



## Operator Assisted Drive Test Report

# Ajmer & Pushkar city

19<sup>th</sup> to 22<sup>nd</sup> Sep'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 Pushkar and Ajmer City and Hotspot from 9:00 AM to 7:00 PM during 20<sup>th</sup> to 22<sup>nd</sup> Sep'2023. The drive test covered drive route of 177 KMs & 6 no hotspots over a period of 3 days. Approximately 229 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 from 20<sup>th</sup> Sep to 22<sup>nd</sup> Sep'2023 covering Pushkar and Ajmer 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 177 KMs. Approximately 229 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 177 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

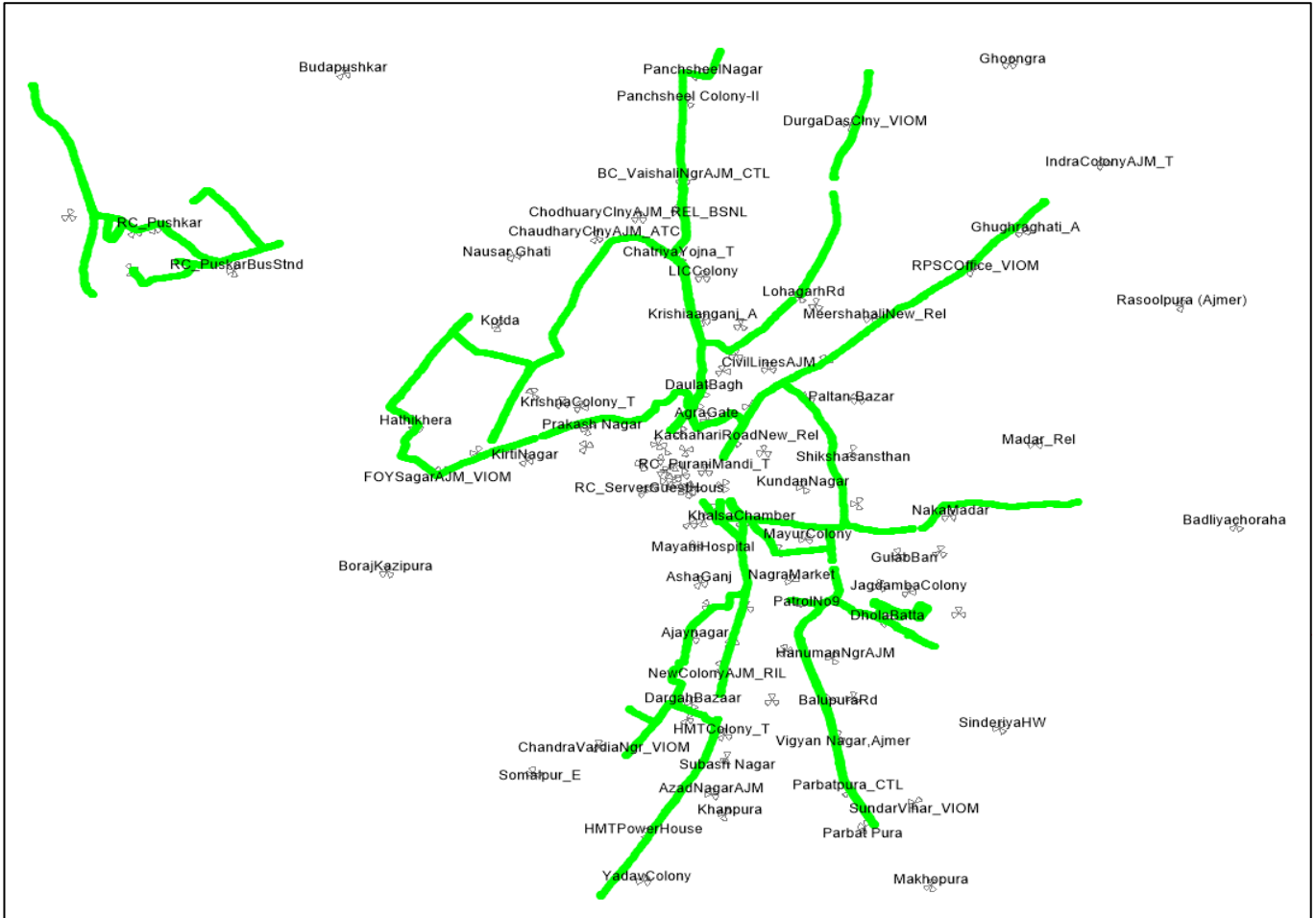
## Static data tests on 6 hotspots

1. Bramha Temple, Pushkar
2. Ajmer Bus stand
3. Ajmer Railway station
4. Ajmer Dargah
5. Wonders park, Ajmer
6. Bajarang garh choraha, Ajmer

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

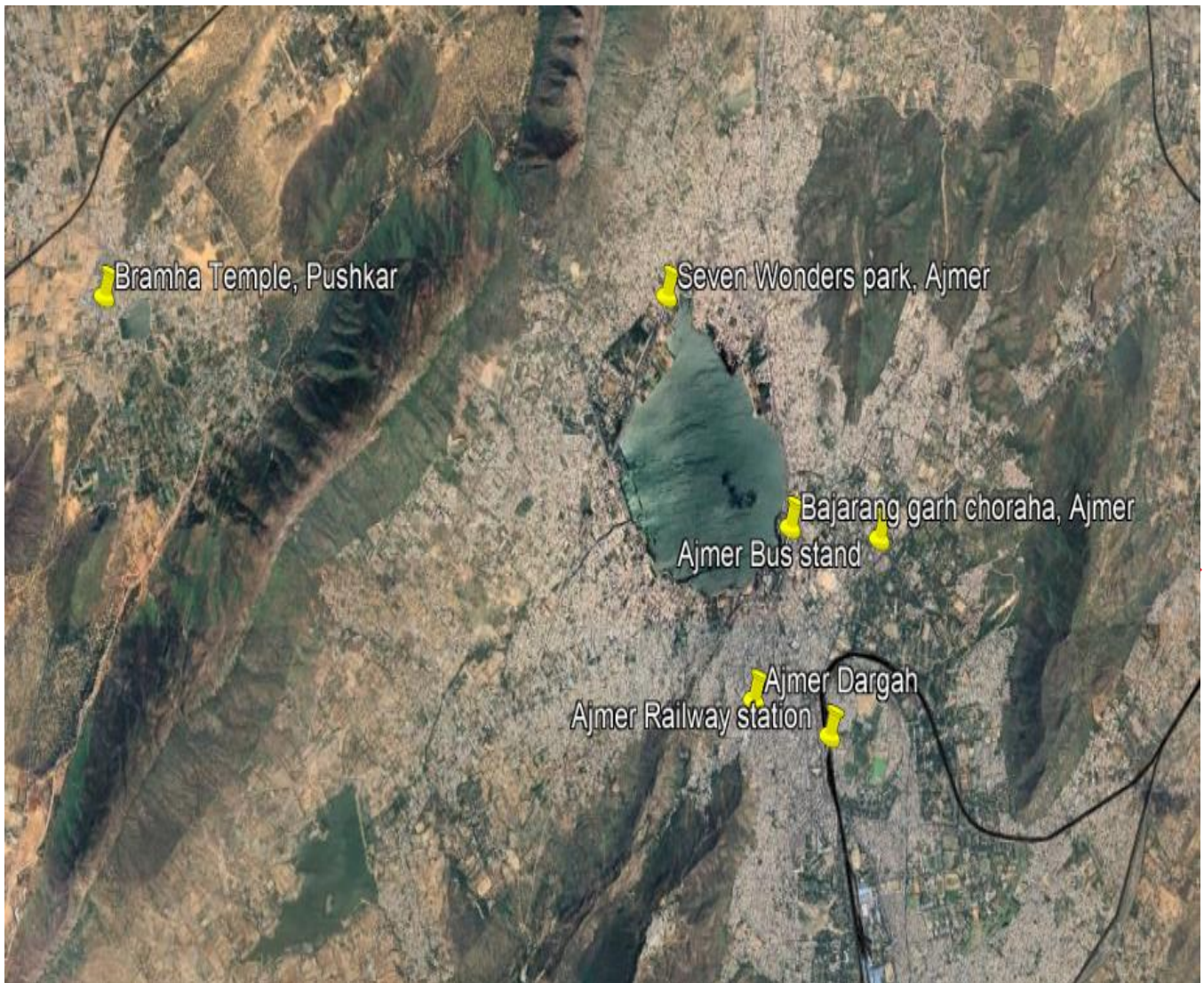
## Voice & Dynamic Data Test Drive Route



