



Operator Assisted Drive Test Report

Rajkot-Amreli- Rajula Highway

22nd 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 Rajkot-Amreli-Rajula Highway from 9:00 AM to 8:00 PM on 22nd Jan 2024. The drive test covered drive route of 185 KMs over a period of 1 days 170 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 22nd Jan 2024 covering the Rajkot-Amreli- Rajula Highway. 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 185 KMs. Approx 170 calls were made for each of the TSPs 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 185 kms for download throughput in all technologies.

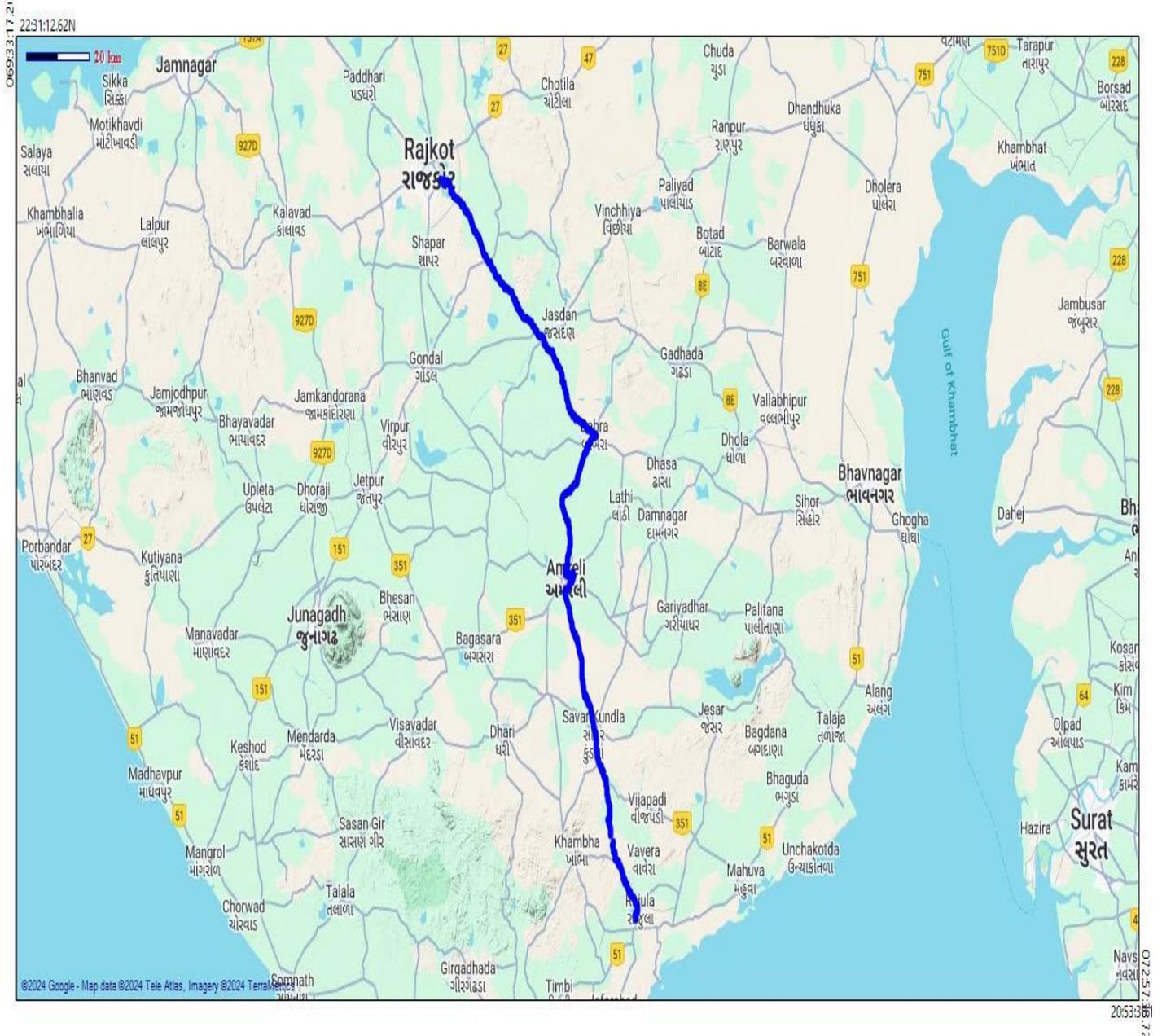
2G – measurement – UE Locked in 2G file size- 500KB

