



# Operator Assisted Drive Test Report

## TARN TARAN to MANWALA via Makhu, Kapurthala Highway

24<sup>th</sup> NOV 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 Highway TarnTaran to Manwala via Makhu Kapurthala Highway from 9:00 AM to 8:00 PM during 24/11/2023. The drive test covered drive route of 169 KMs & 1 no hotspots over a period of 1 days. 190 calls were made for each of the 2G&3G networks: three 2G networks, one 3G network and three LTE networks covering four TSPs.

Overview

Voice  
Summary

Data  
Summary

# Overview

Regional Office, TRAI Jaipur conducted Operator Assisted Drive Test on 24th Nov 2023 covering Tarn Taran to Manawala via Makhu . 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 169 KMs. Approx 190 calls were made in 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 100 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 1 hotspots

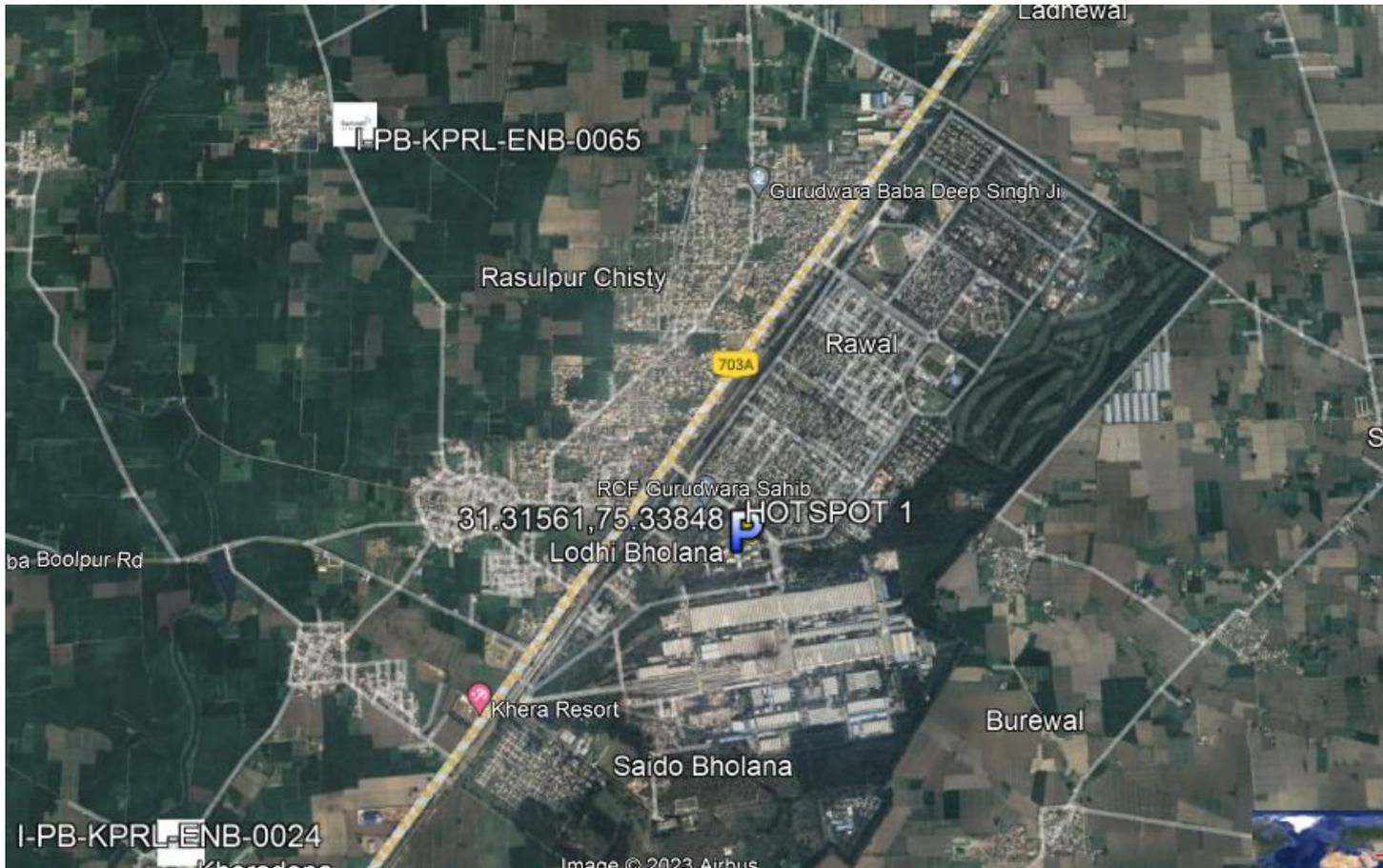
KAPURTHALA RAIL COACH FACTORY

