



Operator Assisted Drive Test Report

Rewari City & Nearby Area

24th November to 25th November 2022

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 Rewari City & Nearby area from 9:00 AM to 8:00 PM during 24-11-2022. to 25-11-2022. The drive test covered drive route of 130 KMs & 6 no hotspots over a period of 2 days. Approximately 165 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 24th November 2022 to 25th November 2022 covering Rewari 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 **130** KMs. Approximately **165 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

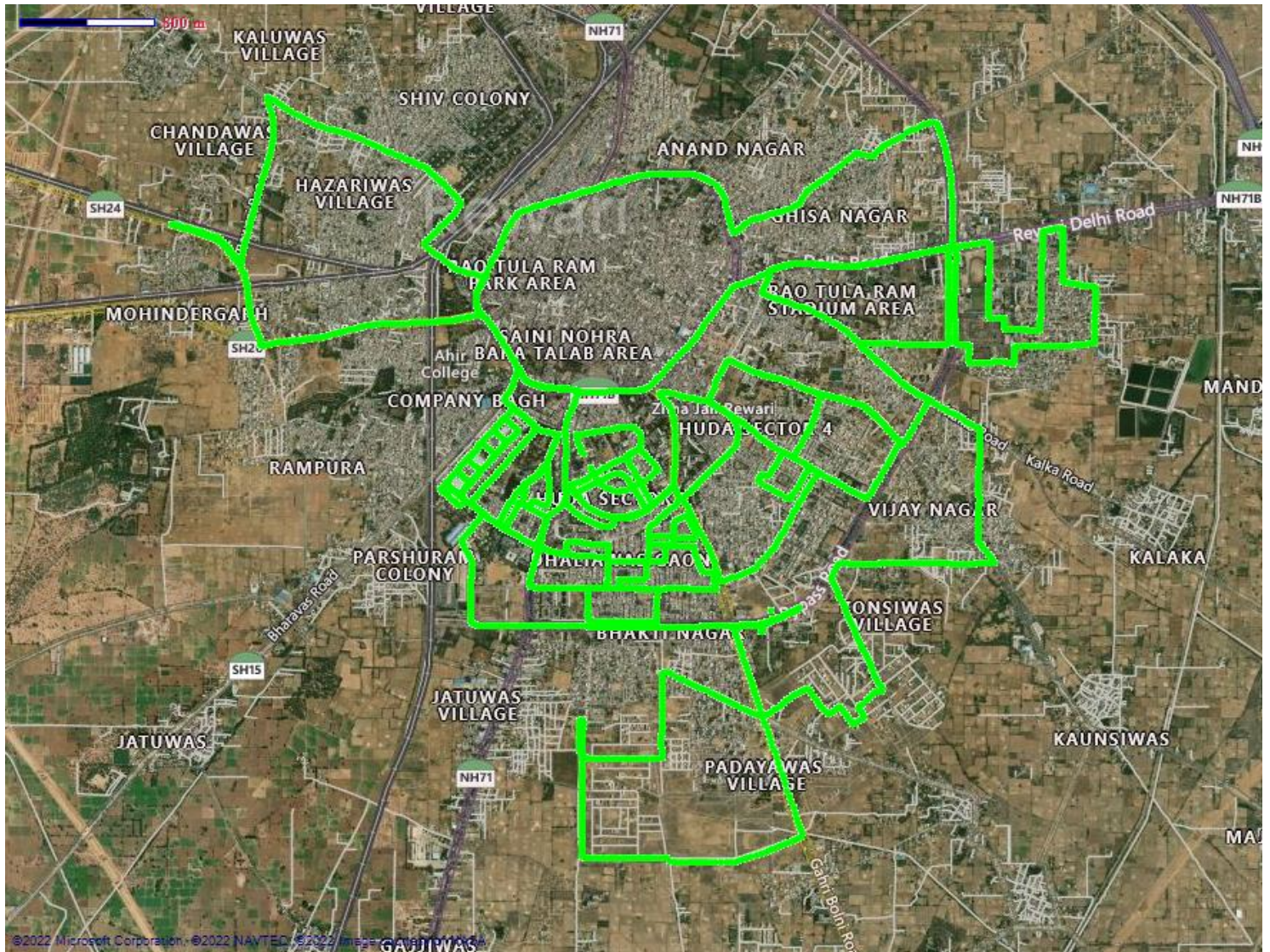
Static data tests on 6 hotspots

Hotspot Locations	
1. District Court	
2. Bus Stand	
3. Railway Station	
4. Civil Hospital	
5. BMG Mall	
6. Model Town, Rewari	