3G – measurement – UE in 3G File Size- 20MB

4G – measurement – UE in LTE File Size- 40MB

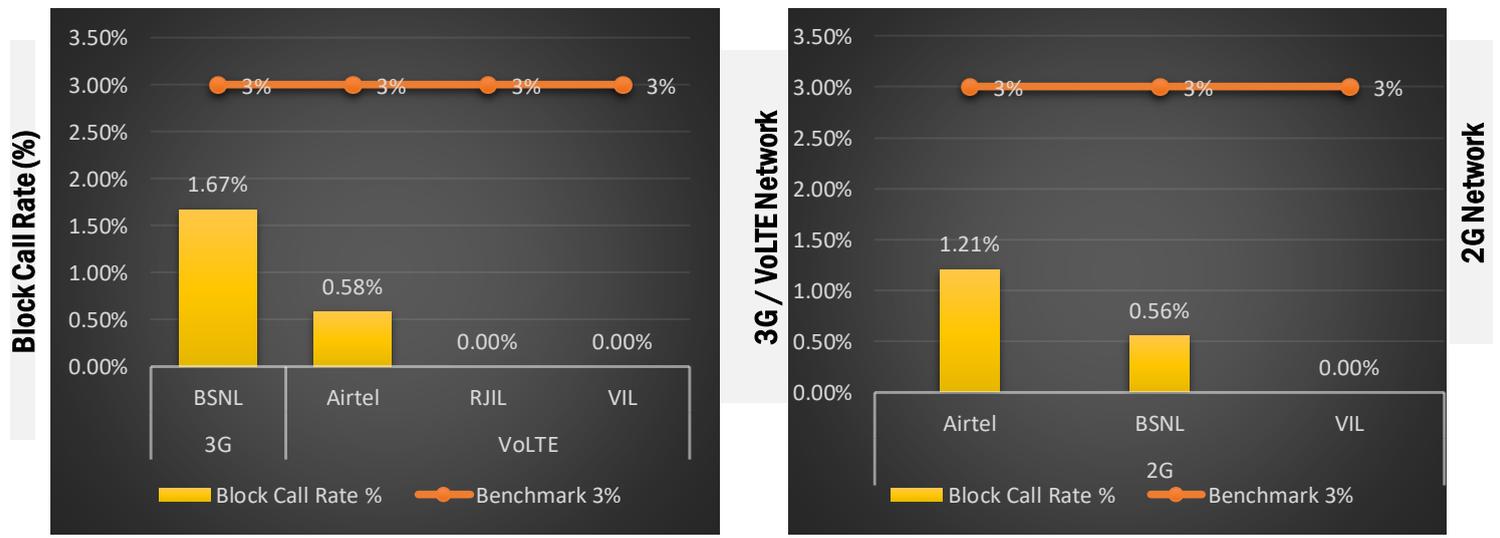
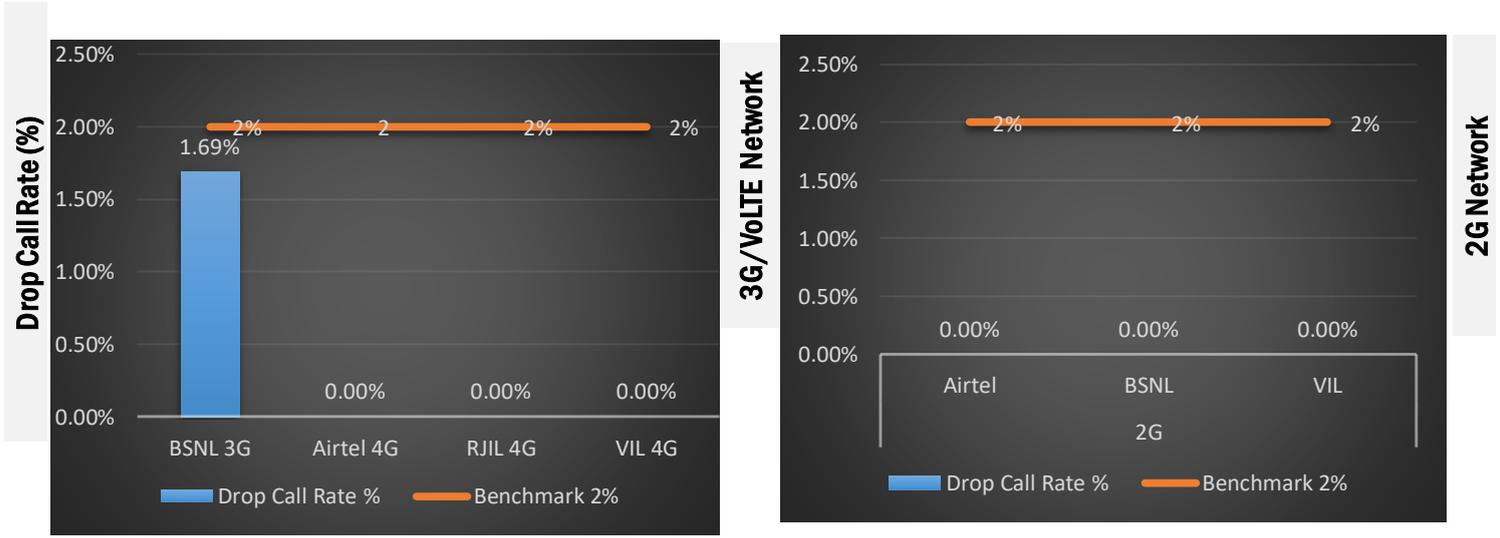
Service	Specifications
Download	2G (Locked) - 500KB, 3G (Dual) - 20 MB, 4G (Free) - 40 MB
Upload	2G (Locked) - 100KB, 3G (Dual) - 5 MB, 4G (Free) - 10 MB
Web Browsing	3 links of e/m commerce website www.amazon.in, www.flipkart.com and PayTm
Latency	32 Bytes on www.google.com

Voice & Dynamic Data Test Drive Route



Date	Test Scenario	Area to be Covered
22-01-2024	2G/3G/4G Voice and 3G/4G Dynamic Data	Starting Point : Aji Dam Chawkadi at 9:00AM : Rajkot-Amreli-Rajula Highway

QoS compliance of the TSPs on Rajkot- Amreli- Rajula Highway 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%	1.69%	0.00%	0.00%	0.00%
Block Call Rate %	1.21%	0.56%	0.00%	1.67%	0.58%	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

Coverage

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

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	80.75%	62.22%	97.85%

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

TSPs	3G
	BSNL
Coverage %	43.69%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	94.73%	99.54%	98.64%

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	29.93%	99.22%	100.00%	100.00%

