



# Operator Assisted Drive Test Report

## Jaipur City

13<sup>th</sup> to 15<sup>th</sup> Feb'2024

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 Jaipur City and Hotspot from 09:00 AM to 8:00 PM on 13<sup>th</sup> to 15<sup>th</sup> Feb'2024. The drive test covered drive route of 250 KMs & 5 no hotspots over a period of 3 day. Approximately 377 calls were made for each of the 7 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 on 13<sup>th</sup> to 15<sup>th</sup> Feb'2024 covering Jaipur city. 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,  
**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 250 KMs. Approximately 377 calls were made for each of the Jio 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 250 kms for download throughput in all technologies.  
2G – measurement – UE Locked in 2G file size- 500KB

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

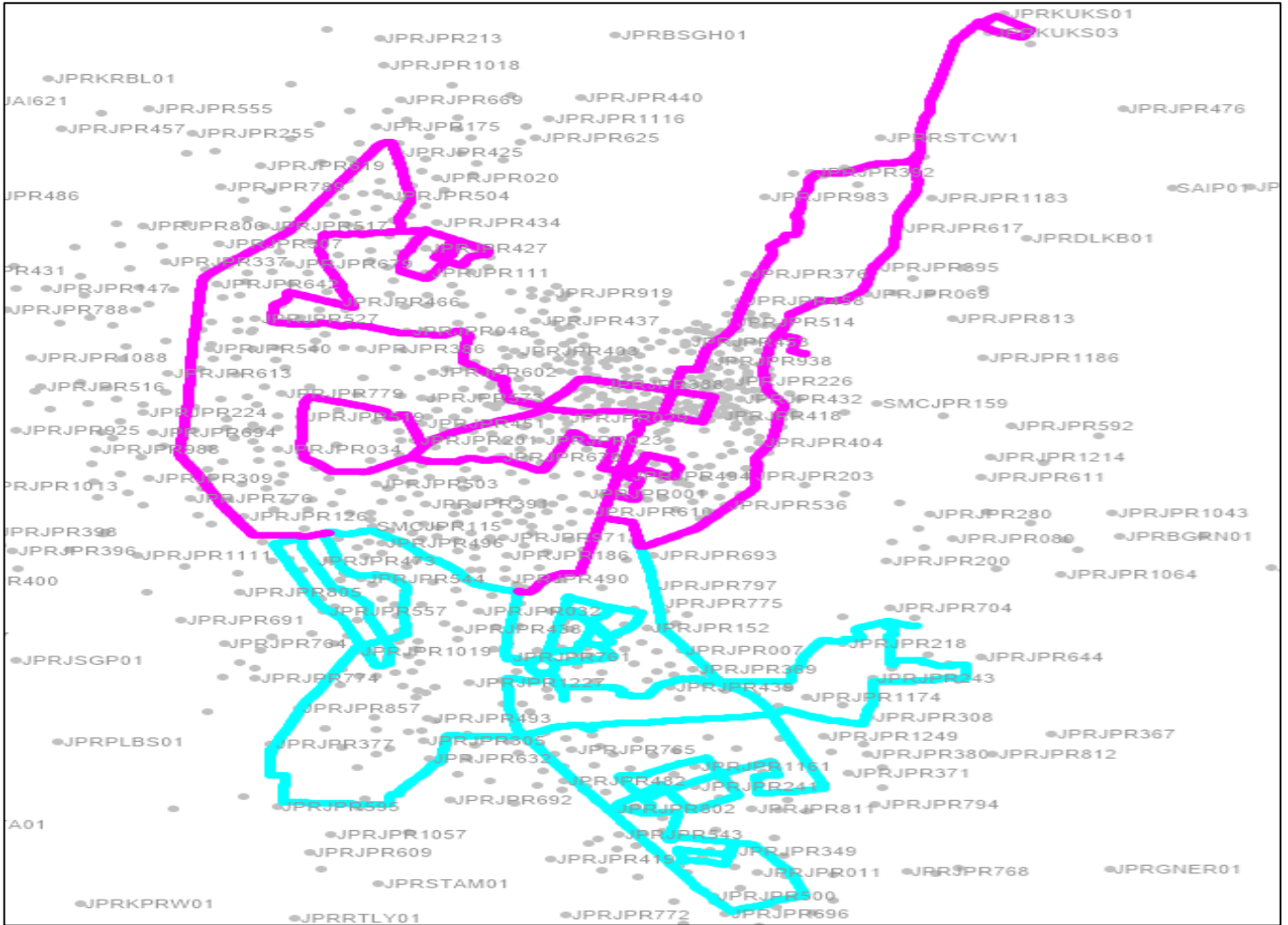
4G – measurement – UE in LTE File Size- 40MB

## Static data tests on 5 hotspots

1. Sindhi Camp Bus Stand, Jaipur
2. JK Lone Hospital, Jaipur
3. Gandhi Nagar Railway Station, Jaipur
4. Jaipuria Hospital, Jaipur
5. WTP, Jaipur

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

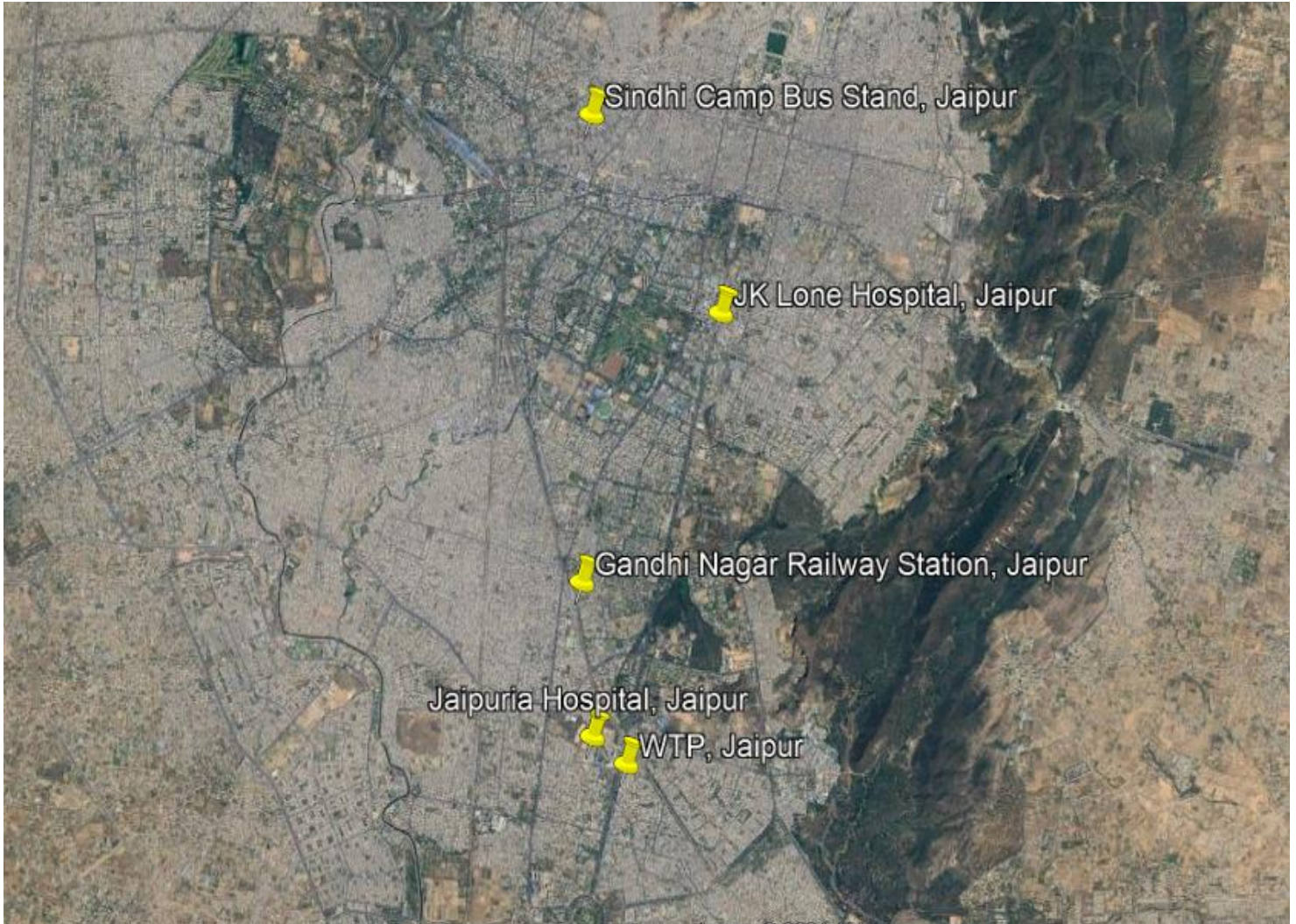
## Voice & Dynamic Data Test Drive Route



