

Operator Assisted Drive Test Report

ROURKELA SSA

NOVEMBER 2023

(RO HYDERABAD)

Key Performance Indicators: All TSPs have met the Drop Call Rate (DCR) benchmark of 2%. All TSPs have met the Call Setup Success Rate (CSSR) of 95% Rx Quality Benchmark not achieved by BSNL 3G, Airtel VoLTE , Jio VoLTE.

The Operator Assisted Drive Test has been carried out by Regional Office, Hyderabad with the help of Service Providers in Rourkela City and surrounding areas Lahunipara, Rajgangpur, Sundergarh and Jharsuguda including important National Highway and State Highways from 9:00 AM to 8:00 PM during 15th November to 18th November 2023. The drive test covered drive route of 383 KMs & 6 hotspots over a period of 4 days. Approximately 377 calls were made for each of the 8 networks: three 2G networks, two 3G networks and Three LTE network covering four TSPs.

Overview

Voice
Summary

Data
Summary

Overview

The Operator Assisted Drive Test has been carried out by Regional Office, Hyderabad with the help of Service Providers 15th to 18th Nov 2023 in Rourkela City and surrounding areas Lahunipada , Biramitrapur , Sundargarch , Rajgangpur, Jharsuguda The performance of Airtel, BSNL, Jio and Vodafone Idea Limited were monitored across various technologies (2G, 3G, and 4G). 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 and Latency

Test Details :

Voice Tests: Calls were made for 90 sec duration with wait time of 10 sec between calls in all technologies. The drive test covered a drive route of approximately 383 KMs over a period of 4 days from 15th Nov to 18th Nov 2023. Approximately 377 calls were made for each of the 8 networks: three 2G (Lock Mode) networks, two 3G (Dual mode) networks and three VoLTE network covering 4 unique TSP's.

Data Tests:

1. Dynamic data test was conducted for 383 kms over a period of 4 days for download throughput for 3G technologies.

2. Data Tests were performed at 6 static locations for 2G, 3G technologies.

*For Voice and Data KPI's, 2G measurement is done with UE locked mode, 3G measurement is done with UE in Dual mode (2G & 3G) and 4G measurement is done with UE in Free Mode.

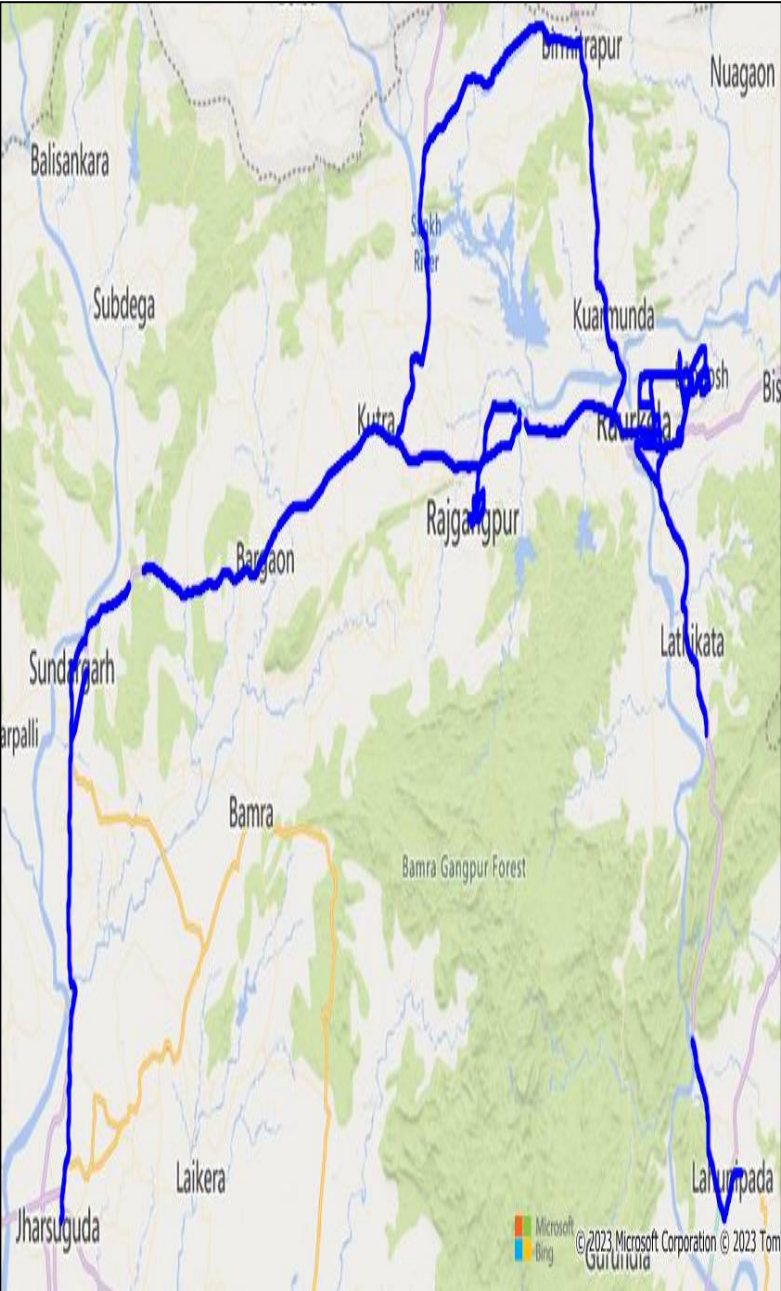
*3G KPI's which are calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.

*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(Locked) 20MB ,4G (Free) - 40 MB |
| Upload | 2G (Locked) - 100KB, 3G(Locked) 5Mb ,4G (Free) - 10 MB |
| Web Browsing | 3 links of e/m commerce website www.amazon.in, www.flipkart.com and PayTm |
| Latency | 32 Bytes on www.google.com |

Overview

Voice & Dynamic Data Test Drive Route



| Area Covered -Rourkela | |
|---------------------------|--------------------------------|
| ISPAT GENERAL HOSPITAL | NIT Rourkela |
| Railway station | VSS Market,Chhend |
| Stadium | Forum Galleria Mall |
| Bus Stand | Ambagan Daily Market |
| Govt College | Ring Road |
| Area Covered- Rajgangapur | |
| Railway Station | OCL Colony |
| Bus stand | Subash Chowk |
| Railway colony | SD Women's College |
| Police Station | Khada Gali/Main Market |
| Area covered -Sundargarh | |
| Bus Stand | Mission Road |
| Stadium | NTPC Hospital |
| Hospital Chowk | Sundargarh Engineering College |
| Area covered -Jharsuguda | |
| Bus Stand | Airport |
| Collector Office | Beheramal Chowk |

| Static Locations |
|----------------------------|
| Govt Hospital-Rourkela |
| Bus Stand-Rourkela |
| Railway Station-Rourkela |
| Railway Station-Rajaganpur |
| Bus Stand-Sundargarh |
| Bus Stand-Jharsuguda |

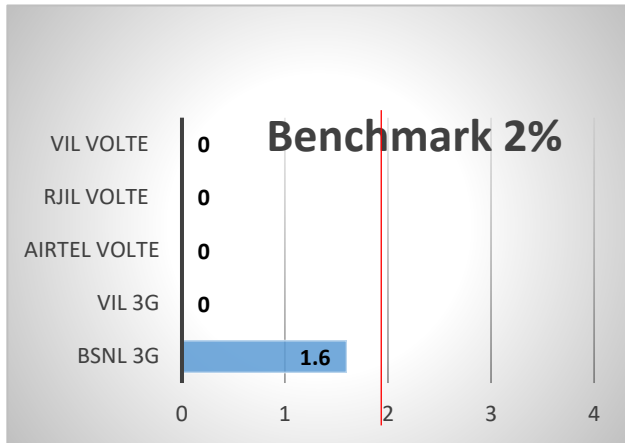


Voice Calls

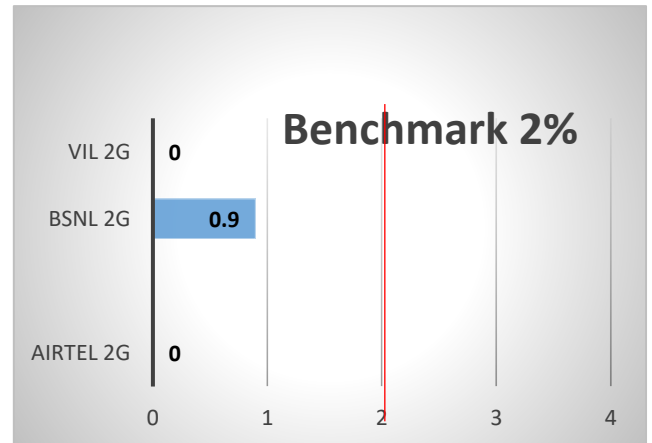
Key Observations

QoS compliance of the TSPs in Madurai for Voice across technologies 2G/3G/4G-VoLTE:

Drop Call Rate (%)

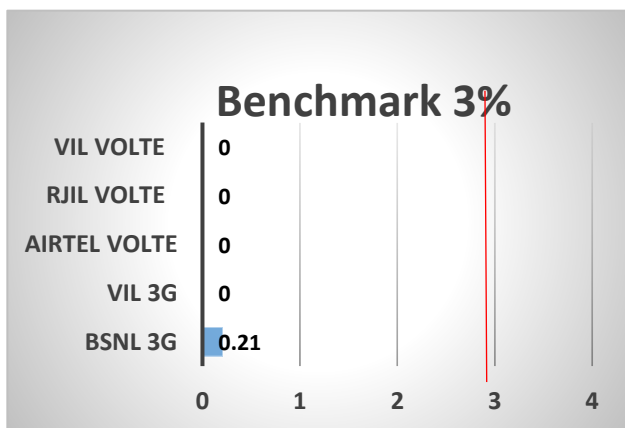


3G/VoLTE Network

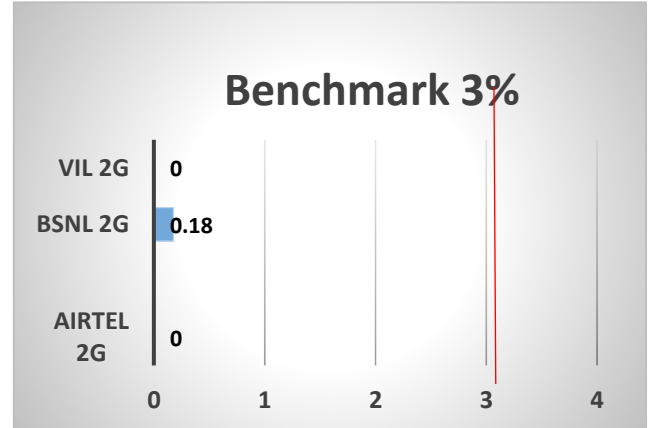


2G Network

Block Call Rate (%)



3G / VoLTE Network



2G Network

| KPIs | 2G | | | 3G | | VoLTE | | |
|-------------------|--------|------|-----|------|-----|--------|------|-----|
| | Airtel | BSNL | VIL | BSNL | VIL | Airtel | RJIL | VIL |
| Drop Call Rate % | 0 | 0.9 | 0 | 1.6 | 0 | 0 | 0 | 0 |
| Block Call Rate % | 0 | 0.18 | 0 | 0.21 | 0 | 0 | 0 | 0 |

- All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%).
- Call Block Rate (CBR%) benchmark of 3% was achieved by all TSP's.

