Operator Assisted Drive Test Report

Junagadh City
3rd to 4th Dec'24
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 Junagadh City and surrounding areas from 9:00 AM to 8:00 PM during 3rd to 4th Dec 2024. The drive test covered drive route of 140 KMs & 5 no hotspots over a period of 2 days. Approximately 270 calls were made for each of the networks: three 2G networks, four 4G/5G networks covering four TSPs.

Overview

Voice Summary

Data Summary

Overview

Regional Office, TRAI Jaipur conducted Operator Assisted Drive Test from 3rd Dec 2024 & 4th Dec 2024 covering Junagadh 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 140 KMs. Approximately 270 calls were made for each of the 2G/4G networks: 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 140 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 hotspots

1	Bahuddin college
2	bus stand
3	Gandhi chowk
4	Railway station
5	Gmrs Hospital

| 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

Voice & Dynamic Data Test Drive Route
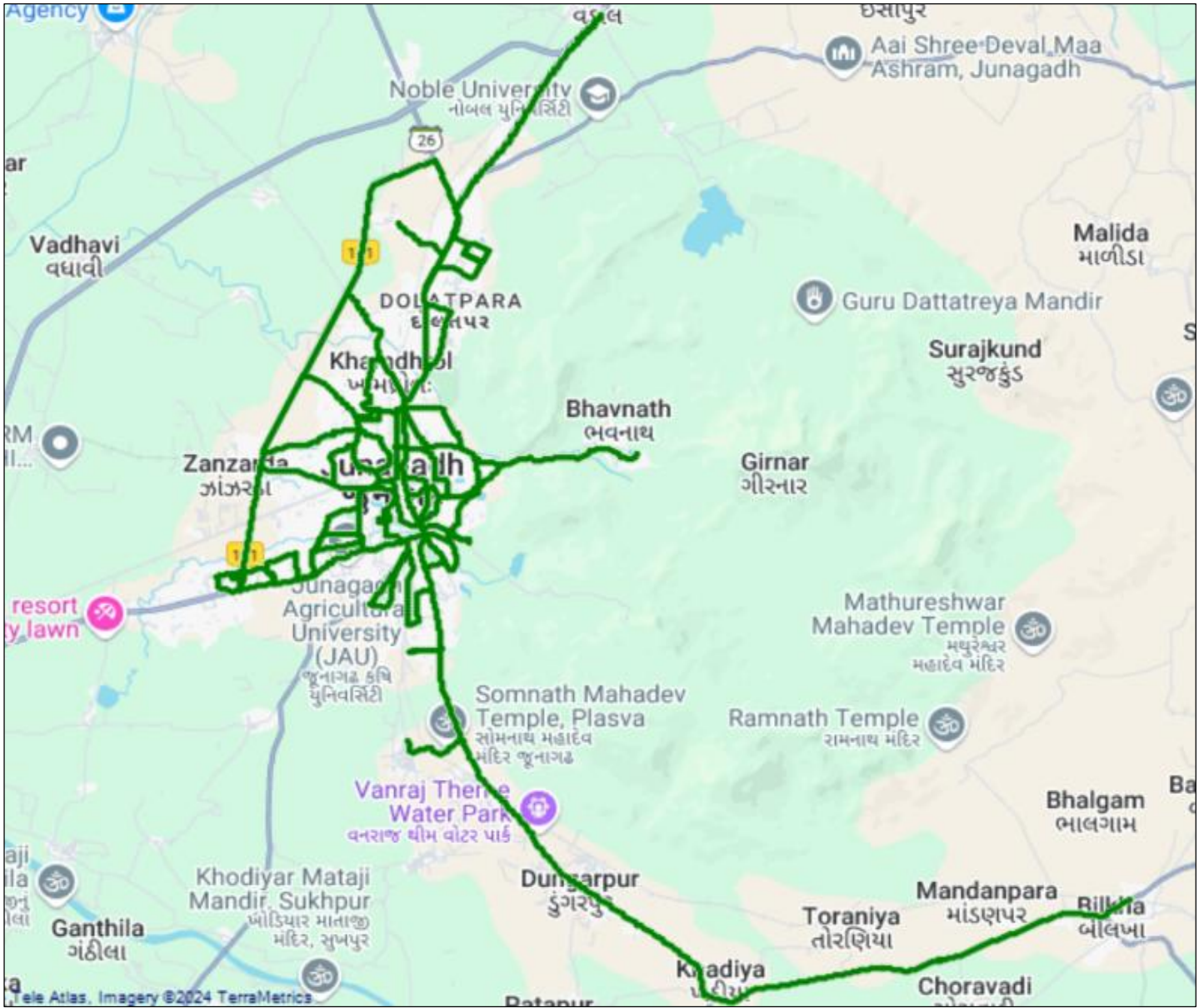
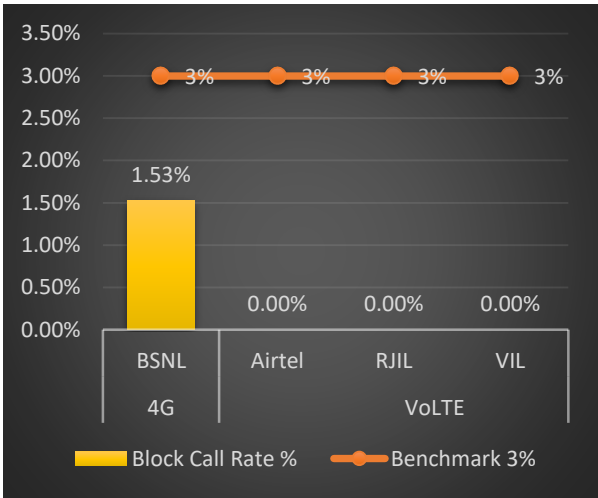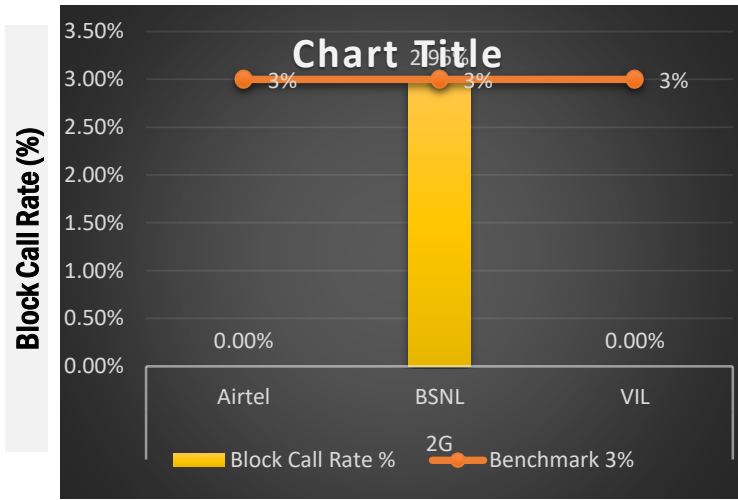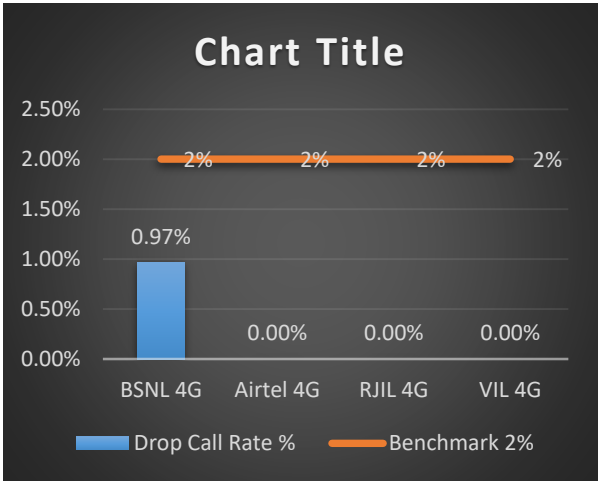| Date	Test Scenario	Area to be Covered
03th Dec 2024	2G/3G/4G Voice and 3G/4G/5G Dynamic Data	**Starting Point at 8.45 AM : Vadal Chowkdi**,saragwada GIDC area, sabalpur GIDC, Khamdrol, APMC Market, Dolatpara, Bhavanath, Zanzarda, Joshipura, Talav gate, Majevedi Gate, Sardarpara, Khadiya, Bilkha
04th Dec 2024	2G/3G/4G Voice and 3G/4G/5G Dynamic Data	**Starting Point Railway station at 9.00 AM : Maduram**, Timbawadi, Kalva Chowk, Kadiyavad, Rajiv nagar
04th Dec 2024	Hot Spots- 2G/3G/4G/5G Static Data Tests	1)Bahaudidin Science college 2) Bus stand 3)Gandhi chowk 4)Railway station 5)GMERS medical college

