



# Operator Assisted Drive Test Report

## Gandhidham City, Kandala Port & Nearby area

17<sup>th</sup> January. to 20<sup>th</sup> January.  
2023

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 Gandhidham City, Kandala Port and surrounding areas from 9:00 AM to 8:00 PM during 17<sup>th</sup> Jan. to 20<sup>th</sup> Jan 2023. The drive test covered drive route of 225 KMs & 5 no hotspots over a period of 4 days. Approximately 350 calls were made in Gandhidham and approx. 30 Calls were made in Deendayal Port Kandala for each of the 4 networks: three 2G networks, and four LTE networks covering four TSPs.

Overview

Voice  
Summary

Data  
Summary

# Overview

Regional Office, TRAI Jaipur conducted Operator Assisted Drive Test from 17<sup>th</sup> January. 2023 to 20<sup>th</sup> January 2023 covering Gandhidham City, Deendayal Port Kandala and surrounding areas. The performance of Airtel, BSNL, Vodafone Idea and Jio was monitored across various technologies (2G 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 225 KMs. Approximately 350 calls from Gandhidham City and 30 Calls from Dendayal Port were made for each of the 4 networks: three 2G (Lock Mode) networks and Four VoLTE networks covering 4 unique TSPs.

## Data Tests:

**Dynamic data test** was conducted for 225 kms for download throughput in all technologies. 2G – measurement – UE Locked in 2G file size- 500KB

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

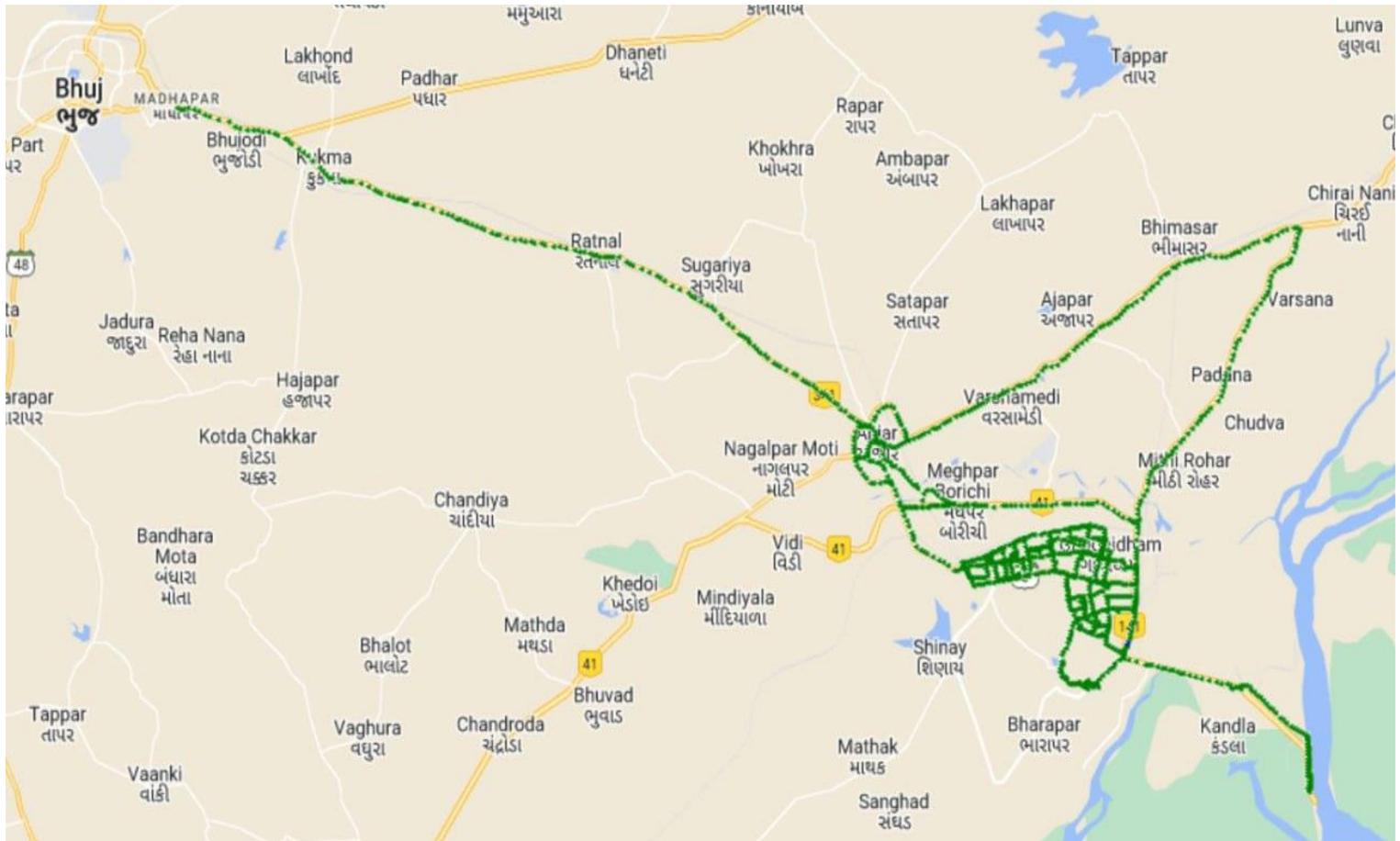
## Static data tests on 5 hotspots

1. North Gate, Kandala Port Trust
2. Bandar Gate, Kandala Port Trust
3. Railway Station, Gandhidham
4. Banking Circle Gandhidham
5. Tolani College, Gandhidham

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
17-Jan-23	2G/3G/4G Voice and 3G/4G Dynamic Data	<b>Starting Point Oslo Circle at 9:30 AM</b> : Kandla port, KASEZ, Ganesh Nagar Society, Jagjivan Nagar, Uday Nagar, Sector 8, Ward 10, Ward 12, Ward 13, Maheshwari Nagar, Ward 1, Ward 2, Ward 3, Ward 4, Ward 5, Ward 9, Ward 10, Galpadar, BSF Campus, Swaminarayan Nagar
18-Jan-23	2G/3G/4G Voice and 3G/4G Dynamic Data	<b>Starting Point Anjar DYSP Office at 9.30 AM</b> : Panchvati, Sorathiya Naka, Mahadev, Vrundavan, Gayatri society, Muktidham society and connecting highway between Gandhidham- Bhachau- Bhimsar - Anjar
19-Jan-23	2G/3G/4G Voice and 3G/4G Dynamic Data	<b>Starting Point Kalash Circle, Anjar at 9:30 AM</b> : Gandhidham to Bhuj highway Drive
20-Jan-23	Hot Spots- 2G/3G/4G Static Data Tests	<ol style="list-style-type: none"> <li>1. North Gate, KPT</li> <li>2. Bandar Gate, KPT</li> <li>3. Railway Station</li> <li>4. Banking Circle</li> <li>5. Tolani Arts and Commerce Collage</li> </ol>

