Operator Assisted Drive Test Report

Sri Ganganagar City
25th to 26th Sep'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 Sri Ganganagar City and Hotspot from 09:00 AM to 8:00 PM on 25th to 26th Sep'2024. The drive test covered drive route of 75 KMs & 5 no hotspots over a period of 2 days. Approximately 160 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 on 25th to 26th Sep'2024 covering Sri Ganganagr 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 75 KMs. Approximately 161 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 75 kms for download throughput in all technologies.
2G – measurement – UE Locked in 2G file size- 500KB

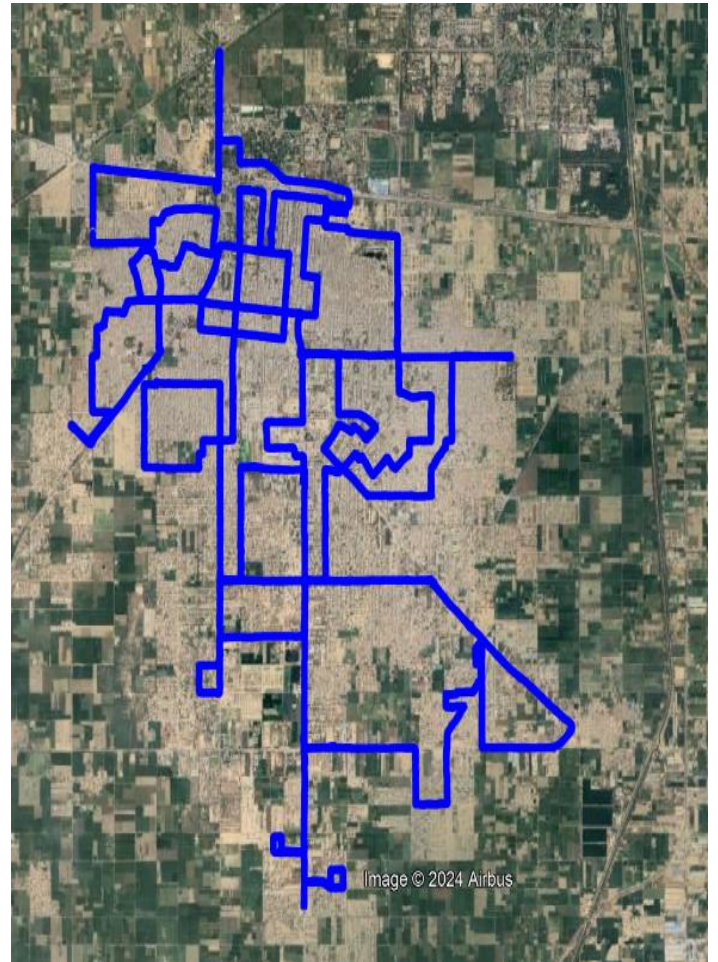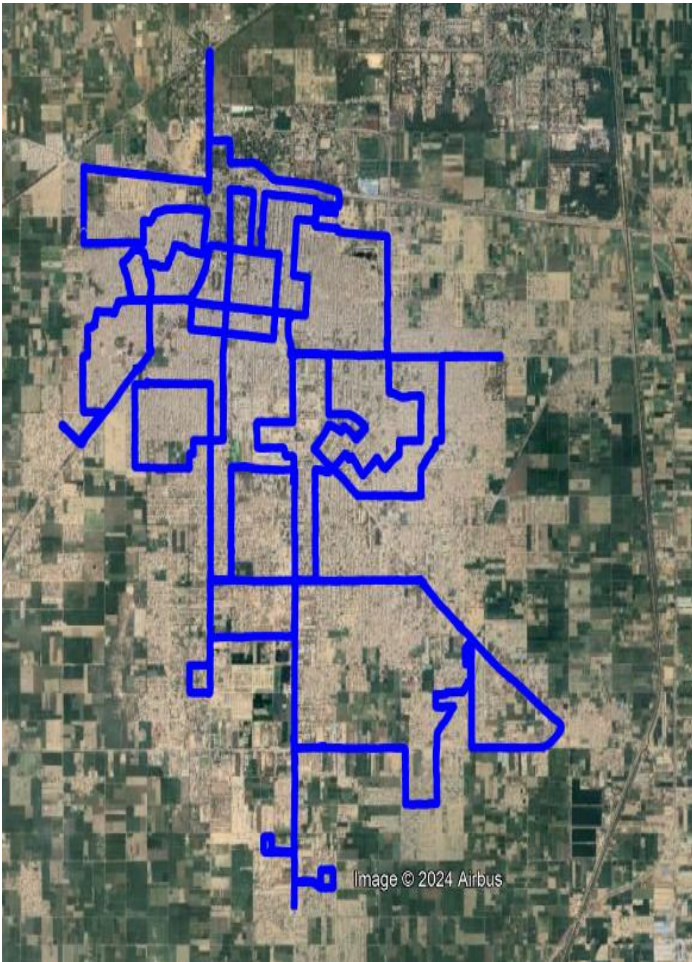 3G – measurement – UE in 3G   File Size- 20MB

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

Static data tests on 5 hotspots

1.   Sukhadiya Circle
2.   Circuit House
3.   Sri Ganganagar Junction
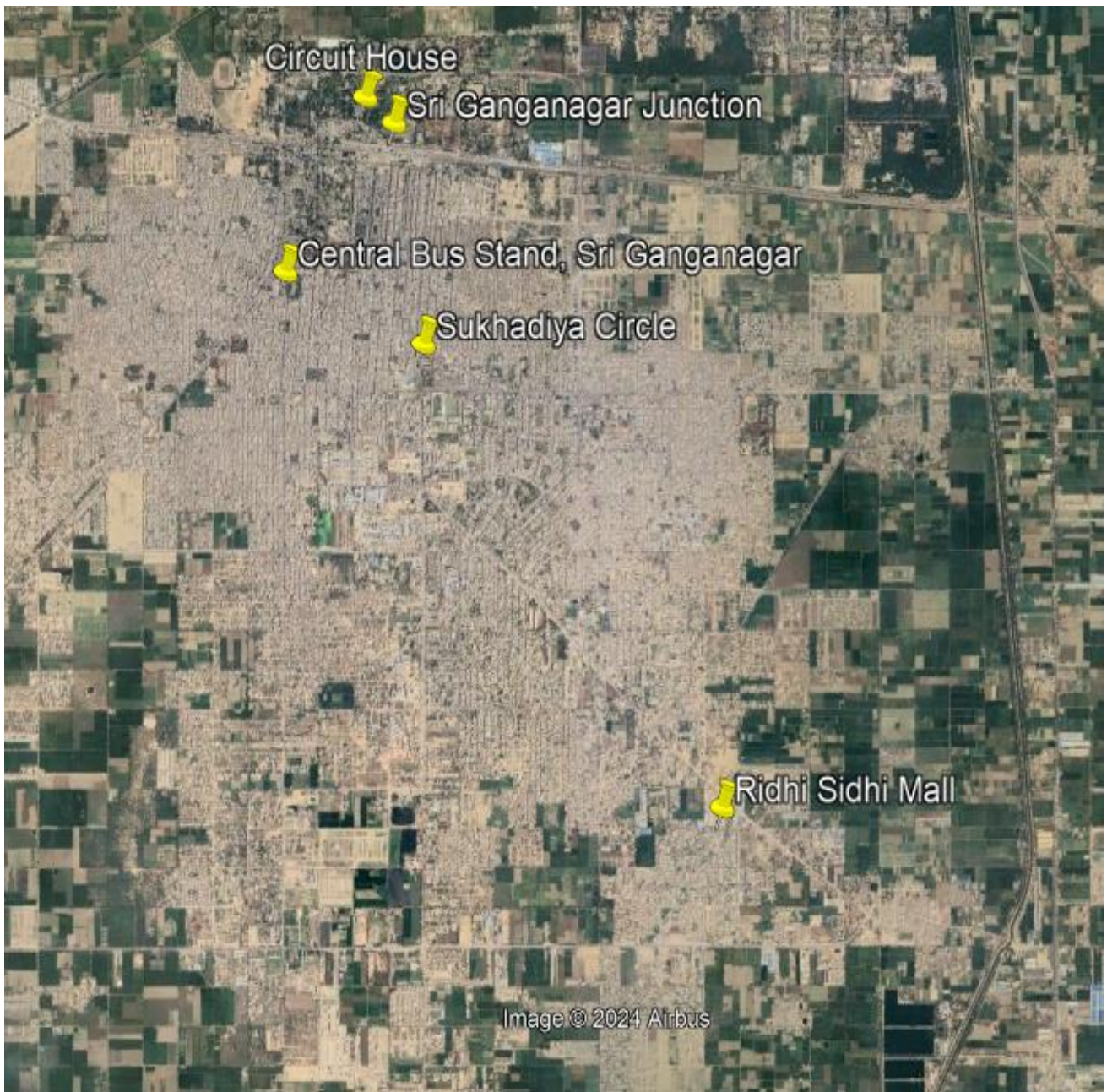4.   Central Bus Stand, Sri Ganganagar
5.   Ridhi Sidhi Mall