Date	Test Scenario	Area to be Covered
19-Sep-23	Hot Spots- 2G/3G/4G Static Data Tests	Static Hotspot – 1) Bramha temple.
20-Sep-23	2G/3G/4G Voice and 3G/4G Dynamic Data	Pushkar City drive test.
21-Sep-23	2G/3G/4G Voice and 3G/4G Dynamic Data	Starting point Ajmer City 9.30 AM at BSNL Office ( Agra Gate ) – Railway Station- Martin bridge – Kesar ganj – Ram ganj- HMT- panchwati circle – chandravardai nagar – adarsh nagar – Makhupara – 9 number petrol pump – Mayo college – Raja cycle circle – CRPF Bridge – Army Cant – railway DRM office – Bus stand – High court – RPSC- MDS university – Kayad – SP office – Savirti college – Ajmer club – Jawahar Rangmanch – Bajrang garh circle - Chopati – bioscopre mall - Man singh palace – Vailshali nagar – Masala chowk – 7 Wonders – Mittal hospital – FOY sagar road - Lake view hotel – Agra gate – Dargah – Madar gate.
22-Sep-23	Hot Spots- 2G/3G/4G Static Data Tests	Static Hotspots – 2)Ajmer Railway station , 3) Ajmer Bus stand , 4)Ajmer Dargah , 5) 7 Wonders park , 6) Bajrang garh choraha.

# Overview

## Data Service Test- Static Locations

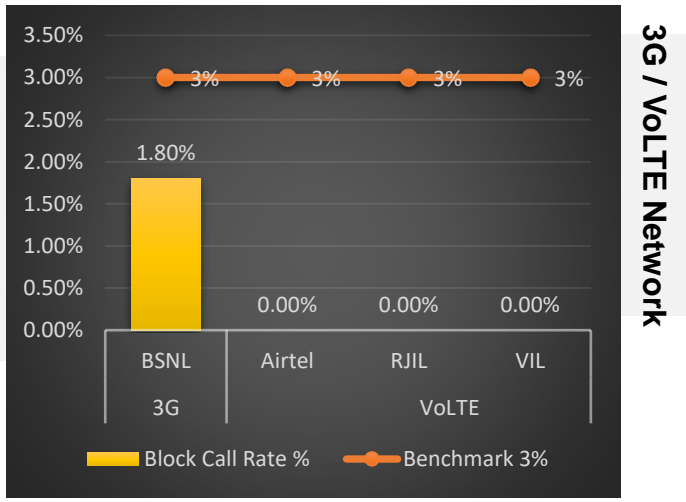
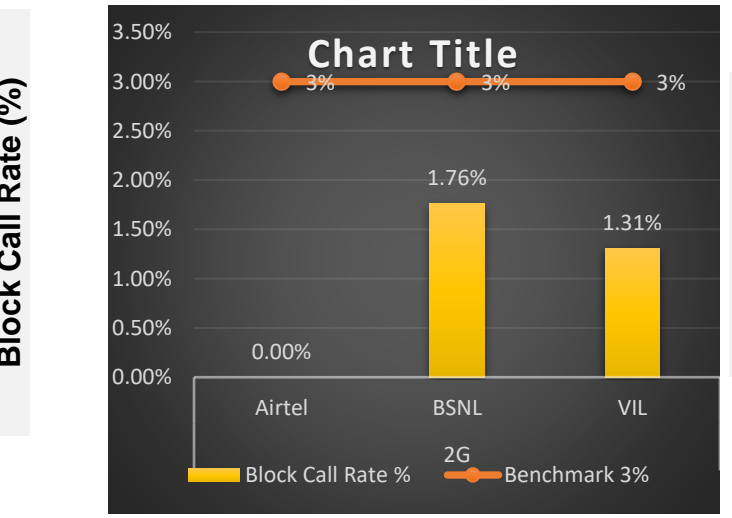
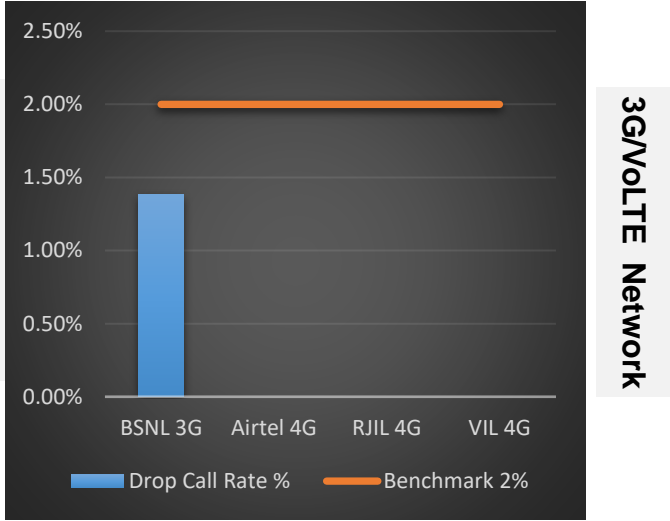
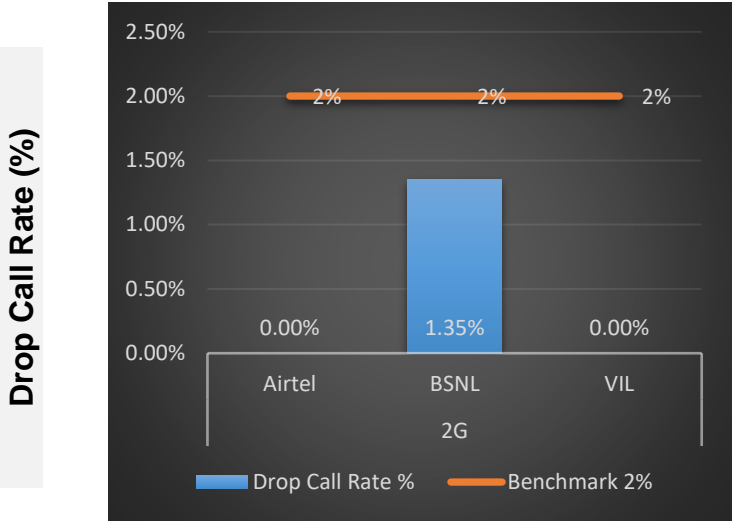


Hotspot Location
Location 1 - Brahma Temple
Location 2- Bus Stand
Location 3- Railway Station
Location 4- Dargah
Location 5- Seven Wonders
Location 6- Bajarang Garh Choraha

# Voice Calls

## Key Observations

QoS compliance of the TSPs in Ajmer & Pushkar City for Voice across technologies 2G/3G/4G-VoLTE:



KPIs	2G			3G	4G		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0.00%	1.35%	0.00%	1.38%	0.00%	0.00%	0%
Block Call Rate %	0.00%	1.76%	1.31%	1.8%	0.00%	0.00%	0%

