



## Operator Assisted Drive Test Report

# Surat to Chhota Udaipur Highway

26-27 July. 2024

by

TRAI Regional office Gujrat

**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 from Surat to Chhota Udaipur via Kevadia from 9:00 AM to 6:30 PM on 26<sup>th</sup> & 27<sup>th</sup> July 2024. The drive test covered drive route of 220 KMs over a period of 2 days. Approximately 225 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 on 26<sup>th</sup> & 27<sup>th</sup> July. 2024 covering Surat-Chhota Udepur 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 220 KMs. Approximately 225 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 220 kms for download throughput in all technologies.  
2G – measurement – UE Locked in 2G file size- 500KB

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

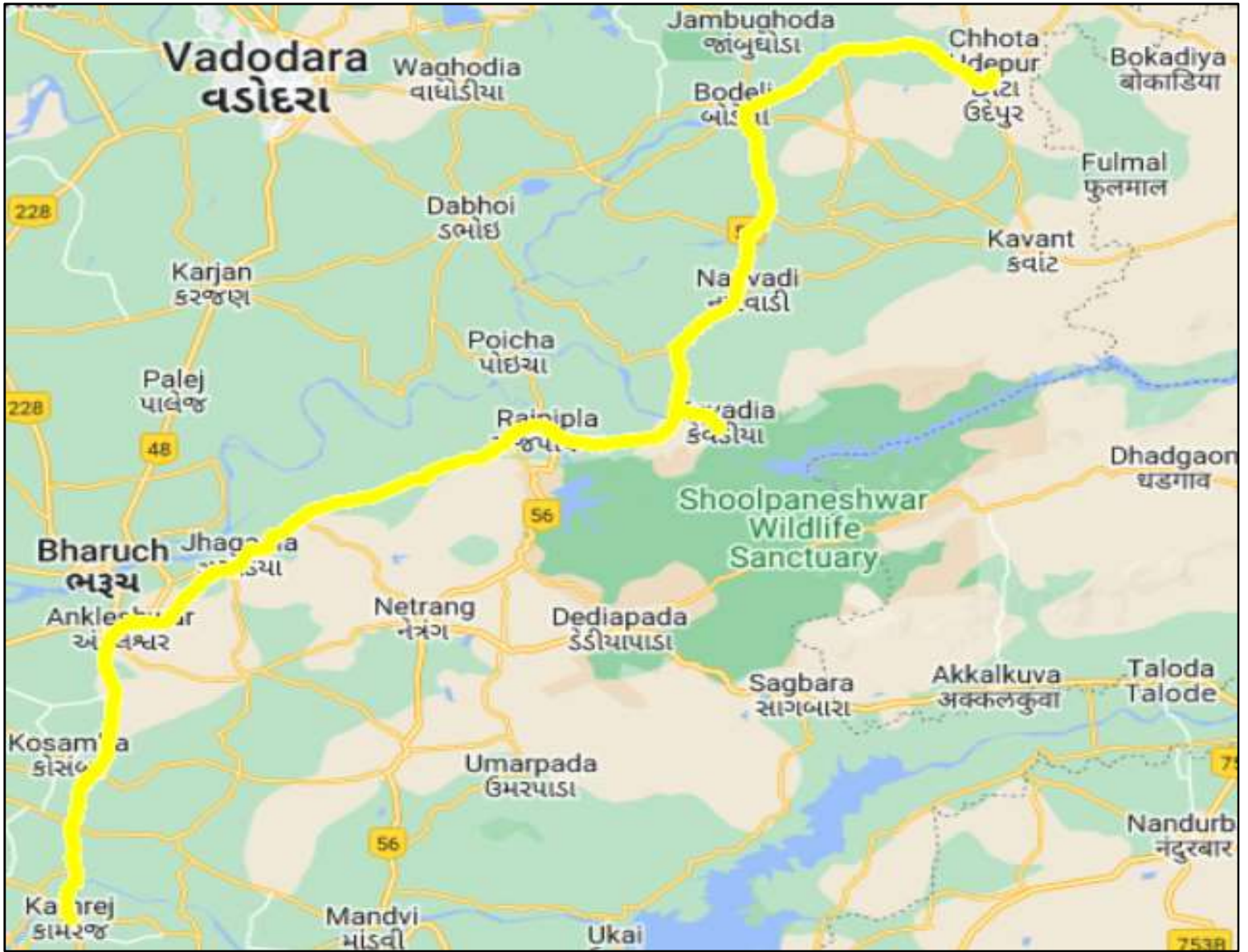
4G – measurement – UE in LTE /5G File Size- 40MB

## **Static data tests on 0 hotspots**

1.

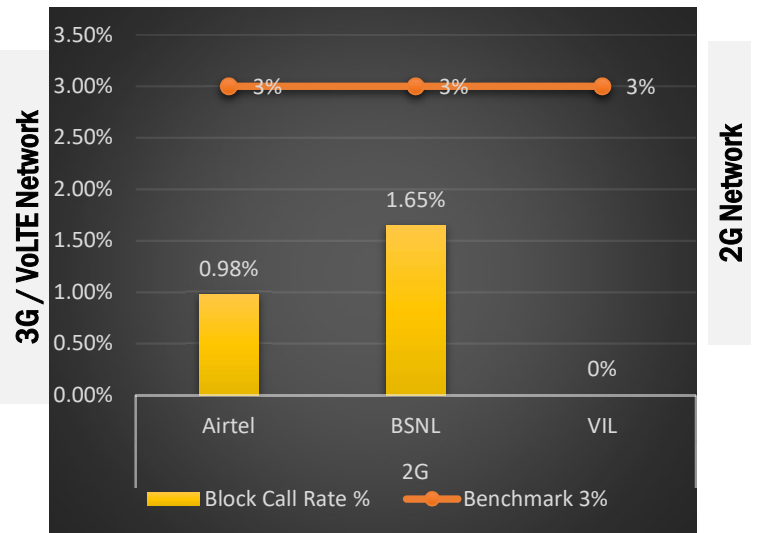
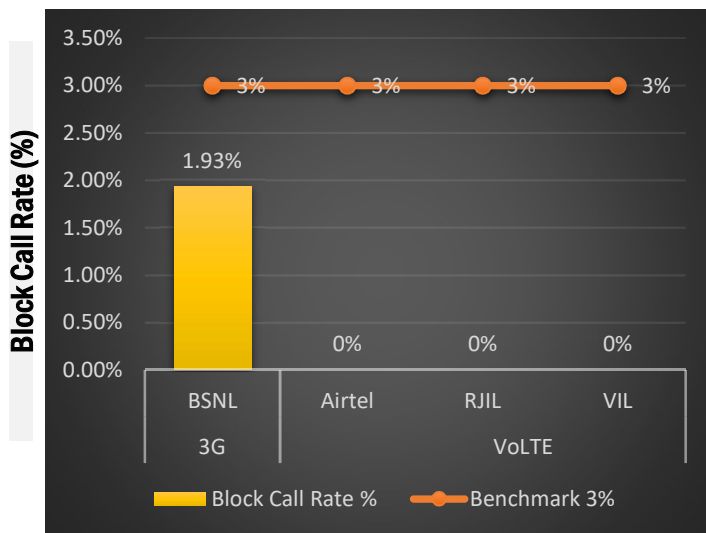
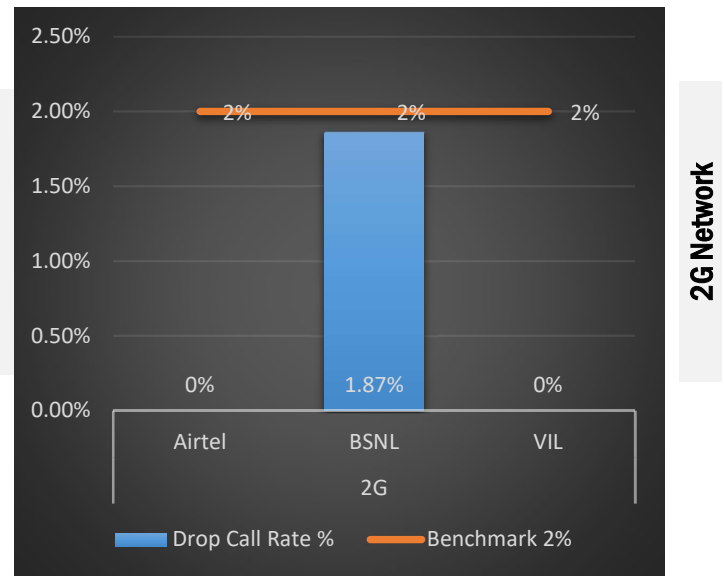
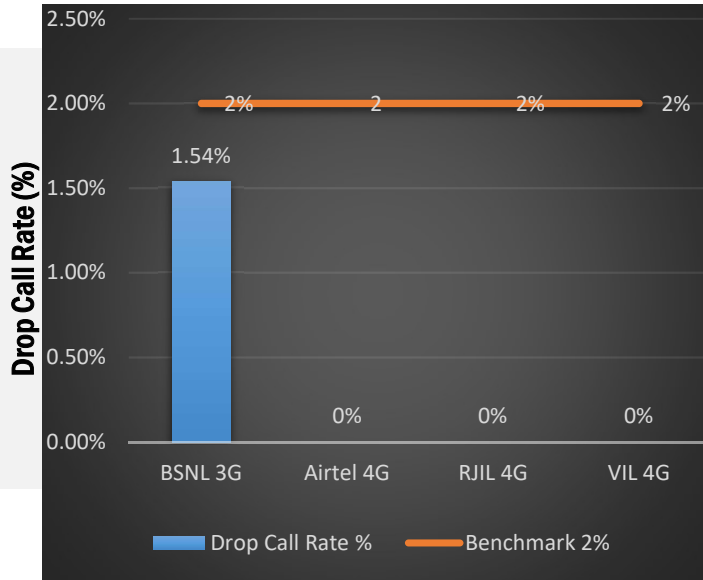
Service	Specifications
Download	2G (Locked) - 500KB, 3G (Dual) - 20 MB, 4G (Free) - 40 MB
Upload	2G (Locked) - 100KB, 3G (Dual) - 5 MB, 4G (Free) - 10 MB
Web Browsing	3 links of e/m commerce website www.amazon.in, www.flipkart.com and PayTm
Latency	32 Bytes on www.google.com

