



## Operator Assisted Drive Test Report

### Hoshiarpur City

30<sup>th</sup> April 2024 & 01<sup>st</sup> May 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 Hoshiarpur City and surrounding areas from 9:00 AM to 8:00 PM on Dated 30<sup>th</sup> April 2024 & 01<sup>st</sup> May 2024 . The drive test covered drive route of 55 KMs & 08 numbers of hotspots over a period of 02 days. Approximately 90 calls were made for each of the 2G & 4G networks: three 2G networks and 04 no 4G networks covering four TSPs.

Overview

Voice Summary

Data Summary

# Overview

Regional Office, TRAI Jaipur conducted Operator Assisted Drive Test on 30<sup>th</sup> Apr & 1<sup>st</sup> May 2024 covering Hoshiarpur City & nearby area. The performance of all TSPs were monitored across various technologies (2G and 4G). The test results obtained from these drive tests were utilized to assess the network quality for Voice and Data services. BSNL reported that in Punjab LSA, 3G is upgraded to 4G for data purposes and voice calls are only through 2G as pendency for 4G integration with IMS for 4G.

**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 230 KMs. Approximately 196 calls were made for 2G & 204 calls were made for 4G LTE networks.

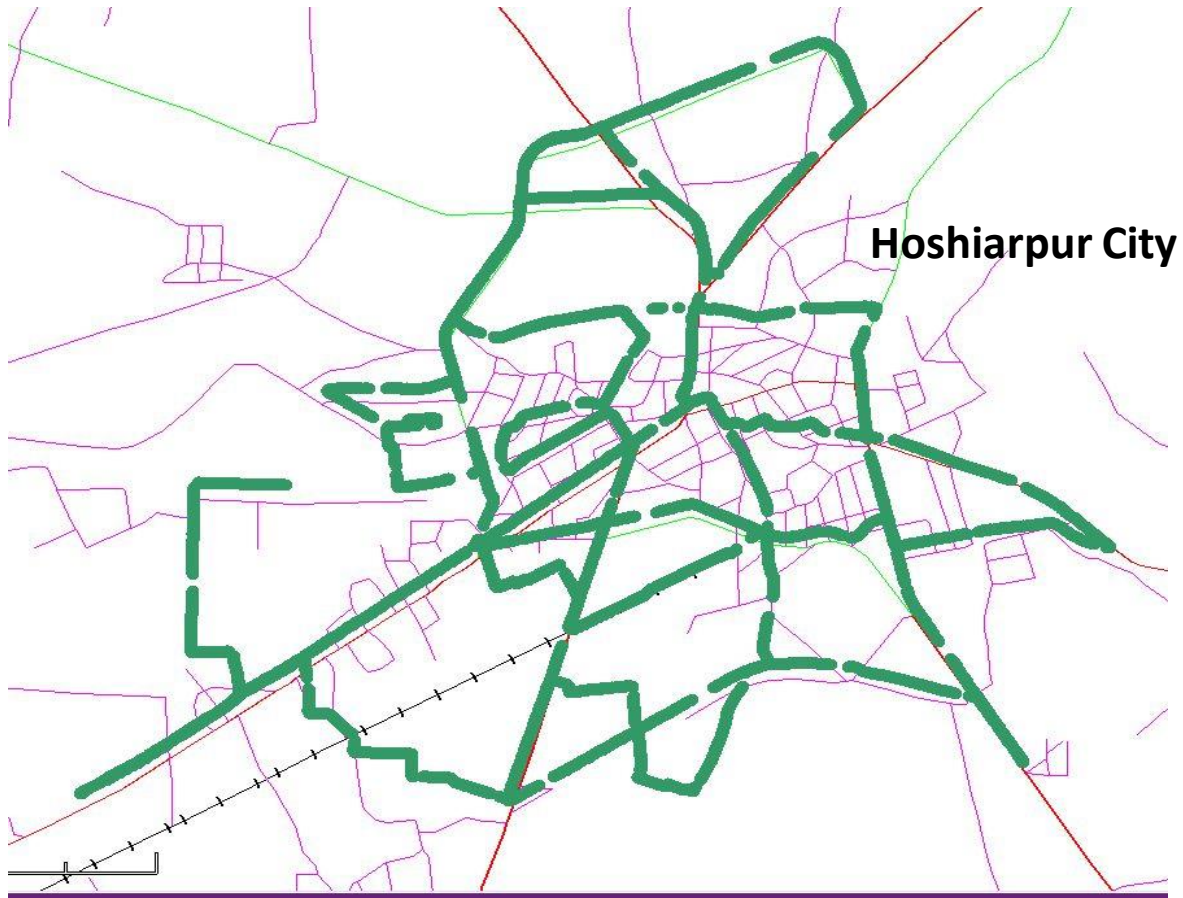
## Data Tests:

**Dynamic data test** was conducted for 230 kms for download throughput in all technologies. 2G – measurement – UE Locked in 2G file size- 500KB

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

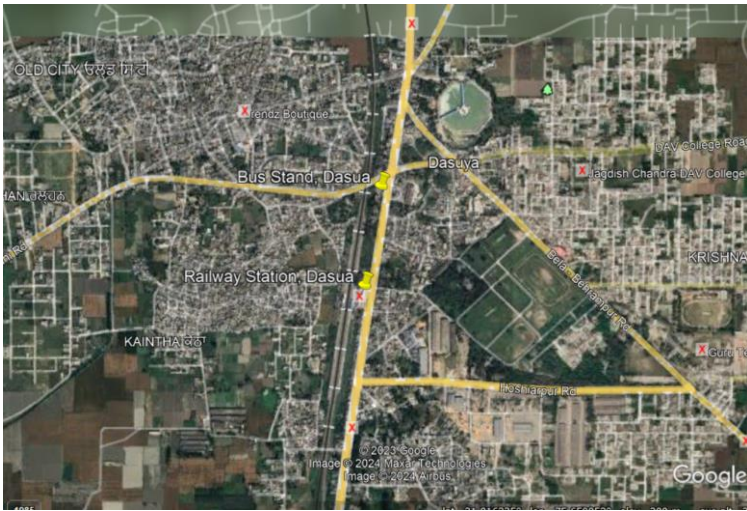
Service	Specifications
Download	2G (Locked) - 500KB, 3G (Dual) - 20 MB, 4G (Free) - 40 MB
Upload	2G (Locked) - 100KB, 3G (Dual) - 5 MB, 4G (Free) - 10 MB
Web Browsing	3 links of e/m commerce website <a href="http://www.amazon.in">www.amazon.in</a> , <a href="http://www.flipkart.com">www.flipkart.com</a> and PayTm
Latency	32 Bytes on <a href="http://www.google.com">www.google.com</a>

## Voice & Dynamic Data Test Drive Route

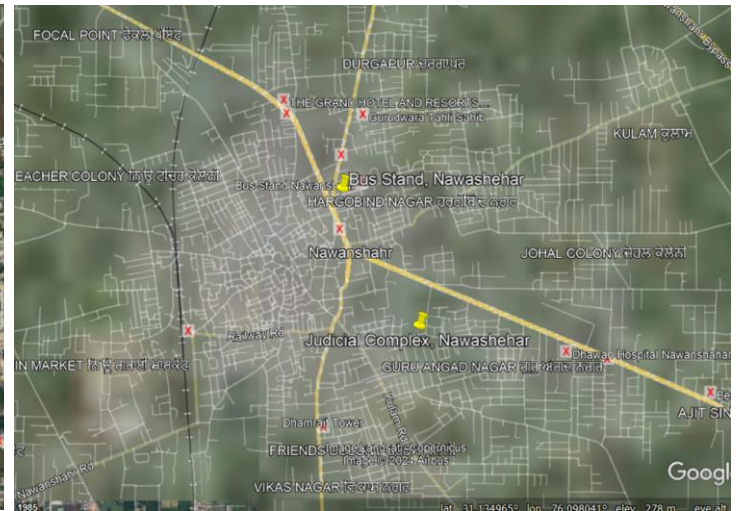


Date	Test Scenario	Area to be Covered
30/04/2024	2G/3G/4G Voice and 3G/4G/ Dynamic Data	Starting from Hotel Amber Residency Hoshiarpur at 9.40 AM to SAS Nagar, Anmol nagar, Naloyian Chowk, Haryana Road, Bahadurpur, Mall road, Bullanwari, Aslamabad, DAV College, Shankar Nagar, Railway station, Guru Ram Dass nagar, Sunder nagar, Pur Hiran, Kirti Nagar, sabji mandi, Jalandhar Road, Piplanwala, Tagore Nagar, Dashmesh Nagar, Subash nagar, Model Town, Bus Stand, Clock tower, Prem Garh, Session Chowk, fatehgarh Chungi.
01/05/2024	Hot Spots- 2G/3G/4G/ Static Data Tests	DAV College Hoshiarpur, Shivam hospital Hoshiarpur, City Centre Hoshiarpur, Shiraj Regency Hoshiarpur, Railway Station Dasuya, Bus Stand Dasuya, Bus Stand Nawanshahar, Judiciary Complex Nawanshahar.

