



# Operator Assisted Drive Test Report

## Tarn Taran City & Nearby area

22<sup>nd</sup> Nov to 23<sup>rd</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 Tarn Taran City and surrounding areas from 9:00 AM to 8:00 PM during 22<sup>nd</sup> Nov to 23<sup>rd</sup> Nov 2023. The drive test covered drive route of 83 KMs & 6 hotspots over a period of 2 days. Approximately 180 calls were made for each of the 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 from 22nd Nov 2023 to 23rd Nov 2023 covering Tarn Taran city and its surrounding area. 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 83 KMs. Approximately 180 calls were made for each of the 4 TSPs 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 83 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

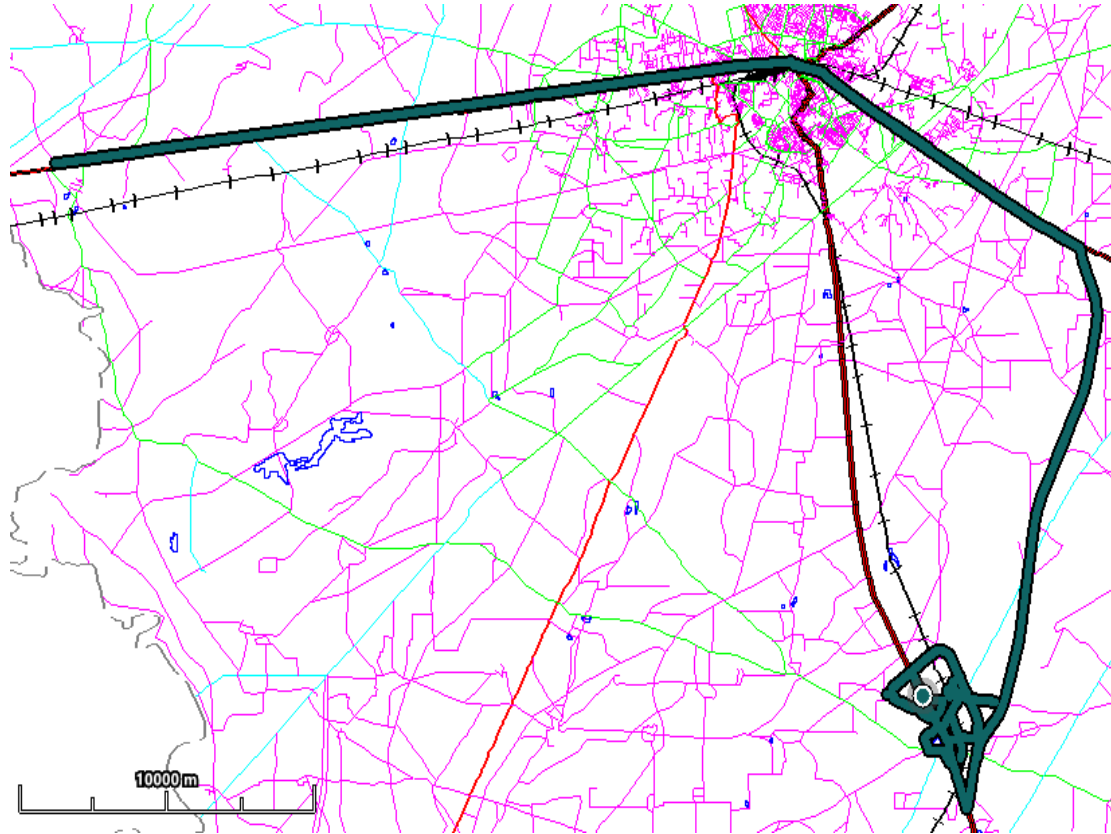
### Static data tests on 1- 6 hotspots

1. Civil Hospital
2. Railway Station
3. Bus Stand
4. Darbar Sahib Gurdwara
5. Sewa Devi SD College
6. Rail Coach Factory, Kapurthala

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

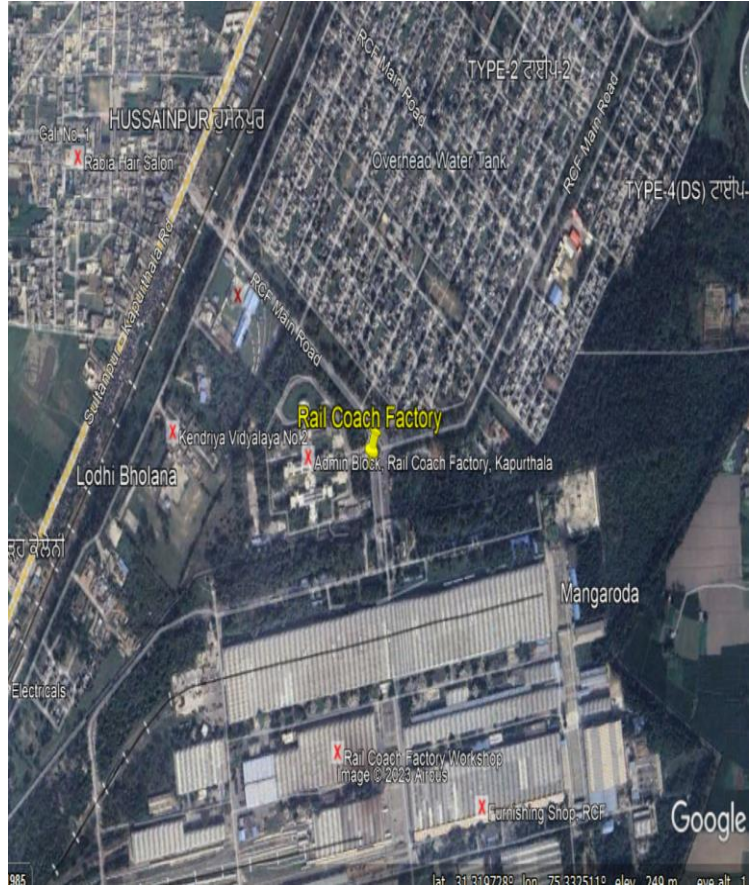
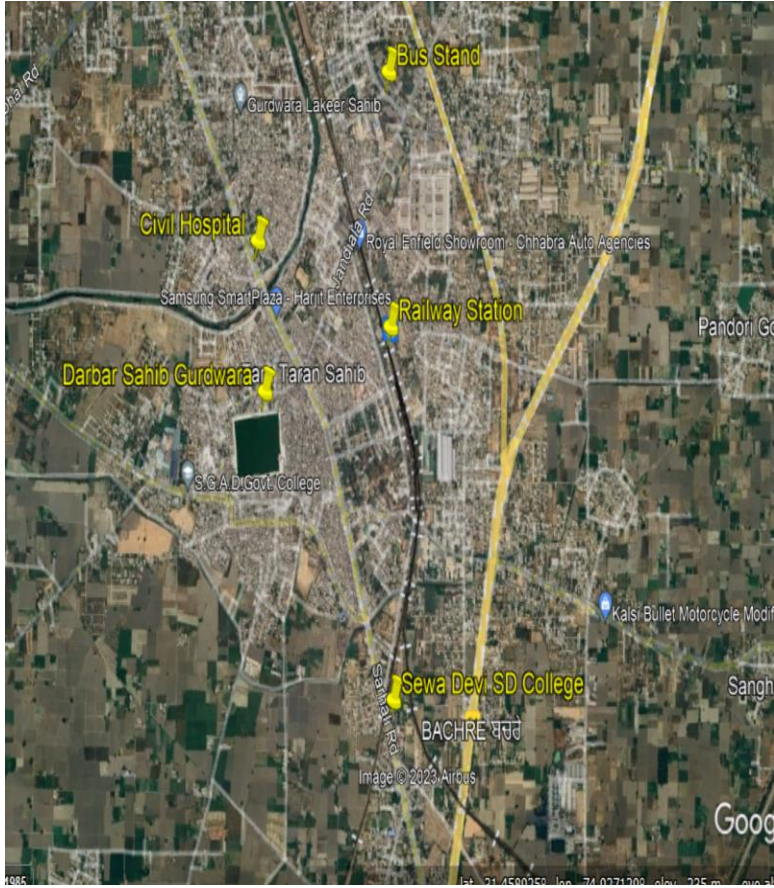
## Voice & Dynamic Data Test Drive Route



