



Operator Assisted Drive Test Report

Jamnagar City & Nearby area

26th to 28th Oct. 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 Jamnagar City and surrounding areas from 9:00 AM to 8:00 PM during 26th to 28th Oct 2023. The drive test covered drive route of 180 KMs & 6 no hotspots over a period of 3 days. Approximately 370 calls were made for each of the TSPs 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 26th Oct 2023 to 28th Oct 2023 covering Jamnagar 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 180 KMs. Approximately 370 calls were made for each of the TSPs networks: three 2G (Lock Mode) networks, two 3G (Dual mode) networks and three VoLTE /5G networks covering 4 unique TSPs.

Data Tests:

Dynamic data test was conducted for 180 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

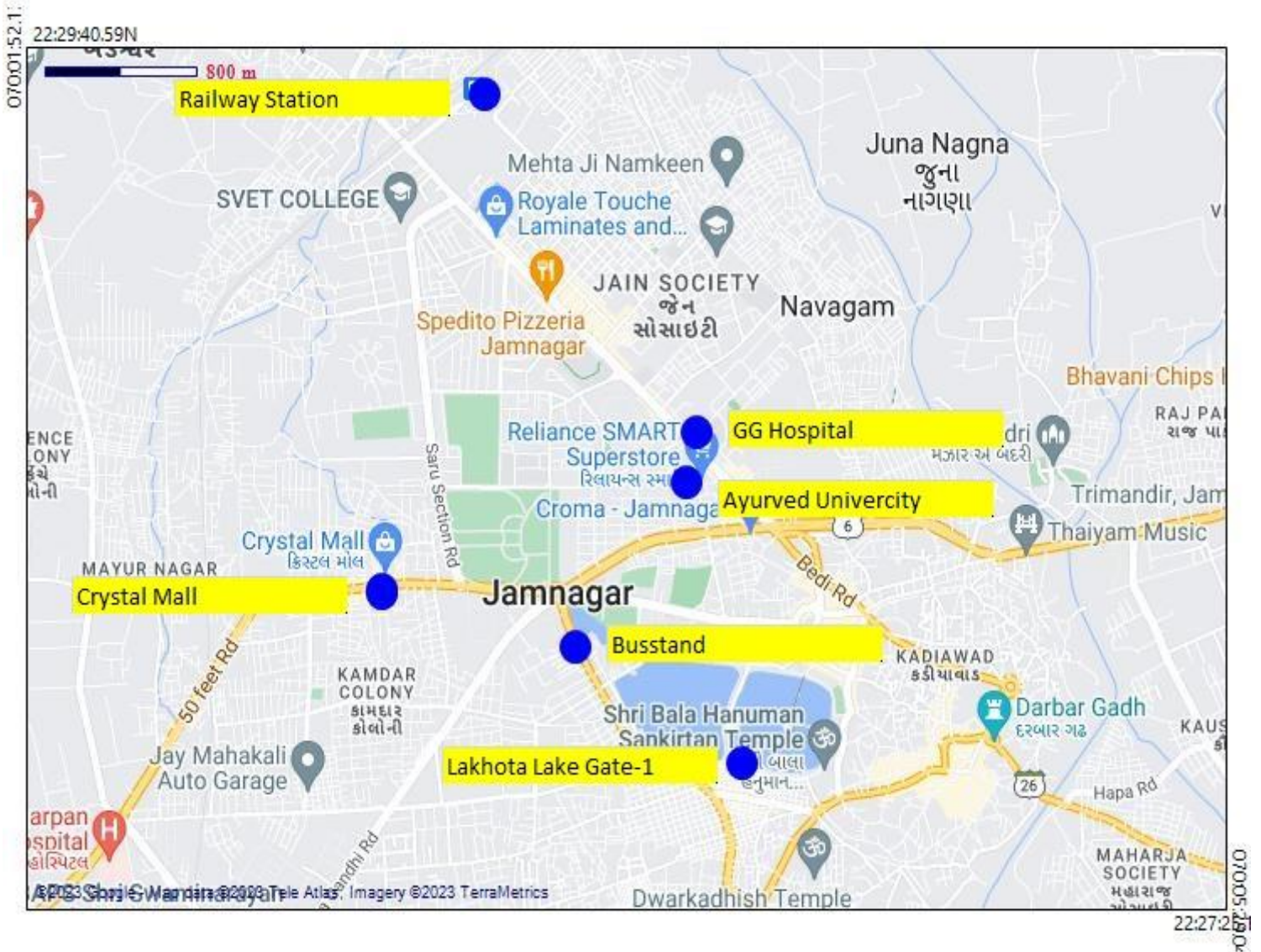
Static data tests on 5- 6 hotspots

1. Railway Station
2. Crystal Mall
3. Bus-Depot
4. Lakhota Lake Gate-1
5. G.G.Hospital
6. Ayurved University

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

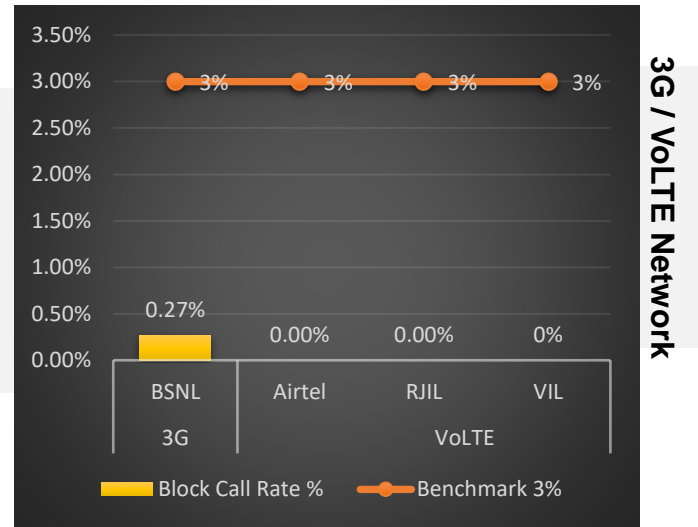
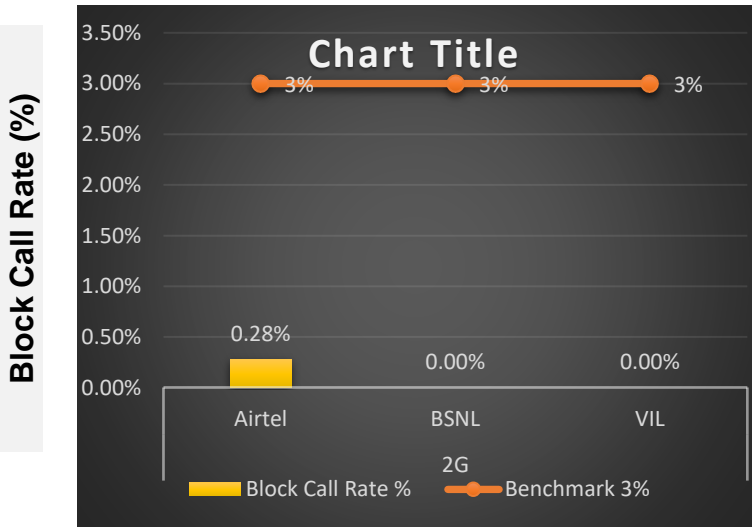
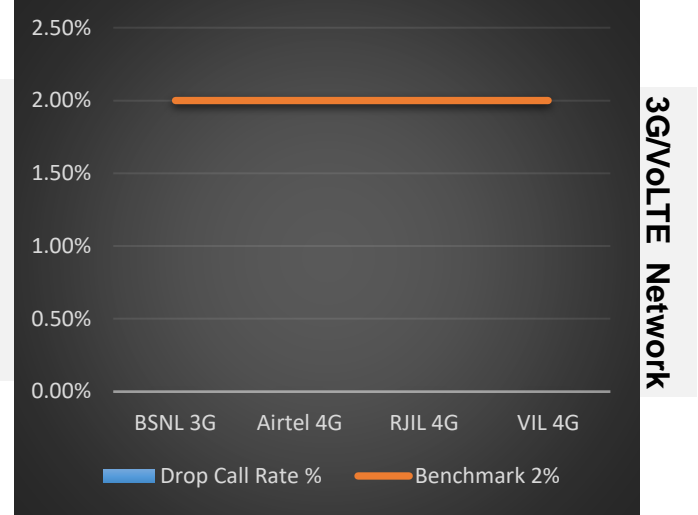
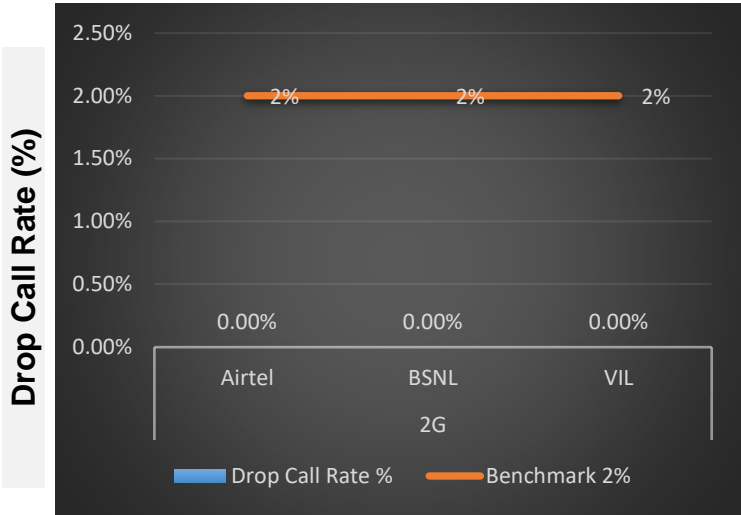
Data Service Test- Static Locations