Voice Calls

Key Observations

Coverage

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

| TSPS | 2G | | |
|------------|--------|------|-------|
| | Airtel | BSNL | VIL |
| Coverage % | 96.75 | 96.4 | 93.99 |

b) Percentage of coverage samples for 3G \geq -90 dBm & LTE \geq -110 dBm

| TSPs | 3G | | VoLTE | | |
|------------|-------|-------|--------|-----|-------|
| | BSNL | VIL | Airtel | JIO | VIL |
| Coverage % | 83.77 | 97.94 | 96.43 | 99 | 97.94 |

c) Percentage of time spent on 3G/VoLTE network

| TSPs | 3G | | VoLTE | | |
|-----------------------|------|-------|--------|-----|-------|
| | BSNL | VIL | Airtel | JIO | VIL |
| Time Spent on 3G/4G % | 77 | 67.35 | 100 | 100 | 62.66 |

Data Services Static

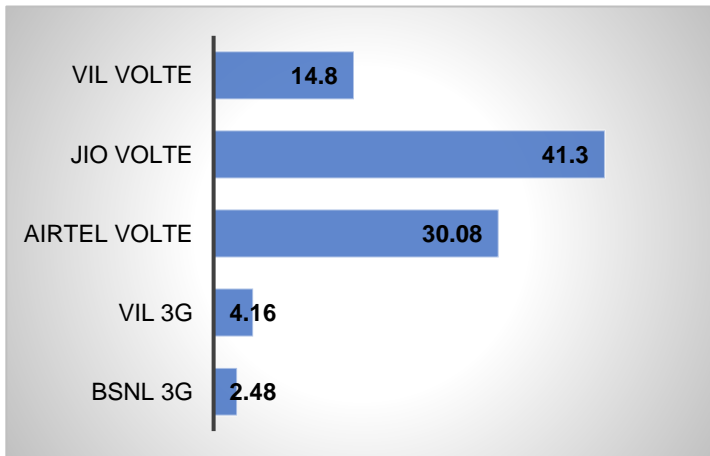
Key Observations (Average of 6 Hotspots)

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

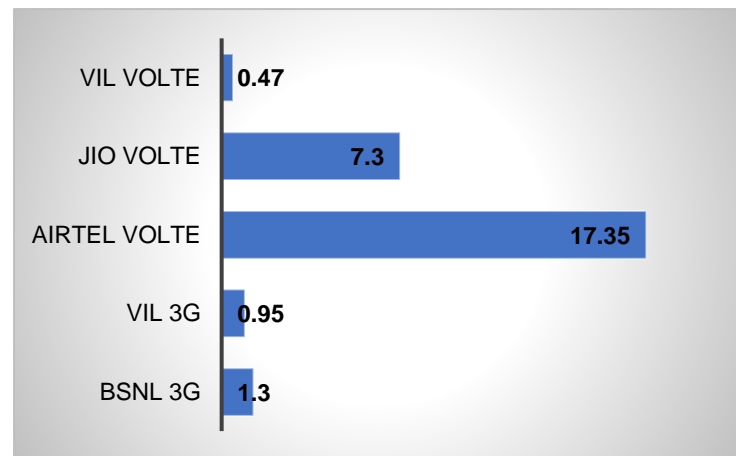
Data Download and Upload Performance (Mbps)

3G/4G Network:

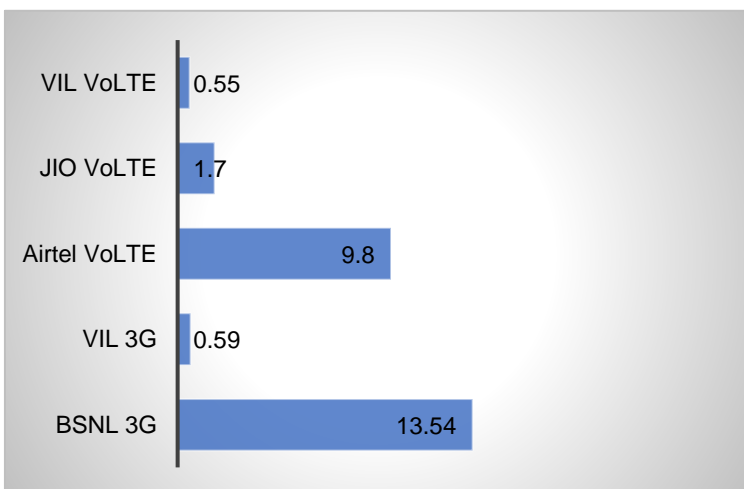
Download Throughput (Mbps)



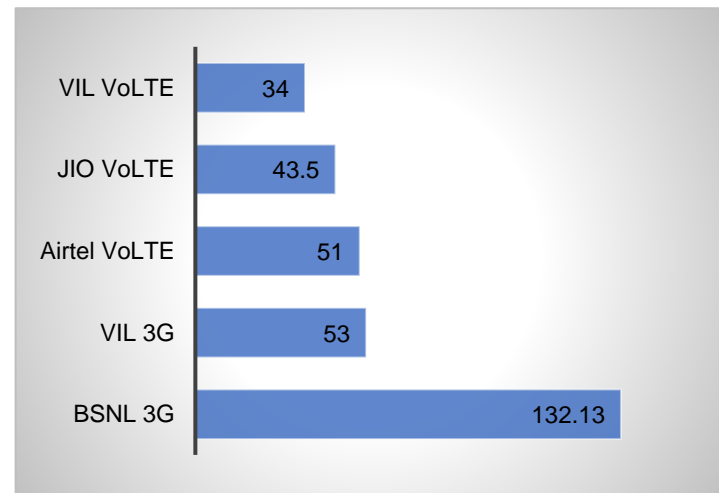
Upload Throughput (Mbps)



Web Browsing delay (Sec)



Latency (ms)



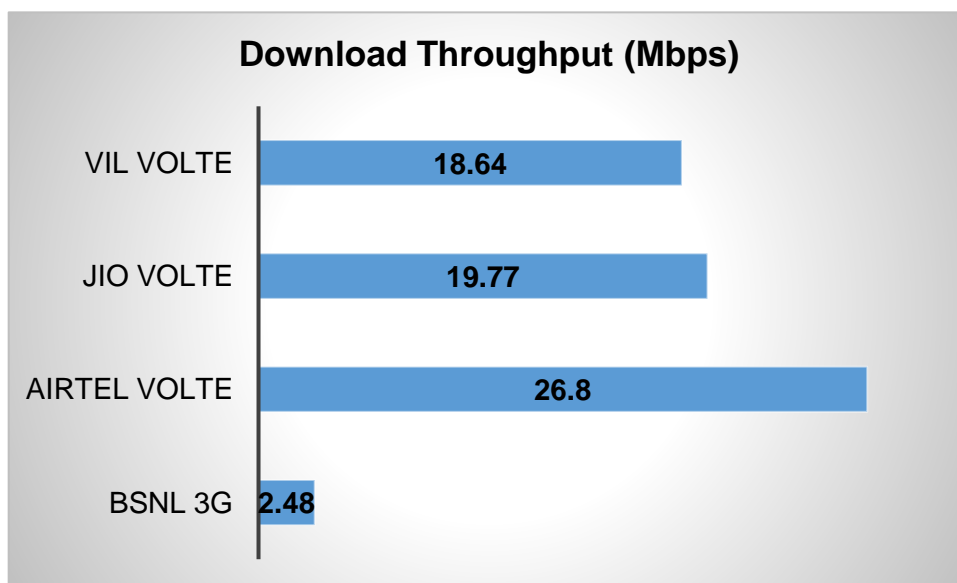
Data Services Dynamic

Key Observations

Dynamic Data was tested for 383 Kms. Download Throughput was tested.

Data Download Performance (kbps) - Dynamic

3G/4G Network:



| Data Services Static Dynamic | VoLTE | | | |
|---------------------------------|---------|-----------|--------|--------|
| | BSNL 3G | Airtel 4G | JIO 4G | VIL 4G |
| Download Throughput (Mbps) | 2.48 | 26.8 | 19.77 | 18.64 |

Summary

SSA Level Summary-Voice

| Voice Call | 2G | | |
|-----------------------|--------|-------|-------|
| | Airtel | BSNL | VIL |
| Call Attempt | 364 | 377 | 341 |
| Blocked Call Rate (%) | 0 | 0.18 | 0 |
| CSSR% (Accessibility) | 100 | 98.22 | 100 |
| Drop Call Rate (%) | 0.00 | 0.9 | 0 |
| Mobility HOSR (%) | 100 | 97.23 | 98.77 |
| Rx Quality (%) | 96.87 | 84.3 | 95.98 |

| Voice Call | 3G | | VoLTE | | |
|-----------------------|-------|-------|--------------|--------------|-----------|
| | BSNL | VIL | Airtel VoLTE | JIO VoLTE | VIL VoLTE |
| Call Attempt | 344 | 202 | 377 | 374 | 166 |
| Blocked Call Rate (%) | 0.21 | 0 | 0 | 0 | 0 |
| CSSR% (Accessibility) | 97.36 | 100 | 100 | 100 | 100 |
| Drop Call Rate (%) | 1.6 | 0 | 0 | 0 | 0 |
| Mobility HOSR (%) | 97.47 | 100 | 100 | 99.8 | 100 |
| Rx Quality (%) | 75.34 | 95.19 | 92.29 | 92.47 | 96.47 |

Summary

SSA Level Summary- (Average of 6 hotspots)- Data Services

| Data Services Static | 2G | | |
|----------------------------|--------|--------|--------|
| | Airtel | BSNL | VIL |
| Download Throughput (Kbps) | 196.28 | 168.33 | 180.73 |
| Upload Throughput (Kbps) | 81.3 | 128.33 | 91.14 |
| Web Browsing Delay (sec) | 19.90 | 31.17 | 0.67 |
| Latency (msec) | 335.66 | 141.70 | 130 |

| Data Services Static | 3G | | VoLTE | | |
|----------------------------|--------|------|--------------|-----------|-----------|
| | BSNL | VIL | Airtel VoLTE | JIO VoLTE | VIL VoLTE |
| Download Throughput (Mbps) | 2.48 | 4.16 | 30.08 | 41.3 | 14.8 |
| Upload Throughput (Mbps) | 1.30 | 0.95 | 17.35 | 7.3 | 0.47 |
| Web Browsing Delay (sec) | 13.54 | 0.59 | 9.8 | 1.7 | 0.55 |
| Latency (msec) | 132.13 | 53 | 51 | 43.5 | 34 |

| Rajgangpur railway station | 2G | | |
|----------------------------|--------|--------|--------|
| | Airtel | BSNL | VIL |
| Download Throughput (kbps) | 243.89 | 177.14 | 206.11 |
| Upload Throughput (kbps) | 111.7 | 98.90 | 82.3 |
| Web Browsing Delay (sec) | 23.4 | 124.1 | 0.71 |
| Latency (msec) | 298.86 | 523 | 134 |

| Sundargarh bus stand | 2G | | |
|----------------------------|--------|--------|-------|
| | Airtel | BSNL | VIL |
| Download Throughput (kbps) | 221.67 | 134.84 | 177.3 |
| Upload Throughput (kbps) | 56.89 | 88.36 | 72.2 |
| Web Browsing Delay (sec) | 15.34 | 113.73 | 0.58 |
| Latency (msec) | 435.7 | 255 | 137 |

| Jharsuguda bus stand | 2G | | |
|----------------------------|--------|--------|-------|
| | Airtel | BSNL | VIL |
| Download Throughput (kbps) | 167.56 | 84.69 | 188.7 |
| Upload Throughput (kbps) | 86.67 | 27.95 | 92.4 |
| Web Browsing Delay (sec) | 20.5 | 123.75 | 0.47 |
| Latency (msec) | 389.1 | 535 | 131 |

| Rourkela Bus Stand | 2G | | |
|----------------------------|--------|--------|--------|
| | Airtel | BSNL | VIL |
| Download Throughput (kbps) | 121.24 | 126.07 | 175.23 |
| Upload Throughput (kbps) | 65.89 | 93.65 | 81.17 |
| Web Browsing Delay (sec) | 18 | 107.24 | 0.63 |
| Latency (msec) | 278.56 | 358.33 | 128 |

| Rourkela Railway station | 2G | | |
|----------------------------|--------|--------|--------|
| | Airtel | BSNL | VIL |
| Download Throughput (kbps) | 198.67 | 136.69 | 178.73 |
| Upload Throughput (kbps) | 87.45 | 88.18 | 98.2 |
| Web Browsing Delay (sec) | 22.64 | 117.89 | 0.61 |
| Latency (msec) | 322.33 | 292.33 | 129 |

| Rourkela Govt hospital | 2G | | |
|----------------------------|--------|--------|--------|
| | Airtel | BSNL | VIL |
| Download Throughput (kbps) | 224.65 | 174.5 | 189.81 |
| Upload Throughput (kbps) | 79.23 | 67.98 | 96.2 |
| Web Browsing Delay (sec) | 19.53 | 108.18 | 0.60 |
| Latency (msec) | 289.43 | 516.4 | 133 |