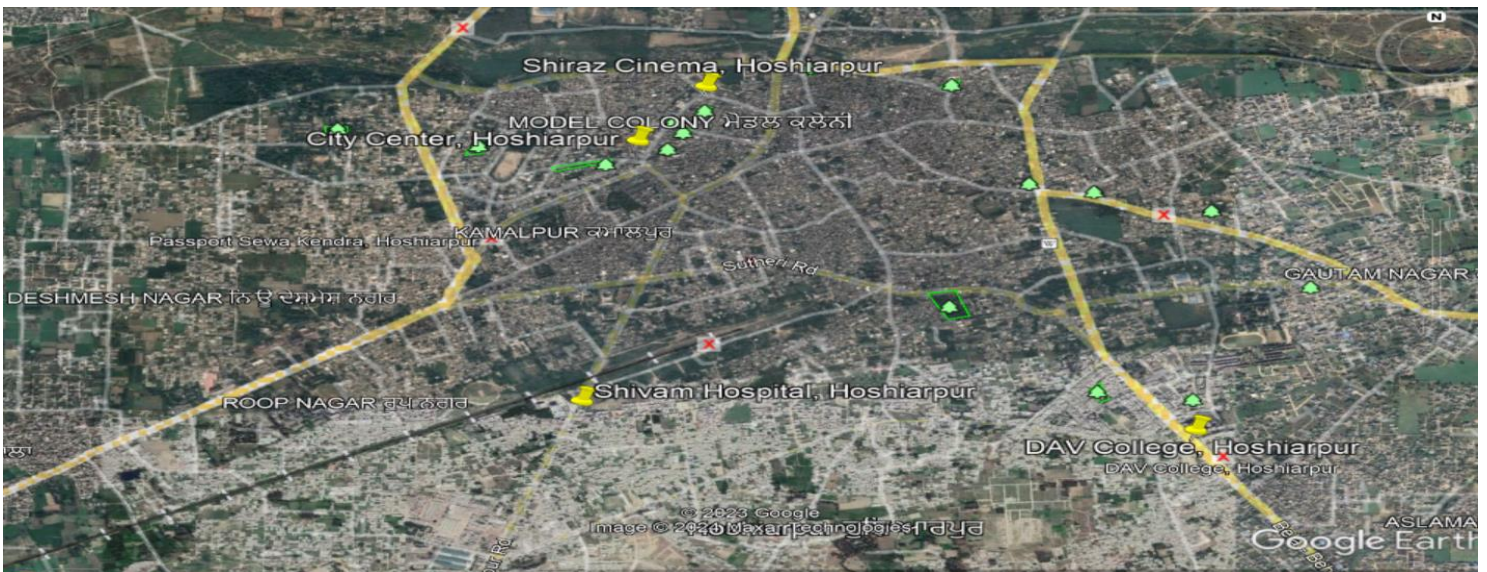
## Data Service Test- Static Locations



Dasua



Nawanshahr

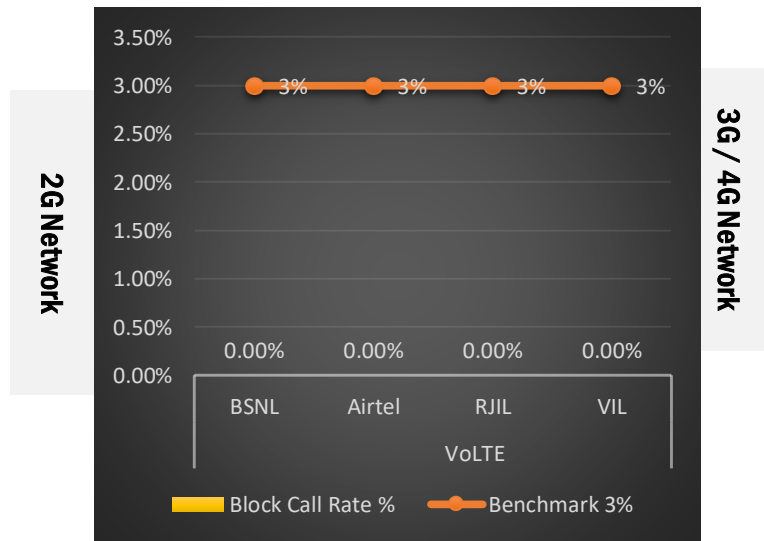
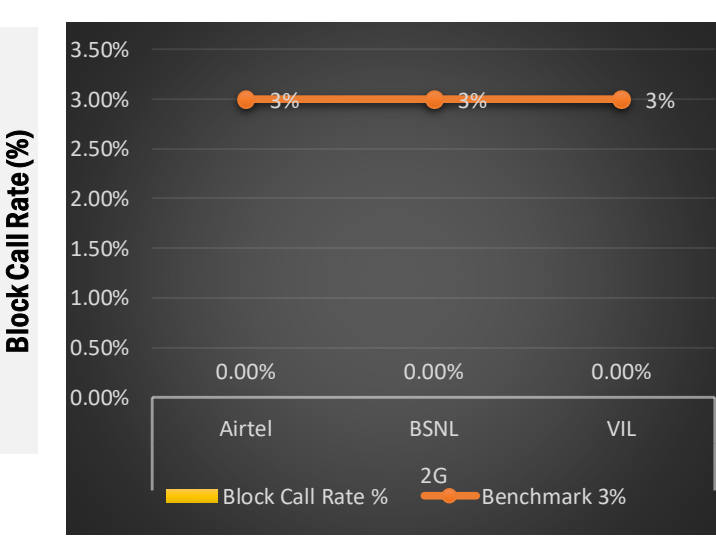
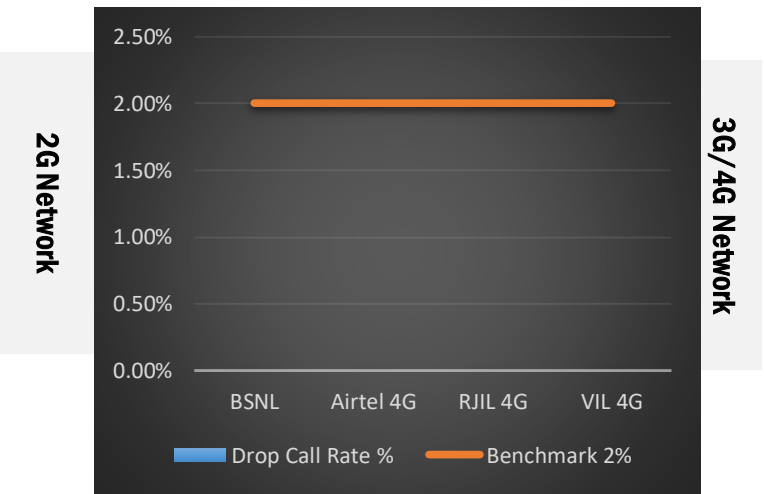
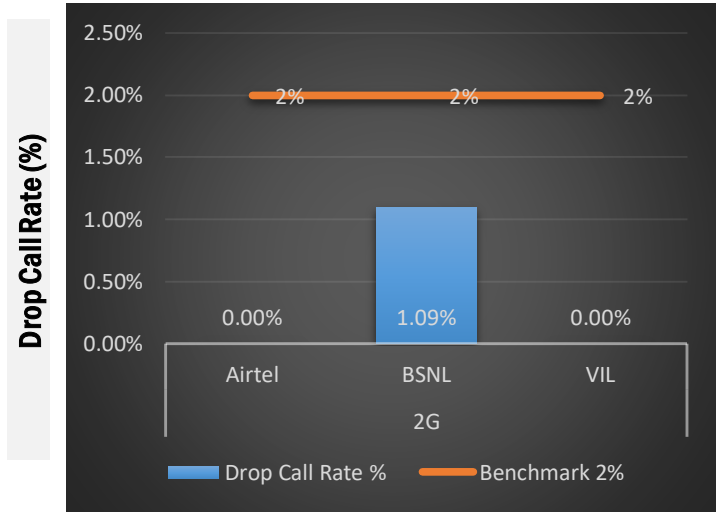


