



# Operator Assisted Drive Test Report

## NELLORE SSA

### February 2022

### (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%.**

The Operator Assisted Drive Test (OADT) has been carried out by TRAI RO Hyderabad with the help of Service Providers in Nellore City and surrounding areas Atmakur, Gudur, Sullurupeta & Kavali from 9:00 AM to 8:00 PM during 23<sup>rd</sup> to 26<sup>th</sup> Feb 2022. The drive test covered drive route of 360 KMs & 5 hotspot over a period of 4 days. Approximately 510 calls were made for each of the 7 networks: Three 2G networks, One 3G network and Three LTE network covering four TSPs.

Overview

Voice  
Summary

Data  
Summary

# Overview

TRAI Hyderabad conducted Operator Assisted Drive Test from 23<sup>rd</sup> to 26<sup>th</sup> Feb' 2022 covering various locations in Nellore City & surrounding regions Atmakur, Gudur, Sullurupeta & Kavali. 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

## Drive 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 360 + KMs over a period of 4 days from 23<sup>rd</sup> to 26<sup>th</sup> Feb'2022. Approximately 510 calls were made for each of the 7 networks: three 2G (Lock Mode) networks, one 3G (Dual mode) networks and three VoLTE network covering 4 unique TSPs.

## Data Tests:

1. Dynamic data test was conducted for 360 kms over a period of 3 days for download throughput for 3G & 4G technologies.

Data Tests were performed at 5 static locations for 2G, 3G & 4G technologies.

2. 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.

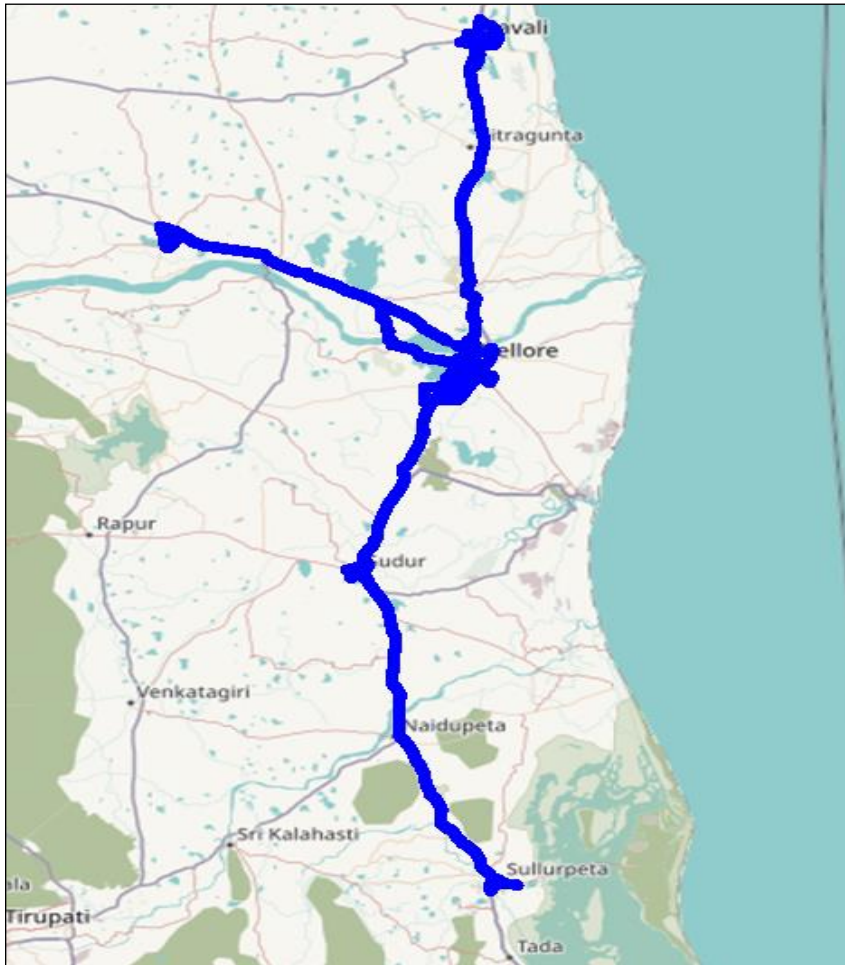
\* 3G KPI's which are calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.

\* 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 (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  |

# Overview

## Voice & Dynamic Data Test Drive Route



| Areas Covered -Nellore |                           |
|------------------------|---------------------------|
| RTC Bus stand          | Bujabuja Nellore          |
| TRUNK ROAD             | ATMAKUR Bus stand         |
| Railway station        | VRC Center                |
| Santapeta              | Vedayapalem               |
| Walkers Road           | Nellore Highway           |
| Batwadipalem           | Mypadu Gate               |
| Podalkur Road          | Childrens park            |
| Kaverinagar            | Nawabpeta                 |
| Areas Covered- Atmakur | Areas Covered- Sullurpeta |
| Old bus stand          | Railway station area      |
| Atmakur-Vinjamur Road  | Bus stand area.           |
| SSR road               | SHAR road                 |
| Areas Covered- Gudur   | Areas Covered- Kavali     |
| Bus stand              | Railway station           |
| Railway station        | RTC Bus stand             |
| M.V. Nagar             | Vengalrao nagar           |
| B.S.Peta               | Janata peta               |
| N.R.Peta               | Kavali Highway            |

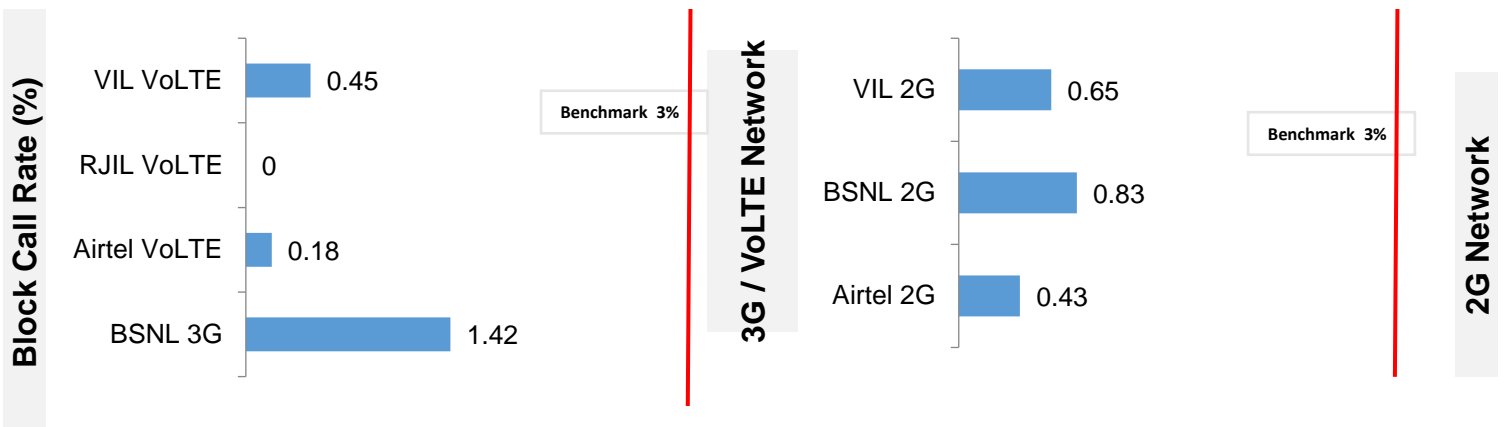
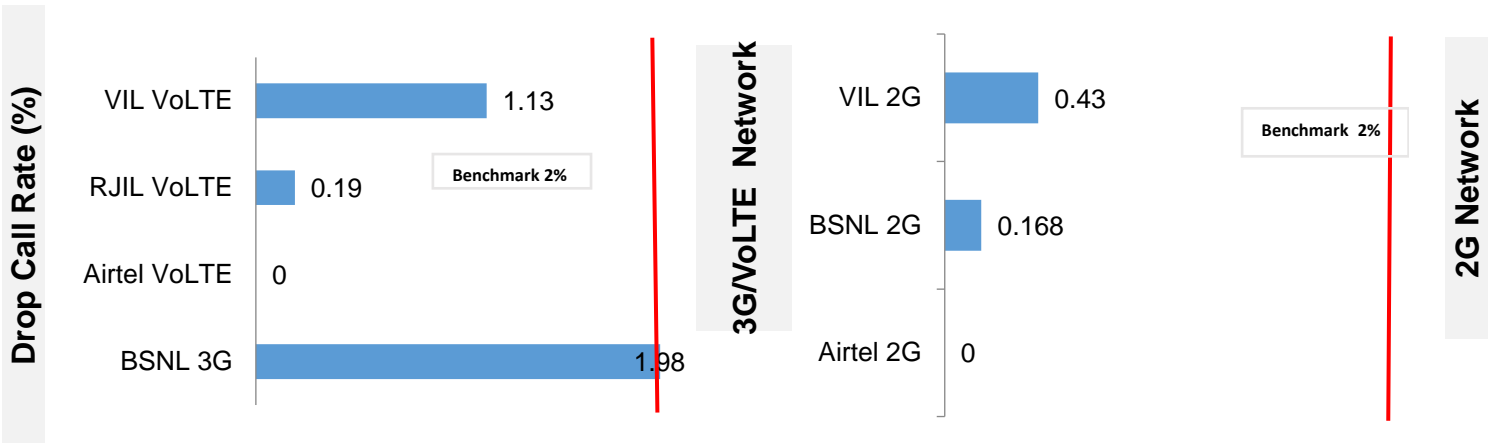
## Data Service Test- Static Locations

| Static Locations         |
|--------------------------|
| Railway station- Gudur   |
| RTC Bus stand - Kavali   |
| RTC Bus stand - Nellore  |
| MGB Mall - Nellore       |
| Govt. Hospital - Nellore |

# Voice Calls

## Key Observations

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



| KPIs                     | 2G     |       |      | 3G   | VoLTE` |      |      |
|--------------------------|--------|-------|------|------|--------|------|------|
|                          | Airtel | BSNL  | VIL  | BSNL | Airtel | RJIL | VIL  |
| <b>Drop Call Rate %</b>  | 0      | 0.168 | 0.43 | 1.98 | 0      | 0.19 | 1.13 |
| <b>Block Call Rate %</b> | 0.43   | 0.83  | 0.65 | 1.42 | 0.18   | 0    | 0.45 |

a) All TSPs have met the 2% QoS benchmark of Drop Call Rate (DCR%)

b) 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 % | 81.9   | 96   | 90  |

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

| TSP        | 3G   | VoLTE  |      |       |
|------------|------|--------|------|-------|
|            | BSNL | Airtel | JIO  | VIL   |
| Coverage % | 92.2 | 98     | 98.9 | 90.41 |

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

| TSP          | 3G   | VoLTE  |     |       |
|--------------|------|--------|-----|-------|
|              | BSNL | Airtel | JIO | VIL   |
| Time spent % | 72.6 | 100    | 100 | 99.41 |

