



Operator Assisted Drive Test Report

Panipat to Ambala NH44

26 August . 2023

By

TRAI Regional office Jaipur

Key Performance Indicators: All TSPs have met the Drop Call Rate (DCR) benchmark of 2% **except VIL 2G**. 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 Panipat to Ambala NH44 area from 9:00 AM to 8:00 PM during 26th August 2023. The drive test covered drive route 120 kms. Approximately 80 calls were made for each of the TSPs 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 26th Aug 2023 covering Panipat to Ambala 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, Upload Throughputs, Web Browsing Delay and Latency.

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 120 KMs. Approximately 80 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 209 kms for download throughput in all technologies.

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

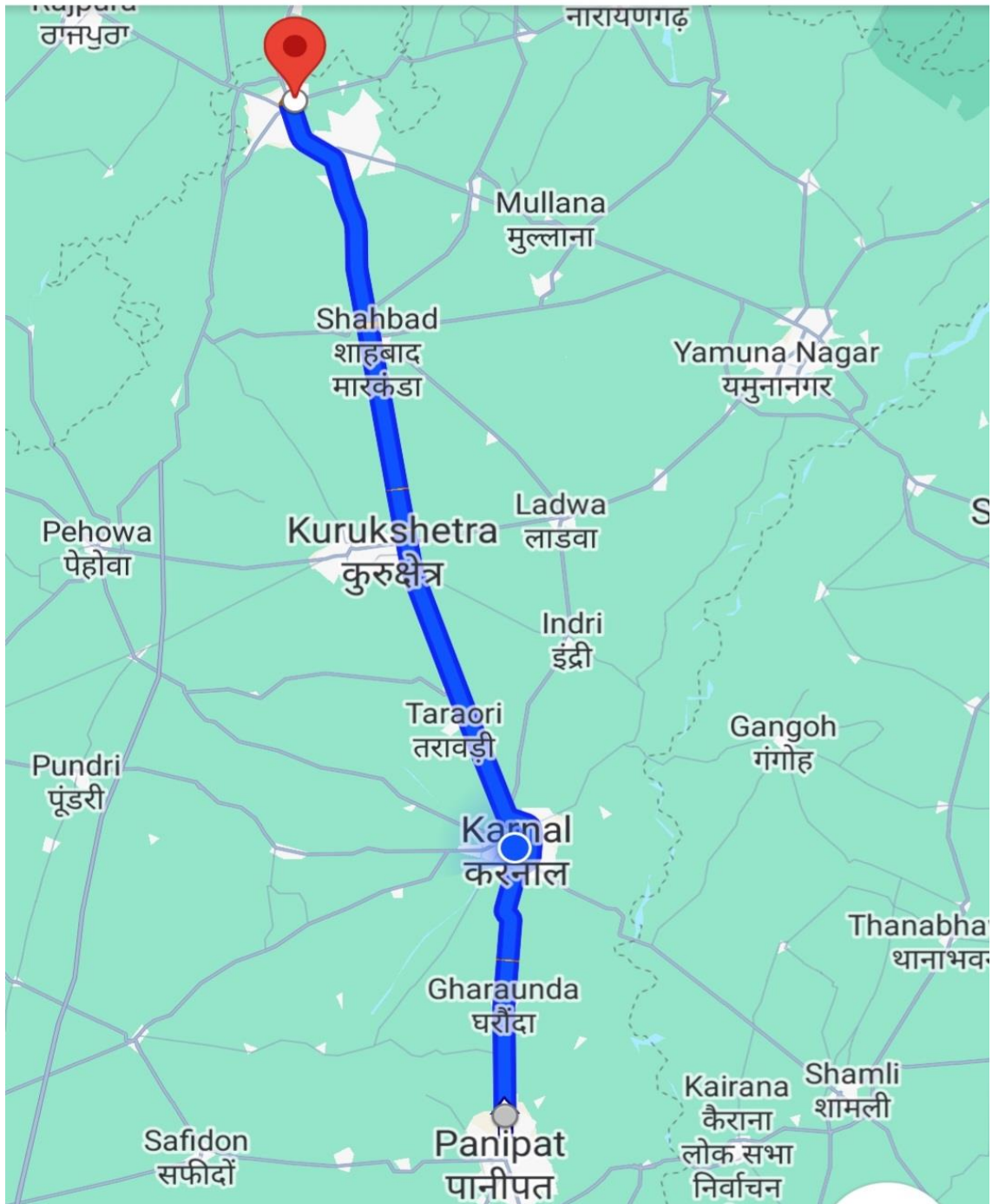
3G – measurement – UE in 3G File Size- 20MB

