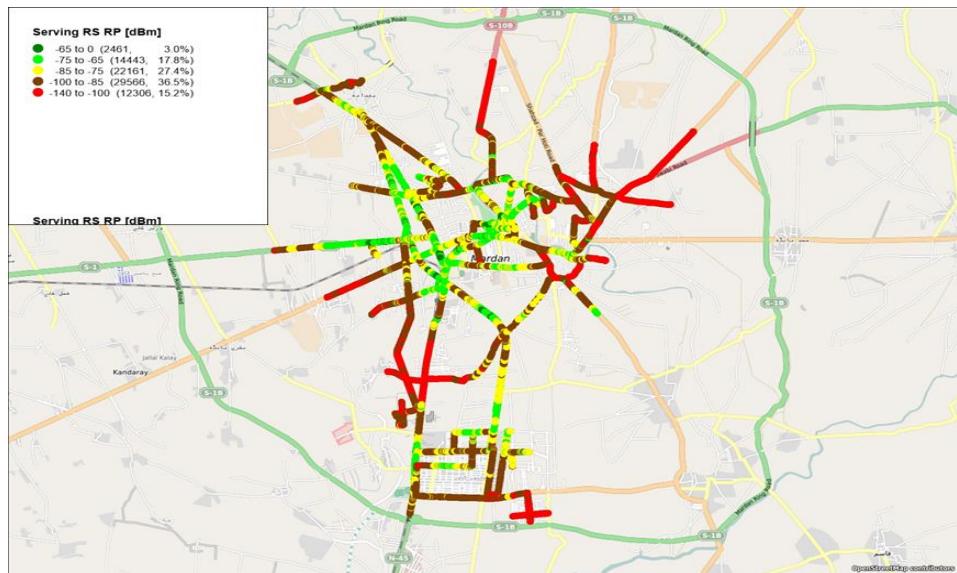


## QUALITY OF SERVICE SURVEY RESULTS – MANSEHRA

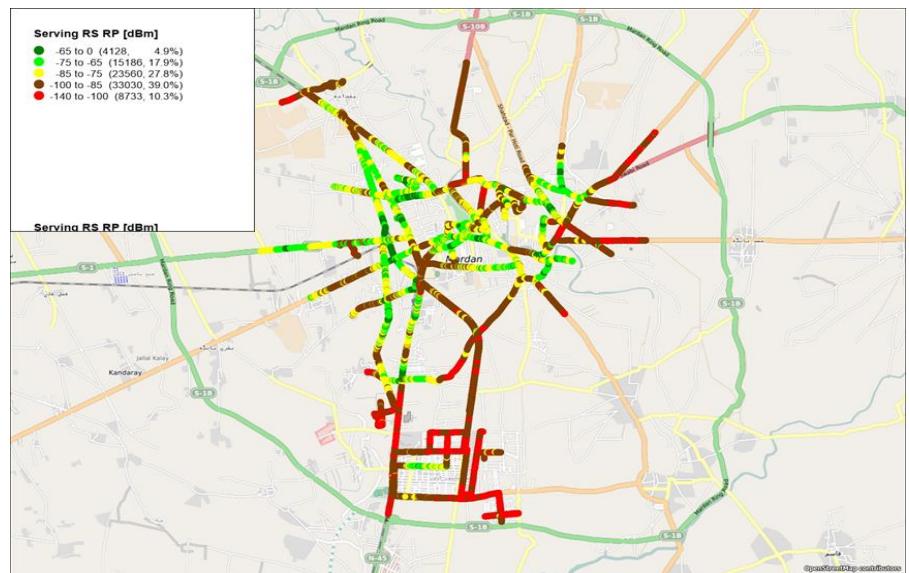


## 4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

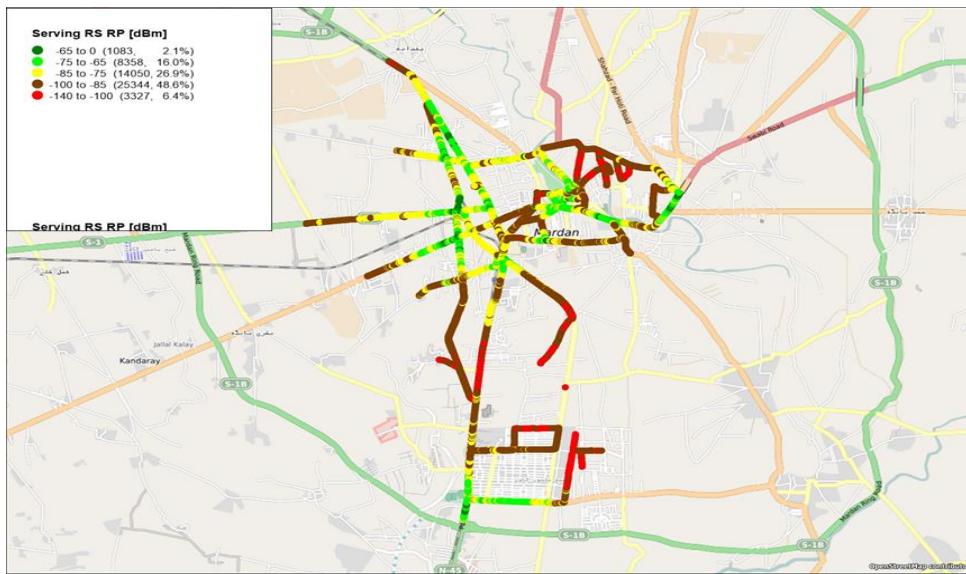
JAZZ 4G NETWORK COVERAGE – MARDAN



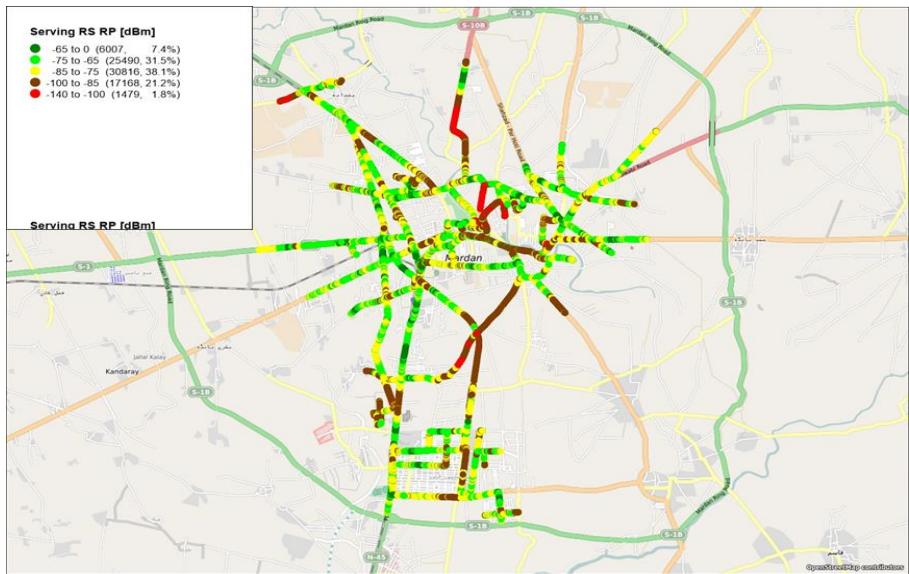
TELENOR 4G NETWORK COVERAGE – MARDAN



UFONE 4G NETWORK COVERAGE – MARDAN

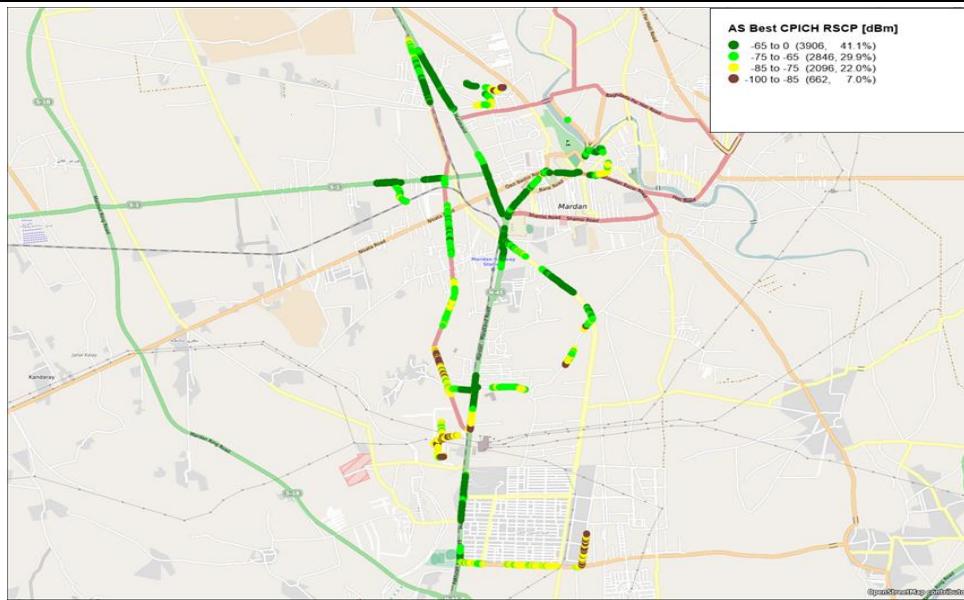


ZONG 4G NETWORK COVERAGE – MARDAN

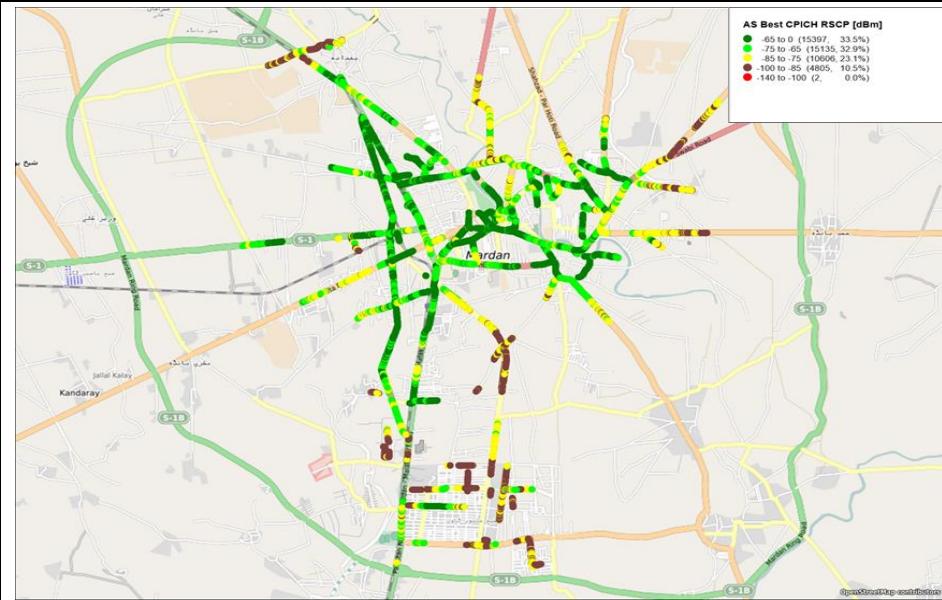


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

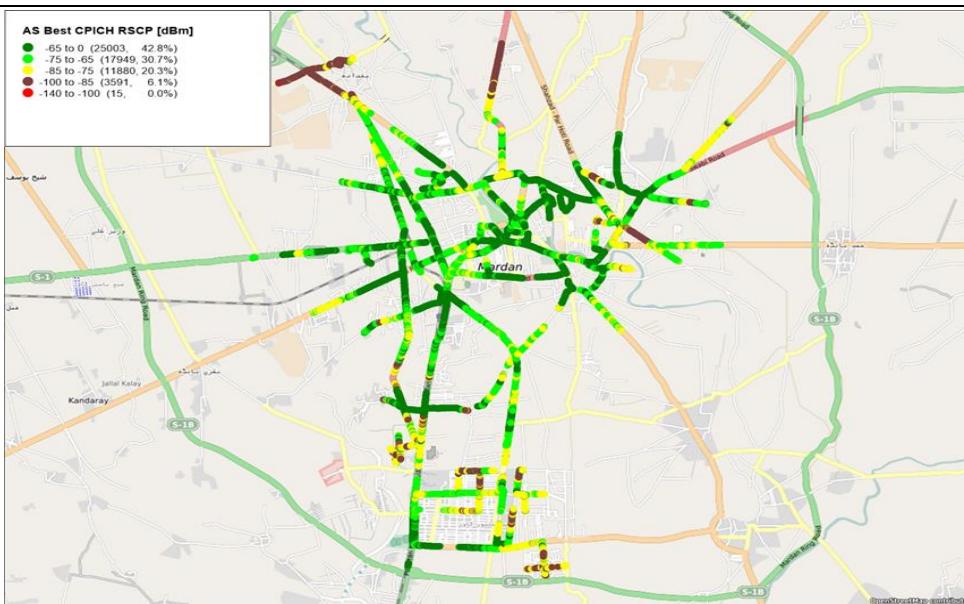
JAZZ 3G NETWORK COVERAGE – MARDAN



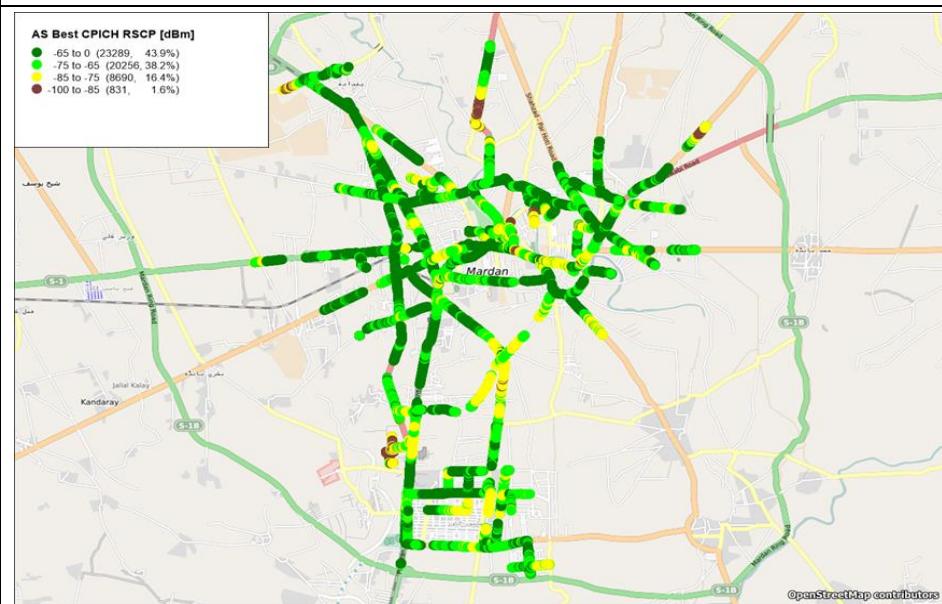
TELENOR 3G NETWORK COVERAGE – MARDAN



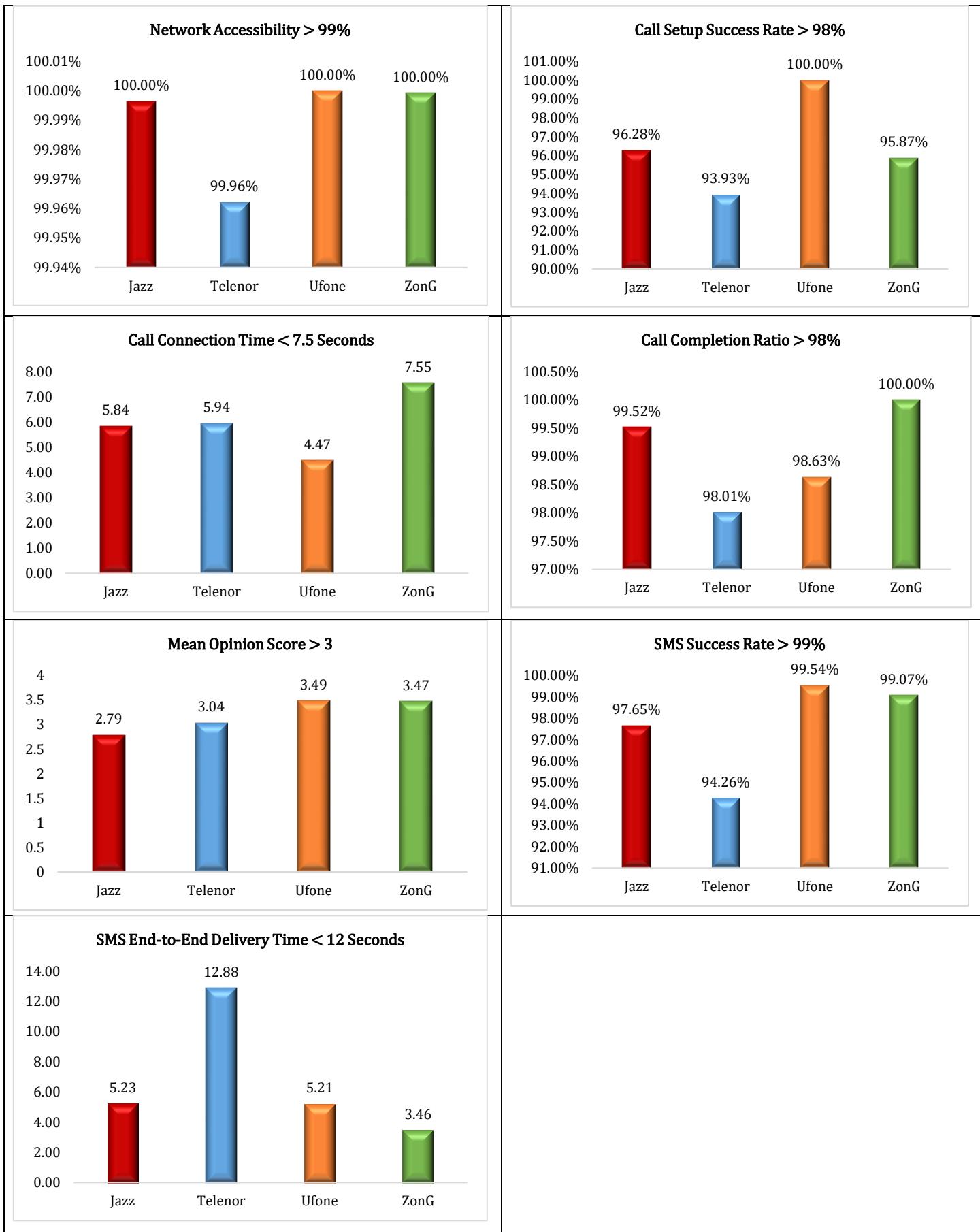
UFONE 3G NETWORK COVERAGE – MARDAN



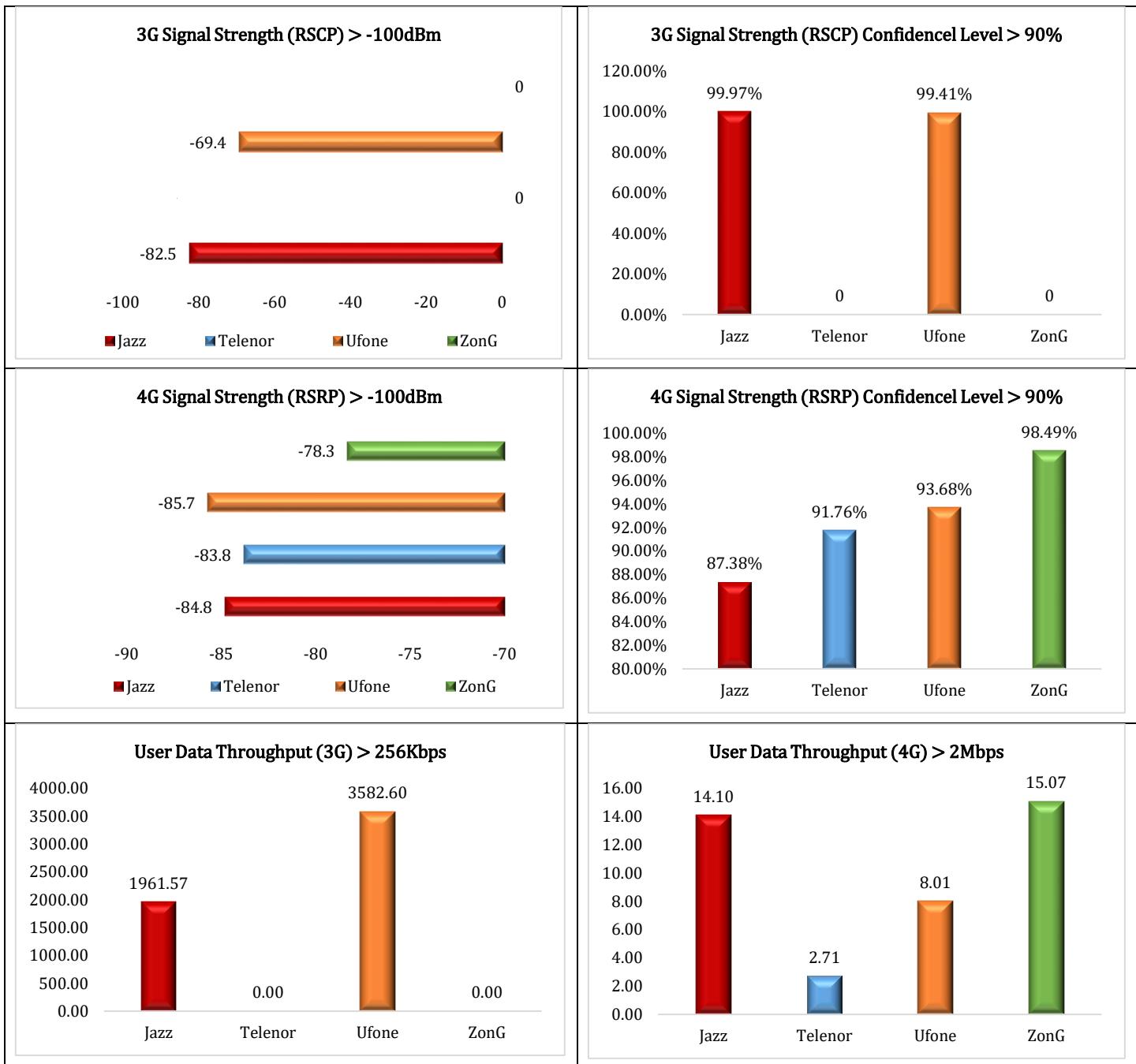
ZONG 3G NETWORK COVERAGE – MARDAN



## QUALITY OF SERVICE SURVEY RESULTS – MARDAN

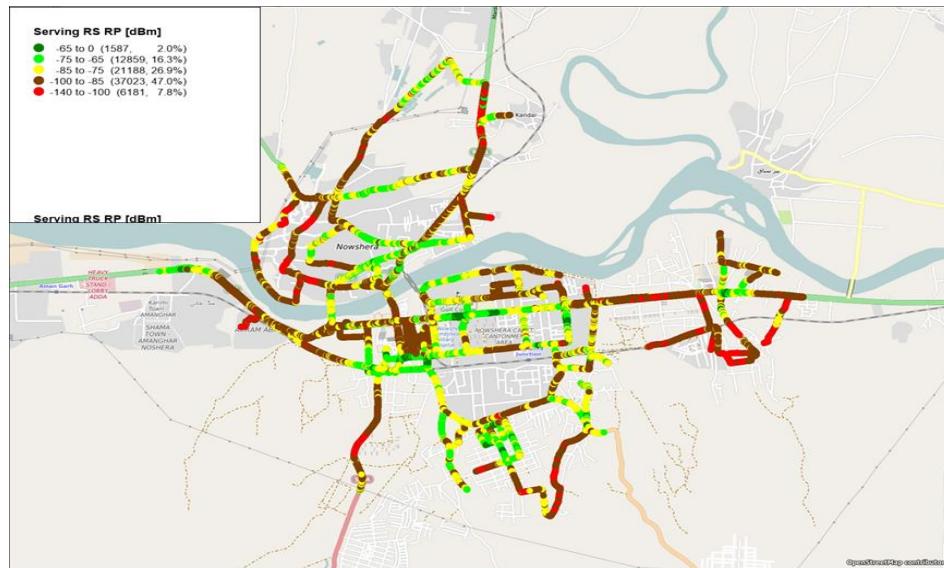


## QUALITY OF SERVICE SURVEY RESULTS – MARDAN

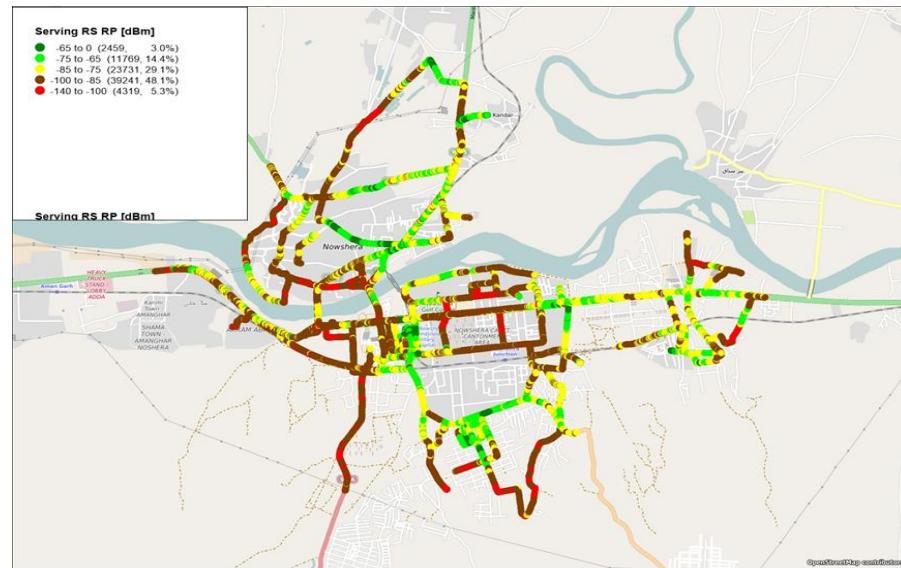