Hotspot Locations

1. Railway Station
2. Crystal Mall
3. Bus-Depot
4. Lakhota Lake Gate-1
5. G.G.Hospital
6. Ayurved University

QoS compliance of the TSPs in Jamnagar 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%	0.00%	0.00%	0.00%	0.00%	0.00%	0%
Block Call Rate %	0.28%	0.00%	0.00%	0.27%	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 %	95.47	89.34	98.99

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

TSPs	3G
	BSNL
Coverage %	90.74

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99.48	99.99	99.82

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	94.86%	100%	100%	100%

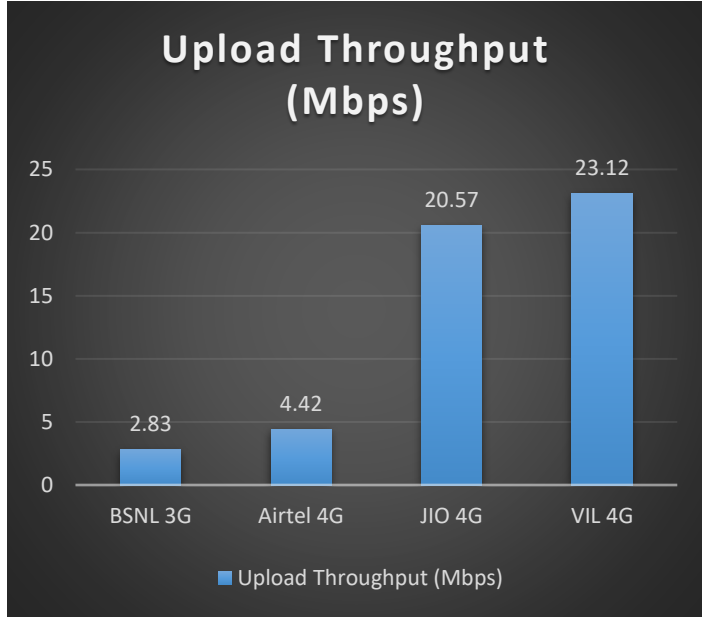
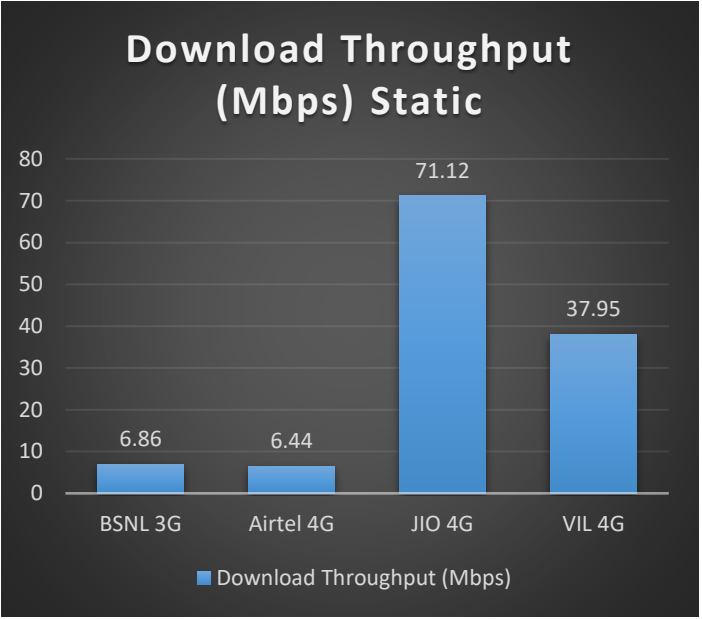
Data Services Static

Key Observations

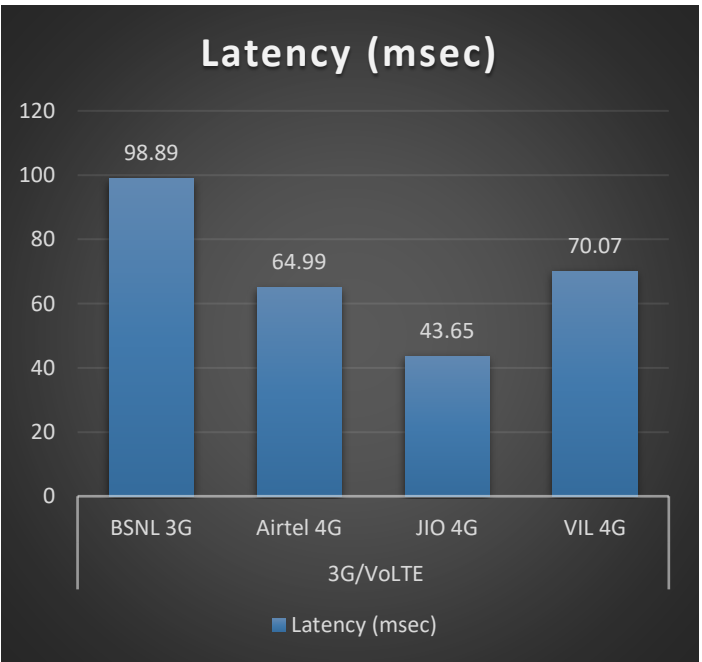
Data was tested at 5 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, Paytm)

Data Download and Upload Performance Static (Mbps)