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

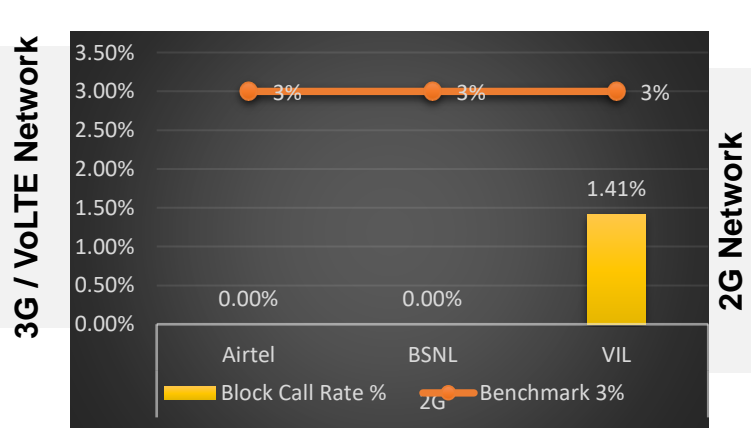
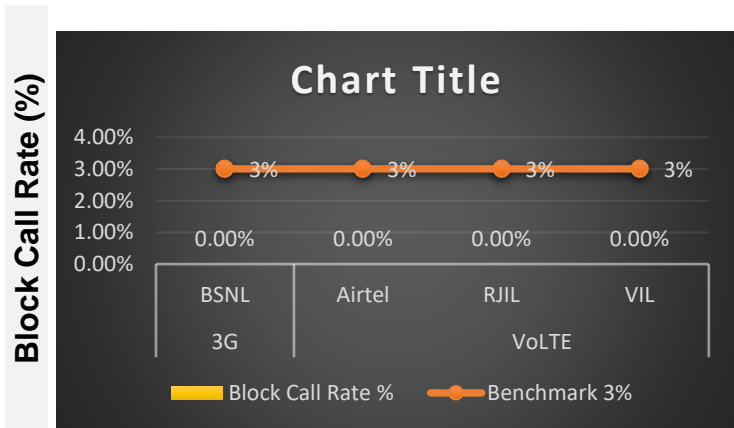
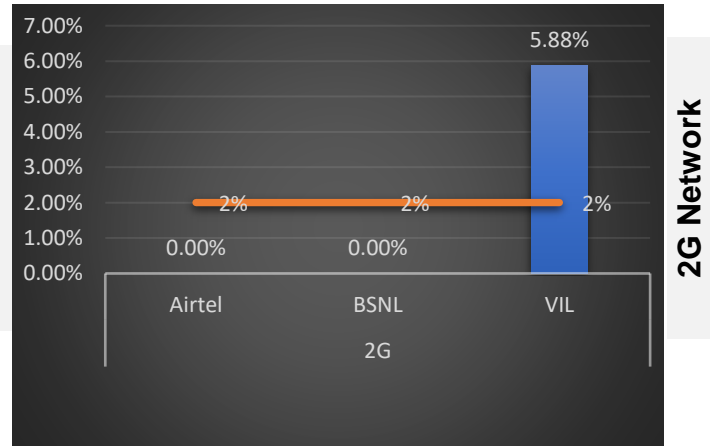
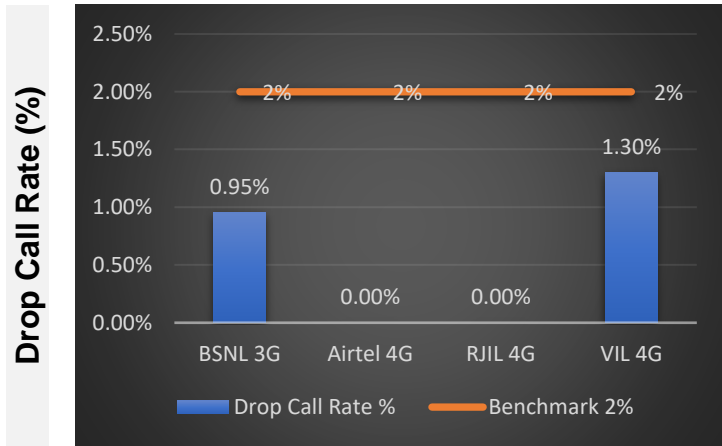


Date	Drive Cat	Area Covered	Kms Approx.
26-08-2023	Voice and Data Dynamic (2G, 3G, 4G)	Panipat to Ambala Highway	120

Voice Calls

Key Observations

QoS compliance of the TSPs in Panipat to Ambala 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%	5.88%	0.95%	0.00%	0.00%	1.30%
Block Call Rate %	0.00%	0.00%	1.41%	0.00%	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 %	99.69%	89.33%	90.00%

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

TSPs	3G
	BSNL
Coverage %	78.83%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99.62%	99.48%	98.00%

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	53.67%	100.00%	100.00%	100.00%

