



# Operator Assisted Drive Test Report

## Mathura & Vrindavan City and nearby Area (UPW LSA)

**18/02/2024 to 20/02/2024**

**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 Mathura & Vrindavan City and surrounding areas from 9:00 AM to 8:00 PM from 18/02/2024 to 20/02/2024 (3 days) . The drive test covered drive route of around 210 KMs.

<b>TSP</b>	<b>Network tested</b>
Airtel	2G & VoLTE
BSNL	2G & 3G
JIO	VoLTE
VIL	2G, VoLTE

### Key Performance Indicators:

<b>KPI</b>	<b>Benchmark</b>	<b>Observations</b>
Block call rate %	≤3%	All TSPs achieved the benchmark.
Drop call rate %	≤2%	All TSPs achieved the benchmark.
CSSR %	≥95 %	All TSPs achieved the benchmark.
Mobility HOSR %	≥95%	All TSPs achieved the benchmark.
Good RX Quality %	≥95%	All TSPs achieved the benchmark. Except Airtel in 2G & Airtel and JIO in VoLTE

# 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)

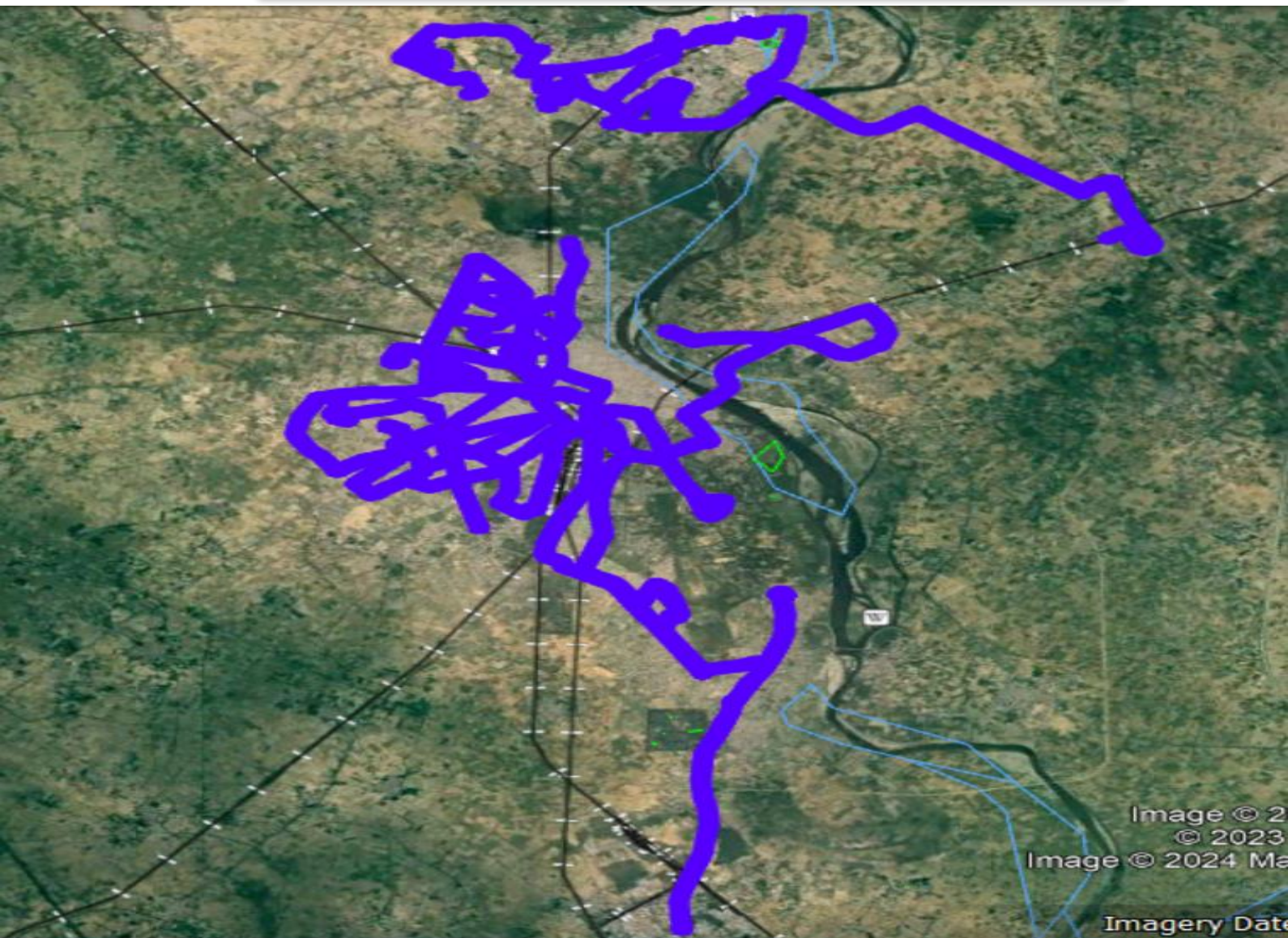
- i. 3G – measurement – UE in 3G File Size- 20MB
- ii. 4G – measurement – UE in LTE File Size- 40MB
- iii. 5G – measurement – UE in 5G File Size- 200MB

**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

Shri Bankey Bihari Ji Temple

Prem Mandir

Mathura Junction

Shree Krishna Janambhumi

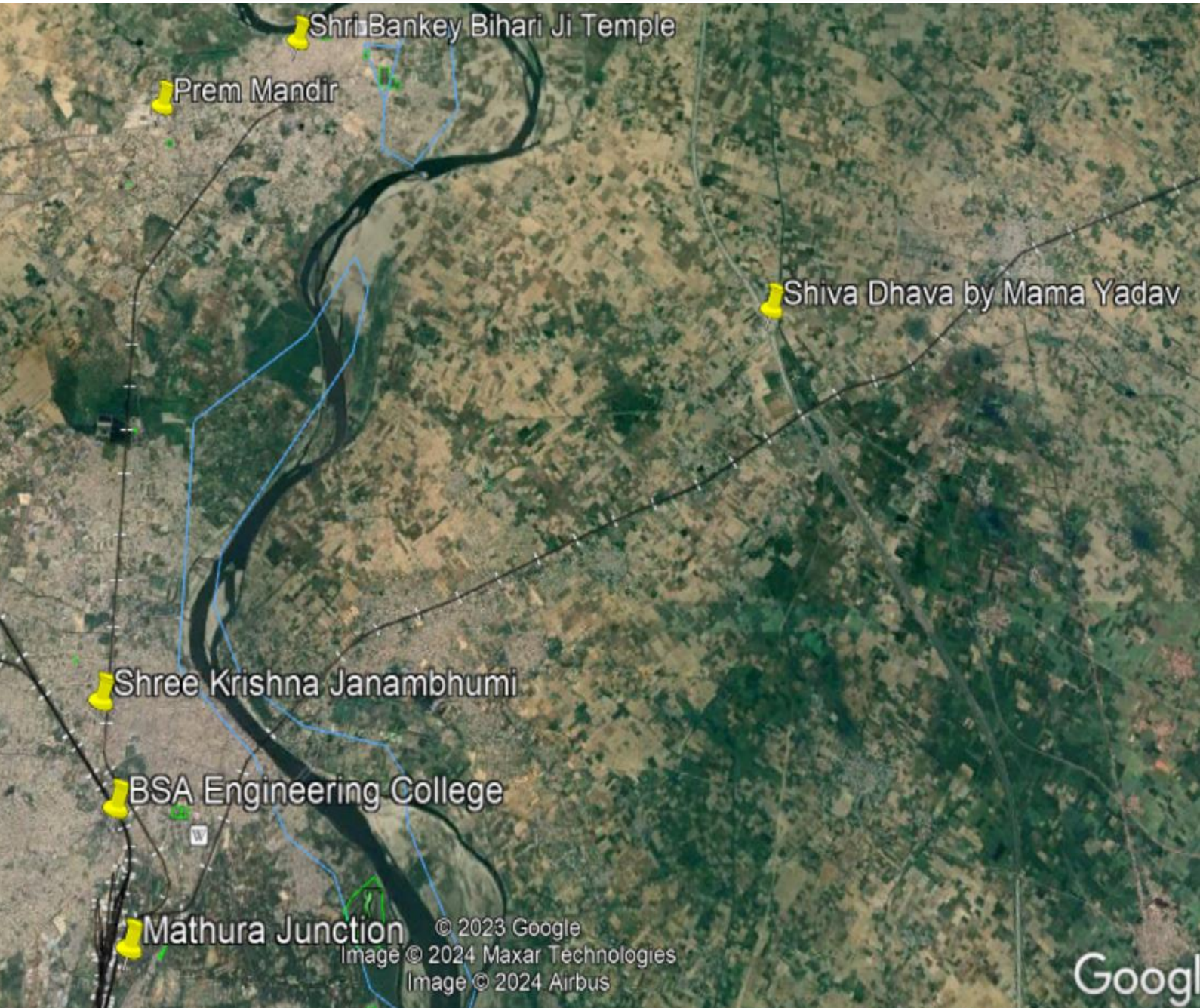
Shiva Dhaba by Mama Yadav

BSA Engineering College

Refinery Township

# Overview

## Data Service Test- Static Locations



### Hotspot Locations

Shri Bankey Bihari Ji Temple

Prem Mandir

Mathura Junction

Shree Krishna Janambhumi

Shiva Dhava by Mama Yadav

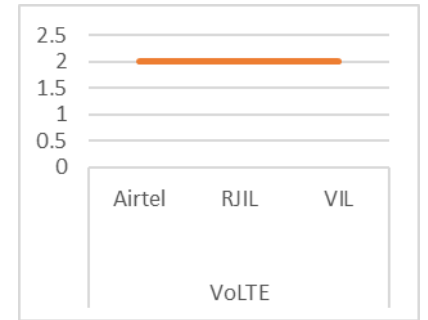
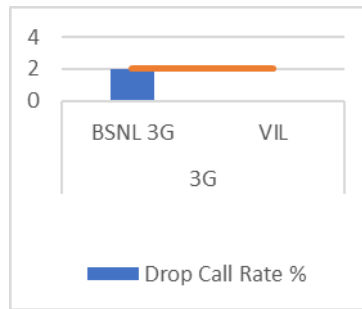
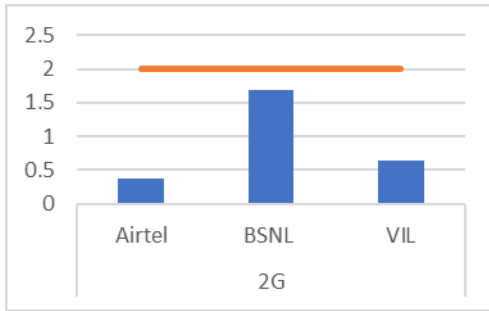
BSA Engineering College

# Voice Calls

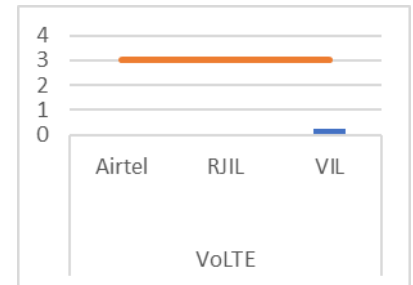
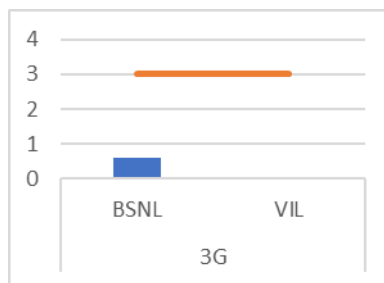
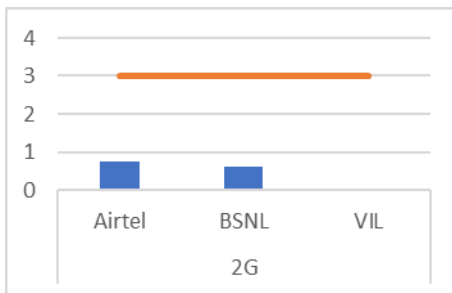
## Key Observations

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 %	0.37	1.69	0.65	2	NA	0	0	0
Block Call Rate %	0.74	0.62	0.0	0.61	NA	0	0	0.22