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
25-Sep-24	2G/3G/4G Voice and 3G/4G Dynamic Data	Starting point:K.L.M Hotel & Resorts,Ridhi Sidhi - 2,Ridhi Sidhi - 1, SN Hospital,SH-62, Vardh Ashram Road,Tiny Tots Senior Sec School,Sadbhavna Nagar,Suratgarh Marg,Govt.Medical College & Hospital,UIT Rd, Jawahar Nagar,Meera Marg,City Hospital Rd,SSB Rd,Chahal Chowk,Tehsil Rd,Gagan Path, Sukharia Nagar,Tantia General Hospital,Jindal Heart & Superspeciality Hospital,Maharishi Goutam Marg,Mausam Vibhag,Ganganagar Bada Bajar,Karni Marg,Arya School,Govt Law College,SGN Khalsa PG College,Hindmalkot Rd, Teen Puli,Railway Station Road, Tara Chand Vatika, Purani Abadi,Sukhwant theatre Rd,Koda Chowk,Purani Abadi SAbzi mandi,Mohar Singh Chowk,Jhanki Wale Balaji Temple,Chugh Anorectal & General Hospital,Padampur Marg, Kunj Vihar, Shyam Nagar,Setia COlony, Bhambhu Colony, Gol Bazar,Radeshyam Rd,Acharya Tulsi Marg, L Block,G Block, H Block,Vinoba Basti, Ravindra path, Dhan Mandi, Sukhadiya Circle.
26-Sep-24	Hot Spots- 2G/3G/4G Static Data Tests	Static Hotspot – 1) Sukhadiya Circle, 2) Circuit House, 3) Sri Ganganagar Junction, 4) Central Bus Stand, Sri Ganganagar, 5) Ridhi Sidhi Mall.

Overview

Data Service Test - Static Locations

Hotspot Locations
1. Sukhadiya Circle
2. Circuit House
3. Sri Ganganagar Junction
4. Central Bus Stand, Sri Ganganagar
5. Ridhi Sidhi Mall

Voice Calls

QoS compliance of the TSPs in **Sir Ganganagar City & Nearby area**
for Voice across technologies 2G/3G/4G-VoLTE:
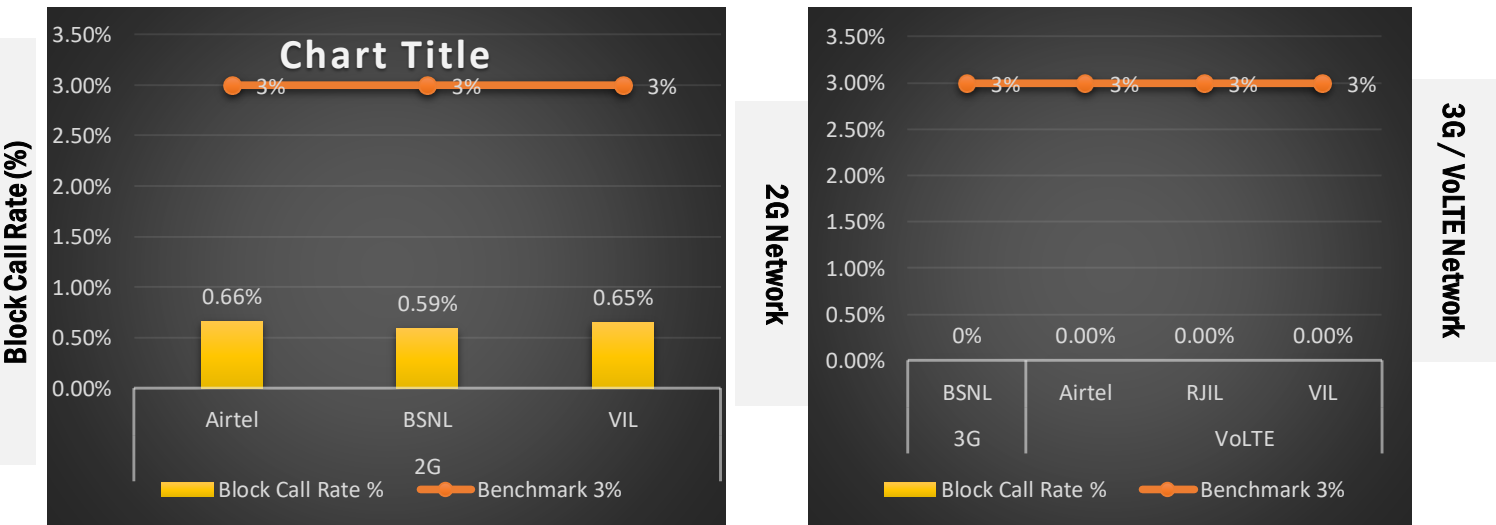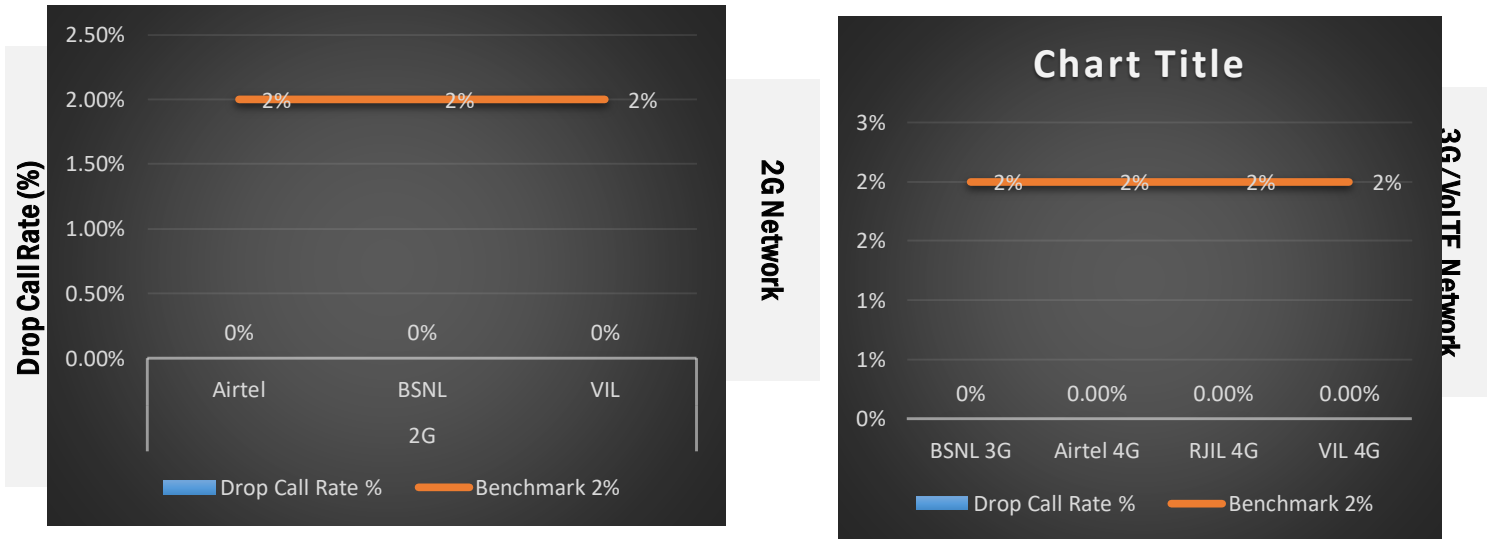
KPIs	2G			3G	4G		
	Airtel	**BSNL**	**VIL**	**BSNL**	**Airtel**	**RJIL**	**VIL**
Drop Call Rate %	0%	0%	0%	0%	0.00%	0.00%	0.00%
Block Call Rate %	0.66%	0.59%	0.65%	0%	0.00%	0.00%	0.00%

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

Coverage

a) Percentage of coverage samples for 2G ≥ -85 dBm.

