



# Operator Assisted Drive Test Report

## Bikaner City & Nearby area

27<sup>th</sup> Feb. to 01<sup>st</sup> March 2023

By

TRAI Regional office Jaipur

**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 has been carried out by Regional Office, Jaipur with the help of Service Providers in Bikaner City & Nearby area from 9:00 AM to 8:00 PM during 27-02-2023. to 01-03-2023. The drive test covered drive route of 140 KMs & 6 no hotspots over a period of 3 days. Approximately 200 calls were made for each of the networks: three 2G networks, one 3G networks and three LTE networks covering four TSPs.

Overview

Voice Summary

Data Summary

# Overview

Regional Office, TRAI Jaipur conducted Operator Assisted Drive Test from 27<sup>th</sup> February 2023 to 1<sup>st</sup> March 2023 covering Bikaner City & Nearby Area. The performance of Airtel, BSNL, Vodafone Idea and Jio was 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.

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

**Data:** Download Throughputs, Upload Throughputs, Web Browsing Delay and Latency.

## Drive Test Details :

**Voice Tests:** Calls were made for 90 sec duration with a wait time of 10 sec between calls in all technologies. The drive test covered a drive route of approximately **140** KMs. Approximately **200 calls** were made for each of the networks: three 2G (Lock Mode) networks, one 3G (Dual mode) networks and three VoLTE networks covering 4 unique TSPs.

## Data Tests:

**Dynamic data test** was conducted for 95 kms for download throughput in all technologies.

2G – measurement – UE Locked in 2G file size- 500KB

3G – measurement – UE in 3G File Size- 20MB

4G – measurement – UE in LTE File Size- 40MB

## Static data tests on 6 hotspots

1. **COP VENUE (Sagar Hotel)**
2. **Roadways Bus Stand**
3. **Tulsi Circle**
4. **Railway Station**
5. **SP Medical Collage Circle**
6. **Murti Circle JNV**

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
Latency	32 Bytes on www.google.com

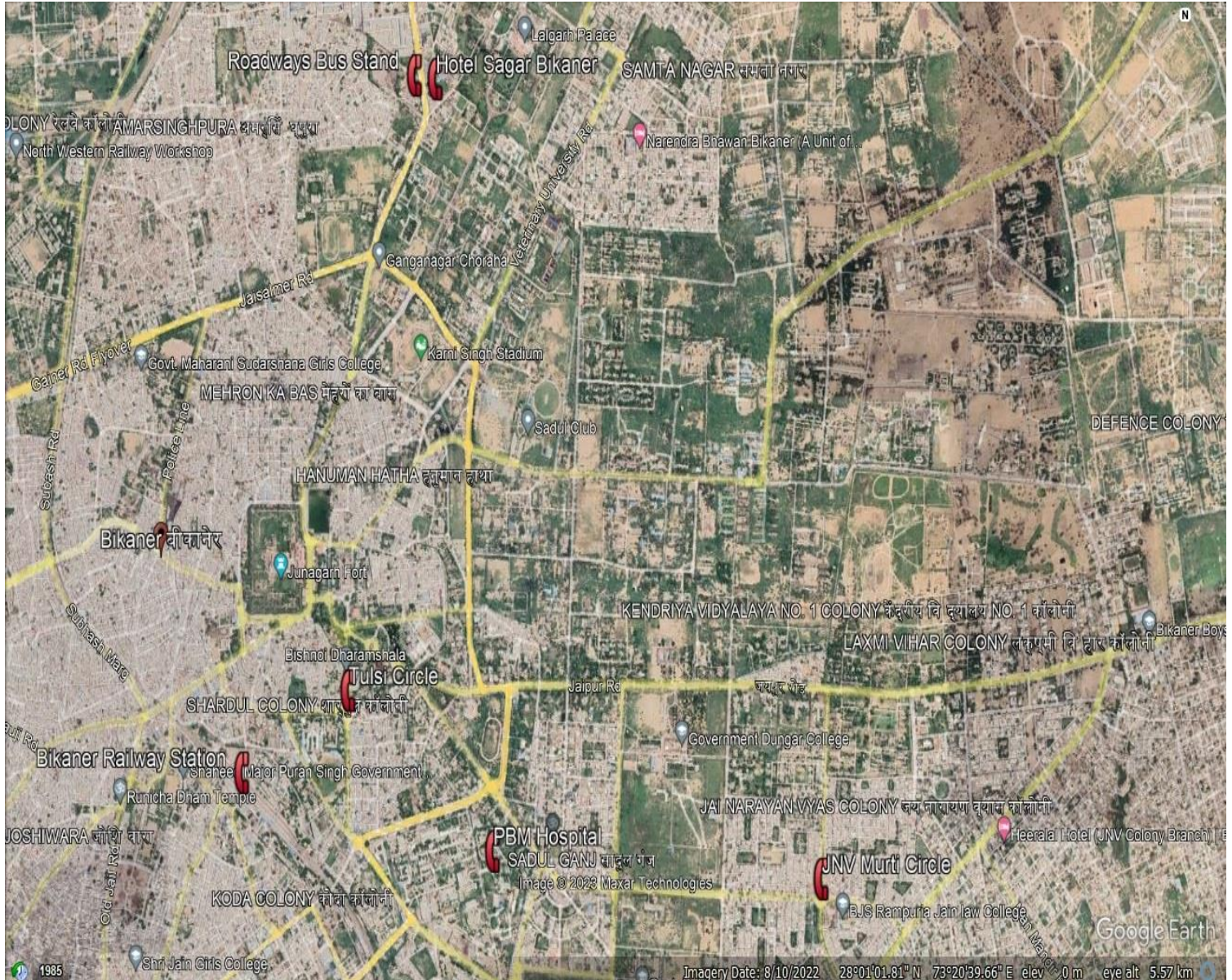
# Overview

## Voice & Dynamic Data Test Drive Route



Date	Test Scenario	Area to be Covered
27-02-23	Hot Spots- 2C/3C/4C Static Data Tests	<b>Starting Point-COP Venue (Hotel Sagar),</b> 2) Roadways Bus Stand- 3) Tulsi Circle, 4) Railway Station, 5)S.P. Medical College Circle, 6) Murti Circle JNV
28-02-23	2G/3G/4G Voice and 3G/4G Dynamic Data	<b>Starting Point VaishnoDham-Jaipur Road</b> at 10.00 AM Vaisno Dham Jaipur Road,Udasar,Tilak Nagar,Kanta Khaturia Colony,JNV Colony,Patel Nagar, Shivbari Chauraha,LIC Office Road, DungarCollege Road, Sadulganj, Museum Circle,Civil Lines, Sadul Colony,Gandhi Nagar, Karni Nagar,Samta Nagar,Roadways Bus Stand, Ganganagar Choraha,AnajM andi,Lalgarh, Sarvodya Basti, Muktaprsad Colony,Bangla Nagar,Police Line Choraha,Murlidhar Vyad Colony, Nathusar Gate, Dudi Petrol Pump, NayaSahar, Hanuman Hatha, Railway Station, K.E.M. Road, Gogagate,Gangashahar,Gopeswar Basti,Mohta Saray, Bhinasar, Sujandesar,PBM hospital Road,Chaukhunti Mohalla,Junagarah,Jasusar Gate, Kothari Hospital,Rathkhana Colony, Medical College Chouraha,OLD gajner Road,Pugal Phanta,New Sabji Mandi,
01-03-23	2G/3G/4G Voice and 3G/4G Dynamic Data	<b>Starting Point Panchati Circle-</b> at 11.00 AM RIICO Industries area, <b>GhaCsisar Road, SNo Road, Ranibazar,Laxm inath Temple road,Panchsati Circle,Duplex Colony,Jailwail Road,Gujro ka Maha Ila,Ind ira hawk, Gandhi Chowk,Gangashashar Old Bus Stand,Jain Public School, Public Park,Tulsi Circle, Morden Market</b>