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 %	95.4	79.68	99.6

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

TSPs	3G
	BSNL
Coverage %	91.65

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	100	99.87	99.8

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

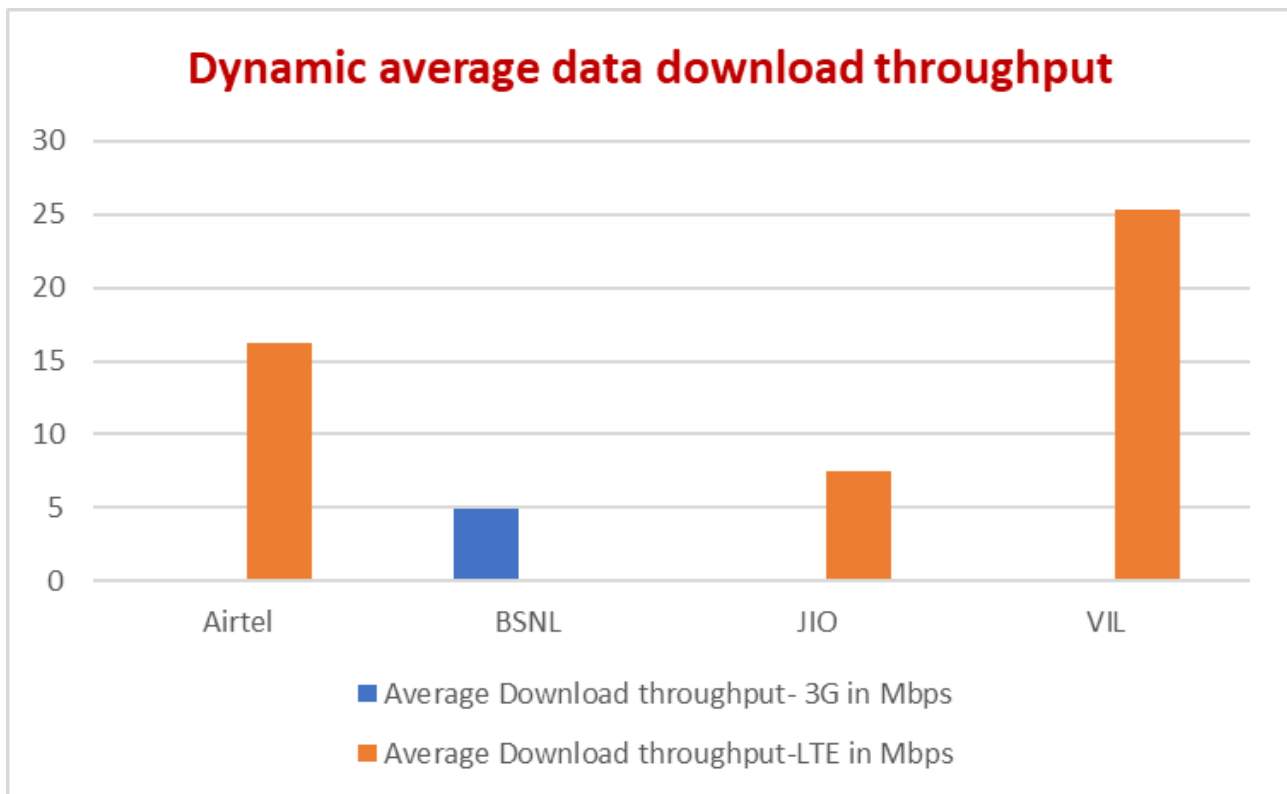
TSPs	3G		VoLTE		
	BSNL	VIL	Airtel	VIL	JIO
Time Spent on 3G/4G %	68.26	NA	100	100	100

# Data Services Dynamic

## Key Observations

Dynamic Data -Download Throughput was tested.

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



TSP	Airtel	BSNL	JIO	VIL
Average Download throughput- 3G In Mbps	NA	4.97	NA	NA
Average Download throughput-LTE in Mbps	16.25	NA	7.43	25.35
Average Download throughput- 5G in Mbps	NA	NA	NA	NA

# Summary

## City Level Summary- Voice

TSP ( For 2G)	Airtel	BSNL	VIL
Call attempts	270	822	465
Block call rate %	0.74	0.61	0.0
CSSR %	99.26	99.39	100
Drop call rate %	0.37	1.69	0.65
Mobility HOSR %	97.53	96.52	99.37
RX Quality %	93.00	97.41	96.8
Average CST Sec	3.57	3.45	3.3

TSP ( For 3G)	BSNL
Call attempts	793
Block call rate %	0.61
CSSR %	99.3
Drop call rate %	2
Mobility HOSR %	96.82
RX Quality %	95.93
Average CST (Sec)	1.19

TSP ( For Volte)	Airtel	BSNL	JIO	VIL
Call attempts	271	NA	254	464
Block call rate %	0	NA	0	0.22
CSSR %	100	NA	100	99.78
Drop call rate %	0	NA	0	0.0
Mobility HOSR %	99.88	NA	99.56	100
RX Quality %	89.8	NA	91.19	95.9
Average CST(Sec)	1.39	NA	0.82	0.88



# Summary

## City Level Summary- Data Services -Static

<b>TSP ( For 3G)</b>	<b>BSNL</b>
<b>Download throughput in Mbps</b>	<b>4.97</b>
<b>Upload Throughput in Mbps</b>	<b>1.56</b>
<b>Video streaming delay in sec</b>	<b>0.51</b>
<b>Web browsing delay in second</b>	<b>0.44</b>
<b>Latency in (msec)</b>	<b>45</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>6.53</b>	<b>NA</b>	<b>21.68</b>	<b>12.56</b>
<b>Upload Throughput in Mbps</b>	<b>3.68</b>	<b>NA</b>	<b>5.34</b>	<b>5.87</b>
<b>Video streaming delay in sec</b>	<b>0.53</b>	<b>NA</b>	<b>0</b>	<b>1.48</b>
<b>Web browsing delay in second</b>	<b>6.11</b>	<b>NA</b>	<b>2.55</b>	<b>1.86</b>
<b>Latency in (msec)</b>	<b>NA</b>	<b>NA</b>	<b>58.02</b>	<b>62.5</b>

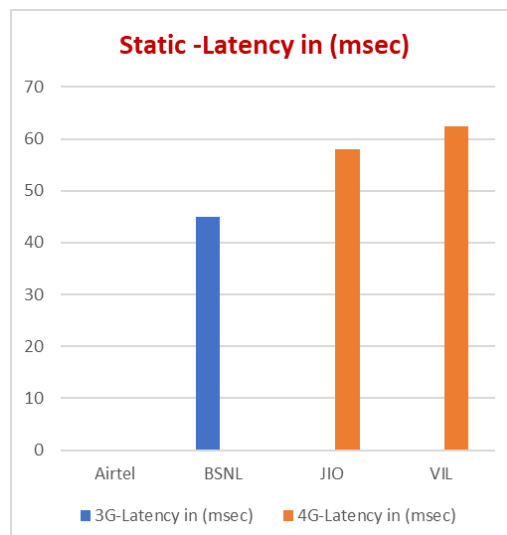
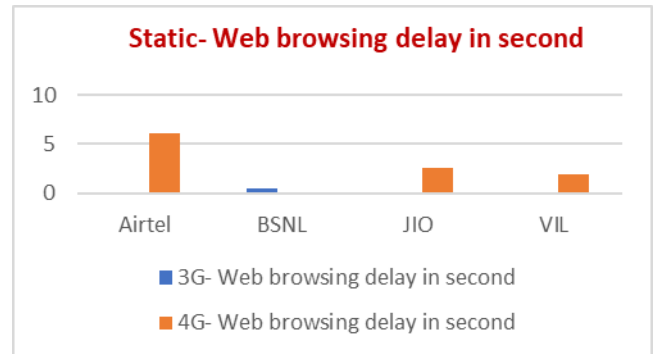
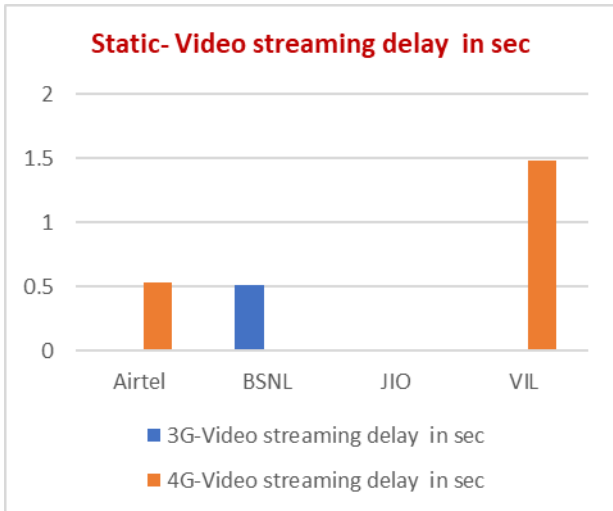
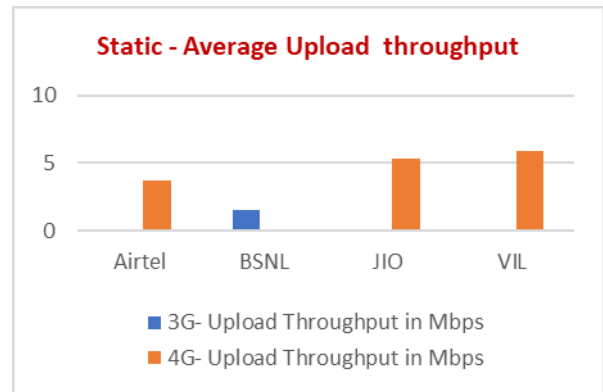
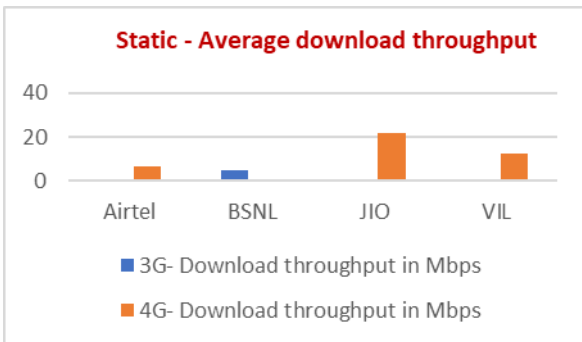
<b>TSP ( For 5G )</b>	<b>Airtel</b>	<b>BSNL</b>	<b>JIO</b>	<b>VIL</b>
<b>Download throughput in Mbps</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Upload Throughput in Mbps</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Video streaming delay in sec</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Web 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- SHRI KRISHAN JANM BHOOMI

	3G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	5.95	NA	NA
Upload Throughput in Mbps	NA	1.81	NA	NA
Video streaming delay in sec	NA	0.52	NA	NA
Web browsing delay in second	NA	0.48	NA	NA
Latency in (msec)	NA	48	NA	NA

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	5.81	NA	26.6	13.70
Upload Throughput in Mbps	1.34	NA	2.4	5.92
Video streaming delay in sec	0.420	NA	0	1.4
Web browsing delay in second	5.92	NA	1.94	2
Latency in (msec)	30	NA	54.8	77

	5G			
	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

## 2. Hotspot Location- Mathura RAILWAY STATION

	3G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	5.88	NA	NA
Upload Throughput in Mbps	NA	1.46	NA	NA
Video streaming delay in sec	NA	0.35	NA	NA
Web browsing delay in second	NA	0.20	NA	NA
Latency in (msec)	NA	23	NA	NA

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	4.92	NA	28.06	14.14
Upload Throughput in Mbps	9.17	NA	16.31	7.73
Video streaming delay in sec	0.048	NA	0	1.5
Web browsing delay in second	5.77	NA	2.16	1.8
Latency in (msec)	70	NA	49.3	57

	5G			
	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

## 3. Hotspot Location-BSA ENGINEERING COLLEGE

	3G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	9.23	NA	NA
Upload Throughput in Mbps	NA	1.72	NA	NA
Video streaming delay in sec	NA	0.49	NA	NA
Web browsing delay in second	NA	0.42	NA	NA
Latency in (msec)	NA	44	NA	NA

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	4.032	NA	15.09	12.03
Upload Throughput in Mbps	0.70	NA	7.4	14.89
Video streaming delay in sec	0.457	NA	0	1.4
Web browsing delay in second	5.74	NA	3.64	1.9
Latency in (msec)	33.7	NA	50.5	68

	5G			
	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

## 4. Hotspot Location-RUDRA SHIVA DHABA

	3G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	3.60	NA	NA
Upload Throughput in Mbps	NA	1.81	NA	NA
Video streaming delay in sec	NA	0.52	NA	NA
Web browsing delay in second	NA	0.48	NA	NA
Latency in (msec)	NA	42	NA	NA

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	2.08	NA	28.59	7.76
Upload Throughput in Mbps	1.80	NA	2.44	1.72
Video streaming delay in sec	0.999	NA	0	1.6
Web browsing delay in second	6.62	NA	2.57	2.3
Latency in (msec)	54	NA	59	74

	5G			
	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

## 5. Hotspot Location- PREM MANDIR

	3G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	8.01	NA	NA
Upload Throughput in Mbps	NA	1.6	NA	NA
Video streaming delay in sec	NA	0.52	NA	NA
Web browsing delay in second	NA	0.48	NA	NA
Latency in (msec)	NA	39	NA	NA

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	16.43	NA	22.14	17.4
Upload Throughput in Mbps	6.77	NA	2.24	4.34
Video streaming delay in sec	0.475	NA	0	1.8
Web browsing delay in second	7.233	NA	2.60	1.4
Latency in (msec)	34	NA	60.5	47

	5G			
	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

## 6. Hotspot Location- VIHARI JI MANDIR

	3G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	7.58	NA	NA
Upload Throughput in Mbps	NA	1.56	NA	NA
Video streaming delay in sec	NA	0.47	NA	NA
Web browsing delay in second	NA	0.41	NA	NA
Latency in (msec)	NA	42.5	NA	NA

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	6.19	NA	9.60	10.55
Upload Throughput in Mbps	2.07	NA	1.25	1.75
Video streaming delay in sec	0.798	NA	0	1.2
Web browsing delay in second	5.424	NA	2.4	1.8
Latency in (msec)	24.5	NA	74	52

