# INDEPENDENT QUALITY OF SERVICE SURVEY - CITIES

FOURTH QUARTER 2022

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

# INDEPENDENT QUALITY OF SERVICE SURVEY REPORT

## INTRODUCTION

1.1. In order to measure the performance and service quality of Cellular Mobile Operators (CMOs), an independent Quality of Service (QoS) Survey has been carried out in Twenty Two (22) x Cities of Punjab, Khyber Pakhtunkhwa and Balochistan during 4th Quarter i.e. October ~ December 2022. The names of cities along with survey dates are mentioned in **Table 1.1: QoS Survey Cities & Dates**:

| S. #. | City | Province | Days | Survey Dates |
|---|---|---|---|---|
| 1 | Bhakkar | Punjab | 4 | 31 October ~ 2 November |
| 2 | Burewala | | 4 | 17 ~ 19 October 2022 |
| 3 | Chakwal | | 4 | 24 ~ 27 October 2022 |
| 4 | Faisalabad | | 4 | 17 ~ 20 October 2022 |
| 5 | Jehlum | | 4 | 17 ~ 20 October 2022 |
| 6 | Layyah | | 4 | 8 ~ 09 November 2022 |
| 7 | Okara | | 4 | 14 ~ 16 October 2022 |
| 8 | Sahiwal | | 4 | 24 ~ 27 October 2022 |
| 9 | Gojra | | 4 | 31 October ~ 03 November 2022 |
| 10 | Attock | | 4 | 13~16 December 2022 |
| 11 | Mandi Bahaudin | | 4 | 06~08 December 2022 |
| 12 | Shakargarh | | 4 | 22 ~ 24 November 2022 |
| 13 | Bannu | Khyber Pakhtunkhwa | 4 | 05 ~ 08 November 2022 |
| 14 | Haripur | | 4 | 18 ~ 21 October 2022 |
| 15 | Kohat | | 4 | 14 ~ 17 November 2022 |
| 16 | Manshera | | 4 | 13 ~ 14 October 2022 |
| 17 | Peshawar | | 4 | 31 October ~ 03 November 2022 |
| 18 | Dhadar | Balochistan | 4 | 28 November ~ 01 December 2022 |
| 19 | Quetta | | 4 | 07 ~ 11 November 2022 |
| 20 | Zhob | | 4 | 21 ~ 24 November 2022 |
| 21 | Ziarat | | 4 | 14 ~ 17 December 2022 |
| 22 | Dalbandin | | 4 | 5 ~ 8 November 2022 |

**Table 1.1: QoS Survey Dates and Samples**

## DRIVE TEST DETAILS

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

## MOBILE NETWORK COVERAGE

3.1. **4G / LTE SIGNAL STRENGTH**. During the survey, while conducting data test in technology auto detect mode as well as locked mode, 4G/LTE signal strength samples were recorded on survey routes. As per Next Generation Mobile Service (NGMS) licenses, licensees are required to meet the threshold of -100 dBm or above of Reference Signal Receive Power (RSRP) with 90% confidence level. City wise compliance of 90% Confidence Level of signal strength is shown in (i). **Table 3.1: 4G Signal Strength Technology Auto Detect Mode -100 dBm with 90% Confidence Level** & (ii). **Table 3.2: 4G Signal Strength Technology Locked Mode -100 dBm with 90% Confidence Level.**

| 4G Signal Strength -100dBm with 90% Confidence Level – Technology Auto Detect Mode | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| City | Confidence Level (%) | | | | Compliant (Yes/No) | | | |
| | Jazz | Telenor | Ufone | ZonG | Jazz | Telenor | Ufone | ZonG |
| *Bhakkar* | 99.11 | 97.28 | 99.96 | 98.78 | Yes | Yes | Yes | Yes |
| *Burewala* | 93.59 | 91.70 | 95.23 | 98.98 | Yes | Yes | Yes | Yes |
| *Chakwal* | 93.11 | **88.77** | 99.93 | 98.87 | Yes | **No** | Yes | Yes |
| *Faisalabad* | 99.23 | 97.52 | 95.36 | 98.37 | Yes | Yes | Yes | Yes |
| *Jehlum* | 95.92 | **83.40** | 98.59 | 95.68 | Yes | **No** | Yes | Yes |
| *Layyah* | 100.00 | 92.39 | 97.87 | 97.24 | Yes | Yes | Yes | Yes |
| *Okara* | 99.30 | 98.17 | 97.36 | 99.77 | Yes | Yes | Yes | Yes |
| *Sahiwal* | 99.33 | **83.29** | 96.42 | 99.36 | Yes | **No** | Yes | Yes |
| *Gojra* | **85.99** | **82.21** | **85.80** | **83.93** | **No** | **No** | **No** | **No** |
| *Mandi Bahaudin* | 94.18 | 97.57 | 97.21 | 93.18 | Yes | Yes | Yes | Yes |
| *Shakargarh* | 98.08 | **87.66** | 92.57 | 97.80 | Yes | **No** | Yes | Yes |
| *Attock* | 97.50 | **88.96** | 97.76 | 98.90 | Yes | **No** | Yes | Yes |
| *Bannu* | **75.53** | **88.61** | 99.99 | 89.55 | **No** | **No** | Yes | **No** |
| *Haripur* | 96.82 | **87.31** | 98.68 | 98.81 | Yes | **No** | Yes | Yes |
| *Kohat* | 92.52 | **82.99** | 99.84 | 93.48 | Yes | **No** | Yes | Yes |
| *Manshera* | 98.49 | 97.34 | 95.95 | 98.76 | Yes | Yes | Yes | Yes |
| *Peshawar* | 96.65 | **88.71** | 98.26 | 91.51 | Yes | **No** | Yes | Yes |
| *Dhadar* | **83.97** | **55.62** | 95.81 | **74.30** | **No** | **No** | Yes | **No** |
| *Quetta* | 99.12 | 97.38 | 99.74 | 100.00 | Yes | Yes | Yes | Yes |
| *Zhob* | 83.95 | 93.78 | 99.79 | 99.73 | **No** | Yes | Yes | Yes |
| *Ziarat* | **0.00** | 98.40 | **82.52** | 98.05 | **No** | Yes | **No** | Yes |
| *Dalbandin* | **0.00** | 99.17 | 100.00 | 97.68 | **No** | Yes | Yes | Yes |

**Table 3.1: 4G Signal Strength Technology Auto Detect Mode -100 dBm with 90 Confidence Level**

| 4G Signal Strength -100dBm with 90% Confidence Level – Technology Locked Mode | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| City | Confidence Level (%) | | | | Compliant (Yes/No) | | | |
| | Jazz | Telenor | Ufone | ZonG | Jazz | Telenor | Ufone | ZonG |
| *Bhakkar* | 99.19 | 98.49 | 99.92 | 98.58 | Yes | Yes | Yes | Yes |
| *Burewala* | 98.49 | 93.36 | 97.28 | 99.81 | Yes | Yes | Yes | Yes |
| *Chakwal* | 93.33 | 90.24 | 99.93 | 99.17 | Yes | Yes | Yes | Yes |
| *Faisalabad* | 99.23 | 97.52 | 95.36 | 98.37 | Yes | Yes | Yes | Yes |
| *Jehlum* | 97.68 | **85.65** | 98.79 | 95.39 | Yes | **No** | Yes | Yes |
| *Layyah* | 99.96 | 97.93 | 98.33 | 98.61 | Yes | Yes | Yes | Yes |
| *Okara* | 98.82 | 91.44 | 94.89 | 99.10 | Yes | Yes | Yes | Yes |
| *Sahiwal* | 99.06 | 91.26 | 93.14 | 99.47 | Yes | Yes | Yes | Yes |
| *Gojra* | 96.19 | 92.24 | 94.31 | 95.99 | Yes | Yes | Yes | Yes |
| *Mandi Bahaudin* | 96.77 | 98.62 | 97.71 | 97.89 | Yes | Yes | Yes | Yes |
| *Shakargarh* | 98.35 | **87.49** | 95.34 | 97.76 | Yes | **No** | Yes | Yes |
| *Attock* | 99.09 | 95.98 | 98.60 | 99.29 | Yes | Yes | Yes | Yes |
| *Bannu* | **83.45** | 90.19 | 99.98 | 90.50 | **No** | Yes | Yes | Yes |
| *Haripur* | 96.47 | 90.90 | 97.88 | 98.64 | Yes | Yes | Yes | Yes |
| *Kohat* | 95.38 | **88.64** | 99.89 | 93.30 | Yes | **No** | Yes | Yes |
| *Manshera* | 98.93 | 99.27 | 97.32 | 98.79 | Yes | Yes | Yes | Yes |
| *Peshawar* | 96.82 | 93.35 | 99.39 | 94.77 | Yes | Yes | Yes | Yes |
| *Dhadar* | **80.69** | **70.18** | **97.52** | **84.41** | **No** | **No** | Yes | **No** |
| *Quetta* | 99.90 | 99.27 | 99.60 | 99.97 | Yes | Yes | Yes | Yes |
| *Zhob* | **84.34** | 97.78 | 98.84 | 99.42 | **No** | Yes | Yes | Yes |
| *Ziarat* | **86.40** | 97.21 | **73.51** | 99.12 | **No** | Yes | **No** | Yes |
| *Dalbandin* | 99.37 | 99.52 | 99.98 | 97.10 | Yes | Yes | Yes | Yes |

**Table 3.2: 4G Signal Strength Technology Locked Mode -100 dBm with 90% Confidence Level**

3.2. **3G SIGNAL STRENGTH IN TECNHOLOGY AUTO DETECT MODE**. During the survey, 3G signal strength samples were also recorded on survey routes, wherever network switched to 3G while keeping the mobile handset in technology auto detect mode and also in technology locked mode. As per Next Generation Mobile Service (NGMS) licenses, licensees are required to meet the threshold of -100 dBm or above of Received Signal Code Power (RSCP) with 90% confidence level. City wise compliance of 90% Confidence Level of signal strength is shown in (i). **Table 3.3: 3G Signal Strength Technology Auto Detect Mode -100 dBm with 90% Confidence Level** (ii). **Table 3.4: 3G Signal Strength Technology Locked Mode -100 dBm with 90% Confidence Level.**

| 3G Signal Strength -100dBm with 90% Confidence Level – Technology Auto Detect Mode | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| City | Confidence Level (%) | | | | Compliant (Yes/No) | | | |
| | Jazz | Telenor | Ufone | ZonG | Jazz | Telenor | Ufone | ZonG |
| *Bhakkar* | N/A | 100 | 100 | N/A | N/A | Yes | Yes | N/A |
| *Burewala* | N/A | | | | | | | |
| *Chakwal* | 100 | N/A | | | Yes | N/A | | |
| *Faisalabad* | N/A | | | | | | | |
| *Jehlum* | N/A | 100 | N/A | | N/A | Yes | N/A | |
| *Layyah* | N/A | | 100 | N/A | N/A | | Yes | N/A |
| *Okara* | N/A | | 100 | N/A | N/A | | Yes | N/A |
| *Sahiwal* | N/A | 100 | 100 | 100 | N/A | Yes | Yes | Yes |
| *Gojra* | N/A | | 91.00 | N/A | N/A | | Yes | N/A |
| *Mandi Bahaudin* | 100 | 100 | 100 | 100 | Yes | Yes | Yes | Yes |
| *Shakargarh* | N/A | | 97.85 | N/A | N/A | | Yes | N/A |
| *Attock* | 100 | 100 | 100 | 100 | Yes | Yes | Yes | Yes |
| *Bannu* | 97.23 | 100 | 100 | 100 | Yes | Yes | Yes | Yes |
| *Haripur* | 100 | 100 | 100 | N/A | Yes | Yes | Yes | N/A |
| *Kohat* | 100 | 98.81 | 100 | 94.51 | Yes | Yes | Yes | Yes |
| *Manshera* | N/A | 100 | 100 | N/A | N/A | Yes | Yes | N/A |
| *Peshawar* | N/A | 99.42 | 100 | 100 | N/A | Yes | Yes | Yes |
| *Dhadar* | 93.36 | 47.59 | 100 | 89.49 | Yes | No | Yes | No |
| *Quetta* | 100 | N/A | 100 | 100 | Yes | N/A | Yes | Yes |
| *Zhob* | 99.79 | N/A | 100 | N/A | Yes | N/A | Yes | N/A |
| *Ziarat* | N/A | | 96.87 | 100 | N/A | | No | Yes |
| *Dalbandin* | 100 | 100 | 100 | 100 | Yes | Yes | Yes | Yes |
| Note: N/A means No Fallback to 3G Network | | | | | | | | |

**Table 3.3: 3G Signal Strength Technology Auto Detect Mode -100 dBm with 90% Confidence Level**

| 3G Signal Strength -100dBm with 90% Confidence Level – Technology Locked Mode | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| City | Signal Strength Percentage | | | | Compliant (Yes/No) | | | |
| | Jazz | Telenor | Ufone | ZonG | Jazz | Telenor | Ufone | ZonG |
| *Bhakkar* | 99.86 | 100 | 100 | 100 | Yes | Yes | Yes | Yes |
| *Burewala* | 100 | 99.97 | 99.99 | 100 | Yes | Yes | Yes | Yes |
| *Chakwal* | 100 | 99.21 | 100 | 100 | Yes | Yes | Yes | Yes |
| *Faisalabad* | 100 | 100 | 99.79 | 100 | Yes | Yes | Yes | Yes |
| *Jehlum* | 99.99 | 99.96 | 100 | 100 | Yes | Yes | Yes | Yes |
| *Layyah* | 100 | 99.99 | 99.91 | 100 | Yes | Yes | Yes | Yes |
| *Okara* | 99.64 | 99.87 | 98.49 | 100 | Yes | Yes | Yes | Yes |
| *Sahiwal* | 99.49 | 99.94 | 99.93 | 100 | Yes | Yes | Yes | Yes |
| *Gojra* | 99.81 | 99.98 | 99.59 | 100 | Yes | Yes | Yes | Yes |
| *Mandi Bahaudin* | 97.58 | 100 | 100 | 100 | Yes | Yes | Yes | Yes |
| *Shakargarh* | 99.53 | 99.81 | 100 | 100 | Yes | Yes | Yes | Yes |
| *Attock* | 99.82 | 99.41 | 99.91 | 99.95 | Yes | Yes | Yes | Yes |
| *Bannu* | 99.09 | 99.67 | 100 | 100 | Yes | Yes | Yes | Yes |
| *Haripur* | 100 | 100 | 100 | 100 | Yes | Yes | Yes | Yes |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Kohat* | 99.97 | 99.91 | 100 | 99.99 | Yes | Yes | Yes | Yes |
| *Manshera* | 100 | 99.73 | 99.92 | 100 | Yes | Yes | Yes | Yes |
| *Peshawar* | 99.98 | 99.98 | 100 | 100 | Yes | Yes | Yes | Yes |
| *Dhadar* | 96.74 | 87.50 | 99.98 | 93.98 | Yes | Yes | Yes | Yes |
| *Quetta* | 99.99 | 99.90 | 100 | 100 | Yes | Yes | Yes | Yes |
| *Zhob* | 100 | 99.98 | 100 | 100 | Yes | Yes | Yes | Yes |
| *Ziarat* | 100 | 100 | 99.64 | 99.98 | Yes | Yes | Yes | Yes |
| *Dalbandin* | 100 | 100 | 100 | 99.99 | Yes | Yes | Yes | Yes |

**Table 3.4: 3G Signal Strength Technology Locked Mode -100 dBm with 90% Confidence Level**

## MOBILE BROADBAND SERVICE

4.1. **DATA SESSIONS IN TECHNOLOGY AUTO DETECT MODE & LOCKED MODE.** A series of data tests including Capacity Tests, Data Transfer Tests, Web Browsing and Ping were carried out wherein Key Performance Indicators (KPIs) of Upload and Download User Data Throughput (i.e. Speed), Webpage Loading Time and Latency have been measured. In Fixed Duration Testing, a File of 10GB was downloaded and Uploaded for 3 minutes duration whereas in Fixed Size Testing, a File of 5MB and 2MB was completely downloaded and uploaded respectively. In order to measure Webpage Loading Time, different national webpages were checked and in case of Latency international and national host were pinged to measure Round Trip Time (RTT)/Latency. The 4G/LTE, 3G and 2G signal strength, Number of Tests, Upload and Download User Data Throughput, Webpage Loading Time and Latency detail is mentioned in **Table4.1: Data Tests Statistics.**

| DESCRIPTION | | | | | JAZZ | TELENOR | UFONE | ZONG |
|---|---|---|---|---|---|---|---|---|
| *AUTO DETECT MODE* | | *CAPACITY TEST* | *DOWNLOAD* | *ATTEMPTS* | 7411 | 8143 | 7835 | 7473 |
| | | | | *SPEED (Mbps)* | 24.86 | 7.322 | 11.18 | 21.98 |
| | | | *UPLOAD* | *ATTEMPTS* | 7418 | 8150 | 7842 | 7480 |
| | | | | *SPEED (Mbps)* | 19.908 | 6.901 | 19.134 | 19.004 |
| | | *DATA TRANSFER TEST* | *DOWNLOAD* | *ATTEMPTS* | 6489 | 8123 | 7857 | 7345 |
| | | | | *SPEED (Mbps)* | 10.315 | 5.916 | 7.242 | 10.404 |
| | | | *UPLOAD* | *ATTEMPTS* | 7464 | 8207 | 7897 | 7512 |
| | | | | *SPEED (Mbps)* | 8.306 | 6.315 | 8.761 | 9.654 |
| | | *BROWSING TEST* | *ATTEMPTS* | | 37191 | 40905 | 39343 | 37482 |
| | | | *LOADING TIME (Seconds)* | | **6.86** | **7.62** | **6.93** | **6.61** |
| | | *PING TEST* | *ATTEMPTS* | | 14955 | 16471 | 15821 | 15054 |
| | | | *LATENCY (msec)* | | **318.39** | **249.77** | **266.3** | **241.57** |
| | | *AVERAGE 4G SIGNAL STRENGTH (RSRP) dBm* | | | -82 | -84.1 | -78.4 | -79.8 |
| | | *AVERAGE 3G SIGNAL STRENGTH (RSCP) dBm* | | | -70.8 | -72.52 | -69.76 | -71.46 |
| *LOCKED MODE* | *4G* | *DATA TRANSFER TEST* | *DOWNLOAD* | *ATTEMPTS* | 4671 | 4699 | 4347 | 4600 |
| | | | | *SPEED (Mbps)* | 18.78 | 4.873 | 9.272 | 19.504 |
| | | | *UPLOAD* | *ATTEMPTS* | 4662 | 4690 | 4399 | 4589 |
| | | | | *SPEED (Mbps)* | 17.374 | 5.258 | 13.454 | 11.356 |
| | | *PING TEST* | *ATTEMPTS* | | 4704 | 4734 | 4440 | 4626 |
| | | | *LATENCY (msec)* | | **95.53** | **97.77** | **100.83** | **105.91** |
| | | *AVERAGE 4G SIGNAL STRENGTH (RSRP) dBm* | | | -81.4 | -84.3 | -80 | -80.8 |
| | *3G* | *DATA TRANSFER TEST* | *DOWNLOAD* | *ATTEMPTS* | 2973 | 4082 | 4308 | 4479 |
| | | | | *SPEED (Mbps)* | 2.742 | 2.453 | 3.129 | 2.289 |
| | | | *UPLOAD* | *ATTEMPTS* | 2959 | 4074 | 4297 | 4469 |
| | | | | *SPEED (Mbps)* | 1.162 | 1.338 | 2.225 | 1.226 |
| | | *PING TEST* | *ATTEMPTS* | | 4599 | 4240 | 4509 | 4619 |
| | | | *LATENCY (msec)* | | **479.54** | **722.39** | **515.09** | **297.36** |
| | | *AVERAGE 3G SIGNAL STRENGTH (RSCP) dBm* | | | -71.06 | -70.52 | -65.86 | -67.16 |

**Table 4.1: Data Tests Statistics**

4.2. **DOWNLOAD USER DATA THROUGHPUT.** As per Next Generation Mobile Service (NGMS) licenses, licensees are required to meet the threshold of minimum of 3Mbps of 4G/LTE & 512Kbps of 3G Download User Data Throughput. The results of Data Service QoS KPI i.e. Download User Data Throughput is shown in (i). **Table 4.2: Download User Data Throughput Technology Auto Detect Mode [Fixed Duration] ≥ 3Mbps,** (ii). **Table 4.3: Download User Data Throughput Technology Auto Detect Mode [Fixed Size] ≥ 3Mbps**, (iii). **Table 4.4: Download User Data Throughput IN 4G/LTE Technology Locked Mode [Fixed Duration] ≥ 3Mbps & Table 4.5: Download User Data Throughput IN 3G Technology Locked Mode [Fixed Duration] ≥ 512Kbps**.

| DOWNLOAD USER DATA THROUGHPUT IN TECHNOLOGY AUTO DETECT MODE (FIXED DURATION) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| City | Download User Data Throughput [Mbps] | | | | Operator Position | | | |
| | Jazz | Telenor | Ufone | ZonG | Jazz | Telenor | Ufone | ZonG |
| *Bhakkar* | 22.44 | 6.49 | 8.73 | 29.82 | Second | Fourth | Third | First |
| *Burewala* | 17.79 | 8.32 | 15.83 | 11.30 | First | Fourth | Second | Third |
| *Chakwal* | 26.15 | 8.22 | 7.21 | 21.38 | First | Third | Fourth | Second |
| *Faisalabad* | 19.21 | 7.19 | 16.57 | 29.29 | Second | Fourth | Third | First |
| *Jehlum* | 31.41 | 10.36 | 14.32 | 20.31 | First | Fourth | Third | Second |
| *Layyah* | 16.82 | 5.48 | 9.89 | 7.80 | First | Fourth | Second | Third |
| *Okara* | 22.42 | 7.43 | 29.79 | 22.69 | Third | Fourth | First | Second |
| *Sahiwal* | 20.20 | 9.70 | 23.79 | 20.80 | Third | Fourth | First | Second |
| *Gojra* | 21.92 | 4.77 | 18.72 | 27.09 | Second | Fourth | Third | First |
| *Mandi Bahaudin* | 26.25 | 3.95 | 12.14 | 18.37 | First | Fourth | Third | Second |
| *Shakargarh* | 18.48 | 6.67 | 13.85 | 23.41 | Second | Fourth | Third | First |
| *Attock* | 29.03 | 6.85 | 15.62 | 20.07 | First | Fourth | Third | Second |
| *Bannu* | 30.04 | 6.10 | 5.80 | 25.01 | First | Third | Fourth | Second |
| *Haripur* | 23.58 | 7.09 | 7.76 | 14.44 | First | Fourth | Third | Second |
| *Kohat* | 24.90 | 5.22 | 4.23 | 29.85 | Second | Third | Fourth | First |
| *Manshera* | 25.46 | **2.90** | 16.52 | 11.75 | First | Fourth | Second | Third |
| *Peshawar* | 18.18 | 4.65 | 6.02 | 20.57 | Second | Fourth | Third | First |
| *Dhadar* | 49.02 | 16.80 | 6.85 | 45.02 | First | Third | Fourth | Second |
| *Quetta* | 22.63 | 5.60 | 5.05 | 16.41 | First | Third | Fourth | Second |
| *Zhob* | 22.85 | 5.84 | 12.29 | 13.87 | First | Fourth | Third | Second |
| *Ziarat* | **0.14** | 11.58 | 12.85 | 34.88 | Fourth | Third | Second | First |
| *Dalbandin* | **0.14** | 4.10 | **0.93** | 9.87 | Fourth | Second | Third | First |

**Table4.2: Download User Data Throughput Technology Auto Detect Mode [Fixed Duration] ≥ 3Mbps**

| DOWNLOAD USER DATA THROUGHPUT IN TECHNOLOGY AUTO DETECT MODE (FIXED SIZE) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| City | Download User Data Throughput [Mbps] | | | | Operator Position | | | |
| | Jazz | Telenor | Ufone | ZonG | Jazz | Telenor | Ufone | ZonG |
| *Bhakkar* | 11.86 | 5.65 | 6.89 | 14.01 | Second | Fourth | Third | First |
| *Burewala* | 11.71 | 6.66 | 7.03 | 7.58 | First | Fourth | Third | Second |
| *Chakwal* | 11.97 | 6.33 | 6.32 | 12.60 | Second | Third | Fourth | First |
| *Jehlum* | 14.02 | 7.45 | 8.38 | 12.75 | First | Fourth | Third | Second |
| *Layyah* | 10.40 | 4.79 | 7.19 | 7.09 | First | Fourth | Second | Third |
| *Okara* | 11.29 | 6.37 | 11.68 | 11.37 | Third | Fourth | First | Second |
| *Sahiwal* | 11.96 | 7.19 | 12.89 | 11.75 | Second | Fourth | First | Third |
| *Gojra* | 12.30 | 4.76 | 11.79 | 13.37 | Second | Fourth | Third | First |
| *Mandi Bahaudin* | 11.67 | 4.81 | 7.44 | 8.99 | First | Fourth | Third | Second |
| *Shakargarh* | 10.62 | 6.72 | 8.41 | 12.26 | Second | Fourth | Third | First |
| *Attock* | 11.41 | 5.80 | 10.59 | 12.33 | Second | Fourth | Third | First |
| *Bannu* | 13.60 | 5.71 | 5.66 | 13.30 | First | Third | Fourth | Second |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Haripur* | 11.59 | 6.79 | 6.44 | 9.69 | First | Third | Fourth | Second |
| *Kohat* | 10.93 | 6.16 | 5.21 | 15.02 | Second | Third | Fourth | First |
| *Manshera* | 12.61 | 4.19 | 10.66 | 9.10 | First | Fourth | Second | Third |
| *Peshawar* | 10.20 | 5.22 | 5.59 | 11.40 | Second | Fourth | Third | First |
| *Dhadar* | 16.32 | 10.08 | 6.07 | 16.29 | First | Third | Fourth | Second |
| *Quetta* | 12.42 | 5.89 | 4.59 | 9.47 | First | Third | Fourth | Second |
| *Zhob* | 7.84 | 6.49 | 8.76 | 9.16 | Third | Fourth | Second | First |
| *Ziarat* | **N/A** | 8.86 | 8.66 | 17.23 | **N/A** | Second | Third | First |
| *Dalbandin* | **N/A** | 6.21 | 2.22 | 6.32 | **N/A** | Second | Third | First |

**Table4.3: Download User Data Throughput Technology Auto Detect Mode [Fixed Size] ≥ 3Mbps**

| DOWNLOAD USER DATA THROUGHPUT IN 4G/LTE TECHNOLOGY LOCKED MODE (FIXED DURATION) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **City** | **Download User Data Throughput [Mbps]** | | | | **Operator Position** | | | |
| | **Jazz** | **Telenor** | **Ufone** | **ZonG** | **Jazz** | **Telenor** | **Ufone** | **ZonG** |
| *Bhakkar* | 19.55 | 6.20 | 6.52 | 23.08 | Second | Fourth | Third | First |
| *Burewala* | 21.76 | 6.53 | 21.72 | 7.83 | First | Fourth | Second | Third |
| *Chakwal* | 8.59 | 2.76 | 3.35 | 15.75 | Second | Fourth | Third | First |
| *Faisalabad* | 19.21 | 7.19 | 16.57 | 29.29 | Second | Fourth | Third | First |
| *Jehlum* | 18.05 | 2.90 | 3.64 | 12.41 | First | Fourth | Third | Second |
| *Layyah* | 14.83 | 3.88 | 7.68 | 4.91 | First | Fourth | Second | Third |
| *Okara* | 14.03 | 4.83 | 20.91 | 18.13 | Third | Fourth | First | Second |
| *Sahiwal* | 19.78 | 8.89 | 24.83 | 21.46 | Third | Fourth | First | Second |
| *Gojra* | 21.62 | 4.34 | 18.53 | 26.76 | Second | Fourth | Third | First |
| *Mandi Bahaudin* | 19.62 | **2.07** | 10.51 | 20.77 | Second | Fourth | Third | First |
| *Shakargarh* | 11.00 | 5.76 | 11.81 | 30.50 | Third | Fourth | Second | First |
| *Attock* | 16.03 | **1.22** | 6.27 | 13.43 | First | Fourth | Third | Second |
| *Bannu* | 23.54 | 4.32 | 4.19 | 26.40 | Second | Third | Fourth | First |
| *Haripur* | 16.15 | 3.50 | 6.49 | 11.13 | First | Fourth | Third | Second |
| *Kohat* | 19.84 | 3.29 | **2.72** | 26.40 | Second | Third | Fourth | First |
| *Manshera* | 16.03 | 2.00 | 14.99 | 9.37 | First | Fourth | Second | Third |
| *Peshawar* | 13.66 | 2.92 | 4.81 | 10.63 | First | Fourth | Third | Second |
| *Dhadar* | 47.60 | 16.72 | 4.22 | 37.20 | First | Third | Fourth | Second |
| *Quetta* | 20.13 | 4.24 | **1.95** | 8.37 | First | Third | Fourth | Second |
| *Zhob* | 17.78 | 3.18 | 13.40 | 13.17 | First | Fourth | Second | Third |
| *Ziarat* | **N/A** | 12.31 | 11.66 | 30.70 | **N/A** | Second | Third | First |
| *Dalbandin* | **N/A** | 3.19 | **0.44** | 4.16 | **N/A** | Second | Third | First |

**Table 4.4: Download User Data Throughput 4G/LTE Technology Locked Mode [Fixed Duration] ≥ 3Mbps**

| DOWNLOAD USER DATA THROUGHPUT IN 3G TECHNOLOGY LOCKED MODE (FIXED DURATION) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **City** | **Download User Data Throughput [Kbps]** | | | | **Operator Position** | | | |
| | **Jazz** | **Telenor** | **Ufone** | **ZonG** | **Jazz** | **Telenor** | **Ufone** | **ZonG** |
| *Bhakkar* | 5409.86 | 1114.67 | 2168.52 | 1849.82 | First | Fourth | Second | Third |
| *Burewala* | 626.13 | 4496.64 | 2957.37 | 994.96 | Fourth | First | Second | Third |
| *Chakwal* | 2710.21 | 3226.19 | 4215.46 | 2344.02 | Third | Second | First | Fourth |
| *Faisalabad* | 3098.16 | 3278.33 | 3277.26 | 3194.51 | Fourth | First | Second | Third |
| *Jehlum* | 3457.39 | 2577.66 | 3756.37 | 1892.60 | Second | Third | First | Fourth |
| *Layyah* | 2430.22 | 2367.67 | 1471.31 | 1592.70 | First | Second | Fourth | Third |
| *Okara* | 2710.79 | 1665.97 | 2559.52 | 1750.95 | First | Fourth | Second | Third |
| *Sahiwal* | 4894.15 | 3270.10 | 6395.07 | 2875.64 | Second | Third | First | Fourth |
| *Gojra* | 3072.96 | 2157.81 | 5832.43 | 1915.29 | Second | Third | First | Fourth |
| *Mandi Bahaudin* | 1992.80 | 1281.41 | 4172.04 | 2775.98 | Third | Fourth | First | Second |
| *Shakargarh* | 3438.79 | 5330.91 | 8591.99 | 4316.04 | Fourth | Second | First | Third |
| *Attock* | 2168.93 | 3025.31 | 4018.42 | 1603.73 | Third | Second | First | Fourth |
| *Bannu* | 2367.99 | 3430.43 | 2442.42 | 3221.06 | Fourth | First | Third | Second |
| *Haripur* | 2577.36 | 2448.06 | 2230.12 | 1904.53 | First | Second | Third | Fourth |
| *Kohat* | 2225.47 | 2241.71 | 2517.10 | 2877.08 | Fourth | Third | Second | First |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Manshera* | 1972.17 | 2244.36 | 5168.83 | 1398.76 | Third | Second | First | Fourth |
| *Peshawar* | 2503.25 | 2304.11 | 2702.06 | 1258.35 | Second | Third | First | Fourth |
| *Dhadar* | 6613.45 | 4781.36 | 1668.29 | 2940.34 | First | Second | Fourth | Third |
| *Quetta* | 4837.07 | 2842.49 | 2692.13 | 1883.94 | First | Second | Third | Fourth |
| *Zhob* | **N/A** | 1079.24 | 4366.31 | 2436.89 | **N/A** | Third | First | Second |
| *Ziarat* | **N/A** | 4415.86 | 2365.89 | 4720.32 | **N/A** | Second | Third | First |
| *Dalbandin* | **N/A** | 674.47 | 791.85 | 568.01 | **N/A** | Second | First | Third |

**Table 4.5: Download User Data Throughput IN 3G Technology Locked Mode [Fixed Duration] ≥ 512Kbps**

4.3. **UPLOAD USER DATA THROUGHPUT.** As per Cellular Mobile Network Quality of Service (QoS) Regulations 2021, licensees are required to meet the threshold of minimum of 786Kbps of 4G/LTE & 128Kbps of 3G of Upload User Data Throughput. The results of Data Service QoS KPI i.e. Upload User Data Throughput is shown in (i). **Table 4.6: Upload User Data Throughput Technology Auto Detect Mode [Fixed Duration] ≥ 768Kbps,** (ii). **Table 4.7: Upload User Data Throughput Technology Auto Detect Mode [Fixed Size] ≥ 768Kbps,** (iii). **Table 4.8: Upload User Data Throughput in 4G/LTE Technology Locked Mode [Fixed Duration] ≥ 768Kbps** & (iv). **Table 4.9: Upload User Data Throughput in 3G Technology Locked Mode [Fixed Duration] ≥ 128Kbps.**

| UPLOAD USER DATA THROUGHPUT IN TECHNOLOGY AUTO DETECT MODE (FIXED DURATION) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| City | Upload User Data Throughput [Kbps] | | | | Operator Position | | | |
| | Jazz | Telenor | Ufone | ZonG | Jazz | Telenor | Ufone | ZonG |
| *Bhakkar* | 27154.64 | 6810.02 | 20699.54 | 19503.05 | First | Fourth | Second | Third |
| *Burewala* | 21123.69 | 5727.35 | 15030.47 | 14515.04 | First | Fourth | Second | Third |
| *Chakwal* | 21286.07 | 8851.64 | 22333.24 | 26289.74 | Third | Fourth | Second | First |
| *Faisalabad* | 19082.47 | 5654.12 | 17917.06 | 9257.32 | First | Fourth | Second | Third |
| *Jehlum* | 24611.60 | 7519.00 | 19980.16 | 20709.90 | First | Fourth | Third | Second |
| *Layyah* | 21370.31 | 6756.00 | 11457.07 | 16873.17 | First | Fourth | Third | Second |
| *Okara* | 23326.71 | 7119.72 | 24827.98 | 19353.98 | Second | Fourth | First | Third |
| *Sahiwal* | 22318.24 | 5531.00 | 22106.59 | 17568.48 | First | Fourth | Second | Third |
| *Gojra* | 25660.28 | 4739.04 | 21634.21 | 16330.83 | First | Fourth | Second | Third |
| *Mandi Bahaudin* | 18840.96 | 4575.80 | 22493.28 | 13602.96 | Second | Fourth | First | Third |
| *Shakargarh* | 22890.16 | 7831.37 | 20244.46 | 16371.34 | First | Fourth | Second | Third |
| *Attock* | 22521.66 | 6255.65 | 23624.14 | 18055.07 | Second | Fourth | First | Third |
| *Bannu* | 17378.51 | 7719.28 | 18920.02 | 18028.89 | Third | Fourth | First | Second |
| *Haripur* | 23365.96 | 6788.24 | 20074.88 | 18588.64 | First | Fourth | Second | Third |
| *Kohat* | 21460.78 | 8710.61 | 16401.35 | 23180.78 | Second | Fourth | Third | First |
| *Manshera* | 24208.33 | 4730.66 | 21625.57 | 19977.68 | First | Fourth | Second | Third |
| *Peshawar* | 19462.99 | 6132.86 | 19303.43 | 20101.58 | Second | Fourth | Third | First |
| *Dhadar* | 27753.65 | 6378.55 | 9215.85 | 15379.66 | First | Fourth | Third | Second |
| *Quetta* | 24766.65 | 5340.08 | 15139.01 | 16877.14 | First | Fourth | Third | Second |
| *Zhob* | 20203.23 | 7009.39 | 23690.95 | 18612.13 | Second | Fourth | First | Third |
| *Ziarat* | 45.08 | 12479.06 | 16597.17 | 23266.72 | Fourth | Third | Second | First |
| *Dalbandin* | 48.14 | 3937.22 | 13285.50 | 9328.27 | Fourth | Third | First | Second |

**Table 4.6: Upload User Data Throughput Technology Auto Detect Mode [Fixed Duration] ≥ 768Kbps**

| UPLOAD USER DATA THROUGHPUT IN TECHNOLOGY AUTO DETECT MODE (FIXED SIZE) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| City | Upload User Data Throughput [Kbps] | | | | Operator Position | | | |
| | Jazz | Telenor | Ufone | ZonG | Jazz | Telenor | Ufone | ZonG |
| *Bhakkar* | 12710.20 | 10130.77 | 13764.32 | 15018.73 | Third | Fourth | Second | First |
| *Burewala* | 13240.78 | 10792.57 | 9582.99 | 15075.74 | Second | Third | Fourth | First |
| *Chakwal* | 7533.79 | 5606.26 | 8286.98 | 8719.09 | Third | Fourth | Second | First |
| *Jehlum* | 8313.87 | 6027.53 | 7699.19 | 8246.90 | First | Fourth | Third | Second |
| *Layyah* | 13631.32 | 11073.83 | 11388.71 | 16111.03 | Second | Fourth | Third | First |
| *Okara* | 6363.76 | 5568.45 | 8426.08 | 8397.54 | Third | Fourth | First | Second |
| *Sahiwal* | 7974.37 | 5093.17 | 7691.18 | 7949.13 | First | Fourth | Third | Second |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Gojra* | 6769.73 | 5008.54 | 8872.65 | 7248.63 | Third | Fourth | First | Second |
| *Mandi Bahaudin* | 6949.76 | 5120.12 | 7650.13 | 6628.47 | Second | Fourth | First | Third |
| *Shakargarh* | 7780.50 | 6186.48 | 7432.88 | 7689.94 | First | Fourth | Third | Second |
| *Attock* | 7520.41 | 5792.99 | 9973.70 | 8238.18 | Third | Fourth | First | Second |
| *Bannu* | 13651.37 | 11028.63 | 12717.67 | 14022.35 | Second | Fourth | Third | First |
| *Haripur* | 14869.93 | 10590.12 | 15515.17 | 15894.37 | Third | Fourth | Second | First |
| *Kohat* | 10318.87 | 11492.04 | 13399.97 | 16184.42 | Fourth | Third | Second | First |
| *Manshera* | 14881.72 | 9560.87 | 17690.54 | 16226.15 | Third | Fourth | First | Second |
| *Peshawar* | 13341.28 | 9823.83 | 15846.63 | 15201.05 | Third | Fourth | First | Second |
| *Dhadar* | 8132.79 | 5476.30 | 3783.05 | 8374.38 | Second | Third | Fourth | First |
| *Quetta* | 8484.27 | 4904.80 | 4903.31 | 8038.92 | First | Third | Fourth | Second |
| *Zhob* | 6358.06 | 5624.02 | 6676.11 | 7298.81 | Third | Fourth | Second | First |
| *Ziarat* | **N/A** | 7216.26 | 7586.97 | 8618.81 | **N/A** | Third | Second | First |
| *Dalbandin* | **N/A** | 4900.15 | 6868.51 | 5802.73 | **N/A** | Third | First | Second |

**Table 4.7: Upload User Data Throughput Technology Auto Detect Mode [Fixed Size] ≥ 768Kbps**

| UPLOAD USER DATA THROUGHPUT IN 4G TECHNOLOGY LOCKED MODE (FIXED DURATION) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **City** | **Upload User Data Throughput [Kbps]** | | | | **Operator Position** | | | |
| | **Jazz** | **Telenor** | **Ufone** | **ZonG** | **Jazz** | **Telenor** | **Ufone** | **ZonG** |
| *Bhakkar* | 20361.57 | 6653.62 | 16978.13 | 10588.20 | First | Fourth | Second | Third |
| *Burewala* | 21467.19 | 5034.19 | 15641.43 | 13849.84 | First | Fourth | Second | Third |
| *Chakwal* | 19873.67 | 8377.74 | 19629.20 | 25355.13 | Second | Fourth | Third | First |
| *Faisalabad* | 19082.47 | 5654.12 | 17917.06 | 9257.32 | First | Fourth | Second | Third |
| *Jehlum* | 19743.11 | 4774.83 | 17595.73 | 17438.06 | First | Fourth | Second | Third |
| *Layyah* | 19495.66 | 5799.86 | 11651.94 | 8541.22 | First | Fourth | Second | Third |
| *Okara* | 18703.68 | 5410.58 | 21993.50 | 10362.83 | Second | Fourth | First | Third |
| *Sahiwal* | 22396.31 | 5754.55 | 18583.73 | 9408.17 | First | Fourth | Second | Third |
| *Gojra* | 21048.73 | 2916.21 | 17945.97 | 7849.90 | First | Fourth | Second | Third |
| *Mandi Bahaudin* | 15947.06 | 2413.87 | 19589.63 | 10588.07 | Second | Fourth | First | Third |
| *Shakargarh* | 18396.78 | 7322.79 | 16022.01 | 10280.57 | First | Fourth | Second | Third |
| *Attock* | 20136.16 | 5173.51 | 20783.91 | 12938.66 | Second | Fourth | First | Third |
| *Bannu* | 14529.84 | 5969.22 | 15148.20 | 12931.87 | Second | Fourth | First | Third |
| *Haripur* | 18354.48 | 5200.07 | 16373.51 | 16466.96 | First | Fourth | Third | Second |
| *Kohat* | 18351.28 | 7045.34 | 14134.30 | 17879.07 | First | Fourth | Third | Second |
| *Manshera* | 20841.58 | 5394.04 | 19761.82 | 18643.85 | First | Fourth | Second | Third |
| *Peshawar* | 16864.90 | 4597.15 | 15190.42 | 9015.80 | First | Fourth | Second | Third |
| *Dhadar* | 21020.53 | 6661.17 | 4109.55 | 14222.28 | First | Third | Fourth | Second |
| *Quetta* | 22140.08 | 4697.57 | 7439.94 | 13020.30 | First | Fourth | Third | Second |
| *Zhob* | 14515.08 | 5568.60 | 14246.05 | 15183.43 | Second | Fourth | Third | First |
| *Ziarat* | **N/A** | 10796.47 | 14149.38 | 21225.71 | **N/A** | Third | Second | First |
| *Dalbandin* | **N/A** | 2798.82 | 10130.13 | 5505.12 | **N/A** | Third | First | Second |

**Table 4.8: Upload User Data Throughput Technology Locked Mode [Fixed Duration] ≥ 768Kbps**

| UPLOAD USER DATA THROUGHPUT IN 3G TECHNOLOGY LOCKED MODE (FIXED DURATION) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **City** | **Upload User Data Throughput [Kbps]** | | | | **Operator Position** | | | |
| | **Jazz** | **Telenor** | **Ufone** | **ZonG** | **Jazz** | **Telenor** | **Ufone** | **ZonG** |
| *Bhakkar* | 1713.90 | 1276.30 | 2143.19 | 952.77 | Second | Third | First | Fourth |
| *Burewala* | 1108.04 | 1403.07 | 1704.74 | 609.35 | Third | Second | First | Fourth |
| *Chakwal* | 1088.47 | 1484.21 | 2936.98 | 1103.62 | Fourth | Second | First | Third |
| *Faisalabad* | 1152.01 | 1436.45 | 2236.43 | 777.98 | Third | Second | First | Fourth |
| *Jehlum* | 839.57 | 1206.41 | 2378.42 | 818.01 | Third | Second | First | Fourth |
| *Layyah* | 1676.48 | 1809.73 | 1515.11 | 943.95 | Second | First | Third | Fourth |
| *Okara* | 787.97 | 1241.28 | 1795.73 | 630.02 | Third | Second | First | Fourth |
| *Sahiwal* | 959.03 | 1001.25 | 2827.15 | 771.64 | Third | Second | First | Fourth |
| *Gojra* | 1202.14 | 958.43 | 3479.30 | 909.25 | Second | Third | First | Fourth |
| *Mandi Bahaudin* | 843.20 | 867.57 | 2548.28 | 767.60 | Third | Second | First | Fourth |
| *Shakargarh* | 1195.35 | 1461.64 | 10711.32 | 748.78 | Third | Second | First | Fourth |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Attock* | 1326.95 | 1326.70 | 2546.60 | 363.04 | Second | Third | First | Fourth |
| *Bannu* | 1191.51 | 1635.28 | 1959.06 | 1977.78 | Fourth | Third | Second | First |
| *Haripur* | 1055.62 | 1450.76 | 2489.41 | 902.81 | Third | Second | First | Fourth |
| *Kohat* | 1008.23 | 1542.06 | 2825.59 | 2030.13 | Fourth | Third | First | Second |
| *Manshera* | 1629.95 | 1253.43 | 2925.10 | 433.74 | Second | Third | First | Fourth |
| *Peshawar* | 1090.25 | 1333.97 | 2312.12 | 1714.95 | Fourth | Third | First | Second |
| *Dhadar* | 1661.07 | 1967.60 | 2084.89 | 1831.97 | Fourth | Second | First | Third |
| *Quetta* | 1480.37 | 1615.83 | 2267.56 | 1310.20 | Third | Second | First | Fourth |
| *Zhob* | **N/A** | 851.77 | 2015.11 | 1388.71 | **N/A** | Third | First | Second |
| *Ziarat* | **N/A** | 2424.54 | 1667.77 | 2982.47 | **N/A** | Second | Third | First |
| *Dalbandin* | **N/A** | 564.32 | 1732.99 | 768.35 | **N/A** | Third | First | Second |

**Table 4.9: Upload User Data Throughput in 3G Technology Locked Mode [Fixed Duration] ≥ 128Kbps**

4.4. **WEBPAGE LOADING TIME.** As per Cellular Mobile Network Quality of Service (QoS) Regulations 2021, licensees are required to meet Webpage Loading Time threshold of 5 Seconds. The results of Webpage Loading Time is shown in **Table 4.10: Webpage Loading Time < 5 Seconds.**

| WEBPAGE LOADING TIME IN TECHNOLOGY AUTO DETECT MODE IN CITIES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| City | Webpage Loading Time [seconds] | | | | Compliant (Yes/No) | | | |
| | Jazz | Telenor | Ufone | ZonG | Jazz | Telenor | Ufone | ZonG |
| *Bhakkar* | **7.52** | **7.58** | **7.63** | **6.37** | **No** | **No** | **No** | **No** |
| *Burewala* | **7.55** | **7.56** | **6.24** | **7.17** | **No** | **No** | **No** | **No** |
| *Chakwal* | **6.15** | **6.90** | **6.22** | **5.48** | **No** | **No** | **No** | **No** |
| *Jehlum* | **5.49** | **6.25** | **6.32** | **5.60** | **No** | **No** | **No** | **No** |
| *Layyah* | **7.54** | **8.25** | **7.58** | **7.52** | **No** | **No** | **No** | **No** |
| *Okara* | **6.19** | **6.76** | **6.02** | **5.77** | **No** | **No** | **No** | **No** |
| *Sahiwal* | **6.63** | **6.92** | **5.64** | **5.82** | **No** | **No** | **No** | **No** |
| *Gojra* | **6.52** | **7.66** | **5.62** | **5.80** | **No** | **No** | **No** | **No** |
| *Mandi Bahaudin* | **6.08** | **7.31** | **6.62** | **5.72** | **No** | **No** | **No** | **No** |
| *Shakargarh* | **6.08** | **6.59** | **6.74** | **6.15** | **No** | **No** | **No** | **No** |
| *Attock* | **5.55** | **6.85** | **5.58** | **5.55** | **No** | **No** | **No** | **No** |
| *Bannu* | **6.53** | **7.78** | **7.72** | **6.00** | **No** | **No** | **No** | **No** |
| *Haripur* | **6.26** | **7.28** | **6.80** | **6.36** | **No** | **No** | **No** | **No** |
| *Kohat* | **6.56** | **7.76** | **7.27** | **6.10** | **No** | **No** | **No** | **No** |
| *Manshera* | **6.39** | **8.16** | **6.38** | **7.23** | **No** | **No** | **No** | **No** |
| *Peshawar* | **7.31** | **8.04** | **7.23** | **6.76** | **No** | **No** | **No** | **No** |
| *Dhadar* | **5.30** | **5.89** | **7.04** | **5.29** | **No** | **No** | **No** | **No** |
| *Quetta* | **5.84** | **7.49** | **6.85** | **6.48** | **No** | **No** | **No** | **No** |
| *Zhob* | **7.41** | **6.84** | **6.58** | **6.59** | **No** | **No** | **No** | **No** |
| *Ziarat* | **N/A** | **6.32** | **6.16** | **5.34** | **N/A** | **No** | **No** | **No** |
| *Dalbandin* | **N/A** | **7.43** | **7.04** | **8.15** | **N/A** | **No** | **No** | **No** |

**Table 4.10: Webpage Loading Time < 5 Seconds**

4.5. **LATENCY.** As per Cellular Mobile Network Quality of Service (QoS) Regulations 2021, licensees are required to meet threshold of 75 milliseconds of 4G/LTE Technology & 150 milliseconds of 3G Technology of Latency. The results of QoS KPI Latency is shown in (i). **Table 4.11: Latency in Technology Auto Detect Mode < 75 milliseconds**, (ii). **Table 4.12: Latency in 4G/LTE Technology Locked Mode < 75 milliseconds** & (iii) **Table 4.13: Latency in 3G Technology Locked Mode < 150 milliseconds.**

| LATENCY IN TECHNOLOGY AUTO DETECT MODE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| City | Latency [milliseconds] | | | | Compliant (Yes/No) | | | |
| | Jazz | Telenor | Ufone | ZonG | Jazz | Telenor | Ufone | ZonG |
| *Bhakkar* | 230 | 235 | 256 | 219 | **No** | **No** | **No** | **No** |
| *Burewala* | 219 | 318 | 411 | 271 | **No** | **No** | **No** | **No** |
| *Chakwal* | 231 | 266 | 227 | 211 | **No** | **No** | **No** | **No** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Faisalabad* | 111 | 83 | 84 | 68 | **No** | **No** | **No** | Yes |
| *Jehlum* | 226 | 255 | 280 | 213 | **No** | **No** | **No** | **No** |
| *Layyah* | 233 | 243 | 342 | 241 | **No** | **No** | **No** | **No** |
| *Okara* | 262 | 226 | 236 | 216 | **No** | **No** | **No** | **No** |
| *Sahiwal* | 236 | 274 | 229 | 211 | **No** | **No** | **No** | **No** |
| *Gojra* | 222 | 267 | 222 | 217 | **No** | **No** | **No** | **No** |
| *Mandi Bahaudin* | 255 | 283 | 239 | 228 | **No** | **No** | **No** | **No** |
| *Shakargarh* | 237 | 222 | 233 | 223 | **No** | **No** | **No** | **No** |
| *Attock* | 281 | 230 | 207 | 214 | **No** | **No** | **No** | **No** |
| *Bannu* | 247 | 243 | 291 | 219 | **No** | **No** | **No** | **No** |
| *Haripur* | 237 | 257 | 243 | 224 | **No** | **No** | **No** | **No** |
| *Kohat* | 292 | 242 | 254 | 219 | **No** | **No** | **No** | **No** |
| *Manshera* | 250 | 240 | 225 | 222 | **No** | **No** | **No** | **No** |
| *Peshawar* | 280 | 252 | 237 | 253 | **No** | **No** | **No** | **No** |
| *Dhadar* | 221 | 232 | 426 | 220 | **No** | **No** | **No** | **No** |
| *Quetta* | 230 | 253 | 433 | 264 | **No** | **No** | **No** | **No** |
| *Zhob* | 271 | 250 | 241 | 266 | **No** | **No** | **No** | **No** |
| *Ziarat* | 1063 | 227 | 233 | 218 | **No** | **No** | **No** | **No** |
| *Dalbandin* | 2174 | 262 | 229 | 483 | **No** | **No** | **No** | **No** |

**Table 4.11: Latency in Technology Auto Detect Mode < 75 milliseconds**

| LATENCY IN 4G/LTE TECHNOLOGY LOCKED MODE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **City** | **Latency [milliseconds]** | | | | **Compliant (Yes/No)** | | | |
| | **Jazz** | **Telenor** | **Ufone** | **ZonG** | **Jazz** | **Telenor** | **Ufone** | **ZonG** |
| *Bhakkar* | **85** | **90** | **114** | **88** | **No** | **No** | **No** | **No** |
| *Burewala* | **112** | **92** | 59 | **75** | **No** | **No** | Yes | **No** |
| *Chakwal* | **85** | **109** | **77** | **80** | **No** | **No** | **No** | **No** |
| *Faisalabad* | **111** | **83** | **84** | **68** | **No** | **No** | **No** | Yes |
| *Jehlum* | **77** | **93** | **89** | **78** | **No** | **No** | **No** | **No** |
| *Layyah* | 73 | **95** | **90** | **76** | Yes | **No** | **No** | **No** |
| *Okara* | **91** | **84** | **91** | 63 | **No** | **No** | **No** | Yes |
| *Sahiwal* | **126** | **83** | **87** | 68 | **No** | **No** | **No** | Yes |
| *Gojra* | **99** | **90** | **77** | 70 | **No** | **No** | **No** | Yes |
| *Mandi Bahaudin* | **102** | **99** | **104** | **77** | **No** | **No** | **No** | **No** |
| *Shakargarh* | **85** | **76** | **89** | **83** | **No** | **No** | **No** | **No** |
| *Attock* | **96** | **83** | 73 | **131** | **No** | **No** | Yes | **No** |
| *Bannu* | **107** | **109** | **147** | **126** | **No** | **No** | **No** | **No** |
| *Haripur* | **104** | **100** | **94** | **114** | **No** | **No** | **No** | **No** |
| *Kohat* | **90** | **108** | **121** | **162** | **No** | **No** | **No** | **No** |
| *Manshera* | **98** | **107** | **102** | **115** | **No** | **No** | **No** | **No** |
| *Peshawar* | **125** | **115** | **104** | **185** | **No** | **No** | **No** | **No** |
| *Dhadar* | 71 | **101** | **134** | **76** | Yes | **No** | **No** | **No** |
| *Quetta* | **86** | **118** | **220** | **109** | **No** | **No** | **No** | **No** |
| *Zhob* | **75** | **114** | **82** | **105** | **No** | **No** | **No** | **No** |
| *Ziarat* | **N/A** | **81** | **80** | **73** | **N/A** | **No** | **No** | Yes |
| *Dalbandin* | **N/A** | **115** | **86** | **241** | **N/A** | **No** | **No** | **No** |

**Table 4.12: Latency in 4G/LTE Technology Locked Mode < 75 milliseconds**

| LATENCY IN 3G TECHNOLOGY LOCKED MODE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **City** | **Latency [milliseconds]** | | | | **Compliant (Yes/No)** | | | |
| | **Jazz** | **Telenor** | **Ufone** | **ZonG** | **Jazz** | **Telenor** | **Ufone** | **ZonG** |
| *Bhakkar* | **183** | **971** | **539** | **173** | **No** | **No** | **No** | **No** |
| *Burewala* | **369** | **956** | **501** | 143 | **No** | **No** | **No** | Yes |
| *Chakwal* | **575** | **632** | **549** | 142 | **No** | **No** | **No** | Yes |
| *Faisalabad* | **417** | **668** | **449** | **172** | **No** | **No** | **No** | **No** |
| *Jehlum* | **553** | **615** | **557** | **191** | **No** | **No** | **No** | **No** |
| *Layyah* | **223** | **1036** | **670** | **133** | **No** | **No** | **No** | Yes |

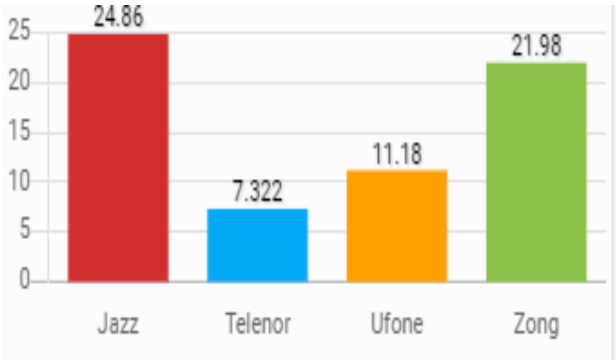
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Okara* | **559** | **369** | **451** | **125** | **No** | **No** | **No** | Yes |
| *Sahiwal* | **639** | **620** | **441** | **114** | **No** | **No** | **No** | Yes |
| *Gojra* | **247** | **675** | **434** | **158** | **No** | **No** | **No** | **No** |
| *Mandi Bahaudin* | **532** | **312** | **561** | 108 | **No** | **No** | **No** | Yes |
| *Shakargarh* | **516** | **618** | **222** | 94 | **No** | **No** | **No** | Yes |
| *Attock* | **557** | **612** | **480** | **411** | **No** | **No** | **No** | **No** |
| *Bannu* | **633** | **681** | **579** | **314** | **No** | **No** | **No** | **No** |
| *Haripur* | **561** | **657** | **604** | **901** | **No** | **No** | **No** | **No** |
| *Kohat* | **574** | **523** | **558** | **387** | **No** | **No** | **No** | **No** |
| *Manshera* | **579** | **601** | **585** | **950** | **No** | **No** | **No** | **No** |
| *Peshawar* | **639** | **576** | **562** | **399** | **No** | **No** | **No** | **No** |
| *Dhadar* | **330** | **1039** | **527** | **376** | **No** | **No** | **No** | **No** |
| *Quetta* | **366** | **921** | **548** | **422** | **No** | **No** | **No** | **No** |
| *Zhob* | **N/A** | **1168** | **480** | **389** | **N/A** | **No** | **No** | **No** |
| *Ziarat* | **N/A** | **979** | **600** | **423** | **N/A** | **No** | **No** | **No** |
| *Dalbandin* | **N/A** | **1070** | **622** | **614** | **N/A** | **No** | **No** | **No** |

**Table 4.13: Latency in 3G Technology Locked Mode < 150 milliseconds**

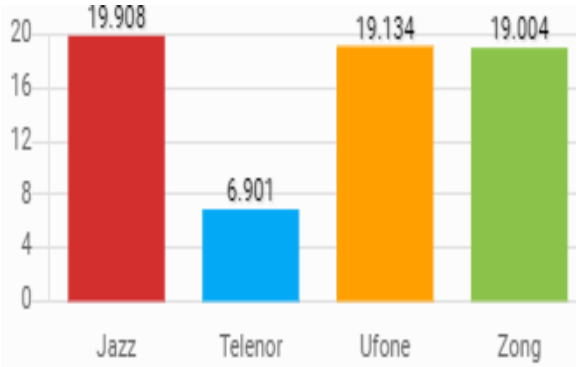
4.6. During the survey, the deployed technologies by Cellular Mobile Operators (CMOs), Success Rate of http Transfer Download Tests and Resource Block Utilization have been recorded. The details can be seen in attached graphs.

**TECHNOLOGY AUTO DETECT MODE TESTING**

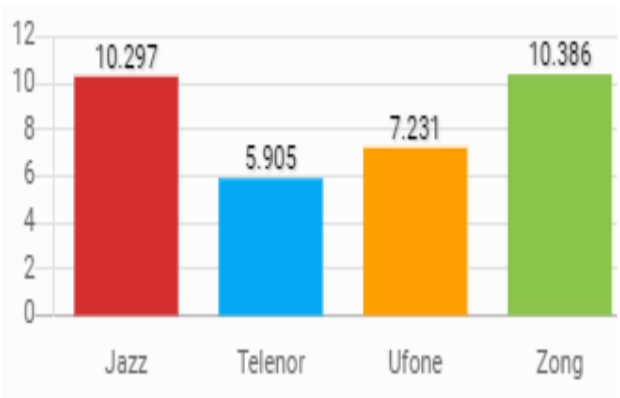
**CAPACITY TEST DOWNLOAD SPEED (Mbps)**



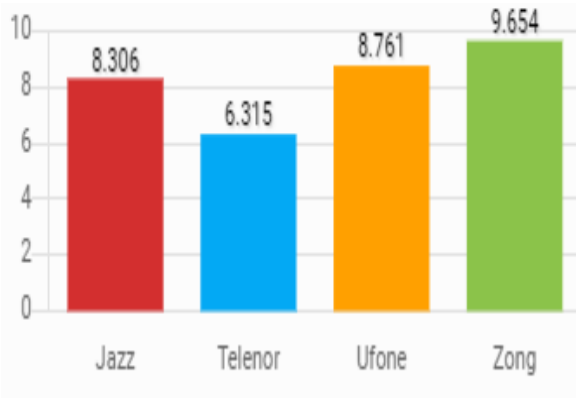

**CAPACITY TEST UPLOAD SPEED (Mbps)**

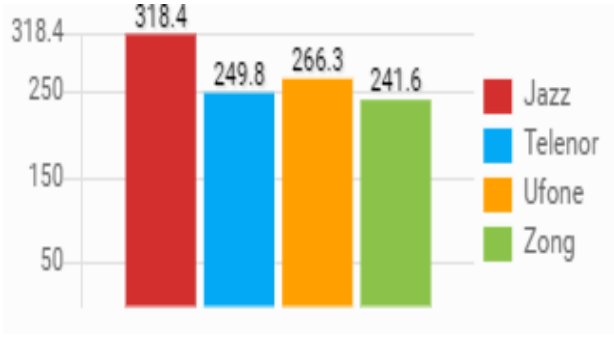
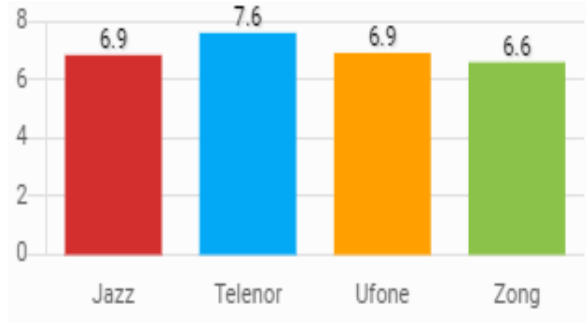



**DATA TRANSFER DOWNLOAD SPEED (Mbps)**

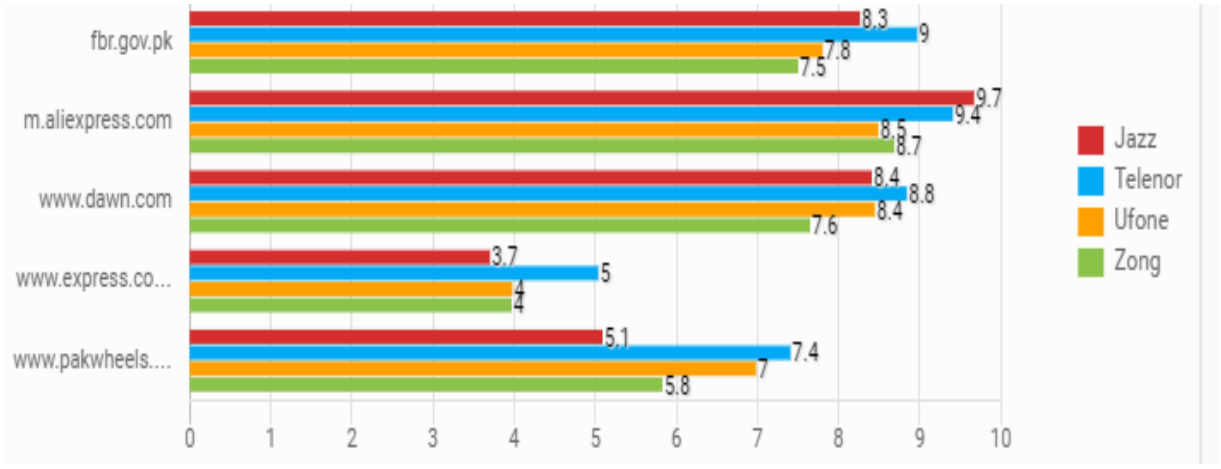


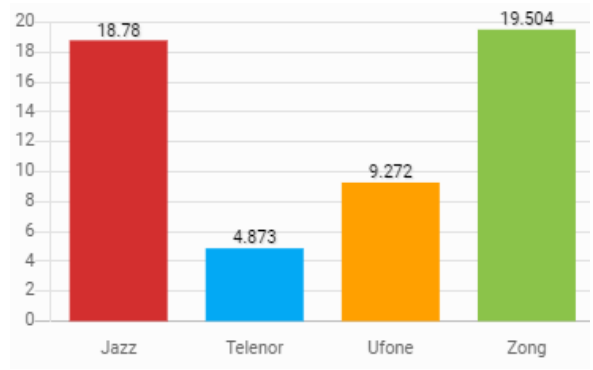
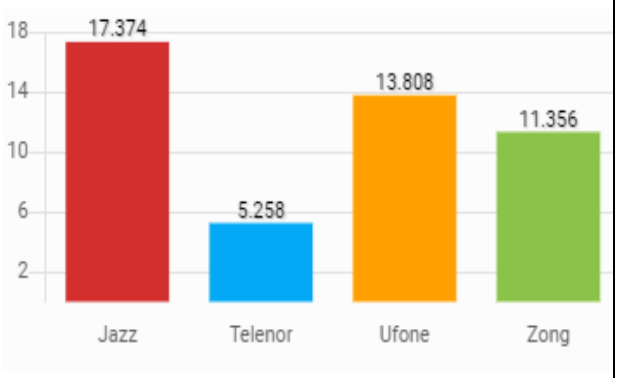
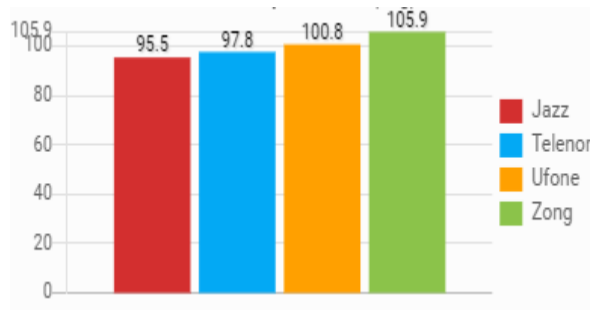
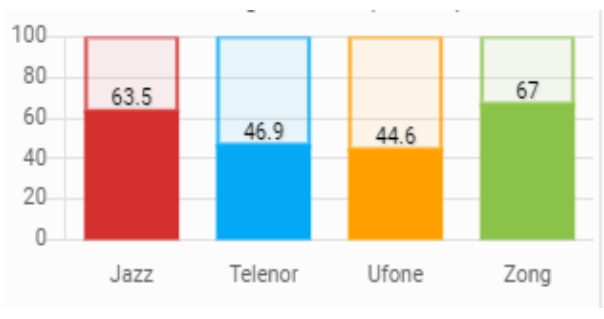

**DATA TRANSFER UPLOAD SPEED (Mbps)**

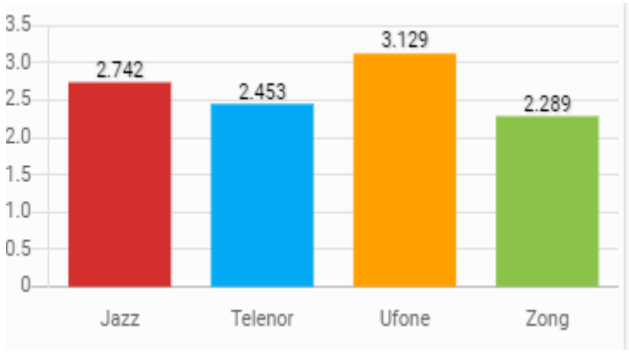
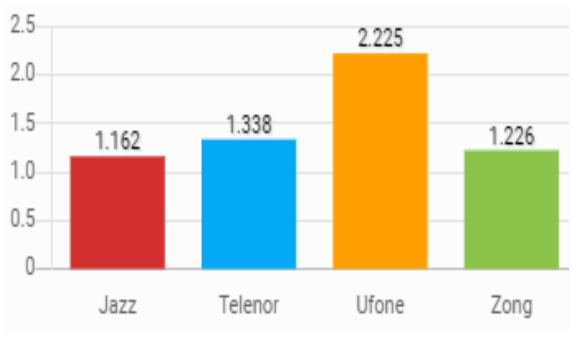
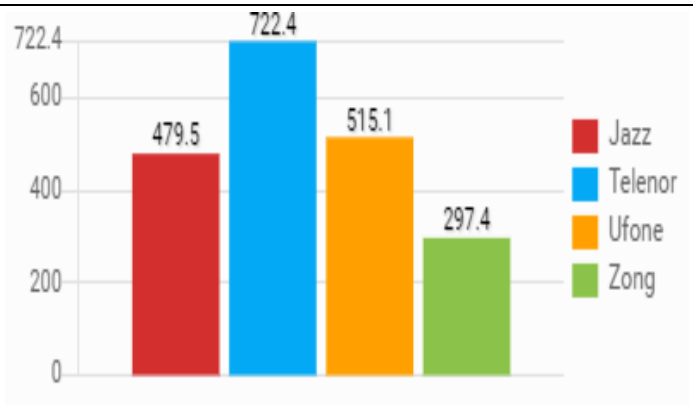


| LATENCY (milliseconds) | WEBPAGE LOADING TIME (Seconds) |
|---|---|
|  |  |

WEBPAGE LOADING TIME PER PAGE (Seconds)



| 4G/LTE TECHNOLOGY LOCKED MODE | |
|---|---|
| DATA TRANSFER DOWNLOAD SPEED (Mbps) | DATA TRANSFER UPLOAD SPEED (Mbps) |
|  |  |
| LATENCY (milliseconds) | RESOURCE BLOCK USAGE DOWNLOAD |
|  |  |

| 3G TECHNOLOGY LOCKED MODE | |
|---|---|
| DATA TRANSFER DOWNLOAD SPEED (Mbps) | DATA TRANSFER UPLOAD SPEED (Mbps) |
|  |  |
| LATENCY (milliseconds) | |
|  | |

## VOICE SERVICE

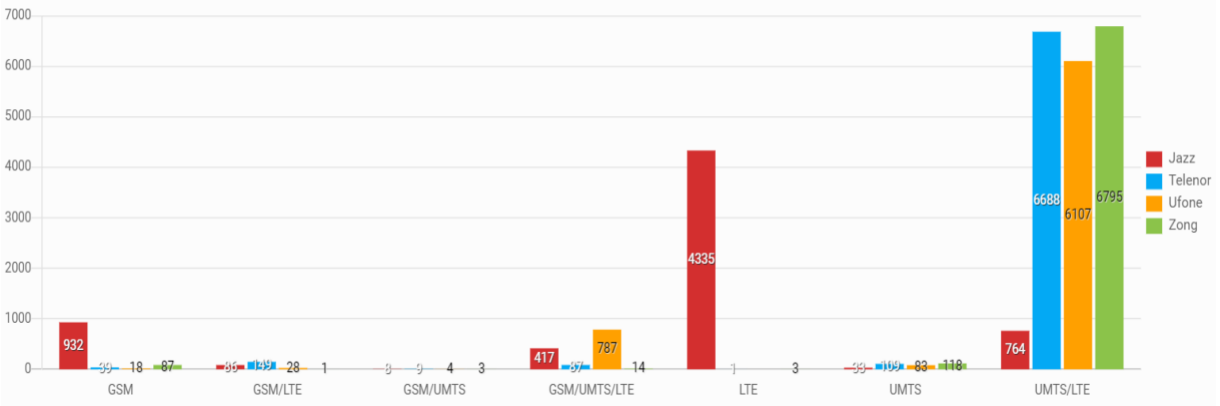
5.1. A total of **27,709 Call attempts** were made and out of which **689 were failed attempts**. In **27,020 successful call attempts**, **241 calls dropped** prior to completion of two minutes duration, whereas, **26,779 calls remained connected** for the complete duration of two minutes. The company wise call statistics is shown in **Table 5.1: Call Statistics.**

| DESCRIPTION | JAZZ | TELENOR | UFONE | ZONG |
|---|---|---|---|---|
| *TOTAL CALLS ATTEMPTS* | 6576 | 7082 | 7027 | 7024 |
| *FAILED CALLS ATTEMPTS* | 196 | 309 | 77 | 107 |
| *ESTABLISHED CALLS ATTEMPTS* | 6380 | 6773 | 6950 | 6917 |
| *DROPPED CALLS ATTEMPTS* | 38 | 60 | 94 | 49 |
| *COMPLETED CALLS ATTEMPTS* | 6342 | 6713 | 6856 | 6868 |
| *CALL SETUP SUCCESS RATE (%)* | 97.02 | 95.64 | 98.9 | 98.48 |
| *CALL SETUP TIME (Sec)* | 8.64 | 9.74 | 6.73 | 6.93 |
| *CALL COMPLETION RATE (%)* | 99.31 | 96.94 | 98.53 | 98.35 |
| *ISHO SUCCESS RATE (%)* | 97.19 | 100 | 99.09 | - |
| *RAB SETUP SUCCESS RATE (%)* | 100 | 99.99 | 99.95 | 99.97 |
| *MEAN OPINION SCORE* | 3.51 | 3.14 | 3.33 | 3.34 |
| *MEAN OPINION SCORE EXCESS RATIO – MOS <1.6 (%)* | 4.54 | 1.32 | 1.8 | 1.4 |
| *TOTAL SPEECH TEST* | 61736 | 67539 | 69216 | 69164 |

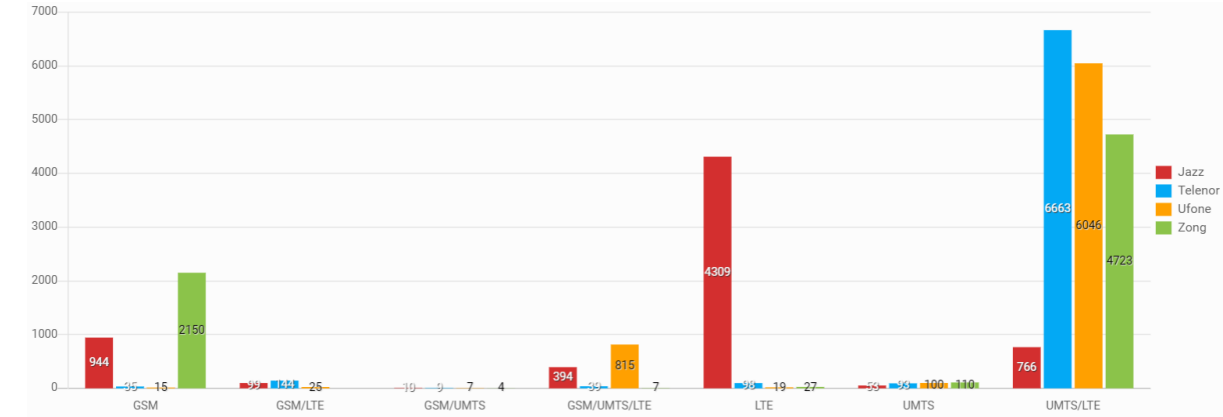
**Table5.1: Call Statistics**

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

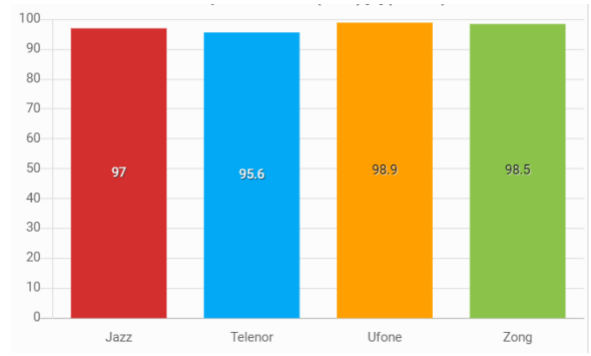
## TECHNOLOGY WISE DISTRIBUTION OF CALLS – A PARTY



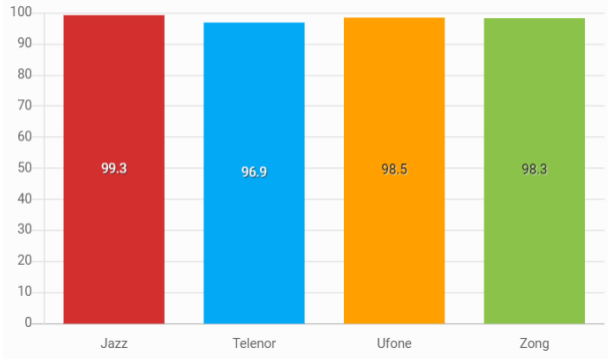

## TECHNOLOGY WISE DISTRIBUTION OF CALLS – B PARTY



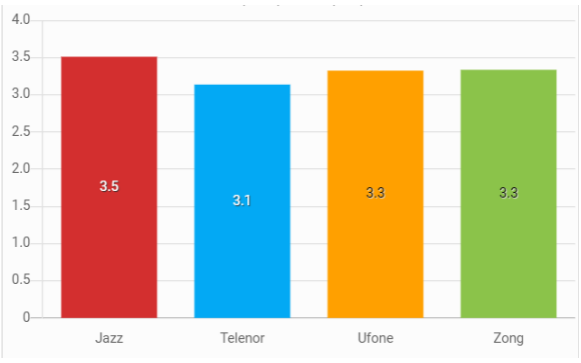

## CALL SETUP SUCCESS RATE



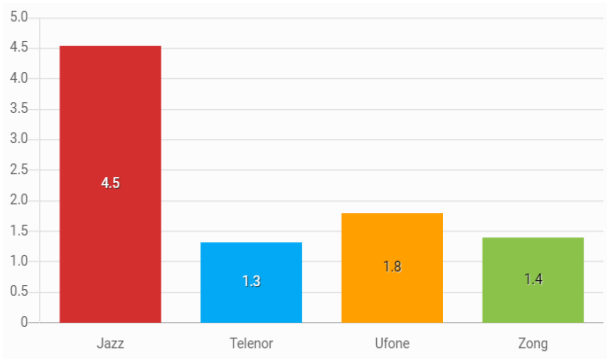

## CALL RETAINABILITY



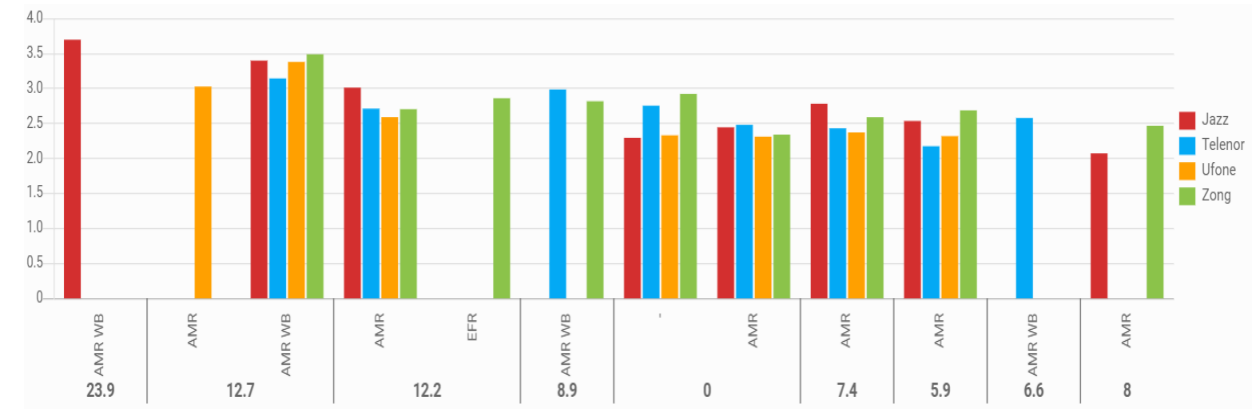

## MEAN OPINION SCORE - AVERAGE




## MEAN OPINION SCORE < 1.6 (PERCENTAGE)



**MEAN OPINION SCORE – VOICE CODEC**




5.3. The 7 x QoS KPIs *(i.e. Network Accessibility, Call Setup Success Rate, Call Setup Time, Call Completion Rate, Mean Opinion Score, Inter System Handover Success Rate & RAB Setup Success Rate)* have been measured while testing voice services in **22 x surveyed cities** of Pakistan. The compliance level of threshold values of voice QoS KPIs is shown in each **Table 5.1: Voice QoS KPIs Compliance Level** and **Table 5.2: Voice QoS KPIs Compliance Level.**

| *CMO* | KPIs | Threshold | Bhakkar | Burewala | Chakwal | Faisalabad | Jehlum | Layyah | Okara | Sahiwal | Dhadar | Quetta | Zhob |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Jazz* | **NA** | **≥ 99%** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | **No** | Yes | **No** |
| | **CSSR** | **≥ 98%** | Yes | Yes | Yes | Yes | **No** | Yes | Yes | Yes | **No** | Yes | **No** |
| | **CCT** | **≤ 7.5 sec** | Yes | Yes | Yes | **No** | Yes | Yes | Yes | Yes | **No** | Yes | **No** |
| | **CCR** | **> 98%** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | **MOS** | **≥ 3** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | **No** |
| | **ISHO** | **≥ 98%** | N/A | Yes | Yes | N/A | N/A | N/A | Yes | Yes | Yes | Yes | Yes |
| | **RSSR** | **> 98%** | N/a | Yes | **No** | Yes | N/A | N/A | Yes | Yes | Yes | **No** | Yes |
| *Telenor* | **NA** | **≥ 99%** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | **No** | Yes | Yes |
| | **CSSR** | **≥ 98%** | Yes | **No** | **No** | **No** | Yes | Yes | Yes | **No** | **No** | **No** | Yes |
| | **CCT** | **≤ 7.5 sec** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | **CCR** | **> 98%** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | **MOS** | **≥ 3** | Yes | Yes | Yes | Yes | **No** | Yes | Yes | Yes | Yes | **No** | **No** |
| | **ISHO** | **≥ 98%** | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | Yes | Yes | Yes |
| | **RSSR** | **> 98%** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Ufone* | **NA** | **≥ 99%** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | **CSSR** | **≥ 98%** | Yes | Yes | Yes | **No** | Yes | **No** | Yes | Yes | Yes | Yes | Yes |
| | **CCT** | **≤ 7.5 sec** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | **CCR** | **> 98%** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | **No** | Yes | **No** |
| | **MOS** | **≥ 3** | **No** | Yes | Yes | Yes | Yes | **No** | Yes | Yes | Yes | Yes | Yes |
| | **ISHO** | **≥ 98%** | Yes | **No** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | **RSSR** | **> 98%** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *ZonG* | **NA** | **≥ 99%** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | **No** | Yes | Yes |
| | **CSSR** | **≥ 98%** | Yes | Yes | Yes | **No** | Yes | Yes | Yes | Yes | **No** | **No** | Yes |
| | **CCT** | **≤ 7.5 sec** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | **CCR** | **> 98%** | Yes | Yes | Yes | **No** | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | **MOS** | **≥ 3** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | N/A | N/A | N/A |
| | **RSSR** | **> 98%** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | **No** | Yes | **No** |

** 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 5.1: Voice QoS KPIs Compliance Level**

| *CMO* | KPIs | Threshold | Ziarat | Gojra | Mandi Bahaudin | Attock | Bannu | Shakargarh | Dalbadin | Haripur | Kohat | Manshera | Peshawar |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Jazz* | NA | ≥ 99% | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CSSR | ≥ 98% | **No** | Yes | Yes | Yes | **No** | Yes | **No** | **No** | Yes | **No** | **No** |
| | CCT | ≤ 7.5 sec | **No** | N/A | Yes | Yes | Yes | Yes | **No** | Yes | Yes | Yes | Yes |
| | CCR | > 98% | Yes | Yes | **No** | **No** | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | MOS | ≥ 3 | N/a | N/a | N/a | Yes | Yes | Yes | **No** | Yes | Yes | Yes | Yes |
| | ISHO | ≥ 98% | Yes | Yes | Yes | Yes | **No** | N/a | N/a | Yes | **No** | Yes | Yes |
| | RSSR | > 98% | N/a | Yes | Yes | Yes | Yes | N/a | N/a | Yes | Yes | Yes | Yes |
| *Telenor* | NA | ≥ 99% | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CSSR | ≥ 98% | Yes | Yes | **No** | **No** | **No** | Yes | **No** | **No** | **No** | **No** | **No** |
| | CCT | ≤ 7.5 sec | Yes | Yes | **No** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CCR | > 98% | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | **No** |
| | MOS | ≥ 3 | Yes | Yes | Yes | Yes | Yes | Yes | **No** | Yes | Yes | Yes | Yes |
| | ISHO | ≥ 98% | N/A | N/A | N/A | N/A | N/A | N/A | Yes | N/A | N/A | N/A | N/A |
| | RSSR | > 98% | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *Ufone* | NA | ≥ 99% | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CSSR | ≥ 98% | Yes | Yes | **No** | Yes | Yes | **No** | Yes | Yes | Yes | Yes | **No** |
| | CCT | ≤ 7.5 sec | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CCR | > 98% | Yes | Yes | Yes | Yes | **No** | Yes | Yes | Yes | Yes | **No** | Yes |
| | MOS | ≥ 3 | Yes | Yes | Yes | Yes | Yes | **No** | Yes | Yes | Yes | Yes | Yes |
| | ISHO | ≥ 98% | Yes | Yes | Yes | Yes | **No** | Yes | Yes | **No** | Yes | **No** | **No** |
| | RSSR | > 98% | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *ZonG* | NA | ≥ 99% | **No** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CSSR | ≥ 98% | **No** | Yes | Yes | Yes | Yes | Yes | **No** | **No** | Yes | Yes | **No** |
| | CCT | ≤ 7.5 sec | **No** | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CCR | > 98% | Yes | Yes | Yes | Yes | Yes | Yes | Yes | **No** | Yes | Yes | Yes |
| | MOS | ≥ 3 | N/A | Yes | Yes | Yes | Yes | Yes | N/A | Yes | Yes | Yes | Yes |
| | RSSR | > 98% | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

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

**Table 5.2: Voice QoS KPIs Compliance Level**

## SMS SERVICE

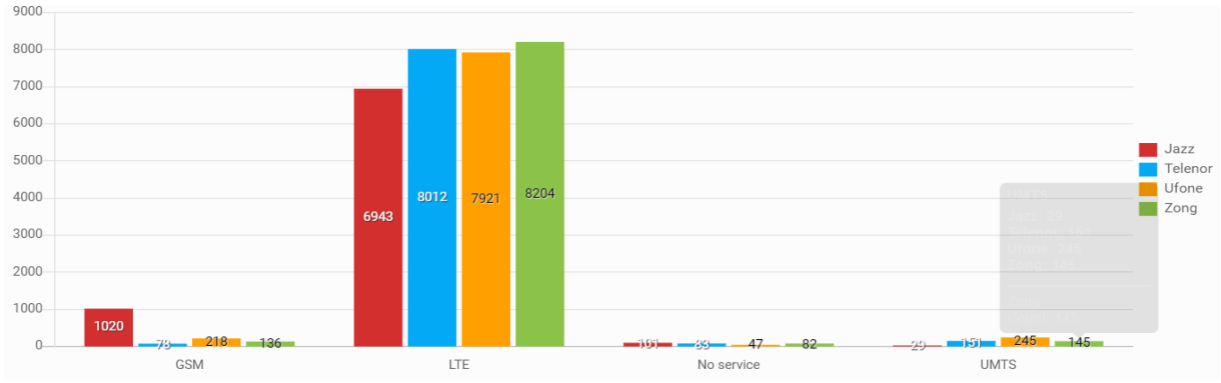
6.1. A total of **33,416 SMS sending attempts** were conducted, out of which **33,019 SMS** were **successfully transmitted** by A-Party while **32,431 SMS** were **successfully received** at B-Party. The company wise SMS Statistics are shown in **Table 6.1: SMS Statistics**

| DESCRIPTION | JAZZ | TELENOR | UFONE | ZONG |
|---|---|---|---|---|
| *SMS SEND REQUEST* | 8093 | 8324 | 8431 | 8568 |
| *SMS SUCCESSFULLY TRANSMITTED* | 7957 | 8208 | 8382 | 8472 |
| *SMS SUCCESSFULLY RECEIVED* | 7829 | 7962 | 8369 | 8271 |
| *SMS RECEIVE SUCCESS RATE (%)* | 96.74 | 95.65 | 99.26 | 96.53 |
| *END-TO-END DELIVERY TIME (Sec)* | 6.19 | 8.24 | 3.4 | 4.11 |

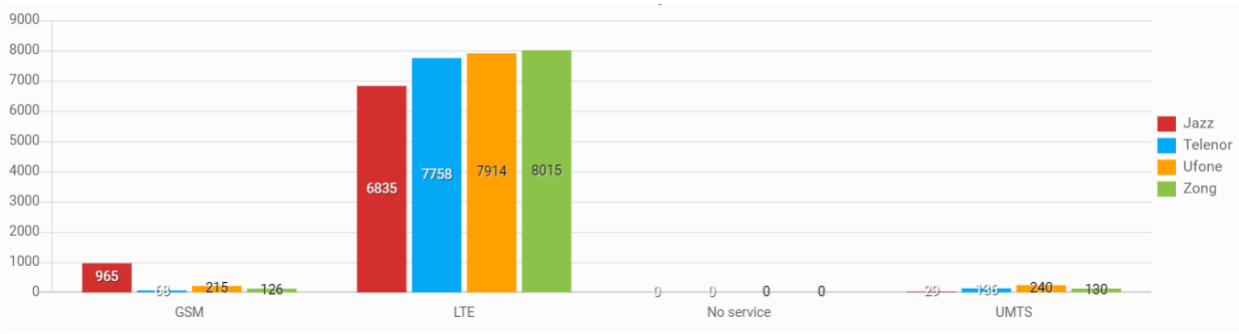
**Table 6.1: SMS Statistics**

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.

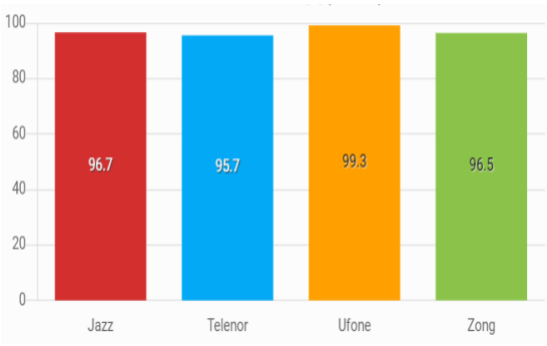
**SMS SEND REQUEST BY TECHNOLOGY**



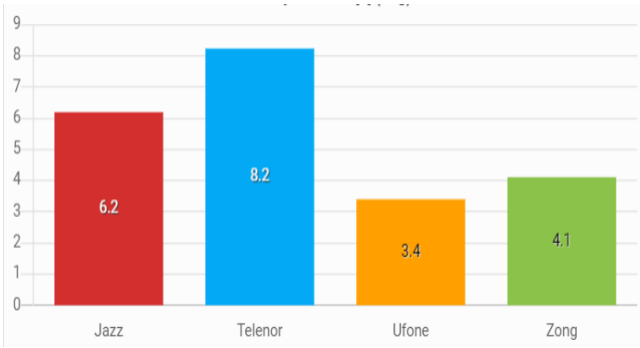

**SMS SUCCESSFUL RECEPTION BY TECHNOLOGY**



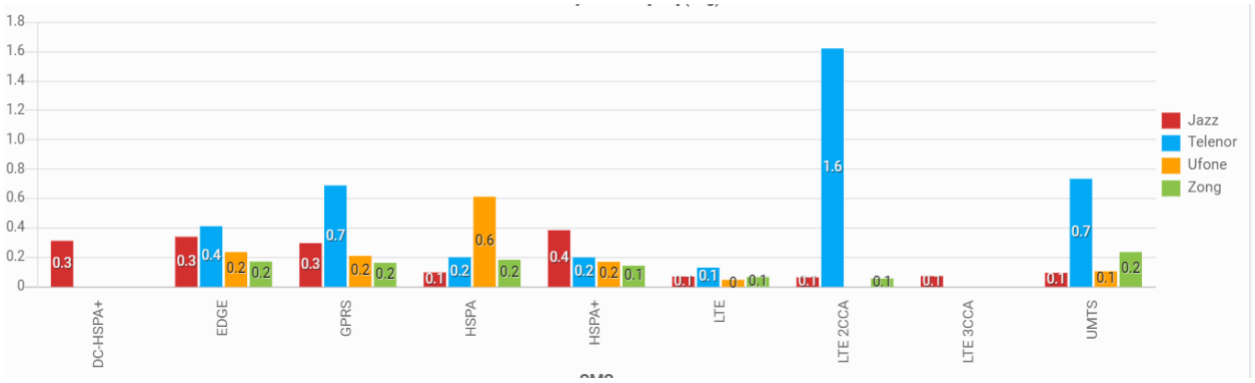

**SMS RECEIVE SUCCESS RATE (%)**




**SMS END TO END DELIVERY TIME (SECONDS)**



SMS DELIVERY 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, were plotted on maps. The Signal Strength maps along-with Voice, SMS and Data QoS KPIs survey results in graphical form are shown at **Annex-A (Coverage Maps), Annex-B (Data QoS Results) and Annex-C (Voice & SMS Results).**

## STANDING IN SURVEY

8.1. CMOs have been prioritized/ placed at 1st, 2nd, 3rd & 4th position in each category i.e. Mobile Network Coverage, Mobile Broadband Service and Voice Service based upon the compliance level against each QoS KPI in each category in 22 x surveyed cities of Punjab, KPK and Balochistan.

a. **MOBILE NETWORK COVERAGE.** The categorization of CMOs as per QoS KPI i.e. Signal Strength of 4G/LTE and 3G Networks measured in Technology Auto Detect and Locked Mode is shown in **Table 8.1: CMOs Standing in Mobile Network Coverage – Technology Auto Detect Mode** & **Table 8.2: CMOs Standing in Mobile Network Coverage – Technology Locked Mode**

| S. #. | Operator | Compliance Level – Number of Cities Technology Auto Detect Mode | | | | | | Standing |
|---|---|---|---|---|---|---|---|---|
| | | Compliant | | | Non-Compliant | | | |
| | | 4G | 3G | Total | 4G | 3G | Total | |
| 1. | Ufone | 20 | 17 | 37 | 2 | 1 | 3 | 1st |
| 2. | ZonG | 19 | 9 | 28 | 3 | 1 | 4 | 2nd |
| 3. | Jazz | 16 | 10 | 26 | 6 | 0 | 6 | 3rd |
| 4. | Telenor | 11 | 11 | 22 | 11 | 1 | 12 | 4th |

**Table 8.1: CMOs Standing in Mobile Network Coverage – Technology Auto Detect Mode**

| S. #. | Operator | Compliance Level – Number of Cities Technology Locked Mode | | | | | | Standing |
|---|---|---|---|---|---|---|---|---|
| | | Compliant | | | Non-Compliant | | | |
| | | 4G | 3G | Total | 4G | 3G | Total | |
| 1. | ZonG | 21 | 22 | 43 | 1 | 0 | 1 | 1st |
| 2. | Ufone | 21 | 22 | 43 | 1 | 0 | 1 | 1st |
| 3. | Jazz | 18 | 22 | 40 | 4 | 0 | 4 | 2nd |
| 4. | Telenor | 18 | 22 | 40 | 4 | 0 | 4 | 2nd |

**Table 8.2: CMOs Standing in Mobile Network Coverage – Technology Locked Mode**

b. **MOBILE BROADBAND SERVICE.** The categorization of each CMOs in Mobile Broadband Service is as under:

i. User Download Data Throughput. The User Download Data Throughput in Fixed Duration and Fixed Size Testing, as per the highest to lowest obtained results, is shown in **Table 8.3: CMOs Standing in User Download Data Throughput – Technology Auto Detect Mode** & Table **8.4: CMOs Standing in User Download Data Throughput – Technology Locked Mode.**

| S. #. | Operator | Highest Download Throughput – Number of Cities | | | | | | | | Standing | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Technology Auto Detect Mode | | | | | | | | Fixed Duration | Fixed Size |
| | | Fixed Duration | | | | Fixed Size | | | | | |
| | | 1st | 2nd | 3rd | 4th | 1st | 2nd | 3rd | 4th | | |
| 1. | Jazz | 12 | 6 | 2 | 2 | 9 | 8 | 2 | 0 | 1st | 2nd |
| 2. | ZonG | 8 | 11 | 3 | 0 | 10 | 8 | 3 | 0 | 2nd | 1st |
| 3. | Ufone | 2 | 4 | 11 | 5 | 2 | 3 | 8 | 6 | 3rd | 3rd |
| 4. | Telenor | 0 | 1 | 6 | 15 | 0 | 0 | 6 | 13 | 4th | 4th |

**Table 8.3: CMOs Standing in User Download Data Throughput– Technology Auto Detect Mode**

| S. #. | Operator | Highest Download Throughput – Number of Cities | | | | | | | | Standing | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Fixed Duration | |
| | | 4G Locked Mode | | | | 3G Locked Mode | | | | 4G | 3G |
| | | Fixed Duration | | | | Fixed Duration | | | | | |
| | | 1st | 2nd | 3rd | 4th | 1st | 2nd | 3rd | 4th | | |
| 1. | ZonG | 10 | 8 | 4 | 0 | 2 | 3 | 8 | 9 | 1st | 4th |
| 2. | Ufone | 2 | 5 | 11 | 4 | 11 | 5 | 4 | 2 | 3rd | 1st |
| 3. | Jazz | 10 | 7 | 3 | 0 | 6 | 4 | 4 | 5 | 2nd | 2nd |
| 4. | Telenor | 0 | 2 | 4 | 16 | 3 | 10 | 6 | 3 | 4th | 3rd |

**Table 8.4: CMOs Standing in User Download Data Throughput – Technology Locked Mode**

ii. User Upload Data Throughput. The User Upload Data Throughput in Fixed Duration and Fixed Size Testing, as per the highest to lowest obtained results, is shown in **Table 8.5: CMOs Standing in User Upload Data Throughput – Technology Auto Detect Mode** & Table **8.6: CMOs Standing in User Upload Data Throughput – Technology Locked Mode.**

| S. #. | Operator | Highest Upload Throughput – Number of Cities | | | | | | | | Standing | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Technology Auto Detect Mode | | | | | | | | Fixed Duration | Fixed Size |
| | | Fixed Duration | | | | Fixed Size | | | | | |
| | | 1st | 2nd | 3rd | 4th | 1st | 2nd | 3rd | 4th | | |
| 1. | ZonG | 4 | 6 | 12 | 0 | 10 | 10 | 1 | 0 | 3rd | 1st |
| 2. | Ufone | 6 | 10 | 6 | 0 | 7 | 6 | 5 | 3 | 2nd | 2nd |
| 3. | Jazz | 12 | 6 | 2 | 2 | 4 | 5 | 9 | 1 | 1st | 3rd |
| 4. | Telenor | 0 | 0 | 2 | 20 | 0 | 0 | 6 | 15 | 4th | 4th |

**Table 8.5: CMOs Standing in User Upload Data Throughput – Technology Auto Detect Mode**

| S. #. | Operator | Highest Upload Throughput – Number of Cities | | | | | | | | Standing | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4G Locked Mode | | | | 3G Locked Mode | | | | | |
| | | Fixed Duration | | | | Fixed Duration | | | | | |
| | | 1st | 2nd | 3rd | 4th | 1st | 2nd | 3rd | 4th | 4G | 3G |
| 1. | Ufone | 5 | 11 | 5 | 1 | 19 | 1 | 2 | - | 2nd | 1st |
| 2. | ZonG | 3 | 5 | 14 | - | 2 | 4 | 2 | 14 | 3rd | 2nd |
| 3. | Telenor | - | - | 3 | 19 | 1 | 12 | 9 | - | 4th | 3rd |
| 4. | Jazz | 14 | 6 | - | - | - | 5 | 9 | 5 | 1st | 4th |

**Table 8.6: CMOs Standing in User Upload Data Throughput – Technology Locked Mode**

iii. Webpage Loading Time. The categorization of each CMOs, as per the maximum compliant of Webpage Loading Time QoS KPIs is shown, is shown in **Table 8.7: CMOs Standing in Webpage Loading Time.**

| S. #. | Operator | Webpage Loading Time - Number of Cities | | Standing |
|---|---|---|---|---|
| | | Compliant | Non-Compliant | |
| 1. | Jazz | - | 19 | - |
| 2. | Telenor | - | 21 | - |
| 3. | Ufone | - | 21 | - |
| 4. | ZonG | - | 21 | - |

**Table 8.7: CMOs Standing in Webpage Loading Time**

iv. Latency. The categorization of each CMOs, as per the maximum compliant of Webpage Loading Time QoS KPIs is shown in **Table 8.8: CMOs Standing in Latency.**

| S. #. | Operator | Latency - Number of Cities | | | | | | | | Standing |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Compliant | | | | Non-Compliant | | | | |
| | | Auto | 4G | 3G | Total | Auto | 4G | 3G | Total | |
| 1. | ZonG | 1 | 5 | 7 | 11 | 21 | 19 | 15 | 55 | 1st |
| 2. | Ufone | - | 2 | - | 2 | 22 | 20 | 22 | 64 | 2nd |
| 3. | Jazz | - | 2 | - | 2 | 22 | 18 | 19 | 64 | 2nd |
| 4. | Telenor | - | - | - | - | 22 | 22 | 22 | 66 | 3rd |

**Table 8.8: CMOs Standing in Latency**

c. VOICE SERVICE. The categorization of each CMOs, as per the maximum compliant of Voice QoS KPIs is shown in **Table 8.8: CMOs Standing in Voice Service.**

| S. #. | Operator | Voice QoS KPIs | | Standing |
|---|---|---|---|---|
| | | Compliant | Non-Compliant | |
| 1. | Ufone | 137 | 17 | 2nd |
| 2. | ZonG | 113 | 14 | 1st |
| 3. | Telenor | 115 | 21 | 3rd |
| 4. | Jazz | 114 | 24 | 4th |

**Table 8.8: CMOs Standing in Voice Service**

d. **OVERALL STANDING.** The overall standing of each CMOs in different category of services is mentioned in **Table 8.9: CMOs Overall Standing in QoS Survey.**

| S. #. | Service | | | | STANDING | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 1st | 2nd | 3rd | 4th |
| 1. | Mobile Network Coverage | | | Auto Mode | Ufone | ZonG | Jazz | Telenor |
| | | | | Locked Mode | ZonG Ufone | Jazz Telenor | - | - |
| 2. | Mobile Broadband | Fixed Duration | Download | Auto Mode | Jazz | ZonG | Ufone | Telenor |
| | | | | 4G | ZonG | Jazz | Ufone | Telenor |
| | | | | 3G | Ufone | Jazz | Telenor | ZonG |
| | | | Upload | Auto Mode | Jazz | Ufone | ZonG | Telenor |
| | | | | 4G | Jazz | Ufone | ZonG | Telenor |
| | | | | 3G | Ufone | ZonG | Telenor | Jazz |
| | | Fixed Size | Download | Auto Mode | ZonG | Jazz | Ufone | Telenor |
| | | | Upload | Auto Mode | ZonG | Ufone | Jazz | Telenor |
| | | Latency | | | ZonG | Ufone Jazz | Telenor | - |
| 3. | Voice | | | | ZonG | Ufone | Telenor | Jazz |

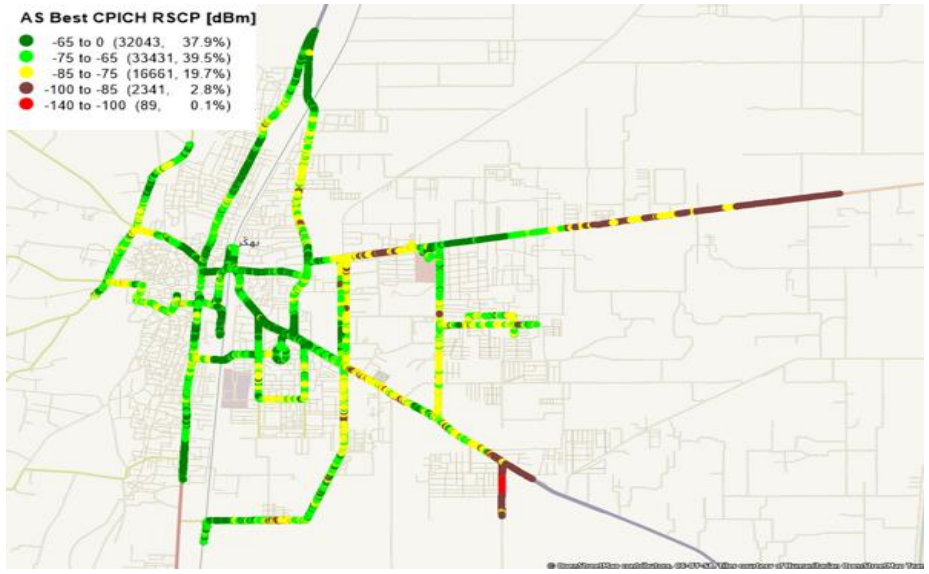
**Table 8.9: CMOs Overall Standing in QoS Survey**

Annex-A

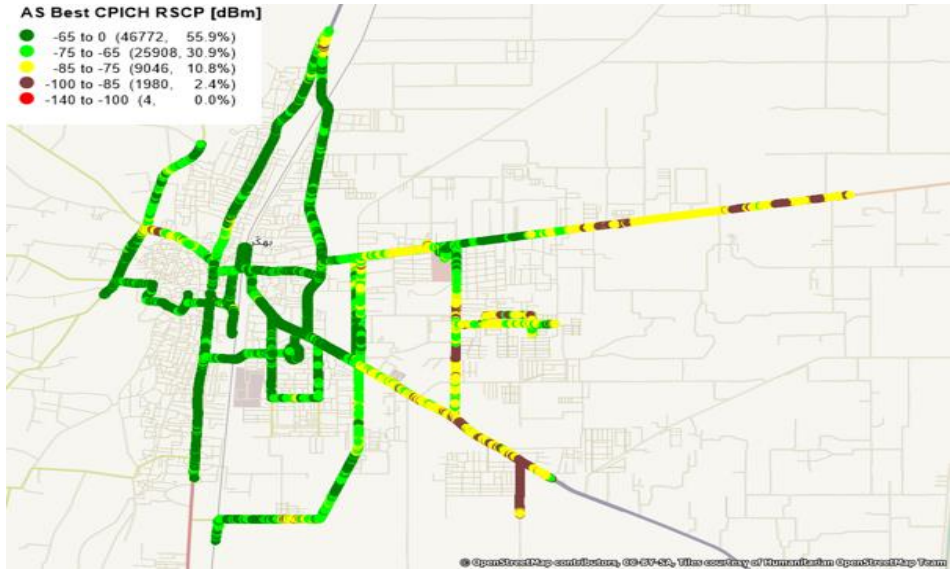
# MOBILE BROADBAND 3G COVERAGE MAPS

# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

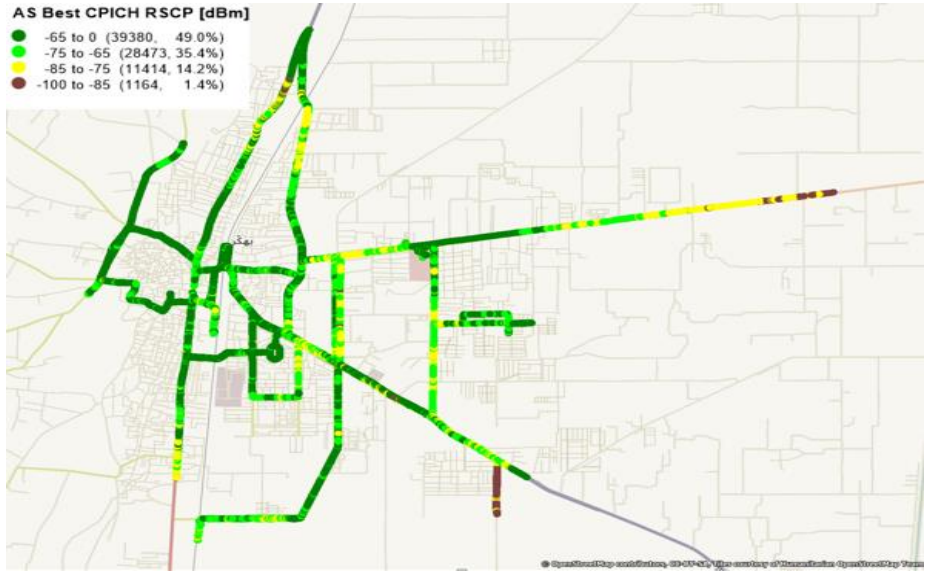
## JAZZ 3G NETWORK COVERAGE – BHAKKAR



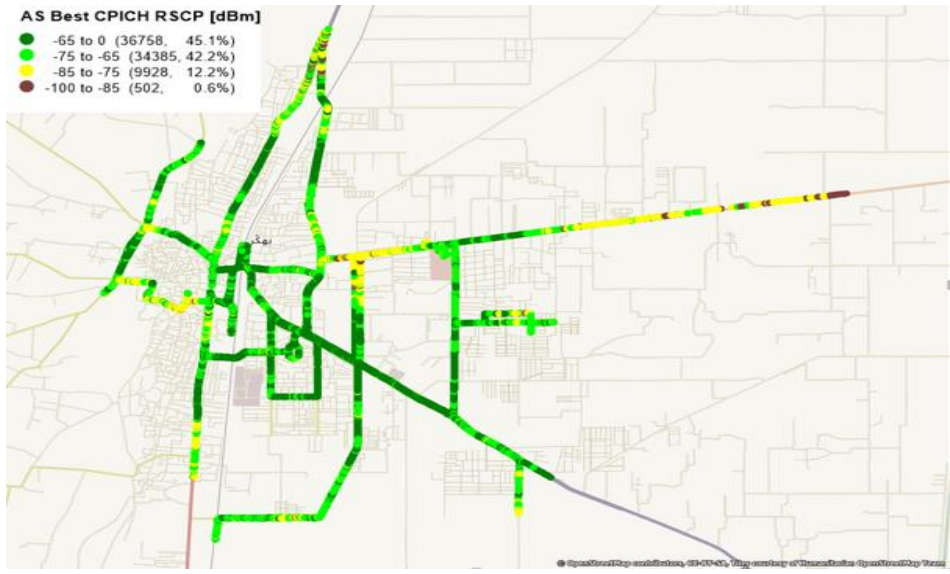

## TELENOR 3G NETWORK COVERAGE – BHAKKAR




## UFONE 3G NETWORK COVERAGE – BHAKKAR

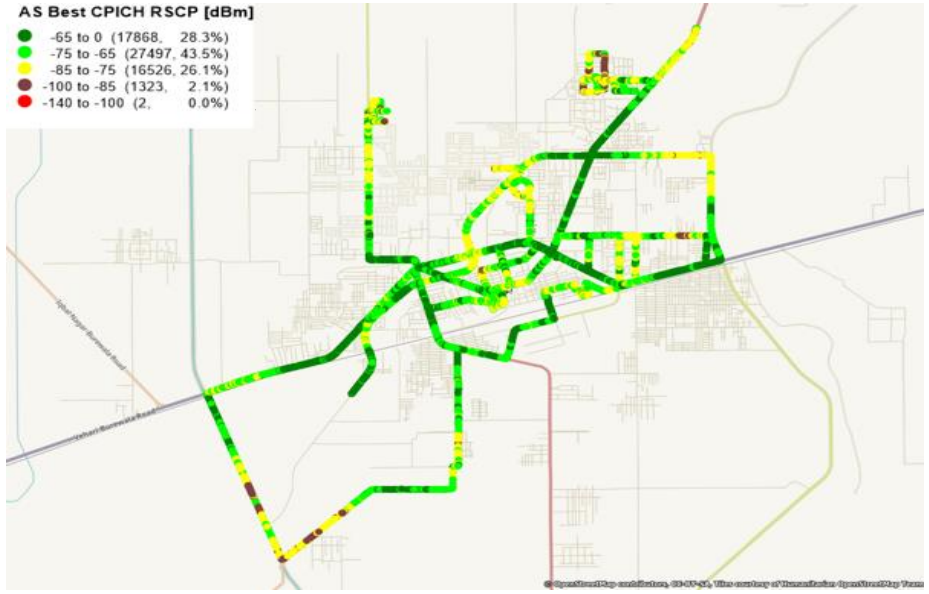



## ZONG 3G NETWORK COVERAGE – BHAKKAR

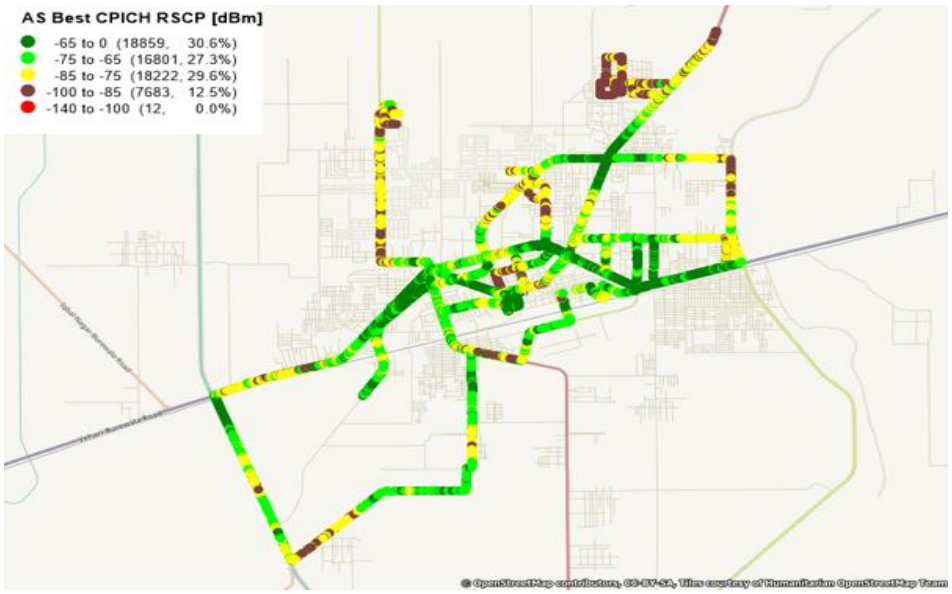


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

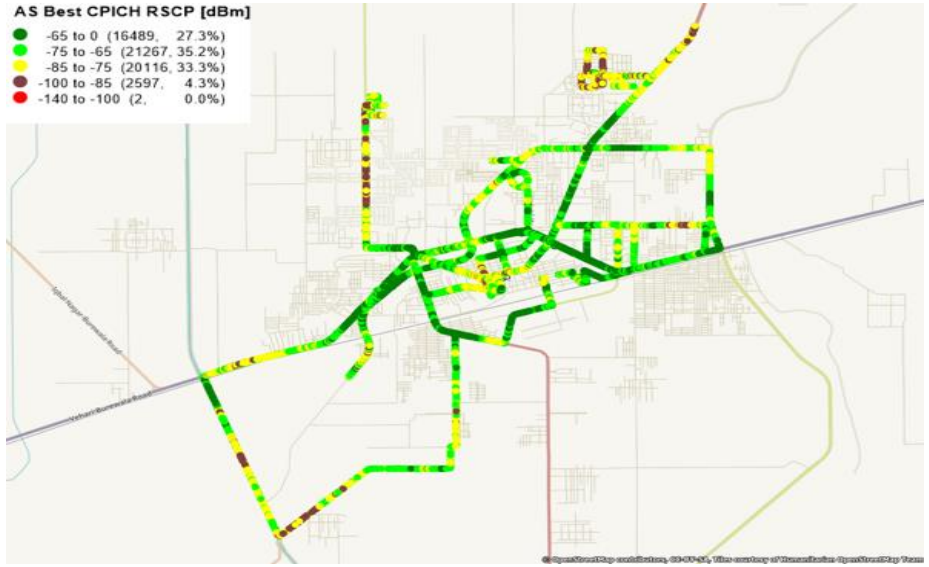
## JAZZ 3G NETWORK COVERAGE – BUREWALA



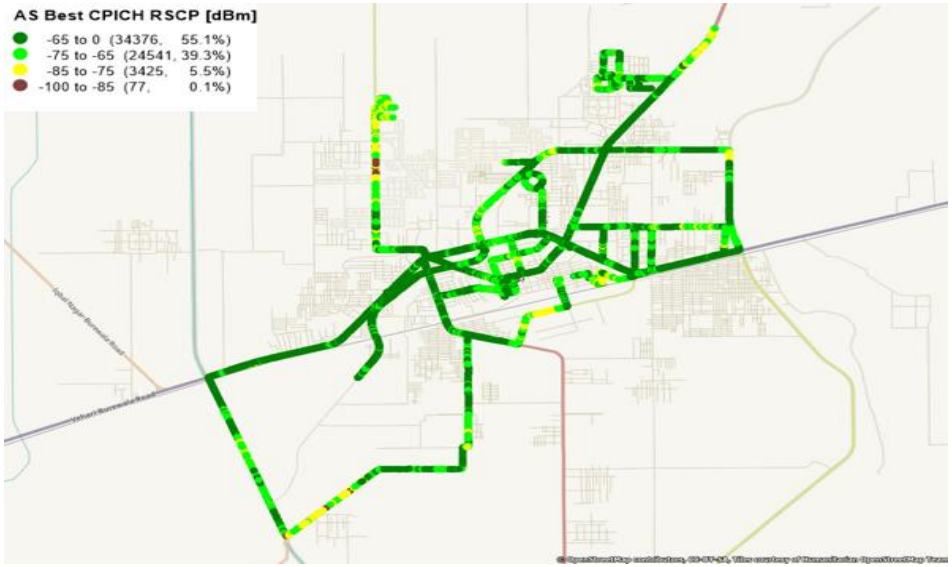

## TELENOR 3G NETWORK COVERAGE – BUREWALA




## UFONE 3G NETWORK COVERAGE – BUREWALA

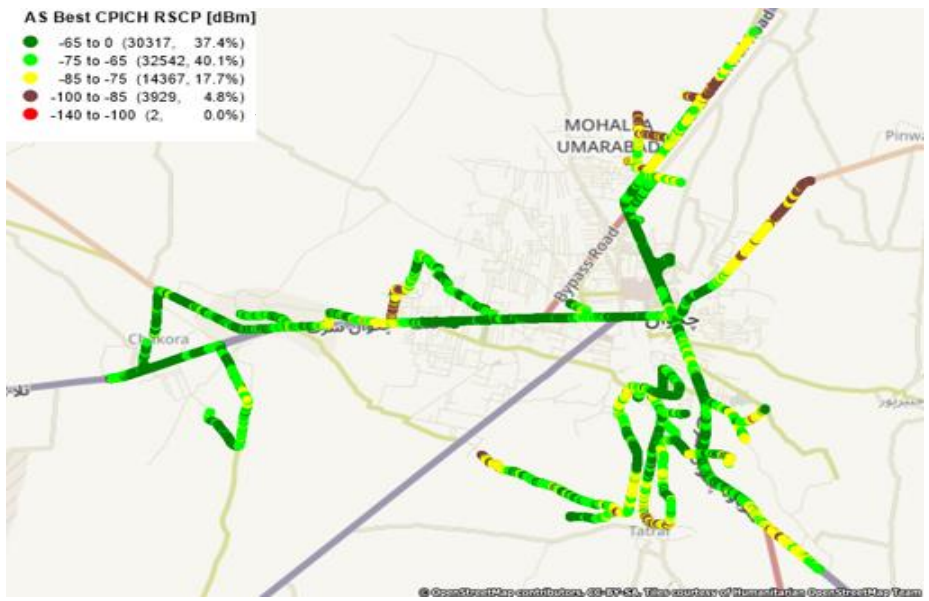



## ZONG 3G NETWORK COVERAGE – BUREWALA

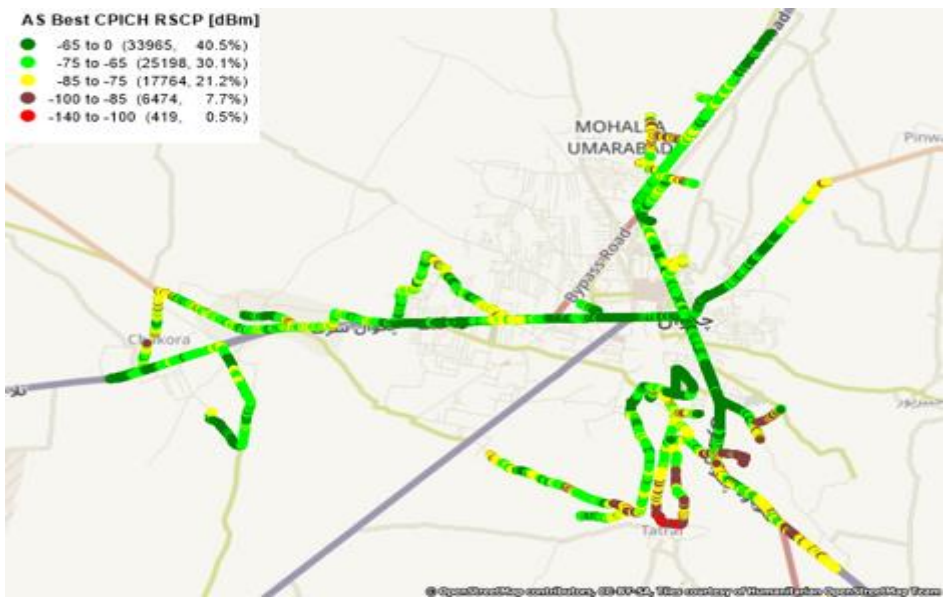


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

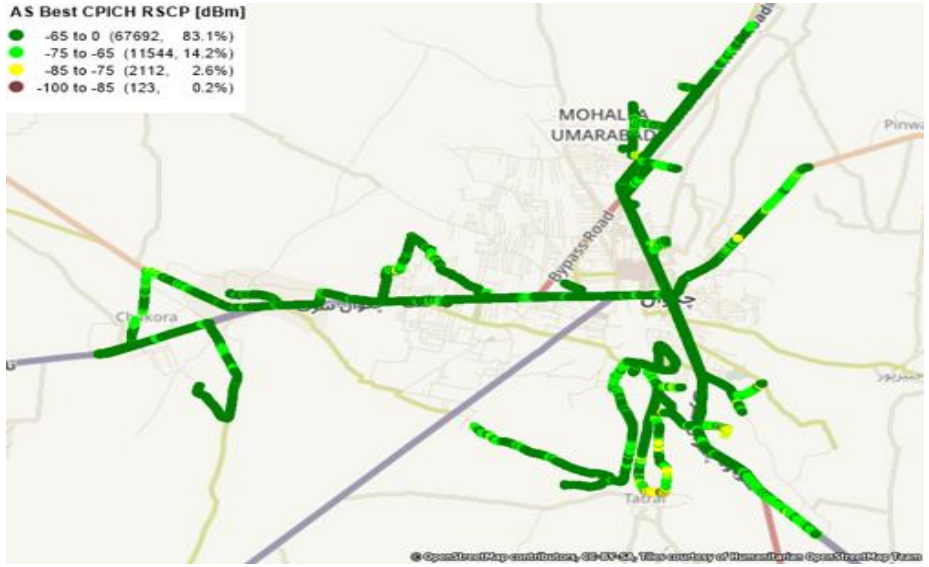
## JAZZ 3G NETWORK COVERAGE – CHAKWAL



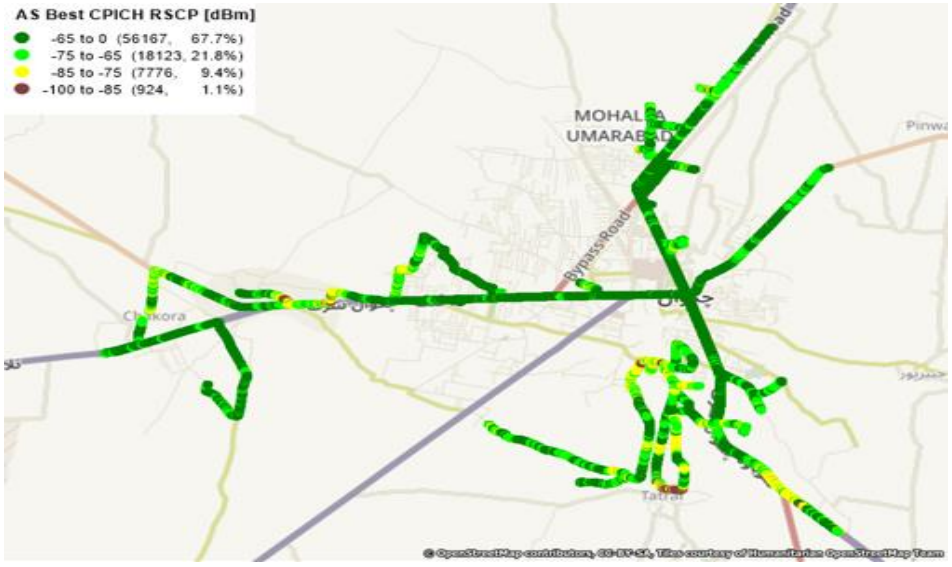

## TELENOR 3G NETWORK COVERAGE – CHAKWAL




## UFONE 3G NETWORK COVERAGE – CHAKWAL

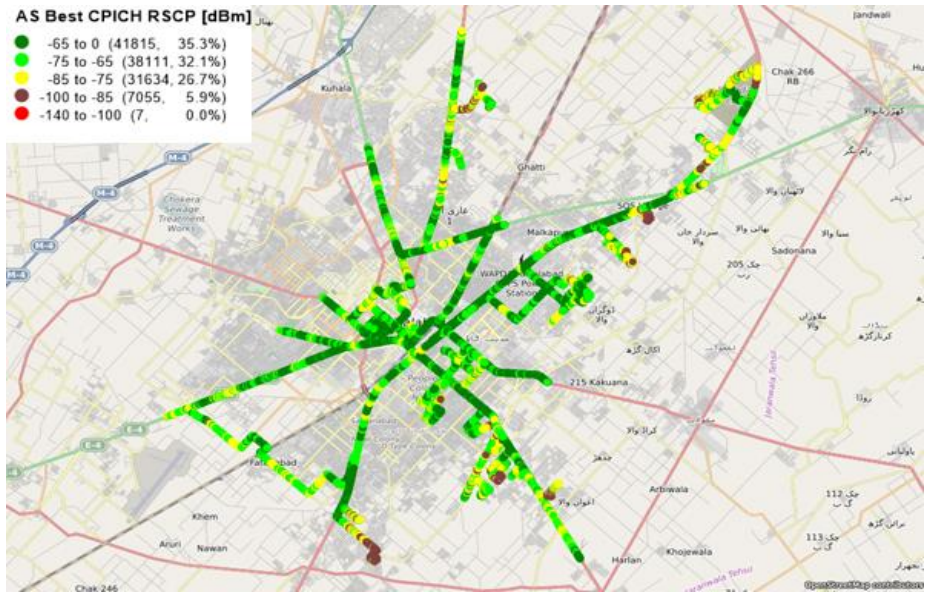



## ZONG 3G NETWORK COVERAGE – CHAKWAL

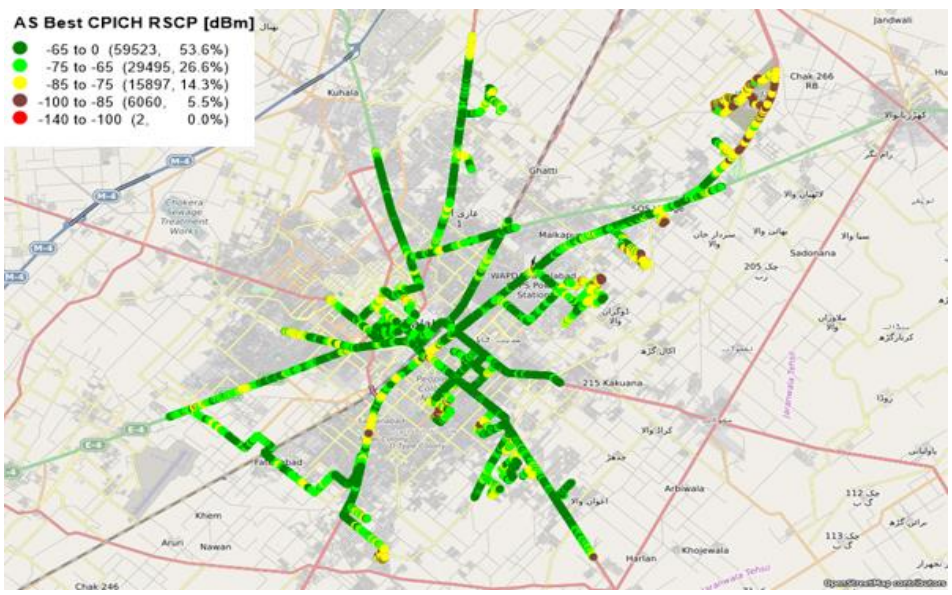


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

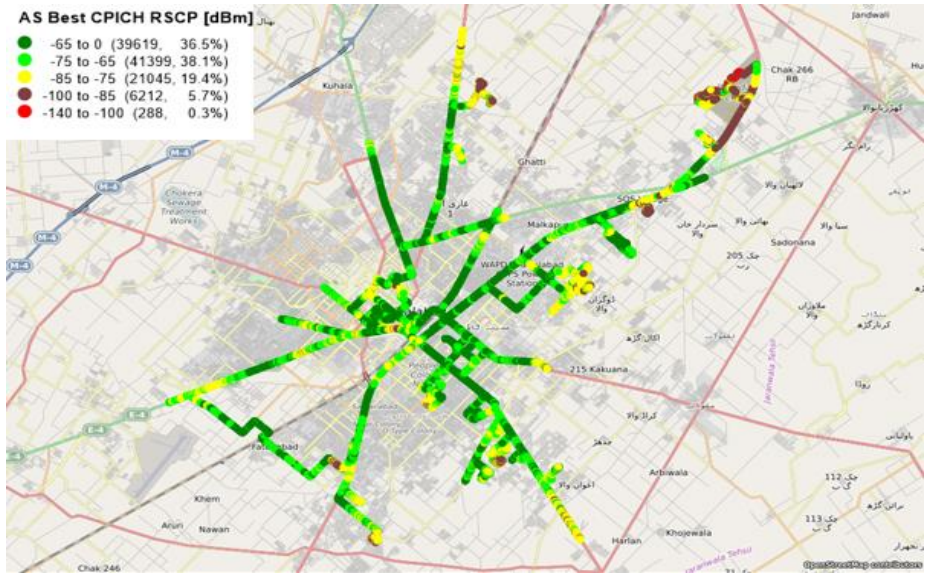
## JAZZ 3G NETWORK COVERAGE – FAISALABAB



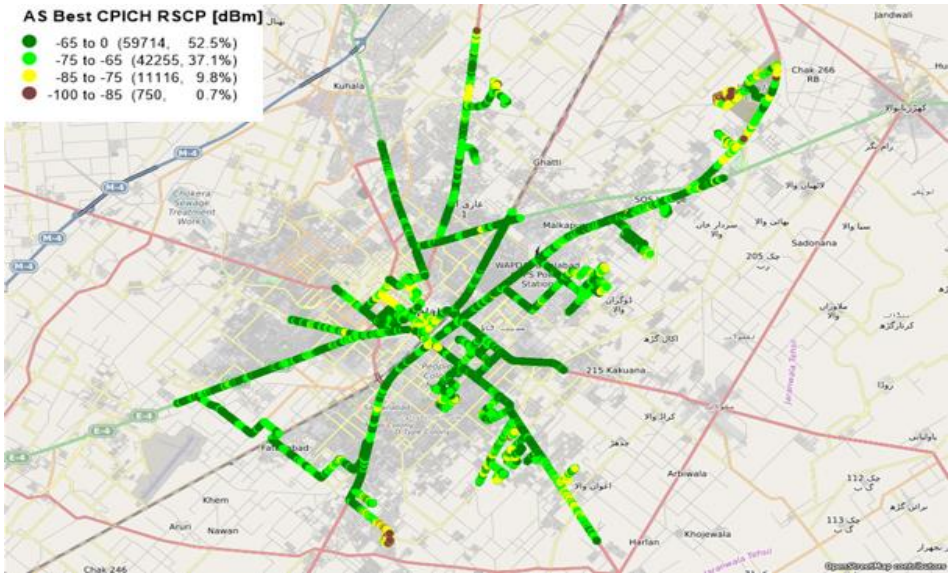

## TELENOR 3G NETWORK COVERAGE – FAISALABAD



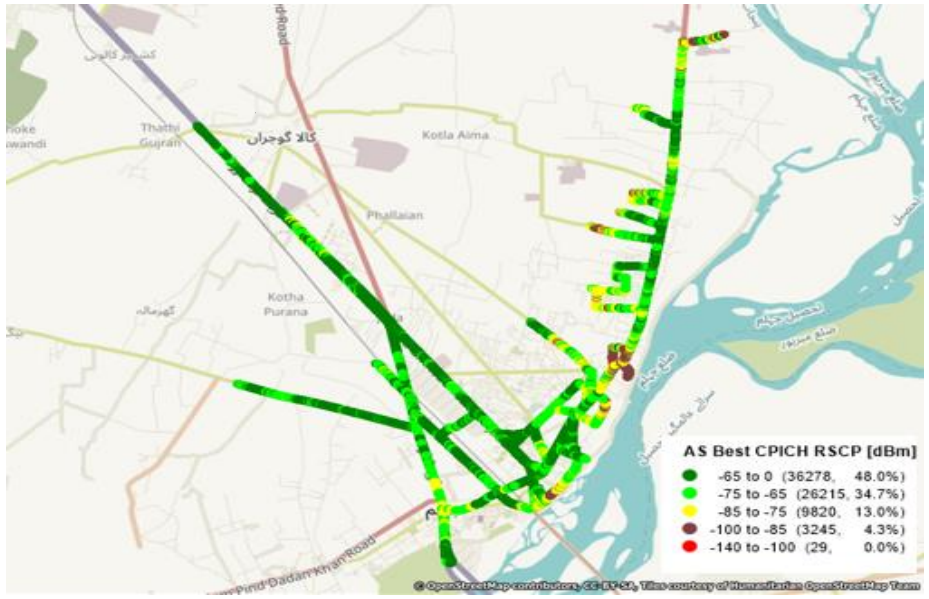
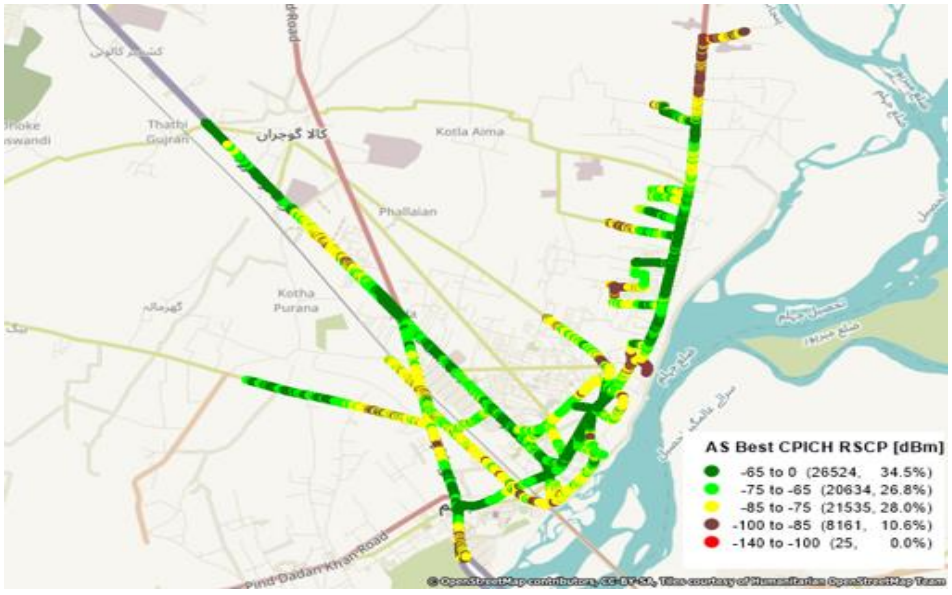
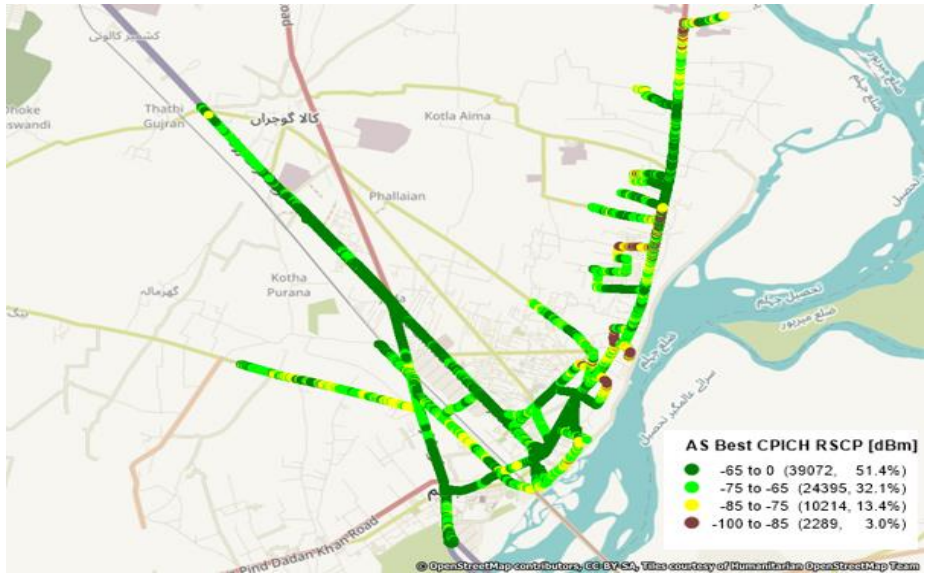
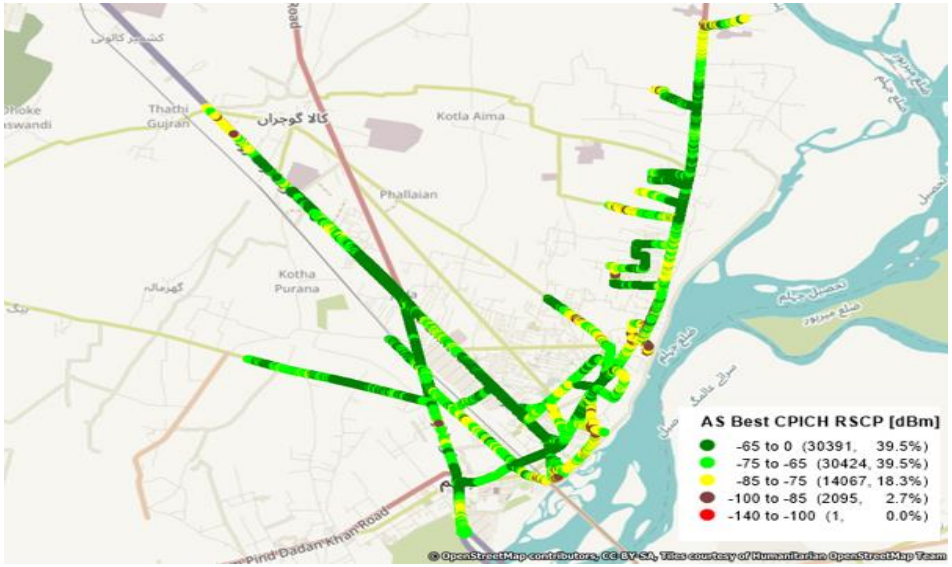