## Data Service Test- Static Locations



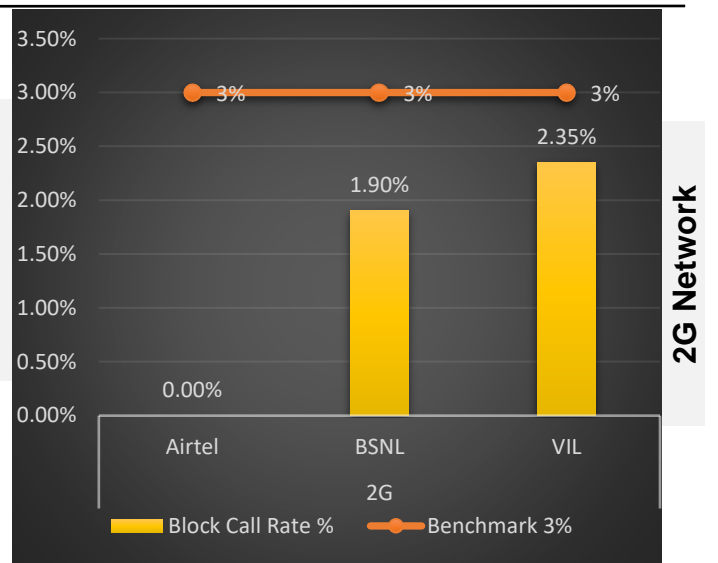
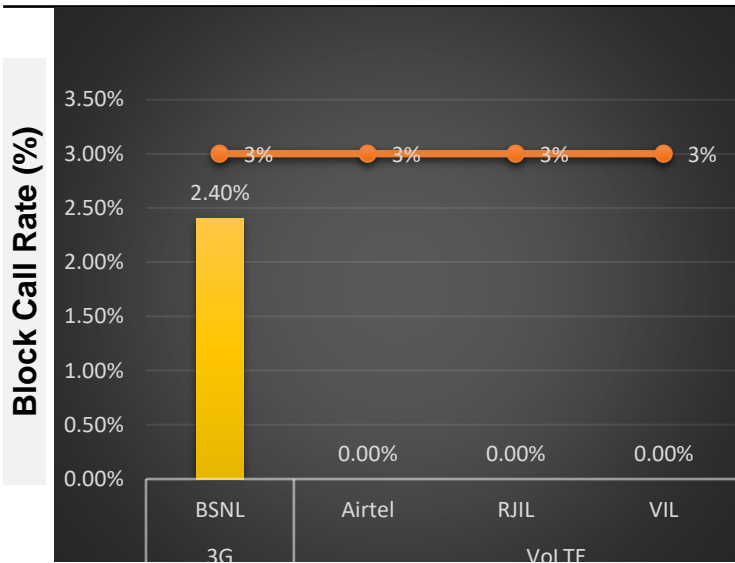
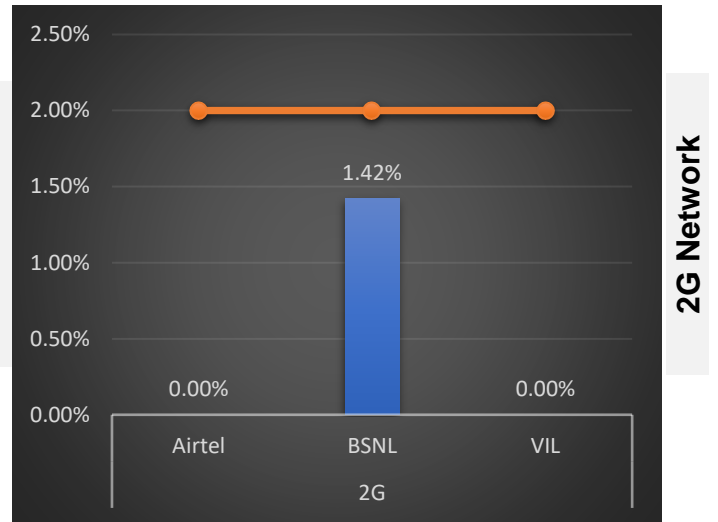
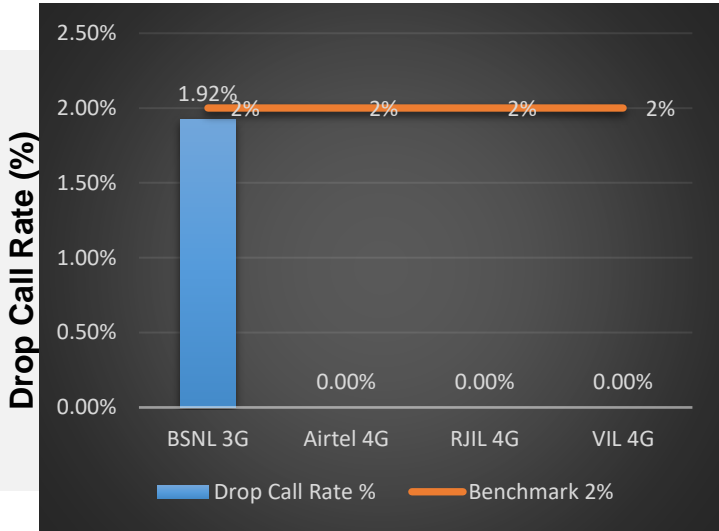
### Hotspot Locations

1. COP VENUE (Sagar Hotel)
2. Roadways Bus Stand
3. Tulsi Circle
4. Railway Station
5. SP Medical Collage Circle
6. Murti Circle JNV

# Voice Calls

## Key Observations

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



KPIs	2G			3G	4G		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0.00%	1.42%	0.00%	1.92%	0.00%	0.00%	0.00%
Block Call Rate %	0.00%	1.90%	2.35%	2.40%	0.00%	0.00%	0.00%

- 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 %	98.78%	91.45%	96.34%

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

TSPs	3G
	BSNL
Coverage %	77.89%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99.84%	99.94%	99.84%

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	34.12%	100.00%	100.00%	100.00%

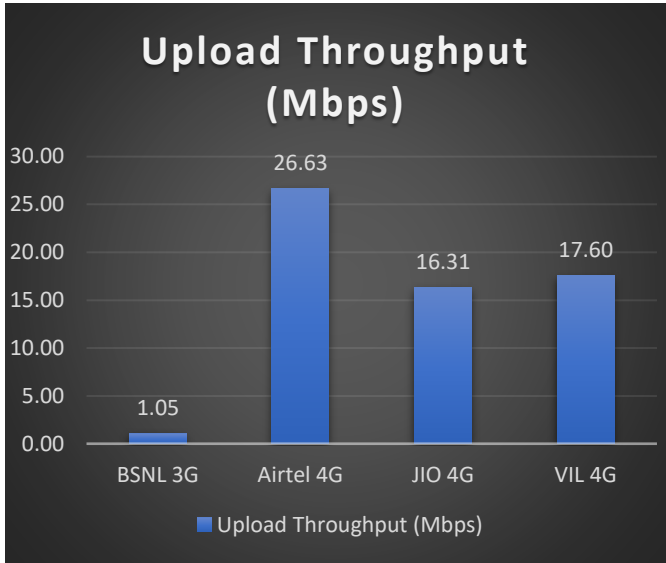
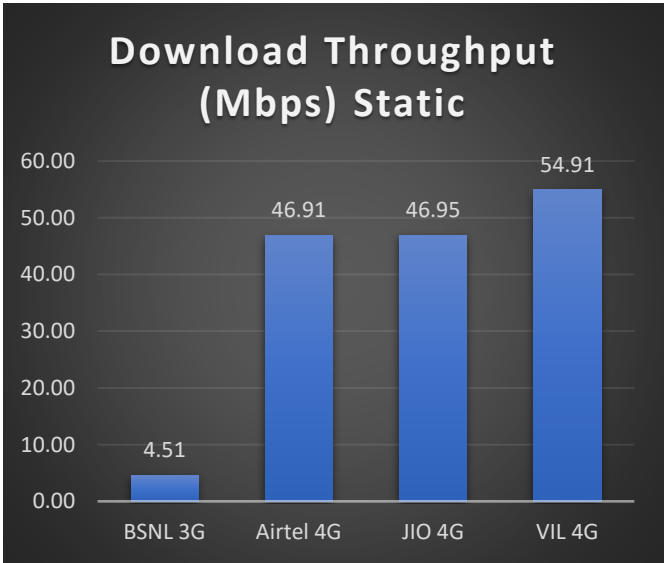
# Data Services Static

## Key Observations

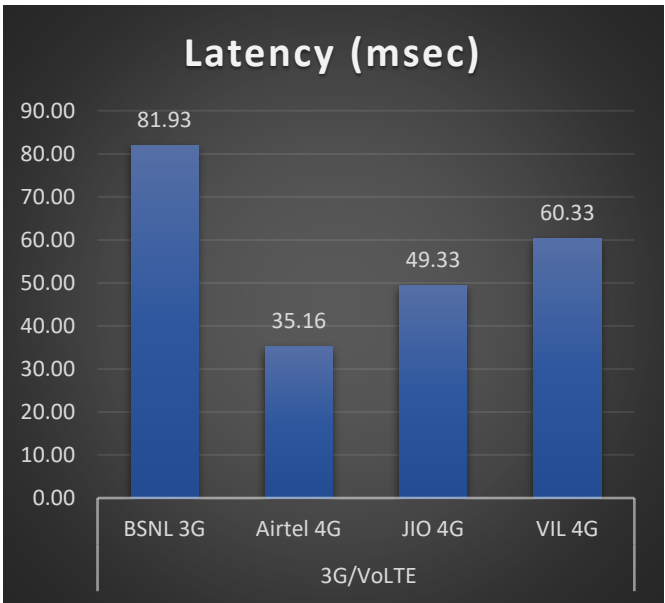
Data was tested at 6 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, Paytm)

### Data Download and Upload Performance Static (Mbps)

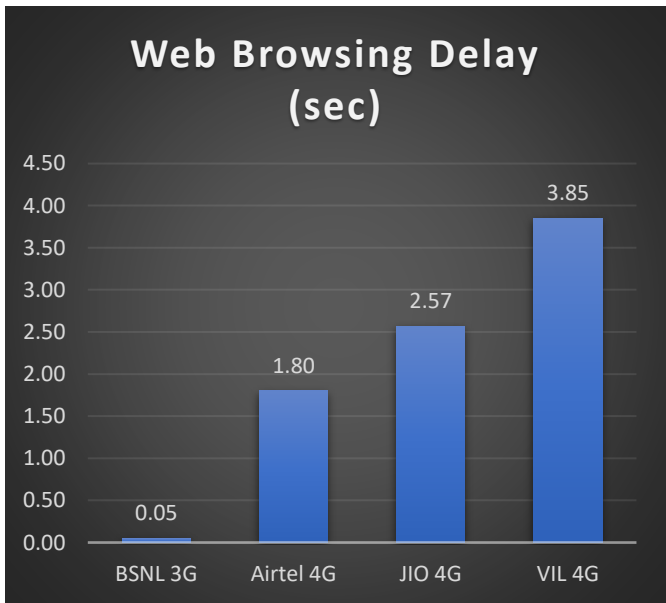
3G/4G/ Network:



### Latency (ms)



### Web Browsing (Sec)



# Data Services Dynamic

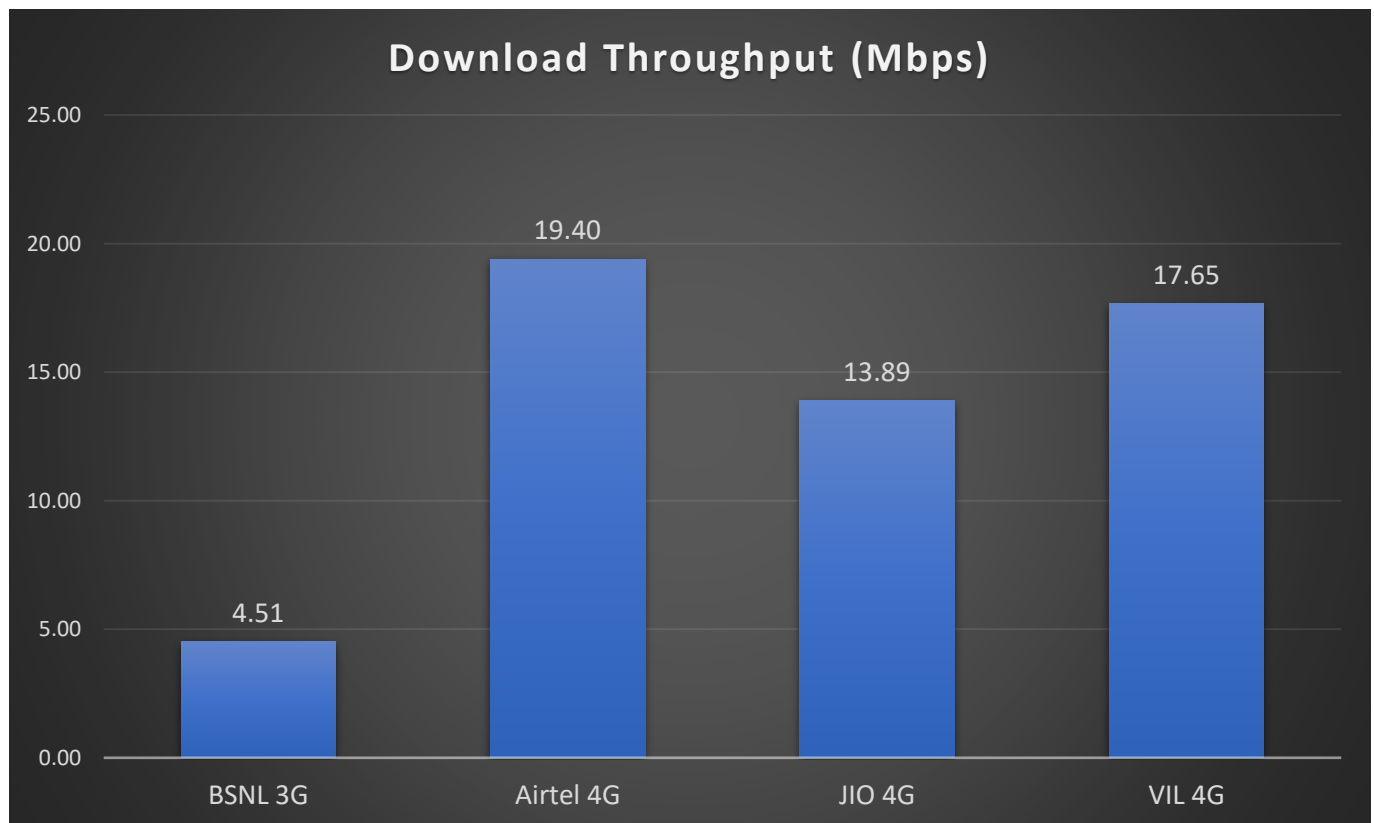
**Key Observations**

Dynamic Data was tested for whole voice route. Download Throughput was tested.

## Data Download Performance (kbps) - Dynamic

3G/4G/ Network:

Data Services Dynamic	3G/VoLTE			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	4.51	19.40	13.89	17.65





# Summary

## City Level Summary-Voice

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	197	210	213
Blocked Call Rate (%)	0.00%	1.90%	2.35%
CSSR% (Accessibility)	100.00%	98.10%	97.65%
Drop Call Rate (%)	0.00%	1.42%	0.00%
Mobility HOSR (%)	100.00%	98.45%	97.72%
Rx Quality (%)	97.04%	96.62%	95.45%
Average CST Sec	2.40	2.76	4.72

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	208	197	204	253
Blocked Call Rate (%)	2.40%	0.00%	0.00%	0.00%
CSSR% (Accessibility)	97.59%	100.00%	100.00%	100.00%
Drop Call Rate (%)	1.92%	0.00%	0.00%	0.00%
Mobility HOSR (%)	98.21%	100.00%	99.68%	100.00%
Rx Quality (%)	96.13%	97.74%	93.79%	95.76%
Average CST Sec	1.91	0.50	0.53	1.41

# Summary

## City Level Summary- Data Services

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	203.30	92.16	161.17
Upload Throughput (kbps)	200.00	10.24	66.00
Web Browsing Delay (sec)	12.48	0.13	28.56
Latency (msec)	206.33	154.26	157.00

Data Services Static	3G / 4G			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	4.51	46.91	46.95	54.91
Upload Throughput(Mbps)	1.05	26.63	16.31	17.60
Video Streaming Delay (sec)	3.40	0.30	0.59	0.49
Web Browsing Delay (sec)	0.05	1.80	2.57	3.85
Latency (msec)	81.93	35.16	49.33	60.33

<u>Sagar Hotel</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	210.00	90.72	153.00
Upload Throughput (kbps)	200.00	20.48	85.00
Web Browsing Delay (sec)	11.76	0.02	41.90
Latency (msec)	190.00	145.60	159.00

<u>Roadways Bus Stand</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	200.00	20.48	85.00
Upload Throughput (kbps)	210.00	20.01	84.00
Web Browsing Delay (sec)	13.04	0.03	24.12
Latency (msec)	160.00	175.00	132.00

<u>Tulsi Circle</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	200.00	92.16	160.00
Upload Throughput (kbps)	210.00	10.24	23.00
Web Browsing Delay (sec)	12.42	0.10	30.00
Latency (msec)	240.00	189.00	185.00

<u>Railway Station</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	190.00	40.96	171.00
Upload Throughput (kbps)	180.00	10.24	14.00
Web Browsing Delay (sec)	12.86	0.33	22.33
Latency (msec)	148.00	145.00	129.00

<u>SP Medical College Circle</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	210.00	31.72	149.00
Upload Throughput (kbps)	200.00	21.48	73.00
Web Browsing Delay (sec)	12.18	0.17	31.00
Latency (msec)	248.00	136.00	198.00

<u>Murti Circle JNV</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	210.00	194.56	249.00
Upload Throughput (kbps)	200.00	112.64	117.00
Web Browsing Delay (sec)	12.66	111.00	22.00
Latency (msec)	252.00	135.00	139.00

# Data Services static

City Level Summary(contd.)

<u>Sagar Hotel</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	<b>3.30</b>	<b>62.38</b>	<b>60.61</b>	<b>57.48</b>
Upload Throughput (mbps)	<b>2.17</b>	<b>17.73</b>	<b>18.30</b>	<b>9.56</b>
Video Streaming Delay ( Secs.)	<b>3.37</b>	<b>0.34</b>	<b>0.61</b>	<b>1.06</b>
Web Browsing Delay (sec)	<b>0.01</b>	<b>1.00</b>	<b>2.81</b>	<b>4.32</b>
Latency (msec)	<b>78.30</b>	<b>32.00</b>	<b>34.00</b>	<b>52.00</b>

<u>Roadways Bus Stand</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	<b>4.51</b>	<b>42.12</b>	<b>71.25</b>	<b>59.55</b>
Upload Throughput (mbps)	<b>1.05</b>	<b>11.25</b>	<b>19.69</b>	<b>21.50</b>
Video Streaming Delay ( Secs.)	<b>3.18</b>	<b>0.26</b>	<b>0.59</b>	<b>0.41</b>
Web Browsing Delay (sec)	<b>0.05</b>	<b>1.80</b>	<b>1.87</b>	<b>3.91</b>
Latency (msec)	<b>69.00</b>	<b>34.00</b>	<b>60.00</b>	<b>62.00</b>

<u>Tulsi Circle</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	<b>2.43</b>	<b>43.69</b>	<b>40.07</b>	<b>47.17</b>
Upload Throughput (mbps)	<b>2.24</b>	<b>48.52</b>	<b>11.67</b>	<b>20.69</b>
Video Streaming Delay ( Secs.)	<b>3.62</b>	<b>0.34</b>	<b>0.59</b>	<b>0.40</b>
Web Browsing Delay (sec)	<b>0.07</b>	<b>1.00</b>	<b>2.01</b>	<b>3.70</b>
Latency (msec)	<b>79.30</b>	<b>36.00</b>	<b>43.00</b>	<b>61.00</b>