Date	Test Scenario	Area to be Covered
22/11/2023	2G/3G/4G Voice and 3G/4G/5G Dynamic Data	<b>Starting from Attari at 9:30 am to Tarn Taran, and drive of Tarn Taran city, bus stand, bath road, sarhali road, Tarn Taran Bypass, sachkhand road, Guru bazar</b>
23/11/2023	2G/3G HOTSPOT TESTING OF DATA	CIVIL HOSPITAL, RAILWAY STATION, BUS STAND, DARBAR SAHIB, SEVA DEVI COLLEGE

# Overview

## Data Service Test- Static Locations



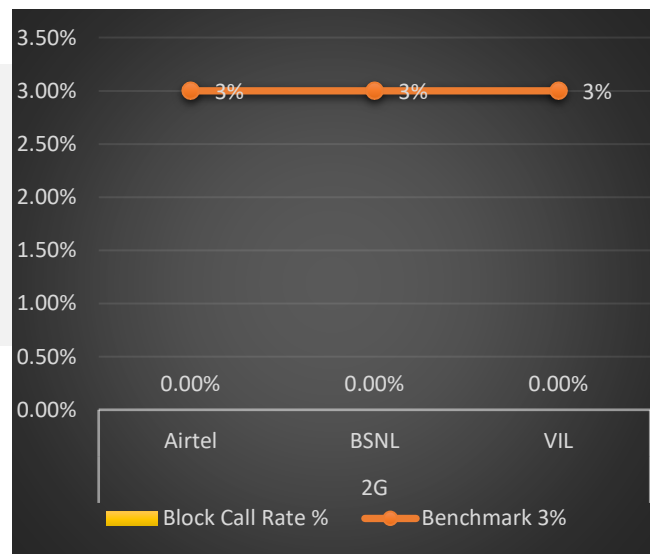
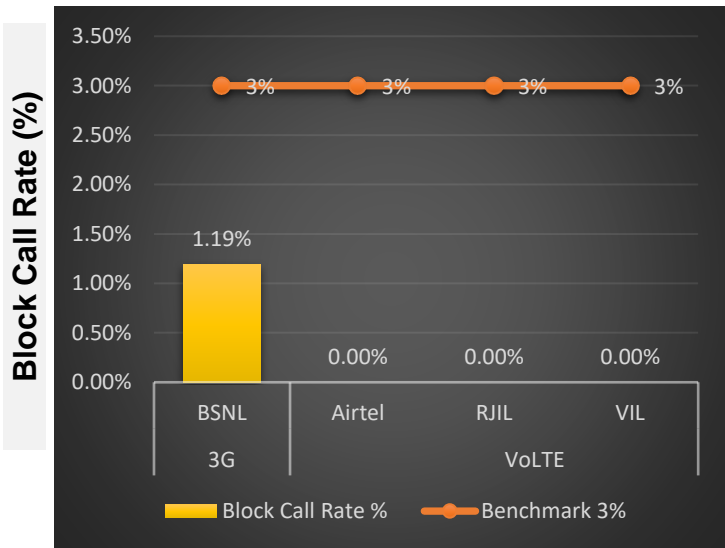
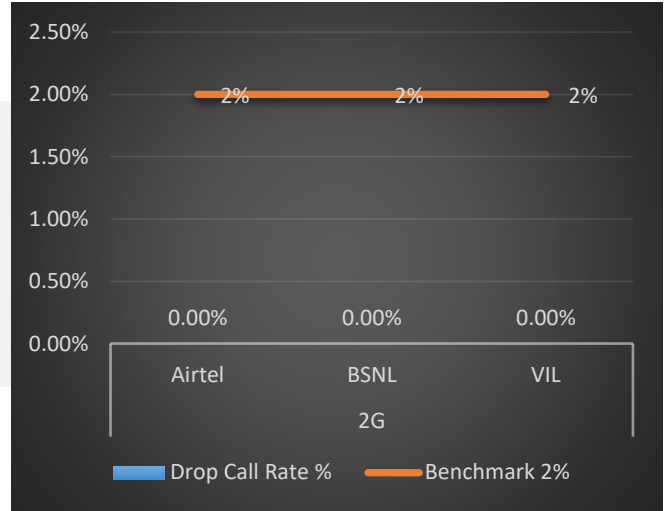
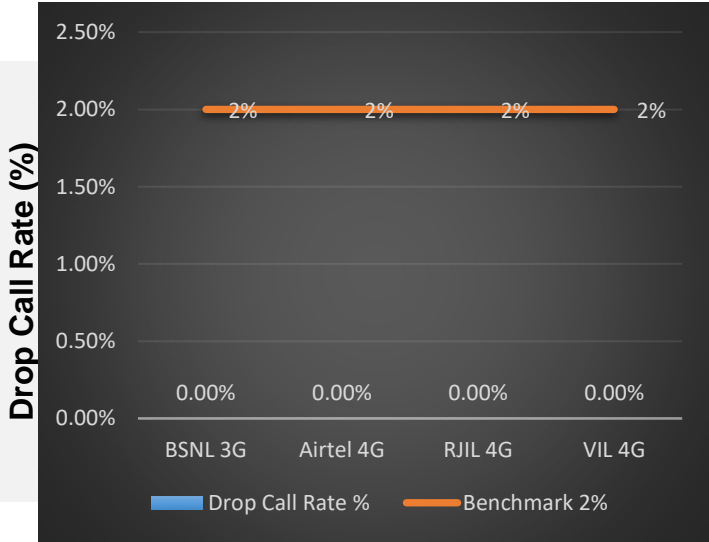
Hotspot Locations
1. Civil Hospital
2. Railway Station
3. Bus Stand
4. Darbar Sahib Gurdwara
5. Sewa Devi SD College
6. Rail Coach Factory, Kapurthala



# Voice Calls

## Key Observations

QoS compliance of the TSPs in Tarn Taran city 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%	0.00%	0.00%	0.00%	0.00%	0.00%
Block Call Rate %	0.00%	0.00%	0.00%	1.19%	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 %	98.84%	91.85%	96.50%

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

TSPs	3G
	BSNL
Coverage %	82.61%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99.82%	99.79%	100.00%

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	87.71%	100%	100.00%	100.00%