Data Service Test- Static Locations
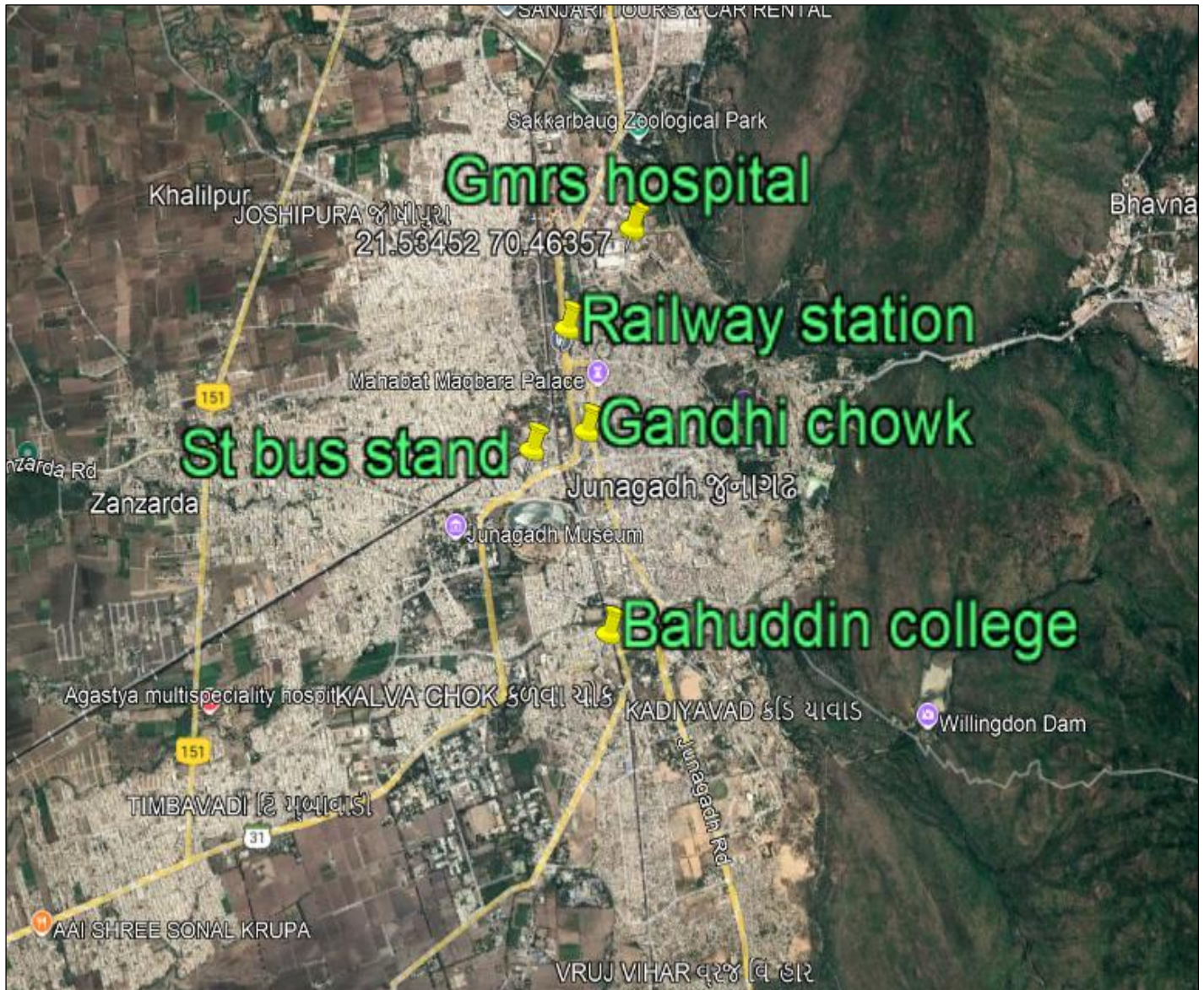
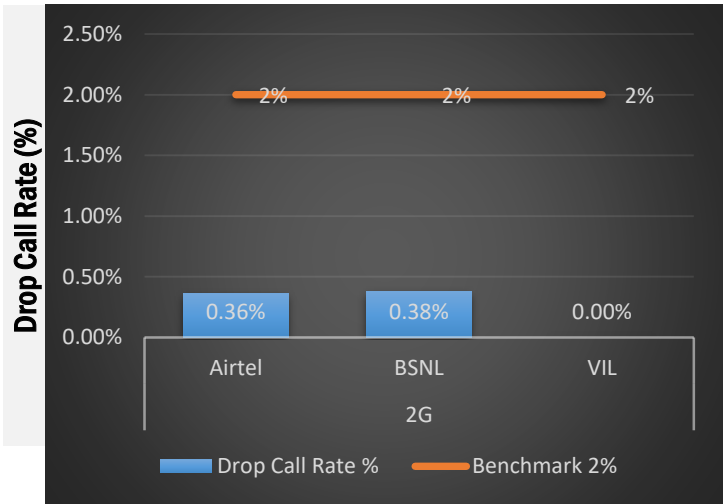| Hotspot Locations |
|---|
| 1)Bahaudidin Science college
2) Bus stand
3)Gandhi chowk
4)Railway station
5)GMERS medical college |

Voice Calls

QoS compliance of the TSPs in **Junagadh City & Nearby area**
for Voice across technologies 2G/4G-VoLTE:

2G Network — Drop Call Rate (%): Airtel 0.36%, BSNL 0.38%, VIL 0.00%; Benchmark 2%

3G/VoLTE Network — Chart Title — Drop Call Rate (%): BSNL 4G 0.97%, Airtel 4G 0.00%, RJIL 4G 0.00%, VIL 4G 0.00%; Benchmark 2%

2G Network — Chart Title — Block Call Rate (%): Airtel 0.00%, BSNL 2.96%, VIL 0.00%; Benchmark 3%

3G/VoLTE Network — Block Call Rate (%): BSNL 4G 1.53%, Airtel VoLTE 0.00%, RJIL VoLTE 0.00%, VIL VoLTE 0.00%; Benchmark 3%

KPIs	2G			4G			
	Airtel	**BSNL**	**VIL**	**BSNL**	**Airtel**	**RJIL**	**VIL**
Drop Call Rate %	0.36%	0.38%	0.00%	0.97%	0.00%	0.00%	0.00%
Block Call Rate %	0.00%	2.96%	0.00%	1.53%	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 %	92.06%	97.03%	99.91%

