



# Operator Assisted Drive Test Report

## Saharanpur City and nearby Area

12/12/2023 to 15/12/2023

By

**TRAI Regional Office Bhopal**

The Operator Assisted Drive Test has been carried out by Regional Office, Bhopal with the help of Telecom Service Providers for Saharanpur City and surrounding areas from 9:00 AM to 8:00 PM from 12/12/2023 to 14/12/2023. The drive test covered drive route of around 256 KMs.

TSP	Network tested
Airtel	2G & VoLTE
BSNL	2G & VoLTE
JIO	VoLTE
VIL	2G, VoLTE

### Key Performance Indicators:

KPI	Benchmark	Observations
Block call rate %	$\leq 3\%$	All TSPs achieved the benchmark
Drop call rate %	$\leq 2\%$	All TSPs achieved the benchmark
CSSR %	$\geq 95\%$	All TSPs achieved the benchmark
Mobility HOSR %	$\geq 95\%$	All TSPs achieved the benchmark
Good RX Quality %	$\geq 95\%$	No TSP achieved the benchmark of Rx Quality in VoLTE. Airtel also not achieved benchmark of Rx Quality in 2G

# Overview

Regional Office, TRAI Bhopal conducted Operator Assisted Drive Test. The performance of Airtel, BSNL, Vodafone Idea and Jio was monitored across various technologies (2G, 3G,4G & 5G). The test results obtained from these drive tests were utilized to assess the network quality for Voice and Data services.

**Voice:** Coverage, Quality, Handover Success Rate, Call Setup Success Rate, Drop Call Rate and Block Call Rate.

**Data:** Download Throughputs

## **Drive Test Details :**

### **Voice Tests:**

- i. 2G – measurement – UE Locked in 2G
- ii. 3G – measurement – UE in Dual mode (2G and 3G)
- iii. 4G – measurement – UE in Free mode

Calls were made for the **120-sec** duration with a wait time of **10 sec** between calls in all technologies.

### **Data Tests:**

**Dynamic data** – repeat data file download ( to check throughput on the entire route)

- i. 3G – measurement – UE in 3G File Size- 20MB
- ii. 4G – measurement – UE in LTE File Size- 40MB
- iii. 5G – measurement – UE in 5G File Size- 200MB

**Static Data:** Download and Upload Throughputs, Web Browsing Delay, Video Streaming Delay, and Latency

- i. Download- 3G - 20 MB, 4G - 40MB, 5G -200 MB
- ii. Upload - 3G - 5 MB, 4G - 10MB, 5G – 100 MB
- iii. Web browsing - 3 links of e-commerce websites <https://www.amazon.in>, <https://www.flipkart.com>, <https://paytm.com>.
- iv. Video Streaming – 130 sec clip
- v. Latency – 32 Bytes on [www.google.com](http://www.google.com).

# Overview

## Voice & Dynamic Data Test Drive Route



### List of important area covered during the drive test

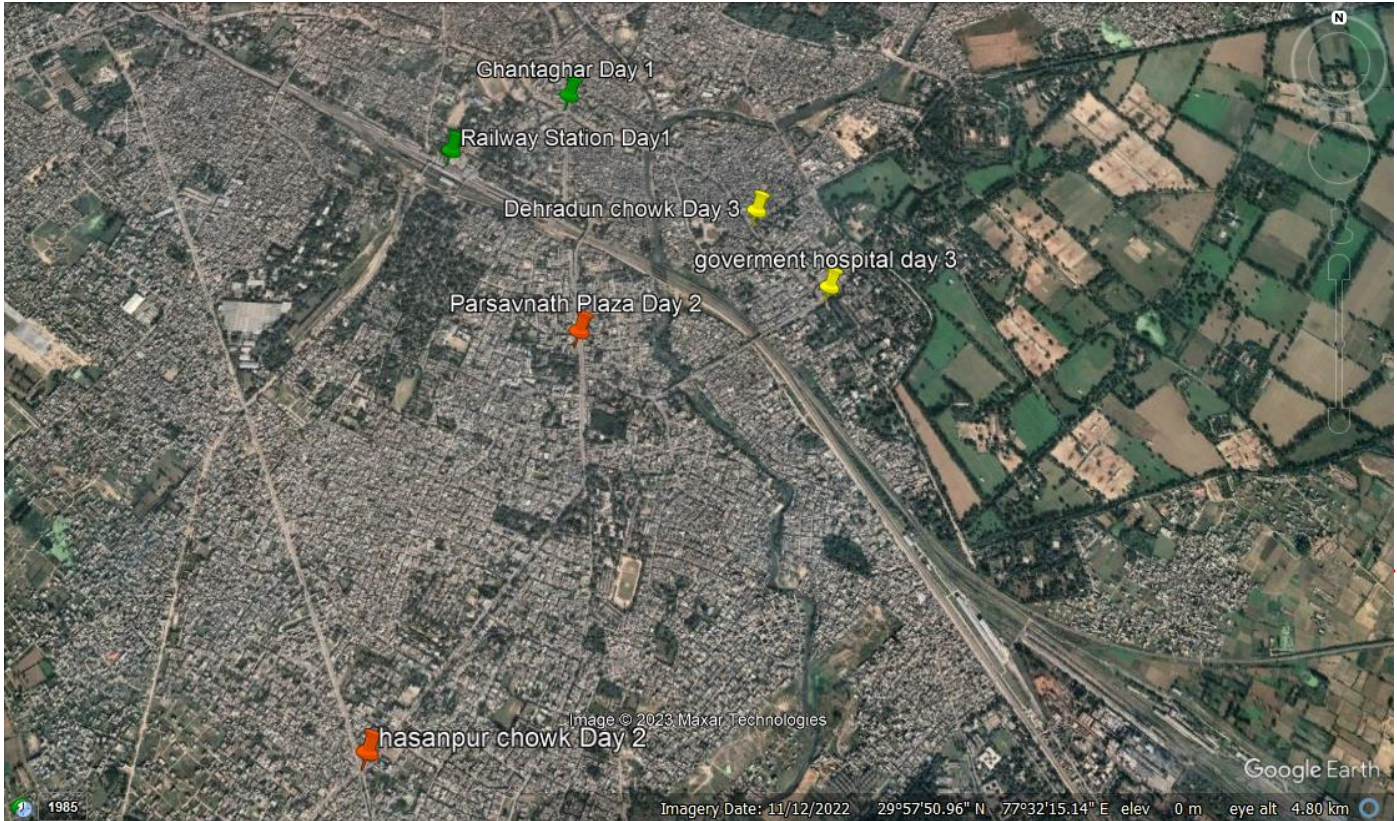
Clock tower to Court road saharanpur, Delhi road, Railway station road, ITC road, Ambala road, Nawada road

Gwaleera road, J.V.Jain college road, Awas vikas, Bajoria road, Dehradun road-Gagalehri, Paper mill road, Nawab ganj, Janta road, Numaish camp and madhav nagar, Bajoria road to Dabki junardar

D.M.Awas road, Behat-road, Chilkana road, Khatakheri, Raiwala, Mandi samiti road, Saharanpur-Sarsawa road



## Data Service Test- Static Locations



### Hotspot Locations

1: Clock Tower

2. Railway station

3.Parsavnath Plaza

4. Hasanpur chowk

5.Dehradun chowk

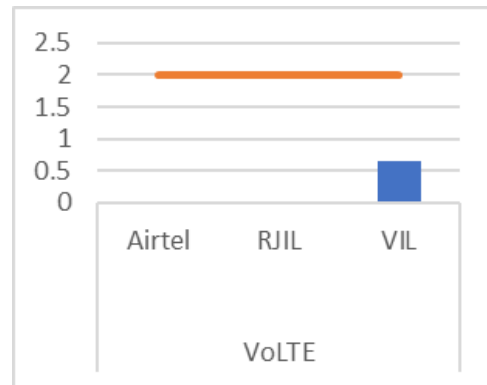
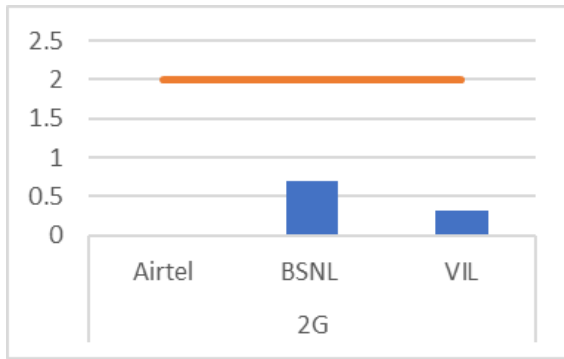
6. Government Hospital

# Voice Calls

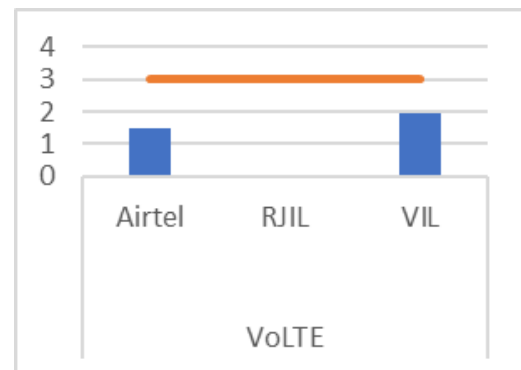
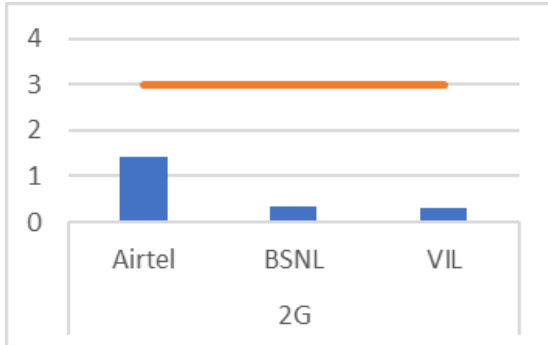
## Key Observations

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

Drop Call Rate (%)



Block Call Rate (%)



KPIs	2G			3G		VoLTE		
	Airtel	BSNL	VIL	BSNL	VIL	Airtel	RJIL	VIL
Drop Call Rate %	0	0.69	0.31	NA	NA	0	0	0.66
Block Call Rate %	1.43	0.34	0.31	NA	NA	1.48	NA	1.94

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 %	95.46	92	90.3

b) Percentage of coverage samples for 3G  $\geq$  -90 dBm

TSPs	3G
	BSNL
Coverage %	NA

b) Percentage of coverage samples for LTE  $\geq$  -110 dBm.

TSPs	VoLTE			
	Airtel	BSNL	JIO	VIL
Coverage %	98.87	87	99.92	98.1

c) Percentage of time spent on 3G/4G network

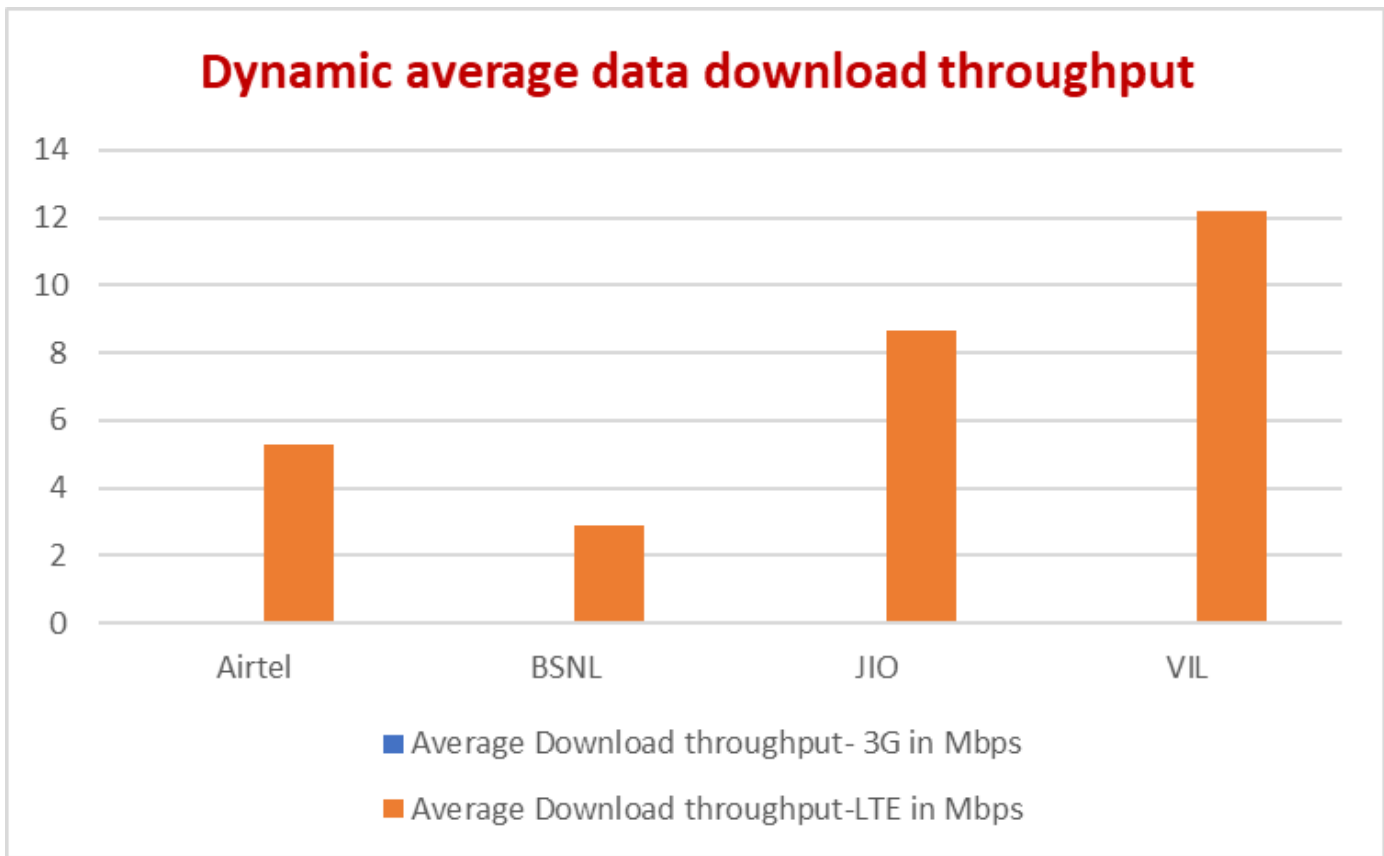
TSPs	3G		VoLTE			
	BSNL	VIL	Airtel	BSNL	VIL	JIO
Time Spent on 3G/4G %	NA	NA	98.66	97	100	100

# Data Services Dynamic

**Key Observations**

Dynamic Data -Download Throughput was tested.