## Voice & Dynamic Data Test Drive Route



Date	Test Scenario	Area to be Covered
26 <sup>th</sup> July 2024	2G/3G/4G Voice and 3G/4G/5G Dynamic Data	<b>Starting Point</b> : Kamrej Cross Road 09:30AM :
27 <sup>th</sup> July 2024	2G/3G/4G Voice and 3G/4G/5G Dynamic Data	<b>Starting Point</b> : Krishna Hotel 09:30AM :

**QoS compliance of the TSPs on Surat to Chhota Udaipur Highway for Voice across technologies 2G/3G/4G-VoLTE:**



KPIs	2G			3G	4G		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0%	1.87%	0%	1.54%	0%	0%	0%
Block Call Rate %	0.98%	1.65%	0%	1.93%	0%	0%	0%

- 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 %	83.9%	40.14%	97.22%

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

TSPs	3G
	BSNL
Coverage %	33.77%

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

TSPs	VoLTE			
	Airtel	JIO	VIL	BSNL
Coverage %	90.37%	98.82%	90.72%	48.41%

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

TSPs	3G	4G	VoLTE		
	BSNL	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	93.57%	6.41%	100%	100%	98.47%

# Data Services Dynamic

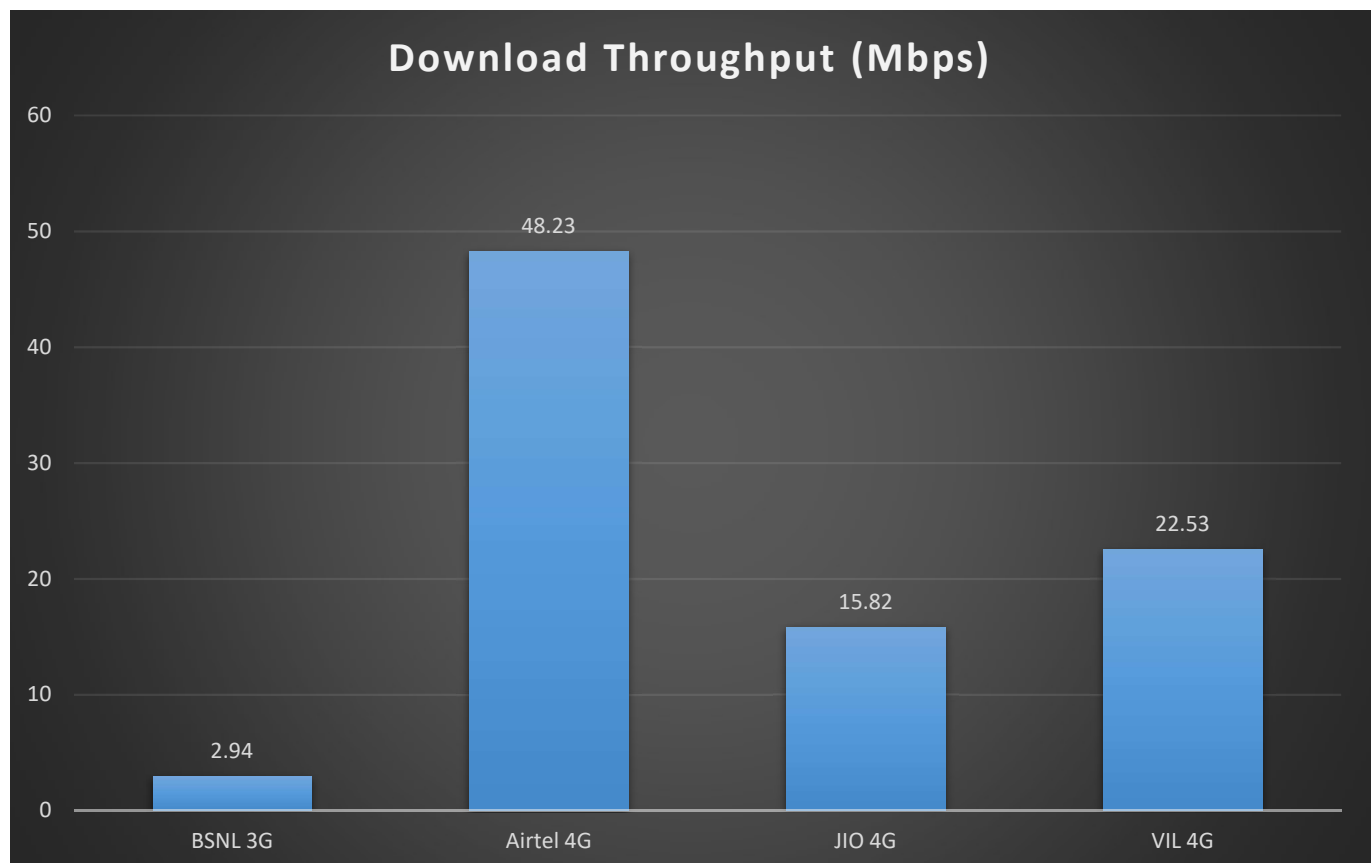
## Key Observations

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)	2.94	48.23	15.82	22.53



# Summary

## City Level Summary- Voice

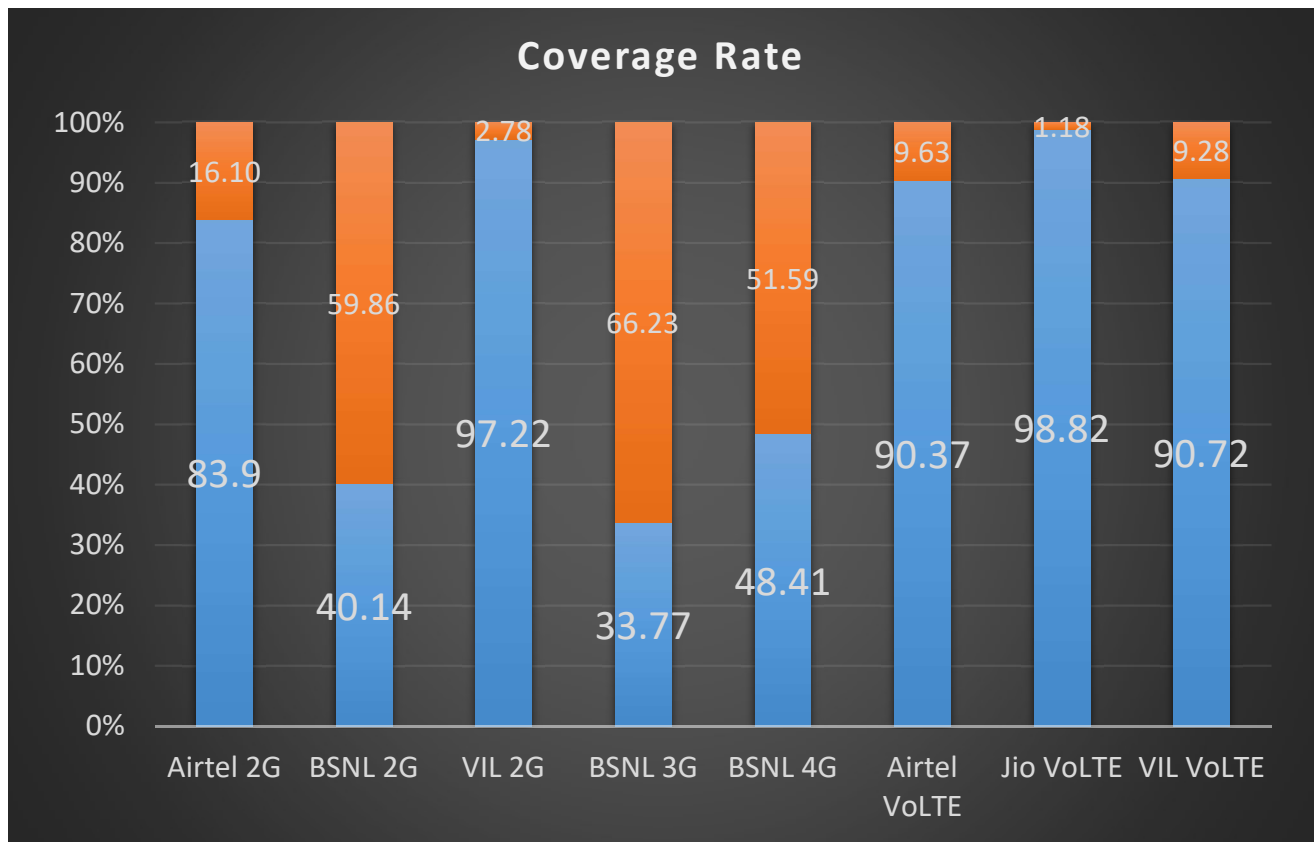
Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	204	277	232
Blocked Call Rate (%)	0.98%	1.67%	0%
CSSR% (Accessibility)	99.02%	95.32%	100%
Drop Call Rate (%)	0%	1.87%	0%
Mobility HOSR (%)	98.81%	95.34%	97.54%
Rx Quality (%)	96.44%	92%	96.18%
Average CST Sec	3.84	4.62	3.39

Voice Call	3G/VoLTE				
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE	BSNL 4G
Call Attempt	193	220	241	242	25
Blocked Call Rate (%)	1.93%	0%	0%	0%	0.021%
CSSR% (Accessibility)	96.23%	100%	100%	100%	98.21%
Drop Call Rate (%)	1.54%	0%	05	0%	1.87%
Mobility HOSR (%)	97.21%	98.76%	99.12%	97.38%	98.23%
Rx Quality (%)	81%	90.71%	92%	87.73%	87.59%
Average CST Sec	4.21	1.36	1.12	0.66	3.81

## 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  $\geq -110$ dBm. The details are as follows.

TSP	Coverage Rate %
Airtel 2G	83.9%
BSNL 2G	40.14%
VIL 2G	97.22%
BSNL 3G	33.77%
BSNL 4G	48.41%
Airtel VoLTE	90.37%
Jio VoLTE	98.82%
VIL VoLTE	90.72%