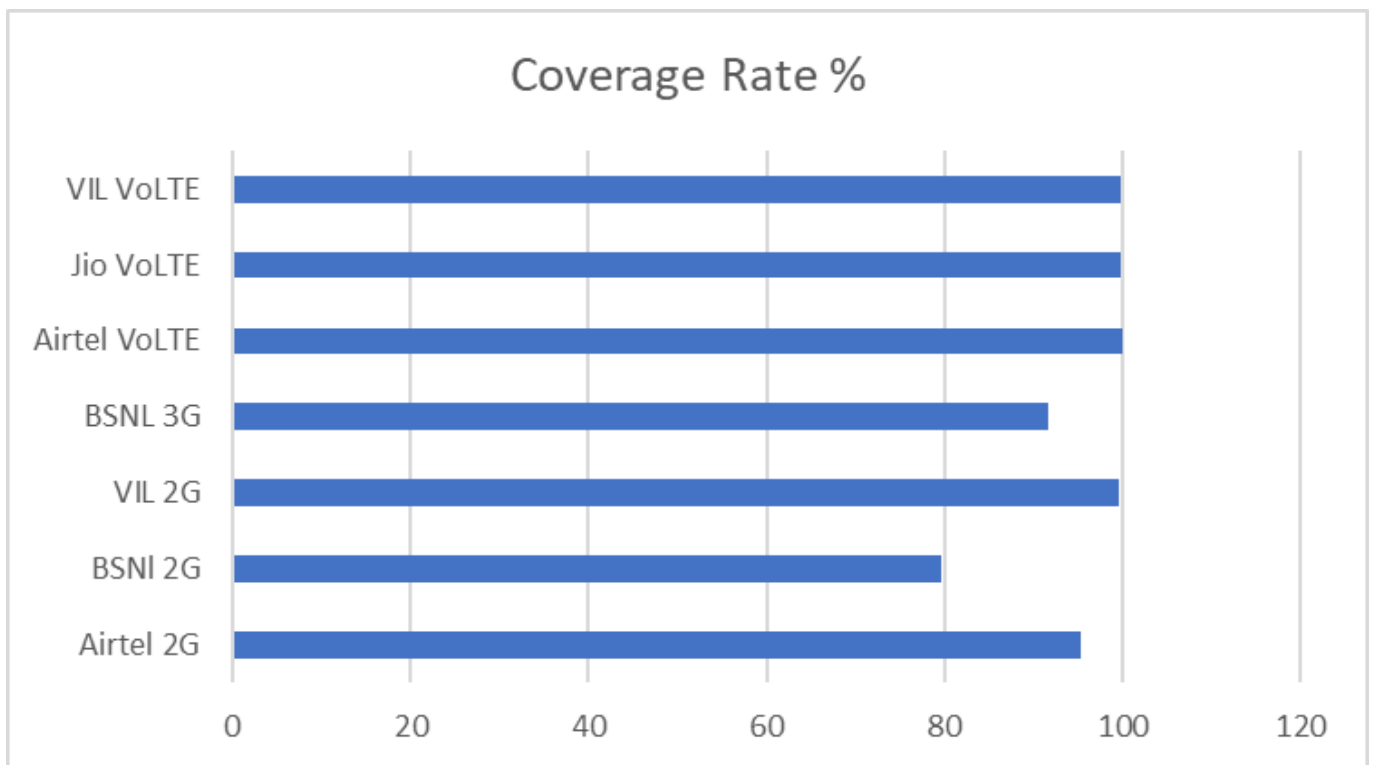
	5G			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	NA	NA	NA
Upload Throughput in Mbps	NA	NA	NA	NA
Video streaming delay in sec	NA	NA	NA	NA
Web browsing delay in second	NA	NA	NA	NA
Latency in (msec)	NA	NA	NA	NA



## 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.

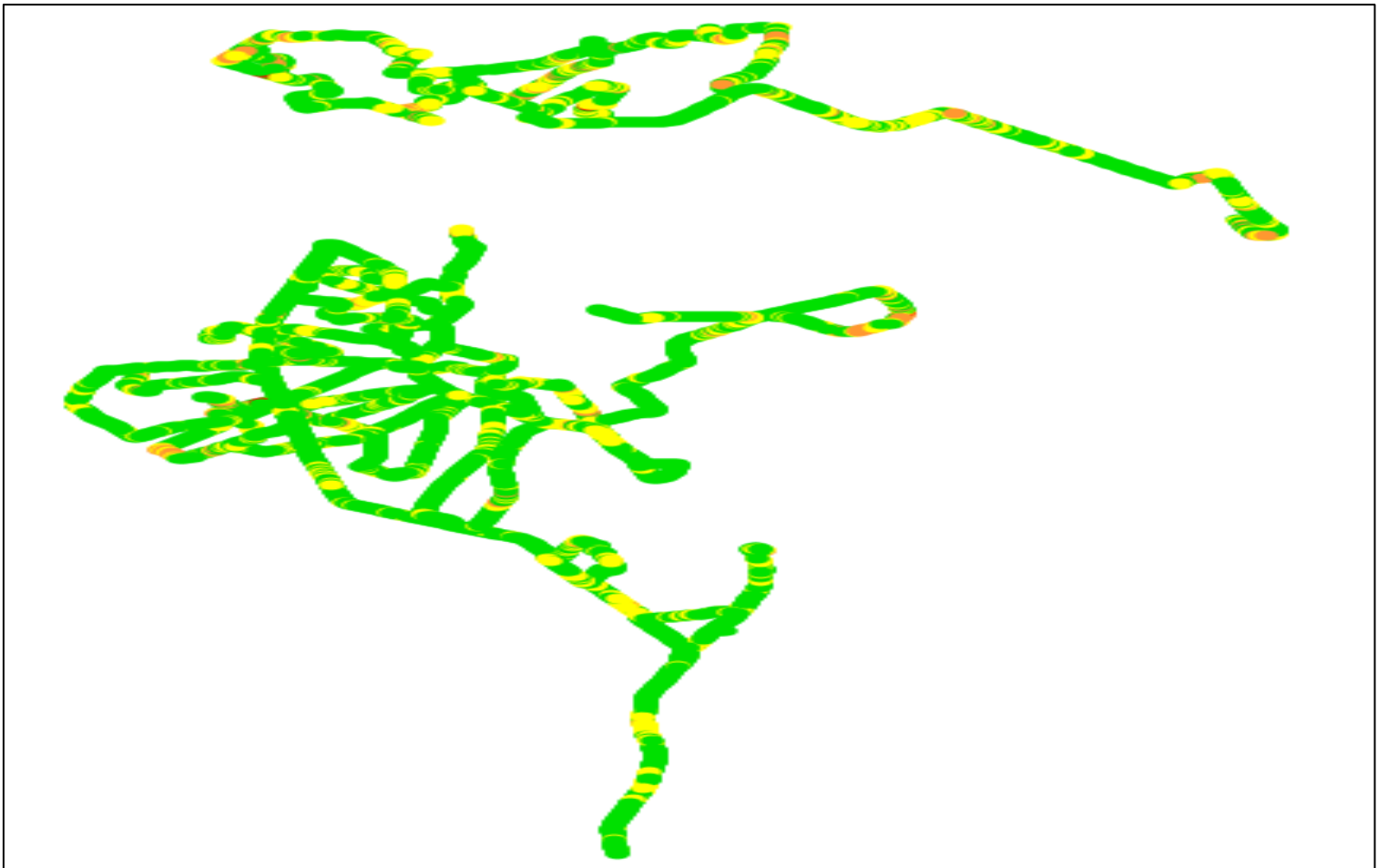
<b>TSP</b>	<b>Coverage Rate %</b>
<b>Airtel 2G</b>	<b>95.4</b>
<b>BSNI 2G</b>	<b>79.68</b>
<b>VIL 2G</b>	<b>99.6</b>
<b>BSNL 3G</b>	<b>91.65</b>
<b>Airtel VoLTE</b>	<b>100</b>
<b>Jio VoLTE</b>	<b>99.87</b>
<b>VIL VoLTE</b>	<b>99.8</b>



# Coverage Details

## TSP-Airtel

Technology	Coverage %
2G	95.4%

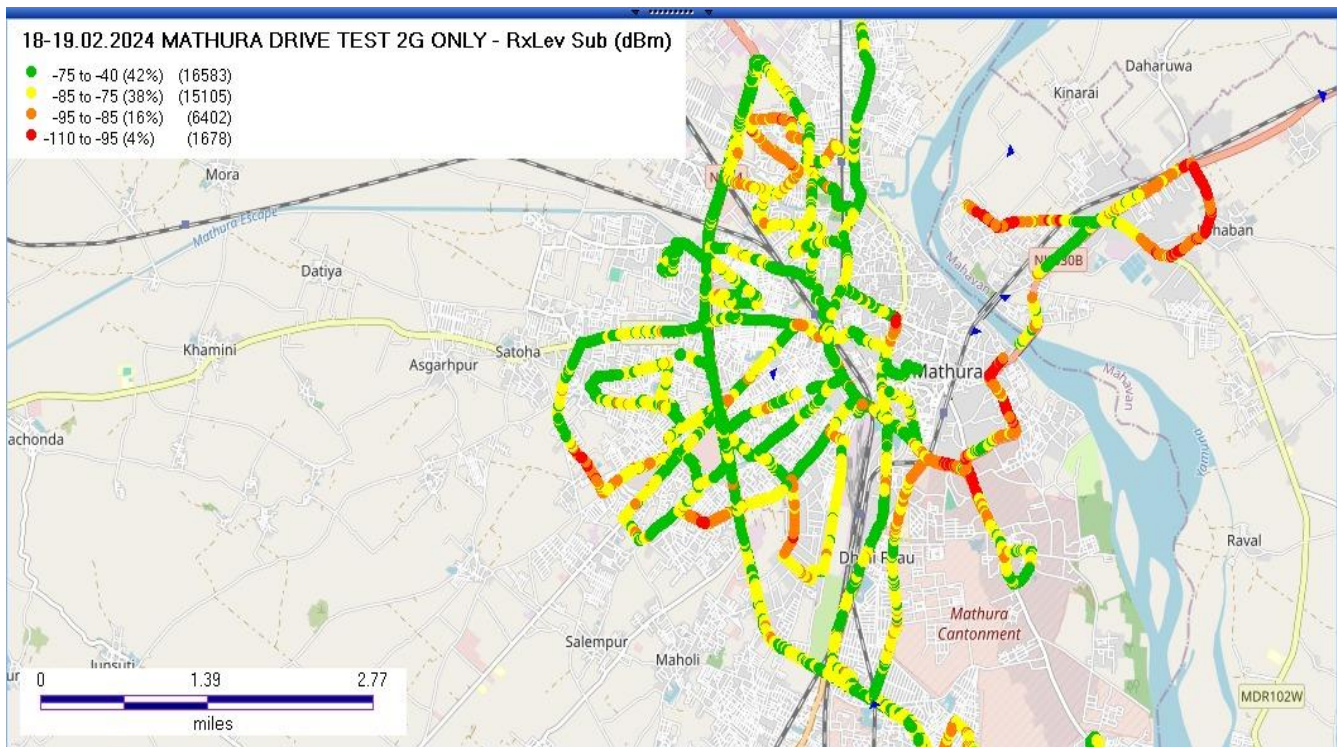


2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	70571	69.8%	
[-75, >=-85)	25893	25.6%	
[-85, >=-95)	4514	4.5%	
[-95, >=Min)	177	0.2%	
<b>Total</b>	<b>101155</b>	<b>100%</b>	

# Coverage Details

## TSP:- BSNL

Technology	Coverage %
2G	79.68.0%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	16583	41.70	
[-75, >=-85)	15105	37.98	
[-85, >=-95)	6402	16.10	
[-95, >=Min)	1678	4.22	
<b>Total</b>			

## TSP-.....VIL

Technology	Coverage %
2G	99.6

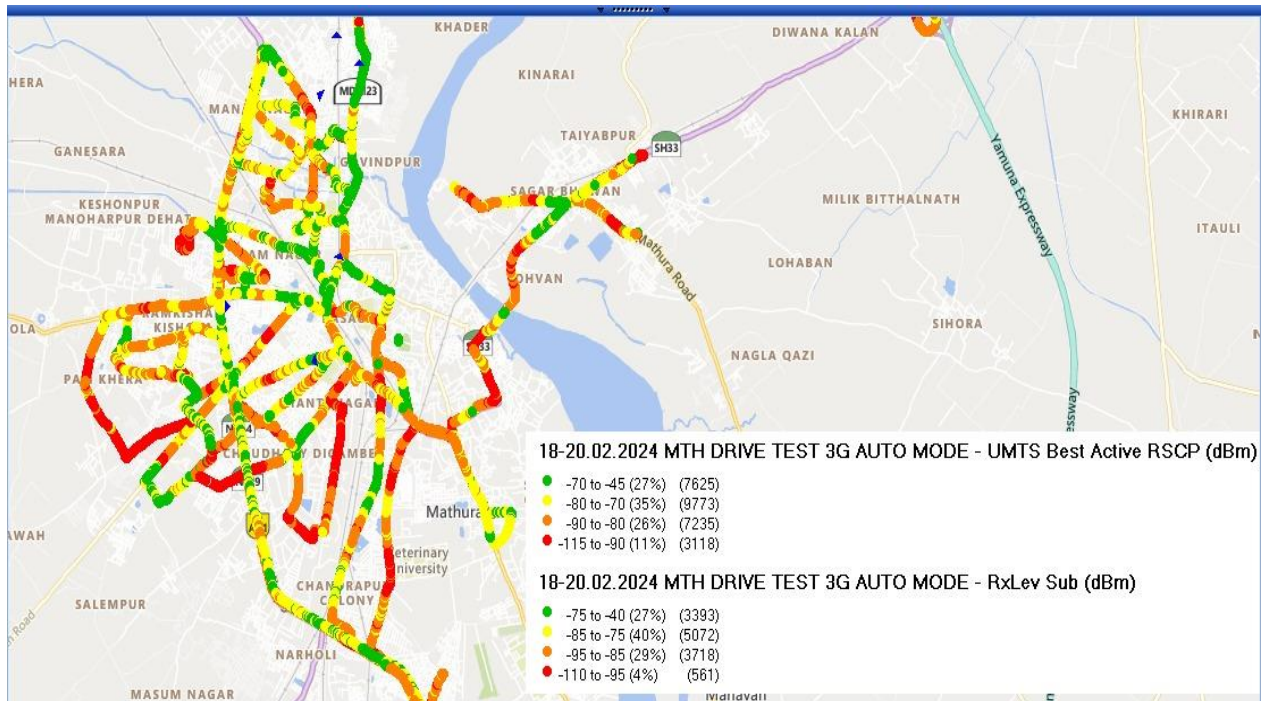


2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	14597	81.5	
[-75, >=-85)	3246	18.1	
[-85, >=-95)	75	0.4	
[-95, >=Min)	0	0.0	
<b>Total</b>	<b>17918</b>	<b>100</b>	

