

# **INDEPENDENT QUALITY OF SERVICE** **SURVEY OF TOWNS IN PAKISTAN**

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FIRST 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 Eight (08) different towns of Punjab, Sindh and Khyber Pakhtunkhwa (KPK). The name of towns along with survey dates are shown in **Table 1.1: QoS Survey Dates**:

S. #.	Province	City	Survey Dates
1.	Punjab	Kot Addu	2 <sup>nd</sup> ~ 3 <sup>rd</sup> Feb, 2021
2.		Gujar Khan	8 <sup>th</sup> & 9 <sup>th</sup> Feb, 2021
3.		Taxila	10 <sup>th</sup> & 15 <sup>th</sup> Feb, 2021
4.		Abdul Hakeem	18 <sup>th</sup> ~ 19 <sup>th</sup> Feb, 2021
5.		Pattoki	9 <sup>th</sup> Mar, 2021
6.	Sindh	Tando Muhammad Khan	25 <sup>th</sup> Feb, 2021
7.		Nooriabad	24 <sup>th</sup> ~ 25 <sup>th</sup> Mar, 2021
8.	Khyber Pakhtunkhwa	Jahangira	26 <sup>th</sup> Feb, 2021

**Table 1.1: QoS Survey Dates**

## DRIVE TEST DETAILS

2.1. QoS survey was carried out using newly procured 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 Voice Calls and SMS Sessions, both A-Party and B-Party mobile handsets were kept in auto detect mode, whereas, in case of Data Sessions the mobile handset were locked in 4G/LTE and 3G modes. The Voice Calls and SMS Samples were distributed as 70% ON-NET and 30% OFF-NET.

## MOBILE NETWORK COVERAGE

3.1. Mobile Network Signal Strength is measured in decibels (dBm). Signal Strength can range from approximately -30 dBm upto -120 dBm. The closer that number is to zero, the stronger the signal. In general, anything better than -100 decibel is considered a usable signal. The different ranges of signal strength and its effects on broadband speed and sustainability can be seen in **Table3.1: Signal Strength and Broadband Speed**.

S. #.	Signal Strength (dBm)	Signal Strength
1.	-65 to 0	Strong Signal with Maximum Data Speed
2.	-75 to -65	Strong Signal with Good Data Speed
3.	-85 to -75	Fair, Useful & Reliable Data Speed is Attainable
4.	-100 to -85	Marginal Data Speed with Possibility of Drop-Out
5.	-140 to -100	Performance will Drop Drastically

**Table3.1: Signal Strength and Broadband Speed**

3.2. **4G / LTE SIGNAL STRENGTH.** During the survey 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 analysis of recorded signal strength revealed following:

- a. **COMPLIANCE.** The towns where CMOs remained compliant is mentioned in **Table 3.2: Compliance of 4G/LTE (RSRP) Signal Strength.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	7	Tando Muhammad Khan, Nooriabad, Kot Addu, Abdul Hakeem, Pattoki, Gujar Khan
2.	Telenor	7	Tando Muhammad Khan, Nooriabad, Kot Addu, Abdul Hakeem, Pattoki, Gujar Khan
3.	Ufone	6	Tando Muhammad Khan, Nooriabad, Kot Addu, Abdul Hakeem, Gujar Khan
4.	ZonG	7	Tando Muhammad Khan, Nooriabad, Kot Addu, Abdul Hakeem, Pattoki, Gujar Khan

**Table 3.2: Compliance of 4G/LTE (RSRP) Signal Strength**

- b. **NON-COMPLIANCE.** The towns where CMOs remained non-compliant is mentioned in **Table 3.3: Non-Compliance of 4G/LTE (RSRP) Signal Strength.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	1	Jhangira
2.	Telenor	1	Jhangira
3.	Ufone	1	Jhangira
4.	ZonG	1	Jhangira

**Table 3.3: Non-Compliance of 4G/LTE (RSRP) Signal Strength**

3.3. **3G SIGNAL STRENGTH.** During the survey 3G 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 analysis of recorded signal strength revealed that all **CMOs remained compliant of the said threshold value at all 08 x surveyed towns.**

## **MOBILE BROADBAND SERVICE**

4.1. **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 analysis of Data Service QoS KPIs i.e. User Data Throughput Survey Results revealed following:

- a. **COMPLIANCE.** The towns where CMOs remained compliant is mentioned in **Table 4.1: Compliance of 4G User Data Throughput > 2 Mbps.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	8	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira
2.	Telenor	5	Taxila, Abdul Hakeem, Nooriabad, Tando Muhammad Khan, Jahangira
3.	Ufone	6	Taxila, Gujar Khan, Abdul Hakeem, Kot Addu, Nooriabad, Jahangira
4.	ZonG	8	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira

**Table 4.1: Compliance of 4G User Data Throughput > 2Mbps**

- b. **NON-COMPLIANCE.** The towns where CMOs remained non-compliant is mentioned in **Table 4.2: Non-Compliance of 4G User Data Through > 2Mbps.**

S. #.	Operator	Towns	
		Count	Names
1.	Telenor	3	Gujar Khan, Pattoki, Kot Addu
2.	Ufone	1	Tando Muhammad Khan

**Table 4.2: Non-Compliance of 4G User Data Throughput > 2Mbps**

- 4.2. **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 analysis of 3G User Data Throughput Survey Results revealed that all **CMOs remained compliant of minimum threshold value of 256 Kbps at all 08 x surveyed towns.**

## VOICE SERVICE

- 5.1. 7 x QoS KPIs have been measured while testing voice services. The results of voice QoS KPIs are as under:

- a. **NETWORK ACCESSIBILITY.** All CMOs have achieved the QoS KPI **Network Accessibility > 99%** in all 08 x surveyed towns.
- b. **SERVICE ACCESSIBILITY.** The analysis of QoS KPI **Service Accessibility of > 98%** in all 08 x surveyed towns revealed following.

- i. **COMPLIANCE.** The towns where CMOs remained compliant is mentioned in **Table 5.1: Compliance of Service Accessibility > 98%**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	5	Taxila, Gujar Khan, Abdul Hakeem, Nooriabad, Tando Muhammad Khan
2.	Telenor	1	Nooriabad
3.	Ufone	3	Abdul Hakeem, Nooriabad, Tando Muhammad Khan
4.	ZonG	4	Pattoki, Abdul Hakeem, Kot Addu, Tando Muhammad Khan

**Table 5.1: Compliance of Service Accessibility > 98%**

- ii. **NON-COMPLIANCE.** The towns where CMOs remained non-compliant is mentioned in **Table 5.2: Non-Compliance of Service Accessibility > 98%.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	3	Pattoki, Kot Addu, Jahangira
2.	Telenor	7	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Tando Muhammad Khan, Jahangira
3.	Ufone	5	Taxila, Gujar Khan, Pattoki, Kot Addu, Jahangira
4.	ZonG	4	Taxila, Gujar Khan, Nooriabad, Jahangira

**Table 5.2: Non-Compliance of Service Accessibility > 98%**

- c. **CALL CONNECTION TIME.** The analysis of QoS KPI **Call Connection Time of < 6.5 Seconds** in all 08 x surveyed towns revealed following.
- i. **COMPLIANCE.** The towns where CMOs remained compliant is mentioned in **Table 5.3: Compliance of Call Connection Time < 6.5 Seconds.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	7	Taxila, Gujar Khan, Pattoki, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira
2.	Telenor	8	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira
3.	Ufone	7	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Nooriabad, Tando Muhammad Khan, Jahangira
4.	ZonG	8	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira

**Table 5.3: Compliance of Call Connection Time < 6.5 Seconds**

- ii. **NON-COMPLIANCE.** The towns where CMOs remained non-compliant is mentioned in **Table 5.4: Non-Compliance of Call Connection Time < 6.5 Seconds.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	1	Abdul Hakeem
2.	Ufone	1	Kot Addu

**Table 5.4: Non-Compliance of Call Connection Time < 6.5 Seconds**

- d. **CALL COMPELETION RATIO.** The analysis of QoS KPI **Call Completion Ratio of > 98%** in all 08 x surveyed towns revealed following:
- i. **COMPLIANCE.** The towns where CMOs remained compliant is mentioned in **Table 5.5: Compliance of Call Completion Ratio > 98%.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	8	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira
2.	Telenor	6	Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira
3.	Ufone	8	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira
4.	ZonG	8	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira

**Table 5.5: Compliance of Call Completion Ratio > 98%**

- ii. **NON-COMPLIANCE.** The towns where CMOs remained non-compliant is mentioned in **Table 5.6: Non-Compliance of Call Completion Ratio > 98%.**

S. #.	Operator	Towns	
		Count	Names
1.	Telenor	2	Taxila, Gujar Khan

**Table 5.6: Non-Compliance of Call Completion Ratio > 98%**

- e. **END-TO-END SPEECH QUALITY / MEAN OPINION SCORE.** The analysis of QoS KPI **End-to-End Speech Quality/ Mean Opinion Score of > 3** in all 08 x surveyed towns revealed following.
- i. **COMPLIANCE.** The towns where CMOs remained compliant is mentioned in **Table 5.7: Compliance of Mean Opinion Score > 3.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	5	Taxila, Pattoki, Nooriabad, Tando Muhammad Khan, Jahangira
2.	Telenor	1	Kot Addu
3.	Ufone	4	Gujar Khan, Pattoki, Kot Addu, Nooriabad
4.	ZonG	8	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira

**Table 5.7: Compliance of Mean Opinion Score > 3**

- ii. **NON-COMPLIANCE.** The towns where CMOs remained non-compliant is mentioned in **Table 5.8: Non-Compliance of Mean Opinion Score > 3.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	3	Gujar Khan, Abdul Hakeem, Kot Addu
2.	Telenor	7	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Nooriabad, Tando Muhammad Khan, Jahangira
3.	Ufone	4	Taxila, Abdul Hakeem, Tando Muhammad Khan, Jahangira

**Table 5.8: Non-Compliance of Mean Opinion Score > 3**

- f. **INTER SYSTEM HANDOVER OF CIRCUIT SWITCHED VOICE.** The analysis of QoS KPI **Inter System Handover of Circuit Switched Voice > 98%** in all 08 x surveyed towns revealed following:

- i. **COMPLIANCE.** The towns where CMOs remained compliant is mentioned in **Table 5.9: ISHO for Circuit Switched Voice  $\geq$  98%.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	8	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira
2.	Telenor	7	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Jahangira
3.	Ufone	7	Taxila, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira
4.	ZonG	7	Taxila, Gujar Khan, Pattoki, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira

**Table 5.9: ISHO for Circuit Switched Voice  $\geq$  98%.**

- ii. **NON-COMPLIANCE.** The towns where CMOs remained non-compliant is mentioned in **Table 5.1.1: ISHO for Circuit Switched Voice  $\geq$  98%.**

S. #.	Operator	Towns	
		Count	Names
1.	Telenor	1	Tando Muhammad Khan
2.	Ufone	1	Gujar Khan
3.	ZonG	1	Abdul Hakeem

**Table 5.1.1: ISHO for Circuit Switched Voice  $\geq$  98%.**

- g. **RAB SETUP SUCCESS RATE.** All CMOs have achieved the QoS KPI **RAB Setup Success Rate > 98%** in all 08 x surveyed towns.

## SMS SERVICE

6.1. 2 x QoS KPIs i.e. “SMS Success Rate” and “SMS End to End Delivery Time” have been measured and the results are as under:

a. **SMS SUCCESS RATE.** The analysis of QoS KPI **SMS Success Rate of 99%** in all 08 x surveyed towns revealed following:

i. **COMPLIANCE.** The towns where CMOs remained compliant is mentioned in **Table 6.1: Compliance of SMS Success Rate > 99%.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	2	Nooriabad, Tando Muhammad Khan
2.	Ufone	1	Taxila

**Table 6.1: Compliance of SMS Success Rate > 99%**

ii. **NON-COMPLIANCE.** The towns where CMOs remained non-compliant is mentioned in **Table 6.2: Non-Compliance of SMS Success Rate > 99%.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	6	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Jahangira
2.	Telenor	8	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira
3.	Ufone	7	Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira
4.	ZonG	8	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira

**Table 6.2: Non-Compliance of SMS Success Rate > 99%**

b. **SMS END-TO-END DELIVERY TIME.** The analysis of QoS KPI **SMS End-to-End Delivery time of 12 Seconds** in all 08 x surveyed towns revealed following:

i. **COMPLIANCE.** The towns where CMOs remained compliant is mentioned in **Table 6.3: Compliance of SMS End-To-End Delivery Time ≤ 12 Seconds.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	7	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan
2.	Telenor	3	Kot Addu, Nooriabad, Tando Muhammad Khan
3.	Ufone	6	Taxila, Gujar Khan, Pattoki, Kot Addu, Nooriabad, Tando Muhammad Khan
4.	ZonG	8	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Kot Addu, Nooriabad, Tando Muhammad Khan, Jahangira

**Table 6.3: Compliance of SMS End-To-End Delivery Time ≤ 12 Seconds**

ii. **NON-COMPLIANCE.** The towns where CMOs remained non-compliant is mentioned in **Table 6.4: Non-Compliance of SMS End-To-End Delivery Time ≤ 12 Seconds.**

S. #.	Operator	Towns	
		Count	Names
1.	Jazz	1	Jahangira
2.	Telenor	5	Taxila, Gujar Khan, Pattoki, Abdul Hakeem, Jahangira



S. #.	Operator	Towns	
		Count	Names
3.	Ufone	2	Abdul Hakeem, Jahangira

Table 6.4: Non-Compliance of SMS End-To-End Delivery Time  $\leq$  12 Seconds

## SURVEY MAPS & GRAPHICAL RESULTS

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

## STANDING OF CMOS 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, Voice Service and SMS Service, based upon the compliance level against each QoS KPI in each category in surveyed towns. The details are:

- a. **MOBILE NETWORK COVERAGE.** The categorization of CMOs as per QoS KPI i.e. Signal Strength of 4G/LTE and 3G Networks in 08 x Surveyed towns is shown in **Table 8.1: CMOs Standing in Mobile Network Coverage.**

S. #.	Operator	Compliance Level – Number of Towns		Standing
		Compliant	Non-Compliant	
1.	ZonG	15	1	1 <sup>st</sup>
2.	Jazz	15	1	1 <sup>st</sup>
3.	Telenor	15	1	1 <sup>st</sup>
4.	Ufone	14	2	2 <sup>nd</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	8	-	-	-	-	-	-	8	1 <sup>st</sup>	4 <sup>th</sup>
2.	Jazz	-	5	3	-	3	2	3	-	2 <sup>nd</sup>	2 <sup>nd</sup>
3.	Ufone	-	3	4	-	4	2	2	-	3 <sup>rd</sup>	1 <sup>st</sup>
4.	Telenor	-	-	1	7	1	4	3	-	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 complaint 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	51	5	1 <sup>st</sup>
2.	Jazz	49	7	2 <sup>nd</sup>
3.	Ufone	45	11	3 <sup>rd</sup>
4.	Telenor	39	17	4 <sup>th</sup>

Table 8.3: CMOs Standing in Voice Service



- d. **SMS SERVICE.** The categorization of each CMOs, as per the maximum complaint SMS QoS KPIs which is shown in **Table 8.4: CMOs Standing in SMS Service**

<i>S. #.</i>	Operator	SMS QoS KPIs		Standing
		Compliant	Non-Compliant	
1.	Jazz	9	7	1 <sup>st</sup>
2.	ZonG	8	8	2 <sup>nd</sup>
3.	Ufone	7	9	3 <sup>rd</sup>
4.	Telenor	3	13	4 <sup>th</sup>

**Table 8.4: CMOs Standing in SMS Service**

- e. **OVERALL STANDING.** The overall standing of each CMOs in each category of service is mentioned in **Table 8.5: CMOs Overall Standing in QoS Survey.**

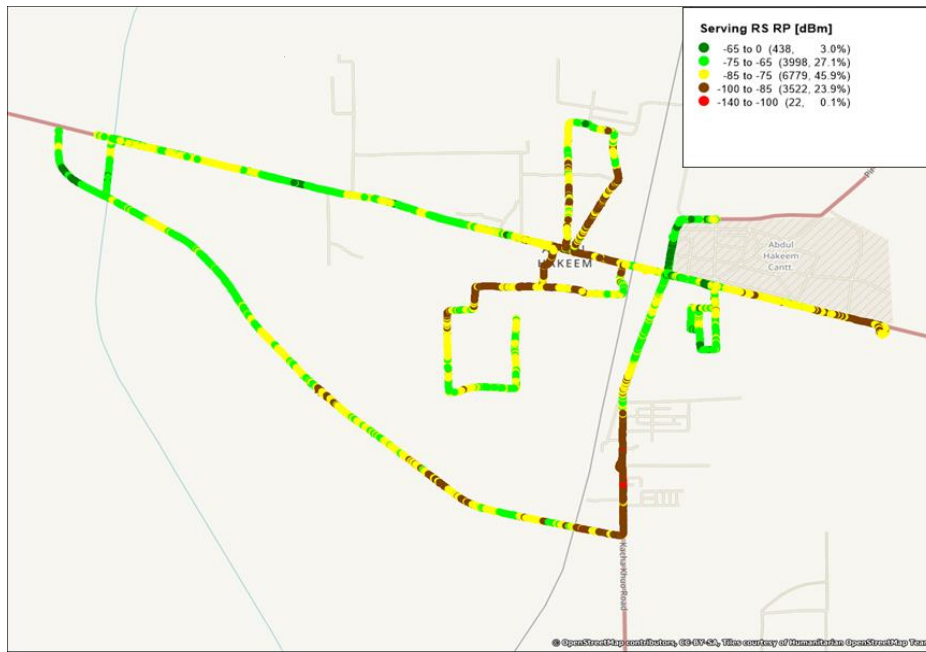
<i>S. #.</i>	Service		STANDING			
			1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>
1.	Mobile Network Coverage		Jazz, Telenor & ZonG	Ufone	-	-
2.	Mobile Broadband	3G	Ufone	Jazz	Telenor	ZonG
		4G	ZonG	Jazz	Ufone	Telenor
3.	Voice		ZonG	Jazz	Ufone	Telenor
4.	SMS		Jazz	ZonG	Ufone	Telenor

**Table 8.5: CMOs Overall Standing in QoS Survey**

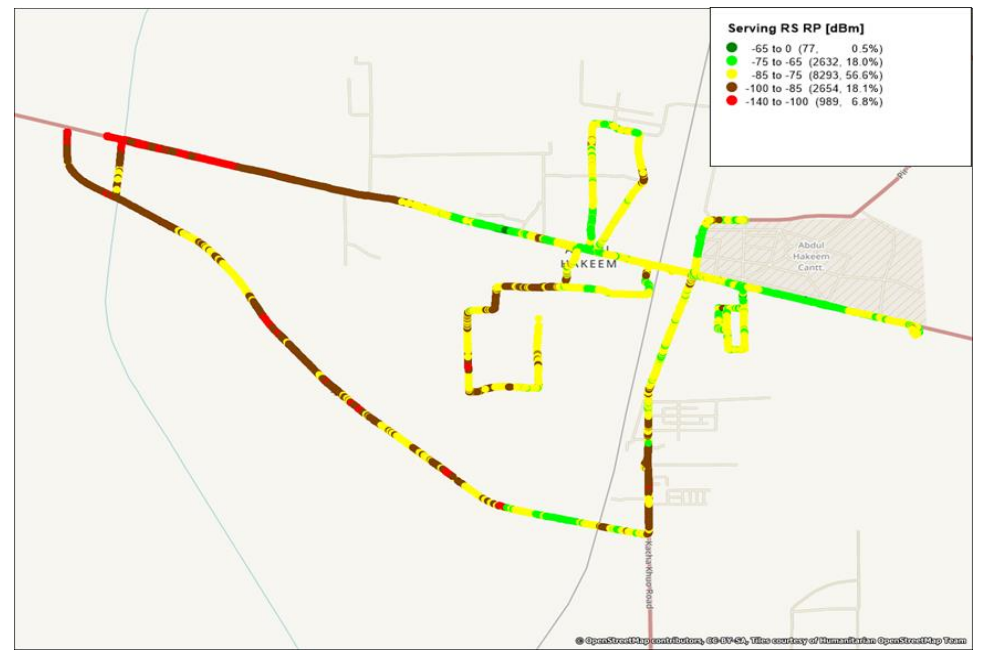
PUNJAB

# 4G NETWORK COVERAGE / SIGNAL STRENGTH (RSRP)

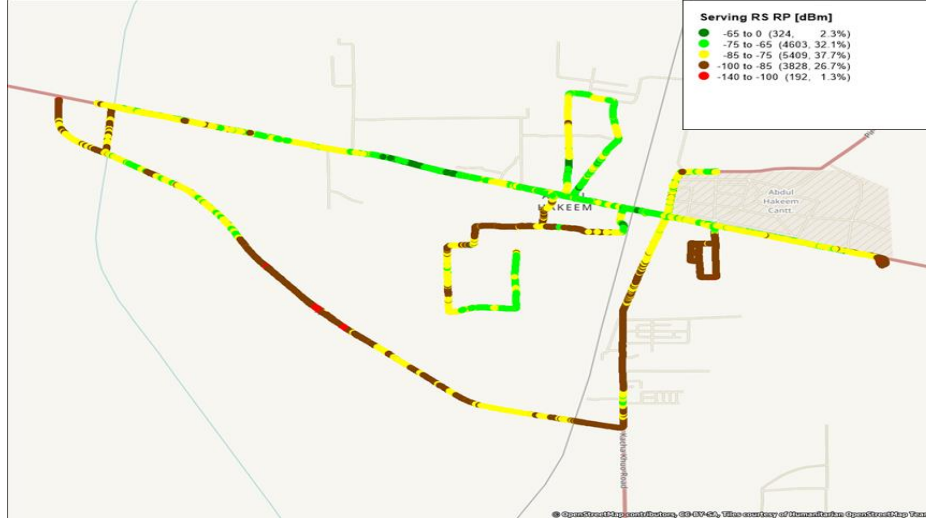
## JAZZ 4G COVERAGE (RSRP) – KOT ADDU



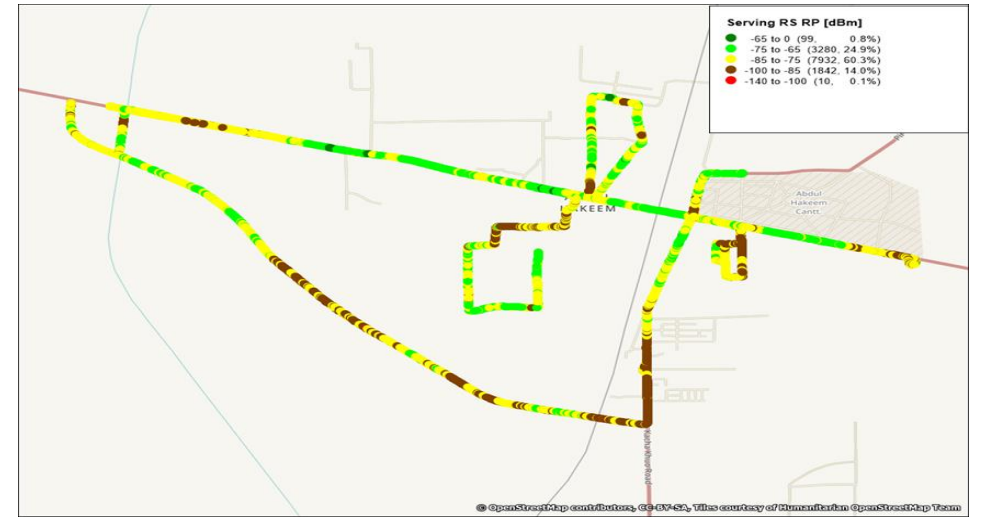
## TELENOR 4G COVERAGE (RSRP) – KOT ADDU



