Operator Assisted Drive Test Report

MOGA CITY
27th July to 28th July 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 **Moga** City and surrounding areas from 9:00 AM to 8:00 PM during 27th July to 28th July 2023. The drive test covered drive route of 103 KMs & 5 no. hotspots over a period of 2 days. Approximately 200 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 27th to 28th July 2023 covering Moga 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, 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 103 KMs. Approximately 197 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 103 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. NESTLE MOGA
2. RAILWAY STATION MOGA
3. CIVIL HOSPITAL MOGA
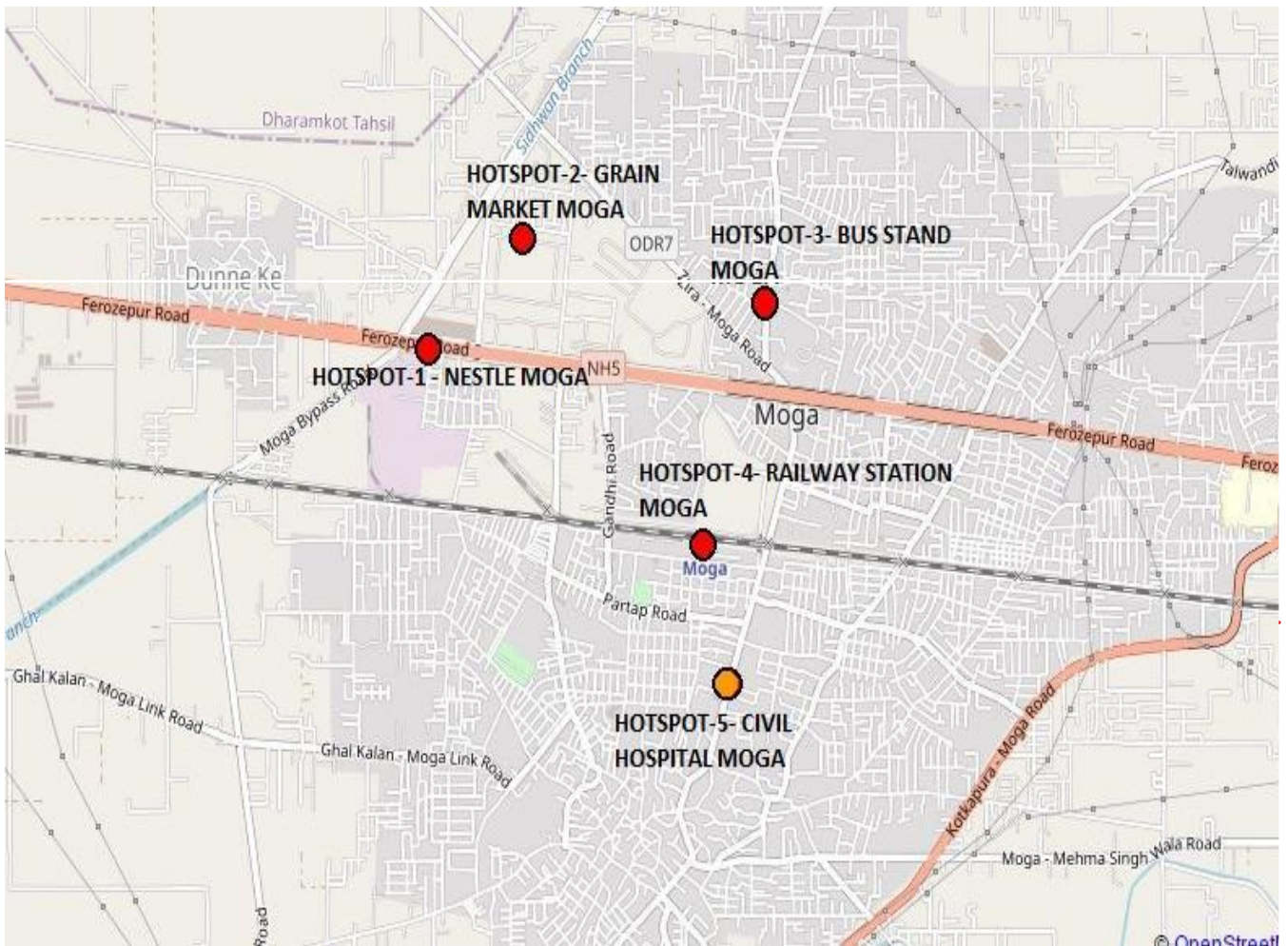4. BUS STAND MOGA
5. GRAIN MARKET MOGA

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
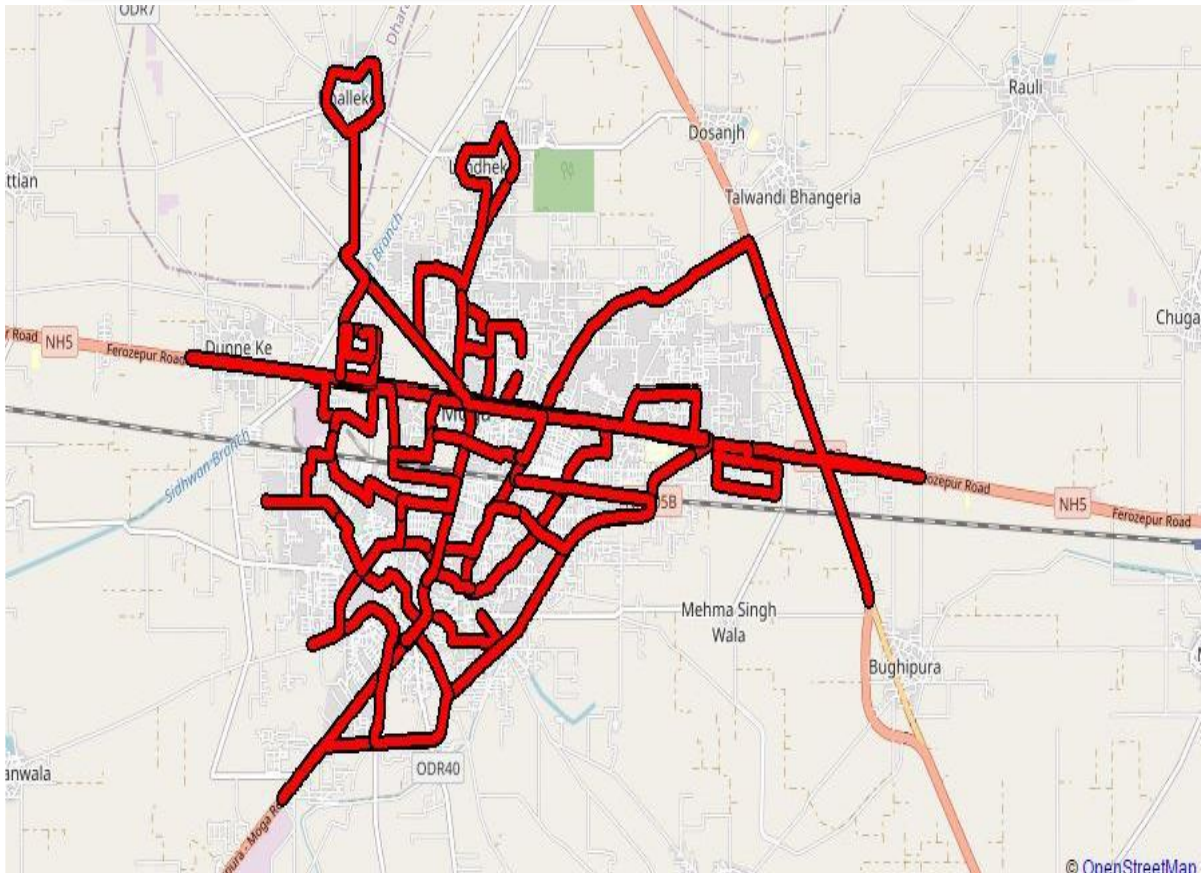
Date	Test Scenario	Area to be Covered
27 July 2023	2G/3G/4G Voice and 3G/4G/5G Dynamic Data	Starting Point Moga Bus stand,Covering Amritsar road to ZIRA raod, Village Dhalleke, Moga Anaj Mandi, Ferozpur road, Rajiv Hospital, Main bazaar Moga, Civil Hospital, Sekha chowk, Gill chowk.
28 July 2023	Hot Spots- 2G/3G/4G Static Data Tests	1) NESTLE MOGA 2) RAILWAY STATION MOGA 3) CIVIL HOSPITAL MOGA 4) BUS STAND MOGA 5) GRAIN MARKET MOGA