# Data Services Static

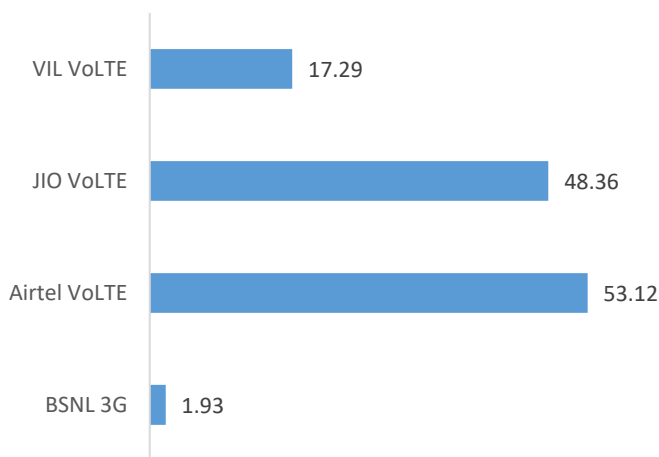
**Key Observations  
(Average of 5  
Hotspots)**

Data was tested at 5 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, PayTm)

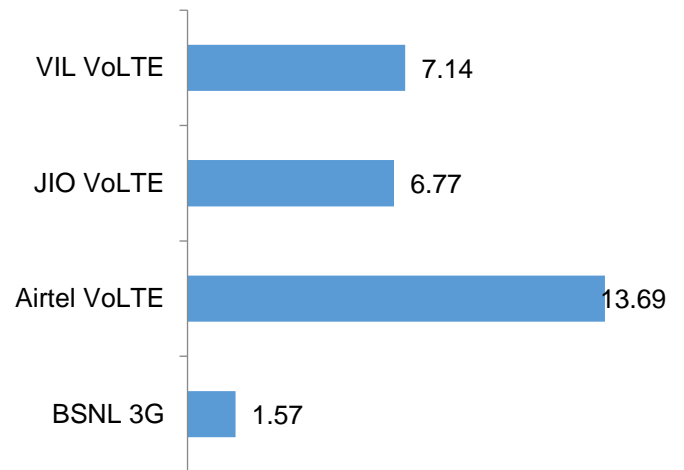
## Data Download and Upload Performance (kbps)

### 3G/4G Network:

#### Download throughput in Mbps

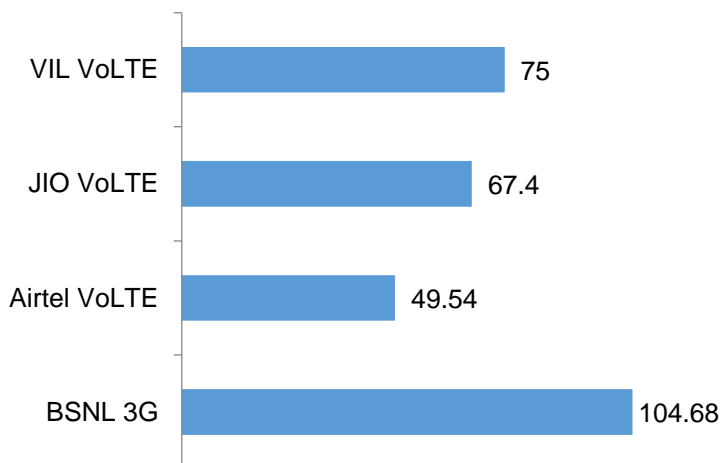


#### Upload Throughput in Mbps



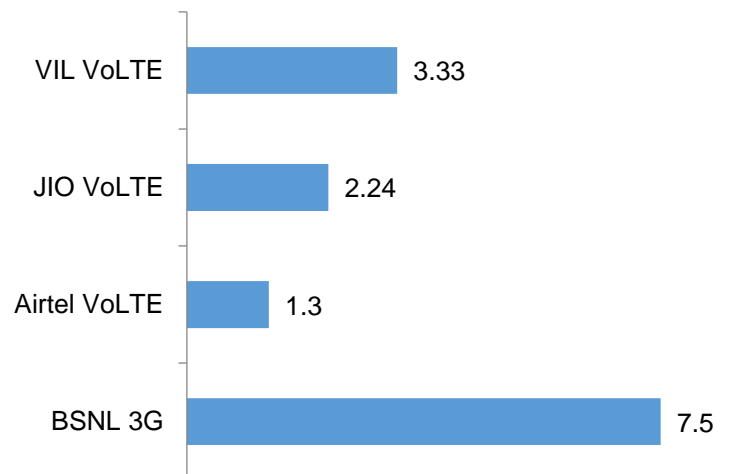
## Latency (ms)

#### Latency in (msec)



## Web Browsing (Sec)

#### Web browsing delay in second



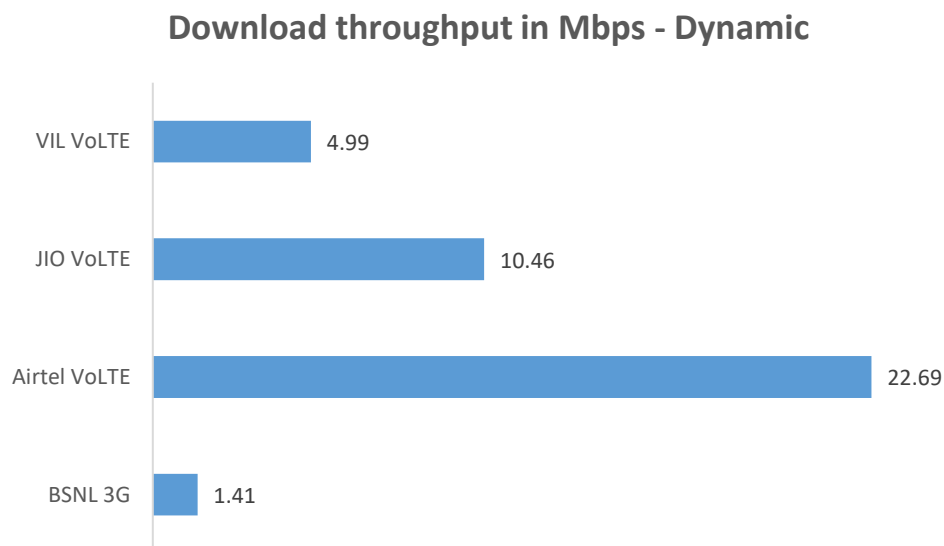
# Data Services Dynamic

## Key Observations

Dynamic Data was tested for 340 Kms. Download Throughput was tested.

### Data Download Performance (Mbps) - Dynamic

3G/4G/ Network:



| Data Services Dynamic       | 3G / VoLTE |              |           |           |
|-----------------------------|------------|--------------|-----------|-----------|
|                             | BSNL 3G    | Airtel VoLTE | JIO VoLTE | VIL VoLTE |
| Download throughput in Mbps | 1.41       | 22.69        | 10.46     | 4.99      |

# Summary

## SSA Level Summary-Voice

| Voice Calls       | 2G          |       |       |
|-------------------|-------------|-------|-------|
|                   | Airtel      | BSNL  | VIL   |
| Call attempts     | 471         | 600   | 465   |
| Block call rate % | 0.43        | 0.83  | 0.65  |
| CSSR %            | 99.82       | 99.17 | 99.35 |
| Drop call rate %  | 0           | 0.168 | 0.43  |
| Mobility HOSR %   | 99.5        | 97.9  | 98.86 |
| RX Quality %      | <b>90.5</b> | 96.2  | 95.31 |

| TSP ( For 3G)     | 3G          | VoLTE       |       |              |
|-------------------|-------------|-------------|-------|--------------|
|                   | BSNL        | Airtel      | JIO   | VIL          |
| Call attempts     | 561         | 561         | 512   | 444          |
| Block call rate % | 1.42        | 0.18        | 0     | 0.45         |
| CSSR %            | 98.57       | 99.82       | 100   | 99.55        |
| Drop call rate %  | 1.98        | 0           | 0.19  | 1.13         |
| Mobility HOSR %   | 99.54       | 100         | 98.98 | 98.08        |
| RX Quality %      | <b>87.9</b> | <b>92.2</b> | 98.52 | <b>77.49</b> |



# Summary

## SSA Level Summary (Average of 5 Hotspots) - Data Services

| Data Services Static         | 2G     |        |        |
|------------------------------|--------|--------|--------|
|                              | Airtel | BSNL   | VIL    |
| Download throughput in Kbps  | 65.38  | 75.072 | 286.71 |
| Upload Throughput in Kbps    | 25.71  | 35.674 | 216.9  |
| Web browsing delay in second | 7.58   | 35.23  | 7.00   |
| Latency in (msec)            | 325.8  | 133.59 | 207.36 |

| Data Services Static         | 3G / VoLTE |              |           |           |
|------------------------------|------------|--------------|-----------|-----------|
|                              | BSNL 3G    | Airtel VoLTE | JIO VoLTE | VIL VoLTE |
| Download throughput in Mbps  | 1.93       | 53.12        | 48.36     | 17.29     |
| Upload Throughput in Mbps    | 1.57       | 13.69        | 6.77      | 7.14      |
| Web browsing delay in second | 7.5        | 1.3          | 2.24      | 3.33      |
| Latency in (msec)            | 104.68     | 49.54        | 67.4      | 75.00     |

| Railway station- Gudur       | 2G     |       |        |
|------------------------------|--------|-------|--------|
|                              | Airtel | BSNL  | VIL    |
| Download throughput in Kbps  | 63.94  | 36.33 | 131.1  |
| Upload Throughput in Kbps    | 20.9   | 17.08 | 91.50  |
| Web browsing delay in second | 11.23  | 61.66 | 10.33  |
| Latency in (msec)            | 194.2  | 136   | 205.33 |

| RTC Bus stand - Kavali       | 2G     |        |        |
|------------------------------|--------|--------|--------|
|                              | Airtel | BSNL   | VIL    |
| Download throughput in Kbps  | 62.81  | 110.14 | 63.5   |
| Upload Throughput in Kbps    | 25.77  | 50.88  | 31.98  |
| Web browsing delay in second | 3.93   | 38.86  | 11.00  |
| Latency in (msec)            | 650.66 | 118.72 | 228.67 |

| RTC Bus stand - Nellore      | 2G     |        |        |
|------------------------------|--------|--------|--------|
|                              | Airtel | BSNL   | VIL    |
| Download throughput in Kbps  | 63.92  | 35.18  | 286.71 |
| Upload Throughput in Kbps    | 27.54  | 18.44  | 216.9  |
| Web browsing delay in second | 9.36   | 27.83  | 7.00   |
| Latency in (msec)            | 226    | 128.82 | 207.36 |

| MGB Mall - Nellore           | 2G     |        |        |
|------------------------------|--------|--------|--------|
|                              | Airtel | BSNL   | VIL    |
| Download throughput in Kbps  | 62.92  | 154.73 | 162.7  |
| Upload Throughput in Kbps    | 31.84  | 76.45  | 130.4  |
| Web browsing delay in second | 8.54   | 12.24  | 8.35   |
| Latency in (msec)            | 354.2  | 143    | 220.63 |