# Overview

## Data Service Test- Static Locations



### Hotspot Locations

**1 North Gate KPT**

**2 Bandar Gate KPT**

**3 Railway Station**

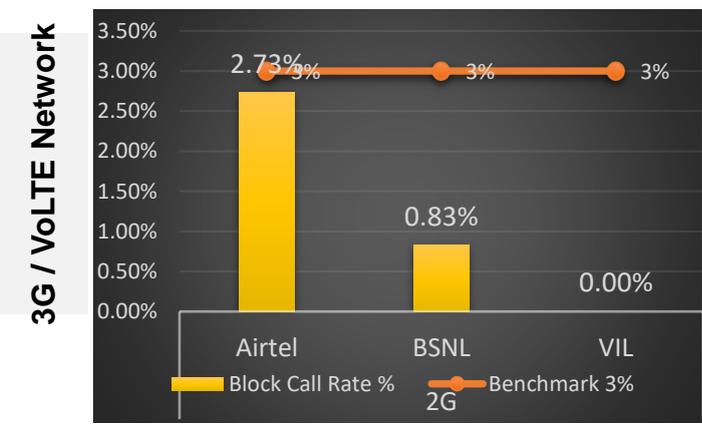
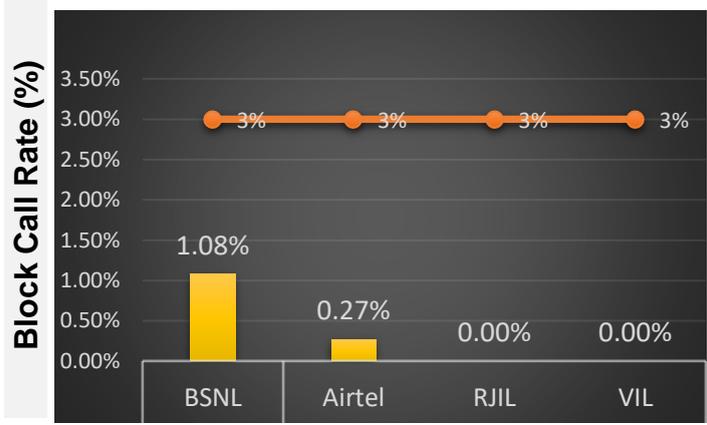
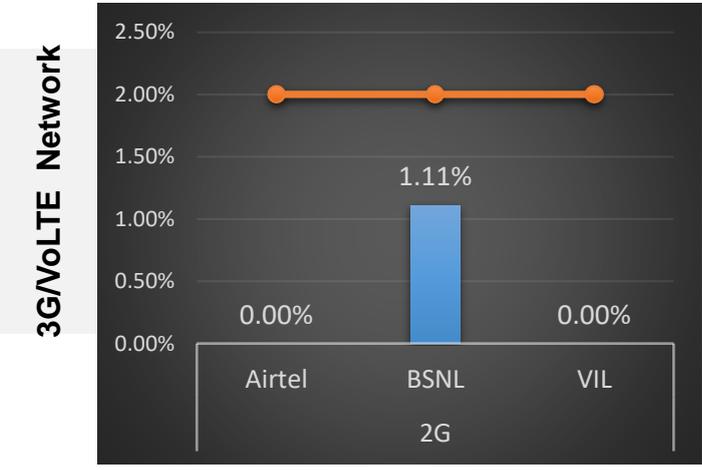
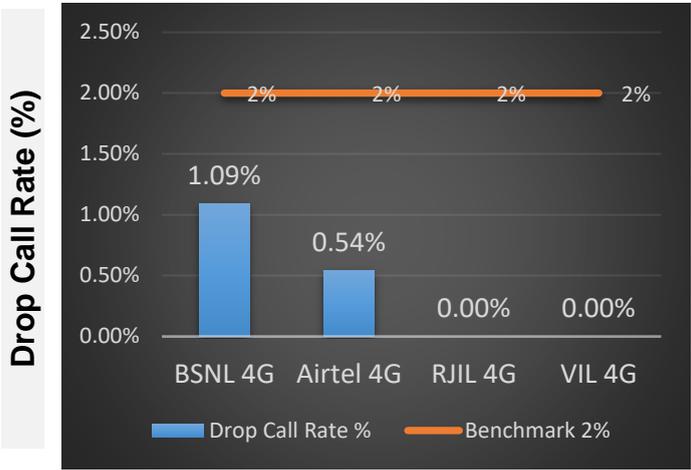
**4 Banking Circle**

**5 Tolani Collage**

# Voice Calls

## Key Observations

QoS compliance of the TSPs in Gandhidham for Voice across technologies 2G/ 4G-VoLTE:



KPIs	2G			4G			
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0.00%	1.11%	0.00%	1.09%	0.54%	0.00%	0.00%
Block Call Rate %	2.73%	0.83%	0.00%	1.08%	0.27%	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 %	96.31%	85.64%	93.50%

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

-NA-

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

TSPs	VoLTE			
	BSNL	Airtel	JIO	VIL
Coverage %	97.65%	99.07%	99.76%	98.89%

d) Percentage of time spent on 4G network

TSPs	VoLTE			
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	90.72%	99.79%	100.00%	100.00%

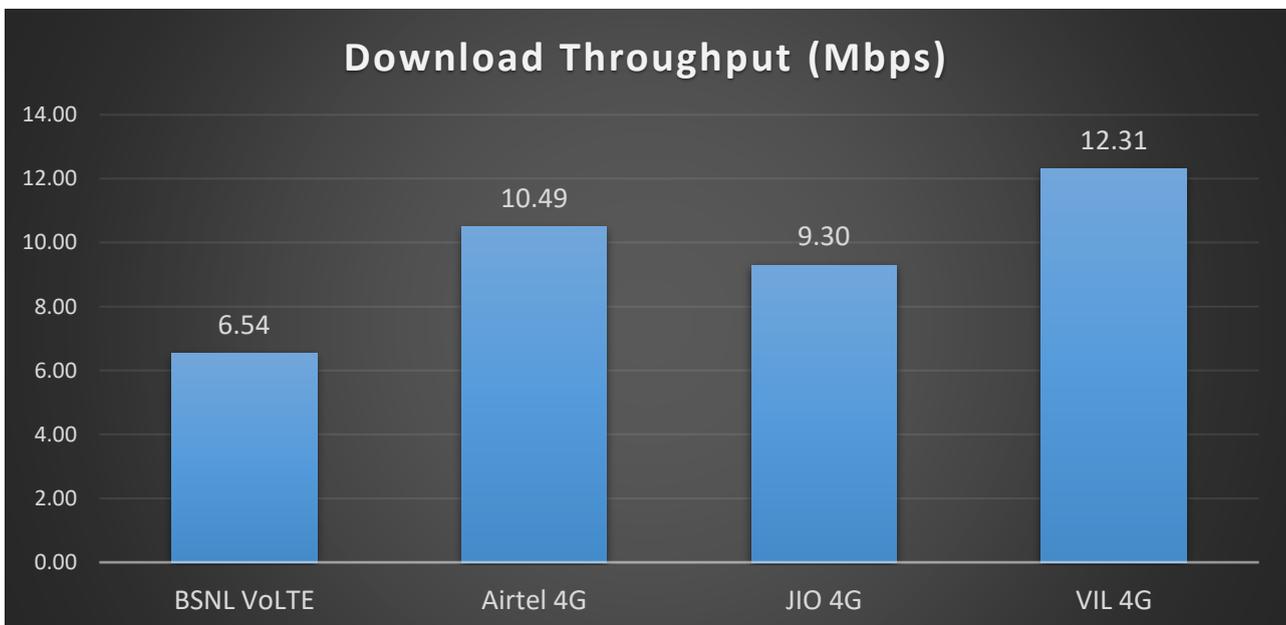
# Data Services Dynamic

## Key Observations

Dynamic Data was tested for 225 Kms. 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)	<b>6.54</b>	<b>10.49</b>	<b>9.30</b>	<b>12.31</b>

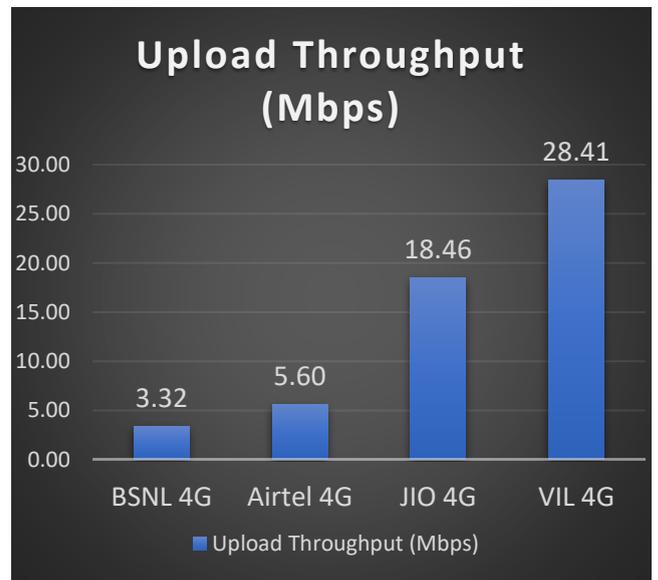
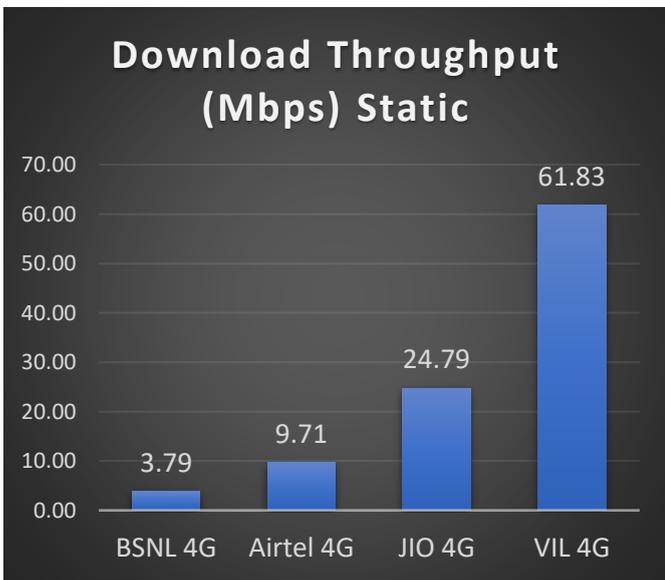
# Data Services Static

## Key Observations

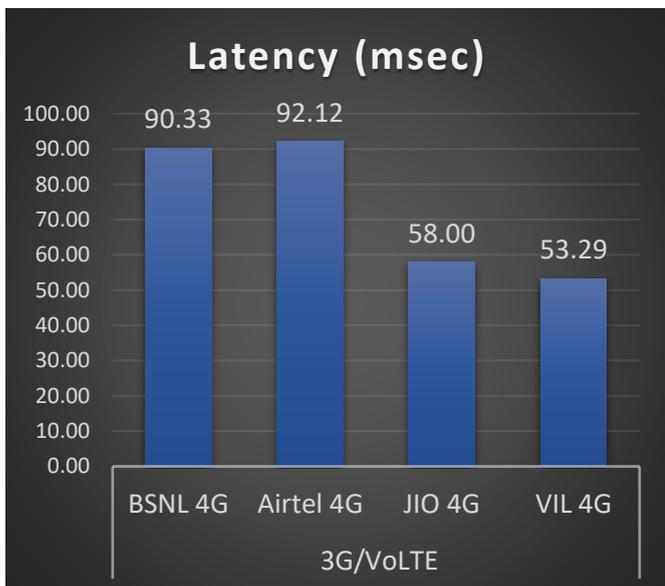
Data was tested at 5 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, PayTm)