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

TSPs	3G
	BSNL
Coverage %	NA

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

TSPs	VoLTE			
	BSNL	Airtel	JIO	VIL
Coverage %	96.55%	99.56%	99.84%	98.09%

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

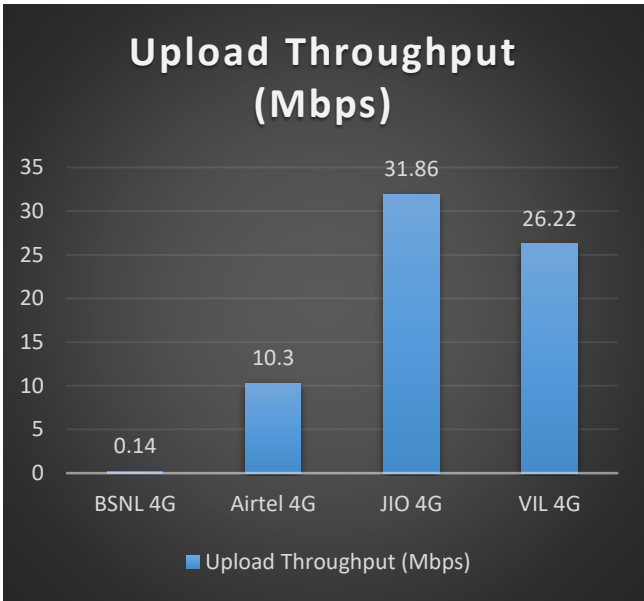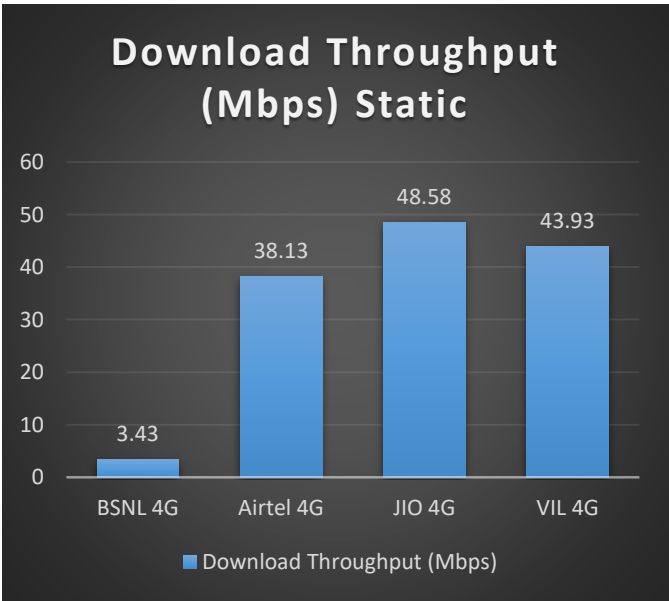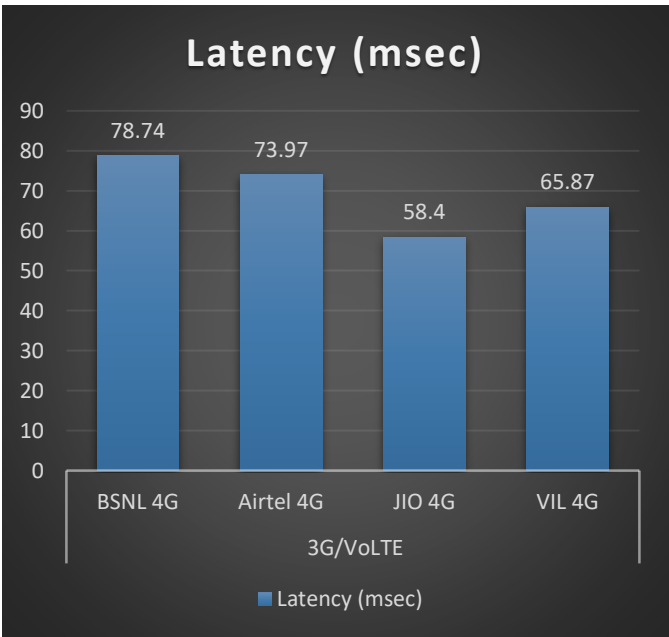| TSPs	VoLTE			
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	95.95%	100%	100%	100%

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)
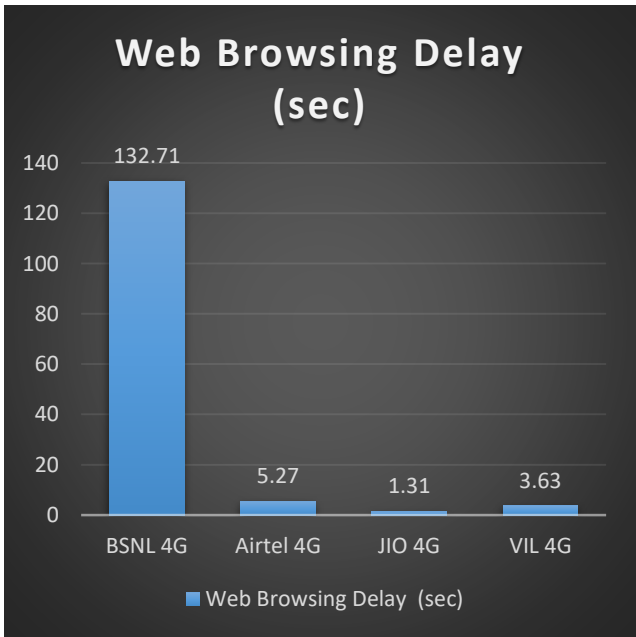
Data Download and Upload Performance Static (Mbps)

4G Network:

Download Throughput (Mbps) Static

Network	Download Throughput (Mbps)
BSNL 4G	3.43
Airtel 4G	38.13
JIO 4G	48.58
VIL 4G	43.93

Upload Throughput (Mbps)

Network	Upload Throughput (Mbps)
BSNL 4G	0.14
Airtel 4G	10.3
JIO 4G	31.86
VIL 4G	26.22

Latency (ms)

Latency (msec) — 3G/VoLTE

Network	Latency (msec)
BSNL 4G	78.74
Airtel 4G	73.97
JIO 4G	58.4
VIL 4G	65.87

Web Browsing (Sec)

Web Browsing Delay (sec)

Network	Web Browsing Delay (sec)
BSNL 4G	132.71
Airtel 4G	5.27
JIO 4G	1.31
VIL 4G	3.63

Summary

| Data Services Static	4G			
	BSNL 4G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	3.43	38.13	48.58	43.93
Upload Throughput(Mbps)	0.14	10.3	31.86	26.22
Video Streaming Delay (sec)	2.53	0.07	0.49	0.06
Web Browsing Delay (sec)	132.71	5.27	1.31	3.63
Latency (msec)	78.74	73.97	58.4	65.87

Data
Services Dynamic

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

Data Download Performance (kbps) - Dynamic

4G Network:

Data Services Dynamic	VoLTE			
	BSNL 4G	**Airtel 4G**	**JIO 4G**	**VIL 4G**
Download Throughput (Mbps)	**4.197**	**35.15**	**22.57**	**36.24**

Download Throughput (Mbps)

