Operator Assisted Drive Test Report

Jhajjar City & Nearby area
6th and 7th June-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 Jhajjar City and surrounding areas from 9:00 AM to 8:00 PM during 6th to 7th June-2024. The drive test covered drive route of 110 KMs & 6 hotspots over a period of 2 days. Approximately 145 calls were made for each of the 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 6th June 2024 to 7th June 2024 covering Jhajjar 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 100 KMs. Approximately 145 calls were made for each of the networks: three 2G (Lock Mode) networks, two 3G (Dual mode) networks and three VoLTE networks covering 4 unique TSPs.
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 File Size- 40MB

Static data tests on 6 hotspots

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

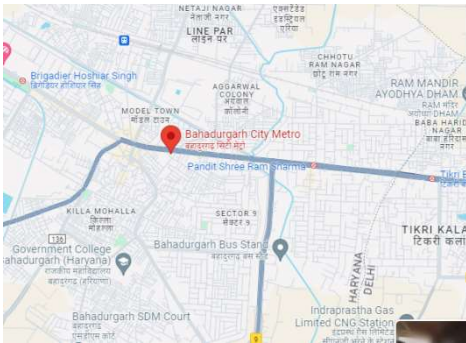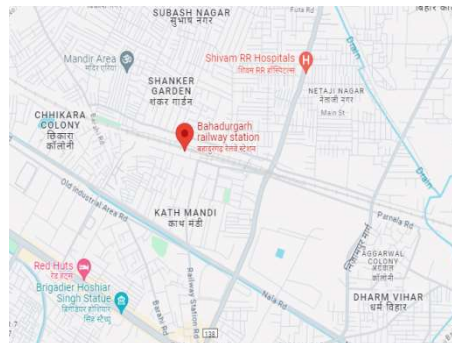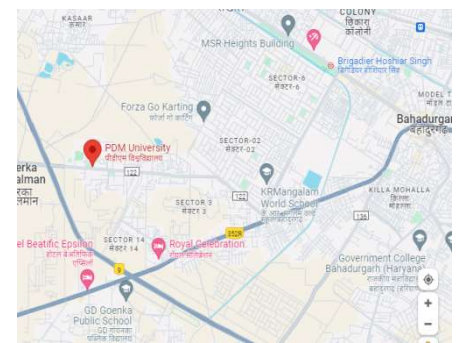## Voice & Dynamic Data Test Drive Route

Data Service Test- Static Locations
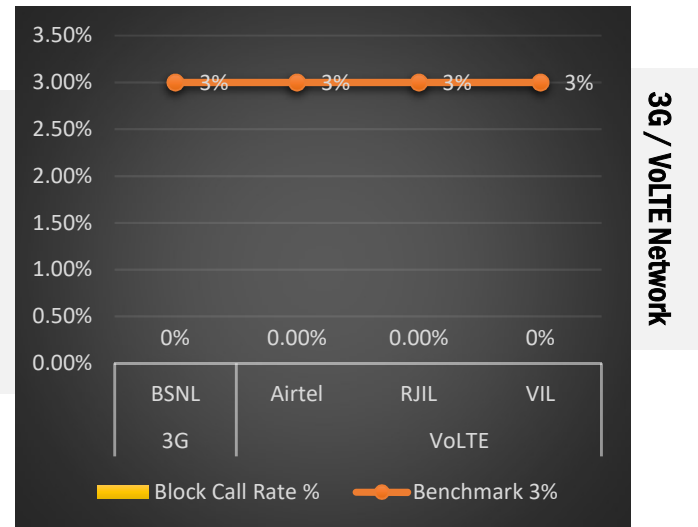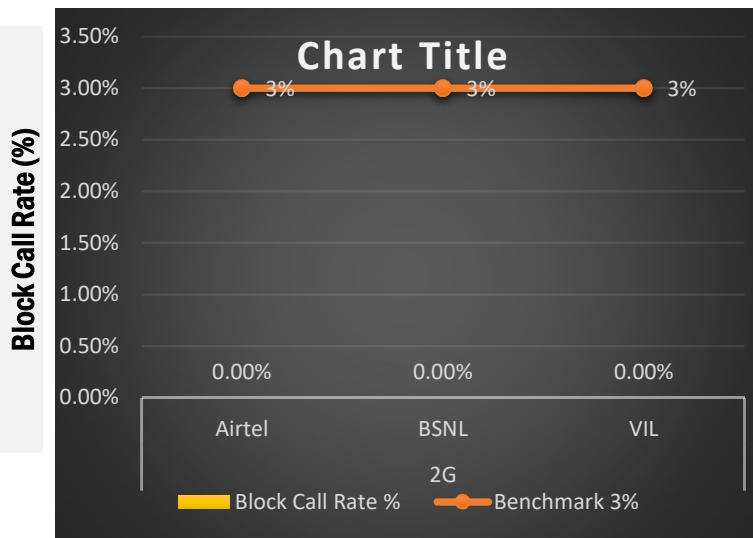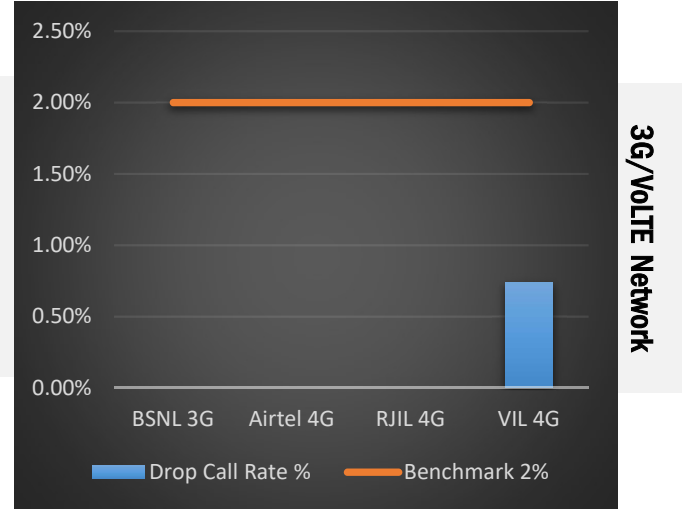

Hotspot 1

Hotspot 2

Hotspot 3
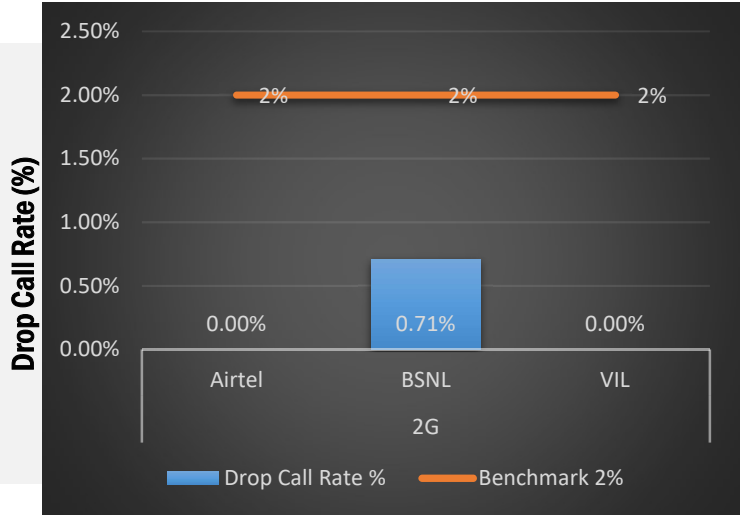

Hotspot 4

Hotspot 5

Hotspot 6

Hotspot Locations
1. Mini-Secretariate, Jhajjar
2. Civil Hospital, Jhajjar
3. New Bus Stand, Jhajjar
4. City Metro Station, Bahadurgarh
5. Railway Station, Bahadurgarh
6. PDM University, Bahadurgarh

QoS compliance of the TSPs in **Jajjar 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%	0.71%	0.00%	0.00%	0.00%	0.00%	0.74%
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.