Date	Test Scenario	Area to be Covered
13-Feb-24	2G/3G/4G Voice and 3G/4G Dynamic Data	Starting point:TRAI Office,Apex Circle, JNU,Khatipura Railway Station, Bombay Hospital, Cheelgadi Restaurant, Sanganer Thana,RUHS Pratap nagar,MGH Hospital, chokhi Dhani, Muhana mandi, Metro MAS Hospital,New Atish Market,Gopalpura Bypass , JLN, Airport, Jagatpura kachchi Basti, Malviya nagar,Gandhi nagar,Rambagh circle, Ambedkar circle, Vidhan Sabha, sahakarmarg, 22 Godam,cicil Lines, Sodala, Gurjar Ki thadi.
14-Feb-24	2G/3G/4G Voice and 3G/4G Dynamic Data	TRAI office,High court,jaipur junction,chandpole , sindhi camp, MI Road, Johri Bazar,Subhash chowk,Jalmahal, Amber,Delhi Road, Kukas,khole ke hanuman ji,Transport Nagar,Rajapark,Jhalana, Bhaskar flyover, Kisan dharma kanta,200 Feet bypass, Chitrakoot stadium, Vaishali nagar, Jhotwara,harmara, Khirmi Fatak,vidhyadhar Nagar, VKI,Shastri Nagar,C-Scheme, moti Dungi.
15-Feb-24	Hot Spots- 2G/3G/4G Static Data Tests	Static Hotspot – 1) Sindhi Camp Bus Stand, 2) JK Lone Hospital, 3) Gandhi Nagar Railway Station, 4) Jaipuria Hospital, 5) WTP.

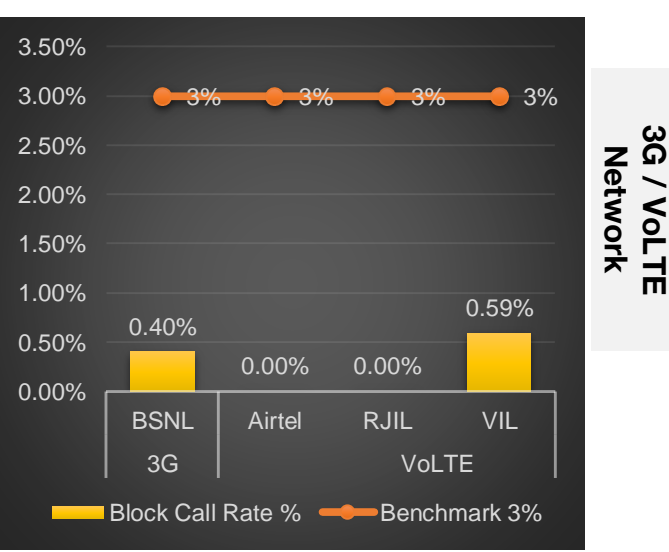
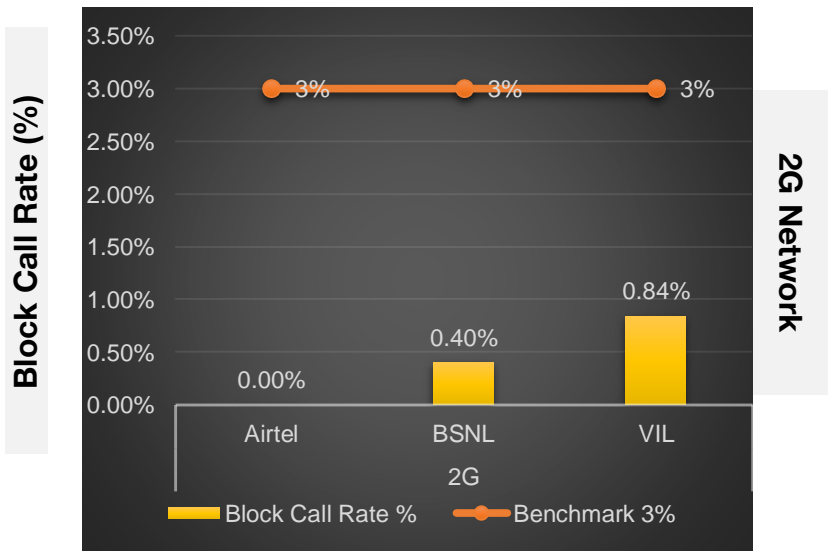
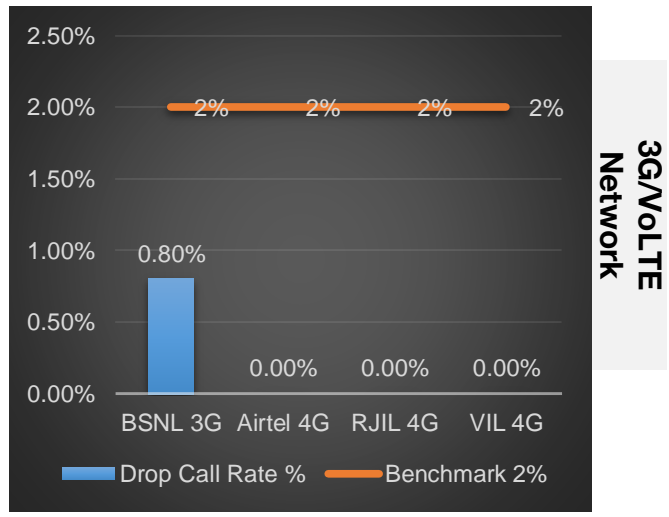
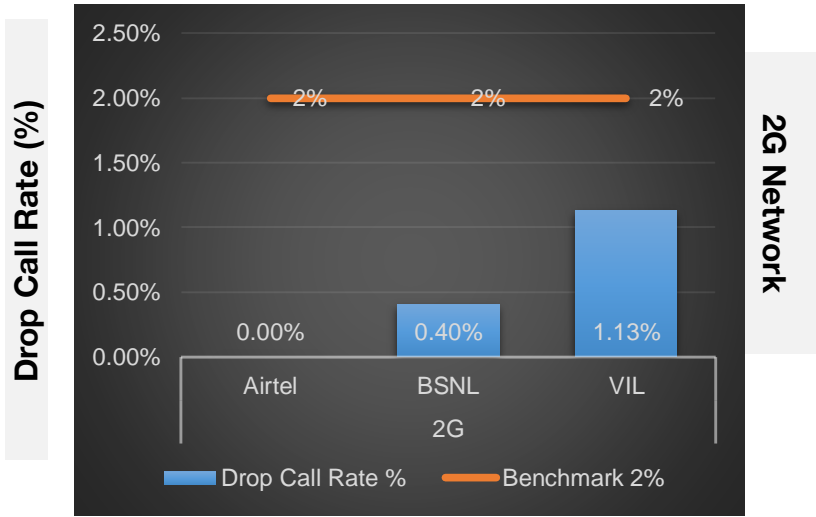
# Overview

