Operator Assisted Drive Test Report

Amreli City & Nearby area Gujarat LSA
23nd to 24th January. 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 Amreli City and surrounding areas of Gujarat LSA from 9:00 AM to 8:00 PM during 23nd to 24th January 2024. The drive test covered drive route of 144 KMs & 5 no hotspots over a period of 3 days. Approx 180 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 23rd Jan 2024 to 24th Jan 2024 covering Amreli 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 144 KMs. Approximately 180 calls were made for each of the TSPs 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 144 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- 6 hotspots

1. Dr. Jivraj N Mehta Govt Polytecnic
2. Railway Station
3. Bus Station
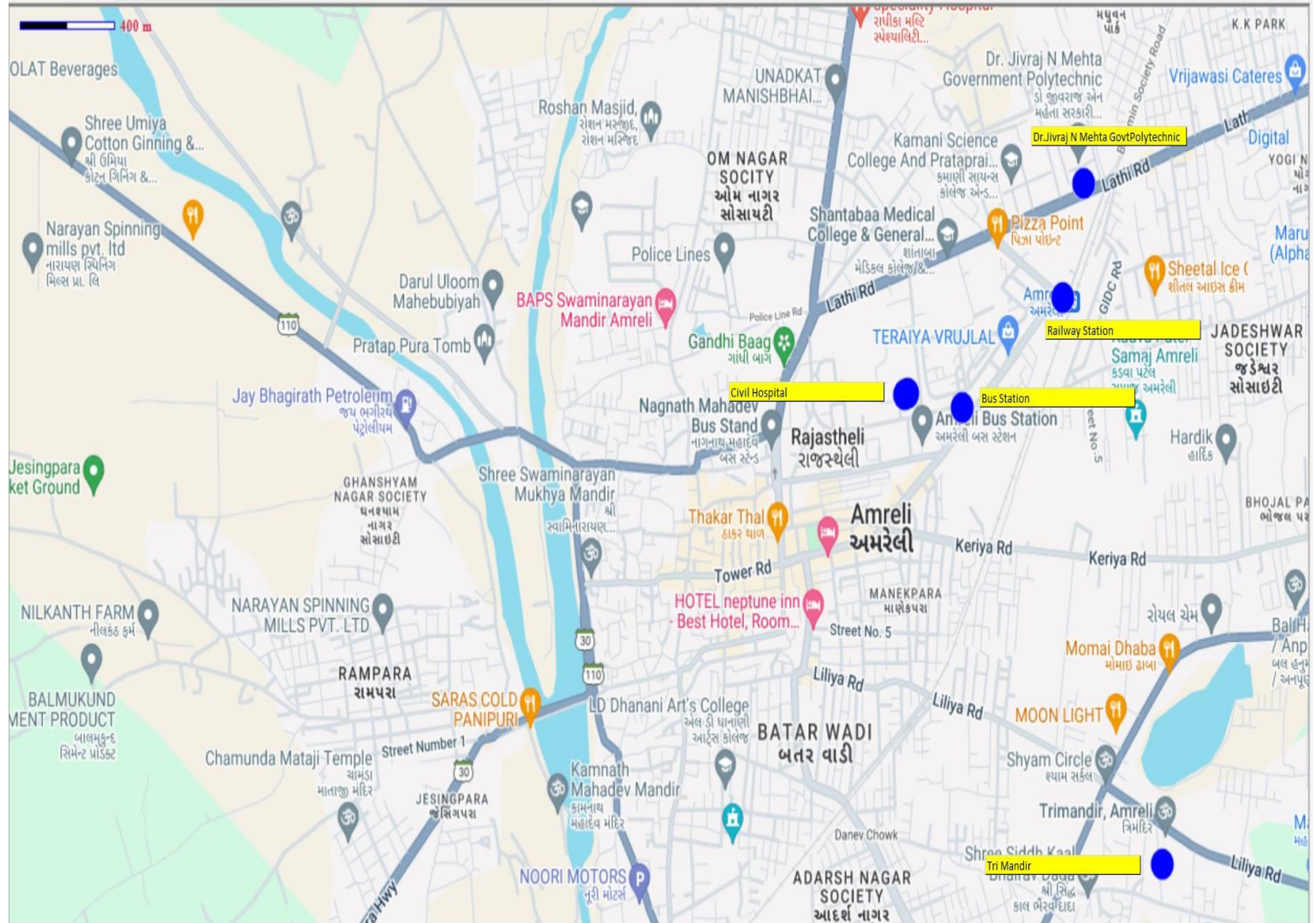4. Civil Hospital
5. Tri Mandir

| 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
23−01−2024	2G/3G/4G Voice and 3G/4G Dynamic Data	**Starting Point : Chatrapati Shivaji Maharaj Chowk at 9:00AM :** Jesingpara,Rampara,Ghanshyamnagar,Society,Haveli chawk, Gajerapara,Batarwadi,Sardar nagar,Adarsh nagar society, Sadguru Vatika,Pragatinagar,Jadeshwar Society, Amreli-Lathi Highway,Amreli-Bagsara Highway
24−01−2024	Hot Spots- 2G/3G/4G Static Data Tests	**Hotspot Location :** 1. **Dr. Jivraj N Mehta Govt Polytecnic** 2. **Railway Station** 3. **Bus station** 4. **Civil Hospital** 5. **Tri Mandir**

Data Service Test- Static Locations

Hotspot Locations
1.Dr.Jivraj N Mehta Govt Polytecnic
2.Railway Station
3.Busstation
4.Civil Hospital
5.Tri Mandir