Coverage

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

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	100%	93.51%	98.15%

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

TSPs	3G
	BSNL
Coverage %	90.85%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99%	99.83%	98.72%

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

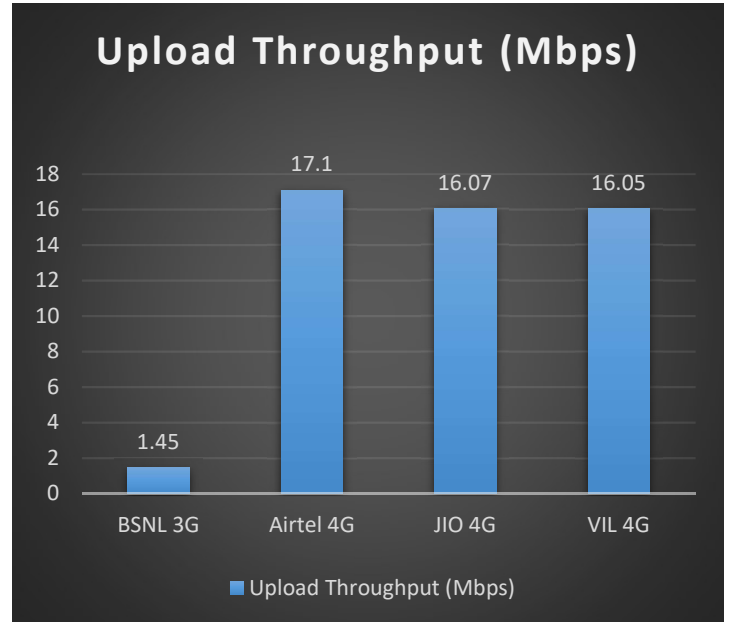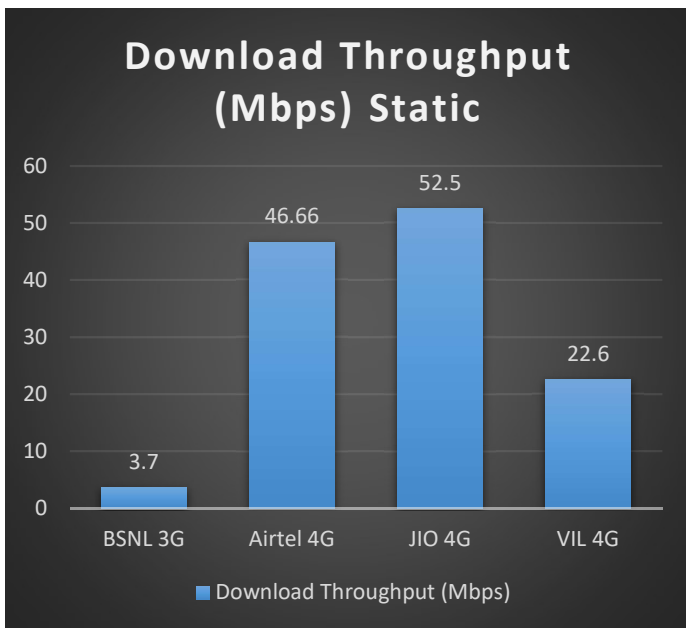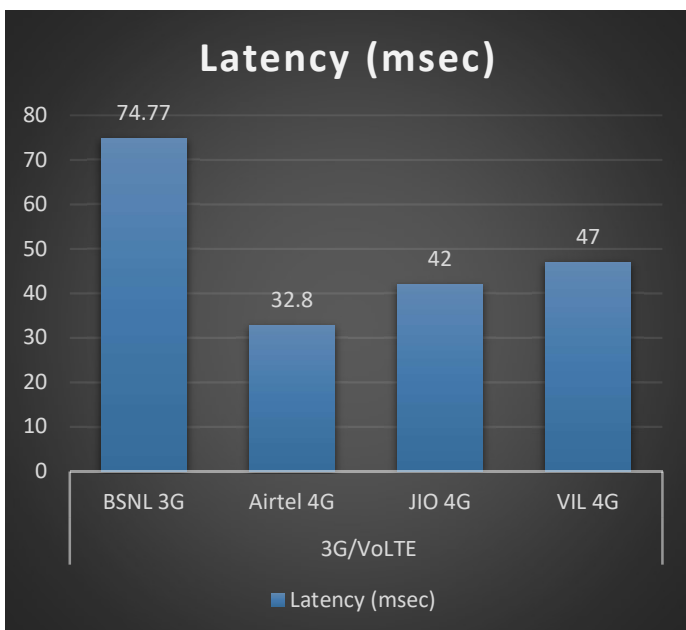| TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	64.85%	100%	100%	100%

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)
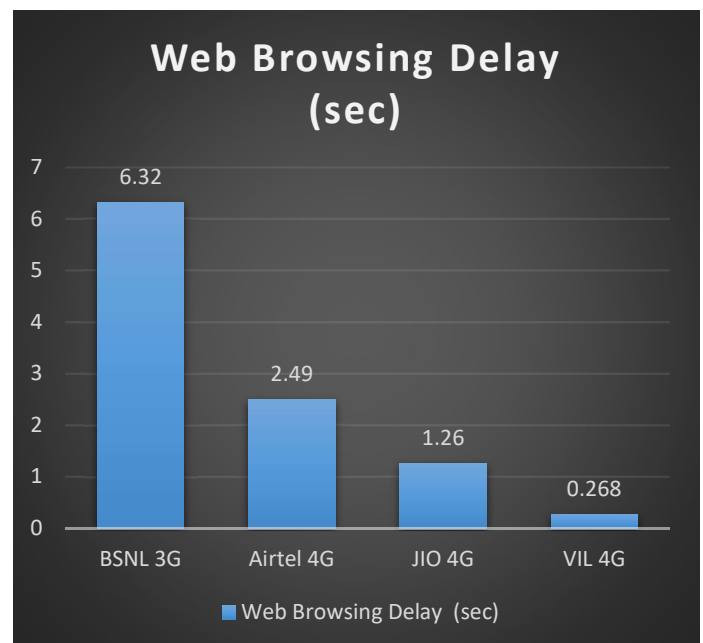
Data Download and Upload Performance Static (Mbps)

3G/4G/ Network:

Download Throughput (Mbps) Static

Network	Download Throughput (Mbps)
BSNL 3G	3.7
Airtel 4G	46.66
JIO 4G	52.5
VIL 4G	22.6

Upload Throughput (Mbps)

Network	Upload Throughput (Mbps)
BSNL 3G	1.45
Airtel 4G	17.1
JIO 4G	16.07
VIL 4G	16.05

Latency (ms)

Latency (msec) — 3G/VoLTE

Network	Latency (msec)
BSNL 3G	74.77
Airtel 4G	32.8
JIO 4G	42
VIL 4G	47

Web Browsing (Sec)

Web Browsing Delay (sec)