# Coverage Details

## TSP- BSNL

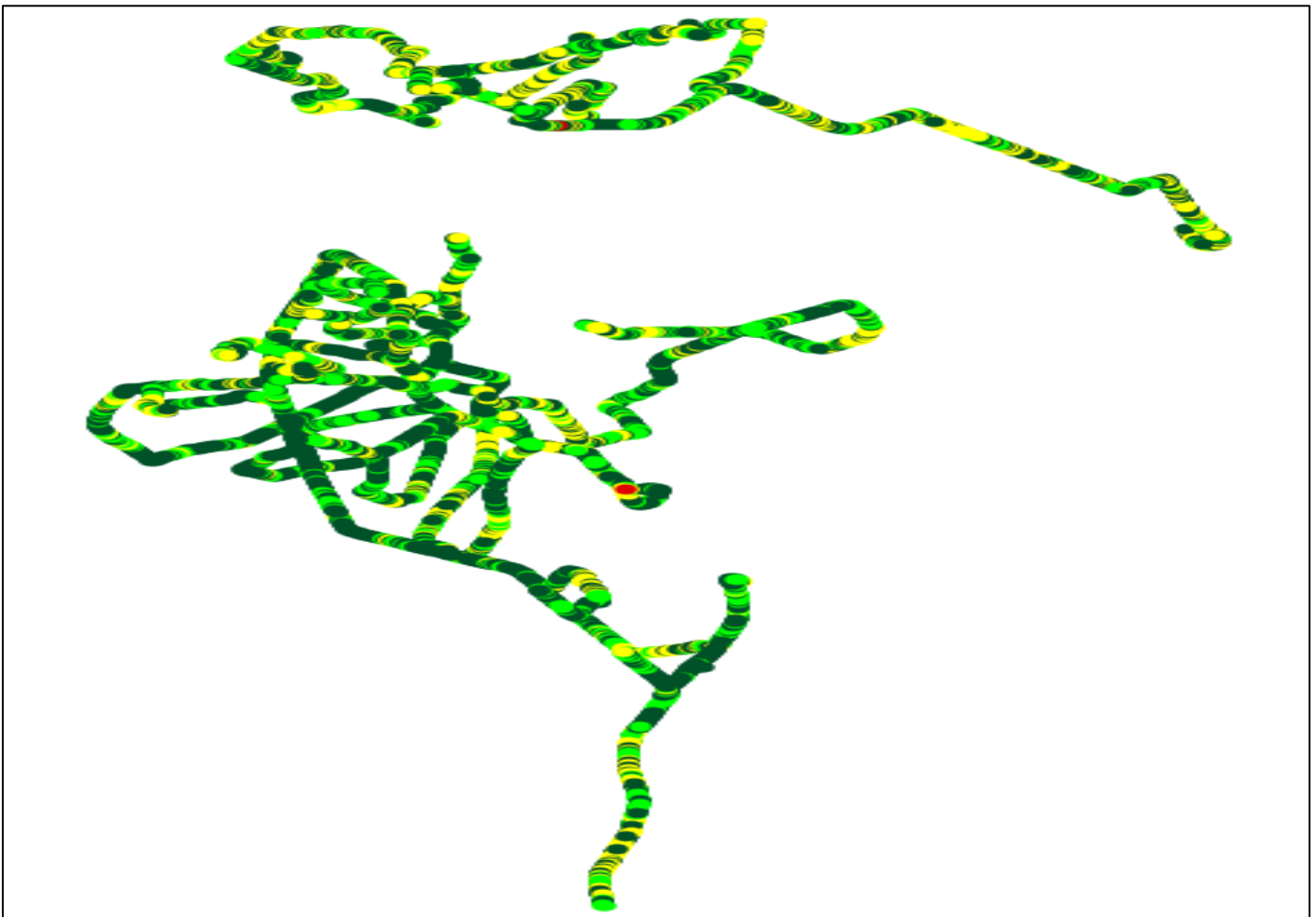
Technology	Coverage %
3G	91.65



3G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	11018	28	
[-70, >=-80)	14845	36.65	
[-80, >=-90)	10953	27	
[-90, >=Min)	3679	8.35	
<b>Total</b>	<b>40495</b>		

## TSP-Airtel

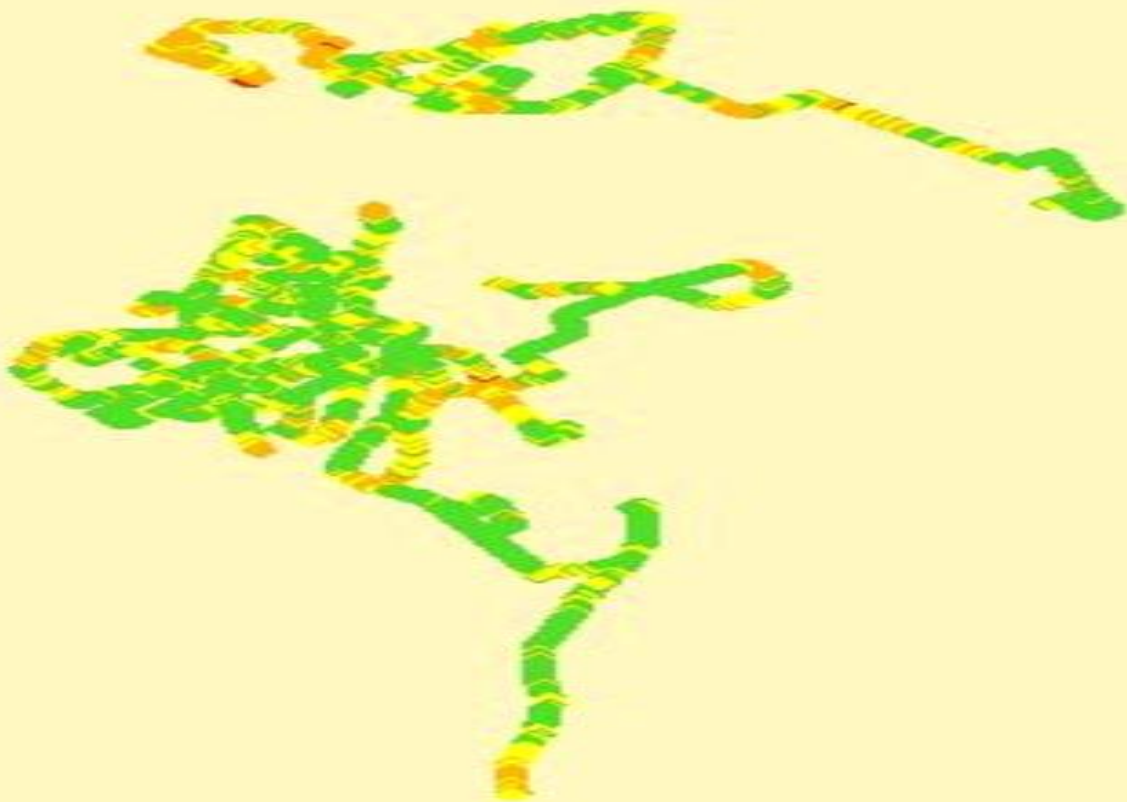
Technology	Coverage %
VoLTE	100%



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	246972	26.8%	<span style="display:inline-block; width:15px; height:15px; background-color:green;"></span>
[-80, >=-90)	407665	44.2%	<span style="display:inline-block; width:15px; height:15px; background-color:yellow;"></span>
[-90, >=-110)	268046	29%	<span style="display:inline-block; width:15px; height:15px; background-color:orange;"></span>
[-110, >=Min)	394	0%	<span style="display:inline-block; width:15px; height:15px; background-color:red;"></span>
<b>Total</b>	<b>923067</b>	<b>100%</b>	

## TSP-Jio

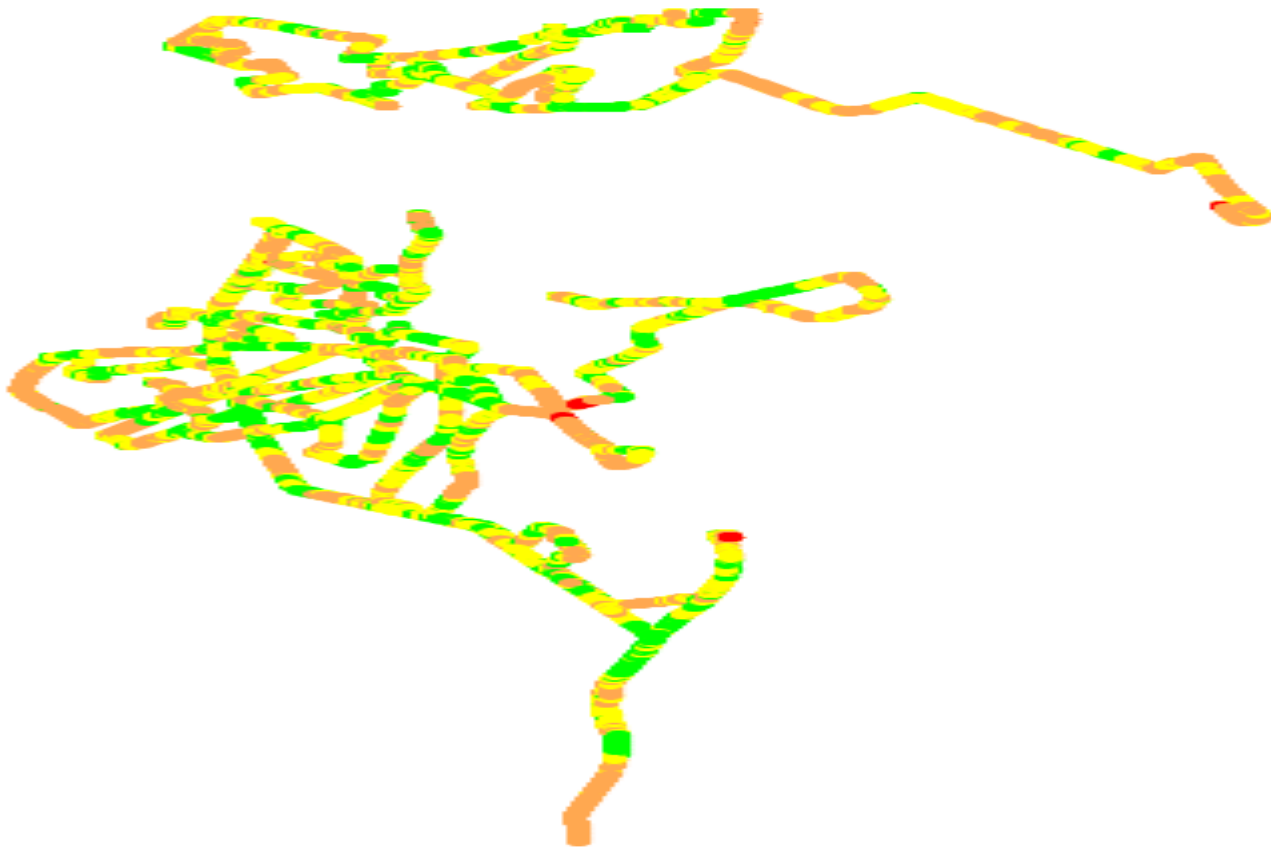
Technology	Coverage %
VoLTE	99.87 %



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	30993	55.81%	<span style="display:inline-block; width:15px; height:15px; background-color:green;"></span>
[-80, >=-90)	15279	27.51%	<span style="display:inline-block; width:15px; height:15px; background-color:yellow;"></span>
[-90, >=-110)	9195	16.56%	<span style="display:inline-block; width:15px; height:15px; background-color:orange;"></span>
[-110, >=Min)	70	0.13%	<span style="display:inline-block; width:15px; height:15px; background-color:red;"></span>
<b>Total</b>	<b>55537</b>	<b>100%</b>	