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

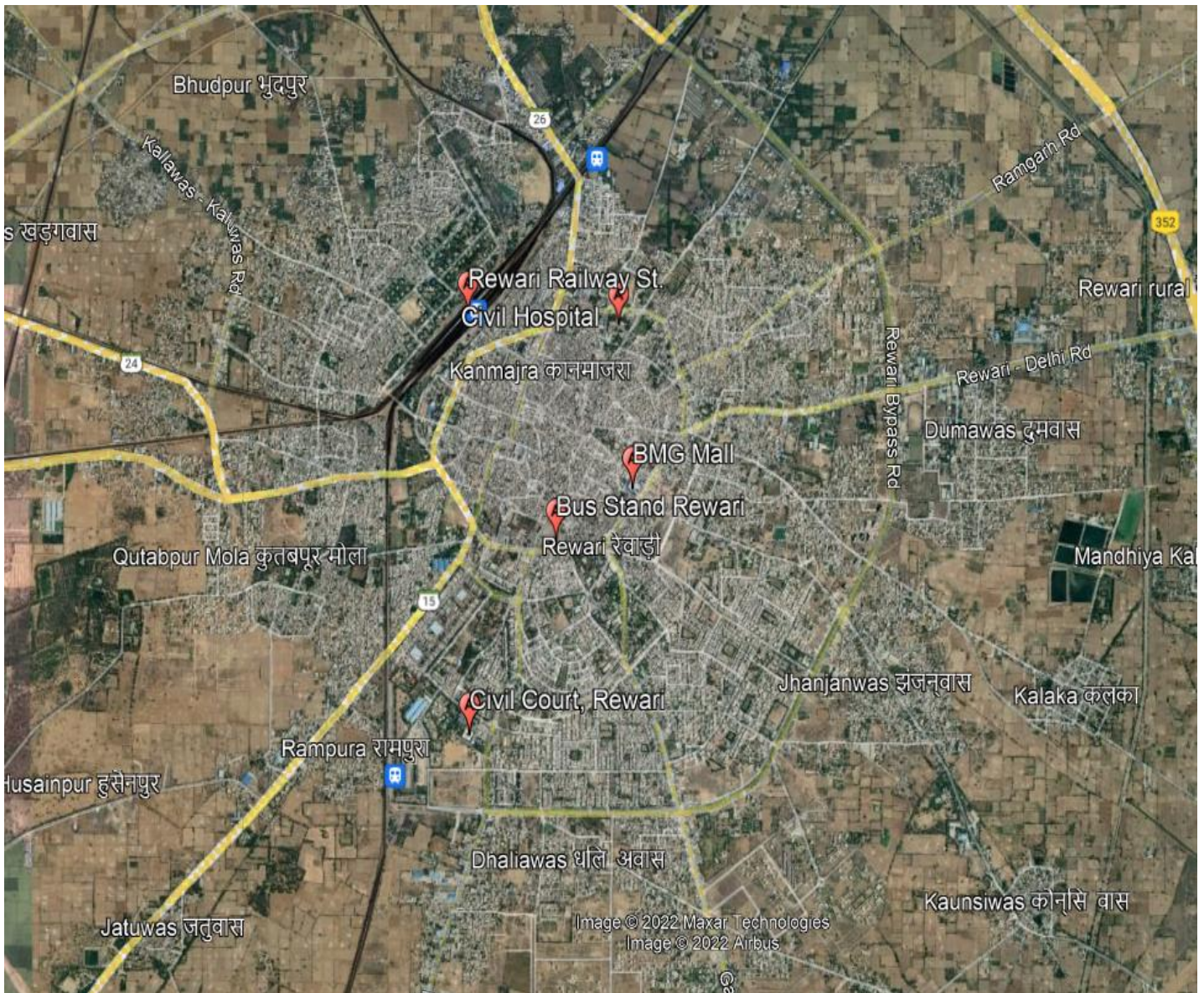
Overview

Voice & Dynamic Data Test Drive Route



Date	Test Scenario	Area to be Covered
24-Nov-22	2G/4G Voice and 4G Dynamic Data	Voice and Data Drive Route: Rewari city sec-2 BSNL start point Rajesh pilot chowk sec-1,sec-2 sec-3 ,and district court Anaj Mandi Bus Stand Ambedkar chowk ,Azad chowk ,Prajapati chowk Poswal chowk ,Dahrurara Chungi sec-4, Shakti Nagar ,Model town.
25-Nov-22	Hot Spot Data	Hotspot : 1-District Court 2-BMG Mall 3-Bus Stand 4-Railway Station 5-Civil Hospital

Data Service Test- Static Locations



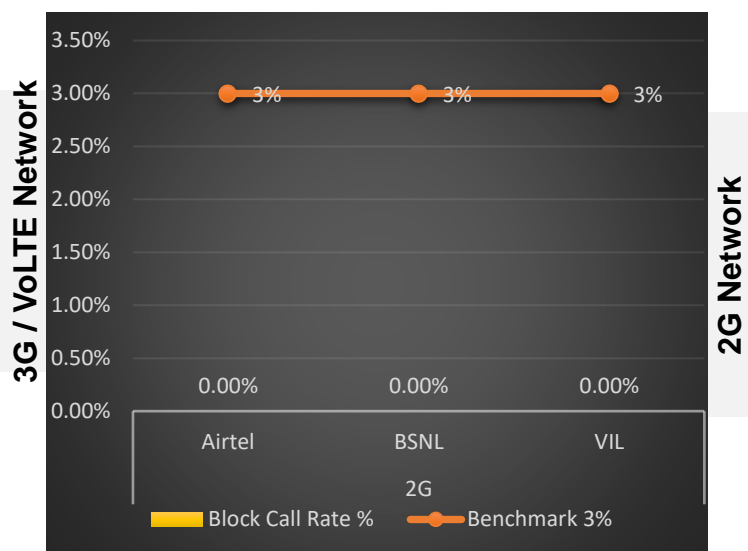
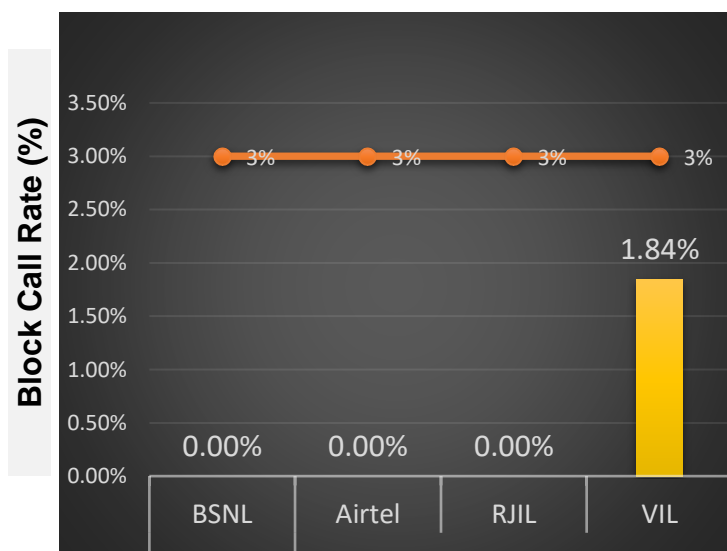
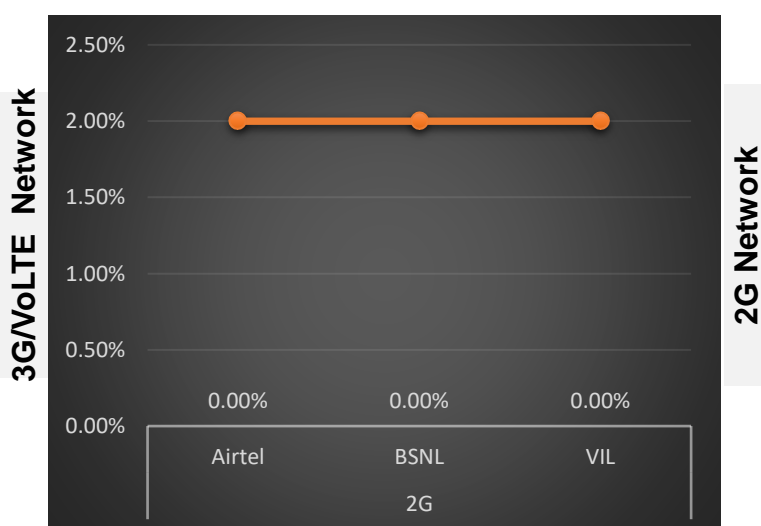
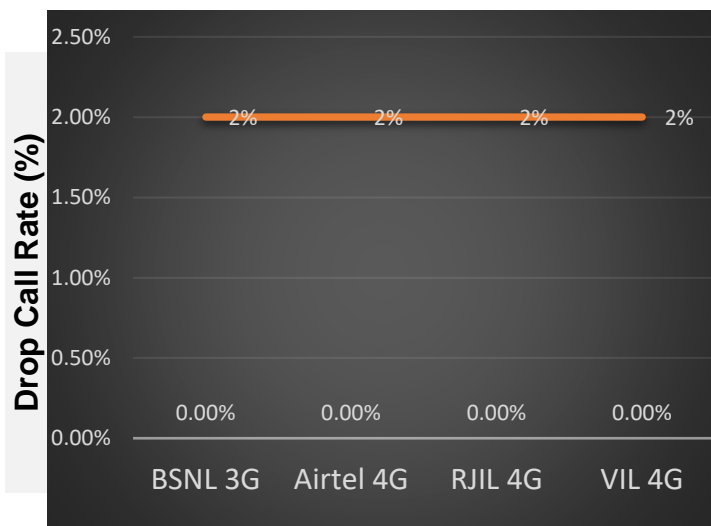
Hotspot Locations

1. District Court
2. Bus Stand
3. Railway Station
4. Civil Hospital
5. BMG Mall
6. Model Town

Voice Calls

Key Observations

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



KPIs	2G			3G	4G		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Block Call Rate %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.84%

- All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%).
- 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 %	98.70%	99.76%	99.00%

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

TSPs	3G
	BSNL
Coverage %	92.28%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	98.78%	99.74%	99.88%

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	69.77%	100.00%	100.00%	100.00%

