



Operator Assisted Drive Test Report

Jaipur to Puskar Highway

19th Sep 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 Jaipur to Puskar Highway from 9:00 AM to 5:00 PM during 19 Sep 2023. The drive test covered drive route of 170 KMs & over a period of 1 days. Approximately 117 calls were made for each of the networks: three 2G networks, one 3G networks and three LTE networks covering four TSPs.

Overview

Voice
Summary

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Summary

Overview

Regional Office, TRAI Jaipur conducted Operator Assisted Drive Test on 19th Sep 2023 covering Jaipur to Puskar 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 170 KMs. Approximately 117 calls were made for each of the TSPs networks: three 2G (Lock Mode) networks, two 3G (Dual mode) networks and three VoLTE networks covering 4 unique TSPs.

Data Tests:

Dynamic data test was conducted for 170 kms for download throughput in all technologies.
2G – measurement – UE Locked in 2G file size- 500KB

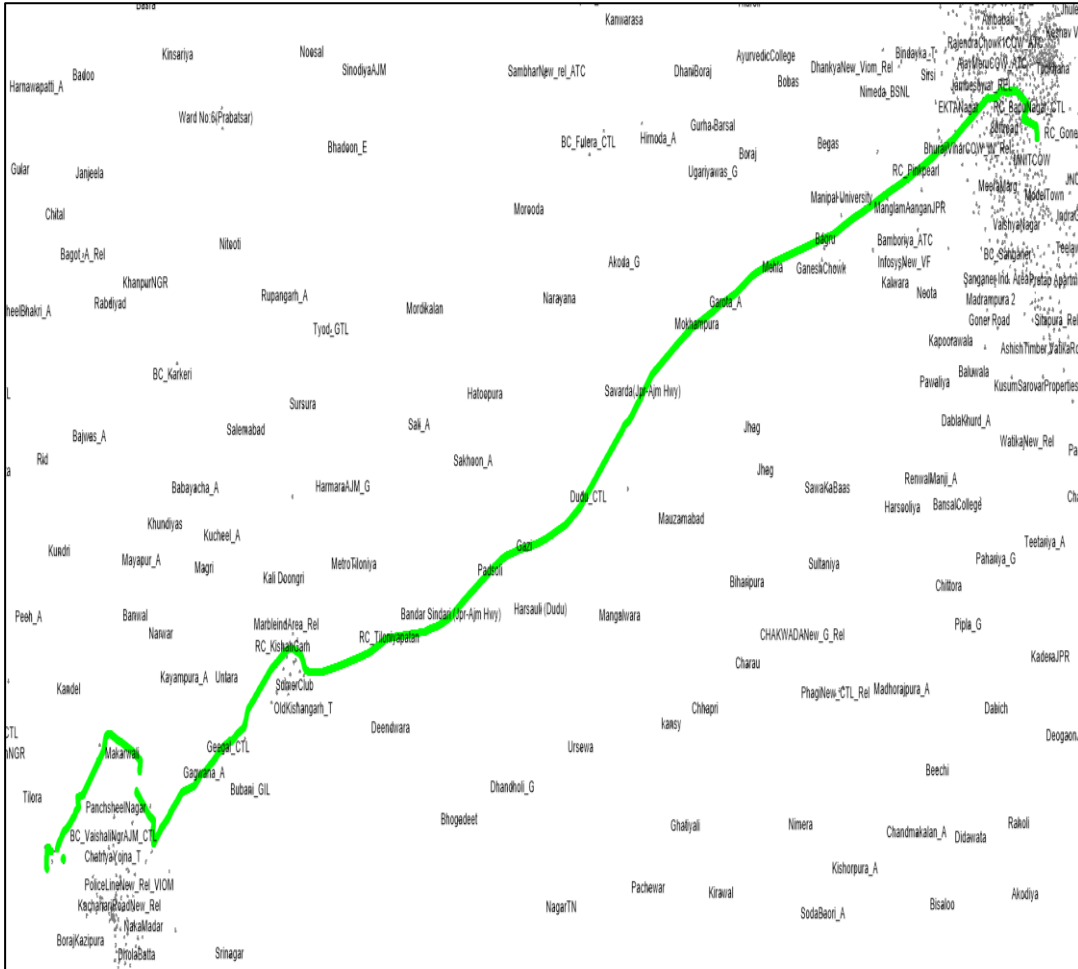
3G – measurement – UE in 3G File Size- 20MB

