

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

THIRD 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 on eight (08) Motorways / Highways / Inter Cities Roads of Punjab, Khyber Pakhtunkhwa (KPK) and Sindh. The name of roads along with survey dates are shown in **Table 1.1: QoS Survey Roads & Dates:**

S. #.	Province	Road	Survey Dates
1.	Punjab	Lahore to Jhang	26 th July 2021
2.		Lahore to Sialkot	2 nd August 2021
3.		Multan to Vehari	30 th August 2021
4.		Multan to Dera Ghazi Khan	5 th September 2021
5.	Khyber Pakhtunkhwa	Peshawar to Bannu	26 th July 2021
6.		Bannu to Dera Ismail Khan	2 nd August 2021
7.	Sindh	Karachi to Thatta	26 th July 2021
8.		Karachi to Tando Allah Yar	2 nd August 2021

Table 1.1: QOS Survey Roads & Dates

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 Motorway / Highway/Inter Cities Roads from one Toll Plaza to another Toll Plaza. During Voice Calls, SMS and Data Sessions, all the mobile handsets were kept in auto detect mode.

MOBILE NETWORK COVERAGE

3.1. **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 Confidence Level and Compliance of signal strength is shown in **Table 3.1: 4G Signal Strength -100dBm with 90% Confidence Level.**

4G SIGNAL STRENGTH ROADS – COMPLIANT (YES/NO)								
Road Name	OPERATORS				COMPLIANT (YES/NO)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Lahore to Jhang	96.86%	97.34%	83.60%	93.80%	Yes	Yes	No	Yes
Lahore to Sialkot	99.16%	99.14%	68.93%	98.40%	Yes	Yes	No	Yes
Multan to Vehari	90.64%	81.84%	48.71%	92.34%	Yes	No	No	Yes
Multan to Dera Ghazi Khan	93.13%	94.20%	87.76%	90.38%	Yes	Yes	No	Yes
Peshawar to Bannu	81.72%	82.15%	94.26%	84.05%	No	No	Yes	No
Bannu to Dera Ismail Khan	76.17%	91.59%	95.81%	87.56%	No	Yes	Yes	No
Karachi to Thatta	91.02%	86.71%	83.13%	96.72%	Yes	No	No	Yes
Karachi to Tando Allah Yar	90.69%	83.80%	88.84%	86.70%	Yes	No	No	No

Table 3.2: 4G Signal Strength -100dBm with 90% Confidence Level.

3.2. **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

Confidence Level and Compliance of signal strength is shown in **Table 3.2: 3G Signal Strength -100dBm with 90% Confidence Level.**

3G SIGNAL STRENGTH ROADS – COMPLIANT (YES/NO)								
Road Name	OPERATORS				COMPLIANT (YES/NO)			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Lahore to Jhang	100.00%	100.00%	97.69%	N/A	Yes	Yes	Yes	N/A
Lahore to Sialkot	N/A	100.00%	99.94%	N/A	N/A	Yes	Yes	N/A
Multan to Vehari	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Multan to Dera Ghazi Khan	100.00%	98.64%	93.29%	99.24%	Yes	Yes	Yes	Yes
Peshawar to Bannu	99.00%	52.00%	98.96%	97.90%	Yes	No	Yes	Yes
Bannu to Dera Ismail Khan	98.43%	100.00%	97.25%	N/A	Yes	Yes	Yes	N/A
Karachi to Thatta	N/A	N/A	94.12%	N/A	N/A	N/A	Yes	N/A
Karachi to Tando Allah Yar	N/A	100.00%	92.83%	100.00%	N/A	Yes	Yes	Yes

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

MOBILE BROADBAND SERVICE

4.1. A total of 24,772 http download test attempts made, out of which 19,296 were successful attempts and rest of the 5,476 were failed. The company wise detail is mentioned in **Table4.1: Data Tests Statistics.**

Description	Jazz	Telenor	Ufone	ZonG
TOTAL DATA TEST ATTEMPTS	3286	15364	2439	1034
SUCCESSFUL DATA TEST ATTEMPTS	685	652	654	640
FAILED DATA TEST ATTEMPTS	2601	14712	1785	394
TEST ATTEMPTS SUCCESS RATIO	20.85%	4.24%	26.81%	61.9%

Table4.1: Data Tests Statistics

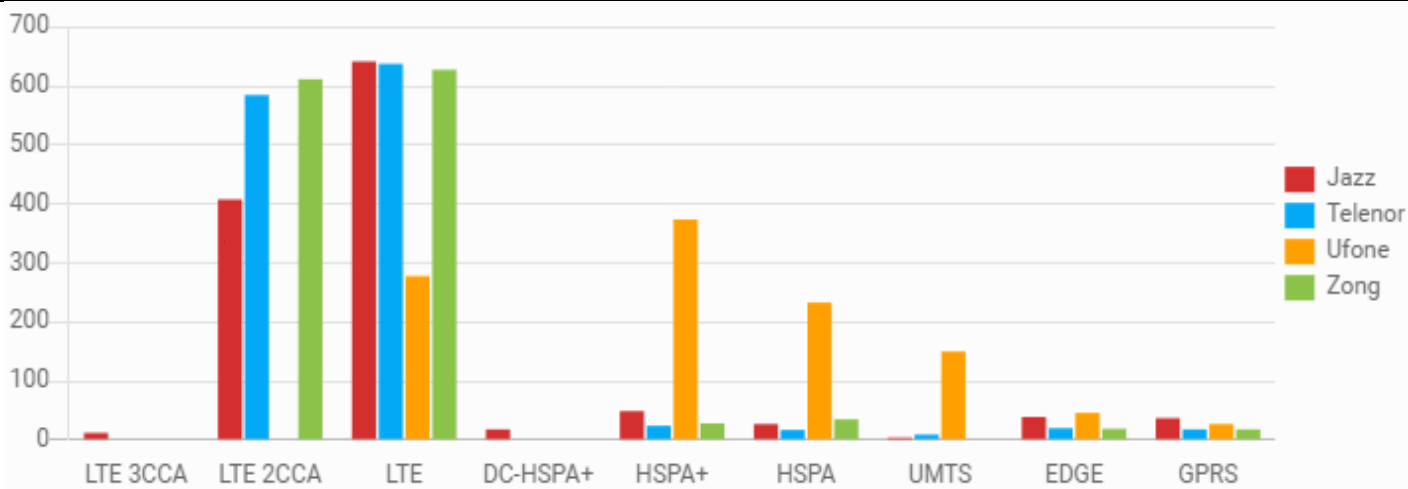
4.2. **4G USER DATA THROUGHPUT.** As per Next Generation Mobile Service (NGMS) licenses awarded, licensees are required to meet **the threshold of minimum of 2Mbps of 4G User Data Throughput.** The results of Data Service QoS KPI i.e. User Data Throughput is shown in **Table4.2: 4G User Data Throughput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

4G DATA THROUGHPUT ROADS								
Road Name	Operators				Highest Throughput			
	Jazz	Telenor	Ufone	ZonG	Jazz	Telenor	Ufone	ZonG
Lahore to Jhang	8.03	1.46	2.03	8.87	Second	Fourth	Third	First
Lahore to Sialkot	3.21	1.94	1.98	6.52	Second	Fourth	Third	First
Multan to Vehari	2.97	5.55	1.41	14.88	Third	Second	Fourth	First
Multan to Dera Ghazi Khan	9.18	2.47	1.52	11.10	Second	Third	Fourth	First
Peshawar to Bannu	6.95	1.81	2.31	10.10	Second	Fourth	Third	First
Bannu to Dera Ismail Khan	9.53	2.43	2.56	14.69	Second	Fourth	Third	First
Karachi to Thatta	9.95	3.34	3.52	7.82	First	Fourth	Third	Second
Karachi to Tando Allah Yar	8.43	3.94	3.95	14.71	Second	Fourth	Third	First

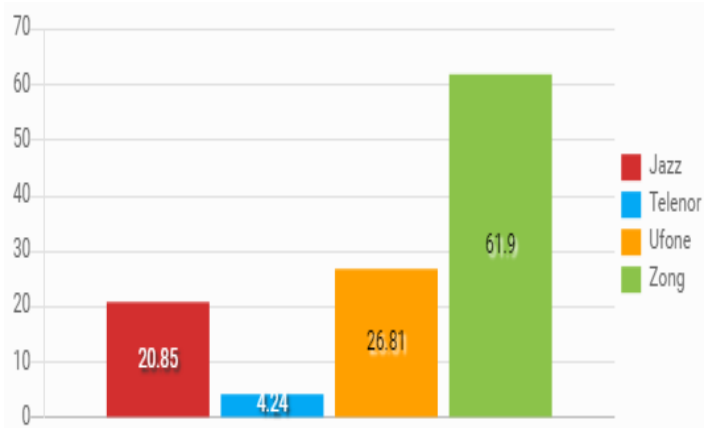
Table4.2: 4G User Data Throughput \geq 2 Mbps

4.3. 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 have been recorded. The details can be seen in attached graphs.

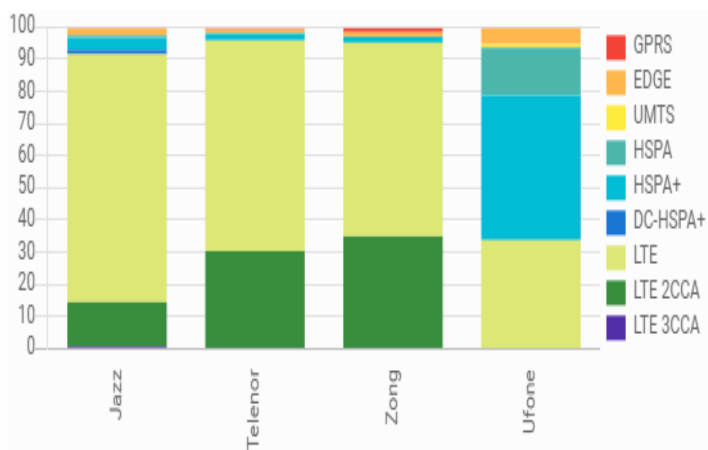
HTTP TRANSFER DOWNLOAD SUCCESS BY TECHNOLOGY



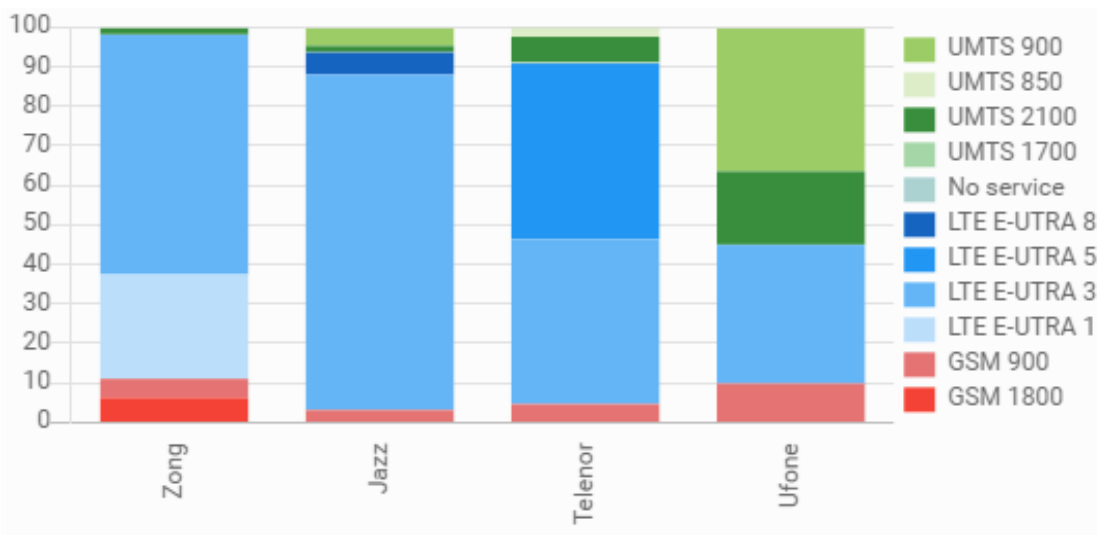
HTTP TRANSFER SUCCESS RATE



DATA SESSION DURATION BY DATA TECHNOLOGY



DATA SESSION BY TECHNOLOGY / BAND



VOICE SERVICE

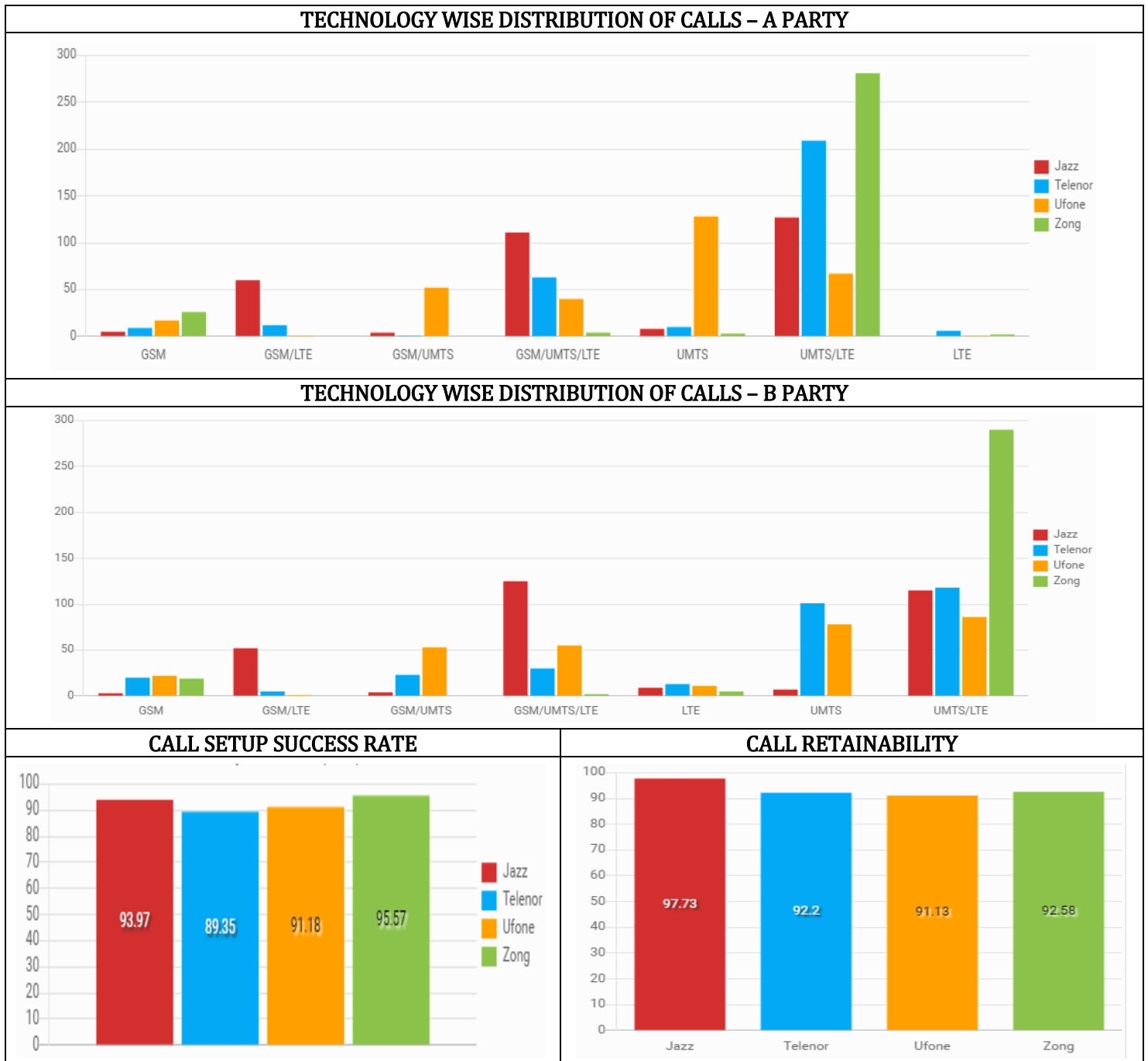
5.1. A total of 1247 Calls attempts made and out of which 83 attempts failed. In 1164 successfully established calls, 41 calls dropped prior to completion of two minutes duration, whereas 1113 calls

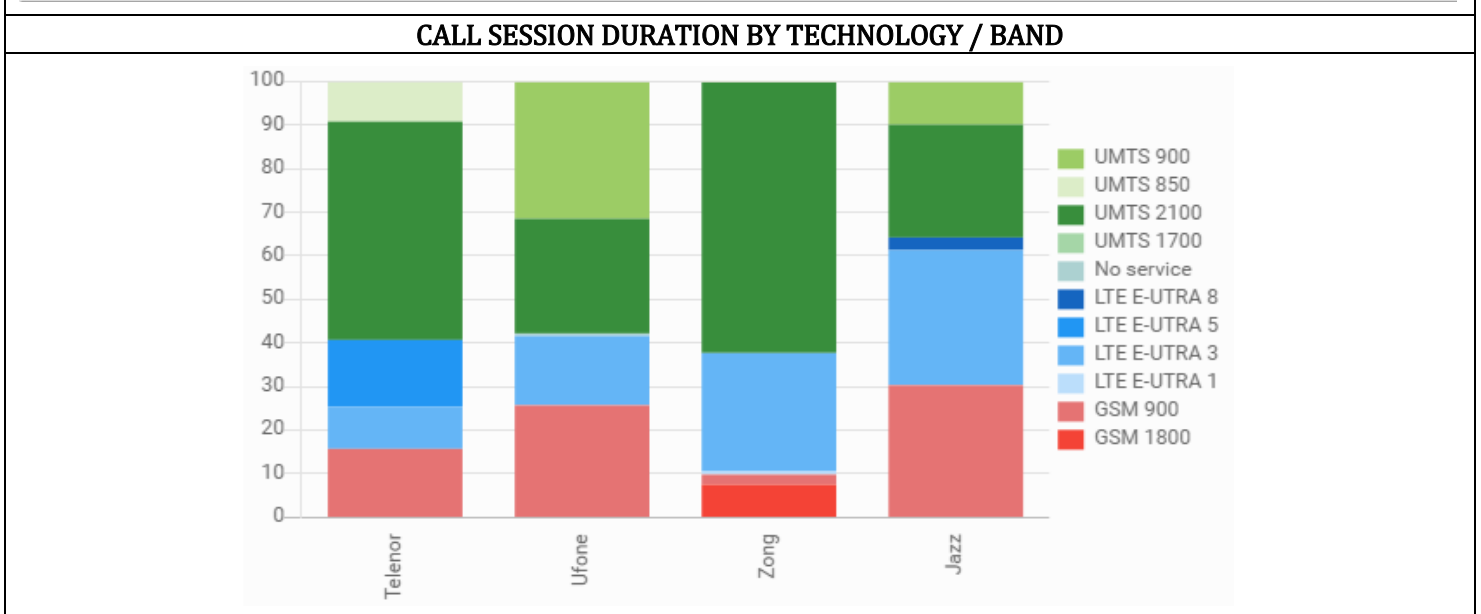
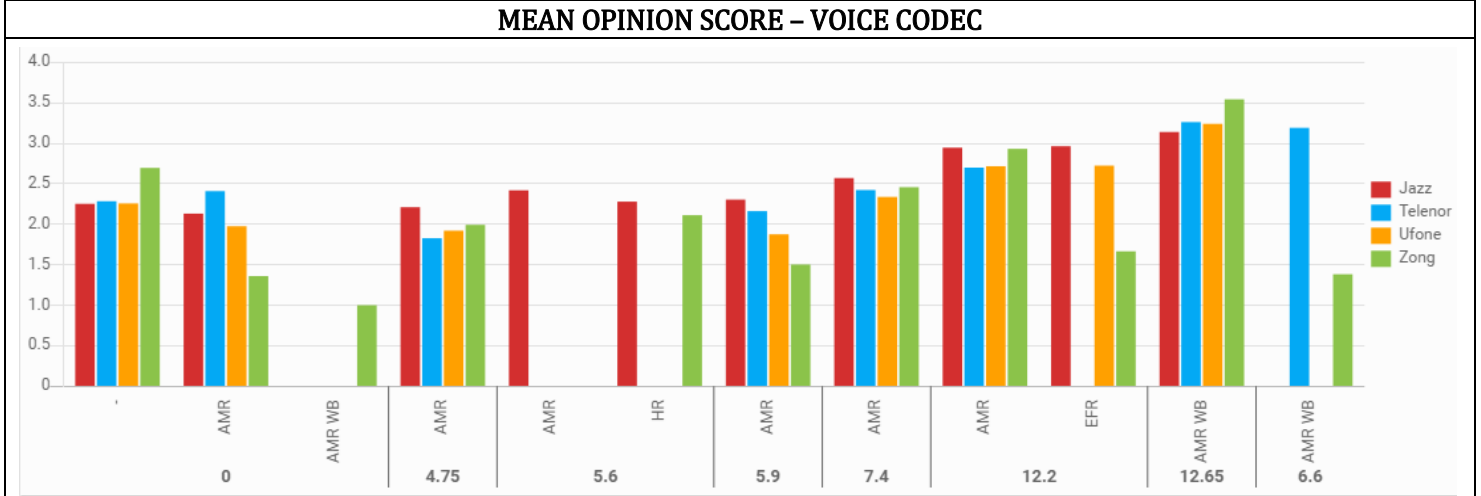
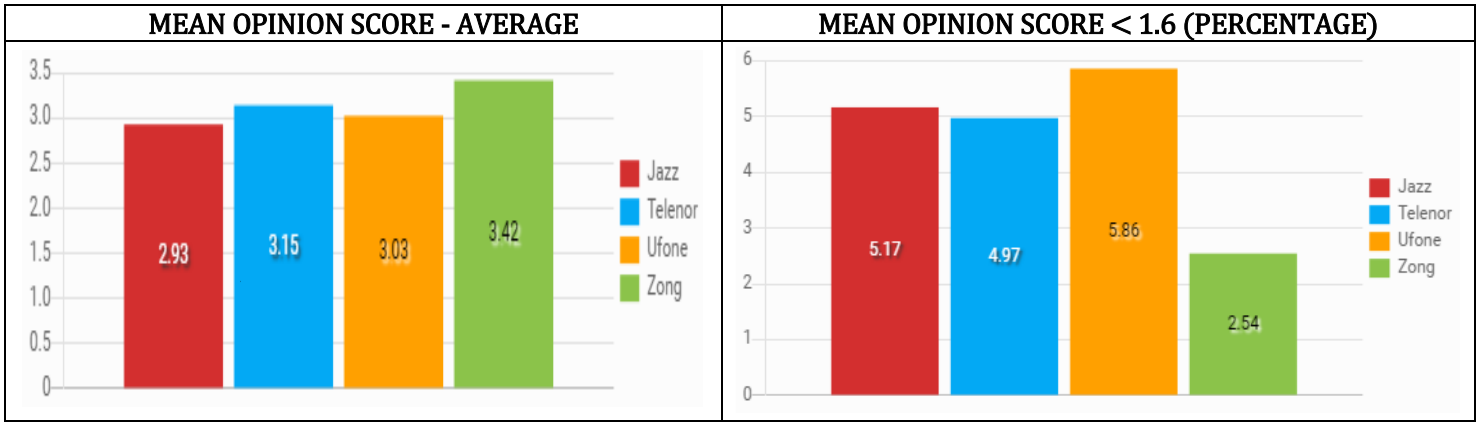
remained connected for the complete duration of two minutes. The company wise call statistics is shown in **Table5.1: Call Statistics**.

DESCRIPTION	JAZZ	TELENOR	UFONE	ZONG
<i>TOTAL CALLS</i>	315	310	306	316
<i>FAILED CALLS</i>	19	23	27	14
<i>ESTABLISHED CALLS</i>	296	287	279	302
<i>DROPPED CALLS</i>	6	12	14	9
<i>COMPLETED CALLS</i>	290	275	265	293

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:





5.3. 7 x QoS KPIs have been measured while testing voice services on 8 x roads of Pakistan. The compliance level of threshold values of voice QoS KPIs in each city is shown in **Table 5.2: Voice QoS KPIs Compliance Level**.