Network	Web Browsing Delay (sec)
BSNL 3G	6.32
Airtel 4G	2.49
JIO 4G	1.26
VIL 4G	0.268

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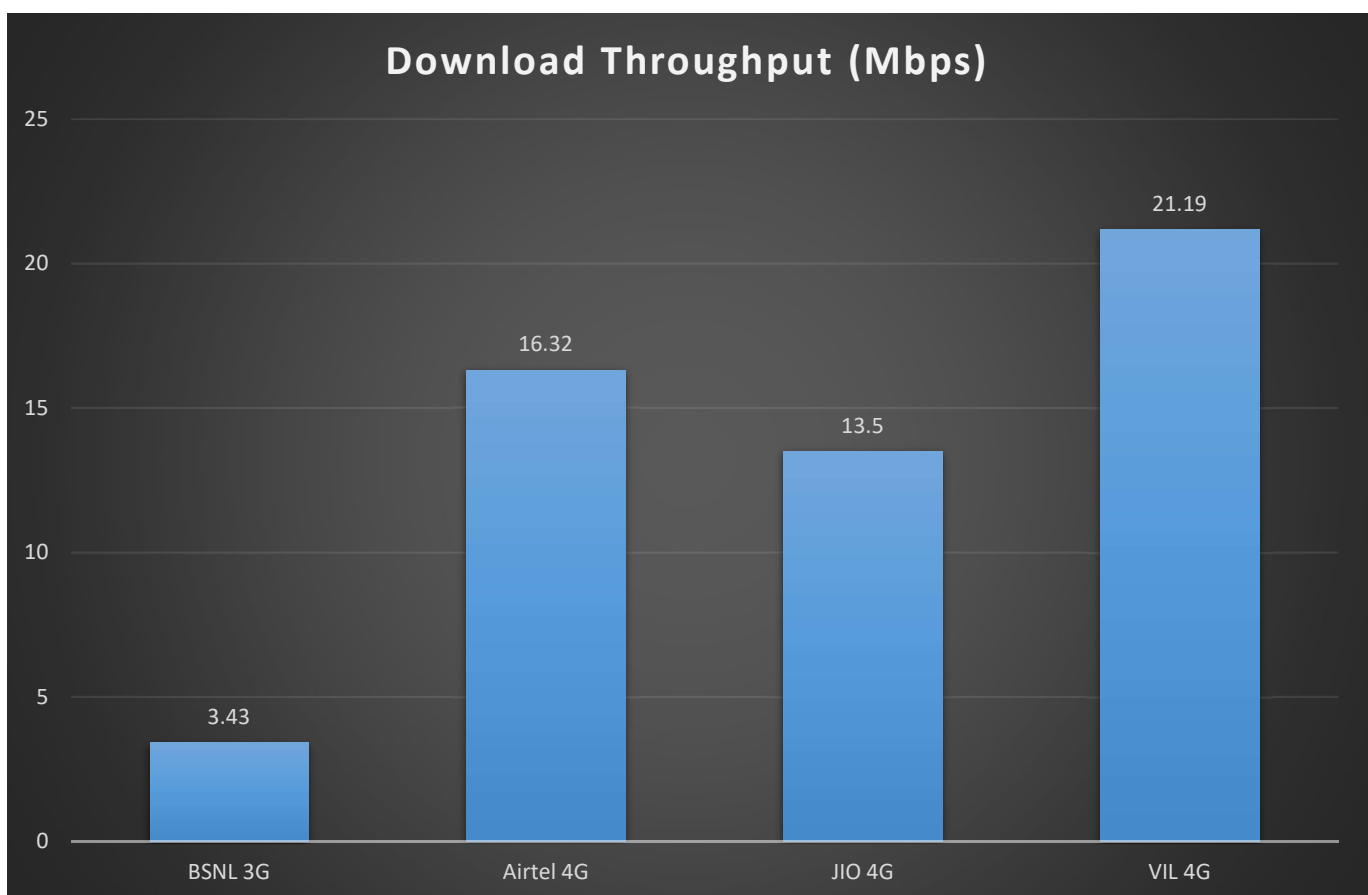
Dynamic Data was tested for whole voice route. Download Throughput was tested.

Data Download Performance (kbps) - Dynamic

3G/4G/ Network:

Data Services Dynamic	3G/VoLTE			
	BSNL 3G	**Airtel 4G**	**JIO 4G**	**VIL 4G**
Download Throughput (Mbps)	**3.43**	**16.32**	**13.5**	**21.19**

Download Throughput (Mbps)

Summary

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	146	140	139
Blocked Call Rate (%)	0%	0%	0%
CSSR% (Accessibility)	100%	100%	100%
Drop Call Rate (%)	0%	0.71%	0%
Mobility HOSR (%)	100%	97.94%	97.6%
Rx Quality (%)	96.40%	97.75%	96%
Average CST Sec	7.69	3.5	3.9

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	140	143	155	136
Blocked Call Rate (%)	0%	0%	0%	0%
CSSR% (Accessibility)	100%	100%	100%	100%
Drop Call Rate (%)	0%	0%	0%	0.74%
Mobility HOSR (%)	98.91%	99%	99.91%	98.77%
Rx Quality (%)	95.95%	96.48%	93.89%	94.75%
Average CST Sec	3.73	1.4	0.5	0.65

Summary

Data Services Static	2G		
	Airtel	**BSNL**	**VIL**
Download Throughput (kbps)	**211.66**	**137.63**	73.6
Upload Throughput (kbps)	**126.71**	**46.2**	76.7
Web Browsing Delay (sec)	**19.72**	**67.4**	0.668
Latency (msec)	**246.25**	**176.52**	127

Data Services Static	3G / 4G			
	BSNL 3G	**Airtel 4G**	**JIO 4G**	**VIL 4G**
Download Throughput (Mbps)	**3.7**	**46.66**	**52.5**	**22.6**
Upload Throughput(Mbps)	**1.45**	**17.10**	**16.07**	**16.05**
Video Streaming Delay (sec)	**4.4**	**0.32**	**0.33**	**0.277**
Web Browsing Delay (sec)	**6.32**	**2.49**	**1.26**	**0.268**
Latency (msec)	**74.77**	**32.8**	**42**	**47**

Mini - Secretariate	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	140	140.2	69
Upload Throughput (kbps)	90.3	35.4	16.4
Web Browsing Delay (sec)	31.097	65.8	3.321
Latency (msec)	197	180.4	119

Civil Hospital	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	100	145.4	47.8
Upload Throughput (kbps)	50	55.2	41
Web Browsing Delay (sec)	5	60.1	4.4
Latency (msec)	247.7	190.2	143

New Bus Stand	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	100	102.4	86.5
Upload Throughput (kbps)	60	45	69.4
Web Browsing Delay (sec)	5.538	70.4	2.2
Latency (msec)	298	175.5	127

City Metro Station	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	410	124.3	91.3
Upload Throughput (kbps)	150	38.7	65.4
Web Browsing Delay (sec)	41.7	63.1	0.768
Latency (msec)	287	175.1	119

Railway Station	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	250	175.1	72.5
Upload Throughput (kbps)	130	42.7	55.9
Web Browsing Delay (sec)	25.596	70.1	0.621
Latency (msec)	193.8	172.3	137

PDM University	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	270	138.4	71.9
Upload Throughput (kbps)	280	60.4	40.3
Web Browsing Delay (sec)	9.439	75.1	0.876
Latency (msec)	254	165.6	145

