# INDEPENDENT DRIVE TEST REPORT

*For*

# Haridwar & Rishikesh

## November 2018

## NORTH ZONE

**<u>Key Performance Indicators:</u> All TSPs have met the Drop Call Rate (DCR) benchmark of 2% except Tata 3G and Airtel VoLTE. All TSPs have met the Call Setup Success Rate (CSSR) of 95% except Tata 2G.**

The Independent Drive Test has been carried out by M/s PhiMetrics Technologies Pvt. Ltd. on behalf of TRAI in Haridwar & Rishikesh City & adjoining areas from 9:00 AM to 9:00 PM; 27th November to 29th November 2018. The drive test covered an drive route of 250 KMs & 6 hotspot over a period of 3 days. Approximately 425 calls were made for each of the 12 networks: five 2G networks, five 3G networks and two LTE network covering 6 unique TSPs

Overview | Voice Summary | Data Summary

# Overview

## Overview:

Telecom Regulatory Authority of India has been entrusted with the task of laying down the standards of quality of service to be provided by the service providers and ensuring its enforcement; and also TRAI is responsible for conducting the periodical audit of such services provided by the service providers so as to protect the interest of the consumers of telecommunications service

TRAI is regularly monitoring the performance of Telecom Service Providers (TSP) against the benchmarks for the various Quality of Service (QoS) parameters laid down by the Authority. TSPs submit Performance Monitoring Reports to TRAI every quarter. TRAI also undertakes audit and assessment of Quality of Service through independent agencies to verify the Quality of Service claimed. The Audit agencies conduct sample 'Drive tests' across various cities in the country as part of audit and assessment of the TSPs' performance.

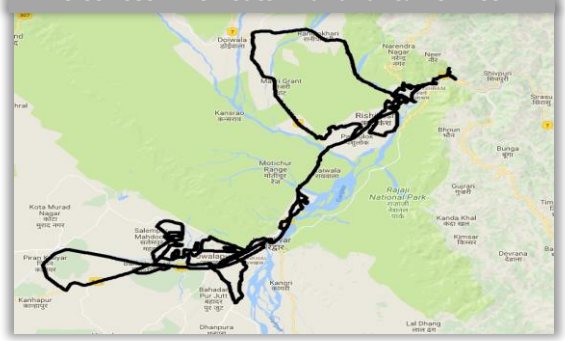
In view of complaints on call drops and other network quality issues, on behalf of TRAI, an Independent Drive Test (IDT) was conducted by PhiMetrics Technologies Pvt. Ltd. From **27th November to 29th November 2018** covering various locations in Haridwar & Rishikesh City & surrounding region. The performance of **Airtel, BSNL, Idea, Tata, Vodafone and Jio** were monitored across various technologies (2G, 3G, and 4G). The drive test route was defined on the basis of several factors that include - areas from where call drop complaints are commonly received; areas of heavy usage; residential areas away from arterial roads; office areas; areas where previous Drive tests showed network issues; etc.
The test results obtained from these drive tests were utilized to assess the network quality for Voice and Data services in terms of
**Voice:** Coverage, Quality, Handover Success Rate, Call Setup Success Rate, Drop Call Rate and Block Call Rate.
**Data:** Download and Upload Throughputs, Web Browsing Delay, Video Streaming Delay and Latency

## Drive Test Details For Haridwar & Rishikesh:

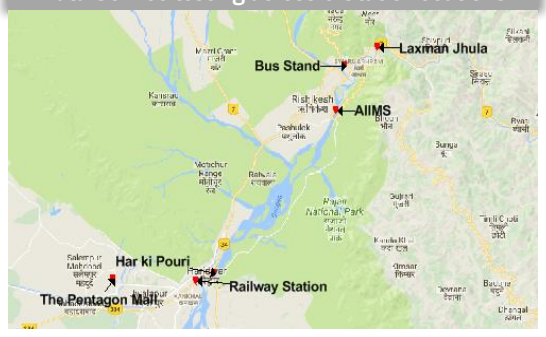
Independent Drive test was conducted for a period of 3 days from 27th November to 29th November 2018 in Haridwar & Rishikesh city & surrounding areas from 9:00 AM to 9:00 PM. Calls were made for 90 sec duration with wait time of 10 sec between calls in all technologies.
**Voice Tests:** The drive test covered a drive route of approximately 250 KMs over a period of 2 days from 27th November to 28th November 2018. Approximately 425 calls were made for each of the 12 networks: five 2G (Lock Mode) networks, five 3G (Free mode) networks and Two VoLTE network covering 6 unique TSPs.
* In case of multiple call failure in similar geo location in given period of 60secs has been counted as one call failure
**Data Tests:** Data Tests were performed at 6 static locations for 1 day on 29th November 2018; five 2G (Lock mode) networks, five 3G (Dual mode) networks and Four 4G (Free mode) networks covering 6 unique TSPs were tested.
* For Voice and Data KPI's, 2G measurement is done with UE locked on 2G, 3G measurement is done with UE in Dual mode (2G & 3G) and 4G measurement is done with UE in Free Mode.
* 3G KPI's which are calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.
* 4G KPI's which are calculated from the UE in Free Mode included samples and events of 2G & 3G.

| Service | Specifications |
|---|---|
| Download | 2G (Locked) - 500KB, 3G (Dual) - 20 MB, 4G (Free) - 40 MB |
| Upload | 2G (Locked) - 100KB, 3G (Dual) - 5 MB, 4G (Free) - 10 MB |
| Web Browsing | 3 links of e/m commerce website www.amazon.in, www.flipkart.com and PayTm |
| Video Streaming | 130 sec clip |
| Latency | 32 Bytes on www.google.com |

Voice Test Drive Route - Haridwar & Rishikesh



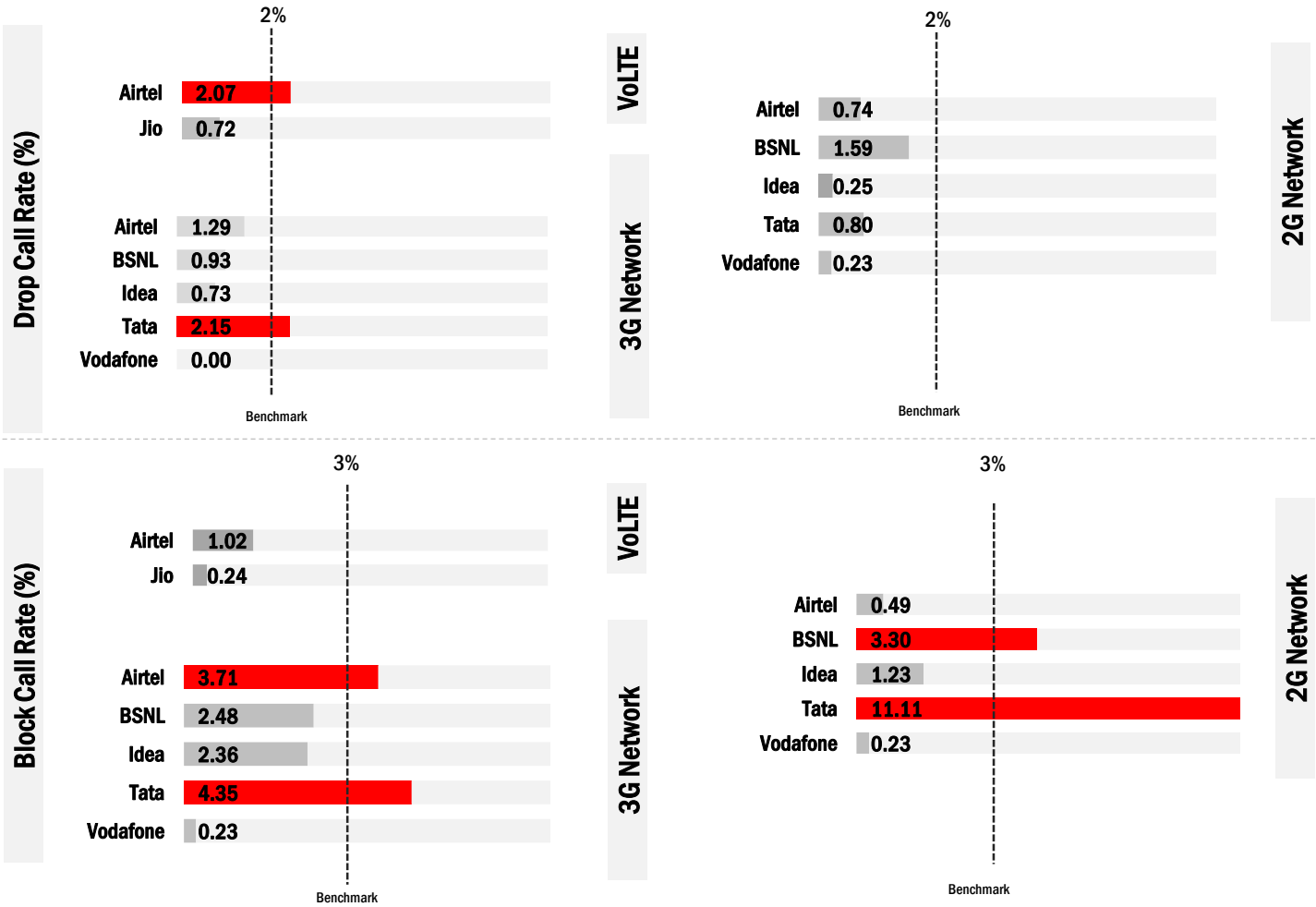
Data Service testing across 6 Static Locations



# Voice Calls

## Key Observations

**QoS compliance** of the TSPs in Haridwar & Rishikesh for Voice across technologies 2G/3G/4G-VoLTE is given below:




| KPI | 2G Networks | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| SDCCH Congestion% | 0.00% | 1.32% | 1.23% | 0.00% | 0.23% |
| TCH Congestion % | 0.49% | 1.98% | 0.00% | 11.11% | 0.00% |

| KPI | 3G Networks | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| CSFB Failure % | 0.50% | NA | 0.00% | NA | 0.00% |
| SDCCH Congestion% | 0.00% | 0.45% | 0.00% | 0.00% | 0.00% |
| RRC Congestion% | 0.99% | 0.23% | 1.89% | 0.46% | 0.23% |
| SDCCH & RRC Congestion% | 0.99% | 0.68% | 1.89% | 0.46% | 0.23% |
| TCH Congestion % | 0.00% | 1.81% | 0.24% | 0.92% | 0.00% |
| RAB Congestion % | 2.23% | 0.00% | 0.24% | 2.97% | 0.00% |
| TCH & RAB Congestion % | 2.23% | 1.81% | 0.47% | 3.89% | 0.00% |

a) All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%) except Tata 3G and Airtel VoLTE.

b) Call Block Rate (CBR%) benchmark of 3% was achieved by all TSP's except BSNL 2G ,Tata 2G, Airtel 3G and Tata 3G.

c) NA (Not Applicable ) in CSFB failure for those TSP ,doesn't have 4G technology.

Not meeting Benchmark

# Voice Calls

## Key Observations

### Coverage

a) Percentage of coverage samples for 2G ≥ -85 dBm.

| TSPs | 2G | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| Coverage% | 88.25% | 62.90% | 89.33% | 86.95% | 92.06% |

b) Percentage of coverage samples for 2G ≥ -85 dBm, 3G ≥ -90 dBm & VoLTE ≥ -110 dBm.

| TSPs | 3G | | | | | VoLTE | |
|---|---|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone | Airtel | Jio |
| Coverage % | 76.24% | 78.78% | 94.70% | 87.41% | 92.48% | 91.16% | 95.54% |

c) Percentage of time spent on 3G network:

| TSPs | 3G | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| Time Spent on 3G% | 73.43% | 44.80% | 82.32% | 77.65% | 80.82% |

d) Percentage of RLT >=48:

| TSPs | 2G | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| %RLT >=48 | 0.00% | 5.42% | 0.00% | 0.00% | 0.00% |

e) Average CST Second

| TSPs | 2G | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| CST(sec) | 0.00% | 5.42% | 0.00% | 0.00% | 0.00% |

| TSPs | 3G | | | | | VOLTE | |
|---|---|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone | Airtel | Jio |
| CST(sec) | 5.77 | 2.47 | 2.82 | 4.14 | 2.91 | 2.13 | 0.48 |

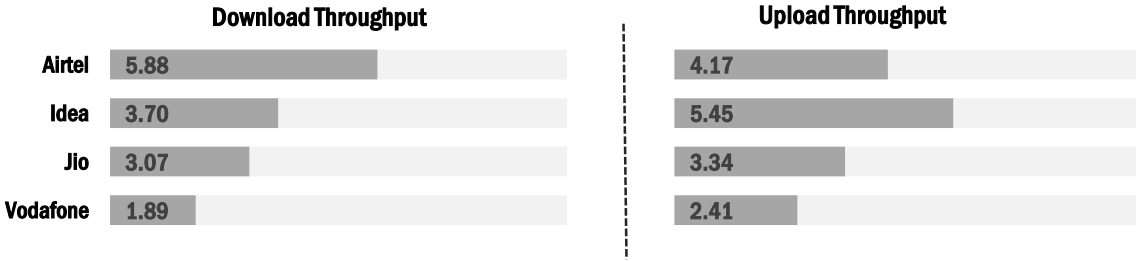
# Data Services Static

## Key Observations

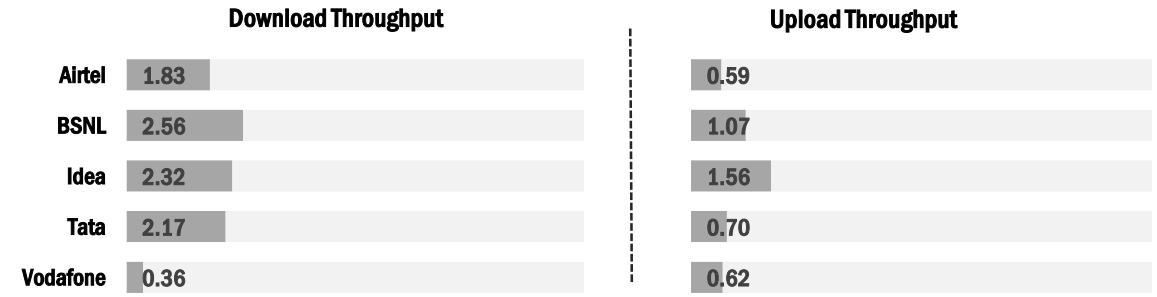
Data was tested at 6 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), Video Streaming (YouTube) and Web browsing (Flipkart, Amazon, PayTm)

### Data Download and Upload Performance (Mbps)

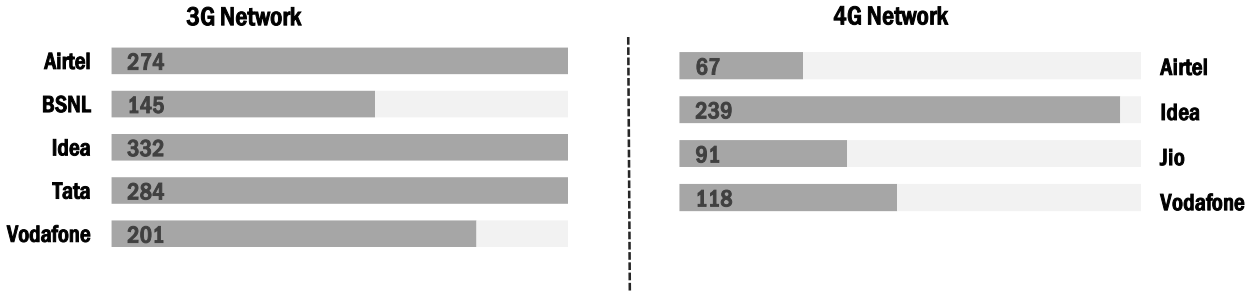
#### 4G Network:




#### 3G Network:




### Latency (msec)

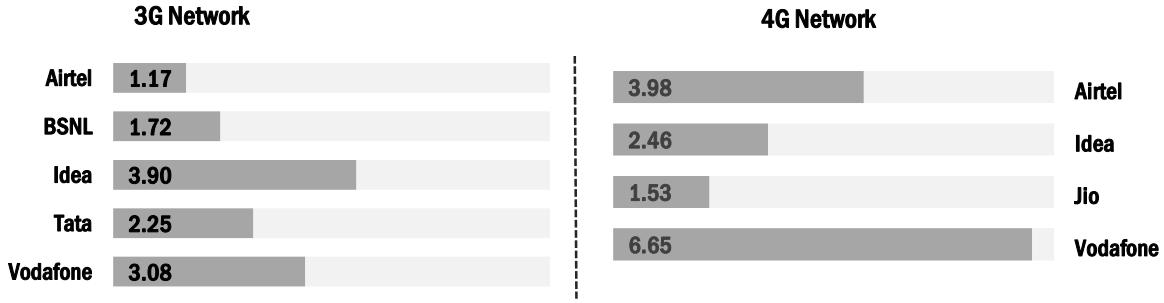


# Data Services Static

## Key Observations

### Video Streaming Performance (130 sec YouTube video sample sizes)

Streaming (sec)

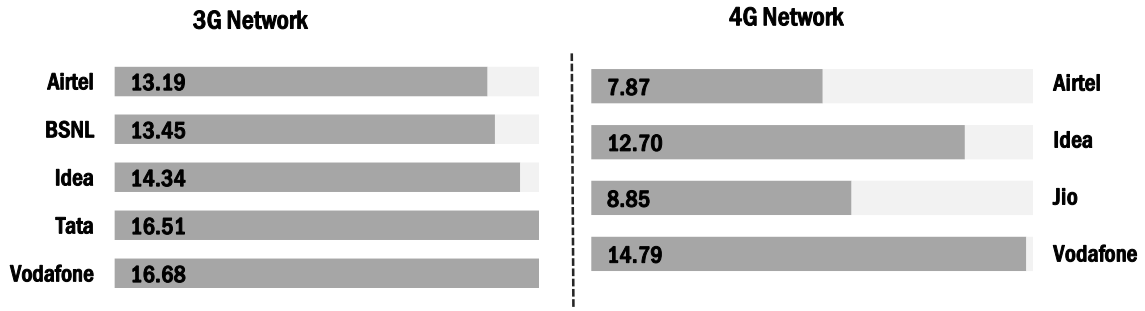



Streaming Delay further broken into 2 parameters which form the end-user perception to assess consistency on Video streaming.

- Initial Start time
- Interruption time while playing the video.

| Video Streaming | 3G | | | | | 4G | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone | Airtel | Idea | Jio | Vodafone |
| Avg. Initial Start Time (sec) | 1.17 | 1.72 | 2.97 | 1.85 | 3.08 | 2.13 | 1.94 | 1.43 | 3.83 |
| Avg. Interruption Time (sec) | | | 0.93 | 0.40 | | 1.85 | 0.52 | 0.10 | 2.82 |

### Web Page Download Time (sec)




Web browsing experience is the average time taken to fully load the websites tested.

