



Operator Assisted Drive Test Report

Barnala & Sangrur Cities

28th to 30th Jan 2025

by

TRAIR 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 Barnala & Sangrur Cities of Punjab LSA from 9:00 AM to 8:00 PM during 28th to 30th Jan 2025. The drive test covered drive route of 115 KMs & 7 no hotspots over a period of 3 days. Approximately 325 calls were made for each of the 4 TSPs networks: three 2G networks, one 3G networks and three LTE /5G networks covering four TSPs.

Overview

Voice Summary

Data Summary

Overview

Regional Office, TRAI Jaipur conducted Operator Assisted Drive Test from 28^h Jan. 2025 to 30th Jan 2025 covering Barnala & Sangrur Cities. 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 ...405..... KMs. Approximately ...325.... calls were made for each of thenetworks: 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 ...412.. 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

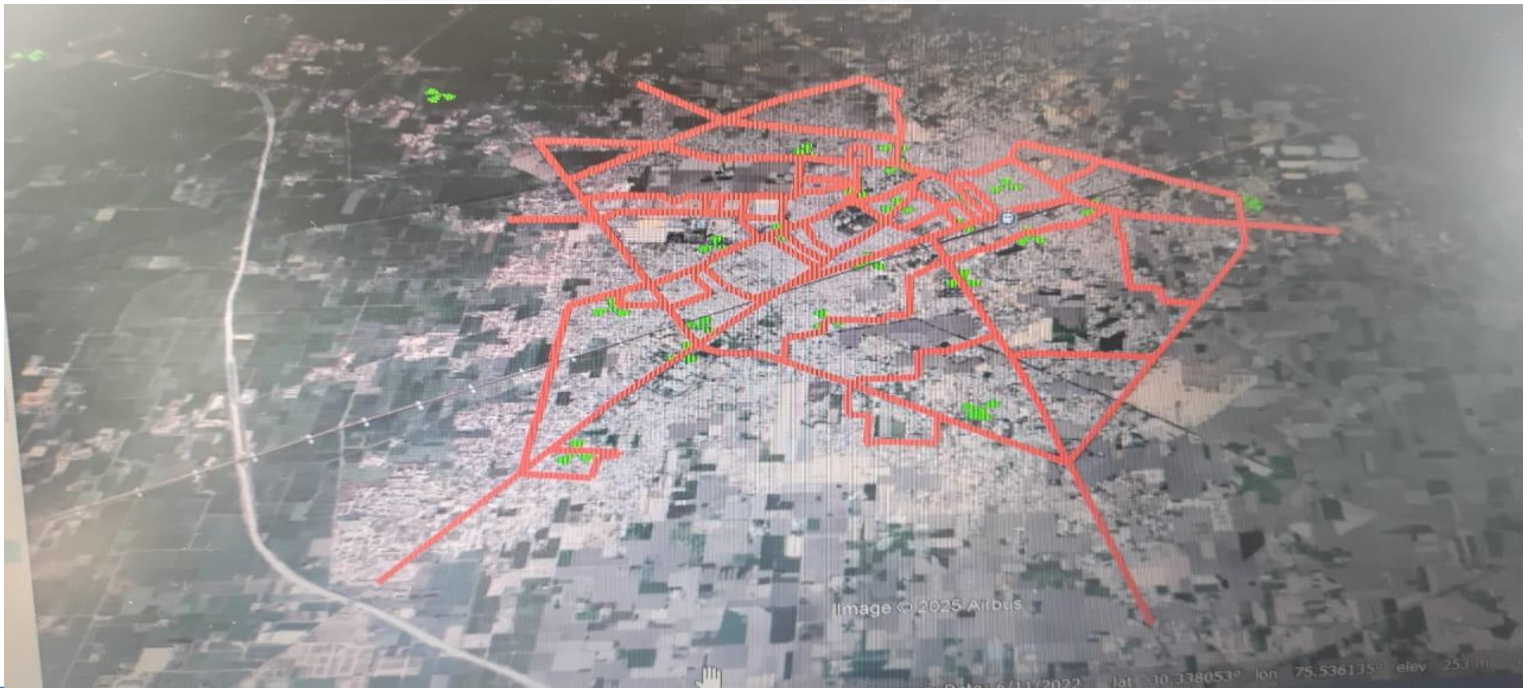
1.

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

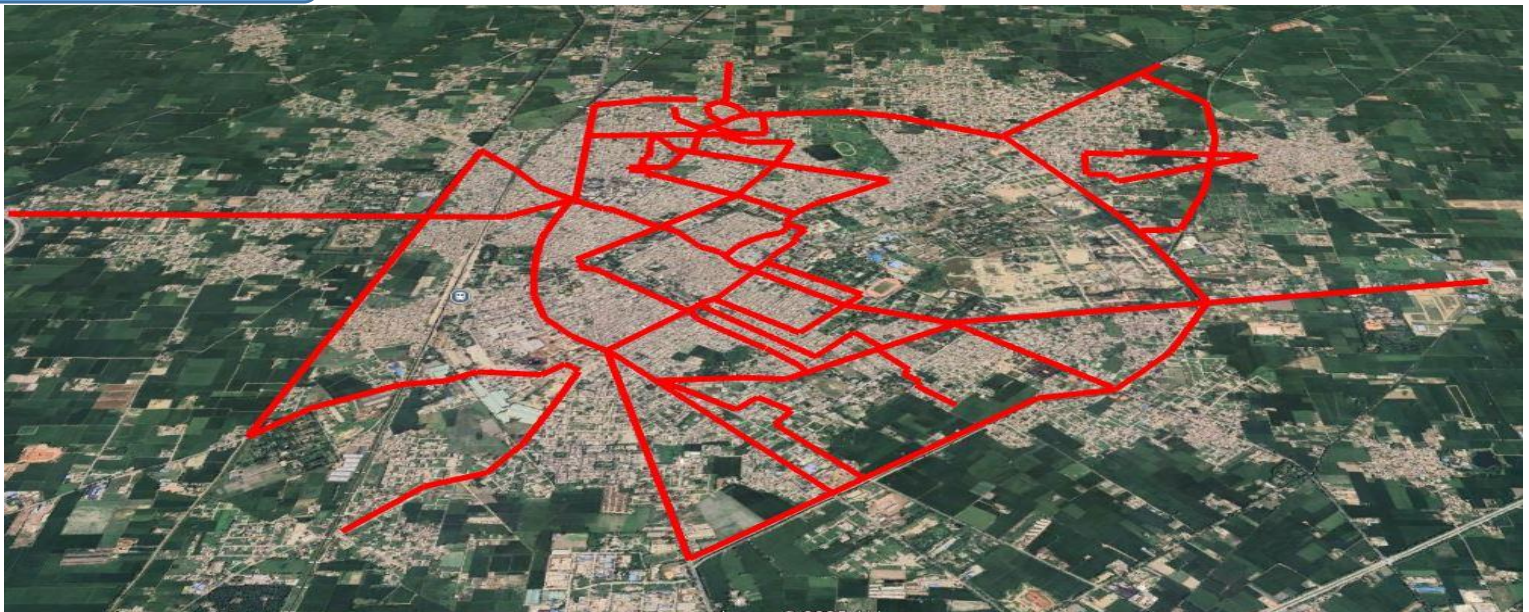
Overview

BARNALA

Voice & Dynamic Data Test Drive Route



SANGRUR



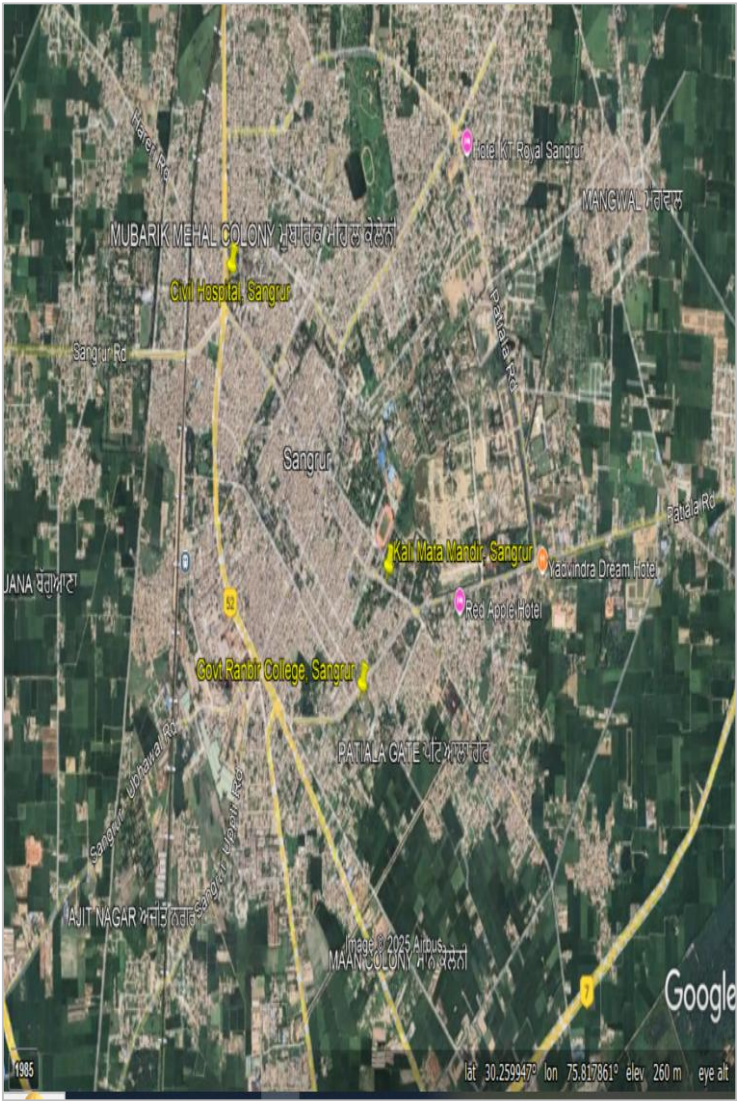
Day	Date	Test Scenario	Area to be Covered
1	28-Jan-25	2G/3G/4G Voice and 3G/4G Dynamic Data + Hotspots- 2G/3G/4G Static Data	Barnala city
2	29-Jan-25	2G/3G/4G Voice and 3G/4G Dynamic Data + Hotspots- 2G/3G/4G Static Data	Sangrur City + 3 Hot spots
3	30-Jan-25	Hotspots- 2G/3G/4G Static Data	Barnala city Hot Spot locations