## Data Service Test - Static Locations



<b>Hotspot Locations</b>
<b>1.Sindhi Camp Bus Stand, Jaipur</b>
<b>2.JK Lone Hospital, Jaipur</b>
<b>3.Gandhi Nagar Railway Station, Jaipur</b>
<b>4.Jaipuria Hospital, Jaipur</b>
<b>5.WTP, Jaipur</b>

### QoS compliance of the TSPs in Jaipur City & Nearby area for Voice across technologies 2G/3G/4G-VoLTE:



KPIs	2G			3G	4G		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0.00%	0.40%	1.13%	0.80%	0.00%	0.00%	0%
Block Call Rate %	0.00%	0.40%	0.84%	0.40%	0.00%	0.00%	0.59%

- 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 %	93.45%	95.74%	90.37%

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

TSPs	3G
	BSNL
Coverage %	95.1%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99.74%	99.82%	98.82%

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	42.25%	100%	100%	100%

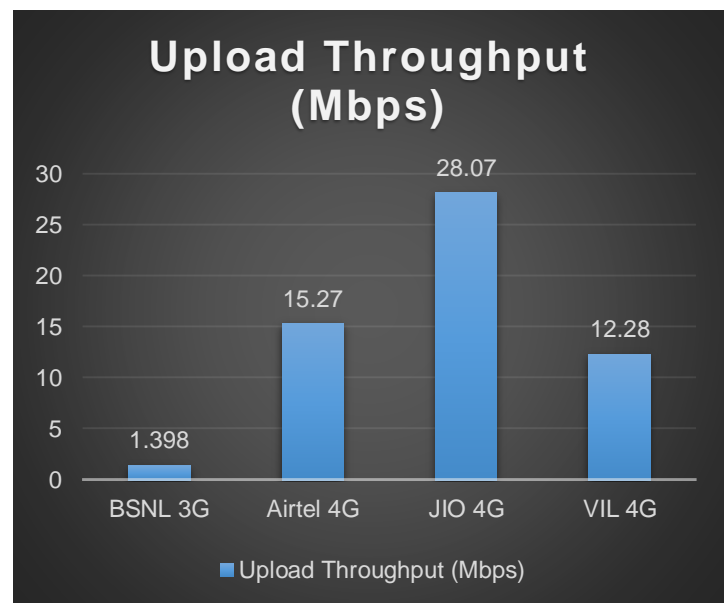
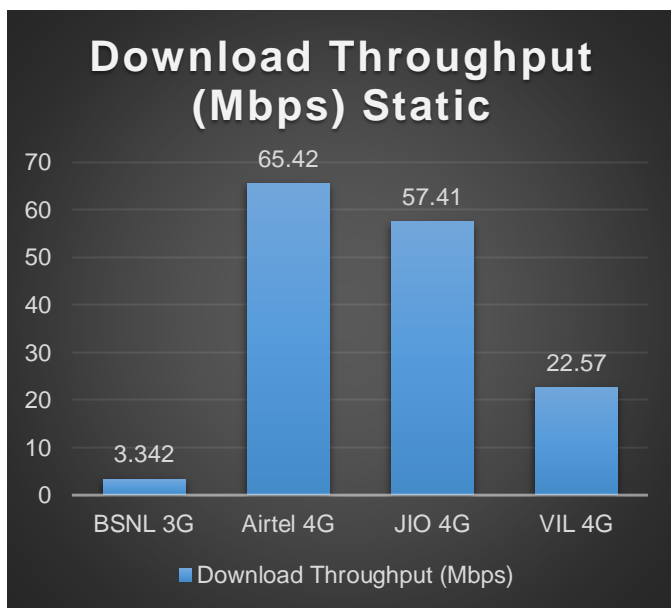
# Data Services Static

## Key Observations

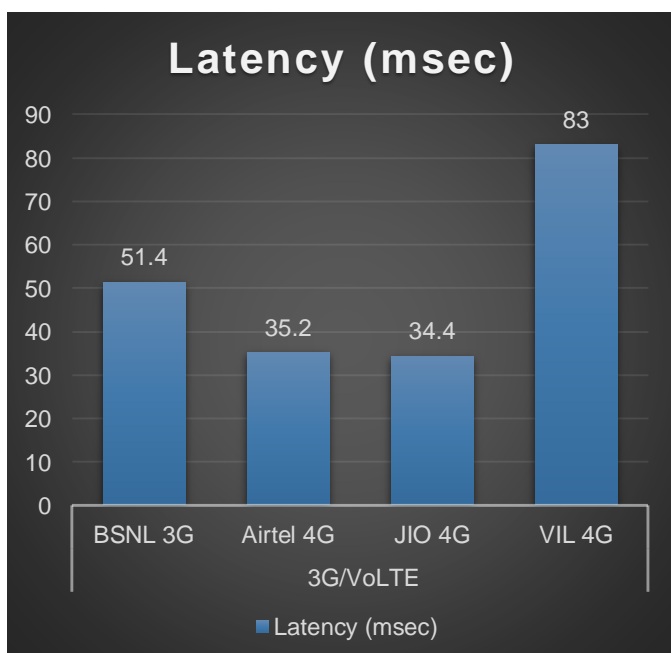
Data was tested at 5 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, Paytm)

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

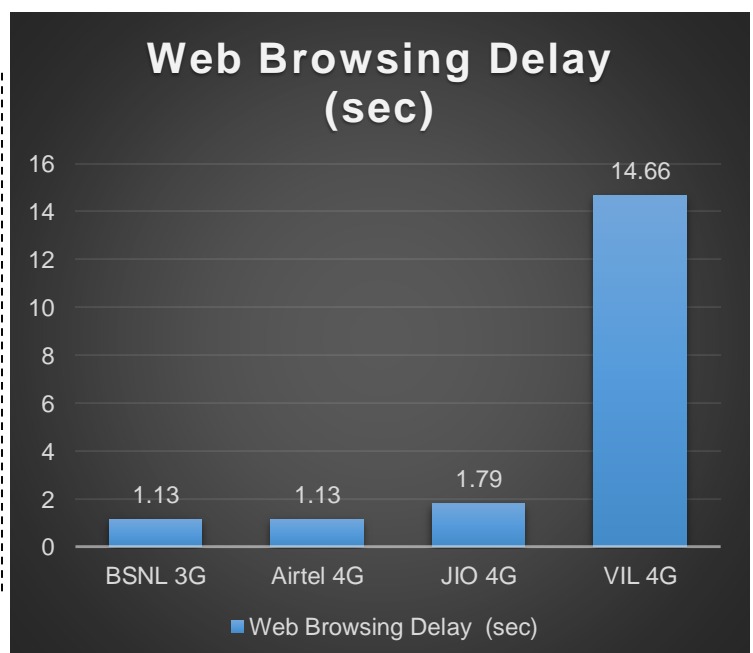
#### 3G/4G/ Network:



