

QUALITY OF SERVICE SURVEY IN CITIES OF GILGIT BALTISTAN

THIRD QUARTER 2022

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

JOINT QUALITY OF SERVICE SURVEY REPORT

INTRODUCTION

1.1 In order to measure the performance and service quality of Cellular Mobile Operators (CMOs), a Joint Quality of Service (QoS) Survey has been carried out in eight (08) x cities of Gilgit Baltistan, in Third Quarter 2022. The name of cities along with survey dates are mentioned in **Table 1.1: QoS Survey Cities & Dates**.

| S. # | Province | City | Days | Survey Dates |
|------|-----------------------|---------|------|-------------------|
| 1. | Gilgit Baltistan (GB) | Gilgit | 2 | 18 ~ 19 July 2022 |
| 2. | | Jaglot | 1 | 20 July 2022 |
| 3. | | Hunza | 2 | 21 ~ 22 July 2022 |
| 4. | | Ghakuch | 2 | 25 ~ 26 July 2022 |
| 5. | | Astore | 2 | 27 ~ 28 July 2022 |
| 6. | | Skardu | 2 | 1 ~ 2 August 2022 |
| 7. | | Shigar | 1 | 3 August 2022 |
| 8. | | Khaplu | 2 | 4 ~ 5 August 2022 |

Table 1.1: QoS Survey Dates and Samples

DRIVE TEST DETAILS

2.1 The QoS survey/drive tests were conducted using **NEMO QoS Tool** of CMOs. Drive test survey teams selected survey routes in such a manner to cover main roads, service roads and majority of sectors/colonies. During the survey, mobile handsets for Voice Calls, SMS and Data Sessions, were kept in 3G/4G locked mode.

VOICE SERVICE

3.1. A total of 5,000 Call attempts were made to analyze the performance of Cellular Voice services in 8 x cities of Gilgit Baltistan. 7x Voice Service 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 8 x surveyed cities of Gilgit Baltistan CMO wise call statistics are shown in **Table 3.1: Call Statistics**. The overall compliance level of threshold values of voice QoS KIs in 8 x cities is shown in in **Table 3.2: City Wise Voice QoS KPIs Compliance Level**.

| DESCRIPTION | Jazz | Telenor | Ufone | ZonG | SCOM |
|-------------------------|--------|---------|-------|------|------|
| TOTAL CALLS ATTEMPTS | 1000 | 1000 | 1000 | 1000 | 1000 |
| NETWORK ACESSEBILITY | 99.94% | 99.74% | 100% | 100% | 100% |
| CALL SETUP SUCCESS RATE | 99.94% | 99.93% | 100% | 100% | 100% |
| CALL SETUP TIME | 7.4 | 10.1 | 6.81 | 8.2 | 5.94 |
| CALL COMPLETION RATIO | 100% | 99.88% | 100% | 100% | 100% |
| MEAN OPINION SCORE | 3.8 | 3.38 | 3.32 | 3.3 | 3.6 |
| ISHO SUCCESS RATE | N/A | N/A | N/A | N/A | 100% |
| RAB SETUP SUCCESS RATE | N/A | N/A | N/A | N/A | 95% |

Table 3.1: Call Statistics.

| Voice Service Cities - Compliance (Yes/No) | | | | | | | | | |
|--|------|--------|--------|---------|-------|--------|--------|--------|--------|
| Operator | KPIs | Astore | Gilgit | Ghakuch | Hunza | Jaglot | Khaplu | Shigar | Skardu |
| Jazz | NA | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | SA | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CCT | Yes | No | Yes | No | Yes | Yes | No | Yes |
| | CCR | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | MOS | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | ISHO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | RSSR | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Telenor | NA | Yes | Yes | Yes | Yes | Yes | No | Yes | Yes |
| | SA | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CCT | No | No | No | No | No | No | No | No |
| | CCR | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | MOS | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | ISHO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Ufone | RSSR | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | NA | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | SA | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CCT | Yes | No | Yes | Yes | Yes | No | Yes | Yes |
| | CCR | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | MOS | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | ISHO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Zong | RSSR | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | NA | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | SA | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CCT | No | Yes | Yes | No | Yes | Yes | Yes | No |
| | CCR | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | MOS | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | ISHO | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| SCOM | RSSR | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | NA | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | SA | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CCT | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CCR | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | MOS | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | ISHO | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| RSSR | No | No | No | No | No | No | Yes | No | |

Table 3.2: City Wise Voice QoS KPIs Compliance Level.

SMS SERVICE

4.1 A total of 5000 SMS sending attempts were conducted to gauge the performance of SMS service in Gilgit Baltistan. CMO wise SMS statistics are shown in **Table 4.1: CMO Wise SMS Statistics**.

| DESCRIPTION | Jazz | Telenor | Ufone | Zong | SCOM |
|--------------------------|--------|---------|-------|-------|------|
| SMS SEND REQUEST | 1000 | 1000 | 1000 | 1000 | 1000 |
| SMS RECEIVE SUCCESS RATE | 99.81% | 100% | 100% | 100% | 100% |
| END-TO-END DELIVERY TIME | 10.5 | 10.98 | 7.48 | 11.46 | 5.58 |

Table 4.1: CMO Wise SMS Statistics

DATA SERVICES SIGNAL STRENGTH

5.1 During the survey, SCOM data services were tested in technology locked mode, wherein 4G and 3G signal strength samples were recorded on survey routes. As per Next Generation Mobile Service (NGMS) Licenses and Cellular Mobile Network Quality of Service (QoS) Regulations 2021, licensees are required to meet the threshold of -100dBm or above with 90% confidence level for RSRP and RSCP.

The Confidence Level and Compliance of signal strength is shown in **Table 5.1: Data Services Signal Strength -100dBm with 90% Confidence Level in Gilgit Baltistan.**

| City | Average RSRP (4G) | | Compliant (Yes/No) | Average RSCP (3G) | | Compliant (Yes/No) |
|---------|-------------------|----------------------|--------------------|-------------------|----------------------|--------------------|
| | Signal Strength | 90% Confidence Level | | Signal Strength | 90% Confidence Level | |
| Gilgit | -79 | 99% | Yes | -64.39 | 99.90% | Yes |
| Jaglot | -82 | 93.10% | Yes | -69.6 | 99.90% | Yes |
| Hunza | -89.1 | 89.10% | No | -78.18 | 98.90% | Yes |
| Ghakuch | -86 | 94% | Yes | -79.1 | 100% | Yes |
| Astore | -83.13 | 92.66% | Yes | -64.9 | 100% | Yes |
| Skardu | -89.46 | 91.20% | Yes | -76.6 | 99.90% | Yes |
| Shigar | -91 | 86.10% | No | -86 | 91.40% | Yes |
| Khaplu | -90.2 | 75.5% | No | -77.3 | 100% | Yes |

Table 5.1: Data Services Signal Strength -100dBm with 90% Confidence Level in Gilgit Baltistan.

USER DATA THROUGHPUT

6.1 As per Next Generation Mobile Service (NGMS) Licenses and Cellular Mobile Network Quality of Service (QoS) Regulations 2021, licensees are required to meet the threshold of minimum of 2Mbps of 4G User Data Throughput and a of minimum of 256Kbps of 3G User Data Throughput. The results of Data Service QoS KPI i.e. User Data Throughput is shown in **Table 6.1: User Data Throughput in Gilgit Baltistan.**

| City | SCOM | |
|---------|-----------------------------------|-------------------------------------|
| | User Data Throughput (4G) > 2Mbps | User Data Throughput (3G) > 256kbps |
| Gilgit | 2.34 | 551.6 |
| Jaglot | 2.14 | 715.1 |
| Hunza | 2.11 | 516.5 |
| Ghakuch | 2.89 | 776.9 |
| Astore | 2.40 | 2966 |
| Skardu | 4.89 | 2046 |
| Shigar | 2.56 | 633.9 |
| Khaplu | 3.18 | 1018 |

Table 6.1: User Data Throughput in Gilgit Baltistan

SURVEY MAPS & GRAPHICAL RESULTS

7.1 The 4G/LTE (RSRP) 3G (RSCP) and 2G (RxLev) Signal Strength samples recorded during drive test on survey routes and plotted on maps. Coverage Maps of Voice Services Signal Strength are shown at **Annex-A**, Voice & SMS QoS KPIs survey results in graphical form are shown at **Annex-B**. Data Services Signal Strengths of SCOM are shown at **Annex-C** wherein **Annex-D** contains Data Services QoS KPIs survey results for 8x cities of Gilgit Baltistan.

STANDING IN SURVEY

8.1 CMOs have been prioritized/ placed at 1st, 2nd, 3rd, 4th & 5th 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 8 x surveyed cities.

- a. **MOBILE NETWORK COVERAGE.** The compliance level of SCOM as per SignalStrength of 4G and 3G Networks is shown in **Table 8.1: Mobile Network Coverage Compliance.**

| S. # | Technology | SCOM Compliance Level – Number of Cities | | Standing |
|------|------------|--|---------------|----------|
| | | Compliant | Non-Compliant | |
| 1. | 4G | 5 | 3 | First |
| 2. | 3G | 8 | 0 | |

Table 8.1: Mobile Network Coverage Compliance

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

| S. # | Operator | Technology | Highest Throughput – Number of Cities | | | | | Standing |
|------|----------|------------------------|---------------------------------------|-----|-----|-----|-----|----------|
| | | | 1st | 2nd | 3rd | 4th | 5th | |
| 1. | SCOM | 4G | 8 | - | - | - | - | First |
| | | 3G | 8 | - | - | - | - | |
| 2. | ZonG | Services Not Available | | | | | - | |
| 3. | Telenor | | | | | | - | |
| 4. | Ufone | | | | | | - | |
| 5. | Jazz | | | | | | - | |

Table 8.2: CMOs Standing in Mobile Broadband Service

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

| S. #. | Operator | Voice QoS KPIs | | Standing |
|-------|----------|----------------|---------------|----------|
| | | Compliant | Non-Compliant | |
| 2. | Ufone | 38 | 2 | First |
| 1. | Jazz | 37 | 3 | Second |
| 4. | ZonG | 37 | 3 | Second |
| 5. | SCOM | 49 | 7 | Third |
| 3. | Telenor | 31 | 9 | Fourth |

Table 8.3: CMOs Standing in Voice Service

- d. **OVERALL STANDING.** The overall standing of each CMOs in different category of services is mentioned in **Table 8.4: CMOs Overall Standing in QoS Survey.**

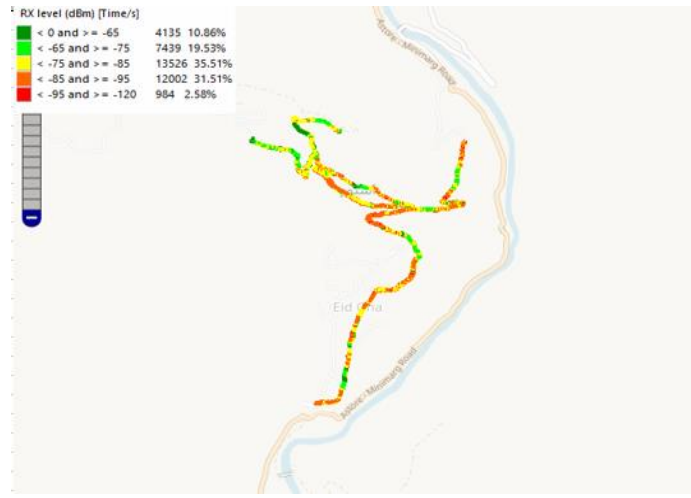
| S. #. | Service | STANDING | | | | |
|-------|------------------|----------|--|------|---------|-----|
| | | 1st | 2nd | 3rd | 4th | 5th |
| 1. | Network Coverage | SCOM | Other CMOs are not providing Data Services | | | |
| 2. | Mobile Broadband | SCOM | | | | |
| 3. | Voice | Ufone | Jazz & ZonG | SCOM | Telenor | - |

Table 8.4: CMOs Overall Standing in QoS Survey

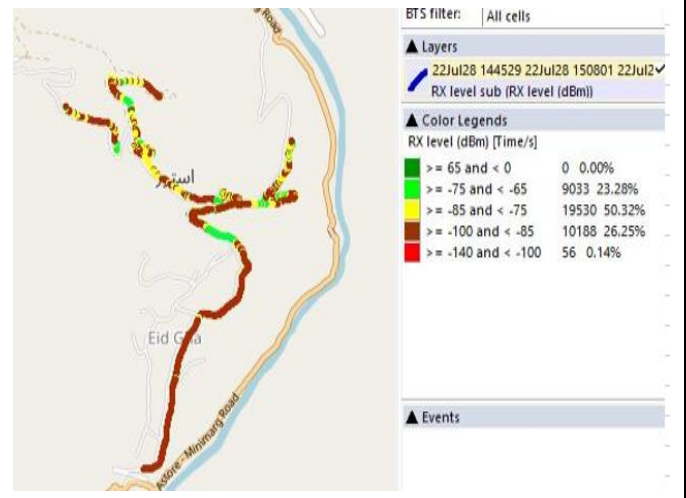
Annex-A (Voice Coverage Maps)