Data Service Test- Static Locations
HOTSPOT LOCATION



BARNALA

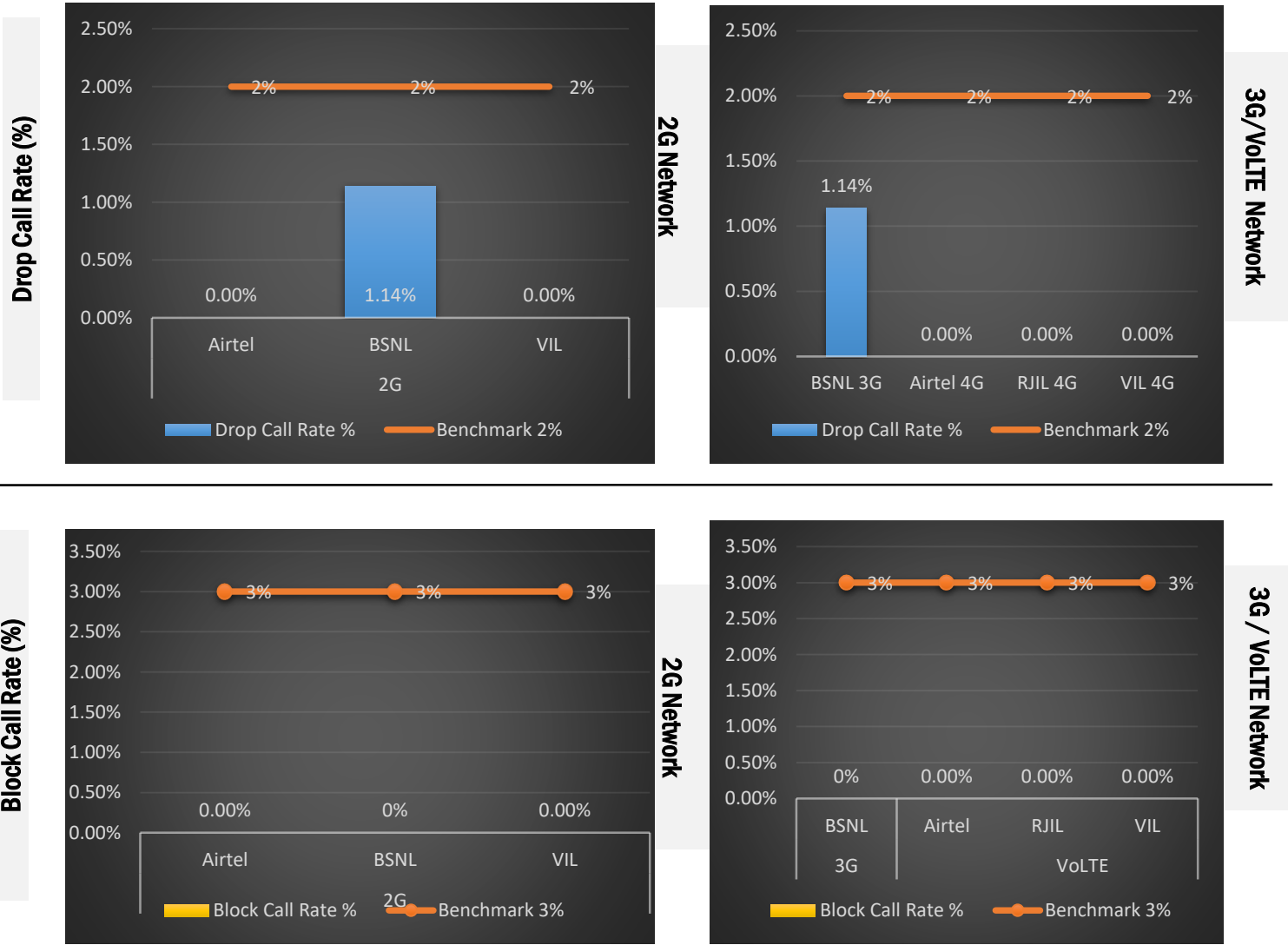
- 1. BUS STAND
- 2.CIVIL HOSPITAL
- 3. DC OFFICE
- 4. RAILWAY STATION



Sangrur

- 1. CIVIL HOSPITAL
- 2. KALI MATA MANDIR
- 3. RANBIR COLLEGE

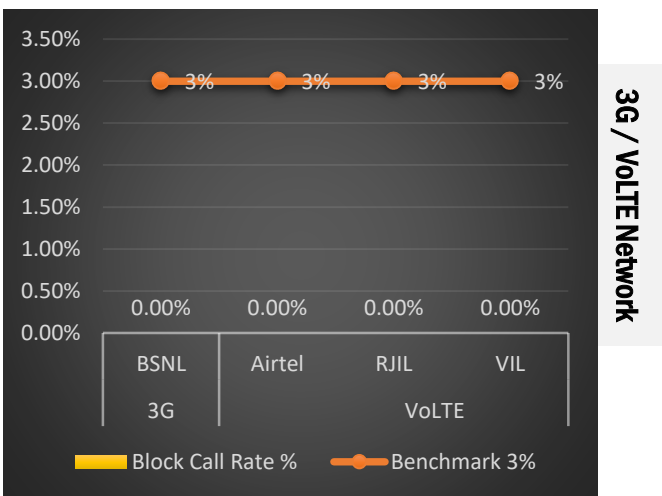
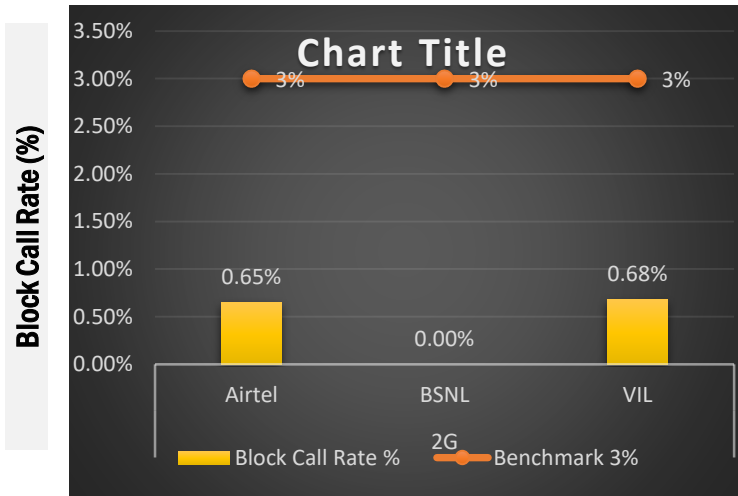
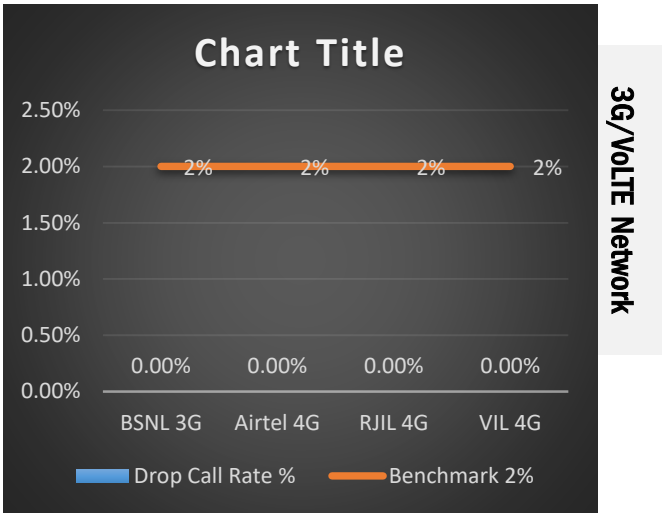
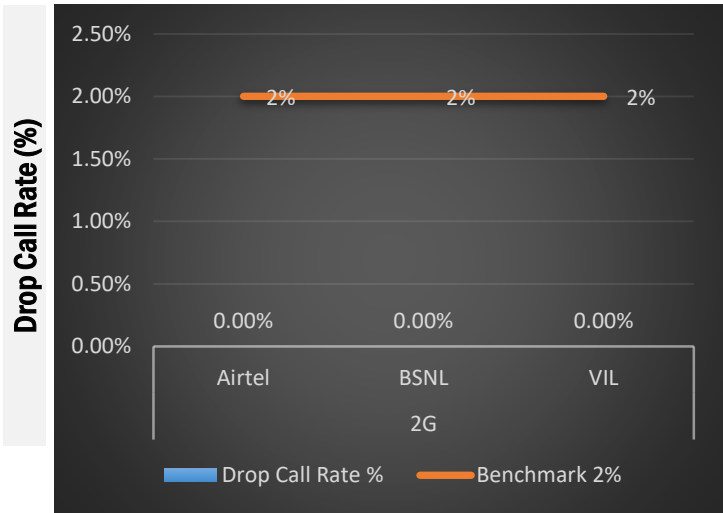
QoS compliance of the TSPs in Barnala City & Nearby area
for Voice across technologies 2G/3G/4G-VolTE:



KPIs	2G			3G	4G		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0.00%	1.14%	0.00%	1.14%	0.00%	0.00%	0.00%
Block Call Rate %	0.00%	0.00%	0.00%	0.00%	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.

QoS compliance of the TSPs in Sangrur 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%	0.00%
Block Call Rate %	0.65%	0.00%	0.68%	0.00%	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

Key Observations

Barnala Coverage

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

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	96.01%	97.6%	98.91%

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

TSPs	3G
	BSNL
Coverage %	83.8%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99.84%	99.62%	99.3%

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

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

Voice Calls

Key Observations

Sangrur Coverage

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

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	98.91%	97.4%	98.66%

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

TSPs	3G
	BSNL
Coverage %	92.4%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99.86%	99.83%	99.97%

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

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

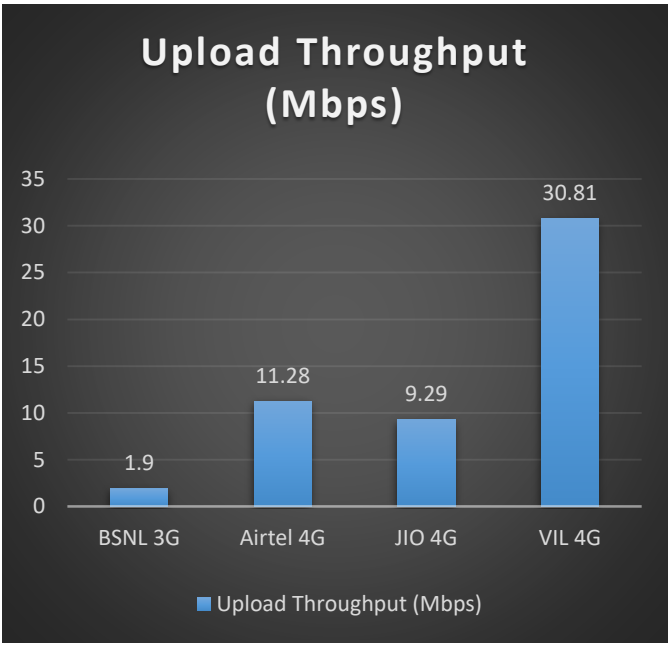
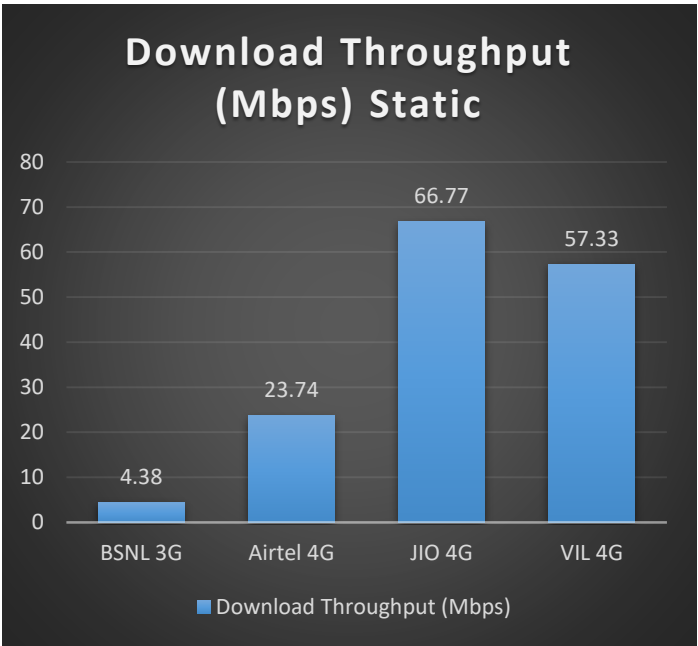
Data Services Static