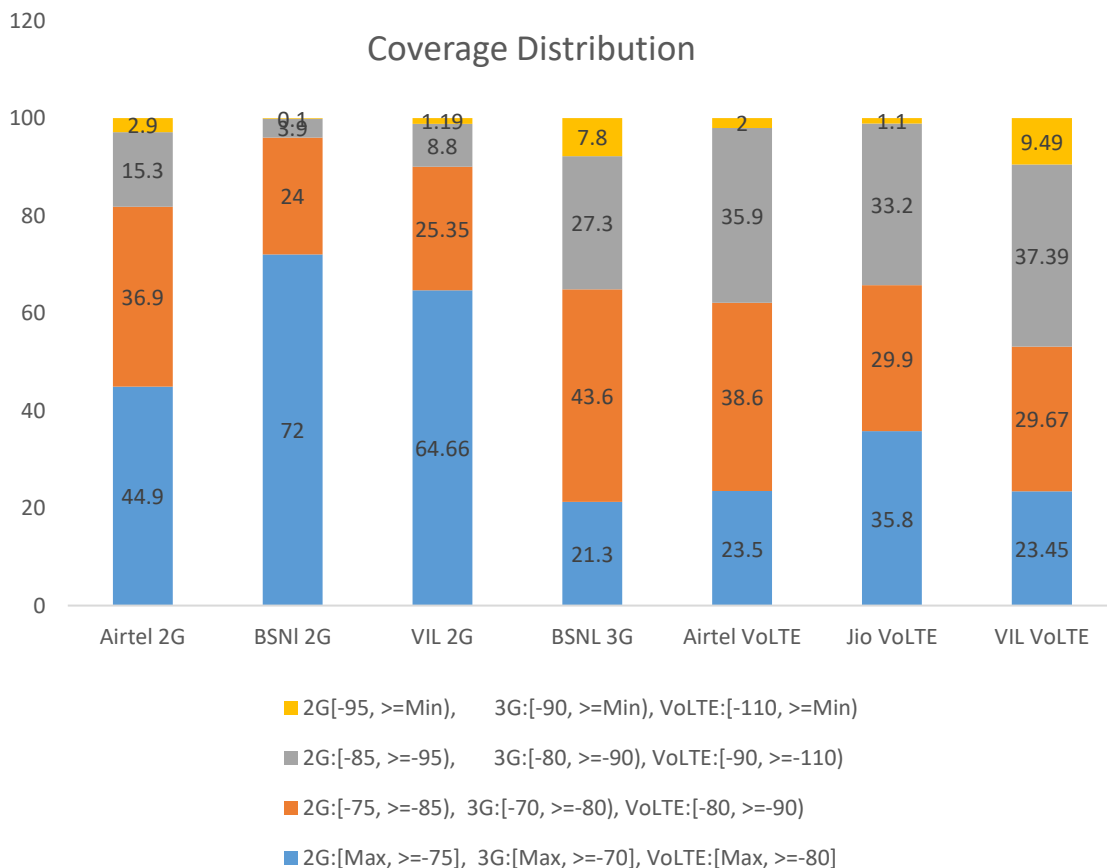
| Govt. Hospital - Nellore     | 2G     |        |       |
|------------------------------|--------|--------|-------|
|                              | Airtel | BSNL   | VIL   |
| Download throughput in Kbps  | 73.28  | 38.98  | 47.18 |
| Upload Throughput in Kbps    | 22.61  | 15.52  | 279.4 |
| Web browsing delay in second | 4.84   | 35.58  | 7.39  |
| Latency in (msec)            | 204.3  | 141.45 | 210.3 |

| Railway station- Gudur          | 3G     | VoLTE  |       |        |
|---------------------------------|--------|--------|-------|--------|
|                                 | BSNL   | Airtel | JIO   | VIL    |
| Download throughput in Mbps     | 1.127  | 33.15  | 63.74 | 6.18   |
| Upload Throughput in Mbps       | 0.84   | 14.85  | 7.6   | 3.87   |
| Web browsing delay in second    | 18.52  | 1.33   | 1.49  | 2.33   |
| Latency in (msec)               | 99.1   | 57.8   | 67.66 | 108.67 |
| <b>RTC Bus stand - Kavali</b>   |        |        |       |        |
| RTC Bus stand - Kavali          | 3G     | VoLTE  |       |        |
|                                 | BSNL   | Airtel | JIO   | VIL    |
| Download throughput in Mbps     | 2.546  | 28.68  | 64    | 15.86  |
| Upload Throughput in Mbps       | 1.746  | 15     | 7.56  | 2.54   |
| Web browsing delay in second    | 4.69   | 1.69   | 1.83  | 3.24   |
| Latency in (msec)               | 140.63 | 47.36  | 68    | 83.63  |
| <b>RTC Bus stand - Nellore</b>  |        |        |       |        |
| RTC Bus stand - Nellore         | 3G     | VoLTE  |       |        |
|                                 | BSNL   | Airtel | JIO   | VIL    |
| Download throughput in Mbps     | 2.05   | 78.89  | 43.06 | 11.12  |
| Upload Throughput in Mbps       | 2.03   | 12.8   | 6.27  | 3.69   |
| Web browsing delay in second    | 5.48   | 1.14   | 3.44  | 1.07   |
| Latency in (msec)               | 89.765 | 56.56  | 52.66 | 88.63  |
| <b>MGB Mall - Nellore</b>       |        |        |       |        |
| MGB Mall - Nellore              | 3G     | VoLTE  |       |        |
|                                 | BSNL   | Airtel | JIO   | VIL    |
| Download throughput in Mbps     | 2.01   | 72     | 41.85 | 8.21   |
| Upload Throughput in Mbps       | 1.6    | 14.4   | 7.22  | 4.17   |
| Web browsing delay in second    | 4.021  | 1.23   | 2.64  | 7.27   |
| Latency in (msec)               | 67.76  | 46.1   | 79.33 | 88.37  |
| <b>Govt. Hospital - Nellore</b> |        |        |       |        |
| Govt. Hospital - Nellore        | 3G     | VoLTE  |       |        |
|                                 | BSNL   | Airtel | JIO   | VIL    |
| Download throughput in Mbps     | 38.98  | 52.7   | 29.12 | 1.73   |
| Upload Throughput in Mbps       | 15.52  | 12     | 5.2   | 7.14   |
| Web browsing delay in second    | 35.58  | 1.13   | 1.76  | 3.33   |
| Latency in (msec)               | 141.45 | 39.9   | 69.33 | 75.00  |

# 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  $\geq$  -85 dBm, RSCP is  $\geq$  -90 dBm & RSRP  $\geq$  -110dBm. The details are as follows.

| TSP          | Coverage Rate % |
|--------------|-----------------|
| Airtel 2G    | 81.9            |
| BSNI 2G      | 96              |
| VIL 2G       | 90              |
| BSNL 3G      | 92.2            |
| Airtel VoLTE | 98              |
| Jio VoLTE    | 98.9            |
| VIL VoLTE    | 90.41           |

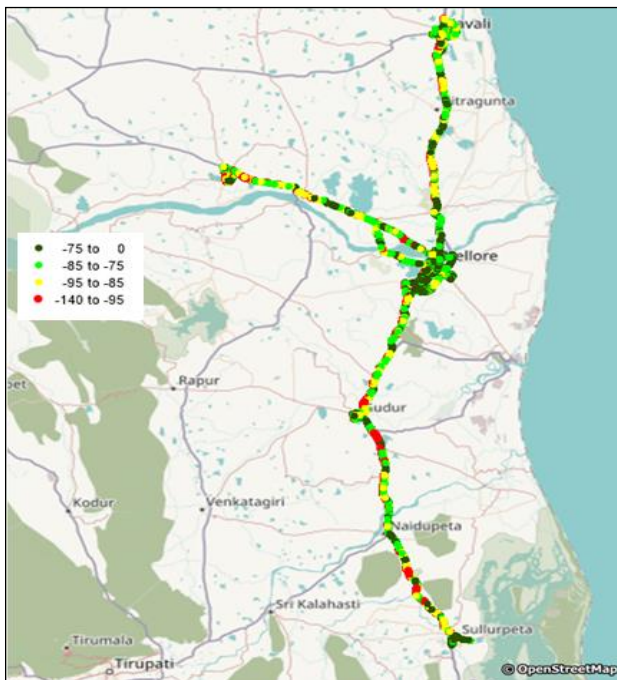


# I. Coverage Details

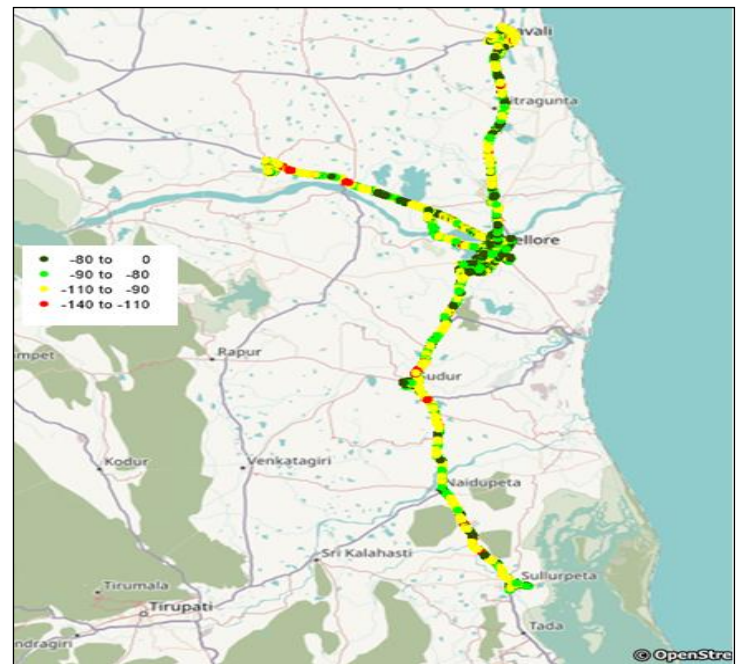
## AIRTEL

| Technology | Coverage Rate % |
|------------|-----------------|
| 2G         | 81.9            |
| VoLTE      | 98              |

### 2G



### VoLTE



### 2G

| Overall RxLevel | # Samples       | %          |
|-----------------|-----------------|------------|
| [Max, >=-75]    | 4622306         | 44.9       |
| [-75, >=-85)    | 3798108         | 36.9       |
| [-85, >=-95)    | 1575875         | 15.3       |
| [-95, >=Min)    | 290811          | 2.8        |
| <b>Total</b>    | <b>16241709</b> | <b>100</b> |