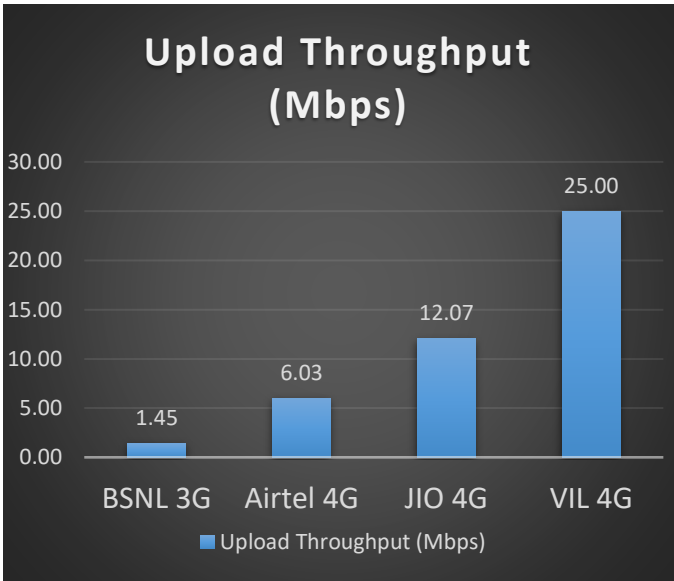
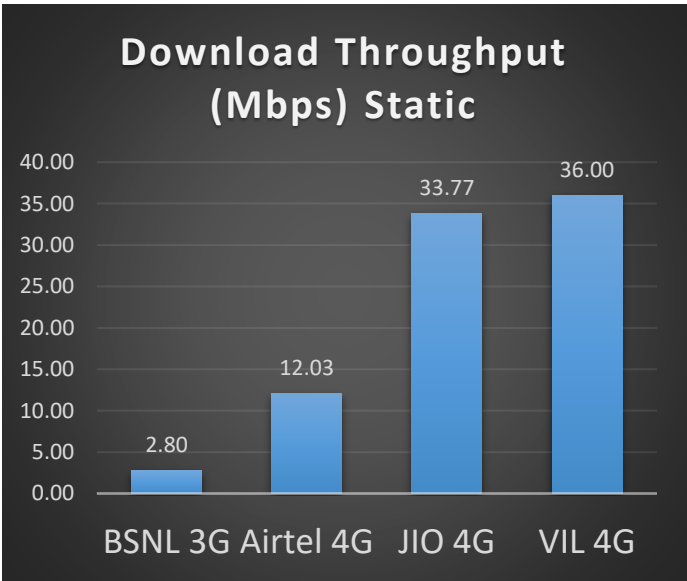
Data Services Static

Key Observations

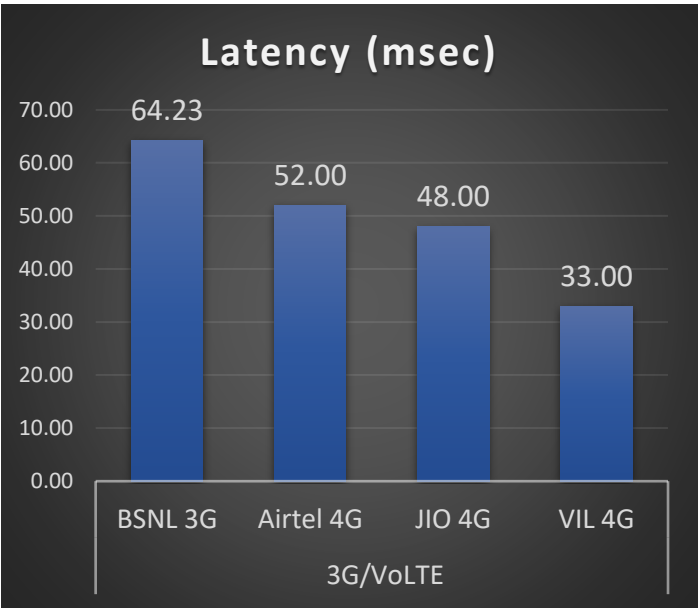
Data was tested at 6 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, Paytm)

Data Download and Upload Performance Static (Mbps)

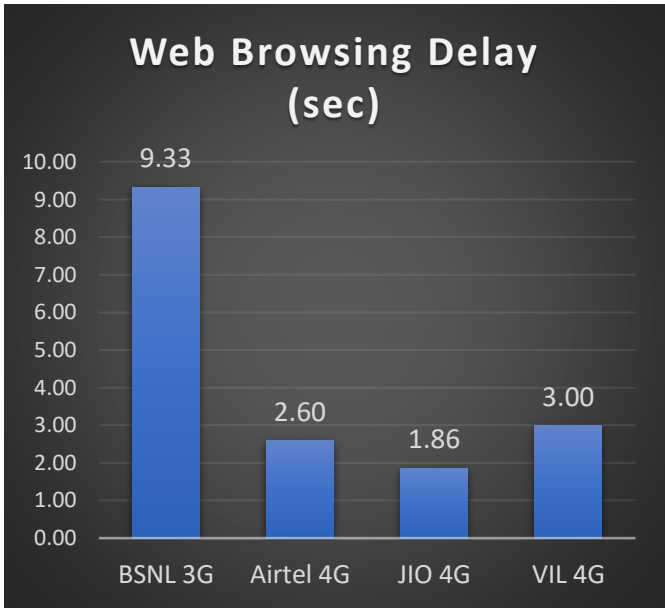
3G/4G/ Network:



Latency (ms)



Web Browsing (Sec)