Data Services static

Mini - Secretariate	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	4.2	131.91	61.15	17.7
Upload Throughput (mbps)	1.6	10.55	17.48	20.1
Video Streaming Delay (Secs.)	4.5	0.248	0 .42	0.1
Web Browsing Delay (sec)	5.2	2.03	1.25	0
Latency (msec)	53.6	29.9	42	29

Civil Hospital	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	3.8	44.88	52.39	7.6
Upload Throughput (mbps)	1.2	18.78	16.07	2.2
Video Streaming Delay (Secs.)	3.7	0.271	0.32	0.38
Web Browsing Delay (sec)	6.4	1.975	1.19	0
Latency (msec)	74	33	42	41

New Bus Stand	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	3.9	13.32	52.5	6.1
Upload Throughput (mbps)	1.4	5.70	24.81	11.4
Video Streaming Delay (Secs.)	4.1	0.461	0 .30	0.2
Web Browsing Delay (sec)	5.2	3.142	1.23	0.1
Latency (msec)	64.6	38.8	41	30

Data Services static

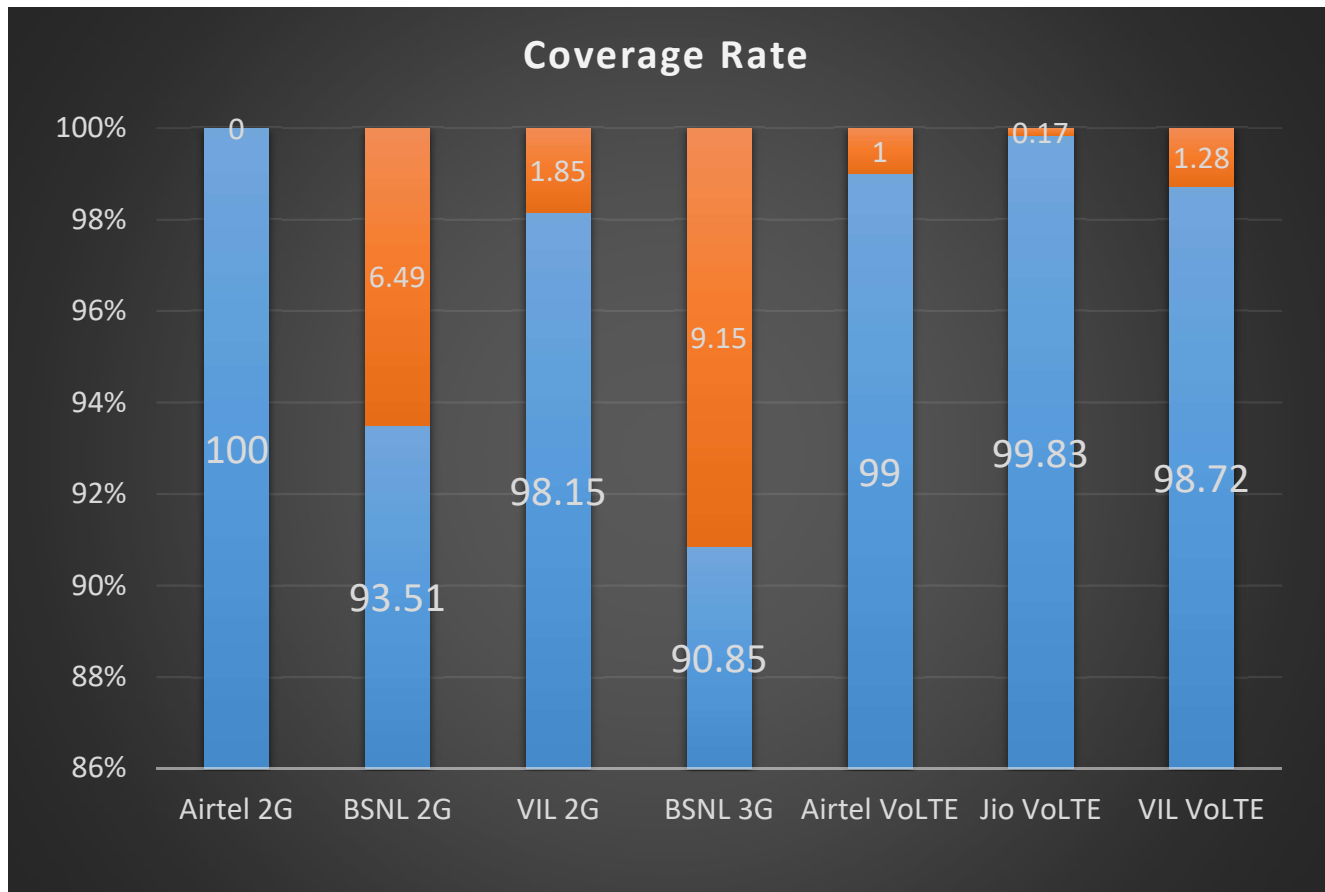| City Metro Station	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	2.9	12.27	34.76	25.8
Upload Throughput (mbps)	1.64	26.74	13.51	25.5
Video Streaming Delay (Secs.)	6.2	0.297	0.34	0.26
Web Browsing Delay (sec)	6.8	2.034	1.15	0.1
Latency (msec)	102.3	31	45	30

Railway station	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	4.0	31.65	55.2	35
Upload Throughput (mbps)	1 .2	13.89	13.43	17.2
Video Streaming Delay (Secs.)	4.5	0.301	0.30	0.25
Web Browsing Delay (sec)	8.2	2.285	1.45	0.167
Latency (msec)	72.1	36	42	43

PDM University	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	3.5	45.94	47.97	21.1
Upload Throughput (mbps)	1.7	26.95	17.05	19.6
Video Streaming Delay (Secs.)	3.4	0.351	0.32	0.159
Web Browsing Delay (sec)	6.1	3.508	1.30	0.2
Latency (msec)	82	28.1	42	30