Data Services Dynamic

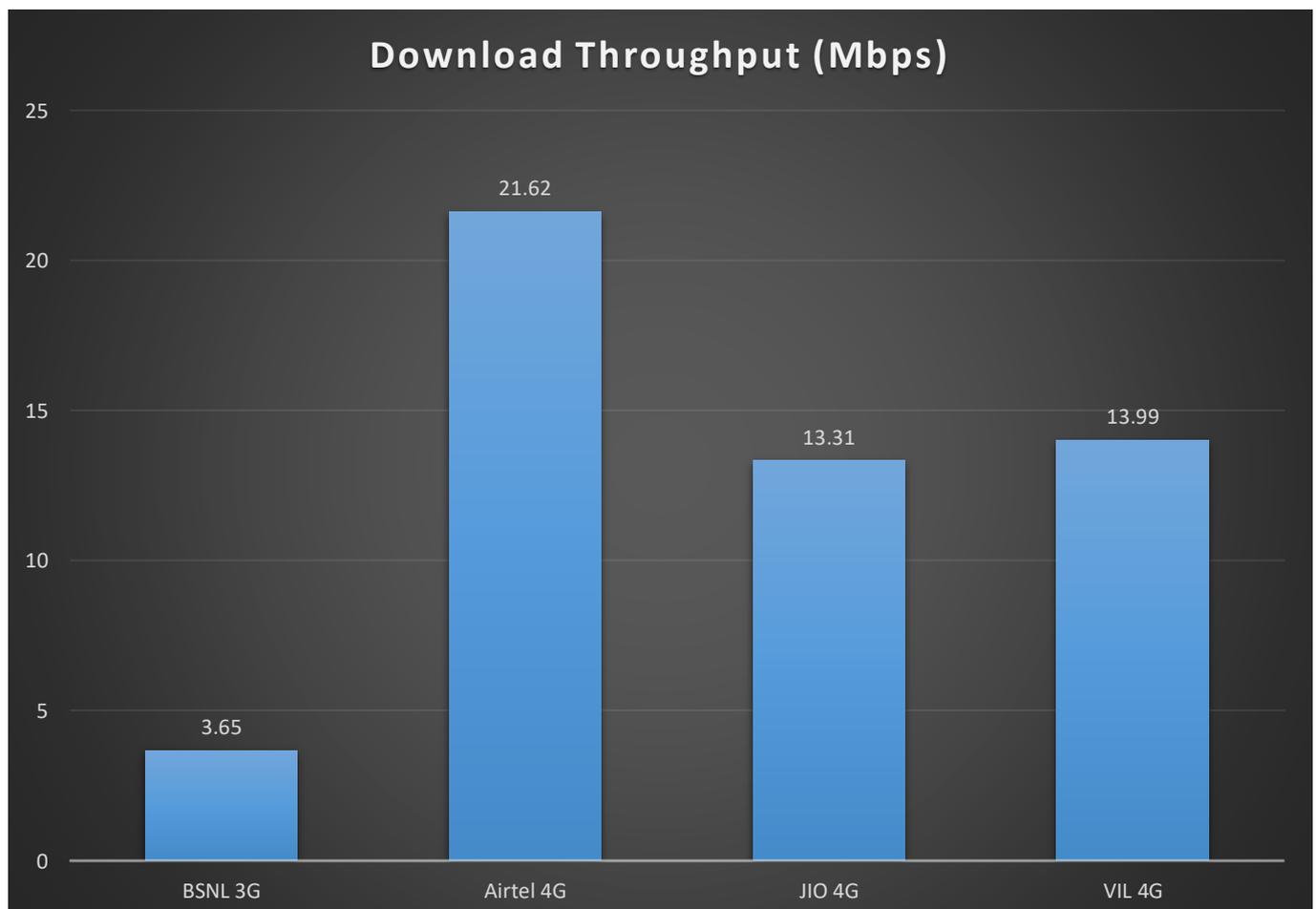
Key Observations

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)	3.65	21.62	13.31	13.99



Summary

City Level Summary- Voice

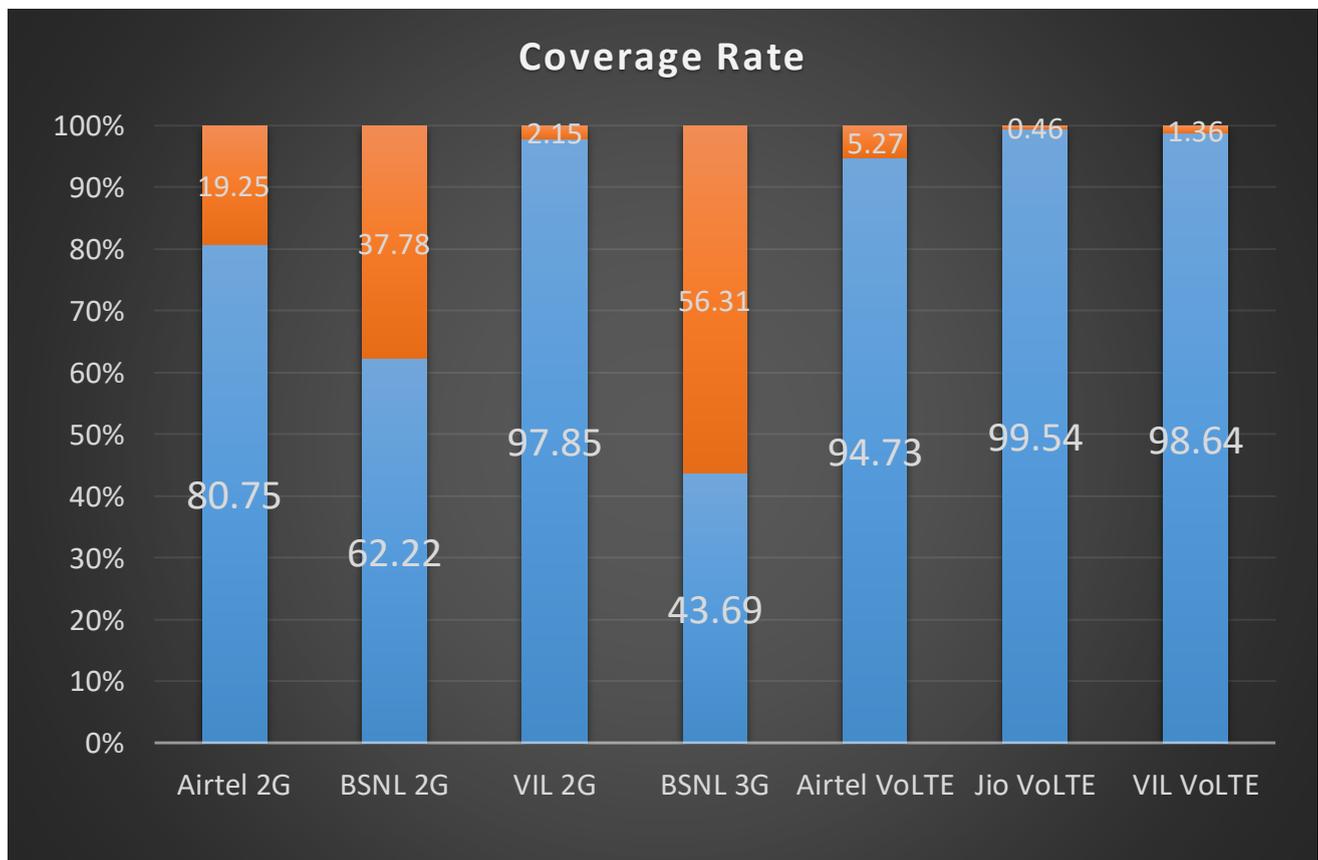
Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	165	180	156
Blocked Call Rate (%)	1.21	0.56	0
CSSR% (Accessibility)	98.79	99.44	100
Drop Call Rate (%)	0	0	0
Mobility HOSR (%)	99.16	96.19	99.22
Rx Quality (%)	93.89	96.76	95.89
Average CST Sec	3.15	2.19	2.49

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	180	171	175	157
Blocked Call Rate (%)	1.67	0.58	0	0
CSSR% (Accessibility)	98.33	99.42	100	100
Drop Call Rate (%)	1.69	0	0	0
Mobility HOSR (%)	97.32	97.83	99.24	99.83
Rx Quality (%)	95.76	92.15	90.62	86.57
Average CST Sec	2.6	1.08	0.7	0.4

Coverage Details

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	80.75%
BSNL 2G	62.22%
VIL 2G	97.85%
BSNL 3G	43.69%
Airtel VoLTE	94.73%
Jio VoLTE	99.54%
VIL VoLTE	98.64%