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

## Data Service Test- Static Locations



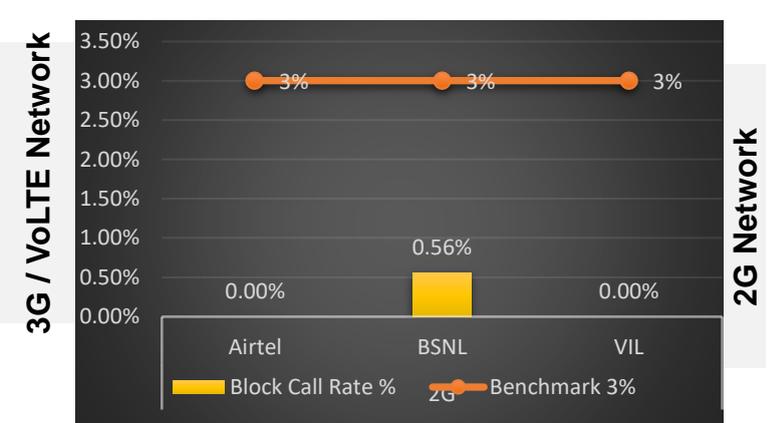
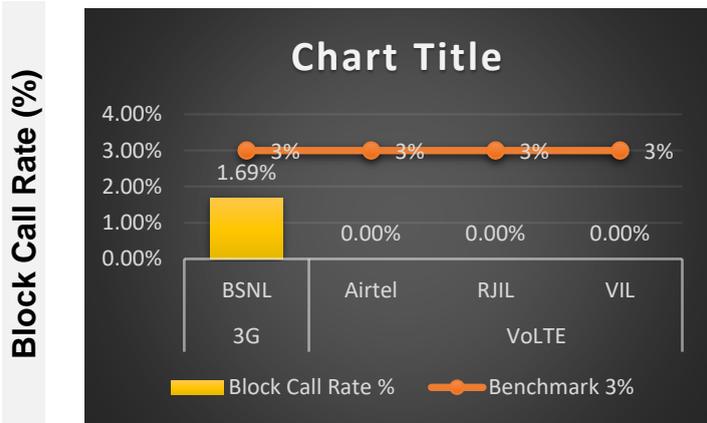
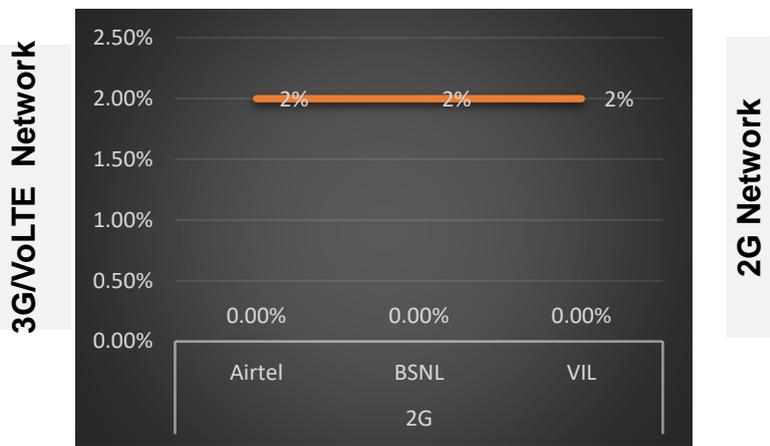
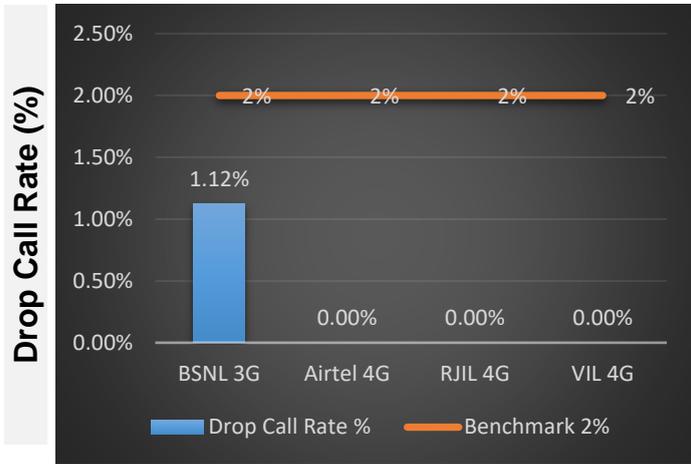
### Hotspot Locations

#### 1. RAIL COACH FACTORY KAPURTHALA

# Voice Calls

## Key Observations

QoS compliance of the TSPs in for Tarn Taran to Amritsar highway via Kapurthala Voice across technologies 2G/3G/4G-VoLTE



KPIs	2G			3G	4G		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0.00%	0.56	0.00%	1.12	0.00%	0.00%	0.00%
Block Call Rate %	0.00%	0.56	0.00%	1.69	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 %	99.95%	75.08%	94.00%

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

TSPs	3G
	BSNL
Coverage %	54.75%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99%	99.72%	99.00%

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	28.19%	100%	100.00%	100.00%