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

Overview

Voice & Dynamic Data Test Drive Route

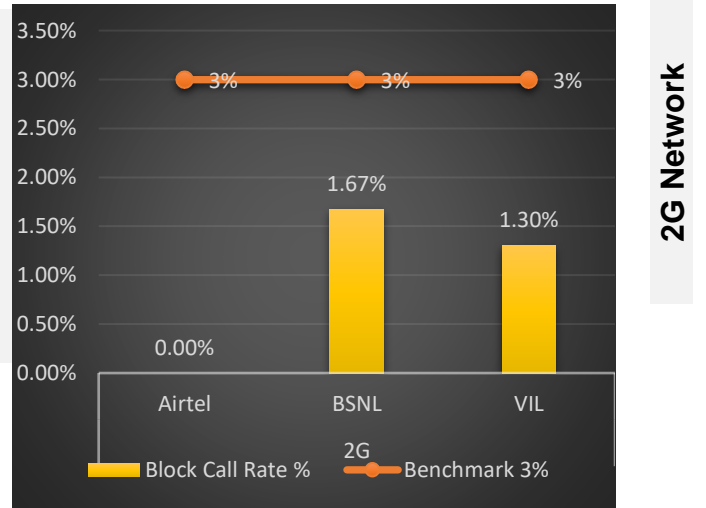
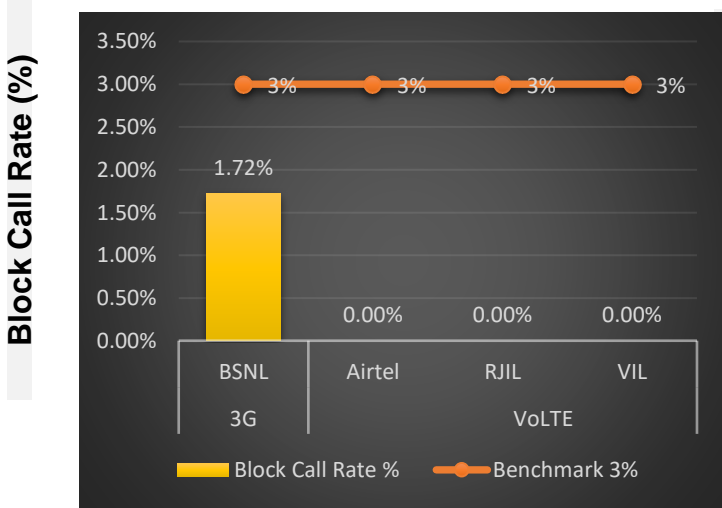
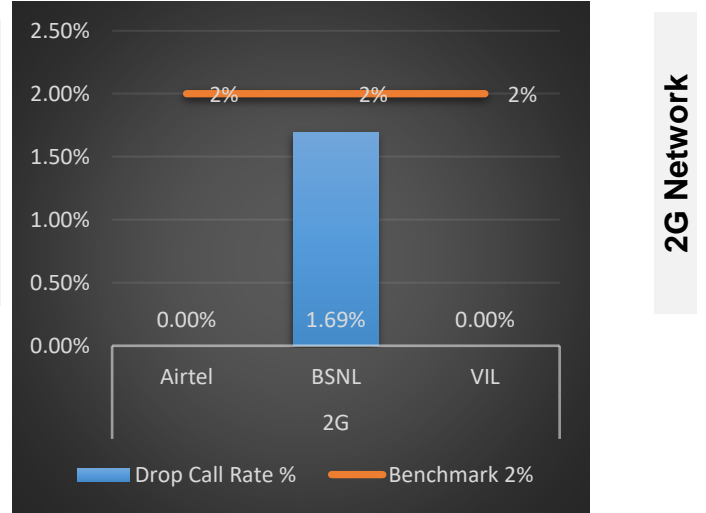
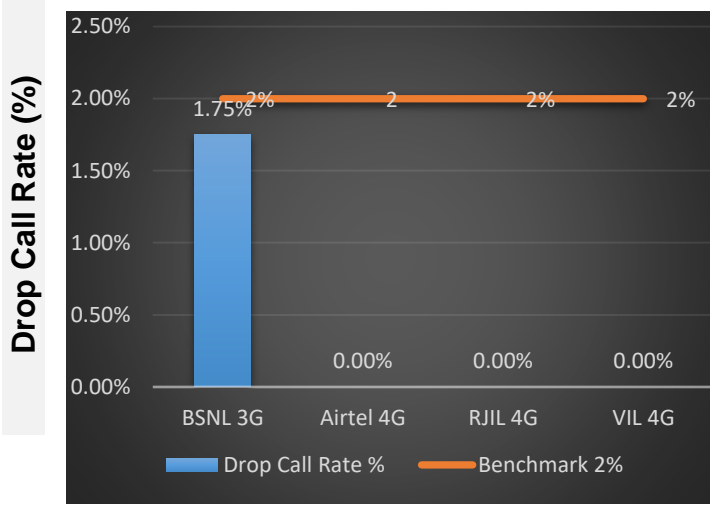


Date	Test Scenario	Area to be Covered
19-Sep-23	2G/3G/4G Voice and 3G/4G/5G Dynamic Data	Starting Point TRAI RO Jaipur to Pushkar via Ajmer .

Voice Calls

Key Observations

QoS compliance of the TSPs on Jaipur to Pushkar Highway via MDS University for Voice across technologies 2G/3G/4G-VoLTE:



KPIs	2G			3G	4G		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0.00%	1.69%	0.00%	1.75%	0.00%	0.00%	0.00%
Block Call Rate %	0.00%	1.67%	1.30%	1.72%	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

Key Observations

Coverage

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

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	97.33%	83.23%	91.47%

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

TSPs	3G
	BSNL
Coverage %	82.33%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	97.49%	99.66%	99.18%

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	17.68%	100.00%	100.00%	100.00%