Data Services Dynamic

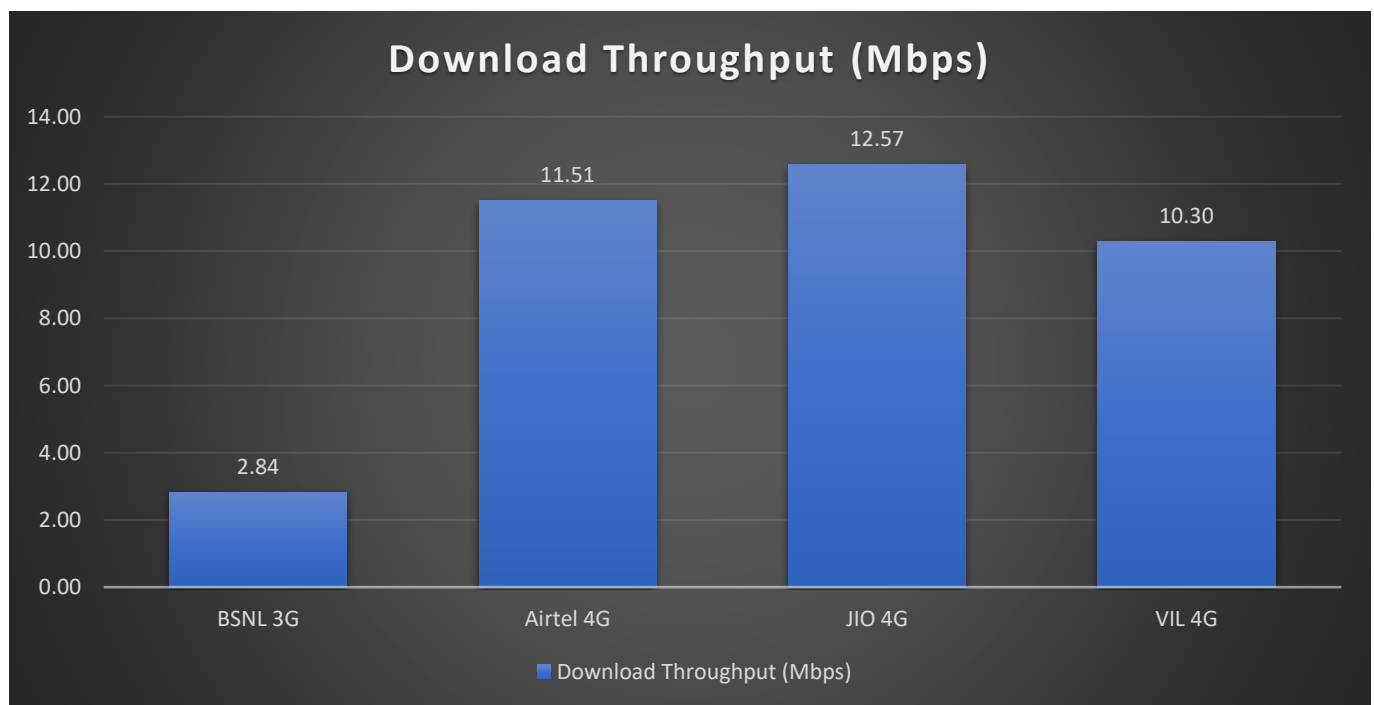
Key Observations

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)	2.84	11.51	12.57	10.30



Summary

City Level Summary-Voice

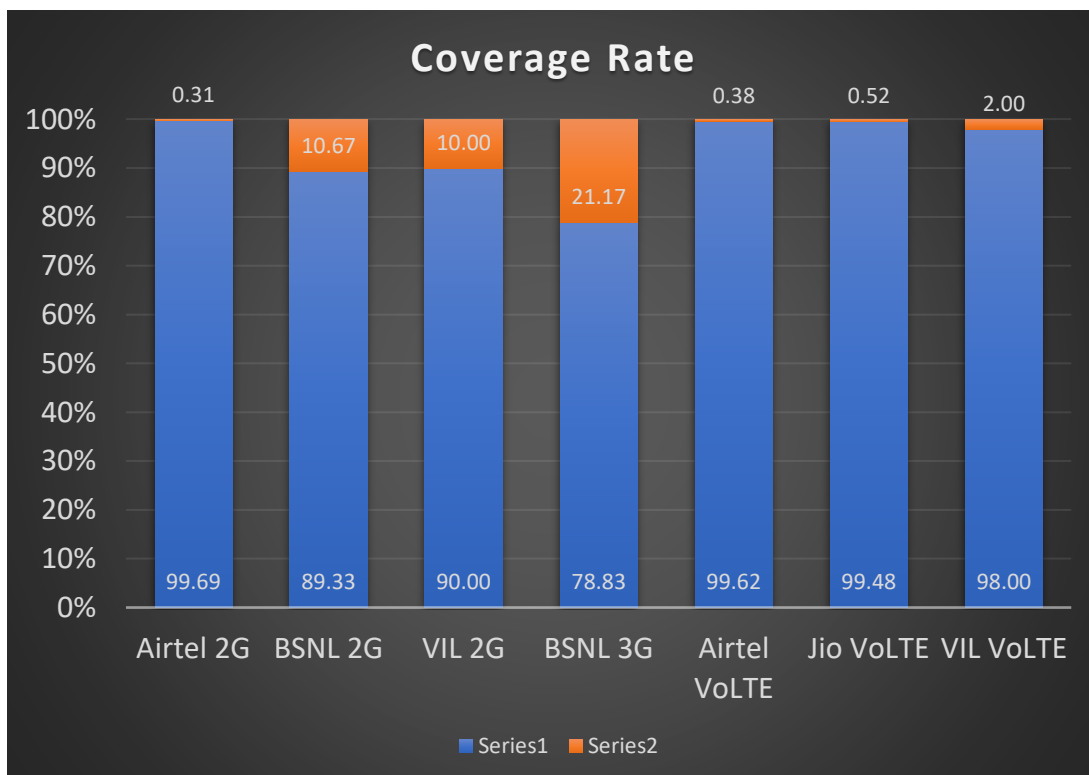
Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	76	105	71
Blocked Call Rate (%)	0.00%	0.00%	1.45%
CSSR% (Accessibility)	100.00%	100.00%	98.45%
Drop Call Rate (%)	0.00%	0.00%	5.88%
Mobility HOSR (%)	100.00%	98.40%	99.19%
Rx Quality (%)	91.04%	94.33%	95.00%
Average CST Sec	3.71	3.01	5.01