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.
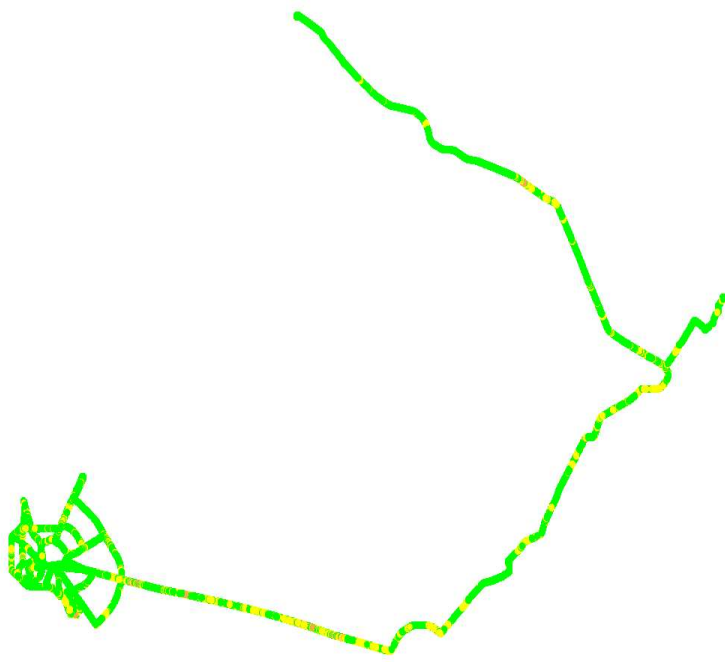
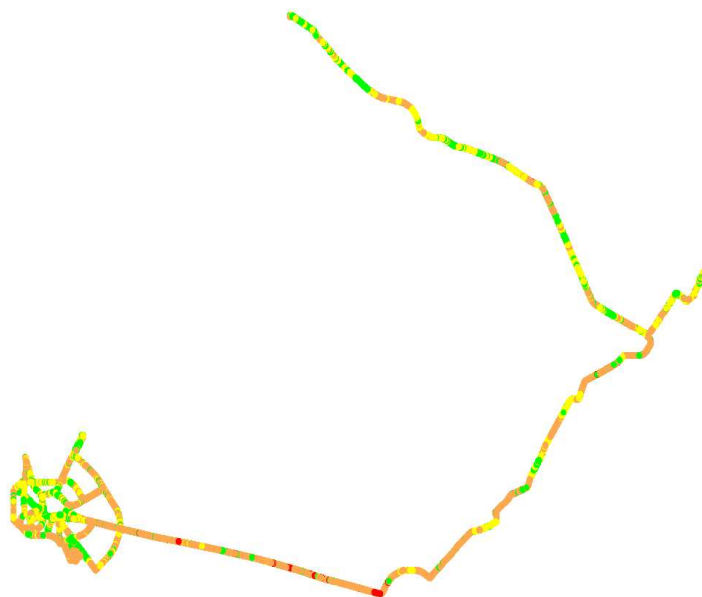| TSP	Coverage Rate %
Airtel 2G	100%
BSNL 2G	93.51%
VIL 2G	98.15%
BSNL 3G	90.85%
Airtel VoLTE	99%
Jio VoLTE	99.83%
VIL VoLTE	98.72%

Coverage Rate

	Airtel 2G	BSNL 2G	VIL 2G	BSNL 3G	Airtel VoLTE	Jio VoLTE	VIL VoLTE
Upper segment	0	6.49	1.85	9.15	1	0.17	1.28
Lower segment	100	93.51	98.15	90.85	99	99.83	98.72

TSP-AIRTEL

Technology	Coverage %
2G	100%
VoLTE	99%

2G

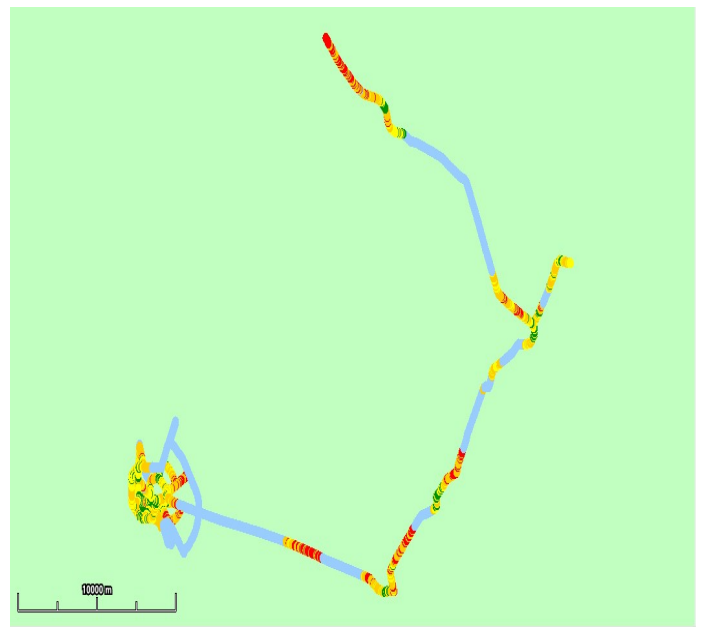| 2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	809160	77.74%	🟩
[-75, >=-85)	220480	21.18%	🟨
[-85, >=-95)	11255	1.08%	🟧
[-95, >=Min)	36	0.00%	🟥
Total	1040931	100%	

VoLTE

VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	436652	22%	🟩
[-80, >=-90)	633540	32%	🟨
[-90, >=-110)	884869	45%	🟧
[-110, >=Min)	19868	1%	🟥
Total	1974929	100%	

TSP- BSNL

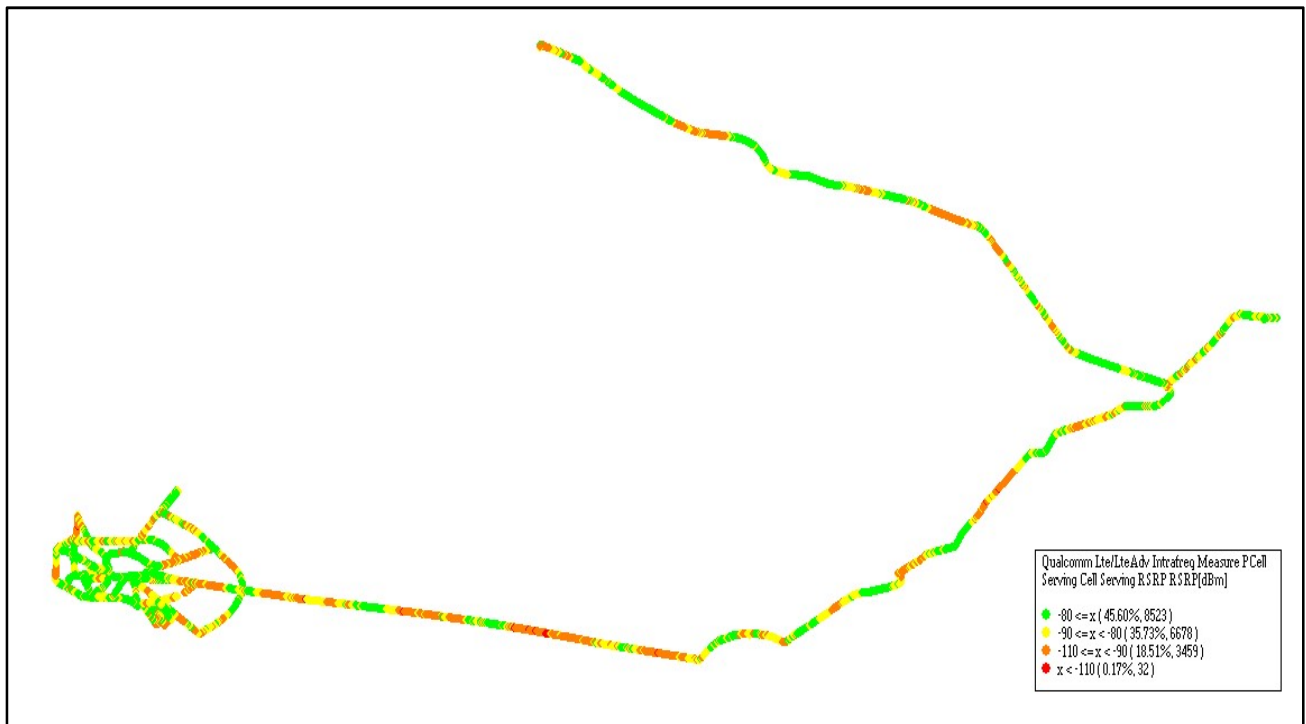| Technology	Coverage %
2G	93.51%
3G	90.85%

2G

3G

2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	10469	68.73	
[-75, >=-85)	3775	24.78	
[-85, >=-95)	959	6.29	
[-95, >=Min)	30	0.20	
Total	15233	100%	