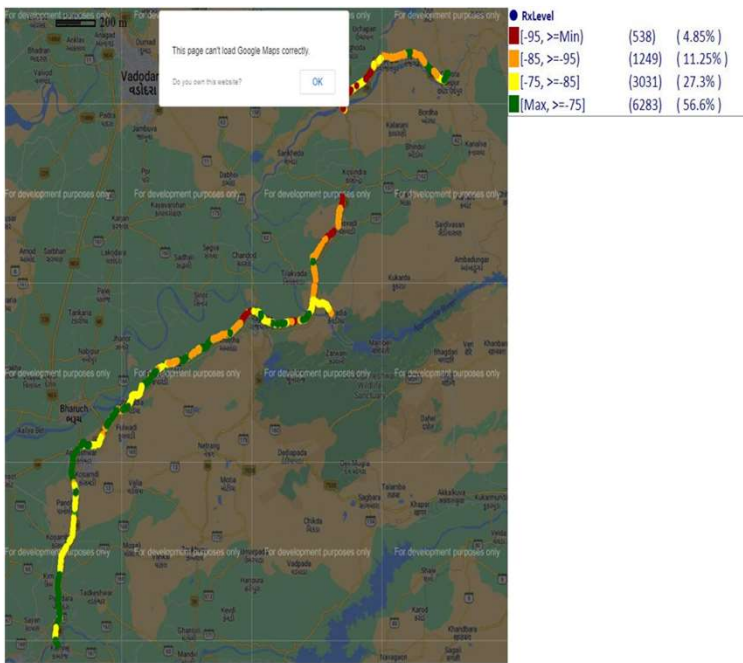




## TSP-AIRTEL

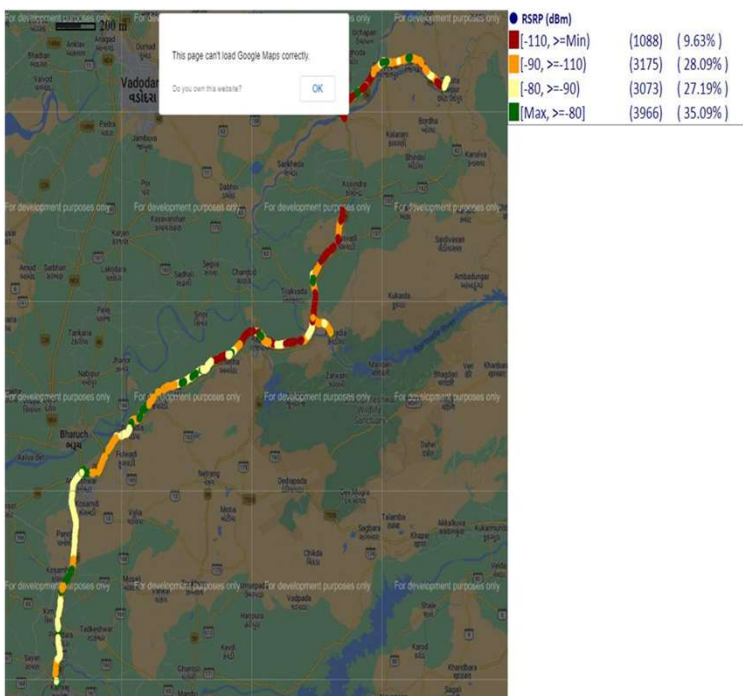
Technology	Coverage %
2G	83.9%
VoLTE	90.37%

2G



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	6283	56.60%	
[-75, >=-85)	3031	27.30%	
[-85, >=-95)	1249	11.25%	
[-95, >=Min)	538	4.85%	
<b>Total</b>	<b>11101</b>	<b>100%</b>	

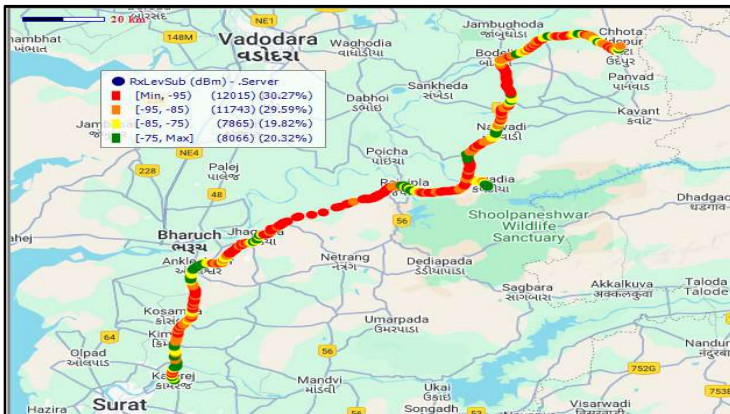
VoLTE



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	3966	35.09%	
[-80, >=-90)	3073	27.19%	
[-90, >=-110)	3175	28.09%	
[-110, >=Min)	1088	9.63%	
<b>Total</b>	<b>11302</b>	<b>100%</b>	

## TSP- BSNL

	Technology	Coverage %	
	2G	40.14%	
2G	3G	33.77%	3G



### 2G

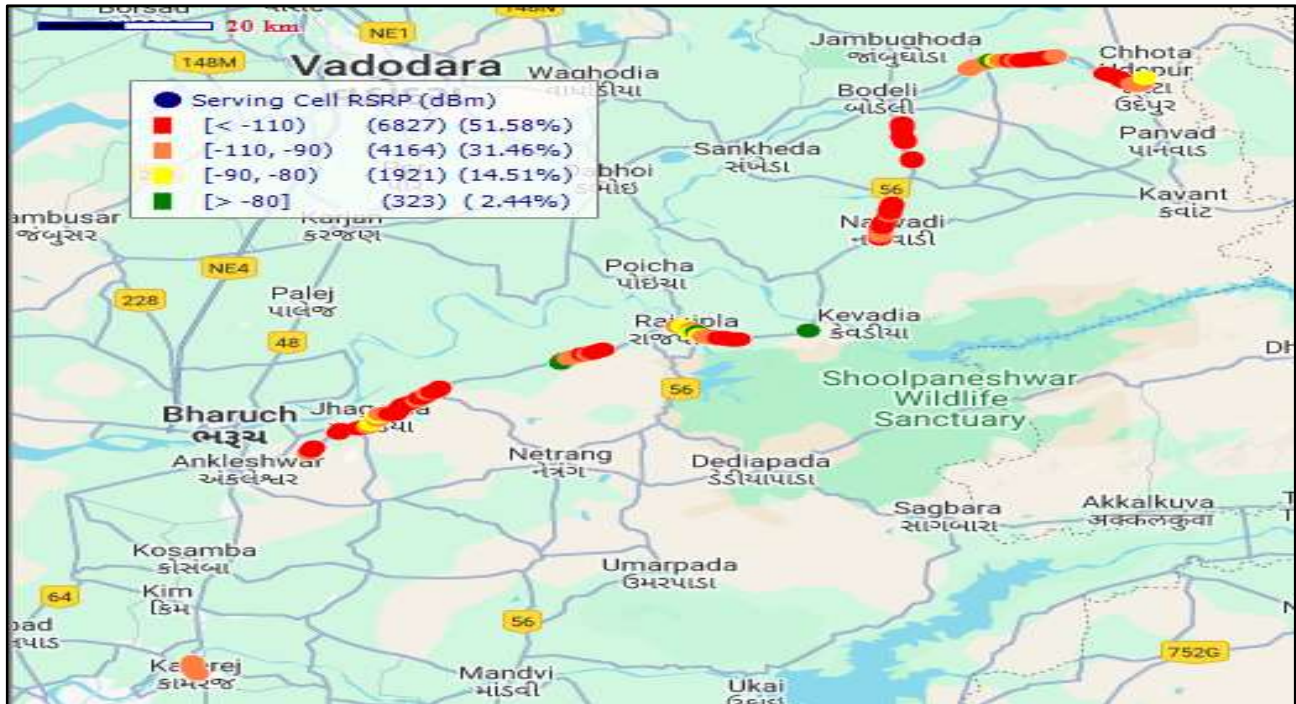
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	8066	20.32%	
[-75, >=-85)	7865	19.82%	
[-85, >=-95)	11743	29.59%	
[-95, >=Min)	12015	30.27%	
<b>Total</b>	<b>39689</b>	<b>100%</b>	

### 3G

Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	1137	3.87%	
[-70, >=-80)	3411	11.62%	
[-80, >=-90)	5367	18.28%	
[-90, >=Min)	19445	66.23%	
<b>Total</b>	<b>29360</b>	<b>100%</b>	

