Operator Assisted Drive Test Report

Rajkot-Jamnagar-Khambhaliya Highway
25th Oct. 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 Rajkot-Jamnagar-Khambhaliya Highway from 9:00 AM to 8:00 PM on 25th Oct'2023. The drive test covered drive route of 150 KMs over a period of 1 days. Approximately 145 calls were made for each of the 2G/4G 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 25th Oct. 2023 covering Rajkot-Jamnagar-Khambhaliya 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 150 KMs. Approximately 150 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 150 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

| 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
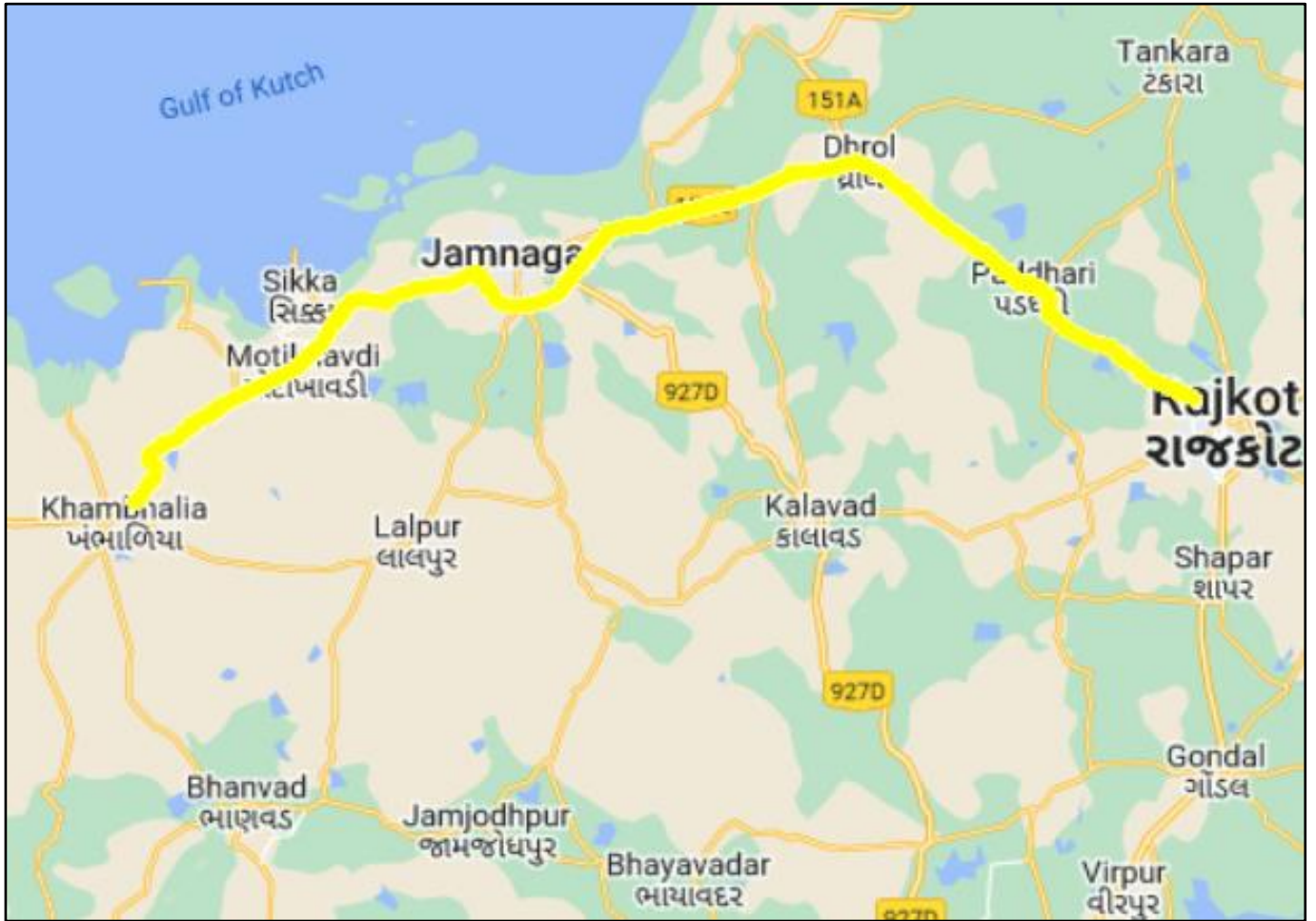
Date	Test Scenario	Area to be Covered
25th Oct 2023	2G/3G/4G Voice and 3G/4G/5G Dynamic Data	**Starting Point** : Rajkot Madhapar Circle 09:30AM : Rajkot to Khambhalia highway, Padadhari, Dhrol, Jamnagar Bypass, Moti Khavdi RIL Refinery main gate, Khambhaliya