## 4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

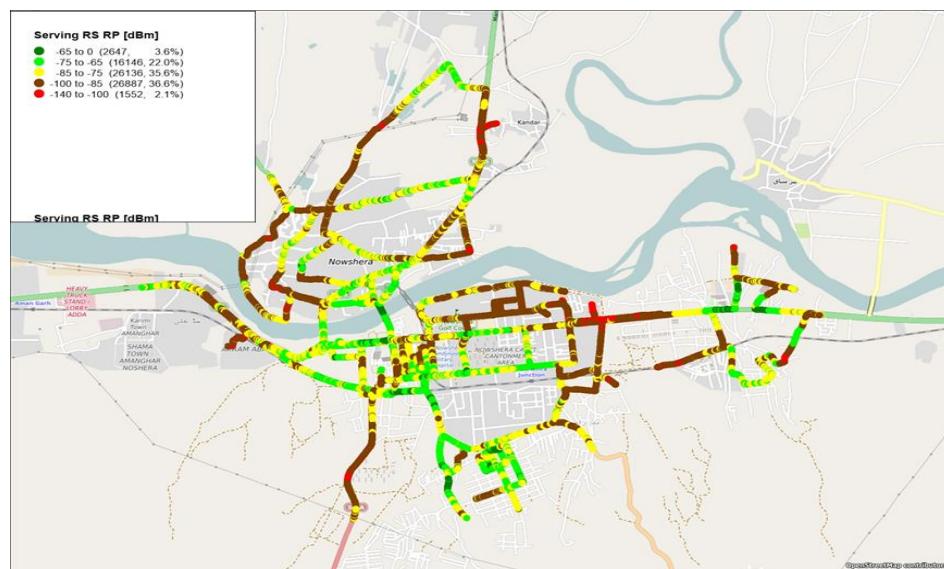
JAZZ 4G NETWORK COVERAGE – NOWSHEHRA



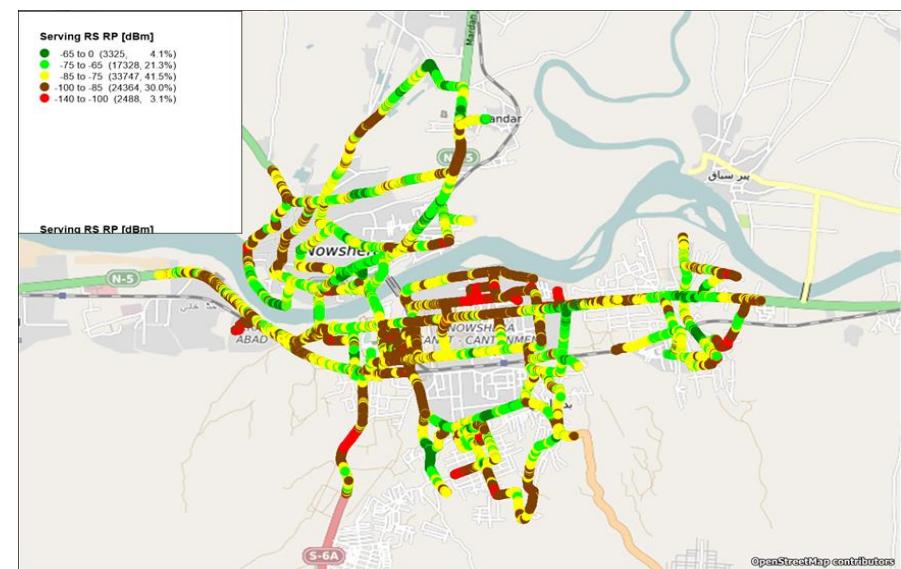
TELENOR 4G NETWORK COVERAGE – NOWSHEHRA



UFONE 4G NETWORK COVERAGE – NOWSHEHRA

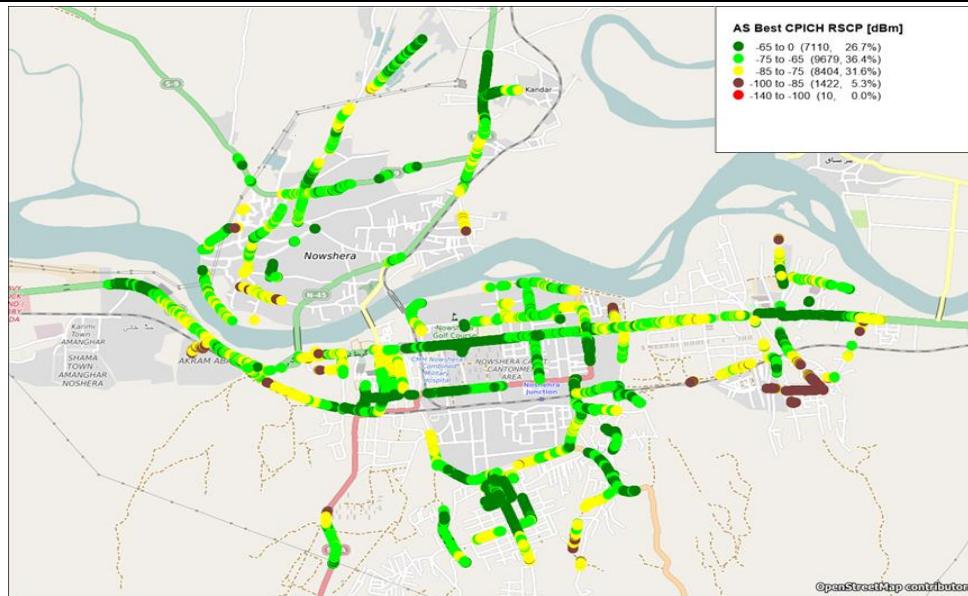


ZONG 4G NETWORK COVERAGE – NOWSHEHRA

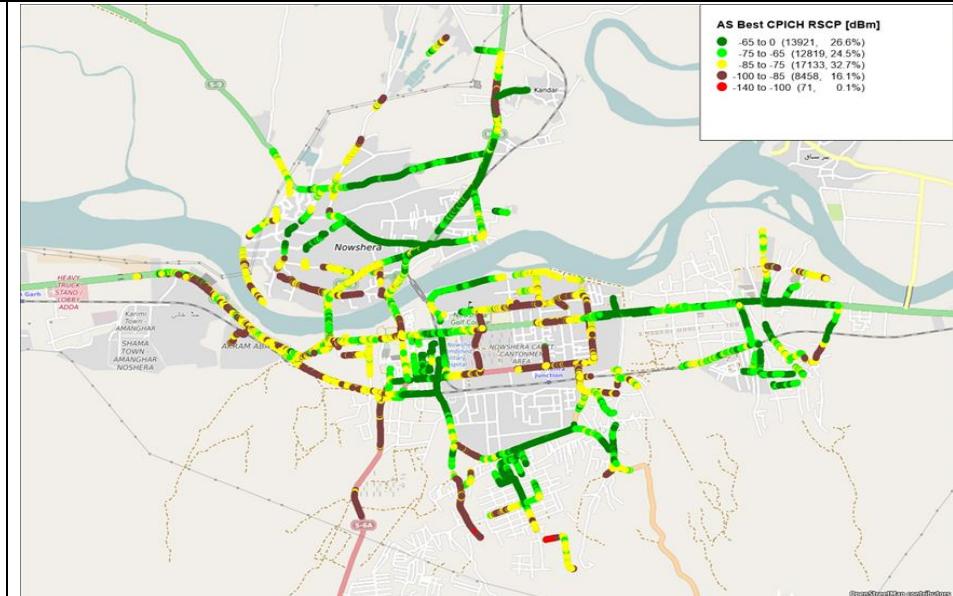


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

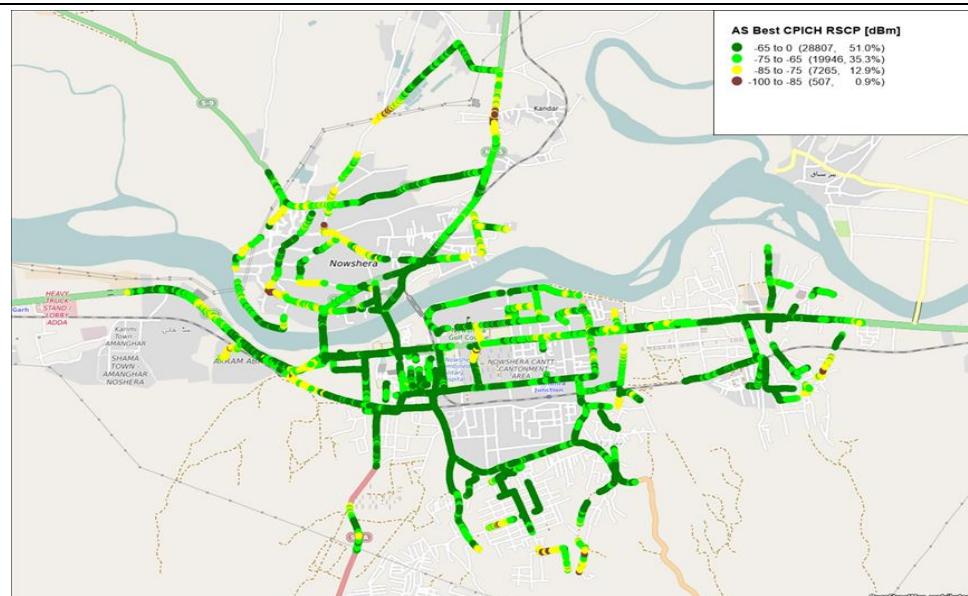
JAZZ 3G NETWORK COVERAGE – NOWSHEHRA



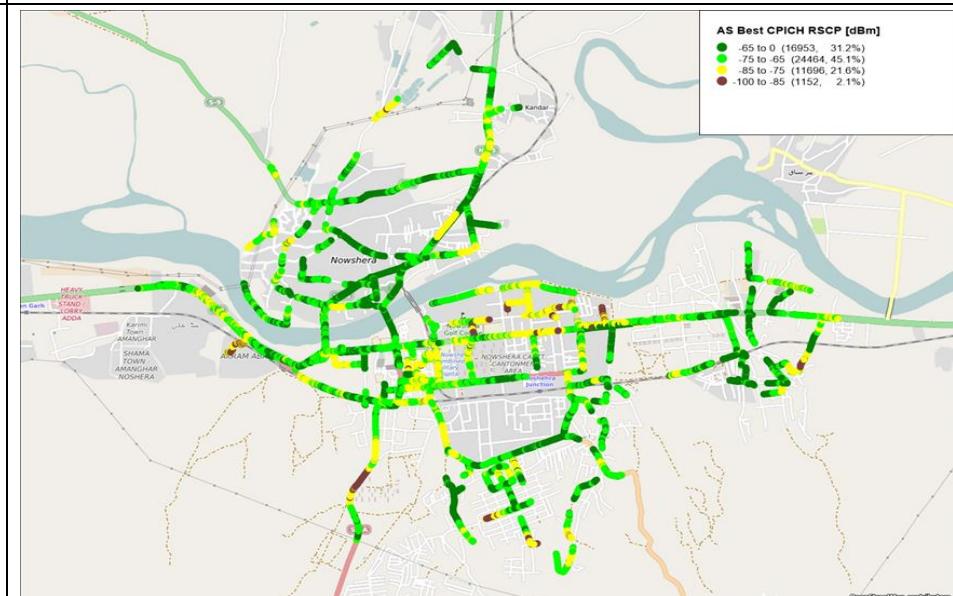
TELENOR 3G NETWORK COVERAGE – NOWSHEHRA



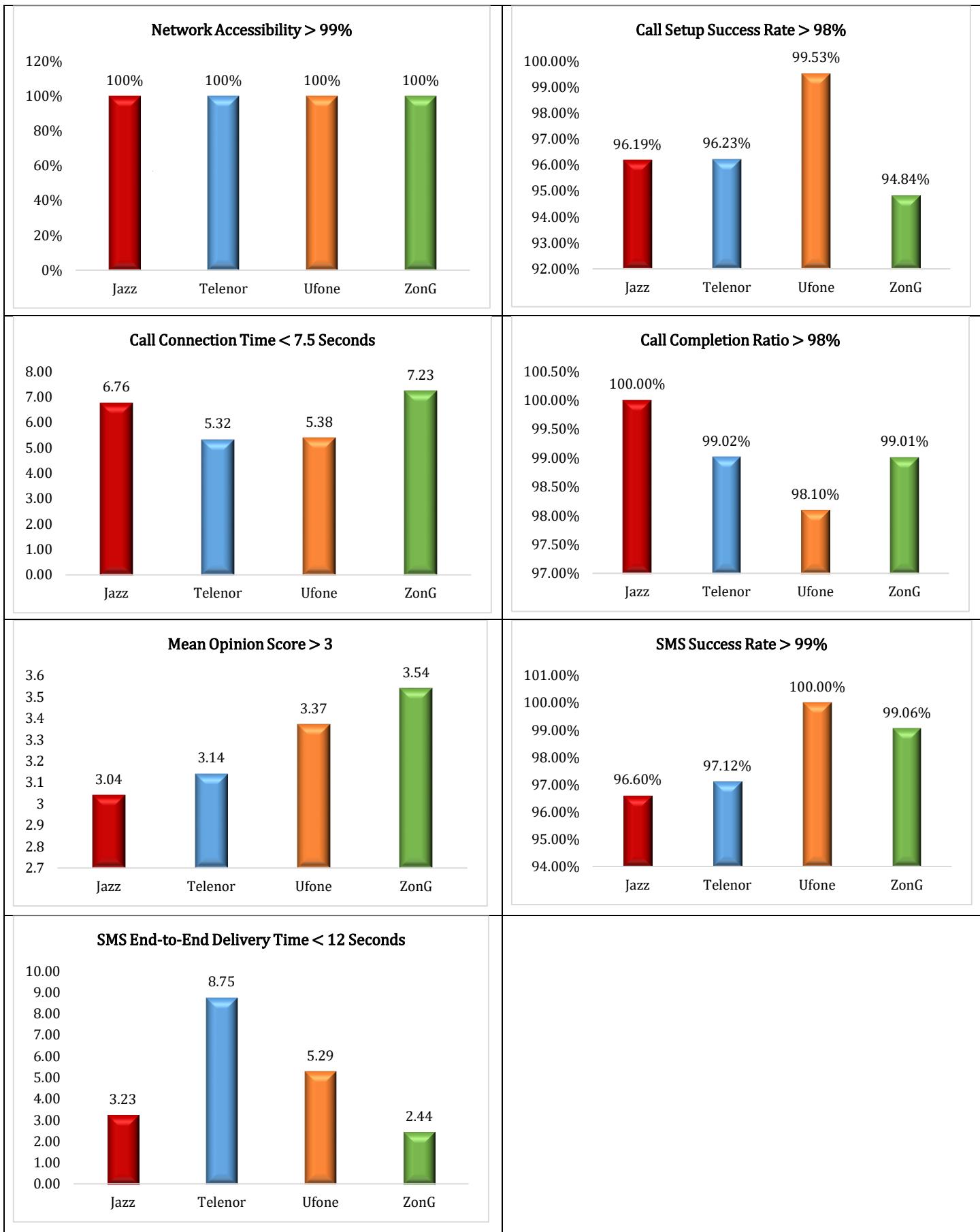
UFONE 3G NETWORK COVERAGE – NOWSHEHRA



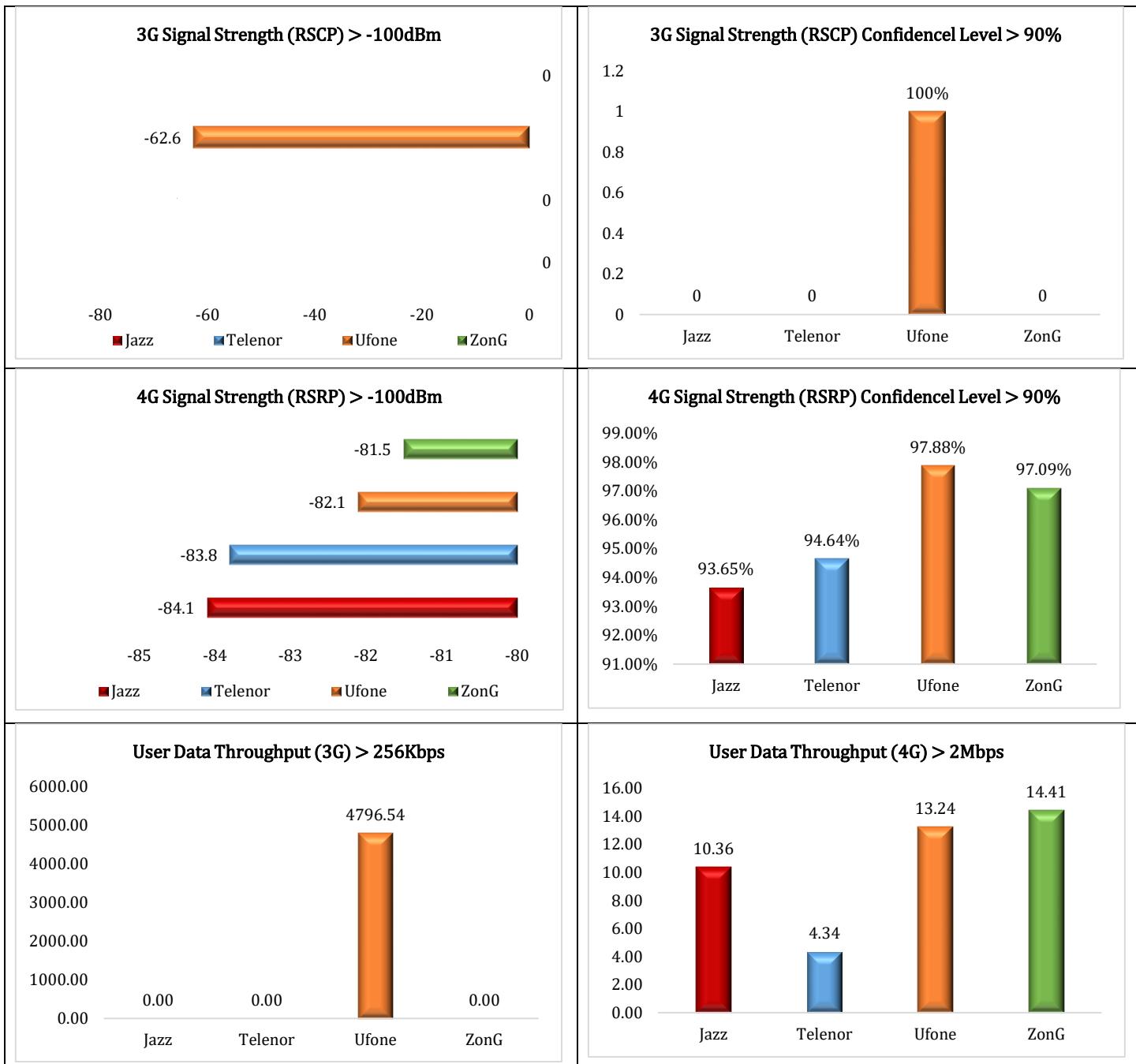
ZONG 3G NETWORK COVERAGE – NOWSHEHRA



## QUALITY OF SERVICE SURVEY RESULTS – NOWSHEHRA

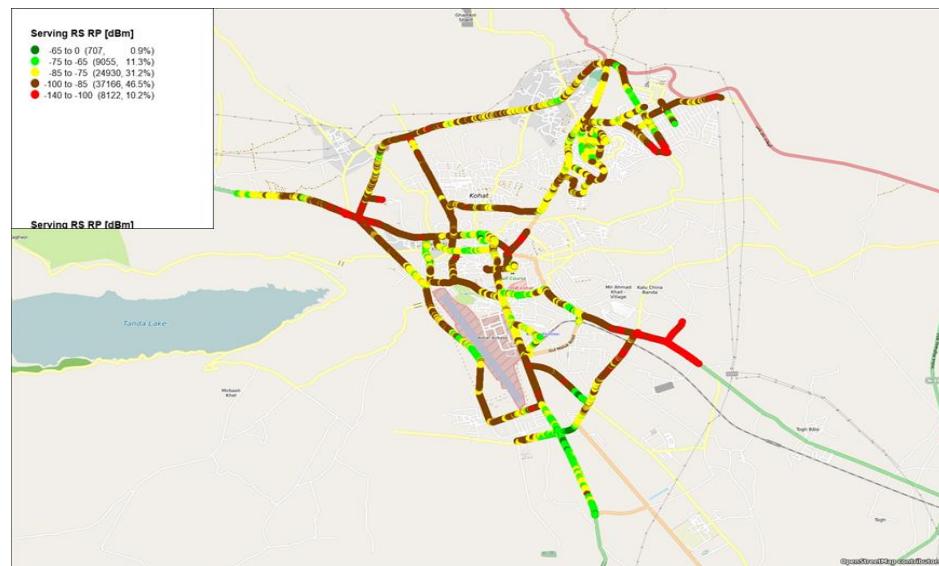


## QUALITY OF SERVICE SURVEY RESULTS – NOWSHEHRA

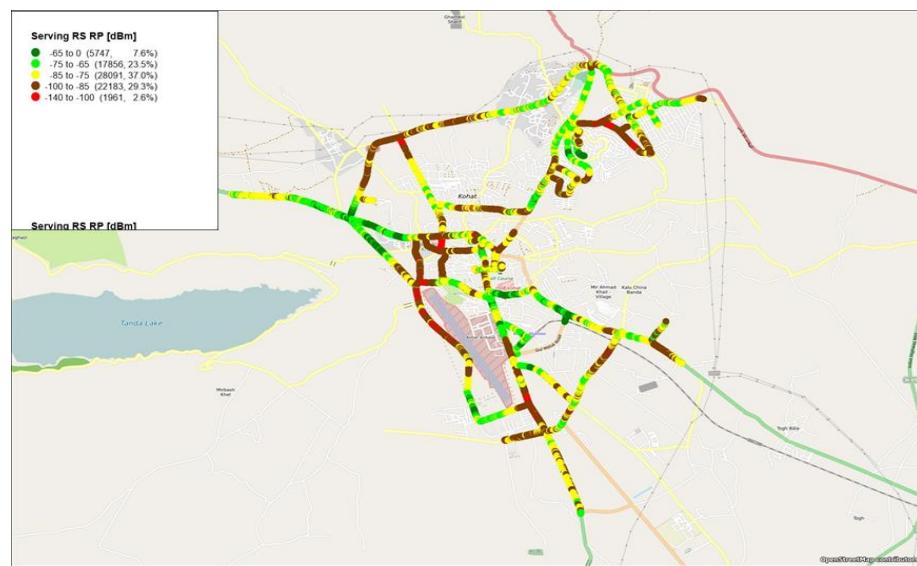


## 4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

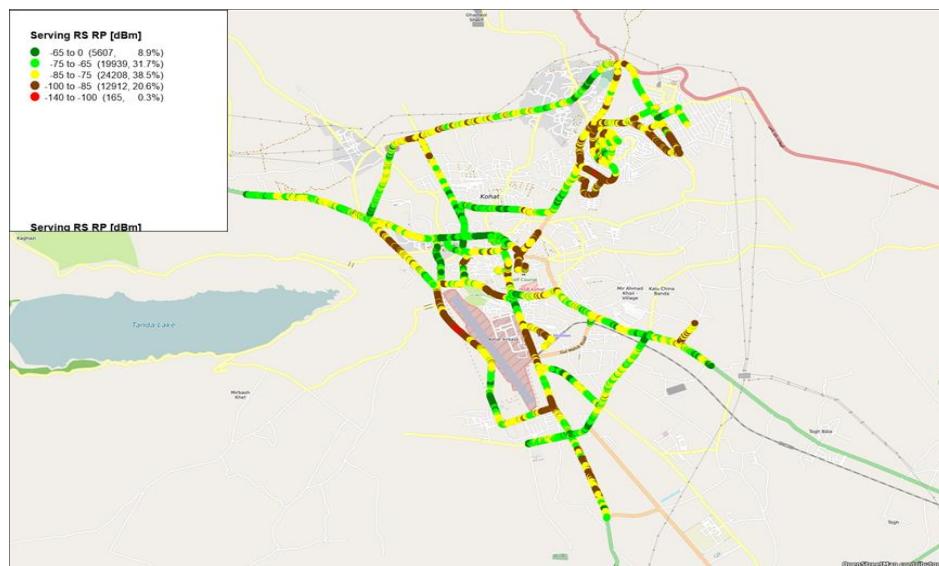
JAZZ 4G NETWORK COVERAGE – KOHAT