- 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 %	90.10%	95.04%	91.47%

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

TSPs	3G
	BSNL
Coverage %	95.01%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99.96%	99.75%	99.18%

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	16.61%	100%	100.00%	100%

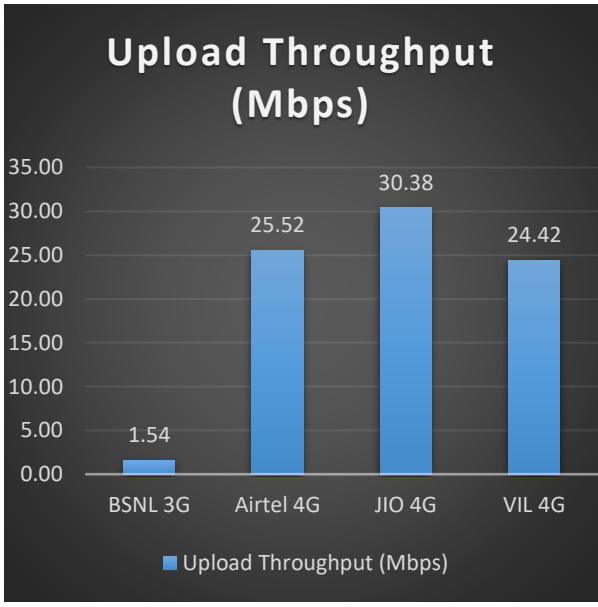
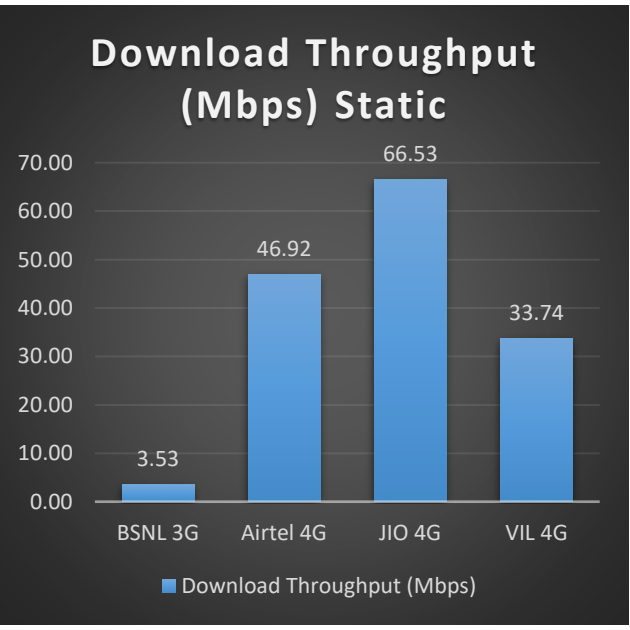
# Data Services Static

## 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)

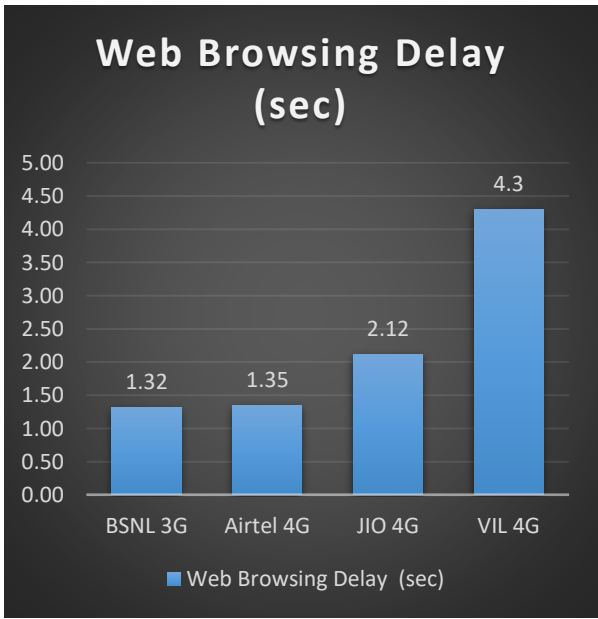
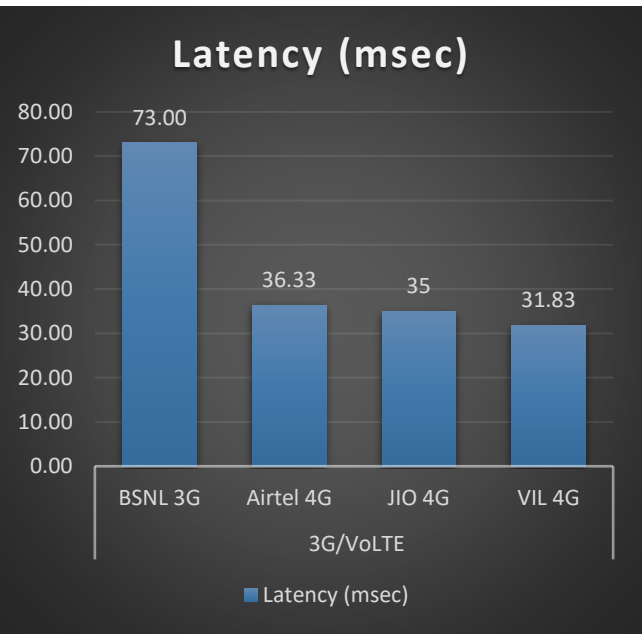
### Data Download and Upload Performance Static (Mbps)

3G/4G/ Network:



### Latency (ms)

### Web Browsing (Sec)



# Data Services Dynamic

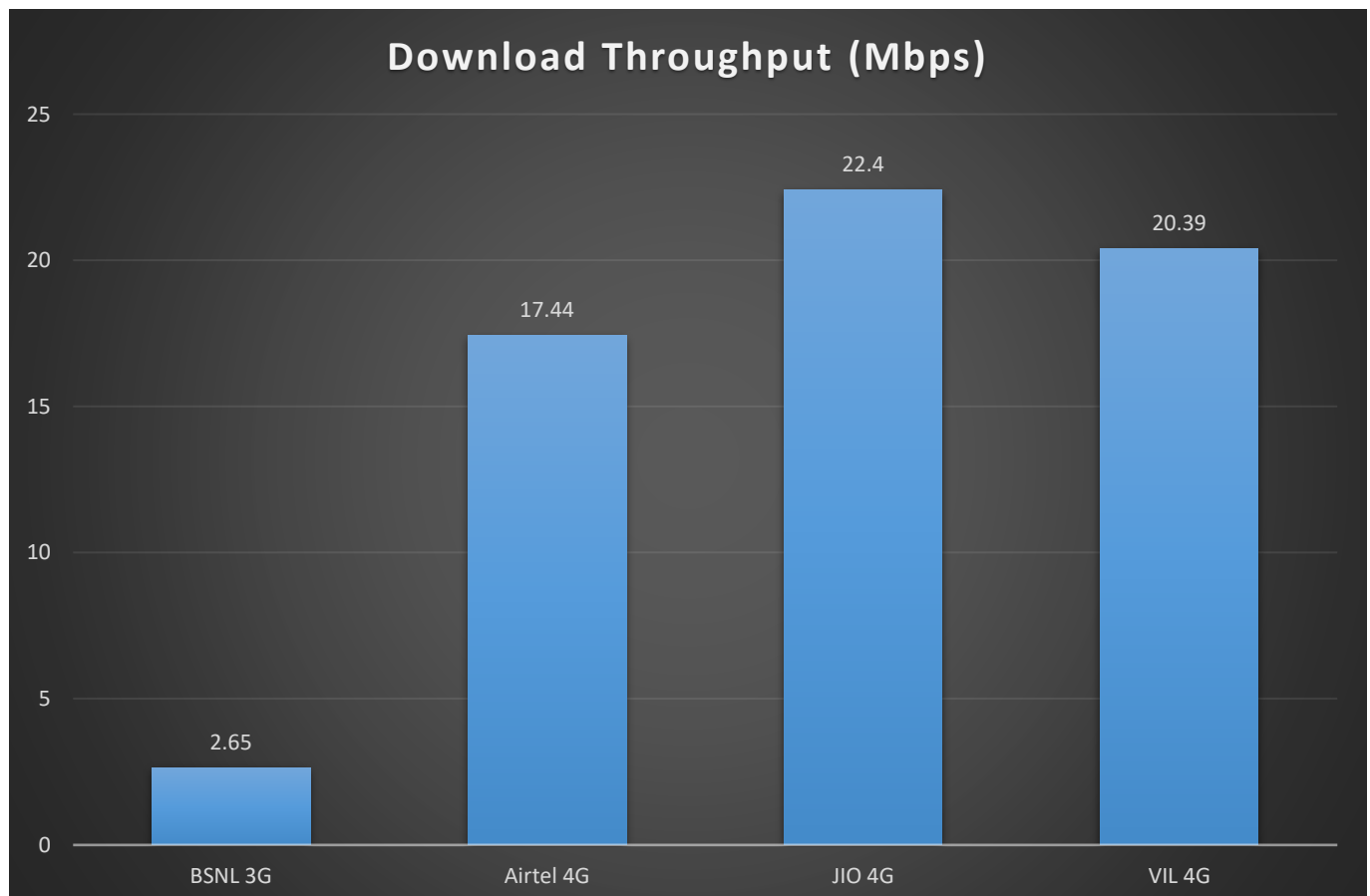
**Key Observations**

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)	<b>2.65</b>	<b>17.44</b>	<b>22.4</b>	<b>20.39</b>





# Summary

## City Level Summary-Voice

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	198	227	229
Blocked Call Rate (%)	0.00%	1.76%	1.31%
CSSR% (Accessibility)	100%	98.24%	98.69%
Drop Call Rate (%)	0.00%	1.35%	0.00%
Mobility HOSR (%)	100%	97.49%	99.66%
Rx Quality (%)	98.53%	95.1%	96.32%
Average CST Sec	2.3	2.48	3.17

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	222	198	229	212
Blocked Call Rate (%)	1.8%	0.00%	0.00%	0.00%
CSSR% (Accessibility)	98.2%	100%	100%	100%
Drop Call Rate (%)	1.38%	0.00%	0.00%	0.00%
Mobility HOSR (%)	99.27%	100%	99.58%	97.82%
Rx Quality (%)	95.61%	98.76%	94.38%	95.70%
Average CST Sec	3.18	0.2	0.68	0.53

# Summary

## City Level Summary- Data Services

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	219.33	170	262.68
Upload Throughput (kbps)	206.67	61	217.13
Web Browsing Delay (sec)	12.12	1.35	32.6
Latency (msec)	209.17	226	221.66

Data Services Static	3G / 4G			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	3.53	46.92	66.53	33.74
Upload Throughput(Mbps)	1.54	25.52	30.38	24.42
Video Streaming Delay (sec)	-	0.25	0.34	1.61
Web Browsing Delay (sec)	1.32	1.35	2.12	4.3
Latency (msec)	73	36.33	35	31.83

<u>Brahma Temple</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	210	239	232.68
Upload Throughput (kbps)	200	54	166.52
Web Browsing Delay (sec)	11.46	1.22	34.28
Latency (msec)	224	400	233

<u>Bus Stand Ajmer</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	220	108	278.09
Upload Throughput (kbps)	220	78	247.89
Web Browsing Delay (sec)	12.28	1.29	32.39
Latency (msec)	232	239	239

<u>Railway Station</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	200	130	332.05
Upload Throughput (kbps)	210	80	299.68
Web Browsing Delay (sec)	11.36	1.45	34.37
Latency (msec)	246	129	223

<u>Dargah</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	210	239	238.86
Upload Throughput (kbps)	200	24	153.70
Web Browsing Delay (sec)	11.86	1.39	31.73
Latency (msec)	184	204	180

<u>Seven Wonders</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	220	128	263.26
Upload Throughput (kbps)	200	46	252.76
Web Browsing Delay (sec)	11.46	1.34	30.56
Latency (msec)	238	239	232

<u>Bairang garh Charaha</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	200	178	231.17
Upload Throughput (kbps)	210	86	187.36
Web Browsing Delay (sec)	11.88	1.42	32.30
Latency (msec)	248	145	223

# Data Services static

<u>Brahma Temple</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	2.63	41.88	77.17	14.24
Upload Throughput (mbps)	1.96	26.82	22.96	15.31
Video Streaming Delay ( Secs.)	-	0.13	0.33	2.0
Web Browsing Delay (sec)	1.32	1.1	1.82	3.9
Latency (msec)	180	36	38	34

<u>Bus Stand Ajmer</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	4.77	55.35	41.19	27.14
Upload Throughput (mbps)	1.78	23.25	20.63	15.31
Video Streaming Delay ( Secs.)	-	0.18	0.35	1.2
Web Browsing Delay (sec)	1.32	1.2	2.3	4.2
Latency (msec)	49	32	35	43

<u>Railway Station</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	4.50	78.24	83.34	56.01
Upload Throughput (mbps)	2.53	31.78	22.82	32.64
Video Streaming Delay ( Secs.)	-	0.12	0.33	1.3
Web Browsing Delay (sec)	1.34	0.8	2.36	4.3
Latency (msec)	59	34	33	24

# Data Services static

<u>Dargah</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	4.76	48.56	65.99	31.49
Upload Throughput (mbps)	1.57	23.26	28.97	23.01
Video Streaming Delay ( Secs.)	-	0.31	0.36	1.7
Web Browsing Delay (sec)	1.34	1.1	1.94	5.3
Latency (msec)	50	38	31	27