## UFONE 3G NETWORK COVERAGE – FAISALABAD




## ZONG 3G NETWORK COVERAGE – FAISALABAD

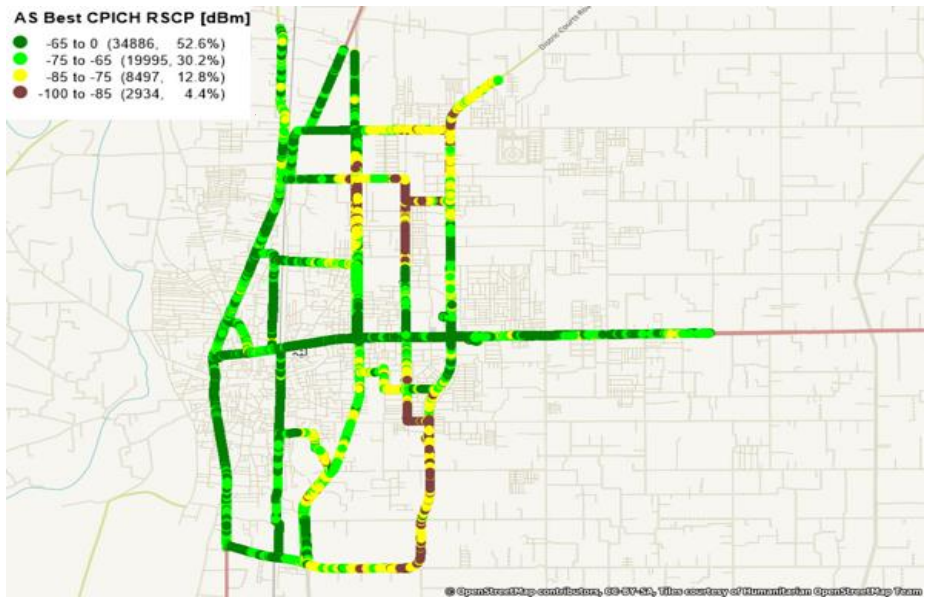


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

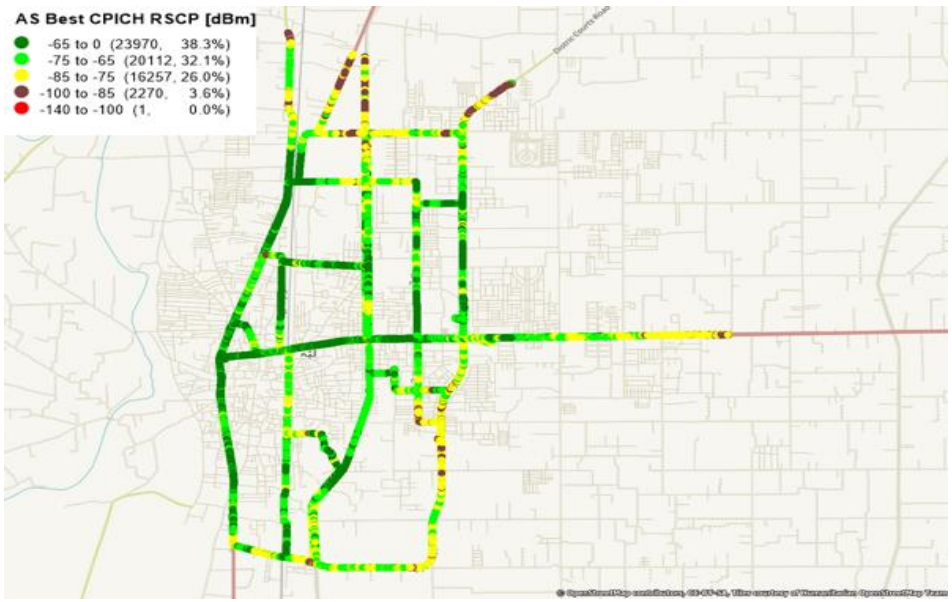
| JAZZ 3G NETWORK COVERAGE – JHELUM | TELENOR 3G NETWORK COVERAGE – JHELUM |
|---|---|
|  |  |
| **UFONE 3G NETWORK COVERAGE – JHELUM** | **ZONG 3G NETWORK COVERAGE – JHELUM** |
|  |  |

# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

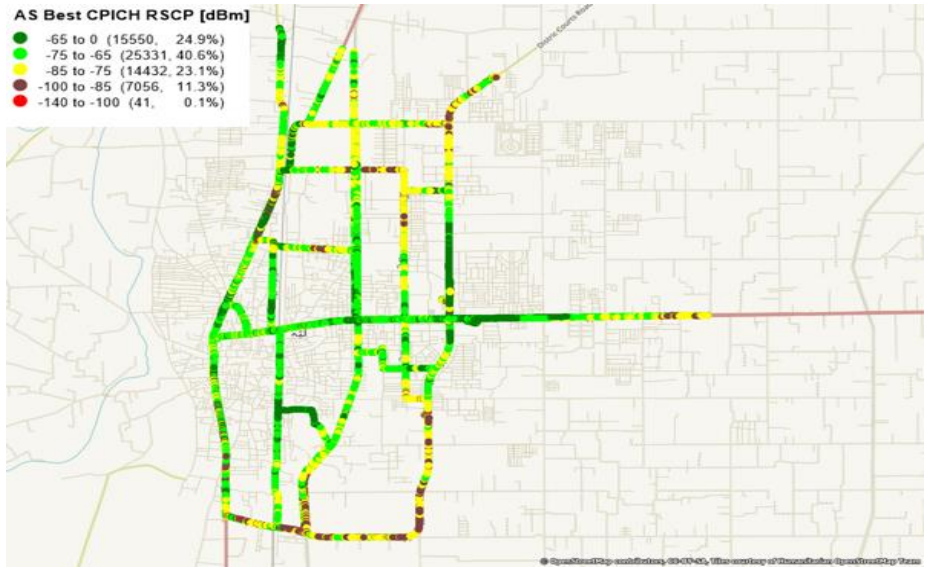
## JAZZ 3G NETWORK COVERAGE – LAYYAH



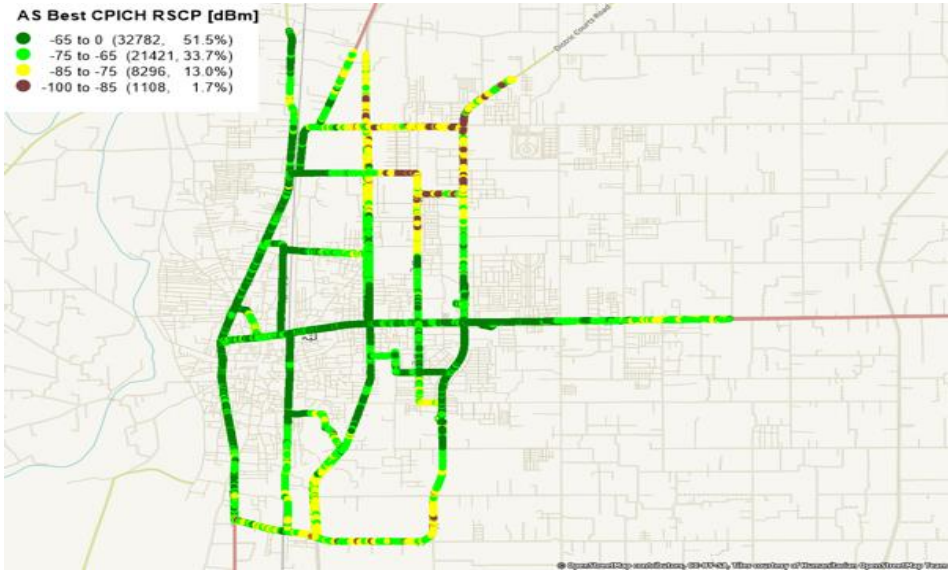

## TELENOR 3G NETWORK COVERAGE – LAYYAH




## UFONE 3G NETWORK COVERAGE – LAYYAH

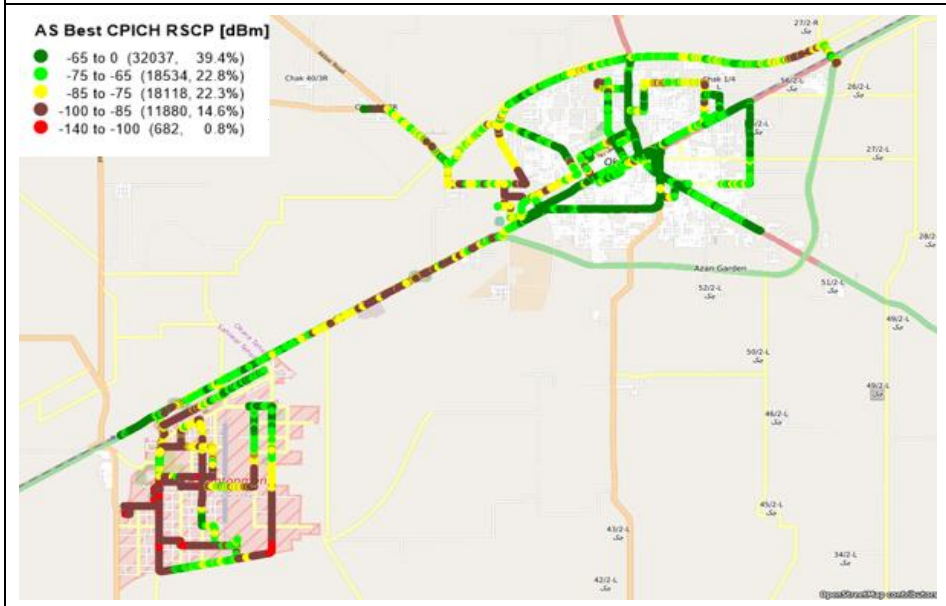



## ZONG 3G NETWORK COVERAGE – LAYYAH

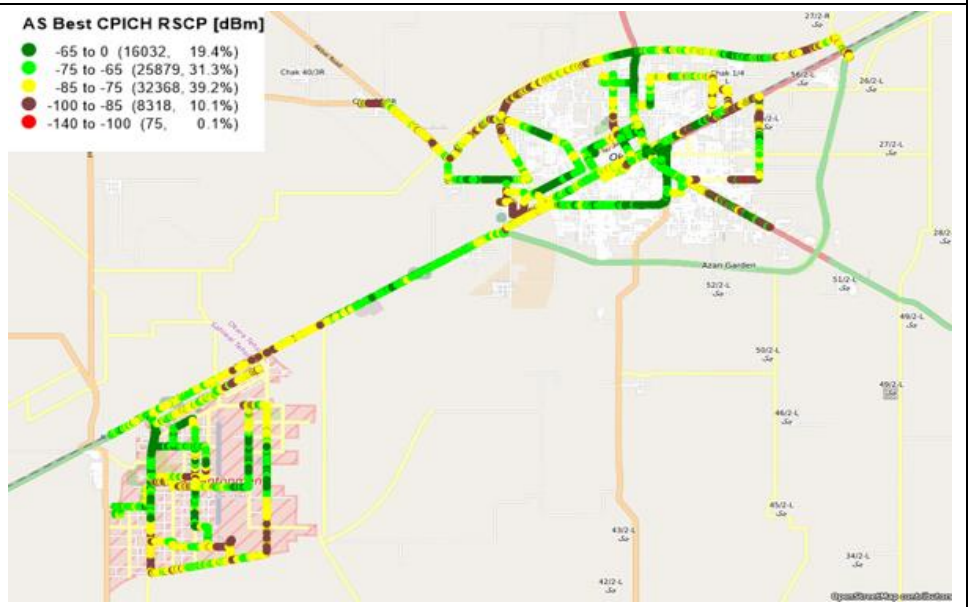


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

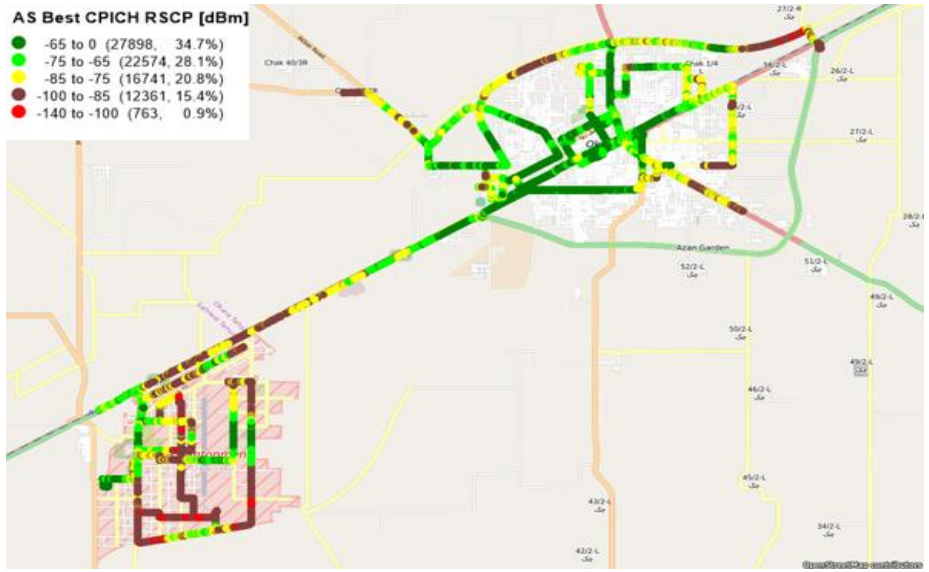
## JAZZ 3G NETWORK COVERAGE –OKARA



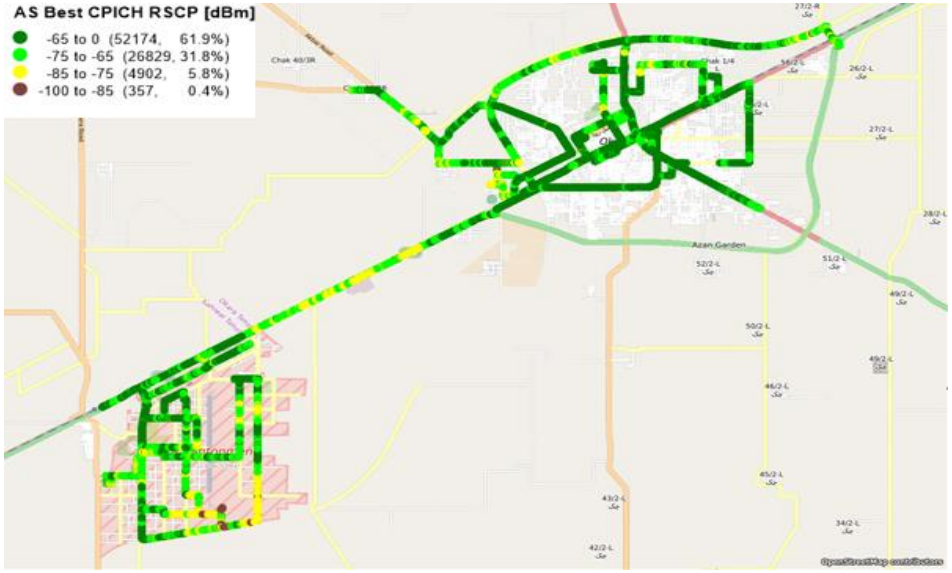

## TELENOR 3G NETWORK COVERAGE – OKARA




## UFONE 3G NETWORK COVERAGE – OKARA

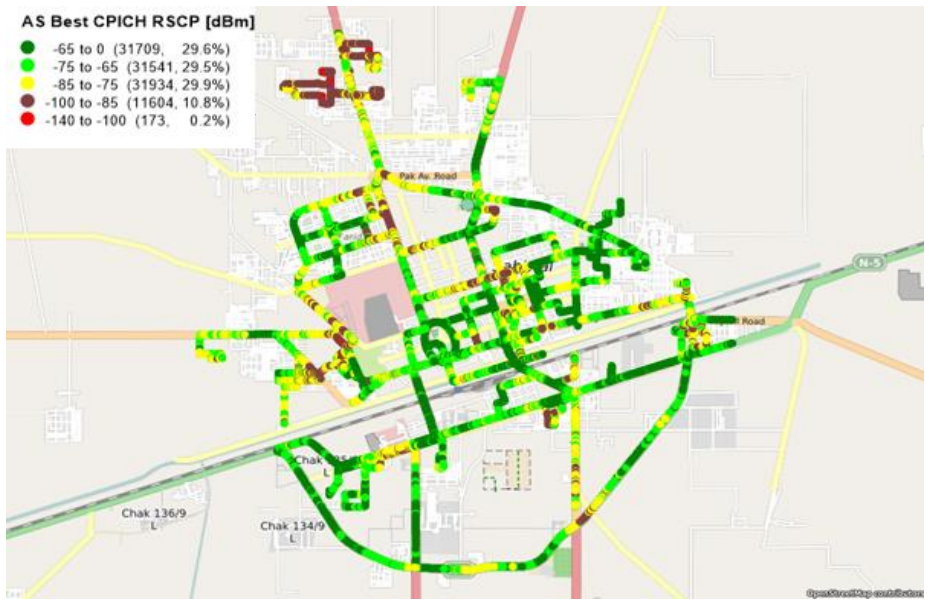



## ZONG 3G NETWORK COVERAGE – OKARA

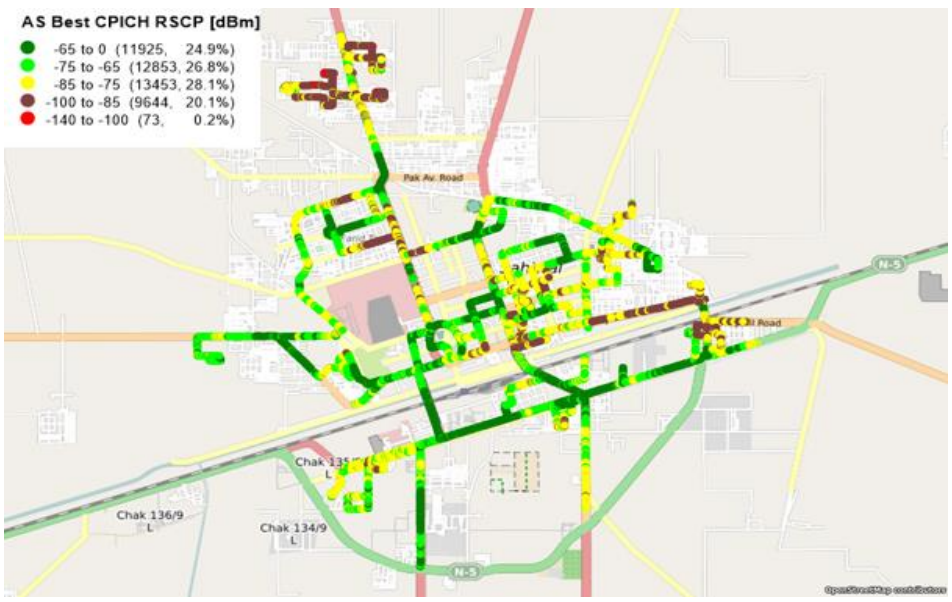


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

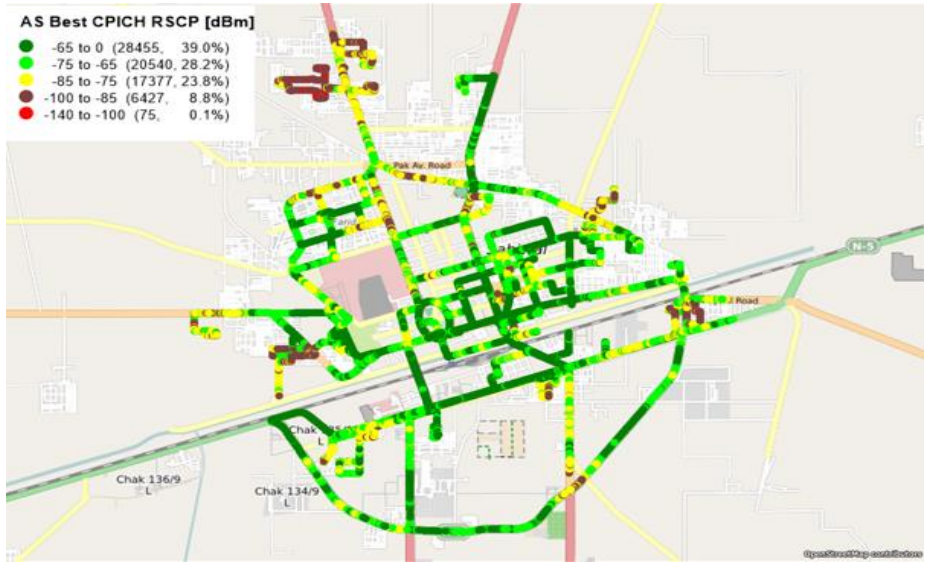
## JAZZ 3G NETWORK COVERAGE – SAHIWAL



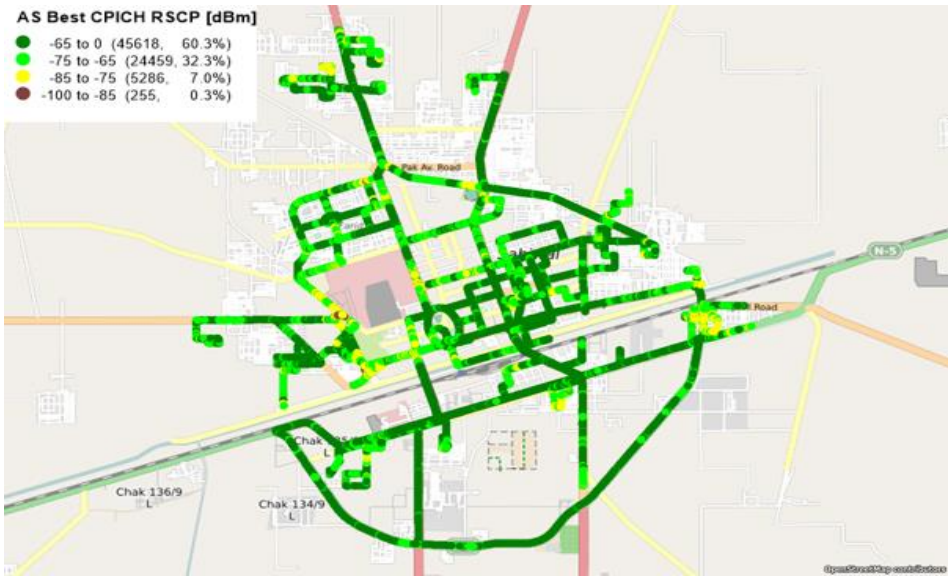

## TELENOR 3G NETWORK COVERAGE – SAHIWAL




## UFONE 3G NETWORK COVERAGE – SAHIWAL

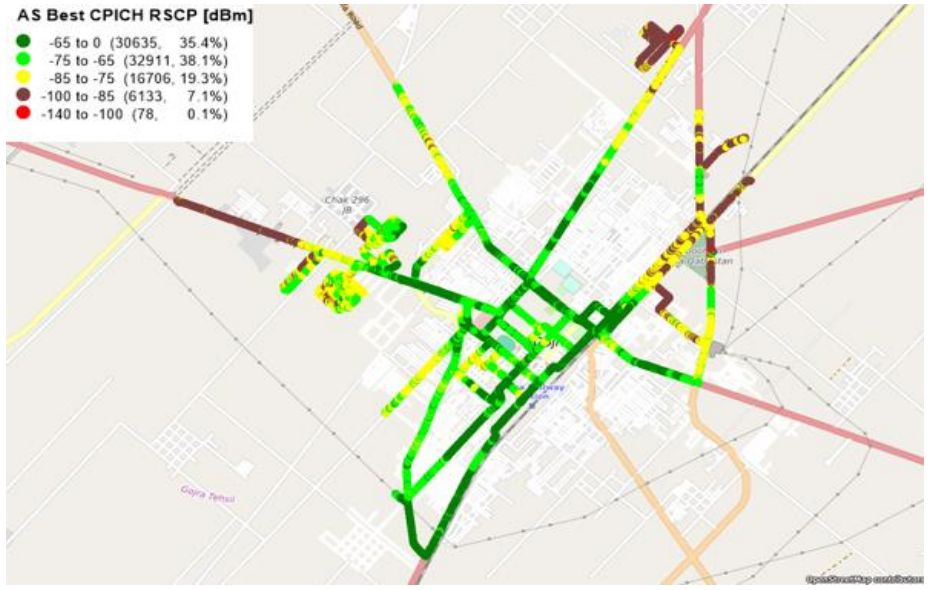



## ZONG 3G NETWORK COVERAGE – SAHIWAL

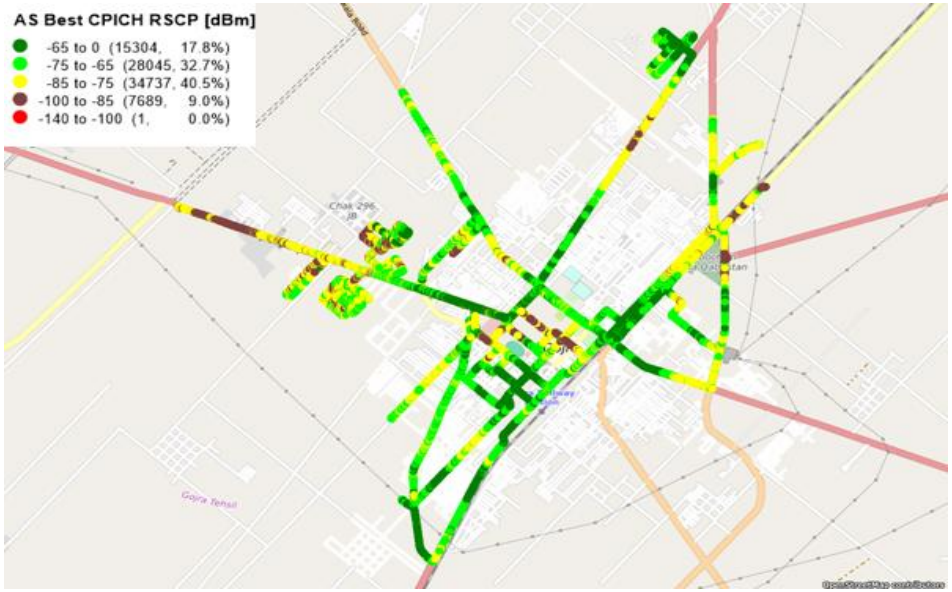


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

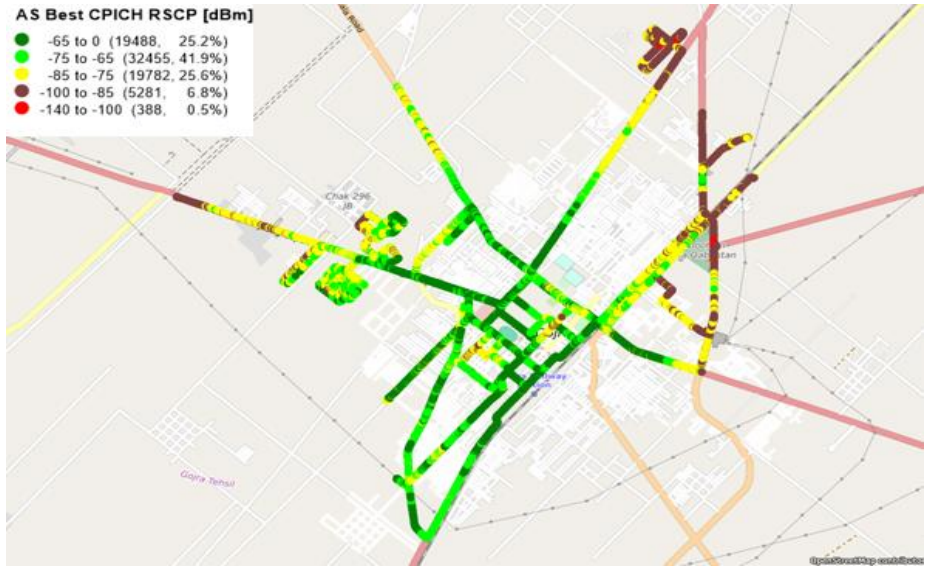
## JAZZ 3G NETWORK COVERAGE – GOJRA



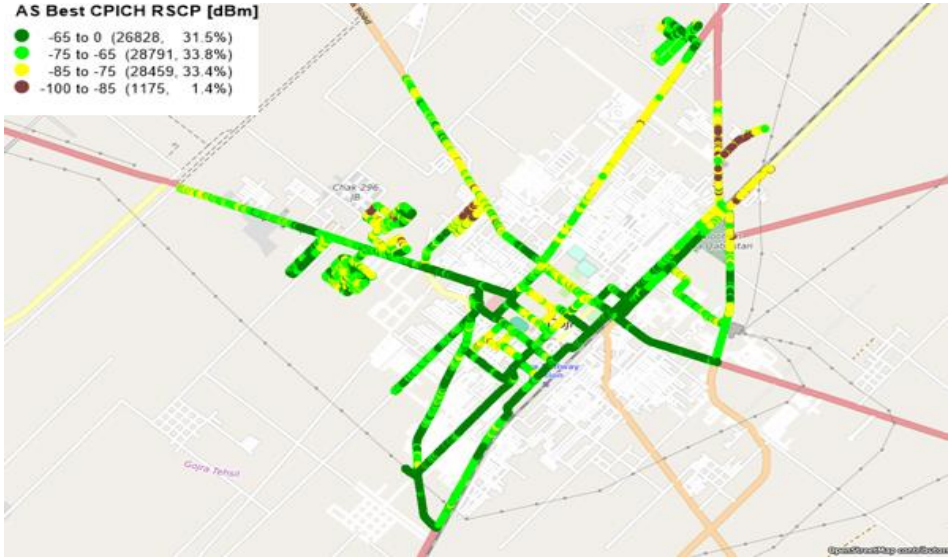

## TELENOR 3G NETWORK COVERAGE – GOJRA




## UFONE 3G NETWORK COVERAGE – GOJRA

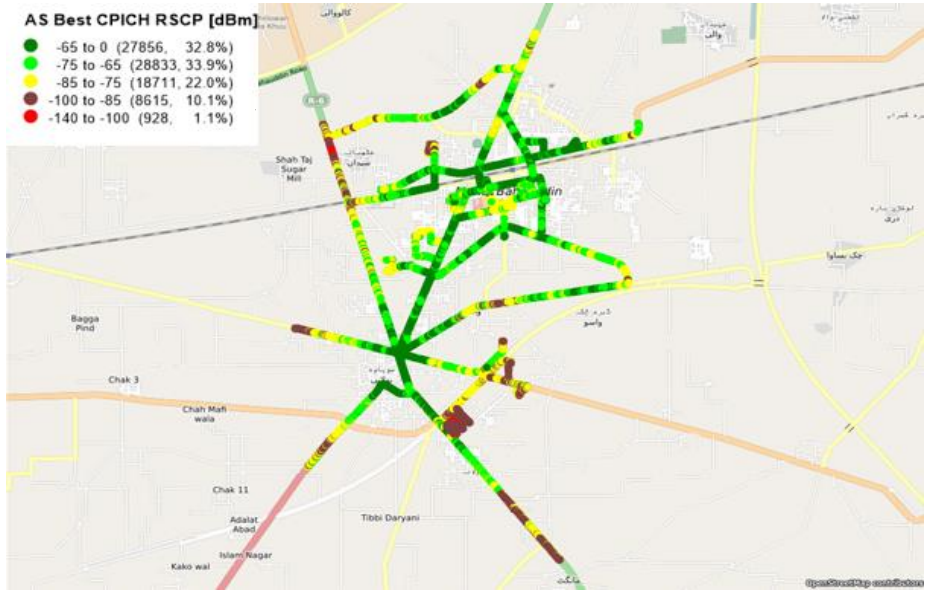



## ZONG 3G NETWORK COVERAGE – GOJRA

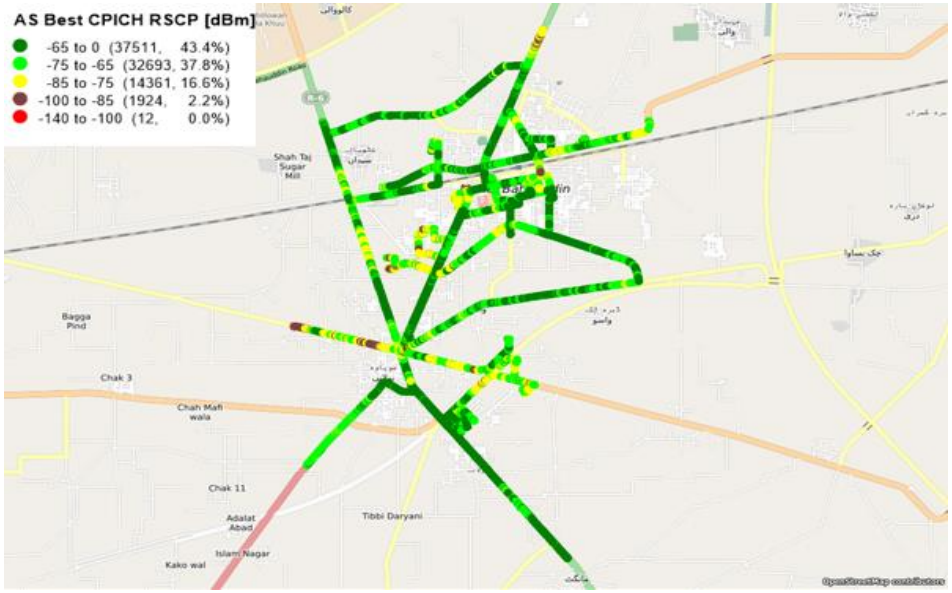


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

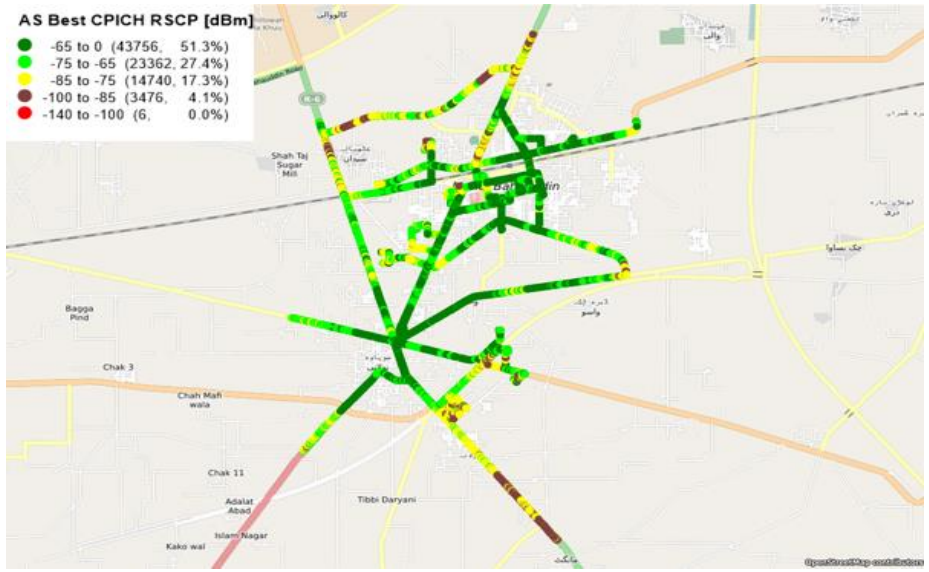
## JAZZ 3G NETWORK COVERAGE – MANDI BAHAUDDIN



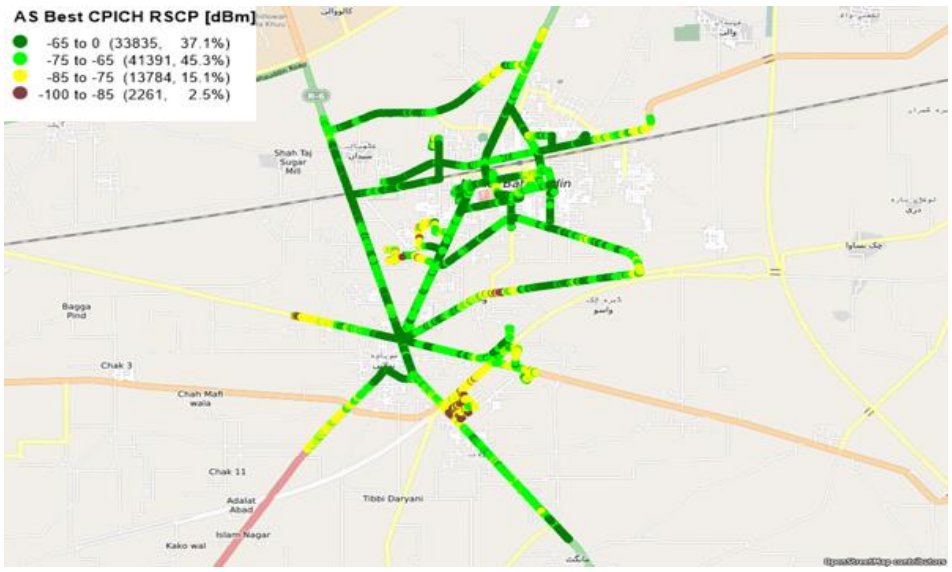

## TELENOR 3G NETWORK COVERAGE – MANDI BAHAUDDIN




## UFONE 3G NETWORK COVERAGE – MANDI BAHAUDDIN

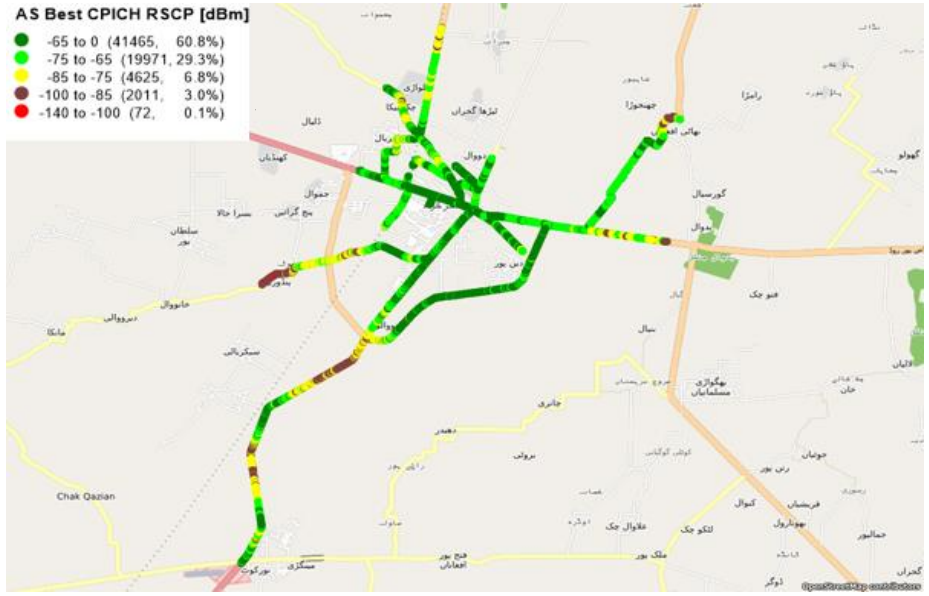



## ZONG 3G NETWORK COVERAGE – MANDI BAHAUDDIN

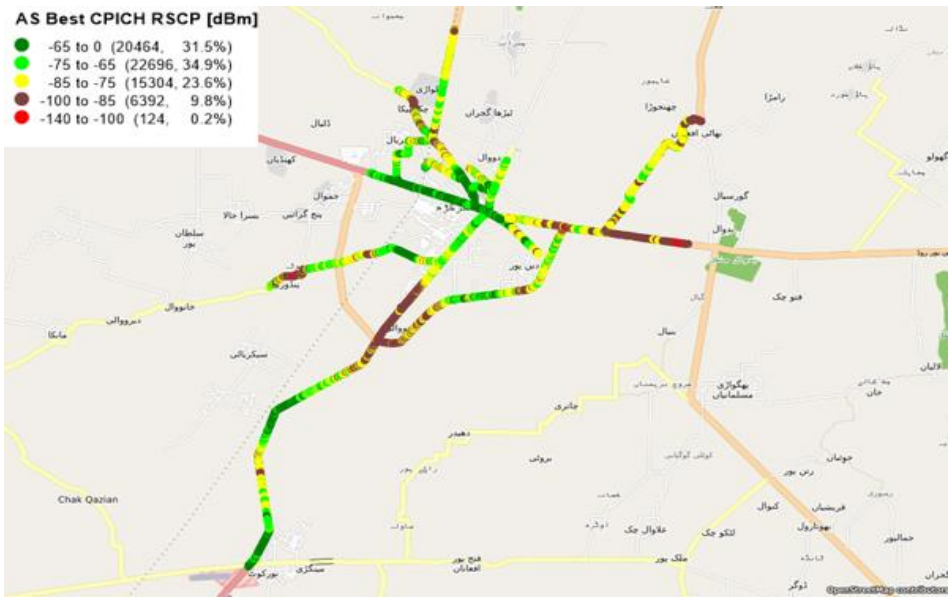


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

## JAZZ 3G NETWORK COVERAGE – SHAKARGARH

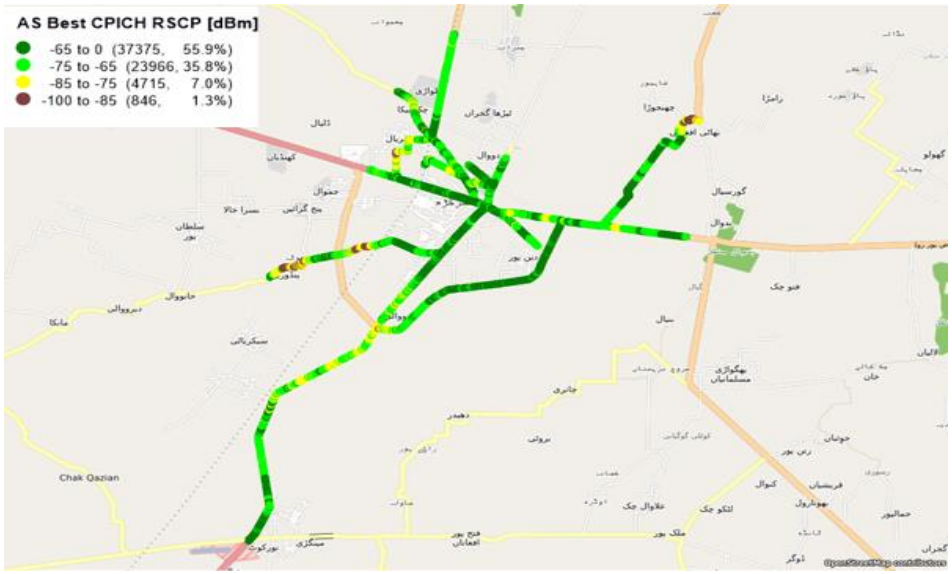



## TELENOR 3G NETWORK COVERAGE – SHAKARGARH

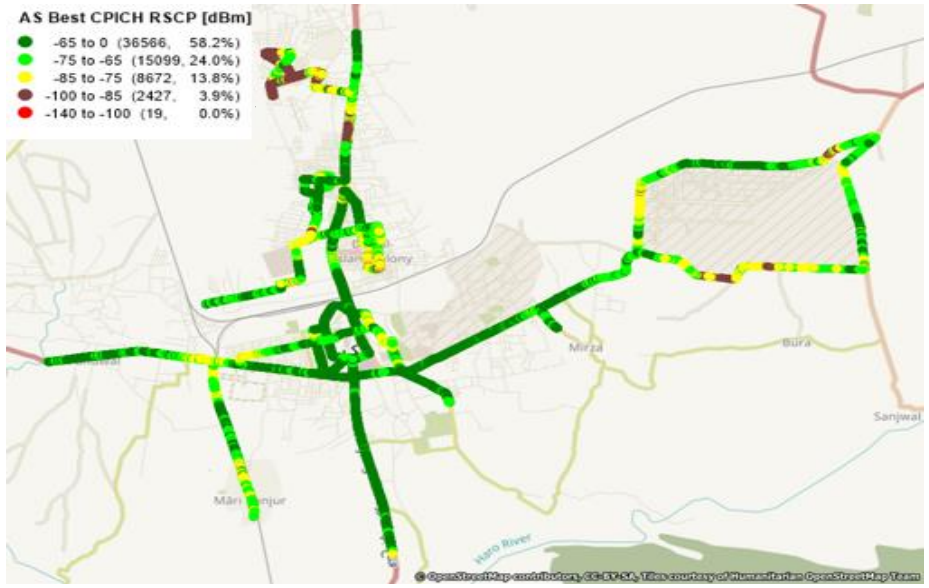
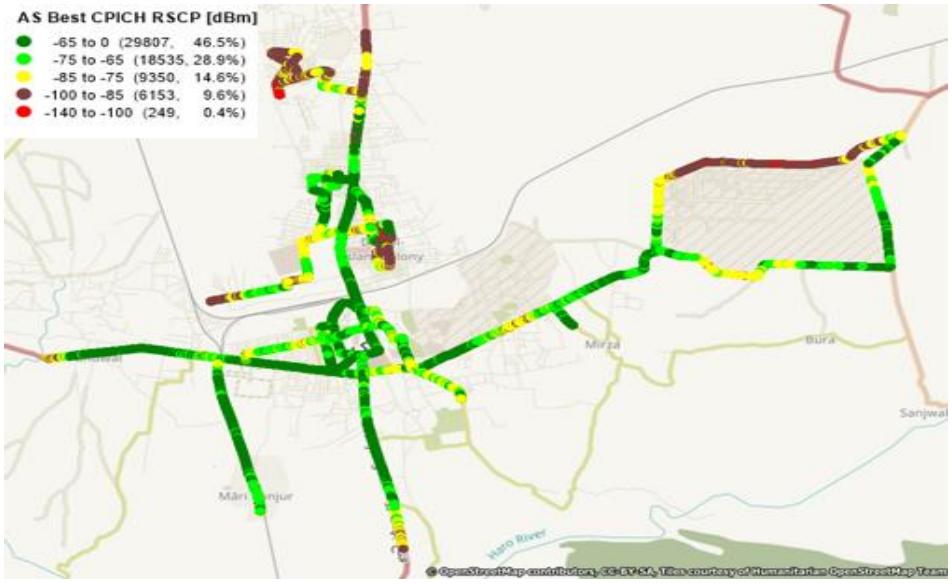
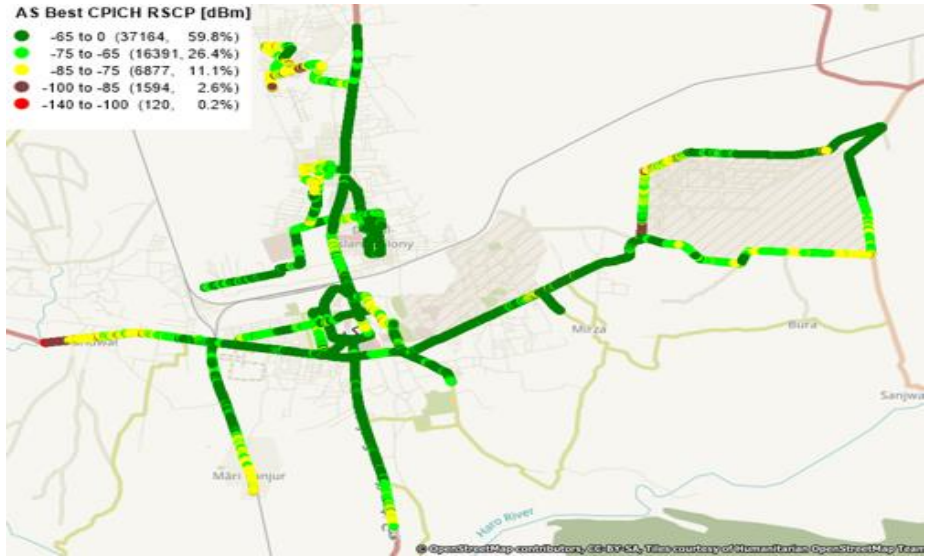
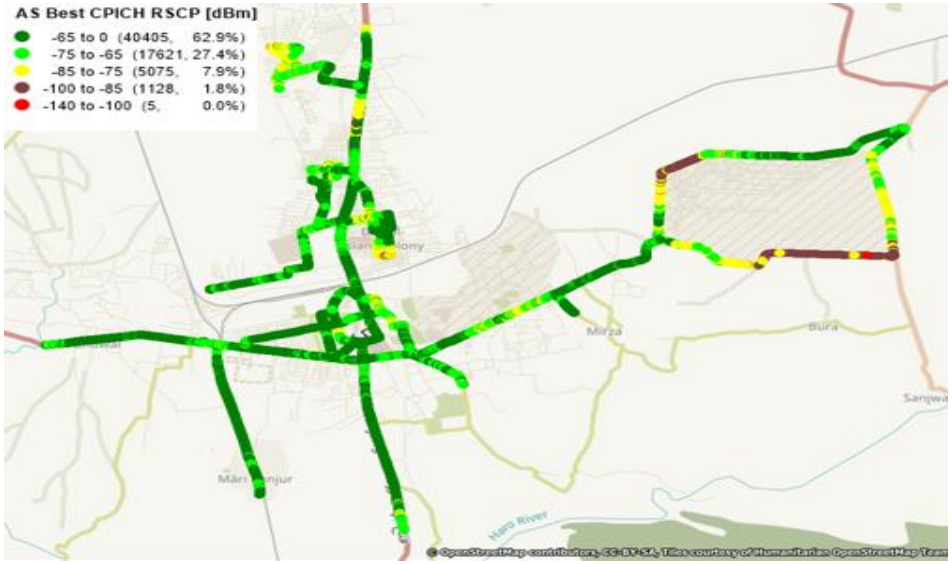



## UFONE 3G NETWORK COVERAGE – SHAKARGARH

## ZONG 3G NETWORK COVERAGE – SHAKARGARH

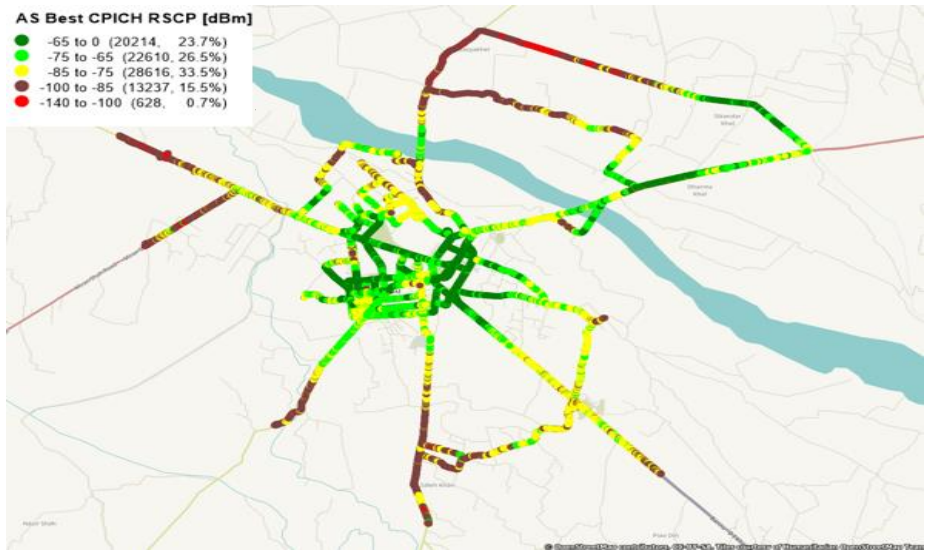


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

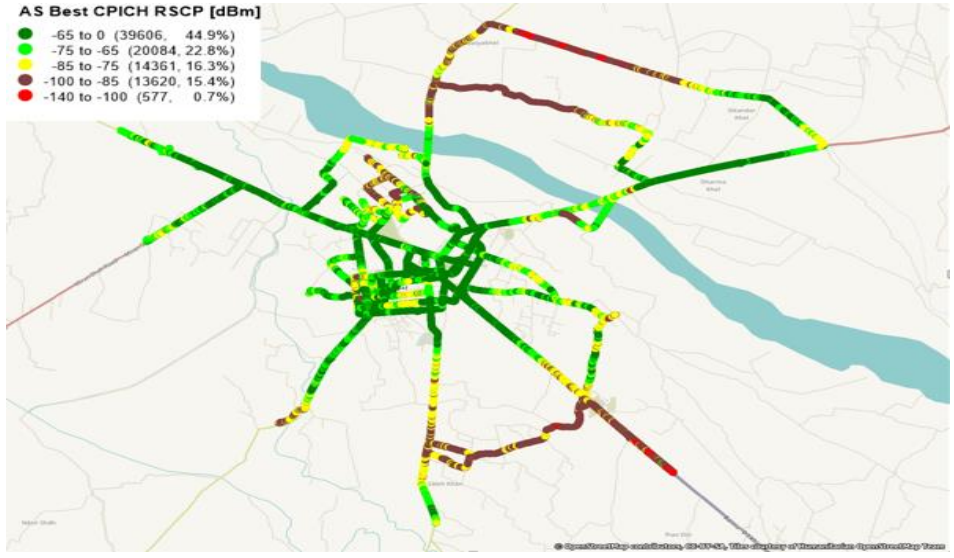
| JAZZ 3G NETWORK COVERAGE – ATTOCK | TELENOR 3G NETWORK COVERAGE – ATTOCK |
|---|---|
|  |  |
| **UFONE 3G NETWORK COVERAGE – ATTOCK** | **ZONG 3G NETWORK COVERAGE – ATTOCK** |
|  |  |

# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

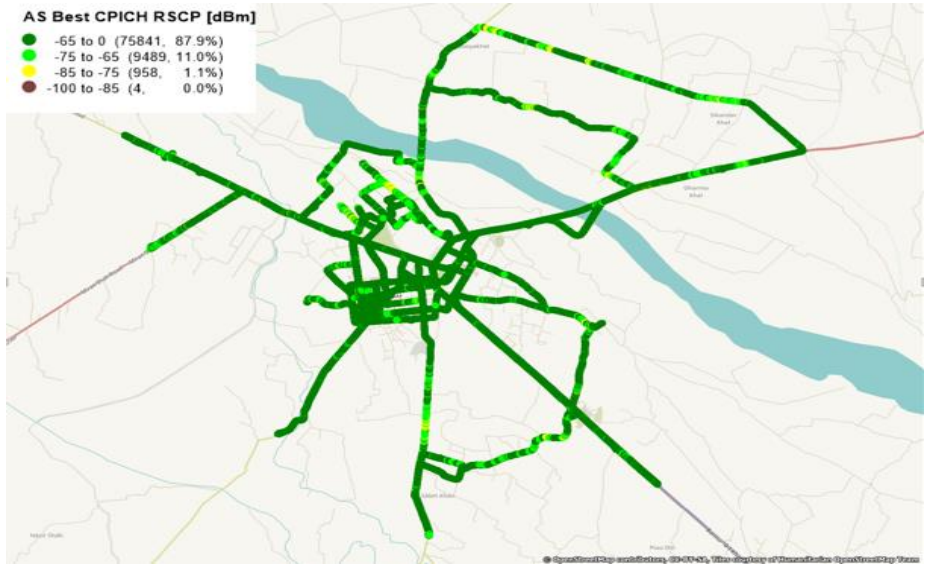
## JAZZ 3G NETWORK COVERAGE – BANNU



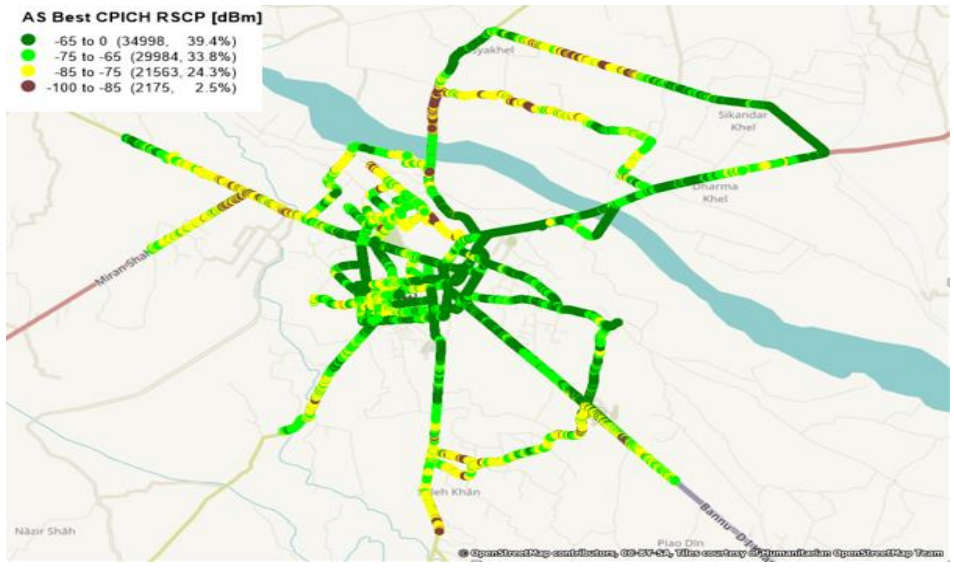

## TELENOR 3G NETWORK COVERAGE – BANNU



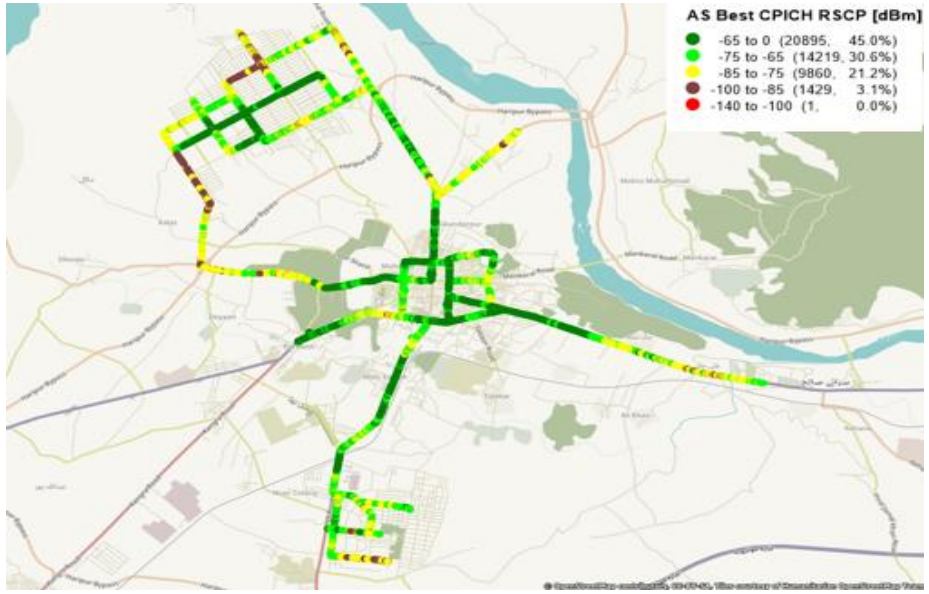
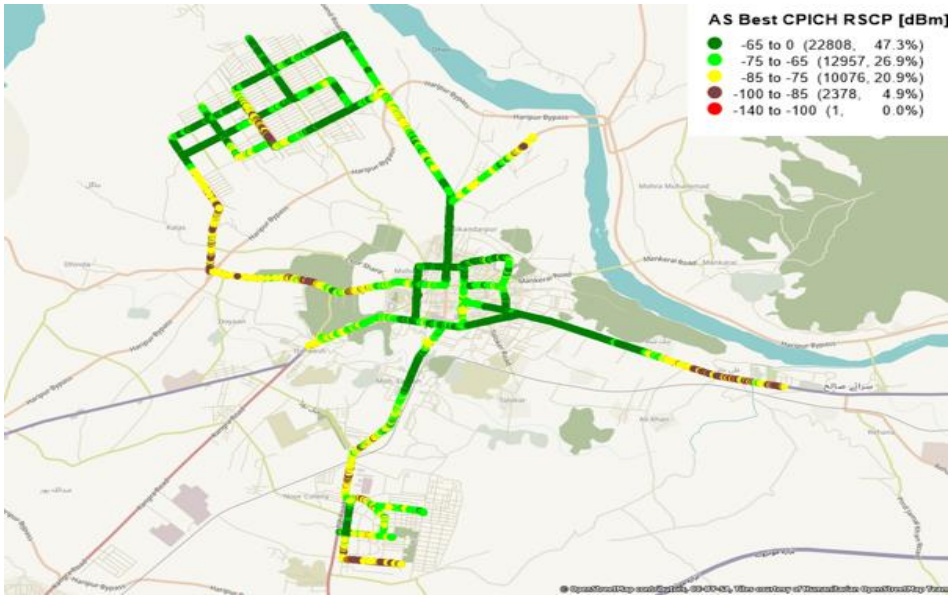
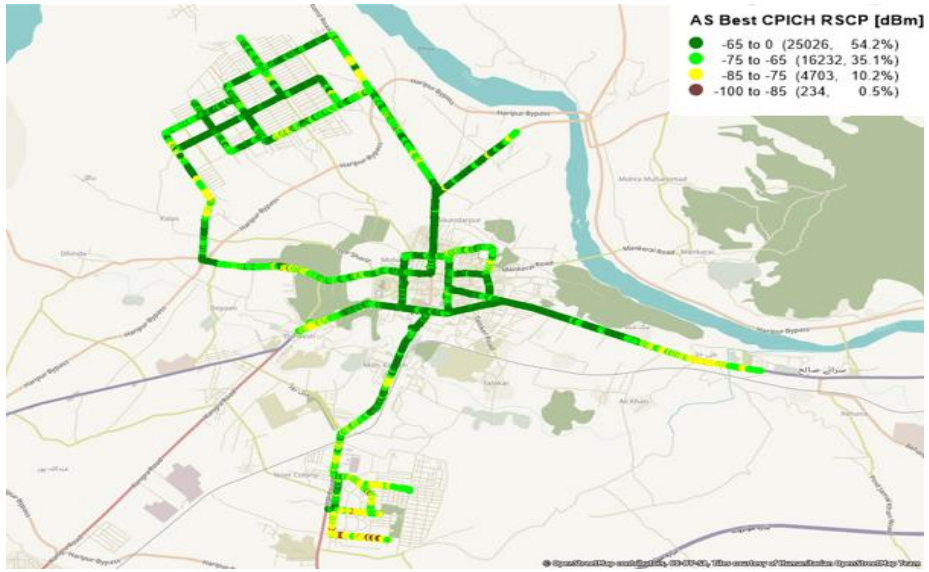
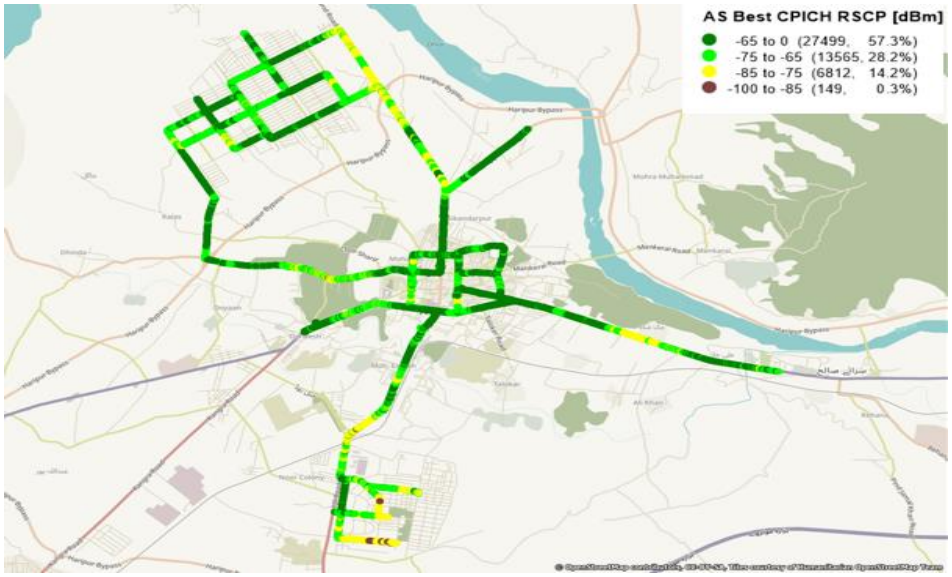

## UFONE 3G NETWORK COVERAGE – BANNU




## ZONG 3G NETWORK COVERAGE – BANNU

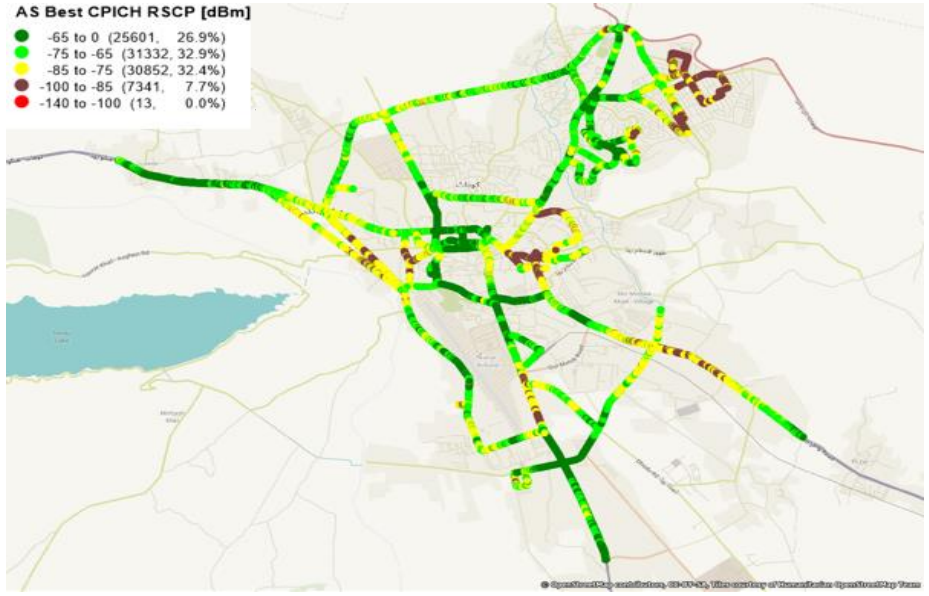


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

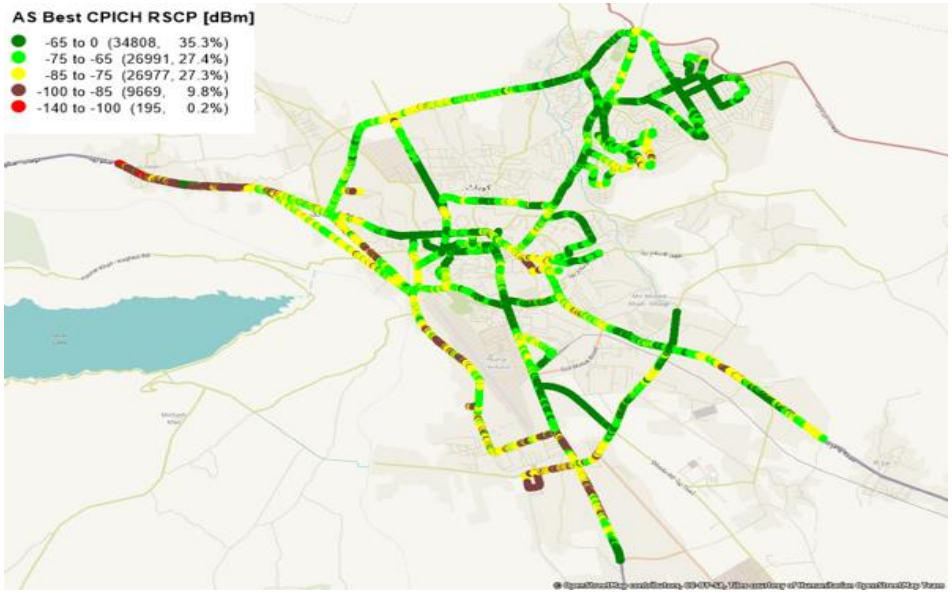
| JAZZ 3G NETWORK COVERAGE – HARIPUR | TELENOR 3G NETWORK COVERAGE – HARIPUR |
|---|---|
|  |  |
| **UFONE 3G NETWORK COVERAGE – HARIPUR** | **ZONG 3G NETWORK COVERAGE – HARIPUR** |
|  |  |

# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

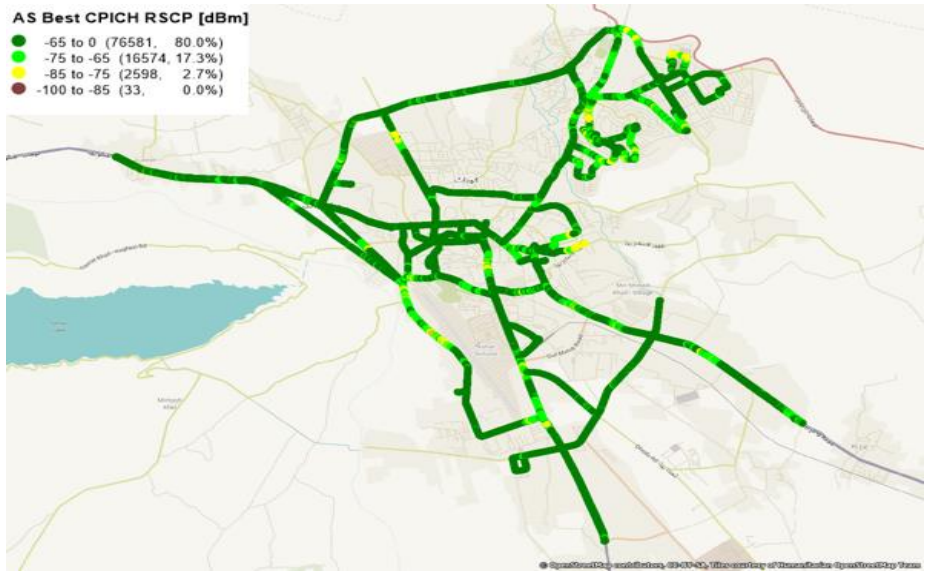
## JAZZ 3G NETWORK COVERAGE – KOHAT



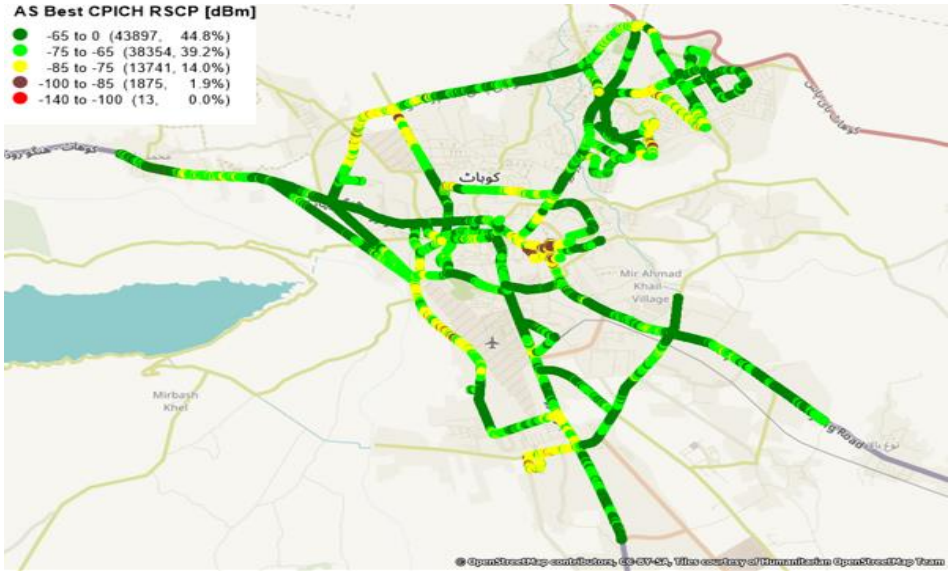

## TELENOR 3G NETWORK COVERAGE – KOHAT




## UFONE 3G NETWORK COVERAGE – KOHAT

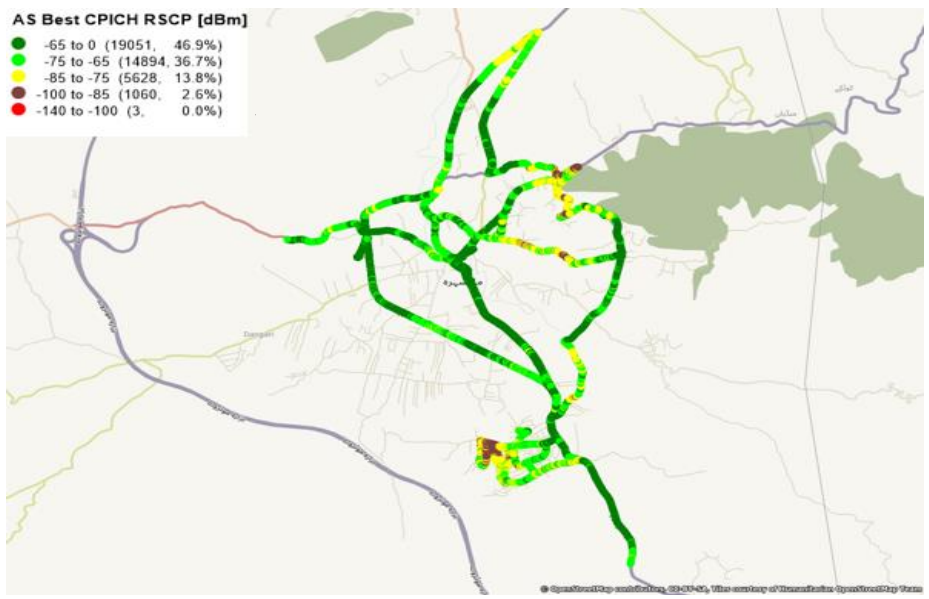



## ZONG 3G NETWORK COVERAGE – KOHAT

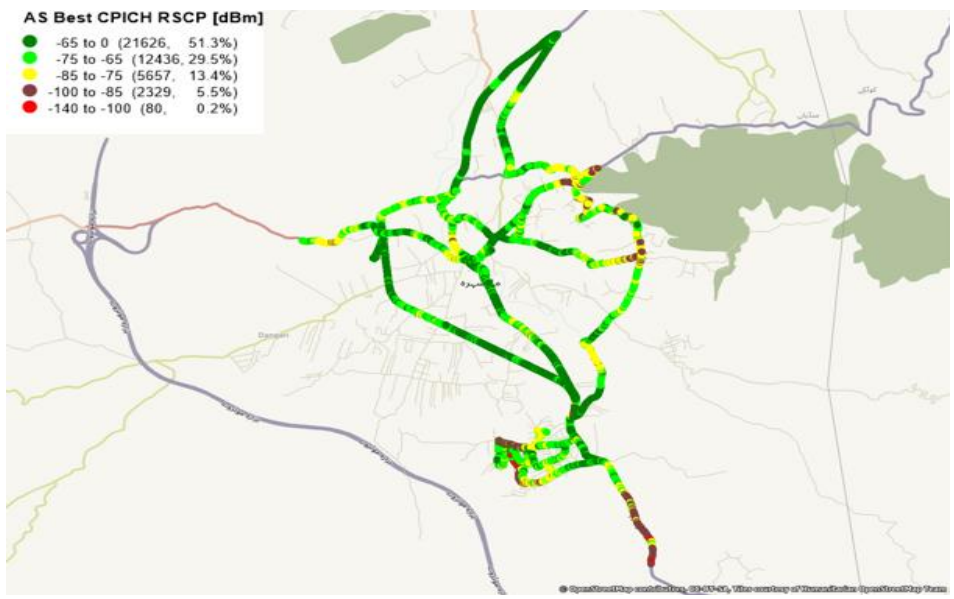


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

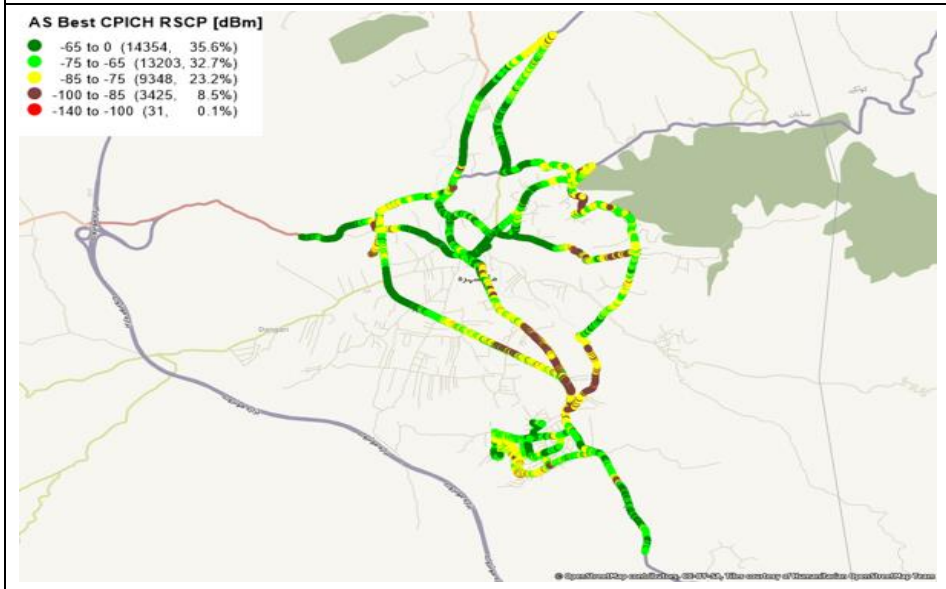
## JAZZ 3G NETWORK COVERAGE – MANSEHRA



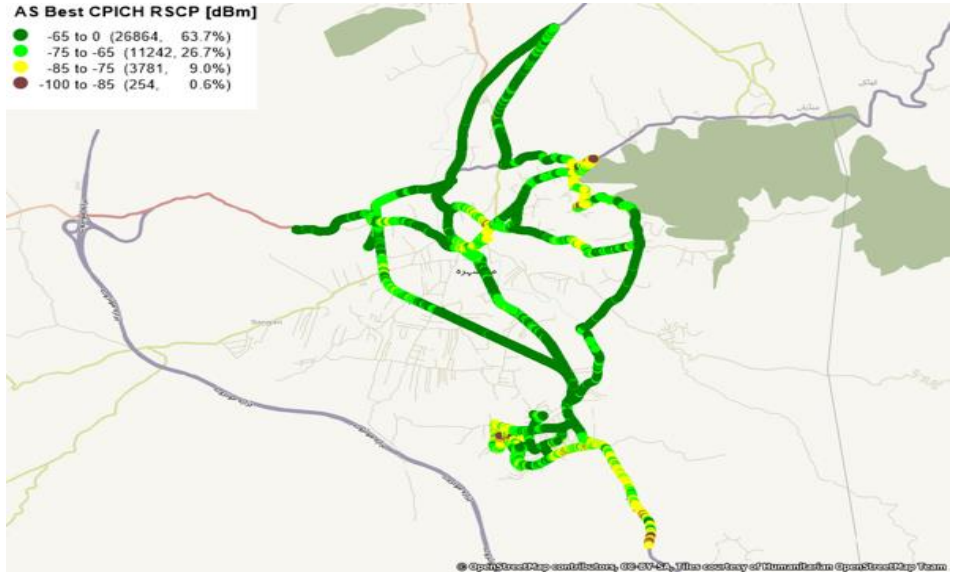

## TELENOR 3G NETWORK COVERAGE – MANSEHRA




## UFONE 3G NETWORK COVERAGE – MANSEHRA

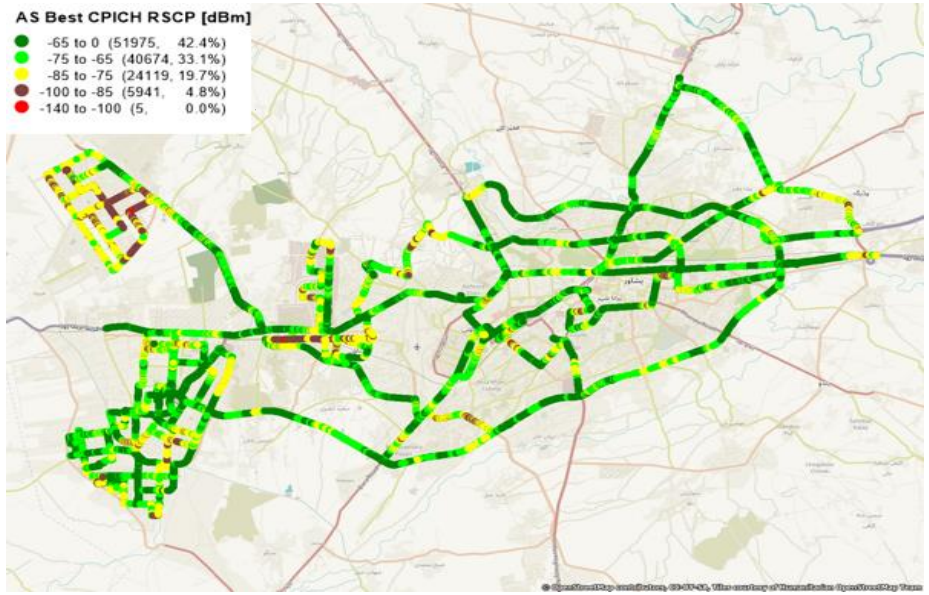



## ZONG 3G NETWORK COVERAGE – MANSEHRA

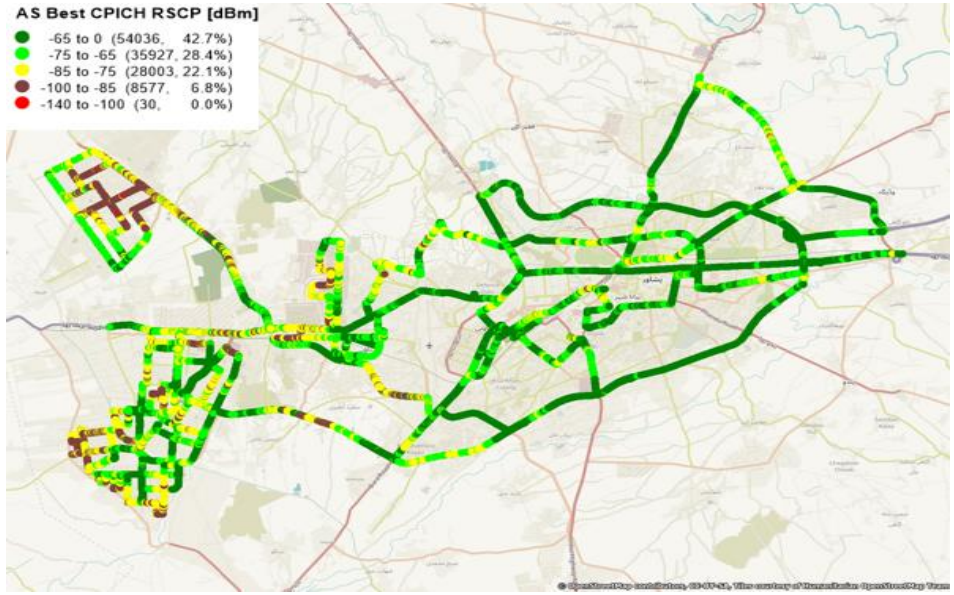


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

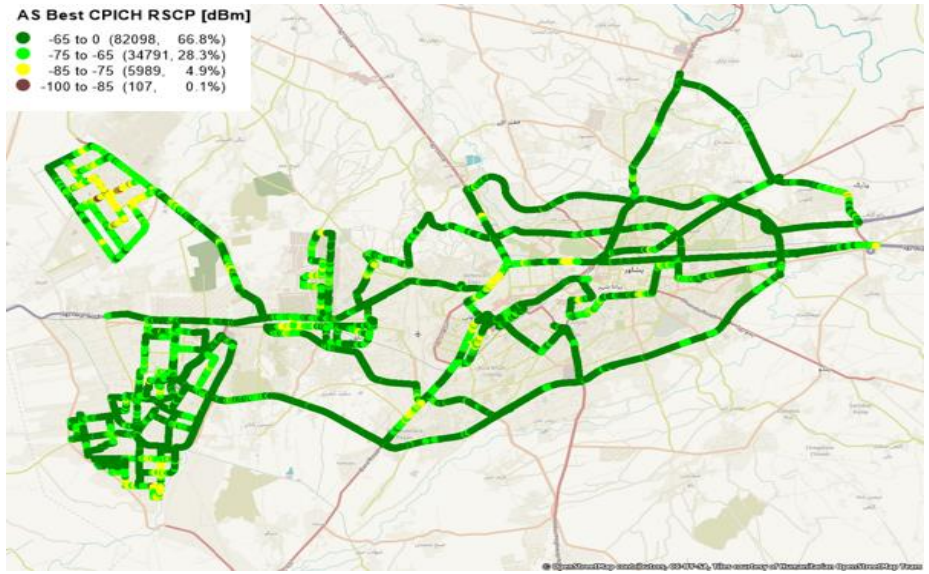
## JAZZ 3G NETWORK COVERAGE – PESHAWAR



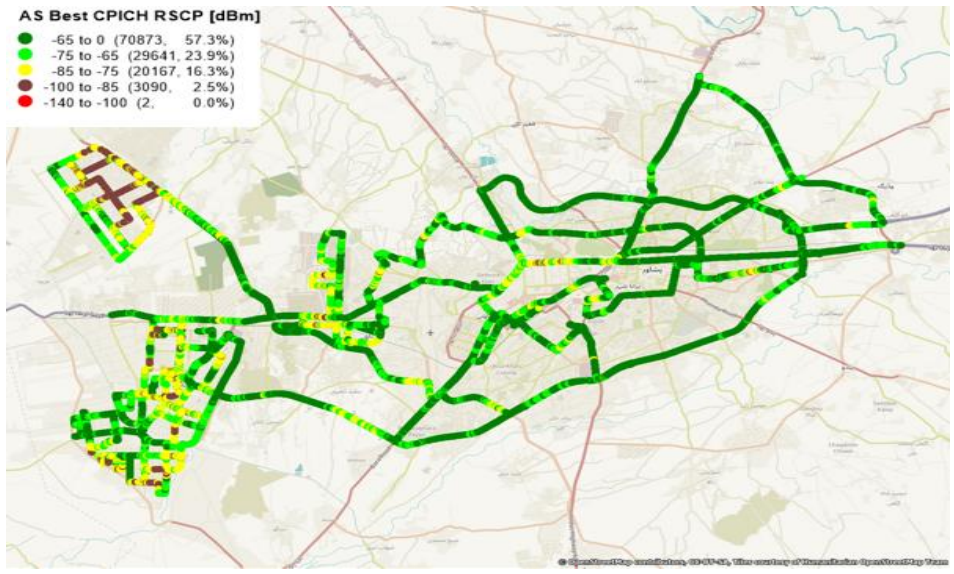

## TELENOR 3G NETWORK COVERAGE – PESHAWAR



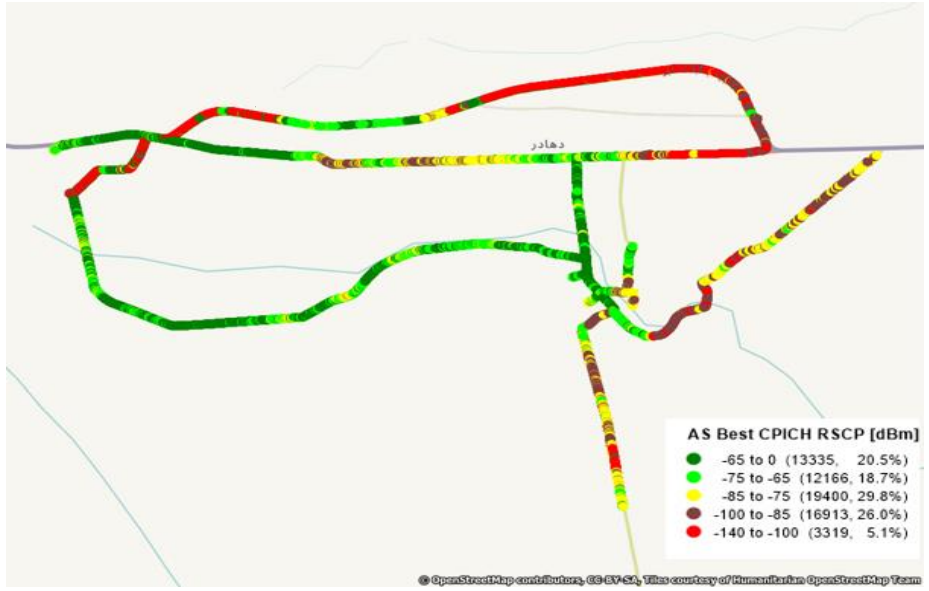
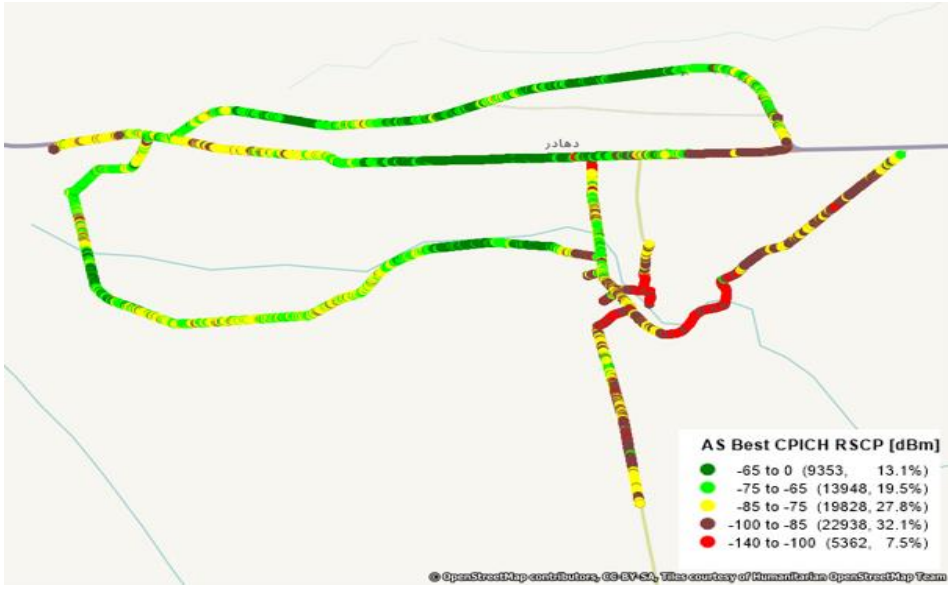
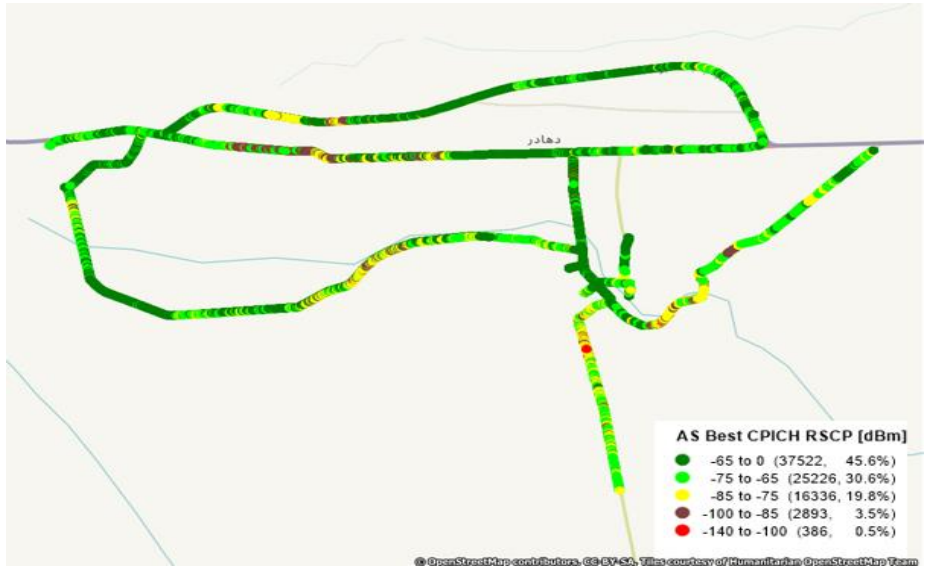
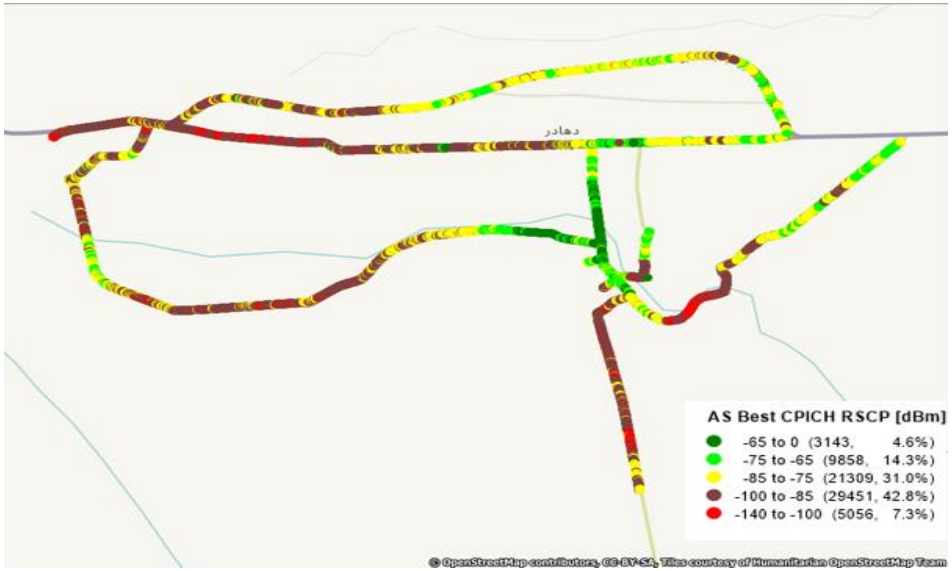

## UFONE 3G NETWORK COVERAGE – PESHAWAR




## ZONG 3G NETWORK COVERAGE – PESHAWAR

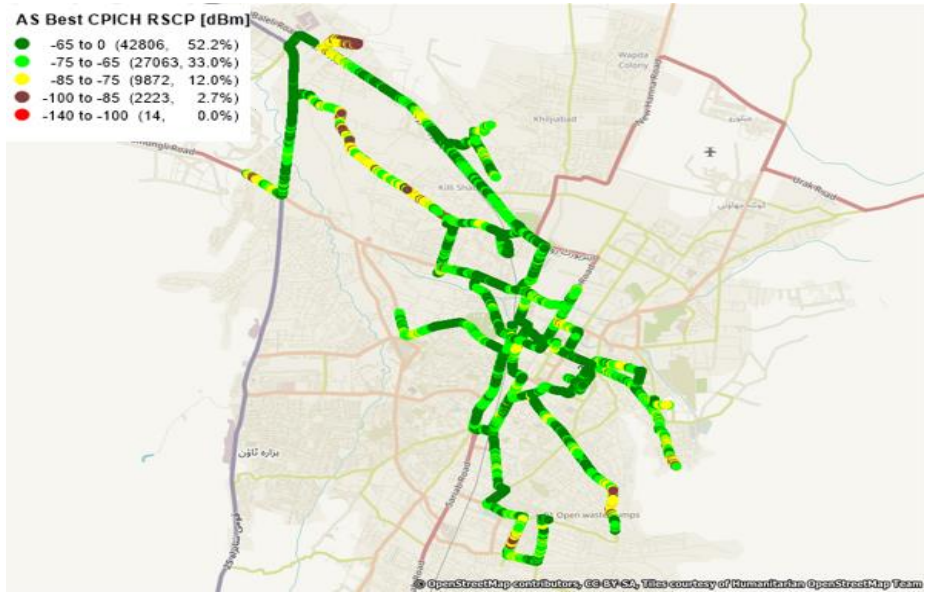


# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

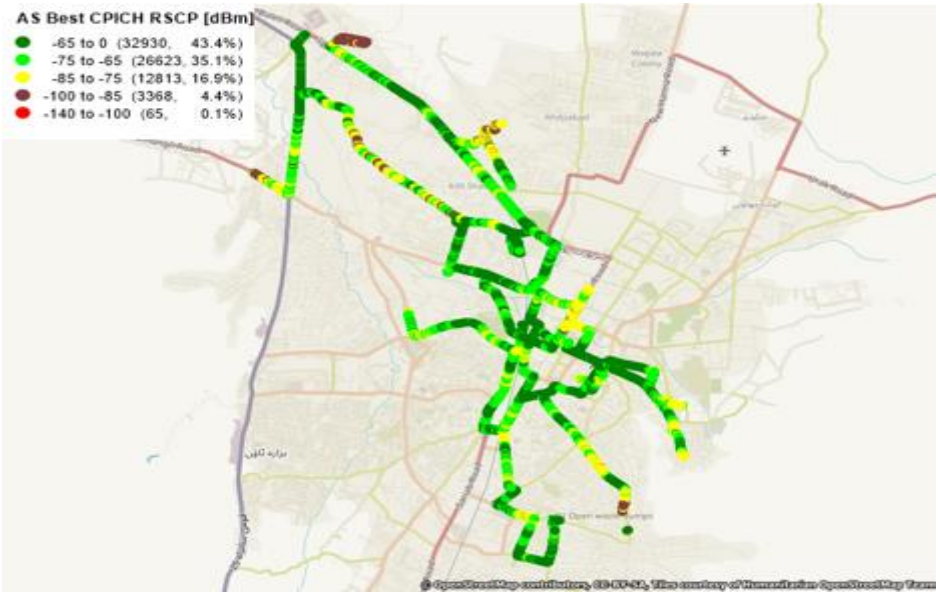
| JAZZ 3G NETWORK COVERAGE – DHADDAR | TELENOR 3G NETWORK COVERAGE – DHADDAR |
|---|---|
|  |  |
| **UFONE 3G NETWORK COVERAGE – DHADDAR** | **ZONG 3G NETWORK COVERAGE – DHADDAR** |
|  |  |

# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

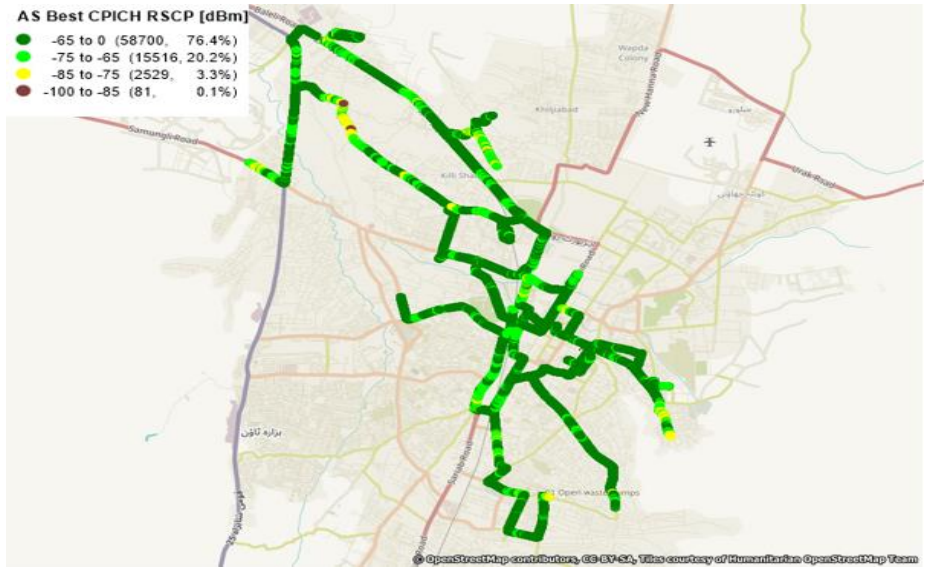
## JAZZ 3G NETWORK COVERAGE – QUETTA



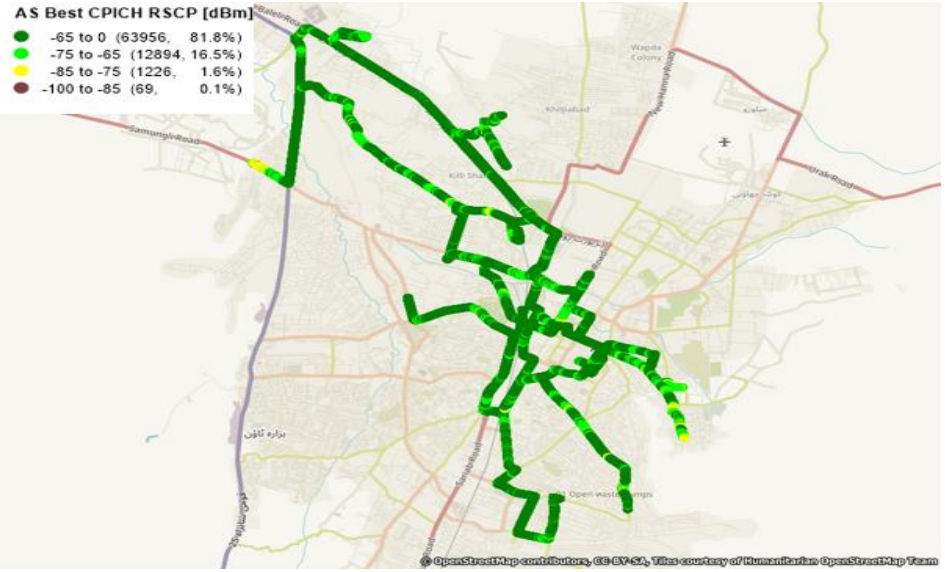

## TELENOR 3G NETWORK COVERAGE – QUETTA




## UFONE 3G NETWORK COVERAGE – QUETTA

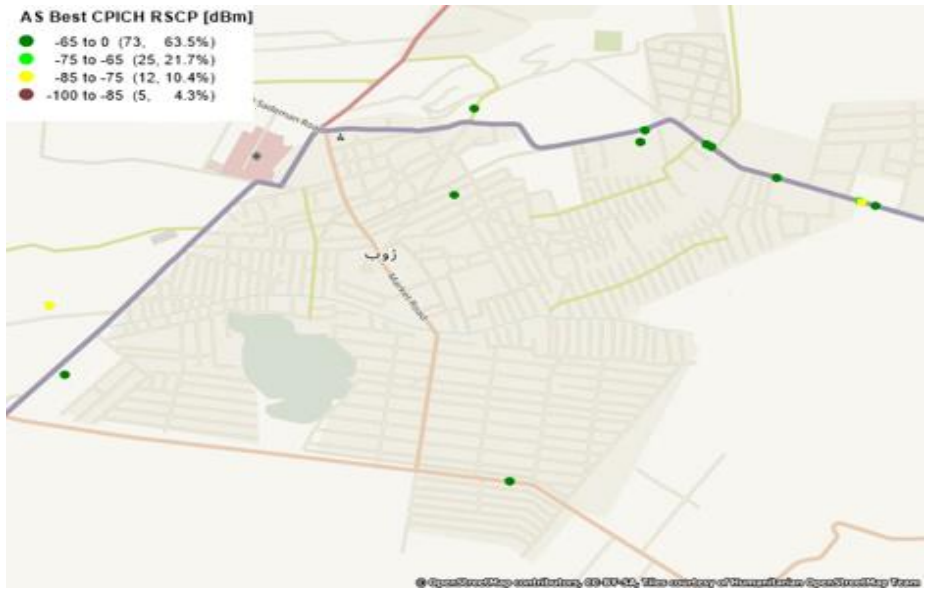



## ZONG 3G NETWORK COVERAGE – QUETTA



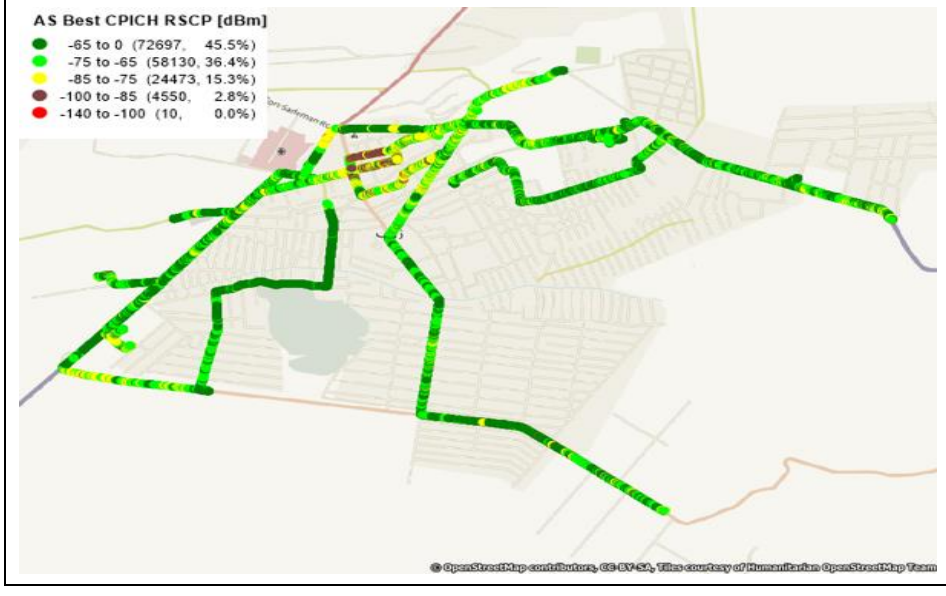
# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

## JAZZ 3G NETWORK COVERAGE – ZHOB

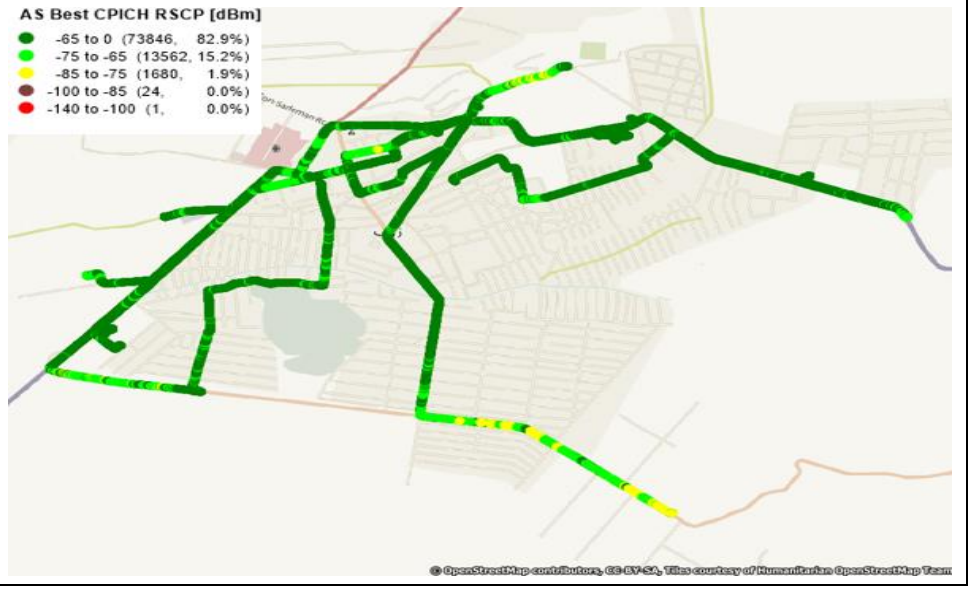



## TELENOR 3G NETWORK COVERAGE – ZHOB

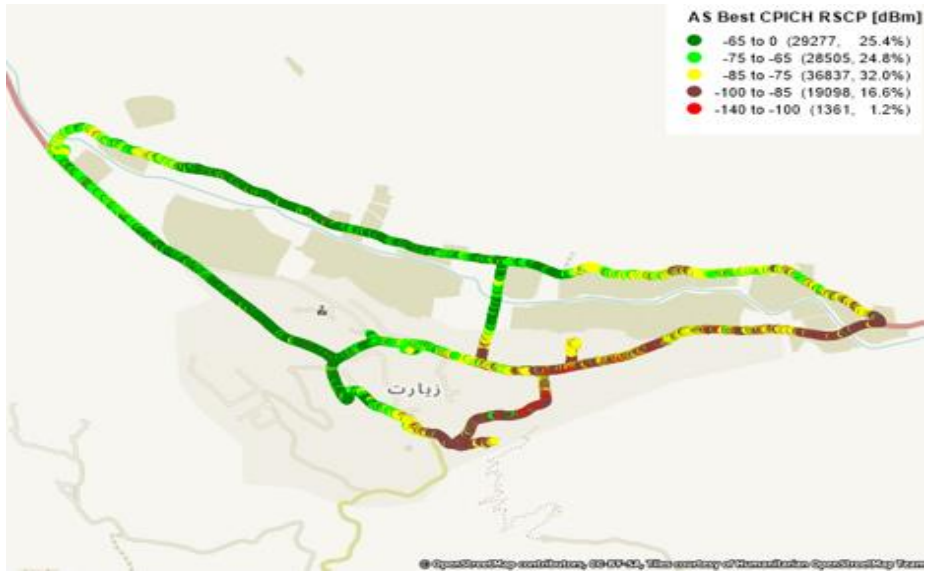
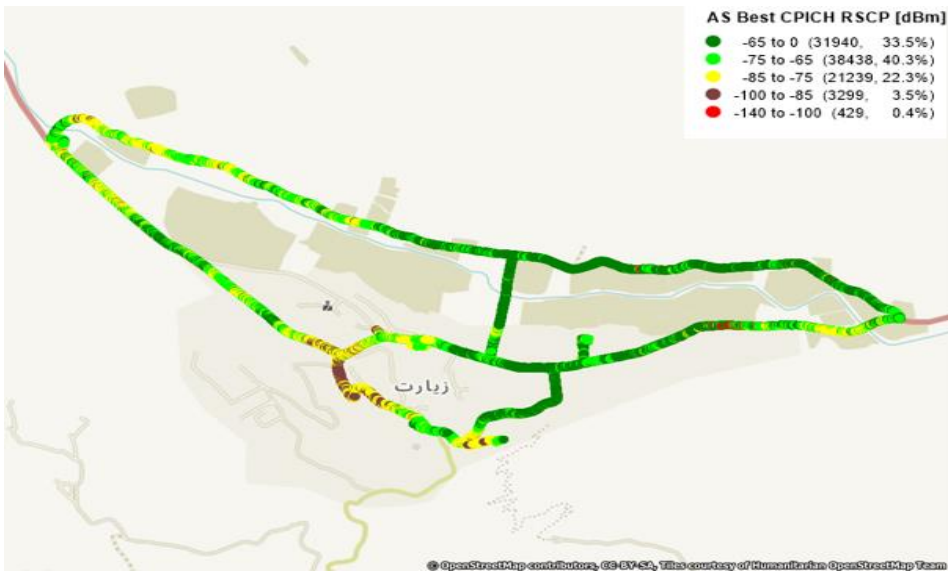
## UFONE 3G NETWORK COVERAGE – ZHOB



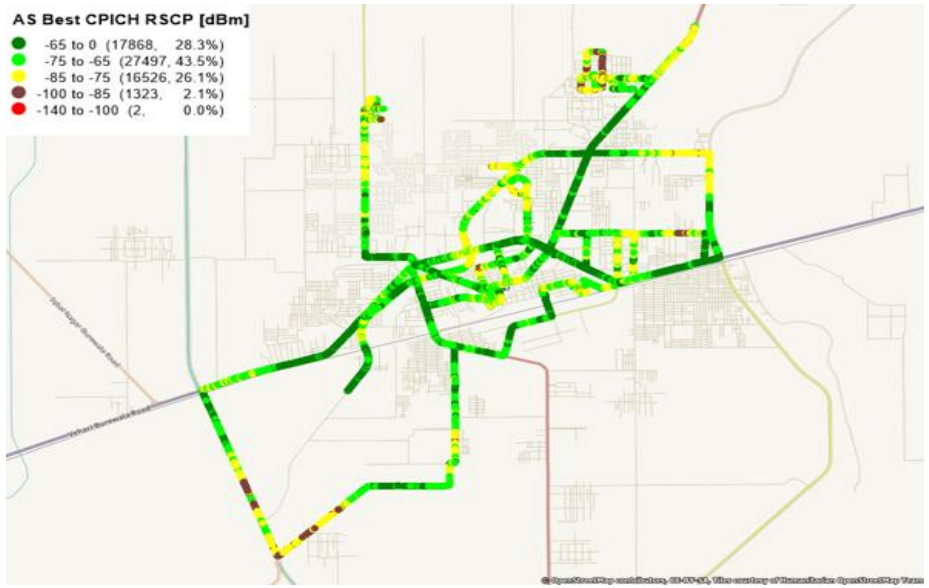
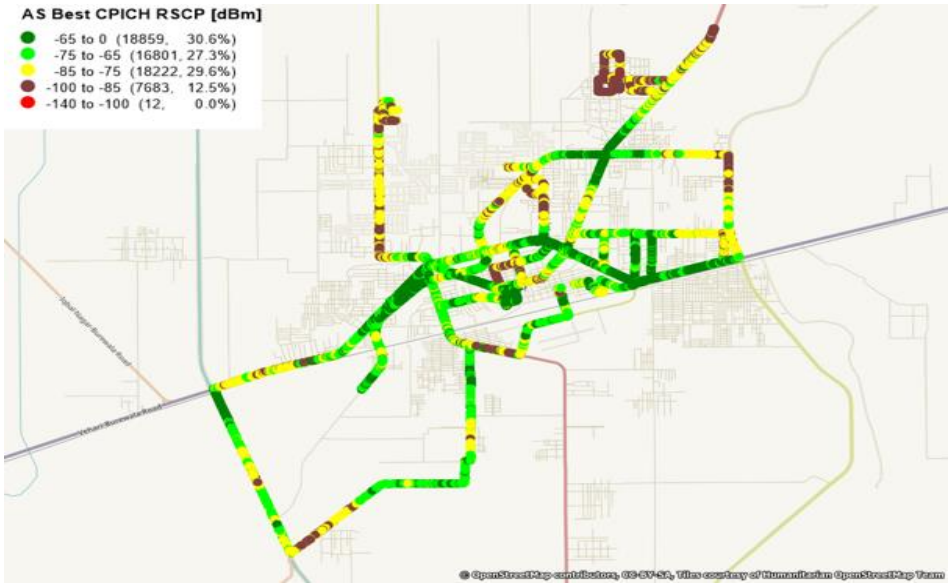
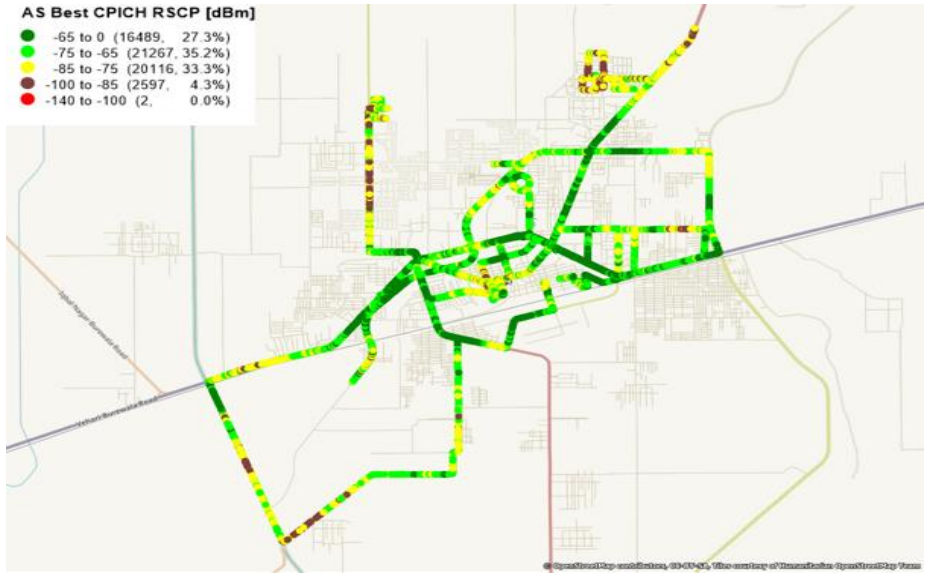
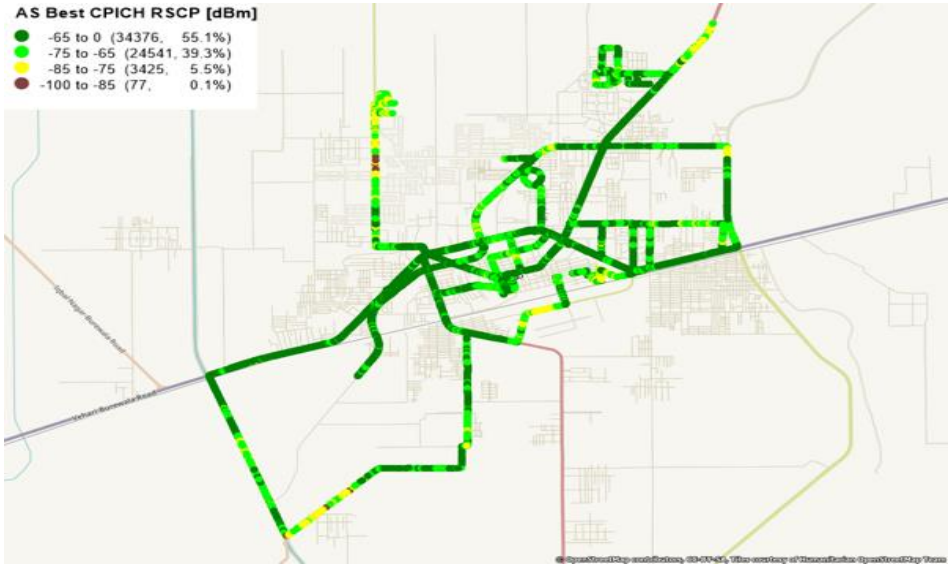

## ZONG 3G NETWORK COVERAGE – ZHOB



# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

| JAZZ 3G NETWORK COVERAGE – ZIARAT | TELENOR 3G NETWORK COVERAGE – ZIARAT |
|---|---|
| N/A | |
| **UFONE 3G NETWORK COVERAGE – ZIARAT** | **ZONG 3G NETWORK COVERAGE – ZIARAT** |
|  |  |

# 3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

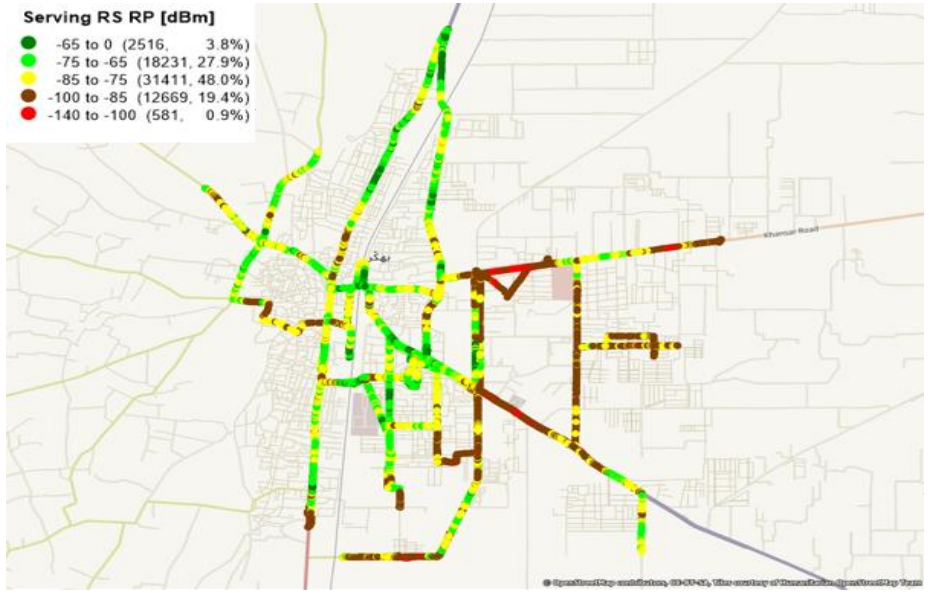
| JAZZ 3G NETWORK COVERAGE – DALBANDDIN | TELENOR 3G NETWORK COVERAGE – DALBANDDIN |
|---|---|
|  |  |
| **UFONE 3G NETWORK COVERAGE – DALBANDDIN** | **ZONG 3G NETWORK COVERAGE – DALBANDDIN** |
|  |  |

Annex-A1

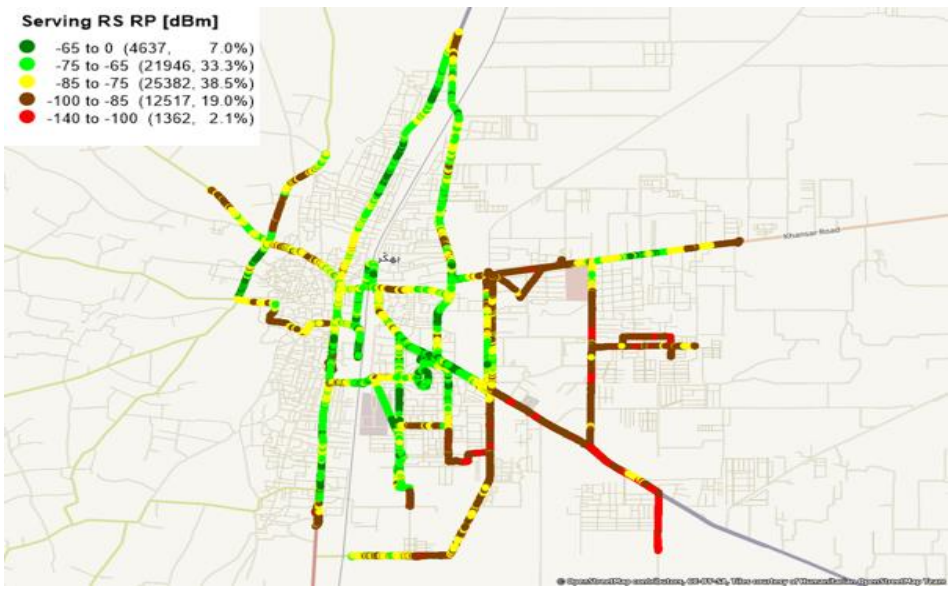
# MOBILE BROADBAND 4G COVERAGE MAPS

# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

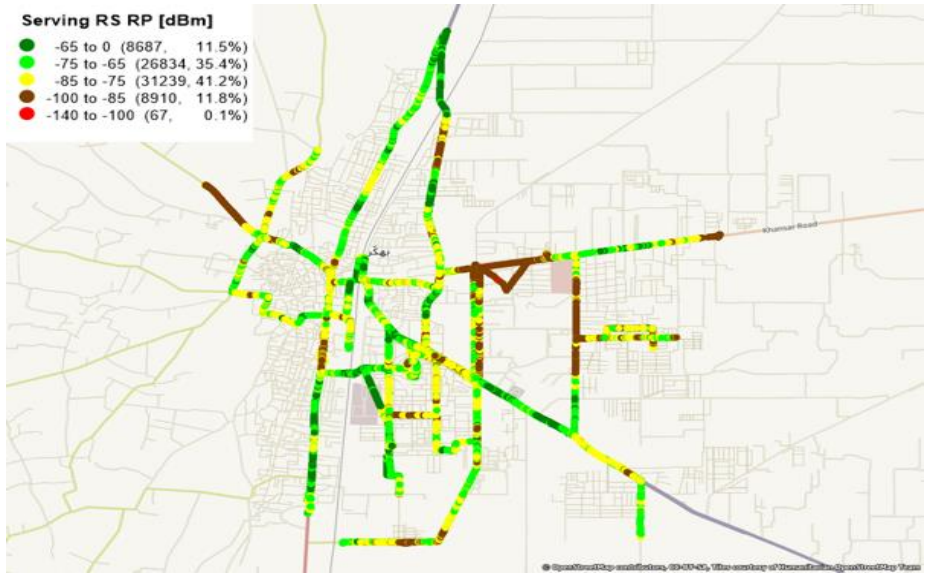
## JAZZ 4G NETWORK COVERAGE – BHAKKAR



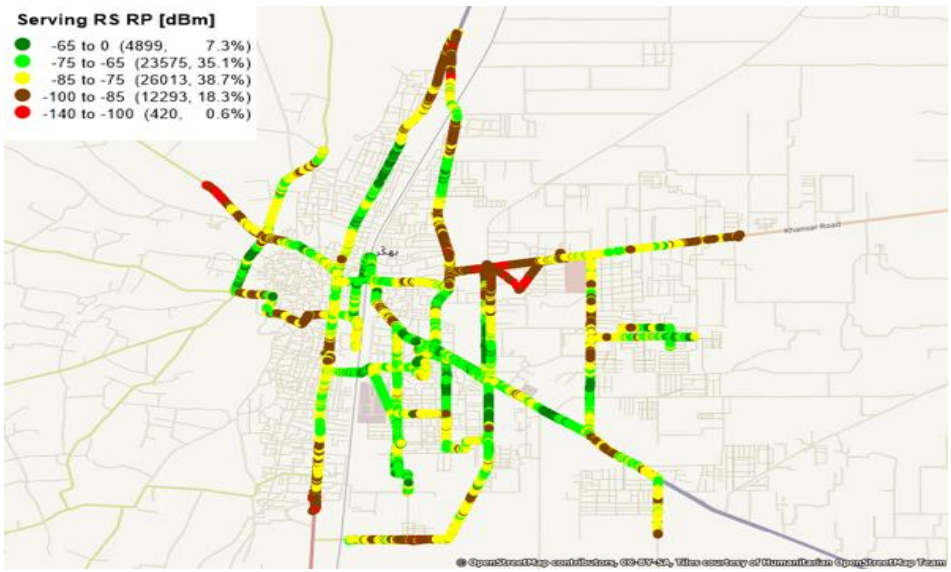

## TELENOR 4G NETWORK COVERAGE – BHAKKAR




## UFONE 4G NETWORK COVERAGE – BHAKKAR

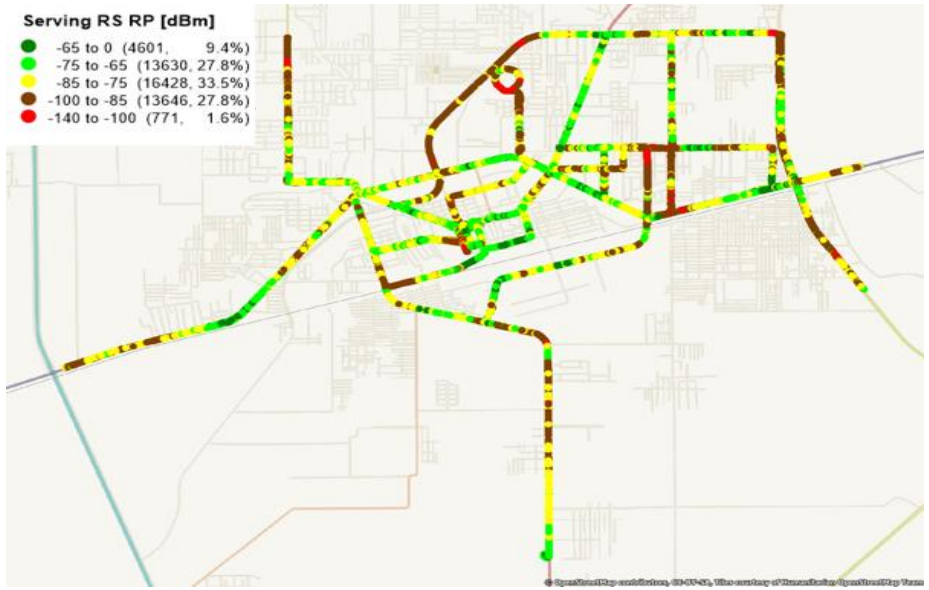



## ZONG 4G NETWORK COVERAGE – BHAKKAR

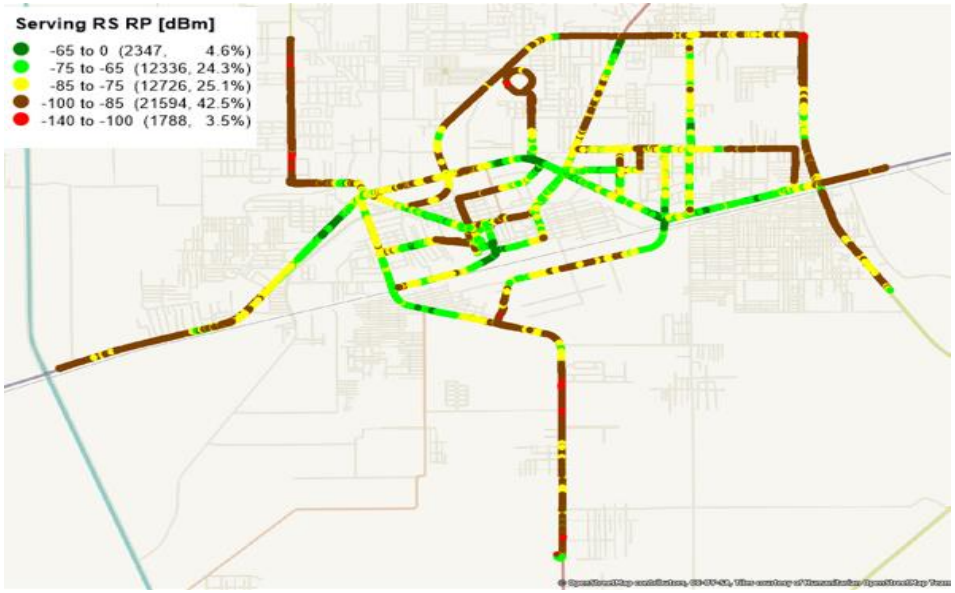


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

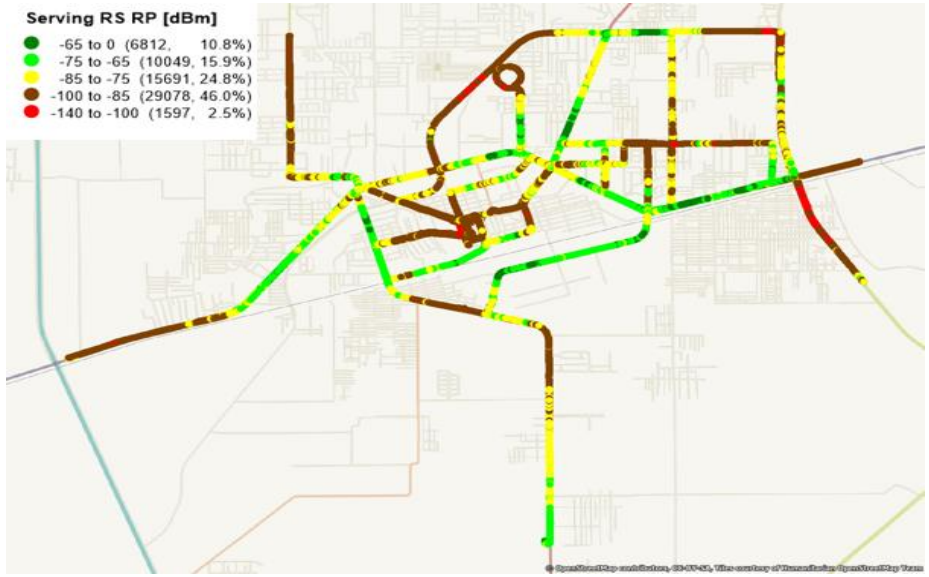
## JAZZ 4G NETWORK COVERAGE – BUREWALA



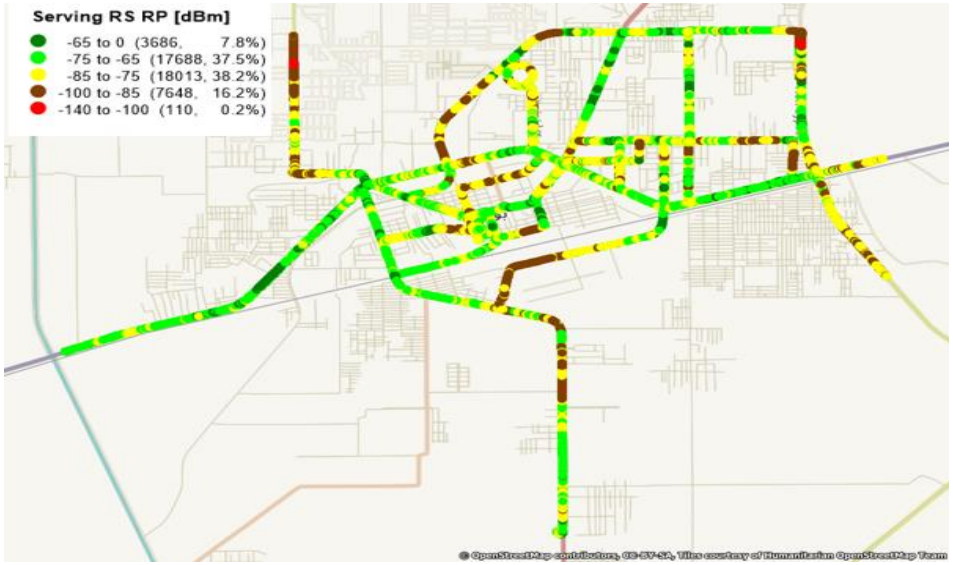

## TELENOR 4G NETWORK COVERAGE – BUREWALA




## UFONE 4G NETWORK COVERAGE – BUREWALA

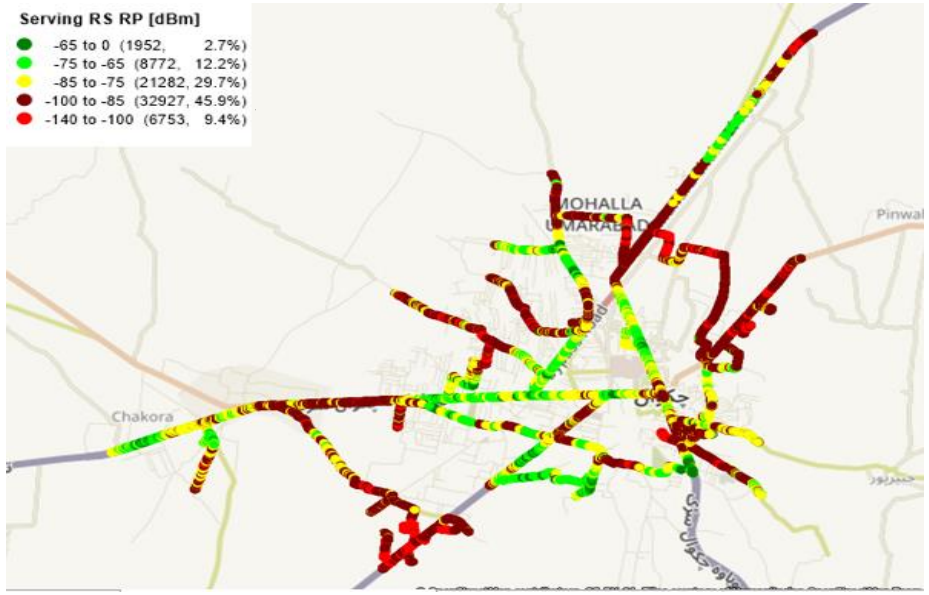



## ZONG 4G NETWORK COVERAGE – BUREWALA

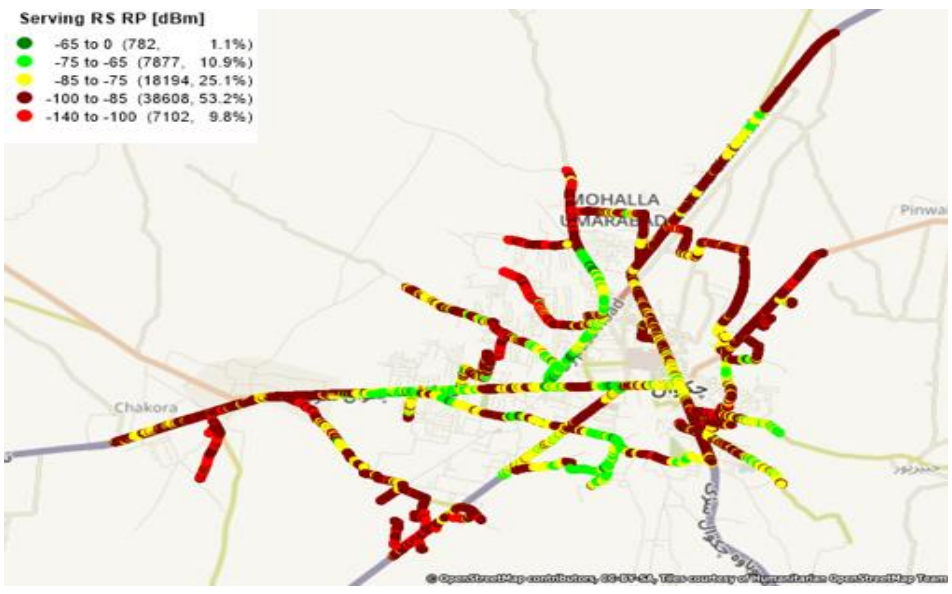


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

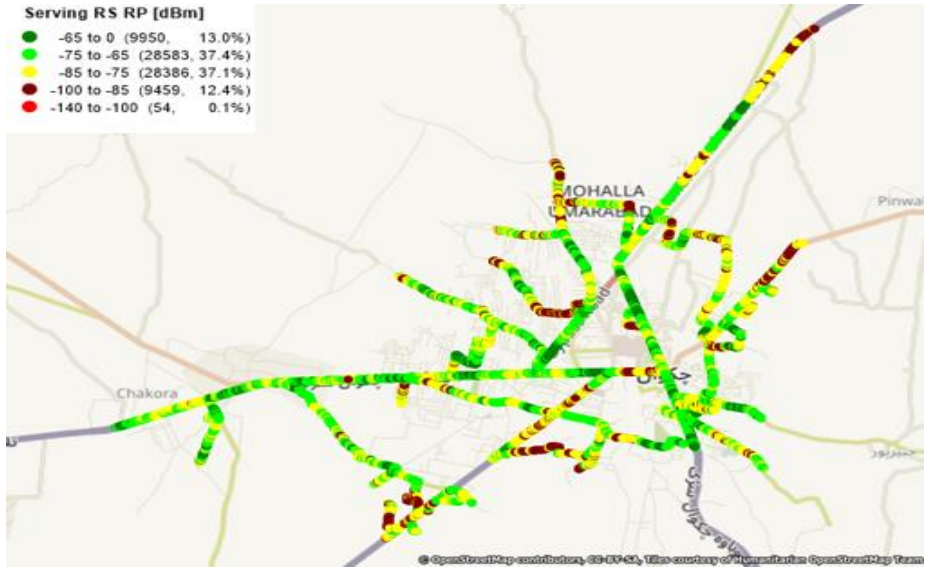
## JAZZ 4G NETWORK COVERAGE – CHAKWAL



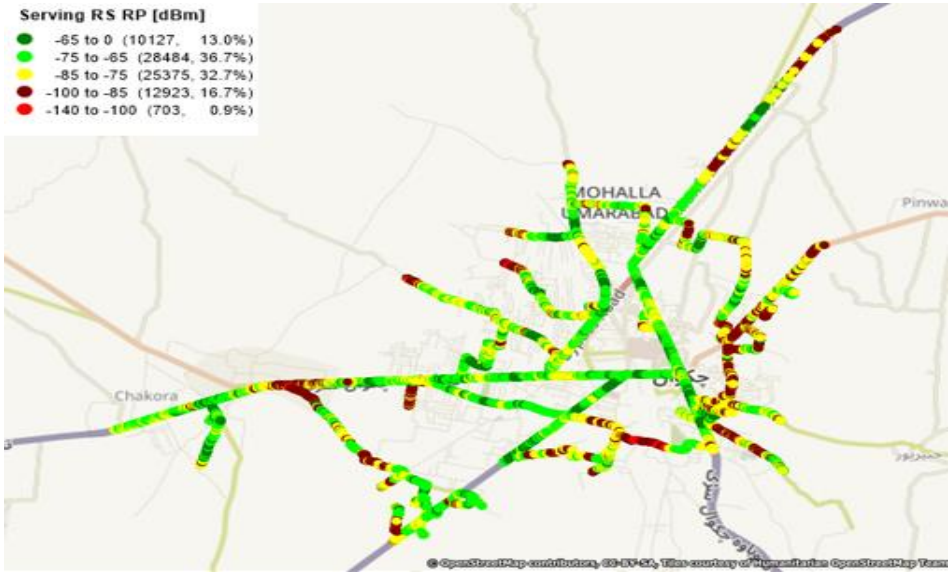

## TELENOR 4G NETWORK COVERAGE – CHAKWAL




## UFONE 4G NETWORK COVERAGE – CHAKWAL

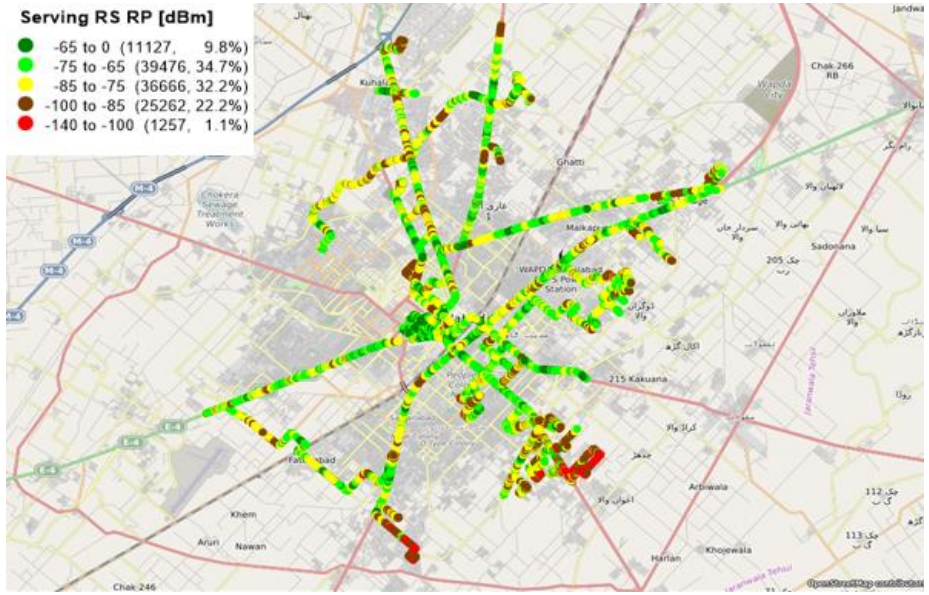



## ZONG 4G NETWORK COVERAGE – CHAKWAL

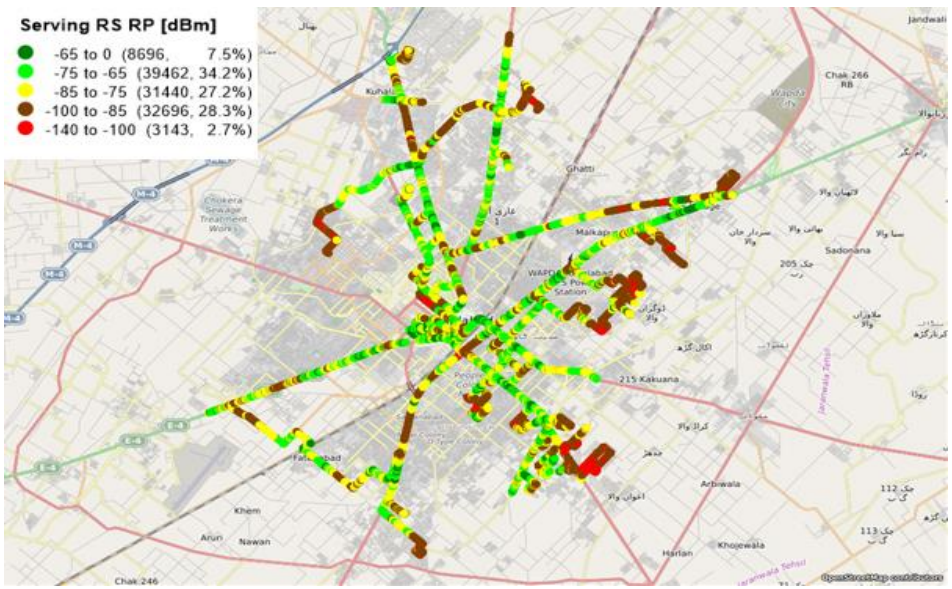


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

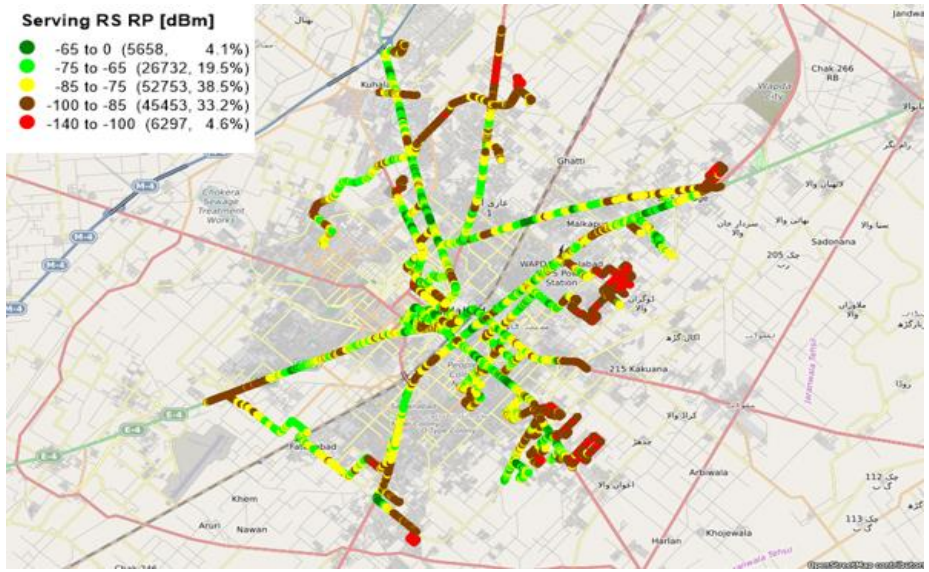
## JAZZ 4G NETWORK COVERAGE – FAISALABAB