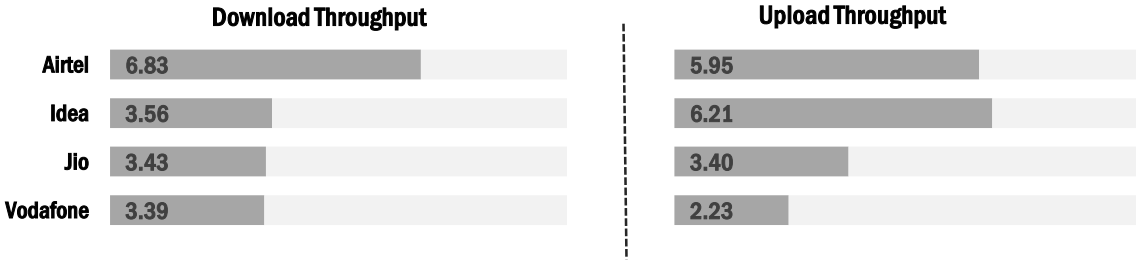
# Data Services Dynamic

## Key Observations

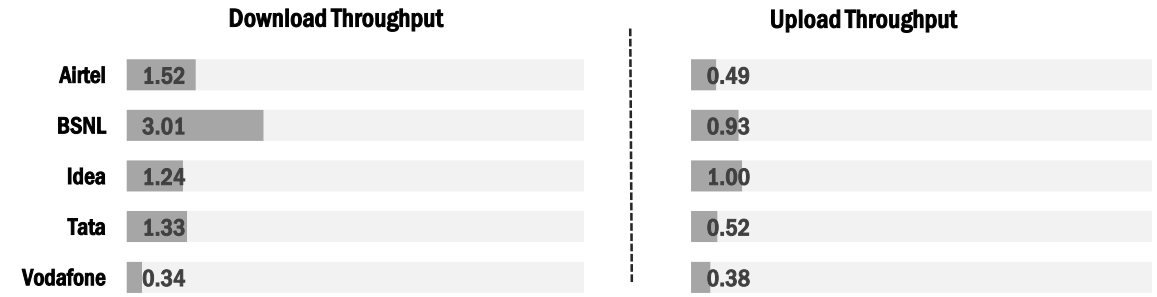
Data was tested between one location to another location .Following services were tested: Data Download/Upload, Latency (www.google.com), Video Streaming (YouTube) and Web browsing (Flipkart, Amazon, PayTm)

### Data Download and Upload Performance (Mbps)

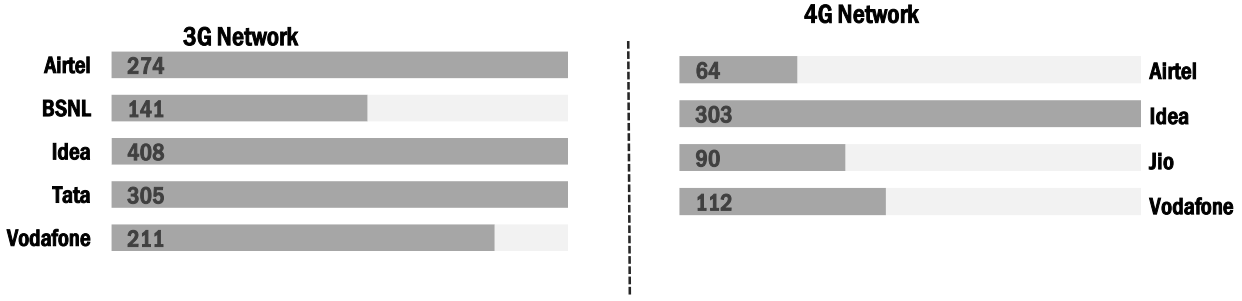
#### 4G Network:




#### 3G Network:




### Latency (msec)

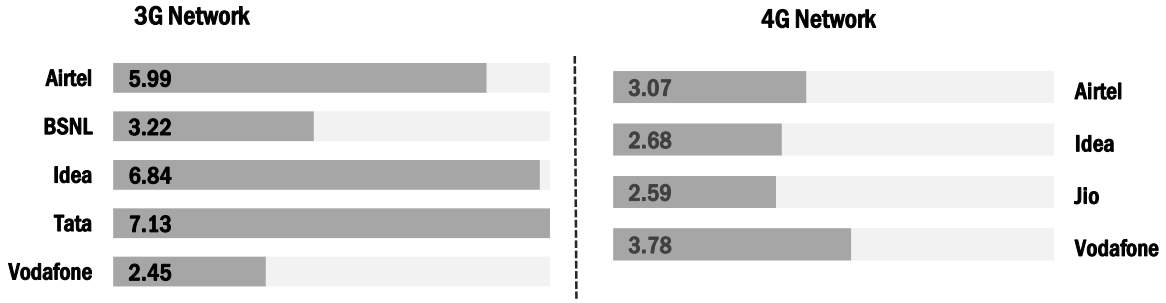


# Data Services Dynamic

## Key Observations

### Video Streaming Performance (130 sec YouTube video sample sizes)

Streaming (sec)

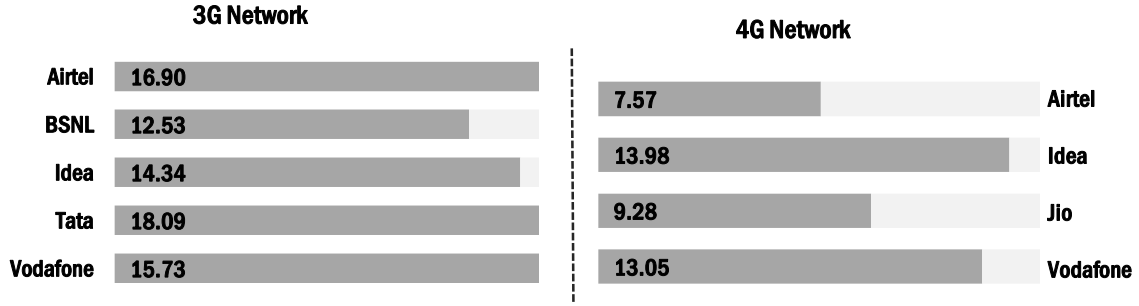



Streaming Delay further broken into 2 parameters which form the end-user perception to assess consistency on Video streaming.

- Initial Start time
- Interruption time while playing the video.

| Video Streaming | 3G | | | | | 4G | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone | Airtel | Idea | Jio | Vodafone |
| Avg. Initial Start Time (sec) | 3.58 | 2.89 | 5.39 | 3.33 | 2.45 | 2.02 | 1.94 | 2.59 | 2.99 |
| Avg. Interruption Time (sec) | 2.41 | 0.33 | 1.45 | 3.80 | | 1.05 | 0.74 | | 0.79 |

### Web Page Download Time (sec)




Web browsing experience is the average time taken to fully load the websites tested.

# Summary

## City Level Summary

| Voice Call | 2G | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| Call Attempt | 407 | 454 | 408 | 423 | 436 |
| Blocked Call Rate (%) | 0.49% | 3.30% | 1.23% | 11.11% | 0.23% |
| CSSR% (Accessibility) | 99.51% | 96.70% | 98.77% | 88.89% | 99.77% |
| Drop Call Rate (%) | 0.74% | 1.59% | 0.25% | 0.80% | 0.23% |
| Mobility HOSR (%) | 98.79% | 92.54% | 97.80% | 99.56% | 97.61% |
| Rx Quality (%) | 98.17% | 98.09% | 96.96% | 97.72% | 98.94% |

| Voice Call | 3G | | | | | VoLTE | |
|---|---|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone | Airtel | Jio |
| Call Attempt | 404 | 443 | 423 | 437 | 430 | 391 | 417 |
| Blocked Call Rate (%) | 3.71% | 2.48% | 2.36% | 4.35% | 0.23% | 1.02% | 0.24% |
| CSSR% (Accessibility) | 96.29% | 97.52% | 97.64% | 95.65% | 99.77% | 98.98% | 99.76% |
| Drop Call Rate (%) | 1.29% | 0.93% | 0.73% | 2.15% | 0.00% | 2.07% | 0.72% |
| Mobility HOSR (%) | 99.93% | 95.46% | 99.97% | 99.78% | 99.93% | 99.71% | 99.16% |
| Rx Quality (%) | 87.55% | 98.39% | 79.14% | 91.19% | 94.89% | 82.57% | 79.99% |

# Summary

## City Level Summary(contd.)

| Data Services Static | 2G | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| Download Throughput (Kbps) | 106.28 | 92.14 | 112.01 | 93.86 | 125.36 |
| Upload Throughput (kbps) | 150.10 | 93.14 | 130.08 | 102.62 | 130.82 |
| Web Browsing Delay (sec) | 30.65 | 44.42 | 40.44 | 30.21 | 29.04 |
| Latency (msec) | 207 | 334 | 579 | 229 | 316 |

| Data Services Static | 3G | | | | | 4G | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone | Airtel | Idea | Jio | Vodafone |
| Download Throughput (Mbps) | 1.83 | 2.56 | 2.32 | 2.17 | 0.36 | 5.88 | 3.70 | 3.07 | 1.89 |
| Upload Throughput (Mbps) | 0.59 | 1.07 | 1.56 | 0.70 | 0.62 | 4.17 | 5.45 | 3.34 | 2.41 |
| Web Browsing Delay (sec) | 13.19 | 13.45 | 14.34 | 16.51 | 16.68 | 7.87 | 12.70 | 8.85 | 14.79 |
| Video Streaming Delay (sec) | 1.17 | 1.72 | 3.90 | 2.25 | 3.08 | 3.98 | 2.46 | 1.53 | 6.65 |
| Latency (msec) | 274 | 145 | 332 | 284 | 201 | 67 | 239 | 91 | 118 |

| Data Services Dynamic | 3G | | | | | 4G | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone | Airtel | Idea | Jio | Vodafone |
| Download Throughput (Mbps) | 1.52 | 3.01 | 1.24 | 1.33 | 0.34 | 6.83 | 3.56 | 3.43 | 3.39 |
| Upload Throughput (Mbps) | 0.49 | 0.93 | 1.00 | 0.52 | 0.38 | 5.95 | 6.21 | 3.40 | 2.23 |
| Web Browsing Delay (sec) | 16.90 | 12.53 | 14.34 | 18.09 | 15.73 | 7.57 | 13.98 | 9.28 | 13.05 |
| Video Streaming Delay (sec) | 5.99 | 3.22 | 6.84 | 7.13 | 2.45 | 3.07 | 2.68 | 2.59 | 3.78 |
| Latency (msec) | 274 | 141 | 408 | 305 | 211 | 64 | 303 | 90 | 112 |

a) TO (Timeout) for Failed data test .

# Summary

## City Level Summary(contd.)

| AIIMS | 2G | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| Download Throughput (Kbps) | 130.80 | 112.17 | 157.75 | 104.46 | 157.75 |
| Upload Throughput (kbps) | 204.75 | 139.63 | 132.23 | 134.34 | 131.52 |
| Web Browsing Delay (sec) | 31.94 | 45.58 | 28.97 | 34.10 | 27.98 |
| Latency (msec) | 187 | 171 | TO | 219 | 347 |

| AIIMS | 3G | | | | | 4G | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone | Airtel | Idea | Jio | Vodafone |
| Download Throughput (Mbps) | 0.34 | 4.47 | 1.25 | 0.98 | TO | 7.41 | 1.06 | 0.39 | 0.35 |
| Upload Throughput (Mbps) | 0.26 | 1.69 | 0.52 | 0.47 | 0.03 | 8.94 | 1.42 | 0.28 | 0.15 |
| Web Browsing Delay (sec) | 13.39 | 12.19 | 15.81 | 17.07 | 11.50 | 8.85 | 16.85 | 15.67 | 22.64 |
| Video Streaming Delay (sec) | TO | 1.76 | TO | 4.02 | TO | 1.28 | 13.66 | TO | TO |
| Latency (msec) | 277 | 199 | 349 | 280 | TO | 65 | TO | 356 | 167 |

| Har ki Pouri | 2G | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| Download Throughput (Kbps) | 86.40 | 78.64 | 84.26 | 76.05 | 61.56 |
| Upload Throughput (kbps) | 114.52 | 94.39 | 89.12 | 80.10 | 90.40 |
| Web Browsing Delay (sec) | 30.30 | 60.26 | 50.62 | 35.22 | 23.99 |
| Latency (msec) | 234 | 435 | 715 | 216 | 794 |

| Har ki Pouri | 3G | | | | | 4G | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone | Airtel | Idea | Jio | Vodafone |
| Download Throughput (Mbps) | 0.31 | 5.84 | 3.64 | 0.59 | 0.20 | 0.72 | 2.59 | 2.87 | 1.12 |
| Upload Throughput (Mbps) | 0.67 | 1.19 | 2.01 | 0.52 | 0.03 | 1.82 | 2.86 | 0.67 | 1.28 |
| Web Browsing Delay (sec) | 15.57 | 8.72 | 10.82 | 18.75 | 16.70 | 5.17 | 10.92 | 9.54 | 15.00 |
| Video Streaming Delay (sec) | TO | 0.97 | 3.65 | TO | 3.51 | 18.84 | 1.37 | 2.19 | 5.25 |
| Latency (msec) | 270 | 105 | 330 | 145 | 170 | 85 | 347 | 65 | 180 |

# Summary

## City Level Summary(contd.)

| Laxman Jhula | 2G | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| Download Throughput (Kbps) | 93.09 | 143.79 | 169.07 | 84.41 | 100.69 |
| Upload Throughput (kbps) | 154.18 | 125.90 | 145.44 | 80.92 | 120.65 |
| Web Browsing Delay (sec) | 30.06 | 47.94 | 45.92 | 30.44 | 30.21 |
| Latency (msec) | 232 | 195 | 522 | 290 | 235 |

| Laxman Jhula | 3G | | | | | 4G | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone | Airtel | Idea | Jio | Vodafone |
| Download Throughput (Mbps) | 1.60 | 2.45 | 0.31 | 3.32 | 0.30 | 13.30 | 0.50 | 6.27 | 3.73 |
| Upload Throughput (Mbps) | 0.49 | 1.75 | 1.38 | 0.72 | 0.05 | 6.05 | 6.96 | 7.27 | 0.19 |
| Web Browsing Delay (sec) | 12.74 | 10.24 | 17.06 | 14.93 | 18.73 | 6.15 | 15.05 | 7.35 | 14.96 |
| Video Streaming Delay (sec) | 1.09 | 2.03 | 12.98 | 2.01 | 12.25 | 0.98 | 1.70 | 0.90 | 5.19 |
| Latency (msec) | 289 | 92 | 319 | 304 | 286 | 72 | 221 | 66 | 117 |

| Haridwar Railway Station | 2G | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| Download Throughput (Kbps) | 93.13 | 35.71 | 104.86 | 92.04 | 170.04 |
| Upload Throughput (kbps) | 139.46 | 60.61 | 152.19 | 112.54 | 159.38 |
| Web Browsing Delay (sec) | 38.19 | 25.72 | 43.15 | 33.26 | 27.70 |
| Latency (msec) | 268 | 735 | 616 | 238 | 176 |

| Haridwar Railway Station | 3G | | | | | 4G | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone | Airtel | Idea | Jio | Vodafone |
| Download Throughput (Mbps) | 3.45 | 0.21 | 1.56 | 2.85 | 0.81 | 7.84 | 3.15 | 2.31 | 3.33 |
| Upload Throughput (Mbps) | 0.68 | 0.08 | 1.10 | 0.71 | 2.22 | 0.34 | 4.49 | 4.09 | 5.38 |
| Web Browsing Delay (sec) | 12.33 | 21.49 | 14.52 | 16.49 | 17.04 | 9.13 | 11.49 | 8.24 | 11.82 |
| Video Streaming Delay (sec) | 1.27 | TO | 2.06 | 1.41 | 1.64 | 1.21 | 2.72 | 3.09 | 1.80 |
| Latency (msec) | 299 | 123 | 335 | 117 | 202 | 74 | 332 | 71 | 90 |

# Summary

## City Level Summary(contd.)

| The Pentagon Mall | 2G | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| Download Throughput (Kbps) | 163.20 | 19.24 | 108.58 | 144.26 | 112.27 |
| Upload Throughput (kbps) | 146.11 | 26.32 | 115.55 | 92.86 | 133.33 |
| Web Browsing Delay (sec) | 30.13 | 40.10 | 31.98 | 26.53 | 30.82 |
| Latency (msec) | 155 | 603 | 490 | 180 | 160 |

| The Pentagon Mall | 3G | | | | | 4G | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone | Airtel | Idea | Jio | Vodafone |
| Download Throughput (Mbps) | 4.71 | 0.22 | 5.69 | 4.77 | 0.27 | 1.99 | 8.41 | 4.53 | 1.43 |
| Upload Throughput (Mbps) | 1.09 | 0.08 | 3.43 | 1.19 | 1.11 | 5.02 | 8.71 | 4.09 | 2.76 |
| Web Browsing Delay (sec) | 12.20 | 21.78 | 12.69 | 15.08 | 16.46 | 8.96 | 12.01 | 7.62 | 12.77 |
| Video Streaming Delay (sec) | 1.15 | TO | 0.97 | 1.34 | 1.31 | 3.73 | 0.83 | 0.75 | 10.24 |
| Latency (msec) | 279 | 172 | 335 | 396 | 159 | 73 | 143 | 69 | 82 |

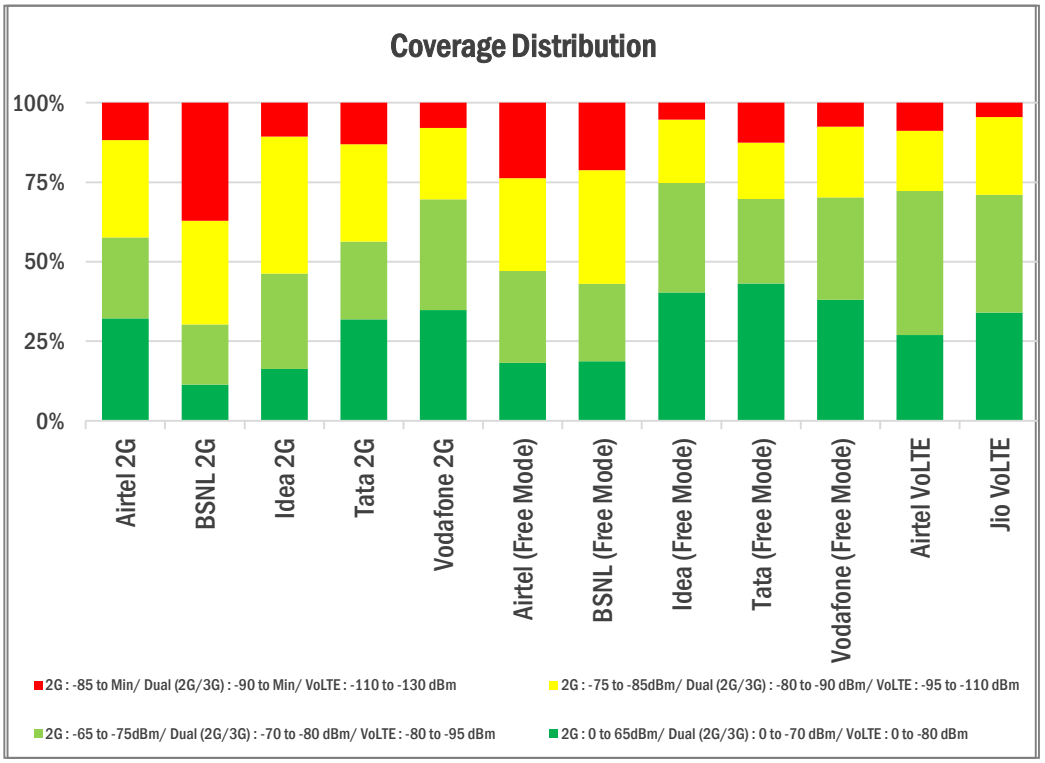
| Rishikesh Bus Stand | 2G | | | | |
|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone |
| Download Throughput (Kbps) | 71.08 | 114.69 | 78.05 | 61.94 | 144.15 |
| Upload Throughput (kbps) | 141.56 | 112.00 | 145.97 | 125.50 | 149.62 |
| Web Browsing Delay (sec) | 21.96 | 39.28 | 40.96 | 19.41 | 32.50 |
| Latency (msec) | 181 | 206 | 569 | 228 | 289 |