Data Services Dynamic

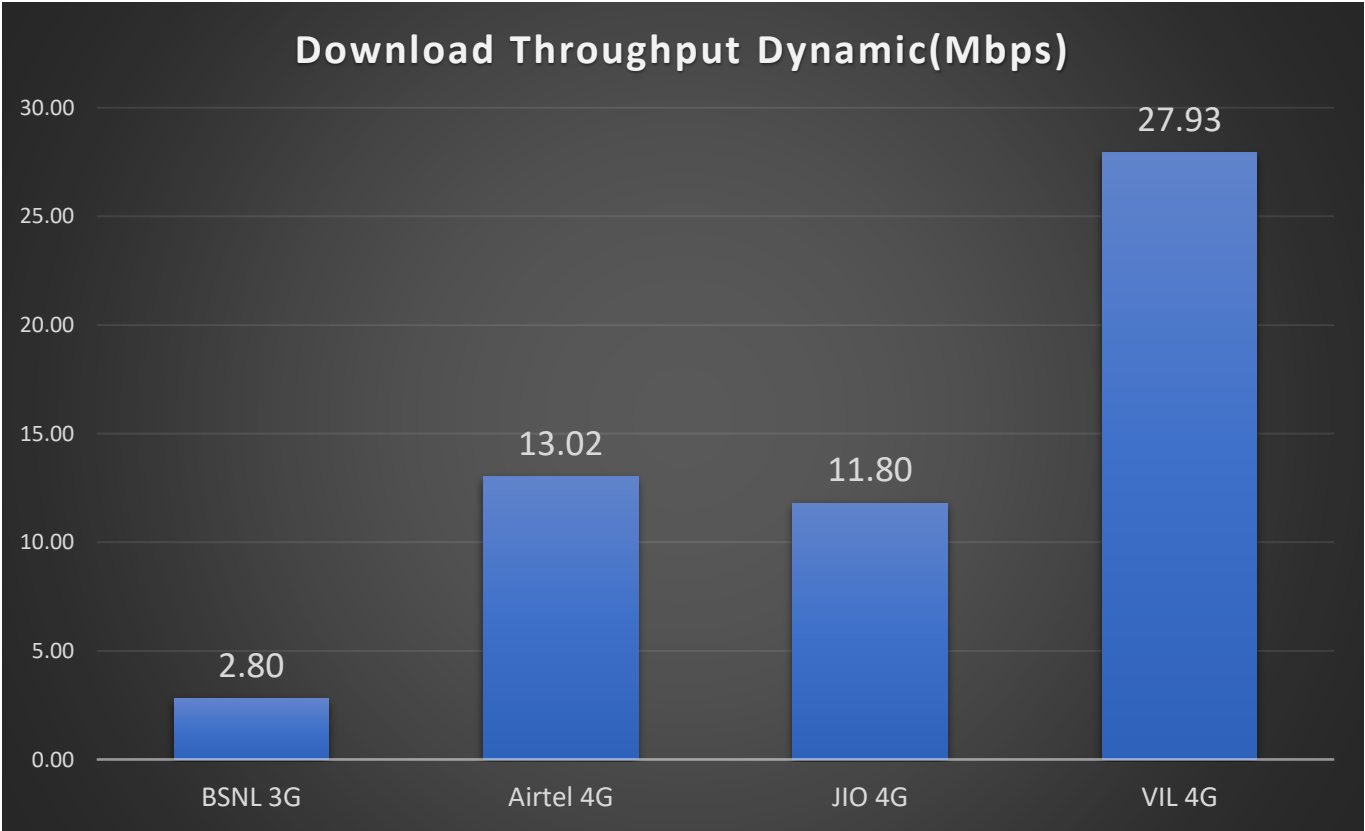
Key
Observations

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)	2.80	13.02	11.80	27.93



Summary

City Level Summary-Voice

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	172	167	175
Blocked Call Rate (%)	0.00%	0.00%	0.00%
CSSR% (Accessibility)	100.00%	100.00%	100.00%
Drop Call Rate (%)	0.00%	0.00%	0.00%
Mobility HOSR (%)	98.14%	100.00%	97.23%
Rx Quality (%)	97.13%	95.21%	97.00%
Average CST Sec	3.65	3.42	2.80

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	165	165	164	184
Blocked Call Rate (%)	0.00%	0.00%	0.00%	1.84%
CSSR% (Accessibility)	100.00%	100.00%	100.00%	98.16%
Drop Call Rate (%)	0.00%	0.00%	0.00%	0.00%
Mobility HOSR (%)	100.00%	99.65%	99.65%	100.00%
Rx Quality (%)	95.21%	95.11%	90.54%	91.46%
Average CST Sec	3.42	1.30	0.45	0.69

Summary

City Level Summary- Data Services

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	106.68	193.00	81.00
Upload Throughput (kbps)	54.79	103.00	56.00
Web Browsing Delay (sec)	26.67	73.49	5.00
Latency (msec)	182.00	125.91	187.00

Data Services Static	3G / 4G			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	2.80	12.03	33.77	36.00
Upload Throughput(Mbps)	1.45	6.03	12.07	25.00
Video Streaming Delay (sec)	5.09	0.84	0.39	0.00
Web Browsing Delay (sec)	9.33	2.60	1.86	3.00
Latency (msec)	64.23	52.00	48.00	33.00

<u>District Court</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	140.81	210.00	92.40
Upload Throughput (kbps)	82.95	140.00	60.70
Web Browsing Delay (sec)	26.07	52.40	5.00
Latency (msec)	134.00	123.90	183.00

<u>Bus Stand</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	53.00	240.00	67.20
Upload Throughput (kbps)	8.00	1.60	51.70
Web Browsing Delay (sec)	30.09	85.90	5.00
Latency (msec)	228.00	123.50	125.00

<u>Railway Station</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	91.00	90.00	69.00
Upload Throughput (kbps)	50.00	70.00	51.80
Web Browsing Delay (sec)	30.09	88.70	5.00
Latency (msec)	180.00	119.60	196.00

<u>Civil Hospital</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	21.28	160.00	81.30
Upload Throughput (kbps)	17.81	80.00	61.60
Web Browsing Delay (sec)	30.09	76.80	5.00
Latency (msec)	224.00	144.00	187.00

<u>BMG Mall</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	124.00	240.00	72.00
Upload Throughput (kbps)	40.00	150.00	77.00
Web Browsing Delay (sec)	30.10	64.39	5.00
Latency (msec)	134.00	129.50	279.00

<u>Model Town</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	210.00	220.00	101.20
Upload Throughput (kbps)	130.00	90.00	30.50
Web Browsing Delay (sec)	13.59	72.80	5.00
Latency (msec)	192.00	115.00	153.00

<u>District Court</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	2.72	15.26	45.00	40.03
Upload Throughput (mbps)	0.83	10.60	18.50	30.30
Video Streaming Delay (Secs.)	4.12	0.67	0.40	0.00
Web Browsing Delay (sec)	8.30	2.58	1.86	3.00
Latency (msec)	63.40	62.62	42.00	38.00

<u>Bus Stand</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	3.90	15.29	43.47	17.17
Upload Throughput (mbps)	1.60	4.17	11.18	17.30
Video Streaming Delay (Secs.)	4.57	0.77	0.35	0.00
Web Browsing Delay (sec)	10.98	2.88	1.82	3.00
Latency (msec)	64.50	60.52	52.00	30.00

<u>Railway Station</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	1.81	5.07	20.88	35.10
Upload Throughput (mbps)	1.48	5.20	8.63	34.50
Video Streaming Delay (Secs.)	6.75	0.73	0.36	0.00
Web Browsing Delay (sec)	10.40	2.54	1.98	3.00
Latency (msec)	57.40	44.00	45.00	28.00

<u>Civil Hospital</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	2.22	6.90	29.53	26.70
Upload Throughput (mbps)	1.35	5.50	7.69	20.20
Video Streaming Delay (Secs.)	5.07	0.74	0.48	0.00
Web Browsing Delay (sec)	13.20	2.60	1.78	3.00
Latency (msec)	78.40	75.12	44.00	35.00

Data Services static

City Level Summary(contd.)