TSPs	2G		
	Airtel	**BSNL**	**VIL**
Coverage %	97.42%	98.55%	85.63%

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

TSPs	3G
	BSNL
Coverage %	89.73%

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

TSPs	VoLTE		
	Airtel	**JIO**	**VIL**
Coverage %	98.72%	99.96%	97.06%

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

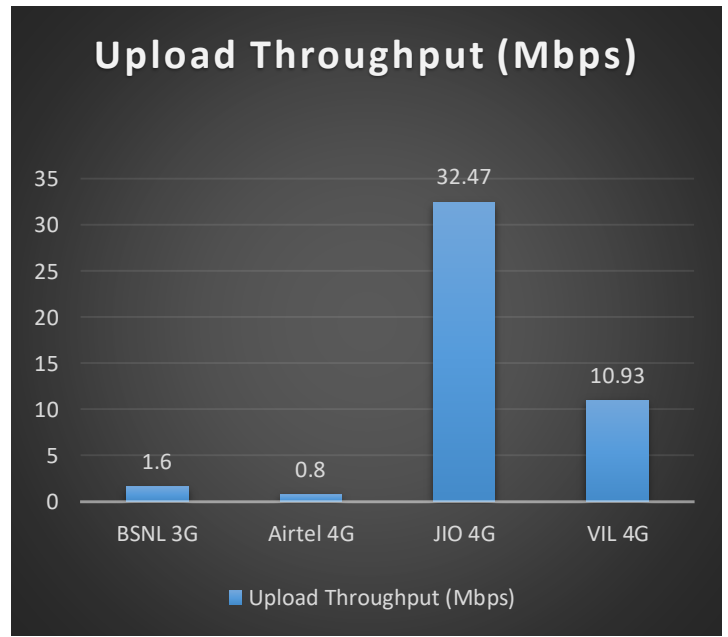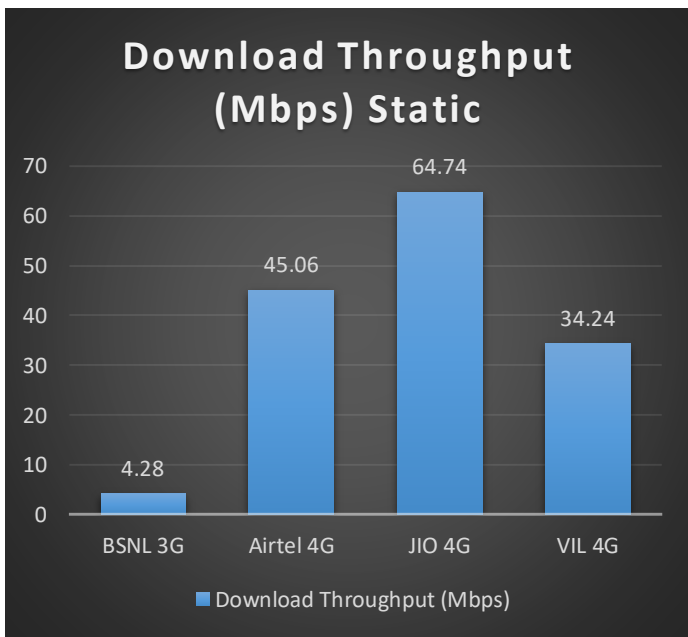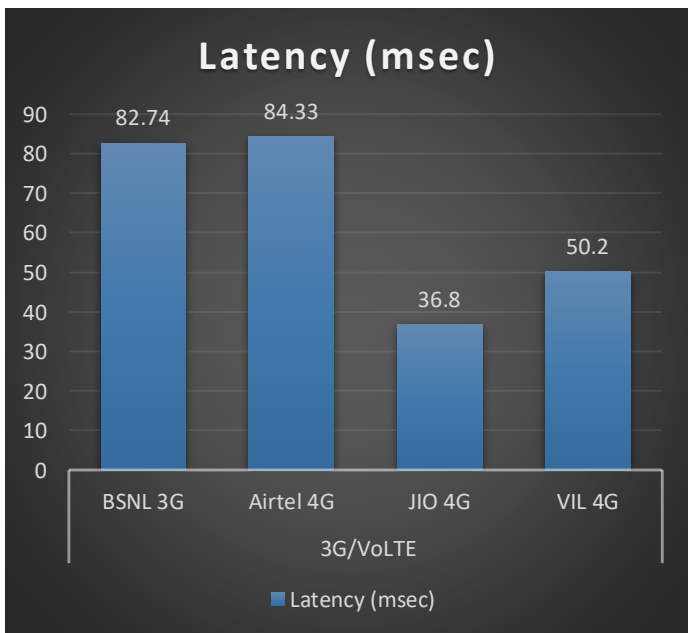| TSPs	3G	VoLTE		
	BSNL	**Airtel**	**JIO**	**VIL**
Time spent on 3G/4G Network %	19.22%	100%	100%	99.99%

Data
Services Static

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:

Download Throughput (Mbps) Static

BSNL 3G	4.28
Airtel 4G	45.06
JIO 4G	64.74
VIL 4G	34.24

Upload Throughput (Mbps)

BSNL 3G	1.6
Airtel 4G	0.8
JIO 4G	32.47
VIL 4G	10.93

Latency (ms)

Web Browsing (Sec)

Latency (msec)

BSNL 3G	82.74
Airtel 4G	84.33
JIO 4G	36.8
VIL 4G	50.2

3G/VoLTE

Web Browsing Delay (sec)

BSNL 3G	2.041
Airtel 4G	6.82
JIO 4G	1.91
VIL 4G	2.81
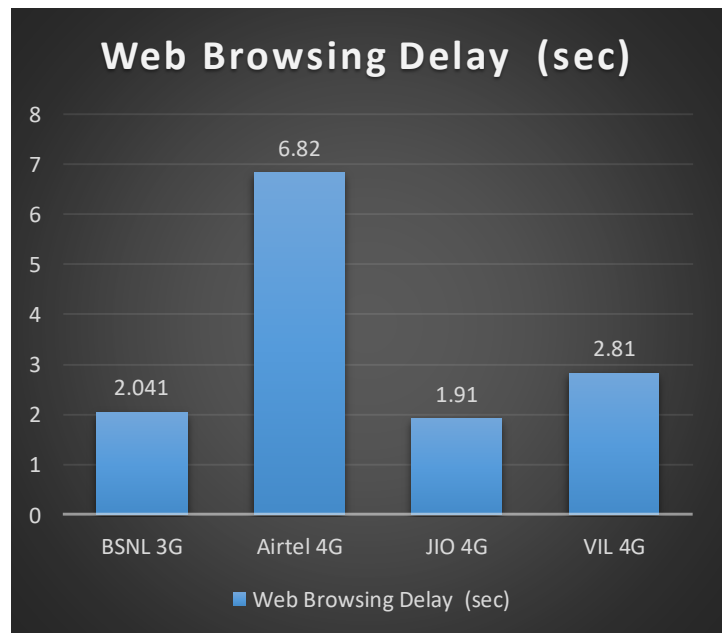
Data Services Dynamic