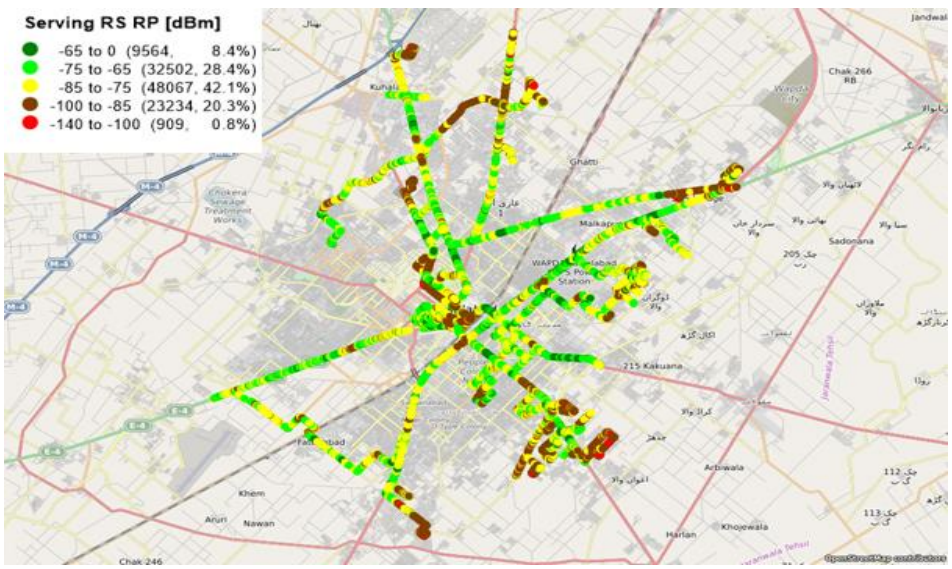

## TELENOR 4G NETWORK COVERAGE – FAISALABAD



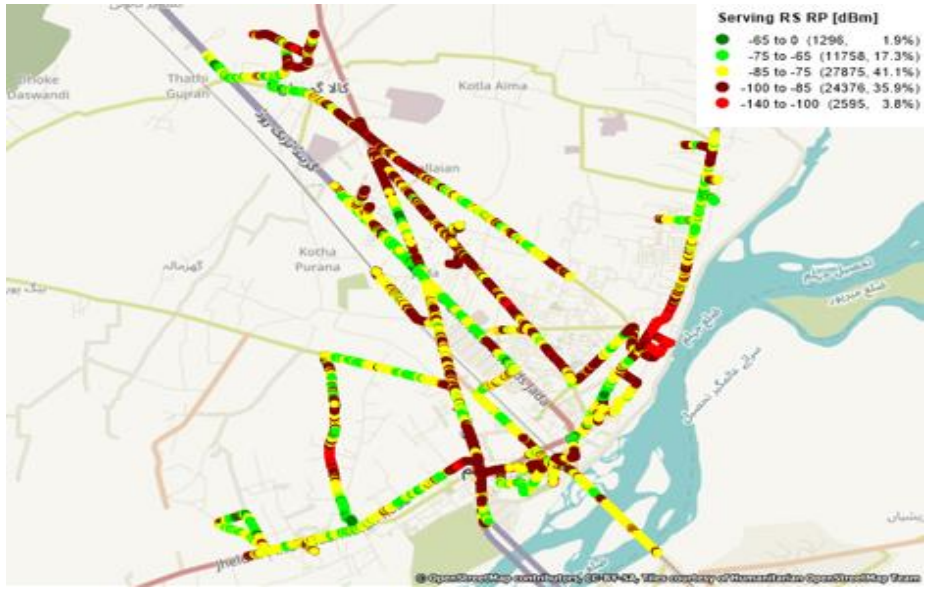
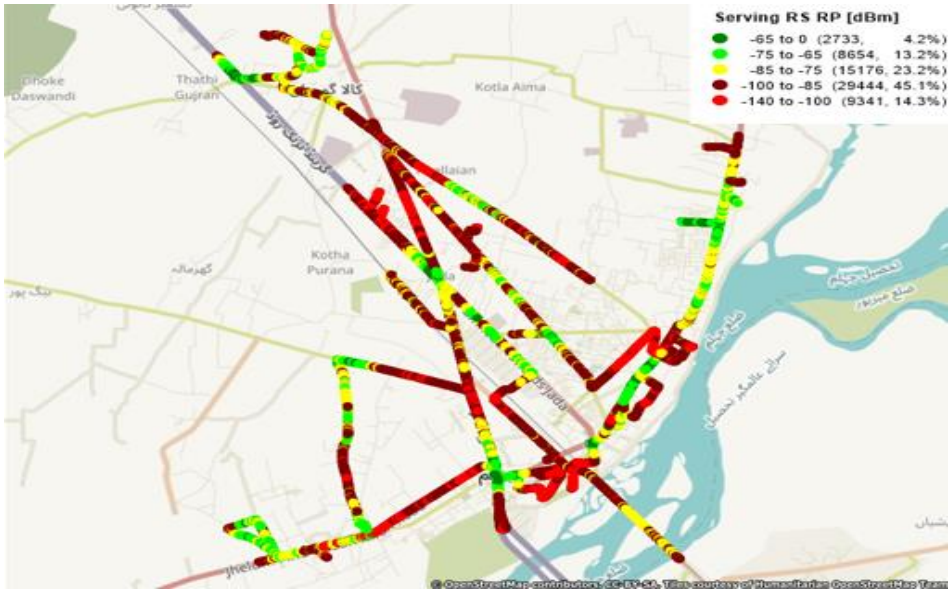
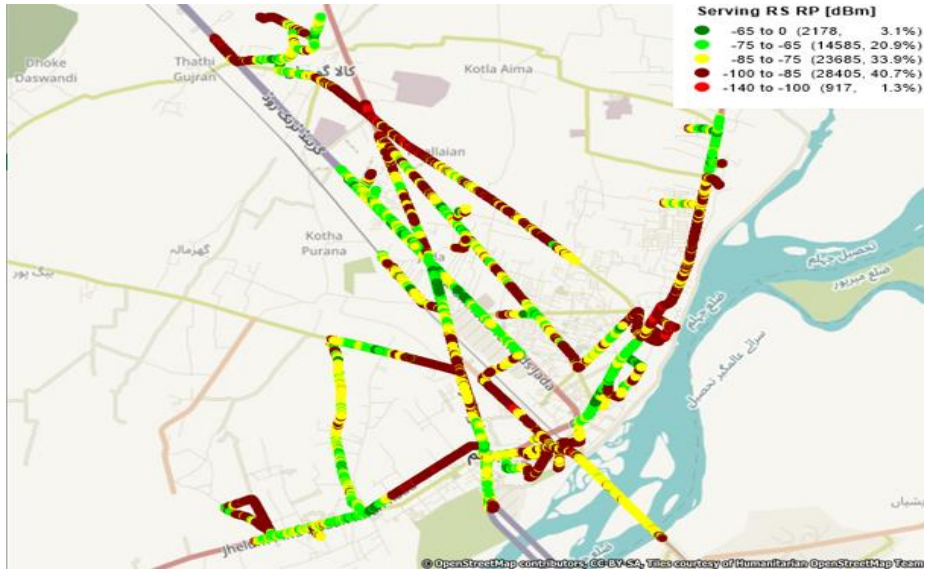
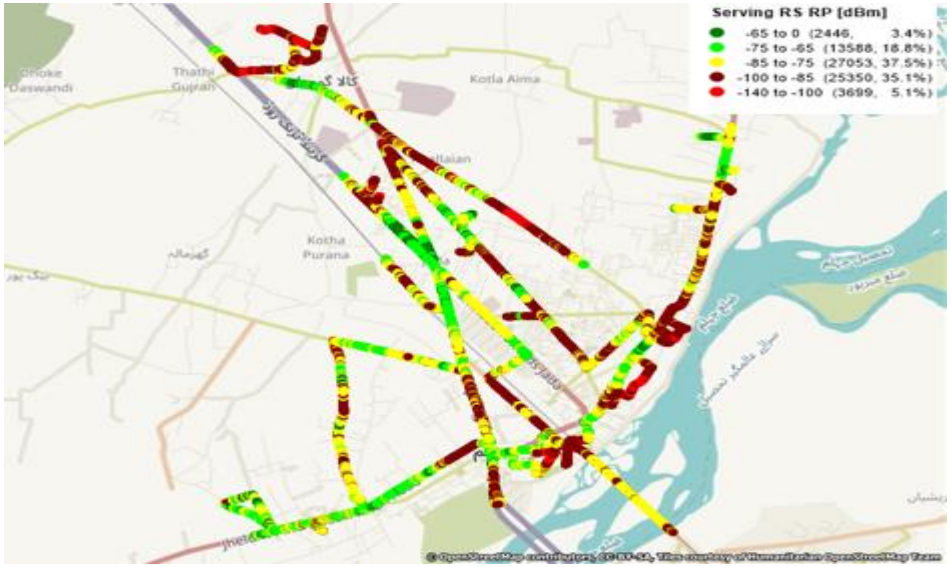

## UFONE 4G NETWORK COVERAGE – FAISALABAD




## ZONG 4G NETWORK COVERAGE – FAISALABAD

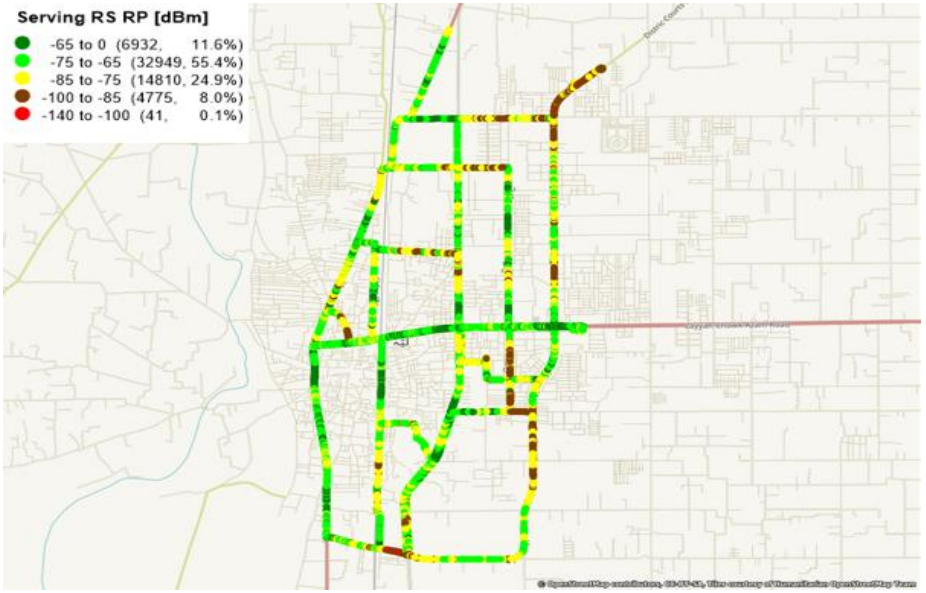


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

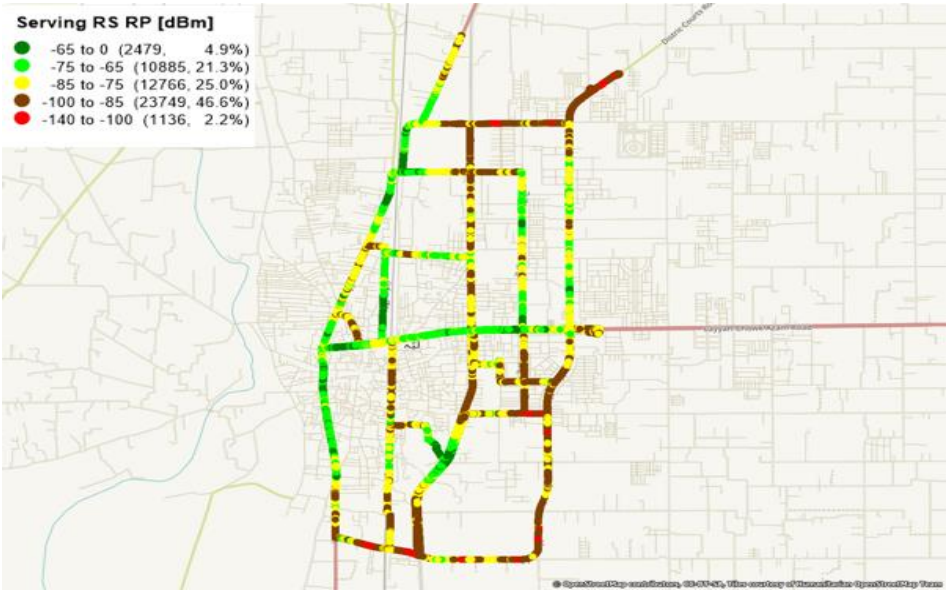
| JAZZ 4G NETWORK COVERAGE – JHELUM | TELENOR 4G NETWORK COVERAGE – JHELUM |
|---|---|
|  |  |
| **UFONE 4G NETWORK COVERAGE – JHELUM** | **ZONG 4G NETWORK COVERAGE – JHELUM** |
|  |  |

# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

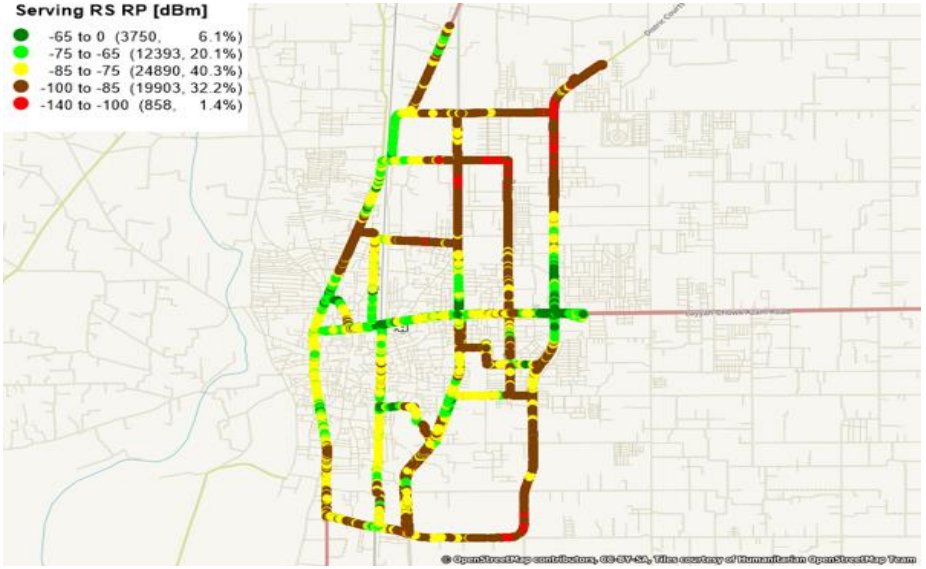
## JAZZ 4G NETWORK COVERAGE – LAYYAH



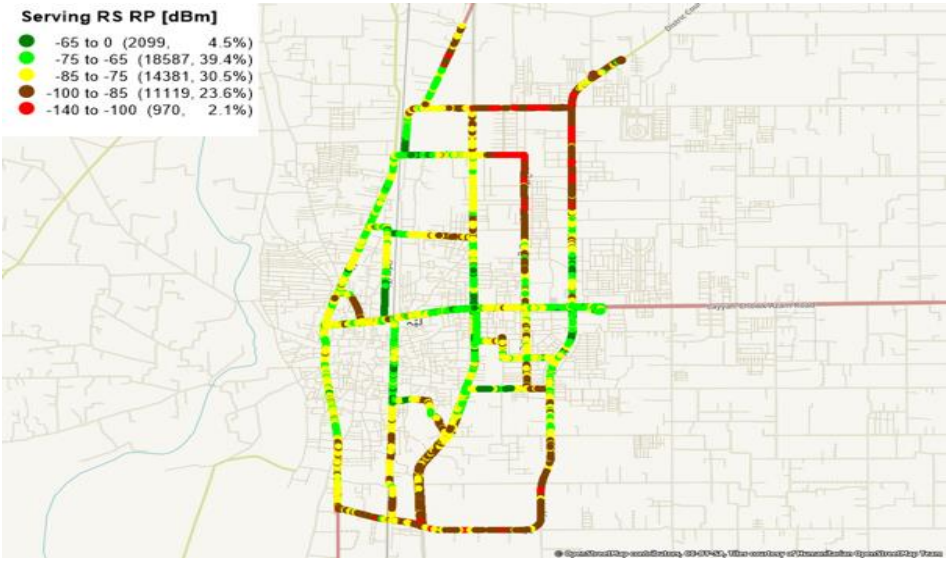

## TELENOR 4G NETWORK COVERAGE – LAYYAH




## UFONE 4G NETWORK COVERAGE – LAYYAH

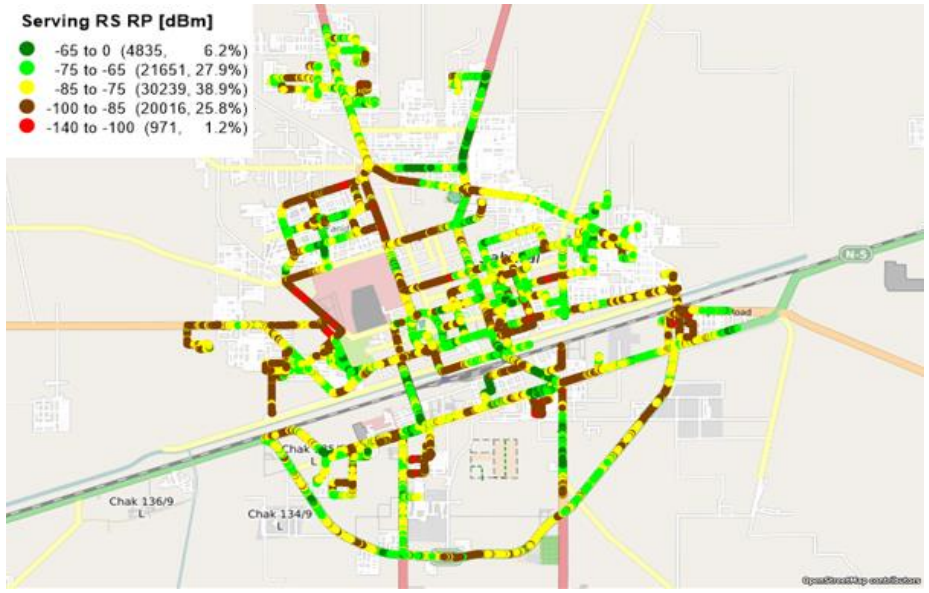



## ZONG 4G NETWORK COVERAGE – LAYYAH

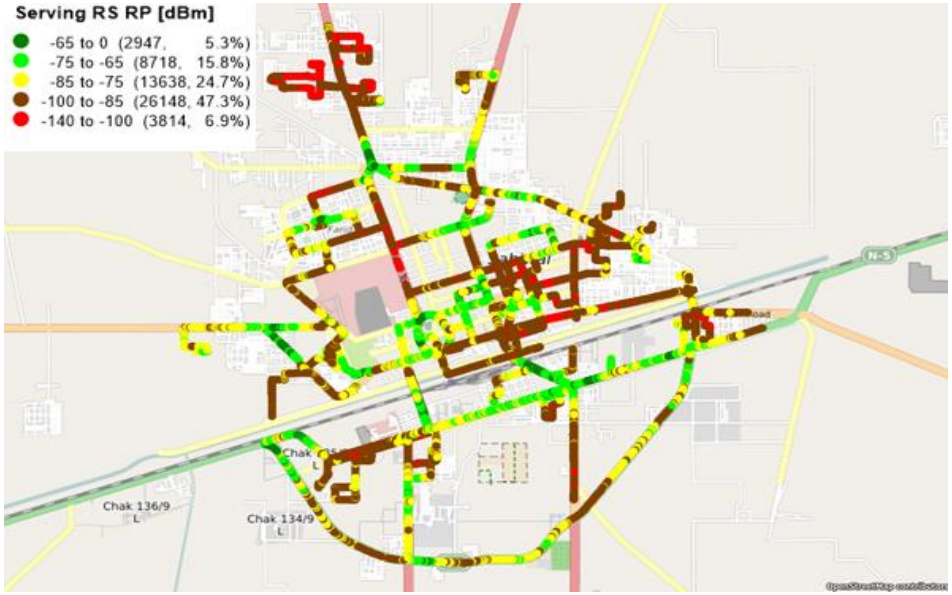


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

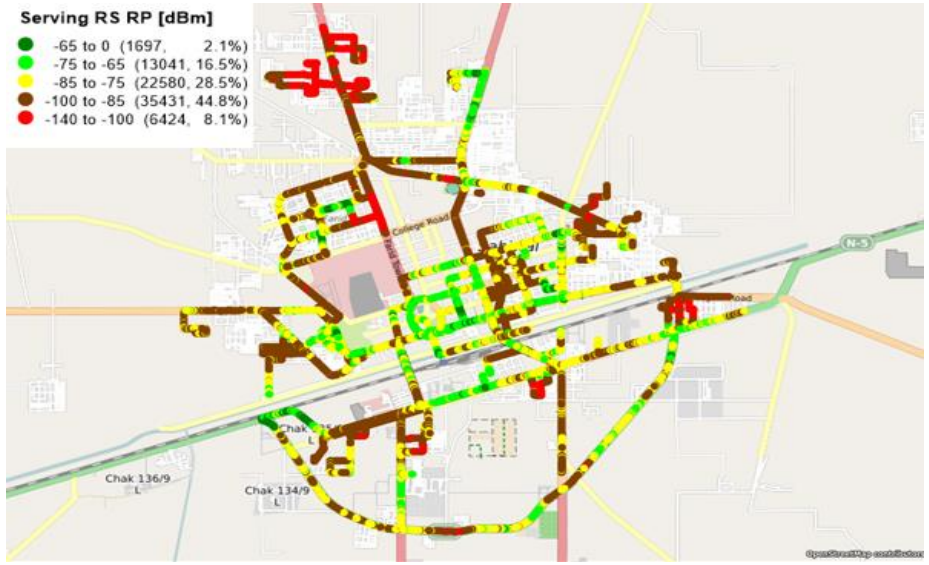
## JAZZ 4G NETWORK COVERAGE – SAHIWAL



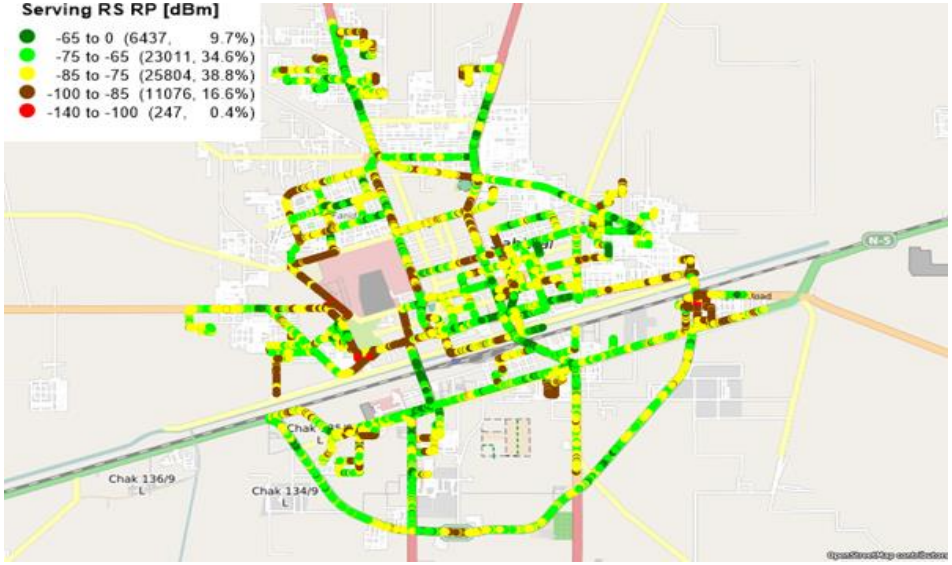

## TELENOR 4G NETWORK COVERAGE – SAHIWAL



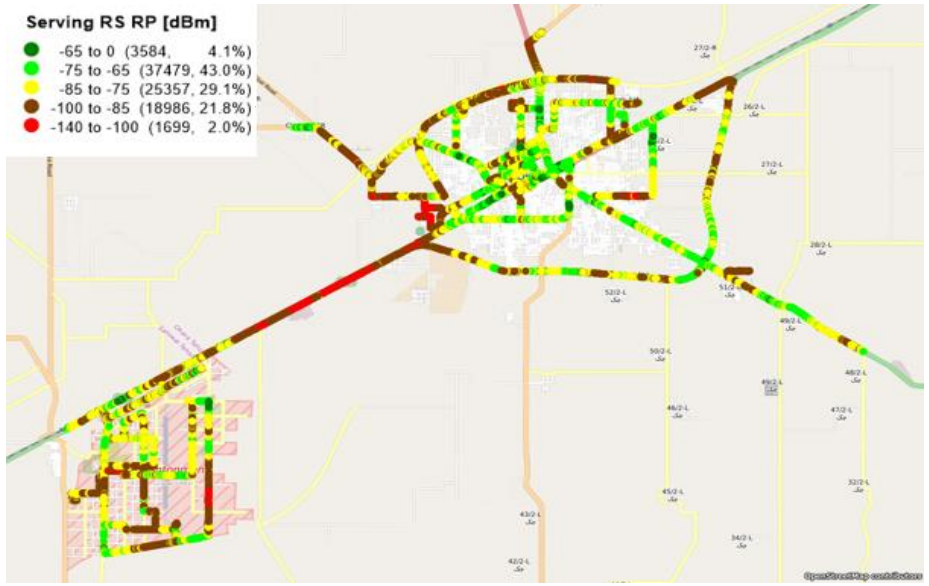
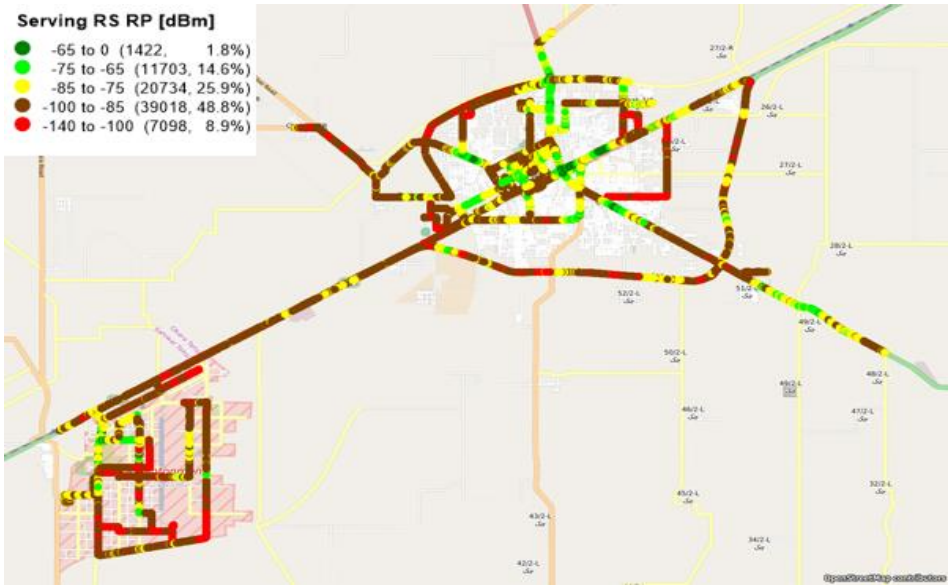
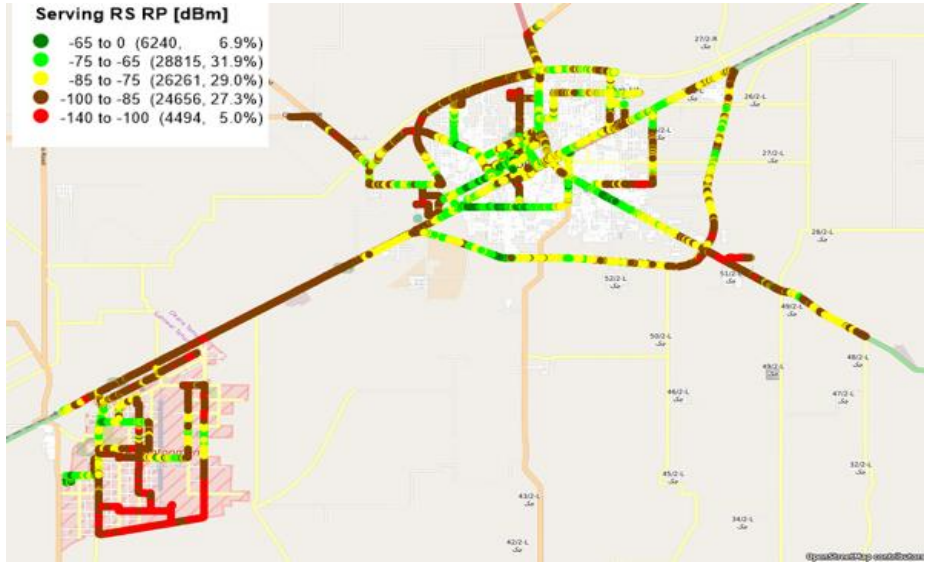
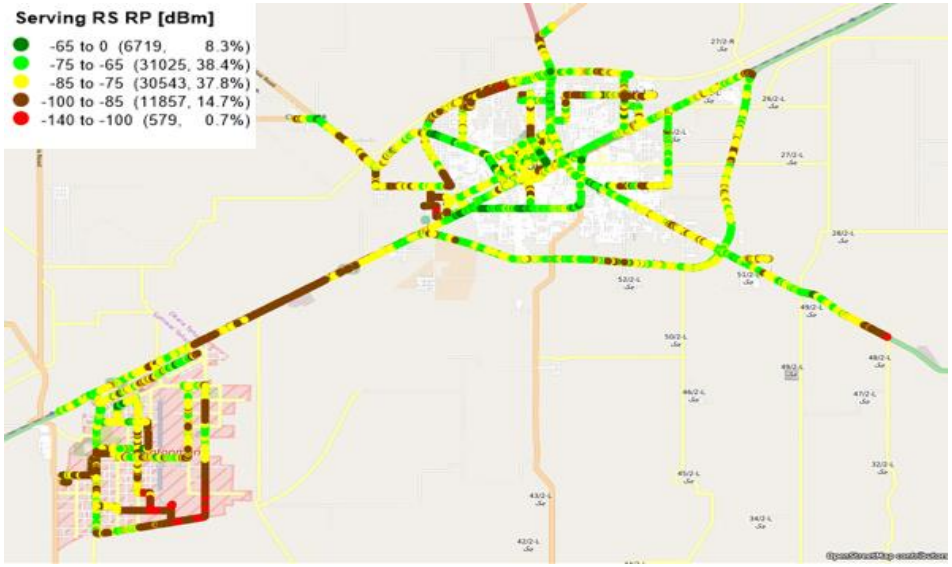

## UFONE 4G NETWORK COVERAGE – SAHIWAL




## ZONG 4G NETWORK COVERAGE – SAHIWAL

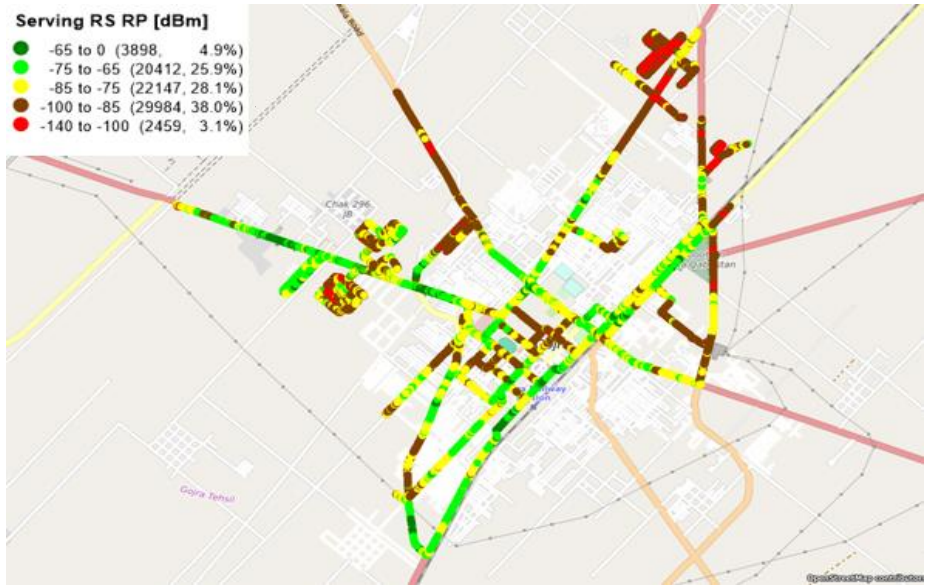


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

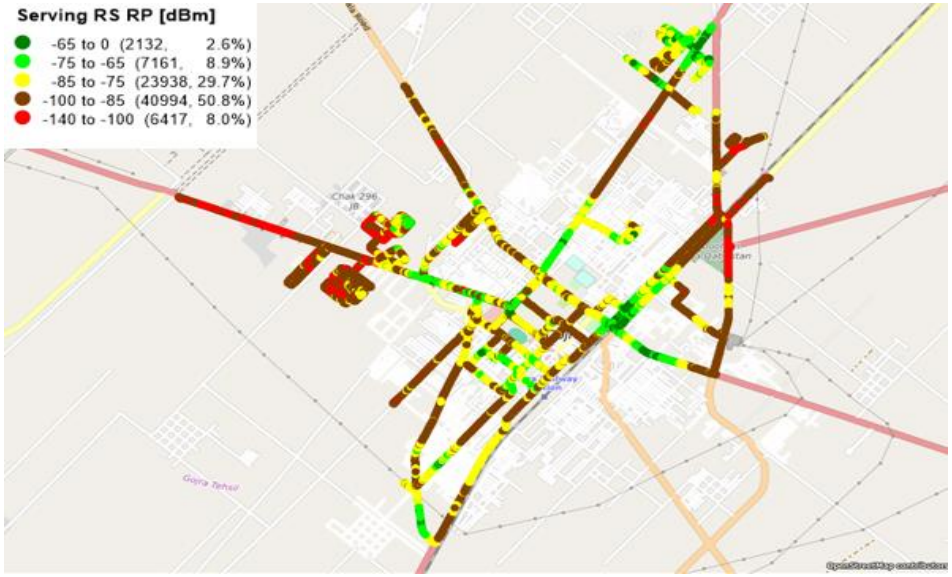
| JAZZ 4G NETWORK COVERAGE –OKARA | TELENOR 4G NETWORK COVERAGE – OKARA |
|---|---|
|  |  |
| **UFONE 4G NETWORK COVERAGE – OKARA** | **ZONG 4G NETWORK COVERAGE – OKARA** |
|  |  |

# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

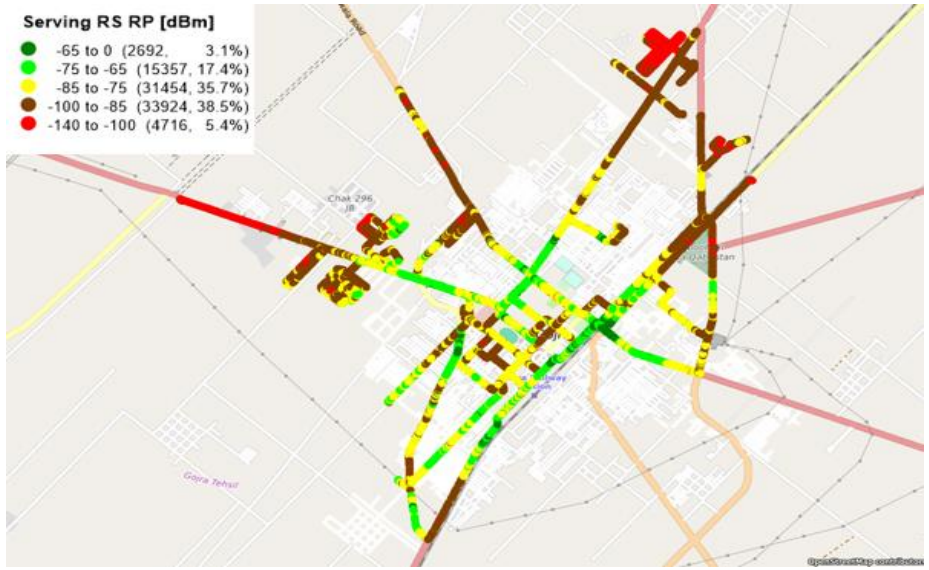
## JAZZ 4G NETWORK COVERAGE – GOJRA



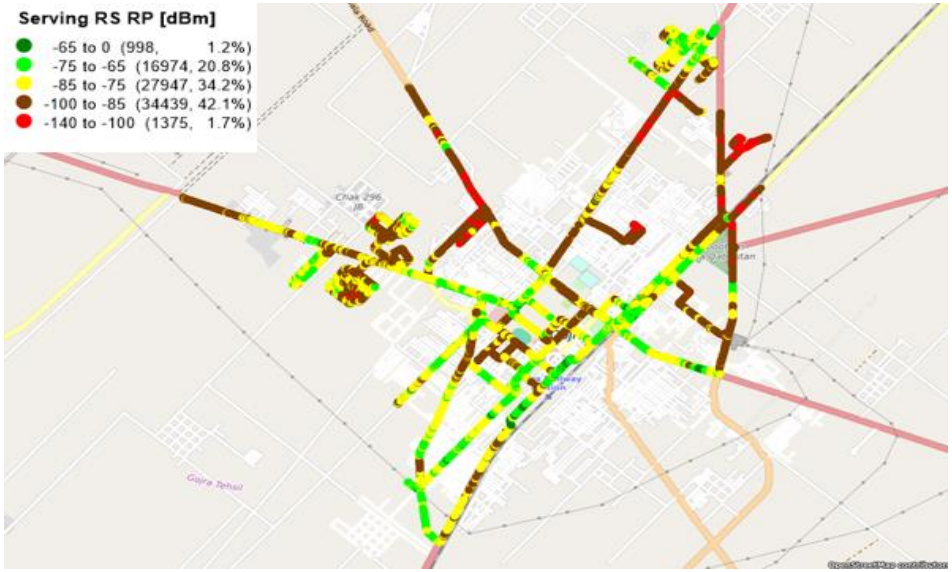

## TELENOR 4G NETWORK COVERAGE – GOJRA




## UFONE 4G NETWORK COVERAGE – GOJRA

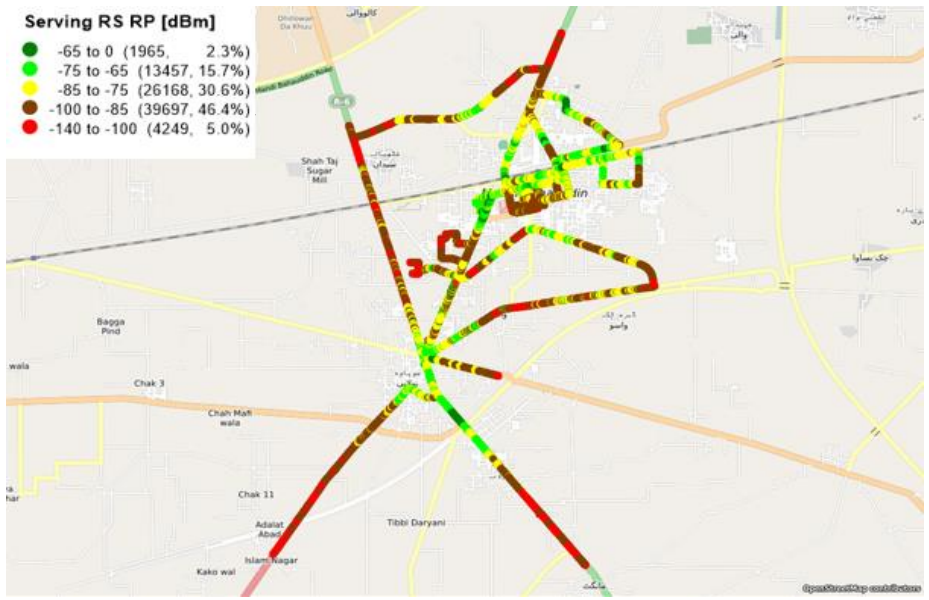



## ZONG 4G NETWORK COVERAGE – GOJRA

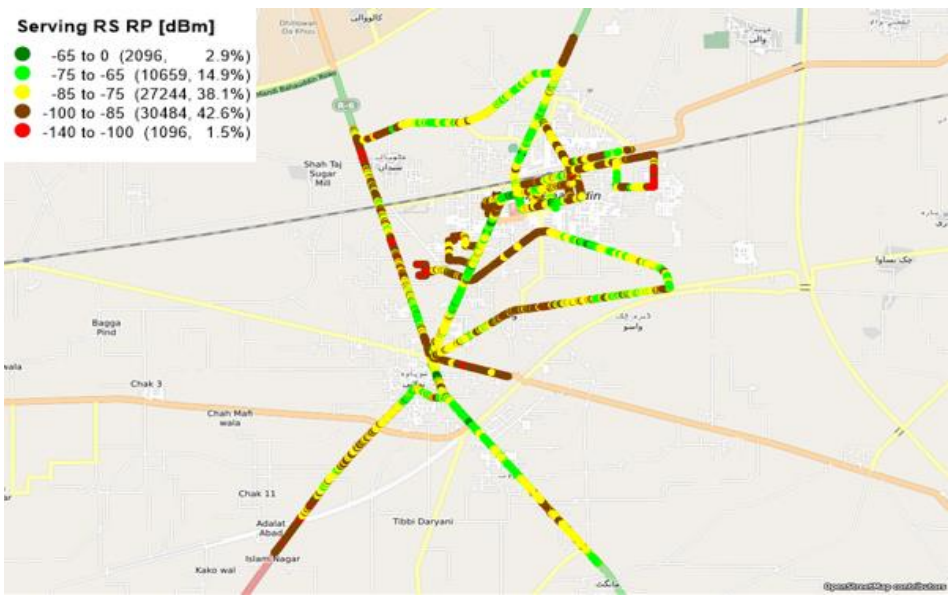


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

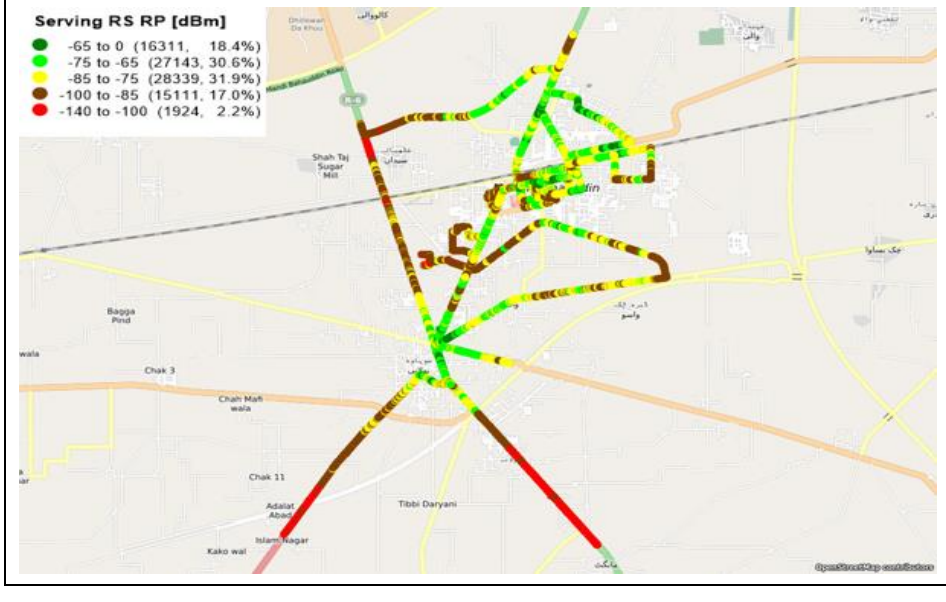
## JAZZ 4G NETWORK COVERAGE – MANDI BAHAUDDIN



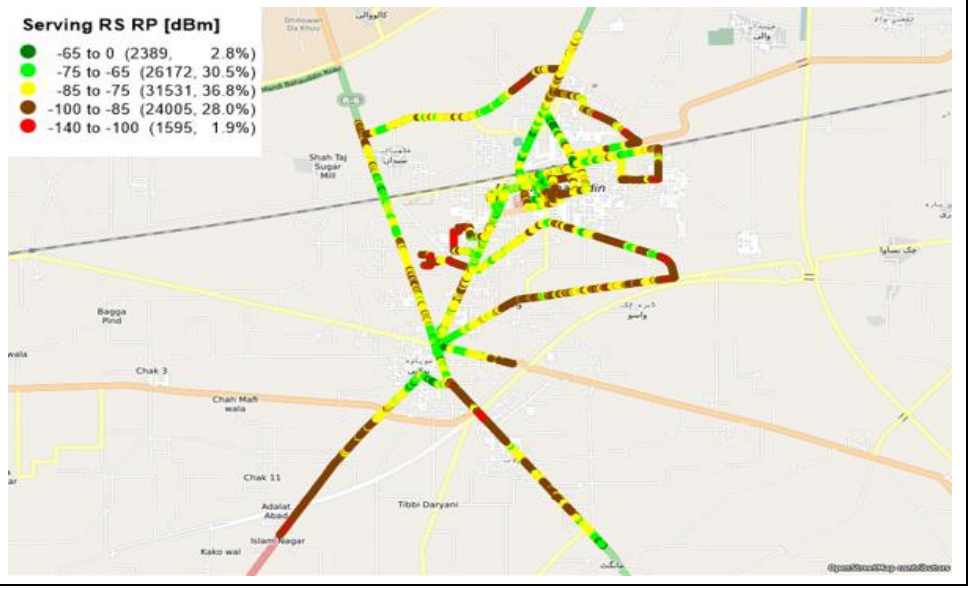

## TELENOR 4G NETWORK COVERAGE – MANDI BAHAUDDIN




## UFONE 4G NETWORK COVERAGE – MANDI BAHAUDDIN

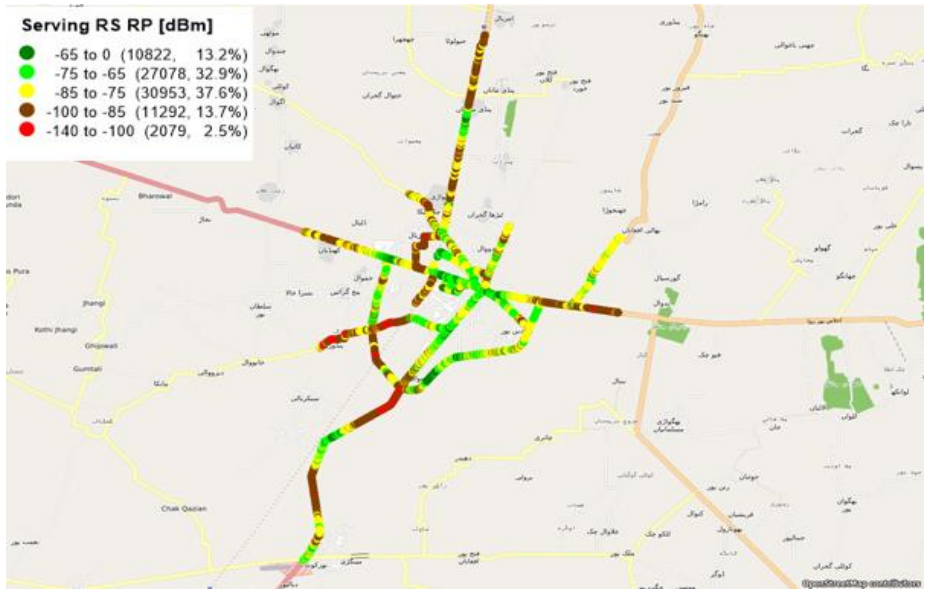



## ZONG 4G NETWORK COVERAGE – MANDI BAHAUDDIN

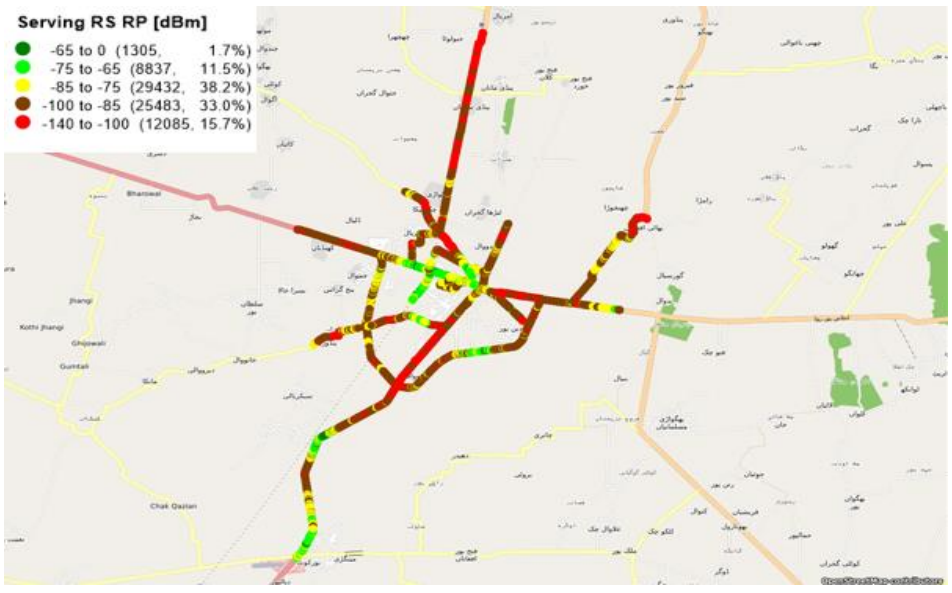


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

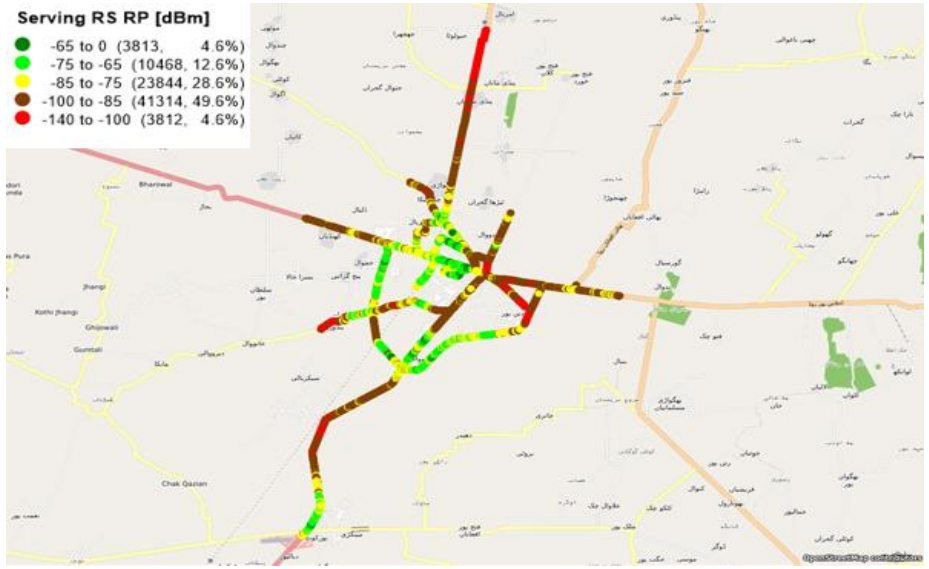
## JAZZ 4G NETWORK COVERAGE – SHAKARGARH



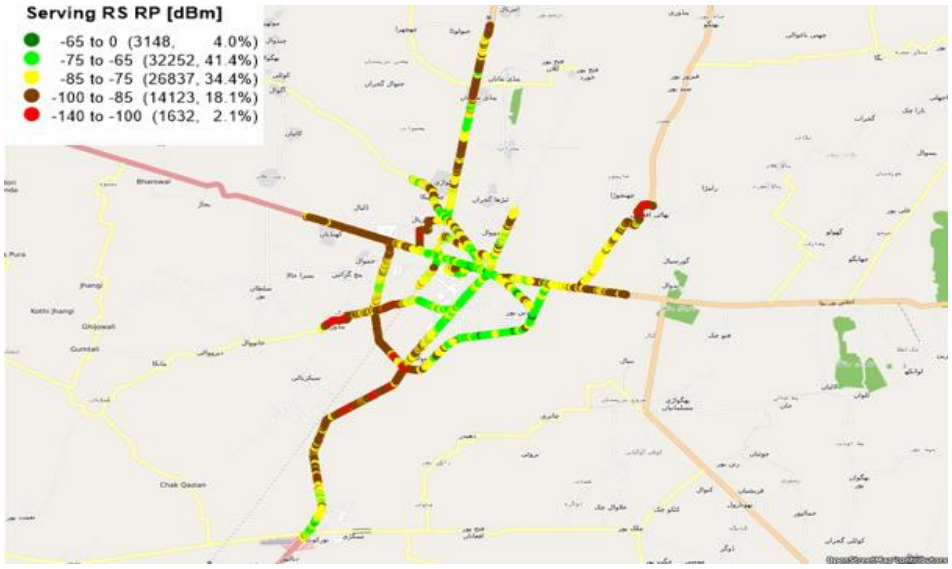

## TELENOR 4G NETWORK COVERAGE – SHAKARGARH



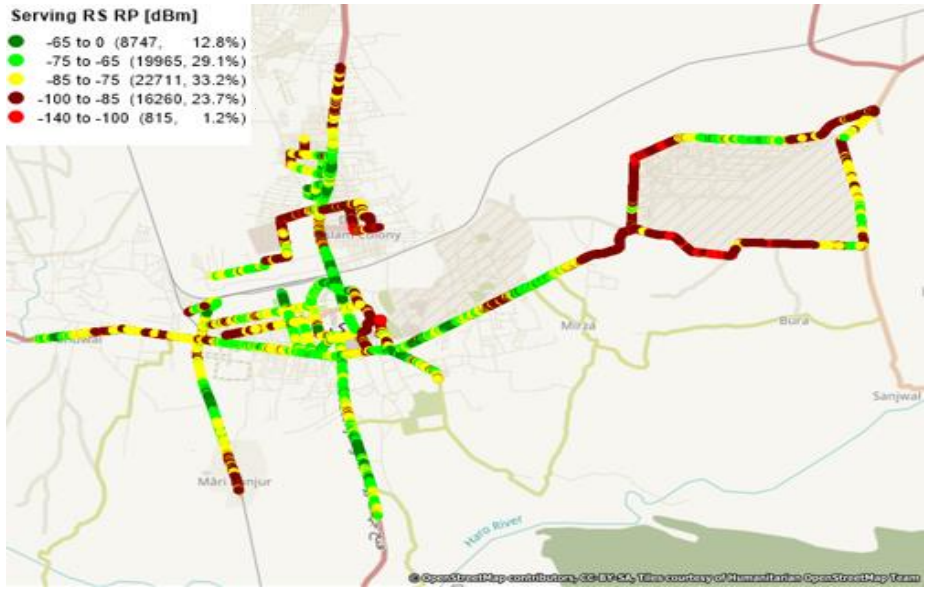
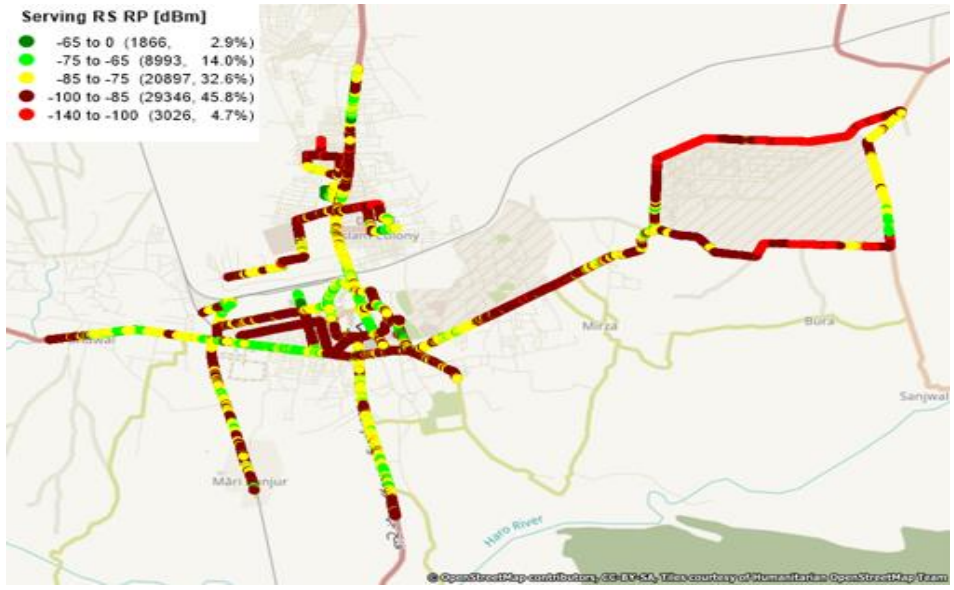
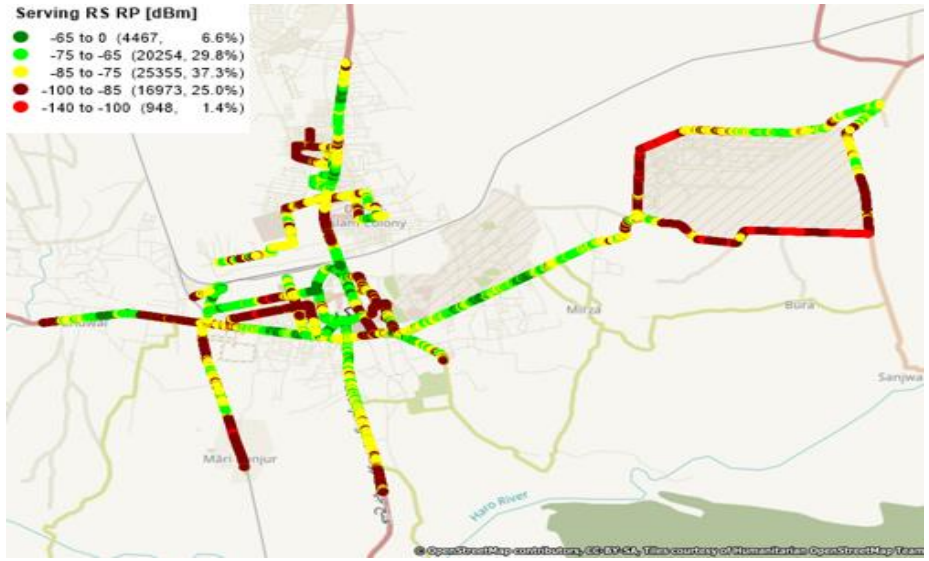
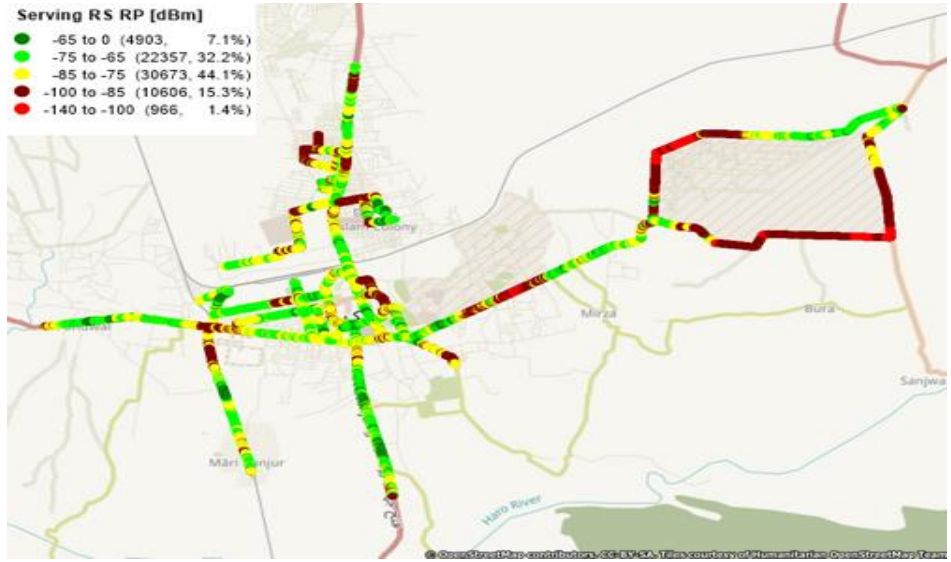

## UFONE 4G NETWORK COVERAGE – SHAKARGARH




## ZONG 4G NETWORK COVERAGE – SHAKARGARH

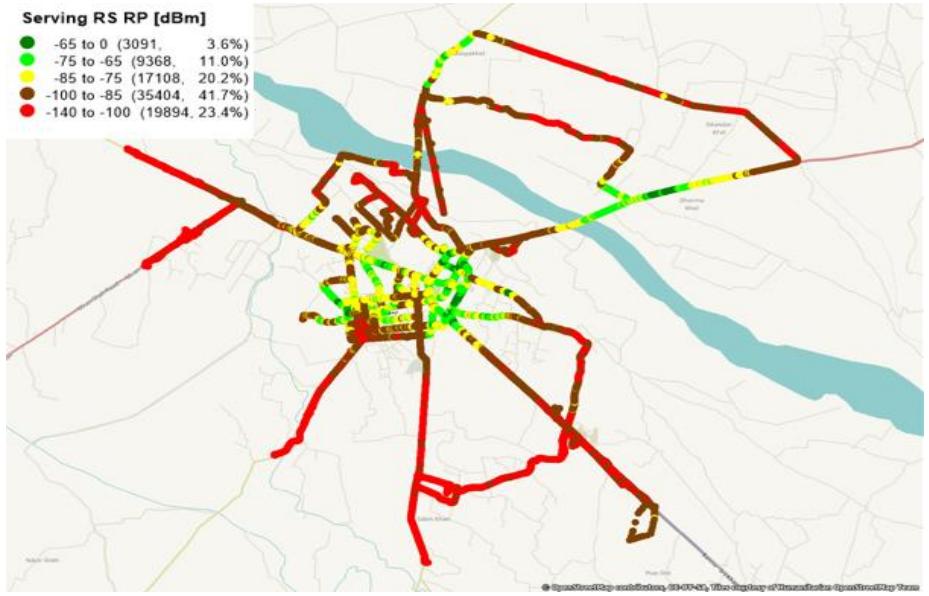


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

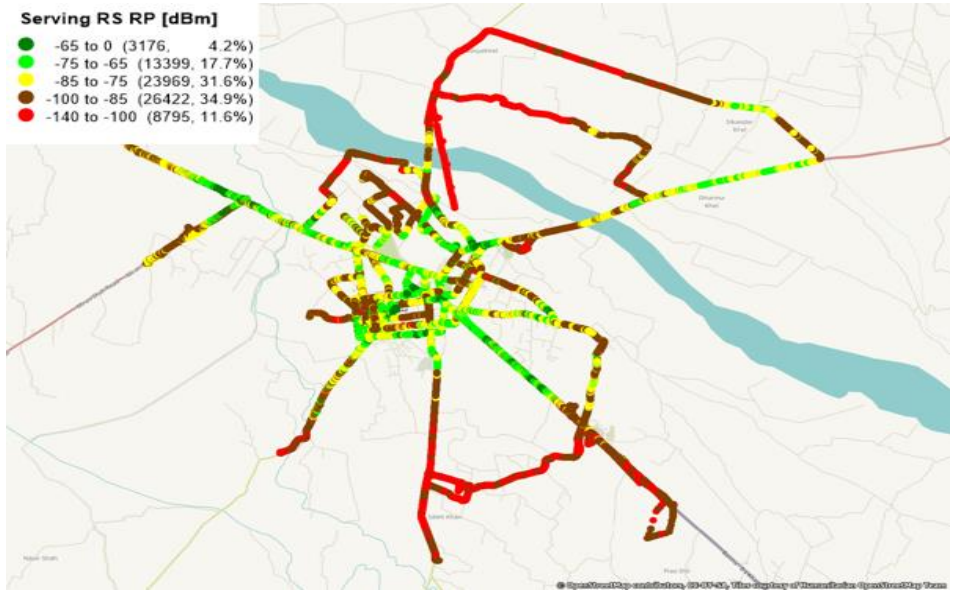
| JAZZ 4G NETWORK COVERAGE – ATTOCK | TELENOR 4G NETWORK COVERAGE – ATTOCK |
|---|---|
|  |  |
| **UFONE 4G NETWORK COVERAGE – ATTOCK** | **ZONG 4G NETWORK COVERAGE – ATTOCK** |
|  |  |

# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

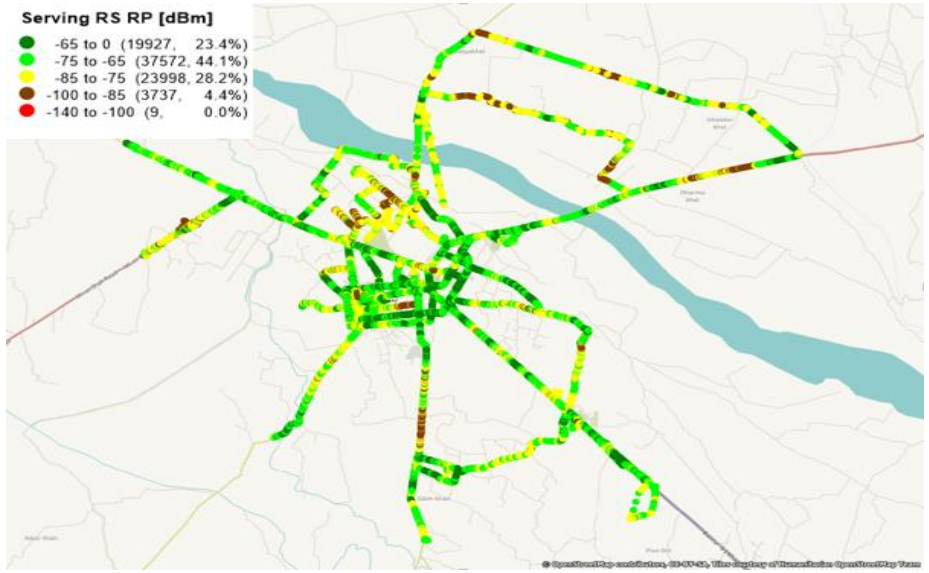
## JAZZ 4G NETWORK COVERAGE – BANNU



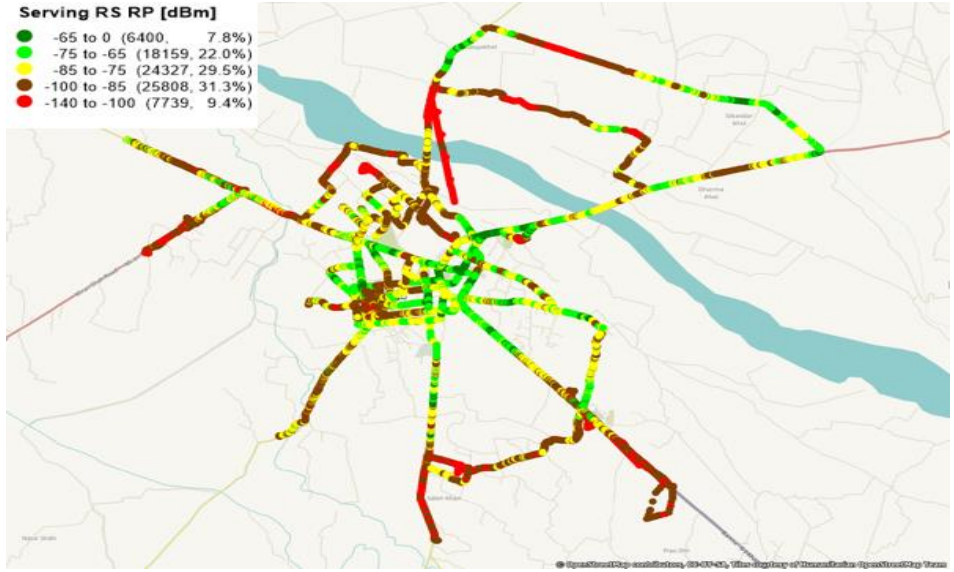

## TELENOR 4G NETWORK COVERAGE – BANNU




## UFONE 4G NETWORK COVERAGE – BANNU

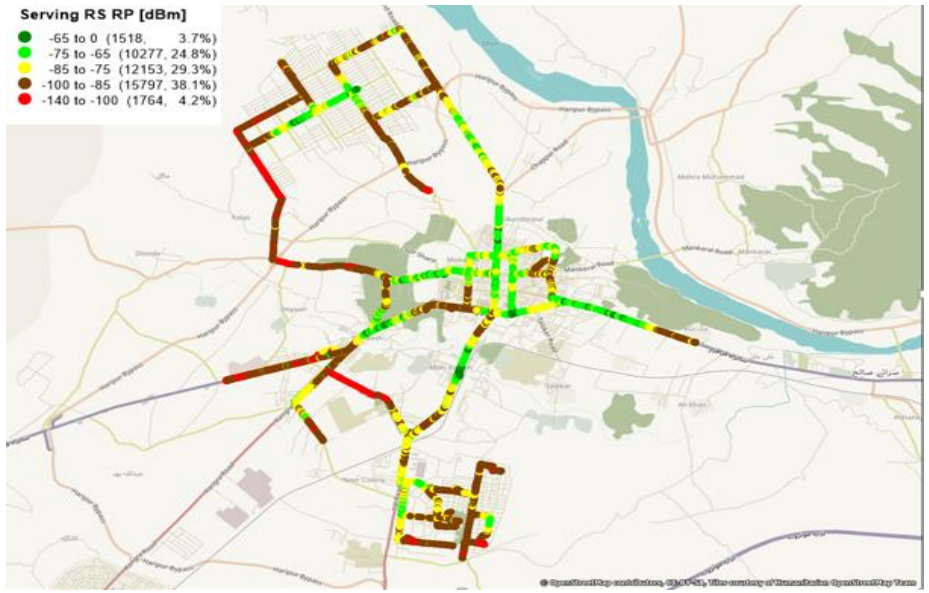



## ZONG 4G NETWORK COVERAGE – BANNU

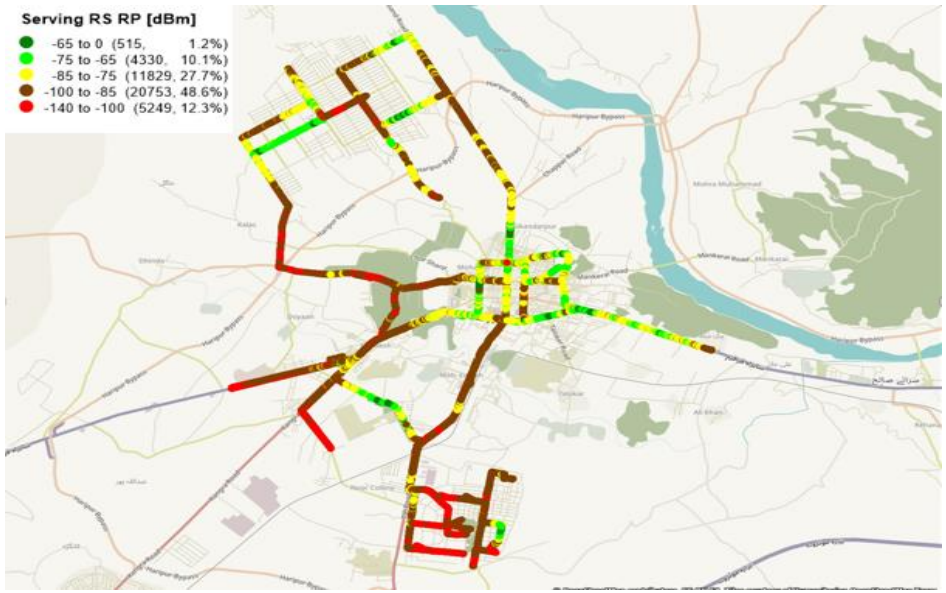


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

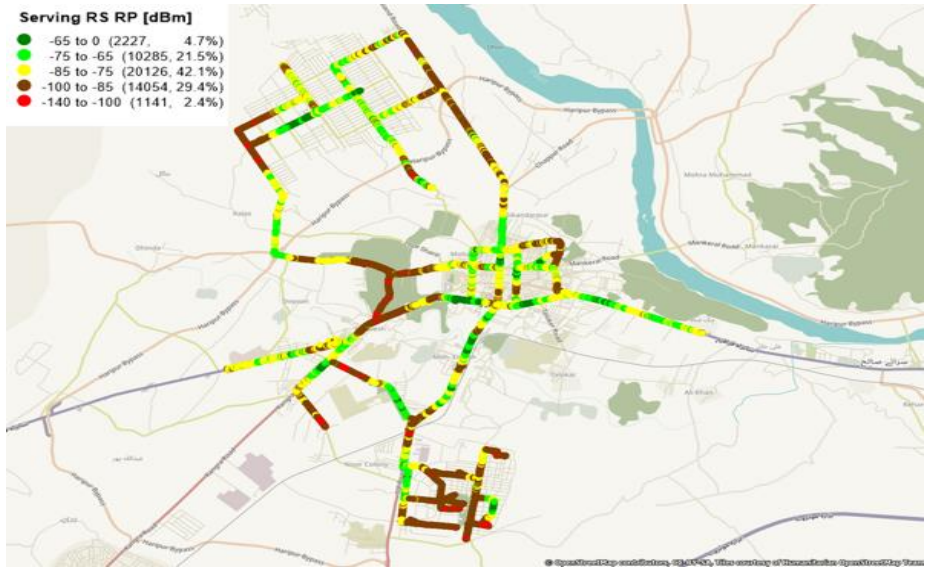
## JAZZ 4G NETWORK COVERAGE – HARIPUR



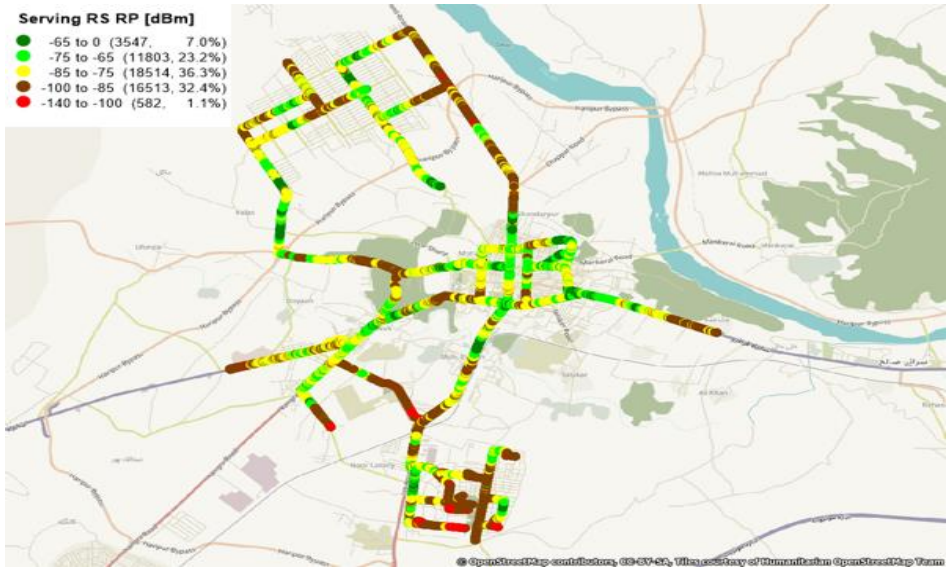

## TELENOR 4G NETWORK COVERAGE – HARIPUR




## UFONE 4G NETWORK COVERAGE – HARIPUR

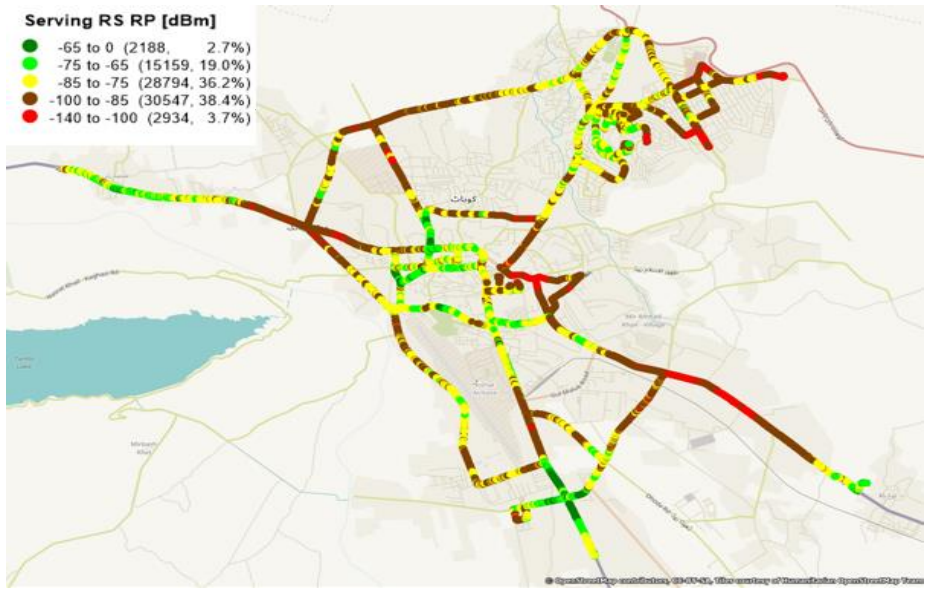



## ZONG 4G NETWORK COVERAGE – HARIPUR

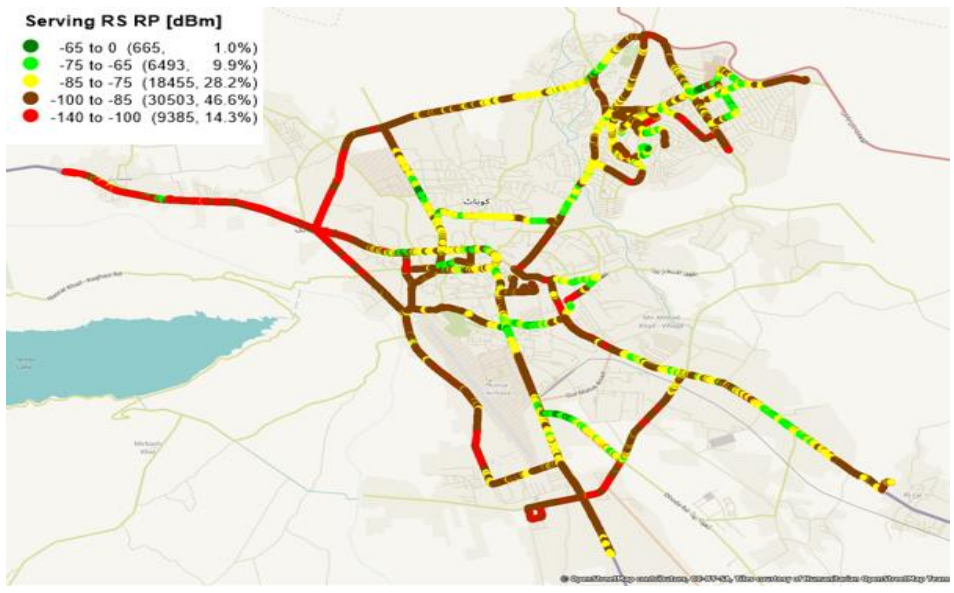


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

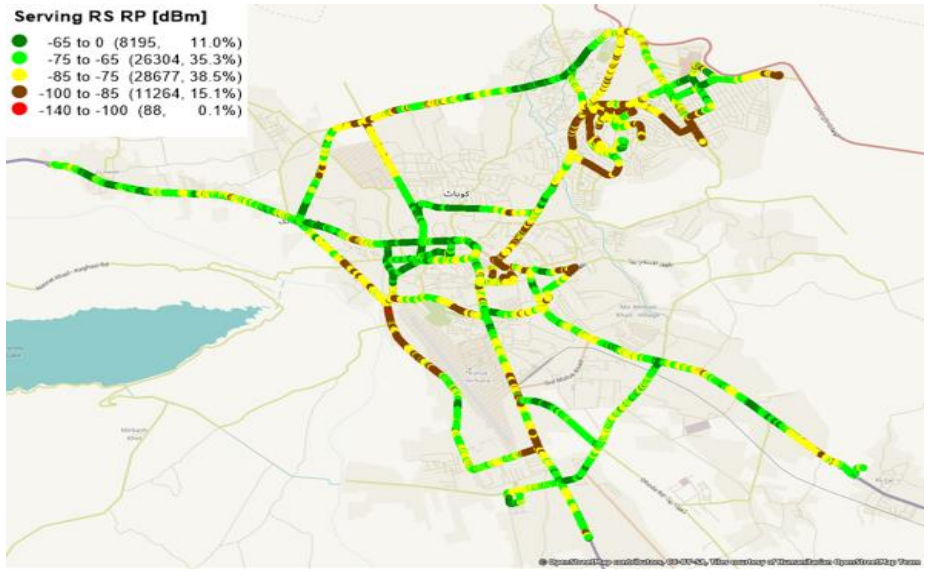
## JAZZ 4G NETWORK COVERAGE – KOHAT



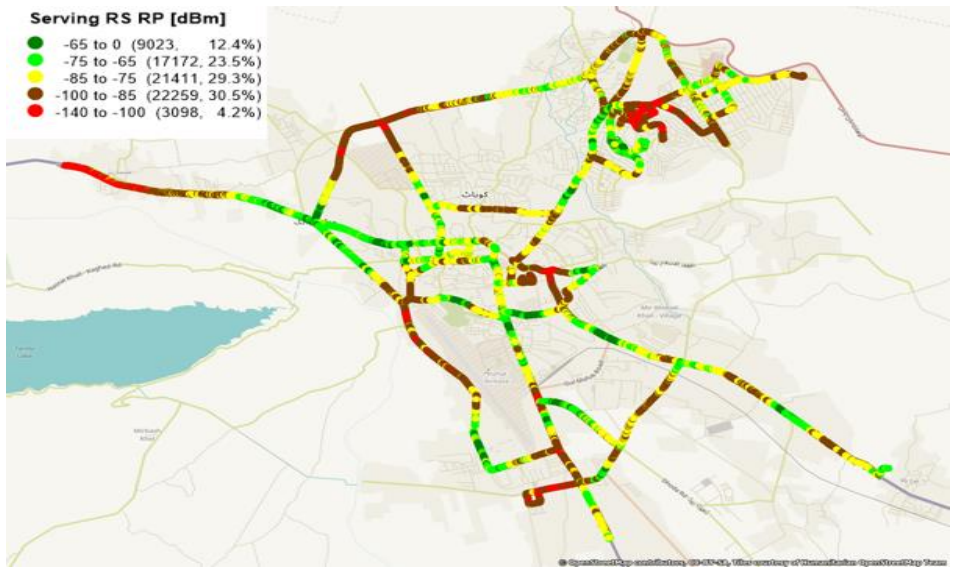

## TELENOR 4G NETWORK COVERAGE – KOHAT




## UFONE 4G NETWORK COVERAGE – KOHAT

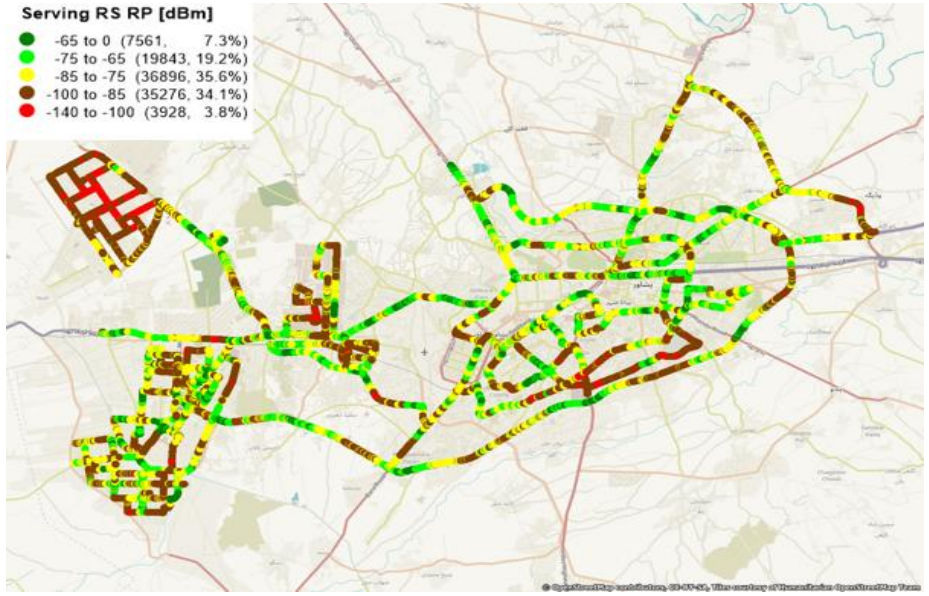



## ZONG 4G NETWORK COVERAGE – KOHAT

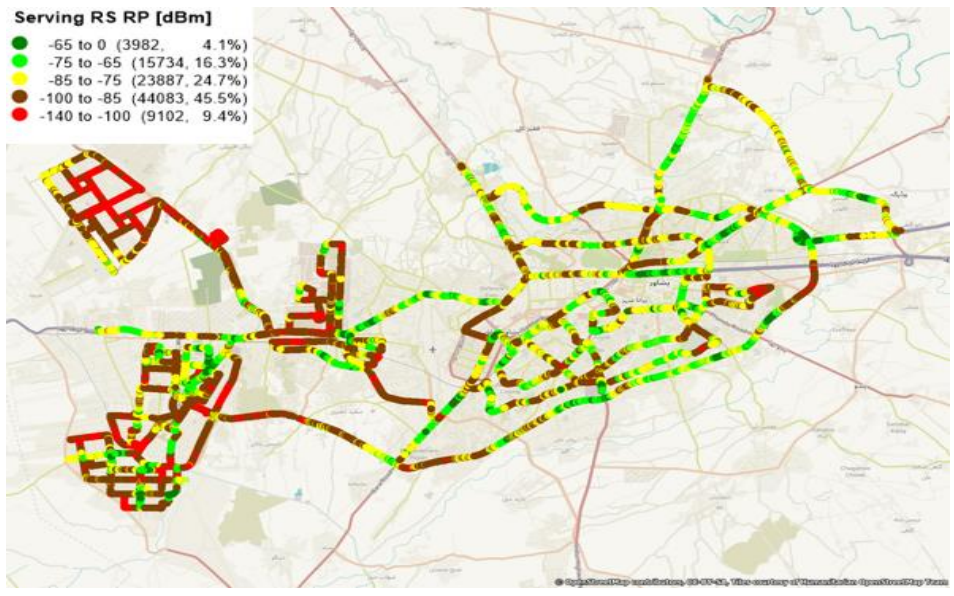


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

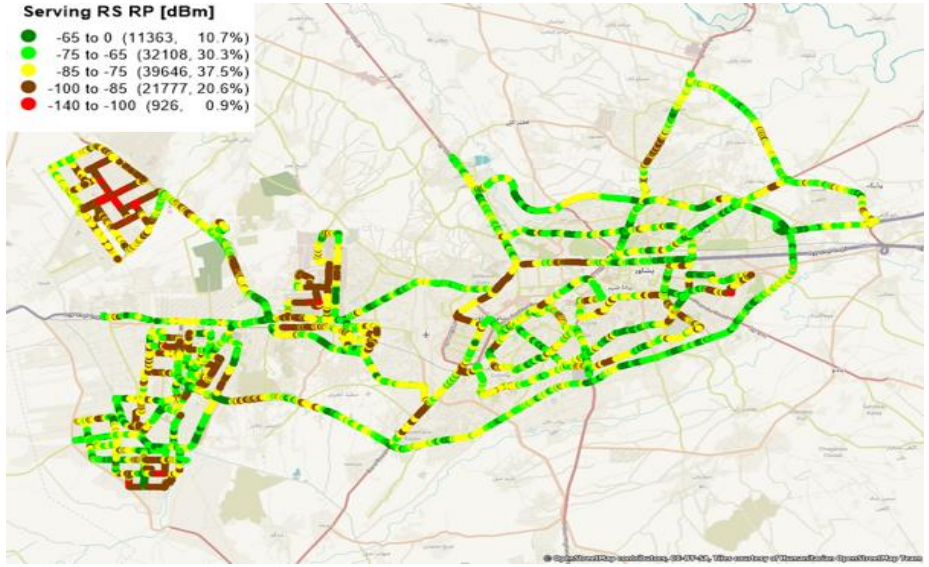
## JAZZ 4G NETWORK COVERAGE – PESHAWAR



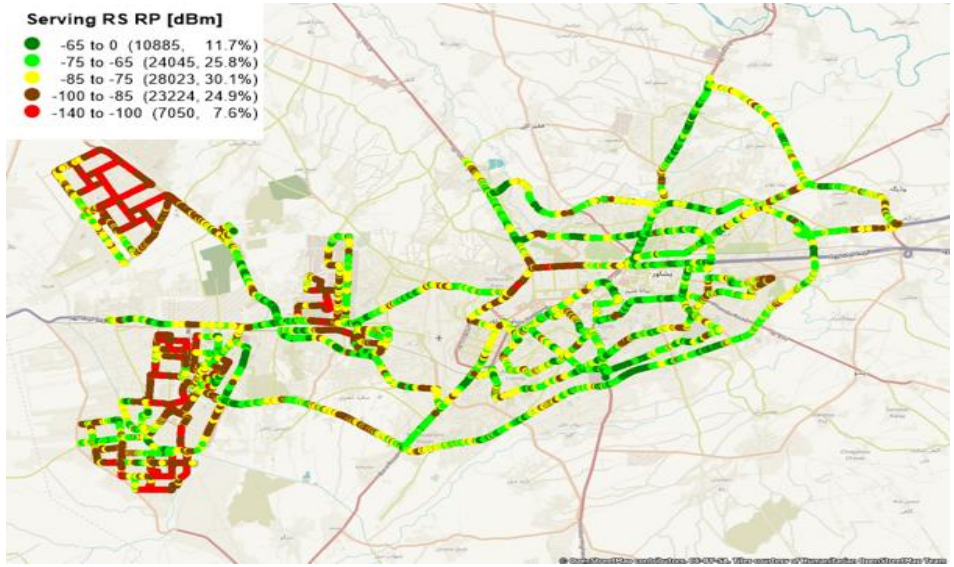

## TELENOR 4G NETWORK COVERAGE – PESHAWAR




## UFONE 4G NETWORK COVERAGE – PESHAWAR

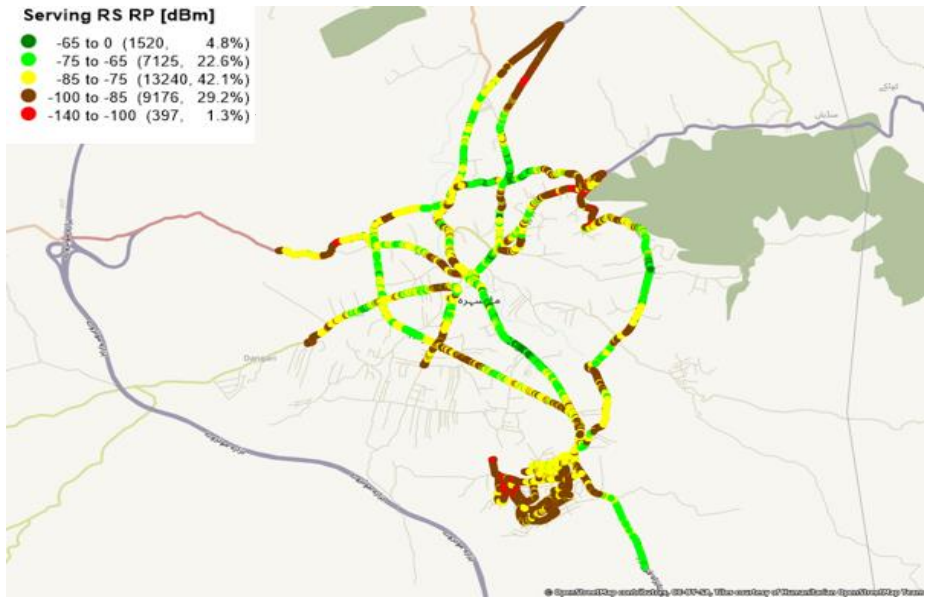



## ZONG 4G NETWORK COVERAGE – PESHAWAR

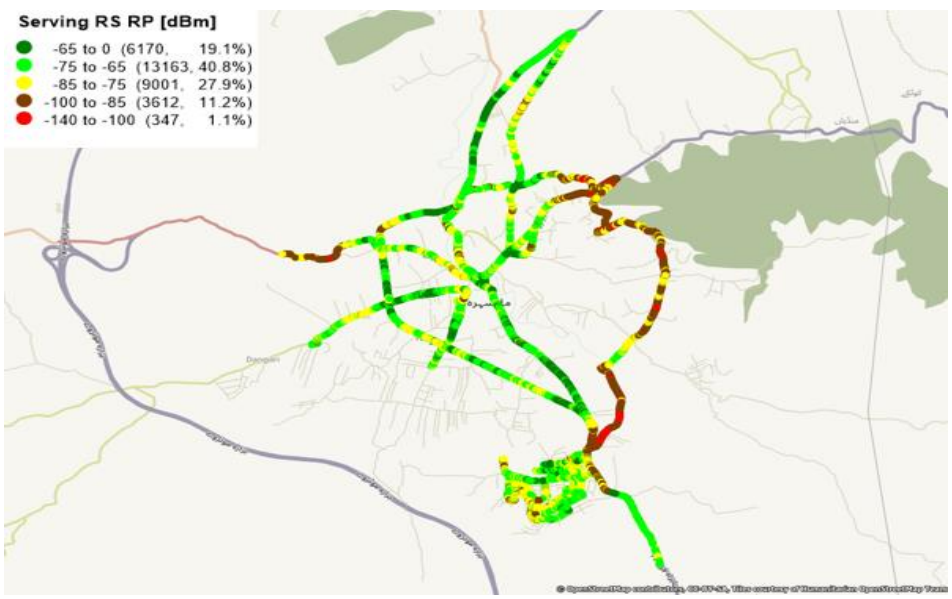


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

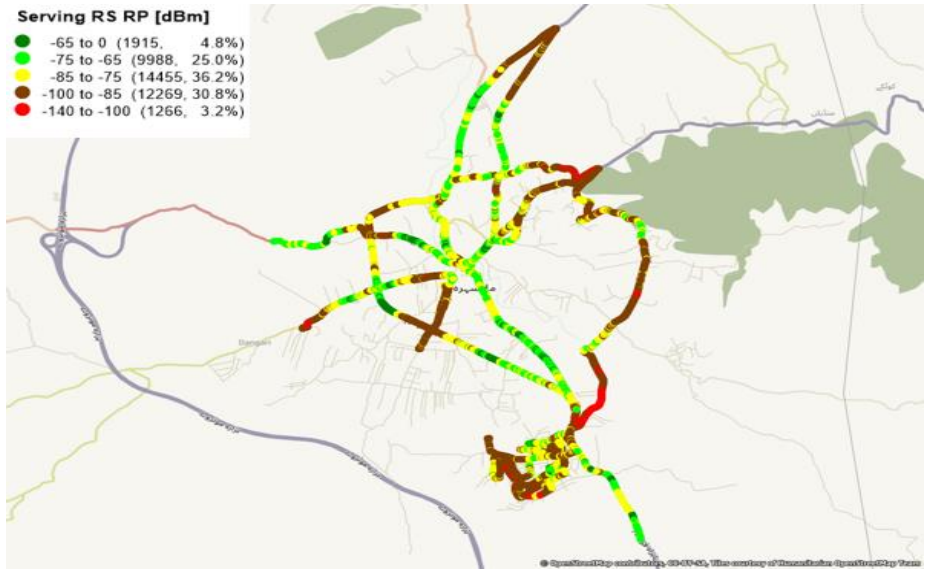
## JAZZ 4G NETWORK COVERAGE – MANSEHRA



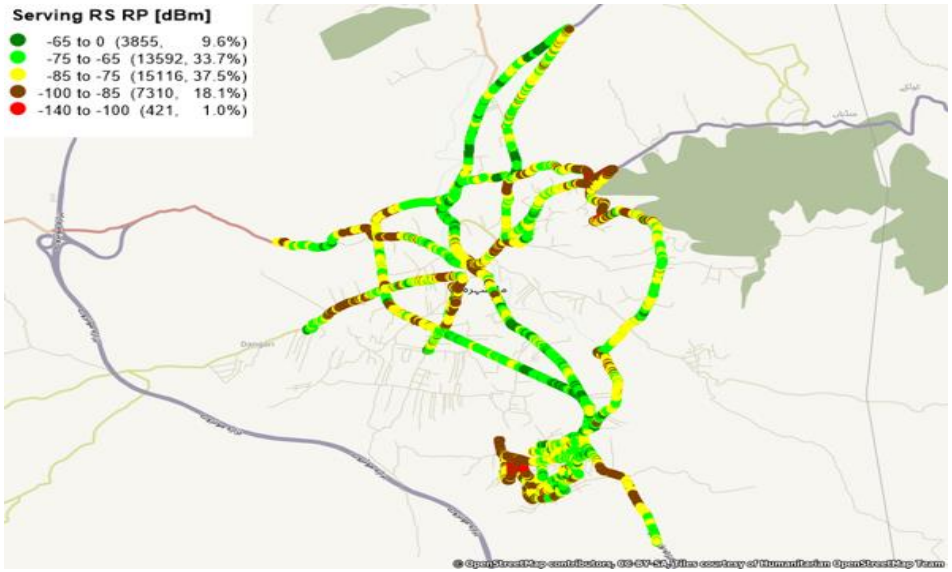

## TELENOR 4G NETWORK COVERAGE – MANSEHRA




## UFONE 4G NETWORK COVERAGE – MANSEHRA

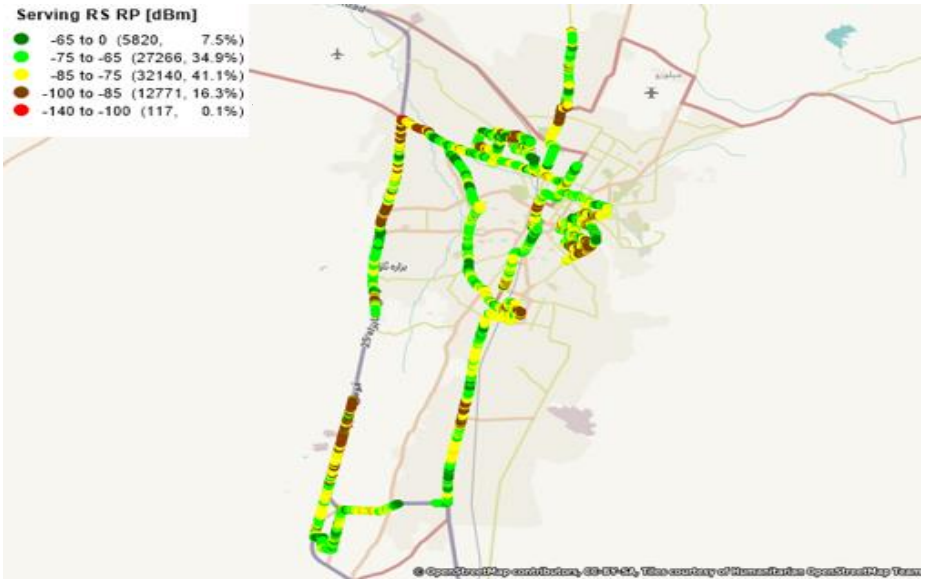



## ZONG 4G NETWORK COVERAGE – MANSEHRA

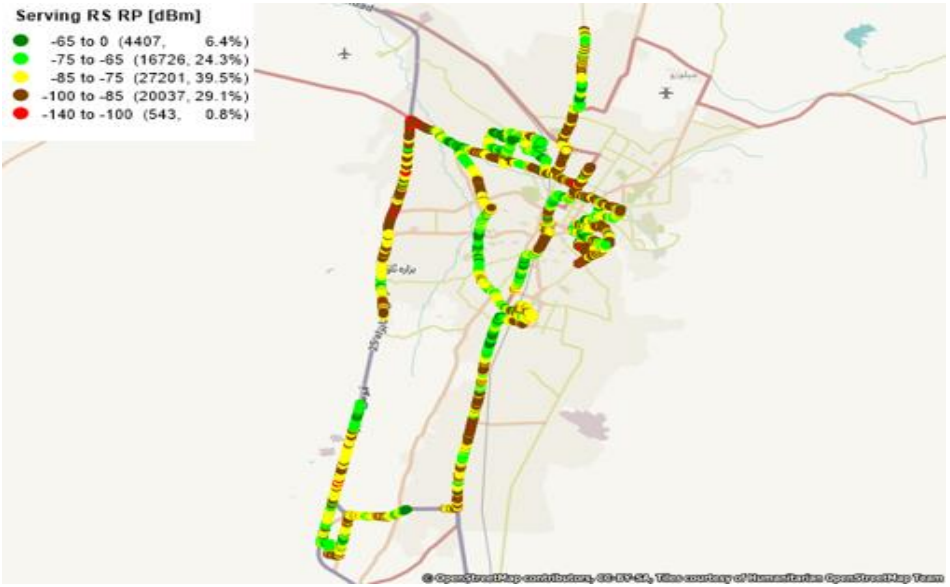


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

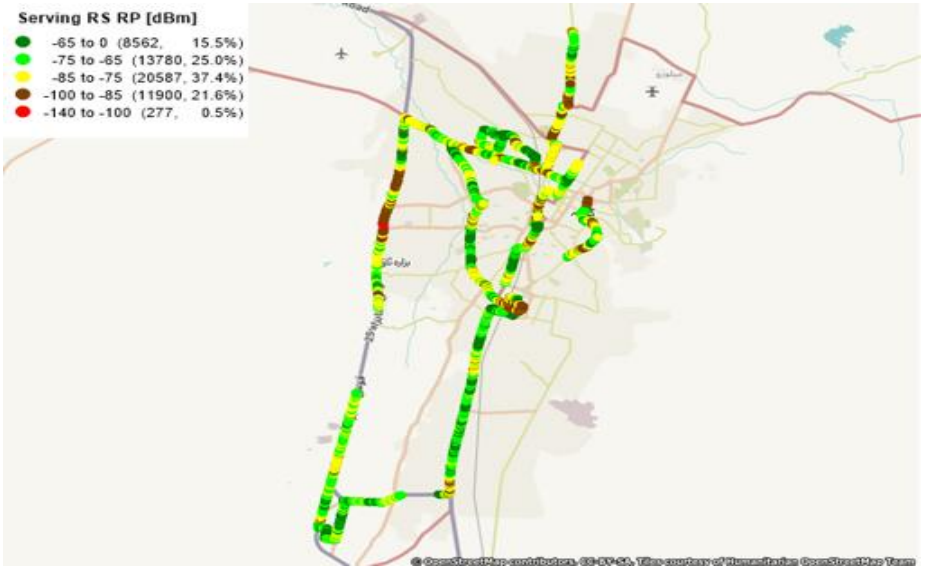
## JAZZ 4G NETWORK COVERAGE – QUETTA



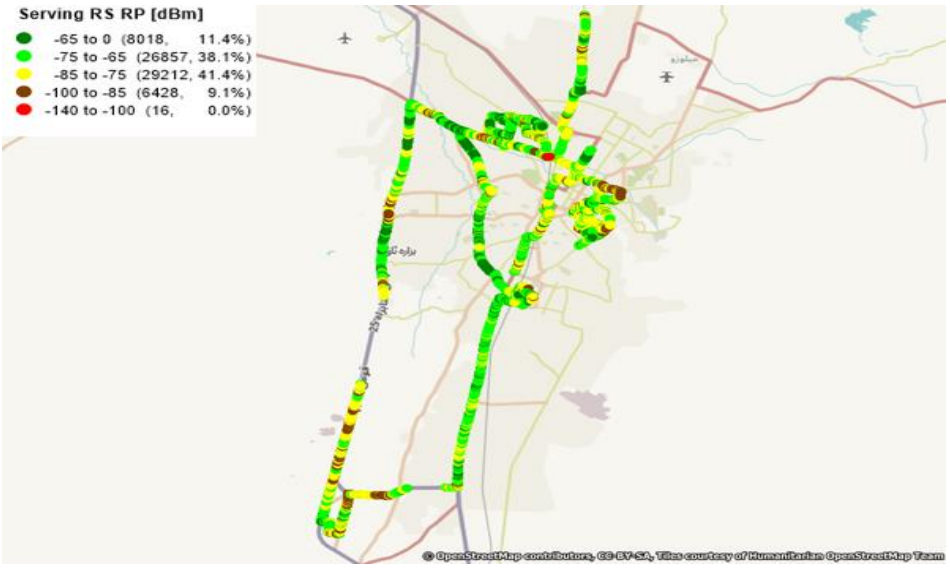

## TELENOR 4G NETWORK COVERAGE – QUETTA




## UFONE 4G NETWORK COVERAGE – QUETTA

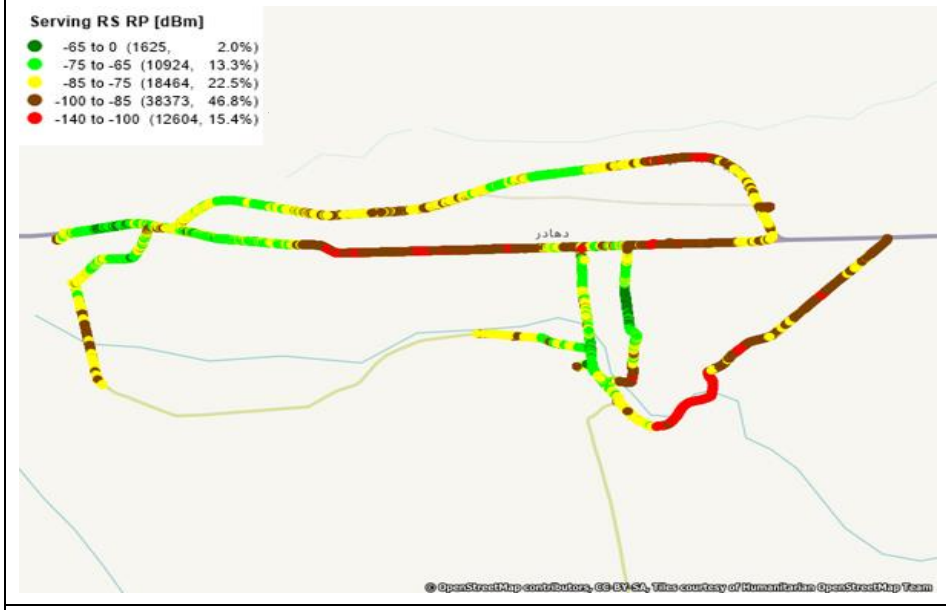



## ZONG 4G NETWORK COVERAGE – QUETTA

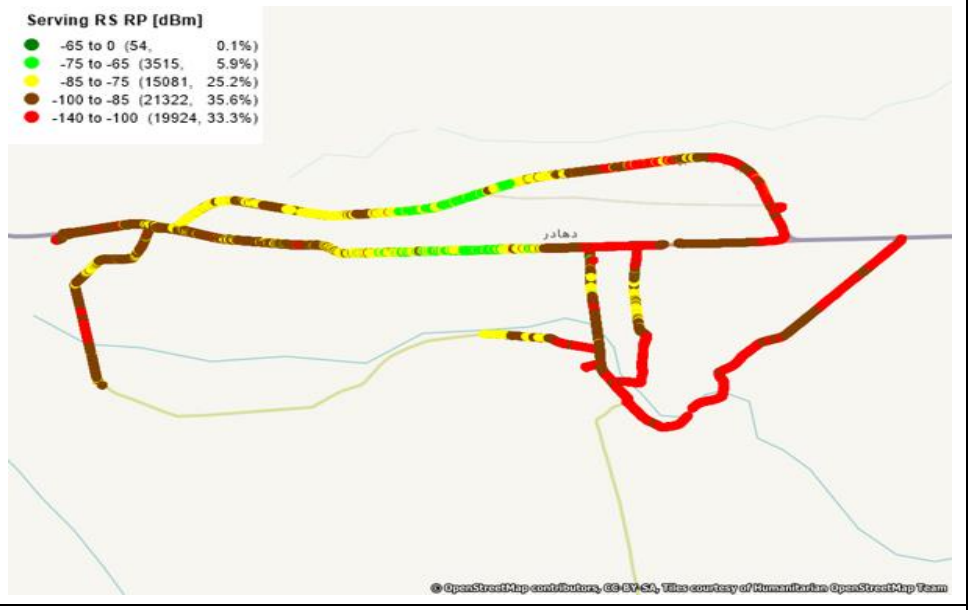


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

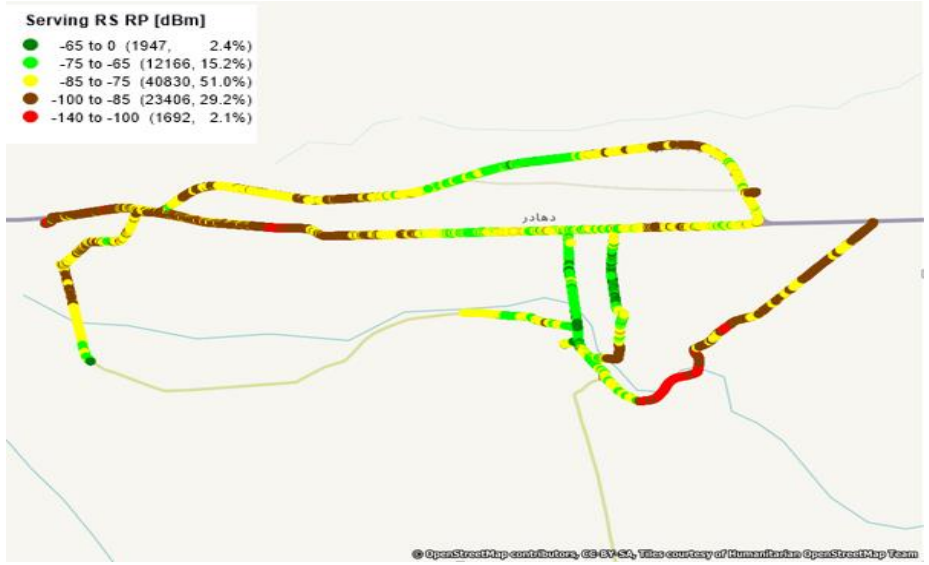
## JAZZ 4G NETWORK COVERAGE – DHADDAR



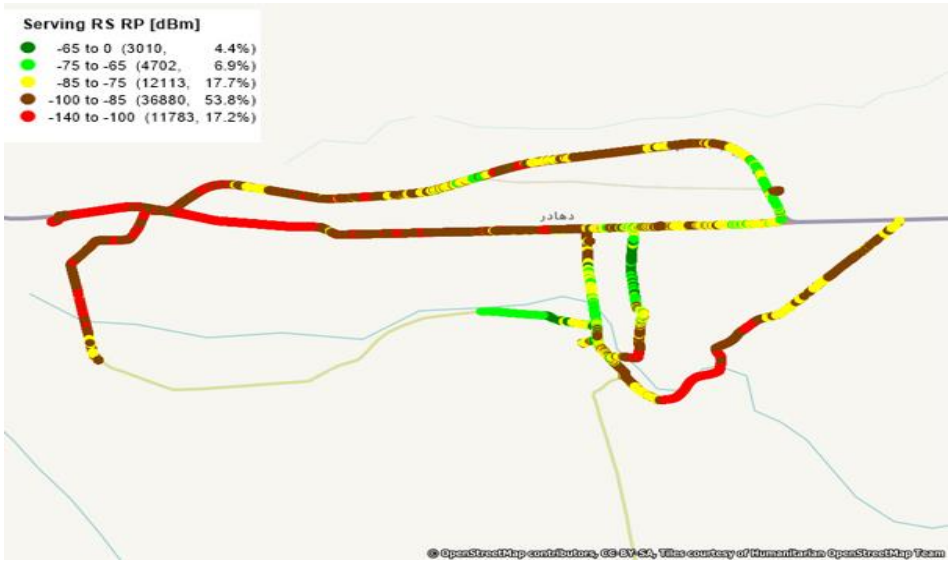

## TELENOR 4G NETWORK COVERAGE – DHADDAR




## UFONE 4G NETWORK COVERAGE – DHADDAR




## ZONG 4G NETWORK COVERAGE – DHADDAR

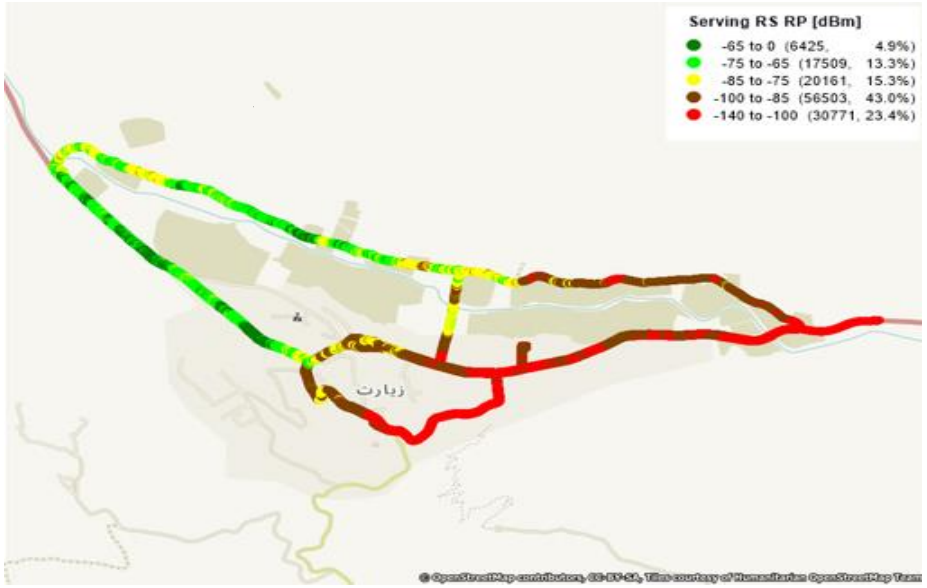


# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

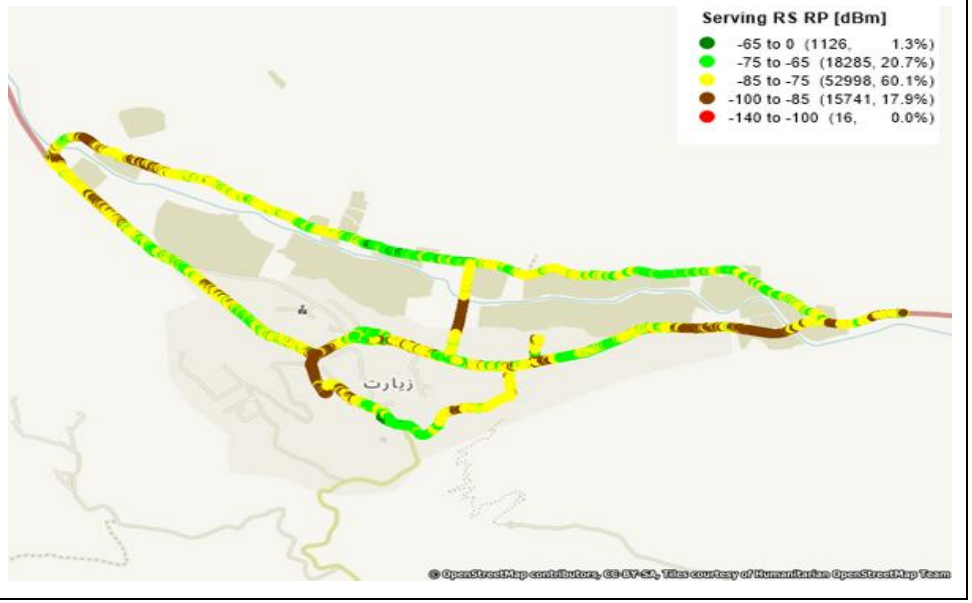
| JAZZ 4G NETWORK COVERAGE – ZHOB | TELENOR 4G NETWORK COVERAGE – ZHOB |
|---|---|
| | |
| **UFONE 4G NETWORK COVERAGE – ZHOB** | **ZONG 4G NETWORK COVERAGE – ZHOB** |
| | |

# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

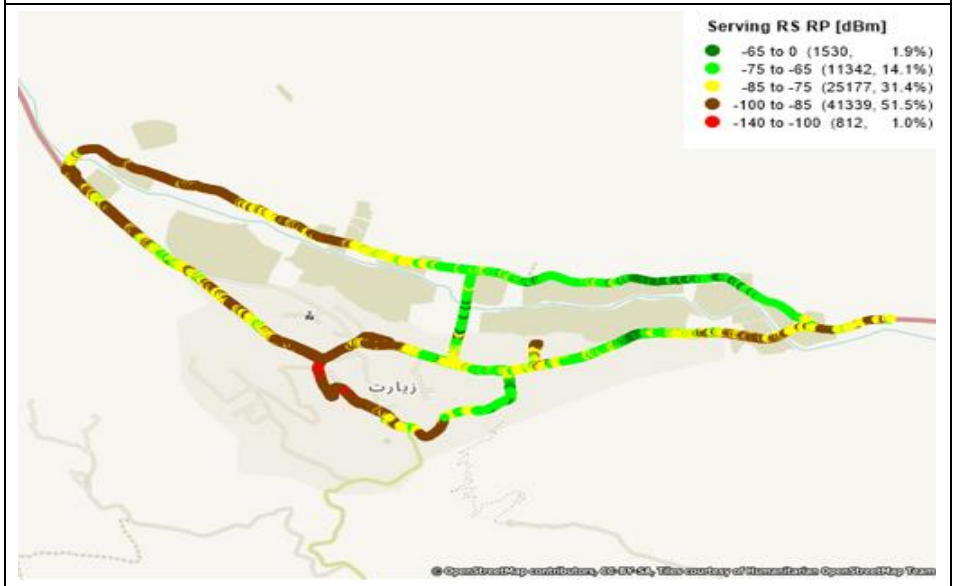
## UFONE 4G NETWORK COVERAGE – ZIARAT




## TELENOR 4G NETWORK COVERAGE – ZIARAT

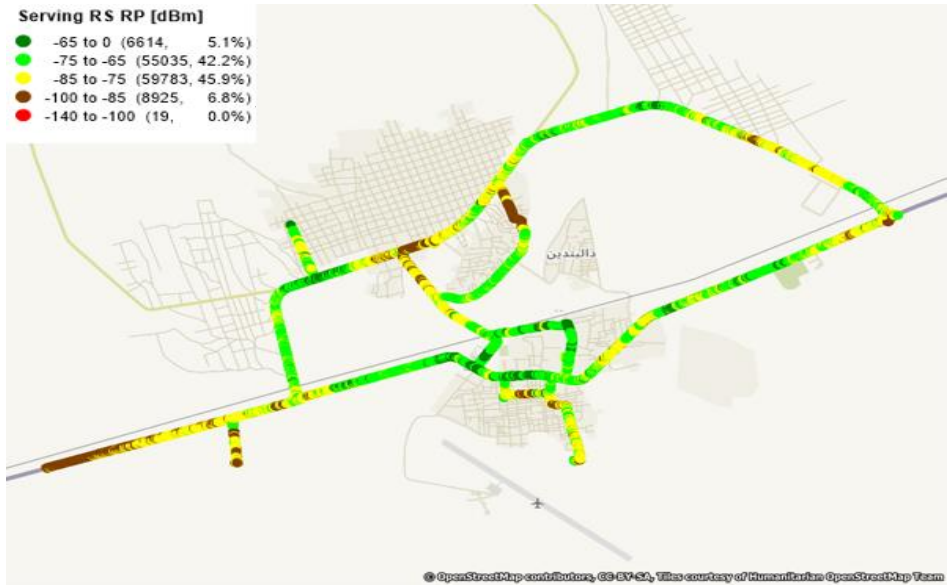



## ZONG 4G NETWORK COVERAGE – ZIARAT



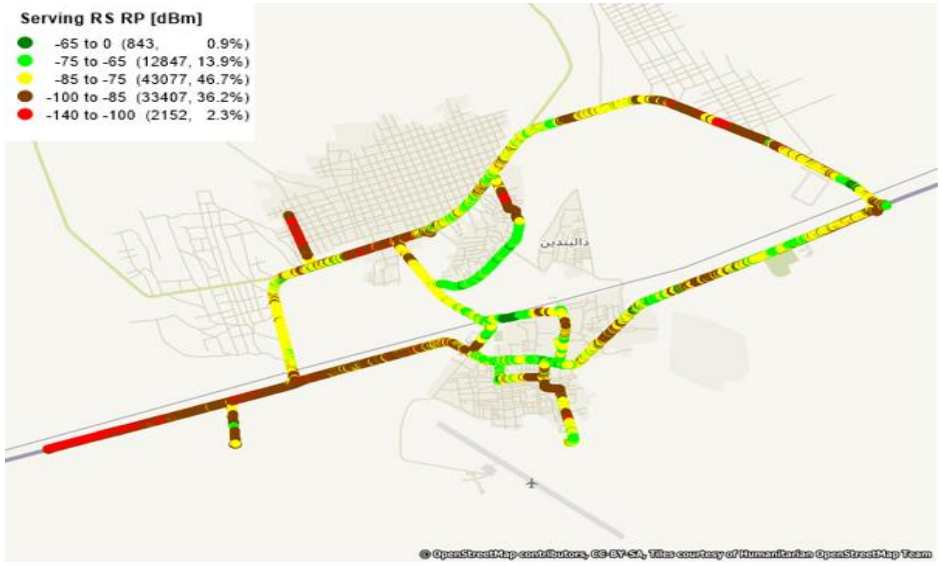
# 4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

## UFONE 4G NETWORK COVERAGE – DALBADDIN




## TELENOR 4G NETWORK COVERAGE – DALBADDIN

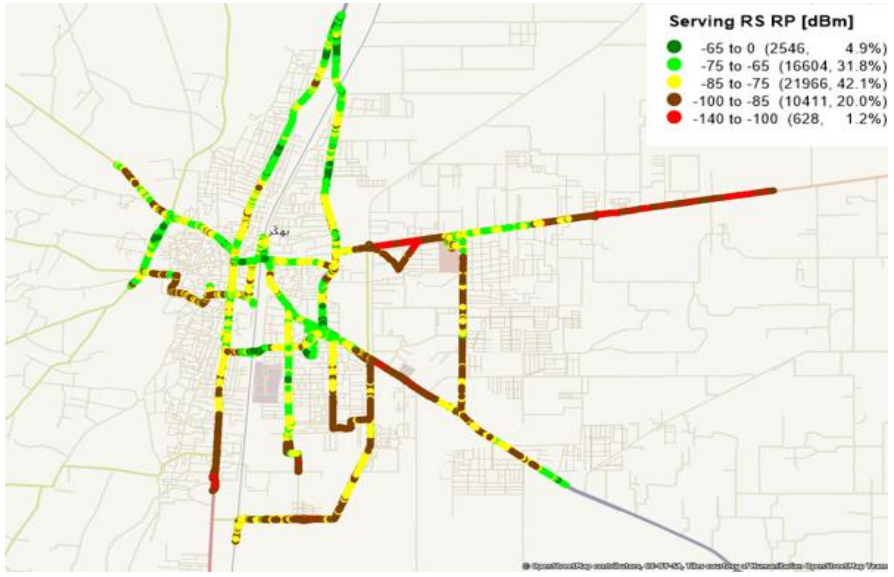
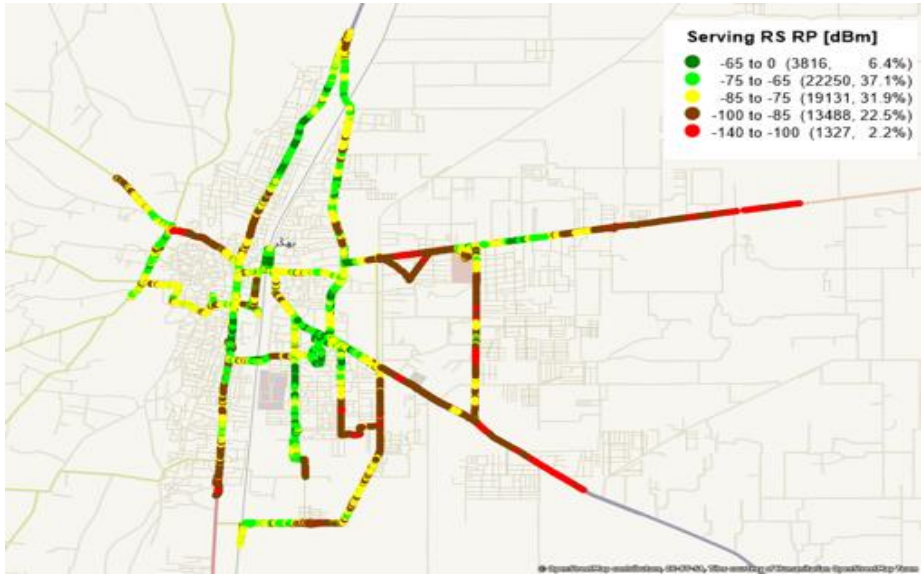
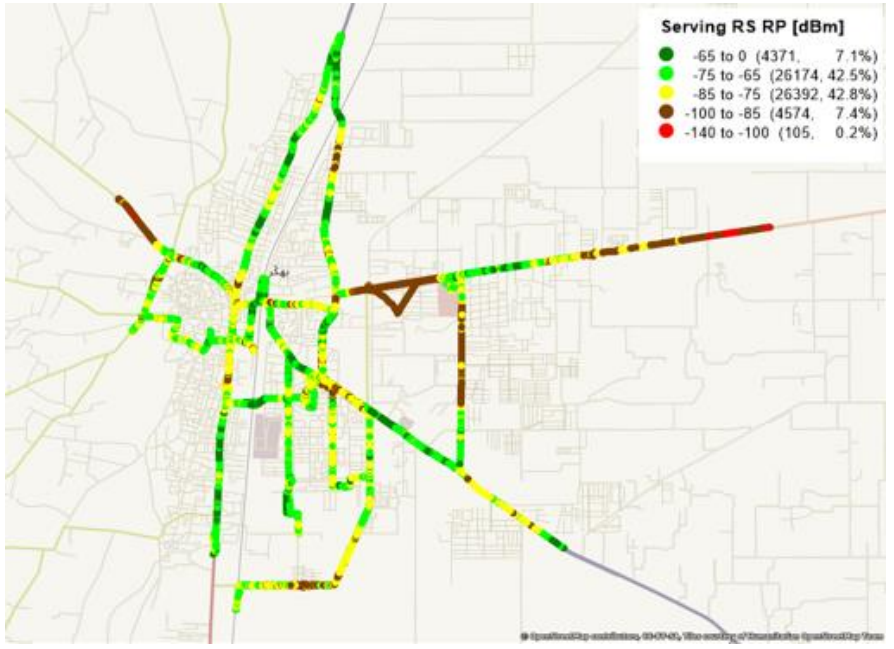
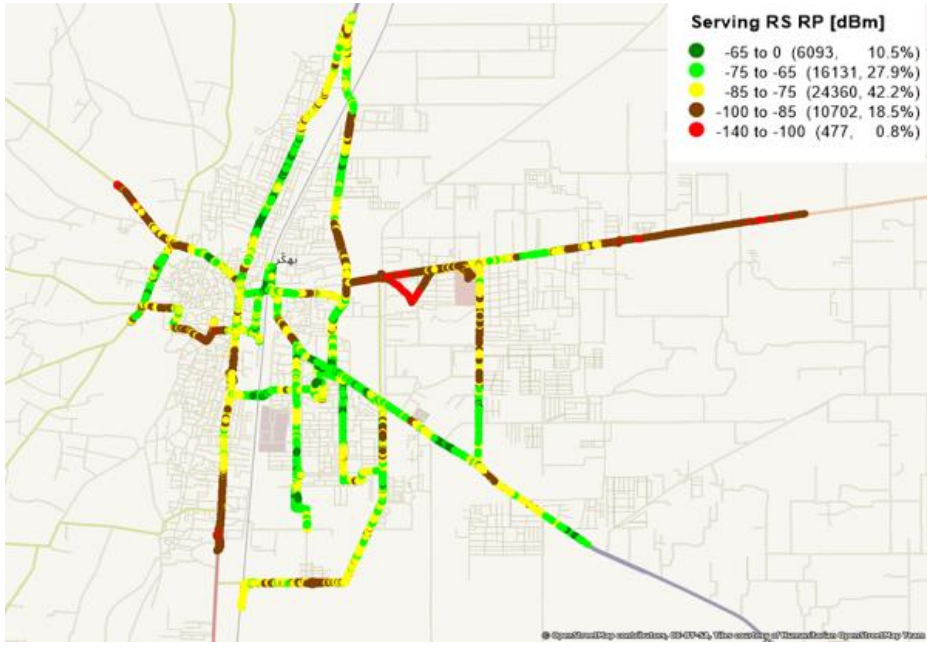
## ZONG 4G NETWORK COVERAGE – DALBADDIN