Voice Calls

QoS compliance of the TSPs in **Amreli City & Nearby area**
for Voice across technologies 2G/3G/4G-VoLTE:
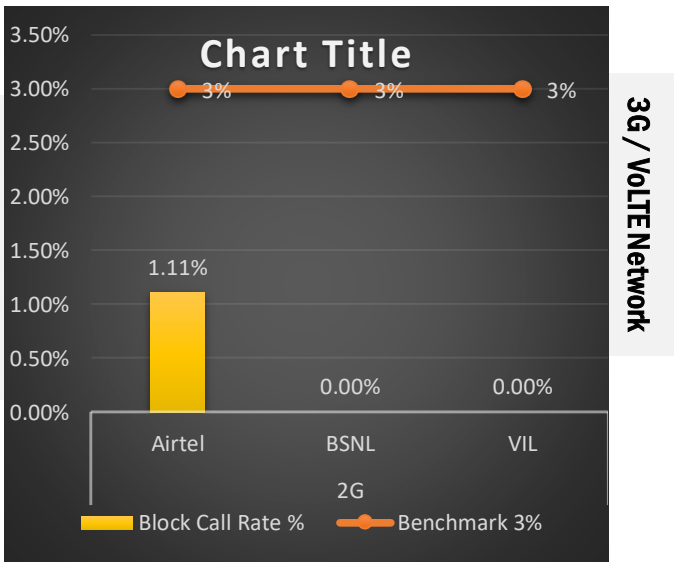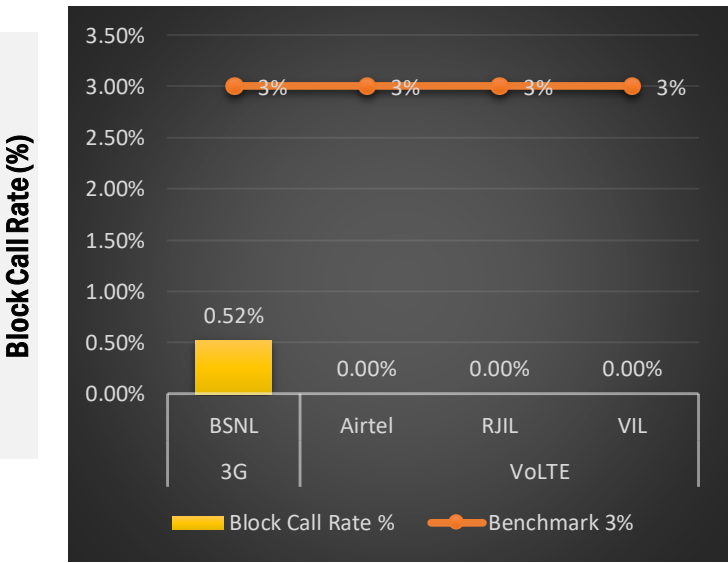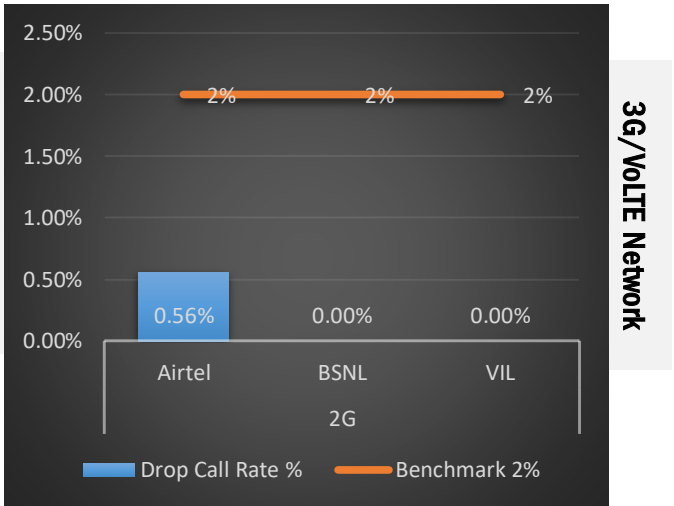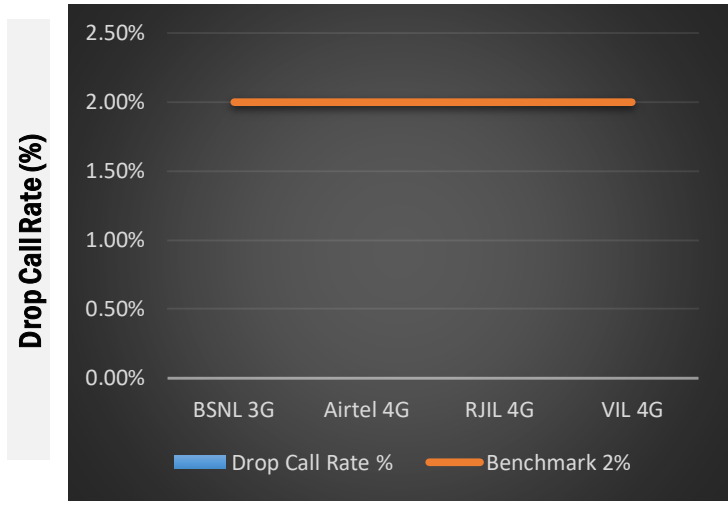
KPIs	2G			3G	4G		
	Airtel	**BSNL**	**VIL**	**BSNL**	**Airtel**	**RJIL**	**VIL**
Drop Call Rate %	0.56%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Block Call Rate %	1.11%	0.00%	0.00%	0.52%	0.00%	0.00%	0.00%

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 %	91.1%	86.16%	99.88%

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

TSPs	3G
	BSNL
Coverage %	97.9%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	94.59%	99.81%	99.36%

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

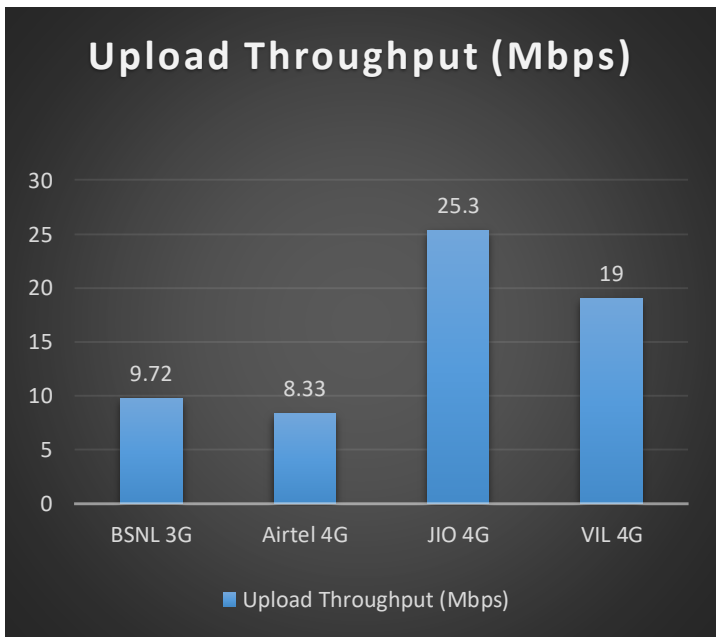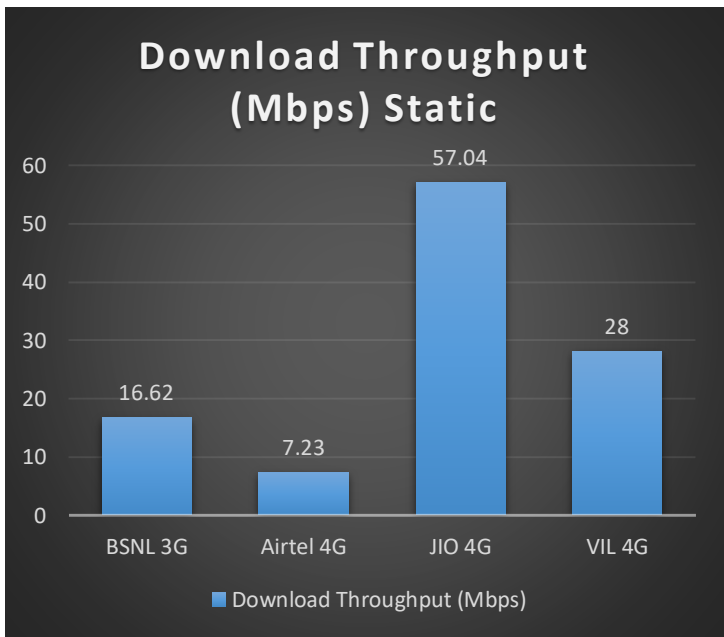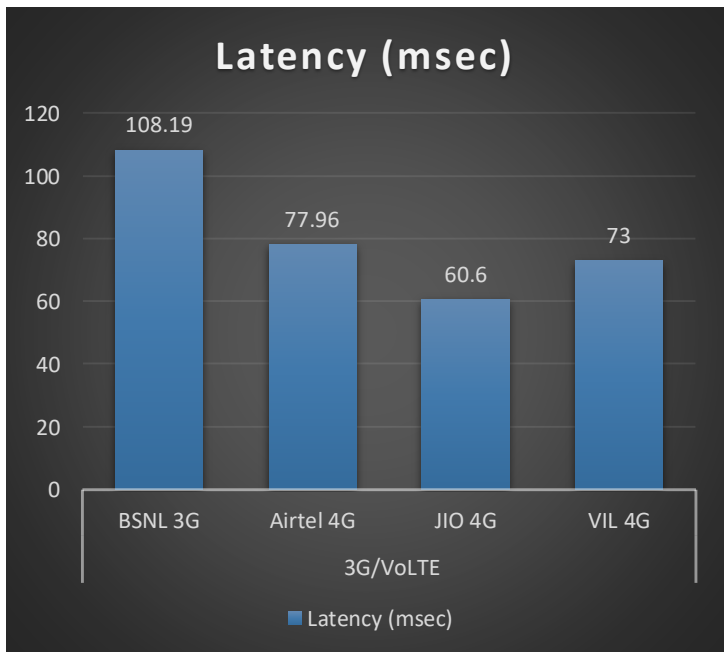| TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	73.77%	99.67%	100%	100%

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	16.62
Airtel 4G	7.23
JIO 4G	57.04
VIL 4G	28

Upload Throughput (Mbps)

Network	Upload Throughput (Mbps)
BSNL 3G	9.72
Airtel 4G	8.33
JIO 4G	25.3
VIL 4G	19

