



Operator Assisted Drive Test Report

Yamunanagar & Jagadhari City

11th – 13th November 2024

by

TRAI Regional office Jaipur

Key Performance Indicators: All TSPs have met the Drop Call Rate (DCR) benchmark of 2% except . 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 Yamunanagar & Jagadhari City from 9:00 AM to 8:00 PM during 11th Nov to 13th Nov 2024. The drive test covered drive route of 200 KMs & 5 no hotspots over a period of 3 days. Approximately 360 calls were made on 2G,3G and 4G networks.

Overview

Voice Summary

Data Summary

Overview

Regional Office, TRAI Jaipur conducted Operator Assisted Drive Test from 11th Nov. 2024 to 13.th Nov 2024 covering Yamunanagar/ Jagadhari City and surrounding areas. 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 .200. KMs. Approximately 360 calls were made on 2G and 4G networks.

Data Tests:

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

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

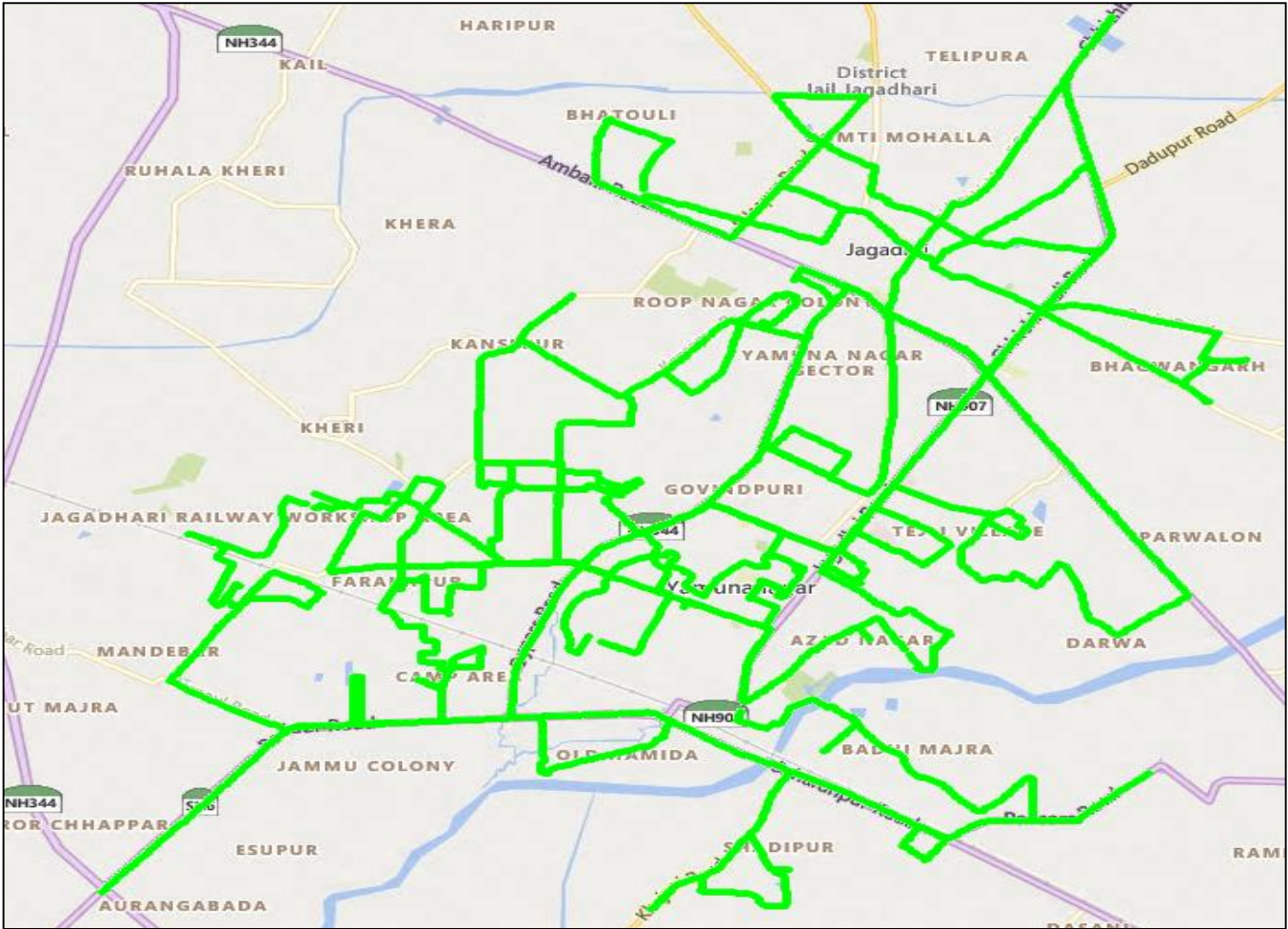
4G – measurement – UE in LTE /5G File Size- 40MB

Static data tests on 5- 6 hotspots

1.