**Data Download Performance – Dynamic 3G/4G/ 5G Network**



TSP	Airtel	BSNL	JIO	VIL
<b>Average Download throughput- 3G In Mbps</b>	NA	NA	NA	NA
<b>Average Download throughput-LTE in Mbps</b>	5.28	2.899	8.63	12.2
<b>Average Download throughput- 5G in Mbps</b>	9.16	NA	NA	NA

# Summary

## City Level Summary- Voice

TSP ( For 2G)	Airtel	BSNL	VIL
Call attempts	280	286	325
Block call rate %	1.43	0.34	0.31
CSSR %	99.65	99.65	99.69
Drop call rate %	0	0.69	0.31
Mobility HOSR %	97.16	98.94	97.86
RX Quality %	93.77	97	97.3
Average CST Sec	4.68	4	2.7

TSP ( For 3G)	BSNL
Call attempts	NA
Block call rate %	NA
CSSR %	NA
Drop call rate %	NA
Mobility HOSR %	NA
RX Quality %	NA
Average CST (Sec)	NA

TSP ( For Volte)	Airtel	BSNL	JIO	VIL
Call attempts	272	177	531	309
Block call rate %	1.48	1.12	0	1.94
CSSR %	99.83	98.87	100	98.06
Drop call rate %	0	0	0	0.66
Mobility HOSR %	98.7	100	99.86	98.88
RX Quality %	88	84	93.44	92.3
Average CST(Sec)	2.46	3.63	0.75	0.61



# Summary

## City Level Summary- Data Services -Static

<b>TSP ( For 3G)</b>	<b>BSNL</b>
<b>Download throughput in Mbps</b>	<b>NA</b>
<b>Upload Throughput in Mbps</b>	<b>NA</b>
<b>Video streaming delay in sec</b>	<b>NA</b>
<b>Web browsing delay in second</b>	<b>NA</b>
<b>Latency in (msec)</b>	<b>NA</b>

<b>TSP ( For LTE )</b>	<b>Airtel</b>	<b>BSNL</b>	<b>JIO</b>	<b>VIL</b>
<b>Download throughput in Mbps</b>	<b>17.30</b>	<b>5.9</b>	<b>34.95</b>	<b>28.96</b>
<b>Upload Throughput in Mbps</b>	<b>7.40</b>	<b>4.6</b>	<b>7.41</b>	<b>12.51</b>
<b>Video streaming delay in sec</b>	<b>NA</b>	<b>0.94</b>	<b>0</b>	<b>1.88</b>
<b>Web browsing delay in second</b>	<b>NA</b>	<b>0.93</b>	<b>1.87</b>	<b>0.78</b>
<b>Latency in (msec)</b>	<b>NA</b>	<b>63.8</b>	<b>83.72</b>	<b>85.23</b>

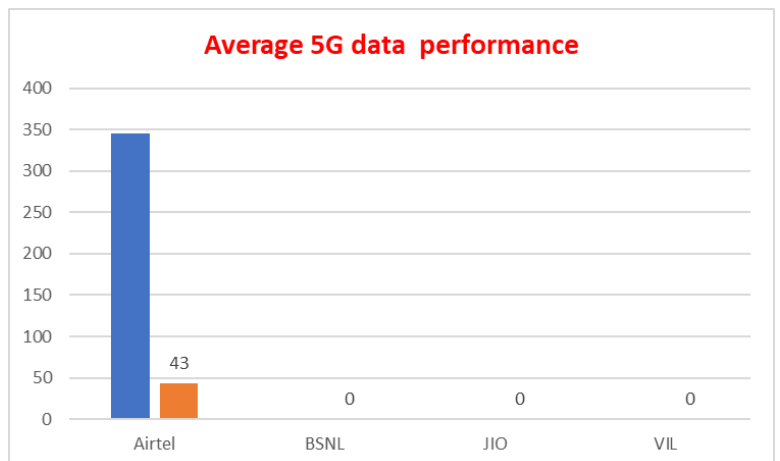
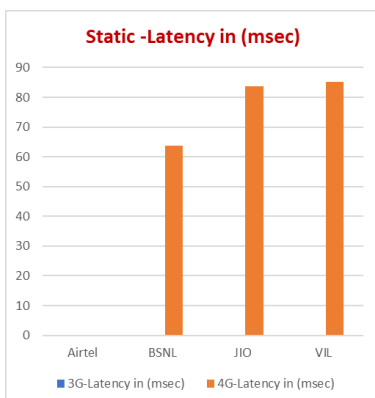
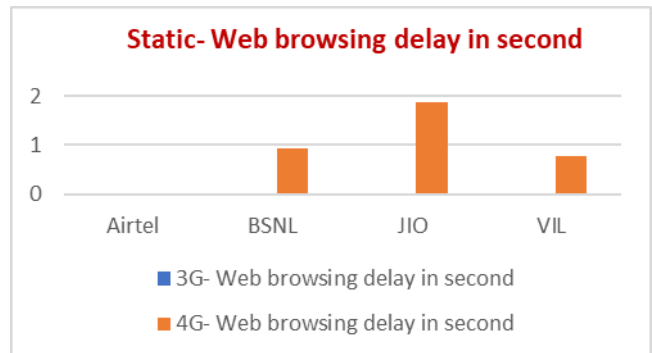
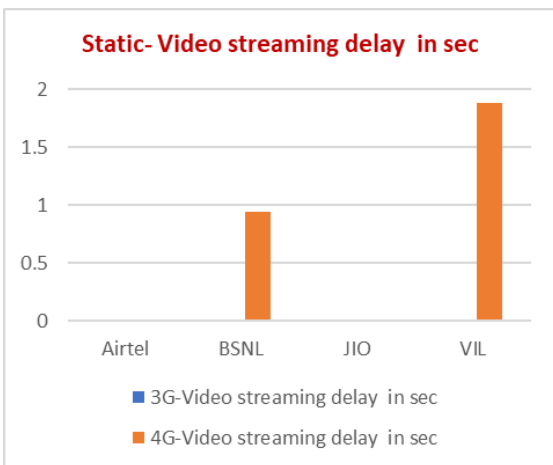
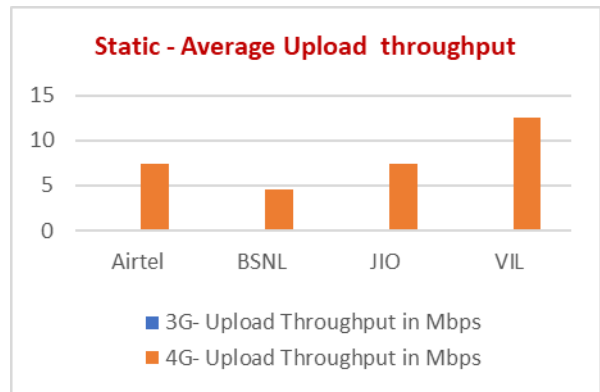
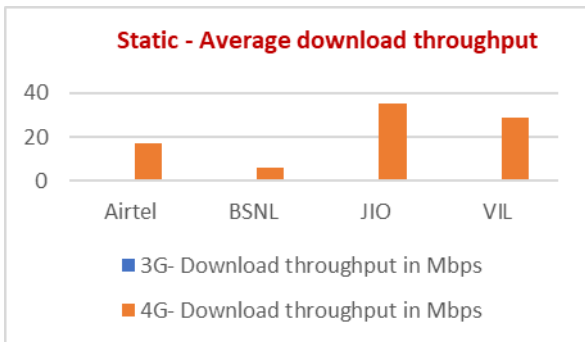
<b>TSP ( For 5G )</b>	<b>Airtel</b>	<b>BSNL</b>	<b>JIO</b>	<b>VIL</b>
<b>Download throughput in Mbps</b>	<b>390</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Upload Throughput in Mbps</b>	<b>173.3</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Video streaming delay in sec</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Web browsing delay in second</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Latency in (msec)</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

# Data Services Static

## Key Observations

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

### 3G/4G/ 5G Network



## 1. Hotspot Location- Clock Town

	3G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	NA	NA	NA
Upload Throughput in Mbps	NA	NA	NA	NA
Video streaming delay in sec	NA	NA	NA	NA
Web browsing delay in second	NA	NA	NA	NA
Latency in (msec)	NA	NA	NA	NA

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	47.99	11.25	35.71	<b>29.19</b>
Upload Throughput in Mbps	20.74	6.9	10	<b>4.23</b>
Video streaming delay in sec	0.443	0.86	0	<b>2</b>
Web browsing delay in second	1.442	0.94	1.93	<b>1.5</b>
Latency in (msec)	37.0	48.9	91.4	<b>64.8</b>

	5G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	54.60	NA	NA	NA
Upload Throughput in Mbps	88.31	NA	NA	NA
Video streaming delay in sec	0.443	NA	NA	NA
Web browsing delay in second	1.444	NA	NA	NA
Latency in (msec)	31.01	NA	NA	NA

## 2. Hotspot Location-Railway Station

	3G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	NA	NA	NA
Upload Throughput in Mbps	NA	NA	NA	NA
Video streaming delay in sec	NA	NA	NA	NA
Web browsing delay in second	NA	NA	NA	NA
Latency in (msec)	NA	NA	NA	NA

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	27.73	4.33	27.92	<b>34.7</b>
Upload Throughput in Mbps	19.41	4.89	6.90	<b>35.9</b>
Video streaming delay in sec	0.154	1.15	0	<b>1.5</b>
Web browsing delay in second	1.476	.79	1.74	<b>0.50</b>
Latency in (msec)	31.0	66.7	83.7	<b>81.2</b>

	5G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	299.28	NA	NA	NA
Upload Throughput in Mbps	79.03	NA	NA	NA
Video streaming delay in sec	0.599	NA	NA	NA
Web browsing delay in second	4.112	NA	NA	NA
Latency in (msec)	29.02	NA	NA	NA

## 3. Hotspot Location-Parasvanath Plaza

	3G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	NA	NA	NA
Upload Throughput in Mbps	NA	NA	NA	NA
Video streaming delay in sec	NA	NA	NA	NA
Web browsing delay in second	NA	NA	NA	NA
Latency in (msec)	NA	NA	NA	NA

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	15.78	5.76	25.64	<b>16.87</b>
Upload Throughput in Mbps	10.24	5.33	6.89	<b>2.88</b>
Video streaming delay in sec	0.344	1.05	0	<b>1.6</b>
Web browsing delay in second	1.444	0.96	2.33	<b>0.68</b>
Latency in (msec)	25.0	55.0	94.9	<b>98</b>

	5G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	177.87	NA	NA	NA
Upload Throughput in Mbps	24.33	NA	NA	NA
Video streaming delay in sec	0.466	NA	NA	NA
Web browsing delay in second	3.100	NA	NA	NA
Latency in (msec)	34.0	NA	NA	NA



## 4. Hotspot Location-Hasanpur Chock

	3G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	NA	NA	NA
Upload Throughput in Mbps	NA	NA	NA	NA
Video streaming delay in sec	NA	NA	NA	NA
Web browsing delay in second	NA	NA	NA	NA
Latency in (msec)	NA	NA	NA	NA

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	11.35	4.77	37.66	<b>36.82</b>
Upload Throughput in Mbps	32.6	4.1	6.75	<b>6.42</b>
Video streaming delay in sec	0.353	0.83	0	<b>2</b>
Web browsing delay in second	2.749	0.96	1.70	<b>0.59</b>
Latency in (msec)	20.0	63.5	93.5	<b>84.2</b>

	5G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	88.11	NA	NA	NA
Upload Throughput in Mbps	74.44	NA	NA	NA
Video streaming delay in sec	0.164	NA	NA	NA
Web browsing delay in second	1.108	NA	NA	NA
Latency in (msec)	42.09	NA	NA	NA

## 5. Hotspot Location- Dehradun Chock

	3G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	NA	NA	NA
Upload Throughput in Mbps	NA	NA	NA	NA
Video streaming delay in sec	NA	NA	NA	NA
Web browsing delay in second	NA	NA	NA	NA
Latency in (msec)	NA	NA	NA	NA

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	12.82	4.1	44.02	<b>24.1</b>
Upload Throughput in Mbps	25.5	2.436	7.40	<b>2.8</b>
Video streaming delay in sec	0.591	0.79	0	<b>2.1</b>
Web browsing delay in second	3.117	0.97	1.77	<b>0.84</b>
Latency in (msec)	28.0	81.1	66	<b>97.8</b>

	5G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	93.67	NA	NA	NA
Upload Throughput in Mbps	39.99	NA	NA	NA
Video streaming delay in sec	0.145	NA	NA	NA
Web browsing delay in second	3.732	NA	NA	NA
Latency in (msec)	29.0	NA	NA	NA

## 6. Hotspot Location- Government Hospital

	3G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	NA	NA	NA
Upload Throughput in Mbps	NA	NA	NA	NA
Video streaming delay in sec	NA	NA	NA	NA
Web browsing delay in second	NA	NA	NA	NA
Latency in (msec)	NA	NA	NA	NA