Voice Calls

QoS compliance of the TSPs on Rajkot-Jamnagar-Khambhaliya Highway for Voice across technologies 2G/3G/4G-VoLTE:
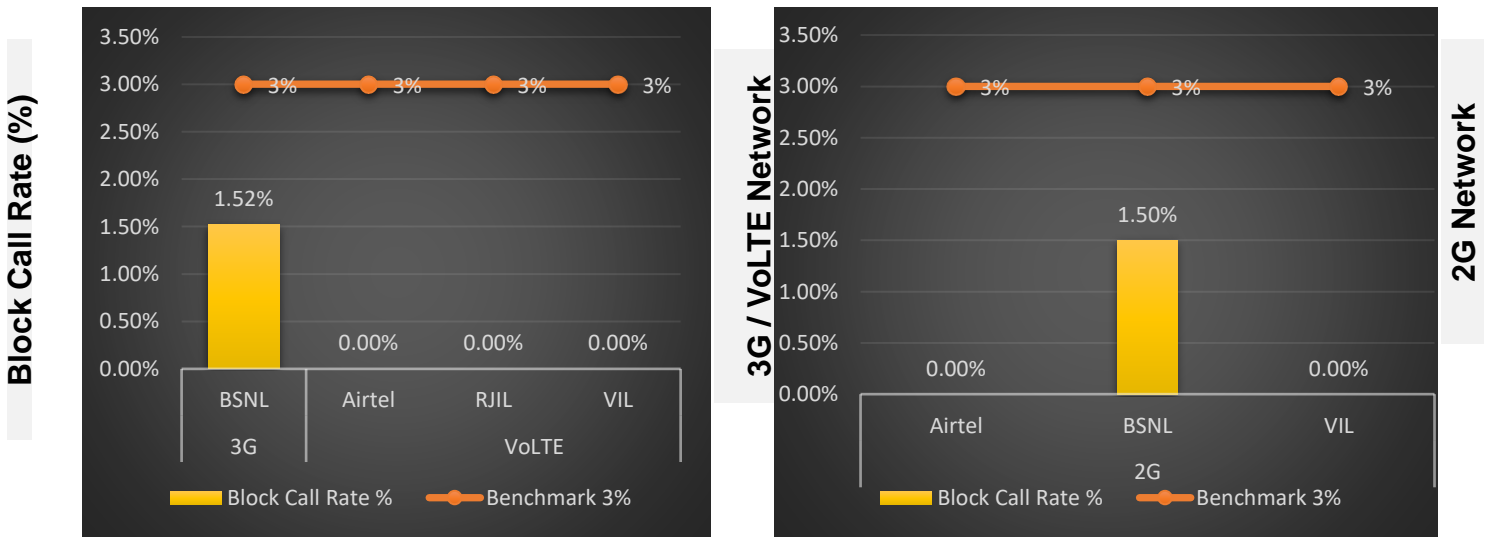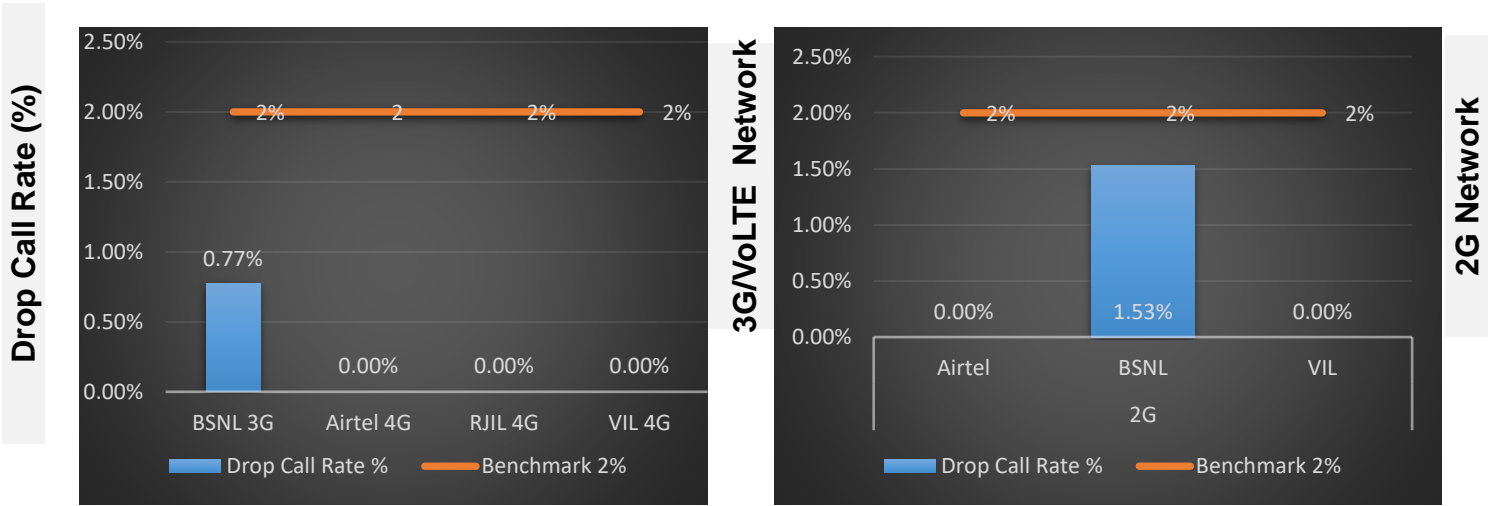
KPIs	2G			3G	4G		
	Airtel	**BSNL**	**VIL**	**BSNL**	**Airtel**	**RJIL**	**VIL**
Drop Call Rate %	0.00%	1.53%	0.00%	0.77%	0.00%	0.00%	0.00%
Block Call Rate %	0.00%	1.50%	0.00%	1.52%	0.00%	0.00%	0.00%

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 %	89.81	71.71	96.56

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

TSPs	3G
	BSNL
Coverage %	61.99

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	97.7	99.87	98.63

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

| TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	66.96%	100.00%	100.00%	99.99%

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)	**4.61**	**11.44**	**18.04**	**22.32**