Key Observations

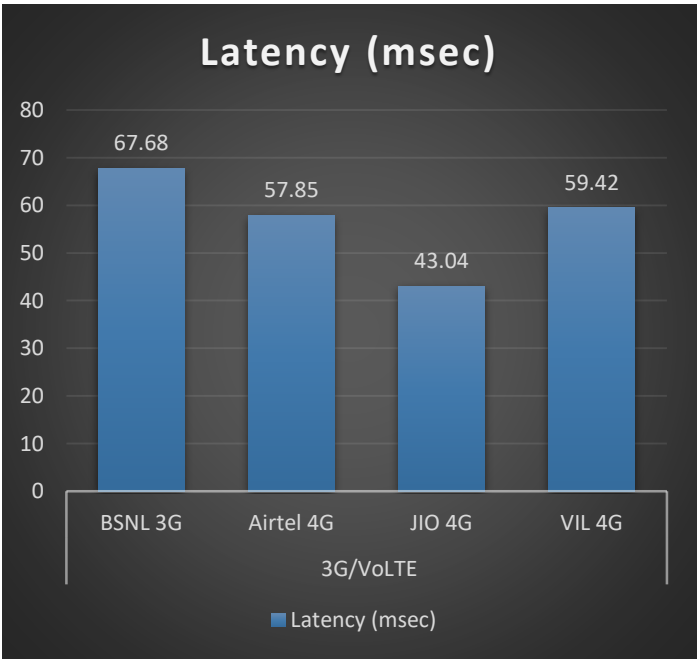
Data was tested at 5 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, Paytm)

Data Download and Upload Performance Static (Mbps) Sangrur

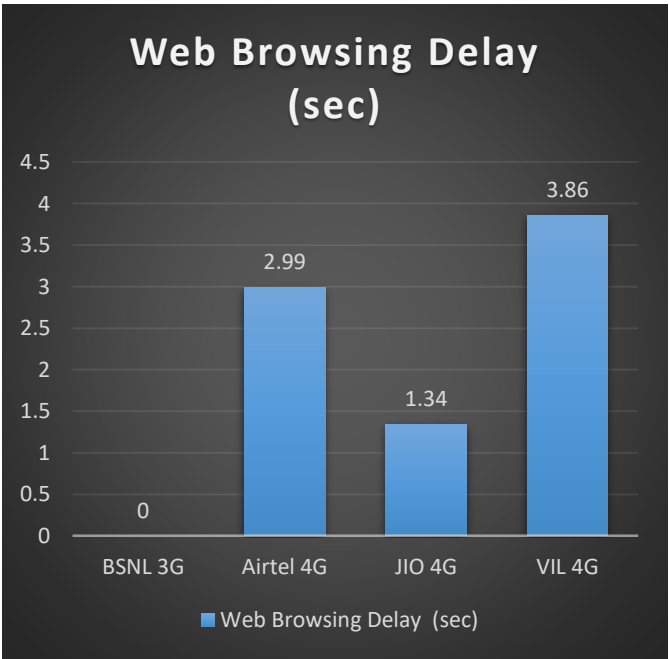
3G/4G Network:



Latency (ms)



Web Browsing (Sec)



Data Services Static	3G / 4G			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	4.38	23.74	66.77	57.33
Upload Throughput(Mbps)	1.9	11.28	9.29	30.81
Video Streaming Delay (sec)	NA	1.44	1.44	1.58
Web Browsing Delay (sec)	NA	2.99	1.34	3.86
Latency (msec)	67.68	57.85	43.04	59.42

Data Services Dynamic

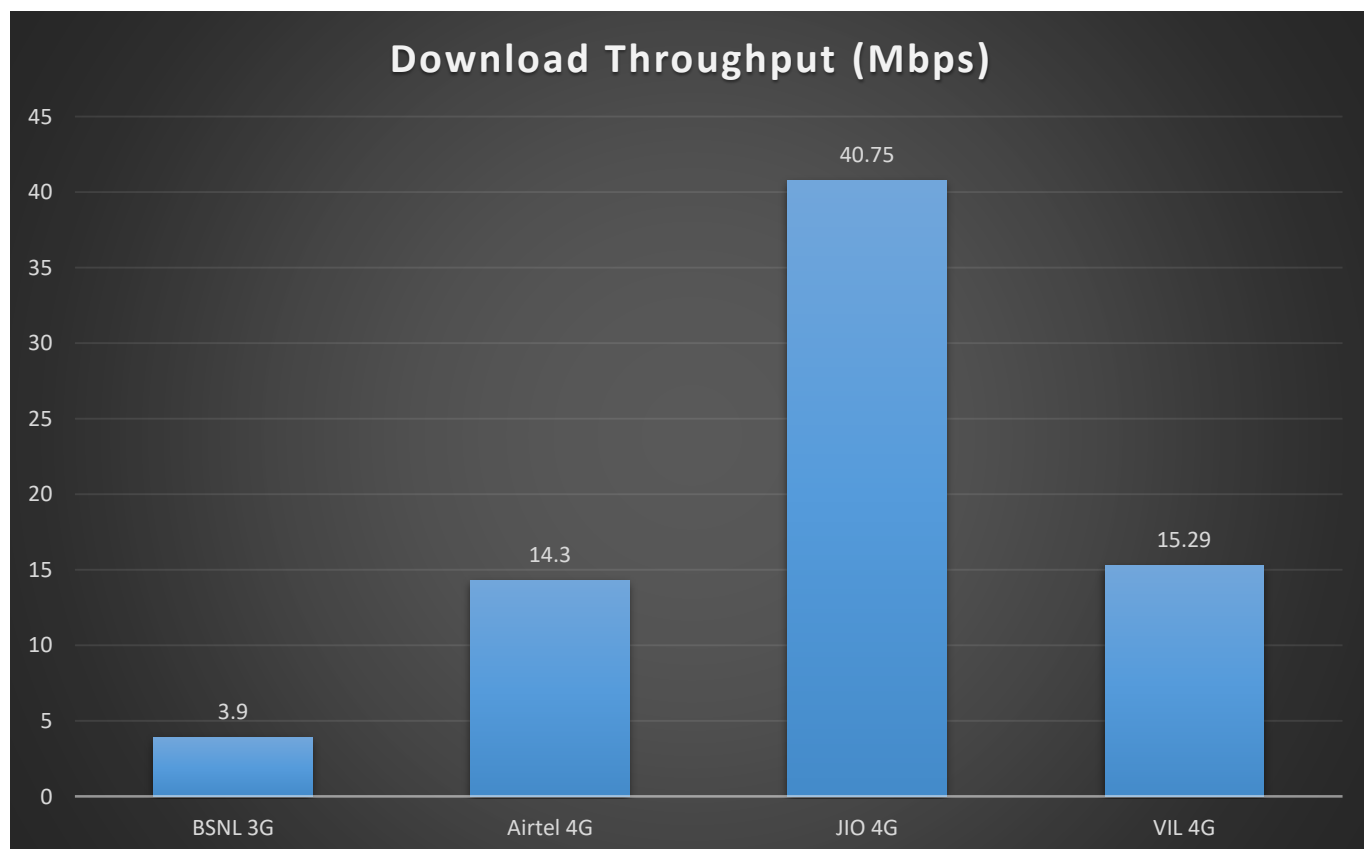
Key Observations

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

Data Download Performance (kbps) - Dynamic Barnala

3G/4G/ Network:

Data Services Dynamic	3G/VoLTE			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	3.90	14.30	40.75	15.29



Data Services Dynamic

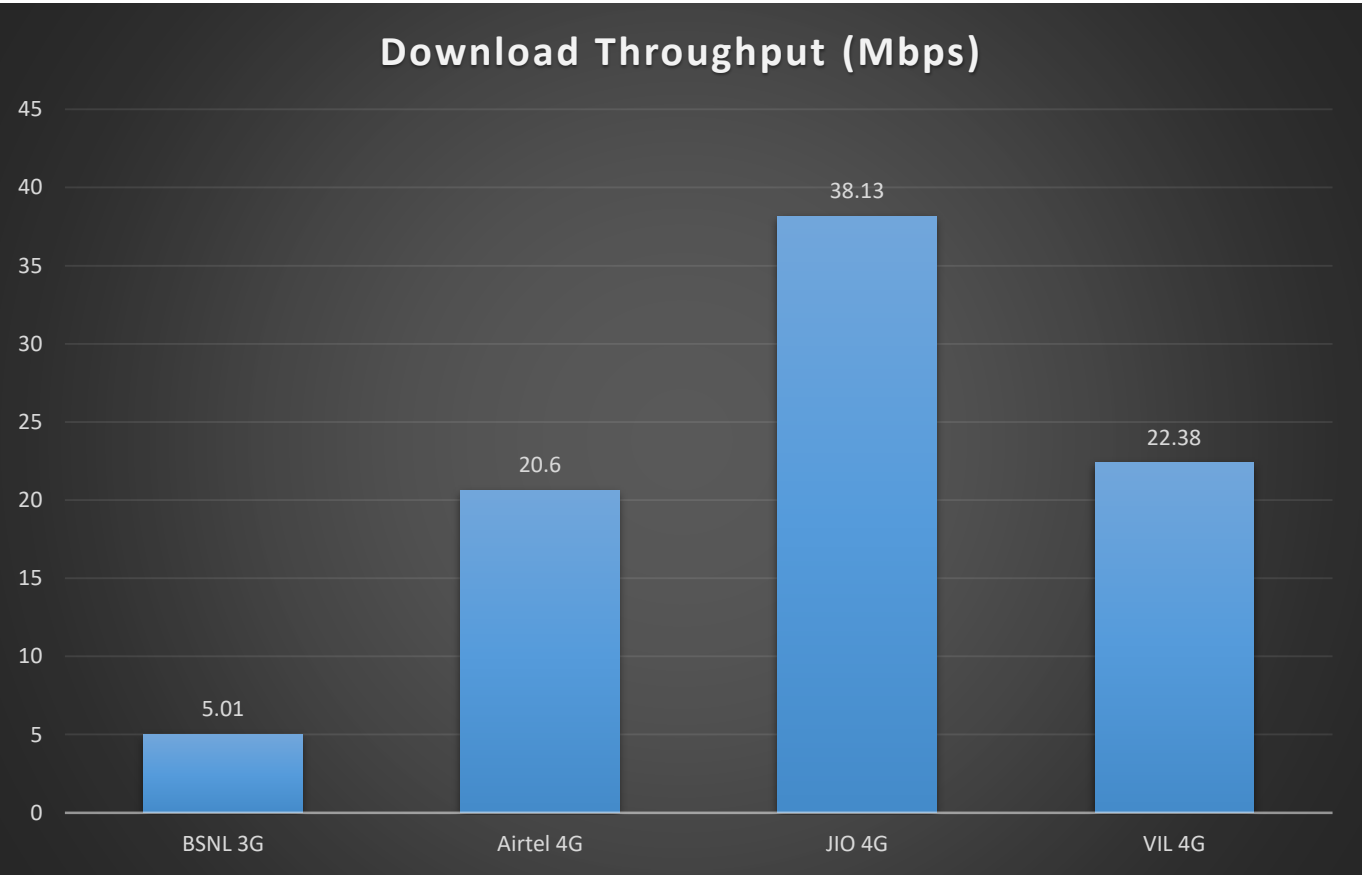
Key Observations

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

Data Download Performance (kbps) - Dynamic Sangrur

3G/4G/ Network:

Data Services Dynamic	3G/VoLTE			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	5.01	20.60	38.13	22.38



Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	175	176	174
Blocked Call Rate (%)	0%	0%	0%
CSSR% (Accessibility)	100%	100%	100%
Drop Call Rate (%)	0%	1.14%	0%
Mobility HOSR (%)	99.99%	99.47%	99.47%
Rx Quality (%)	90.97%	95.59%	96.70%
Average CST Sec	3.3	2.5	3.69

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	175	173	180	175
Blocked Call Rate (%)	0%	0%	0%	0%
CSSR% (Accessibility)	100%	100%	100%	100%
Drop Call Rate (%)	1.14%	0%	0%	0%
Mobility HOSR (%)	100%	99.99%	100%	100%
Rx Quality (%)	95.63%	85.56%	94.46%	91.09%
Average CST Sec	1.77	1.32	0.7	2.19

Summary

City Level Summary- Voice Sangrur

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	148	154	149
Blocked Call Rate (%)	0%	0.65%	0.68%
CSSR% (Accessibility)	100%	99.35%	99.32%
Drop Call Rate (%)	0%	0%	0%
Mobility HOSR (%)	99.99%	99.75%	100%
Rx Quality (%)	96.03%	96.58%	96.25%
Average CST Sec	3.29	2.3	3.83

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	152	149	150	150
Blocked Call Rate (%)	0%	0%	0%	0%
CSSR% (Accessibility)	100%	100%	100%	100%
Drop Call Rate (%)	0%	0%	0%	0%
Mobility HOSR (%)	100%	99.99%	99.39%	100%
Rx Quality (%)	95.69%	87.89%	93.39%	91.71%
Average CST Sec	1.6	1.29	0.67	2.32

<u>Bus Stand, BARNALA</u>	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	2.85	20.50	68.35	31.89
Upload Throughput (mbps)	1.96	11.13	14.6	30.41
Video Streaming Delay (Secs.)	NA	1.6	1.19	1.6
Web Browsing Delay (sec)	NA	2.89	0.99	2.05
Latency (msec)	77.5	51	40	53

CIVIL HOSPITAL BARNALA	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	4.88	21.77	54.72	52.02
Upload Throughput (mbps)	1.91	12.79	7.9	25.52
Video Streaming Delay (Secs.)	NA	1.5	1.17	1.57
Web Browsing Delay (sec)	NA	2.9	1.11	3.66
Latency (msec)	84.4	61	45.5	71

<u>DC OFFICE BARNALA</u>	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	3.23	21.09	64.17	68.72
Upload Throughput (mbps)	1.81	11.42	9.01	36.43
Video Streaming Delay (Secs.)	NA	1.6	1.9	1.57
Web Browsing Delay (sec)	NA	3.6	1.33	3.76
Latency (msec)	80.8	62	34	50

<u>RAILWAY STATION BARNALA</u>	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	4.61	23.04	88.02	86.85
Upload Throughput (mbps)	1.82	12.60	7.4	33.36
Video Streaming Delay (Secs.)	Na	1.8	1.63	1.58
Web Browsing Delay (sec)	NA	3.1	1.29	3.82
Latency (msec)	107.4	58	52	60

<u>CIVIL HOSPITAL SANGRUR</u>	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	5.52	25.49	68.7	58.77
Upload Throughput (mbps)	1.96	9.47	7.95	22.65
Video Streaming Delay (Secs.)	Na	1.2	1.49	1.62
Web Browsing Delay (sec)	NA	2.89	1.83	3.85
Latency (msec)	42.9	61	46.8	53

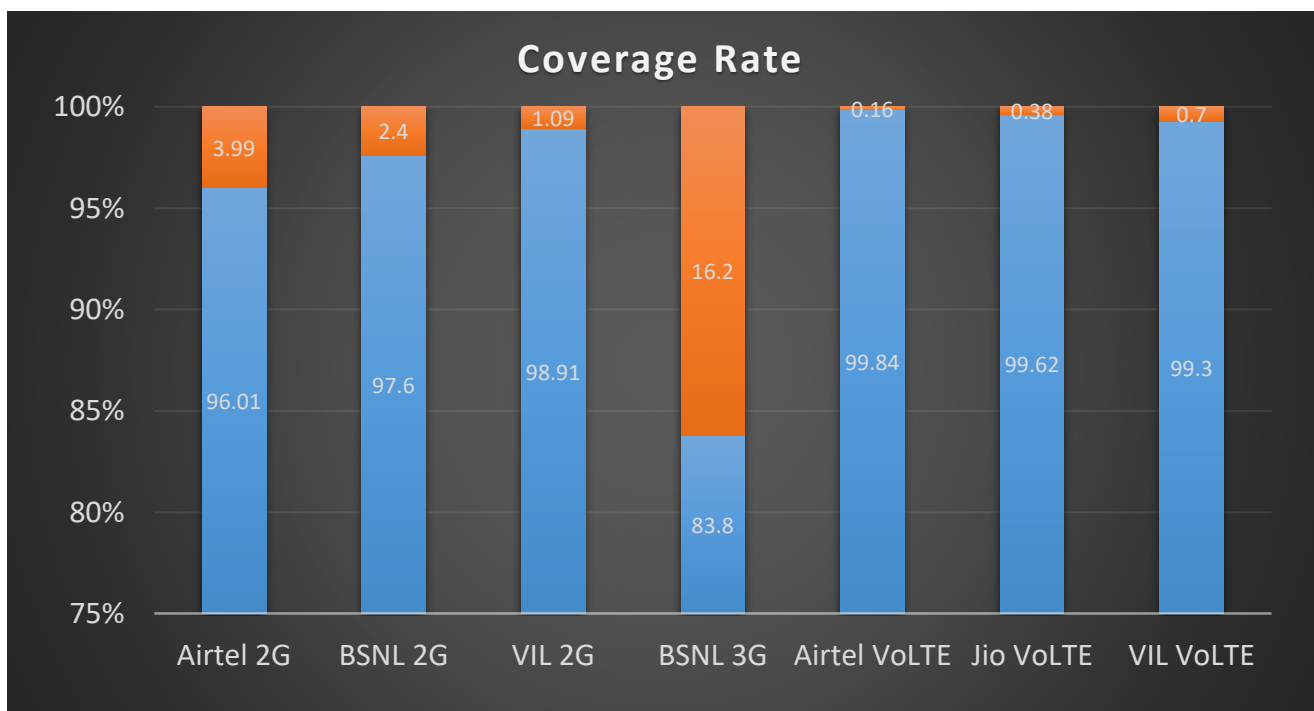
<u>KALI MATA MANDIR SANGRUR</u>	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	4.31	26.66	31.46	48.89
Upload Throughput (mbps)	1.95	10.74	8.92	31.26
Video Streaming Delay (Secs.)	NA	1.1	1.22	1.52
Web Browsing Delay (sec)	NA	2.78	1.43	3.89
Latency (msec)	44.6	53	44.8	56

<u>RANBIR COLLEGE</u> <u>SANGRUR</u>	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	5.2	27.64	91.94	54.18
Upload Throughput (mbps)	1.95	10.87	9.26	36.07
Video Streaming Delay (Secs.)	NA	1.3	1.46	1.62
Web Browsing Delay (sec)	NA	2.82	1.42	3.92
Latency (msec)	56.3	59	38.2	73

Coverage Details Barnala

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	96.01%
BSNL 2G	97.6%
VIL 2G	98.91%
BSNL 3G	83.8%
Airtel VoLTE	99.84%
Jio VoLTE	99.62%
VIL VoLTE	99.3%



TSP-AIRTEL

2G

Technology	Coverage %
2G	96.01%
VoLTE	99.84%



VoLTE



2G

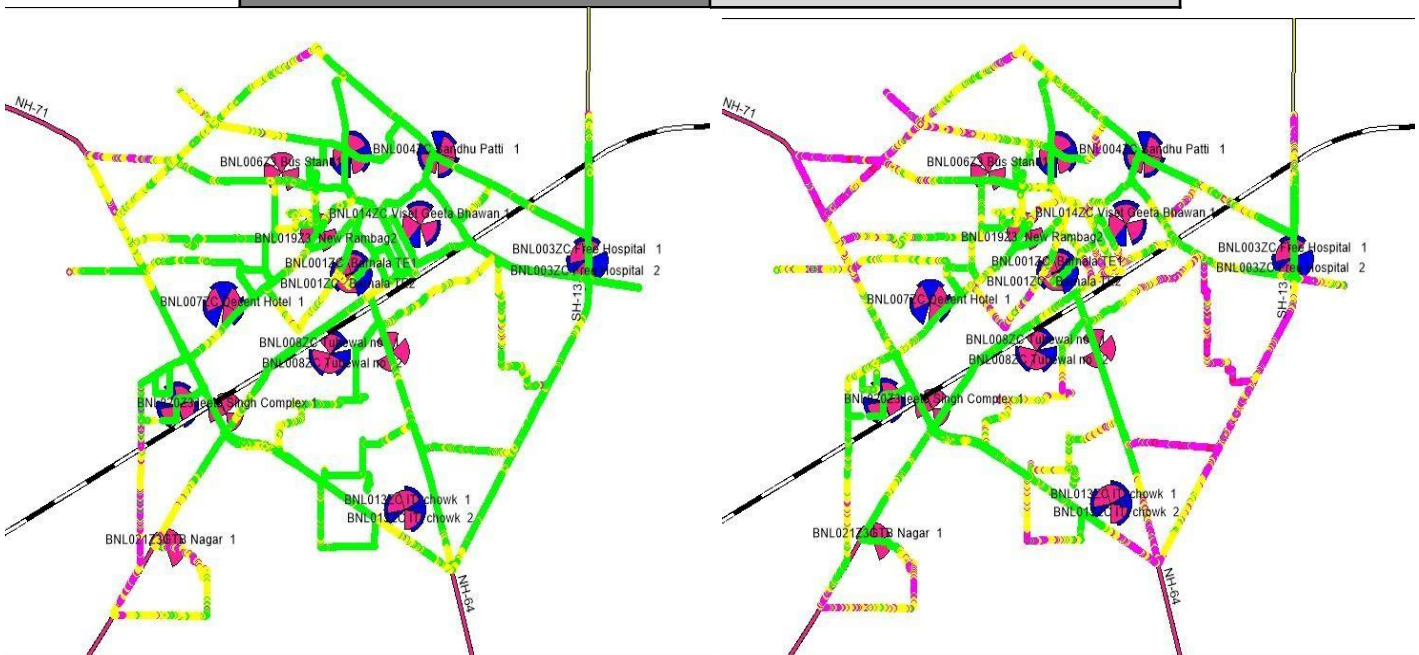
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	848595	75.51%	
[-75, >=-85]	230416	20.50%	
[-85, >=-95]	39817	3.54%	
[-95, >=Min)	5018	.45%	
Total	1123846	100%	

VoLTE /5G

Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	561448	25.57%	
[-80, >=-90]	1244042	56.67%	
[-90, >=-110]	386416	17.60%	
[-110, >=Min)	3437	0.16%	
Total	2195343	100%	