Data Services Dynamic

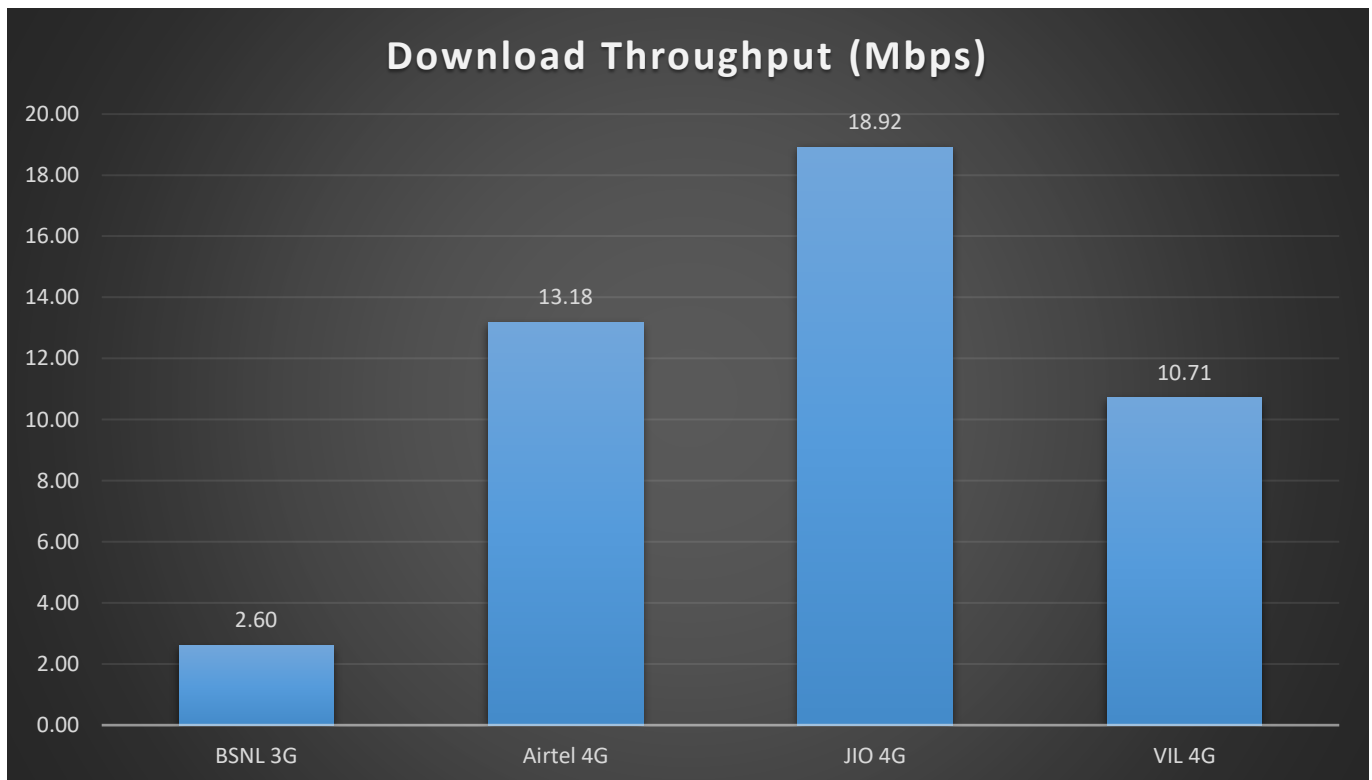
Key Observations

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)	2.60	13.18	18.92	10.71



Summary

City Level Summary-Voice

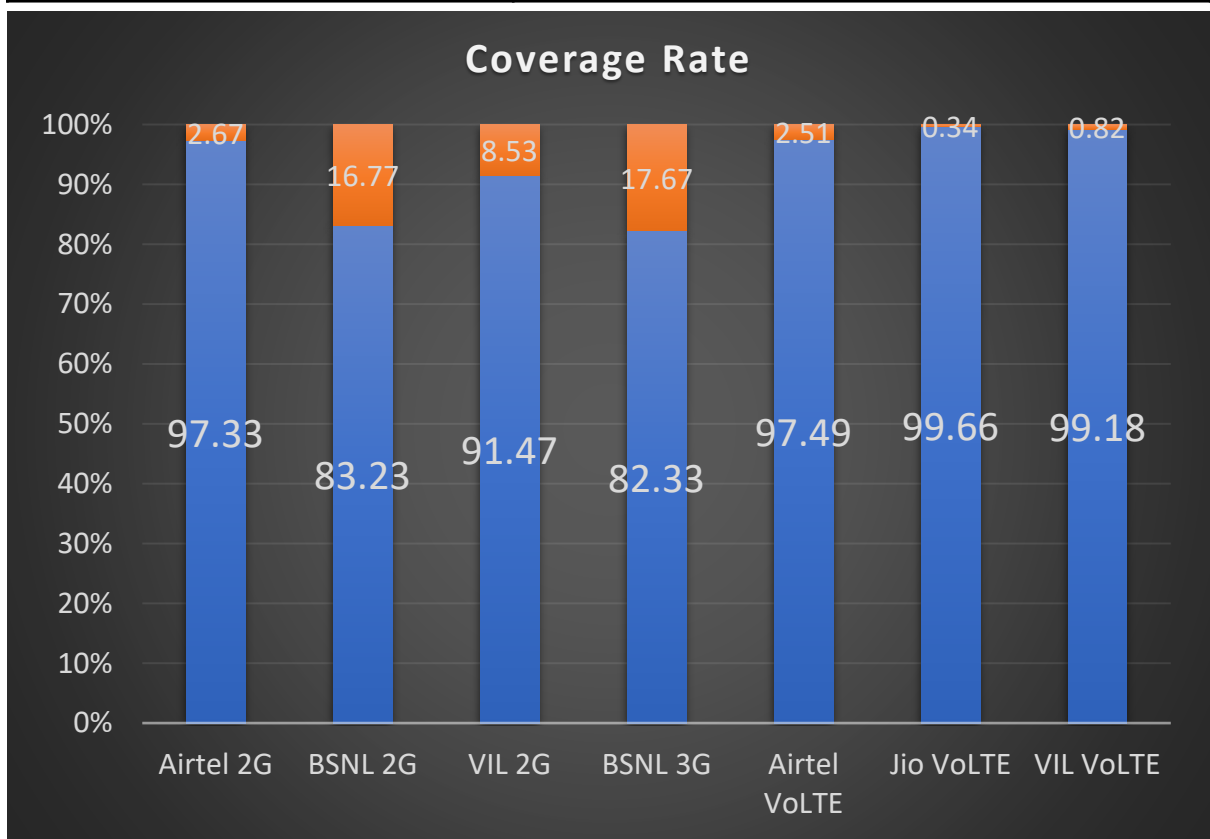
Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	117	120	153
Blocked Call Rate (%)	0.00%	1.67%	1.30%
CSSR% (Accessibility)	100%	98.33%	98.70%
Drop Call Rate (%)	0.00%	1.69%	0.00%
Mobility HOSR (%)	100%	98.77%	99.41%
Rx Quality (%)	97.09%	98.22%	95.04%
Average CST Sec	2.19	3.92	3.43