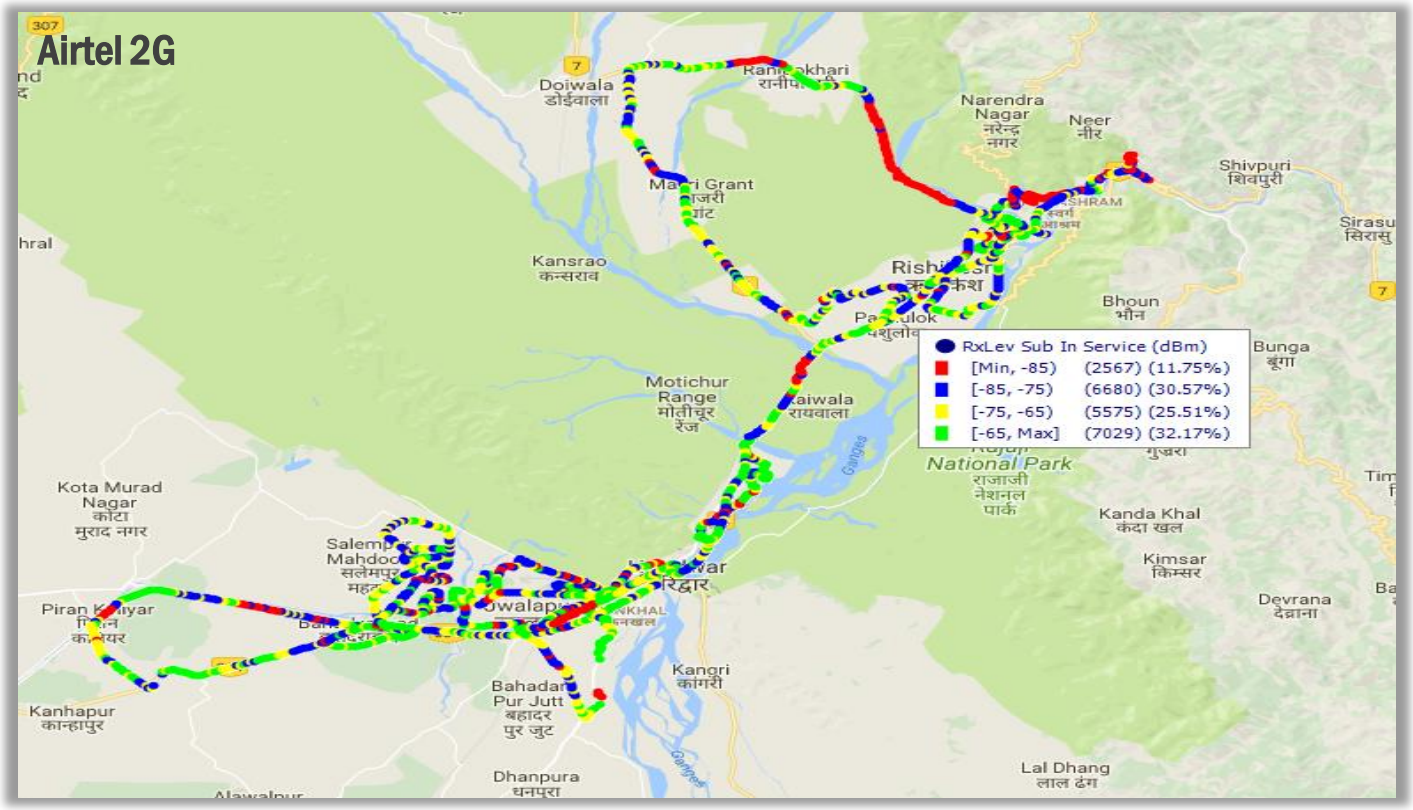
| Rishikesh Bus Stand | 3G | | | | | 4G | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Airtel | BSNL | Idea | Tata | Vodafone | Airtel | Idea | Jio | Vodafone |
| Download Throughput (Mbps) | 0.08 | 2.14 | 0.77 | 0.50 | 0.34 | 3.99 | 4.75 | 4.74 | 1.28 |
| Upload Throughput (Mbps) | 0.33 | 1.67 | 0.90 | 0.59 | 0.05 | 2.87 | 5.56 | 3.62 | 4.71 |
| Web Browsing Delay (sec) | 13.72 | 10.55 | 15.12 | 17.27 | 16.39 | 7.91 | 12.27 | 8.53 | 11.91 |
| Video Streaming Delay (sec) | TO | 2.11 | 2.87 | 2.91 | TO | 7.76 | 1.59 | 0.72 | 10.77 |
| Latency (msec) | 148 | 183 | 330 | 309 | 184 | 32 | 149 | 65 | 76 |

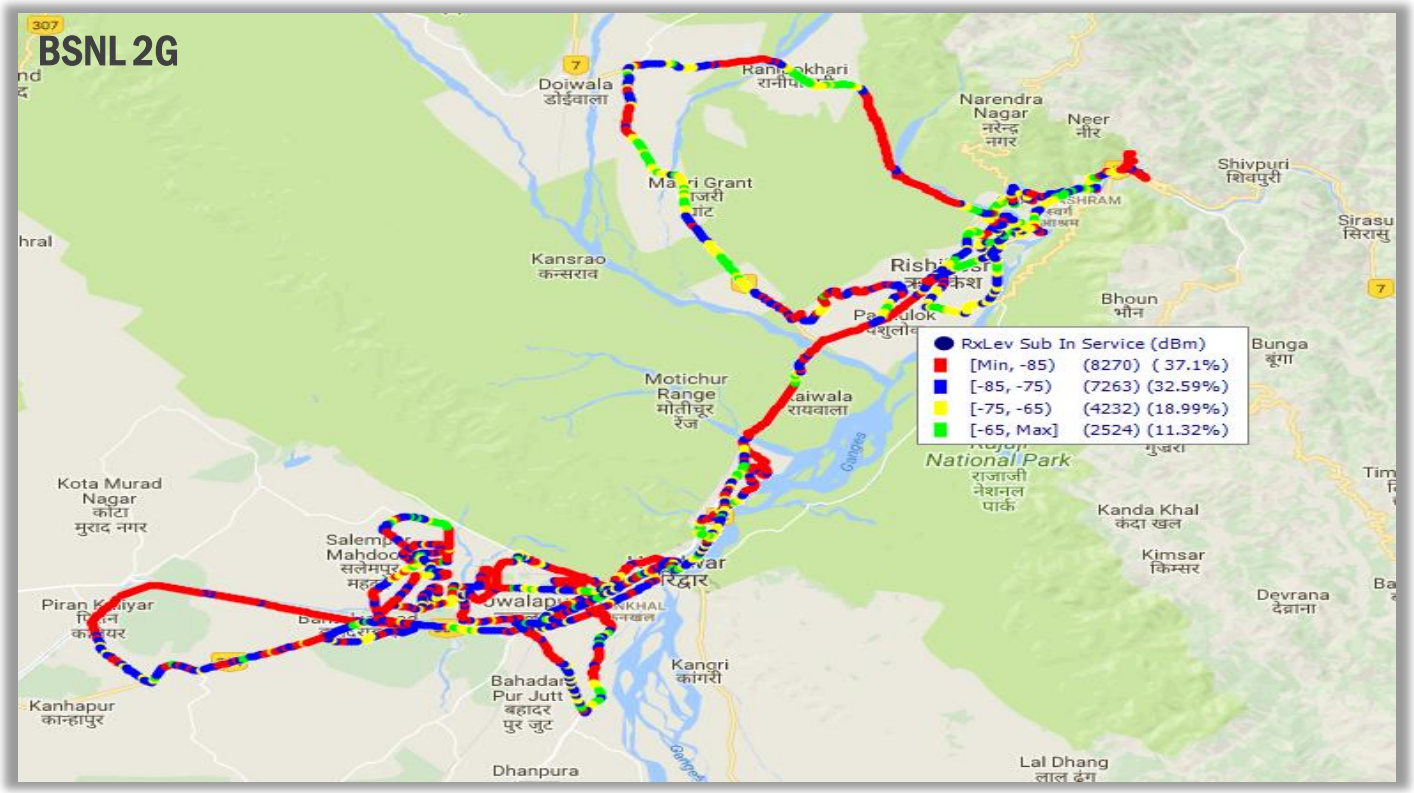
# I. Coverage Details

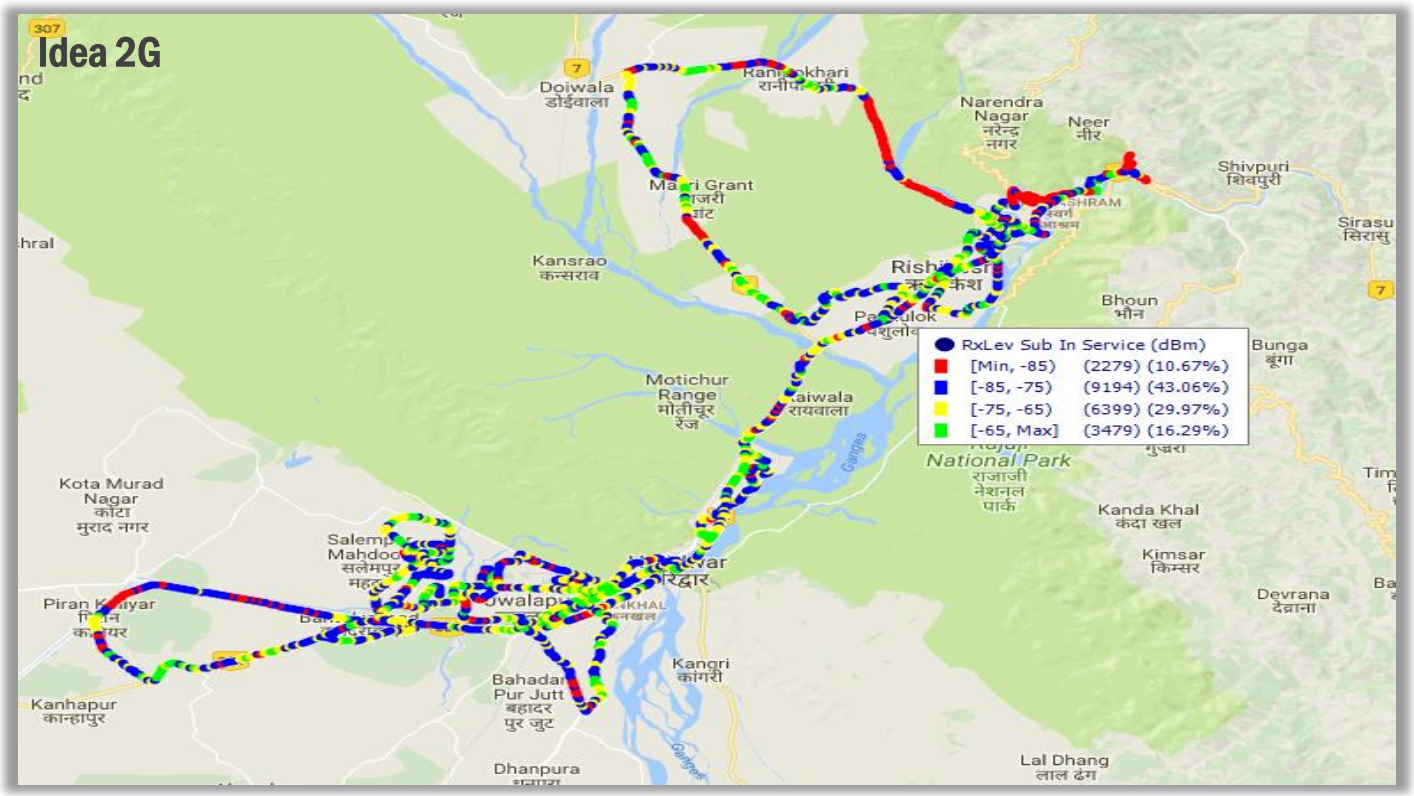
RF Coverage relates to the geographical footprint within the system that has sufficient RF signal strength to provide for a call/data session. The Coverage rate of an TSP is calculated on the basis of % of samples in which the Rx level ≥ -85 dBm, RSCP is ≥ -90 dBm & RSRP ≥ -110dBm. The details are as follows.

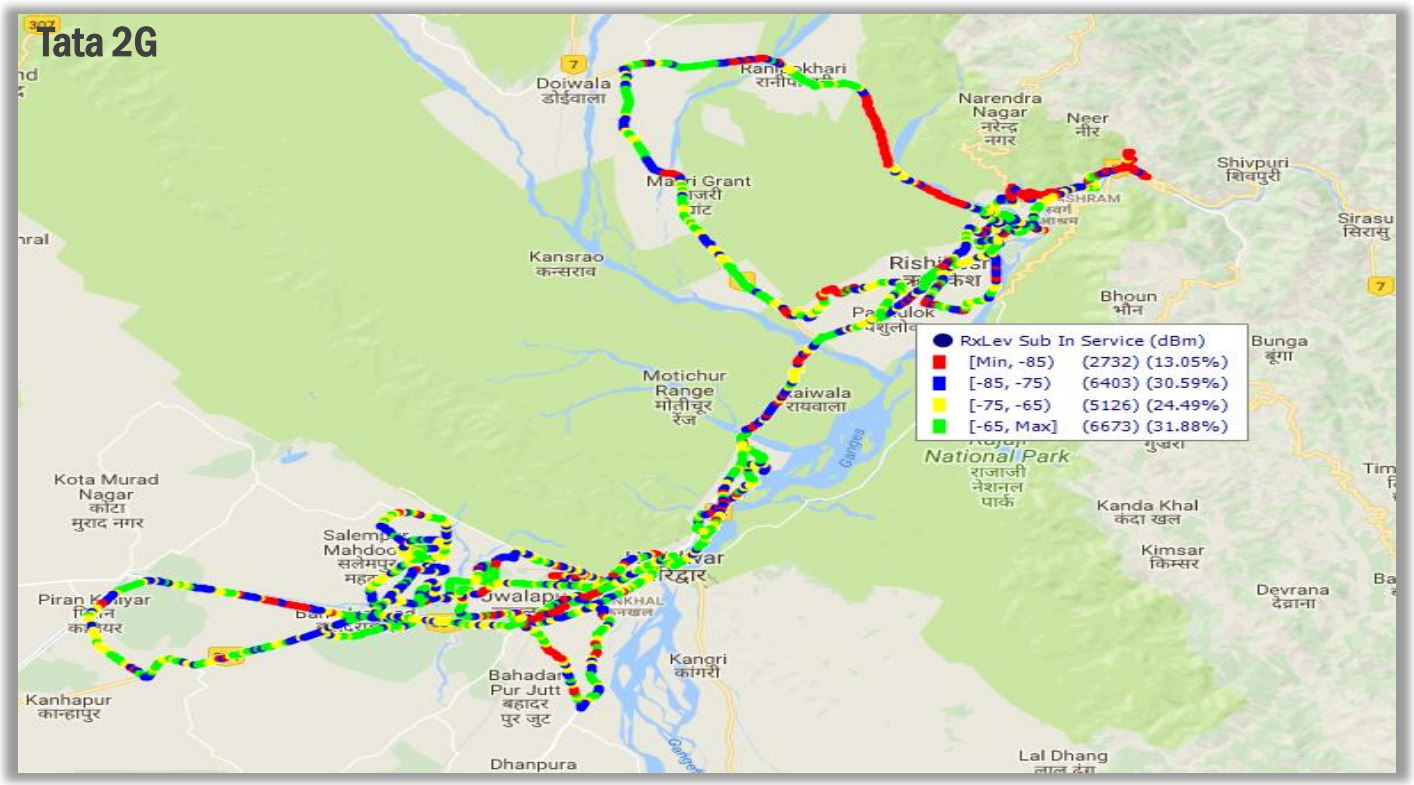
| TSP | Coverage Rate |
|---|---|
| Airtel 2G | 88.25% |
| BSNL 2G | 62.90% |
| Idea 2G | 89.33% |
| Tata 2G | 86.95% |
| Vodafone 2G | 92.06% |
| Airtel (Free Mode) | 76.24% |
| BSNL (Free Mode) | 78.78% |
| Idea (Free Mode) | 94.70% |
| Tata (Free Mode) | 87.41% |
| Vodafone (Free Mode) | 92.48% |
| Airtel VoLTE | 91.16% |
| Jio VoLTE | 95.54% |