TSP- BSNL

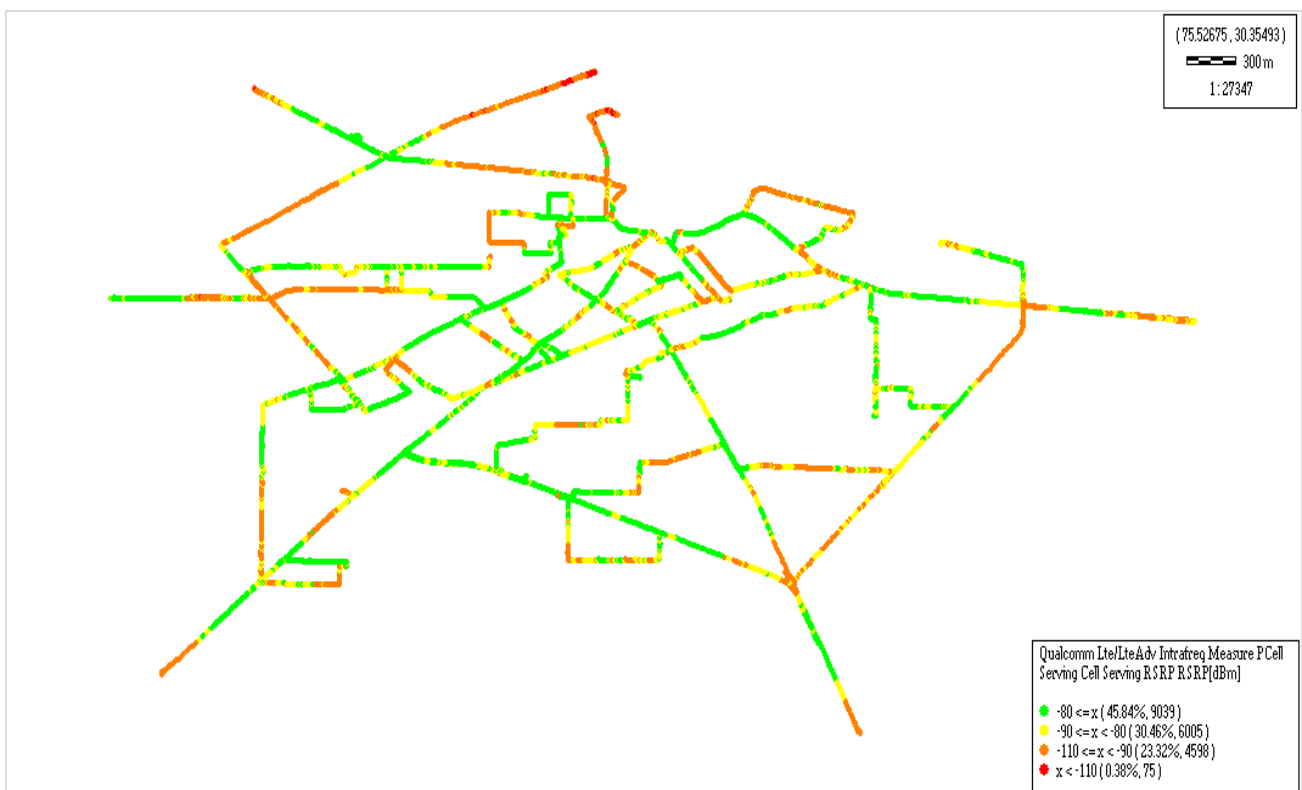
2G	Technology	Coverage %	3G
	2G	97.60%	
	3G	83.80%	



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	27101	73.1%	
[-75, >=-85)	9066	24.5%	
[-85, >=-95)	876	2.4%	
[-95, >=Min)	2	0.0%	
Total	37045	100%	
3G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	160729	44.0%	
[-70, >=-80)	145419	39.8%	
[-80, >=-90)	57442	15.7%	
[-90, >=Min)	1648	0.5%	
Total	365238	100%	

JIO

Technology	Coverage %
VoLTE	99.62%



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	9039	45.84%	
[-80, >=-90)	6005	30.46%	
[-90, >=-110)	4598	23.32%	
[-110, >=Min)	75	0.38%	
Total	19717	100%	

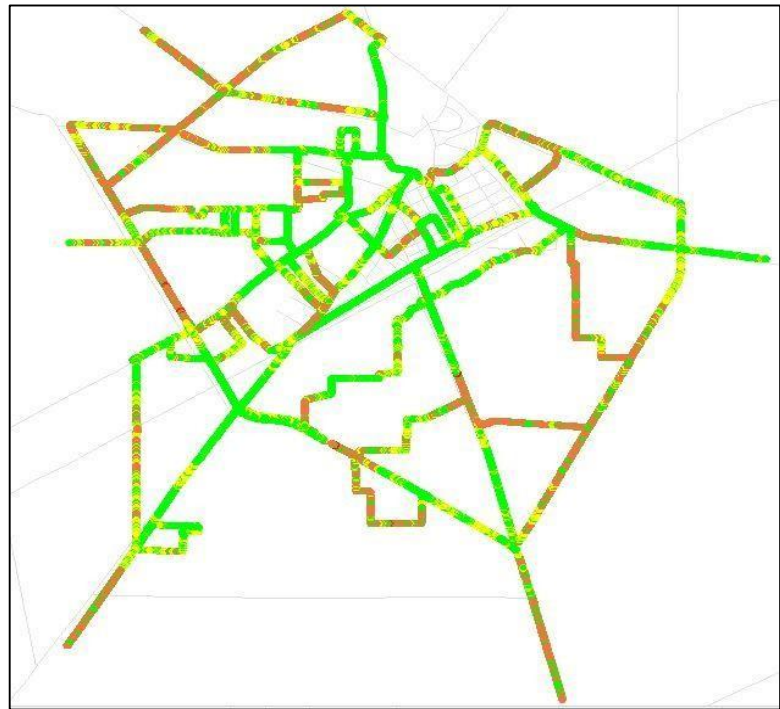
VIL

2G	Technology	Coverage Rate %
	2G	98.91%
	VoLTE	99.3%



VoLTE

2G			
Over all RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	5051095	94.16%	
[-75, >=-85)	255044	4.75%	
[-85, >=-95)	56704	1.06%	
[-95, >=Min)	1651	0.03%	
Total	5364494	100%	

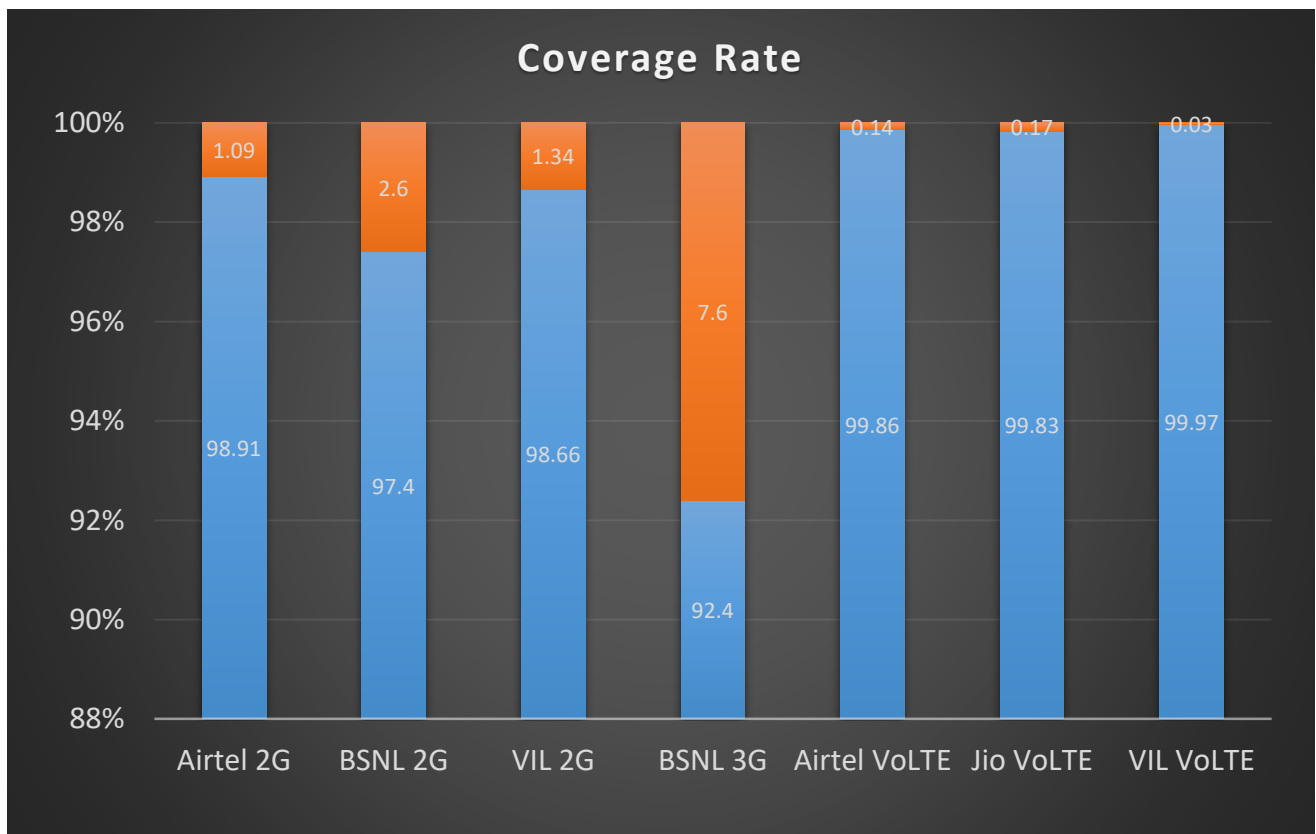


VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	2864985	53.41%	
[-80, >=-90)	1194361	22.26%	
[-90, >=-110)	1267486	23.63%	
[-110, >=Min)	37662	.70%	
Total	5364494	100%	

Coverage Details Sangrur

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	98.91%
BSNL 2G	97.4%
VIL 2G	98.66%
BSNL 3G	92.4%
Airtel VoLTE	99.86%
Jio VoLTE	99.83%
VIL VoLTE	99.97%



TSP-AIRTEL

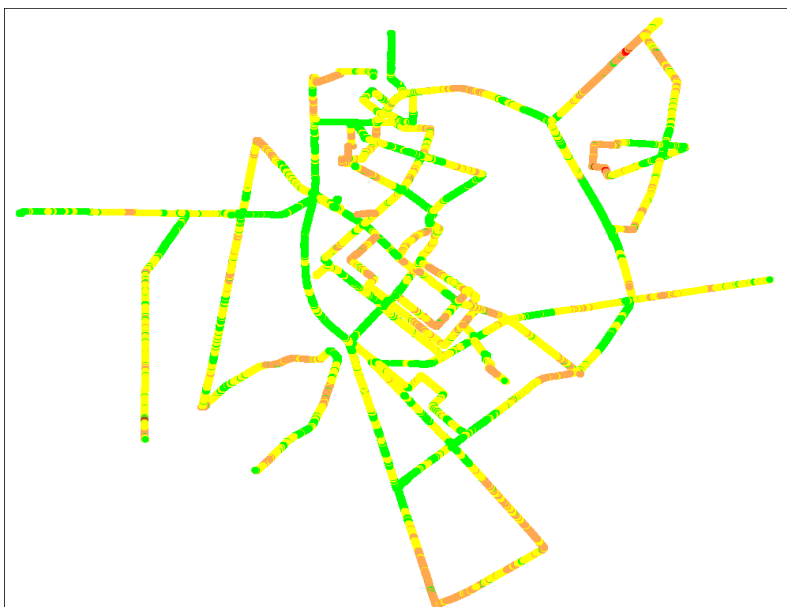
2G

Technology	Coverage %
2G	98.91%
VoLTE	99.86%



VoLTE

2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	818636	76.48%	
[-75, >=-85]	240051	22.43%	
[-85, >=-95]	9632	0.90%	
[-95, >=Min)	2012	0.19%	
Total	1070331	100%	