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	116	101	111	141
Blocked Call Rate (%)	1.72%	0.00%	0.00%	0.00%
CSSR% (Accessibility)	98.28%	100%	100%	100.00%
Drop Call Rate (%)	1.75%	0.00%	0.00%	0.00%
Mobility HOSR (%)	98.25%	100%	99.51%	97.22%
Rx Quality (%)	94.13%	97.54%	92.48%	95.70%
Average CST Sec	3.77	0.96	0.75	0.54

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 ≥ -85 dBm, RSCP is ≥ -90 dBm & RSRP ≥ -110 dBm. The details are as follows.

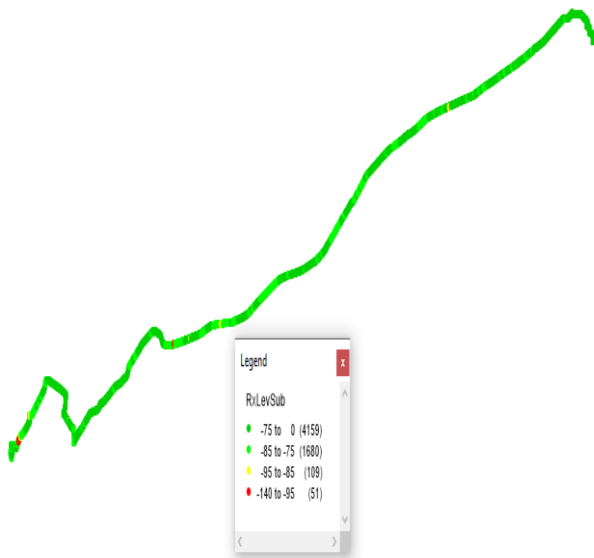
TSP	Coverage Rate %
Airtel 2G	97.33%
BSNL 2G	83.23%
VIL 2G	91.47%
BSNL 3G	82.33%
Airtel VoLTE	97.49%
Jio VoLTE	99.66%
VIL VoLTE	99.18%



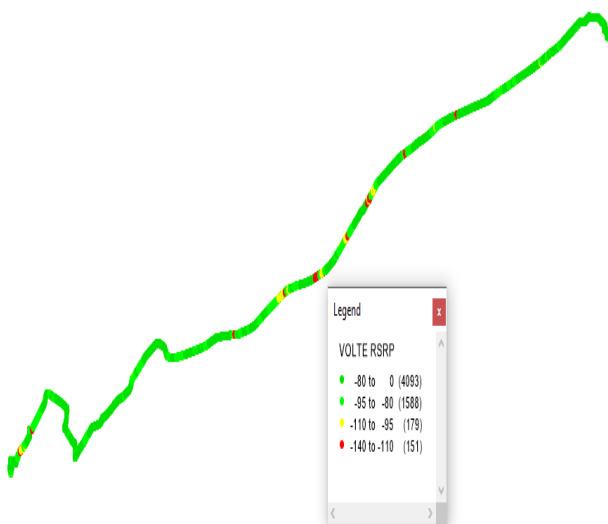
TSP-AIRTEL

Technology	Coverage %
2G	97.33
VoLTE	97.49

2G



VoLTE



2G

Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	4159	69.33%	
[-75, >=-85)	1680	28.00%	
[-85, >=-95)	109	1.81%	
[-95, >=Min)	51	0.86%	
Total	5999	100%	

VoLTE

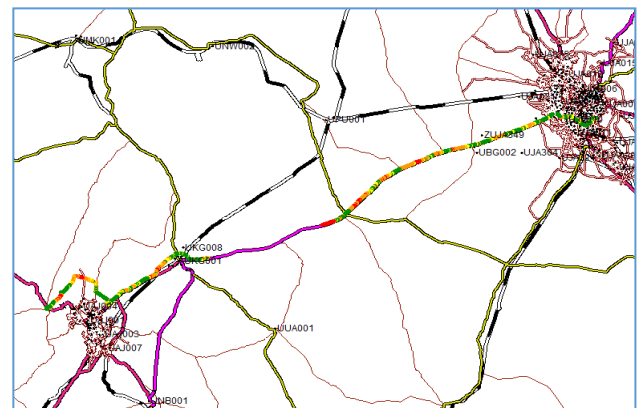
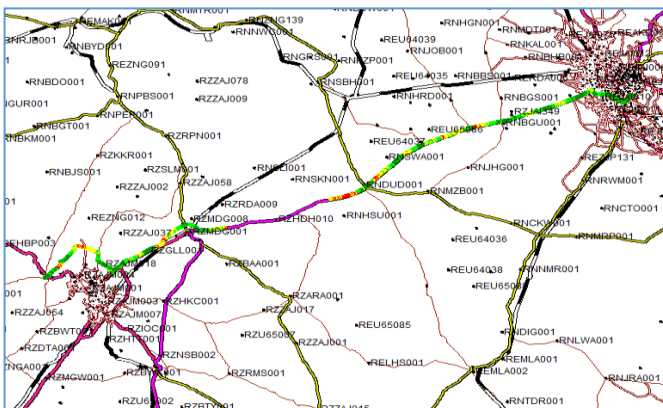
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	4093	68.09%	
[-80, >=-90)	1588	26.42%	
[-90, >=-110)	179	2.98%	
[-110, >=Min)	151	2.51%	
Total	6011	100%	