Summary
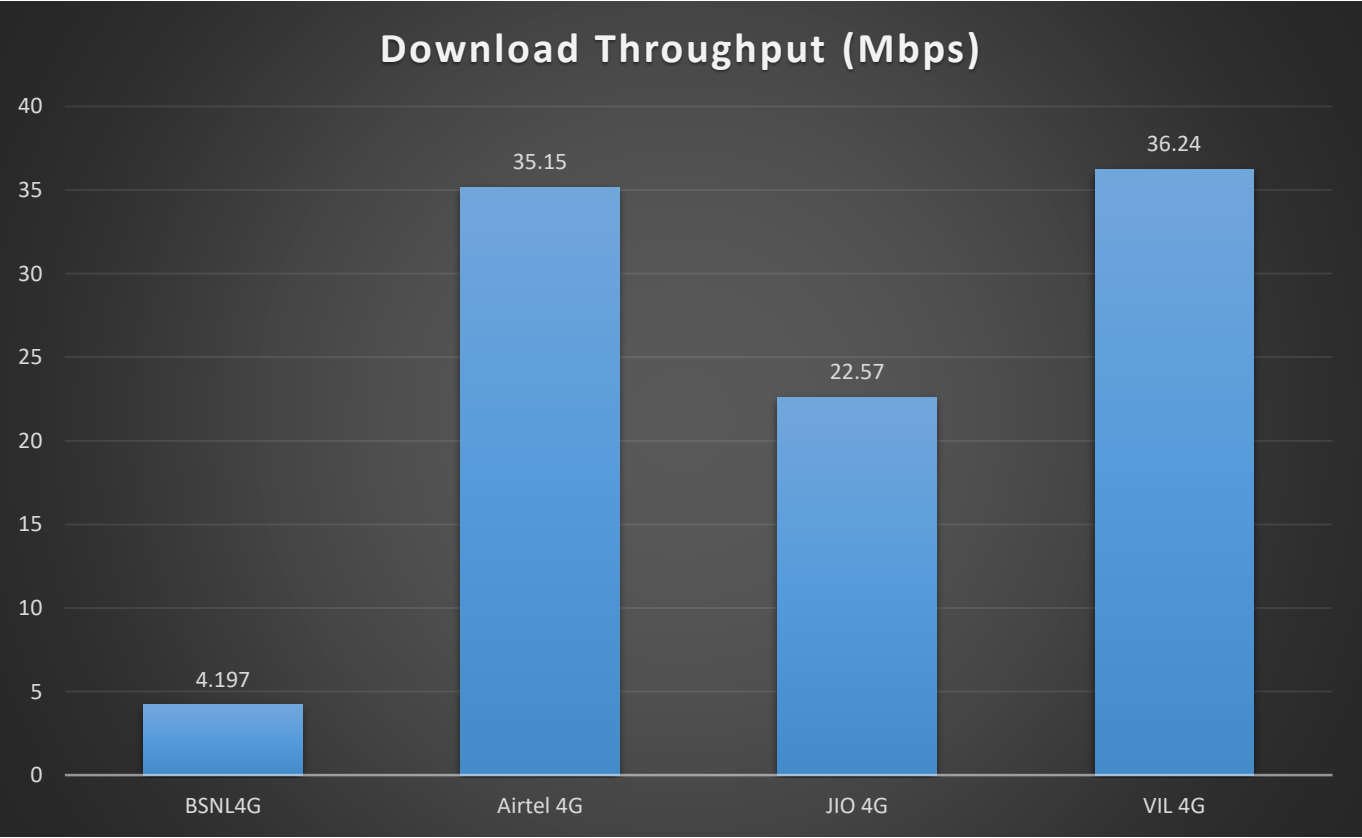
Voice Call	2G		
	Airtel	**BSNL**	**VIL**
Call Attempt	275	270	262
Blocked Call Rate (%)	0%	2.96%	0%
CSSR% (Accessibility)	100%	97.04%	100%
Drop Call Rate (%)	0.36%	0.38%	0%
Mobility HOSR (%)	99.42%	95.71%	99.29%
Rx Quality (%)	96.24%	96.02%	96.77%
Average CST Sec	3.47	2.51	2.35

Voice Call	VoLTE			
	BSNL 4G	**Airtel VoLTE**	**JIO VoLTE**	**VIL VoLTE**
Call Attempt	278	294	249	258
Blocked Call Rate (%)	1.53%	0%	0%	0%
CSSR% (Accessibility)	98.47%	100%	100%	100%
Drop Call Rate (%)	0.97%	0%	0%	0%
Mobility HOSR (%)	98.34%	99.9%	99.66%	99.9%
Rx Quality (%)	95.49%	96.53%	**90.54%**	**90.85%**
Average CST Sec	2.34	0.8	0.67	0.38

Data Services static

Bahaudidin Science college	4G			
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	3.14	38.69	53.72	36.02
Upload Throughput (mbps)	0.11	6.76	32.35	23.01
Video Streaming Delay (Secs.)	2.37	0.08	0.42	0.07
Web Browsing Delay (sec)	155	5.62	1.51	3.14
Latency (msec)	86.44	95.64	58	65.83

Bus stand	4G			
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	2.97	28.9	47.20	25.03
Upload Throughput (mbps)	0.11	11.09	32.45	29.75
Video Streaming Delay (Secs.)	4.38	0.07	0.37	0.06
Web Browsing Delay (sec)	221.69	5.26	1.44	3.85
Latency (msec)	53.72	69.16	57	66.57

Gandhi chowk	4G			
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	4.22	37.24	40.31	74.44
Upload Throughput (mbps)	0.23	9.95	26.90	26.77
Video Streaming Delay (Secs.)	2.01	0.07	0.67	0.06
Web Browsing Delay (sec)	119.67	4.91	1.4	3.97
Latency (msec)	45.61	67.06	58	64.73

Data Services static

Railway station	4G			
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	3.81	34.13	38.60	31.73
Upload Throughput (mbps)	0.13	14.89	32.71	29.14
Video Streaming Delay (Secs.)	2.00	0.06	0.33	0.07
Web Browsing Delay (sec)	87.25	5.14	1.48	3.52
Latency (msec)	159	66.22	61	65.57

GMERS medical college	4G			
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	2.99	51.67	57.34	52.43
Upload Throughput (mbps)	0.13	8.83	31.82	22.45
Video Streaming Delay (Secs.)	1.88	0.08	0.64	0.07
Web Browsing Delay (sec)	79.92	5.42	0.71	3.67
Latency (msec)	48.92	71.76	58	66.67

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	92.06%
BSNL 2G	97.03%
VIL 2G	99.91%
BSNL 4G	96.55%
Airtel VoLTE	99.56%
Jio VoLTE	99.84%
VIL VoLTE	98.09%

Coverage Rate

	Airtel 2G	BSNL 2G	VIL 2G	BSNL 4G	Airtel VoLTE	Jio VoLTE	VIL VoLTE
Orange	7.94	2.97	0.09	10.27	0.44	0.16	1.91
Blue	92.06	97.03	99.91	96.55	99.56	99.84	98.09
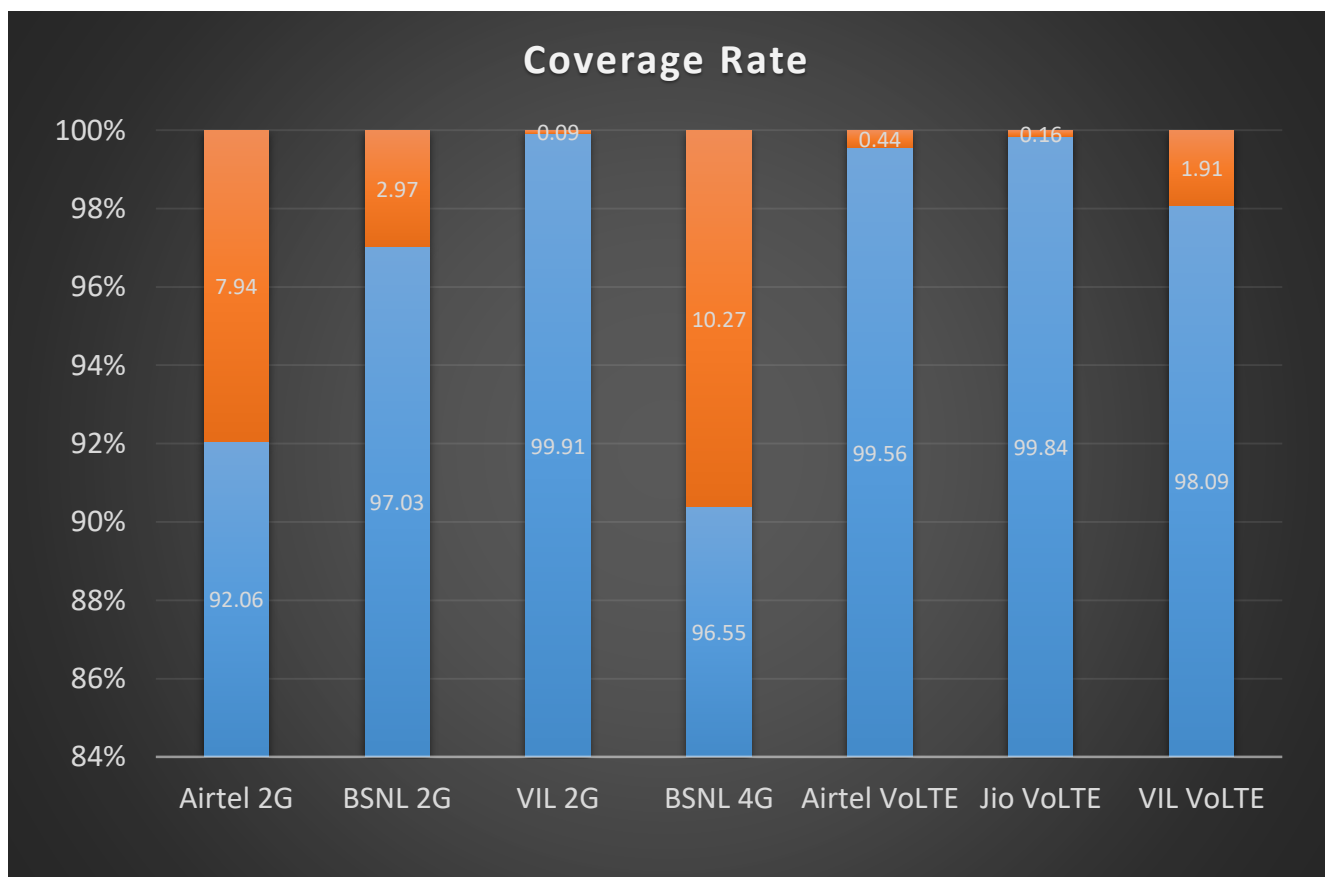
TSP-AIRTEL