Overview
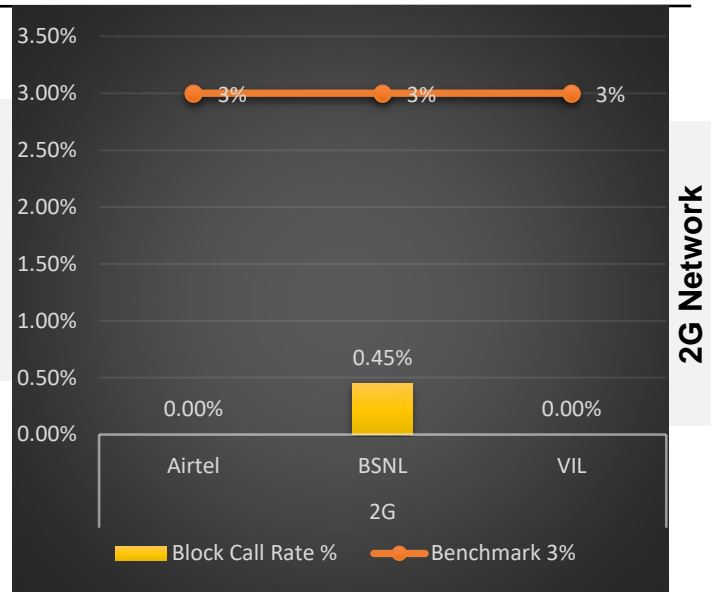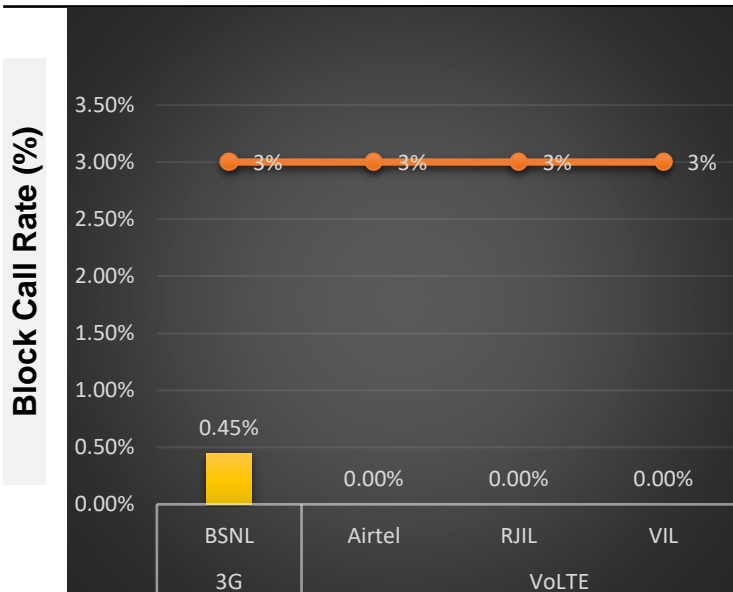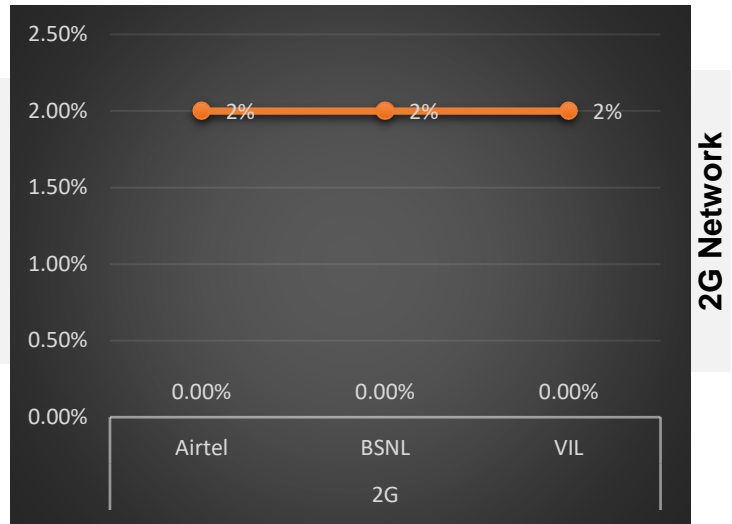
Data Service Test- Static Locations

Hotspot Locations
1)   NESTLE INDIA LTD. MOGA
2)   RAILWAY STATION MOGA
3)   CIVIL HOSPITAL MOGA
4)   BUS STAND MOGA
5)   GRAIN MARKET MOGA

Voice Calls

QoS compliance of the TSPs in **Moga City** for Voice across technologies 2G/3G/4G-VoLTE:
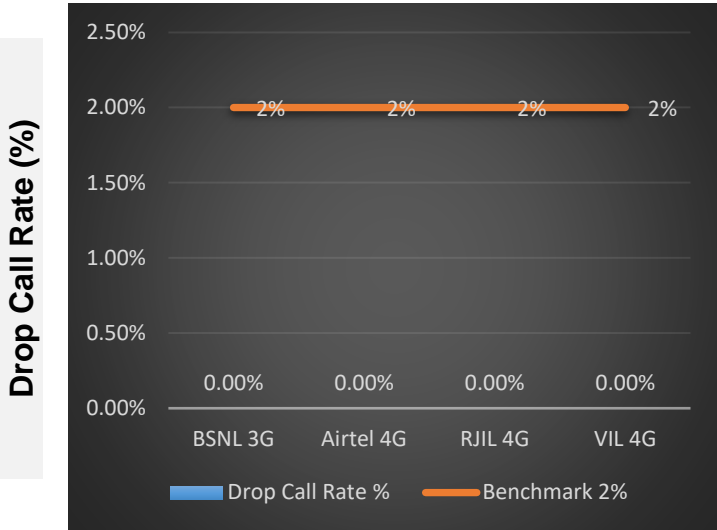
KPIs	2G			3G	4G		
	Airtel	**BSNL**	**VIL**	**BSNL**	**Airtel**	**RJIL**	**VIL**
Drop Call Rate %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Block Call Rate %	0.00%	0.45%	0.00%	0.45%	0.00%	0.00%	0.00%