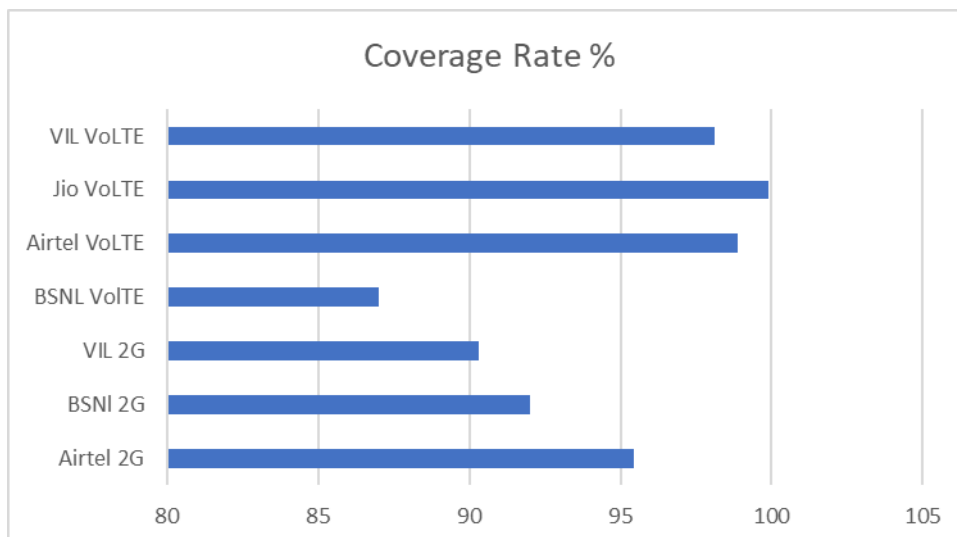
	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	20.42	5.3	38.74	<b>32.1</b>
Upload Throughput in Mbps	13.70	4.2	6.54	<b>22.8</b>
Video streaming delay in sec	0.466	0.96	0	<b>2.1</b>
Web browsing delay in second	1.435	0.98	1.75	<b>0.55</b>
Latency in (msec)	32.0	67.8	72.9	<b>85.4</b>

	5G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	308.22	NA	NA	NA
Upload Throughput in Mbps	106.38	NA	NA	NA
Video streaming delay in sec	0.177	NA	NA	NA
Web browsing delay in second	2.544	NA	NA	NA
Latency in (msec)	31.0	NA	NA	NA

## 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.

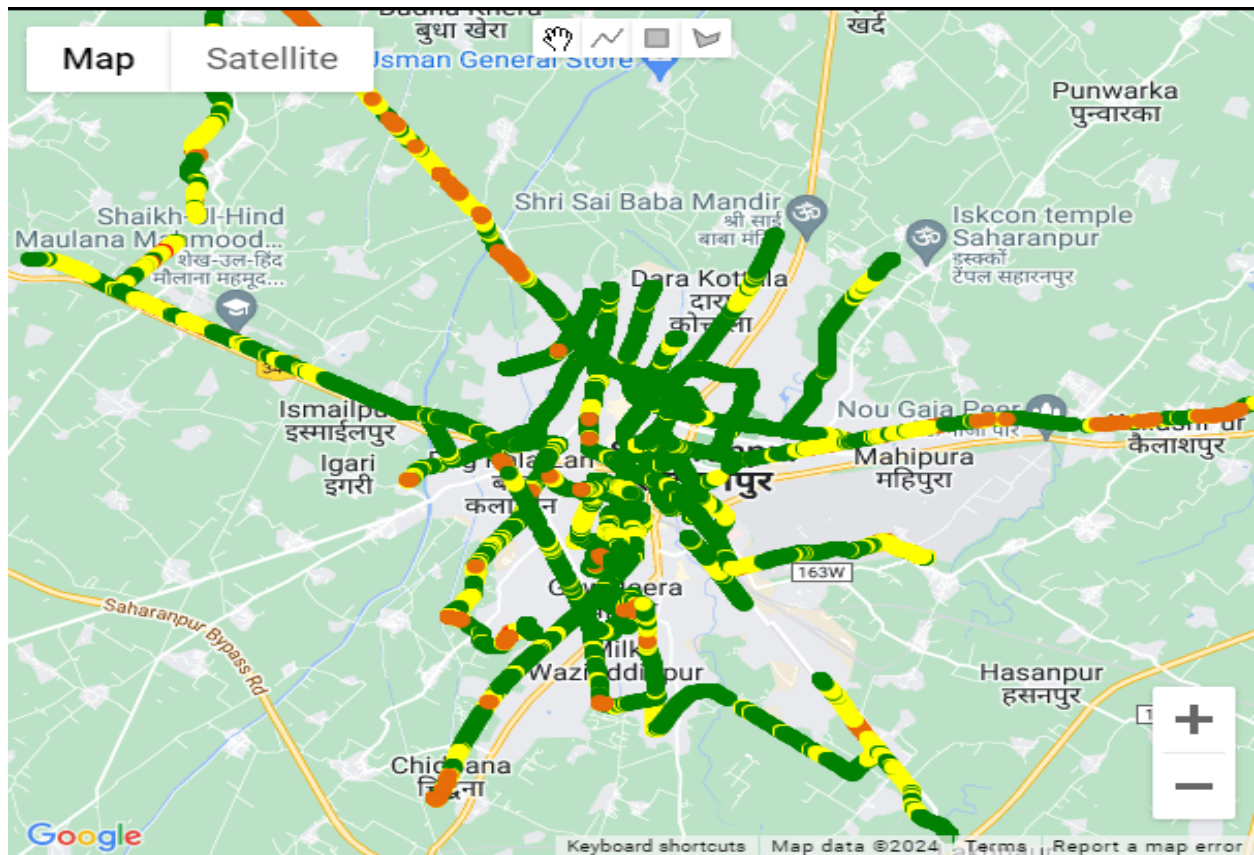
<b>TSP</b>	<b>Coverage Rate %</b>
<b>Airtel 2G</b>	<b>95.46</b>
<b>BSNI 2G</b>	<b>92</b>
<b>VIL 2G</b>	<b>90.3</b>
<b>BSNL 4G</b>	<b>87</b>
<b>Airtel VoLTE</b>	<b>98.87</b>
<b>Jio VoLTE</b>	<b>99.92</b>
<b>VIL VoLTE</b>	<b>98.1</b>



# Coverage Details

## TSP-Airtel

Technology	Coverage %
2G	95.46%



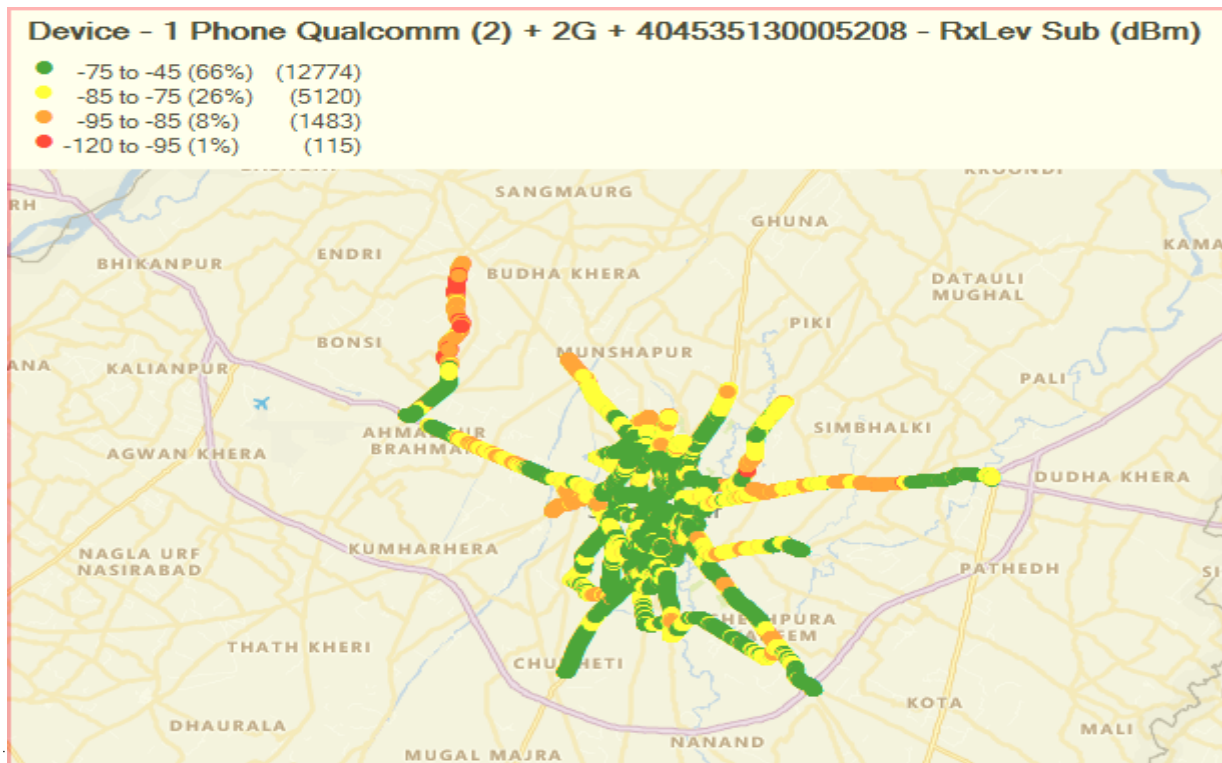
2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	13986	78.22%	
[-75, >=-85)	3083	17.24%	
[-85, >=-95)	803	4.49%	
[-95, >=Min)	9	0.05%	
<b>Total</b>	<b>17881</b>	<b>100%</b>	



# Coverage Details

## TSP-BSNL

Technology	Coverage %
2G	92%

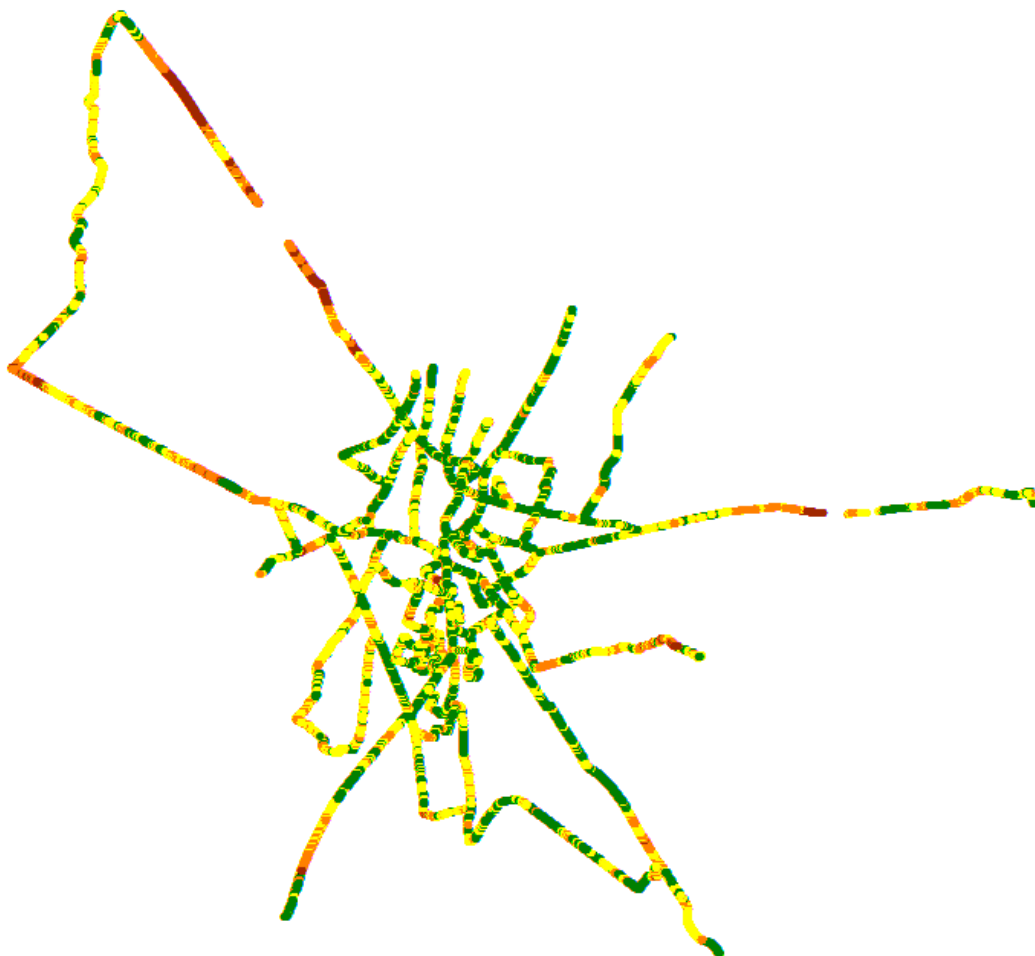



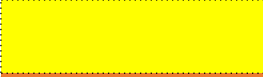


2G

Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	12774	66%	
[-75, >=-85)	5120	26%	
[-85, >=-95)	1483	8%	
[-95, >=Min)	115	0%	
<b>Total</b>	<b>19492</b>	<b>100%</b>	