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



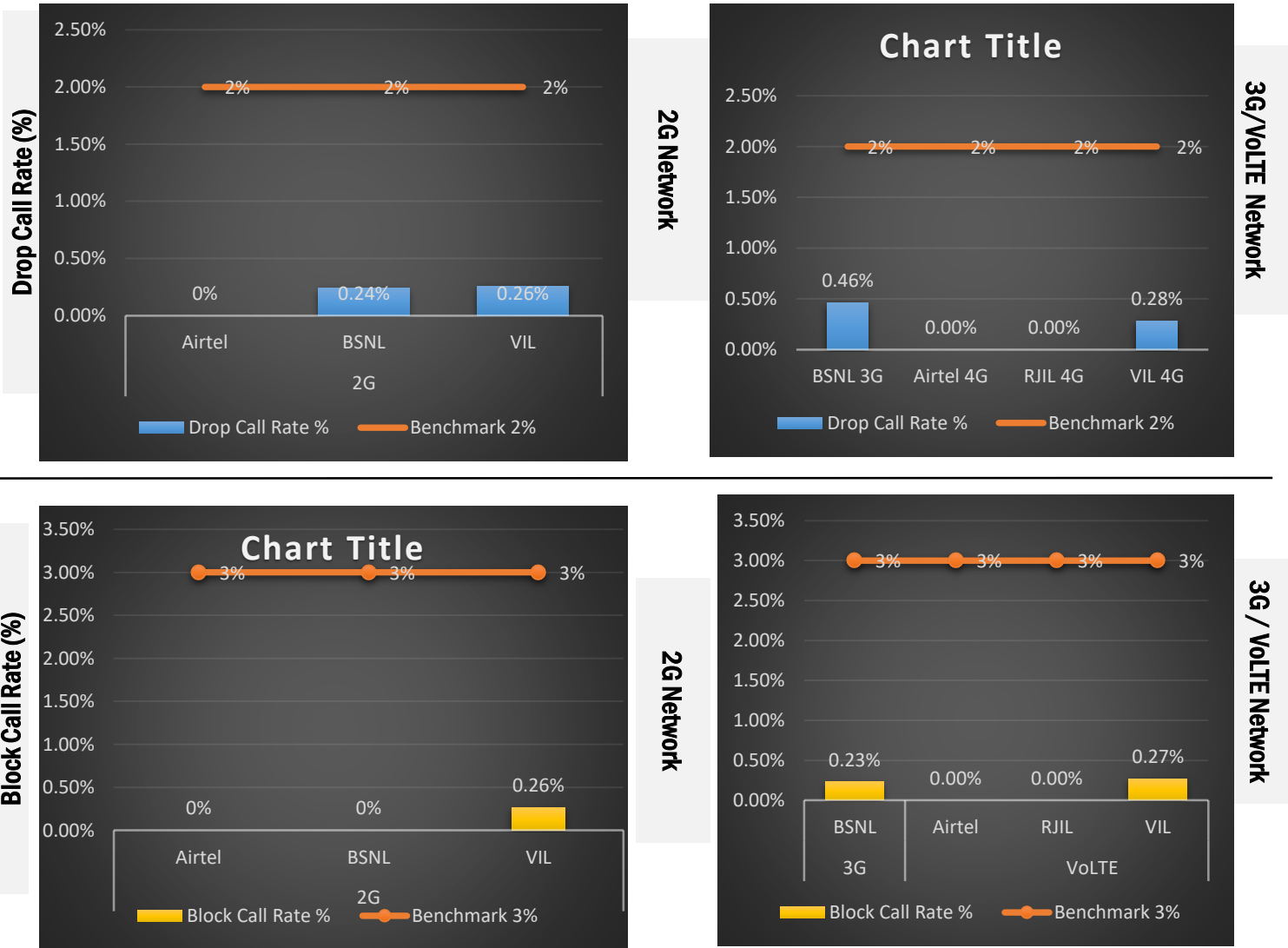
Date	Date	11 th to 13 th NOV'24
DAY-1,2 & 3, 11.11.24 to 13.11.24	Dynamic Drive	Yamunanagar City
		Jagadhari City
	Static Drive	5 Hotspot Locations

Data Service Test- Static Locations



Hotspot Locations
1.Railway Station Jagadhari
2.Civil Hospital Yamunanagar
3.Kamani Chowk (Bus Stand) Yamunanagar
4. Jagadhari Bus Stand
5. GABA Hospital Yamunanagar

QoS compliance of the TSPs in Yamunanagar 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%	0.24%	0.26%	0.46%	0.00%	0.00%	0.28%
Block Call Rate %	0%	0%	0.26%	0.23%	0.00%	0.00%	0.27%

- 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 %	99%	85.41%	97%

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

TSPs	3G
	BSNL
Coverage %	59.53%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99.80%	99.74%	98.16%

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	46.77%	100%	100%	100%

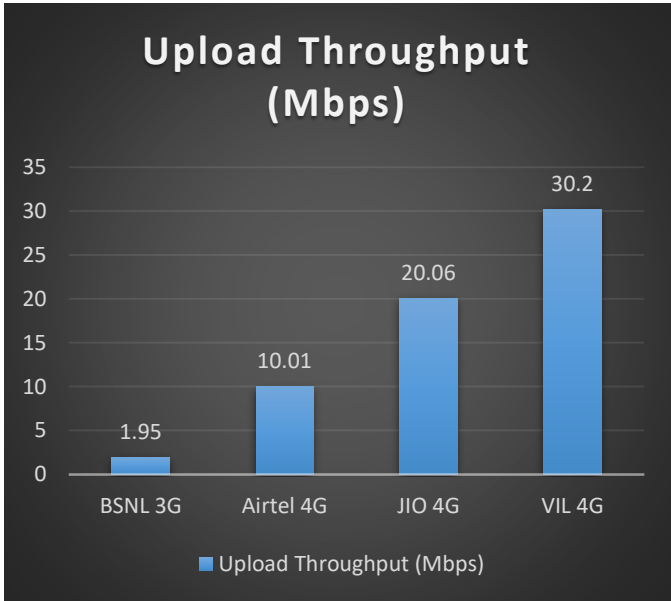
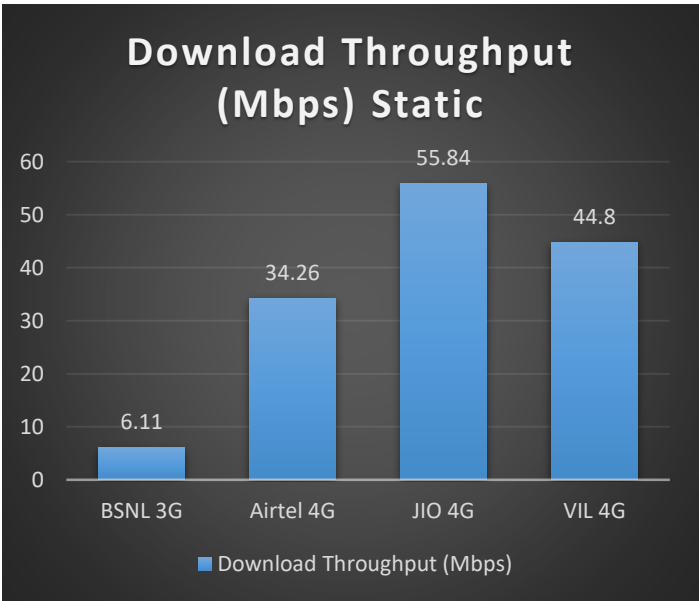
Data Services Static

Key Observations

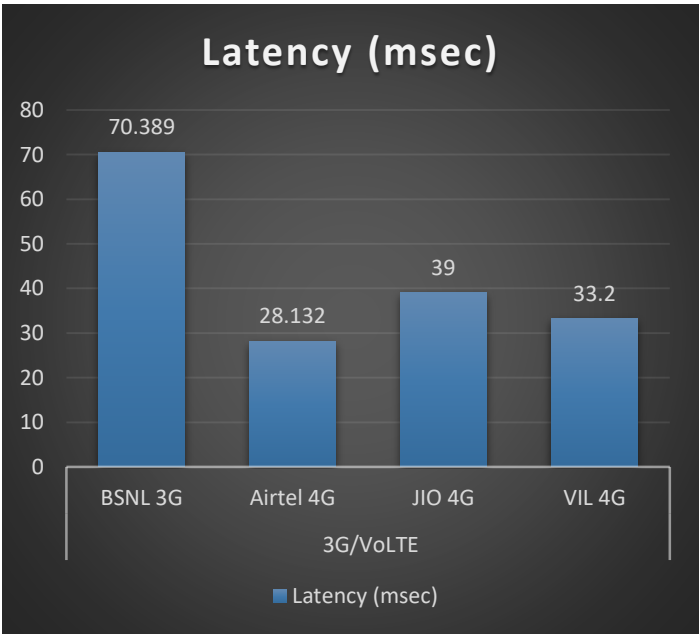
Data was tested at 5 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, Paytm)