Download Throughput (Mbps)
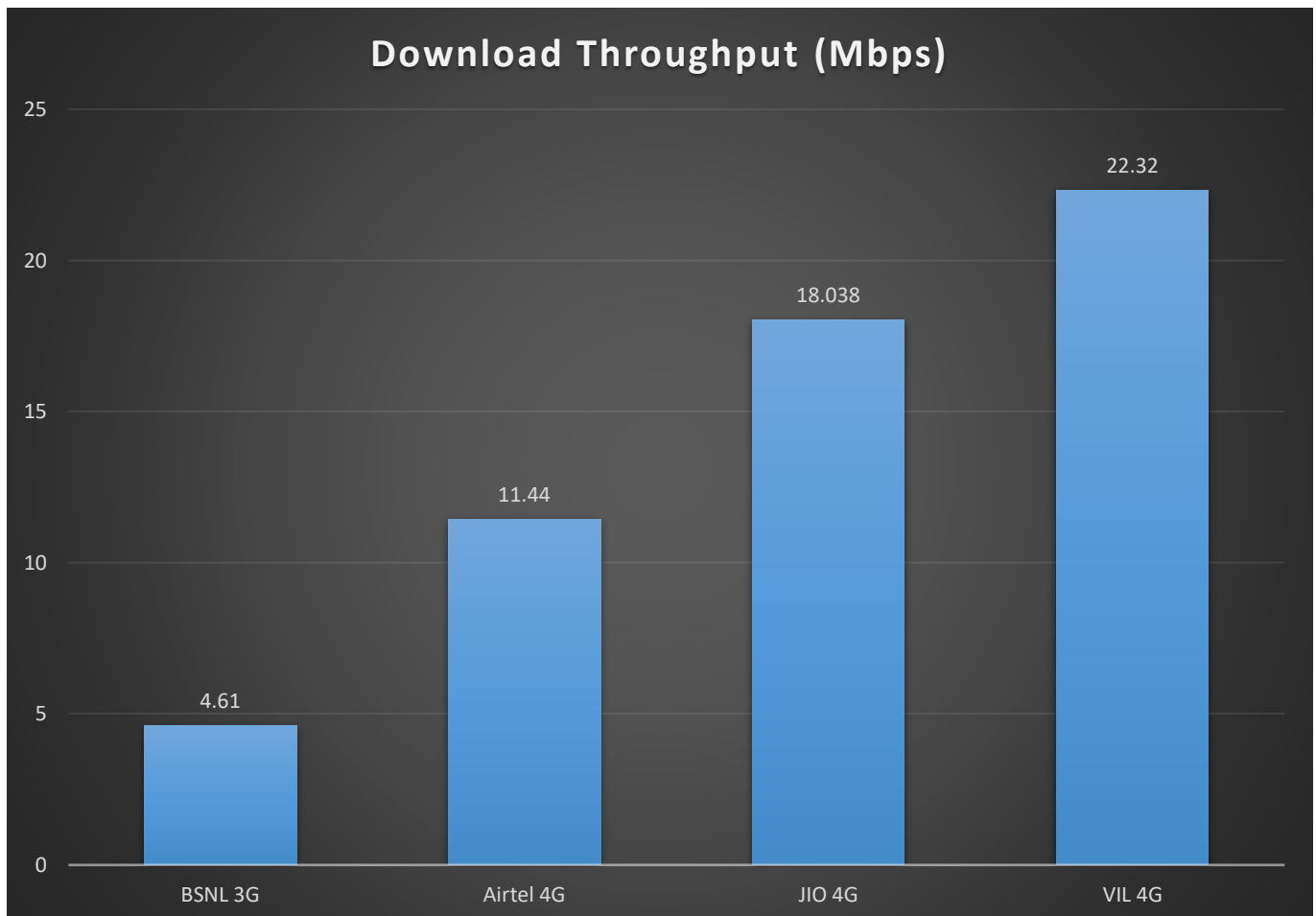
Summary

Voice Call	2G		
	Airtel	**BSNL**	**VIL**
Call Attempt	158	133	147
Blocked Call Rate (%)	0	1.5	0
CSSR% (Accessibility)	100	98.5	100
Drop Call Rate (%)	0	1.53	0
Mobility HOSR (%)	99.59	98.17	97.65
Rx Quality (%)	97.19	97.61	97.88
Average CST Sec	3.43	2.54	2.7

Voice Call	3G/VoLTE			
	BSNL 3G	**Airtel VoLTE**	**JIO VoLTE**	**VIL VoLTE**
Call Attempt	132	163	135	161
Blocked Call Rate (%)	1.52	0	0	0
CSSR% (Accessibility)	98.48	100	100	100
Drop Call Rate (%)	0.77	0	0	0
Mobility HOSR (%)	96.46	99.85	99.82	99.5
Rx Quality (%)	96.74	90.06	92.92	86.68
Average CST Sec	2.97	1.1	1.46	0.49

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	89.81%
BSNL 2G	71.71%
VIL 2G	96.56%
BSNL 3G	61.99%
Airtel VoLTE	97.7%
Jio VoLTE	99.87%
VIL VoLTE	98.63%

Coverage Rate

Airtel 2G: 89.81, 10.19
BSNL 2G: 71.71, 28.29
VIL 2G: 96.56, 3.44
BSNL 3G: 61.99, 38.01
Airtel VoLTE: 97.7, 2.30
Jio VoLTE: 99.87, 0.13
VIL VoLTE: 98.63, 1.37
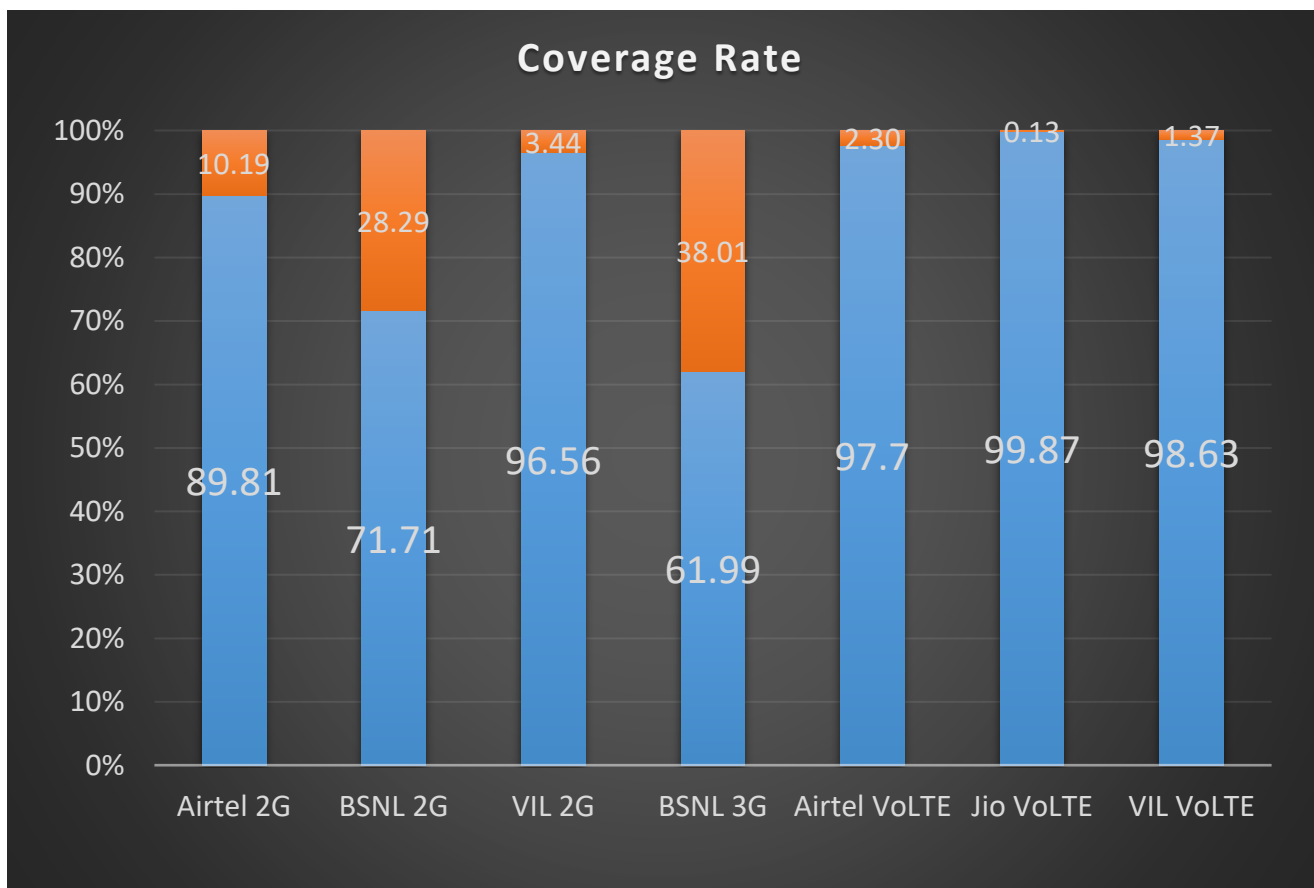
TSP-AIRTEL