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 %	95.48%	83.40%	91.12%

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

TSPs	3G
	BSNL
Coverage %	89.09%

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

TSPs	VoLTE		
	Airtel	**JIO**	**VIL**
Coverage %	99.87%	99.96%	99.59%

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

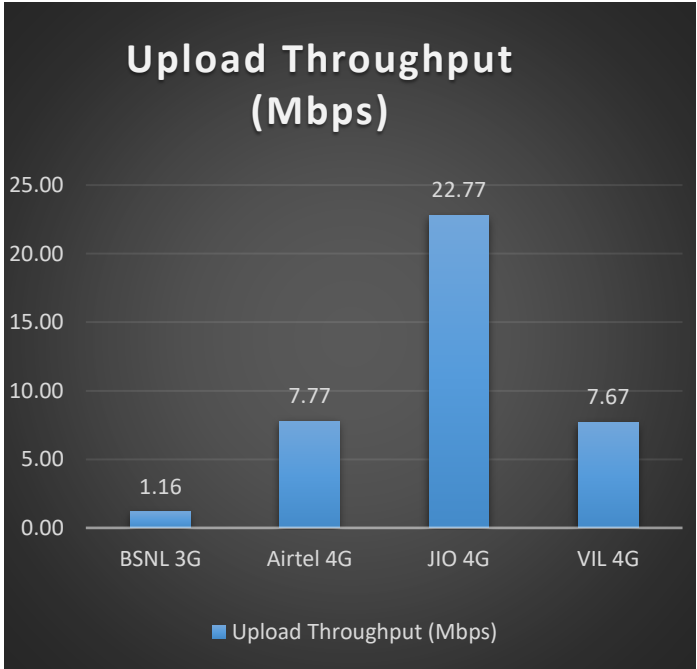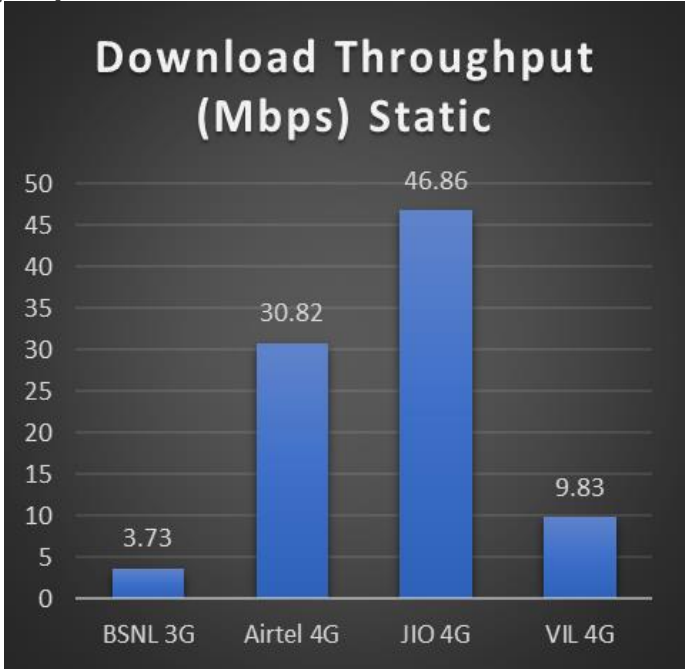| TSPs	3G	VoLTE		
	BSNL	**Airtel**	**JIO**	**VIL**
Time spent on 3G/4G Network %	100.00%	100.00%	100.00%	100.00%

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

Network	Mbps
BSNL 3G	3.73
Airtel 4G	30.82
JIO 4G	46.86
VIL 4G	9.83

Upload Throughput (Mbps)

Network	Mbps
BSNL 3G	1.16
Airtel 4G	7.77
JIO 4G	22.77
VIL 4G	7.67

■ Upload Throughput (Mbps)

Latency (ms)

Latency (msec)

Network	msec
BSNL 3G	85.20
Airtel 4G	31.90
JIO 4G	46.50
VIL 4G	28.20

3G/VoLTE

Web Browsing (Sec)

Web Browsing Delay (sec)

Network	sec
BSNL 3G	17.37
Airtel 4G	2.58
JIO 4G	2.03
VIL 4G	4.40
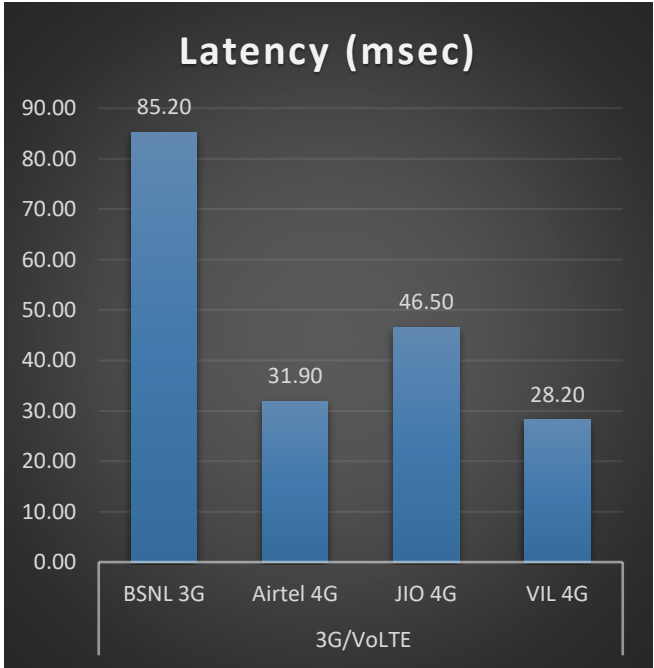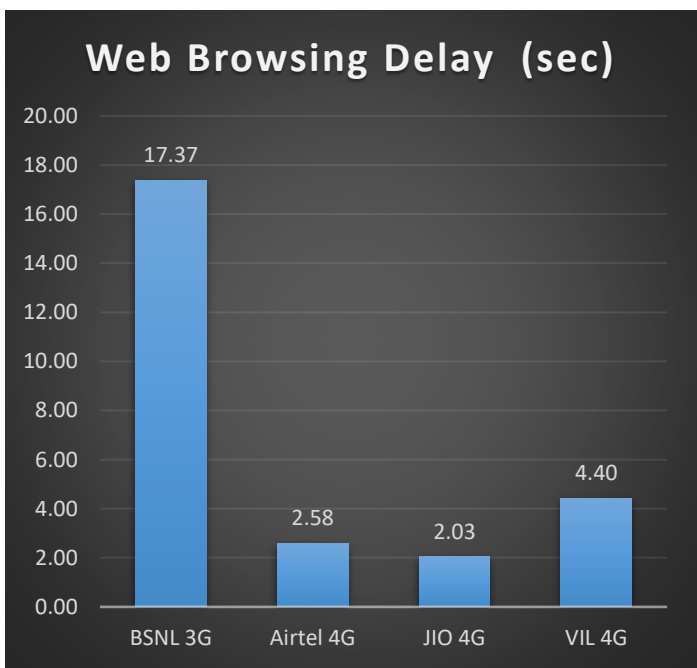
Data Services Dynamic

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)	**1.60**	**15.35**	**28.87**	**22.35**

Download Throughput (Mbps)