## UFONE 4G COVERAGE (RSRP) – KOT ADDU

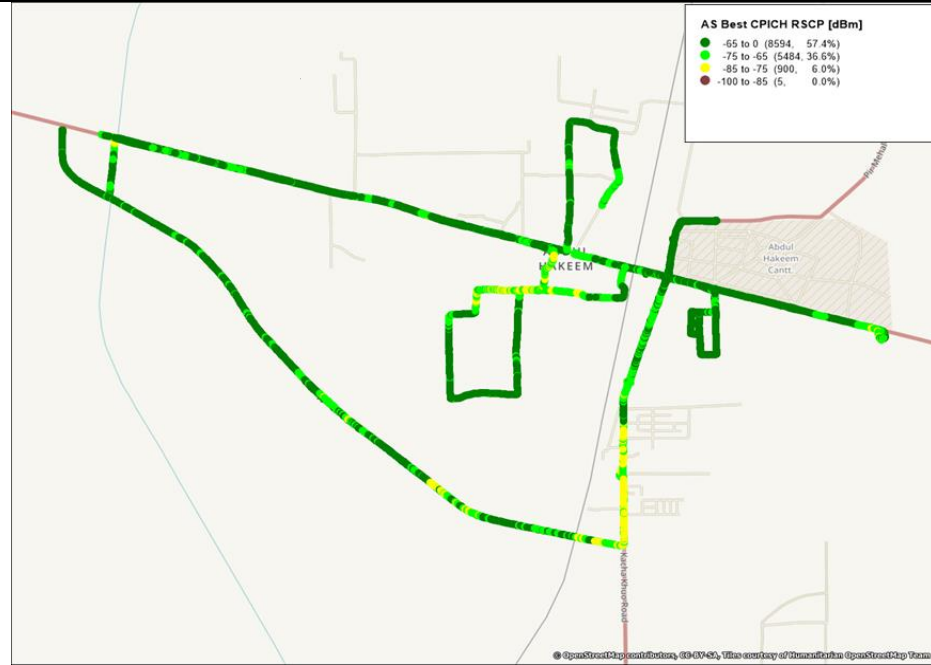


## ZONG 4G COVERAGE (RSRP) – KOT ADDU

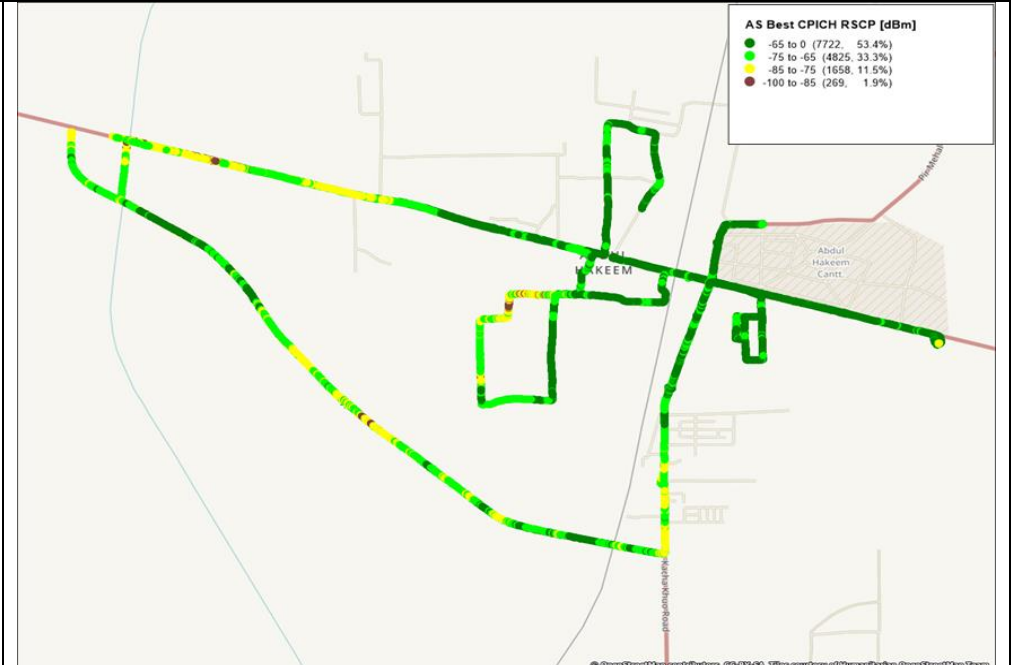


# 3G NETWORK COVERAGE / SIGNAL STRENGTH (RSCP)

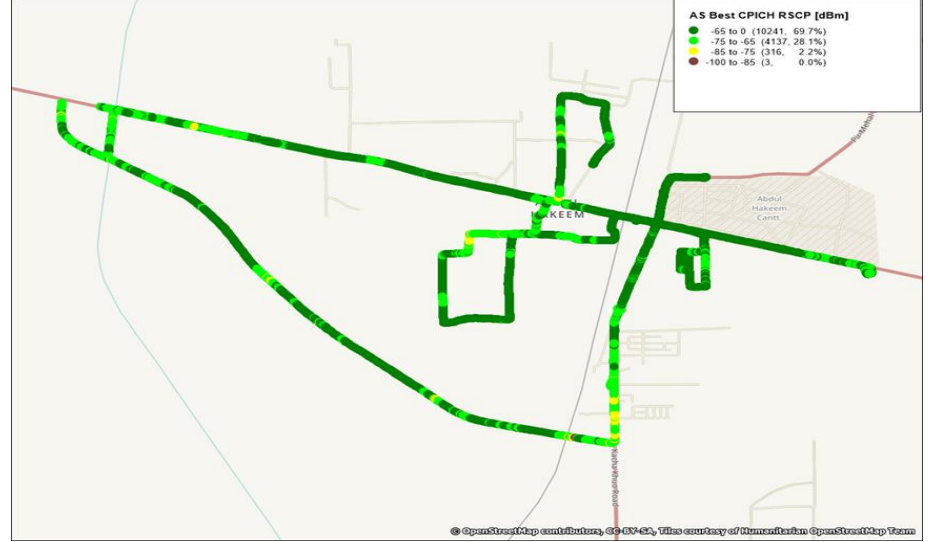
**JAZZ 3G COVERAGE (RSCP) – KOT ADDU**



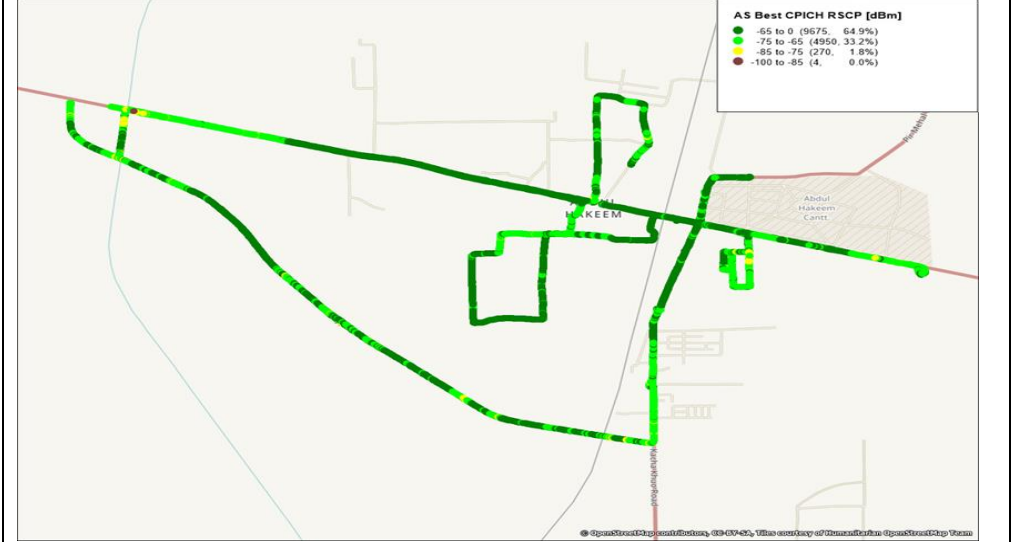
**TELENOR 3G COVERAGE (RSCP) – KOT ADDU**



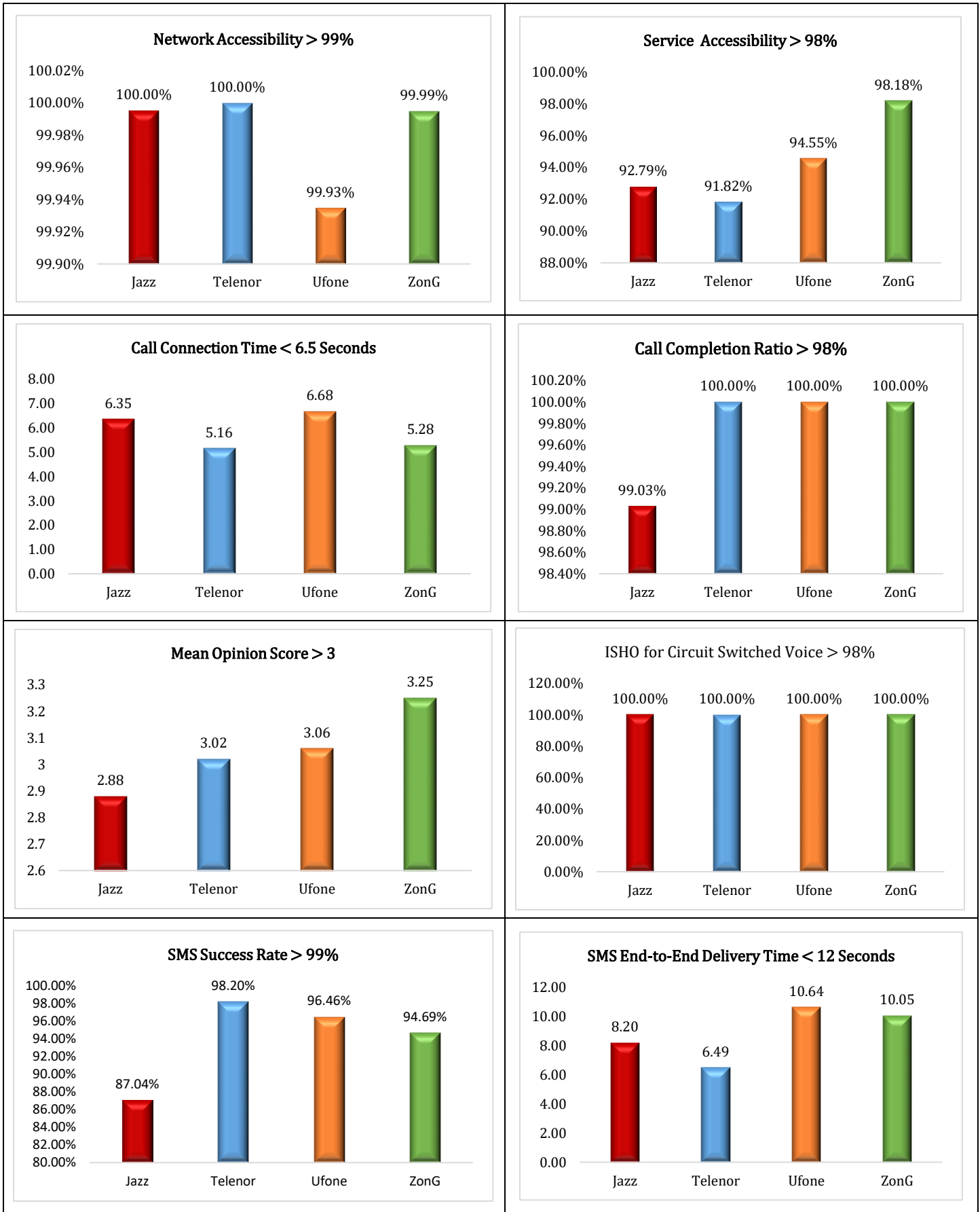
**UFONE 3G COVERAGE (RSCP) – KOT ADDU**



**ZONG 3G COVERAGE (RSCP) – KOT ADDU**

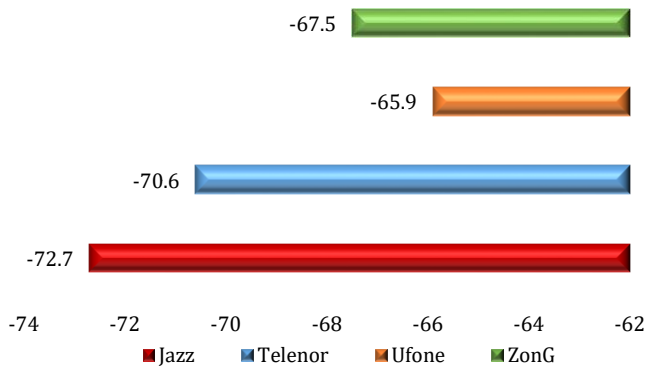


## QUALITY OF SERVICE SURVEY RESULTS – KOT ADDU

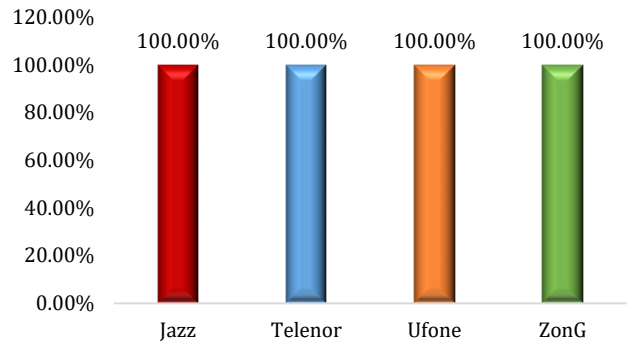


## QUALITY OF SERVICE SURVEY RESULTS – KOT ADDU

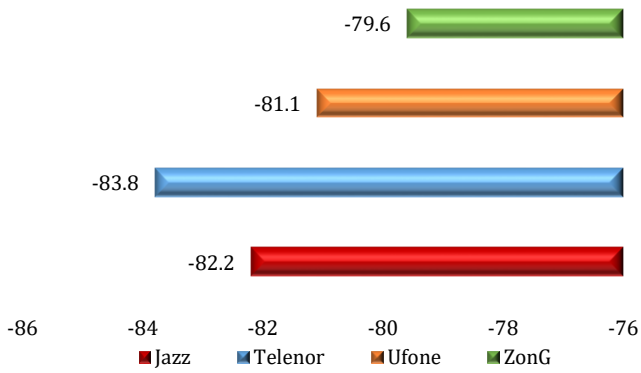
**Signal Strength (RSCP) > -100dBm**



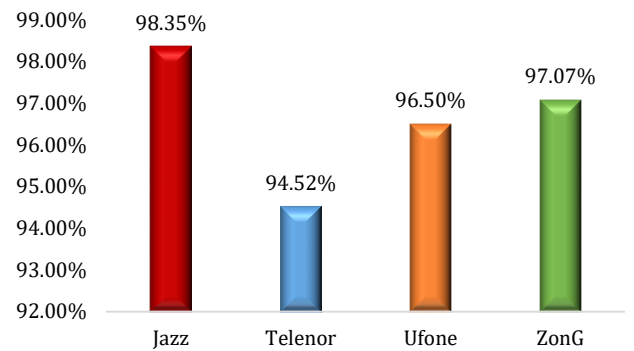
**Signal Strength (RSCP) Confidencel Level > 90%**



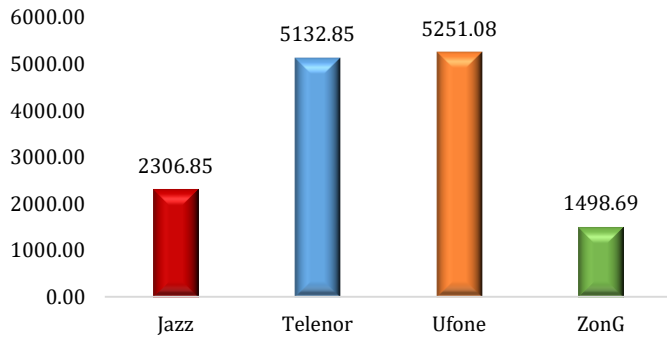
**Signal Strength (RSRP) > -100dBm**



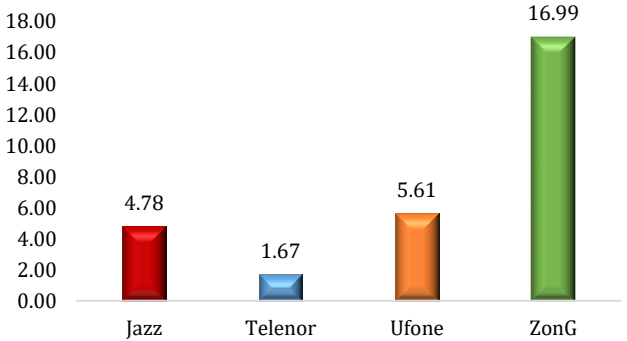
**Signal Strength (RSRP) Confidencel Level > 90%**



**User Data Throughput (3G) > 256Kbps**



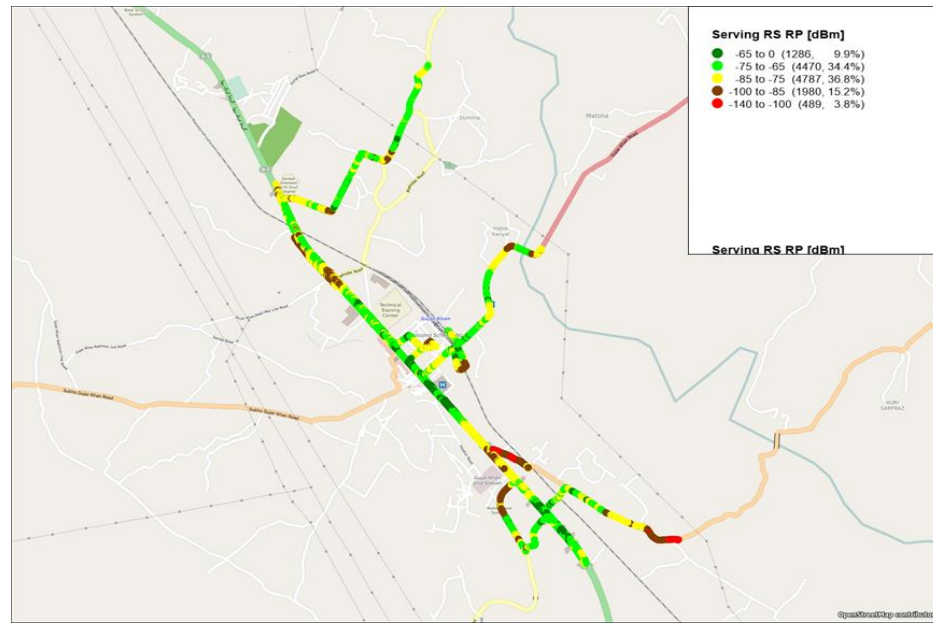
**User Data Throughput (4G) > 2Mbps**



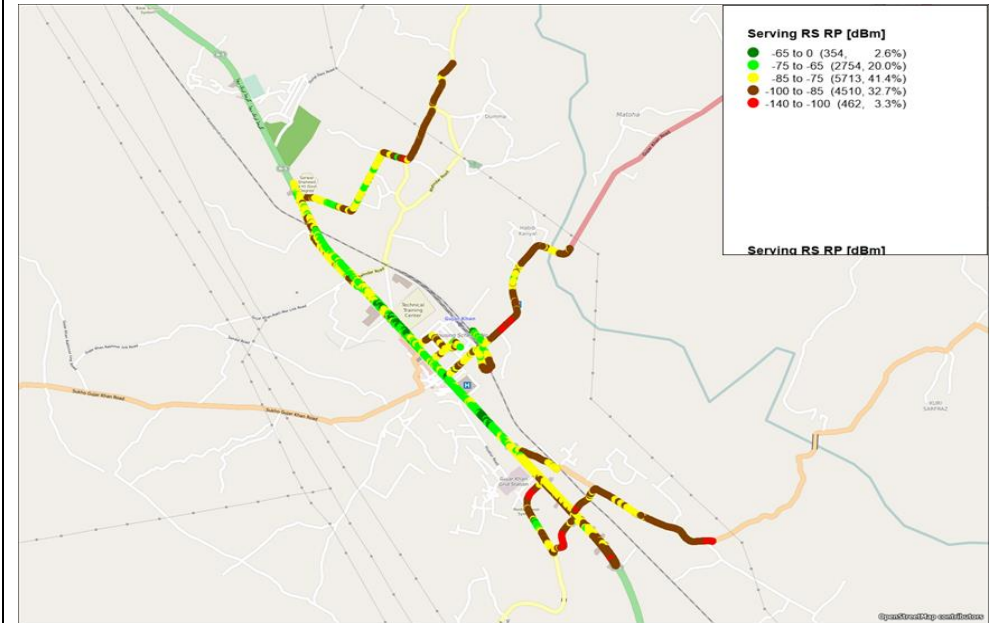


# 4G NETWORK COVERAGE / SIGNAL STRENGTH (RSRP)

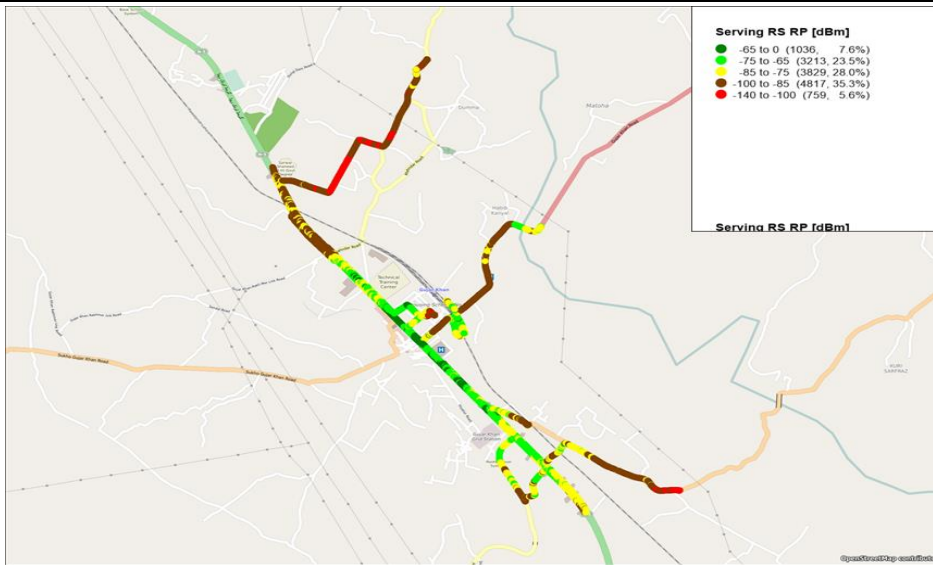
## JAZZ 4G COVERAGE (RSRP) – GUJAR KHAN



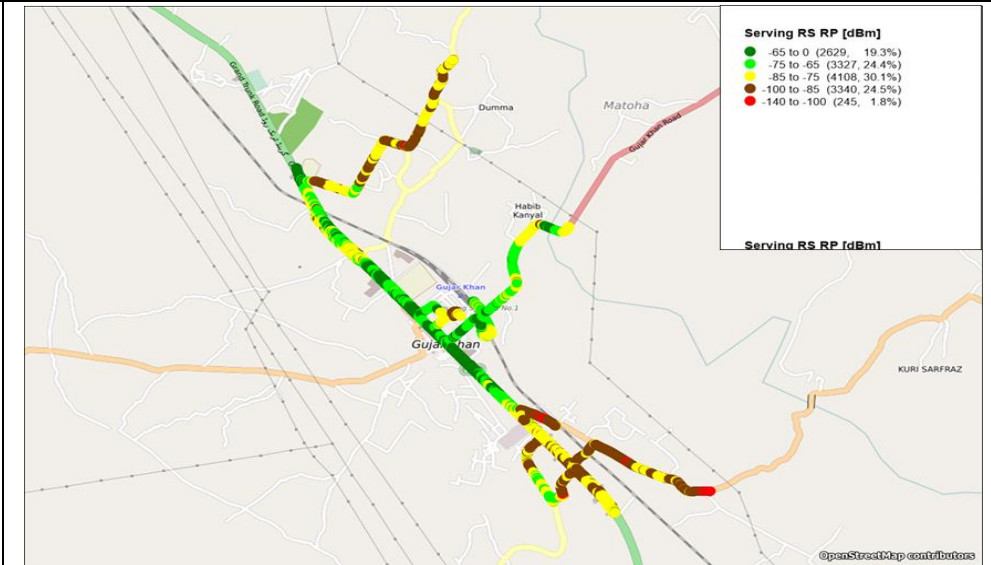
## TELENOR 4G COVERAGE (RSRP) – GUJAR KHAN



## UFONE 4G COVERAGE (RSRP) – GUJAR KHAN



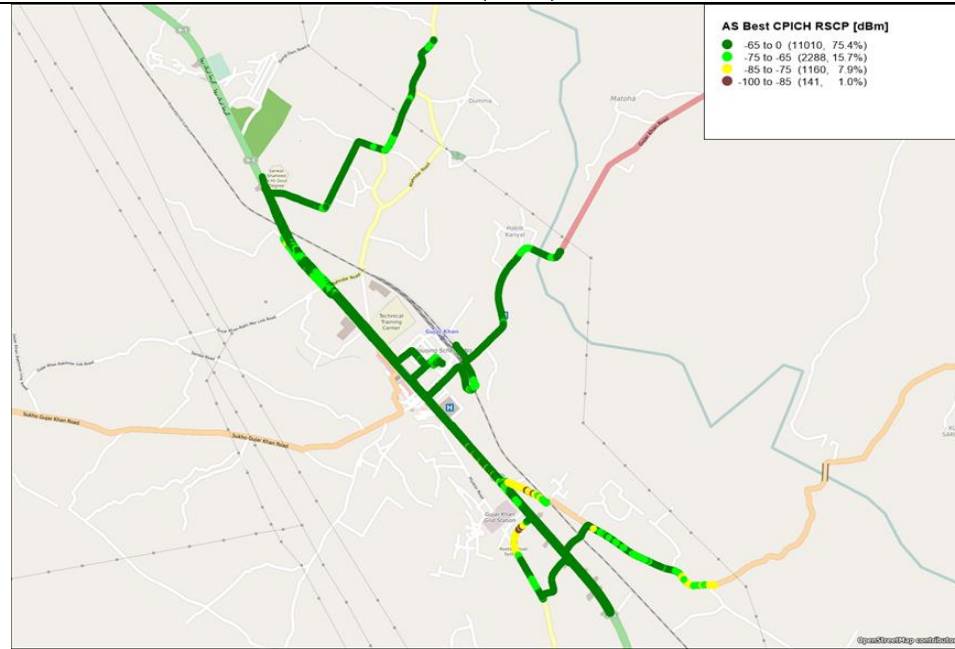
## ZONG 4G COVERAGE (RSRP) – GUJAR KHAN



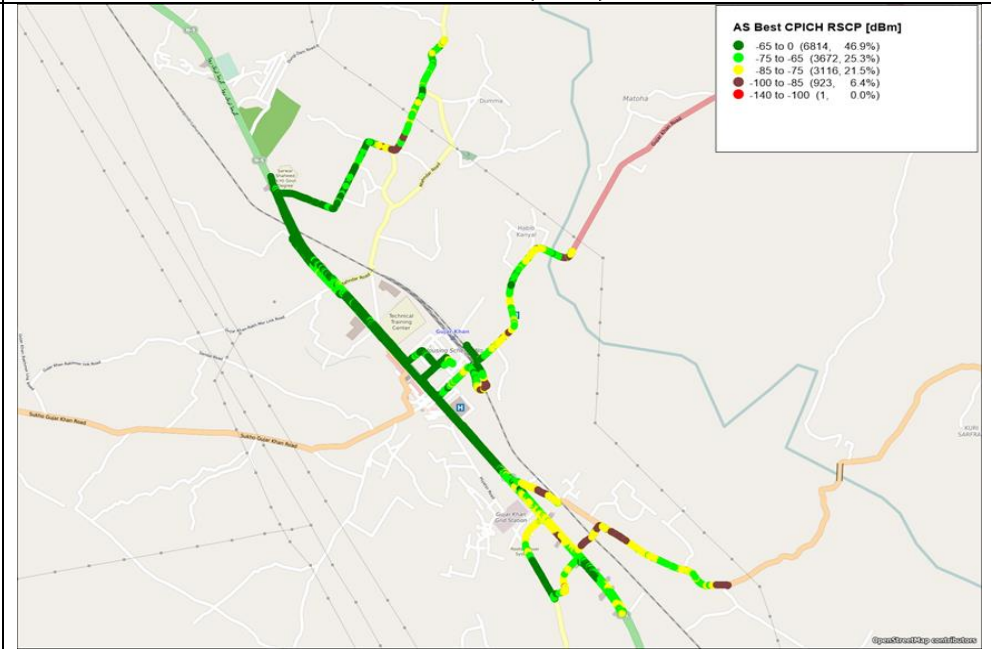


# 3G NETWORK COVERAGE / SIGNAL STRENGTH (RSCP)

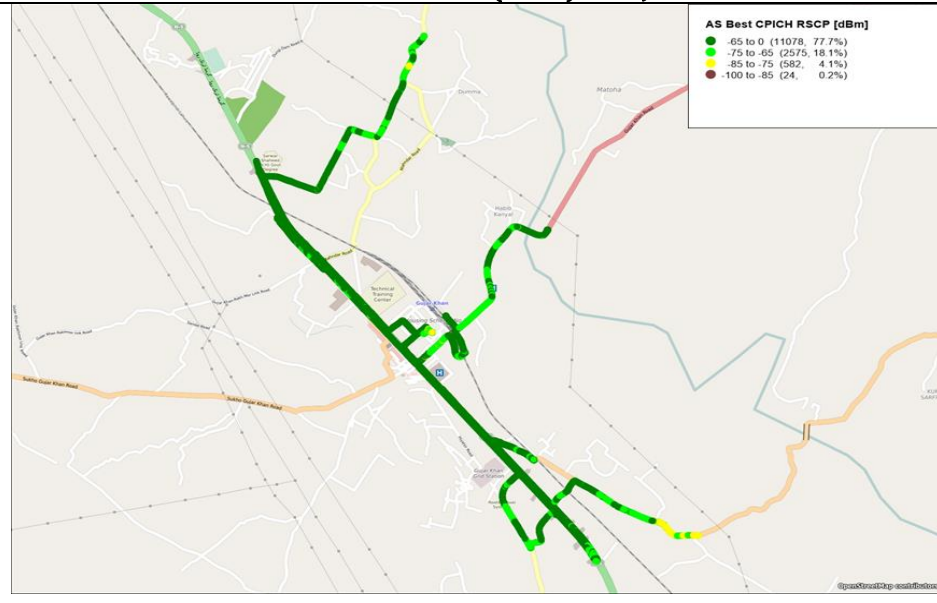
## JAZZ 3G COVERAGE (RSCP) – GUJAR KHAN



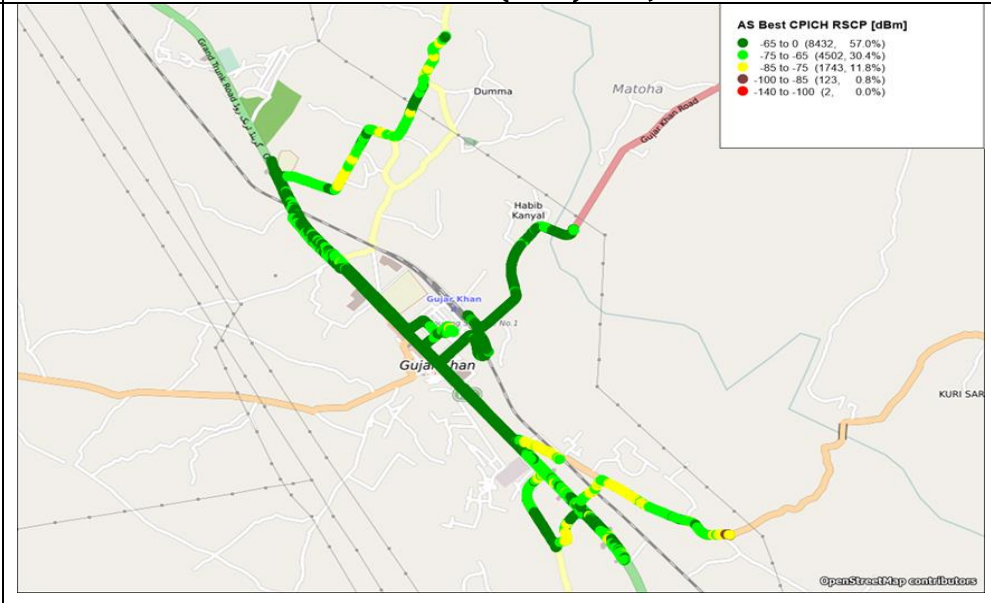
## TELENOR 3G COVERAGE (RSCP) – GUJAR KHAN