# Data Services Dynamic

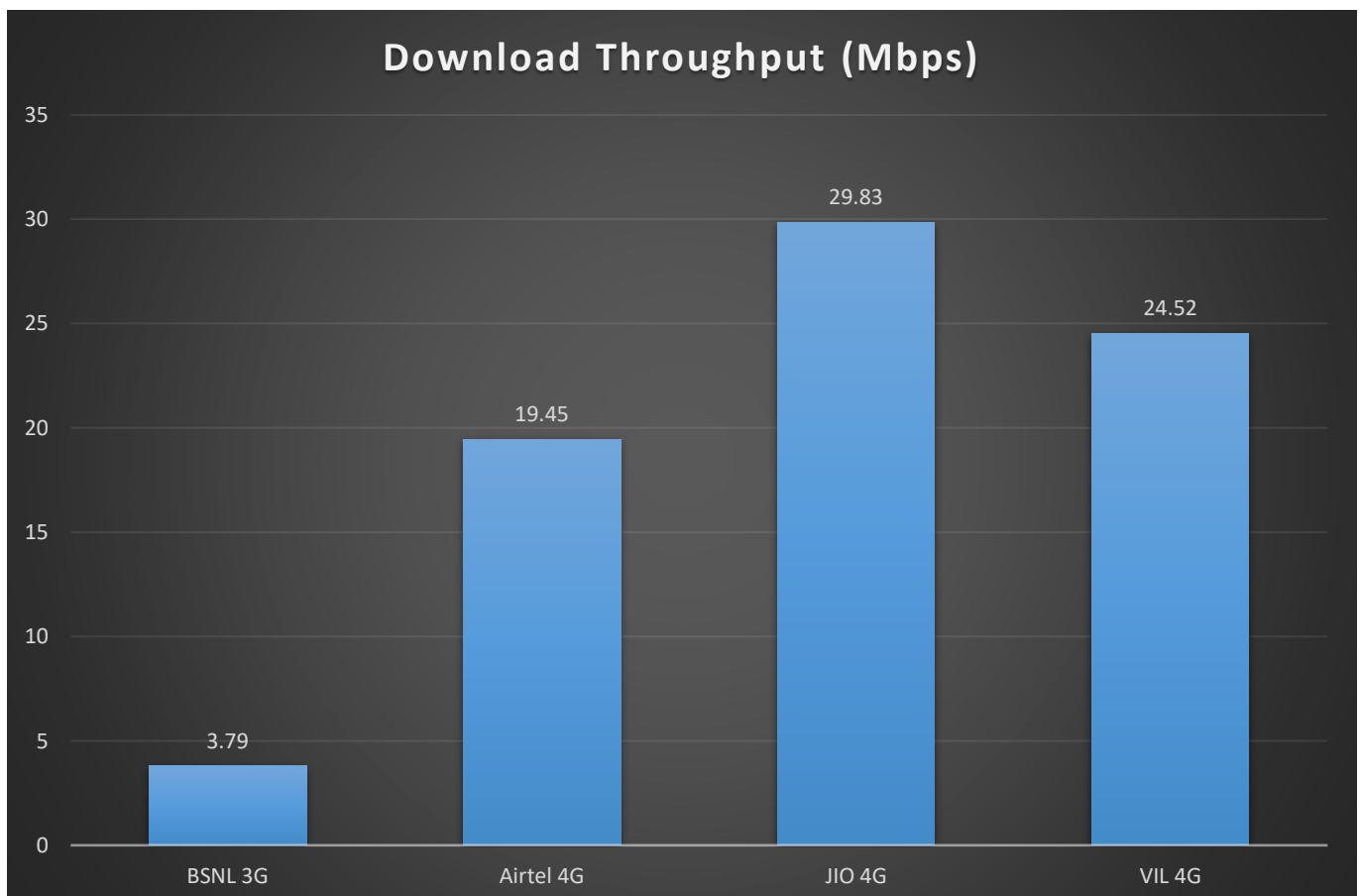
**Key Observations**

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>3.79</b>	<b>19.45</b>	<b>29.83</b>	<b>24.52</b>



# Summary

## City Level Summary-Voice

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	136	168	162
Blocked Call Rate (%)	0	0	0
CSSR% (Accessibility)	100	100	100
Drop Call Rate (%)	0	0	0
Mobility HOSR (%)	98.84	97.5	99.07
Rx Quality (%)	88	98.15	97
Average CST Sec	3.32	2.31	3.79

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	168	138	167	162
Blocked Call Rate (%)	1.19	0	0	0
CSSR% (Accessibility)	98.81	100	100	100
Drop Call Rate (%)	0	0	0	0
Mobility HOSR (%)	100	99.82	99.7	100
Rx Quality (%)	91.06	89.1	91.41	89
Average CST Sec	1.74	1.29	1.59	1.43



# Summary

## City Level Summary- Data Services

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	192	99.61	91.26
Upload Throughput (kbps)	89	13.2	26.06
Web Browsing Delay (sec)	8.4	246.22	116.17
Latency (msec)	436	287.2	216.10

Data Services Static	3G / 4G			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	4.06	23.1	53.15	18.12
Upload Throughput(Mbps)	1.01	10.11	18.42	5.65
Video Streaming Delay (sec)	NA	1.19	0.71	1.36
Web Browsing Delay (sec)	12.4	3.1	2.15	3.79
Latency (msec)	92.49	51	48.27	32.80

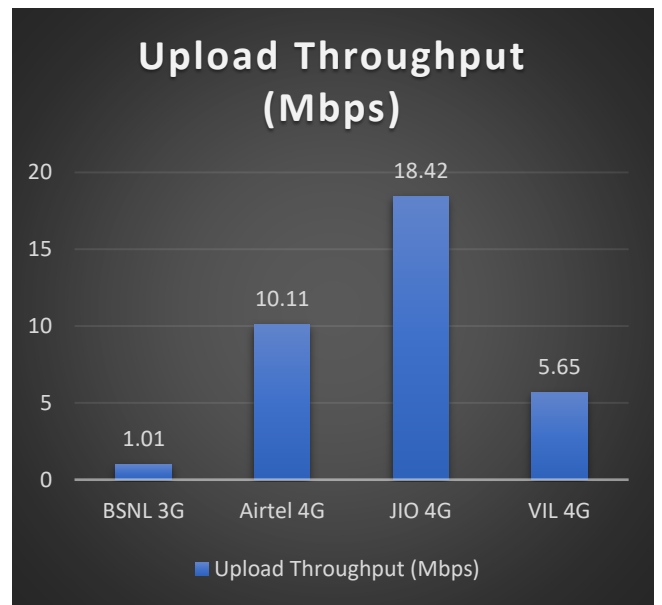
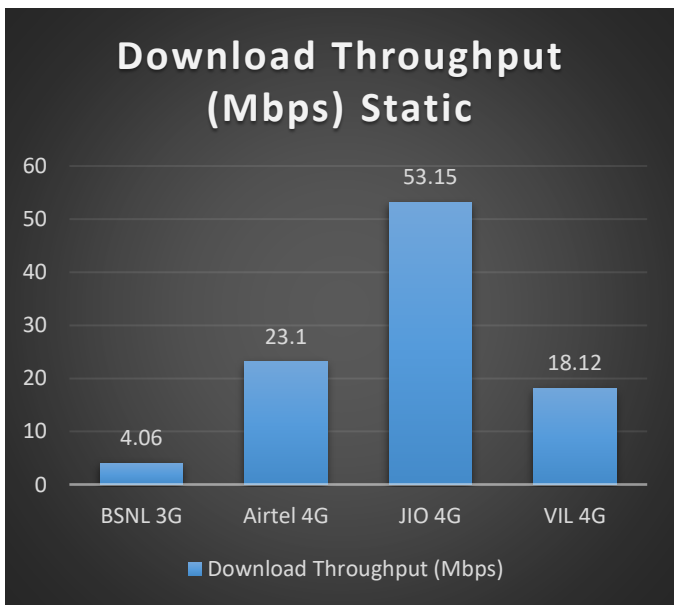
# Data Services Static

## Key Observations

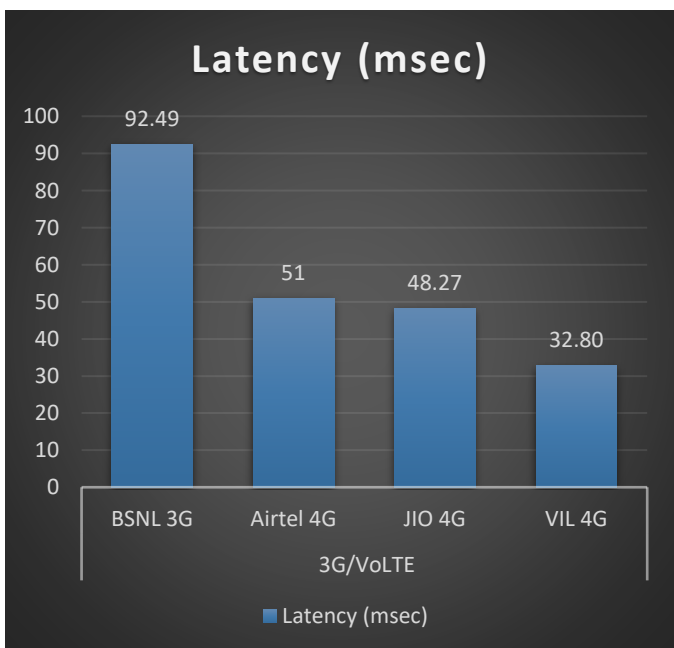
Data was tested at 5 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, Paytm)