Annex-A2

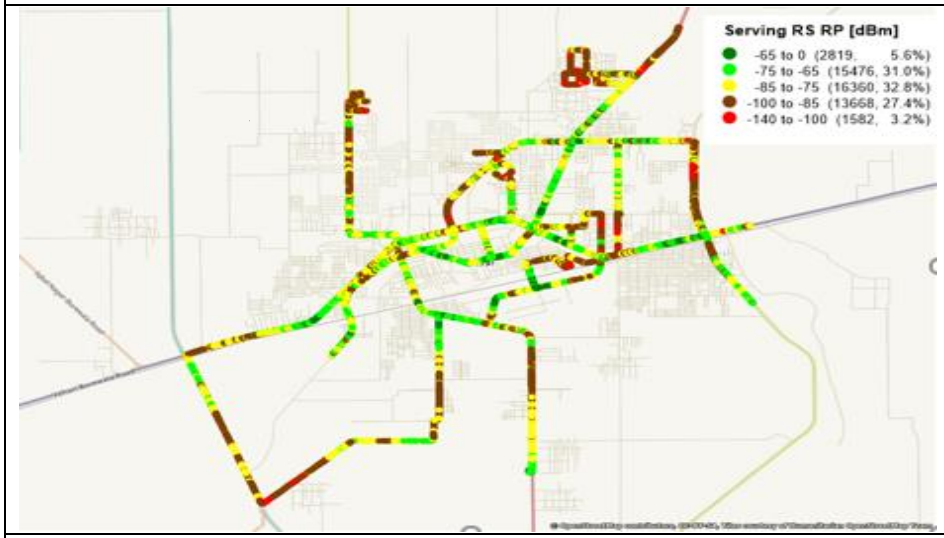
# MOBILE BROADBAND AUTOMODE COVERAGE MAPS

# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

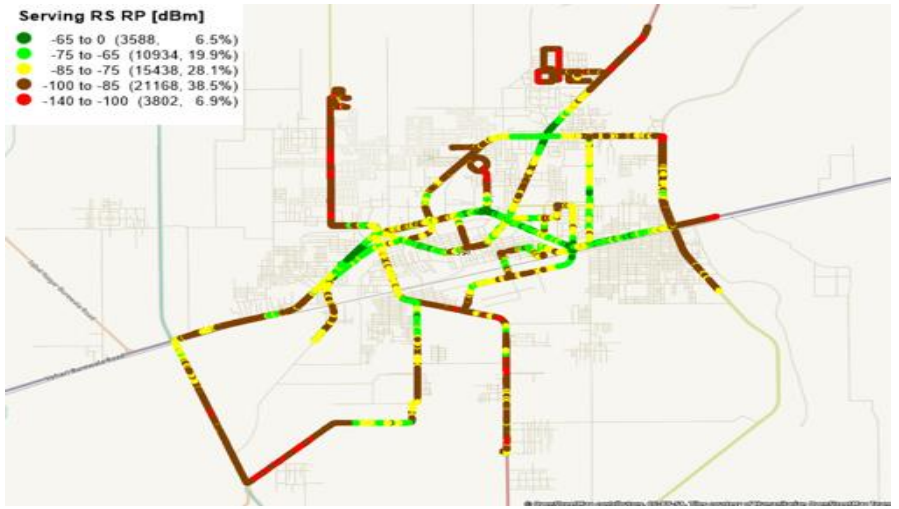
| JAZZ AUTOMODE NETWORK COVERAGE – BAHKKAR | TELENOR AUTOMODE NETWORK COVERAGE – BAHKKAR |
|---|---|
|  |  |
| **UFONE AUTOMODE NETWORK COVERAGE – BAHKKAR** | **ZONG AUTOMODE NETWORK COVERAGE – BAHKKAR** |
|  |  |

# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

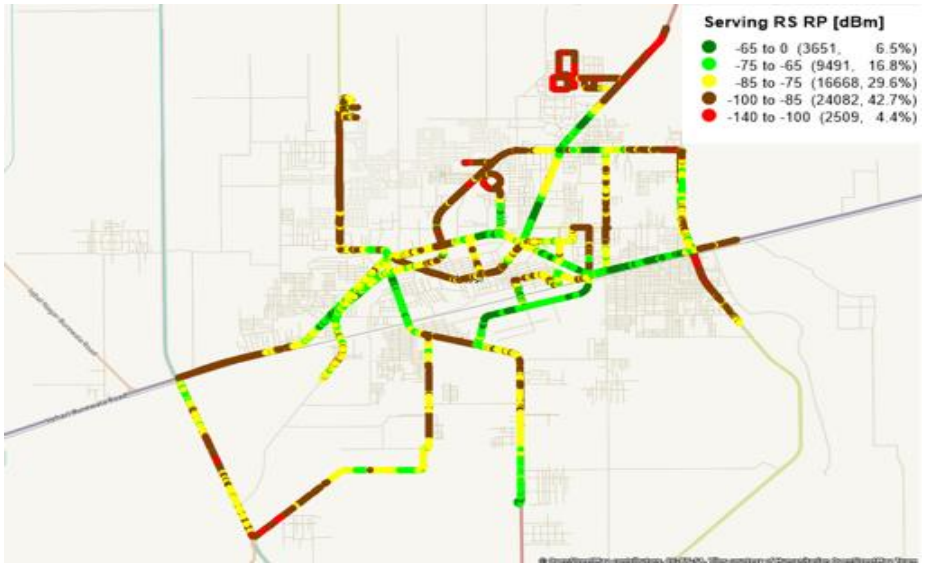
## JAZZ AUTOMODE NETWORK COVERAGE – BUREWALA




## TELENOR AUTOMODE NETWORK COVERAGE – BUREWALA



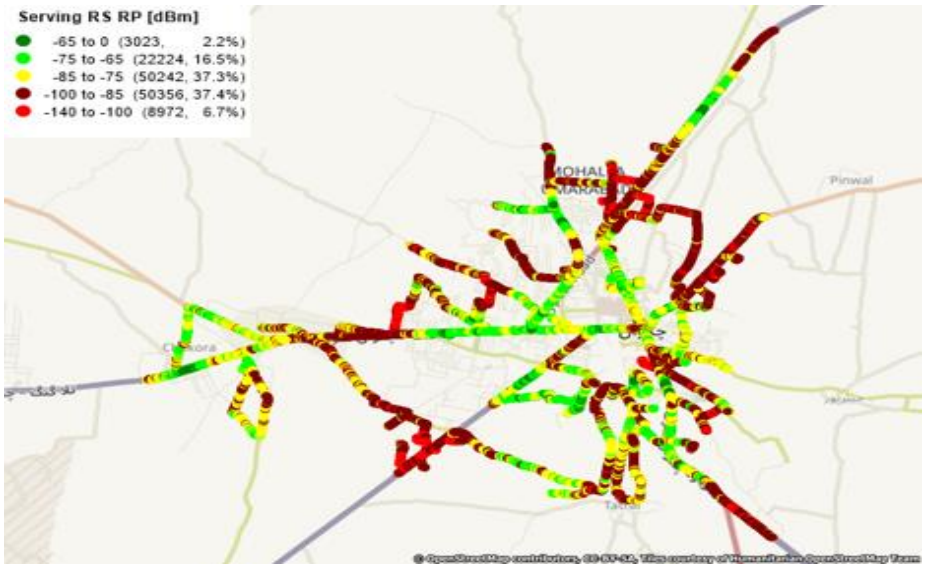

## UFONE AUTOMODE NETWORK COVERAGE – BUREWALA



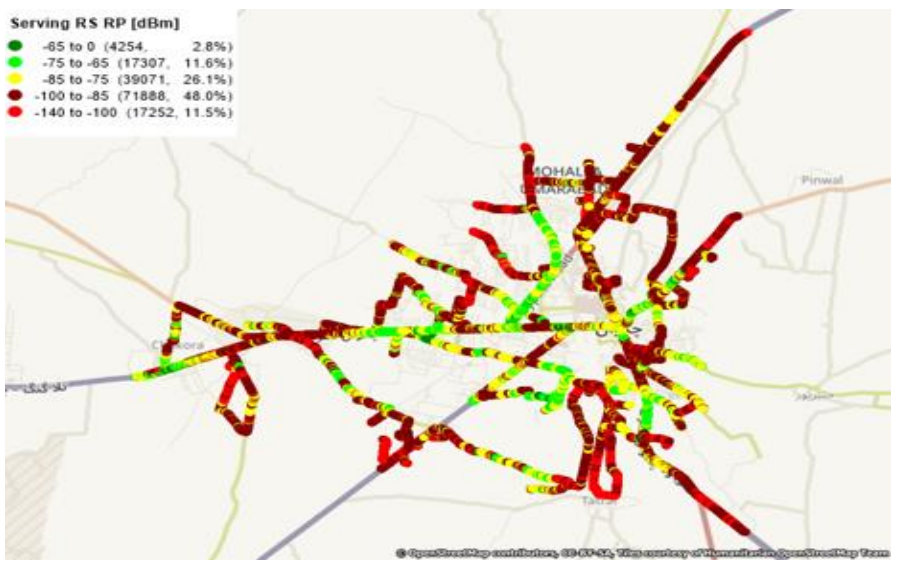

## ZONG AUTOMODE NETWORK COVERAGE – BUREWALA

# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

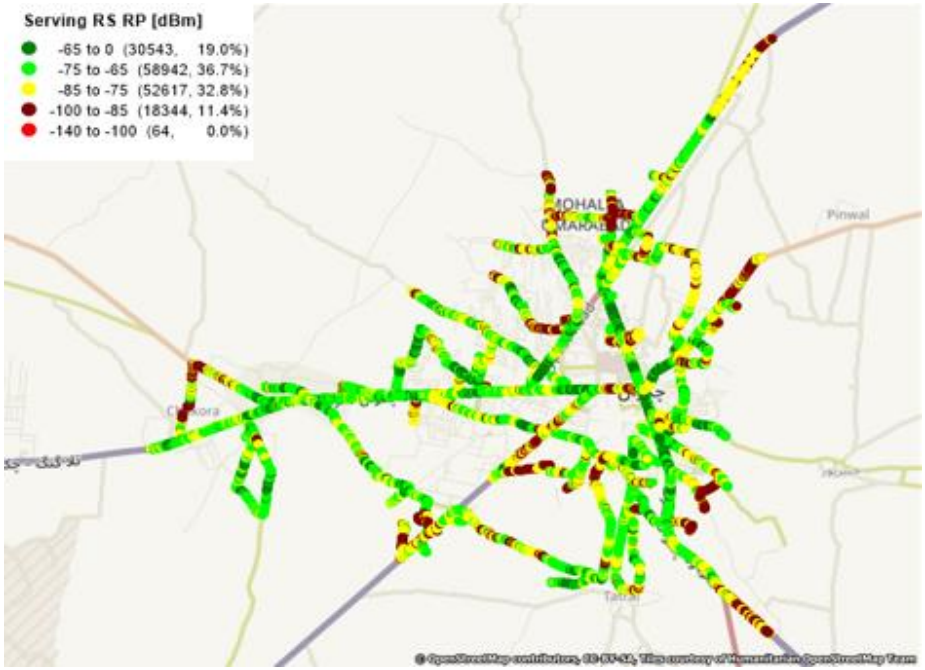
## JAZZ AUTOMODE NETWORK COVERAGE – CHAKWAL



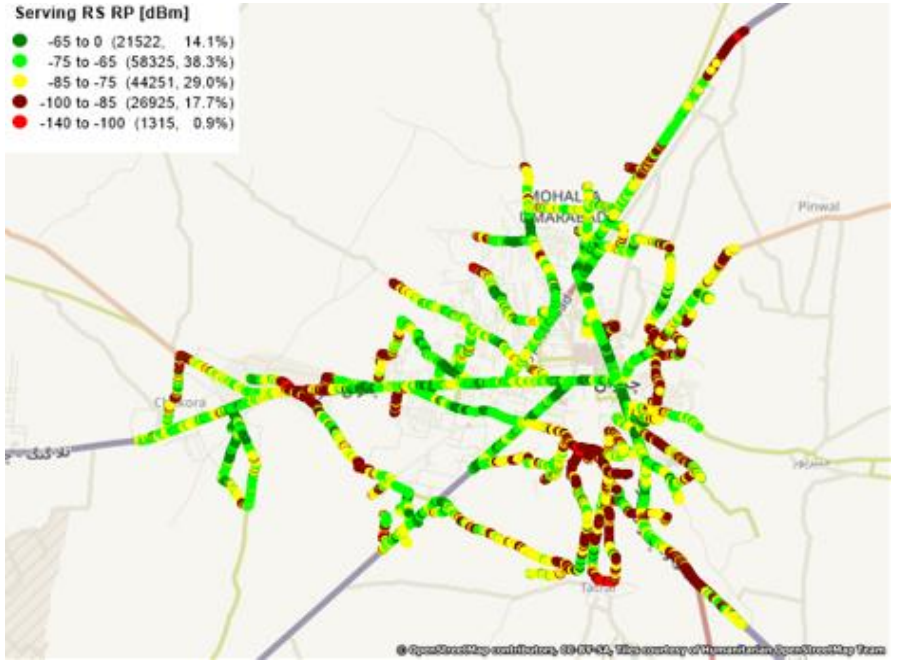

## TELENOR AUTOMODE NETWORK COVERAGE – CHAKWAL




## UFONE AUTOMODE NETWORK COVERAGE – CHAKWAL

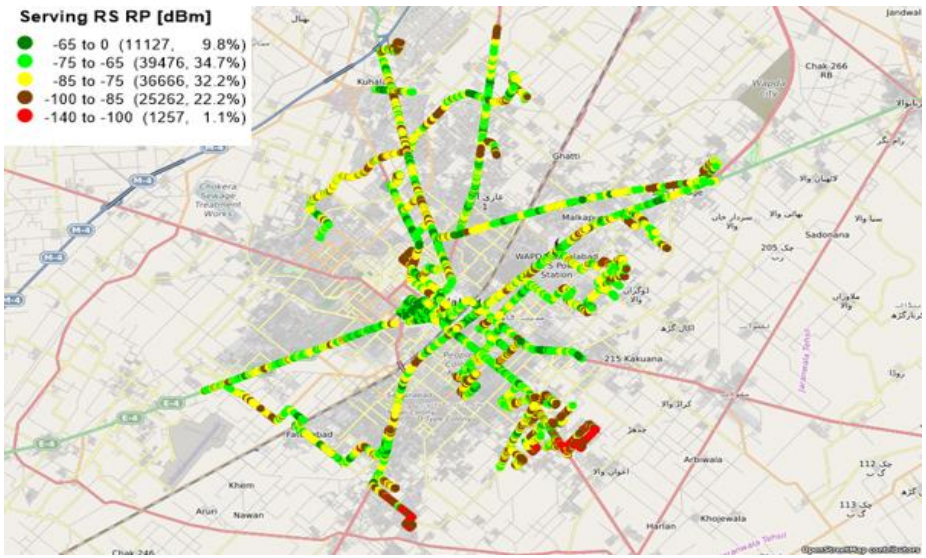



## ZONG AUTOMODE NETWORK COVERAGE – CHAKWAL

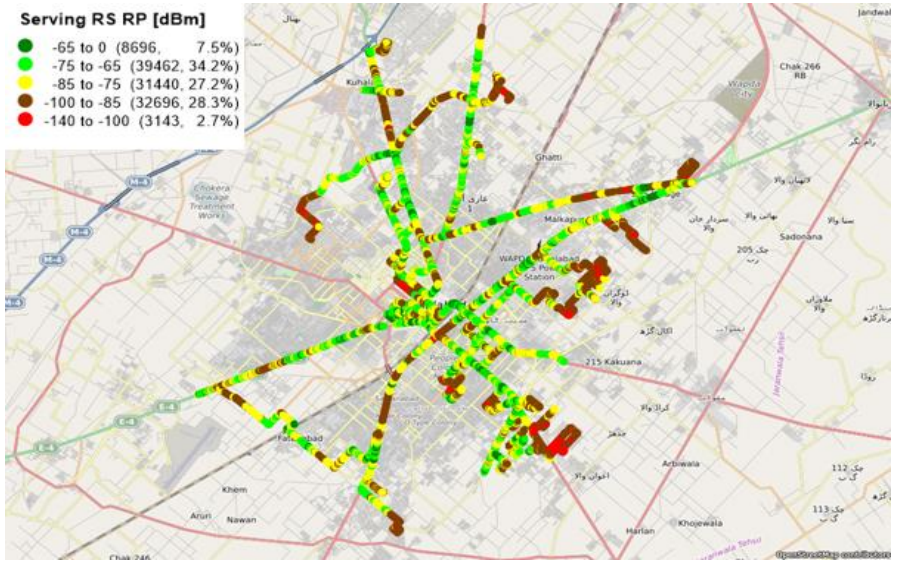


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

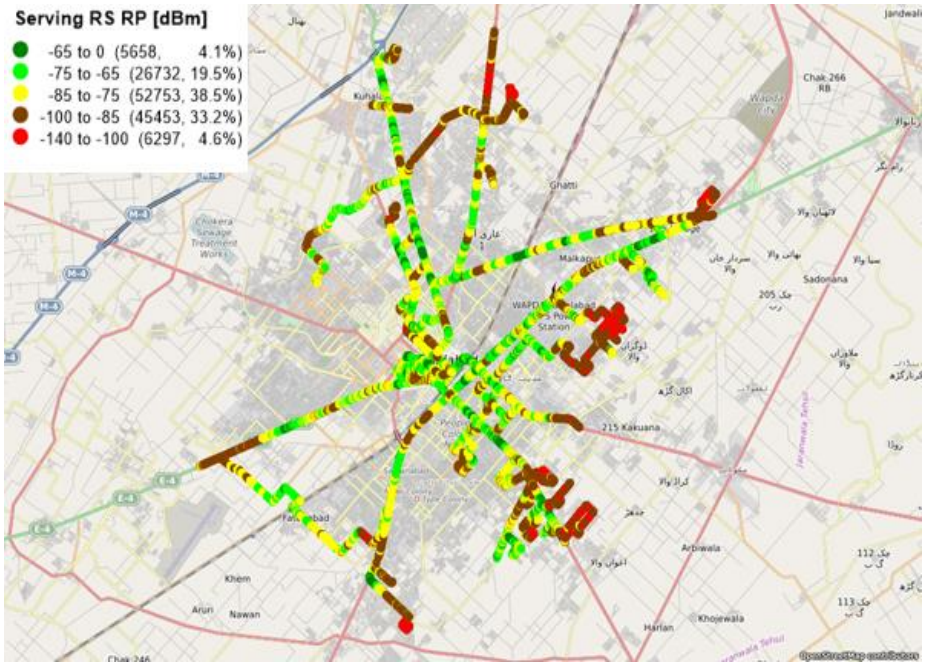
## JAZZ AUTOMODE NETWORK COVERAGE – FAISALABAD



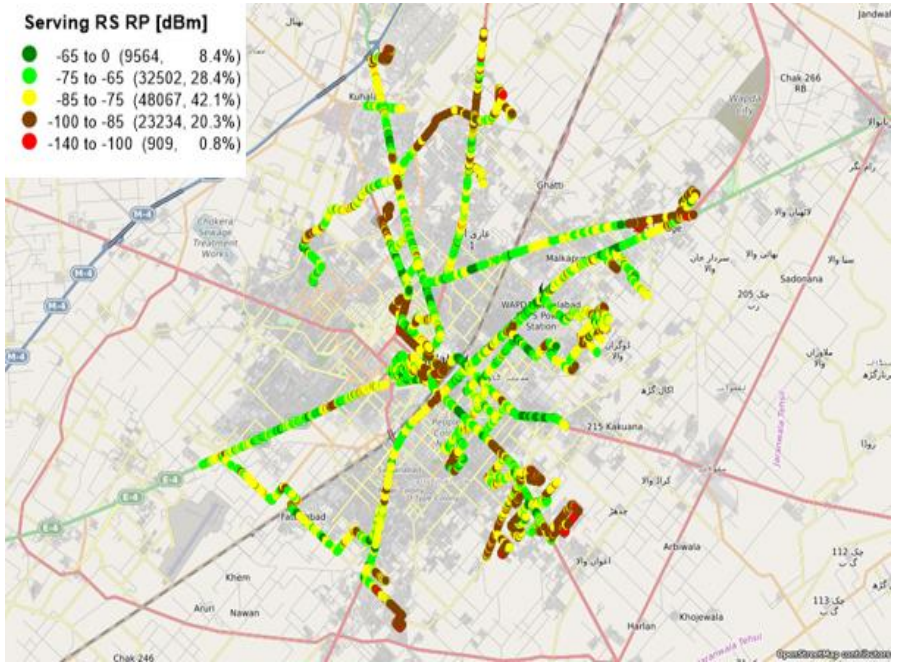

## TELENOR AUTOMODE NETWORK COVERAGE – FAISALABAD




## UFONE AUTOMODE NETWORK COVERAGE – FAISALABAD

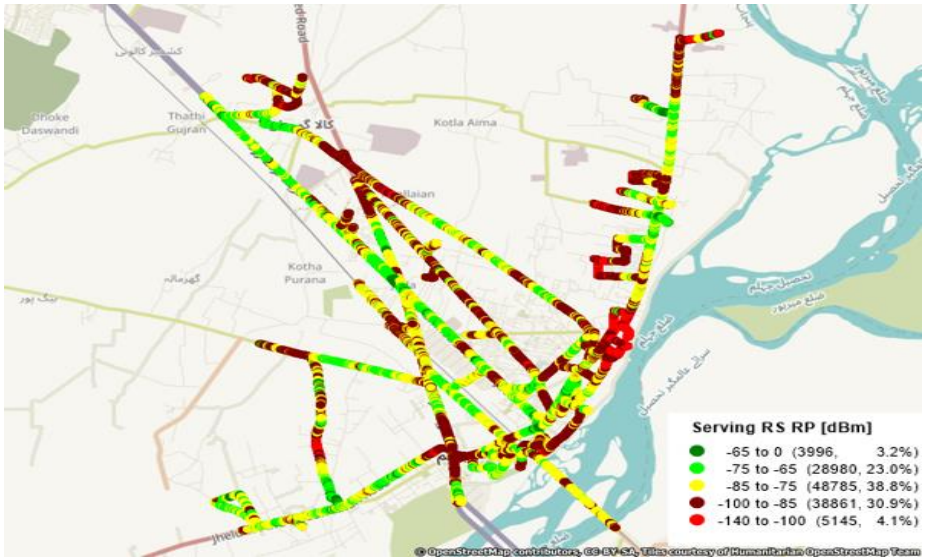



## ZONG AUTOMODE NETWORK COVERAGE – FAISALABAD

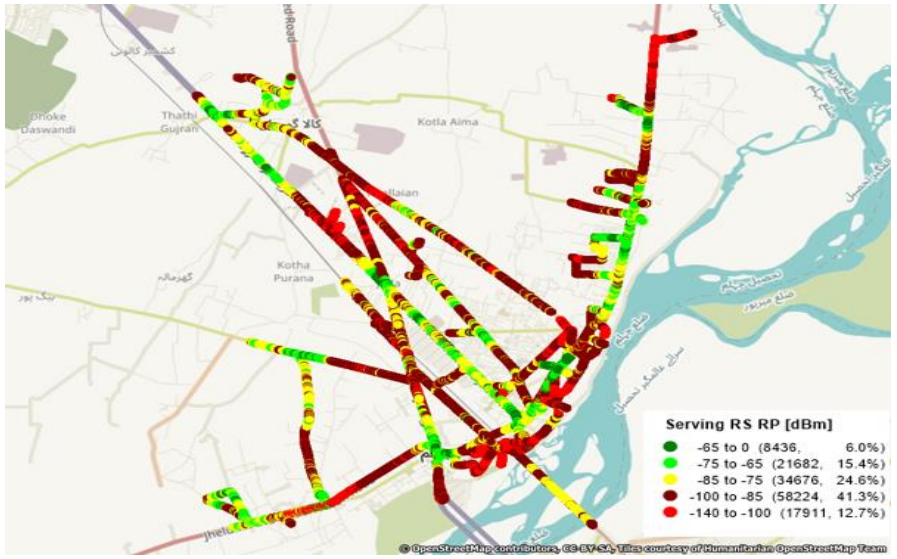


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

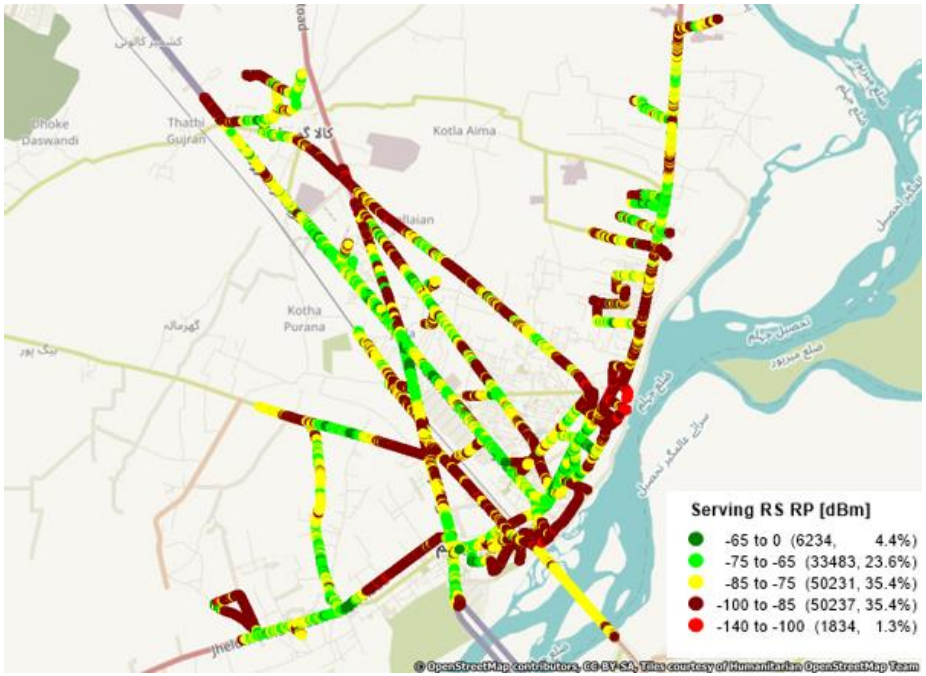
## JAZZ AUTOMODE NETWORK COVERAGE – JHELUM



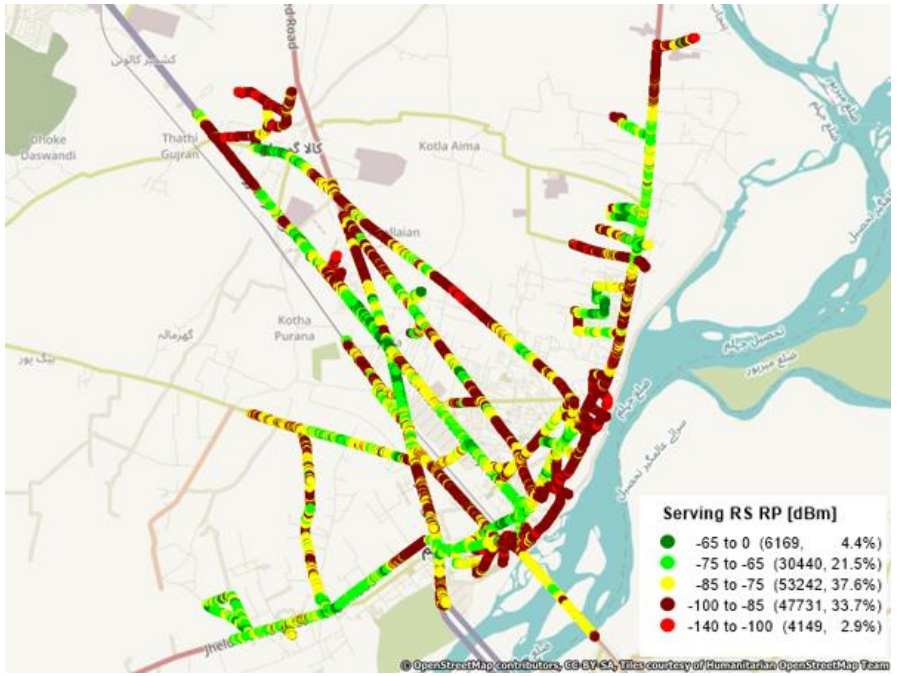

## TELENOR AUTOMODE NETWORK COVERAGE – JHELUM




## UFONE AUTOMODE NETWORK COVERAGE – JHELUM

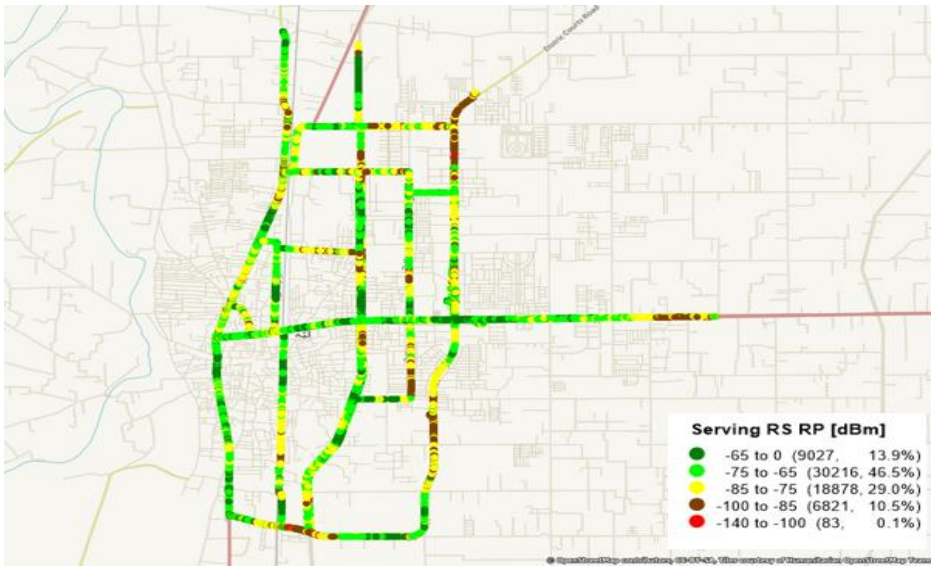



## ZONG AUTOMODE NETWORK COVERAGE – JHELUM

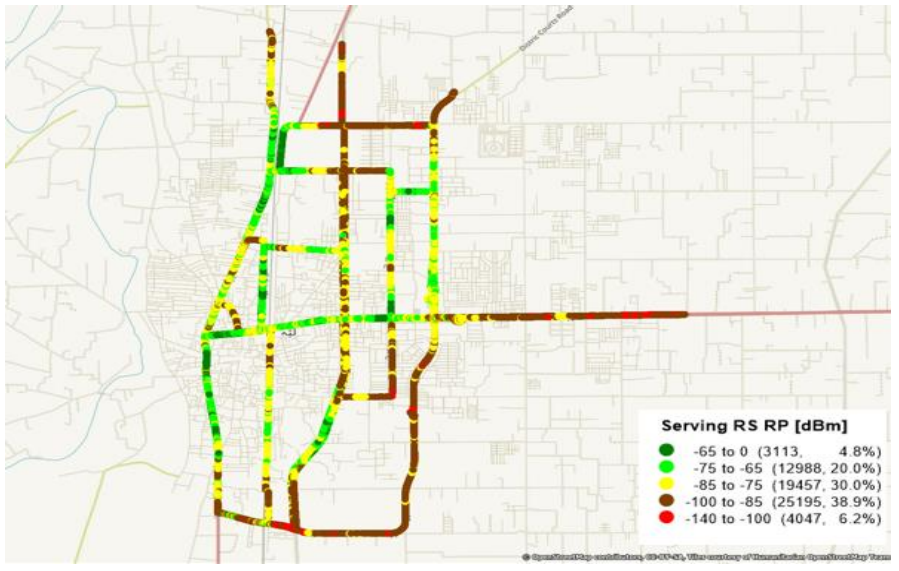


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

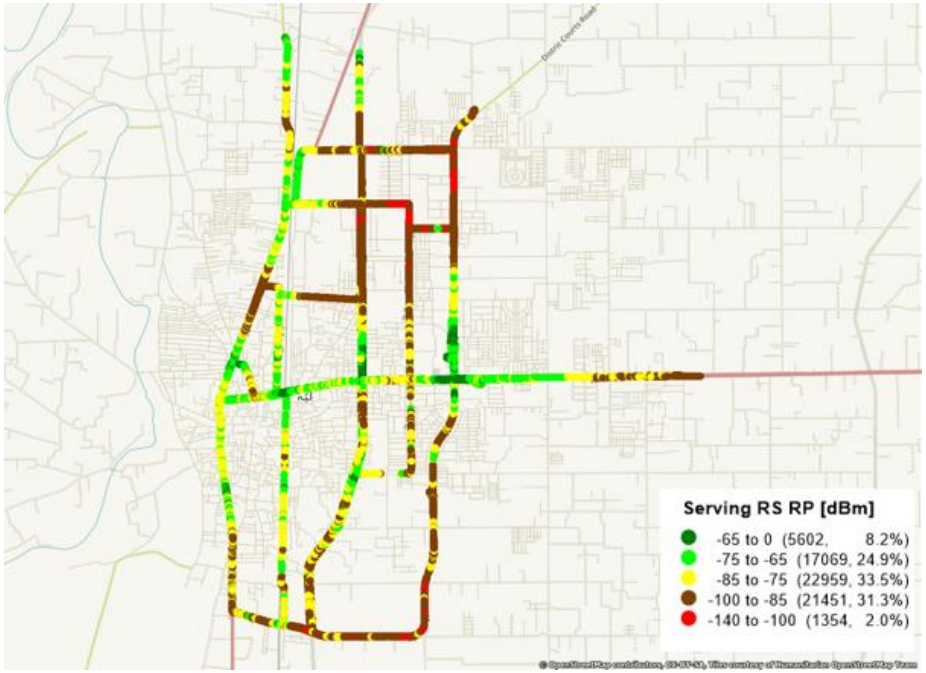
## JAZZ AUTOMODE NETWORK COVERAGE – LAYYAH



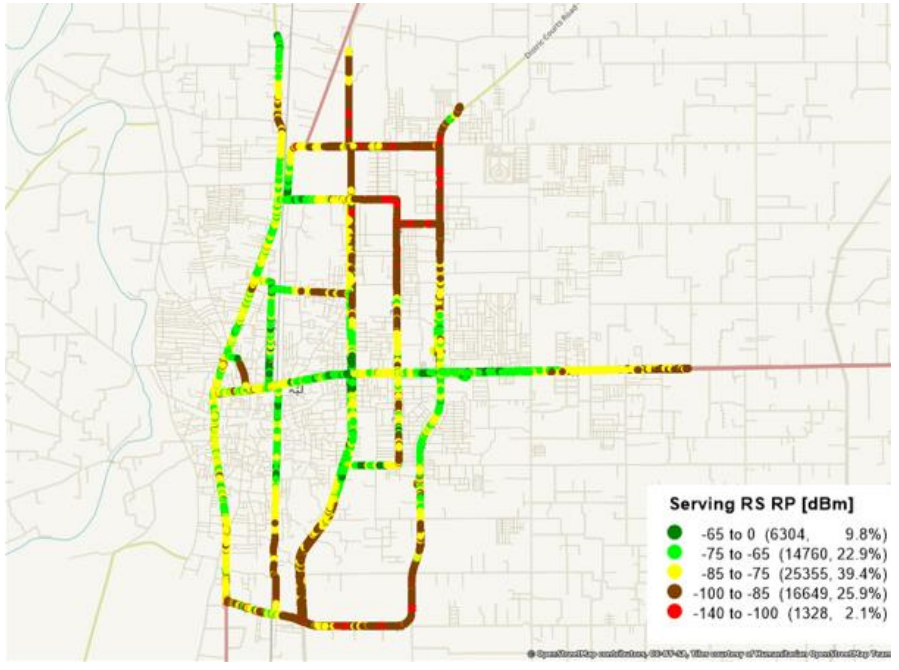

## TELENOR AUTOMODE NETWORK COVERAGE – LAYYAH




## UFONE AUTOMODE NETWORK COVERAGE – LAYYAH

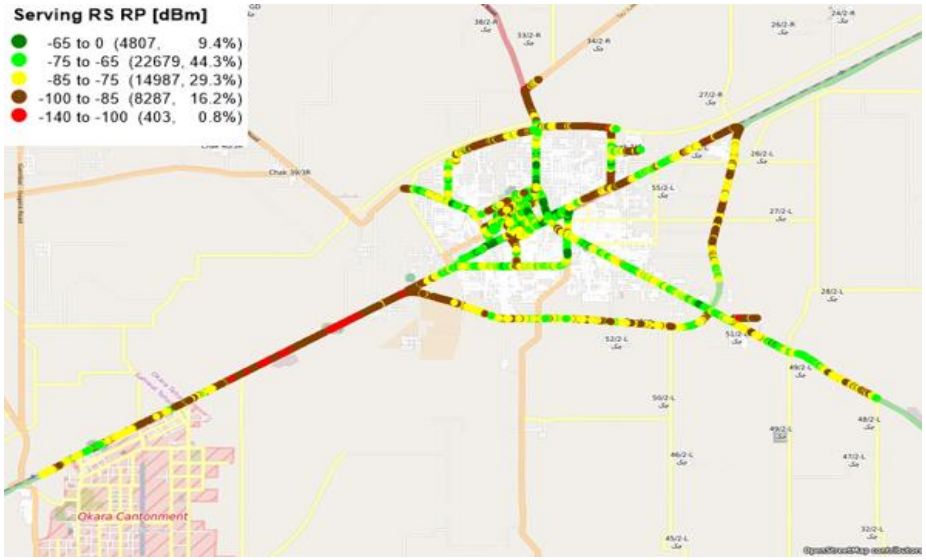



## ZONG AUTOMODE NETWORK COVERAGE – LAYYAH

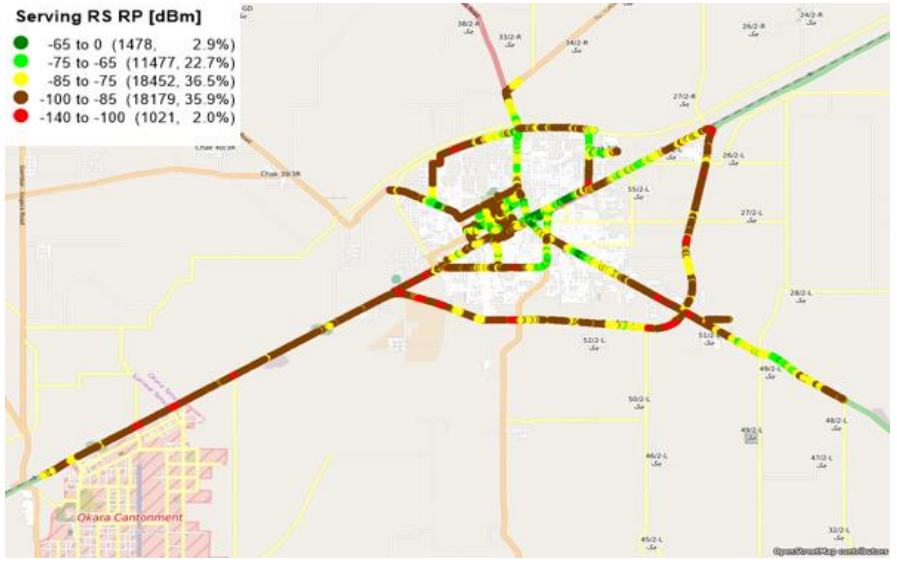


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

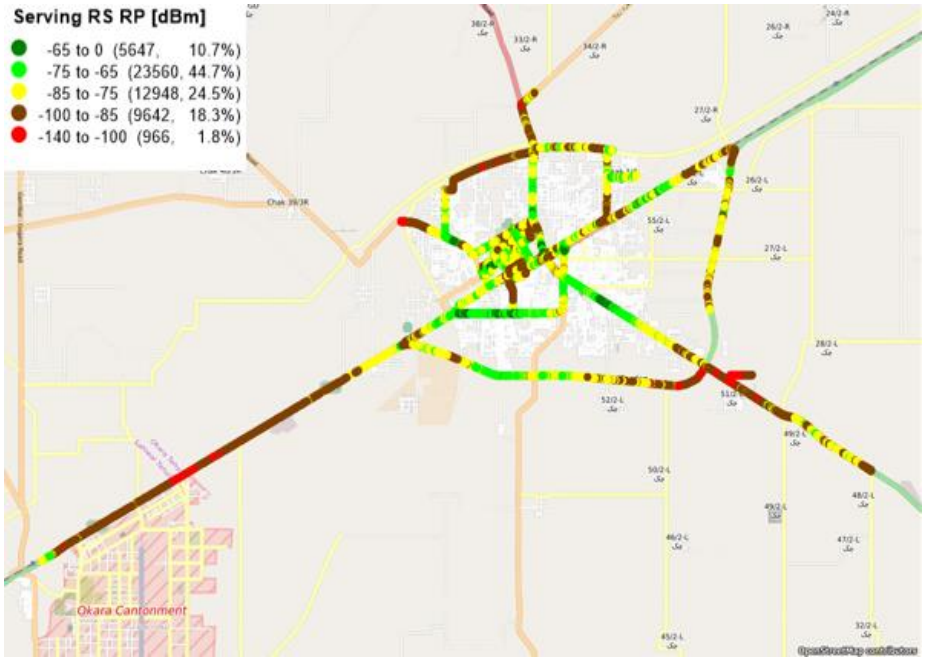
## JAZZ AUTOMODE NETWORK COVERAGE – OKARA



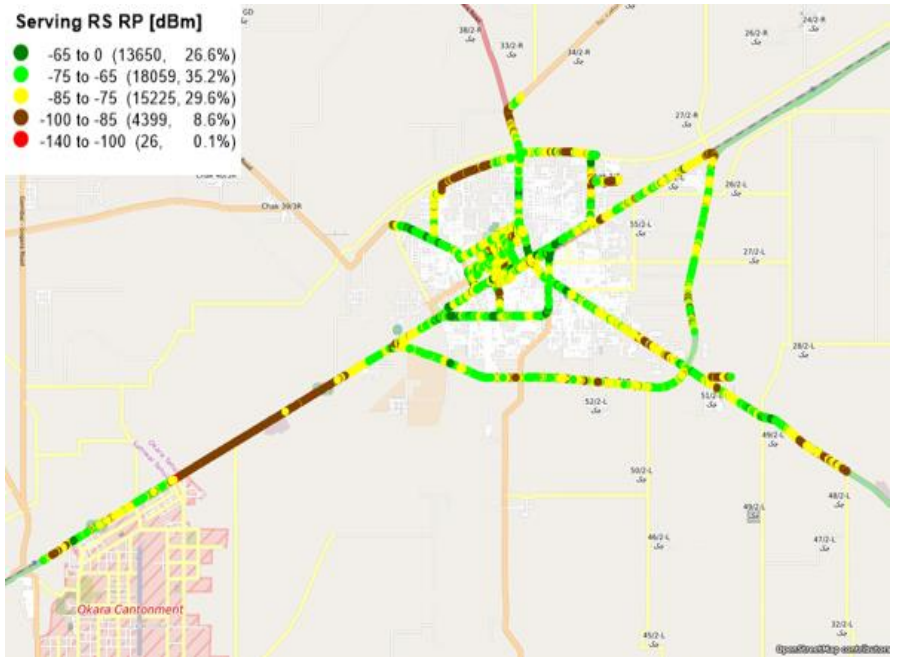

## TELENOR AUTOMODE NETWORK COVERAGE – OKARA




## UFONE AUTOMODE NETWORK COVERAGE – OKARA

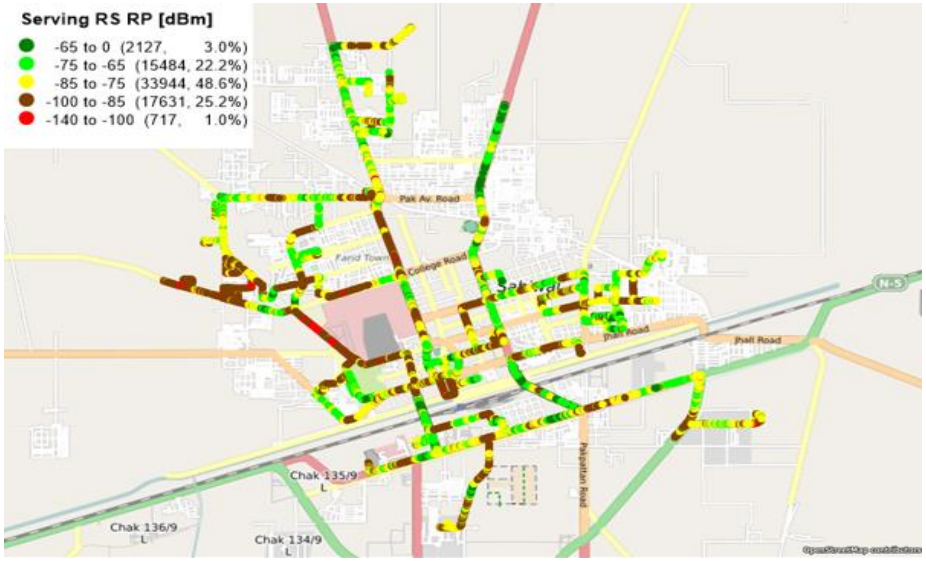



## ZONG AUTOMODE NETWORK COVERAGE – OKARA

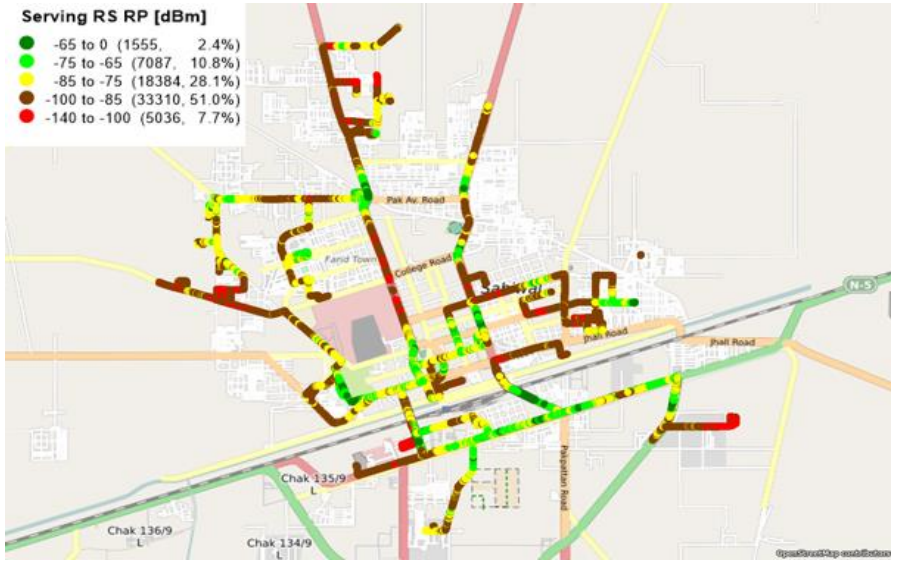


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

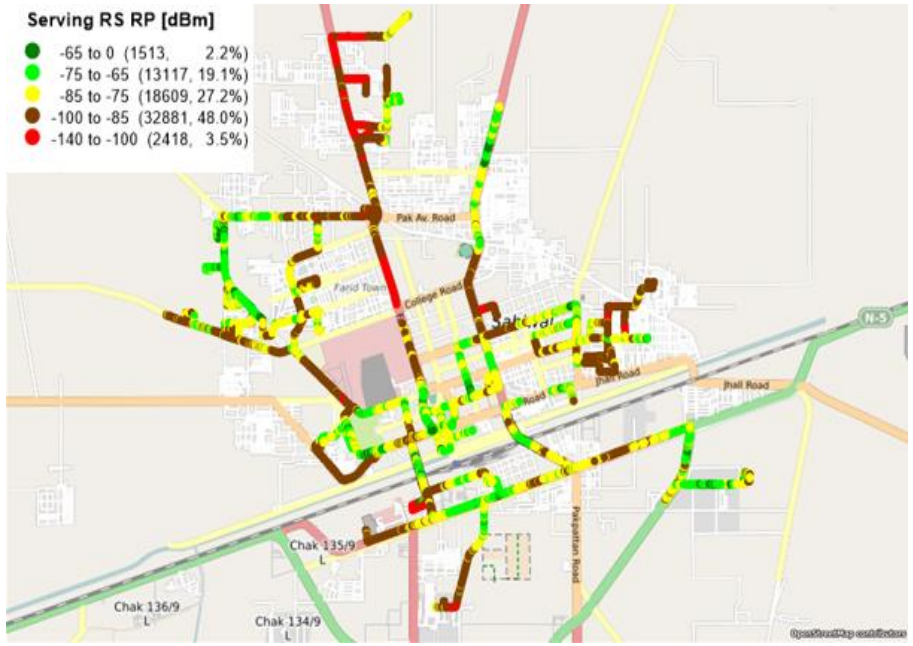
## JAZZ AUTOMODE NETWORK COVERAGE – SAHIWAL



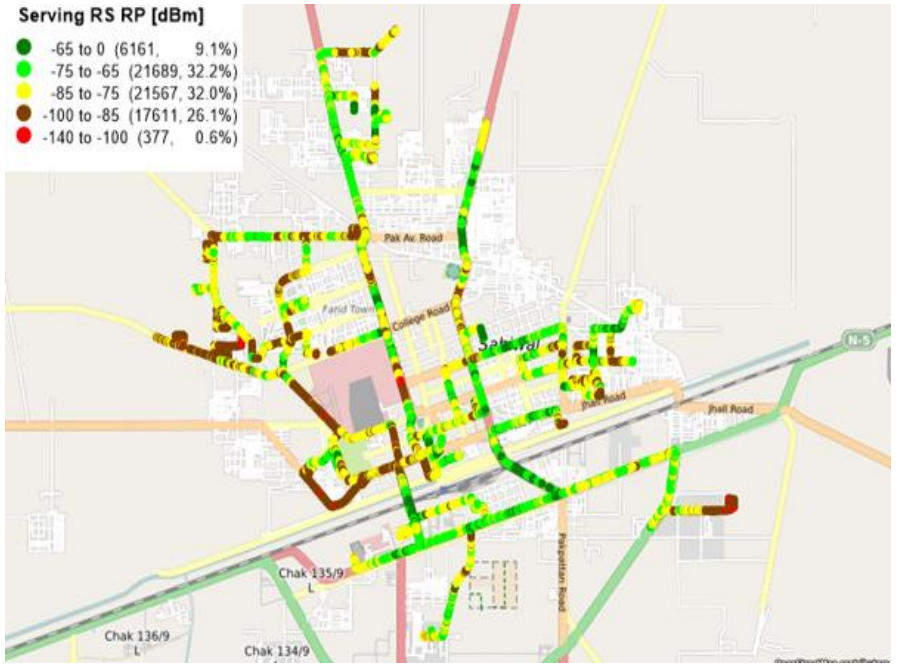

## TELENOR AUTOMODE NETWORK COVERAGE – SAHIWAL




## UFONE AUTOMODE NETWORK COVERAGE – SAHIWAL

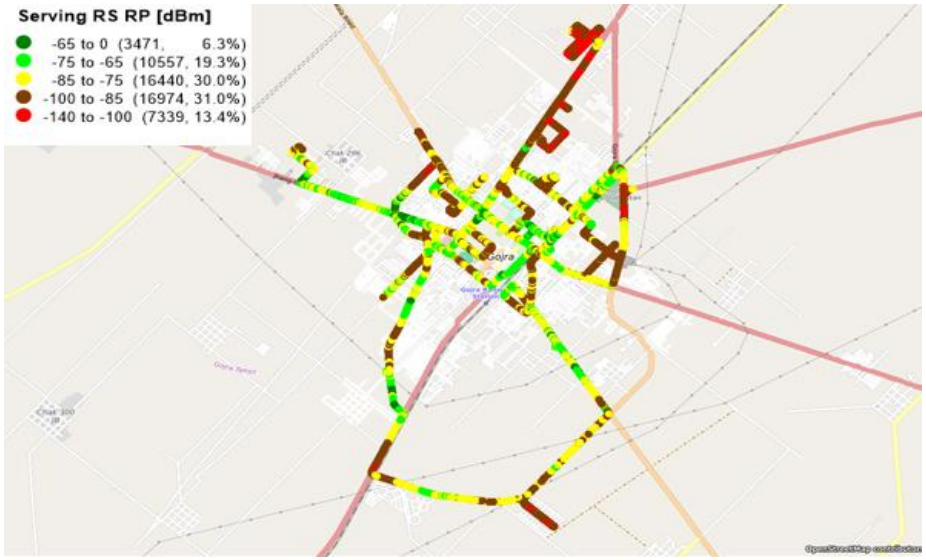



## ZONG AUTOMODE NETWORK COVERAGE – SAHIWAL

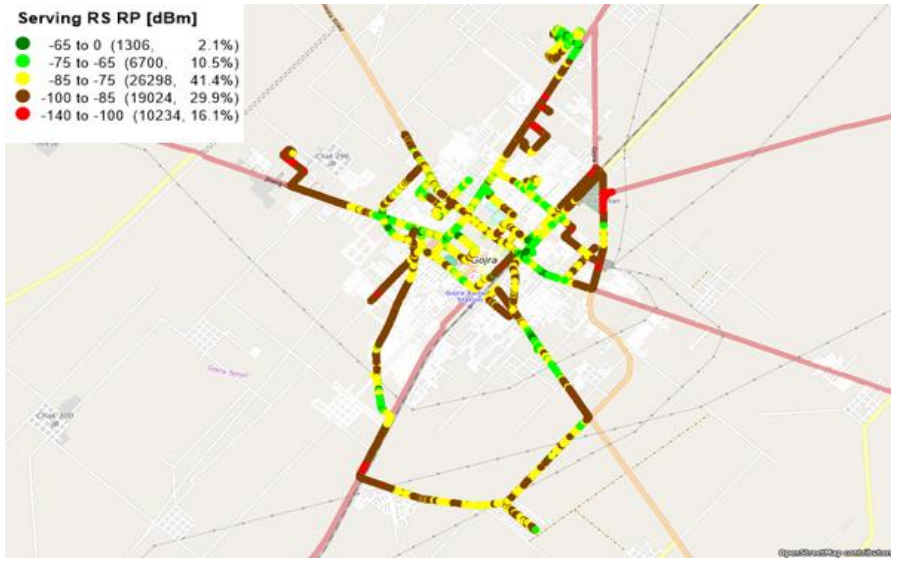


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

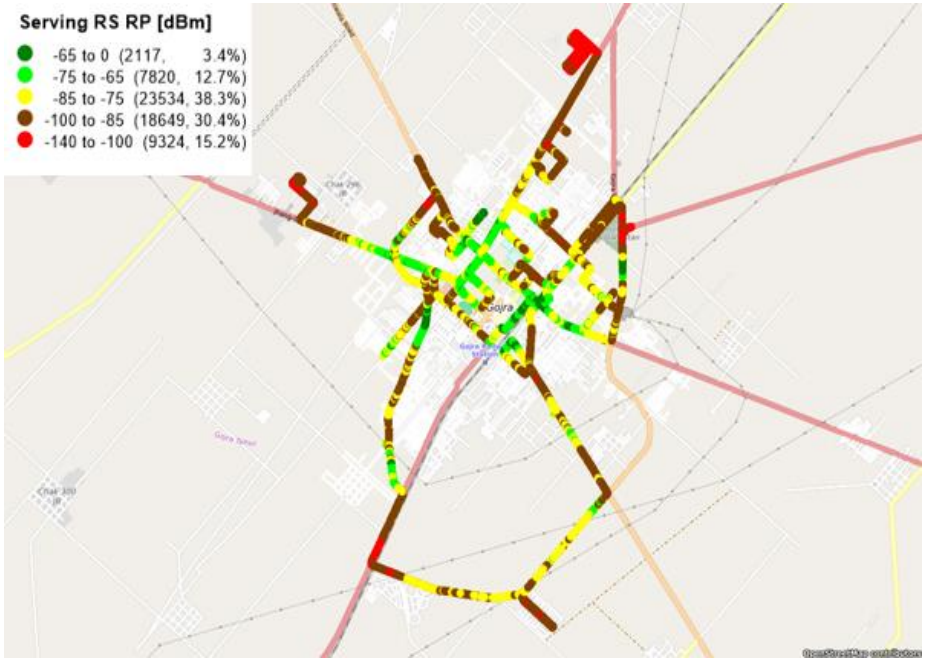
## JAZZ AUTOMODE NETWORK COVERAGE – GOJRA



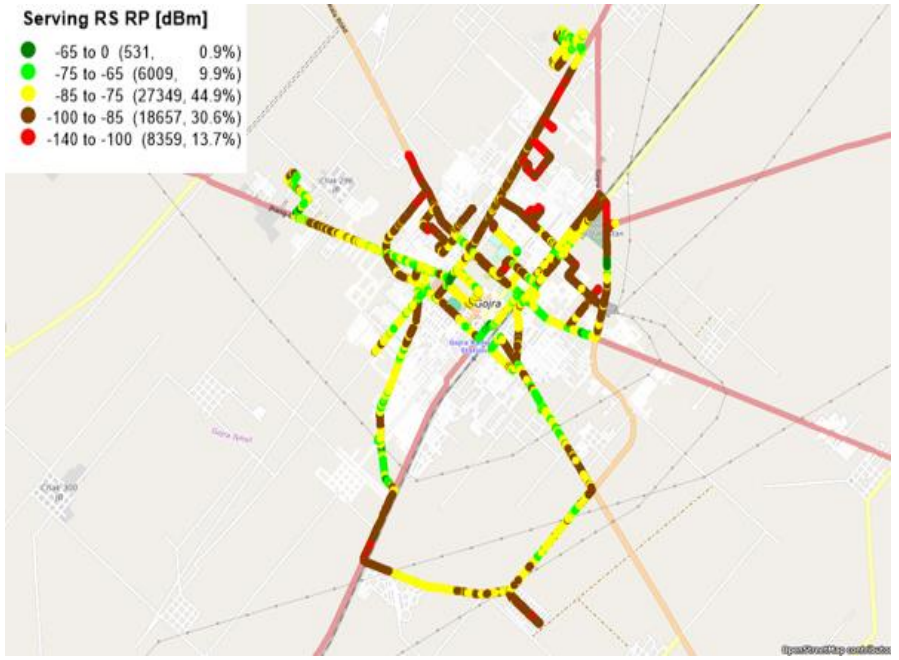

## TELENOR AUTOMODE NETWORK COVERAGE – GOJRA




## UFONE AUTOMODE NETWORK COVERAGE – GOJRA

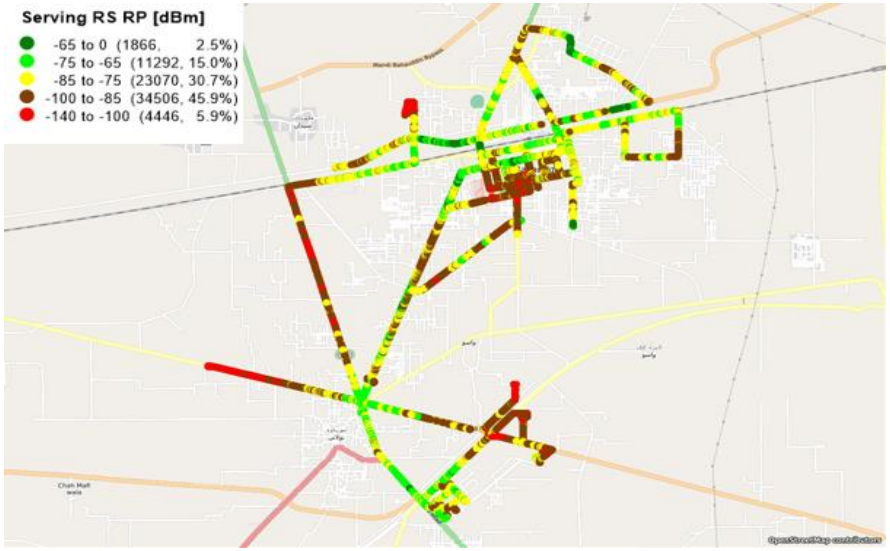



## ZONG AUTOMODE NETWORK COVERAGE – GOJRA

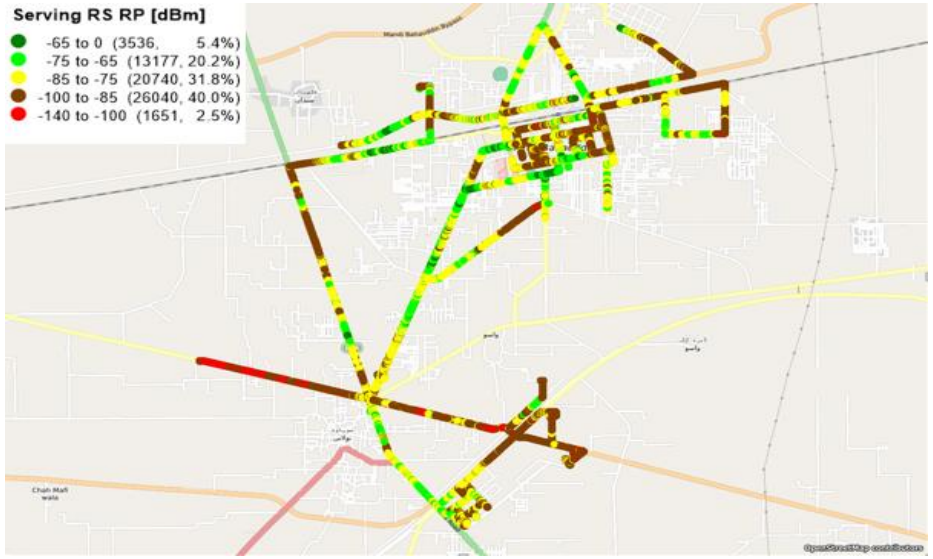


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

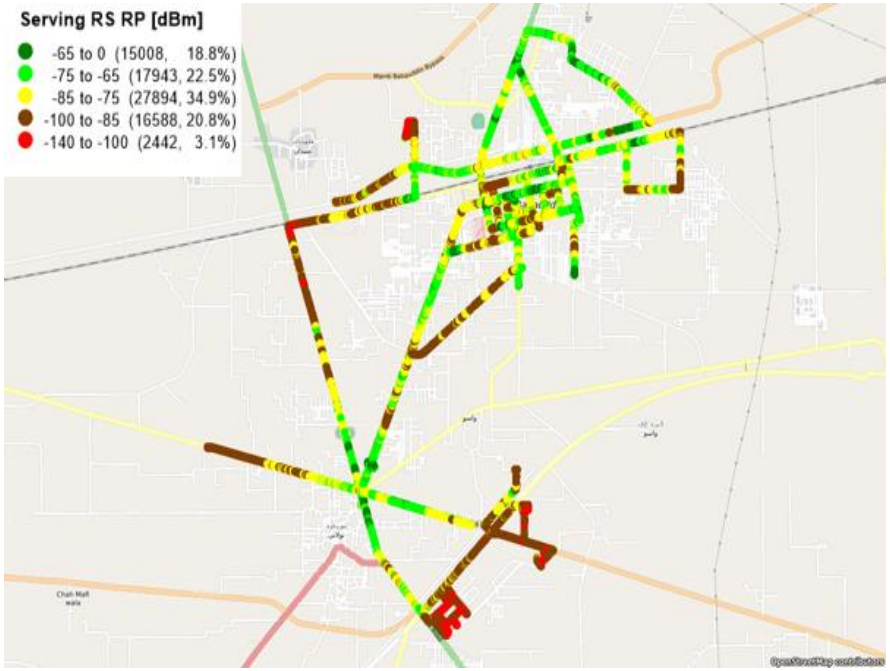
## JAZZ AUTOMODE NETWORK COVERAGE – MANDI BAHAUDDIN



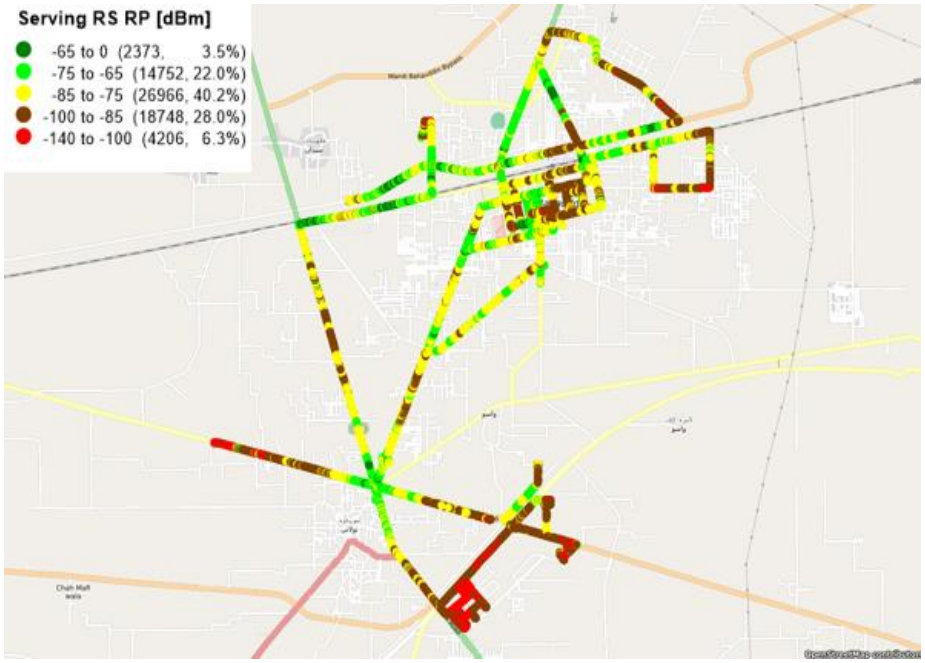

## TELENOR AUTOMODE NETWORK COVERAGE – MANDI BAHAUDDIN



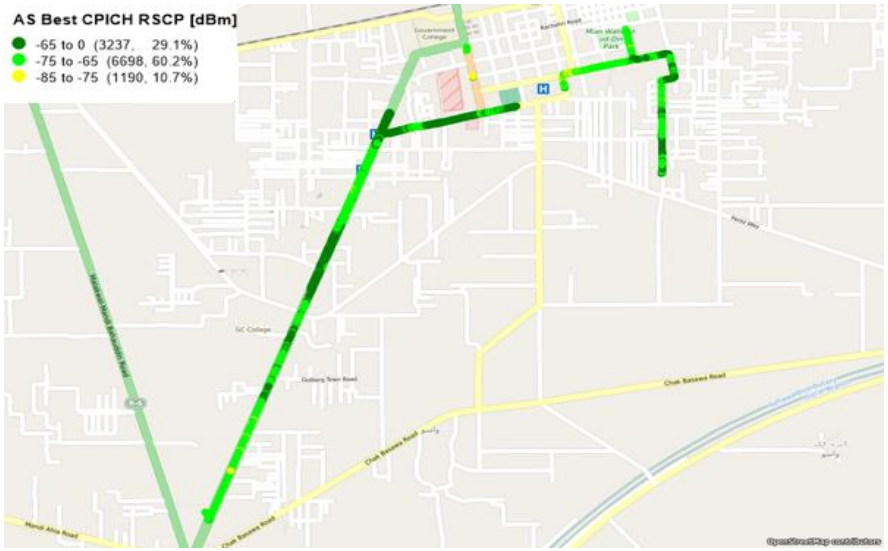
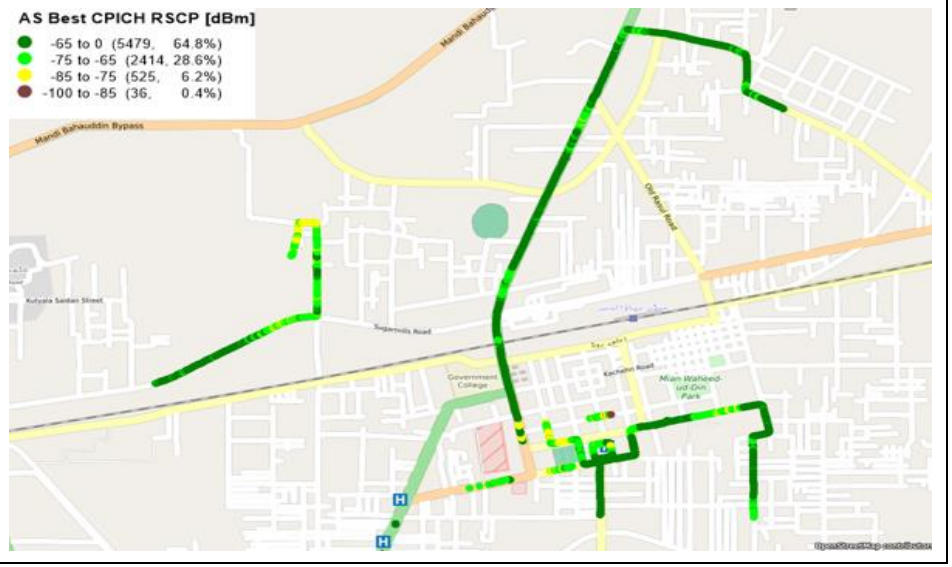

## UFONE AUTOMODE NETWORK COVERAGE – MANDI BAHAUDDIN




## ZONG AUTOMODE NETWORK COVERAGE – MANDI BAHAUDDIN

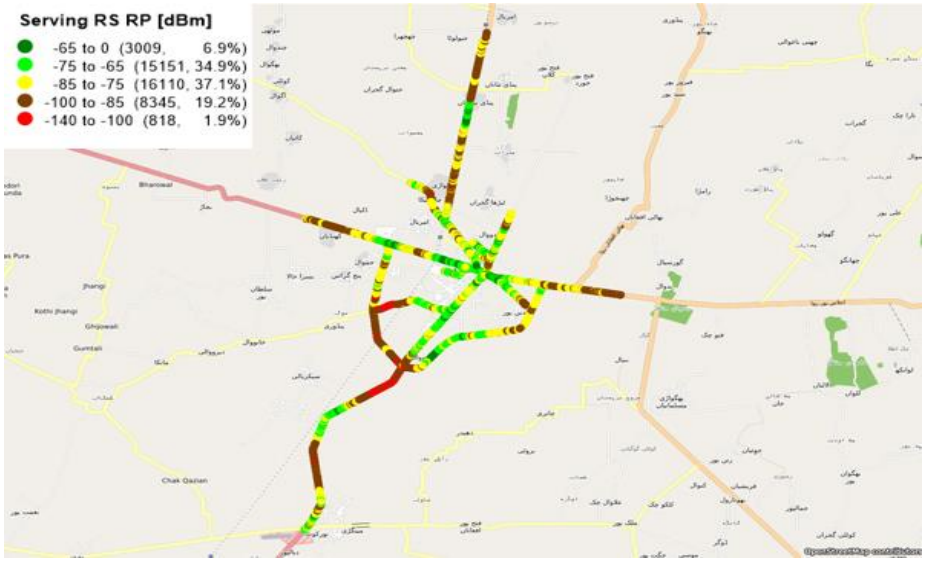


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

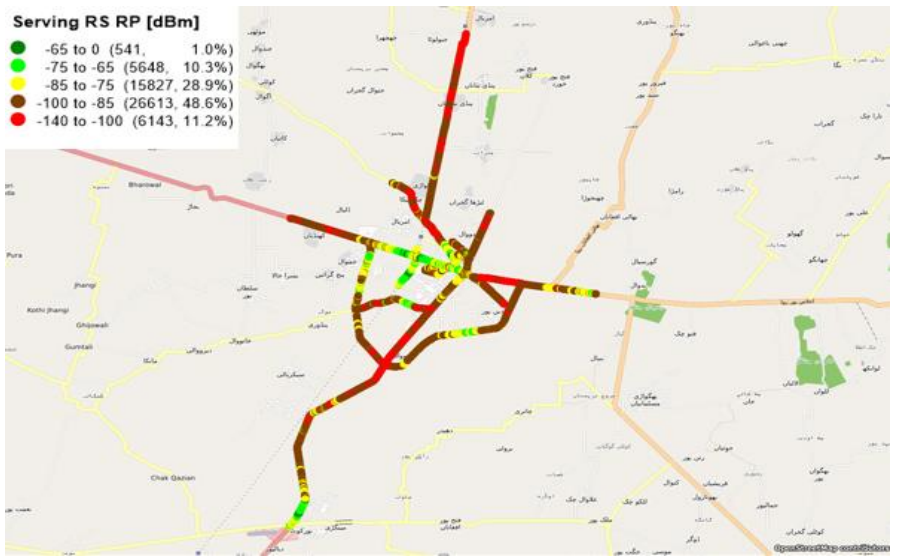
| ZONG AUTOMODE 3G NETWORK COVERAGE – MANDI BAHAUDDIN | TELENOR AUTOMODE 3G NETWORK COVERAGE – MANDI BAHAUDDIN |
|---|---|
|  |  |

# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

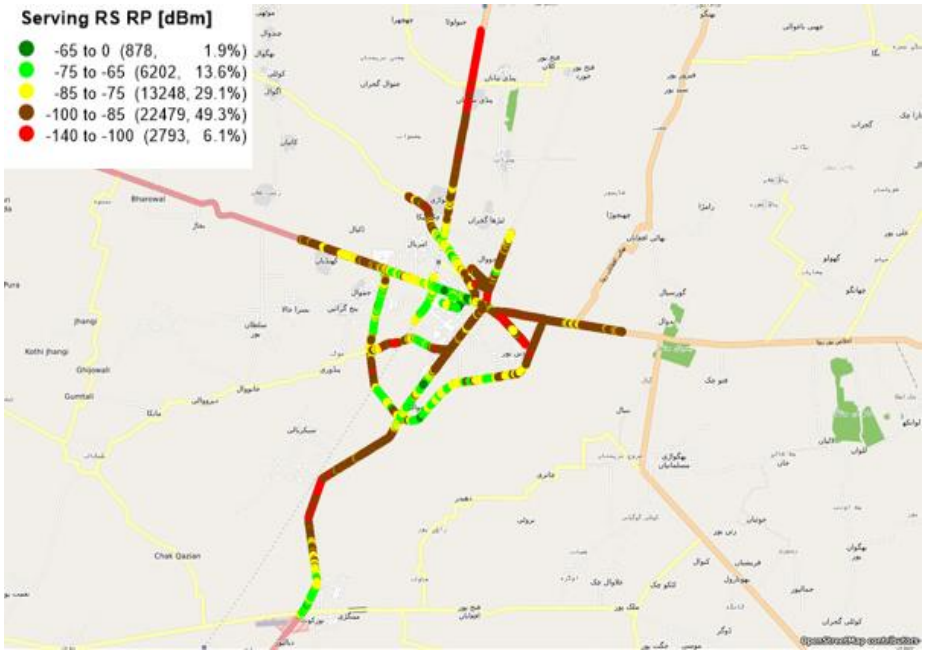
## JAZZ AUTOMODE NETWORK COVERAGE – SHAKARGARH



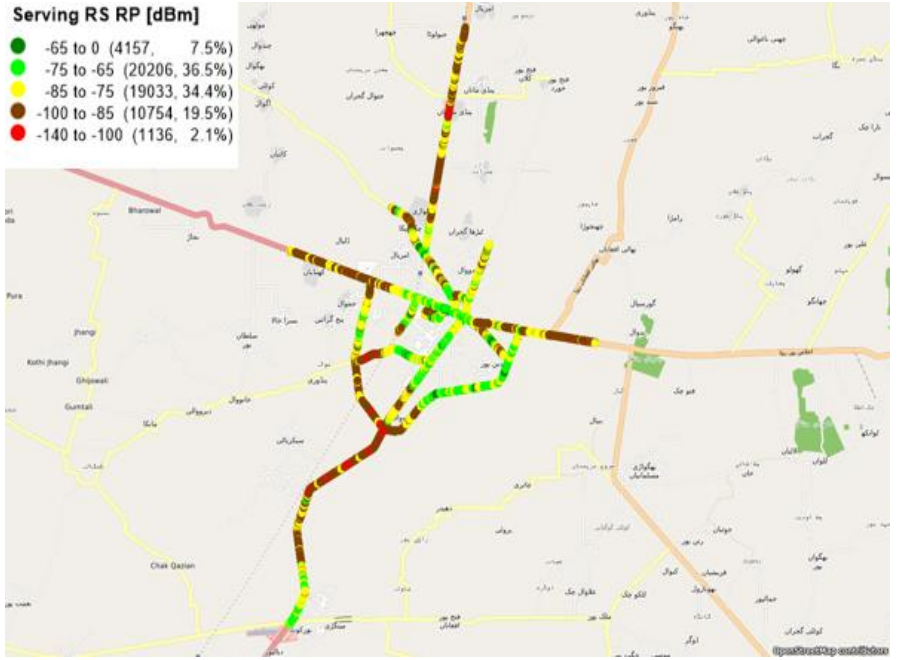

## TELENOR AUTOMODE NETWORK COVERAGE – SHAKARGARH




## UFONE AUTOMODE NETWORK COVERAGE – SHAKARGARH

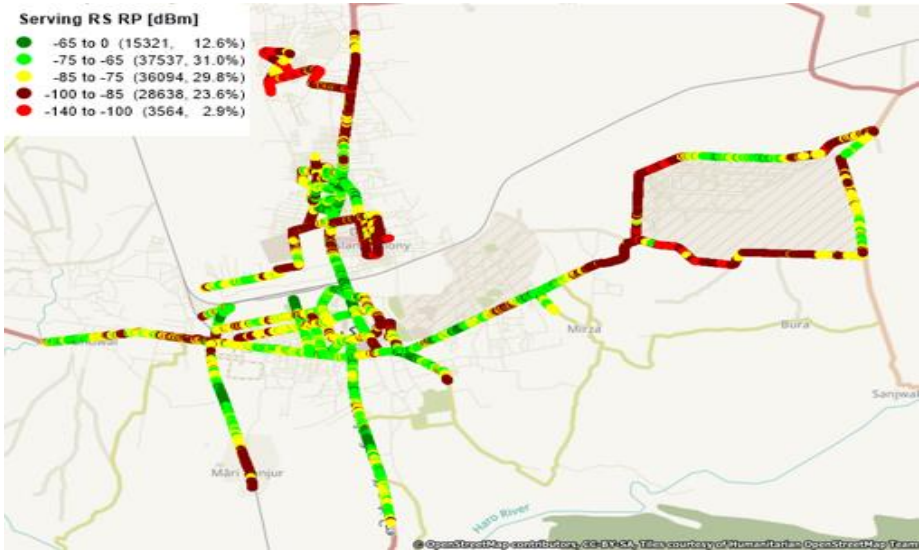



## ZONG AUTOMODE NETWORK COVERAGE – SHAKARGARH

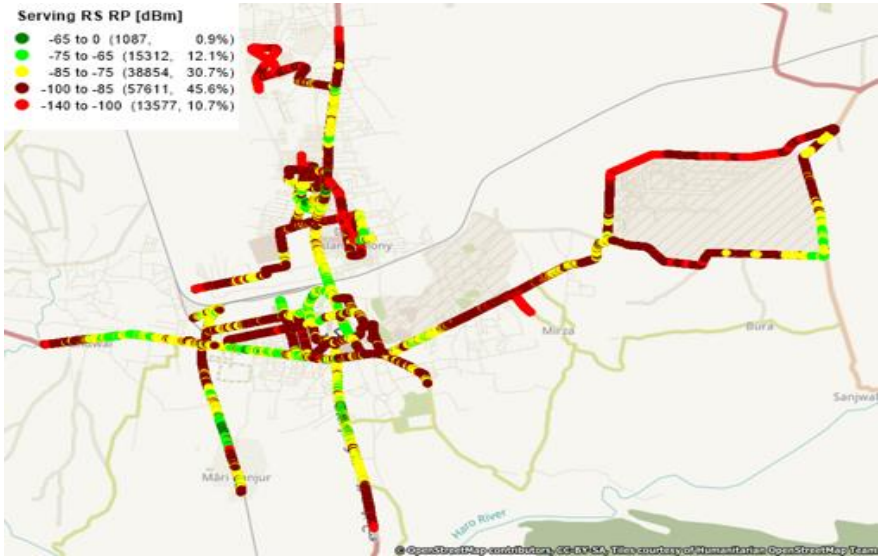


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

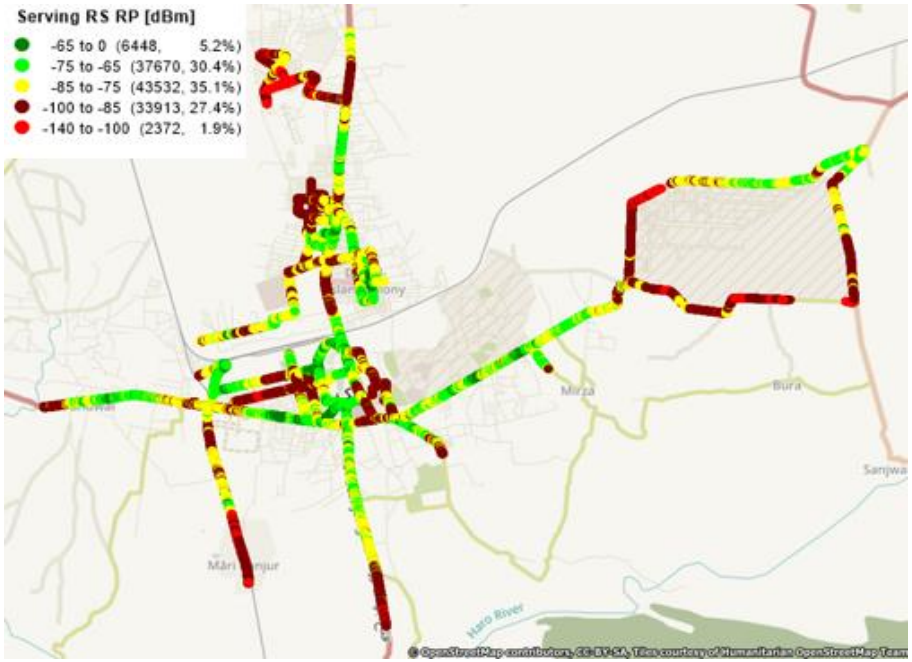
## JAZZ AUTOMODE NETWORK COVERAGE – ATTOCK



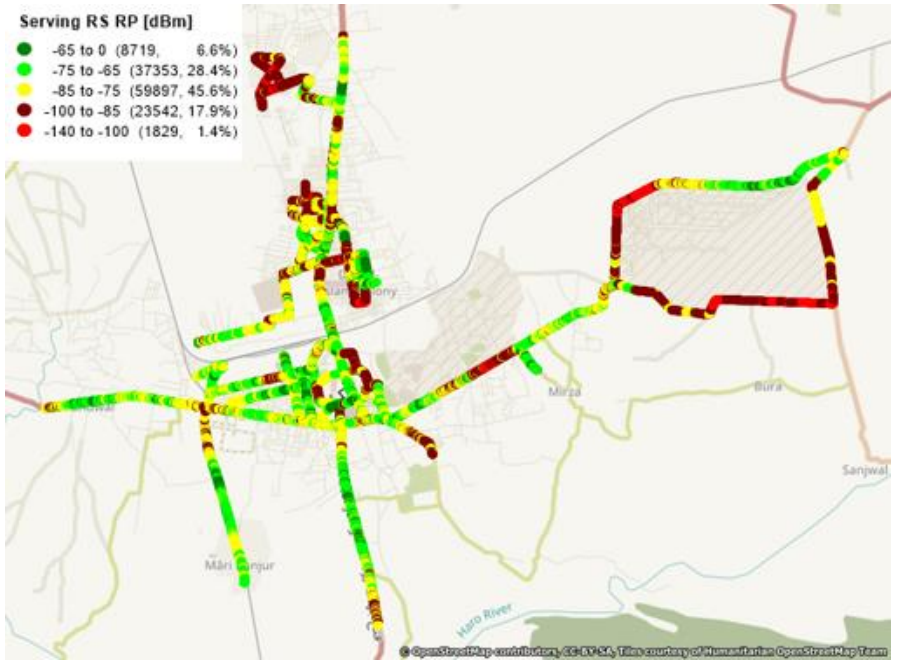

## TELENOR AUTOMODE NETWORK COVERAGE – ATTOCK




## UFONE AUTOMODE NETWORK COVERAGE – ATTOCK

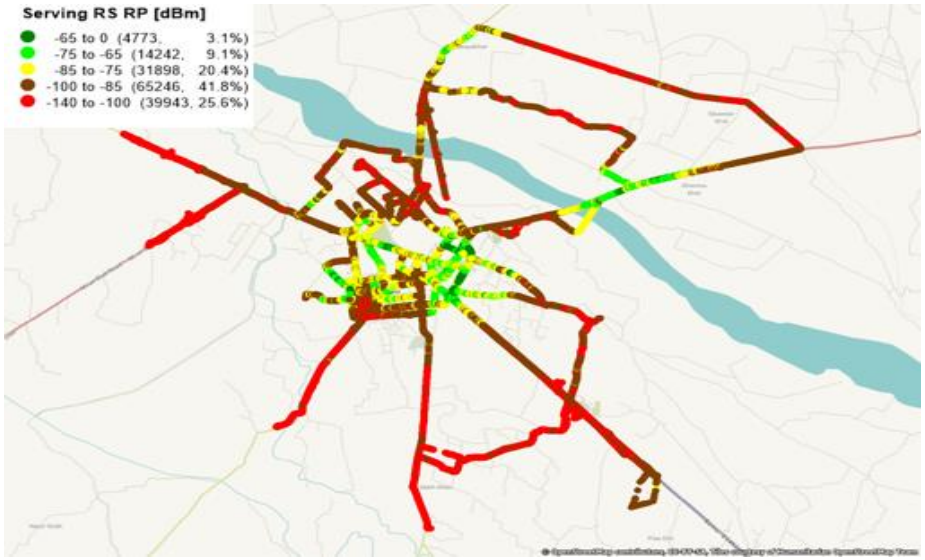



## ZONG AUTOMODE NETWORK COVERAGE – ATTOCK

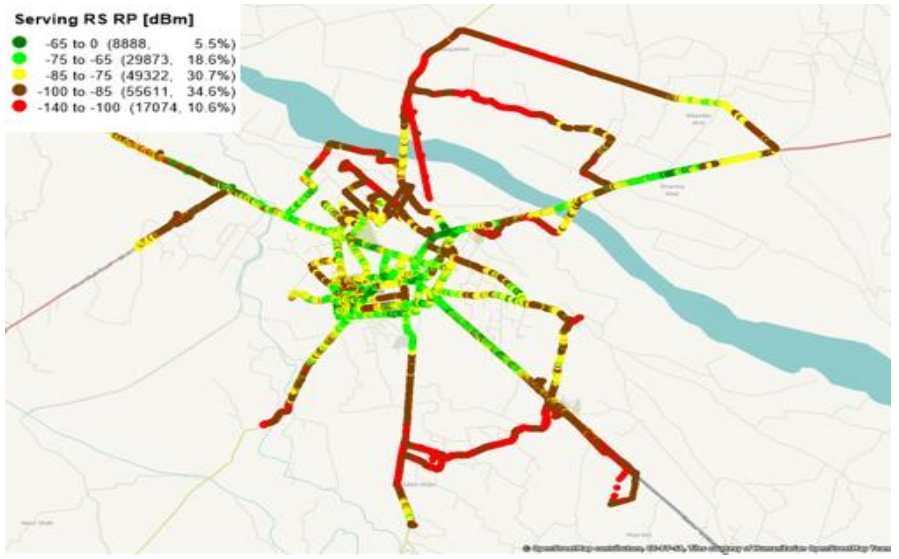


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

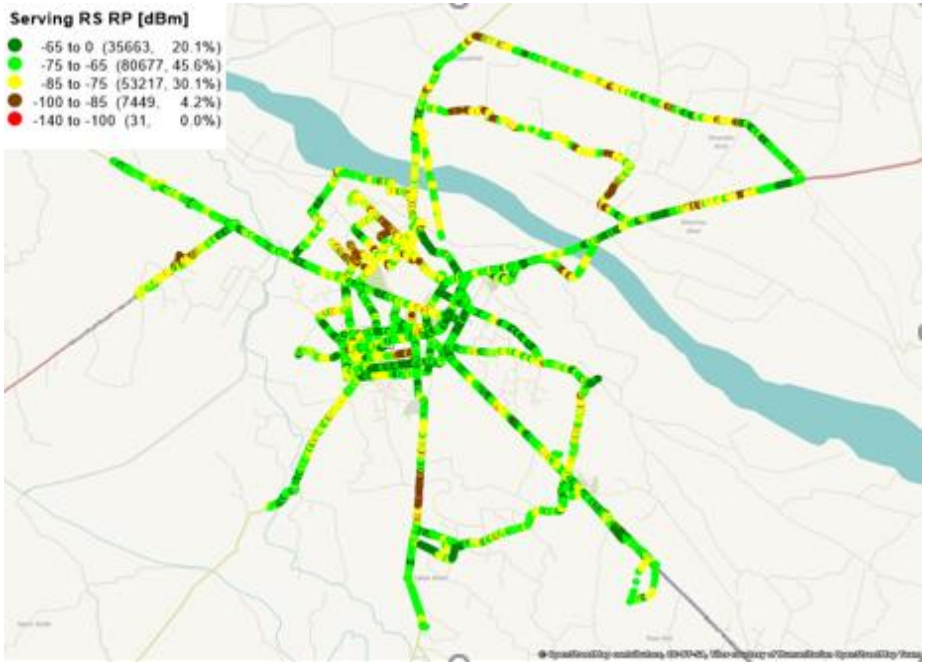
## JAZZ AUTOMODE NETWORK COVERAGE – BANNU



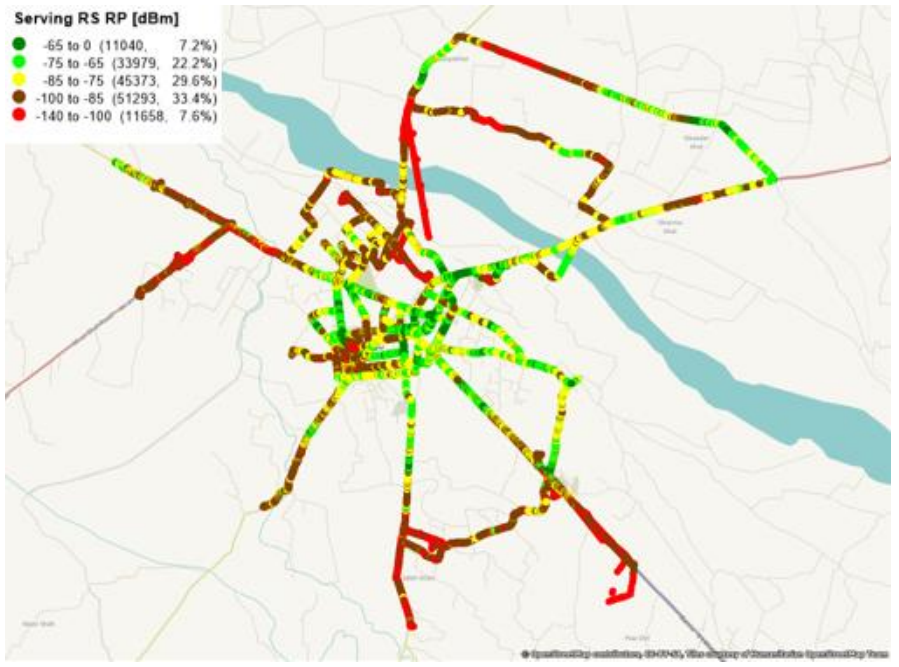

## TELENOR AUTOMODE NETWORK COVERAGE – BANNU




## UFONE AUTOMODE NETWORK COVERAGE – BANNU

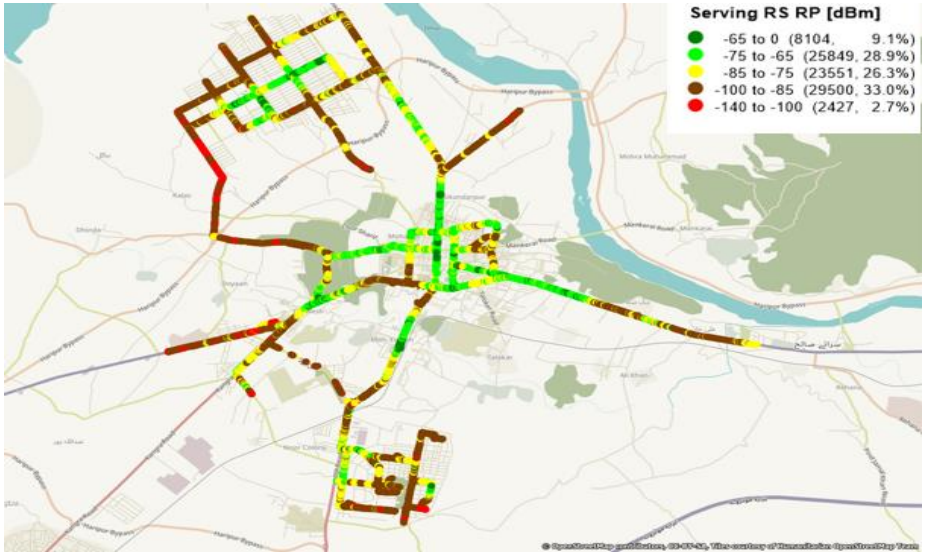



## ZONG AUTOMODE NETWORK COVERAGE – BANNU

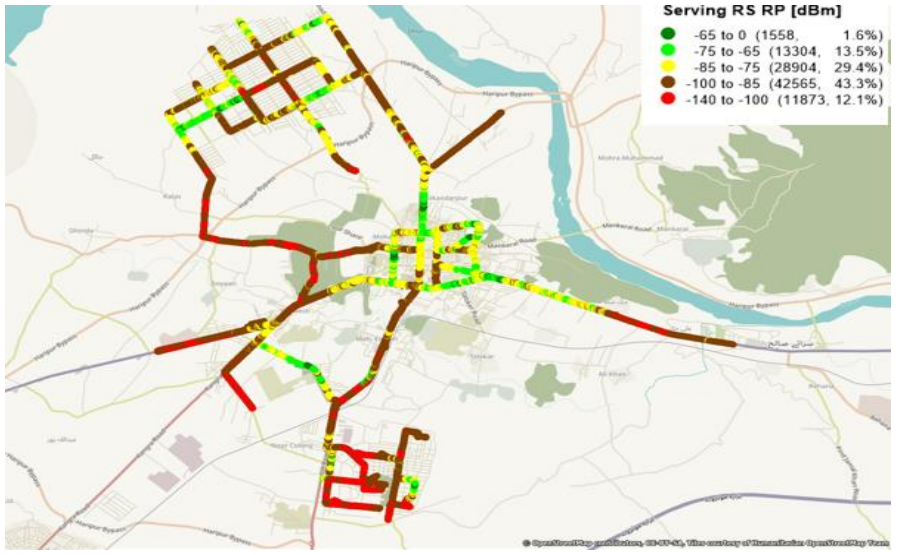


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

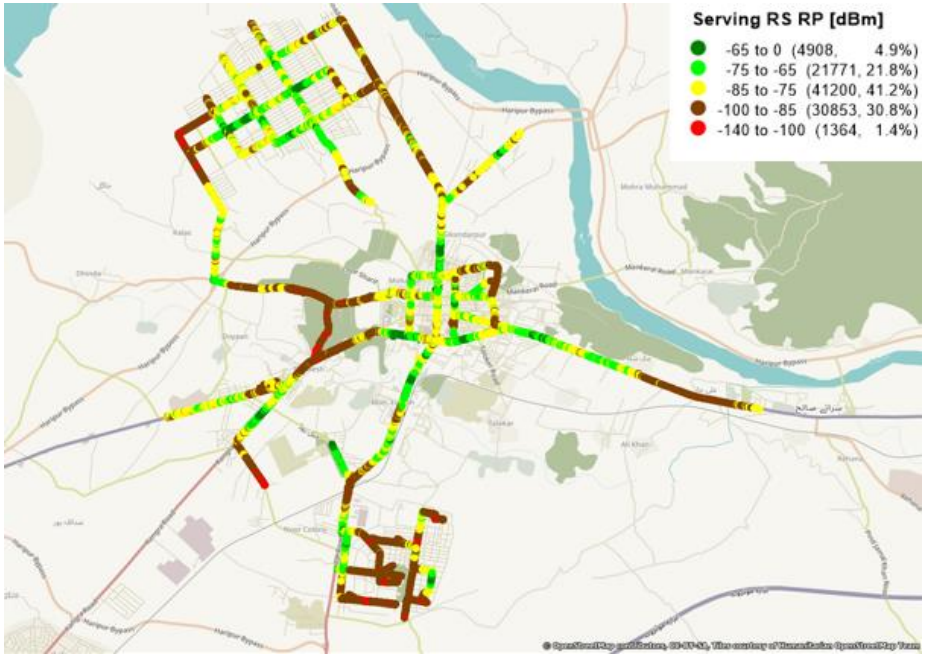
## JAZZ AUTOMODE NETWORK COVERAGE – HARIPUR



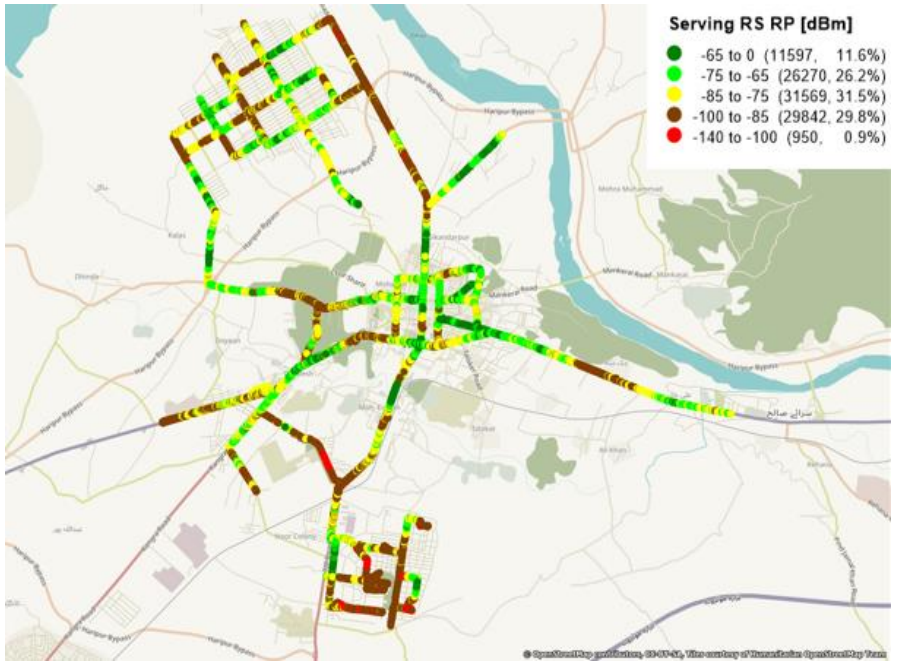

## TELENOR AUTOMODE NETWORK COVERAGE – HARIPUR




## UFONE AUTOMODE NETWORK COVERAGE – HARIPUR



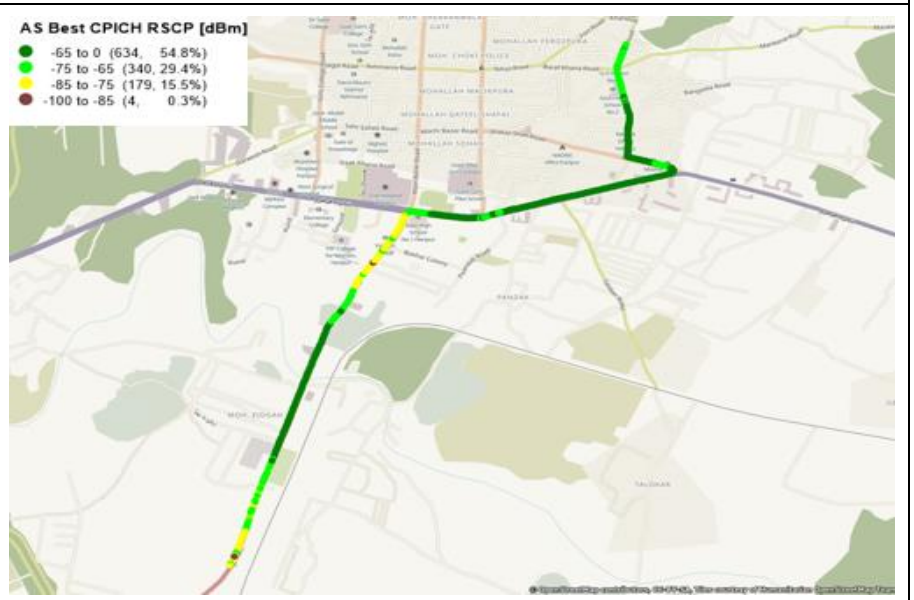

## ZONG AUTOMODE NETWORK COVERAGE – HARIPUR



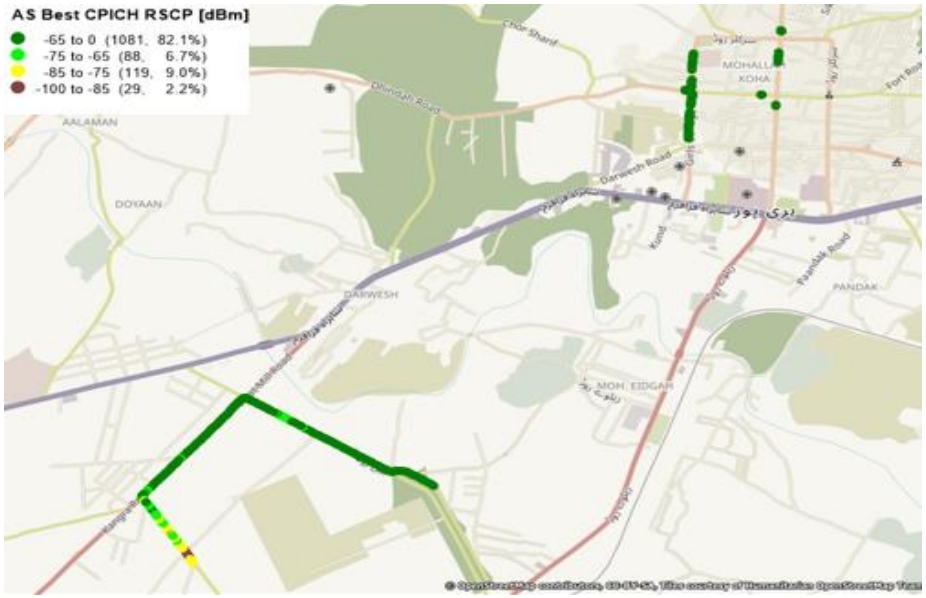
# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

## JAZZ AUTOMODE 3G NETWORK COVERAGE – HARIPUR

## TELENOR AUTOMODE 3G NETWORK COVERAGE – HARIPUR

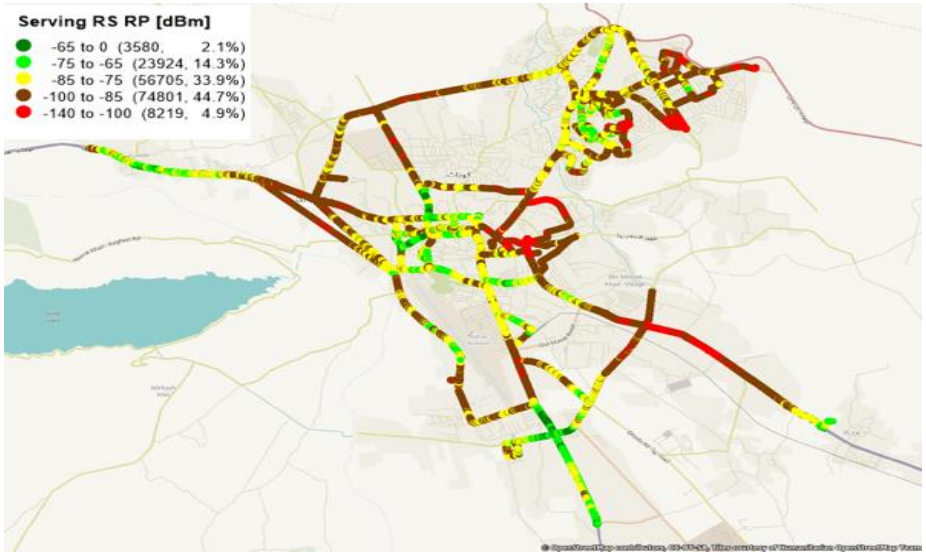



## JAZZ AUTOMODE 3G NETWORK COVERAGE – HARIPUR

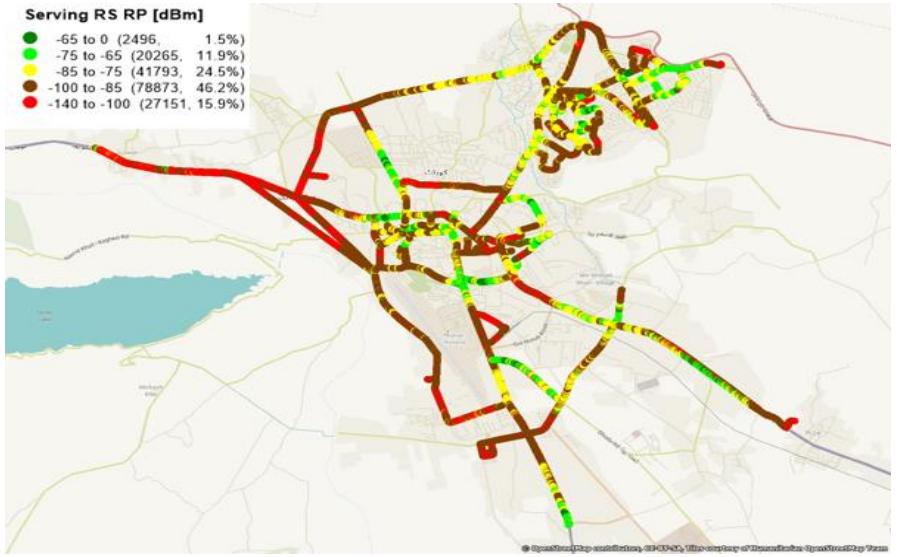


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

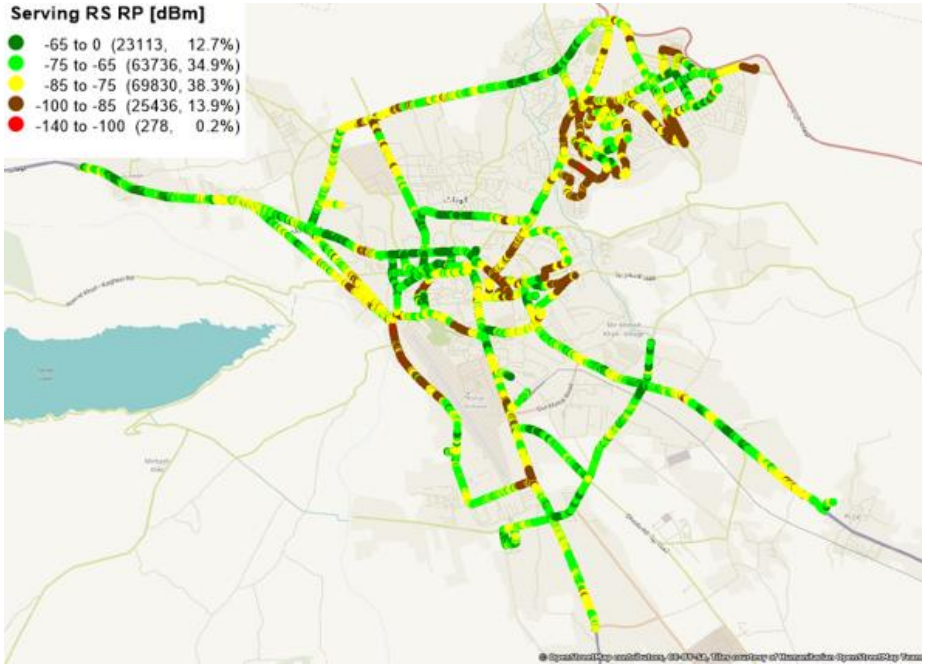
## JAZZ AUTOMODE NETWORK COVERAGE – KOHAT



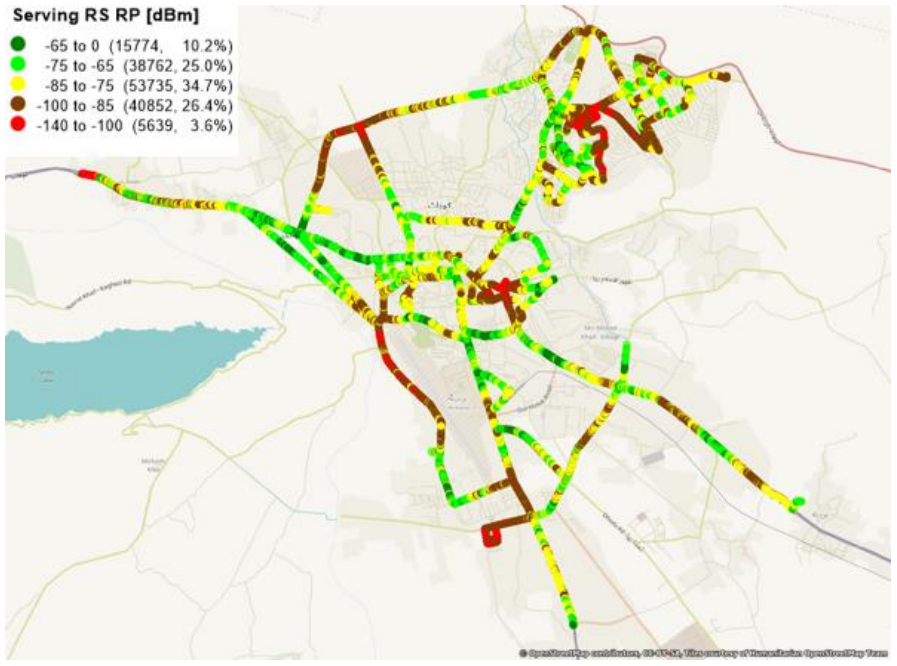

## TELENOR AUTOMODE NETWORK COVERAGE – KOHAT




## UFONE AUTOMODE NETWORK COVERAGE – KOHAT

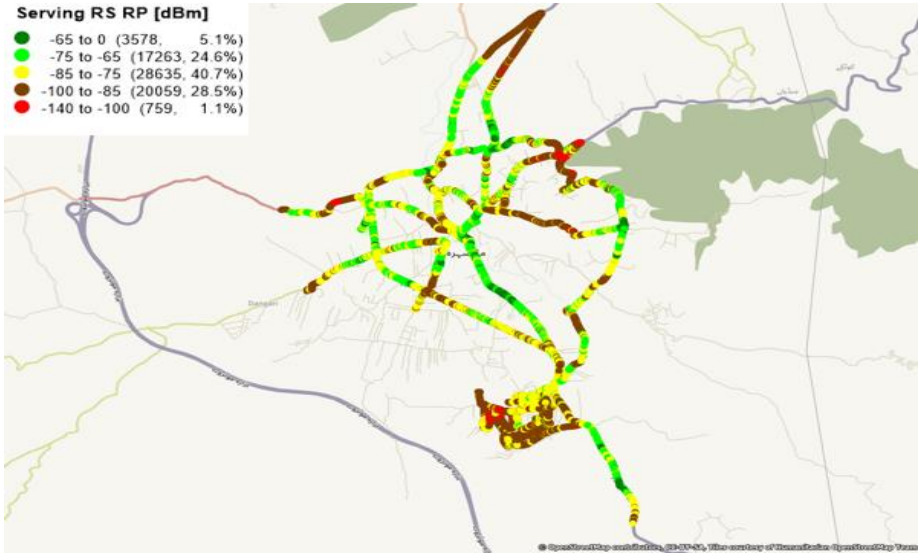



## ZONG AUTOMODE NETWORK COVERAGE – KOHAT

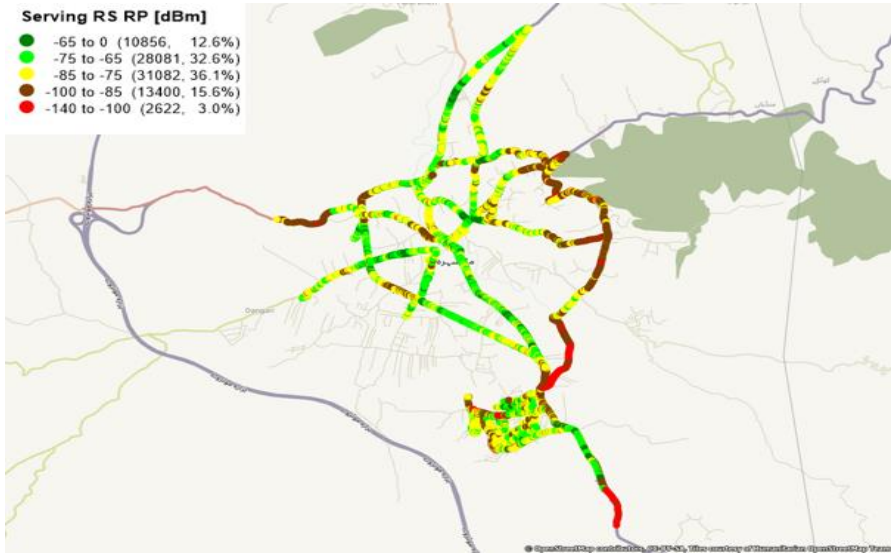


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

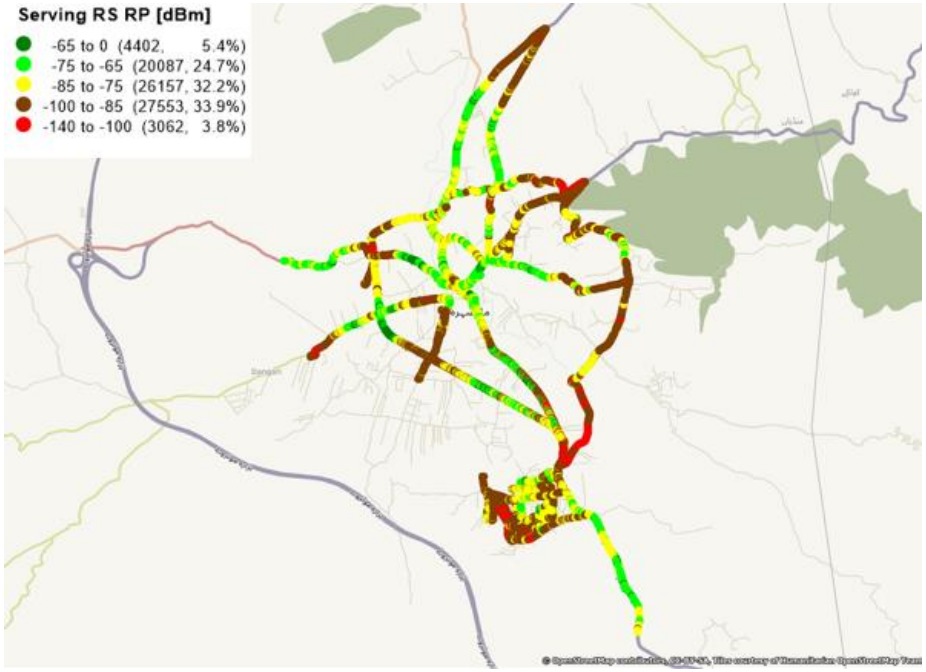
## JAZZ AUTOMODE NETWORK COVERAGE – MANSEHRA



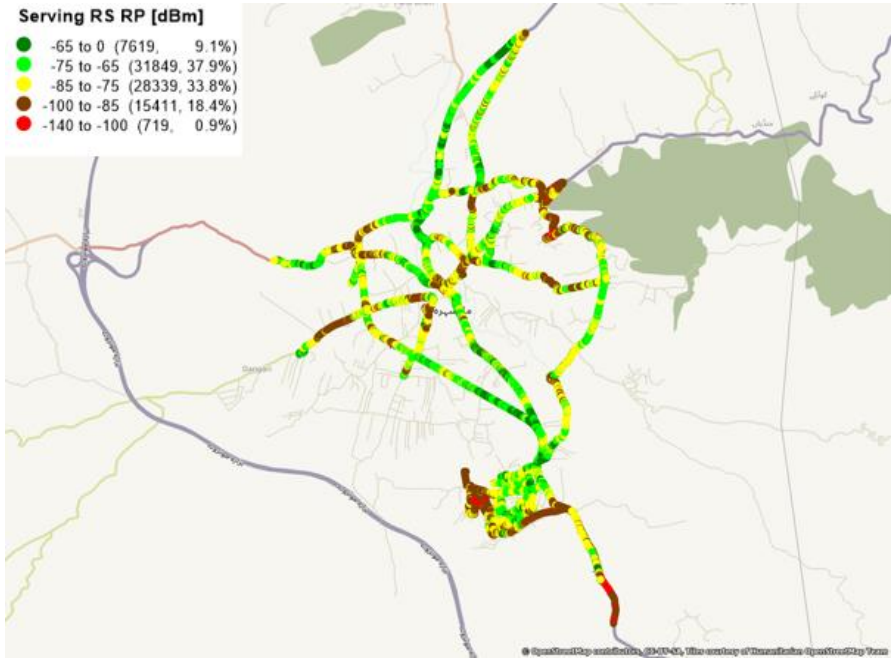

## TELENOR AUTOMODE NETWORK COVERAGE – MANSEHRA




## UFONE AUTOMODE NETWORK COVERAGE – MANSEHRA

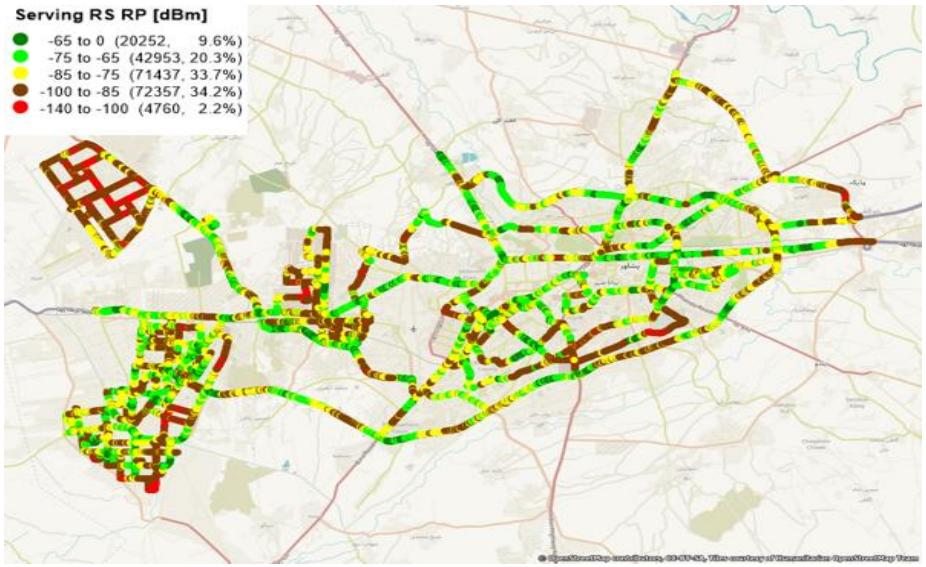



## ZONG AUTOMODE NETWORK COVERAGE – MANSEHRA

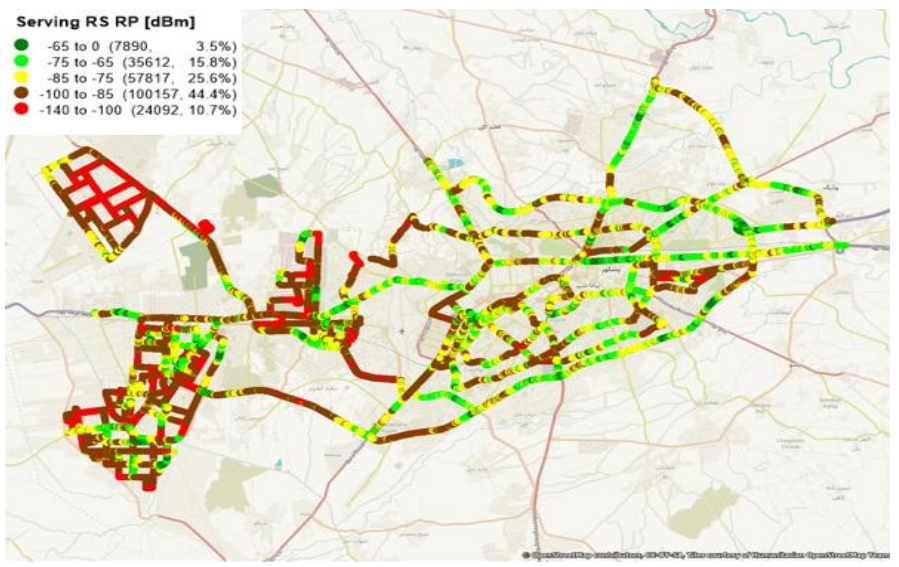


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

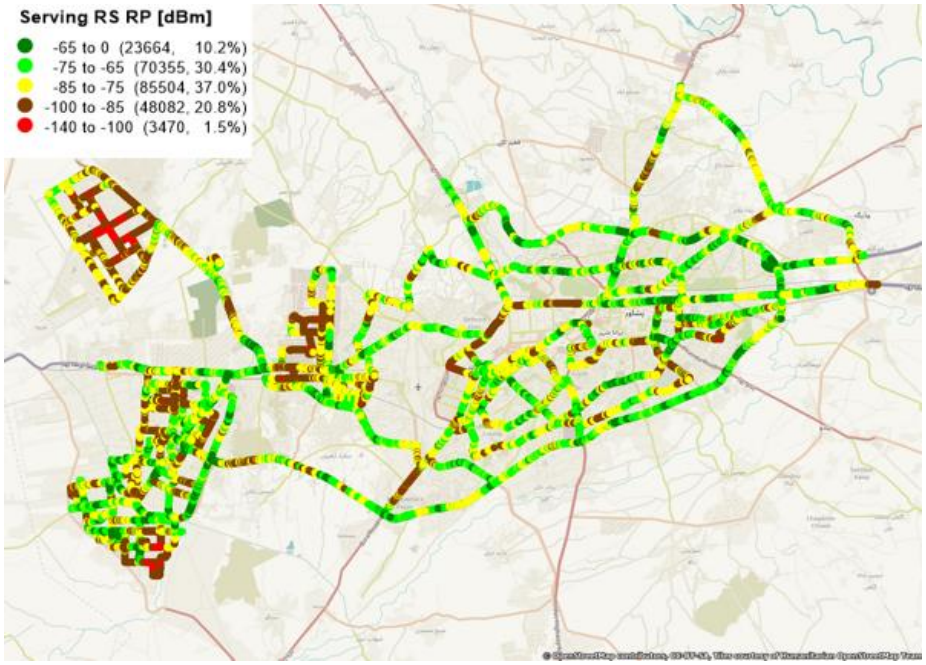
## JAZZ AUTOMODE NETWORK COVERAGE – PESHAWAR



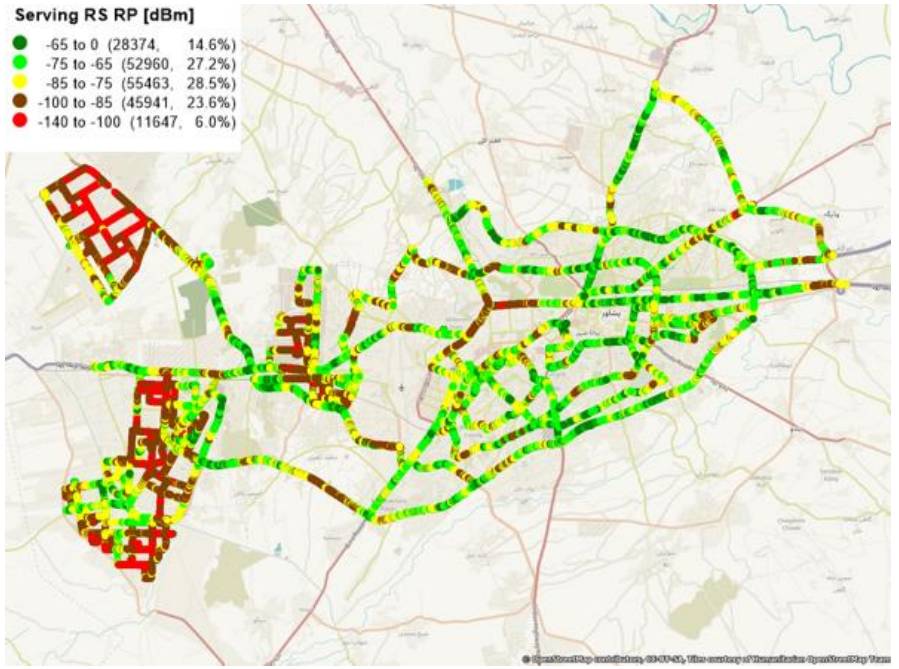

## TELENOR AUTOMODE NETWORK COVERAGE – PESHAWAR




## UFONE AUTOMODE NETWORK COVERAGE – PESHAWAR

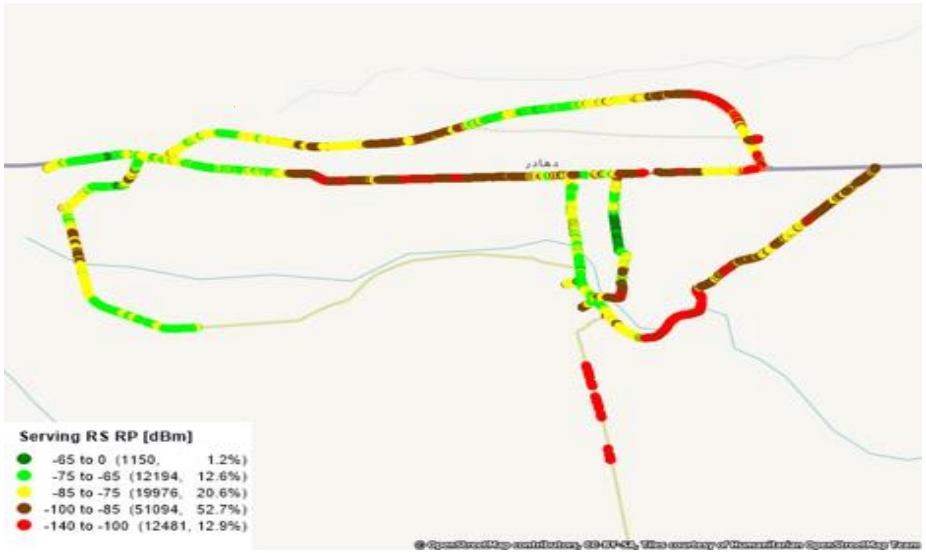



## ZONG AUTOMODE NETWORK COVERAGE – PESHAWAR

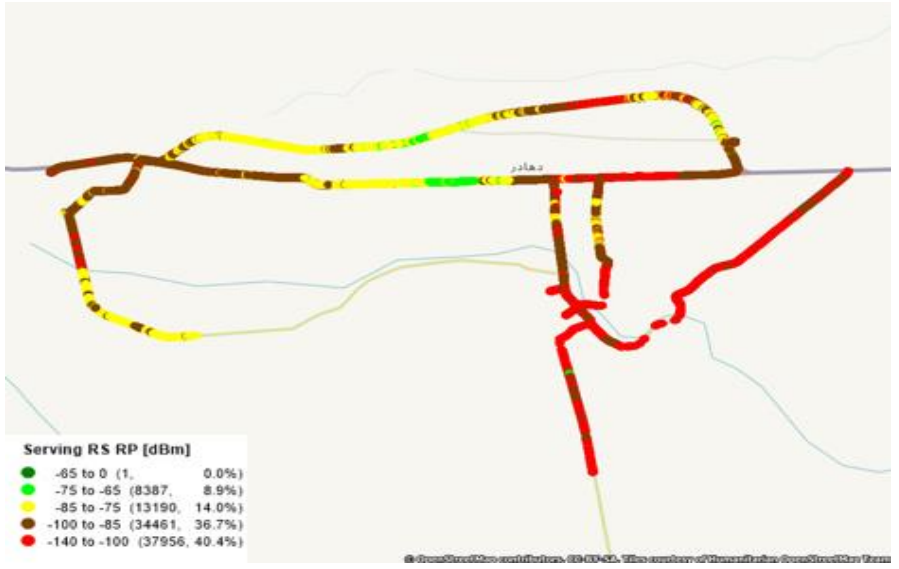


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

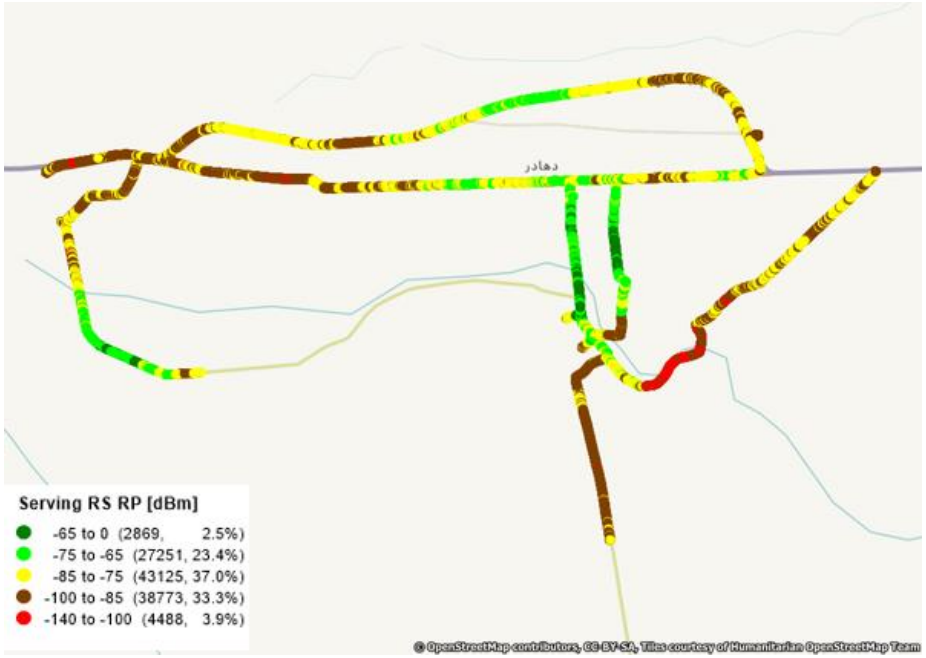
## JAZZ AUTOMODE NETWORK COVERAGE – DHADDAR



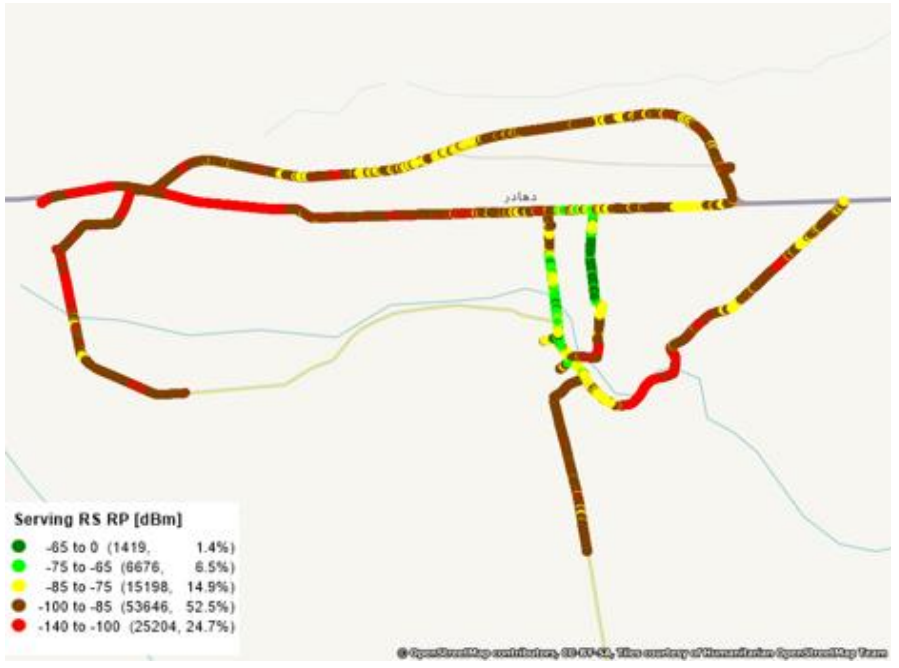

## TELENOR AUTOMODE NETWORK COVERAGE – DHADDAR




## UFONE AUTOMODE NETWORK COVERAGE – DHADDAR

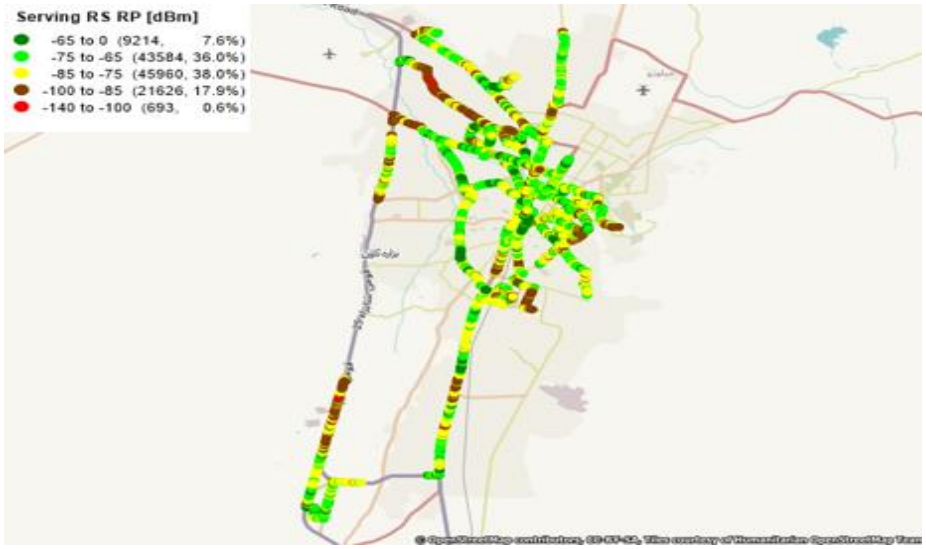



## ZONG AUTOMODE NETWORK COVERAGE – DHADDAR

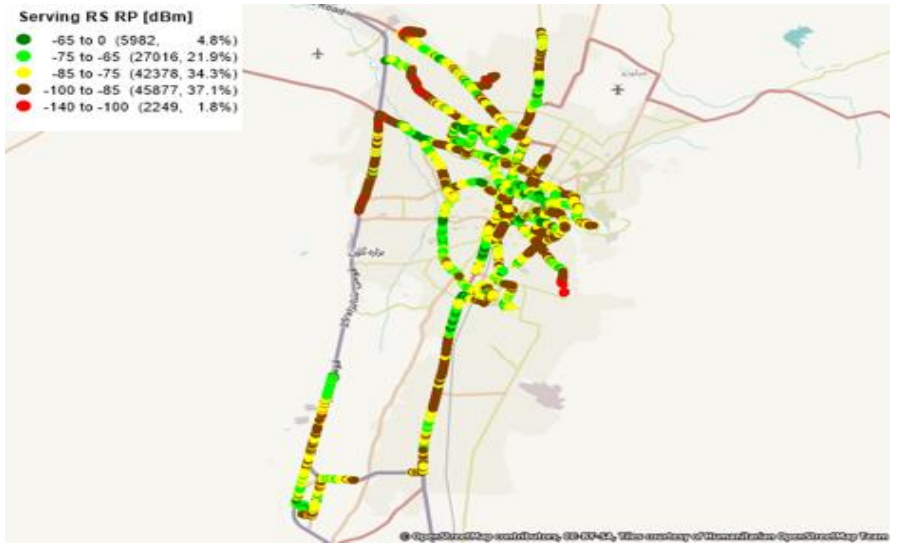


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

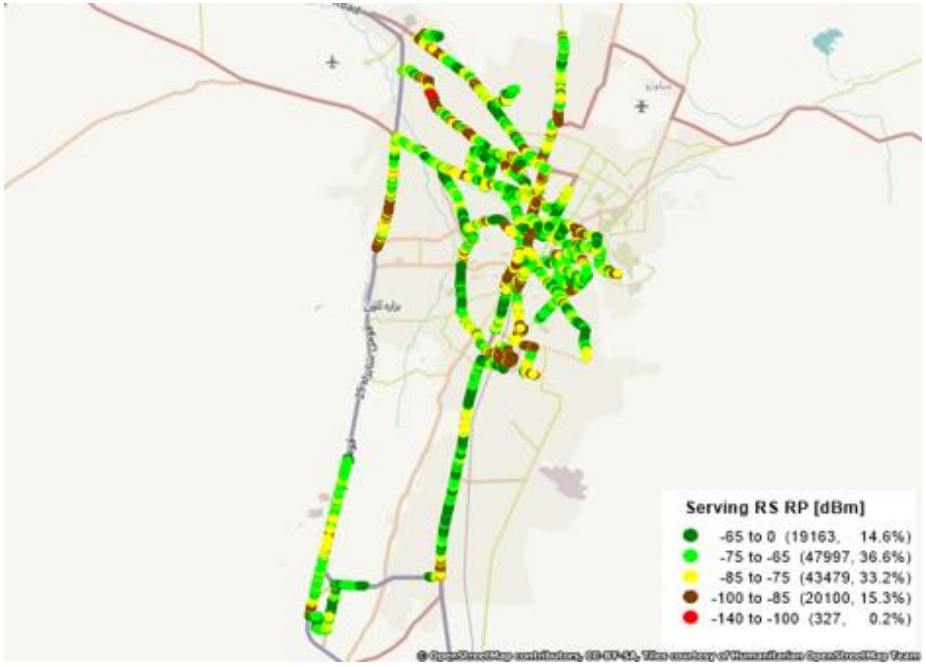
## JAZZ AUTOMODE NETWORK COVERAGE – QUETTA