## TSP-.....VIL

Technology	Coverage %
VoLTE	99.8



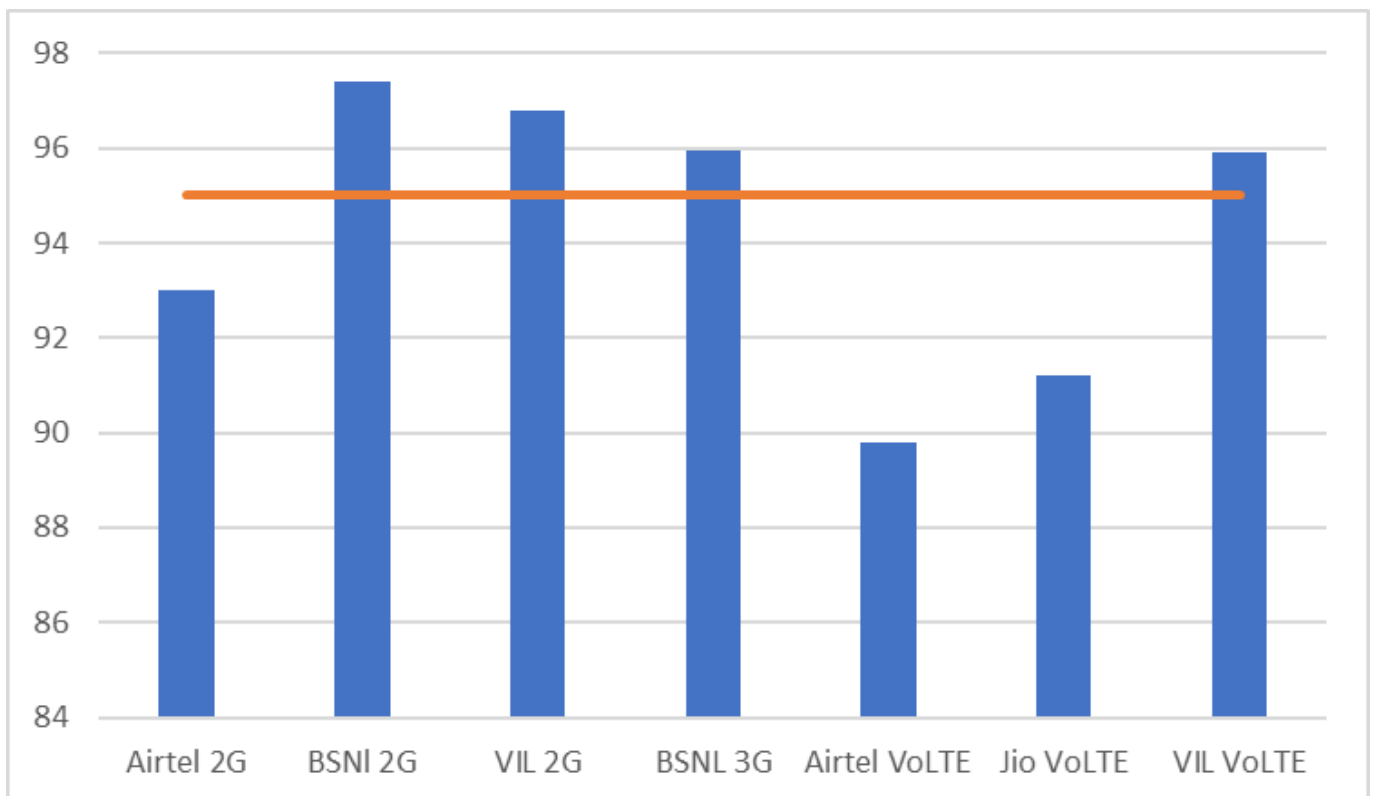
VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	9107	28.4	
[-80, >=-90)	13403	41.9	
[-90, >=-110)	9440	29.5	
[-110, >=Min)	67	0.2	
<b>Total</b>	<b>32017</b>	<b>100</b>	



## 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	Rx Quality %
Airtel 2G	93.00
BSNI 2G	97.41
VIL 2G	96.8
BSNL 3G	95.93
Airtel VoLTE	89.8
Jio VoLTE	91.19
VIL VoLTE	95.9

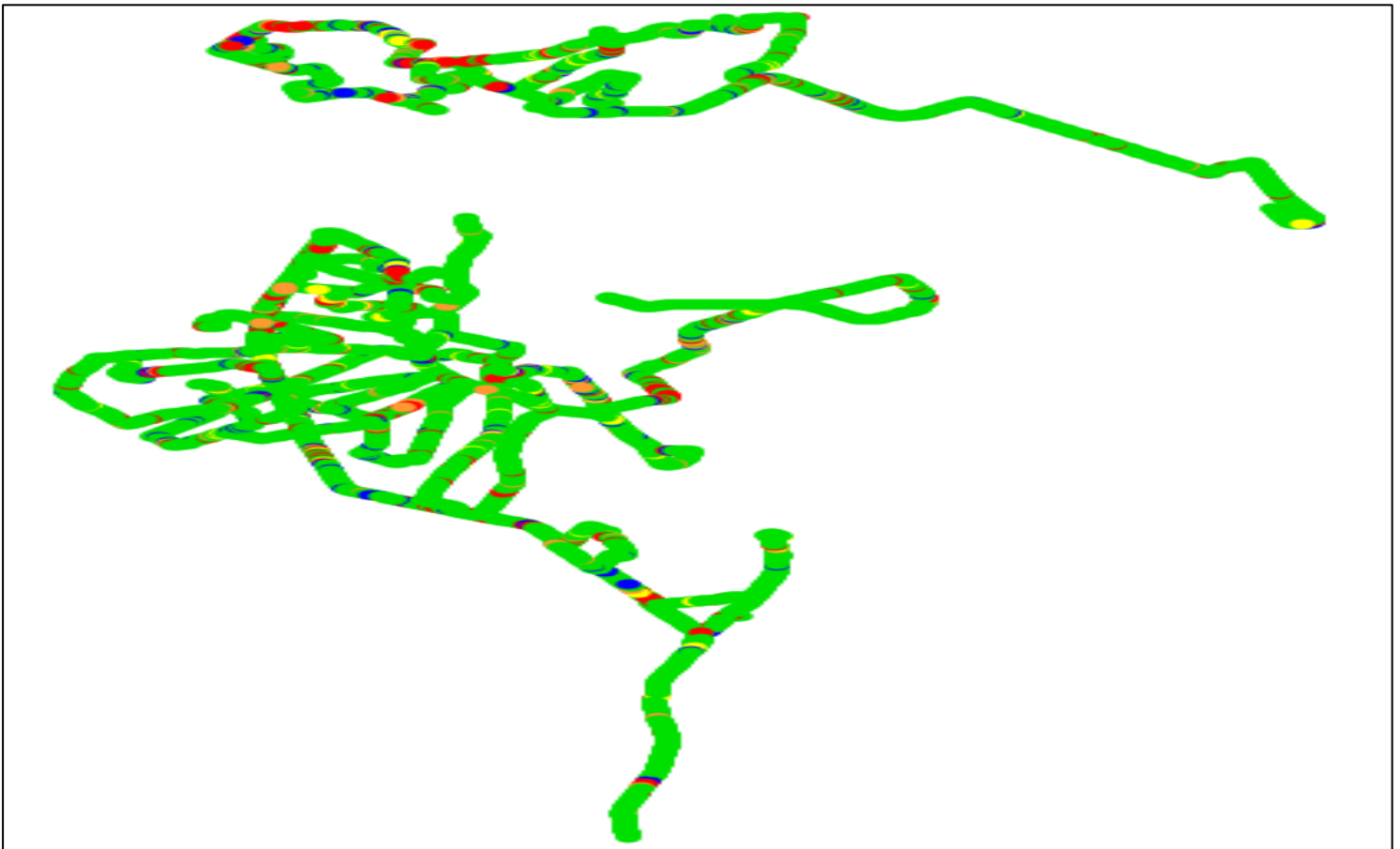


## Quality Details

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	93.00%



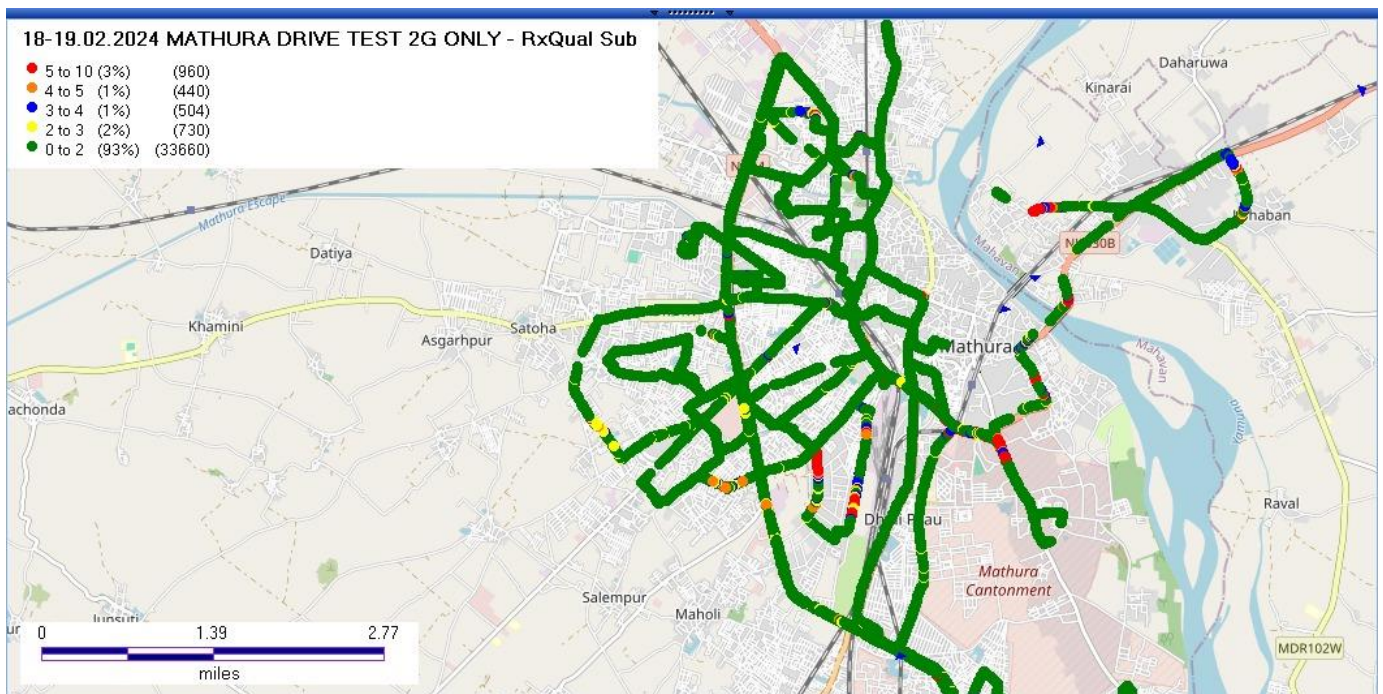
Overall Rx Quality	# Samples	% PDF	Legends
(Min, $\leq 2$ )	77632	81.5%	
(2, $\leq 3$ )	2944	3.1%	
(3, $\leq 4$ )	4328	4.5%	
(4, $\leq 5$ )	3650	3.8%	
(5, $\leq \text{Max}$ )	6677	7.0%	
<b>Total</b>	<b>95231</b>	<b>100%</b>	

# 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	97.41%



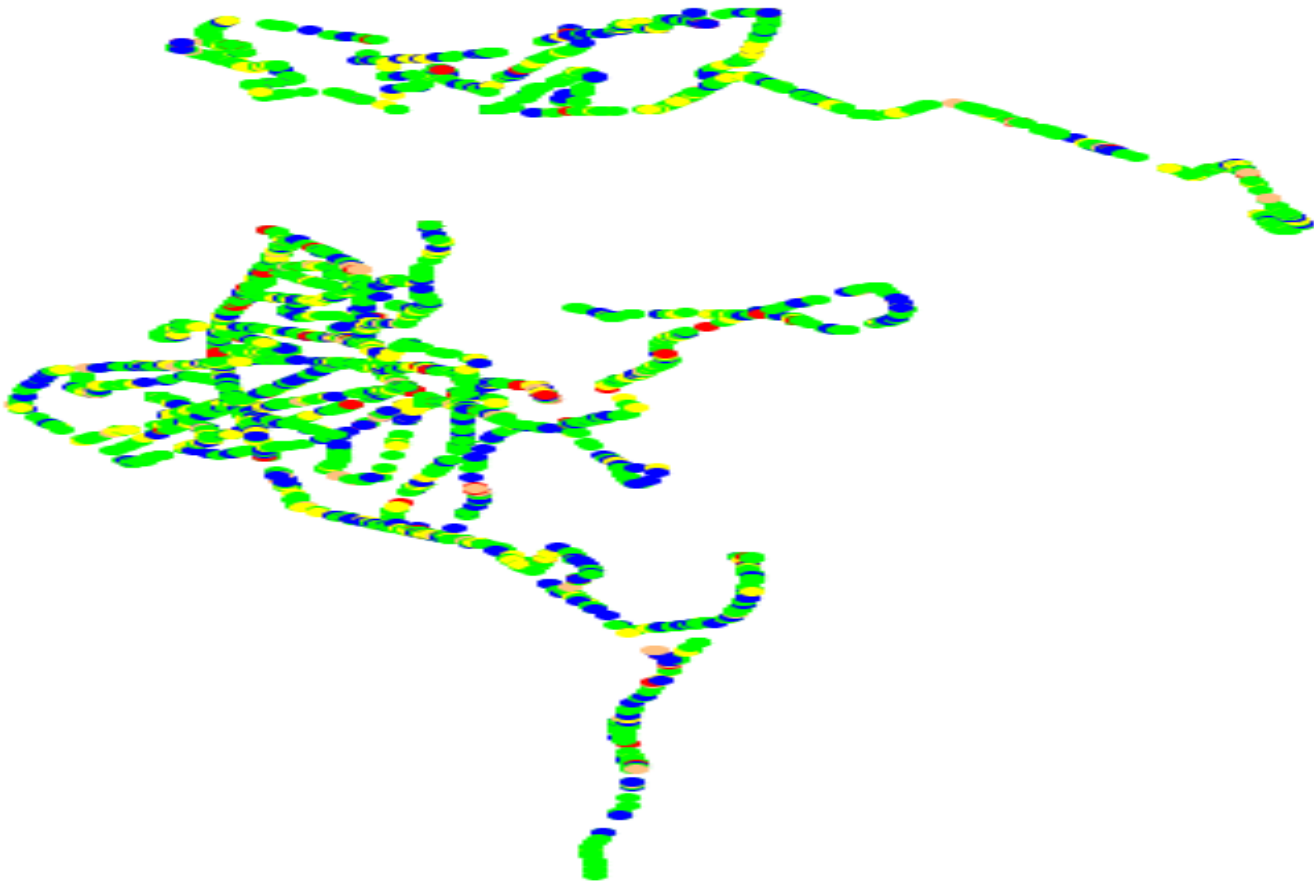
Overall Rx Quality	# Samples	% PDF	Legends
(Min, $\leq 2$ )	33660	92.8	
(2, $\leq 3$ )	730	2.01	
(3, $\leq 4$ )	504	1.39	
(4, $\leq 5$ )	440	1.21	
(5, $\leq$ Max)	960	2.59	
<b>Total</b>	<b>36254</b>		