# Data Services Dynamic

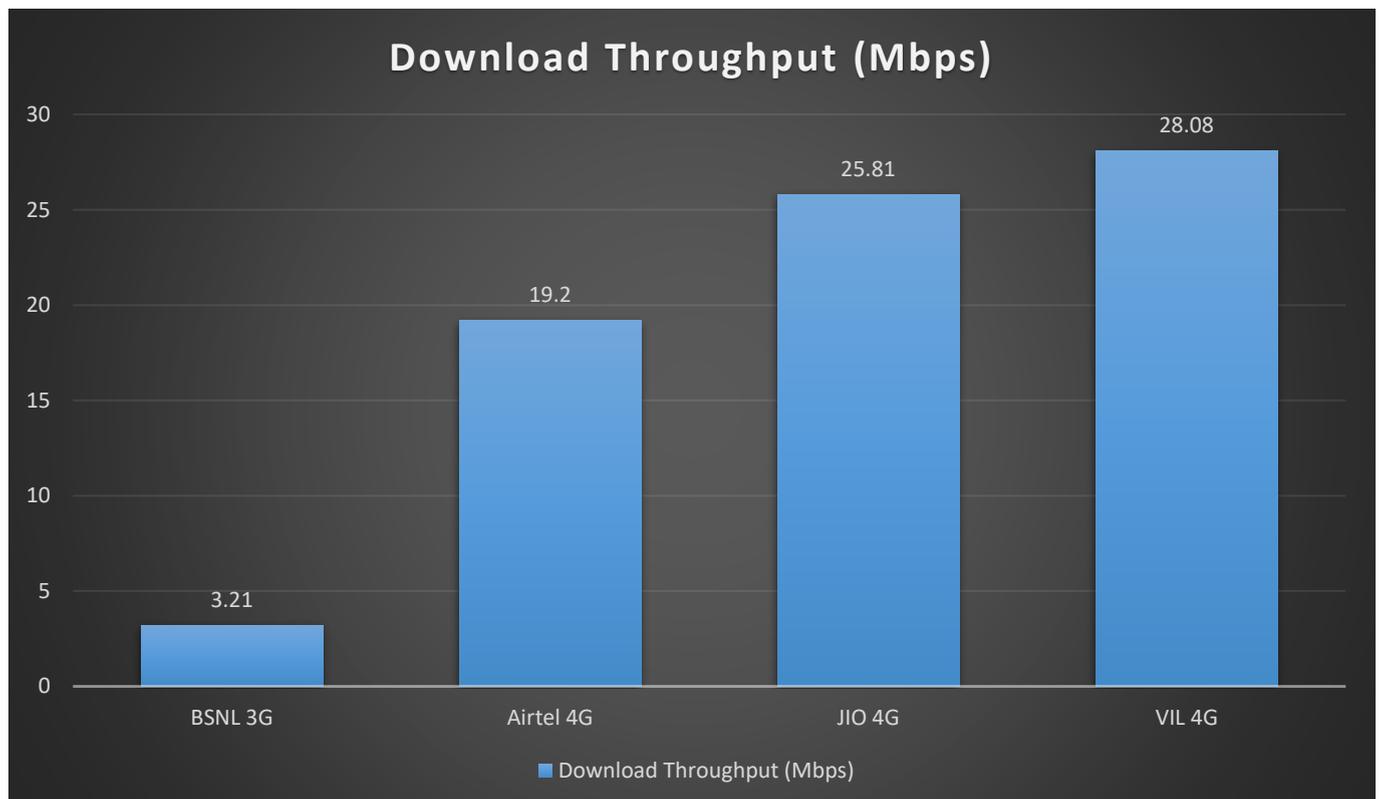
**Key Observations**

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)	<b>3.21</b>	<b>19.2</b>	<b>25.81</b>	<b>28.08</b>



# Summary

## City Level Summary-Voice

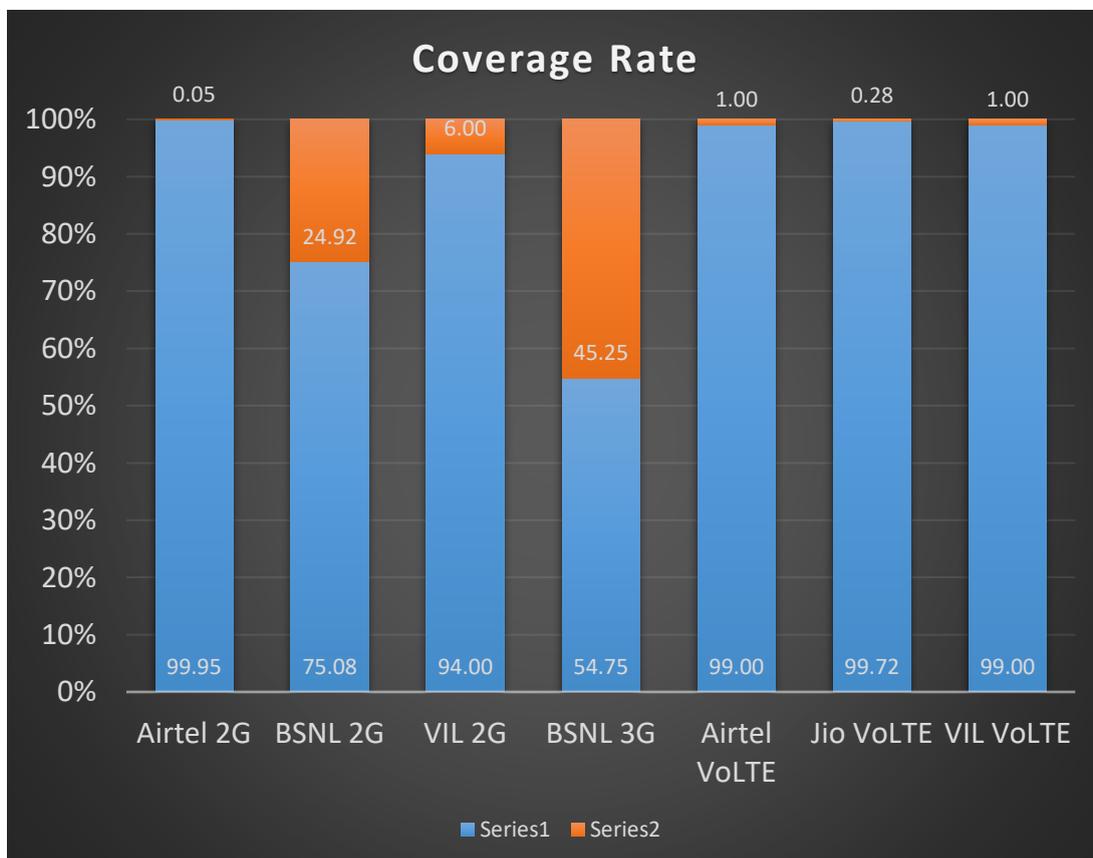
Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	209	178	213
Blocked Call Rate (%)	0	0.56	0
CSSR% (Accessibility)	100	99.43	100
Drop Call Rate (%)	0	0	0
Mobility HOSR (%)	99.59	97.6	98.60
Rx Quality (%)	83.1	97.51	95.40
Average CST Sec	3.67	2.43	3.91