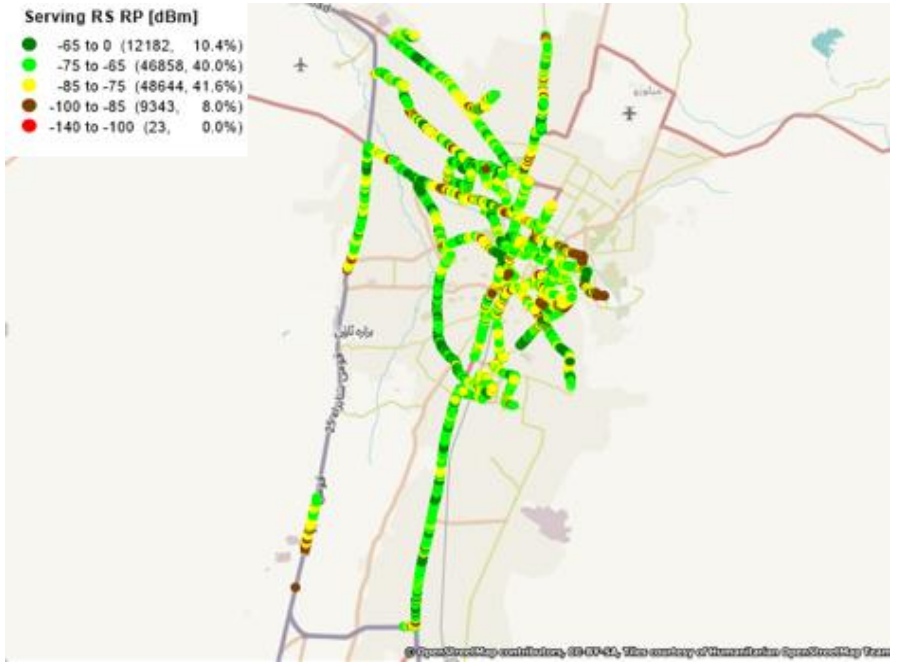

## TELENOR AUTOMODE NETWORK COVERAGE – QUETTA




## UFONE AUTOMODE NETWORK COVERAGE – QUETTA




## ZONG AUTOMODE NETWORK COVERAGE – QUETTA



# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

## JAZZ AUTOMODE NETWORK COVERAGE – ZHOB

## TELENOR AUTOMODE NETWORK COVERAGE – ZHOB

## UFONE AUTOMODE NETWORK COVERAGE – ZHOB

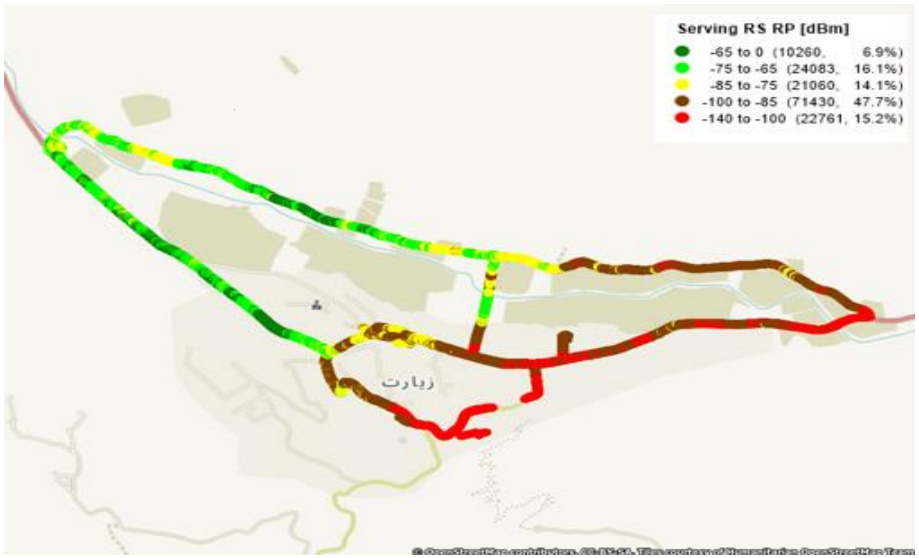
## ZONG AUTOMODE NETWORK COVERAGE – ZHOB

# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

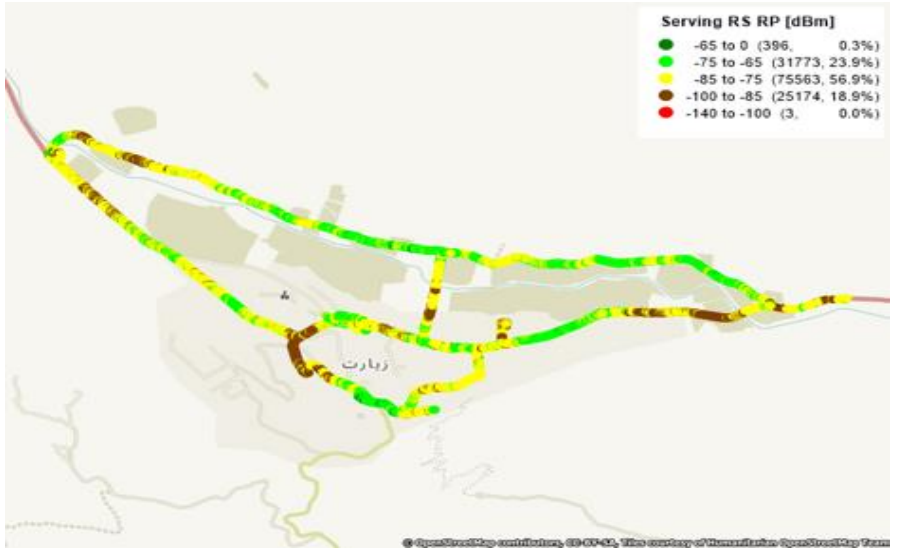
## UFONE AUTOMODE 3G NETWORK COVERAGE – ZHOB

# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

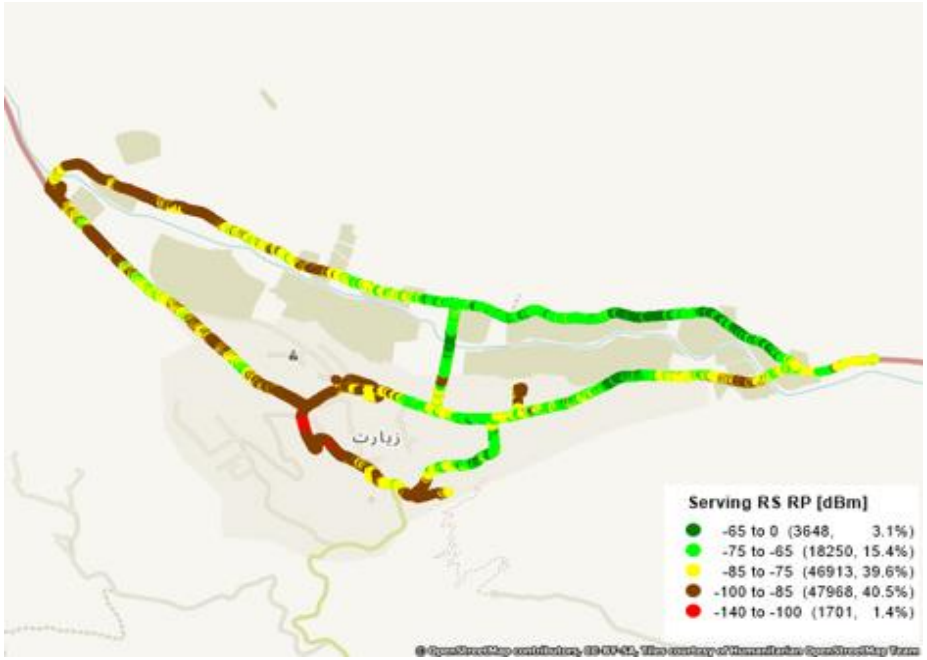
## UFONE AUTOMODE NETWORK COVERAGE – ZIARAT




## TELENOR AUTOMODE NETWORK COVERAGE – ZIARAT

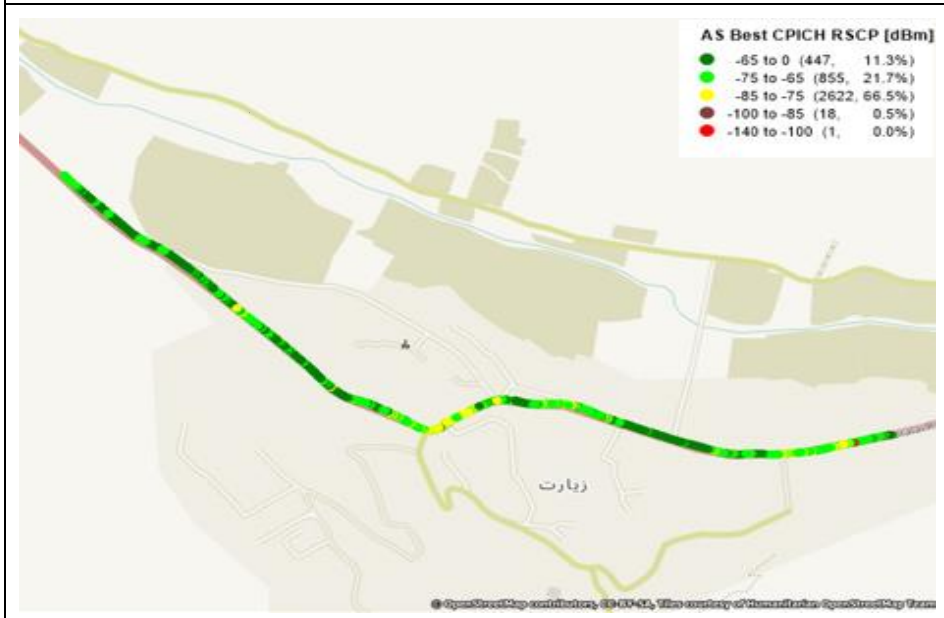



## ZONG AUTOMODE NETWORK COVERAGE – ZIARAT

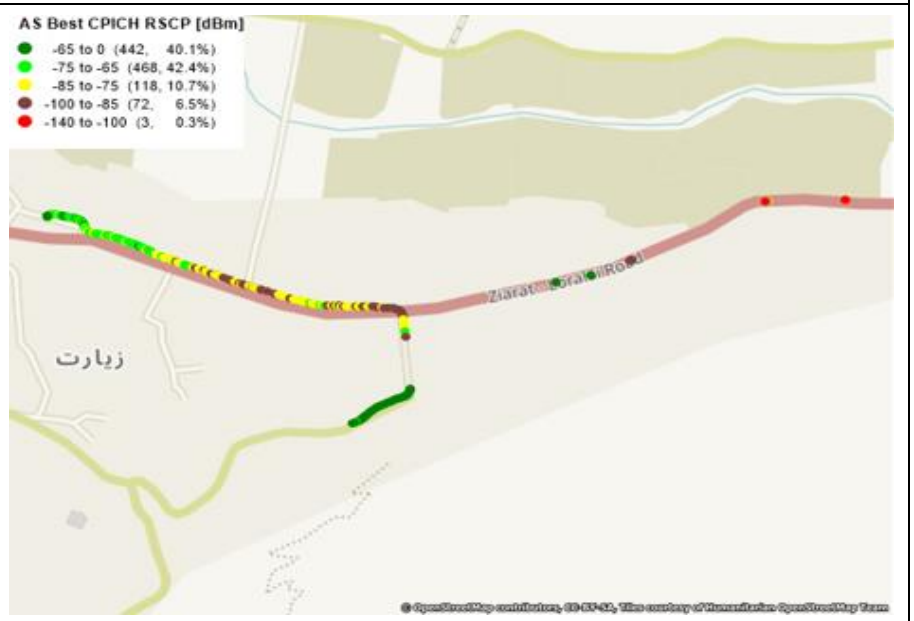


# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

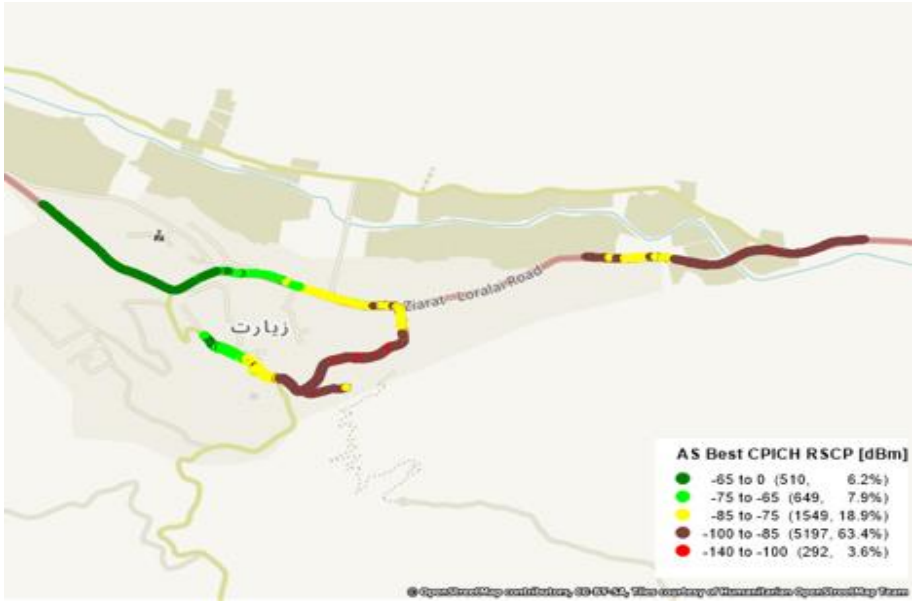
## TELENOR AUTOMODE 3G NETWORK COVERAGE – ZIARAT




## ZONG AUTOMODE 3G NETWORK COVERAGE – ZIARAT




## UFONE AUTOMODE 3G NETWORK COVERAGE – ZIARAT



# AUTOMODE MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

## UFONE AUTOMODE NETWORK COVERAGE – DALBADDIN

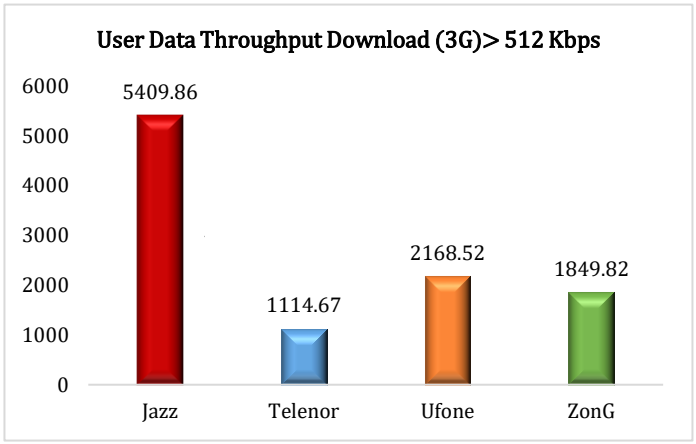
## TELENOR AUTOMODE NETWORK COVERAGE – DALBADDIN

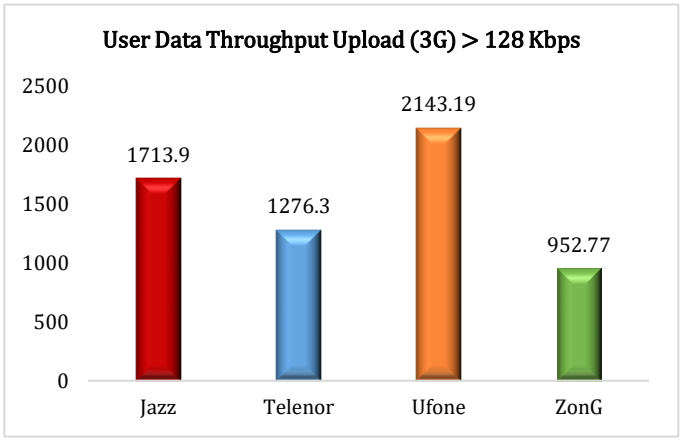
## ZONG AUTOMODE NETWORK COVERAGE – DALBADDIN

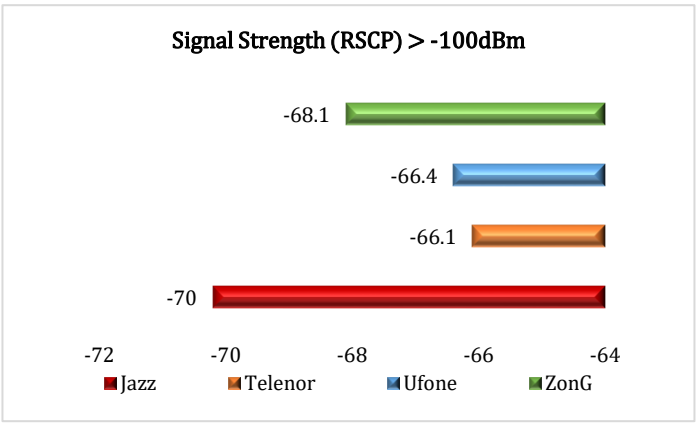
Annex-B

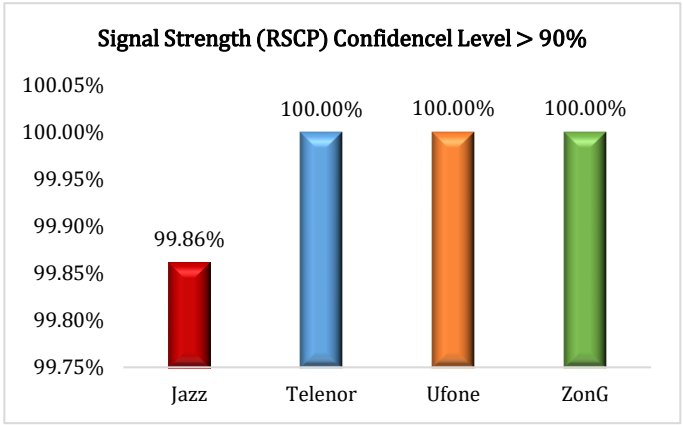
# MOBILE BROADBAND 3G KPIs RESULT

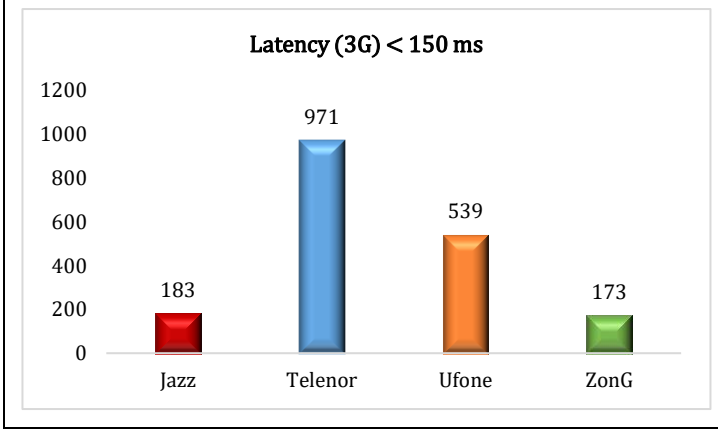
# `QUALITY OF SERVICE SURVEY RESULTS (3G) – BHAKKAR



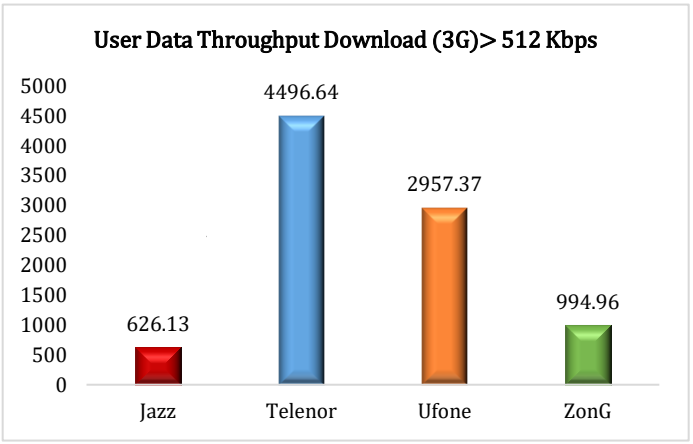



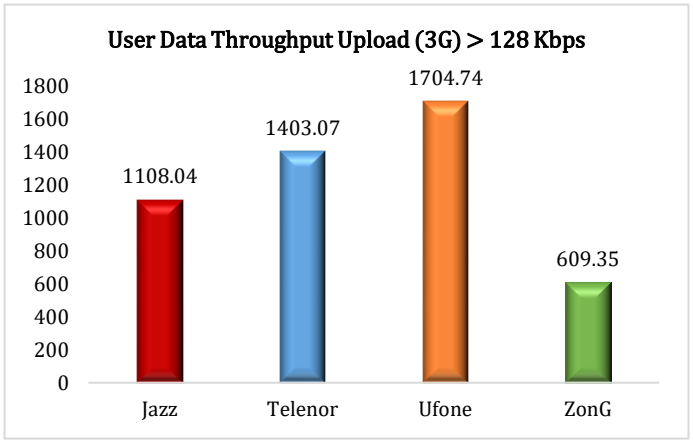



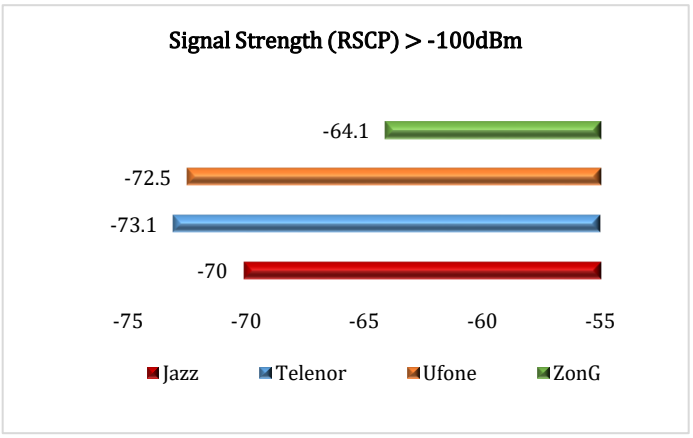



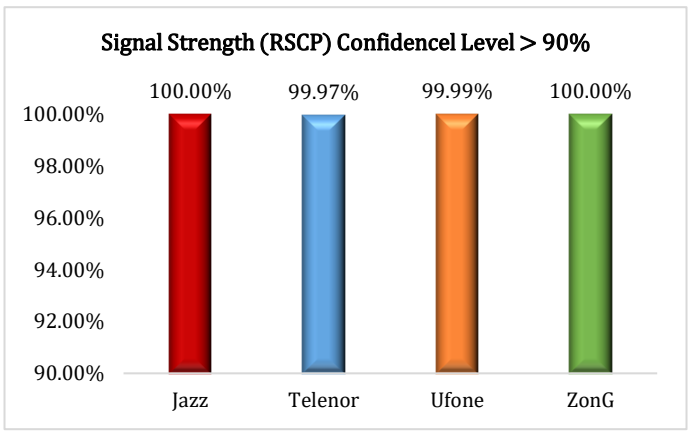



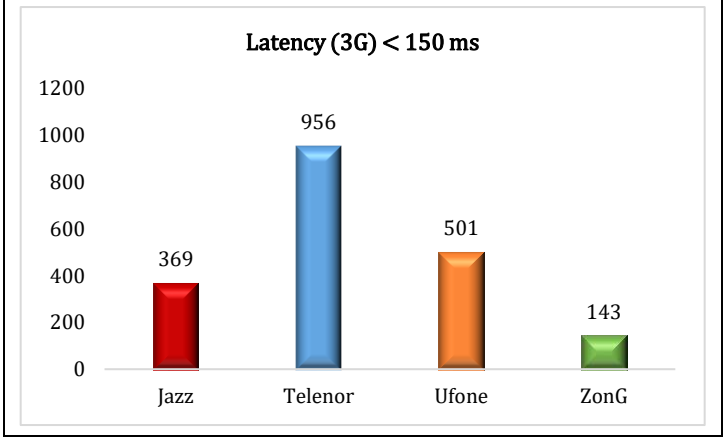
# QUALITY OF SERVICE SURVEY RESULTS (3G) –BUREWALA



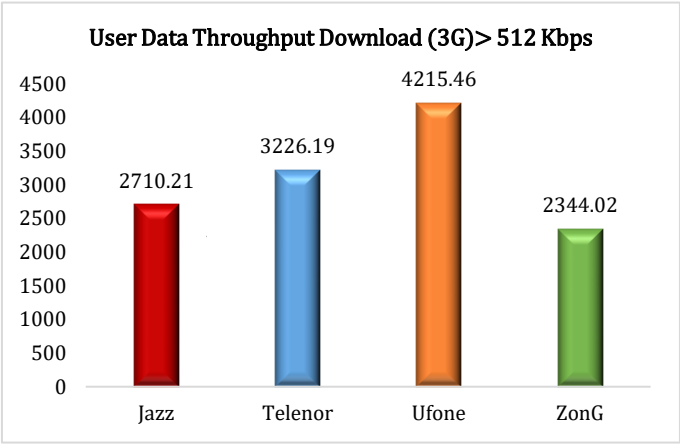



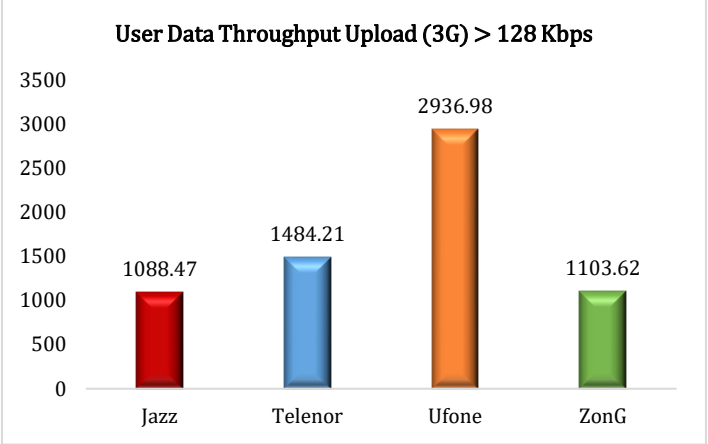



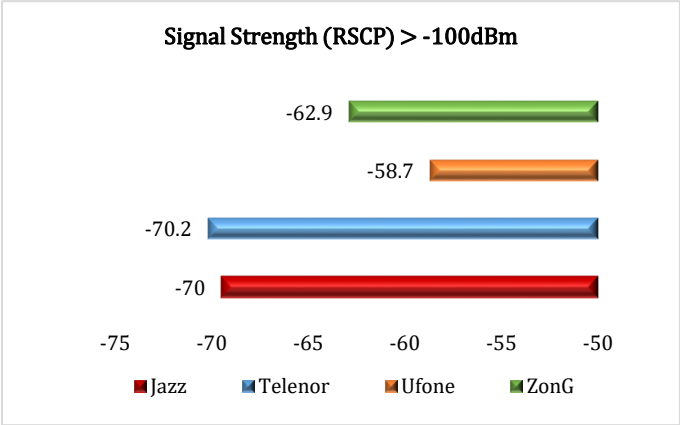



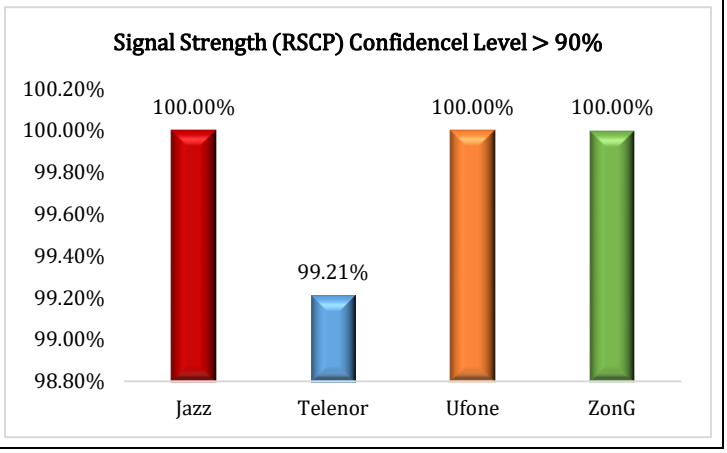



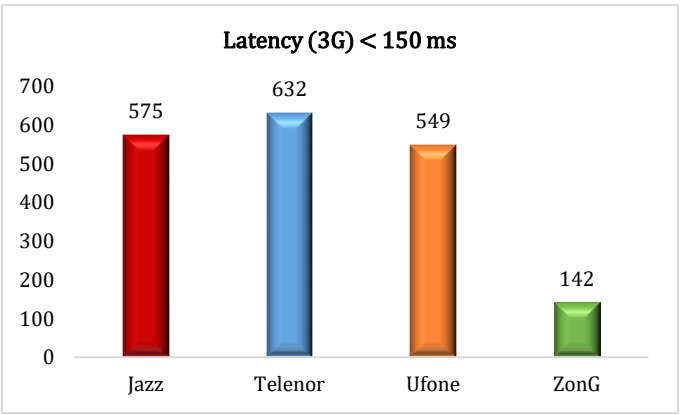
# QUALITY OF SERVICE SURVEY RESULTS (3G) – CHAKWAL



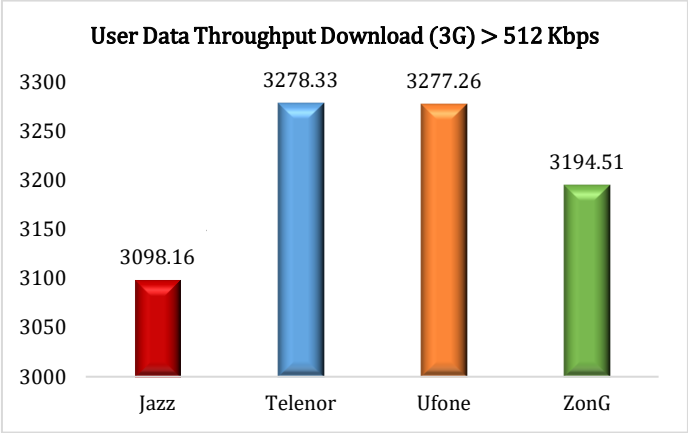



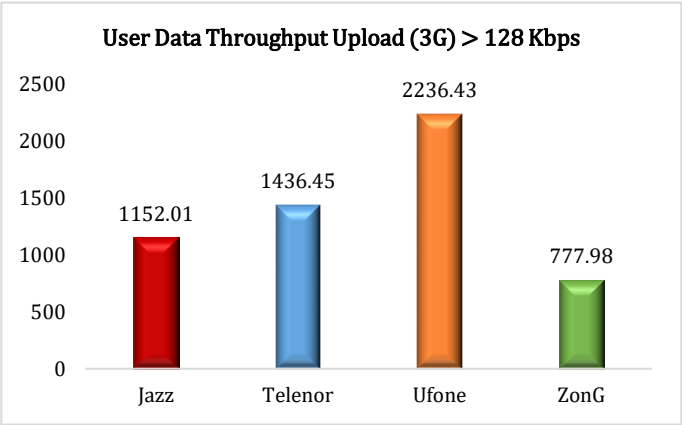



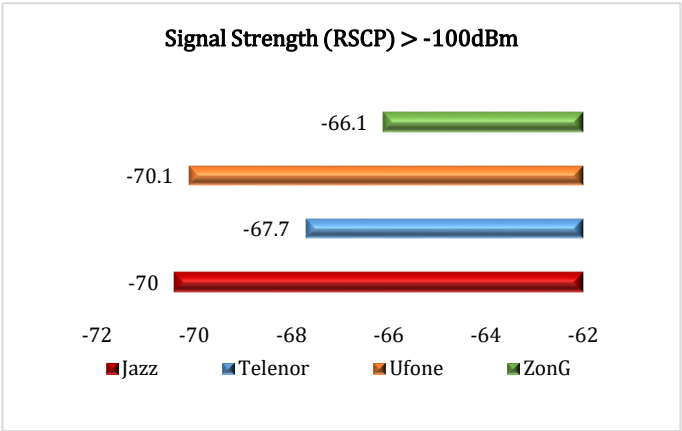



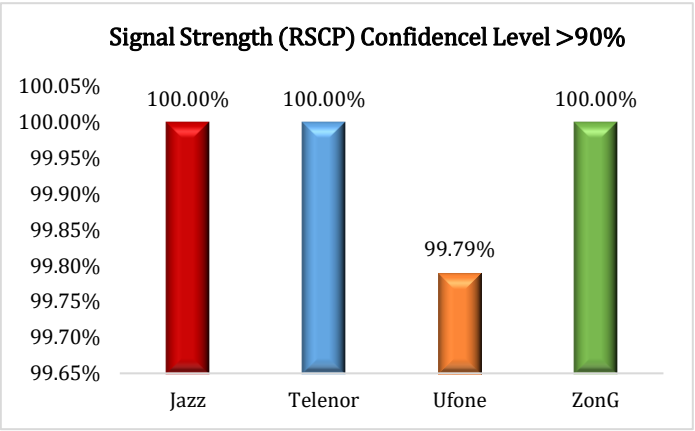



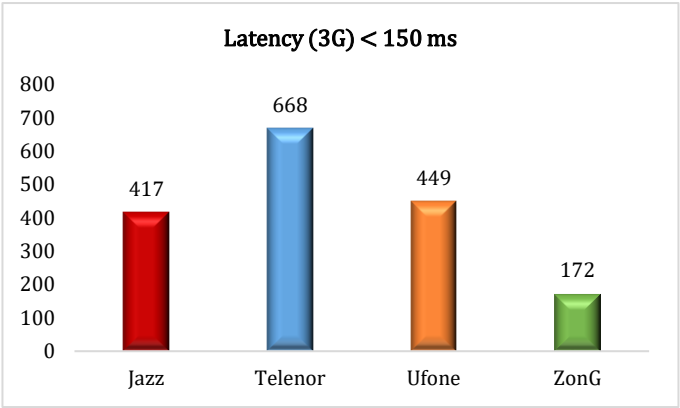
# QUALITY OF SERVICE SURVEY RESULTS (3G) – FAISALABAD



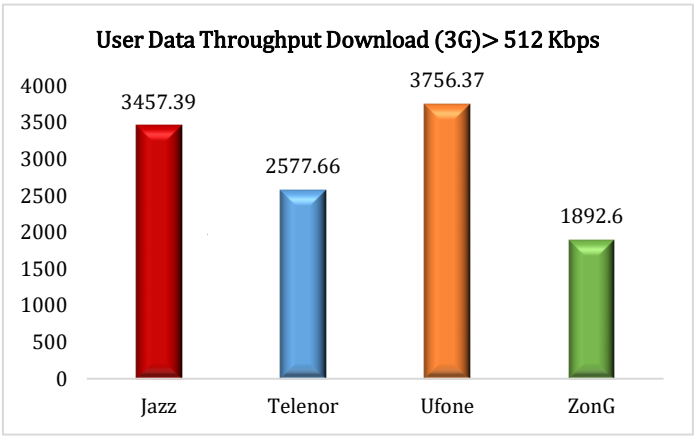



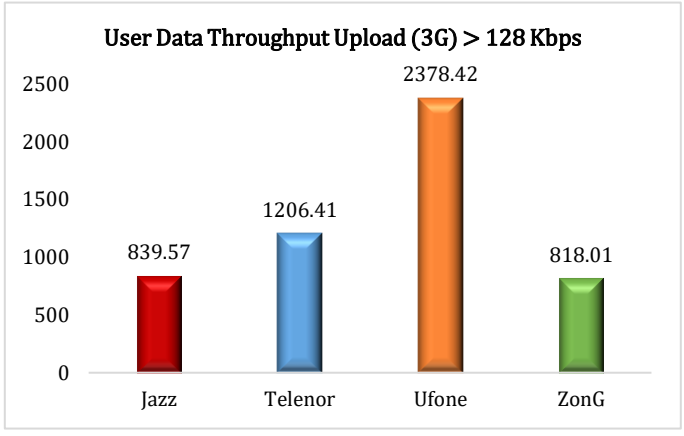



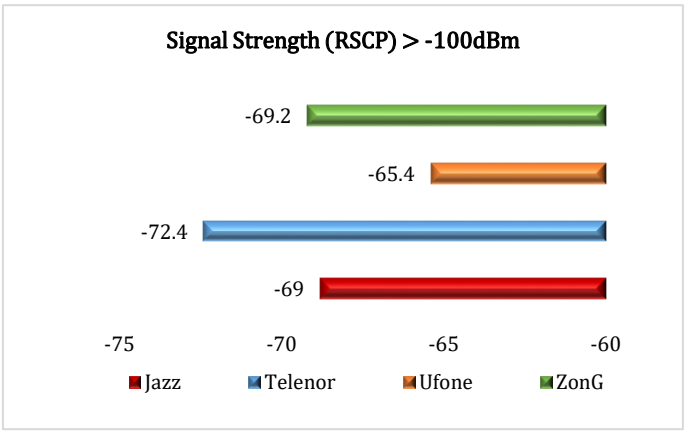



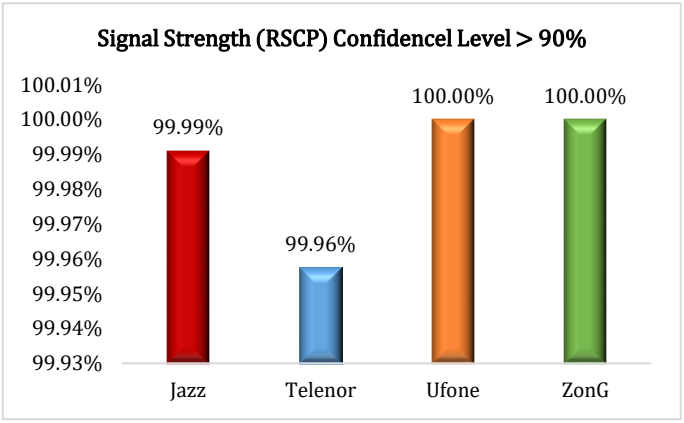



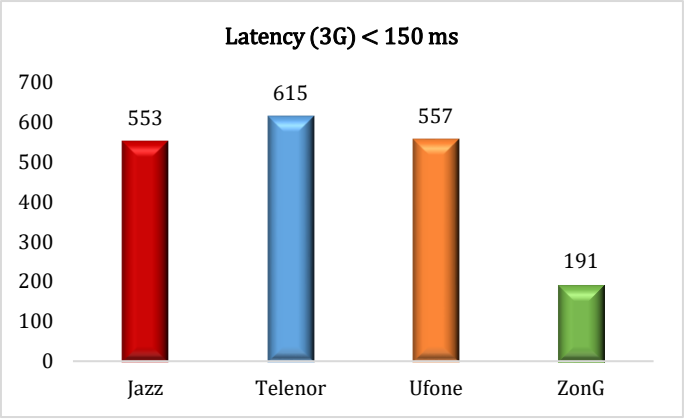
# QUALITY OF SERVICE SURVEY RESULTS (3G) – JHELUM



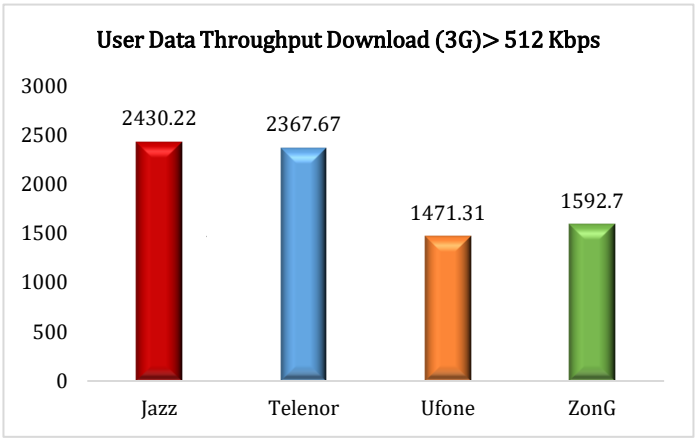



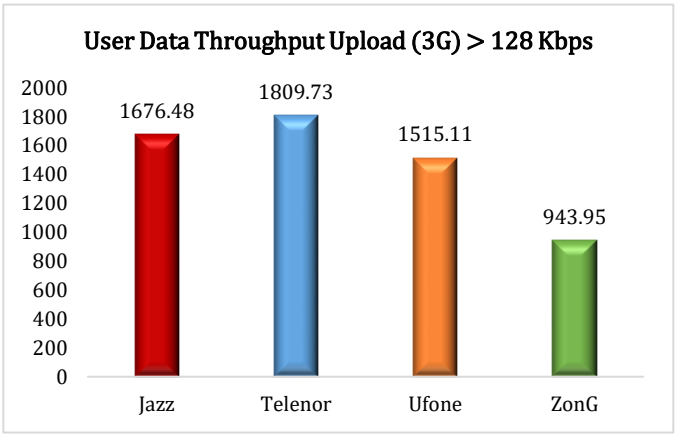



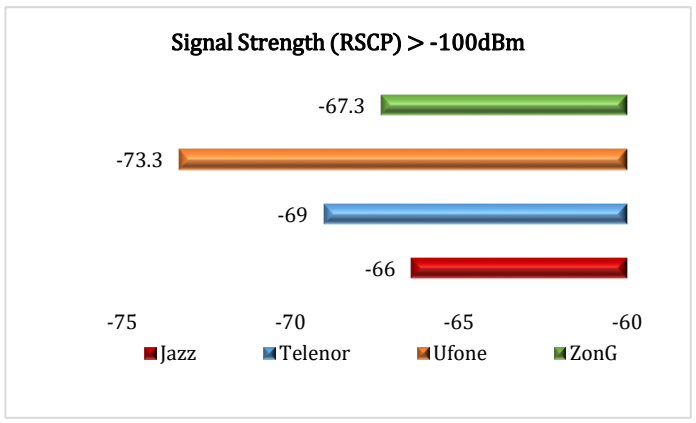



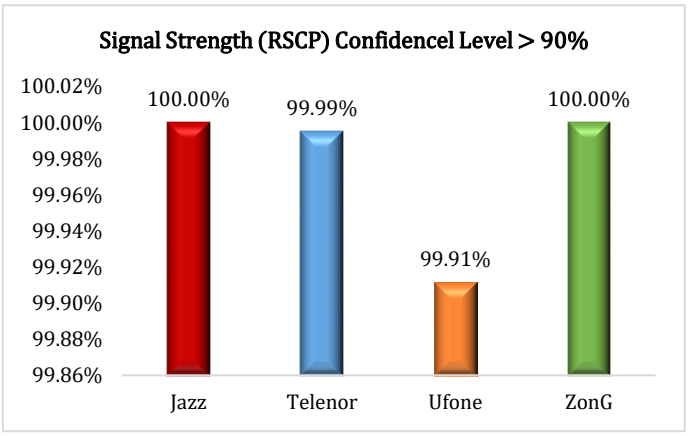



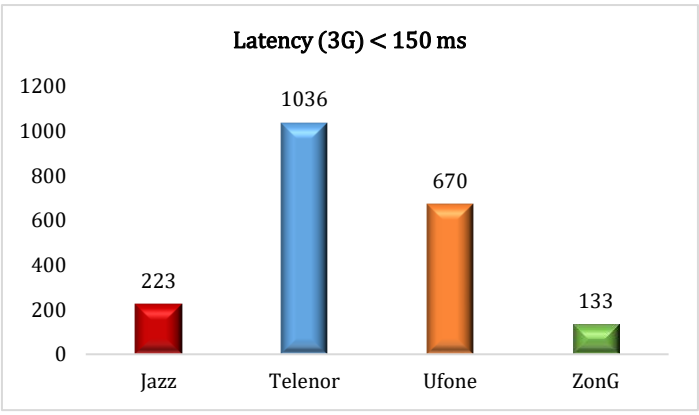
# QUALITY OF SERVICE SURVEY RESULTS (3G) – LAYYAH



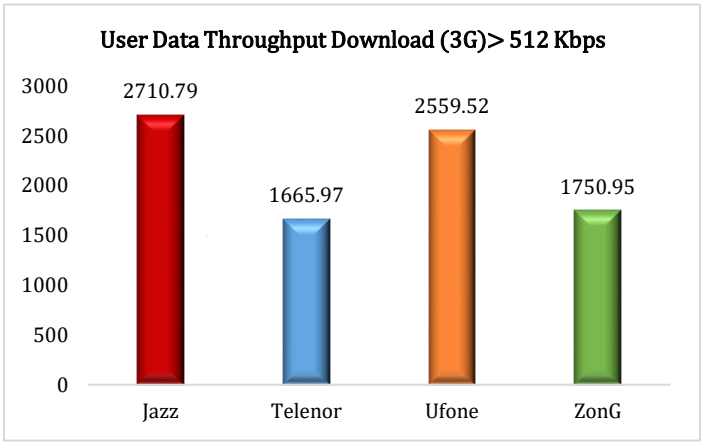



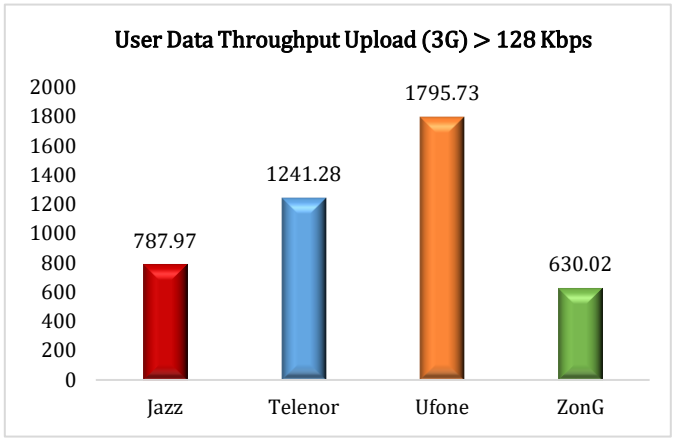



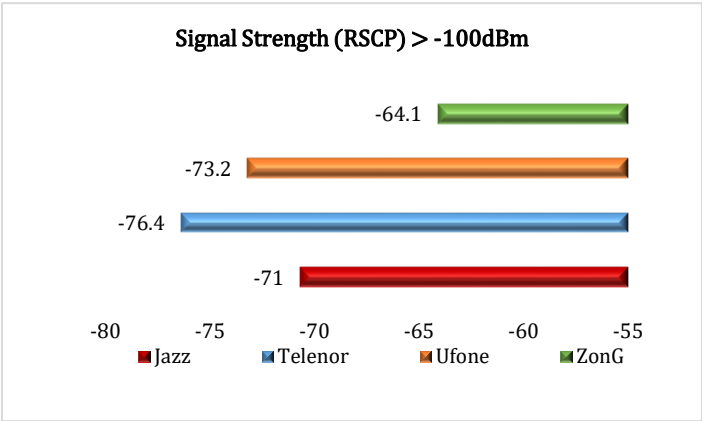



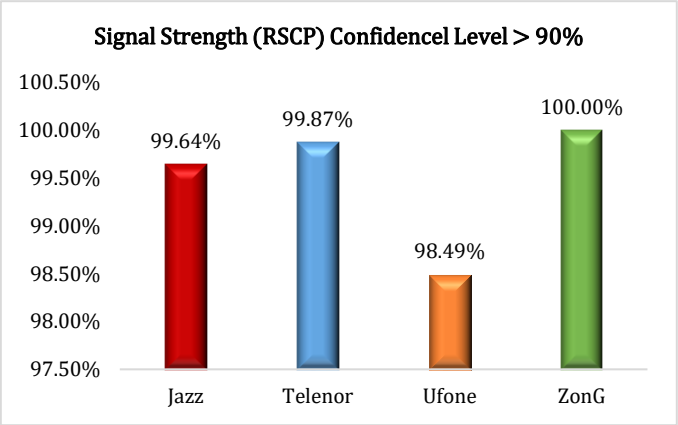



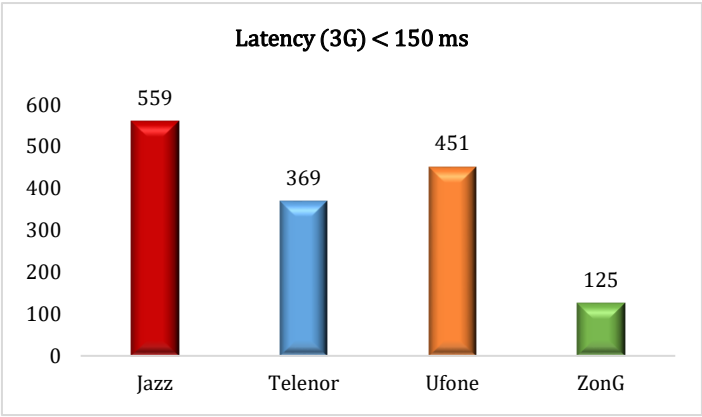
# QUALITY OF SERVICE SURVEY RESULTS (3G) –OKARA



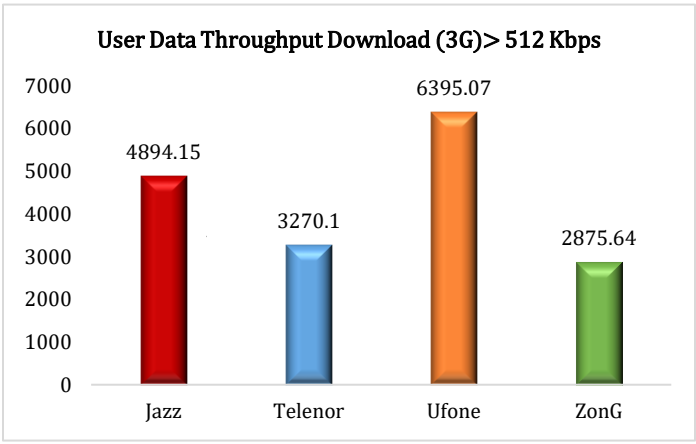



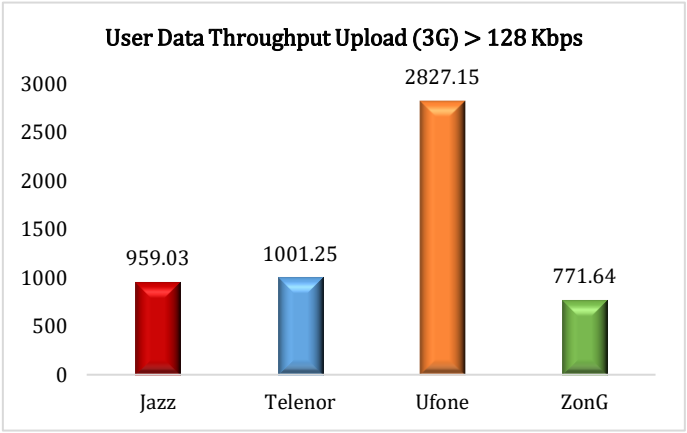



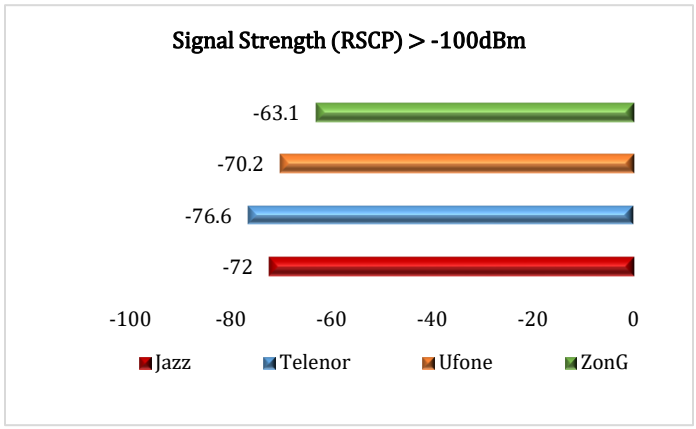



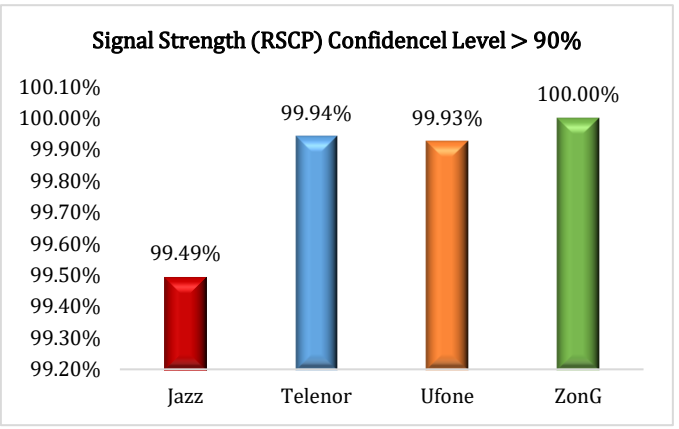



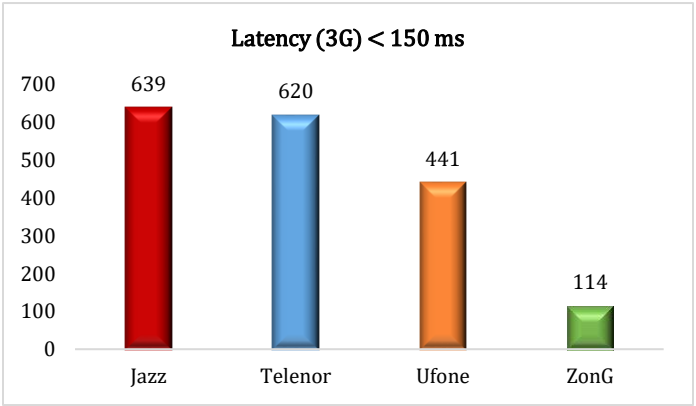
# QUALITY OF SERVICE SURVEY RESULTS (3G) – SAHIWAL



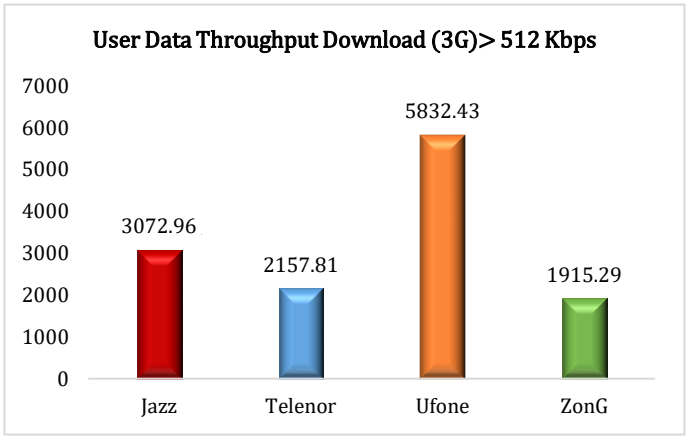



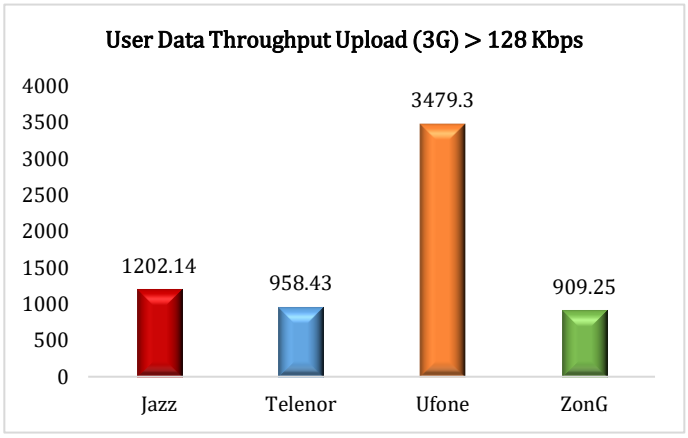



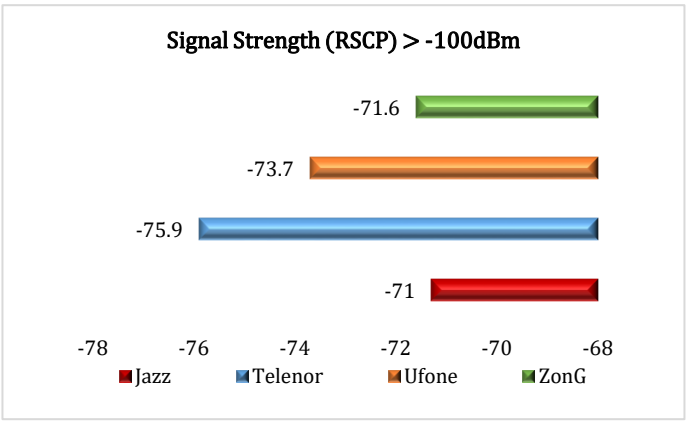



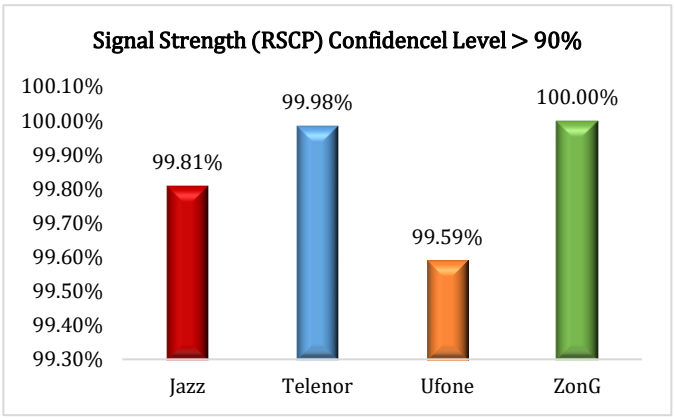



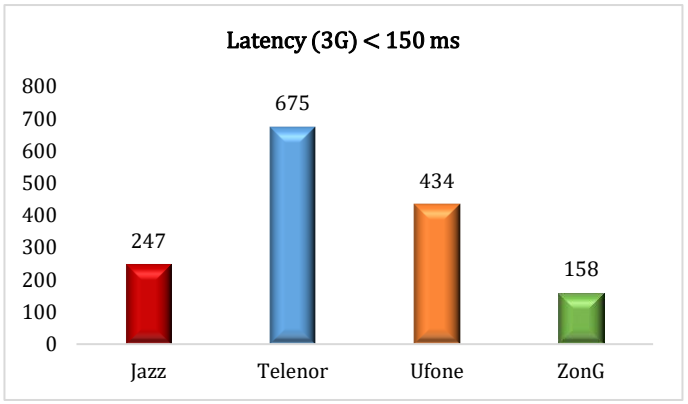
# QUALITY OF SERVICE SURVEY RESULTS (3G) – GOJRA



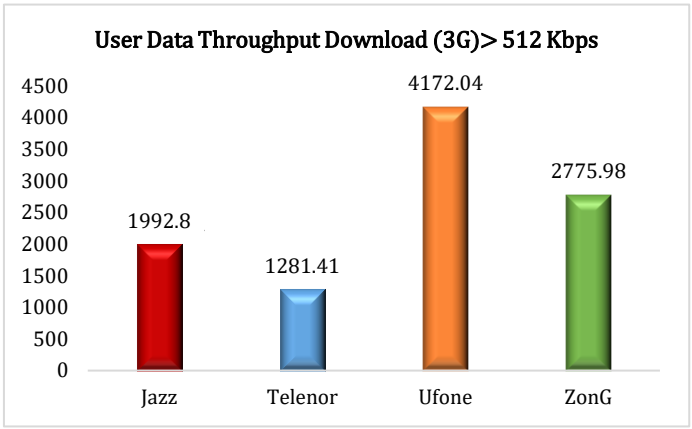



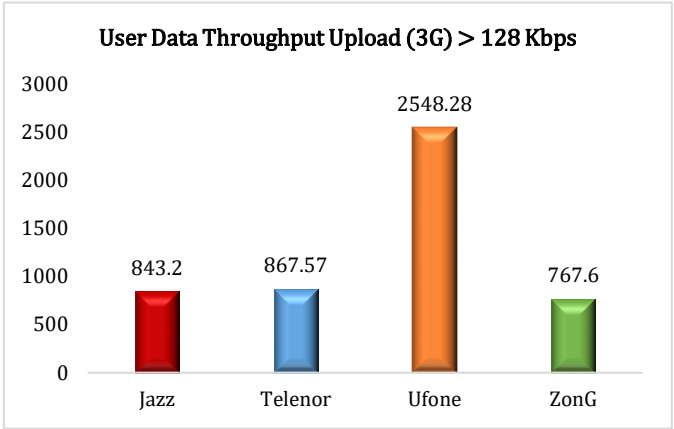



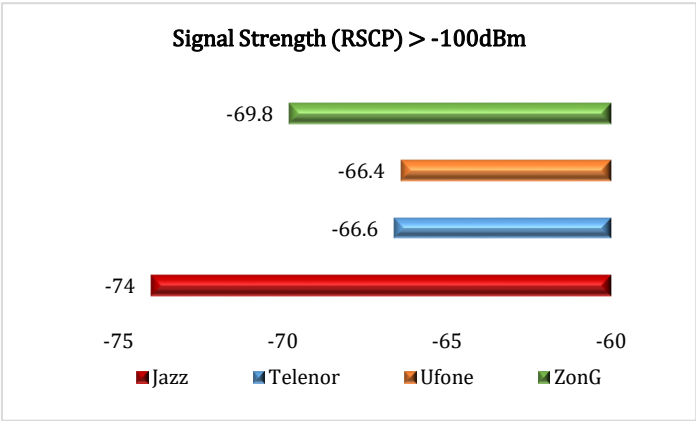



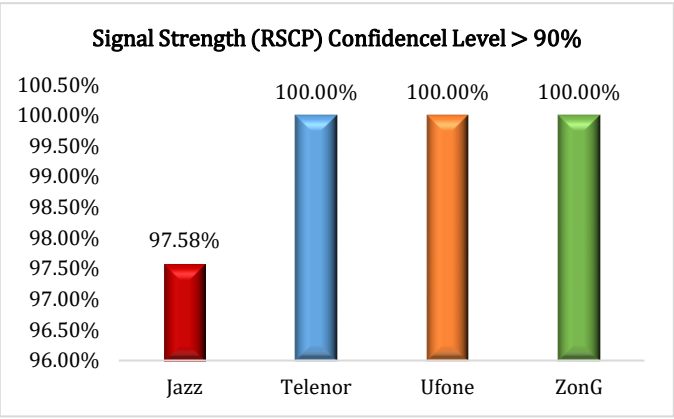



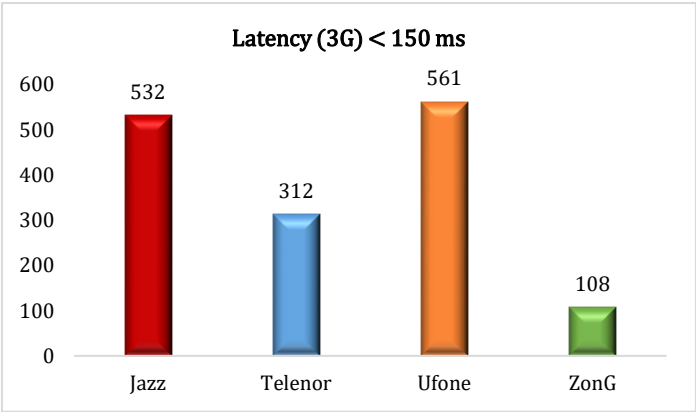
# QUALITY OF SERVICE SURVEY RESULTS (3G) – MANDI BAHAUDIN



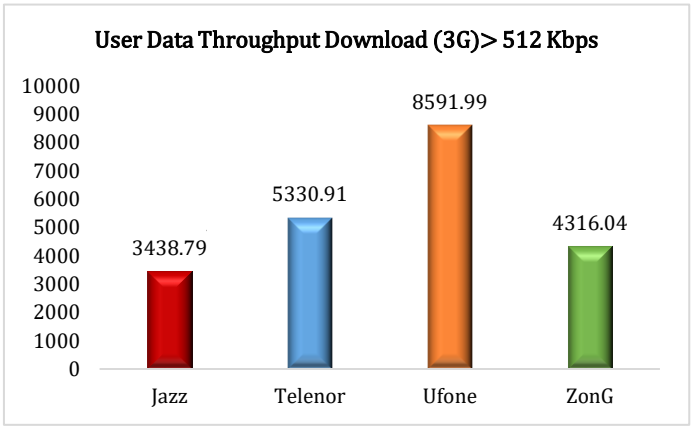



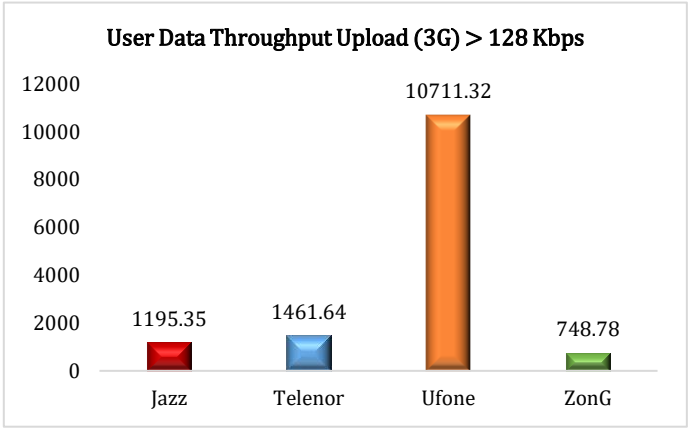



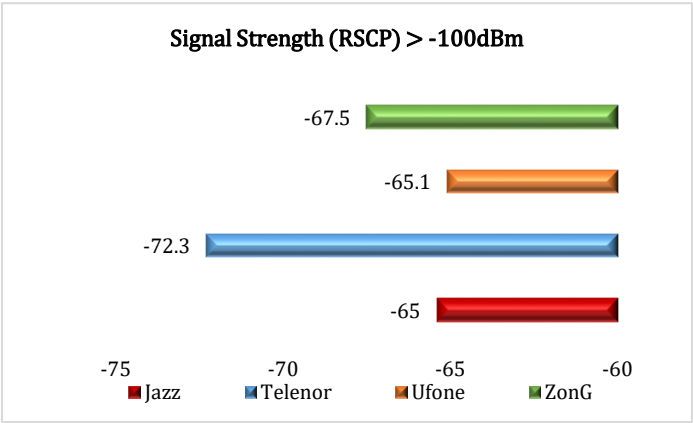



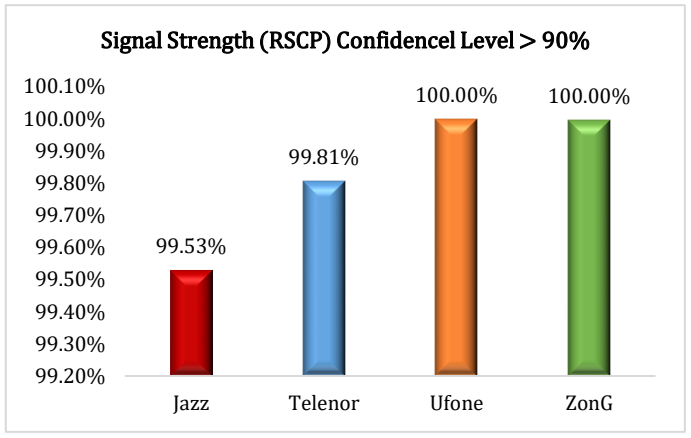



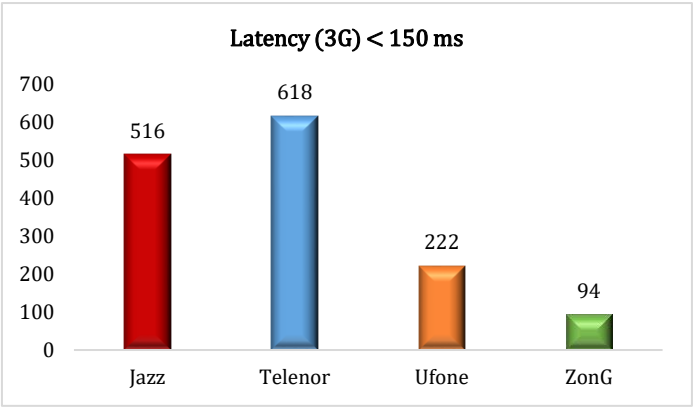
# QUALITY OF SERVICE SURVEY RESULTS (3G) – SHAKARGARH



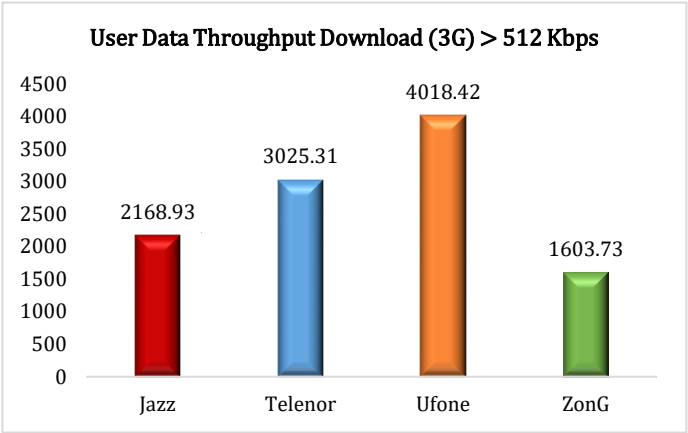



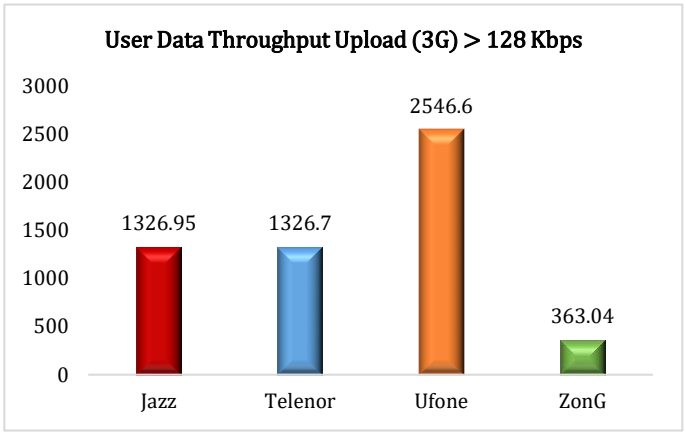



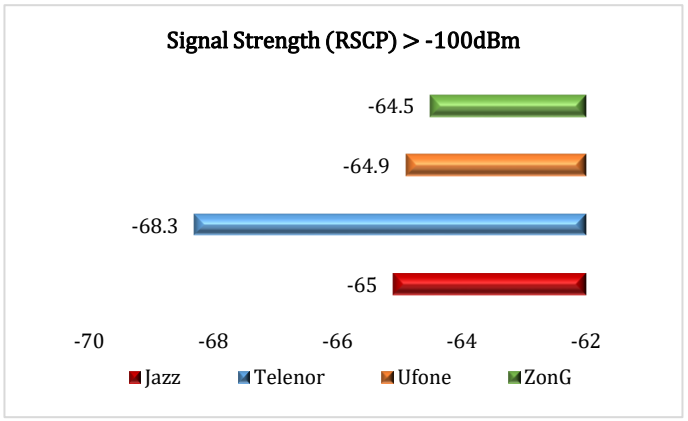



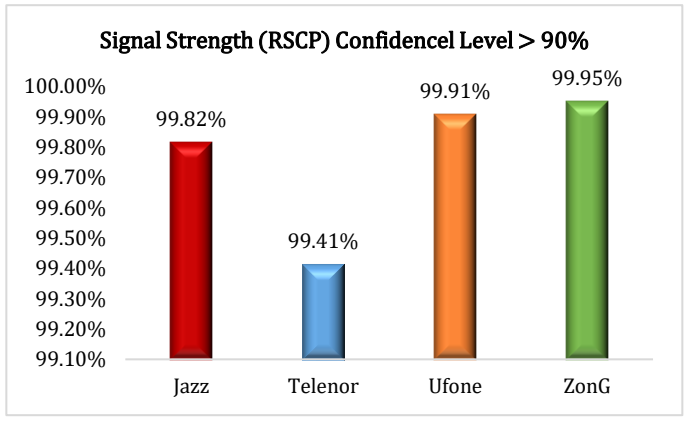



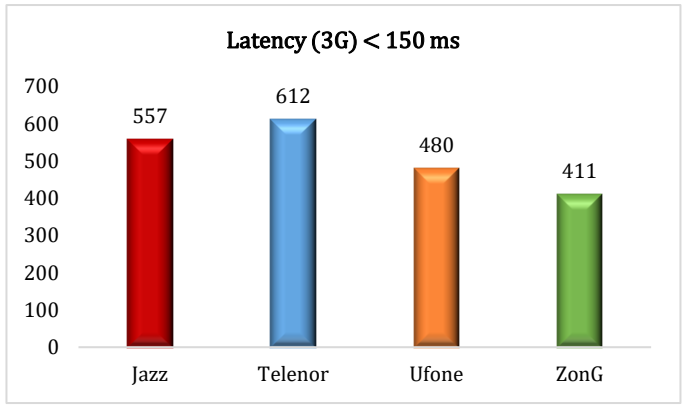
# QUALITY OF SERVICE SURVEY RESULTS (3G) – ATTOCK



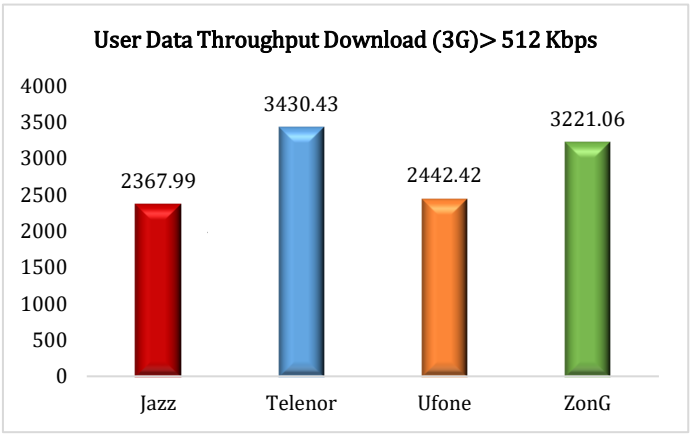



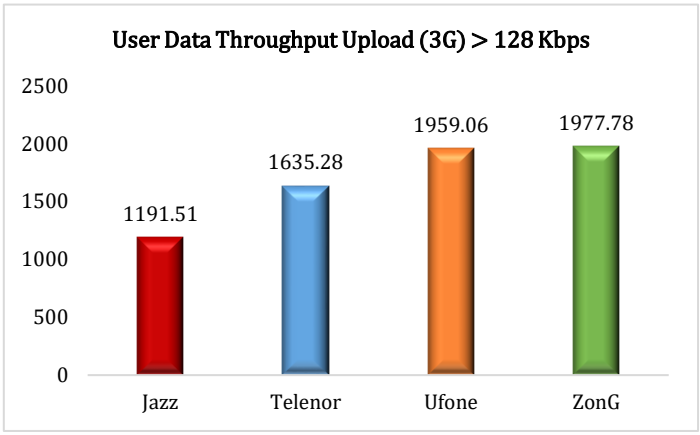



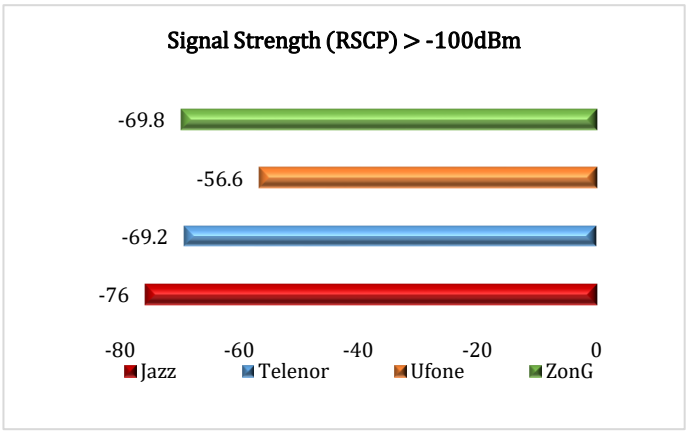



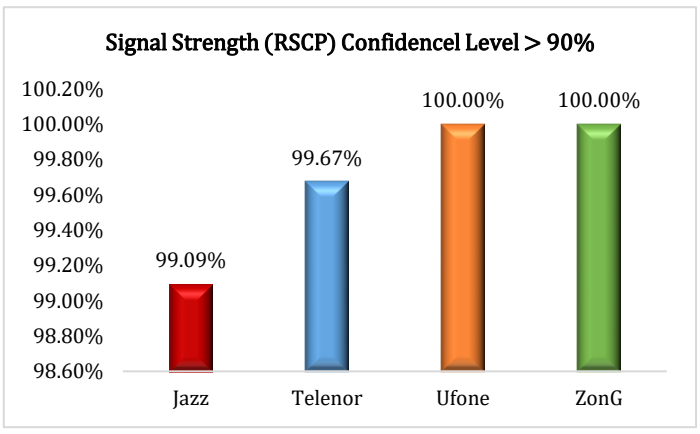



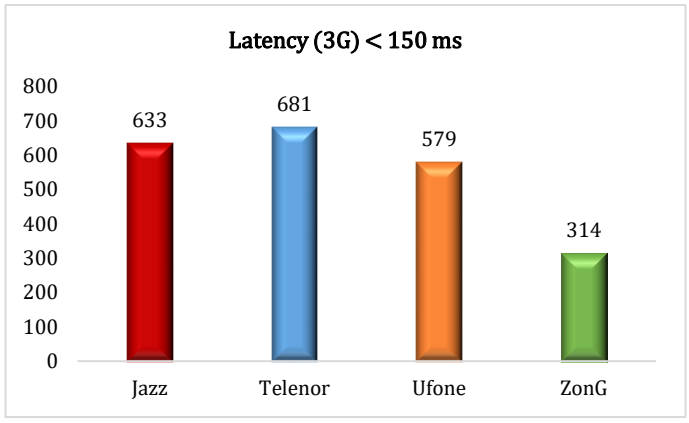
# QUALITY OF SERVICE SURVEY RESULTS (3G) –BANNU



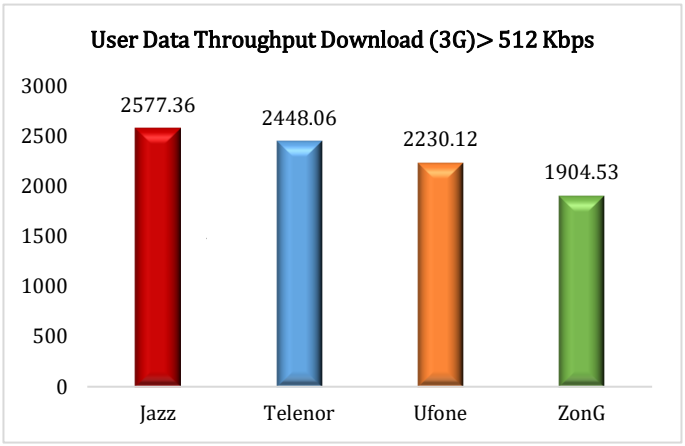



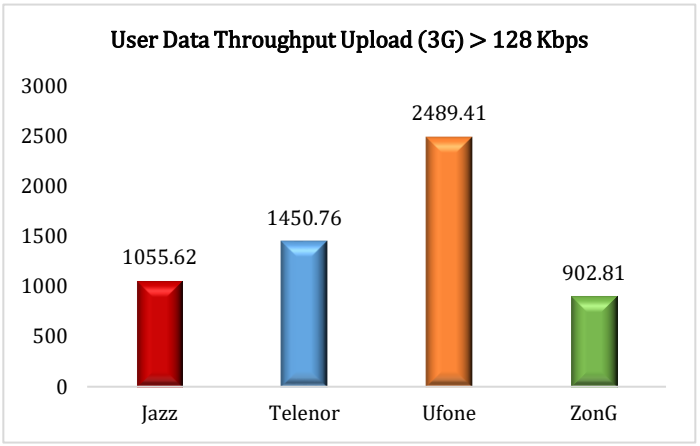



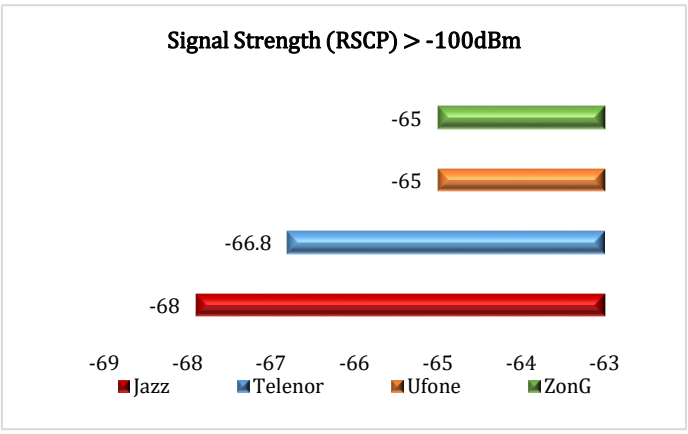



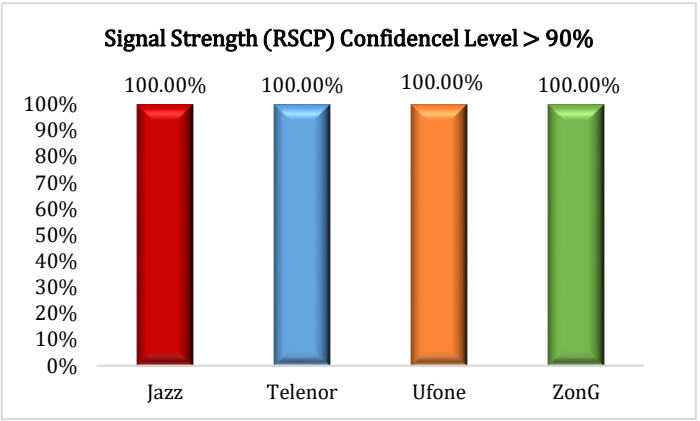



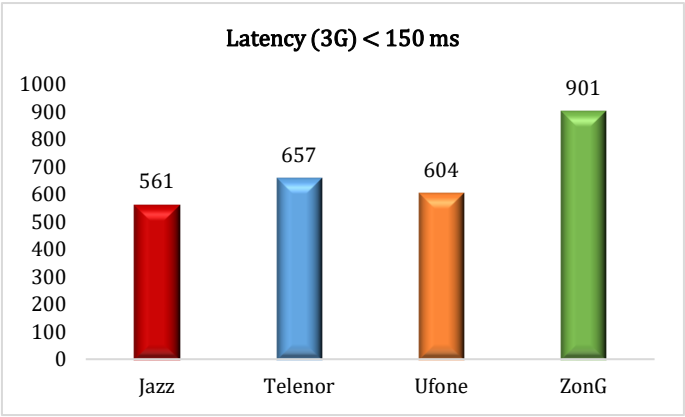
# QUALITY OF SERVICE SURVEY RESULTS (3G) – HARIPUR



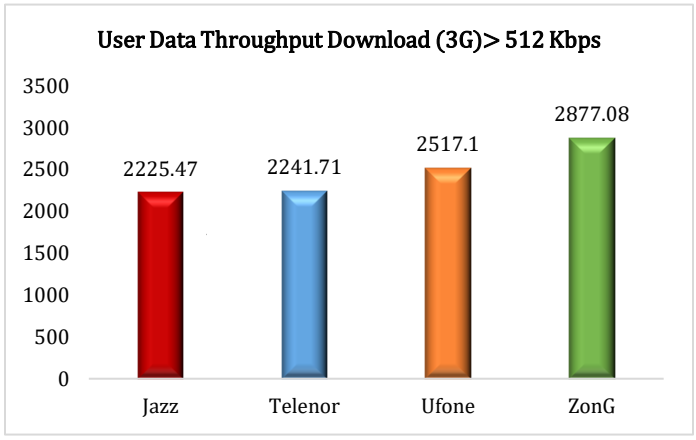



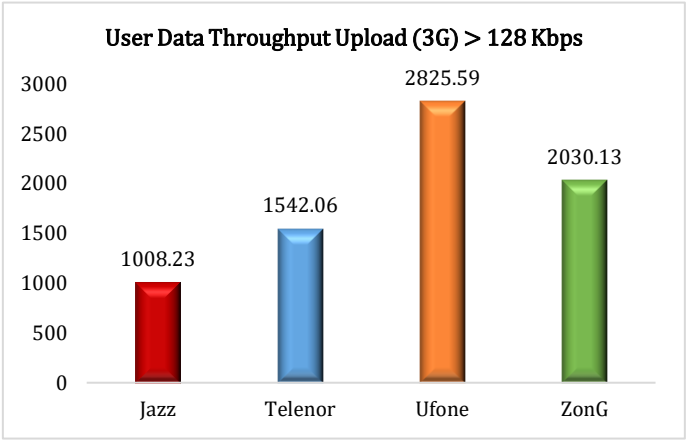



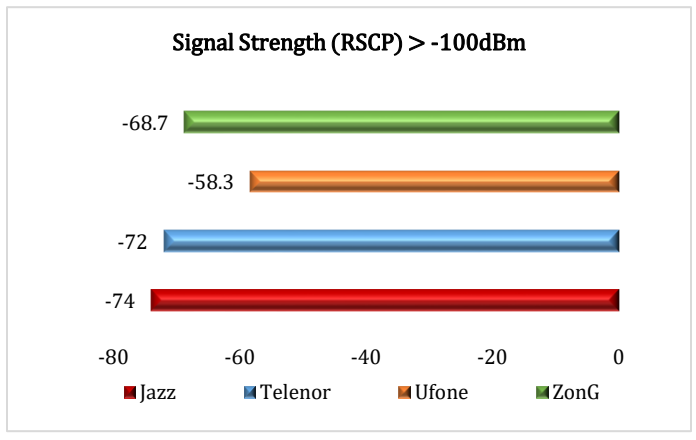



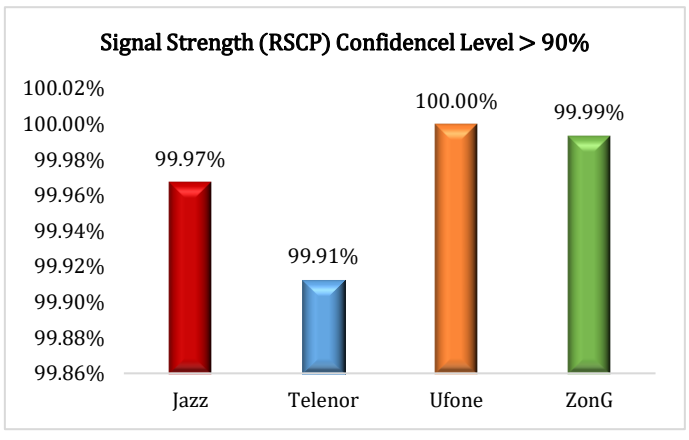



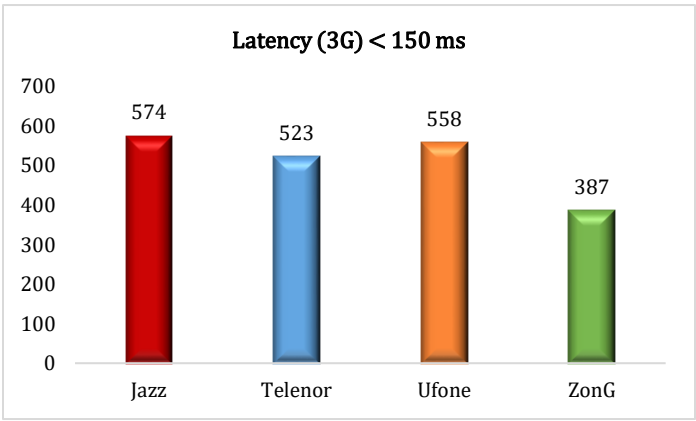
# QUALITY OF SERVICE SURVEY RESULTS (3G) – KOHAT



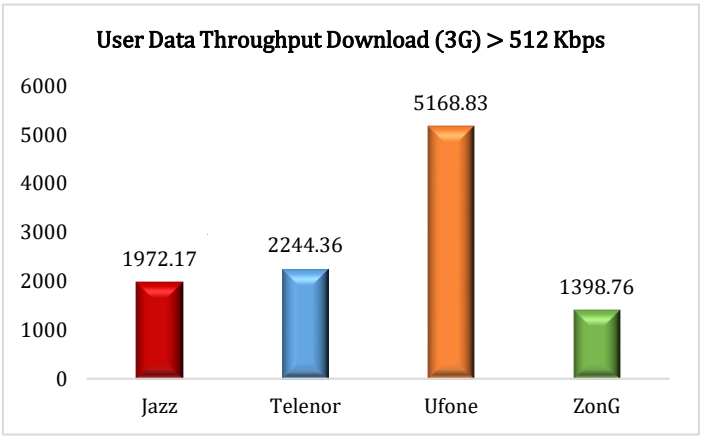



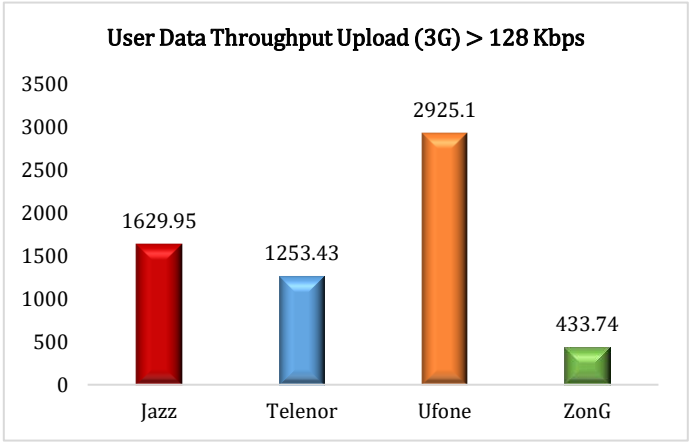



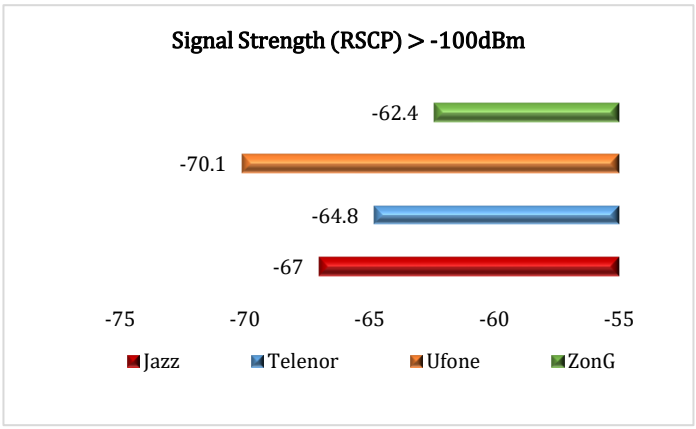



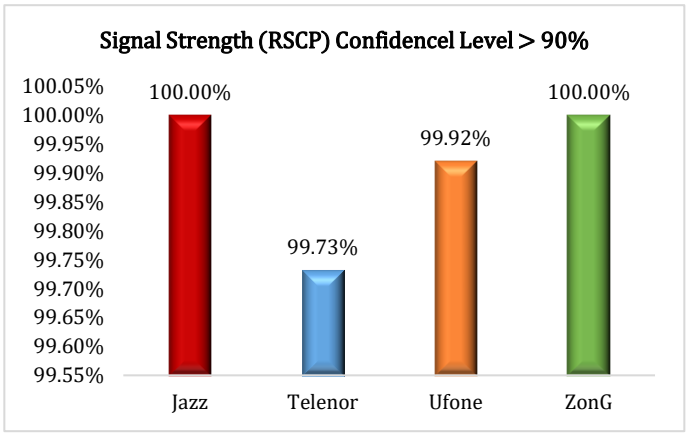



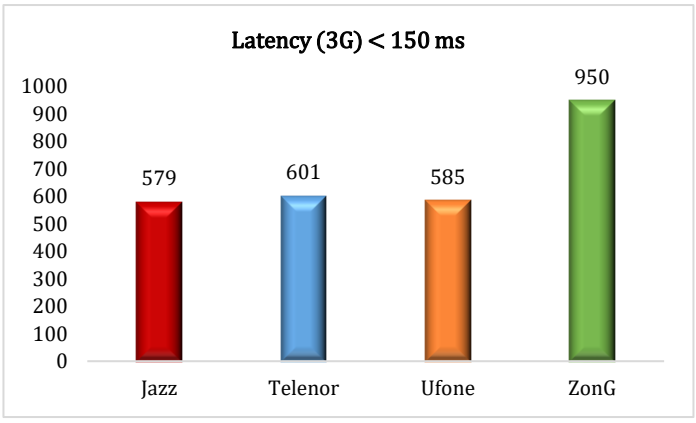
# QUALITY OF SERVICE SURVEY RESULTS (3G) – MANSEHRA



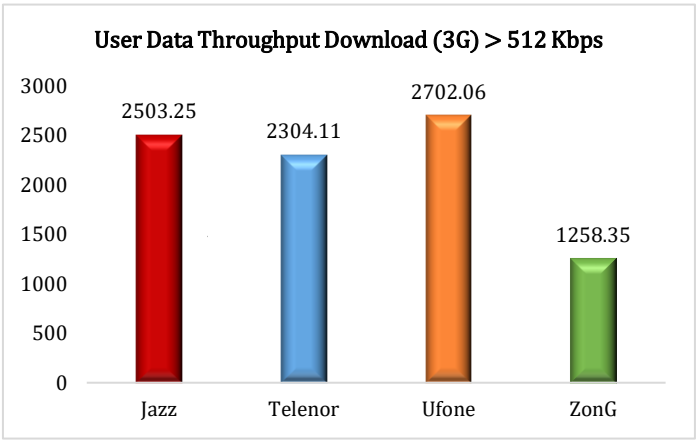



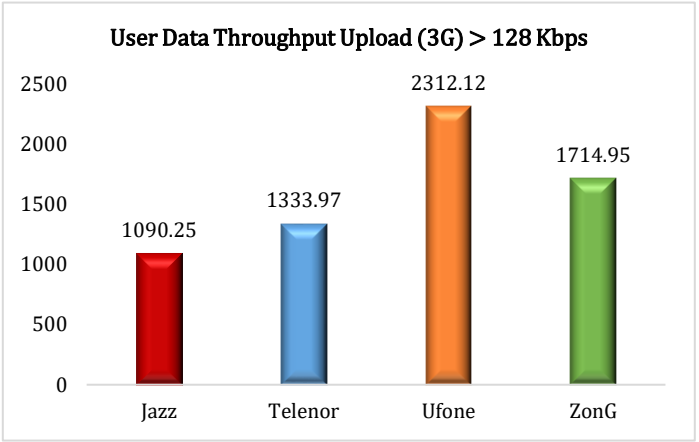



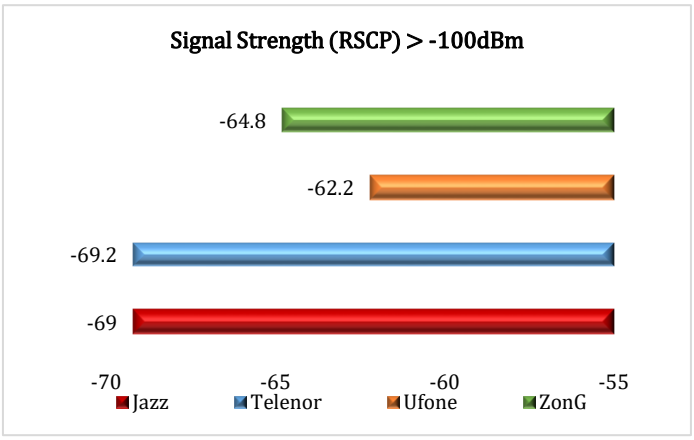



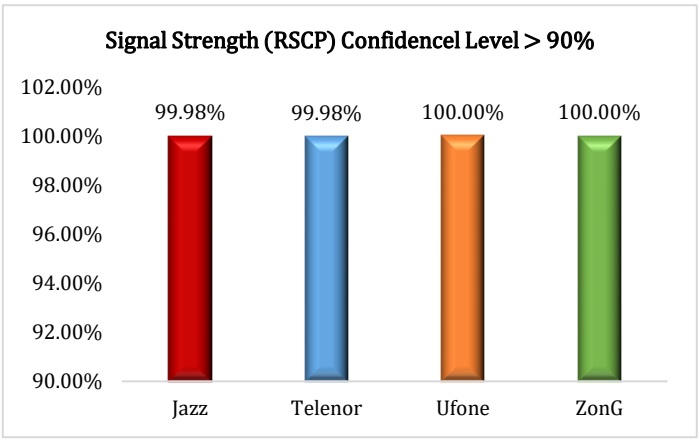



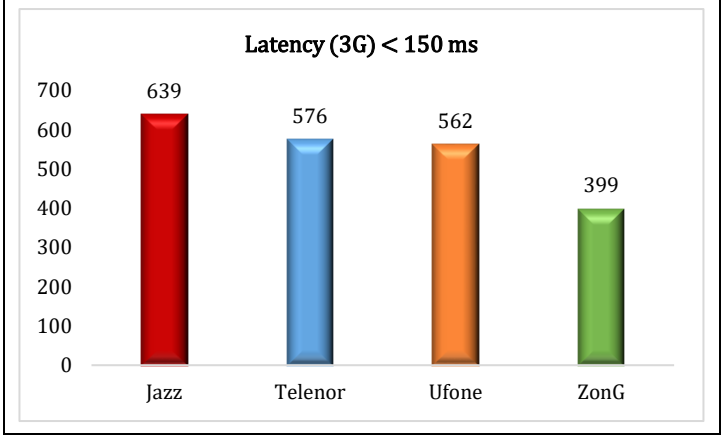
# QUALITY OF SERVICE SURVEY RESULTS (3G) – PESHAWAR



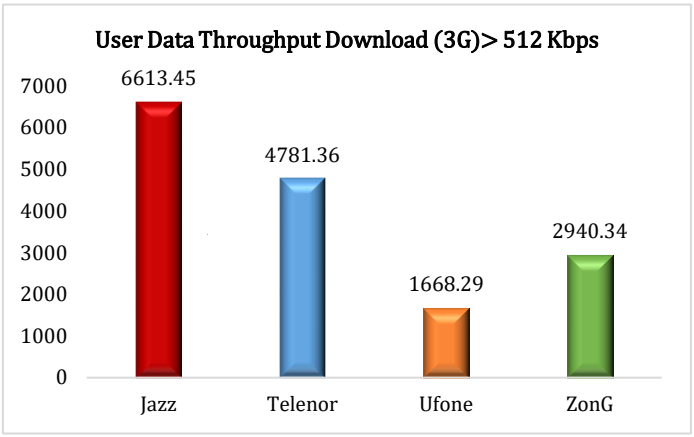



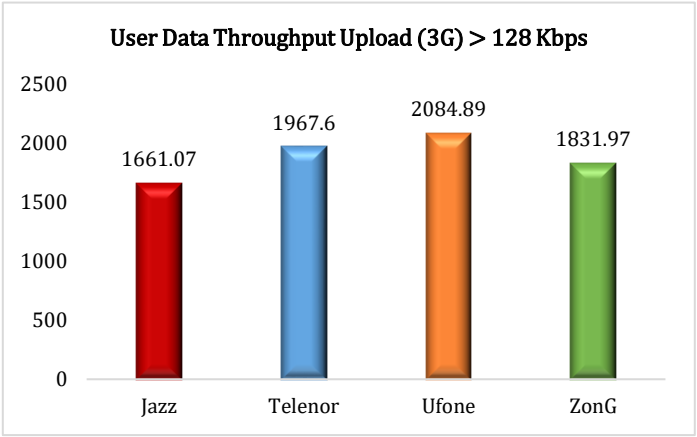



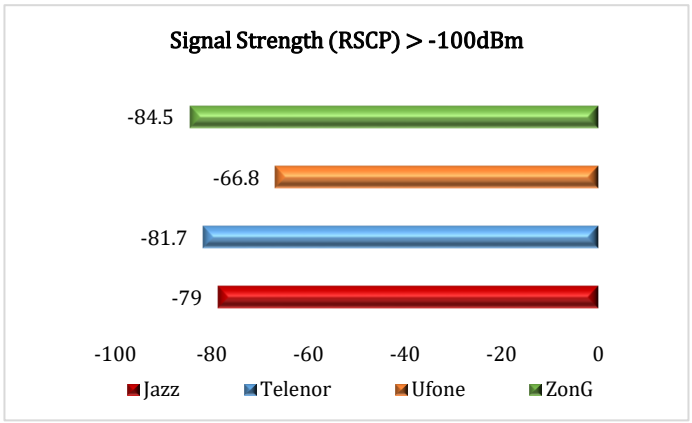



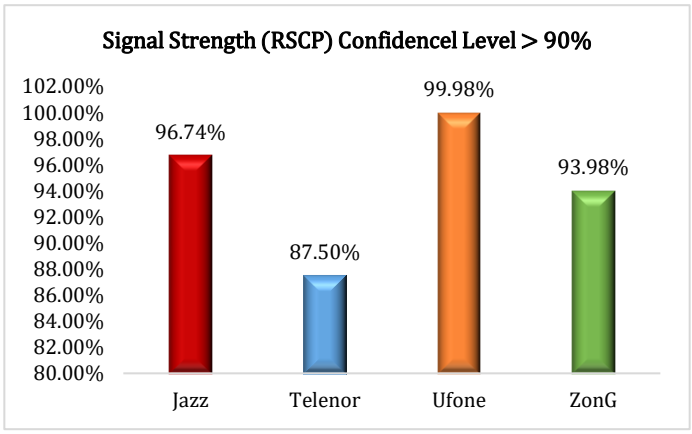



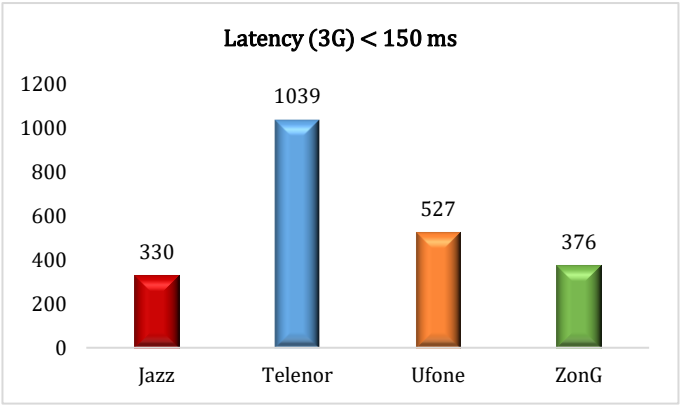
# QUALITY OF SERVICE SURVEY RESULTS (3G) – DHADDAR



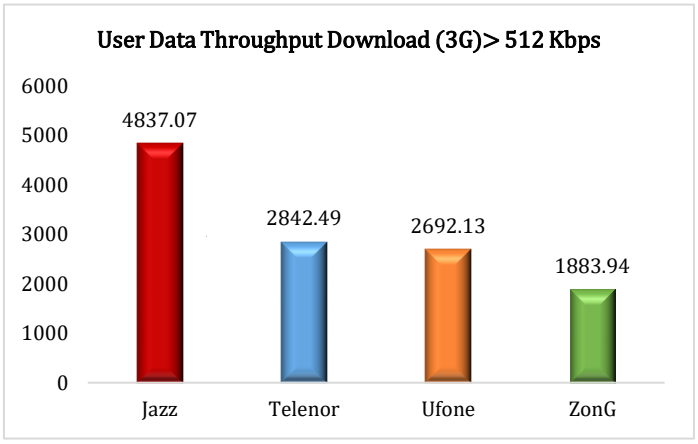



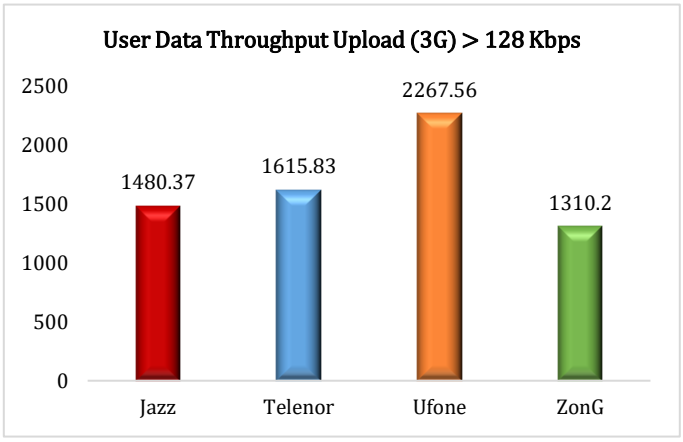



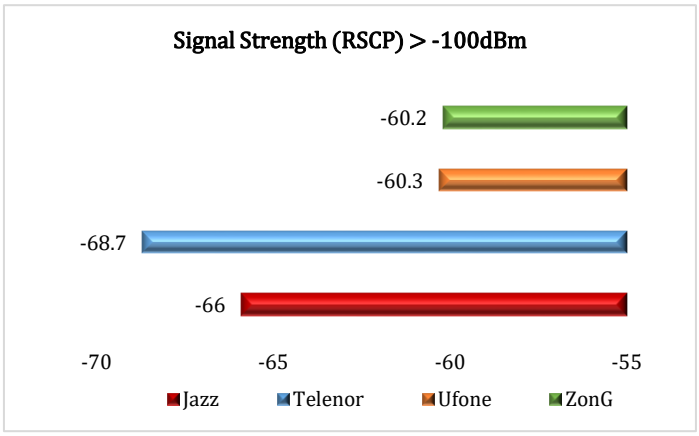



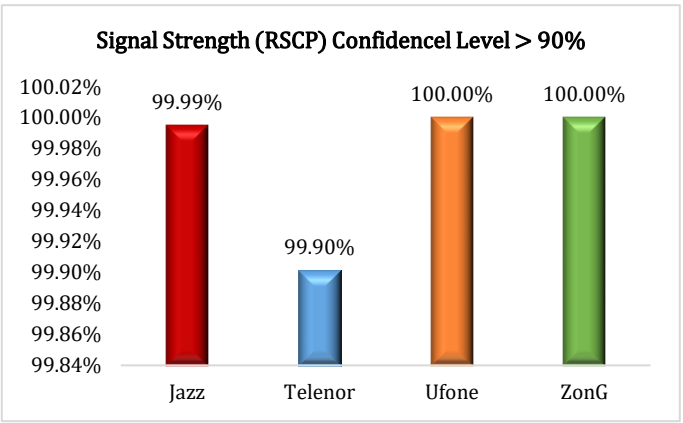



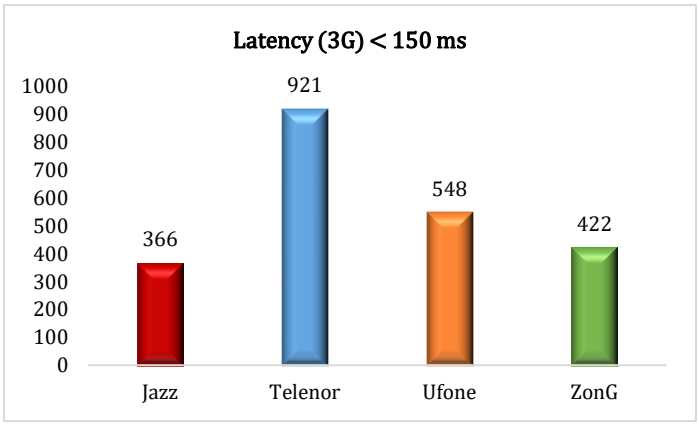
# QUALITY OF SERVICE SURVEY RESULTS (3G) – QUETTA



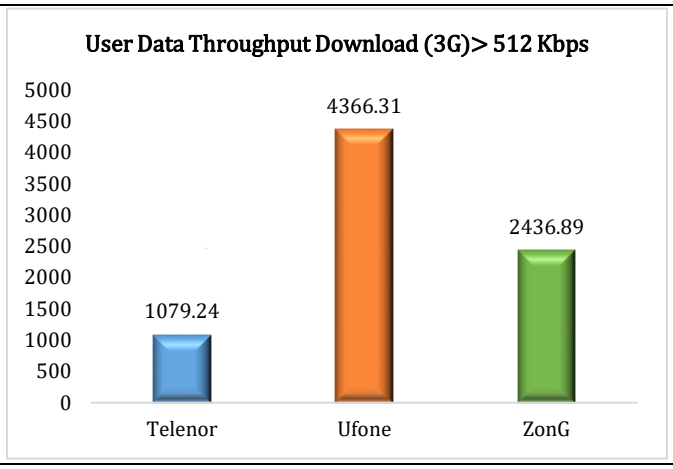



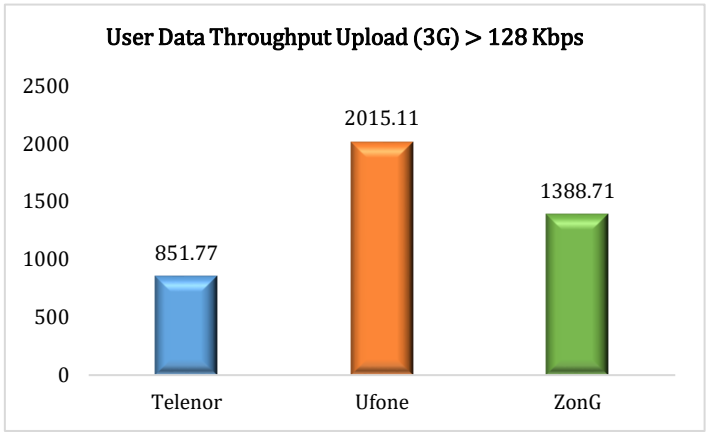



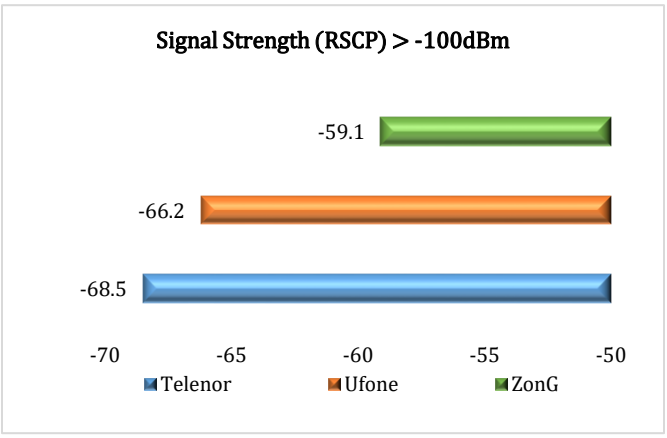



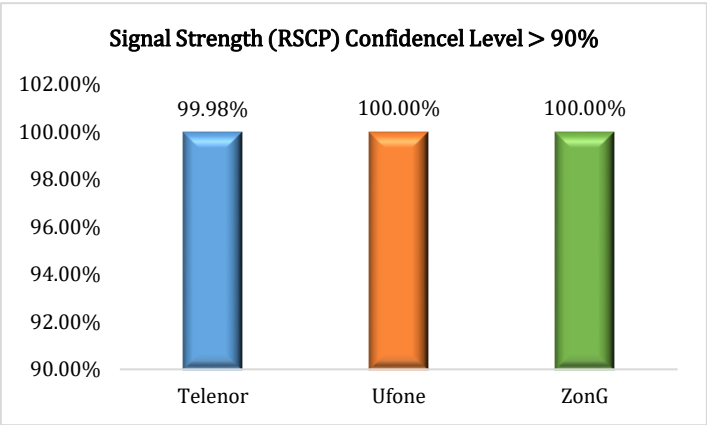



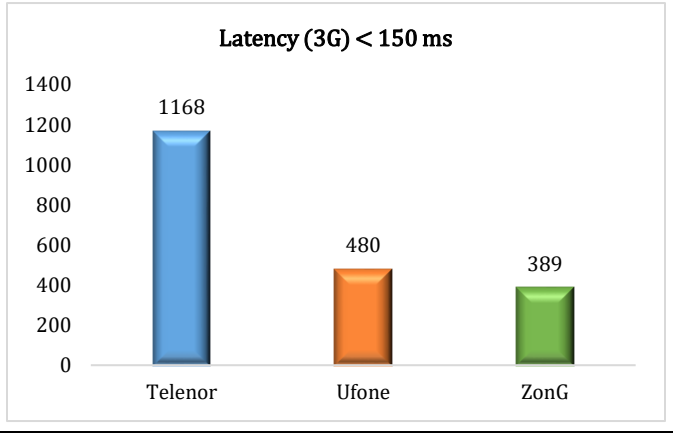
# QUALITY OF SERVICE SURVEY RESULTS (3G) –ZHOB



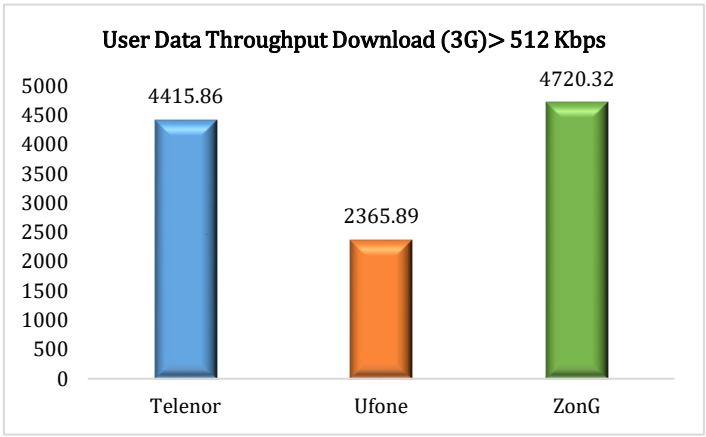



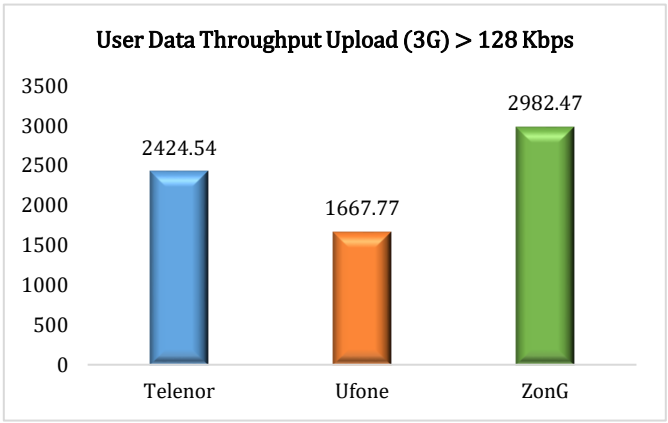



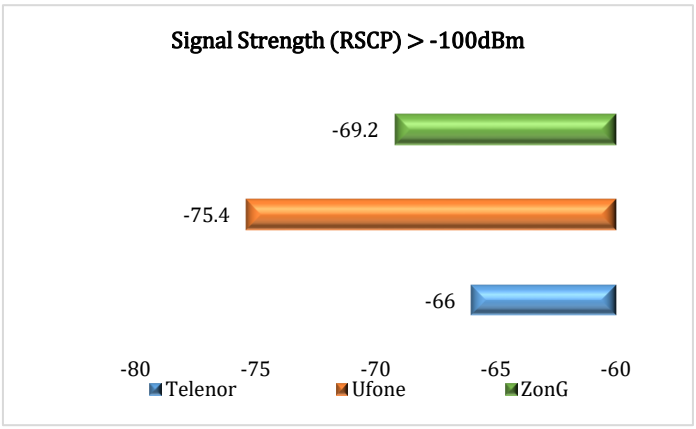



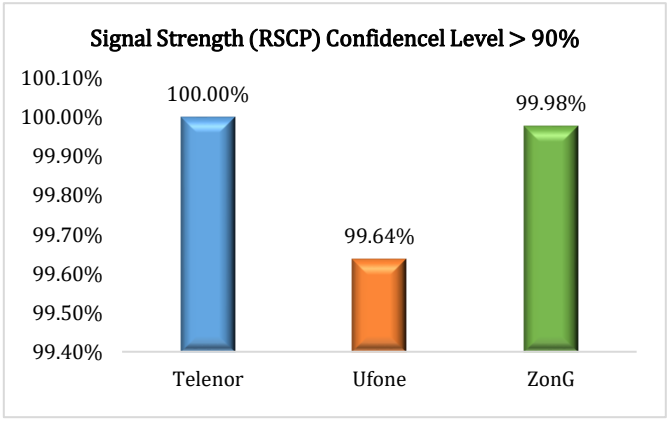



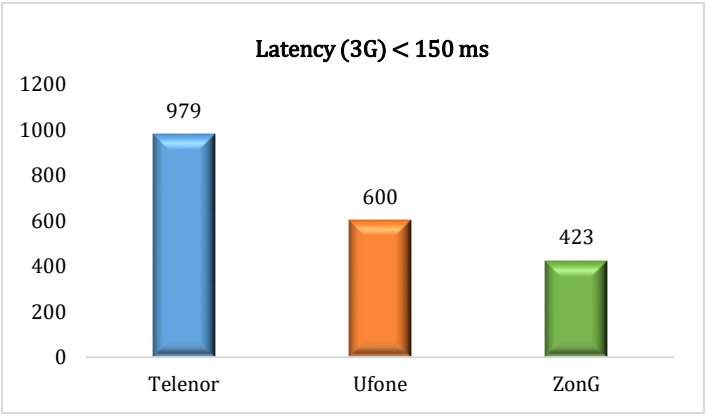
# QUALITY OF SERVICE SURVEY RESULTS (3G) – ZIARAT



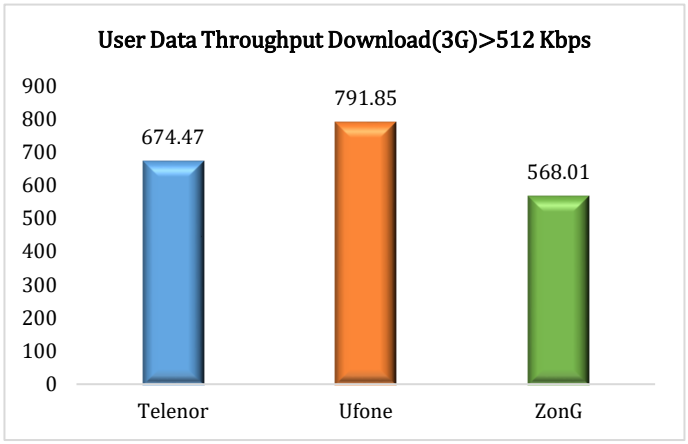



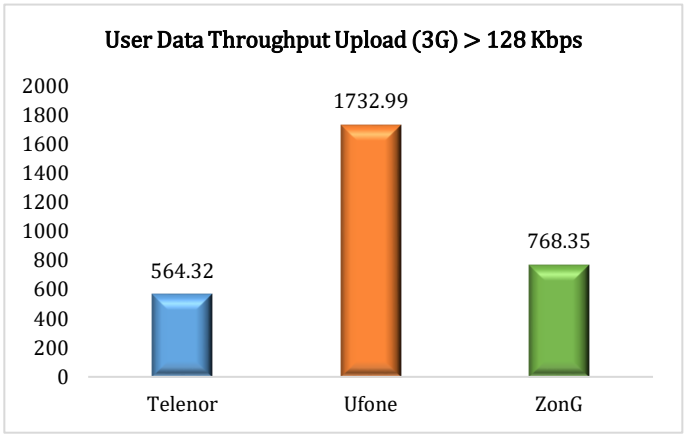



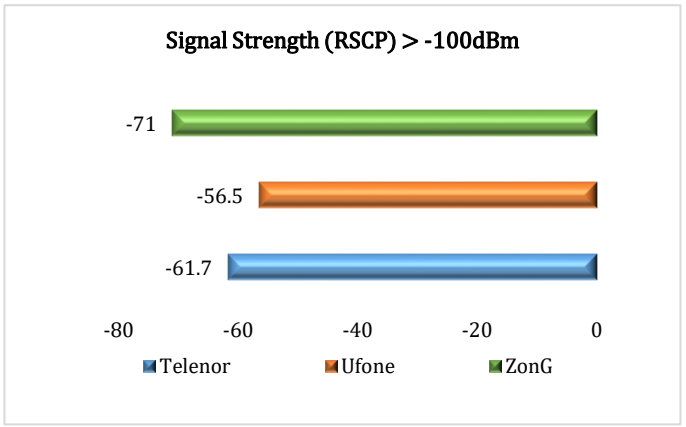



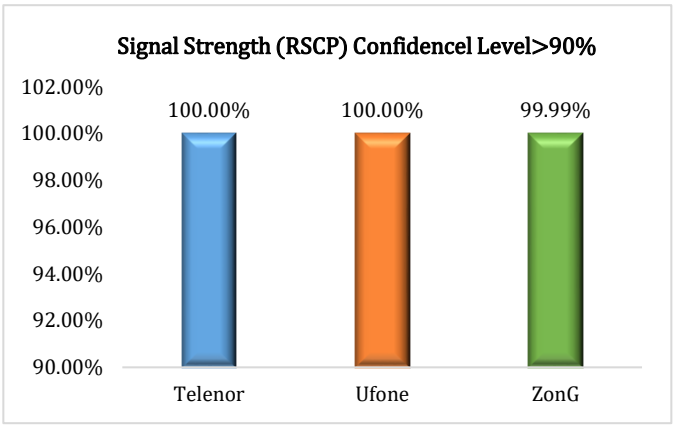



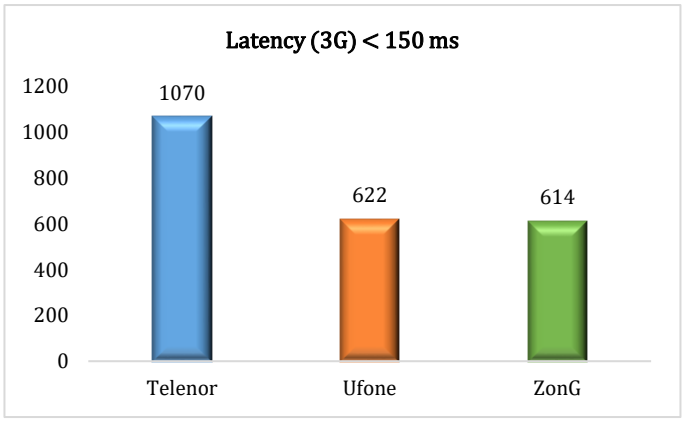
# QUALITY OF SERVICE SURVEY RESULTS (3G) – DALBANDIN



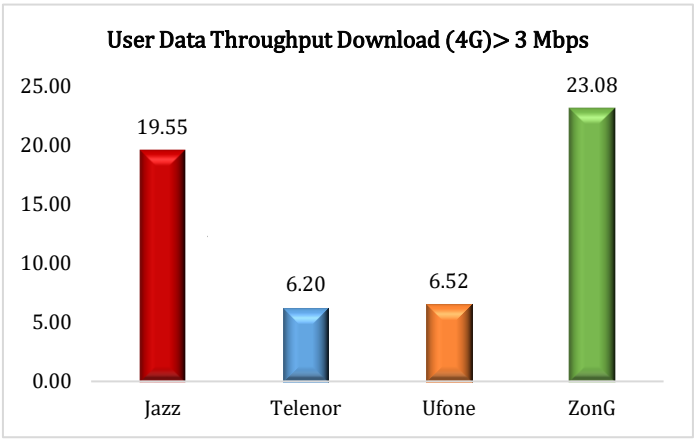



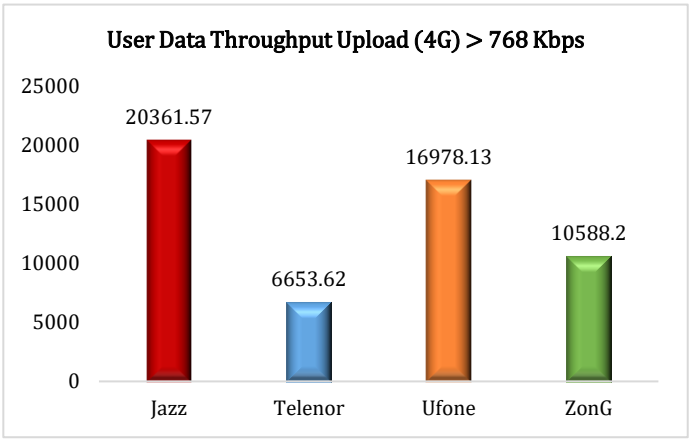



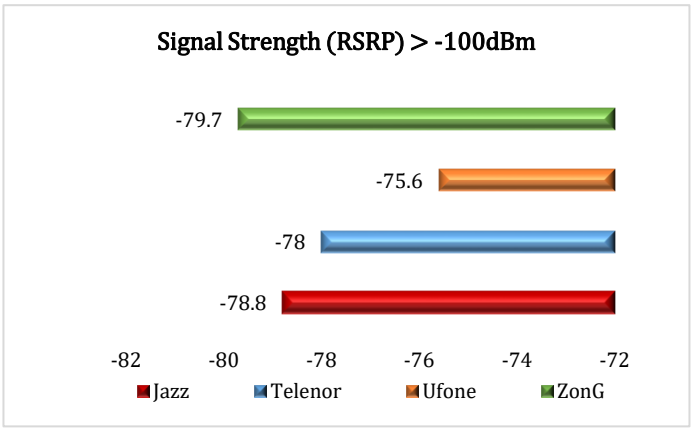
Annex-B1

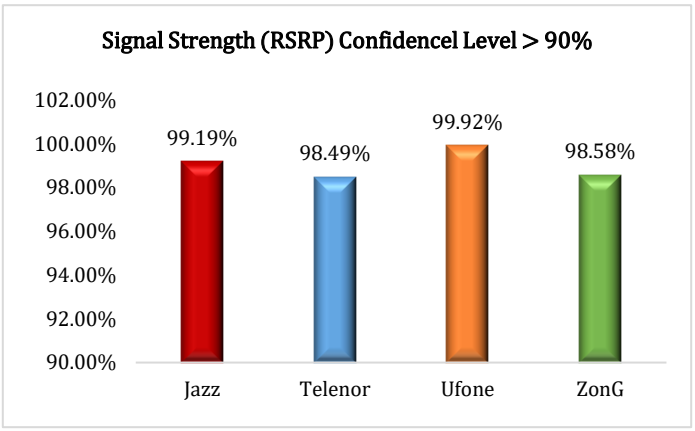
# MOBILE BROADBAND 4G KPIs RESULT

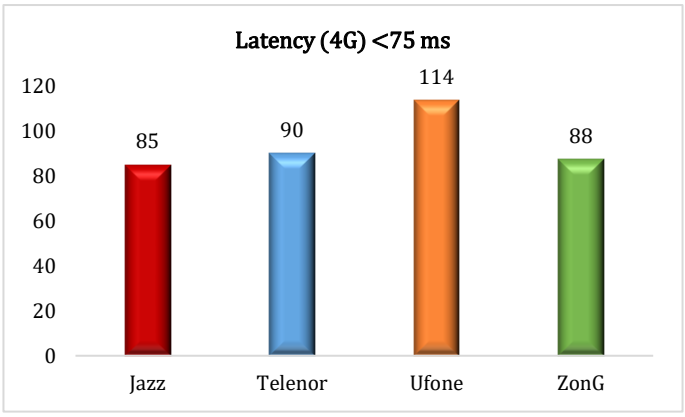
# QUALITY OF SERVICE SURVEY RESULTS (4G) – BHAKKAR



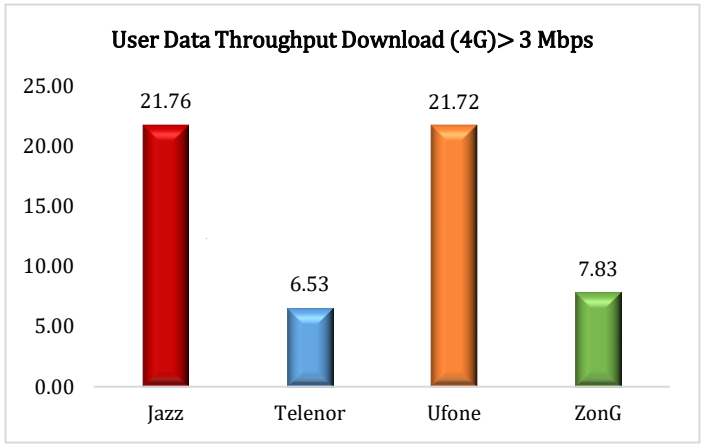



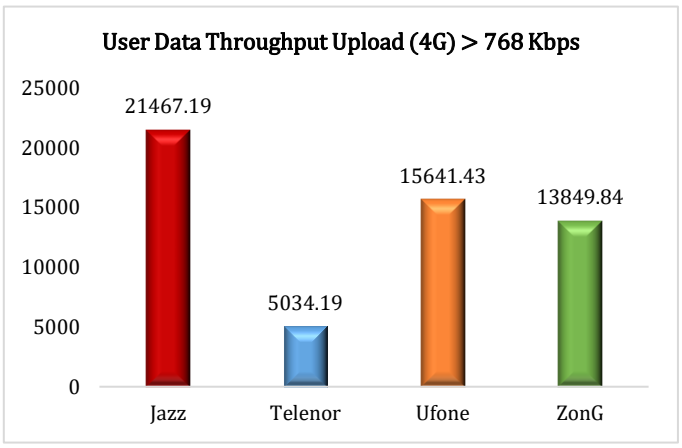



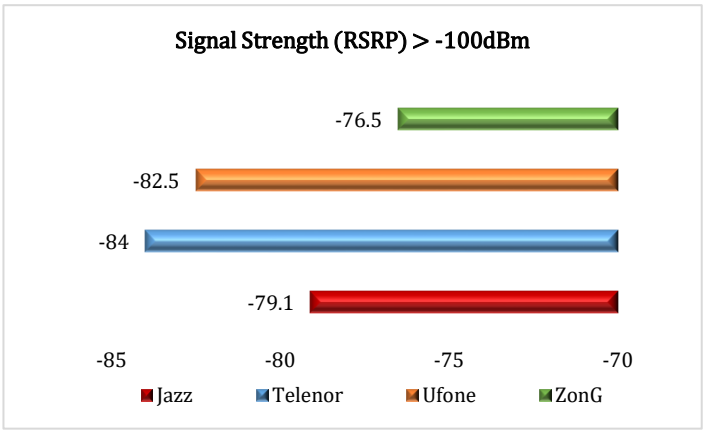



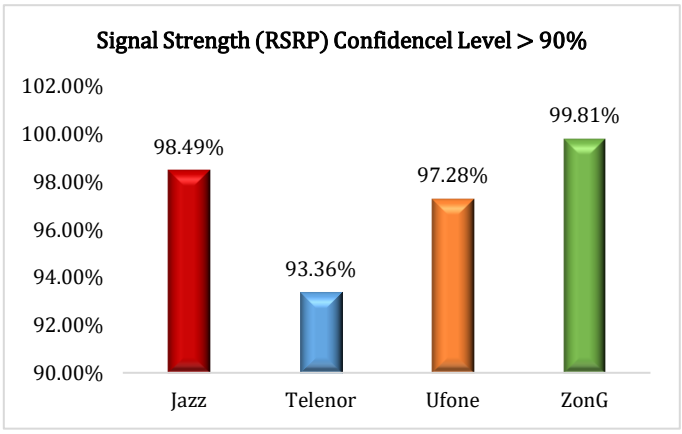



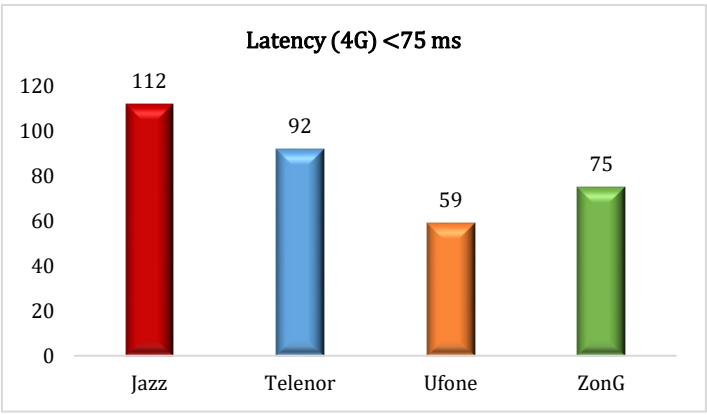
# QUALITY OF SERVICE SURVEY RESULTS (4G) –BUREWALA