Hoshiarpur

### Hotspot Locations

1. Railway Station, Dasua
2. Bus Stand, Dasua
3. Bus Stand, Nawanshahr
4. Judicial Complex, Nawanshahr
5. City Centre, Hoshiarpur
6. Hotel Siraj, Hoshiarpur
7. Dev College, Hoshiarpur
8. Shivam Hospital, Hoshiarpur

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



KPIs	2G			4G	4G		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0.00%	1.09%	0.00%	NA	0.00%	0.00%	0.00%
Block Call Rate %	0.00%	0.00%	0.00%	NA	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 %	97%	97.51%	97.35%

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

TSPs	3G
	BSNL
Coverage %	NA

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

TSPs	4G			
	BSNL	Airtel	JIO	VIL
Coverage %	93.77%	99.00%	99.93%	99.96%

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

TSPs	4G	4G		
	BSNL	Airtel	JIO	VIL
Time spent on 4G Network %	100%	99.99%	100%	100%

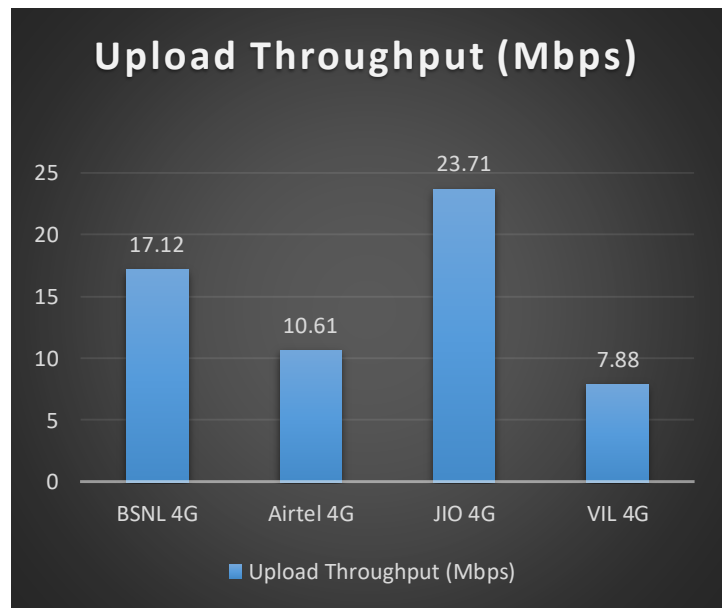
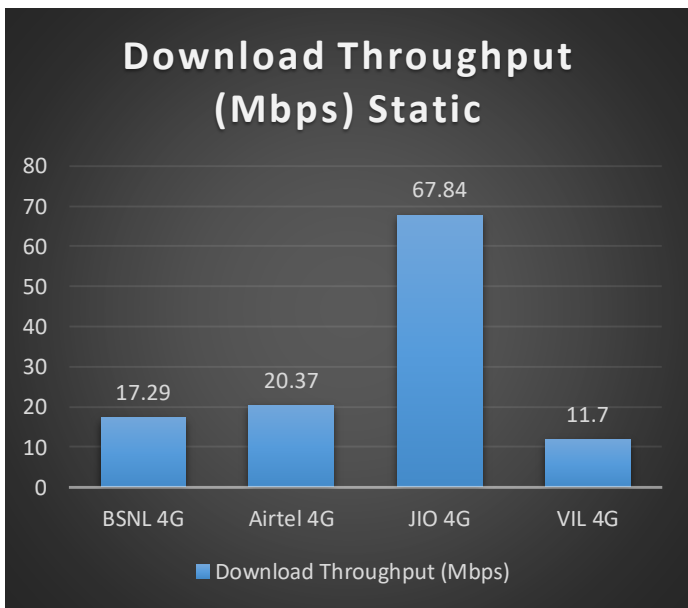
# Data Services Static

## Key Observations

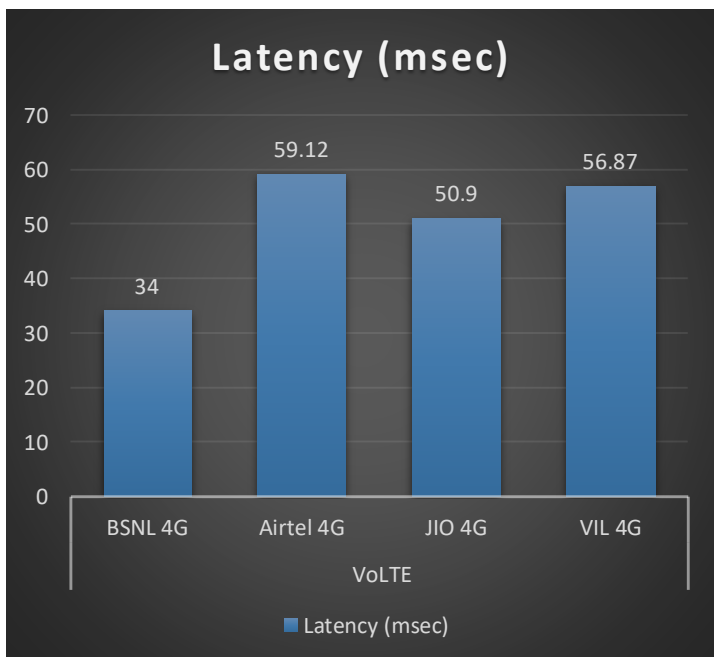
Data was tested at 5 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, Paytm)

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

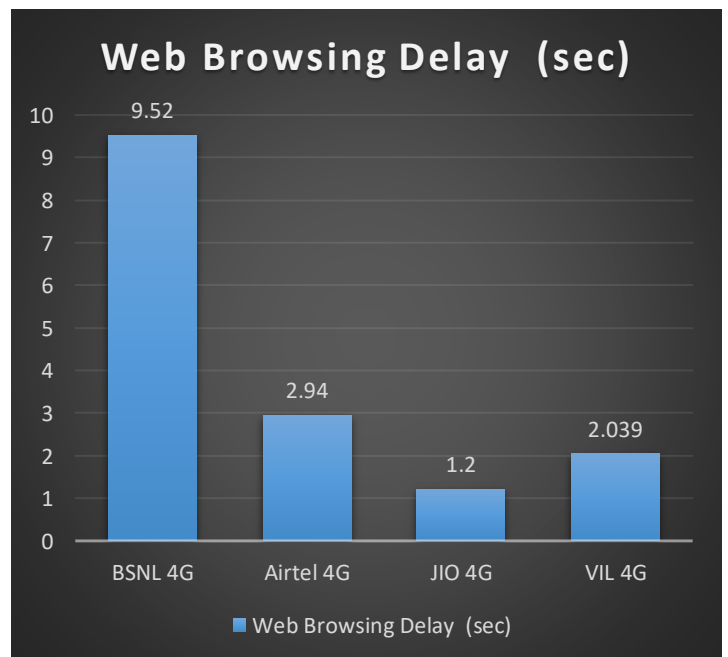
3G/4G/ Network:



### Latency (ms)



### Web Browsing (Sec)



# Data Services Dynamic

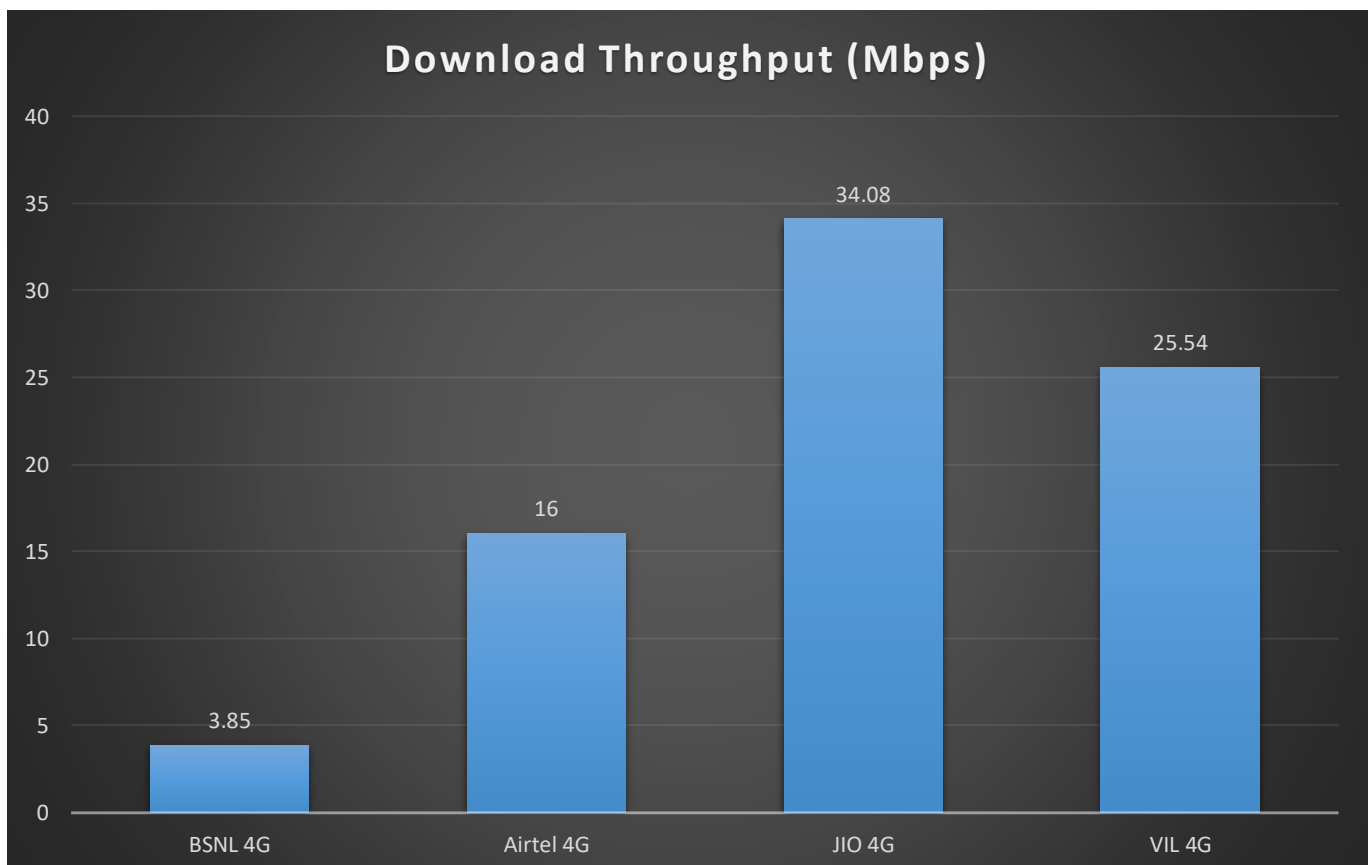
## Key Observations

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

### Data Download Performance (kbps) - Dynamic

4G/ Network:

Data Services Dynamic	4G			
	BSNL4G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	3.85	16	34.08	25.54





Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	91	91	90
Blocked Call Rate (%)	0%	0%	0%
CSSR% (Accessibility)	100%	100%	100%
Drop Call Rate (%)	0%	1.09%	0%
Mobility HOSR (%)	99.99%	100%	100%
Rx Quality (%)	95%	96.81%	97.84%
Average CST Sec	3.42	3.28	4.6

Voice Call	4G			
	BSNL 4G	Airtel 4G	JIO 4G	VIL 4G
Call Attempt	NA	93	85	92
Blocked Call Rate (%)	NA	0%	0%	0%
CSSR% (Accessibility)	NA	100%	100%	100%
Drop Call Rate (%)	NA	0%	0%	0%
Mobility HOSR (%)	NA	99.99%	99.81%	100%
Rx Quality (%)	NA	92.95%	90.32%	95.49%
Average CST Sec	NA	1.34	0.6	1.34

# Summary

## City Level Summary- Data Services

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	149.9	40.02	106.27
Upload Throughput (kbps)	81.46	25.39	56.02
Web Browsing Delay (sec)	8.97	150	87.55
Latency (msec)	415.28	193	452.75

Data Services Static	4G			
	BSNL 4G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	17.29	20.37	67.84	11.7
Upload Throughput(Mbps)	17.12	10.61	23.71	7.88
Video Streaming Delay (sec)	NA	1.29	0.77	0.857
Web Browsing Delay (sec)	9.52	2.94	1.2	2.039
Latency (msec)	34	59.12	50.9	56.87

Dasuya Railway Station	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	113	21.13	43.7
Upload Throughput (kbps)	73	6.93	34.6
Web Browsing Delay (sec)	8.4	146	89.8
Latency (msec)	417	206	246

Dasuya bus stand	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	132	18.53	42.5
Upload Throughput (kbps)	82.2	9.81	16.3
Web Browsing Delay (sec)	10.12	145	172.8
Latency (msec)	410	173	299

Nawasahar bus stand	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	140.3	9.42	122.3
Upload Throughput (kbps)	83	4.26	40.9
Web Browsing Delay (sec)	9.4	247	77.7
Latency (msec)	402.28	196	871

<b><u>Nawasahar Court</u></b>	<b>2G</b>		
	<b>Airtel</b>	<b>BSNL</b>	<b>VIL</b>
<b>Download Throughput (kbps)</b>	<b>137.1</b>	<b>212</b>	<b>222.6</b>
<b>Upload Throughput (kbps)</b>	<b>87.2</b>	<b>155</b>	<b>62.3</b>
<b>Web Browsing Delay (sec)</b>	<b>8.29</b>	<b>160</b>	<b>44.08</b>
<b>Latency (msec)</b>	<b>437</b>	<b>147</b>	<b>480</b>

<b><u>City Centre</u></b>	<b>2G</b>		
	<b>Airtel</b>	<b>BSNL</b>	<b>VIL</b>
<b>Download Throughput (kbps)</b>	<b>188</b>	<b>8.1</b>	<b>106.3</b>
<b>Upload Throughput (kbps)</b>	<b>82.2</b>	<b>5.59</b>	<b>38.6</b>
<b>Web Browsing Delay (sec)</b>	<b>8</b>	<b>121</b>	<b>46.7</b>
<b>Latency (msec)</b>	<b>409</b>	<b>270</b>	<b>395</b>

<u>Hotel Siraj</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	195	23.0	114.8
Upload Throughput (kbps)	89.2	8.65	76.3
Web Browsing Delay (sec)	8.1	121	40.03
Latency (msec)	409	194	382

<u>Dav College</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	154	23.61	41.5
Upload Throughput (kbps)	81.3	8.94	92.9
Web Browsing Delay (sec)	10.2	93.15	171.43
Latency (msec)	418	177	455

<u>Shivam Hospital</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	140.5	4.43	156.5
Upload Throughput (kbps)	73.6	4.01	86.2
Web Browsing Delay (sec)	9.3	170	57.87
Latency (msec)	420	178	494

## Data Services static

<u>Dasuya Railway Station</u>	4G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	13.36	23.4	50.1	15.11
Upload Throughput (mbps)	14.04	11.3	22.39	9.12
Video Streaming Delay ( Secs.)	NA	1.17	0.63	0.128
Web Browsing Delay (sec)	8.37	2	1.22	2.051
Latency (msec)	25	52	50.60	44

<u>Dasuya bus stand</u>	4G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	13.25	19.23	59.62	22.96
Upload Throughput (mbps)	12.83	10.6	18.59	12.05
Video Streaming Delay ( Secs.)	NA	1.14	0.73	0.722
Web Browsing Delay (sec)	8.36	3.2	1.26	1.9
Latency (msec)	31	59	55.2	40

<u>Nawasahar bus stand</u>	4G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	29.45	16.6	39.36	20.04
Upload Throughput (mbps)	16.86	11.45	24.3	11.07
Video Streaming Delay ( Secs.)	NA	1.11	0.87	0.909
Web Browsing Delay (sec)	6.97	2.24	1.25	1.88
Latency (msec)	29	64	48.2	45

<u>Nawasahar Court</u>	4G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	48.32	19.13	85.56	8.49
Upload Throughput (mbps)	13.19	8.4	24.01	6.3
Video Streaming Delay ( Secs.)	NA	1.12	0.84	1.101
Web Browsing Delay (sec)	16.87	2.3	1.16	2.185
Latency (msec)	36	54	63.2	69

<u>City Centre</u>	4G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	6.16	19.56	95.87	3.16
Upload Throughput (mbps)	6.46	11,2	25.44	4.42
Video Streaming Delay ( Secs.)	NA	1.7	0.89	0.953
Web Browsing Delay (sec)	8.52	3,8	1.14	2.425
Latency (msec)	39	51	64	73