### VoLTE

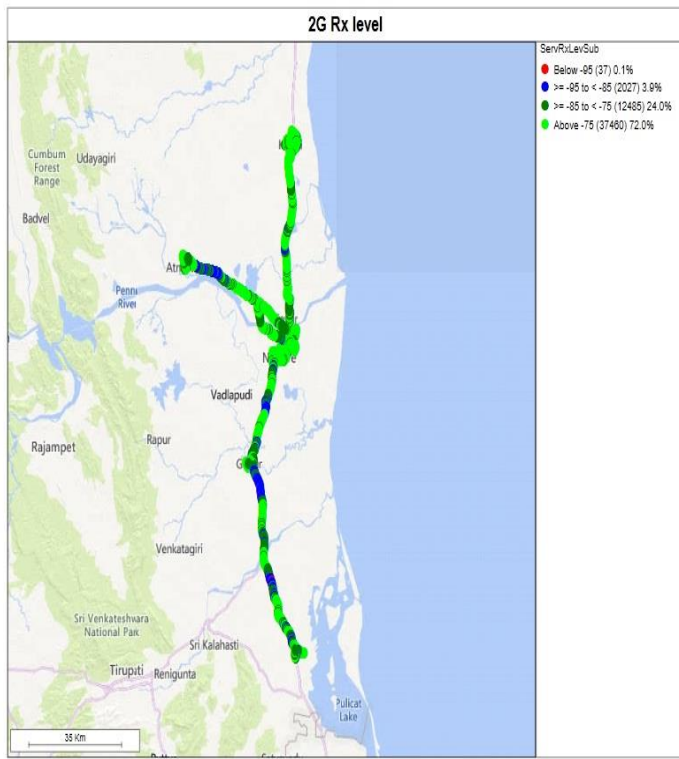
| Overall RSRP  | # Samples       | %          |
|---------------|-----------------|------------|
| [Max, >=-80]  | 3007281         | 23.5       |
| [-80, >=-90)  | 4935234         | 38.6       |
| [-90, >=-110) | 937377          | 35.9       |
| [-110, >=Min) | 250386          | 2.0        |
| <b>Total</b>  | <b>12785609</b> | <b>100</b> |

# I. Coverage Details

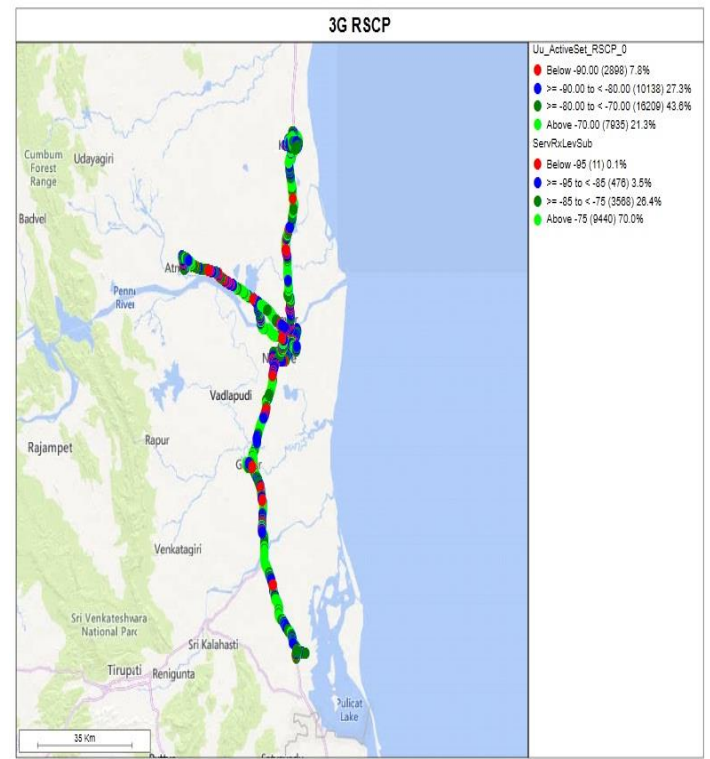
## BSNL

| Technology | Coverage Rate % |
|------------|-----------------|
| 2G         | 96.0            |
| 3G         | 92.2            |

### 2G



### 3G (Dual mode)



### 2G

| Overall RxLevel          | # Samples    | %          |
|--------------------------|--------------|------------|
| [Max, $\geq -75$ ]       | 37460        | 72         |
| $[-75, \geq -85)$        | 12485        | 24.0       |
| $[-85, \geq -95)$        | 2027         | 3.9        |
| $[-95, \geq \text{Min})$ | 37           | 0.1        |
| <b>Total</b>             | <b>52009</b> | <b>100</b> |

### 3G

| Overall RSCP             | # Samples    | %          |
|--------------------------|--------------|------------|
| [Max, $\geq -70$ ]       | 7935         | 21.3       |
| $[-70, \geq -80)$        | 16209        | 43.6       |
| $[-80, \geq -90)$        | 10138        | 27.3       |
| $[-90, \geq \text{Min})$ | 2898         | 7.8        |
| <b>Total</b>             | <b>37180</b> | <b>100</b> |

# I. Coverage Details

## JIO

| Technology | Coverage Rate % |
|------------|-----------------|
| VoLTE      | 98.90           |



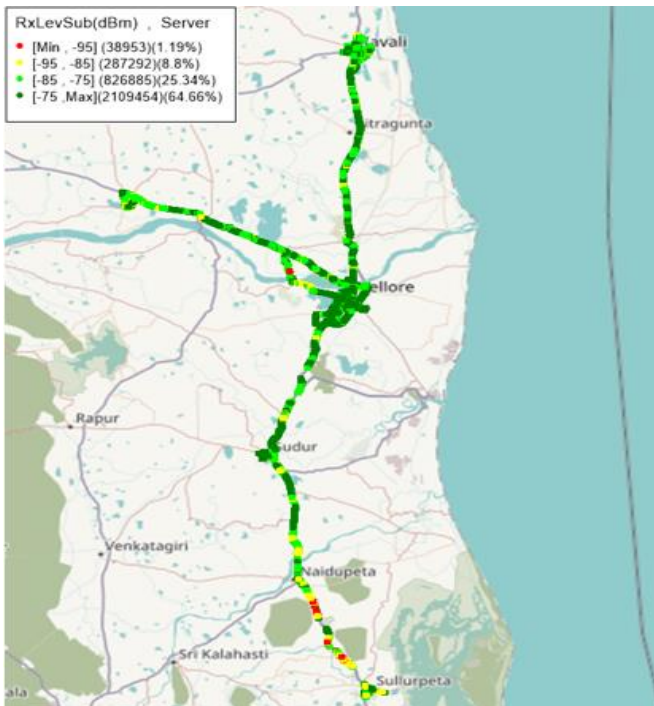
| VoLTE         |              |            |
|---------------|--------------|------------|
| Overall RSRP  | #Samples     | %          |
| [Max, >=-80]  | 19740        | 35.82      |
| [-80, >=-90)  | 16485        | 29.92      |
| [-90, >=-110) | 18275        | 33.16      |
| [-110, >=Min) | 605          | 1.1        |
| <b>Total</b>  | <b>55105</b> | <b>100</b> |

# I. Coverage Details

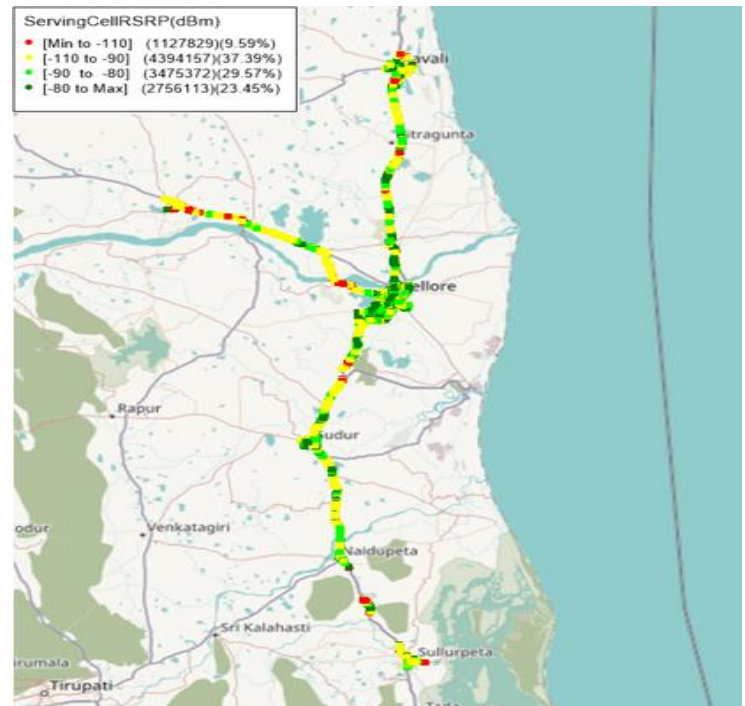
## VIL

| Technology | Coverage Rate % |
|------------|-----------------|
| 2G         | 90.0            |
| VoLTE      | 90.41           |

### 2G



### VoLTE



### 2G

| Overall RxLevel | # Samples      | %          |
|-----------------|----------------|------------|
| [Max, >=-75]    | 2109454        | 64.66      |
| [-75, >=-85)    | 826885         | 25.34      |
| [-85, >=-95)    | 287292         | 8.8        |
| [-95, >=Min)    | 38953          | 1.19       |
| <b>Total</b>    | <b>3262584</b> | <b>100</b> |

### VoLTE

| Overall RxLevel | # Samples       | %          |
|-----------------|-----------------|------------|
| [Max, >=-80]    | 2756113         | 23.45      |
| [-80, >=-90)    | 3475372         | 29.57      |
| [-90, >=-110)   | 4394154         | 37.39      |
| [-110, >=Min)   | 1127829         | 9.59       |
| <b>Total</b>    | <b>11753468</b> | <b>100</b> |

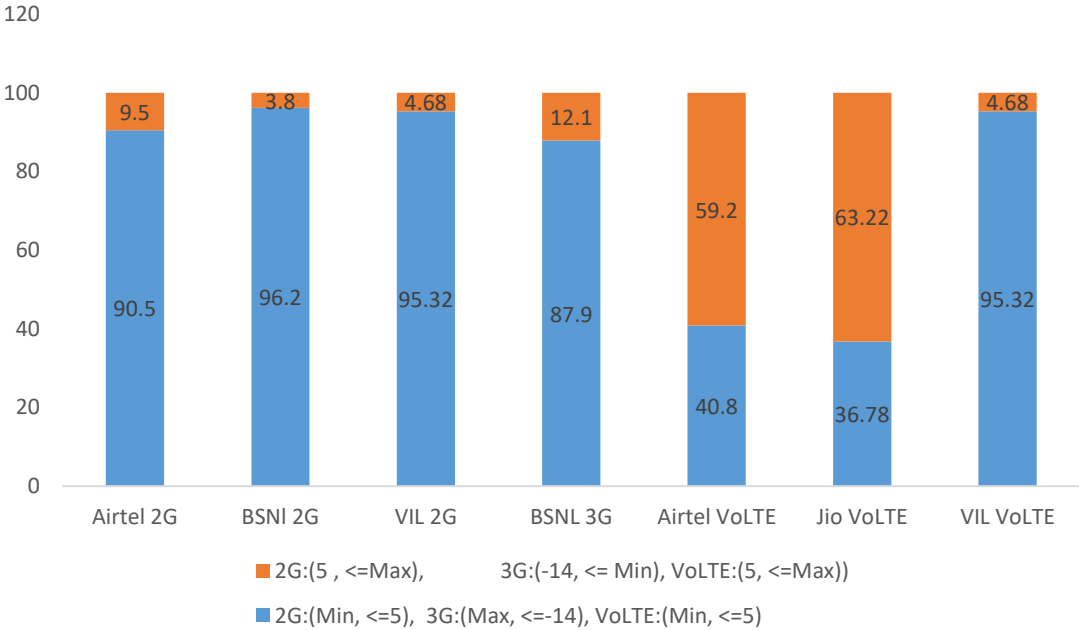


## II. Quality Details

For measuring voice quality, as per the QoS norms, RxQual  $\leq 5$  for GSM TSPs, EcNo  $\geq -14$  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  $\geq 95\%$ .