## TSP-VIL

Technology	Coverage %
2G	90.3

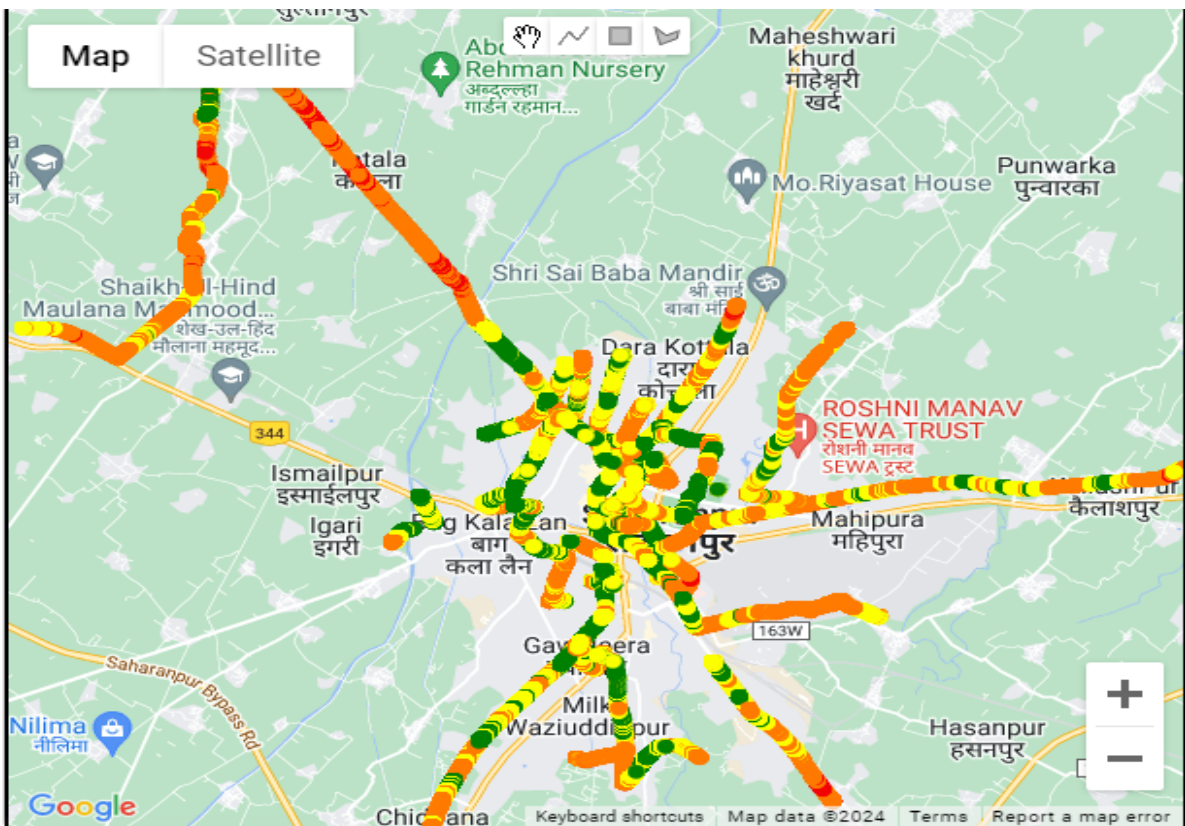


Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	43488	52.3	
[-75, >=-85)	31555	38	
[-85, >=-95)	7165	8.6	
[-95, >=Min)	888	1.1	
<b>Total</b>			

# Coverage Details

## TSP-Airtel

Technology	Coverage %
VoLTE	98.87%



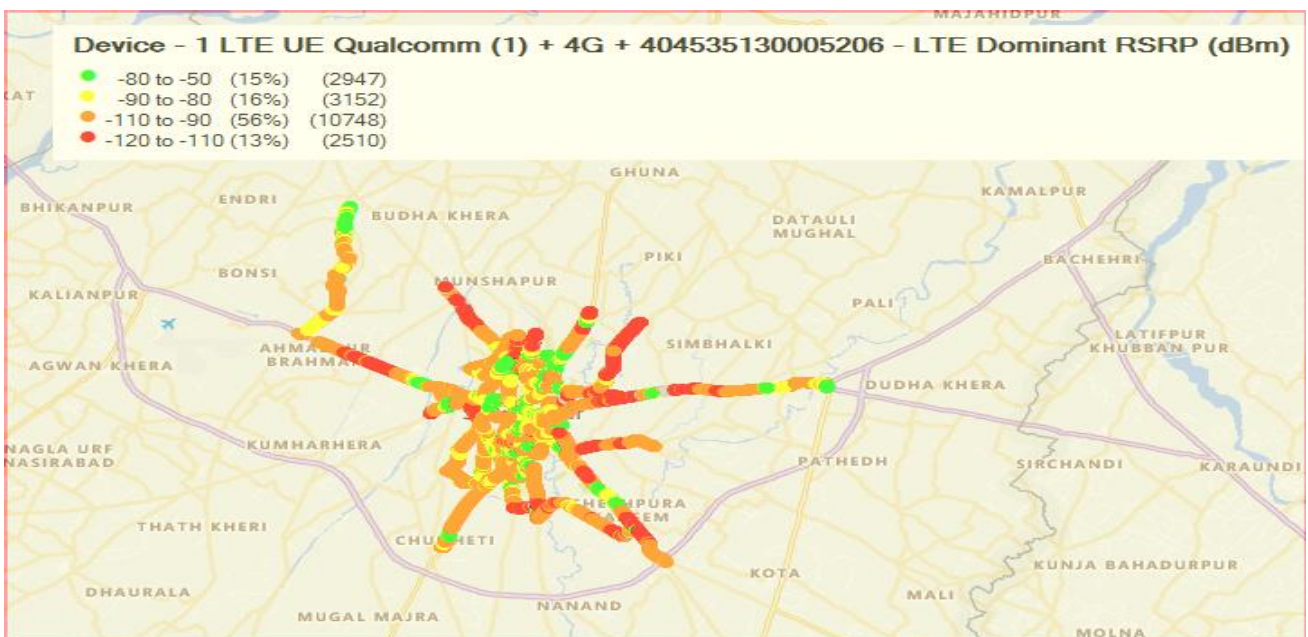
### VoLTE

Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	36612	32.9%	Green
[-80, >=-90)	35833	32.2%	Yellow
[-90, >=-110)	37564	33.76%	Orange
[-110, >=Min)	1262	1.13	Red
<b>Total</b>	<b>111271</b>	<b>100%</b>	

# Coverage Details

## TSP-BSNL

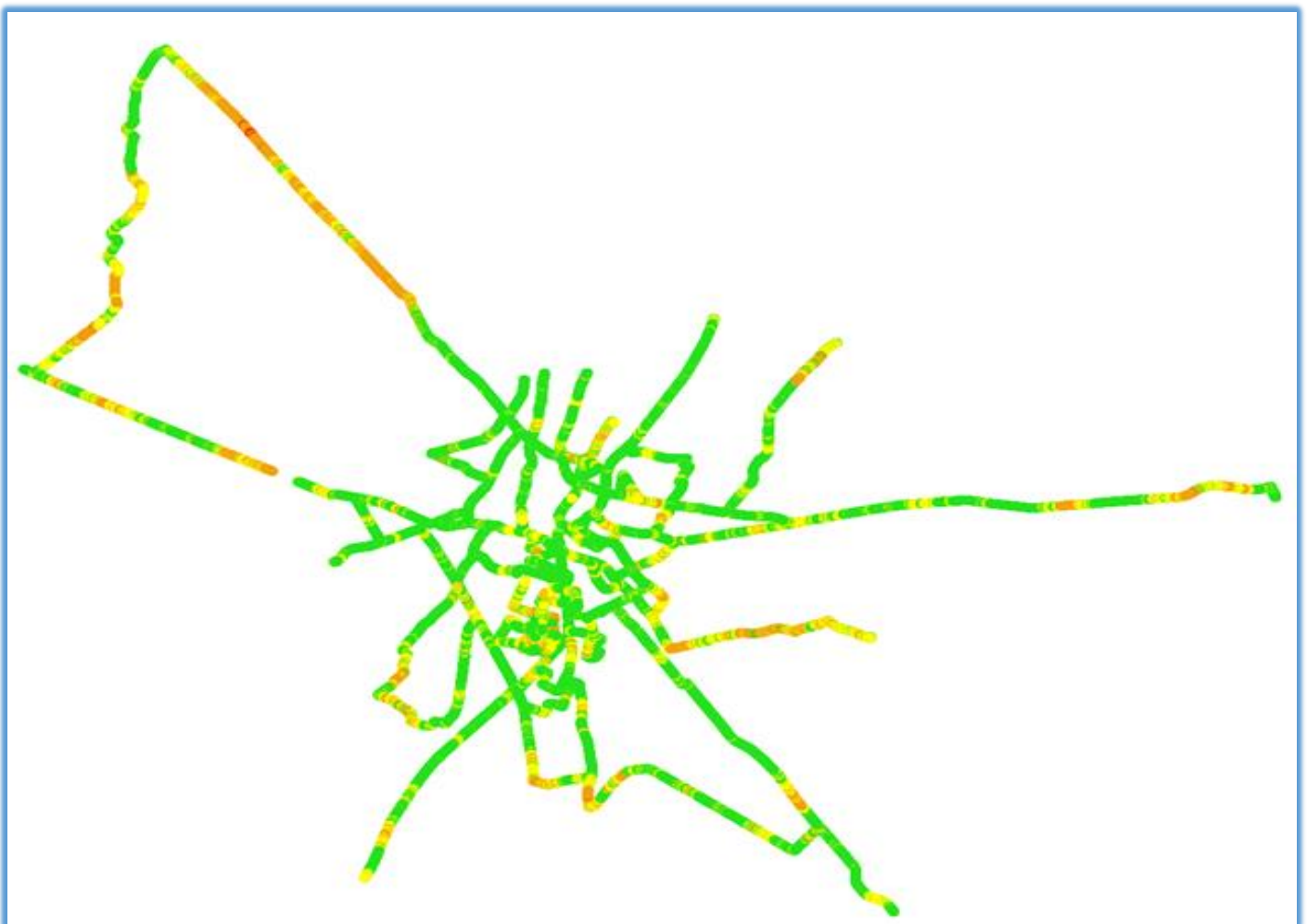
Technology	Coverage %
VoLTE	87%







VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	2947	15%	
[-80, >=-90)	3152	16%	
[-90, >=-110)	10748	56%	
[-110, >=Min)	2510	13%	
<b>Total</b>	<b>19357</b>	<b>100%</b>	

## TSP- Jio

Technology	Coverage %
VoLTE	99.92







Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	3372875	71.45	
[-80, >=-90)	1017081	21.55	
[-90, >=-110)	326838	6.92	
[-110, >=Min)	3605	0.08	
<b>Total</b>	<b>4720399</b>		



## TSP-VIL.

Technology	Coverage %
VoLTE	98.1

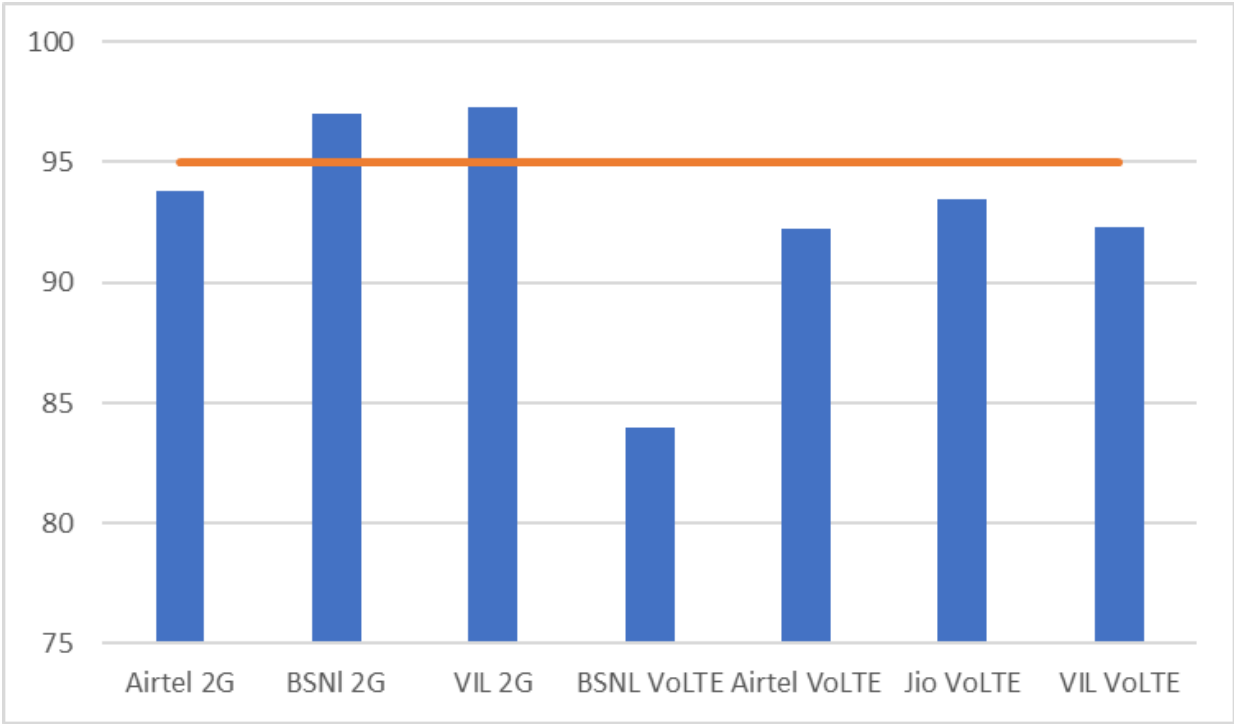


Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	98953	14.4	
[-80, >=-90)	253308	36.9	
[-90, >=-110)	321284	46.8	
[-110, >=Min)	12971	1.9	
<b>Total</b>			

# 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	93.77
BSNI 2G	97
VIL 2G	97.3
BSNL 4G	84
Airtel VoLTE	92.21
Jio VoLTE	93.44
VIL VoLTE	92.3