TSP- BSNL

Technology	Coverage %
2G	83.23
3G	82.33

2G

3G

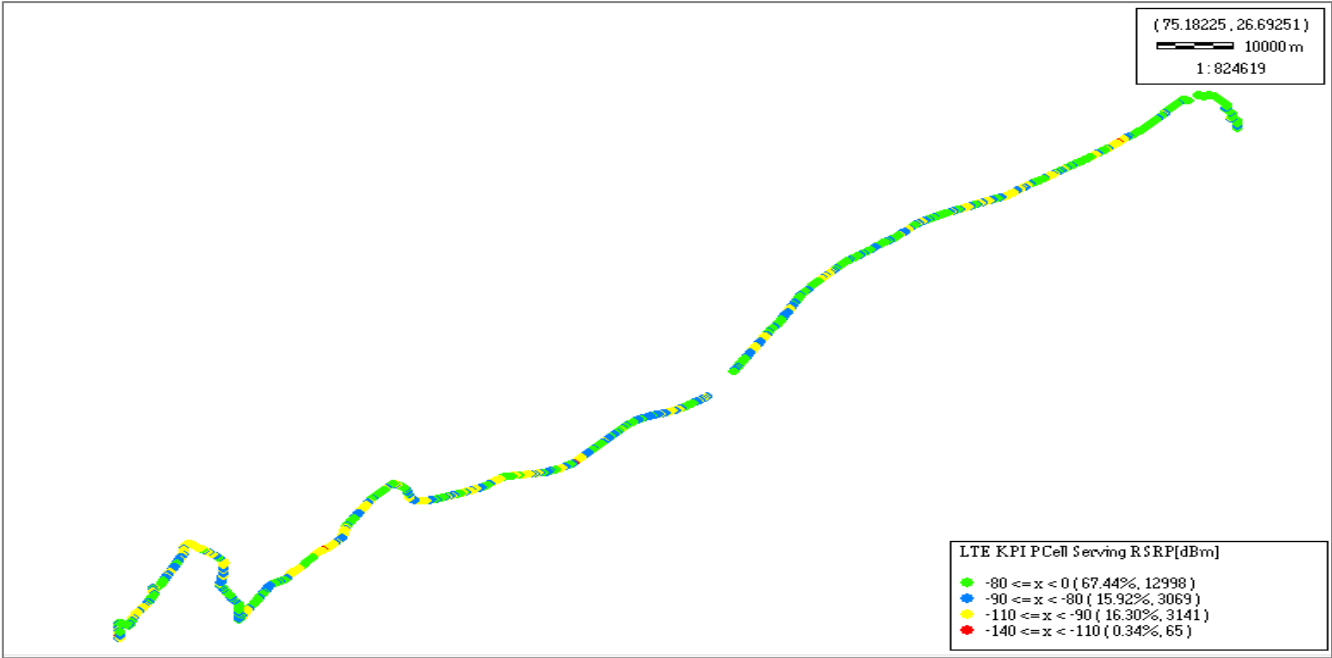


2G			Legends
Overall RxLevel	# Samples	% PDF	
[Max, >=-75]	4496	35.37%	
[-75, >=-85)	6083	47.86%	
[-85, >=-95)	1119	8.80%	
[-95, >=Min)	1013	7.97%	
Total	12711	100%	

3G			Legends
Overall RSCP	# Samples	% PDF	
[Max, >=-70]	4185	33.01	
[-70, >=-80)	3535	27.88	
[-80, >=-90)	2718	21.44	
[-90, >=Min)	2240	17.67	
Total	12678	100%	

JIO

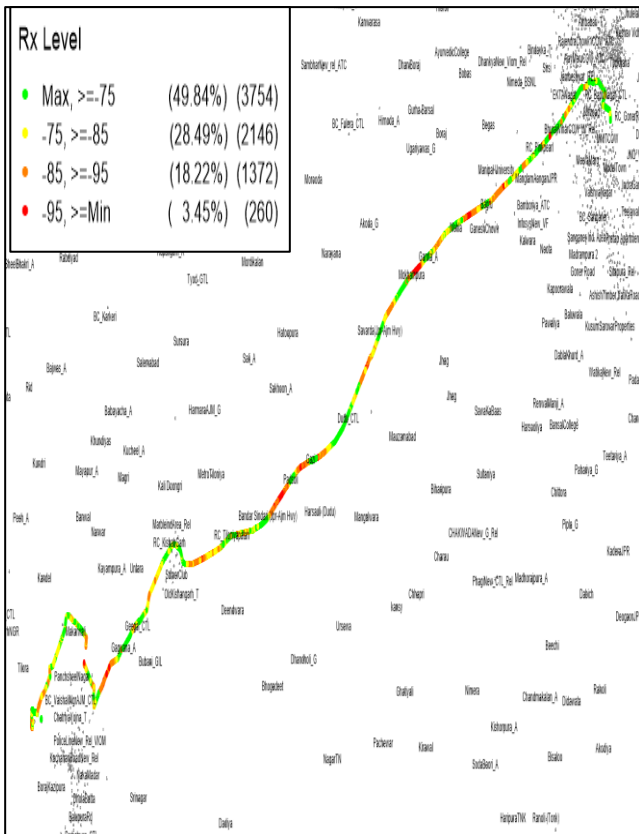
Technology	Coverage %
VoLTE	99.66%



VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	12998	67.44%	
[-80, >=-90)	3069	15.92%	
[-90, >=-110)	3141	16.30%	
[-110, >=Min)	65	0.34%	
Total	19273	100%	