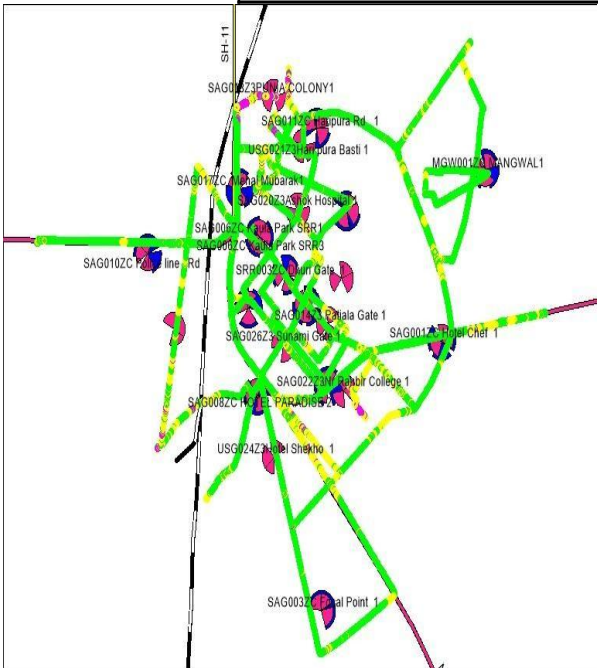


VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	567233	28.10%	
[-80, >=-90]	896084	44.39%	
[-90, >=-110]	552537	27.37%	
[-110, >=Min)	2660	.14%	
Total	2018514	100%	

Coverage Details

TSP- BSNL

2G

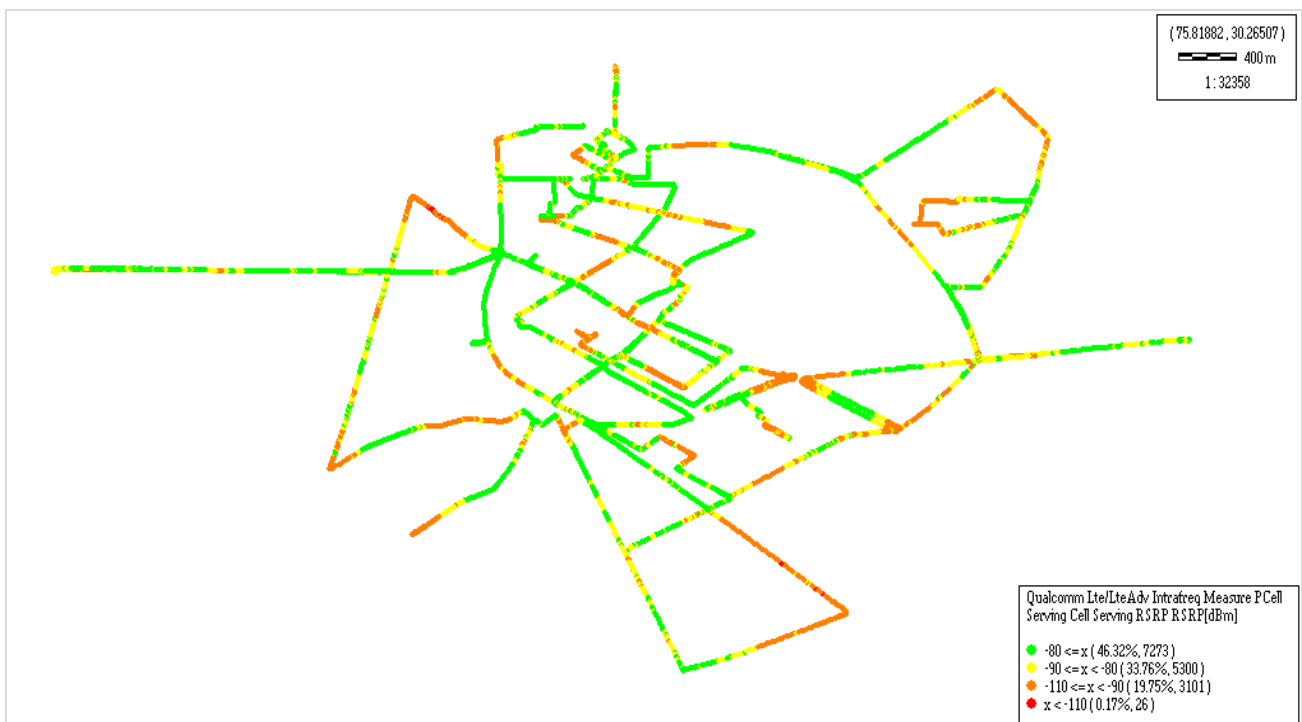


2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	25851	77.0%	
[-75, >=-85)	6852	20.4%	
[-85, >=-95)	866	2.5%	
[-95, >=Min)	17	0.1%	
Total	33586	100%	

3G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	204169	59.1%	
[-70, >=-80)	115236	33.3%	
[-80, >=-90)	25819	7.5%	
[-90, >=Min)	278	0.1%	
Total	345502	100%	

JIO

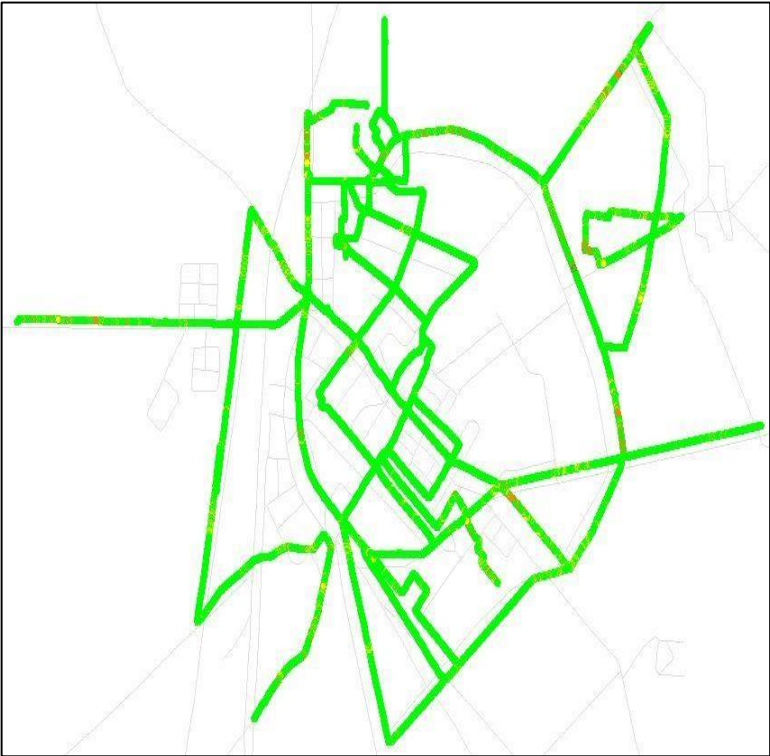
Technology	Coverage %
VoLTE	99.83%



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	7273	46.32%	
[-80, >=-90)	5300	33.76%	
[-90, >=-110)	3101	19.75%	
[-110, >=Min)	26	0.17%	
Total	15700	100%	

VIL

2G	Technology	Coverage Rate %
	2G	98.66%
	VoLTE	99.97%



VoLTE

2G			
Over all RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	4227780	93.04%	
[-75, >=-85)	255119	5.62%	
[-85, >=-95)	58548	1.29%	
[-95, >=Min)	2455	0.05%	
Total	4543902	100%	

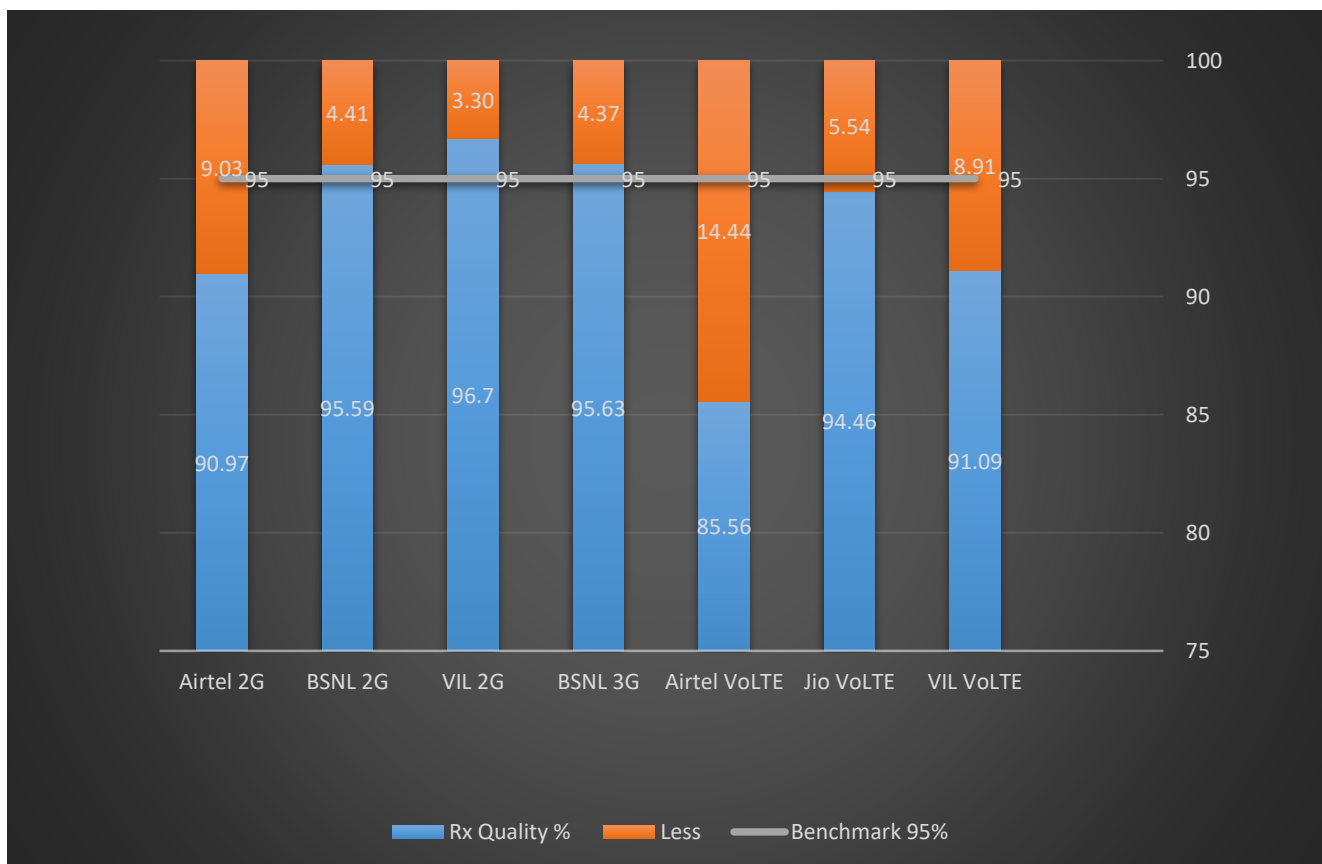


VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	2775217	61.08%	
[-80, >=-90)	1065556	23.45%	
[-90, >=-110)	701777	15.44%	
[-110, >=Min)	1352	0.03%	
Total	4543902	100%	

II. Quality Details Barnala

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	90.97%
BSNL 2G	95.59%
VIL 2G	96.7%
BSNL 3G	95.63%
Airtel VoLTE	85.56%
Jio VoLTE	94.46%
VIL VoLTE	91.09%