Data Download and Upload Performance Static (Mbps)

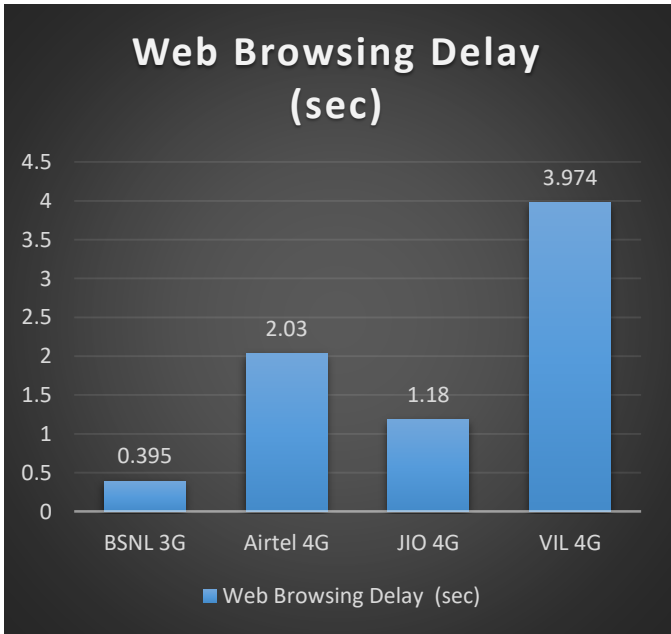
3G/4G/ Network:



Latency (ms)



Web Browsing (Sec)



Data Services Static	3G / 4G			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	6.11	34.26	55.84	44.8
Upload Throughput(Mbps)	1.95	10.01	20.06	30.2
Video Streaming Delay (sec)	3.56	0.53	0.31	0.454
Web Browsing Delay (sec)	0.395	2.03	1.18	3.974
Latency (msec)	70.389	28.132	39	33.2

Data Services Dynamic

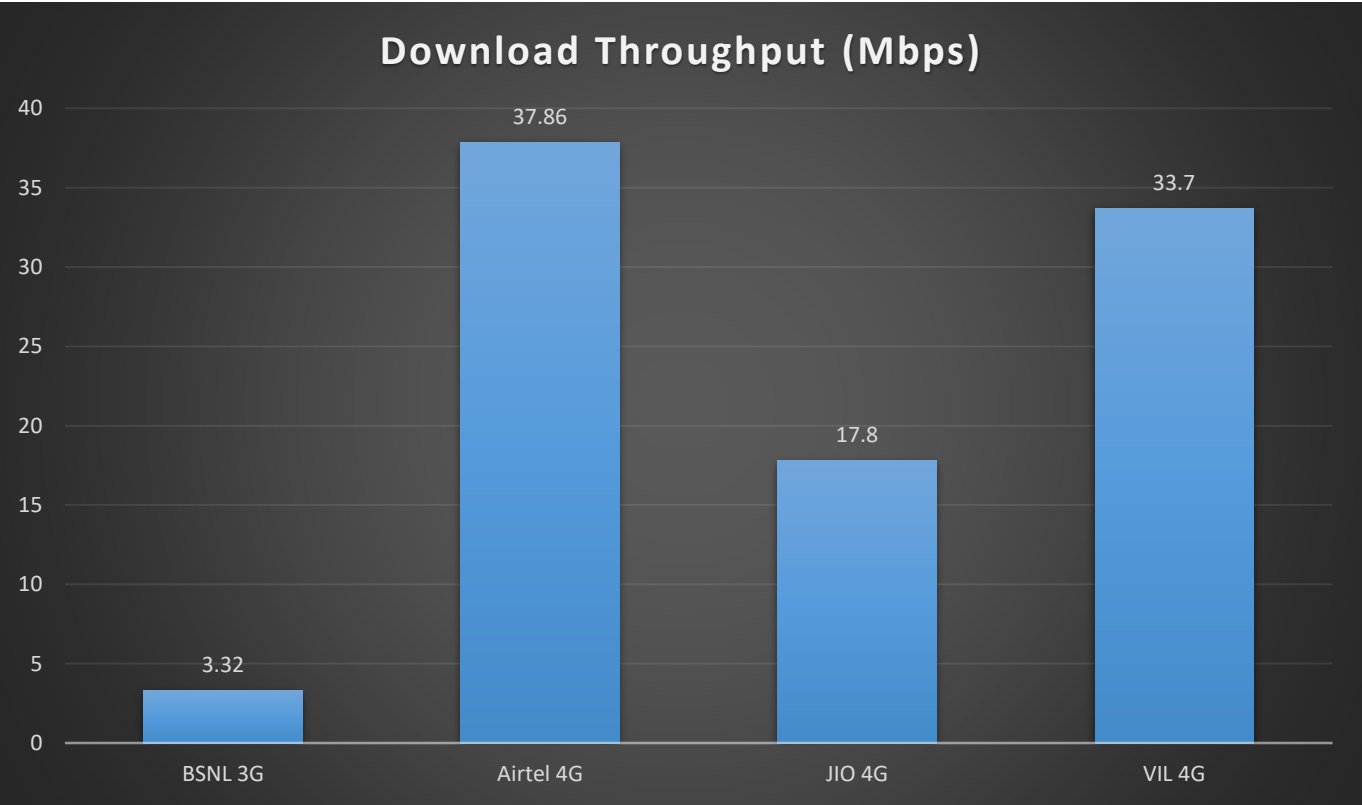
Key Observations

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)	3.32	37.86	17.8	33.7



Summary

City Level Summary- Voice

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	343	410	386
Blocked Call Rate (%)	0%	0%	0.26%
CSSR% (Accessibility)	100%	100%	99.74%
Drop Call Rate (%)	0%	0.24%	0.26%
Mobility HOSR (%)	99.90%	95.13%	97.71%
Rx Quality (%)	96.10%	96.86%	96.38%
Average CST Sec	3.04	3.583	4.26

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	436	351	352	376
Blocked Call Rate (%)	0.23%	0%	0%	0.27%
CSSR% (Accessibility)	99.77%	100%	100%	99.73%
Drop Call Rate (%)	0.46%	0%	0%	0.28%
Mobility HOSR (%)	100%	99.80%	99.89%	100%
Rx Quality (%)	76.88%	97.43%	96.08%	93.13%
Average CST Sec	3.3	1.13	0.46	1.6

<u>Railway Station Jagadhari</u>	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	4.04	24.65	61.47	50
Upload Throughput (mbps)	1.24	10.38	17.05	31
Video Streaming Delay (Secs.)	5.89	0.388	0.28	0.10
Web Browsing Delay (sec)	1.089	1.84	1.20	3.85
Latency (msec)	28.16	33	36	24