### Data Download and Upload Performance Static (Mbps)

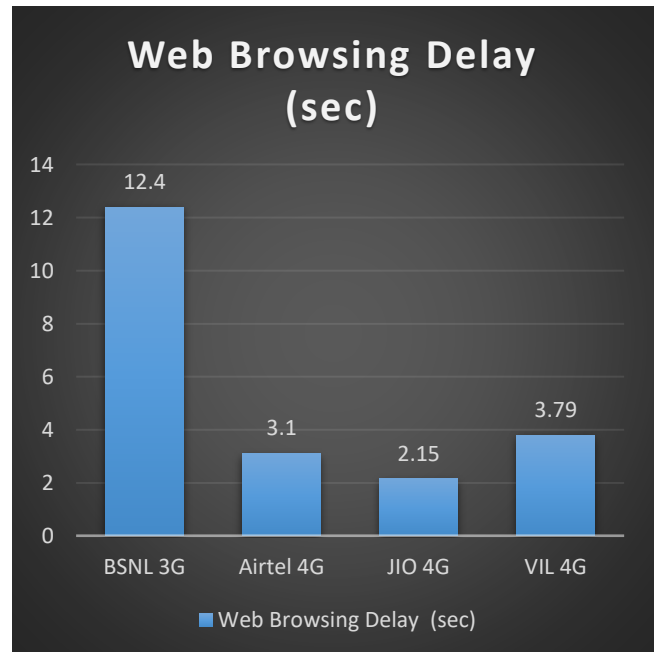
3G/4G/ Network:



### Latency (ms)



### Web Browsing (Sec)



<u>Civil hospital</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	210	119.97	103.50
Upload Throughput (kbps)	82.3	12	30.10
Web Browsing Delay (sec)	10.5	241	140.10
Latency (msec)	405	294.6	150.50

<u>Railway Station</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	180	127.2	95.70
Upload Throughput (kbps)	75	13	17.59
Web Browsing Delay (sec)	8.6	245	147.22
Latency (msec)	424	256	247.50

<u>Bus Stand</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	121.0	96	73.98
Upload Throughput (kbps)	82.0	18	29.12
Web Browsing Delay (sec)	9.2	257	105.25
Latency (msec)	477.0	293.5	196.00

<u>Darbar Shiab</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	189.1	99.28	92.47
Upload Throughput (kbps)	89.3	12	26.68
Web Browsing Delay (sec)	7.51	229	68.51
Latency (msec)	402	294	207.00

<u>Seva Devi college</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	195.2	55.6	90.68
Upload Throughput (kbps)	87.2	11	26.84
Web Browsing Delay (sec)	8.29	259.12	119.77
Latency (msec)	437	297.90	229.50

<u>Rail Coach Factory Kapurthala</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	205	82.34	117.20
Upload Throughput (kbps)	82	15.12	20.58
Web Browsing Delay (sec)	8.5	580	100.21
Latency (msec)	355	340	197.00

# Data Services static

<u>Civil hospital</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	4.12	19.4	37.42	28.92
Upload Throughput (mbps)	1.02	10.2	17.66	3.86
Video Streaming Delay ( Secs.)	NA	1.15	0.55	1.33
Web Browsing Delay (sec)	1.65	3.1	2.09	3.65
Latency (msec)	93.2	87	47	43.00

<u>Railway Station</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	3.3	20.4	36.47	7.54
Upload Throughput (mbps)	1.08	12.3	24.19	3.50
Video Streaming Delay ( Secs.)	NA	1.23	0.81	0.85
Web Browsing Delay (sec)	15.79	2.1	2.12	2.79
Latency (msec)	92.3	56	37.5	46.50

<u>Bus Stand</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	4.6	23.1	65.89	12.10
Upload Throughput (mbps)	1.02	14.4	18.74	9.32
Video Streaming Delay ( Secs.)	NA	1.16	0.7	2.87
Web Browsing Delay (sec)	8.15	2.39	2.23	5.90
Latency (msec)	93.5	90	51.5	19.50

# Data Services static

<u>Darbar Shiab</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	3.2	19.4	53.33	22.70
Upload Throughput (mbps)	0.97	12.2	17.84	7.02
Video Streaming Delay ( Secs.)	NA	1.26	0.85	0.95
Web Browsing Delay (sec)	8.9	2.3	2.08	1.87
Latency (msec)	92.12	61	47	16.00

<u>Seva Devi college</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	5.12	16	85.5	19.35
Upload Throughput (mbps)	0.98	10.3	17.65	4.55
Video Streaming Delay ( Secs.)	NA	1.18	0.8	0.85
Web Browsing Delay (sec)	12.7	2.5	1.94	4.77
Latency (msec)	91.34	63	52	39.00

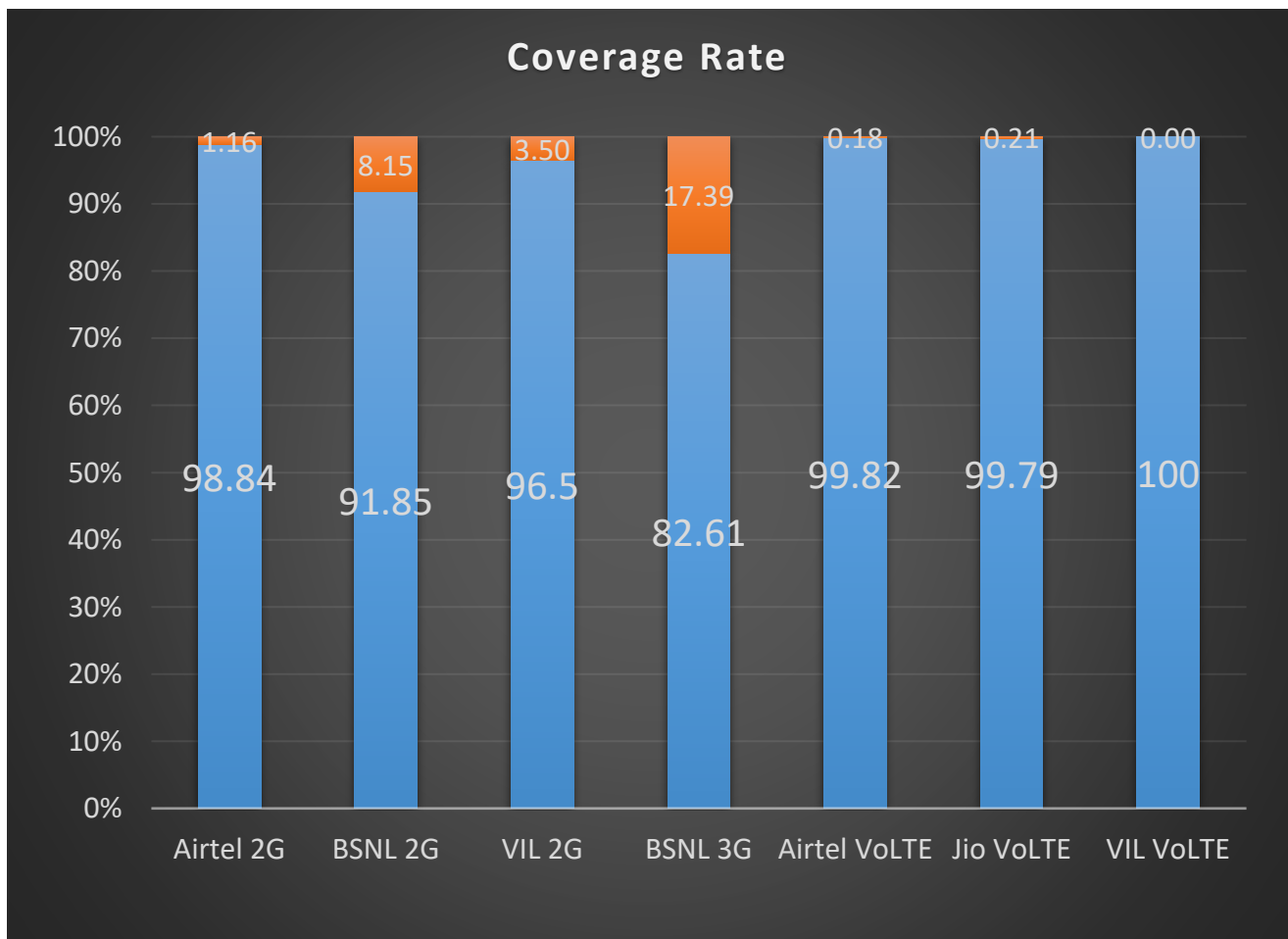
<u>Rail Coach Factory Kapurthala</u>	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	3.38	19.4	40.29	16.20
Upload Throughput (mbps)	1.23	10.9	14.47	4.30
Video Streaming Delay ( Secs.)	NA	1.15	0.53	0.81
Web Browsing Delay (sec)	10.59	3.1	2.45	2.73
Latency (msec)	94.5	85	54.6	43.00