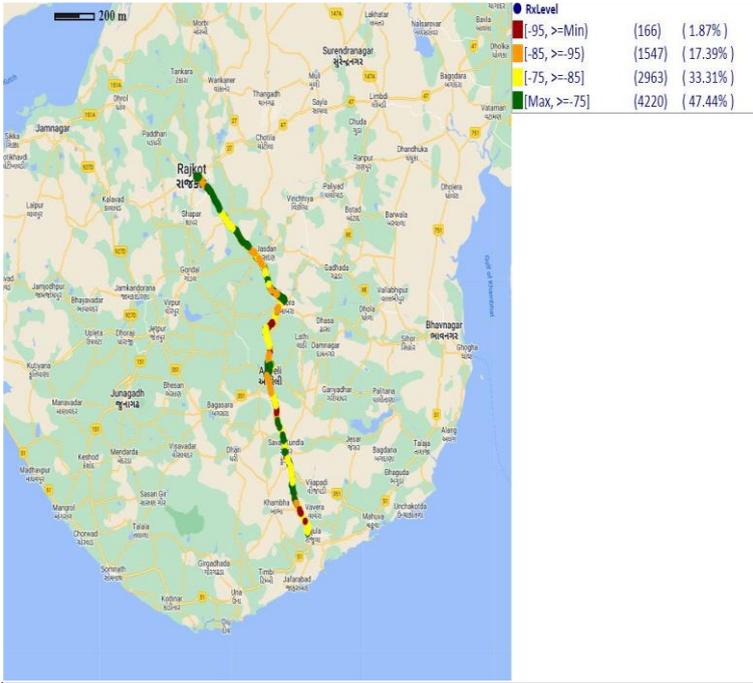


Coverage Details

TSP-AIRTEL

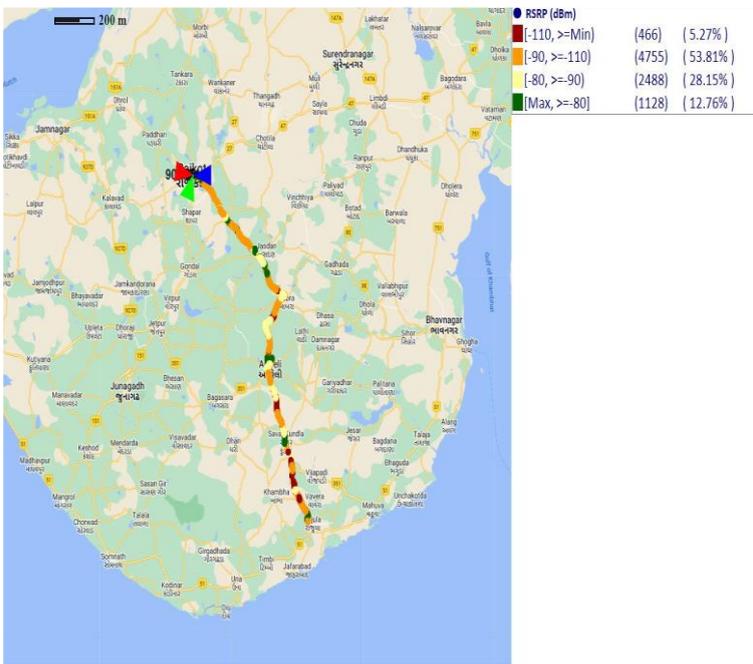
Technology	Coverage %
2G	80.75%
VoLTE	94.73%

2G



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	4220	47.44%	Green
[-75, >=-85]	2963	33.31%	Yellow
[-85, >=-95]	1547	17.39%	Orange
[-95, >=Min]	166	1.86%	Red
Total	8896	100.00	

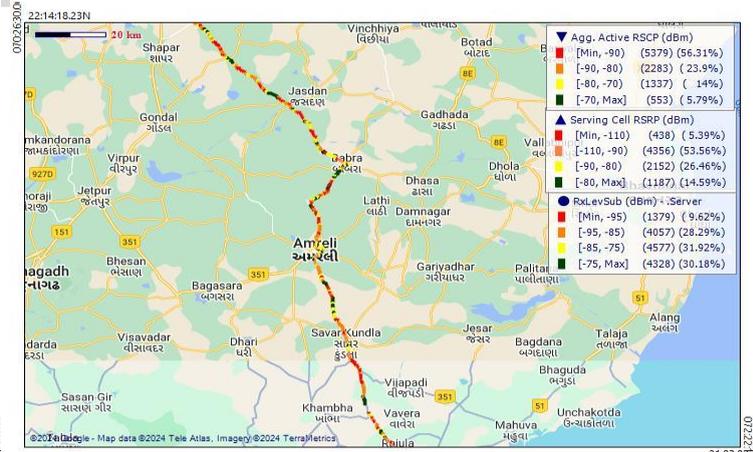
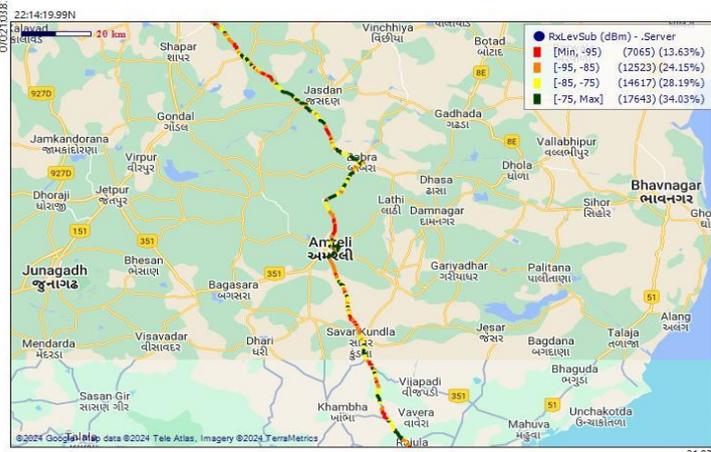
VoLTE



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	1128	12.76%	Green
[-80, >=-90]	2488	28.16%	Yellow
[-90, >=-110]	4755	53.81%	Orange
[-110, >=Min]	466	5.27%	Red
Total	8837	100.00	