### Data Download and Upload Performance (kbps)

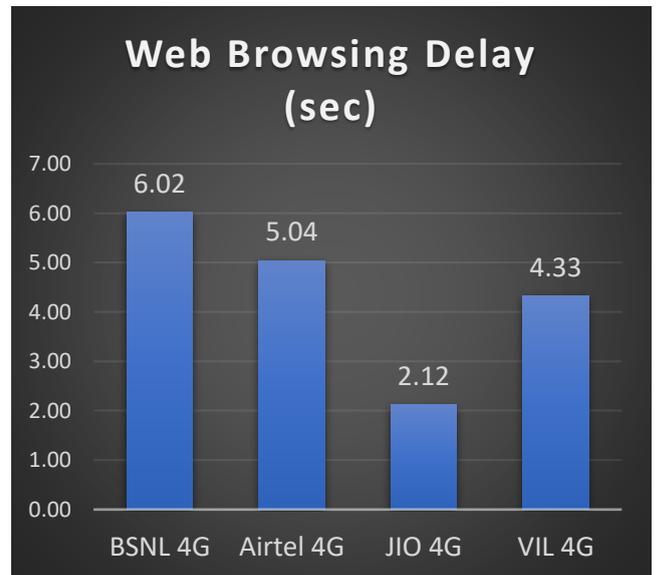
3G/4G/ Network:



### Latency (ms)



### Web Browsing (Sec)



# Summary

## City Level Summary- Voice - Gandhidham

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	329	354	211
Blocked Call Rate (%)	2.73%	0.84%	0.00%
CSSR% (Accessibility)	97.27%	99.16%	100.00%
Drop Call Rate (%)	0.00%	1.13%	0.00%
Mobility HOSR (%)	98.74%	99.38%	96.76%
Rx Quality (%)	93.65%	99.41%	96.93%
Average CST Sec	3.22	2.60	3.71

Voice Call	VoLTE			
	BSNL VoLTE	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	363	368	425	209
Blocked Call Rate (%)	1.10%	0.27%	0.00%	0.00%
CSSR% (Accessibility)	98.90%	99.73%	100.00%	100.00%
Drop Call Rate (%)	1.11%	0.54%	0.00%	0.00%
Mobility HOSR (%)	99.58%	99.89%	98.44%	99.80%
Rx Quality (%)	98.63%	70.46%	88.78%	84.94%
Average CST Sec	0.99	1.09	0.50	0.39

# Summary

## City Level Summary- Voice – **Kandala Port**

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	27	8	14
Blocked Call Rate (%)	0.00%	0.00%	0.00%
CSSR% (Accessibility)	100.00%	100.00%	100.00%
Drop Call Rate (%)	0.00%	0.00%	0.00%
Mobility HOSR (%)	95.46%	100.00%	97.66%
Rx Quality (%)	92.40%	99.41%	96.35%
Average CST Sec	3.40	2.60	3.77

Voice Call	VoLTE			
	BSNL VoLTE	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	8	31	26	16
Blocked Call Rate (%)	0.00%	0.00%	0.00%	0.00%
CSSR% (Accessibility)	100.00%	100.00%	100.00%	100.00%
Drop Call Rate (%)	0.00%	0.00%	0.00%	0.00%
Mobility HOSR (%)	100.00%	100.00%	100.00%	99.80%
Rx Quality (%)	98.63%	56.66%	88.86%	88.42%
Average CST Sec	0.99	0.92	0.57	0.39

# Summary

## City Level Summary- Data Services- Gandhidham

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	162.16	151.23	251.90
Upload Throughput (kbps)	54.91	76.22	221.18
Web Browsing Delay (sec)	81.74	13.85	51.22
Latency (msec)	347.00	242.99	241.40

Data Services Static	3G / 4G			
	BSNL 4G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	3.79	9.71	24.79	61.83
Upload Throughput(Mbps)	3.32	5.60	18.46	28.41
Video Streaming Delay (sec)	8.56	0.32	0.31	0.08
Web Browsing Delay (sec)	6.02	5.04	2.12	4.33
Latency (msec)	90.33	92.12	58.00	53.29

<u>North Gate Kandla Port</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	<b>145.77</b>	<b>148.47</b>	<b>337.92</b>
Upload Throughput (kbps)	<b>36.10</b>	<b>63.21</b>	<b>276.48</b>
Web Browsing Delay (sec)	<b>88.34</b>	<b>14.81</b>	<b>55.56</b>
Latency (msec)	<b>387.00</b>	<b>275.66</b>	<b>215.36</b>

<u>Bandar Gate Kandala Port</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	<b>187.77</b>	<b>150.60</b>	<b>389.12</b>
Upload Throughput (kbps)	<b>64.93</b>	<b>78.60</b>	<b>307.20</b>
Web Browsing Delay (sec)	<b>57.43</b>	<b>13.65</b>	<b>42.77</b>
Latency (msec)	<b>328.00</b>	<b>169.00</b>	<b>276.17</b>

<u>Railway Station Gandhidham</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	189.50	186.70	143.36
Upload Throughput (kbps)	58.25	94.33	153.60
Web Browsing Delay (sec)	83.59	13.21	52.12
Latency (msec)	364.00	166.66	391.21

<u>Banking Circle</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	188.03	169.24	204.80
Upload Throughput (kbps)	45.80	82.19	235.52
Web Browsing Delay (sec)	83.75	13.94	41.00
Latency (msec)	358.00	313.66	242.00

<u>Tolani College</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	99.70	101.15	184.32
Upload Throughput (kbps)	69.48	62.75	133.12
Web Browsing Delay (sec)	95.57	13.63	33.70
Latency (msec)	298.00	290.00	249.13

# Data Services static

## City Level Summary- Deendayal Port , Kandala

<u>North Gate Kandla Port</u>	4G			
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	1.72	10.09	28.50	98.80
Upload Throughput (mbps)	1.19	0.82	7.79	21.80
Video Streaming Delay ( Secs.)	9.00	0.27	0.26	0.05
Web Browsing Delay (sec)	7.68	4.50	2.13	4.22
Latency (msec)	86.00	110.00	63.30	54.39

<u>Bandar Gate Kandala Port</u>	4G			
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	1.84	8.07	12.86	46.40
Upload Throughput (mbps)	0.91	4.94	7.90	24.63
Video Streaming Delay ( Secs.)	22.90	0.13	0.32	0.00
Web Browsing Delay (sec)	10.40	4.79	2.06	4.32
Latency (msec)	128.00	91.72	62.30	52.78

# Data Services static

## City Level Summary- Gandhidham

<u>Railway Station Gandhidham</u>	4G			
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	4.36	5.43	23.95	45.20
Upload Throughput (mbps)	2.88	8.90	24.56	37.10
Video Streaming Delay ( Secs.)	8.90	0.02	0.26	0.03
Web Browsing Delay (sec)	5.35	4.10	2.10	4.31
Latency (msec)	81.66	79.11	50.70	45.78