<u>Civil Hospital Yamunanagar</u>	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	10.98	25.49	53.18	41
Upload Throughput (mbps)	3.28	11.87	15.48	45
Video Streaming Delay (Secs.)	3.4	0.320	0.34	0.12
Web Browsing Delay (sec)	0.109	1.92	1.18	4.5
Latency (msec)	67.75	30	42	43

<u>Kamanin Chowk Bus Stand Yamunanagar</u>	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	5.28	11.37	53.5	40
Upload Throughput (mbps)	1.24	7.56	16.51	25
Video Streaming Delay (Secs.)	5.98	0.654	0.34	0.10
Web Browsing Delay (sec)	6.6	2.96	1.17	3.67
Latency (msec)	72.5	31	33	39

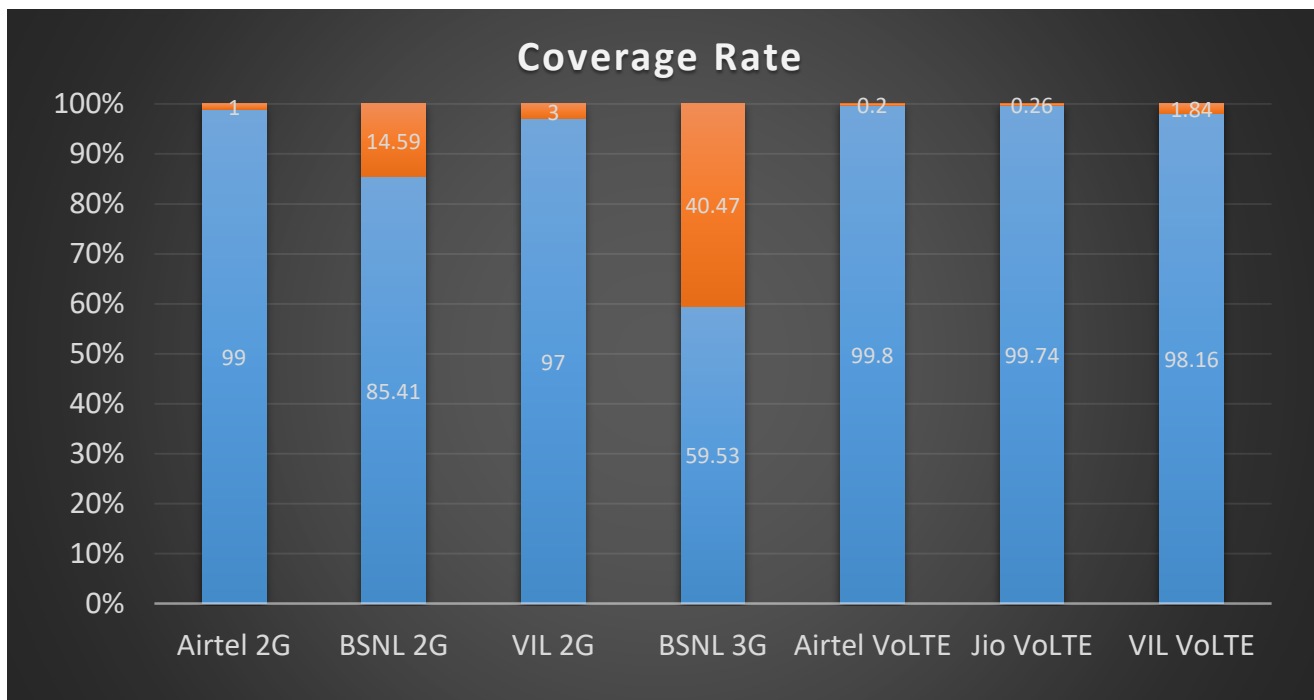
<u>Jagadhari Bus Stand</u>	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	6.5	65.61	55.9	38
Upload Throughput (mbps)	2.39	10	22.81	19
Video Streaming Delay (Secs.)	6.43	0.854	0 .28	1.09
Web Browsing Delay (sec)	4.12	1.64	1.18	4.07
Latency (msec)	19.38	21.66	41	32

<u>GABA Hospital</u>	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	2.96	44.21	55.15	55
Upload Throughput (mbps)	1.32	10.25	28.49	31
Video Streaming Delay (Secs.)	6.74	0.491	0.32	0.86
Web Browsing Delay (sec)	2.36	1.79	1.19	3.78
Latency (msec)	41.63	25	45	28

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	99%
BSNL 2G	85.41%
VIL 2G	97%
BSNL 3G	59.53%
Airtel VoLTE	99.8%
Jio VoLTE	99.74%
VIL VoLTE	98.16%