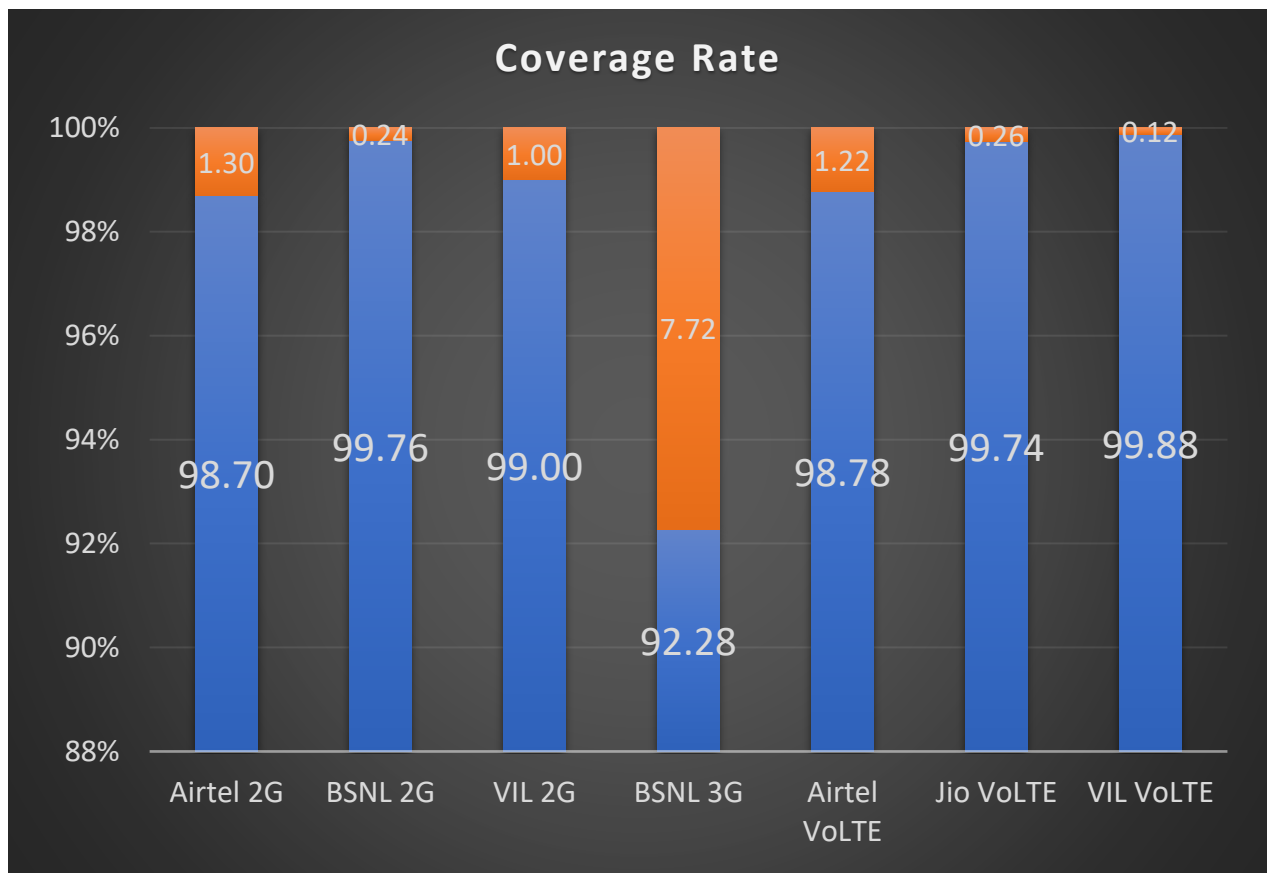
<u>BMG Mall</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	3.60	5.50	29.48	31.50
Upload Throughput (mbps)	1.67	3.20	18.05	16.49
Video Streaming Delay (Secs.)	4.01	1.07	0.47	0.00
Web Browsing Delay (sec)	5.67	2.77	1.94	3.00
Latency (msec)	62.20	39.86	52.00	33.00

<u>Model Town</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	2.56	13.92	34.27	63.86
Upload Throughput (mbps)	1.74	7.51	8.40	32.43
Video Streaming Delay (Secs.)	6.30	1.03	0.31	0.00
Web Browsing Delay (sec)	67.40	2.31	1.79	3.00
Latency (msec)	59.50	31.00	52.00	34.00

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.

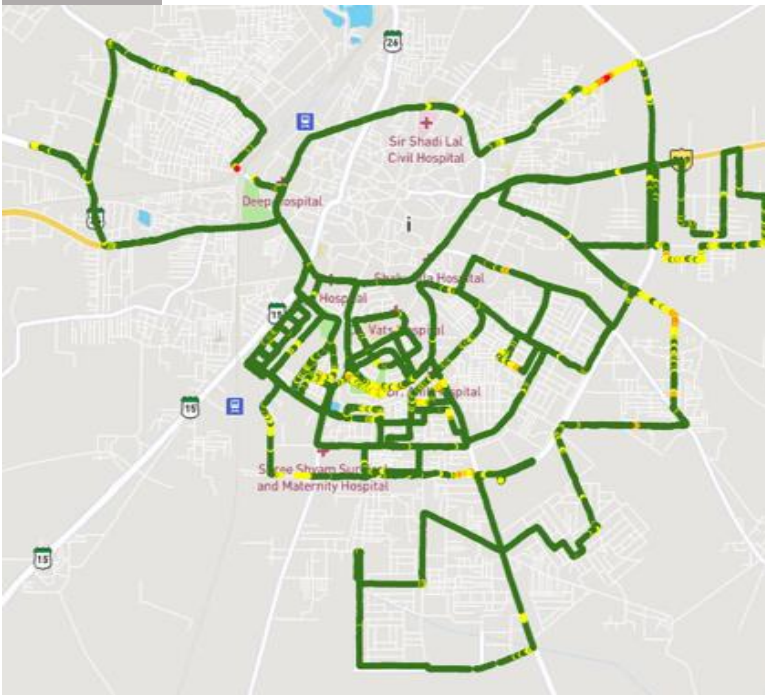
TSP	Coverage Rate %
Airtel 2G	98.70%
BSNL 2G	99.76%
VIL 2G	99.00%
BSNL 3G	92.28%
Airtel VoLTE	98.78%
Jio VoLTE	99.74%
VIL VoLTE	99.88%



TSP-AIRTEL

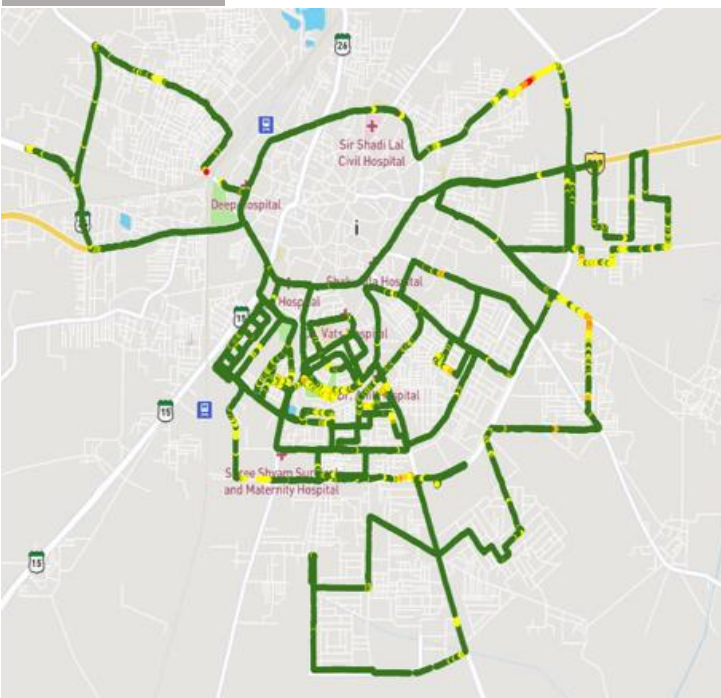
Technology	Coverage %
2G	98.70%
VoLTE	98.78%

2G



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	30783	86.79	Green
[-75, >=-85)	4226	11.91	Yellow
[-85, >=-95)	440	1.24	Orange
[-95, >=Min)	19	0.05	Red
Total		100%	

VoLTE



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	18393	23.83	Green
[-80, >=-90)	29356	38.03	Yellow
[-90, >=-110)	28498	36.92	Orange
[-110, >=Min)	936	1.21	Red
Total		100%	