<u>Hotel Siraj</u>	4G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	13.34	26.3	51.39	9.49
Upload Throughput (mbps)	12.52	10.32	25.8	7.2
Video Streaming Delay ( Secs.)	NA	1.9	0.68	0.107
Web Browsing Delay (sec)	10.67	3.1	1.17	1.853
Latency (msec)	34	69	38.5	73

## Data Services static

<u>Dav College</u>	4G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	9.68	17.33	60.37	6.15
Upload Throughput (mbps)	14.99	9.13	25.1	5.69
Video Streaming Delay ( Secs.)	NA	1.12	0.57	1.62
Web Browsing Delay (sec)	8.90	3.5	1.17	1.894
Latency (msec)	37	67	51.5	71

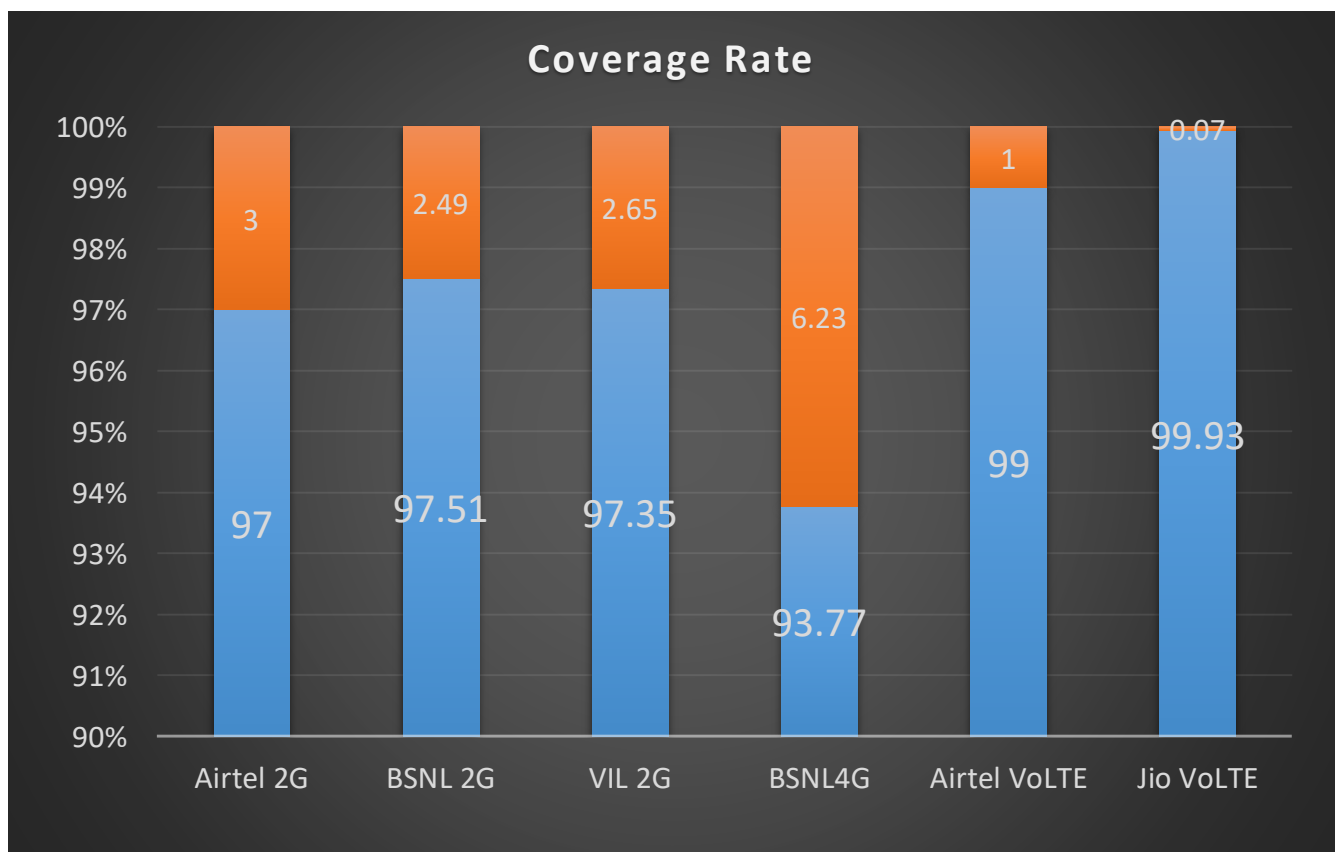
<u>Shivam Hospital</u>	4G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	4.81	21.44	100.44	8.33
Upload Throughput (mbps)	46.12	12.5	24.11	7.26
Video Streaming Delay ( Secs.)	NA	1.11	0.97	1.318
Web Browsing Delay (sec)	7.50	3.4	1.2	2.126
Latency (msec)	42	57	36	40



## Coverage Details

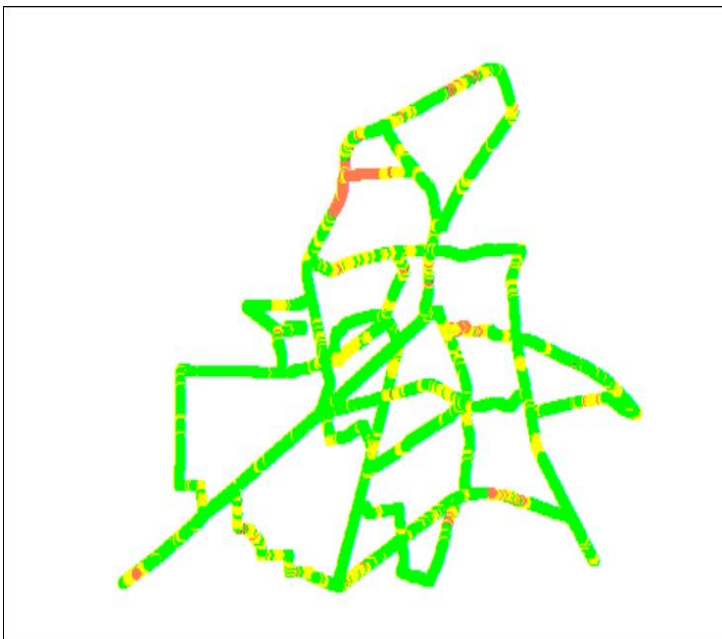
RF Coverage relates to the geographical footprint within the system that has sufficient RF signal strength to provide for a call session. The Coverage rate is calculated on the basis of % of samples in which the Rx level  $\geq -85$  dBm, RSCP is  $\geq -90$  dBm & RSRP  $\geq -110$ dBm. The details are as follows.

TSP	Coverage Rate %
Airtel 2G	97%
BSNL 2G	97.51%
VIL 2G	97.35%
BSNL 4G	93.77%
Airtel 4G	99%
Jio 4G	99.93%
VIL 4G	99.96%



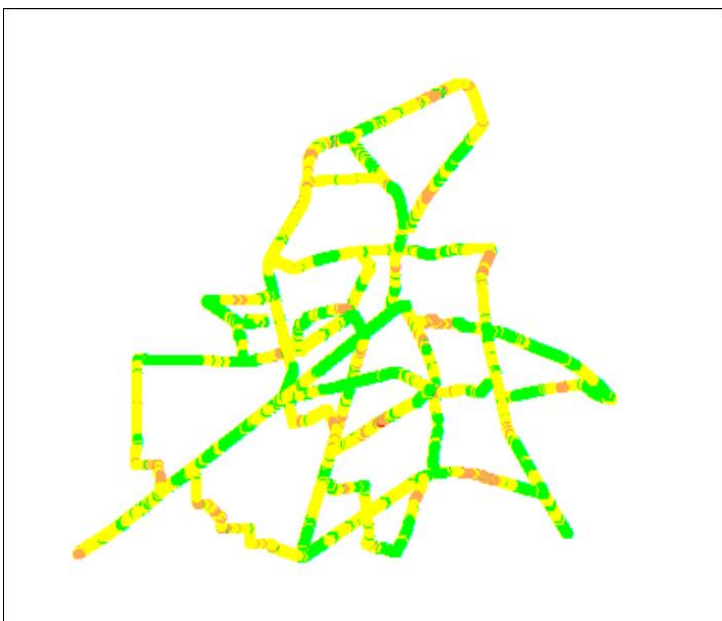
## TSP-AIRTEL

	Technology	Coverage %
2G	2G	97%
	4G	99%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	526954	77%	Green
[-75, >=-85)	137309	20%	Yellow
[-85, >=-95)	20221	2.96%	Orange
[-95, >=Min)	58	0.04%	Red
<b>Total</b>	<b>684542</b>	<b>100%</b>	