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	105	80	97	77
Blocked Call Rate (%)	0.00%	0.00%	0.00%	0.00%
CSSR% (Accessibility)	100.00%	100.00%	100.00%	100.00%
Drop Call Rate (%)	0.95%	0.00%	0.00%	1.30%
Mobility HOSR (%)	100.00%	99.80%	98.58%	99.31%
Rx Quality (%)	89.58%	94.00%	91.07%	86.00%
Average CST Sec	3.40	1.60	0.54	2.60

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.

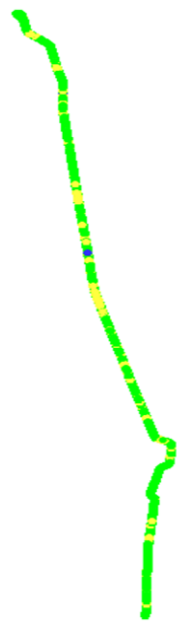
TSP	Coverage Rate %
Airtel 2G	99.69%
BSNL 2G	89.33%
VIL 2G	90.00%
BSNL 3G	78.83%
Airtel VoLTE	99.62%
Jio VoLTE	99.48%
VIL VoLTE	98.00%



TSP-AIRTEL

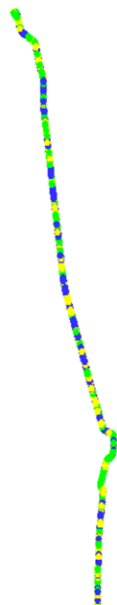
Technology	Coverage %
2G	99.69%
VoLTE	99.62%

2G



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	564937	84.65%	
[-75, >=-85)	100347	15.04%	
[-85, >=-95)	2062	0.31%	
[-95, >=Min)	0	0%	
Total	667346	100%	

VoLTE



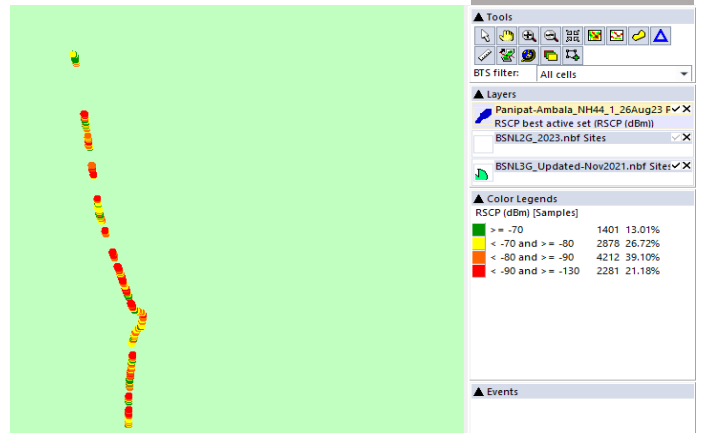
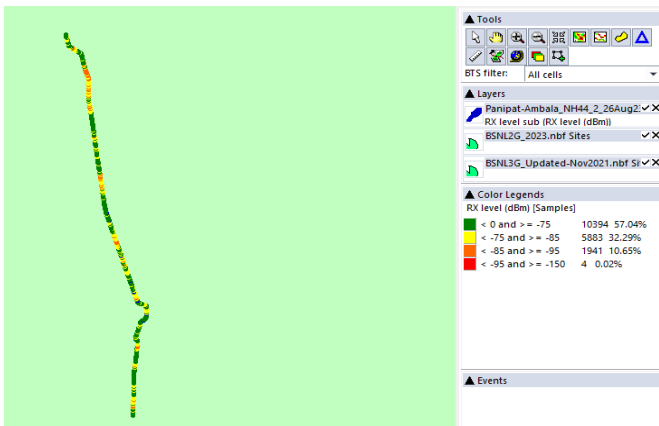
VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	437537	36.99%	
[-80, >=-90)	402512	34.03%	
[-90, >=-110)	338345	28.60%	
[-110, >=Min)	4510	0.38%	
Total	1182904	100%	