TSP- BSNL

Technology	Coverage %
2G	62.22%
3G	43.69%



2G

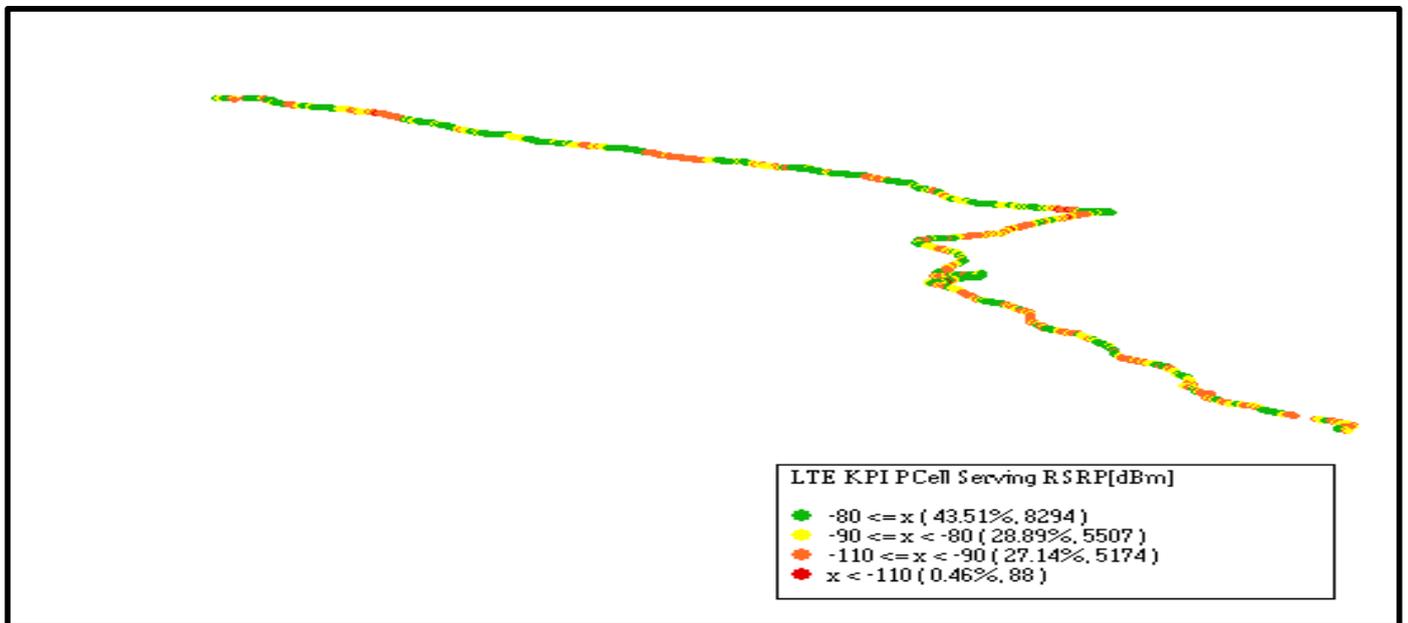
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	17643	34.03%	
[-75, >=-85)	14617	28.19%	
[-85, >=-95)	12523	24.15%	
[-95, >=Min)	7065	13.63%	
Total	51848	100%	

3G

Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	553	5.79%	
[-70, >=-80)	1337	14%	
[-80, >=-90)	2283	23.9%	
[-90, >=Min)	5379	56.31%	
Total	9552	100%	

JIO

Technology	Coverage %
VoLTE	99.54%

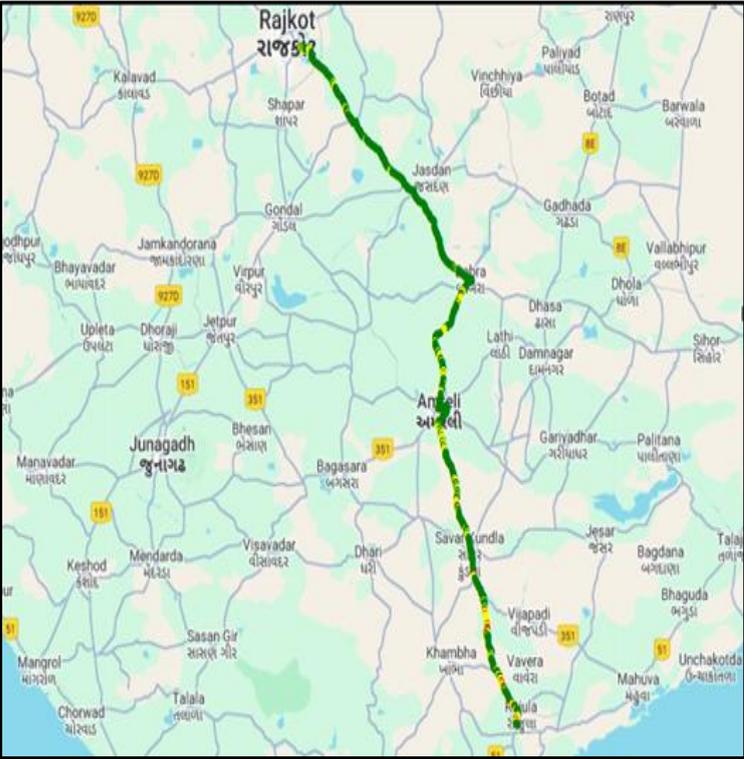


VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	8294	43.51%	
[-80, >=-90)	5507	28.89%	
[-90, >=-110)	5174	27.14%	
[-110, >=Min)	88	0.46%	
Total	19063	100%	

VIL

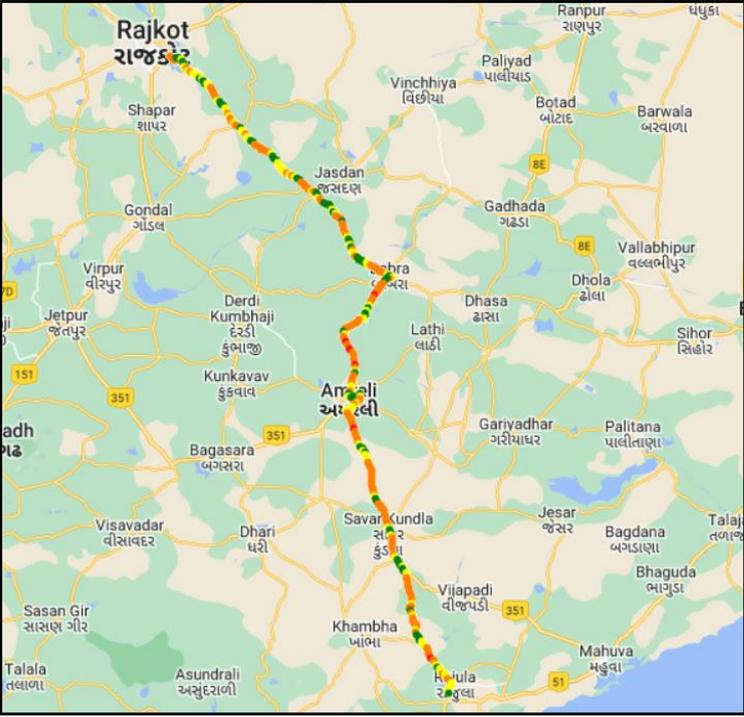
2G

Technology	Coverage Rate %
2G	97.85%
VoLTE	98.64%



2G			
Overall Rx Level	# Samples	% PDF	Legends
[Max, >=-75]	14947	82.74%	Green
[-75, >=-85)	2729	15.11%	Yellow
[-85, >=-95)	387	2.14%	Orange
[-95, >=Min)	1	0.01%	Red
Total	18064	100%	