#### Latency (ms)



#### Web Browsing (Sec)



# Data Services Dynamic

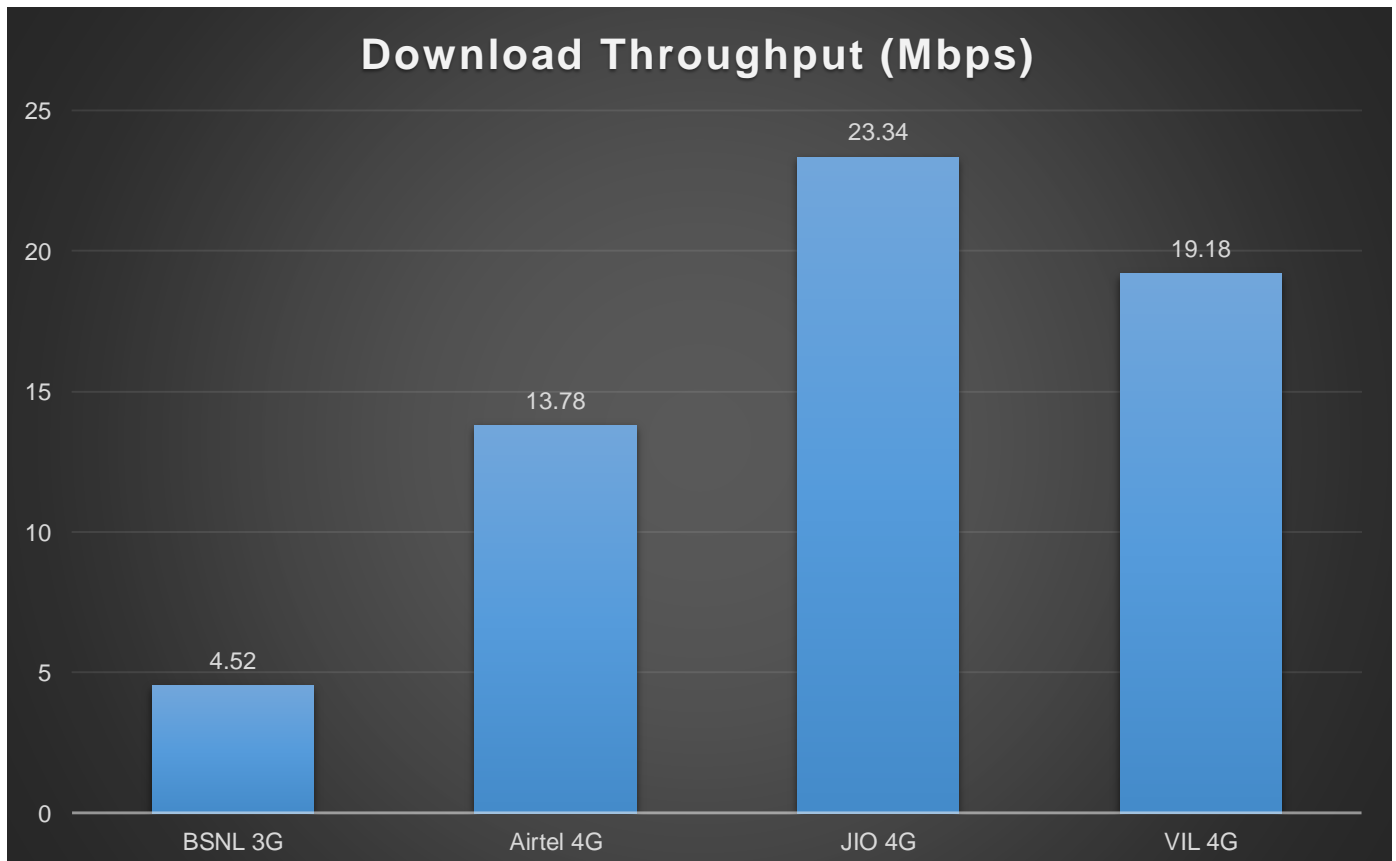
**Key Observations**

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)	4.52	13.78	23.34	19.18





# Summary

## City Level Summary-Voice

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	377	349	358
Blocked Call Rate (%)	0%	0.40%	0.84%
CSSR% (Accessibility)	100	99.60%	99.16
Drop Call Rate (%)	0%	0.40%	1.13%
Mobility HOSR (%)	100%	98.66%	95.1%
Rx Quality (%)	95.37%	96.04%	93.87%
Average CST Sec	2.6	3.09	3.16

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	350	377	377	340
Blocked Call Rate (%)	0.80%	0%	0%	0.59%
CSSR% (Accessibility)	99.20%	100	100	99.41
Drop Call Rate (%)	0.40%	0%	0%	0%
Mobility HOSR (%)	100%	100	99.72	100
Rx Quality (%)	97.78%	94.26%	93.46%	95.67%
Average CST Sec	2.9	0.2	0.61	1.06

# Summary

## City Level Summary- Data Services

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	232	124.20	133.58
Upload Throughput (kbps)	272	62.00	77.76
Web Browsing Delay (sec)	11.25	1.90	34.32
Latency (msec)	228.4	Not reported	363

Data Services Static	3G / 4G			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	3.342	65.42	57.41	22.57
Upload Throughput(Mbps)	1.398	15.27	28.07	12.28
Video Streaming Delay (sec)	1.56	0.17	NA	NA
Web Browsing Delay (sec)	1.13	1.13	1.79	14.66
Latency (msec)	51.4	35.2	34.4	83

<b><u>Sindhi Camp Bus stand</u></b>	<b>2G</b>		
	<b>Airtel</b>	<b>BSNL</b>	<b>VIL</b>
<b>Download Throughput (kbps)</b>	<b>210</b>	<b>101</b>	<b>115.6</b>
<b>Upload Throughput (kbps)</b>	<b>220</b>	<b>90</b>	<b>91.6</b>
<b>Web Browsing Delay (sec)</b>	<b>11.23</b>	<b>1.3</b>	<b>32.23</b>
<b>Latency (msec)</b>	<b>210</b>	<b>820.5</b>	<b>436</b>

<b>J K Loan Hospital</b>	<b>2G</b>		
	<b>Airtel</b>	<b>BSNL</b>	<b>VIL</b>
<b>Download Throughput (kbps)</b>	<b>150</b>	<b>170</b>	<b>232.93</b>
<b>Upload Throughput (kbps)</b>	<b>260</b>	<b>50</b>	<b>90.92</b>
<b>Web Browsing Delay (sec)</b>	<b>11.86</b>	<b>1.6</b>	<b>37.65</b>
<b>Latency (msec)</b>	<b>240</b>	<b>950</b>	<b>384</b>

<b><u>Gandhi Nagar Railway Station</u></b>	<b>2G</b>		
	<b>Airtel</b>	<b>BSNL</b>	<b>VIL</b>
<b>Download Throughput (kbps)</b>	<b>280</b>	<b>150</b>	<b>115.37</b>
<b>Upload Throughput (kbps)</b>	<b>430</b>	<b>40</b>	<b>20.66</b>
<b>Web Browsing Delay (sec)</b>	<b>10.98</b>	<b>1.2</b>	<b>35.79</b>
<b>Latency (msec)</b>	<b>246</b>	<b>1194.7</b>	<b>470</b>

<u>Jaipuriya Hospital</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	260	100	127.14
Upload Throughput (kbps)	220	50	125.01
Web Browsing Delay (sec)	11.26	3.1	32.66
Latency (msec)	198	3536.2	283

<u>WTP</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	260	100	91.04
Upload Throughput (kbps)	230	80	56.24
Web Browsing Delay (sec)	10.94	2.3	33.25
Latency (msec)	248	2436.8	267

# Data Services static

City Level  
Summary(contd.)