Technology	Coverage %
2G	92.06%
VoLTE	99.56%

2G

2G
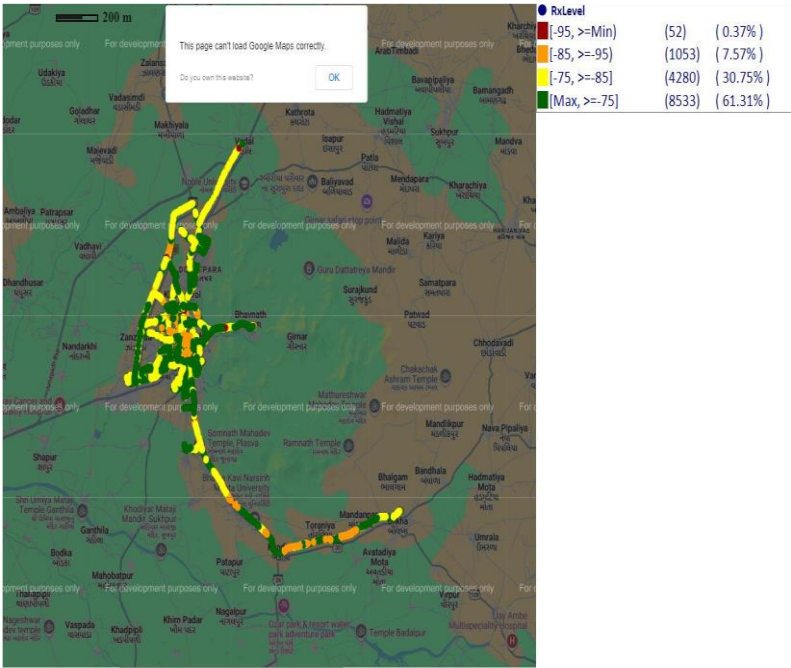
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	8533	61.31%	
[-75, >=-85)	4280	30.75%	
[-85, >=-95)	1053	7.57%	
[-95, >=Min)	52	0.37%	
Total	13918	100%	

VoLTE
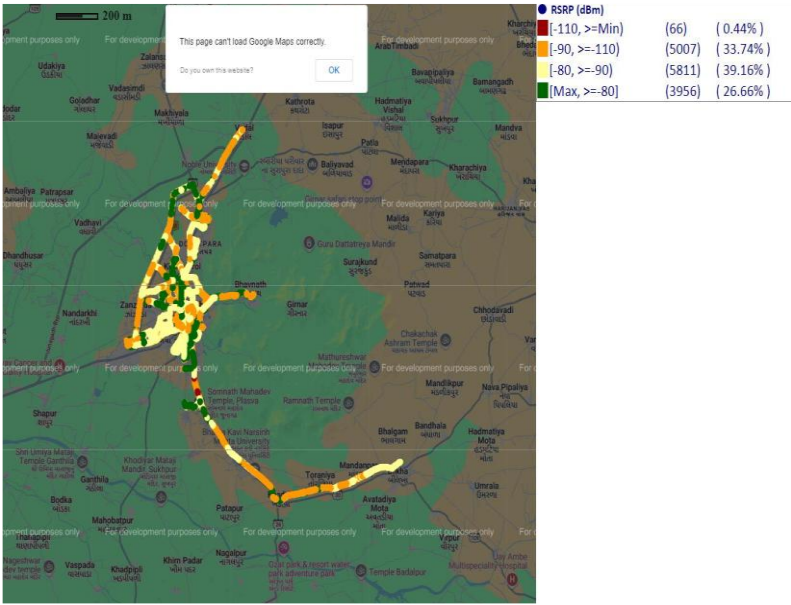
VoLTE /5G

Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	3956	26.66%	
[-80, >=-90)	5811	39.16%	
[-90, >=-110)	5007	33.74%	
[-110, >=Min)	66	0.44%	
Total	14840	100%	

TSP- BSNL

Technology	Coverage %
2G	97.03%
4G	96.55%

2G

4G
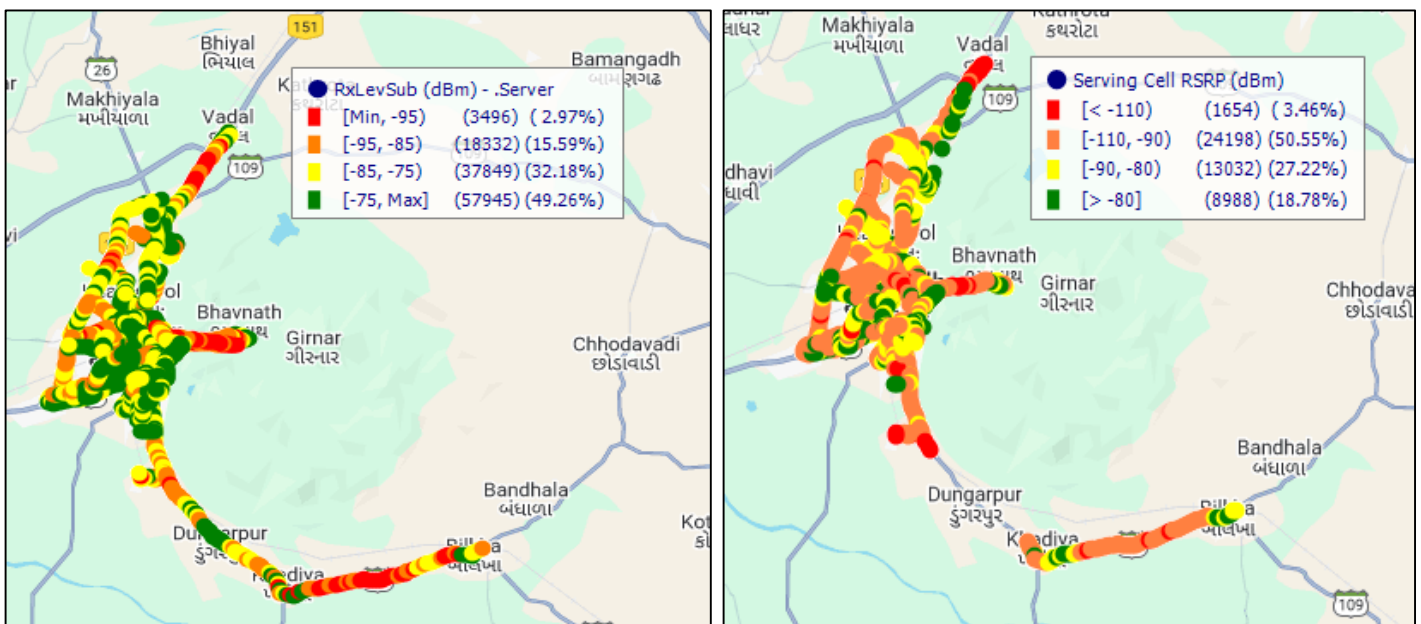
2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	57945	49.26%	🟩
[-75, >=-85)	37849	32.18%	🟨
[-85, >=-95)	18332	15.59%	🟧
[-95, >=Min)	3496	2.97%	🟥
Total	**117622**	**100%**	