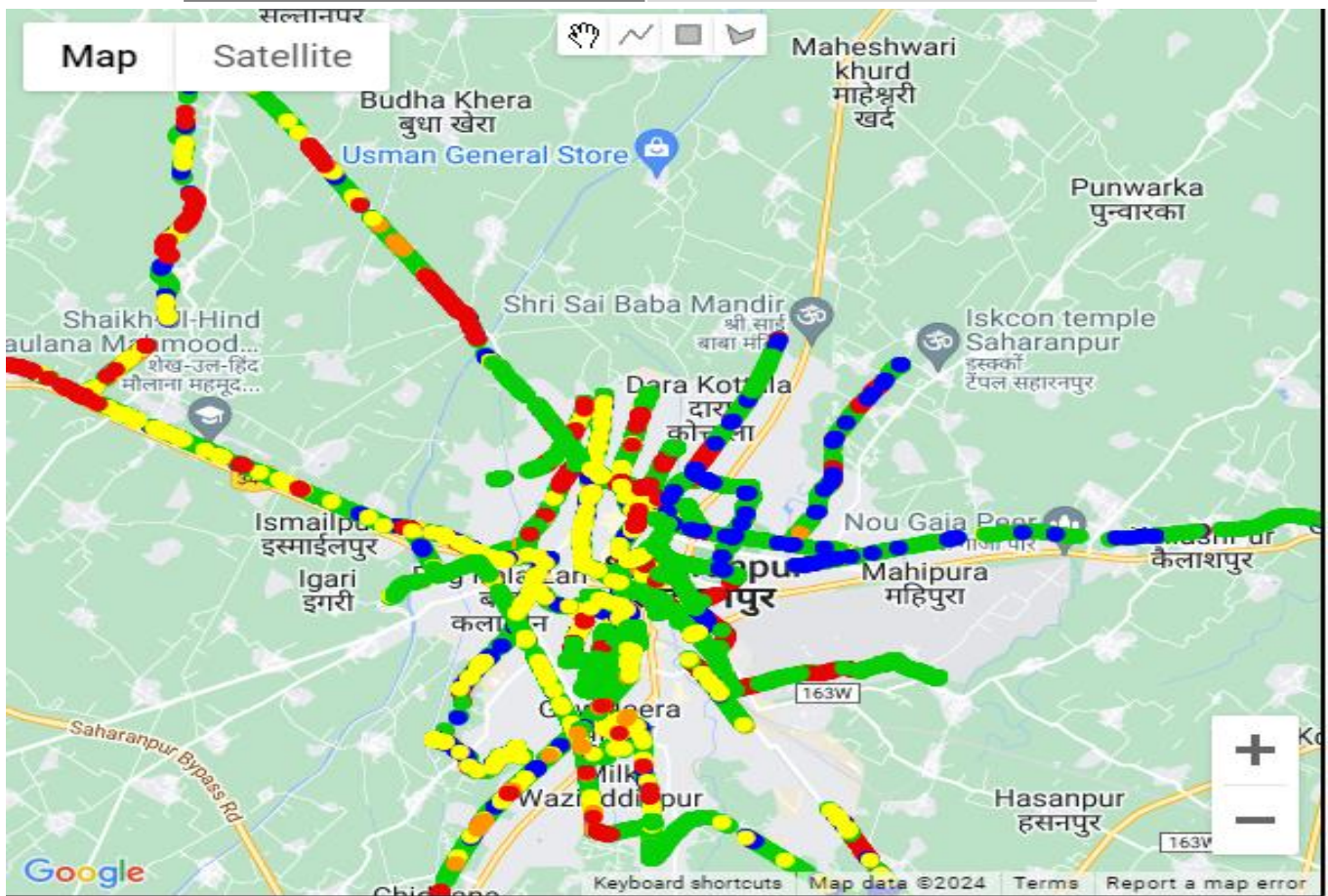







## Quality Details

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  $\geq 95\%$ .

### TSP-Airtel

Technology	Rx Quality %
2G	93.77%



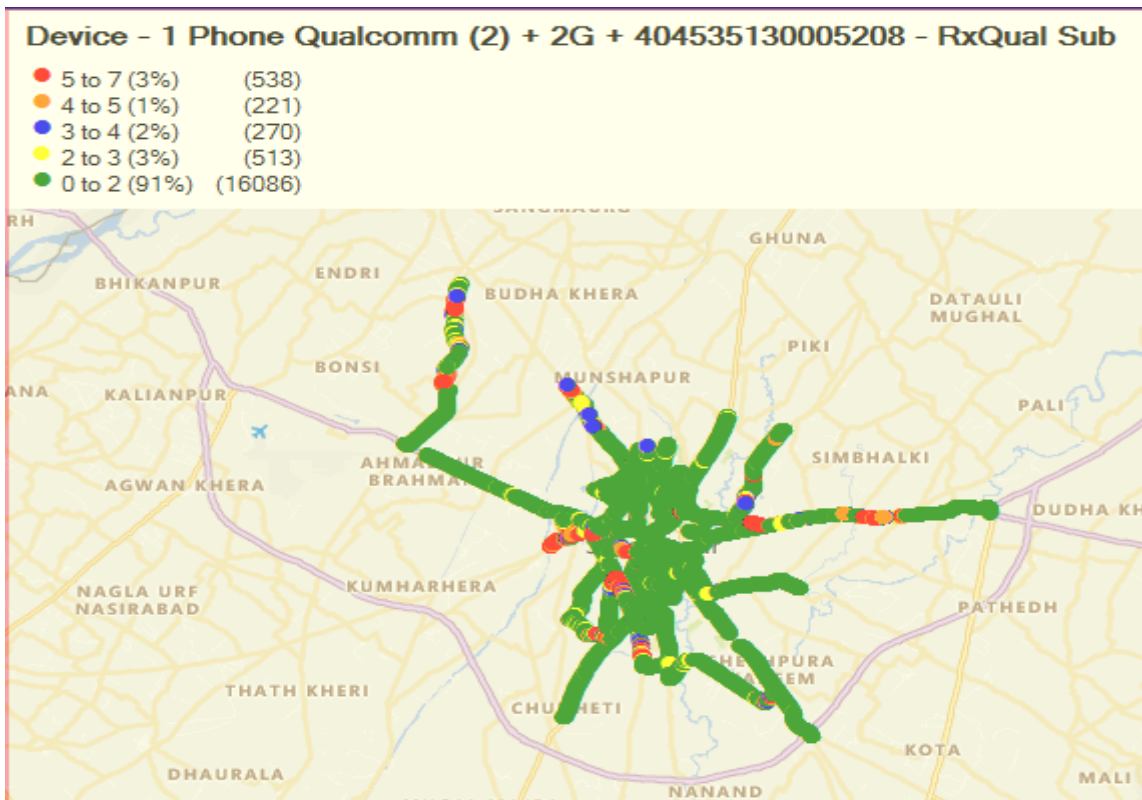
Overall Rx Quality	# Samples	% PDF	Legends
(Min, $\leq 2$ )	12447	76.72%	
(2, $\leq 3$ )	1191	7.34%	
(3, $\leq 4$ )	999	6.16%	
(4, $\leq 5$ )	576	3.55%	
(5, $\leq$ Max)	1011	6.23%	
<b>Total</b>	<b>16224</b>	<b>100%</b>	

## 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  $\geq 95\%$ .

### TSP-BSNL

Technology	Rx Quality %
2G	97%



Overall Rx Quality1	# Samples	% PDF	Legends
(Min, $\leq 2$ )	16086	91%	
(2, $\leq 3$ )	513	3%	
(3, $\leq 4$ )	270	2%	
(4, $\leq 5$ )	221	1%	
(5, $\leq \text{Max}$ )	538	3%	
<b>Total</b>	<b>17628</b>	<b>100%</b>	






## 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  $\geq 95\%$ .

### TSP-... VIL

Technology	Rx Quality %
2G	97.3



Overall Rx Quality	# Samples	% PDF	Legends
(Min, $\leq 2$ )	73686	93.9	
(2, $\leq 3$ )	841	1.1	
(3, $\leq 4$ )	904	1.2	
(4, $\leq 5$ )	900	1.1	
(5, $\leq \text{Max}$ )	2143	2.7	
<b>Total</b>			

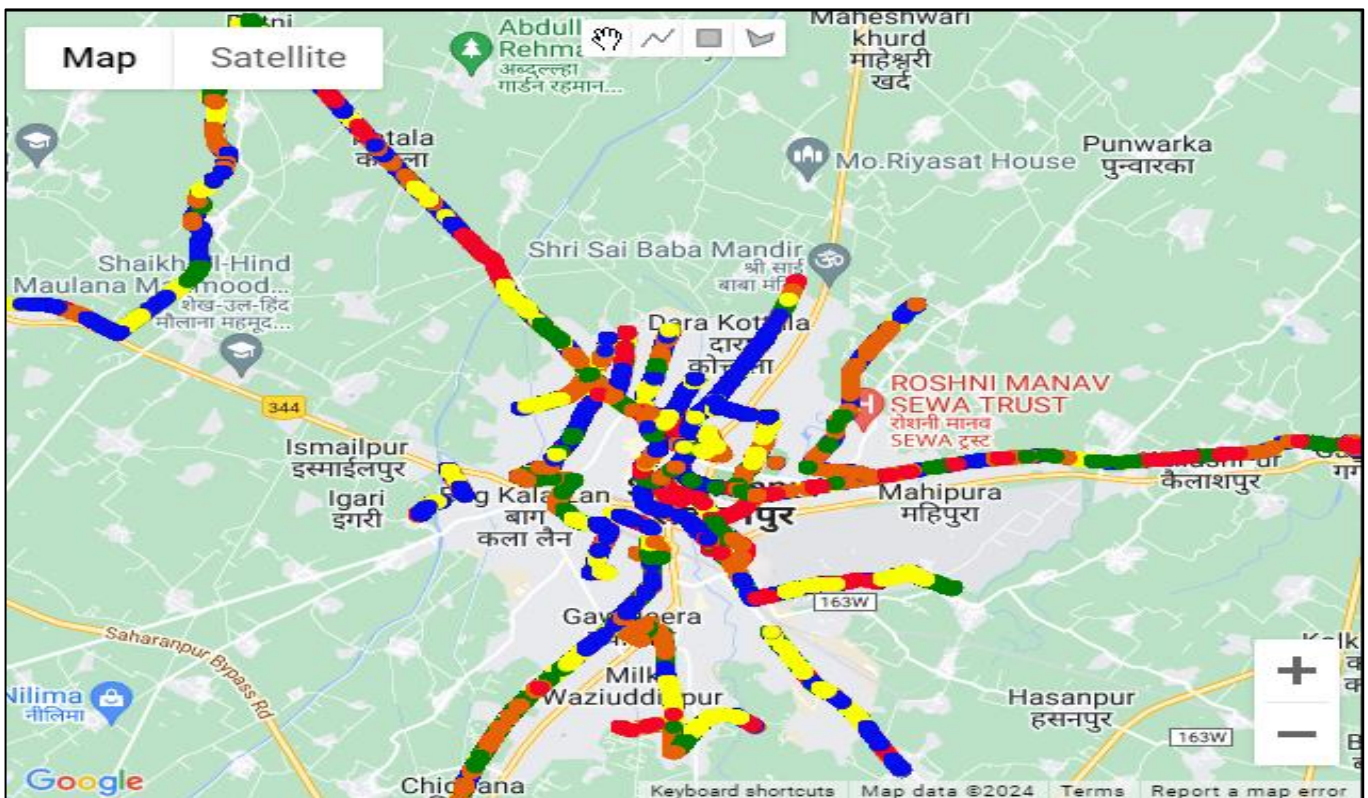


## Quality Details

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-Airtel

Technology	Rx Quality %
VoLTE	92.21%



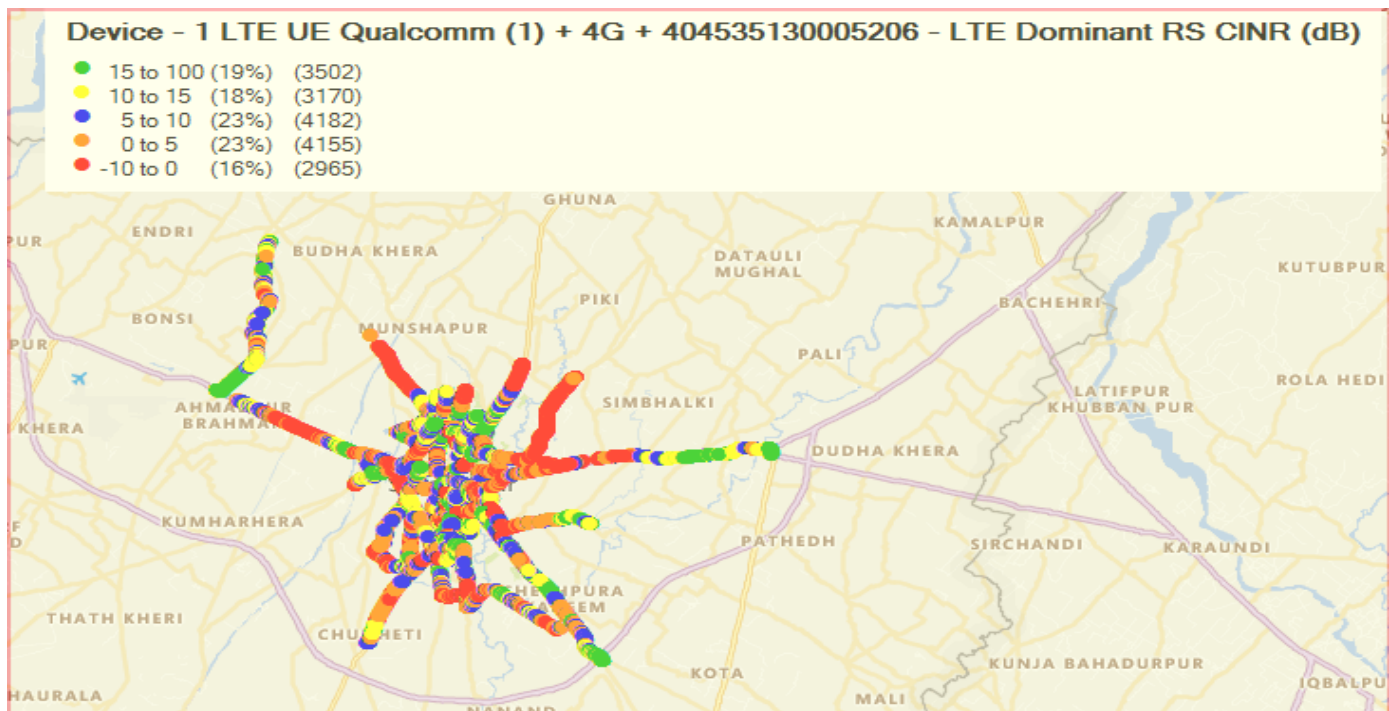
Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	8621	7.79%	Red
(0, $\leq 5$ )	24202	21.88%	Orange
(5, $\leq 10$ )	32712	29.57%	Blue
(10, $\leq 15$ )	28710	25.96%	Yellow
(15, $\leq \text{Max}$ )	16365	14.8%	Green
<b>Total</b>	<b>110610</b>	<b>100%</b>	