VOICE CALLS ROADS – COMPLINACE (YES/NO)									
Operator	*Voice KPIs	Lahore to Jhang	Lahore to Sialkot	Multan to Vehari	Multan to DG Khan	Peshawar to Bannu	Bannu to DI Khan	Karachi to Thatta	Karachi to Tando Allah Yar
Jazz	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	No	No	Yes	No	No	No	No	No
	CCT	Yes	No	Yes	No	No	No	Yes	No
	CCR	No	No	Yes	Yes	No	No	Yes	Yes
	MOS	Yes	No	Yes	Yes	Yes	Yes	No	Yes
	ISHO	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Telenor	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	No	No	Yes	No	No	No	No	No
	CCT	No	No	Yes	No	No	No	No	No
	CCR	No	Yes	Yes	Yes	No	No	Yes	Yes
	MOS	No	No	Yes	Yes	Yes	Yes	Yes	Yes
	ISHO	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ufone	NA	Yes	Yes	Yes	Yes	No	No	Yes	Yes
	SA	No	No	Yes	No	No	No		No
	CCT	Yes	No	Yes	Yes	No	Yes	Yes	Yes
	CCR	Yes	No	Yes	No	No	No	Yes	No
	MOS	Yes	No	Yes	No	No	Yes	Yes	Yes
	ISHO	No	No	Yes	Yes	No	Yes	Yes	Yes
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ZonG	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	SA	No	No	Yes	No	No	No	Yes	No
	CCT	Yes	No	Yes	No	No	Yes	Yes	Yes
	CCR	Yes	No	Yes	Yes	No	No	Yes	Yes
	MOS	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
	RSSR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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

Table 5.2: Voice QoS KPIs Compliance Level

SMS SERVICE

6.1. A total of 1230 SMS sending attempt conducted, out of which 1164 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>	311	305	301	313
<i>SMS SUCCESSFULLY RECEIVED</i>	300	280	281	303
<i>SMS RECEIVE SUCCESS RATE</i>	96.46%	91.80%	93.35%	96.85%

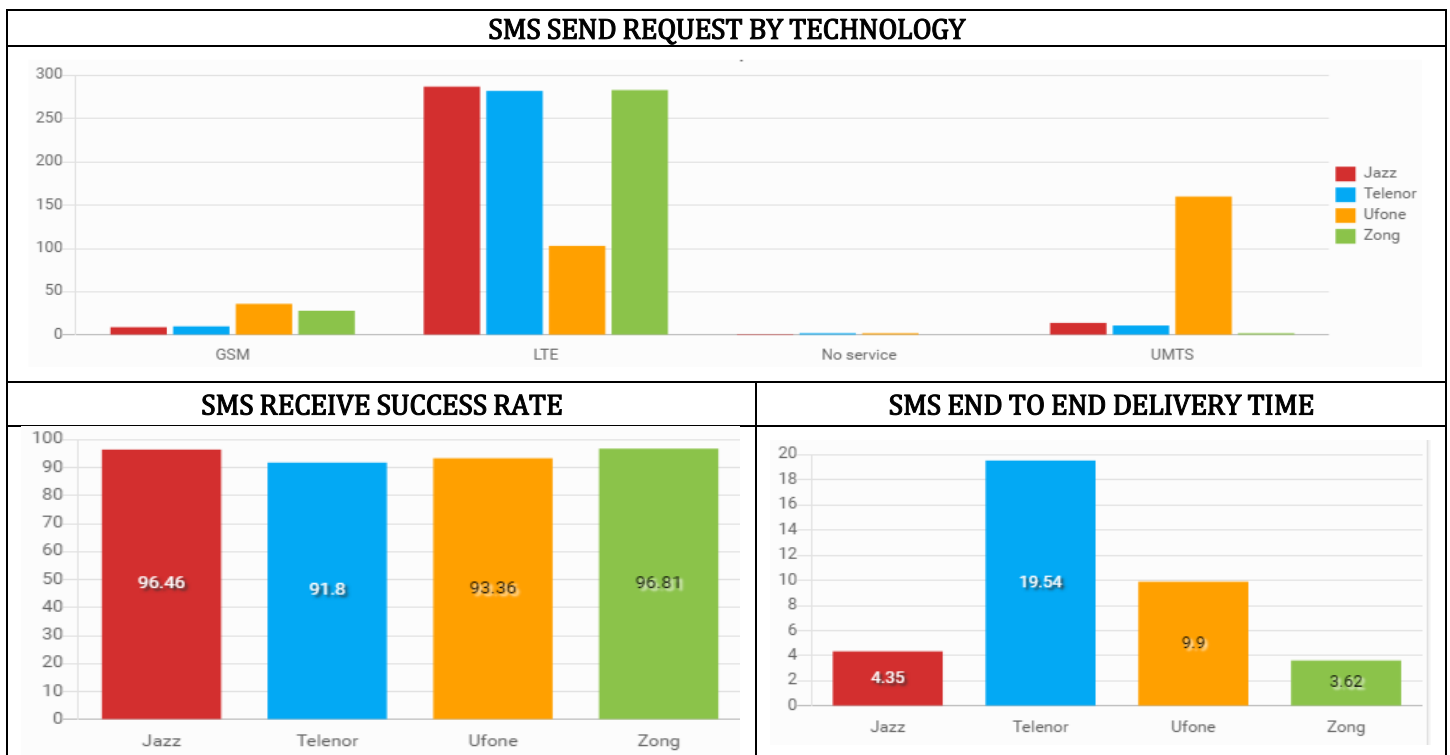
6.2. 2 x QoS KPIs i.e. “SMS Success Rate” and “SMS End to End Delivery Time” have been measured. The compliance level of threshold values of SMS QoS KPIs on each road is shown in **Table 6.2: SMS QoS KPIs Compliance Level**.

SMS SERVICE ROADS – COMPLIANT (YES/NO)									
Operator		Jazz		Telenor		Ufone		ZonG	
SMS KPI		SR	DT	SR	DT	SR	DT	SR	DT
Roads	Lahore to Sialkot	No	Yes	No	No	Yes	Yes	Yes	Yes
	Lahore to Jhang	Yes	Yes	No	Yes	Yes	Yes	No	Yes
	Multan to Vehari	Yes	Yes	No	No	Yes	Yes	No	Yes
	Multan to Dera Ghazi Khan	No	Yes	No	No	No	Yes	No	Yes
	Peshawar to Bannu	No	Yes	No	No	No	Yes	Yes	Yes
	Bannu to Dera Ismail Khan	Yes	Yes	No	Yes	No	No	Yes	Yes
	Karachi to Thatta	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
	Karachi to Tando Allah Yar	No	Yes	No	Yes	Yes	Yes	No	Yes

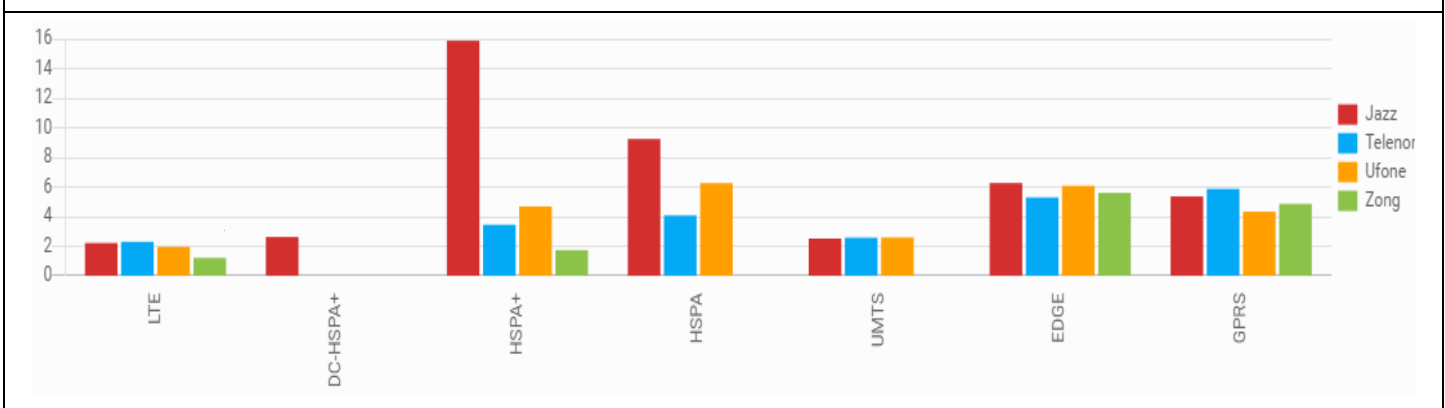
* Note SMS QoS KPIs : SMS Success Rate (SR) ≥ 99% & SMS End to End Delivery Time (DT) ≤ 12 Seconds

Table 6.2: SMS QoS KPIs Compliance Level

6.3. The SMS Send Request by Technology, Success Rate and End to End Delivery Time and Send Duration is shown as under:



AVERAGE SEND MESSAGING DURATION BY TECHNOLOGY



SURVEY MAPS & GRAPHICAL RESULTS

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

STANDING IN SURVEY

8.1. CMOs have been prioritized/ placed at 1st, 2nd, 3rd & 4th position in each category i.e. Mobile Network Coverage, Mobile Broadband Service, Voice Service and SMS Service, based upon the compliance level against each QoS KPI in each category on surveyed roads.

- a. **MOBILE NETWORK COVERAGE.** The categorization of CMOs as per QoS KPI i.e. Signal Strength of 4G/LTE and 3G Networks on 8 x Surveyed Roads is shown in **Table 8.1: CMOs Standing in Mobile Network Coverage.**

S. #	Operator	Compliance Level – Number of Cities		Standing
		Compliant	Non-Compliant	
1.	Jazz	10	2	1 st
2.	ZonG	8	3	2 nd
3.	Telenor	9	5	3 rd
4.	Ufone	9	6	4 th

Table 8.1: CMOs Standing in Mobile Network Coverage

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

S. #	Operator	Highest Throughput – No. of Roads				Standing
		1 st	2 nd	3 rd	4 th	
1.	ZonG	7	1	-	-	1 st
2.	Jazz	1	6	1	-	2 nd
3.	Telenor	-	1	1	6	3 rd
4.	Ufone	-	-	6	2	4 th

Table 8.2: CMOs Standing in Mobile Broadband Service

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

<i>S. #.</i>	Operator	Voice QoS KPIs		Standing
		Compliant	Non-Compliant	
1.	ZonG	35	13	1 st
2.	Jazz	37	19	2 nd
3.	Telenor	36	20	3 rd
4.	Ufone	35	21	4 th

Table 8.3: CMOs Standing in Voice Service

- d. **SMS SERVICE.** The categorization of each CMOs, as per the maximum compliance of 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	12	4	1 st
2.	Ufone	12	4	2 nd
3.	ZonG	11	5	3 rd
4.	Telenor	5	11	4 th

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

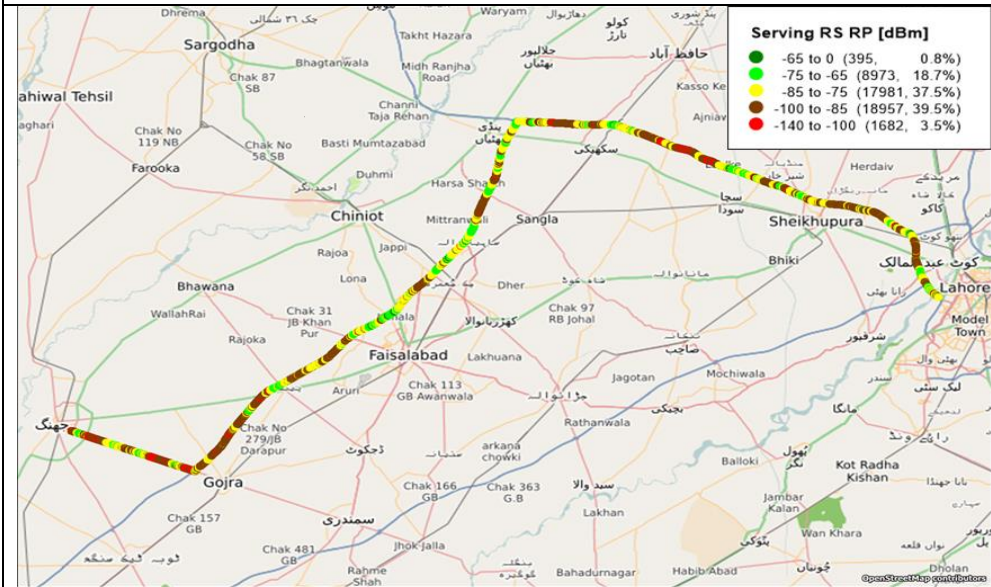
Table 8.5: CMOs Overall Standing in QoS Survey

ANNEX – A

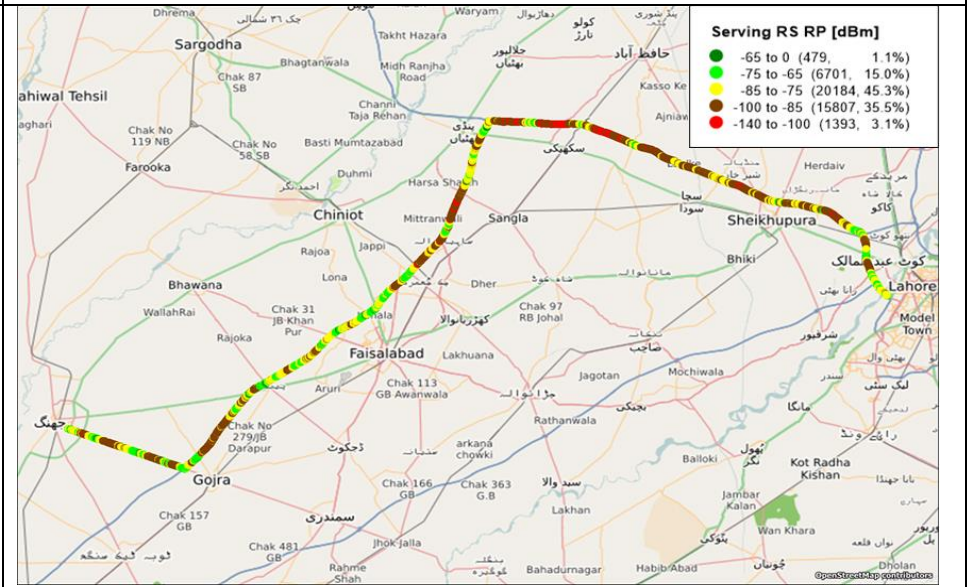
PUNJAB

4G MOBILE COVERAGE ON MOTORWAYS / HIGHWAYS / ROADS – SIGNAL STRENGTH (RSRP)

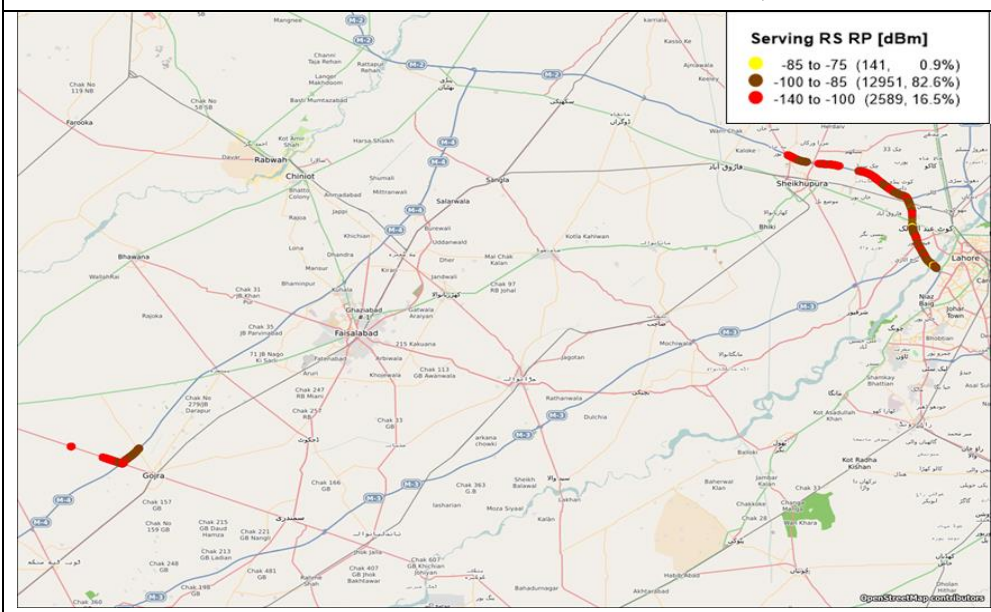
JAZZ 4G NETWORK COVERAGE – LAHORE TO JHANG



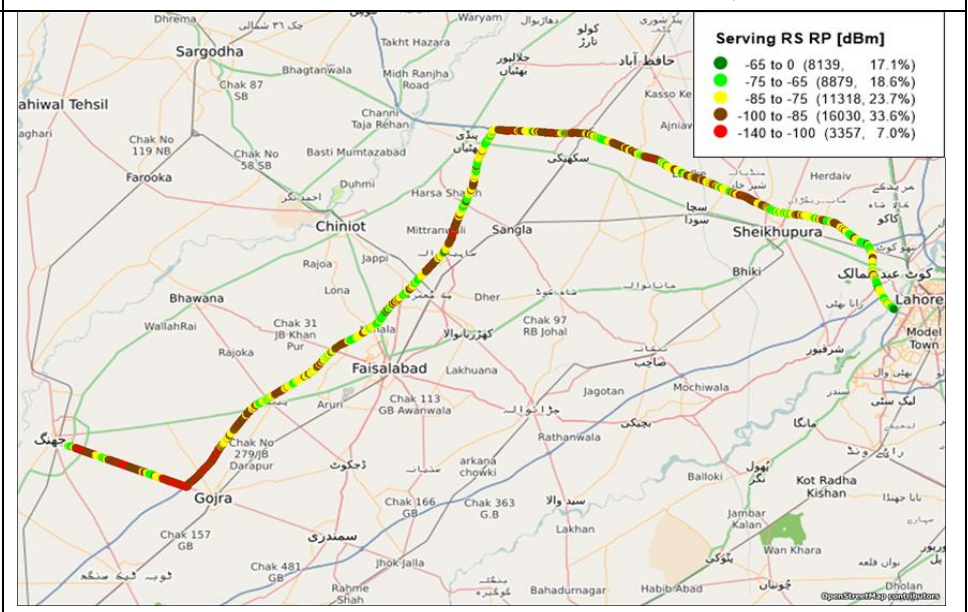
TELENOR 4G NETWORK COVERAGE – LAHORE TO JHANG