Summary

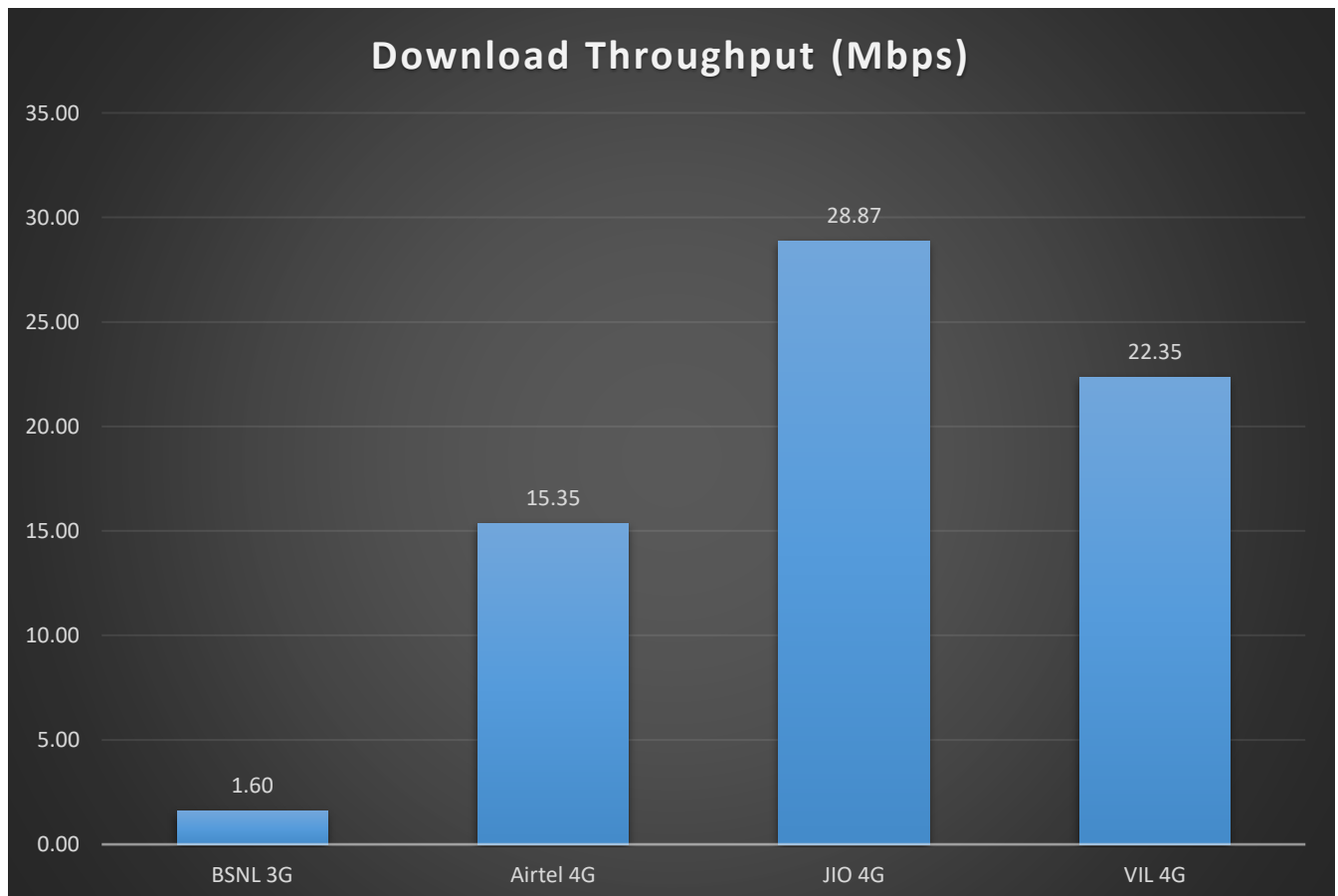| Voice Call	2G		
	Airtel	**BSNL**	**VIL**
Call Attempt	191	219	188
Blocked Call Rate (%)	0.00%	0.46%	0.00%
CSSR% (Accessibility)	100.00%	99.54%	100.00%
Drop Call Rate (%)	0.00%	0.00%	0.00%
Mobility HOSR (%)	100.00%	97.45%	100.00%
Rx Quality (%)	97.09%	97.38%	97.76%
Average CST Sec	3.18	2.98	3.70

Voice Call	3G/VoLTE			
	BSNL 3G	**Airtel VoLTE**	**JIO VoLTE**	**VIL VoLTE**
Call Attempt	218	189	178	193
Blocked Call Rate (%)	0.46%	0.00%	0.00%	0.00%
CSSR% (Accessibility)	99.54%	100.00%	100.00%	100.00%
Drop Call Rate (%)	0.00%	0.00%	0.00%	0.00%
Mobility HOSR (%)	100.00%	99.27%	99.59%	99.41%
Rx Quality (%)	91.22%	90.18%	92.37%	91.73%
Average CST Sec	1.61	1.83	0.63	2.34

Summary

Data Services Static	2G		
	Airtel	**BSNL**	**VIL**
Download Throughput (kbps)	112.70	64.93	112.50
Upload Throughput (kbps)	90.36	65.53	67.76
Web Browsing Delay (sec)	89.50	272.77	60.59
Latency (msec)	328.00	0.00	201.20

Data Services Static	3G / 4G			
	BSNL 3G	**Airtel 4G**	**JIO 4G**	**VIL 4G**
Download Throughput (Mbps)	3.73	30.82	46.86	9.83
Upload Throughput(Mbps)	1.16	7.77	22.77	7.67
Video Streaming Delay (sec)	-	0.14	0.81	0.48
Web Browsing Delay (sec)	17.37	2.58	2.03	4.40
Latency (msec)	85.20	31.90	46.50	28.20

Data Services Static

NESTLE MOGA	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	127.00	71.68	73.80
Upload Throughput (kbps)	210.00	122.88	37..2
Web Browsing Delay (sec)	84.60	228.02	92.00
Latency (msec)	256.00	0.00	240.50

Railway Station, Moga	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	128.00	71.8	130.10
Upload Throughput (kbps)	89.00	112.64	56.50
Web Browsing Delay (sec)	85.70	326.11	43.95
Latency (msec)	331.00	0.00	241.00

Civil Hospital	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	157.00	51.2	94.10
Upload Throughput (kbps)	96.00	40.96	62.50
Web Browsing Delay (sec)	93.80	235.56	57.30
Latency (msec)	248.00	0.00	136.50

Bus Stand	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	204.00	54.47	156.50
Upload Throughput (kbps)	112.00	30.72	98.50
Web Browsing Delay (sec)	89.60	269.92	52.20
Latency (msec)	229.00	0.00	166.50

Grain Market	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	198.00	75.62	108.10
Upload Throughput (kbps)	117.00	20.48	84.00
Web Browsing Delay (sec)	73.40	244.26	57.53
Latency (msec)	215.00	0.00	221.50

Data Services static

NESTLE MOGA	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	2.19	28.69	48.68	11.63
Upload Throughput (mbps)	0.69	4.10	21.58	8.10
Video Streaming Delay (Secs.)	-	0.13	0.69	0.54
Web Browsing Delay (sec)	9.69	2.55	2.05	4.71
Latency (msec)	95.75	27.60	45.50	29.50

Railway Station, Moga	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	2.52	23.33	55.34	10.31
Upload Throughput (mbps)	0.90	43.85	21.22	1.61
Video Streaming Delay (Secs.)	-	0.12	0.99	0.45
Web Browsing Delay (sec)	12.64	2.11	2.00	4.45
Latency (msec)	78.50	41.90	55.50	28.00

Civil Hospital	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	1.96	30.38	55.77	6.17
Upload Throughput (mbps)	0.78	28.96	21.73	2.56
Video Streaming Delay (Secs.)	-	0.13	0.64	0.56
Web Browsing Delay (sec)	23.26	2.22	2.02	4.42
Latency (msec)	87.75	27.30	42.50	39.50