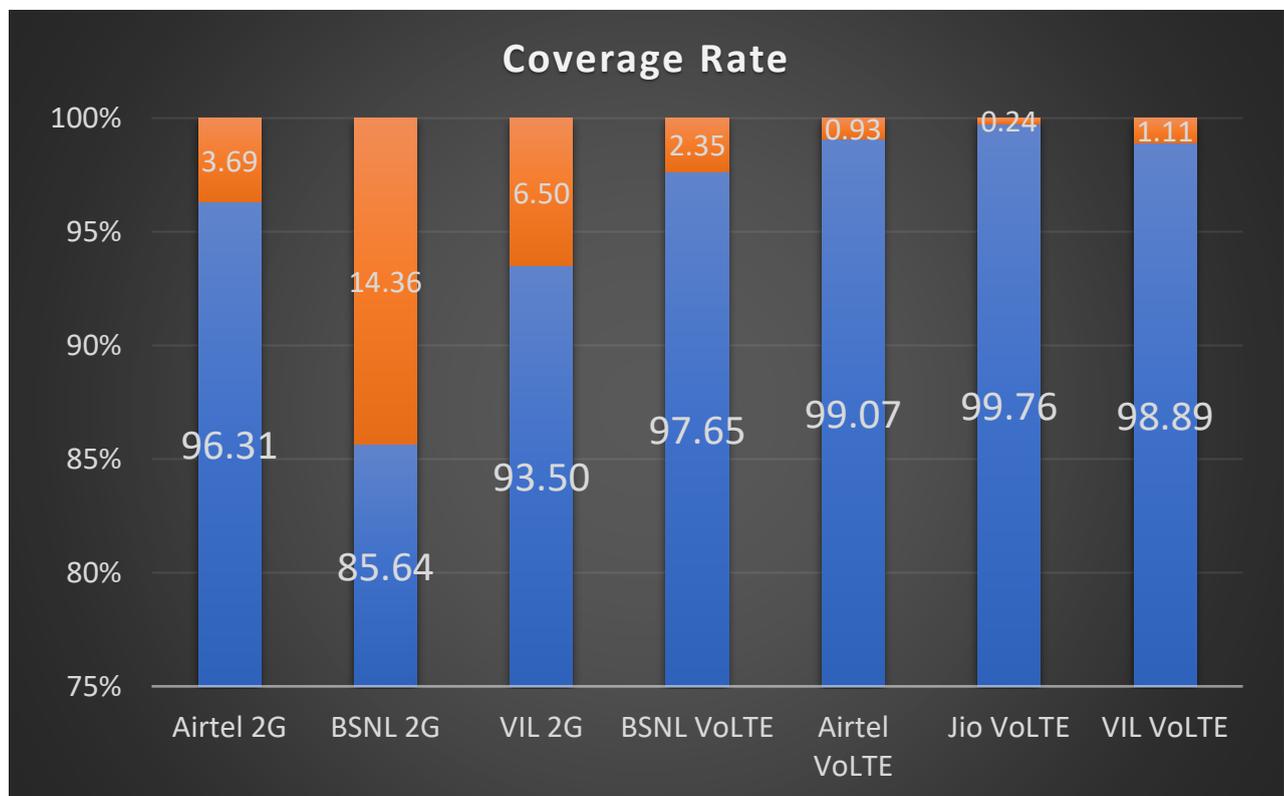
<u>Banking Circle</u>	4G			
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	5.18	9.12	21.57	57.50
Upload Throughput (mbps)	5.20	6.02	15.45	26.30
Video Streaming Delay ( Secs.)	0.99	0.61	0.50	0.07
Web Browsing Delay (sec)	4.21	5.45	2.32	4.32
Latency (msec)	74.66	87.09	48.00	46.87

<u>Tolani College</u>	4G			
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	5.38	15.88	34.18	61.20
Upload Throughput (mbps)	6.02	24.17	34.48	32.20
Video Streaming Delay ( Secs.)	0.99	0.61	0.26	0.04
Web Browsing Delay (sec)	2.44	6.37	1.98	4.07
Latency (msec)	81.33	92.67	65.70	64.99

## 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.

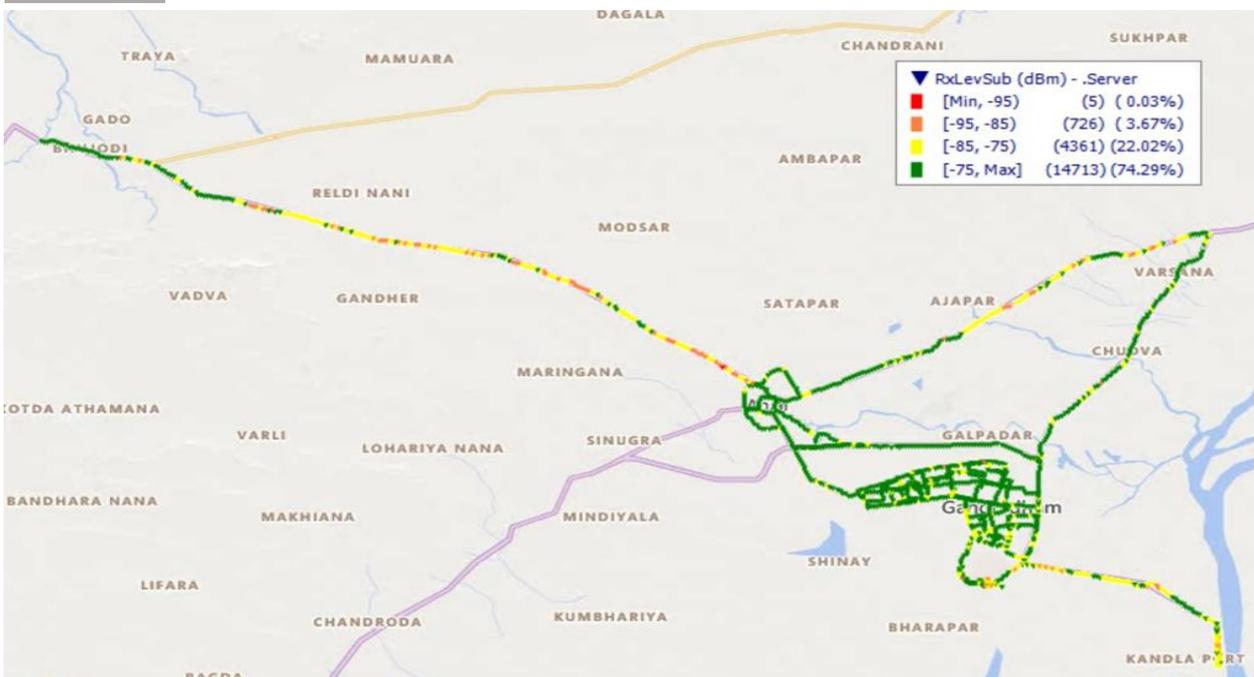
<u>TSP</u>	<u>Coverage Rate %</u>
Airtel 2G	96.30%
BSNL 2G	85.64%
VIL 2G	93.50%
BSNL VoLTE	97.65%
Airtel VoLTE	99.07%
Jio VoLTE	99.76%
VIL VoLTE	98.89%