Data Services static

SSA Level Summary(contd.)

| Rajgangpur railway station | 3G | | 4G | | |
|----------------------------|-------|------|--------|-------|-------|
| | BSNL | VIL | Airtel | JIO | VIL |
| Download Throughput (Mbps) | 2.65 | 3.62 | 23.12 | 58.12 | 13.21 |
| Upload Throughput (Mbps) | 1.22 | 1.1 | 13.67 | 8.6 | 6.8 |
| Web Browsing Delay (sec) | 1.91 | 0.66 | 11.23 | 2 | 0.53 |
| Latency (msec) | 187.3 | 53 | 66.0 | 52 | 35 |

| Sundargarh bus stand | 3G | | 4G | | |
|----------------------------|--------|------|--------|-------|------|
| | BSNL | VIL | Airtel | JIO | VIL |
| Download Throughput (Mbps) | 3.34 | 3.02 | 48.89 | 62.21 | 12.7 |
| Upload Throughput (Mbps) | 0.49 | 1.2 | 32.56 | 8.5 | 9.2 |
| Web Browsing Delay (sec) | 13.36 | 0.93 | 7.23 | 1.8 | 0.73 |
| Latency (msec) | 129.24 | 57 | 46.0 | 45 | 31 |

| Jharsuguda bus stand | 3G | | 4G | | |
|----------------------------|--------|------|--------|------|------|
| | BSNL | VIL | Airtel | JIO | VIL |
| Download Throughput (Mbps) | 2.54 | 4.1 | 17.89 | 39.6 | 21.3 |
| Upload Throughput (Mbps) | 1.58 | 1.7 | 12.56 | 8.1 | 11.7 |
| Web Browsing Delay (sec) | 14.69 | 0.47 | 15.21 | 4.1 | 0.52 |
| Latency (msec) | 107.16 | 43 | 45.0 | 43 | 32 |

| Rourkela Bus Stand | 3G | | 4G | | |
|----------------------------|--------|------|--------|-----|------|
| | BSNL | VIL | Airtel | JIO | VIL |
| Download Throughput (Mbps) | 2.85 | 5.5 | 21.37 | 27 | 14.2 |
| Upload Throughput (Mbps) | 1.3 | 2.17 | 5.2 | 6.2 | 9.8 |
| Web Browsing Delay (sec) | 13.36 | 0.59 | 9.56 | 1.8 | 0.34 |
| Latency (msec) | 125.35 | 40 | 50.0 | 45 | 39 |

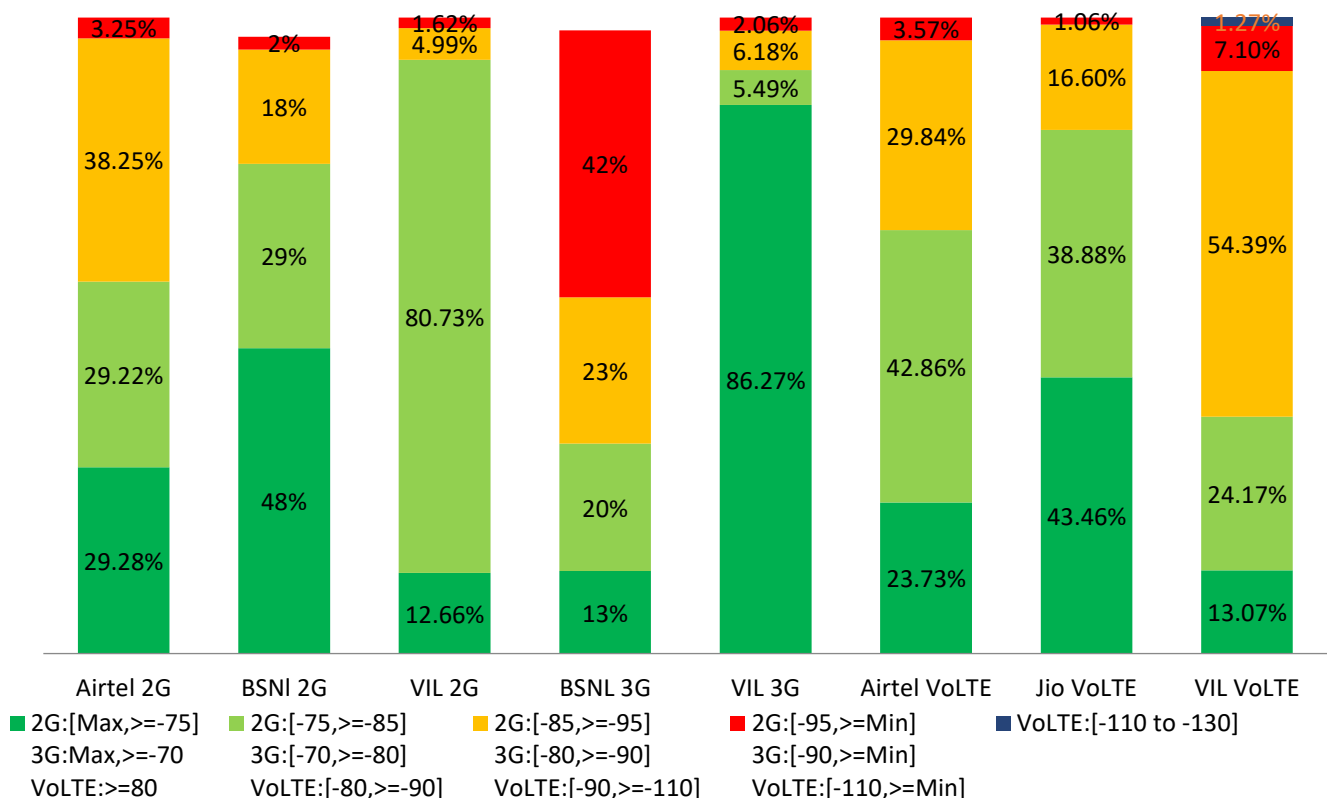
| Rourkela railway station | 3G | | 4G | | |
|----------------------------|--------|------|--------|------|-------|
| | BSNL | VIL | Airtel | JIO | VIL |
| Download Throughput (Mbps) | 1.76 | 4.12 | 36.88 | 28.2 | 11.15 |
| Upload Throughput (Mbps) | 1.41 | 2.21 | 17.82 | 8.5 | 8.4 |
| Web Browsing Delay (sec) | 12.21 | 0.43 | 5.67 | 1.8 | 0.48 |
| Latency (msec) | 106.66 | 44 | 51.0 | 45 | 33 |

| Rourkela Govt hospital | 3G | | 4G | | |
|----------------------------|------|------|--------|------|-------|
| | BSNL | VIL | Airtel | JIO | VIL |
| Download Throughput (Mbps) | 2.29 | 4.46 | 31.38 | 32.6 | 18.24 |
| Upload Throughput (Mbps) | 1.42 | 2.34 | 22.34 | 3.8 | 11.3 |
| Web Browsing Delay (sec) | 3.92 | 0.52 | 10.23 | 1.7 | 0.49 |
| Latency (msec) | 86 | 51 | 50.0 | 32 | 36 |

I. Coverage Details

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

| TSP | Coverage Rate % |
|--------------|-----------------|
| Airtel 2G | 96.75 |
| BSNL 2G | 94.20 |
| VIL 2G | 93.39 |
| BSNL 3G | 77.3 |
| VIL 3G | 97.94 |
| Airtel VoLTE | 96.43 |
| Jio VoLTE | 99 |
| VIL VoLTE | 98.73 |



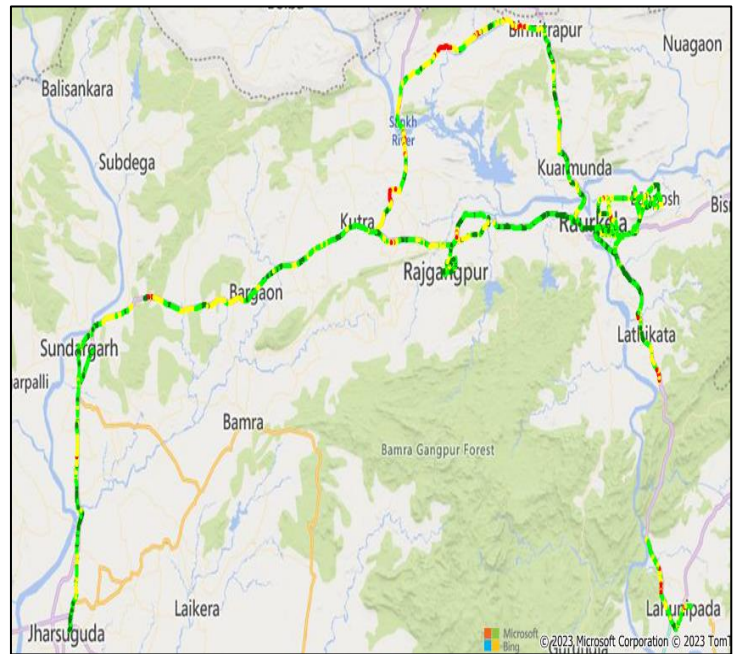
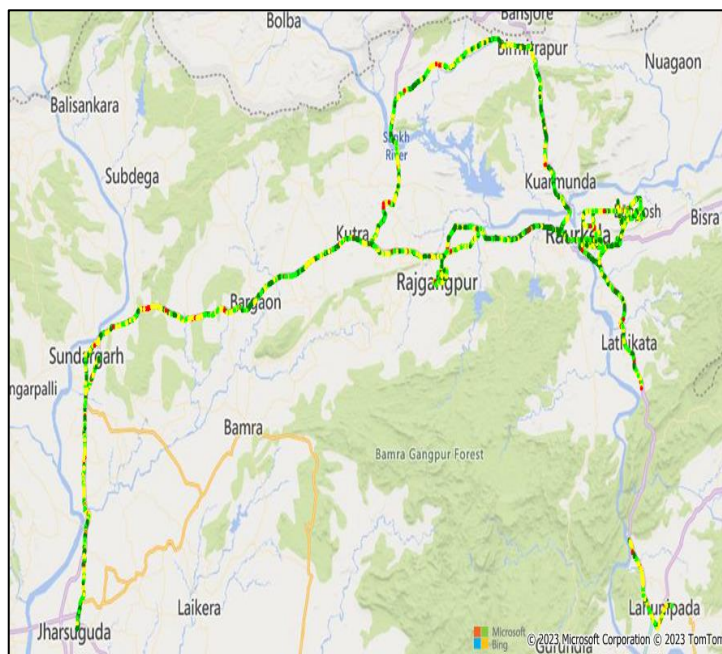
I. Coverage Details

AIRTEL

| TSP | Coverage Rate % |
|--------------|-----------------|
| Airtel 2G | 96.75 |
| Airtel VoLTE | 96.43 |

2G

VoLTE



| Overall Rx Level | # Samples | % |
|------------------|----------------|------------|
| [Max, >=-75] | 1083786 | 29.28 |
| [-75, >=-85) | 1081493 | 29.22 |
| [-85, >=-95) | 1415926 | 38.25 |
| [-95, >=Min) | 120262 | 3.25 |
| Total | 3701467 | 100 |

| Overall RSRP | # Samples | % |
|---------------|-----------------|------------|
| [Max, >=-80] | 2768597 | 23.73 |
| [-80, >=-90) | 5001476 | 42.86 |
| [-90, >=-110) | 3482302 | 29.84 |
| [-110, >=Min) | 416548 | 3.57 |
| Total | 11668923 | 100 |