TSP- BSNL

Technology	Coverage %
2G	89.33%
3G	78.83%

2G

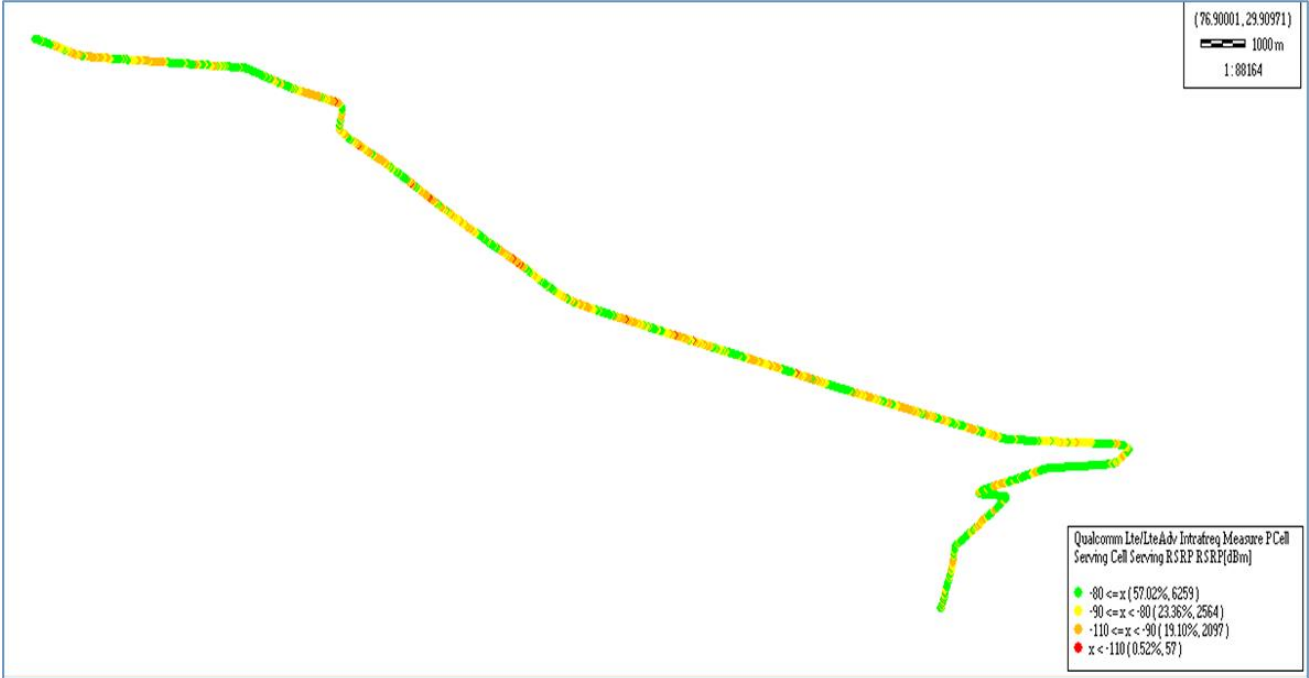
3G



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	10394	57.04%	
[-75, >=-85)	5883	32.29%	
[-85, >=-95)	1941	10.65%	
[-95, >=Min)	4	0.02%	
Total	18222	100%	
3G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	1401	13.00%	
[-70, >=-80)	2878	26.72%	
[-80, >=-90)	4212	39.10%	
[-90, >=Min)	2281	21.18%	
Total	10772	100%	

JIO

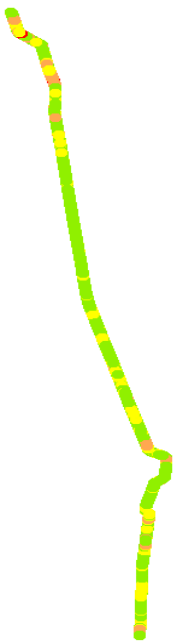
Technology	Coverage %
VoLTE	99.48%



VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	6259	57.02%	
[-80, >=-90)	2564	23.36%	
[-90, >=-110)	2097	19.10%	
[-110, >=Min)	57	.52%	
Total	10977	100%	