VoLTE

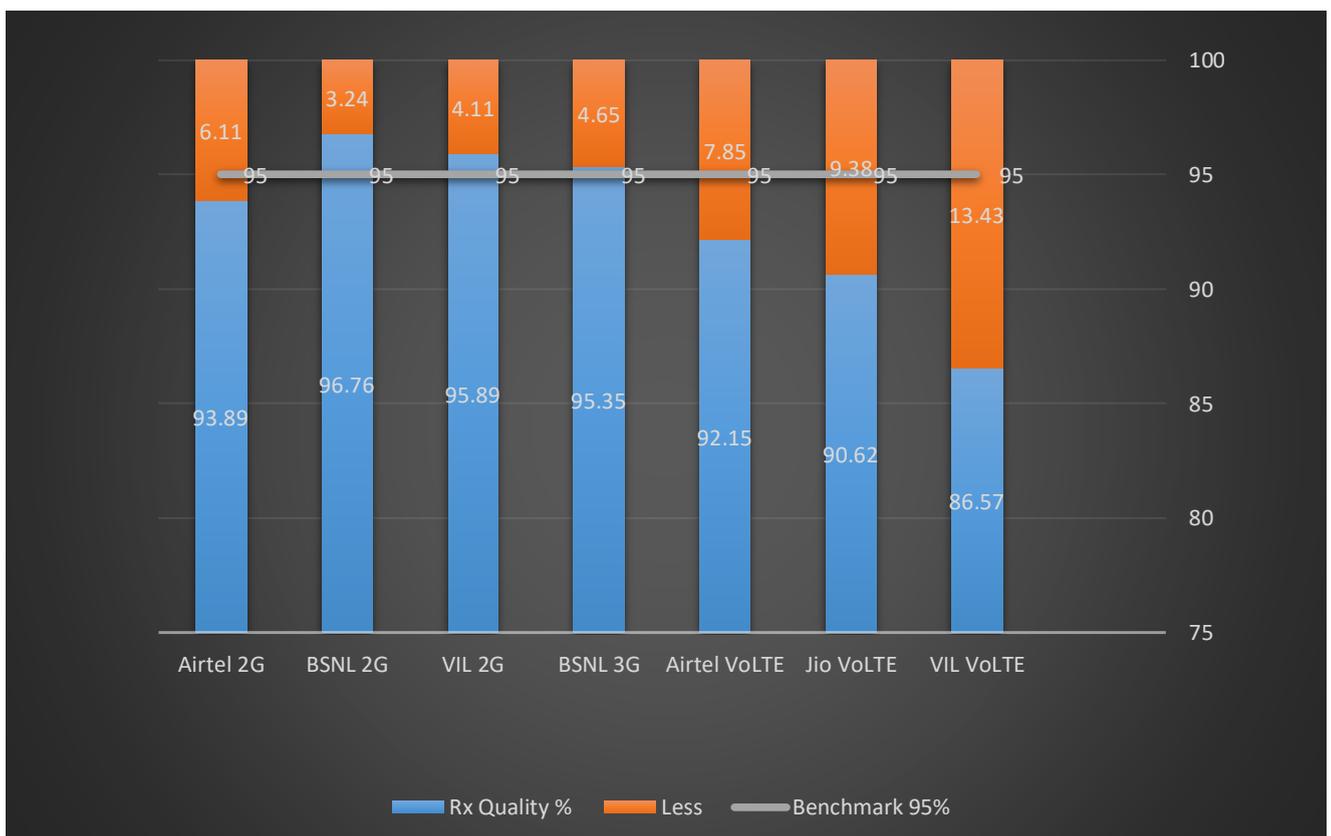


VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	2179	24.96%	Green
[-80, >=-90)	2248	25.75%	Yellow
[-90, >=-110)	4184	47.93%	Orange
[-110, >=Min)	119	1.36%	Red
Total	8730	100%	

II. Quality Details

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 $\geq 95\%$.

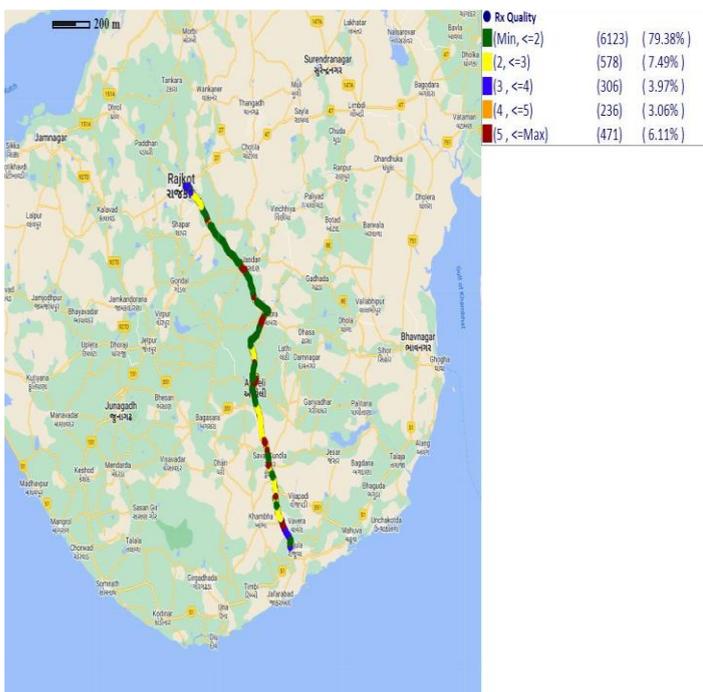
<u>TSP</u>	Rx Quality %
Airtel 2G	93.89%
BSNL 2G	96.76%
VIL 2G	95.89%
BSNL 3G	95.76%
Airtel VoLTE	92.15%
Jio VoLTE	90.62%
VIL VoLTE	86.57%