Data Services static

Bus Stand	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	3.14	49.04	45.56	7.81
Upload Throughput (mbps)	0.37	9.76	23.78	11.29
Video Streaming Delay (Secs.)	0.00	0.16	0.90	0.47
Web Browsing Delay (sec)	22.95	2.11	2.12	5.06
Latency (msec)	81.50	31.40	42.50	32.00

Grain Market	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	2.14	22.65	28.93	13.22
Upload Throughput (mbps)	0.25	3.26	25.52	9.04
Video Streaming Delay (Secs.)	-	0.15	0.84	0.37
Web Browsing Delay (sec)	18.34	2.47	1.95	3.38
Latency (msec)	82.50	28.20	46.50	62.00

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.
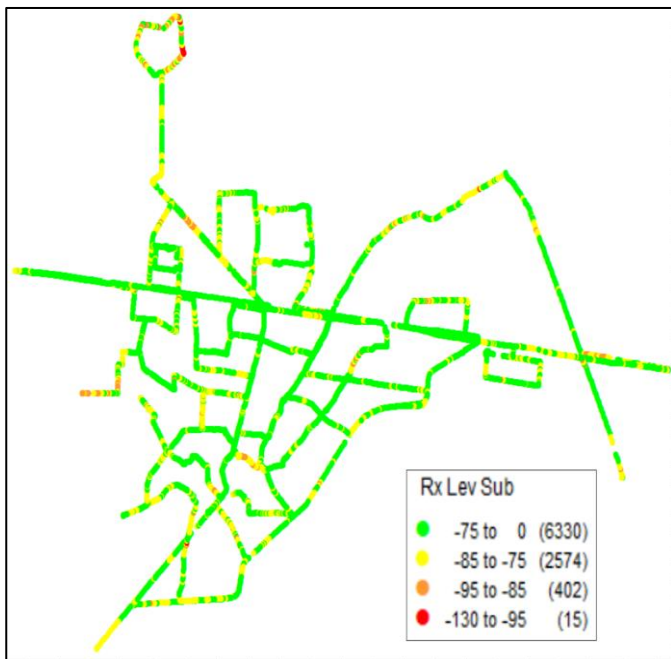
TSP	Coverage Rate %
Airtel 2G	95.48
BSNL 2G	83.40
VIL 2G	91.12
BSNL 3G	89.09
Airtel VoLTE	99.87
Jio VoLTE	99.96
VIL VoLTE	99.59

Coverage Rate
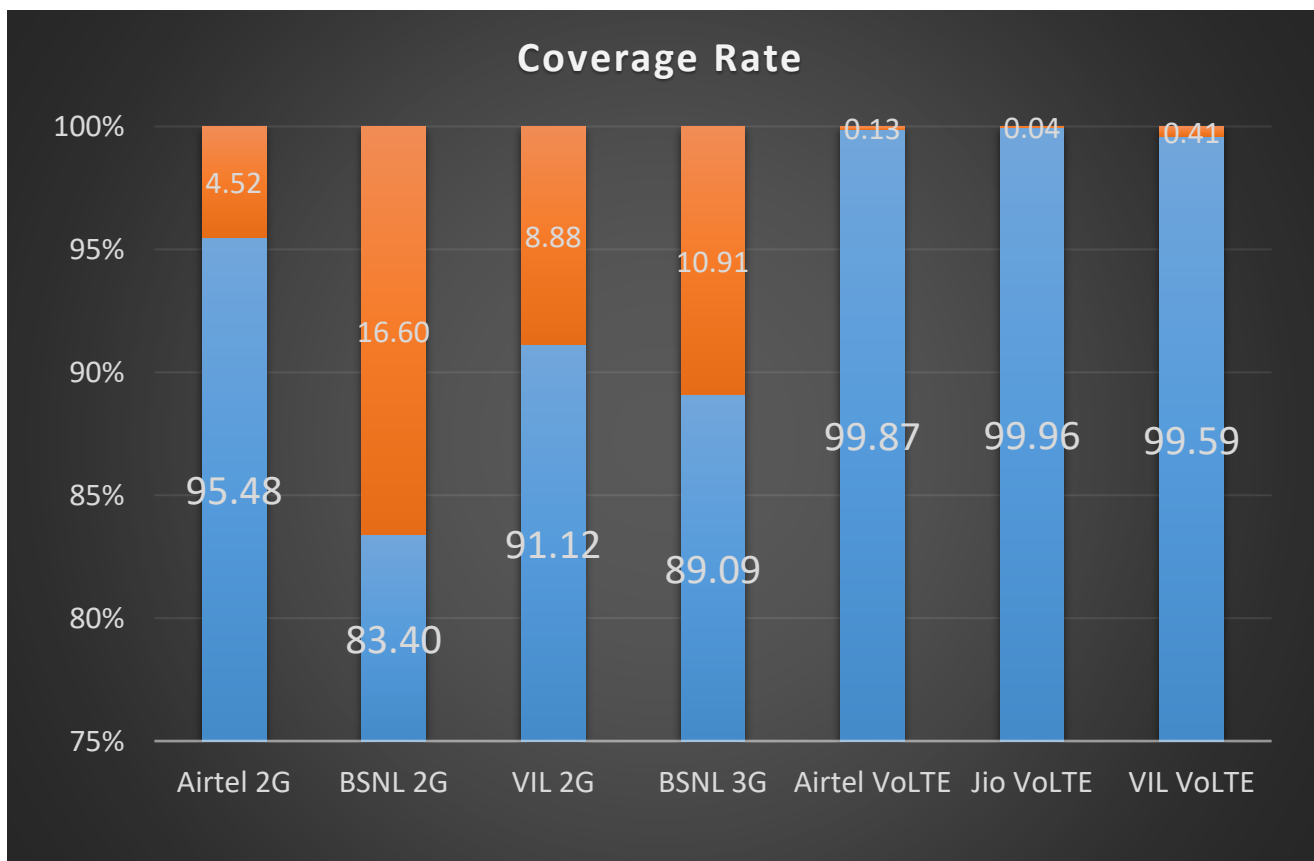
TSP-AIRTEL

Technology	Coverage %
2G	95.48%
VoLTE	99.87%

2G

Rx Lev Sub

- -75 to 0 (6330)
- -85 to -75 (2574)
- -95 to -85 (402)
- -130 to -95 (15)

2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	6330	67.86%	
[-75, >=-85)	2574	27.62%	
[-85, >=-95)	402	4.34%	
[-95, >=Min)	15	0.17%	
Total	**9321**	**100%**	

VoLTE

RSRP

- -80 to 0 (1039537)
- -90 to -80 (1196242)
- -110 to -90 (501992)
- -130 to -110 (3613)
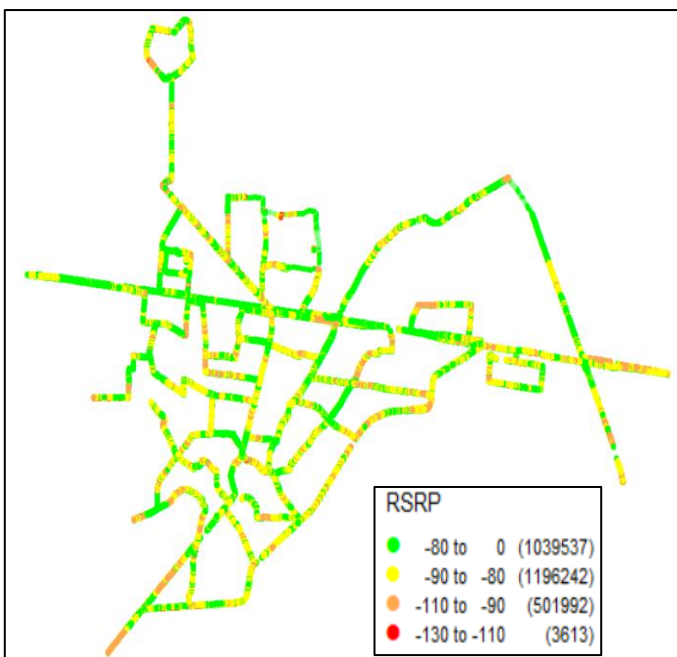
VoLTE			
Overall RSRP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	1039537	37.92%	
[-80, >=-90)	1196242	43.64%	
[-90, >=-110)	501992	18.31%	
[-110, >=Min)	3613	0.13%	
Total	**2741384**	**100%**	