TSP- BSNL

2G	Technology	Coverage %
	2G	99.76%
	3G	92.28%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	155329	93.99	
[-75, >=-85)	9540	5.77	
[-85, >=-95)	391	0.24	
[-95, >=Min)	0	0	
Total	165260	100%	

3G



3G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	90017	54.47	
[-70, >=-80)	29706	17.98	
[-80, >=-90)	32777	19.83	
[-90, >=Min)	12760	7.72	
Total	165260	100%	

JIO

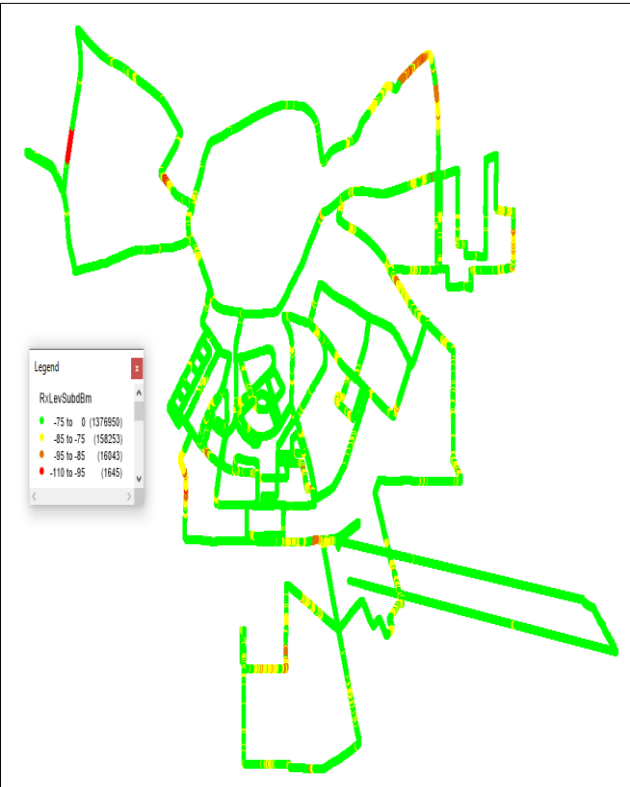
Technology	Coverage %
VoLTE	99.74%



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	8498	47.95	
[-80, >=-90)	5574	31.45	
[-90, >=-110)	3603	20.33	
[-110, >=Min)	46	0.26	
Total	17721	100%	

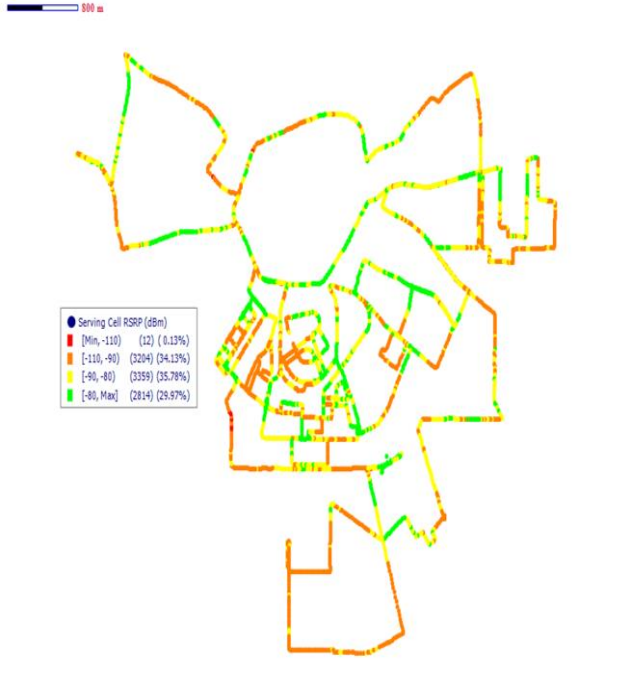
VIL

2G	Technology	Coverage Rate %
	2G	99.00%
	VoLTE	99.88%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	1376950	89	
[-75, >=-85)	158253	10	
[-85, >=-95)	16043	1	
[-95, >=Min)	1645	0	
Total		100%	

VoLTE

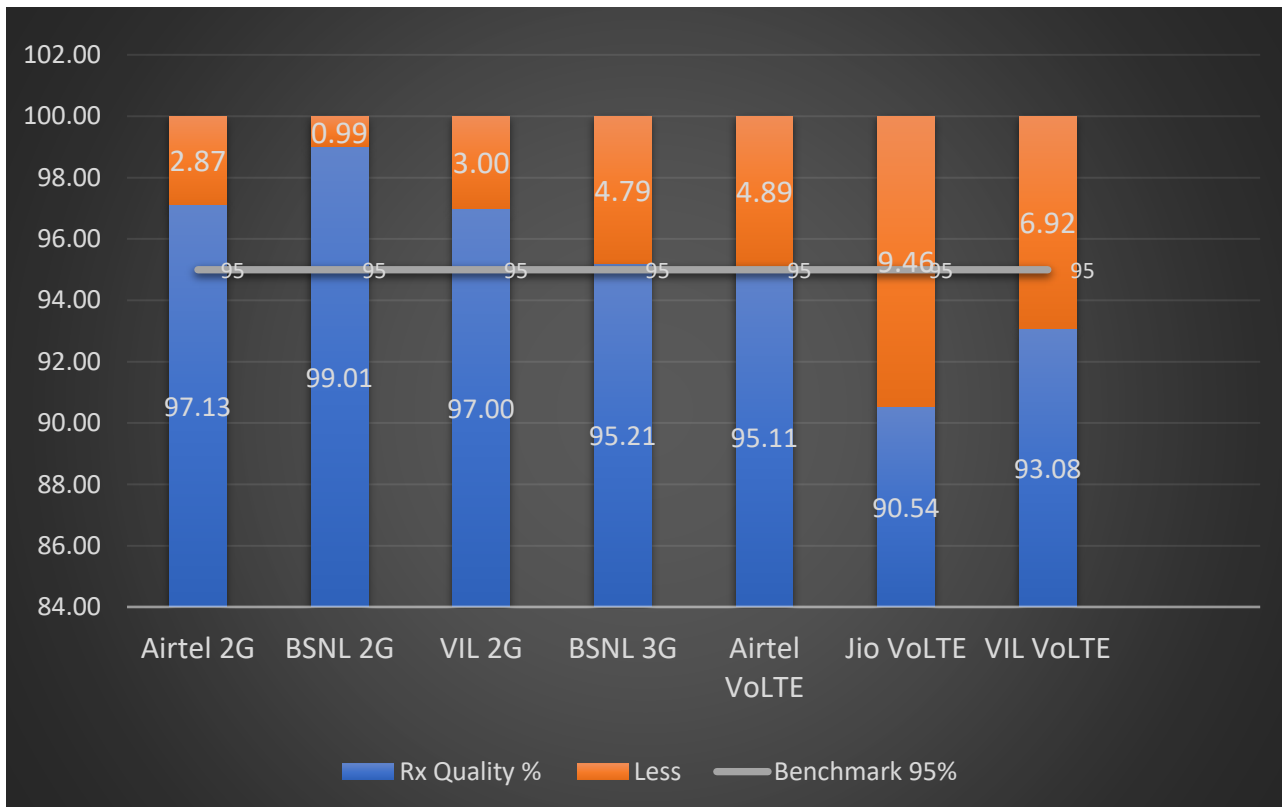


VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	2814	29.97	
[-80, >=-90)	3359	35.78	
[-90, >=-110)	3204	34.13	
[-110, >=Min)	12	0.13	
Total		100%	