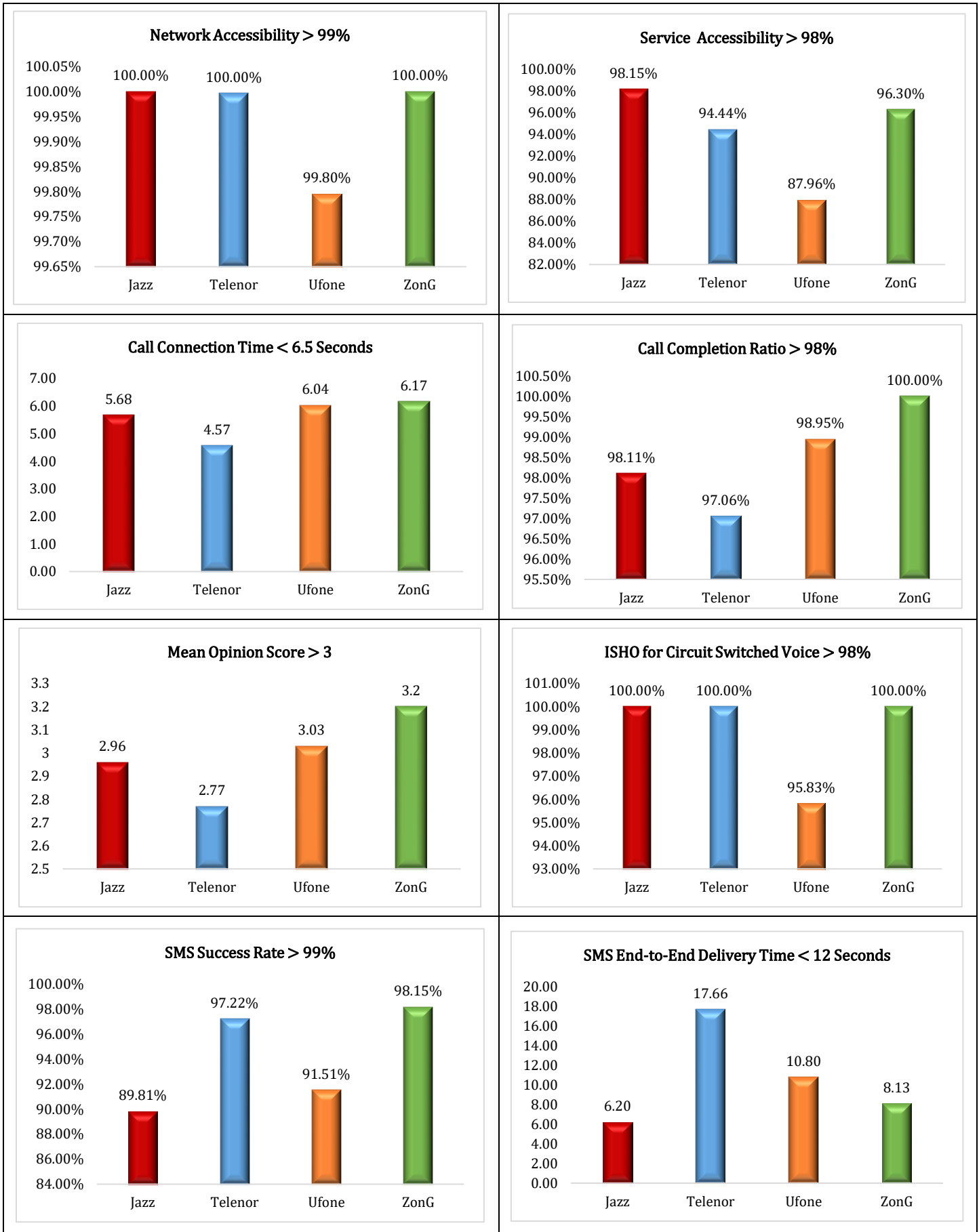
## UFONE 3G COVERAGE (RSCP) – GUJAR KHAN



## ZONG 3G COVERAGE (RSCP) – GUJAR KHAN

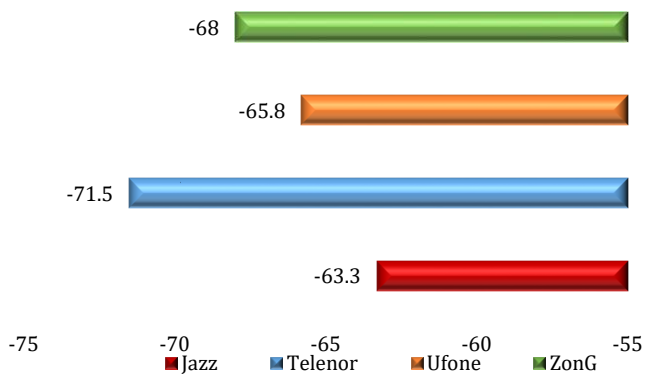


## QUALITY OF SERVICE SURVEY RESULTS – GUJAR KHAN

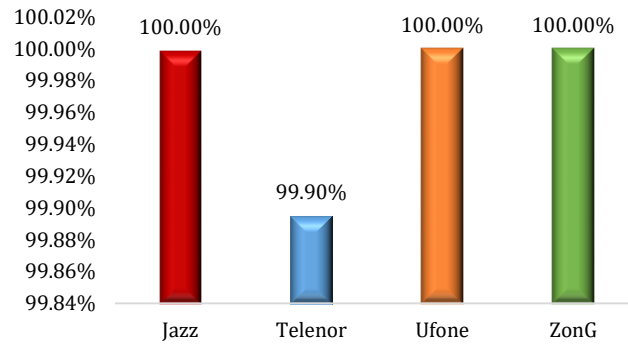


## QUALITY OF SERVICE SURVEY RESULTS – GUJAR KHAN

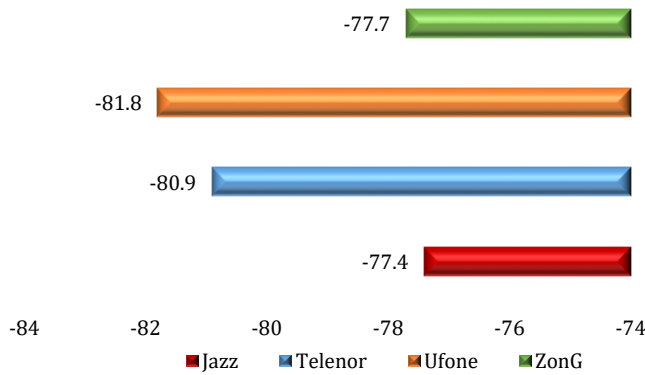
**Signal Strength (RSCP) > -100dBm**



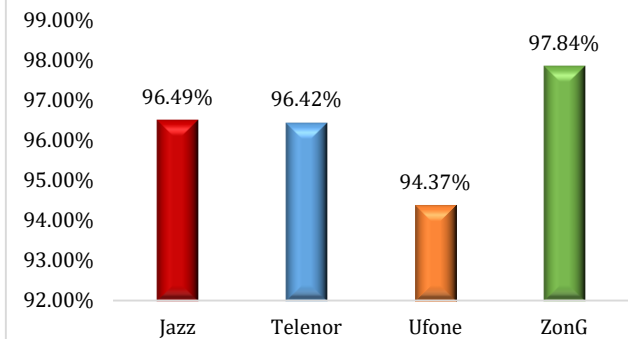
**Signal Strength (RSCP) Confidencel Level > 90%**



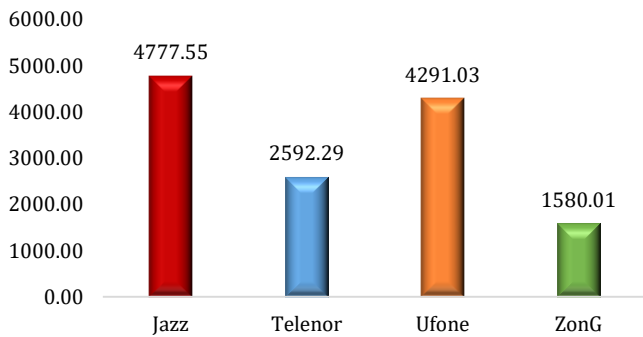
**Signal Strength (RSRP) > -100dBm**



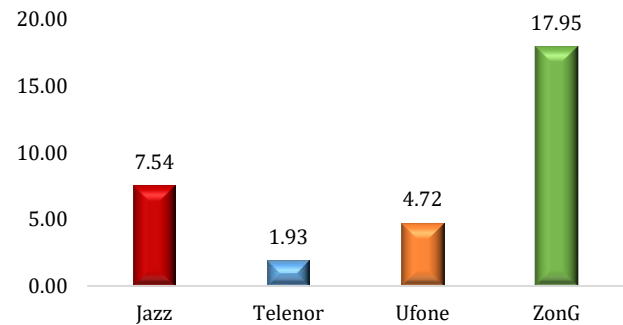
**Signal Strength (RSRP) Confidencel Level > 90%**