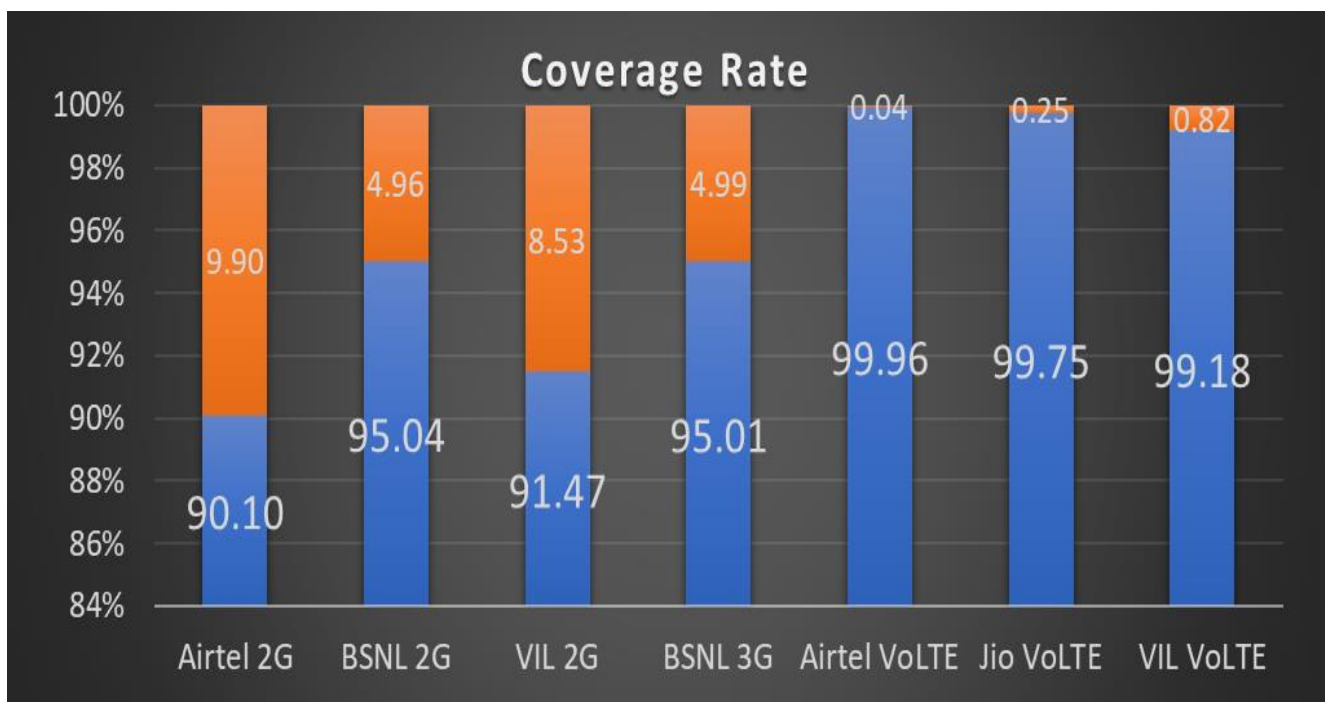
<u>Seven Wonders</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	2.06	58.24	68.81	26.16
Upload Throughput (mbps)	1.45	26.77	38.44	27.28
Video Streaming Delay ( Secs.)	-	0.19	0.33	1.6
Web Browsing Delay (sec)	1.32	1.1	1.99	3.3
Latency (msec)	49	28	30	41

<u>Bajrang garh Charaha</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	2.46	58.78	62.66	47.41
Upload Throughput (mbps)	1.54	32.46	48.44	33.07
Video Streaming Delay ( Secs.)	-	0.26	0.34	1.9
Web Browsing Delay (sec)	1.26	1.3	2.3	4.8
Latency (msec)	51	36	43	22

## 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	90.10%
BSNL 2G	95.04%
VIL 2G	91.47%
BSNL 3G	95.01%
Airtel VoLTE	99.96%
Jio VoLTE	99.75%
VIL VoLTE	99.18%



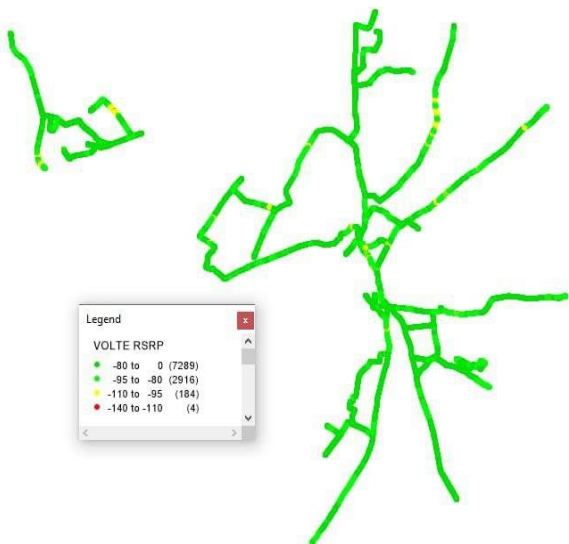
## TSP-AIRTEL

	Technology	Coverage %
2G	2G	90.10%
	VoLTE	99.96%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	7265	70.18%	Green
[-75, >=-85)	2994	28.92%	Yellow
[-85, >=-95)	59	0.56%	Orange
[-95, >=Min)	33	0.34%	Red
<b>Total</b>	<b>10351</b>	<b>100%</b>	

## VoLTE



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	7289	70.13%	Green
[-80, >=-90)	2916	28.06%	Yellow
[-90, >=-110)	184	1.77%	Orange
[-110, >=Min)	4	0.04%	Red
<b>Total</b>	<b>10393</b>	<b>100%</b>	

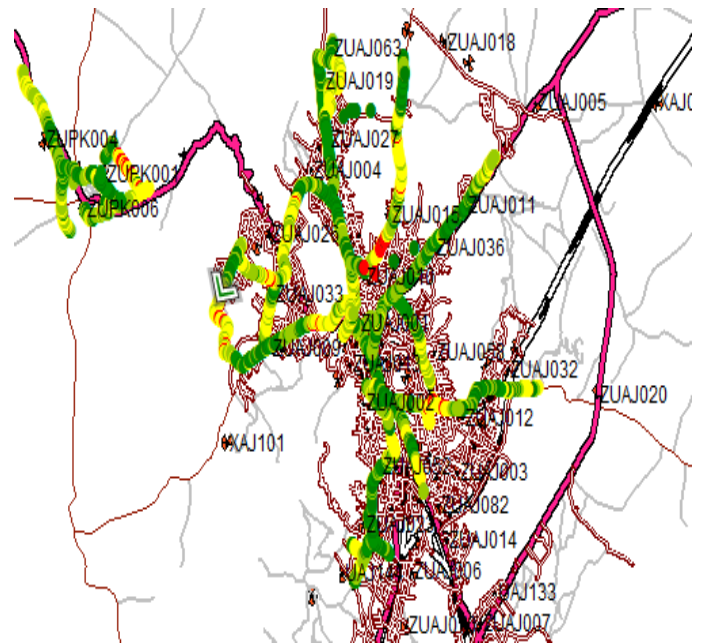
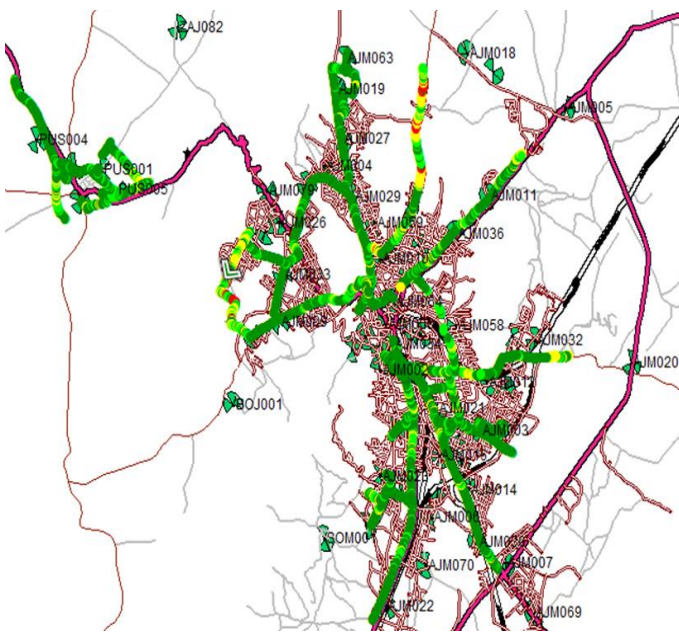