# Data Services static

<u>Railway Station</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	2.37	39.88	22.23	64.23
Upload Throughput (mbps)	2.26	14.84	18.53	10.88
Video Streaming Delay ( Secs.)	3.64	0.42	0.59	0.43
Web Browsing Delay (sec)	0.08	2.00	3.26	3.60
Latency (msec)	132.00	39.00	39.00	63.00

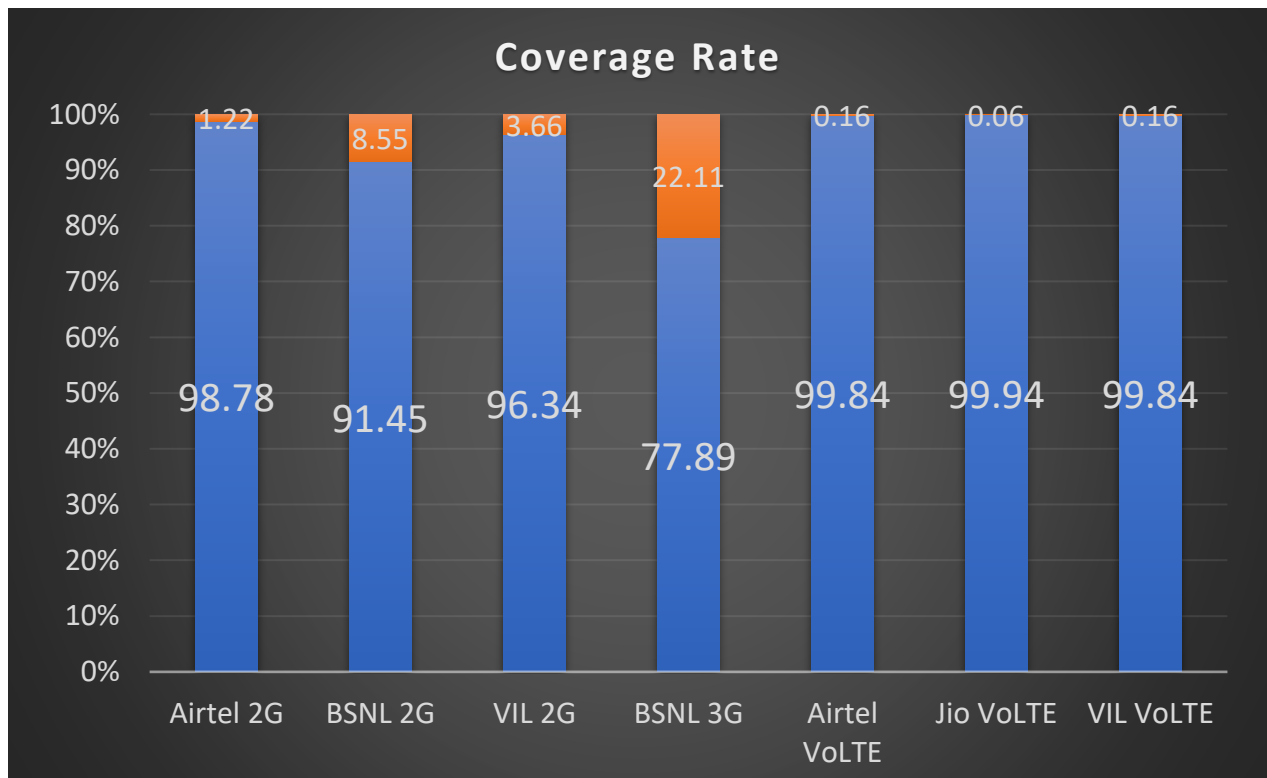
<u>SP Medical College Circle</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	2.11	43.62	56.15	35.47
Upload Throughput (mbps)	2.08	25.85	11.19	13.26
Video Streaming Delay ( Secs.)	4.05	0.13	0.60	0.30
Web Browsing Delay (sec)	0.08	3.00	2.55	3.79
Latency (msec)	64.00	30.00	64.00	62.00

<u>Murti Circle JNV</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	3.21	49.82	31.39	65.59
Upload Throughput (mbps)	2.05	41.62	18.48	24.77
Video Streaming Delay ( Secs.)	3.68	0.34	0.57	0.35
Web Browsing Delay (sec)	0.04	2.00	2.92	3.76
Latency (msec)	69.00	40.00	56.00	62.00

## 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.

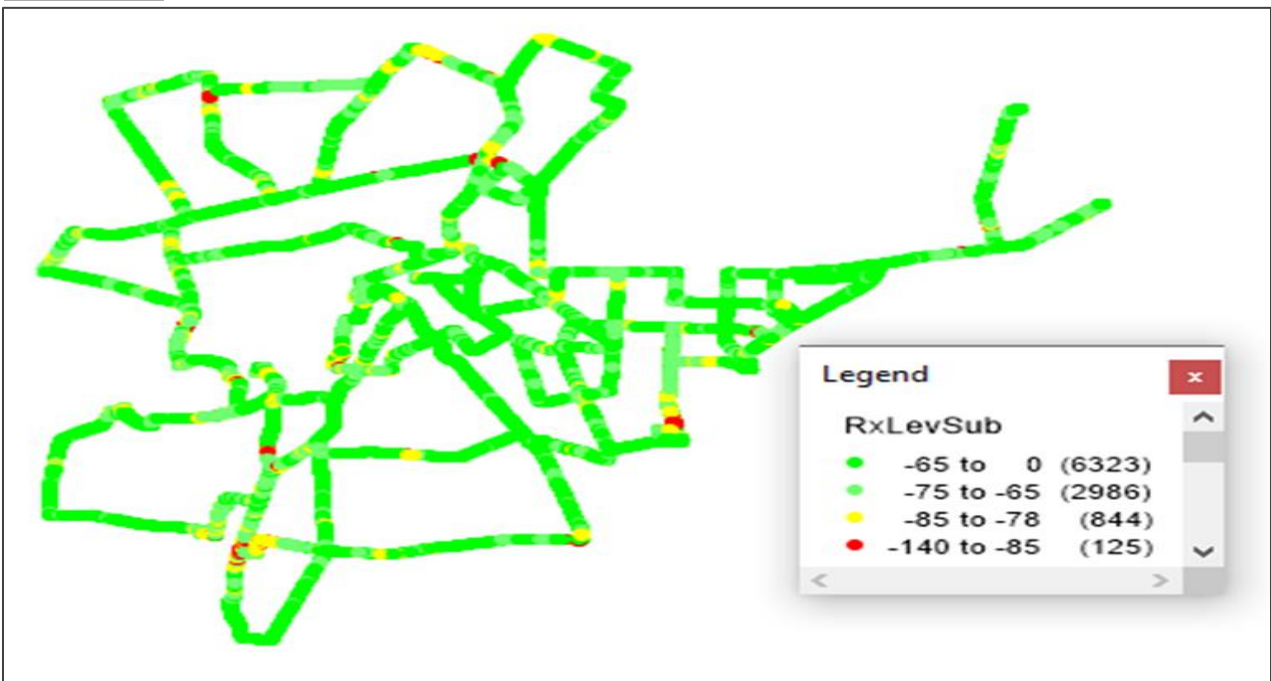
<u>TSP</u>	<u>Coverage Rate %</u>
Airtel 2G	<b>98.78%</b>
BSNL 2G	<b>91.45%</b>
VIL 2G	<b>96.34%</b>
BSNL 3G	<b>77.89%</b>
Airtel VoLTE	<b>99.84%</b>
Jio VoLTE	<b>99.94%</b>
VIL VoLTE	<b>99.84%</b>