**User Data Throughput (3G) > 256Kbps**



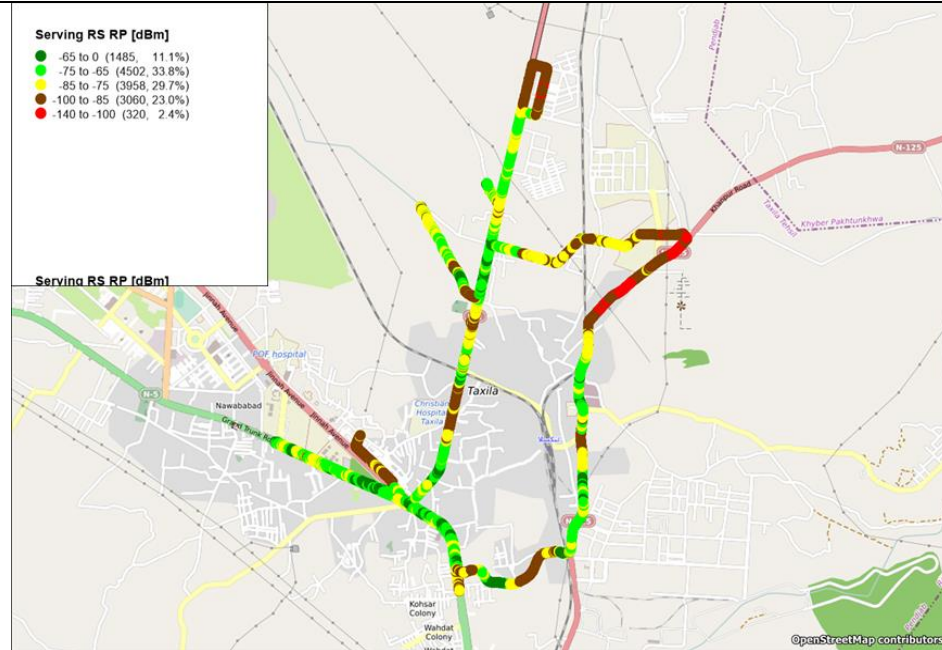
**User Data Throughput (4G) > 2Mbps**



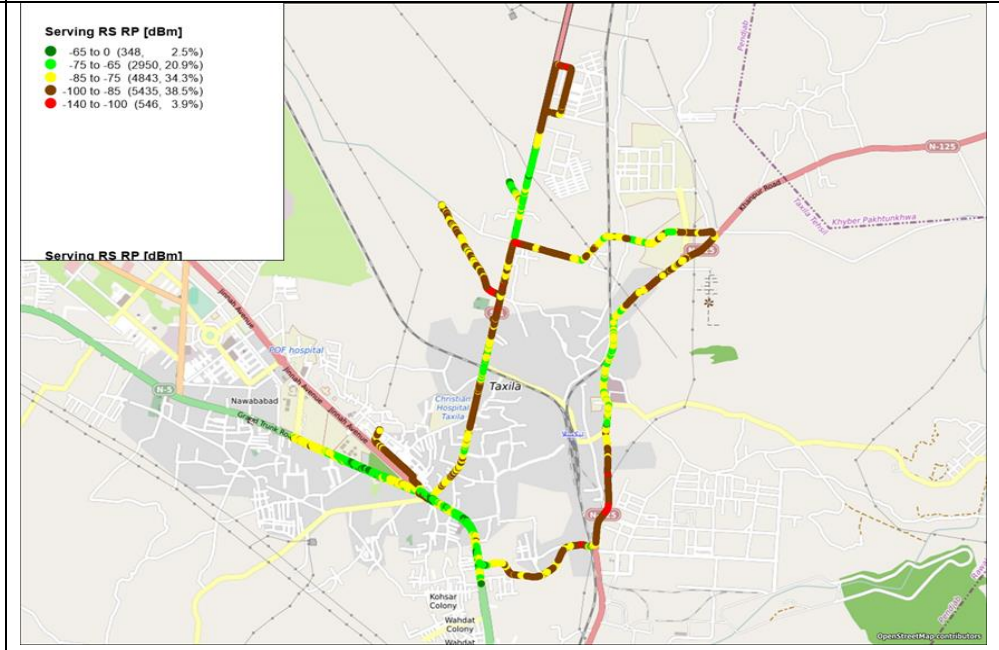


# 4G NETWORK COVERAGE / SIGNAL STRENGTH (RSRP)

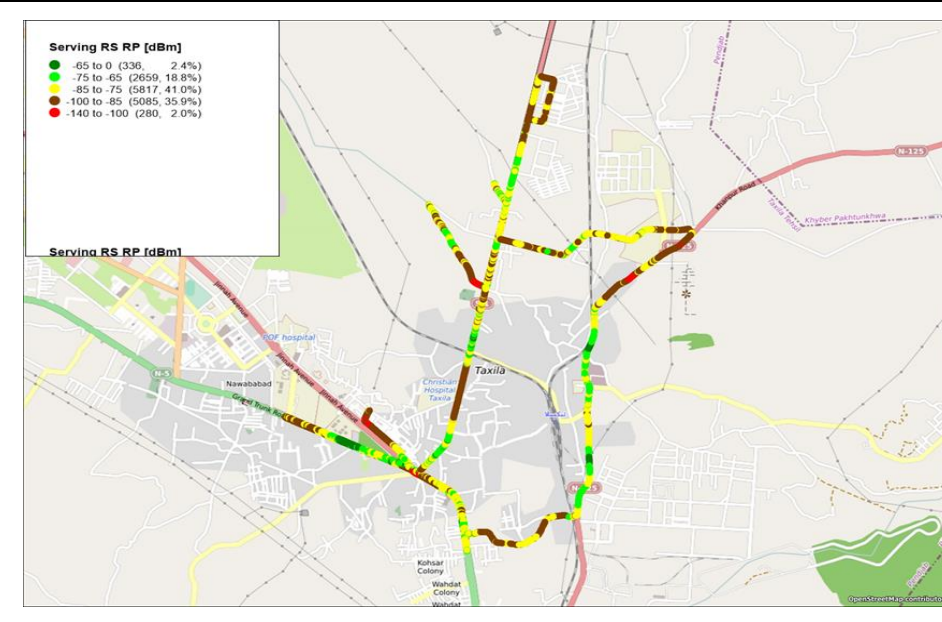
## JAZZ 4G COVERAGE (RSRP) - TAXILA



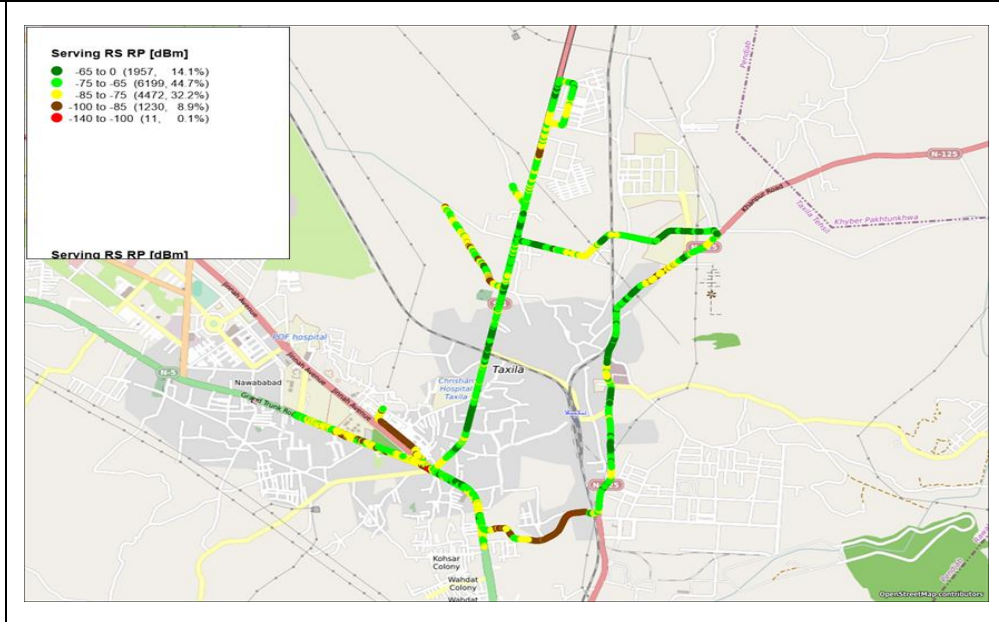
## TELENOR 4G COVERAGE (RSRP) - TAXILA



## UFONE 4G COVERAGE (RSRP) - TAXILA



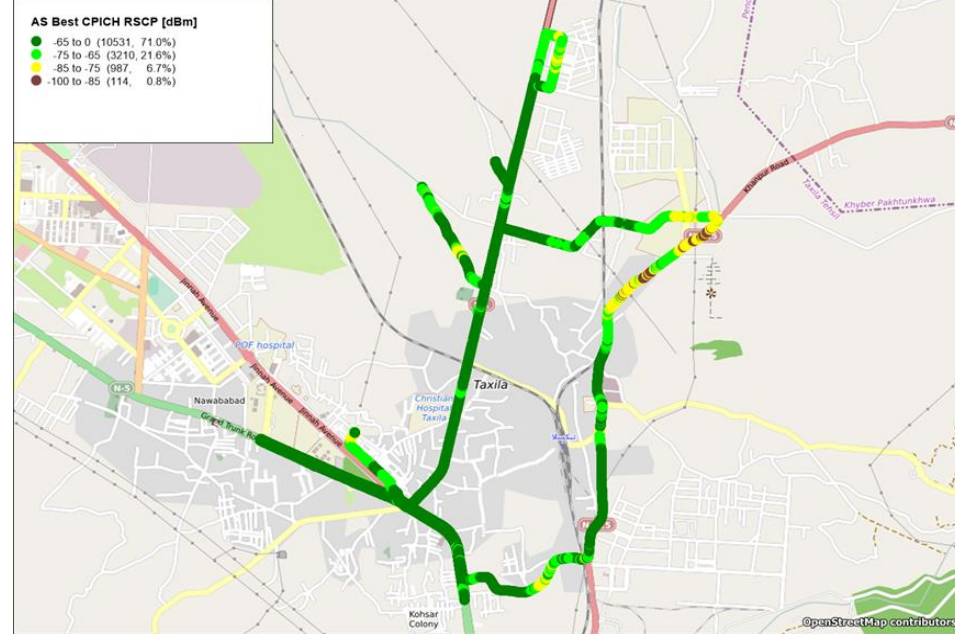
## ZONG 4G COVERAGE (RSRP) - TAXILA



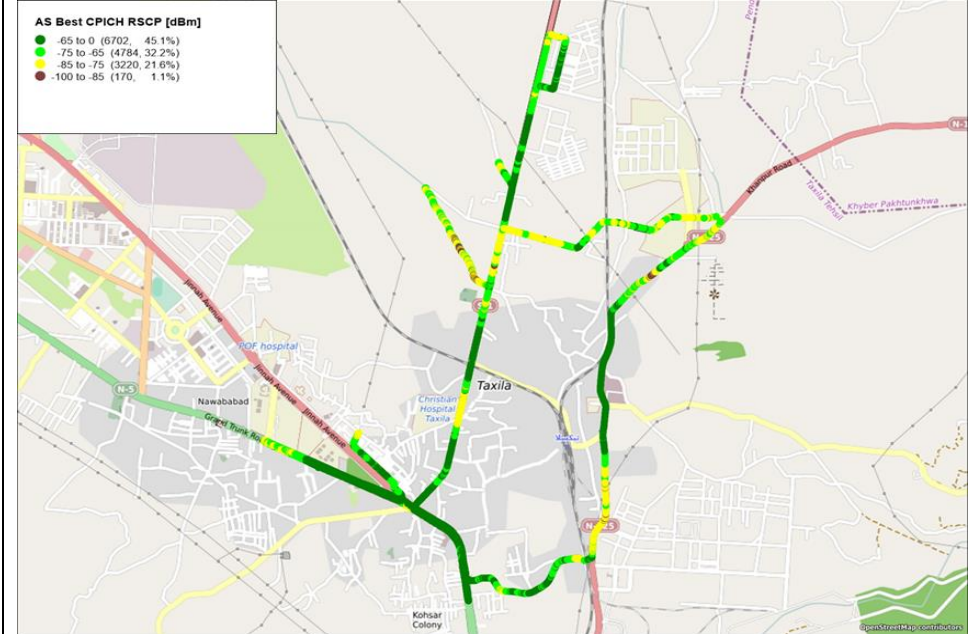


# 3G NETWORK COVERAGE / SIGNAL STRENGTH (RSCP)

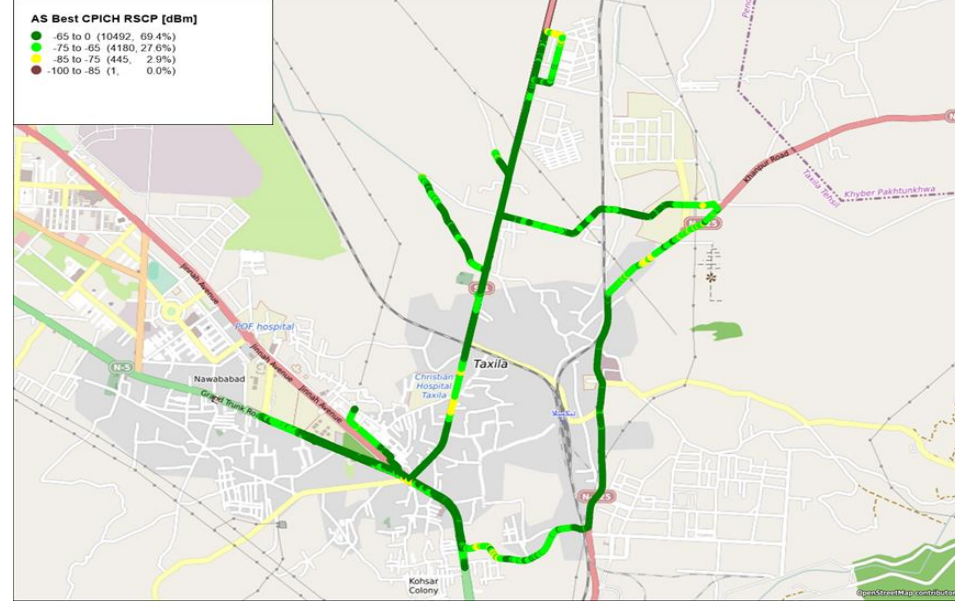
## JAZZ 3G COVERAGE (RSCP) - TAXILA



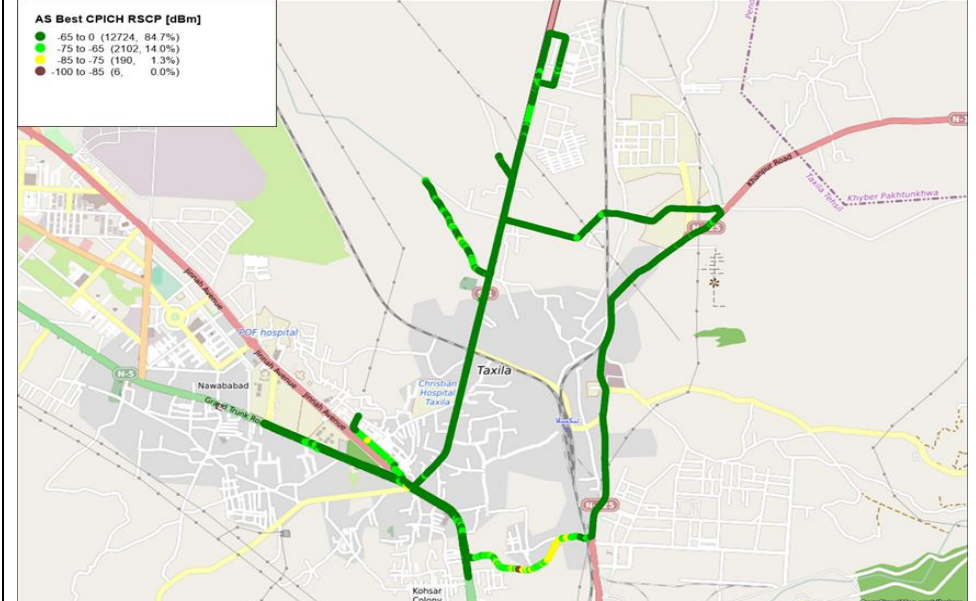
## TELENOR 3G COVERAGE (RSCP) - TAXILA



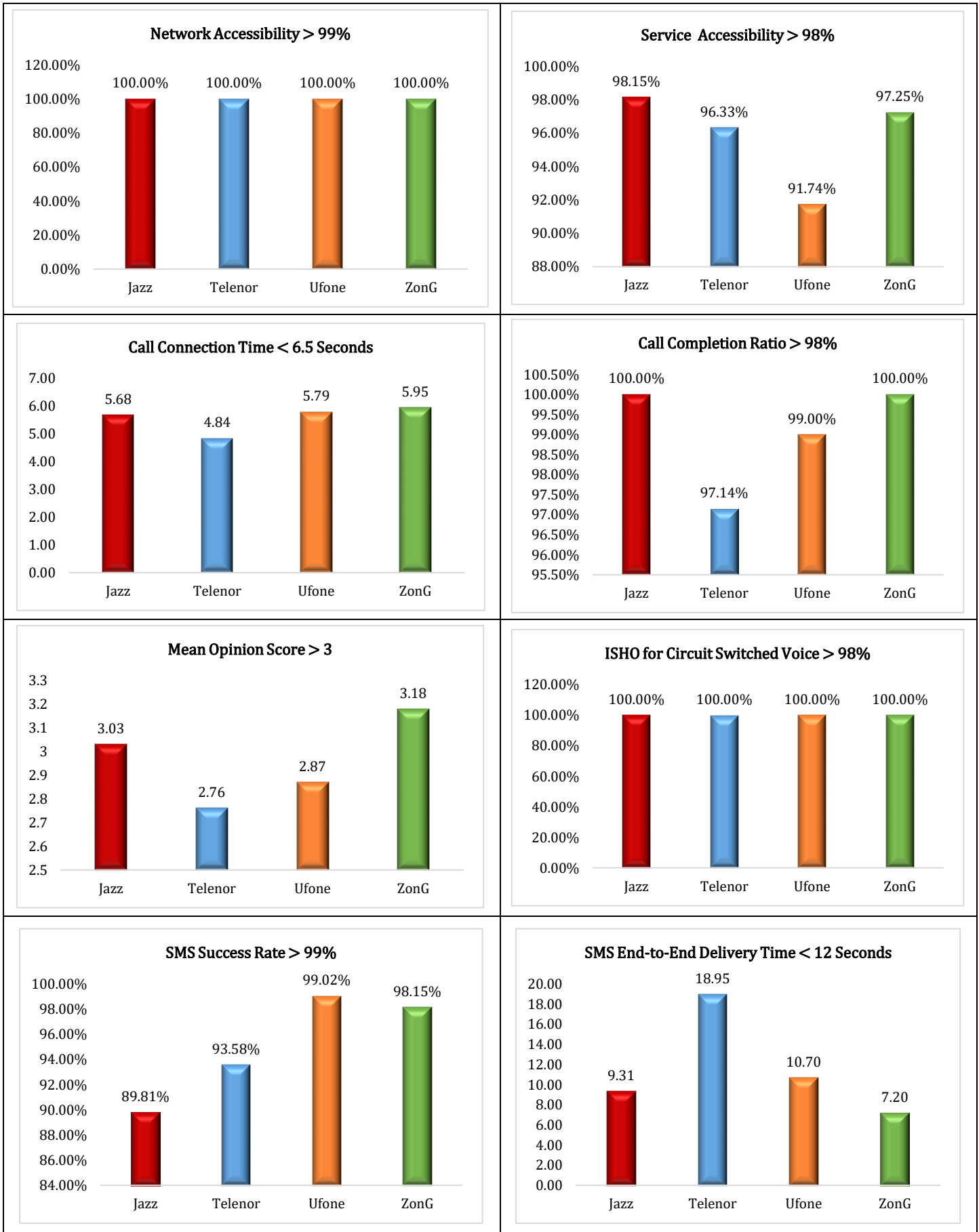
## UFONE 3G COVERAGE (RSCP) - TAXILA



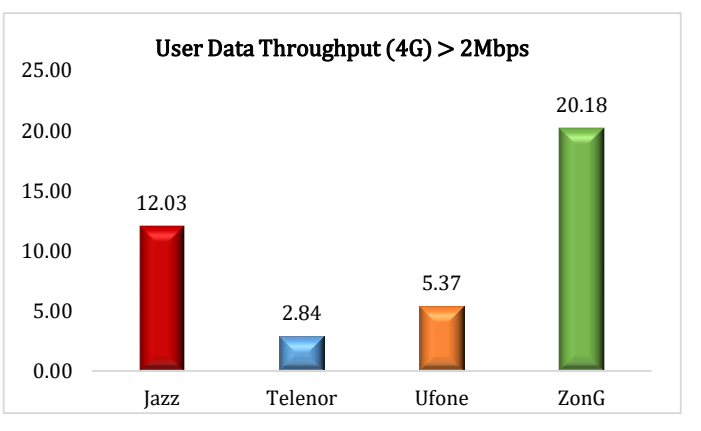
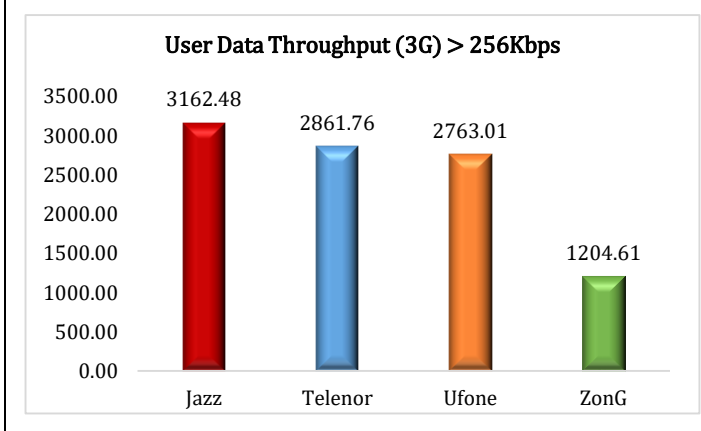
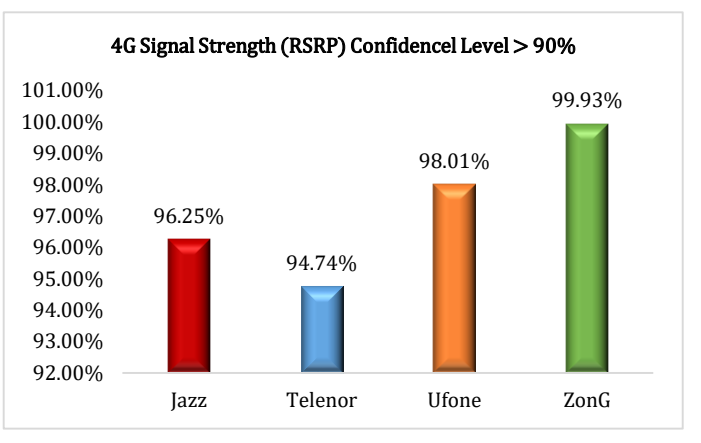
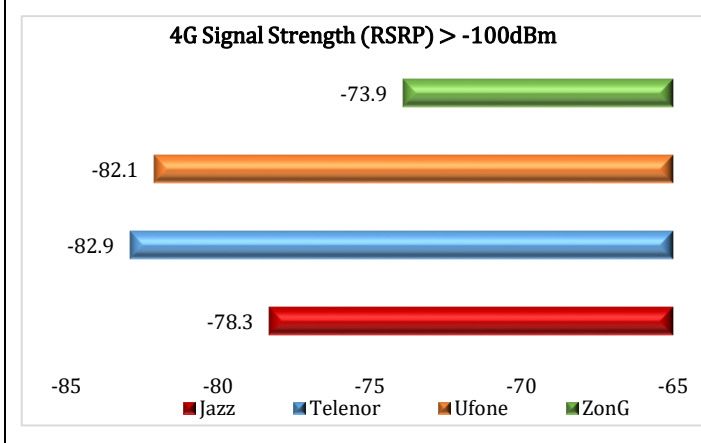
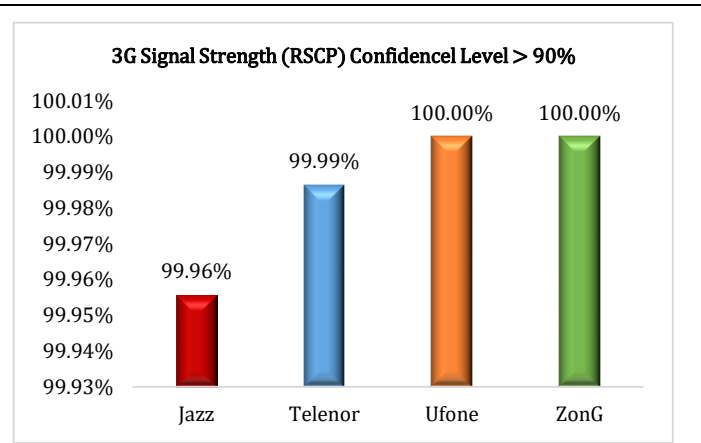
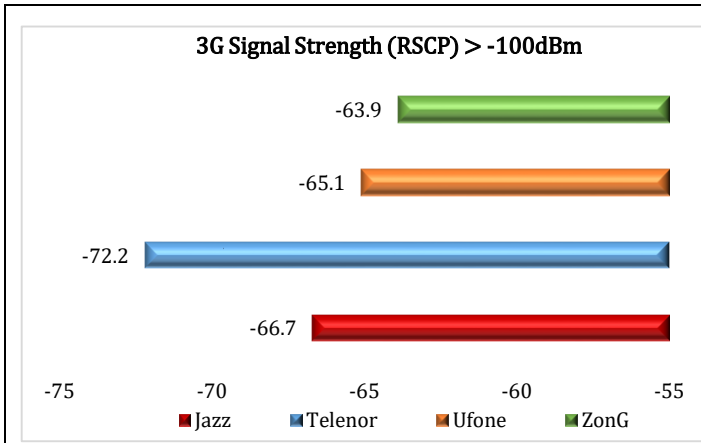
## ZONG 3G COVERAGE (RSCP) - TAXILA



## QUALITY OF SERVICE SURVEY RESULTS – TAXILA



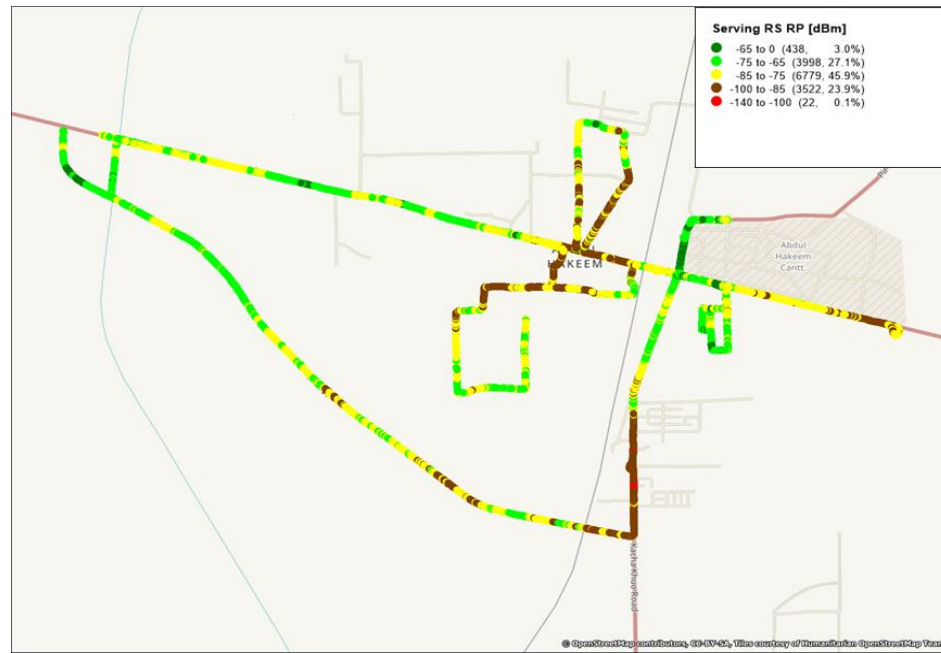
## QUALITY OF SERVICE SURVEY RESULTS – TAXILA



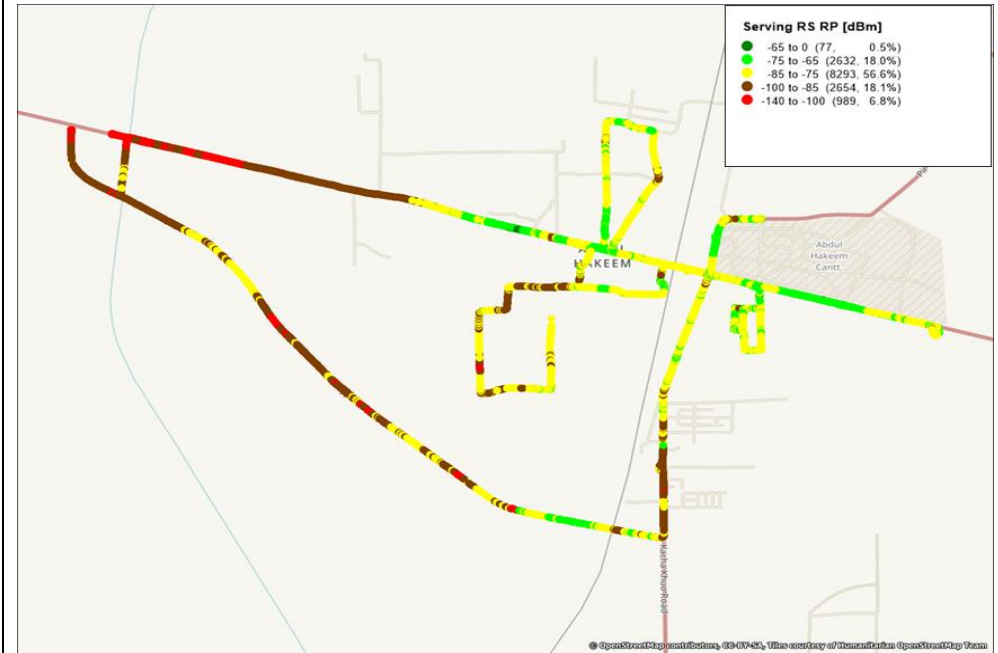


## 4G NETWORK COVERAGE / SIGNAL STRENGTH (RSRP)

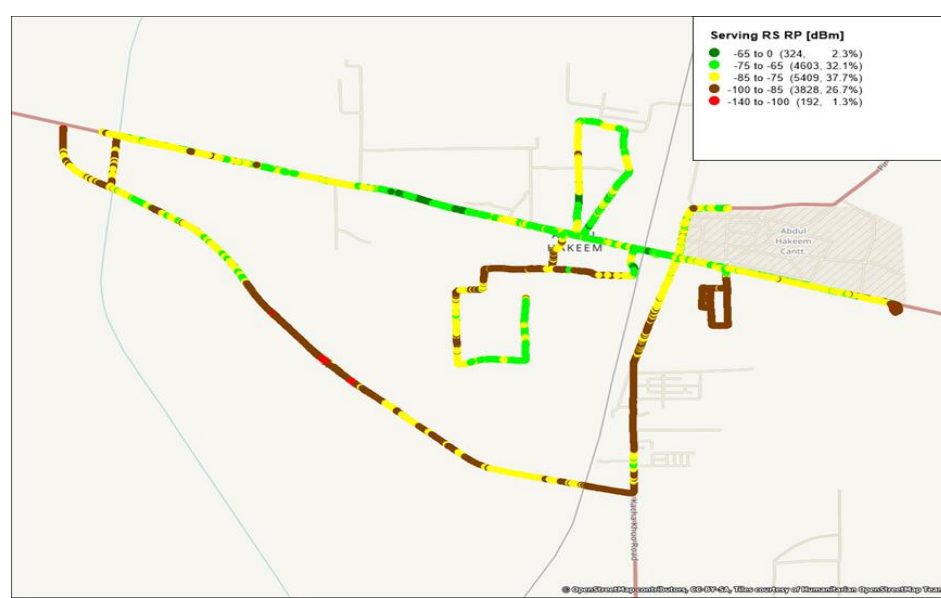
### JAZZ 4G COVERAGE (RSRP) – ABDUL HAKEEM



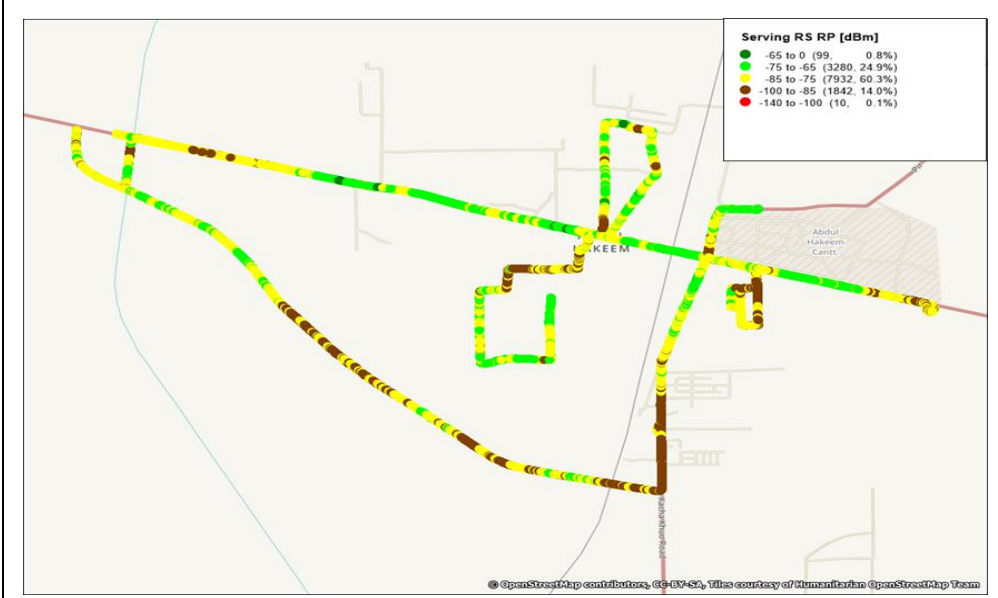
### TELENOR 4G COVERAGE (RSRP) – ABDUL HAKEEM



### UFONE 4G COVERAGE (RSRP) – ABDUL HAKEEM

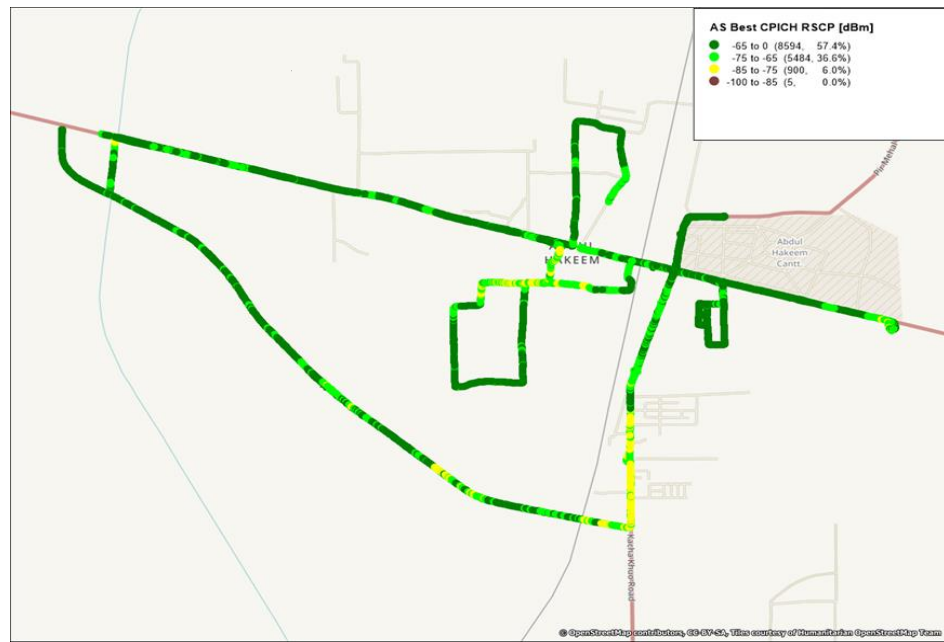


### ZONG 4G COVERAGE (RSRP) – ABDUL HAKEEM

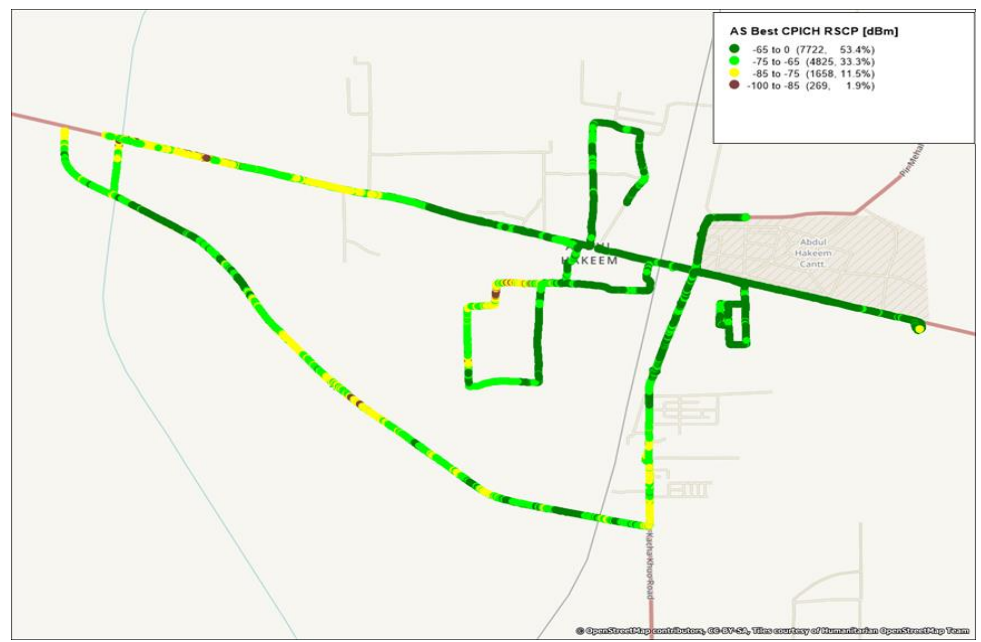


# 3G NETWORK COVERAGE / SIGNAL STRENGTH (RSCP)

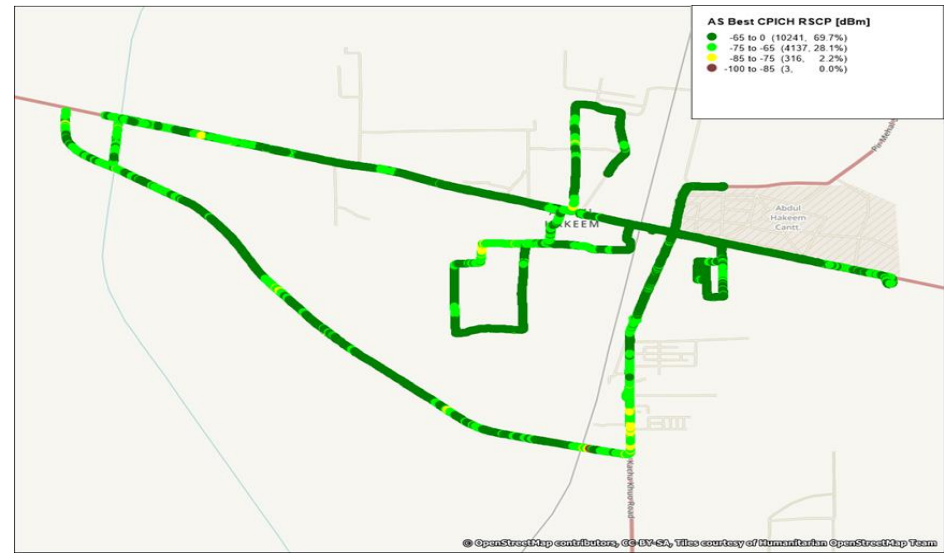
## JAZZ 3G COVERAGE (RSCP) – ABDUL HAKEEM



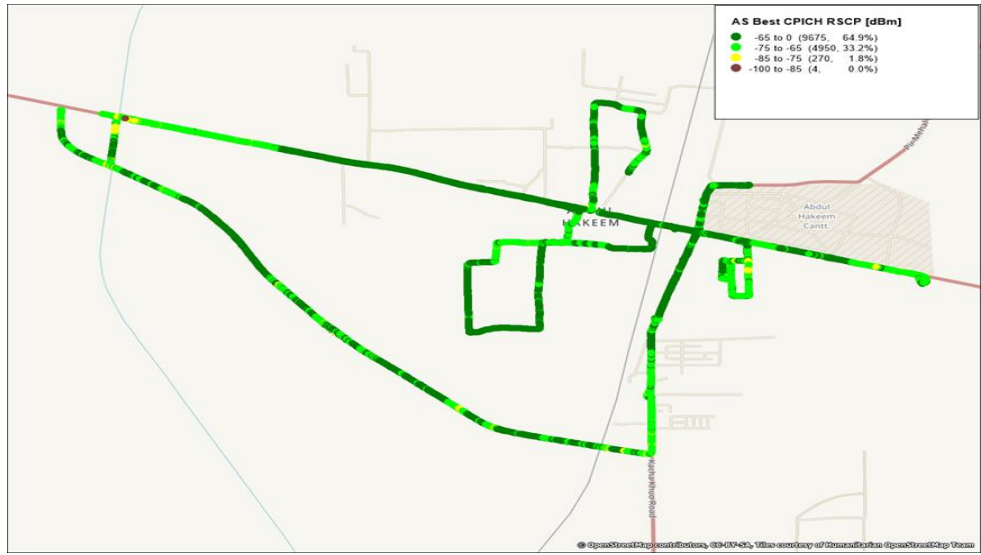
## TELENOR 3G COVERAGE (RSCP) – ABDUL HAKEEM