II. Quality Details

For measuring voice quality, as per the QoS norms, RxQual ≤ 5 for GSM TSPs, EcNo ≥ -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	Rx Quality %
Airtel 2G	97.13%
BSNL 2G	99.01%
VIL 2G	97.00%
BSNL 3G	95.21%
Airtel VoLTE	95.11%
Jio VoLTE	90.54%
VIL VoLTE	93.08%

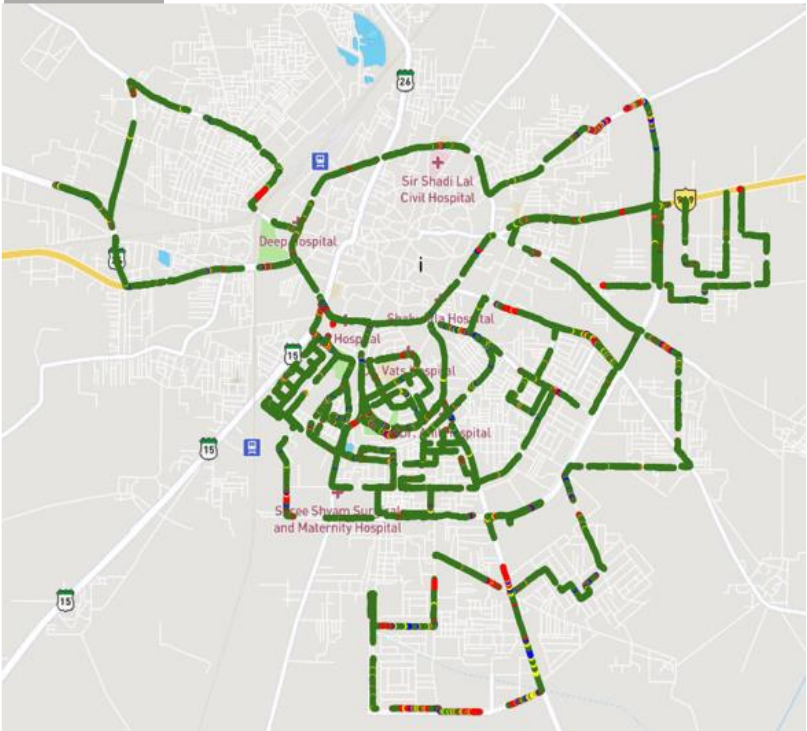


II. Quality Details

Airtel

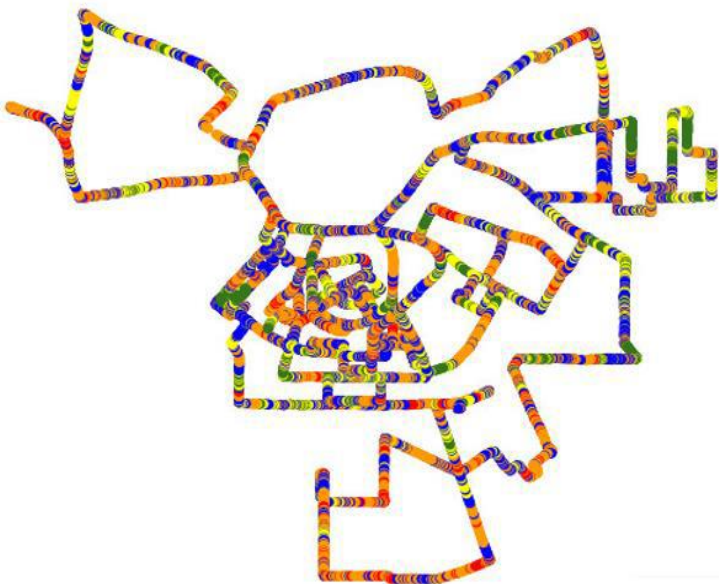
Technology	Rx Quality %
2G	97.13%
VoLTE	95.11%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	30636	92.34	
(2, <=3)	512	1.54	
(3, <=4)	555	1.67	
(4, <=5)	523	1.57	
(5, <=Max)	950	2.86	
Total		100%	

VoLTE



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	3765	4.89	
(0, <=5)	29481	38.27	
(5, <=10)	24748	32.12	
(10, <=15)	12682	16.42	
(15, <=Max)	6370	8.26	
Total			

II. Quality Details

BSNL

2G	Technology	Rx Quality %
	2G	99.01%
	3G	95.21%



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	160659	97.22	
(2, <=3)	946	0.57	
(3, <=4)	996	0.60	
(4, <=5)	1030	0.62	
(5, <=Max)	1629	0.99	
Total	165260	100%	

3G

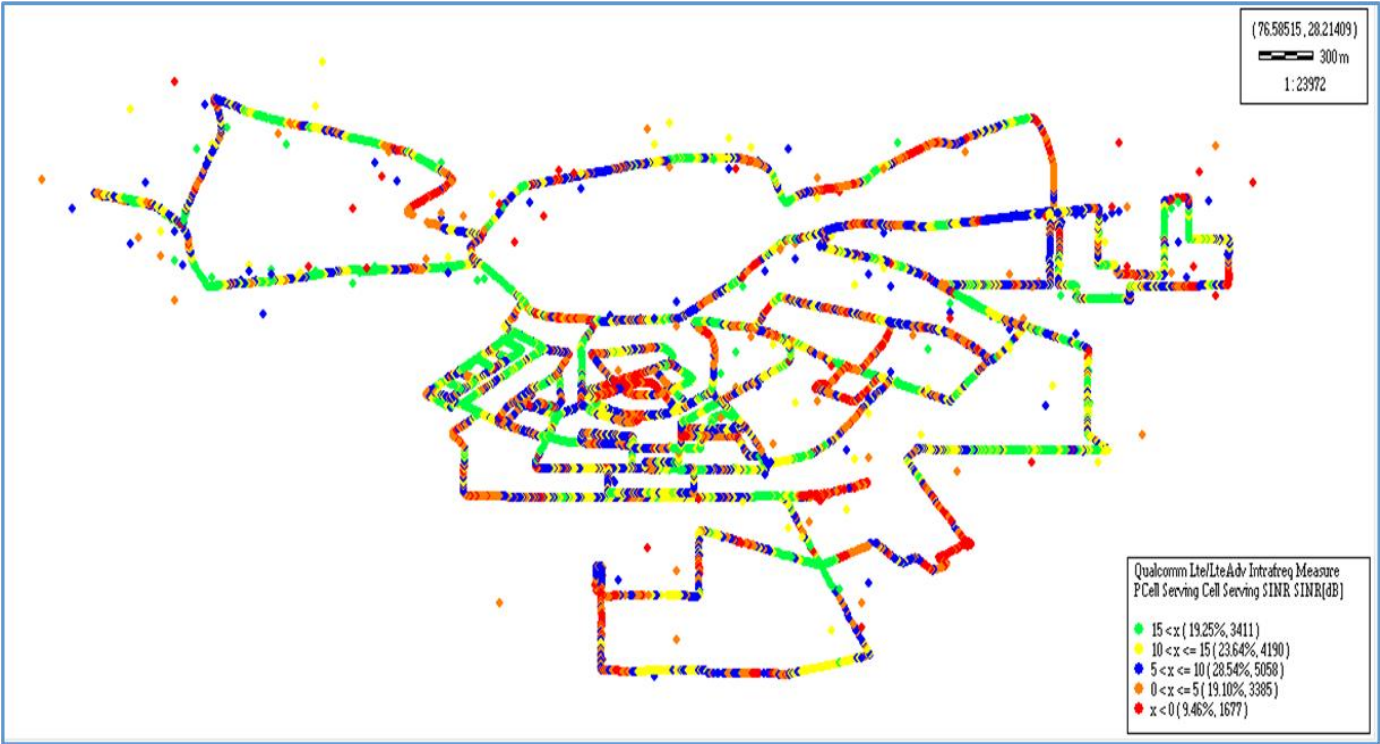


Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	70557	42.69	
(-6, <=-9)	3714	2.25	
(-9, <=-11)	24494	14.82	
(-11, <=-14)	58576	35.44	
(-14, <= Min)	7919	4.79	
Total	165260	100%	

For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -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 ≥ 95%.