Latency (ms)

Latency (msec) — 3G/VoLTE

Network	Latency (msec)
BSNL 3G	108.19
Airtel 4G	77.96
JIO 4G	60.6
VIL 4G	73

Web Browsing (Sec)

Web Browsing Delay (sec)

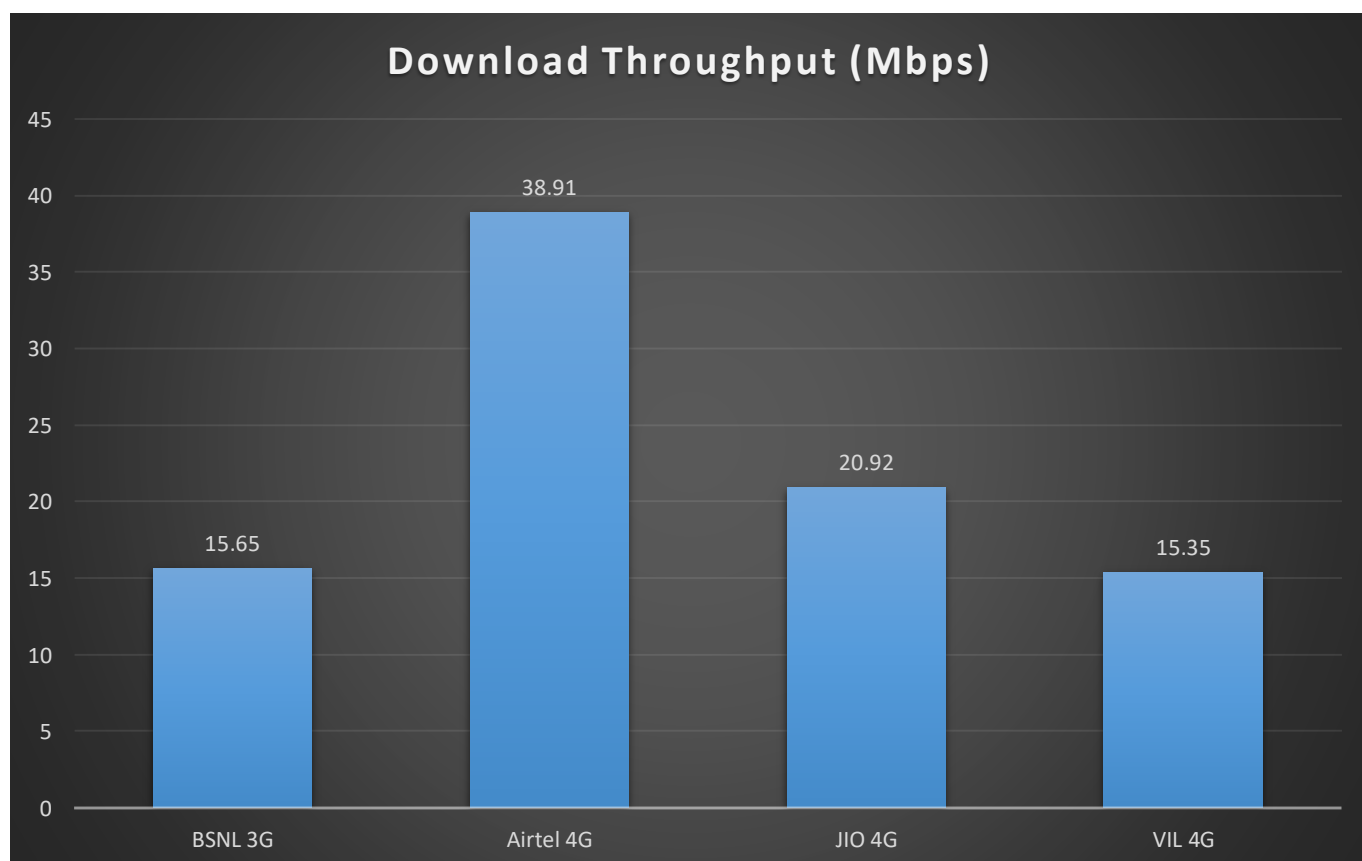| Network	Web Browsing Delay (sec)
BSNL 3G	2.81
Airtel 4G	6.69
JIO 4G	1.3
VIL 4G	4
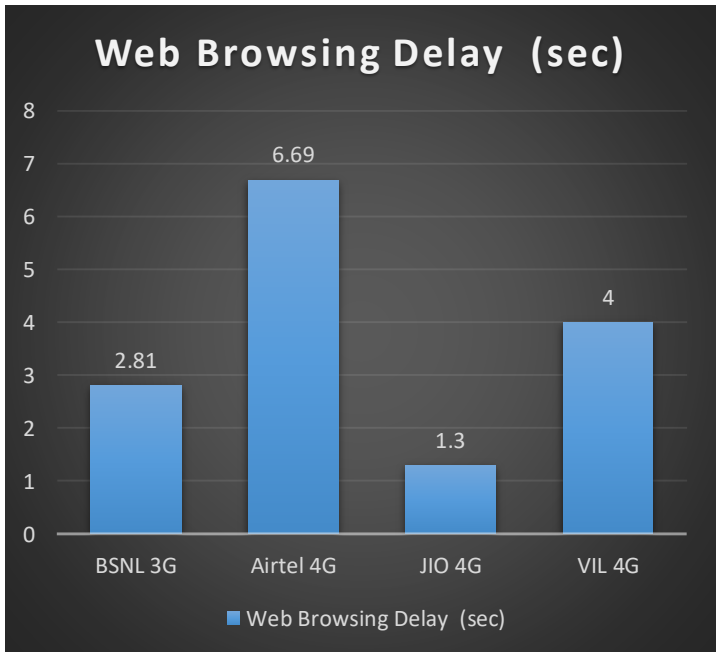
Data Services Dynamic

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)	15.65	38.91	20.92	15.35

Download Throughput (Mbps)

Summary

Voice Call	2G		
	Airtel	**BSNL**	**VIL**
Call Attempt	180	192	168
Blocked Call Rate (%)	1.11	0	0
CSSR% (Accessibility)	98.89	100	100
Drop Call Rate (%)	0.56	0	0
Mobility HOSR (%)	97.69	100	99.35
Rx Quality (%)	95.58	98.67	98.14
Average CST Sec	3.15	2.38	2.43

Voice Call	3G/VoLTE			
	BSNL 3G	**Airtel VoLTE**	**JIO VoLTE**	**VIL VoLTE**
Call Attempt	191	188	183	175
Blocked Call Rate (%)	0.52	0	0	0
CSSR% (Accessibility)	99.48	100	100	100
Drop Call Rate (%)	0	0	0	0
Mobility HOSR (%)	99.58	95.92	99.68	99.68
Rx Quality (%)	95.9	89.43	92.6	89.41
Average CST Sec	2.87	1.05	0.58	0.32

Summary

Data Services Static	2G		
	Airtel	**BSNL**	**VIL**
Download Throughput (kbps)	202.4	149.6	206
Upload Throughput (kbps)	96.32	77.09	120
Web Browsing Delay (sec)	26.75	14.76	39
Latency (msec)	254.3	197.79	191

Data Services Static	3G / 4G			
	BSNL 3G	**Airtel 4G**	**JIO 4G**	**VIL 4G**
Download Throughput (Mbps)	16.62	7.23	57.04	28
Upload Throughput(Mbps)	9.72	8.33	25.3	19
Video Streaming Delay (sec)	2.02	0	0.38	0.08
Web Browsing Delay (sec)	2.81	6.69	1.3	4
Latency (msec)	108.19	77.96	60.6	73

Dr Jivaraj Mehta Govt polytechnic	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	237.04	141	217
Upload Throughput (kbps)	120.94	77.27	82
Web Browsing Delay (sec)	25.77	15.31	34
Latency (msec)	191.44	171.33	180

Amreli Railway station	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	150.24	157.48	223
Upload Throughput (kbps)	107.36	76.37	134
Web Browsing Delay (sec)	27.54	15.24	43
Latency (msec)	252.45	196.33	202