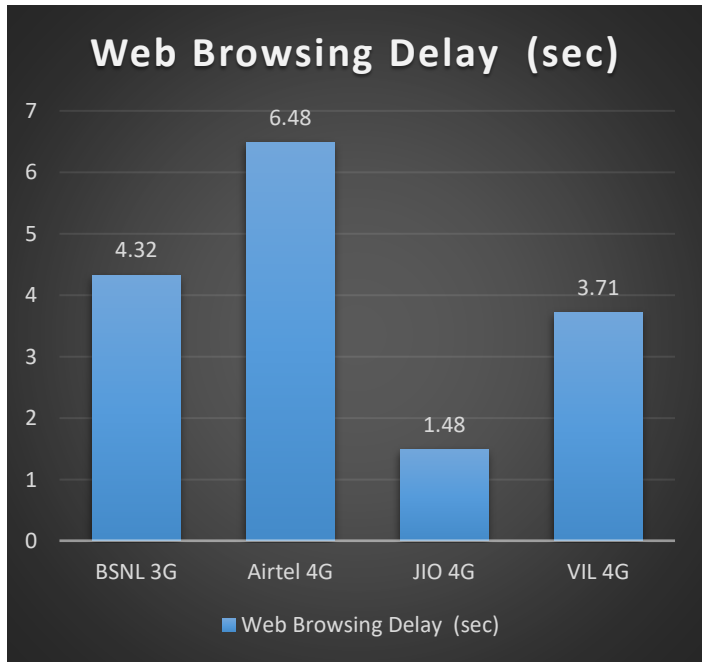
3G/4G/ Network:



Latency (ms)



Web Browsing (Sec)



Data Services Dynamic

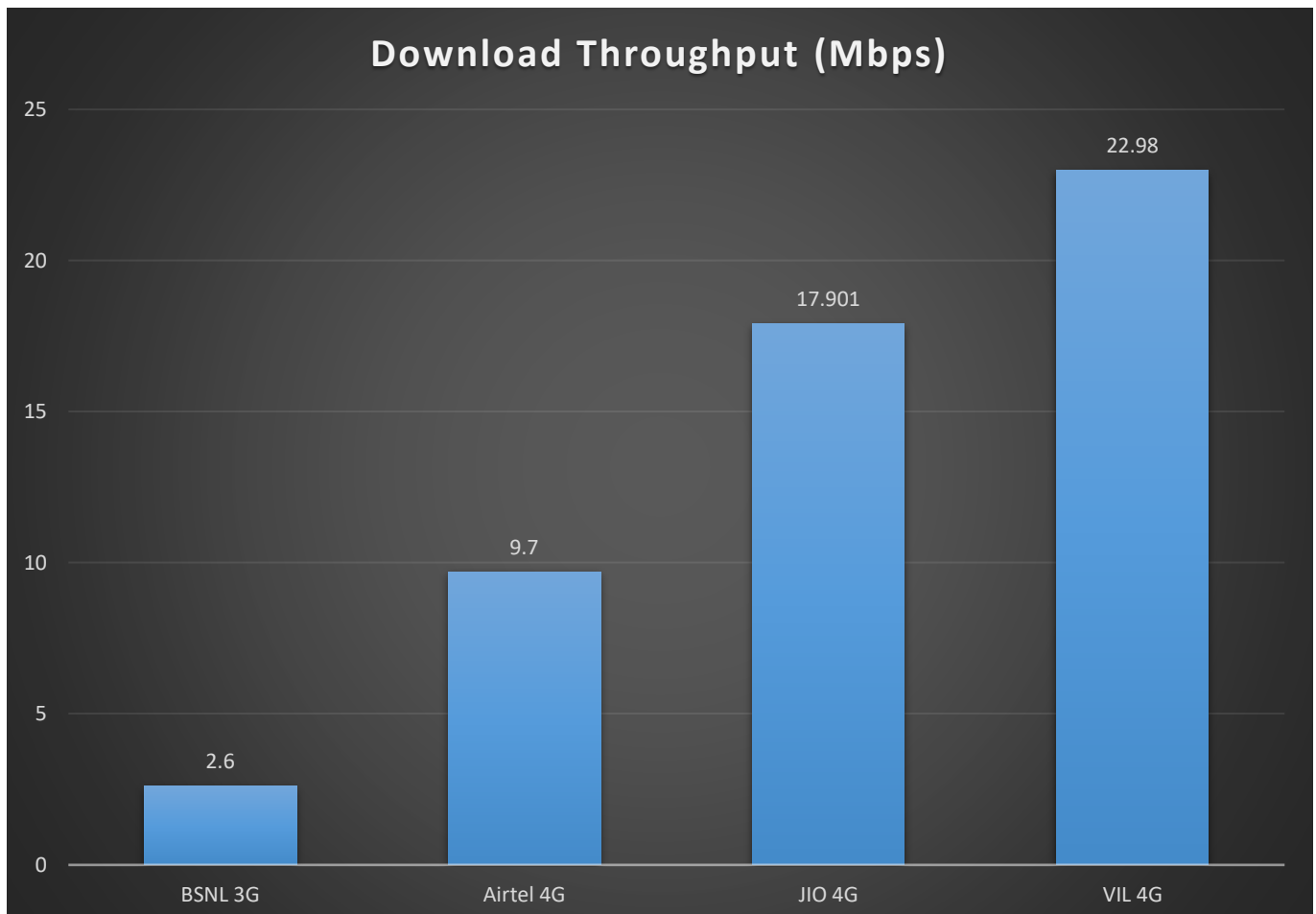
Key Observations

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)	2.6	9.7	17.9	22.98



Summary

City Level Summary-Voice

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	358	368	343
Blocked Call Rate (%)	0.28	0	0
CSSR% (Accessibility)	99.72	100	100
Drop Call Rate (%)	0	0	0
Mobility HOSR (%)	99.19	98.64	98.95
Rx Quality (%)	96.5	98.48	95.12
Average CST Sec	3.38	2.51	2.37

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	371	372	361	382
Blocked Call Rate (%)	0.27	0	0	0
CSSR% (Accessibility)	99.73	100	100	100
Drop Call Rate (%)	0	0	0	0
Mobility HOSR (%)	98.34	100	99.83	99.62
Rx Quality (%)	95.06	93.41	93.58	86.65
Average CST Sec	1.88	1	2.04	0.35

Summary

City Level Summary- Data Services

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	131.7	150.23	205
Upload Throughput (kbps)	68.36	80.94	96.4
Web Browsing Delay (sec)	54.9	14.62	37.1
Latency (msec)	375.44	197.17	76

Data Services Static	3G / 4G			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	6.86	6.44	71.12	37.95
Upload Throughput(Mbps)	2.83	4.42	20.57	23.12
Video Streaming Delay (sec)	4.2	0.92	0.74	0.11
Web Browsing Delay (sec)	4.32	6.48	1.48	3.71
Latency (msec)	98.89	64.99	43.65	70.07

<u>Railway Station</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	122.96	112.9	170.2
Upload Throughput (kbps)	74.62	96.74	119.6
Web Browsing Delay (sec)	161.85	14.56	44.99
Latency (msec)	528.55	181.33	169.8

<u>Crystal Mall</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	103.78	135.37	205
Upload Throughput (kbps)	51.4	74.9	126
Web Browsing Delay (sec)	27.44	15.09	25
Latency (msec)	320.44	174.33	169

<u>Bus Stand</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	72.08	139.58	82.38
Upload Throughput (kbps)	60.04	72.82	64.51
Web Browsing Delay (sec)	28.41	14.30	26
Latency (msec)	344.57	210.67	247