## 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	96.8



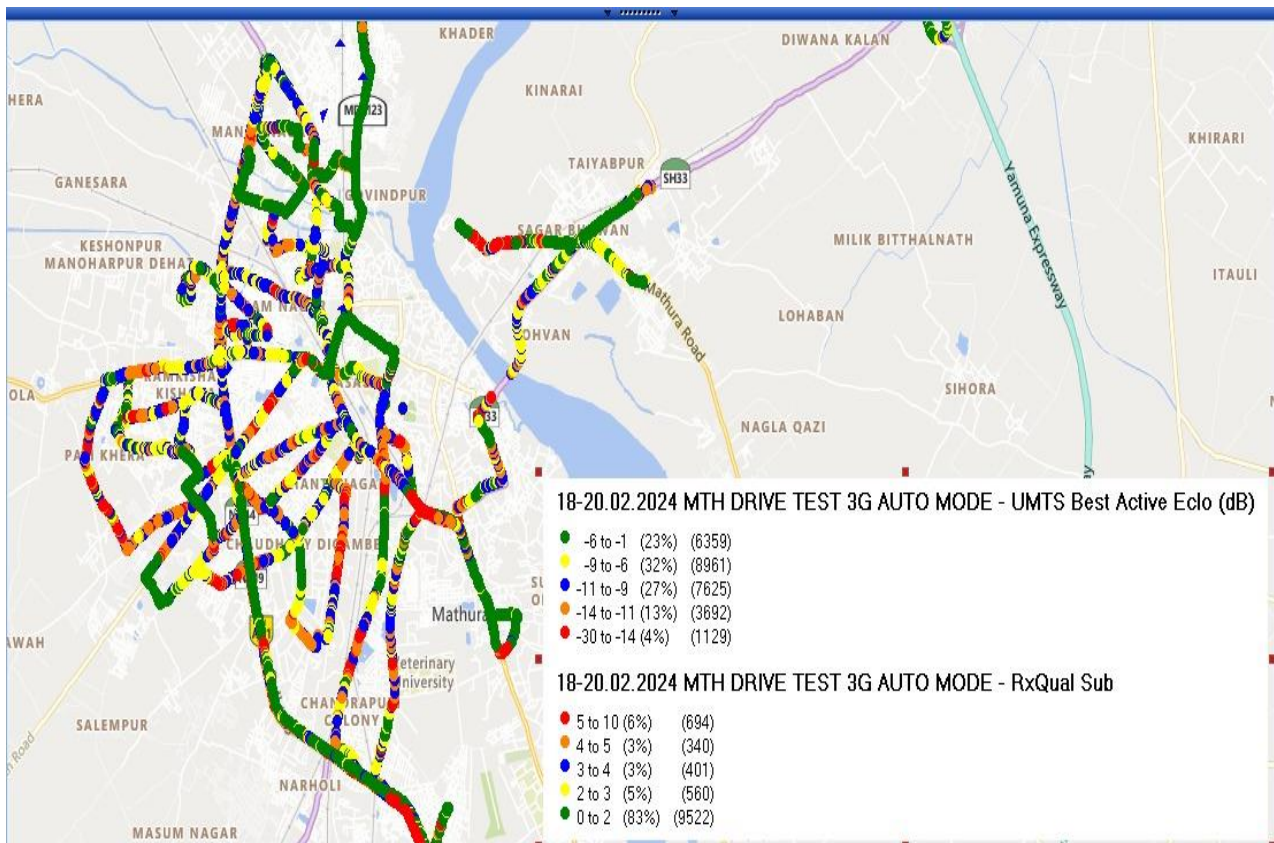
Overall Rx Quality	# Samples	% PDF	Legends
(Min, $\leq 2$ )	3664	63.6	
(2, $\leq 3$ )	852	14.8	
(3, $\leq 4$ )	844	14.6	
(4, $\leq 5$ )	218	3.8	
(5, $\leq \text{Max}$ )	185	3.2	
<b>Total</b>	<b>5763</b>	<b>100</b>	

# 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 %
3G	95.93%



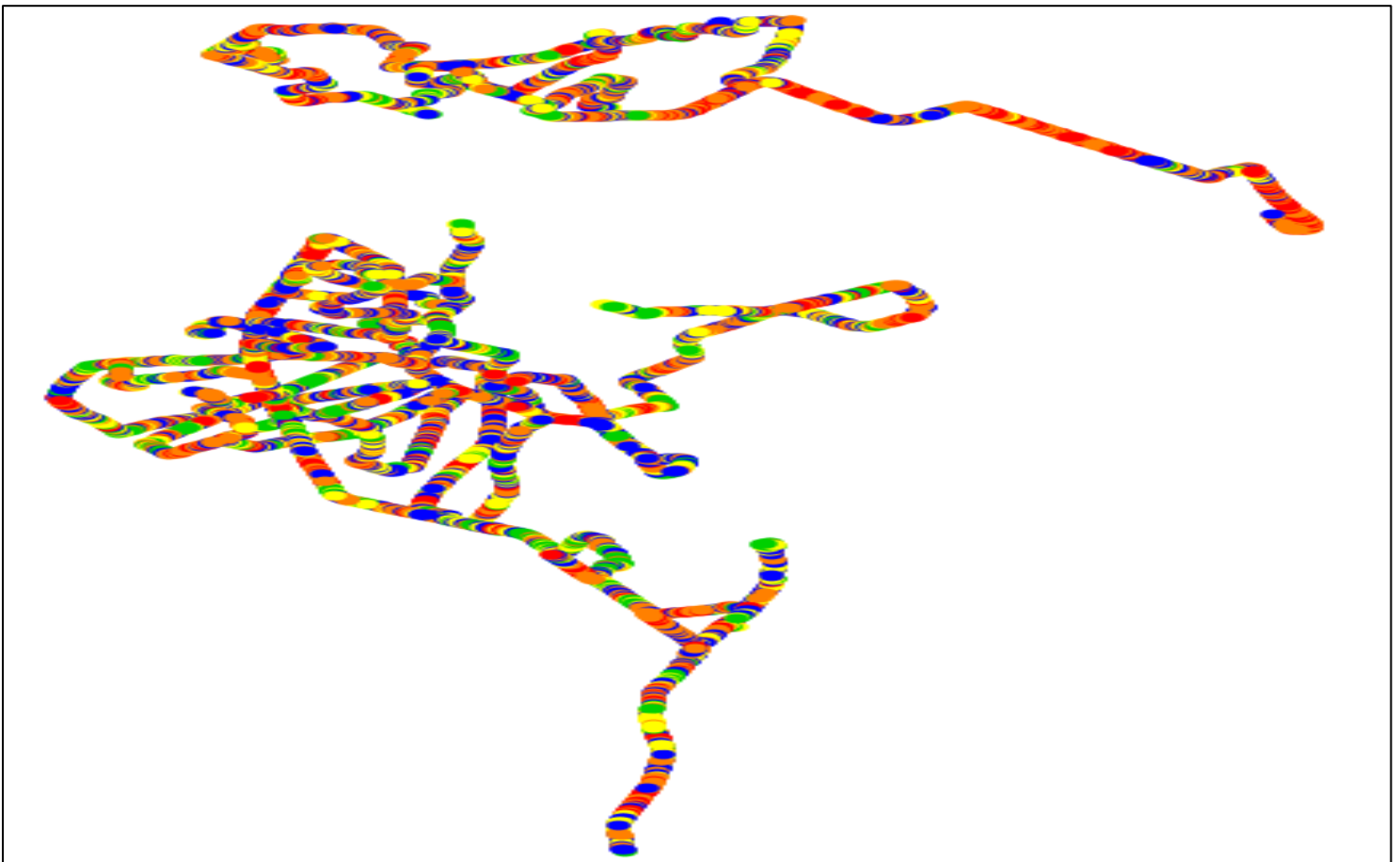
Overall Ec/No	# Samples	% PDF	Legends
(Max, $\leq -6$ )	6359	22.90	
(-6, $\leq -9$ )	8961	32.27	
(-9, $\leq -11$ )	7625	27.46	
(-11, $\leq -14$ )	3692	13.30	
(-14, $\leq$ Min)	1129	4.07	
<b>Total</b>			

## 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	<b>89.8%</b>



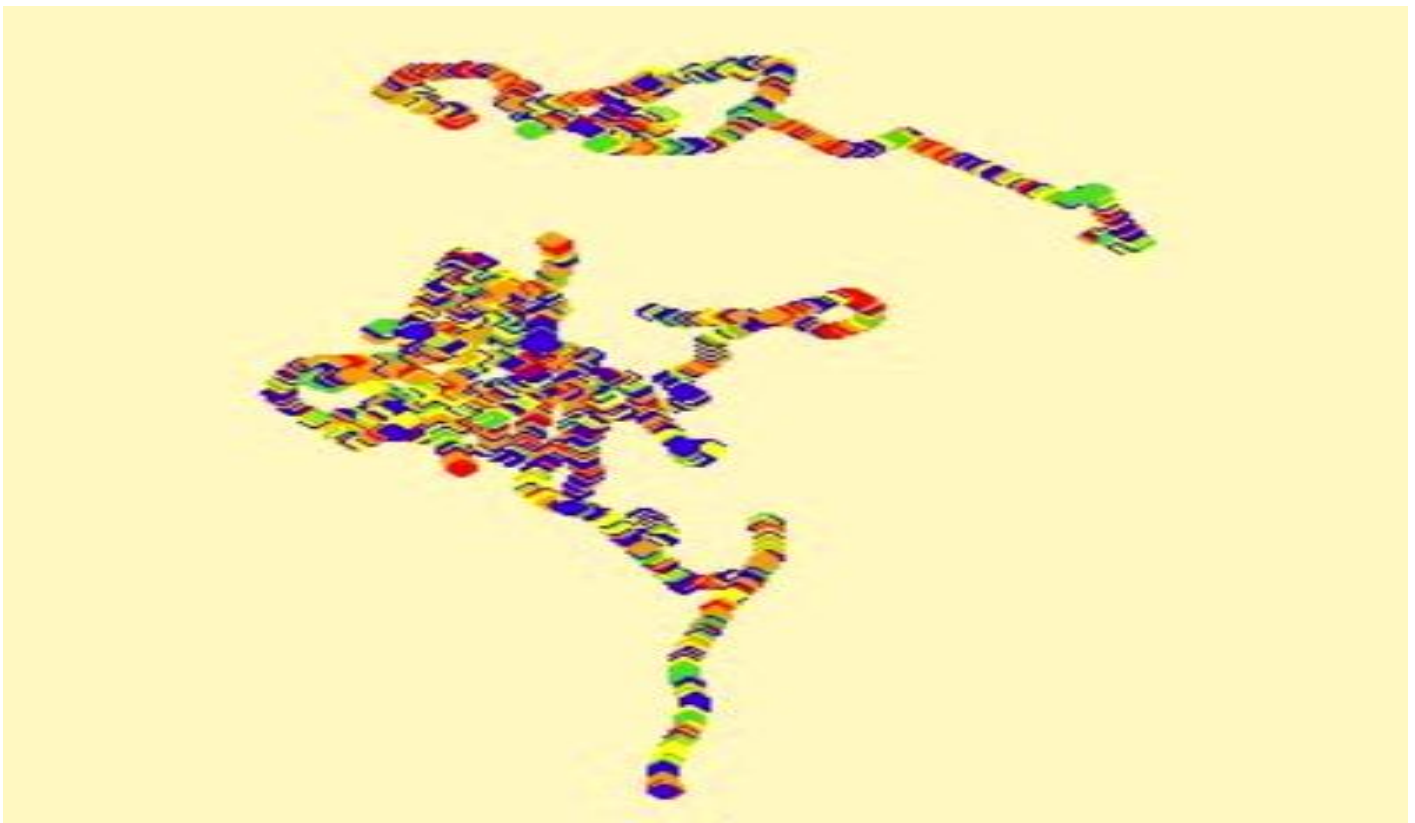
Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	53395	10.2%	
(0, $\leq 5$ )	129994	24.8%	
(5, $\leq 10$ )	151362	28.8%	
(10, $\leq 15$ )	116396	22.2%	
(15, $\leq \text{Max}$ )	73773	14.1%	
<b>Total</b>	<b>524920</b>	<b>100%</b>	