## UFONE 3G COVERAGE (RSCP) – ABDUL HAKEEM

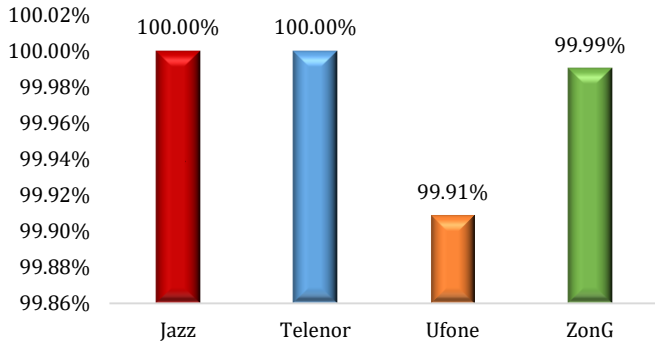


## ZONG 3G COVERAGE (RSCP) – ABDUL HAKEEM

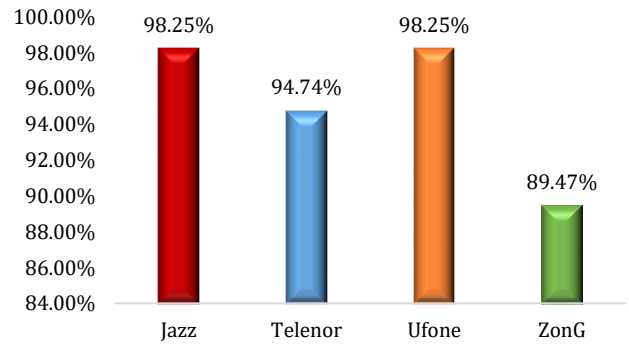


## QUALITY OF SERVICE SURVEY RESULTS – ABDUL HAKEEM

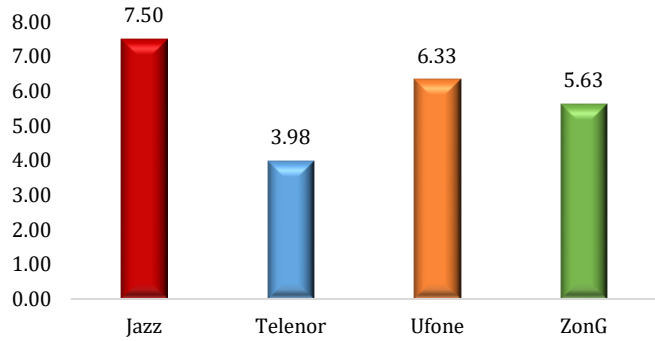
**Network Accessibility > 99%**



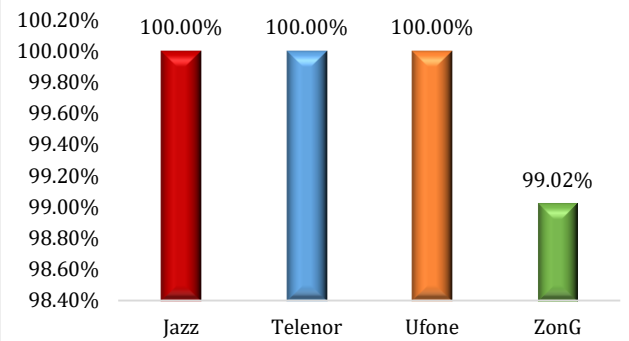
**Service Accessibility > 98%**



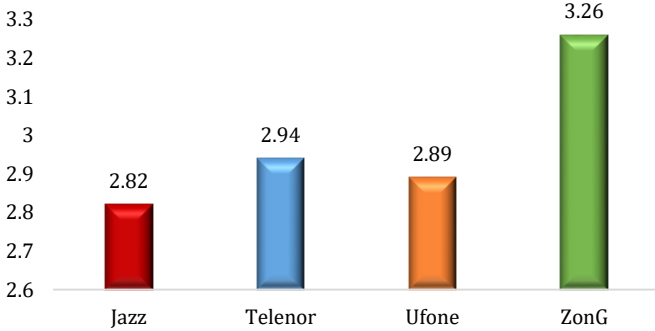
**Call Connection Time < 6.5 Seconds**



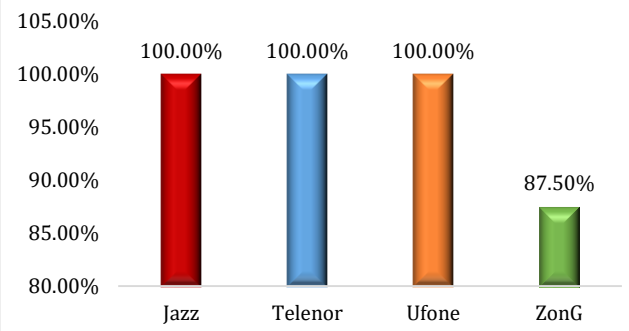
**Call Completion Ratio > 98%**



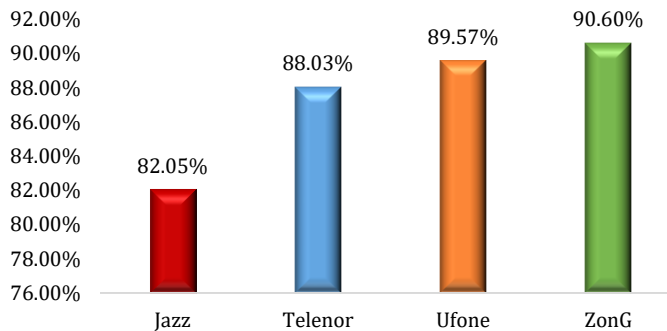
**Mean Opinion Score > 3**



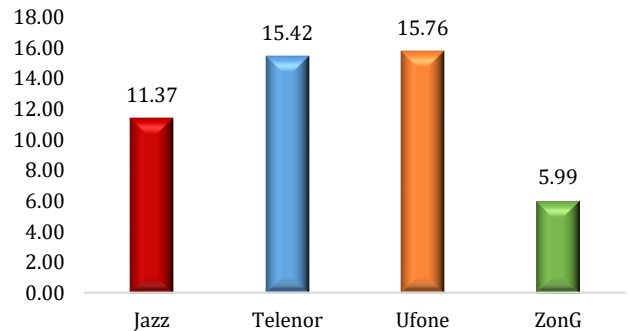
**ISHO for Circuit Switched Voice > 98%**



**SMS Success Rate > 99%**

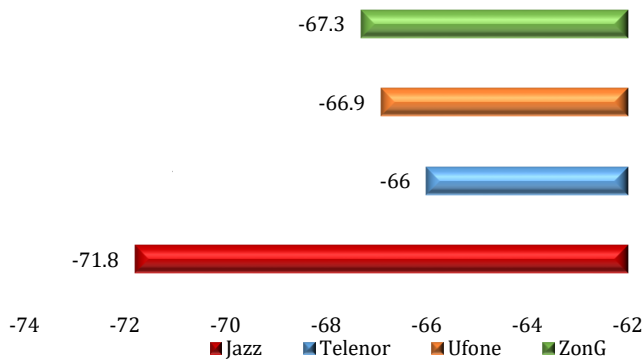


**SMS End-to-End Delivery Time < 12 Seconds**

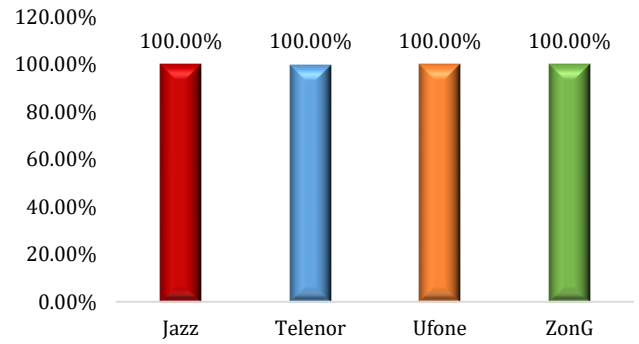


## QUALITY OF SERVICE SURVEY RESULTS – ABDUL HAKEEM

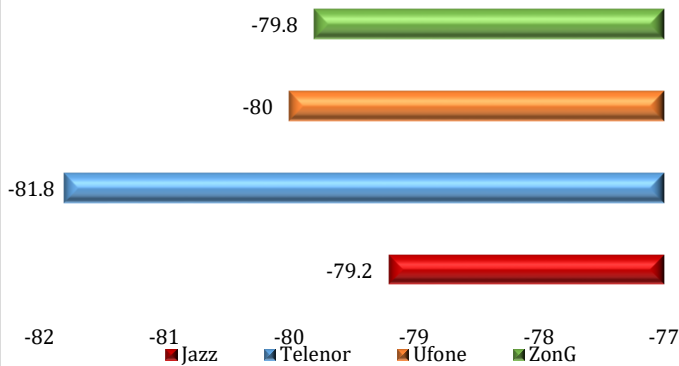
**Signal Strength (RSCP) > -100dBm**



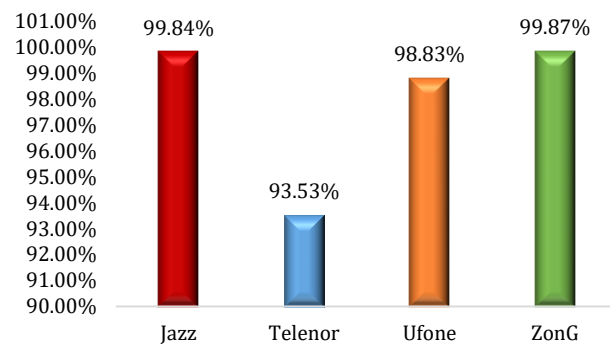
**Signal Strength (RSCP) Confidencel Level > 90%**



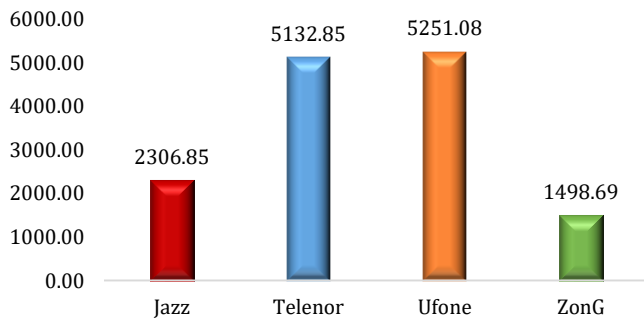
**Signal Strength (RSRP) > -100dBm**



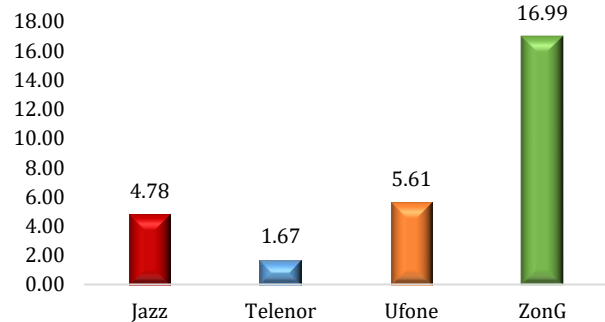
**Signal Strength (RSRP) Confidencel Level > 90%**



**User Data Throughput (3G) > 256Kbps**



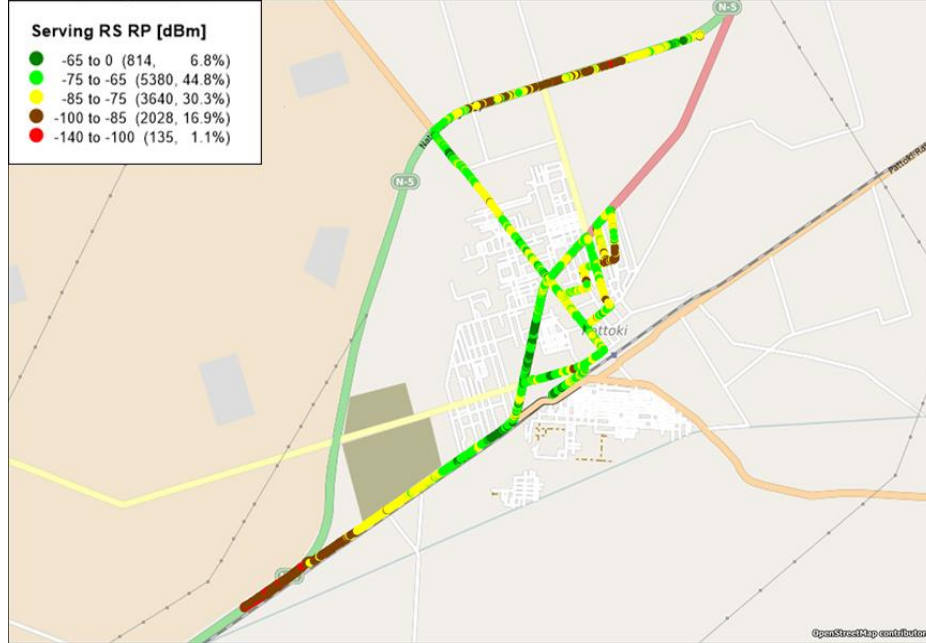
**User Data Throughput (4G) > 2Mbps**



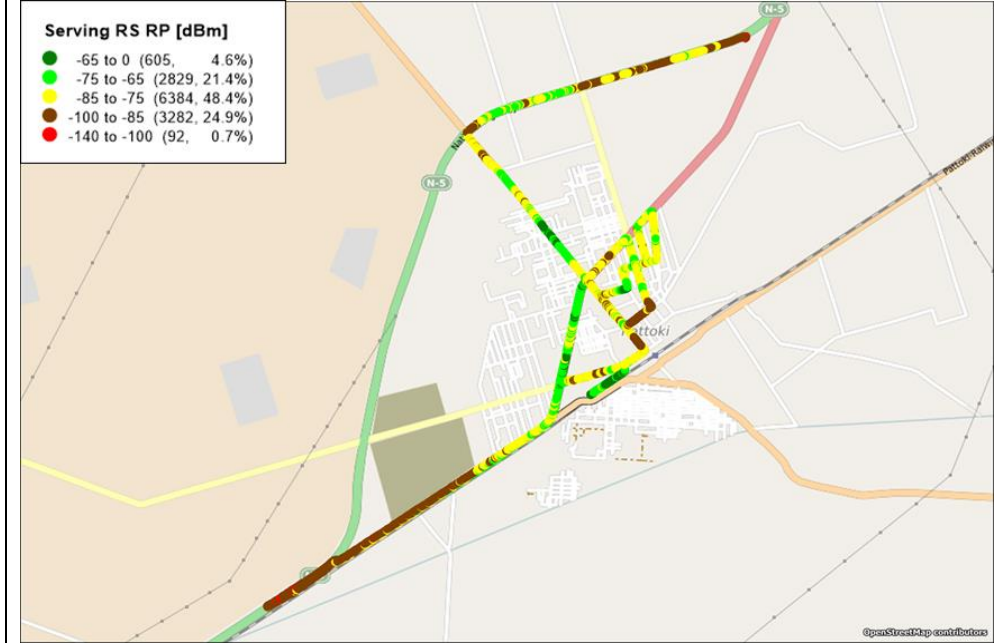


## 4G NETWORK COVERAGE / SIGNAL STRENGTH (RSRP)

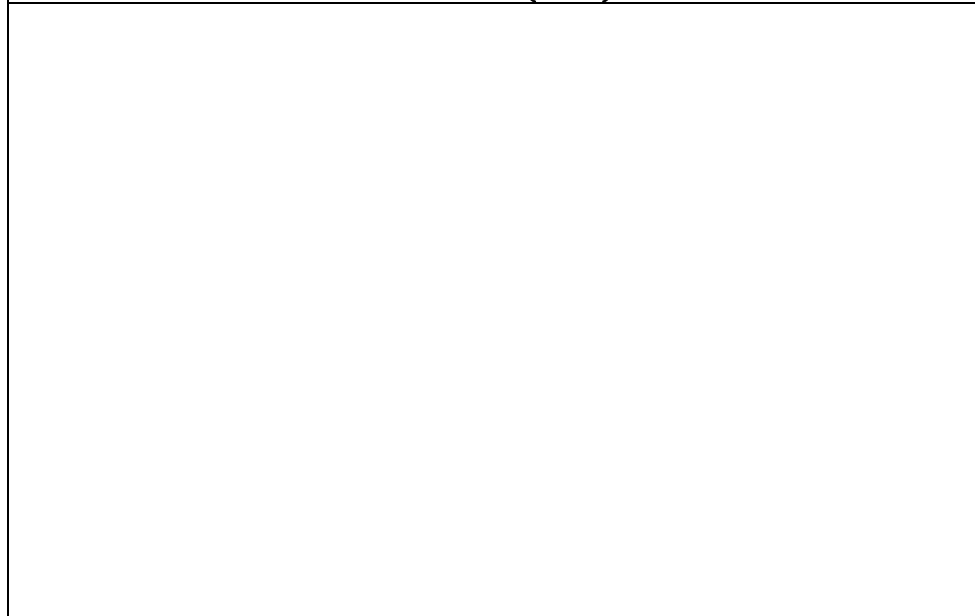
### JAZZ 4G COVERAGE (RSRP) - PATTOKI



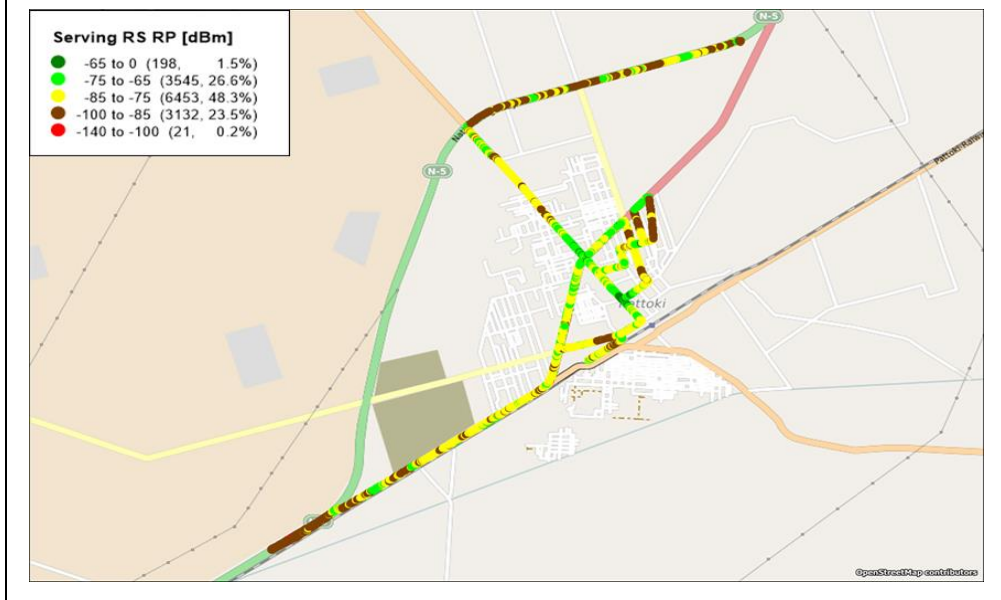
### TELENOR 4G COVERAGE (RSRP) - PATTOKI



