



# Operator Assisted Drive Test Report

## Srinagar –Badrinath.Highway

04/11/2023

By

TRAI Regional Office Bhopal

The Operator Assisted Drive Test has been carried out by Regional Office, Bhopal with the help of Telecom Service Providers for Srinagar to Badrinath Highway from 9:00 AM to 8:00 PM. The drive test covered drive route of around 190 KMs.

TSP	Network tested
Airtel	2G & VoLTE
BSNL	2G & 3G
JIO	VoLTE
VIL	2G & VoLTE

### Key Performance Indicators:

KPI	Benchmark	Observations
Block call rate %	$\leq 3\%$	All TSPs achieved the benchmark. Except Airtel in 2G & VoLTE
Drop call rate %	$\leq 2\%$	All TSPs achieved the benchmark. Except Airtel in 2G & VoLTE and BSNL in 2G & 3G
CSSR %	$\geq 95\%$	All TSPs achieved the benchmark. Except for Airtel in 2G
Mobility HOSR %	$\geq 95\%$	All TSPs achieved the benchmark. Except for Airtel in 2G
Good RX Quality %	$\geq 95\%$	None of the TSPs achieved the benchmark. Except for Vi in 2G

# Overview

Regional Office, TRAI Bhopal conducted Operator Assisted Drive Test. The performance of Airtel, BSNL, Vodafone Idea and Jio was monitored across various technologies (2G, 3G, 4G & 5G). 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:**

- i. 2G – measurement – UE Locked in 2G
- ii. 3G – measurement – UE in Dual mode (2G and 3G)
- iii. 4G – measurement – UE in Free mode

Calls were made for the **180-sec** duration with a wait time of **10 sec** between calls in all technologies.