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

Data Download Performance (kbps) - Dynamic

3G/4G/ Network:
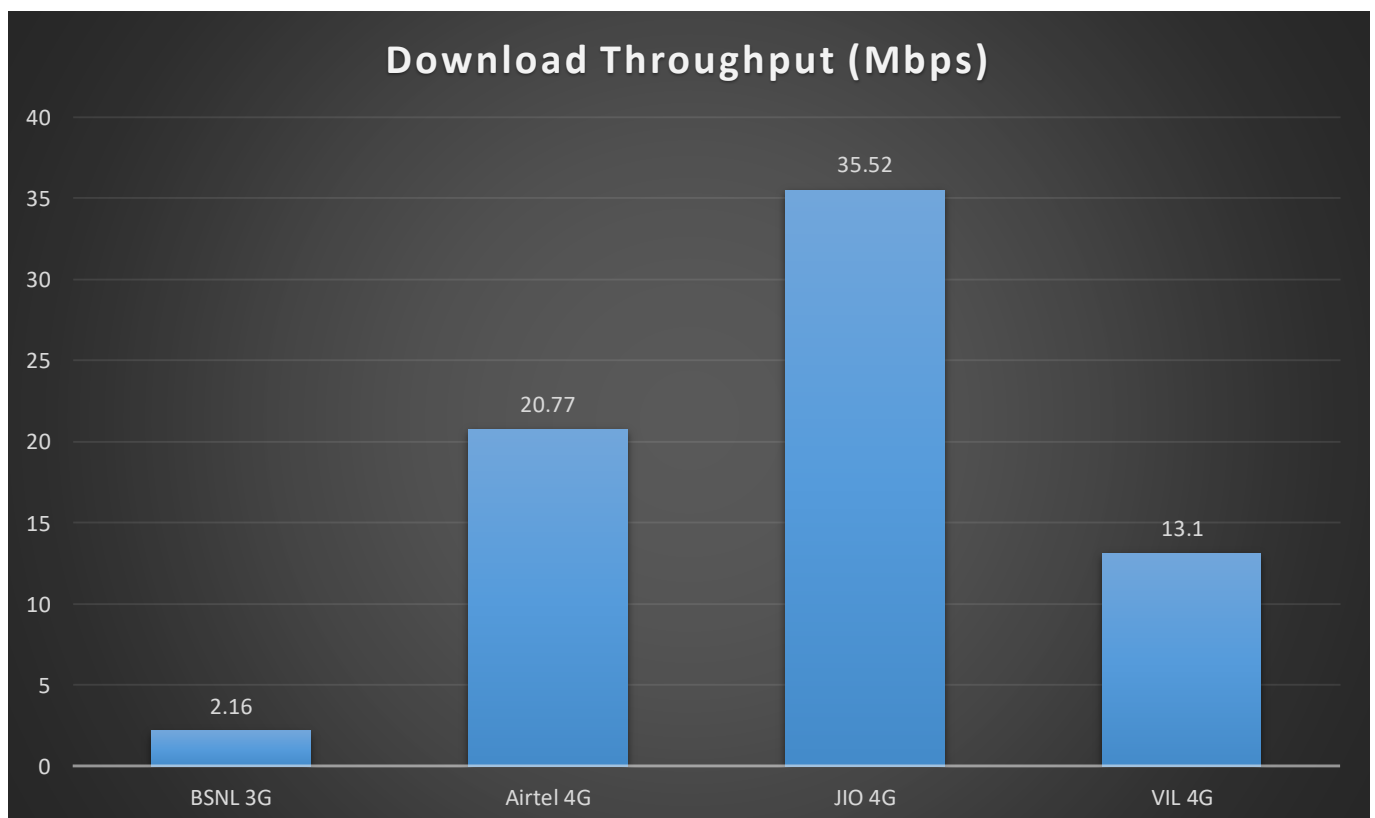
Data Services Dynamic	3G/VoLTE			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	2.16	20.77	35.52	13.1

Download Throughput (Mbps)

Summary

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	156	169	153
Blocked Call Rate (%)	0%	0.59%	0.65%
CSSR% (Accessibility)	99.34%	99.41%	99.34%
Drop Call Rate (%)	0.66%	0%	0%
Mobility HOSR (%)	99.33%	97.95%	100%
Rx Quality (%)	97.76%	96.2%	98.41%
Average CST Sec	3.48	3.28	3.37

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	165	157	163	155
Blocked Call Rate (%)	0%	0%	0%	0%
CSSR% (Accessibility)	100%	100%	100%	100%
Drop Call Rate (%)	0%	0%	0%	0%
Mobility HOSR (%)	100%	100%	99.85%	100%
Rx Quality (%)	87.74%	90.3%	91.35%	95.25%
Average CST Sec	3.74	1.93	0.77	0.47

Summary

Data Services Static	3G / 4G			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	4.28	45.06	64.74	34.24
Upload Throughput(Mbps)	1.6	0.8	32.47	10.93
Video Streaming Delay (sec)	2.072	0.12	0.29	1.82
Web Browsing Delay (sec)	2.041	6.82	1.91	2.81
Latency (msec)	82.74	84.33	36.8	50.2

Sukhadiya Circle	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	5.52	26.38	71.55	31.58
Upload Throughput (mbps)	1.67	1.2	27.55	12.40
Video Streaming Delay (Secs.)	2.038	0.16	0.31	1.79
Web Browsing Delay (sec)	2.062	5.73	1.66	2.05
Latency (msec)	78	102.67	40	65

Circuit House	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	3.61	62.76	83.87	42.03
Upload Throughput (mbps)	1.71	0.77	29.41	8.87
Video Streaming Delay (Secs.)	2.081	0.14	0.28	1.53
Web Browsing Delay (sec)	2.013	7.1	1.76	4.2
Latency (msec)	107.1	71.57	38	46

Railway Station	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	4.52	58.81	60.92	20.89
Upload Throughput (mbps)	1.64	0.81	32.6	16.89
Video Streaming Delay (Secs.)	2.107	0.13	0.3	1.84
Web Browsing Delay (sec)	1.999	6.97	1.93	3.38
Latency (msec)	59.7	105.17	33	45

Data Services static

Bus Stand	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	2.08	38.67	53.72	47.67
Upload Throughput (mbps)	1.42	0.5	23.91	9.62
Video Streaming Delay (Secs.)	2.094	0.17	0.29	1.84
Web Browsing Delay (sec)	2.01	8.64	2.05	2.41
Latency (msec)	81.5	57.93	33	50

Riddhi Siddhi Mall	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	5.67	38.7	53.62	29.05
Upload Throughput (mbps)	1.59	0.63	48.46	6.87
Video Streaming Delay (Secs.)	2.042	0.15	0.28	2.02
Web Browsing Delay (sec)	2.124	5.67	2.15	2.04
Latency (msec)	87.4	55.12	40	45

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 ≥ -85 dBm, RSCP is ≥ -90 dBm & RSRP ≥ -110dBm. The details are as follows.

TSP	Coverage Rate %
Airtel 2G	97.42%
BSNL 2G	98.55%
VIL 2G	85.63%
BSNL 3G	89.73%
Airtel VoLTE	98.72%
Jio VoLTE	99.96%
VIL VoLTE	97.06%

Coverage Rate

	Airtel 2G	BSNL 2G	VIL 2G	BSNL 3G	Airtel VoLTE	Jio VoLTE	VIL VoLTE
Upper segment	2.58	1.45	14.37	10.27	1.28	0.04	2.94
Lower segment	97.42	98.55	85.63	89.73	98.72	99.96	97.06
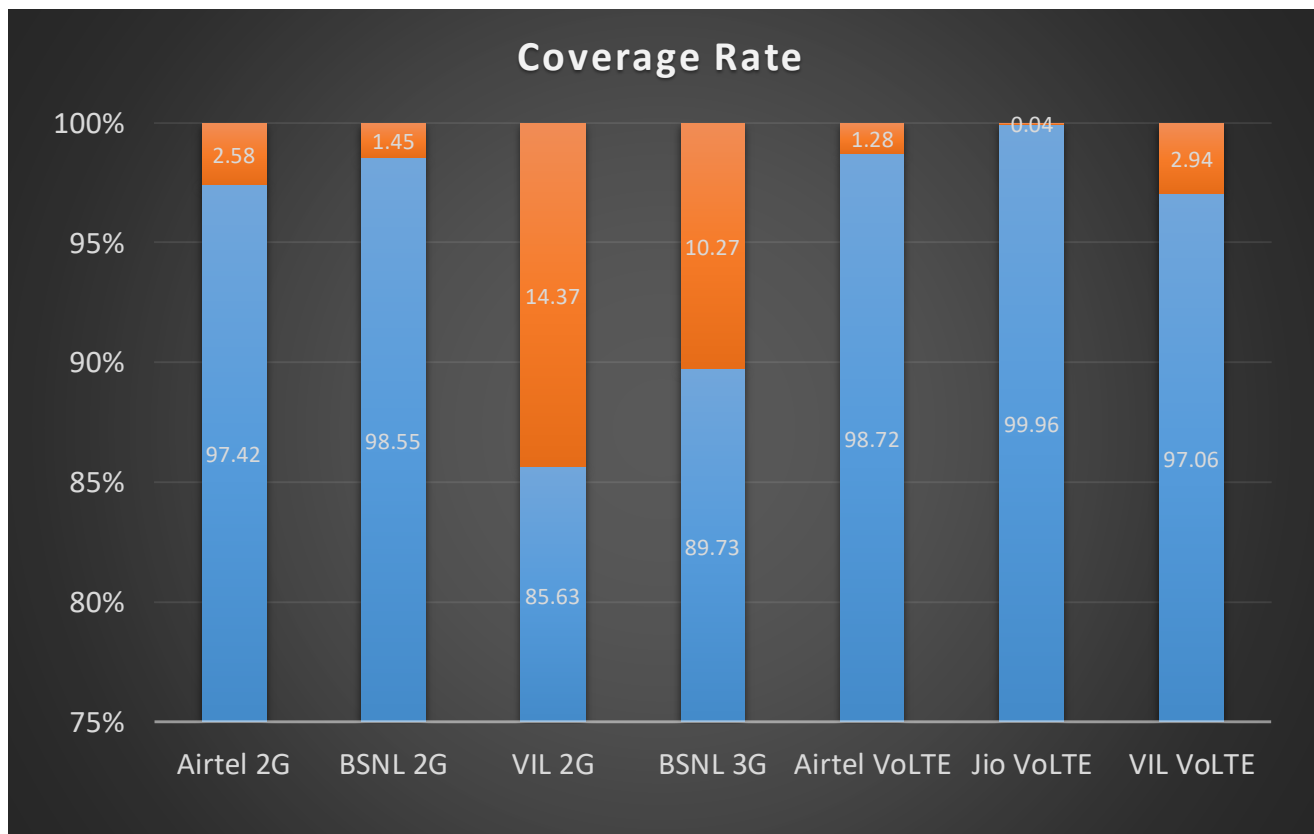
TSP-AIRTEL