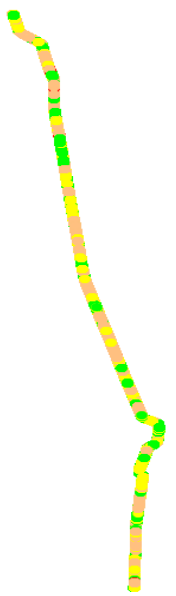
VIL

	Technology	Coverage Rate %
2G	2G	90.00%
	VoLTE	98.00%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	397501	66%	Green
[-75, >=-85)	141545	24%	Yellow
[-85, >=-95)	60218	10%	Orange
[-95, >=Min)	2550	0%	Red
Total	601814	100%	

VoLTE

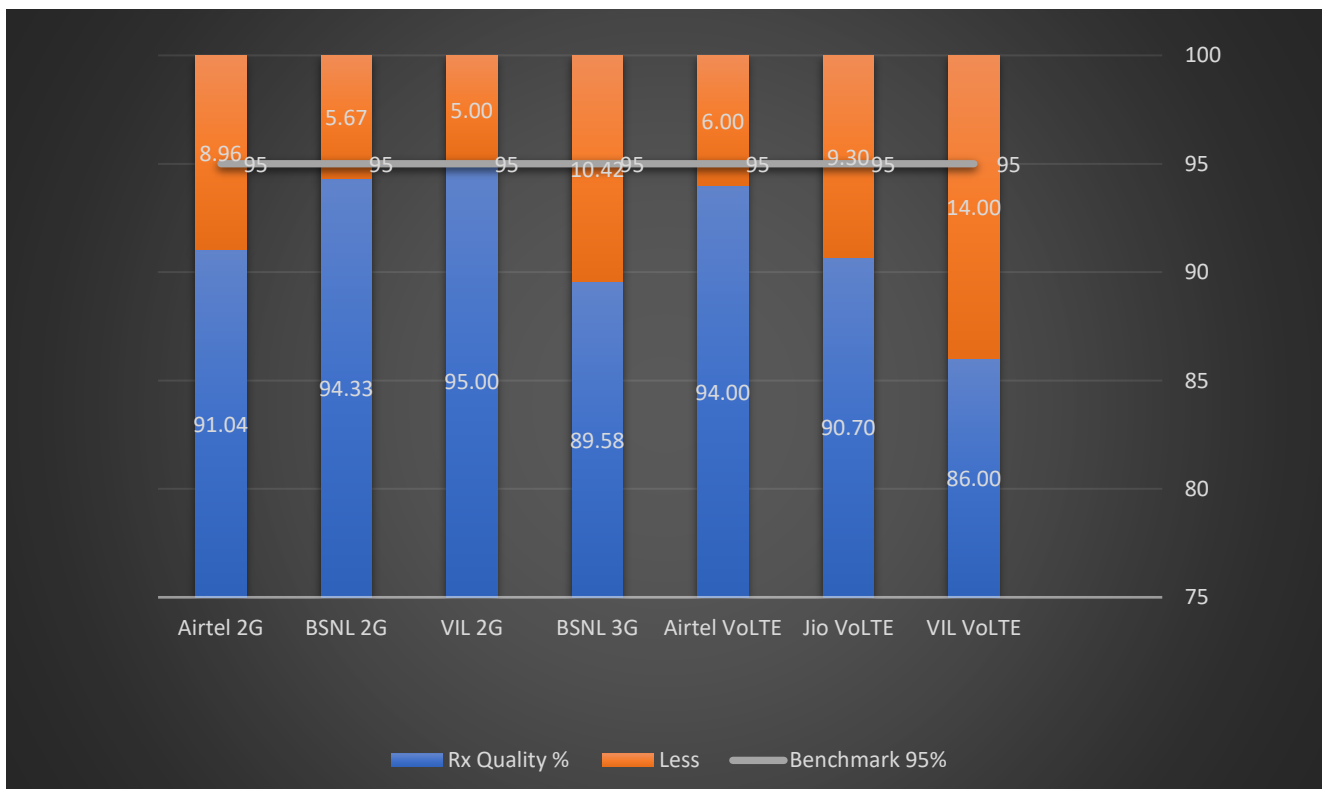


VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	785460	71%	Green
[-80, >=-90)	118405	11%	Yellow
[-90, >=-110)	153741	14%	Orange
[-110, >=Min)	54522	5%	Red
Total	1112128	100%	

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	91.04%
BSNL 2G	94.33%
VIL 2G	95.00%
BSNL 3G	89.58%
Airtel VoLTE	94.00%
Jio VoLTE	91.07%
VIL VoLTE	86.00%

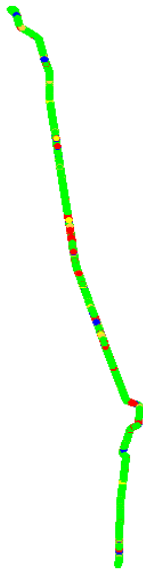


II. Quality Details

Airtel

Technology	Rx Quality %
2G	94.33%
VoLTE	94.00%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	560121	80.80%	Green
(2, <=3)	23911	3.45%	Orange
(3, <=4)	25222	3.64%	Yellow
(4, <=5)	21810	3.15%	Blue
(5, <=Max)	62136	8.96%	Red
Total	693200	100%	