<b><u>Sindhi Camp Bus stand</u></b>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	2.34	81.04	54.13	34.69
Upload Throughput (mbps)	1.3	19.27	23.67	14.69
Video Streaming Delay (Secs.)	2.1	0.14	NA	NA
Web Browsing Delay (sec)	2	1.3	2.06	14
Latency (msec)	42.5	32	37	51

<b>J K Loan Hospital</b>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	3.77	72.25	72.54	21.96
Upload Throughput (mbps)	1.92	5.64	36.27	13.26
Video Streaming Delay (Secs.)	2.3	0.2	NA	NA
Web Browsing Delay (sec)	0.65	1.4	1.9	13.62
Latency (msec)	61.2	34	33	140

<b><u>Gandhi Nagar Railway Station</u></b>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	2.65	76.4	52.28	12.16
Upload Throughput (mbps)	0.47	12.25	22.51	11.65
Video Streaming Delay (Secs.)	1.2	0.1	NA	NA
Web Browsing Delay (sec)	1.1	0.7	1.56	13.78
Latency (msec)	80.9	38	39	55

# Data Services static

City Level  
Summary(contd.)

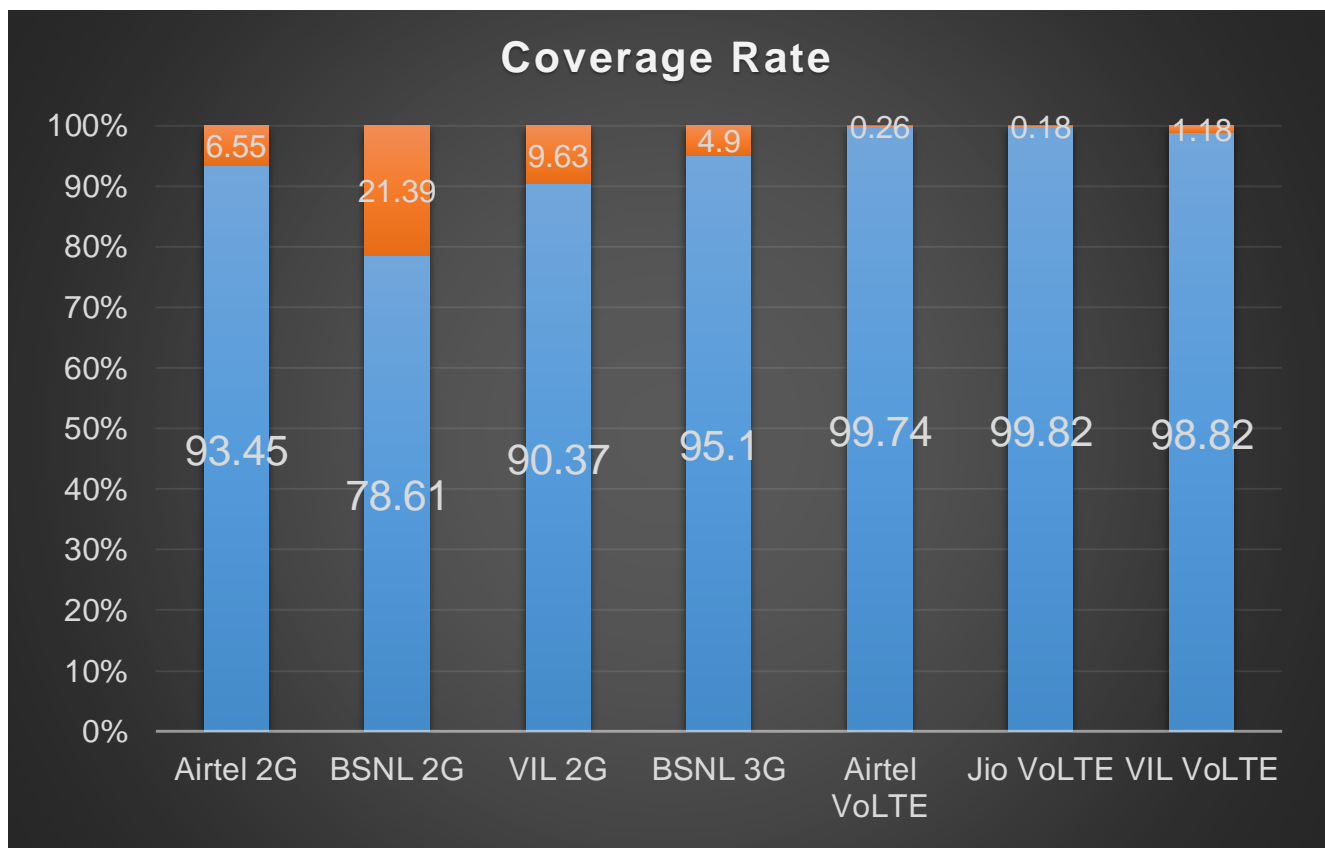
<u>Jaipuriya Hospital</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	4.87	43.91	44.1	2.4
Upload Throughput (mbps)	0.8	11.05	31.12	6.2
Video Streaming Delay (Secs.)	1.1	0.28	NA	NA
Web Browsing Delay (sec)	1	1.1	1.78	17.11
Latency (msec)	37.5	34	27	99

<u>WTP</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	3.08	53.48	64	34.32
Upload Throughput (mbps)	2.5	28.15	26.77	15.76
Video Streaming Delay (Secs.)	1.1	0.12	NA	NA
Web Browsing Delay (sec)	0.9	1.13	1.63	14.79
Latency (msec)	34.9	38	36	70

## 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	93.45%
BSNL 2G	78.61%
VIL 2G	90.37%
BSNL 3G	95.1%
Airtel VoLTE	99.74%
Jio VoLTE	99.82%
VIL VoLTE	98.82%



## TSP-AIRTEL

	Technology	Coverage %
2G	2G	93.45%
	VoLTE	99.74%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	1807749	73.33%	Green
[-75, >=-85)	496035	20.12%	Yellow
[-85, >=-95)	147914	5.99%	Orange
[-95, >=Min)	13745	0.56%	Red
<b>Total</b>	<b>2465443</b>	<b>100%</b>	

## VoLTE



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	8642	44.89%	Green
[-80, >=-90)	6383	33.16%	Yellow
[-90, >=-110)	4177	21.69%	Orange
[-110, >=Min)	51	0.26%	Red
<b>Total</b>	<b>19253</b>	<b>100%</b>	