Technology	Coverage %
2G	89.81%
VoLTE	97.70%

2G

2G
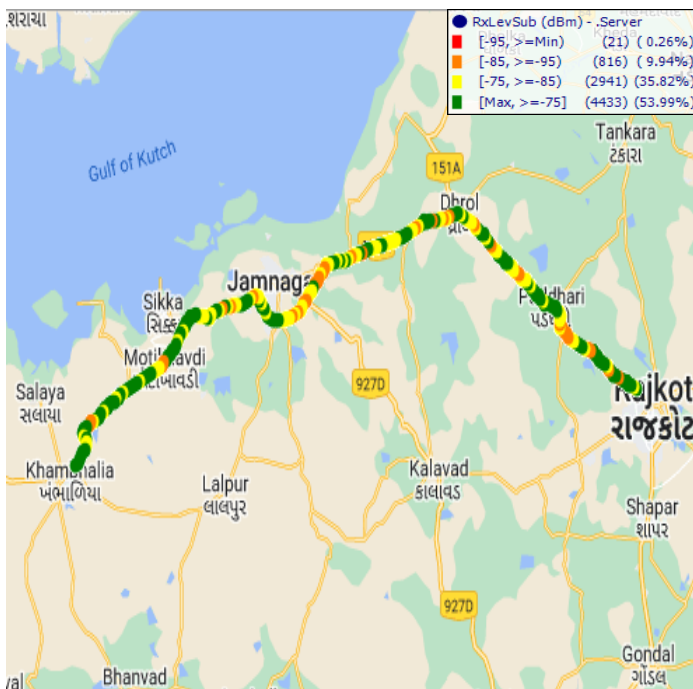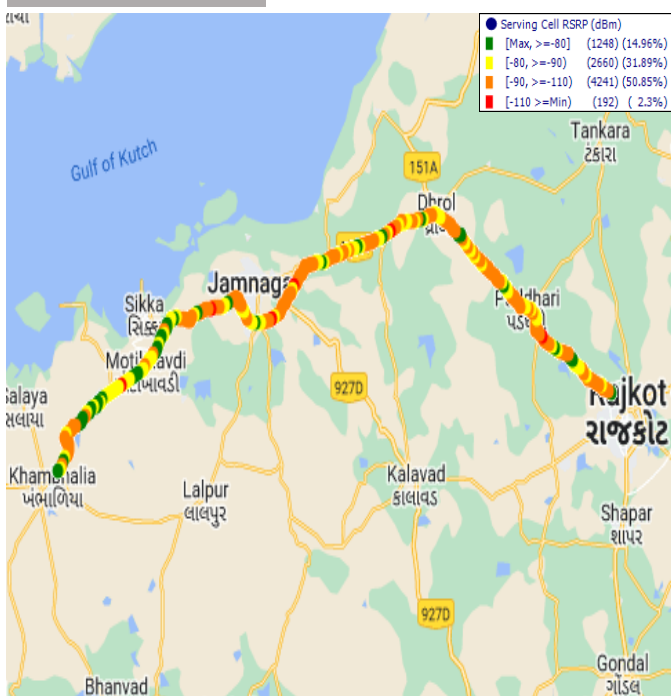
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	4433	53.99%	
[-75, >=-85)	2941	35.81%	
[-85, >=-95)	816	9.94%	
[-95, >=Min)	21	0.26%	
Total	8211	100%	

VoLTE

VoLTE

Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	1248	14.96%	
[-80, >=-90)	2660	31.89%	
[-90, >=-110)	4241	50.85%	
[-110, >=Min)	192	2.30%	
Total	8341	100%	

TSP- BSNL

Technology	Coverage %
2G	71.71%
3G	61.99%

2G		3G

2G

Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	15030	38.48%	
[-75, >=-85)	12982	33.24%	
[-85, >=-95)	8182	20.95%	
[-95, >=Min)	2866	7.33%	
Total	39060	100%	

3G

Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	1595	3.24%	
[-70, >=-80)	8651	17.57%	
[-80, >=-90)	20278	41.18%	
[-90, >=Min)	18715	38.01%	
Total	49239	100%	