2G (VOICE) COVERAGE MAPS – ASTORE

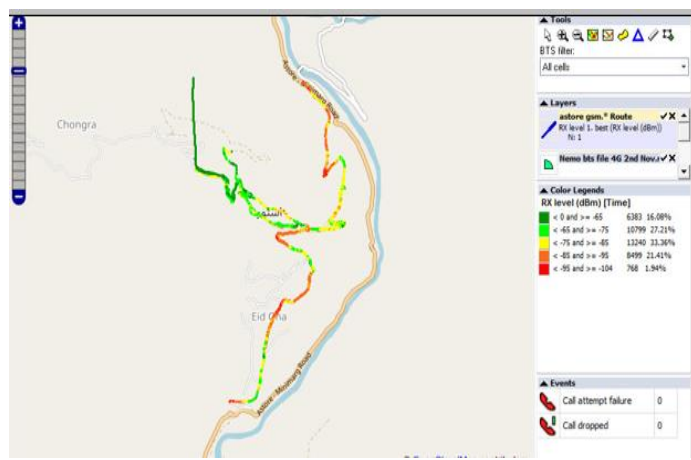
JAZZ VOICE NETWORK COVERAGE



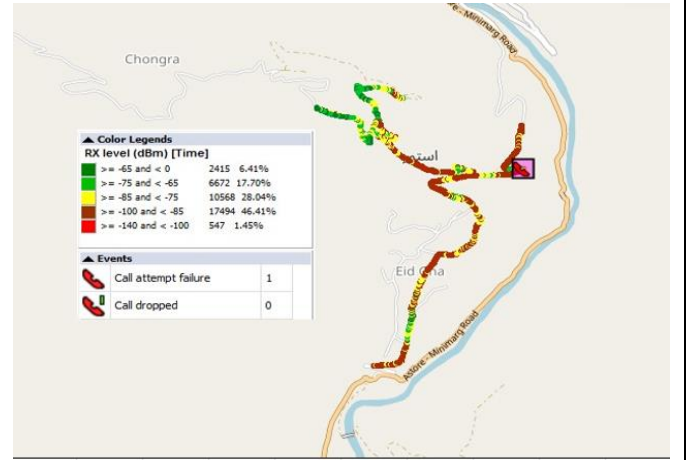
TELENOR VOICE NETWORK COVERAGE



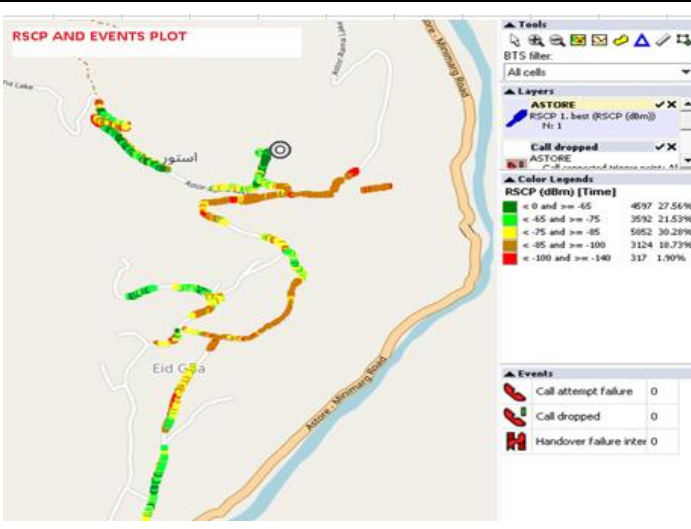
UFONE VOICE NETWORK COVERAGE



ZONG VOICE NETWORK COVERAGE

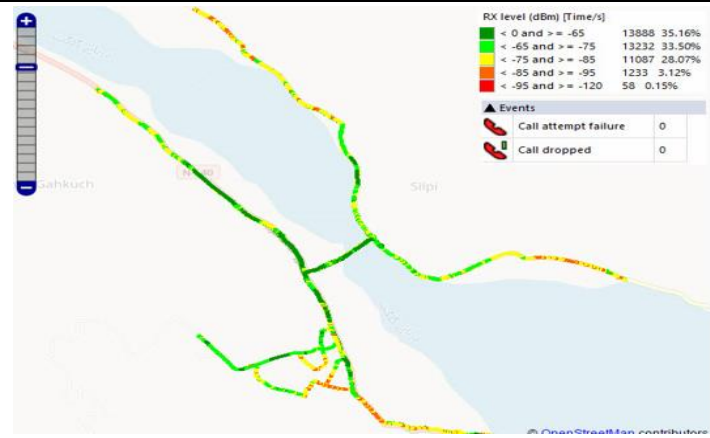


SCOM VOICE NETWORK COVERAGE

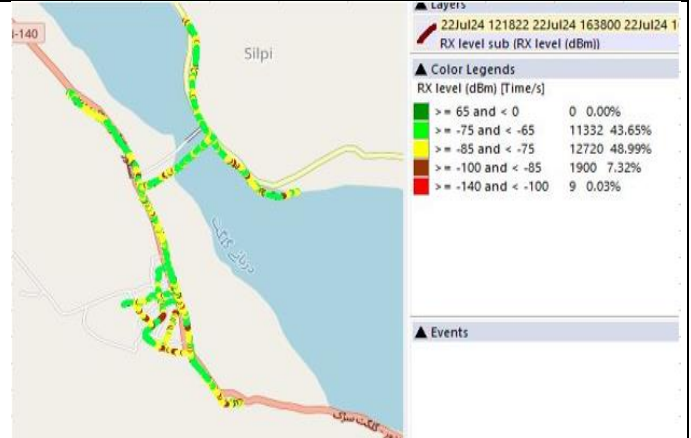


2G (VOICE) COVERAGE MAPS – GHAKUCH

JAZZ VOICE NETWORK COVERAGE



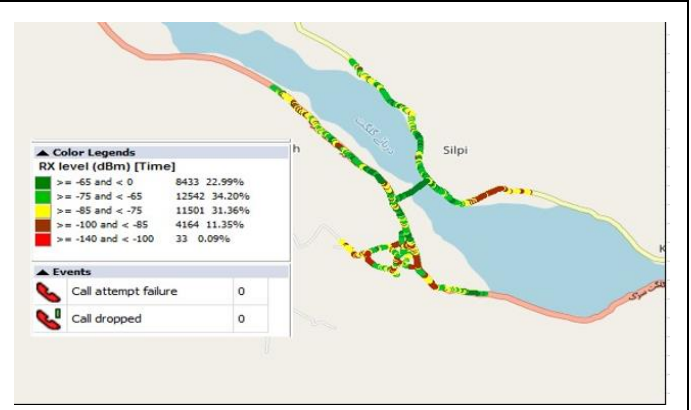
TELENOR VOICE NETWORK COVERAGE



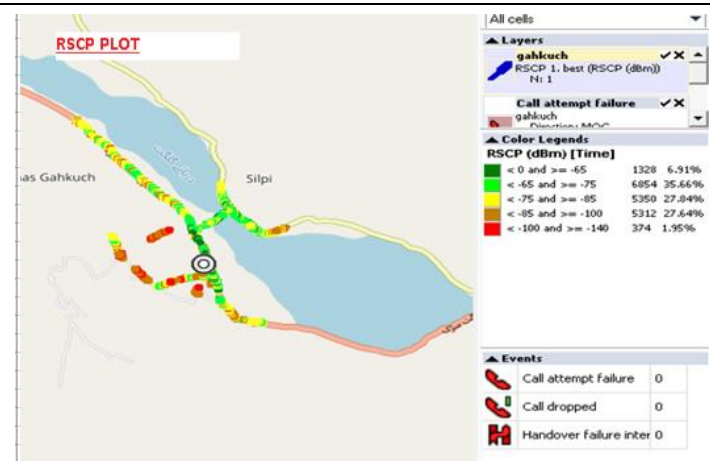
UFONE VOICE NETWORK COVERAGE



ZONG VOICE NETWORK COVERAGE

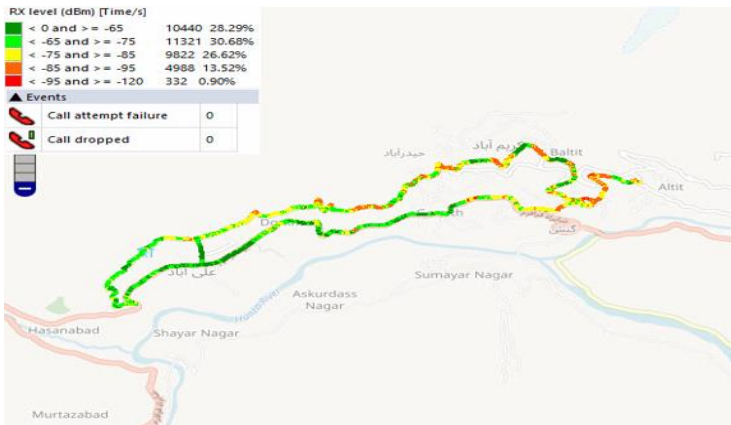


SCOM VOICE NETWORK COVERAGE

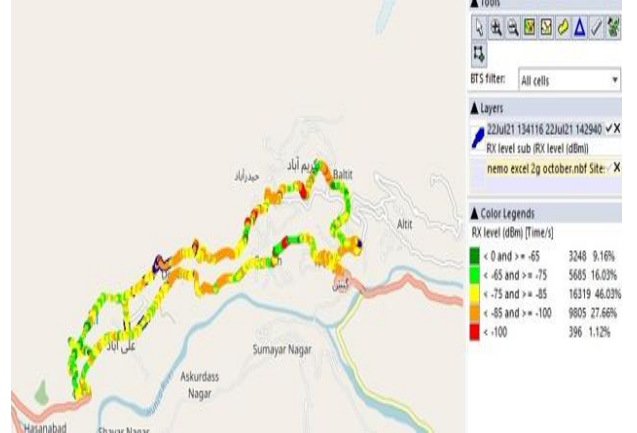


2G (VOICE) COVERAGE MAPS – HUNZA

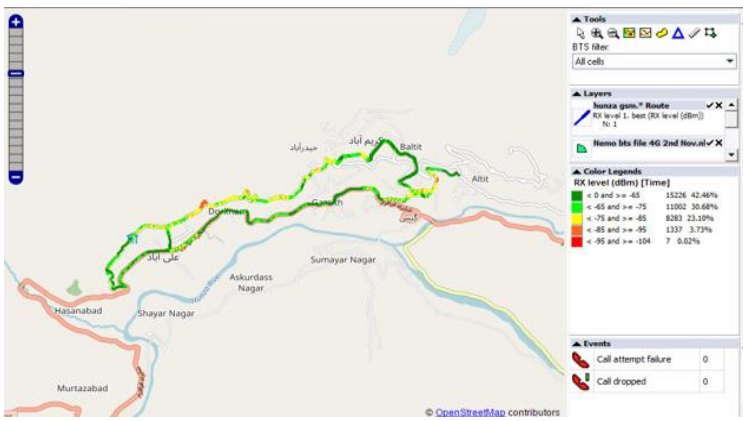
JAZZ VOICE NETWORK COVERAGE



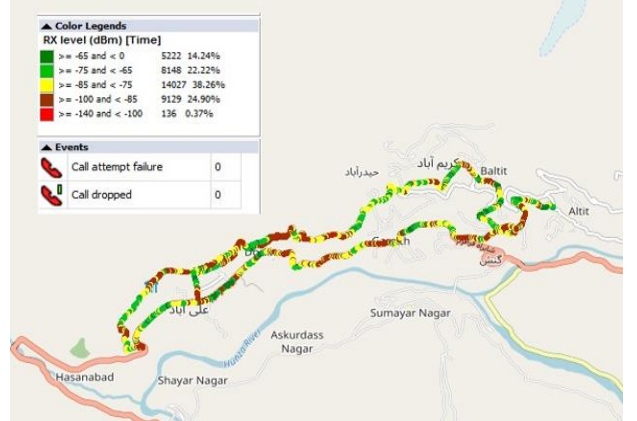
TELENOR VOICE NETWORK COVERAGE



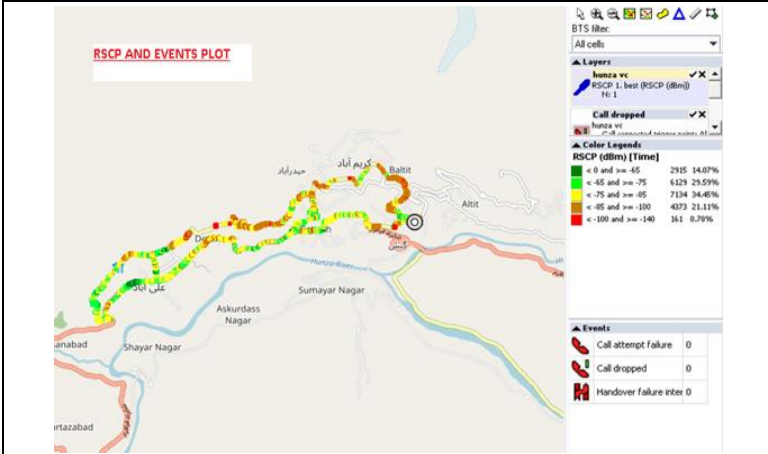
UFONE VOICE NETWORK COVERAGE



ZONG VOICE NETWORK COVERAGE

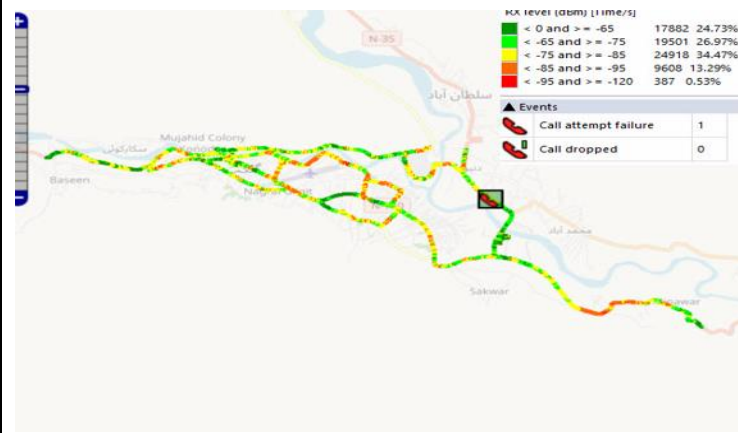