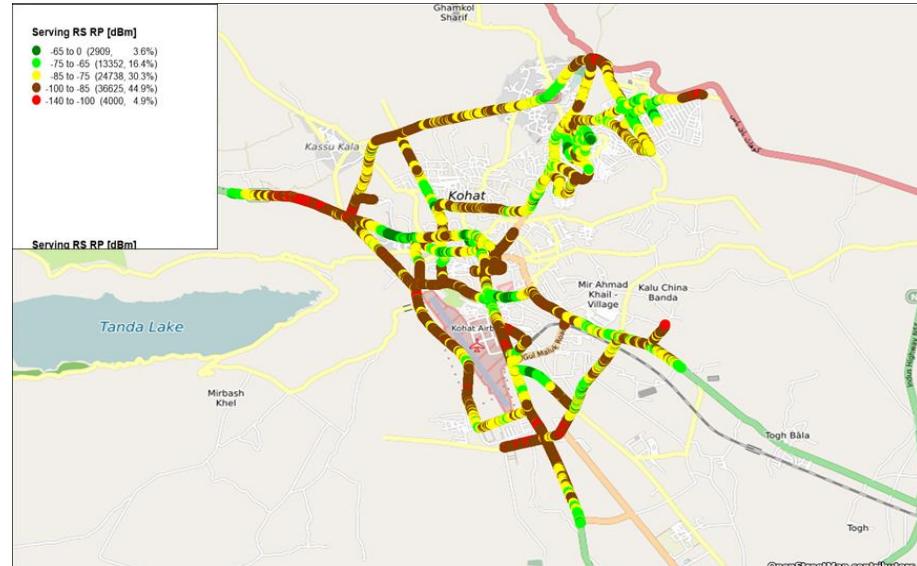
TELENOR 4G NETWORK COVERAGE – KOHAT



UFONE 4G NETWORK COVERAGE – KOHAT



ZONG 4G NETWORK COVERAGE – KOHAT

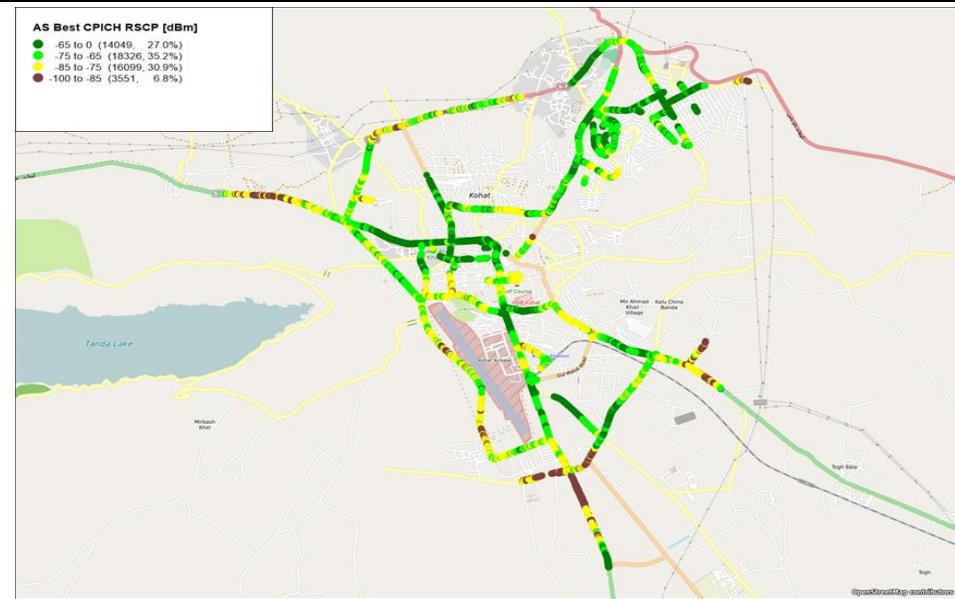


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

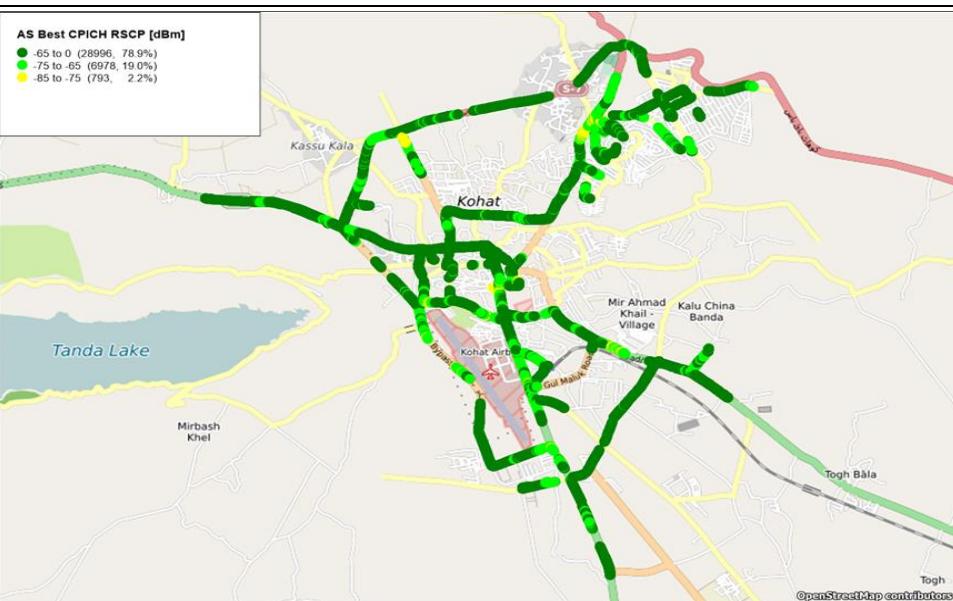
JAZZ 3G NETWORK COVERAGE – KOHAT



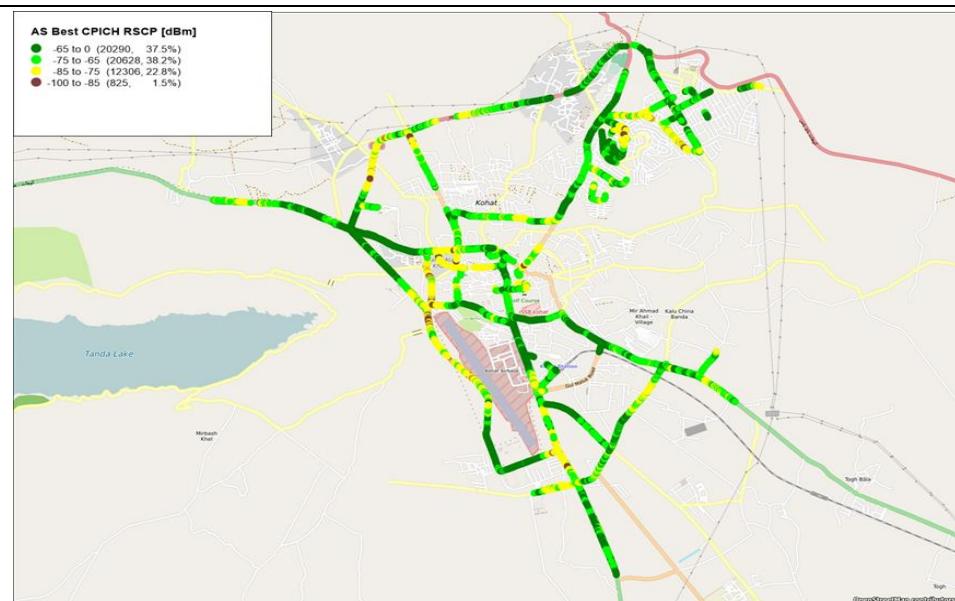
TELENOR 3G NETWORK COVERAGE – KOHAT



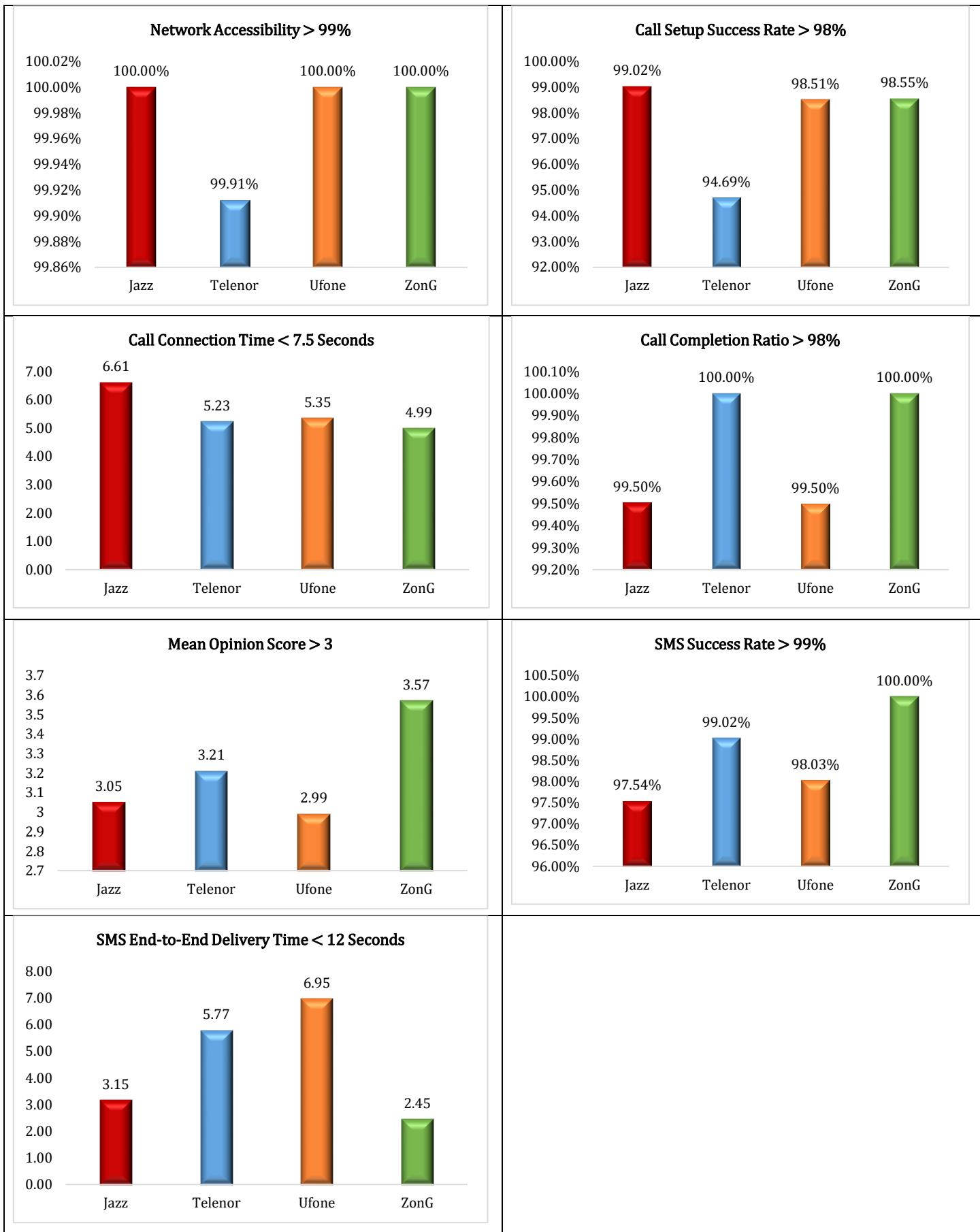
UFONE 3G NETWORK COVERAGE – KOHAT



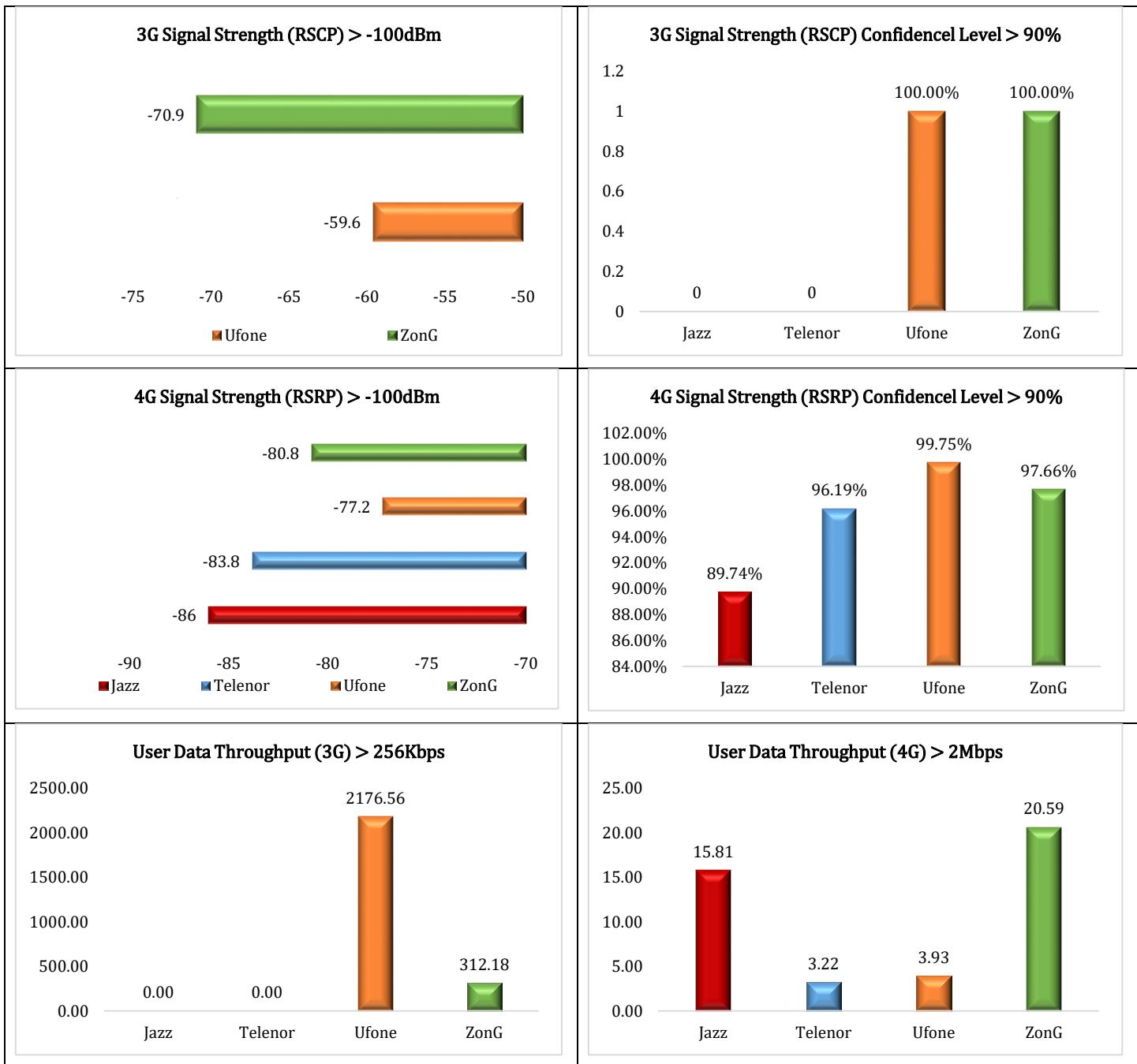
ZONG 3G NETWORK COVERAGE – KOHAT



## QUALITY OF SERVICE SURVEY RESULTS – KOHAT

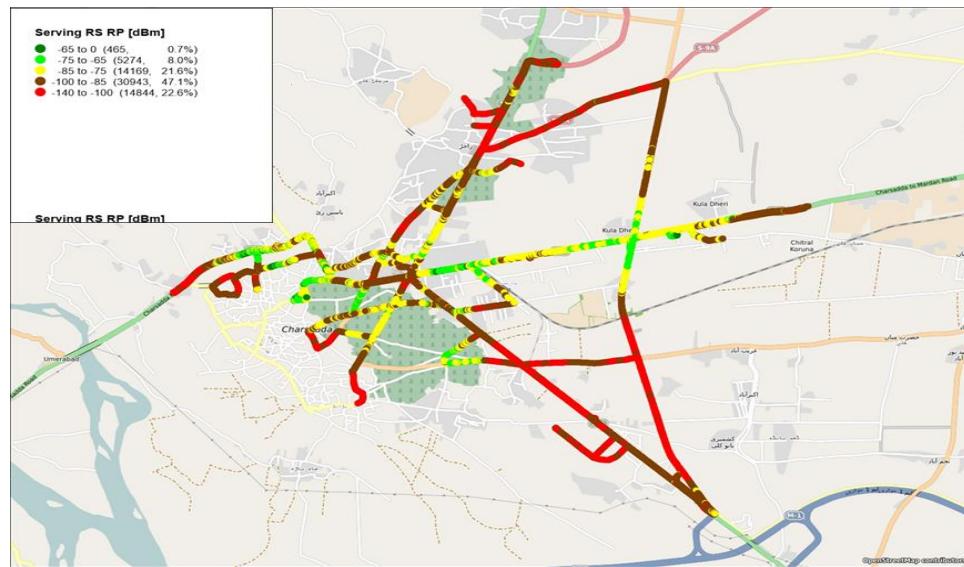


## QUALITY OF SERVICE SURVEY RESULTS – KOHAT

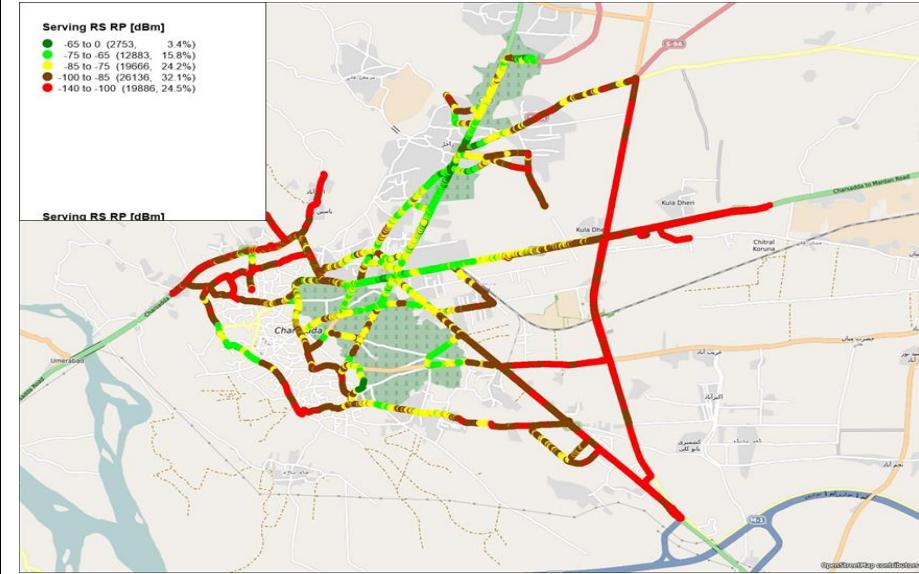


## 4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

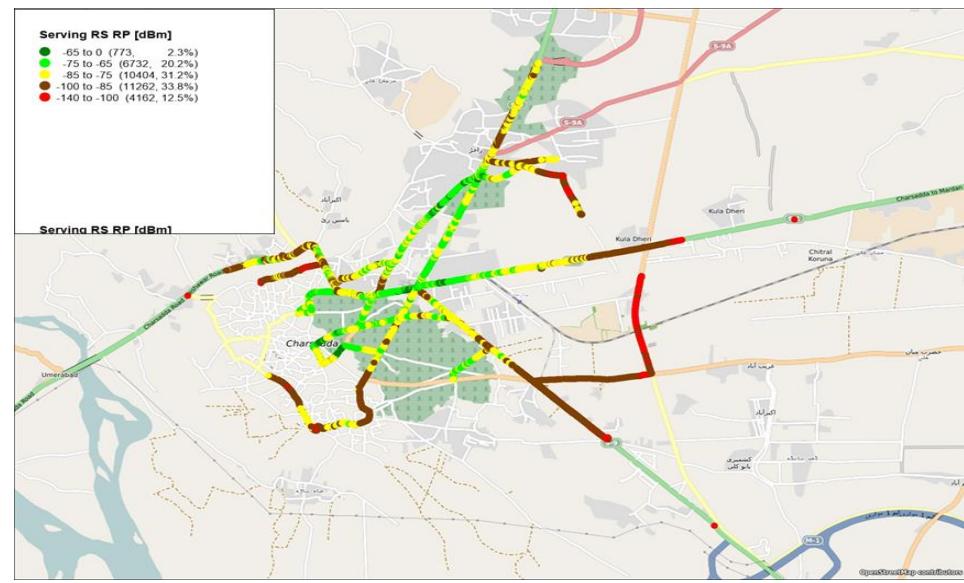
JAZZ 4G NETWORK COVERAGE – CHARSADDA



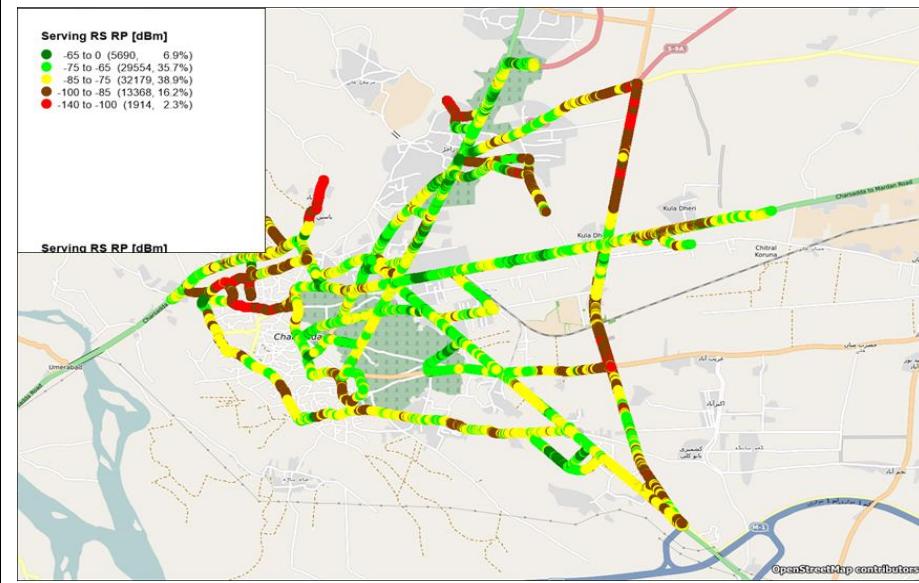
TELENOR 4G NETWORK COVERAGE – CHARSADDA



UFONE 4G NETWORK COVERAGE – CHARSADDA

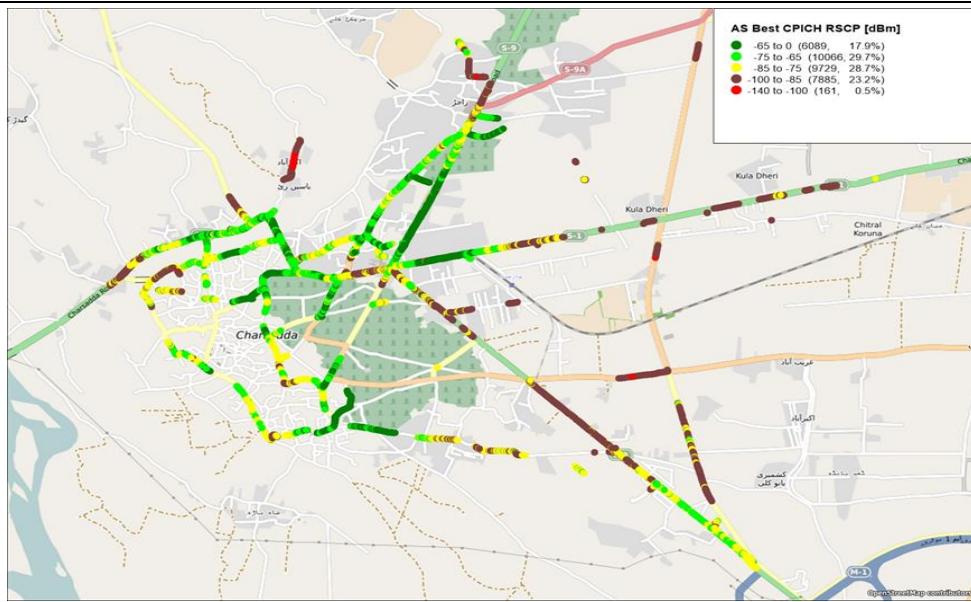


ZONG 4G NETWORK COVERAGE – CHARSADDA