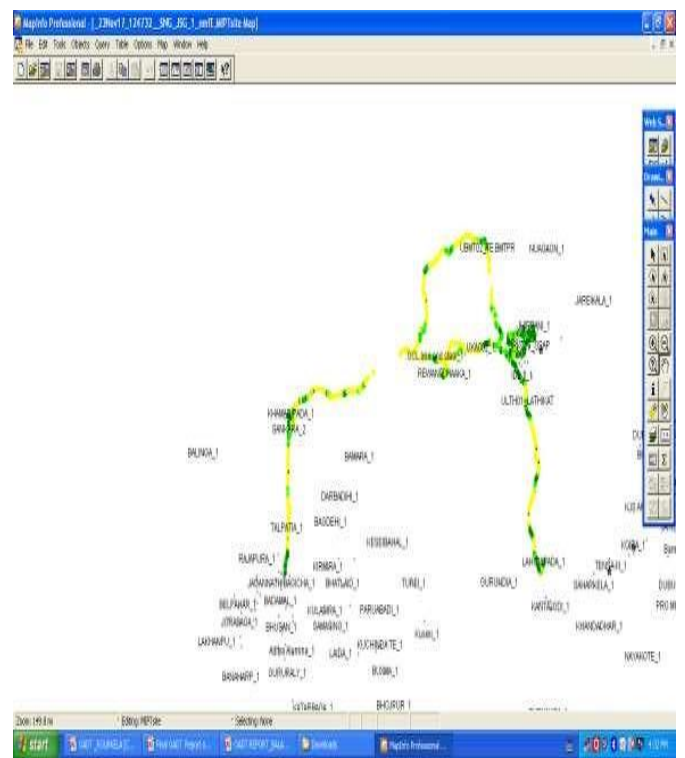
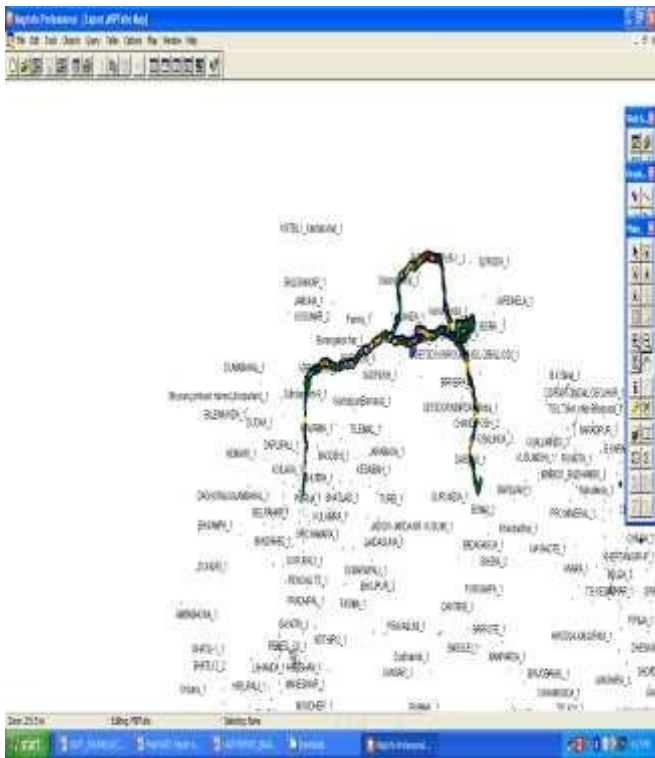
I. Coverage Details

BSNL

| Technology | Coverage Rate % |
|------------|-----------------|
| 2G | 94.2 |
| 3G | 77.3 |

2G

3G



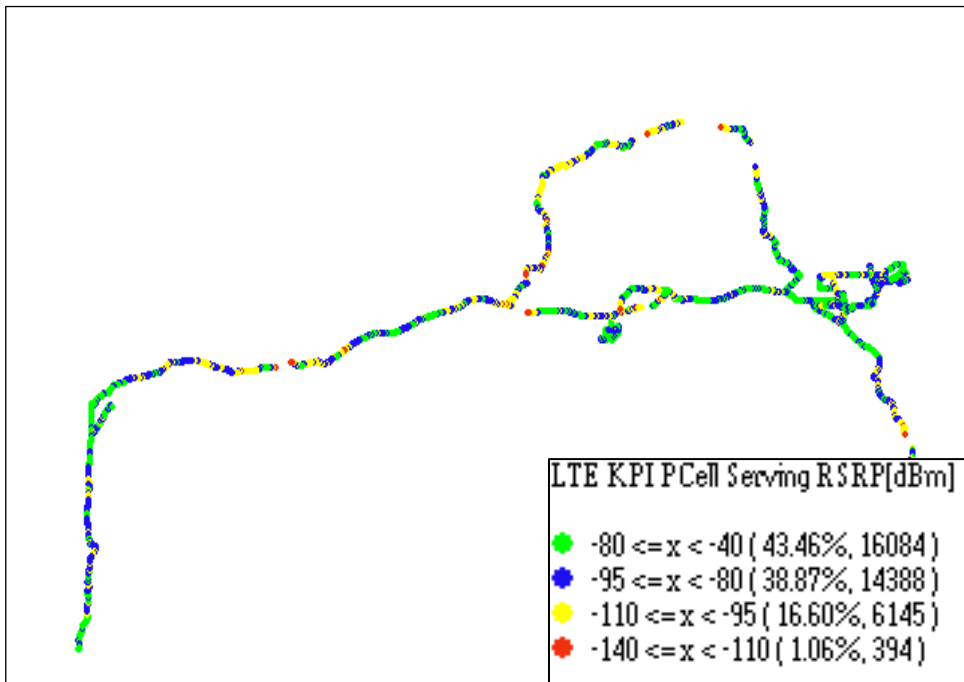
| 2G | | |
|-----------------|-----------|------------|
| Overall RxLevel | # Samples | % |
| [Max, >=-75] | 38244 | 48 |
| [-75, >=-85) | 21027 | 29 |
| [-85, >=-95) | 12633 | 18 |
| [-95, >=Min) | 3055 | 2 |
| Total | | 100 |

| 3G | | |
|--------------|-----------|------------|
| Overall RSCP | # Samples | % |
| [Max, >=-70] | 29065 | 13 |
| [-70, >=-80) | 43649 | 20 |
| [-80, >=-90) | 49989 | 23 |
| [-90, >=Min) | 91338 | 42 |
| Total | | 100 |

I. Coverage Details

JIO

| Technology | Coverage Rate % |
|------------|-----------------|
| VoLTE | 97.14 |



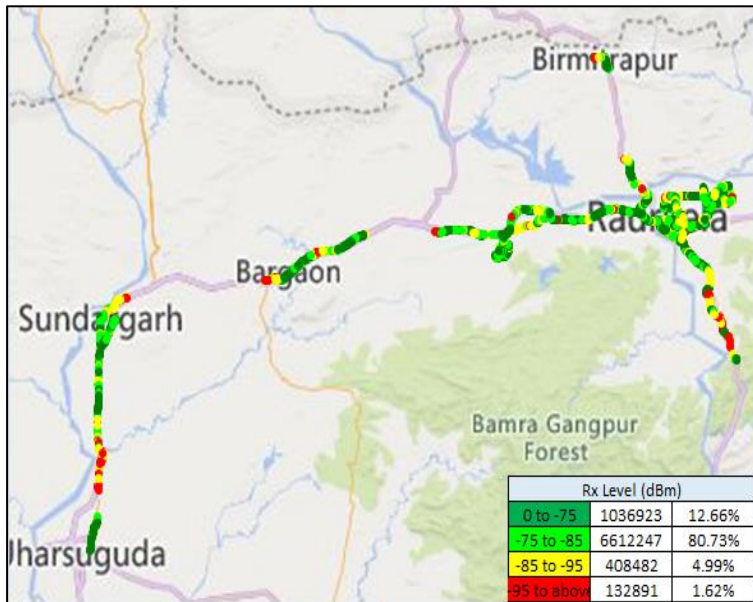
| Overall RSRP-Volte | # Samples | % |
|--------------------|-----------|-------|
| [Min, >=-80] | 11418 | 43.46 |
| [-80, =-90] | 12683 | 38.88 |
| [-90, <=-110] | 5903 | 16.60 |
| [-110, >=Min] | 803 | 1.06 |
| Total | 30807 | 100 |

I. Coverage Details

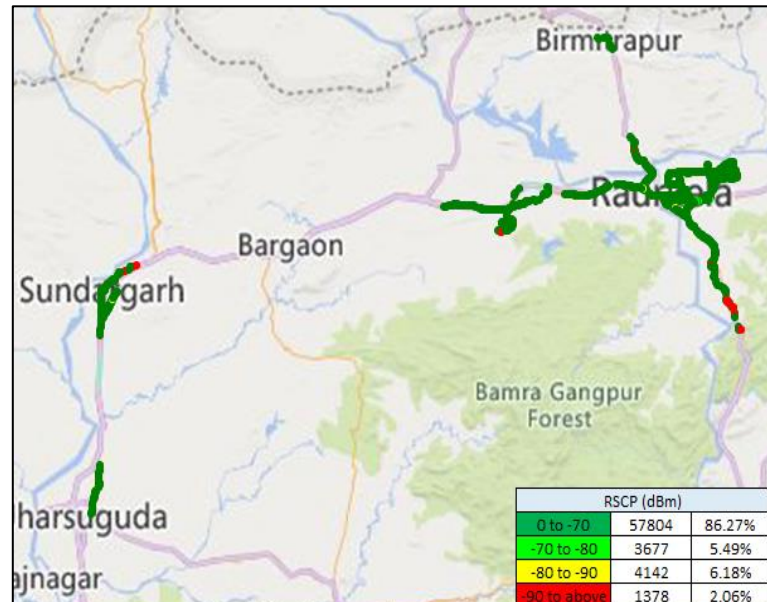
VIL

| Technology | Coverage Rate % |
|------------|-----------------|
| 2G | 93.39 |
| 3G | 97.94 |

2G



3G



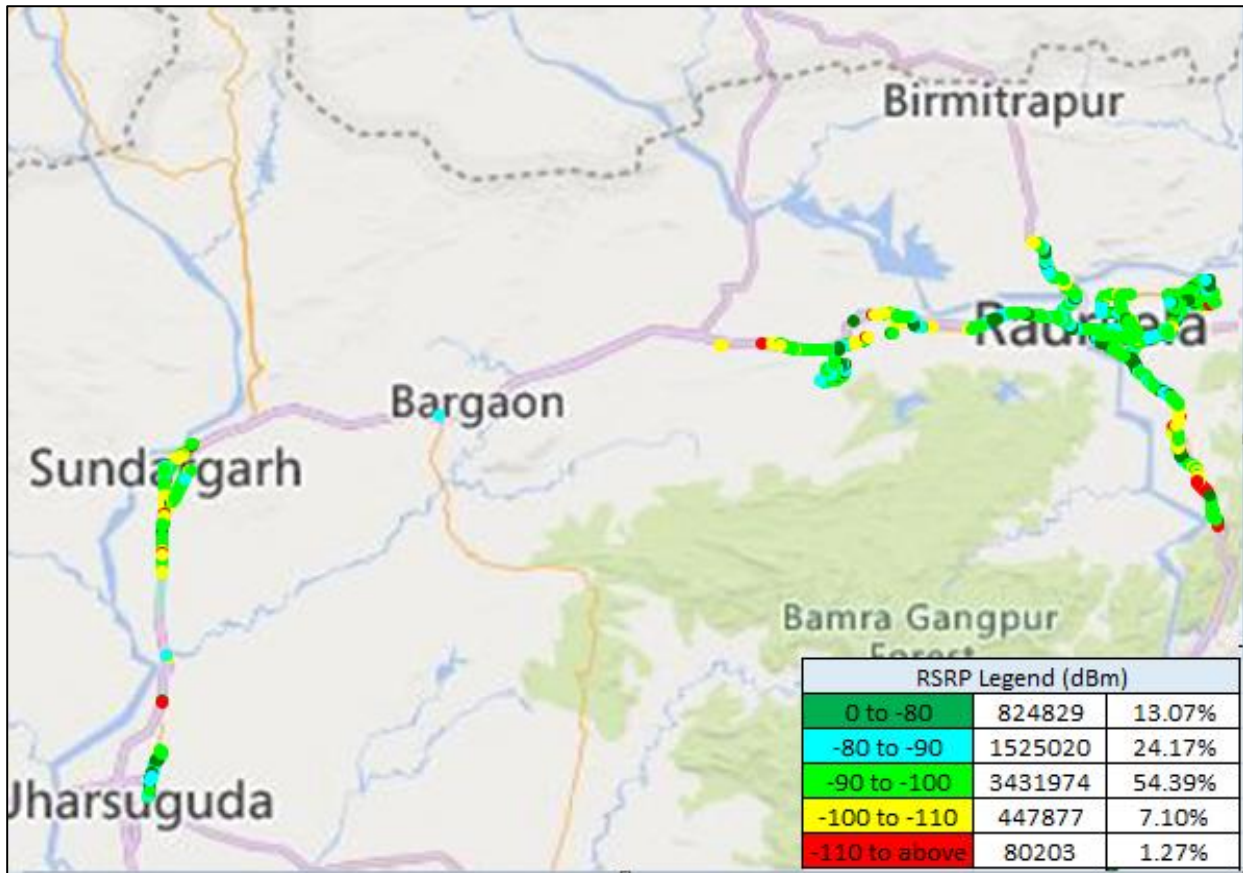
| Overall Rx Level | # Samples | % |
|------------------|----------------|------------|
| [Max, >=-75] | 1036923 | 12.66 |
| [-75, >=-85) | 6612247 | 80.73 |
| [-85, >=-95) | 408482 | 4.99 |
| [-95, >=Min) | 132891 | 1.62 |
| Total | 8190543 | 100 |

| Overall RSRP | # Samples | % |
|---------------|--------------|------------|
| [Max, >=-80] | 57804 | 86.27 |
| [-80, >=-90) | 3677 | 5.49 |
| [-90, >=-110) | 4142 | 6.18 |
| [-110, >=Min) | 1378 | 2.06 |
| Total | 67001 | 100 |