SCOM VOICE NETWORK COVERAGE

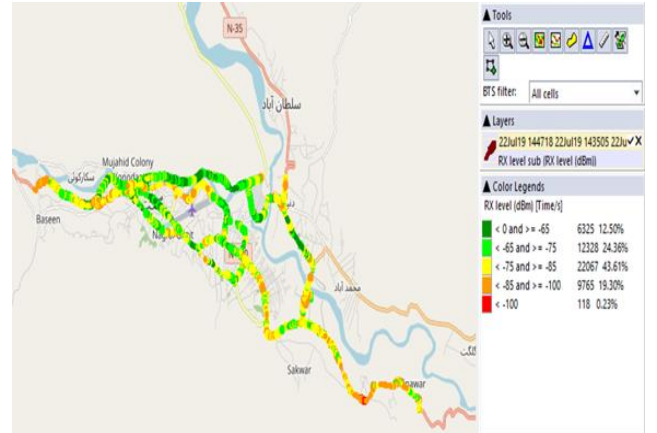


2G (VOICE) COVERAGE MAPS – GILGIT

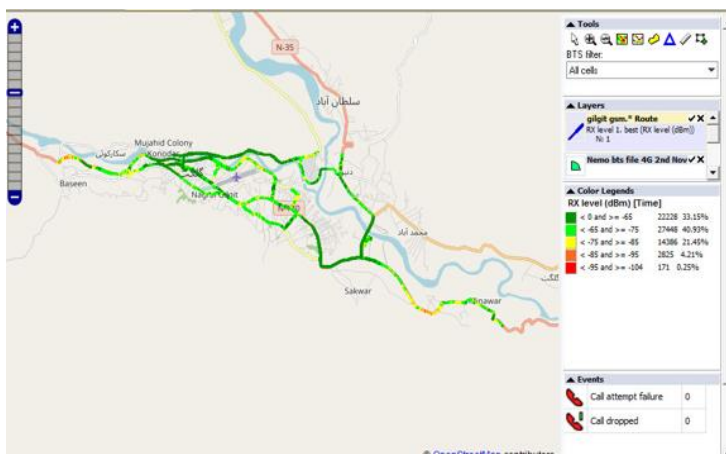
JAZZ VOICE NETWORK COVERAGE



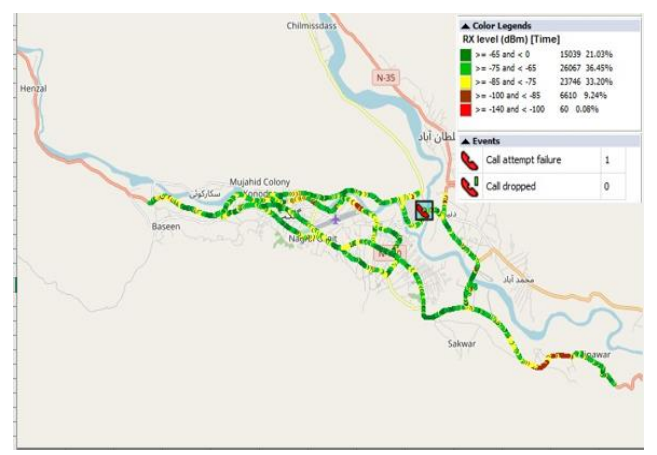
TELENOR VOICE NETWORK COVERAGE



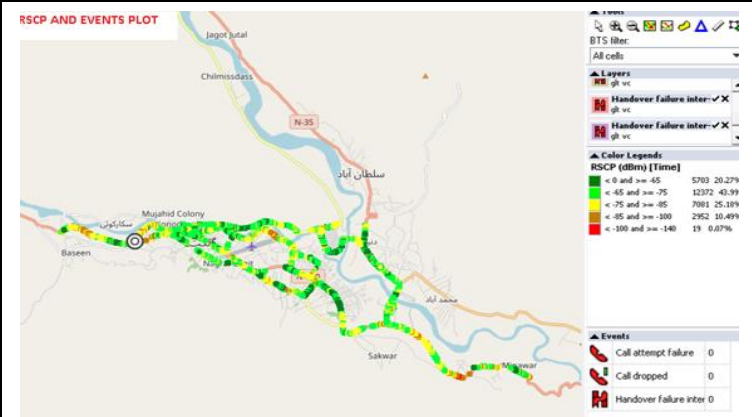
UFONE VOICE NETWORK COVERAGE



ZONG VOICE NETWORK COVERAGE

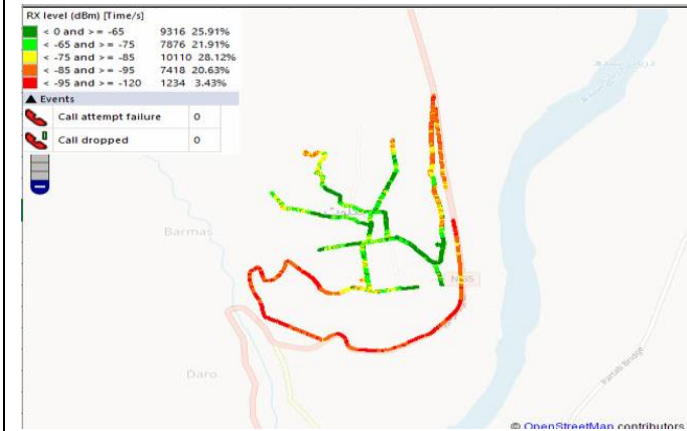


SCOM VOICE NETWORK COVERAGE

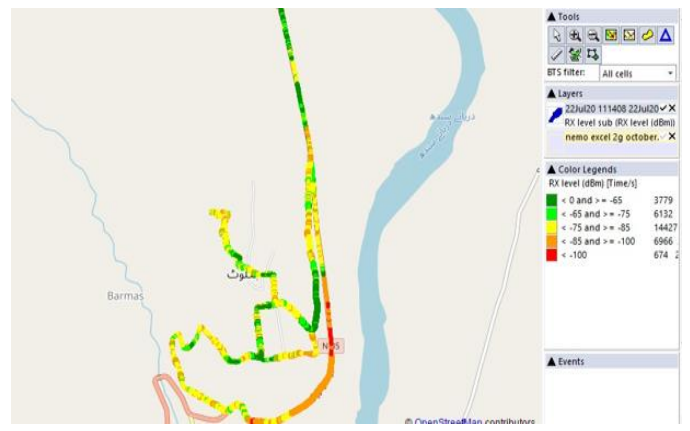


2G (VOICE) COVERAGE MAPS – JAGLOT

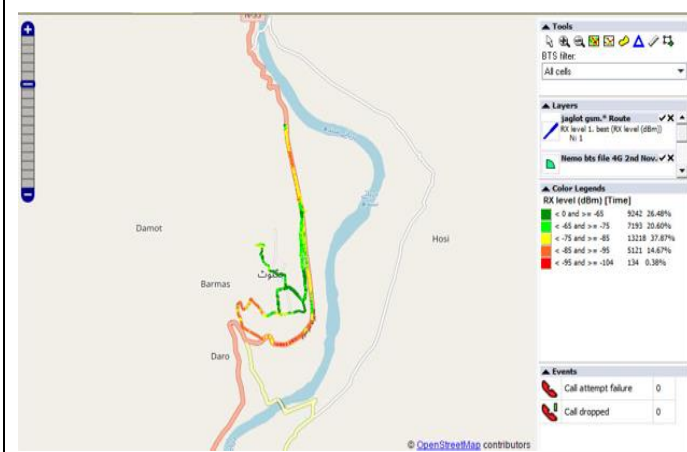
JAZZ VOICE NETWORK COVERAGE



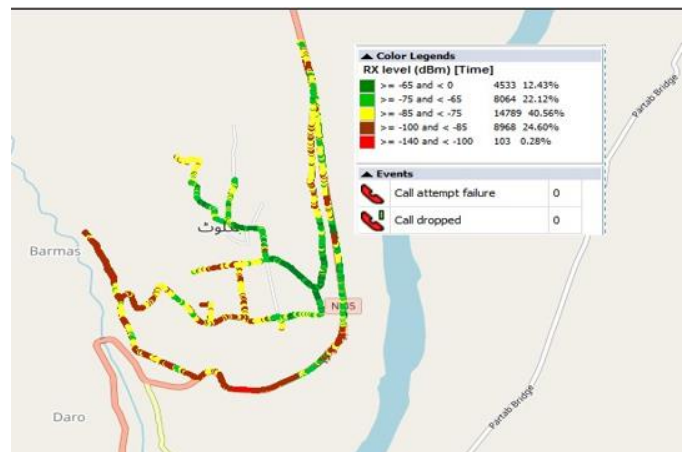
TELENOR VOICE NETWORK COVERAGE



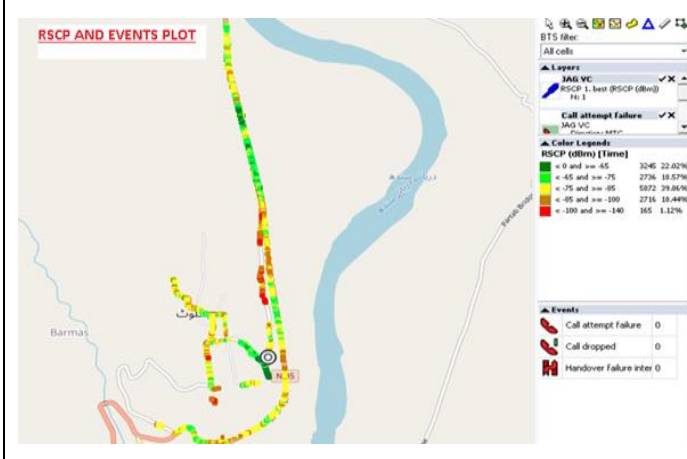
UFONE VOICE NETWORK COVERAGE



ZONG VOICE NETWORK COVERAGE

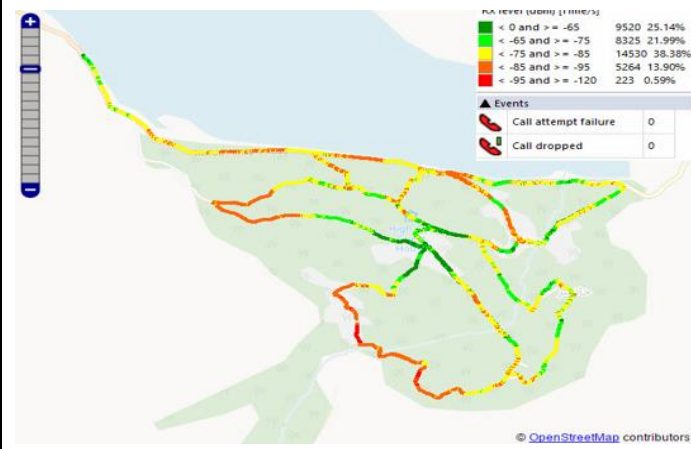


SCOM VOICE NETWORK COVERAGE

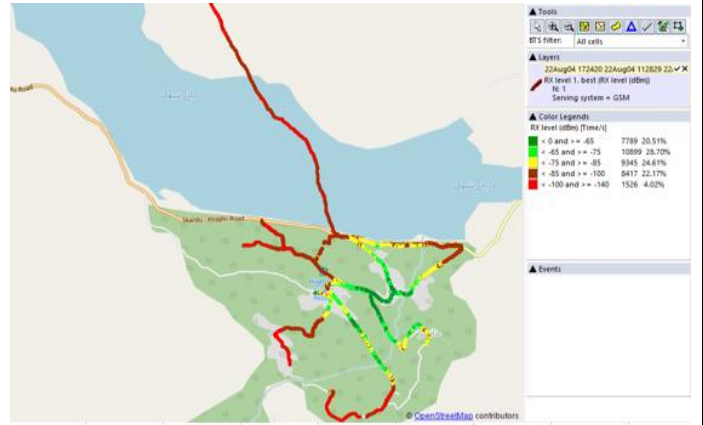


2G (VOICE) COVERAGE MAPS - KHAPLU

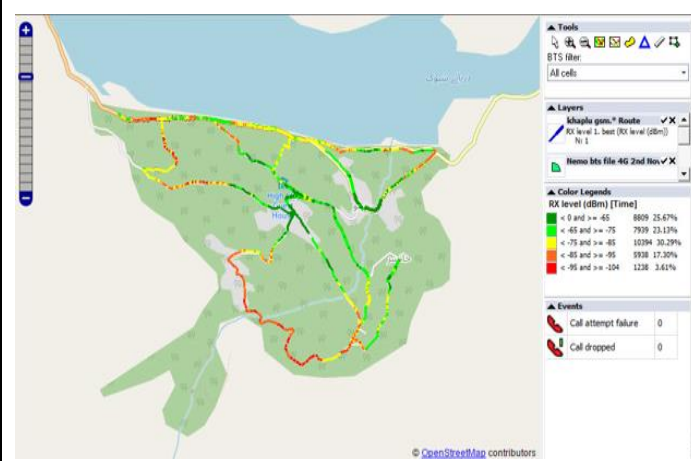
JAZZ VOICE NETWORK COVERAGE



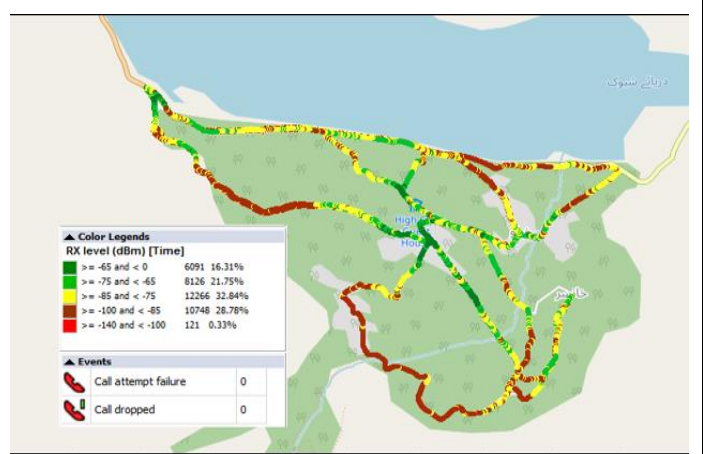
TELENOR VOICE NETWORK COVERAGE



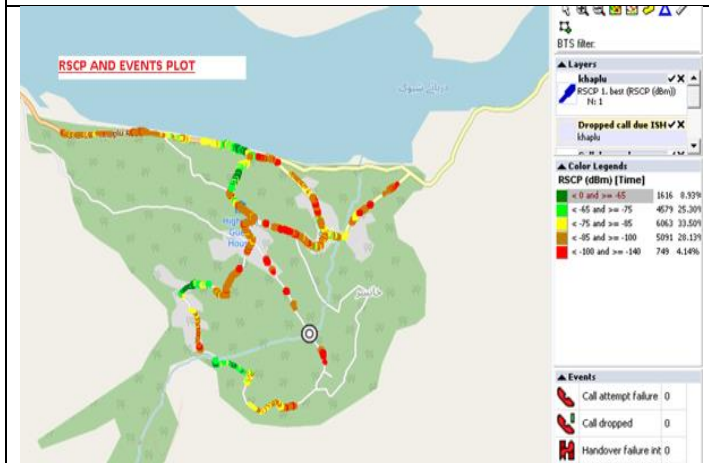