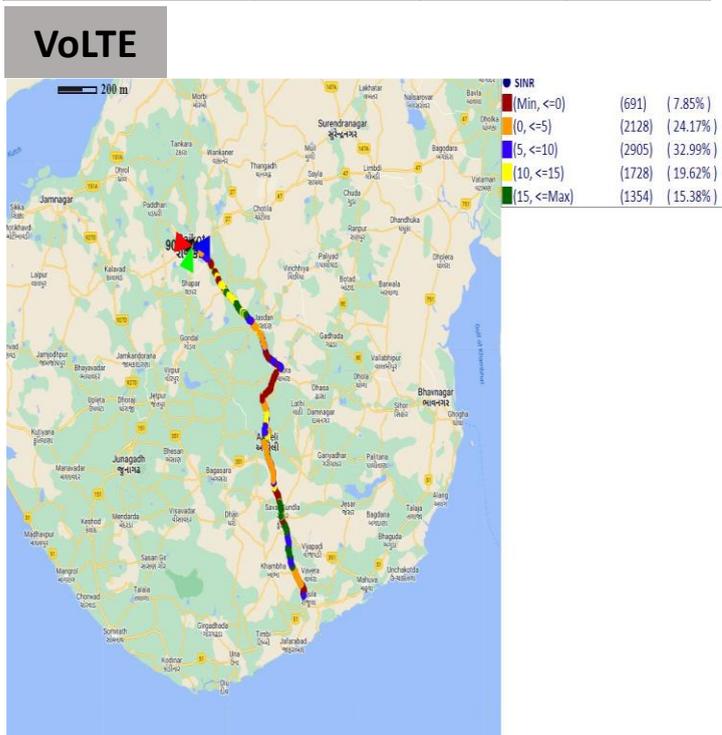
II. Quality Details

Airtel

Technology	Rx Quality %
2G	93.89%
2G	92.15%



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	6123	79.37%	
(2, <=3)	578	7.49%	
(3, <=4)	306	3.97%	
(4, <=5)	236	3.06%	
(5, <=Max)	471	6.11%	
Total	7714	100.00	

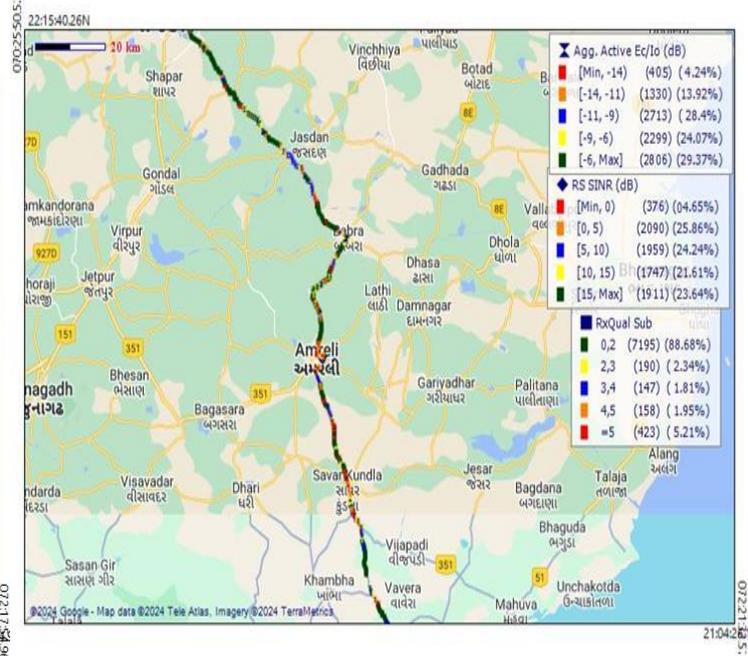
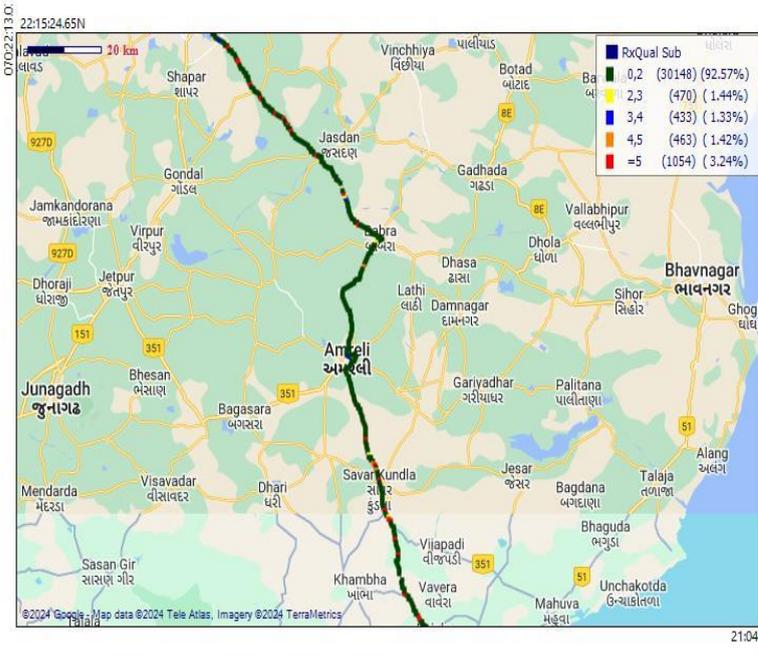


Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	691	7.85%	
(0, <=5)	2128	24.17%	
(5, <=10)	2905	32.99%	
(10, <=15)	1728	19.62%	
(15, <=Max)	1354	15.38%	
Total	8806	100.00	

II. Quality Details

BSNL

	Technology	Rx Quality %	
2G	2G	96.76%	3G
	3G	95.76%	



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	30148	92.57%	Green
(2, <=3)	470	1.44%	Yellow
(3, <=4)	433	1.33%	Blue
(4, <=5)	463	1.42%	Orange
(5, <=Max)	1054	3.24%	Red
Total	32568	100%	