### UFONE 4G COVERAGE (RSRP) - PATTOKI

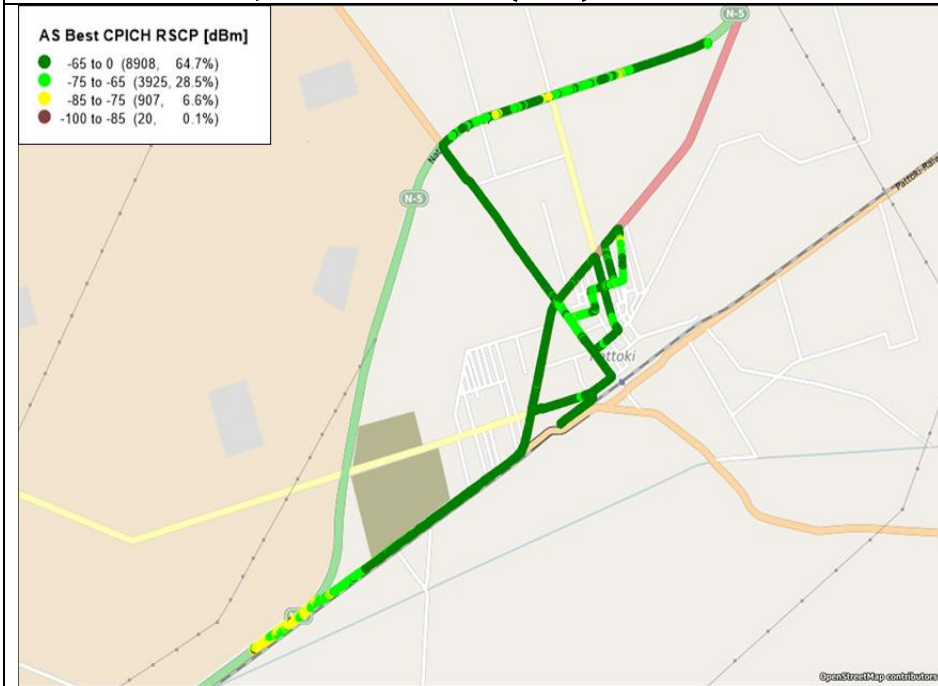


### ZONG 4G COVERAGE (RSRP) - PATTOKI

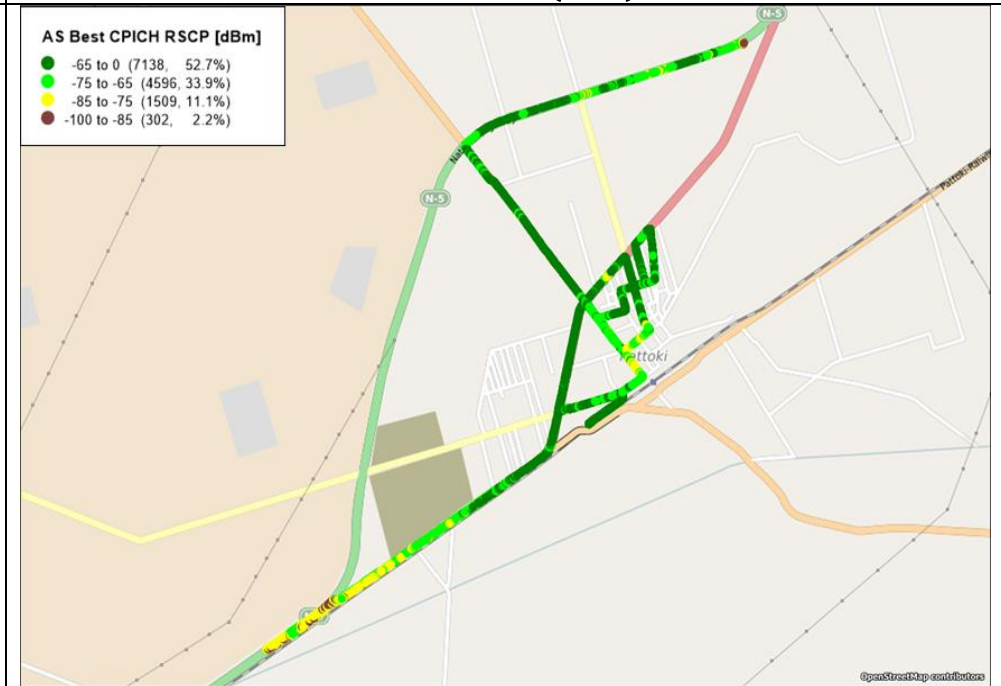


# 3G NETWORK COVERAGE / SIGNAL STRENGTH (RSCP)

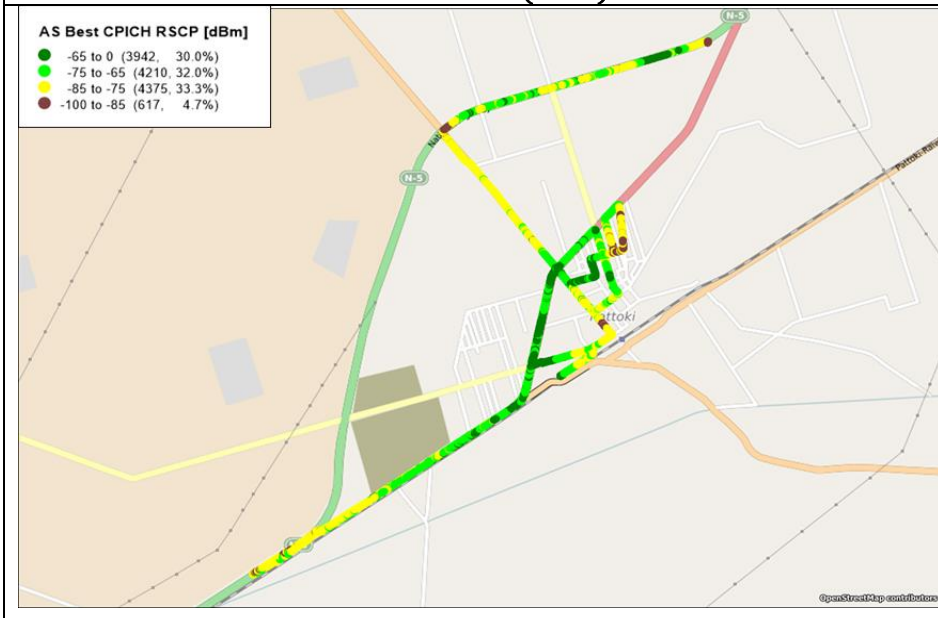
## JAZZ 3G COVERAGE (RSCP) - PATTOKI



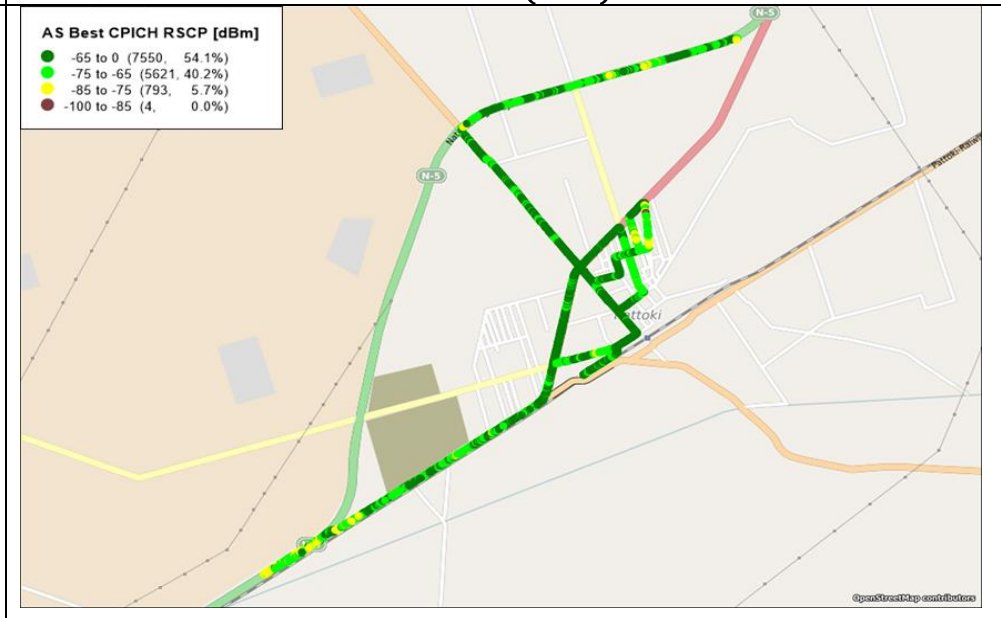
## TELENOR 3G COVERAGE (RSCP) - PATTOKI



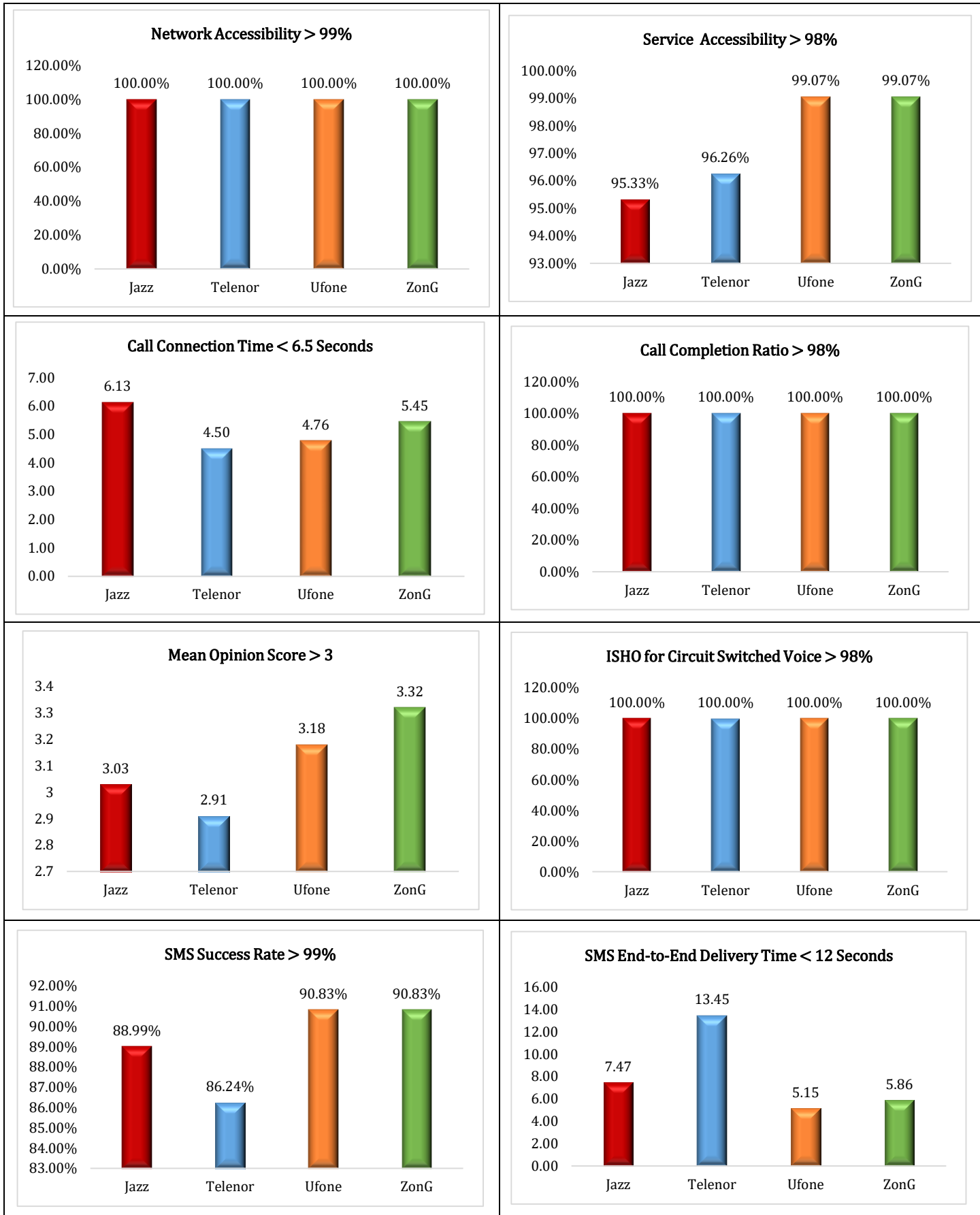
## UFONE 3G COVERAGE (RSCP) - PATTOKI



## ZONG 3G COVERAGE (RSCP) - PATTOKI

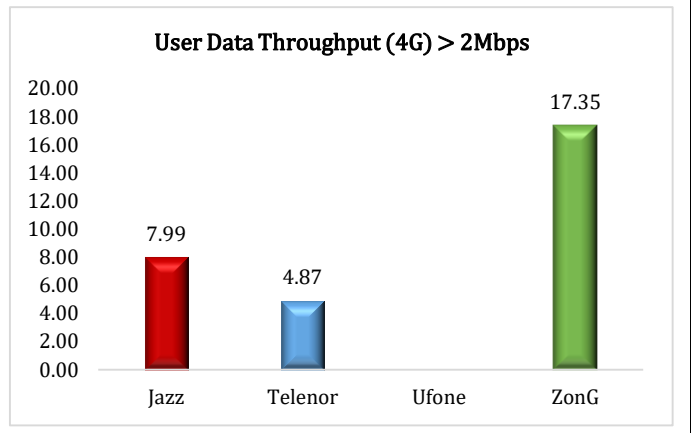
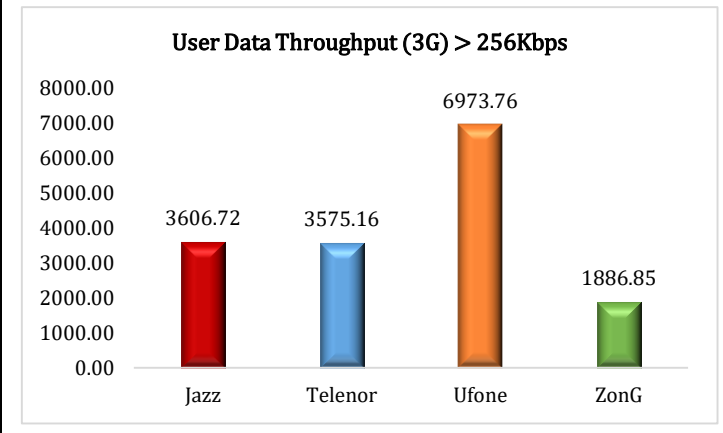
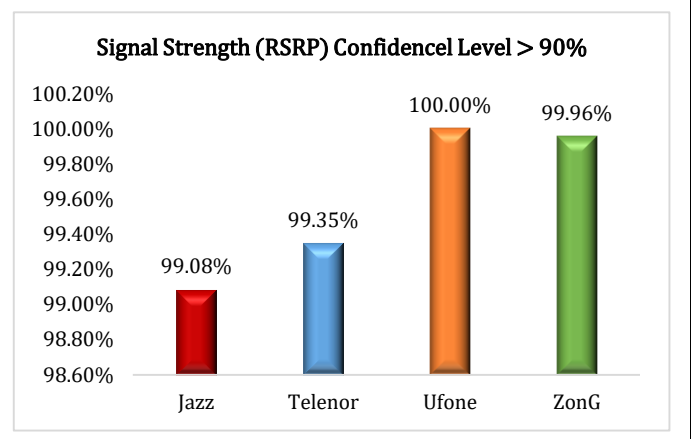
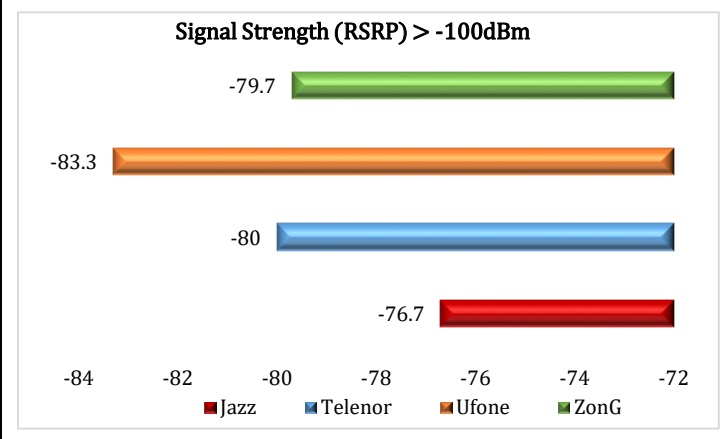
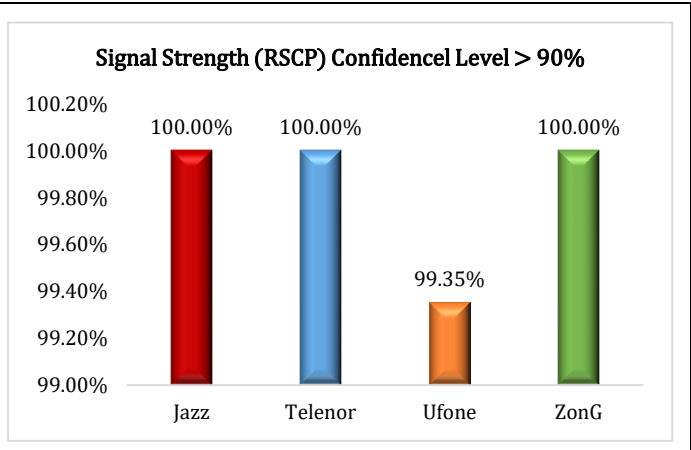
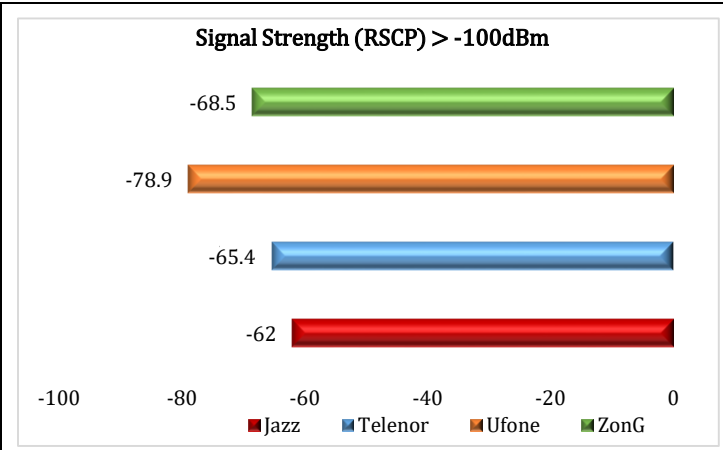


## QUALITY OF SERVICE SURVEY RESULTS – PATTOKI





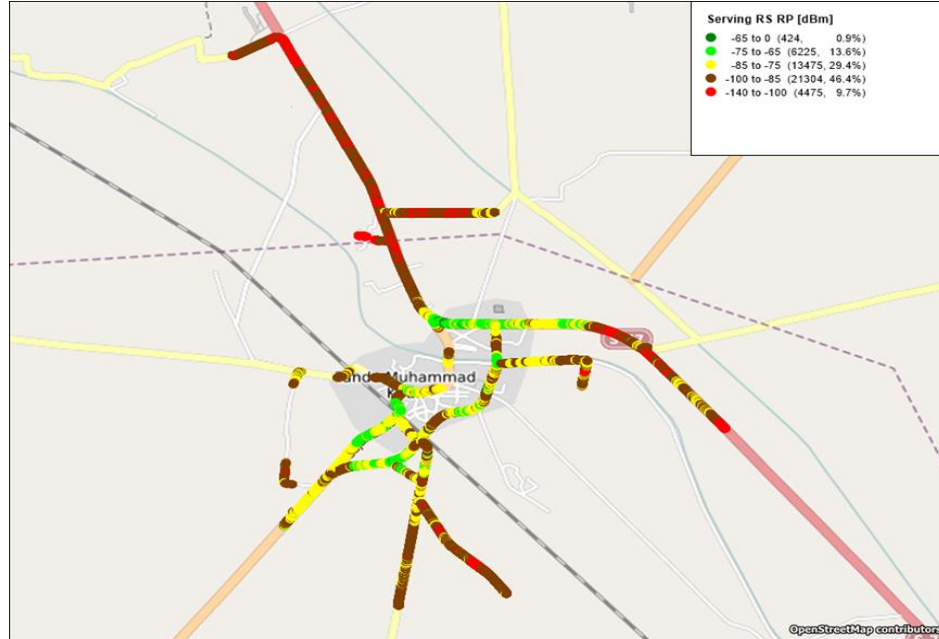
## QUALITY OF SERVICE SURVEY RESULTS – PATTOKI



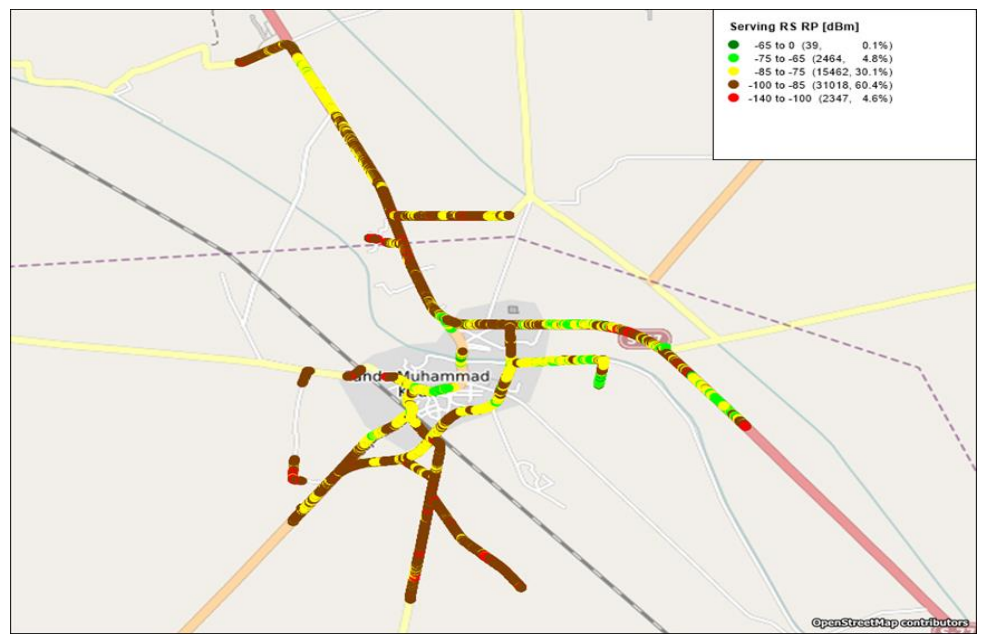
**SINDH**

## 4G NETWORK COVERAGE / SIGNAL STRENGTH (RSRP)

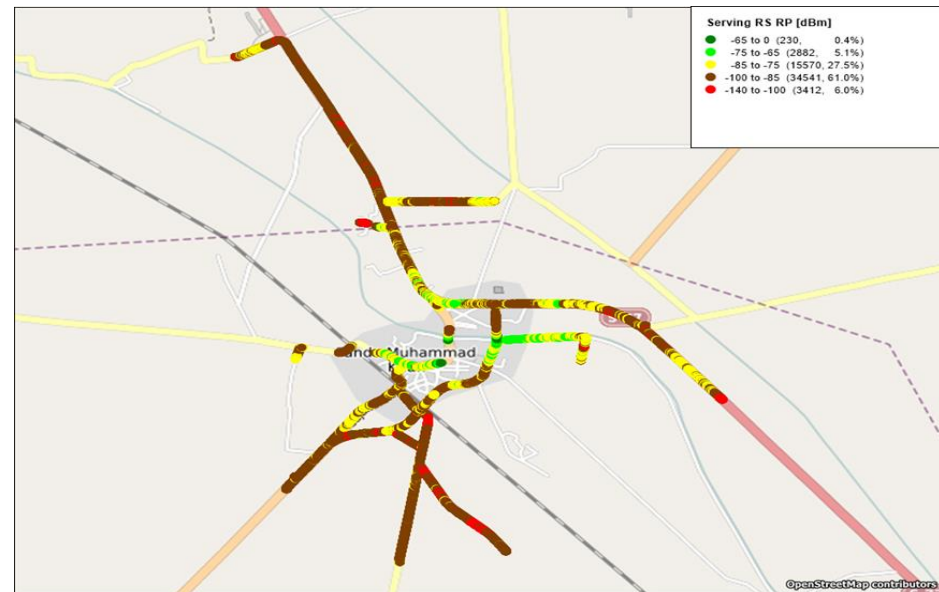
**JAZZ 4G COVERAGE (RSRP) – TANDO MUHAMMAD KHAN**



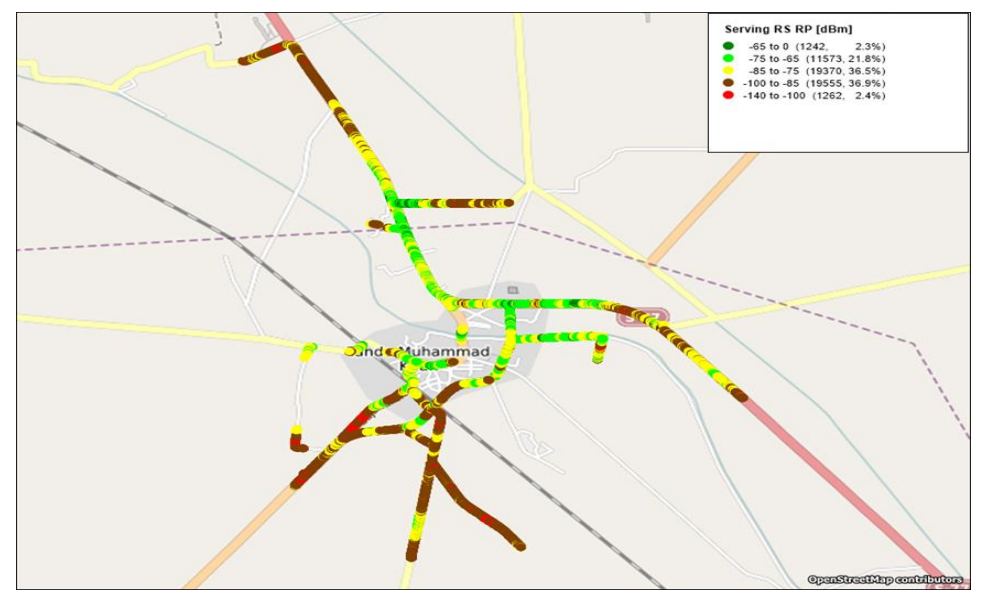
**TELENOR 4G COVERAGE (RSRP) – TANDO MUHAMMAD KHAN**



**UFONE 4G COVERAGE (RSRP) – TANDO MUHAMMAD KHAN**

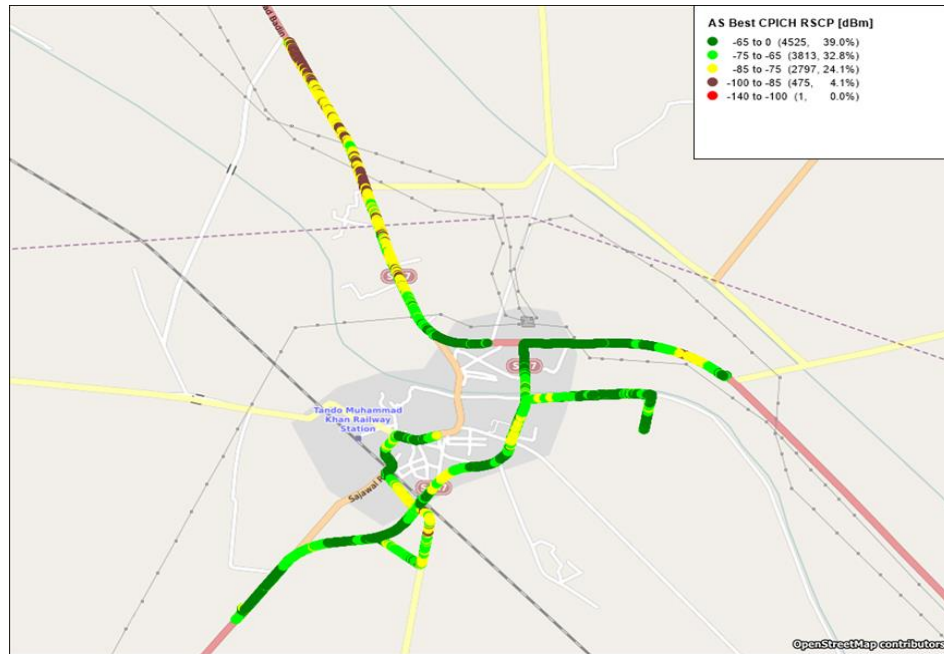


**ZONG 4G COVERAGE (RSRP) – TANDO MUHAMMAD KHAN**

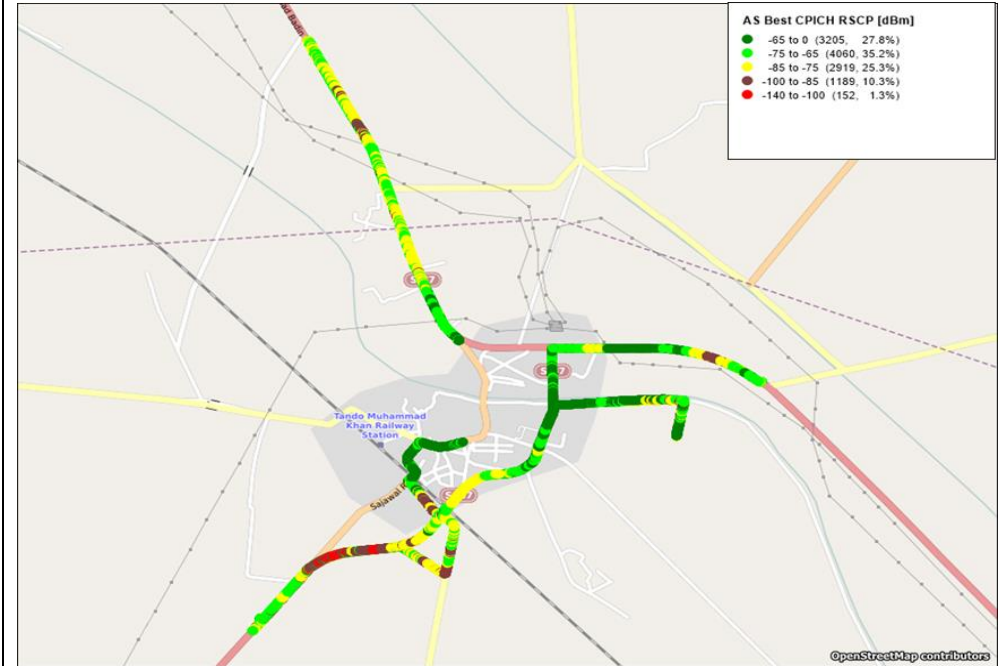


# 3G NETWORK COVERAGE / SIGNAL STRENGTH (RSCP)

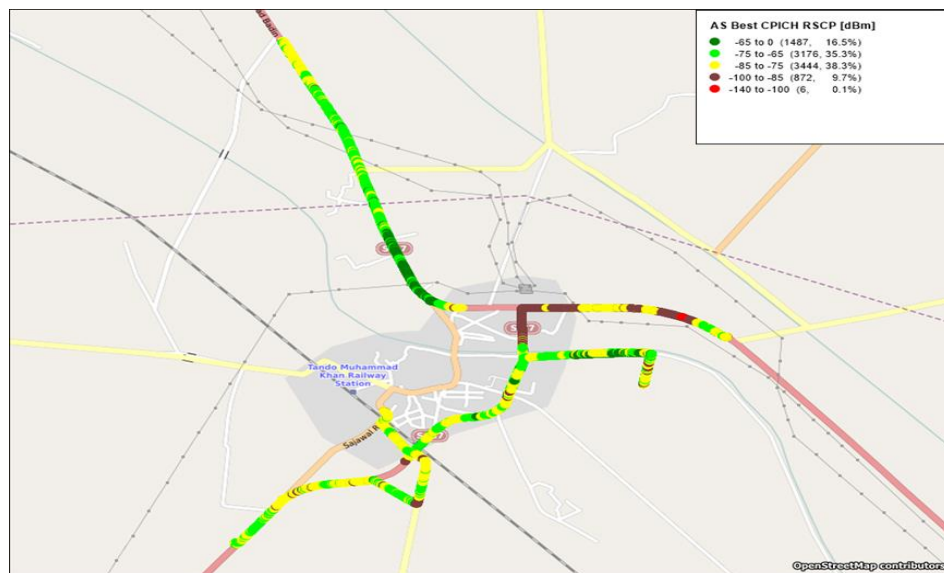
## JAZZ 3G COVERAGE (RSCP) – TANDO MUHAMMAD KHAN



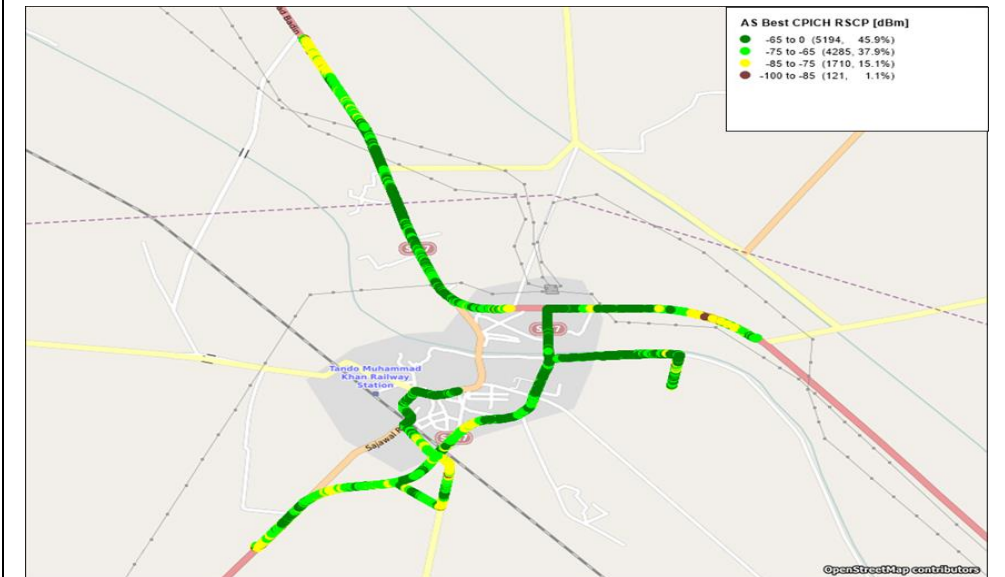
## TELENOR 3G COVERAGE (RSCP) – TANDO MUHAMMAD KHAN