TSP- BSNL

Technology	Coverage %
2G	**83.40%**
3G	**89.09%**

2G

3G
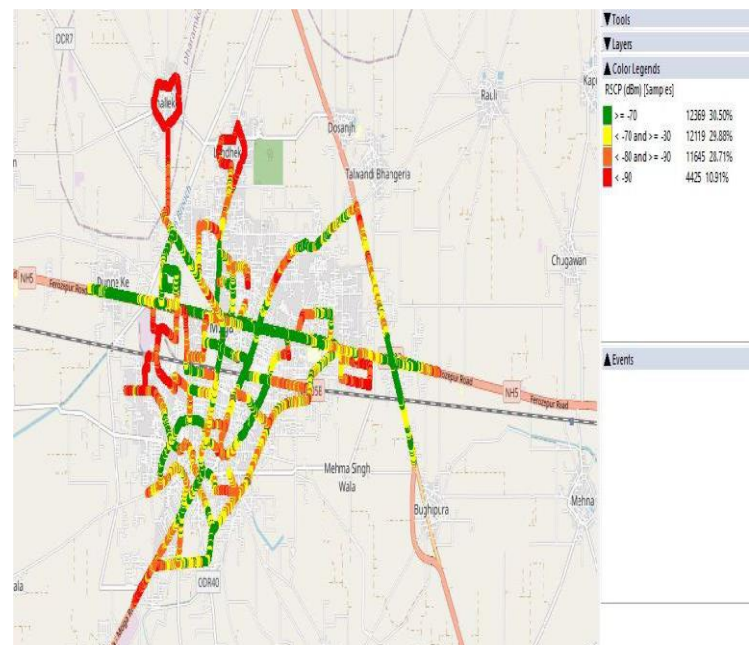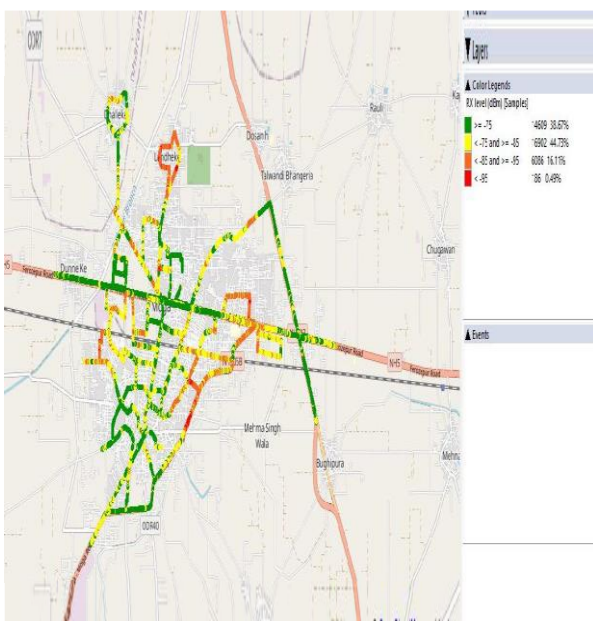
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	14609	38.67%	
(2, <=3)	16902	44.73%	
(4 , <=5)	6086	16.11%	
(5 , <=Max)	186	0.49%	
Total	37783	100%	

Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	12369	30.50%	
(-6, <=-9)	12119	29.88%	
(-11, <=-14)	11645	28.71%	
(-14, <= Min)	4425	10.91%	
Total	40558	100.00%	

JIO

Technology	Coverage %
VoLTE	99.96%

VoLTE /5G

Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	12587	65.97	
[-80, >=-90)	4548	23.84	
[-90, >=-110)	1936	10.15	
[-110, >=Min)	8	0.04	
Total	**19079**	**100%**	

VIL

Technology	Coverage Rate %
2G	**91.12%**
VoLTE	**99.59%**

2G

2G
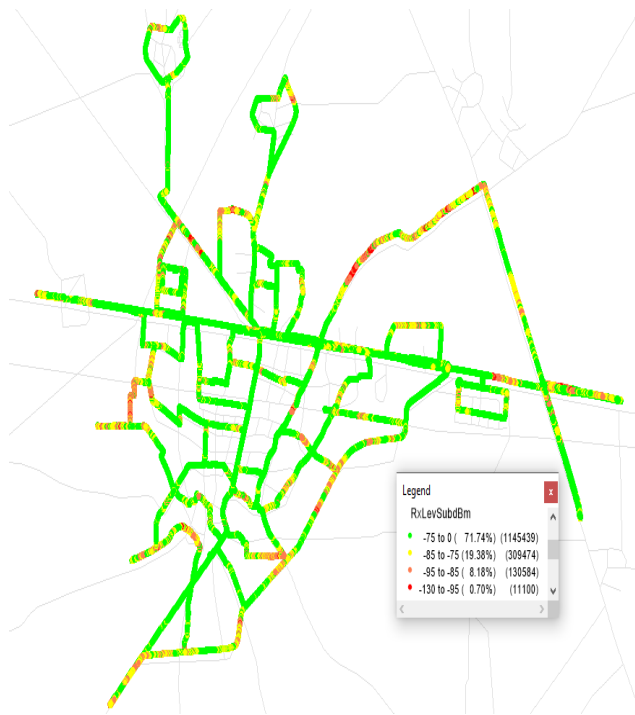
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	1145439	71.74	
[-75, >=-85)	309474	19.38	
[-85, >=-95)	130584	8.18	
[-95, >=Min)	11100	0.70	
Total	**1596597**	**100%**	
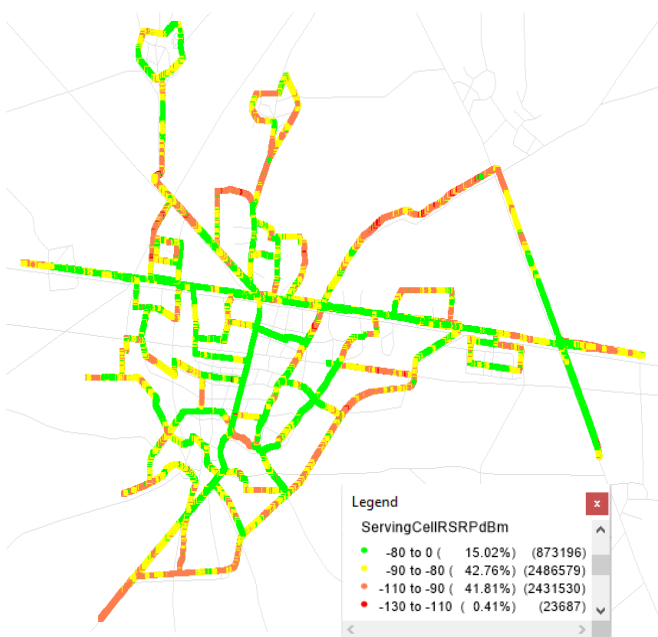
VoLTE