UFONE 4G NETWORK COVERAGE – LAHORE TO JHANG

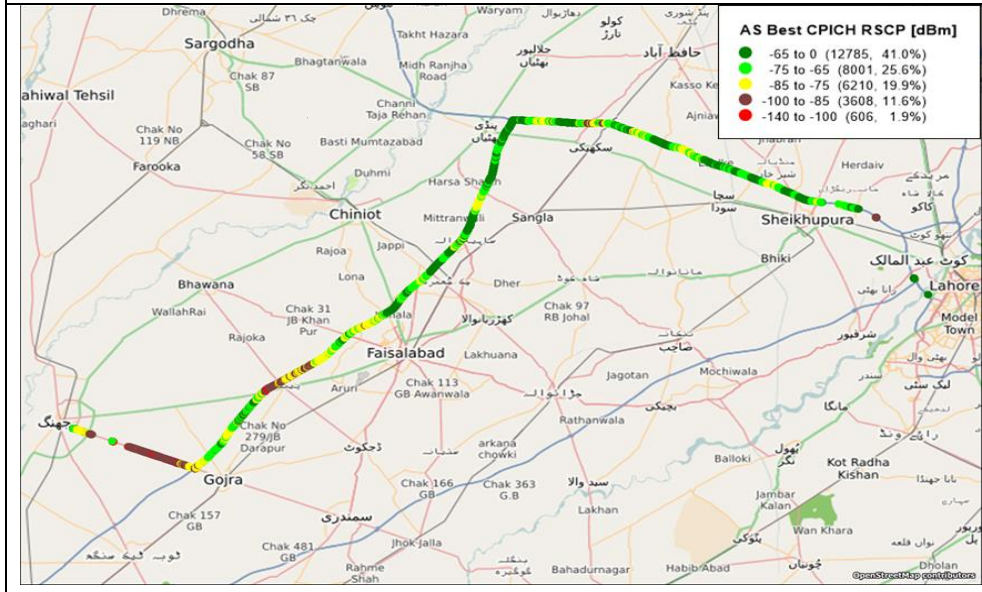


ZONG 4G NETWORK COVERAGE – LAHORE TO JHANG

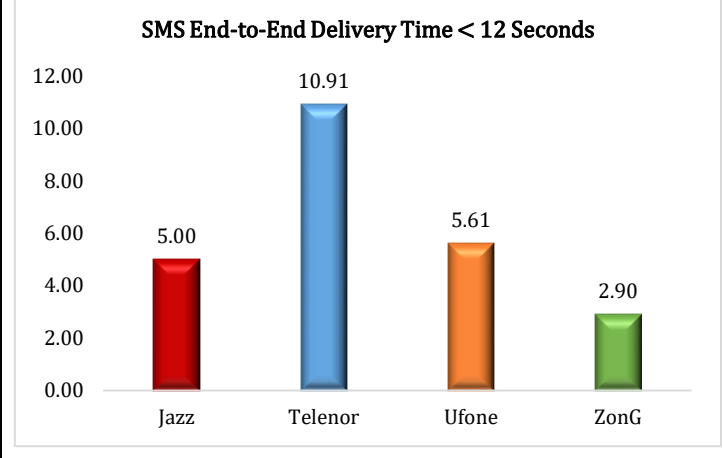
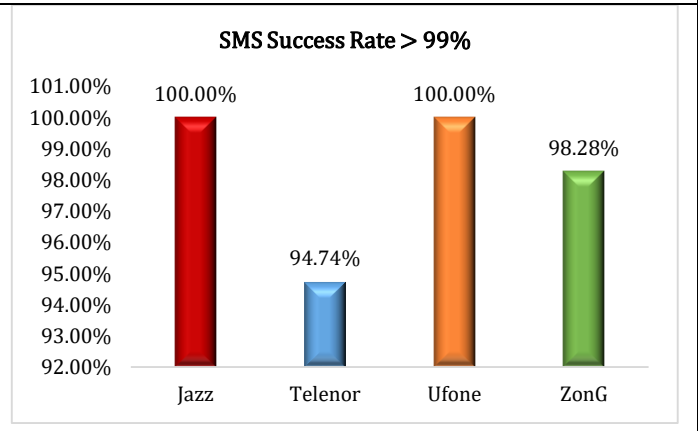
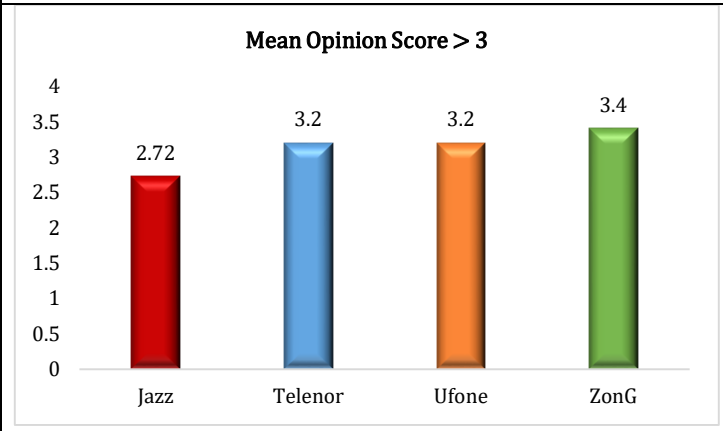
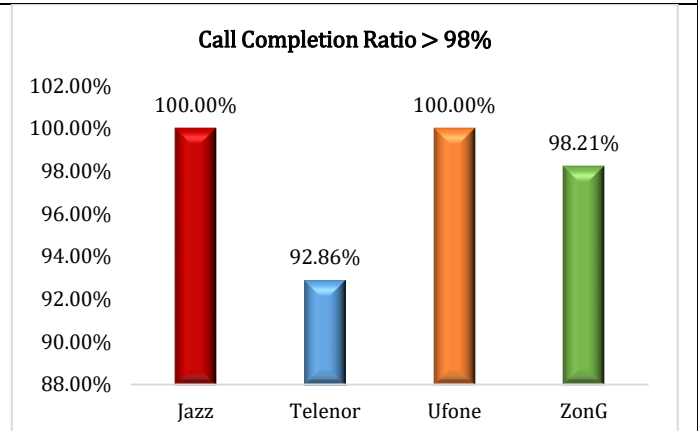
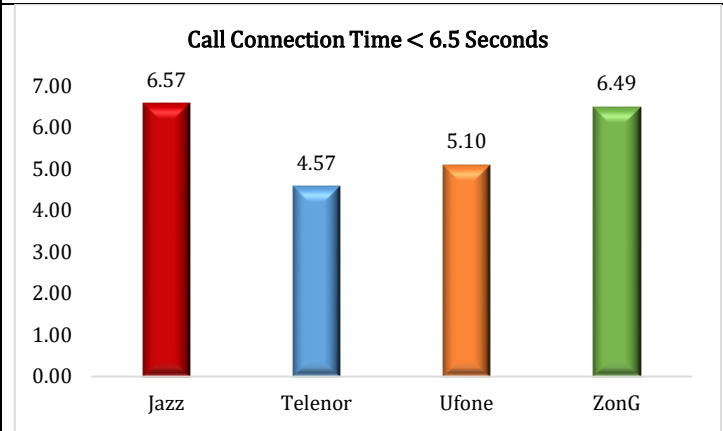
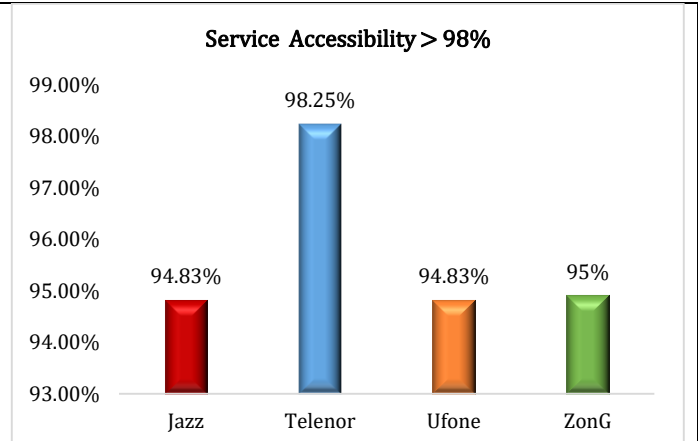
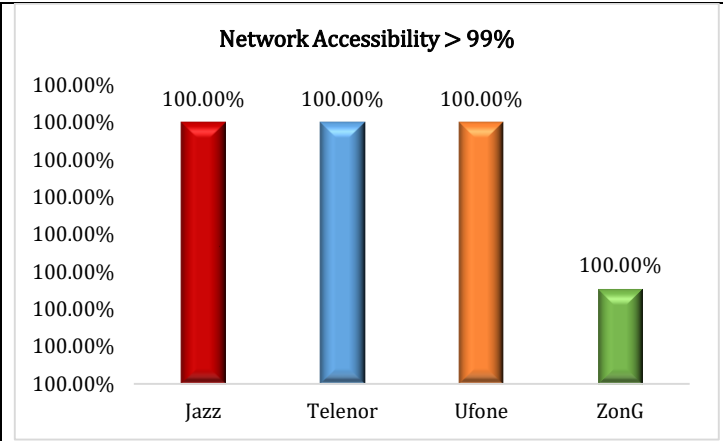


3G MOBILE COVERAGE ON MOTORWAYS / HIGHWAYS / ROADS – SIGNAL STRENGTH (RSCP)

UFONE 3G NETWORK COVERAGE – LAHORE TO JHANG

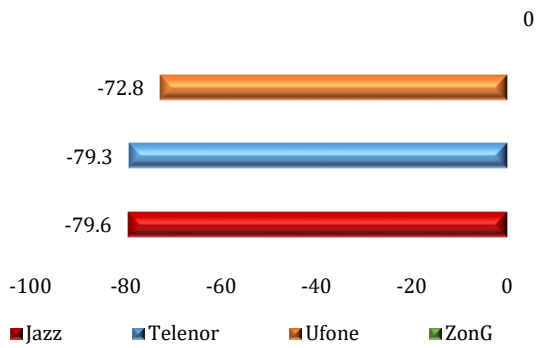


QUALITY OF SERVICE SURVEY RESULTS – LAHORE TO JHANG

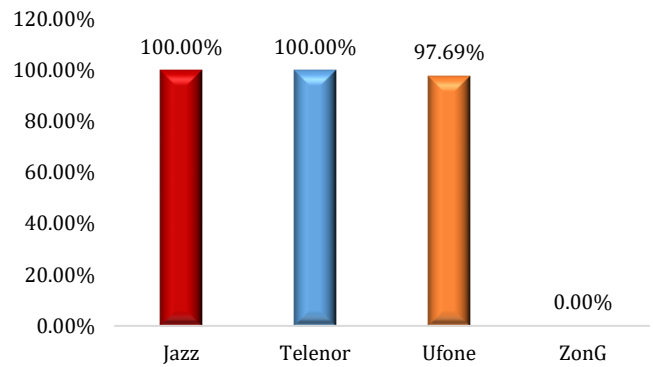


QUALITY OF SERVICE SURVEY RESULTS – LAHORE TO JHANG

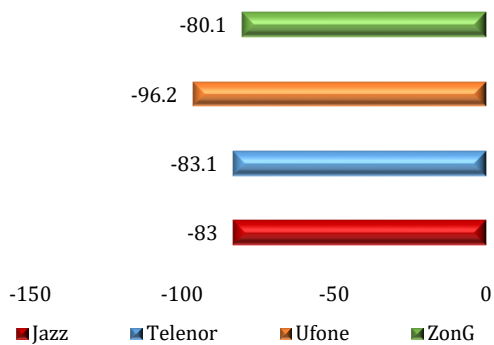
3G Signal Strength (RSCP) > -100dBm



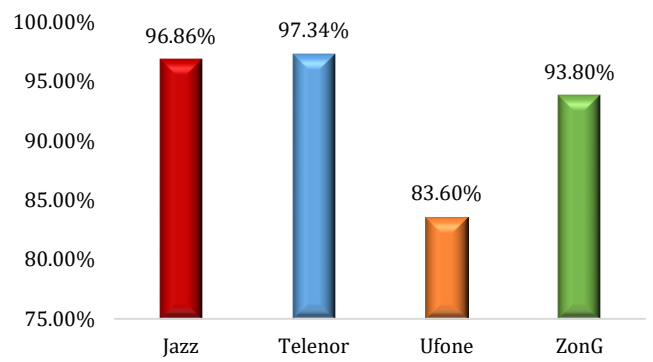
3G Signal Strength (RSCP) Confidencel Level > 90%



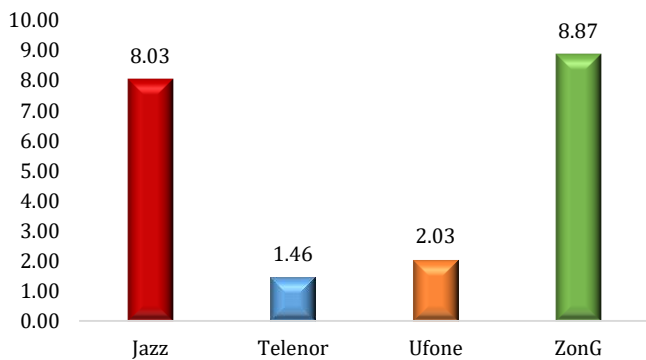
4G Signal Strength (RSRP) > -100dBm



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

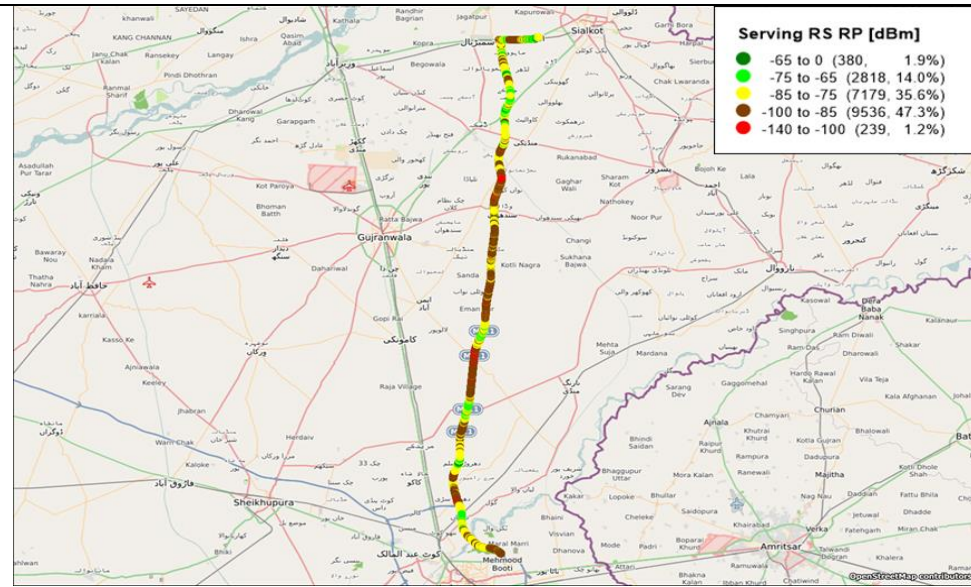


User Data Throughput (4G) > 2Mbps

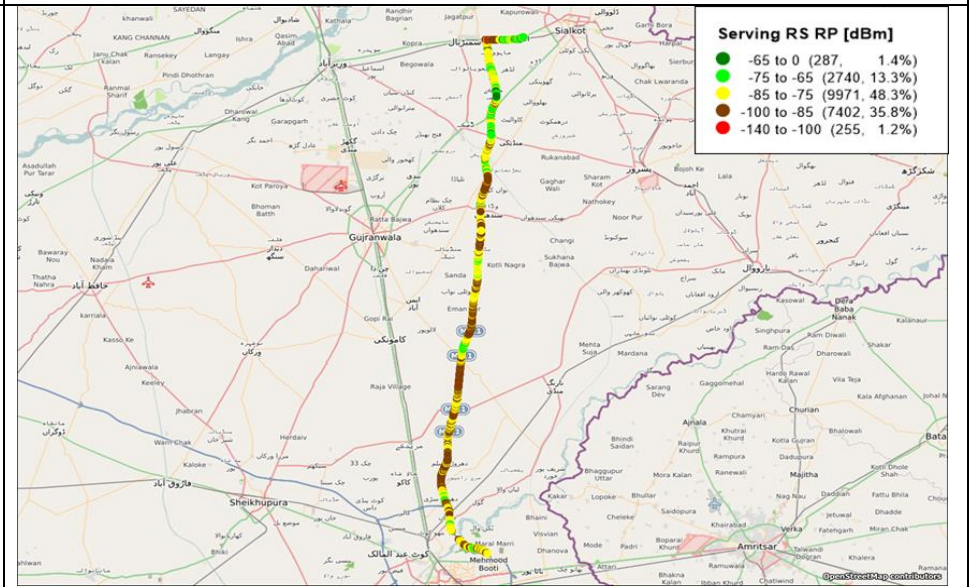


4G MOBILE COVERAGE ON MOTORWAYS / HIGHWAYS / ROADS – SIGNAL STRENGTH (RSRP)

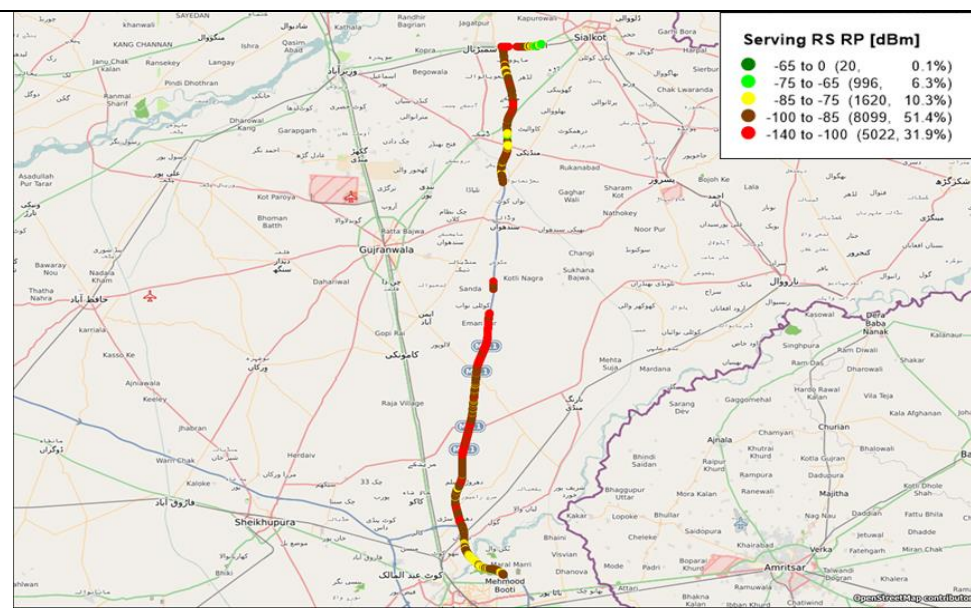
JAZZ 4G NETWORK COVERAGE – LAHORE TO SIALKOT



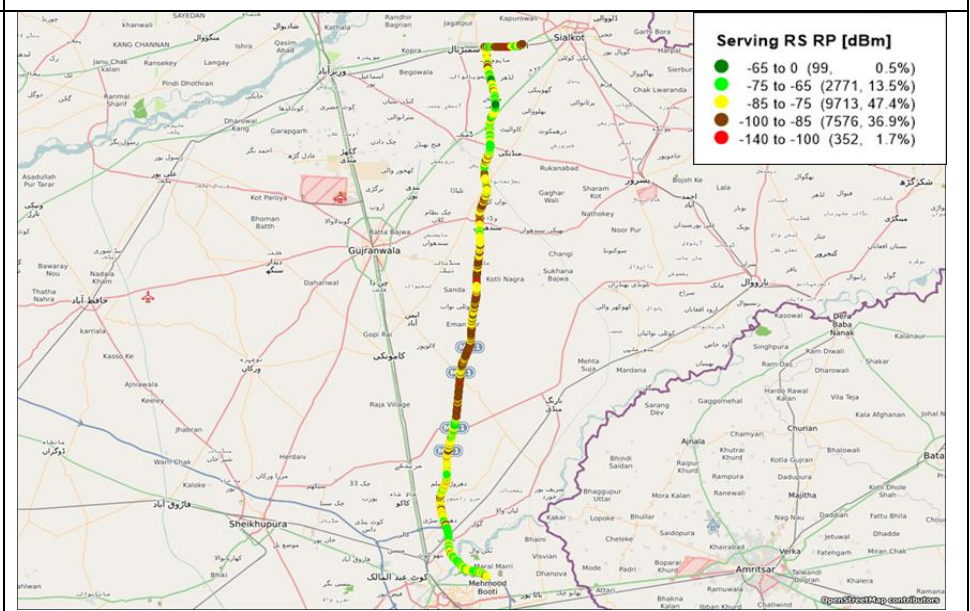
TELEOR 4G NETWORK COVERAGE – LAHORE TO SIALKOT



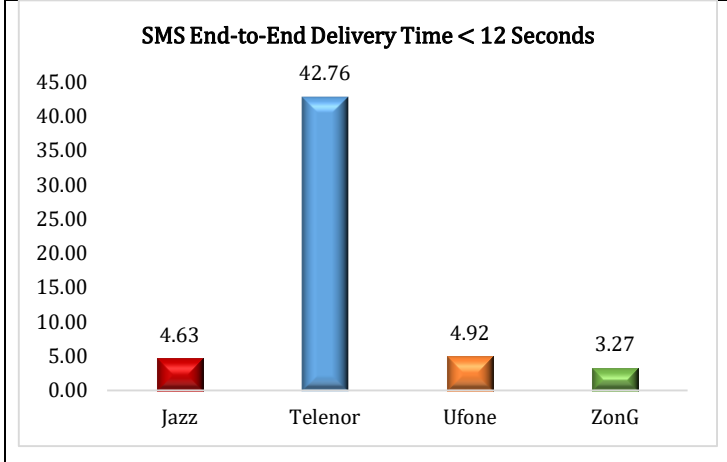
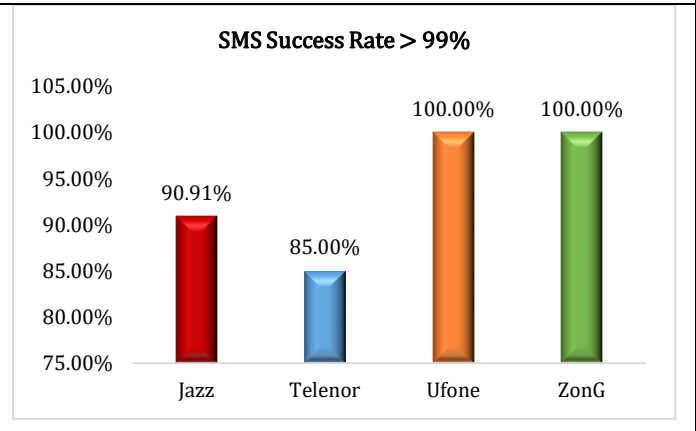
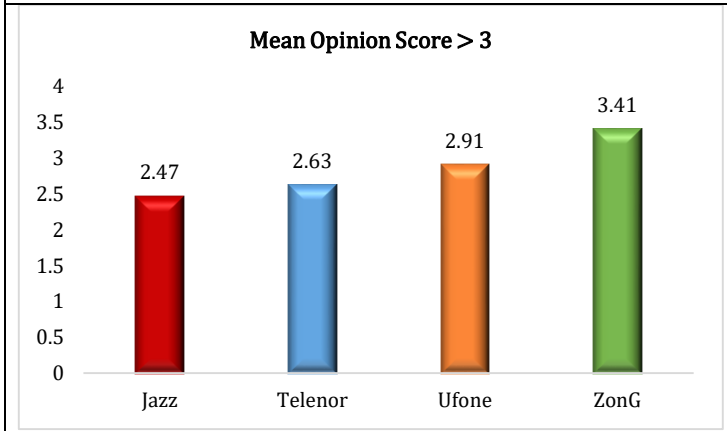
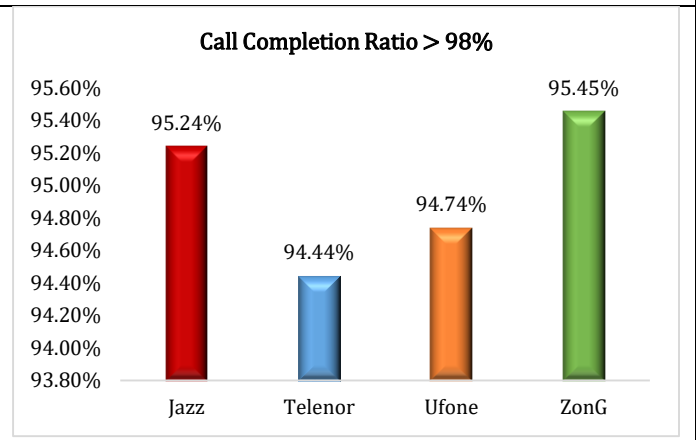
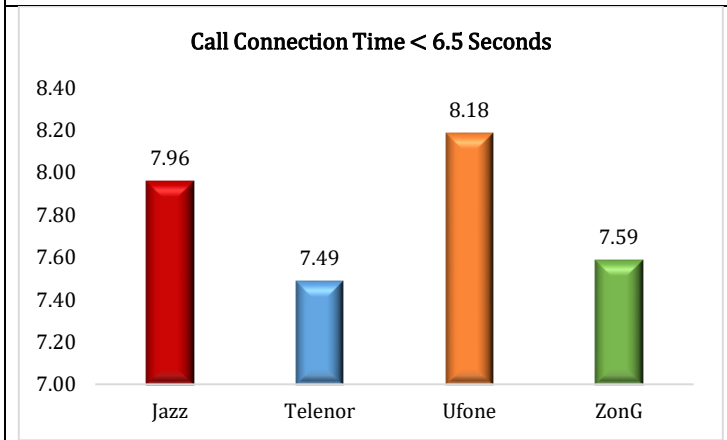
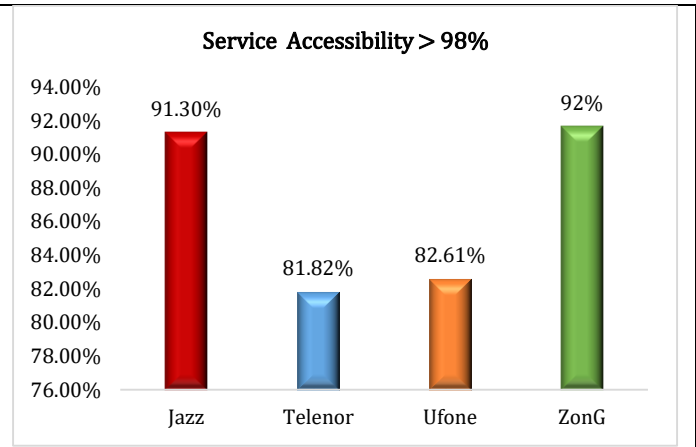
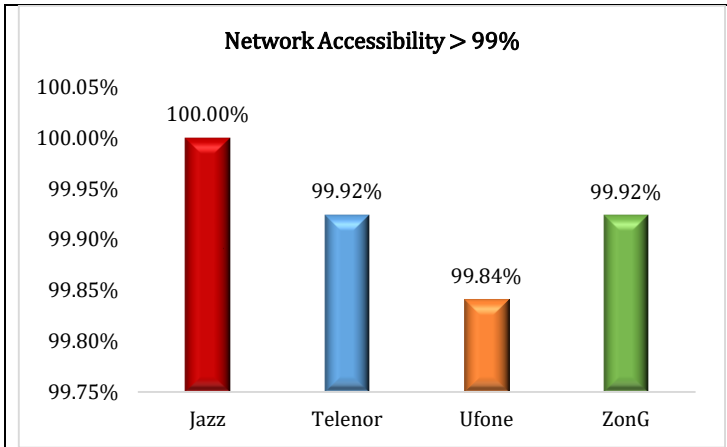
UFONE 4G NETWORK COVERAGE – LAHORE TO SIALKOT