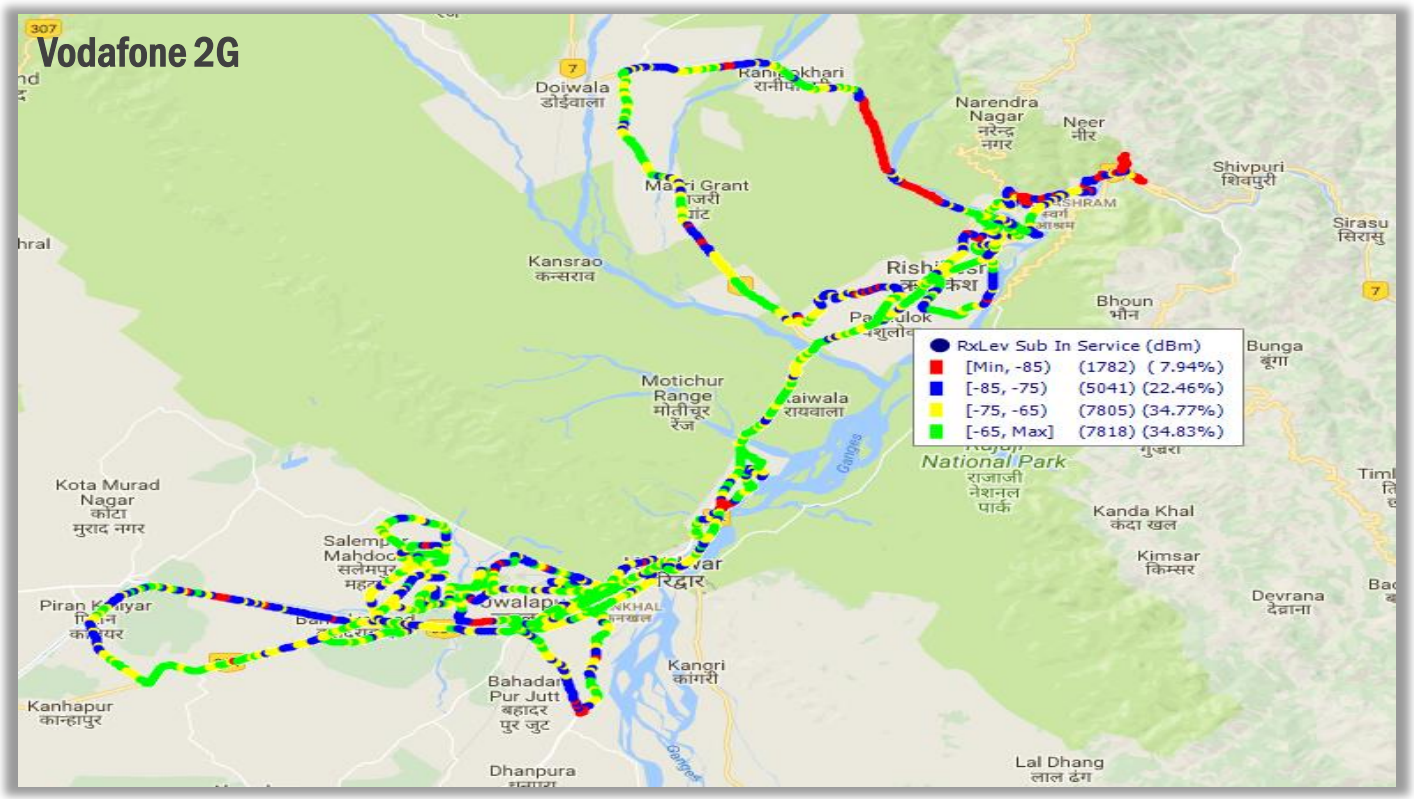


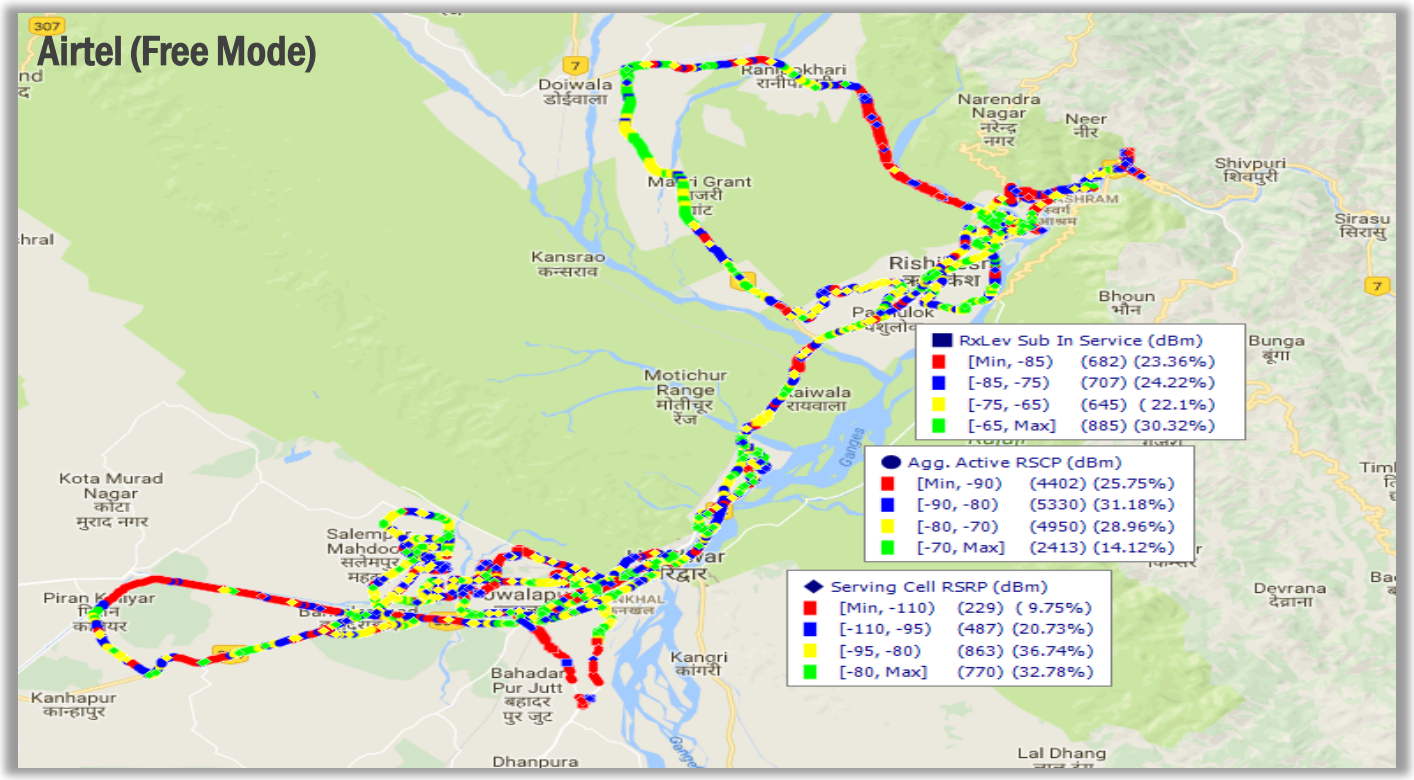



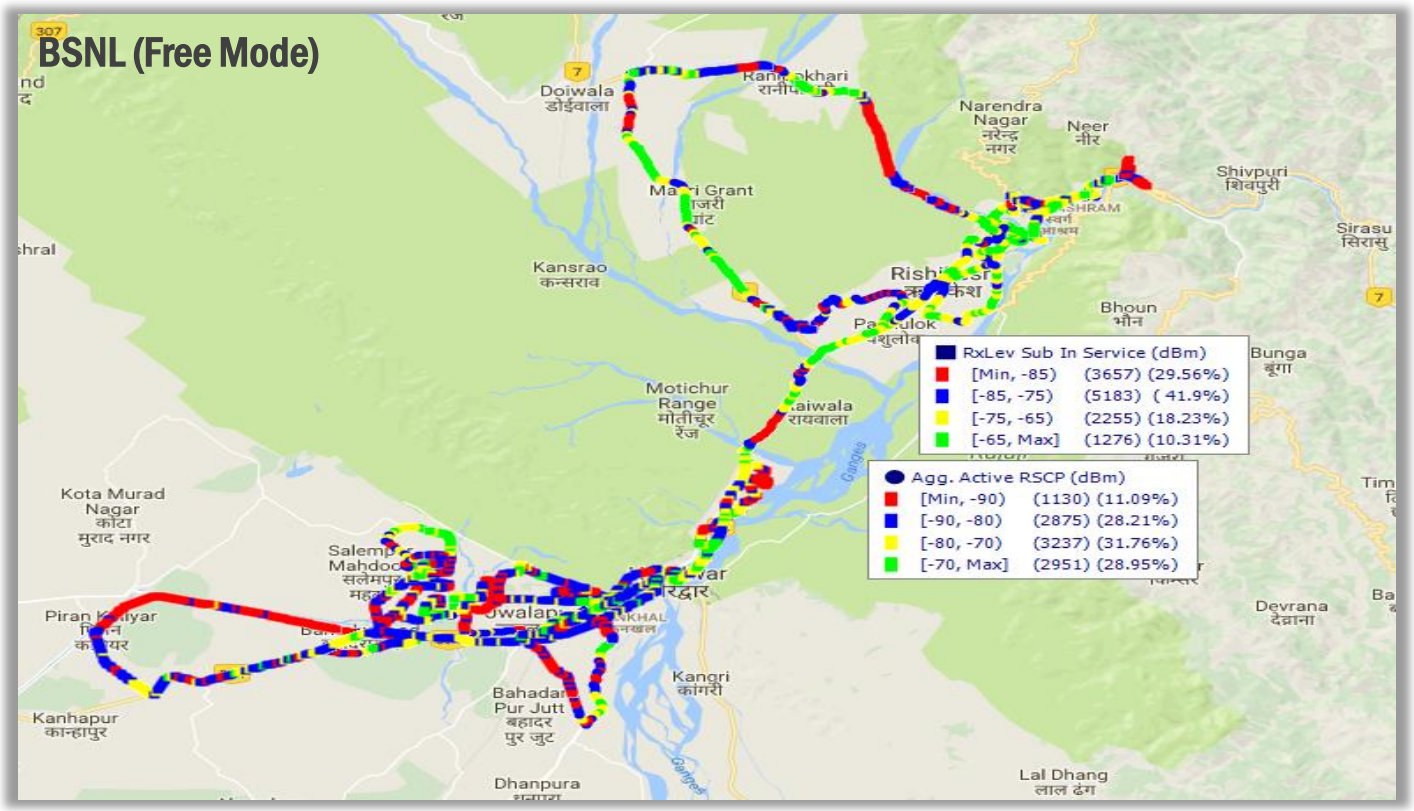

BSNL 2G
RxLev Sub In Service (dBm)
[Min, -85) (8270) ( 37.1%)
[-85, -75) (7263) (32.59%)
[-75, -65) (4232) (18.99%)
[-65, Max] (2524) (11.32%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Bhoun
Bunga
Motichur Range
National Park
Kanda Khal
Kimsar
Devrana
Kota Murad Nagar
Kanhapur
Kangri
Dhanpura
Lal Dhang


Idea 2G
RxLev Sub In Service (dBm)
[Min, -85) (2279) (10.67%)
[-85, -75) (9194) (43.06%)
[-75, -65) (6399) (29.97%)
[-65, Max] (3479) (16.29%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Bhoun
Bunga
Motichur Range
National Park
Kanda Khal
Kimsar
Devrana
Kota Murad Nagar
Kanhapur
Kangri
Dhanpura
Lal Dhang

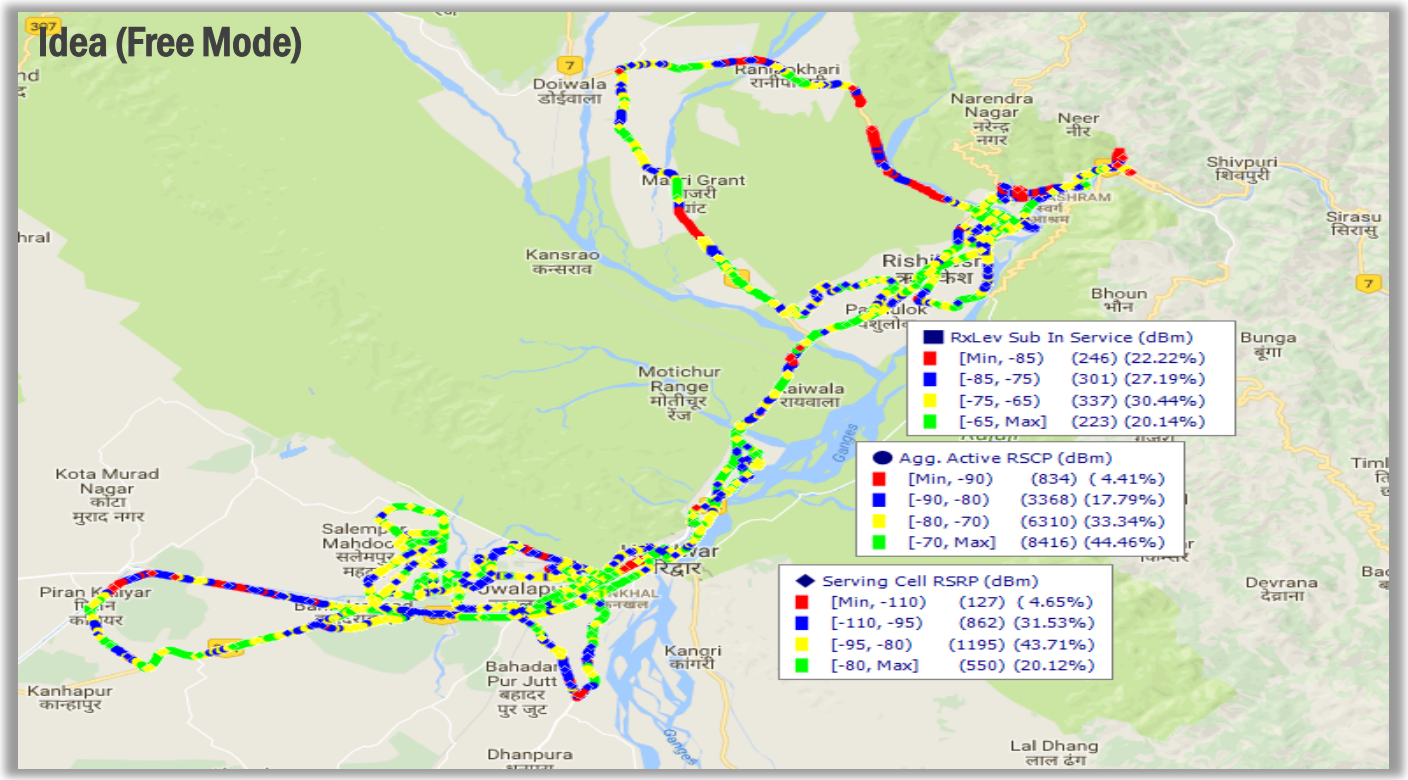

Tata 2G
RxLev Sub In Service (dBm)
[Min, -85) (2732) (13.05%)
[-85, -75) (6403) (30.59%)
[-75, -65) (5126) (24.49%)
[-65, Max] (6673) (31.88%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Bhoun
Bunga
Motichur Range
National Park
Kanda Khal
Kimsar
Devrana
Kota Murad Nagar
Kanhapur
Kangri
Dhanpura
Lal Dhang


Vodafone 2G
RxLev Sub In Service (dBm)
[Min, -85) (1782) ( 7.94%)
[-85, -75) (5041) (22.46%)
[-75, -65) (7805) (34.77%)
[-65, Max] (7818) (34.83%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Bhoun
Bunga
Motichur Range
National Park
Kanda Khal
Kimsar
Devrana
Kota Murad Nagar
Kanhapur
Kangri
Dhanpura
Lal Dhang

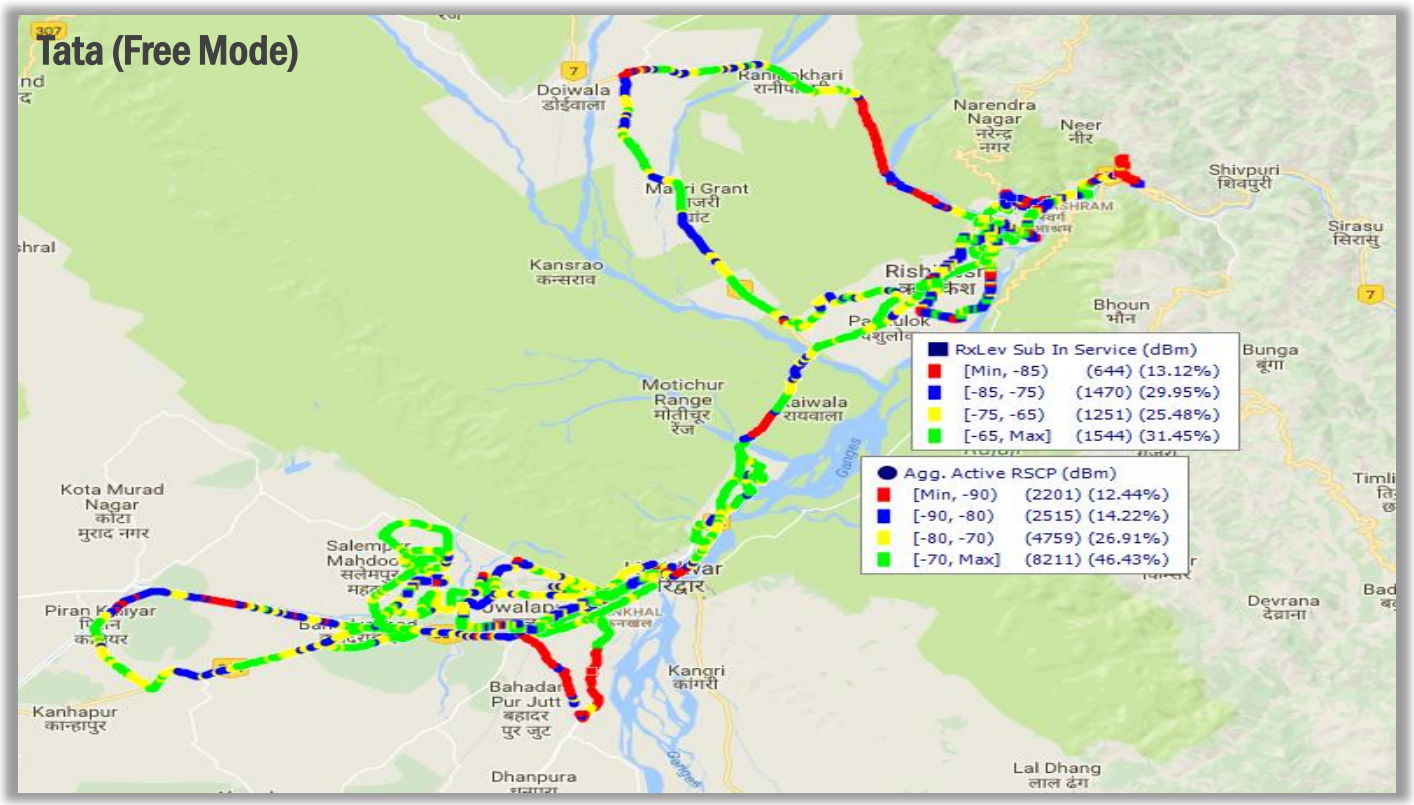

Airtel (Free Mode)
RxLev Sub In Service (dBm)
[Min, -85) (682) (23.36%)
[-85, -75) (707) (24.22%)
[-75, -65) (645) ( 22.1%)
[-65, Max] (885) (30.32%)
Agg. Active RSCP (dBm)
[Min, -90) (4402) (25.75%)
[-90, -80) (5330) (31.18%)
[-80, -70) (4950) (28.96%)
[-70, Max] (2413) (14.12%)
Serving Cell RSRP (dBm)
[Min, -110) (229) ( 9.75%)
[-110, -95) (487) (20.73%)
[-95, -80) (863) (36.74%)
[-80, Max] (770) (32.78%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Motichur Range
Bhoun
Bunga
Kota Murad Nagar
Kangri
Bahadar Pur Jutt
Kanhapur
Dhanpura
Lal Dhang
Devrana

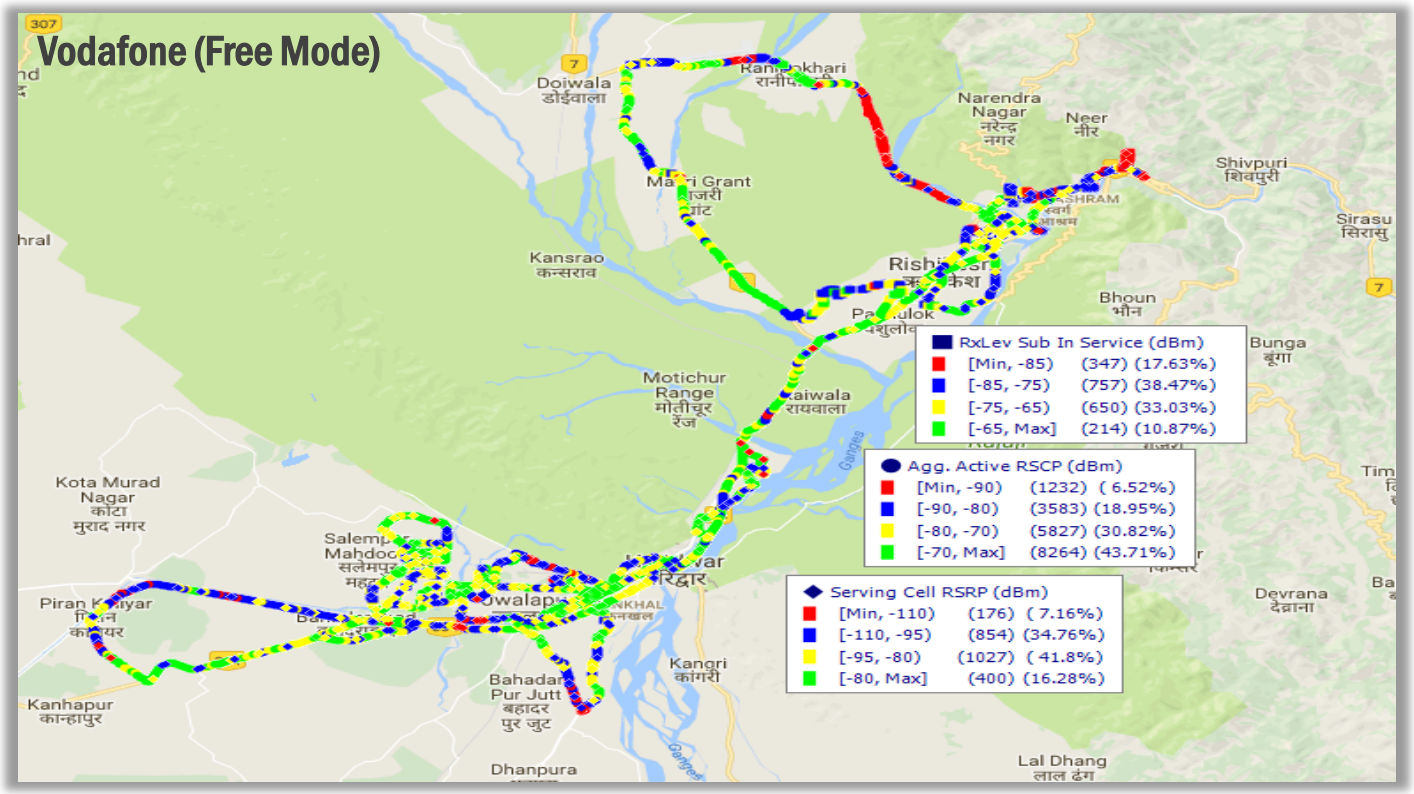

BSNL (Free Mode)
RxLev Sub In Service (dBm)
[Min, -85) (3657) (29.56%)
[-85, -75) (5183) ( 41.9%)
[-75, -65) (2255) (18.23%)
[-65, Max] (1276) (10.31%)
Agg. Active RSCP (dBm)
[Min, -90) (1130) (11.09%)
[-90, -80) (2875) (28.21%)
[-80, -70) (3237) (31.76%)
[-70, Max] (2951) (28.95%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Motichur Range
Bhoun
Bunga
Kota Murad Nagar
Kangri
Bahadar Pur Jutt
Kanhapur
Dhanpura
Lal Dhang
Devrana

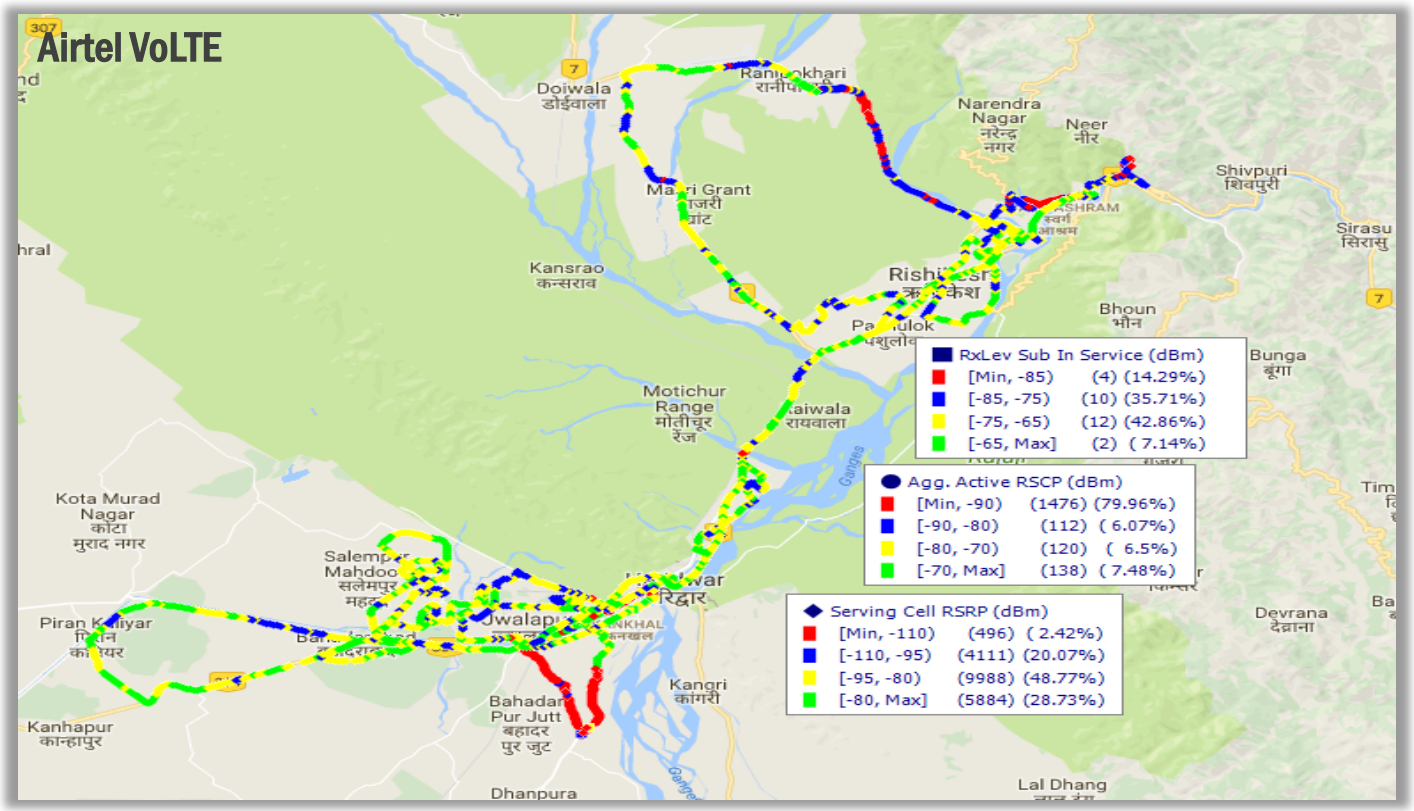
## Idea (Free Mode)