<u>Lakhota Lake</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	157.4	177.13	223
Upload Throughput (kbps)	77.48	89.72	101.9
Web Browsing Delay (sec)	28.64	13.55	26.46
Latency (msec)	316.98	202	230

<u>G.G. Hospital</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	129.35	173.89	154.06
Upload Throughput (kbps)	42.5	72.56	115.28
Web Browsing Delay (sec)	28.18	15.42	16.76
Latency (msec)	545.06	181.67	131.9

<u>Ayurved University</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	204.63	162.51	125.4
Upload Throughput (kbps)	104.1	78.89	51.13
Web Browsing Delay (sec)	25.45	14.78	47.79
Latency (msec)	197.15	233	304

Data Services static

<u>Railway Station</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	3.85	18.67	82.32	60.7
Upload Throughput (mbps)	2.60	8.27	20.87	32.7
Video Streaming Delay (Secs.)	4.48	0.8	0.7	0.13
Web Browsing Delay (sec)	4.36	5.38	1.4	3.08
Latency (msec)	118	81.28	31.85	57.6

<u>Crystal Mall</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	6.25	6.71	100.85	16
Upload Throughput (mbps)	3.39	2.31	11.18	15
Video Streaming Delay (Secs.)	2.15	0.89	0.87	0.09
Web Browsing Delay (sec)	4.09	5.31	1.6	3.76
Latency (msec)	90	64.44	59.85	57

<u>Bus Stand</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	7.34	2.5	43.27	8
Upload Throughput (mbps)	2.75	1.17	27.85	6
Video Streaming Delay (Secs.)	5.65	1,25	0.66	0.09
Web Browsing Delay (sec)	5.32	8.61	1.4	3.8
Latency (msec)	86.33	61.58	39.85	121

Data Services static

<u>Lakhota Lake</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	5.60	2.44	83.96	41
Upload Throughput (mbps)	2.15	4.4	27.65	32
Video Streaming Delay (Secs.)	5.73	0.82	0.76	0.11
Web Browsing Delay (sec)	6.16	8.4	1.4	4.24
Latency (msec)	155.33	56.4	63.35	54.1

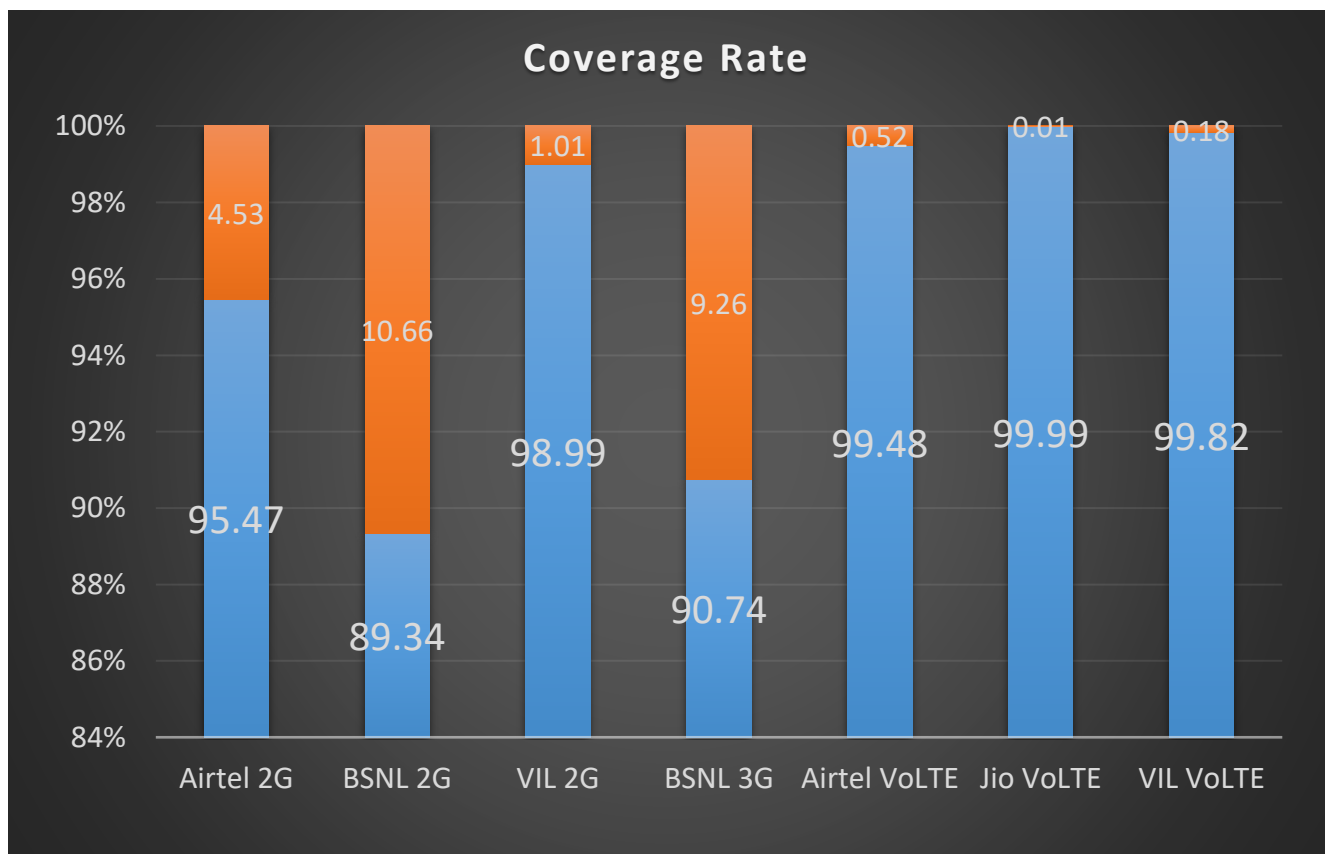
<u>G.G. Hospital</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	9.56	4.3	58.5	47
Upload Throughput (mbps)	2.37	9.33	15.09	25
Video Streaming Delay (Secs.)	3.31	1	0.65	0.1
Web Browsing Delay (sec)	3.12	5.75	1.6	3.03
Latency (msec)	78.33	49.36	30	57.5

<u>Ayurved University</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	8.57	4.02	57.81	55
Upload Throughput (mbps)	3.76	1.06	20.77	28
Video Streaming Delay (Secs.)	3.88	0.78	0.77	0.11
Web Browsing Delay (sec)	2.82	5.42	1.5	4.32
Latency (msec)	65.33	76.86	37	73.2

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.

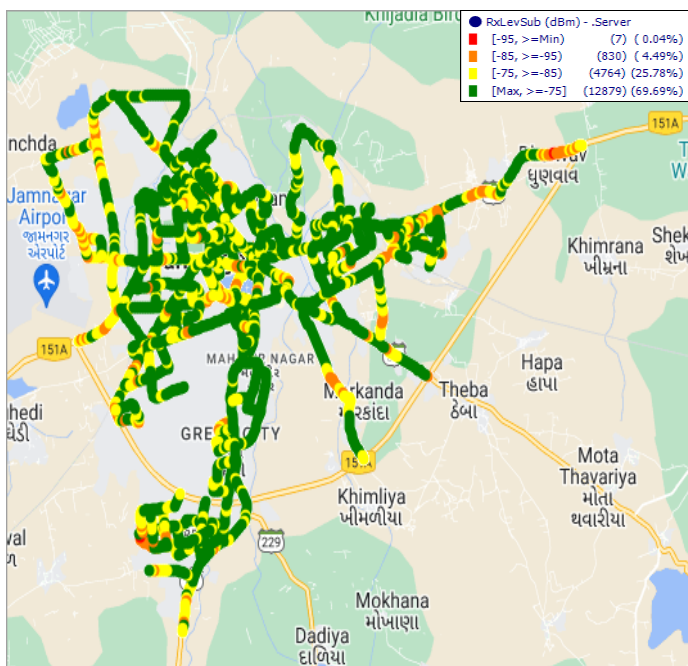
TSP	Coverage Rate %
Airtel 2G	95.47%
BSNL 2G	89.34%
VIL 2G	98.99%
BSNL 3G	90.74%
Airtel VoLTE	99.48%
Jio VoLTE	99.99%
VIL VoLTE	99.82%