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	180	217	193	213
Blocked Call Rate (%)	1.69	0	0	0
CSSR% (Accessibility)	98.31	100	100	100
Drop Call Rate (%)	1.12	0	0	0
Mobility HOSR (%)	100	99	99.61	100
Rx Quality (%)	87.67	84.12	89.66	84.30
Average CST Sec	1.89	1.53	1.7	1.44

## 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	99.95%
BSNL 2G	75.08%
VIL 2G	94.00%
BSNL 3G	54.75%
Airtel VoLTE	99.00%
Jio VoLTE	99.72%
VIL VoLTE	99.00%



## TSP-AIRTEL

	Technology	Coverage %
	2G	99.95%
2G	VoLTE	99%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	3103239	78%	
[-75, >=-85)	723636	18%	
[-85, >=-95)	146941	4%	
[-95, >=Min)	5083	0%	
<b>Total</b>	<b>3978899</b>	<b>100%</b>	

## VoLTE



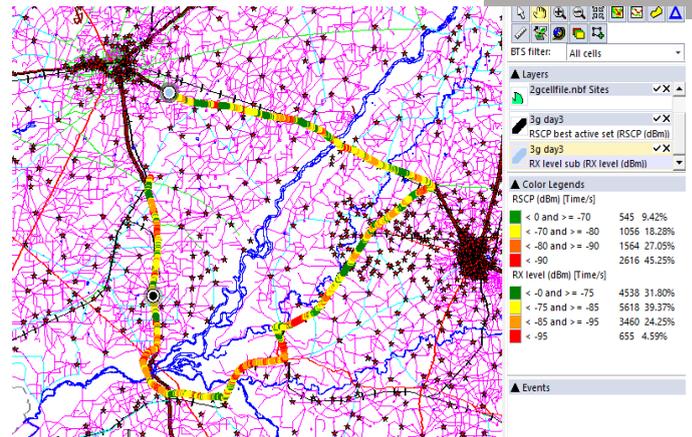
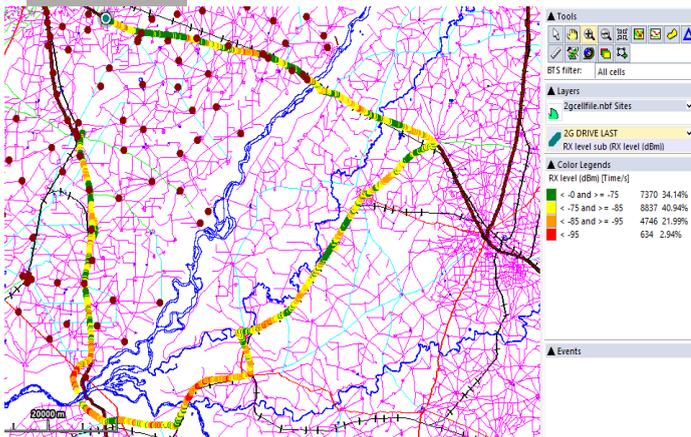
VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	1720762	42%	
[-80, >=-90)	1881392	46%	
[-90, >=-110)	467155	11%	
[-110, >=Min)	31613	1%	
<b>Total</b>	<b>4100922</b>	<b>100%</b>	