## 4G



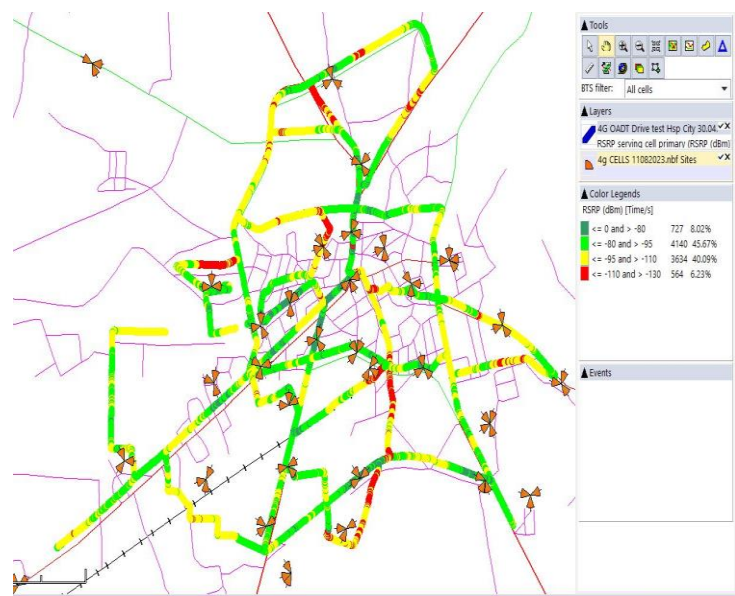
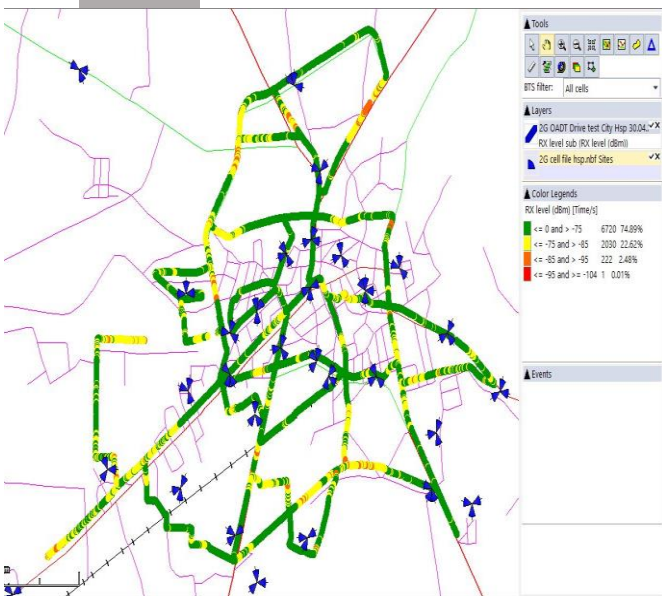
4G /			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	4713347	81%	Green
[-80, >=-90)	986599	16.97%	Yellow
[-90, >=-110)	85549	1%	Orange
[-110, >=Min)	466	0.03%	Red
<b>Total</b>	<b>5785961</b>	<b>100%</b>	

## TSP- BSNL

Technology	Coverage %
2G	97.51%
4G	93.77%

2G

4G



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	6720	74.89%	
[-75, >=-85)	2030	22.62%	
[-85, >=-95)	222	2.48%	
[-95, >=Min)	1	0.01%	
<b>Total</b>	<b>8973</b>	<b>100%</b>	

4G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	727	8.02%	
[-70, >=-80)	4140	45.67%	
[-80, >=-90)	3634	40.08%	
[-90, >=Min)	564	6.23%	
<b>Total</b>	<b>9065</b>	<b>100%</b>	

## JIO

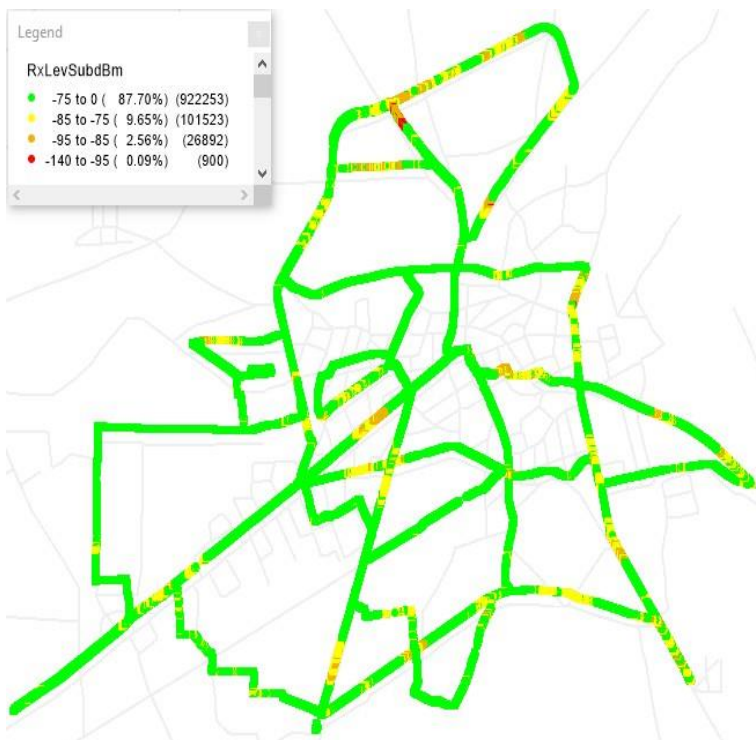
Technology	Coverage %
4G	99.93%



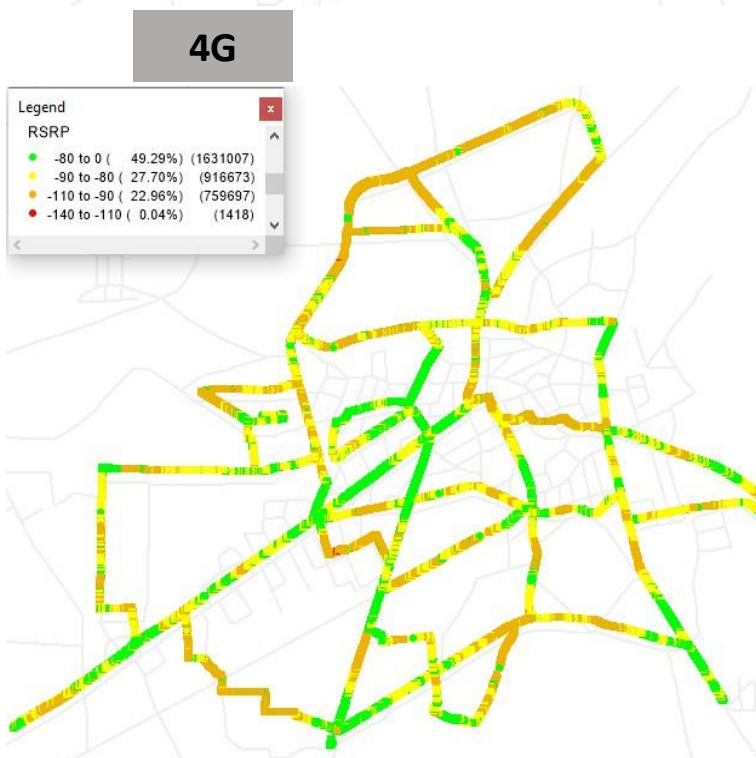
4G /			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	5883	66.91%	
[-80, >=-90)	2195	24.96%	
[-90, >=-110)	709	8.06%	
[-110, >=Min)	6	0.07%	
<b>Total</b>	<b>8793</b>	<b>100%</b>	

## VIL

	Technology	Coverage Rate %
2G	2G	97.35 %
	4G	99.96%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	922253	87.70%	
[-75, >=-85)	101523	09.65%	
[-85, >=-95)	26892	02.56%	
[-95, >=Min)	900	00.09%	
<b>Total</b>	<b>1051568</b>	<b>100%</b>	