## TSP- BSNL

Technology	Coverage %
2G	95.04%
3G	95.01%

2G

3G

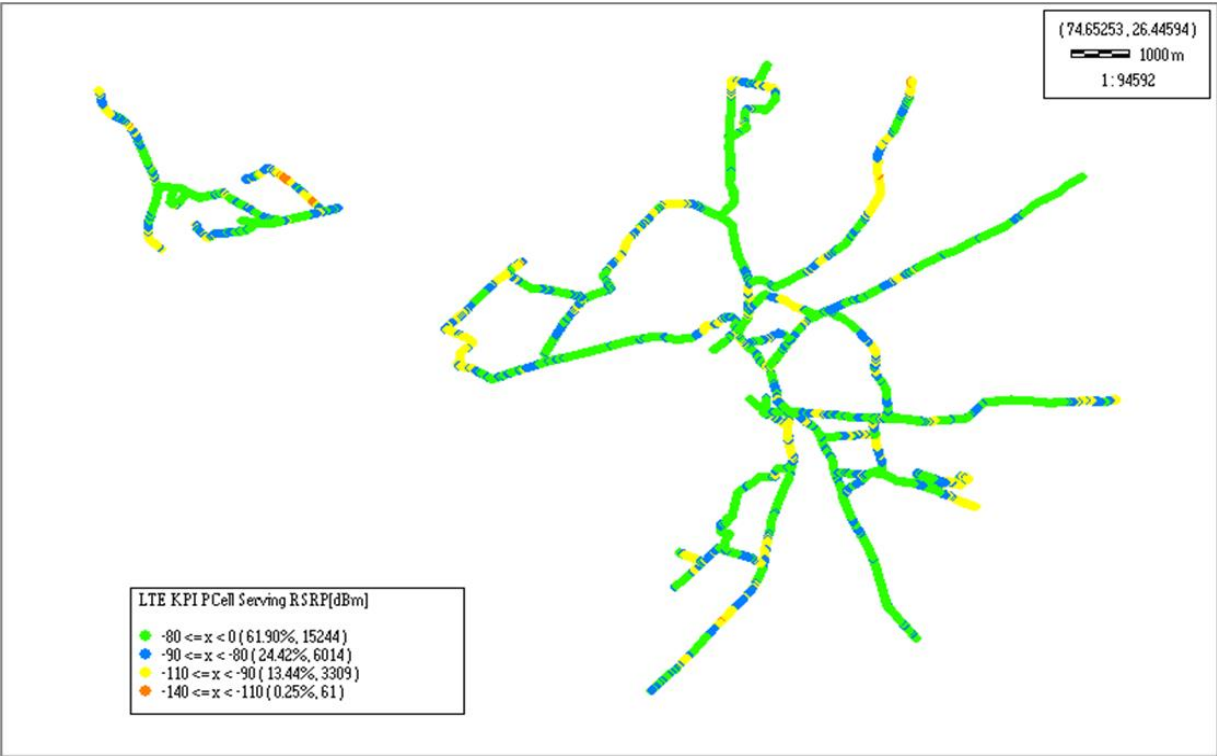


		2G		
Overall RxLevel	# Samples	% PDF	Legends	
[Max, >=-75]	10254	66.47%		
[-75, >=-85)	4409	28.57%		
[-85, >=-95)	742	4.81%		
[-95, >=Min)	22	0.14%		
<b>Total</b>	<b>15427</b>	<b>100%</b>		

		3G		
Overall RSCP	# Samples	% PDF	Legends	
[Max, >=-70]	6477	40.39%		
[-70, >=-80)	5210	32.49%		
[-80, >=-90)	3547	22.12%		
[-90, >=Min)	801	4.99%		
<b>Total</b>	<b>16035</b>	<b>100%</b>		

JIO

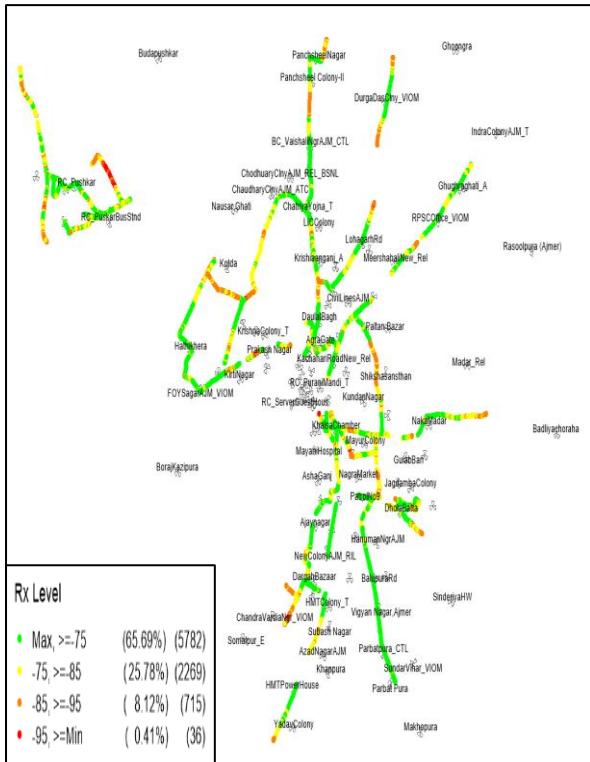
Technology	Coverage %
VoLTE	99.75



VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	15244	61.90%	
[-80, >=-90)	6014	24.42%	
[-90, >=-110)	3309	13.43%	
[-110, >=Min)	61	0.25%	
<b>Total</b>	<b>24628</b>	<b>100%</b>	

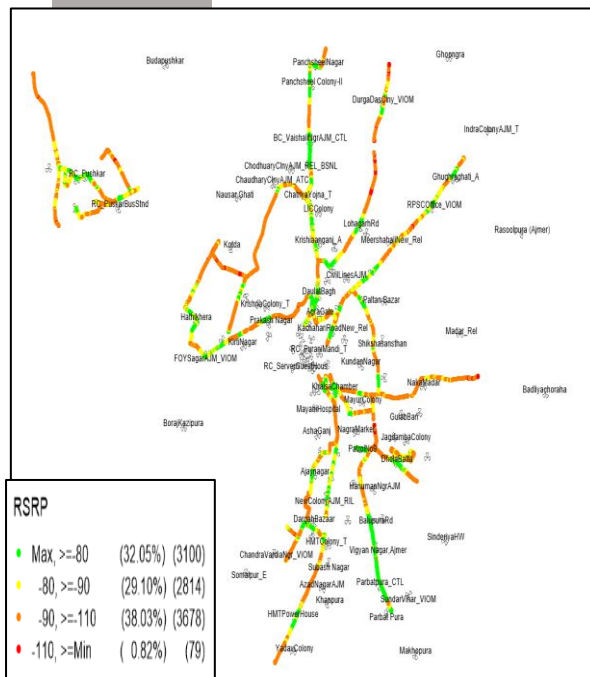
## VIL

	Technology	Coverage Rate %
2G	2G	91.47%
	VoLTE	99.18%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	5782	65.69%	
[-75, >=-85)	2269	25.78%	
[-85, >=-95)	715	8.12%	
[-95, >=Min)	36	0.41%	
<b>Total</b>	<b>8802</b>	<b>100%</b>	