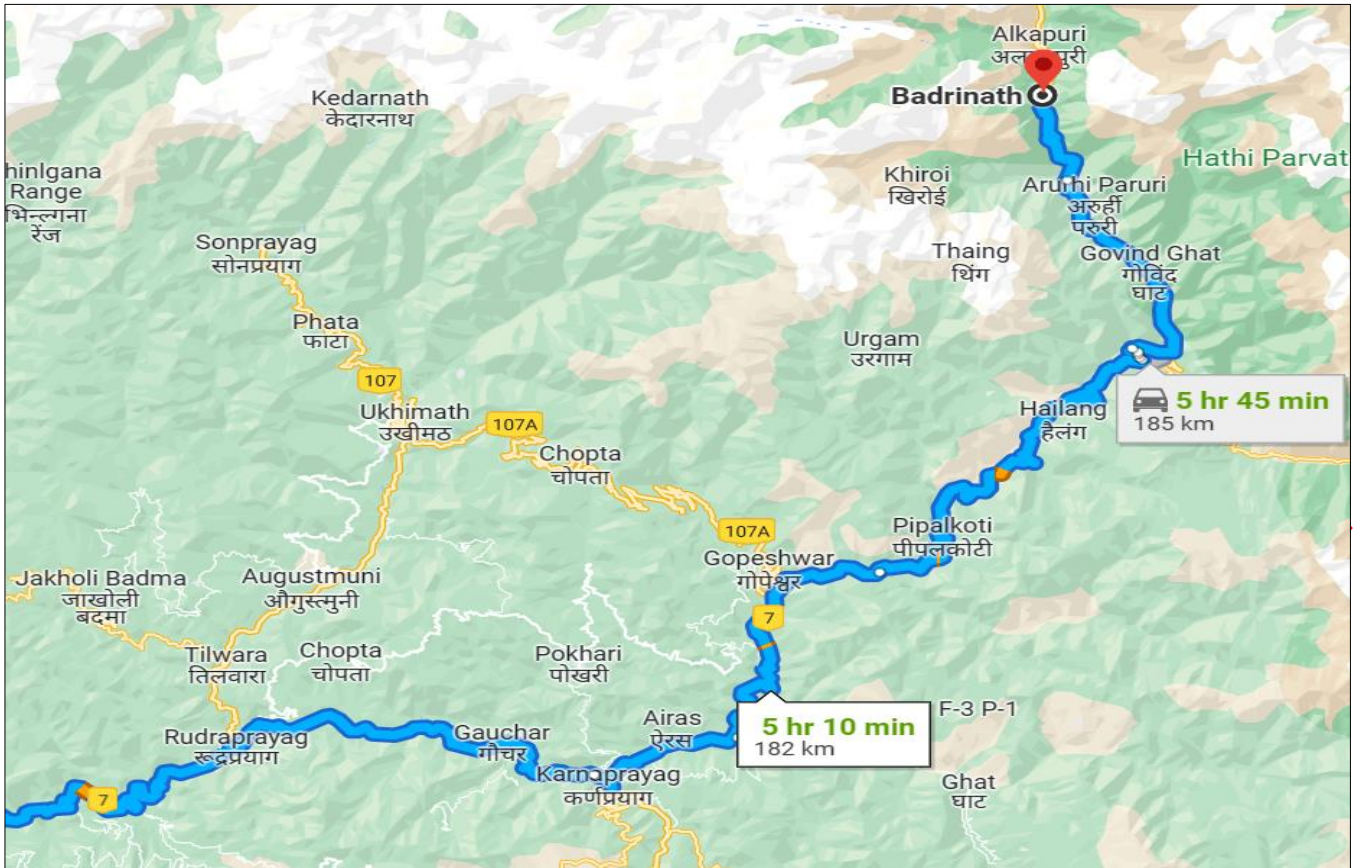
### **Data Tests:**

**Dynamic data** – repeat data file download ( to check throughput on the entire route)

- i. 3G – measurement – UE in 3G File Size- 20MB
- ii. 4G – measurement – UE in LTE File Size- 40MB
- iii. 5G – measurement – UE in 5G File Size- 200MB

# Overview

## Voice & Dynamic Data Test Drive Route



### List of important area covered during the drive test

**SRINAGAR city**

**Dhari Devi temple**

**Rudrapryag city**

**Karanprayag city**

**Chamoli city**

**Joshimath city**

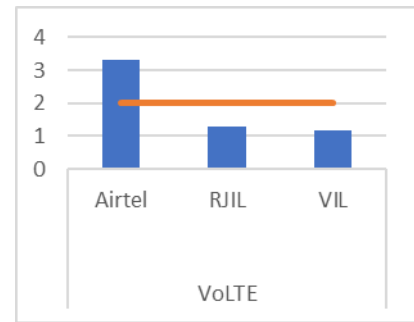
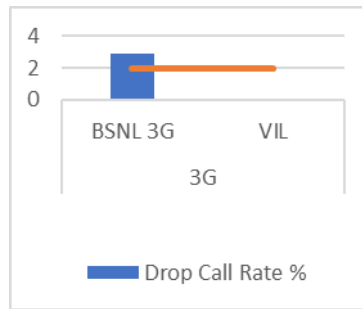
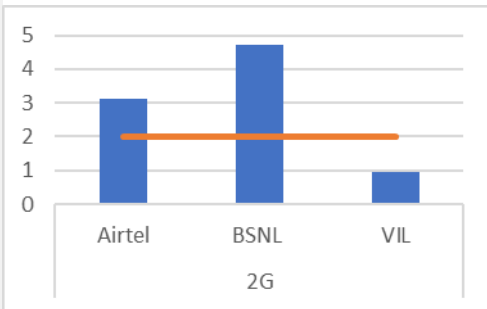
**Badrinath temple**

# Voice Calls

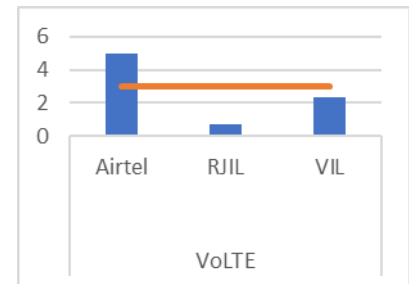
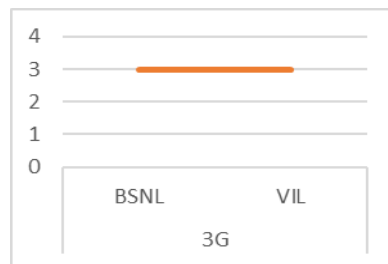
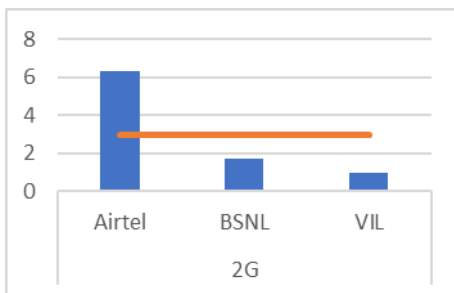
## Key Observations