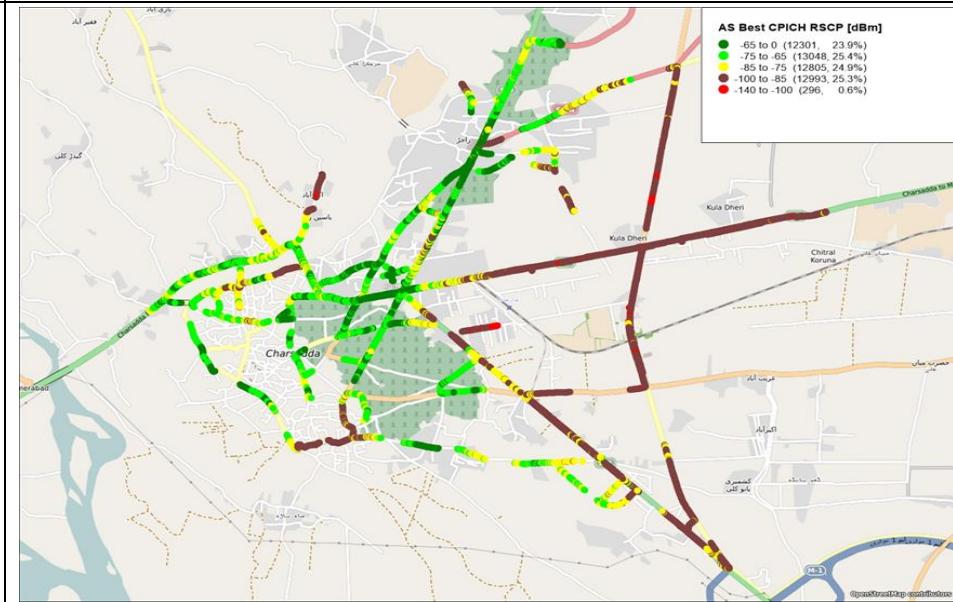


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

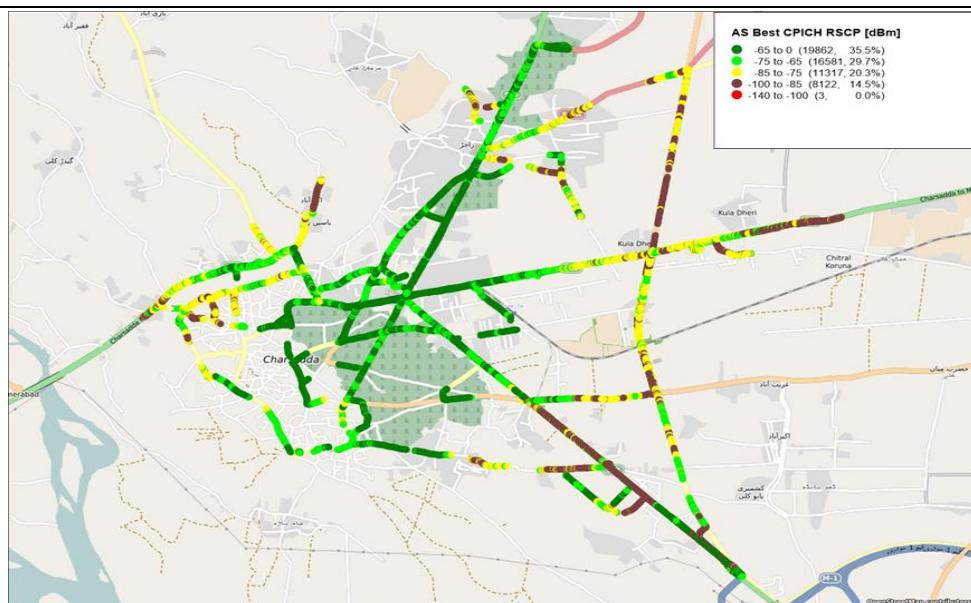
JAZZ 3G NETWORK COVERAGE – CHARSADDA



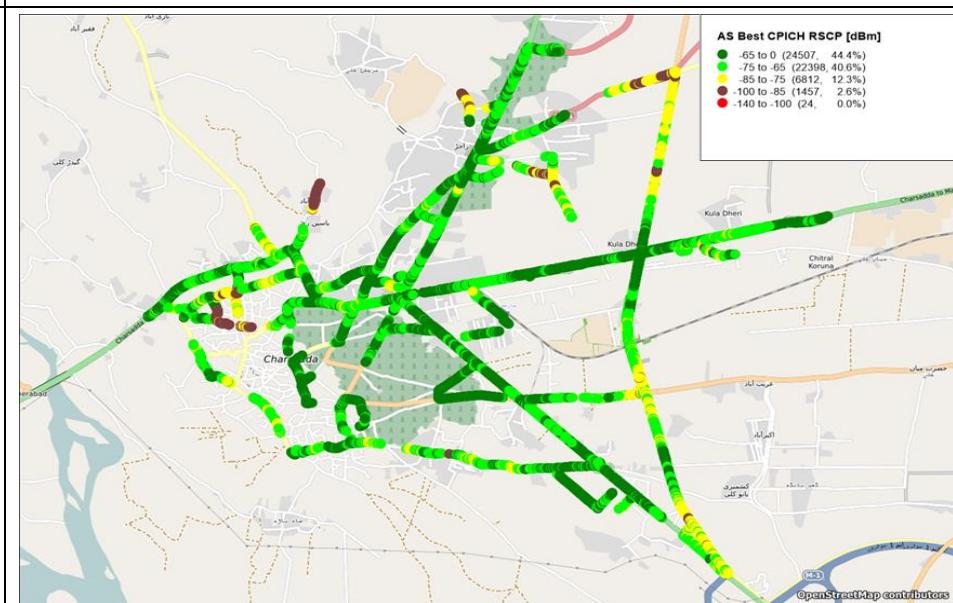
TELENOR 3G NETWORK COVERAGE – CHARSADDA



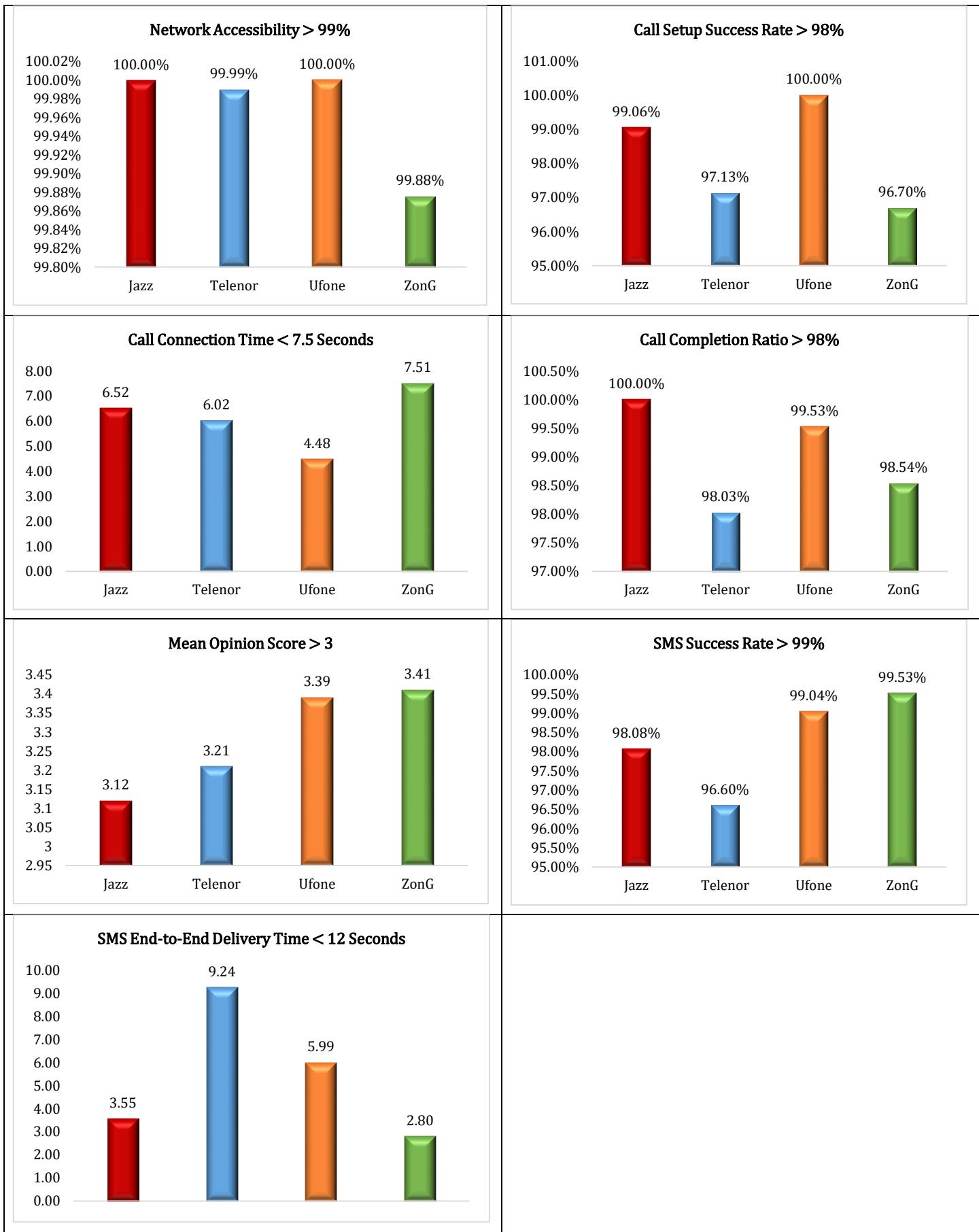
UFONE 3G NETWORK COVERAGE – CHARSADDA



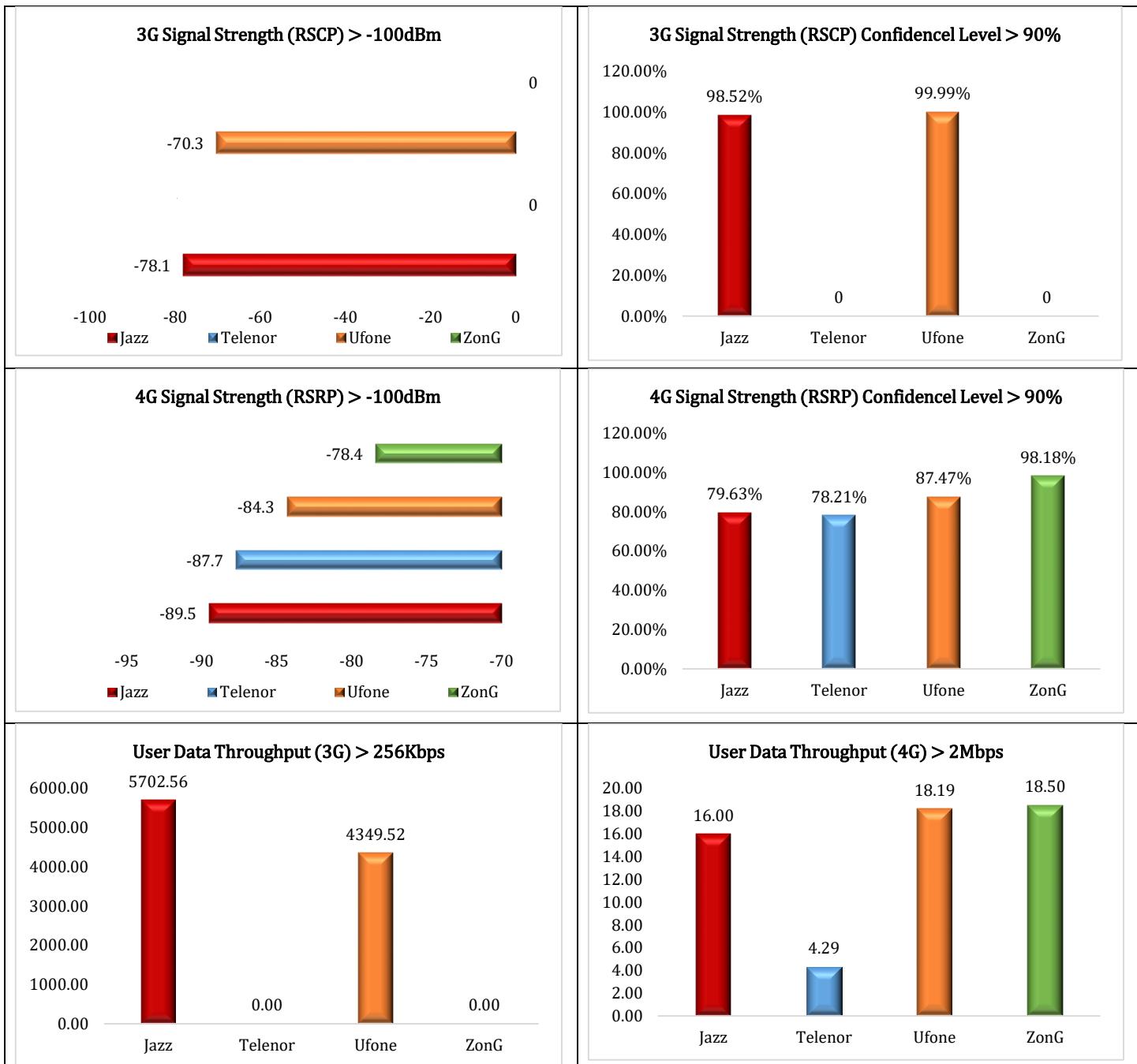
ZONG 3G NETWORK COVERAGE – CHARSADDA



## QUALITY OF SERVICE SURVEY RESULTS – CHARSADDA

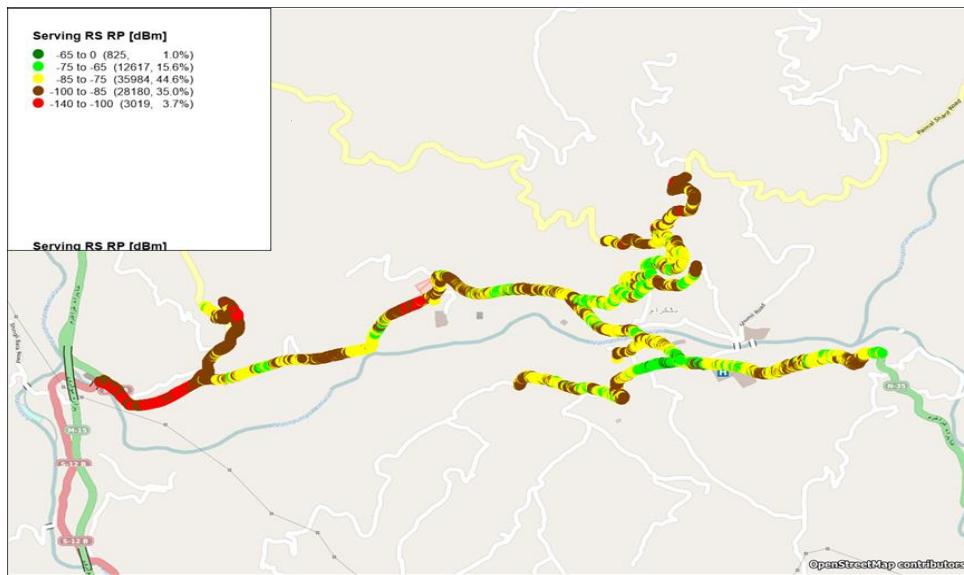


## QUALITY OF SERVICE SURVEY RESULTS – CHARSADDA

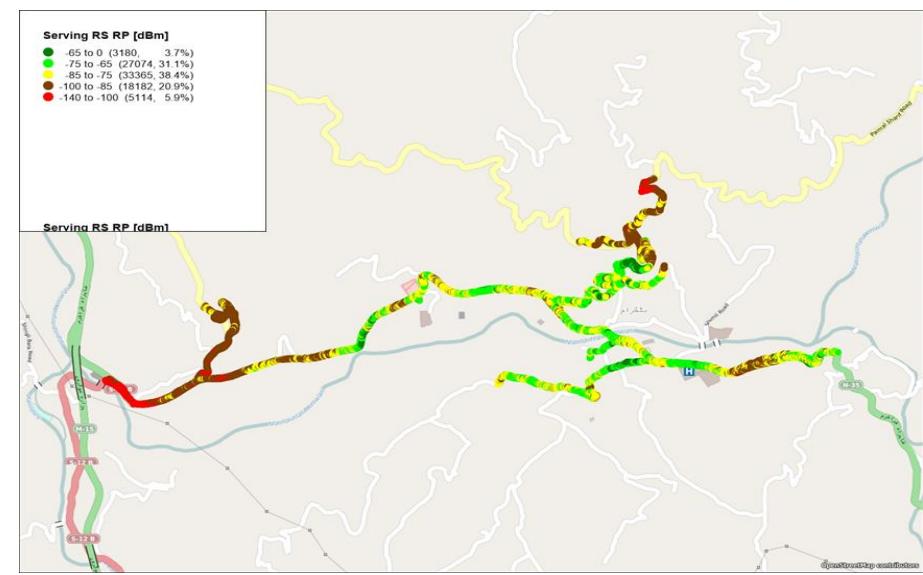


## 4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

JAZZ 4G NETWORK COVERAGE – BATTAGRAM



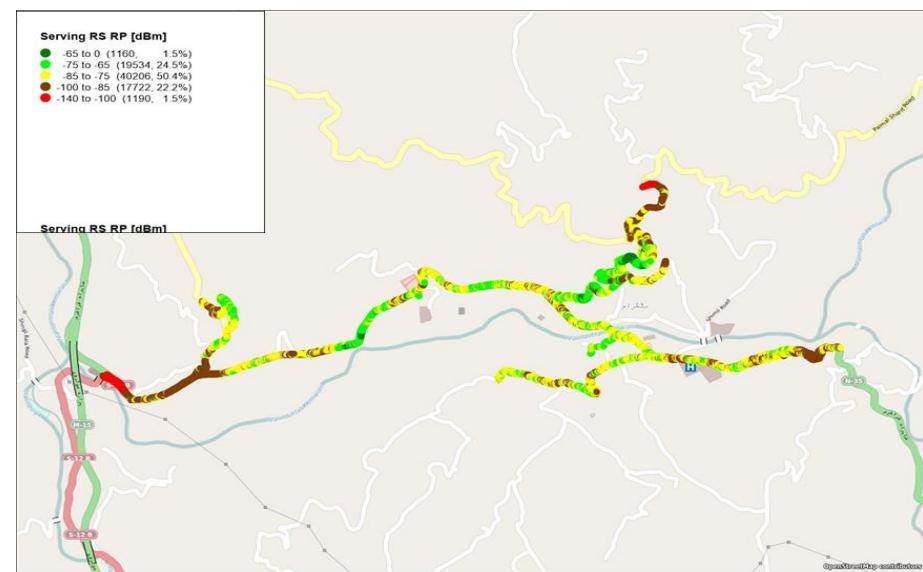
TELENOR 4G NETWORK COVERAGE – BATTAGRAM



UFONE 4G NETWORK COVERAGE – BATTAGRAM

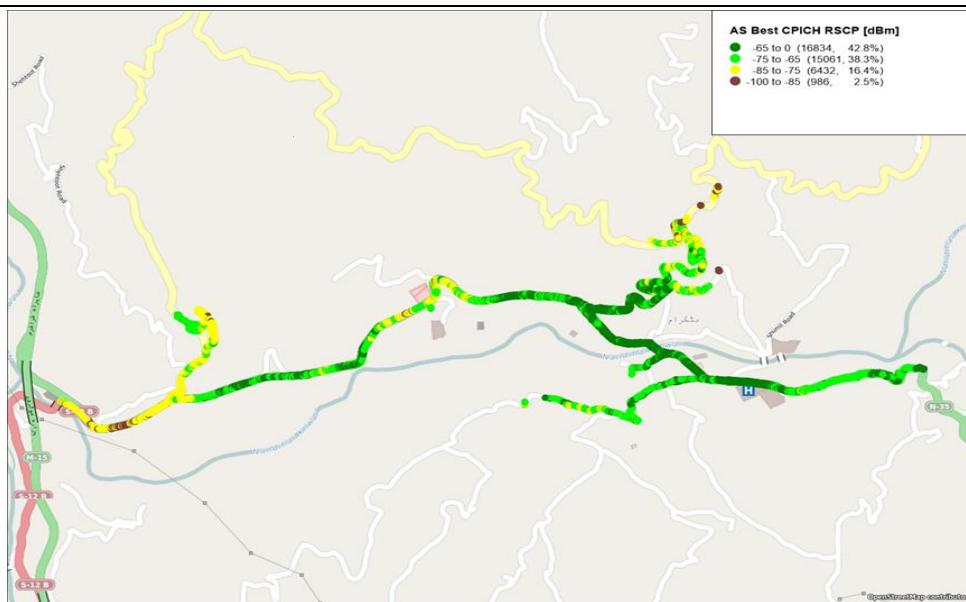
4G NOT AVAILABLE

ZONG 4G NETWORK COVERAGE – BATTAGRAM

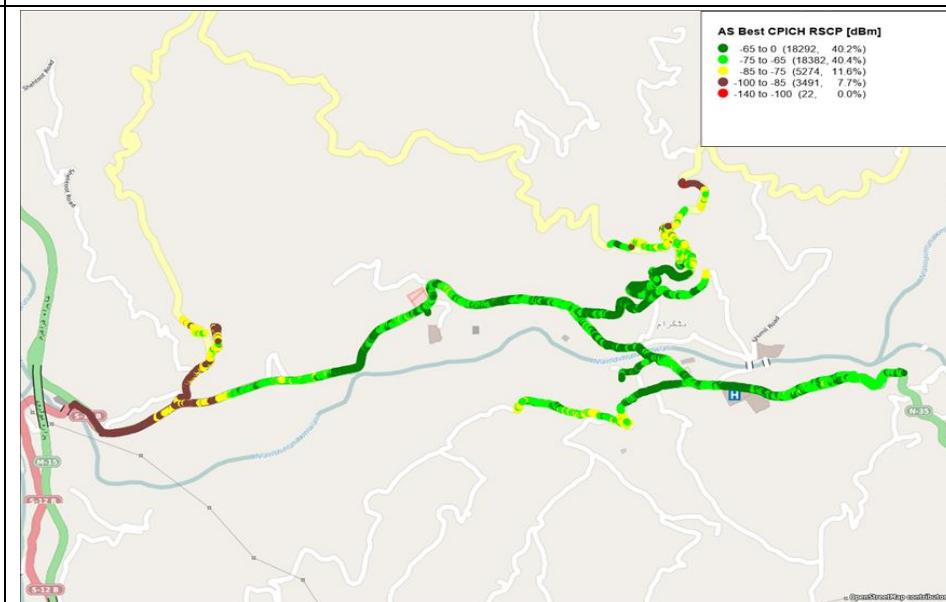


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

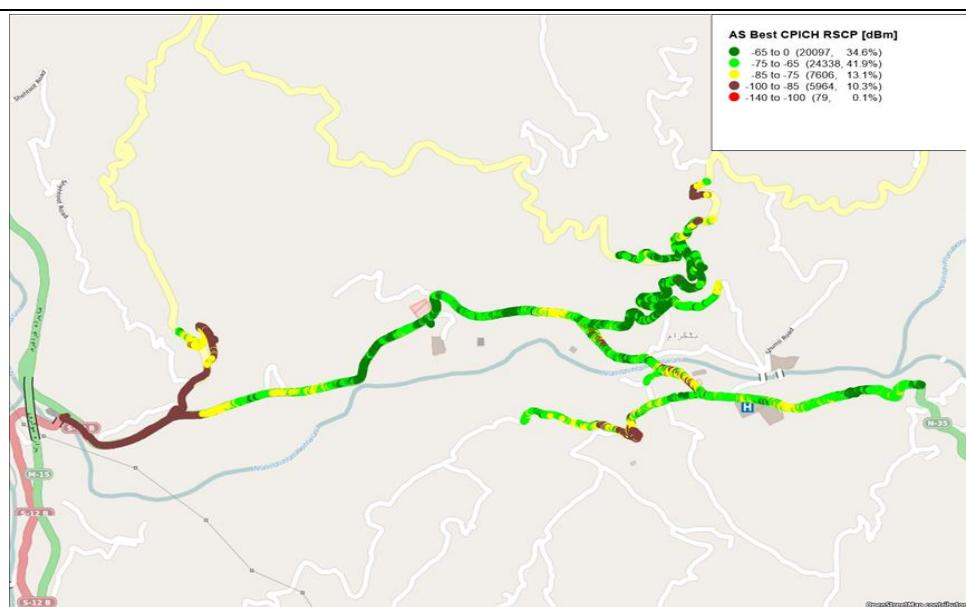