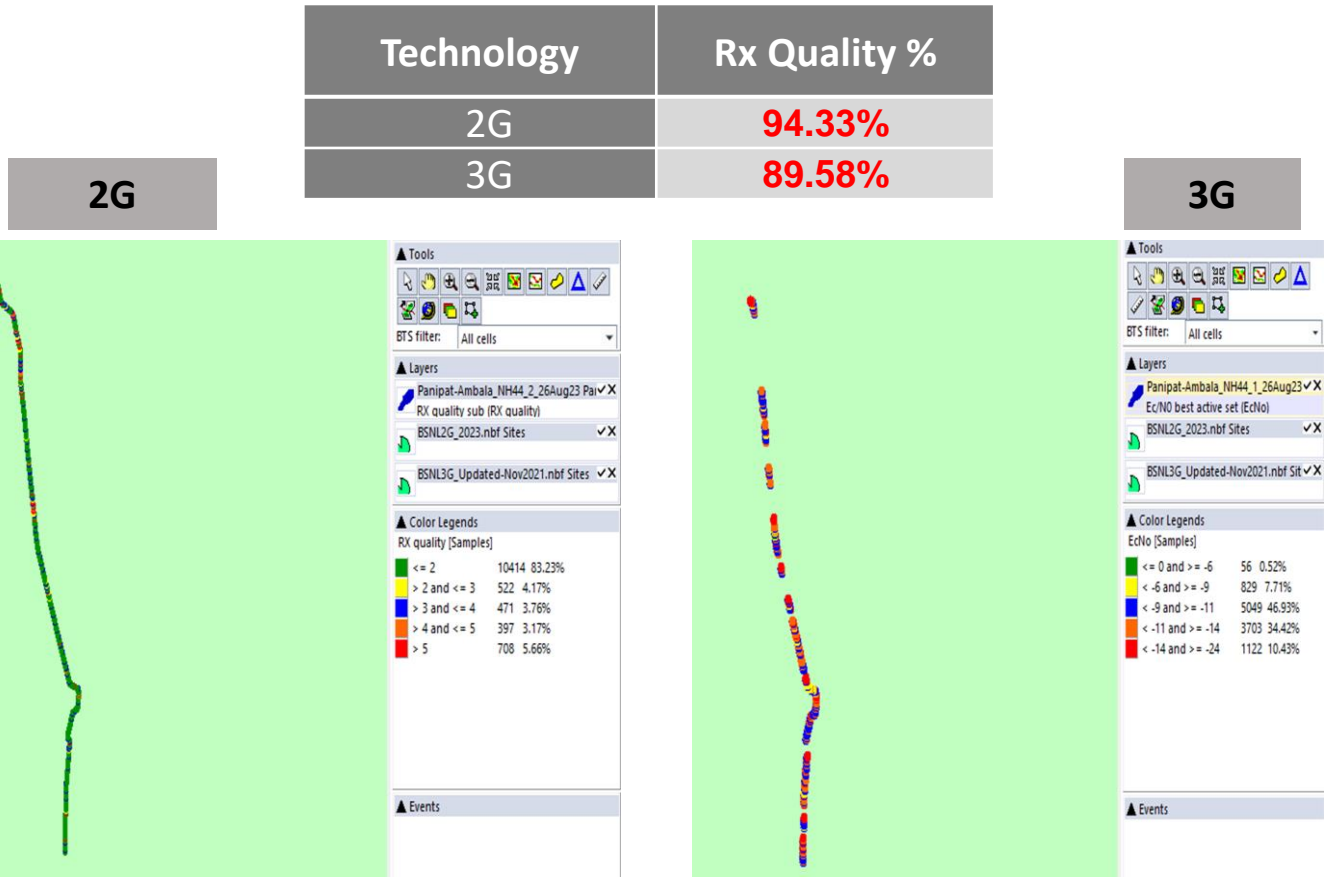
VoLTE



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	73866	6%	Red
(0, <=5)	583236	48%	Orange
(5, <=10)	323692	27%	Blue
(10, <=15)	154146	13%	Yellow
(15, <=Max)	86497	7%	Green
Total	1221437	100%	

II. Quality Details

BSNL



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	10414	83.23	
(2, <=3)	522	4.17	
(3, <=4)	471	3.76	
(4, <=5)	397	3.17	
(5, <=Max)	708	5.66	
Total	12512	100%	