## TSP- BSNL

Technology%	Coverage %
2G	75.08%
3G	54.75%

2G

3G



### 2G

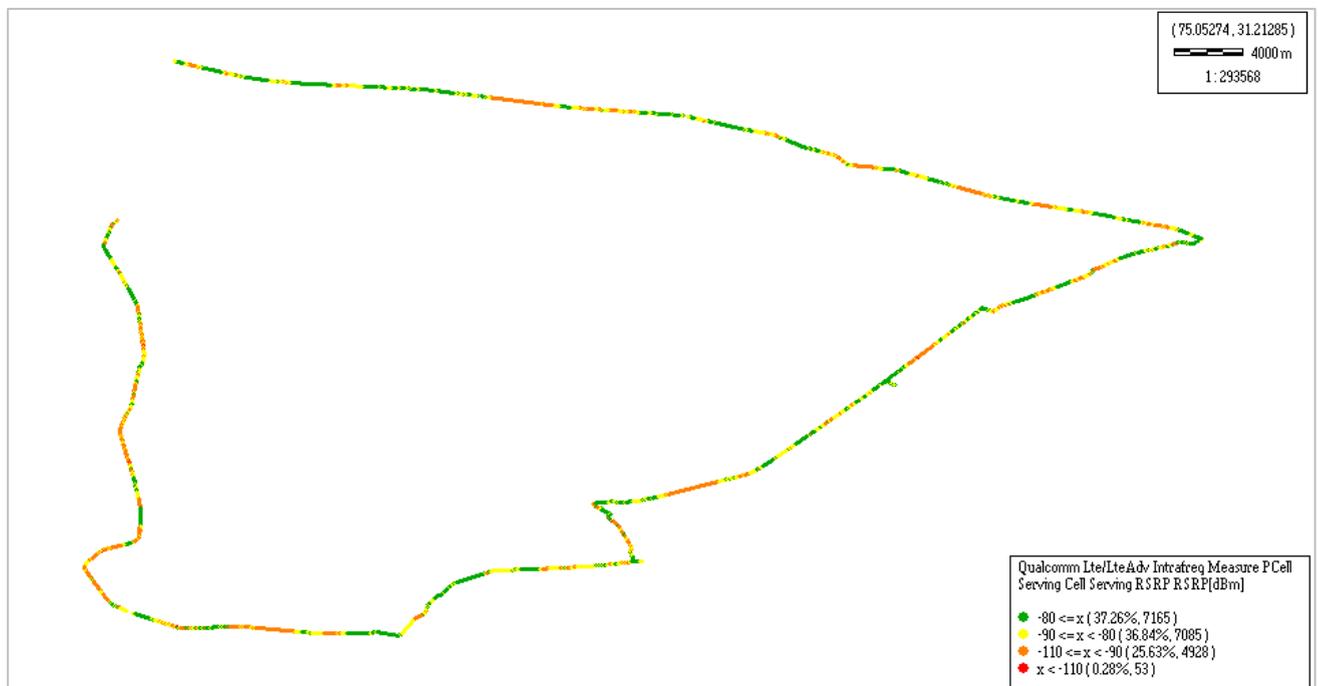
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	7370	34.14%	
[-75, >=-85)	8837	40.94%	
[-85, >=-95)	4746	21.98%	
[-95, >=Min)	634	2.94%	
<b>Total</b>	<b>21587</b>	<b>100%</b>	

### 3G

Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	545	9.42%	
[-70, >=-80)	1056	18.28%	
[-80, >=-90)	1564	27.05%	
[-90, >=Min)	2616	45.25%	
<b>Total</b>	<b>5781</b>	<b>100%</b>	

## JIO

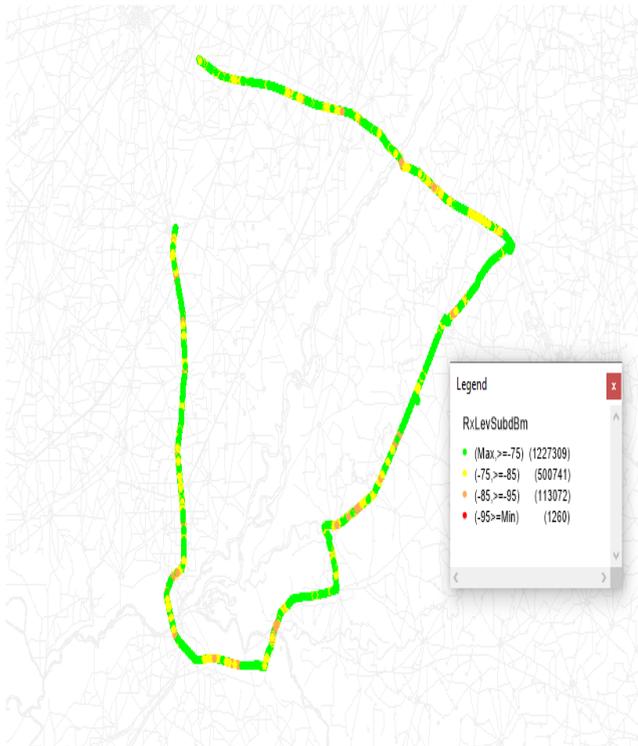
Technology	Coverage %
VoLTE	99.72%



VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	7165	37.26%	
[-80, >=-90)	7085	36.84%	
[-90, >=-110)	4928	25.63%	
[-110, >=Min)	53	0.27%	
<b>Total</b>	<b>19231</b>	<b>100%</b>	