Amreli Bus station	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	197.24	161.8	252
Upload Throughput (kbps)	89.56	82.14	145
Web Browsing Delay (sec)	27.41	14.15	39.95
Latency (msec)	234.47	197.33	171

Civil Hospital	2G		
	Airtel	**BSNL**	**VIL**
Download Throughput (kbps)	176.5	132.8	225
Upload Throughput (kbps)	46.77	77.06	129
Web Browsing Delay (sec)	27.34	15.29	32
Latency (msec)	364.28	211.66	180

Tri Mandir -	2G		
	Airtel	**BSNL**	**VIL**
Download Throughput (kbps)	250.98	154.92	159
Upload Throughput (kbps)	116.95	71.63	96
Web Browsing Delay (sec)	25.68	13.49	46
Latency (msec)	228.88	212.33	273

Dr Jivaraj Mehta Govt polytechnic	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	20.15	10.6	54.64	28
Upload Throughput (mbps)	10.74	16.58	32.84	14
Video Streaming Delay (Secs.)	1.92	0	0.57	0.08
Web Browsing Delay (sec)	2.15	12.23	1.24	3.42
Latency (msec)	118	61.53	61	74

Amreli Railway station	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	18.98	11.55	120	10
Upload Throughput (mbps)	10.95	14.69	9.26	19
Video Streaming Delay (Secs.)	1.83	0	0.37	0.08
Web Browsing Delay (sec)	2.15	5.21	1.32	4.86
Latency (msec)	121.33	88.97	58	74

Amreli Bus station	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	12.7	4.99	79.17	44
Upload Throughput (mbps)	8.58	1.98	23.81	30
Video Streaming Delay (Secs.)	2.43	0	0.32	0.08
Web Browsing Delay (sec)	2.87	5.95	1.36	3.39
Latency (msec)	96.66	94.34	54	70

Data Services static

Civil Hospital	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	20.79	4.15	39.72	24
Upload Throughput (mbps)	11.92	7.36	27.77	12
Video Streaming Delay (Secs.)	2.19	0	0.3	0.07
Web Browsing Delay (sec)	4.17	5.18	1.14	3.9
Latency (msec)	93.66	70.2	69	69

Tri Mandir	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	10.5	4.86	54.65	32
Upload Throughput (mbps)	6.41	1.06	32.85	12
Video Streaming Delay (Secs.)	1.75	0	0.35	0.08
Web Browsing Delay (sec)	2.73	4.9	1.42	4
Latency (msec)	111.33	74.77	61	66.1

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.
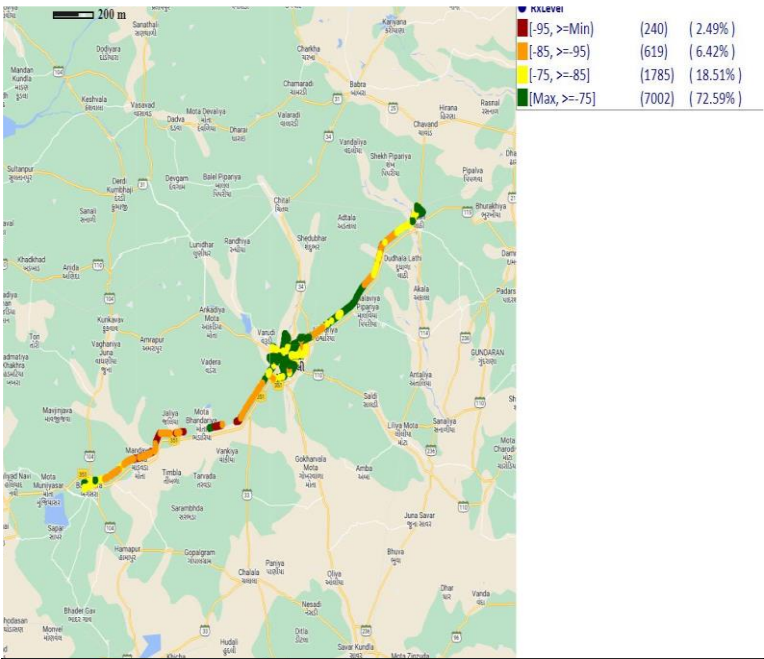
TSP	Coverage Rate %
Airtel 2G	91.1%
BSNL 2G	86.16%
VIL 2G	99.88%
BSNL 3G	97.9%
Airtel VoLTE	94.59%
Jio VoLTE	99.81%
VIL VoLTE	99.36%
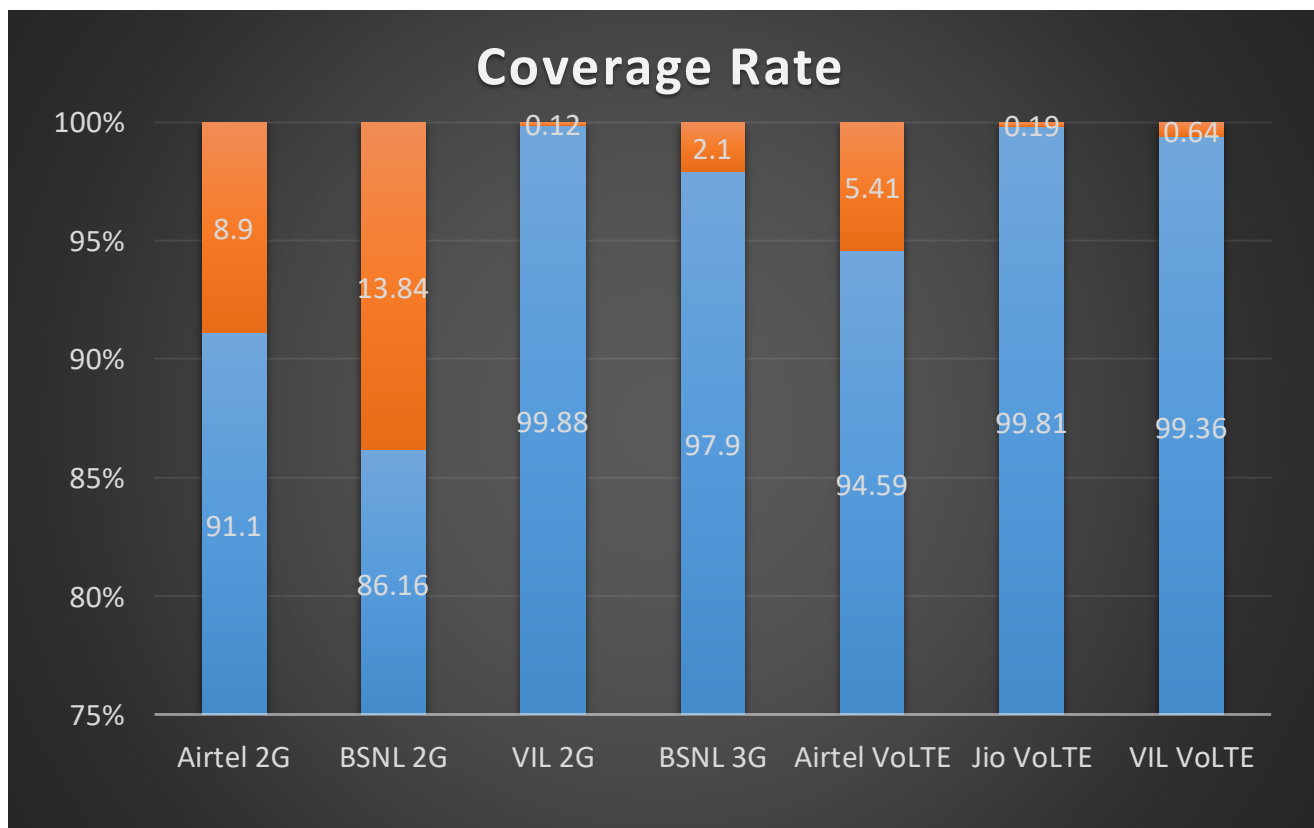
TSP-AIRTEL