ZONG 4G NETWORK COVERAGE – LAHORE TO SIALKOT

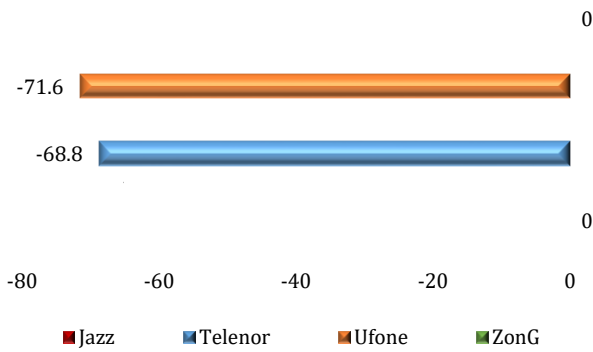


QUALITY OF SERVICE SURVEY RESULTS – LAHORE TO SIALKOT

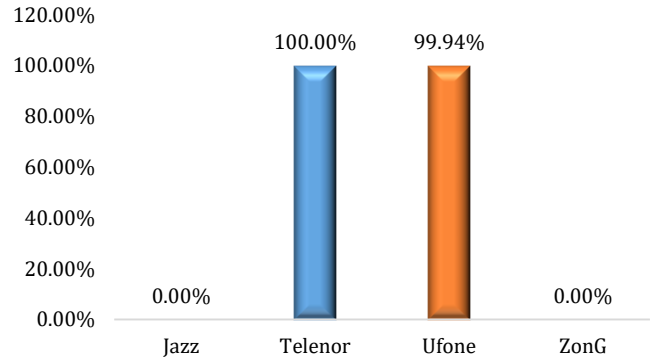


QUALITY OF SERVICE SURVEY RESULTS – LAHORE TO SIALKOT

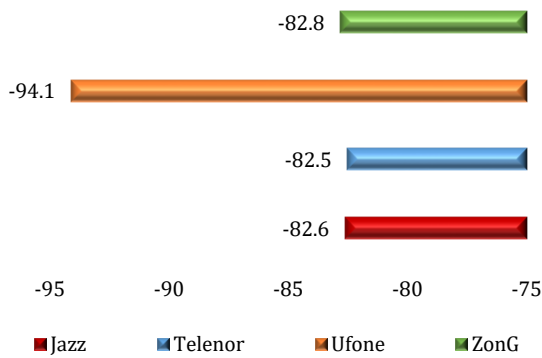
3G Signal Strength (RSCP) > -100dBm



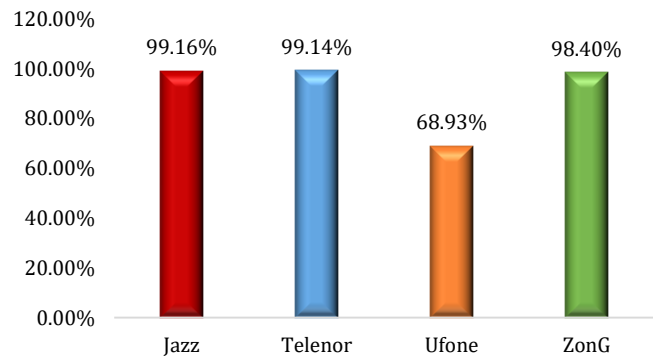
3G Signal Strength (RSCP) Confidencel Level > 90%



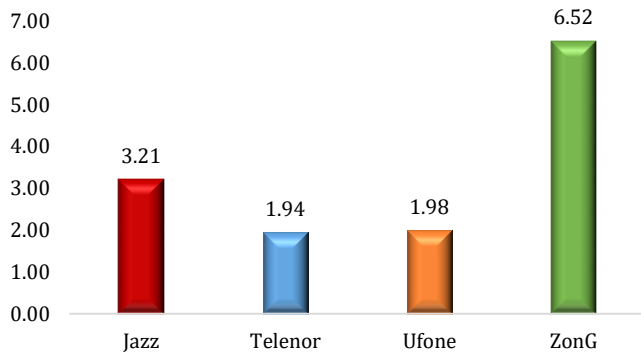
4G Signal Strength (RSRP) > -100dBm



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

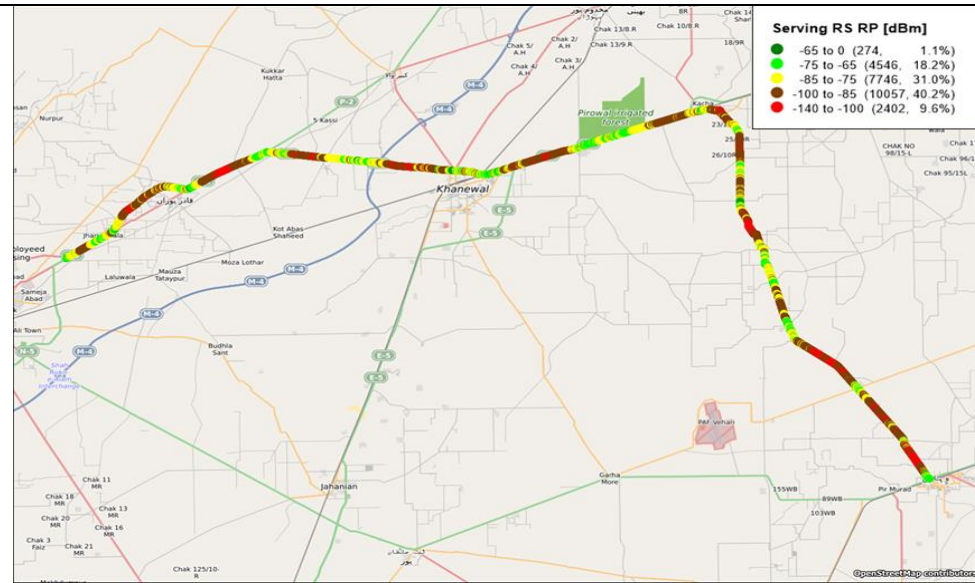


User Data Throughput (4G) > 2Mbps

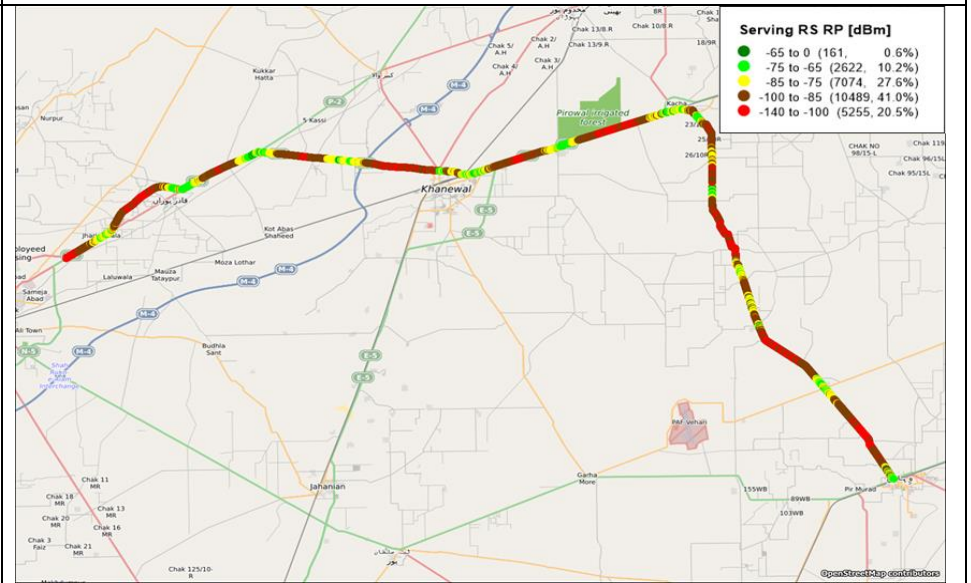


4G MOBILE COVERAGE ON MOTORWAYS / HIGHWAYS / ROADS – SIGNAL STRENGTH (RSRP)

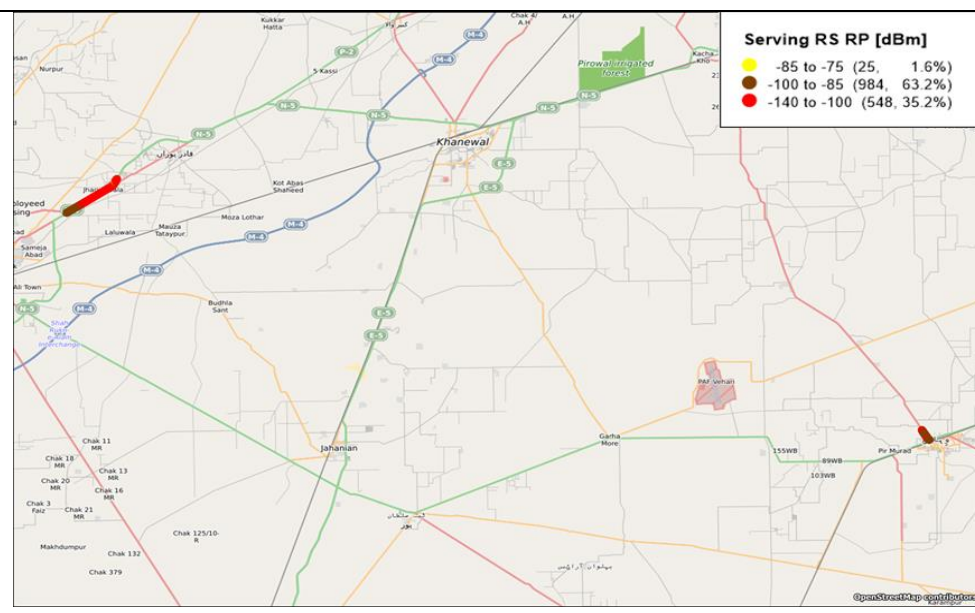
JAZZ 4G NETWORK COVERAGE – MULTAN TO VEHARI



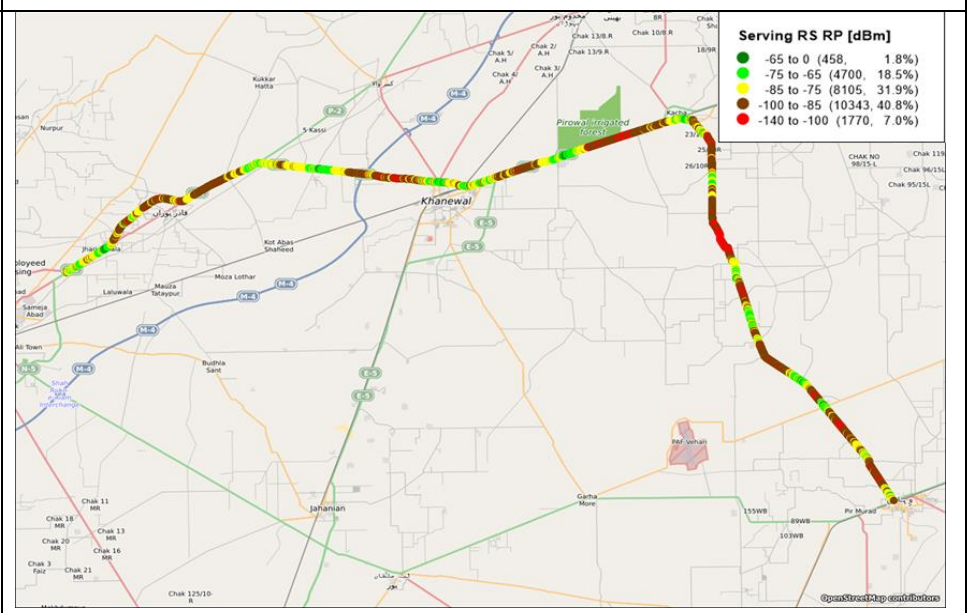
TELENOR 4G NETWORK COVERAGE – MULTAN TO VEHARI



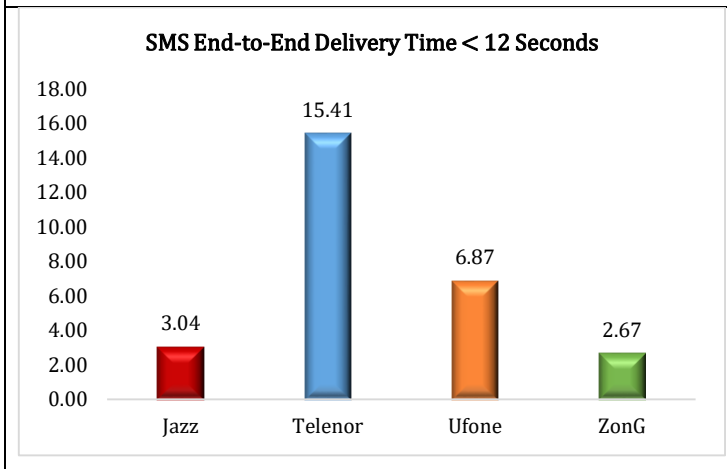
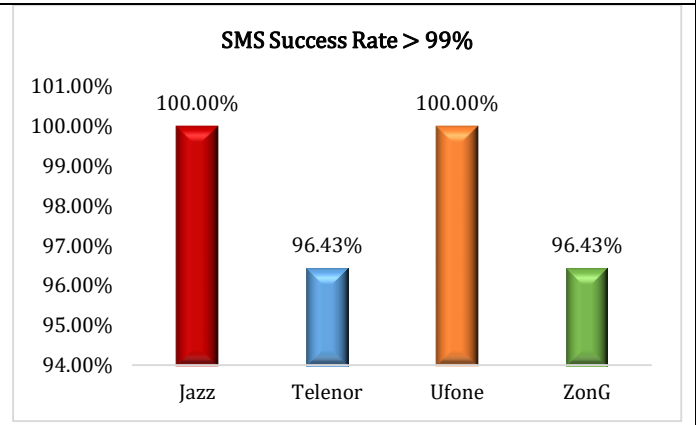
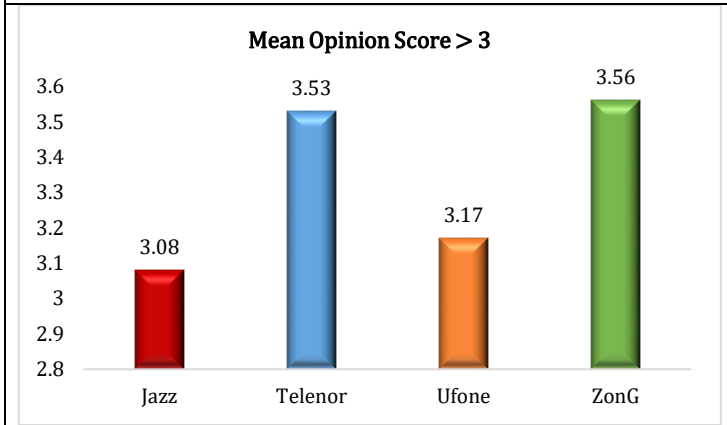
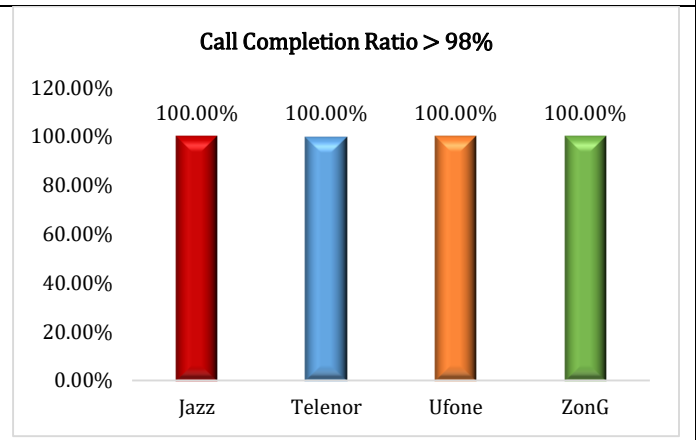
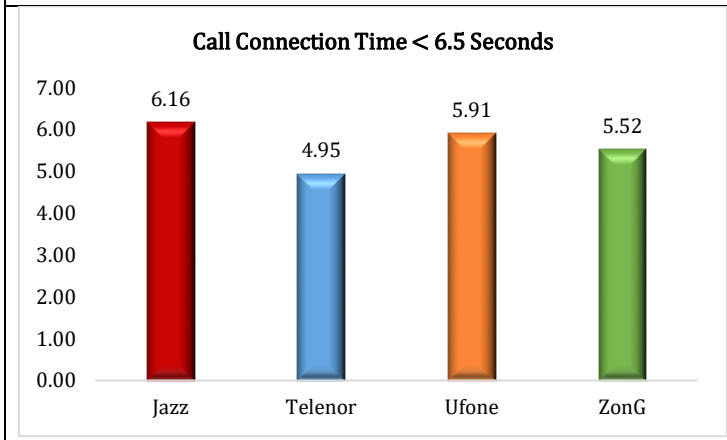
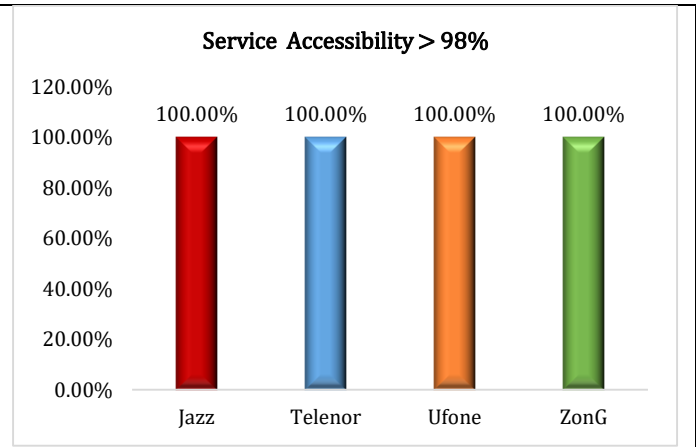
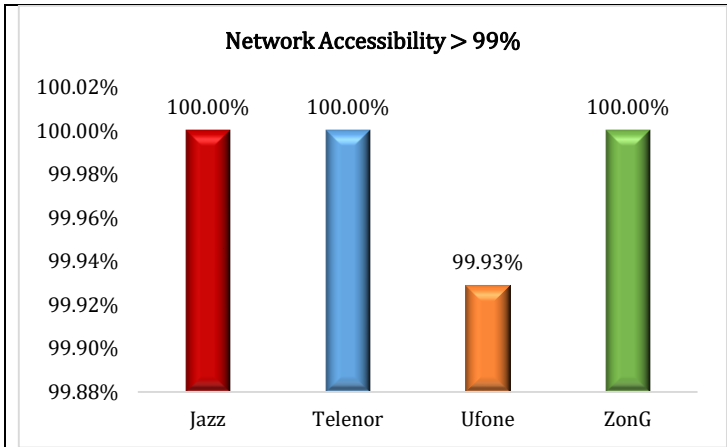
UFONE 4G NETWORK COVERAGE – MULTAN TO VEHARI



ZONG 4G NETWORK COVERAGE – MULTAN TO VEHARI

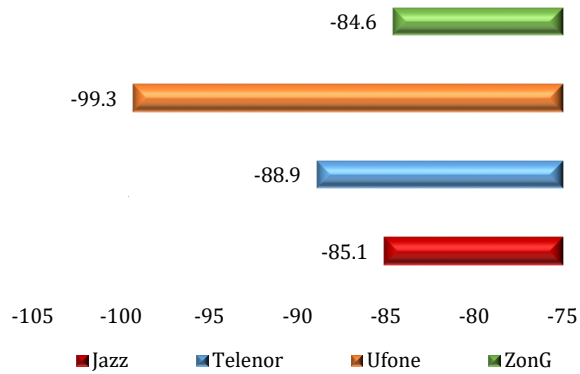


QUALITY OF SERVICE SURVEY RESULTS – MULTAN TO VEHARI

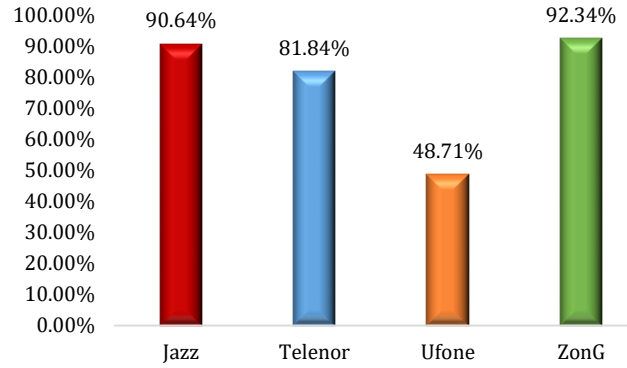


QUALITY OF SERVICE SURVEY RESULTS – MULTAN TO VEHARI

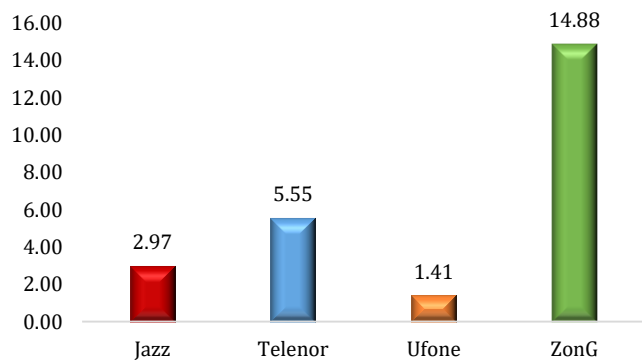
4G Signal Strength (RSRP) > -100dBm



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

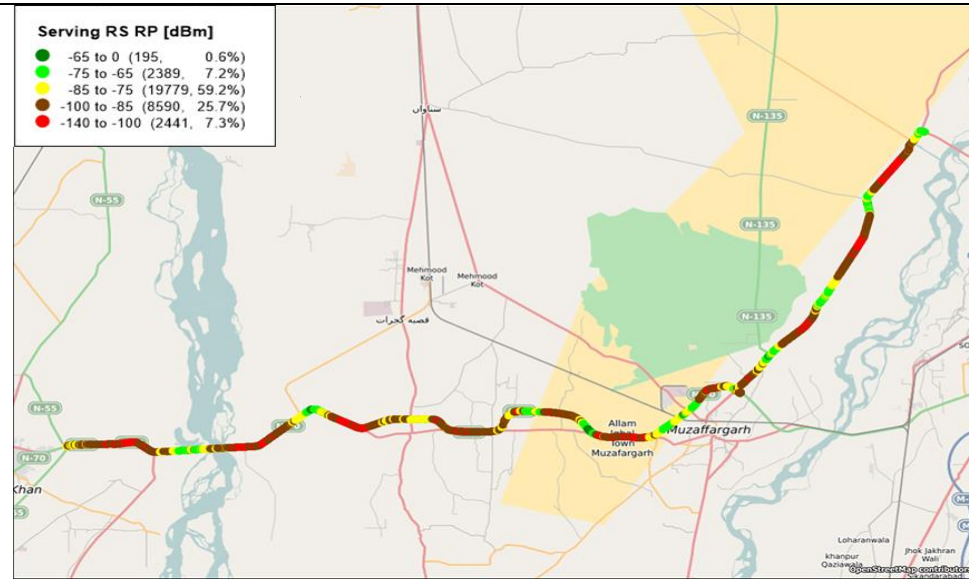


User Data Throughput (4G) > 2Mbps

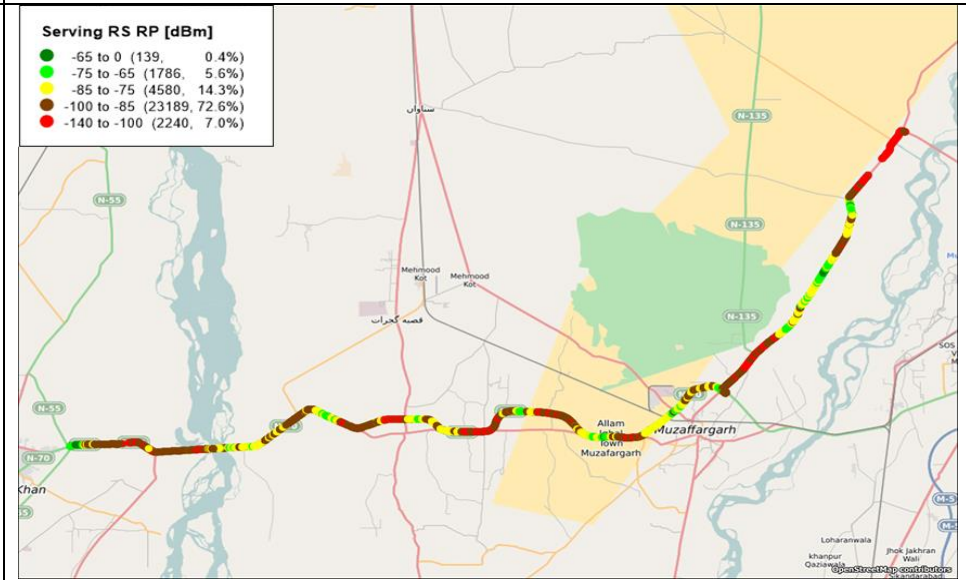


4G MOBILE COVERAGE ON MOTORWAYS / HIGHWAYS / ROADS – SIGNAL STRENGTH (RSRP)