VoLTE /5G

Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	873196	15.02	
[-80, >=-90)	2486579	42.76	
[-90, >=-110)	2431530	41.81	
[-110, >=Min)	23687	0.41	
Total	**5814992**	**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	97.09
BSNL 2G	97.38
VIL 2G	97.76
BSNL 3G	**91.22**
Airtel VoLTE	**90.18**
Jio VoLTE	**92.37**
VIL VoLTE	**91.73**
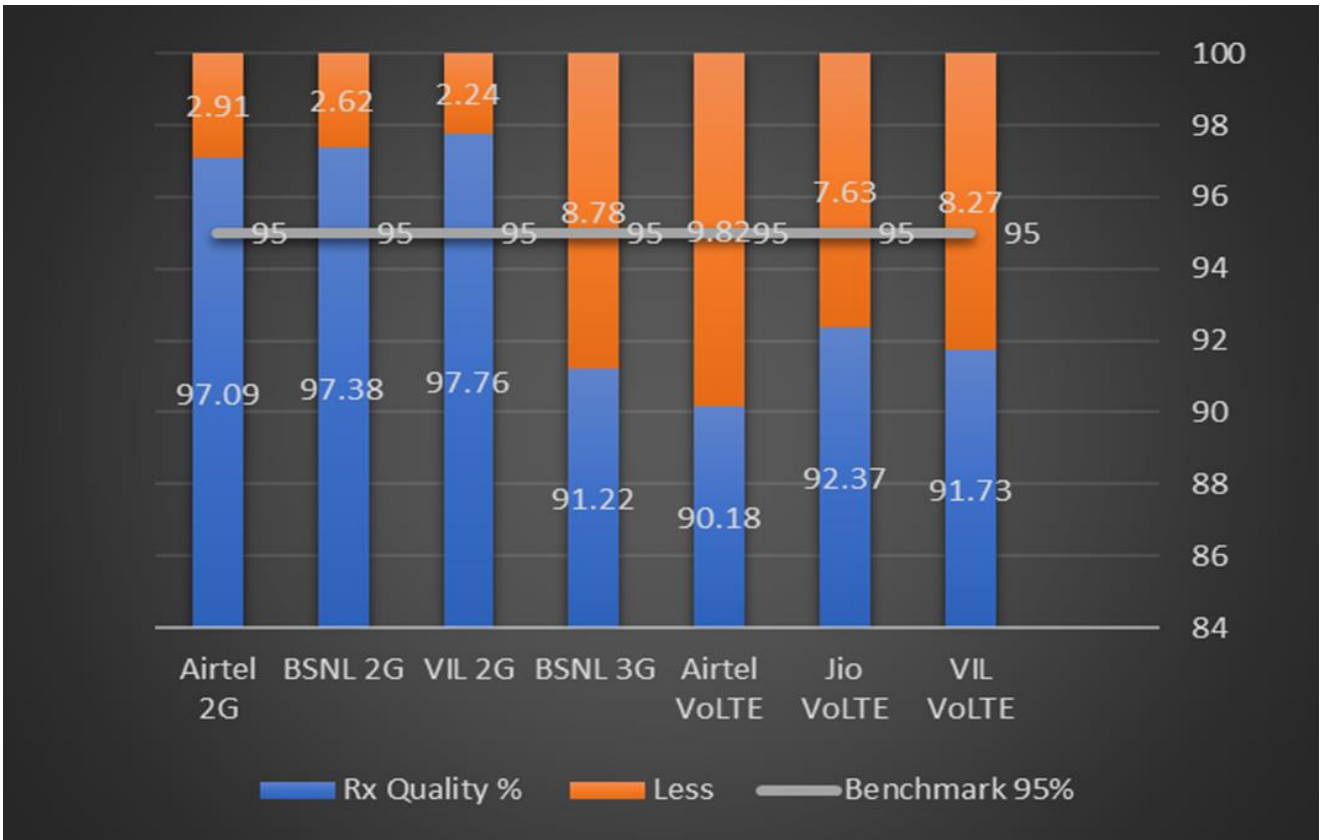
Airtel

Technology	Rx Quality %
2G	**97.09%**
VoLTE	**90.18%**

2G
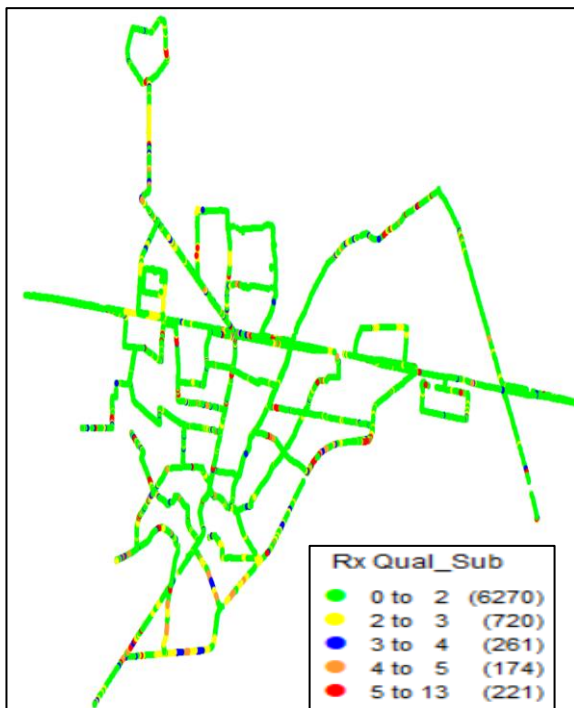
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	6270	82.00%	
(2, <=3)	720	9.41%	
(3 , <=4)	261	3.41%	
(4 , <=5)	174	2.27%	
(5 , <=Max)	221	2.89%	
Total	7646	100%	

VoLTE
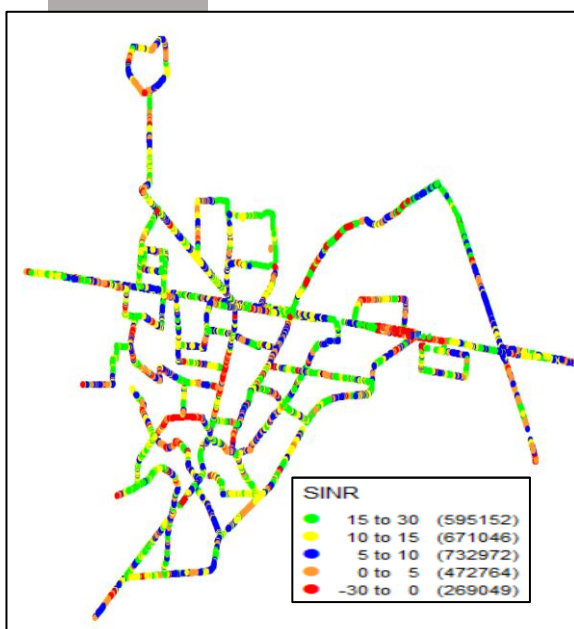
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	269049	9.82%	
(0, <=5)	472764	17.25%	
(5, <=10)	732972	26.74%	
(10, <=15)	671046	24.48%	
(15, <=Max)	595152	21.71%	
Total	2740983	100%	