JAZZ 3G NETWORK COVERAGE – BATTAGRAM



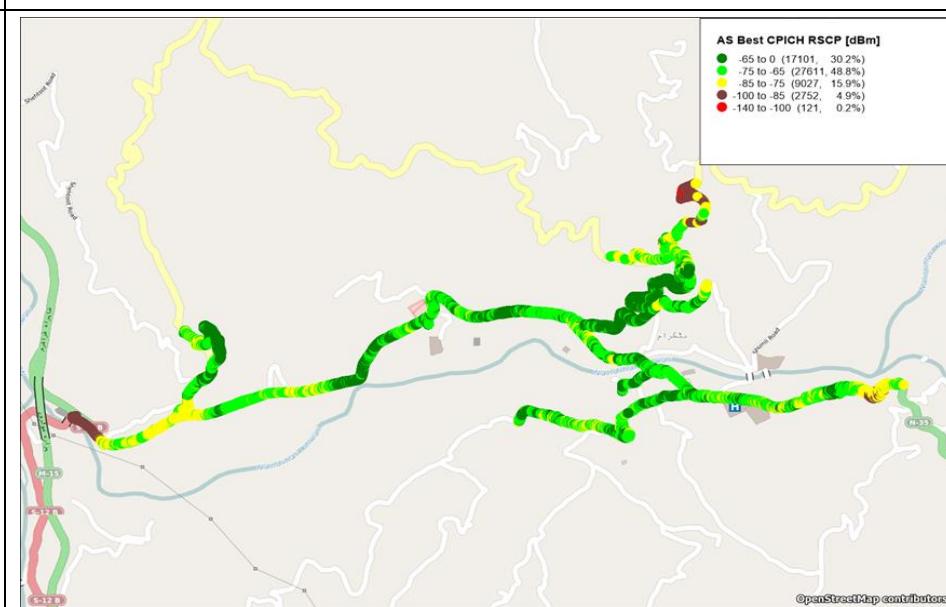
TELENOR 3G NETWORK COVERAGE – BATTAGRAM



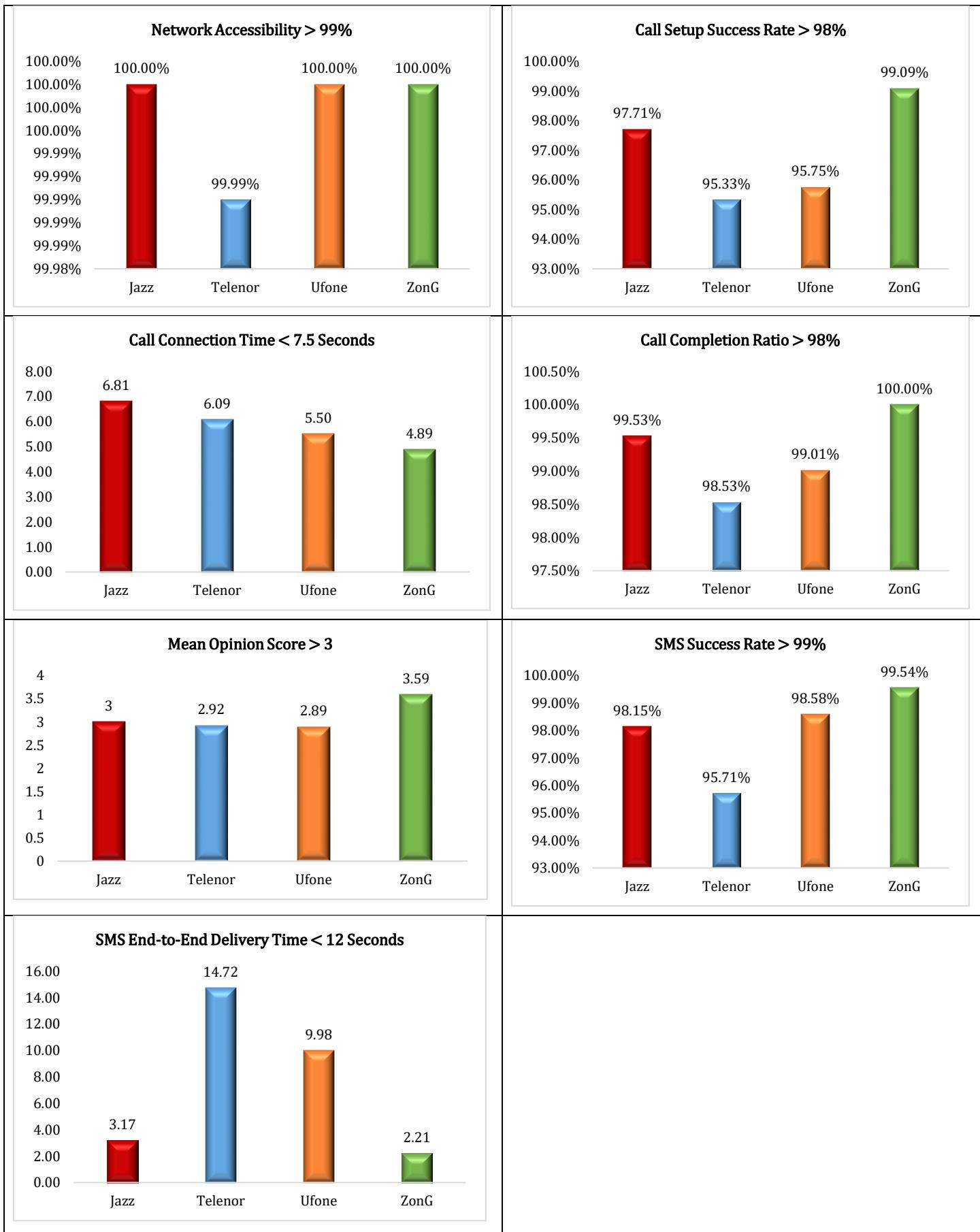
UFONE 3G NETWORK COVERAGE – BATTAGRAM



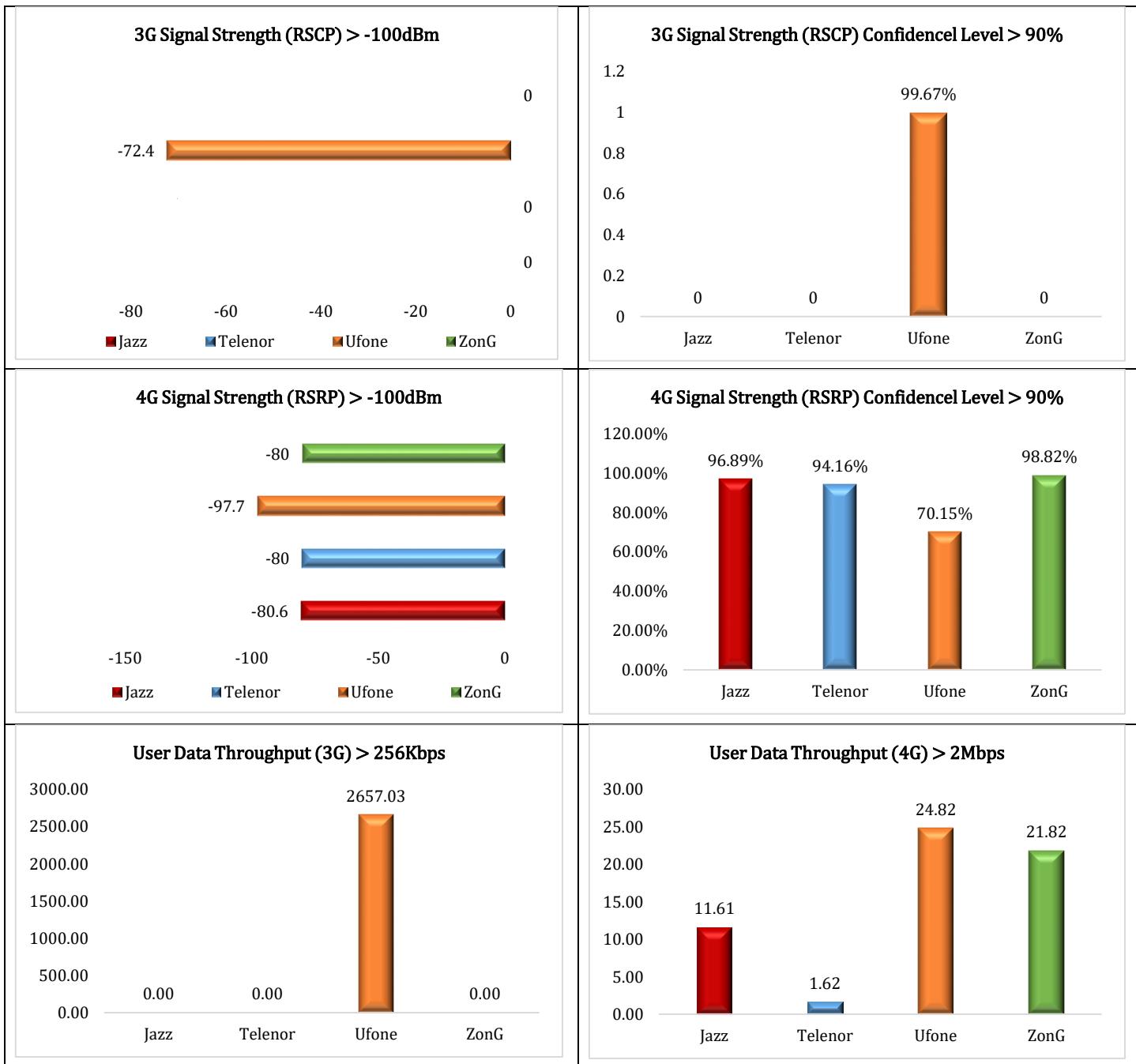
ZONG 3G NETWORK COVERAGE – BATTAGRAM



## QUALITY OF SERVICE SURVEY RESULTS – BATTAGRAM



## QUALITY OF SERVICE SURVEY RESULTS – BATTAGRAM

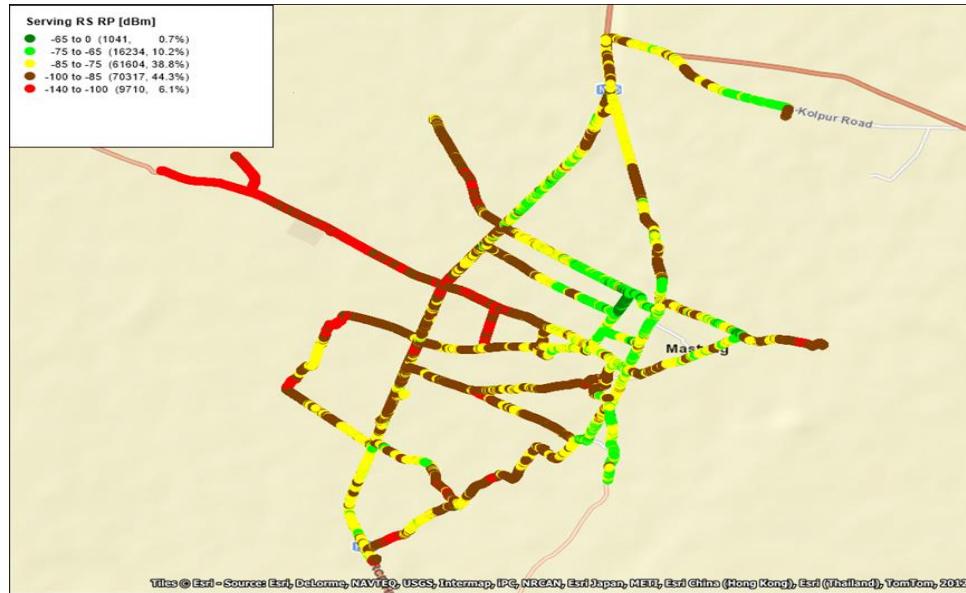


## **ANNEX – C**

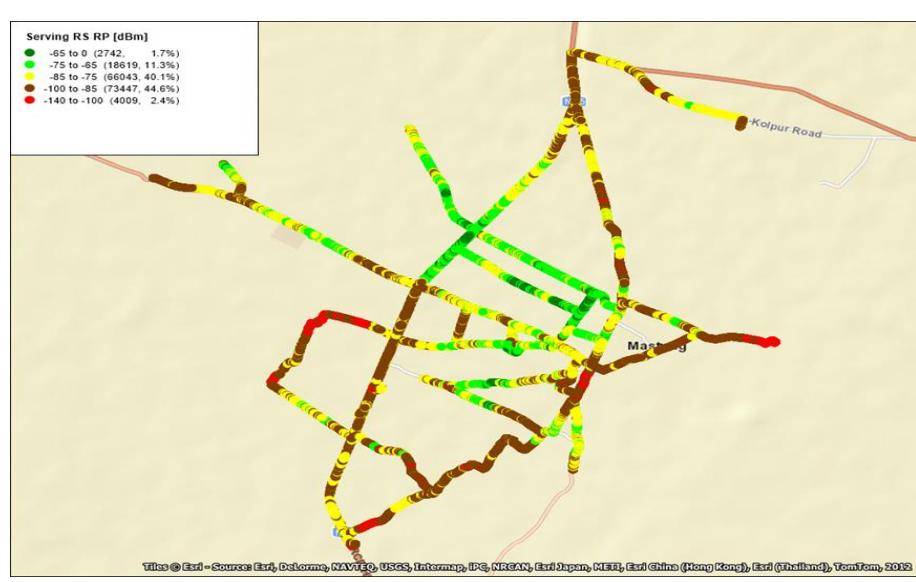
# **BALOCHISTAN**

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

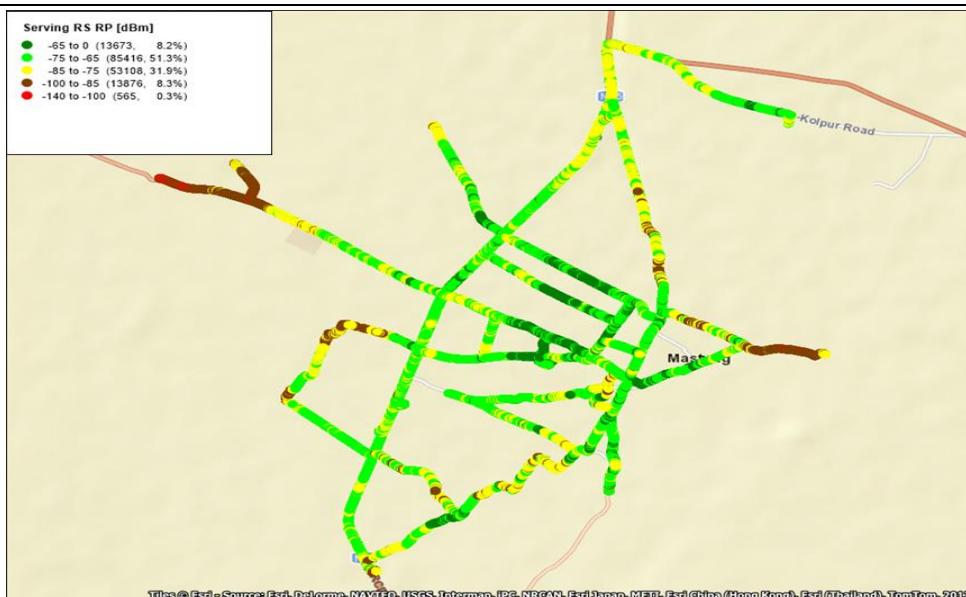
JAZZ 4G NETWORK COVERAGE – MASTUNG



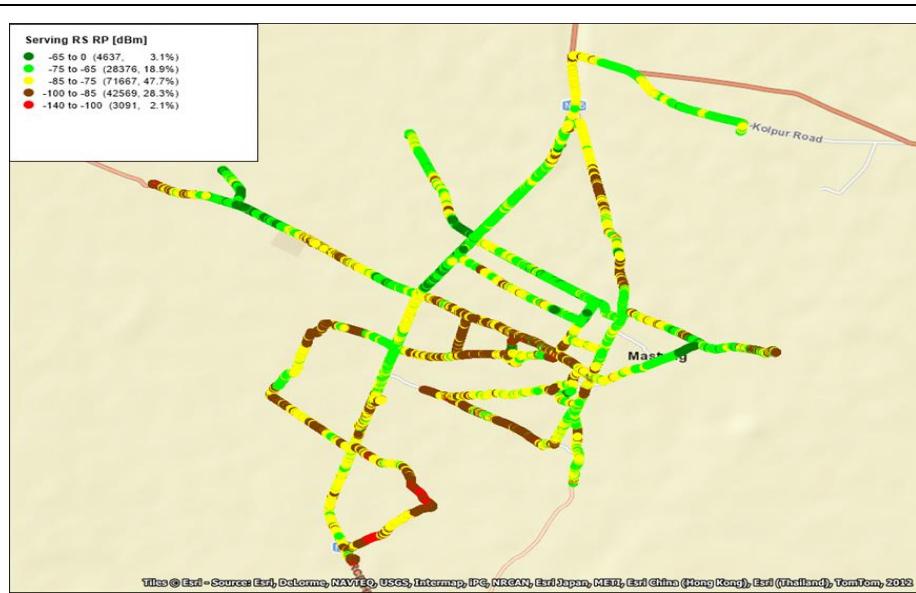
TELENOR 4G NETWORK COVERAGE – MASTUNG



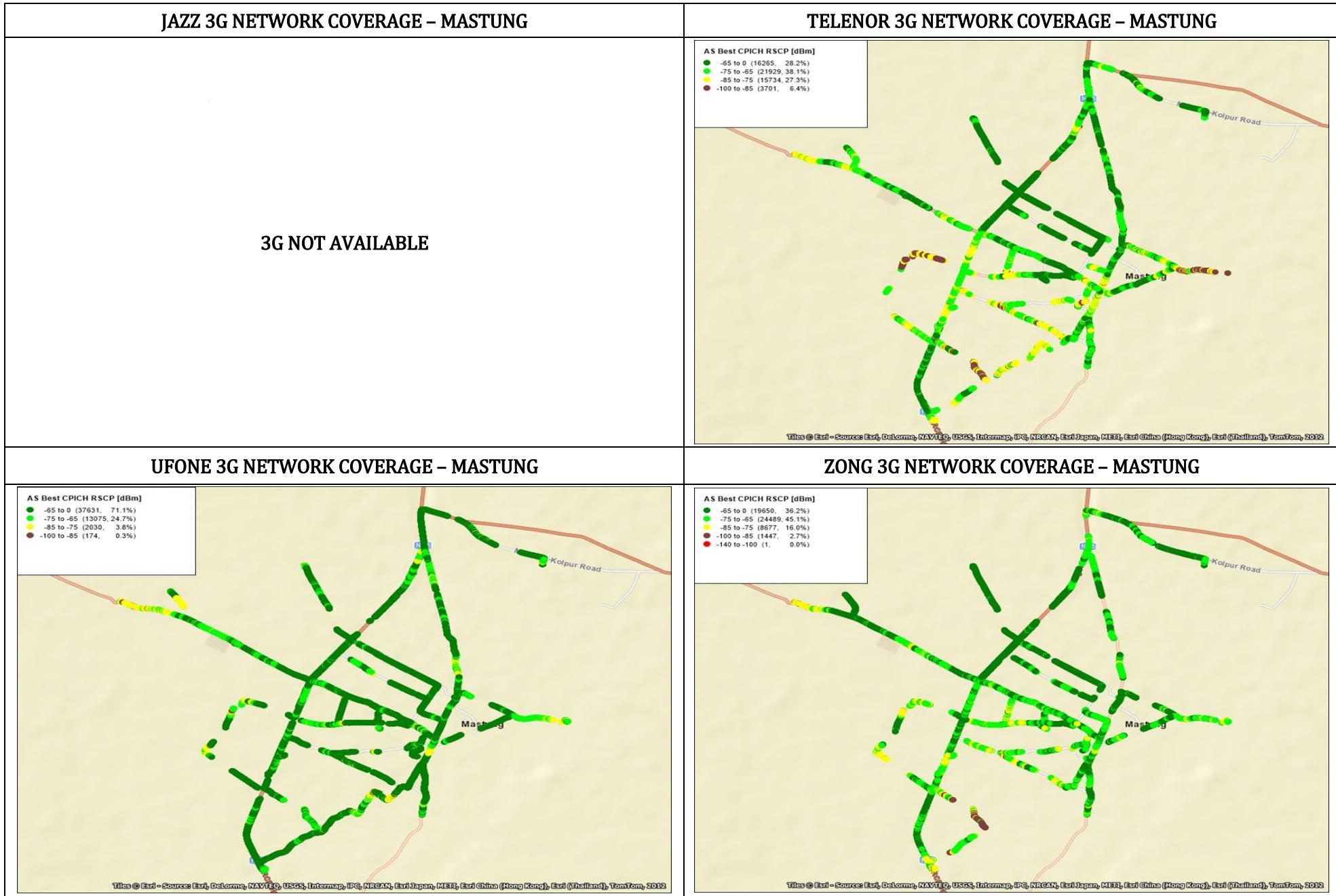
UFONE 4G NETWORK COVERAGE – MASTUNG



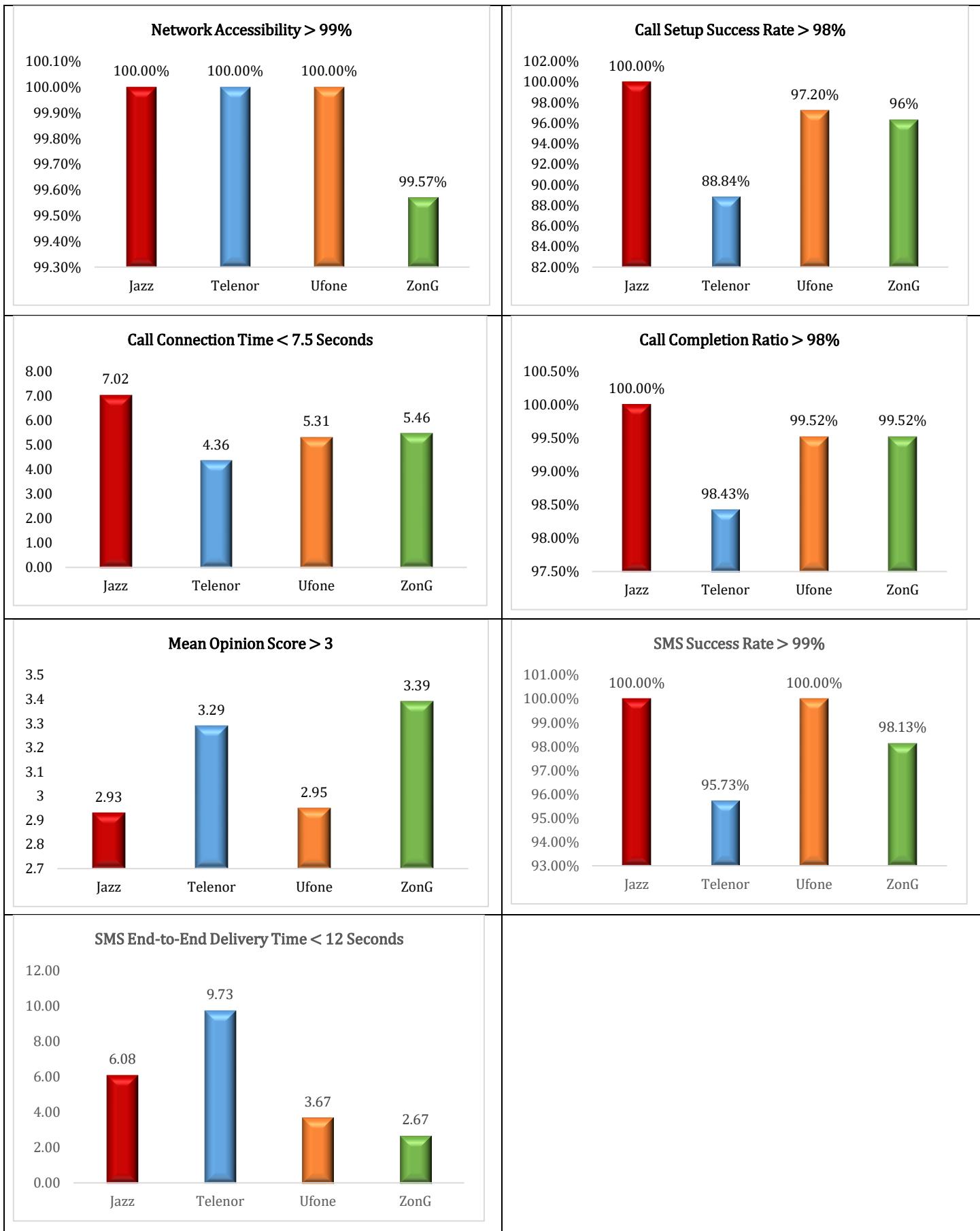
ZONG 4G NETWORK COVERAGE – MASTUNG



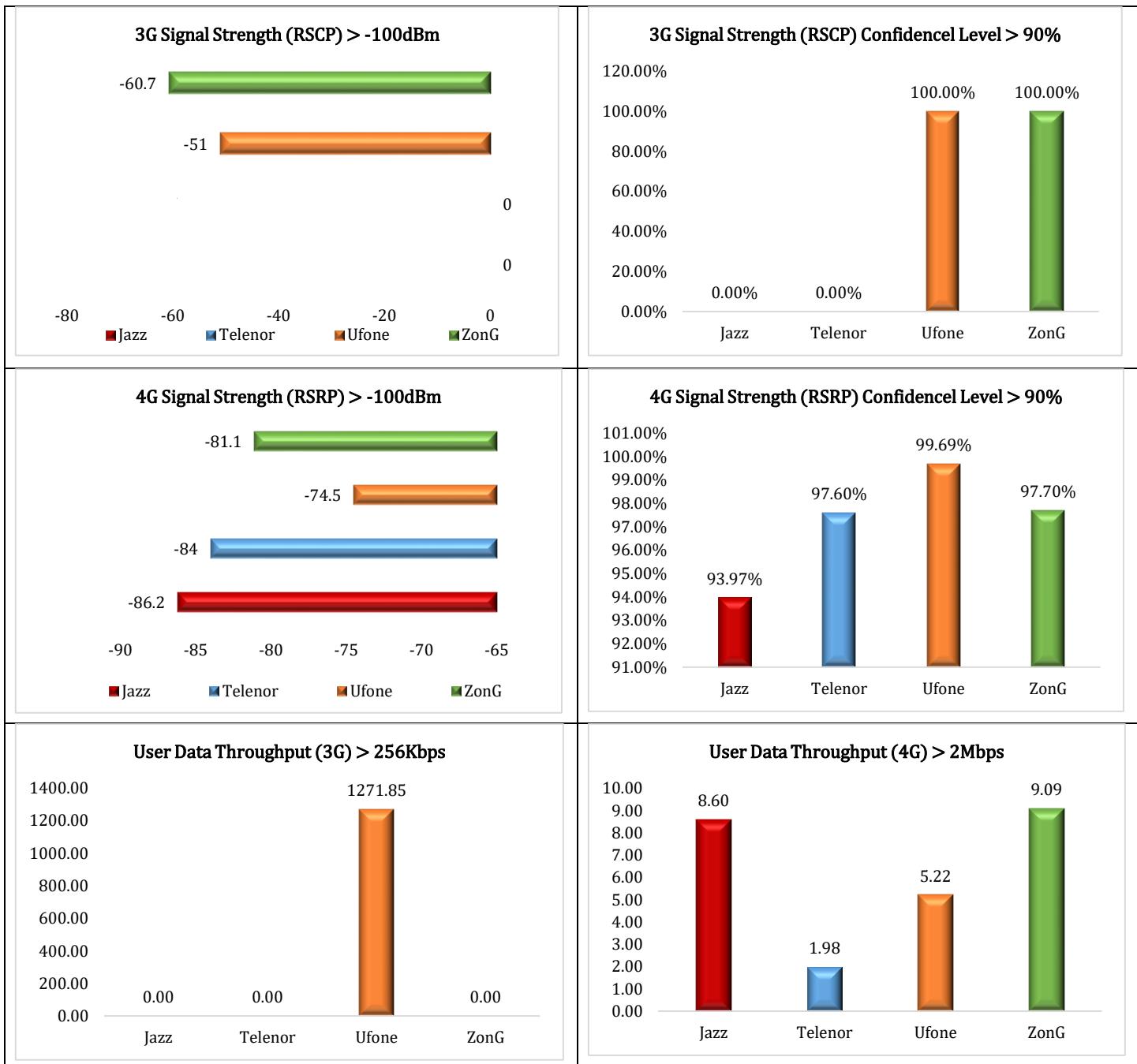
## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)



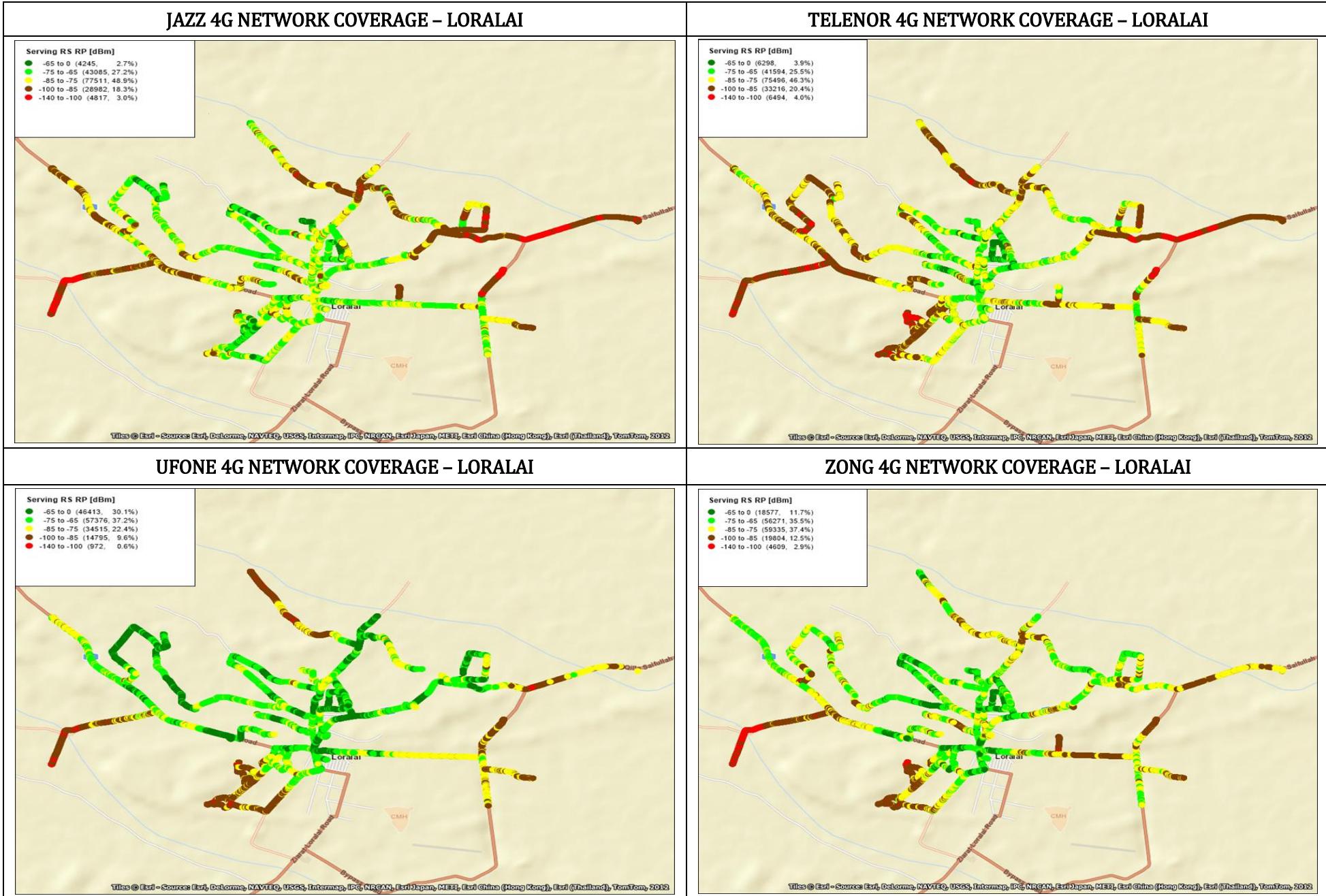
## QUALITY OF SERVICE SURVEY RESULTS – MASTUNG