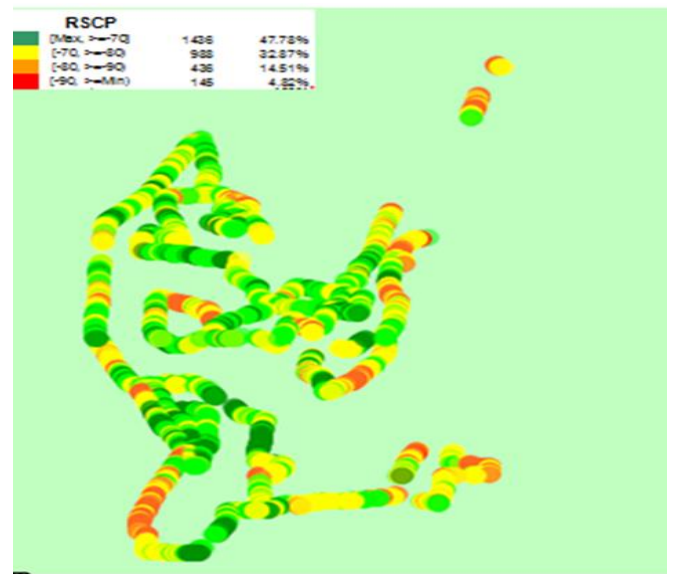
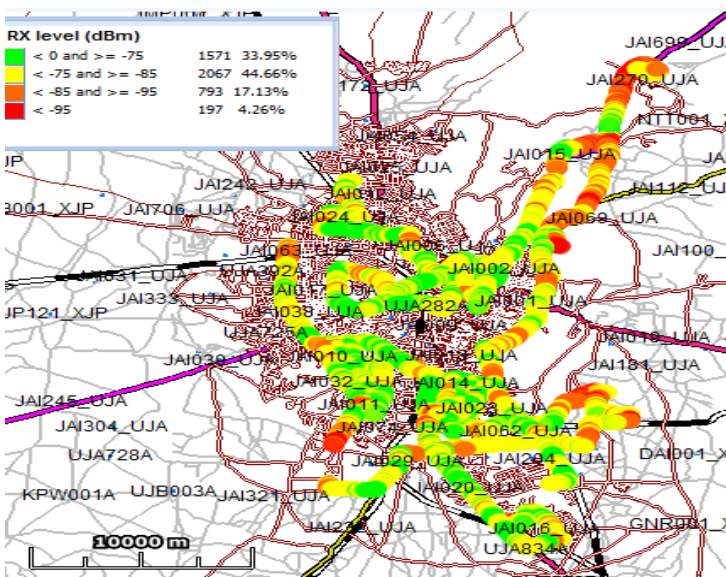


## TSP- BSNL

Technology	Coverage %
2G	78.61%
3G	95.1%

2G

3G



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >= -75]	1571	33.95%	
[-75, >= -85)	2067	44.66%	
[-85, >= -95)	793	17.13%	
[-95, >= Min)	197	4.26%	
<b>Total</b>	<b>4628</b>	<b>100%</b>	

3G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >= -70]	1436	47.78%	
[-70, >= -80)	988	32.87%	
[-80, >= -90)	436	14.51%	
[-90, >= Min)	145	4.84%	
<b>Total</b>	<b>3005</b>	<b>100%</b>	

JIO

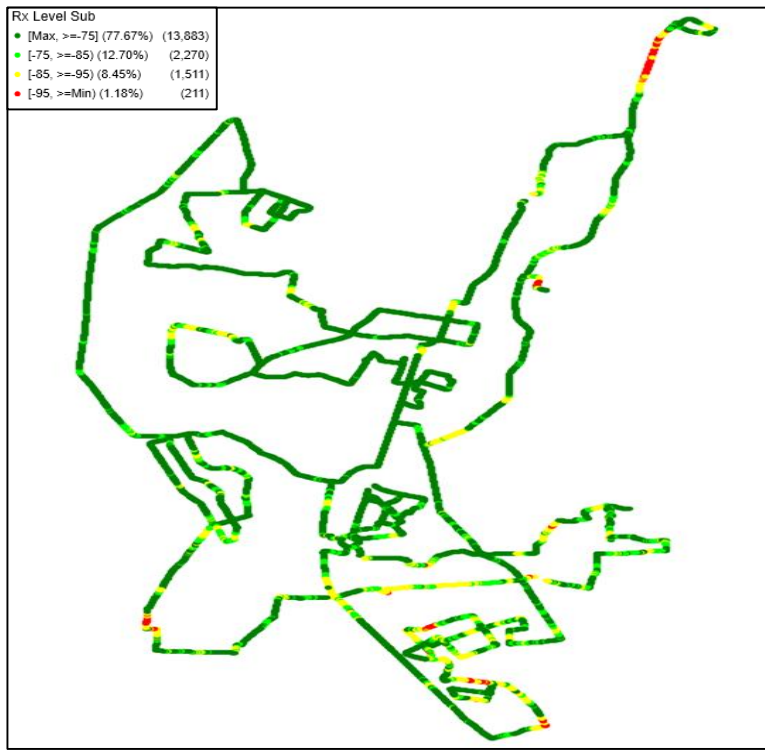
Technology	Coverage %
VoLTE	99.82%



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	32178	78.83%	
[-80, >=-90)	6325	15.49%	
[-90, >=-110)	2244	5.50%	
[-110, >=Min)	75	0.18%	
<b>Total</b>	<b>40822</b>	<b>100%</b>	

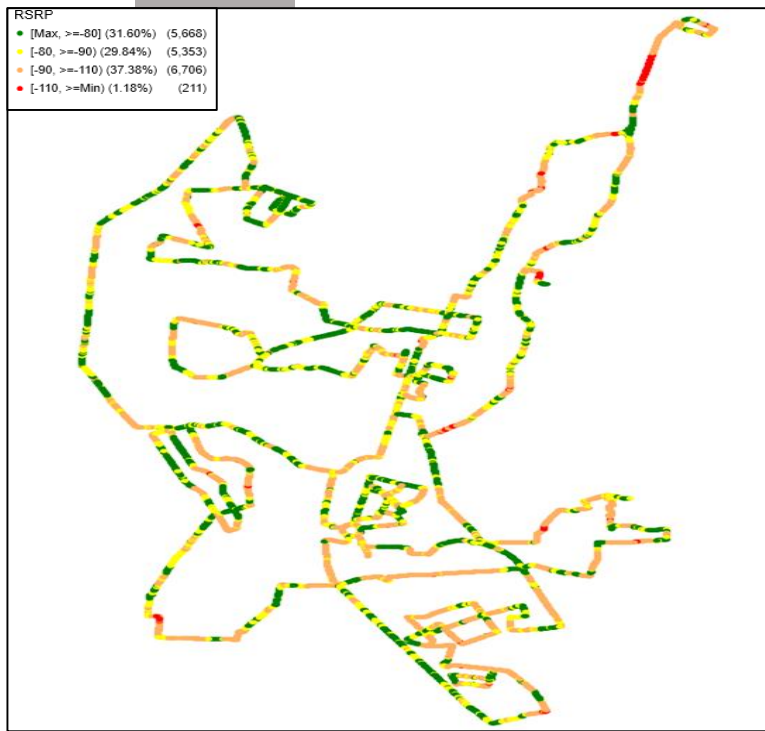
## VIL

	Technology	Coverage Rate %
	2G	90.37%
2G	VoLTE	98.82%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	13883	77.67%	
[-75, >=-85)	2270	12.70%	
[-85, >=-95)	1511	8.45%	
[-95, >=Min)	211	1.18%	
<b>Total</b>	<b>17875</b>	<b>100%</b>	