4G			
Overall RSCP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	8988	18.78%	🟩
[-80, >=-90)	13032	27.22%	🟨
[-90, >=-110)	24198	50.55%	🟧
[-110, >=Min)	1654	3.45%	🟥
Total	**47872**	**100%**	

JIO

Technology	Coverage %
VoLTE	99.84%
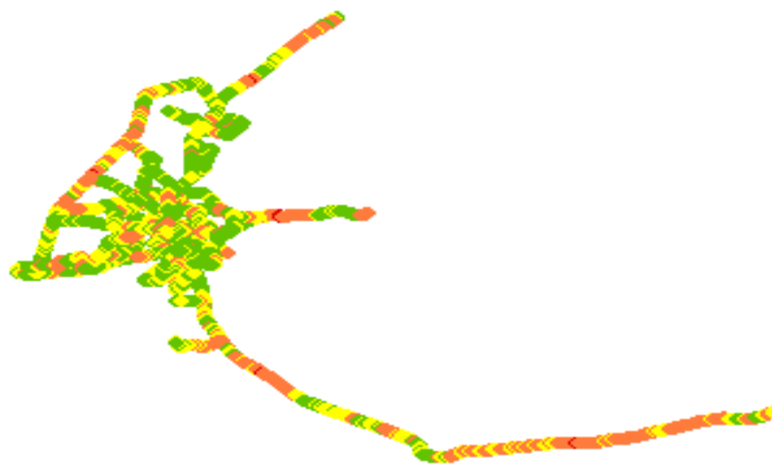
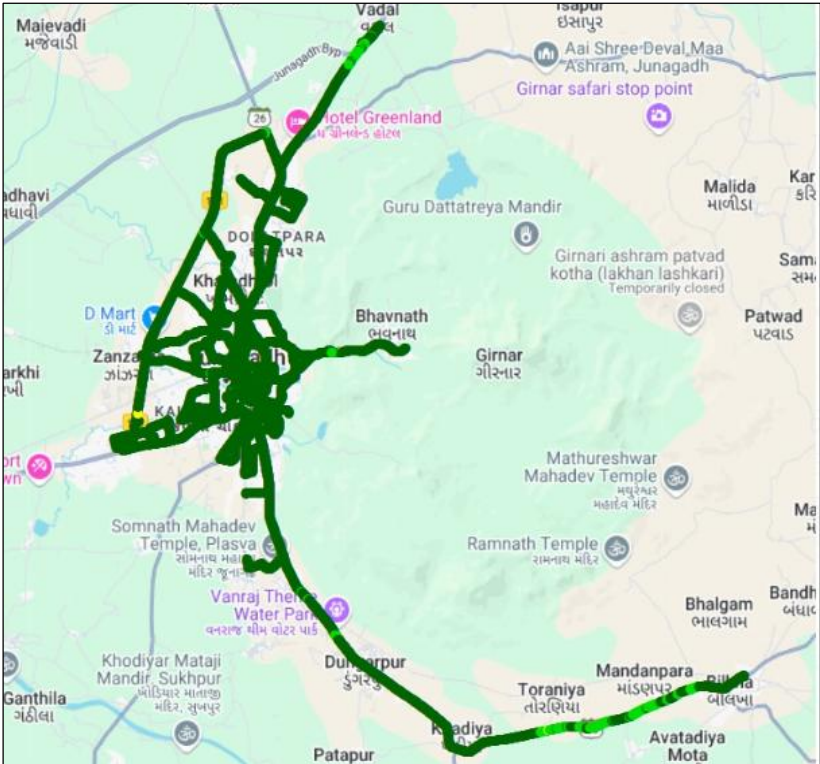LTE KPI PCell Serving RSRP[dBm]

- -80 <= x (51.03%, 14069)
- -90 <= x < -80 (29.61%, 8162)
- -110 <= x < -90 (19.15%, 5278)
- x < -110 (0.21%, 59)

VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	7924	51.86%	
[-80, >=-90)	4402	28.81%	
[-90, >=-110)	2930	19.17%	
[-110, >=Min)	24	0.16%	
Total	15280	100%	

VIL

Technology	Coverage Rate %
2G	99.91%
VoLTE	98.09%

2G

2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	41412	97.81%	
[-75, >=-85)	891	2.10%	
[-85, >=-95)	37	0.09%	
[-95, >=Min)	1	0%	
Total	42341	100%	

VoLTE
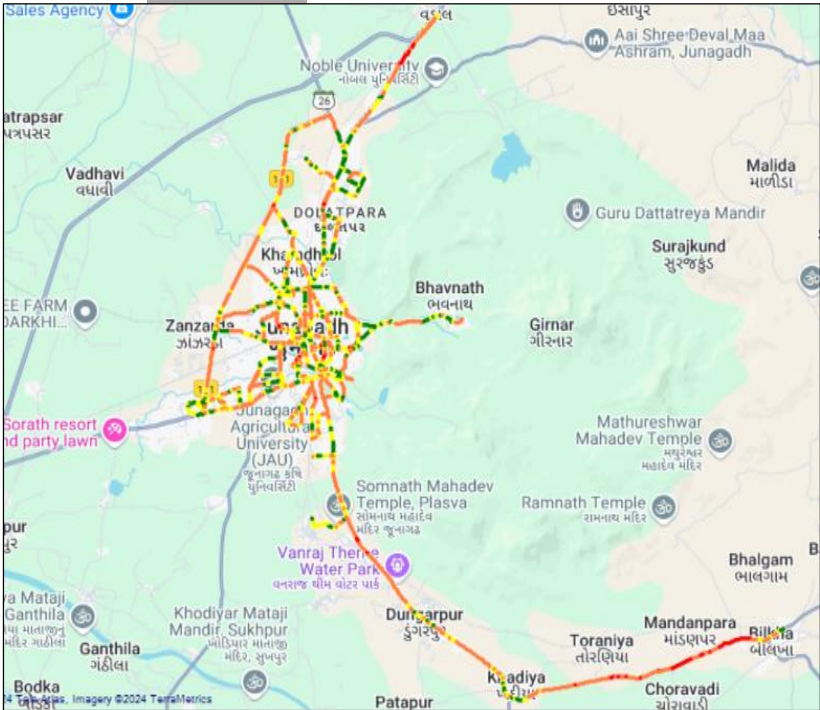
VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	3219	21.45%	
[-80, >=-90)	4926	32.84%	
[-90, >=-110)	6570	43.80%	
[-110, >=Min)	286	1.91%	
Total	15001	100%	