II. Quality Details

Airtel

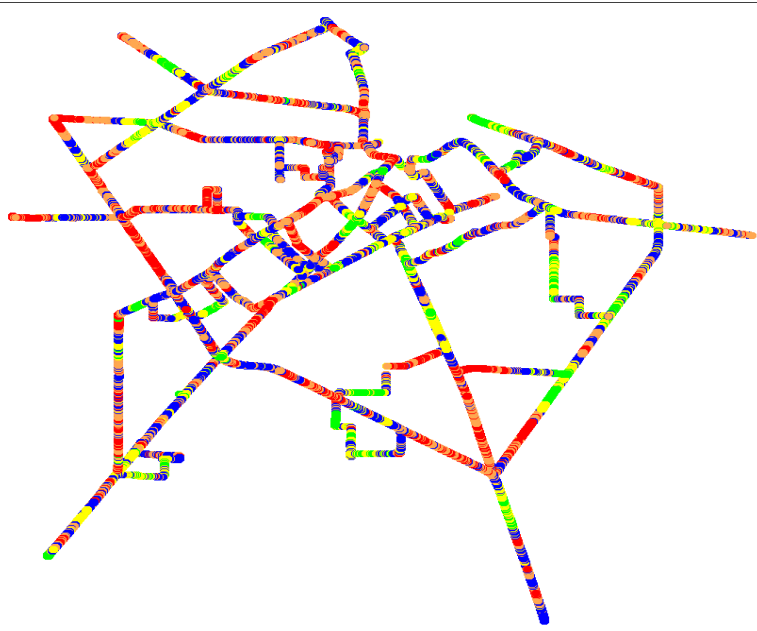
Technology	Rx Quality %
2G	90.97%
VoLTE	85.56%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	937014	83.37%	
(2, <=3)	26742	2.38%	
(3 , <=4)	29961	2.67%	
(4 , <=5)	28717	2.55%	
(5 , <=Max)	101412	9.03%	
Total	1123846	100%	

VoLTE

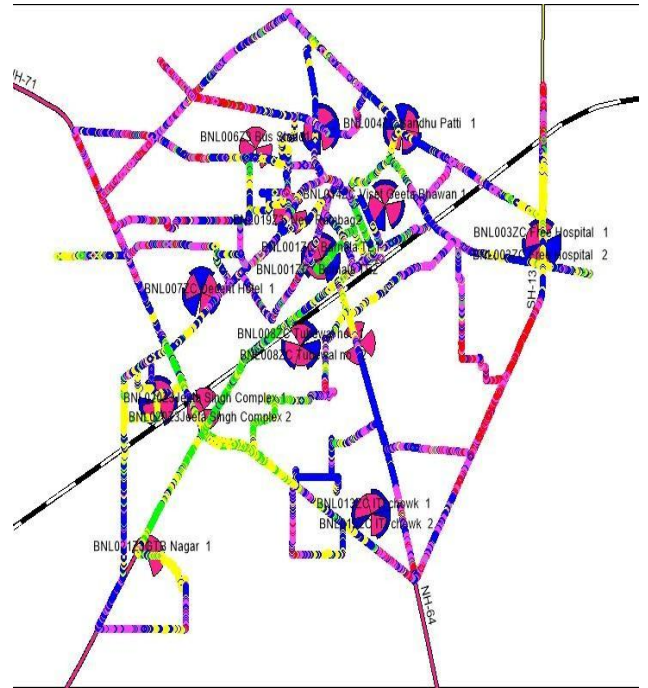
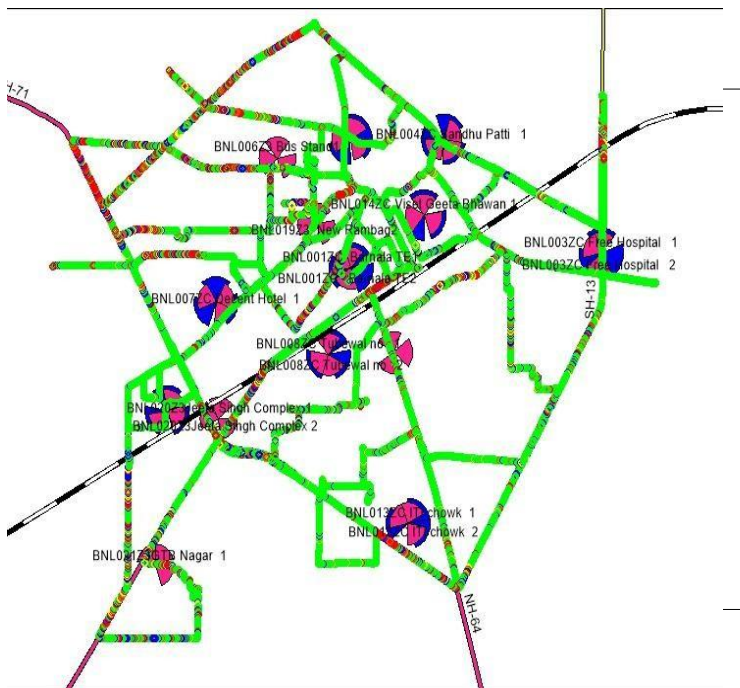


Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	316949	14.44%	
(0, <=5)	714846	32.56%	
(5, <=10)	670425	30.54%	
(10, <=15)	343550	15.65%	
(15, <=Max)	149555	6.81%	
Total	2195325	100%	

II. Quality Details

BSNL

	Technology	Rx Quality %	
2G	2G	95.59%	3G
	3G	95.63%	



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	29147	85.60%	
(2, <=3)	848	2.50%	
(3, <=4)	1044	3.06%	
(4, <=5)	1509	4.43%	
(5, <=Max)	1506	4.41%	
Total	34054	100%	

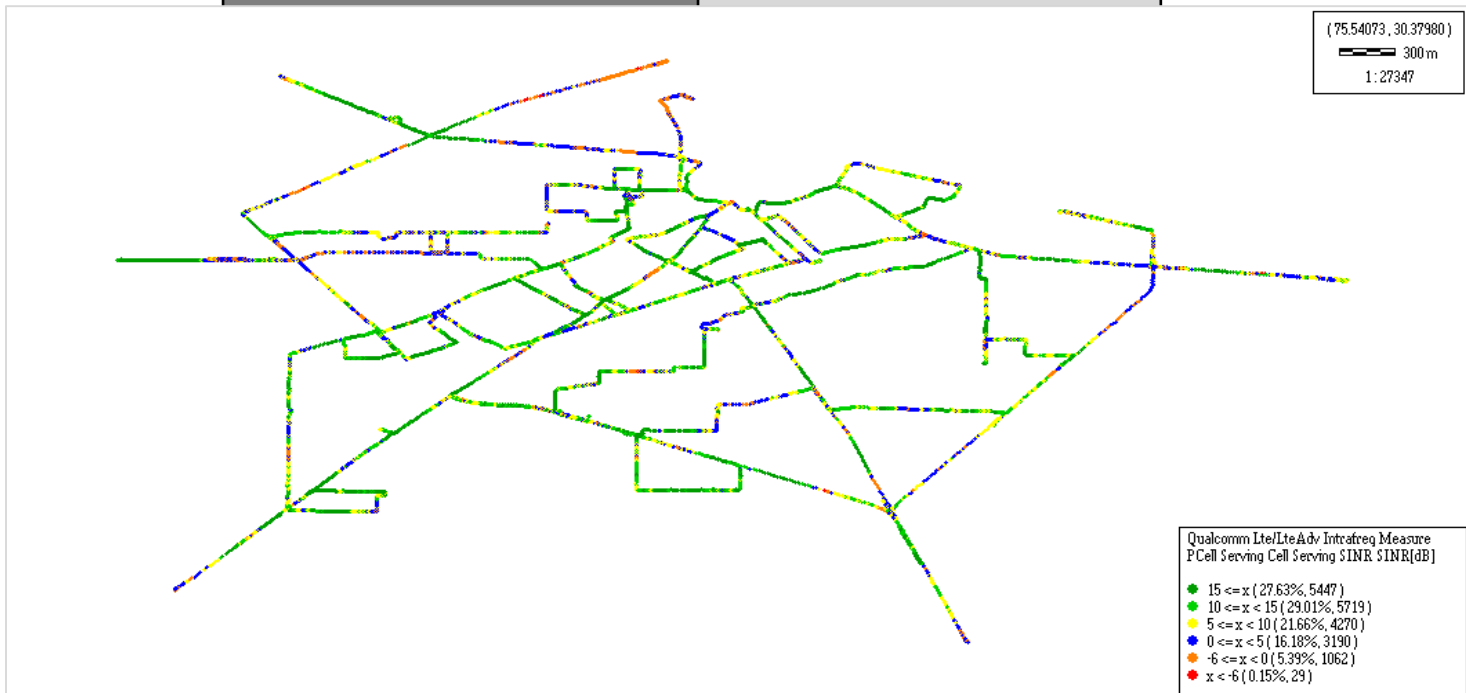
Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	10114	3.68%	
(-6, <=-9)	50562	18.38%	
(-9, <=-11)	91307	33.21%	
(-11, <=-14)	111017	40.36%	
(-14, <= Min)	12026	4.37%	
Total	275026	100%	

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	94.46%



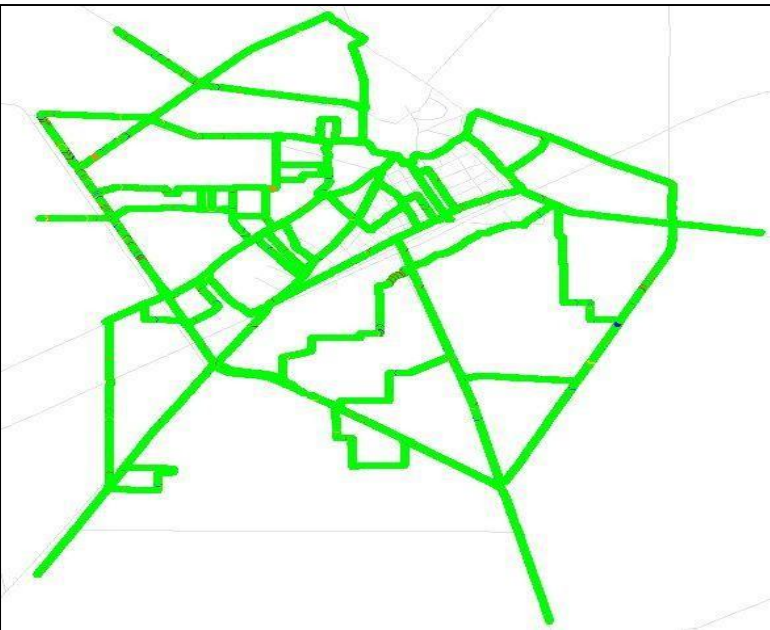
Overall SINR	# Samples	% PDF	Legends
(Min, ≤ -6)	29	0.15%	
(-6, ≤ 0)	1062	5.39%	
(0, ≤ 5)	3190	16.18%	
(5, ≤ 10)	4270	21.66%	
(10, ≤ 15)	5719	29.01%	
(15, $\leq \text{Max}$)	5447	27.61%	
Total	19717	100%	

II. Quality Details

VIL

Technology	Rx Quality %
2G	96.7%
4G	91.09%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	5132823	95.68 %	
(2, <=3)	17074	0.32 %	
(3, <=4)	19026	0.35 %	
(4, <=5)	18790	0.35 %	
(5, <=Max)	176781	3.30 %	
Total	5364494	100%	