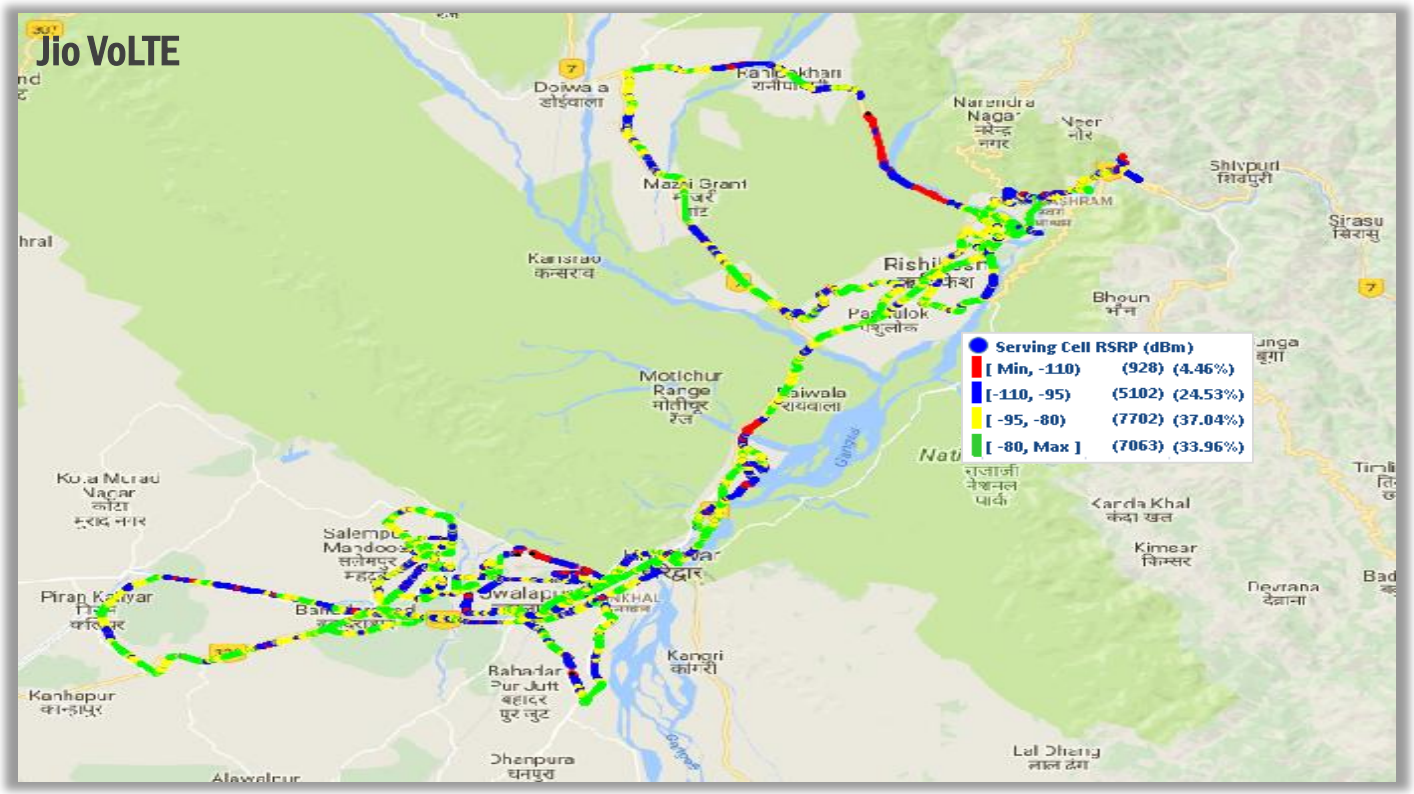



## Tata (Free Mode)




Vodafone (Free Mode)
RxLev Sub In Service (dBm)
[Min, -85] (347) (17.63%)
[-85, -75] (757) (38.47%)
[-75, -65] (650) (33.03%)
[-65, Max] (214) (10.87%)
Agg. Active RSCP (dBm)
[Min, -90] (1232) ( 6.52%)
[-90, -80] (3583) (18.95%)
[-80, -70] (5827) (30.82%)
[-70, Max] (8264) (43.71%)
Serving Cell RSRP (dBm)
[Min, -110] (176) ( 7.16%)
[-110, -95] (854) (34.76%)
[-95, -80] (1027) ( 41.8%)
[-80, Max] (400) (16.28%)


Airtel VoLTE
RxLev Sub In Service (dBm)
[Min, -85] (4) (14.29%)
[-85, -75] (10) (35.71%)
[-75, -65] (12) (42.86%)
[-65, Max] (2) ( 7.14%)
Agg. Active RSCP (dBm)
[Min, -90] (1476) (79.96%)
[-90, -80] (112) ( 6.07%)
[-80, -70] (120) ( 6.5%)
[-70, Max] (138) ( 7.48%)
Serving Cell RSRP (dBm)
[Min, -110] (496) ( 2.42%)
[-110, -95] (4111) (20.07%)
[-95, -80] (9988) (48.77%)
[-80, Max] (5884) (28.73%)

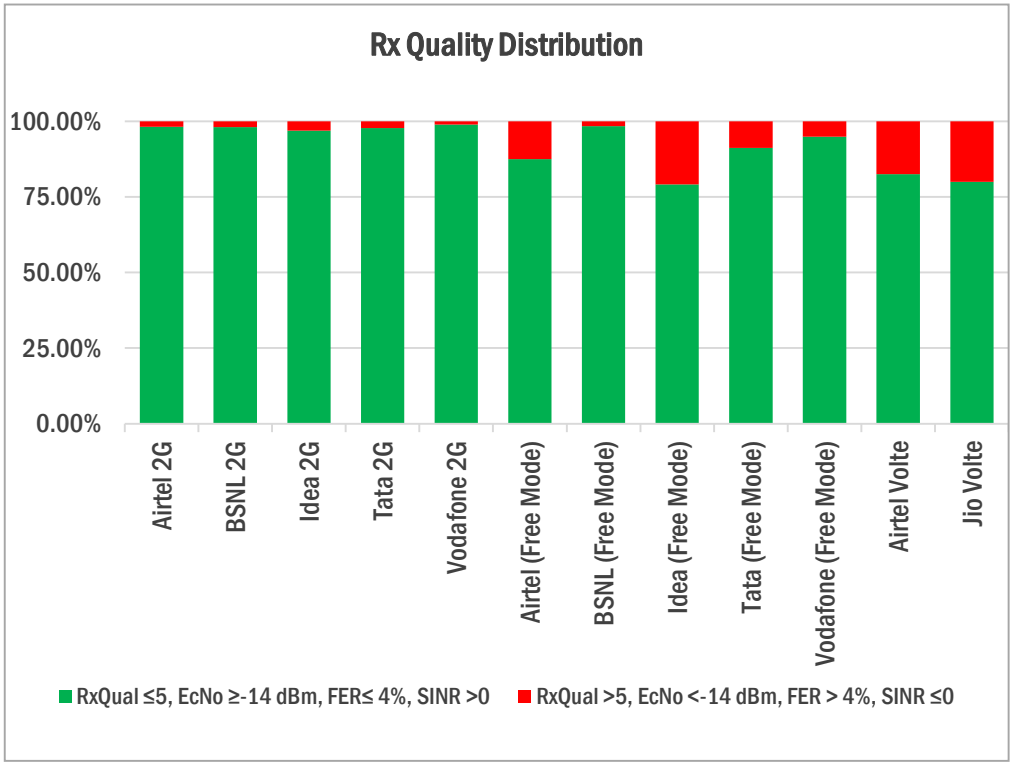

Jio VoLTE
Doiwala
डोईवाला
Mazri Grant
Kansrao
कनसरव
Rishikesh
Motichur
Range
मोतीचूर
रेंज
Narendra
Nagar
Shivpuri
शिवपुरी
Sirasu
Bhoun
Serving Cell RSRP (dBm)
[ Min, -110) (928) (4.46%)
[-110, -95) (5102) (24.53%)
[ -95, -80) (7702) (37.04%)
[ -80, Max ] (7063) (33.96%)
Kardia Khal
Kimear
Kangri
कांगरी
Kanhapur
Dhanpura
Lal Dhang

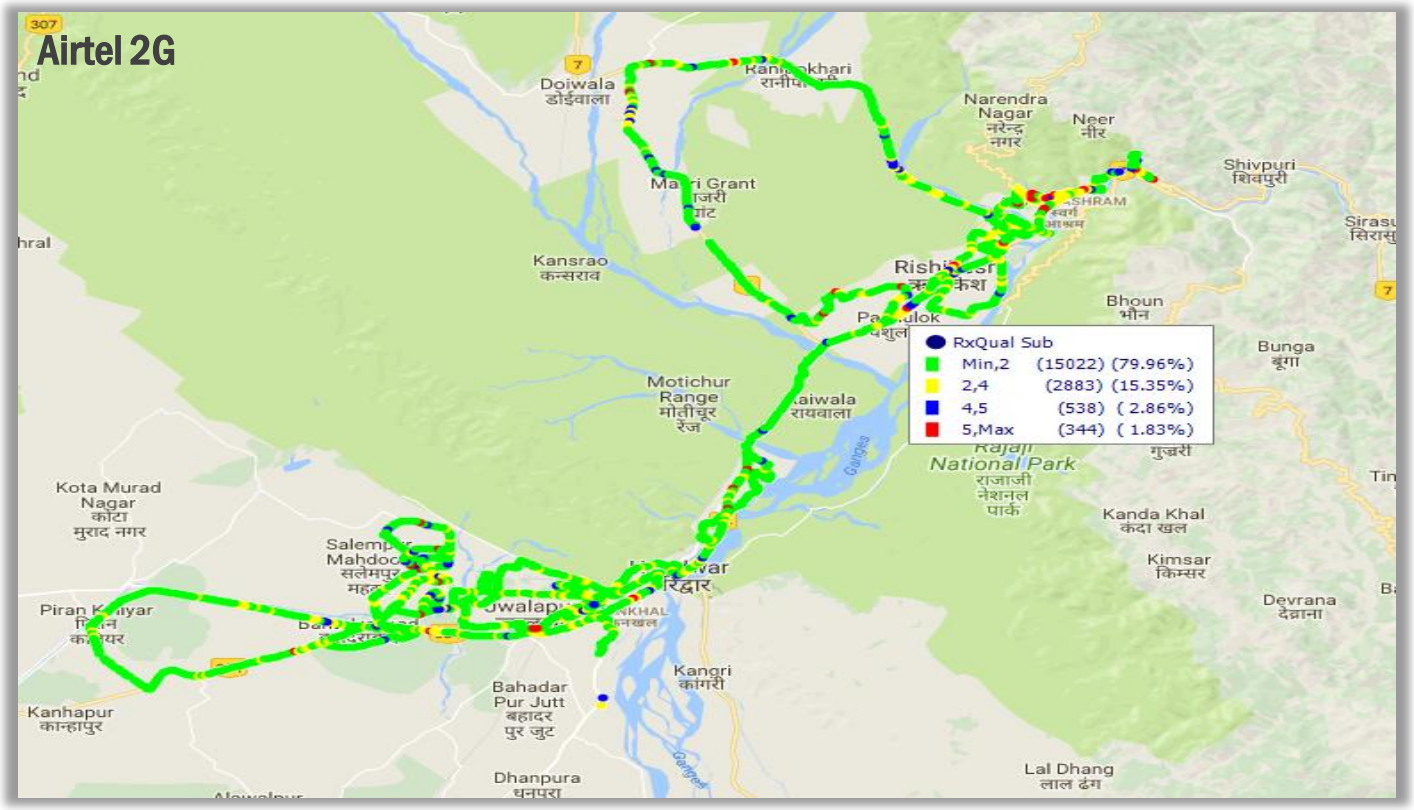
# II. Quality Details

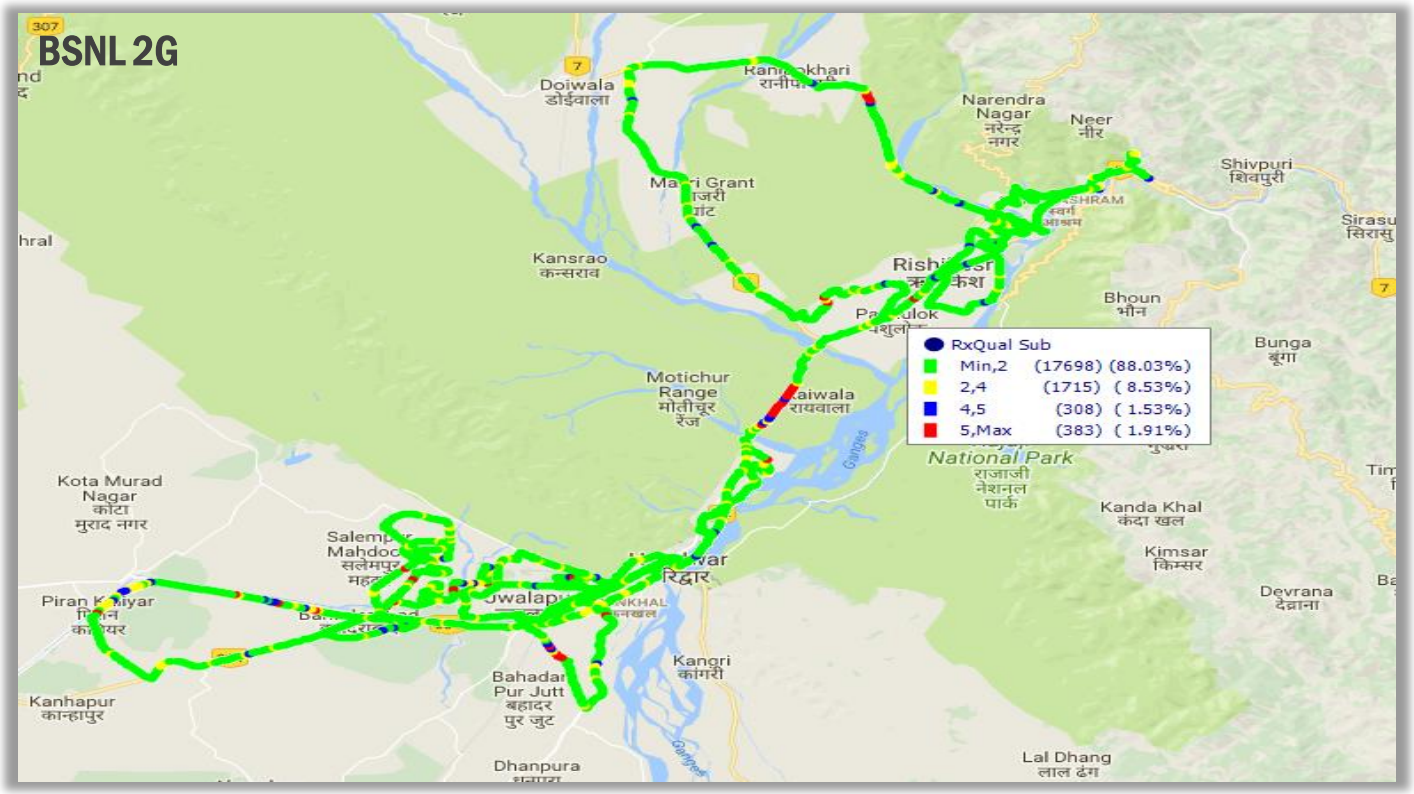
For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -14 dBm for 3G TSP sand SINR >0 in case of VoLTE is considered to be good, where as quality beyond this benchmark is considered to be bad. The benchmark should usually be ≥ 95%.

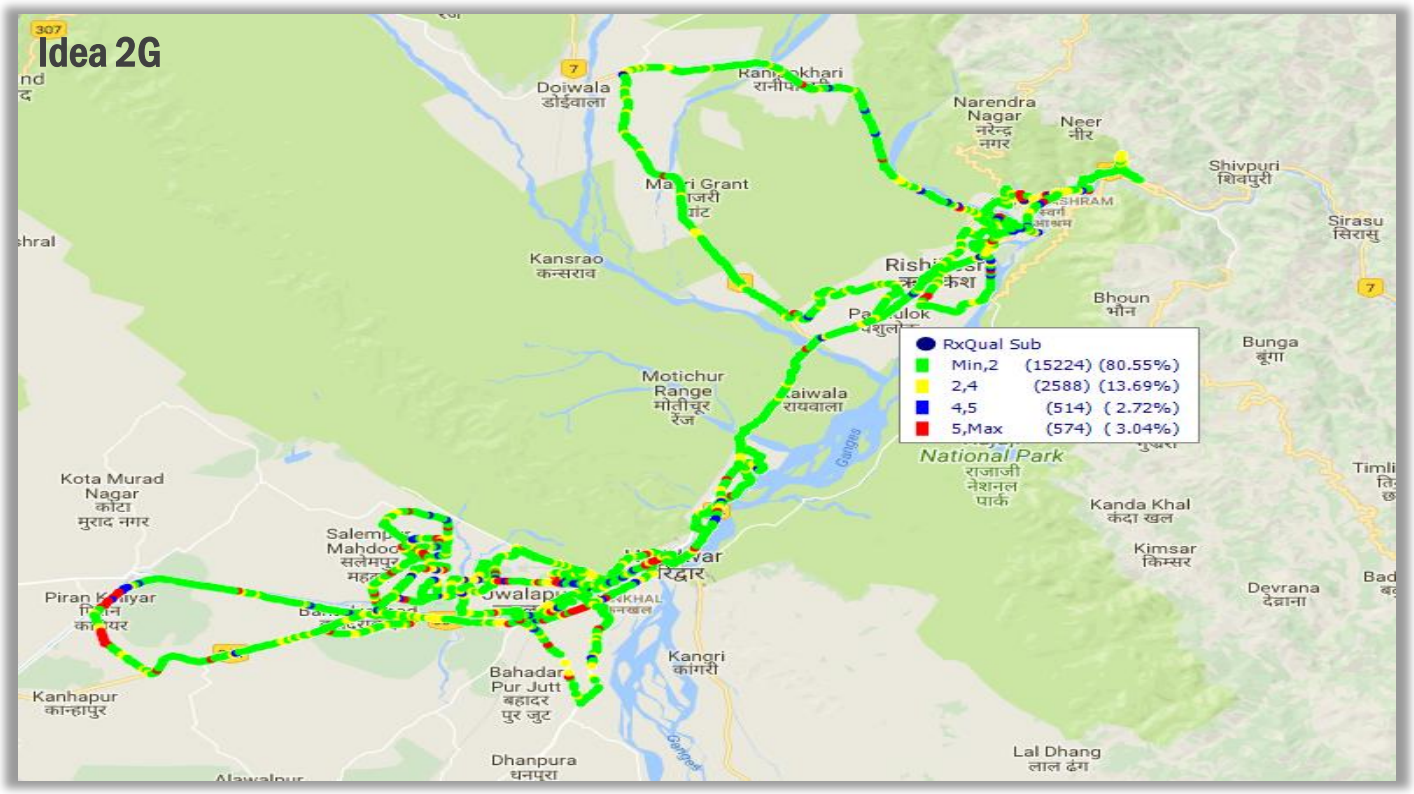
| TSP | Rx Quality |
|---|---|
| Airtel 2G | 98.17% |
| BSNL 2G | 98.09% |
| Idea 2G | 96.96% |
| Tata 2G | 97.72% |
| Vodafone 2G | 98.94% |
| Airtel (Free Mode) | 87.55% |
| BSNL (Free Mode) | 98.39% |
| Idea (Free Mode) | 79.14% |
| Tata (Free Mode) | 91.19% |
| Vodafone(Free Mode) | 94.89% |
| Airtel VoLTE | 82.57% |
| Jio VoLTE | 79.99% |