UFONE VOICE NETWORK COVERAGE



ZONG VOICE NETWORK COVERAGE

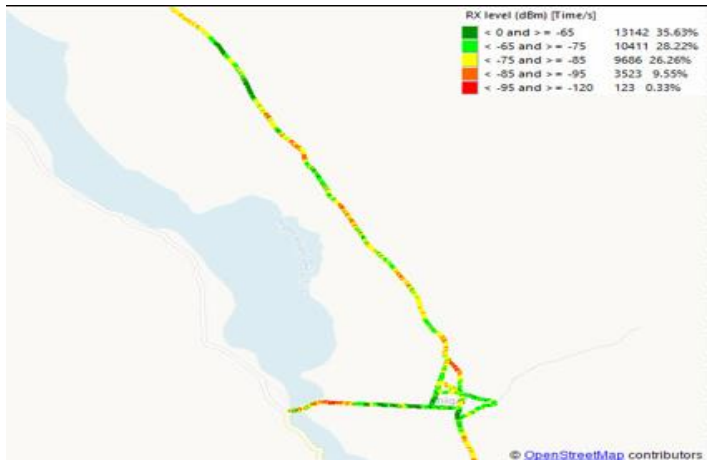


SCOM VOICE NETWORK COVERAGE

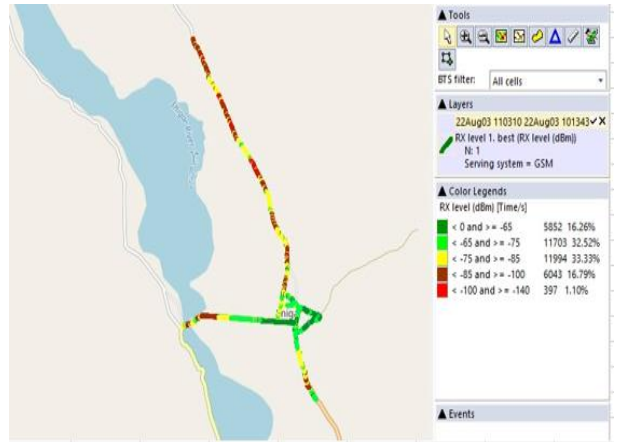


2G (VOICE) COVERAGE MAPS – SHIGAR

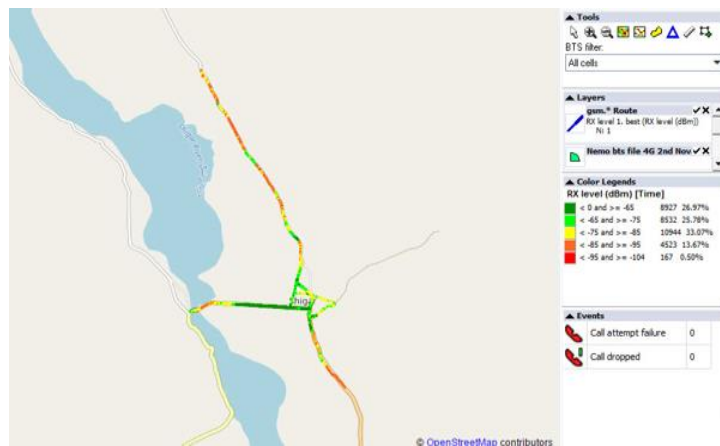
JAZZ VOICE NETWORK COVERAGE



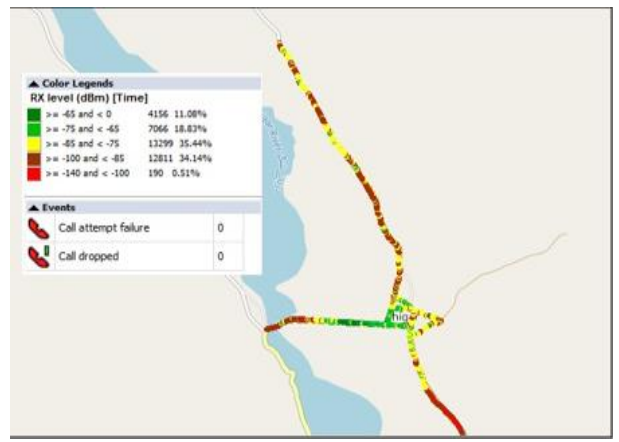
TELENOR VOICE NETWORK COVERAGE



UFONE VOICE NETWORK COVERAGE



ZONG VOICE NETWORK COVERAGE

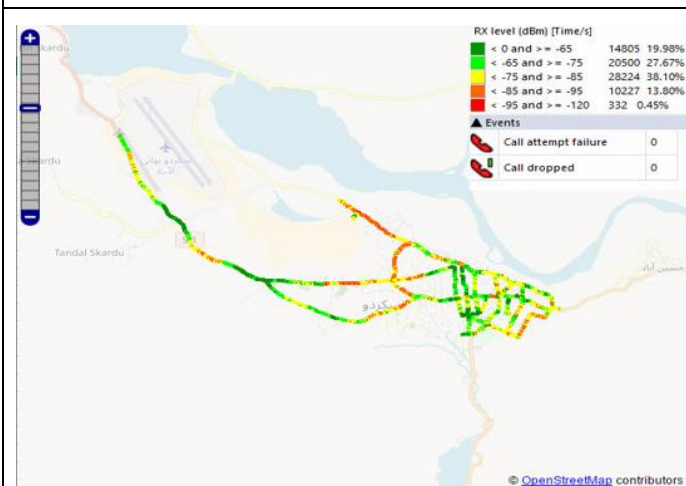


SCOM VOICE NETWORK COVERAGE

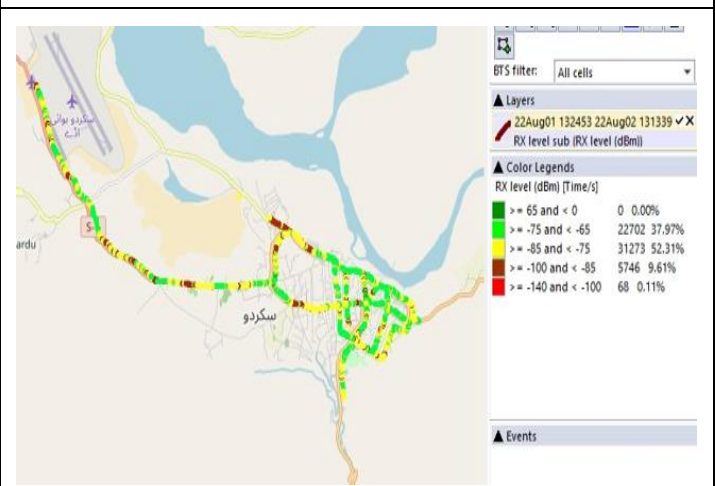


2G (VOICE) COVERAGE MAPS – SKARDU

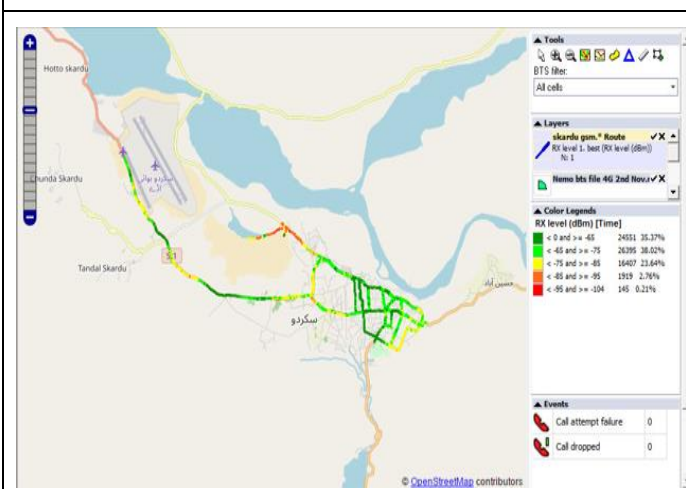
JAZZ VOICE NETWORK COVERAGE



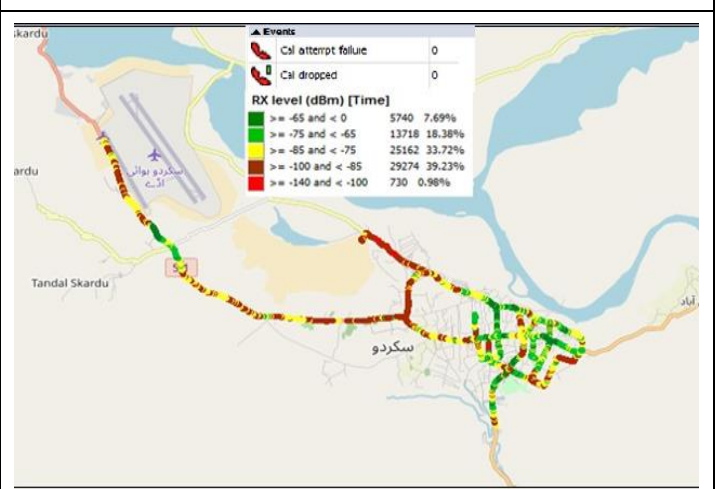
TELENOR VOICE NETWORK COVERAGE



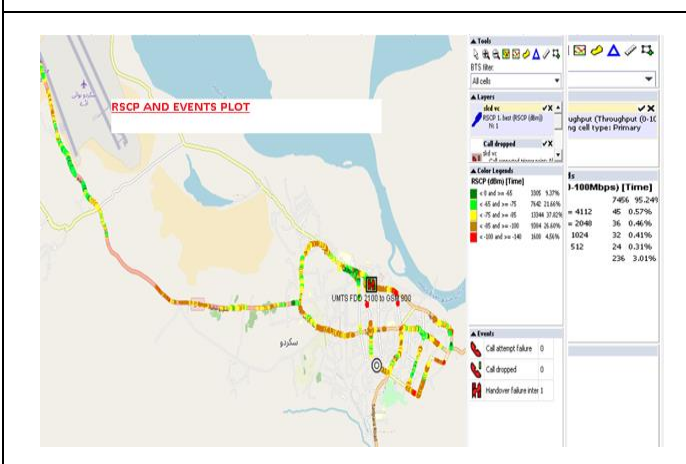
UFONE VOICE NETWORK COVERAGE



ZONG VOICE NETWORK COVERAGE

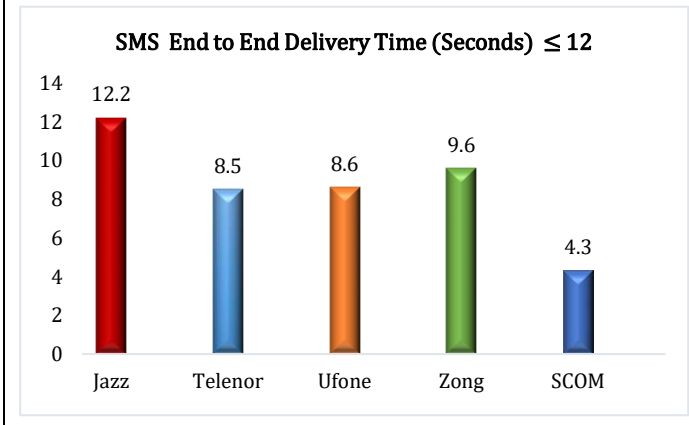
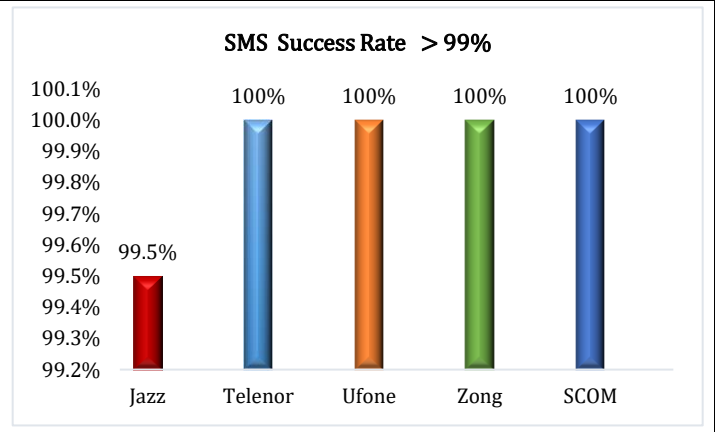
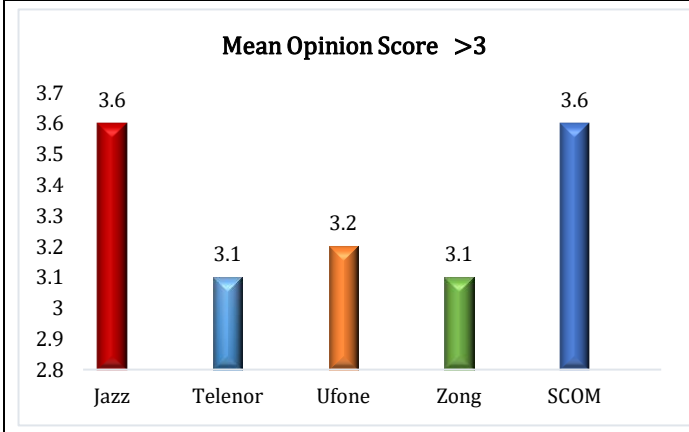
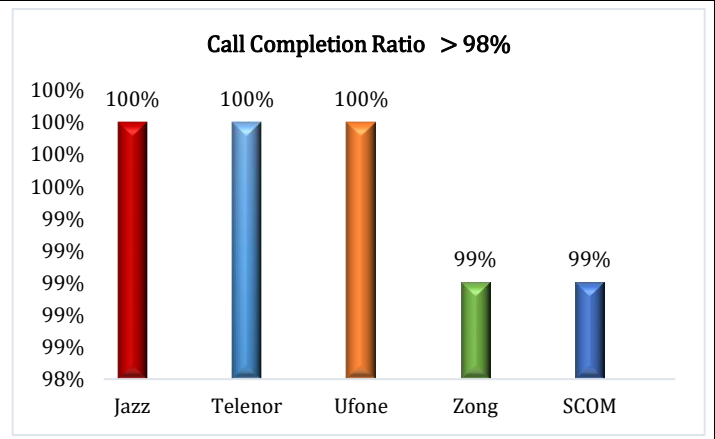
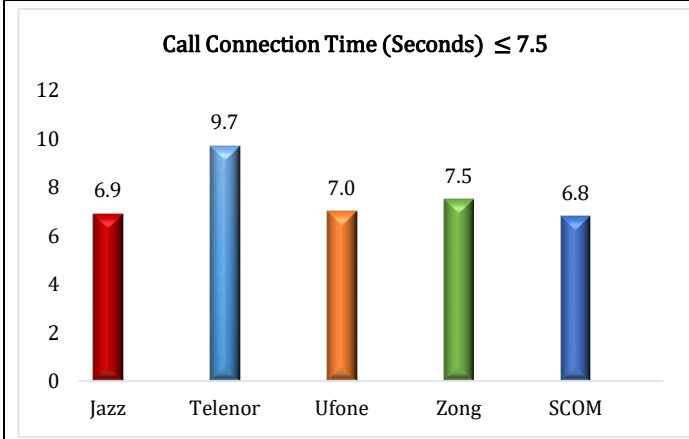
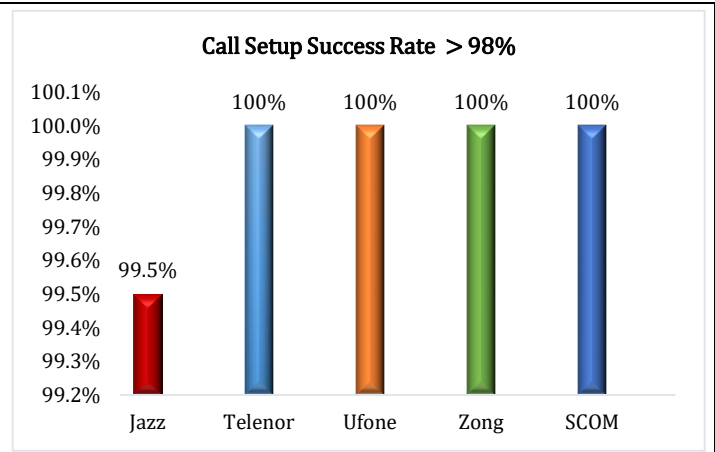
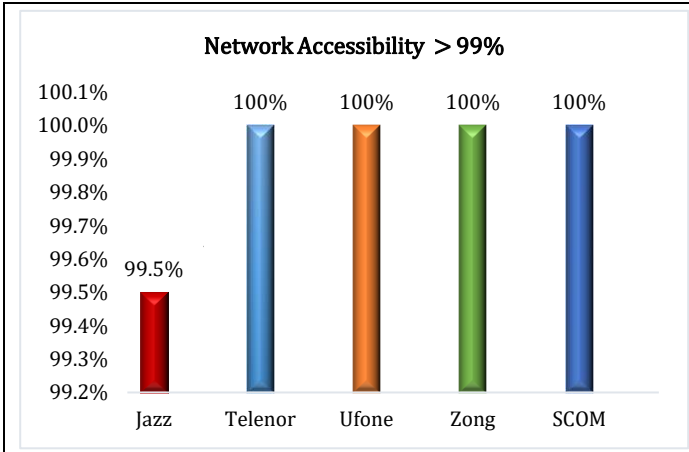