QoS compliance of the TSPs for Voice across technologies 2G/3G/4G-VoLTE:

Drop Call Rate (%)



Block Call Rate (%)



KPIs	2G			3G		VoLTE		
	Airtel	BSNL	VIL	BSNL	VIL	Airtel	RJIL	VIL
Drop Call Rate %	<b>3.1</b>	<b>4.7</b>	0.95	<b>2.9</b>		<b>3.3</b>	<b>1.3</b>	<b>1.19</b>
Block Call Rate %	<b>6.3</b>	<b>1.7</b>	0.94	<b>0</b>		<b>5.0</b>	<b>0.68</b>	<b>2.32</b>

a) All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%) Except Airtel & BSNL

b) Call Block Rate (CBR%) benchmark of 3% was achieved by all TSP's except Airtel.

# Voice Calls

## Key Observations

### Coverage

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

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	67	70.34	<b>68</b>

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

TSPs	3G
	BSNL
Coverage %	94.78

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	77.49	84.55	<b>87.27</b>

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

TSPs	3G		VoLTE		
	BSNL	VIL	Airtel	JIO	VIL
Time Spent on 3G/4G %	3.273	NA	NA	100	80

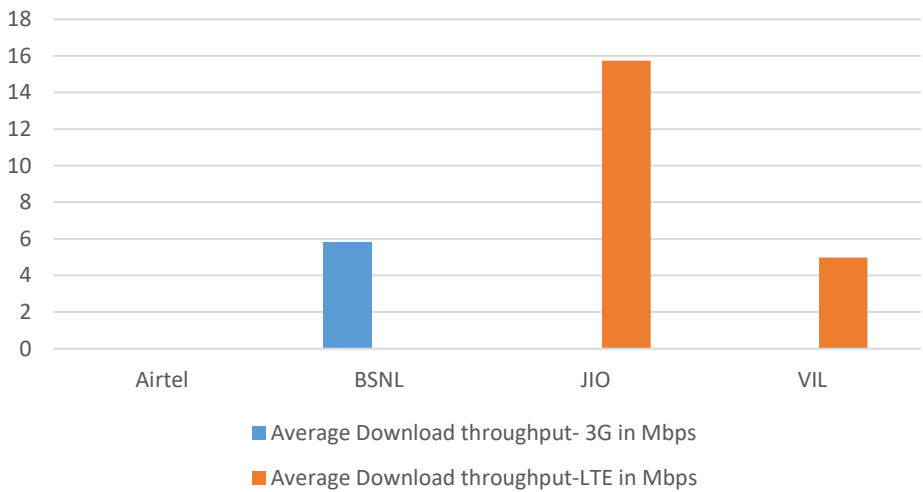
# Data Services Dynamic

**Key Observations**

Dynamic Data -Download Throughput was tested.

**Data Download Performance – Dynamic 3G/4G/ 5G Network**

**Dynamic average data download throughput**



TSP	Airtel	BSNL	JIO	VIL
Average Download throughput- 3G In Mbps	NA	5.82	NA	NA
Average Download throughput-LTE in Mbps	NA	NA	15.74	4.98
Average Download throughput- 5G in Mbps	NA	NA	NA	NA

Data not received from Airtel

# Summary

## City Level Summary- Voice

TSP ( For 2G)	Airtel	BSNL	VIL
Call attempts	64	85	106
Block call rate %	6.3	1.7	0.94
CSSR %	93.8	95.12	99.05
Drop call rate %	3.1	4.7	0.95
Mobility HOSR %	94.3	100	95.06
RX Quality %	87	93.97	97.26
Average CST Sec	NA	3.032	6