## TSP- BSNL

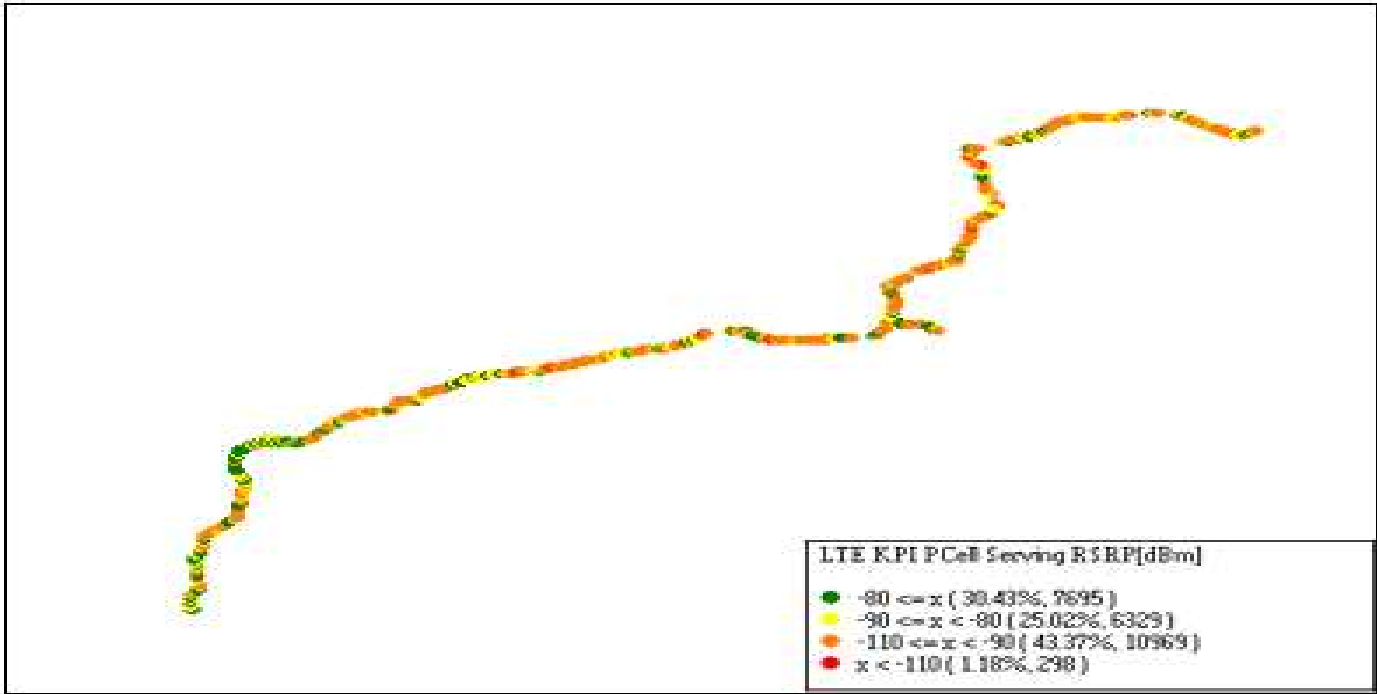
Technology	Coverage %
4G	48.41%



3G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-80]	323	2.44%	Green
[-80, >=-90)	1921	14.52%	Yellow
[-90, >=-110)	4164	31.46%	Orange
[-110, >=Min)	6827	51.58%	Red
<b>Total</b>	<b>13235</b>	<b>100%</b>	

JIO

Technology	Coverage %
VoLTE	98.82%



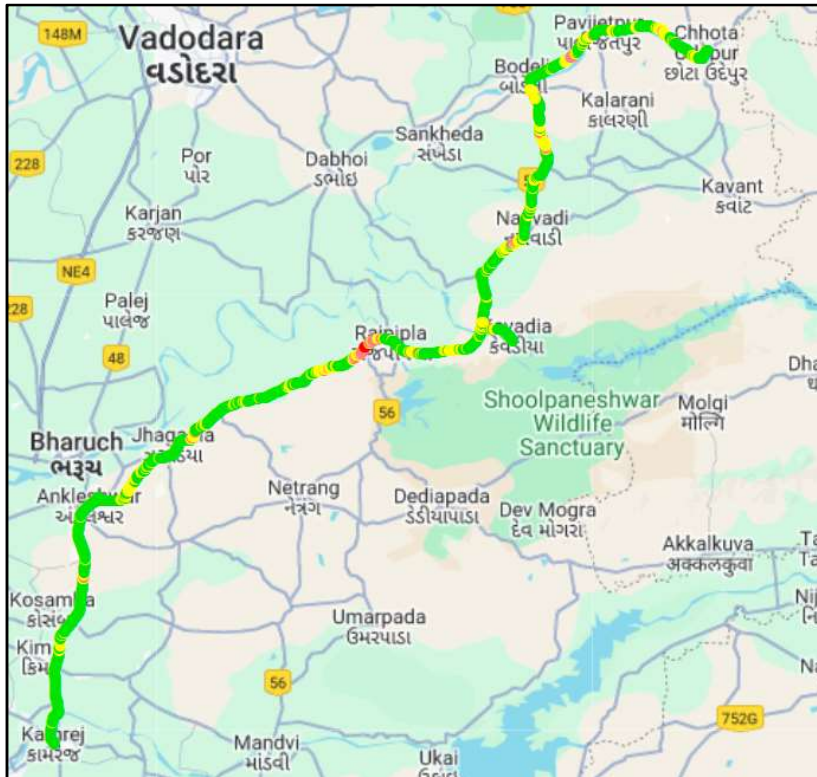
VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	7695	30.43%	<span style="background-color: green; width: 20px; height: 10px; display: inline-block;"></span>
[-80, >=-90)	6329	25.02%	<span style="background-color: yellow; width: 20px; height: 10px; display: inline-block;"></span>
[-90, >=-110)	10969	43.37%	<span style="background-color: orange; width: 20px; height: 10px; display: inline-block;"></span>
[-110, >=Min)	298	1.18%	<span style="background-color: red; width: 20px; height: 10px; display: inline-block;"></span>
<b>Total</b>	<b>25291</b>	<b>100%</b>	



## VIL

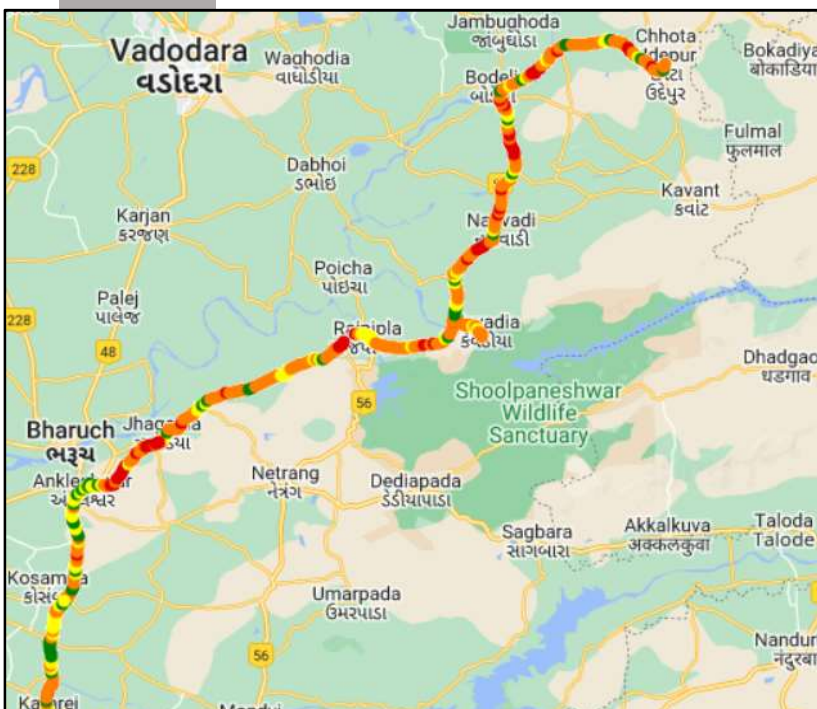
2G

Technology	Coverage Rate %
2G	97.22%
VoLTE	90.72%



2G			
Overall Rx Level	# Samples	% PDF	Legends
[Max, >=-75]	19092	80.11%	Green
[-75, >=-85]	4077	17.11%	Yellow
[-85, >=-95]	636	2.67%	Orange
[-95, >=Min)	28	0.11%	Red
<b>Total</b>	<b>23833</b>	<b>100%</b>	