SCOM VOICE NETWORK COVERAGE

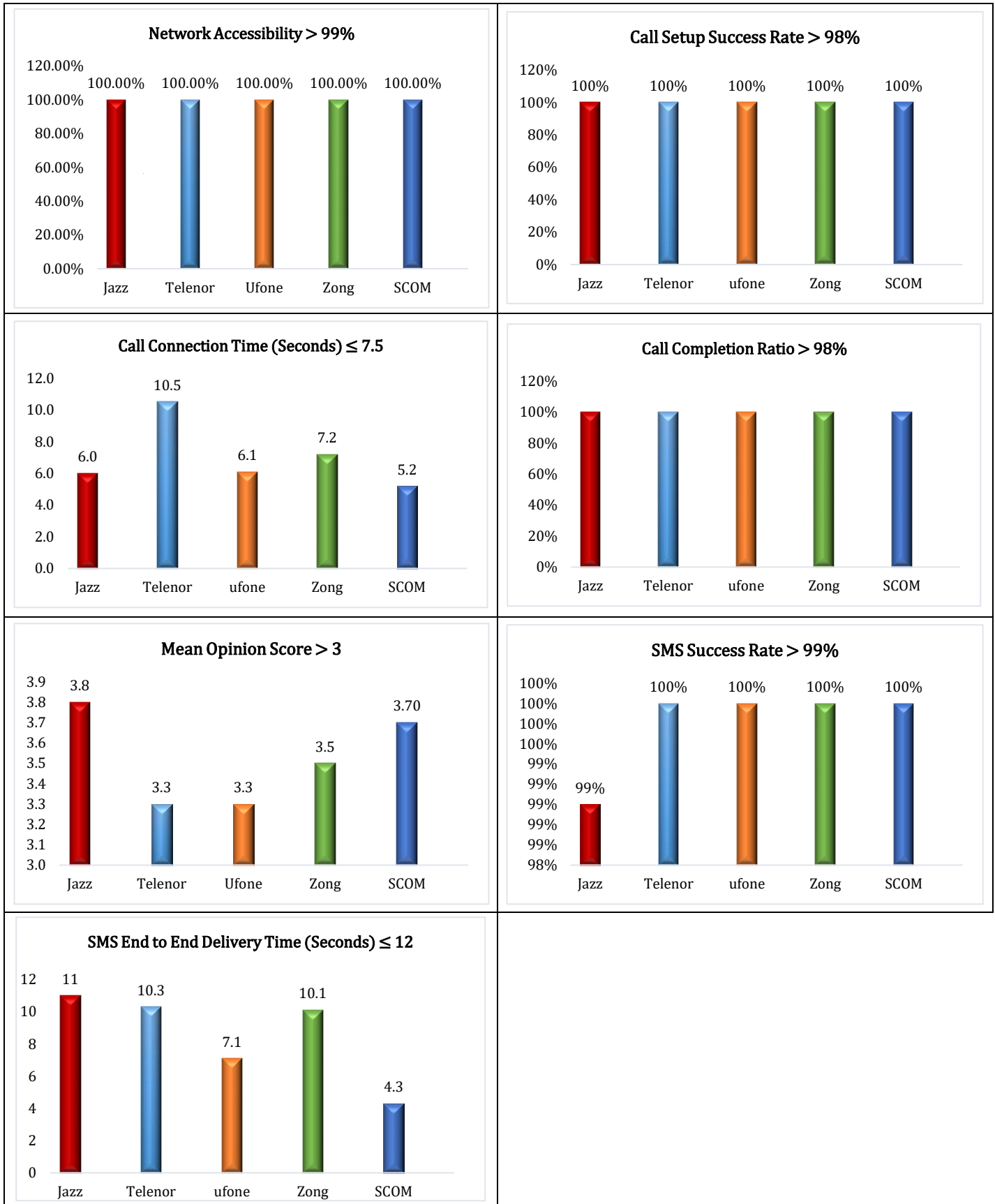


Annex-B (Voice QoS KPI Graphs)