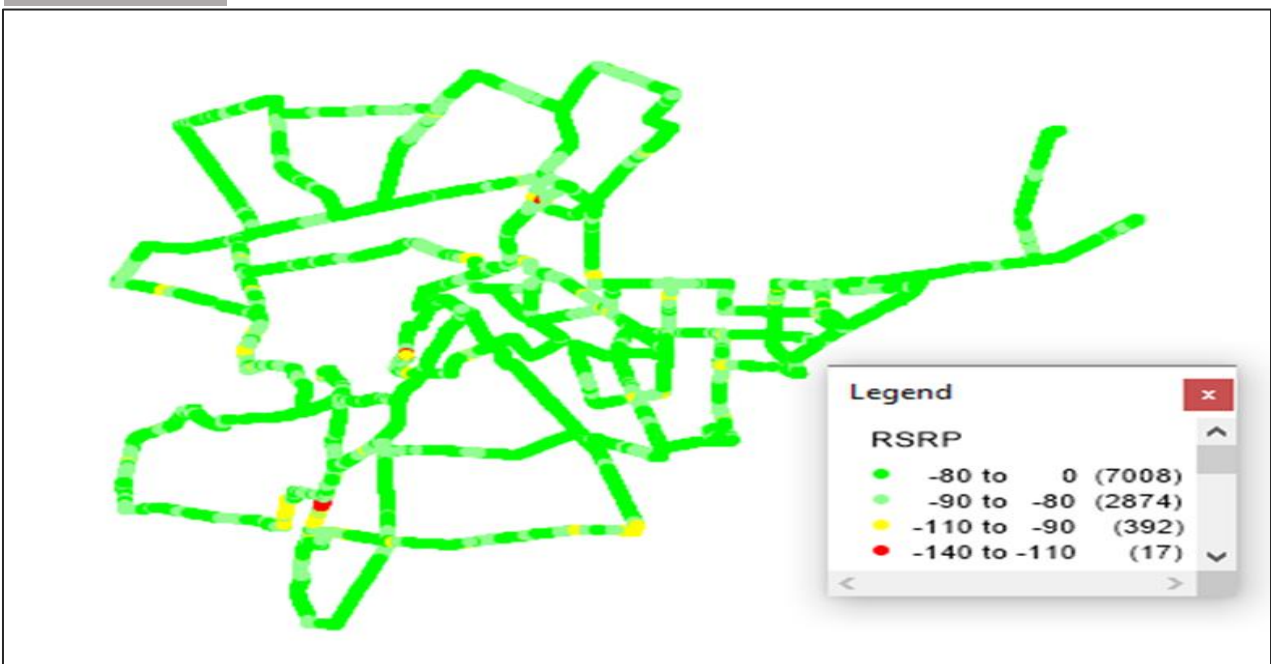
TSP-AIRTEL

Technology	Coverage %
2G	98.78%
VoLTE	99.84%

2G



VoLTE

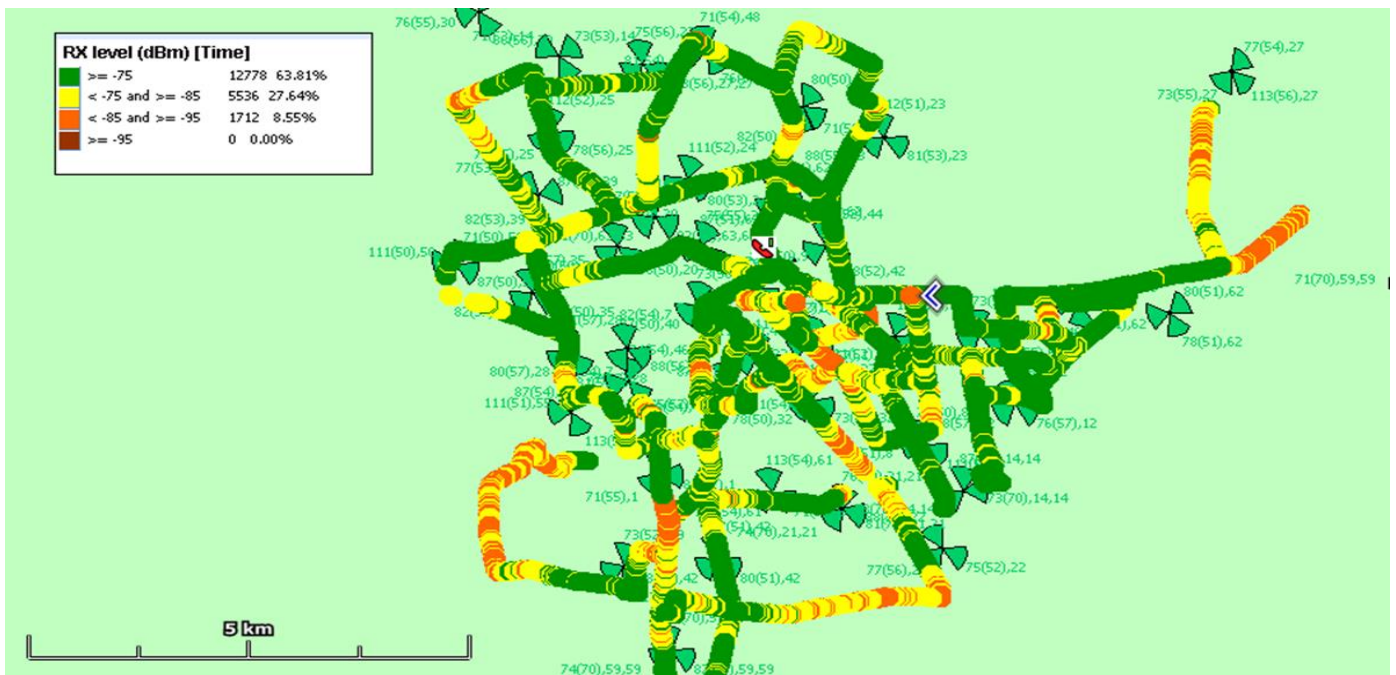




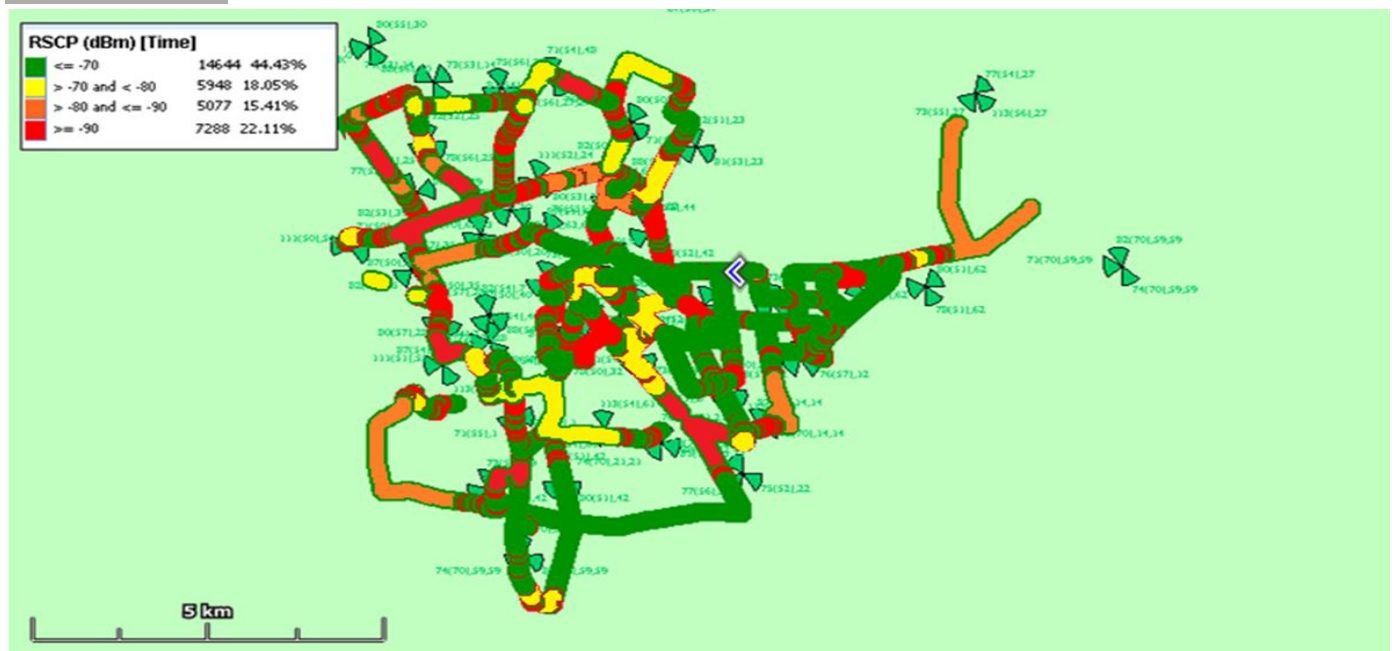
## TSP- BSNL

Technology	Coverage %
2G	<b>91.45%</b>
3G	<b>77.89%</b>

2G

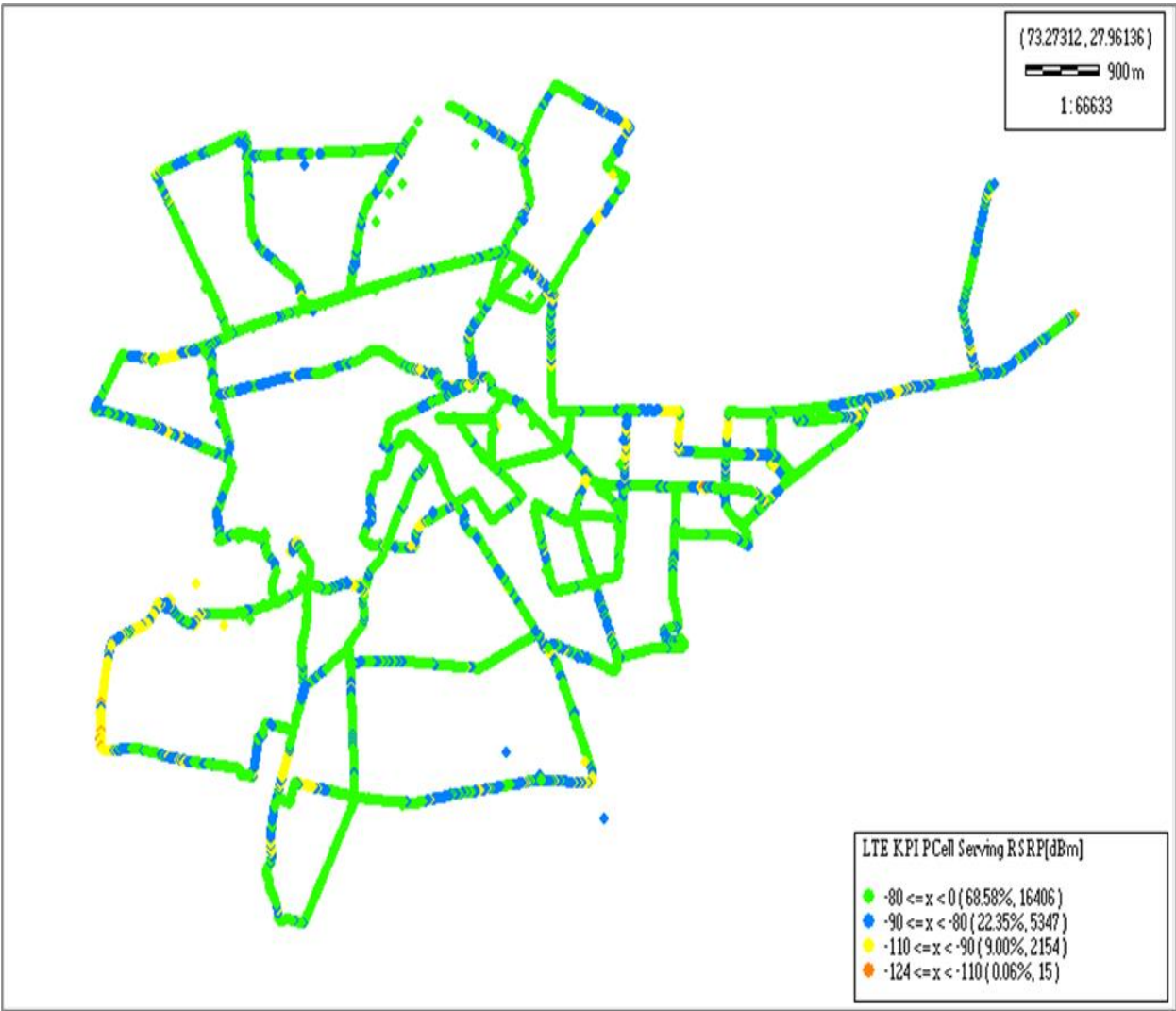


3G



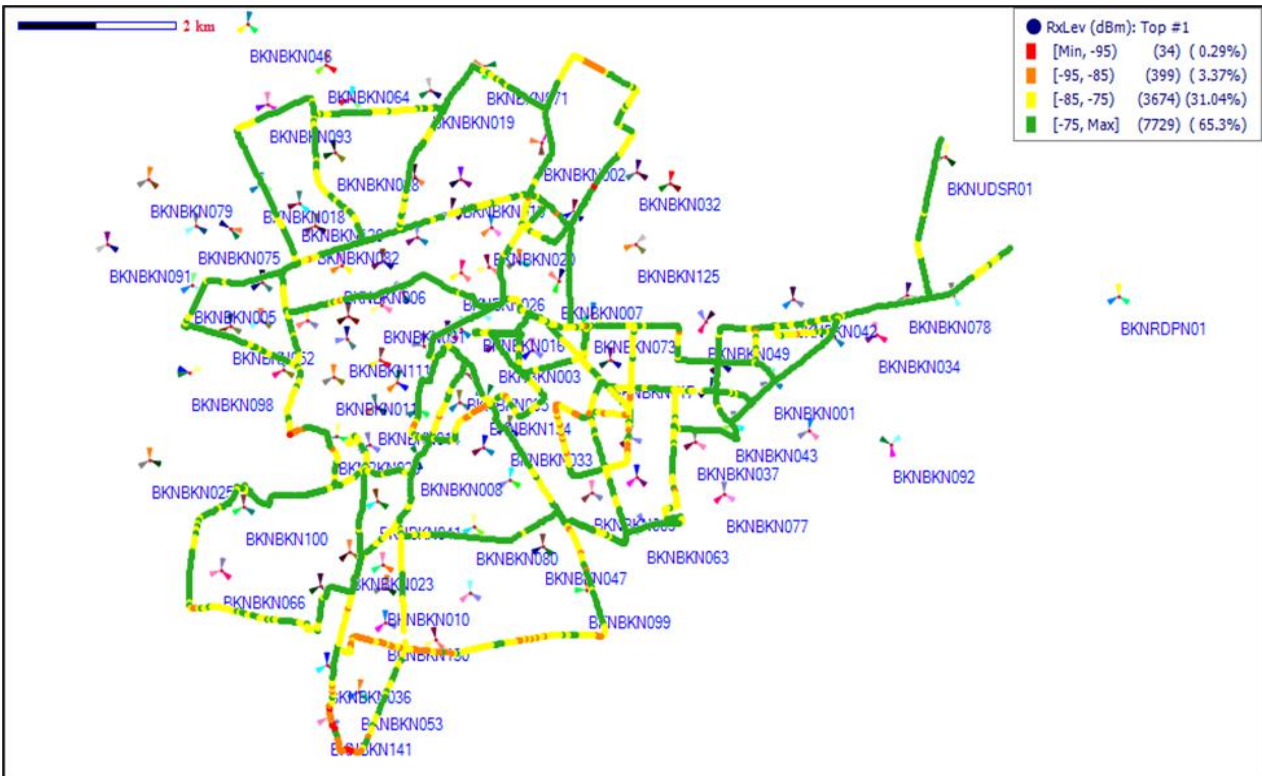
JIO