VoLTE

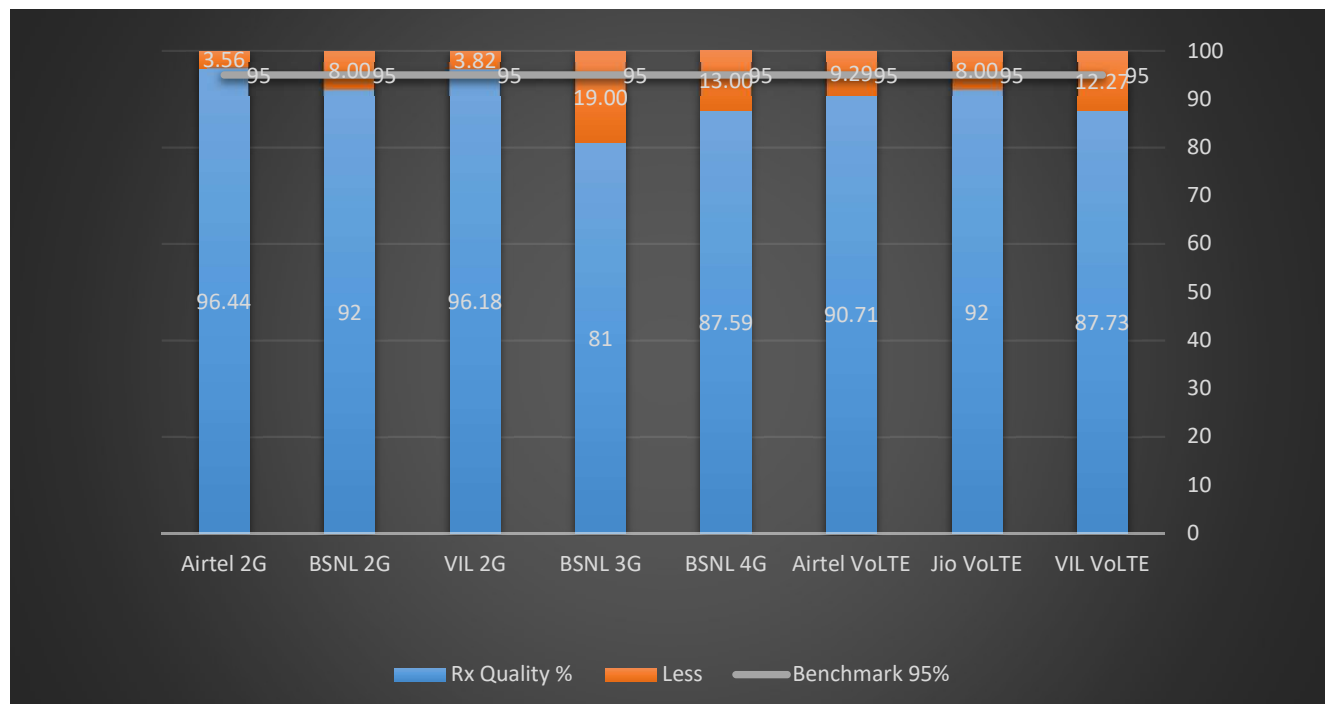


VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	1991	15.71%	Green
[-80, >=-90]	3166	24.99%	Yellow
[-90, >=-110]	6337	50.02%	Orange
[-110, >=Min)	1176	9.28%	Red
<b>Total</b>	<b>12670</b>	<b>100%</b>	

## II. Quality Details

For measuring voice quality, as per the QoS norms, RxQual  $\leq 5$  for GSM TSPs, EcNo  $\geq -14$  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  $\geq 95\%$ .

<u>TSP</u>	Rx Quality %
Airtel 2G	96.44%
BSNL 2G	92%
VIL 2G	96.18%
BSNL 3G	81%
BSNL 4G	87.59%
Airtel VoLTE	90.71%
Jio VoLTE	92%
VIL VoLTE	87.73%

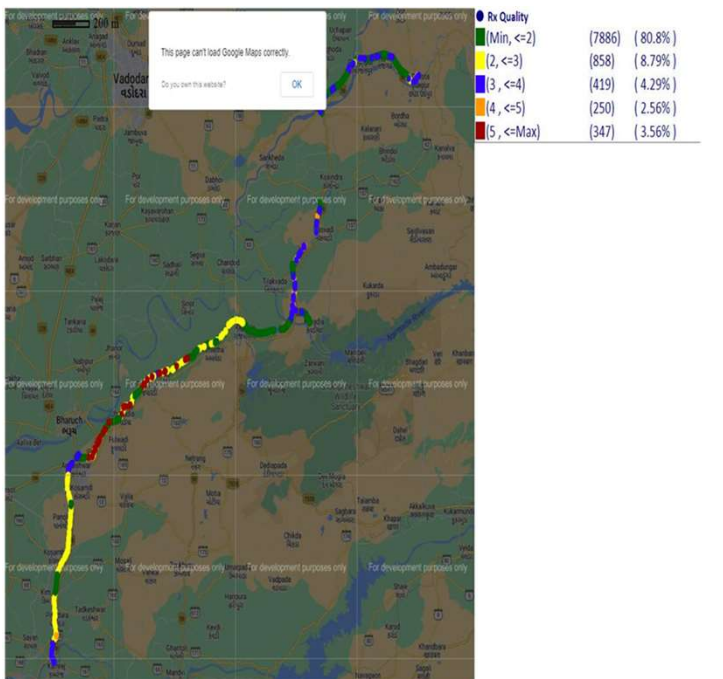


## II. Quality Details

### Airtel

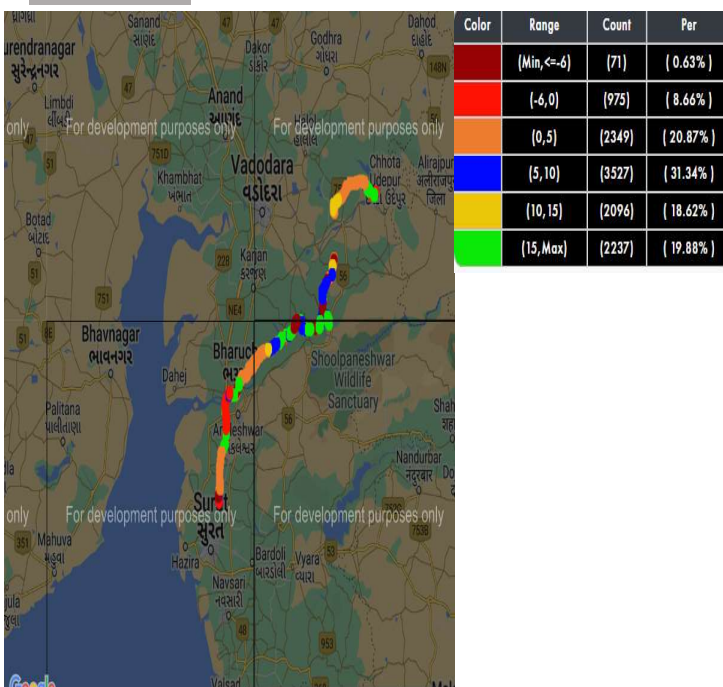
Technology	Rx Quality %
2G	96.44%
VoLTE	90.71%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	7886	80.80%	
(2, <=3)	858	8.79%	
(3, <=4)	419	4.29%	
(4, <=5)	250	2.56%	
(5, <=Max)	347	3.56%	
<b>Total</b>	<b>9760</b>	<b>100%</b>	