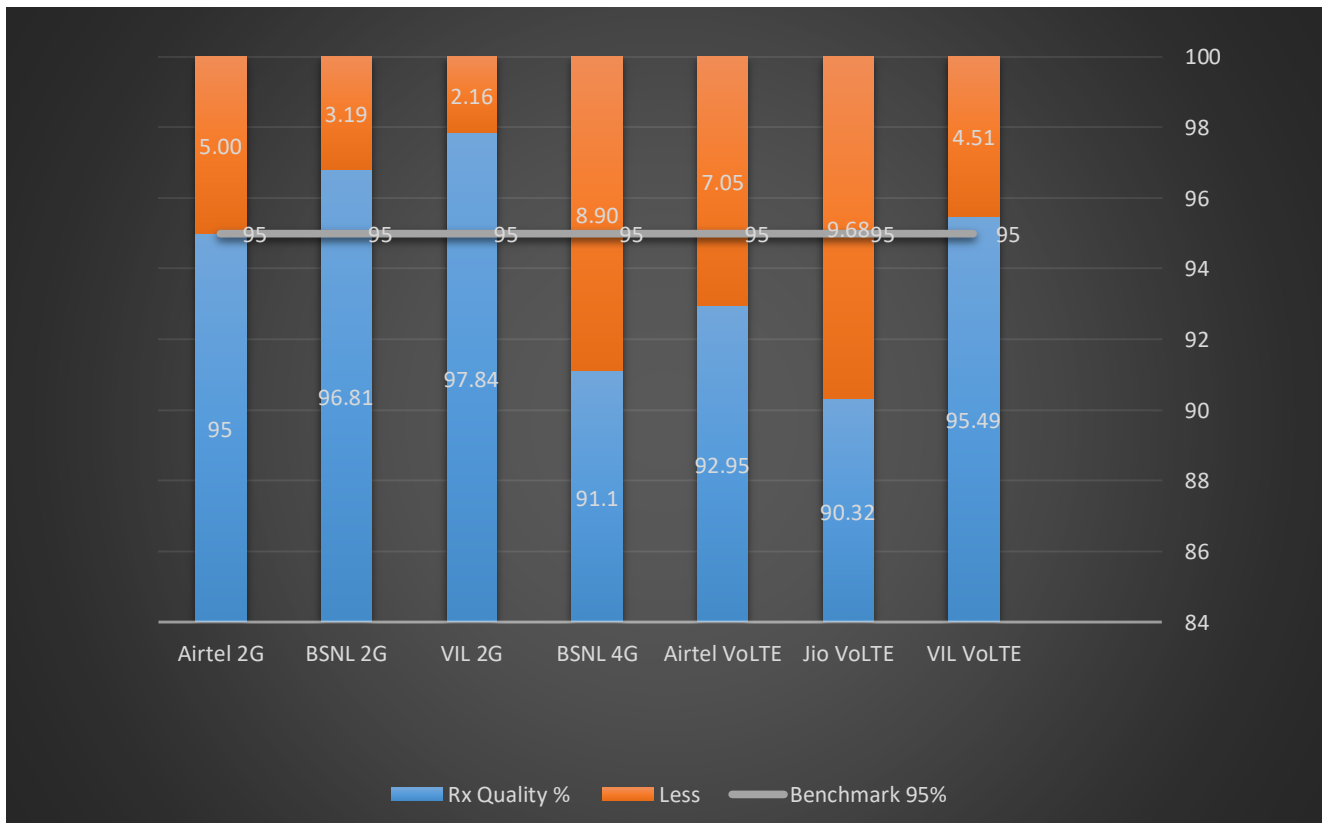


4G /			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	1631007	49.29%	
[-80, >=-90)	916673	27.70%	
[-90, >=-110)	759697	22.96%	
[-110, >=Min)	1418	00.04%	
<b>Total</b>	<b>3308795</b>	<b>100</b>	

## 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 4G 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%
BSNL 2G	96.81%
VIL 2G	97.84%
BSNL 4G	91.1%
Airtel 4G	92.95%
Jio 4G	90.32%
VIL 4G	95.49%



## II. Quality Details

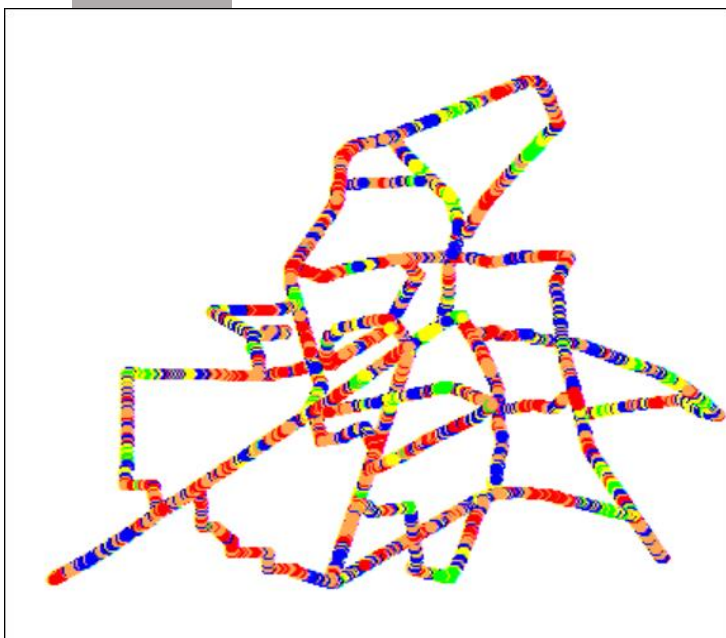
### Airtel

	Technology	Rx Quality %
2G	2G	95%
	4G	92.95%



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	608655	89%	
(2, <=3)	14994	2%	
(3, <=4)	14751	2%	
(4, <=5)	12962	2%	
(5, <=Max)	33180	5%	
<b>Total</b>	<b>684542</b>	<b>100%</b>	

### 4G

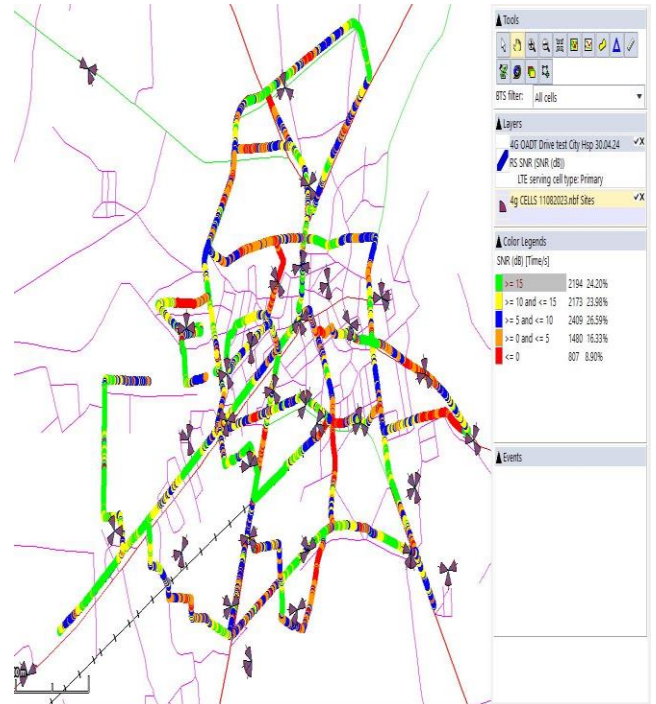
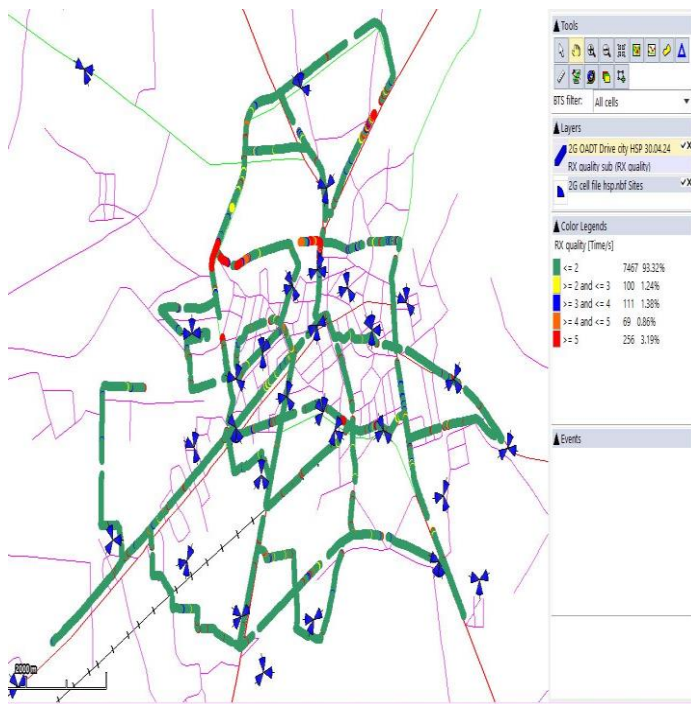


Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	323972	7%	
(0, <=5)	754707	13%	
(5, <=10)	1582004	27%	
(10, <=15)	2952836	50%	
(15, <=Max)	172422	3%	
<b>Total</b>	<b>5785941</b>	<b>100%</b>	

## II. Quality Details

### BSNL

	Technology	Rx Quality %	
2G	2G	96.81%	4G
	4G	91.10%	



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	7467	93.32%	
(2, <=3)	100	1.24%	
(3, <=4)	111	1.38%	
(4, <=5)	69	0.87%	
(5, <=Max)	256	3.19%	
<b>Total</b>	<b>8003</b>	<b>100%</b>	

Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	807	8.90%	
(-6, <=-9)	1480	16.33%	
(-9, <=-11)	2409	26.59%	
(-11, <=-14)	2173	23.98%	
(-14, <= Min)	2194	24.20%	
<b>Total</b>	<b>9063</b>	<b>100%</b>	

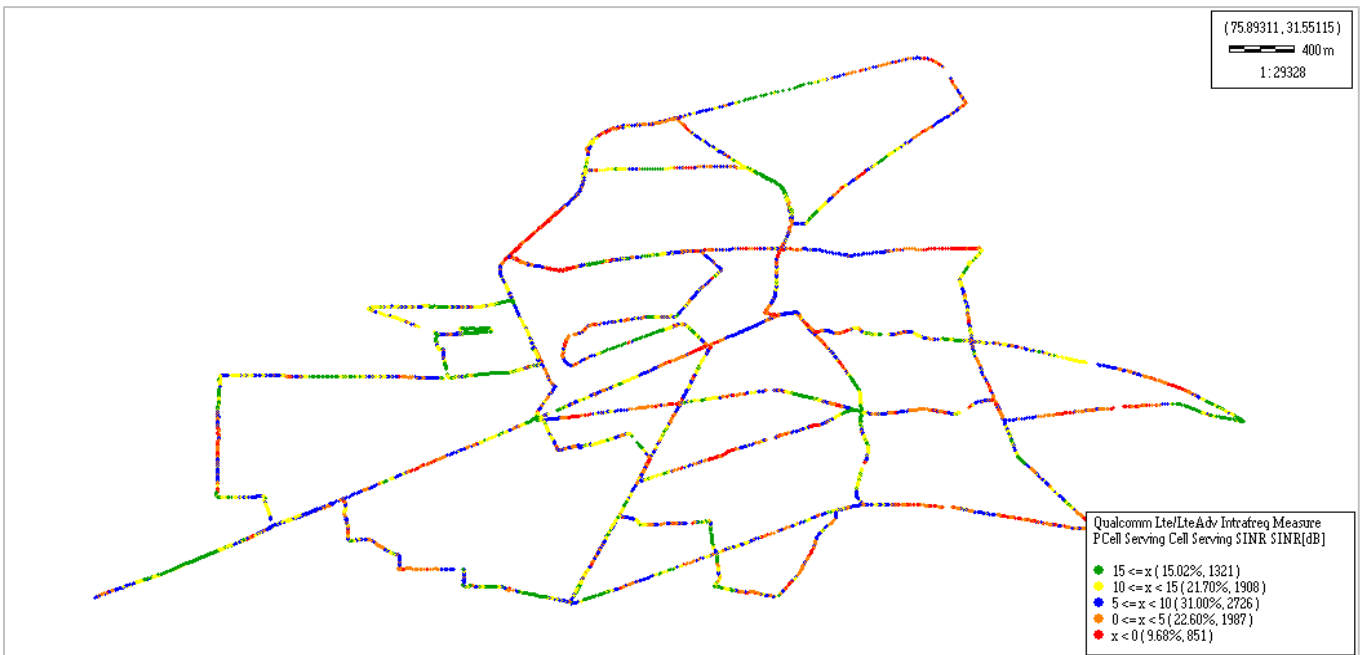


# Quality Details

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 4G 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 %
4G	<b>90.32%</b>



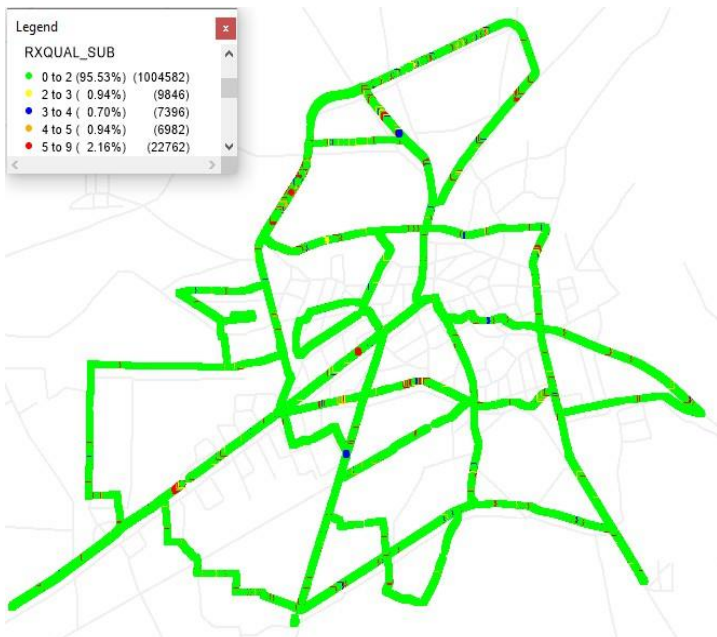
Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	851	9.68%	
(0, $\leq 5$ )	1987	22.60%	
(5, $\leq 10$ )	2726	31.00%	
(10, $\leq 15$ )	1908	21.70%	
(15, $\leq \text{Max}$ )	1321	15.02%	
<b>Total</b>	<b>8793</b>	<b>100%</b>	

## II. Quality Details

### VIL

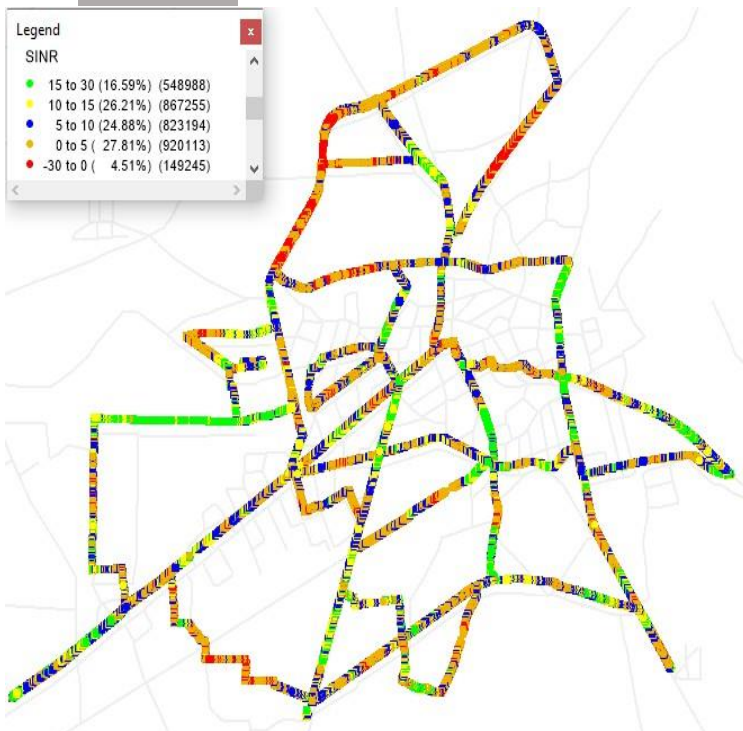
Technology	Rx Quality %
2G	97.84%
4G	95.49%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	1004582	95.53%	
(2, <=3)	9846	0.94%	
(3, <=4)	7396	0.70%	
(4, <=5)	6982	0.66%	
(5, <=Max)	22762	2.17%	
<b>Total</b>	<b>1051568</b>	<b>100%</b>	

4G



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	149245	4.51%	
(0, <=5)	920113	27.81%	
(5, <=10)	823194	24.88%	
(10, <=15)	867255	26.21%	
(15, <=Max)	548988	16.59%	
<b>Total</b>	<b>3308795</b>	<b>100%</b>	

### III. Technology Details

TSP	% of Time Spent on 4G
<b>BSNL 4G</b>	<b>100.00%</b>
<b>Airtel 4G</b>	<b>99.99%</b>
<b>Jio 4G</b>	<b>100.00%</b>
<b>VIL 4G</b>	<b>100.00%</b>