Technology	Coverage %
2G	97.42%
VoLTE	98.72%

2G
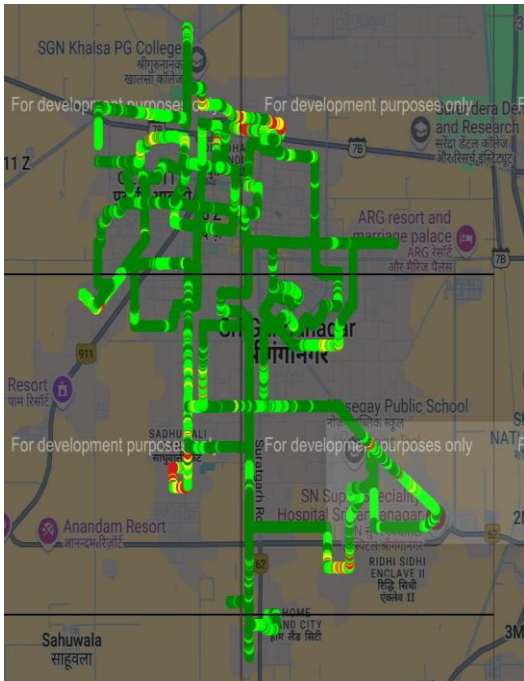
Color	Range	Count	Per
	[Min to -95)	(204)	(2.59%)
	[-95 to -85)	(205)	(2.6%)
	[-85 to -75)	(1940)	(24.59%)
	[-75,Max)	(5539)	(70.22%)

2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	5539	70.23%	
[-75, >=-85)	1940	24.60%	
[-85, >=-95)	205	2.59%	
[-95, >=Min)	204	2.58%	
Total	7888	100%	

VoLTE
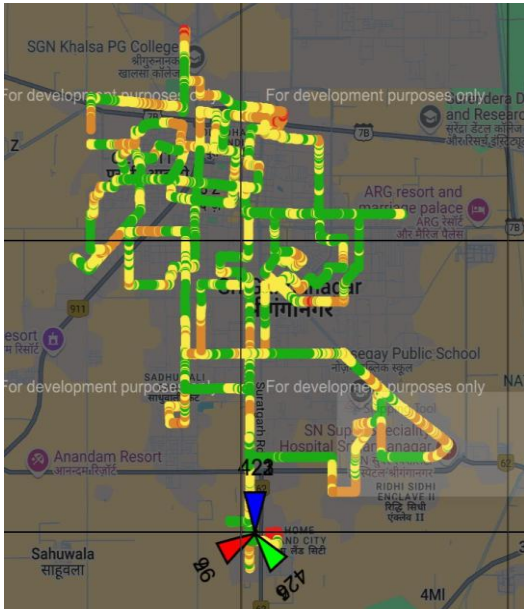
Color	Range	Count	Per
	[Min,-140)	(102)	(1.28%)
	[-110,-90)	(1413)	(17.7%)
	[-90,-80)	(2884)	(36.13%)
	[-80,Max)	(3584)	(44.9%)

VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	3584	44.89%	
[-80, >=-90)	2884	36.13%	
[-90, >=-110)	1413	17.70%	
[-110, >=Min)	102	1.28%	
Total	7983	100%	

TSP- BSNL

Technology	Coverage %
2G	98.55%
3G	89.73%

2G

3G
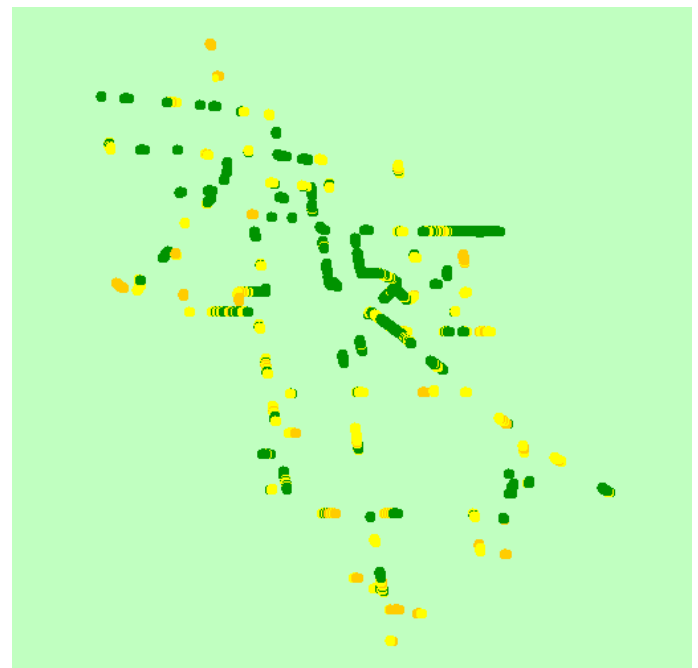
2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	14098	83.20%	🟩
[-75, >=-85)	2601	15.35%	🟨
[-85, >=-95)	239	1.41%	🟧
[-95, >=Min)	7	0.04%	🟥
Total	**16945**	**100**	

3G			
Overall RSCP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	2356	66.51%	🟩
[-80, >=-90)	822	23.22%	🟨
[-90, >=-110)	361	10.19%	🟧
[-110, >=Min)	3	0.08%	🟥
Total	**3542**	**100%**	