## 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  $\geq -110$ dBm. The details are as follows.

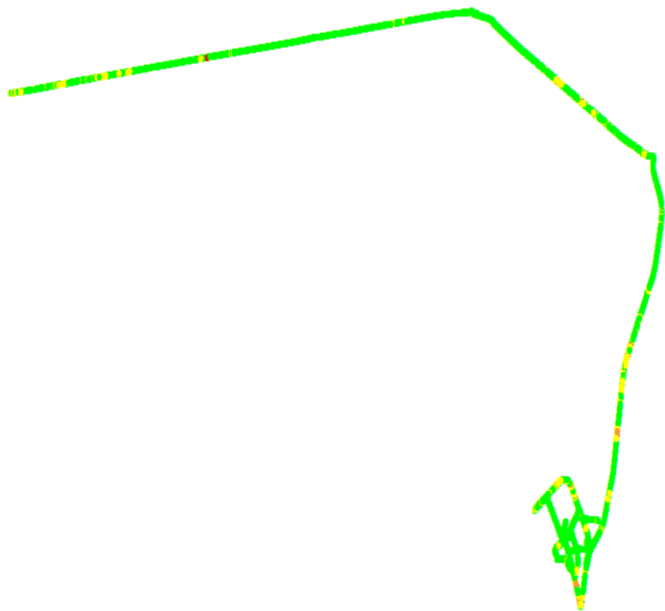
TSP	Coverage Rate %
Airtel 2G	98.84%
BSNL 2G	91.85%
VIL 2G	96.5%
BSNL 3G	82.61%
Airtel VoLTE	99.82%
Jio VoLTE	99.79%
VIL VoLTE	100%



## TSP-AIRTEL

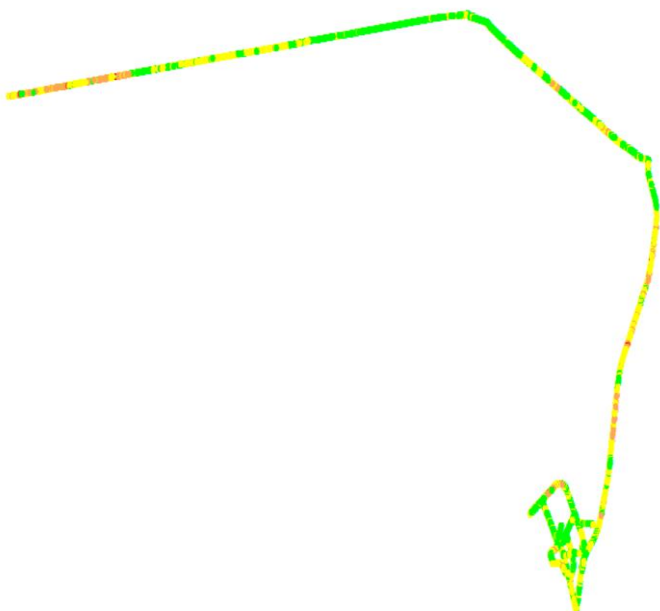
Technology	Coverage %
2G	98.84%
VoLTE	99.82%

2G



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	2227574	87%	
[-75, >=-85)	317711	12%	
[-85, >=-95)	28718	1%	
[-95, >=Min)	1202	0%	
<b>Total</b>	<b>2575205</b>	<b>100%</b>	

VoLTE



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	1434432	55%	
[-80, >=-90)	1023899	39%	
[-90, >=-110)	167186	6%	
[-110, >=Min)	4814	0%	
<b>Total</b>	<b>2630331</b>	<b>100%</b>	

## TSP- BSNL

Technology

Coverage %

2G

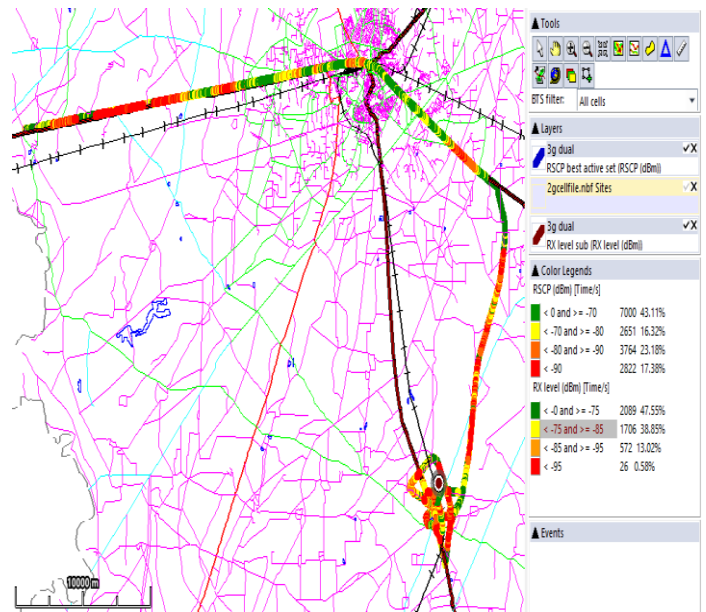
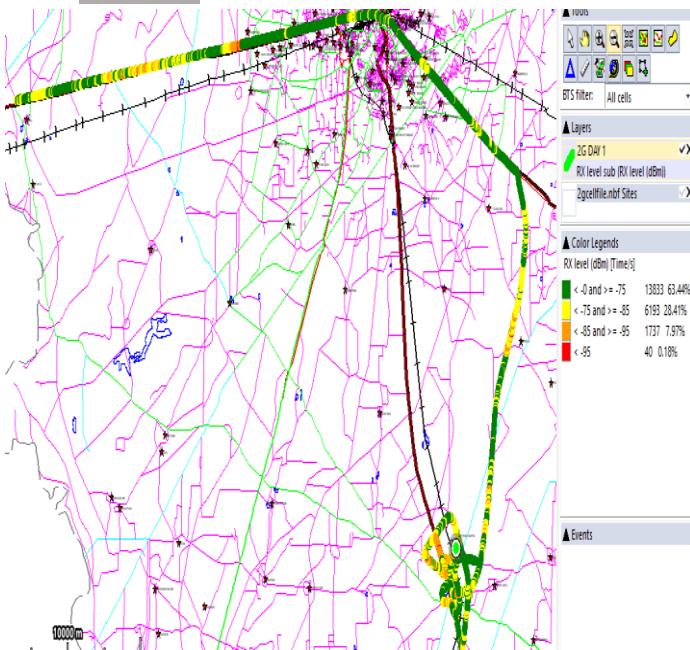
91.85%