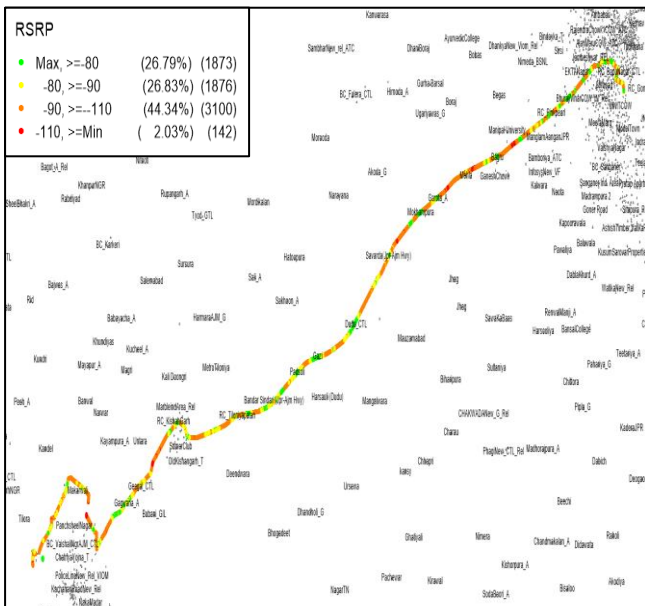
VIL

	Technology	Coverage Rate %
2G	2G	96.55%
	VoLTE	97.97%



Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	3754	49.84%	
[-75, >=-85)	2146	28.49%	
[-85, >=-95)	1372	18.22%	
[-95, >=Min)	260	3.45%	
Total	7532	100%	

VoLTE

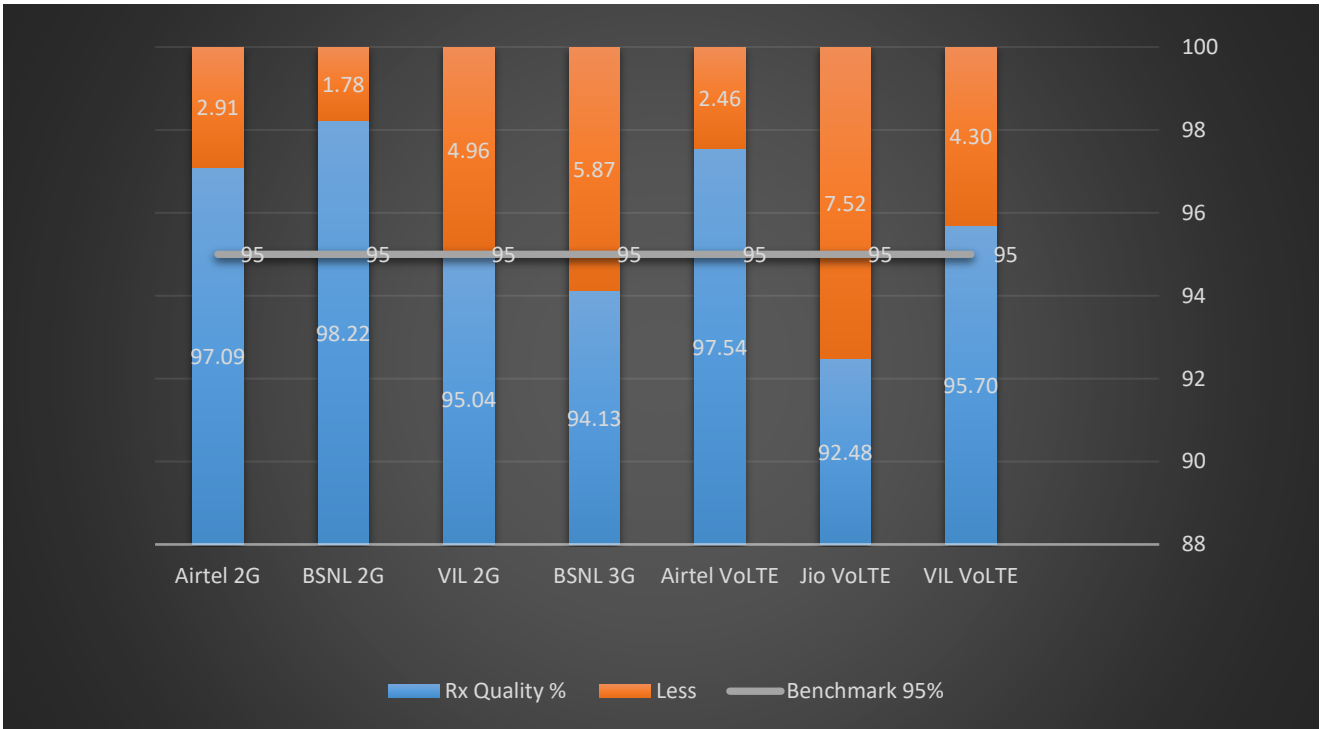


Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	1873	26.79%	
[-80, >=-90)	1876	26.83%	
[-90, >=-110)	3100	44.34%	
[-110, >=Min)	142	2.03%	
Total	6991	100%	

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	97.09%
BSNL 2G	98.22%
VIL 2G	95.04%
BSNL 3G	94.13%
Airtel VoLTE	97.54%
Jio VoLTE	92.48%
VIL VoLTE	95.70%