## 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-BSNL

Technology	Rx Quality %
VoLTE	84%



Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	2965	16%	
(0, $\leq 5$ )	4155	23%	
(5, $\leq 10$ )	4182	23%	
(10, $\leq 15$ )	3170	18%	
(15, $\leq \text{Max}$ )	3502	20%	
<b>Total</b>	<b>17974</b>	<b>100%</b>	

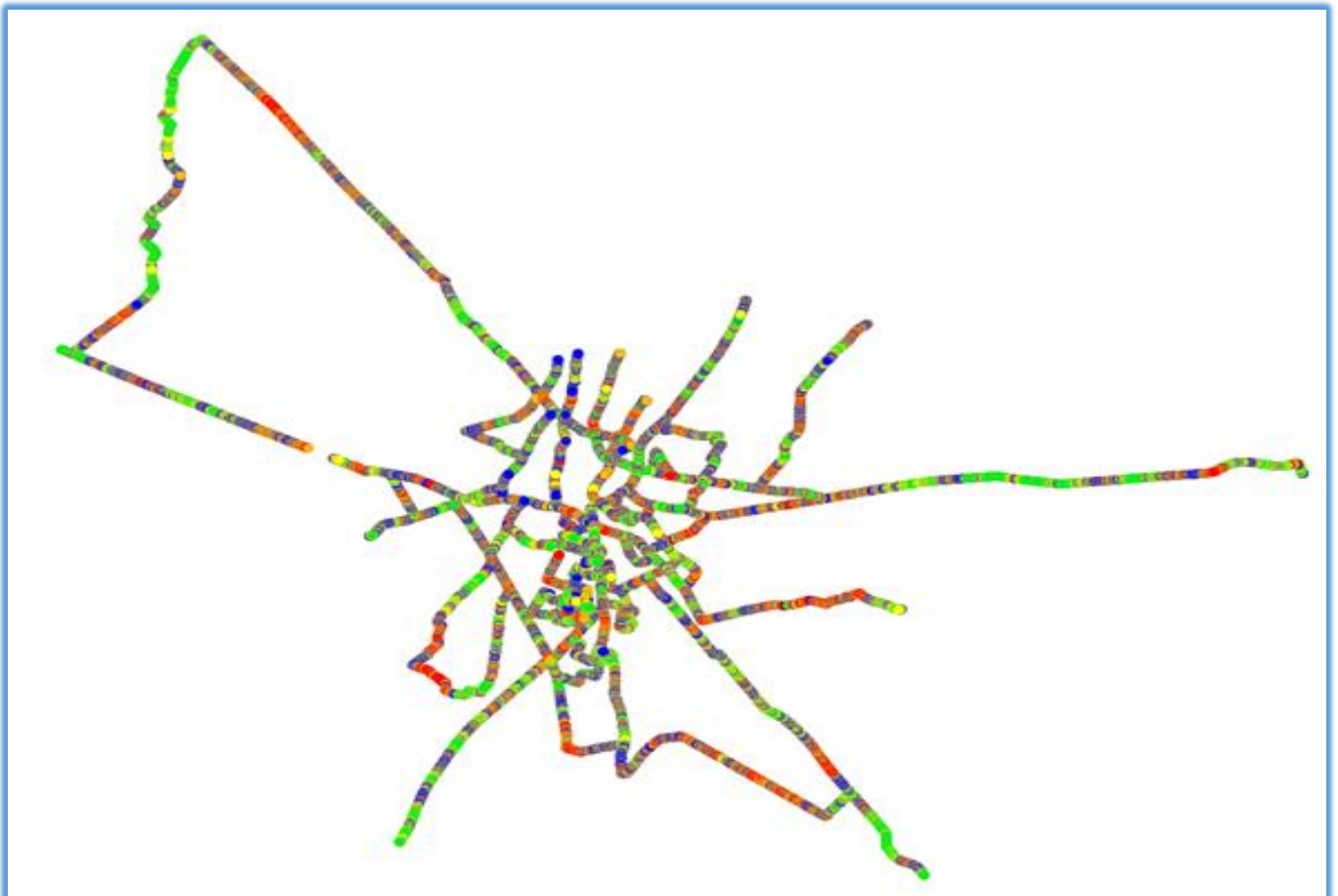


## Quality Details

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- Jio

Technology	Rx Quality %
VoLTE	93.44



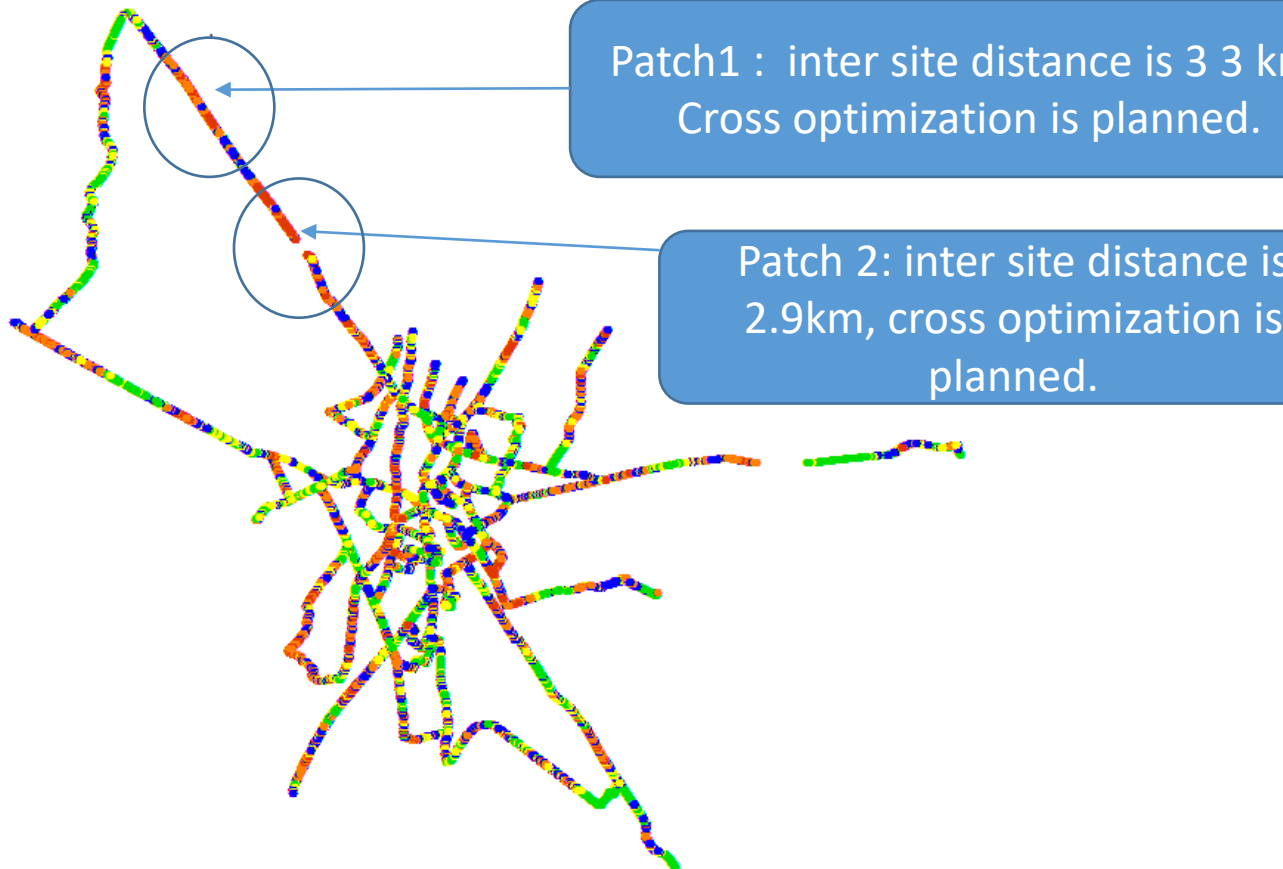
Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	309785	6.56	
(0, $\leq 5$ )	1141769	24.19	
(5, $\leq 10$ )	1450711	30.73	
(10, $\leq 15$ )	1028391	21.79	
(15, $\leq \text{Max}$ )	789743	16.73	
<b>Total</b>	<b>4720399</b>		

## 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  $\geq 95\%$ .

### TSP- VIL

Technology	Rx Quality %
VoLTE	<b>92.3</b>

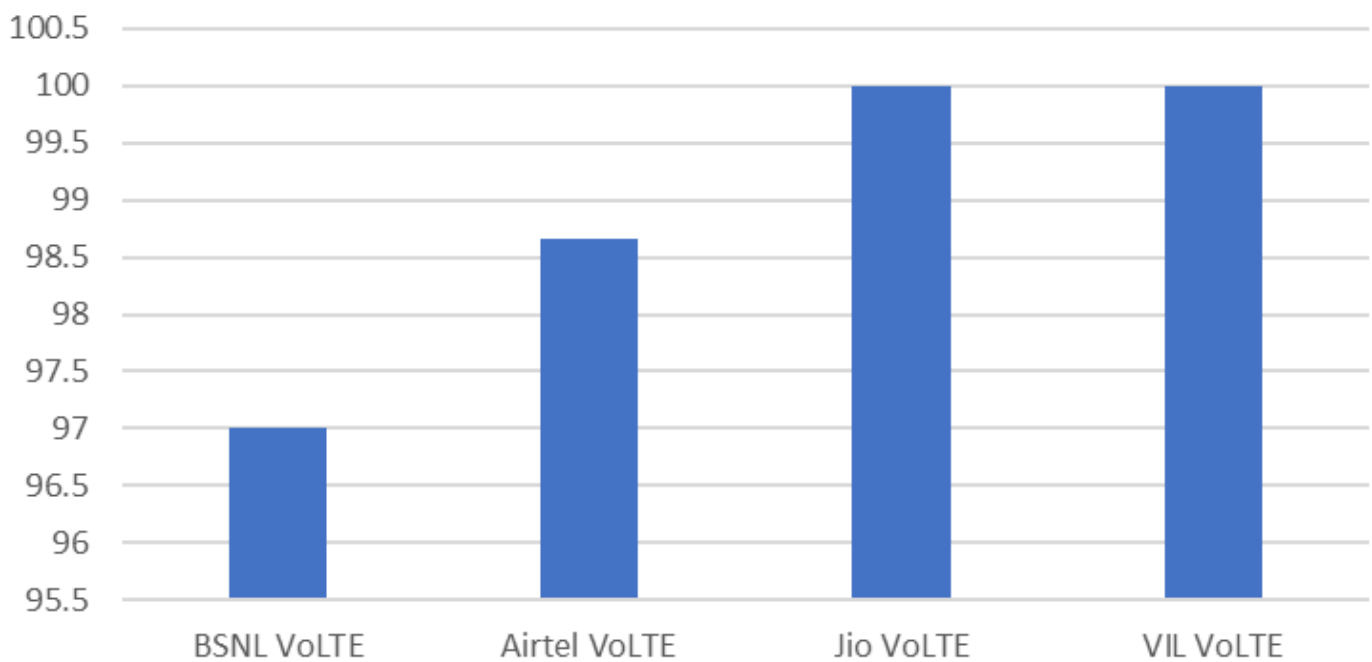


Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	31944	7.7	
(0, $\leq 5$ )	74189	17.8	
(5, $\leq 10$ )	107495	25.8	
(10, $\leq 15$ )	107926	25.9	
(15, $\leq \text{Max}$ )	94517	22.7	
<b>Total</b>			

## Technology Details

<b>TSP</b>	<b>% of Time Spent on 3G/VoLTE</b>
<b>BSNL VoLTE</b>	<b>97</b>
<b>Airtel VoLTE</b>	<b>98.66</b>
<b>Jio VoLTE</b>	<b>100</b>
<b>VIL VoLTE</b>	<b>100</b>