JIO

Technology	Coverage %
VoLTE	99.96%

LTE KPI PCell Serving RSRP[dBm]
- -80 <= x < 0 (60.76%, 10748)
- -90 <= x < -80 (22.78%, 4029)
- -110 <= x < -90 (16.43%, 2906)
- -140 <= x < -110 (0.04%, 7)
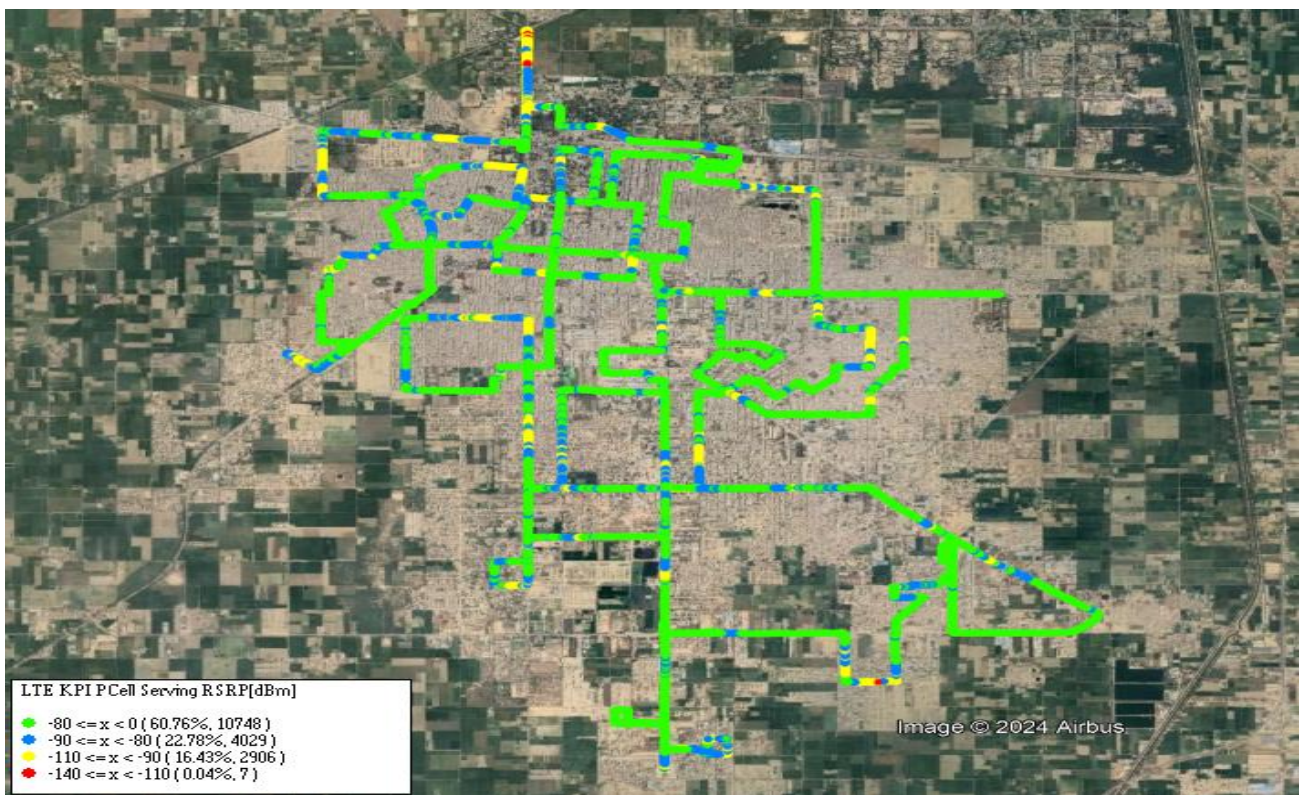
VoLTE			
Overall RSRP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	10748	60.76%	
[-80, >=-90)	4029	22.77%	
[-90, >=-110)	2906	16.43%	
[-110, >=Min)	7	0.04%	
Total	17690	100%	

VIL

Technology	Coverage Rate %
2G	85.63%
VoLTE	97.06%

2G

RxLevSub_Server
- -75 to Max (49.27%) (6999)
- -85 to -75 (36.36%) (5166)
- -95 to -85 (13.96%) (1983)
- Min to -95 (0.41%) (58)
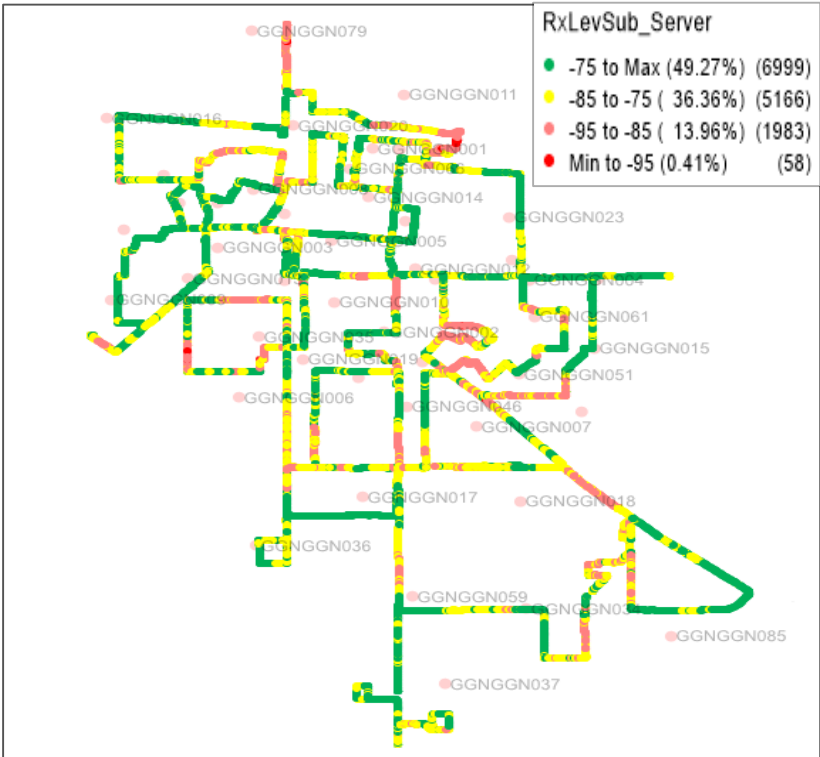
2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	6999	49.27%	
[-75, >=-85)	5166	36.36%	
[-85, >=-95)	1983	13.96%	
[-95, >=Min)	58	0.41%	
Total	14206	100%	

VoLTE

ServingCellRsrp
- -80 to Max (11.31%) (1537)
- -90 to -80 (25.17%) (3423)
- -110 to -90 (60.58%) (8237)
- Min to -110 (2.94%) (400)
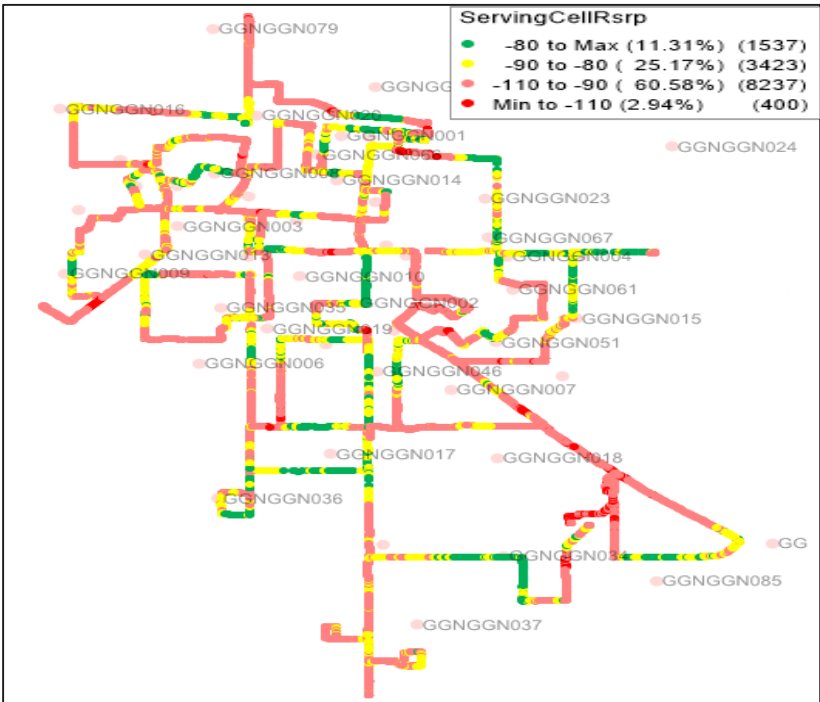
VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	1537	11.31%	
[-80, >=-90)	3423	25.17%	
[-90, >=-110)	8237	60.58%	
[-110, >=Min)	400	2.94%	
Total	13597	100%	

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%.