TSP-AIRTEL

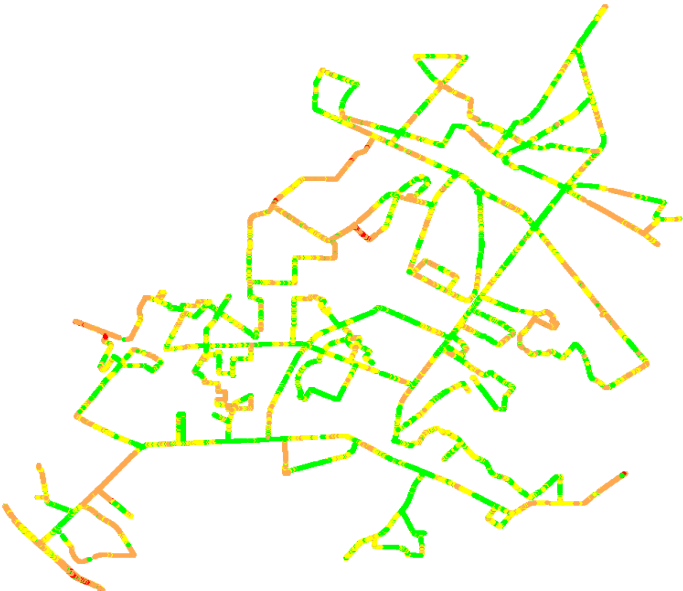
2G

Technology	Coverage %
2G	99%
VoLTE	99.8%



VoLTE

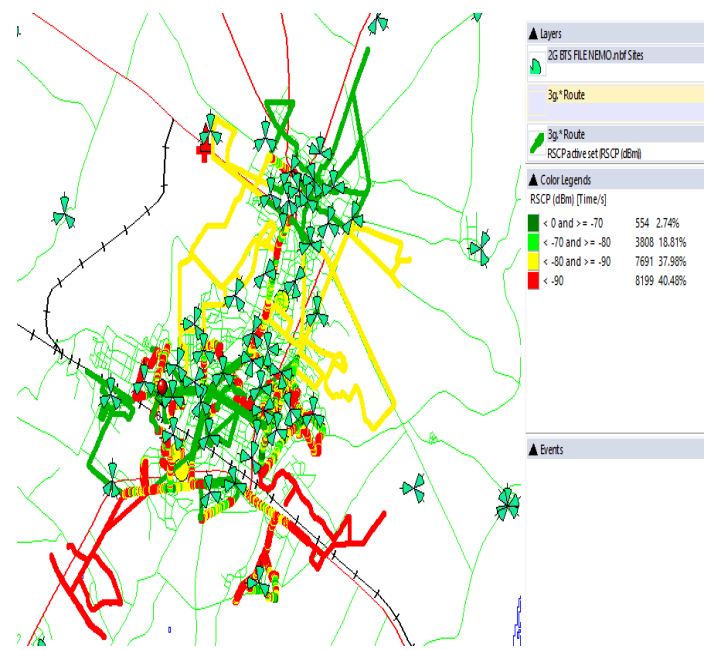
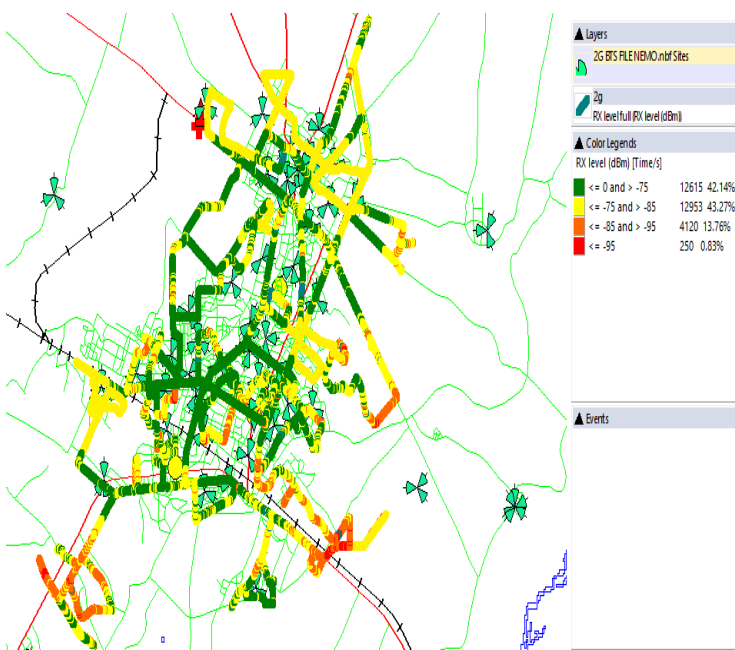
2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	2171158	79.5%	
[-75, >=-85)	533234	19.5%	
[-85, >=-95)	24933	0.9%	
[-95, >=Min)	1401	0.1%	
Total	2730726	100%	



VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	2059905	40.3%	
[-80, >=-90)	1941579	38.0%	
[-90, >=-110)	1098931	21.5%	
[-110, >=Min)	10090	0.2%	
Total	5110505	100.0%	

TSP- BSNL

Technology		Coverage %
2G	2G	85.41%
	3G	59.53%

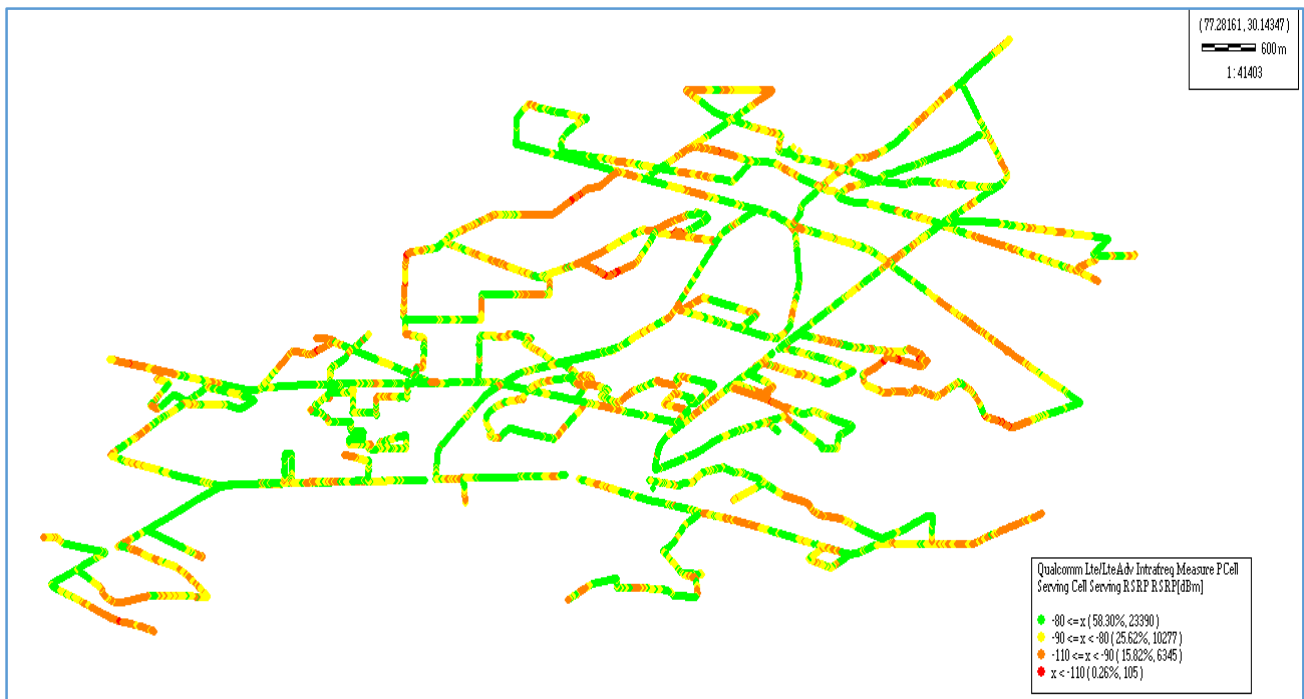


2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	12615	42.14%	
[-75, >=-85)	12953	43.27%	
[-85, >=-95)	4120	13.76%	
[-95, >=Min)	250	0.83%	
Total	29938	100%	

3G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-80]	554	2.74%	
[-80, >=-90)	3808	18.81%	
[-90, >=-110)	7691	37.98%	
[-110, >=Min)	8199	40.47%	
Total	20252	100%	