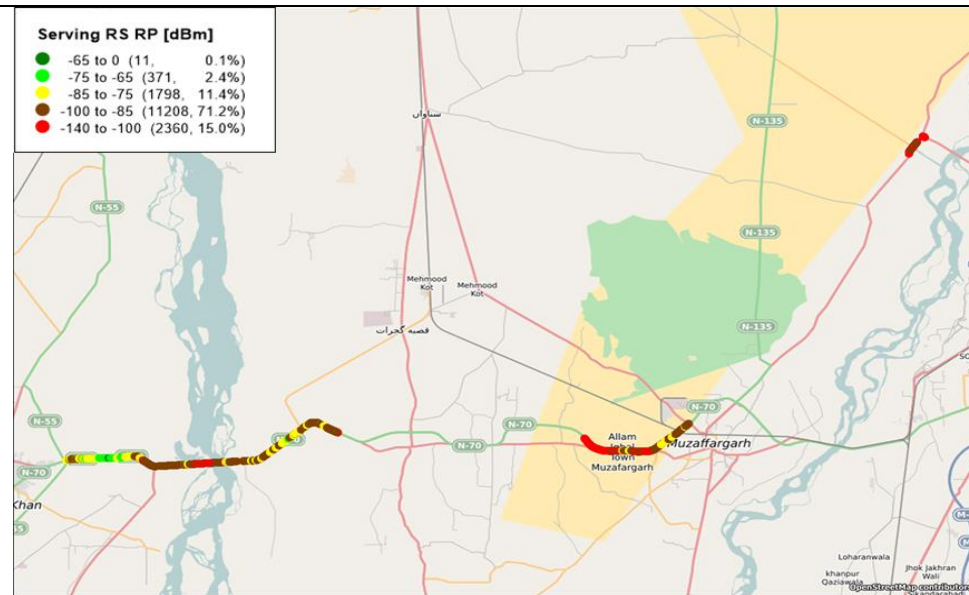
JAZZ 4G NETWORK COVERAGE – MULTAN TO DG KHAN



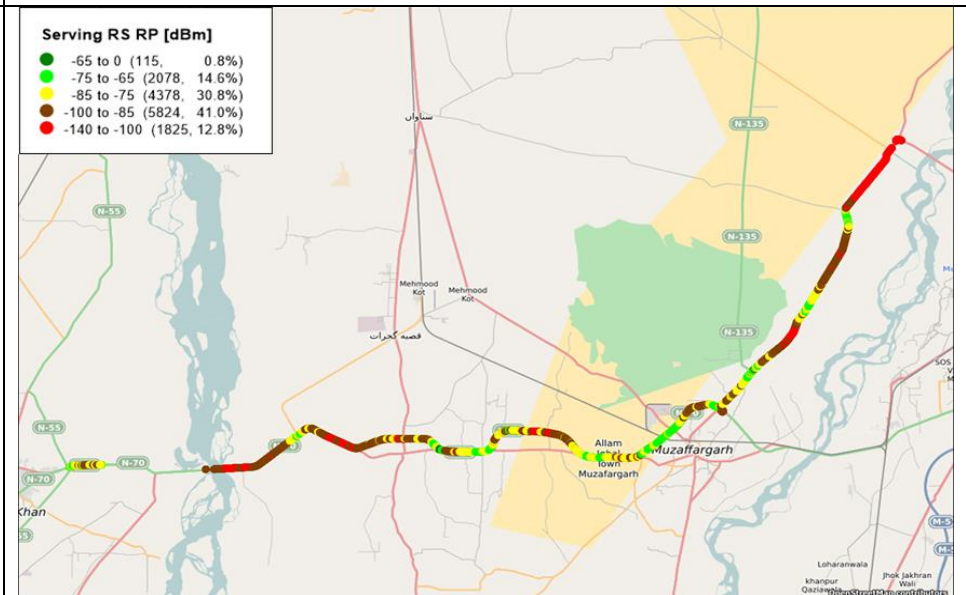
TELENOR 4G NETWORK COVERAGE – MULTAN TO DG KHAN



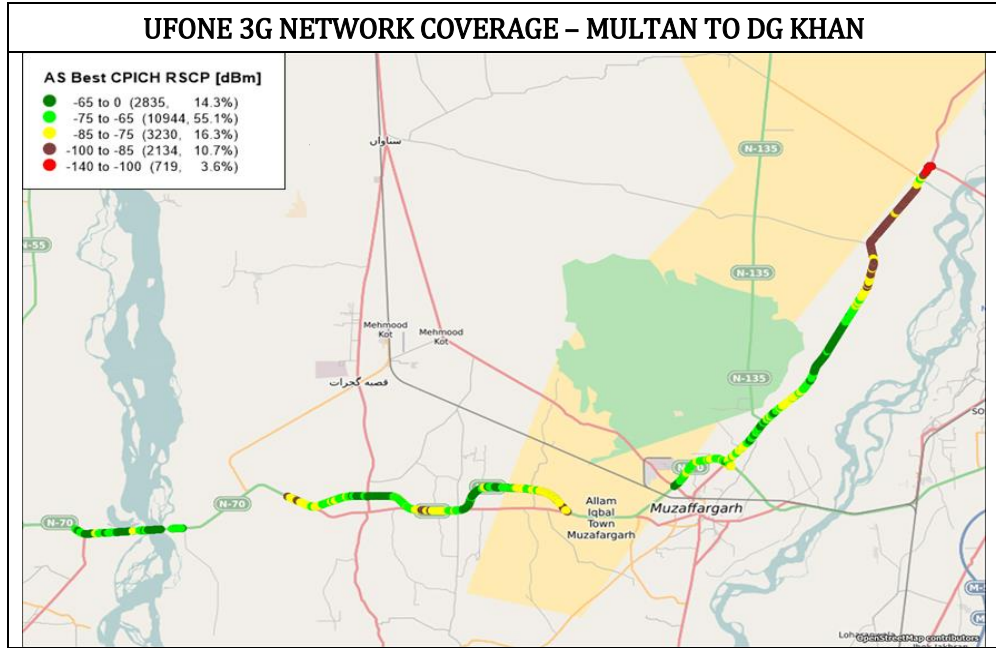
UFONE 4G NETWORK COVERAGE – MULTAN TO DG KHAN



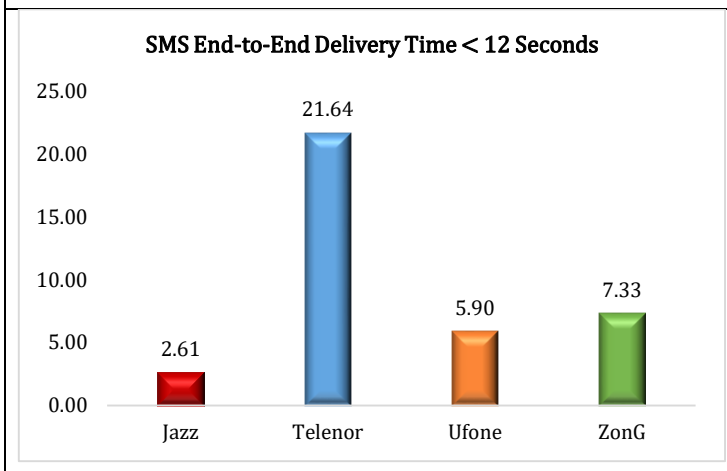
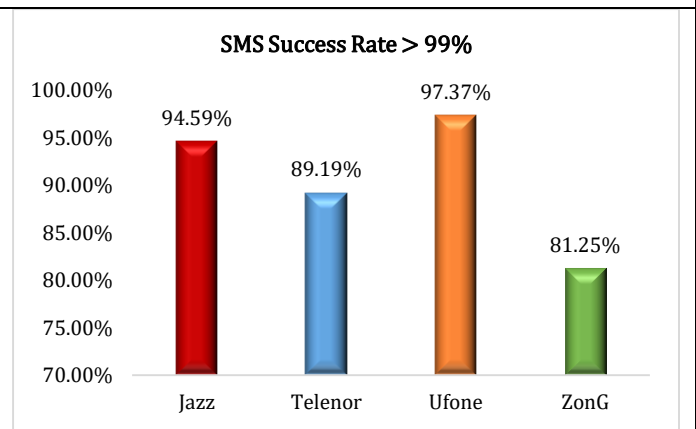
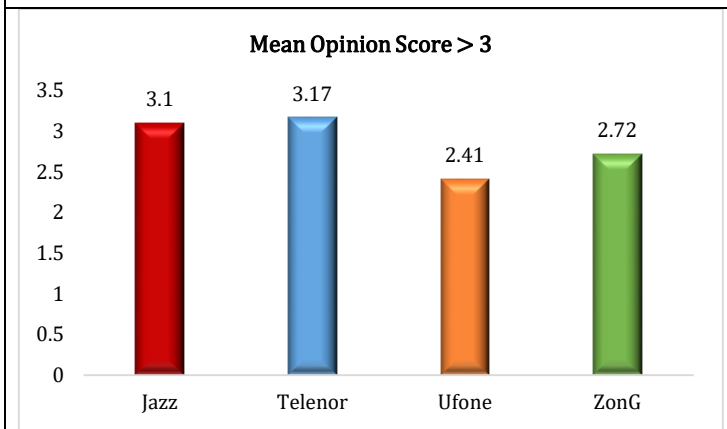
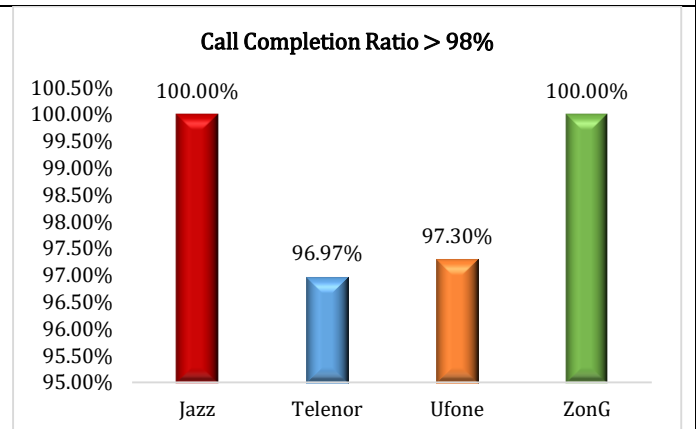
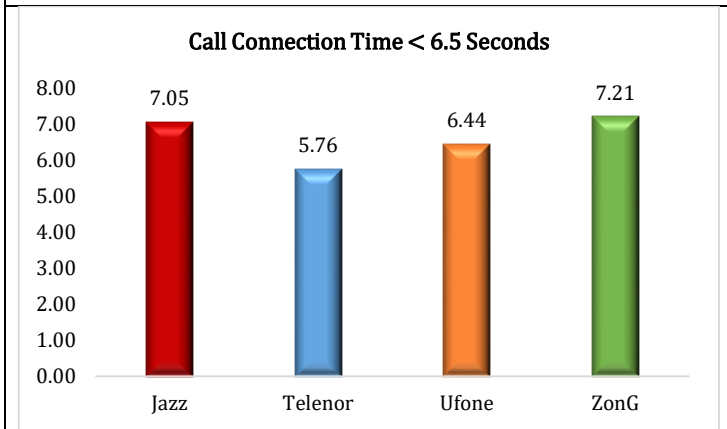
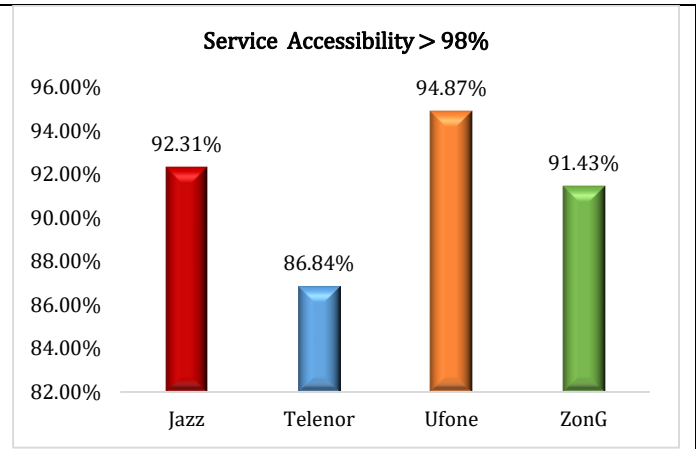
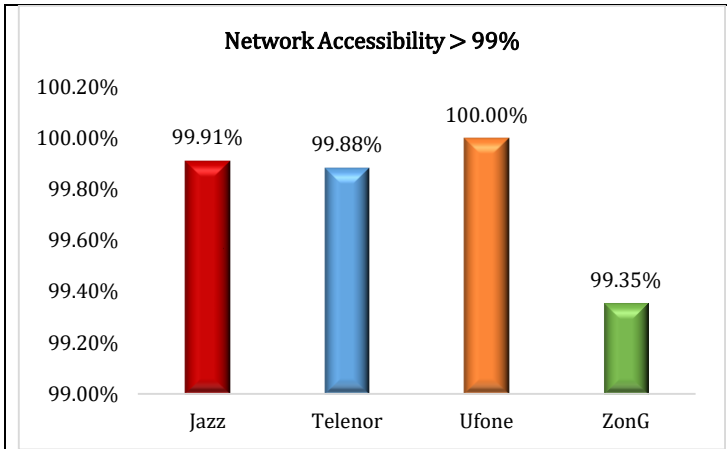
ZONG 4G NETWORK COVERAGE – MULTAN TO DG KHAN



3G MOBILE COVERAGE ON MOTORWAYS / HIGHWAYS / ROADS – SIGNAL STRENGTH (RSCP)

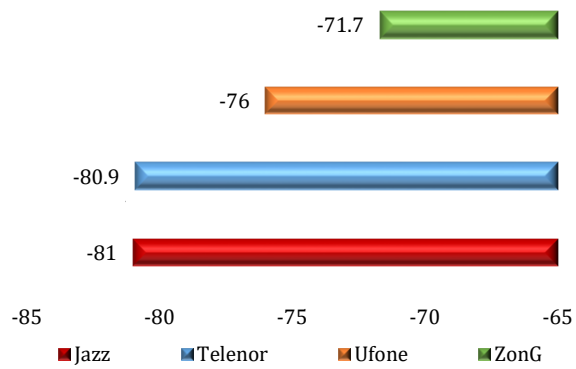


QUALITY OF SERVICE SURVEY RESULTS – MULTAN TO DG KHAN

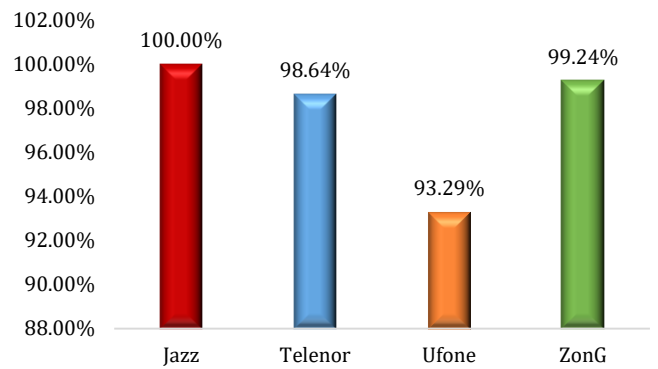


QUALITY OF SERVICE SURVEY RESULTS – MULTAN TO DG KHAN

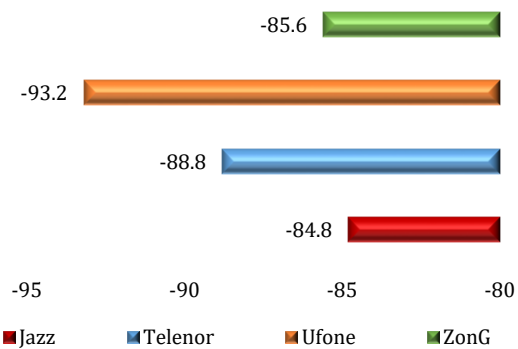
3G Signal Strength (RSCP) > -100dBm



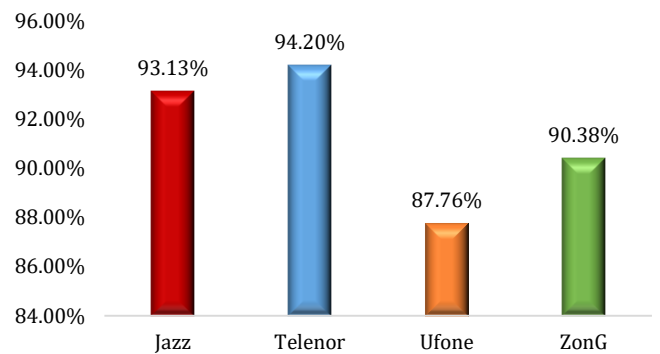
3G Signal Strength (RSCP) Confidence Level > 90%



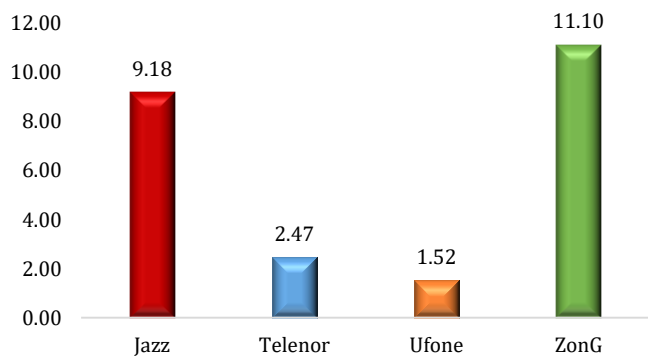
4G Signal Strength (RSRP) > -100dBm



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



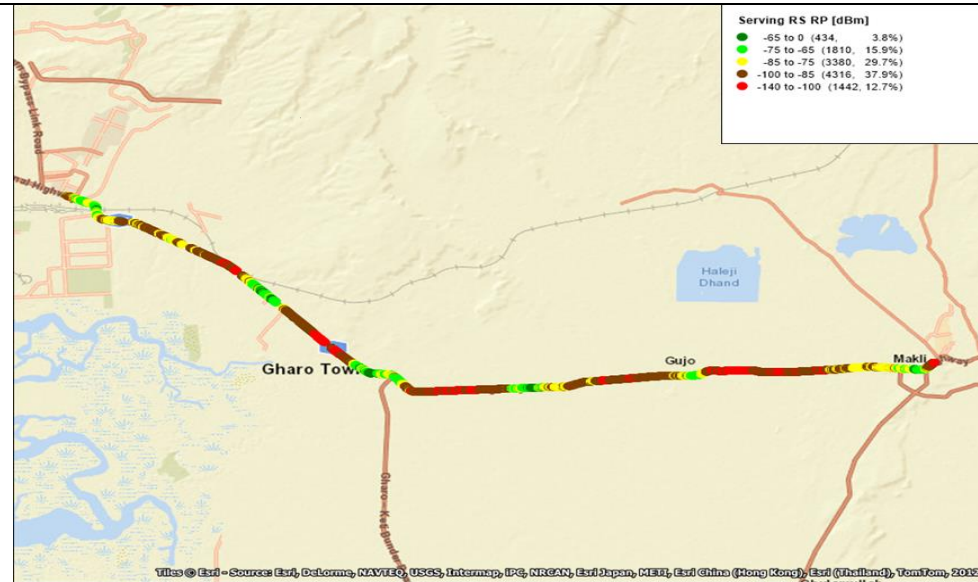
User Data Throughput (4G) > 2Mbps



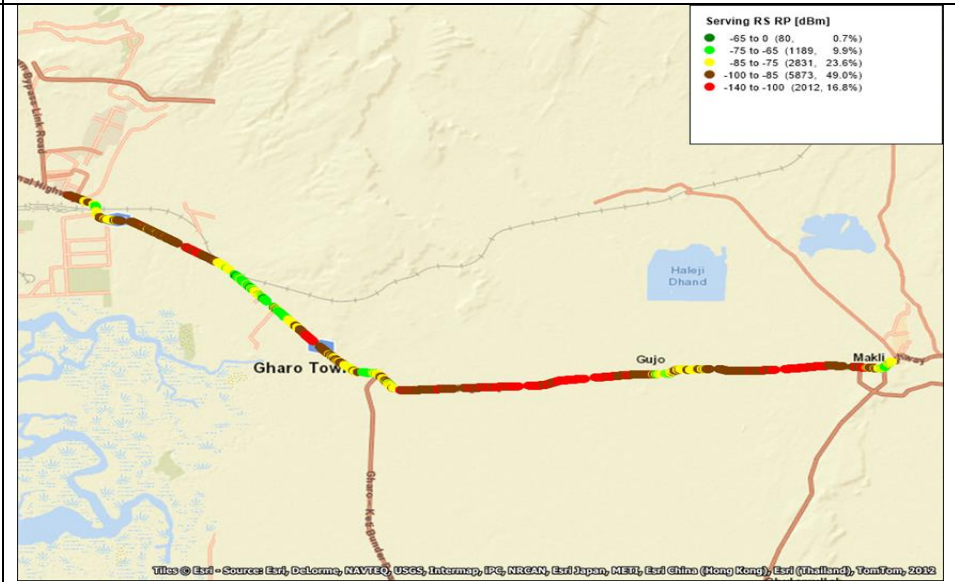
SINDH

4G MOBILE COVERAGE ON MOTORWAYS / HIGHWAYS / ROADS – SIGNAL STRENGTH (RSRP)

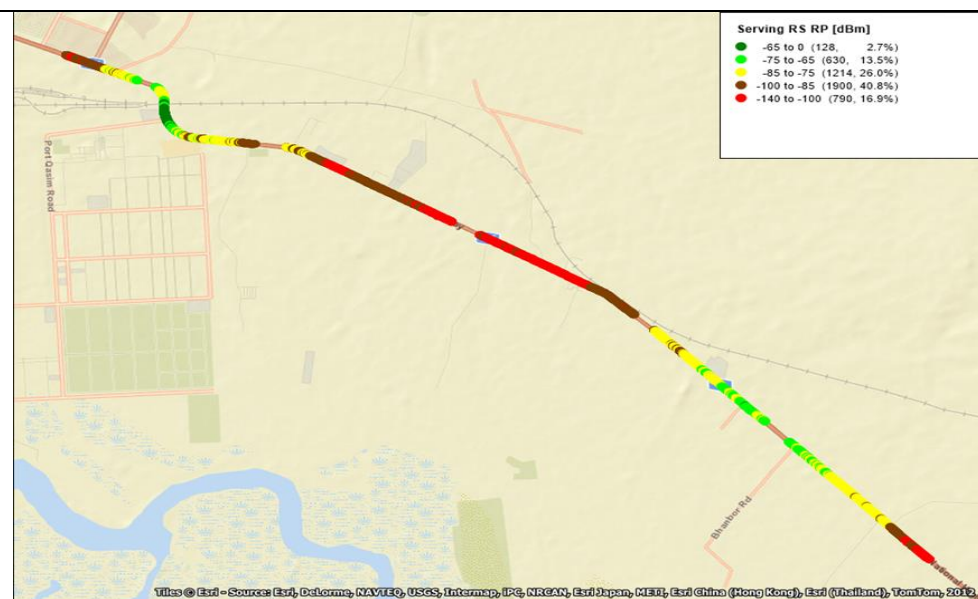
JAZZ 4G NETWORK COVERAGE – KARACHI TO THATTA