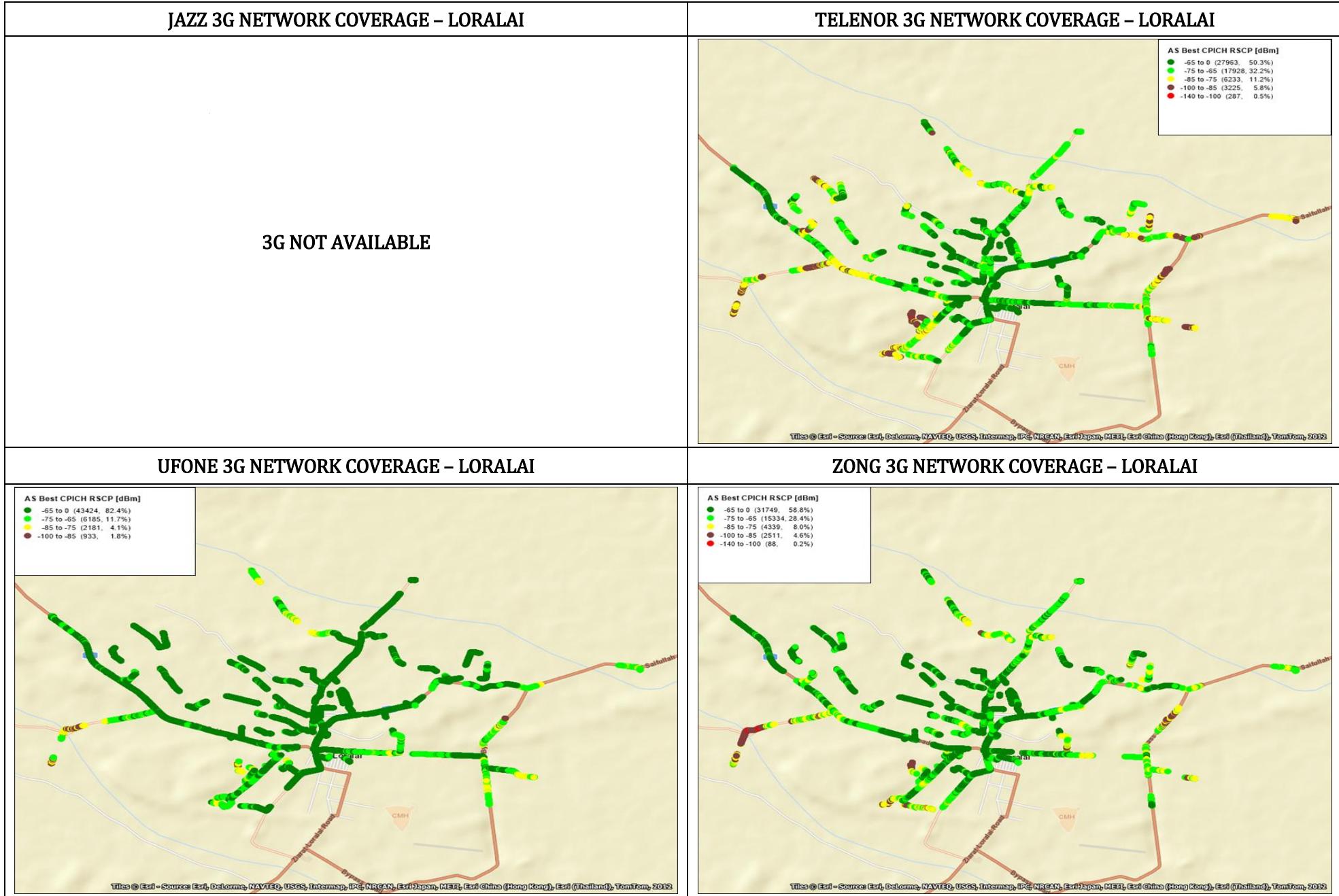
## QUALITY OF SERVICE SURVEY RESULTS – MASTUNG



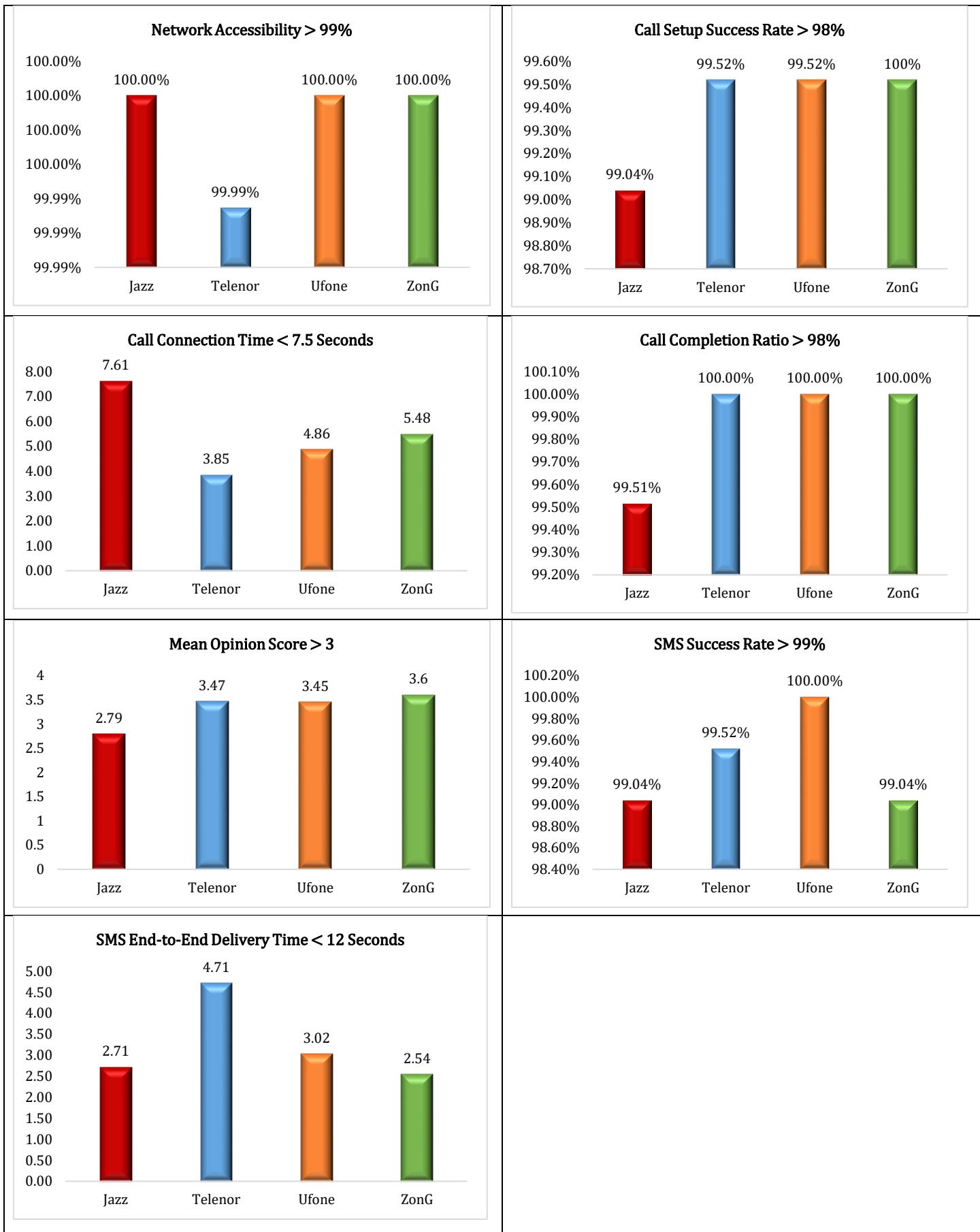
## 4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)



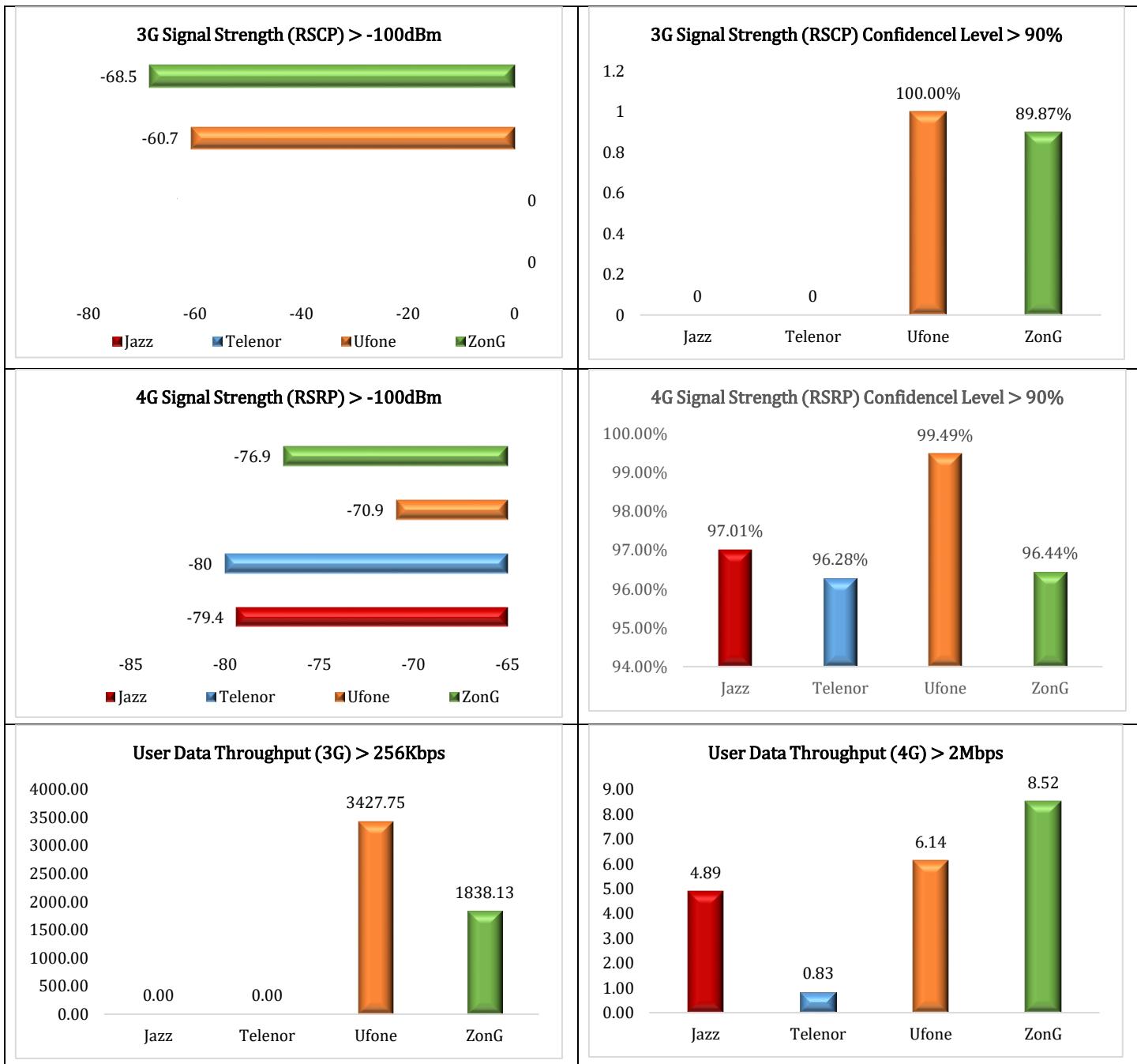
## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)



## QUALITY OF SERVICE SURVEY RESULTS – LORALAI

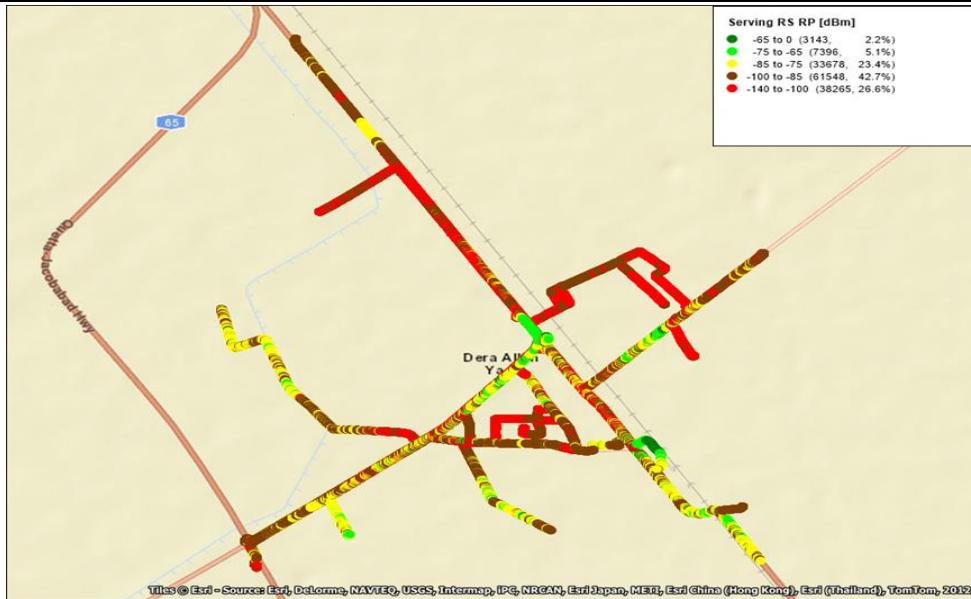


## QUALITY OF SERVICE SURVEY RESULTS – LORALAI

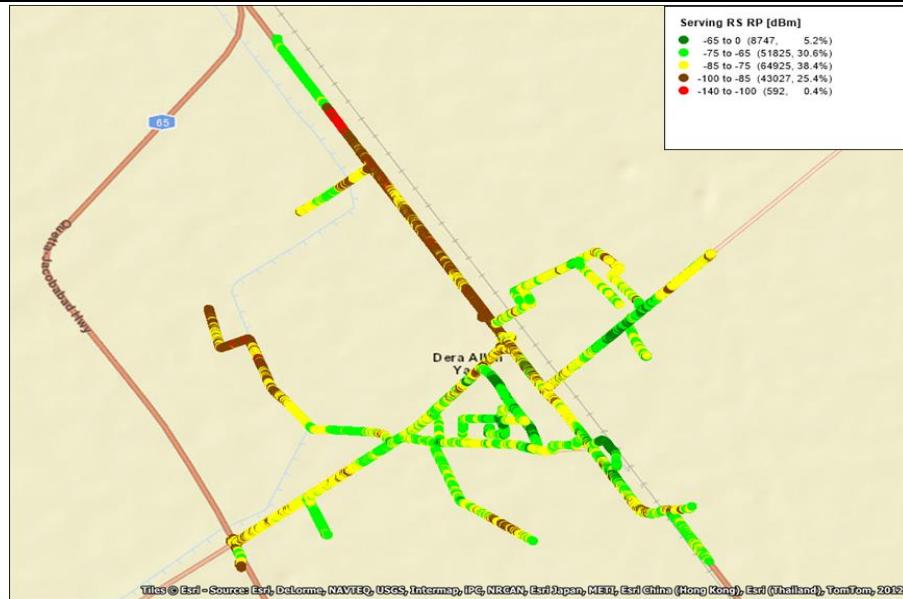


## 4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

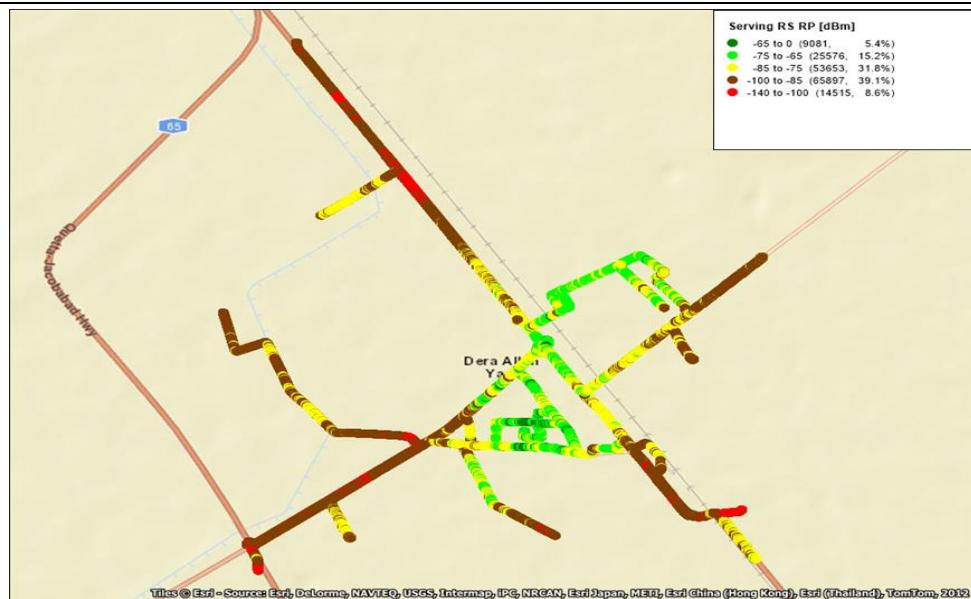
JAZZ 4G NETWORK COVERAGE – DERA ALLAH YAR



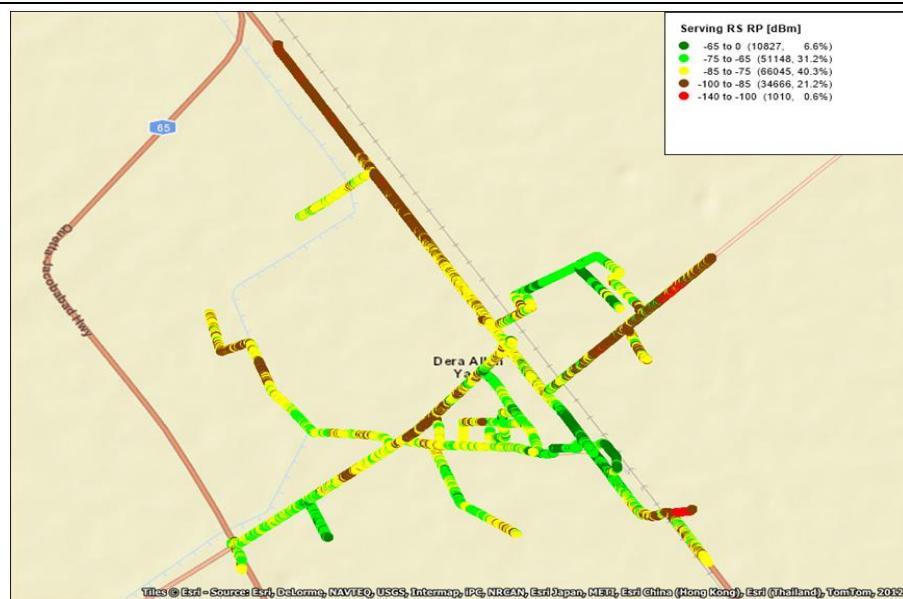
TELENOR 4G NETWORK COVERAGE – DERA ALLAH YAR



UFONE 4G NETWORK COVERAGE – DERA ALLAH YAR

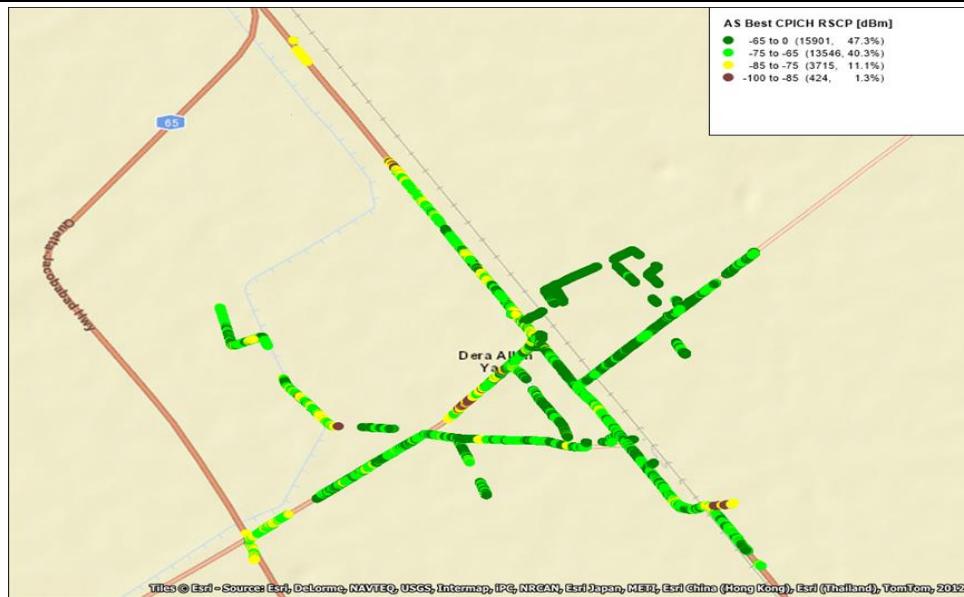


ZONG 4G NETWORK COVERAGE – DERA ALLAH YAR

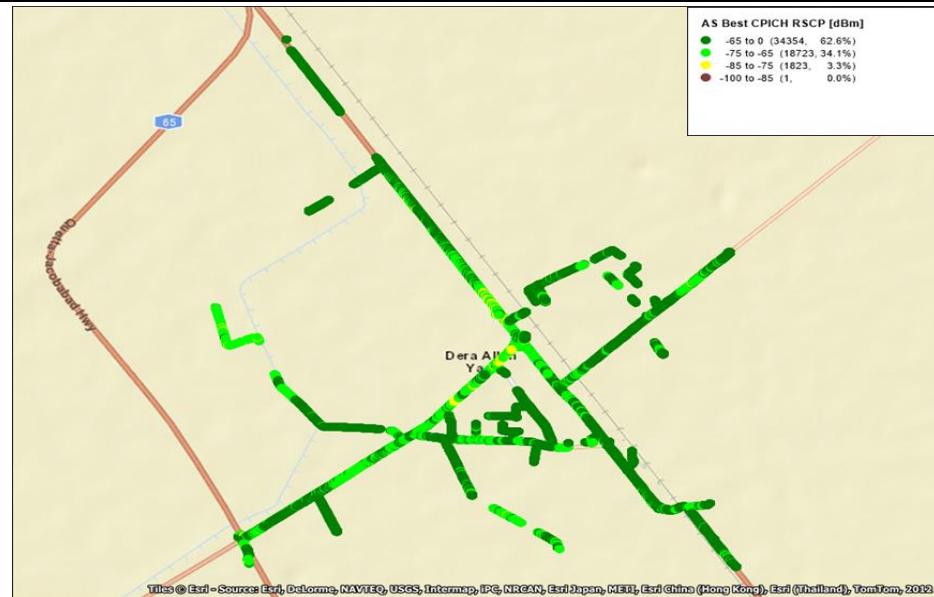


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

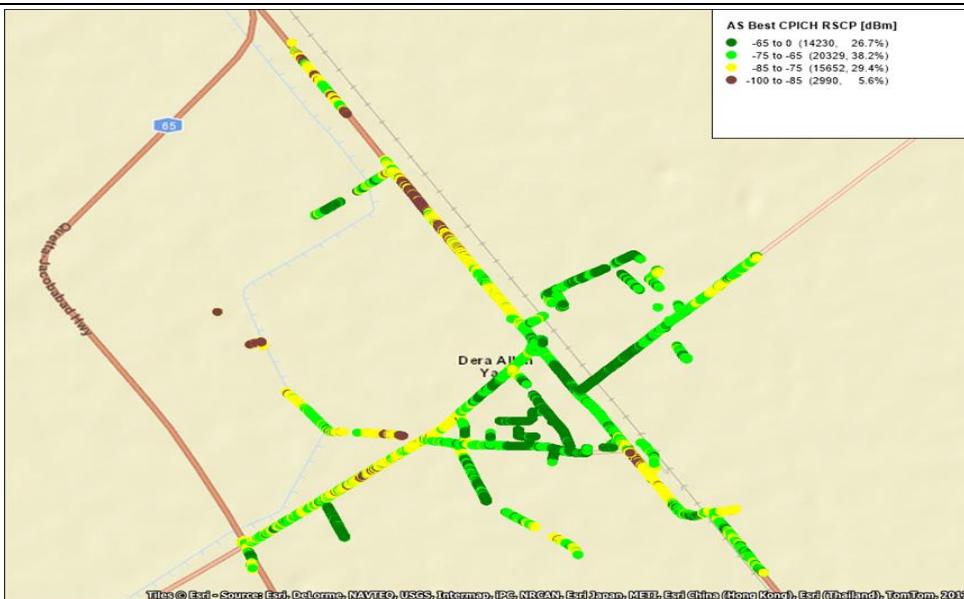
JAZZ 3G NETWORK COVERAGE – DERA ALLAH YAR



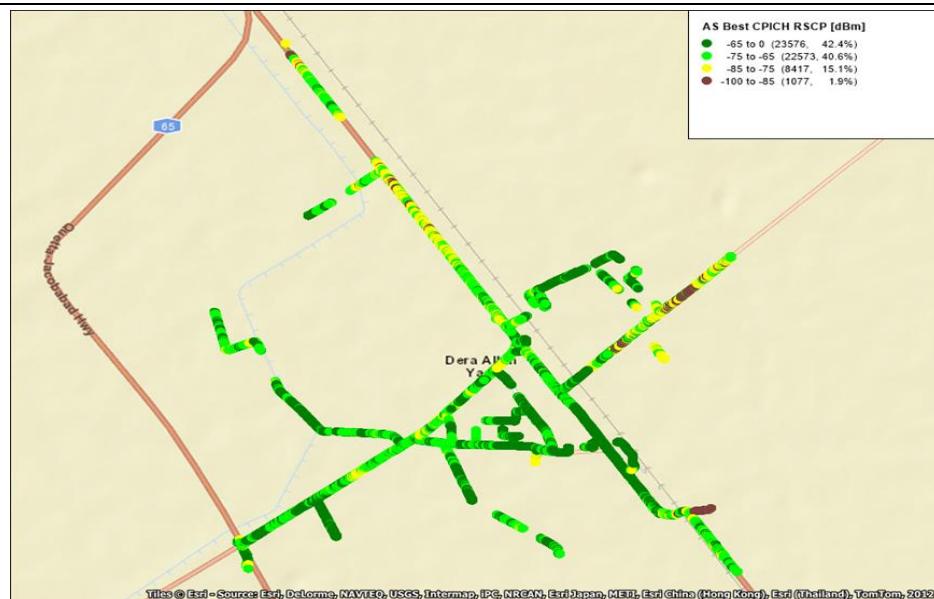
TELENOR 3G NETWORK COVERAGE – DERA ALLAH YAR