TSP-AIRTEL

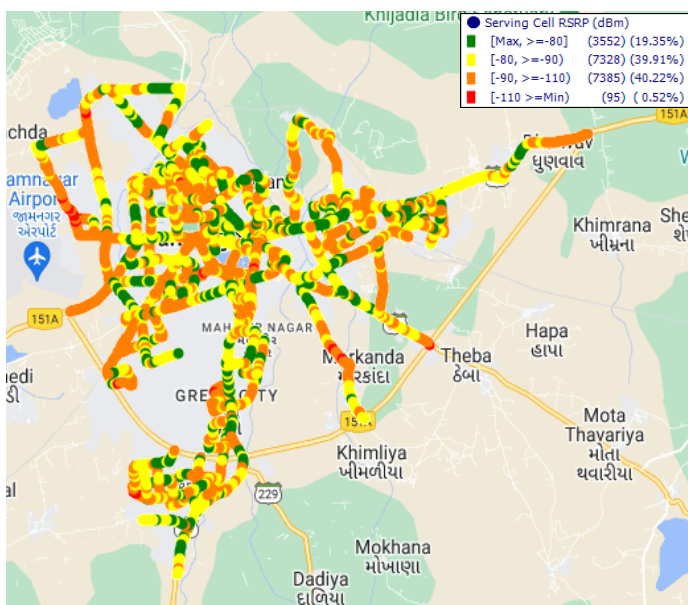
Technology	Coverage %
2G	95.47%
VoLTE	99.48%

2G



2G			
Overall RxLevel	# Samples	% PDF	Legend s
[Max, >=-75]	12879	69.69%	
[-75, >=-85)	4764	25.78%	
[-85, >=-95)	830	4.49%	
[-95, >=Min)	7	0.04%	
Total	18480	100%	

VoLTE



VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legend s
[Max, >=-80]	3552	19.35%	
[-80, >=-90)	7328	39.91%	
[-90, >=-110)	7385	40.22%	
[-110, >=Min)	95	0.52%	
Total	18360	100%	

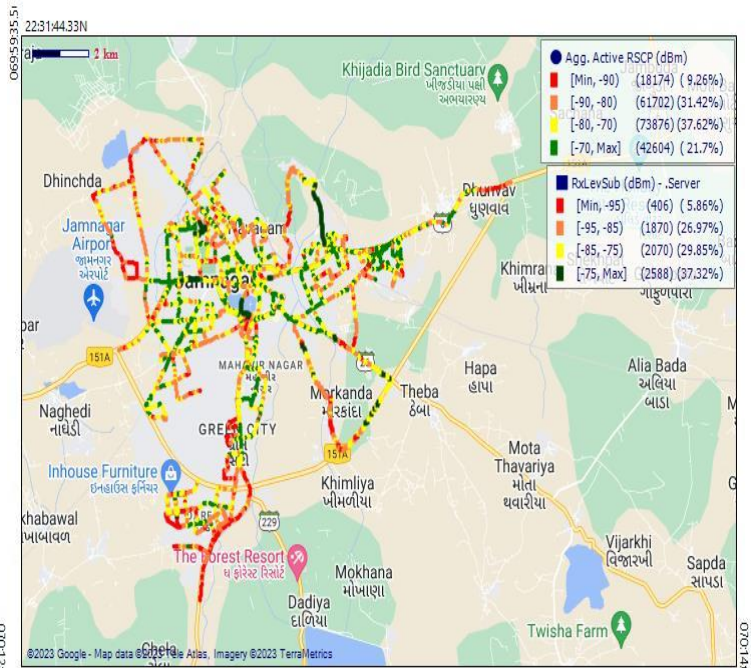
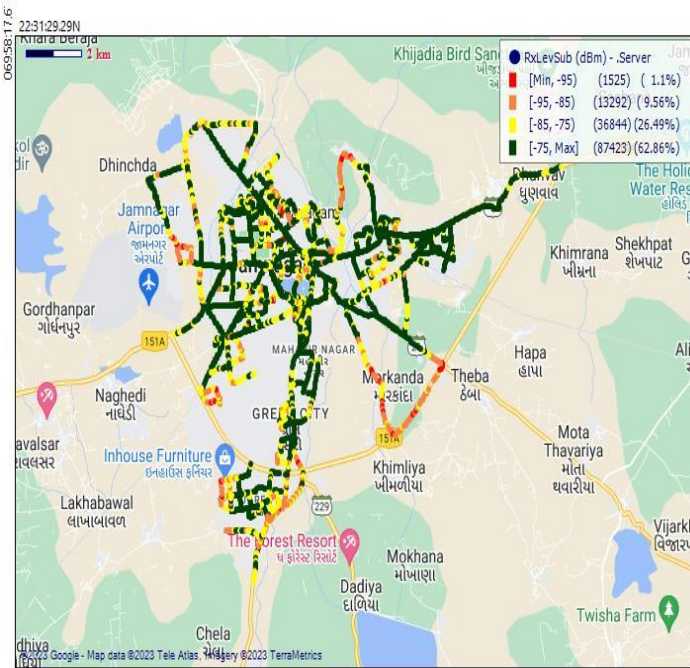
Coverage Details