## 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	<b>91.19 %</b>



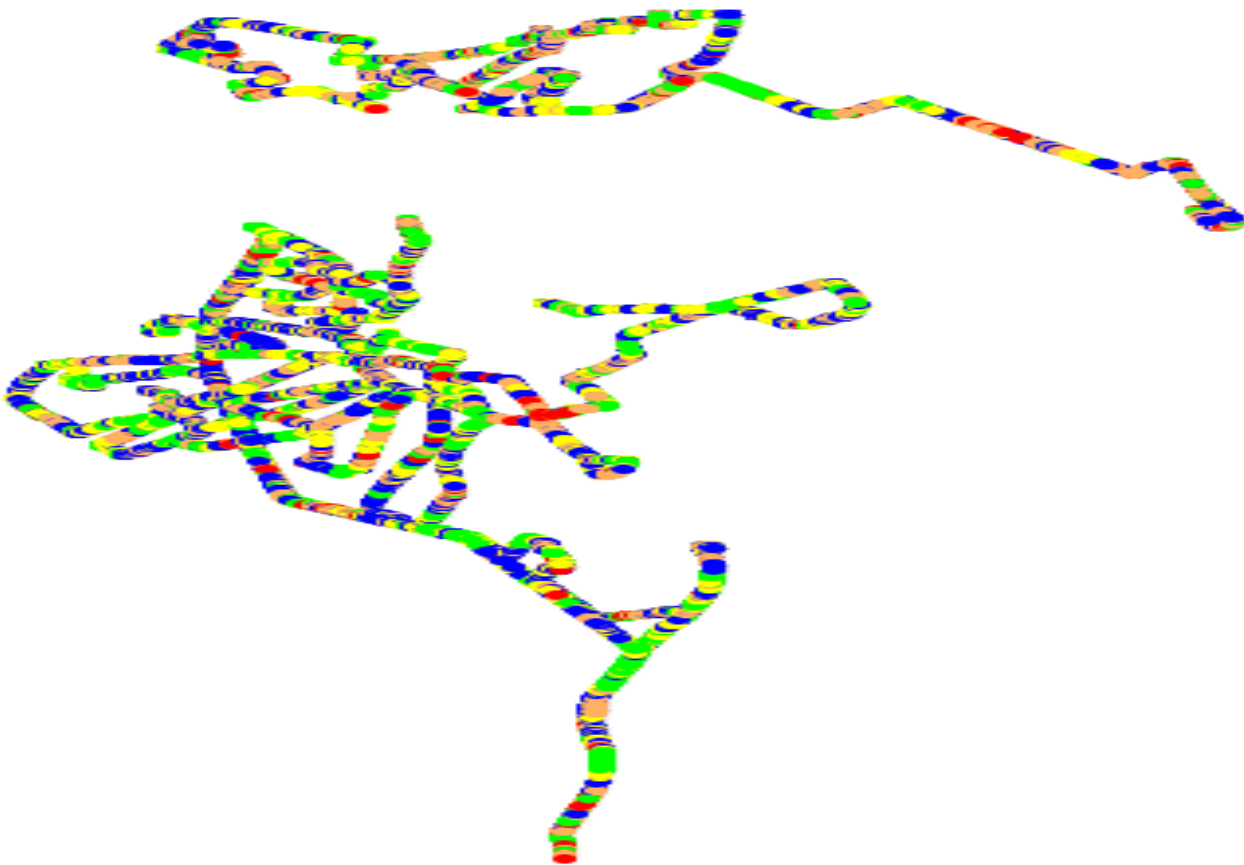
Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	4893	8.81%	
(0, $\leq 5$ )	15715	28.30%	
(5, $\leq 10$ )	17444	31.41%	
(10, $\leq 15$ )	11321	20.38%	
(15, $\leq \text{Max}$ )	6164	11.10%	
<b>Total</b>	<b>55537</b>	<b>100%</b>	

## 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-.....VIL**

Technology	Rx Quality %
VoLTE	<b>95.9</b>

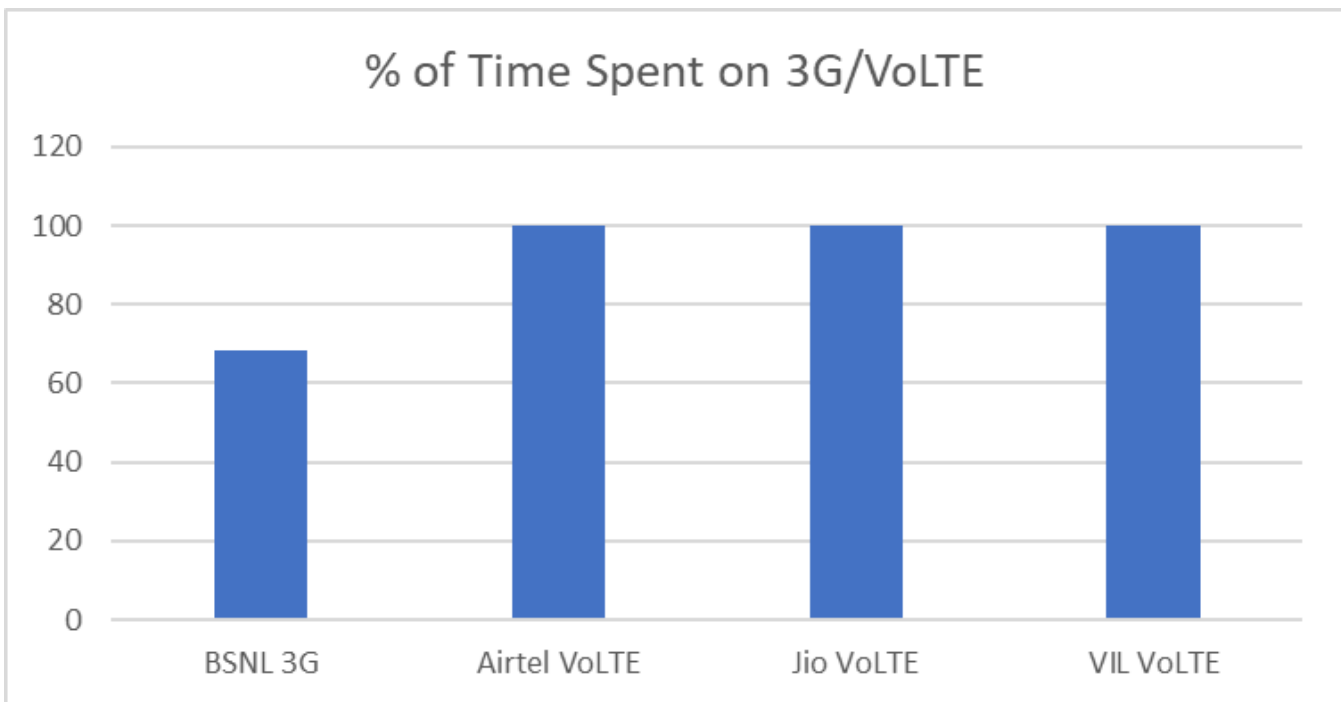


Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	1235	4.1	
(0, $\leq 5$ )	7280	24.0	
(5, $\leq 10$ )	8979	29.6	
(10, $\leq 15$ )	6396	21.1	
(15, $\leq \text{Max}$ )	6394	21.1	
<b>Total</b>	<b>30284</b>	<b>100</b>	



# Technology Details

<b>TSP</b>	<b>% of Time Spent on 3G/ VoLTE</b>
<b>BSNL 3G</b>	<b>68.26</b>
<b>Airtel VoLTE</b>	<b>100</b>
<b>JIO VoLTE</b>	<b>100</b>
<b>VIL VoLTE</b>	<b>100</b>



## TSP- Airtel

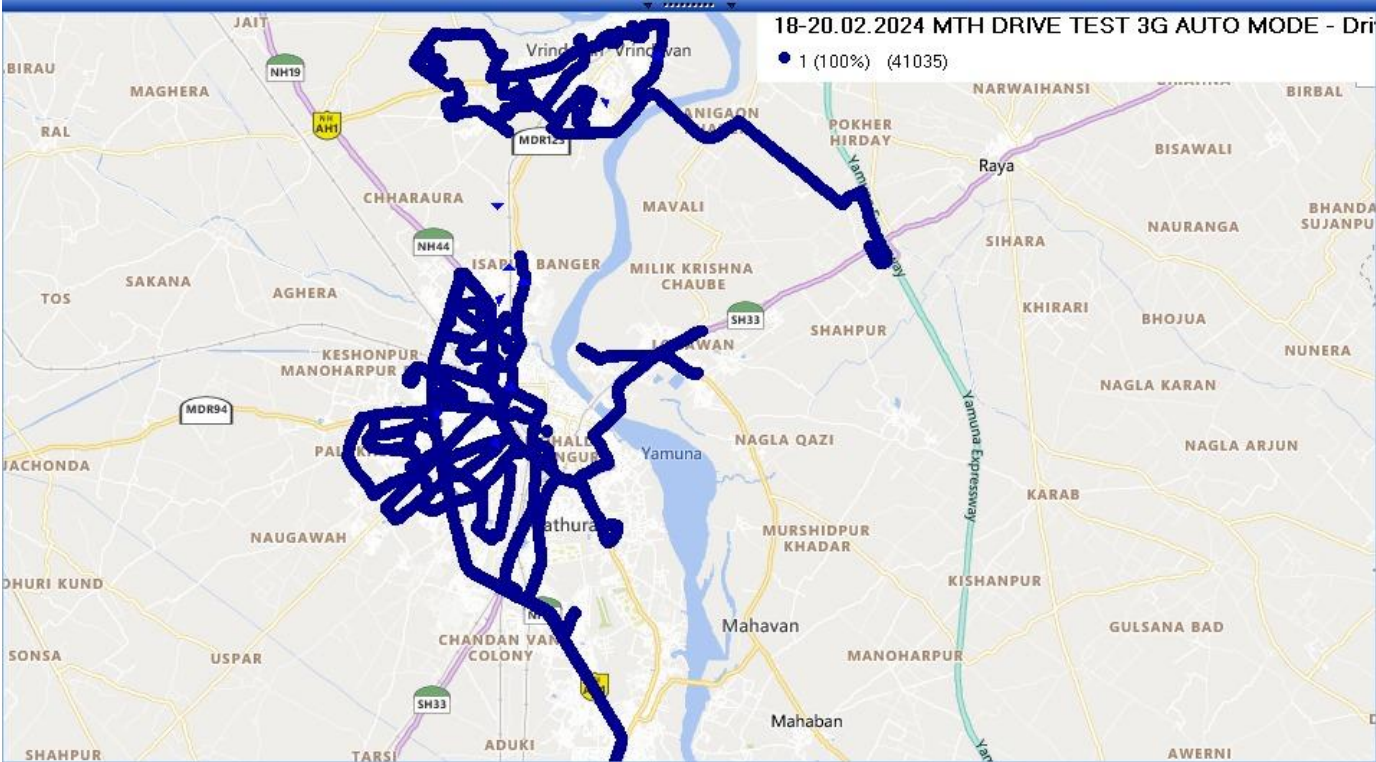
TECHNOLOGY	%	Legends
2G	0%	Yellow
VoLTE	100%	Green



# Technology Details

## TSP-BSNL

Technology	% of Time Spent on
3G	68.26%
VoLTE	



## TSP- Vi

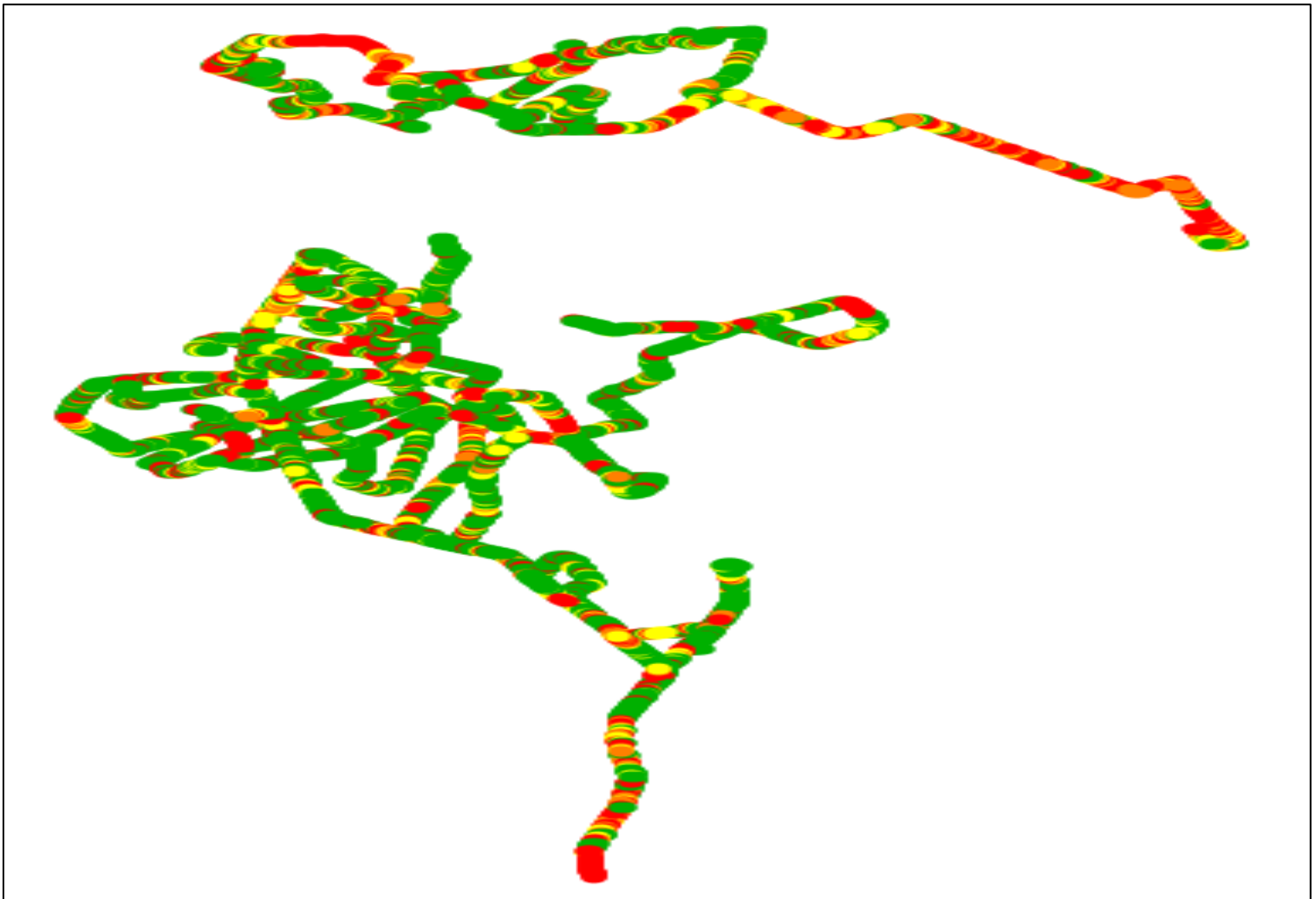
Technology	% of Time Spent on
3G	
VoLTE	100