VoLTE

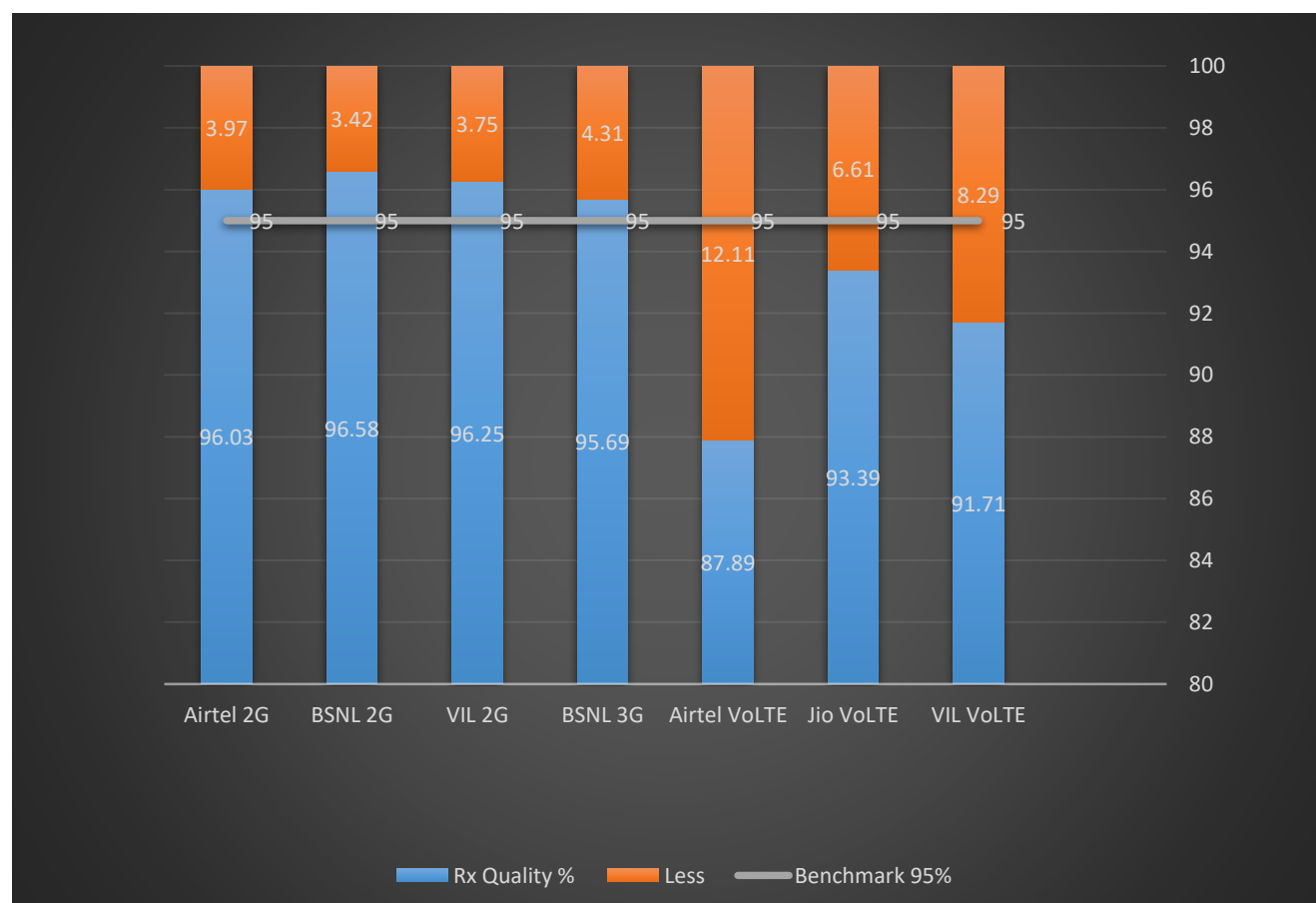


Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	477798	8.91 %	
(0, <=5)	2127552	39.66 %	
(5, <=10)	938352	17.49 %	
(10, <=15)	834145	15.55 %	
(15, <=Max)	986647	18.39 %	
Total	5364494	100%	

II. Quality Details Sangrur

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 $\geq 95\%$.

<u>TSP</u>	<u>Rx Quality %</u>
Airtel 2G	96.03%
BSNL 2G	96.58%
VIL 2G	96.25%
BSNL 3G	95.69%
Airtel VoLTE	87.89%
Jio VoLTE	93.39%
VIL VoLTE	91.71%



II. Quality Details

Airtel

2G

Technology	Rx Quality %
2G	96.03%
VoLTE	87.89%



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	962071	90.05%	
(2, <=3)	20670	1.93%	
(3 , <=4)	22561	2.12%	
(4 , <=5)	20607	2.93%	
(5 , <=Max)	42410	3.97%	
Total	1068319	100%	

VoLTE

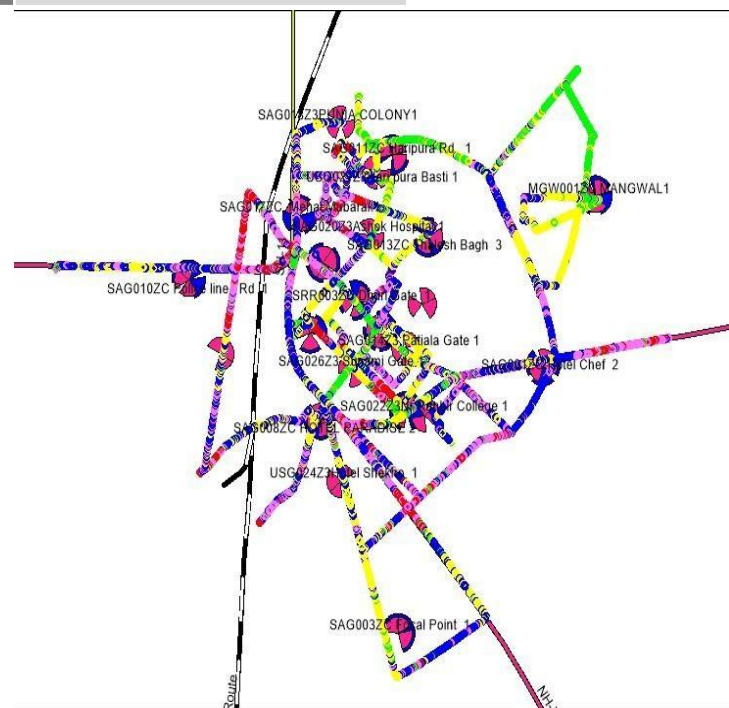


Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	244534	12.11%	
(0, <=5)	741775	36.75%	
(5, <=10)	600182	29.74%	
(10, <=15)	285872	14.16%	
(15, <=Max)	146148	7.24%	
Total	2018511	100%	

II. Quality Details

BSNL

2G



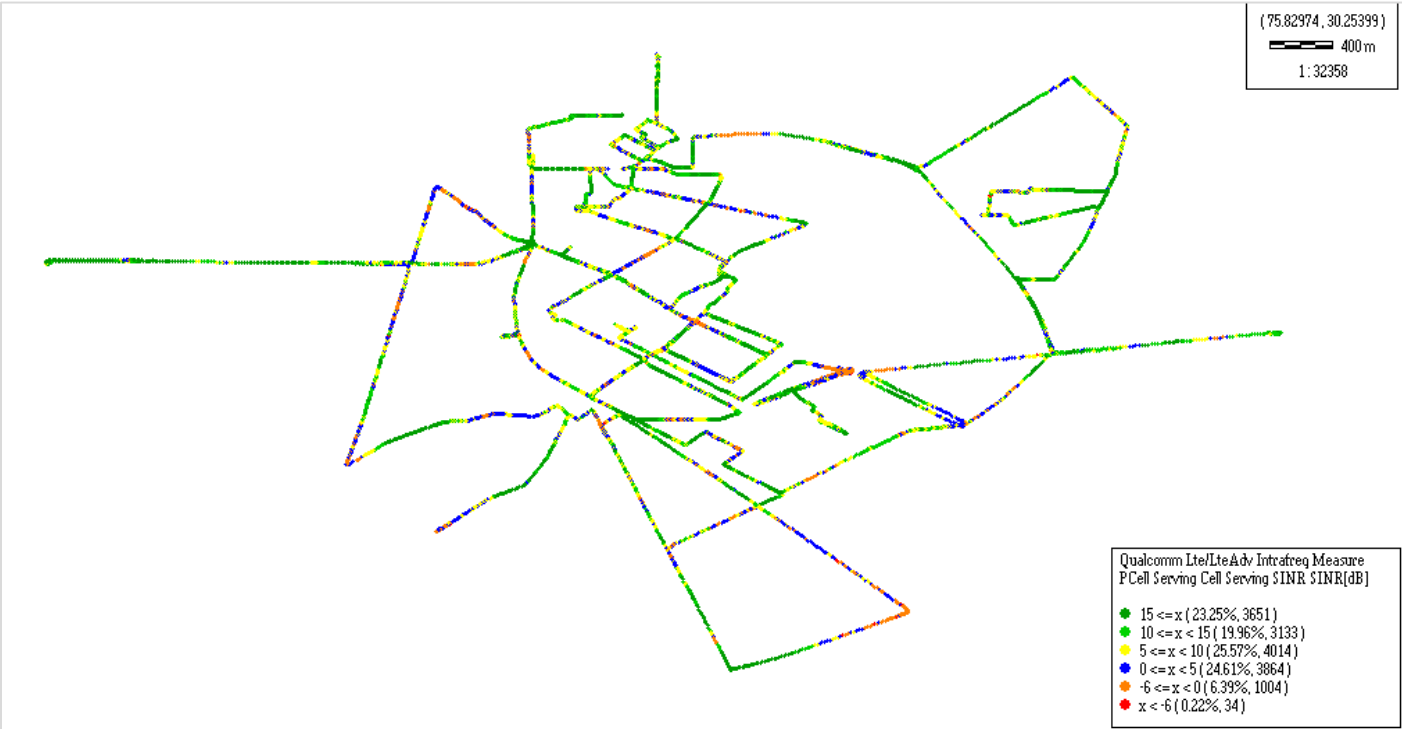
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	26420	87.83%	
(2, <=3)	752	2.50%	
(3 , <=4)	883	2.94%	
(4 , <=5)	996	3.31%	
(5 , <=Max)	1030	3.42%	
Total	30081	100%	

Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	12135	4.79%	
(-6, <=-9)	40368	15.93%	
(-9, <=-11)	87365	34.47%	
(-11, <=-14)	102659	40.50%	
(-14, <= Min)	10945	4.31%	
Total	253472	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	93.39%



Overall SINR	# Samples	% PDF	Legends
(Min, <= -6)	34	0.22%	
(-6, <=0)	1004	6.39%	
(0, <=5)	3864	24.61%	
(5, <=10)	4014	25.57%	
(10, <=15)	3133	19.96%	
(15, <=Max)	3651	23.25%	
Total	15700	100%	

II. Quality Details

VIL

Technology	Rx Quality %
2G	96.25%
4G	91.71%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	4349648	95.30 %	
(2, <=3)	13932	0.31 %	
(3, <=4)	14518	0.32 %	
(4, <=5)	14793	0.32 %	
(5, <=Max)	171150	3.75 %	
Total	4543902	100%	

VoLTE



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	376911	8.29 %	
(0, <=5)	1830100	40.28 %	
(5, <=10)	769318	16.93 %	
(10, <=15)	736604	16.21 %	
(15, <=Max)	830969	18.29 %	
Total	4543902	100%	

III. Technology Details

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