| TSP          | Rx Quality % |
|--------------|--------------|
| Airtel 2G    | 90.5         |
| BSNI 2G      | 96.2         |
| VIL 2G       | 95.31        |
| BSNL 3G      | 87.9         |
| Airtel VoLTE | 92.2         |
| Jio VoLTE    | 98.52        |
| VIL VoLTE    | 77.49        |

Rx Quality Distribution

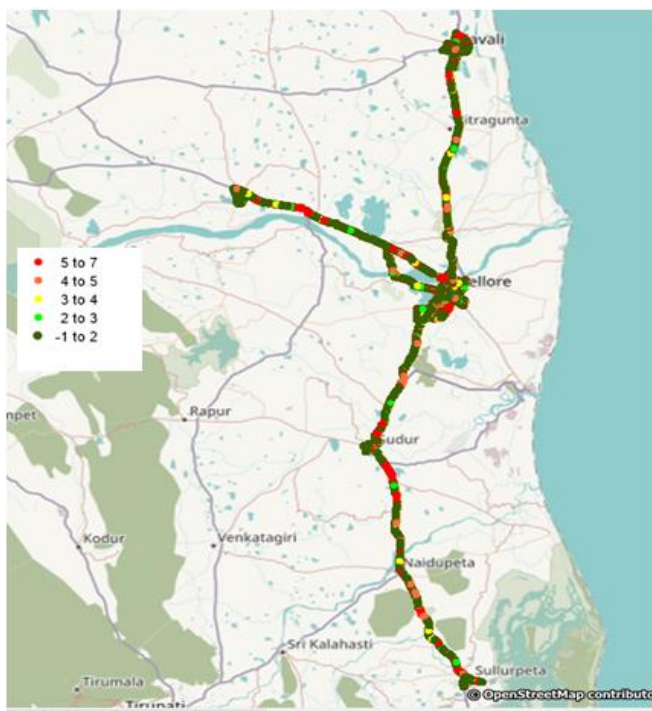


## II. Quality Details

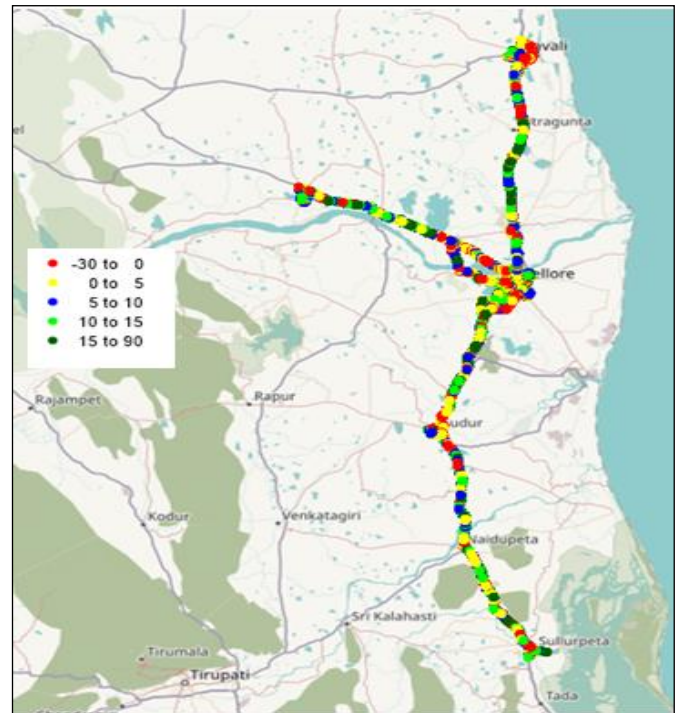
### Airtel

| Technology | Rx Quality % |
|------------|--------------|
| 2G         | 90.5         |
| VoLTE      | 92.2         |

#### 2G



#### VoLTE



| Overall Rx Quality | # Samples       | %          |
|--------------------|-----------------|------------|
| (Min, <=2)         | 6693469         | 71.6       |
| (2, <=3)           | 469179          | 5.0        |
| (3, <=4)           | 422154          | 4.5        |
| (4, <=5)           | 877331          | 9.4        |
| (5, <=Max)         | 890241          | 9.5        |
| <b>Total</b>       | <b>16241709</b> | <b>100</b> |

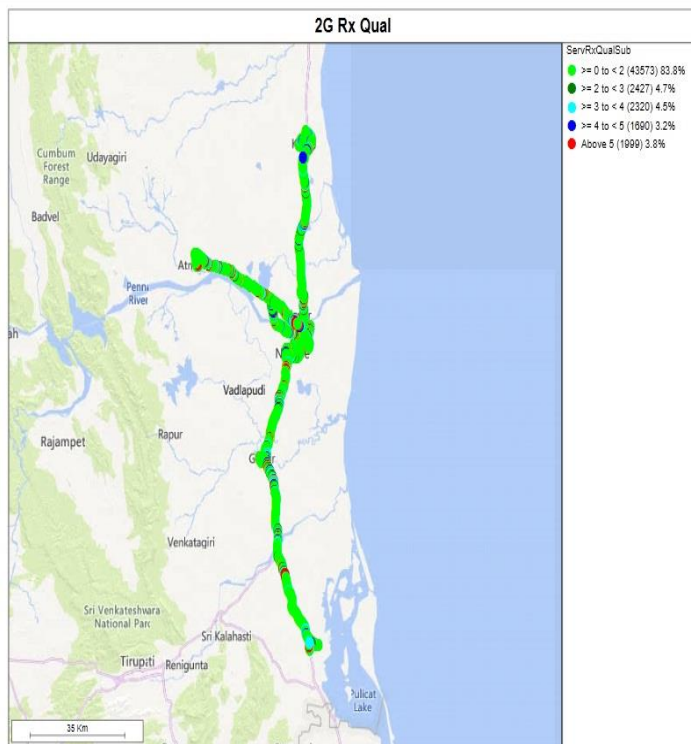
| Overall SINR | # Samples       | %          |
|--------------|-----------------|------------|
| (Min, <=0)   | 1006613         | 7.8        |
| (0, <=5)     | 4233669         | 33         |
| (5, <=10)    | 2721709         | 21.2       |
| (10, <=15)   | 2486054         | 19.4       |
| (15, <=Max)  | 2385791         | 18.6       |
| <b>Total</b> | <b>19283628</b> | <b>100</b> |

## II. Quality Details

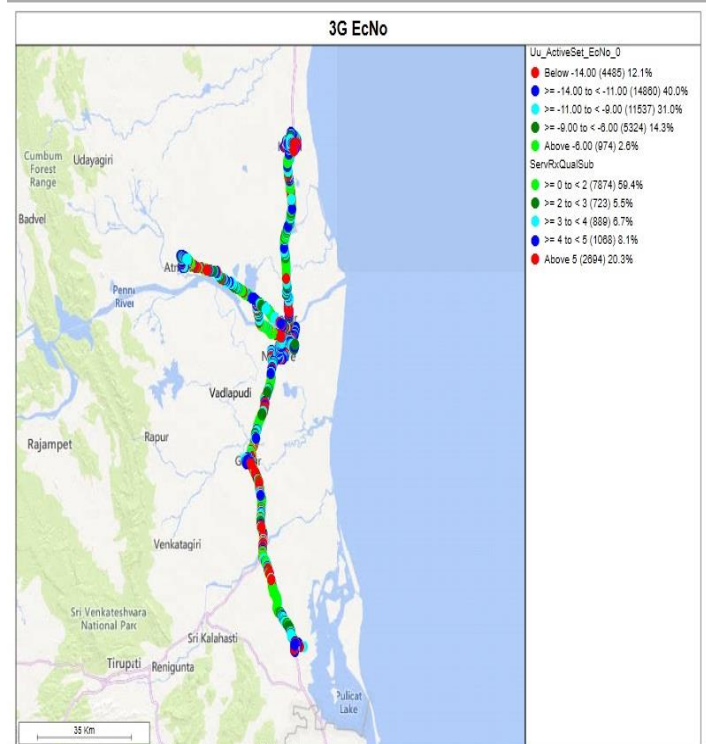
### BSNL

| Technology | Rx Quality % |
|------------|--------------|
| 2G         | 96.2         |
| 3G         | 87.9         |

### 2G



### 3G (Dual mode)



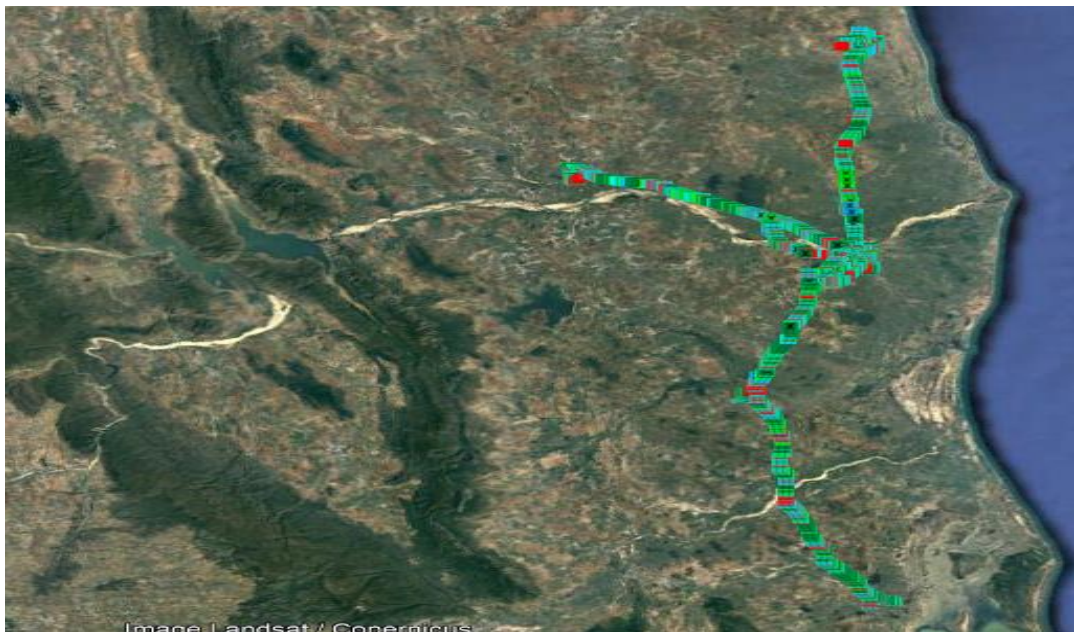
| Overall Rx Quality | # Samples    | %           |
|--------------------|--------------|-------------|
| (Min, <=2)         | 43573        | 83.8        |
| (2, <=3)           | 2427         | 4.7         |
| (3, <=4)           | 2320         | 4.5         |
| (4, <=5)           | 1690         | 3.2         |
| (5, <=Max)         | 1999         | 3.8         |
| <b>Total</b>       | <b>52009</b> | <b>100%</b> |

| Overall EcNo  | # Samples    | %          |
|---------------|--------------|------------|
| (Max, <=-6)   | 974          | 2.6        |
| (-6, <=-9)    | 5324         | 14.3       |
| (-9, <=-11)   | 11537        | 31.0       |
| (-11, <=-14)  | 14860        | 40.0       |
| (-14, <= Min) | 1185         | 12.1       |
| <b>Total</b>  | <b>33880</b> | <b>100</b> |