QUALITY OF SERVICE SURVEY RESULTS – GILGIT

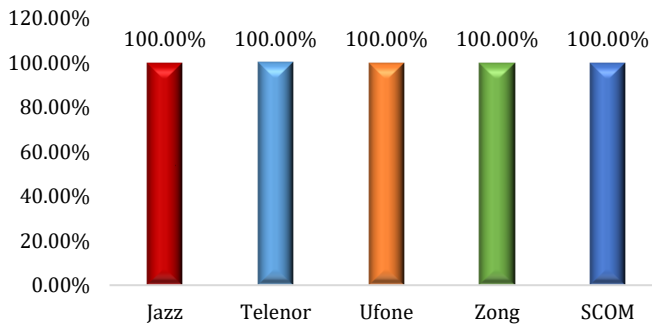


QUALITY OF SERVICE SURVEY RESULTS – JAGLOT

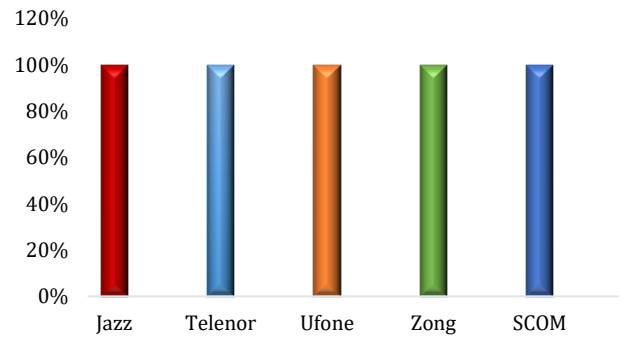


QUALITY OF SERVICE SURVEY RESULTS – HUNZA

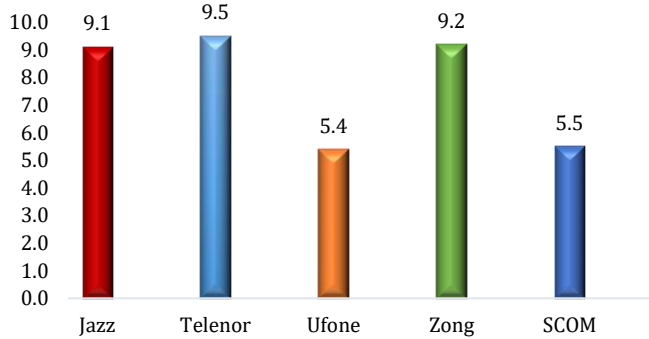
Network Accessibility > 99%



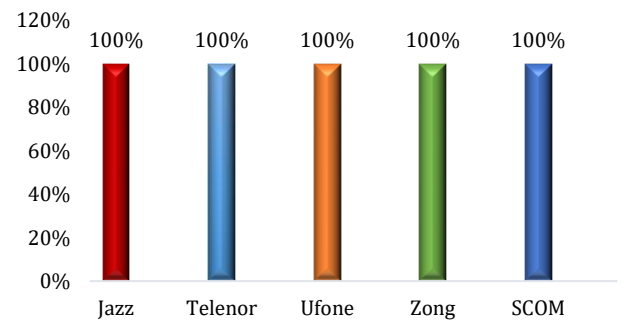
Call Setup Success Rate > 98%



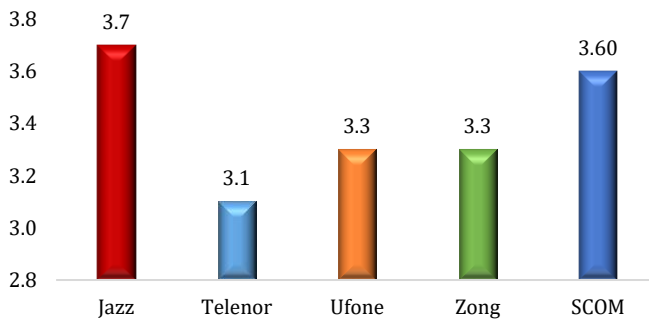
Call Connection Time (Seconds) ≤ 7.5



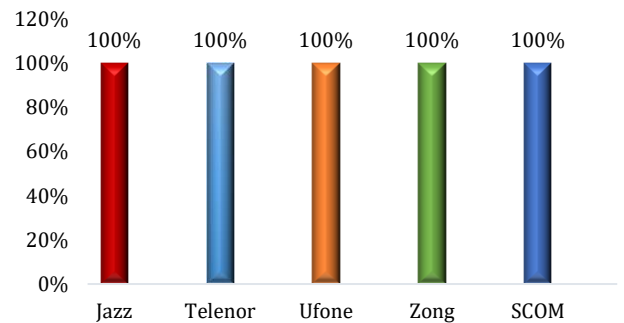
Call Completion Ratio > 98%



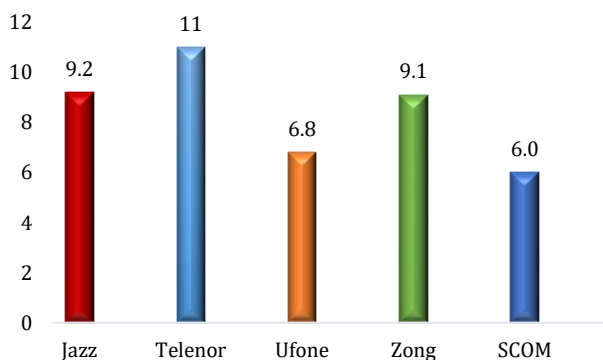
Mean Opinion Score > 3



SMS Success Rate > 99%

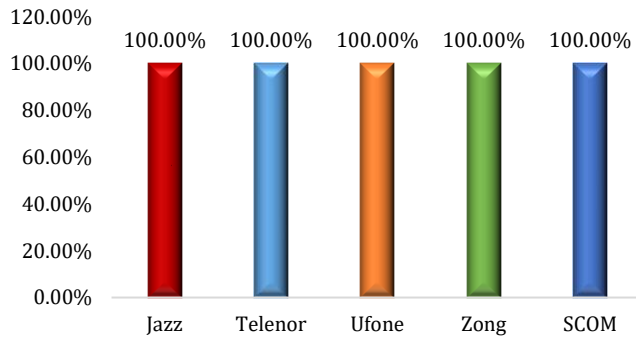


SMS End to End Delivery Time (Seconds) ≤ 12

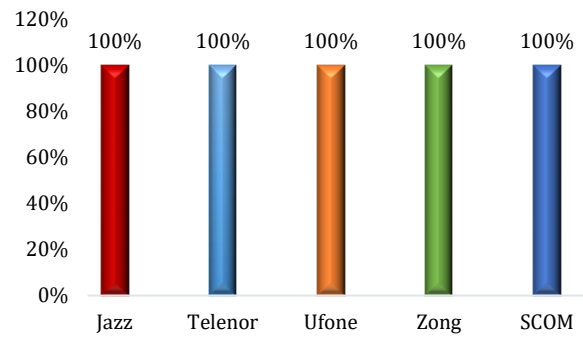


QUALITY OF SERVICE SURVEY RESULTS – GHAKUCH

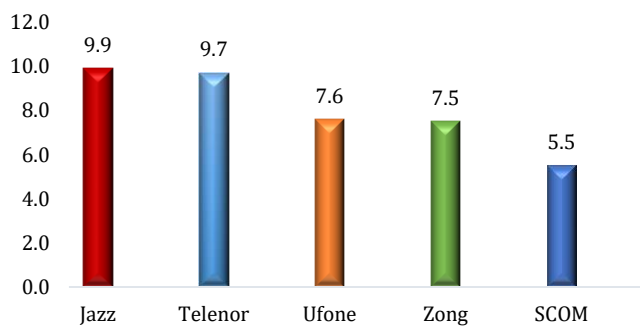
Network Accessibility > 99%



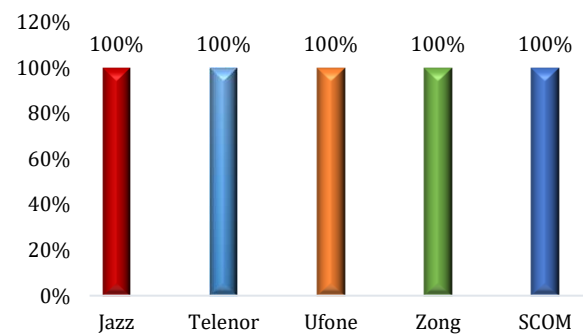
Call Setup Success Rate > 98%



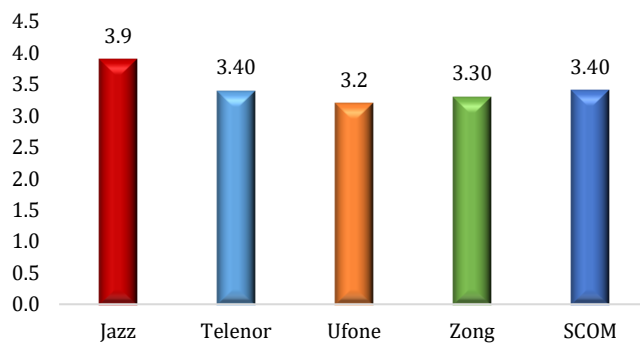
Call Connection Time (Seconds) ≤ 7.5



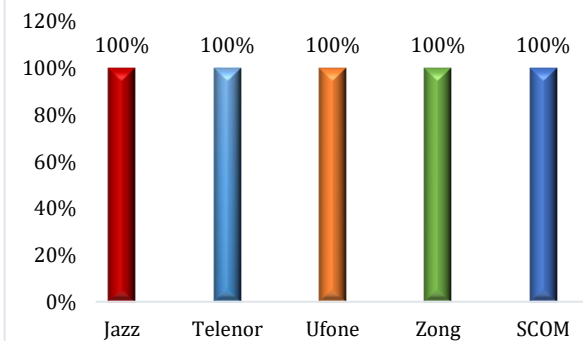
Call Completion Ratio > 98%



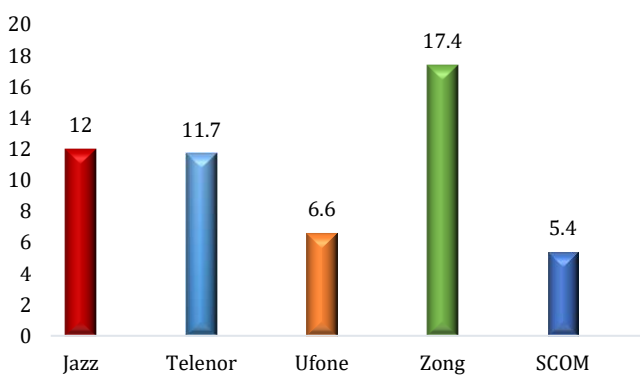
Mean Opinion Score > 3



SMS Success Rate > 99%

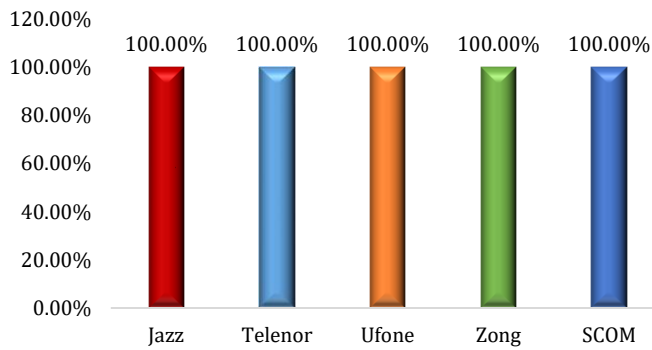


SMS End to End Delivery Time (Seconds) ≤ 12

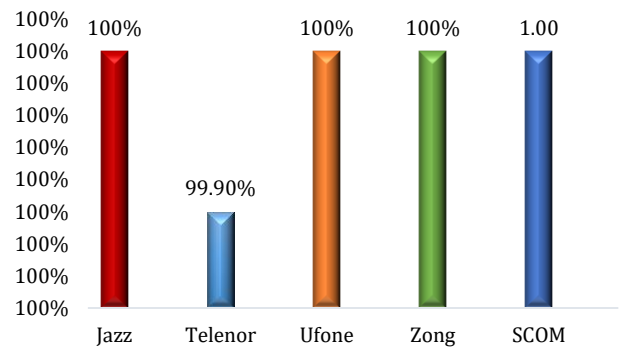


QUALITY OF SERVICE SURVEY RESULTS – ASTORE

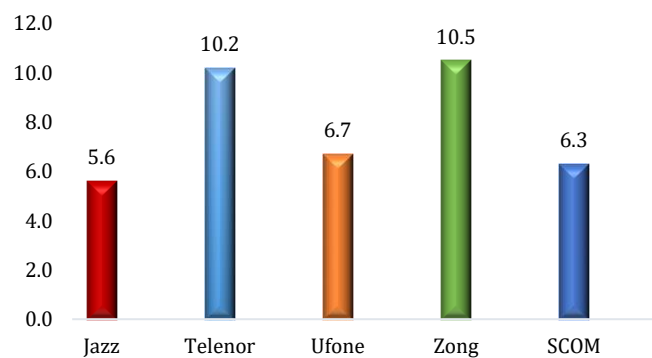
Network Accessibility > 99%



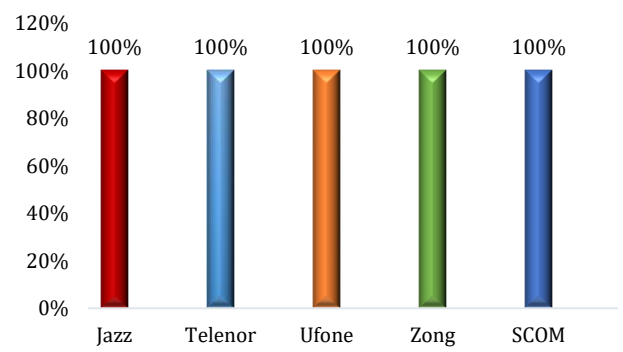
Call Setup Success Rate > 98%



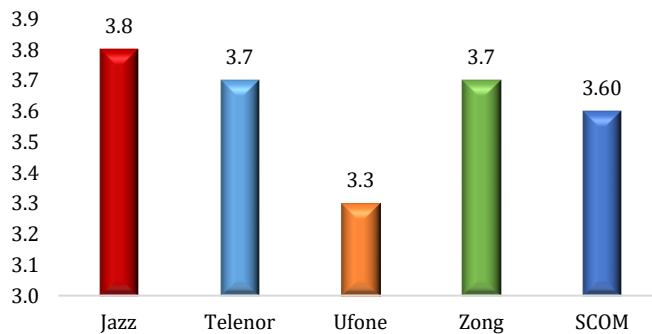
Call Connection Time (Seconds) ≤ 7.5



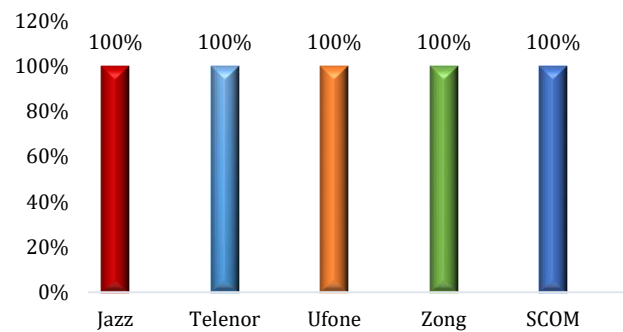
Call Completion Ratio > 98%



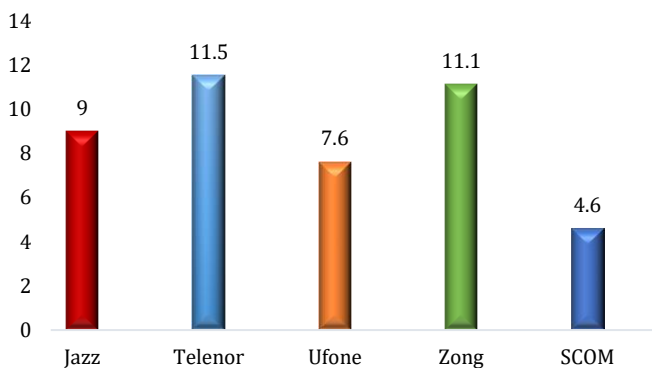
Mean Opinion Score > 3



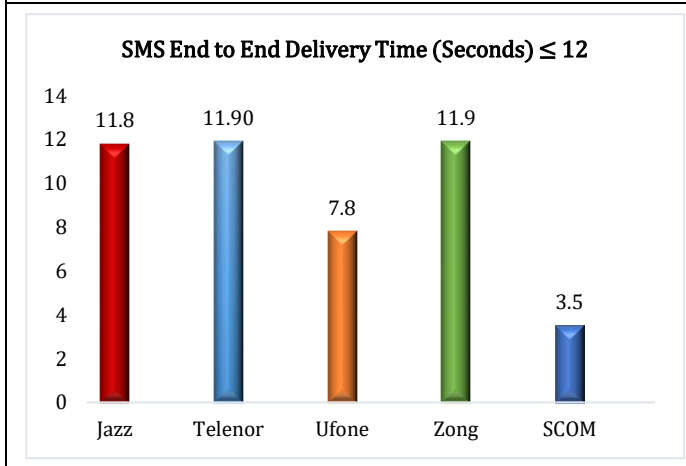
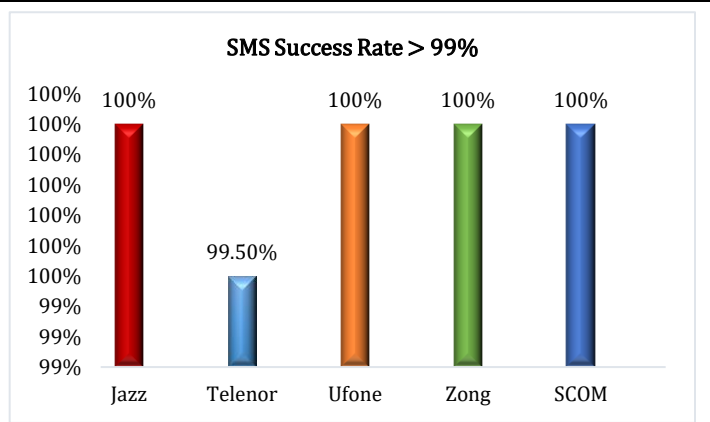
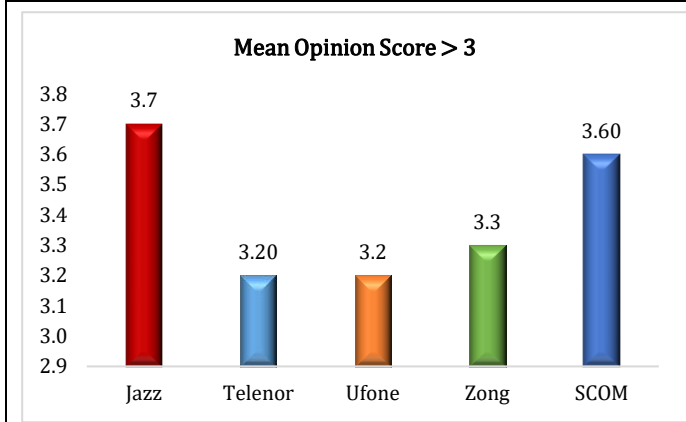
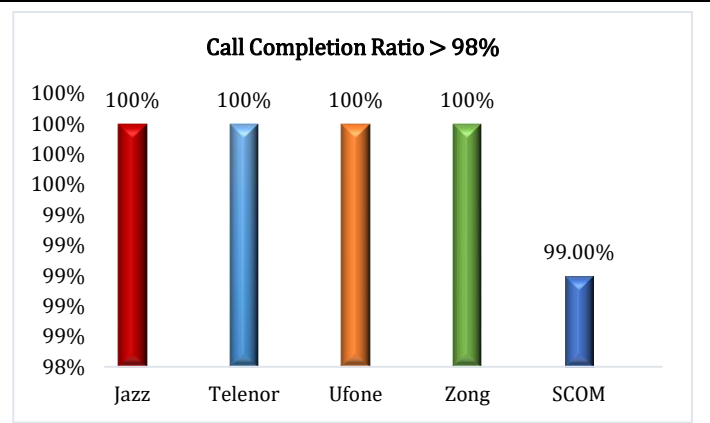
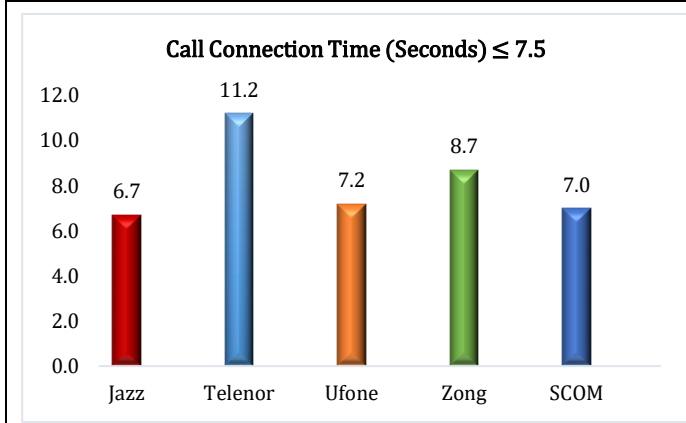
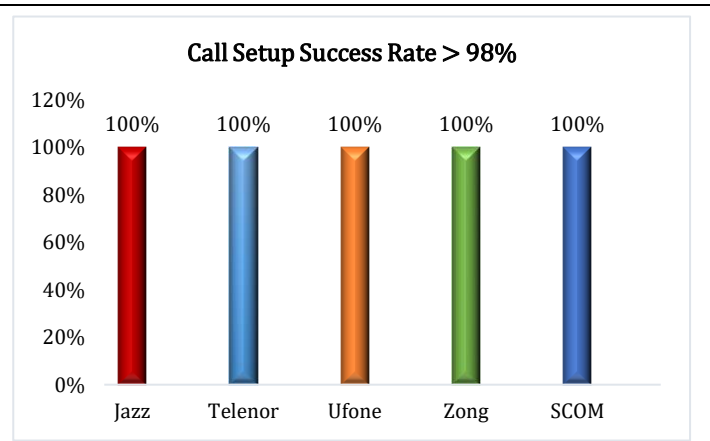
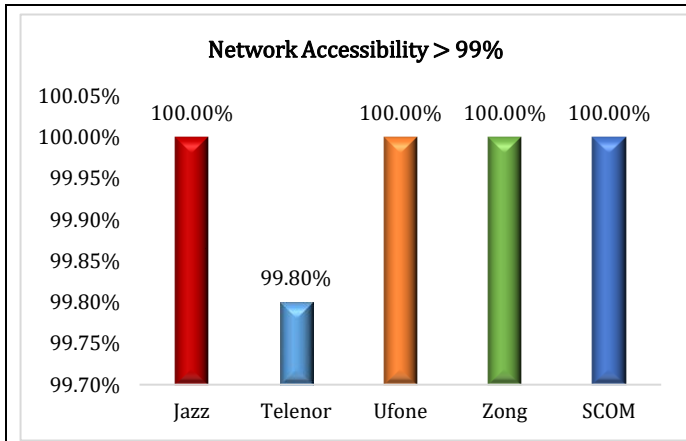
SMS Success Rate > 99%