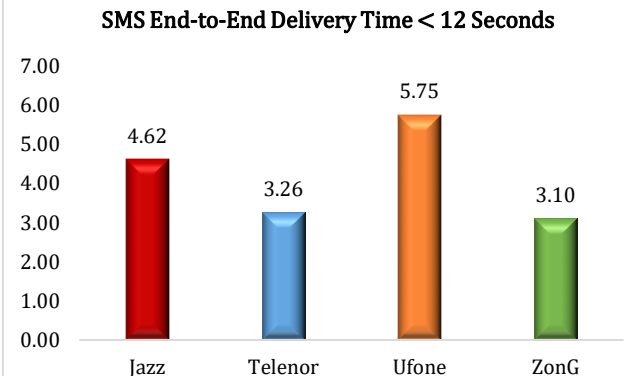
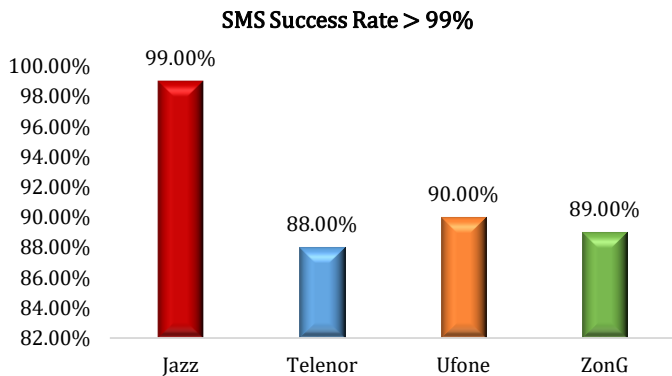
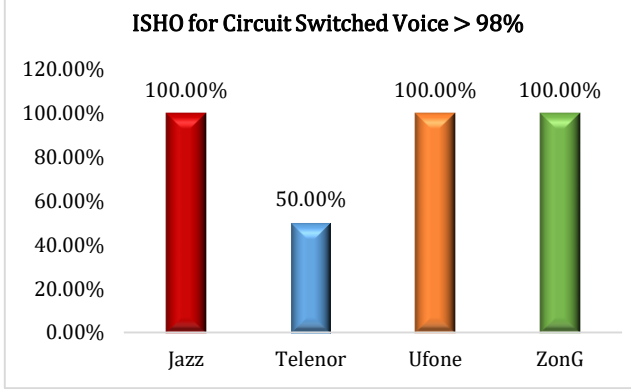
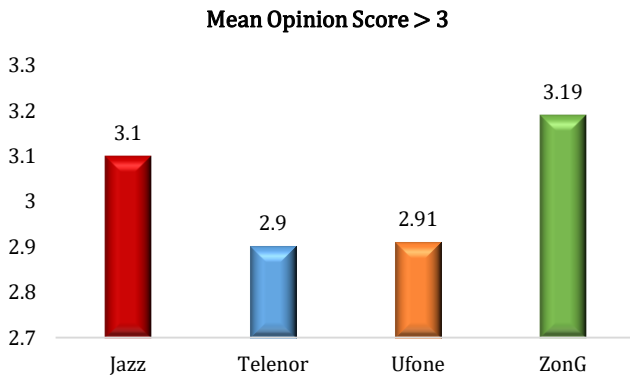
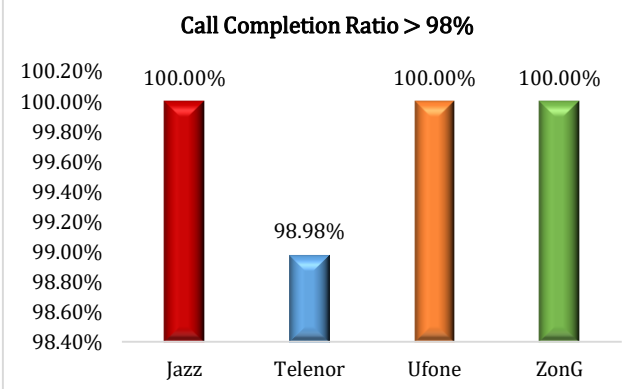
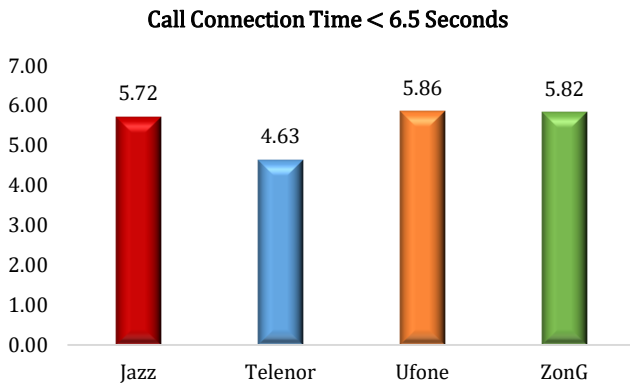
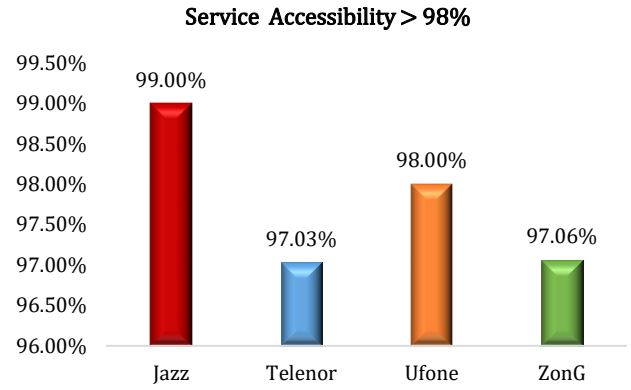
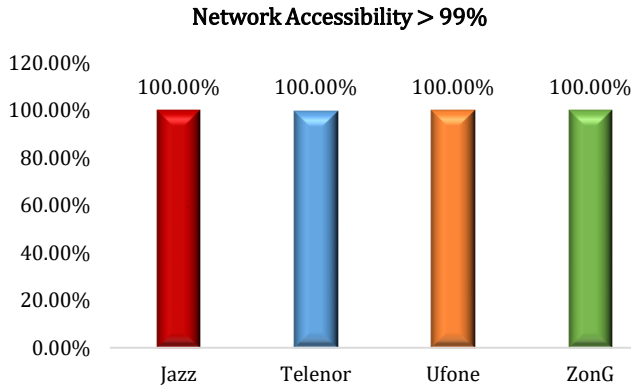
## UFONE 3G COVERAGE (RSCP) – TANDO MUHAMMAD KHAN



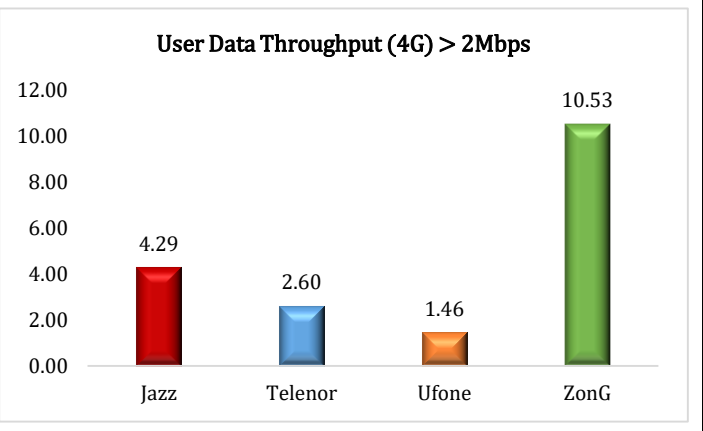
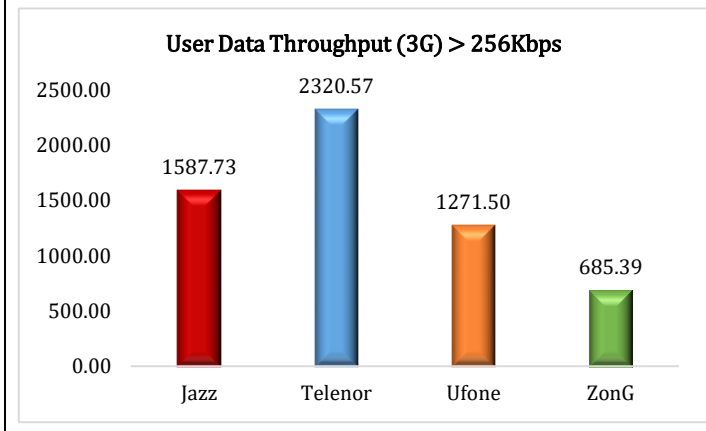
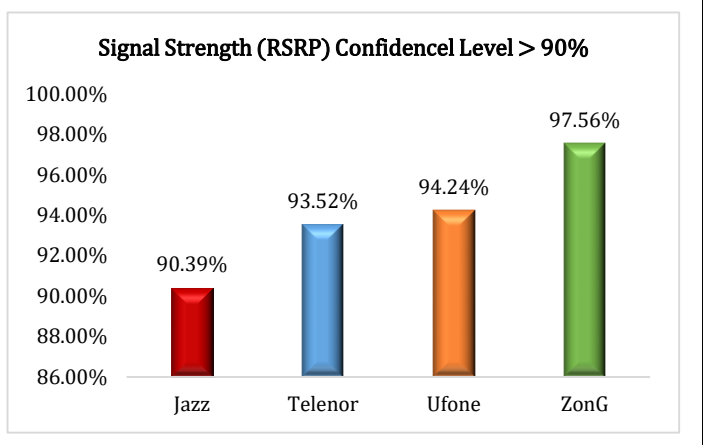
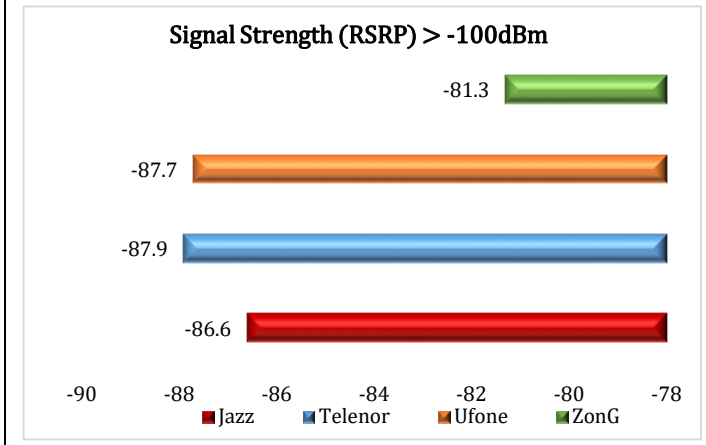
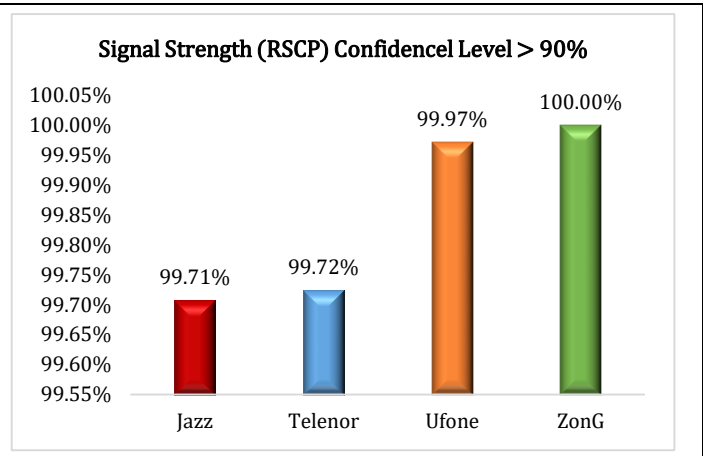
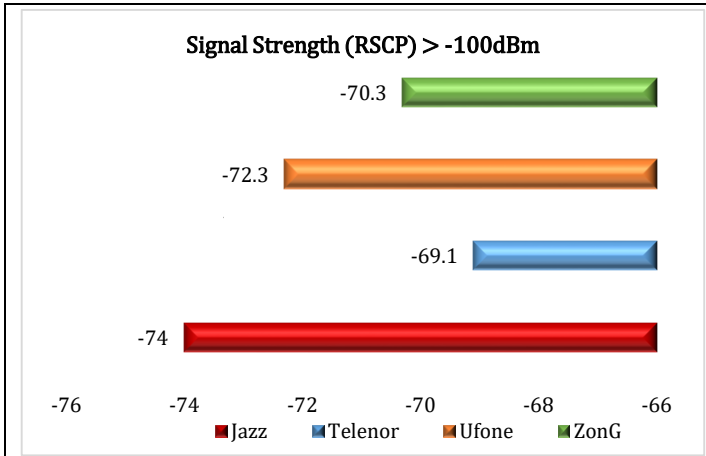
## ZONG 3G COVERAGE (RSCP) – TANDO MUHAMMAD KHAN



# QUALITY OF SERVICE SURVEY RESULTS – TANDO MUHAMMAD KHAN



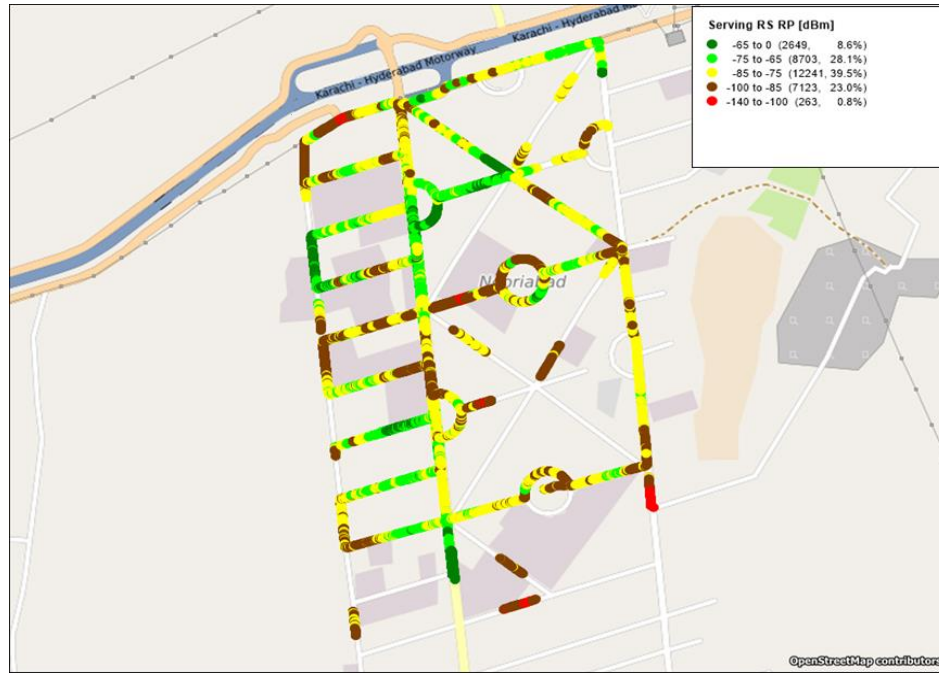
# QUALITY OF SERVICE SURVEY RESULTS – TANDO MUHAMMAD KHAN



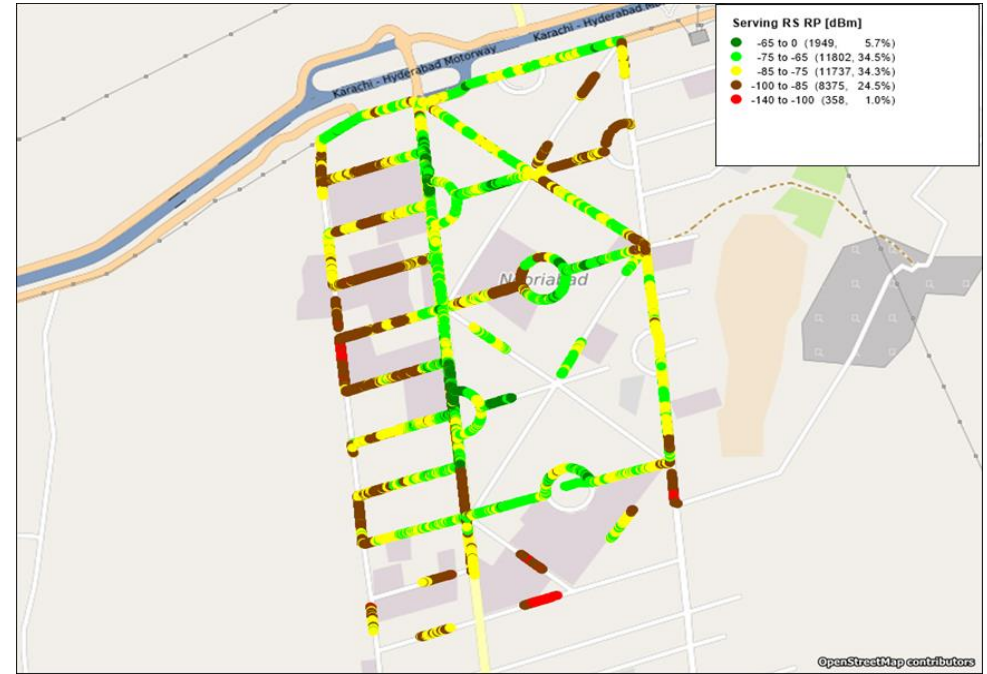


## 4G NETWORK COVERAGE / SIGNAL STRENGTH (RSRP)

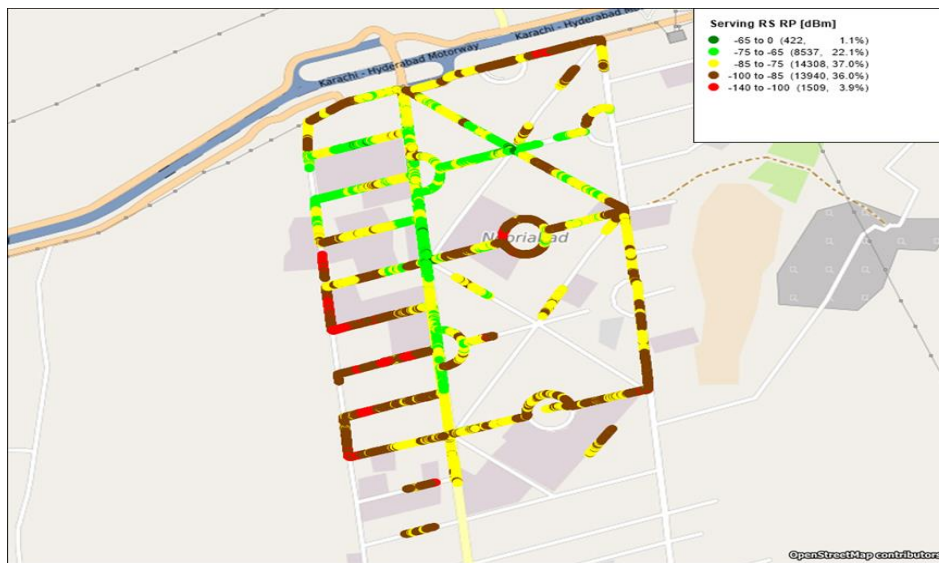
### JAZZ 4G COVERAGE (RSRP) – NOORIABAD



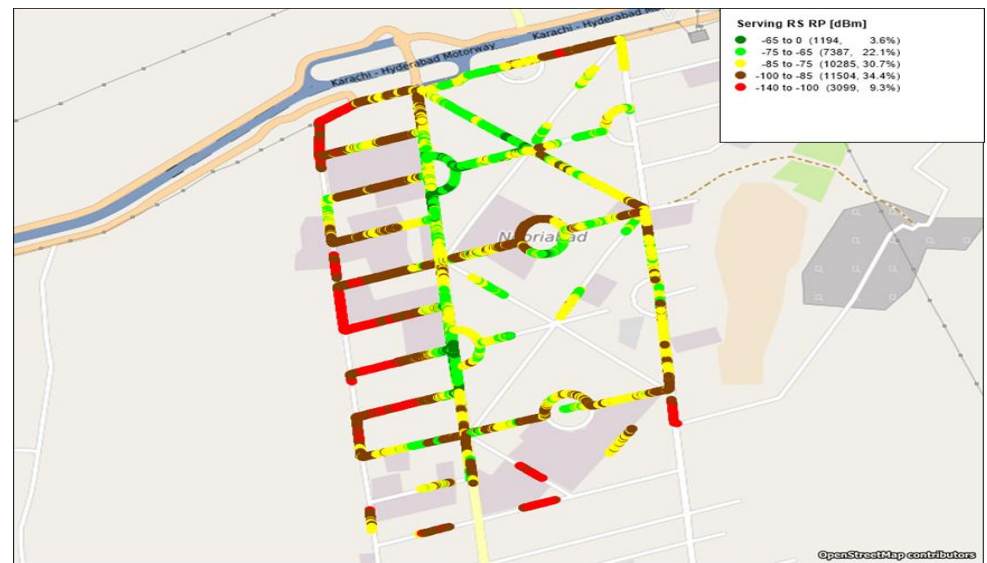
### TELEOR 4G COVERAGE (RSRP) – NOORIABAD



### UFONE 4G COVERAGE (RSRP) – NOORIABAD



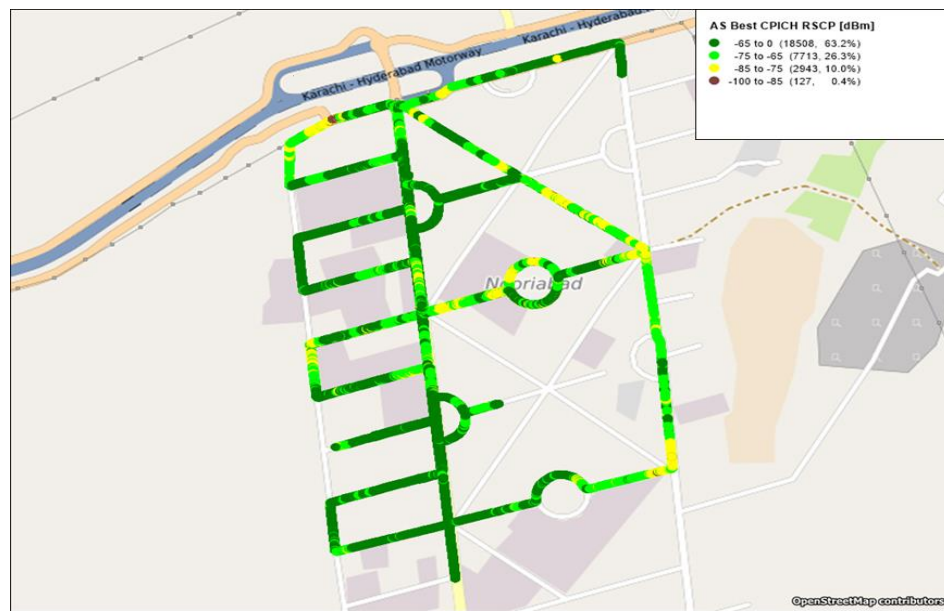
### ZONG 4G COVERAGE (RSRP) – NOORIABAD



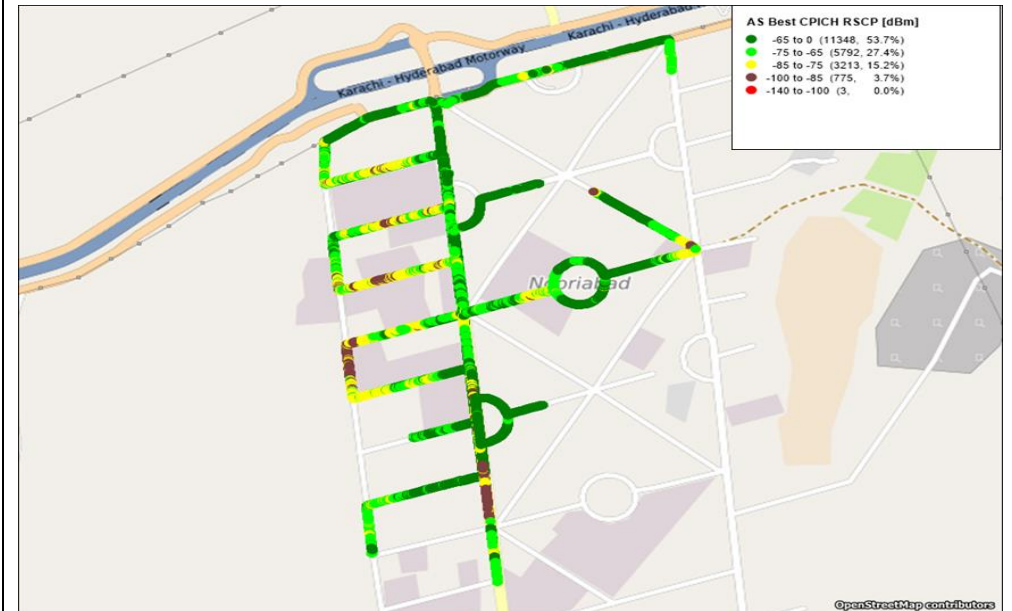


### 3G NETWORK COVERAGE / SIGNAL STRENGTH (RSCP)

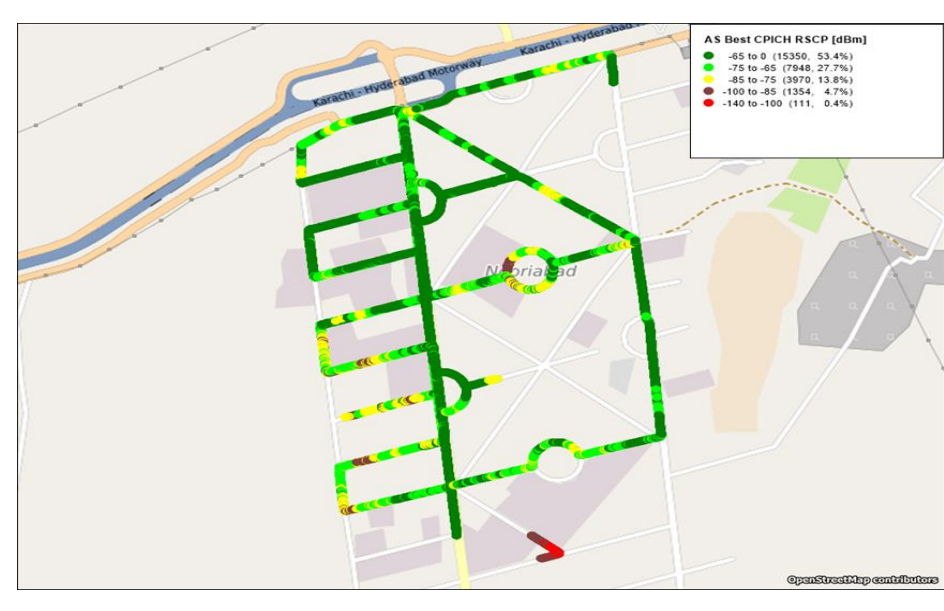
**JAZZ 3G COVERAGE (RSCP) – NOORIABAD**



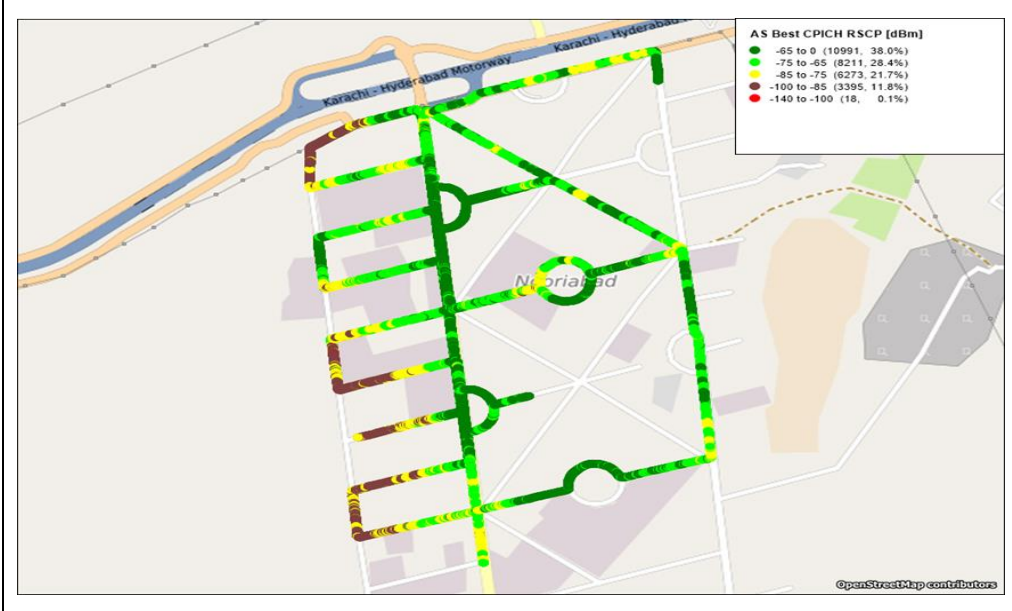
**TELENOR 3G COVERAGE (RSCP) – NOORIABAD**