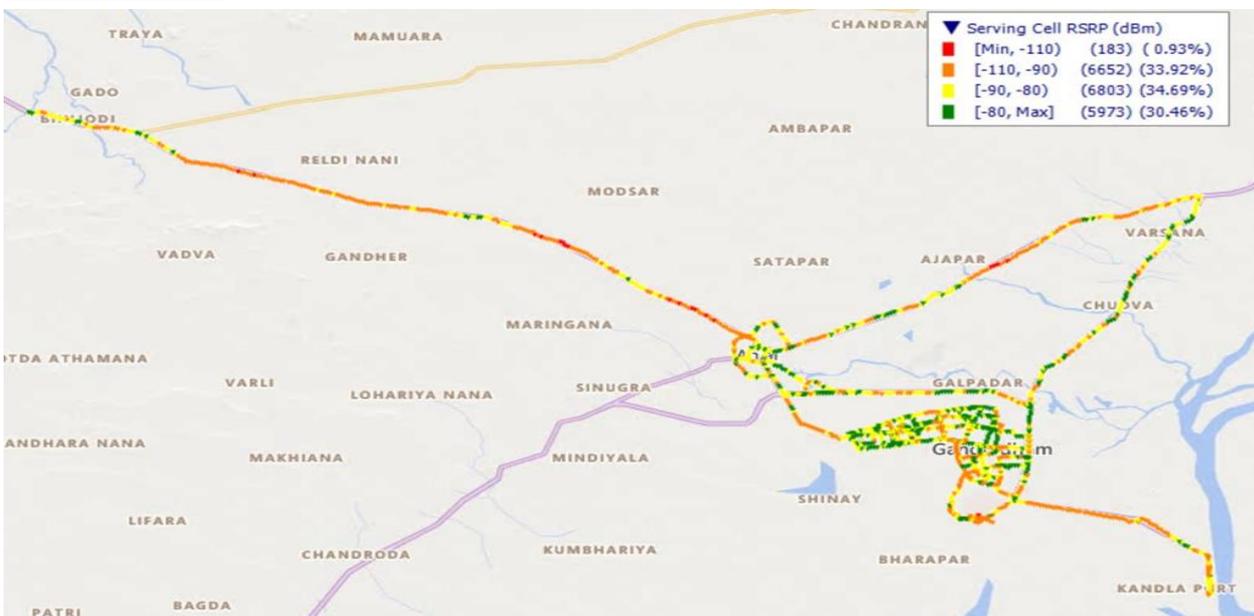
## TSP-AIRTEL

Technology	Coverage %
2G	96.30%
VoLTE	99.07%

2G



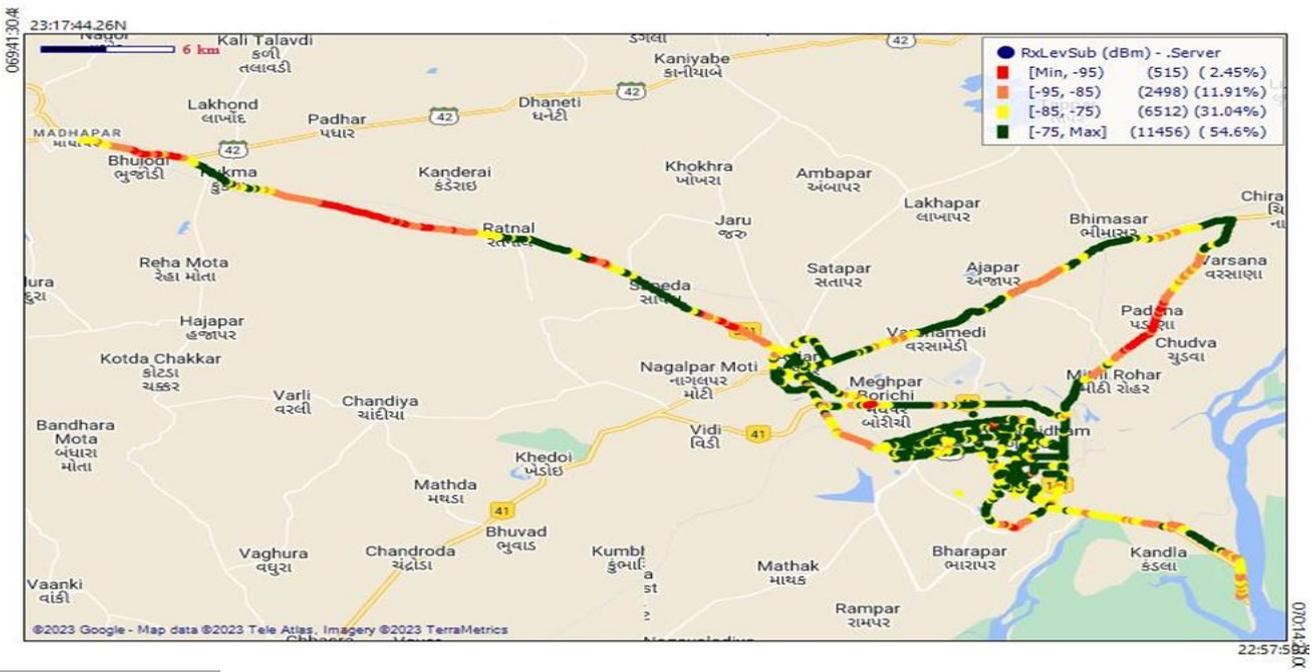
VoLTE



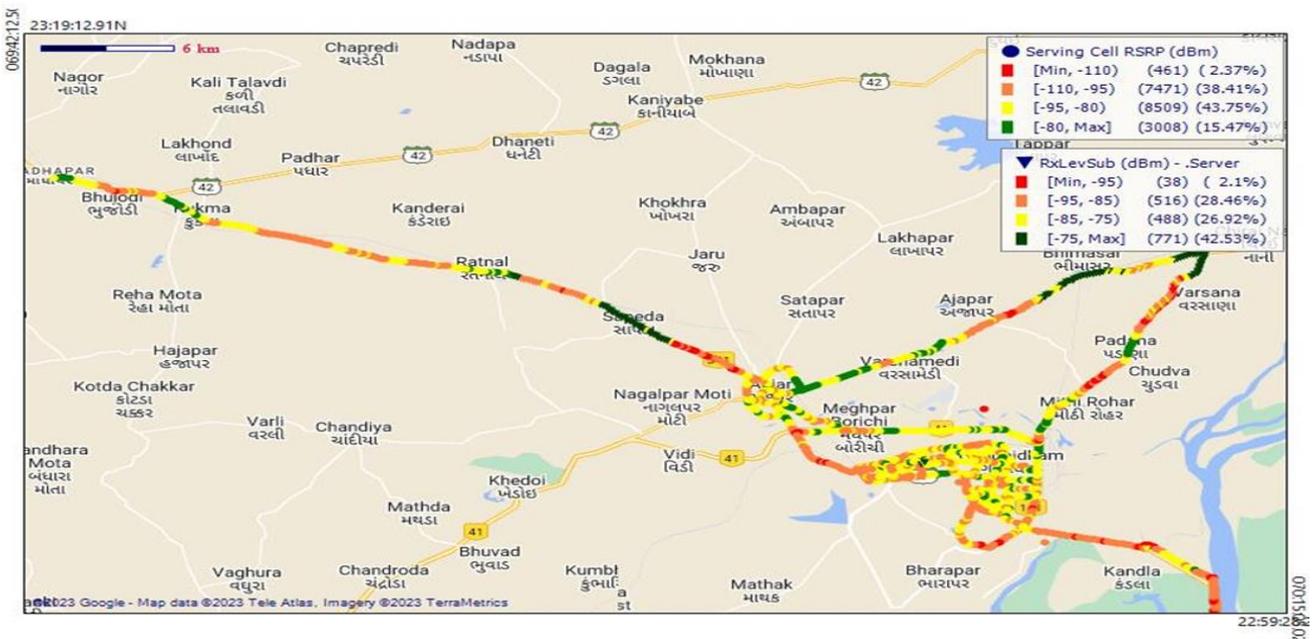
## TSP- BSNL

Technology	Coverage %
2G	85.64%
VoLTE	97.65%

2G

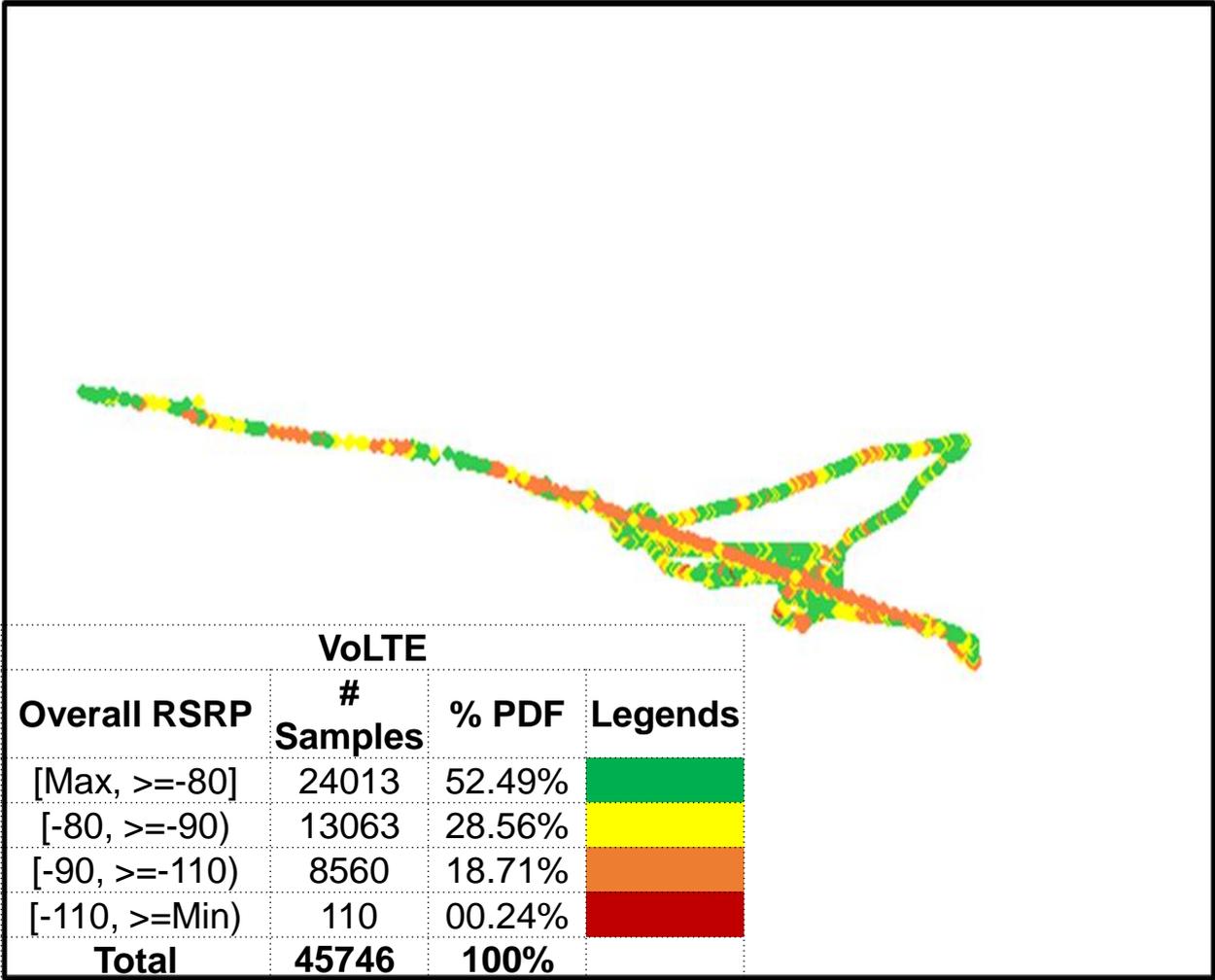


4G



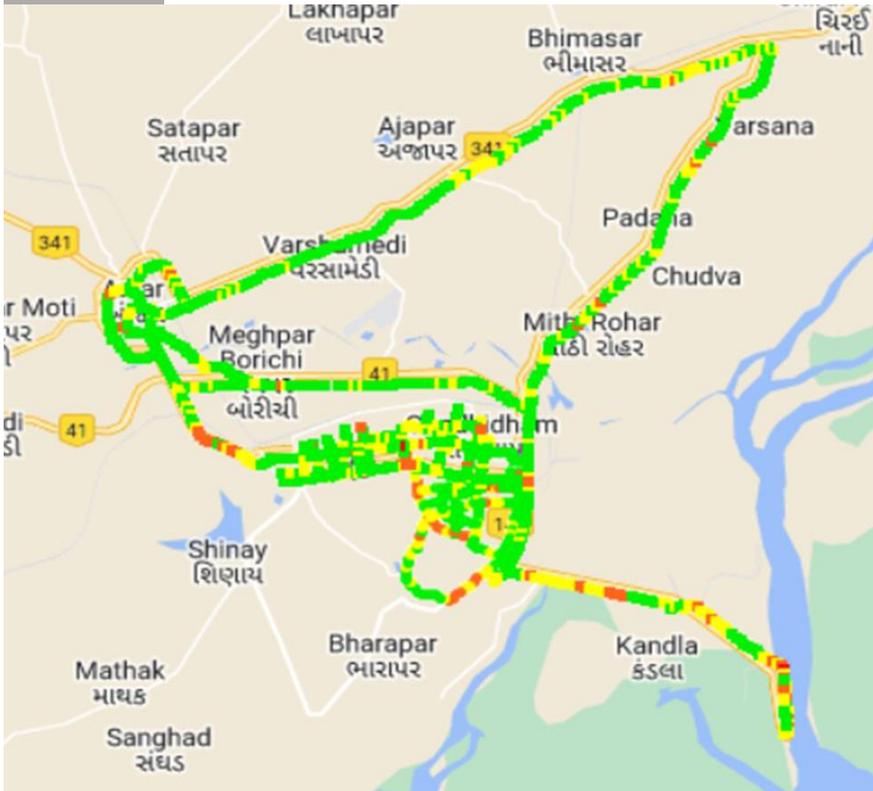
JIO

Technology	Coverage %
VoLTE	99.76%



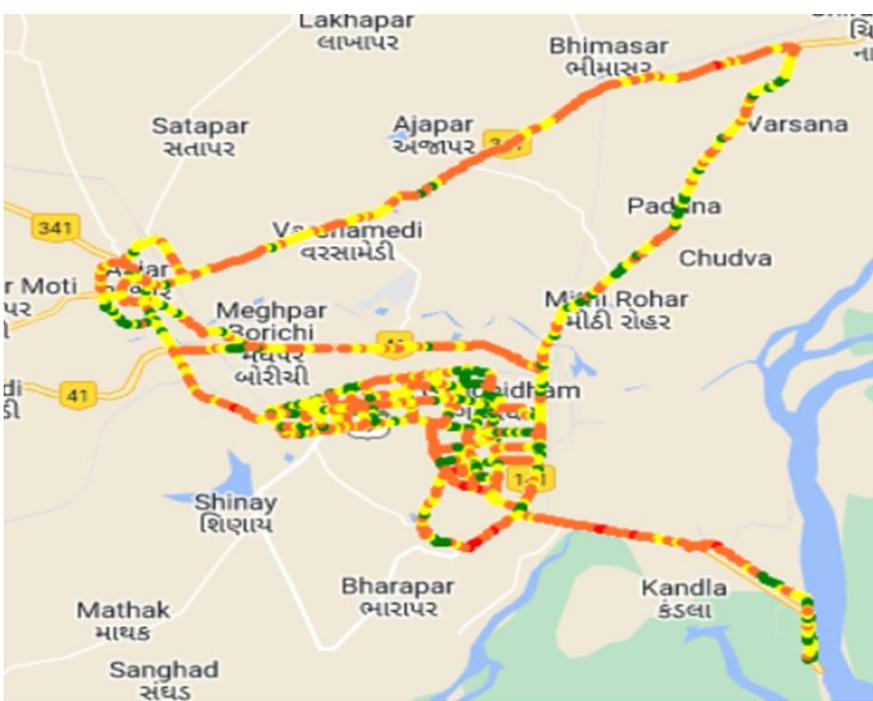
## VIL

	Technology	Coverage Rate %
	2G	<b>93.50%</b>
<b>2G</b>	VoLTE	<b>98.89%</b>



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	6358	69.02	Green
[-75, >=-85)	2232	24.23	Yellow