BSNL

Technology	Rx Quality %
2G	**97.38%**
3G	**91.22%**

2G

3G
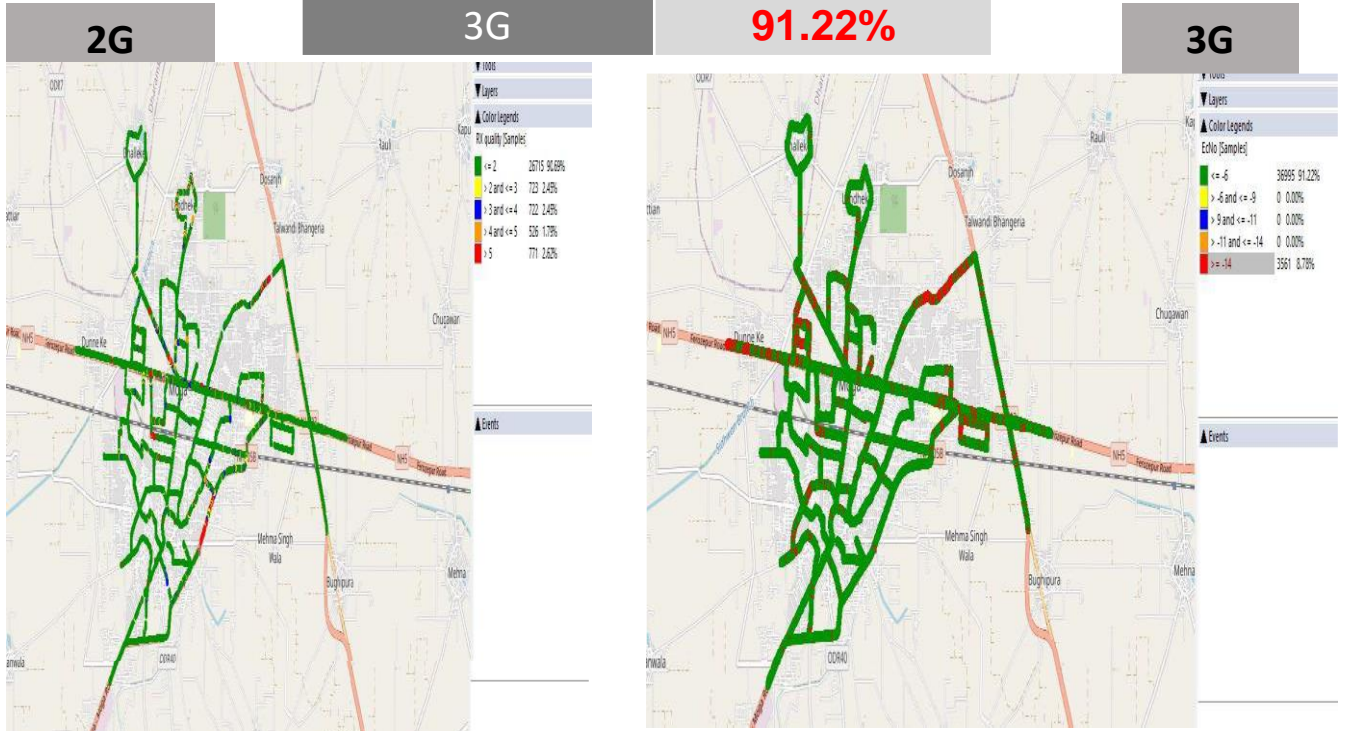
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	26715	90.69	
(2, <=3)	723	2.45	
(3 , <=4)	722	2.45	
(4 , <=5)	526	1.79	
(5 , <=Max)	771	2.62	
Total	29457	100%	

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	36995	91.22%	
(2, <=3)	0	0.00%	
(3 , <=4)	0	0.00%	
(4 , <=5)	0	0.00%	
(5 , <=Max)	3561	8.78%	
Total	29457	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%.
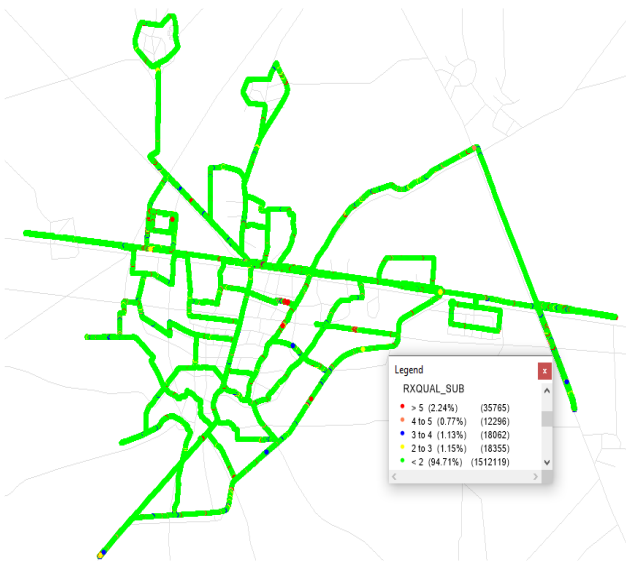
JIO

Technology	Rx Quality %
VoLTE	**92.37%**

Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1456	7.63	
(0, <=5)	4065	21.31	
(5, <=10)	5560	29.14	
(10, <=15)	4641	24.33	
(15, <=Max)	3357	17.60	
Total	**19079**	**100%**	

VIL

Technology	Rx Quality %
2G	**97.76%**
4G	**91.73%**

2G

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	1512119	94.71	🟩
(2, <=3)	18355	1.15	🟨
(3 , <=4)	18062	1.13	🟦
(4 , <=5)	12296	0.77	🟧
(5 , <=Max)	35765	2.24	🟥
Total	1596597	100%	
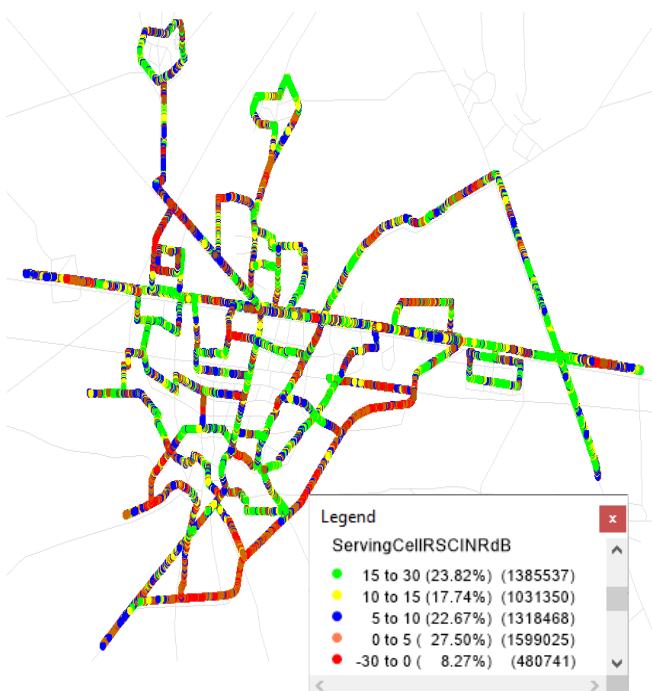
VoLTE

Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	480741	8.27	🟥
(0, <=5)	1599025	27.50	🟧
(5, <=10)	1318468	22.67	🟦
(10, <=15)	1031350	17.74	🟨
(15, <=Max)	1385537	23.82	🟩
Total	5815121	100%	

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

Time Spent On 3G/4G

	BSNL 3G	Airtel VoLTE	Jio VoLTE	VIL VoLTE
0.00%	0.00%	0.00%	0.00%	0.00%
100.00%	100.00%	100.00%	100.00%	100.00%

Legend: ■ % of Time Spent on 3G/VoLTE ■ % Time Spend on 2G