TSP- BSNL

Technology	Coverage %
2G	89.34%
3G	90.74%

2G

3G

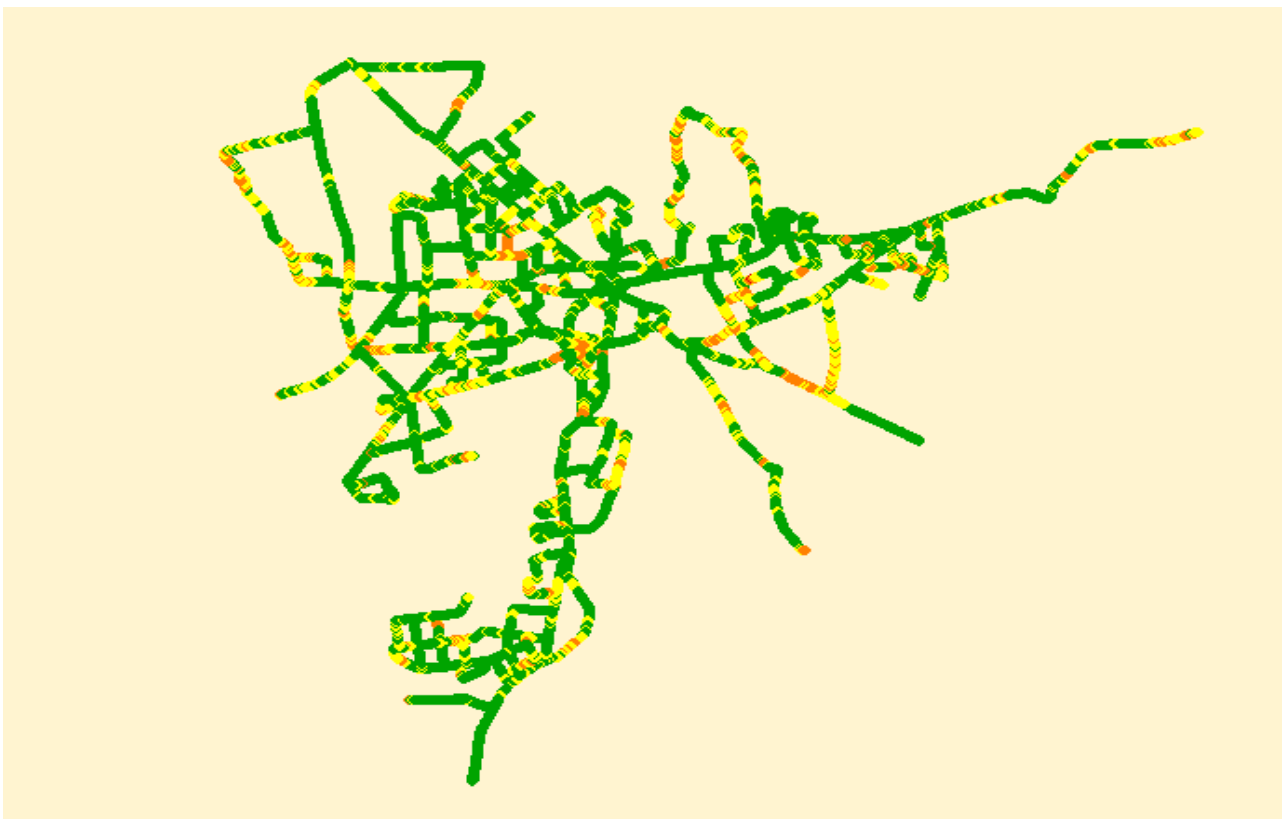






2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	87423	62.86%	
[-75, >=-85)	36844	26.48%	
[-85, >=-95)	13292	9.56%	
[-95, >=Min)	1525	1.1%	
Total	139084	100%	

3G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	42604	21.7%	
[-70, >=-80)	73876	37.62%	
[-80, >=-90)	61702	31.42%	
[-90, >=Min)	18174	9.26%	
Total	196356	100%	

JIO

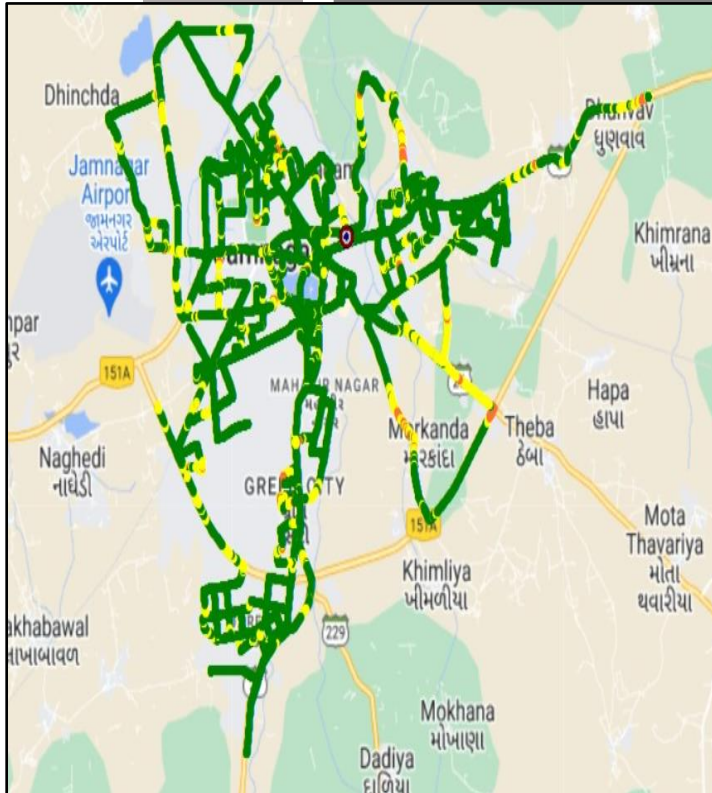
Technology	Coverage %
VoLTE	99.99%



VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	28354	71.14%	
[-80, >=-90)	9070	22.76%	
[-90, >=-110)	2428	6.09%	
[-110, >=Min)	3	0.01%	
Total	39855	100%	

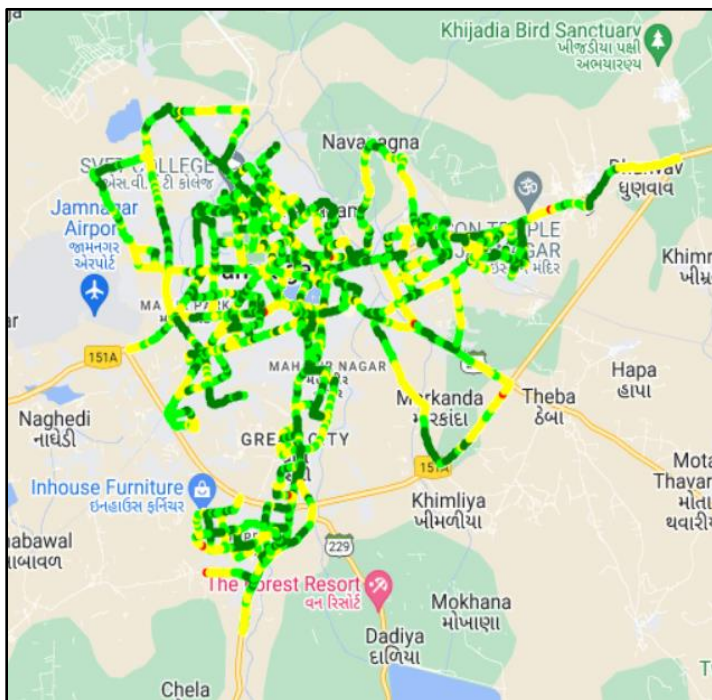
VIL

	Technology	Coverage Rate %
2G	2G	98.99%
	VoLTE	99.82%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	37909	87.19%	Green
[-75, >=-85)	5134	11.80%	Yellow
[-85, >=-95)	437	1.01%	Orange
[-95, >=Min)	0	0	Red
Total	43480	100%	