3G

82.61%

2G

3G

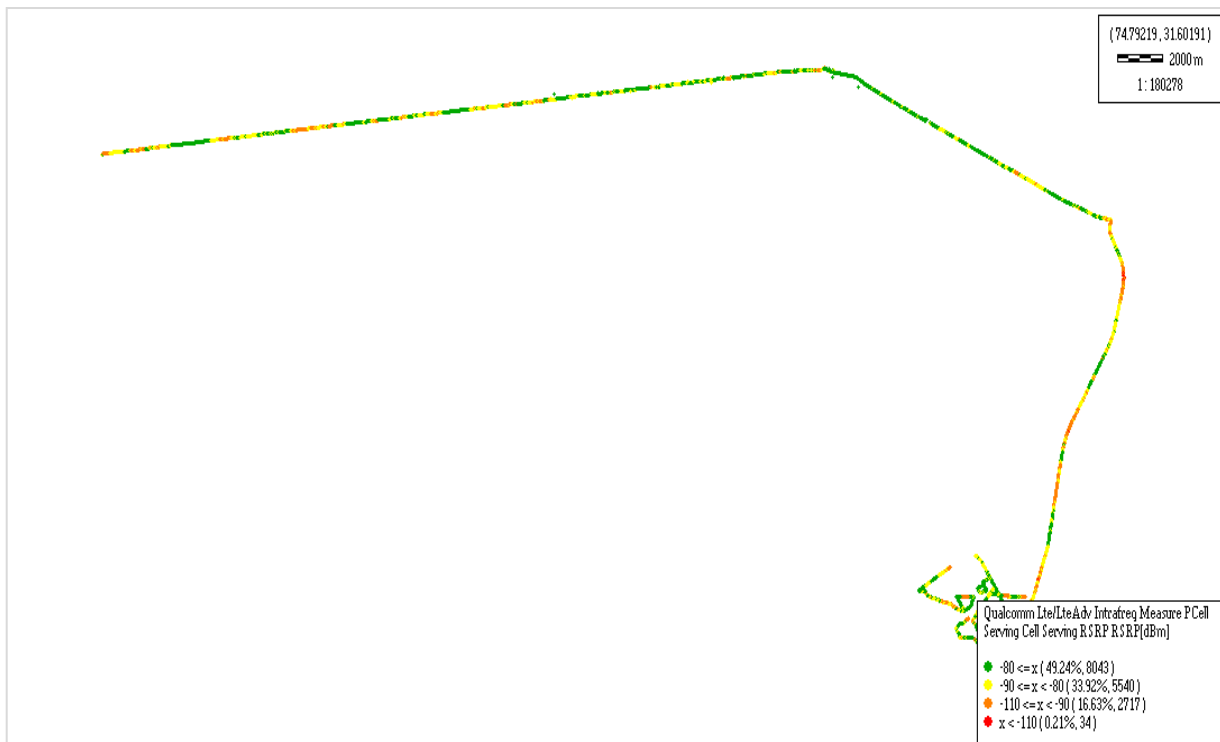


Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	13833	63.44%	
[-75, >=-85)	6193	28.41%	
[-85, >=-95)	1737	7.97%	
[-95, >=Min)	40	0.18%	
<b>Total</b>	<b>21803</b>	<b>100%</b>	

Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	7000	43.11%	
[-70, >=-80)	2651	16.32%	
[-80, >=-90)	3764	23.18%	
[-90, >=Min)	2822	17.38%	
<b>Total</b>	<b>16237</b>	<b>100%</b>	

## JIO

Technology	Coverage %
VoLTE	99.79%



VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	8043	49.24%	<span style="background-color: green; width: 20px; height: 10px; display: inline-block;"></span>
[-80, >=-90)	5540	33.92%	<span style="background-color: yellow; width: 20px; height: 10px; display: inline-block;"></span>
[-90, >=-110)	2717	16.63%	<span style="background-color: orange; width: 20px; height: 10px; display: inline-block;"></span>
[-110, >=Min)	34	0.21%	<span style="background-color: red; width: 20px; height: 10px; display: inline-block;"></span>
<b>Total</b>	<b>16334</b>	<b>100%</b>	

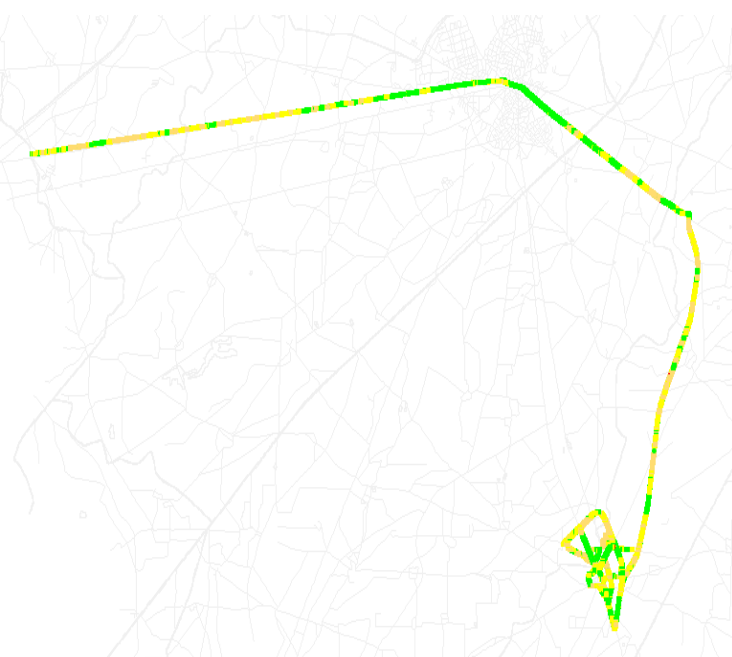
## VIL

	Technology	Coverage Rate %
2G	2G	96.5%
	VoLTE	100%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	1016622	70.4%	
[-75, >=-85)	376876	26.1%	
[-85, >=-95)	49898	3.5%	
[-95, >=Min)	613	0%	
<b>Total</b>	<b>1444009</b>	<b>100%</b>	