Technology	Coverage %
2G	91.1%
VoLTE	94.59%

2G

2G			
Overall RxLevel	# Samples	% PDFs	Legends
[Max, >=-75]	7002	72.59	🟩
[-75, >=-85)	1785	18.51	🟨
[-85, >=-95)	619	6.42	🟧
[-95, >=Min)	240	2.49	🟥
Total	9646	100.00	

VoLTE
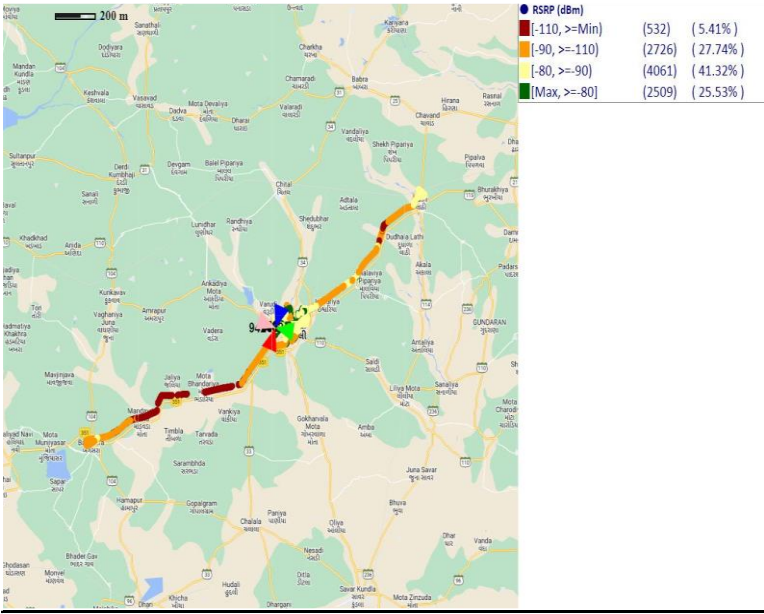
VoLTE /			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	2509	25.53	🟩
[-80, >=-90)	4061	41.32	🟨
[-90, >=-110)	2726	27.74	🟧
[-110, >=Min)	532	5.41	🟥
Total	9828	100.00	

TSP- BSNL

Technology	Coverage %
2G	86.16%
3G	97.90%

2G

3G
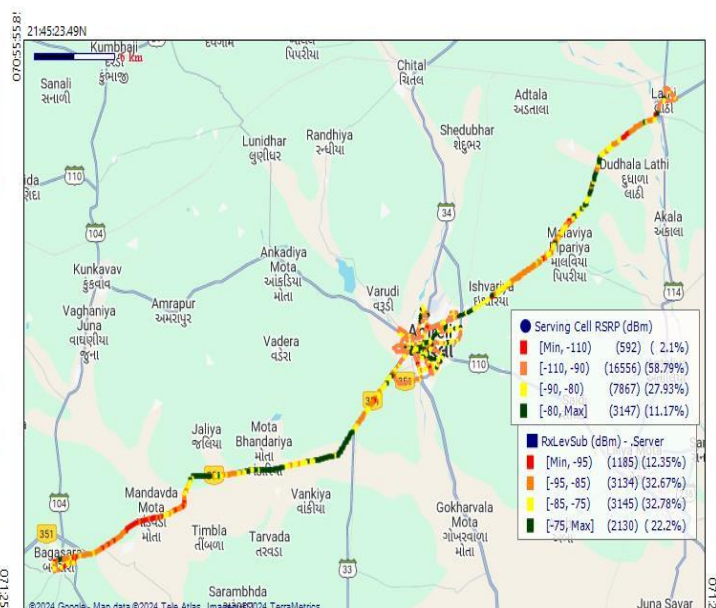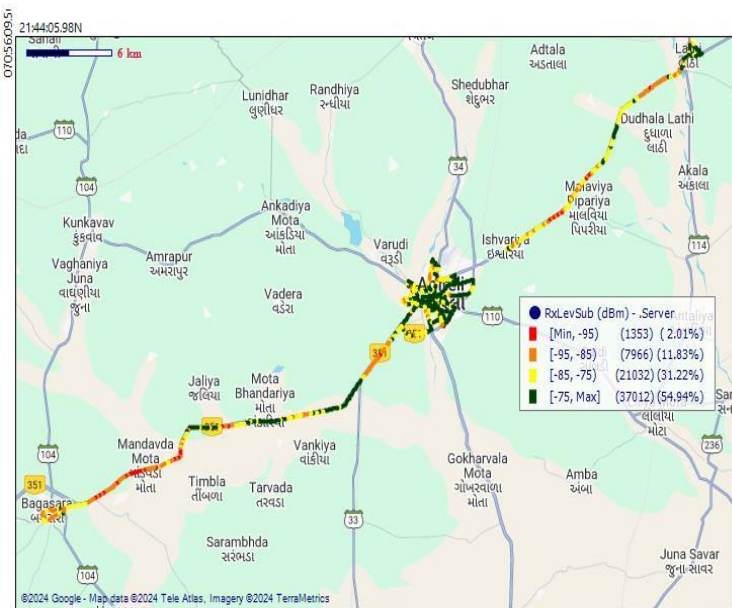
2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	37012	54.94%	
[-75, >=-85)	21032	31.22%	
[-85, >=-95)	7966	11.83%	
[-95, >=Min)	1353	2.01%	
Total	67363	100%	

3G			
Overall RSCP	**# Samples**	**% PDF**	**Legends**
[Max, >=-70]	3147	11.47%	
[-70, >=-80)	7867	27.93%	
[-80, >=-90)	16556	58.79%	
[-90, >=Min)	592	2.1%	
Total	28162	100%	

JIO	
Technology	**Coverage %**
VoLTE	**99.81%**

LTE KPI PCell Serving RSRP[dBm]

● -80 <= x (51.58%, 10274)
● -90 <= x < -80 (29.56%, 5889)
● -110 <= x < -90 (18.67%, 3719)
● x < -110 (0.19%, 38)
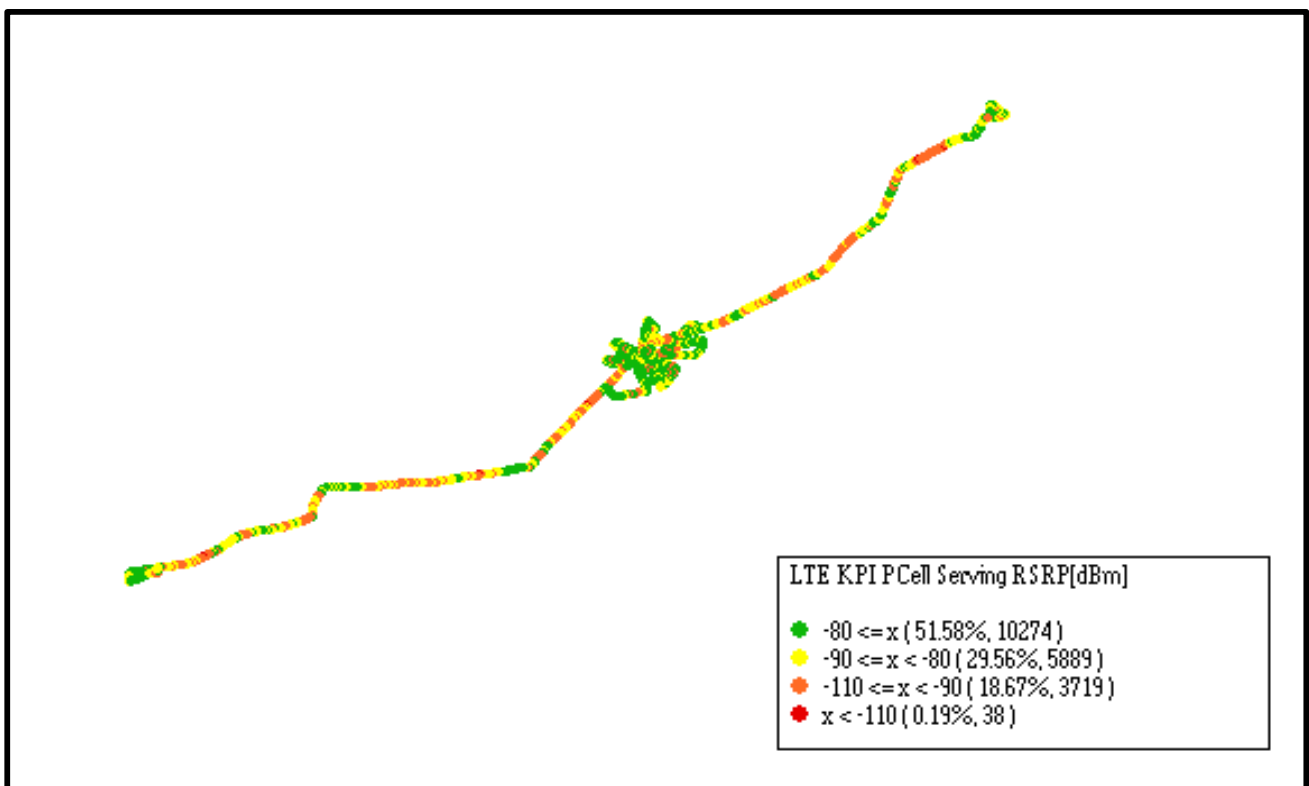
VoLTE /			
Overall RSRP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	10274	51.58%	
[-80, >=-90)	5889	29.56%	
[-90, >=-110)	3719	18.67%	
[-110, >=Min)	38	0.19%	
Total	**19920**	**100%**	