## TSP- Airtel

### Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	16.25



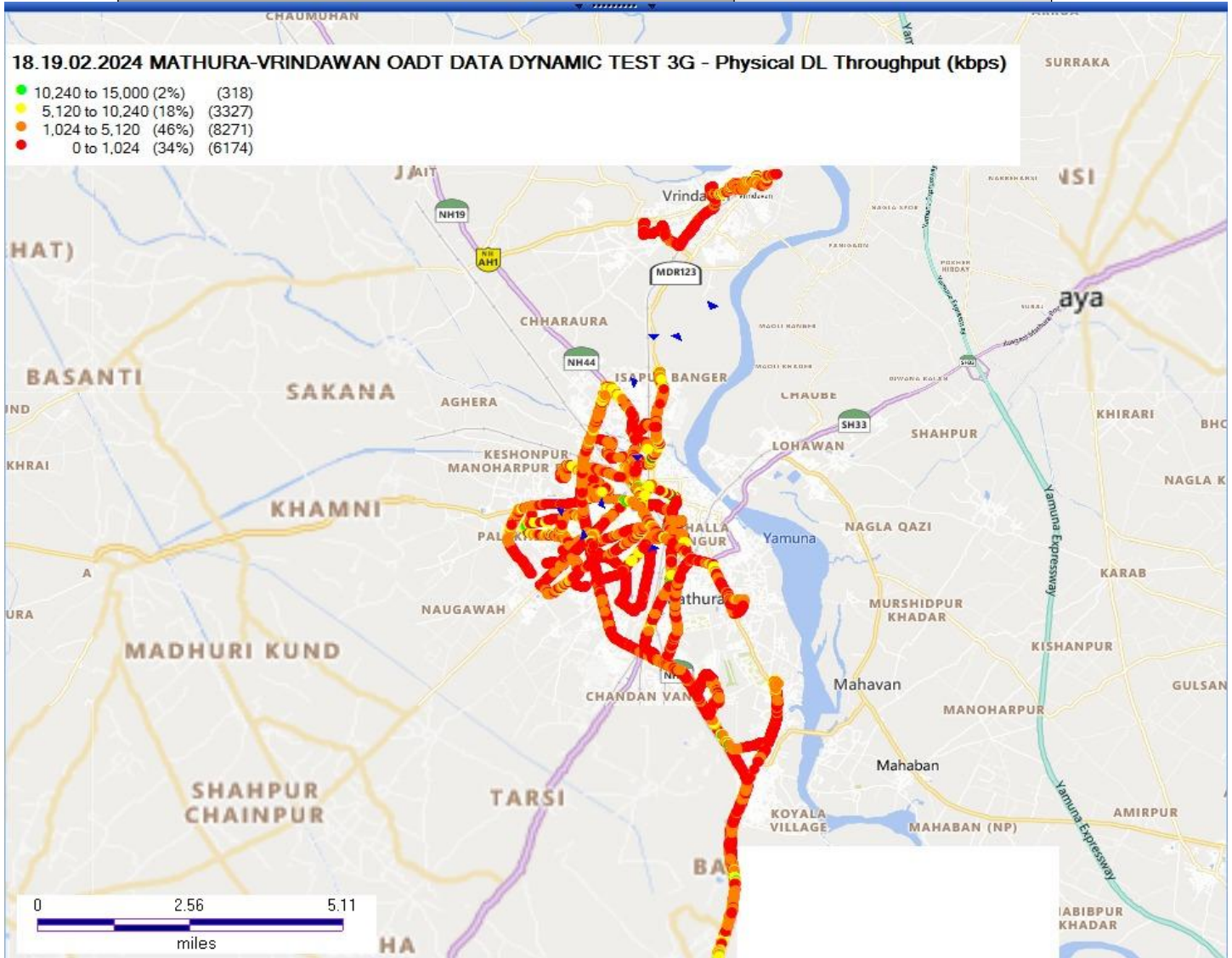
DL throughput	No of Sample	%	Legends
< 2Mbps	5971	12.2%	Red
2-5 Mbps	5322	10.8%	Orange
5-10 Mbps	8335	17%	Yellow
>10Mbps	29443	60%	Green

# Dynamic Data Test

## TSP-BSNL

### Data Statistics - Dynamic data testing

Data KPIs - Overall	3G
Download Throughput (Mbps)	4.01

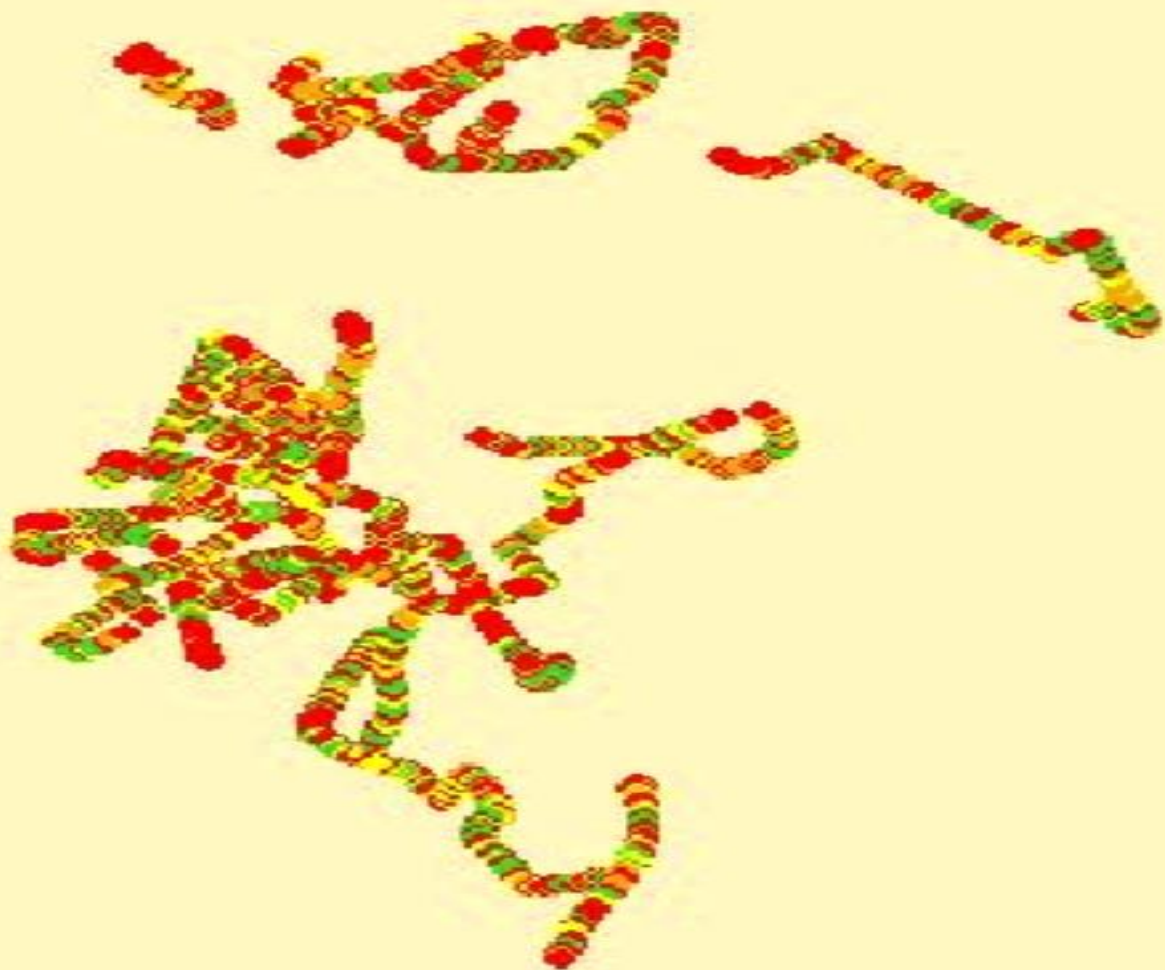


DL throughput	No of Sample	%	Legends
< 1 Mbps	6174	34	Red
1-5 Mbps	8271	46	Orange
5-10 Mbps	3327	18	Yellow
>10Mbps	318	2	Green

## TSP-Jio

### Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	6.86



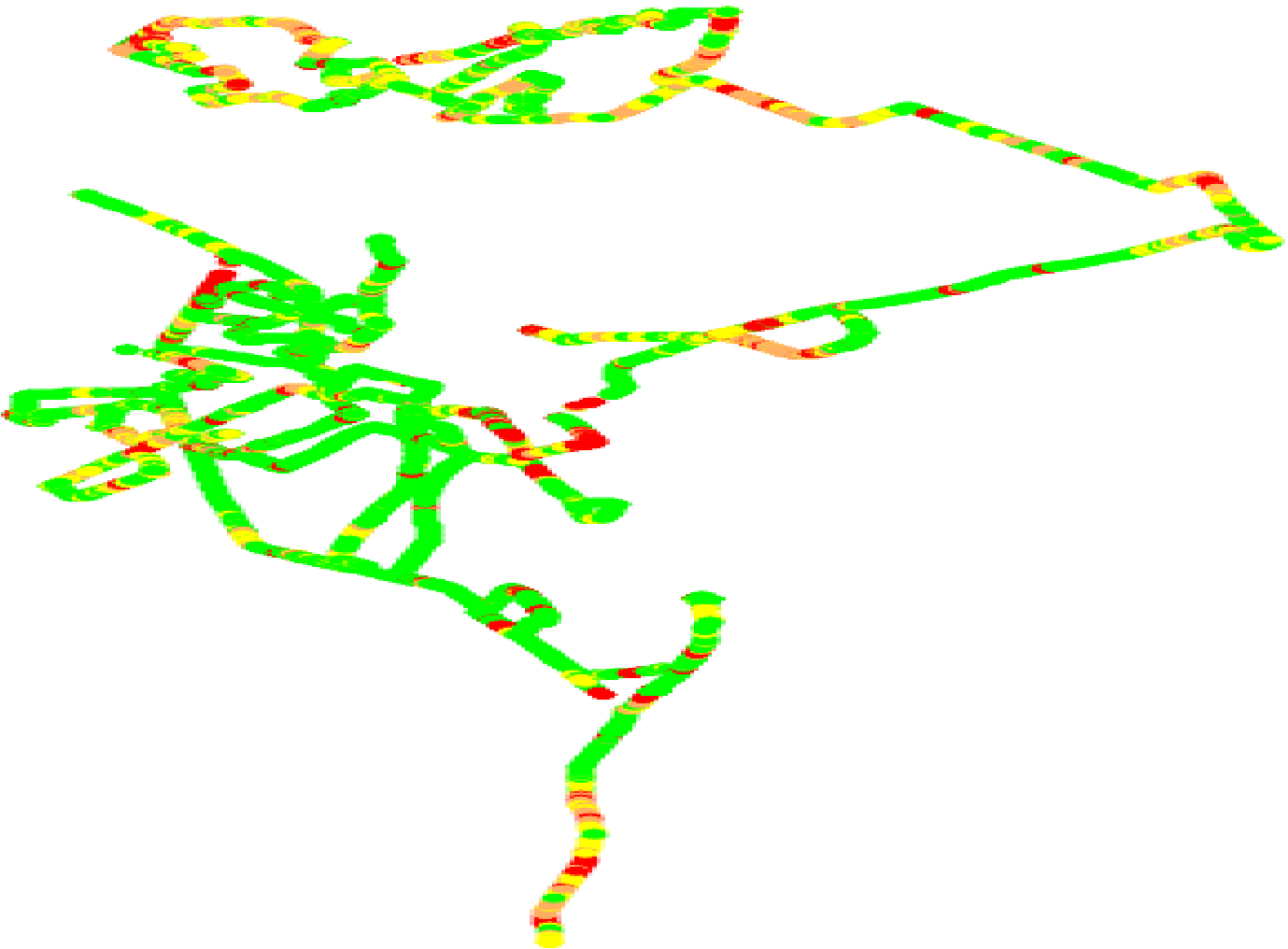
DL throughput	No of Sample	%	Legends
< 2Mbps	15153	39.39%	Red
2-5 Mbps	5542	14.4%	Orange
5-10 Mbps	7288	18.94%	Yellow
>10Mbps	10490	27.27%	Green

# Dynamic Data Test

## TSP-.....VIL

Data Statistics - Dynamic data testing 180 km

Data KPIs - Overall	LTE
Download Throughput (Mbps)	25.35



DL throughput	No of Sample	%	Legends
< 2Mbps	1644	7.8	Red
2-5 Mbps	2046	9.7	Orange
5-10 Mbps	3449	16.3	Yellow
>10Mbps	14056	66.3	Green