## VoLTE

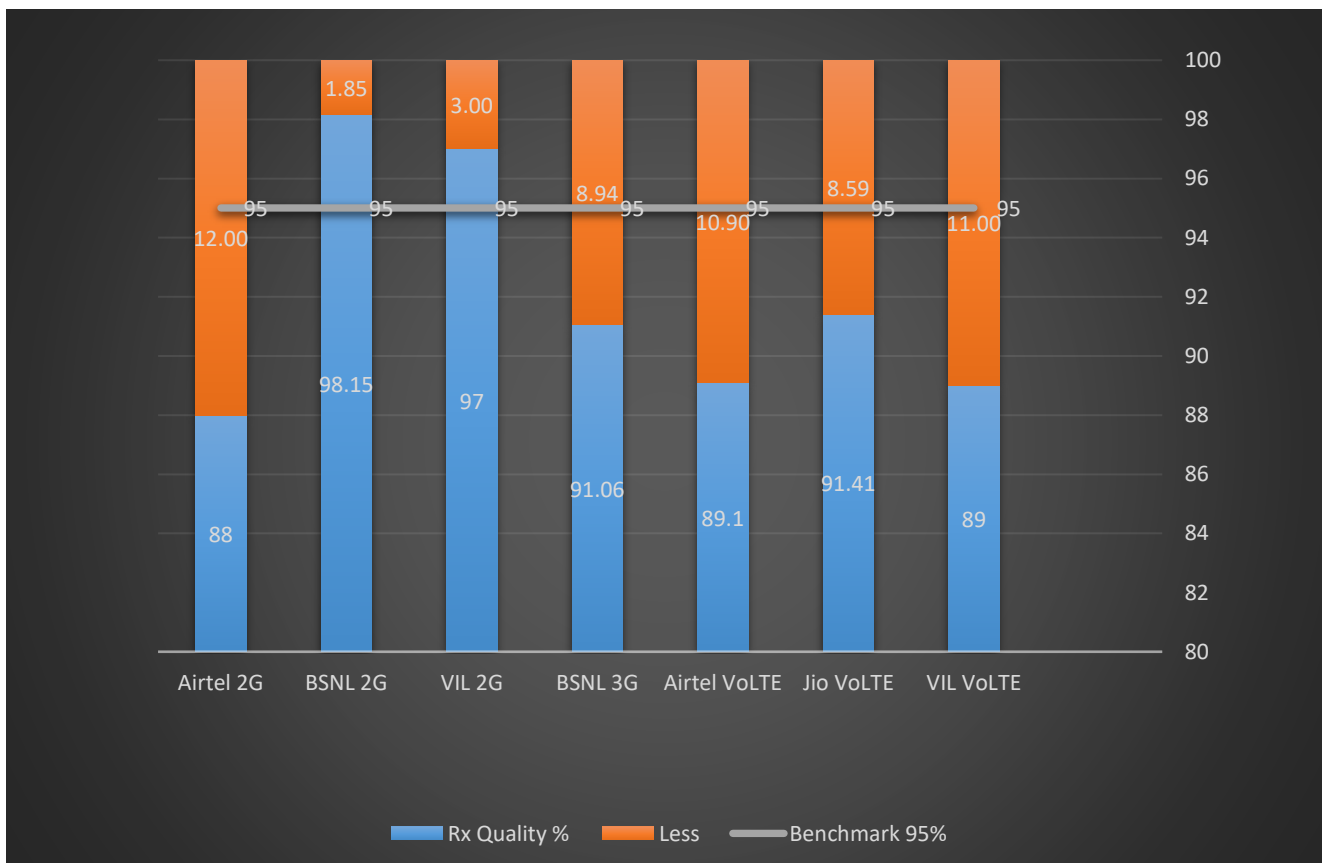


VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	1880477	41%	
[-80, >=-90)	1838980	40%	
[-90, >=-110)	874851	19%	
[-110, >=Min)	6224	0%	
<b>Total</b>	<b>4600532</b>	<b>100%</b>	

## 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	<b>88%</b>
BSNL 2G	<b>98.15%</b>
VIL 2G	<b>97%</b>
BSNL 3G	<b>91.06%</b>
Airtel VoLTE	<b>89.1%</b>
Jio VoLTE	<b>91.41%</b>
VIL VoLTE	<b>89%</b>



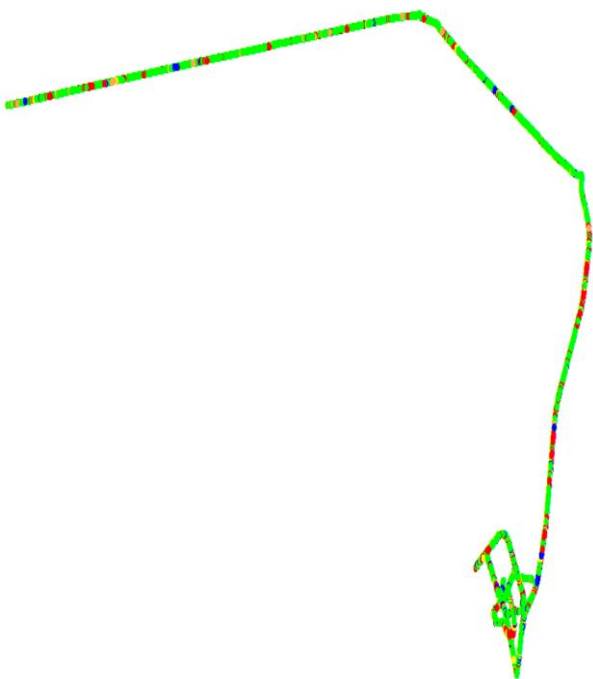


## II. Quality Details

### Airtel

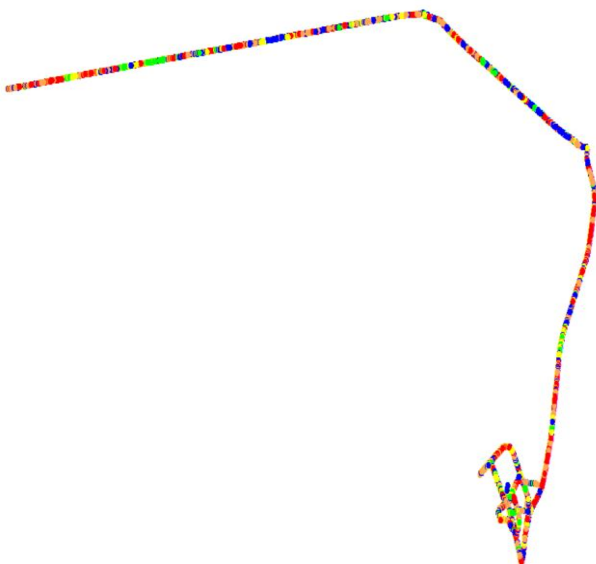
Technology	Rx Quality %
2G	88%
VoLTE	89.1%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	1925603	75%	Green
(2, <=3)	87161	3%	Yellow
(3, <=4)	120769	5%	Blue
(4, <=5)	124098	5%	Orange
(5, <=Max)	317592	12%	Red
<b>Total</b>	<b>2575223</b>	<b>100%</b>	

VoLTE



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	550677	11%	Red
(0, <=5)	824653	16%	Orange
(5, <=10)	674181	13%	Blue
(10, <=15)	717103	14%	Yellow
(15, <=Max)	2285951	45%	Green
<b>Total</b>	<b>5052565</b>	<b>100%</b>	

## II. Quality Details

### BSNL

Technology

Rx Quality %

2G

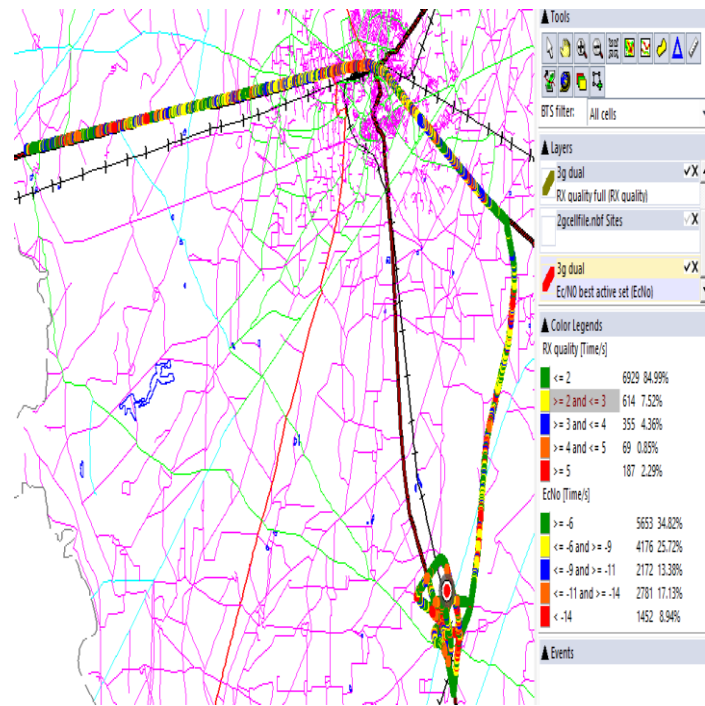
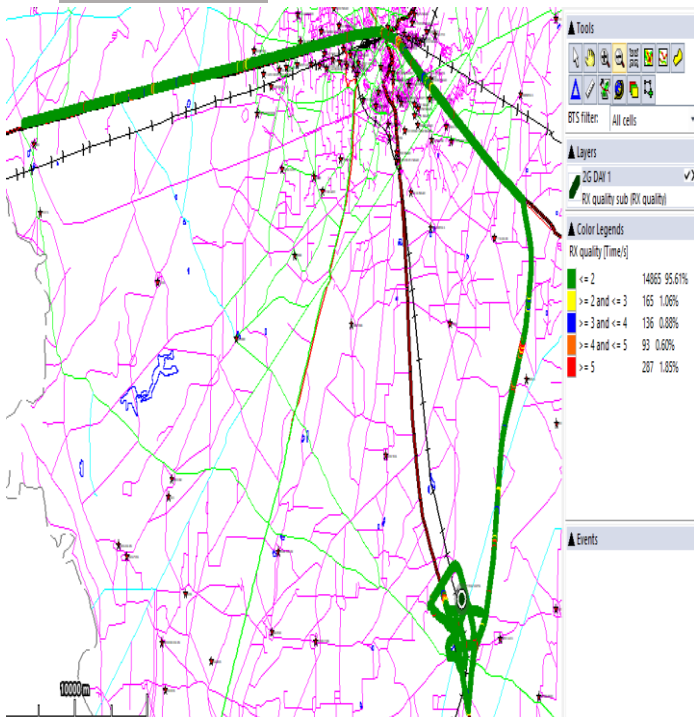
**98.15%**