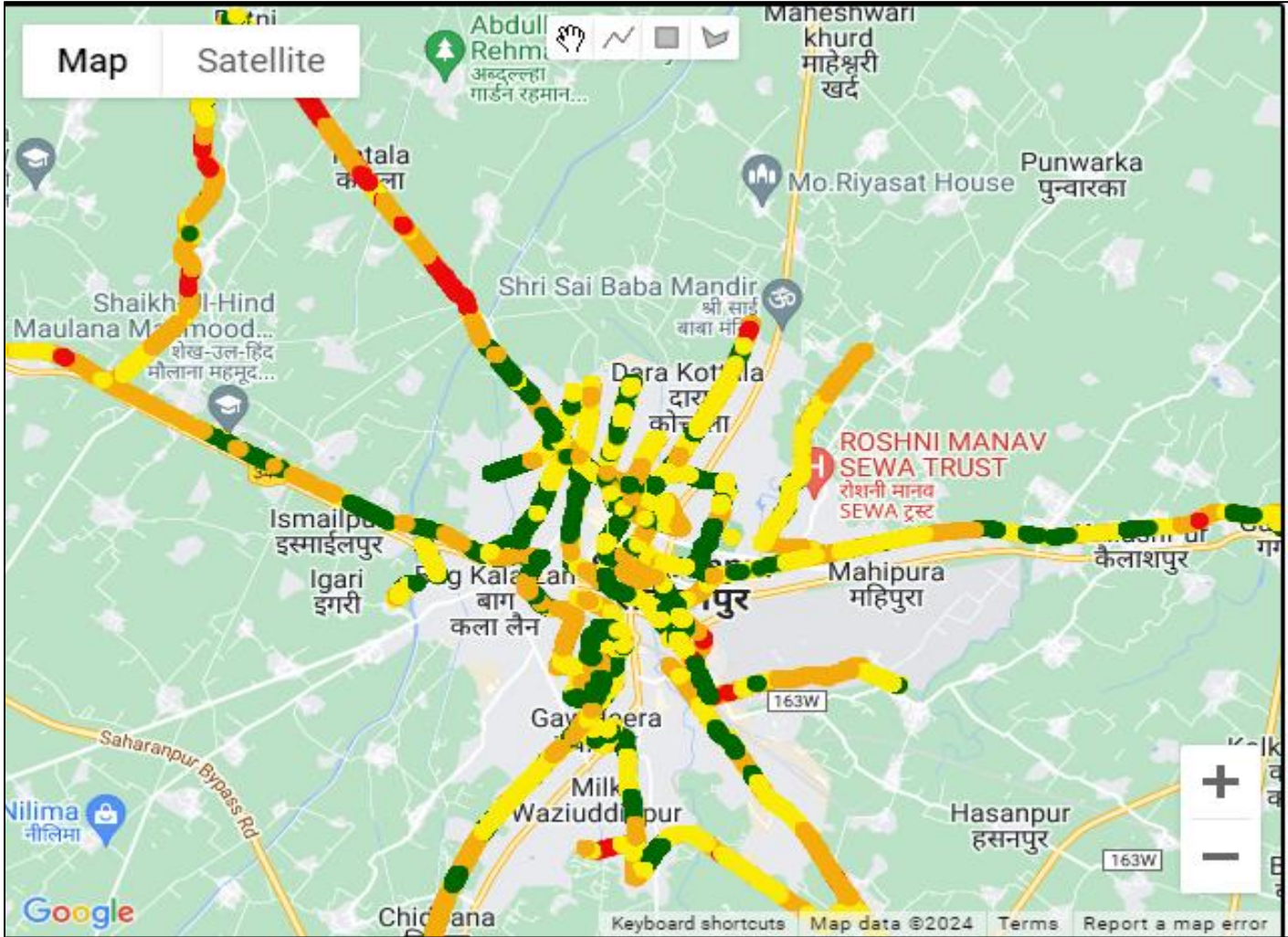
% of Time Spent on 3G/VoLTE



# Technology Details

## TSP-Airtel

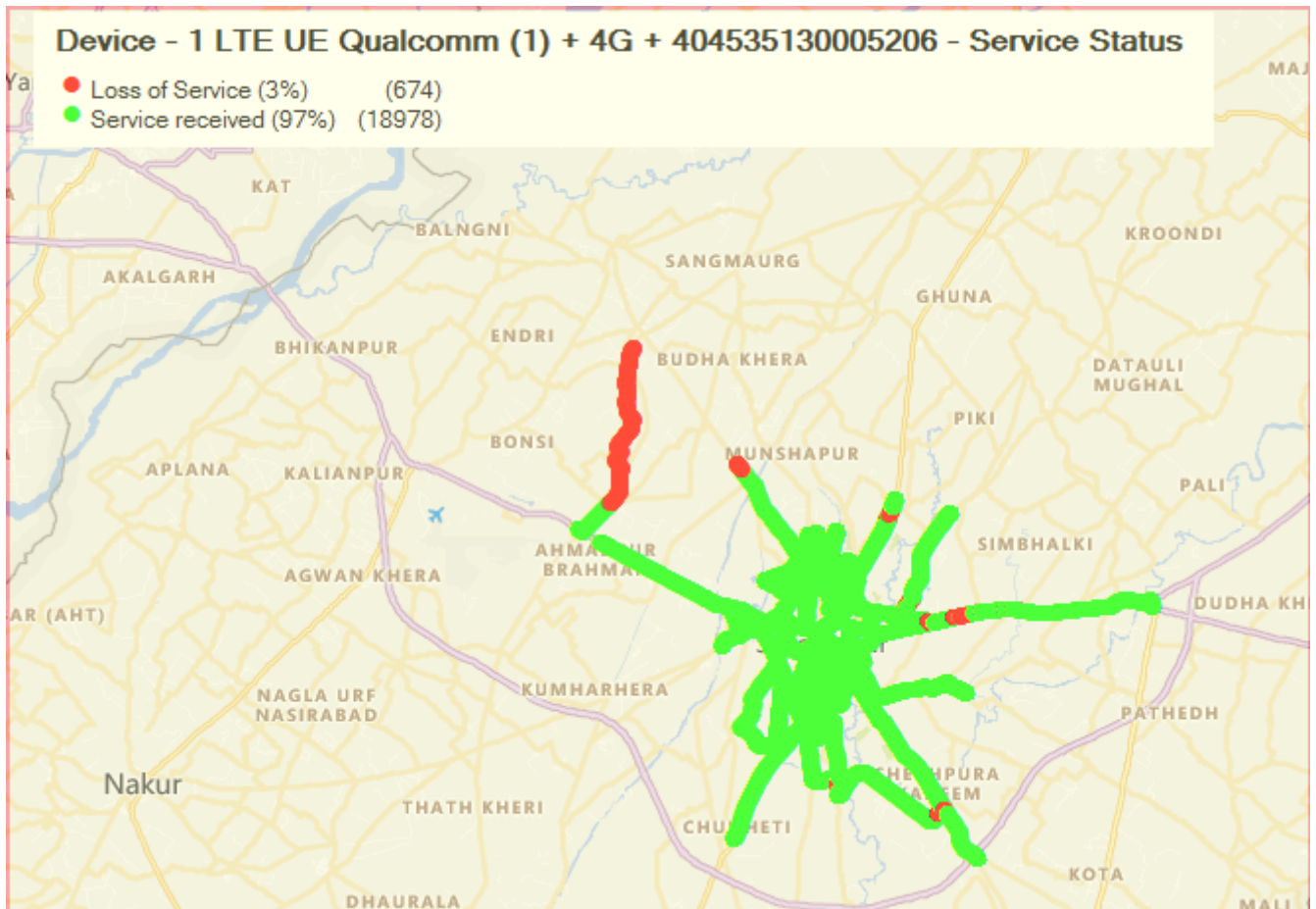
Technology	% of Time Spent on
3G	
VoLTE	98.66%



# Technology Details

## TSP-.BSNL

Technology	% of Time Spent on
3G	NA
VoLTE	97





## TSP- Jio

Technology	% of Time Spent on
3G	
VoLTE	100%



## TSP : VIL.

Technology	% of Time Spent on
3G	
VoLTE	100

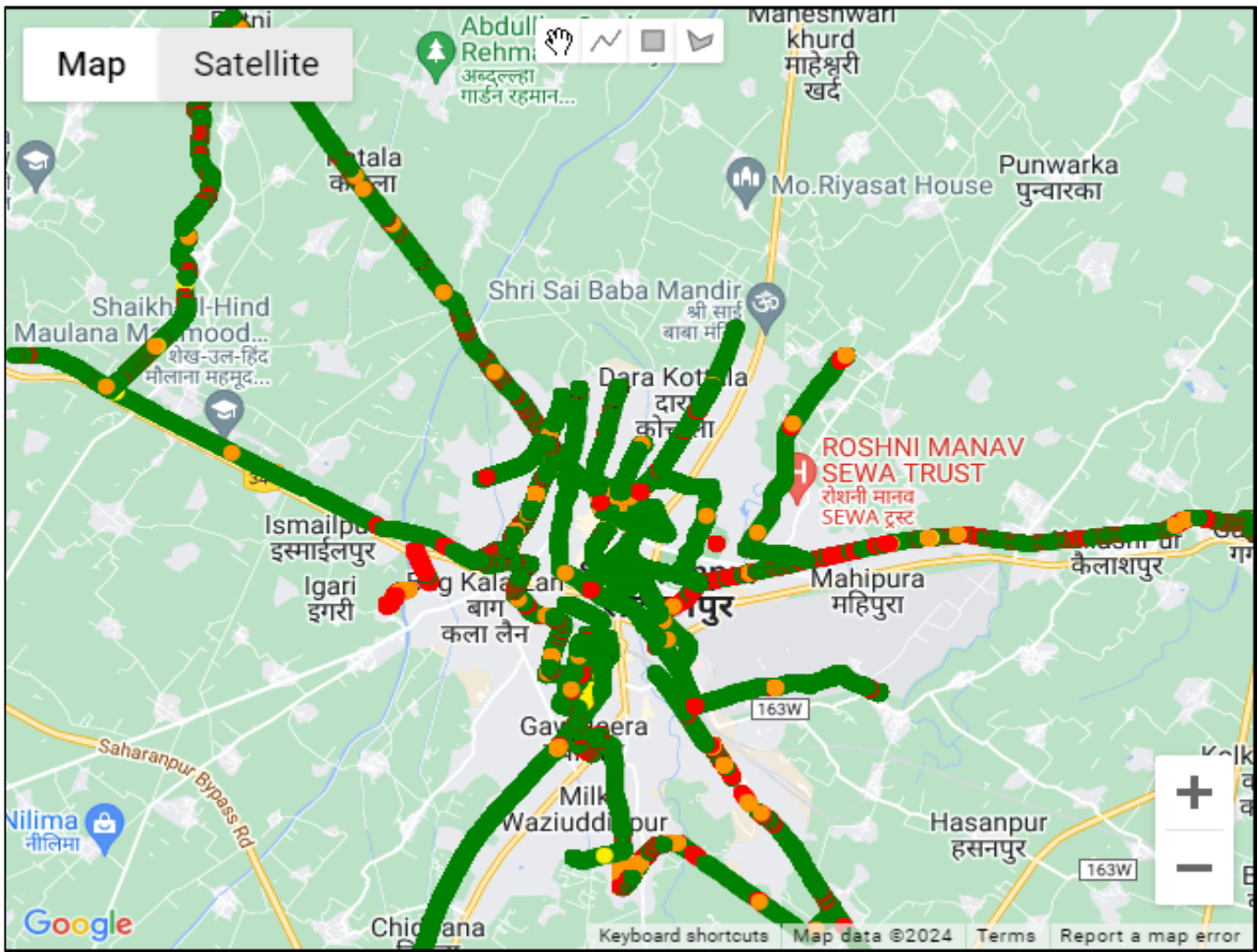




## TSP- Airtel

### Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	5.28



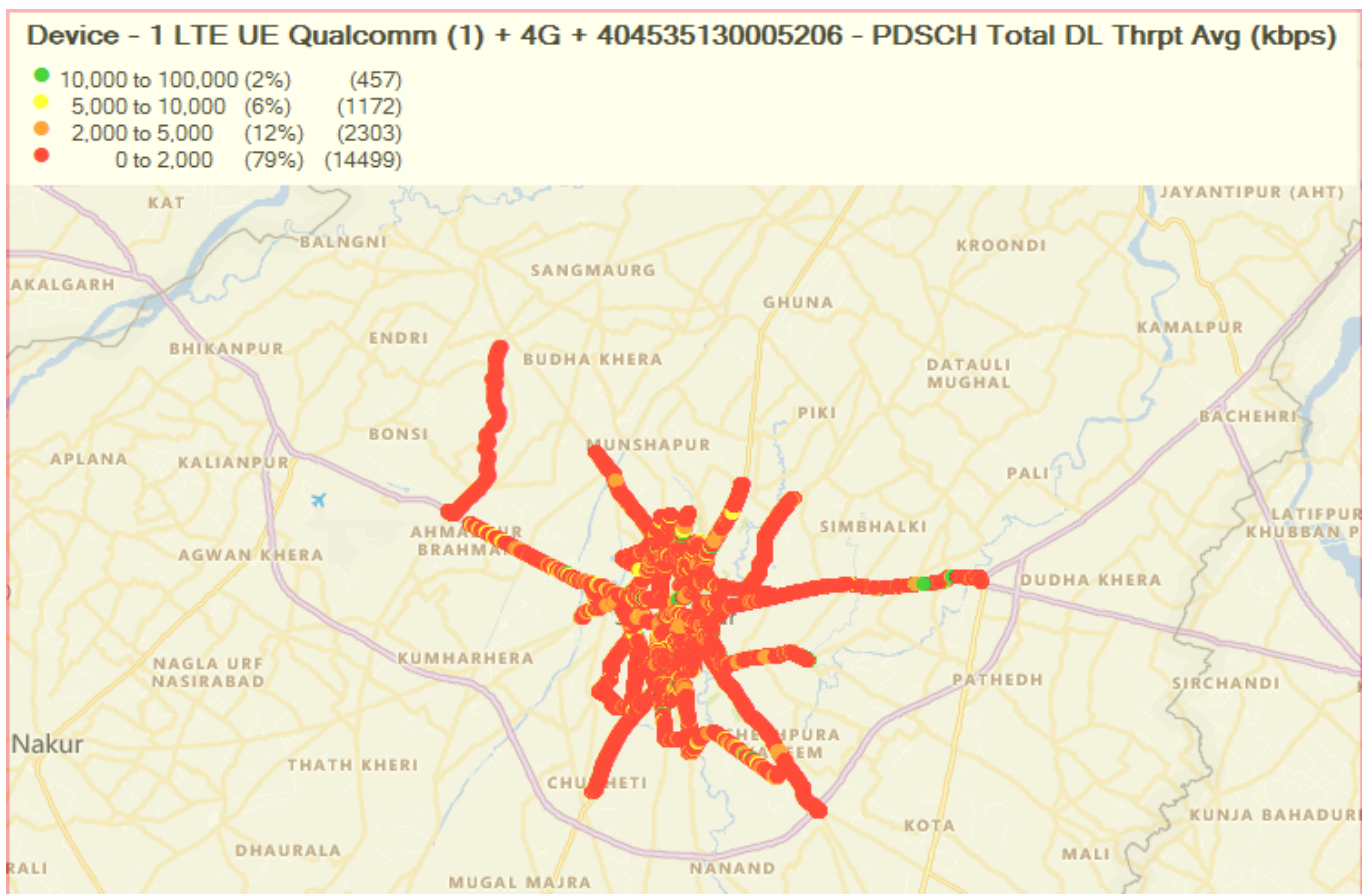
DL throughput	No of Sample	%	Legends
< 2Mbps	6955	6.2%	Red
2-5 Mbps	807	0.7%	Orange
5-10 Mbps	400	0.35%	Yellow
>10Mbps	107299	92.93%	Green