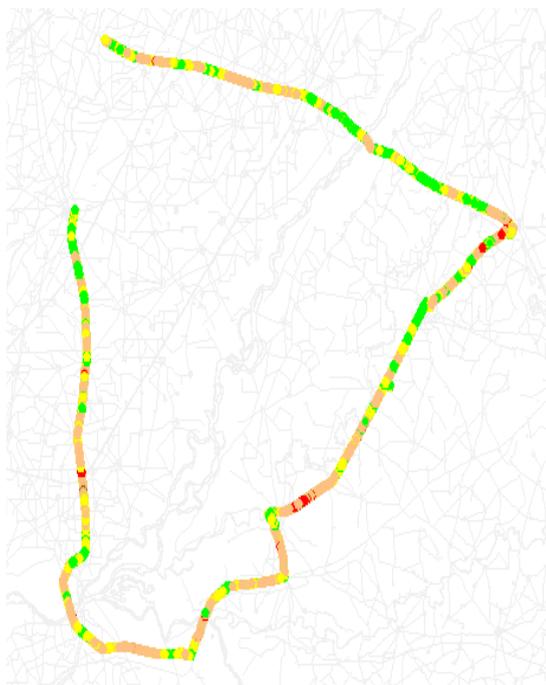
## VIL

	Technology	Coverage Rate %
2G	2G	94.00%
	VoLTE	99.00%



VoLTE

2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	1227309	67%	
[-75, >=-85)	500741	27%	
[-85, >=-95)	113072	6%	
[-95, >=Min)	1260	0	
<b>Total</b>	<b>1842382</b>	<b>100%</b>	

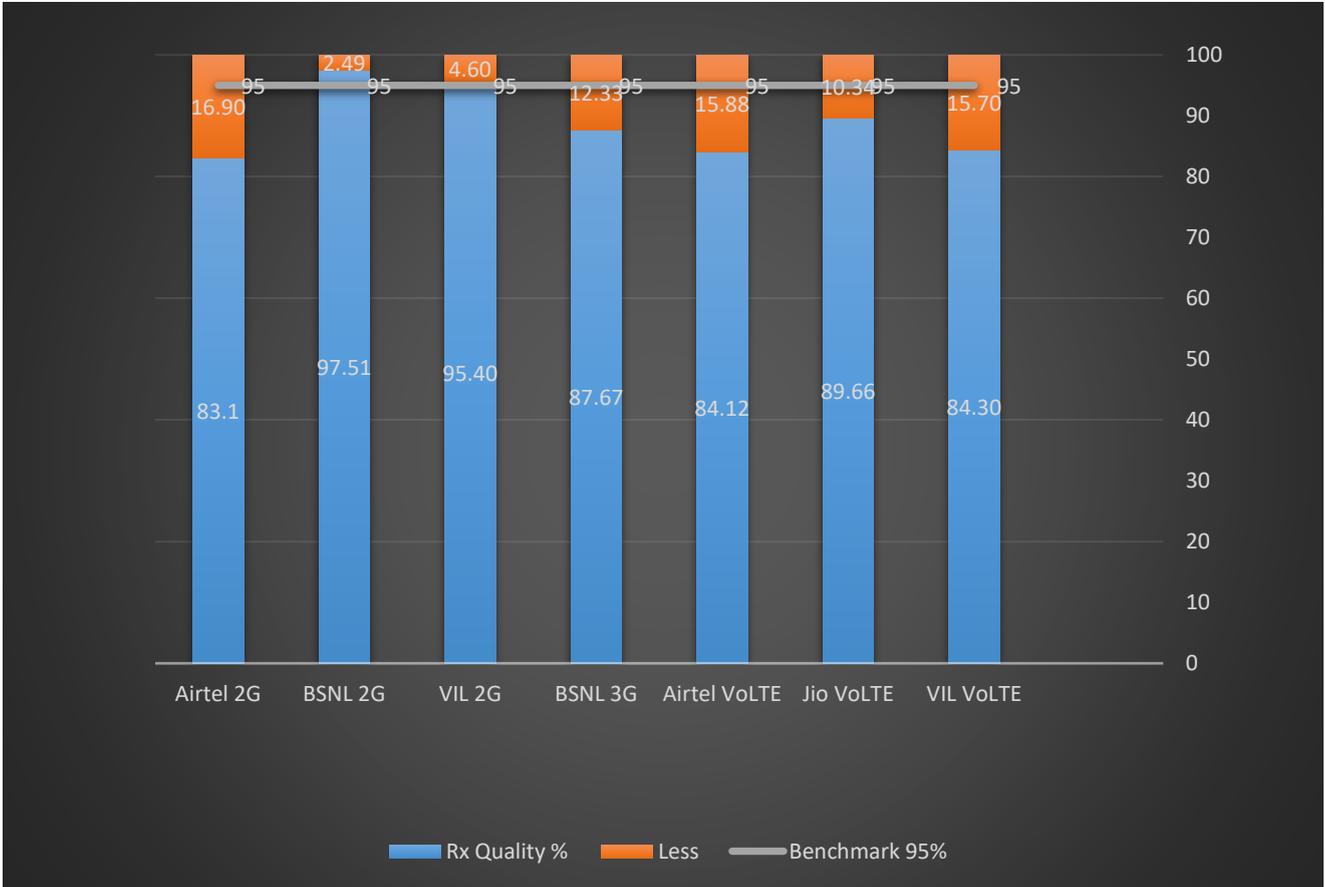


VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	1389392	25%	
[-80, >=-90)	2285920	41%	
[-90, >=-110)	1879831	33%	
[-110, >=Min)	81686	1%	
<b>Total</b>	<b>5636829</b>	<b>100%</b>	