## II. Quality Details

### JIO

| Technology | Rx Quality % |
|------------|--------------|
| VoLTE      | 98.52        |



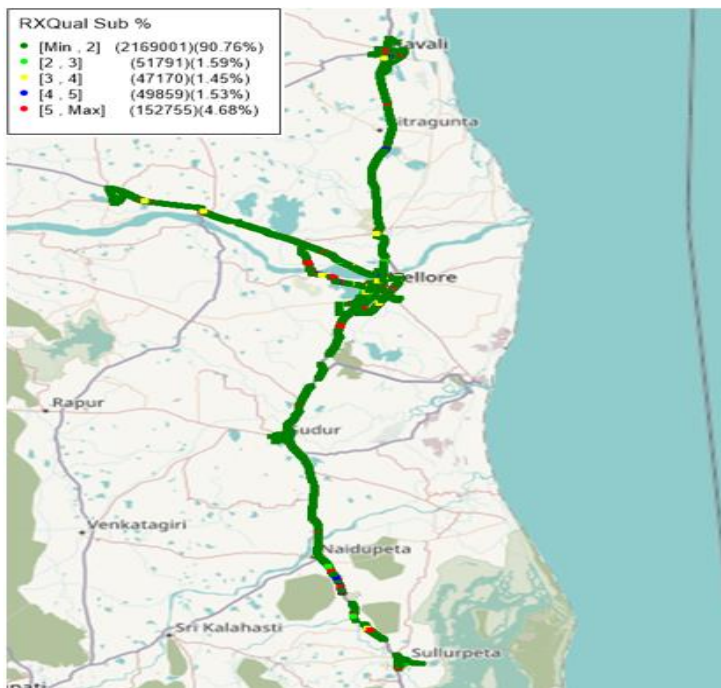
| Overall SINR | # Samples    | %          |
|--------------|--------------|------------|
| (Min, <=-6)  | 809          | 1.47       |
| (-6, <=5)    | 19369        | 35.31      |
| (5, <=10)    | 14115        | 25.74      |
| (10, <=15)   | 9924         | 18.09      |
| (15, <=Max)  | 10638        | 19.39      |
| <b>Total</b> | <b>54855</b> | <b>100</b> |

## II. Quality Details

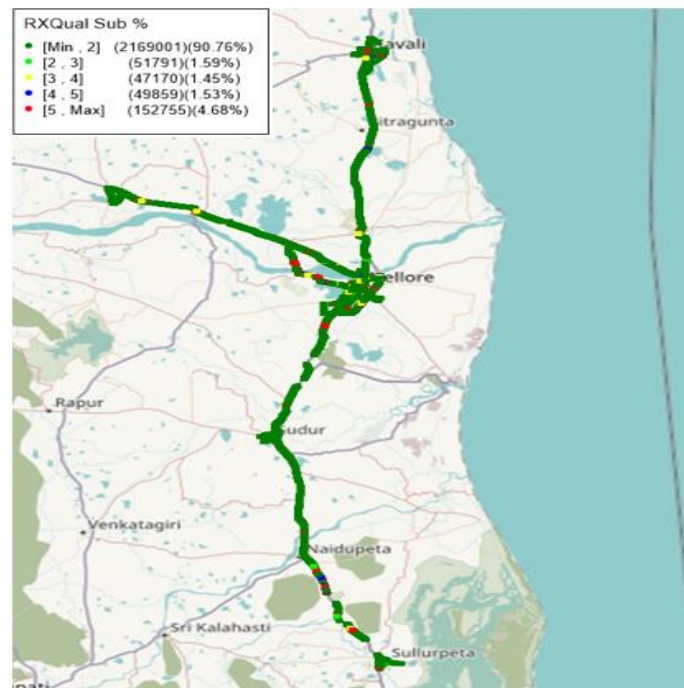
For measuring voice quality, as per the QoS norms, RxQual  $\leq 5$  for GSM TSPs, EcNo  $\geq -14$  dBm for 3G TSP and SINR  $> 0$  in case of VoLTE is considered to be good, where as quality beyond this benchmark is considered to be bad. The benchmark should usually be  $\geq 95\%$ .

| VIL        |              |
|------------|--------------|
| Technology | Rx Quality % |
| 2G         | 95.31        |
| VoLTE      | 77.49        |

### 2G



### VoLTE

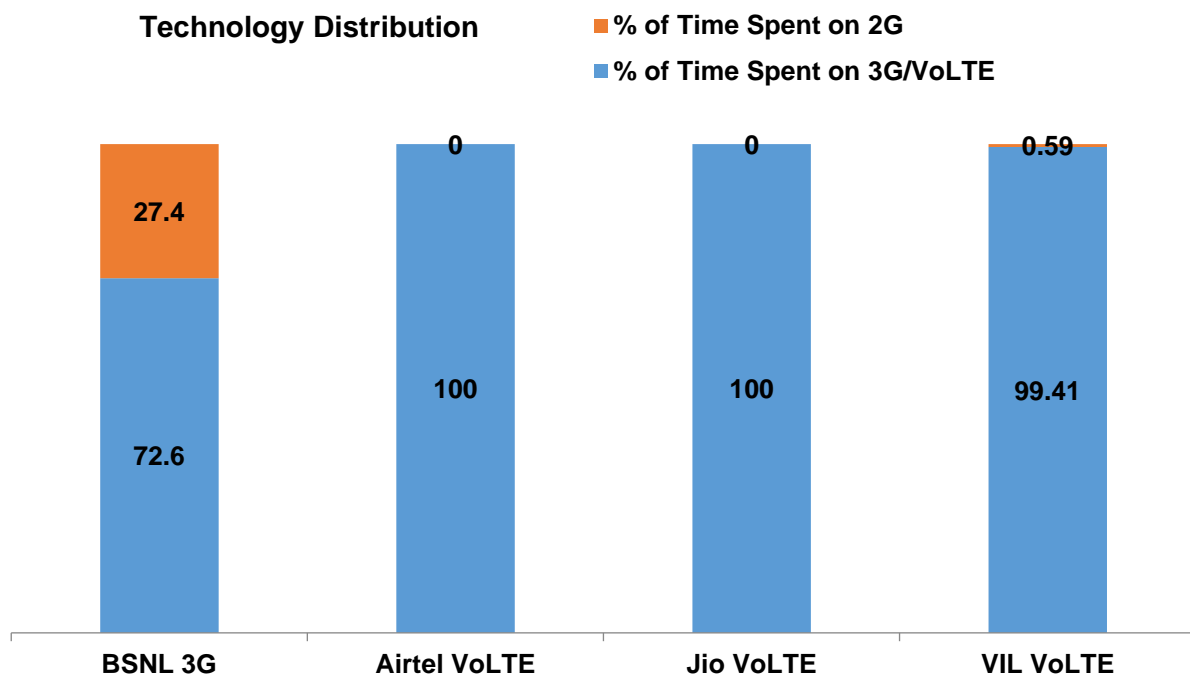


| Overall Rx Quality      | # Samples      | %          |
|-------------------------|----------------|------------|
| (Min, $\leq 2$ )        | 2161009        | 90.76      |
| (2, $\leq 3$ )          | 51791          | 1.58       |
| (3, $\leq 4$ )          | 47170          | 1.45       |
| (4, $\leq 5$ )          | 49859          | 1.53       |
| (5, $\leq \text{Max}$ ) | 152755         | 4.68       |
| <b>Total</b>            | <b>3262584</b> | <b>100</b> |

| Overall Rx Quality      | # Samples      | %          |
|-------------------------|----------------|------------|
| (Min, $\leq 2$ )        | 2161009        | 90.76      |
| (2, $\leq 3$ )          | 51791          | 1.58       |
| (3, $\leq 4$ )          | 47170          | 1.45       |
| (4, $\leq 5$ )          | 49859          | 1.53       |
| (5, $\leq \text{Max}$ ) | 152755         | 4.68       |
| <b>Total</b>            | <b>3262584</b> | <b>100</b> |

### III. Technology Details

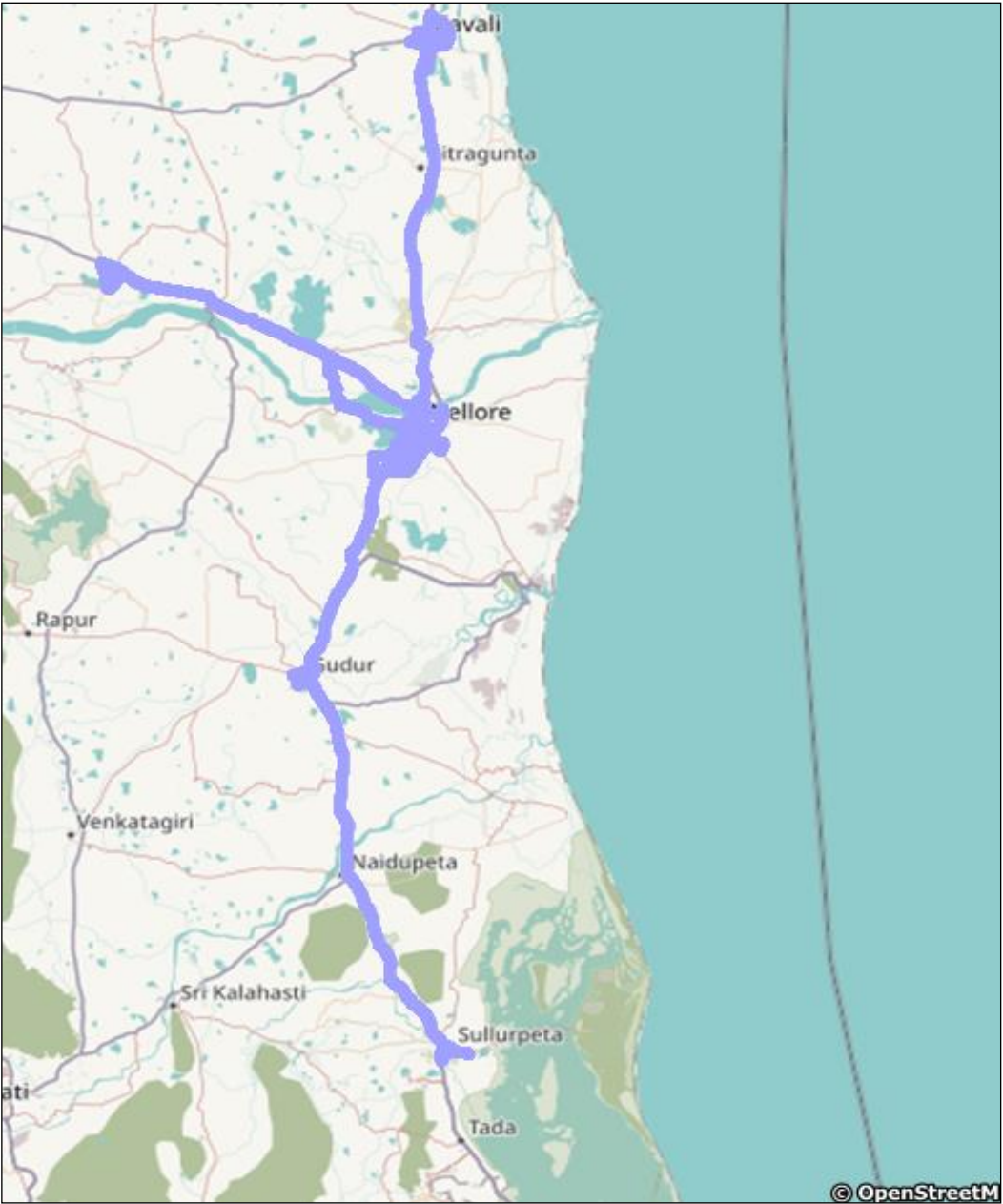
| TSP          | % of Time Spent on |
|--------------|--------------------|
| BSNL 3G      | 72.6               |
| Airtel VoLTE | 100                |
| Jio VoLTE    | 100                |
| VIL VoLTE    | 99.41              |