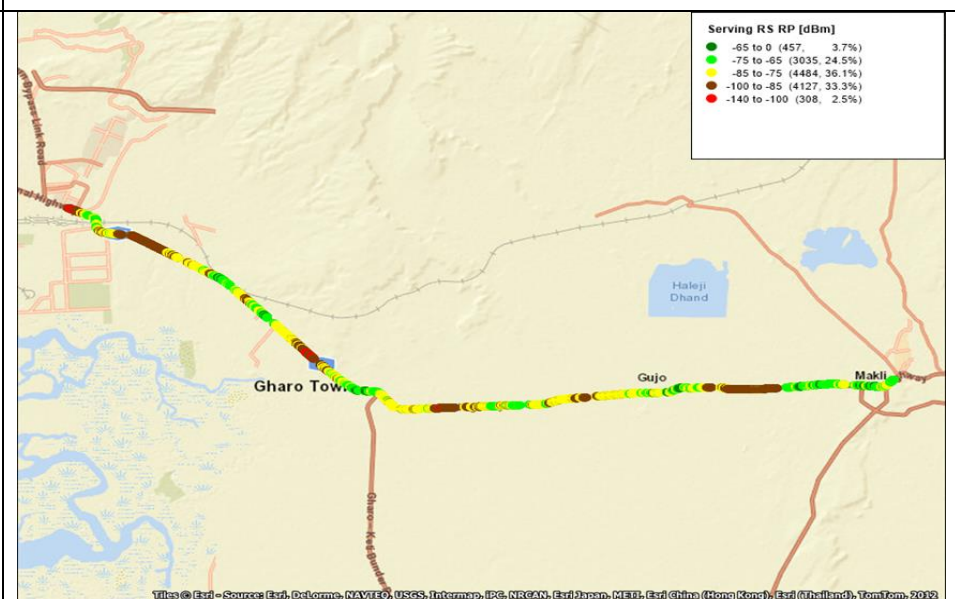
TELENOR 4G NETWORK COVERAGE – KARACHI TO THATTA



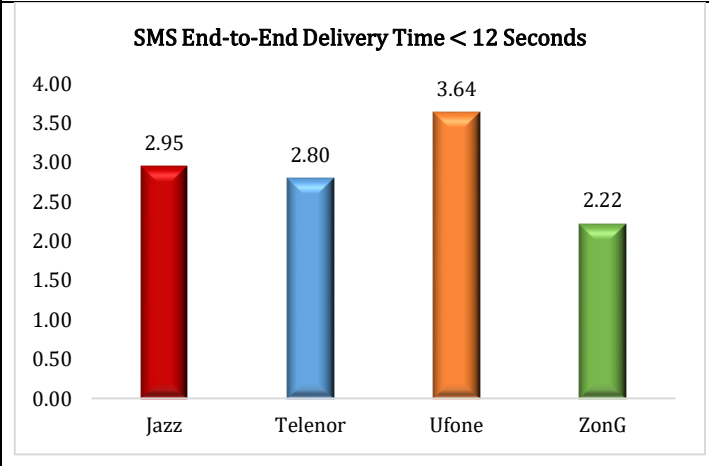
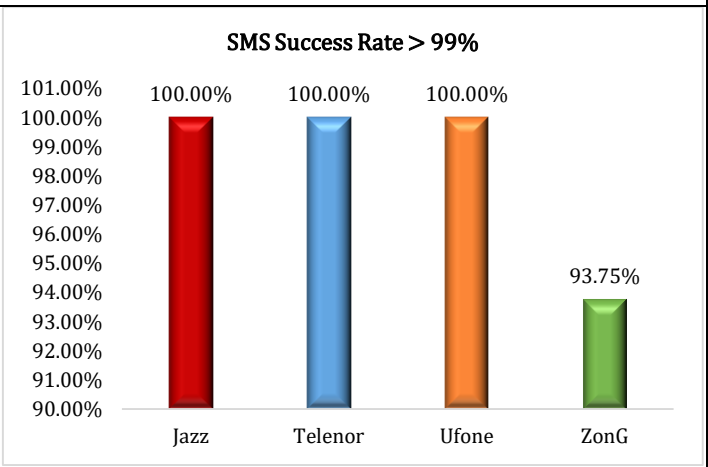
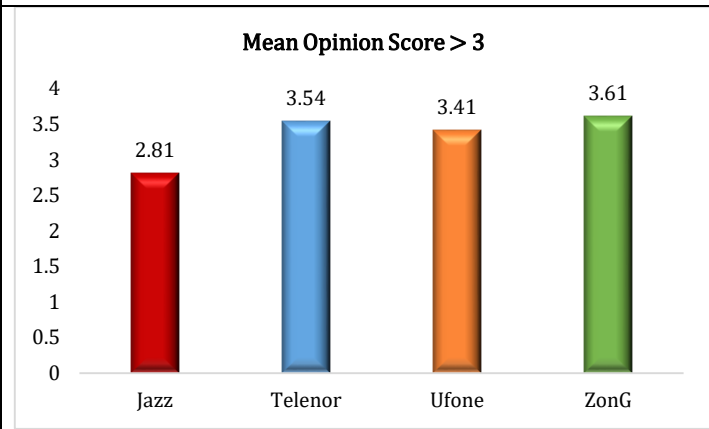
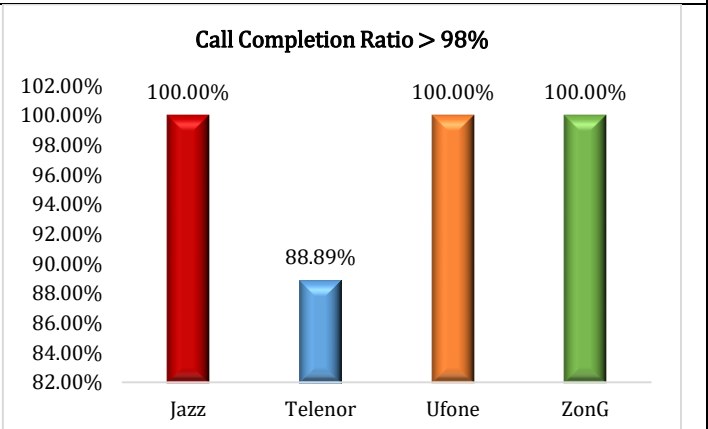
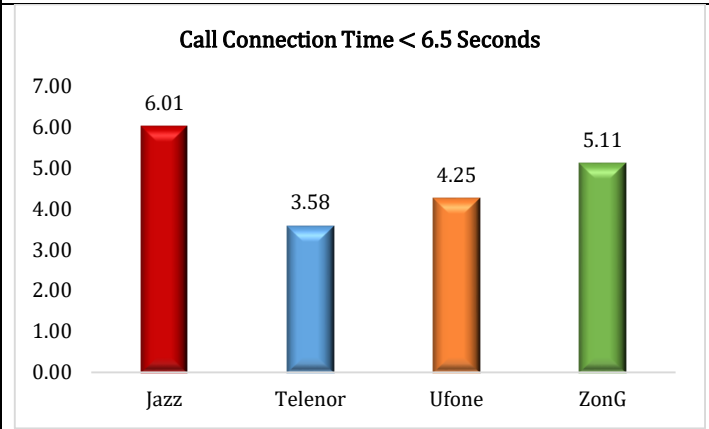
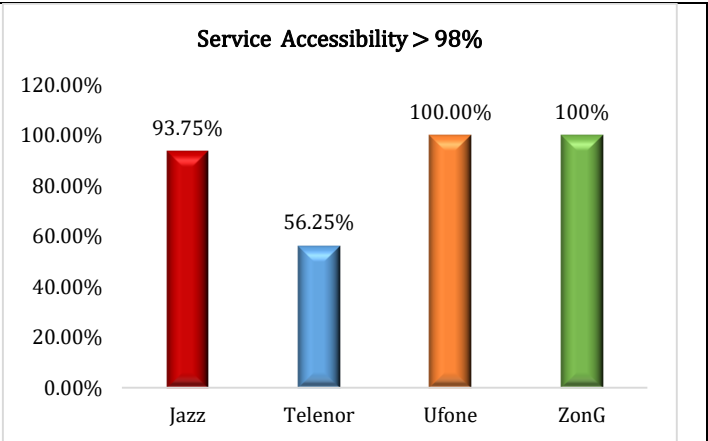
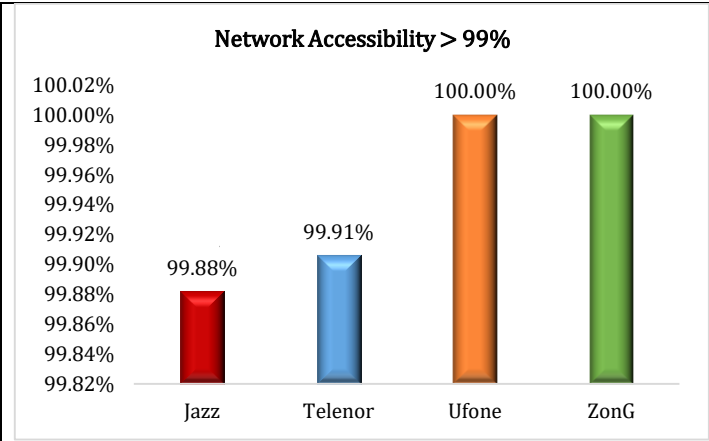
UFONE 4G NETWORK COVERAGE – KARACHI TO THATTA



ZONG 4G NETWORK COVERAGE – KARACHI TO THATTA

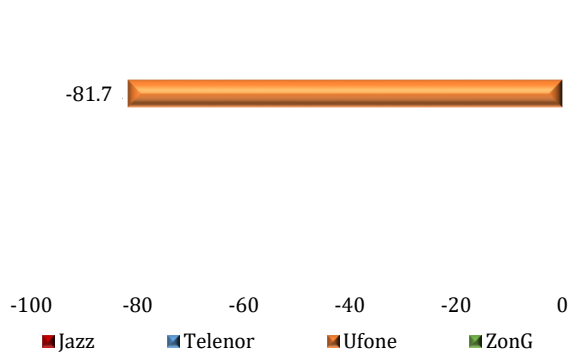


QUALITY OF SERVICE SURVEY RESULTS – KARACHI TO THATTA

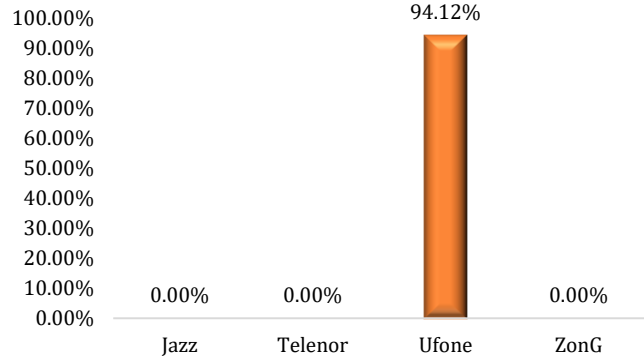


QUALITY OF SERVICE SURVEY RESULTS – KARACHI TO THATTA

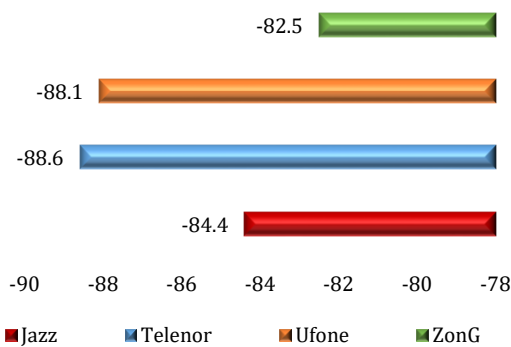
3G Signal Strength (RSCP) > -100dBm



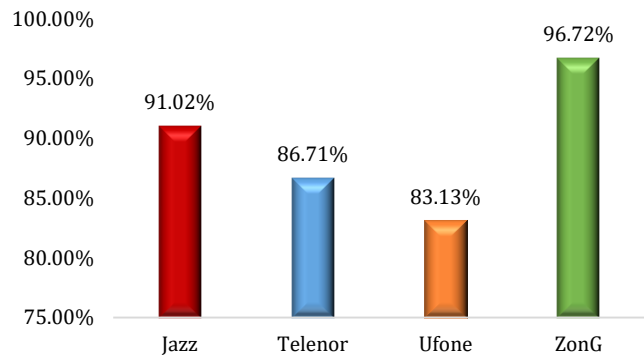
3G Signal Strength (RSCP) Confidencel Level > 90%



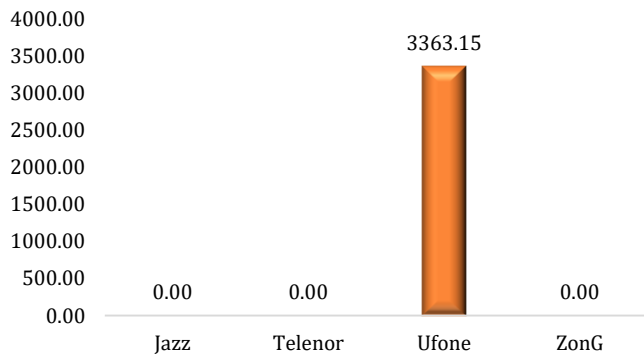
4G Signal Strength (RSRP) > -100dBm



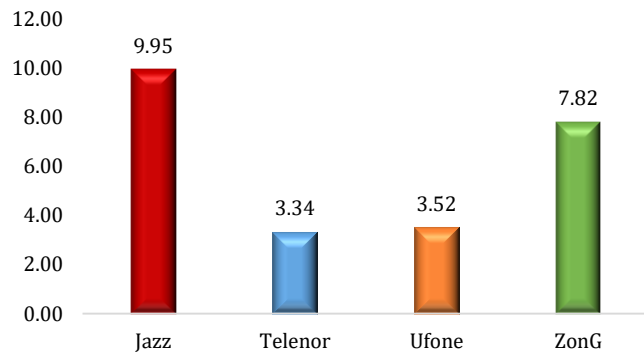
4G Signal Strength (RSRP) Confidencel Level > 90%



User Data Throughput (3G) > 256Kbps

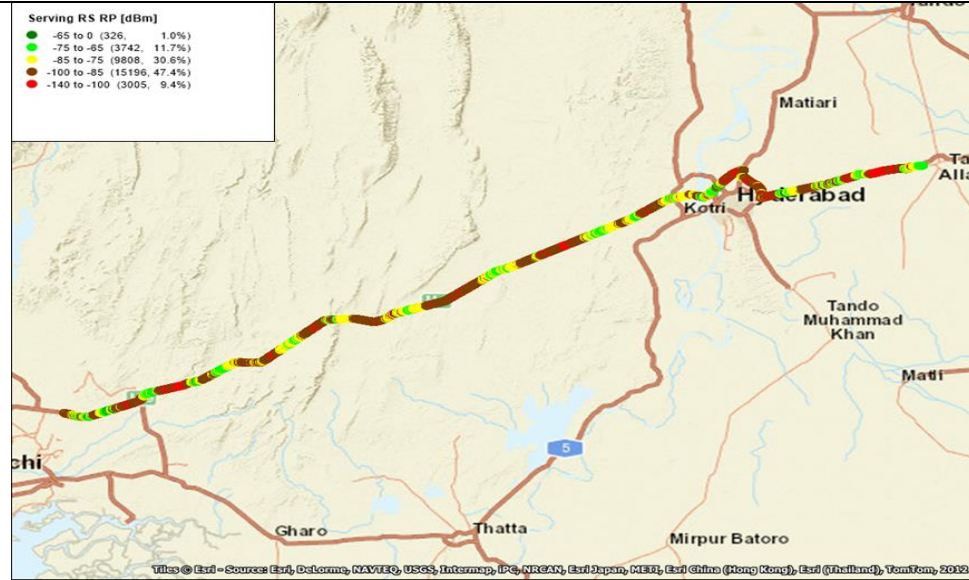


User Data Throughput (4G) > 2Mbps

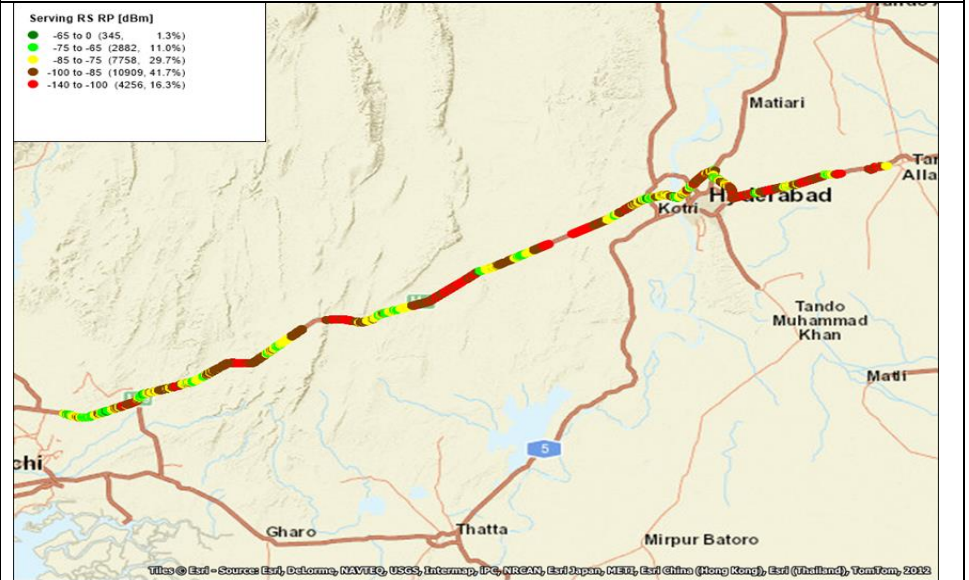


4G MOBILE COVERAGE ON MOTORWAYS / HIGHWAYS / ROADS – SIGNAL STRENGTH (RSRP)