[-85, >=-95)	543	5.89	Orange
[-95, >=Min)	79	0.86	Red
<b>Total</b>	<b>9212</b>	<b>100%</b>	

## VoLTE

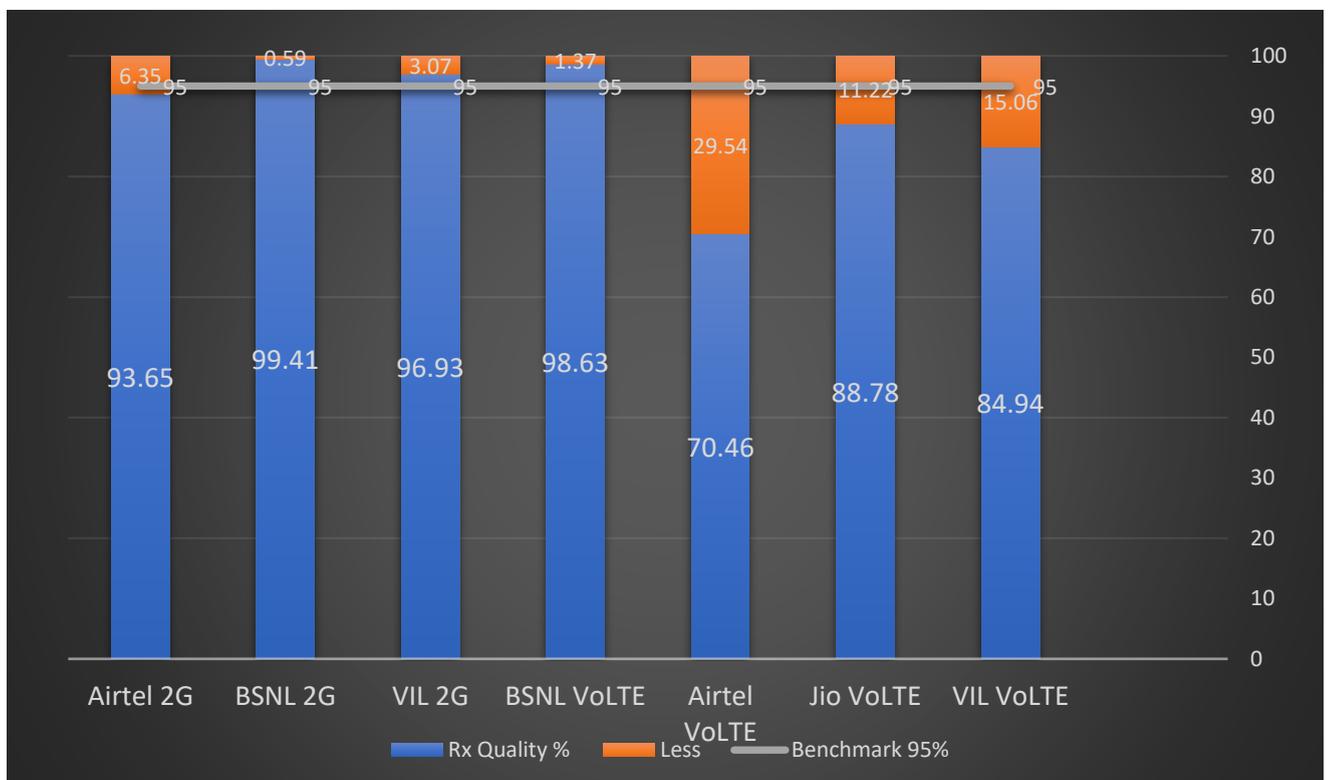


VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	2248	18.08	Green
[-80, >=-90)	4287	34.47	Yellow
[-90, >=-110)	5764	46.35	Orange
[-110, >=Min)	138	01.11	Red
<b>Total</b>	<b>12437</b>	<b>100%</b>	

## 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 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>	<u>Rx Quality %</u>
Airtel 2G	<b>93.65%</b>
BSNL 2G	<b>99.41%</b>
VIL 2G	<b>96.93%</b>
BSNL VoLTE	<b>98.63%</b>
Airtel VoLTE	<b>70.46%</b>
Jio VoLTE	<b>88.78%</b>
VIL VoLTE	<b>84.94%</b>