## 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>	Rx Quality %
Airtel 2G	83.1%
BSNL 2G	97.51%
VIL 2G	95.40%
BSNL 3G	87.67%
Airtel VoLTE	84.12%
Jio VoLTE	89.66%
VIL VoLTE	84.30%

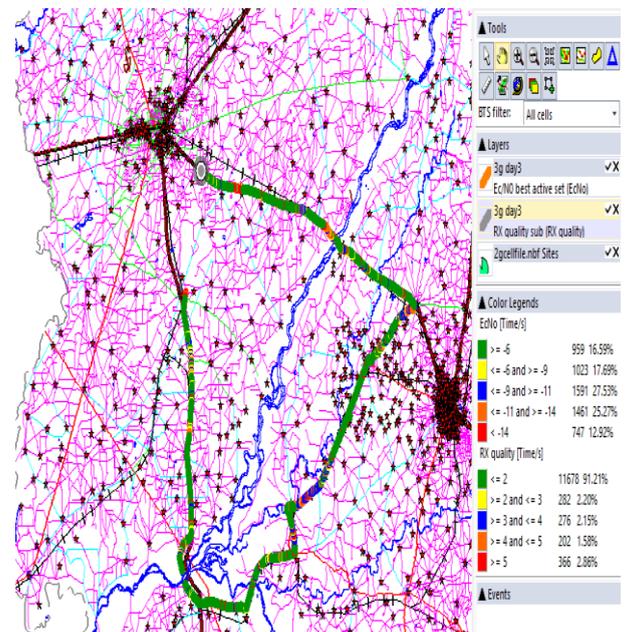
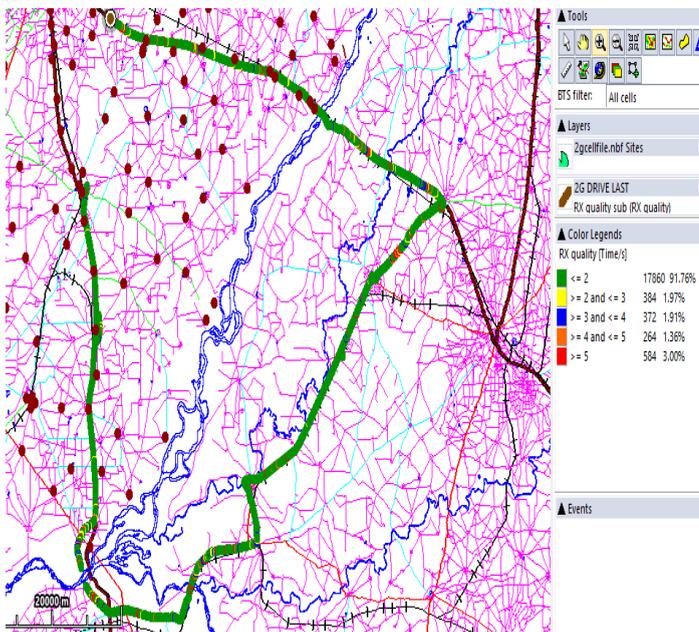




## II. Quality Details

### BSNL

	Technology	Rx Quality %	
2G	2G	97.51%	3G
	3G	87.67%	



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	17860	91.76%	
(2, <=3)	384	1.97%	
(3, <=4)	372	1.91%	
(4, <=5)	264	1.36%	
(5, <=Max)	584	3.00%	
<b>Total</b>	<b>19464</b>	<b>100%</b>	

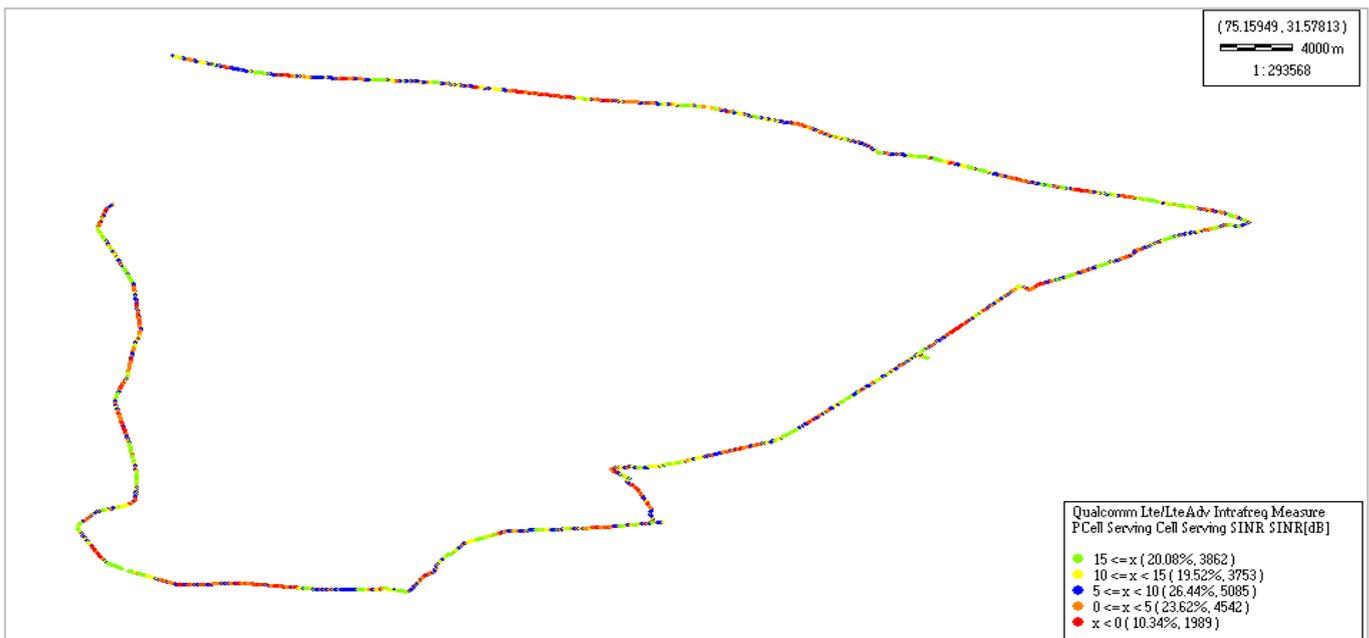
Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	959	16.59%	
(-6, <=-9)	1023	17.69%	
(-9, <=-11)	1591	27.53%	
(-11, <=-14)	1461	25.27%	
(-14, <= Min)	747	12.92%	
<b>Total</b>	<b>5781</b>	<b>100%</b>	