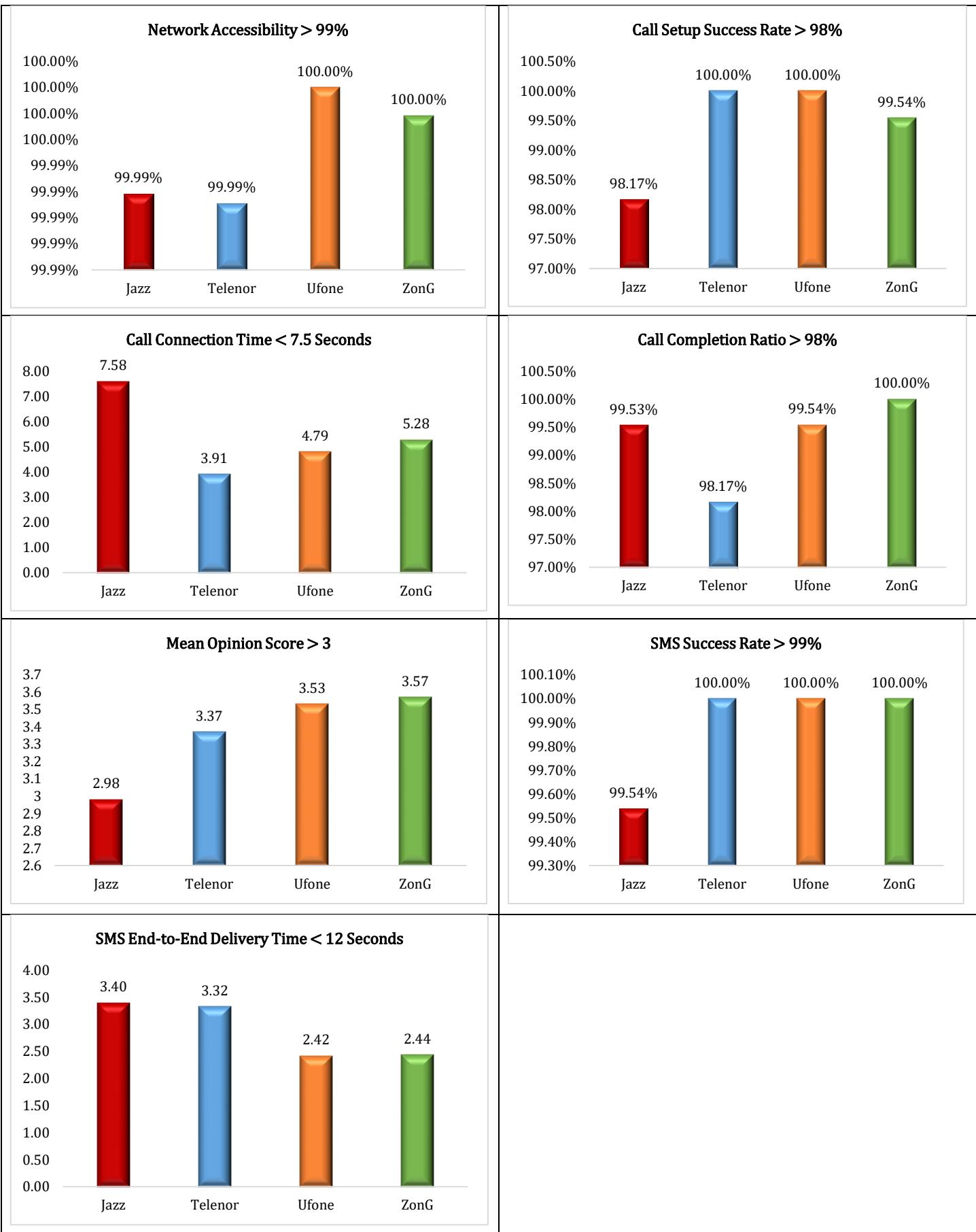
UFONE 3G NETWORK COVERAGE – DERA ALLAH YAR



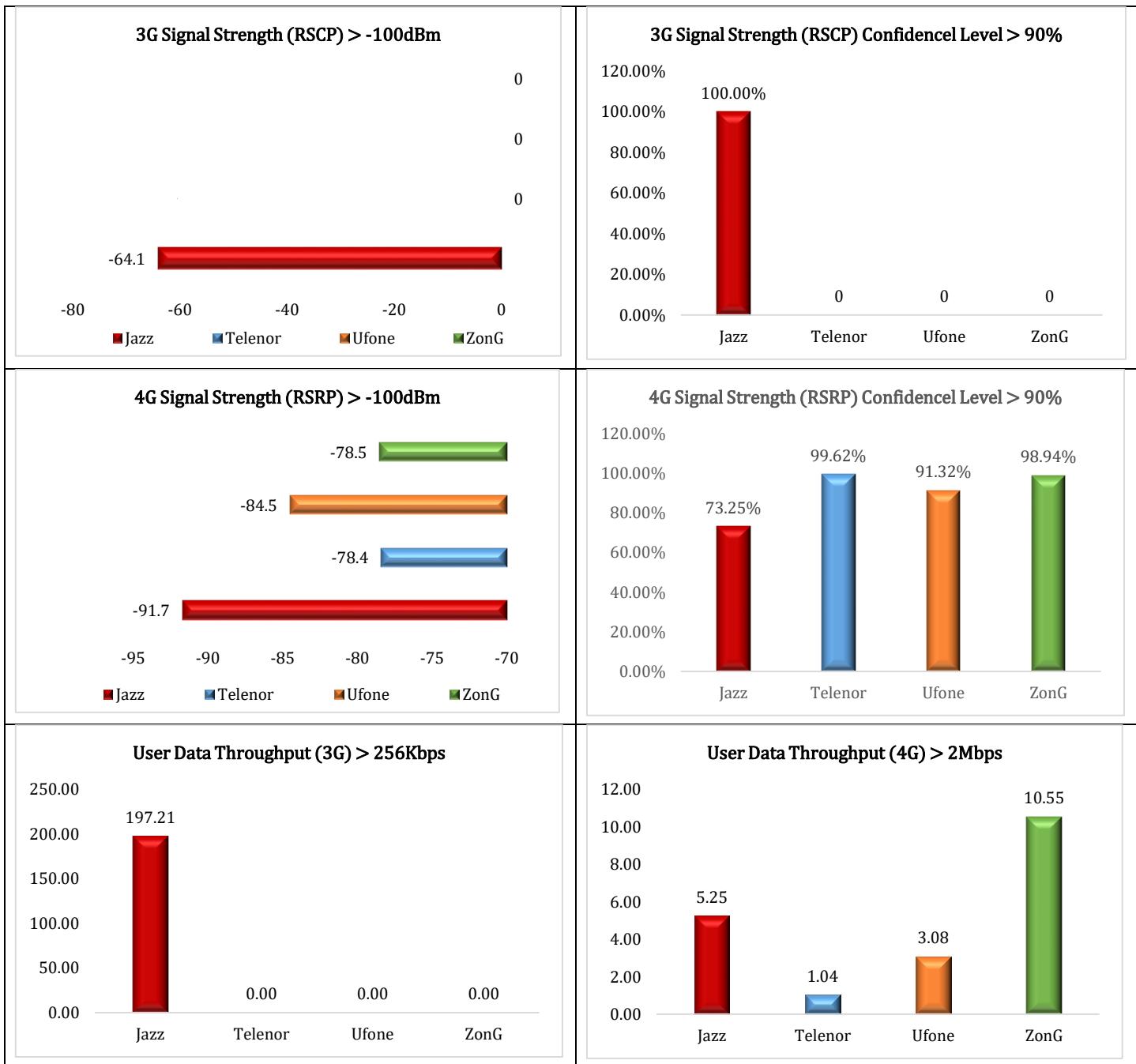
ZONG 3G NETWORK COVERAGE – DERA ALLAH YAR



## 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



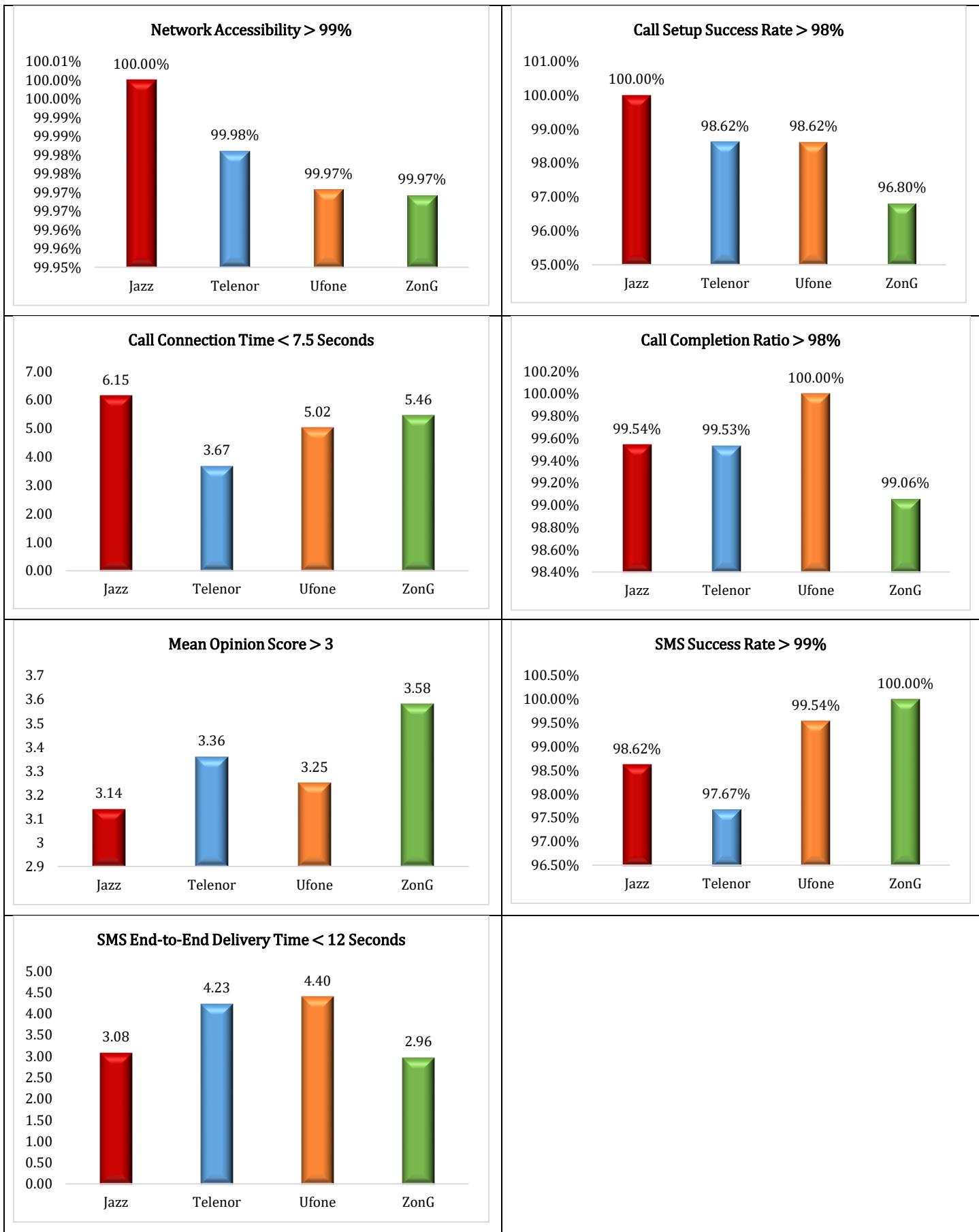
UFONE 3G NETWORK COVERAGE – DERA MURAD JAMALI



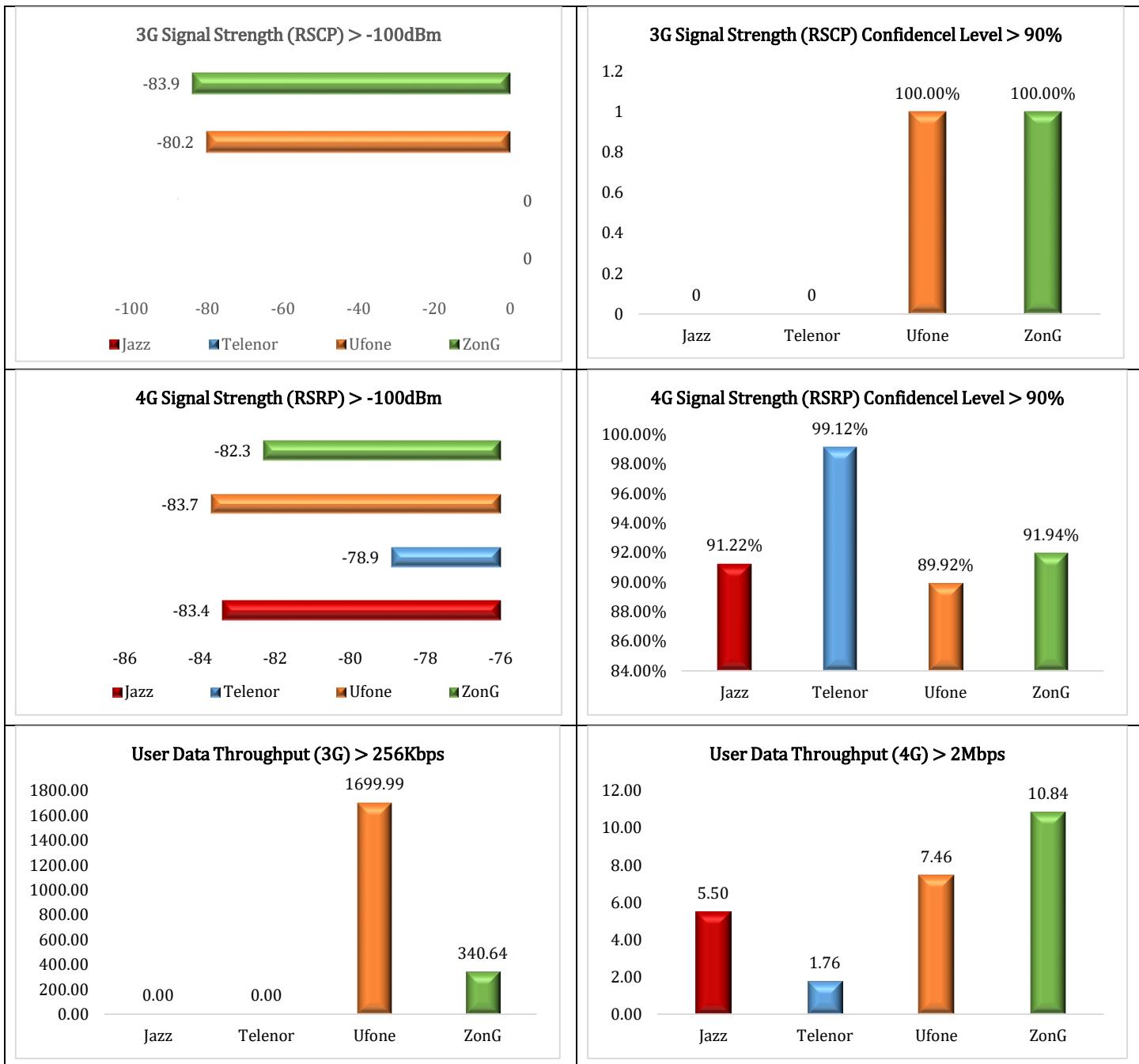
ZONG 3G NETWORK COVERAGE – DERA MURAD JAMALI