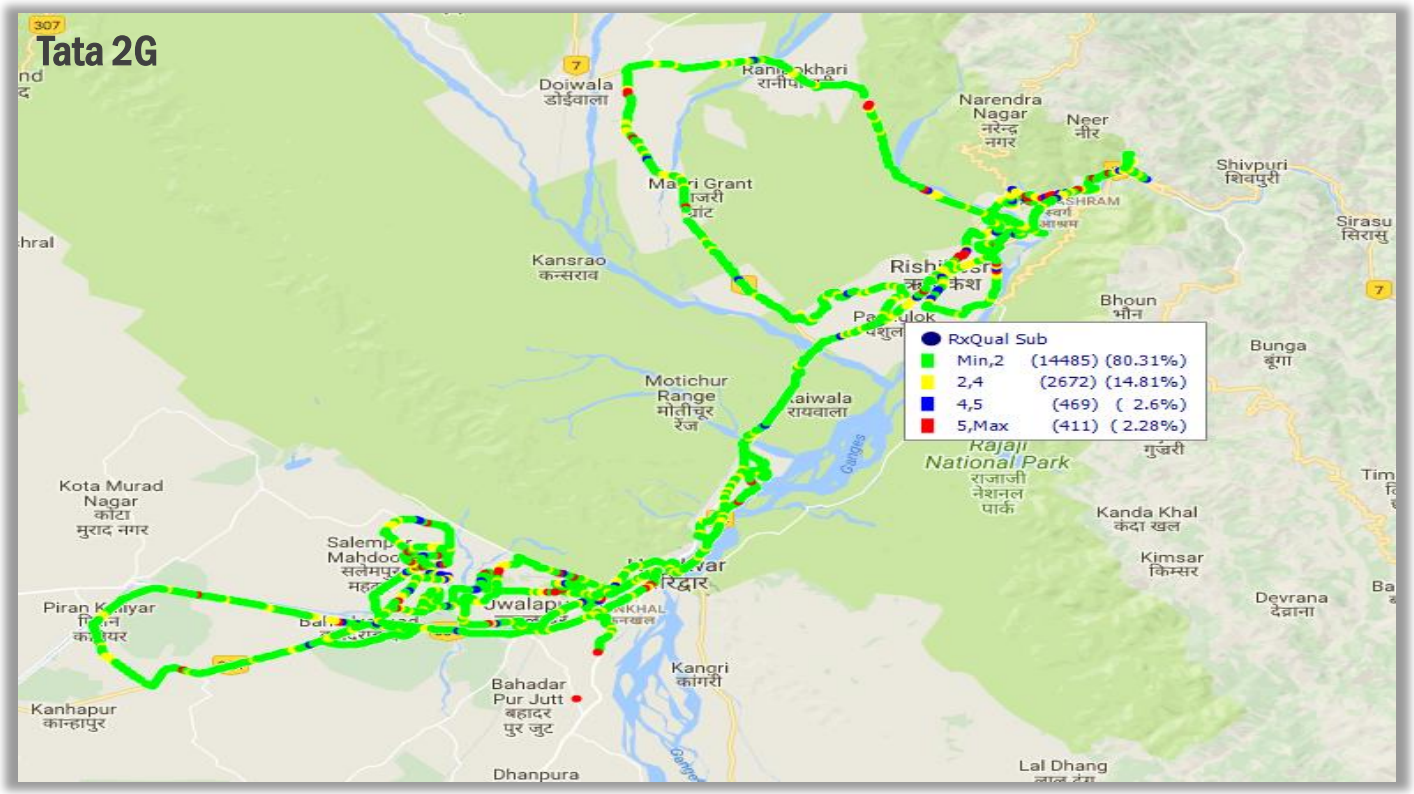
TSPs not meeting the Benchmark

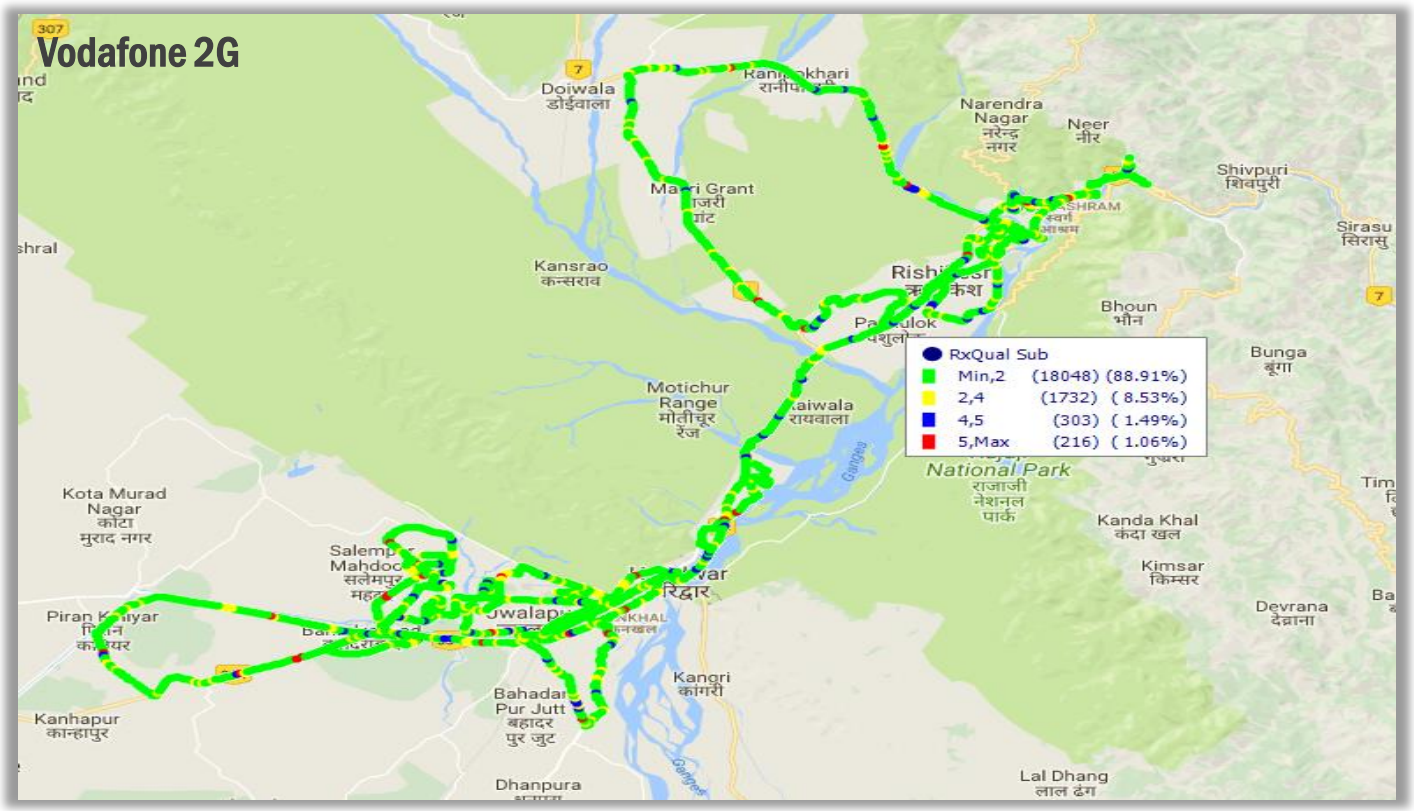


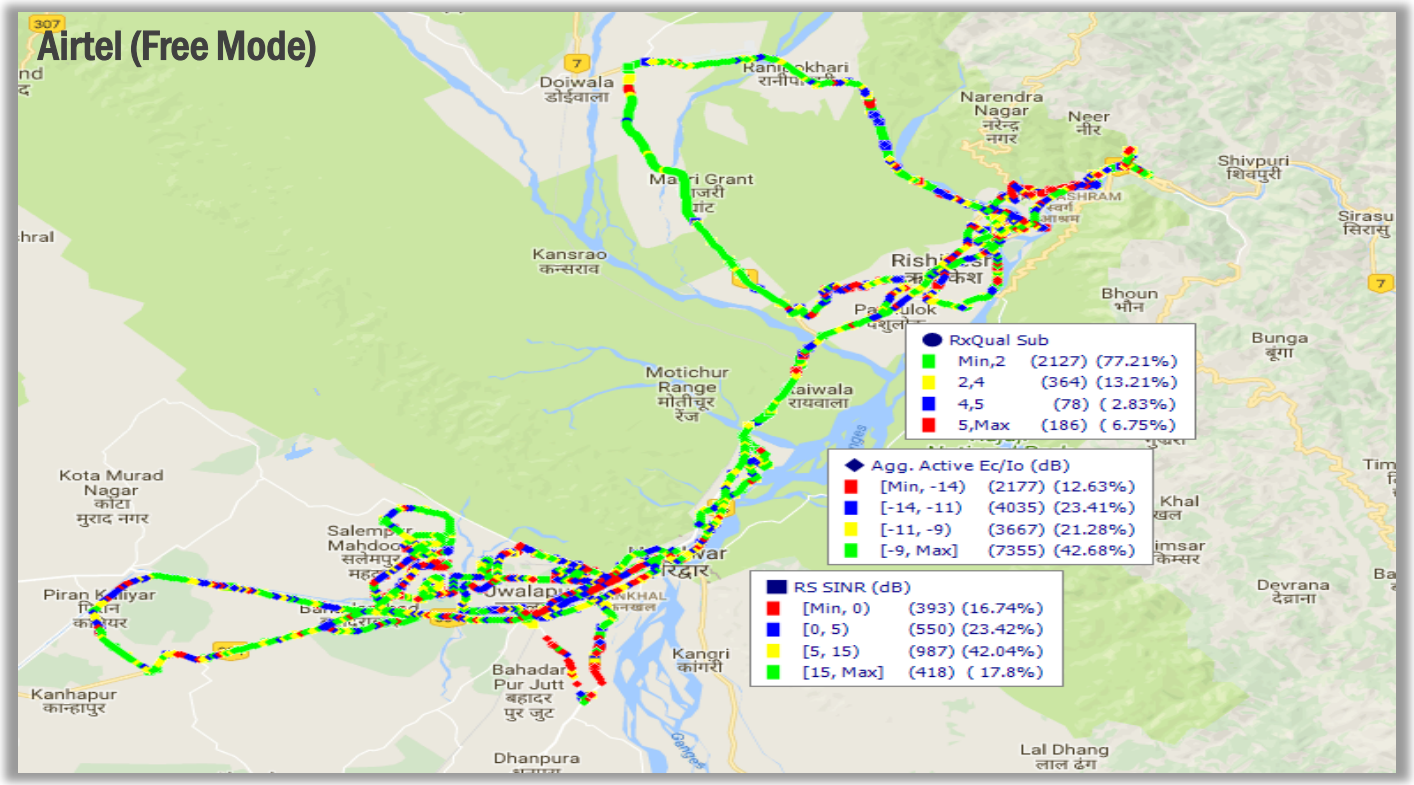



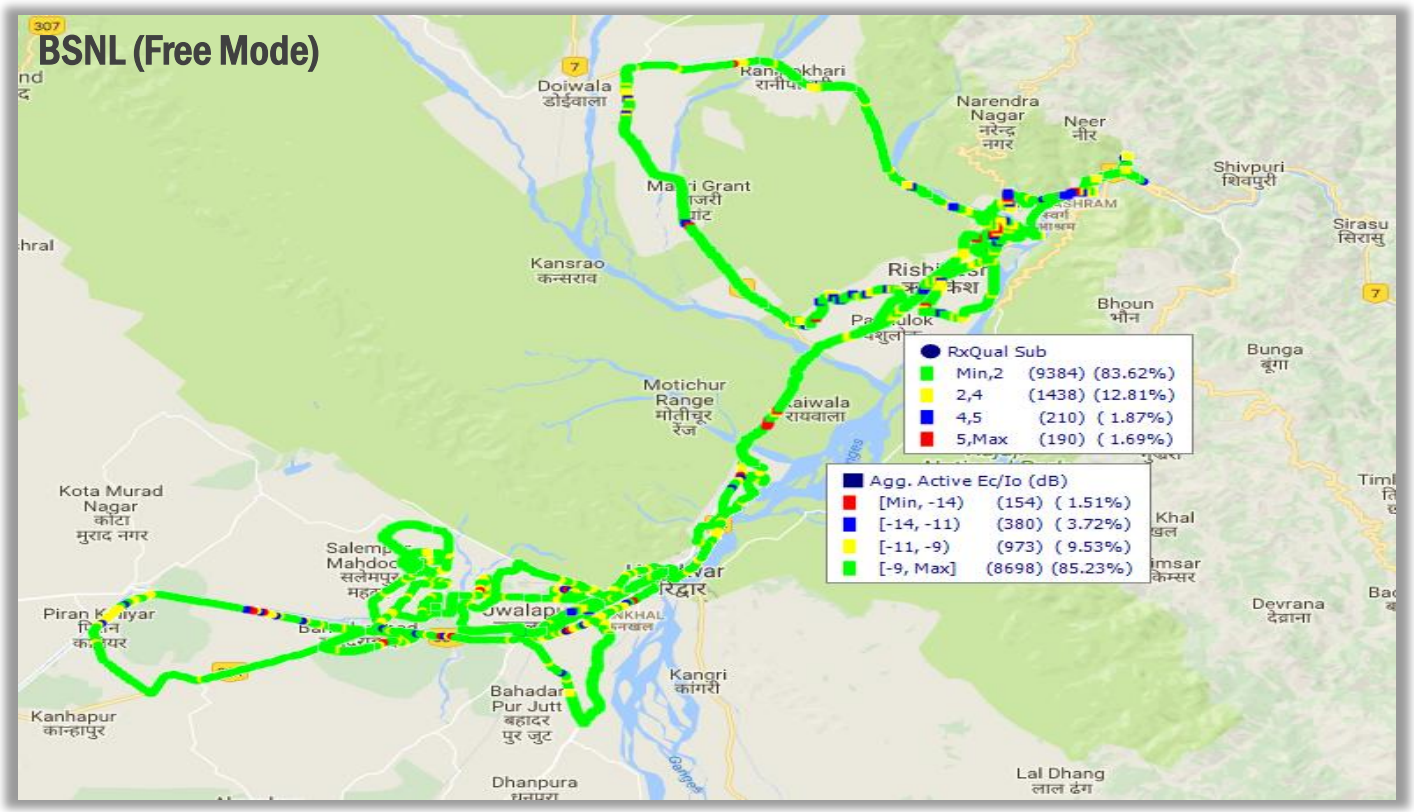

BSNL 2G
RxQual Sub
Min,2 (17698) (88.03%)
2,4 (1715) ( 8.53%)
4,5 (308) ( 1.53%)
5,Max (383) ( 1.91%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Bhoun
Bunga
Motichur Range
National Park
Kanda Khal
Kimsar
Devrana
Kota Murad Nagar
Kanhapur
Kangri
Dhanpura
Lal Dhang

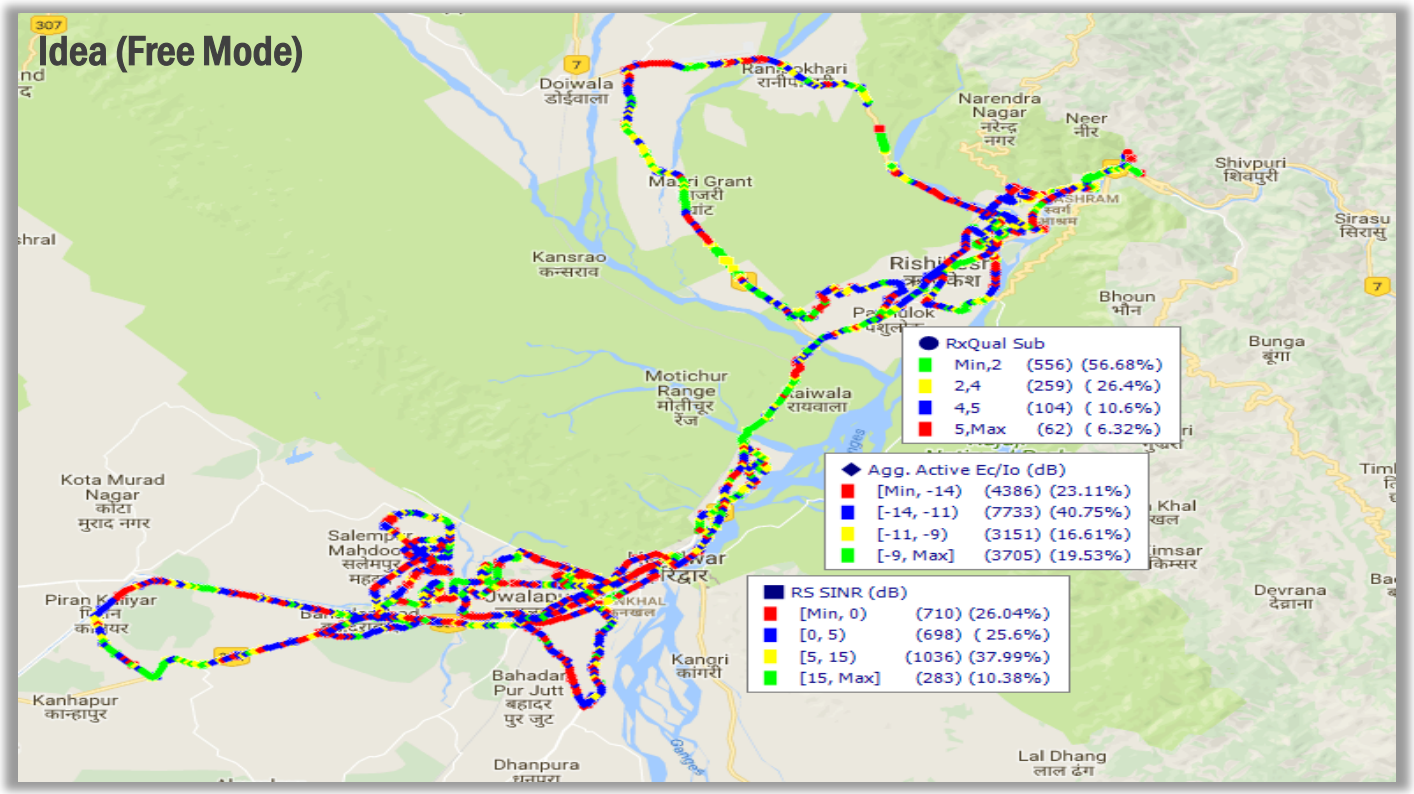

Idea 2G
RxQual Sub
Min,2 (15224) (80.55%)
2,4 (2588) (13.69%)
4,5 (514) ( 2.72%)
5,Max (574) ( 3.04%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Bhoun
Bunga
Motichur Range
National Park
Kanda Khal
Kimsar
Devrana
Kota Murad Nagar
Kanhapur
Kangri
Dhanpura
Lal Dhang