## 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  $\geq 95\%$ .

### JIO

Technology	Rx Quality %
VoLTE	89.66%



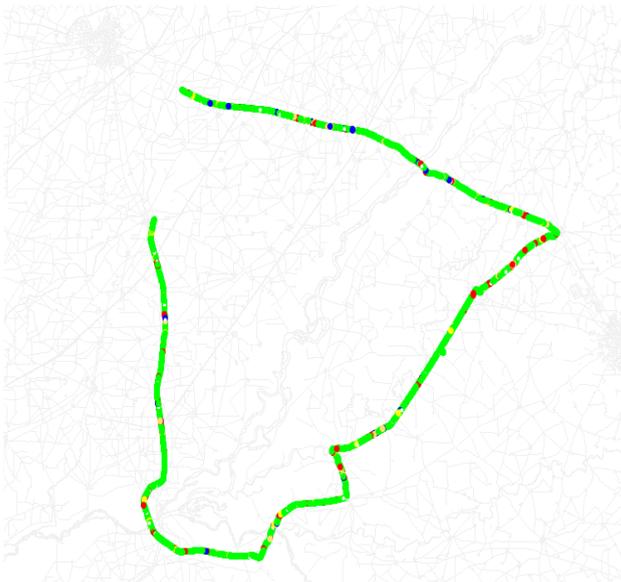
Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	1989	10.34%	
(0, $\leq 5$ )	4542	23.62%	
(5, $\leq 10$ )	5085	26.44%	
(10, $\leq 15$ )	3753	19.52%	
(15, $\leq$ Max)	3862	20.08%	
<b>Total</b>	<b>19231</b>	<b>100%</b>	

## II. Quality Details

### VIL

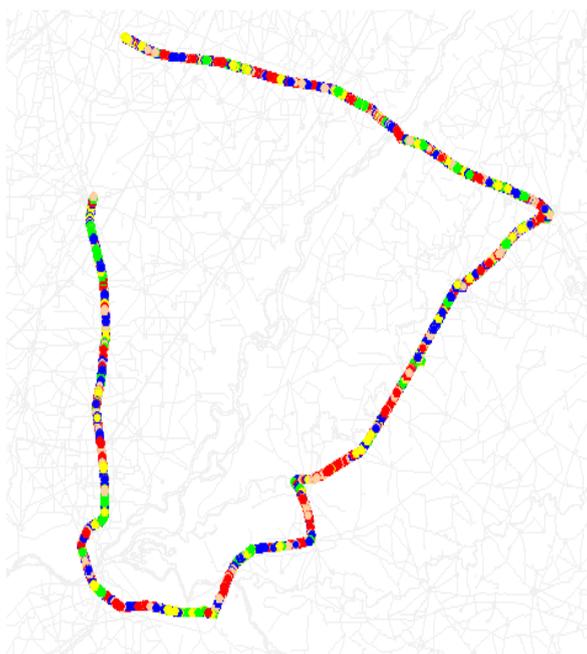
Technology	Rx Quality %
2G	95.40%
4G	84.30%

2G



VoLTE

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	1640987	89.1%	
(2, <=3)	36915	2.2%	
(3, <=4)	38100	2.1%	
(4, <=5)	41195	2.0%	
(5, <=Max)	85185	4.6%	
<b>Total</b>	<b>1842382</b>	<b>100%</b>	



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	883087	15.7%	
(0, <=5)	1067692	18.9%	
(5, <=10)	1404743	24.9%	
(10, <=15)	866616	15.4%	
(15, <=Max)	1414691	25.1%	
<b>Total</b>	<b>5636829</b>	<b>100%</b>	

### III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	28.19%
Airtel VoLTE	100%
Jio VoLTE	100%
VIL VoLTE	100%