VIL

Technology	Coverage Rate %
2G	99.88%
VoLTE	99.36%

2G
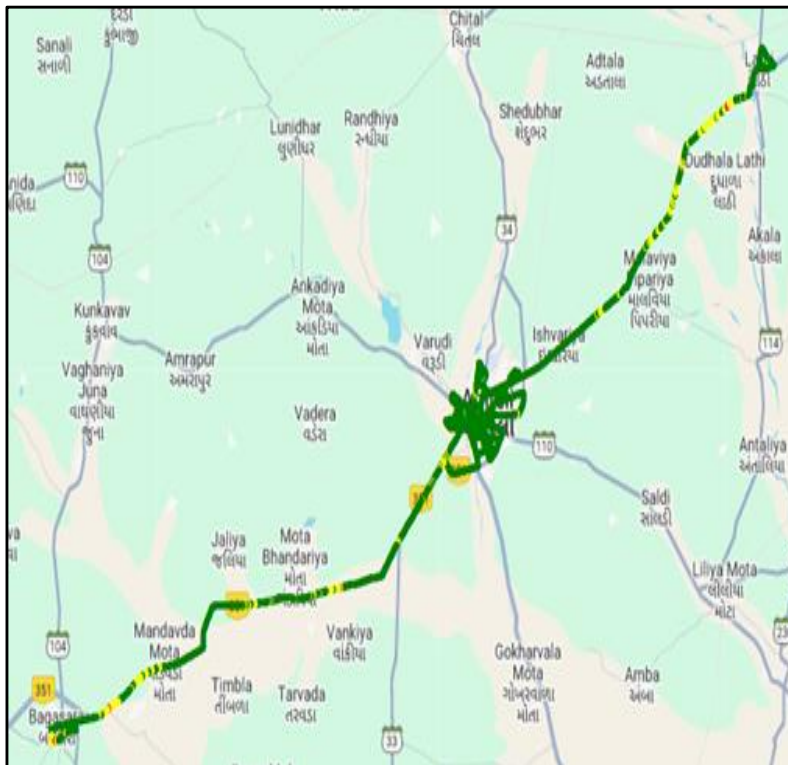
2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	20502	95.53%	
[-75, >=-85)	934	4.35%	
[-85, >=-95)	24	0.11%	
[-95, >=Min)	2	0.01%	
Total	21462	100%	

VoLTE
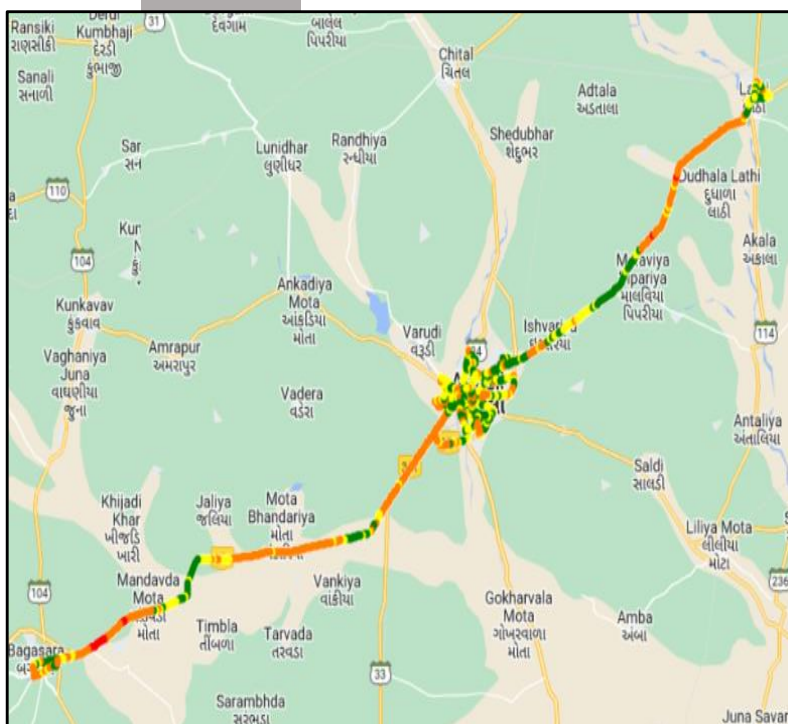
VoLTE /			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	3827	39.91%	
[-80, >=-90)	3236	33.75%	
[-90, >=-110)	2464	25.7%	
[-110, >=Min)	62	0.64%	
Total	9589	100%	