JIO

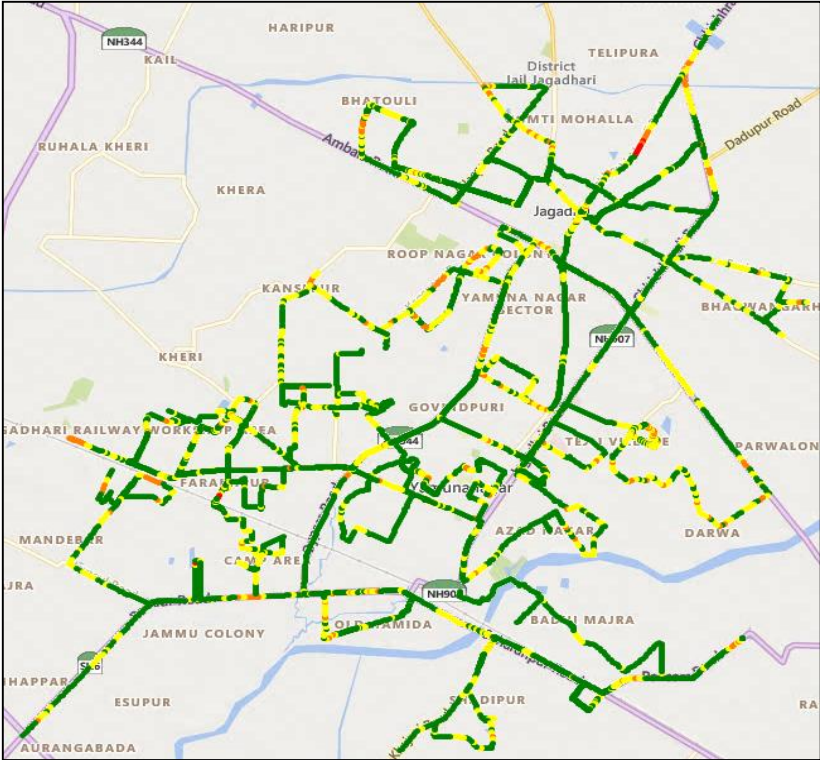
Technology	Coverage %
VoLTE	99.74%



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, ≥ -80]	23390	58.30%	
[-80, ≥ -90)	10277	25.62%	
[-90, ≥ -110)	6345	15.82%	
[-110, $\geq \text{Min}$)	105	.26%	
Total	40117	100%	

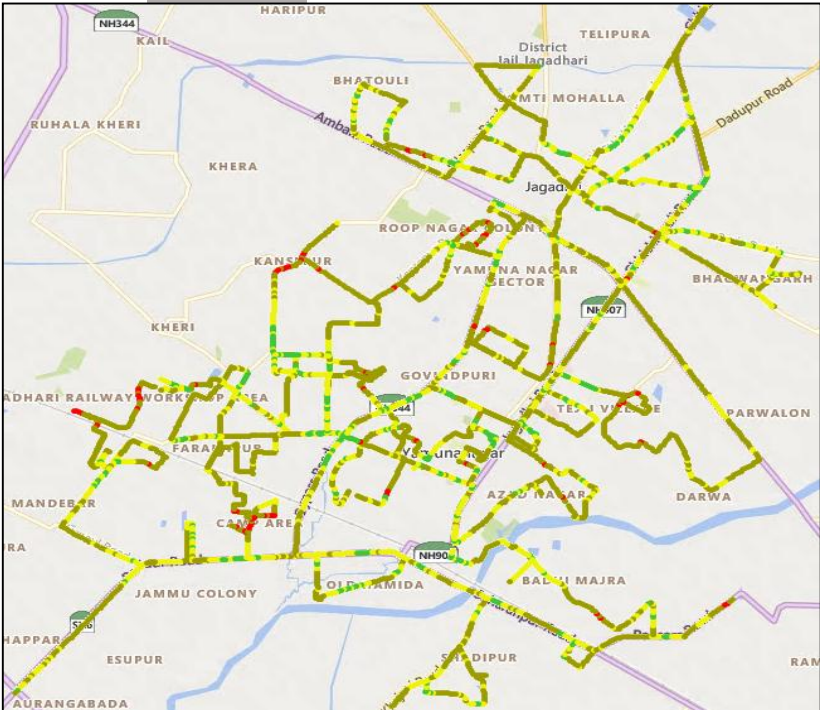
VIL

2G	Technology	Coverage Rate %
	2G	97%
	VoLTE	98.16%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	14186	70.83%	
[-75, >=-85]	5145	25.69%	
[-85, >=-95]	650	3.25%	
[-95, >=Min)	48	0.23%	
Total	20029	100%	