## VoLTE

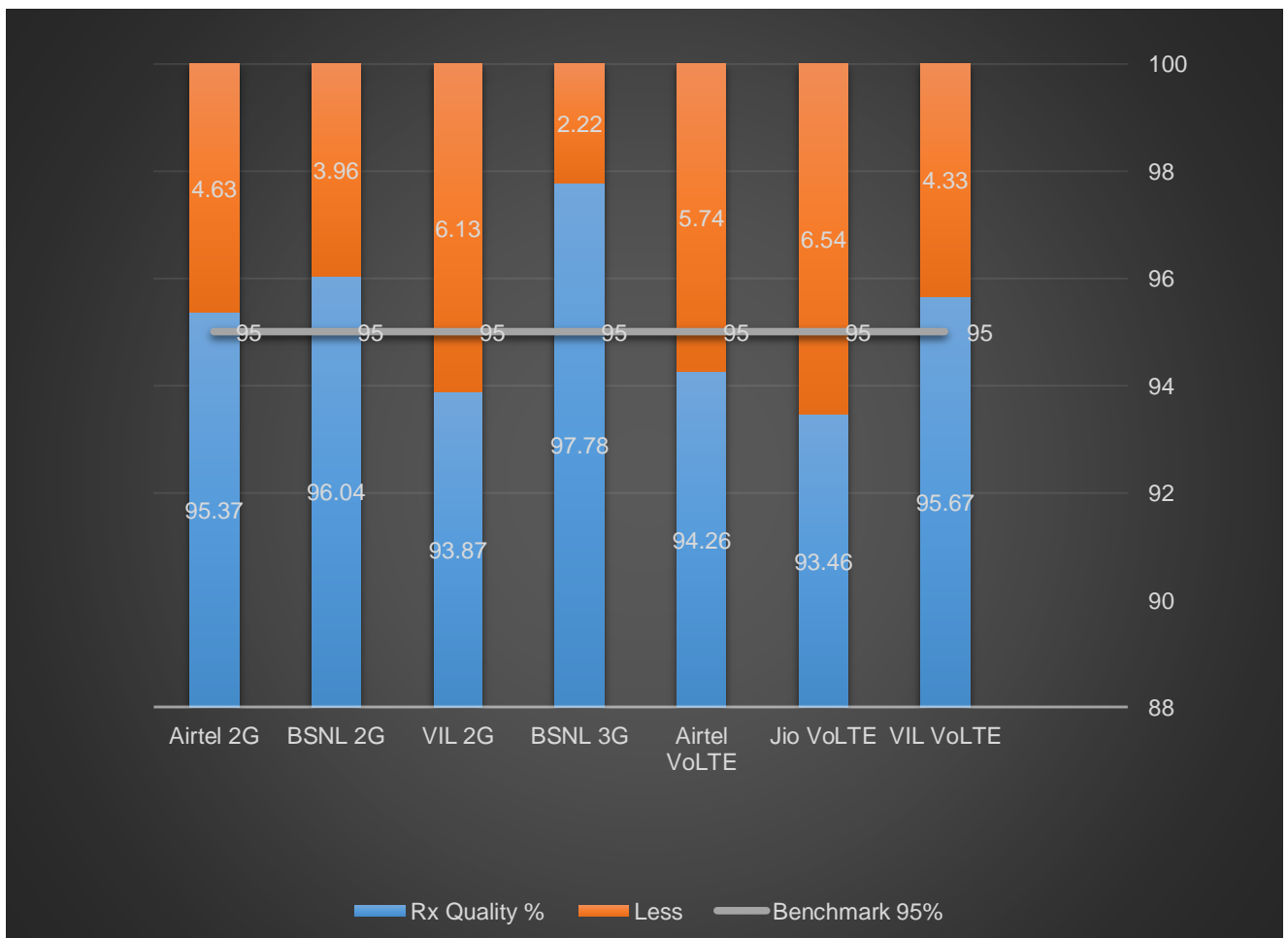


VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	5668	31.60%	
[-80, >=-90)	5353	29.84%	
[-90, >=-110)	6706	37.38%	
[-110, >=Min)	211	1.18%	
<b>Total</b>	<b>17938</b>	<b>100%</b>	

## 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	95.37%
BSNL 2G	96.04%
VIL 2G	93.87%
BSNL 3G	97.78%
Airtel VoLTE	94.26%
Jio VoLTE	93.46%
VIL VoLTE	95.67%

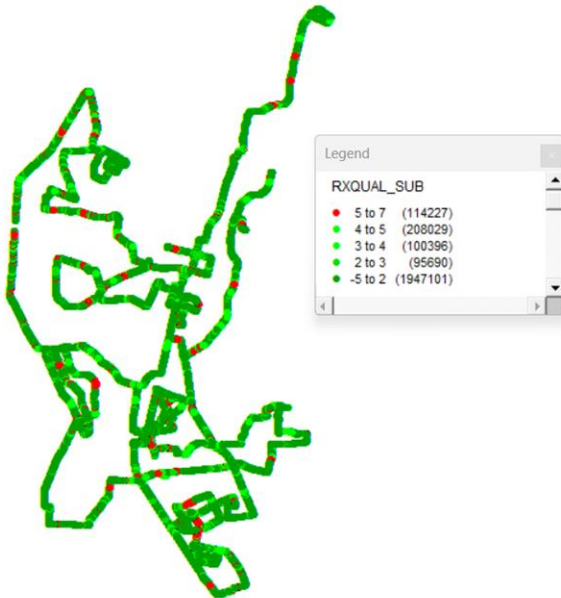


## II. Quality Details

### Airtel

2G

Technology	Rx Quality %
2G	95.37%
VoLTE	94.26%



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	1947101	78.97%	
(2, <=3)	95690	3.89%	
(3, <=4)	100396	4.07%	
(4, <=5)	208029	8.44%	
(5, <=Max)	114227	4.63%	
<b>Total</b>	<b>2465443</b>	<b>100%</b>	

VoLTE



Overall SINR	# Samples	% PDF	Legends
(Min, <=-6)	156	0.81%	
(-6, <=0)	949	4.93%	
(0, <=5)	8580	44.61%	
(5, <=10)	4974	25.86%	
(10, <=15)	3108	16.16%	
(15, <=Max)	1468	7.63%	
<b>Total</b>	<b>19235</b>	<b>100%</b>	