# Dynamic Data Test

## TSP-.BSNL

### Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	2.899



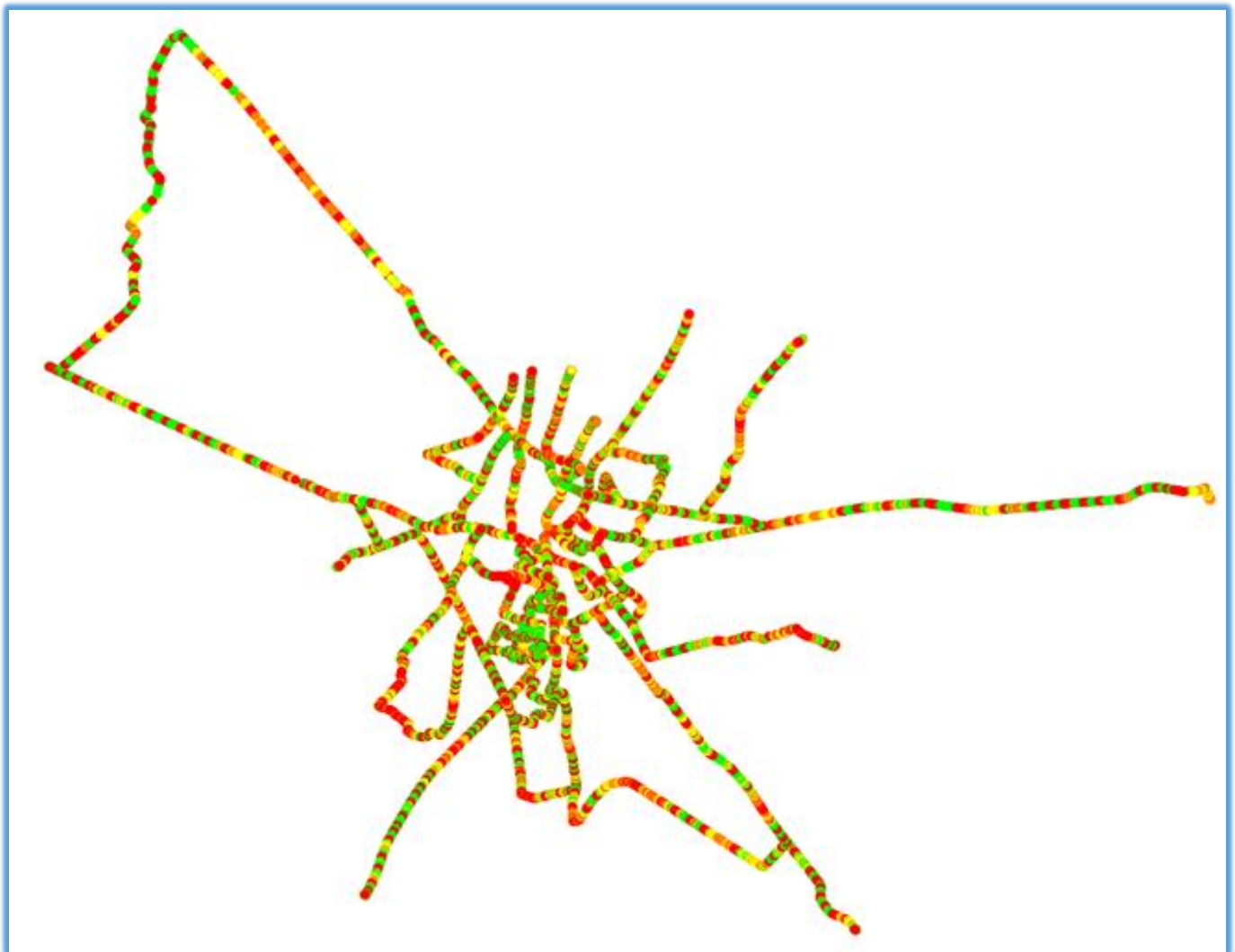
DL throughput	No of Sample	%	Legends
< 2Mbps	14499	79%	Red
2-5 Mbps	2303	12%	Orange
5-10 Mbps	1172	6%	Yellow
>10Mbps	457	2%	Green

# Dynamic Data Test

## TSP- Jio

### Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	8.63

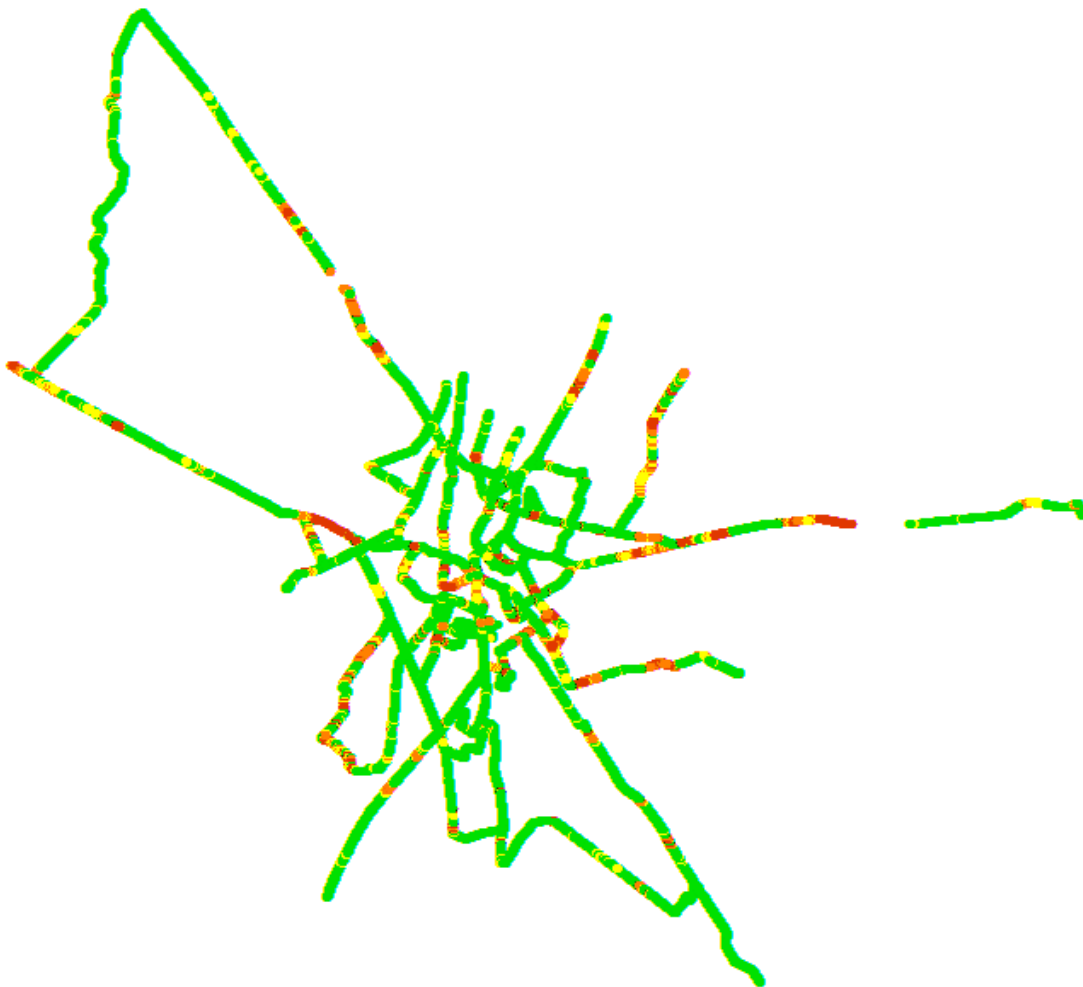


DL throughput	No of Sample	%	Legends
< 2Mbps	16093	34.33	Red
2-5 Mbps	6513	13.89	Orange
5-10 Mbps	9019	19.24	Yellow
>10Mbps	15252	32.54	Green

## TSP-...VIL.....

### Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	12.2



DL throughput	No of Sample	%	Legends
< 2Mbps	294584	3.18	<span style="background-color: red; width: 20px; height: 10px; display: inline-block;"></span>
2-5 Mbps	420879	4.54	<span style="background-color: orange; width: 20px; height: 10px; display: inline-block;"></span>
5-10 Mbps	622721	6.72	<span style="background-color: yellow; width: 20px; height: 10px; display: inline-block;"></span>
>10Mbps	7934832	85.57	<span style="background-color: green; width: 20px; height: 10px; display: inline-block;"></span>

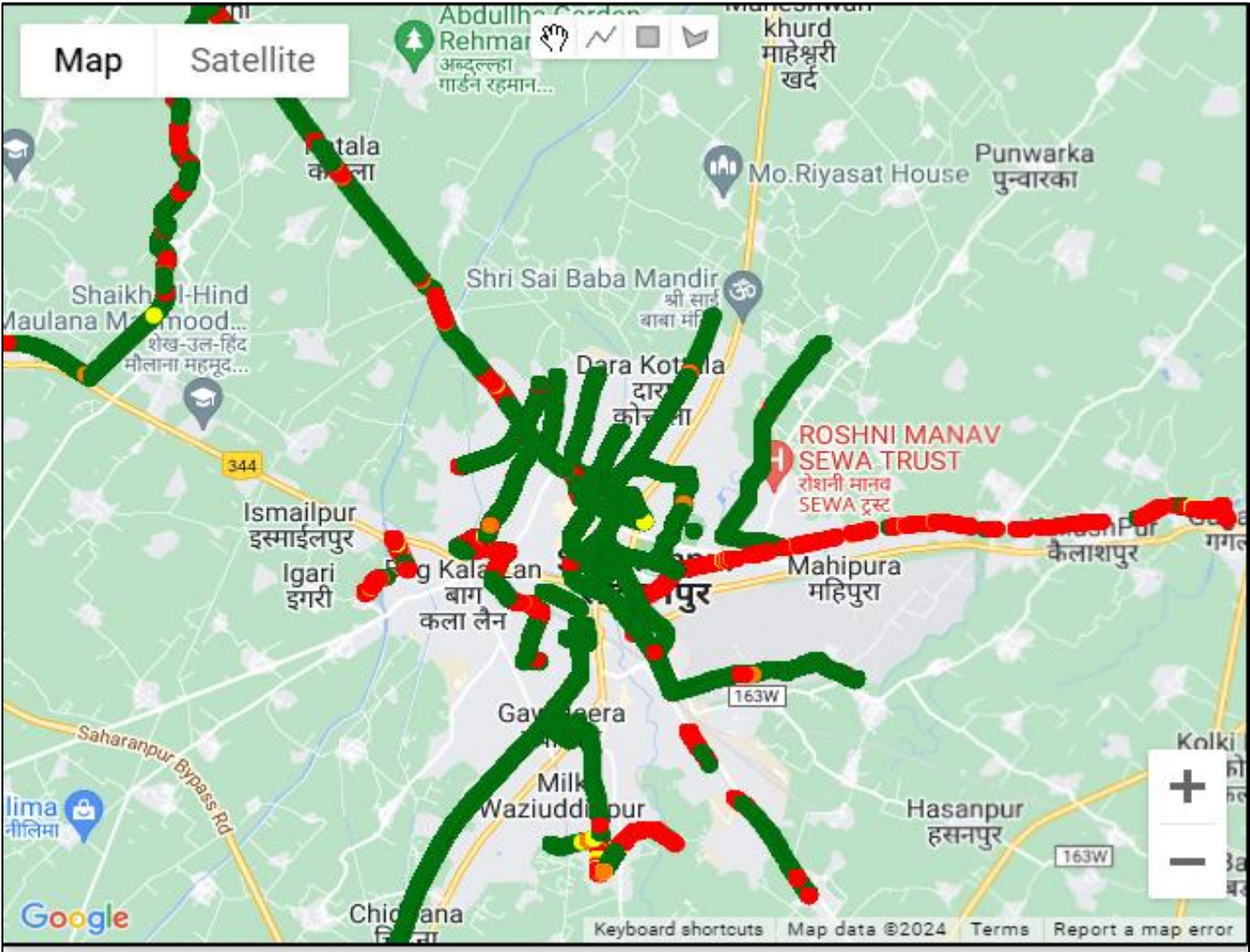


# Dynamic Data Test

## TSP-Airtel

### Data Statistics - Dynamic data testing

Data KPIs - Overall	5G
Download Throughput (Mbps)	9.16



DL throughput	No of Sample	%	Legends
< 2Mbps	6083	5.89%	Red
2-5 Mbps	729	0.71%	Orange
5-10 Mbps	240	0.23%	Yellow
>10Mbps	96209	93.17%	Green