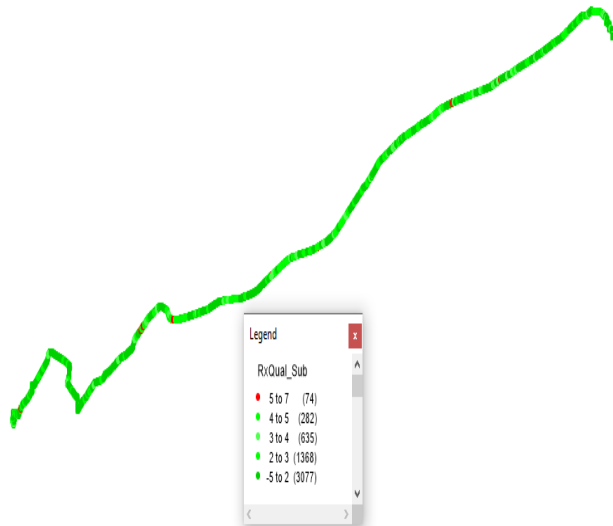


II. Quality Details

Airtel

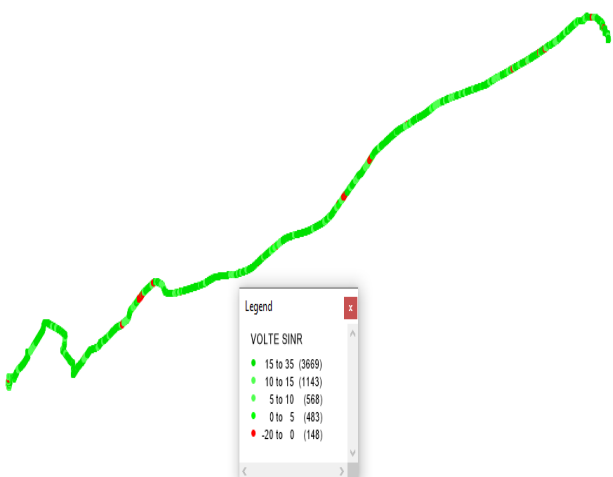
2G

Technology	Rx Quality %
2G	97.09%
VoLTE	97.54%



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	3077	56.60%	
(2, <=3)	1368	25.17%	
(3, <=4)	635	11.68%	
(4, <=5)	282	5.19%	
(5, <=Max)	74	1.36%	
Total	5436	100%	

VoLTE

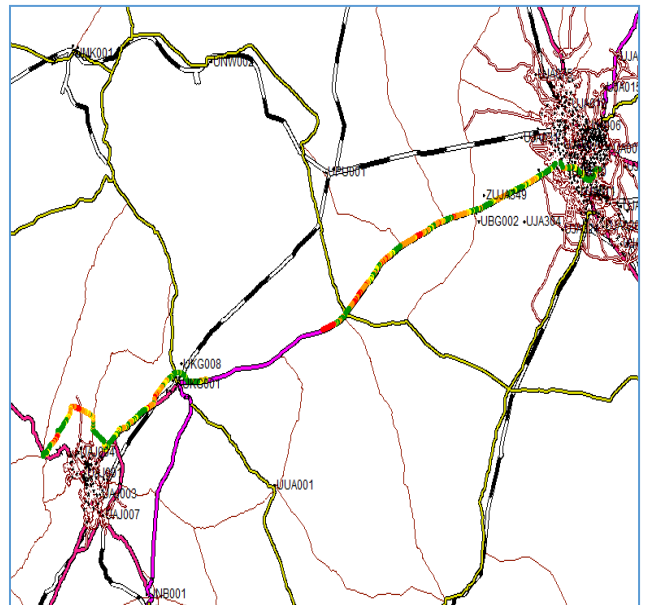
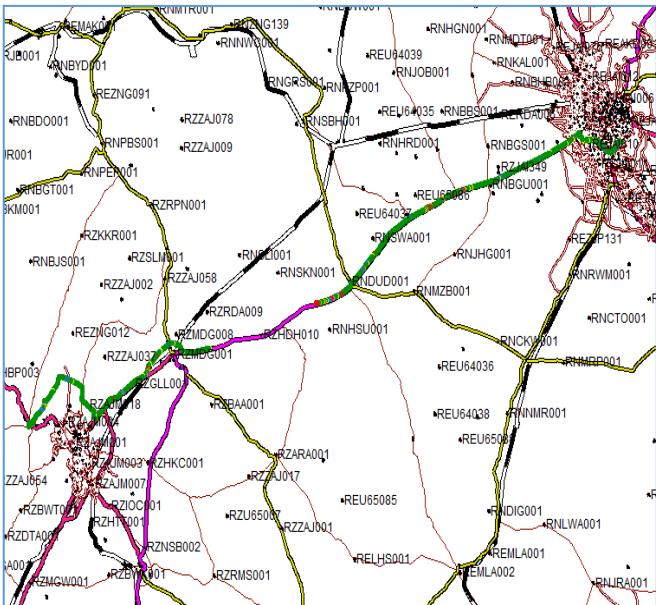


Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	148	2.46%	
(0, <=5)	483	8.04%	
(5, <=10)	568	9.44%	
(10, <=15)	1143	19.02%	
(15, <=Max)	3669	61.04%	
Total	6011	100%	

II. Quality Details

BSNL

	Technology	Rx Quality %	
	2G	98.22%	
2G	3G	94.13%	3G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	11063	90.10%	Green
(2, <=3)	450	3.66%	Yellow
(3, <=4)	371	3.02%	Blue
(4, <=5)	177	1.44%	Orange
(5, <=Max)	218	1.78%	Red
Total	12279	100%	