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%.
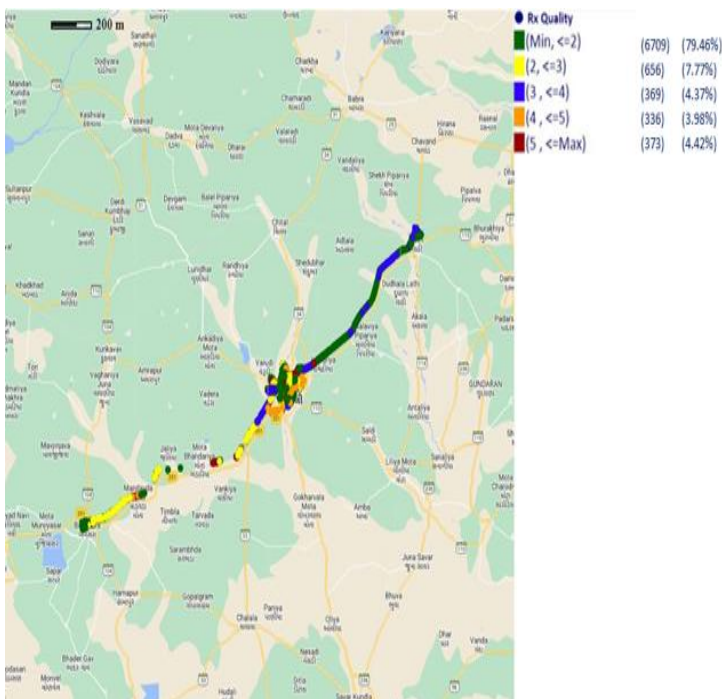
TSP	Rx Quality %
Airtel 2G	**95.58%**
BSNL 2G	**98.67%**
VIL 2G	**98.14%**
BSNL 3G	**95.9%**
Airtel VoLTE	**89.43%**
Jio VoLTE	**92.6%**
VIL VoLTE	**89.41%**
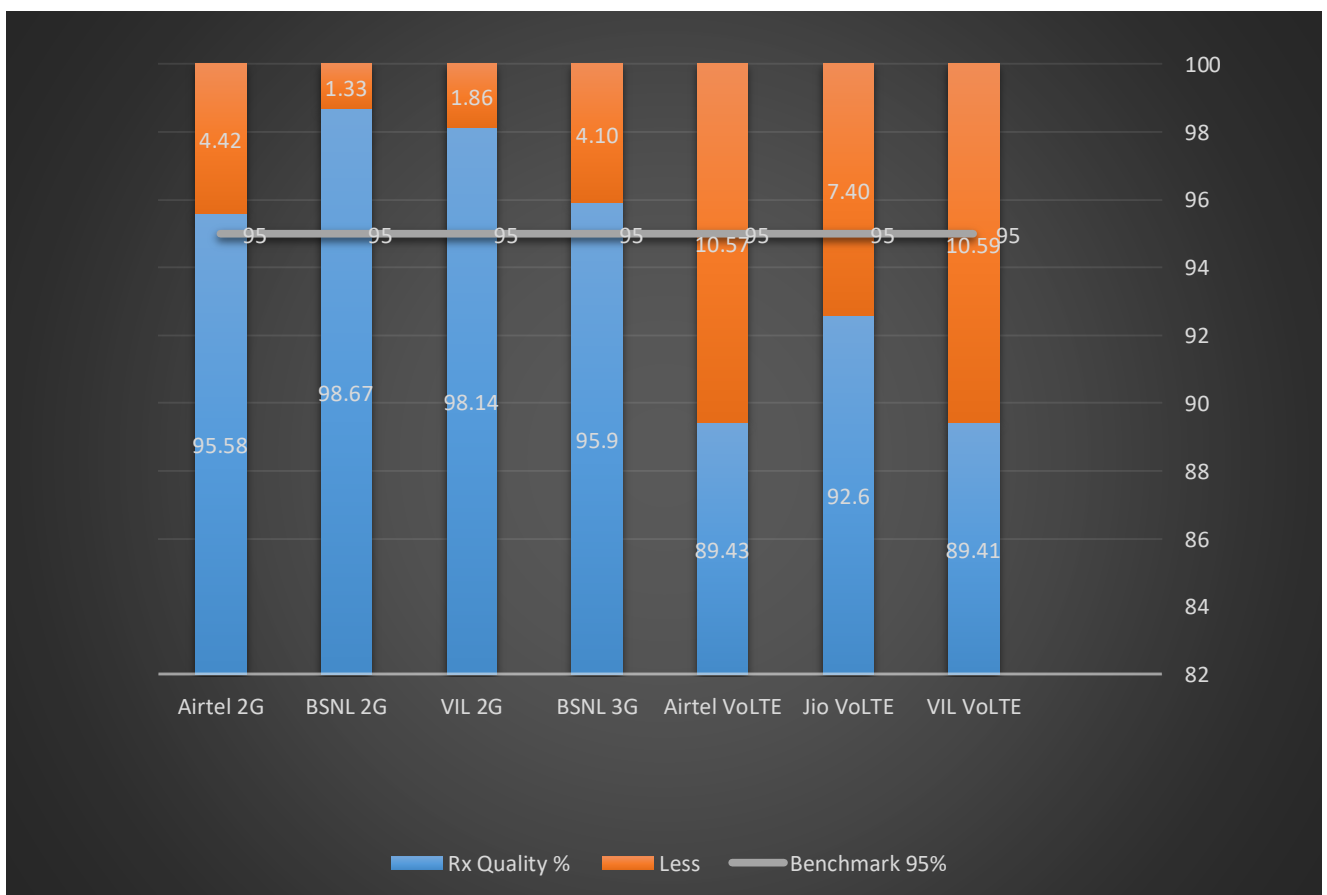
Airtel

Technology	Rx Quality %
2G	**95.58%**
VoLTE	**89.43%**

2G

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	6709	79.46%	
(2, <=3)	656	7.77%	
(3 , <=4)	369	4.37%	
(4 , <=5)	336	3.98%	
(5 , <=Max)	373	4.42%	
Total	8443	100.00	

VoLTE
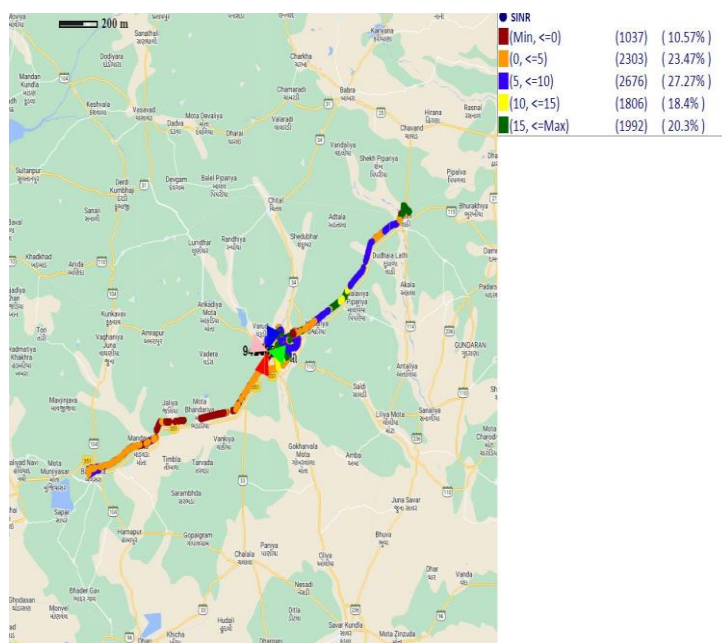
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1037	10.57%	
(0, <=5)	2303	23.46%	
(5, <=10)	2676	27.27%	
(10, <=15)	1806	18.4%	
(15, <=Max)	1992	20.3%	
Total	9814	100.00	

BSNL

Technology	Rx Quality %
2G	98.67%
3G	95.90%

2G

3G
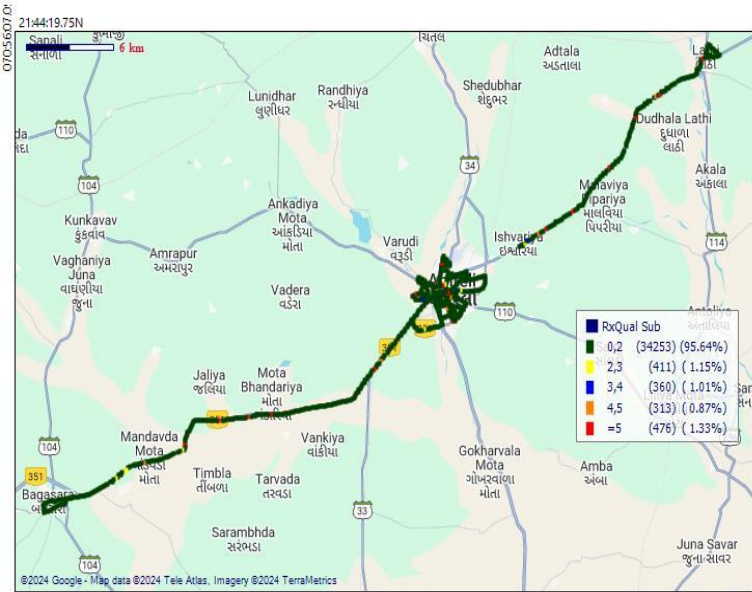
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	34253	95.64%	
(2, <=3)	411	1.15%	
(3 , <=4)	360	1.01%	
(4 , <=5)	313	0.87%	
(5 , <=Max)	476	1.33%	
Total	35813	100%	

Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	1149	4.1%	
(-6, <=-9)	8723	31.12%	
(-9, <=-11)	7193	25.66%	
(-11, <=-14)	5520	19.69%	
(-14, <= Min)	5446	19.43%	
Total	28031	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%.
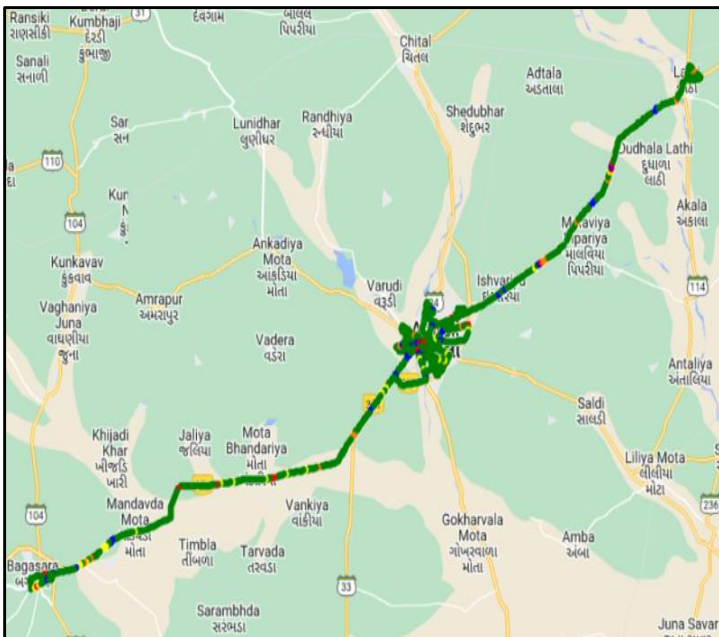
JIO

Technology	Rx Quality %
VoLTE	92.6%

LTE KPI PCell SINR[dB]

● 15 <= x (25.89%, 5157)
● 10 <= x < 15 (22.72%, 4526)
● 5 <= x < 10 (26.50%, 5279)
● 0 <= x < 5 (17.49%, 3484)
● x < 0 (7.40%, 1474)
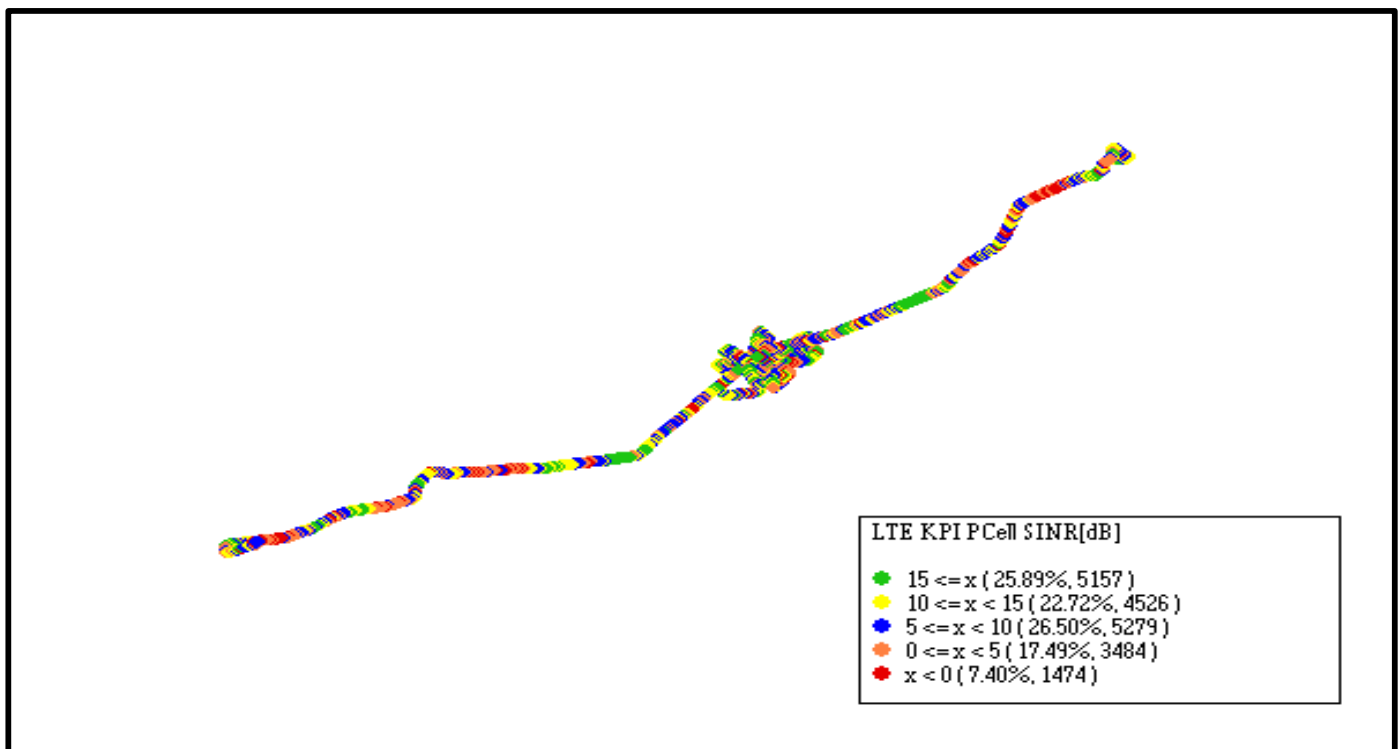
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1474	7.40%	
(0, <=5)	3484	17.49%	
(5, <=10)	5279	26.50%	
(10, <=15)	4526	22.72%	
(15, <=Max)	5157	25.89%	
Total	19920	100%	

VIL

Technology	Rx Quality %
2G	98.14%
4G	89.41%

2G

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	7150	87.31%	
(2, <=3)	397	4.85%	
(3 , <=4)	368	4.49%	
(4 , <=5)	122	1.49%	
(5 , <=Max)	152	1.86%	
Total	8189	100%	

VoLTE
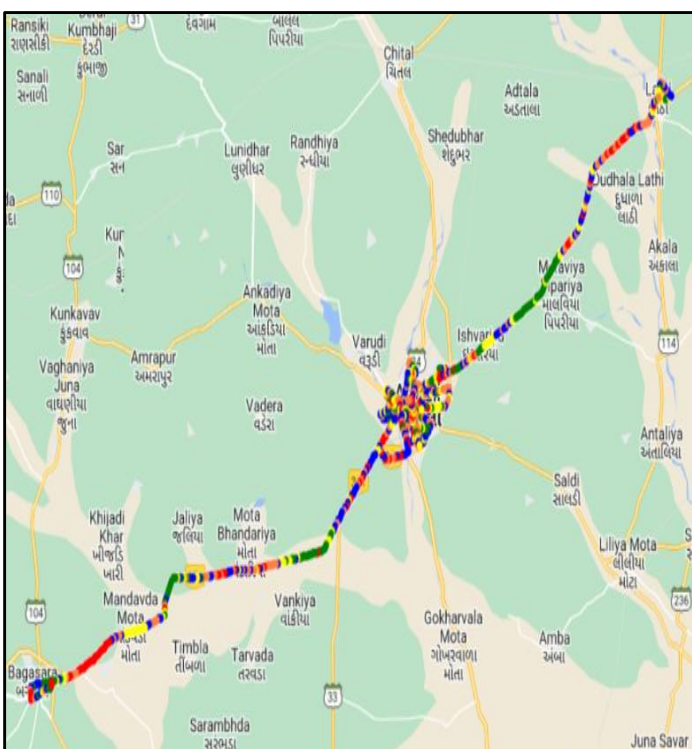
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1015	10.59%	
(0, <=5)	2276	23.76%	
(5, <=10)	2631	27.46%	
(10, <=15)	2021	21.1%	
(15, <=Max)	1637	17.09%	
Total	9580	100%	

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	73.77%
Airtel VoLTE	99.67%
Jio VoLTE	100.00%
VIL VoLTE	100.00%

Time Spent On 3G/4G

	BSNL 3G	Airtel VoLTE	Jio VoLTE	VIL VoLTE
% Time Spend on 2G	26.23%	0.33%	0.00%	0.00%
% of Time Spent on 3G/VoLTE	73.77%	99.67%	100.00%	100.00%

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