I. Coverage Details

VIL

| Technology | Coverage Rate % |
|------------|-----------------|
| VoLTE | 98.73 |

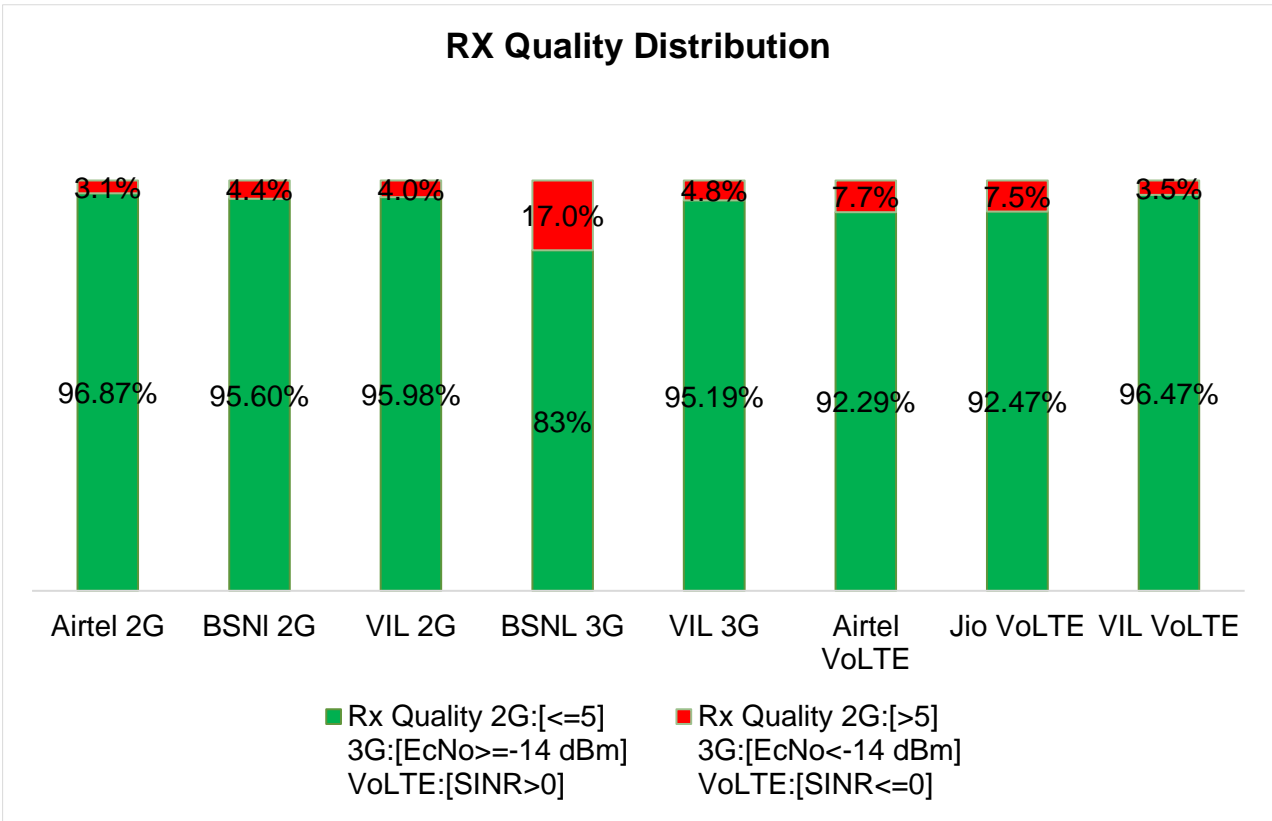


| Overall RSRP | # Samples | % |
|---------------|----------------|------------|
| [Max, >=-80] | 824829 | 13.07 |
| [-80, >=-90) | 1525020 | 24.17 |
| [-90, >=-110) | 3431974 | 54.39 |
| [110, >=-120) | 447877 | 7.10 |
| [120, >=-Min) | 80203 | 1.27 |
| Total | 6309903 | 100 |

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, whereas quality beyond this benchmark is considered to be bad. The benchmark should usually be $\geq 95\%$.

| TSP | Rx Quality % |
|--------------|--------------|
| Airtel 2G | 96.87 |
| BSNL 2G | 95.6 |
| VIL 2G | 95.98 |
| BSNL 3G | 83 |
| VIL 3G | 95.19 |
| Airtel VoLTE | 92.29 |
| Jio VoLTE | 92.47 |
| VIL VoLTE | 96.47 |

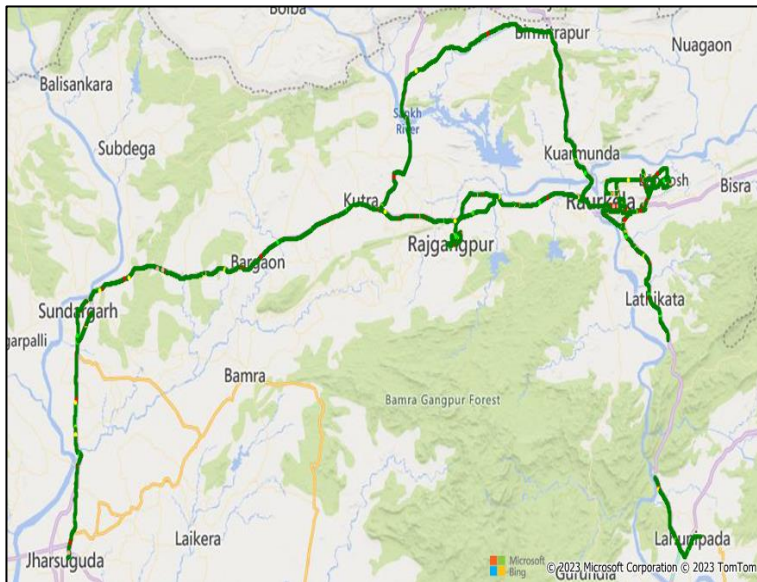


II. Quality Details

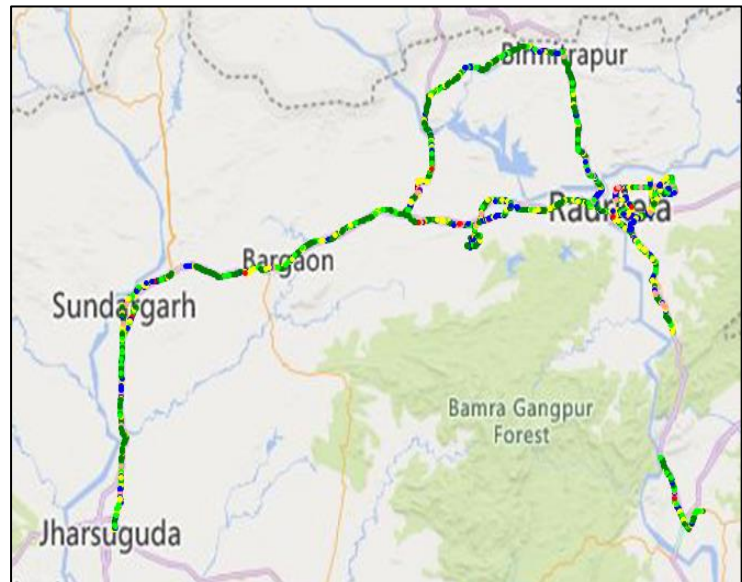
Airtel

| Technology | Rx Quality % |
|------------|--------------|
| 2G | 96.87 |
| VoLTE | 92.29 |

2G



VoLTE



| Overall Rx Quality | # Samples | % |
|--------------------|----------------|-------------|
| (Min, <=2) | 3406110 | 92.02 |
| (2, <=3) | 64856 | 1.75 |
| (3, <=4) | 62096 | 1.68 |
| (4, <=5) | 52416 | 1.42 |
| (5, <=Max) | 115989 | 3.13 |
| Total | 3701467 | 100% |

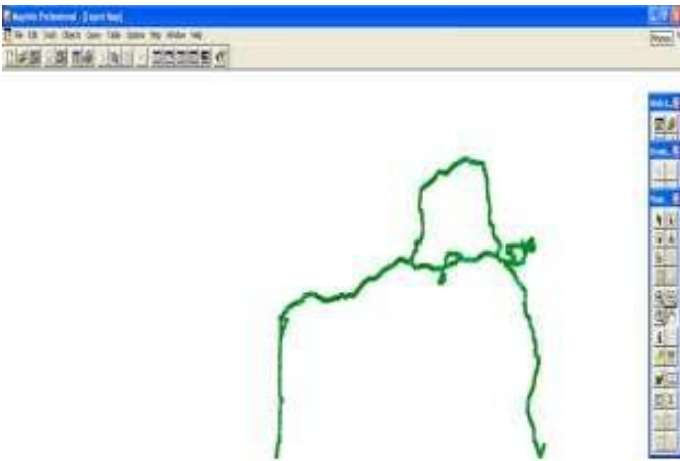
| Overall SINR | # Samples | % |
|--------------|-----------------|------------|
| (Min, <=-3) | 285460 | 2.45 |
| (-3, <=0) | 613880 | 5.26 |
| (0, <=5) | 2298645 | 19.70 |
| (5, <=10) | 2645651 | 22.67 |
| (10, <=15) | 2263403 | 19.40 |
| (15, <=Max) | 3561884 | 30.52 |
| Total | 11668923 | 100 |

II. Quality Details

BSNL

| Technology | Rx Quality % |
|------------|--------------|
| 2G | 95.6 |
| 3G | 83 |