VoLTE

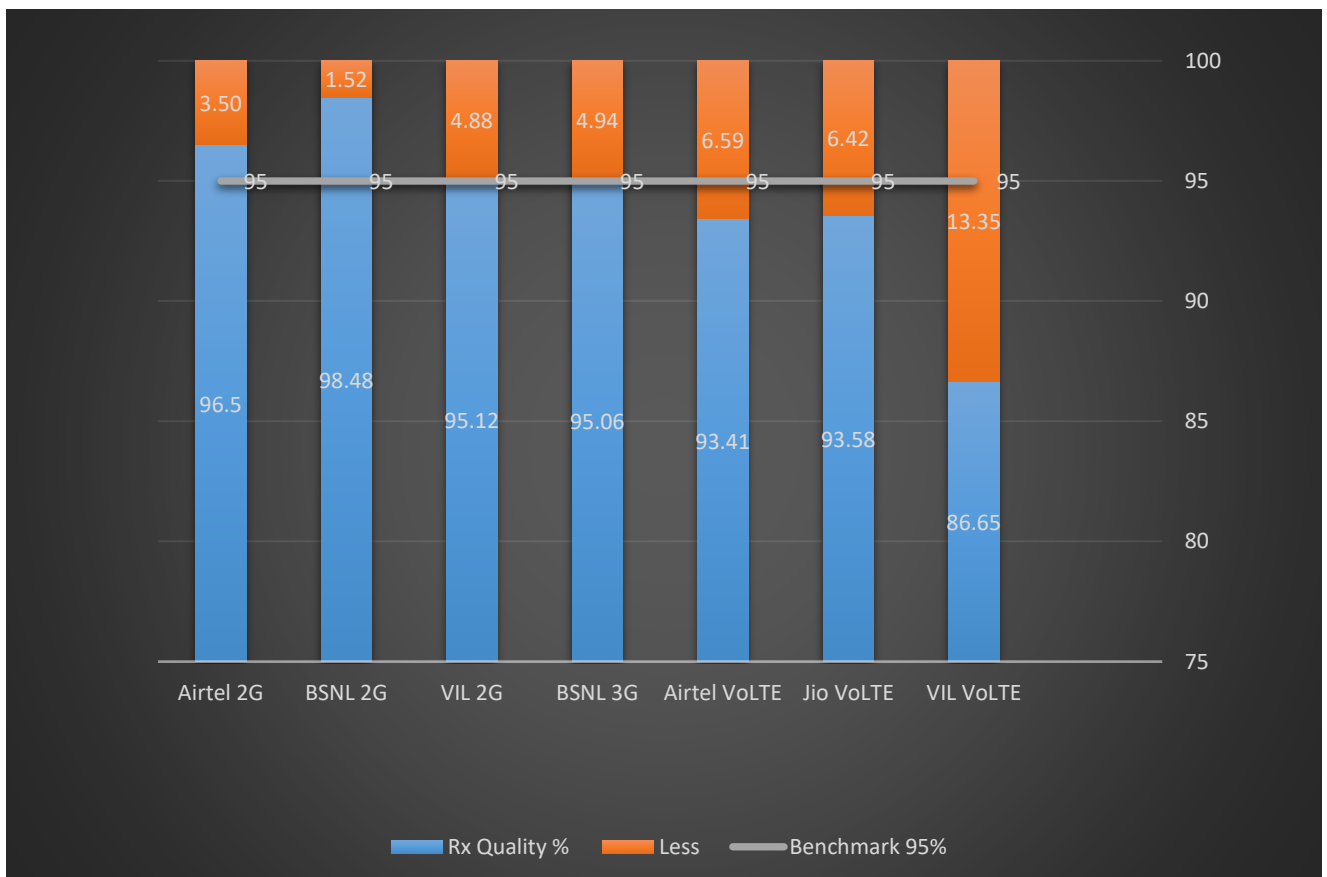


VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	7300	36.48%	Green
[-80, >=-90)	7355	36.76%	Yellow
[-90, >=-110)	5319	26.58%	Orange
[-110, >=Min)	37	0.18%	Red
Total	20011	100%	

II. Quality Details

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 $\geq 95\%$.

<u>TSP</u>	Rx Quality %
Airtel 2G	96.5%
BSNL 2G	98.48%
VIL 2G	95.12%
BSNL 3G	95.06%
Airtel VoLTE	93.41%
Jio VoLTE	93.58%
VIL VoLTE	86.65%

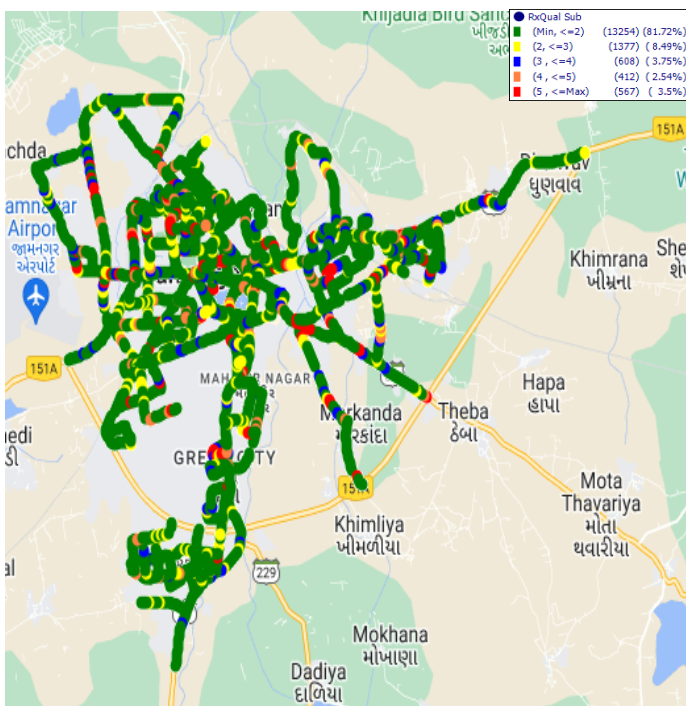


II. Quality Details

Airtel

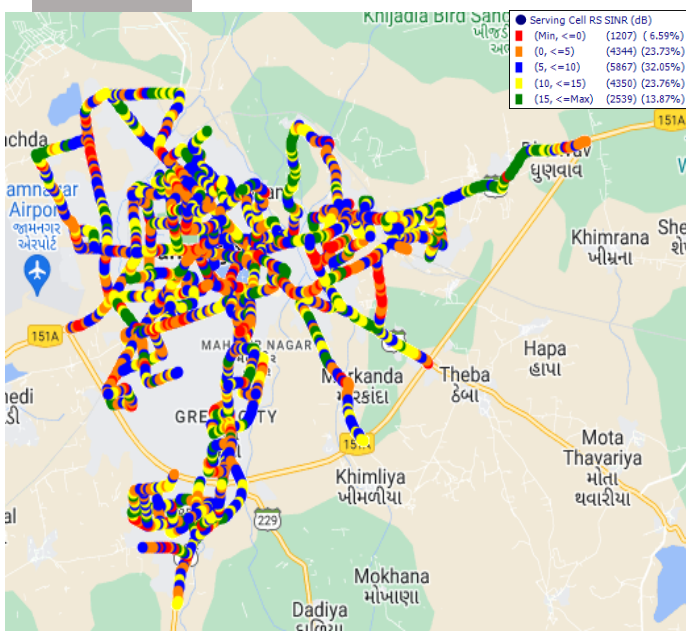
Technology	Rx Quality %
2G	96.5%
VoLTE	93.41%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	13254	81.72%	Green
(2, <=3)	1377	8.49%	Yellow
(3, <=4)	608	3.75%	Blue
(4, <=5)	412	2.54%	Orange
(5, <=Max)	567	3.50%	Red
Total	16218	100%	