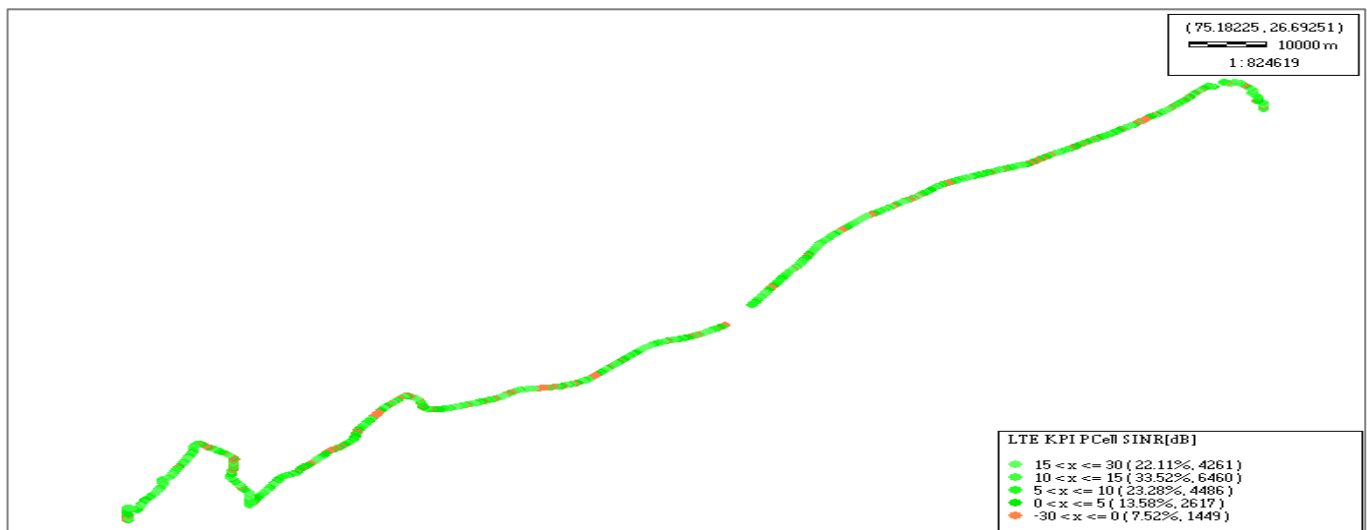
Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	8969	75.35%	Green
(-6, <=-9)	695	5.84%	Yellow
(-9, <=-11)	745	6.26%	Blue
(-11, <=-14)	795	6.68%	Orange
(-14, <= Min)	699	5.87%	Red
Total	11903	100%	

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	92.48%



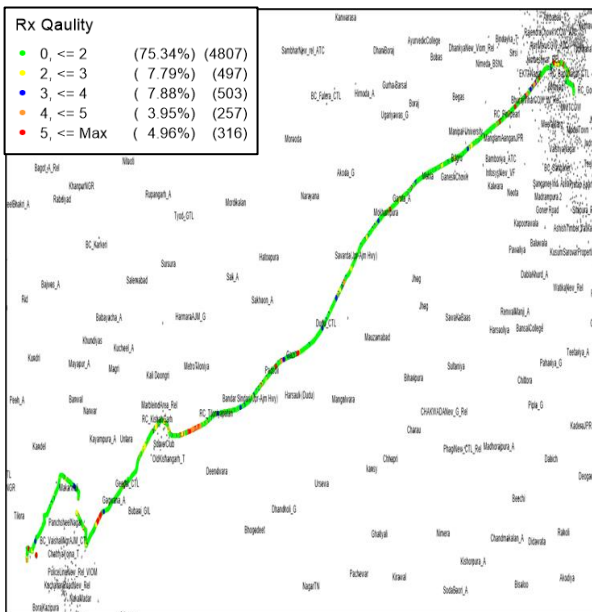
Overall SINR	# Samples	% PDF	Legends
(Min, ≤ 0)	1449	7.52%	
(0, ≤ 5)	2617	13.58%	
(5, ≤ 10)	4486	23.27%	
(10, ≤ 15)	6460	33.52%	
(15, $\leq \text{Max}$)	4261	22.11%	
Total	19273	100%	

II. Quality Details

VIL

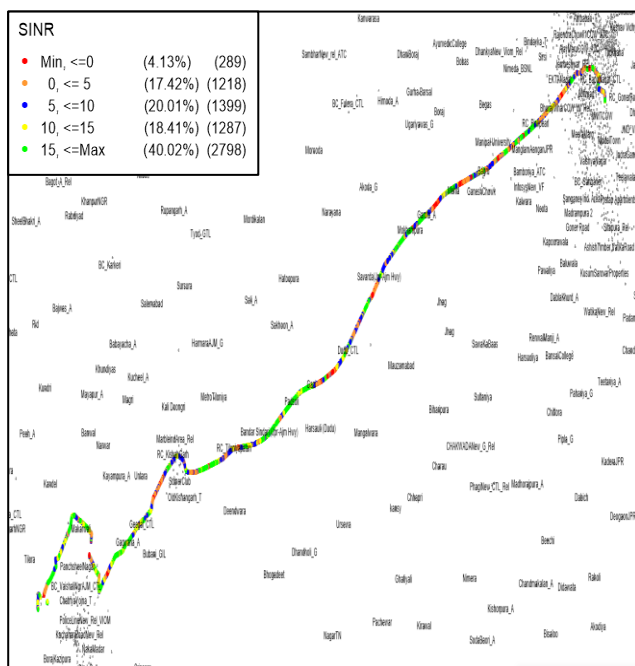
Technology	Rx Quality %
2G	95.04%
4G	95.87%

2G



Overall Rx Quality	# Samples	% PDF	Legend s
(Min, <=2)	4807	75.34%	
(2, <=3)	497	7.79%	
(3, <=4)	503	7.88%	
(4, <=5)	257	3.95%	
(5, <=Max)	316	4.96%	
Total	6380	100%	

VolTE



Overall SINR	# Samples	% PDF	Legend s
(Min, <=0)	289	4.13%	
(0, <=5)	1218	17.42%	
(5, <=10)	1399	20.01%	
(10, <=15)	1287	18.41%	
(15, <=Max)	2798	40.02%	
Total	9670	100%	

III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	17.68%
Airtel VoLTE	100.00%
Jio VoLTE	100.00%
VIL VoLTE	100.00%