2G



3G



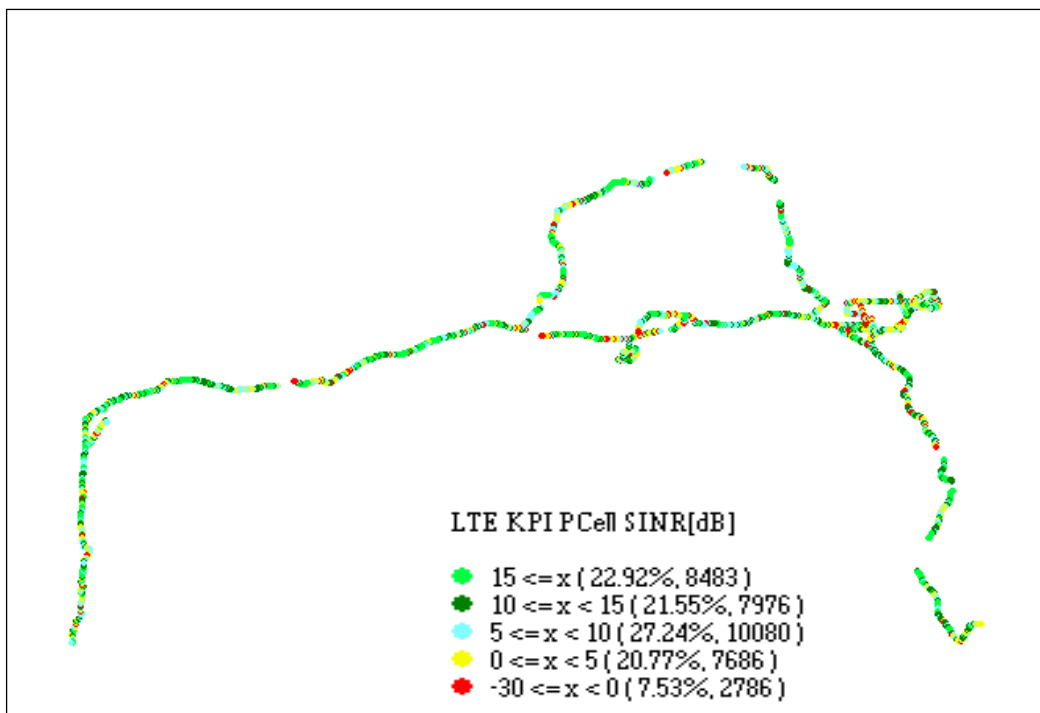
| Overall Rx Quality | # Samples | % |
|--------------------|---------------|------------|
| (Min, <=2) | 99047 | 89 |
| (2, <=3) | 2140 | 2 |
| (3, <=4) | 2358 | 2 |
| (4, <=5) | 2328 | 2 |
| (5, <=Max) | 5421 | 5 |
| Total | 108966 | 100 |

| Overall EcNo | # Samples | % |
|---------------|---------------|------------|
| (Max, <=-6) | 47075 | 23 |
| (-6, <=-9) | 40629 | 19 |
| (-9, <=-11) | 50719 | 23 |
| (-11, <=-14) | 36405 | 17 |
| (-14, <= Min) | 42939 | 20 |
| Total | 217767 | 100 |

II. Quality Details

JIO

| Technology | Rx Quality % |
|------------|--------------|
| VoLTE | 92.47 |



| VoLTE | | |
|--------------|--------------|-------------|
| Overall SINR | # Samples | % |
| (Min, ≤0) | 2786 | 7.53 |
| (0, ≤5) | 7686 | 20.77 |
| (5, ≤10) | 10080 | 27.24 |
| (10, ≤15) | 7976 | 21.55 |
| (15, ≤Max) | 8483 | 22.91% |
| Total | 30807 | 100% |

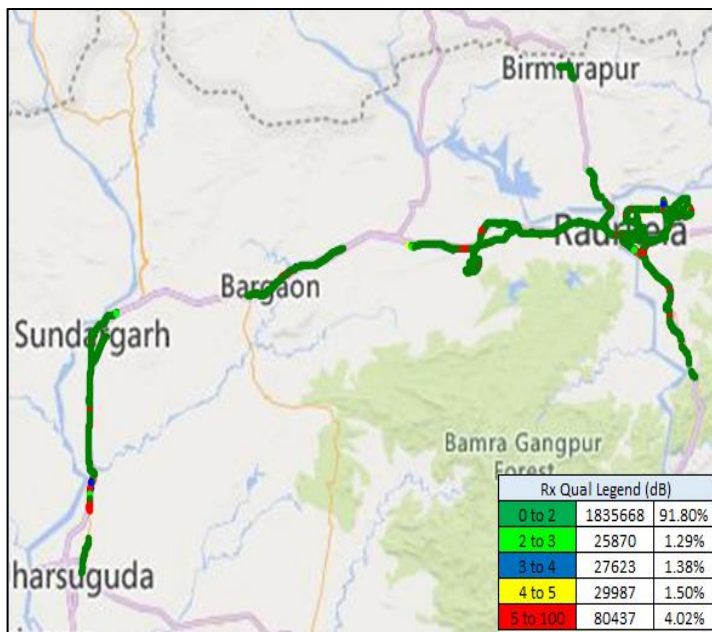
II. Quality Details

For measuring voice quality, as per the QoS norms, RxQual ≤ 5 for GSM TSPs, EcNo ≥ -14 dBm for 3G TSP and 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 $\geq 95\%$.

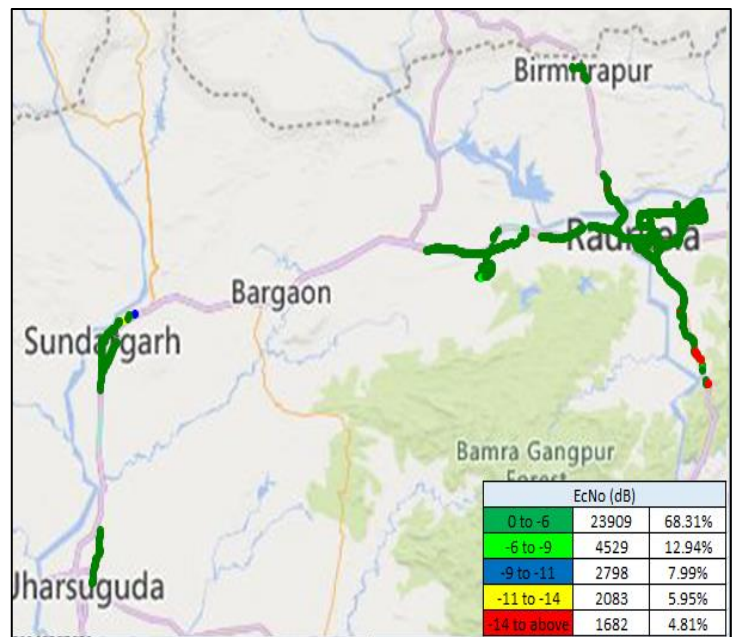
VII

| Technology | Rx Quality % |
|------------|--------------|
| 2G | 95.98 |
| 3G | 95.19 |

2G



3G



| Overall Rx Quality | # Samples | % |
|--------------------|----------------|------------|
| (Min, ≤ 2) | 1835668 | 91.80 |
| (2, ≤ 3) | 25870 | 1.29 |
| (3, ≤ 4) | 27623 | 1.39 |
| (4, ≤ 5) | 29987 | 1.50 |
| (5, \leq Max) | 80437 | 4.02 |
| Total | 2533357 | 100 |

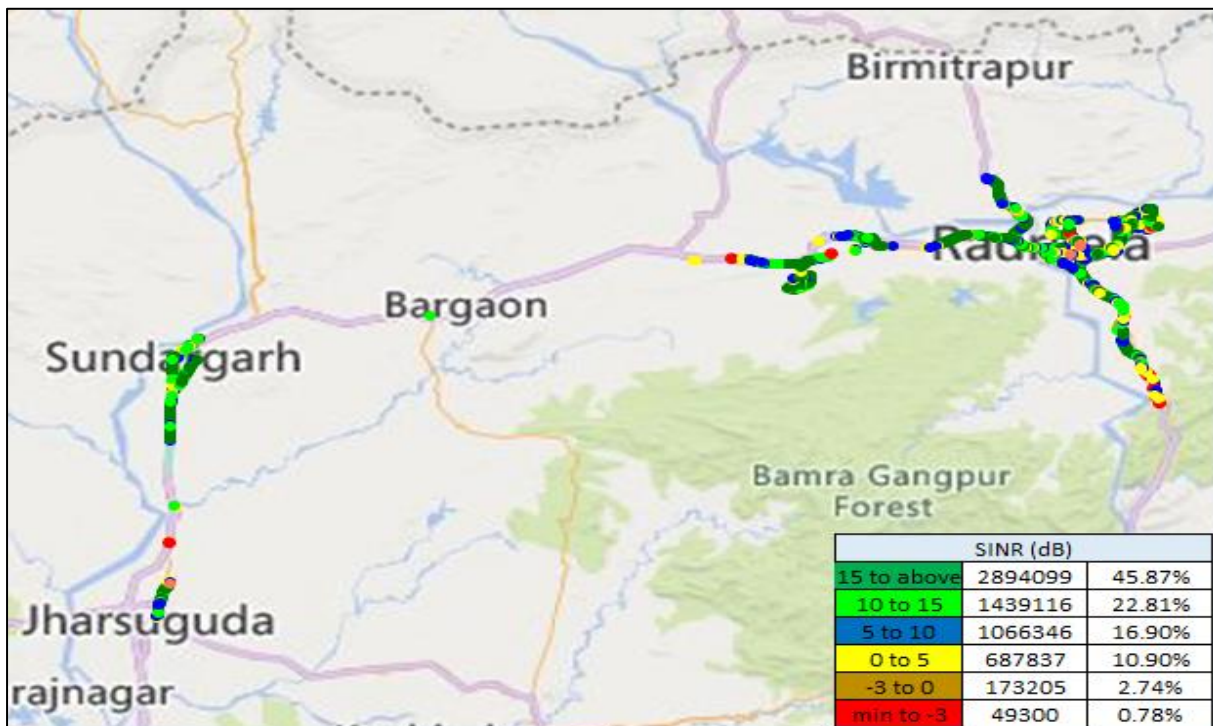
| Overall Ec/No | # Samples | % |
|-------------------|--------------|------------|
| [Max, ≥ -6] | 23909 | 68.31 |
| $[-6, \geq -9]$ | 4529 | 12.94 |
| $[-9, \geq -11]$ | 2798 | 7.99 |
| $[-11, \geq -14]$ | 2083 | 5.95 |
| $-14, \leq$ Min | 1682 | 4.81 |
| Total | 35001 | 100 |

II. Quality Details

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

VIL

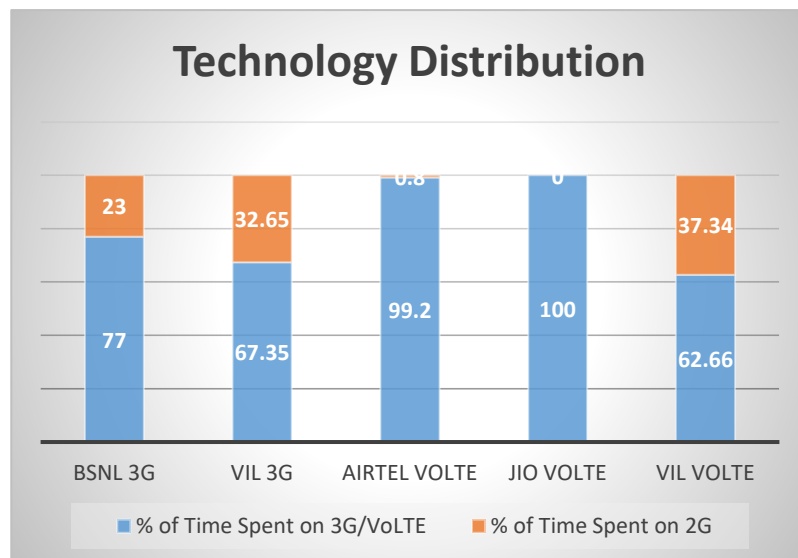
| Technology | Rx Quality % |
|------------|--------------|
| VoLTE | 96.47 |



| 4G | | |
|-----------------------|----------------|------------|
| Overall SINR | # Samples | % |
| [Min, ≤ -3] | 49300 | 0.78 |
| $-3, \leq 0$ | 173205 | 2.74 |
| $0, \leq 5$ | 687837 | 10.9 |
| $5, \leq 10$ | 1066346 | 16.9 |
| $10, \leq 15$ | 1439116 | 22.81 |
| $15, \leq \text{Max}$ | 2894099 | 45.87 |
| Total | 6309903 | 100 |

III. Technology Details

| TSP | % of Time Spent on 3G/VoLTE |
|--------------|-----------------------------|
| BSNL 3G | 77 |
| Airtel VoLTE | 99.2 |
| Jio VoLTE | 100 |
| VIL 3G | 67.35 |
| VIL VoLTE | 62.66 |



III. Technology Details

Airtel

| Technology | Time Spent on 4G |
|------------|------------------|
| 4G | 99.2% |

BSNL

| Technology | Time Spent on 3G |
|------------|------------------|
| 3G | 77% |

JIO

| Technology | Time Spent on 4G |
|------------|------------------|
| 4G | 100% |