VoLTE



Overall SINR	# Samples	% PDF	Legends
(Min, <=-6)	71	0.63%	
(-6, <=0)	975	8.66%	
(0, <=5)	2349	20.87%	
(5, <=10)	3527	31.34%	
(10, <=15)	2096	18.62%	
(15, <=Max)	2237	19.88%	
<b>Total</b>	<b>11255</b>	<b>100%</b>	



## II. Quality Details

### BSNL

Technology

Rx Quality %

2G

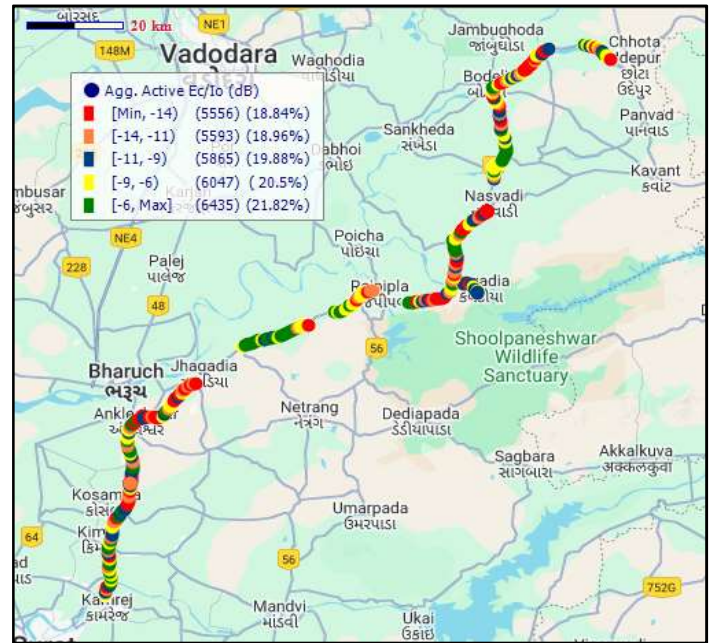
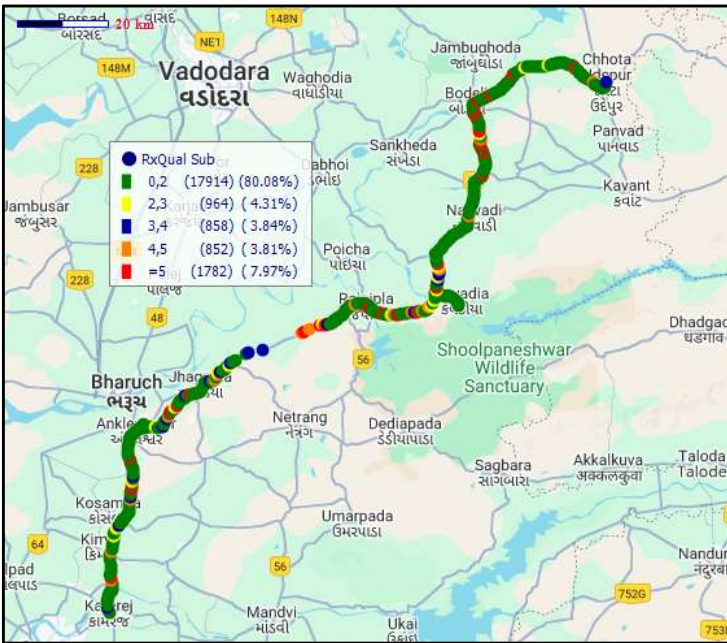
92%

3G

81%

2G

3G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	17914	80.08%	
(2, <=3)	964	4.30%	
(3, <=4)	858	3.84%	
(4, <=5)	852	3.81%	
(5, <=Max)	1782	7.97%	
<b>Total</b>	<b>22370</b>	<b>100%</b>	

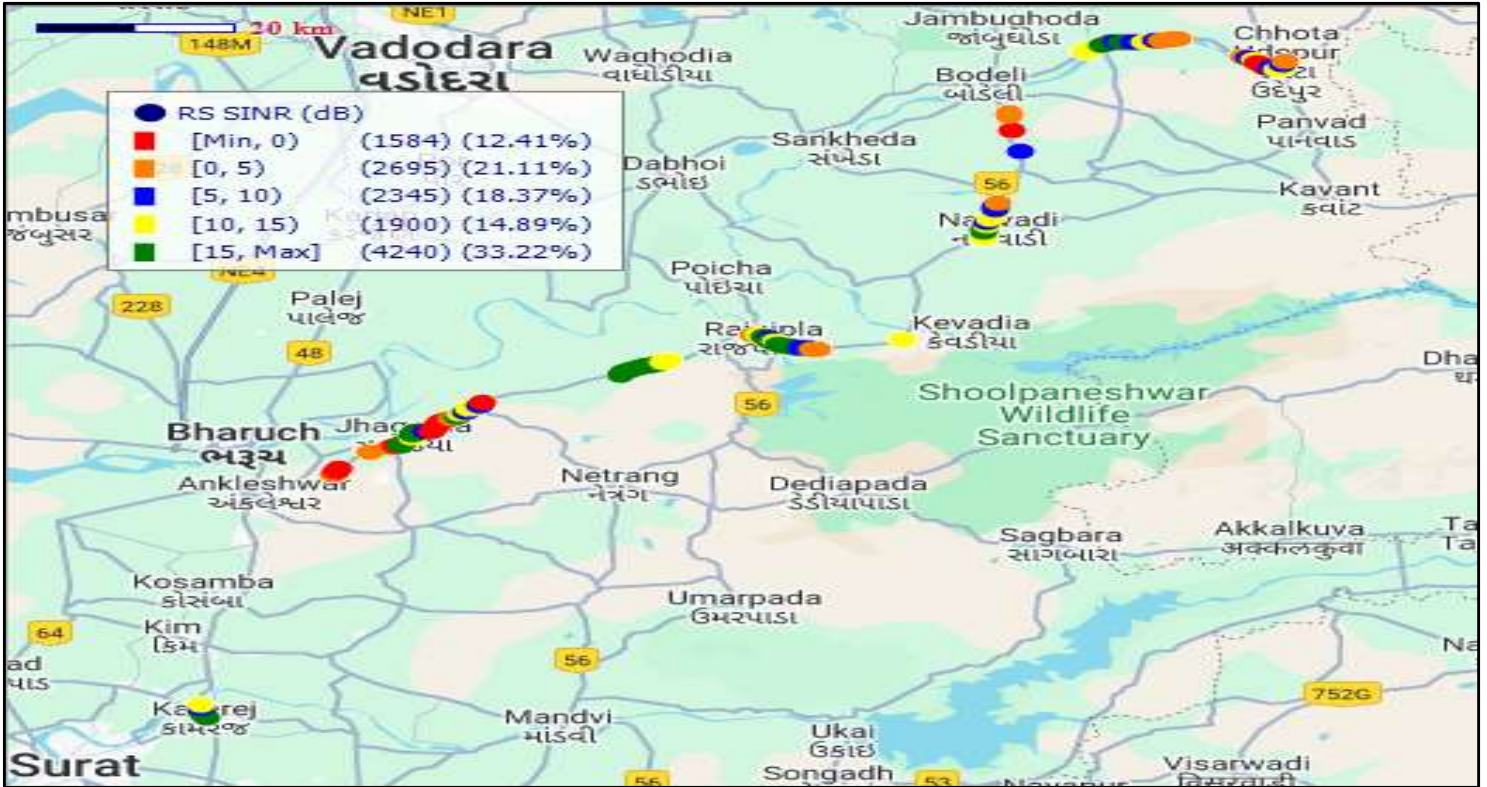
Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	6435	21.82%	
(-6, <=-9)	6047	20.5%	
(-9, <=-11)	5865	19.88%	
(-11, <=-14)	5593	18.96%	
(-14, <= Min)	5556	18.84%	
<b>Total</b>	<b>29496</b>	<b>100%</b>	