## VoLTE

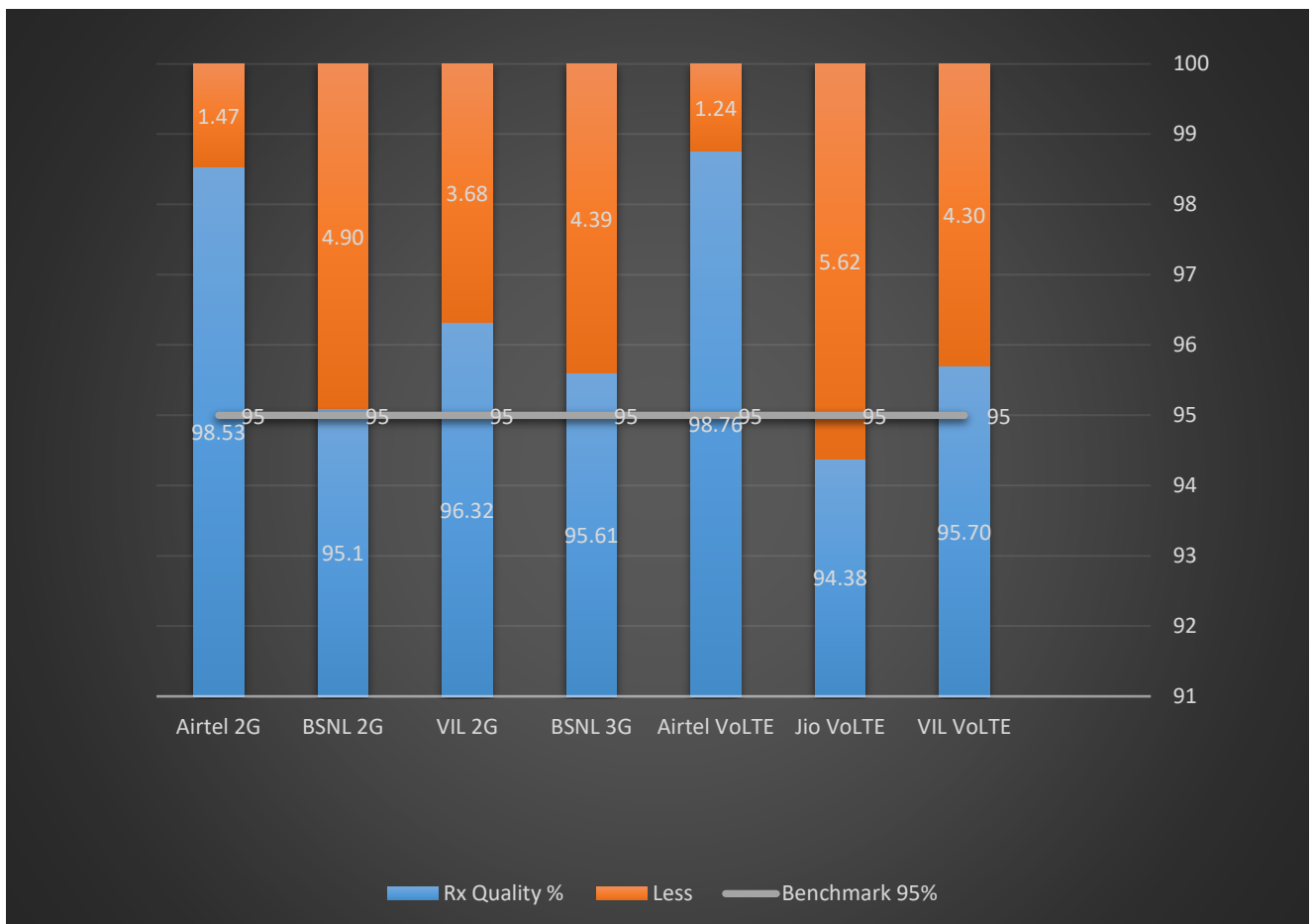


VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	3100	32.05%	
[-80, >=-90)	2814	29.10%	
[-90, >=-110)	3678	38.03%	
[-110, >=Min)	79	0.82%	
<b>Total</b>	<b>9671</b>	<b>100%</b>	

## 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  $\geq 95\%$ .

<u>TSP</u>	Rx Quality %
Airtel 2G	<b>98.53%</b>
BSNL 2G	<b>95.1%</b>
VIL 2G	<b>96.32%</b>
BSNL 3G	<b>95.61%</b>
Airtel VoLTE	<b>98.76%</b>
Jio VoLTE	<b>94.38%</b>
VIL VoLTE	<b>95.70%</b>



## II. Quality Details

### Airtel

Technology	Rx Quality %
2G	98.53%
VoLTE	98.76%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	5281	57.77%	Green
(2, <=3)	2304	25.20%	Yellow
(3, <=4)	1016	11.11%	Blue
(4, <=5)	407	4.45%	Orange
(5, <=Max)	133	1.47%	Red
<b>Total</b>	<b>9141</b>	<b>100%</b>	

VoLTE

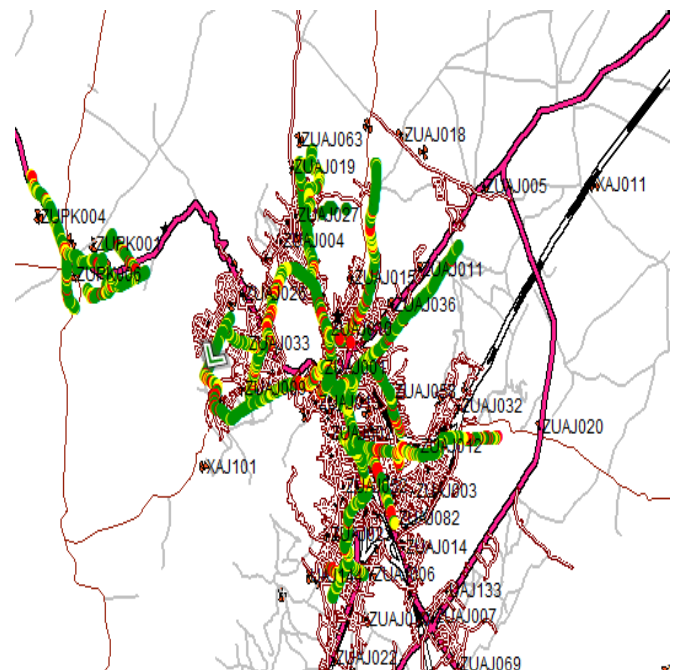
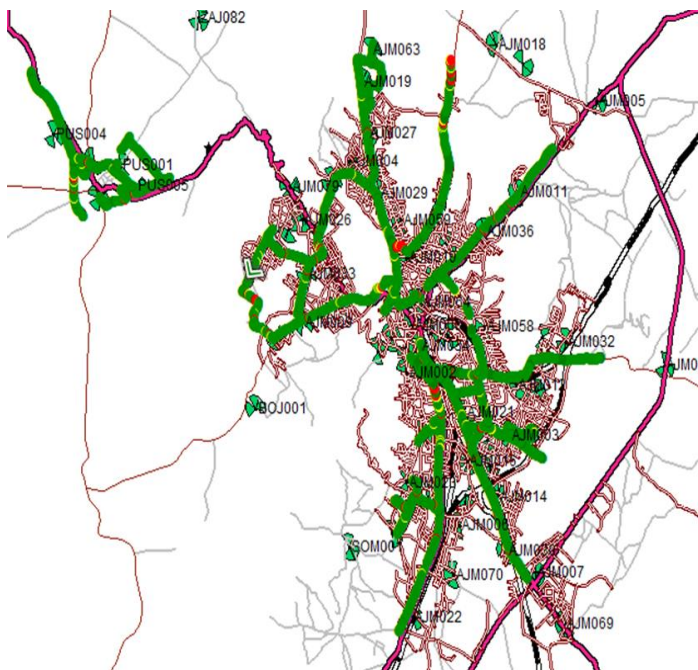


Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	129	1.24%	Red
(0, <=5)	565	5.44%	Orange
(5, <=10)	1141	10.98%	Blue
(10, <=15)	2105	20.25%	Yellow
(15, <=Max)	6453	62.09%	Green
<b>Total</b>	<b>10393</b>	<b>100%</b>	

## II. Quality Details

### BSNL

		Technology	Rx Quality %		
2G		2G	95.1%	3G	
		3G	95.61%		



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	9483	83.98%	
(2, <=3)	411	3.64%	
(3, <=4)	400	3.54%	
(4, <=5)	444	3.93%	
(5, <=Max)	554	4.90%	
<b>Total</b>	<b>11292</b>	<b>100%</b>	