3G

**91.06%**

2G

3G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	14865	95.61%	
(2, <=3)	165	1.06%	
(3, <=4)	136	0.88%	
(4, <=5)	93	0.60%	
(5, <=Max)	287	1.85%	
<b>Total</b>	<b>15546</b>	<b>100%</b>	

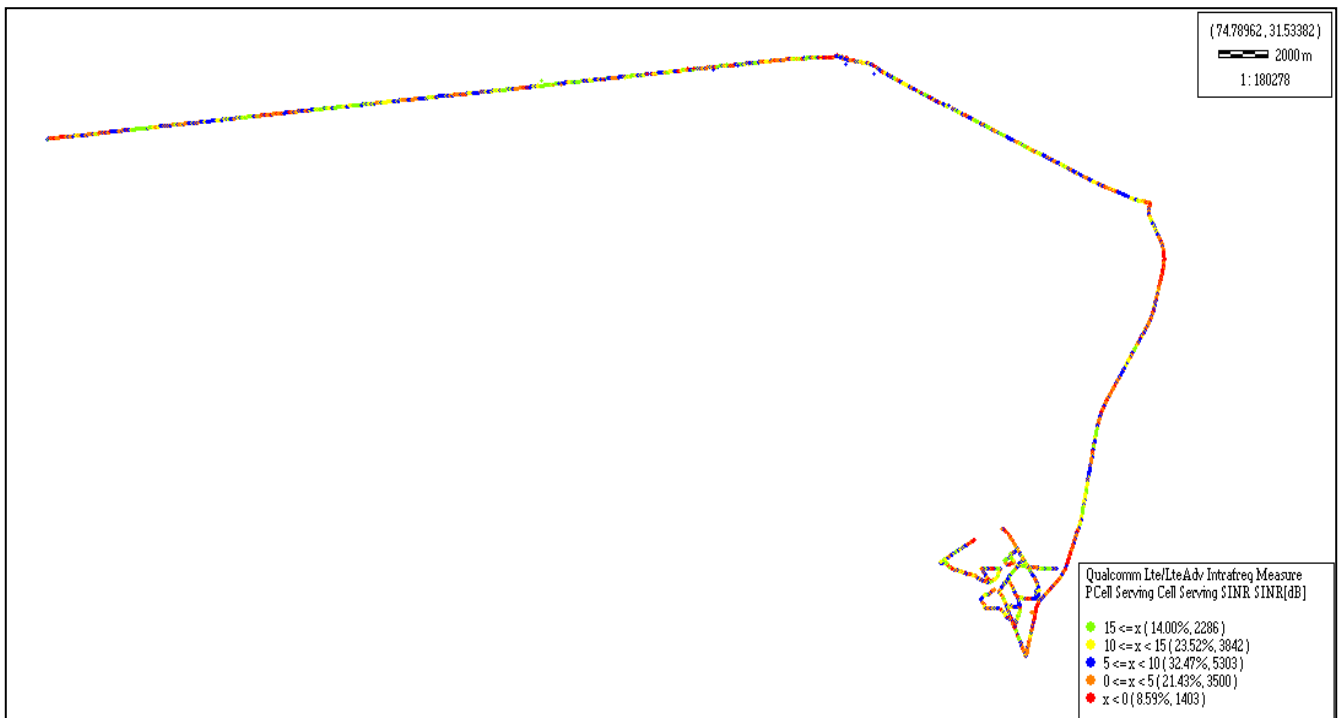
Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	5653	34.82%	
(-6, <=-9)	4176	25.72%	
(-9, <=-11)	2172	13.38%	
(-11, <=-14)	2781	17.13%	
(-14, <= Min)	1452	8.94%	
<b>Total</b>	<b>16234</b>	<b>100%</b>	

# 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	<b>91.41%</b>



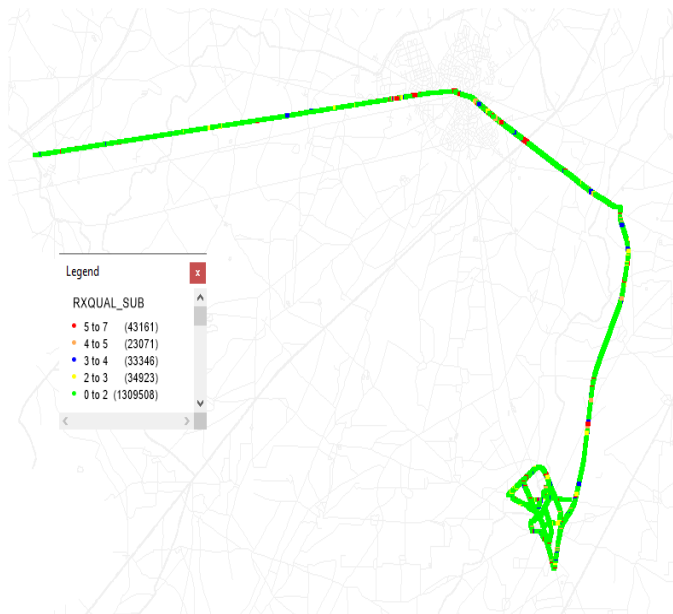
Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	1403	8.59%	
(0, $\leq 5$ )	3500	21.43%	
(5, $\leq 10$ )	5303	32.47%	
(10, $\leq 15$ )	3842	23.52%	
(15, $\leq \text{Max}$ )	2286	13.99%	
<b>Total</b>	<b>16334</b>	<b>100%</b>	

## II. Quality Details

### VIL

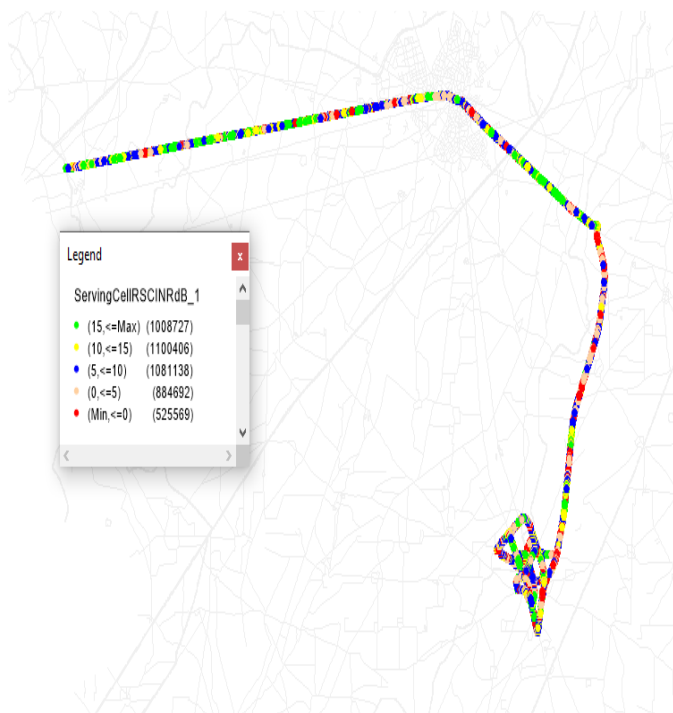
Technology	Rx Quality %
2G	97%
4G	89%

2G



VoLTE

Overall Rx Quality	# Samples	% PDF	Legend s
(Min, <=2)	1309508	91%	
(2, <=3)	34923	2%	
(3, <=4)	33346	2%	
(4, <=5)	23071	2%	
(5, <=Max)	43161	3%	
<b>Total</b>	<b>1444009</b>	<b>100%</b>	



Overall SINR	# Samples	% PDF	Legend s
(Min, <=0)	525569	11%	
(0, <=5)	884632	19%	
(5, <=10)	1081138	24%	
(10, <=15)	1100406	24%	
(15, <=Max)	1008727	22%	
<b>Total</b>	<b>4600532</b>	<b>100%</b>	

### III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	80.83%
Airtel VoLTE	100.00%
Jio VoLTE	100.00%
VIL VoLTE	100.00%