JIO

Technology	Coverage %
VoLTE	99.87%
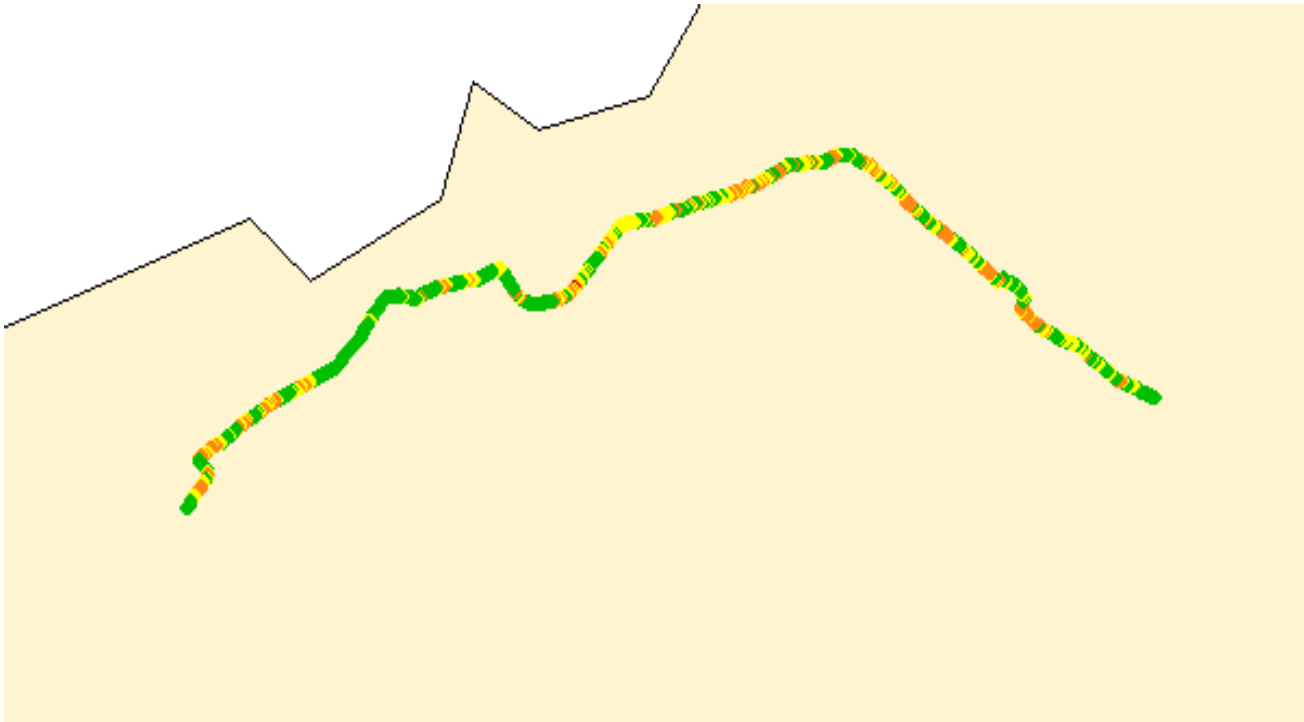
VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	7773	52.48%	
[-80, >=-90)	4490	30.32%	
[-90, >=-110)	2528	17.07%	
[-110, >=Min)	19	0.13%	
Total	14810	100%	

VIL

	Technology	Coverage Rate %
2G	2G	96.56%
	VoLTE	98.63%

2G
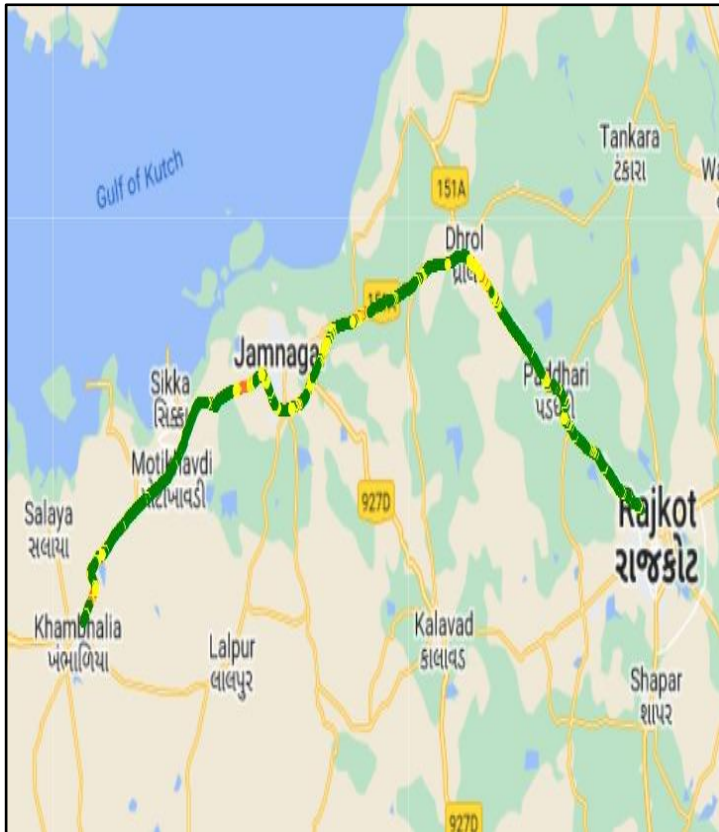
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	12654	66.22%	
[-75, >=-85)	5798	30.34%	
[-85, >=-95)	658	3.44%	
[-95, >=Min)	0	0	
Total	19110	100%	