### III. Technology Details

## Airtel

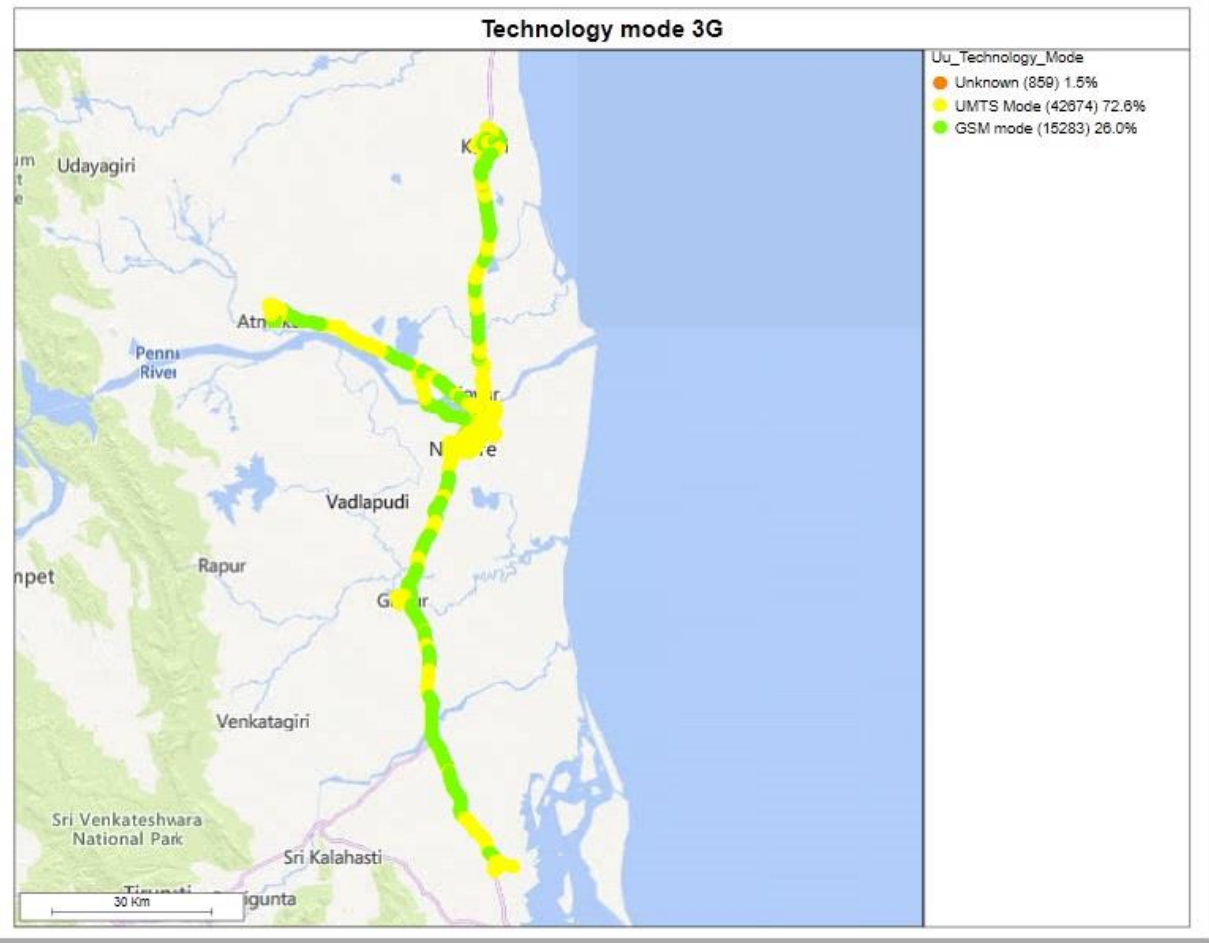
| Technology | Time Spent % |
|------------|--------------|
| VoLTE      | 100          |



# III. Technology Details

## BSNL

| Technology | Time Spent % |
|------------|--------------|
| 3G         | 72.6         |





## III. Technology Details

### RJIO

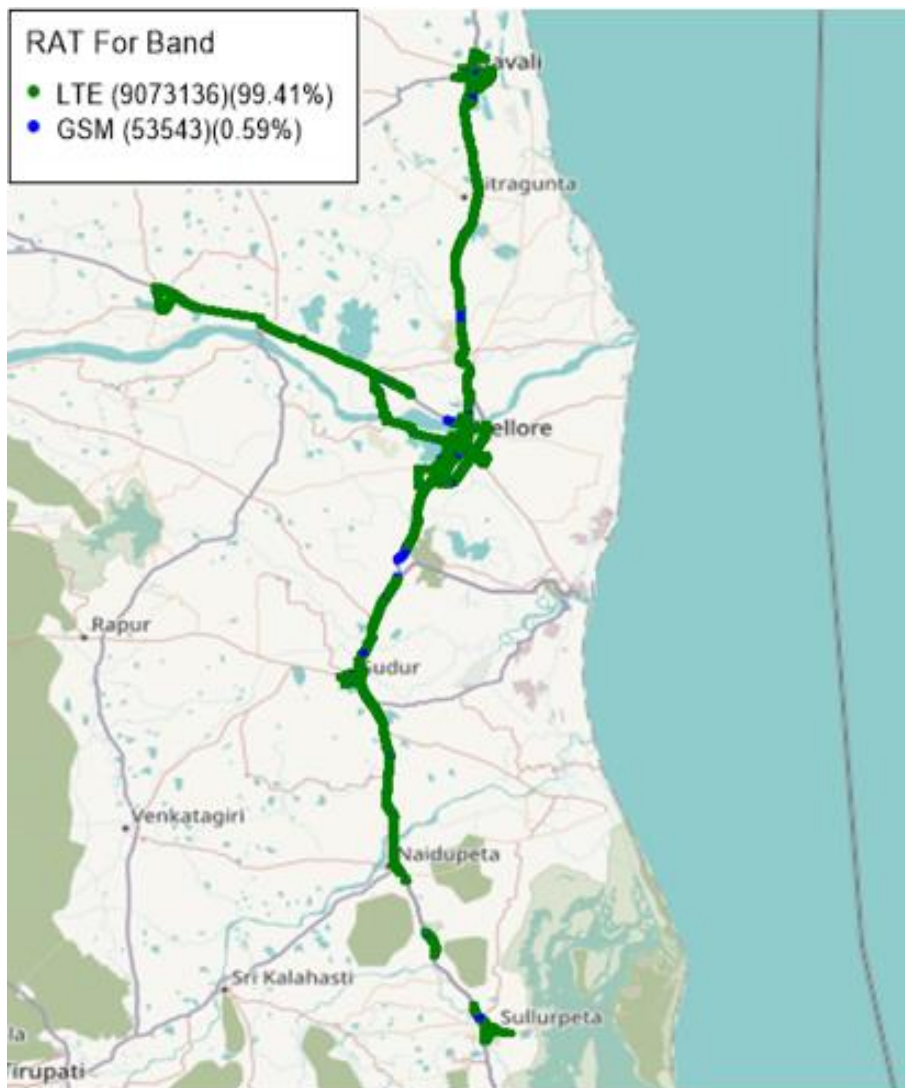
| Technology | Time Spent % |
|------------|--------------|
| VoLTE      | 100          |



### III. Technology Details

## VIL

| Technology | Time Spent % |
|------------|--------------|
| VoLTE      | 99.41        |

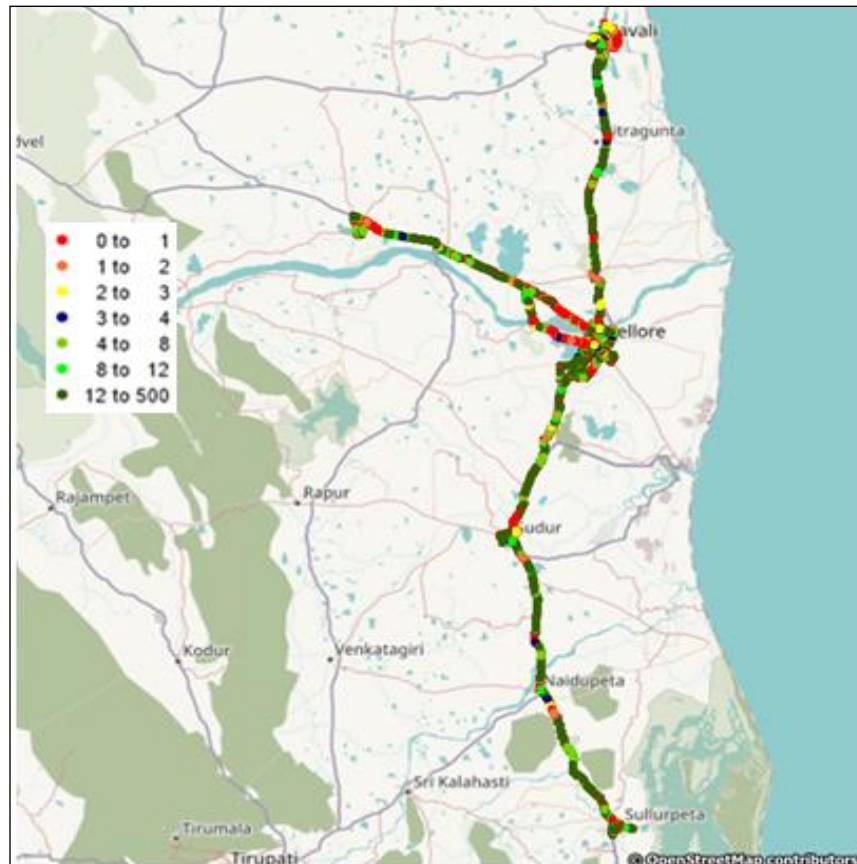


# IV. Dynamic Data Test- 4G DL Details

## Airtel

### Data Statistics - Dynamic Complete SSA 360 Kms

|                            |       |
|----------------------------|-------|
| Data KPIs - Overall        | 4G    |
| Download Throughput (Mbps) | 22.69 |