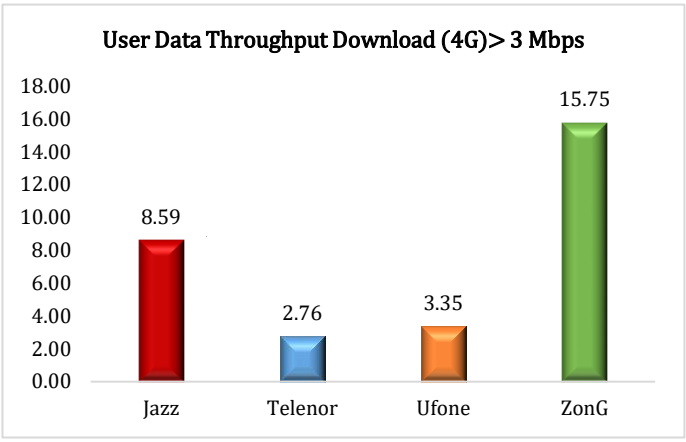



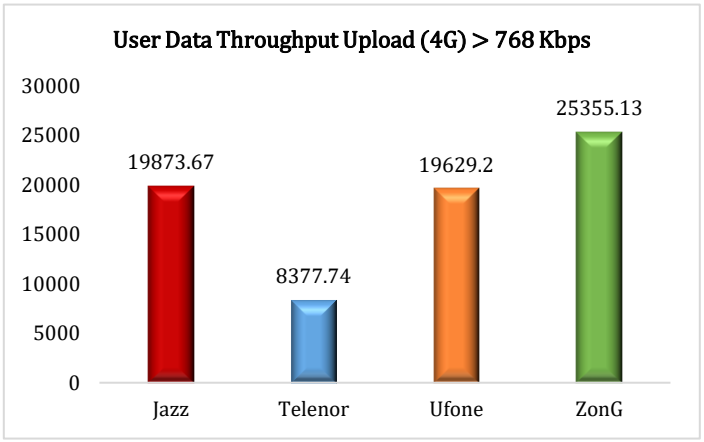



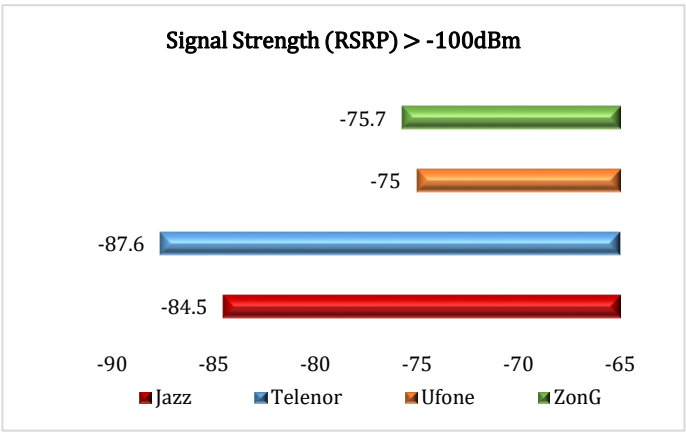



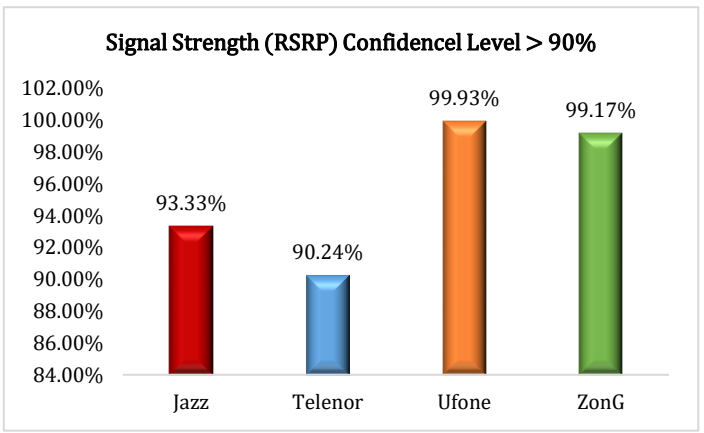



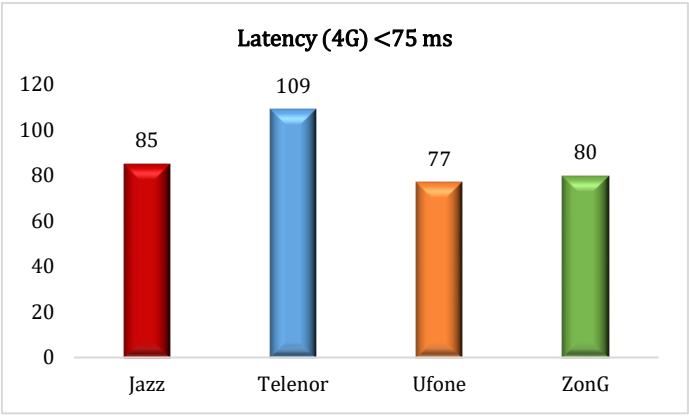
# QUALITY OF SERVICE SURVEY RESULTS (4G) – CHAKWAL



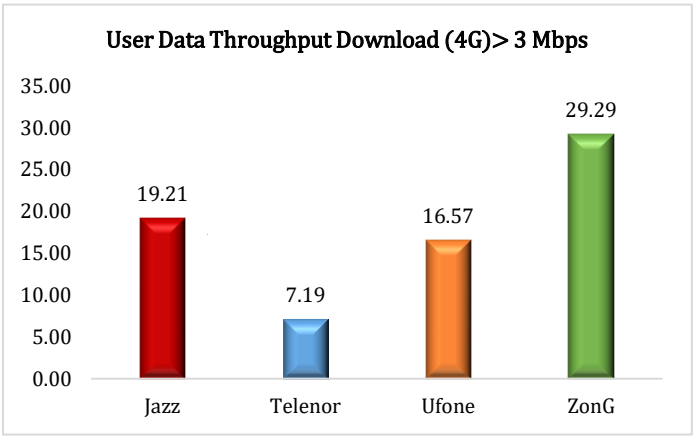



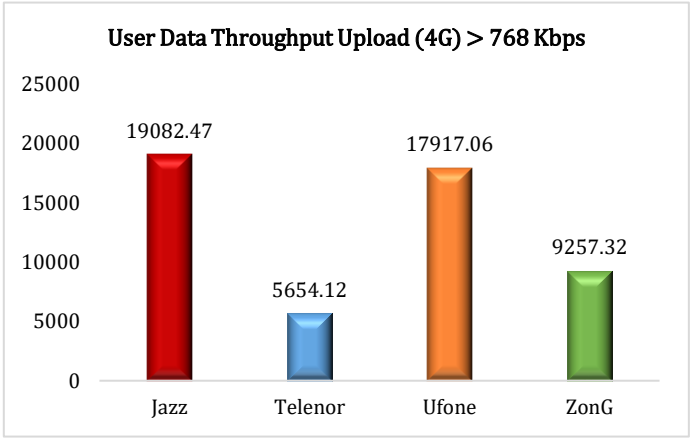



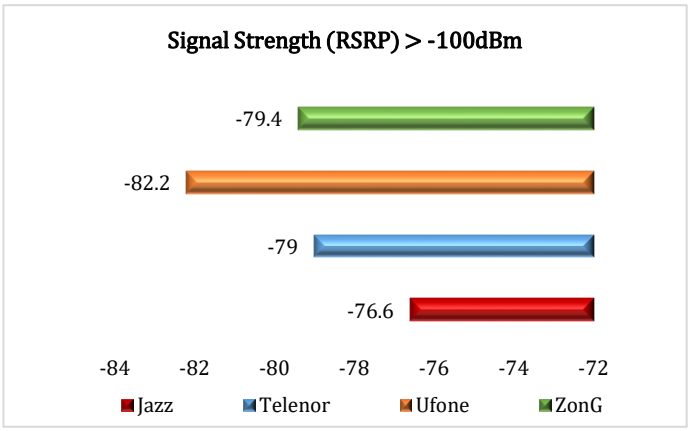



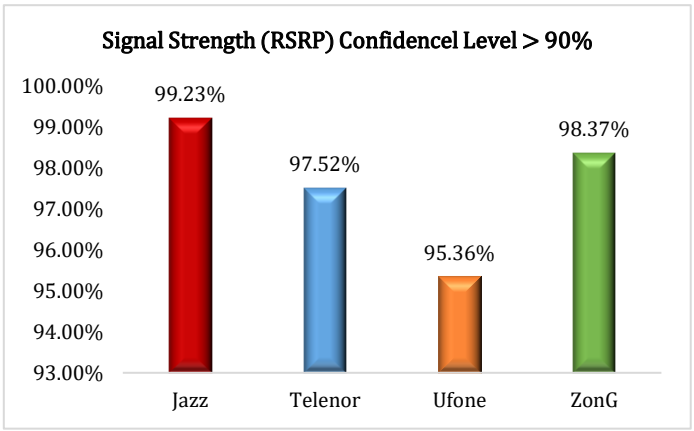



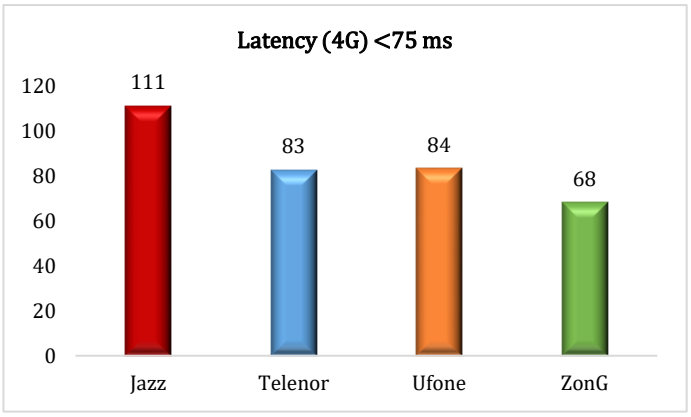
# QUALITY OF SERVICE SURVEY RESULTS (4G) – FAISALABAD



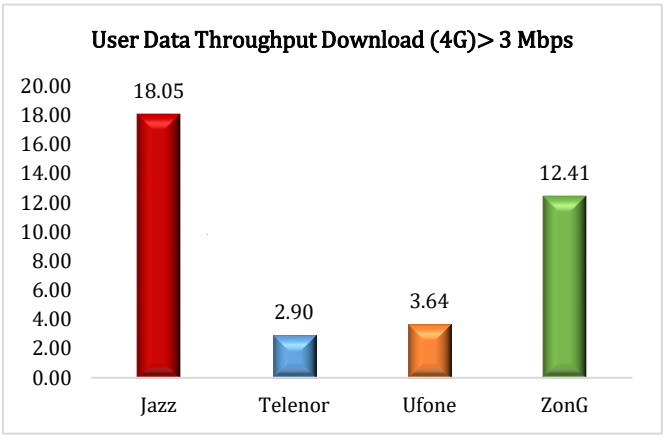



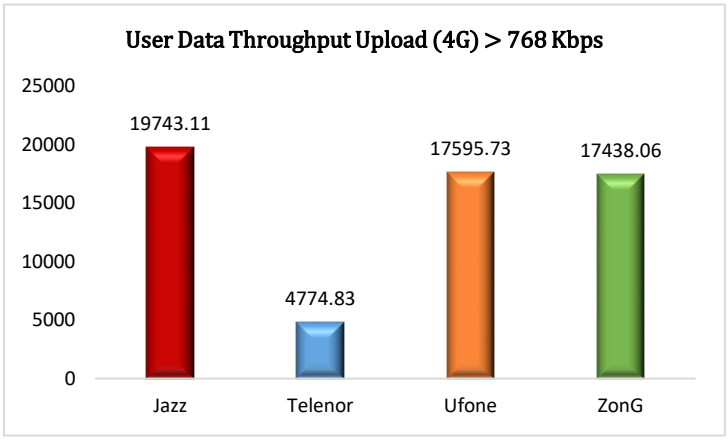



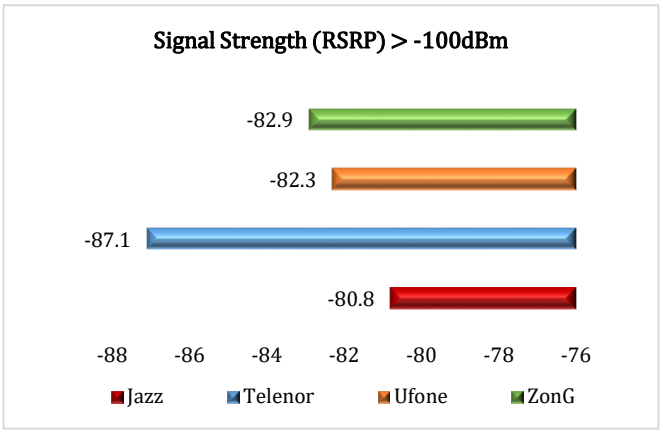



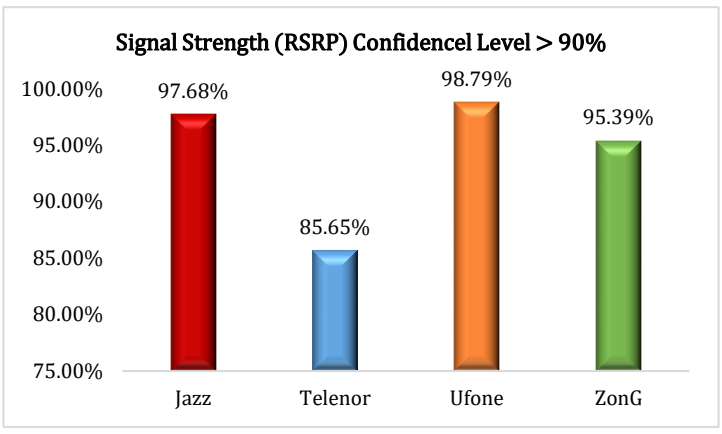



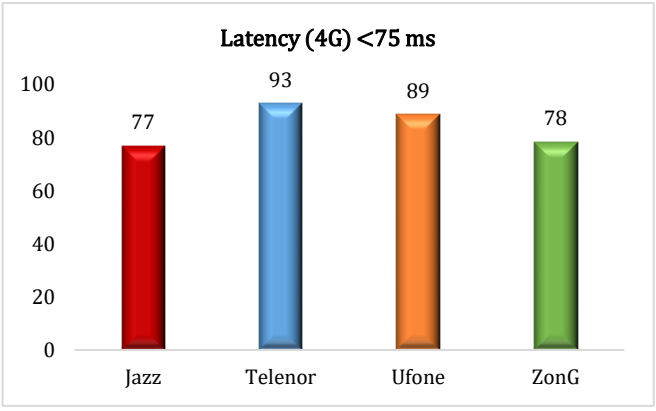
# QUALITY OF SERVICE SURVEY RESULTS (4G) – JHELUM



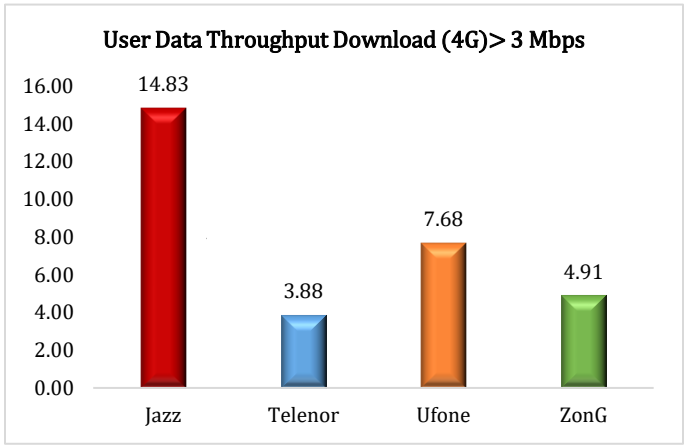



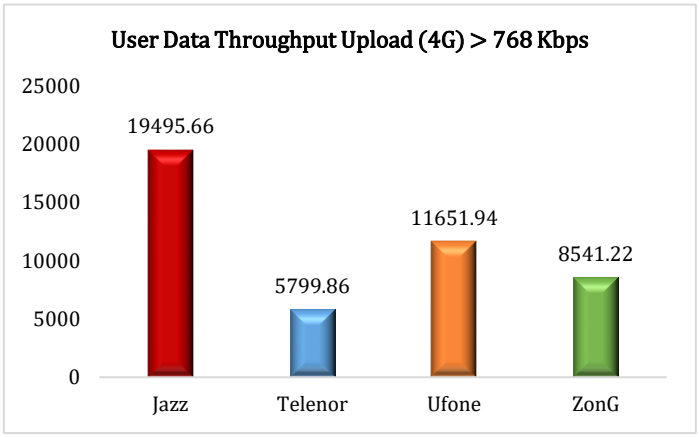



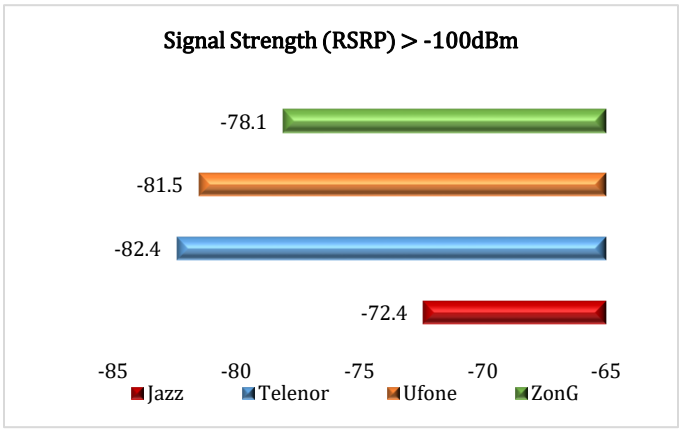



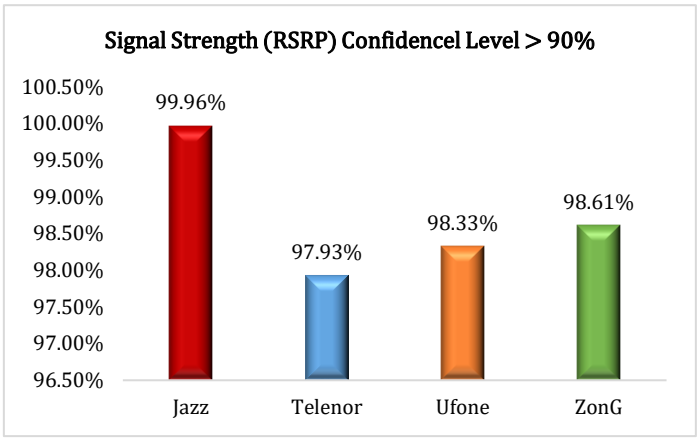



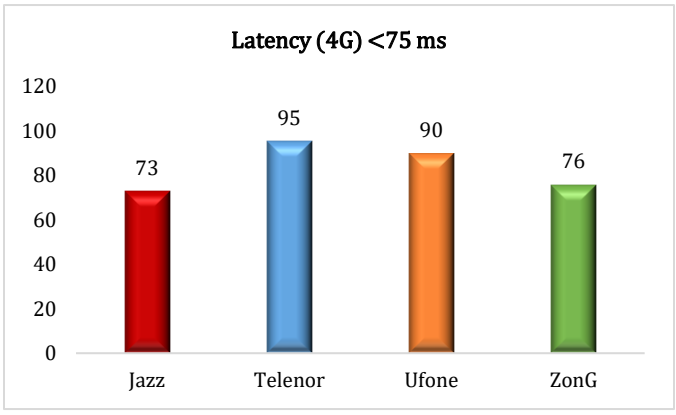
# QUALITY OF SERVICE SURVEY RESULTS (4G) – LAYYAH



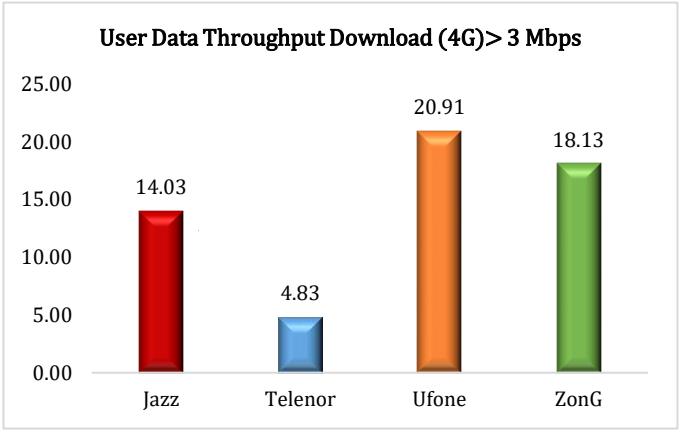



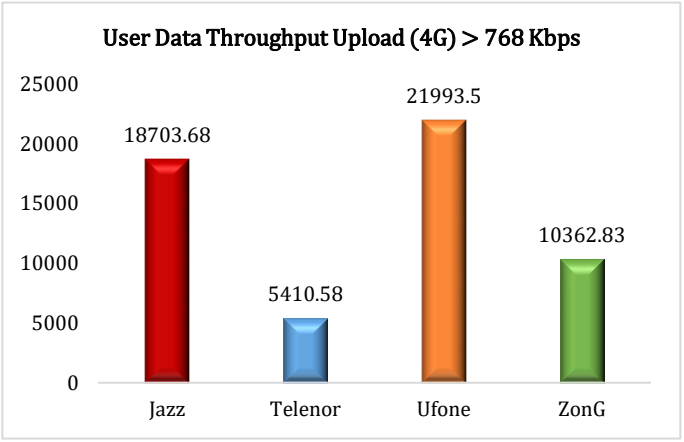



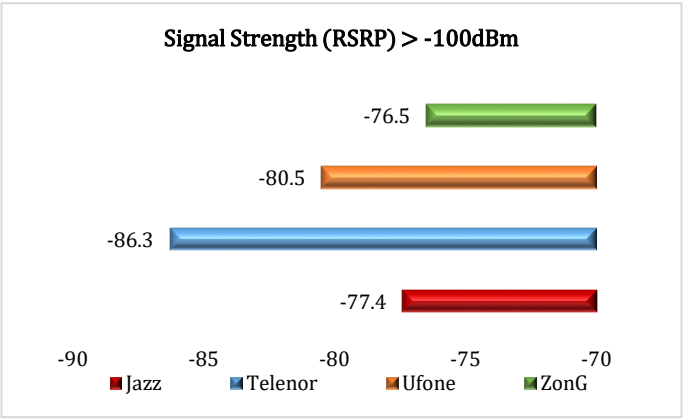



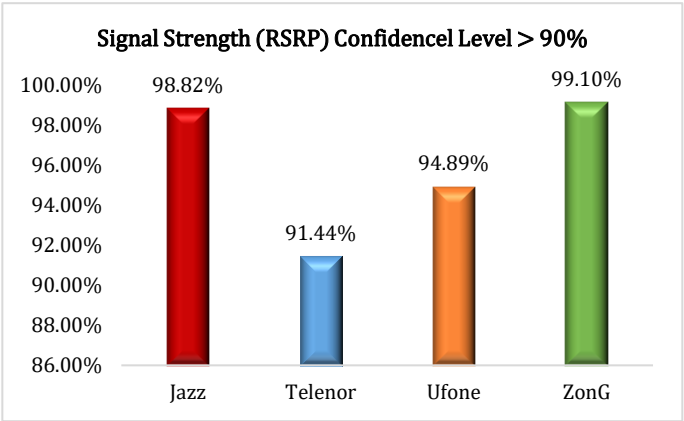



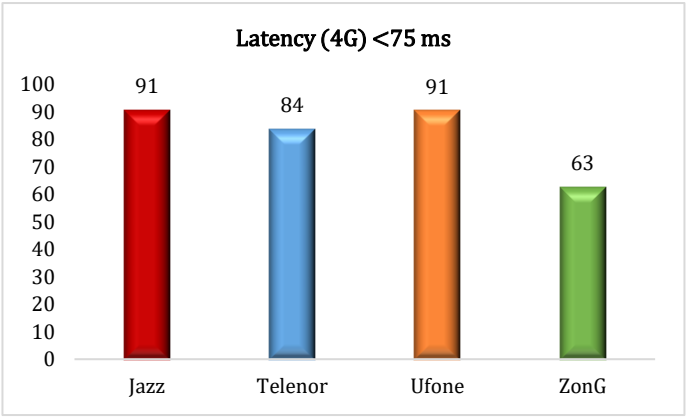
# QUALITY OF SERVICE SURVEY RESULTS (4G) – OKARA



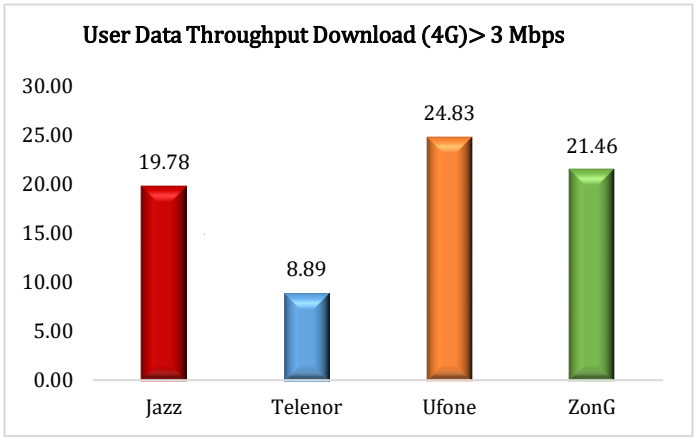



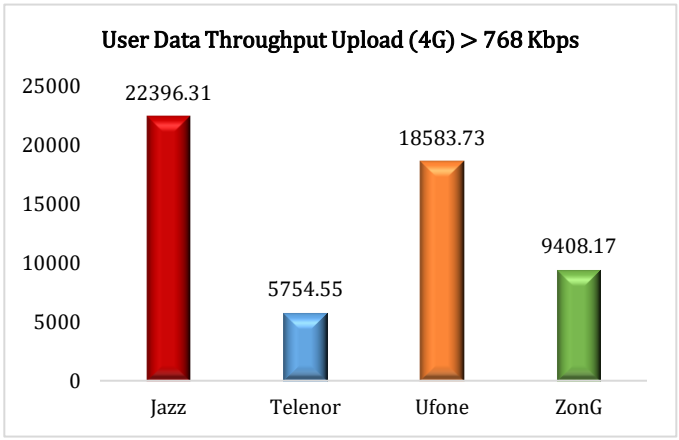



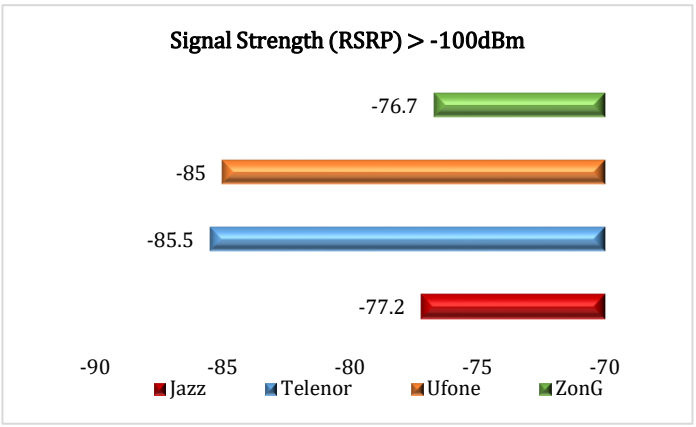



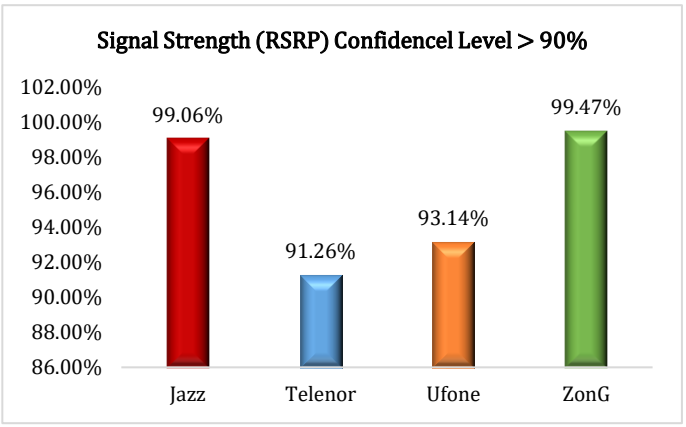



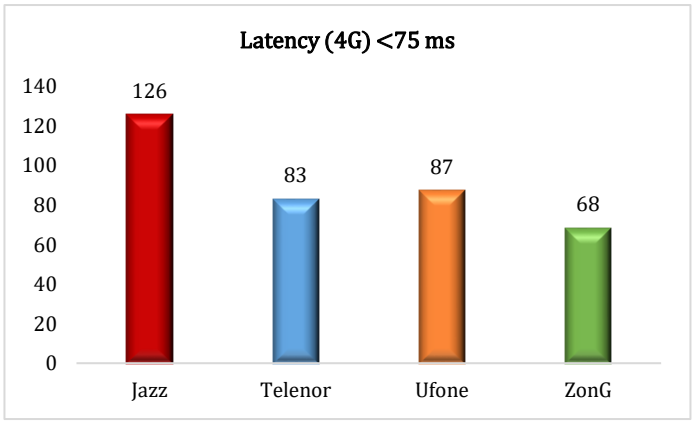
# QUALITY OF SERVICE SURVEY RESULTS (4G) – SAHIWAL



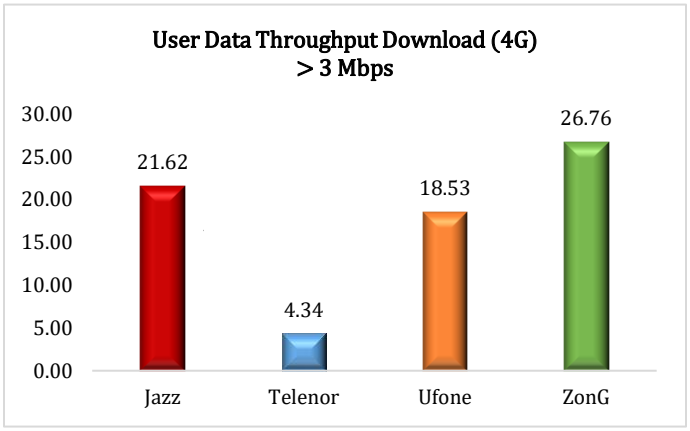



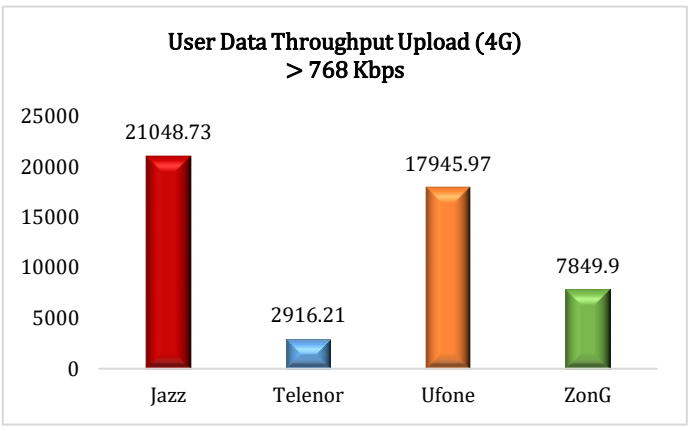



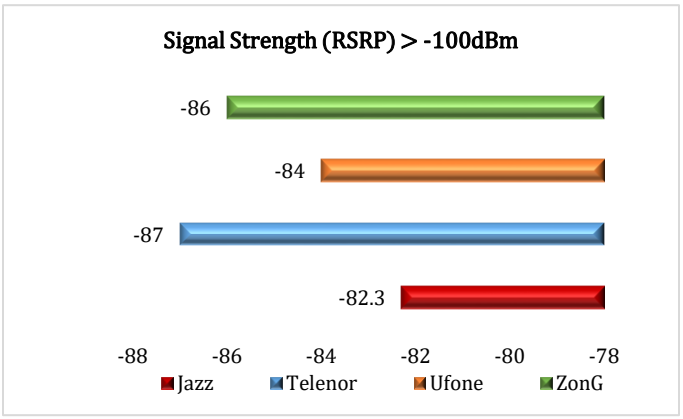



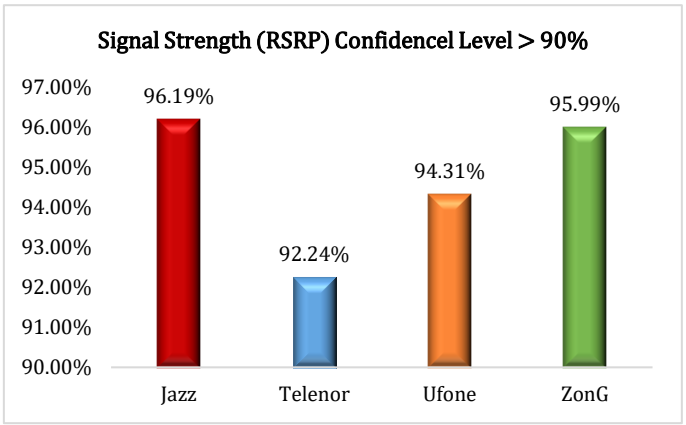



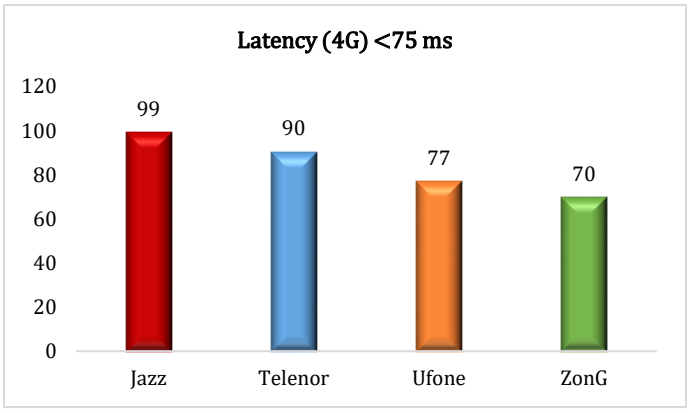
# QUALITY OF SERVICE SURVEY RESULTS (4G) – GOJRA



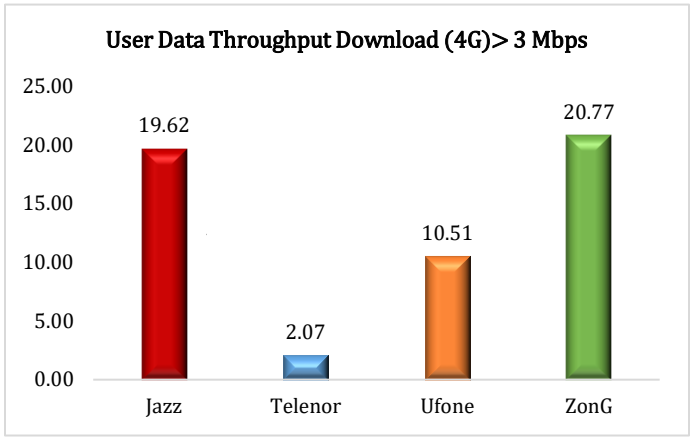



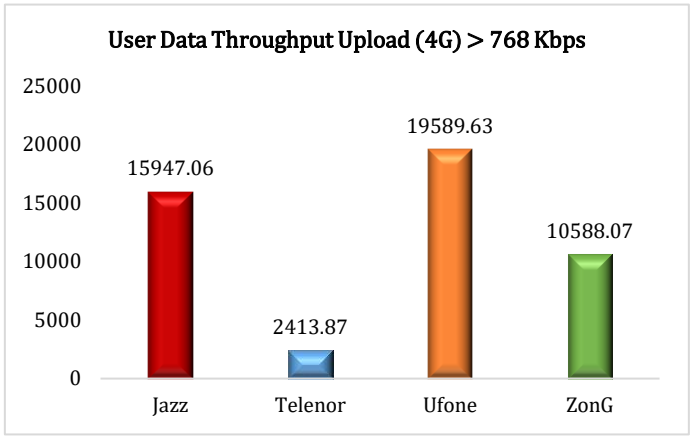



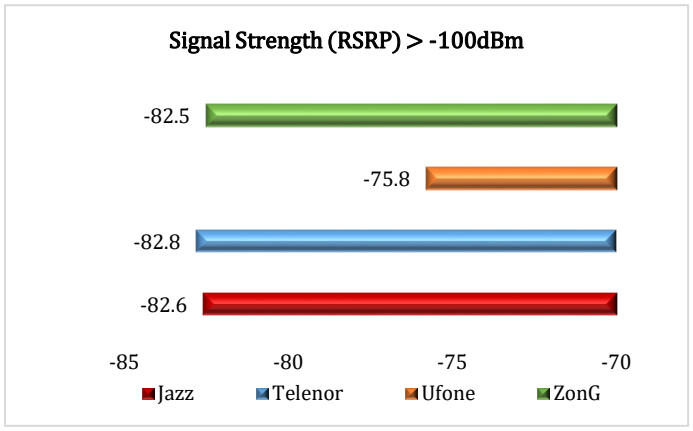



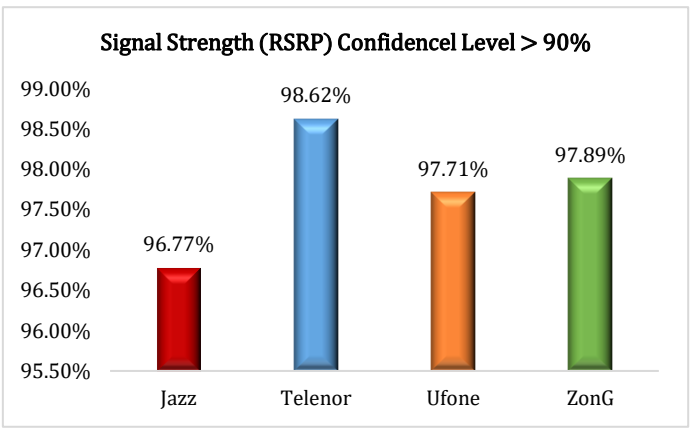



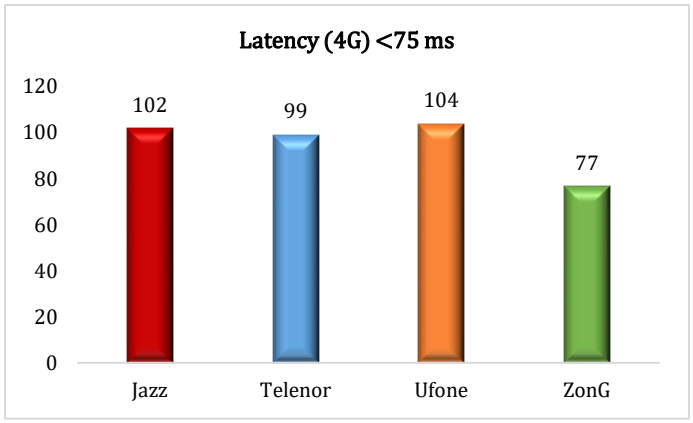
# QUALITY OF SERVICE SURVEY RESULTS (4G) – MANDI BAHAUDIN



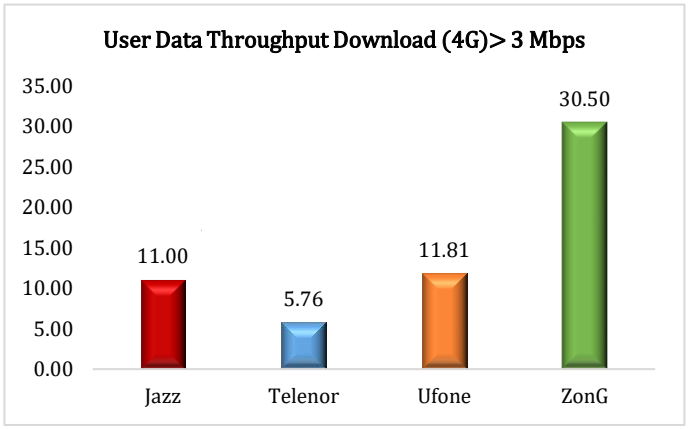



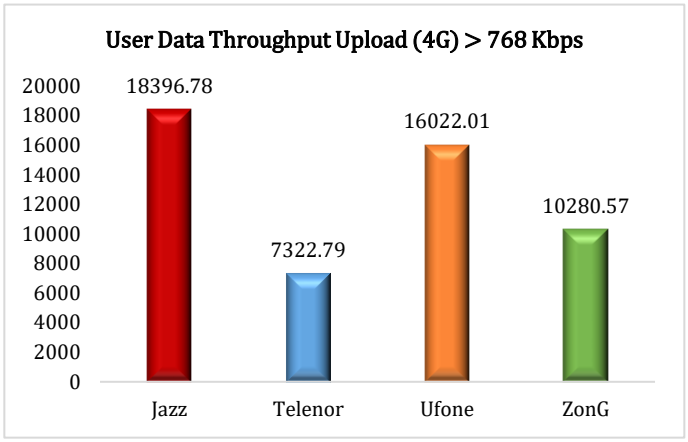



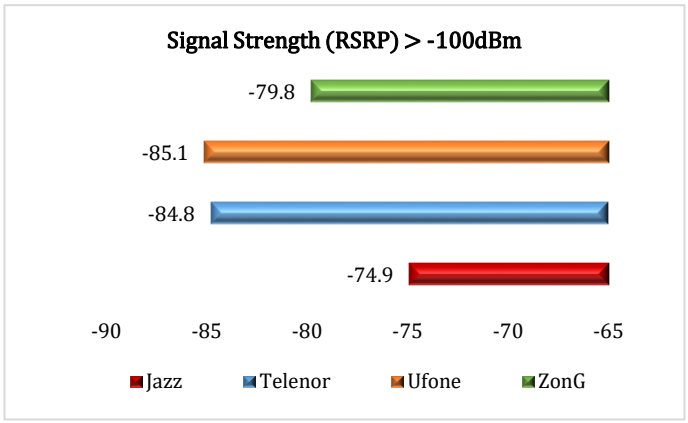



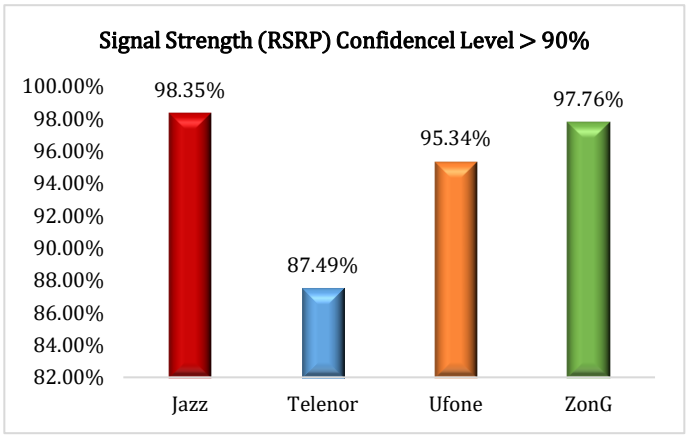



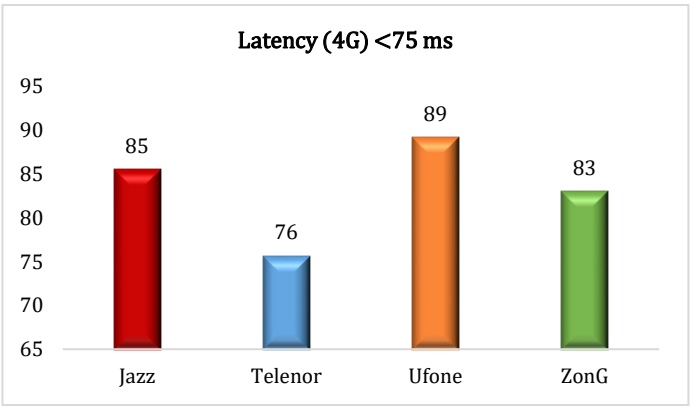
# QUALITY OF SERVICE SURVEY RESULTS (4G) – SHAKARGARH



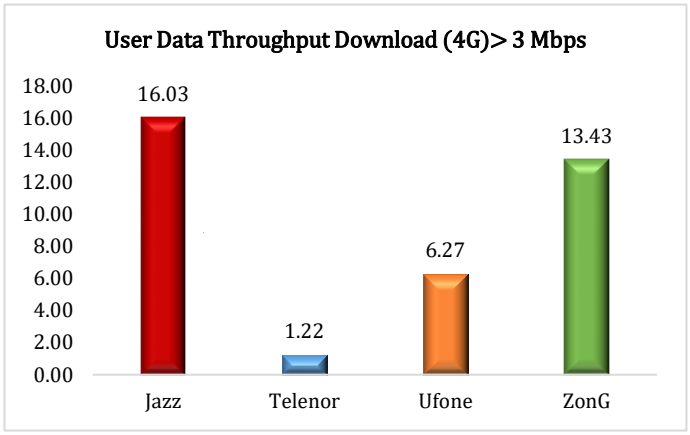



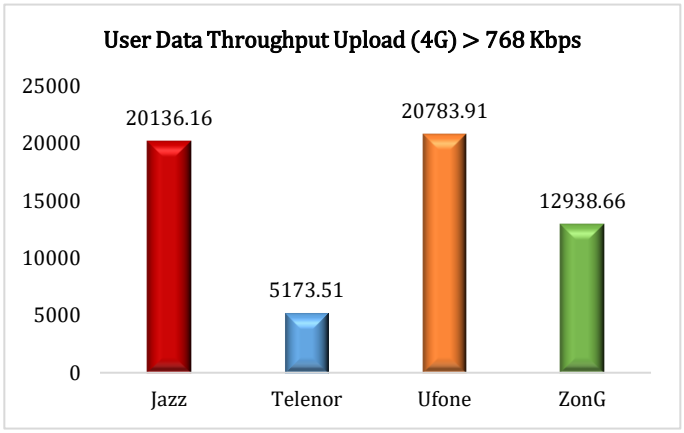



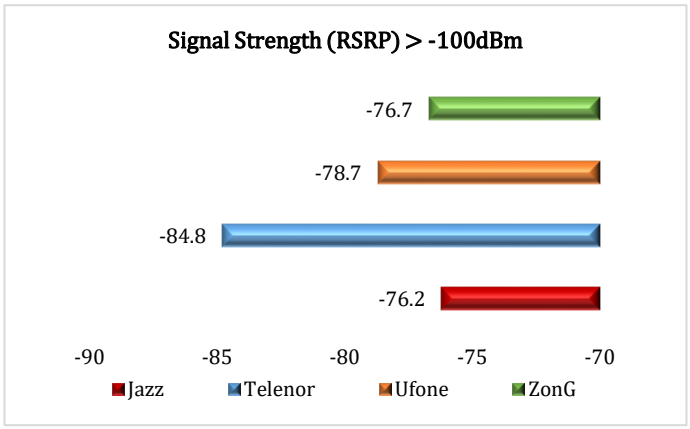



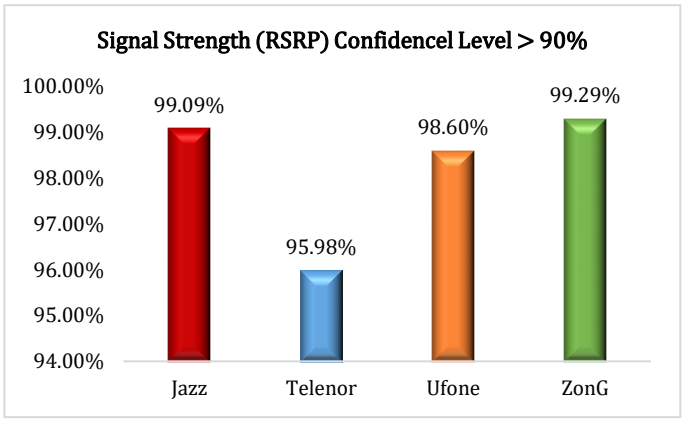



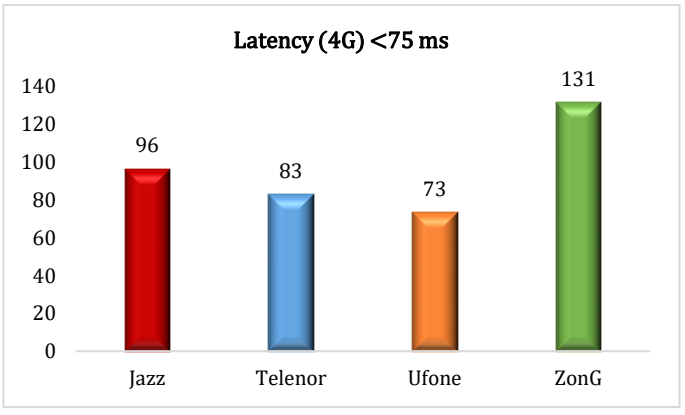
# QUALITY OF SERVICE SURVEY RESULTS (4G) – ATTOCK



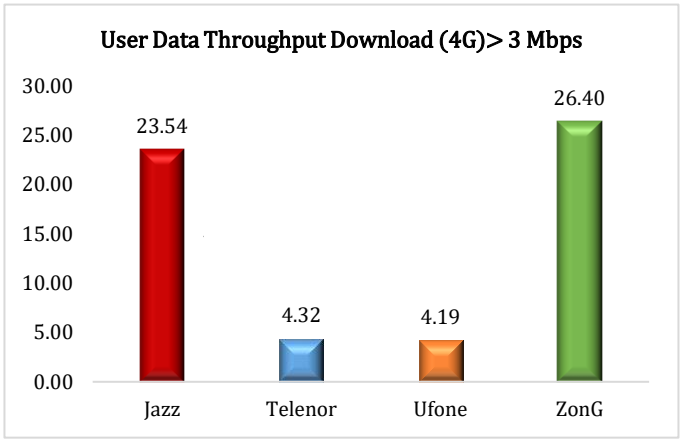



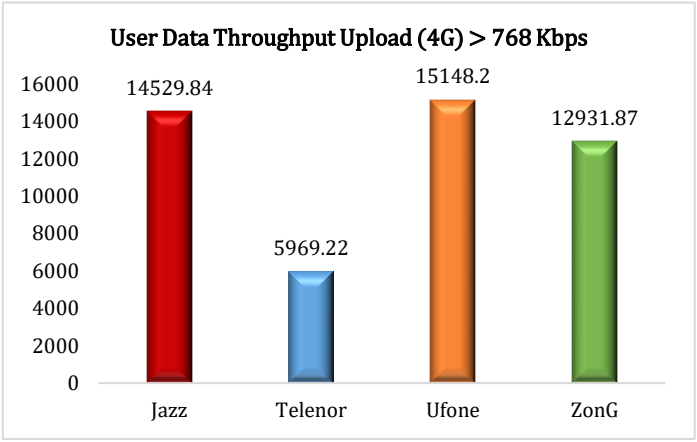



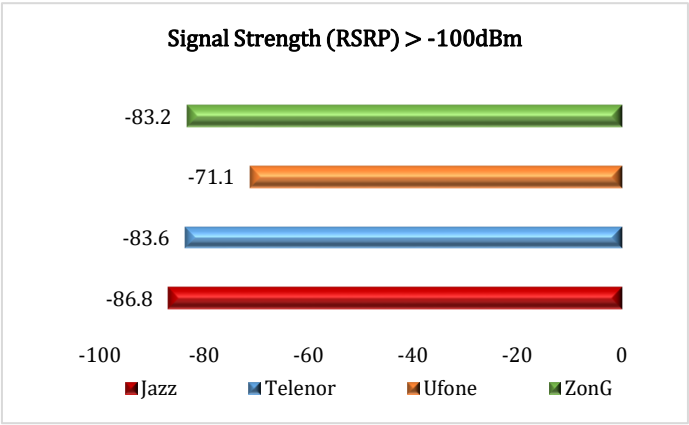



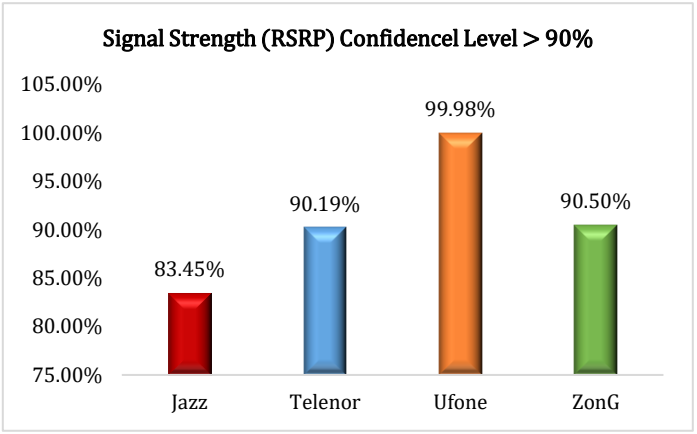



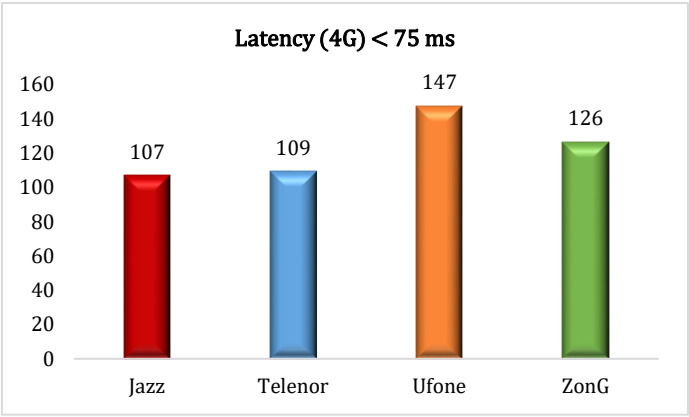
# QUALITY OF SERVICE SURVEY RESULTS (4G) – BANNU



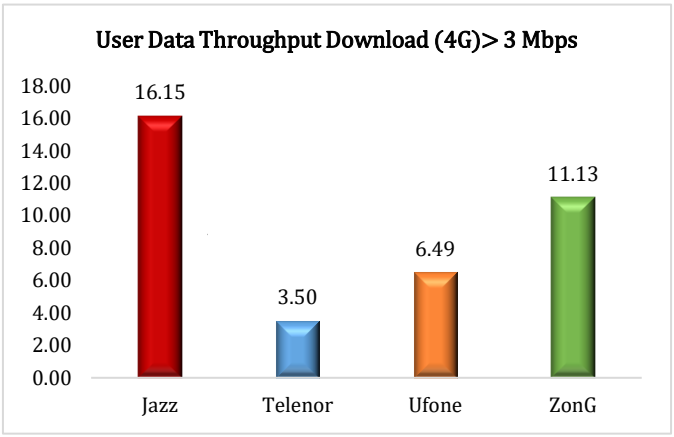



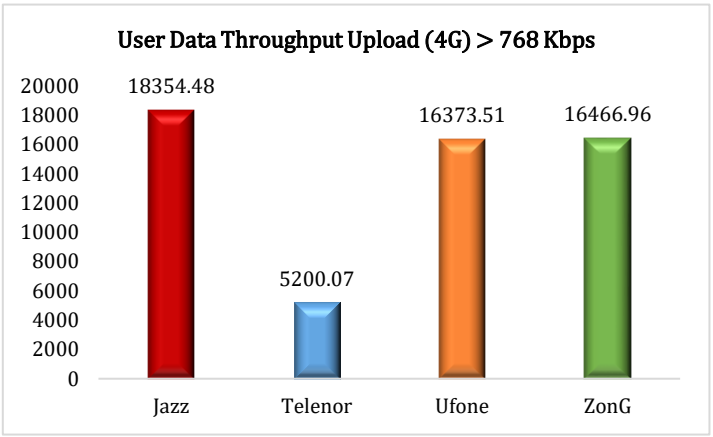



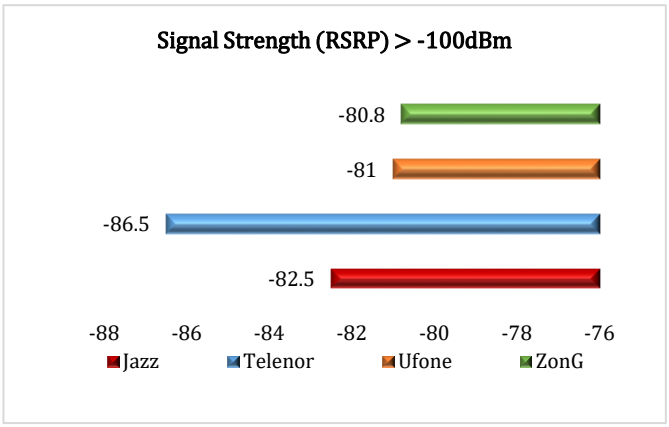



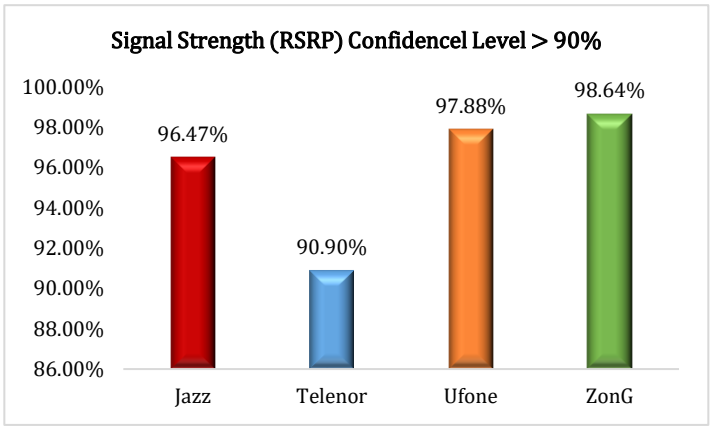



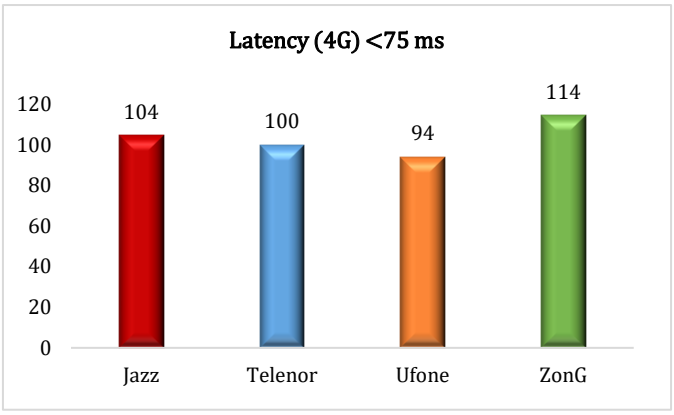
# QUALITY OF SERVICE SURVEY RESULTS (4G) – HARIPUR



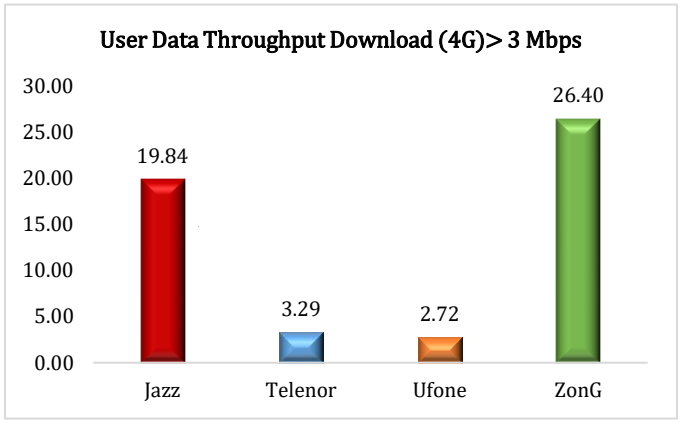



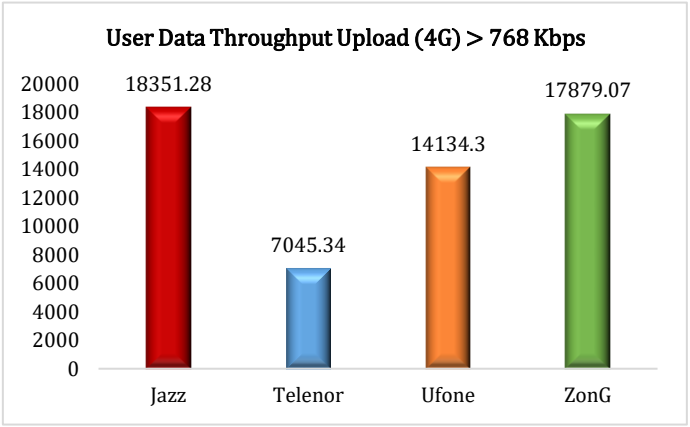



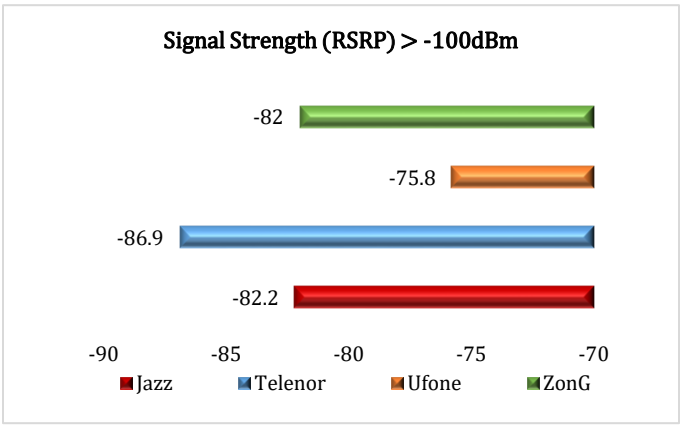



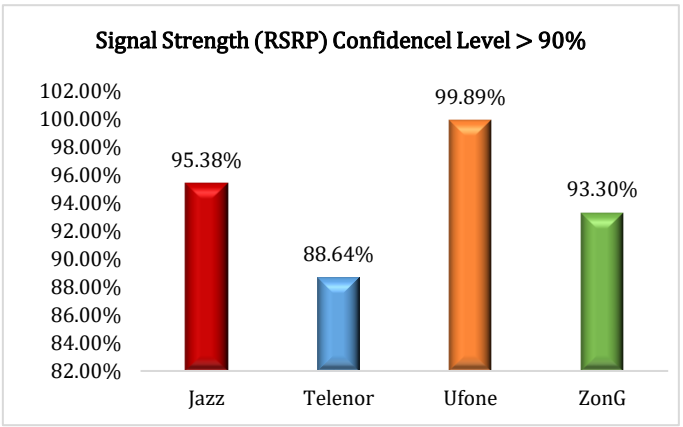



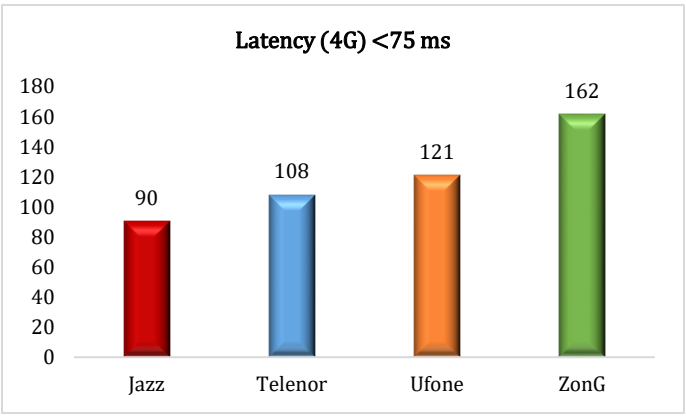
# QUALITY OF SERVICE SURVEY RESULTS (4G) – KOHAT



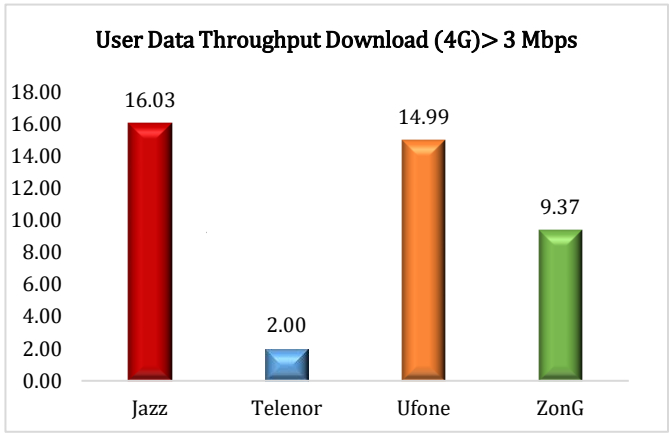



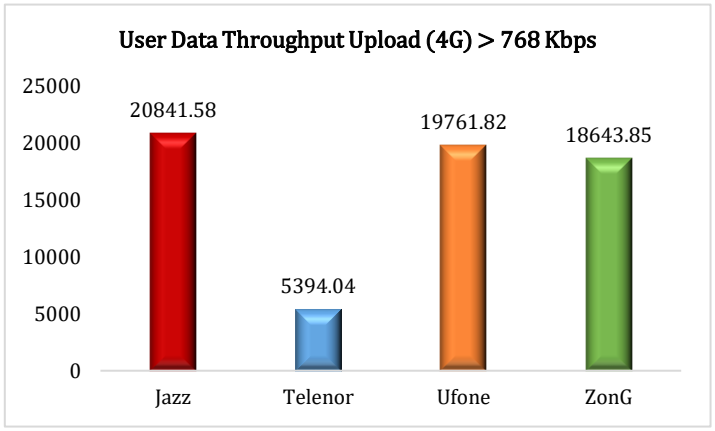



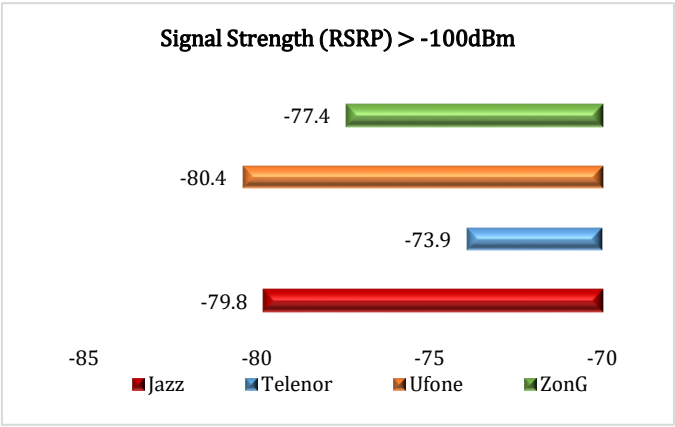



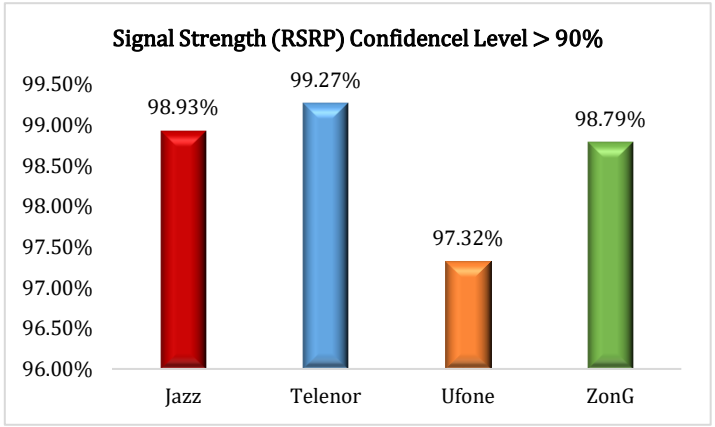



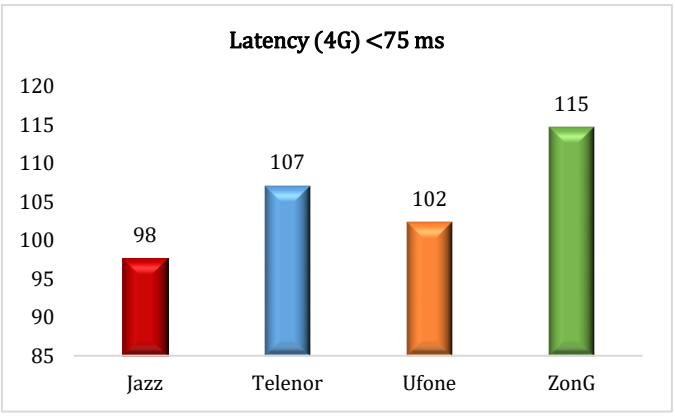
# QUALITY OF SERVICE SURVEY RESULTS (4G) – MANSEHRA



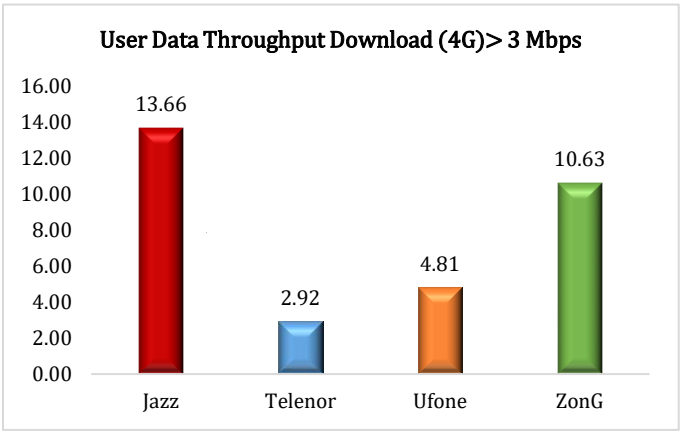



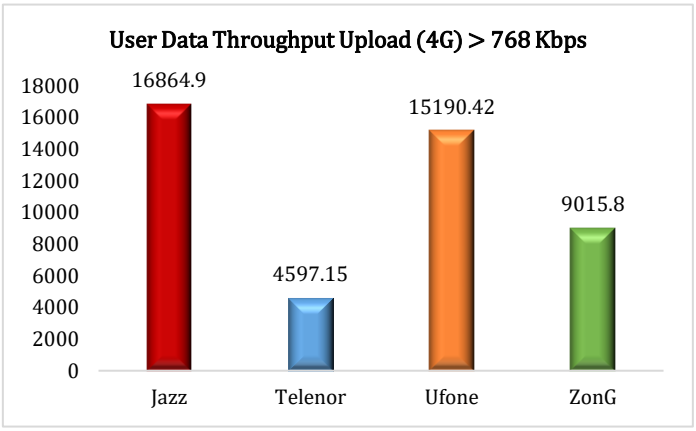



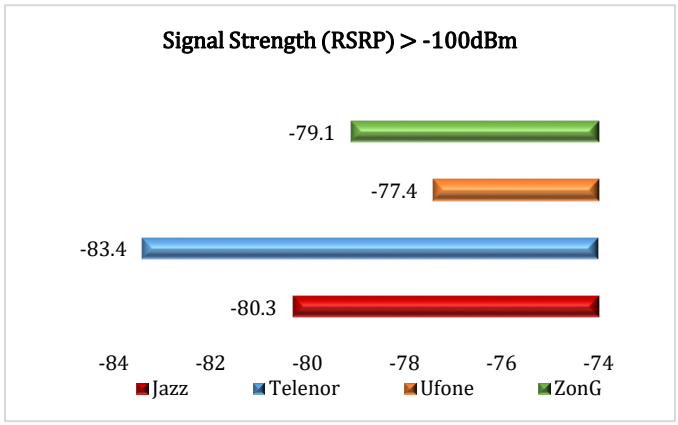



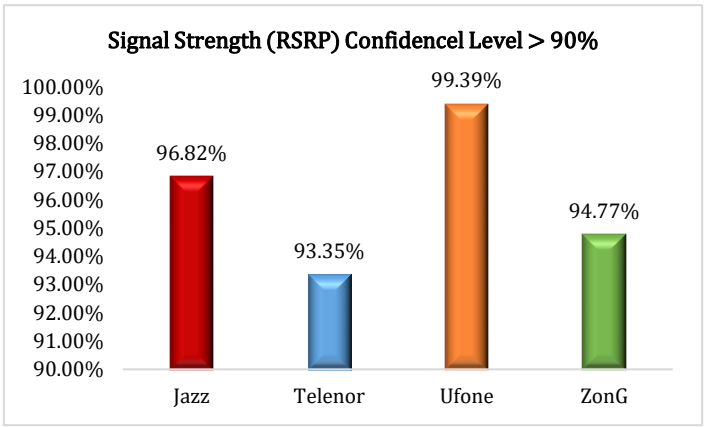



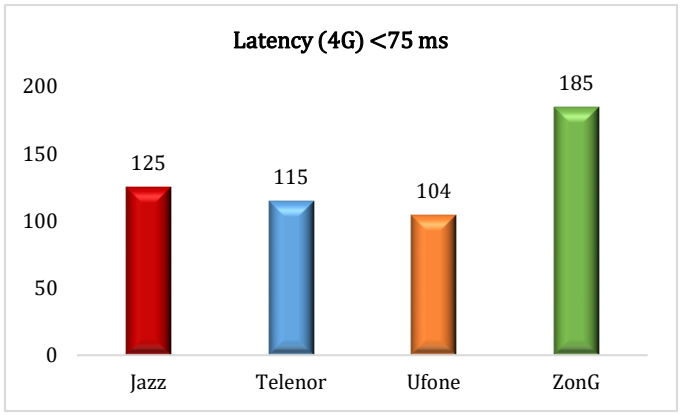
# QUALITY OF SERVICE SURVEY RESULTS (4G) – PESHAWAR



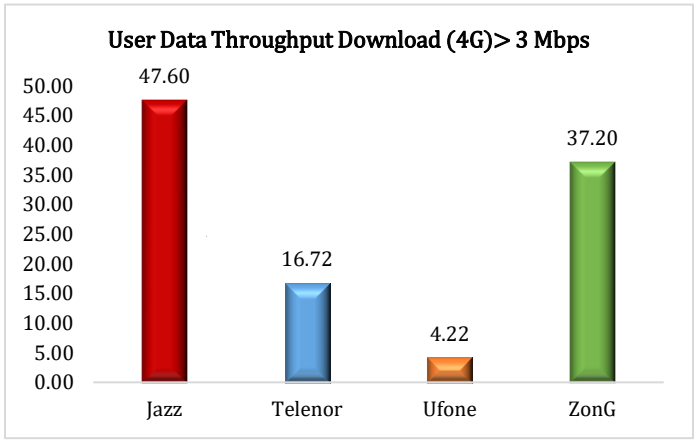



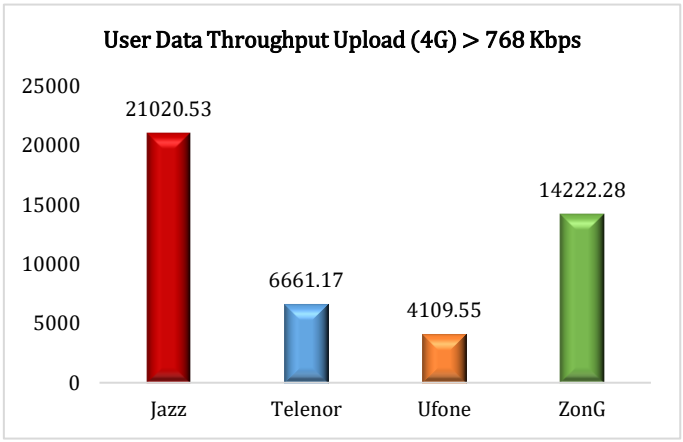



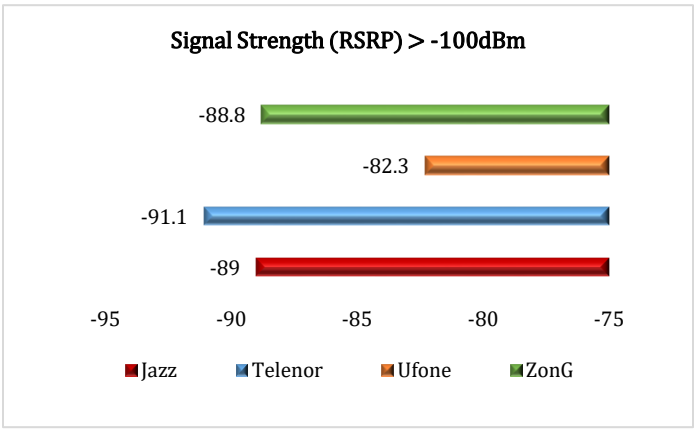



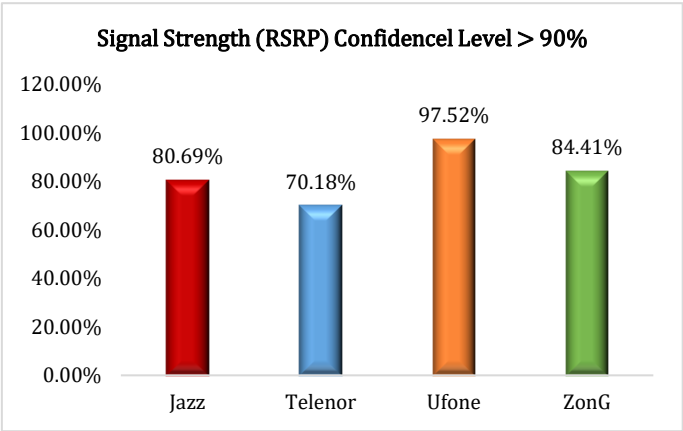



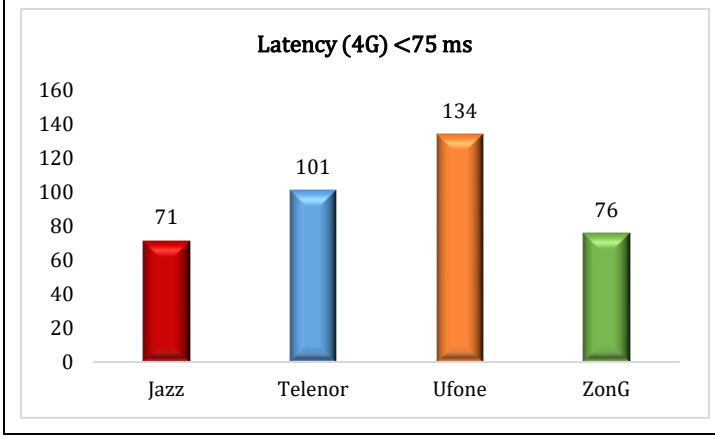
# QUALITY OF SERVICE SURVEY RESULTS (4G) – DHADDAR



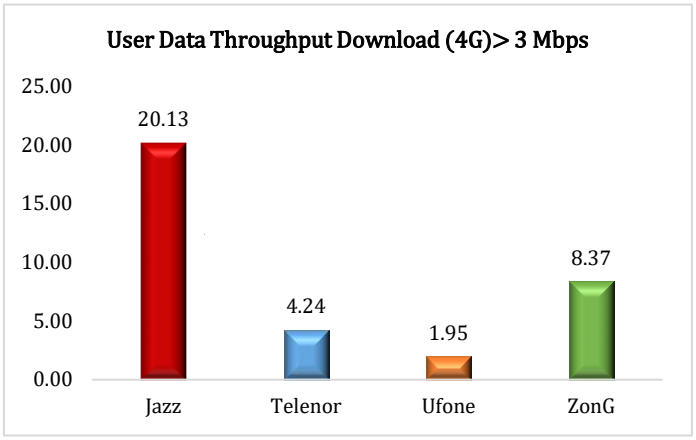



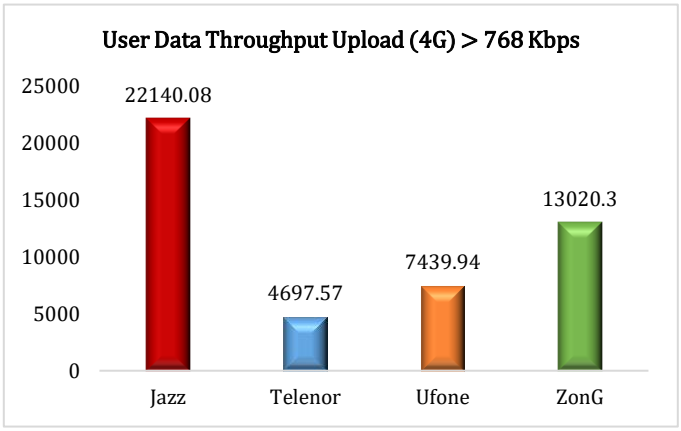



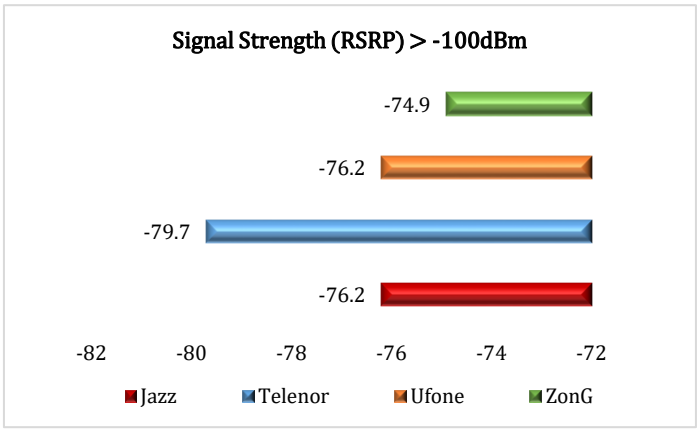



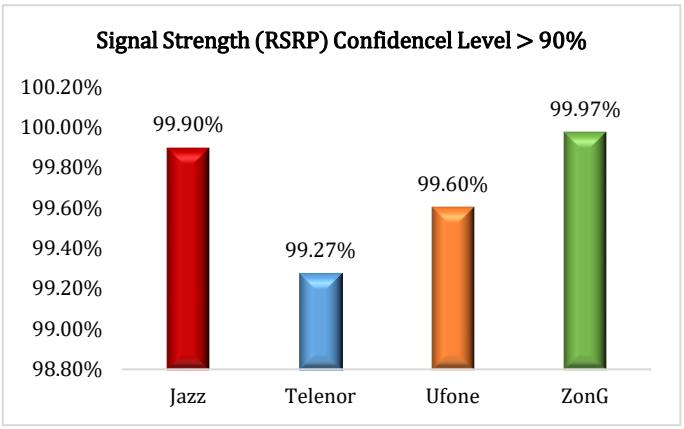



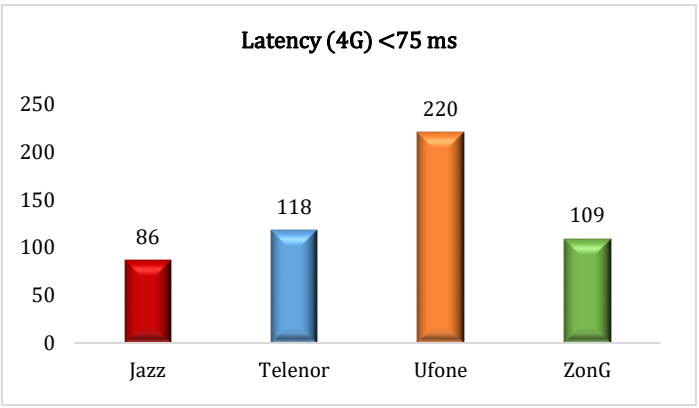
# QUALITY OF SERVICE SURVEY RESULTS (4G) – QUETTA



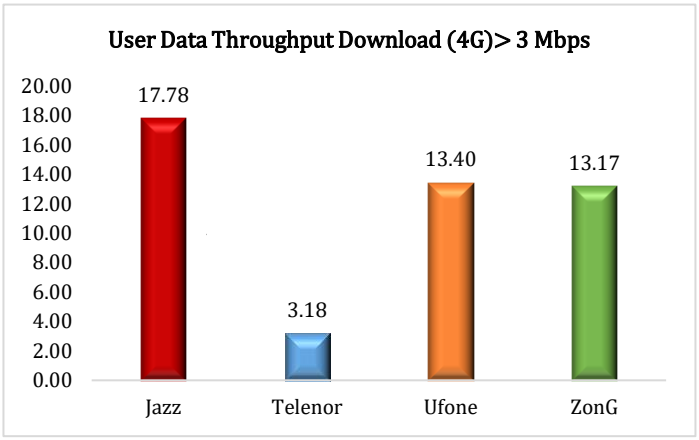



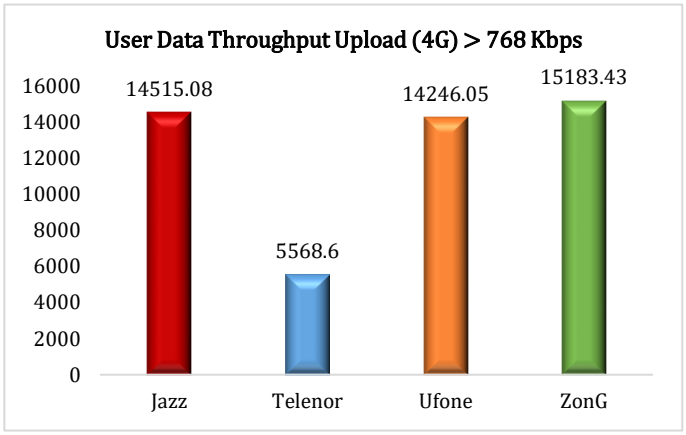



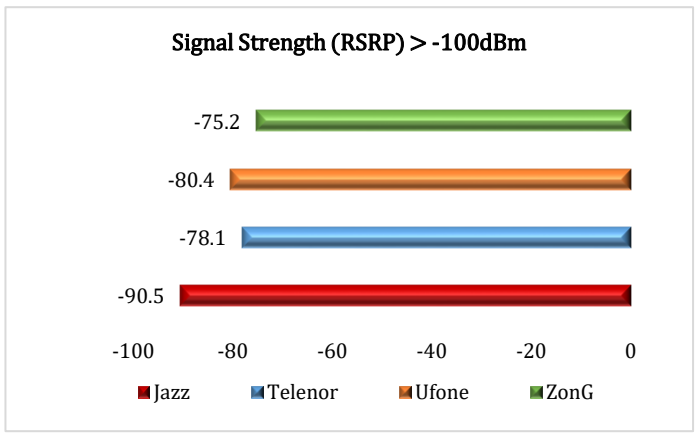



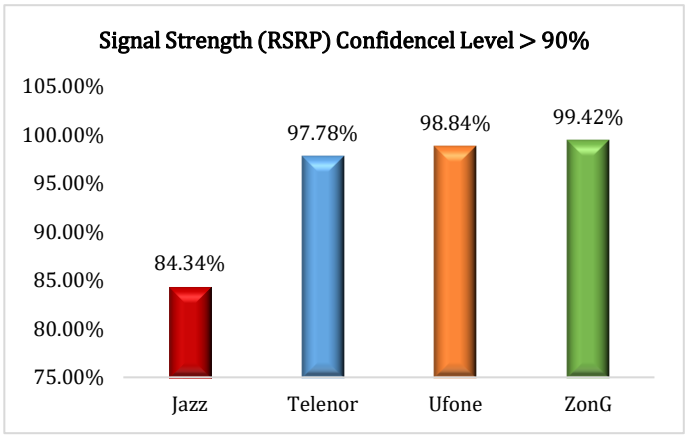



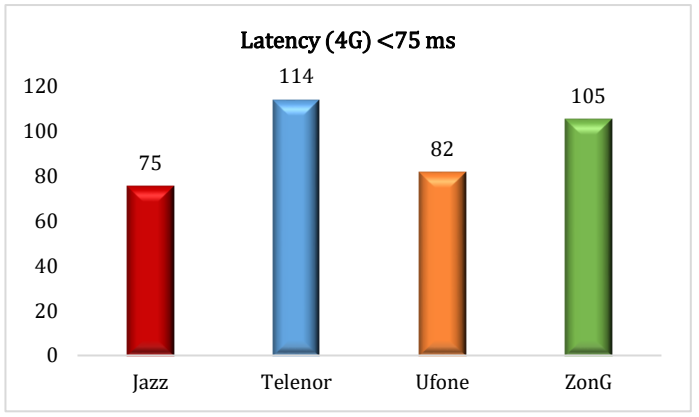
# QUALITY OF SERVICE SURVEY RESULTS (4G) – ZHOB



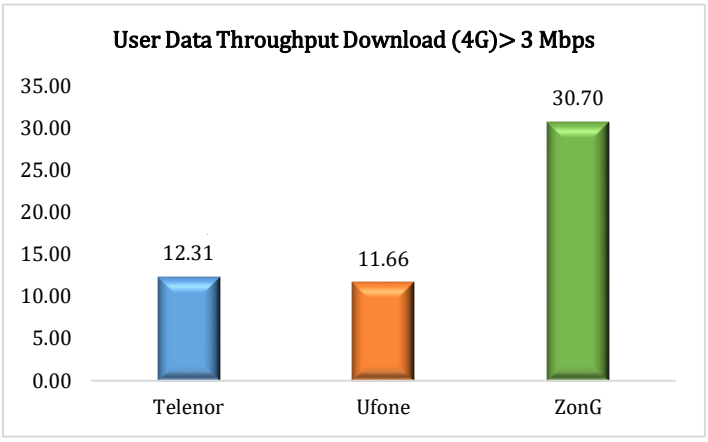



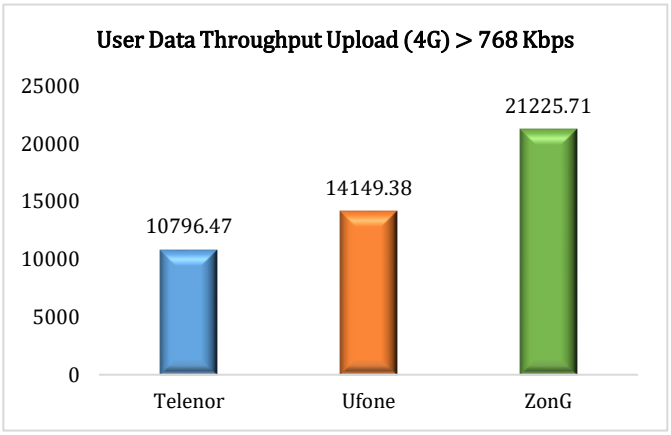



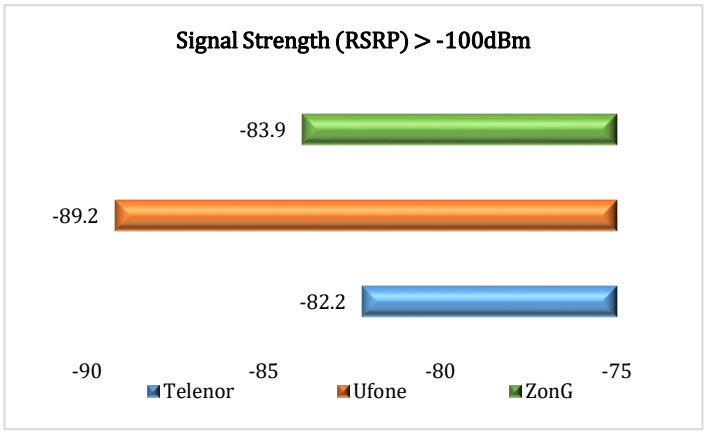



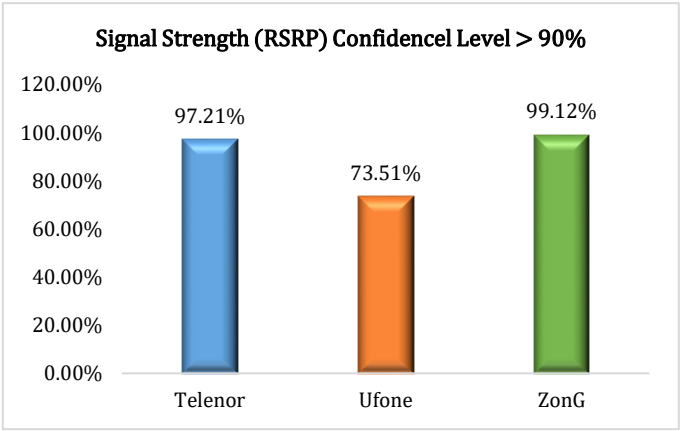



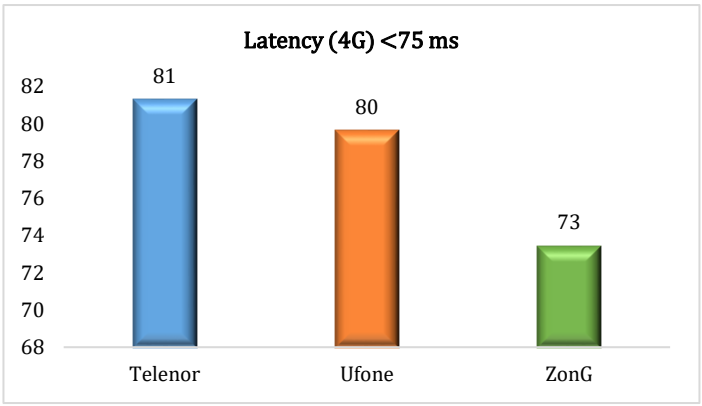
# QUALITY OF SERVICE SURVEY RESULTS (4G) – ZIARAT



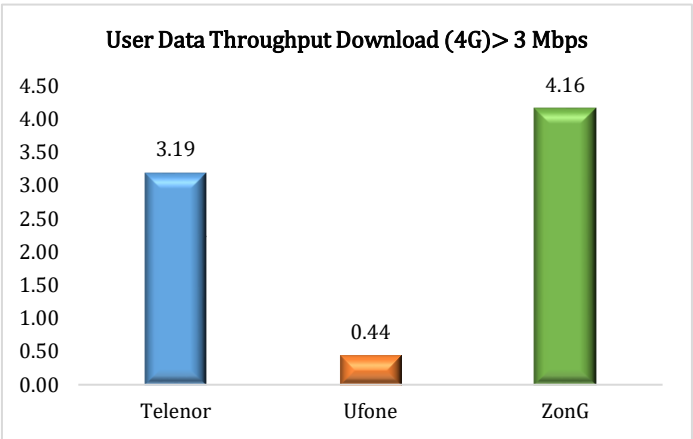



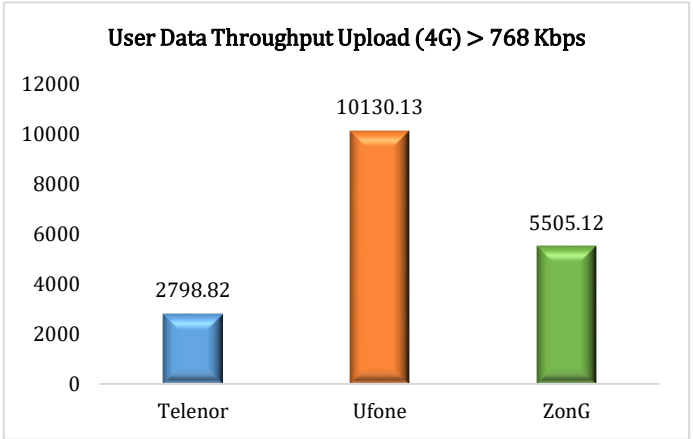



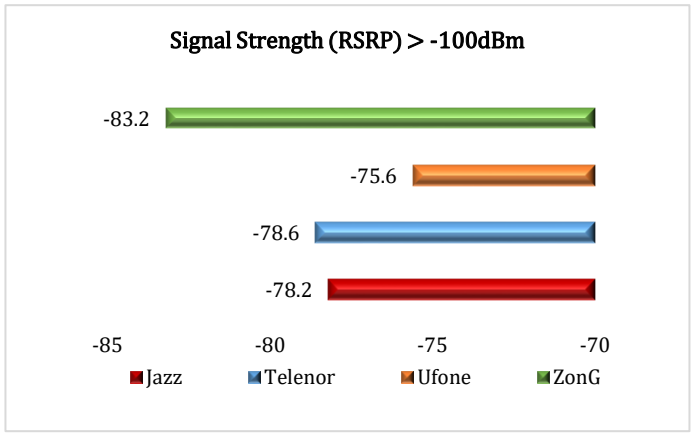



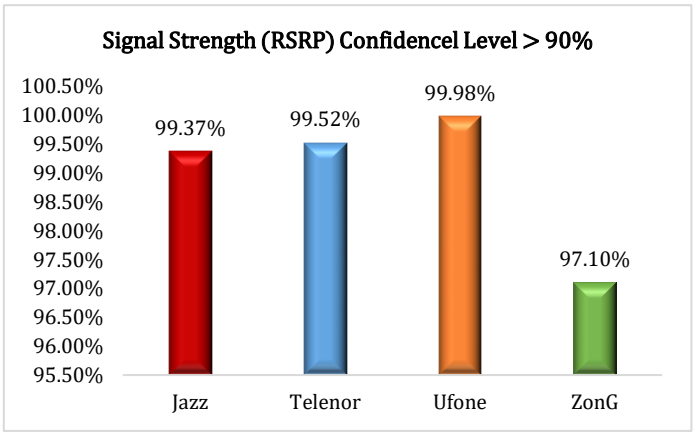



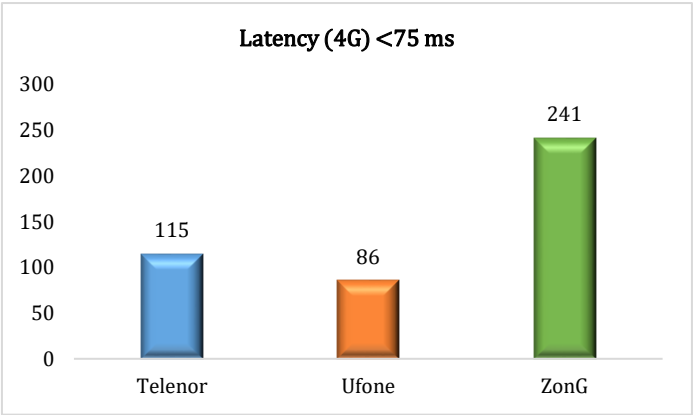
# QUALITY OF SERVICE SURVEY RESULTS (4G) – DALBANDIN



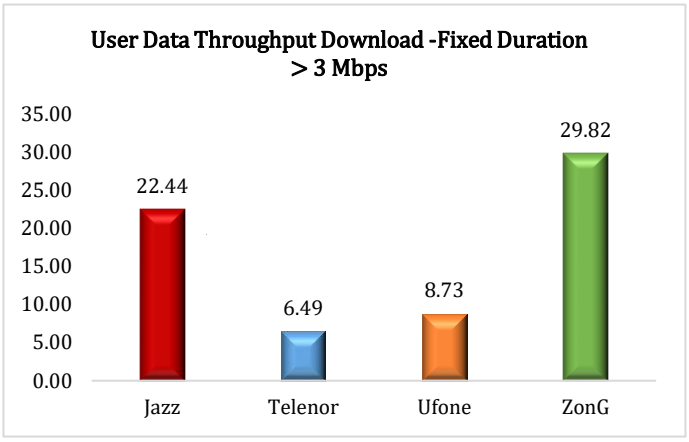



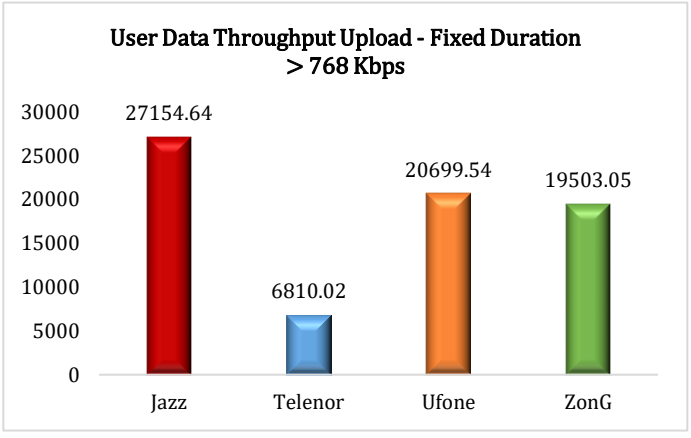



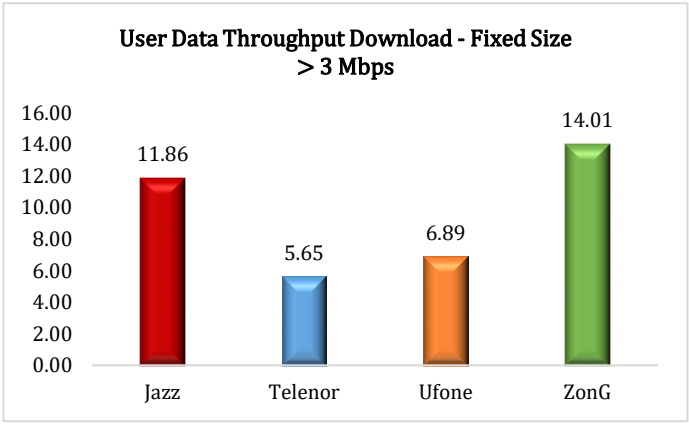
Annex-B2

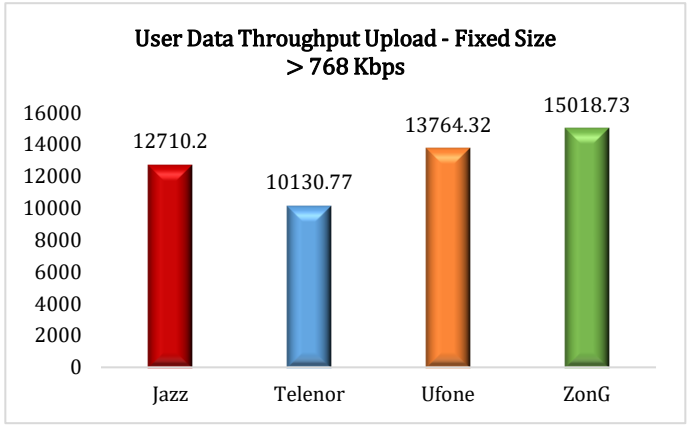
# MOBILE BROADBAND AUTOMODE KPIs RESULT

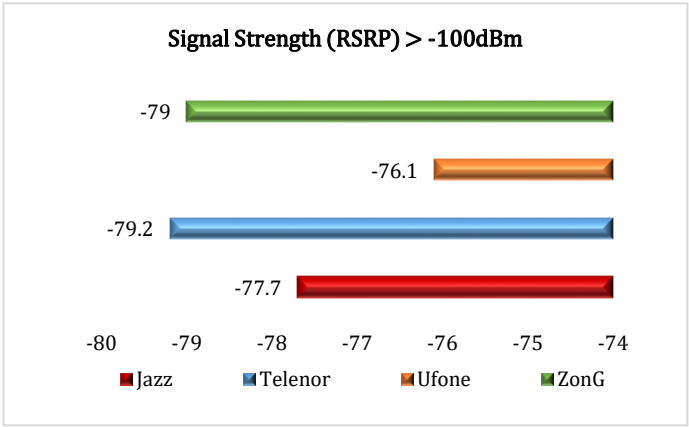
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – BHAKKAR

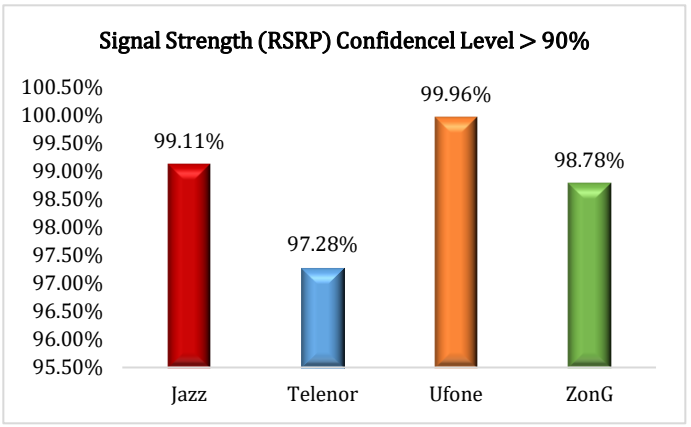


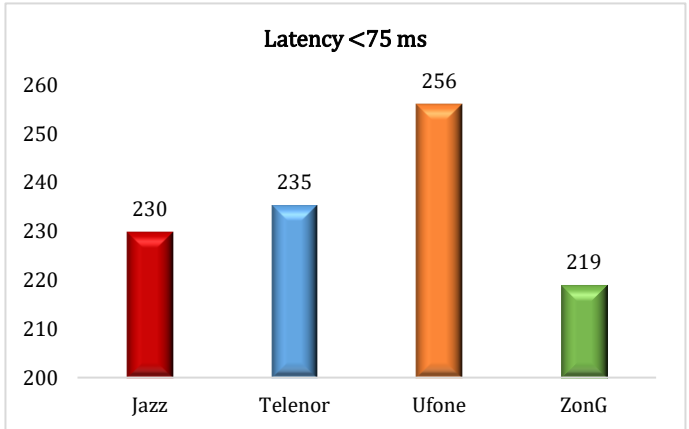



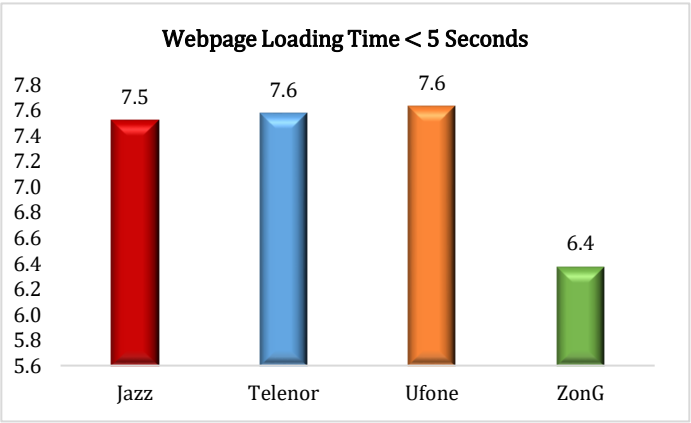



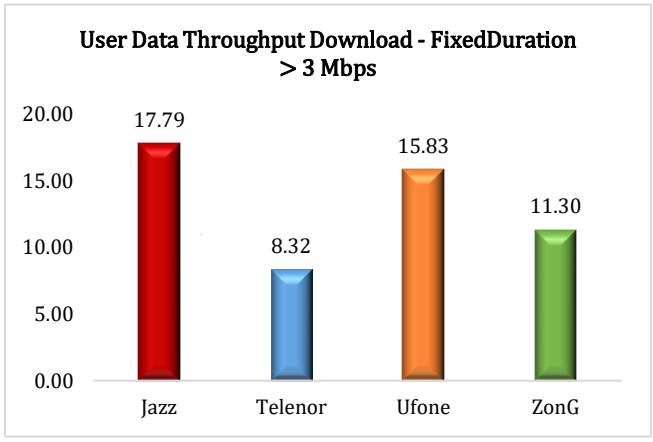



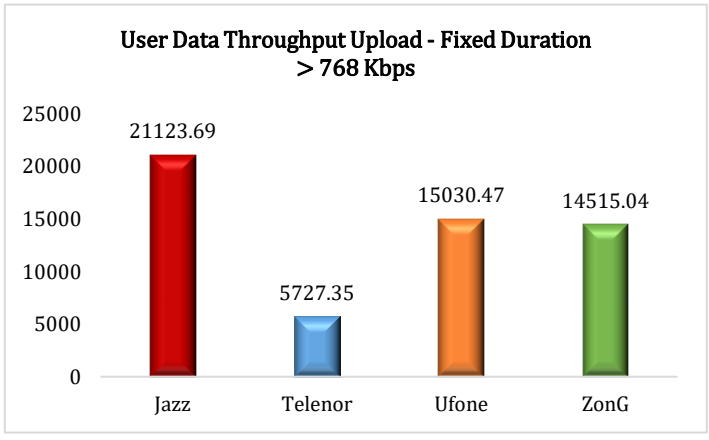



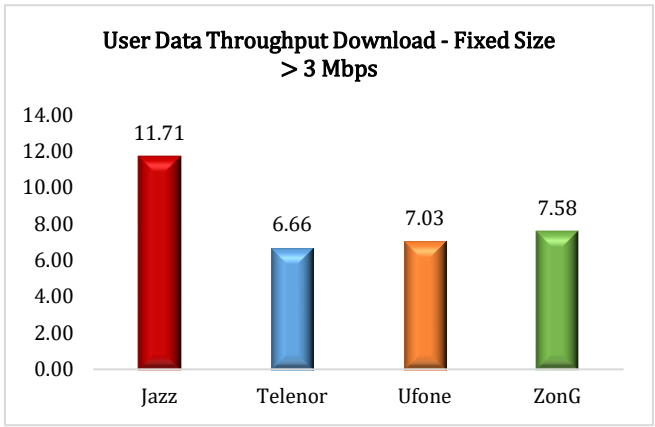



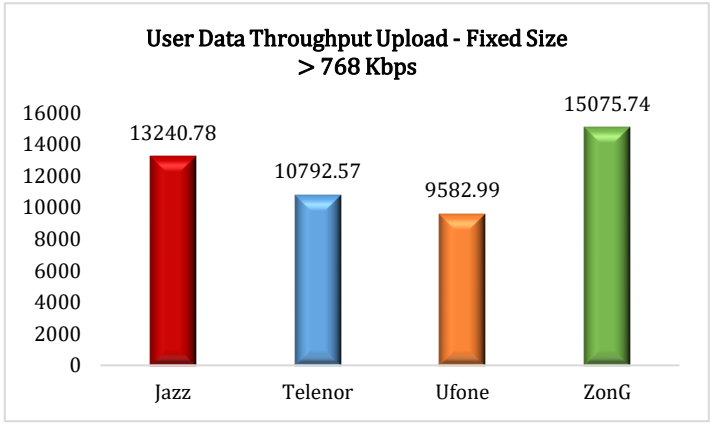



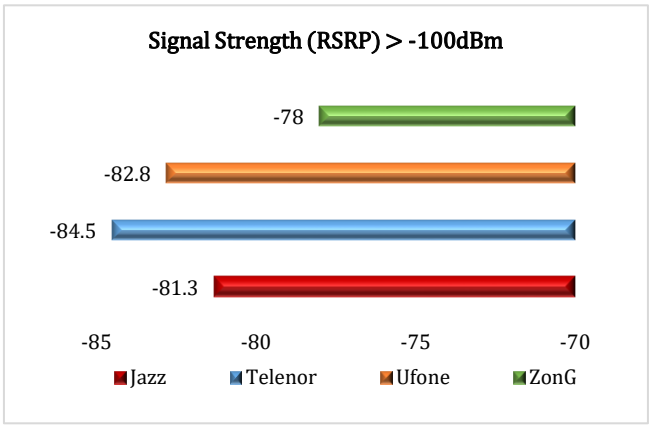
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – BUREWALA

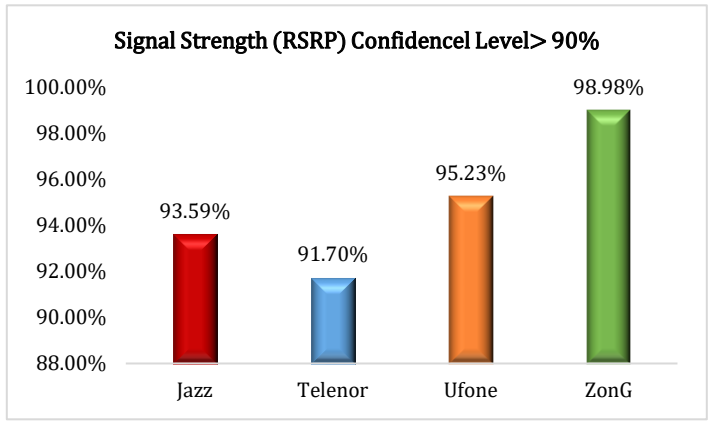


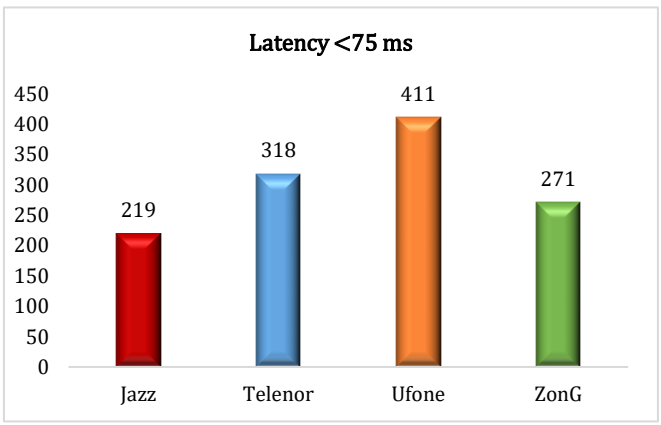



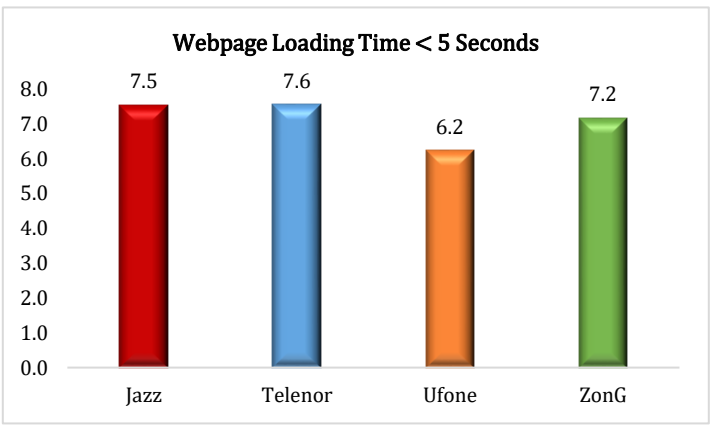



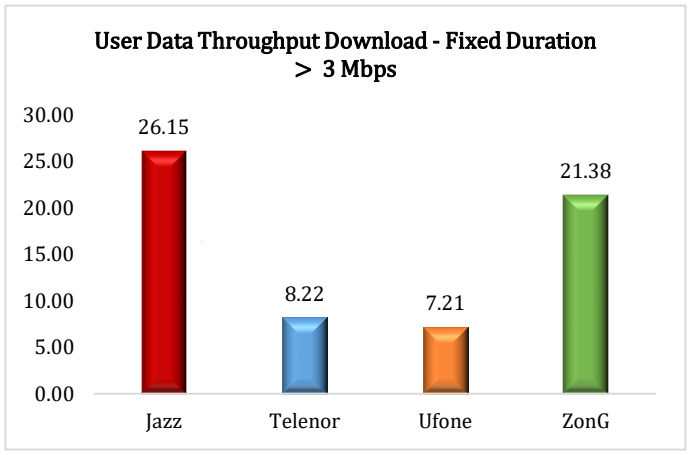



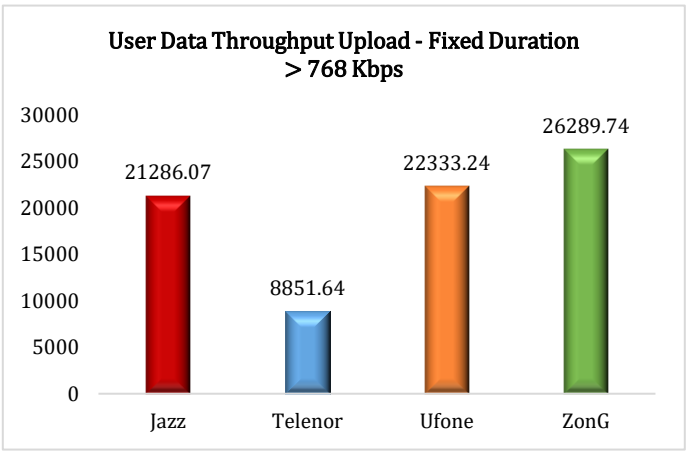



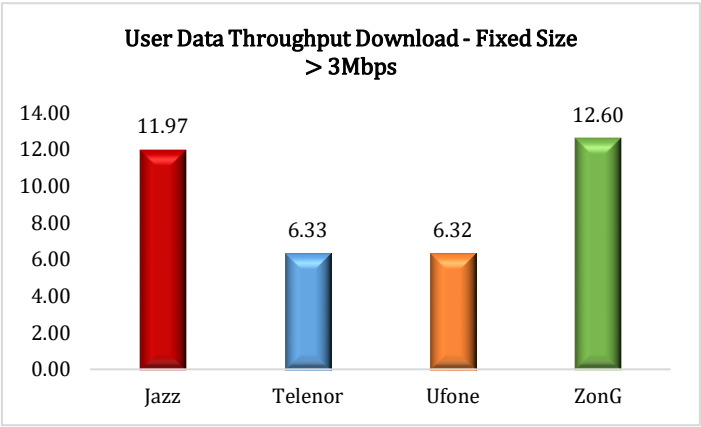



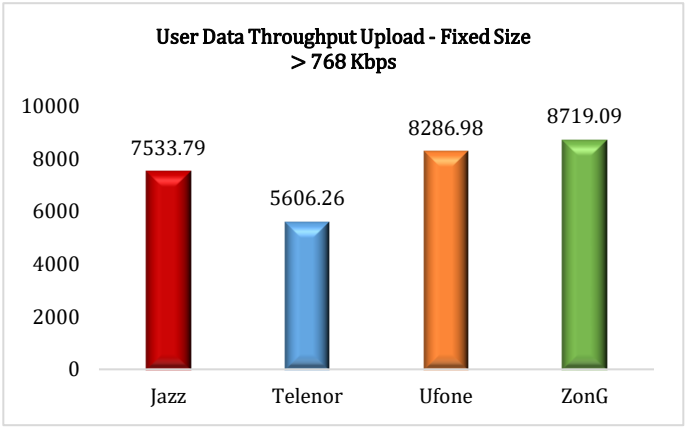



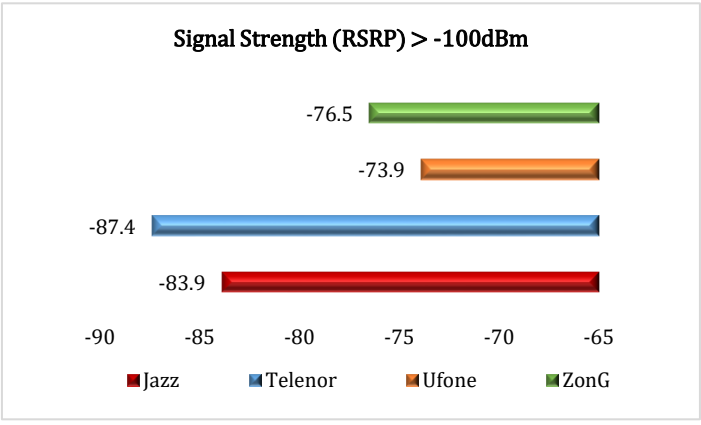
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – CHAKWAL

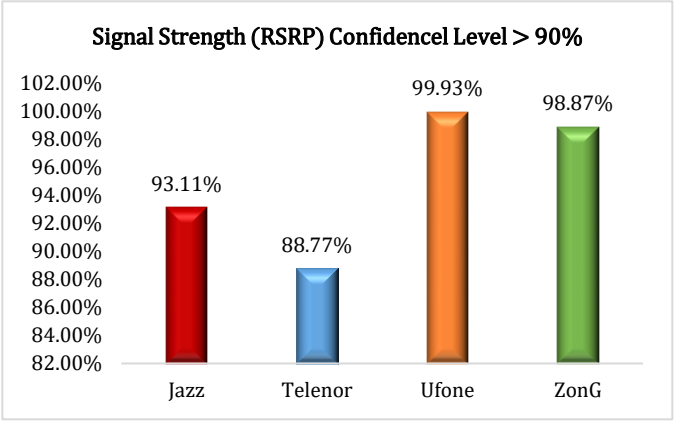


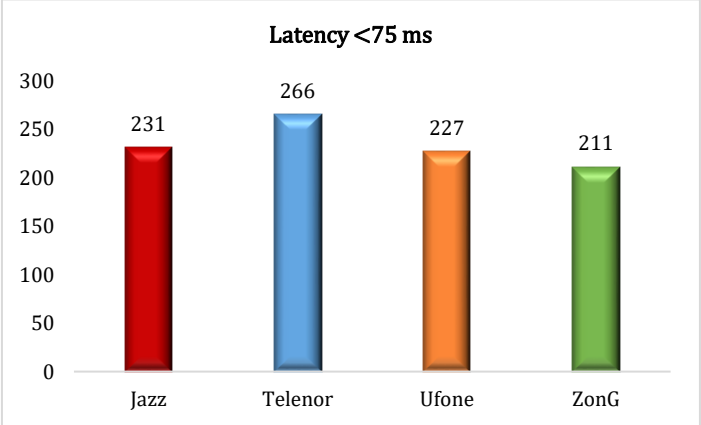



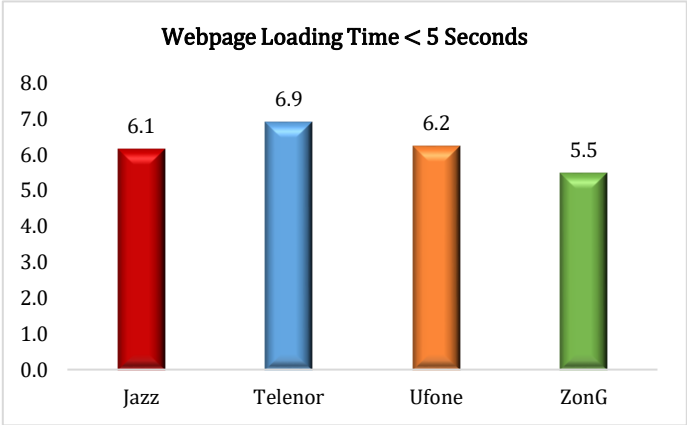



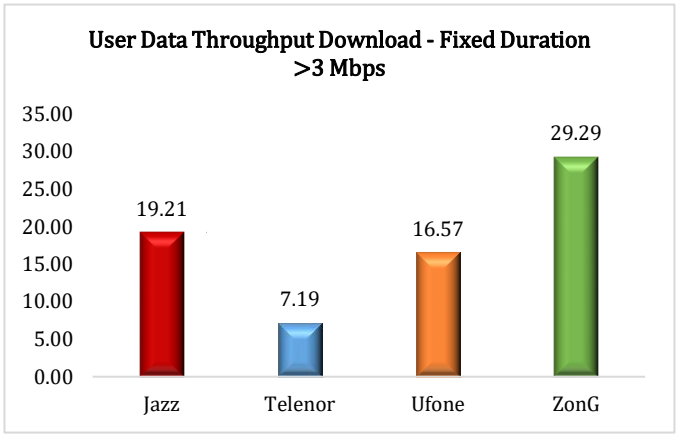



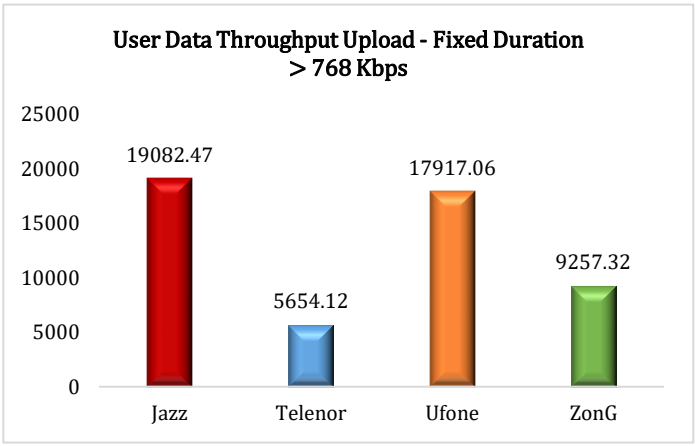



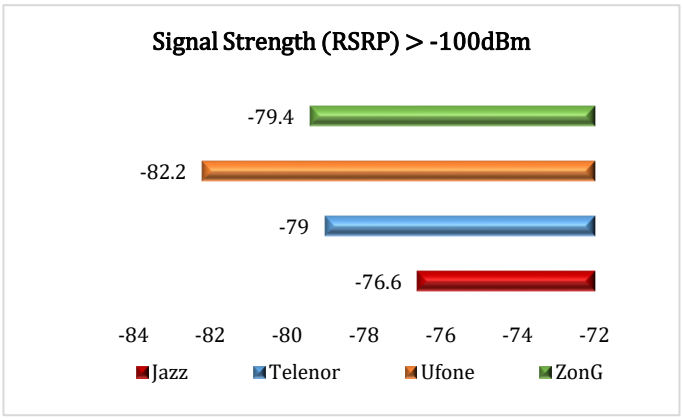



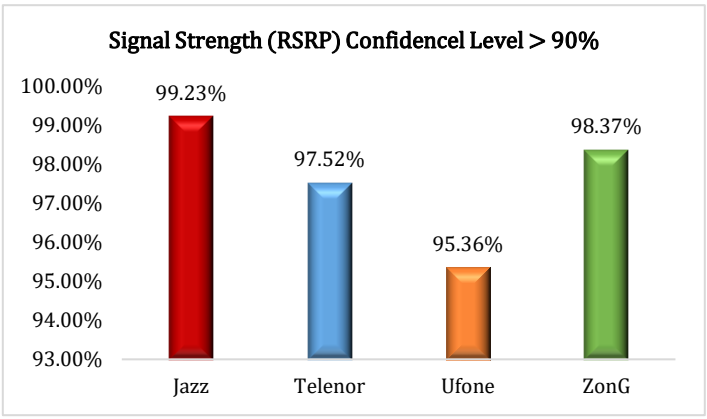



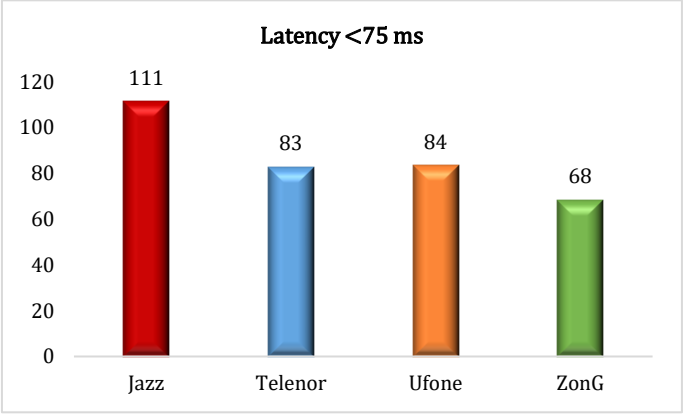
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – FAISALABAD



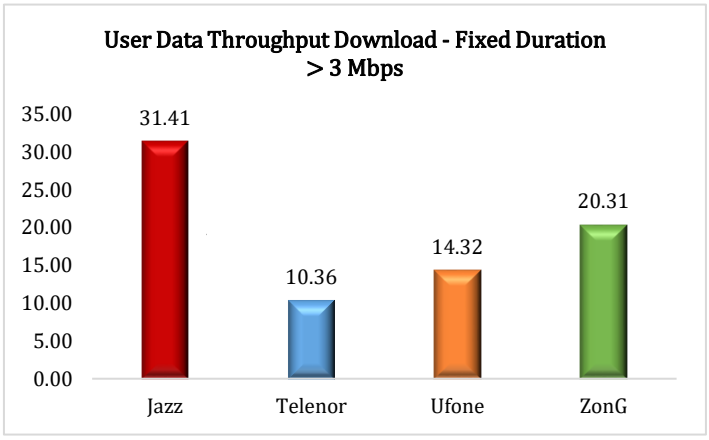



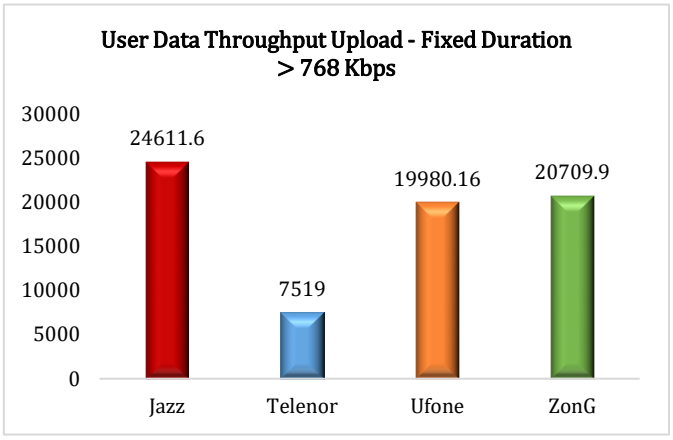



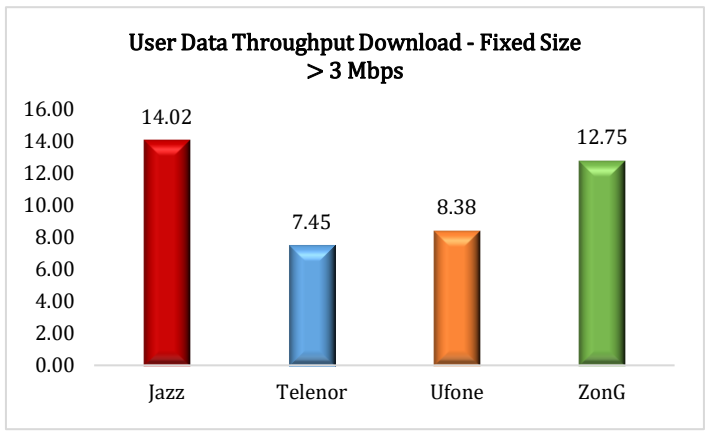



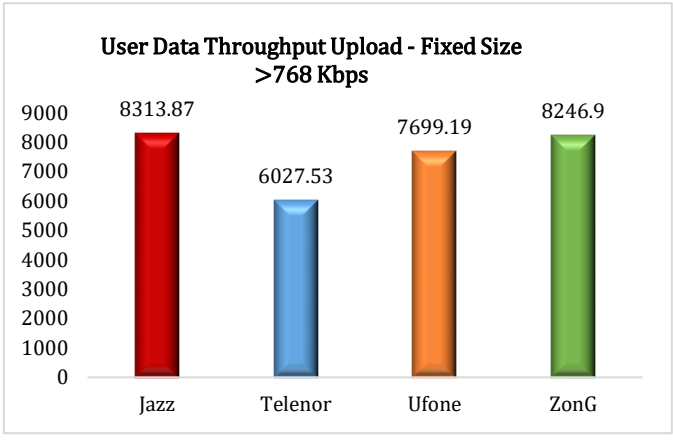



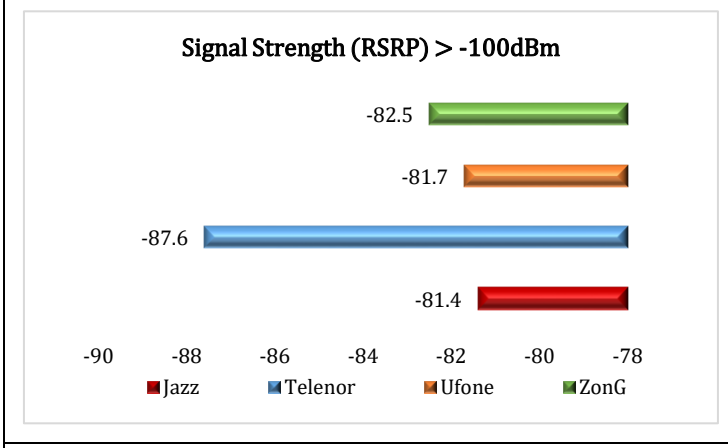
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – JHELUM

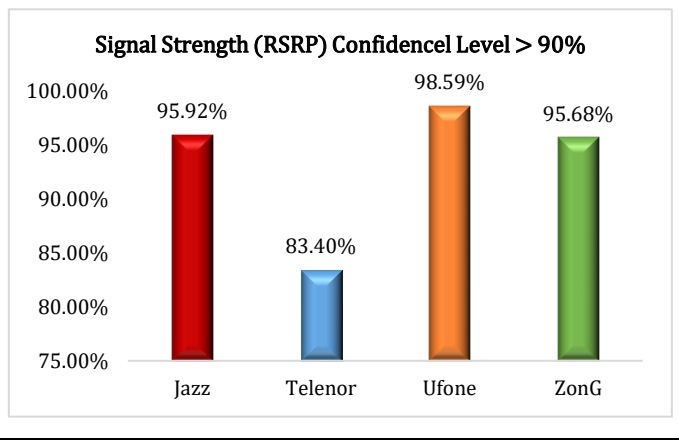


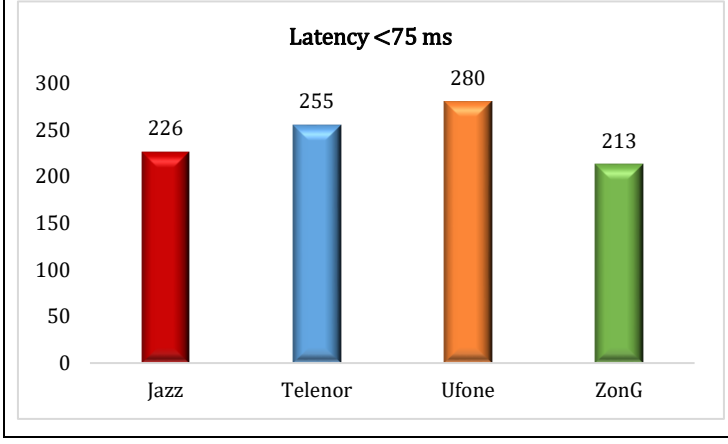



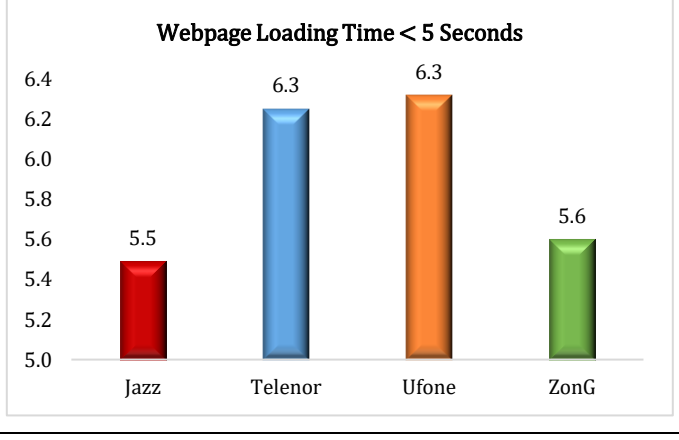



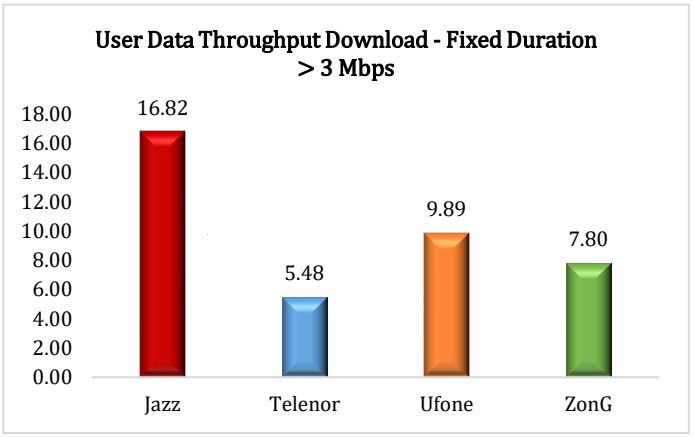



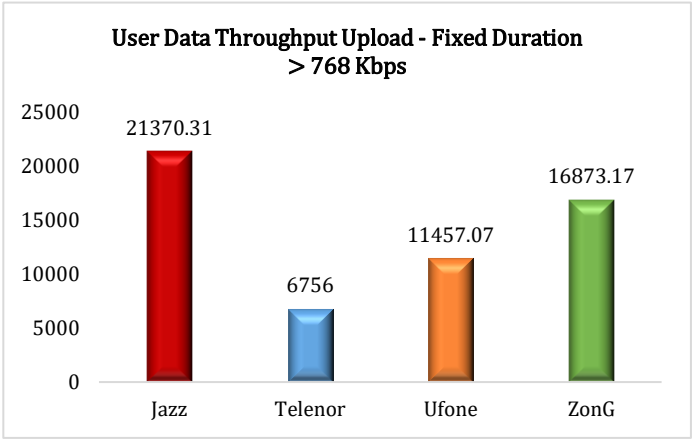



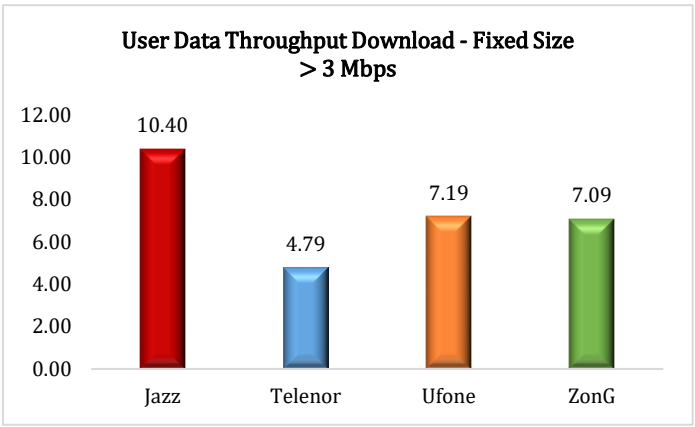



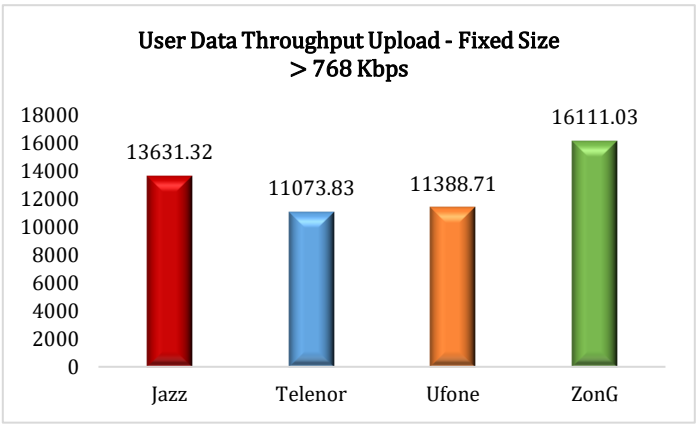



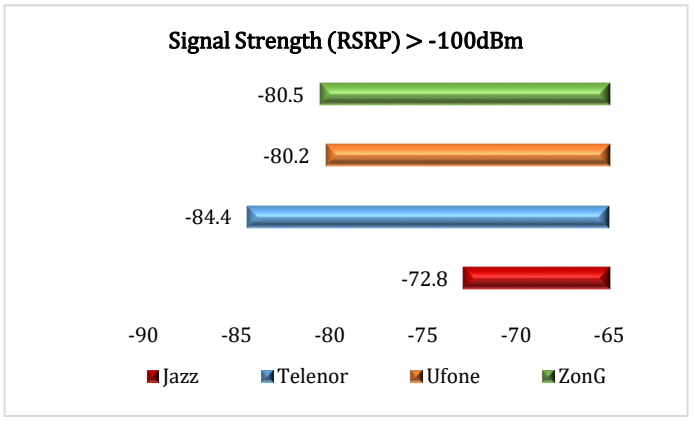
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – LAYYAH