VoLTE
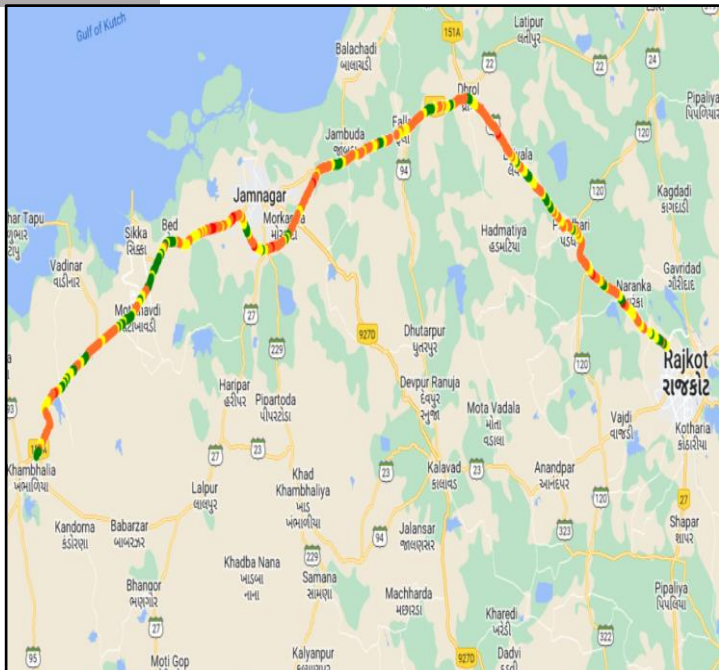
VoLTE /5G

Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	1789	24.79%	
[-80, >=-90)	2219	30.74%	
[-90, >=-110)	3111	43.1%	
[-110, >=Min)	99	1.37%	
Total	7218	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	97.19%
BSNL 2G	97.61%
VIL 2G	97.88%
BSNL 3G	96.74%
Airtel VoLTE	90.06%
Jio VoLTE	92.92%
VIL VoLTE	86.68%
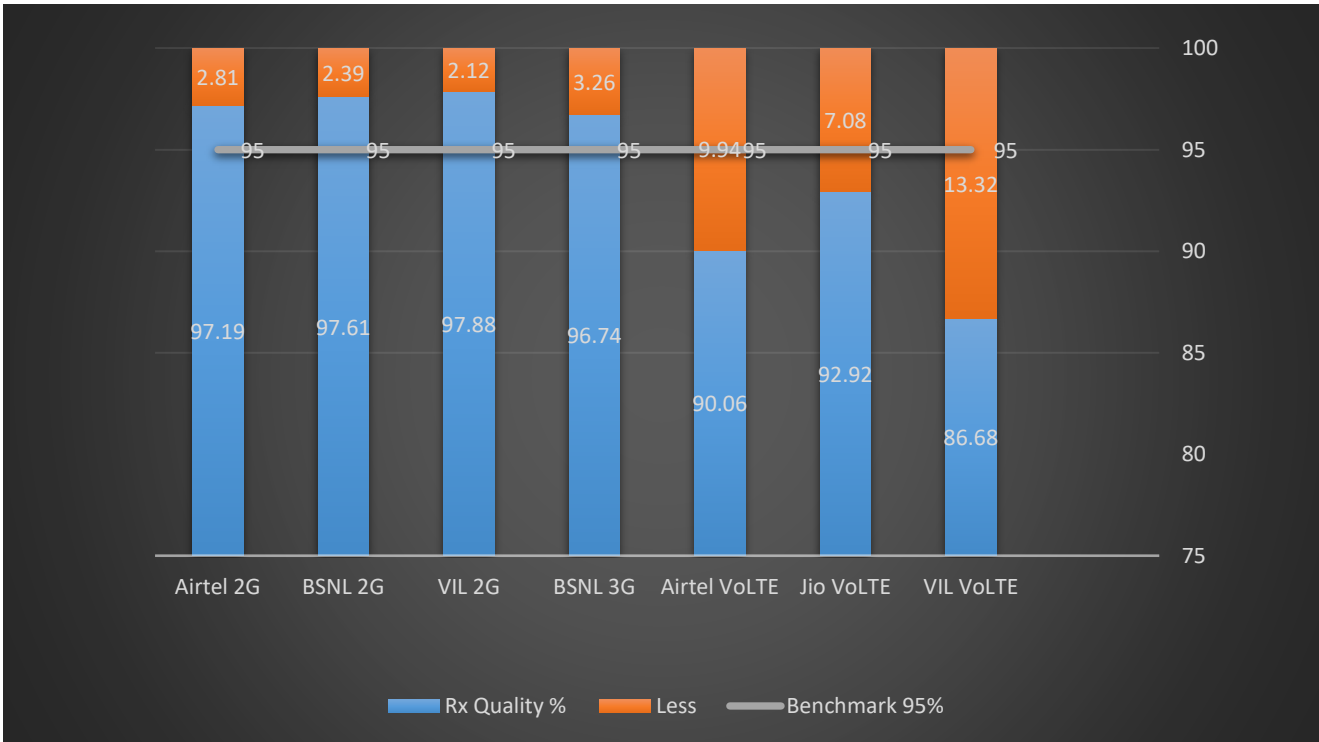
Airtel

Technology	Rx Quality %
2G	**97.19%**
VoLTE	**90.06%**

2G
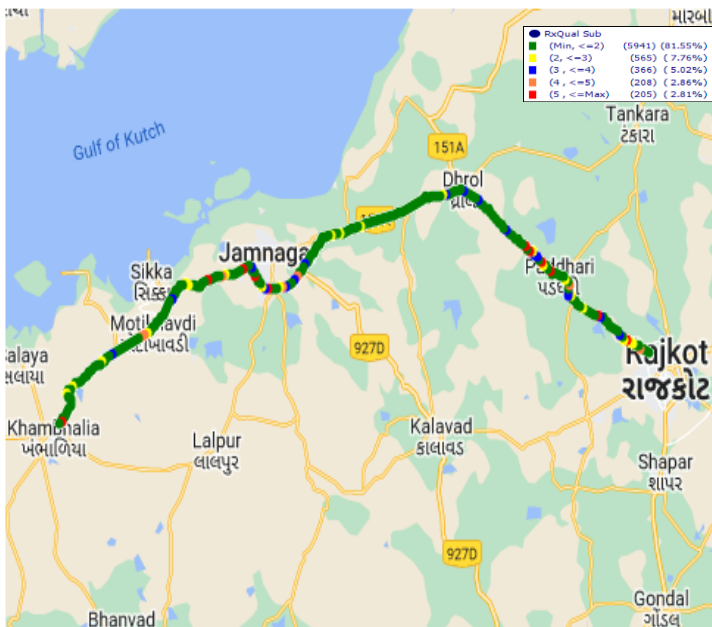
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	5941	81.55%	
(2, <=3)	565	7.76%	
(3 , <=4)	366	5.02%	
(4 , <=5)	208	2.86%	
(5 , <=Max)	205	2.81%	
Total	**7285**	**100.00**	