VoLTE

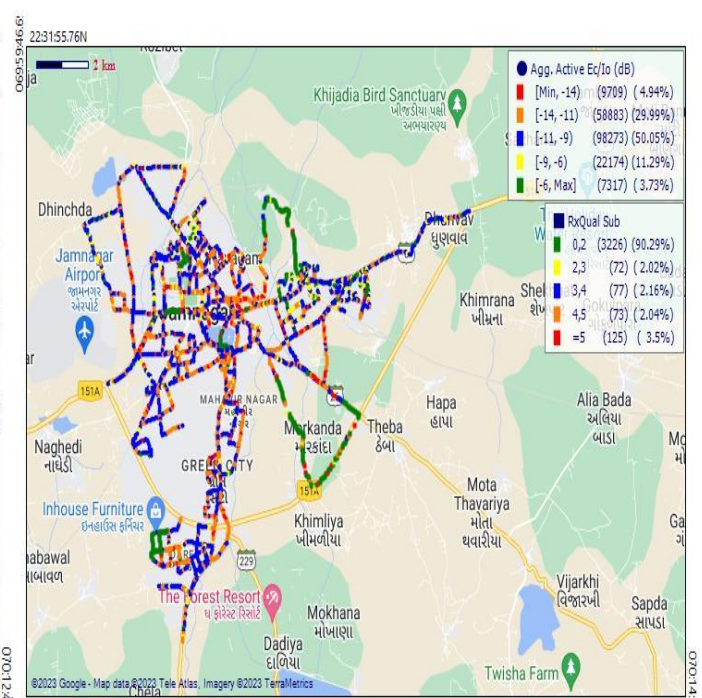
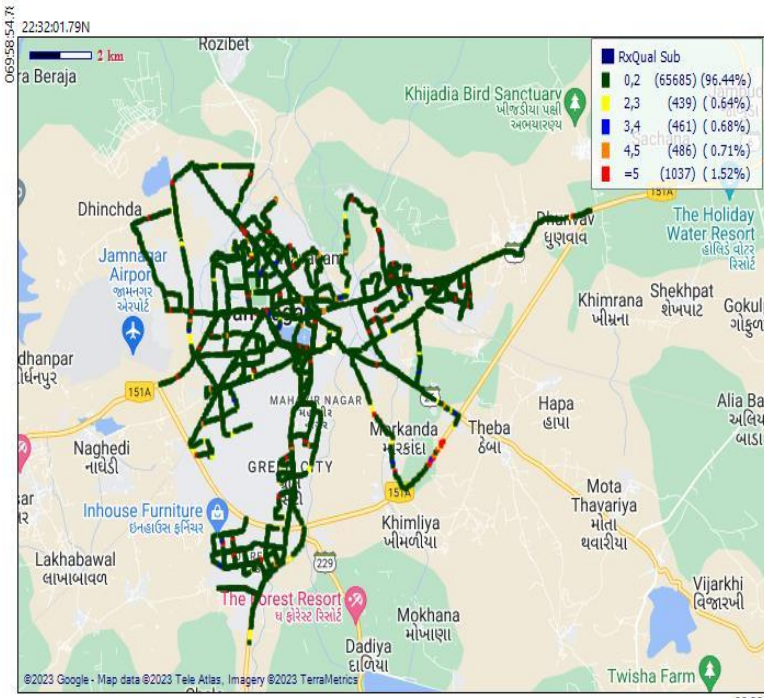


Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1207	6.59%	Red
(0, <=5)	4344	23.73%	Orange
(5, <=10)	5867	32.05%	Blue
(10, <=15)	4350	23.76%	Yellow
(15, <=Max)	2539	13.87%	Green
Total	18307	100%	

II. Quality Details

BSNL

Technology		Rx Quality %
2G	2G	98.48%
	3G	95.06%



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	65685	96.44%	
(2, <=3)	439	0.64%	
(3, <=4)	461	0.68%	
(4, <=5)	486	0.72%	
(5, <=Max)	1037	1.52%	
Total	68108	100%	

Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	7317	3.73%	
(-6, <=-9)	22174	11.29%	
(-9, <=-11)	98273	50.05%	
(-11, <=-14)	58883	29.99%	
(-14, <= Min)	9709	4.94%	
Total	196356	100%	

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 $\geq 95\%$.

JIO

Technology	Rx Quality %
VoLTE	93.58%



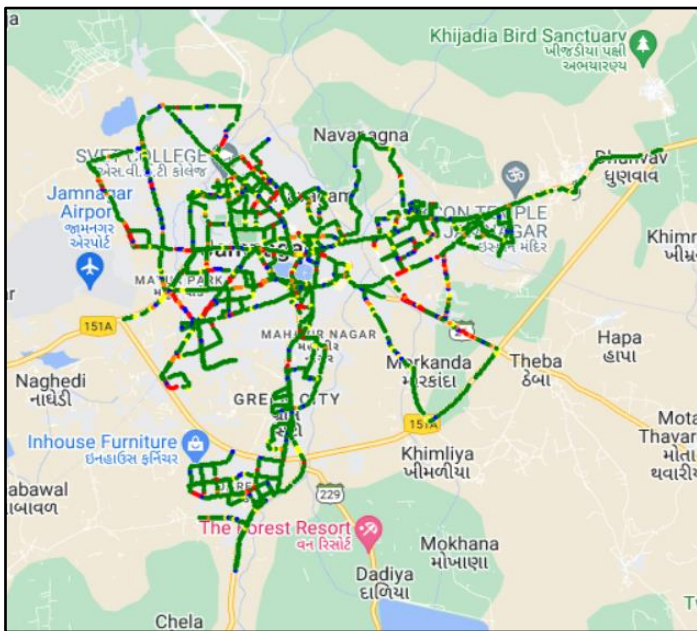
Overall SINR	# Samples	% PDF	Legends
(Min, ≤ 0)	2558	6.42%	
(0, ≤ 5)	8204	20.58%	
(5, ≤ 10)	11434	28.69%	
(10, ≤ 15)	9461	23.74%	
(15, $\leq \text{Max}$)	8198	20.57%	
Total	39855	100%	

II. Quality Details

VIL

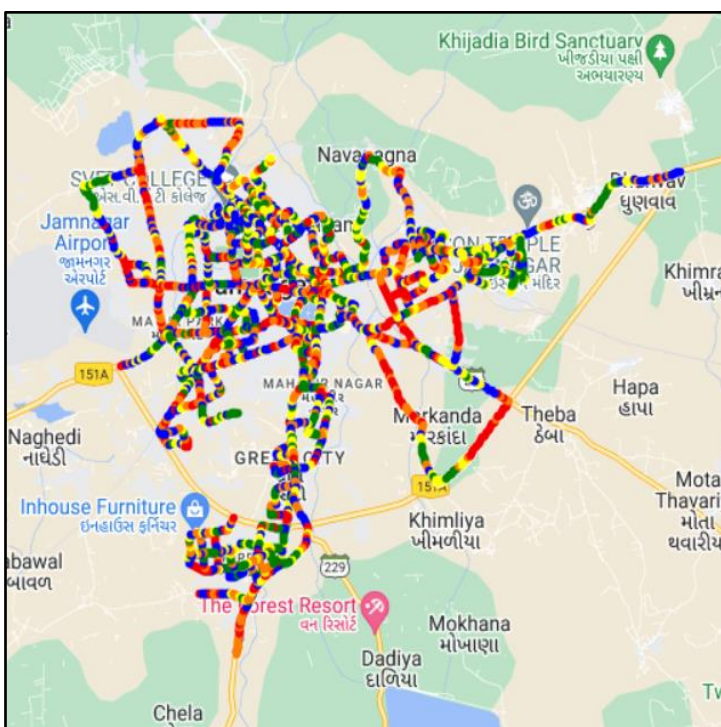
Technology	Rx Quality %
2G	95.12%
4G	86.65%

2G



Overall Rx Quality	# Samples	% PDF	Legend s
(Min, <=2)	14616	82.23%	Green
(2, <=3)	890	5.01%	Yellow
(3, <=4)	922	5.19%	Blue
(4, <=5)	478	2.68%	Orange
(5, <=Max)	869	4.89%	Red
Total	17775	100%	

VoLTE



Overall SINR	# Samples	% PDF	Legend s
(Min, <=0)	2667	13.35%	Red
(0, <=5)	4397	22.01%	Orange
(5, <=10)	4956	24.8%	Blue
(10, <=15)	4134	20.69%	Yellow
(15, <=Max)	3826	19.15%	Green
Total	19980	100%	

III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	94.86%
Airtel VoLTE	100.00%
Jio VoLTE	100.00%
VIL VoLTE	100.00%