VoLTE

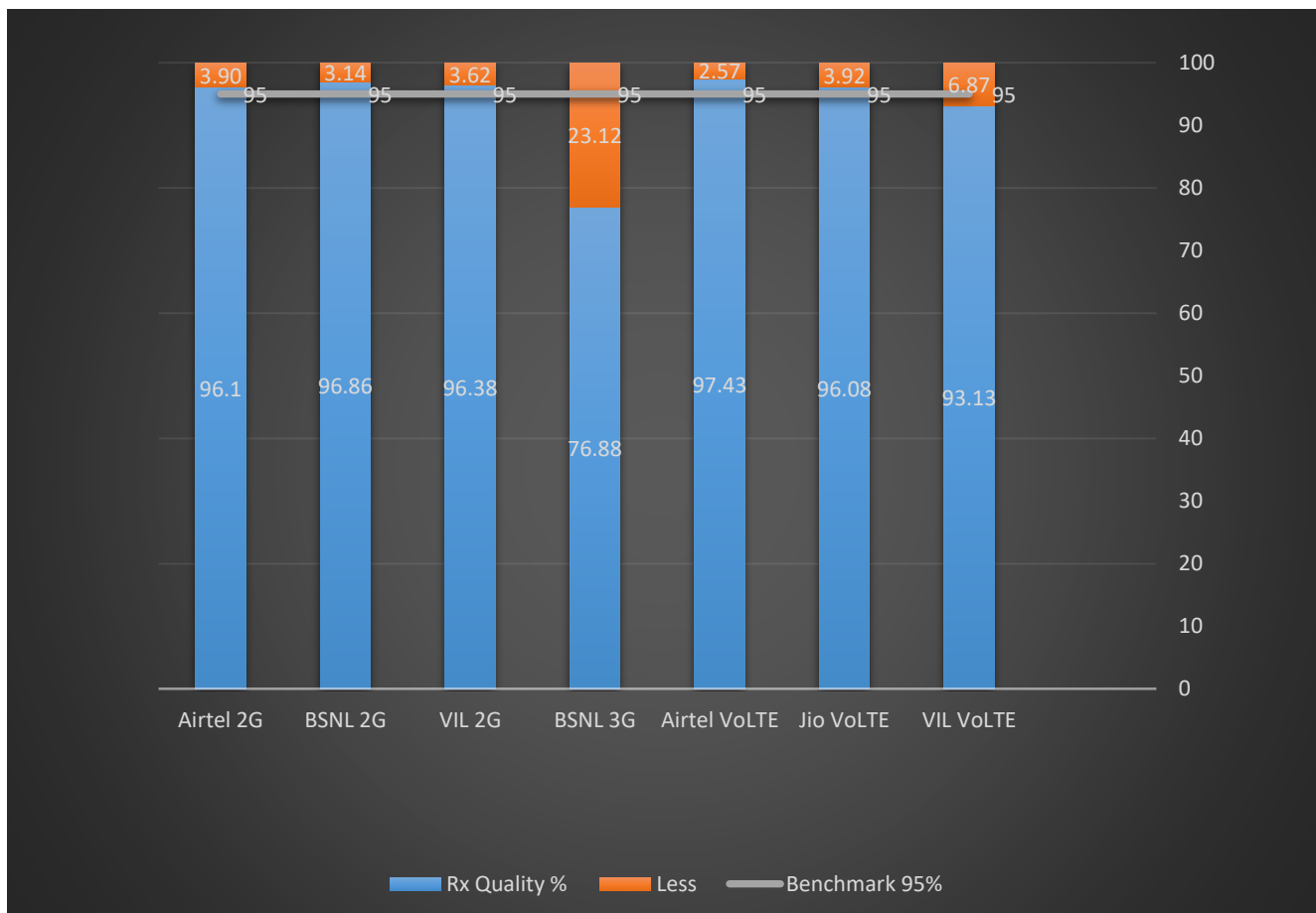


VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	2428	12.39%	
[-80, >=-90]	5523	28.19%	
[-90, >=-110]	11281	57.58%	
[-110, >=Min)	360	1.84%	
Total	19592	100%	

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	96.1%
BSNL 2G	96.86%
VIL 2G	96.38%
BSNL 3G	76.88%
Airtel VoLTE	97.43%
Jio VoLTE	96.08%
VIL VoLTE	93.13%



II. Quality Details

Airtel

Technology	Rx Quality %
2G	96.10%
VoLTE	97.43%

2G



VoLTE



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	2404615	88.06%	
(2, <=3)	41720	1.53%	
(3 , <=4)	60416	2.21%	
(4 , <=5)	117605	4.30%	
(5 , <=Max)	106370	3.90%	
Total	2730726	100.00%	

Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	131526	2.57%	
(0, <=5)	2190257	42.86%	
(5, <=10)	1621123	31.72%	
(10, <=15)	746127	14.60%	
(15, <=Max)	421472	8.25%	
Total	5110505	100%	

II. Quality Details

BSNL

2G

Technology

2G

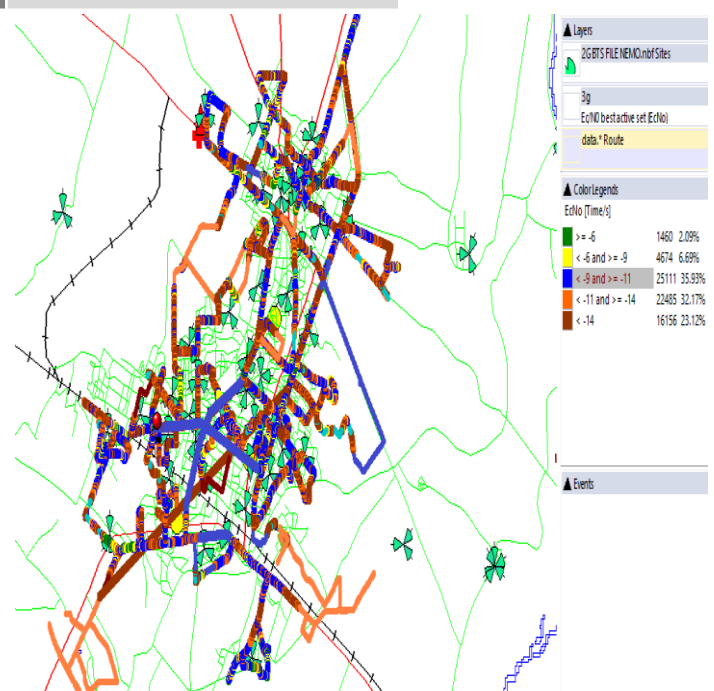
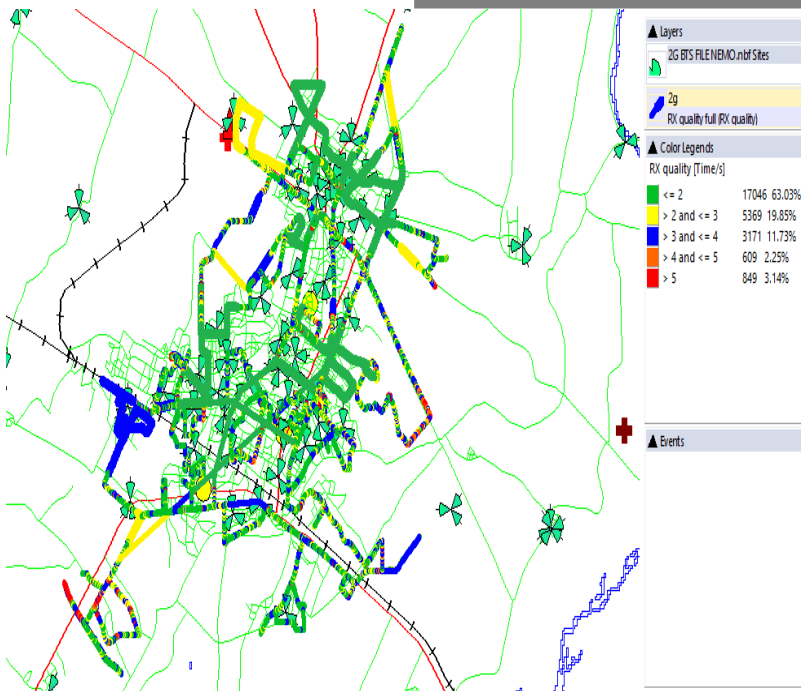
Rx Quality %