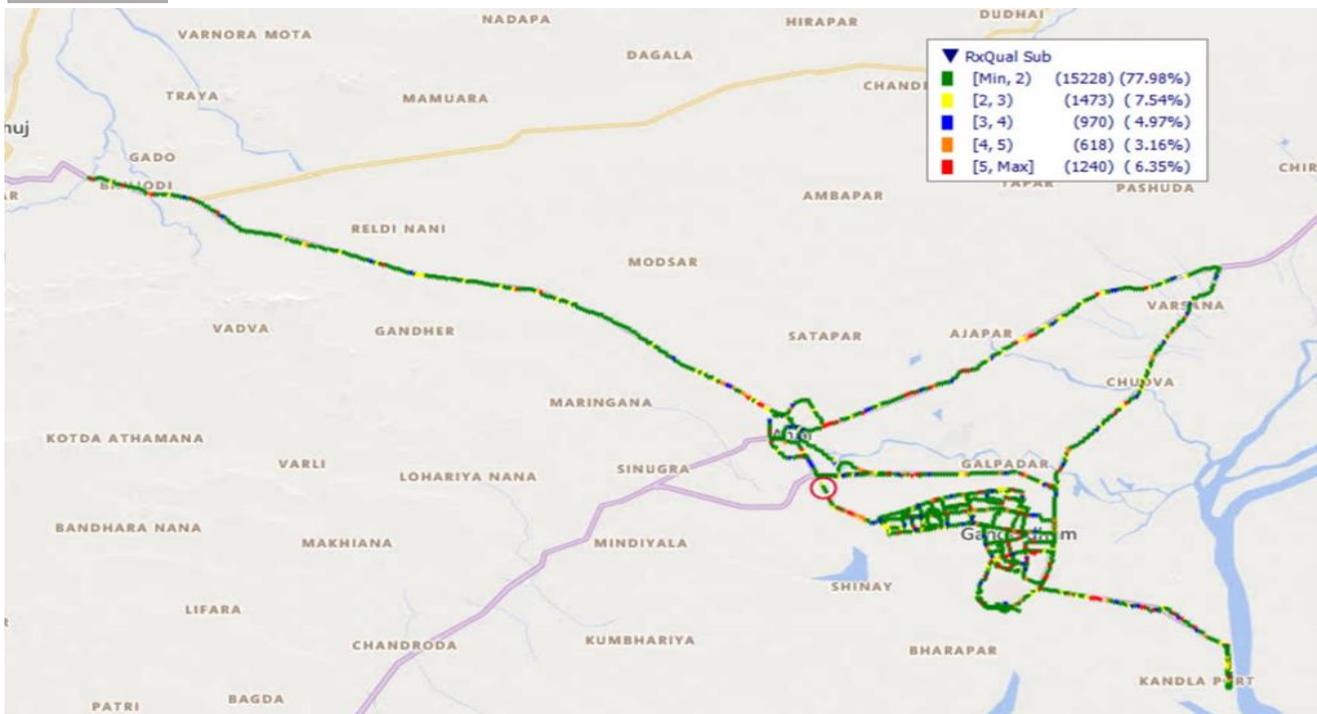


## II. Quality Details

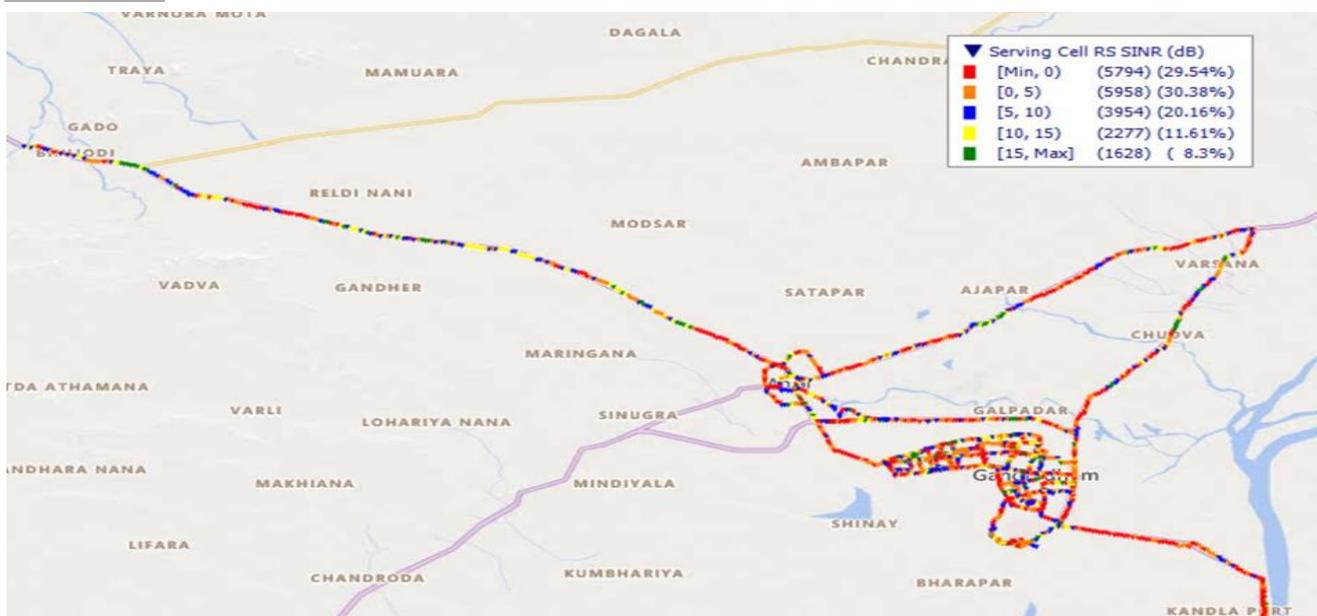
### Airtel

Technology	Rx Quality %
2G	<b>93.65%</b>
VoLTE	<b>70.46%</b>

2G



VoLTE

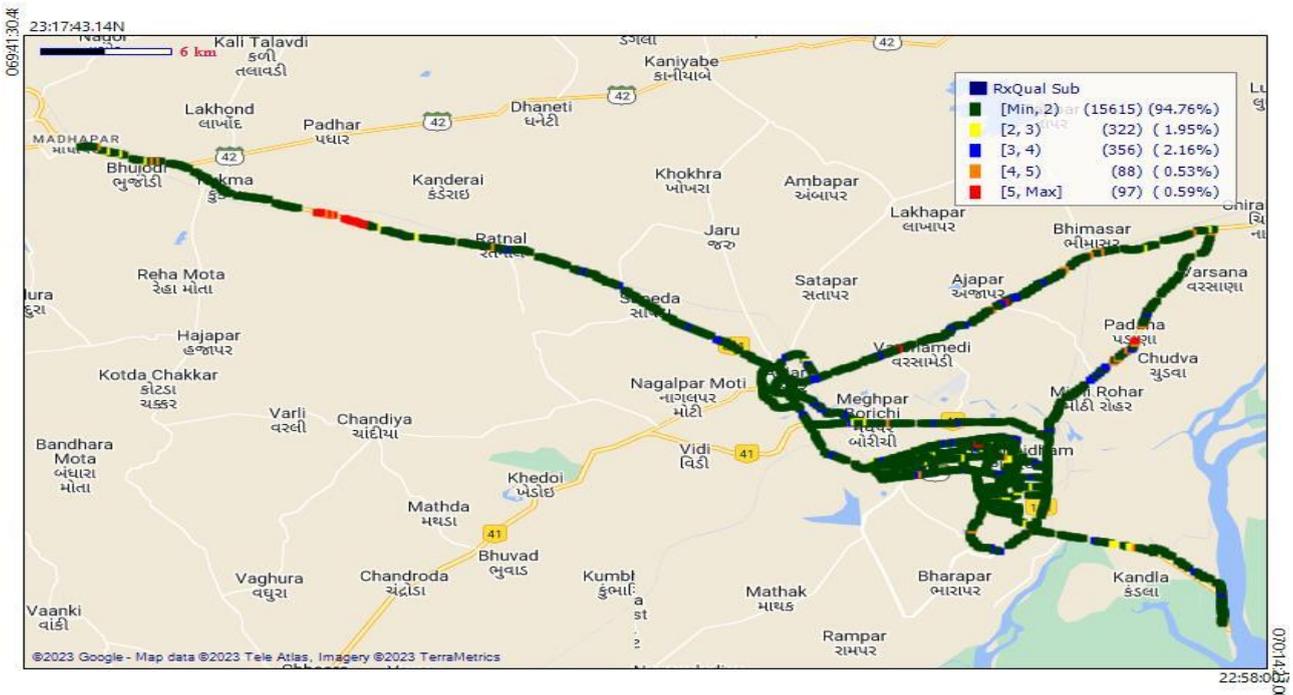


## II. Quality Details

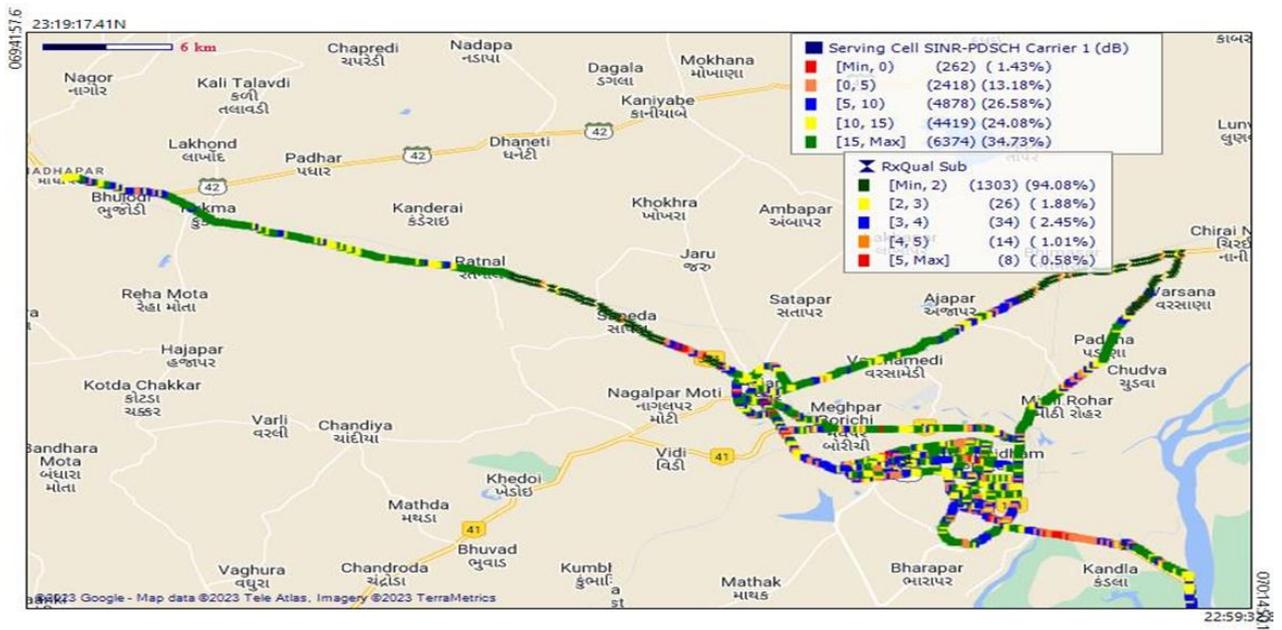
### BSNL

Technology	Rx Quality %
2G	99.41%
4G	98.63%

2G



4G

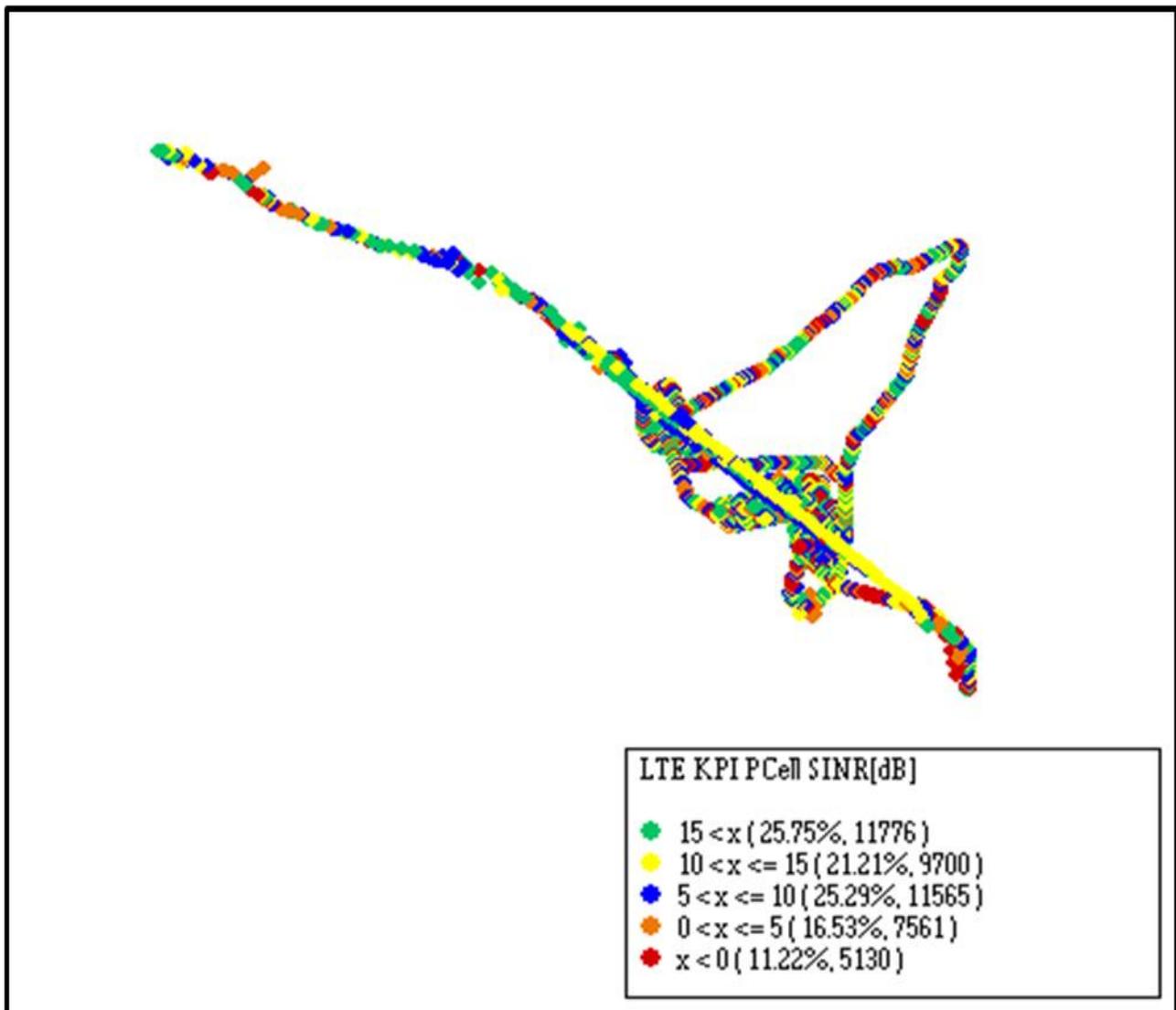


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For measuring voice quality, as per the QoS norms, RxQual  $\leq 5$  for GSM TSPs, EcNo  $\geq -14$  dBm for 3G TSP and SINR  $> 0$  in case of VoLTE is considered to be good, where as quality beyond this benchmark is considered to be bad. The benchmark should usually be  $\geq 95\%$ .