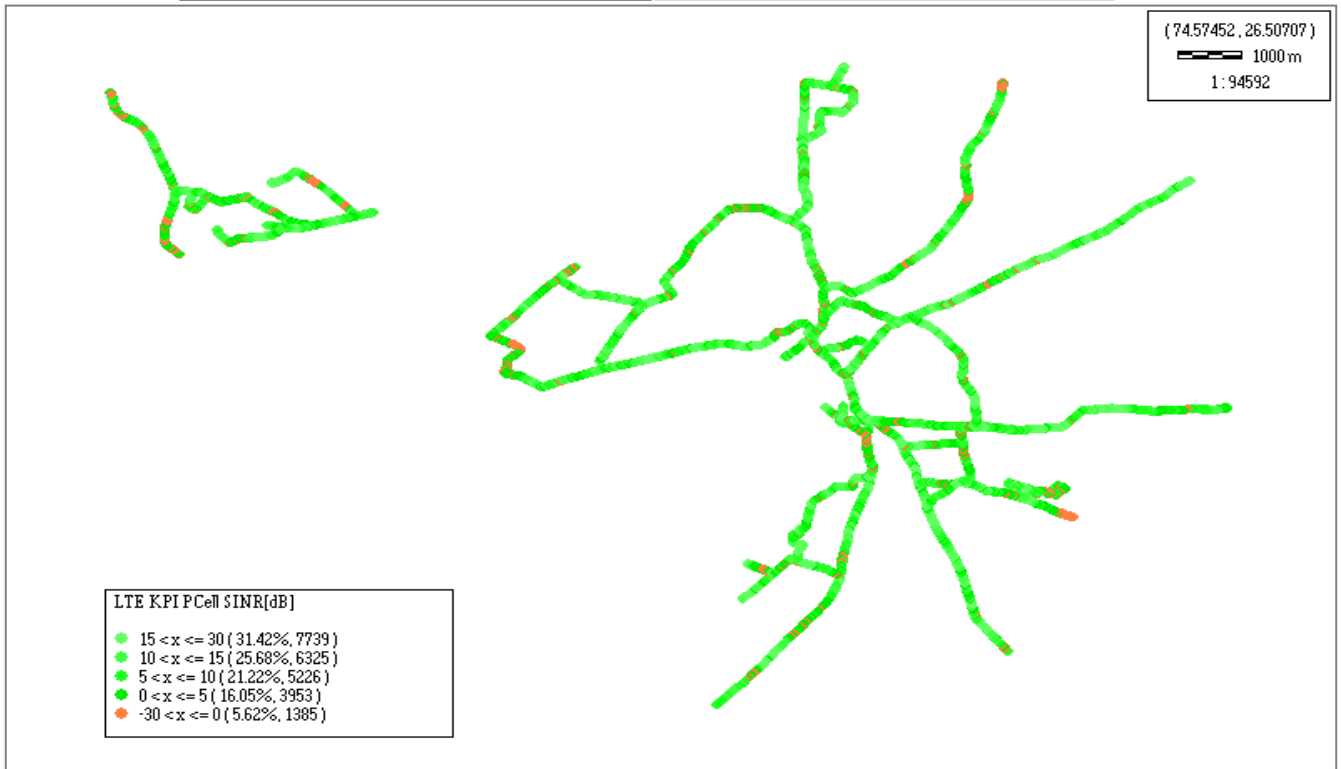
Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	738	4.60	
(-6, <=-9)	1949	12.15	
(-9, <=-11)	8626	53.79	
(-11, <=-14)	4019	25.07	
(-14, <= Min)	703	4.39	
<b>Total</b>	<b>16035</b>	<b>100%</b>	

# 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  $\geq 95\%$ .

## JIO

Technology	Rx Quality %
VoLTE	<b>94.38%</b>



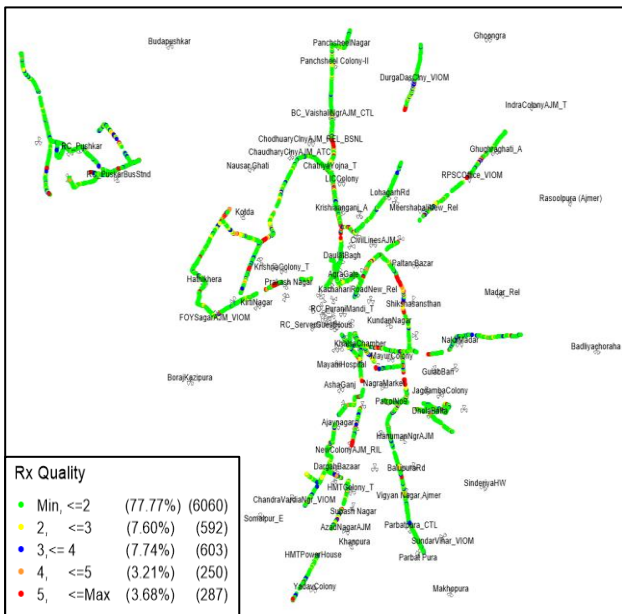
Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	1385	5.62%	
(0, $\leq 5$ )	3953	16.05%	
(5, $\leq 10$ )	5226	21.22%	
(10, $\leq 15$ )	6325	25.68%	
(15, $\leq \text{Max}$ )	7739	31.43%	
<b>Total</b>	<b>24628</b>	<b>100%</b>	

## II. Quality Details

### VIL

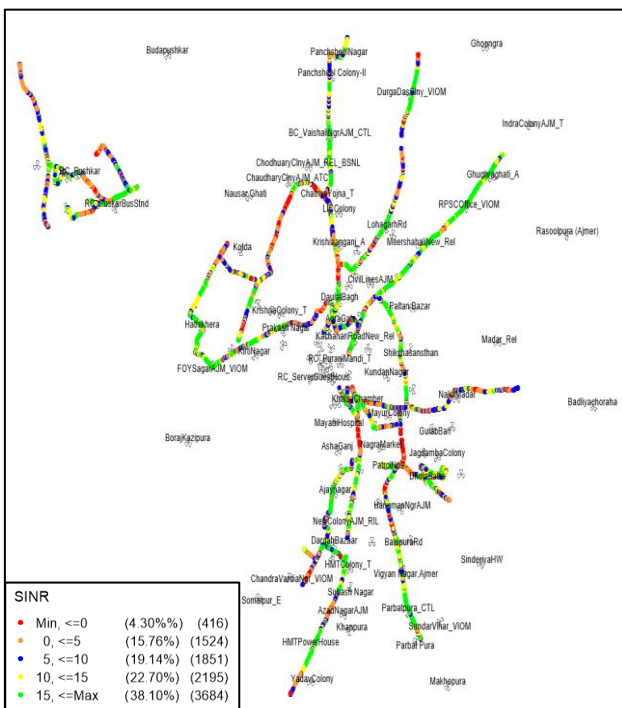
Technology	Rx Quality %
2G	96.32%
4G	95.70%

2G



Overall Rx Quality	# Samples	% PDF	Legend s
(Min, <=2)	6060	77.77%	
(2, <=3)	592	7.60%	
(3, <=4)	603	7.74%	
(4, <=5)	250	3.21%	
(5, <=Max)	287	3.68%	
<b>Total</b>	<b>7792</b>	<b>100%</b>	

### VoLTE



Overall SINR	# Samples	% PDF	Legend s
(Min, <=0)	416	4.30%	
(0, <=5)	1524	15.76%	
(5, <=10)	1851	18.51%	
(10, <=15)	2195	21.95%	
(15, <=Max)	3684	36.84%	
<b>Total</b>	<b>9670</b>	<b>100%</b>	



### III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	16.61%
Airtel VoLTE	100.00%
Jio VoLTE	100.00%
VIL VoLTE	100.00%