VoLTE
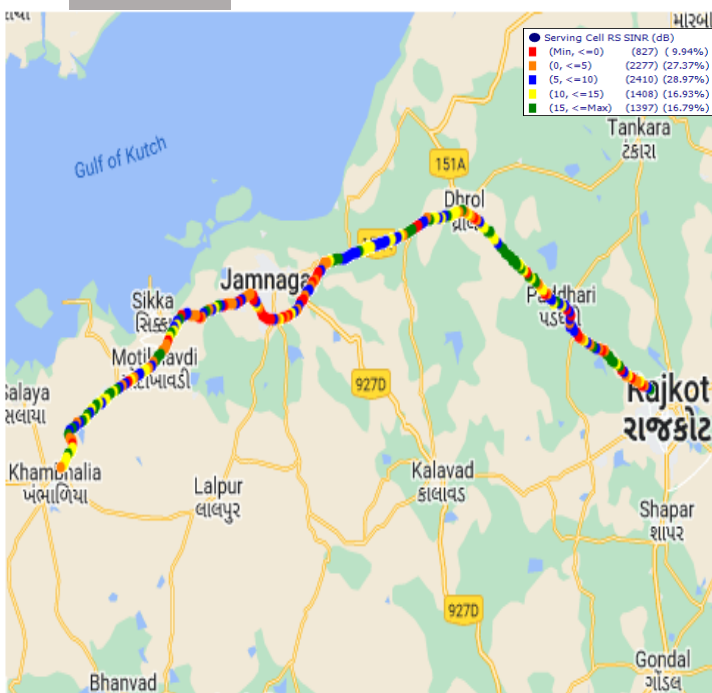
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	827	9.94%	
(0, <=5)	2277	27.37%	
(5, <=10)	2410	28.97%	
(10, <=15)	1408	16.93%	
(15, <=Max)	1397	16.79%	
Total	**8319**	**100.00**	

BSNL

Technology	Rx Quality %
2G	97.61%
3G	96.74%

2G

3G
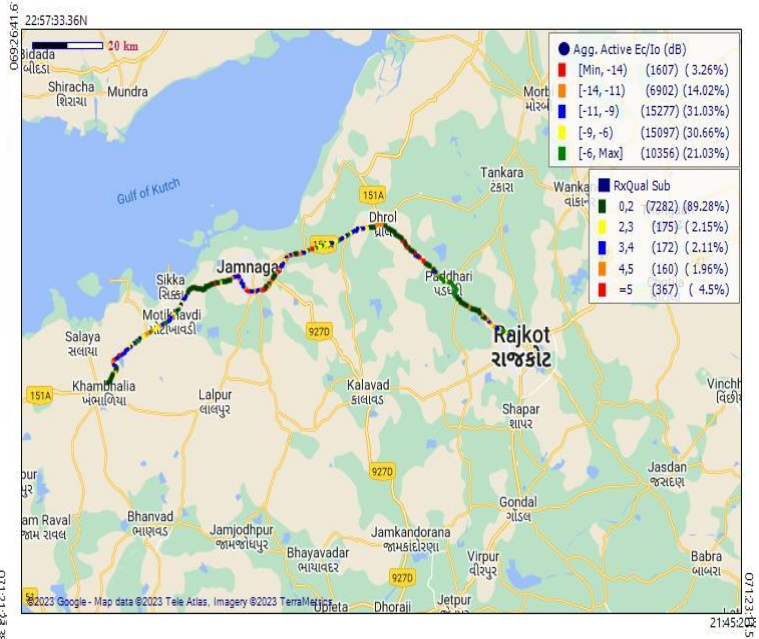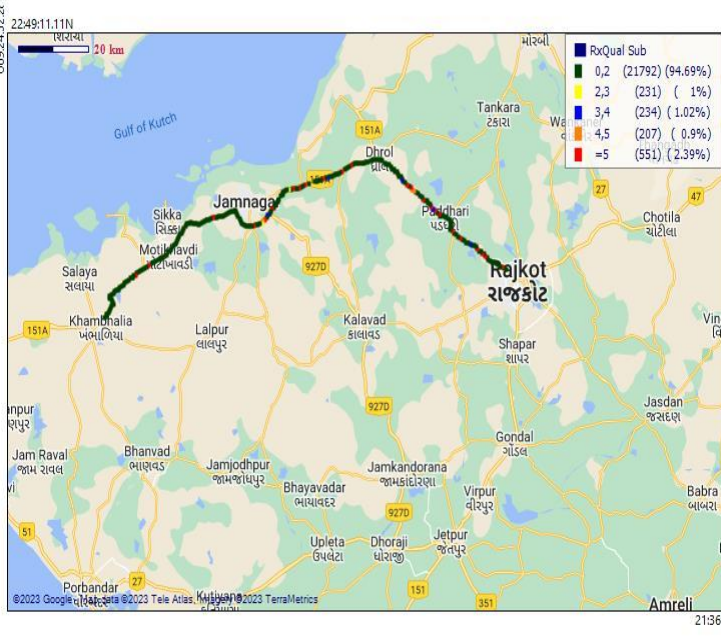
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	21972	94.69%	🟩
(2, <=3)	231	1.0%	🟨
(3 , <=4)	234	1.02%	🟦
(4 , <=5)	207	0.9%	🟧
(5 , <=Max)	551	2.39%	🟥
Total	23195	100%	

Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	10356	21.03%	🟩
(-6, <=-9)	15097	30.66%	🟨
(-9, <=-11)	15277	31.03%	🟦
(-11, <=-14)	6902	14.02%	🟧
(-14, <= Min)	1607	3.26%	🟥
Total	49239	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%.
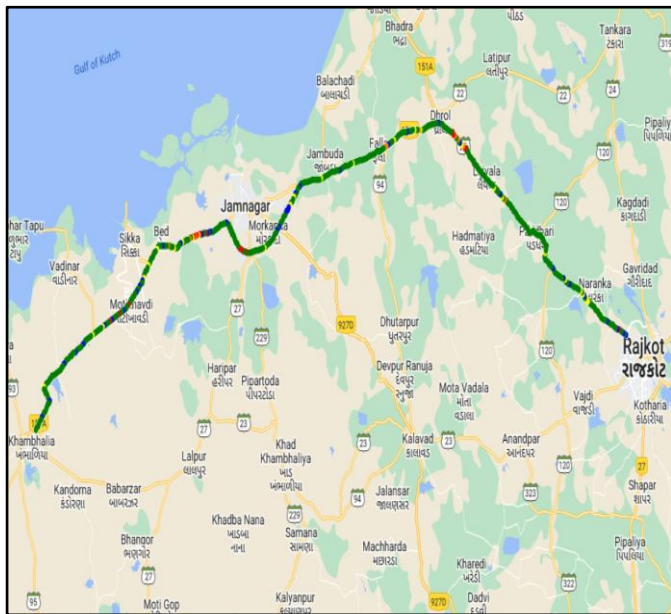
JIO

Technology	Rx Quality %
VoLTE	**92.92%**
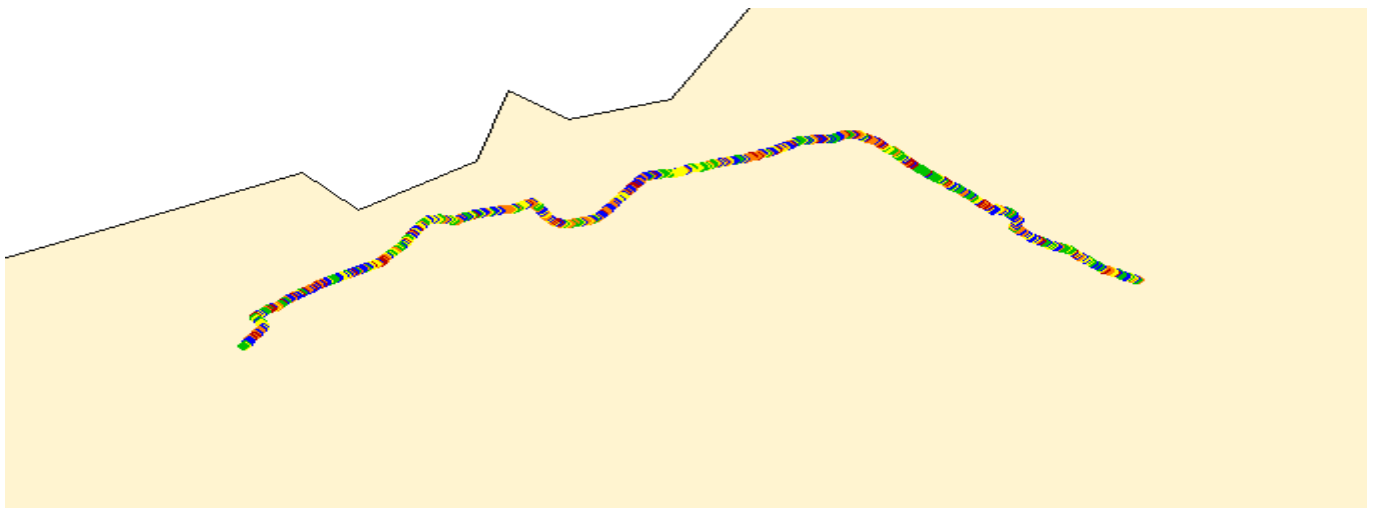
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1049	7.09%	(red)
(0, <=5)	2666	18.00%	(orange)
(5, <=10)	4091	27.62%	(blue)
(10, <=15)	3994	26.97%	(yellow)
(15, <=Max)	3010	20.32%	(green)
Total	**14810**	**100%**	

VIL

Technology	Rx Quality %
2G	97.88%
4G	**86.68%**

2G

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	6387	88.57%	🟩
(2, <=3)	288	3.99%	🟨
(3 , <=4)	265	3.67%	🟦
(4 , <=5)	118	1.64%	🟧
(5 , <=Max)	153	2.12%	🟥
Total	7211	100%	

VoLTE
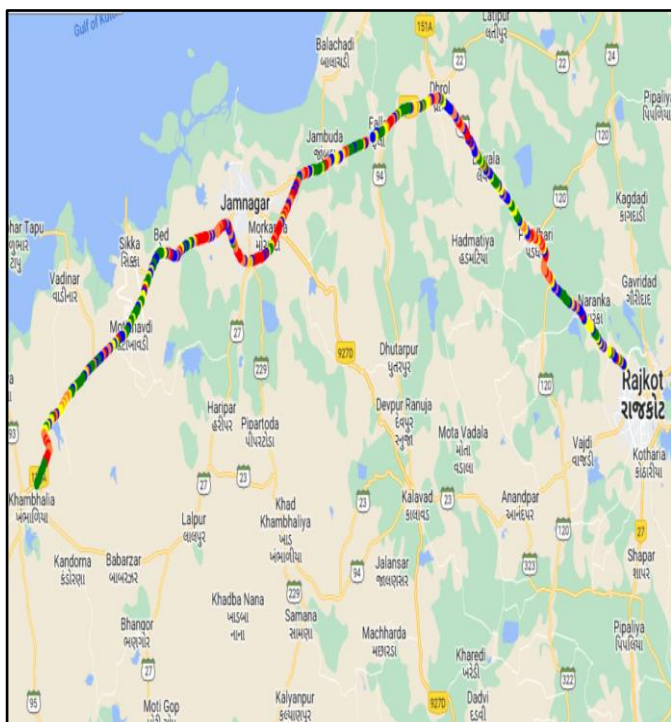
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	961	13.32%	🟥
(0, <=5)	1370	18.99%	🟧
(5, <=10)	1544	21.41%	🟦
(10, <=15)	1377	19.09%	🟨
(15, <=Max)	1961	27.19%	🟩
Total	7213	100%	

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	66.96%
Airtel VoLTE	100.00%
Jio VoLTE	100.00%
VIL VoLTE	99.99%

Time Spent On 3G/4G

	BSNL 3G	Airtel VoLTE	Jio VoLTE	VIL VoLTE
% Time Spend on 2G	33.04%	0.00%	0.00%	0.01%
% of Time Spent on 3G/VoLTE	66.96%	100.00%	100.00%	99.99%