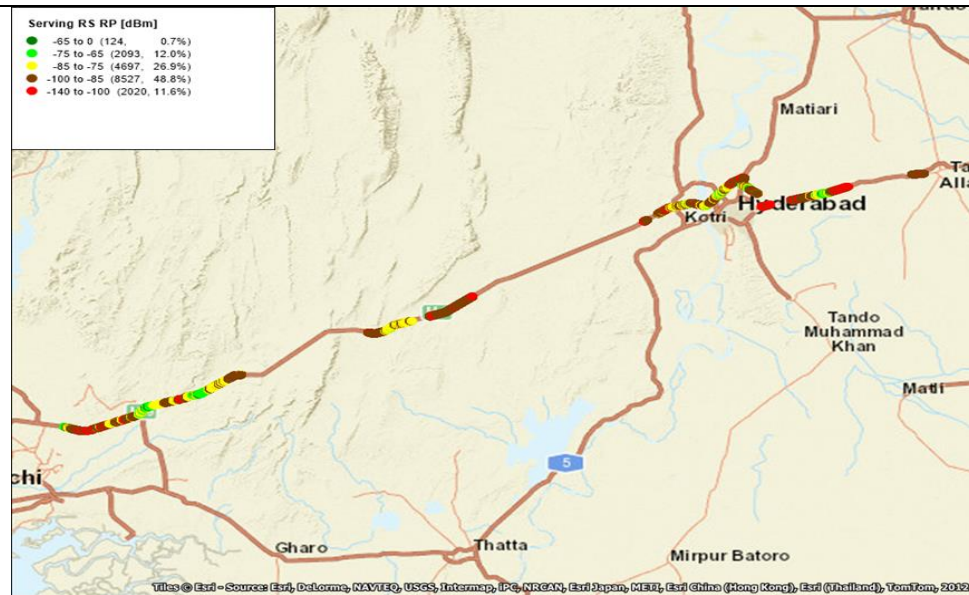
JAZZ 4G NETWORK COVERAGE – KARACHI TO TANDO ALLAH YAR



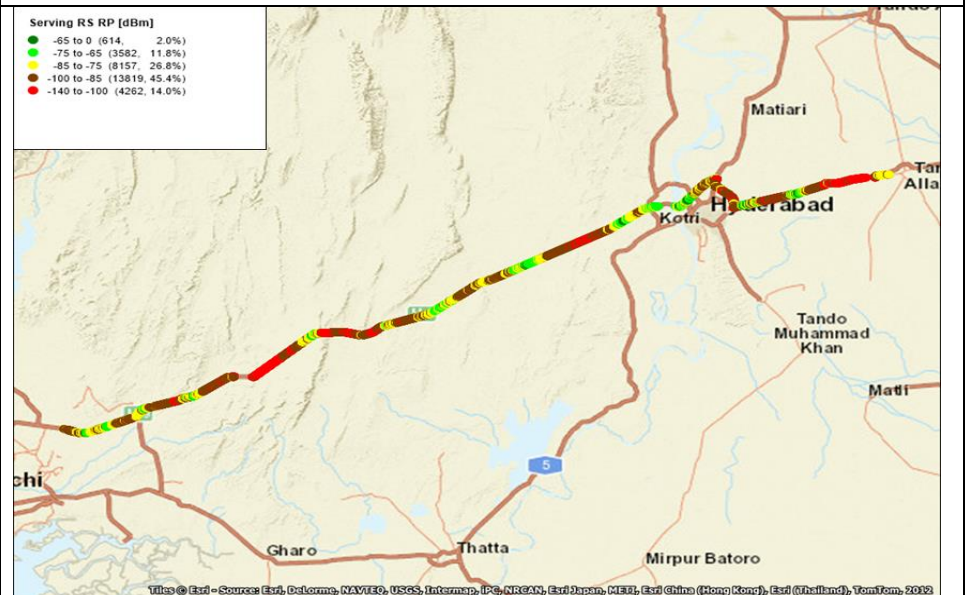
TELENOR 4G NETWORK COVERAGE – KARACHI TO TANDO ALLAH YAR



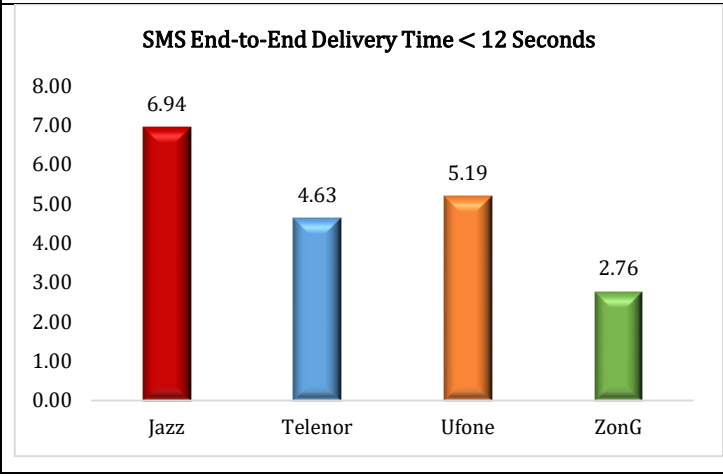
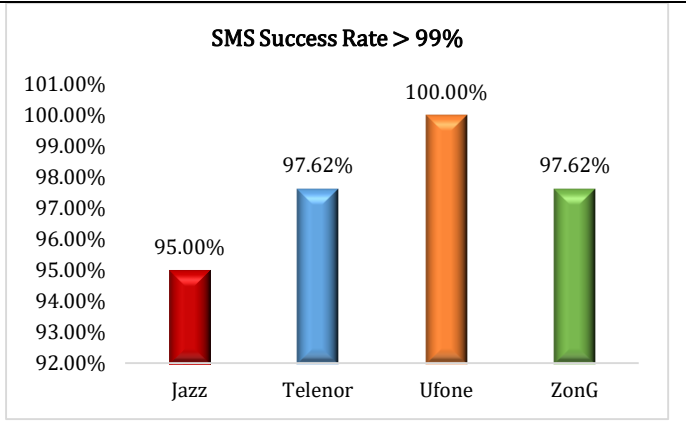
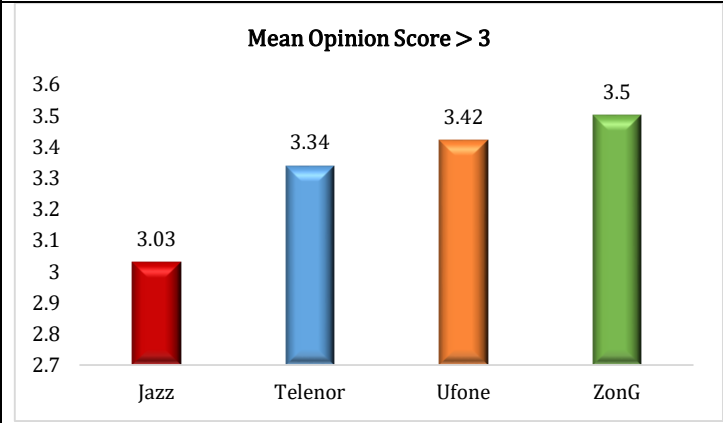
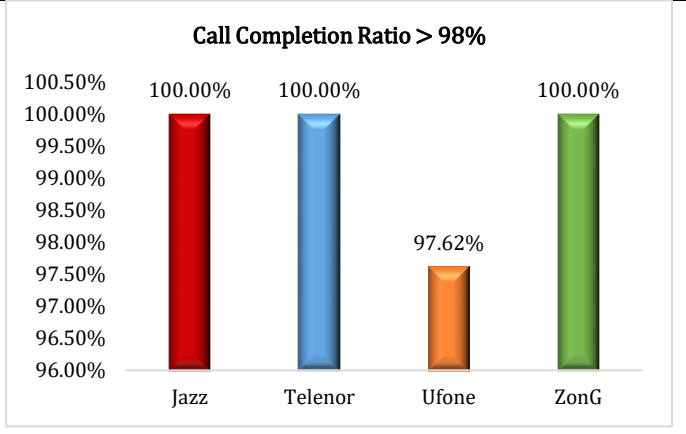
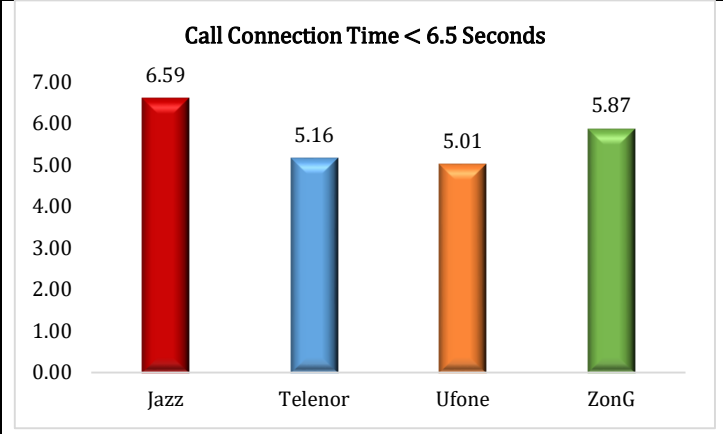
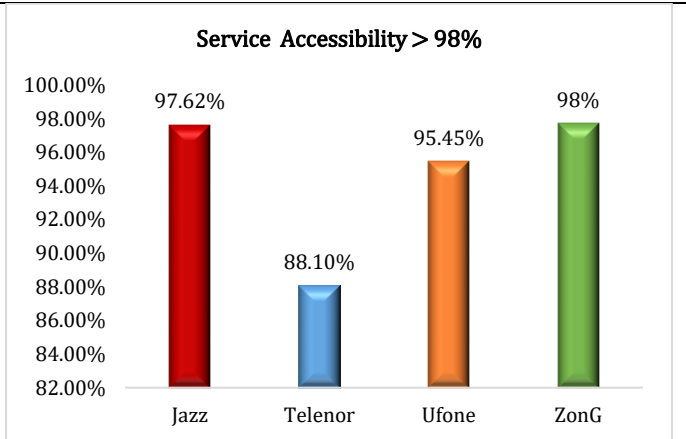
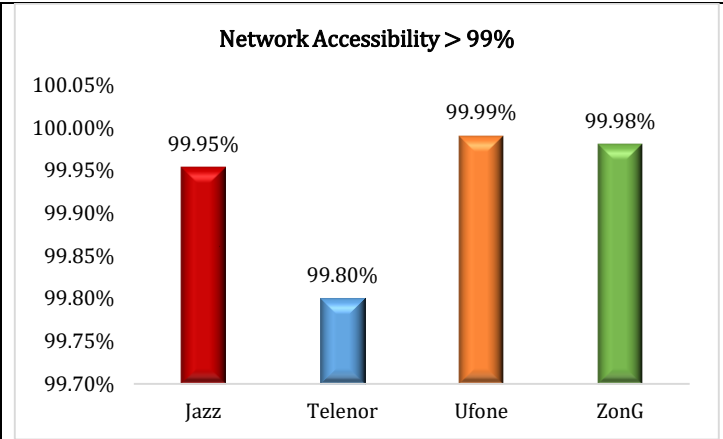
UFONE 4G NETWORK COVERAGE – KARACHI TO TANDO ALLAH YAR



ZONG 4G NETWORK COVERAGE – KARACHI TO TANDO ALLAH YAR

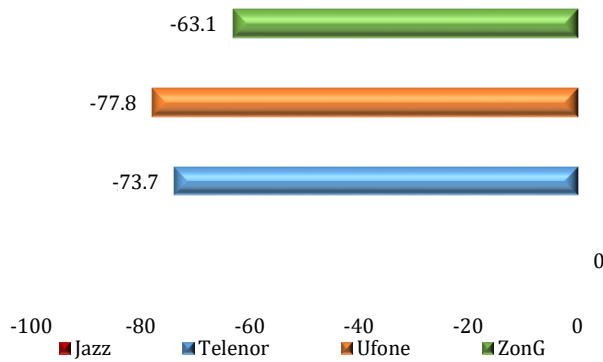


QUALITY OF SERVICE SURVEY RESULTS – KARACHI TO TANDO ALLAH YAR

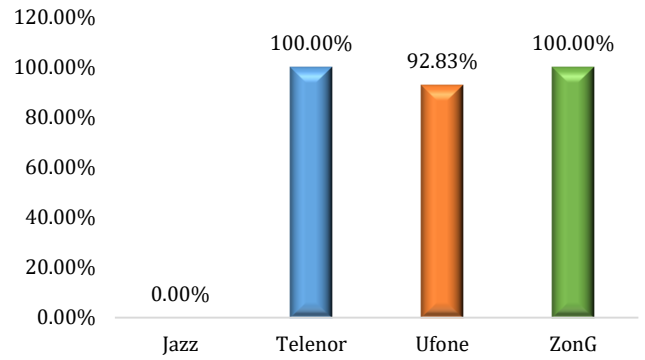


QUALITY OF SERVICE SURVEY RESULTS – KARACHI TO TANDO ALLAH YAR

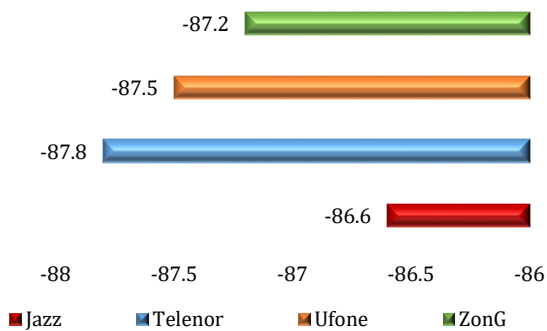
3G Signal Strength (RSCP) > -100dBm



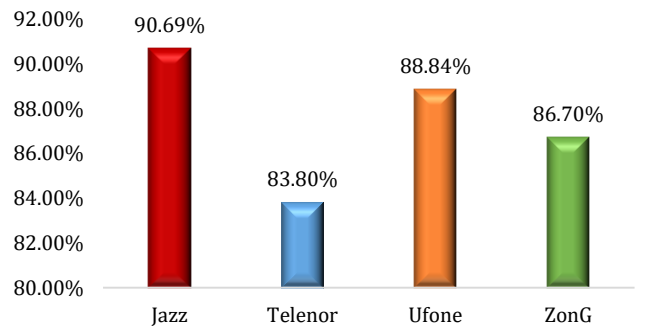
3G Signal Strength (RSCP) Confidencel Level > 90%



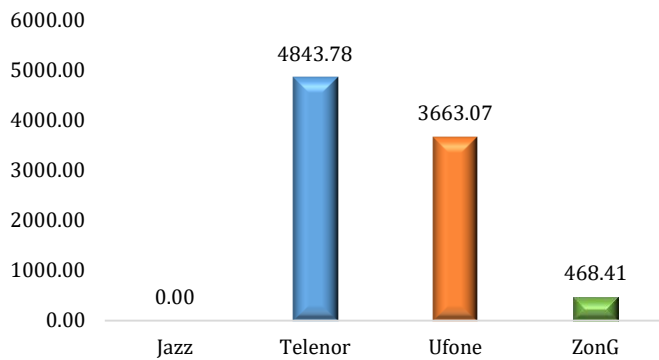
4G Signal Strength (RSRP) > -100dBm



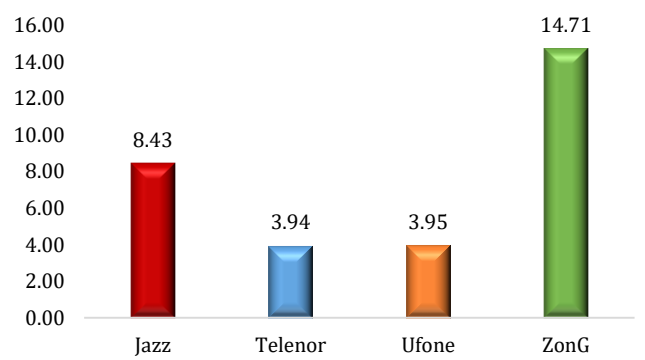
4G Signal Strength (RSRP) Confidencel Level > 90%



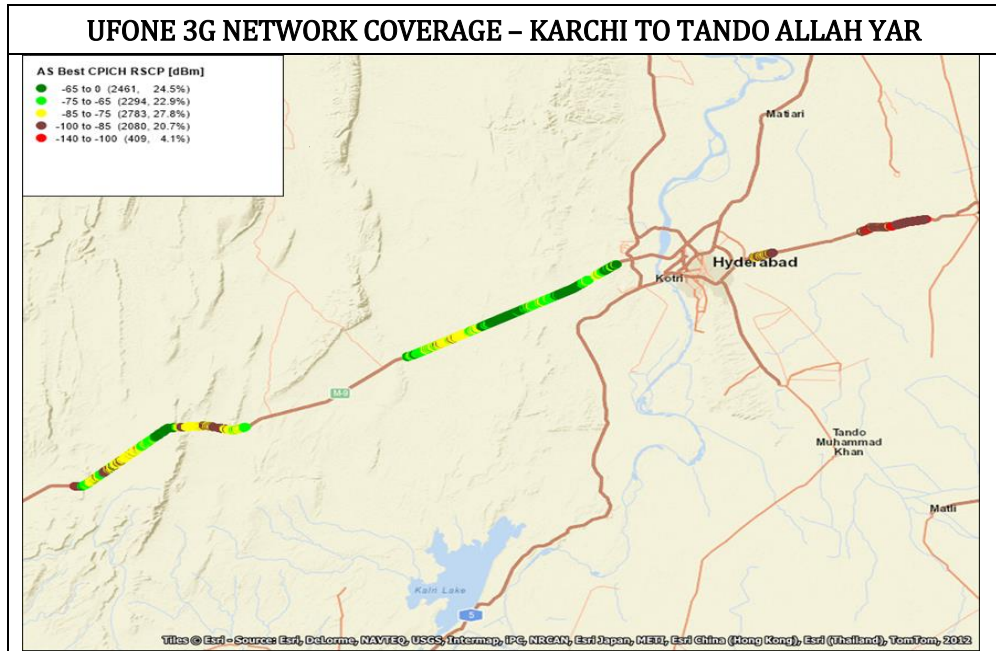
User Data Throughput (3G) > 256Kbps



User Data Throughput (4G) > 2Mbps



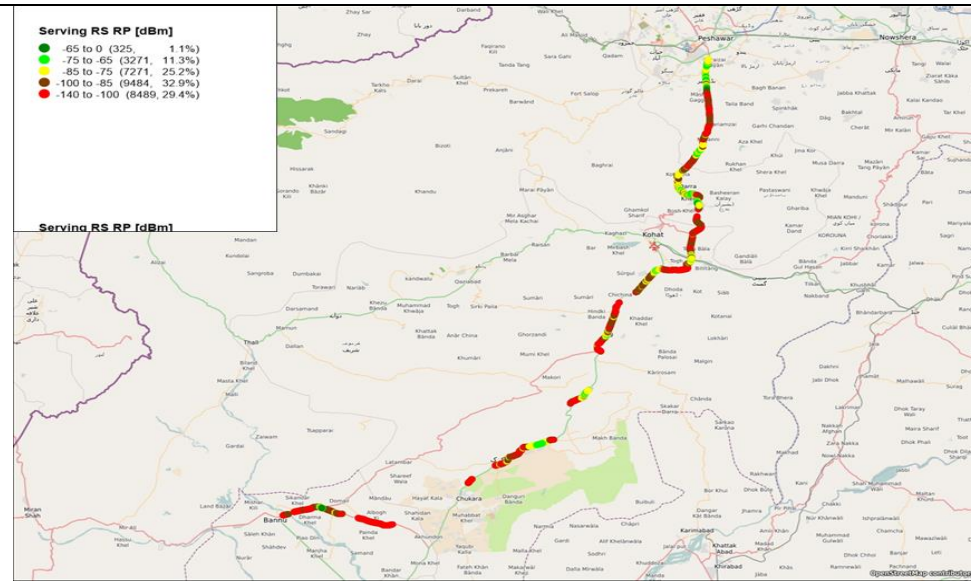
3G MOBILE COVERAGE ON MOTORWAYS / HIGHWAYS / ROADS – SIGNAL STRENGTH (RSCP)



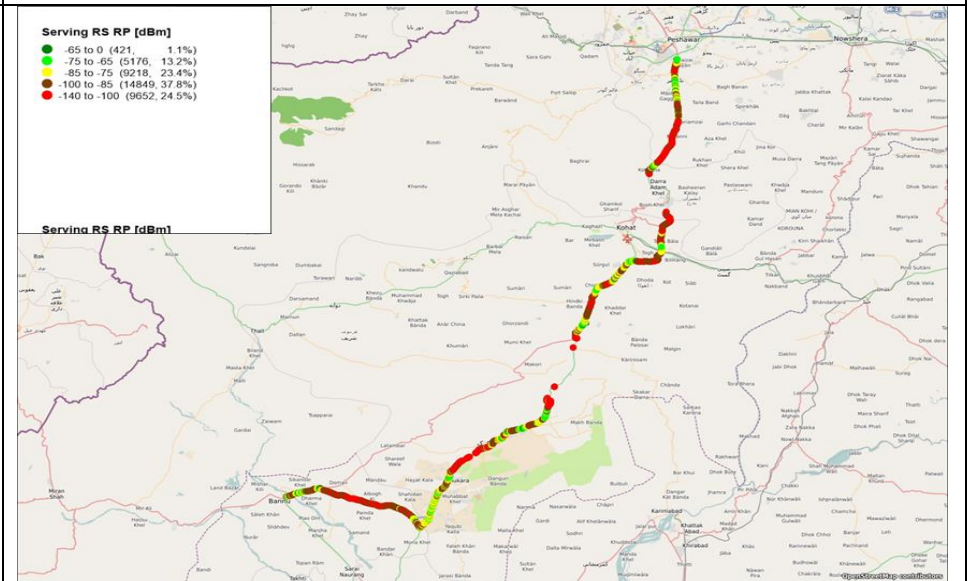
KHYBER PAKHTUNKHWA

4G MOBILE COVERAGE ON MOTORWAYS / HIGHWAYS / ROADS – SIGNAL STRENGTH (RSRP)

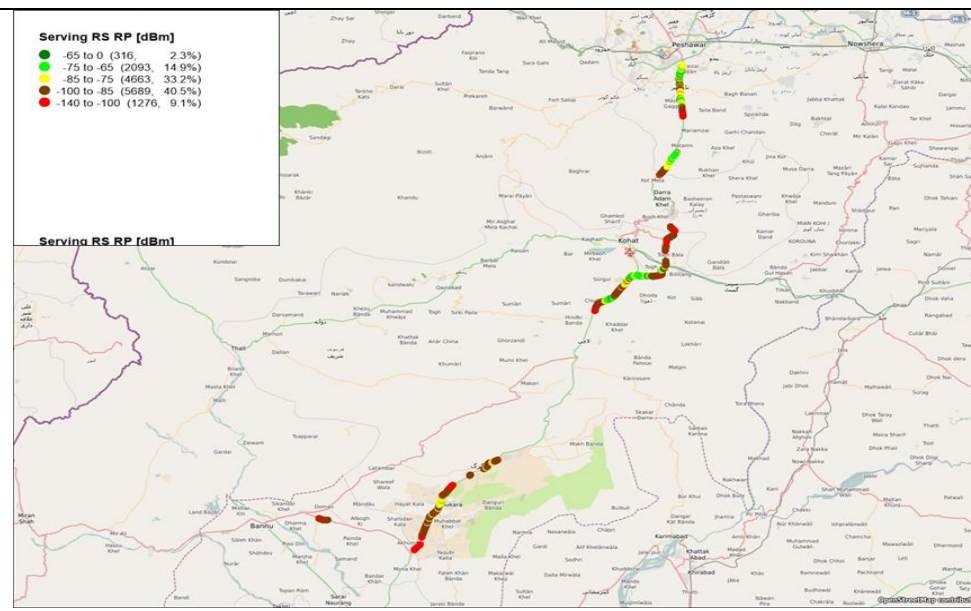
JAZZ 4G NETWORK COVERAGE – PESHAWAR TO BANNU



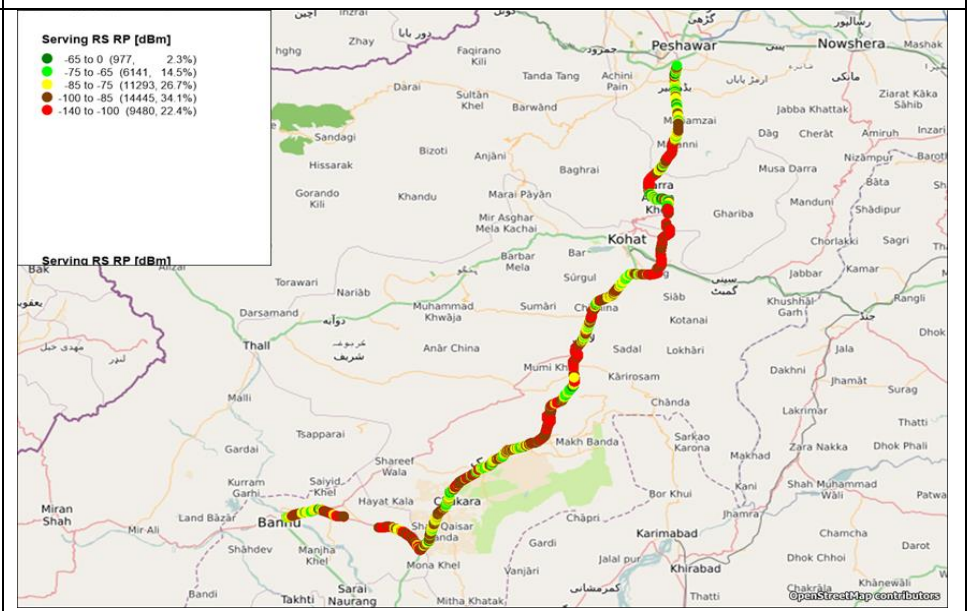
TELENOR 4G NETWORK COVERAGE – PESHAWAR TO BANNU



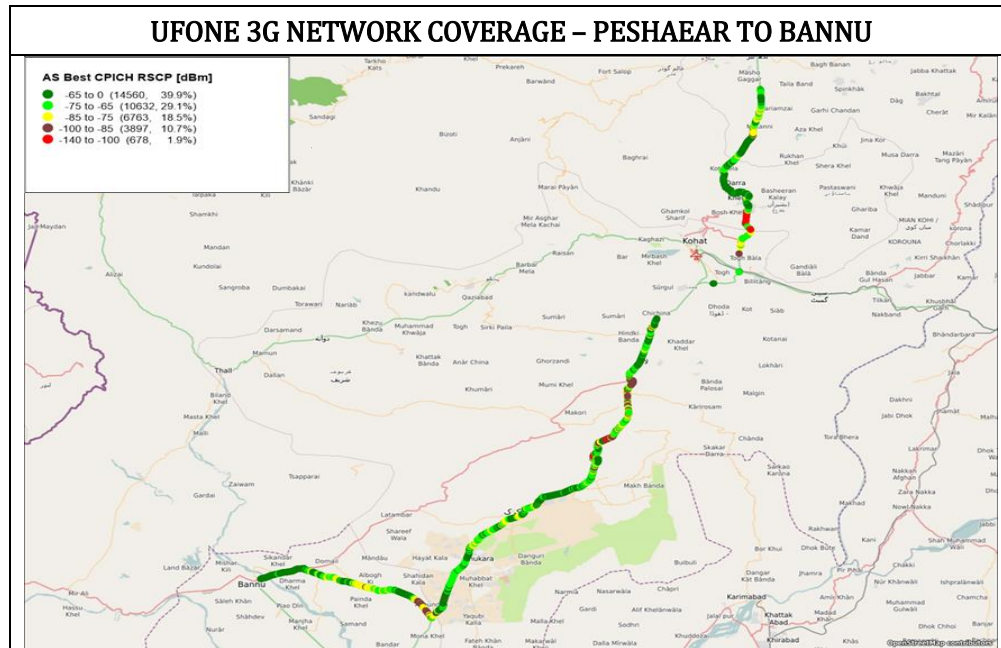
UFONE 4G NETWORK COVERAGE – PESHAWAR TO BANNU



ZONG 4G NETWORK COVERAGE – PESHAWAR TO BANNU

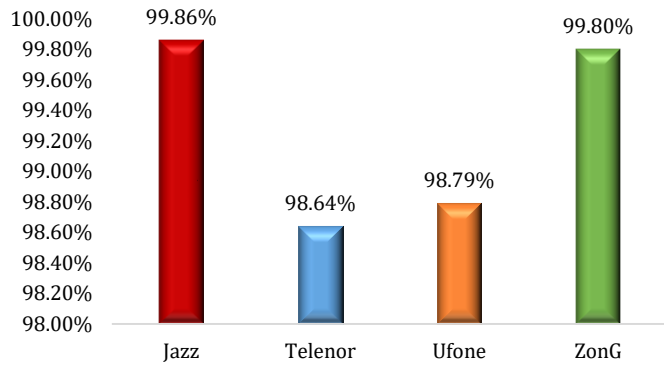


3G MOBILE COVERAGE ON MOTORWAYS / HIGHWAYS / ROADS – SIGNAL STRENGTH (RSCP)