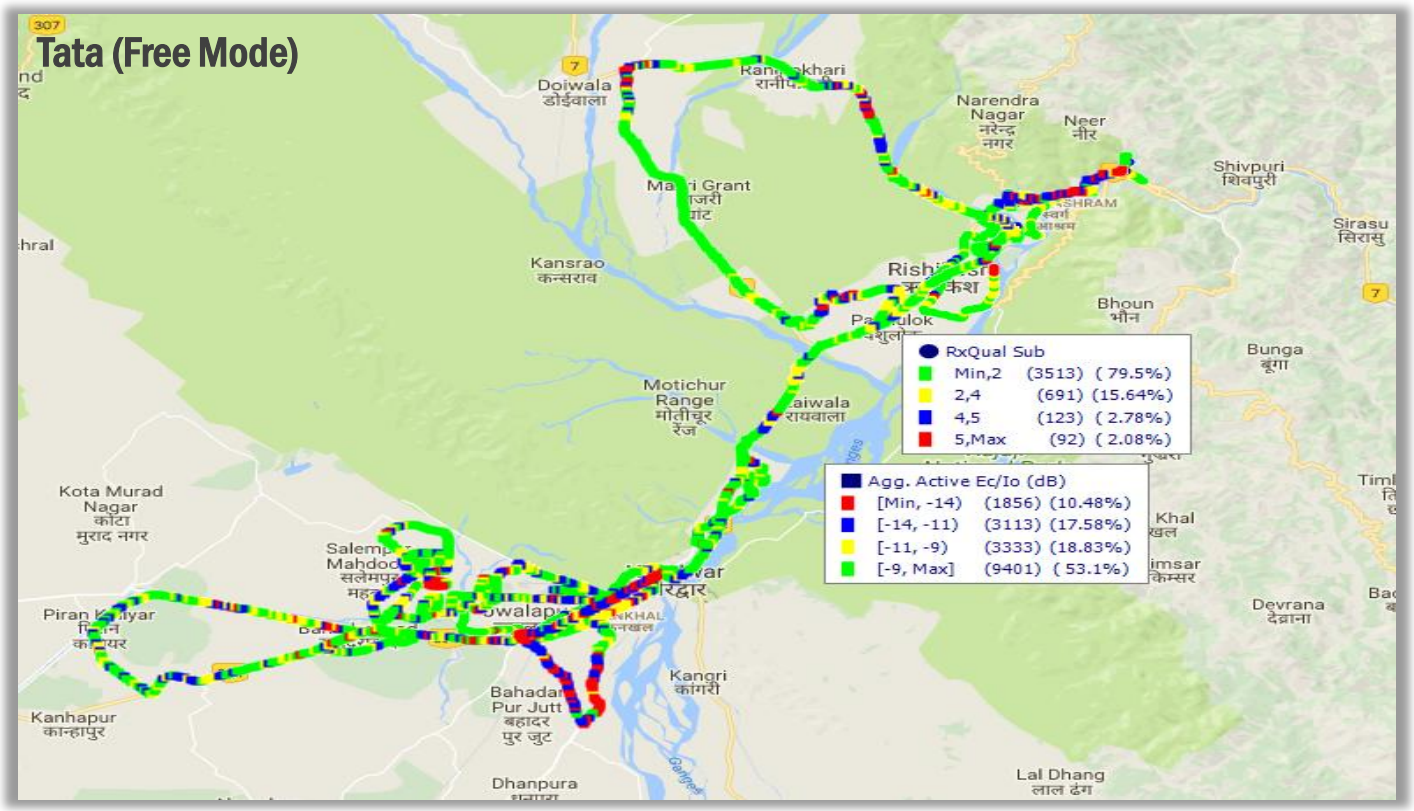

Tata 2G
RxQual Sub
Min,2 (14485) (80.31%)
2,4 (2672) (14.81%)
4,5 (469) ( 2.6%)
5,Max (411) ( 2.28%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Sirasu
Kansrao
Bhoun
Bunga
Motichur Range
Rajaji National Park
Kanda Khal
Kimsar
Devrana
Kota Murad Nagar
Kanhapur
Bahadar Pur Jutt
Kangri
Dhanpura
Lal Dhang

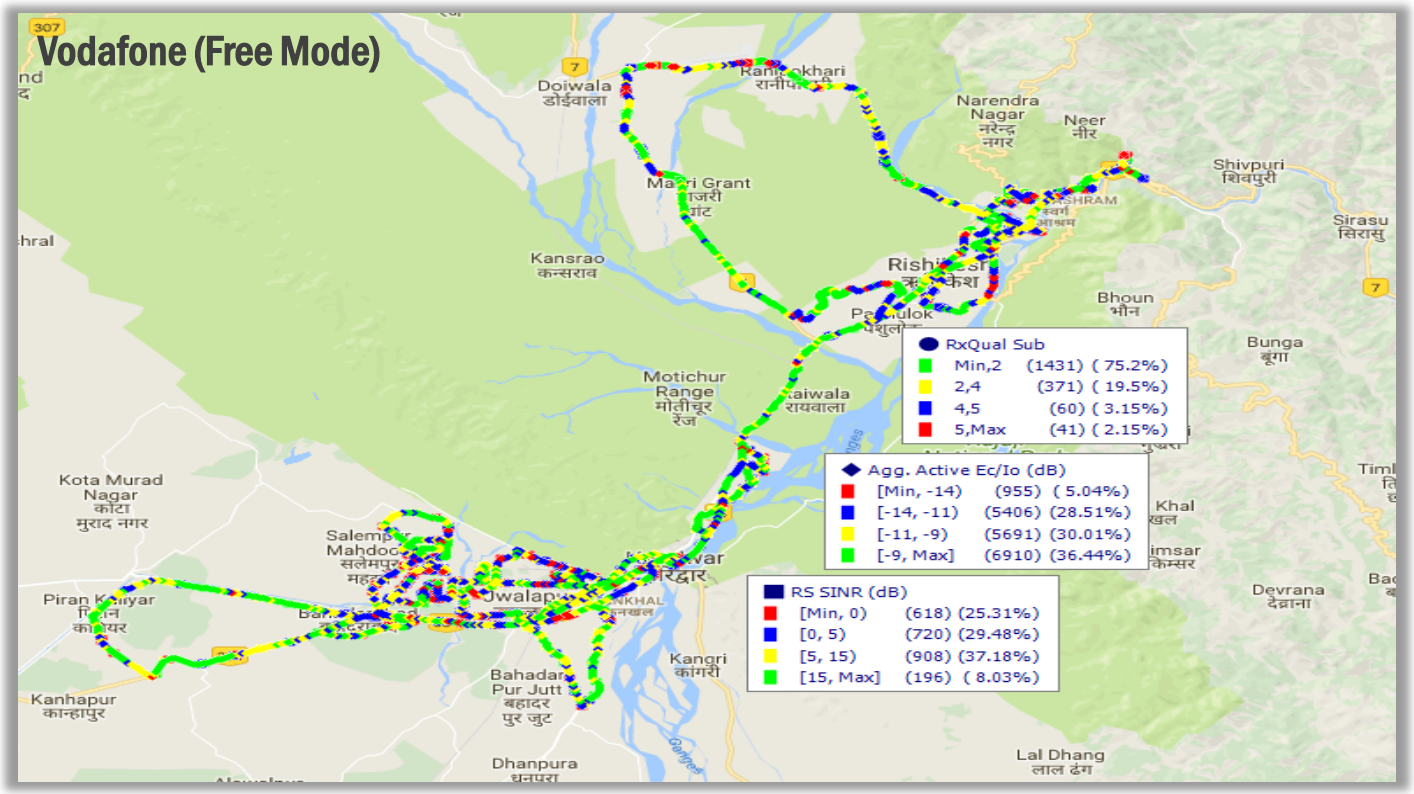

Vodafone 2G
RxQual Sub
Min,2 (18048) (88.91%)
2,4 (1732) ( 8.53%)
4,5 (303) ( 1.49%)
5,Max (216) ( 1.06%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Sirasu
Kansrao
Bhoun
Bunga
Motichur Range
Rajaji National Park
Kanda Khal
Kimsar
Devrana
Kota Murad Nagar
Kanhapur
Kangri
Dhanpura
Lal Dhang

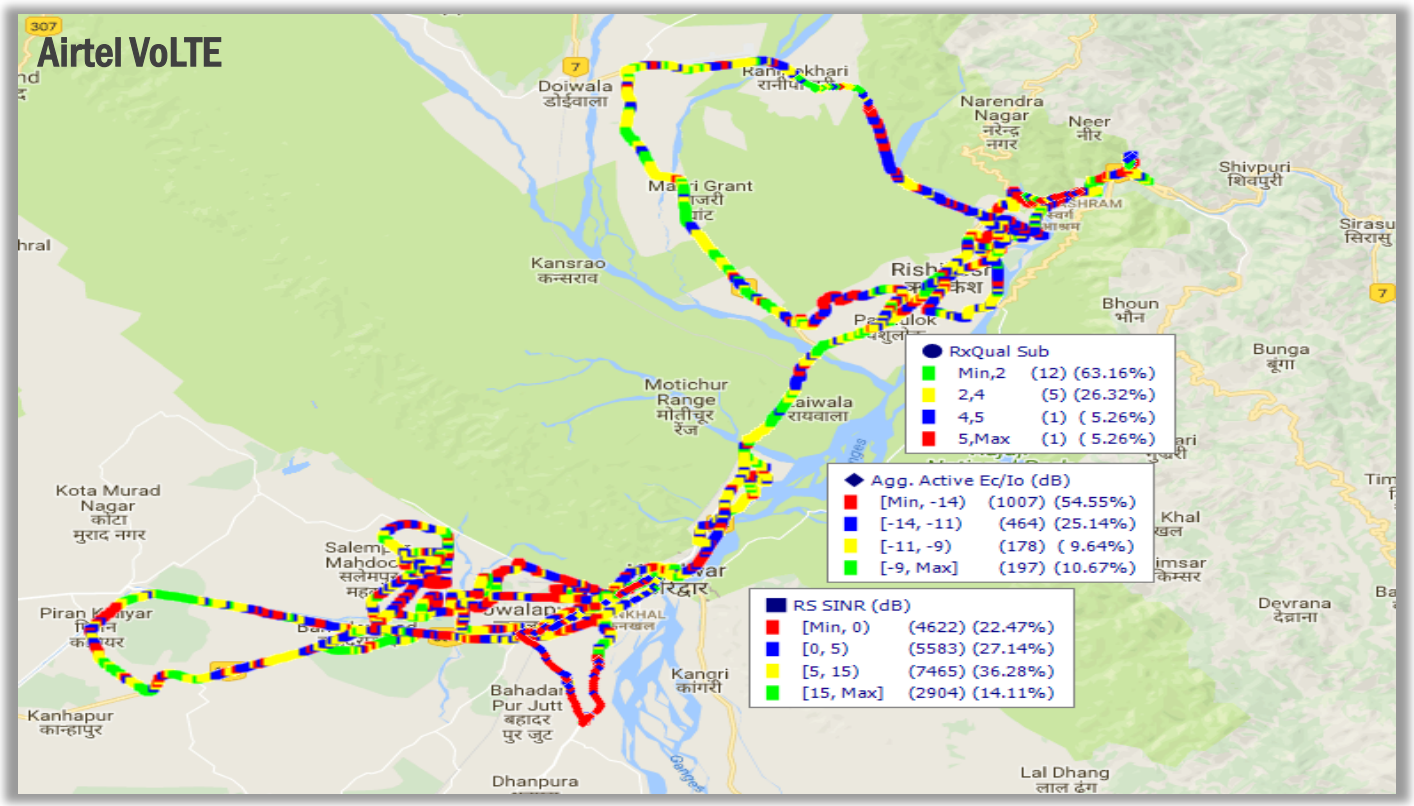

Airtel (Free Mode)
RxQual Sub
Min,2 (2127) (77.21%)
2,4 (364) (13.21%)
4,5 (78) ( 2.83%)
5,Max (186) ( 6.75%)
Agg. Active Ec/Io (dB)
[Min, -14) (2177) (12.63%)
[-14, -11) (4035) (23.41%)
[-11, -9) (3667) (21.28%)
[-9, Max] (7355) (42.68%)
RS SINR (dB)
[Min, 0) (393) (16.74%)
[0, 5) (550) (23.42%)
[5, 15) (987) (42.04%)
[15, Max] (418) ( 17.8%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Sirasu
Kansrao
Bhoun
Bunga
Motichur Range
Kota Murad Nagar
Kangri
Bahadar Pur Jutt
Kanhapur
Dhanpura
Lal Dhang
Devrana

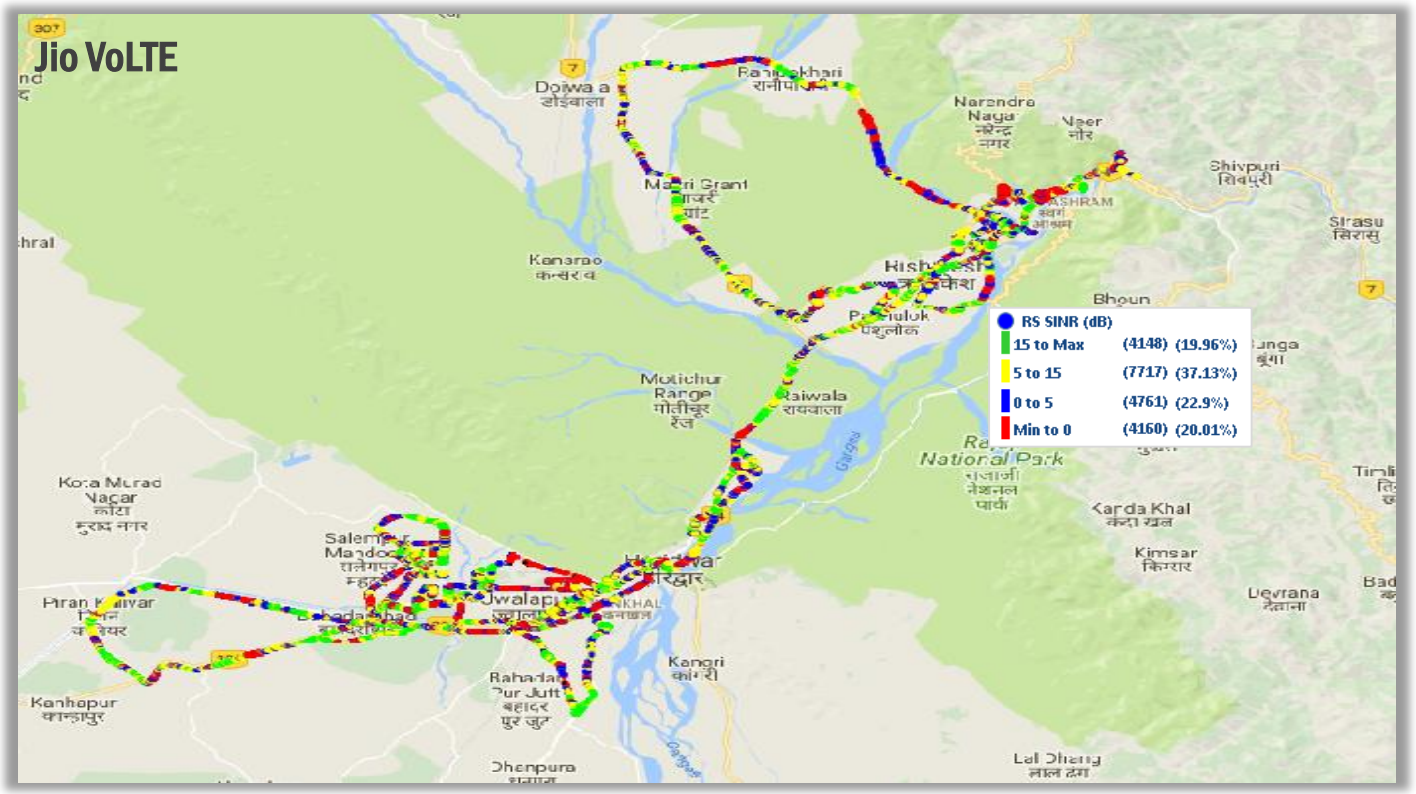

BSNL (Free Mode)
RxQual Sub
Min,2 (9384) (83.62%)
2,4 (1438) (12.81%)
4,5 (210) ( 1.87%)
5,Max (190) ( 1.69%)
Agg. Active Ec/Io (dB)
[Min, -14) (154) ( 1.51%)
[-14, -11) (380) ( 3.72%)
[-11, -9) (973) ( 9.53%)
[-9, Max] (8698) (85.23%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Sirasu
Kansrao
Bhoun
Bunga
Motichur Range
Kota Murad Nagar
Kangri
Bahadar Pur Jutt
Kanhapur
Dhanpura
Lal Dhang
Devrana


Idea (Free Mode)
RxQual Sub
Min,2 (556) (56.68%)
2,4 (259) ( 26.4%)
4,5 (104) ( 10.6%)
5,Max (62) ( 6.32%)
Agg. Active Ec/Io (dB)
[Min, -14) (4386) (23.11%)
[-14, -11) (7733) (40.75%)
[-11, -9) (3151) (16.61%)
[-9, Max] (3705) (19.53%)
RS SINR (dB)
[Min, 0) (710) (26.04%)
[0, 5) (698) ( 25.6%)
[5, 15) (1036) (37.99%)
[15, Max] (283) (10.38%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Rishikesh
Bhoun
Bunga
Motichur Range
Kota Murad Nagar
Kanhapur
Bahadar Pur Jutt
Kangri
Dhanpura
Lal Dhang
Devrana

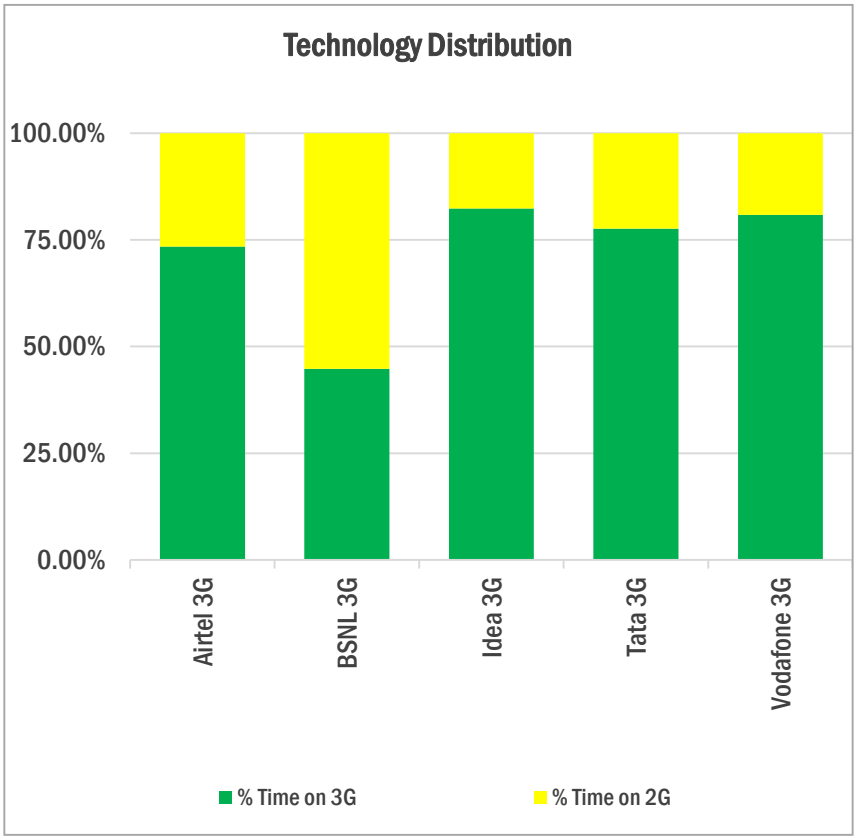

Tata (Free Mode)
RxQual Sub
Min,2 (3513) ( 79.5%)
2,4 (691) (15.64%)
4,5 (123) ( 2.78%)
5,Max (92) ( 2.08%)
Agg. Active Ec/Io (dB)
[Min, -14) (1856) (10.48%)
[-14, -11) (3113) (17.58%)
[-11, -9) (3333) (18.83%)
[-9, Max] (9401) ( 53.1%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Rishikesh
Bhoun
Bunga
Motichur Range
Kota Murad Nagar
Kanhapur
Bahadar Pur Jutt
Kangri
Dhanpura
Lal Dhang
Devrana