JIO

Technology	Rx Quality %
VoLTE	90.54%



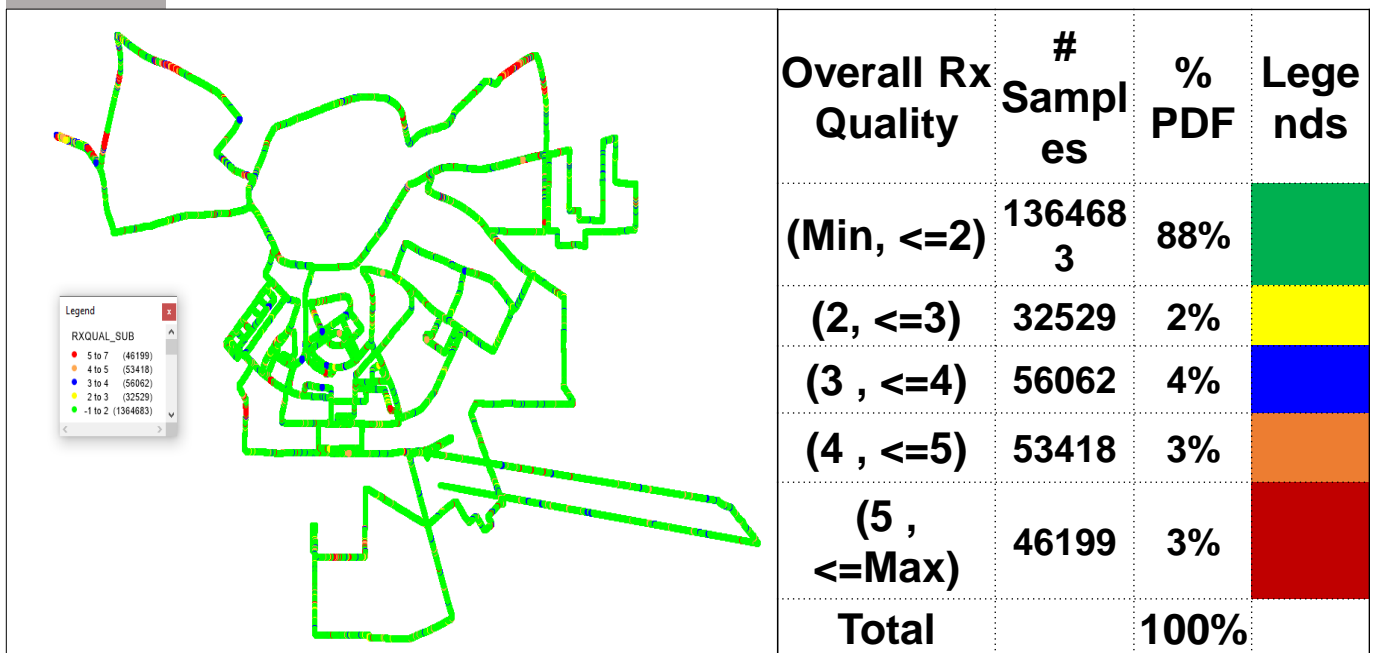
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1677	9.46	
(0, <=5)	3385	19.10	
(5, <=10)	5058	28.54	
(10, <=15)	4190	23.64	
(15, <=Max)	9411	19.25	
Total	17721	100%	

II. Quality Details

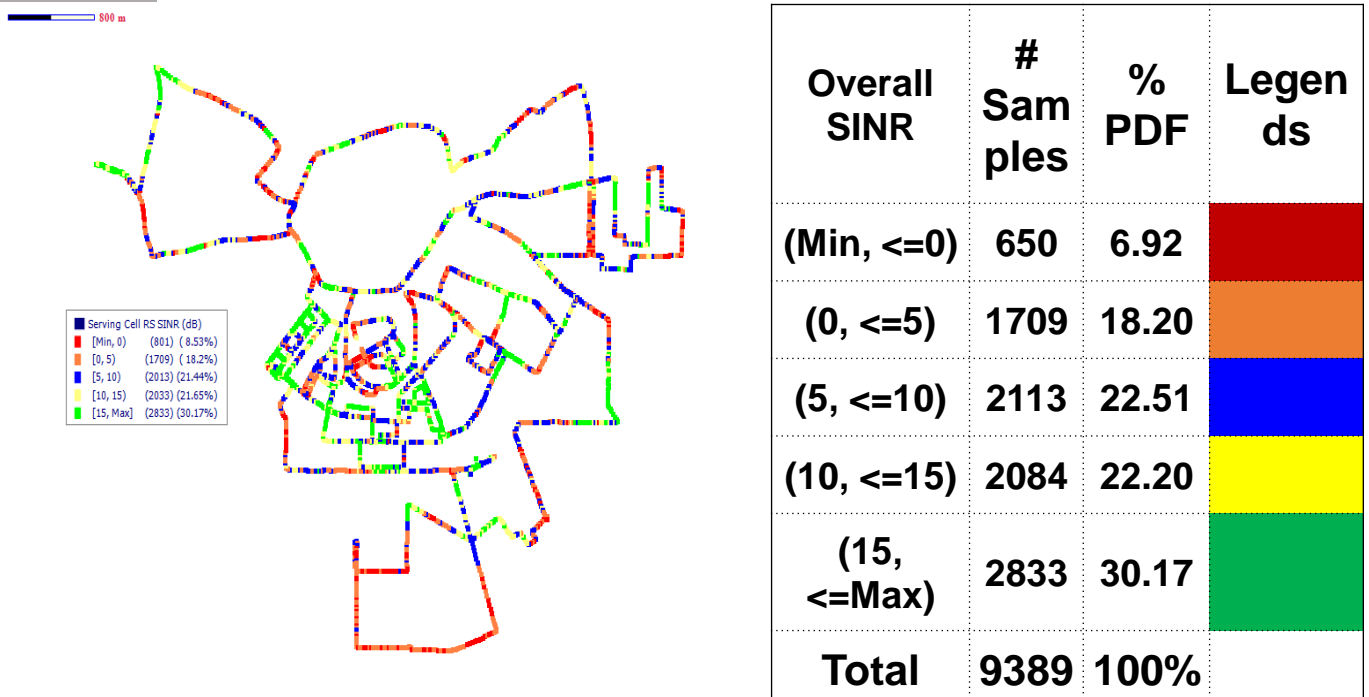
VIL

Technology	Rx Quality %
2G	97.00%
4G	93.08%

2G



VoLTE



III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	69.77
Airtel VoLTE	100.00
Jio VoLTE	100.00
VIL VoLTE	100.00