SMS End to End Delivery Time (Seconds) ≤ 12

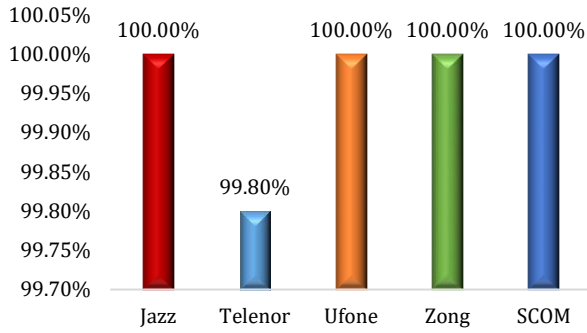


QUALITY OF SERVICE SURVEY RESULTS –SKARDU

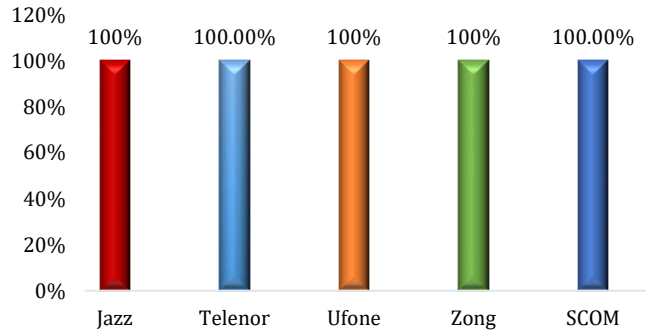


QUALITY OF SERVICE SURVEY RESULTS – SHIGAR

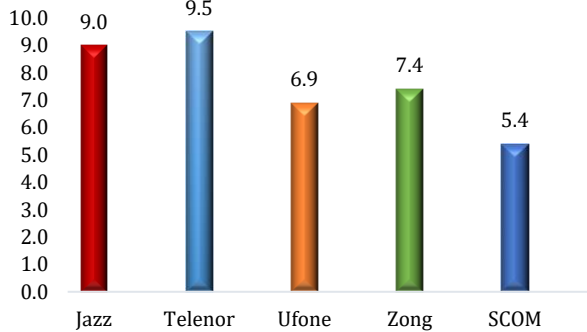
Network Accessibility > 99%



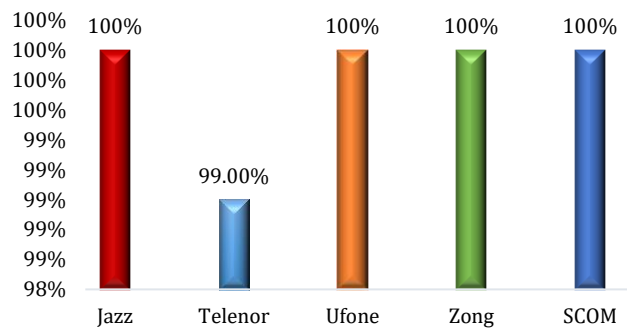
Call Setup Success Rate > 98%



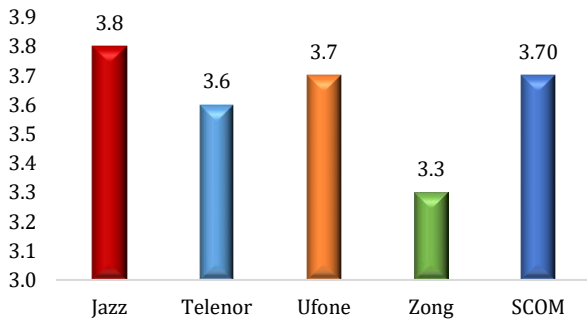
Call Connection Time (Seconds) ≤ 7.5



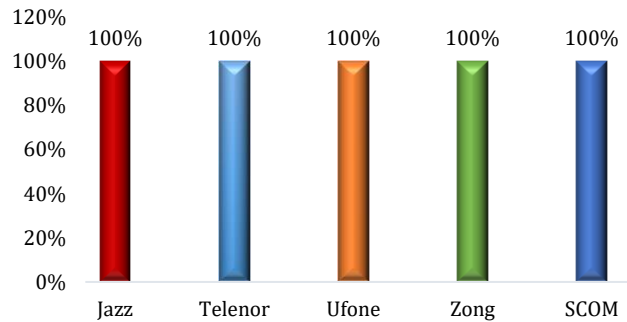
Call Completion Ratio > 98%



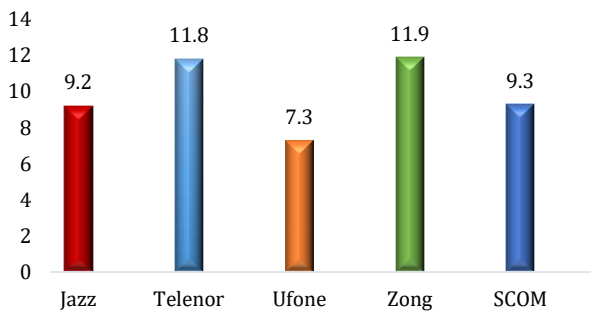
Mean Opinion Score > 3



SMS Success Rate > 99%

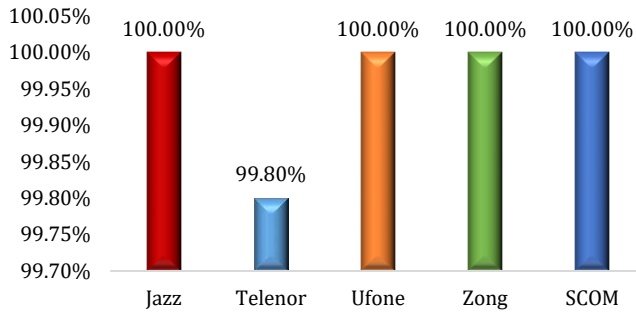


SMS End to End Delivery Time (Seconds) ≤ 12

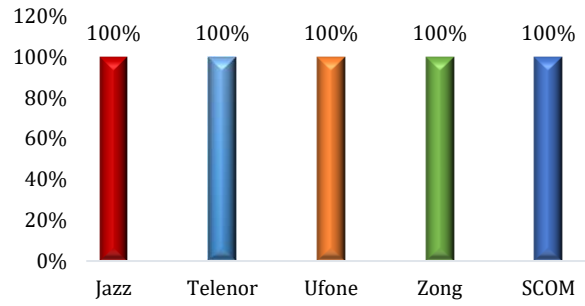


QUALITY OF SERVICE SURVEY RESULTS – KHAPLU

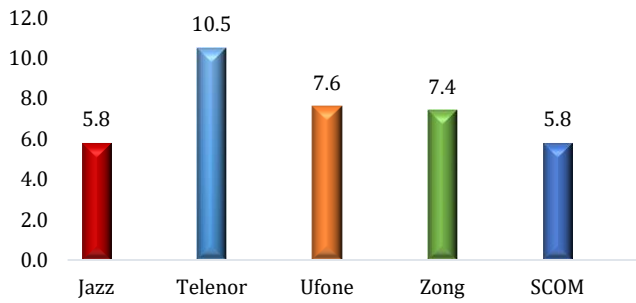
Network Accessibility > 99%



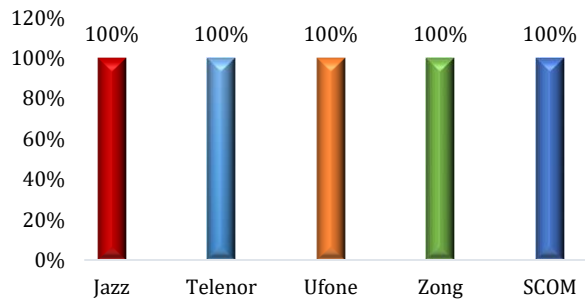
Call Setup Success Rate > 98%



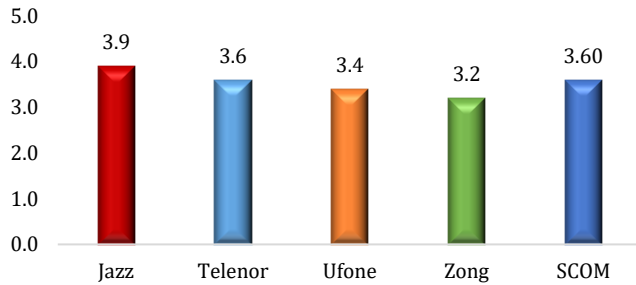
Call Connection Time (Seconds) ≤ 7.5



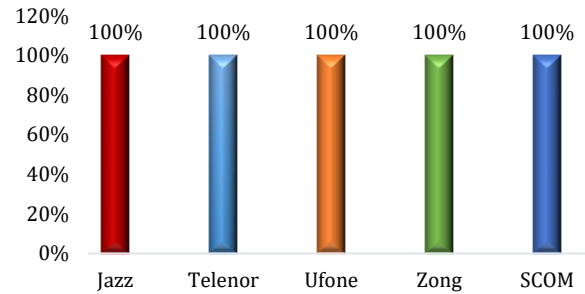
Call Completion Ratio > 98%



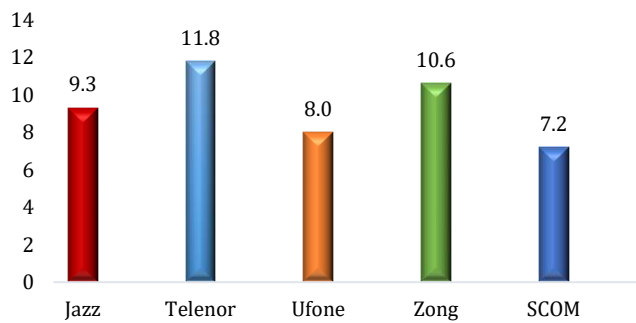
Mean Opinion Score > 3



SMS Success Rate > 99%



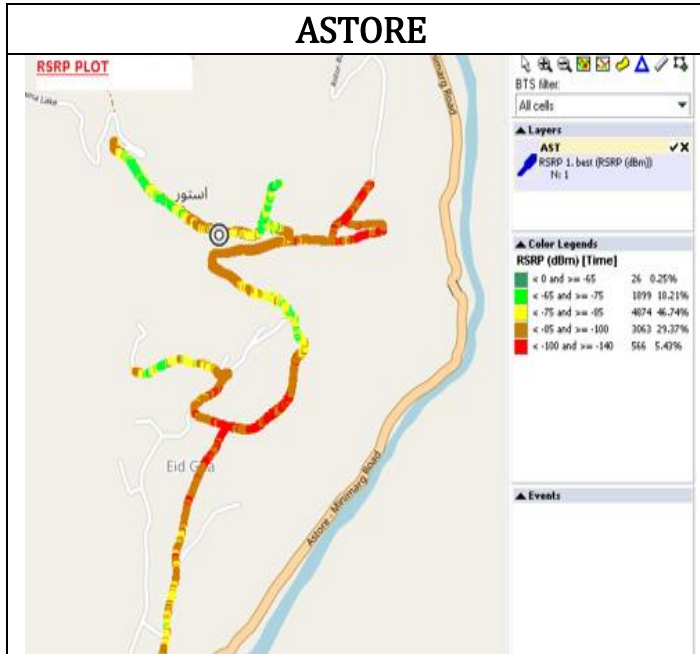
SMS End to End Delivery Time (Seconds) ≤ 12



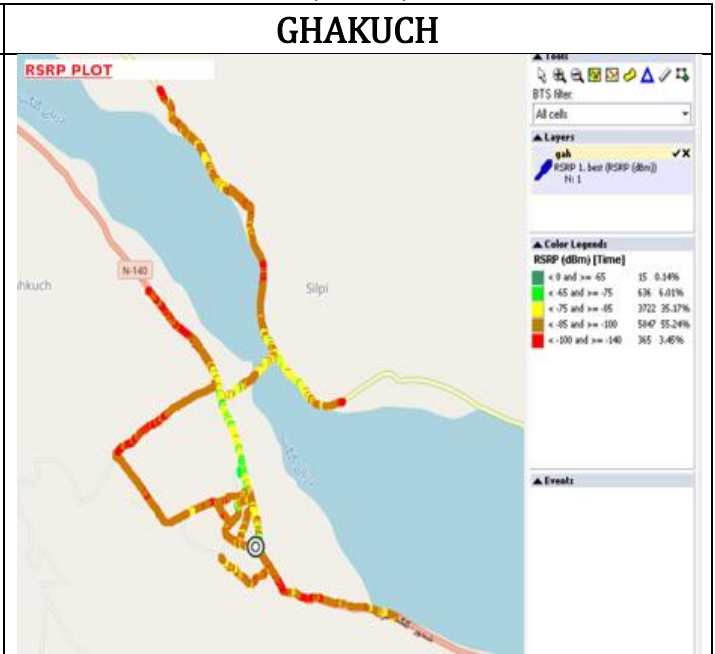
Annex-C (Data Coverage Maps)

4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

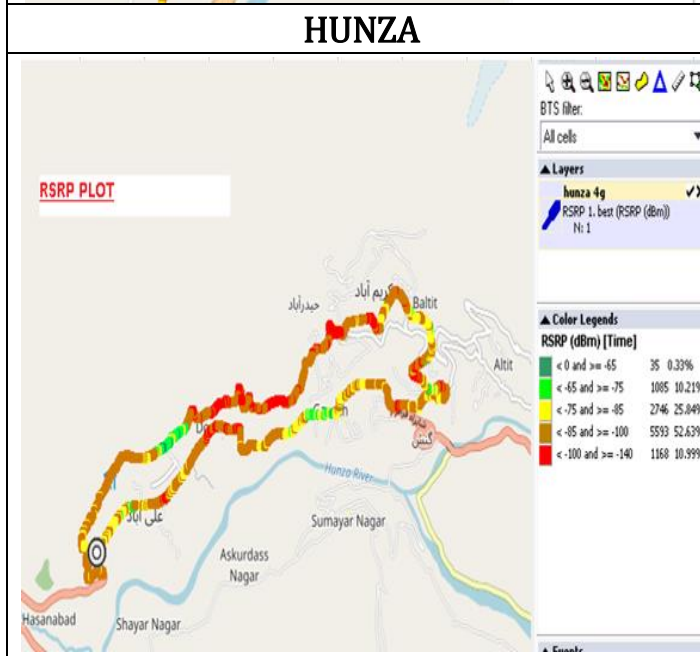
ASTORE



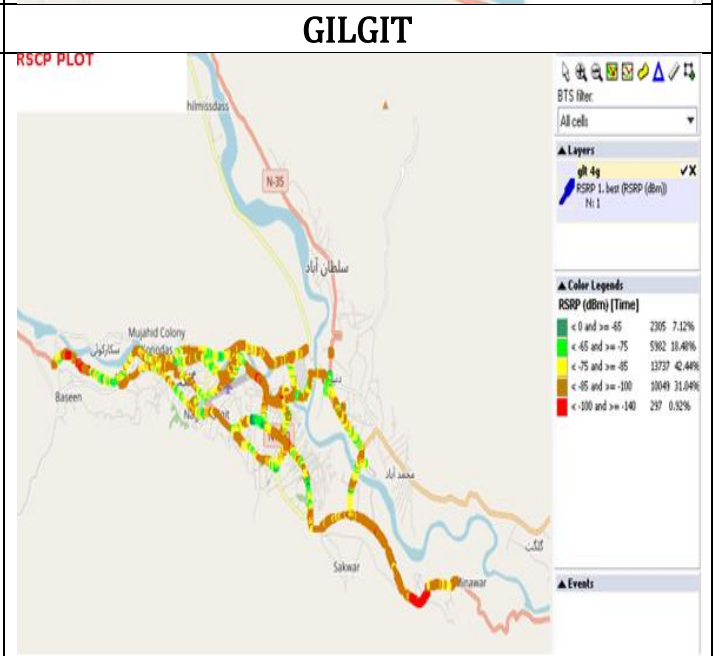
GHAKUCH



HUNZA

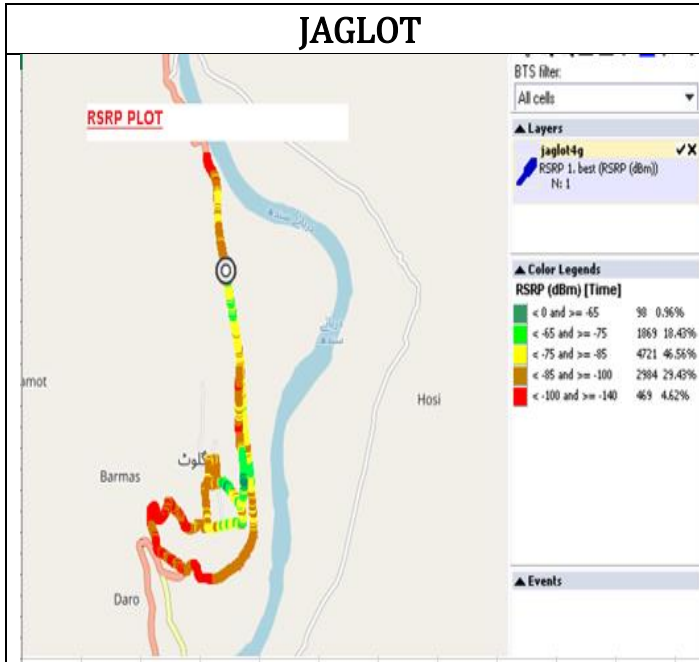


GILGIT

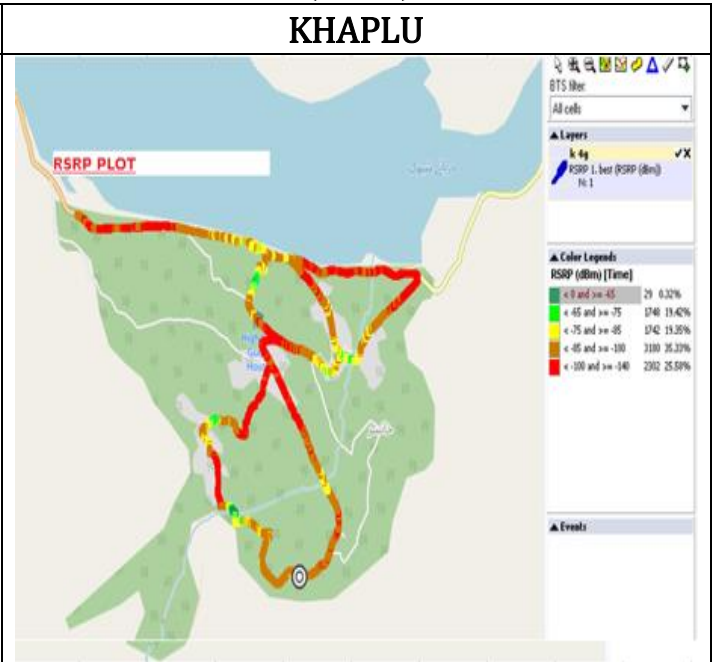


4G MOBILE COVERAGE – SIGNAL STRENGTH (RSRP)