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	96.24%
BSNL 2G	96.02%
VIL 2G	96.77%
BSNL 4G	95.49%
Airtel VoLTE	96.53%
Jio VoLTE	90.54%
VIL VoLTE	90.85%
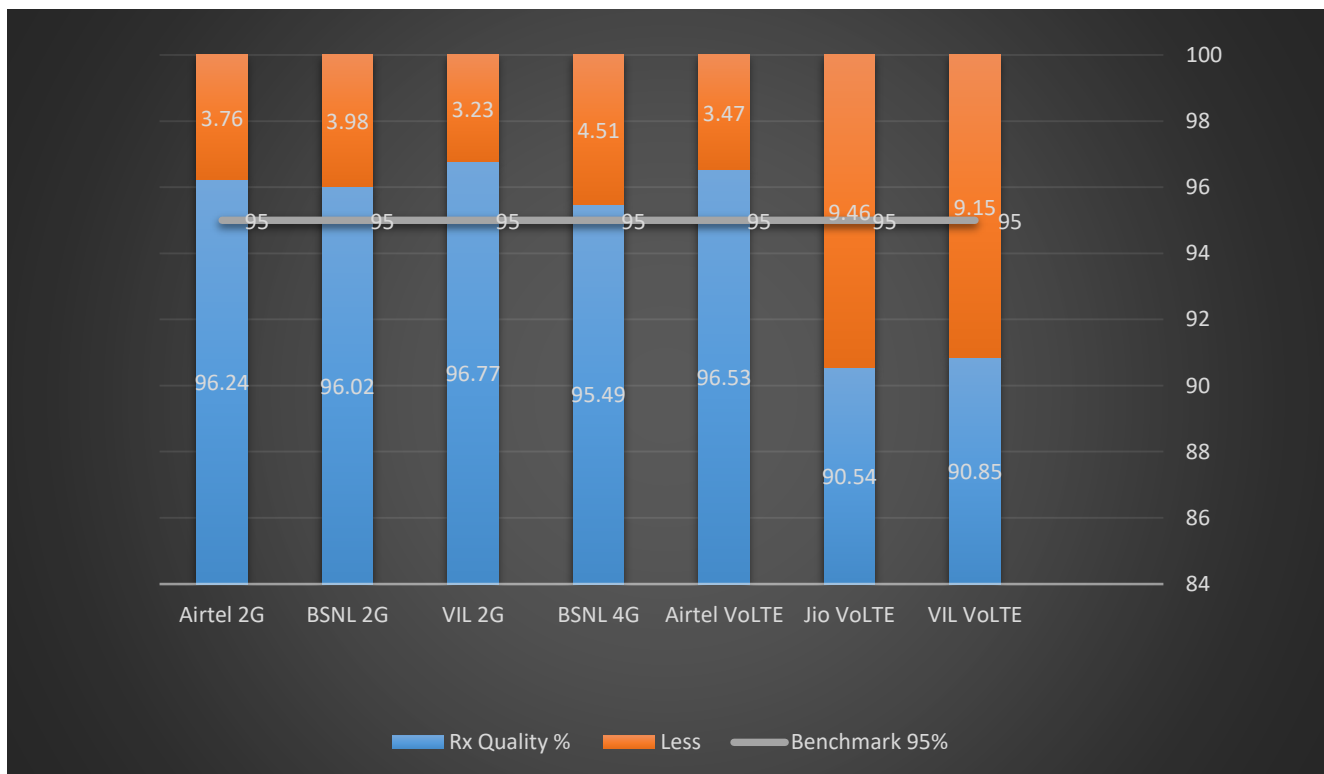
Airtel

Technology	Rx Quality %
2G	96.24%
VoLTE	96.53%

2G
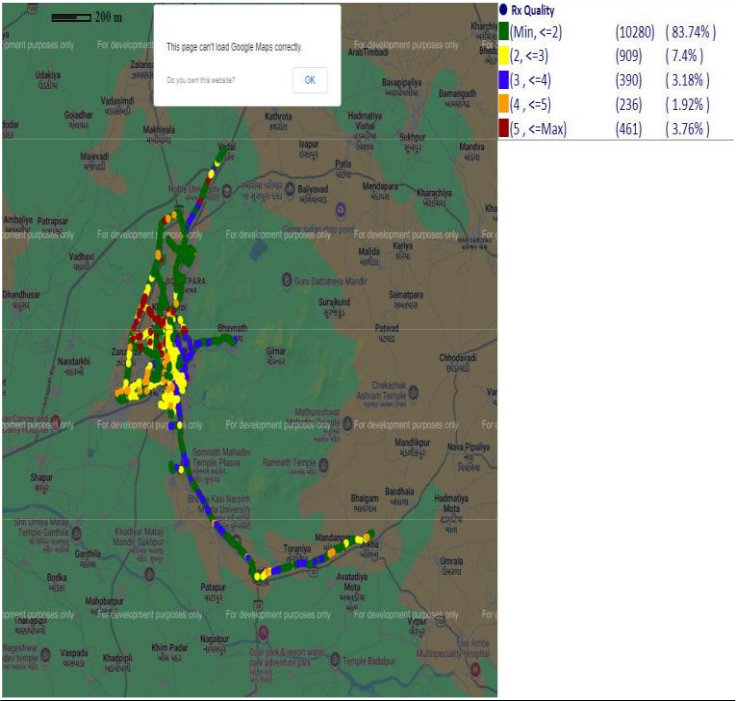
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	10280	83.74%	
(2, <=3)	909	7.40%	
(3 , <=4)	390	3.18%	
(4 , <=5)	236	1.92%	
(5 , <=Max)	461	3.76%	
Total	12276	100%	

VoLTE
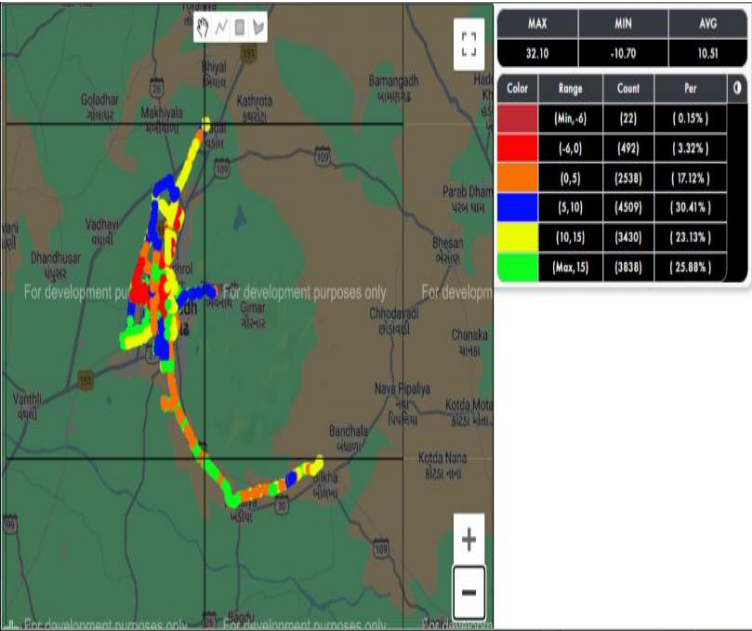
Overall SINR	# Samples	% PDF	Legends
(Min, -6)	22	0.15%	
(-6,0)	492	3.32%	
(0,5)	2538	17.12%	
(5,10)	4509	30.41%	
(10,15)	3430	23.12%	
(Max,15)	3838	25.88%	
Total	14829	100%	

BSNL

Technology	Rx Quality %
2G	96.02%
4G	95.49%

2G

4G
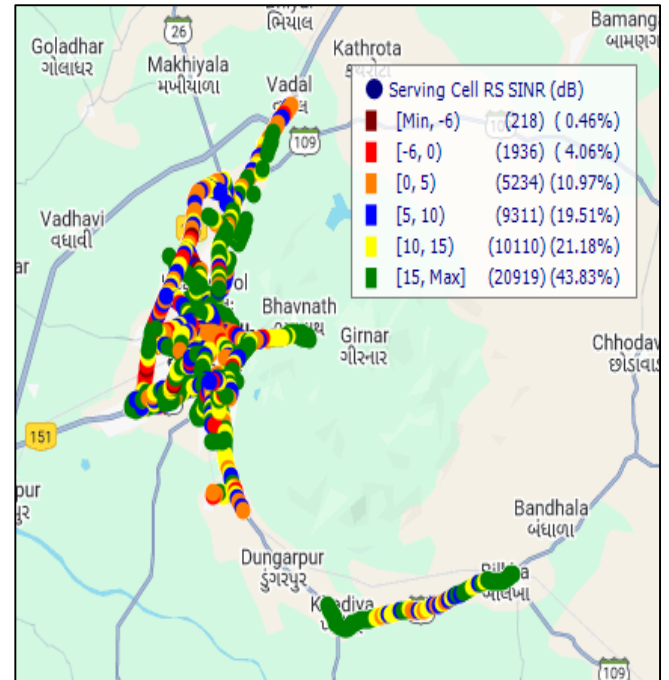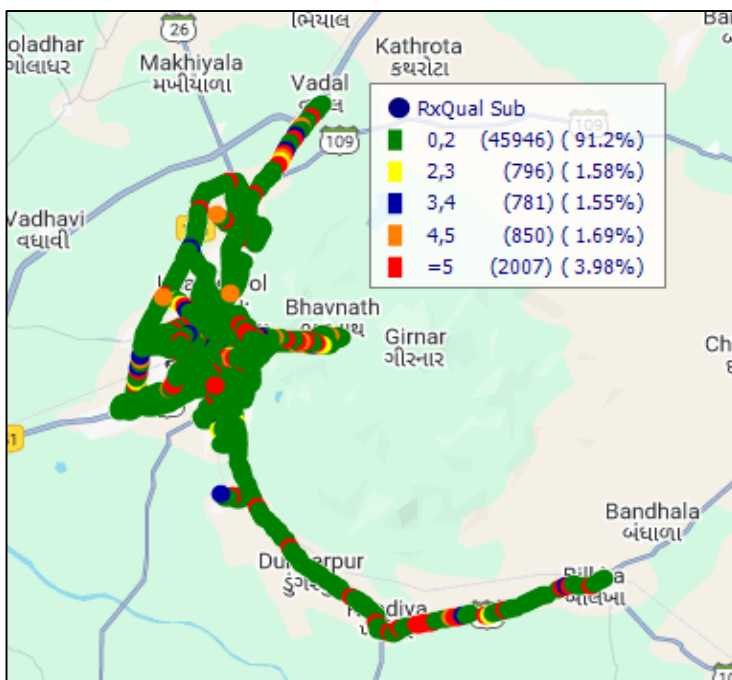
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	45946	91.2%	🟩
(2, <=3)	796	1.58%	🟨
(3 , <=4)	781	1.55%	🟦
(4 , <=5)	850	1.69%	🟧
(5 , <=Max)	2007	3.98%	🟥
Total	50380	100%	

Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	2154	4.51%	🟥
(0, <=5)	5234	10.97%	🟧
(5, <=10)	9311	19.51%	🟦
(10, <=15)	10110	21.18%	🟨
(15, <=Max)	20919	43.83%	🟩
Total	47728	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	90.54%
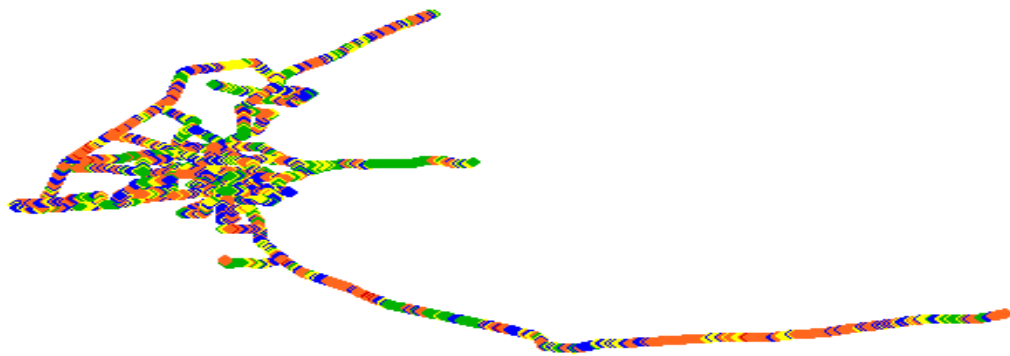
LTE KPI PCell SINR[dB]

- 15 <= x (20.36%, 5613)
- 10 <= x < 15 (22.81%, 6288)
- 5 <= x < 10 (27.06%, 7459)
- 0 <= x < 5 (20.31%, 5600)
- -6 <= x < 0 (8.97%, 2473)
- x < -6 (0.49%, 135)

Overall SINR	# Samples	% PDF	Legends
(Min, <=-6)	135	0.49%	
(-6, <=0)	2473	8.97%	
(0, <=5)	5600	20.31%	
(5, <=10)	7459	27.06%	
(10, <=15)	6288	22.81%	
(15, <=Max)	5613	20.36%	
Total	27568	100%	

VIL

Technology	Rx Quality %
2G	96.77%
4G	**90.85%**

2G
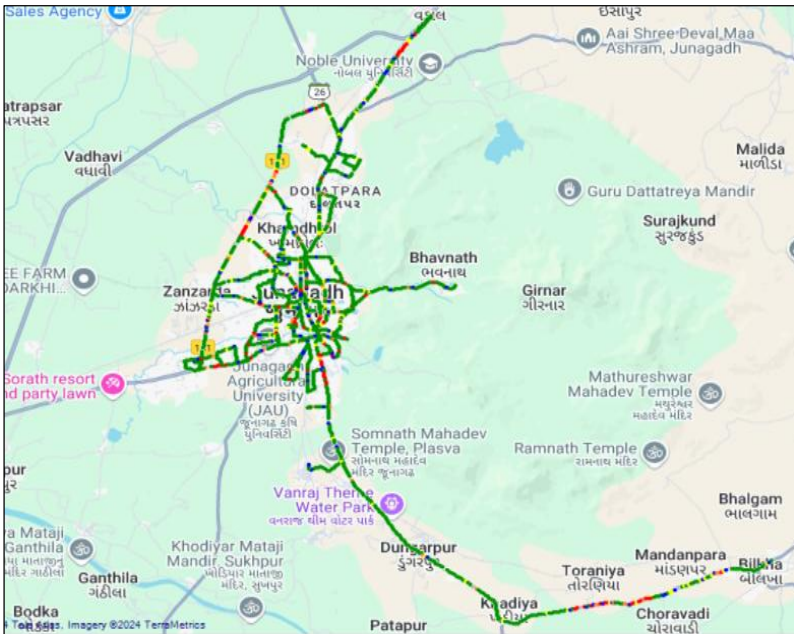
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	10391	82.18%	
(2, <=3)	709	5.61%	
(3 , <=4)	862	6.82%	
(4 , <=5)	273	2.16%	
(5 , <=Max)	409	3.23%	
Total	12644	100%	

VoLTE
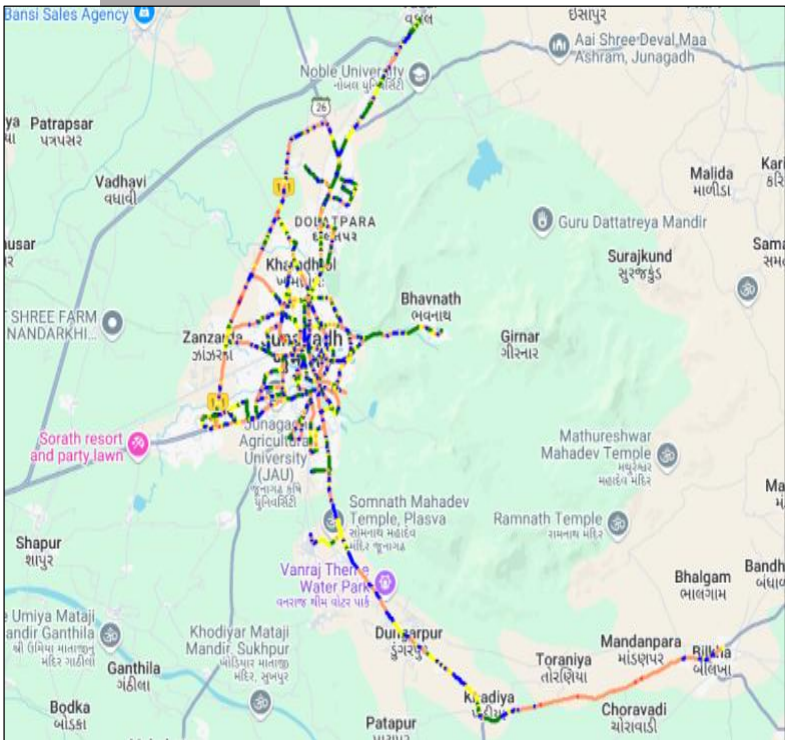
Overall SINR	# Samples	% PDF	Legends
(Min, <=-6)	64	0.43%	
(-6,<=0)	1308	8.72%	
(0, <=5)	2753	18.36%	
(5, <=10)	3833	25.57%	
(10, <=15)	3772	25.16%	
(15, <=Max)	3262	21.76%	
Total	14992	100%	

TSP	% of Time Spent on 3G/VoLTE
BSNL 4G	95.95%
Airtel VoLTE	100%
Jio VoLTE	100%
VIL VoLTE	100%

Time Spent On 4G

Legend: % of Time Spent on VoLTE, % Time Spend on 2G

BSNL 4G: 95.95% (VoLTE), 4.05% (2G)
Airtel VoLTE: 100%, 0.00%
Jio VoLTE: 100%, 0.00%
VIL VoLTE: 100%, 0.00%