## II. Quality Details

### BSNL

2G

Technology

2G

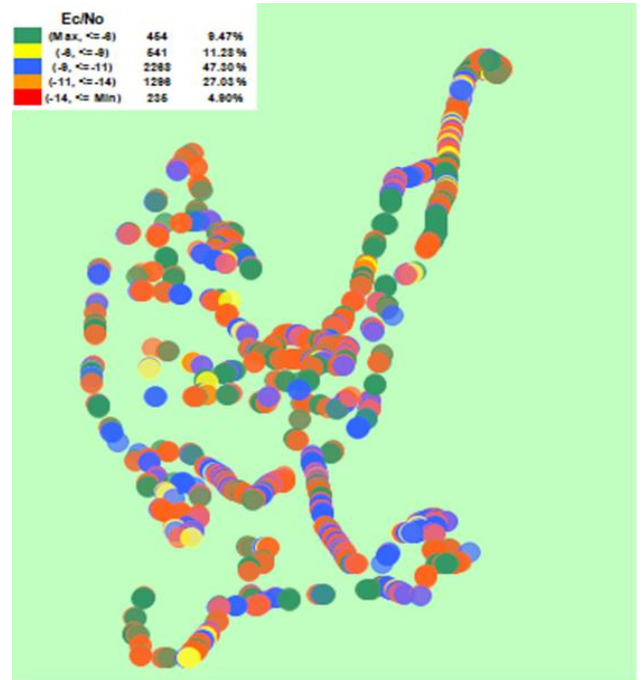
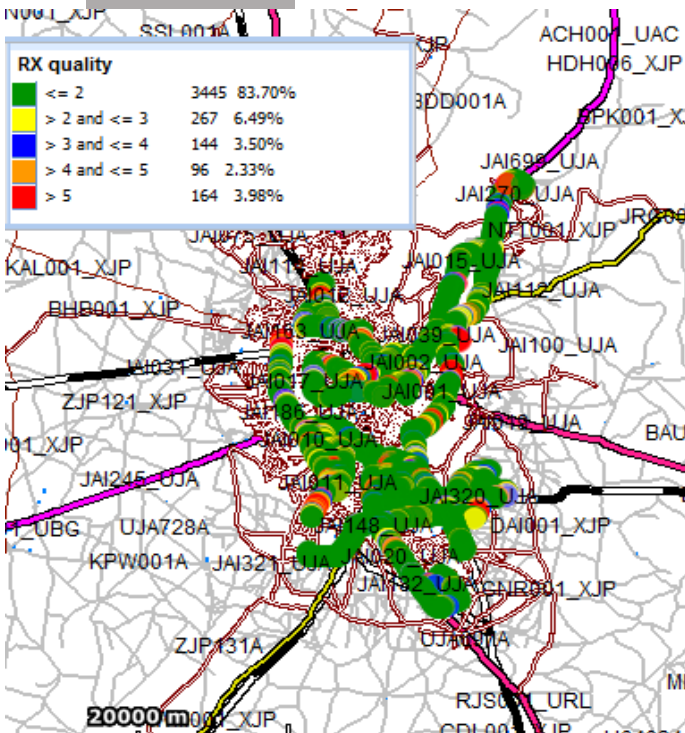
3G

Rx Quality %

96.02%

97.78%

3G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	3445	83.7%	
(2, <=3)	267	6.49%	
(3, <=4)	144	3.5%	
(4, <=5)	96	2.33%	
(5, <=Max)	164	3.98%	
<b>Total</b>	<b>4116</b>	<b>100%</b>	

Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	454	9.47%	
(-6, <=-9)	541	11.28%	
(-9, <=-11)	2268	47.3%	
(-11, <=-14)	1296	27.03%	
(-14, <= Min)	235	4.9%	
<b>Total</b>	<b>4794</b>	<b>100.00%</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  $\geq 95\%$ .

## JIO

Technology	Rx Quality %
VoLTE	<b>93.46%</b>



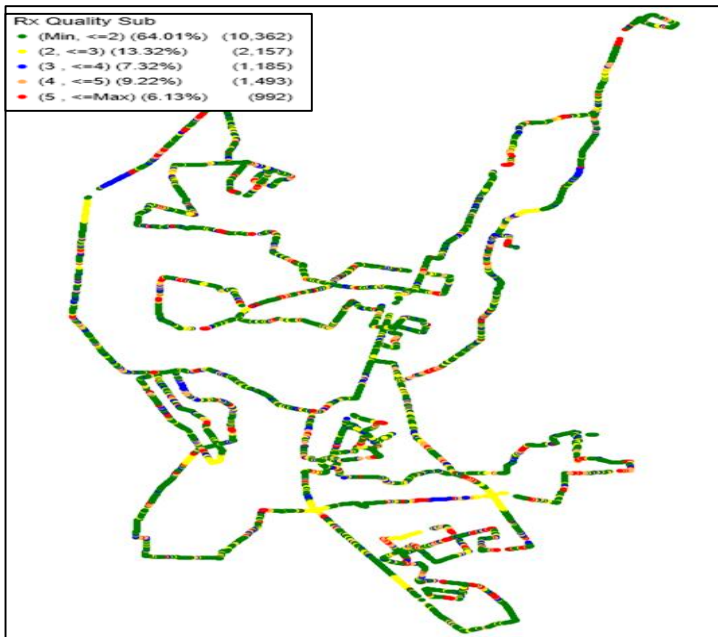
Overall SINR	# Samples	% PDF	Legends
(Min, $\leq -6$ )	87	0.21%	
(-6, $\leq -3$ )	527	1.29%	
(-3, $\leq 0$ )	2054	5.04%	
(0, $\leq 5$ )	9272	22.71%	
(5, $\leq 10$ )	12947	31.72%	
(10, $\leq 15$ )	9279	22.73%	
(15, $\leq \text{Max}$ )	6656	16.30%	
<b>Total</b>	<b>40822</b>	<b>100%</b>	

## II. Quality Details

### VIL

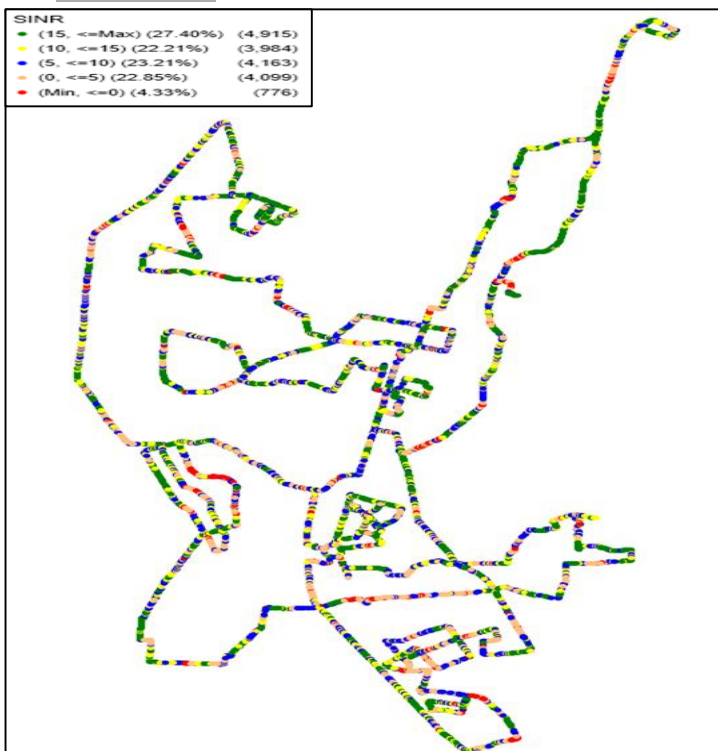
Technology	Rx Quality %
2G	<b>93.87%</b>
4G	<b>95.67%</b>

#### 2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	10362	64.01%	
(2, <=3)	2157	13.32%	
(3, <=4)	1185	7.32%	
(4, <=5)	1493	9.22%	
(5, <=Max)	992	6.13%	
<b>Total</b>	<b>16189</b>	<b>100%</b>	

#### VoLTE



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	776	4.33%	
(0, <=5)	4099	22.85%	
(5, <=10)	4163	23.21%	
(10, <=15)	3984	22.21%	
(15, <=Max)	4915	27.40%	
<b>Total</b>	<b>29680</b>	<b>100%</b>	



### III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	42.25%
Airtel VoLTE	100.00%
Jio VoLTE	100.00%
VIL VoLTE	100.00%