TSP	Rx Quality %
Airtel 2G	**97.76%**
BSNL 2G	**96.2%**
VIL 2G	**98.41%**
BSNL 3G	**87.74%**
Airtel VoLTE	**90.3%**
Jio VoLTE	**91.35%**
VIL VoLTE	**95.25%**
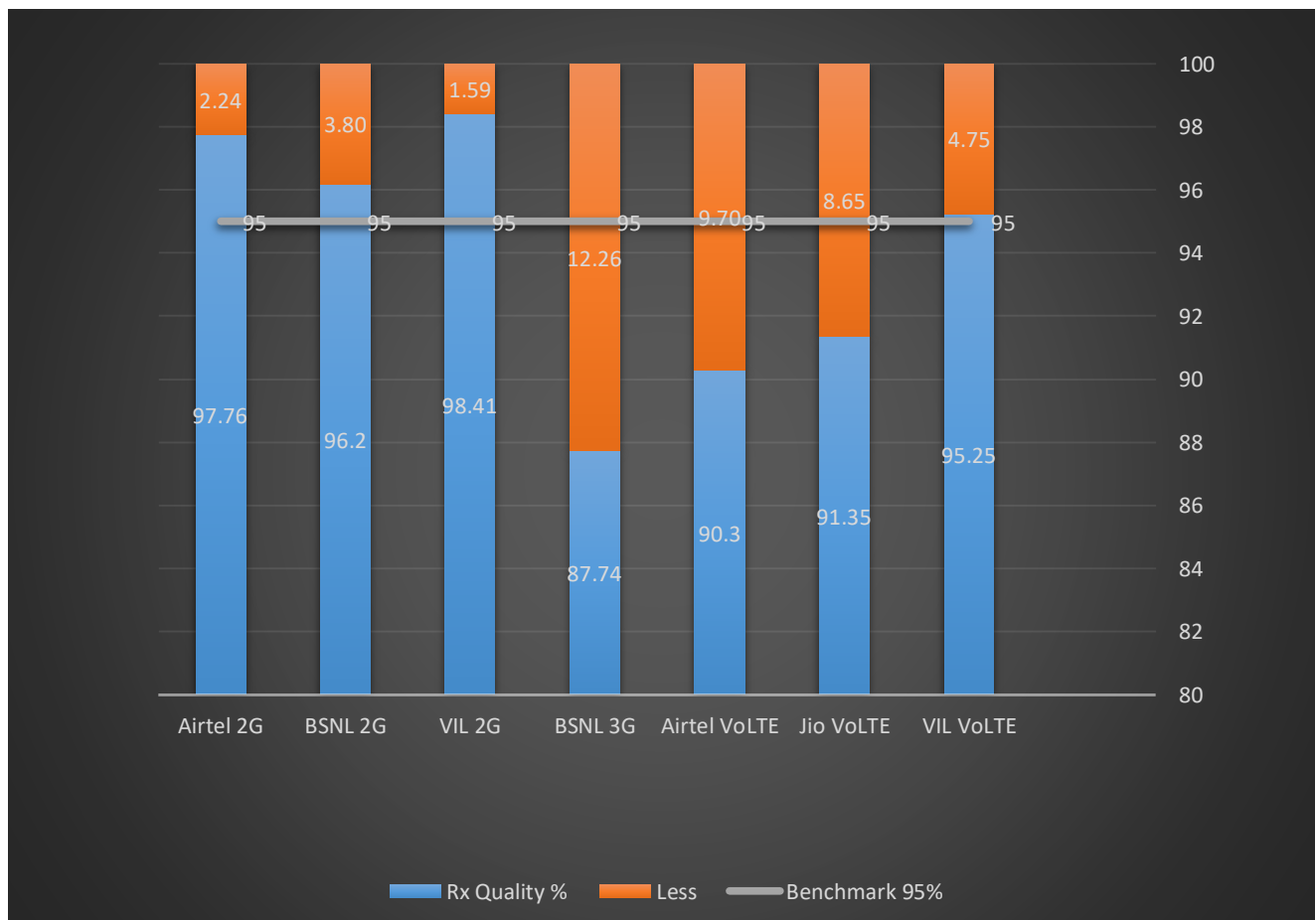
Airtel

Technology	Rx Quality %
2G	97.76%
VoLTE	91.35%

2G

Color	Range	Count	Per
	[Min, 2]	(6097)	(87.64%)
	[2 , 3]	(283)	(4.07%)
	[3 , 4]	(322)	(4.63%)
	[4 , 5]	(95)	(1.37%)
	[5 , Max]	(160)	(2.3%)
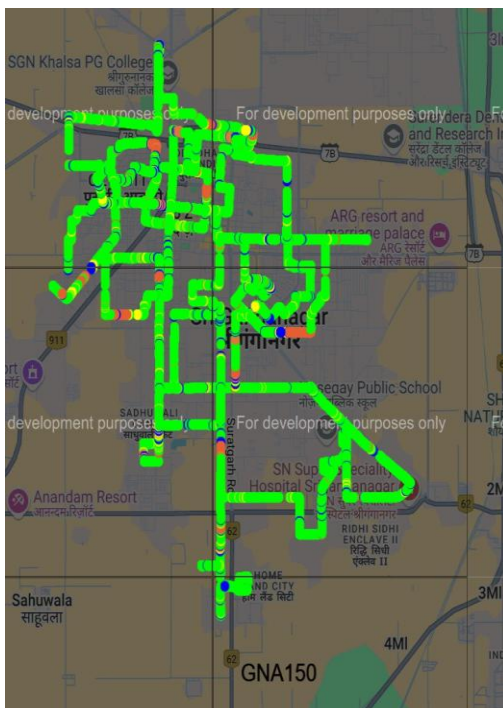
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	6097	87.64%	
(2, <=3)	283	4.07%	
(3 , <=4)	322	4.63%	
(4 , <=5)	95	1.37%	
(5 , <=Max)	160	2.29%	
Total	6957	100%	

VoLTE

Color	Range	Count	Per
	(Min, 0)	(332)	(4.15%)
	(0, 5)	(434)	(5.43%)
	(5, 10)	(1605)	(20.07%)
	(10, 15)	(1571)	(19.65%)
	(15, Max)	(4054)	(50.7%)
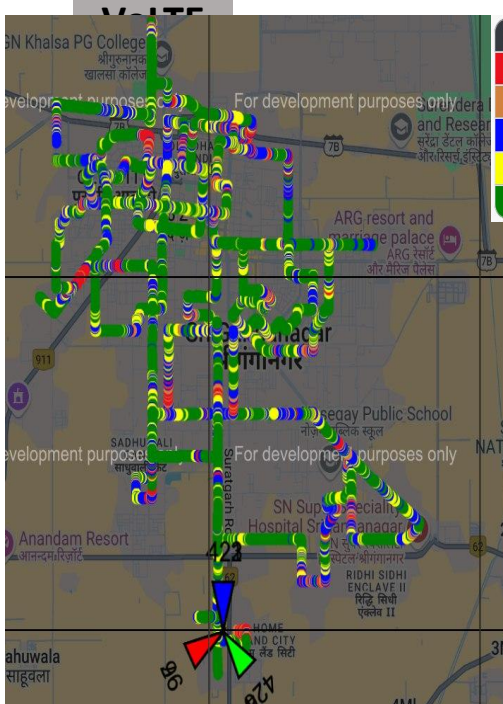
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	332	4.15%	
(0, <=5)	434	5.43%	
(5, <=10)	1605	20.07%	
(10, <=15)	1571	19.65%	
(15, <=Max)	4054	50.70%	
Total	7996	100%	

BSNL

Technology	Rx Quality %
2G	96.20%
3G	87.74%

2G   3G
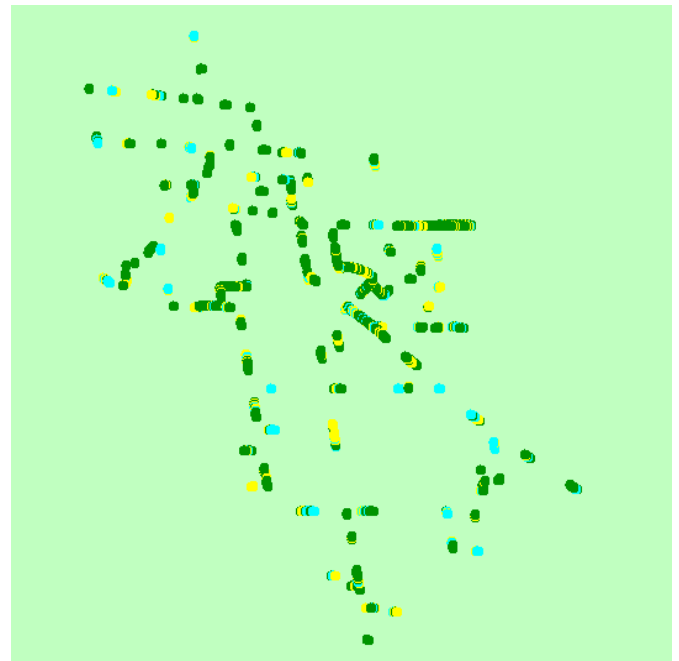
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	13639	90.72%	
(2, <=3)	296	1.97%	
(3 , <=4)	301	2.0%	
(4 , <=5)	226	1.51%	
(5 , <=Max)	572	3.80%	
Total	15034	100%	

Overall Ec/N0	# Samples	% PDF	Legends
[Max, >=-12]	2396	67.74%	
[-12, >=-14)	707	20.00%	
[-14, >=Min)	434	12.26%	
Total	3537	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