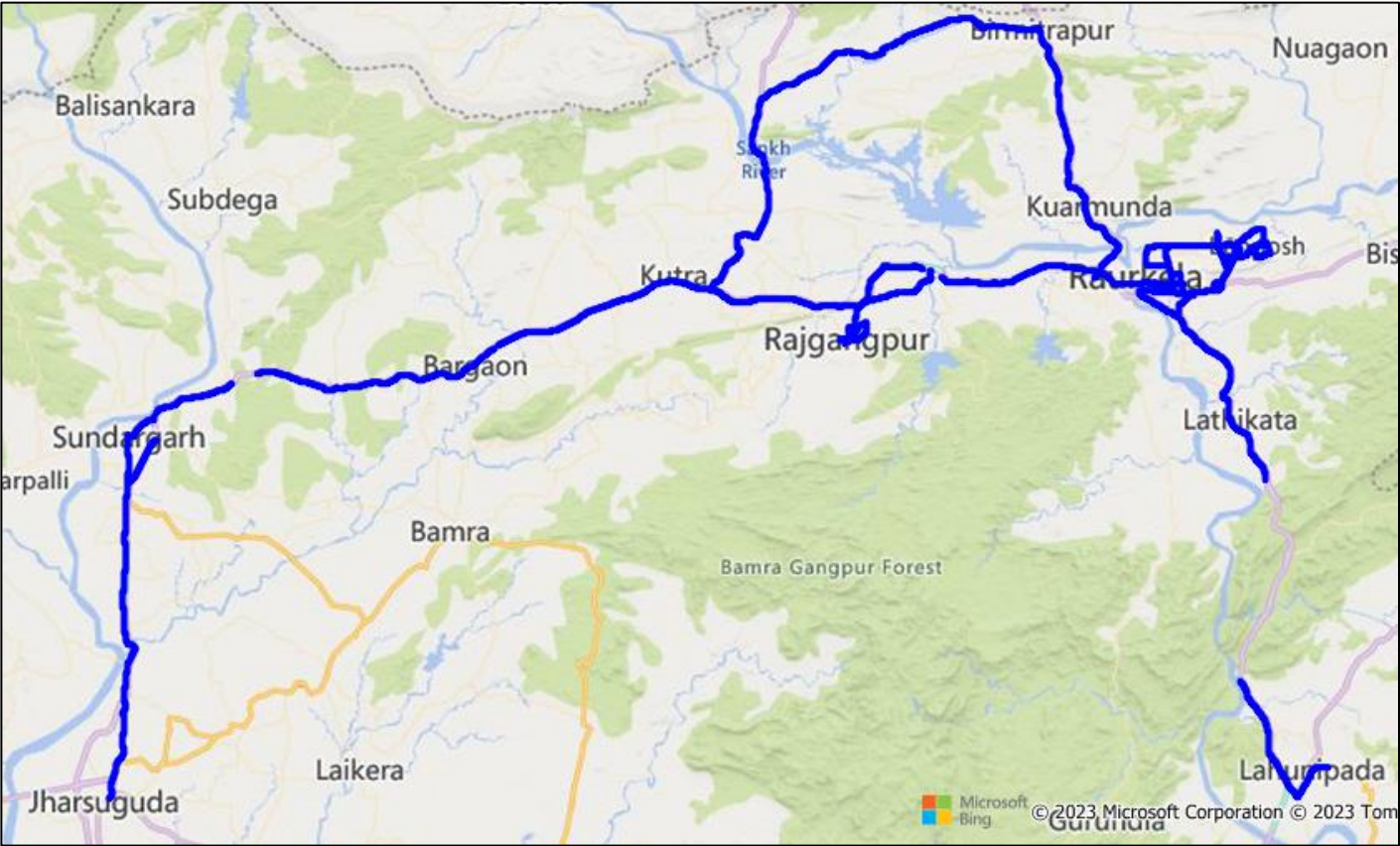
VIL

| Technology | Time Spent on 4G |
|------------|------------------|
| 4G | 62.66% |

III. Technology Details

Airtel

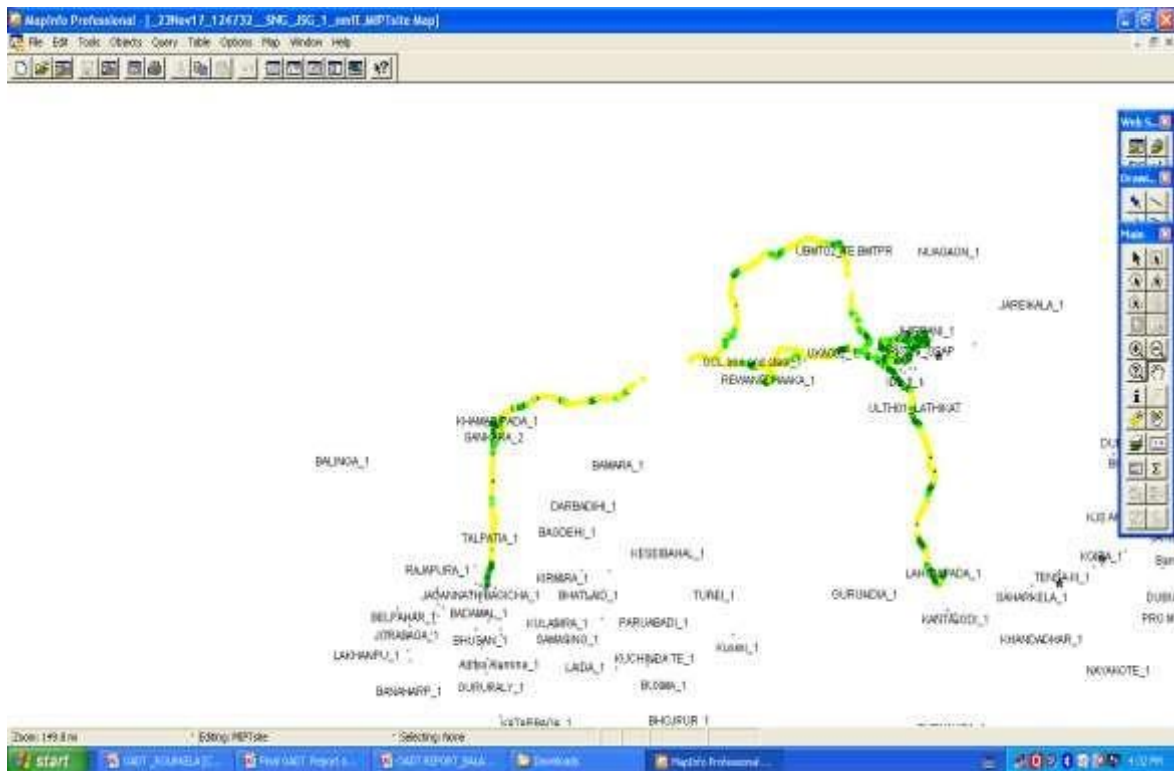
| Technology | Time Spent on 4G |
|------------|------------------|
| 4G | 99.2% |



III. Technology Details

BSNL

| Technology | Time Spent on 3G |
|------------|------------------|
| 3G | 77% |



III. Technology Details

JIO

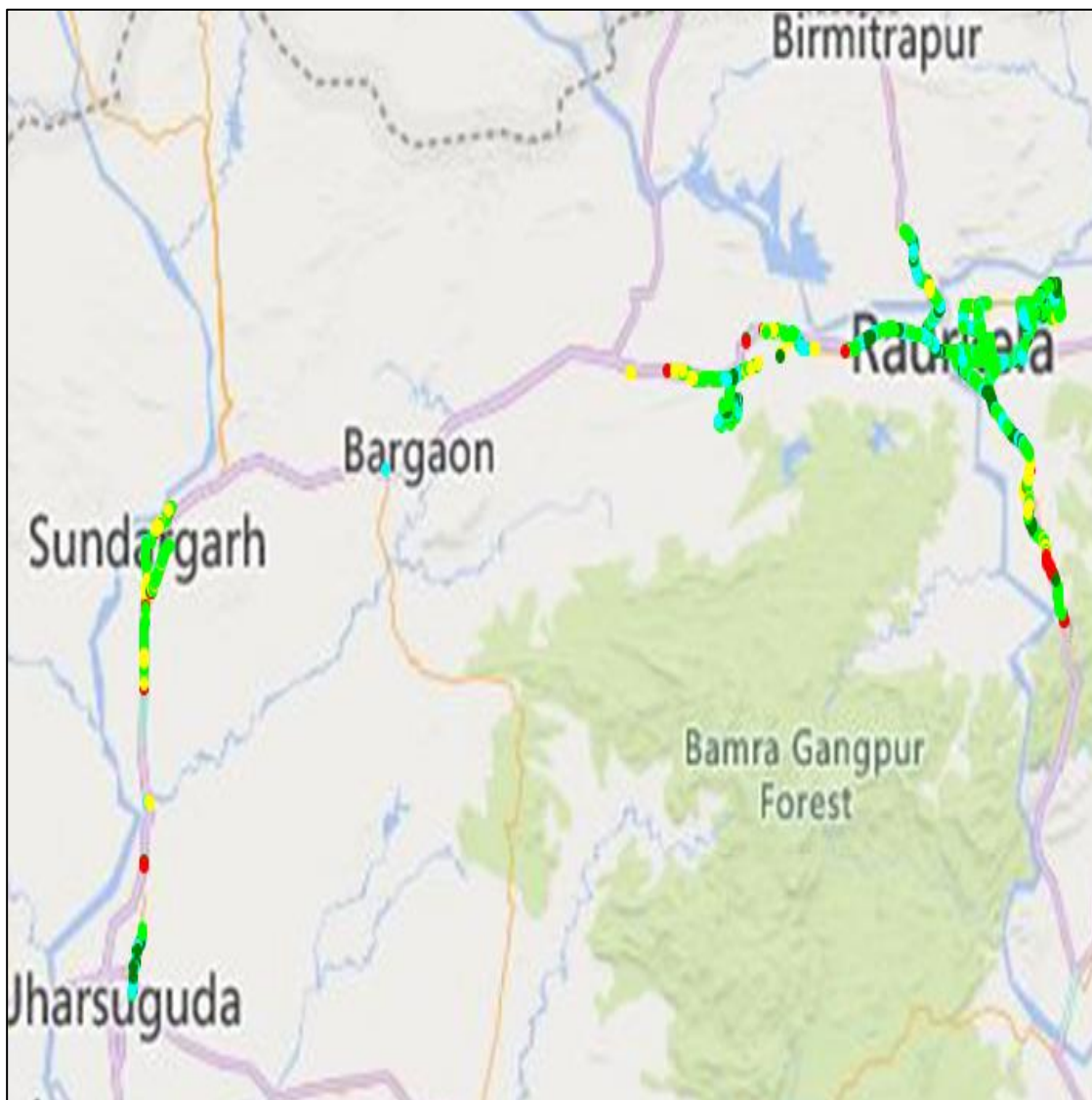
| Technology | Time Spent on 4G |
|------------|------------------|
| 4G | 100% |



III. Technology Details

VIL

| Technology | Time Spent on 4G |
|------------|------------------|
| 4G | 62.66 |