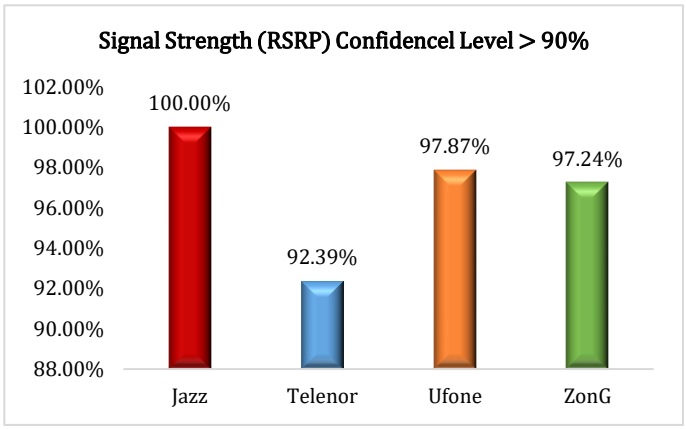


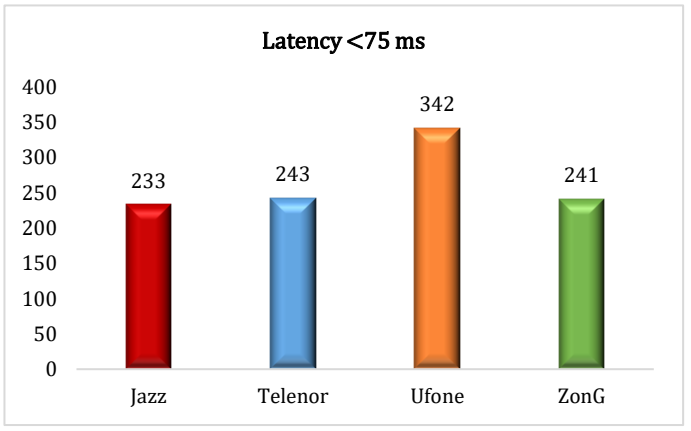



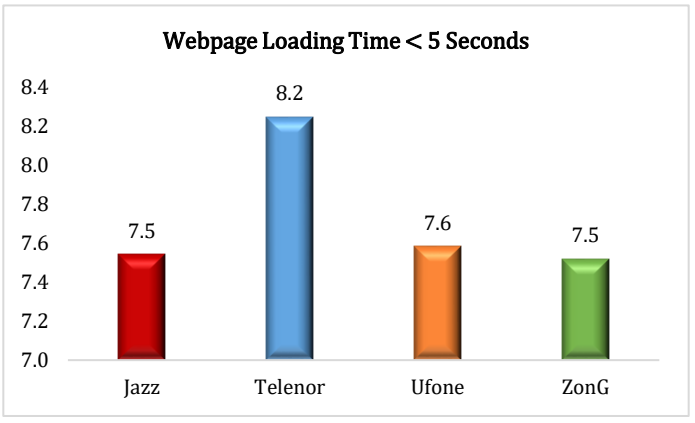



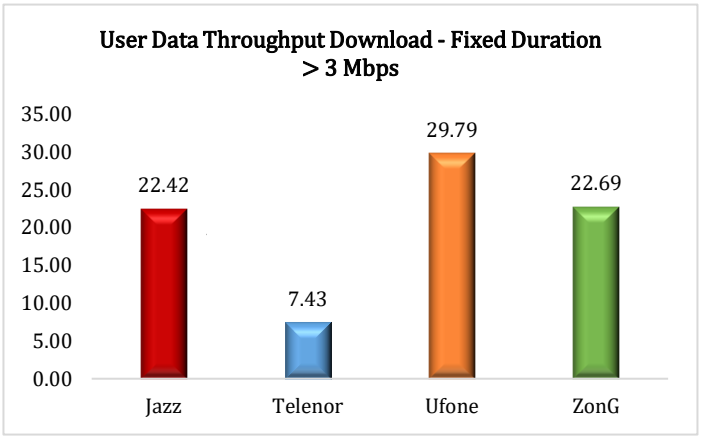



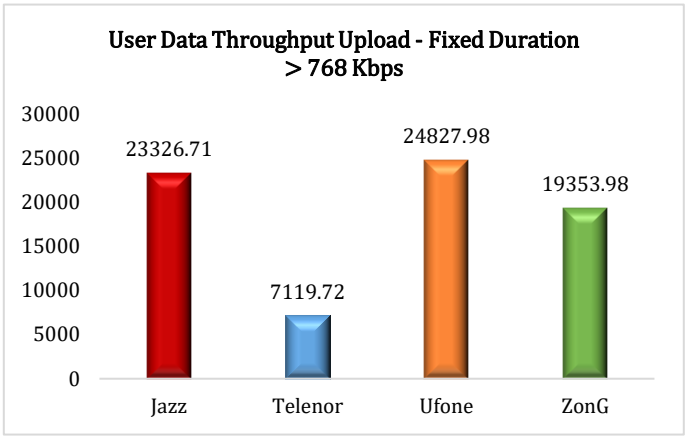



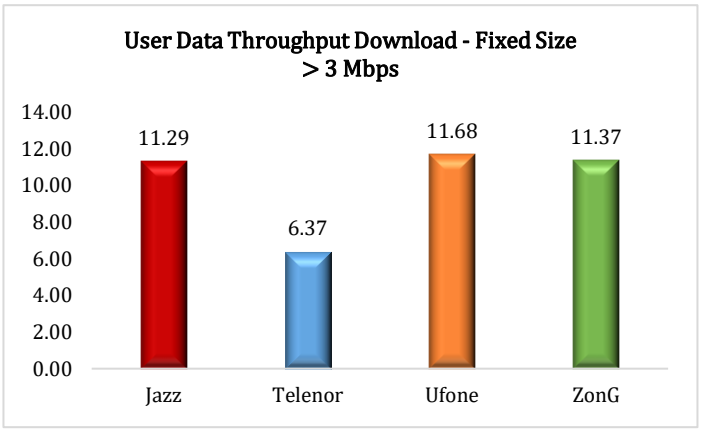



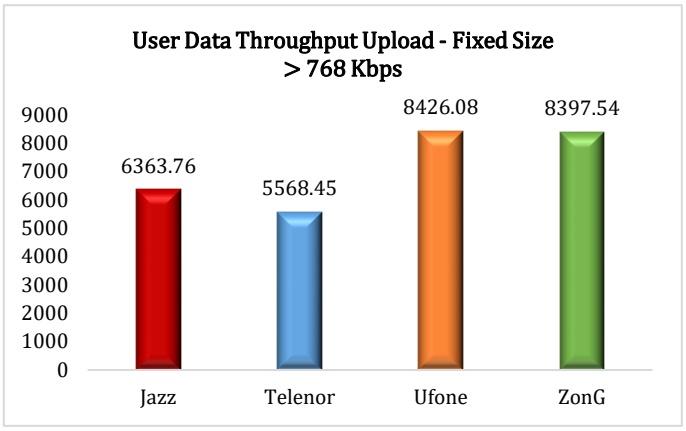



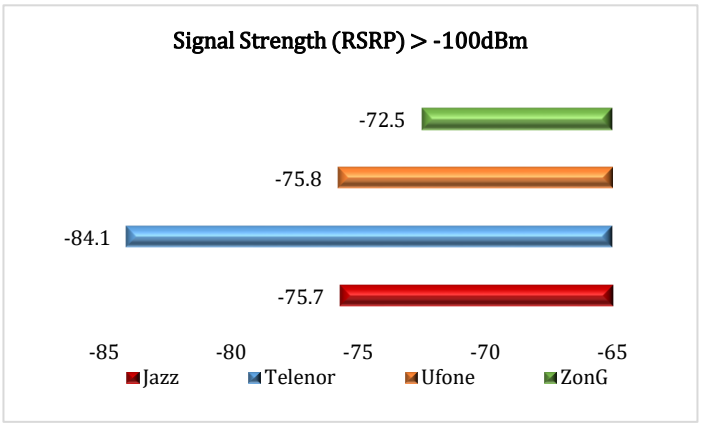
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) –OKARA

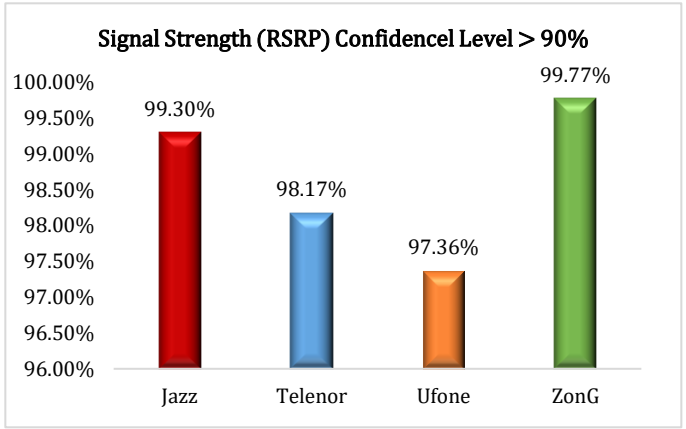


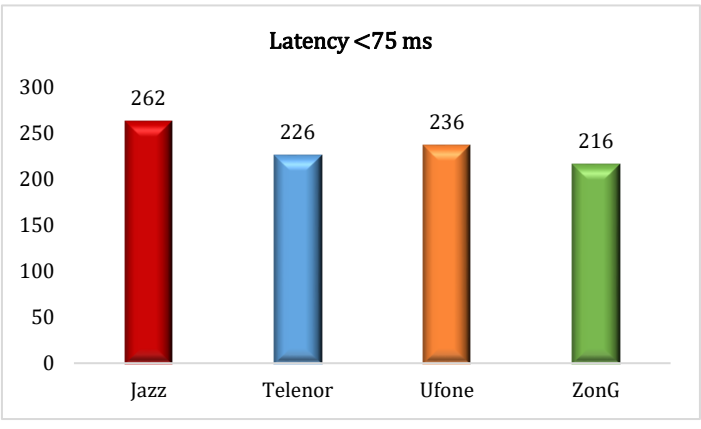



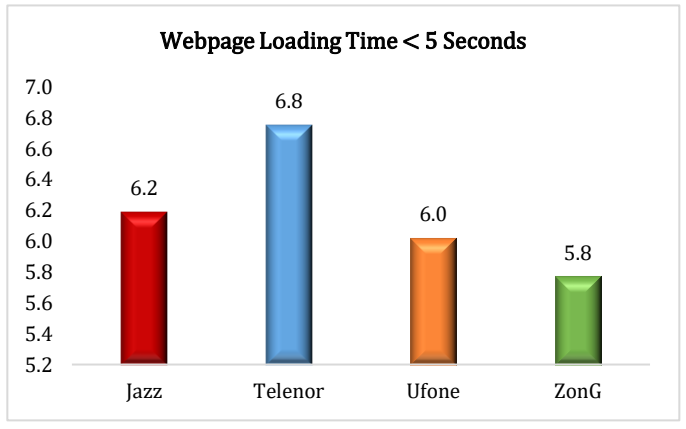



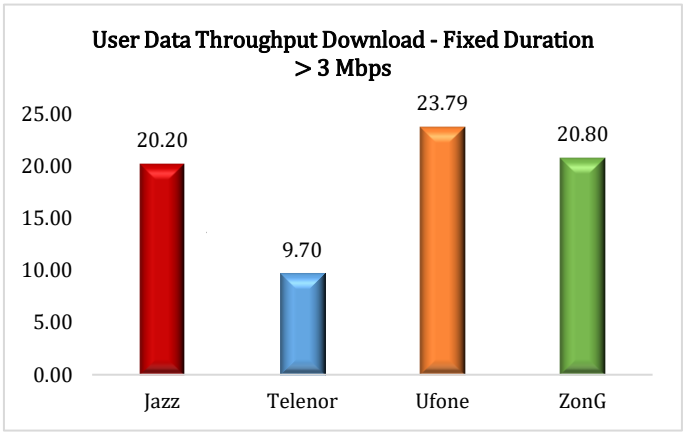



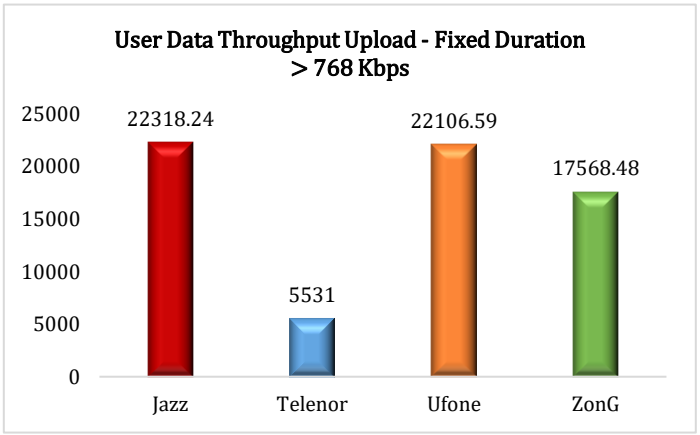



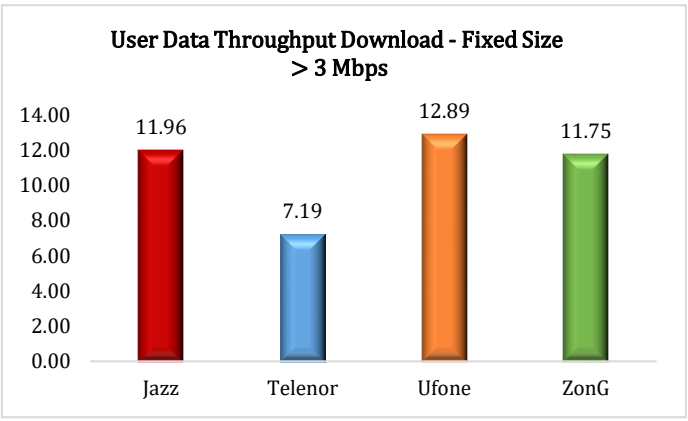



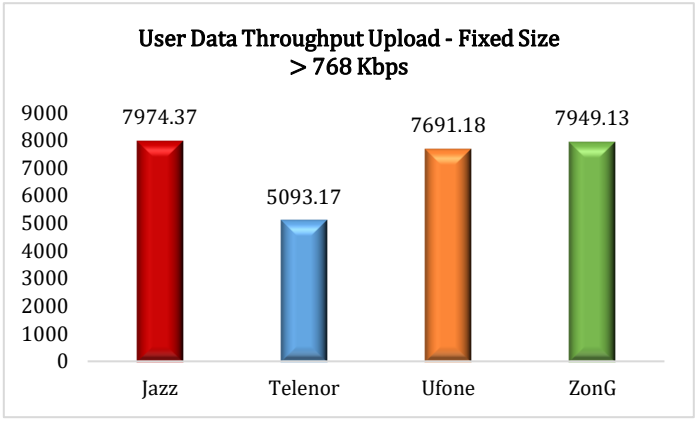



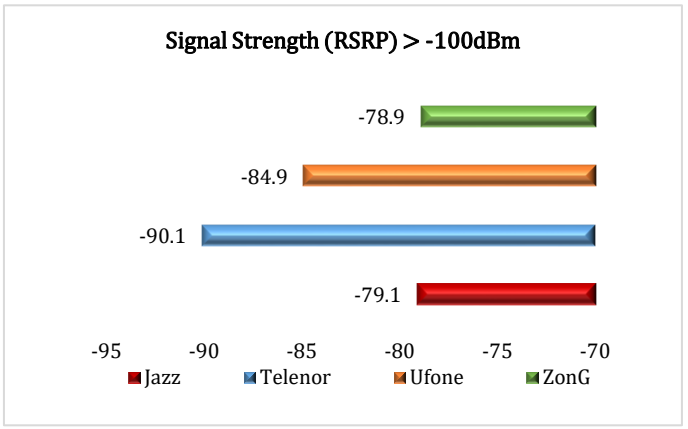
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – SAHIWAL

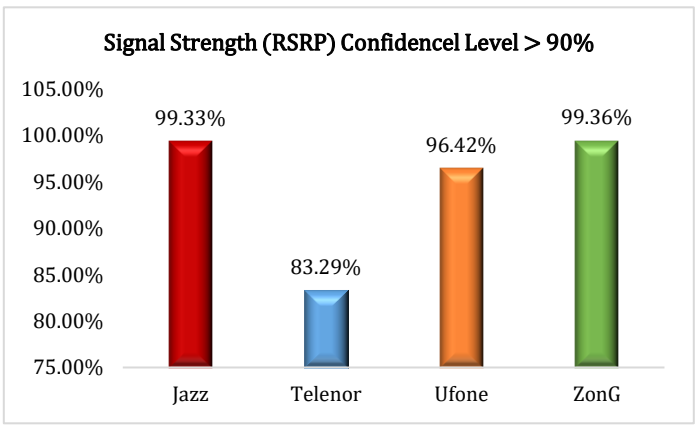


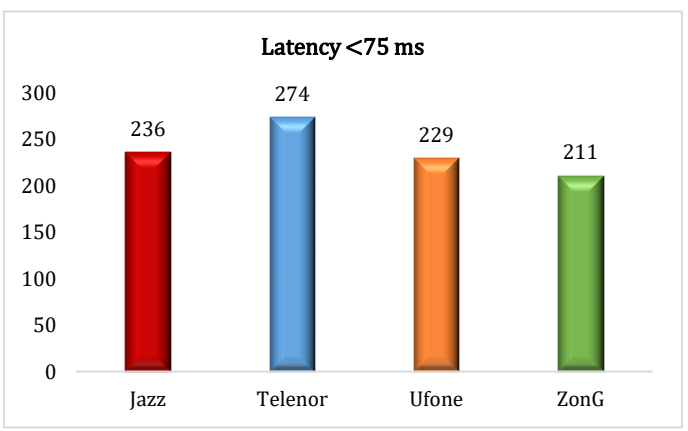



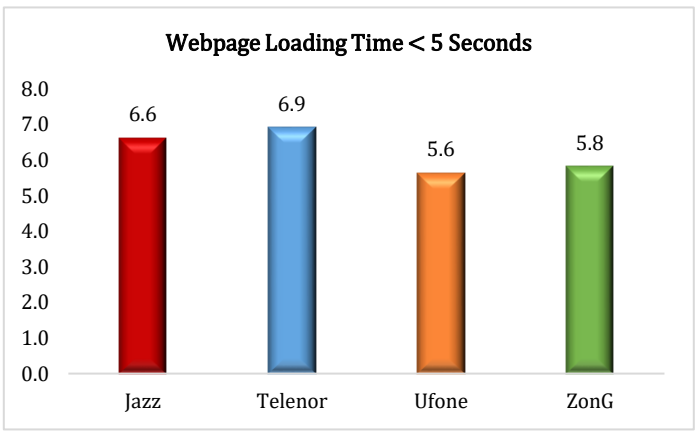



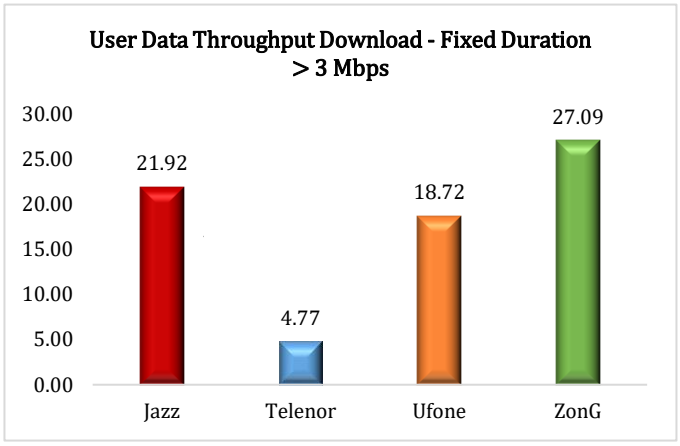



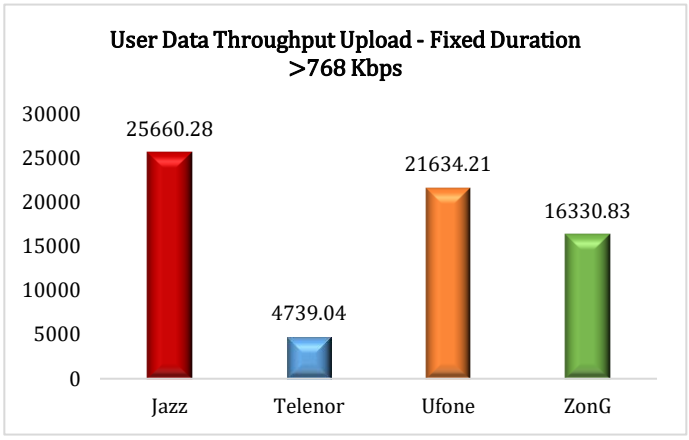



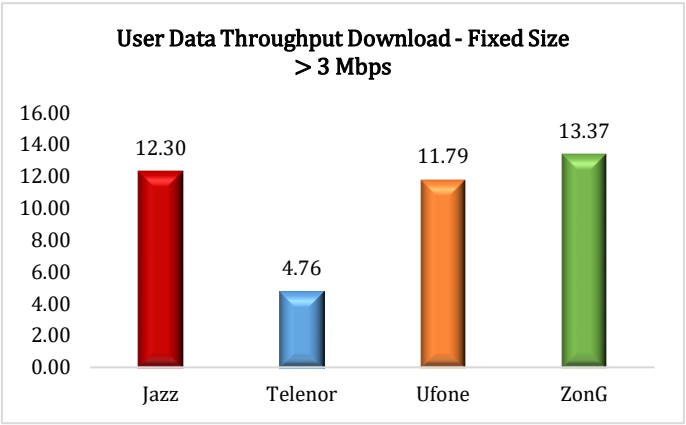



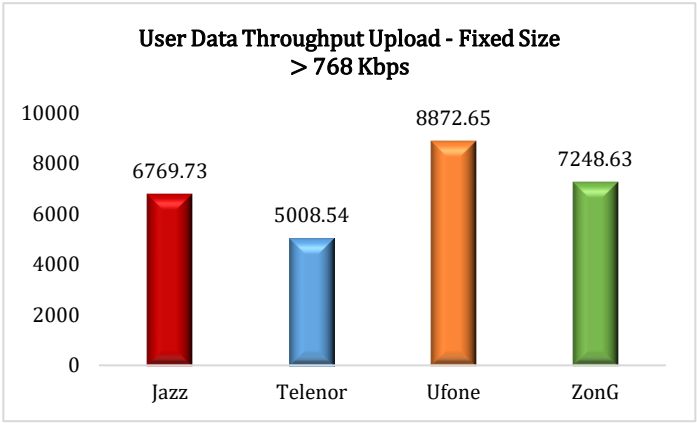



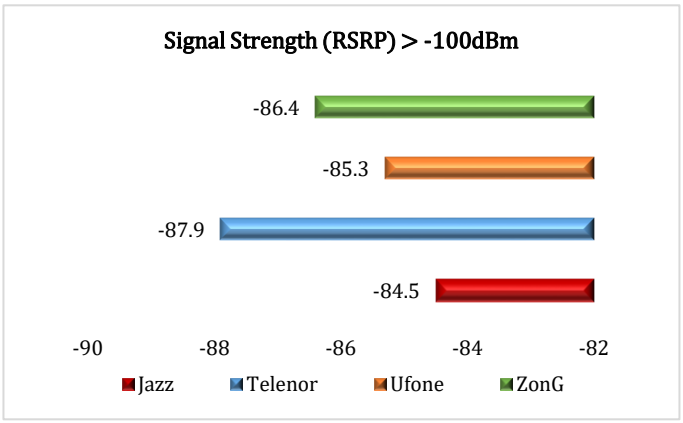
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – GOJRA

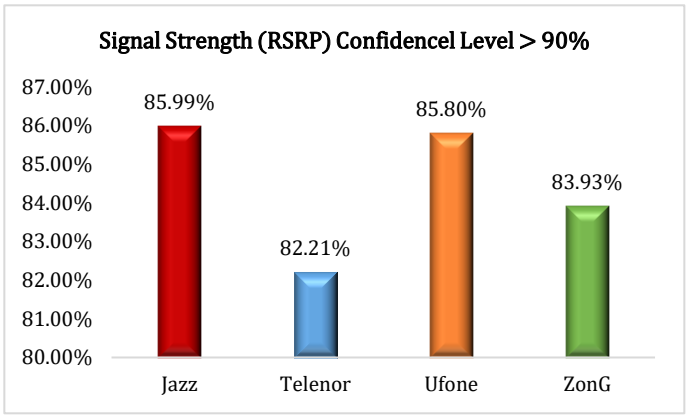


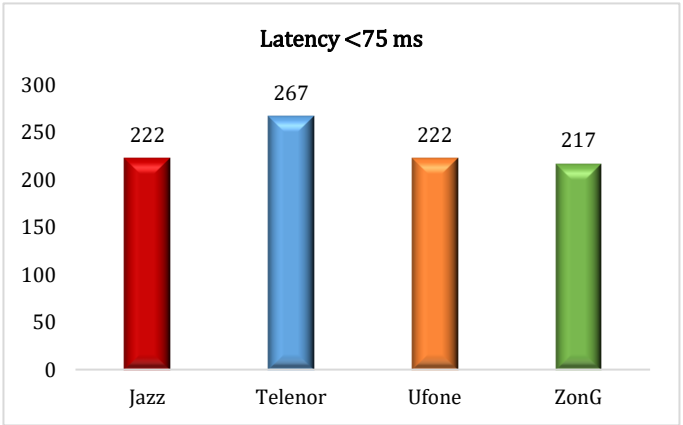



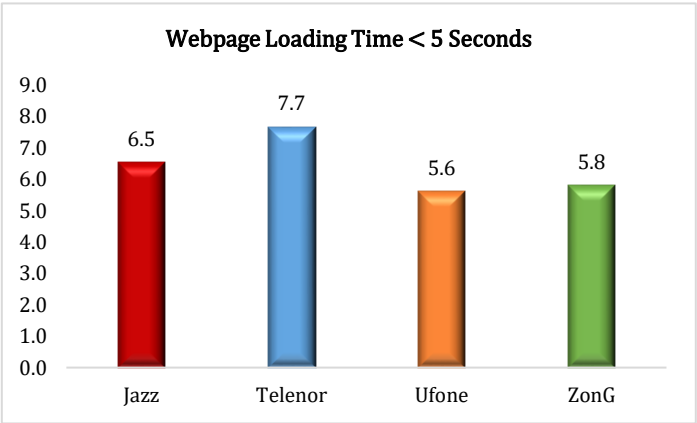



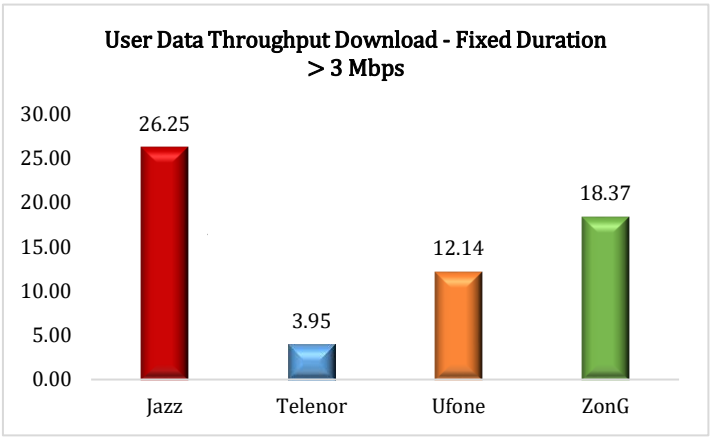



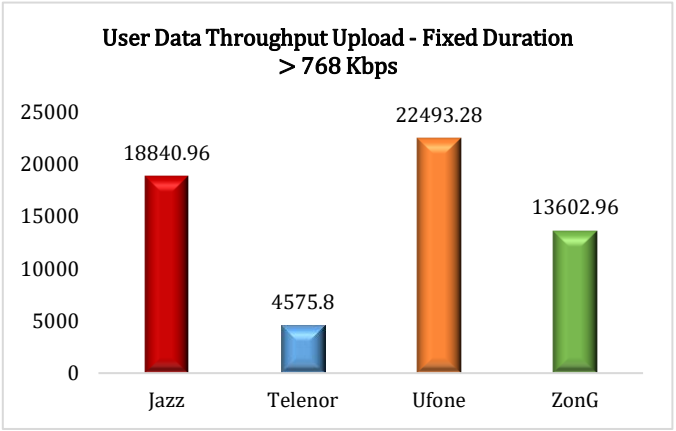



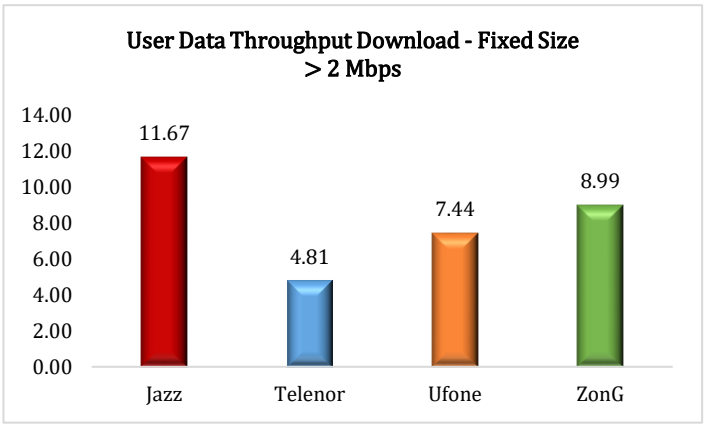



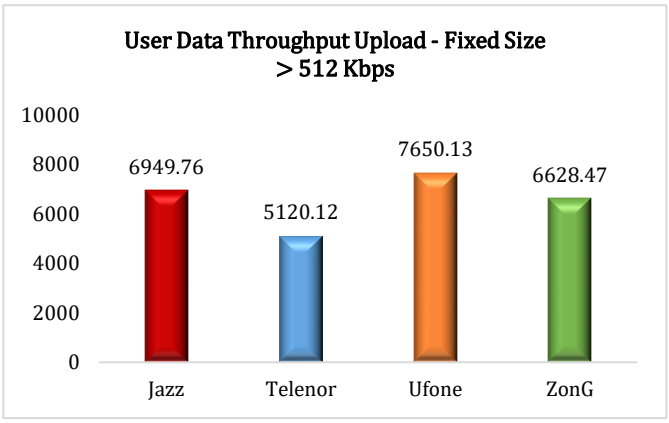



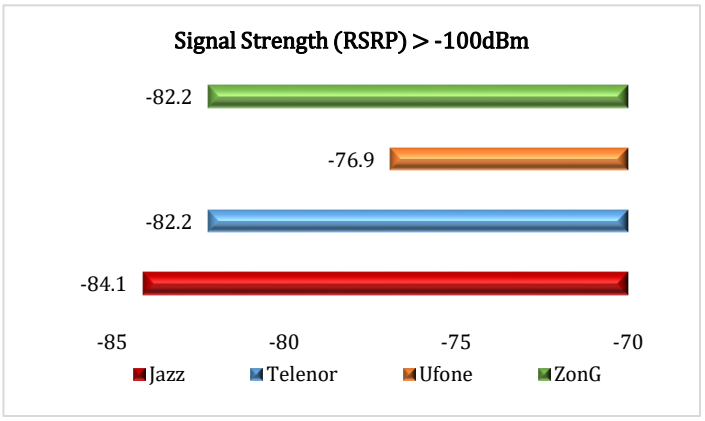
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – MANDI BAHAUDDIN

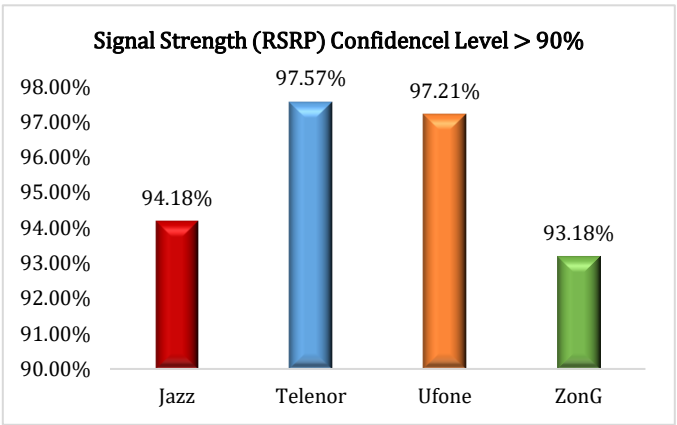


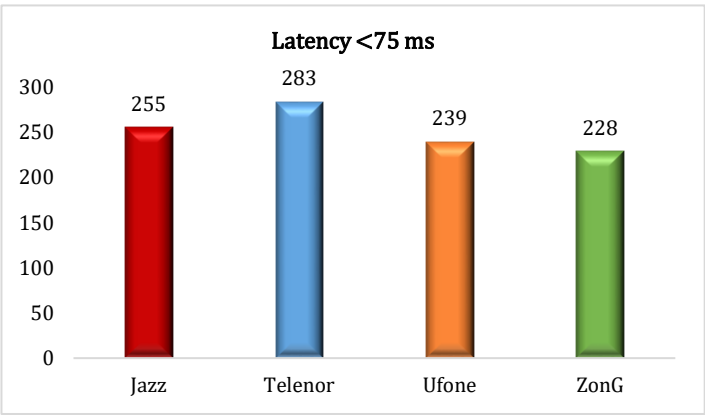



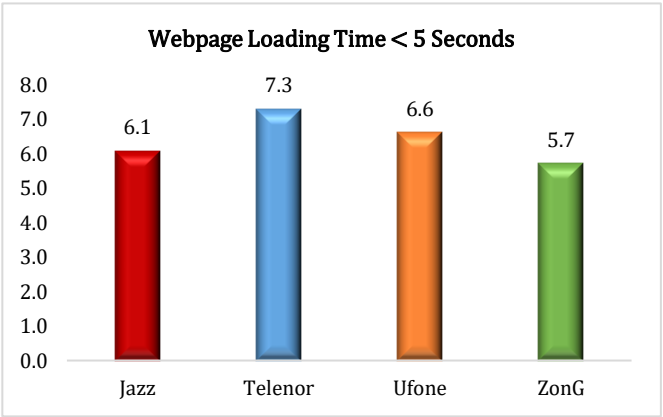



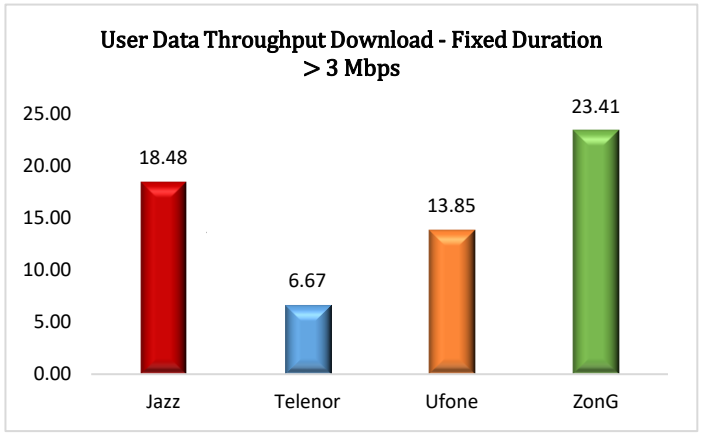



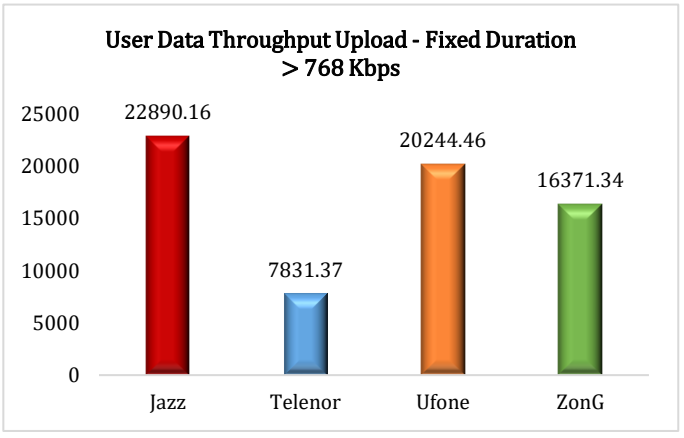



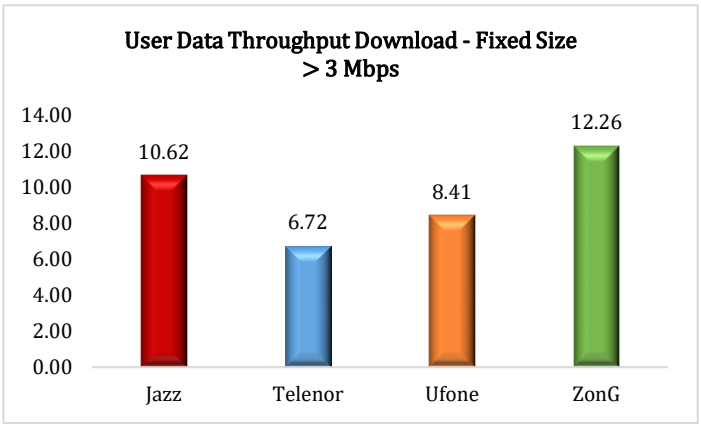



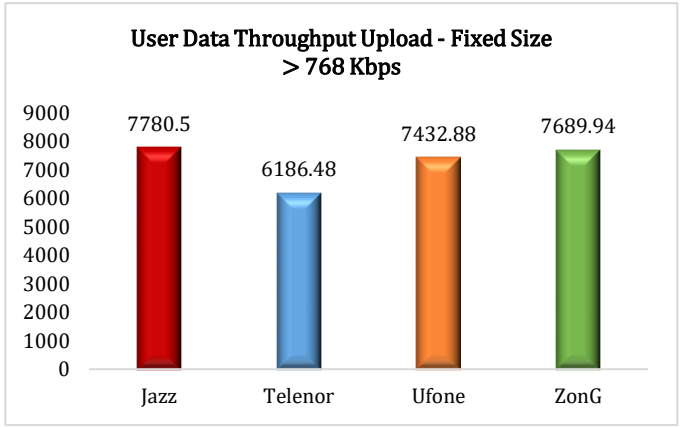



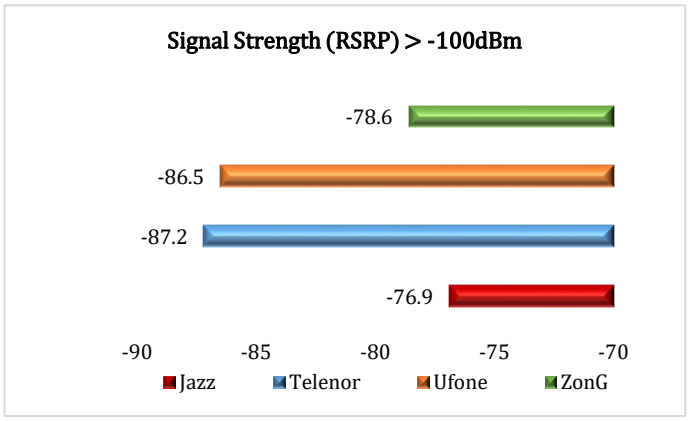
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – SHAKAR GARH

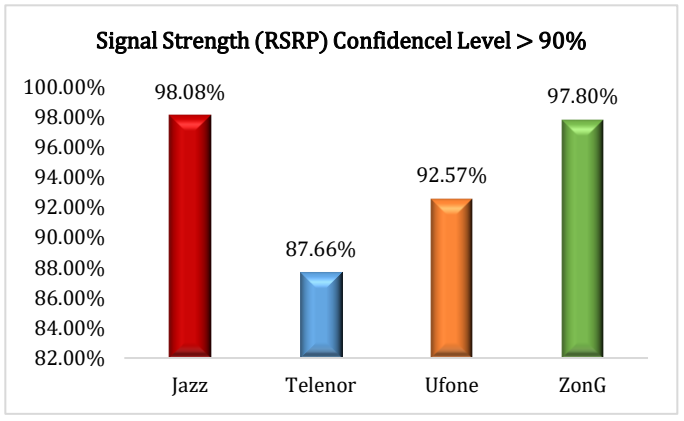


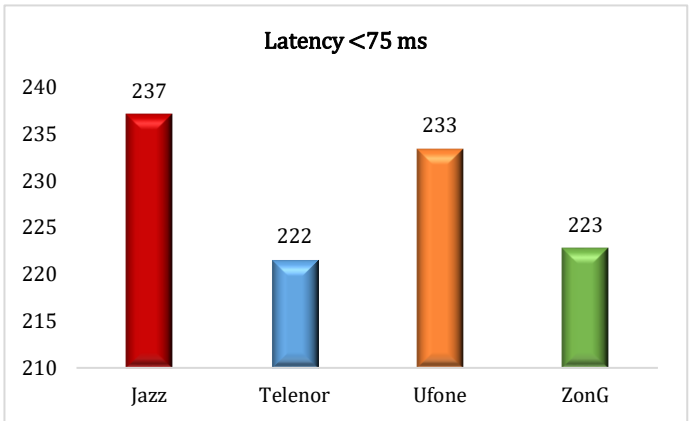



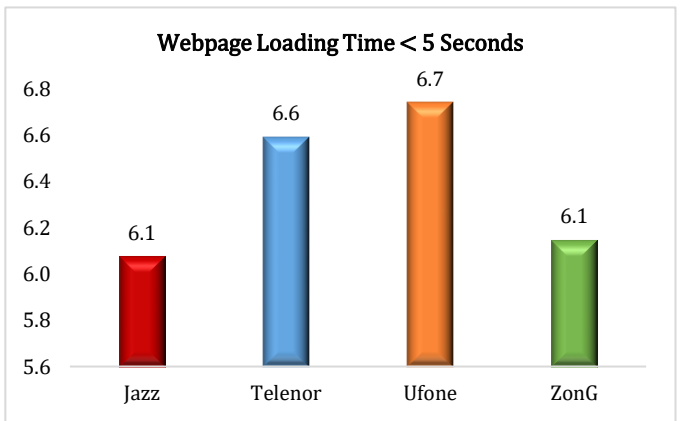



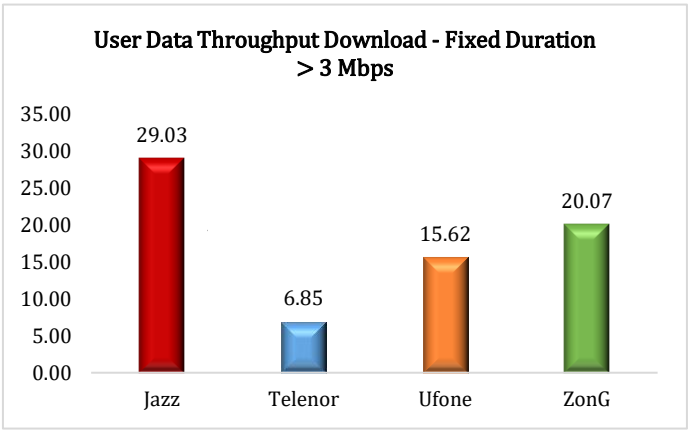



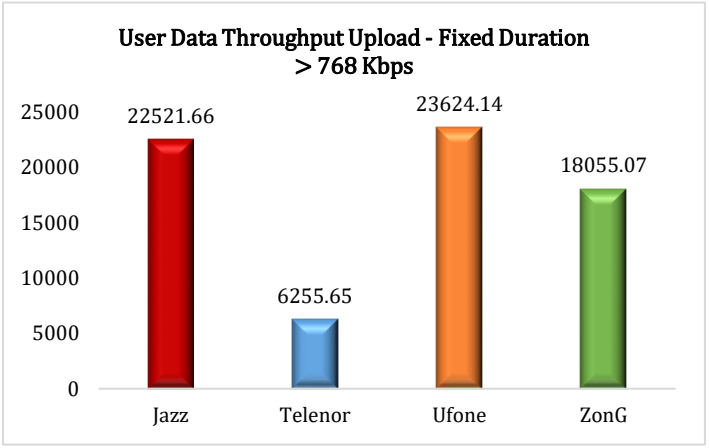



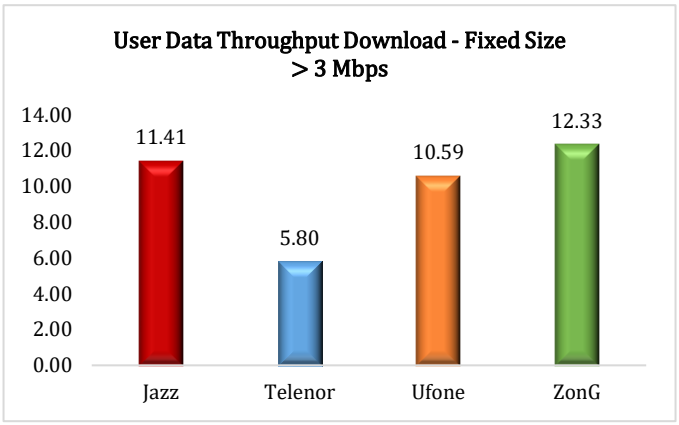



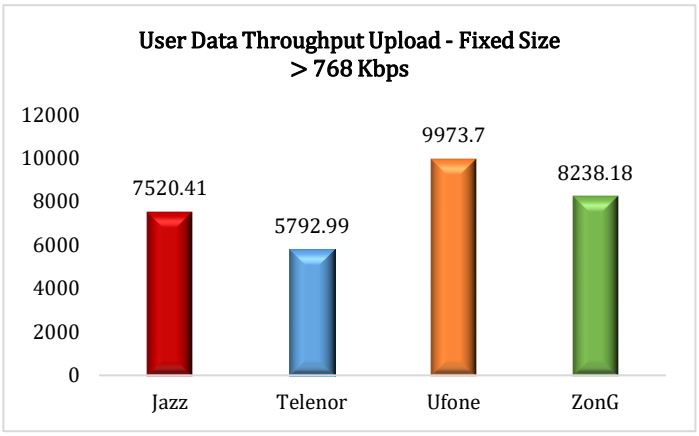



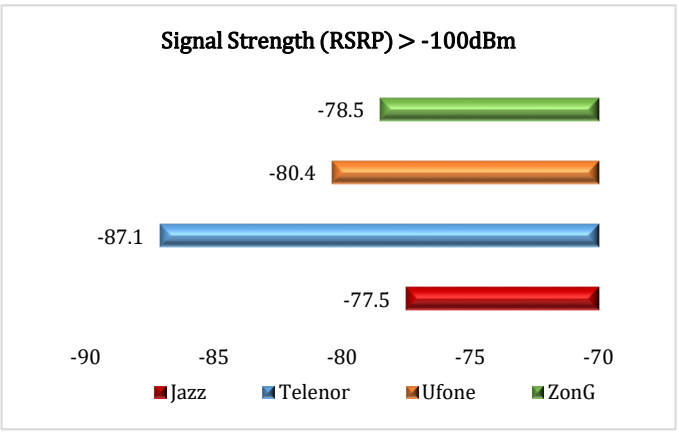
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – ATTOCK

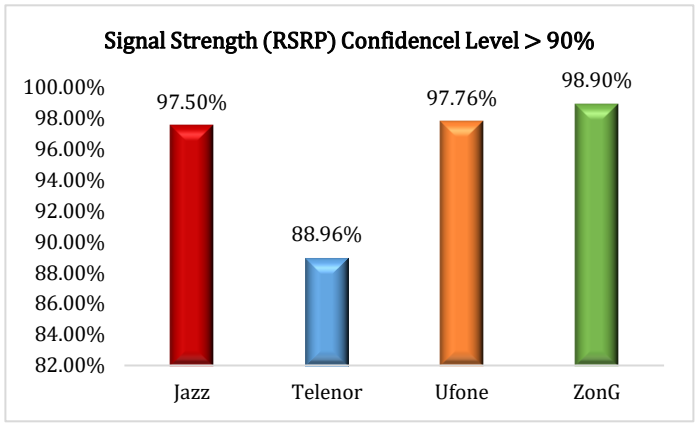


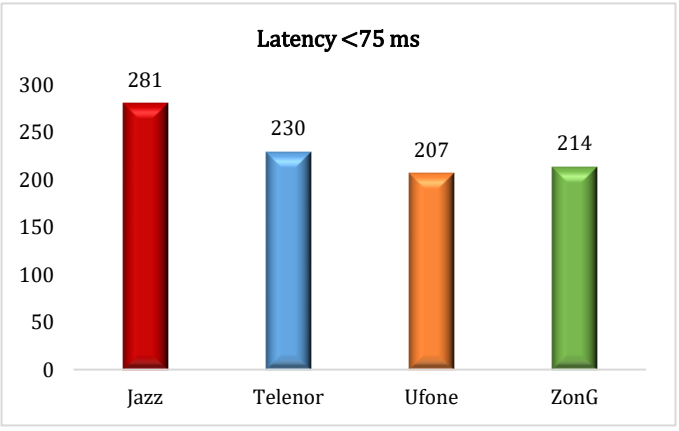



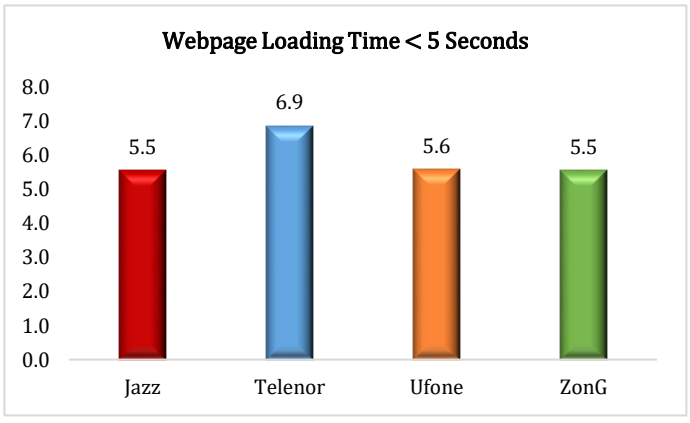



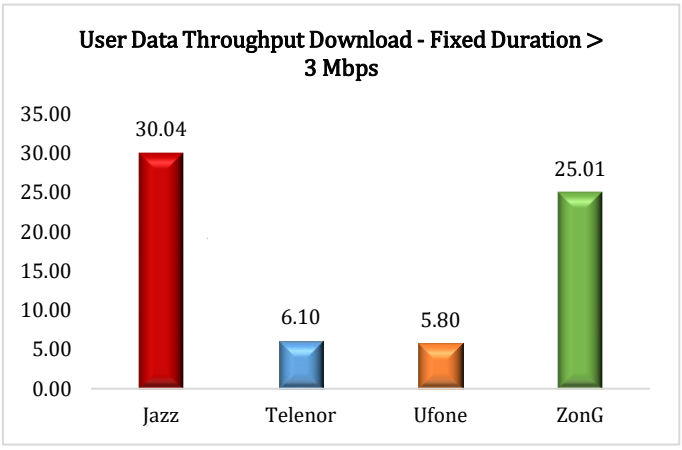



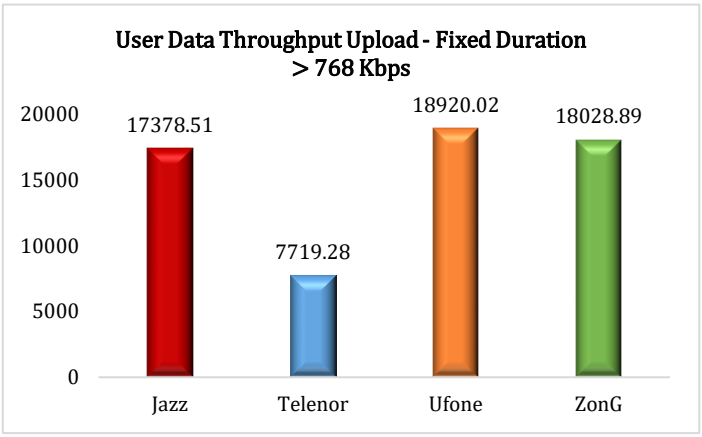



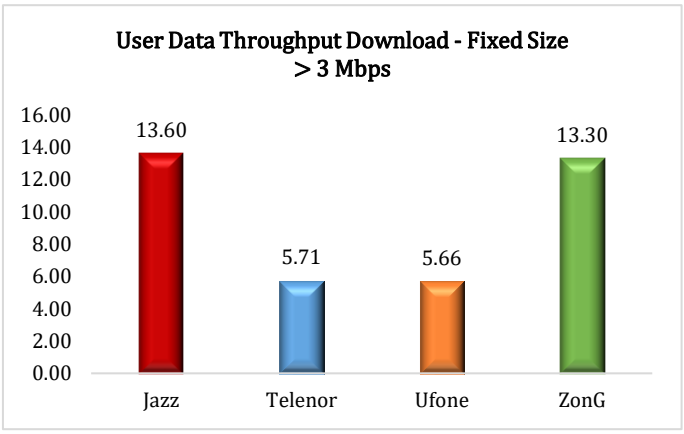



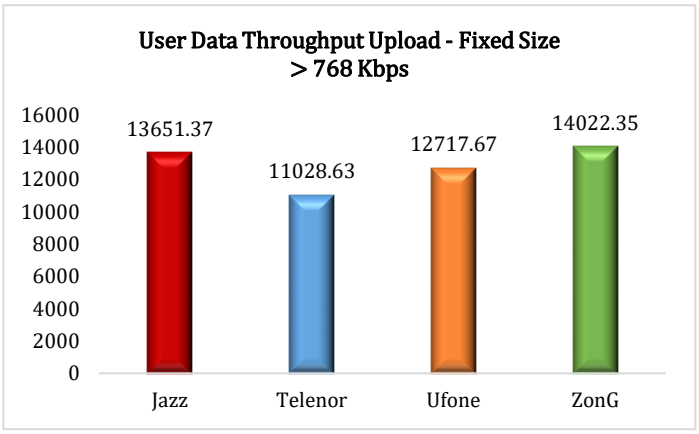



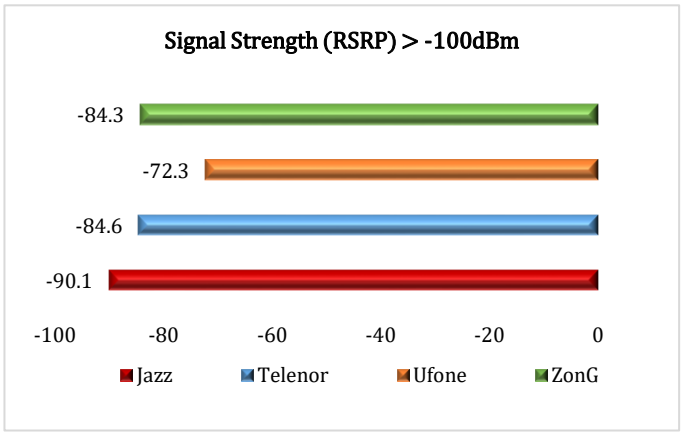
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – BANNU

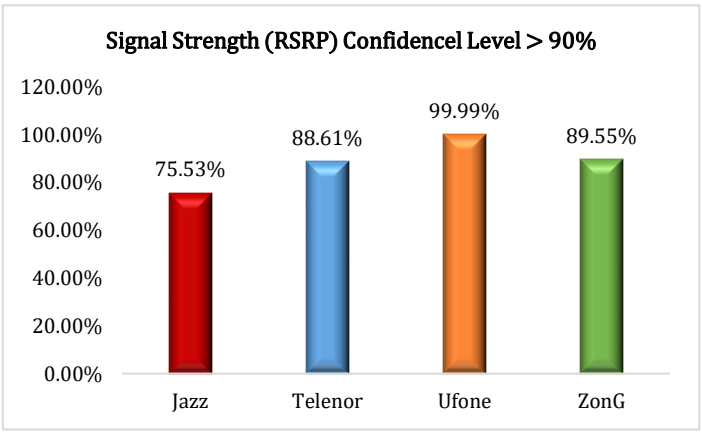


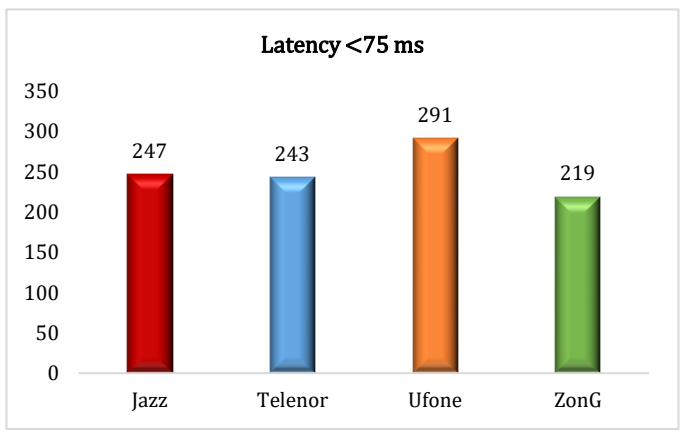



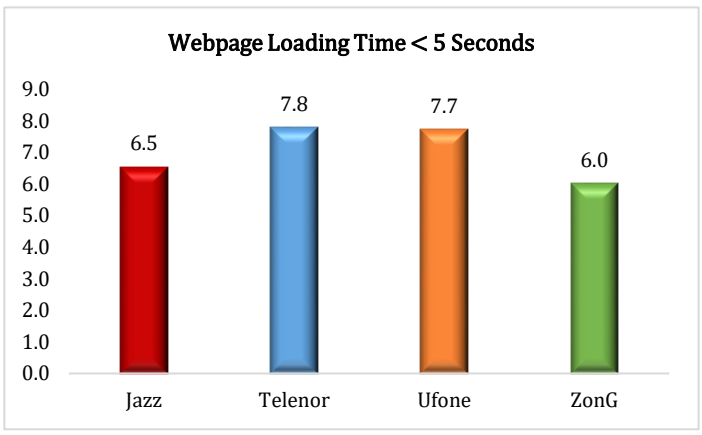



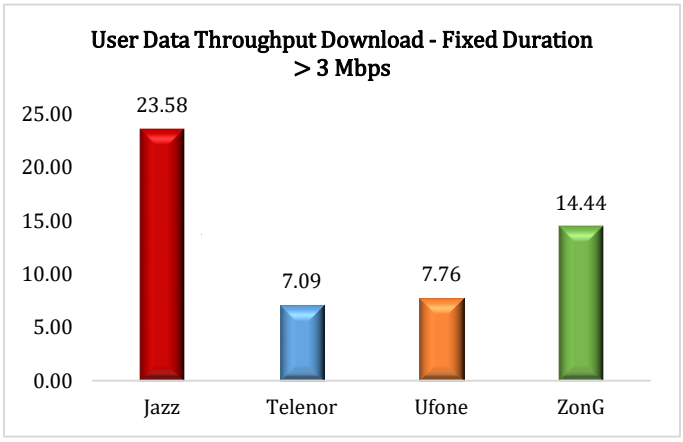



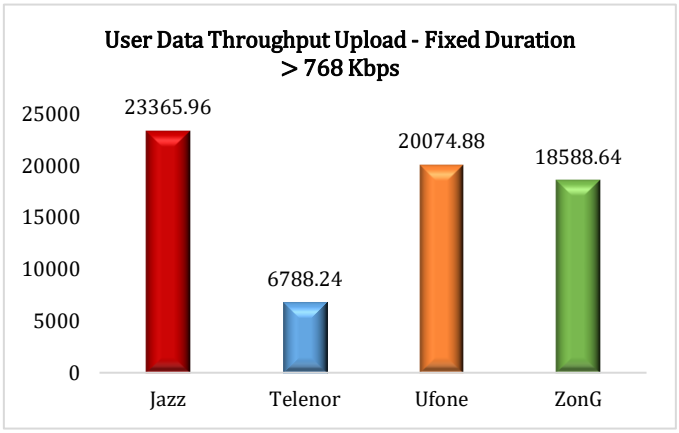



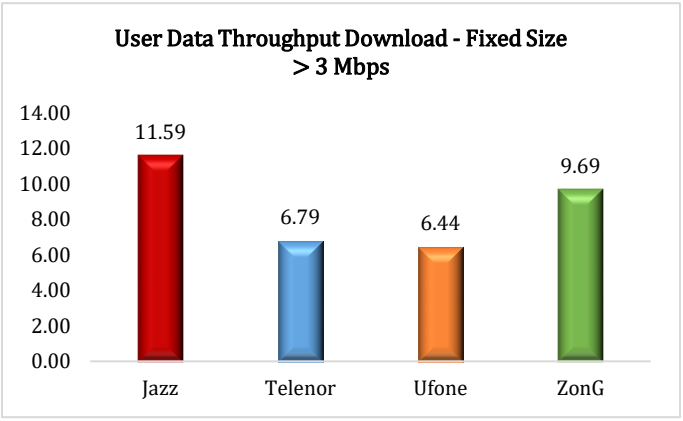



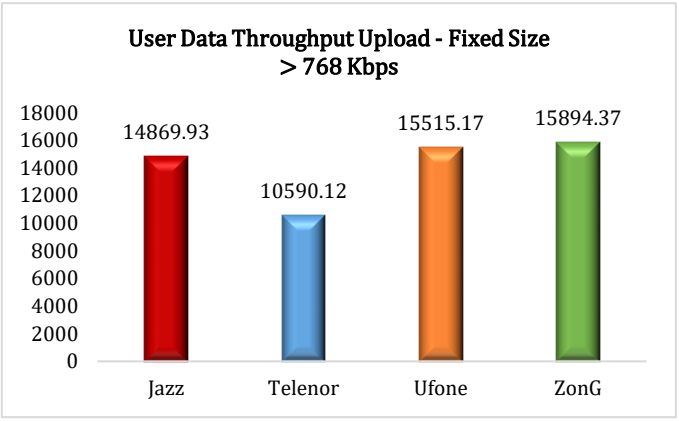



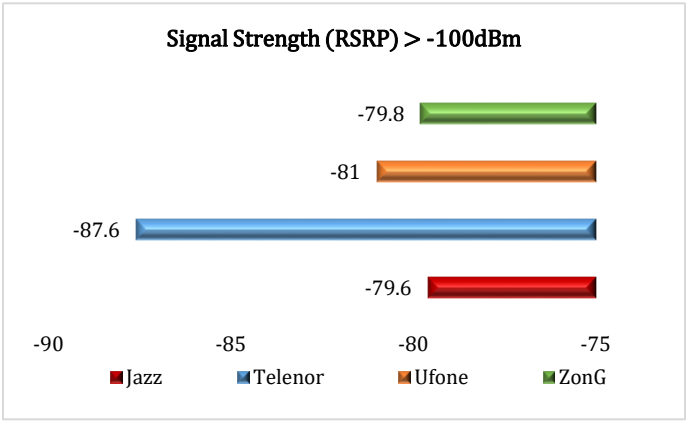
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – HARIPUR

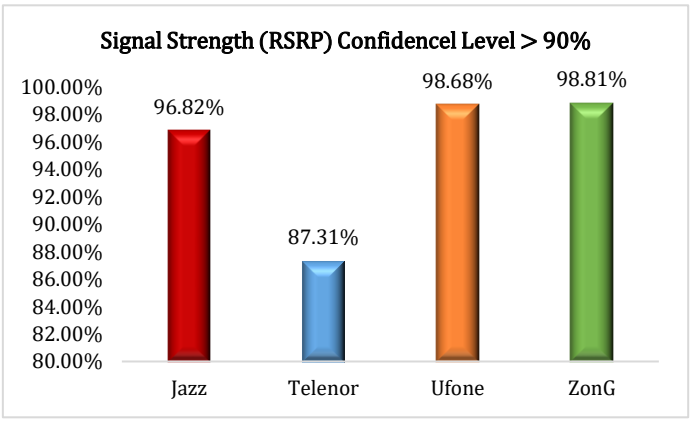


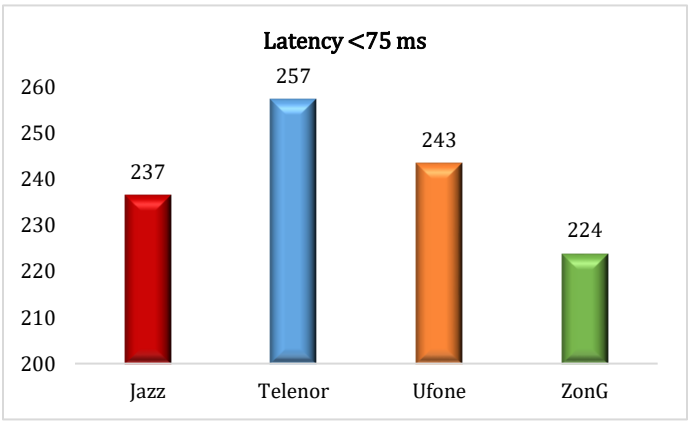



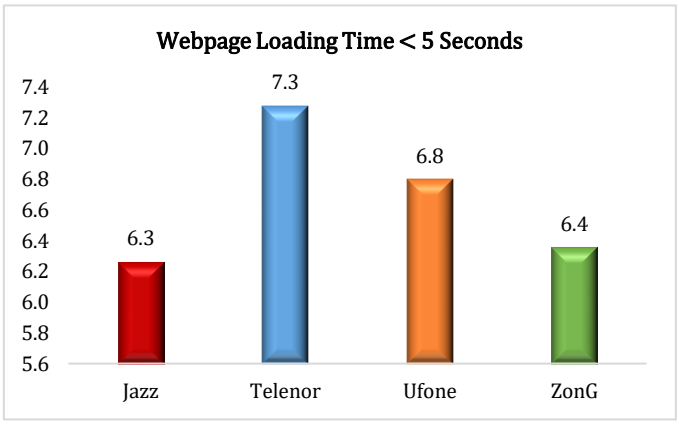



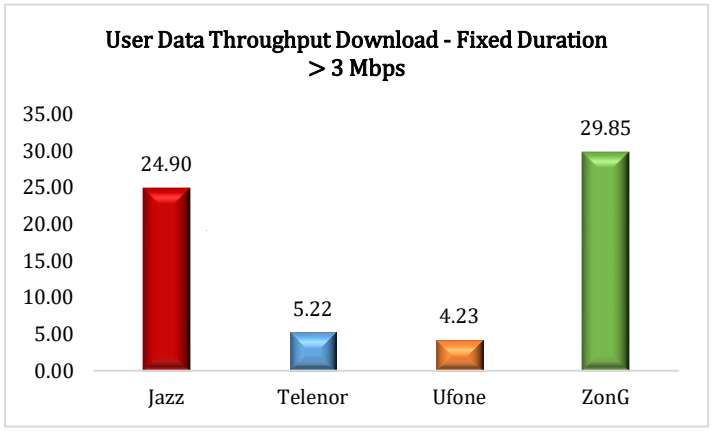



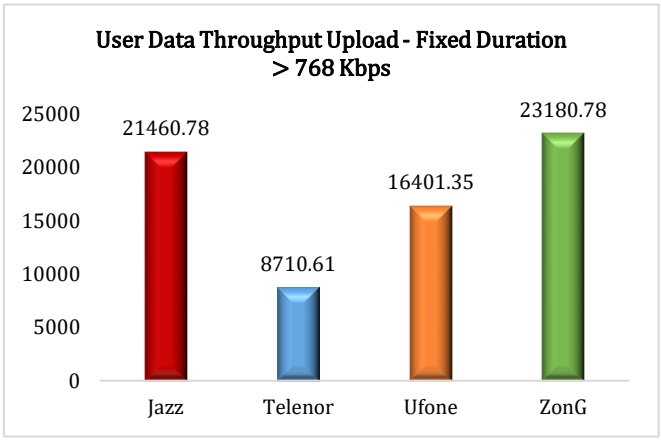



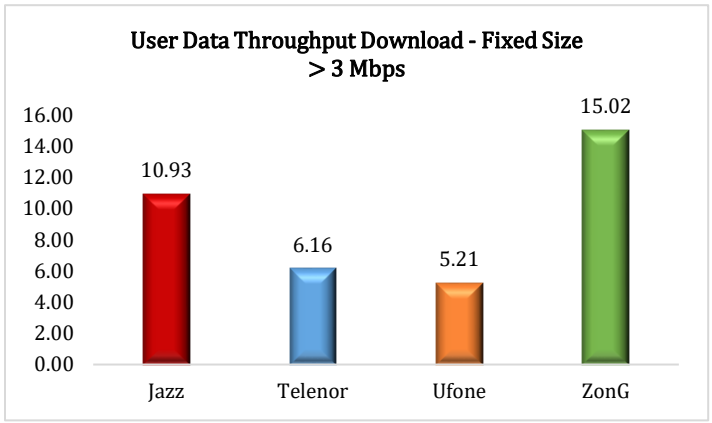



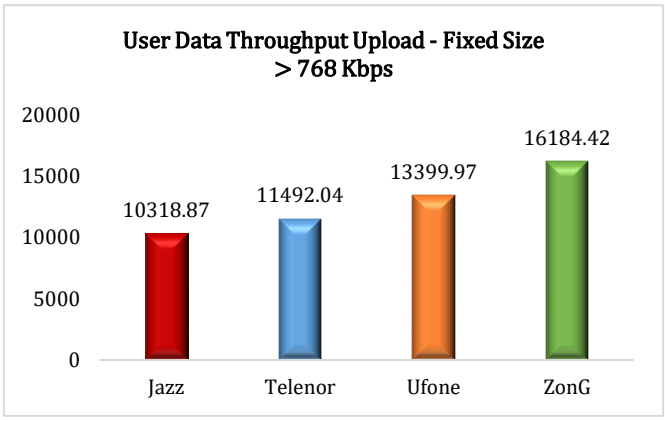



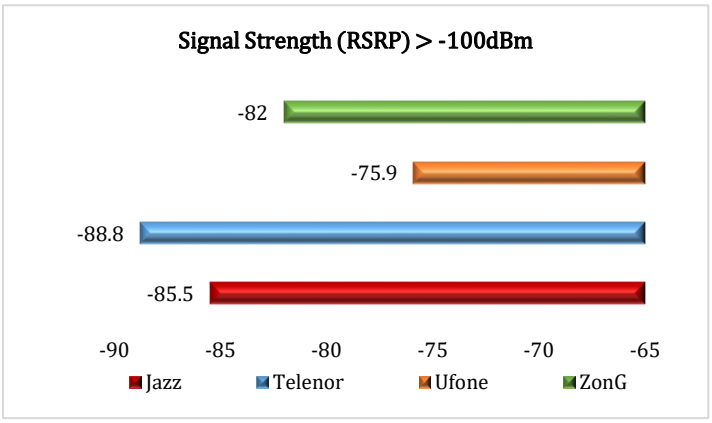
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – KOHAT

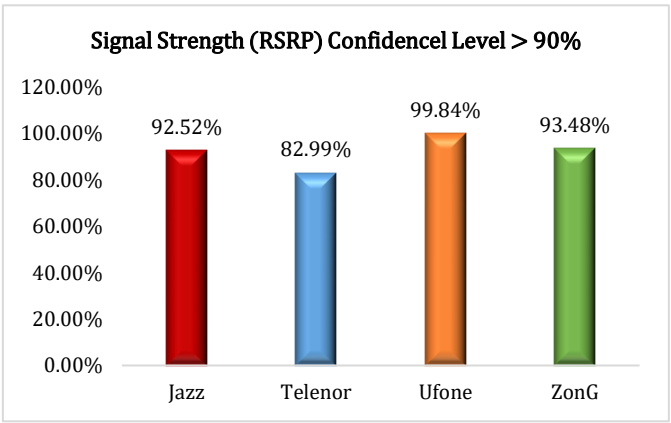


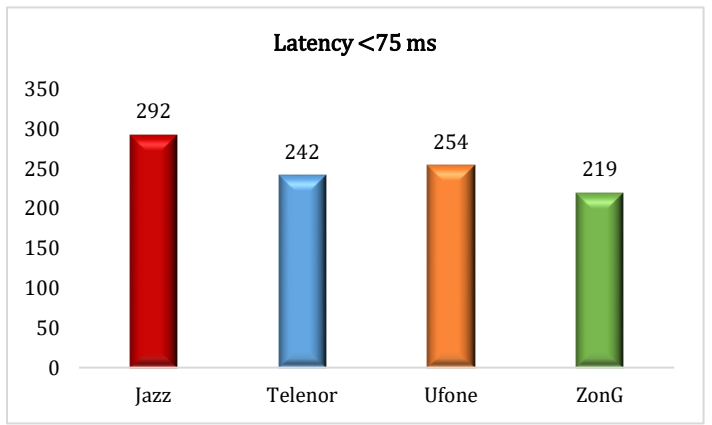



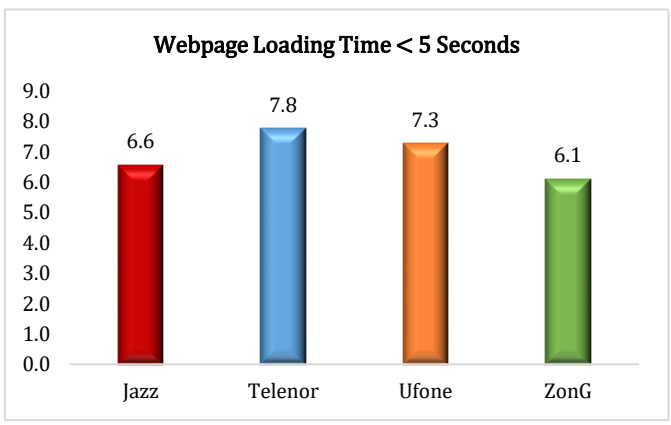



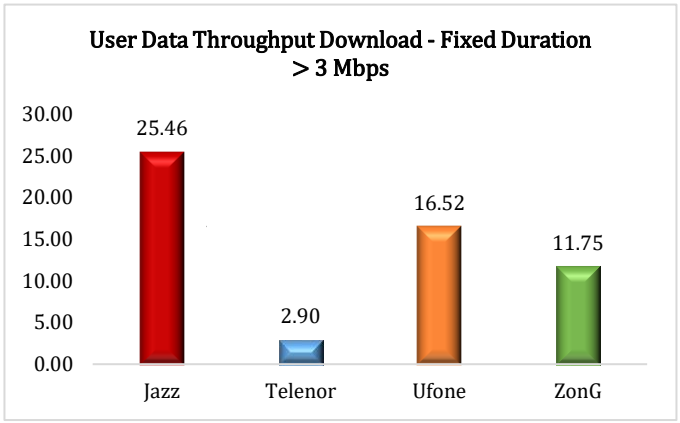



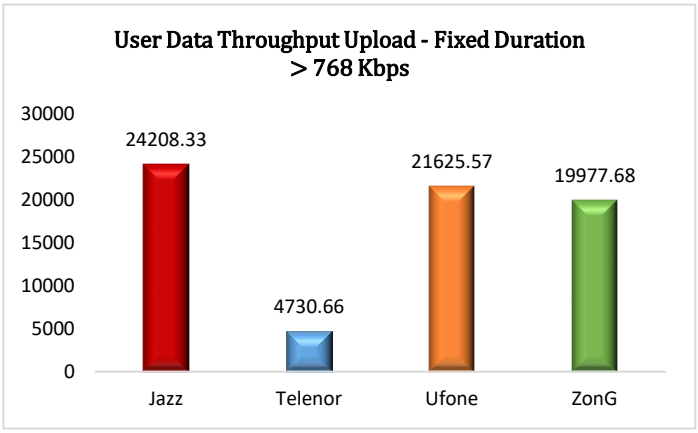



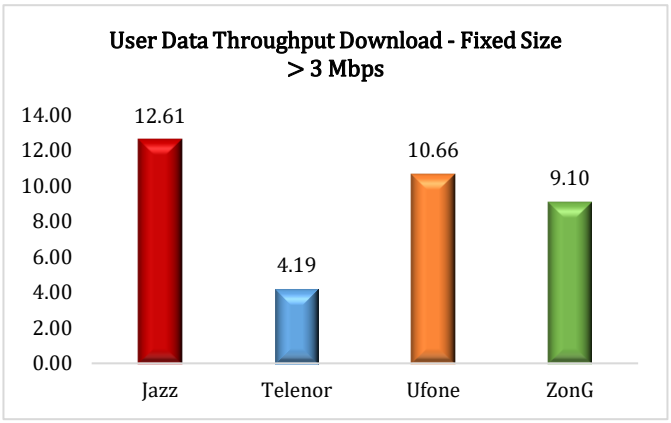



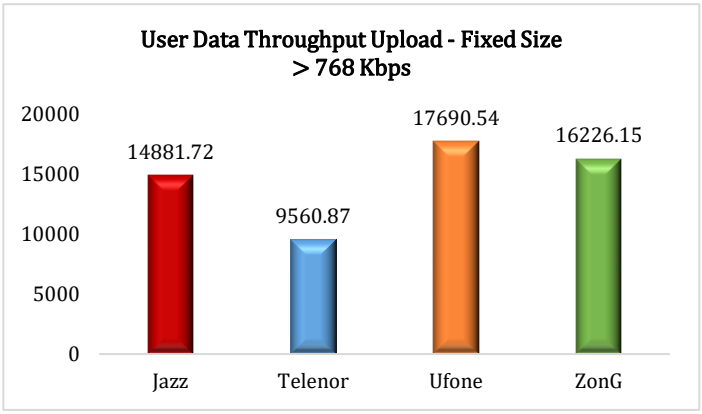



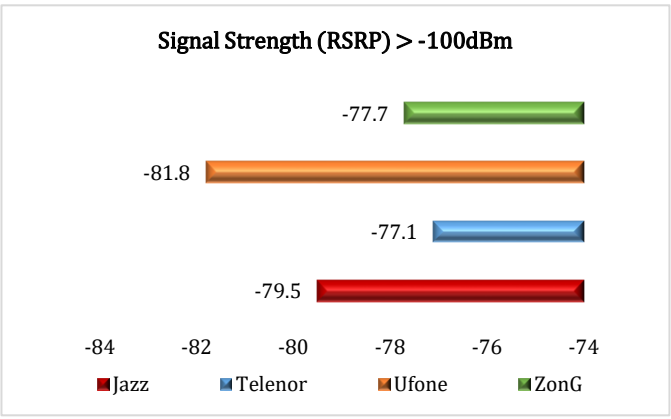
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – MANSEHRA

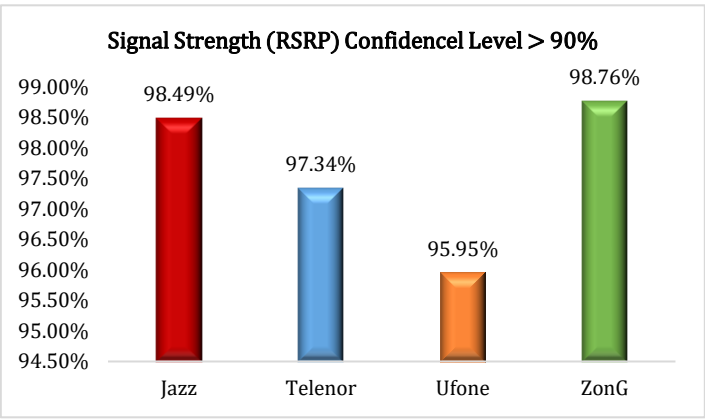


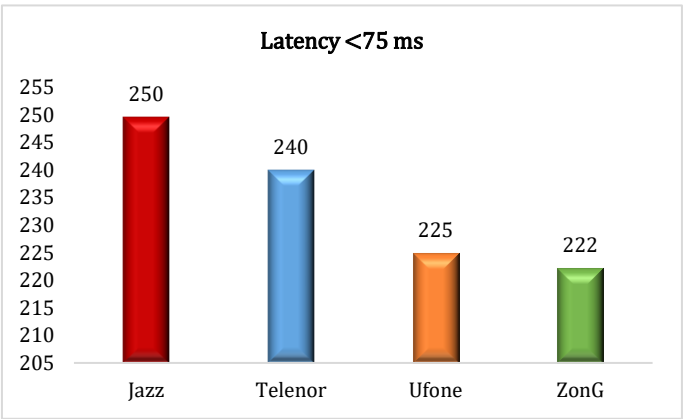



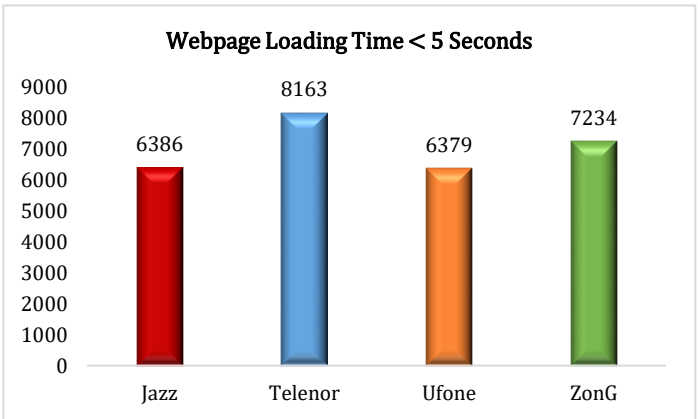



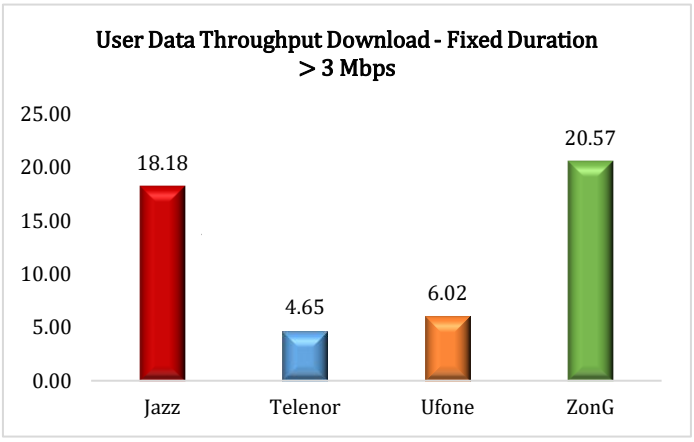



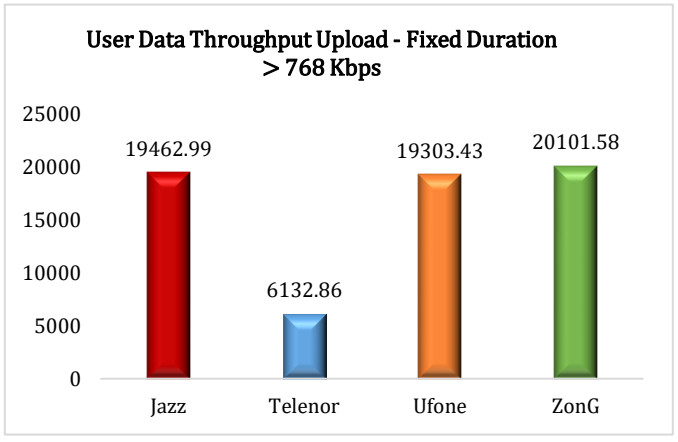



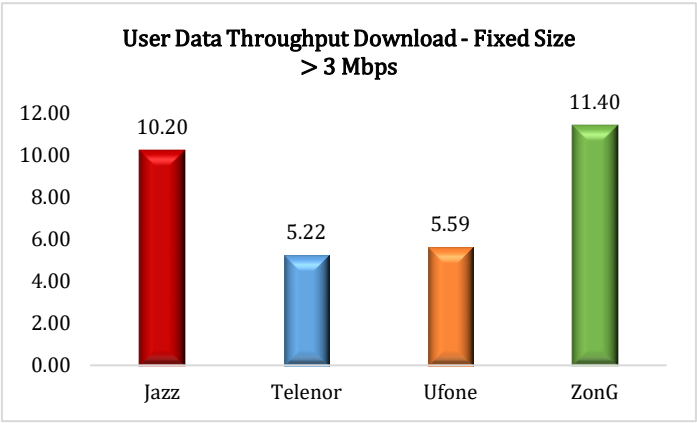



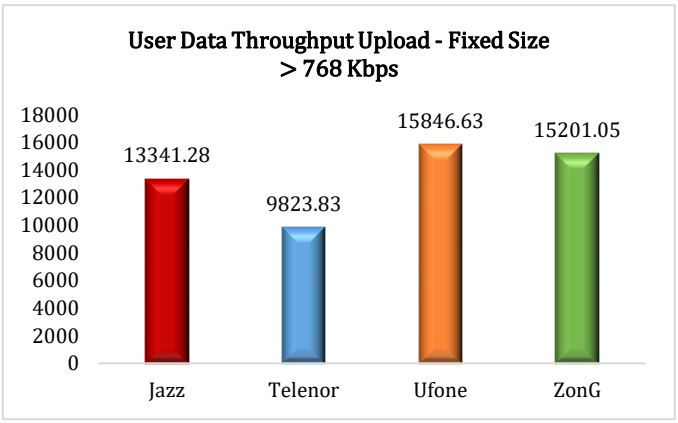



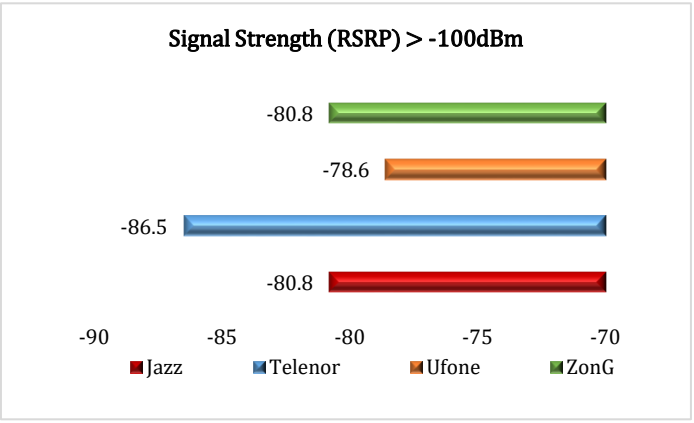
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – PESHAWAR

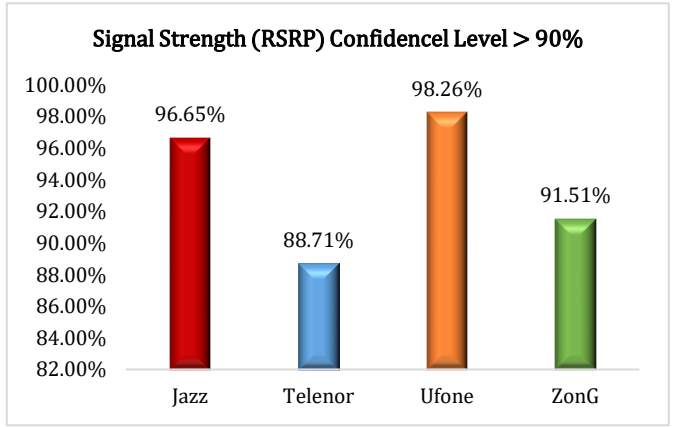


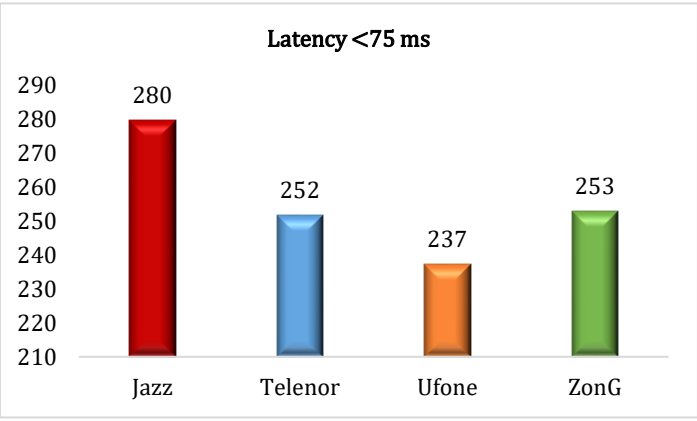



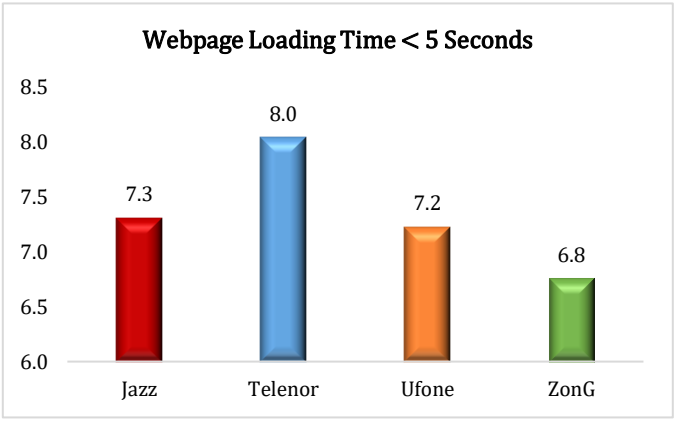



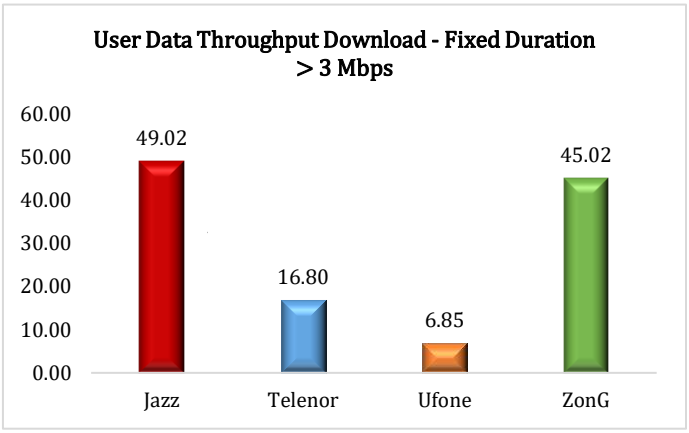



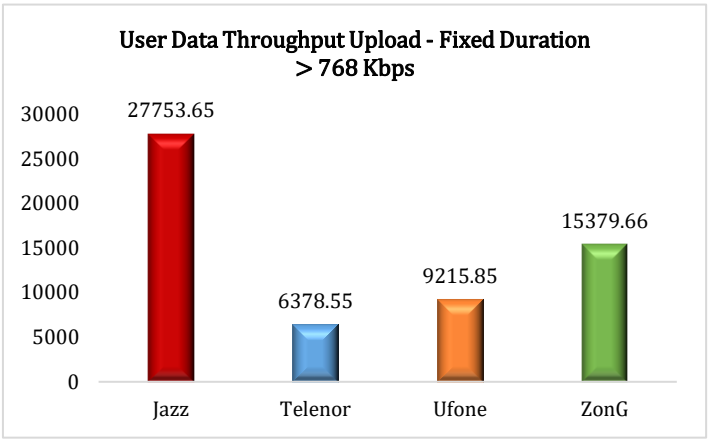



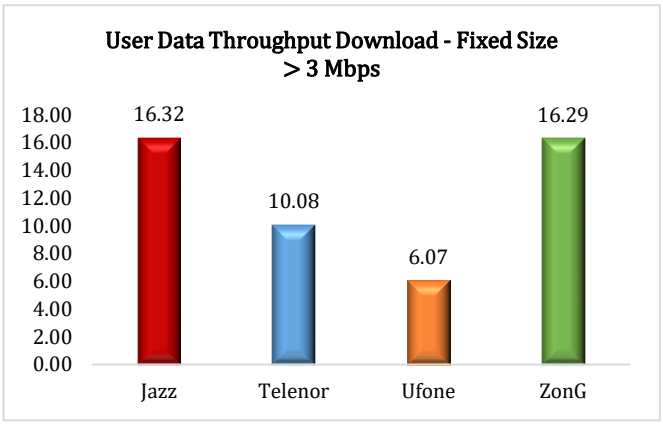



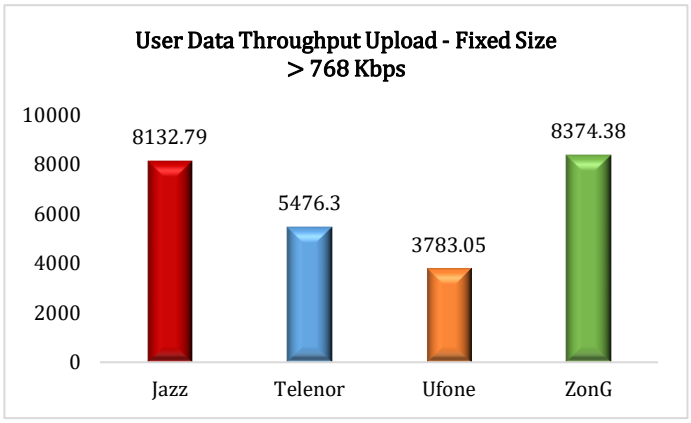



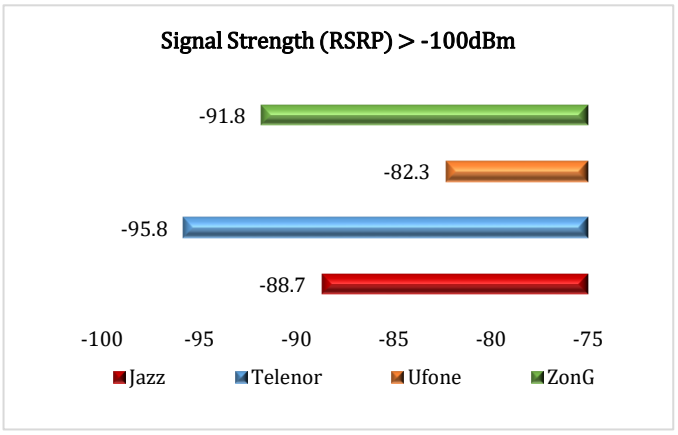
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – DHADDAR

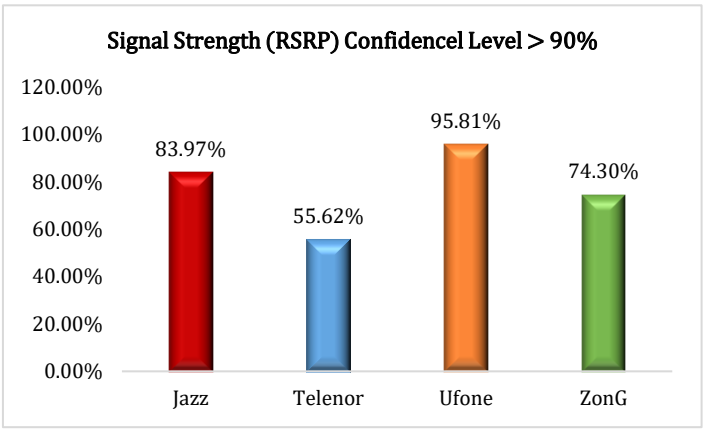


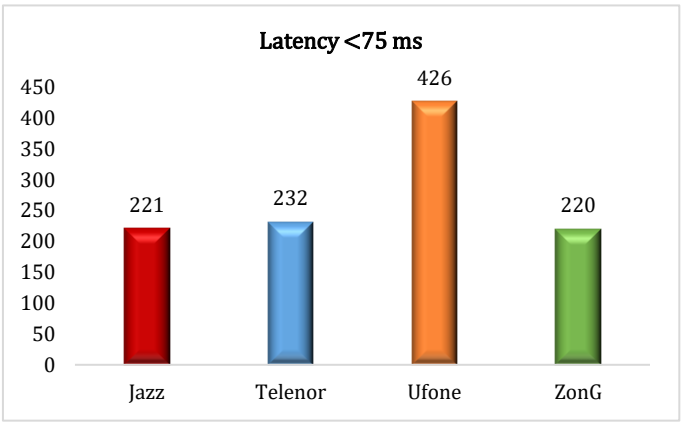



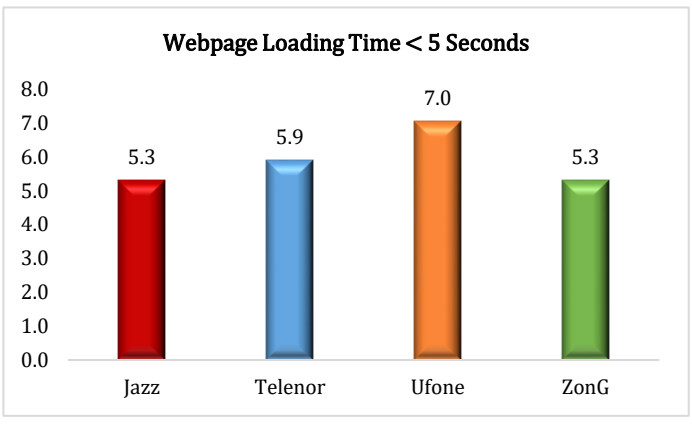



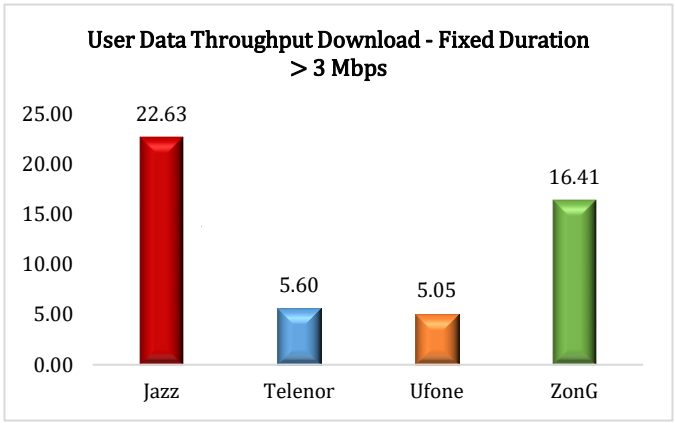



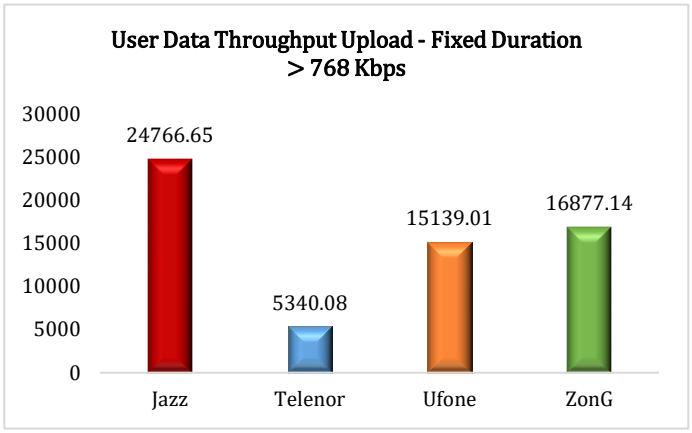



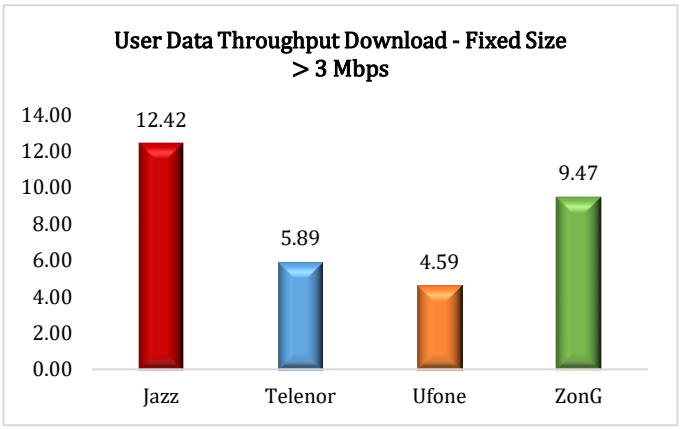



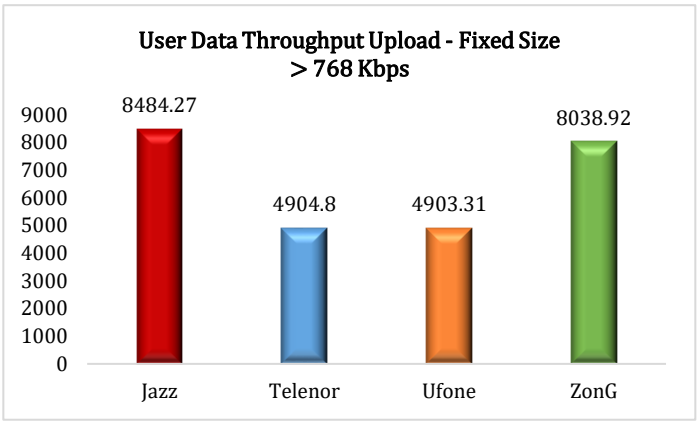



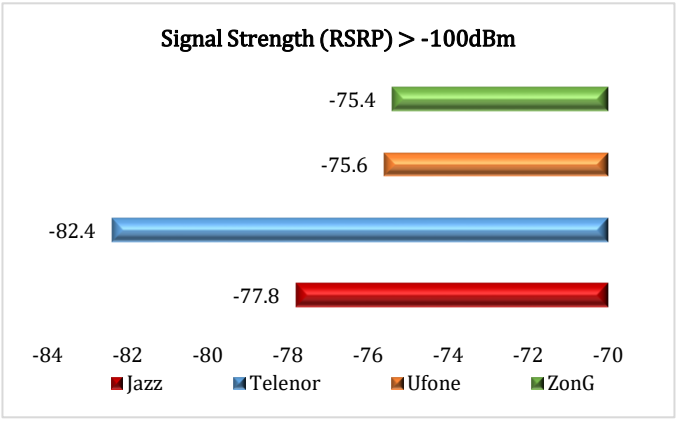
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – QUETTA

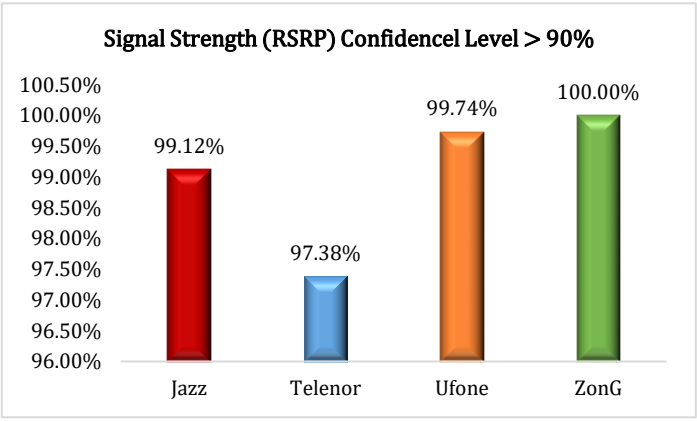


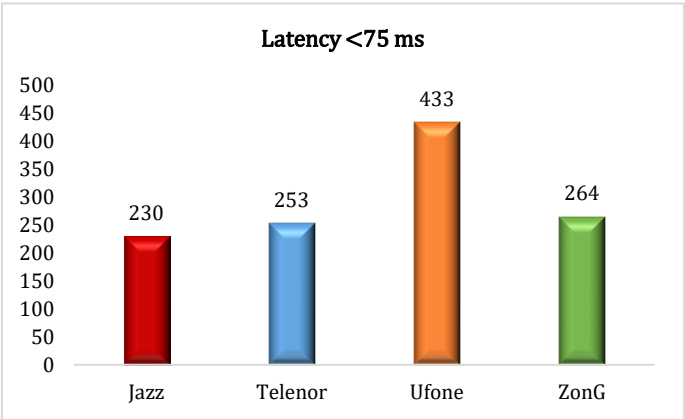



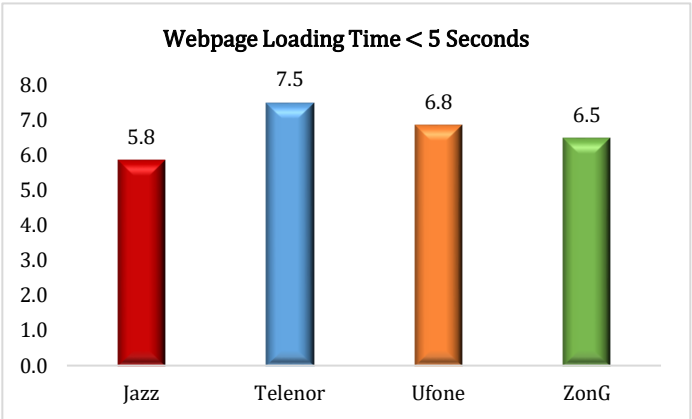



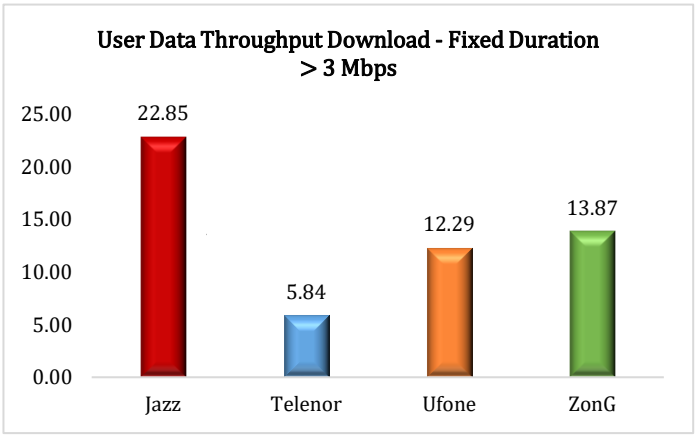



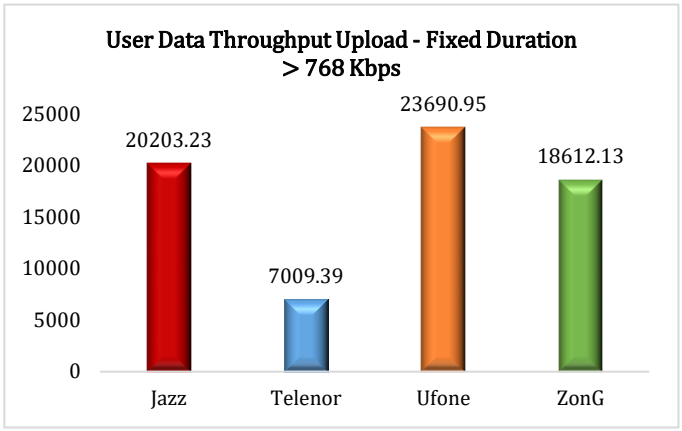



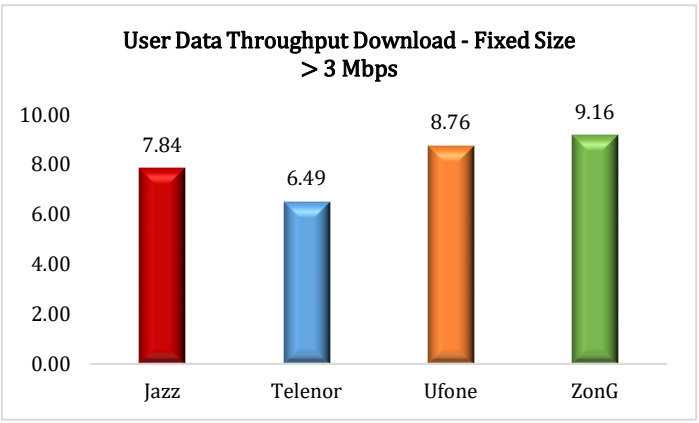



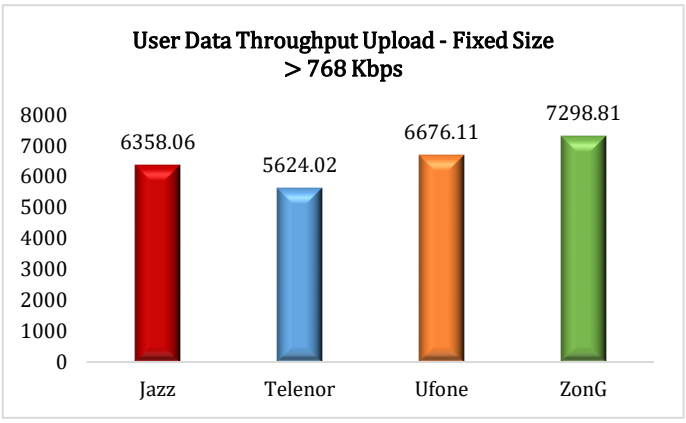



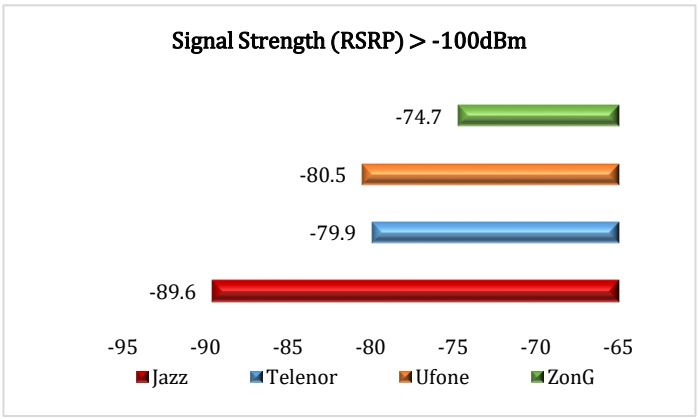
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – ZHOB

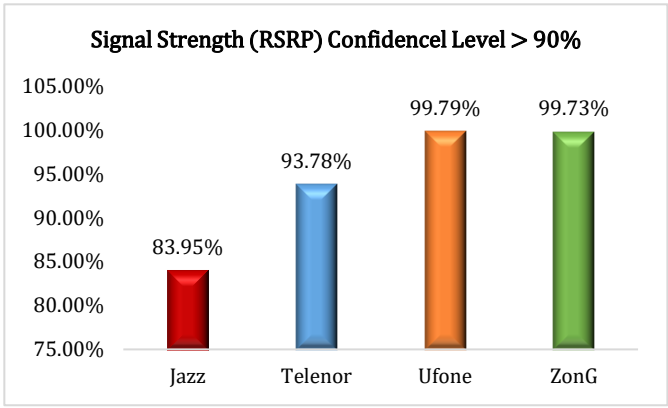


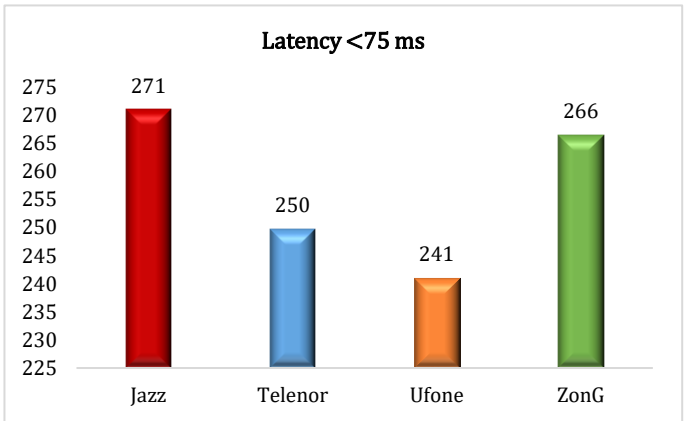



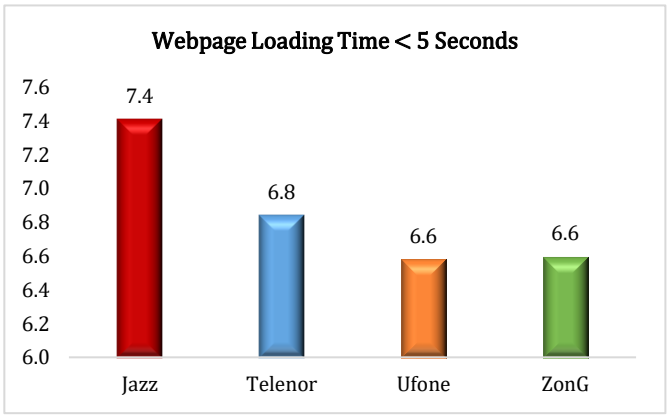



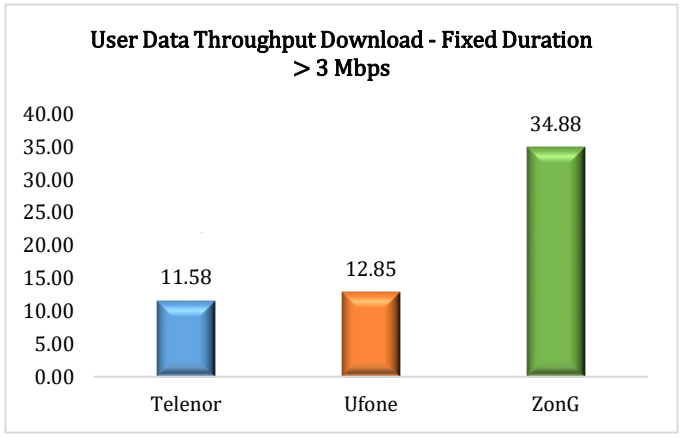



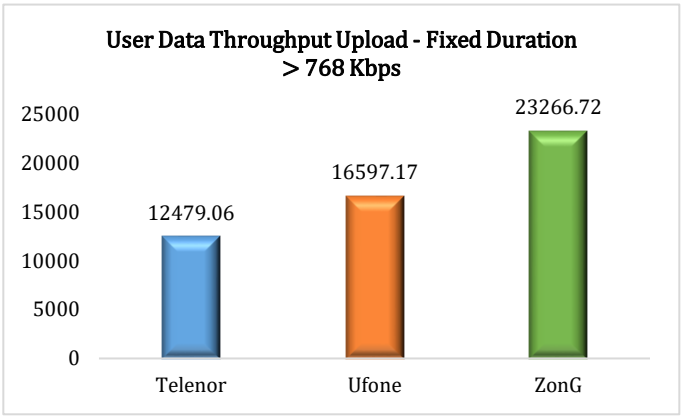



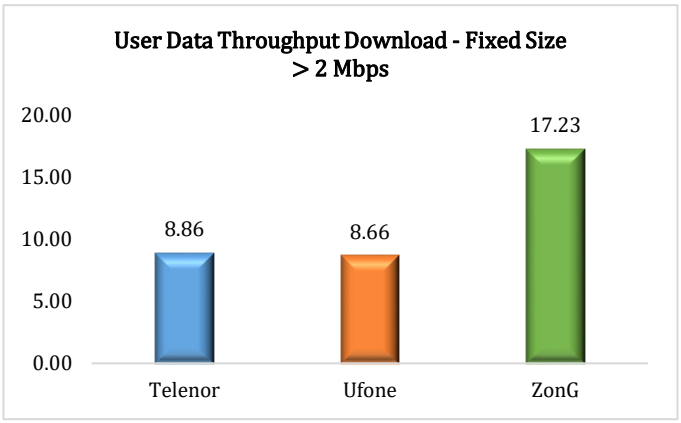



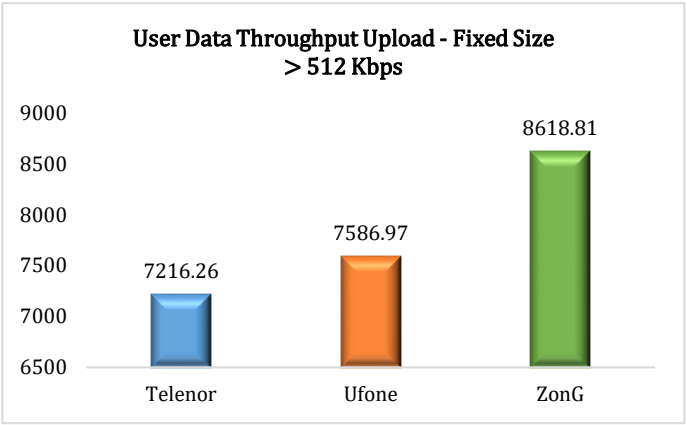



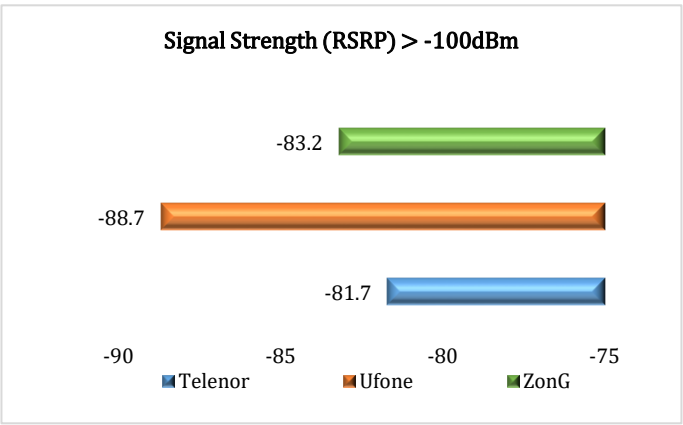
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – ZIARAT

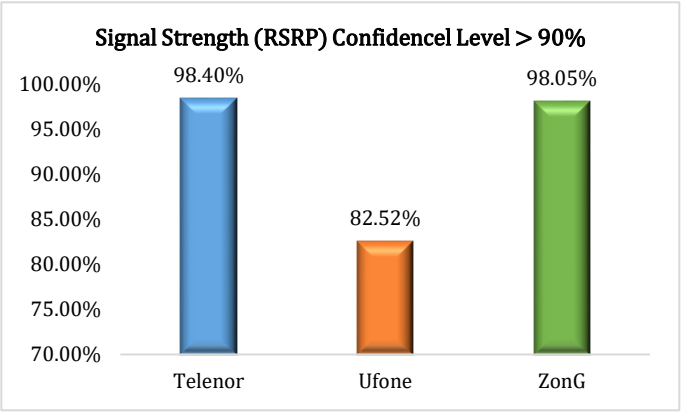


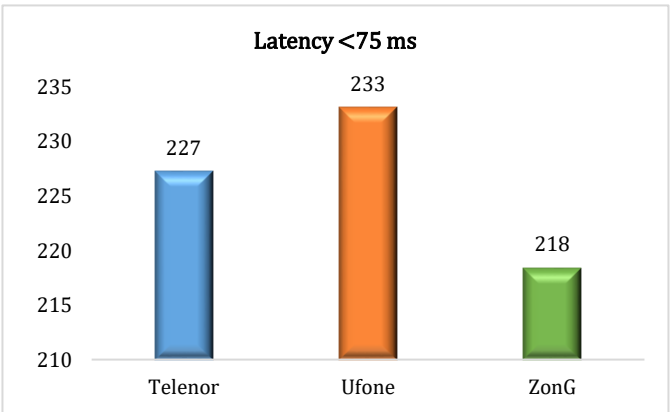



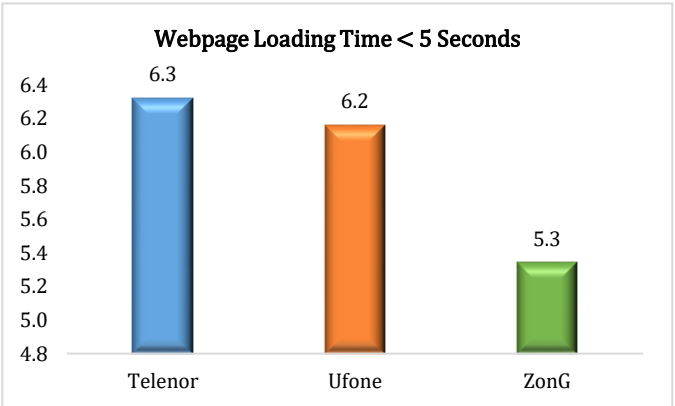



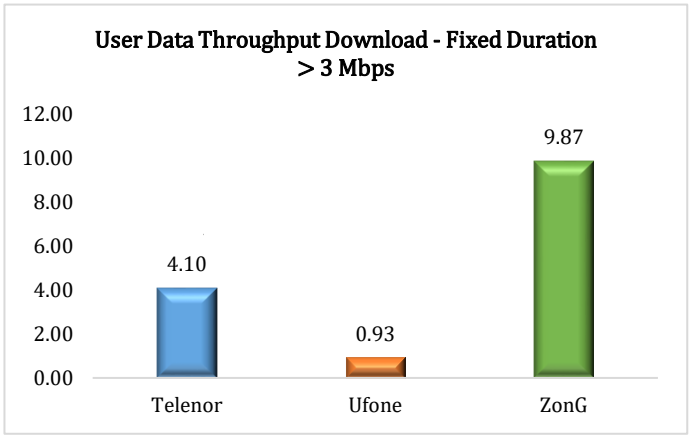



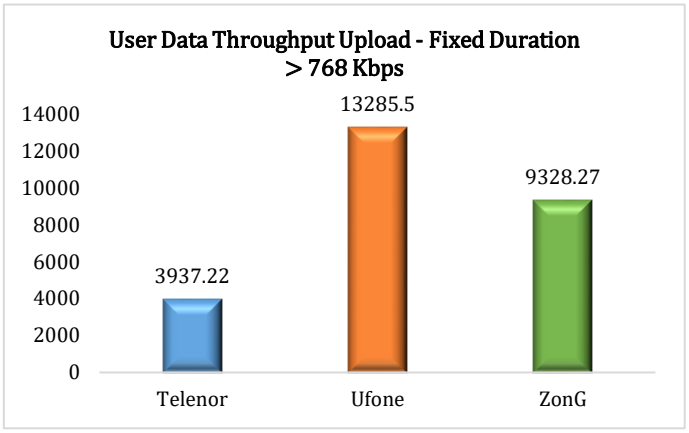



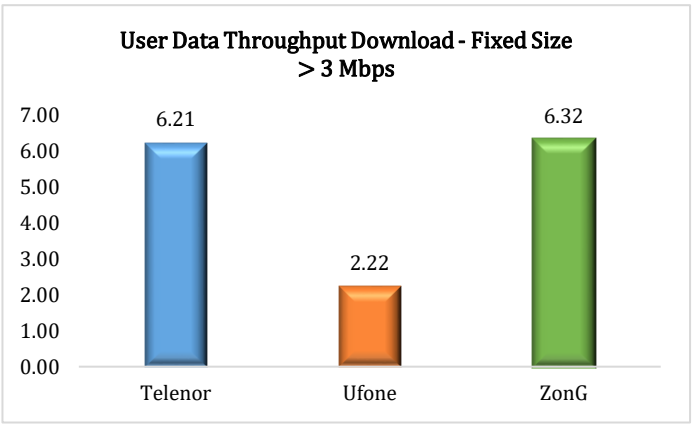



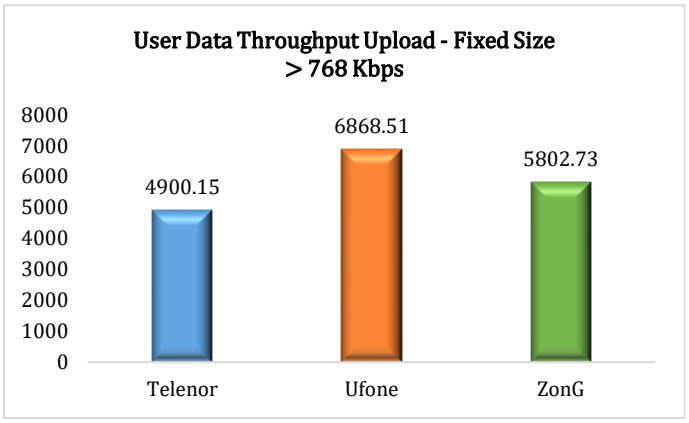



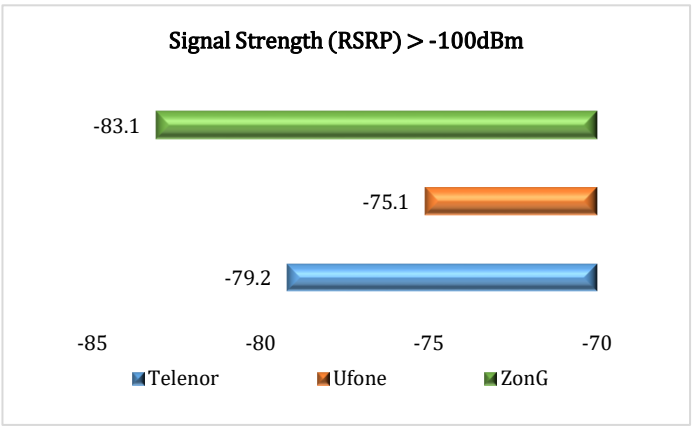
# QUALITY OF SERVICE SURVEY RESULTS (AUTOMODE) – DALBANDIN

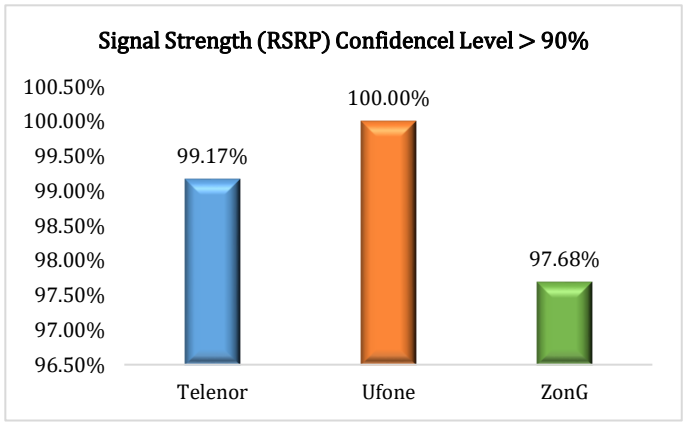


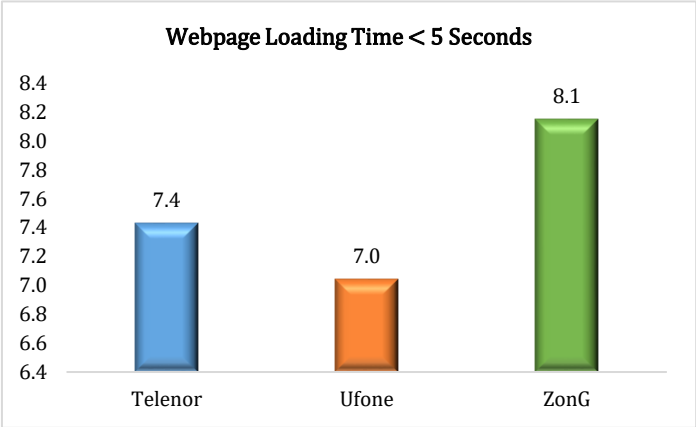



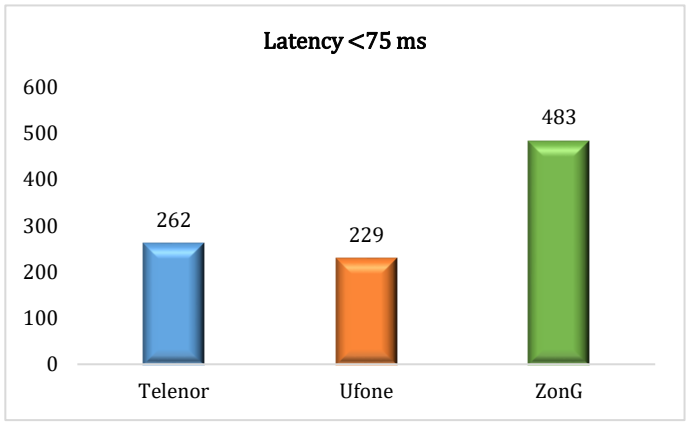



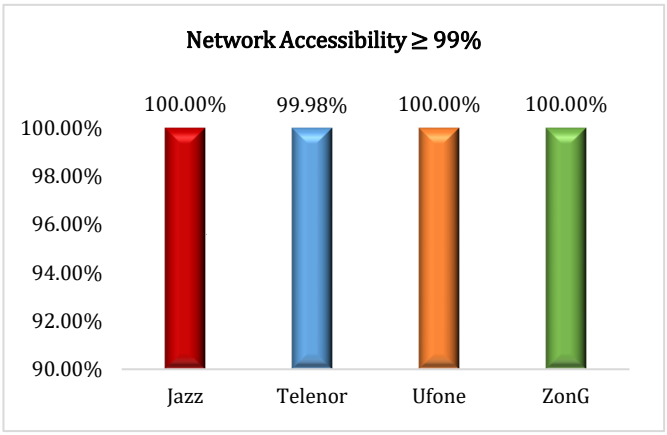



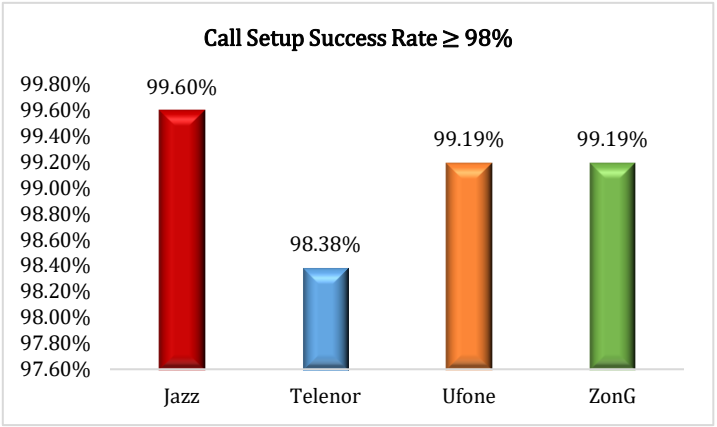



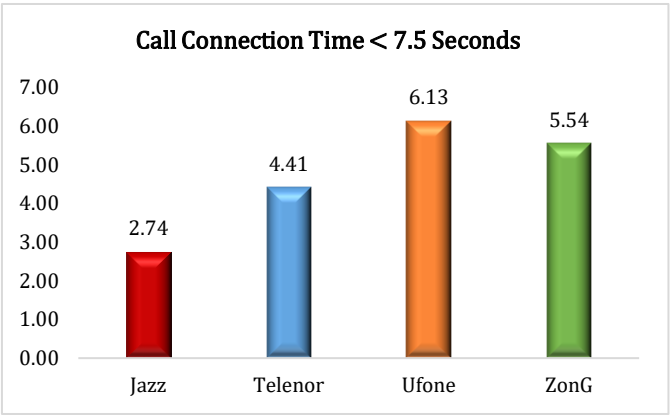
Annex-C

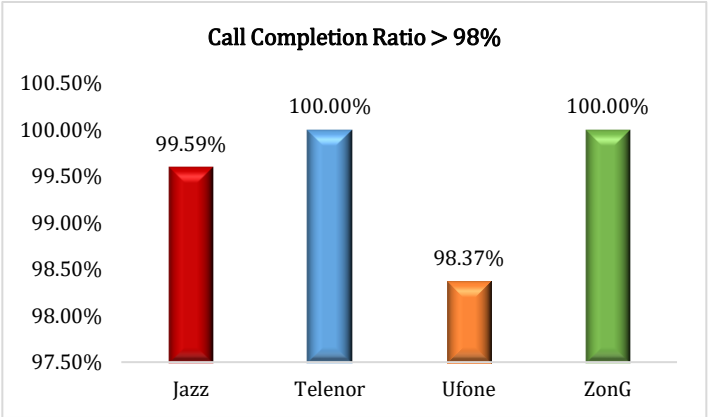
# VOICE & SMS RESUTS

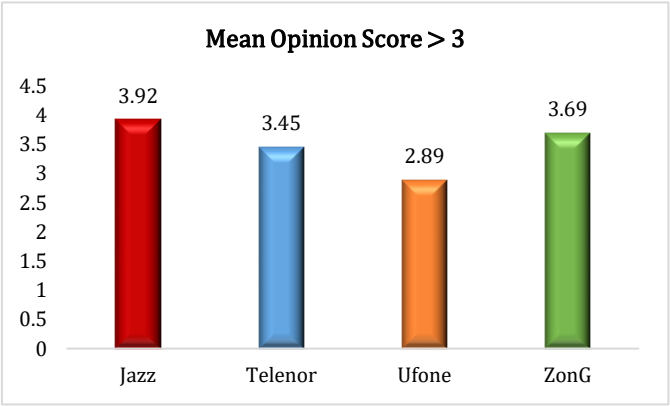
# QUALITY OF SERVICE SURVEY RESULTS – BHAKKAR

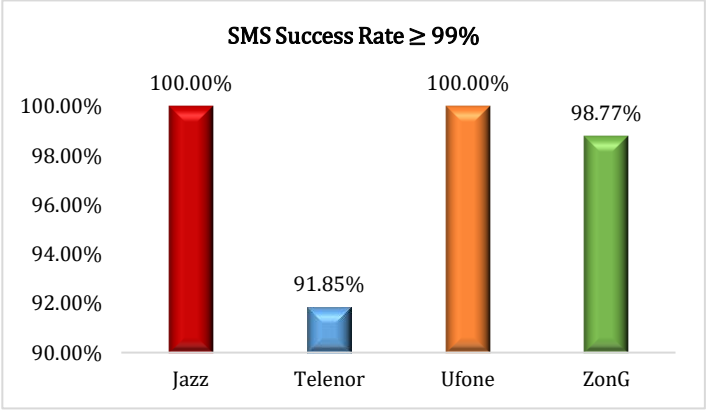


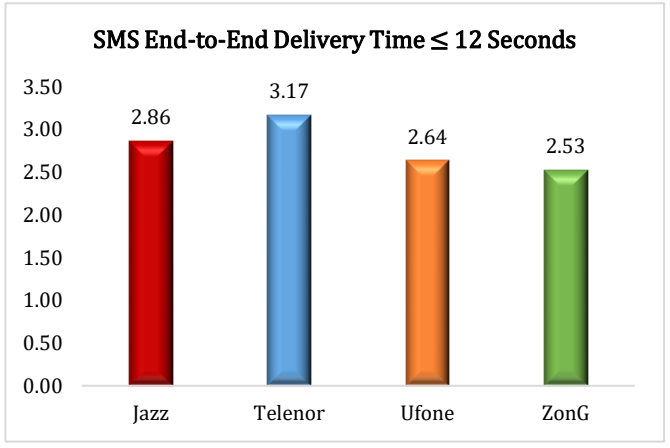



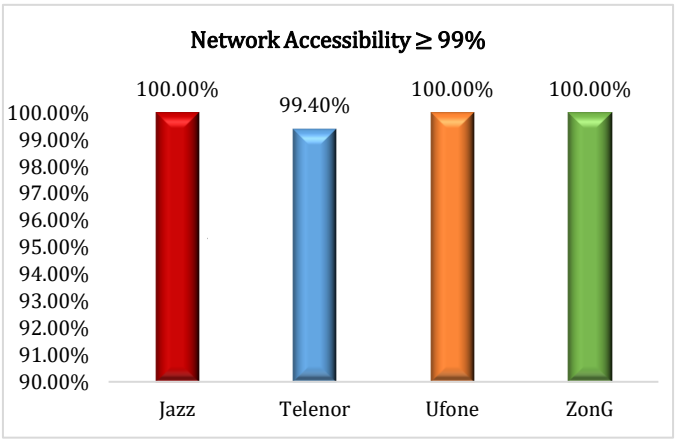



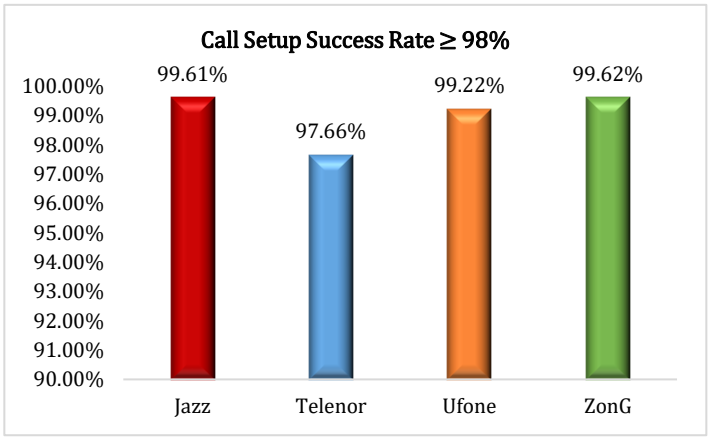



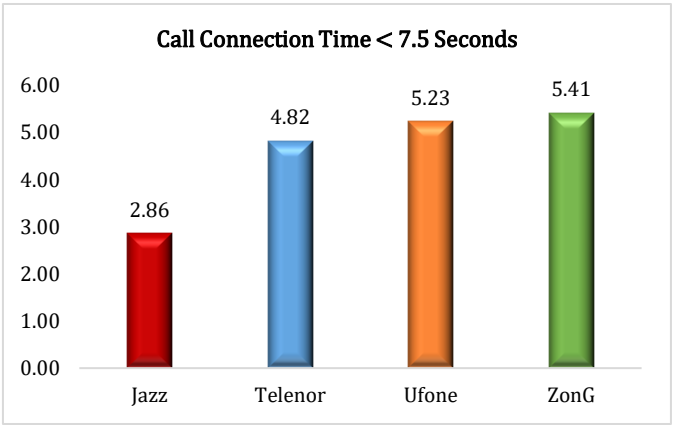



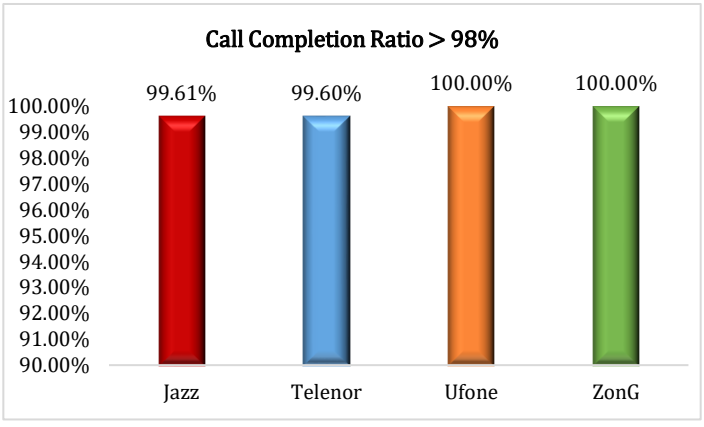



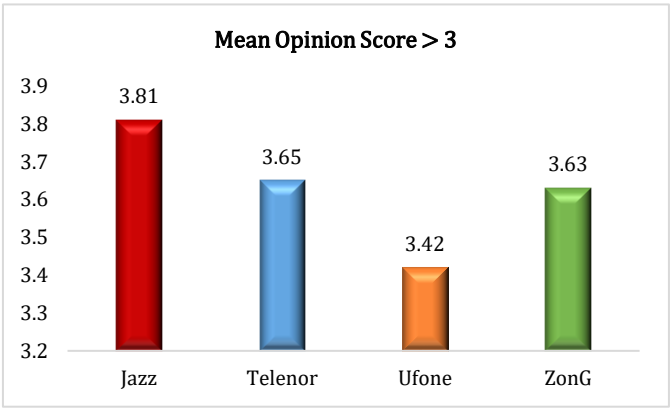
# QUALITY OF SERVICE SURVEY RESULTS – BUREWALA