Technology	Coverage %
VoLTE	99.94%

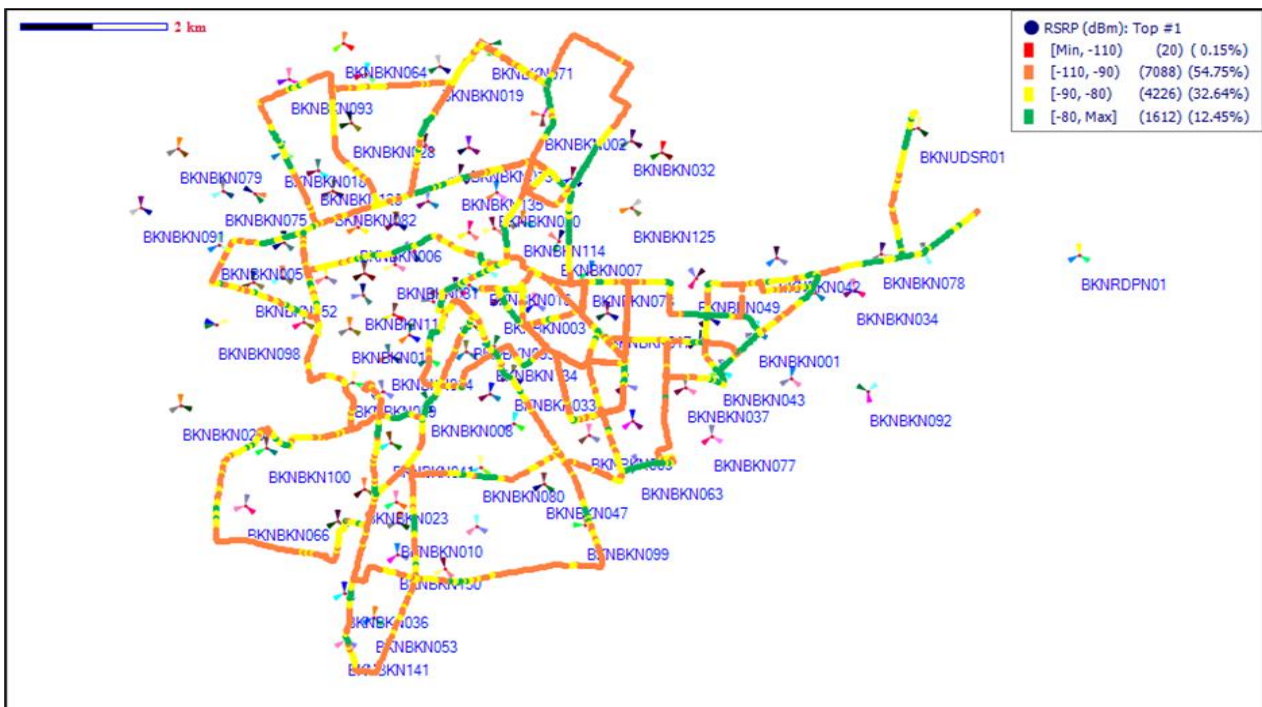


## VIL

	Technology	Coverage Rate %
	2G	<b>96.34%</b>
<b>2G</b>	VoLTE	<b>99.84%</b>



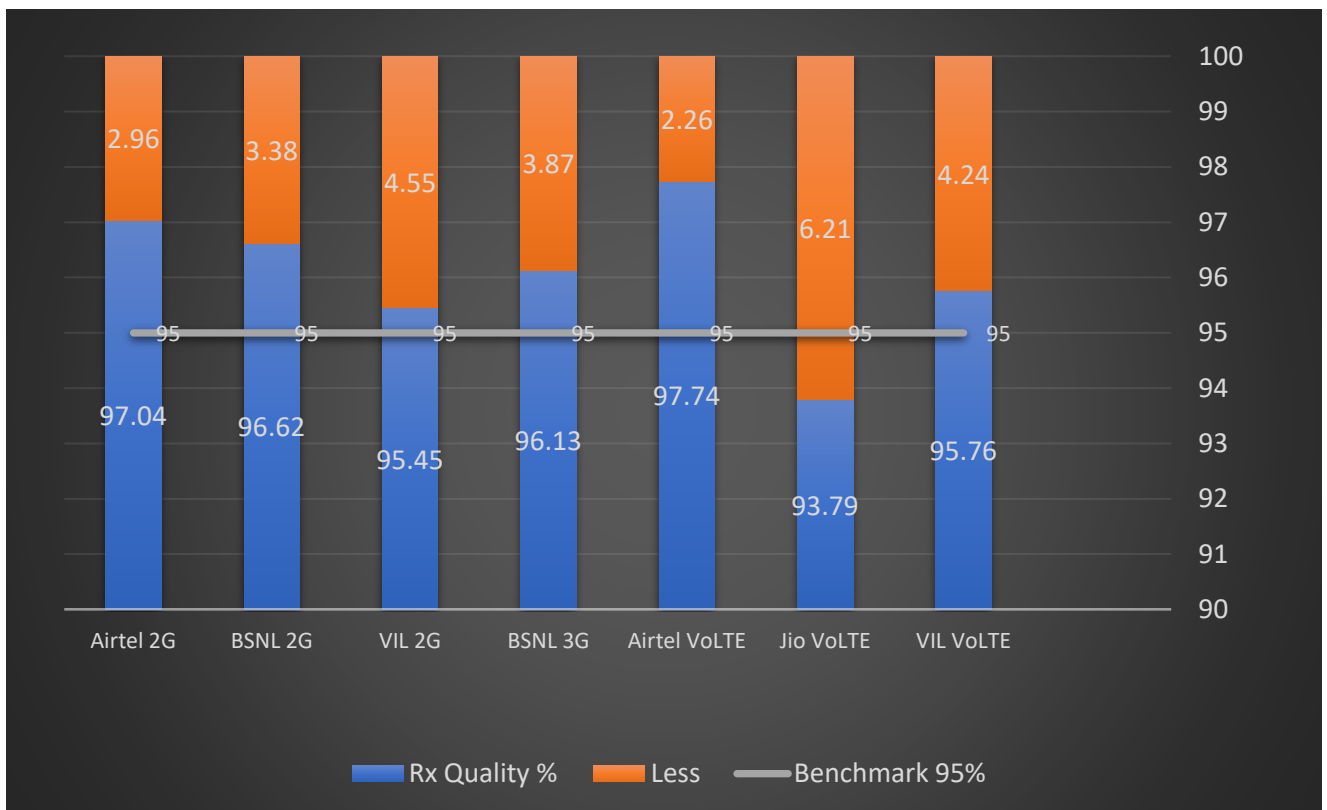
## VoLTE



## 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	97.04%
BSNL 2G	96.62%
VIL 2G	95.45%
BSNL 3G	96.13%
Airtel VoLTE	97.74%
Jio VoLTE	93.79%
VIL VoLTE	95.76%