96.86%

3G

76.88%

3G



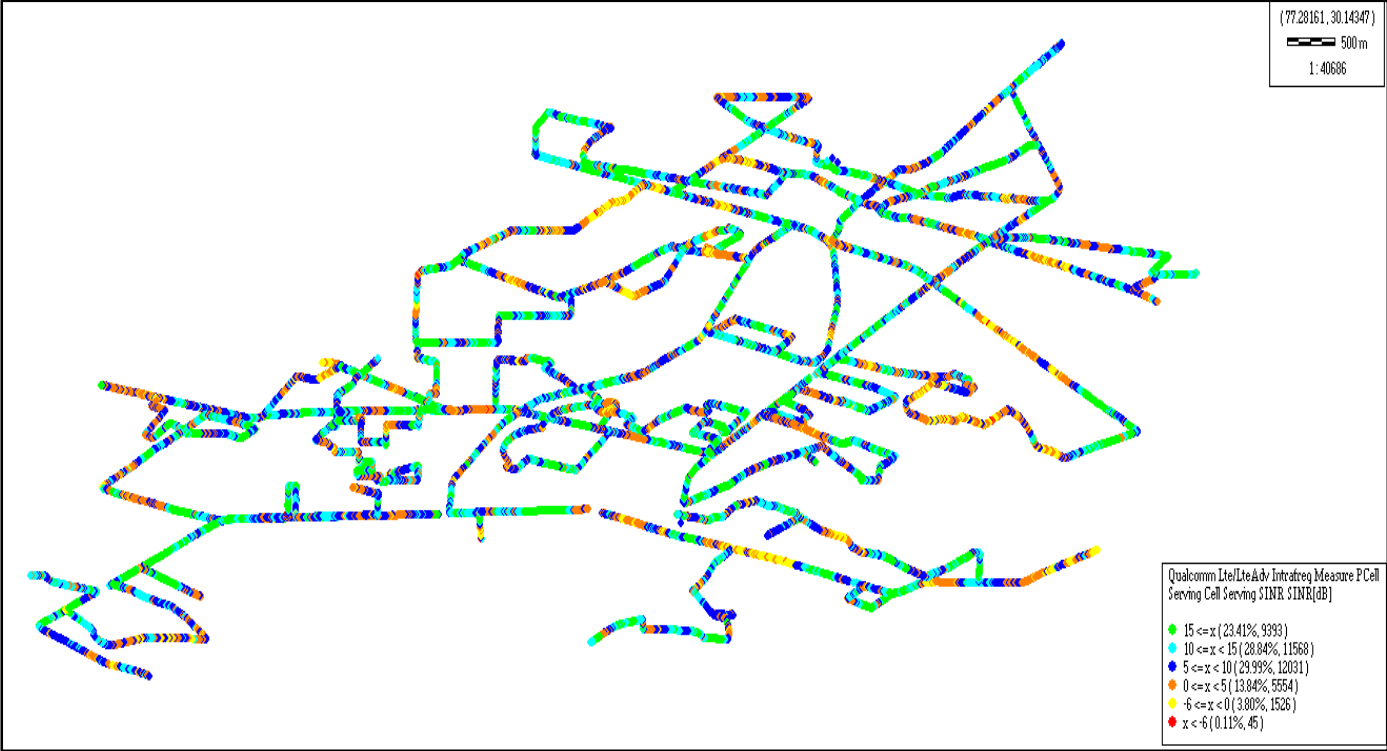
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	17046	63.03%	
(2, <=3)	5369	19.85%	
(3 , <=4)	3171	11.73%	
(4 , <=5)	609	2.25%	
(5 , <=Max)	849	3.14%	
Total	27044	100%	

Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	1460	2.09%	
(-6, <=-9)	4674	6.69%	
(-9, <=-11)	25111	35.93%	
(-11, <=-14)	22485	32.17%	
(-14, <= Min)	16156	23.12%	
Total	68572	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	96.08%



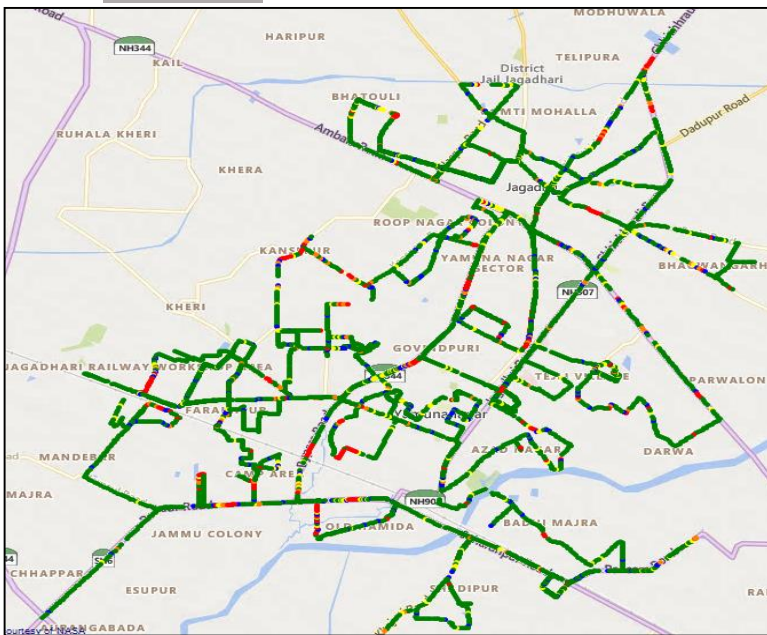
Overall SINR	# Samples	% PDF	Legends
(Min, >=-6)	45	0.12%	
(0<=-6)	1526	3.8%	
(0, <=5)	5554	13.84%	
(5, <=10)	12031	29.99%	
(10, <=15)	11568	28.84%	
(15, <=Max)	9393	23.41%	
Total	40117	100%	

II. Quality Details

VIL

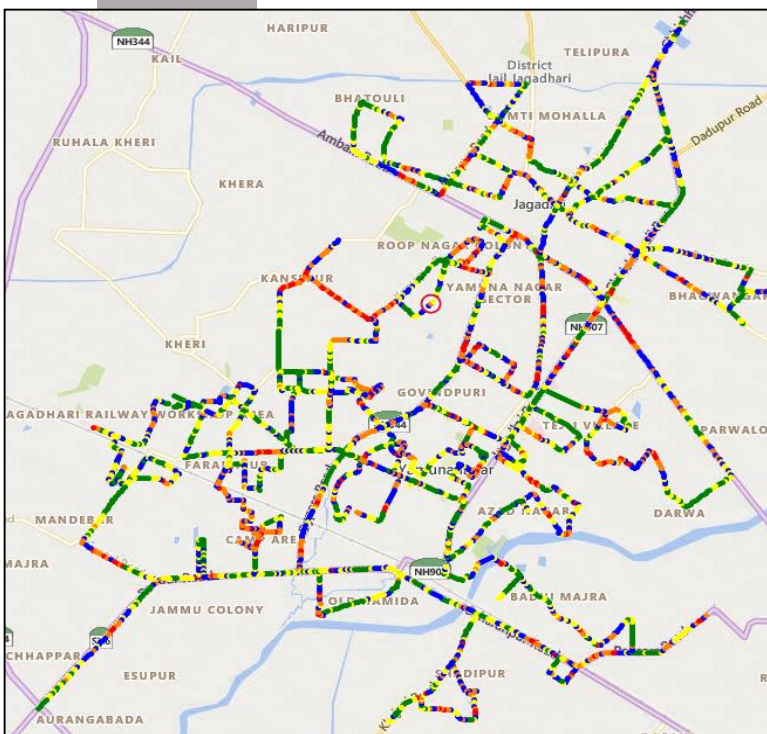
Technology	Rx Quality %
2G	96.38%
4G	93.13%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	15055	85.94%	
(2, <=3)	779	4.45%	
(3, <=4)	723	4.13%	
(4, <=5)	327	1.86%	
(5, <=Max)	634	3.62%	
Total	17518	100%	

VoLTE



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	2689	6.87%	
(0, <=5)	6928	17.70%	
(5, <=10)	10127	25.88%	
(10, <=15)	10075	25.74%	
(15, <=Max)	9315	23.81%	
Total	39134	100%	

III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	46.77%
Airtel VoLTE	100%
Jio VoLTE	100%
VIL VoLTE	100%