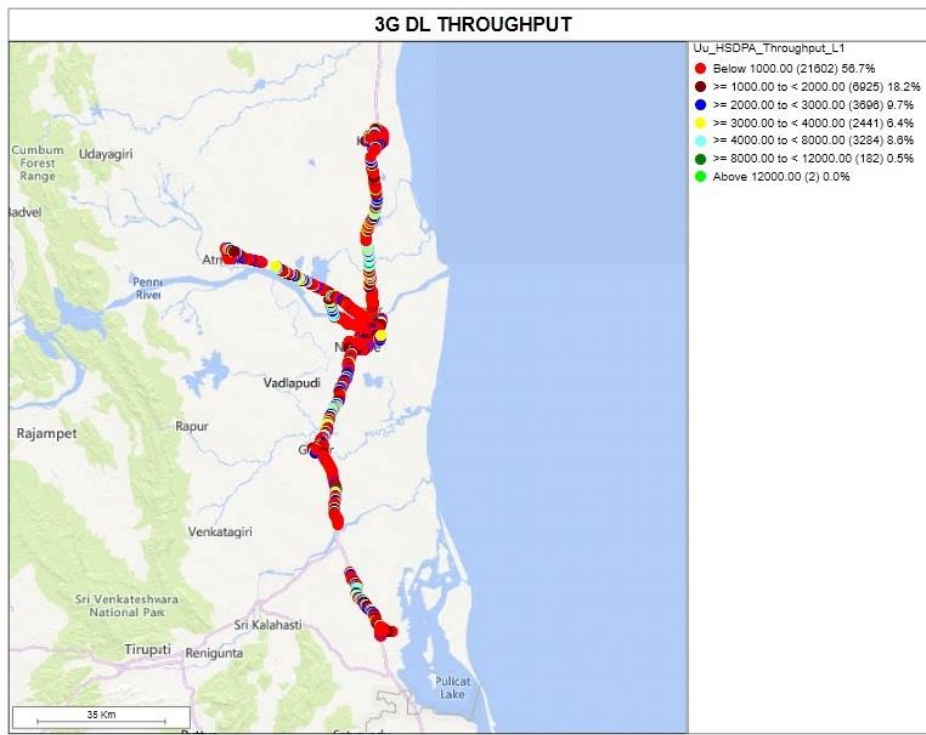
| DL throughput | No of Sample | %     |
|---------------|--------------|-------|
| 0 to 1 Mbps   | 1906445      | 18.3  |
| 1 to 2 Mbps   | 553569       | 5.3   |
| 2 to 3 Mbps   | 447445       | 4.3   |
| 3 to 4 Mbps   | 406816       | 3.9   |
| 4 to 8 Mbps   | 1161589      | 11.2  |
| 8 to 12 Mbps  | 1032216      | 9.9   |
| >12 Mbps      | 4883542      | 46.99 |

## IV. Dynamic Data Test- 3G DL Details

### BSNL

#### Data Statistics - Dynamic Complete SSA 360 Kms

|                            |      |
|----------------------------|------|
| Data KPIs - Overall        | 3G   |
| Download Throughput (Mbps) | 1.42 |



| DL throughput | No of Samples | %    |
|---------------|---------------|------|
| 0 to 1 Mbps   | 21602         | 56.7 |
| 1 to 2 Mbps   | 6925          | 18.2 |
| 2 to 3 Mbps   | 3696          | 9.7  |
| 3 to 4 Mbps   | 2441          | 6.4  |
| 4 to 8 Mbps   | 3284          | 8.6  |
| 8 to 12 Mbps  | 182           | 0.5  |
| >12 Mbps      | 2             | 0    |

## IV. Dynamic Data Test- 4G DL Details

### RJIO

#### Data Statistics - Dynamic Complete SSA 350 Kms

|                            |       |
|----------------------------|-------|
| Data KPIs - Overall        | 4G    |
| Download Throughput (Mbps) | 10.46 |

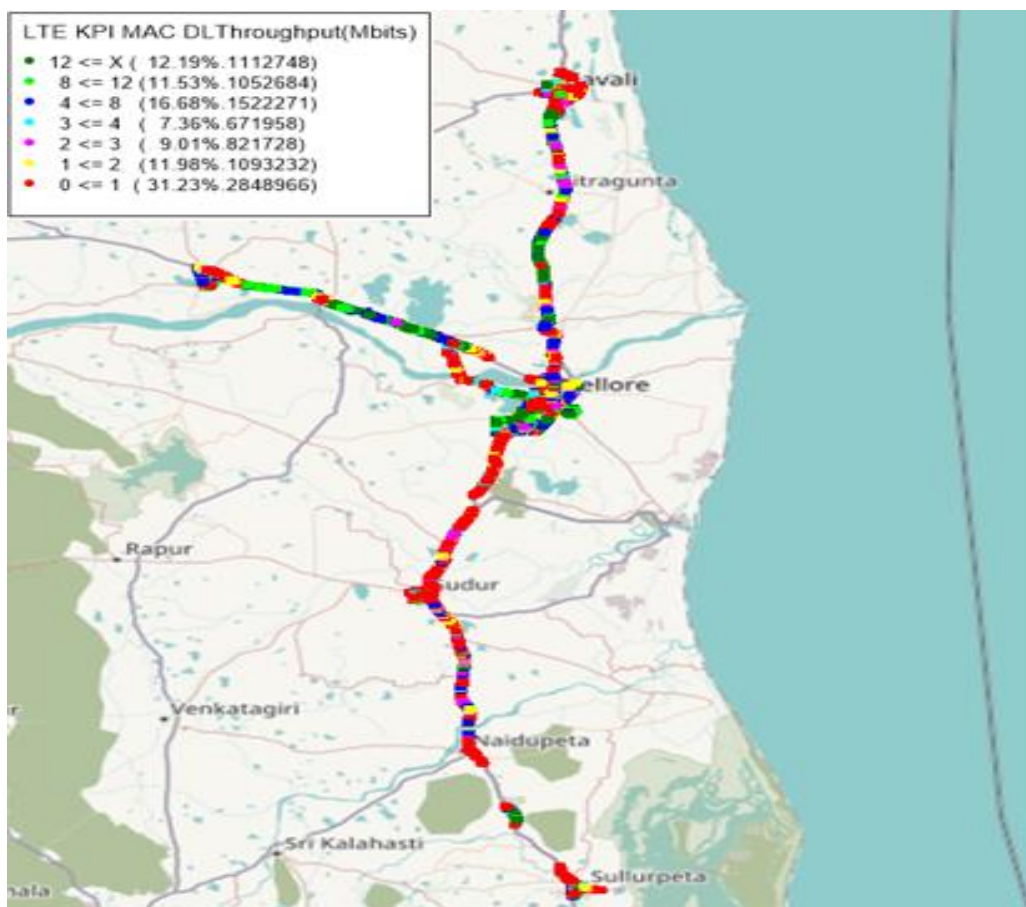


| DL throughput | No. of Samples | %     |
|---------------|----------------|-------|
| 0 to 1 Mbps   | 15163          | 29.75 |
| 1 to 2 Mbps   | 3040           | 5.97  |
| 2 to 3 Mbps   | 3014           | 5.91  |
| 3 to 4 Mbps   | 2799           | 5.49  |
| 4 to 8 Mbps   | 9000           | 17.66 |
| 8 to 12 Mbps  | 5786           | 11.35 |
| >12 Mbps      | 12159          | 23.86 |
| Total         | 50648          | 100   |

## VIL

### Data Statistics - Dynamic Complete SSA 315 Kms

|                            |      |
|----------------------------|------|
| Data KPIs - Overall        | 4G   |
| Download Throughput (Mbps) | 4.99 |



| DL throughput | No of Sample | %     |
|---------------|--------------|-------|
| 0 to 1 Mbps   | 2848966      | 12.20 |
| 1 to 2 Mbps   | 1093232      | 11.98 |
| 2 to 3 Mbps   | 821728       | 9.00  |
| 3 to 4 Mbps   | 671958       | 7.37  |
| 4 to 8 Mbps   | 1522271      | 16.68 |
| 8 to 12 Mbps  | 1052684      | 11.54 |
| >12 Mbps      | 1112748      | 12.19 |
| Total         | 9123587      | 100%  |

## Airtel

| Technology - 4G  | Railway station-Gudur | RTC Bus stand - Kavali | RTC Bus stand - Nellore | MGB Mall - Nellore | Govt. Hospital - Nellore |
|------------------|-----------------------|------------------------|-------------------------|--------------------|--------------------------|
| Download in Mbps | 25.8                  | 35.14                  | 45.19                   | 59.79              | 40.48                    |
| Upload in Mbps   | 5.75                  | 30.24                  | 10.41                   | 3.54               | 3.28                     |

## BSNL

| Technology - 3G  | Railway station-Gudur | RTC Bus stand - Kavali | RTC Bus stand - Nellore | MGB Mall - Nellore | Govt. Hospital - Nellore |
|------------------|-----------------------|------------------------|-------------------------|--------------------|--------------------------|
| Download in Mbps | 3.02                  | 6.40                   | 6.31                    | 3.80               | 2.97                     |
| Upload in Mbps   | 1.86                  | 2.52                   | 2.07                    | 2.24               | 0.68                     |

## JIO

| Technology - 4G  | Railway station-Gudur | RTC Bus stand - Kavali | RTC Bus stand - Nellore | MGB Mall - Nellore | Govt. Hospital - Nellore |
|------------------|-----------------------|------------------------|-------------------------|--------------------|--------------------------|
| Download in Mbps | 39.38                 | 48.4                   | 38.99                   | 35.03              | 73.91                    |
| Upload in Mbps   | 20.08                 | 17.12                  | 19.5                    | 27.26              | 6.95                     |

## VIL

| Technology - 4G  | Railway station-Gudur | RTC Bus stand - Kavali | RTC Bus stand - Nellore | MGB Mall - Nellore | Govt. Hospital - Nellore |
|------------------|-----------------------|------------------------|-------------------------|--------------------|--------------------------|
| Download in Mbps | 22.20                 | 34.47                  | 5.03                    | 8.31               | 20.17                    |
| Upload in Mbps   | 4.60                  | 3.43                   | 3.34                    | 8.45               | 1.41                     |