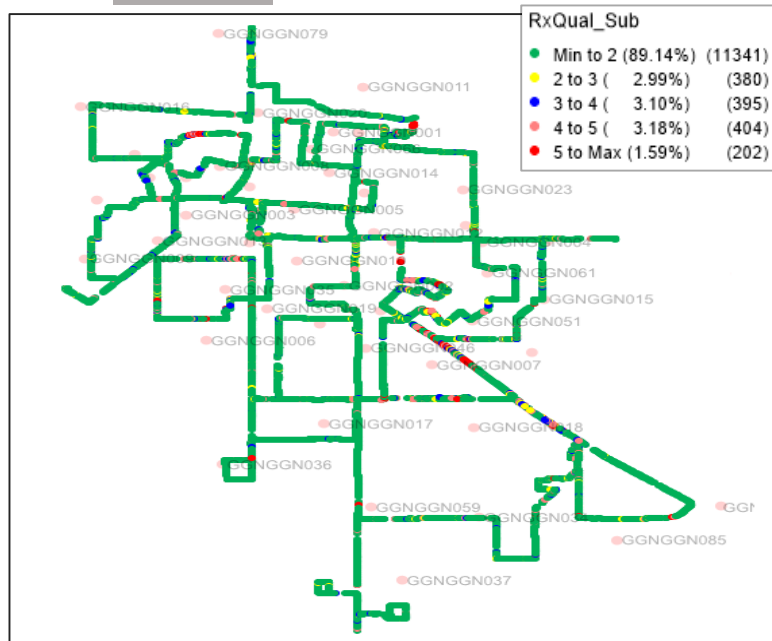| Technology	Rx Quality %
VoLTE	**91.35%**

LTE KPI PCell SINR[dB]

- 15 < x <= 30 (17.40%, 3078)
- 10 < x <= 15 (20.81%, 3681)
- 5 < x <= 10 (32.17%, 5690)
- 0 < x <= 5 (20.97%, 3710)
- -3 < x <= 0 (5.98%, 1058)
- -6 < x <= -3 (2.33%, 413)
- -30 < x <= -6 (0.34%, 60)
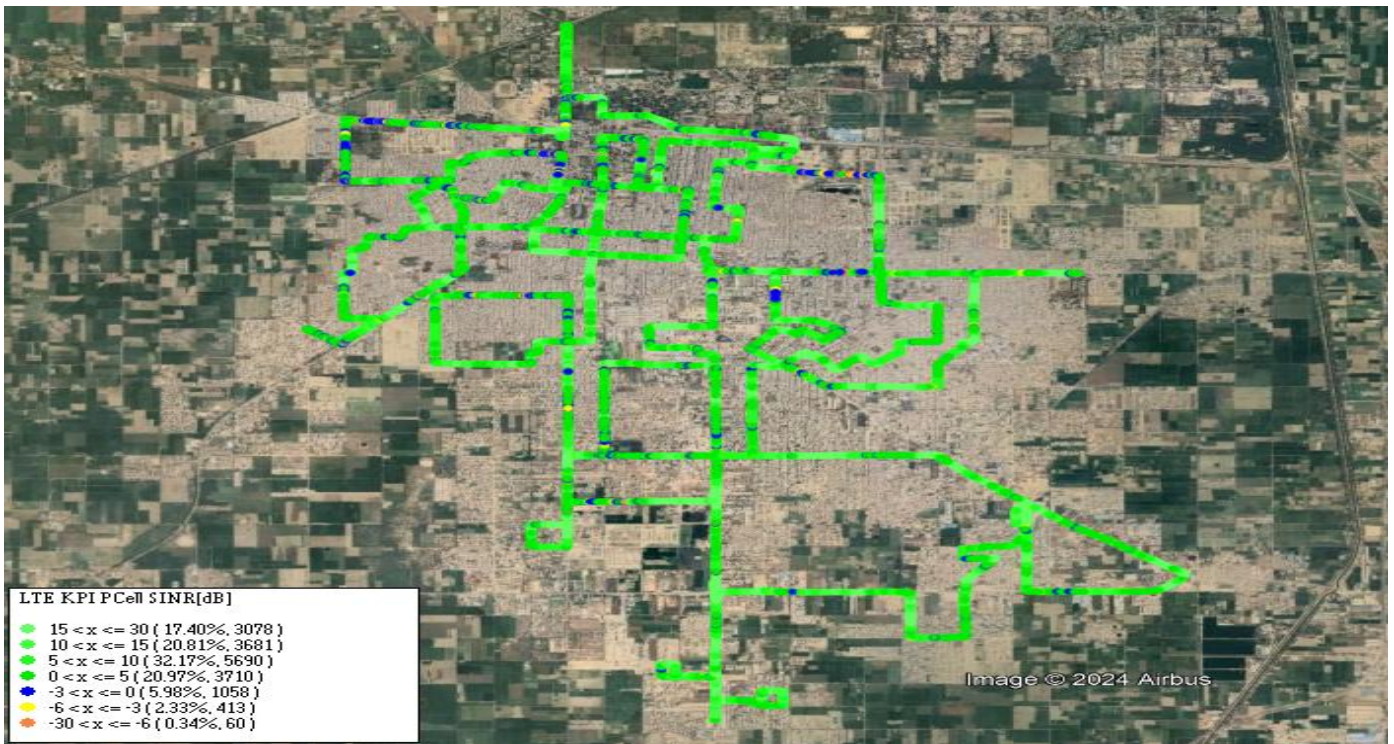
Overall SINR	# Samples	% PDF	Legends
(Min, <=-6)	60	0.34%	
(-6, <=-3)	413	2.33%	
(-3, <=0)	1058	5.98%	
(0, <=5)	3710	20.97%	
(5, <=10)	5690	32.17%	
(10, <=15)	3681	20.81%	
(15, <=Max)	3078	17.40%	
Total	17690	100%	

VIL

Technology	Rx Quality %
2G	98.41%
4G	95.25%

2G

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	11341	89.14%	
(2, <=3)	380	2.99%	
(3 , <=4)	395	3.10%	
(4 , <=5)	404	3.18%	
(5 , <=Max)	202	1.59%	
Total	12722	100%	

VoLTE
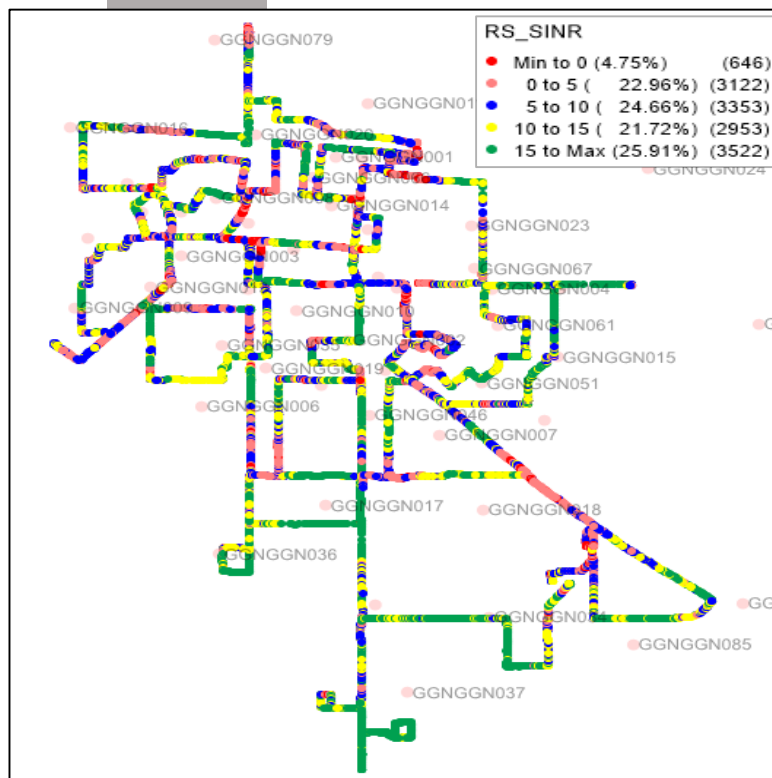
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	646	4.75%	
(0, <=5)	3122	22.96%	
(5, <=10)	3353	24.66%	
(10, <=15)	2953	21.72%	
(15, <=Max)	3522	25.91%	
Total	13596	100%	

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	**19.22%**
Airtel VoLTE	**100%**
Jio VoLTE	**100%**
VIL VoLTE	**99.99%**

Time Spent On 3G/4G

% of Time Spent on 3G/VoLTE   % Time Spend on 2G