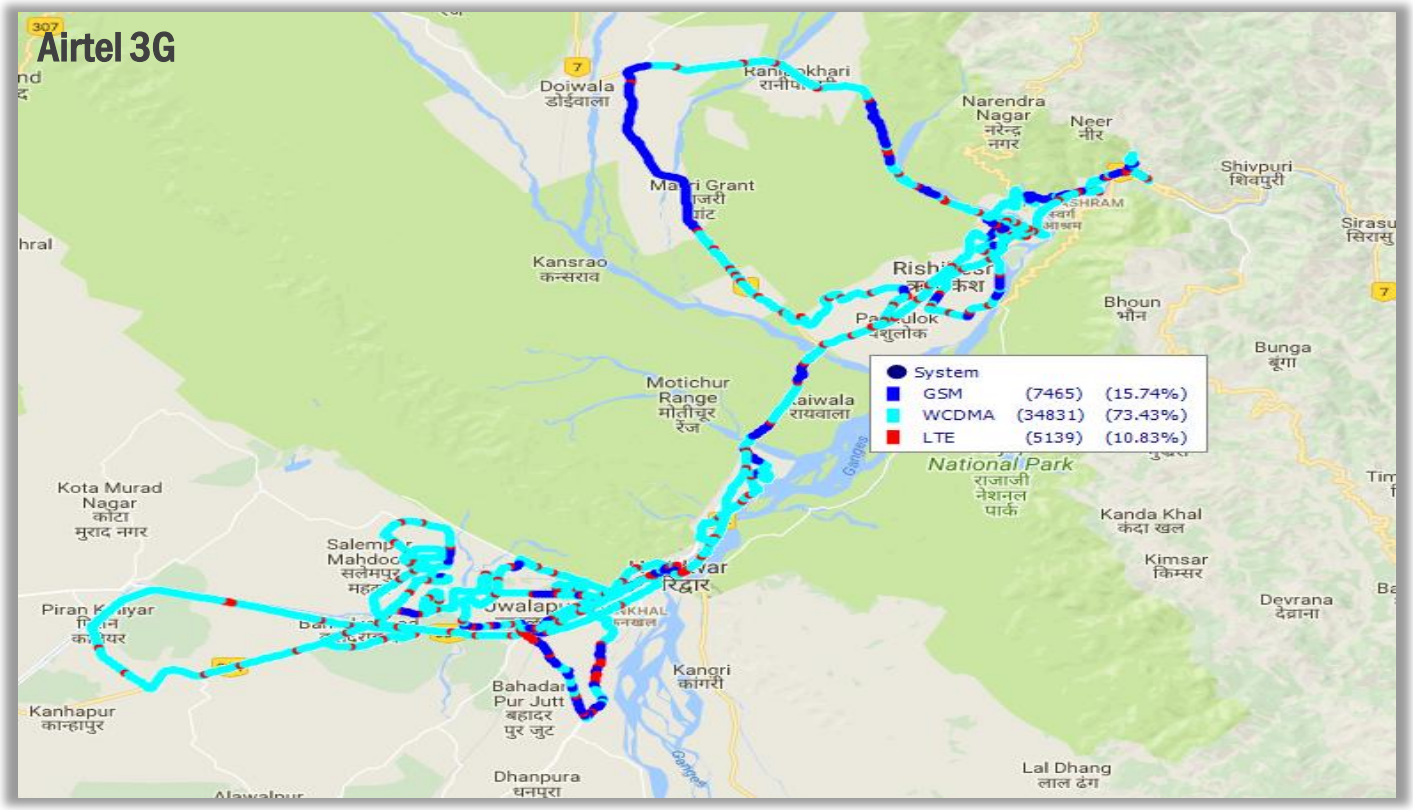

Vodafone (Free Mode)
RxQual Sub
Min,2 (1431) ( 75.2%)
2,4 (371) ( 19.5%)
4,5 (60) ( 3.15%)
5,Max (41) ( 2.15%)
Agg. Active Ec/Io (dB)
[Min, -14) (955) ( 5.04%)
[-14, -11) (5406) (28.51%)
[-11, -9) (5691) (30.01%)
[-9, Max] (6910) (36.44%)
RS SINR (dB)
[Min, 0) (618) (25.31%)
[0, 5) (720) (29.48%)
[5, 15) (908) (37.18%)
[15, Max] (196) ( 8.03%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Rishikesh
Bhoun
Bunga
Motichur Range
Kota Murad Nagar
Kangri
Bahadar Pur Jutt
Kanhapur
Dhanpura
Lal Dhang
Devrana

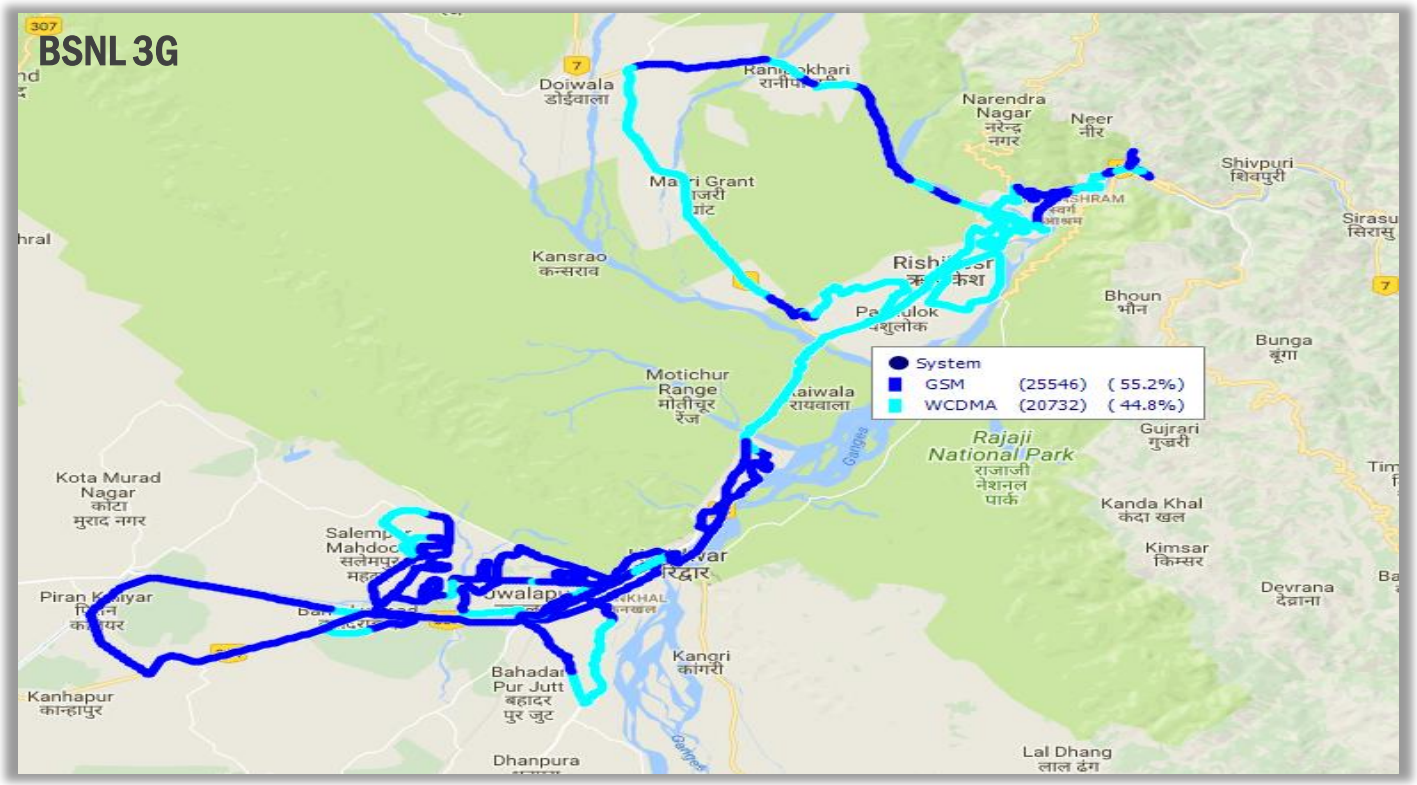

Airtel VoLTE
RxQual Sub
Min,2 (12) (63.16%)
2,4 (5) (26.32%)
4,5 (1) ( 5.26%)
5,Max (1) ( 5.26%)
Agg. Active Ec/Io (dB)
[Min, -14) (1007) (54.55%)
[-14, -11) (464) (25.14%)
[-11, -9) (178) ( 9.64%)
[-9, Max] (197) (10.67%)
RS SINR (dB)
[Min, 0) (4622) (22.47%)
[0, 5) (5583) (27.14%)
[5, 15) (7465) (36.28%)
[15, Max] (2904) (14.11%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Rishikesh
Bhoun
Bunga
Motichur Range
Kota Murad Nagar
Kangri
Bahadar Pur Jutt
Kanhapur
Dhanpura
Lal Dhang
Devrana

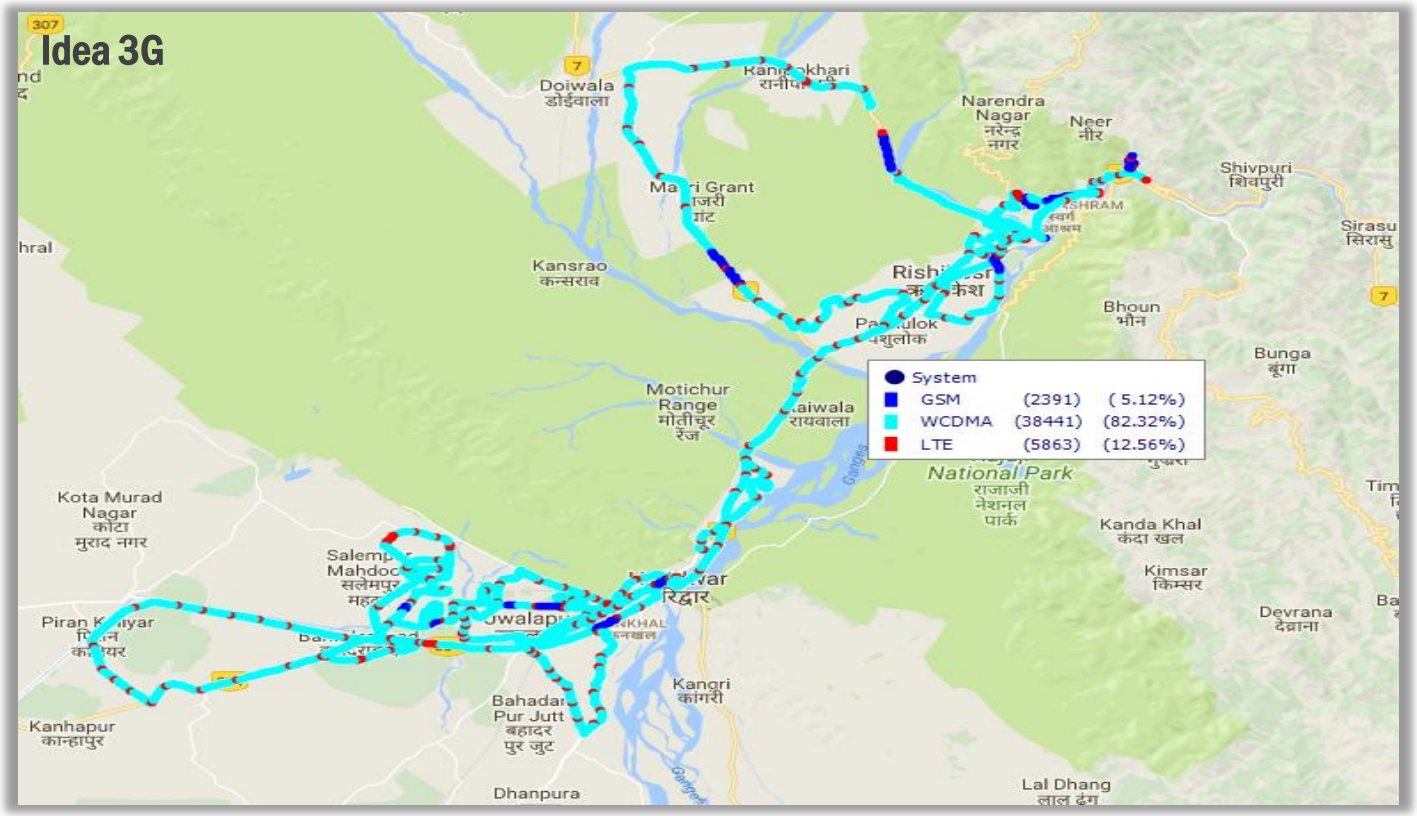

Jio VoLTE
RS SINR (dB)
15 to Max (4148) (19.96%)
5 to 15 (7717) (37.13%)
0 to 5 (4761) (22.9%)
Min to 0 (4160) (20.01%)
Doiwala
Narendra Nagar
Shivpuri
Kansrao
Bhoun
Motichur Range
Raiwala
Karda Khal
Kimsar
Kangri
Kanhapur
Dhenpura
Lal Dhang

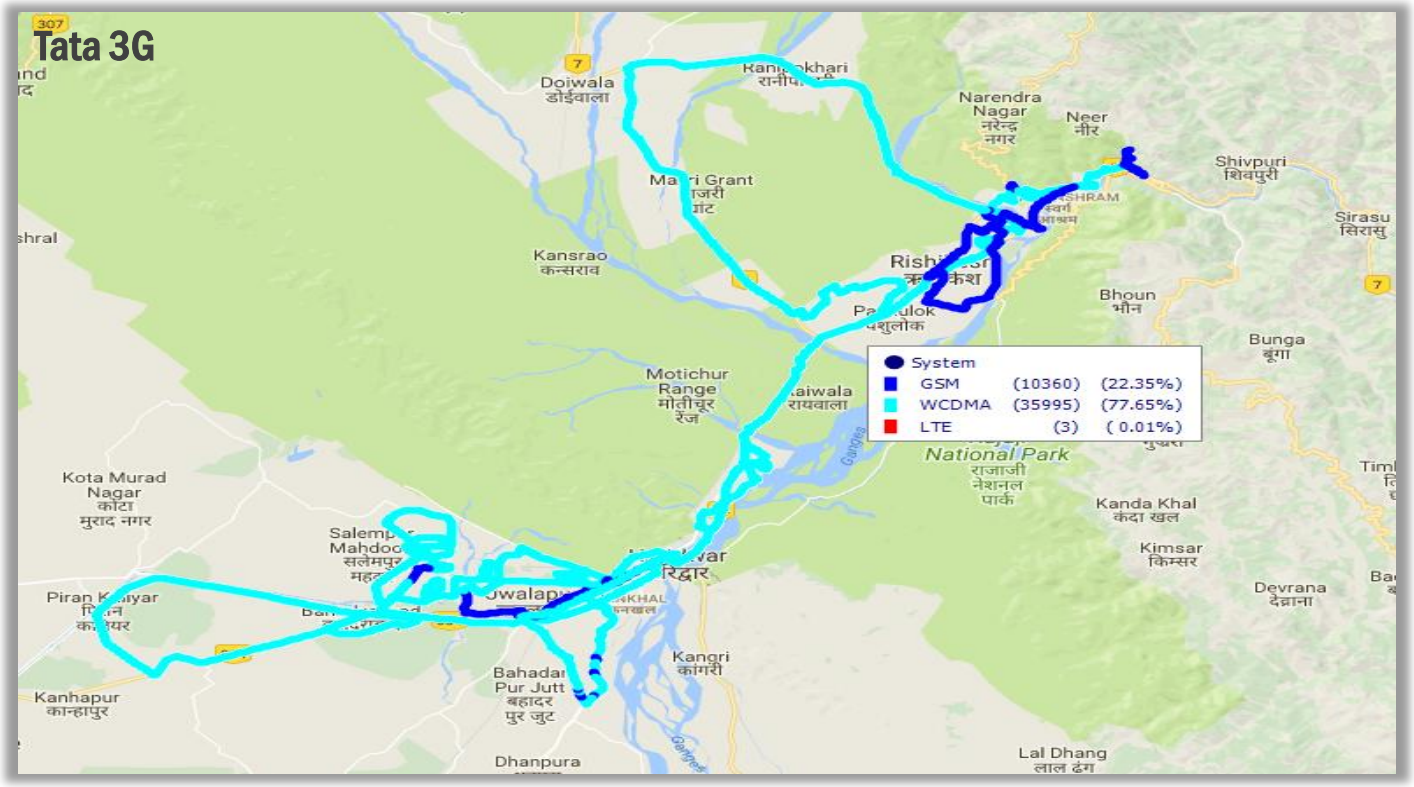
| TSP | % Time on 3G |
|---|---|
| Airtel 3G | 73.43% |
| BSNL3G | 44.80% |
| Idea 3G | 82.32% |
| Tata 3G | 77.65% |
| Vodafone 3G | 80.82% |

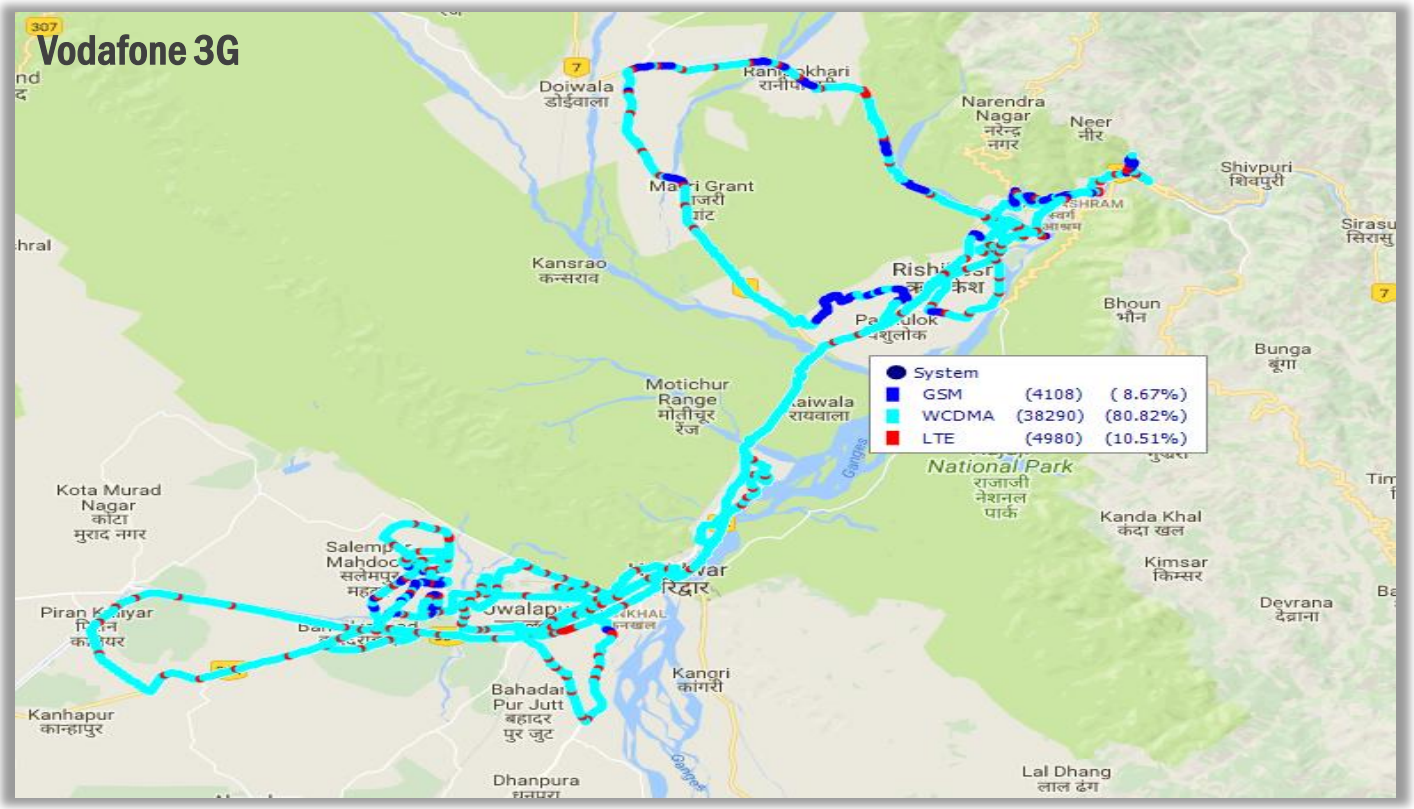



BSNL 3G
System
GSM (25546) ( 55.2%)
WCDMA (20732) ( 44.8%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Motichur Range
Rajaji National Park
Kota Murad Nagar
Kanda Khal
Kimsar
Devrana
Kangri
Bahadarpur Jutt
Kanhapur
Dhanpura
Lal Dhang
Bhoun
Bunga
Gujrari
Sirasu


Idea 3G
System
GSM (2391) ( 5.12%)
WCDMA (38441) (82.32%)
LTE (5863) (12.56%)
Doiwala
Narendra Nagar
Neer
Shivpuri
Kansrao
Motichur Range
National Park
Kota Murad Nagar
Kanda Khal
Kimsar
Devrana
Kangri
Kanhapur
Dhanpura
Lal Dhang
Bhoun
Bunga
Sirasu


Tata 3G
System
GSM (10360) (22.35%)
WCDMA (35995) (77.65%)
LTE (3) ( 0.01%)
Doiwala
डोईवाला
Narendra Nagar
नरेन्द्र नगर
Neer
नीर
Shivpuri
शिवपुरी
Sirasu
सिरासु
Kansrao
कन्सराव
Bhoun
भौन
Bunga
बूंगा
Motichur Range
मोतीचूर रेंज
National Park
राजाजी नेशनल पार्क
Kanda Khal
कंदा खल
Kimsar
किम्सर
Devrana
देव्राना
Kota Murad Nagar
कोटा मुराद नगर
Kangri
कांगरी
Kanhapur
कान्हापुर
Dhanpura
Lal Dhang
लाल ढंग


Vodafone 3G
System
GSM (4108) ( 8.67%)
WCDMA (38290) (80.82%)
LTE (4980) (10.51%)
Doiwala
डोईवाला
Narendra Nagar
नरेन्द्र नगर
Neer
नीर
Shivpuri
शिवपुरी
Sirasu
सिरासु
Kansrao
कन्सराव
Bhoun
भौन
Bunga
बूंगा
Motichur Range
मोतीचूर रेंज
National Park
राजाजी नेशनल पार्क
Kanda Khal
कंदा खल
Kimsar
किम्सर
Devrana
देव्राना
Kota Murad Nagar
कोटा मुराद नगर
Kangri
कांगरी
Kanhapur
कान्हापुर
Dhanpura
Lal Dhang
लाल ढंग