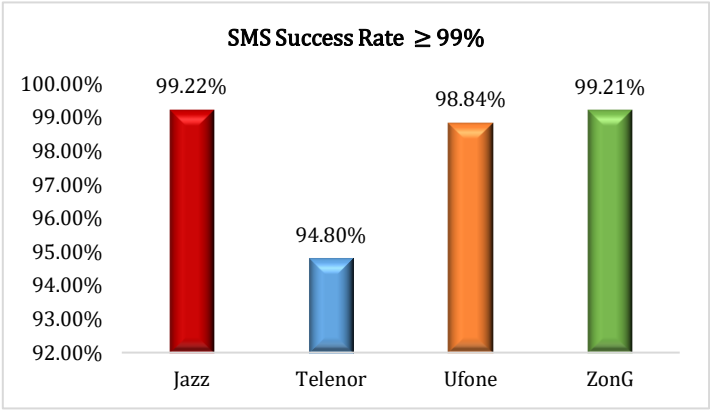


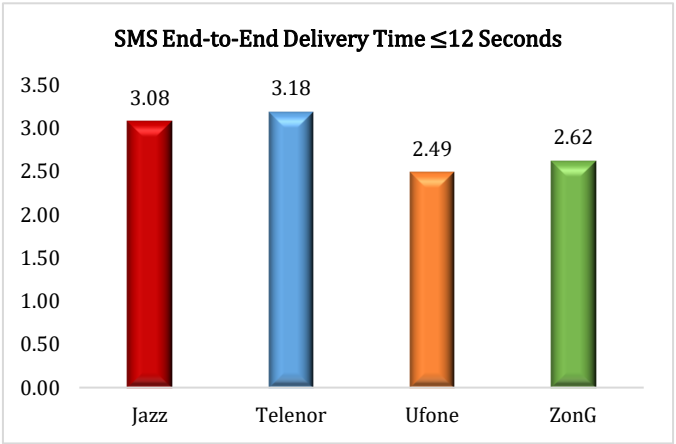



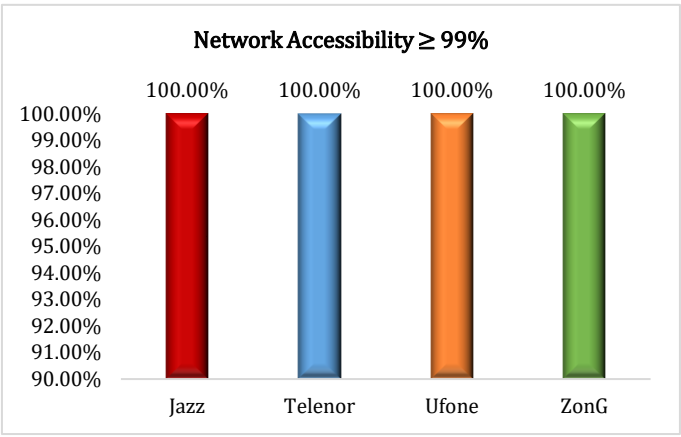



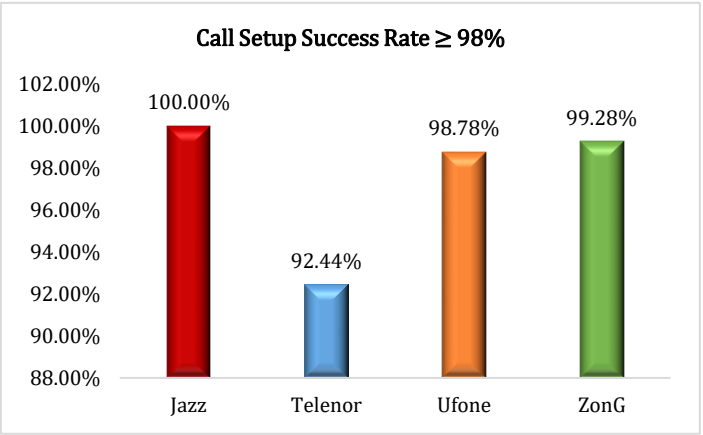



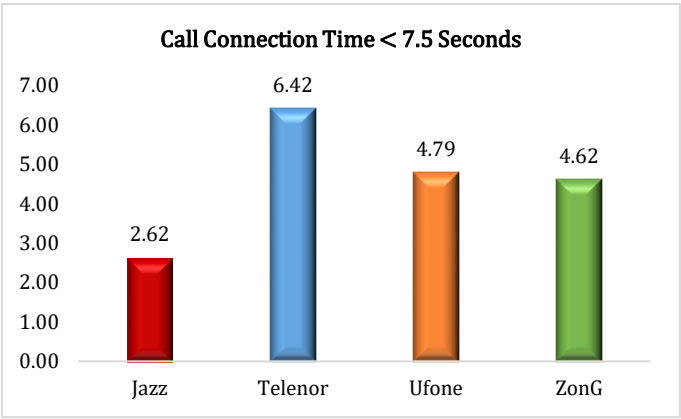



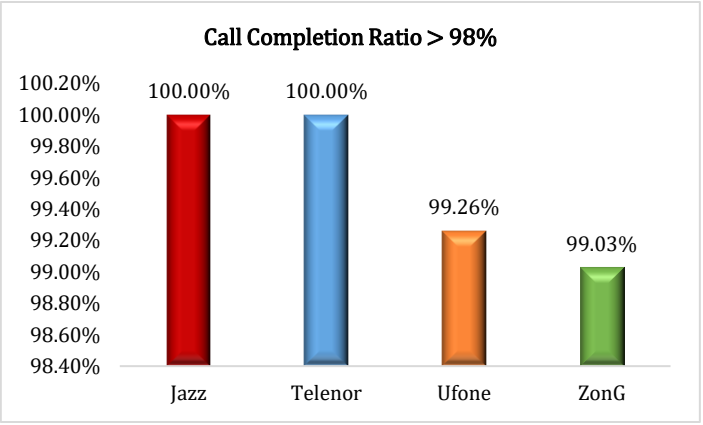



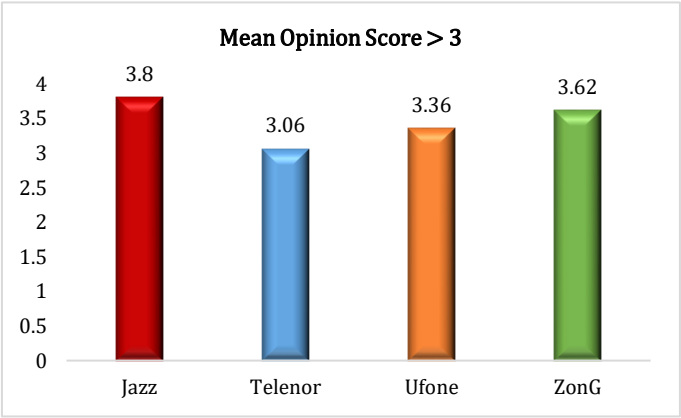
# QUALITY OF SERVICE SURVEY RESULTS – CHAKWAL

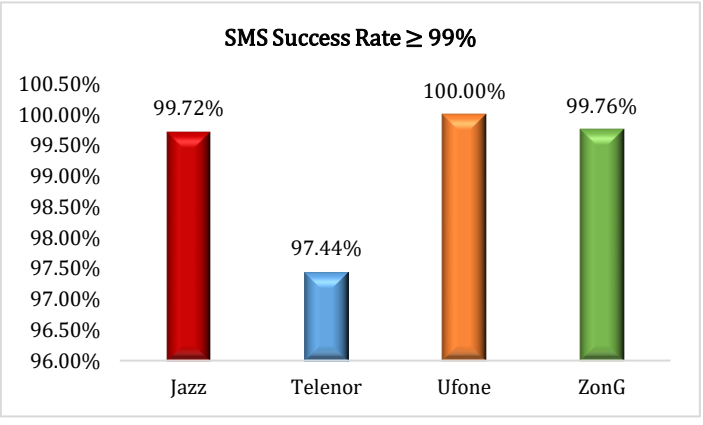


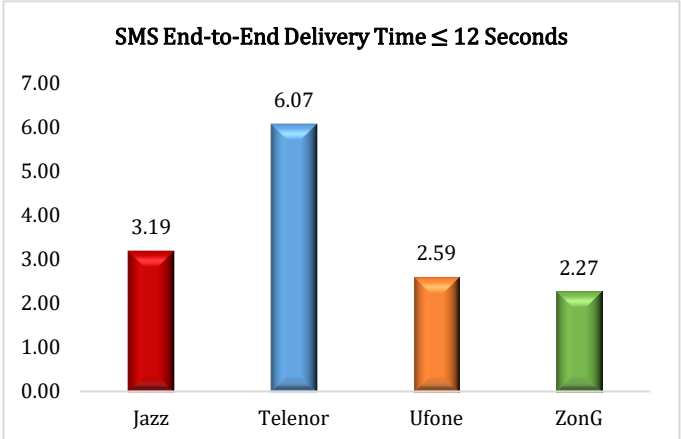



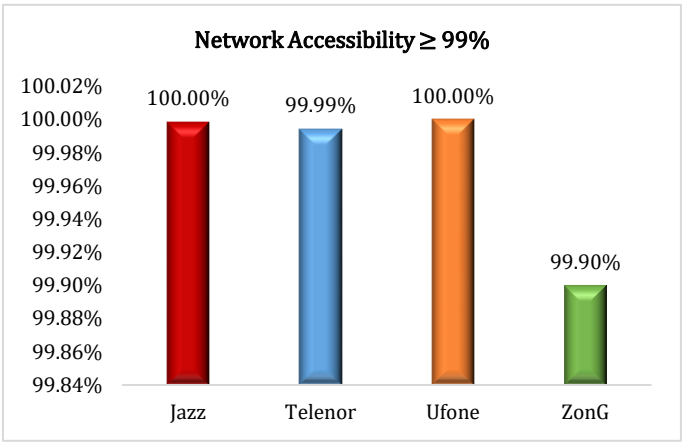



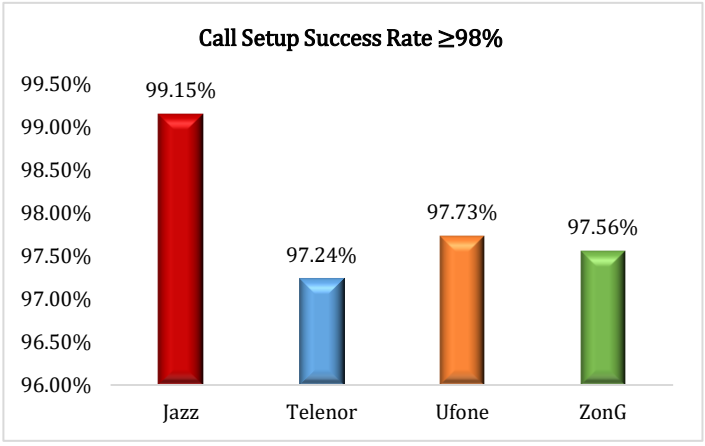



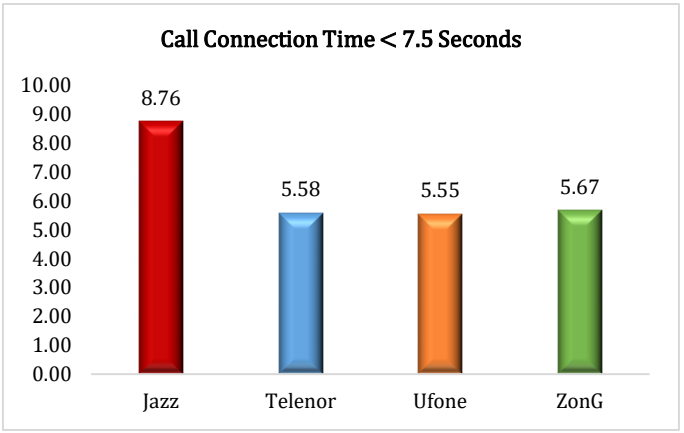



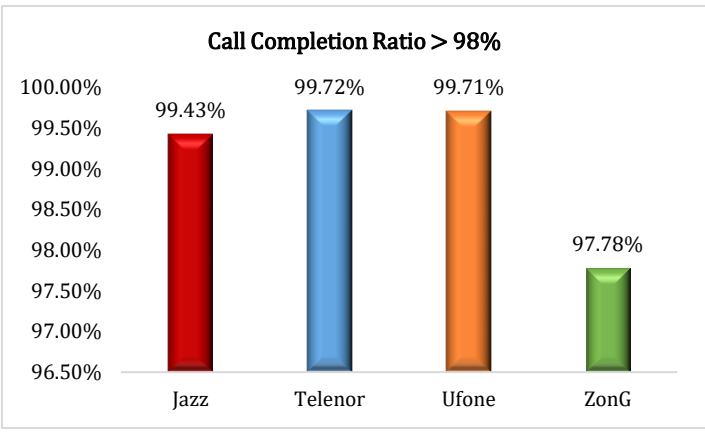



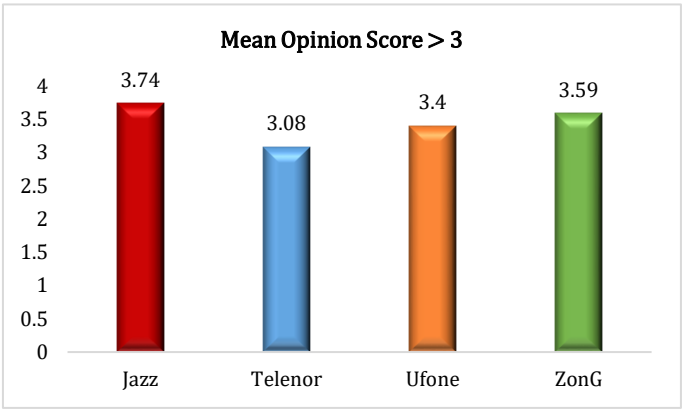
# QUALITY OF SERVICE SURVEY RESULTS – FAISALABAD

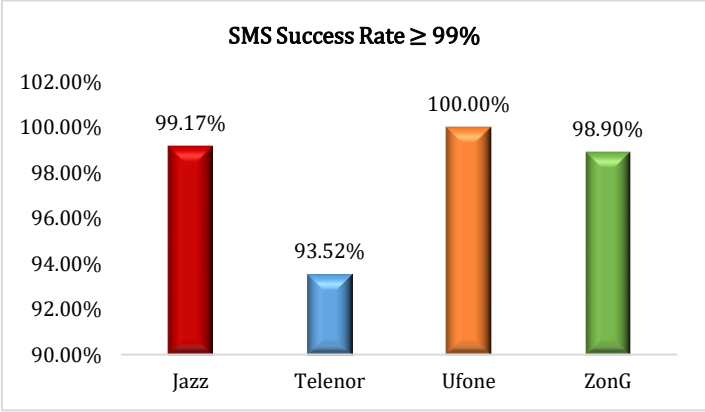


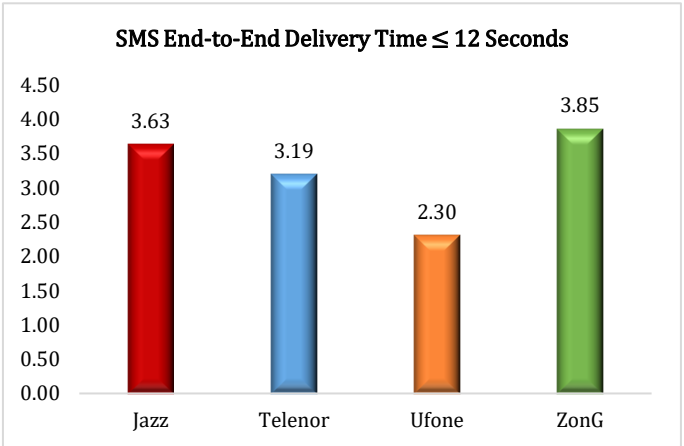



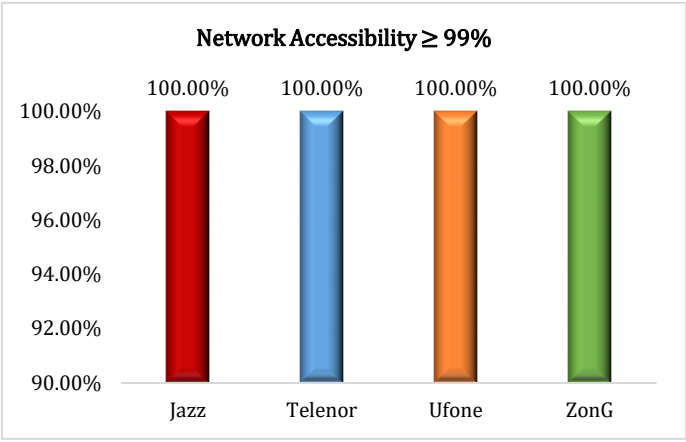



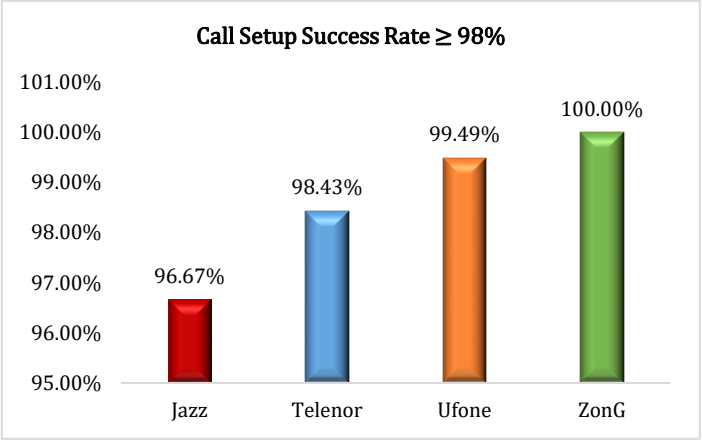



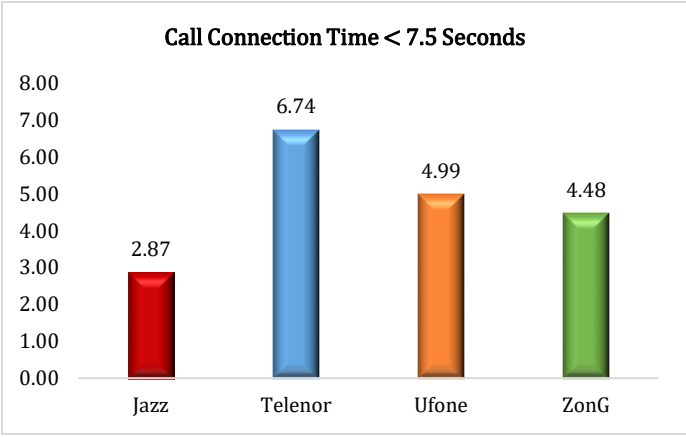



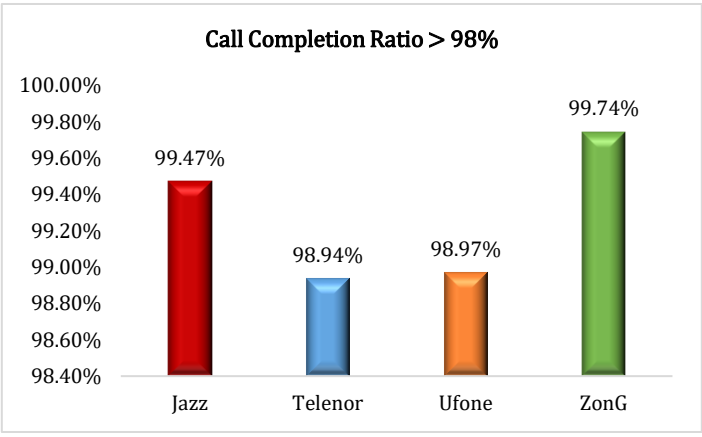



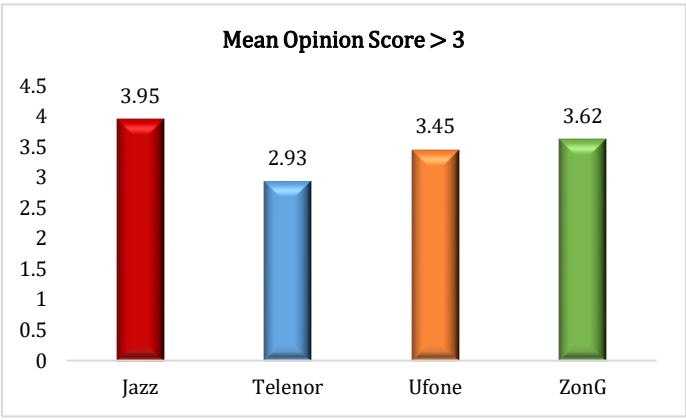
# QUALITY OF SERVICE SURVEY RESULTS – JHELUM

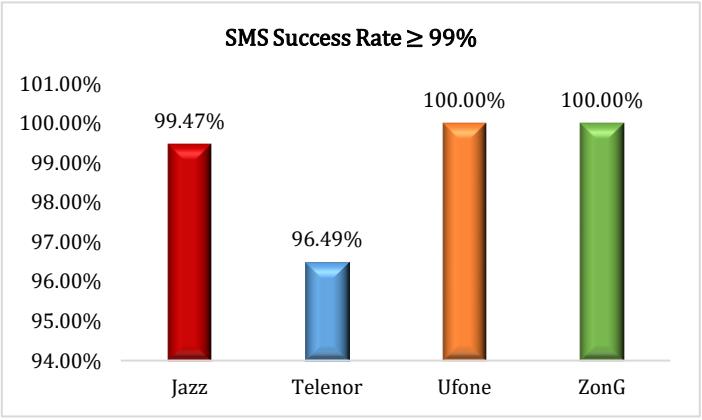


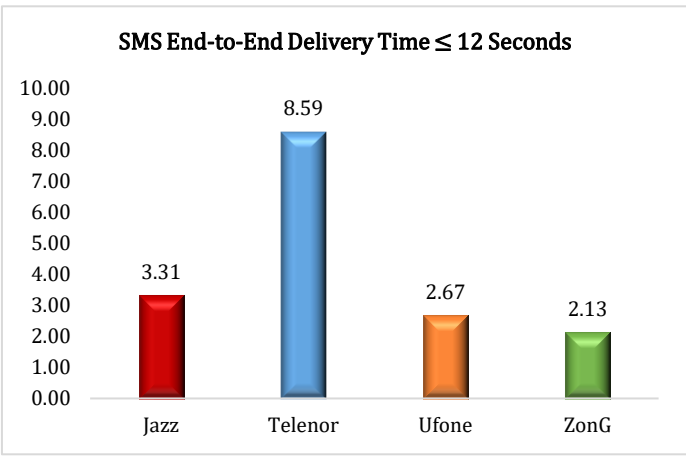



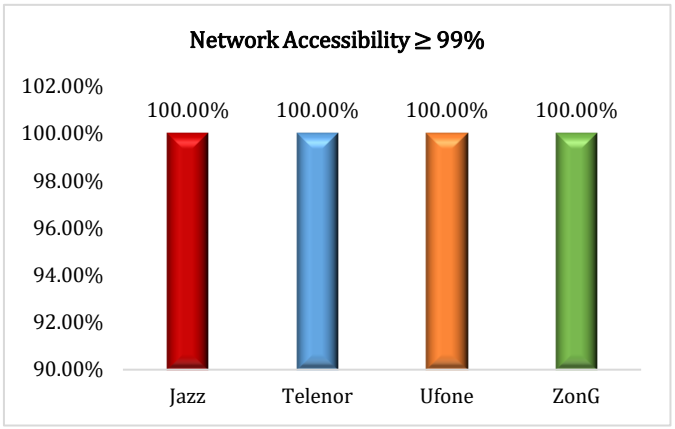



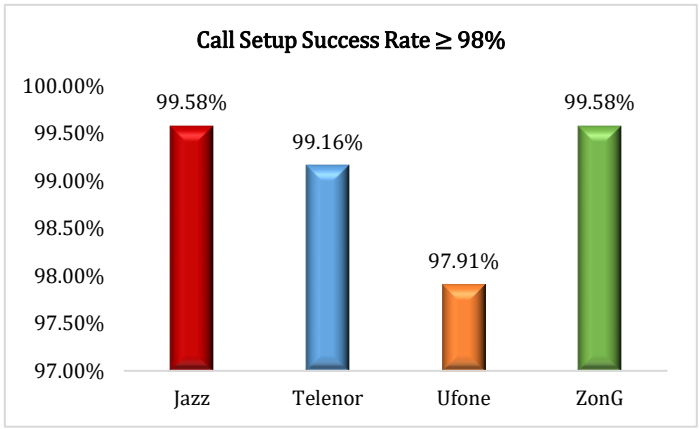



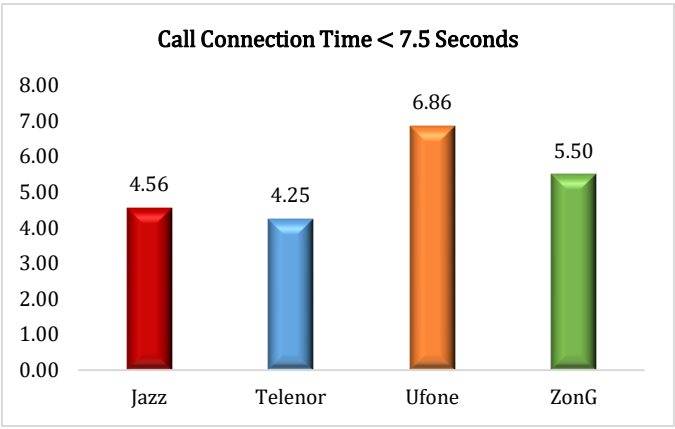



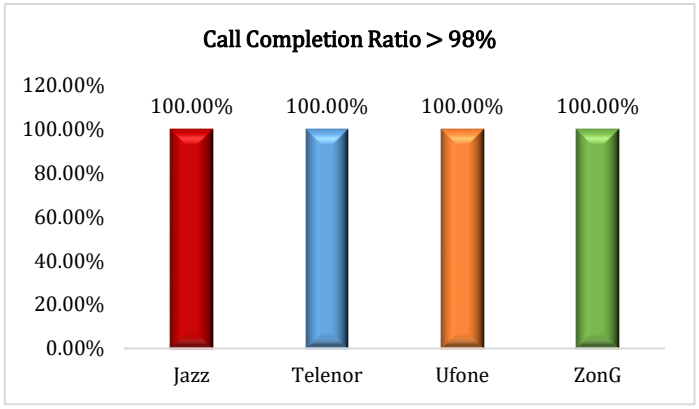



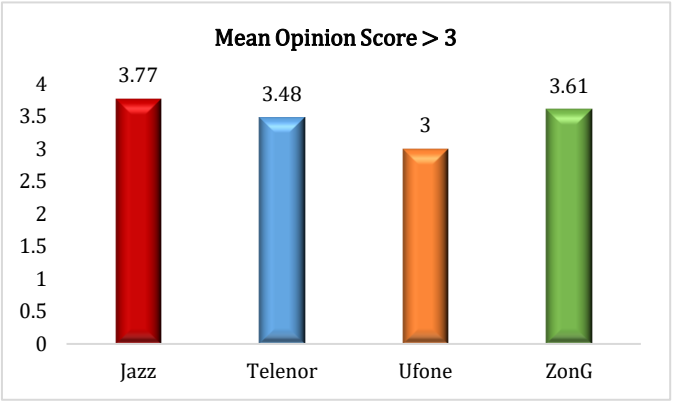
# QUALITY OF SERVICE SURVEY RESULTS – LAYYAH

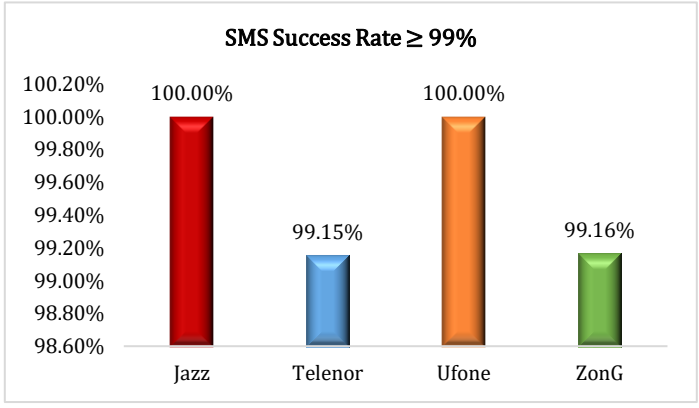


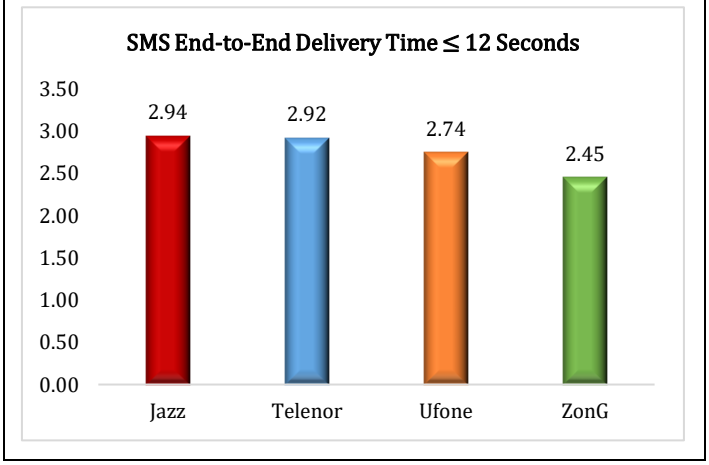



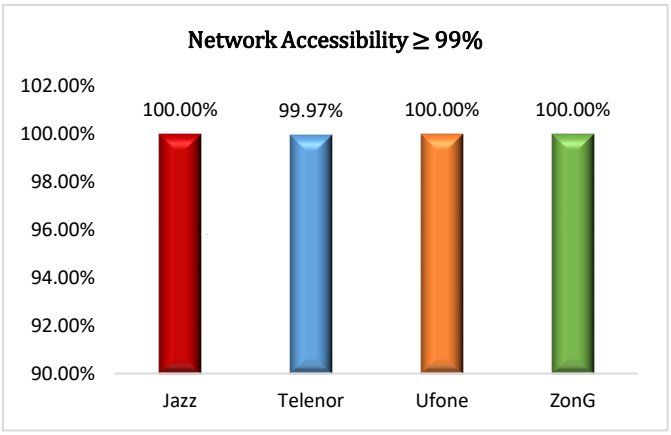



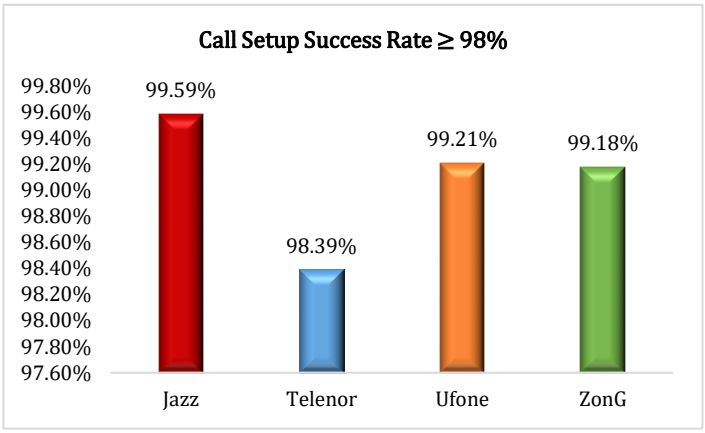



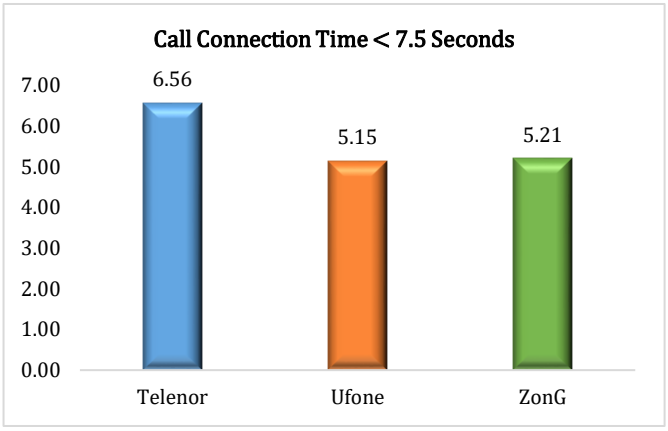



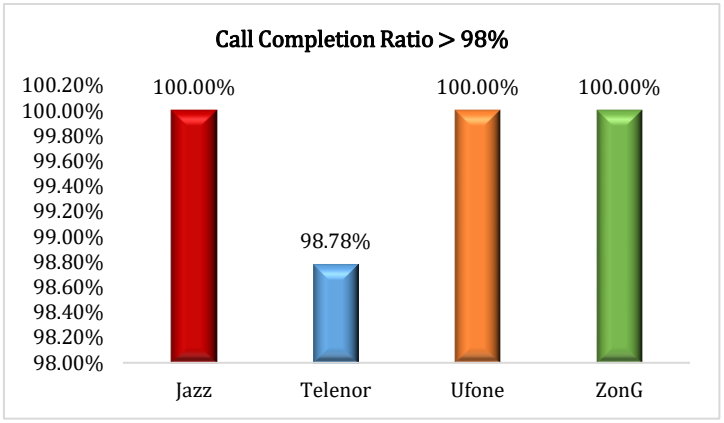



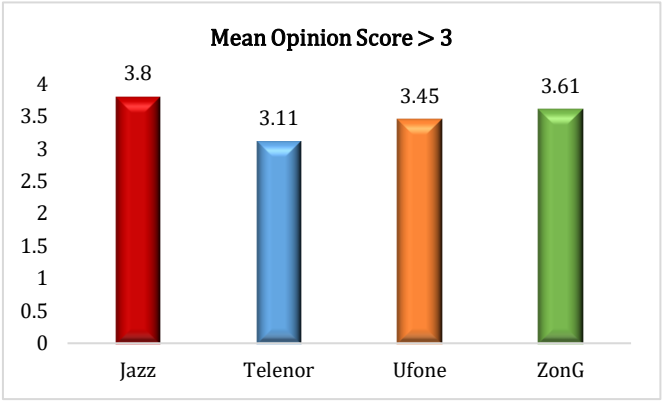
# QUALITY OF SERVICE SURVEY RESULTS – OKARA

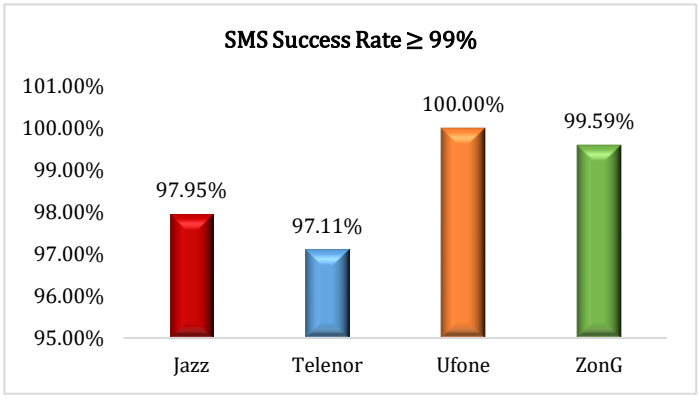


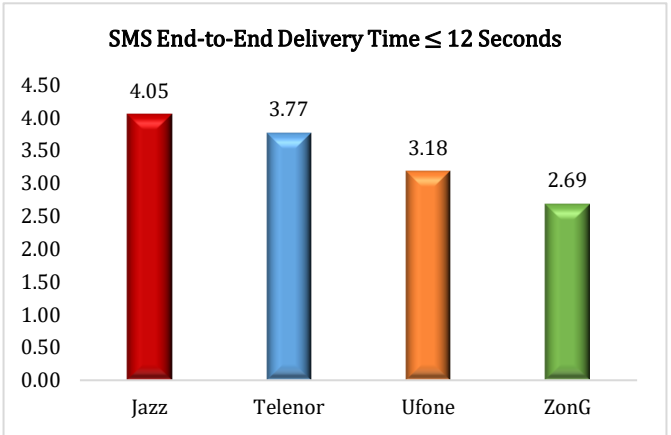



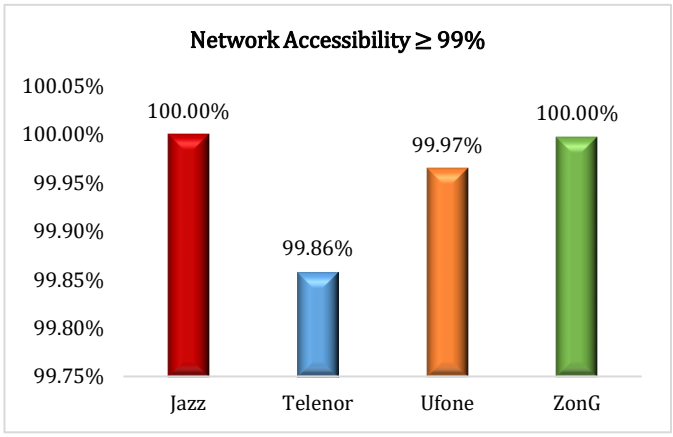



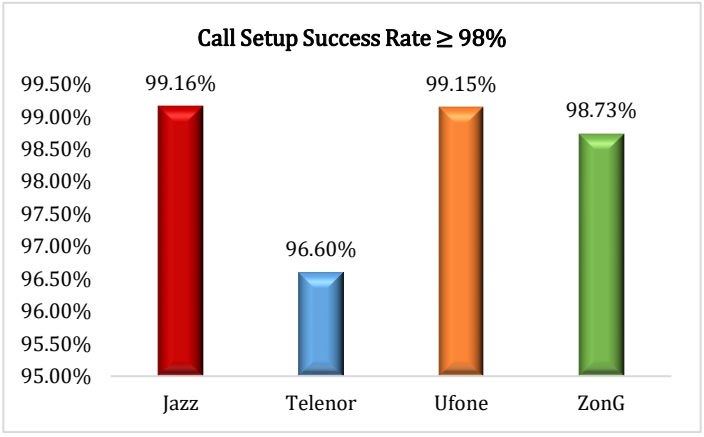



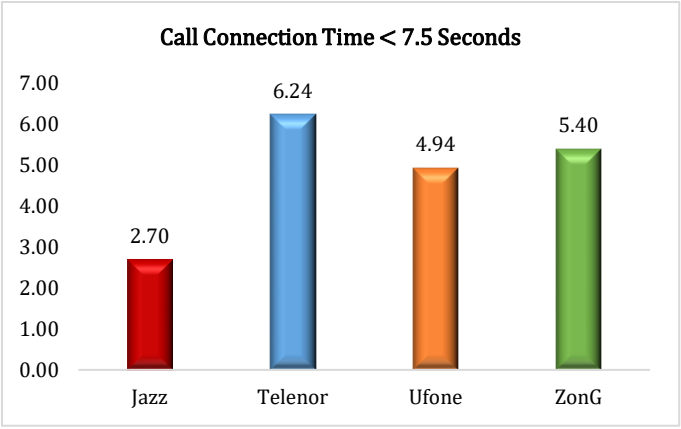



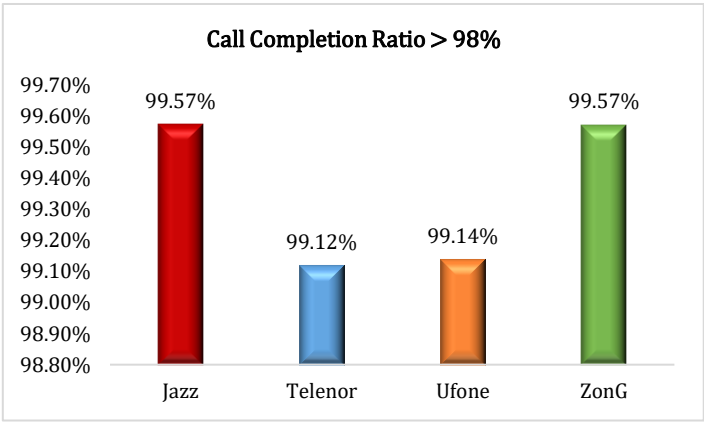



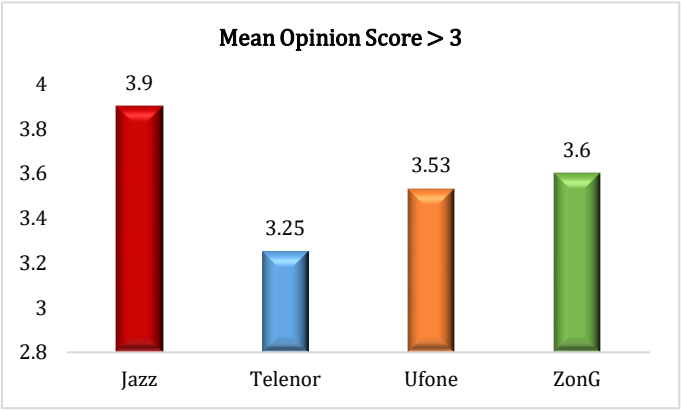
# QUALITY OF SERVICE SURVEY RESULTS – SAHIWAL

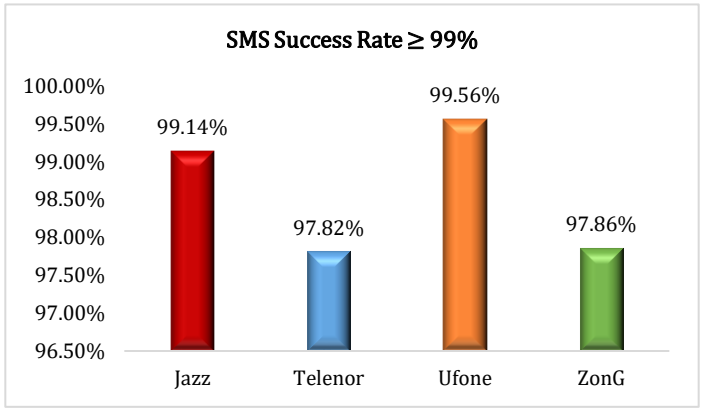


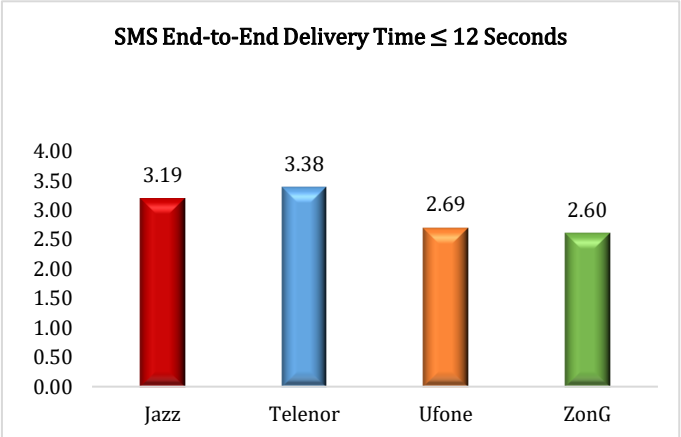



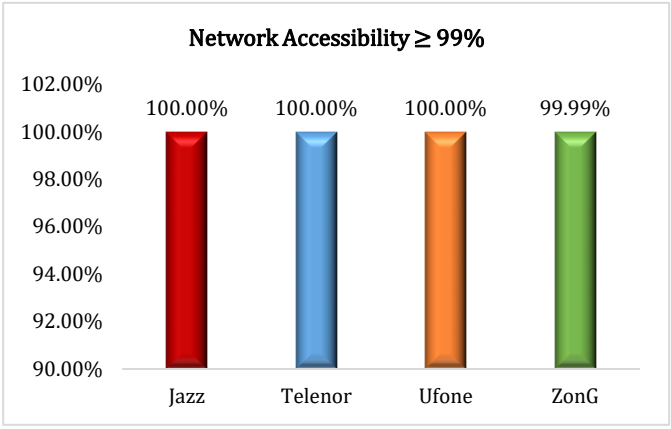



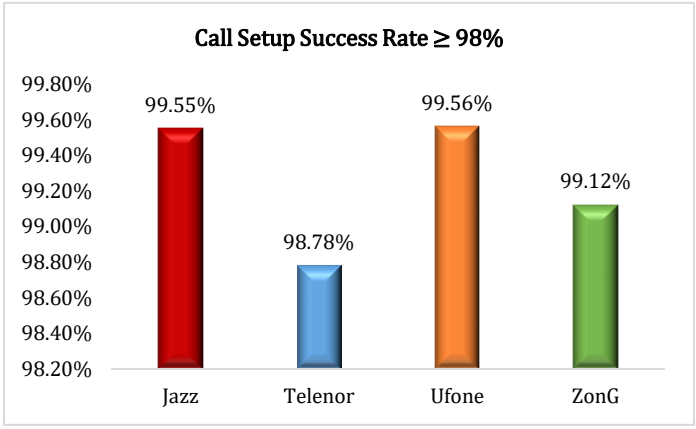



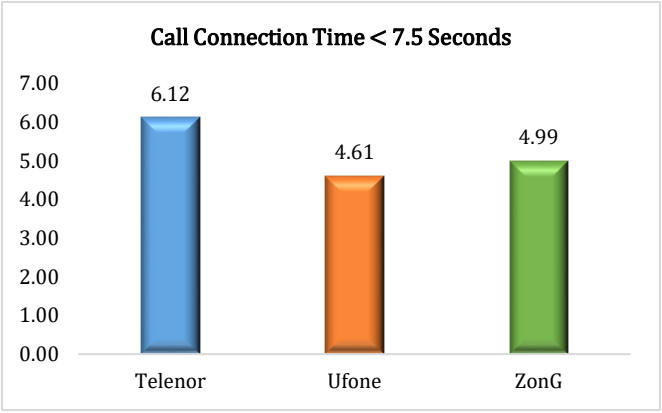



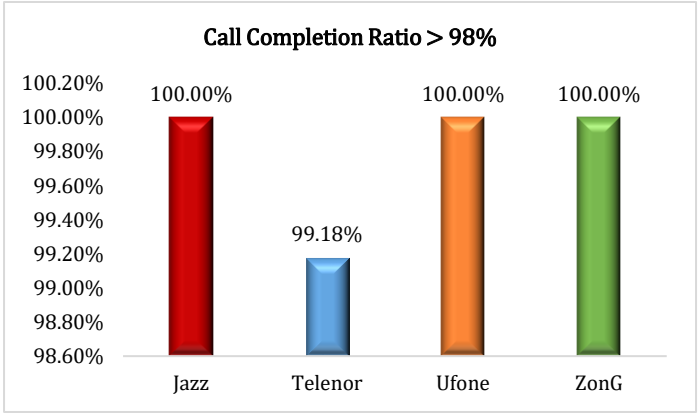



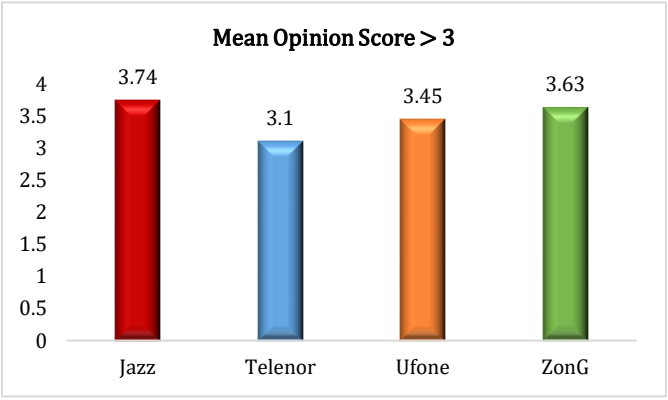
# QUALITY OF SERVICE SURVEY RESULTS – GOJRA

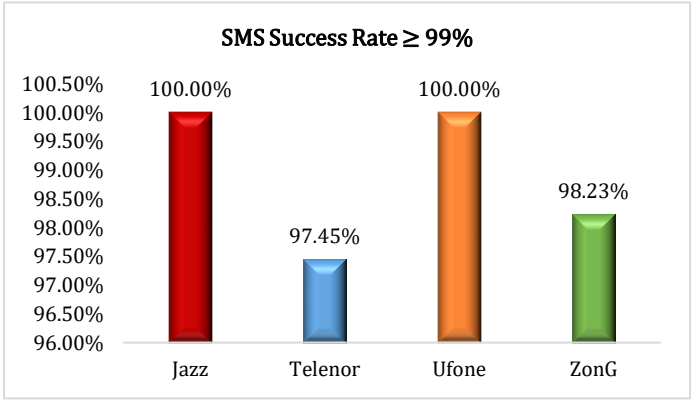


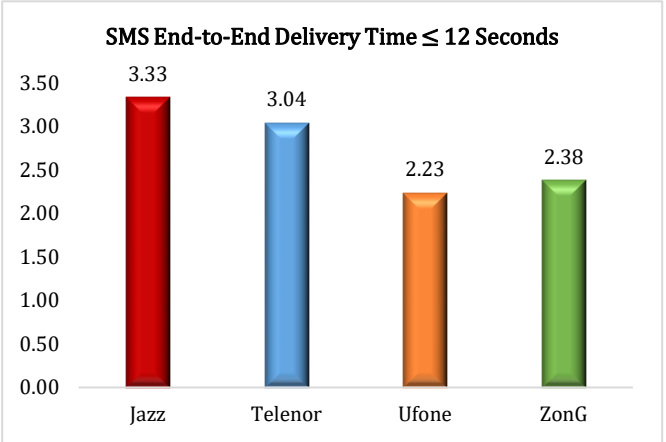



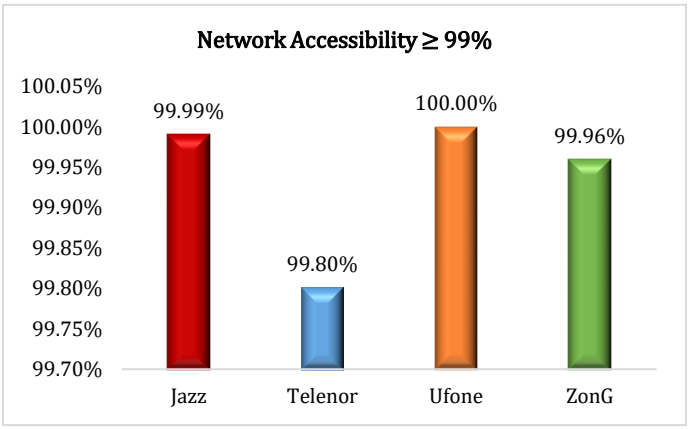



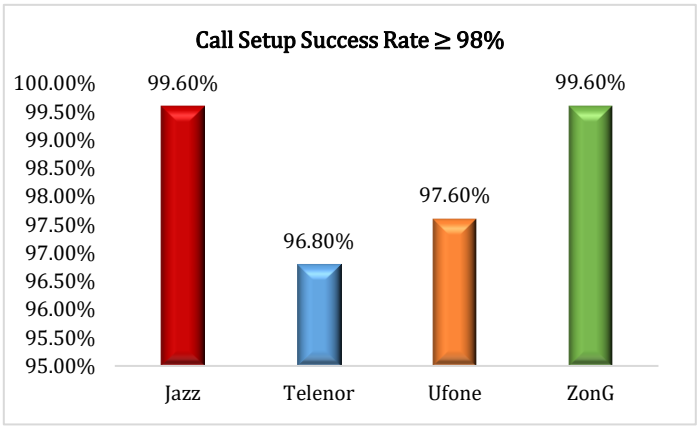



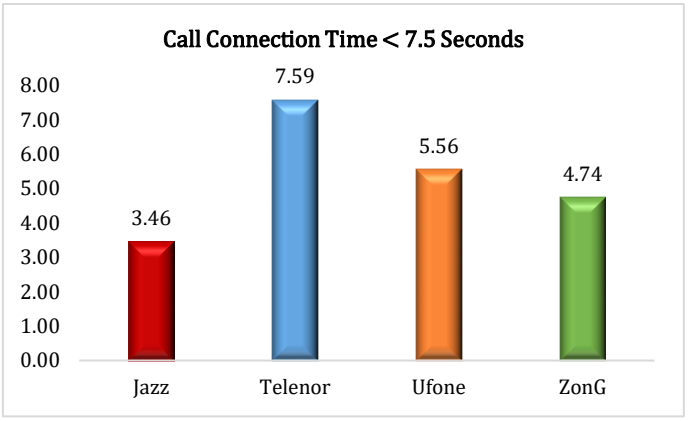



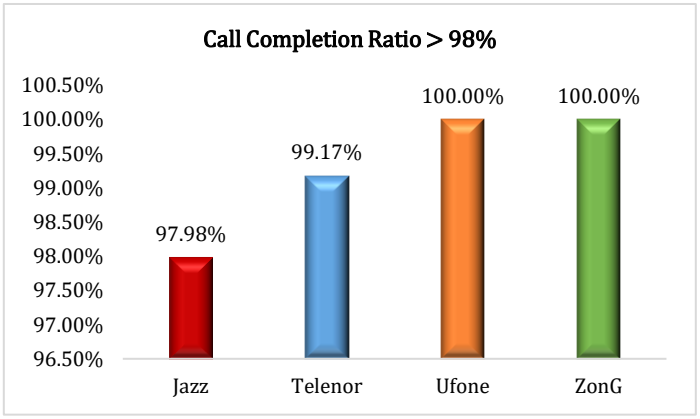



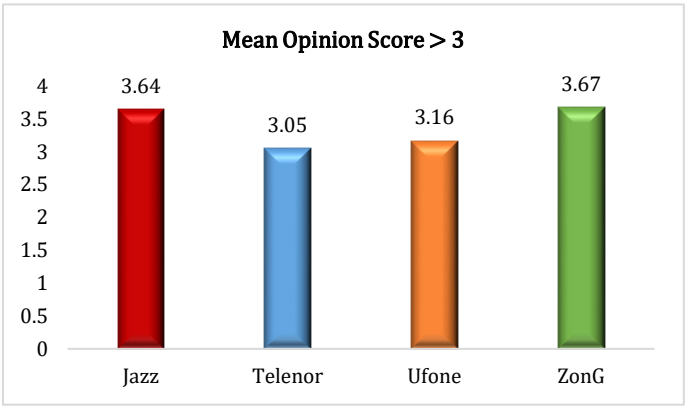
# QUALITY OF SERVICE SURVEY RESULTS – MANDI BAHAUADIN

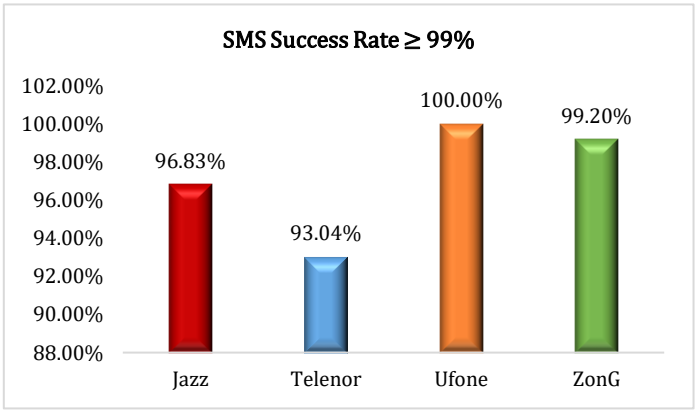


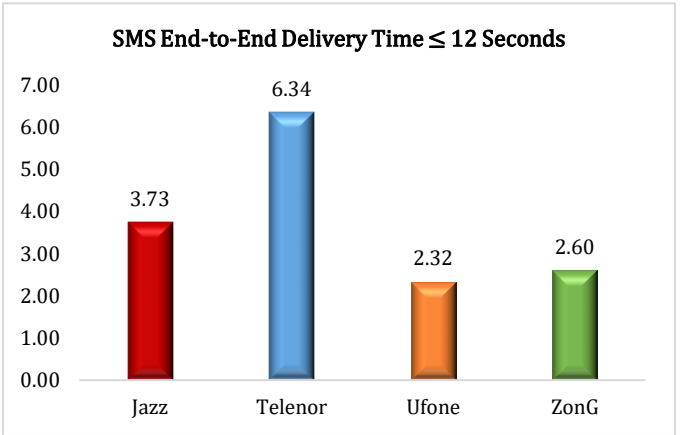



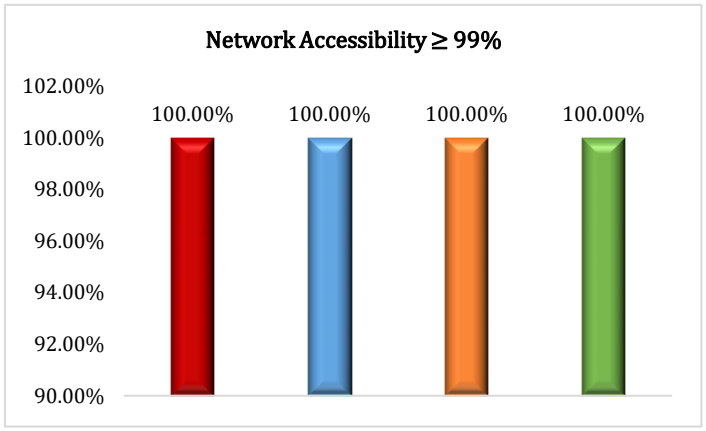



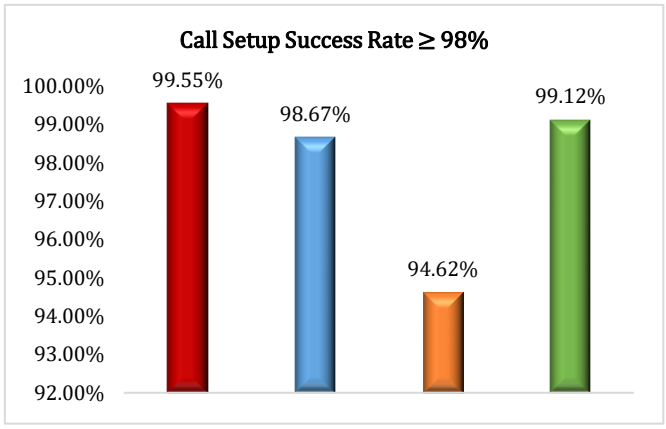



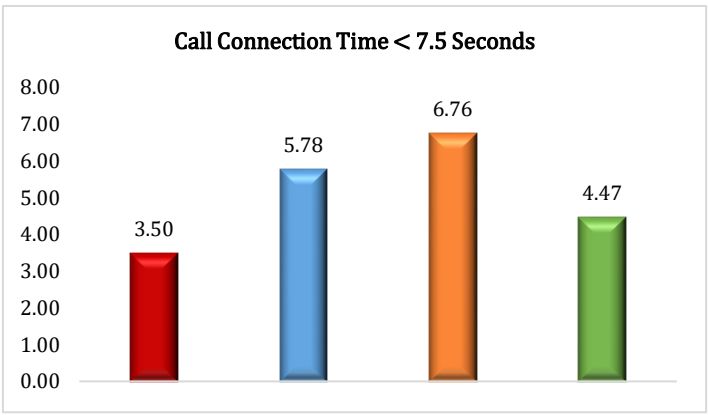



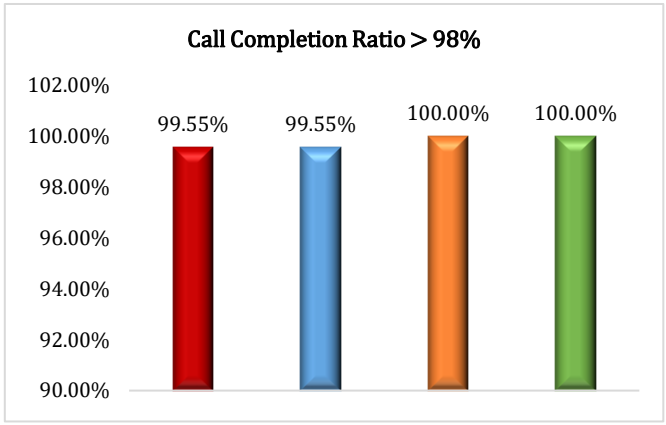



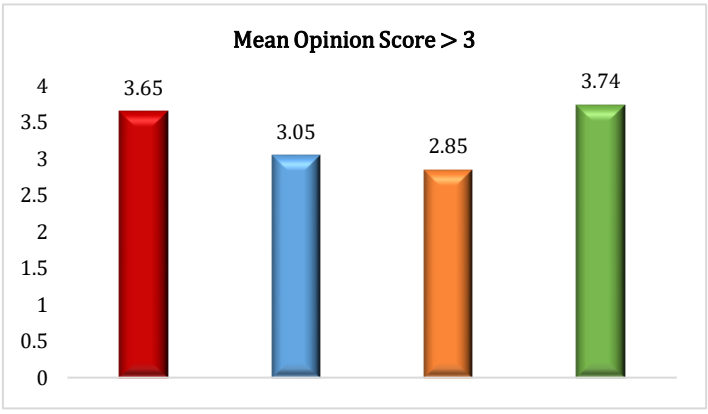
# QUALITY OF SERVICE SURVEY RESULTS – SHAKAR GARH

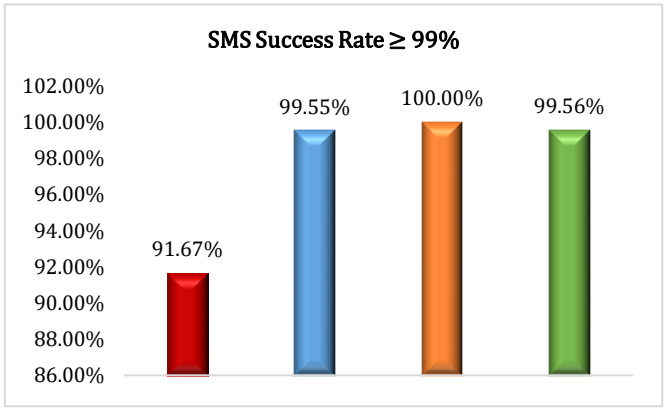


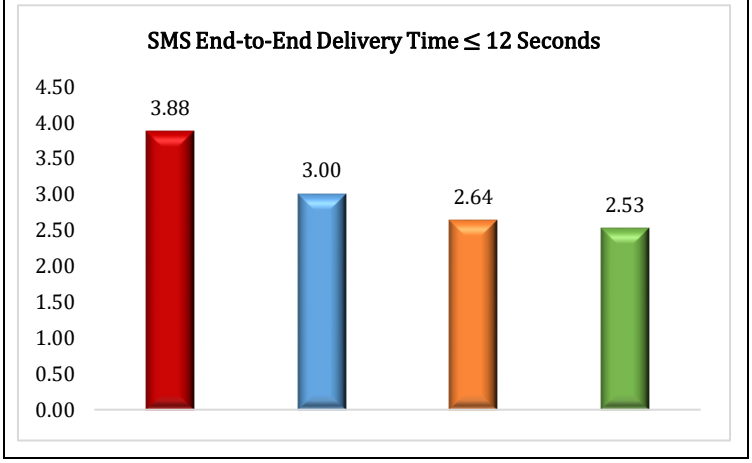



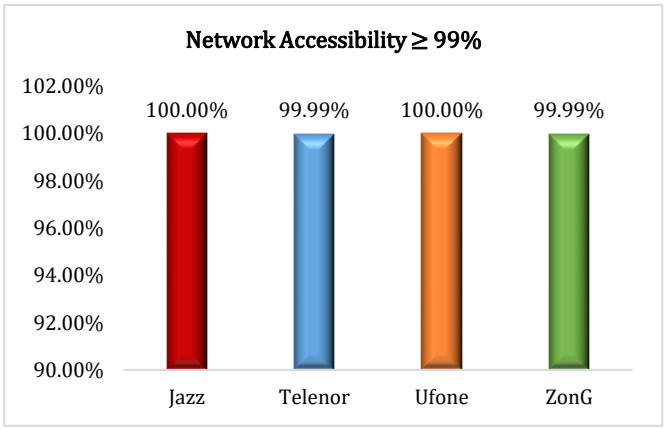



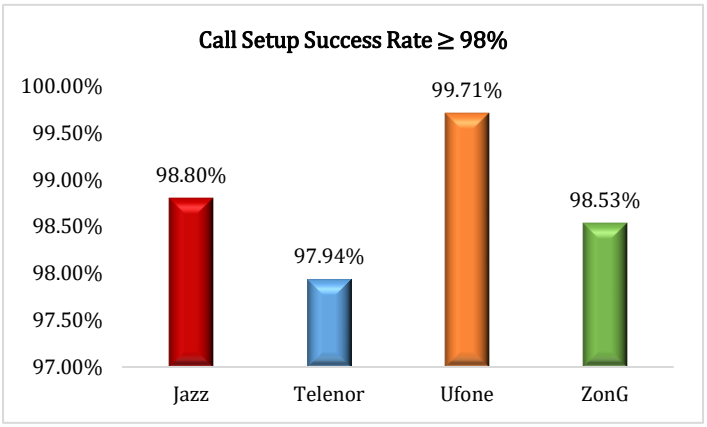



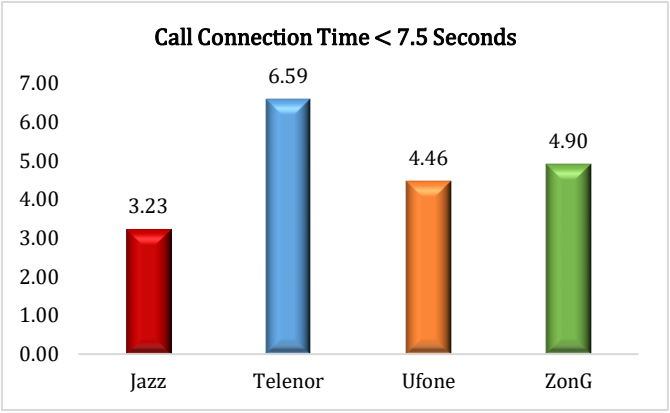



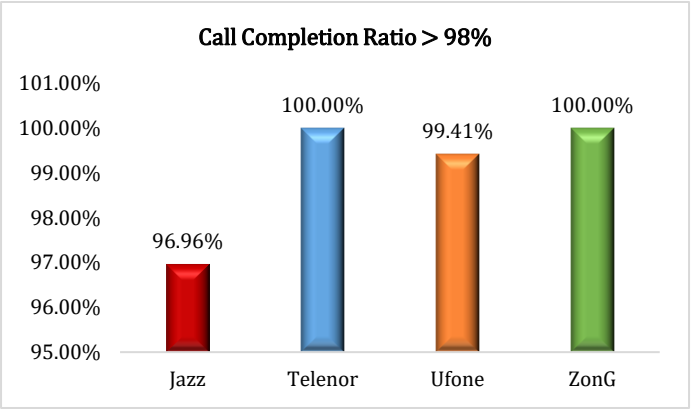



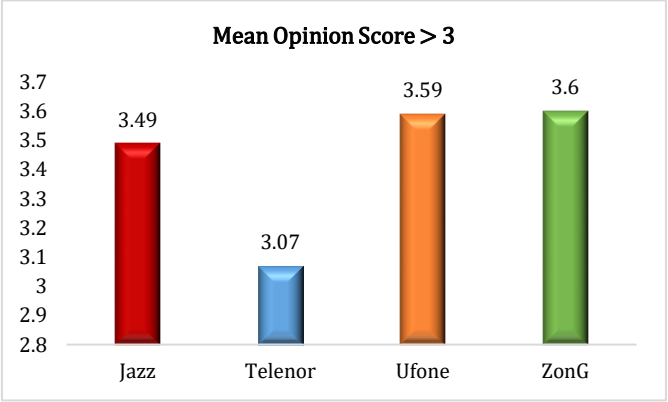
# QUALITY OF SERVICE SURVEY RESULTS – ATTOCK

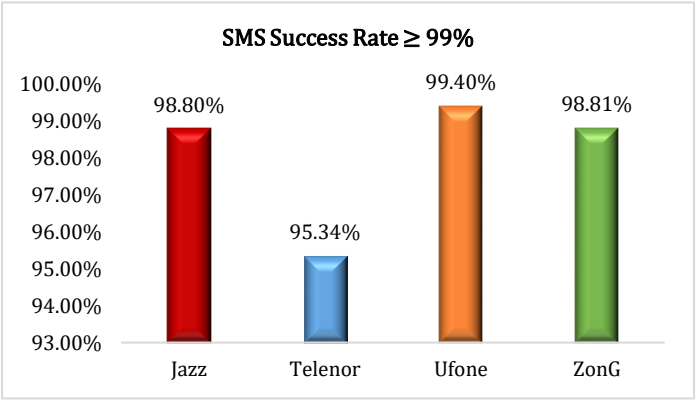


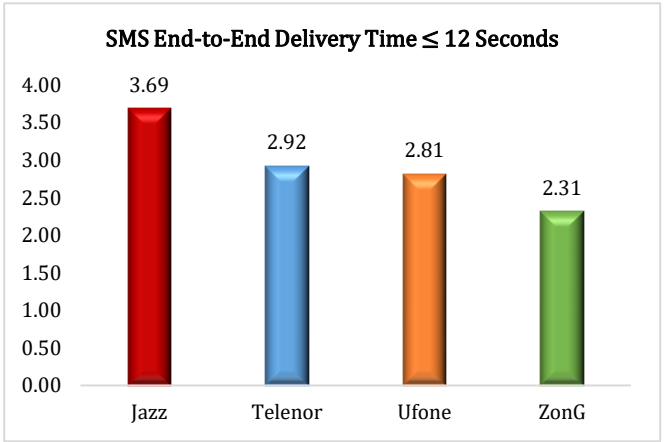



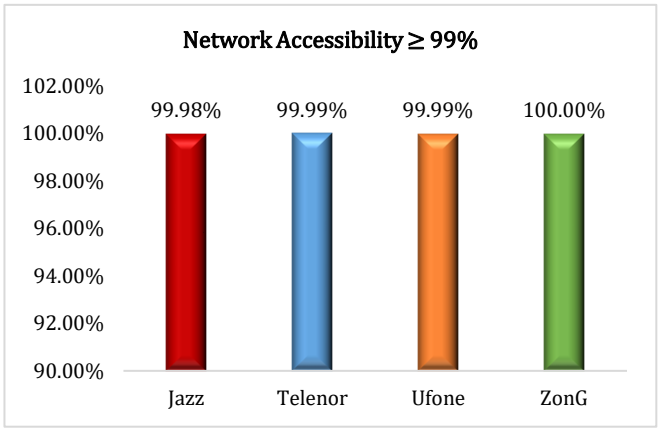



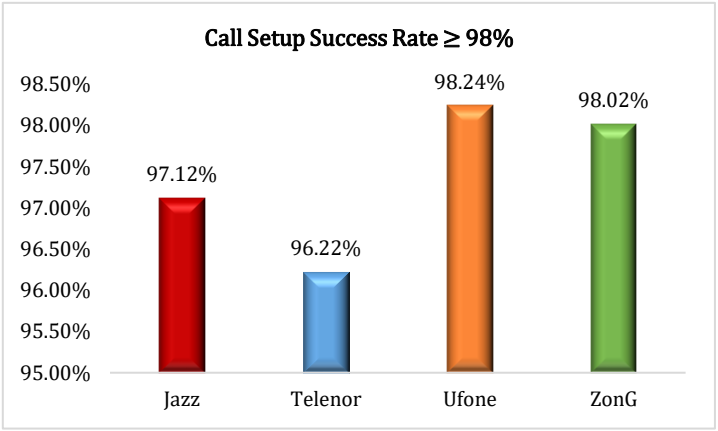



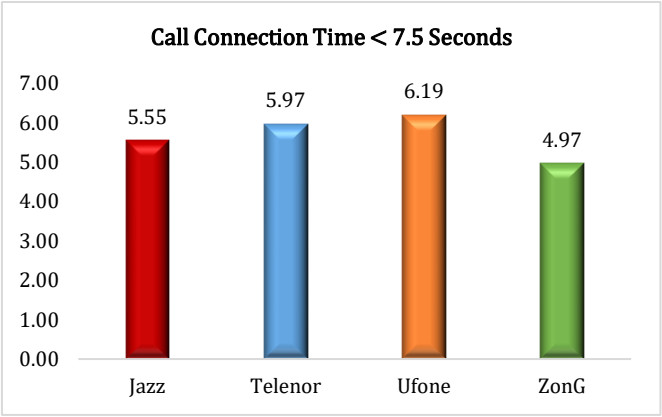



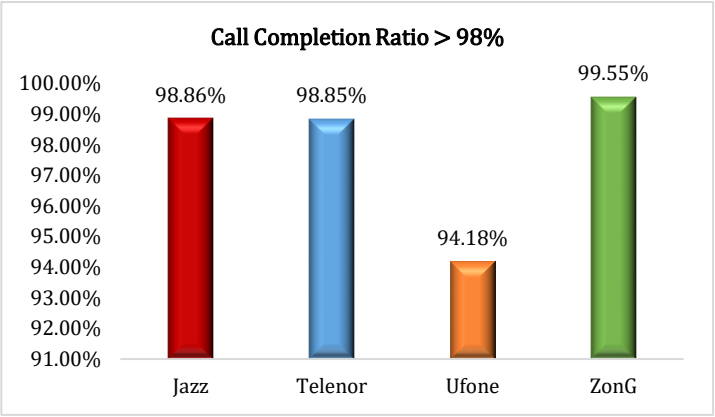



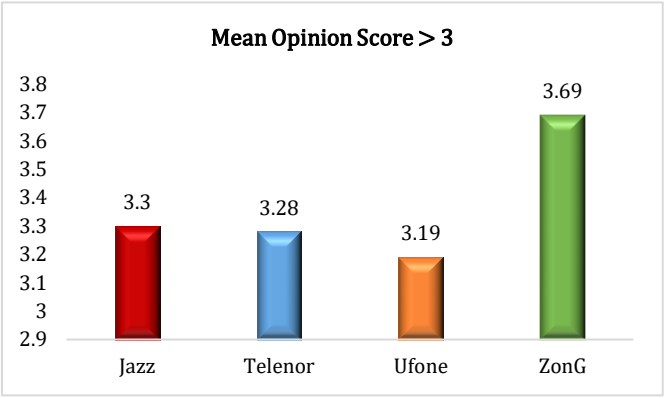
# QUALITY OF SERVICE SURVEY RESULTS – BANNU

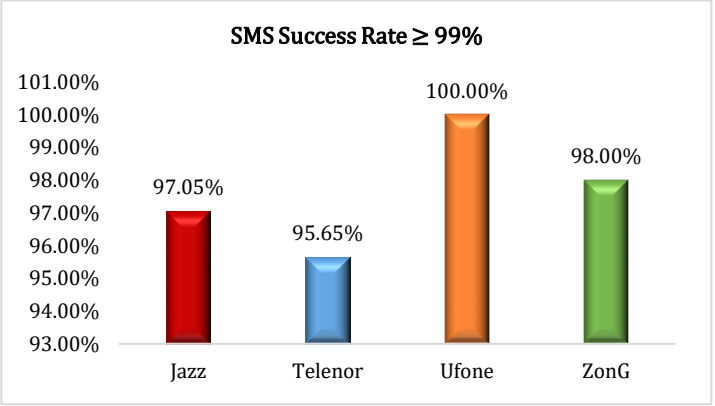


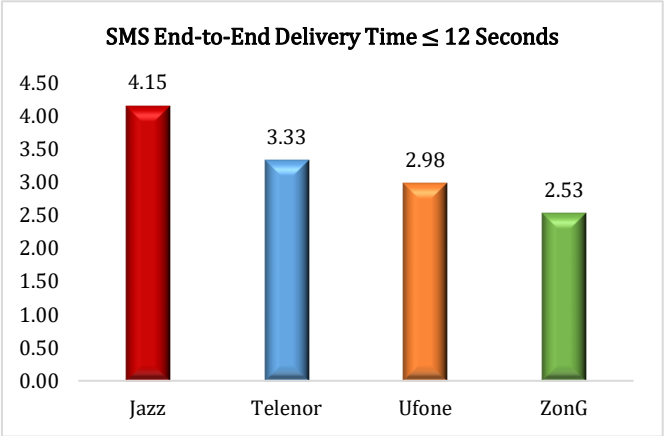



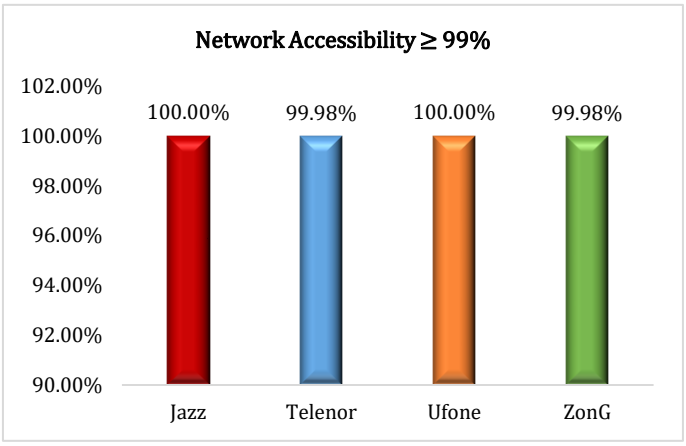



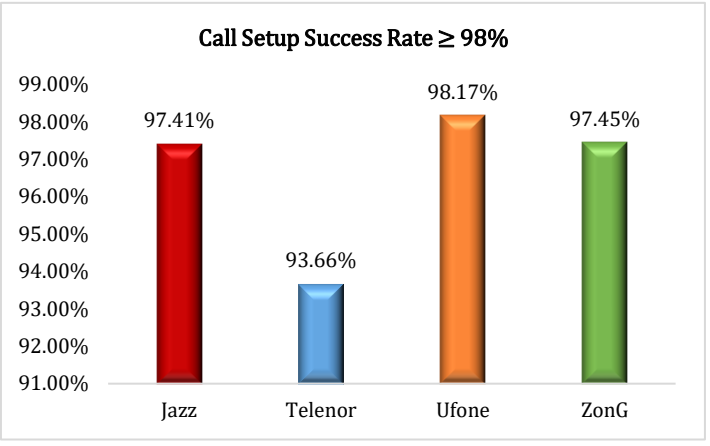



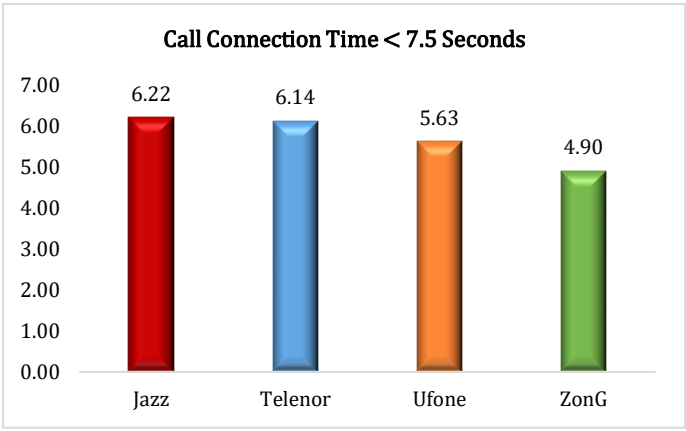



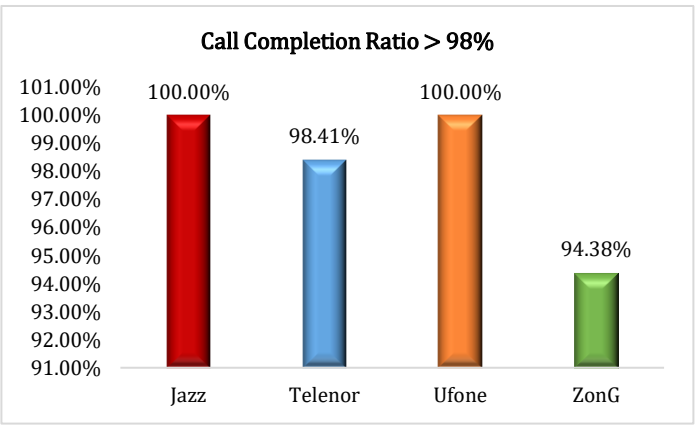



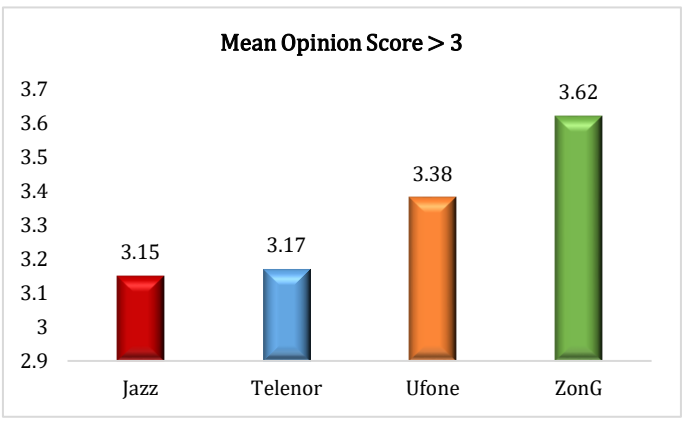
# QUALITY OF SERVICE SURVEY RESULTS – HARIPUR

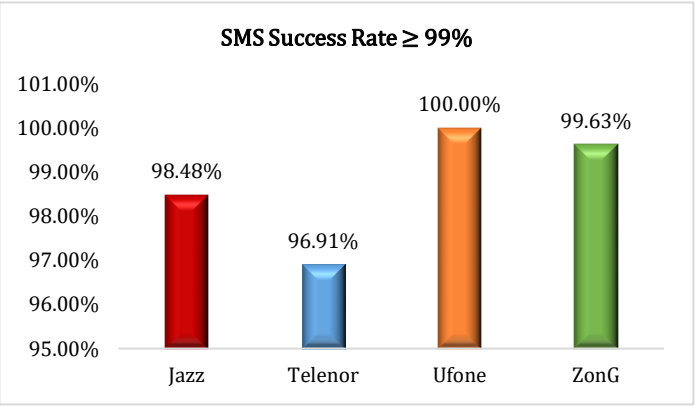


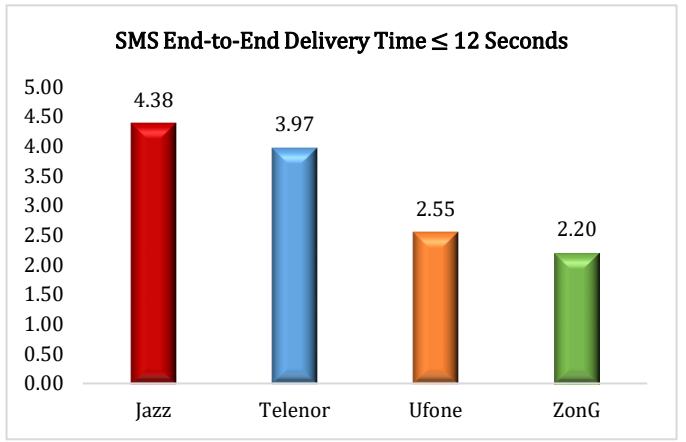



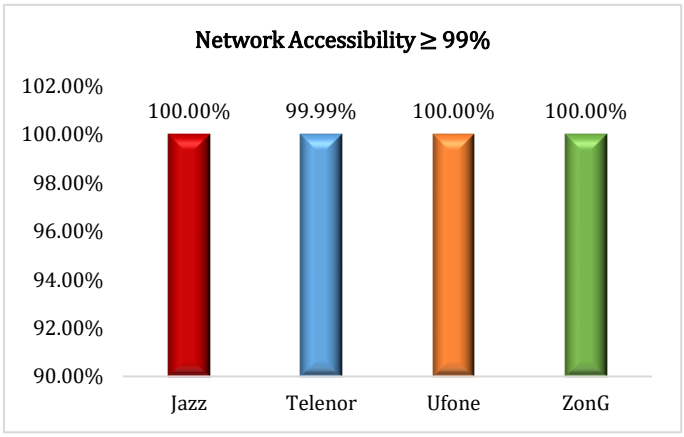



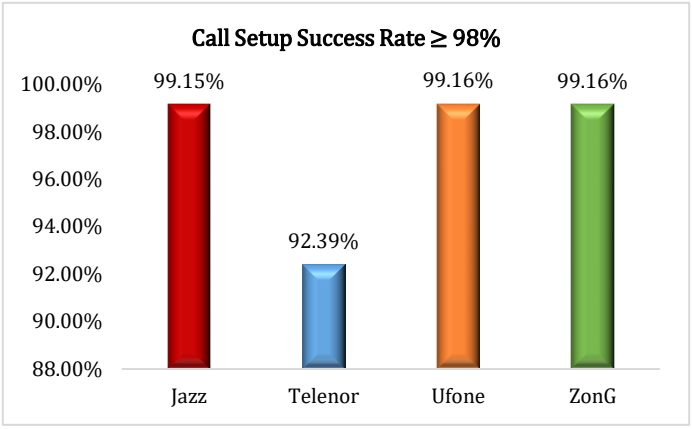



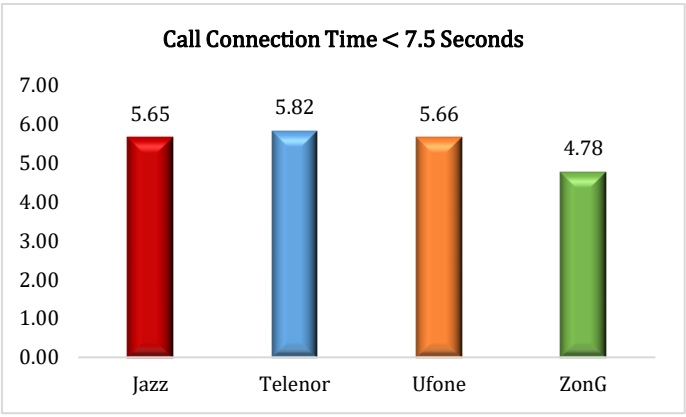



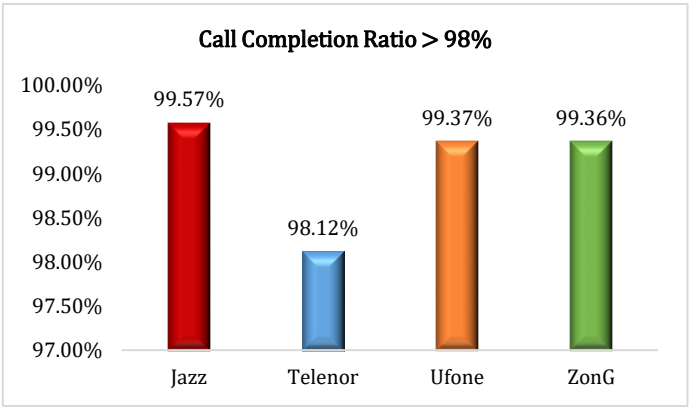



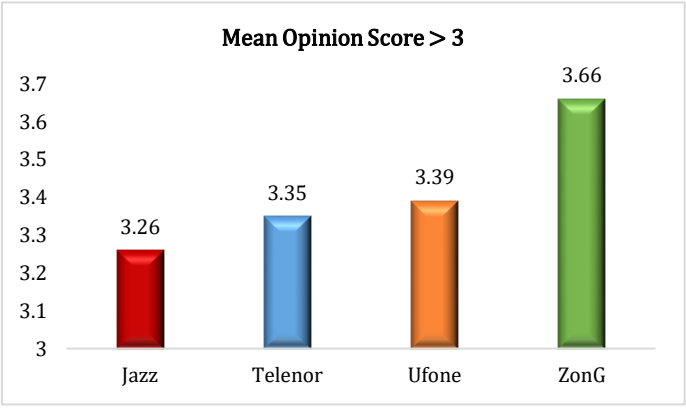
# QUALITY OF SERVICE SURVEY RESULTS – KOHAT

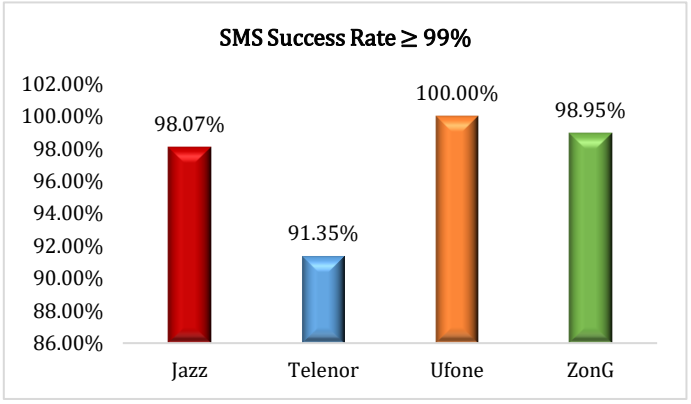


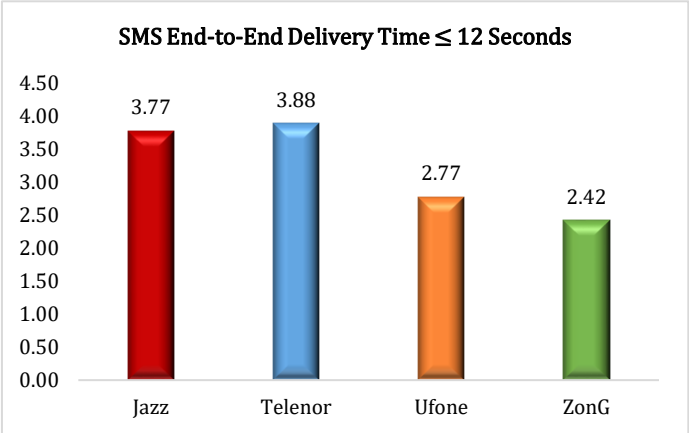



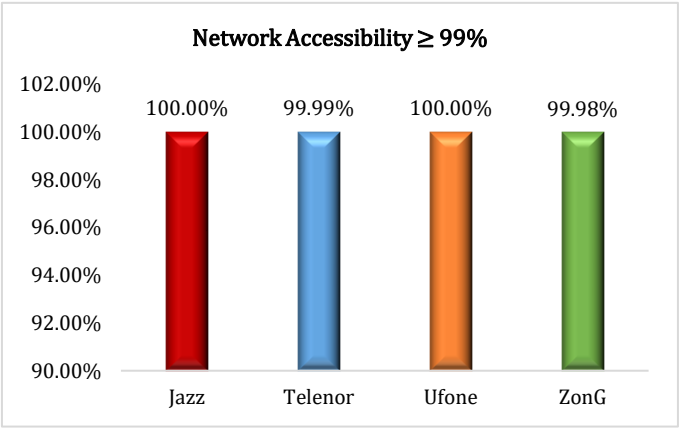



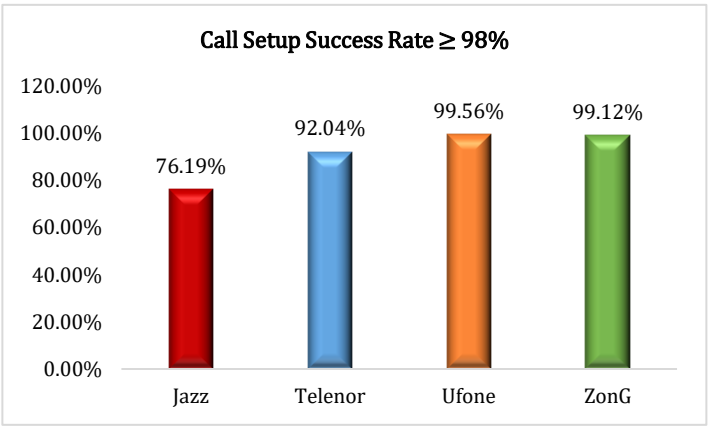



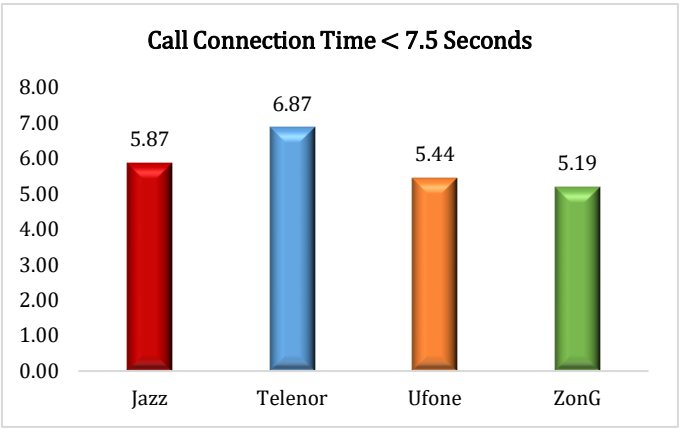



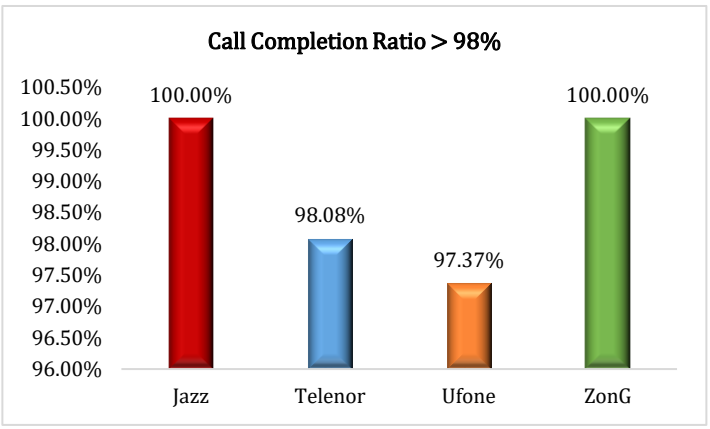



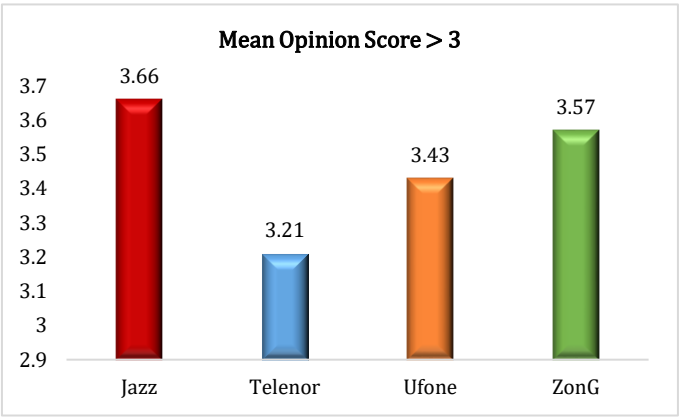
# QUALITY OF SERVICE SURVEY RESULTS – MANSEHRA

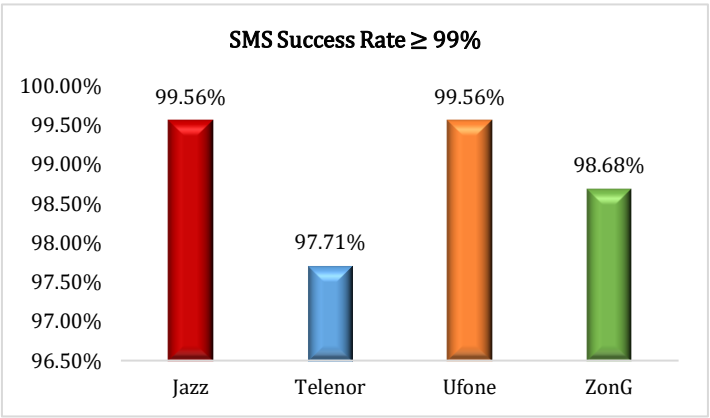


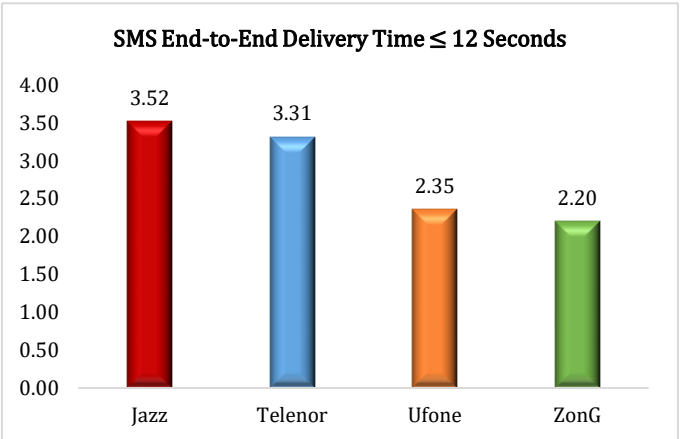



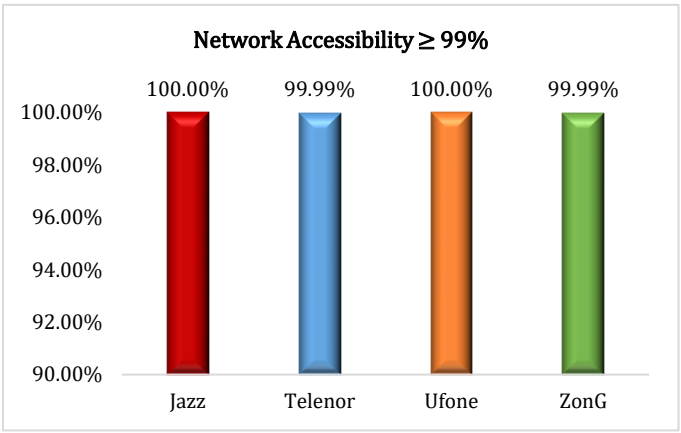



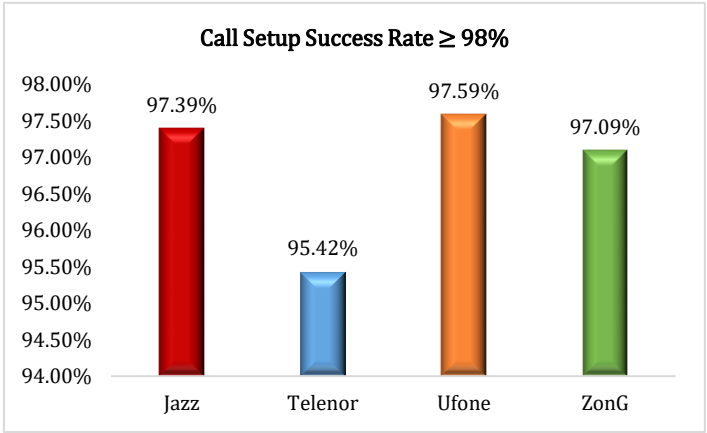



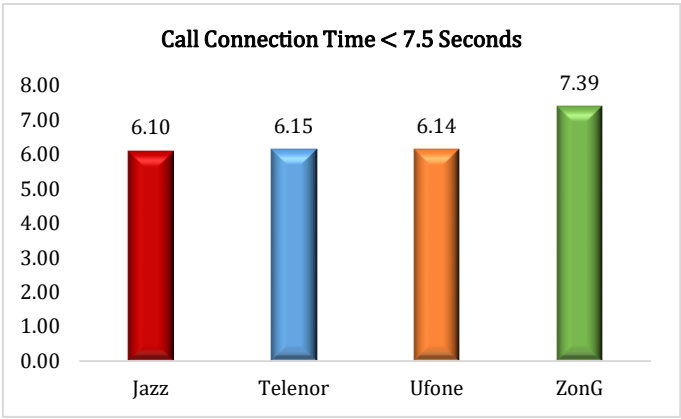



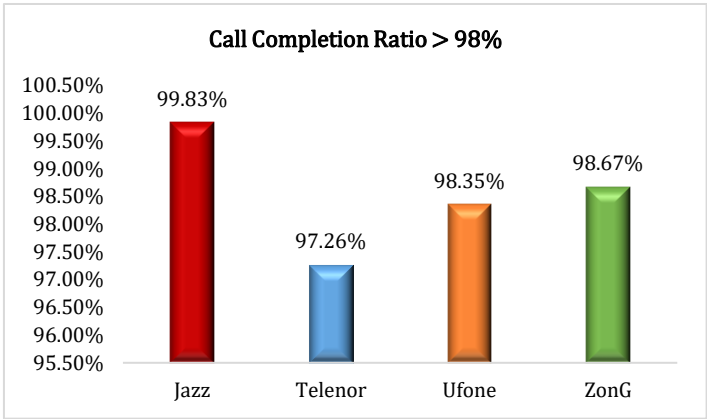



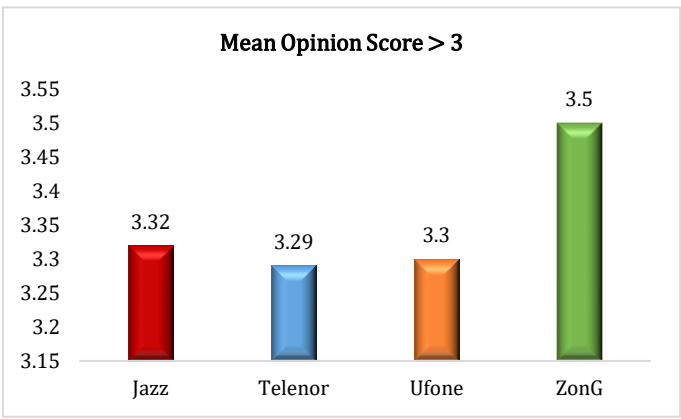
# QUALITY OF SERVICE SURVEY RESULTS – PESHAWAR

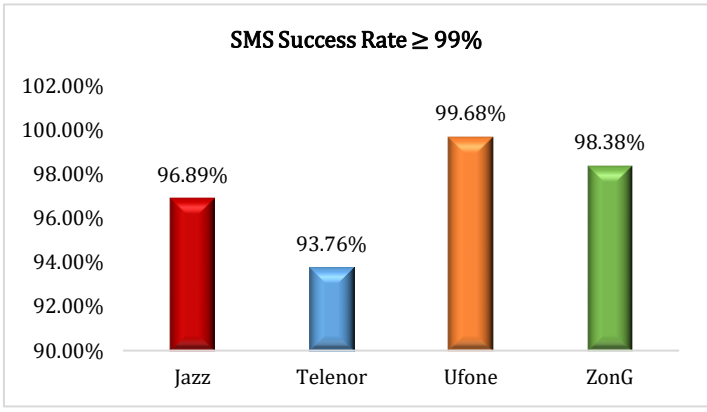


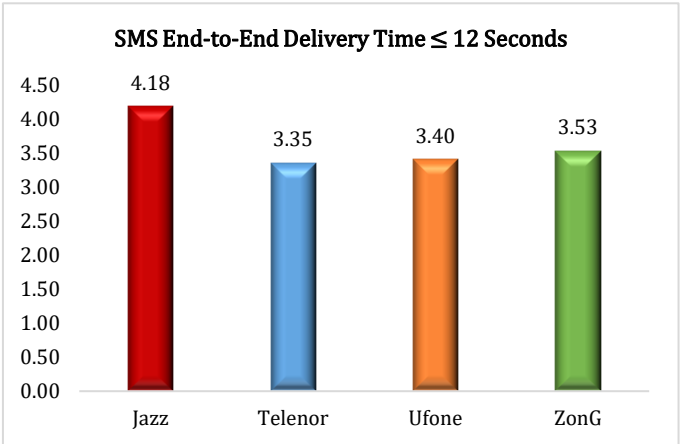



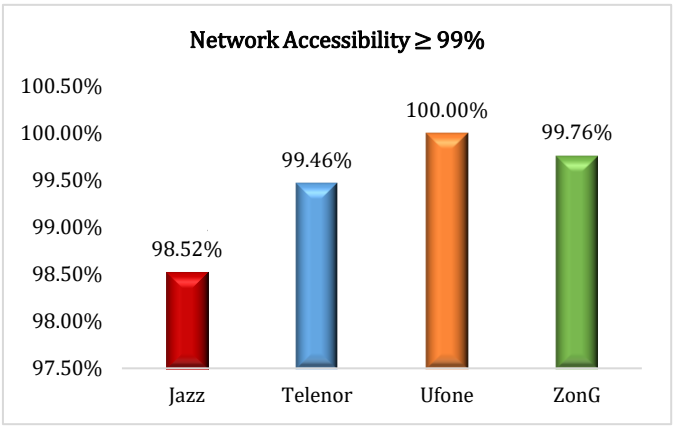



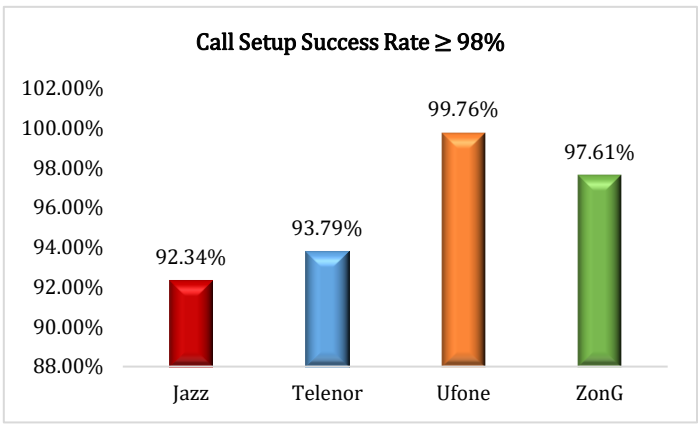



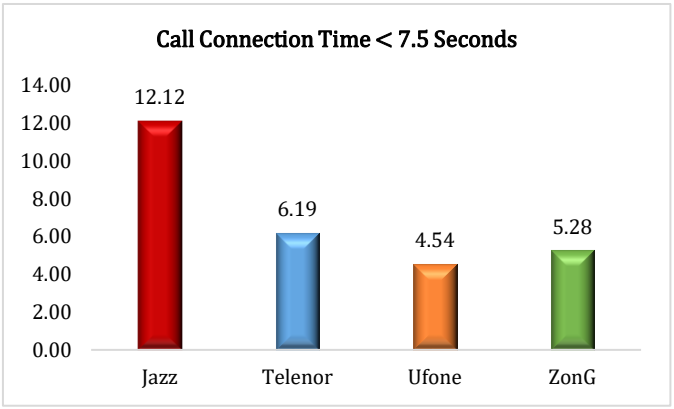



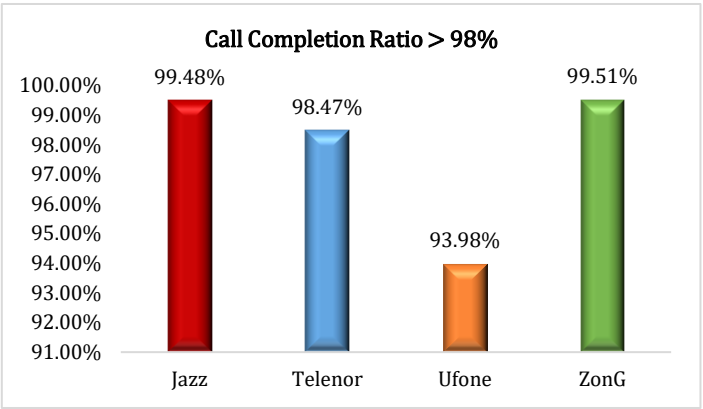



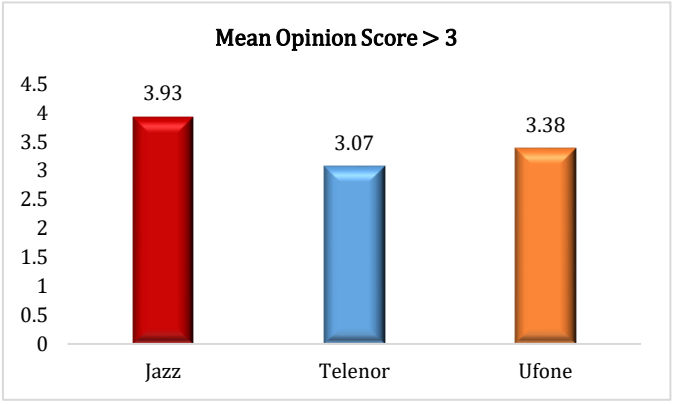
# QUALITY OF SERVICE SURVEY RESULTS – DHADDAR

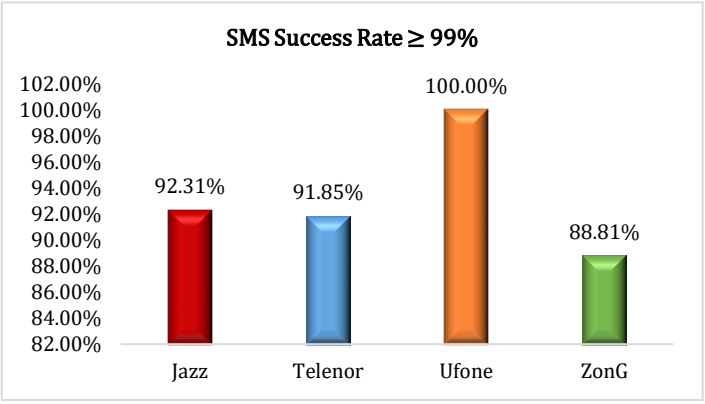


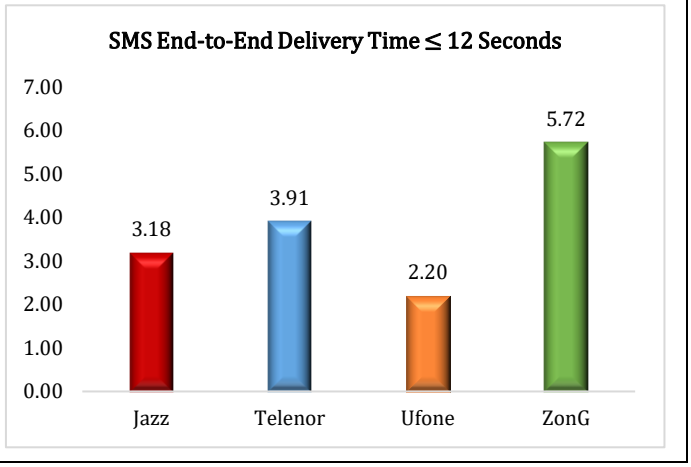



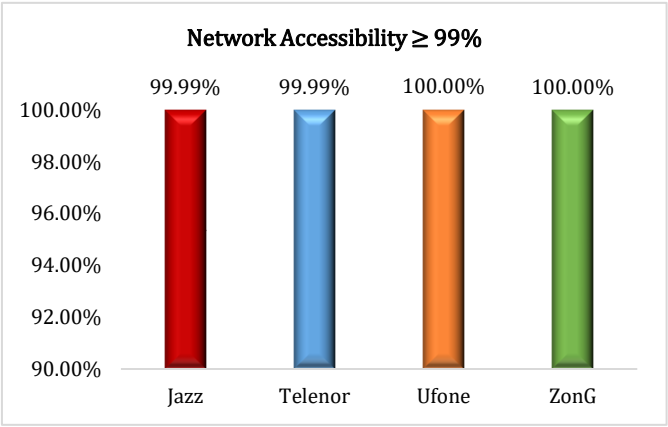



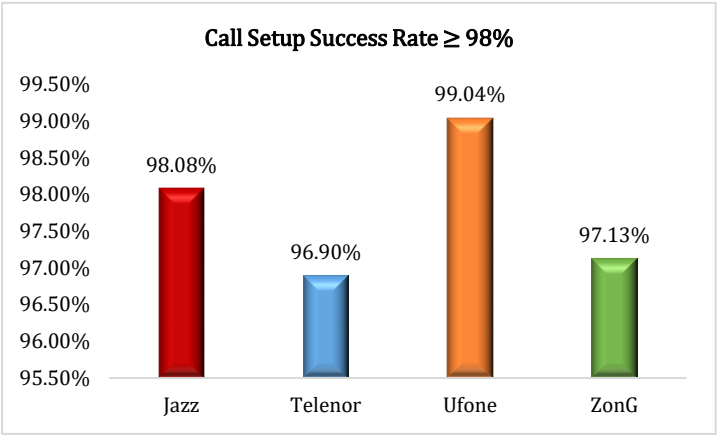



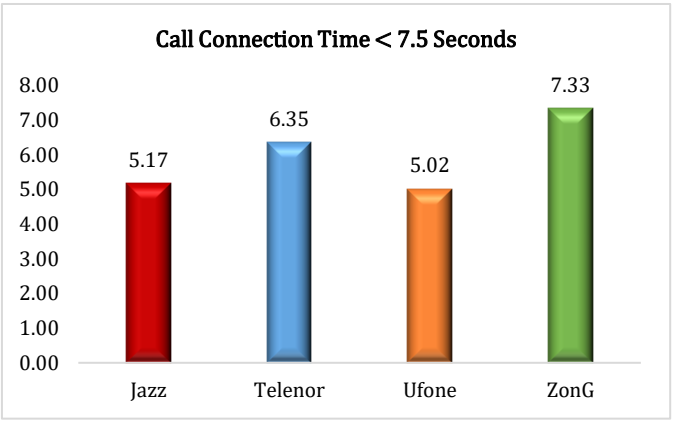



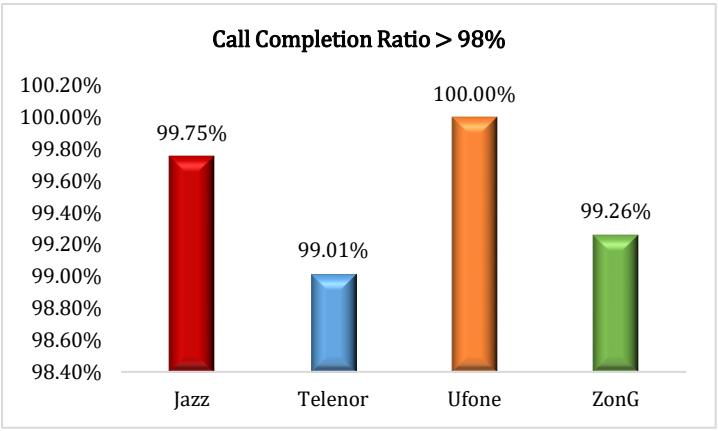



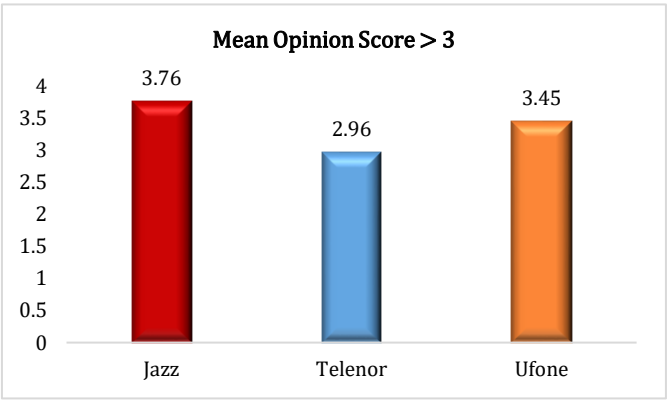
# QUALITY OF SERVICE SURVEY RESULTS – QUETTA

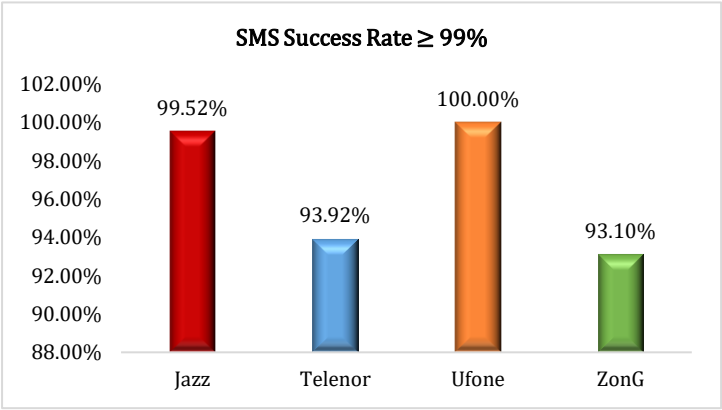


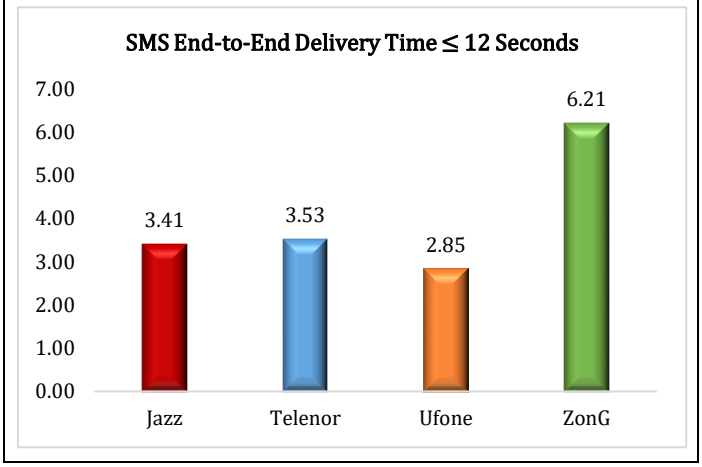



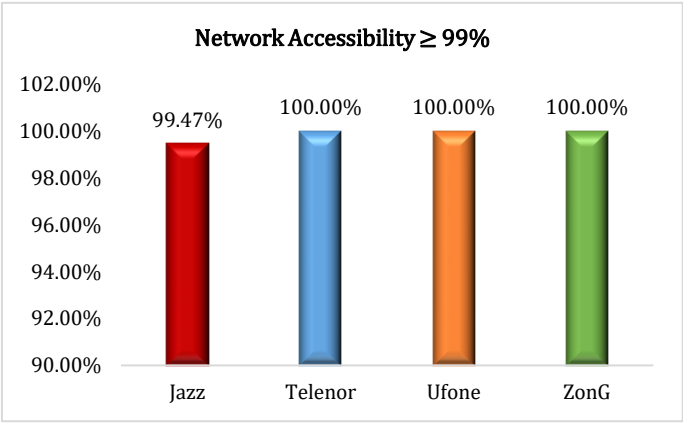



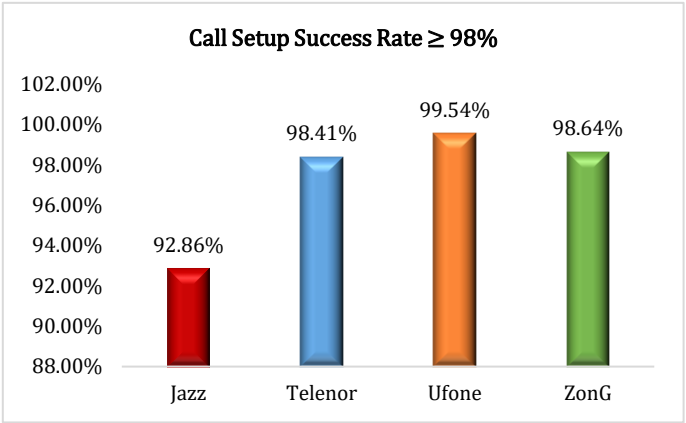



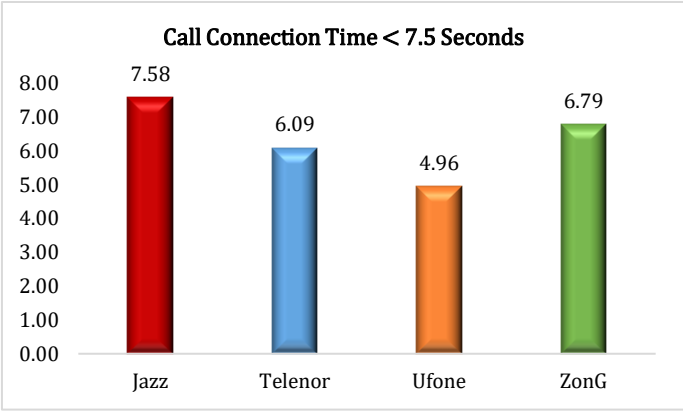



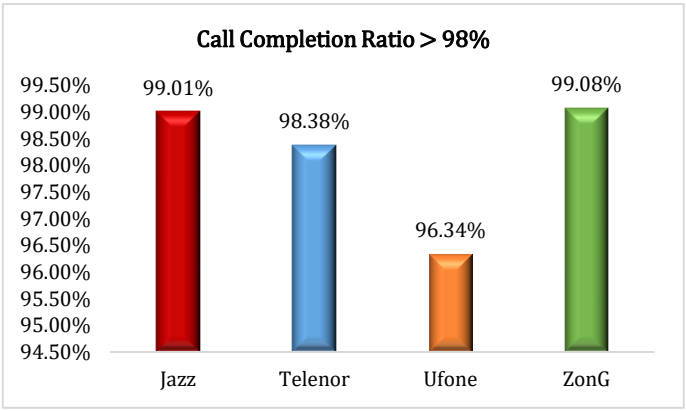



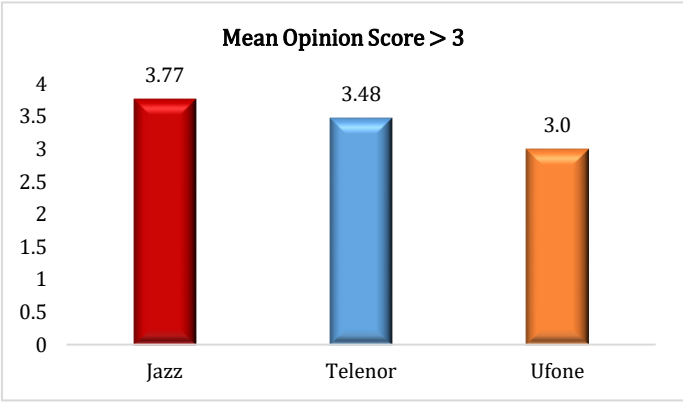
# QUALITY OF SERVICE SURVEY RESULTS – ZHOB

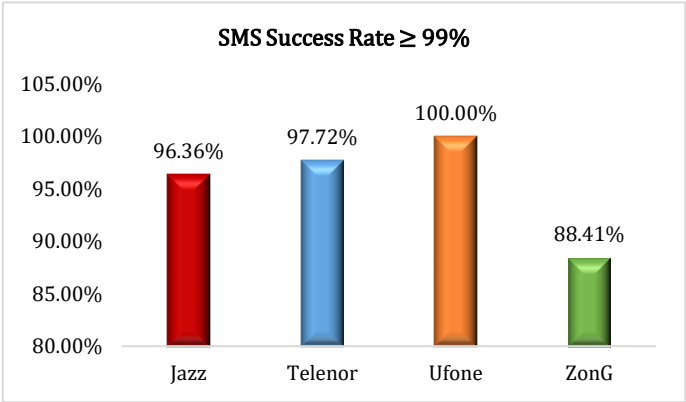


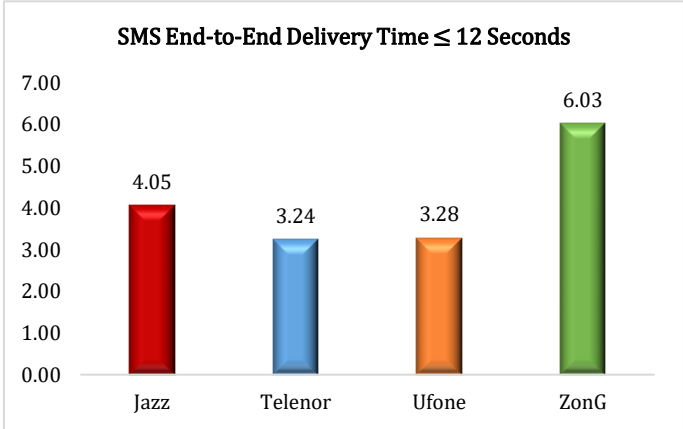



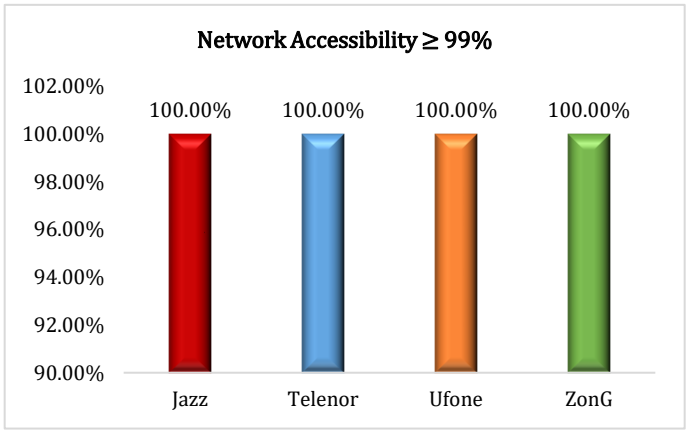



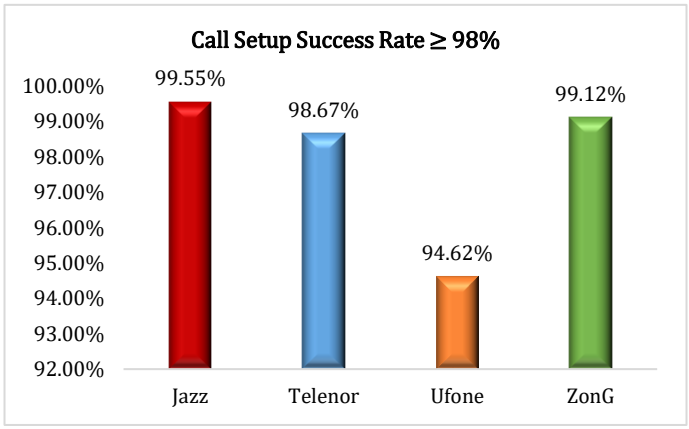



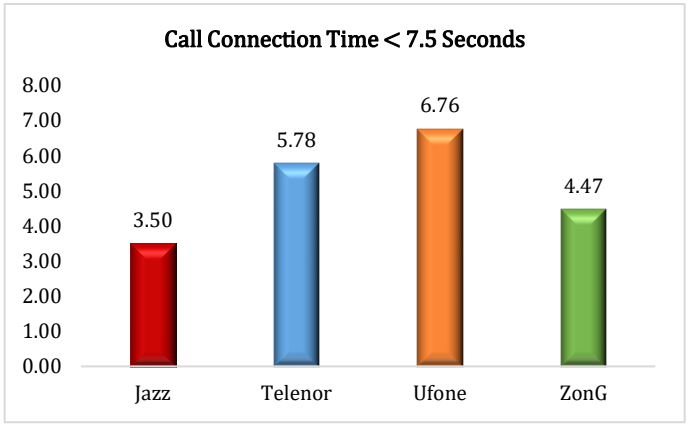



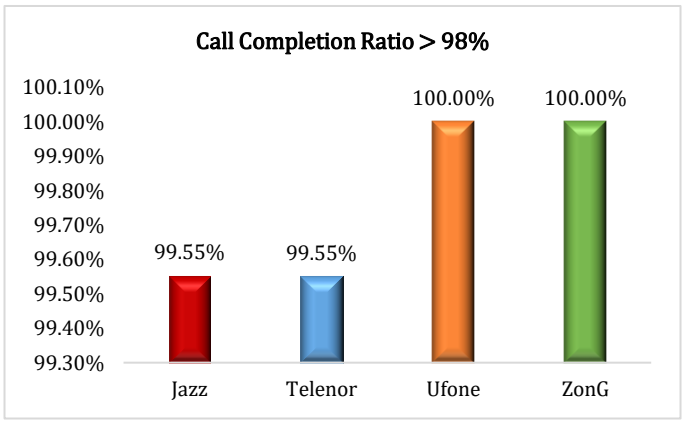



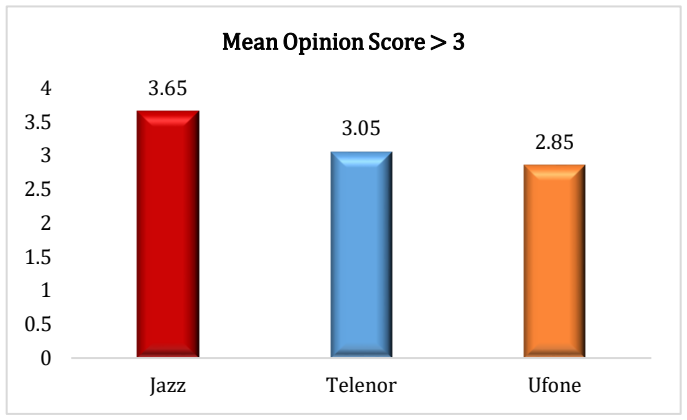
# QUALITY OF SERVICE SURVEY RESULTS – ZIARAT

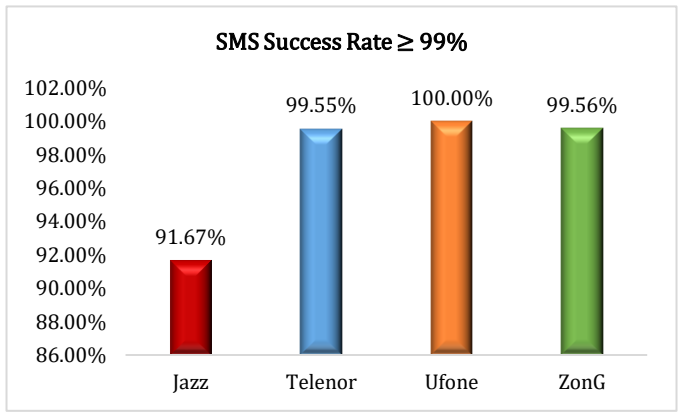


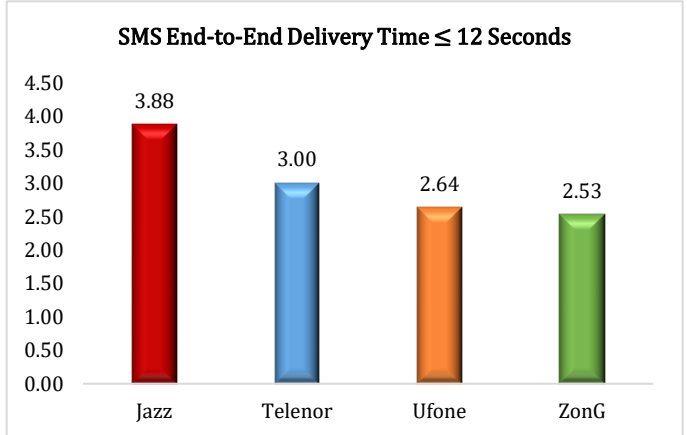
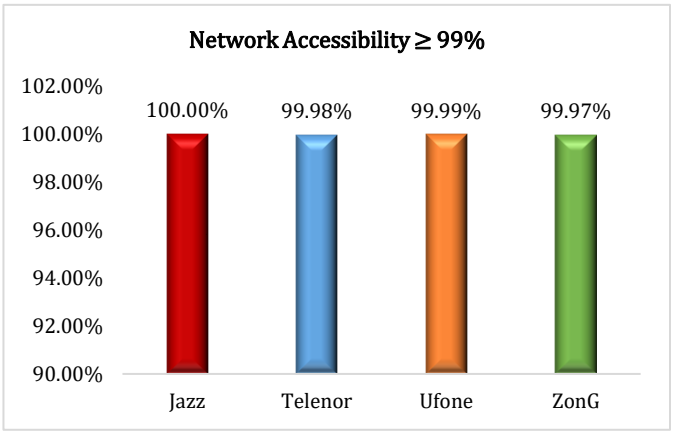
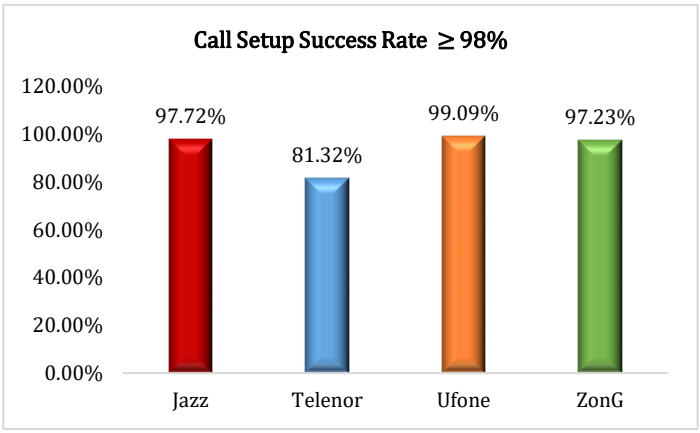
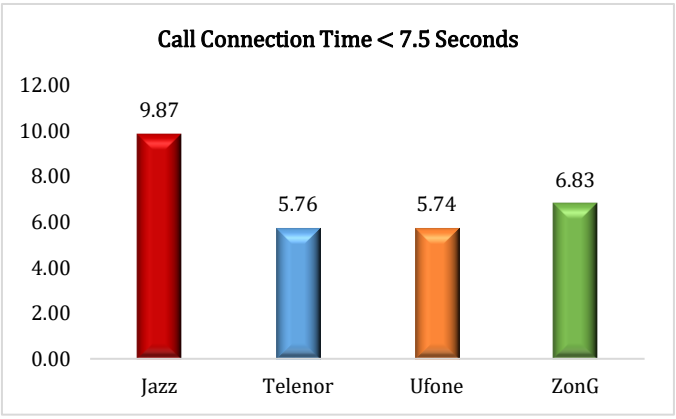
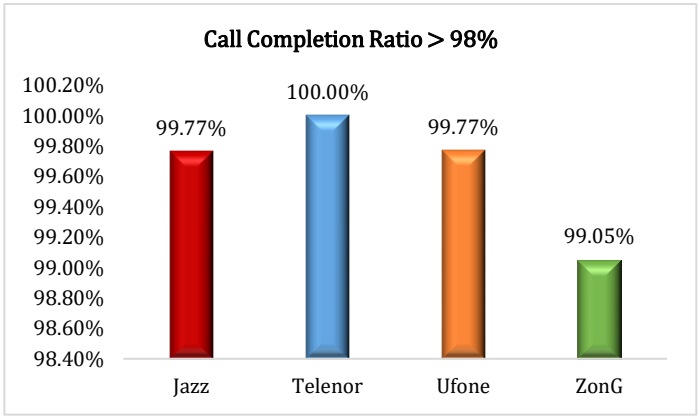
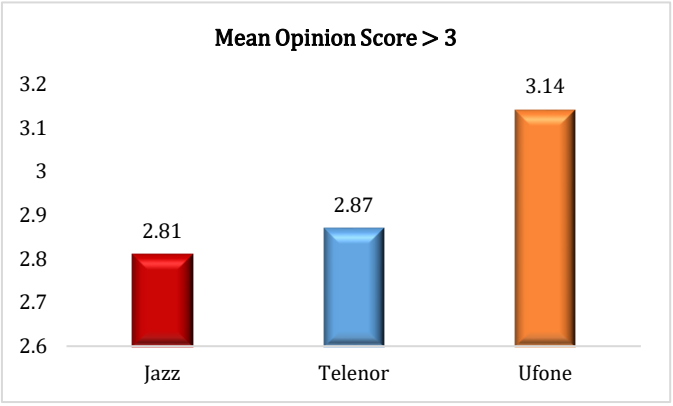
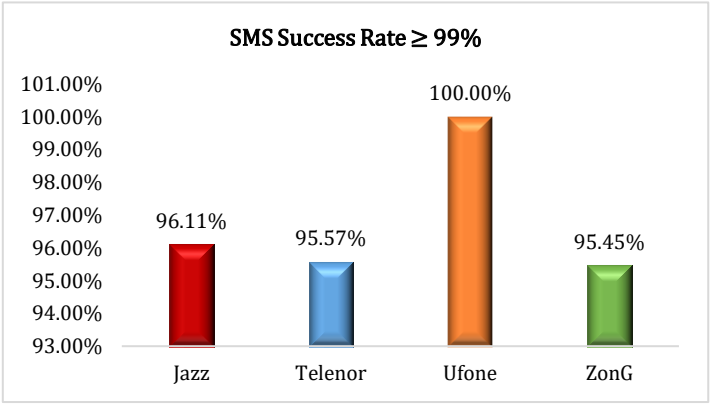
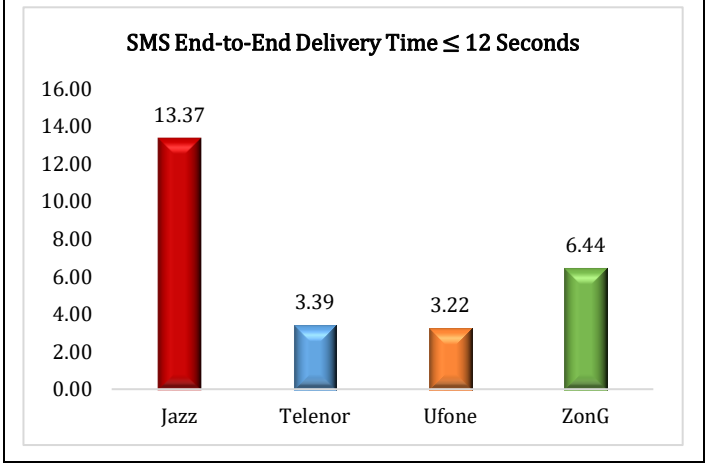






# QUALITY OF SERVICE SURVEY RESULTS – DALBANDIN