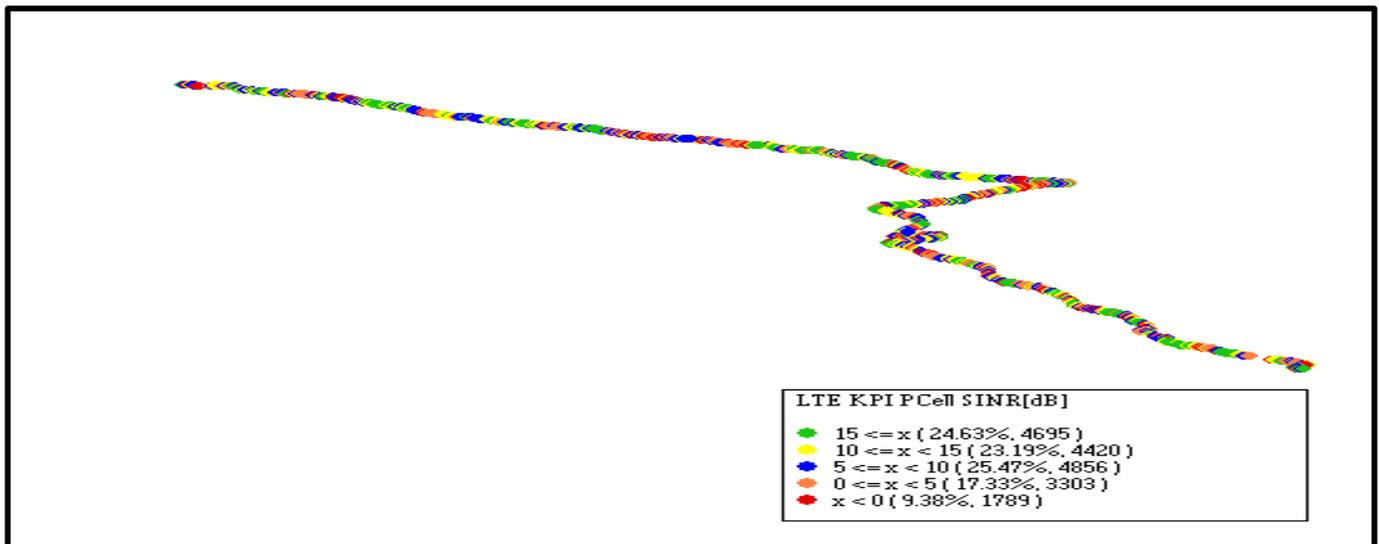
Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	2806	29.37%	Green
(-6, <=-9)	2299	24.07%	Yellow
(-9, <=-11)	2713	28.4%	Blue
(-11, <=-14)	1330	13.92%	Orange
(-14, <= Min)	405	4.24%	Red
Total	9553	100%	

II. 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	90.62%



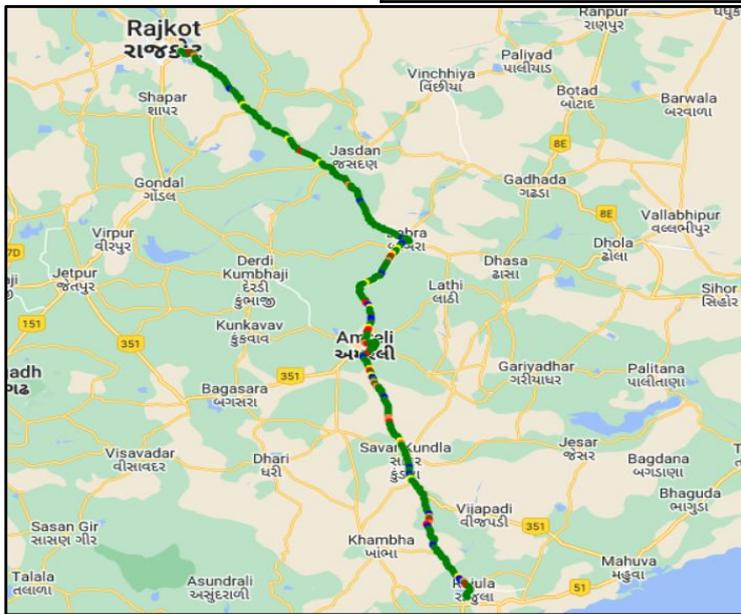
Overall SINR	# Samples	% PDF	Legends
(Min, ≤ 0)	1789	9.38%	
(0, ≤ 5)	3303	17.33%	
(5, ≤ 10)	4856	25.47%	
(10, ≤ 15)	4420	23.19%	
(15, \leq Max)	4695	24.63%	
Total	19063	100%	

II. Quality Details

VIL

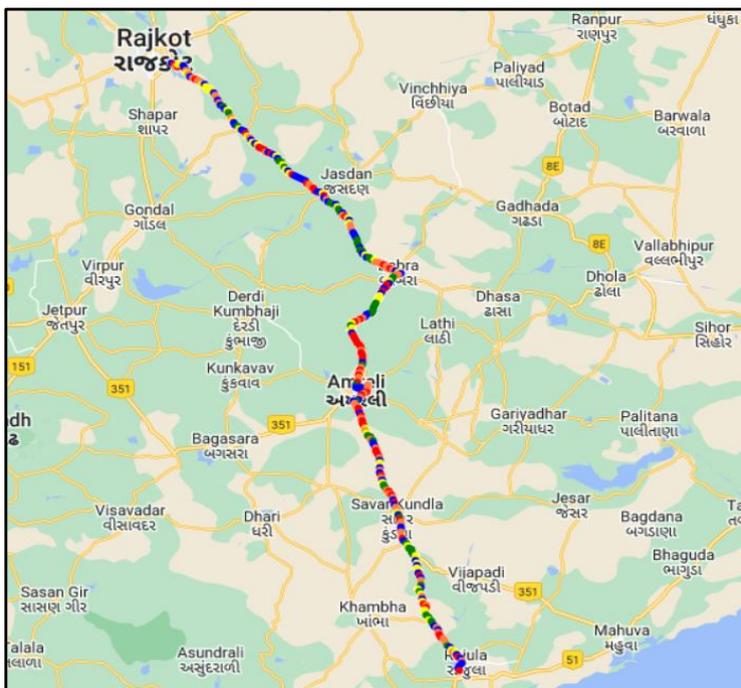
Technology	Rx Quality %
2G	95.89%
4G	86.57%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	6294	84.35%	Green
(2, <=3)	363	4.86%	Yellow
(3, <=4)	345	4.62%	Blue
(4, <=5)	154	2.06%	Orange
(5, <=Max)	306	4.11%	Red
Total	7462	100%	

VOLTE



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1171	13.43%	Red
(0, <=5)	1905	21.84%	Orange
(5, <=10)	2237	25.65%	Blue
(10, <=15)	1655	18.98%	Yellow
(15, <=Max)	1754	20.10%	Green
Total	8722	100%	

III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	29.93%
Airtel VoLTE	99.22%
Jio VoLTE	100.00%
VIL VoLTE	100.00%