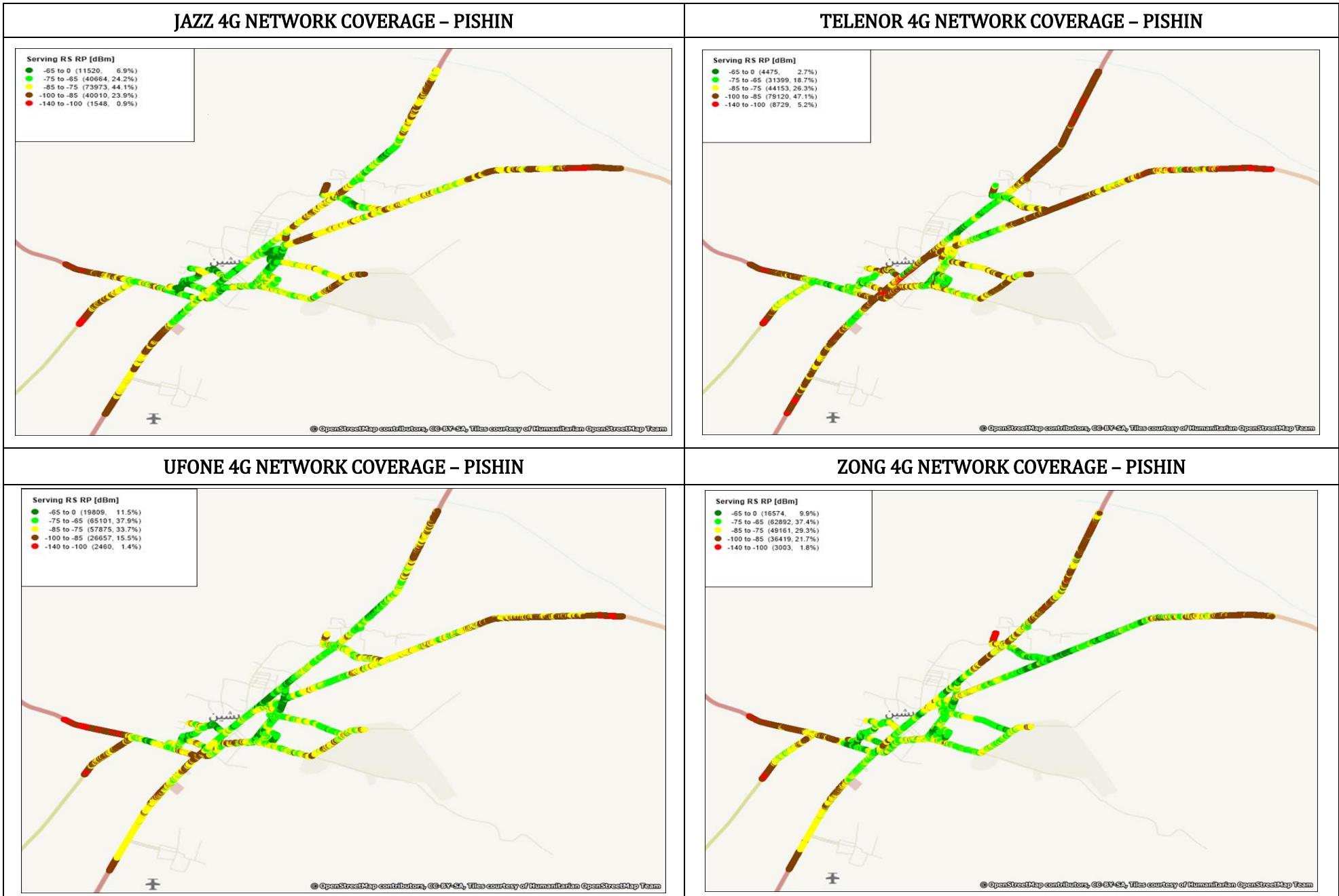
## QUALITY OF SERVICE SURVEY RESULTS – DERA MURAD JAMALI



## QUALITY OF SERVICE SURVEY RESULTS – DERA MURAD JAMALI

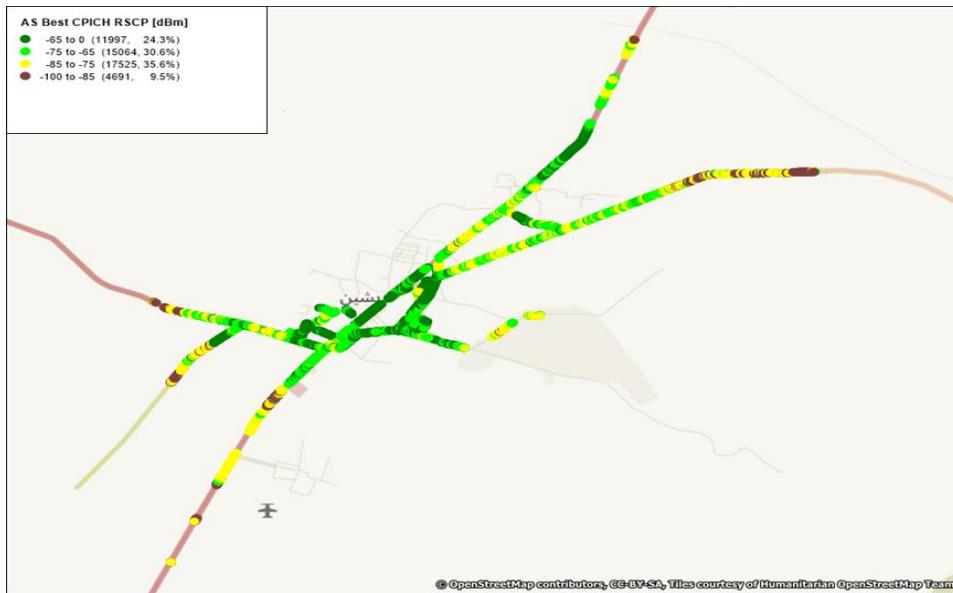


## 4G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSRP)

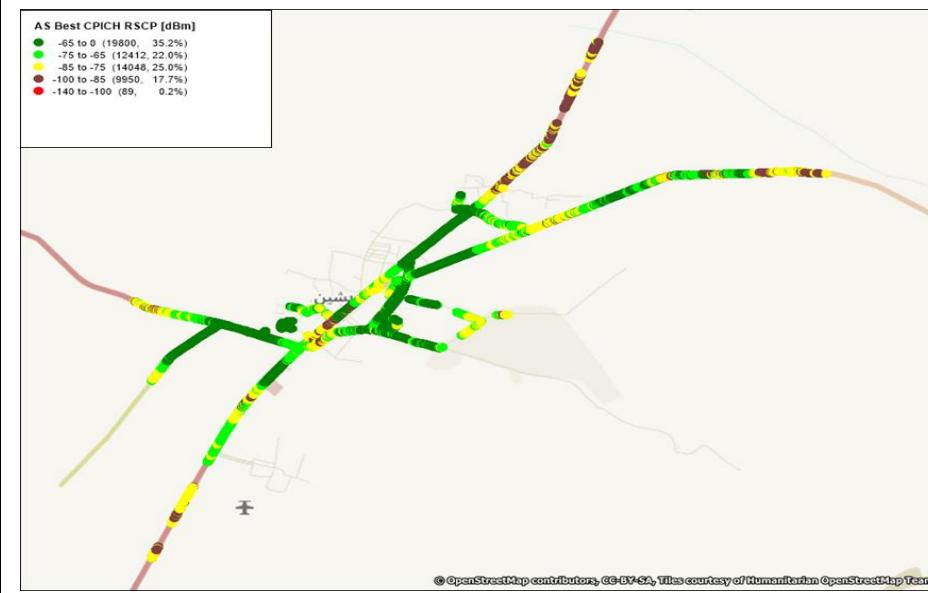


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

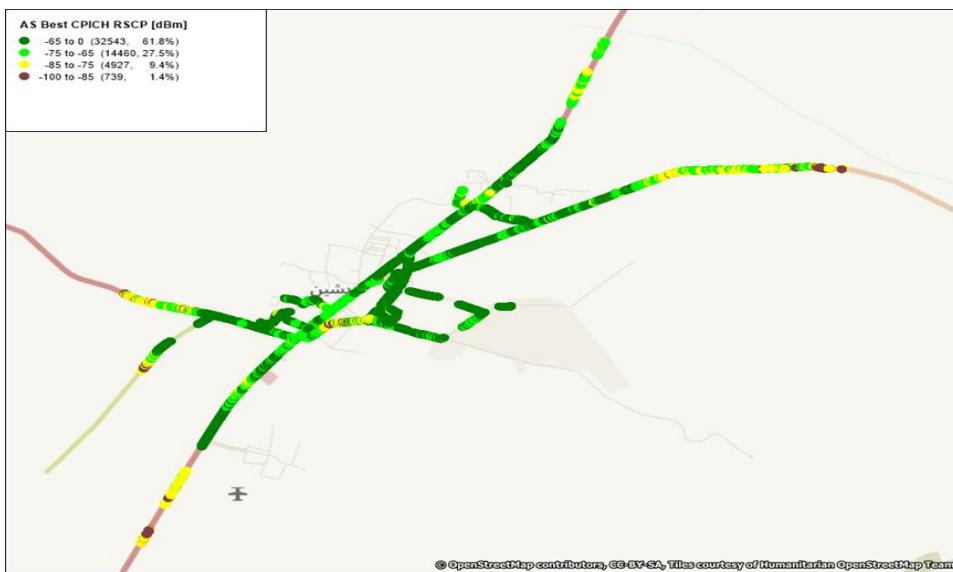
JAZZ 3G NETWORK COVERAGE – PISHIN



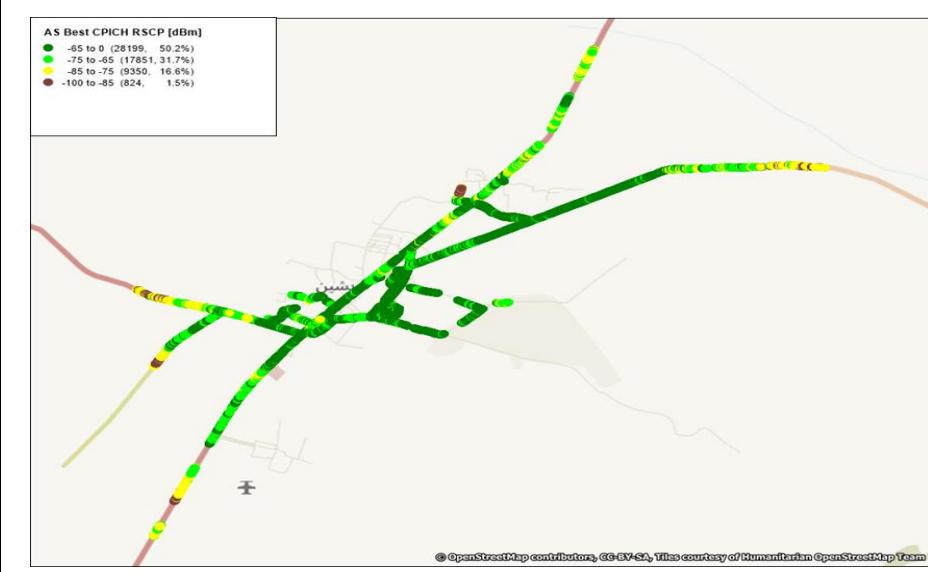
TELENOR 3G NETWORK COVERAGE – PISHIN



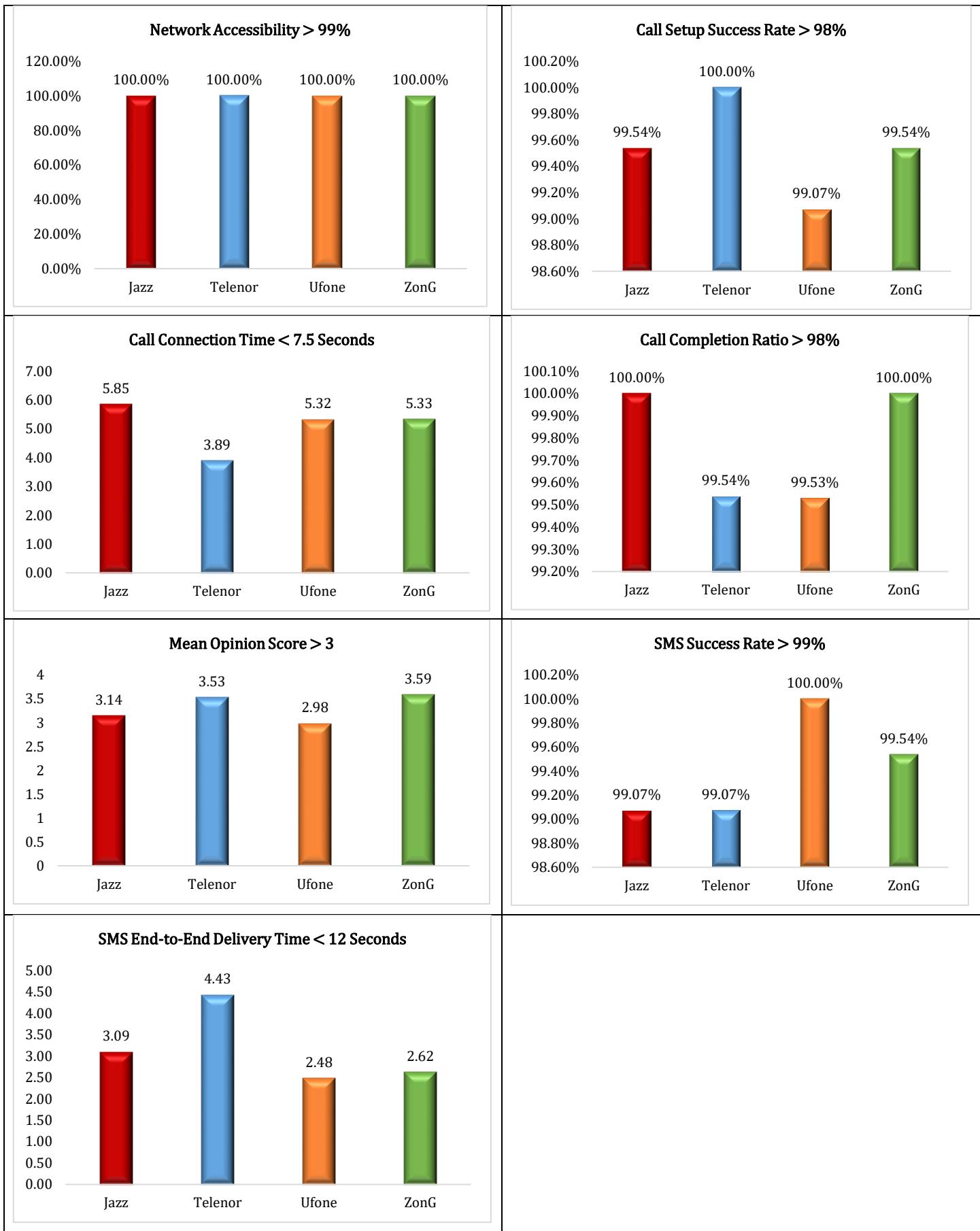
UFONE 3G NETWORK COVERAGE – PISHIN



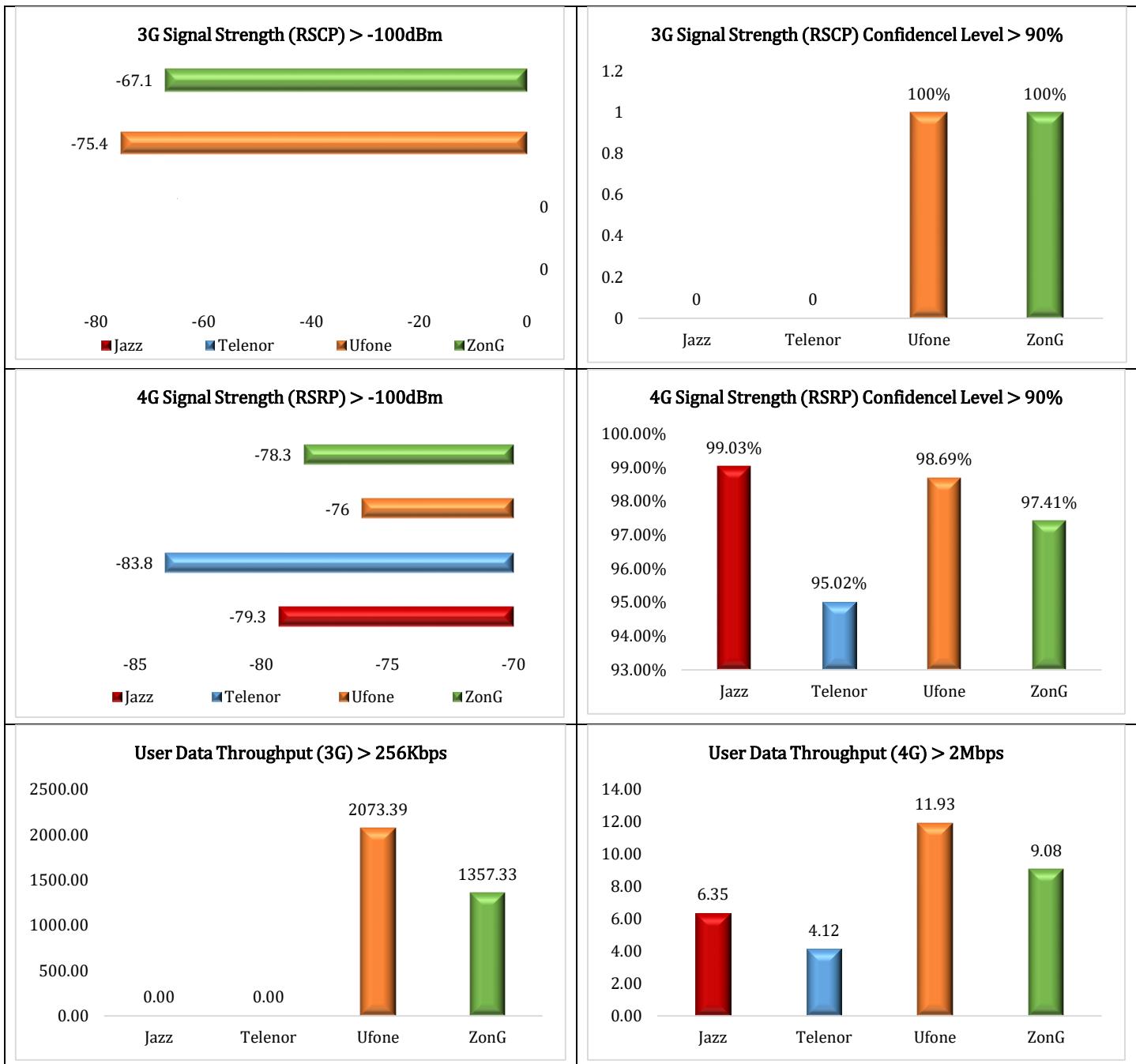
ZONG 3G NETWORK COVERAGE – PISHIN



## QUALITY OF SERVICE SURVEY RESULTS – PISHIN



## QUALITY OF SERVICE SURVEY RESULTS – PISHIN

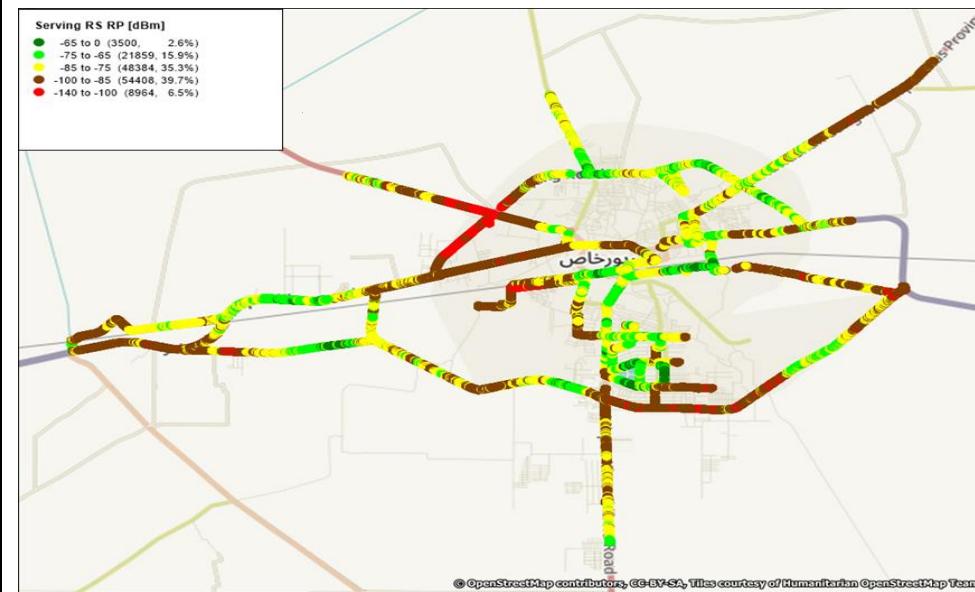


## **ANNEX – D**

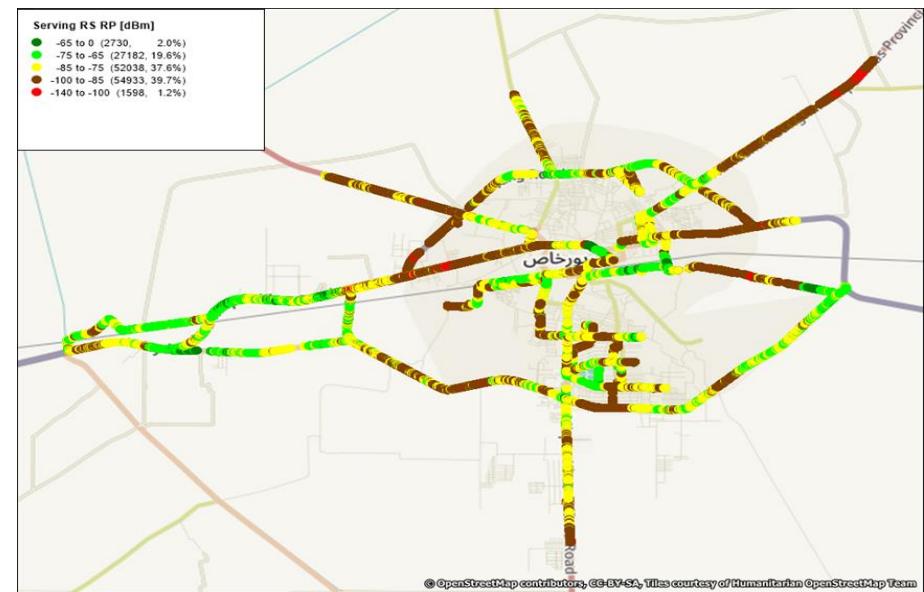
**SINDH**

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

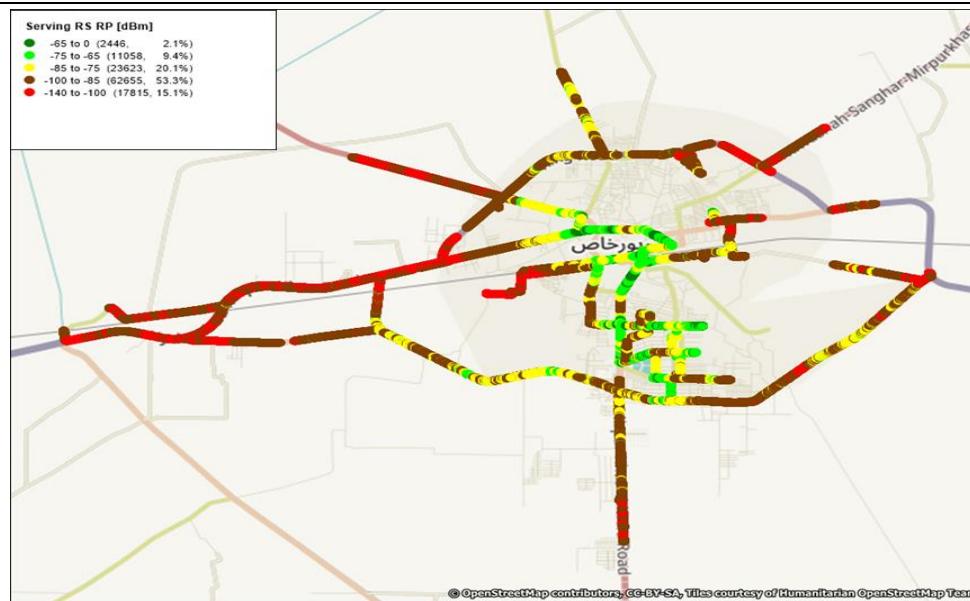
JAZZ 4G NETWORK COVERAGE – MIRPUR KHAS



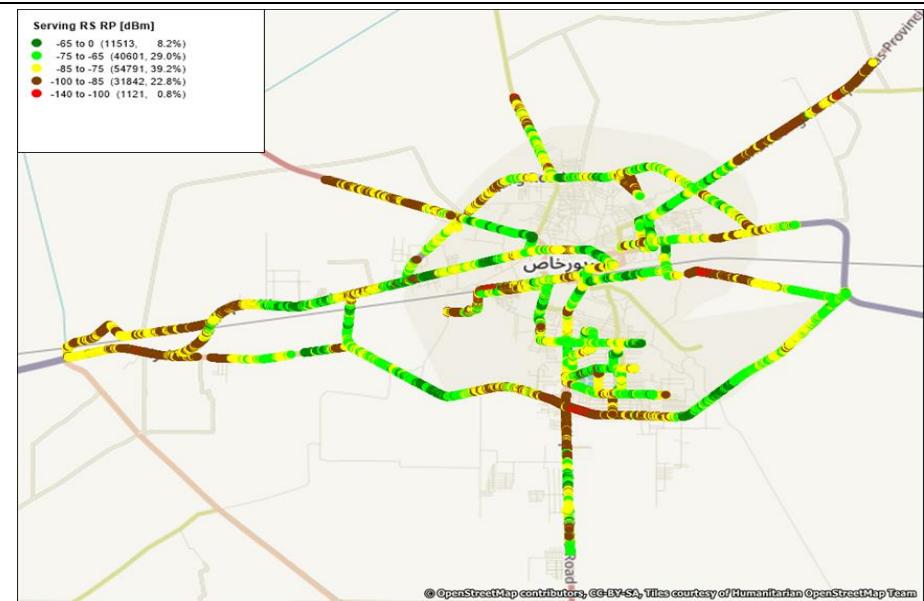
TELENOR 4G NETWORK COVERAGE – MIRPUR KHAS



UFONE 4G NETWORK COVERAGE – MIRPUR KHAS

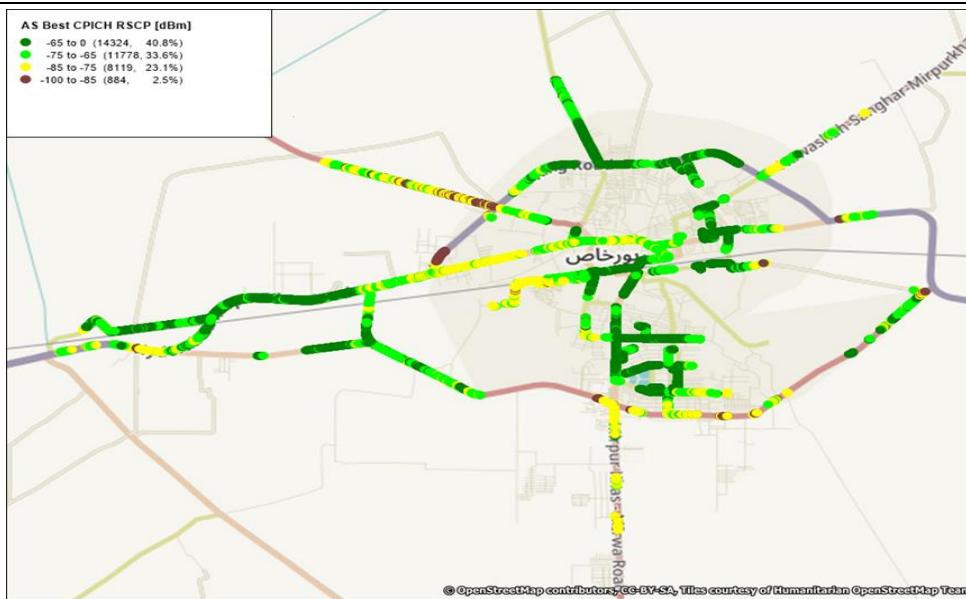


ZONG 4G NETWORK COVERAGE – MIRPUR KHAS

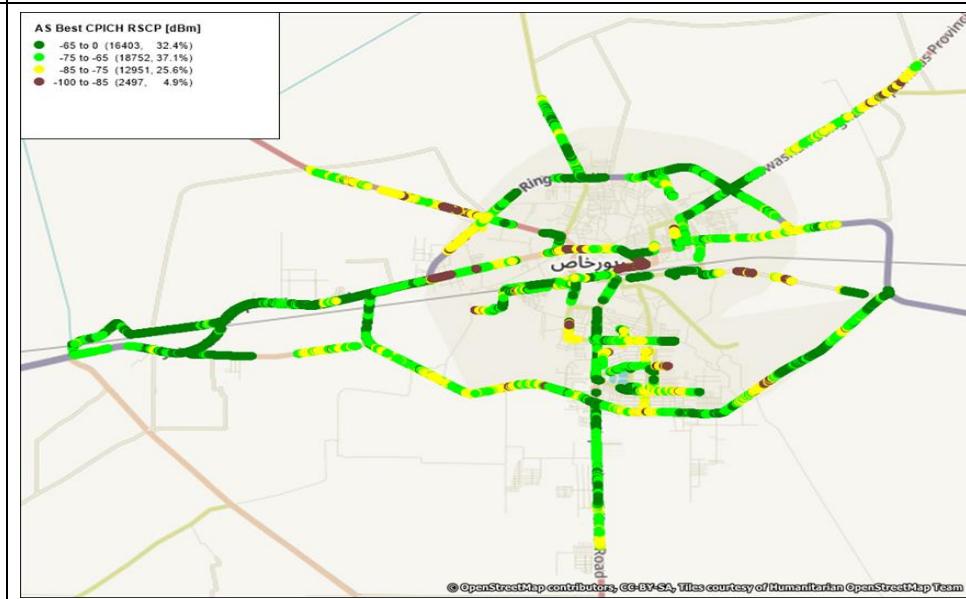


## 3G MOBILE COVERAGE IN CITIES- SIGNAL STRENGTH (RSCP)

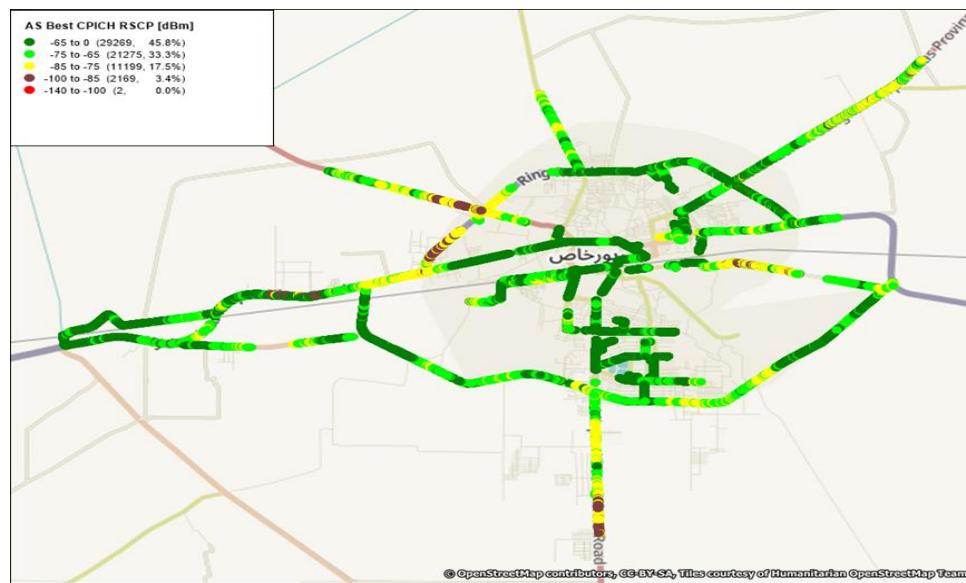
JAZZ 3G NETWORK COVERAGE – MIRPUR KHAS



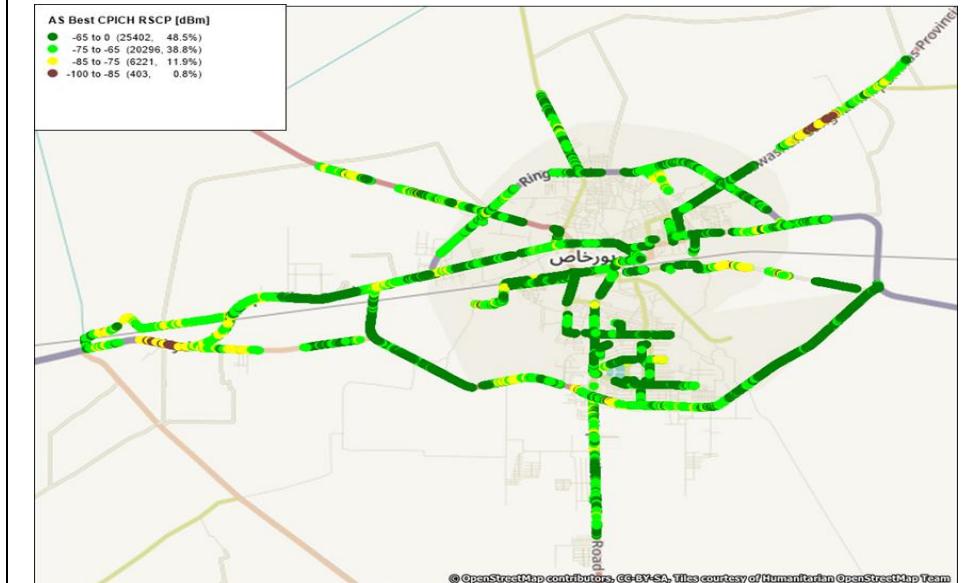
TELENOR 3G NETWORK COVERAGE – MIRPUR KHAS



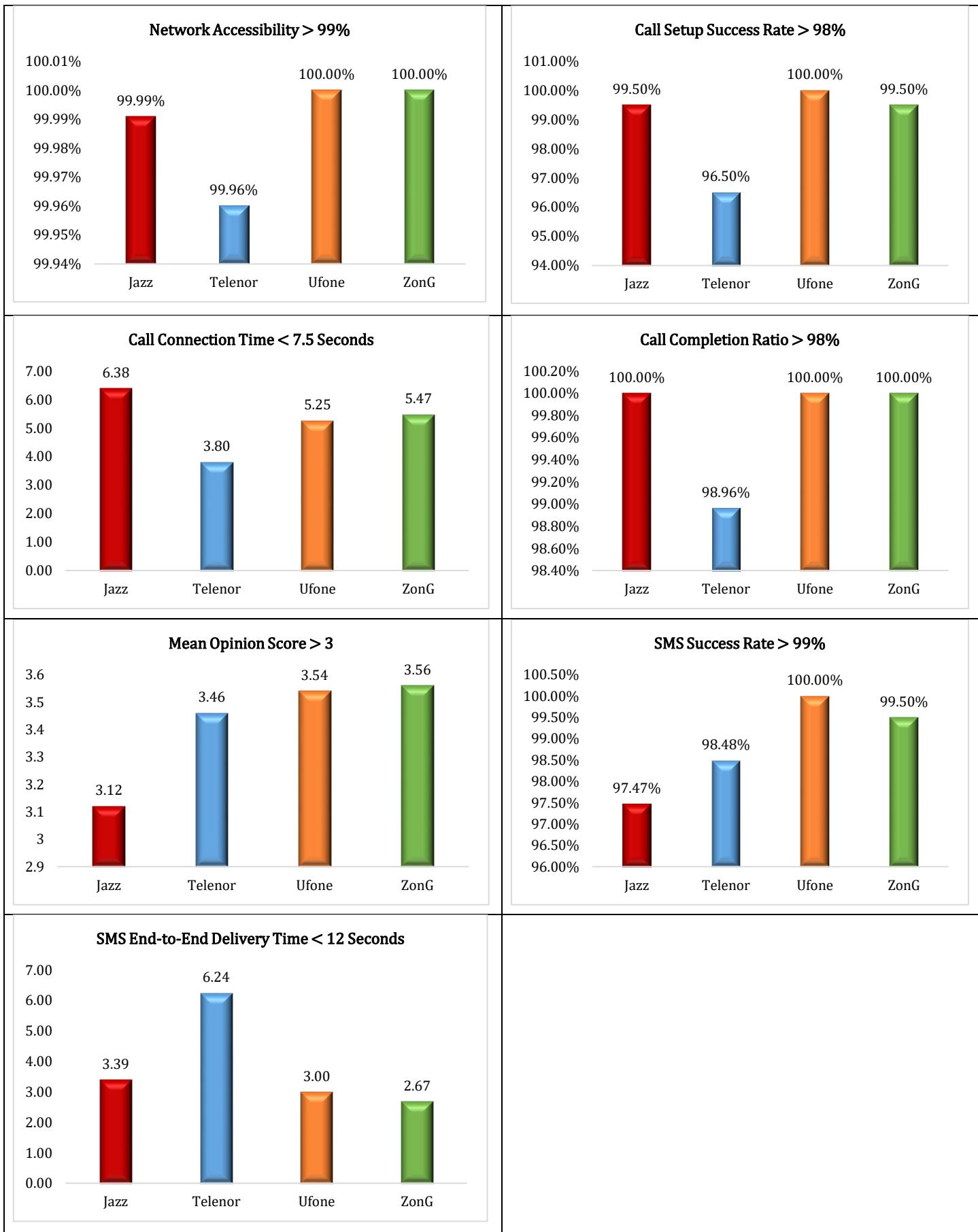
UFONE 3G NETWORK COVERAGE – MIRPUR KHAS



ZONG 3G NETWORK COVERAGE – MIRPUR KHAS



## QUALITY OF SERVICE SURVEY RESULTS – MIRPUR KHAS



## QUALITY OF SERVICE SURVEY RESULTS – MIRPUR KHAS