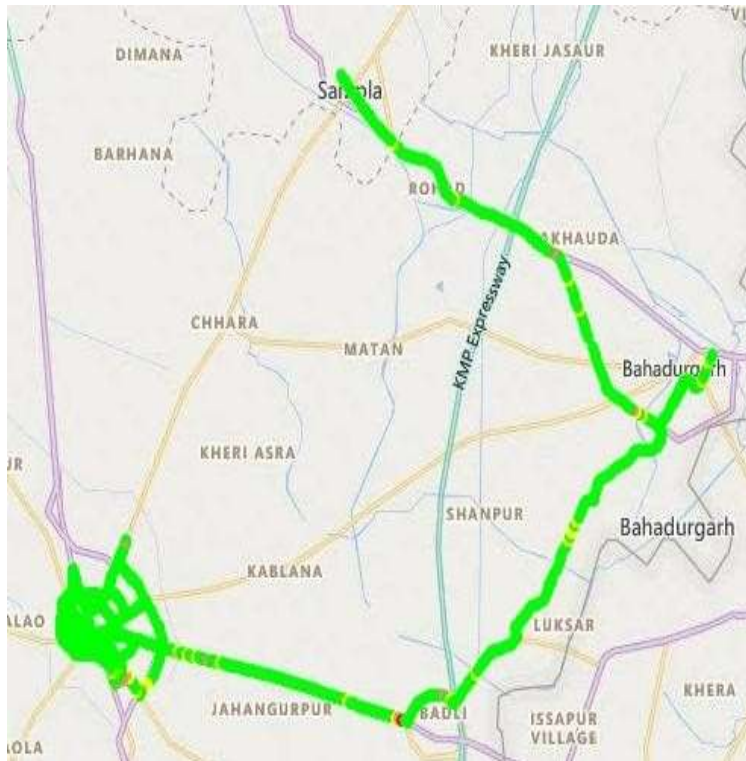| 3G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	1567	15.69	
[-70, >=-80)	3297	33.03	
[-80, >=-90)	4207	42.13	
[-90, >=Min)	914	9.15	
Total	9985	100%	

JIO

Technology	Coverage %
VoLTE	99.83%

Qualcomm Lte/LteAdv Intrafreq Measure PCell
Serving Cell Serving RSRP RSRP[dBm]

- -80 <= x (45.60%, 8523)
- -90 <= x < -80 (35.73%, 6678)
- -110 <= x < -90 (18.51%, 3459)
- x < -110 (0.17%, 32)

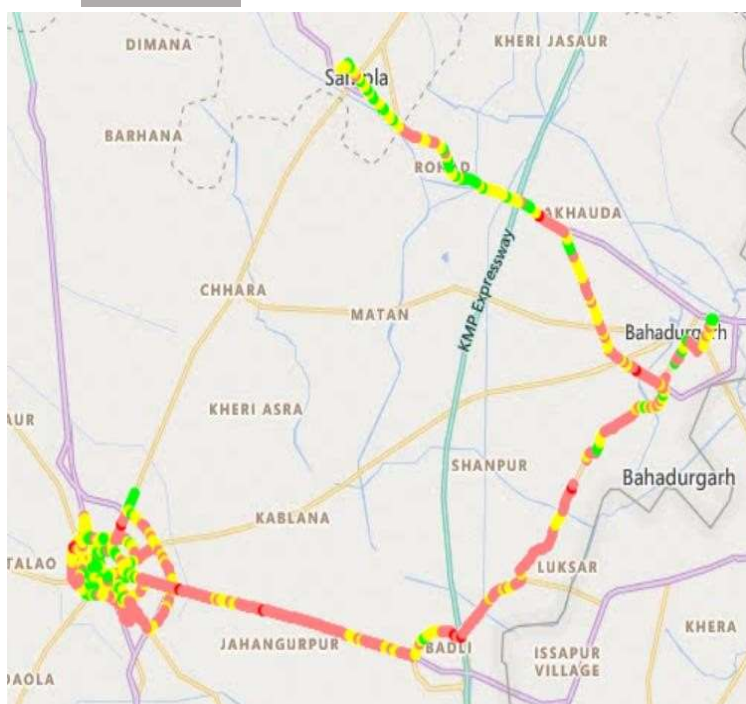| VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	8523	45.60	
[-80, >=-90)	6678	35.73	
[-90, >=-110)	3459	18.51	
[-110, >=Min)	32	.16	
Total	18692	100%	

VIL

Technology	Coverage Rate %
2G	98.15%
VoLTE	98.72%

2G

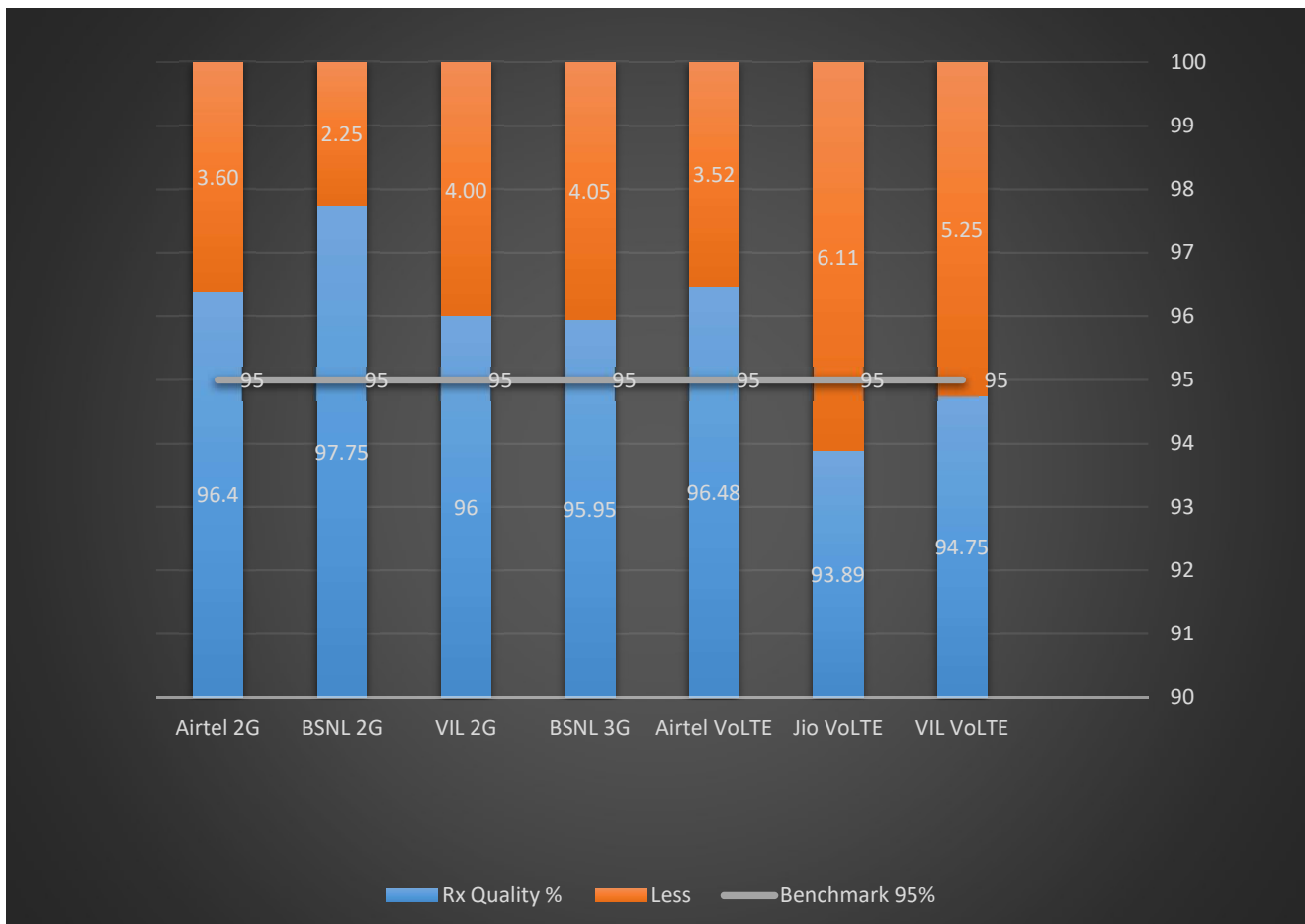| 2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	6924	93.54%	
[-75, >=-85)	341	4.61%	
[-85, >=-95)	108	1.46%	
[-95, >=Min)	29	0.39%	
Total	7402	100%	