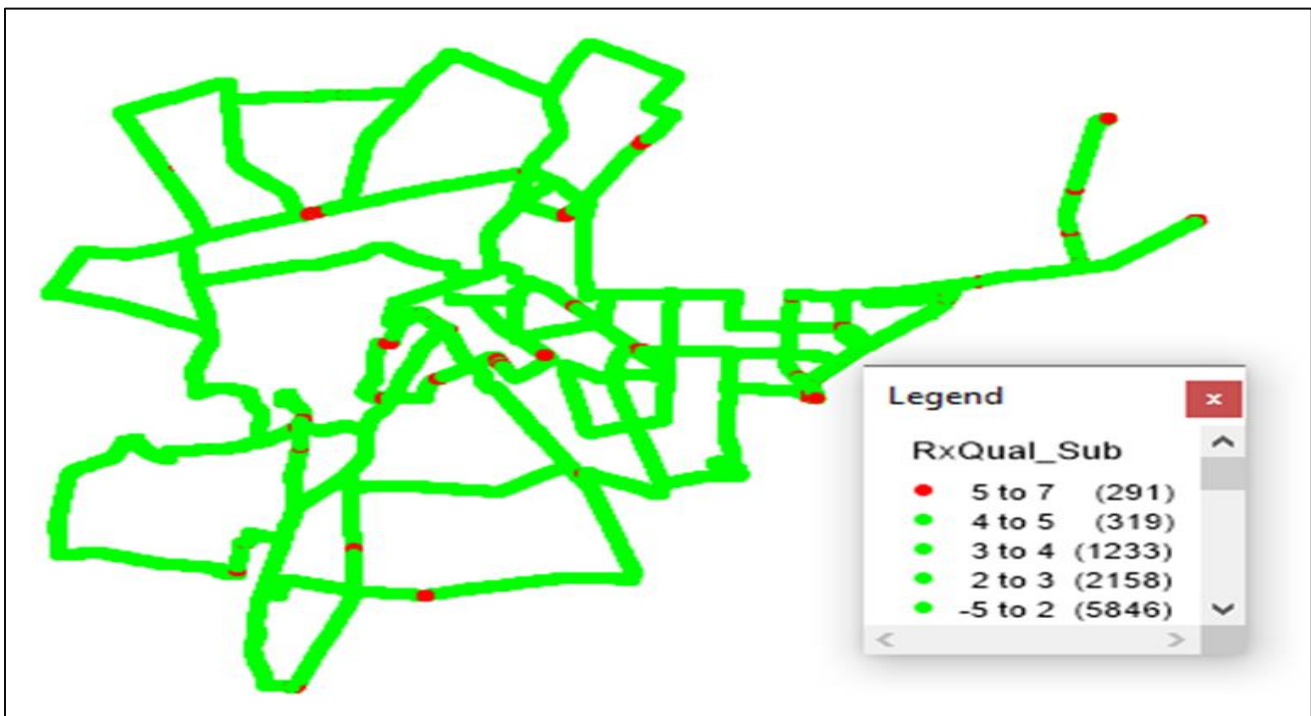


## II. Quality Details

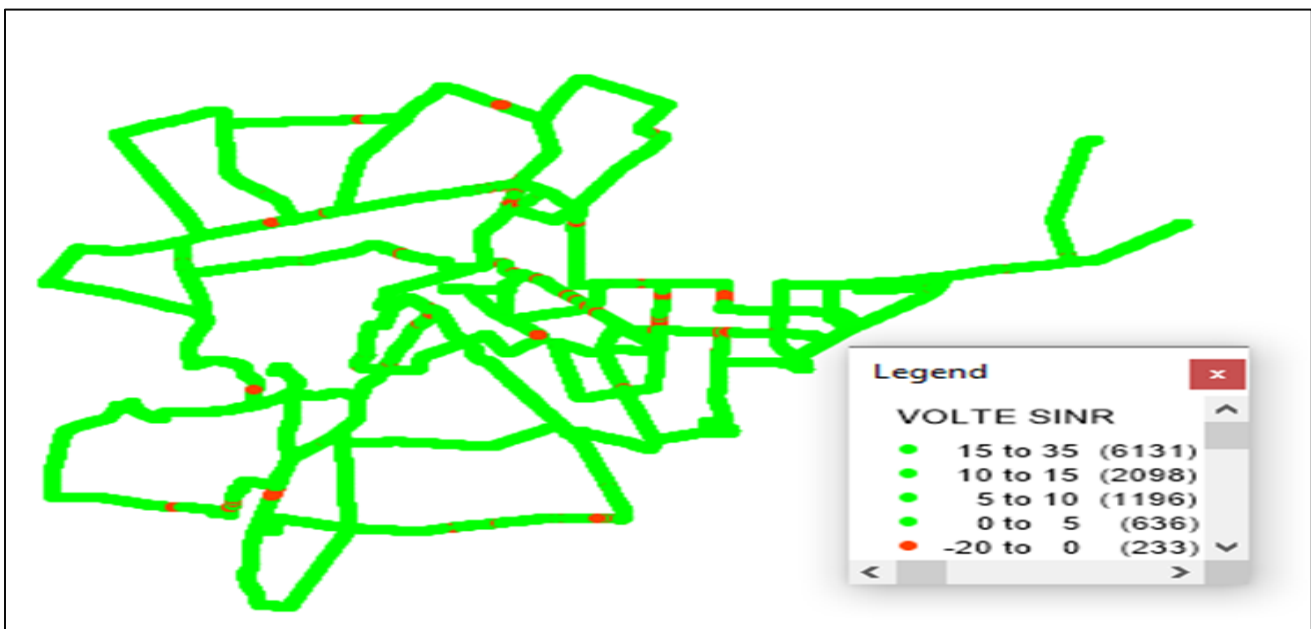
### Airtel

Technology	Rx Quality %
2G	97.04%
VoLTE	97.74%

2G



VoLTE



## II. Quality Details

### BSNL

Technology	Rx Quality %
	2G
3G	<b>96.13%</b>

2G



3G

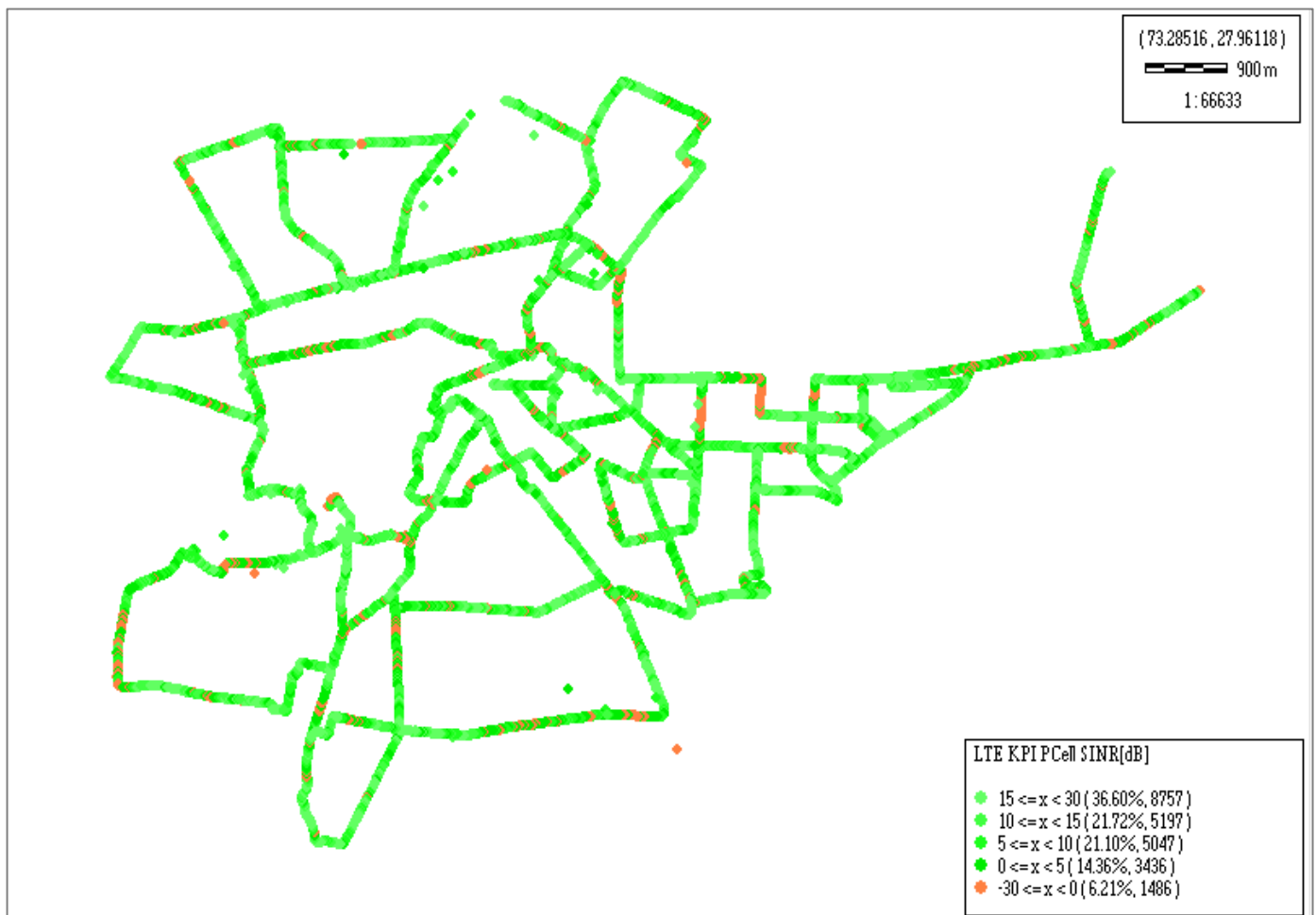


# Quality Details

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## JIO