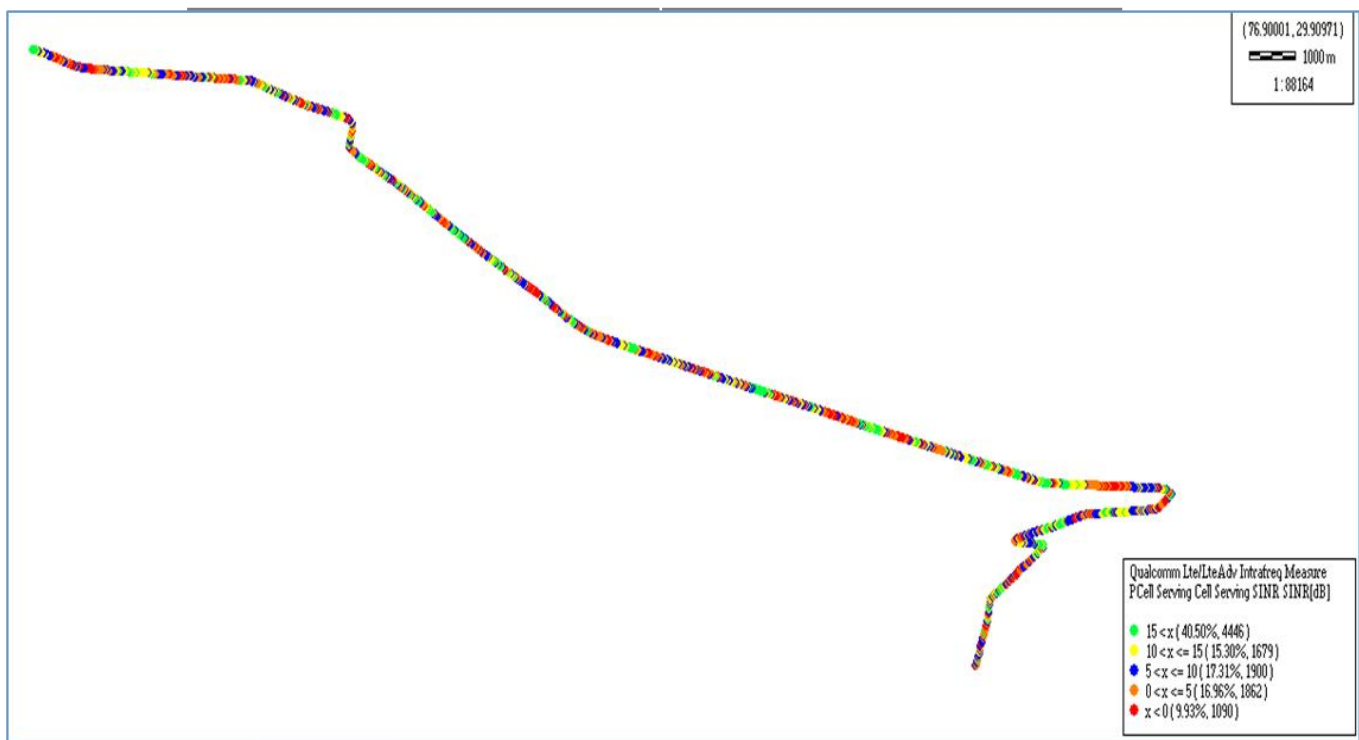
Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	56	0.52	
(-6, <=-9)	829	7.71	
(-9, <=-11)	5049	46.93	
(-11, <=-14)	3703	34.41	
(-14, <= 24)	1122	10.43	
Total	10759	100%	

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, whereas quality beyond this benchmark is considered to be bad. The benchmark should usually be $\geq 95\%$.

JIO

Technology	Rx Quality %
VoLTE	91.07%



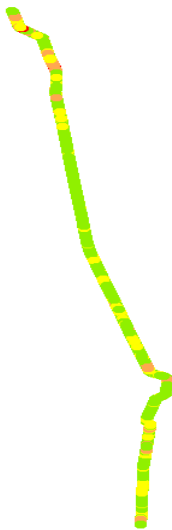
Overall SINR	# Samples	% PDF	Legends
(Min, ≤ 0)	1090	9.93%	
(0, ≤ 5)	1862	16.96%	
(5, ≤ 10)	1900	17.31%	
(10, ≤ 15)	1679	15.30%	
(15, $\leq \text{Max}$)	4446	40.50%	
Total	10977	100%	

II. Quality Details

VIL

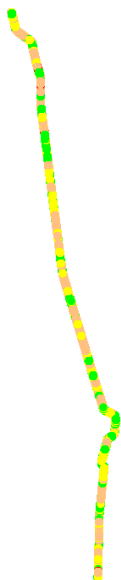
Technology	Rx Quality %
2G	95.00%
4G	86.00%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	2119457	89.5%	
(2, <=3)	53613	2.3%	
(3, <=4)	53921	2.3%	
(4, <=5)	43932	1.8%	
(5, <=Max)	97124	4.1%	
Total	2368047	100%	

VoLTE



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	914138	9%	
(0, <=5)	1232545	12%	
(5, <=10)	6421488	63%	
(10, <=15)	952695	9%	
(15, <=Max)	695484	7%	
Total	10216350	100%	

III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	53.67%
Airtel VoLTE	100.00%
Jio VoLTE	100.00%
VIL VoLTE	100.00%