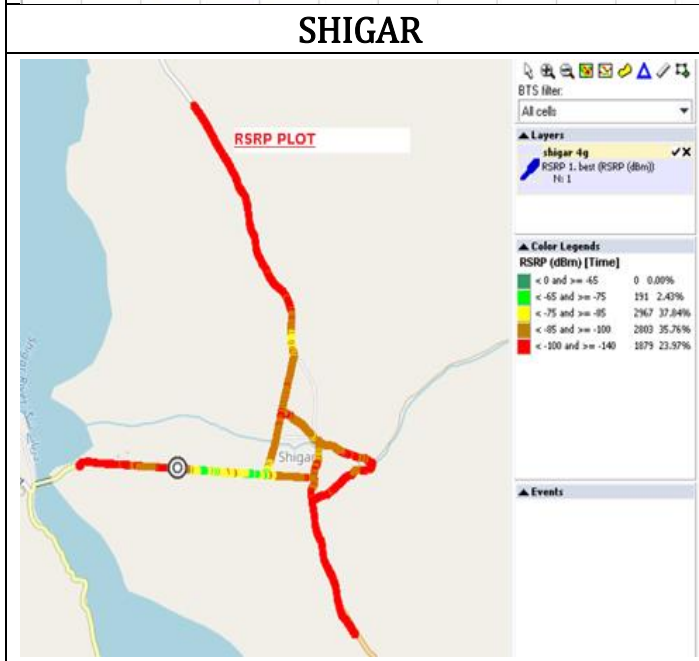
JAGLOT



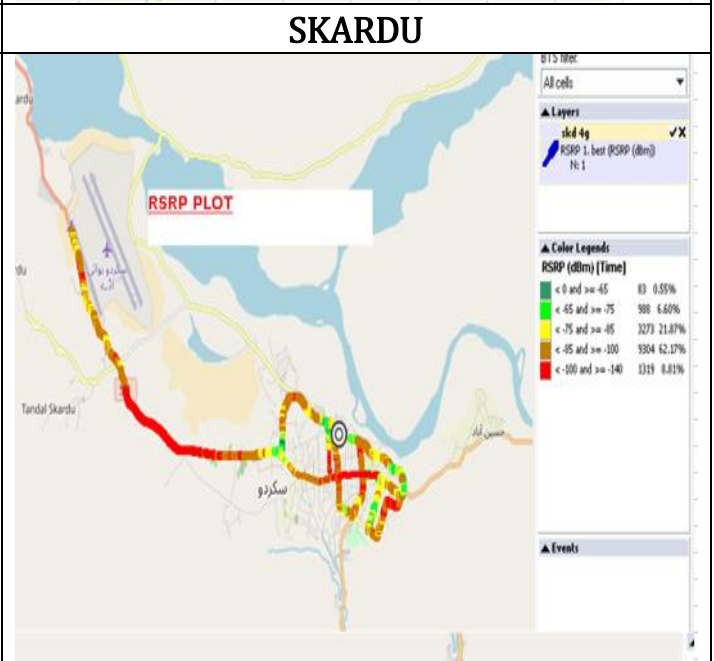
KHAPLU



SHIGAR

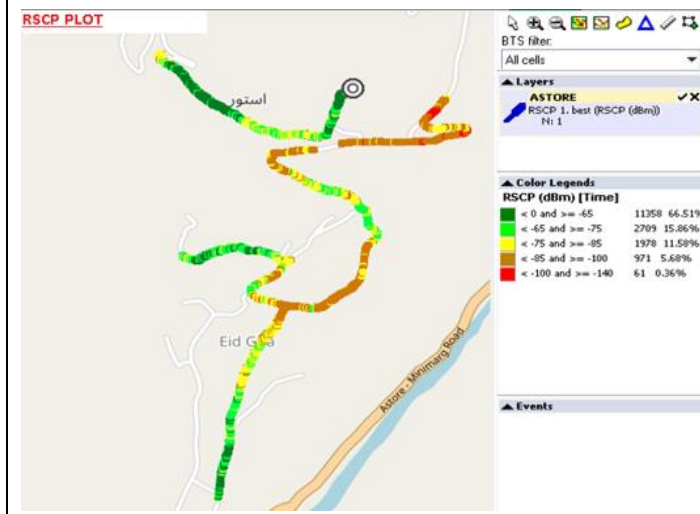


SKARDU

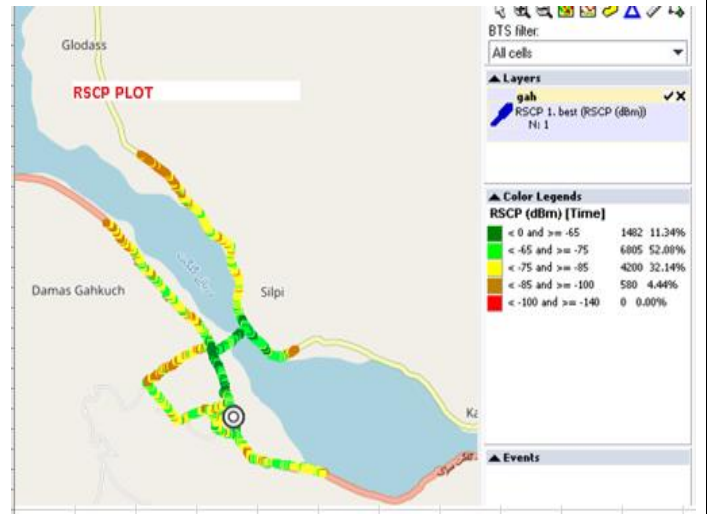


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

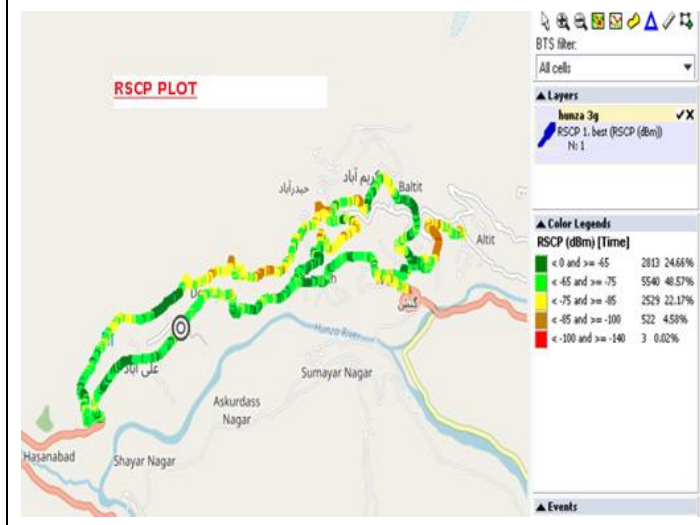
ASTORE



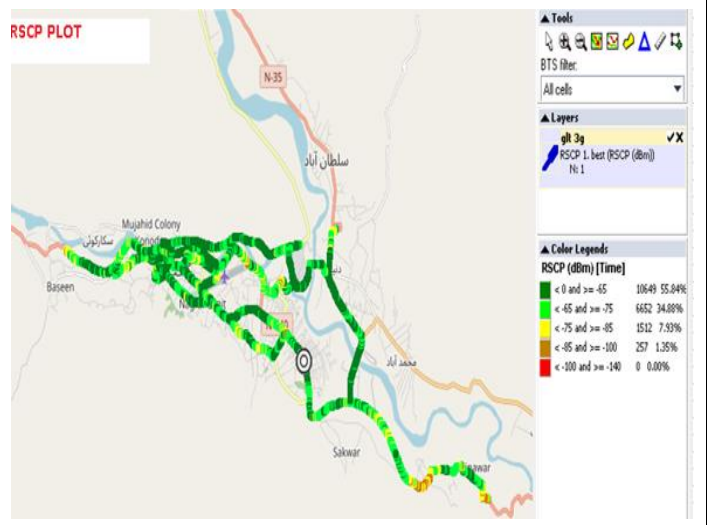
GHAKUCH



HUNZA

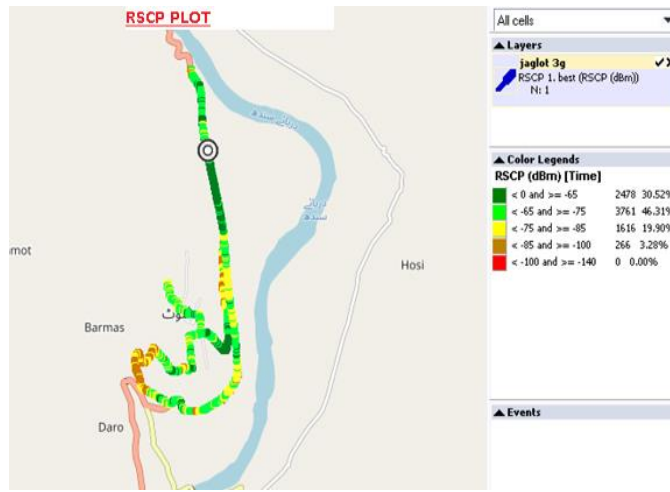


GILGIT

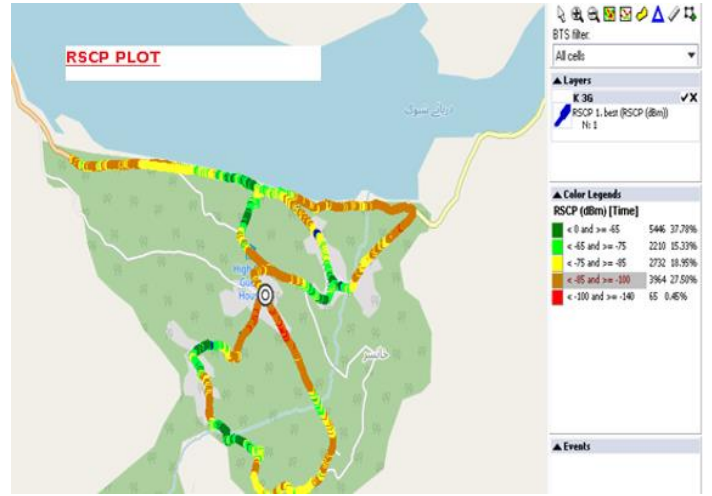


3G MOBILE COVERAGE – SIGNAL STRENGTH (RSCP)

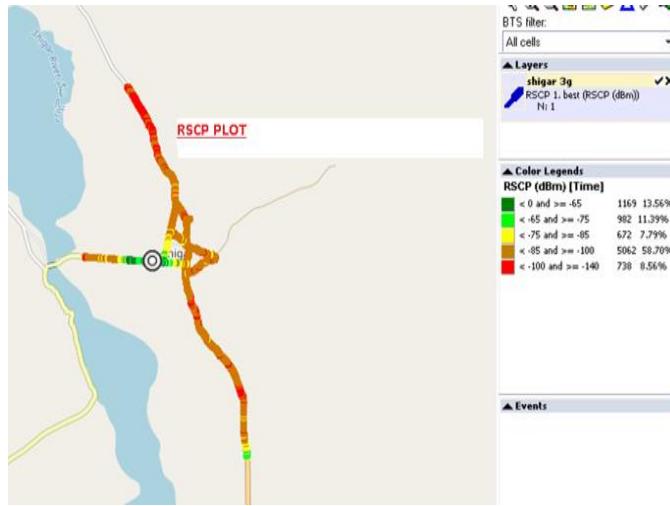
JAGLOT



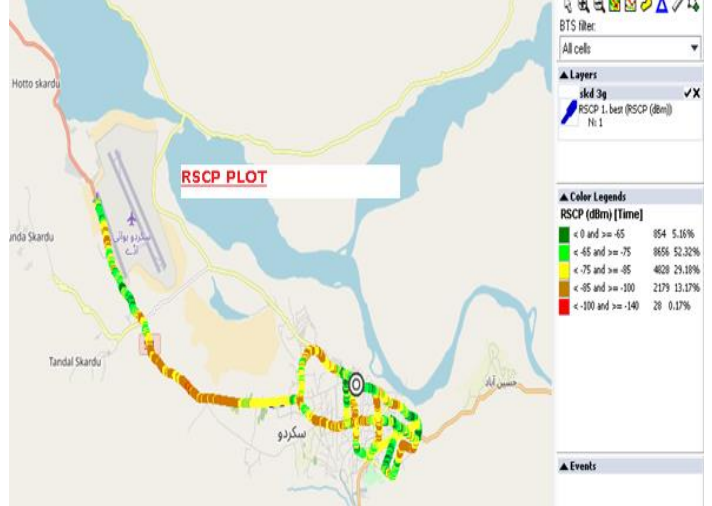
KHAPLU



SHIGAR



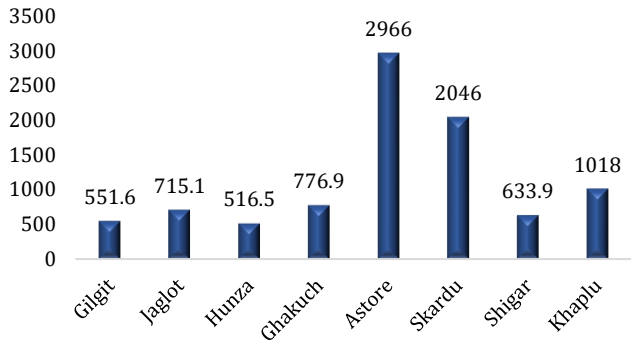
SKARDU



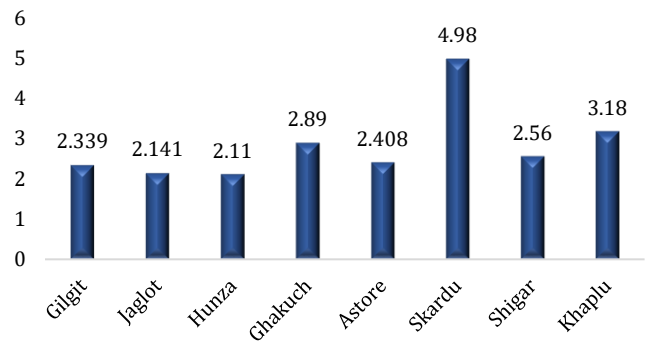
Annex-D (Data QoS KPI Graphs)

QUALITY OF SERVICE SURVEY RESULTS GILGIT BALTISTAN

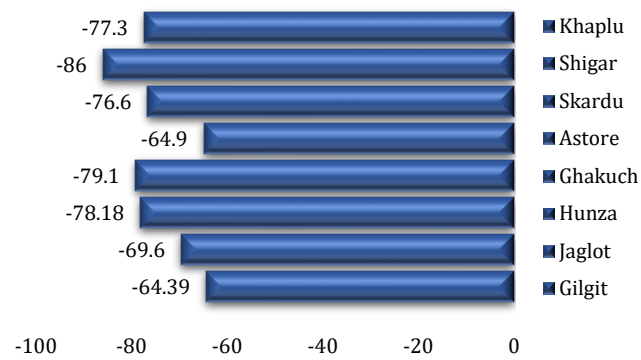
User Data Throughput (3G) > 256kbps



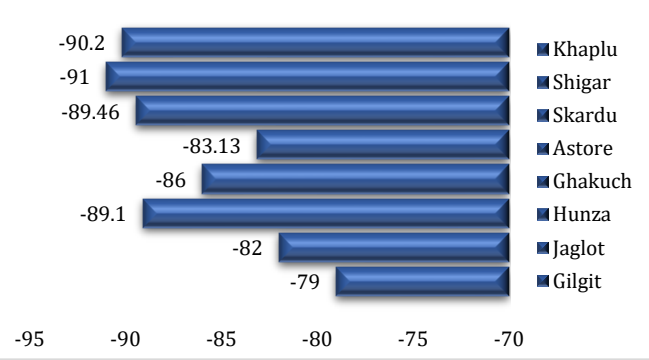
User Data Throughput (4G) > 2Mbps



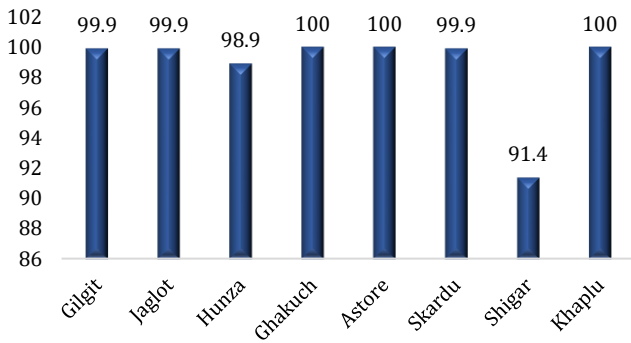
Signal Strength RSCP (3G)-100dBm



Signal Strength RSRP (4G) -100dBm



Signal Strength RSCP (3G) 90% Confidence Level



Signal Strength RSRP (4G) 90% Confidence Level