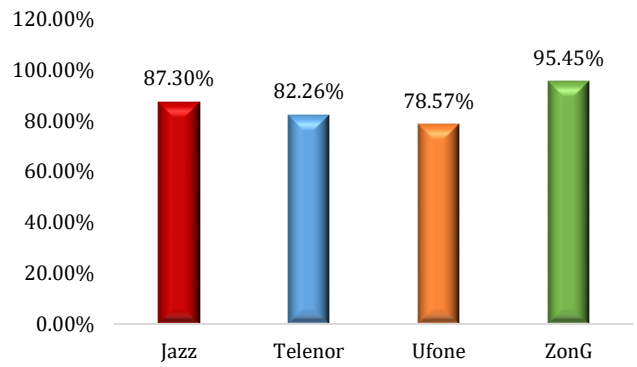


QUALITY OF SERVICE SURVEY RESULTS – PESHAWAR TO BANNU

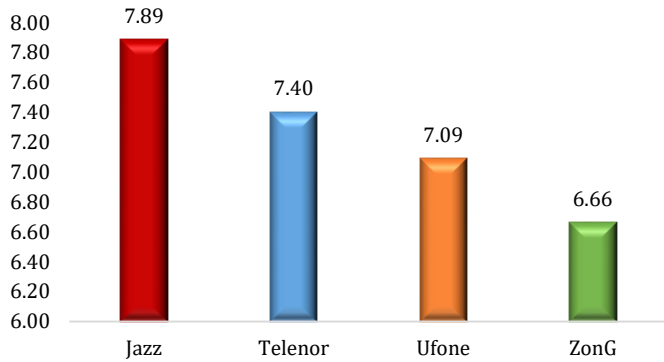
Network Accessibility > 99%



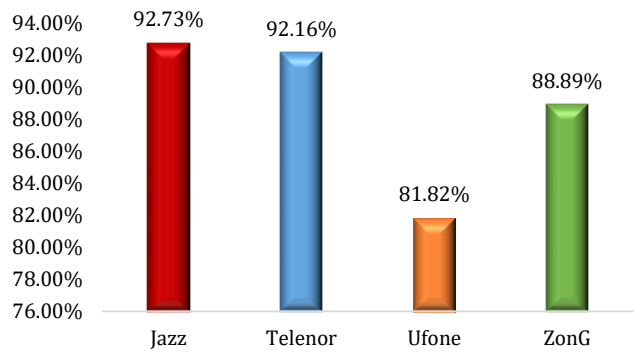
Service Accessibility > 98%



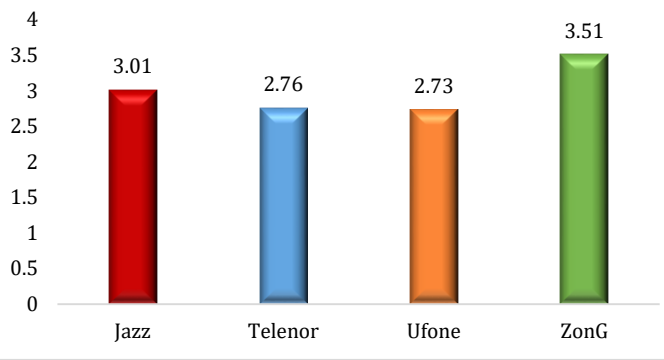
Call Connection Time < 6.5 Seconds



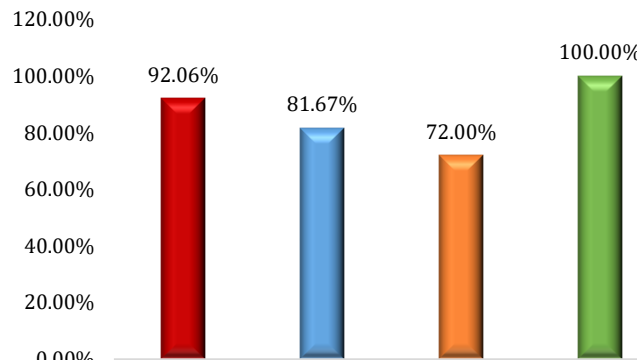
Call Completion Ratio > 98%



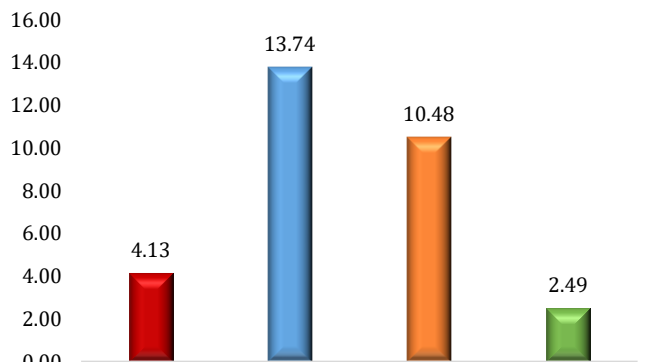
Mean Opinion Score > 3



SMS Success Rate > 99%

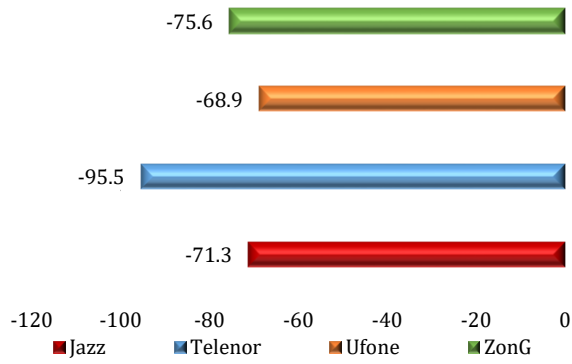


SMS End-to-End Delivery Time < 12 Seconds

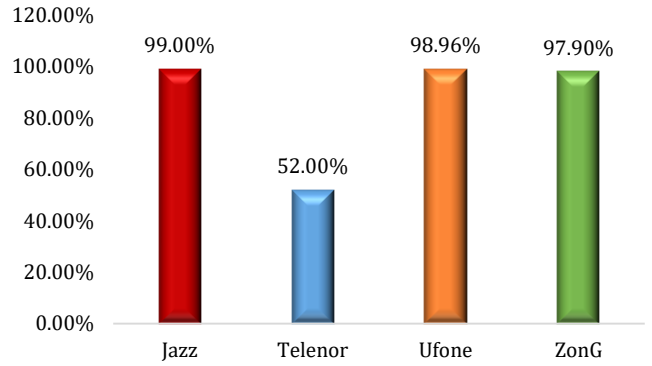


QUALITY OF SERVICE SURVEY RESULTS – PESHAWAR TO BANNU

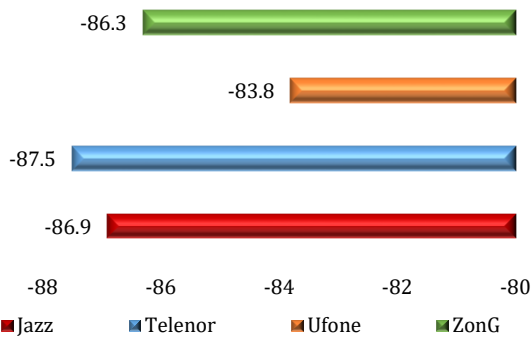
3G Signal Strength (RSCP) > -100dBm



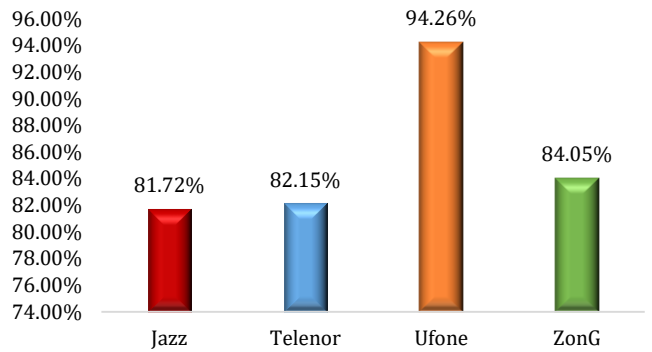
3G Signal Strength (RSCP) Confidencel Level > 90%



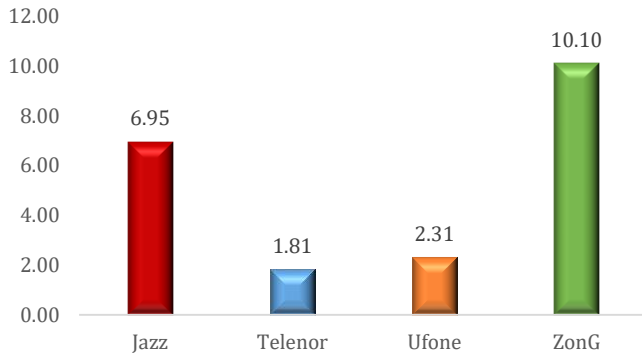
4G Signal Strength (RSRP) > -100dBm



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

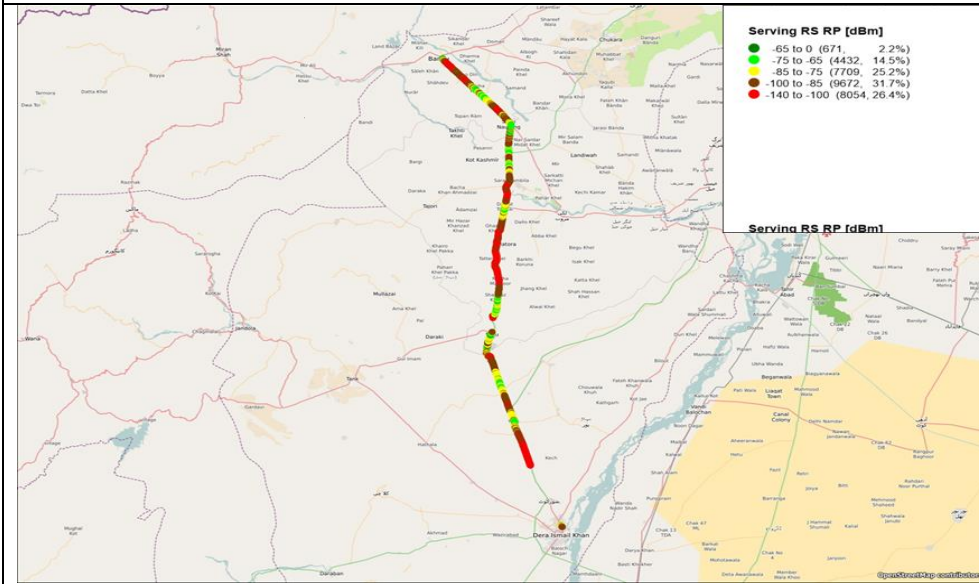


User Data Throughput (4G) > 2Mbps

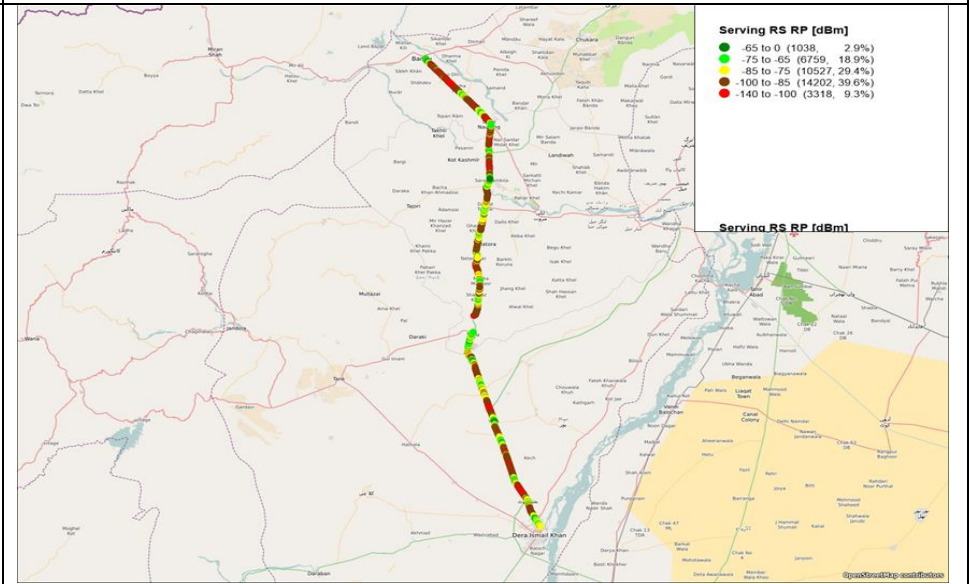


4G MOBILE COVERAGE ON MOTORWAYS / HIGHWAYS / ROADS – SIGNAL STRENGTH (RSRP)

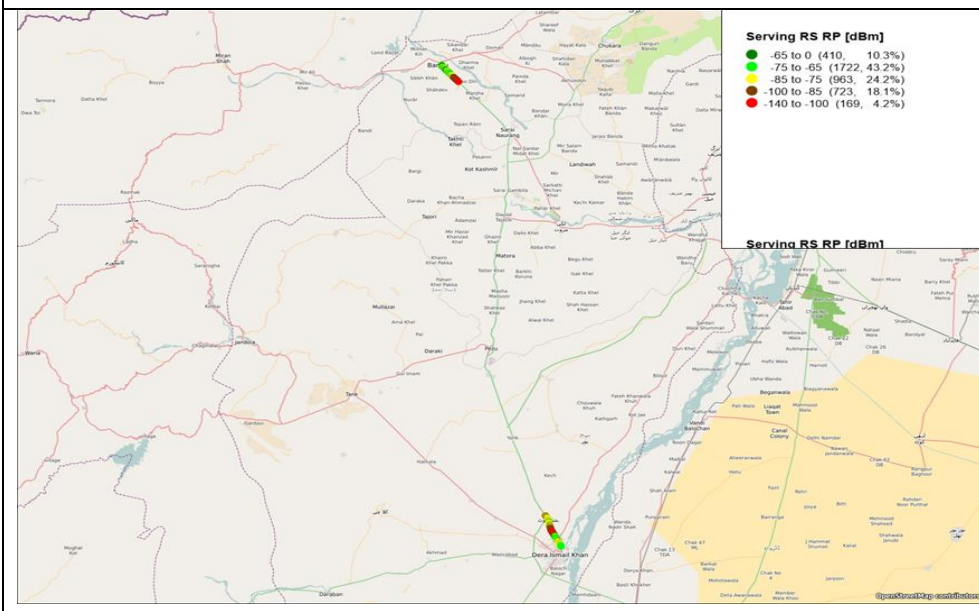
JAZZ 4G NETWORK COVERAGE – BANNU TO DI KHAN



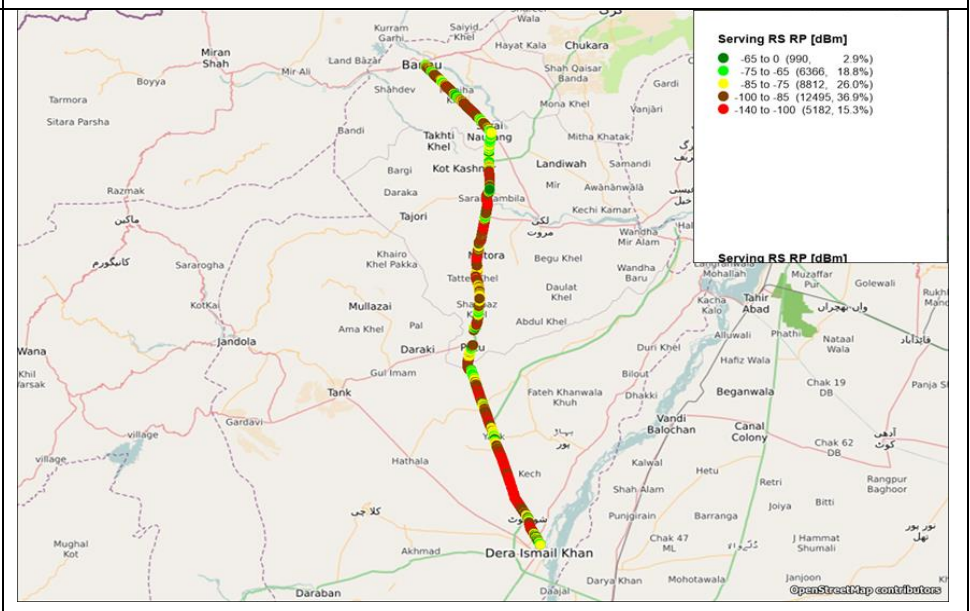
TELEOR 4G NETWORK COVERAGE – BANNU TO DI KHAN



UFONE 4G NETWORK COVERAGE – BANNU TO DI KHAN

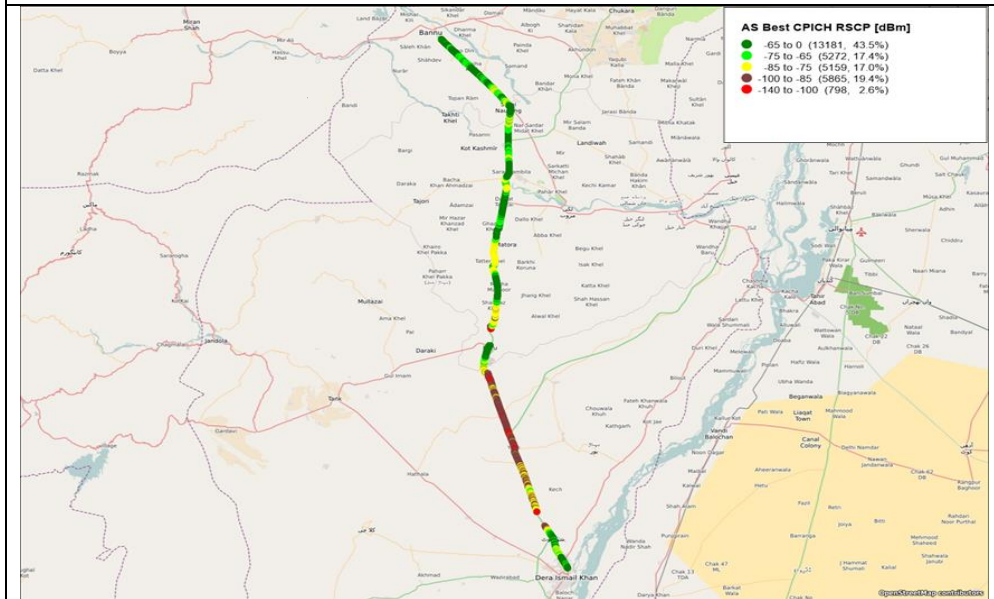


ZONG 4G NETWORK COVERAGE – BANNU TO DI KHAN

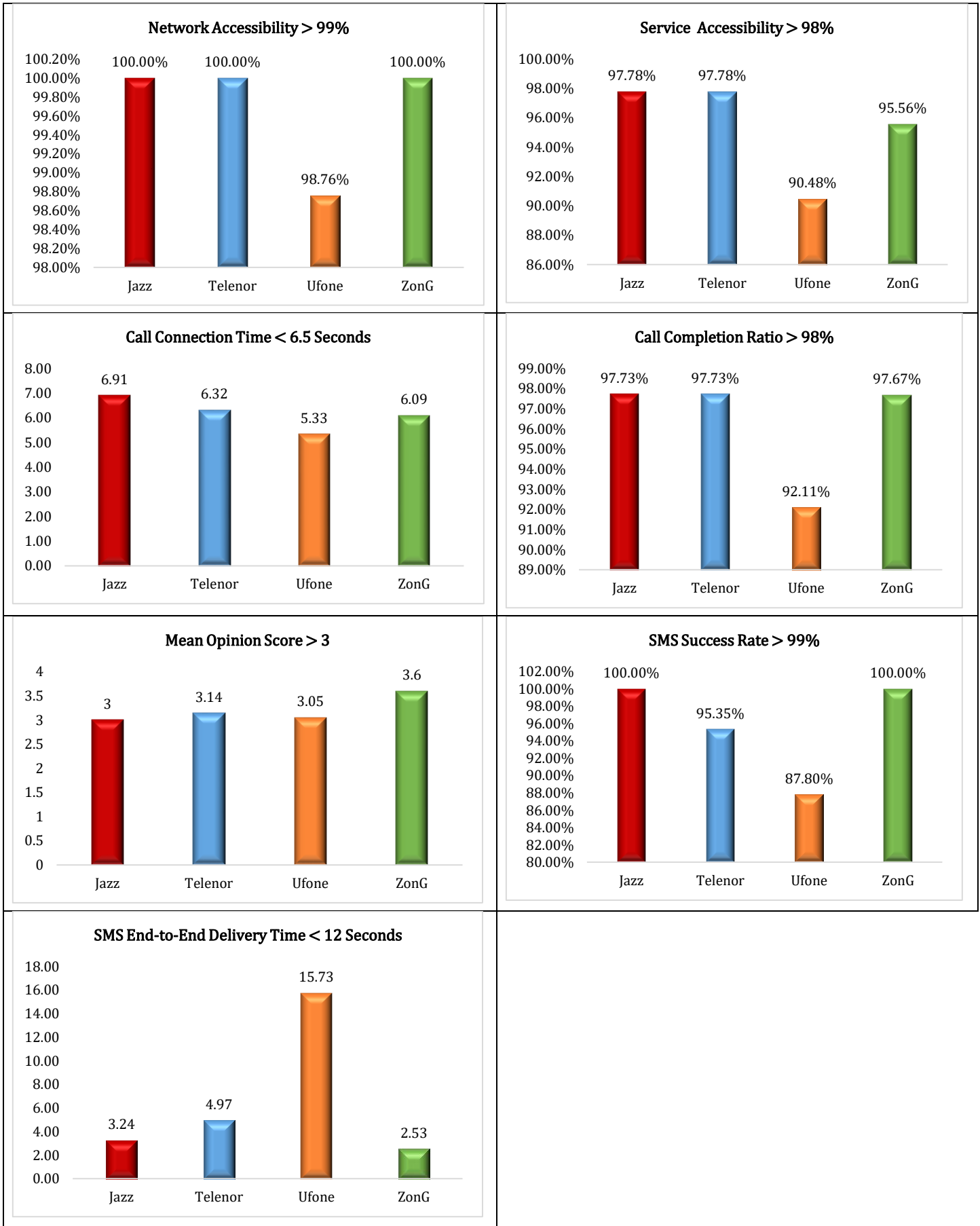


3G MOBILE COVERAGE ON MOTORWAYS / HIGHWAYS / ROADS – SIGNAL STRENGTH (RSCP)

UFONE 3G NETWORK COVERAGE –BANNU TO DI KHAN

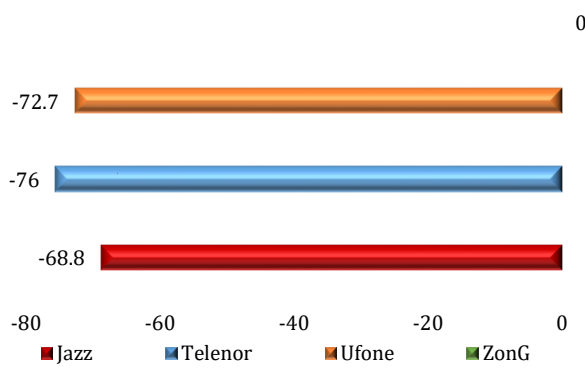


QUALITY OF SERVICE SURVEY RESULTS – BANNU TO DI KHAN

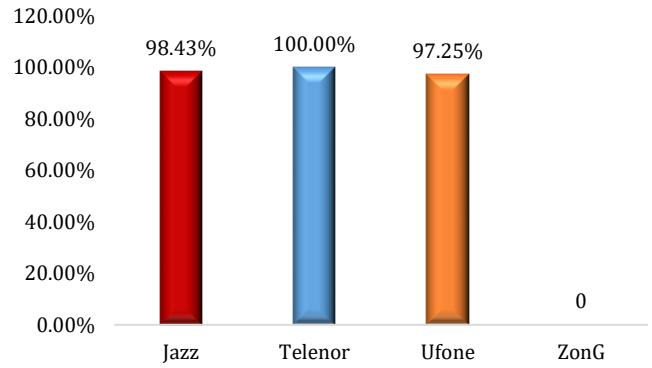


QUALITY OF SERVICE SURVEY RESULTS – BANNU TO DI KHAN

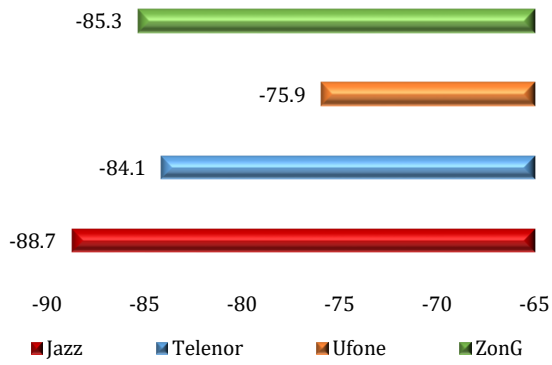
3G Signal Strength (RSCP) > -100dBm



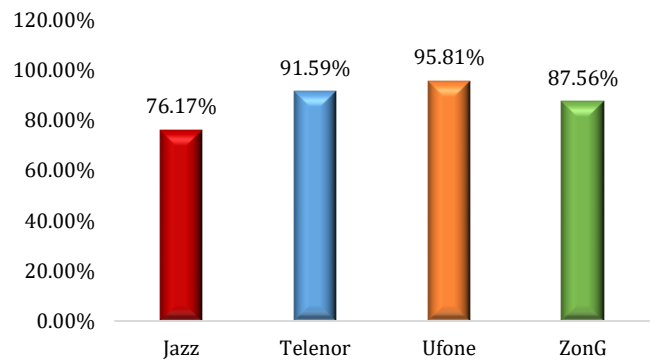
3G Signal Strength (RSCP) Confidencel Level > 90%



4G Signal Strength (RSRP) > -100dBm



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



User Data Throughput (4G) > 2Mbps