## II. Quality Details

### BSNL

Technology	Rx Quality %
4G	<b>87.59%</b>



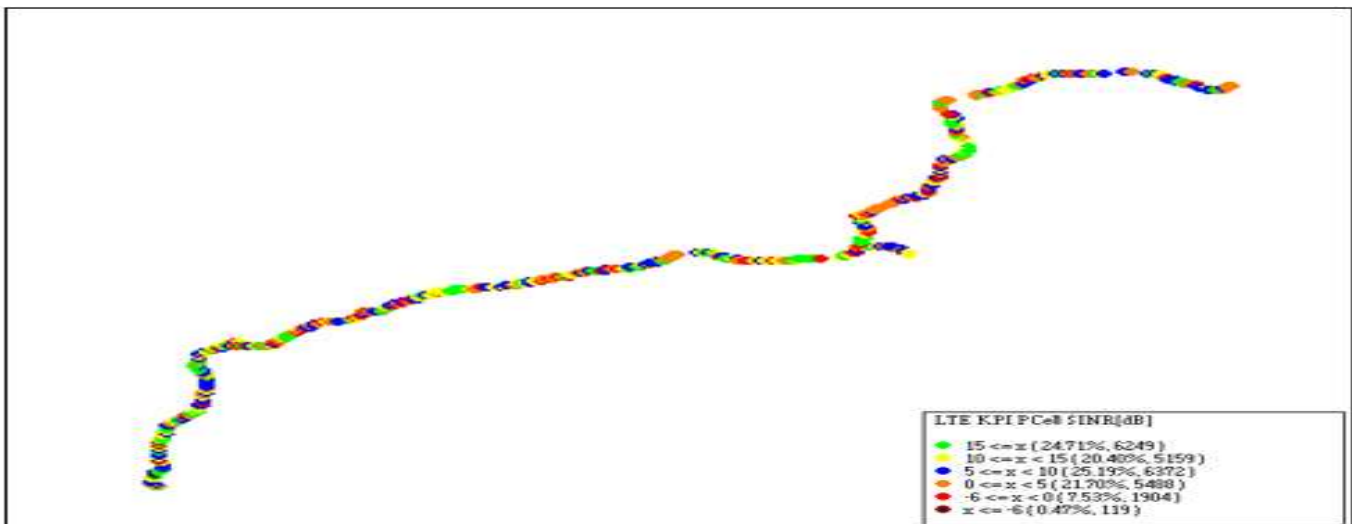
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1584	12.41%	
(0, <=5)	2695	21.11%	
(5, <=10)	2345	18.37%	
(10, <=15)	1900	14.89%	
(15, <=Max)	4240	33.22%	
Total	12764	100%	

## II. Quality Details

For measuring voice quality, as per the QoS norms, RxQual  $\leq 5$  for GSM TSPs, EcNo  $\geq -14$  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	<b>92%</b>



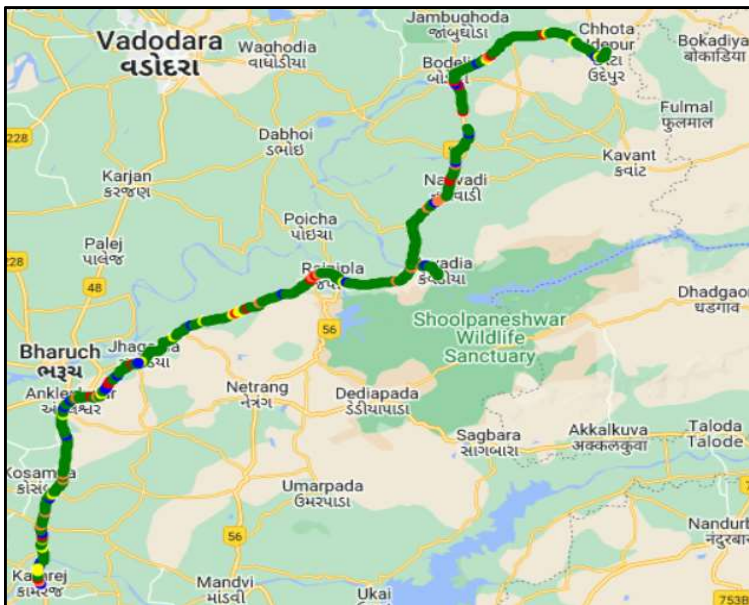
Overall SINR	# Samples	% PDF	Legends
(Min, $\leq -6$ )	119	0.47%	
(-6, $\leq 0$ )	1904	7.53%	
(0, $\leq 5$ )	5458	21.7%	
(5, $\leq 10$ )	6372	25.19%	
(10, $\leq 15$ )	5159	20.4%	
(15, $\leq \text{Max}$ )	6249	24.71%	
<b>Total</b>	<b>25261</b>	<b>100%</b>	

## II. Quality Details

### VIL

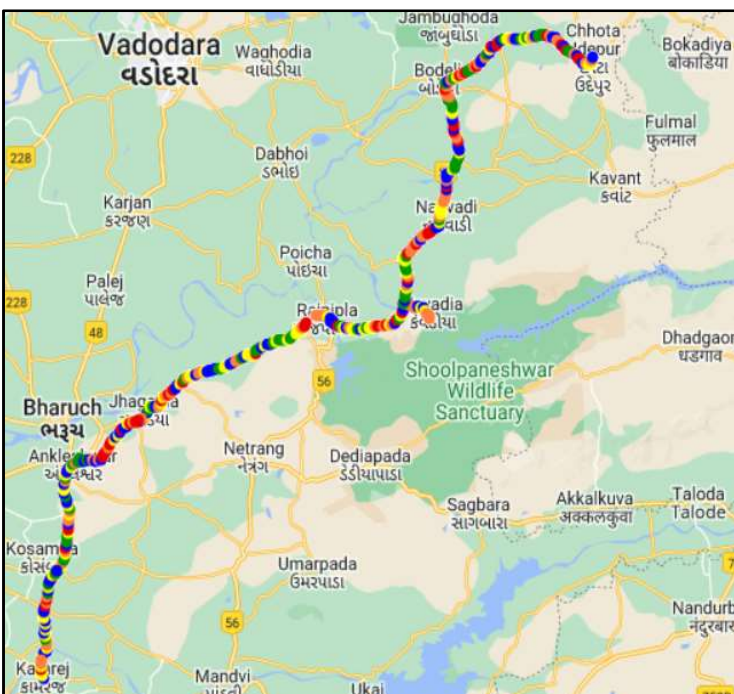
Technology	Rx Quality %
2G	96.18%
4G	87.73%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	8857	81.94%	Green
(2, <=3)	568	5.25%	Yellow
(3, <=4)	623	5.76%	Blue
(4, <=5)	349	3.23%	Orange
(5, <=Max)	412	3.82%	Red
<b>Total</b>	<b>10809</b>	<b>100%</b>	

VoLTE



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1554	12.27%	Red
(0, <=5)	2585	20.41%	Orange
(5, <=10)	3174	25.06%	Blue
(10, <=15)	2532	19.99%	Yellow
(15, <=Max)	2820	22.27%	Green
<b>Total</b>	<b>12665</b>	<b>100%</b>	

### III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	93.57%
BSNL 4G	6.41%
Airtel VoLTE	100%
Jio VoLTE	100%
VIL VoLTE	98.47%