VoLTE

VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	1304	18.44%	
[-80, >=-90)	2732	38.64%	
[-90, >=-110)	2944	41.64%	
[-110, >=Min)	90	1.28%	
Total	7070	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%.

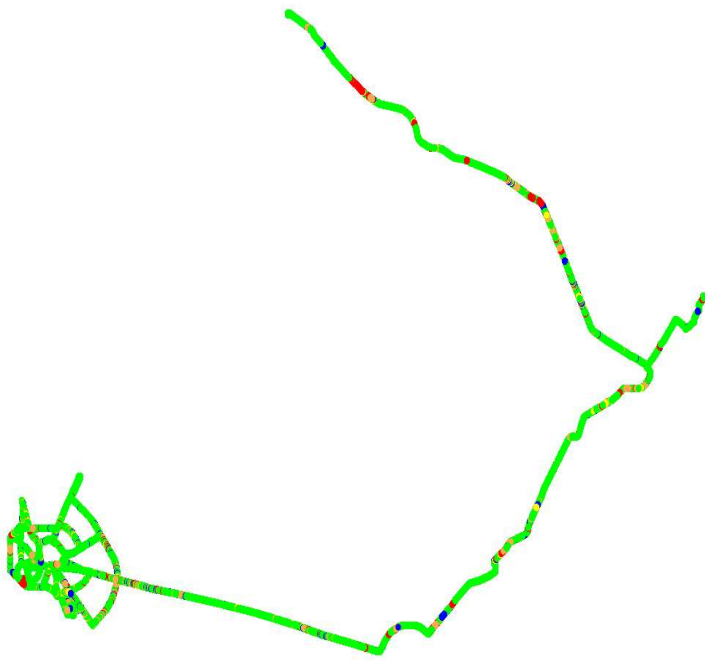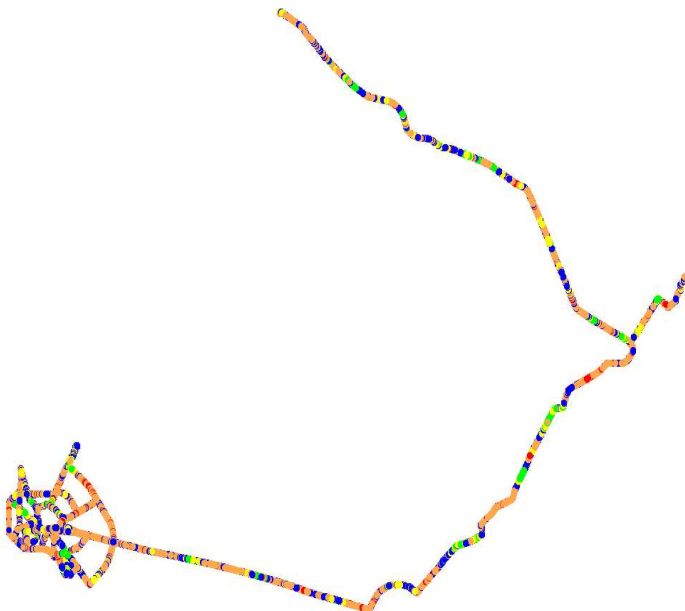| TSP	Rx Quality %
Airtel 2G	96.4%
BSNL 2G	97.75%
VIL 2G	96%
BSNL 3G	95.95%
Airtel VoLTE	96.48%
Jio VoLTE	93.89%
VIL VoLTE	94.75%

Airtel

Technology	Rx Quality %
2G	96.4%
VoLTE	96.48%

2G

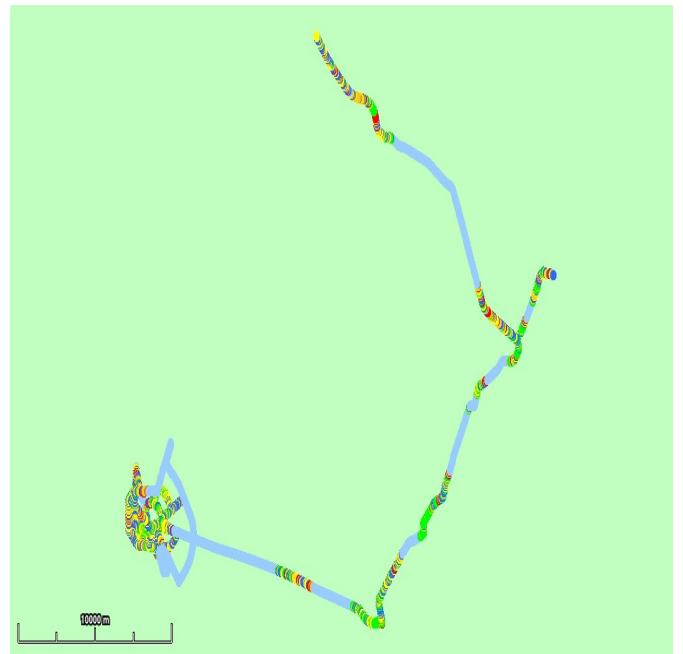| Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	854118	82.1%	
(2, <=3)	38046	3.7%	
(3 , <=4)	46812	4.5%	
(4 , <=5)	64947	6.2%	
(5 , <=Max)	37008	3.6%	
Total	1040931	100%	

VoLTE

Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	69569	3.52%	
(0, <=5)	988557	50.06%	
(5, <=10)	499690	25.30%	
(10, <=15)	263197	13.33%	
(15, <=Max)	153916	7.79%	
Total	1974929	100%	