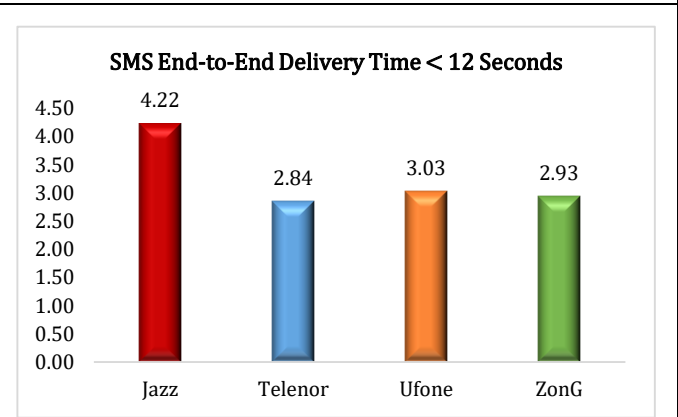
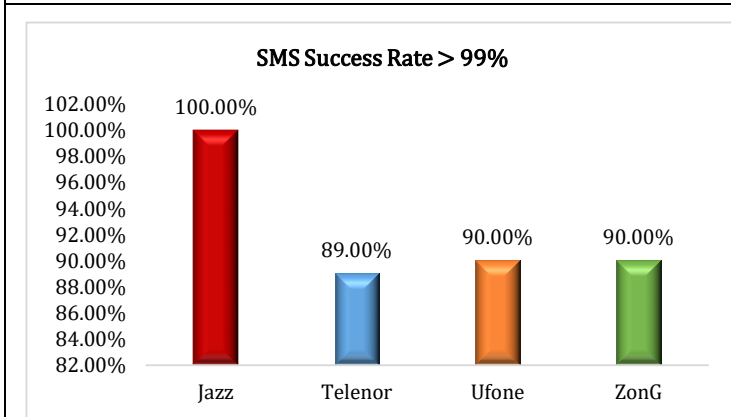
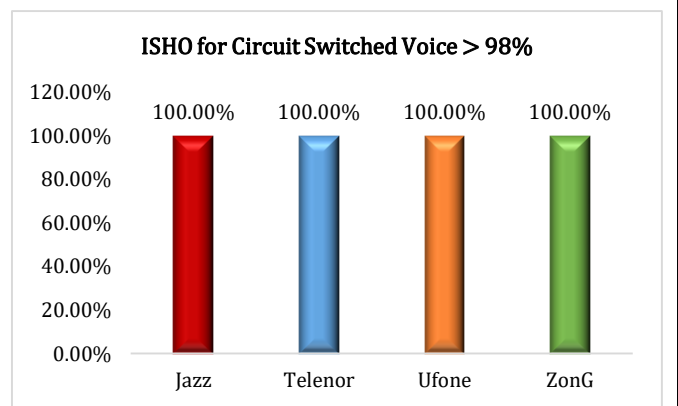
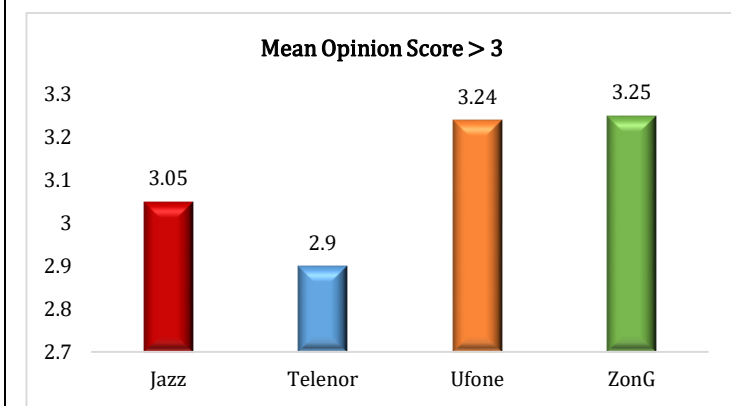
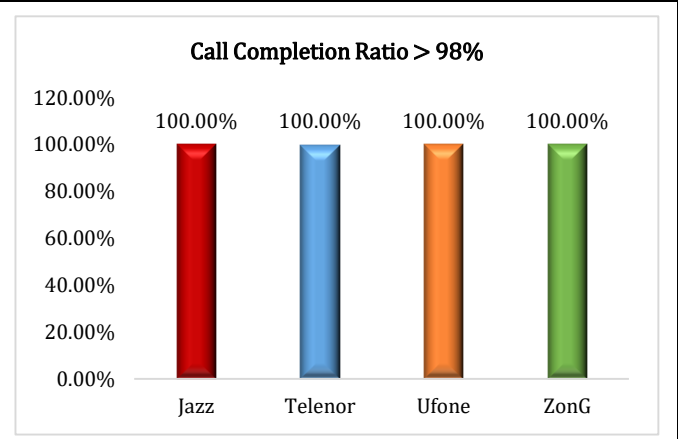
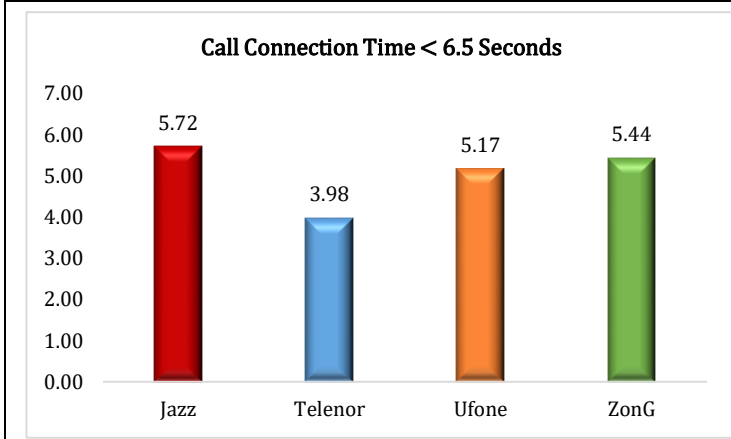
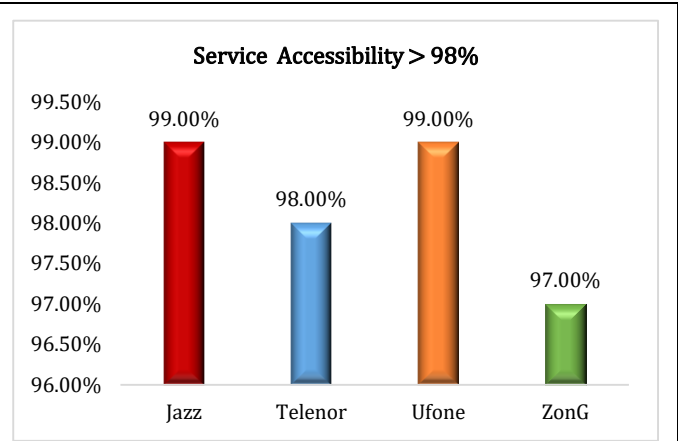
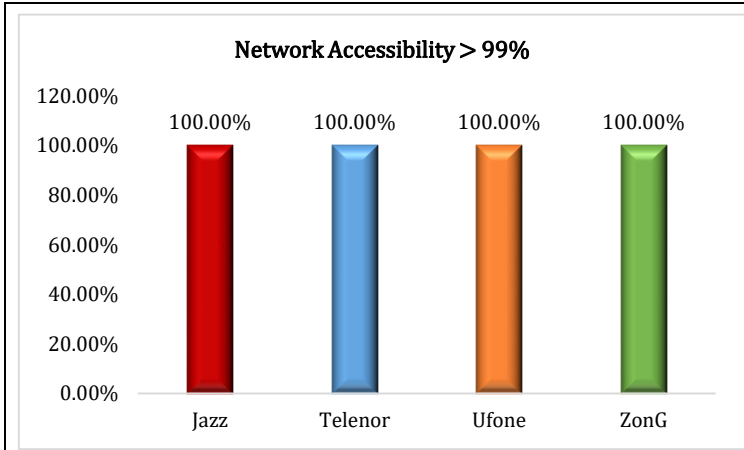
**UFONE 3G COVERAGE (RSCP) – NOORIABAD**



**ZONG 3G COVERAGE (RSCP) – NOORIABAD**

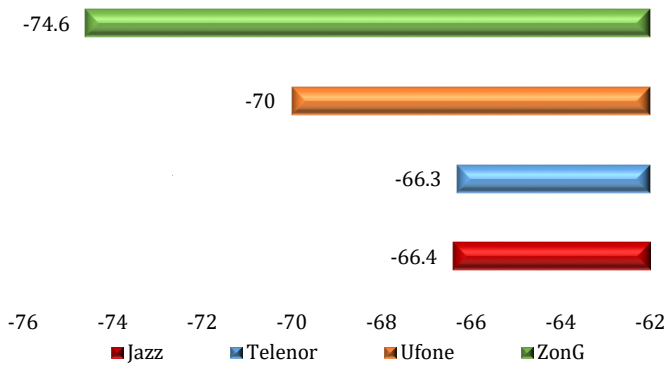


## QUALITY OF SERVICE SURVEY RESULTS – NOORIABAD

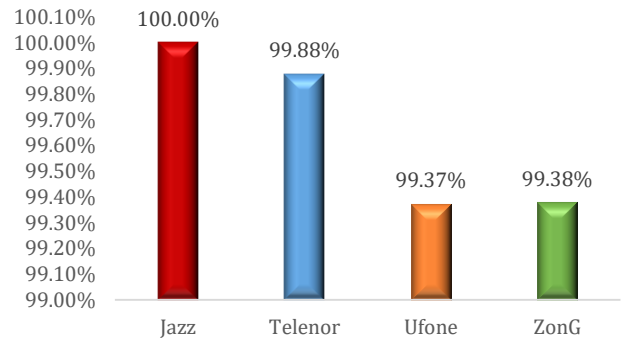


## QUALITY OF SERVICE SURVEY RESULTS – NOORIABAD

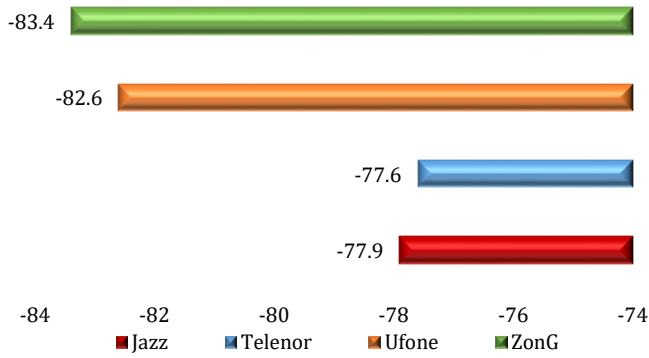
**Signal Strength (RSCP) > -100dBm**



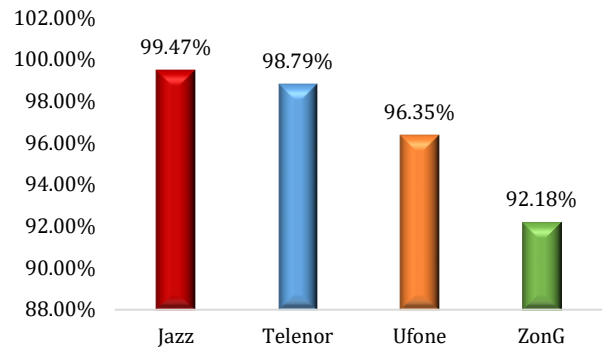
**Signal Strength (RSCP) Confidencel Level > 90%**



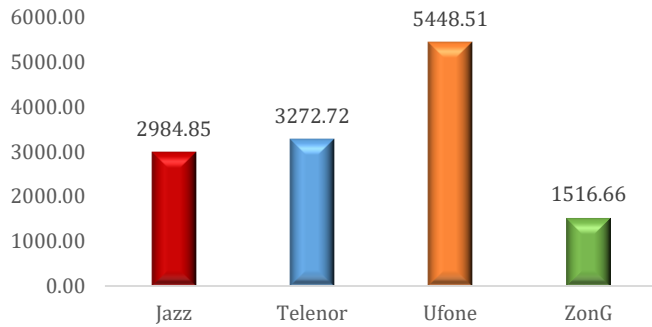
**Signal Strength (RSRP) > -100dBm**



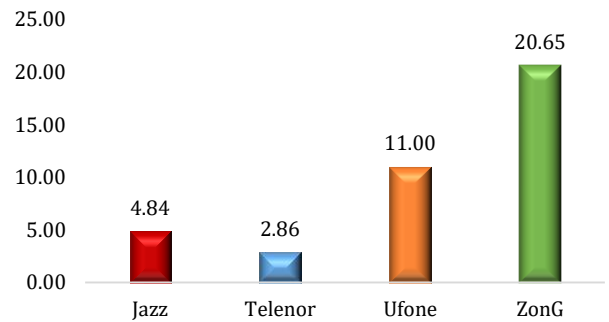
**Signal Strength (RSRP) Confidencel Level > 90%**



**User Data Throughput (3G) > 256Kbps**



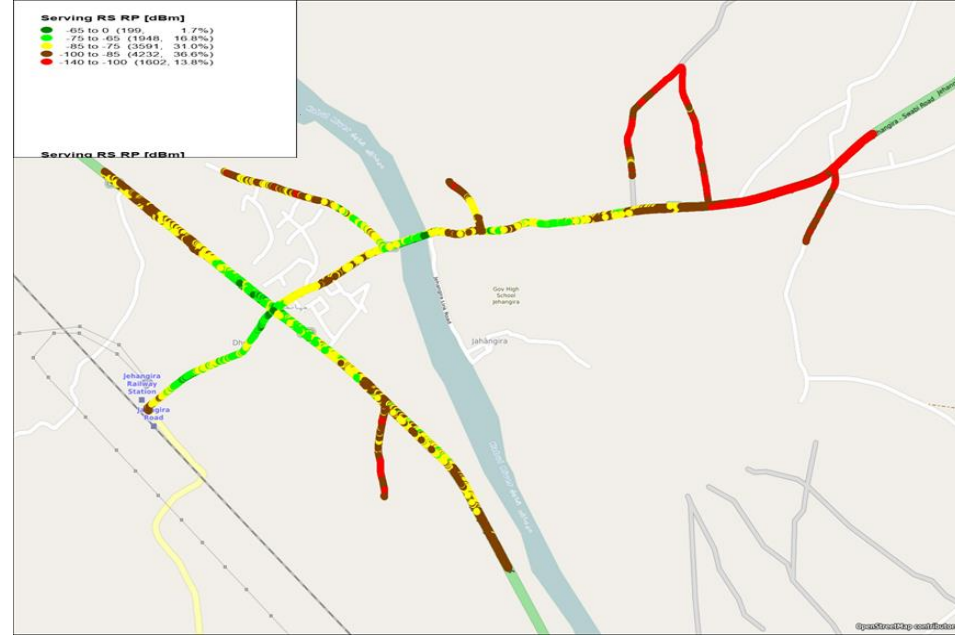
**User Data Throughput (4G) > 2Mbps**



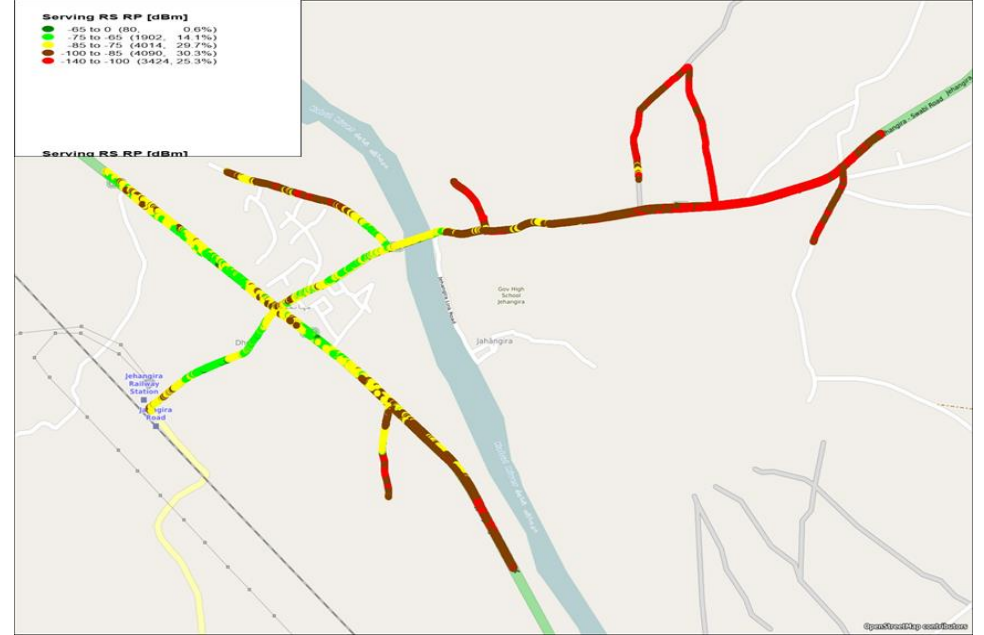
**KHYBER PAKHTUNKHWA**

# 4G NETWORK COVERAGE / SIGNAL STRENGTH (RSRP)

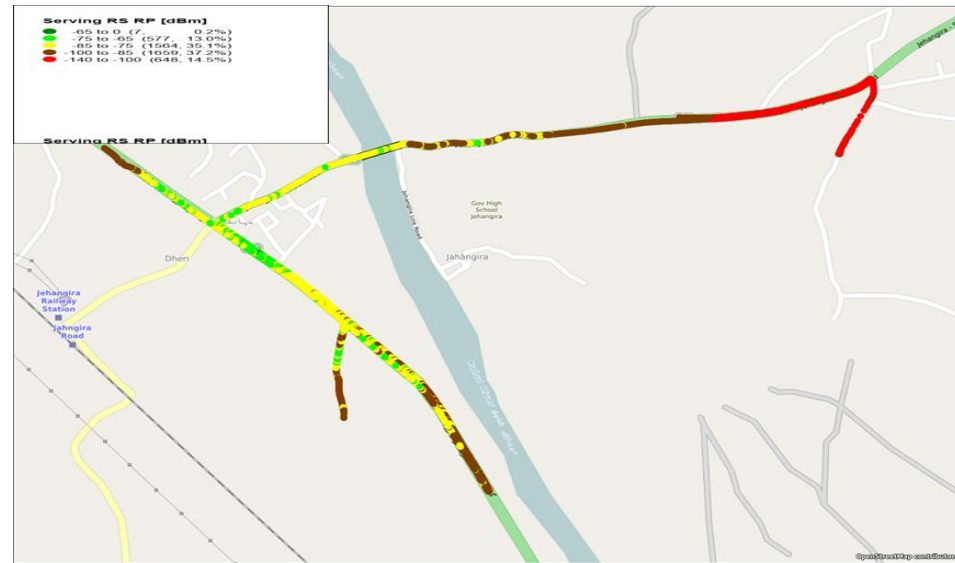
## JAZZ 4G COVERAGE (RSRP) - JAHANGIRA



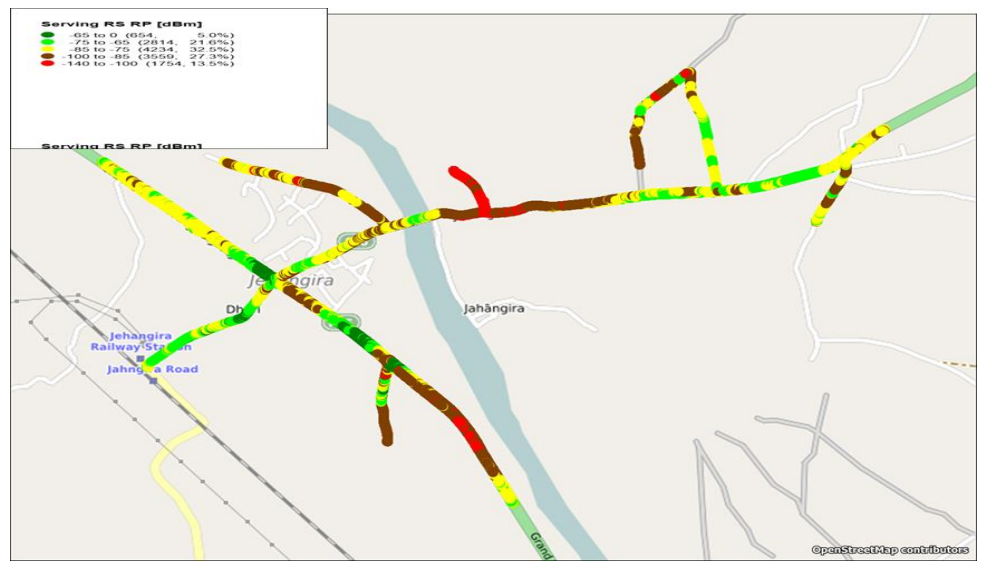
## TELENOR 4G COVERAGE (RSRP) - JAHANGIRA



## UFONE 4G COVERAGE (RSRP) - JAHANGIRA



## ZONG 4G COVERAGE (RSRP) - JAHANGIRA





# 3G NETWORK COVERAGE / SIGNAL STRENGTH (RSCP)

## JAZZ 3G COVERAGE (RSCP) – JAHANGIRA



## TELENOR 3G COVERAGE (RSCP) – JAHANGIRA



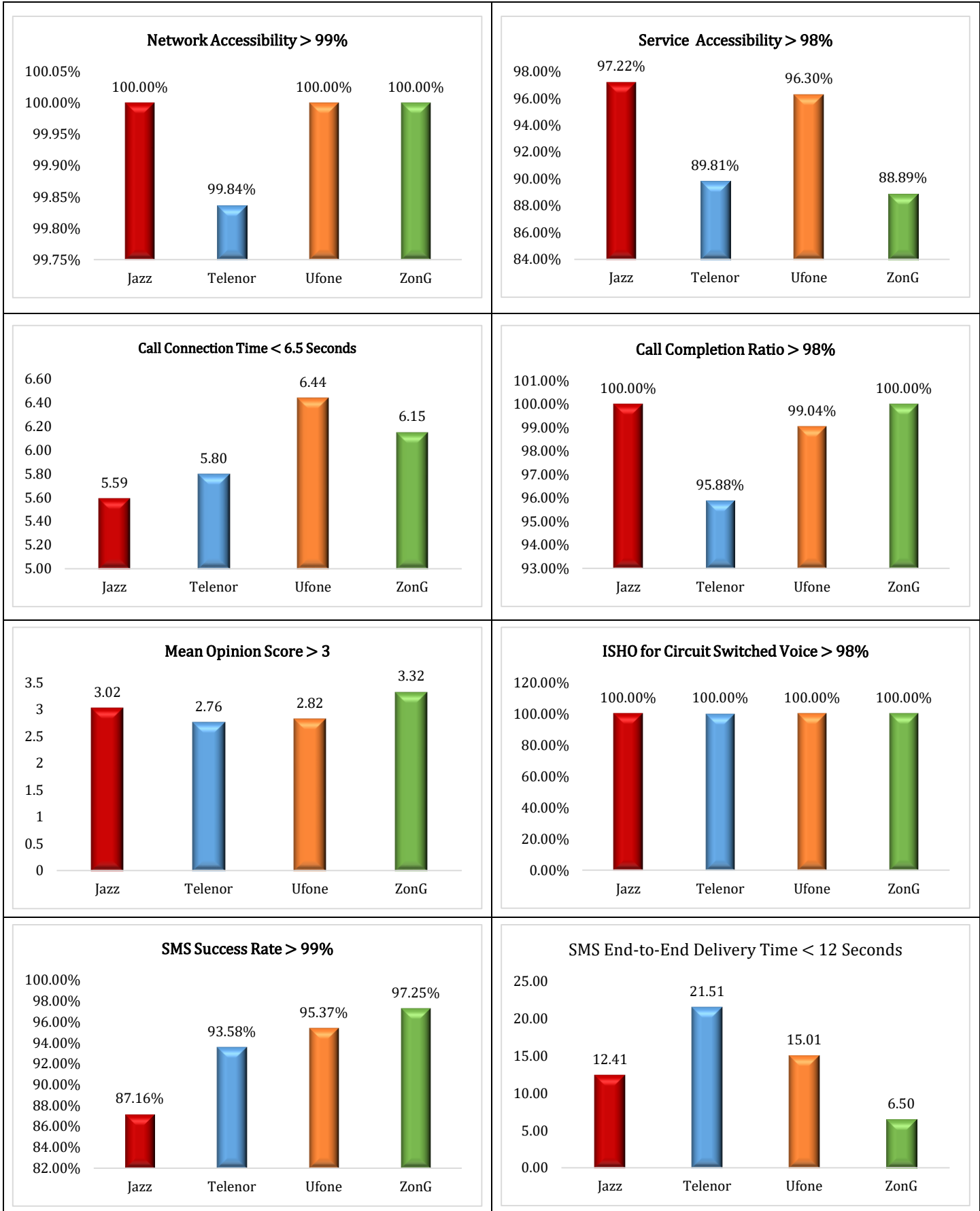
## UFONE 3G COVERAGE (RSCP) – JAHANGIRA



## ZONG 3G COVERAGE (RSCP) – JAHANGIRA



## QUALITY OF SERVICE SURVEY RESULTS – JAHANGIRA



# QUALITY OF SERVICE SURVEY RESULTS – JAHANGIRA