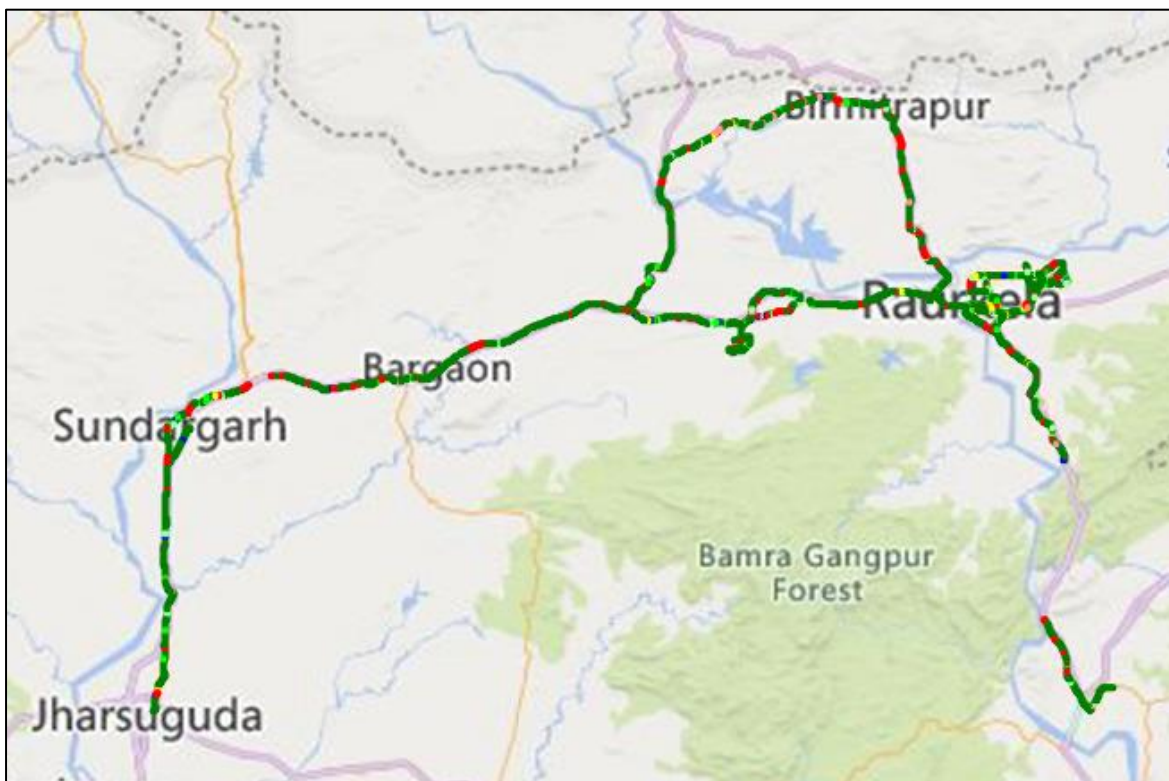


IV. Dynamic Data Test- 4G DL Details

Airtel

Data Statistics - Dynamic Complete SSA

| Data KPIs – Overall | 4G |
|----------------------------|------|
| Download Throughput (Mbps) | 26.8 |



| DL throughput | No of Sample | % |
|---------------|-----------------|------------|
| 0 to 1 Mbps | 929393 | 7.96 |
| 1 to 2 Mbps | 189709 | 1.63 |
| 2 to 3 Mbps | 126513 | 1.08 |
| 3 to 4 Mbps | 112141 | 0.96 |
| 4 to 8 Mbps | 413679 | 4.40 |
| 8 to 12 Mbps | 591646 | 5.07 |
| >12 Mbps | 9205842 | 78.89 |
| Total | 11668923 | 100 |

IV. Dynamic Data Test- 3G DL Details

BSNL

Data Statistics - Dynamic Complete SSA 383 Kms

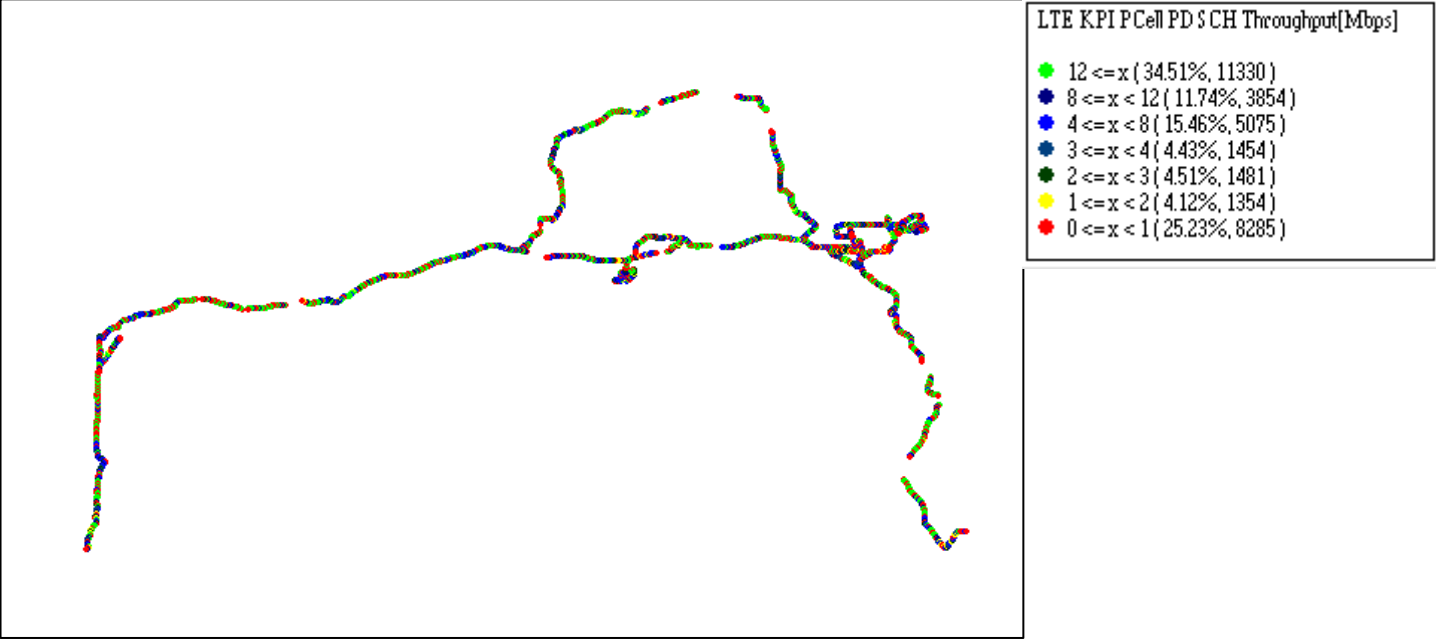
| | |
|----------------------------|------|
| Data KPIs - Overall | 3G |
| Download Throughput (Mbps) | 2.48 |

IV. Dynamic Data Test- 4G DL Details

JIO

Data Statistics - Dynamic Complete SSA - 400 Kms

| | |
|----------------------------|-------|
| Data KPIs - Overall | 4G |
| Download Throughput (Mbps) | 19.77 |



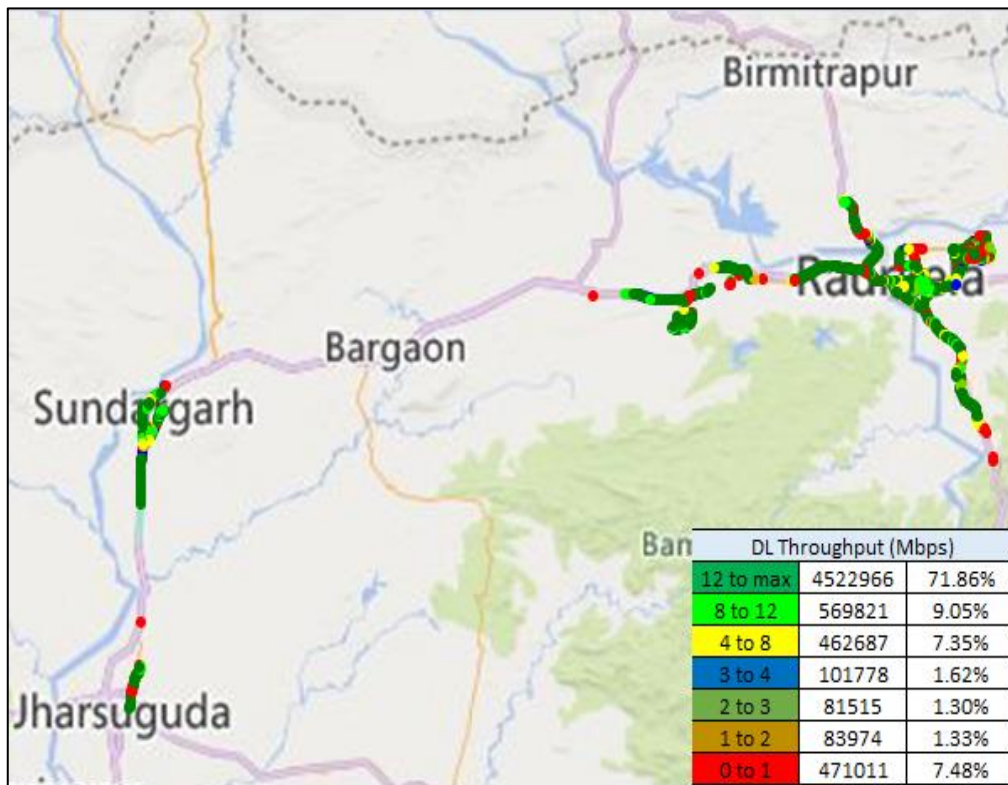
| DL Throughput | No of Samples | % |
|---------------|---------------|-------|
| 0 to 1Mbps | 8285 | 25.23 |
| 1 to 2Mbps | 1354 | 4.12 |
| 2 to 3Mbps | 1481 | 4.51 |
| 3 to 4Mbps | 1454 | 4.43 |
| 4 to 8Mbps | 5075 | 15.46 |
| 8 to 12 Mbps | 3854 | 11.74 |
| >12Mbps | 11330 | 34.51 |

IV. Dynamic Data Test- 4G DL Details

VIL

Data Statistics - Dynamic Complete SSA - 410 Kms

| | |
|----------------------------|------|
| Data KPIs - Overall | 4G |
| Download Throughput (Mbps) | 14.8 |



| DL throughput | No of Sample | % |
|---------------|--------------|-------|
| 0 to 1 Mbps | 471011 | 7.48 |
| 1 to 2 Mbps | 83974 | 1.33 |
| 2 to 3 Mbps | 81515 | 1.3 |
| 3 to 4 Mbps | 101778 | 1.62 |
| 4 to 8 Mbps | 462687 | 7.35 |
| 8 to 12 Mbps | 569821 | 9.05 |
| >12 Mbps | 4522966 | 71.86 |
| Total | 6293752 | 100 |

V. TRAI MySpeed App

Airtel

| Technology- 4G | Rajgangapur Railway Station | Sundargarh Bus Stand | Jharsuguda Bus Stand | Rourkela Bus Stand | Rourkela Railway Station | Rourkela Govt. Hospital |
|---------------------|-----------------------------|----------------------|----------------------|--------------------|--------------------------|-------------------------|
| Download Speed Mbps | 87.87 | 126.62 | 62.35 | 24.90 | 103.52 | 113.14 |
| Upload Speed Mbps | 28.91 | 34.39 | 29.47 | 11.13 | 29.33 | 33.74 |

BSNL

| Technology- 3G | Rajgangapur Railway Station | Sundargarh Bus Stand | Jharsuguda Bus Stand | Rourkela Bus Stand | Rourkela Railway Station | Rourkela Govt. Hospital |
|---------------------|-----------------------------|----------------------|----------------------|--------------------|--------------------------|-------------------------|
| Download Speed Mbps | 4.23 | 1.86 | 3.53 | 6.57 | 5.01 | 5.05 |
| Upload Speed Mbps | 3.29 | 1.41 | 2.99 | 3.15 | 3.5 | 4.1 |

JIO

| Technology- 4G | Rajgangapur Railway Station | Sundargarh Bus Stand | Jharsuguda Bus Stand | Rourkela Bus Stand | Rourkela Railway Station | Rourkela Govt. Hospital |
|---------------------|-----------------------------|----------------------|----------------------|--------------------|--------------------------|-------------------------|
| Download Speed Mbps | 47.81 | 28.22 | 59.82 | 46.51 | 34.21 | 43.09 |
| Upload Speed Mbps | 21.76 | 8.48 | 6.68 | 6.17 | 11.13 | 6.94 |

VIL

| Technology- 4G | Rajgangapur Railway Station | Sundargarh Bus Stand | Jharsuguda Bus Stand | Rourkela Bus Stand | Rourkela Railway Station | Rourkela Govt. Hospital |
|---------------------|-----------------------------|----------------------|----------------------|--------------------|--------------------------|-------------------------|
| Download Speed Mbps | 18.59 | 14.74 | 39.94 | 11.16 | 11.68 | 21.41 |
| Upload Speed Mbps | 23.14 | 17.52 | 10.97 | 26.30 | 22.96 | 25.07 |

NH/SH Routes Covered in OADT by Airtel/BSNL/RJIL/VIL

| S.No | No. of NH/SH Routes | NH routes | SH routes | Distance(Km) |
|------|--------------------------------------|-------------------|----------------|--------------|
| 1 | Rourkela- Lahunipura | NH-143, NH-520 | | 65KM |
| 2 | Rourkela- Biramtrapur -Rajgangpur | NH-544 | | 92KM |
| 3 | Rourkela- Sundargarh-Jharsuguda | | SH-10 & 10A | 130KM |