Technology	Rx Quality %
VoLTE	<b>93.79%</b>

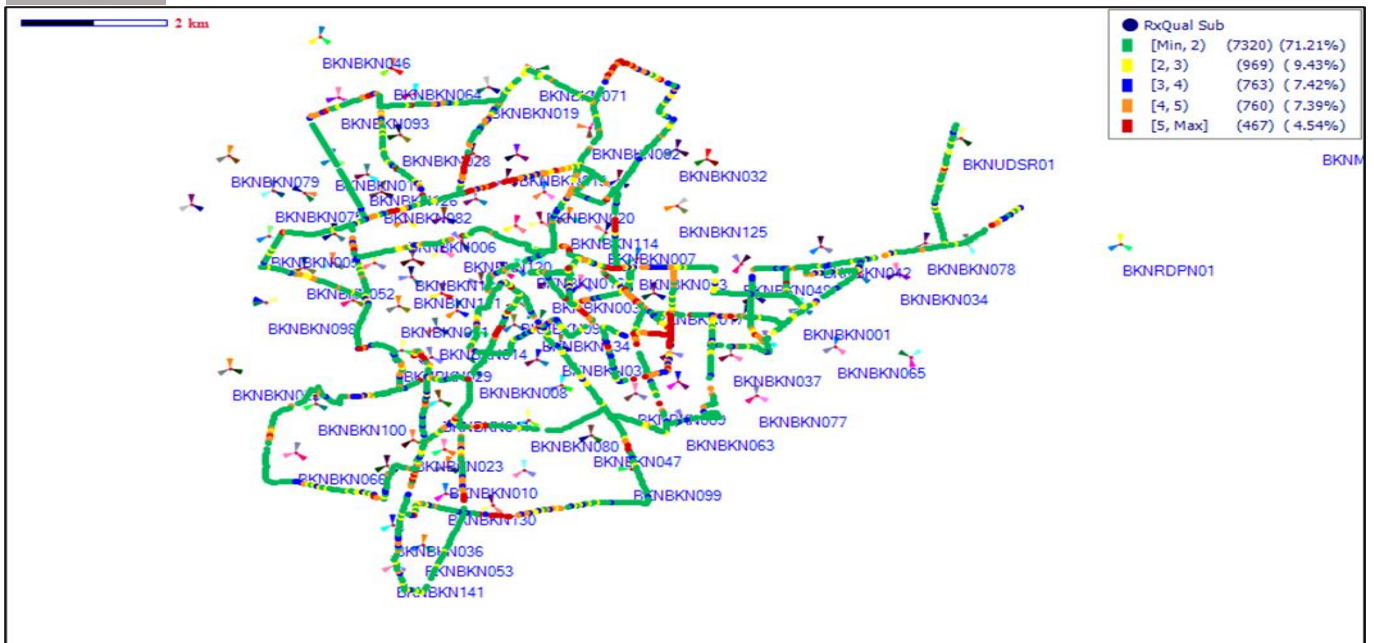


## II. Quality Details

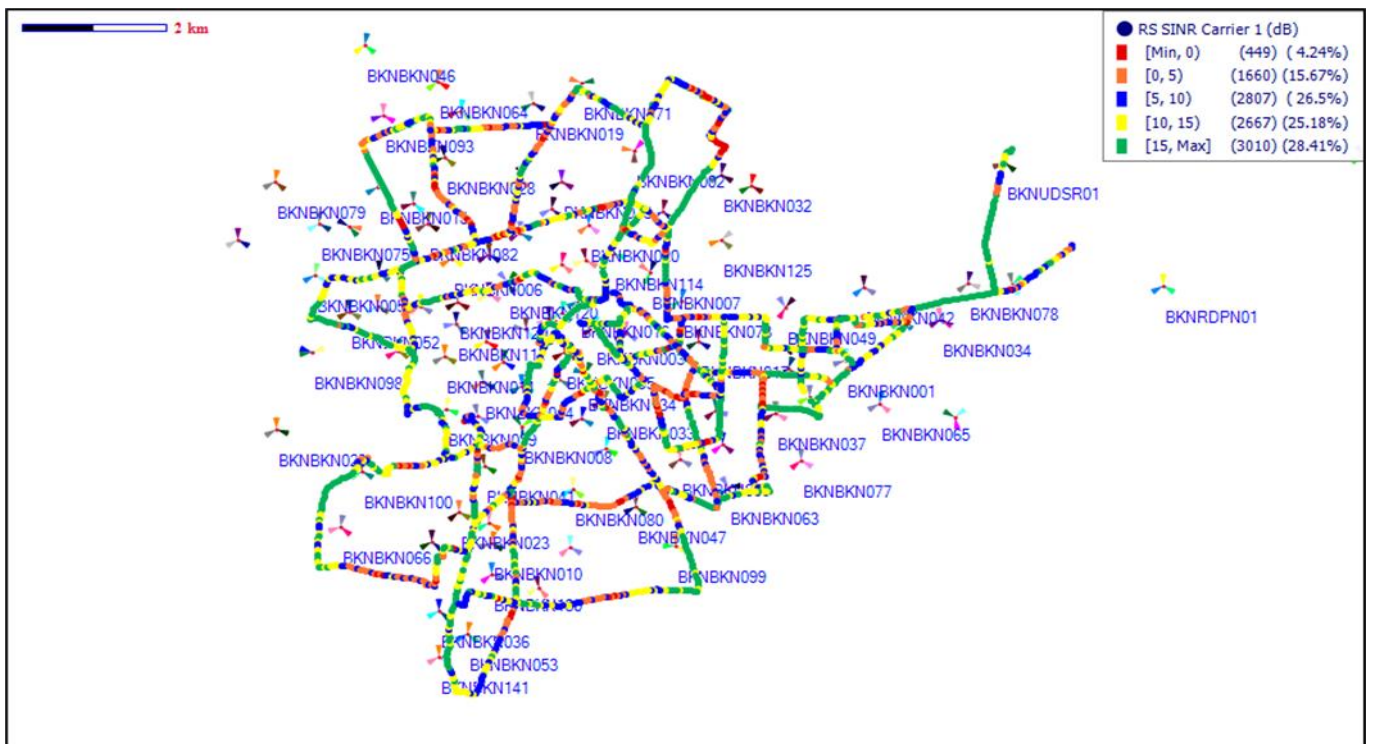
### VIL

Technology	Rx Quality %
2G	<b>95.45%</b>
4G	<b>95.76%</b>

2G



VoLTE





### III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	34.12
Airtel VoLTE	100.00
Jio VoLTE	100.00
VIL VoLTE	100.00