### JIO

Technology	Rx Quality %
VoLTE	<b>88.78%</b>

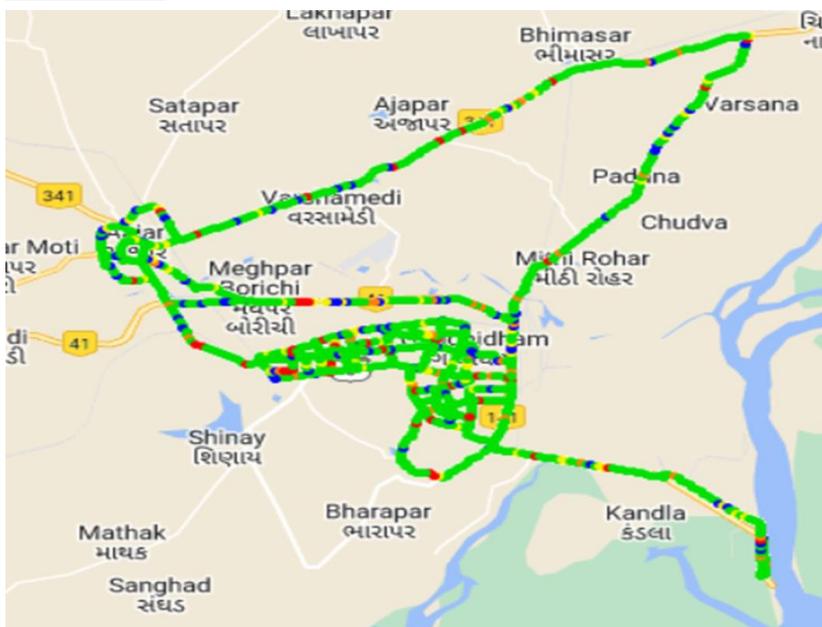


## II. Quality Details

### VIL

Technology	Rx Quality %
2G	96.93%
4G	84.94%

2G



Overall Rx Quality (Min, <=2)	# Samples	% PDF	Leg ends
(2, <=3)	589	5.44	Yellow
(3, <=4)	669	6.18	Blue
(4, <=5)	284	2.62	Orange
(5, <=Max)	332	3.07	Red
<b>Total</b>	<b>1082</b>	<b>100</b>	<b>%</b>

VoLTE



Overall SINR (Min, <=0)	# Samples	% PDF	Leg ends
(0, <=5)	3741	30.34	Orange
(5, <=10)	3732	30.26	Blue
(10, <=15)	2102	17.05	Yellow
(15, <=Max)	899	7.29	Green
<b>Total</b>	<b>1233</b>	<b>100</b>	<b>%</b>

### III. Technology Details

<u>TSP</u>	<u>% of Time Spent on 3G/VoLTE</u>
BSNL VoLTE	90.72
Airtel VoLTE	99.79
Jio VoLTE	100.00
VIL VoLTE	100.00