BSNL

Technology	Rx Quality %
2G	97.75%
3G	95.95%

2G

3G

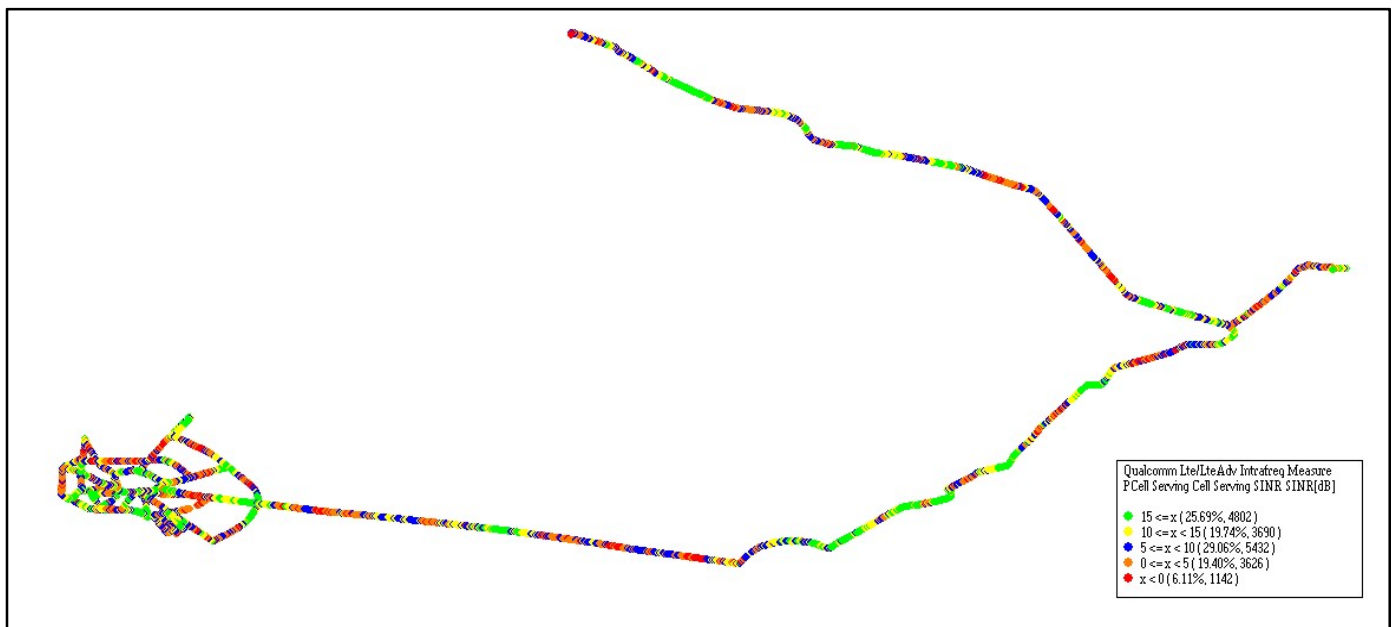| Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	12170	94.12%	
(2, <=3)	173	1.34%	
(3 , <=4)	155	1.20%	
(4 , <=5)	142	1.10%	
(5 , <=Max)	291	2.24%	
Total	12931	100%	

Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	2260	22.66%	
(-6, <=-9)	2773	27.79%	
(-9, <=-11)	3079	30.86%	
(-11, <=-14)	1461	14.64%	
(-14, <= Min)	404	4.05%	
Total	9977	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

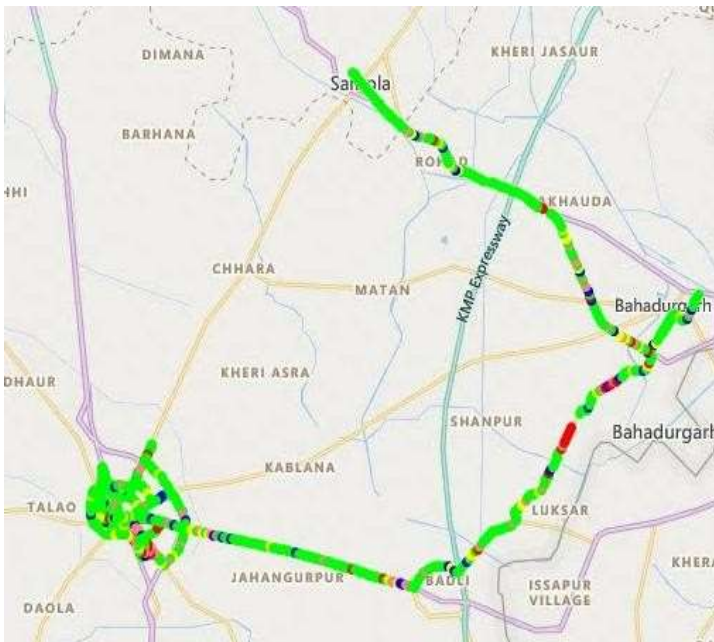| Technology	Rx Quality %
VoLTE	**93.89%**

Qualcomm Lte/LteAdv Intrafreq Measure
PCell Serving Cell Serving SINR SINR[dB]

- 15 <= x (25.69%, 4802)
- 10 <= x < 15 (19.74%, 3690)
- 5 <= x < 10 (29.06%, 5432)
- 0 <= x < 5 (19.40%, 3626)
- x < 0 (6.11%, 1142)

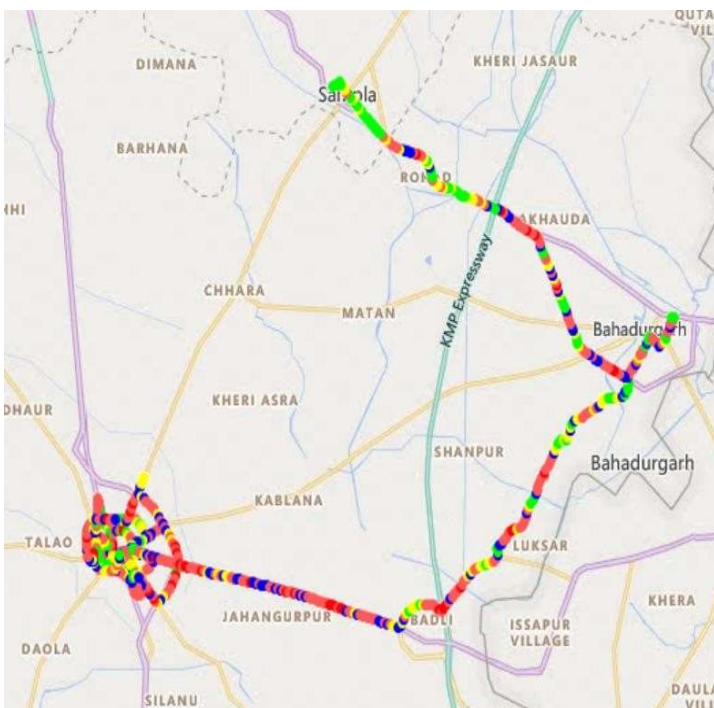| Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1142	6.11%	
(0, <=5)	3626	19.40%	
(5, <=10)	5432	29.06%	
(10, <=15)	3690	19.74%	
(15, <=Max)	4802	25.69%	
Total	18692	100%	

VIL

Technology	Rx Quality %
2G	96%
4G	**94.75%**

2G

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	5248	77.8%	
(2, <=3)	444	6.6%	
(3 , <=4)	382	5.7%	
(4 , <=5)	400	5.9%	
(5 , <=Max)	270	4.0%	
Total	6744	100%	

VoLTE

Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	375	5.25%	
(0, <=5)	2642	37.00%	
(5, <=10)	1537	21.52%	
(10, <=15)	1326	18.57%	
(15, <=Max)	1261	17.66%	
Total	7141	100%	

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	64.85%
Airtel VoLTE	100%
Jio VoLTE	100%
VIL VoLTE	100%

Time Spent On 3G/4G

TSP	Value
BSNL 3G	35.15% / 64.85%
Airtel VoLTE	0.00% / 100%
Jio VoLTE	0.00% / 100%
VIL VoLTE	0.00% / 100%

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