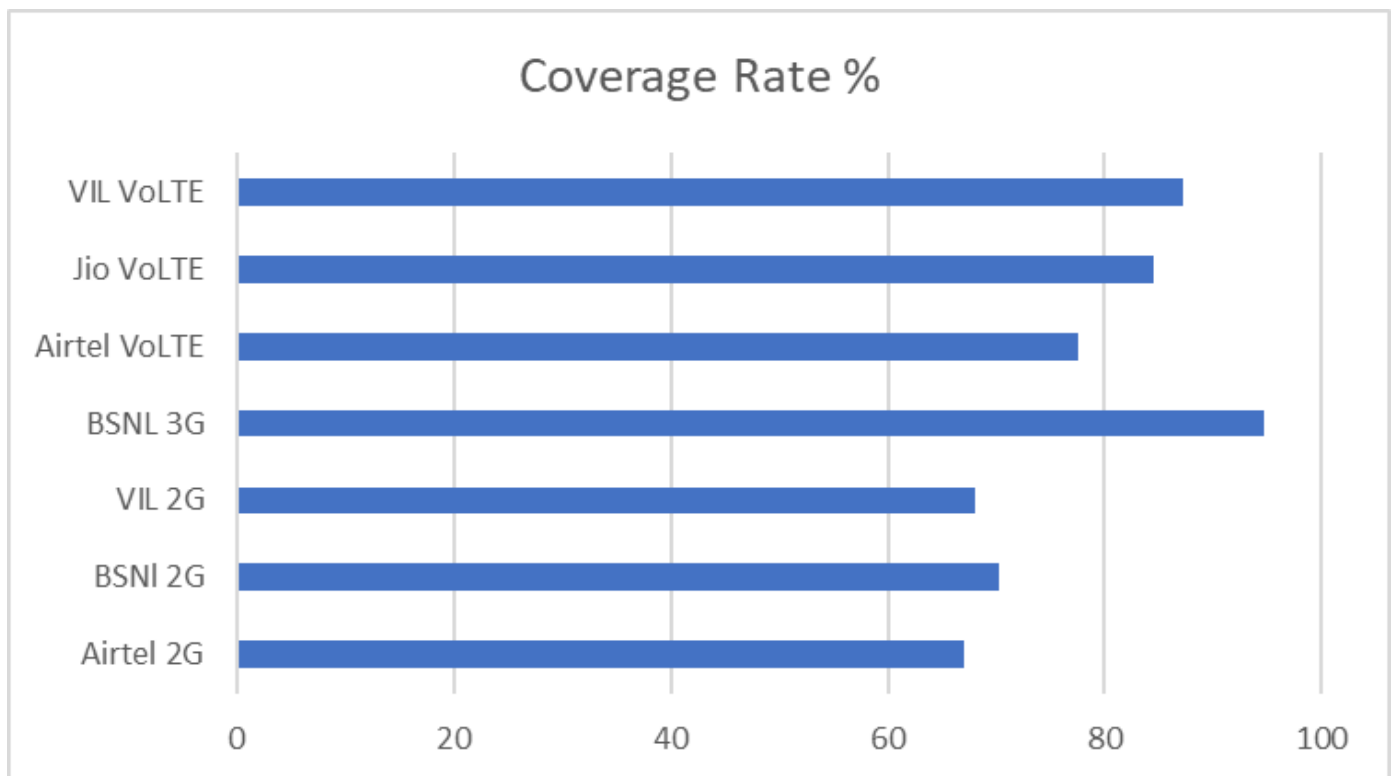
TSP ( For 3G)	BSNL
Call attempts	101
Block call rate %	0
CSSR %	98.02
Drop call rate %	2.9
Mobility HOSR %	100
RX Quality %	96.95
Average CST (Sec)	3.273

TSP ( For Volte)	Airtel	BSNL	JIO	VIL
Call attempts	60	NA	146	86
Block call rate %	5.0	NA	0.68	2.32
CSSR %	95	NA	99.31	97.67
Drop call rate %	3.3	NA	1.3	1.19
Mobility HOSR %	97.81	NA	98.78	99.76
RX Quality %	85	NA	84.55	86.60
Average CST(Sec)	NA	NA	0.36	3

## 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.

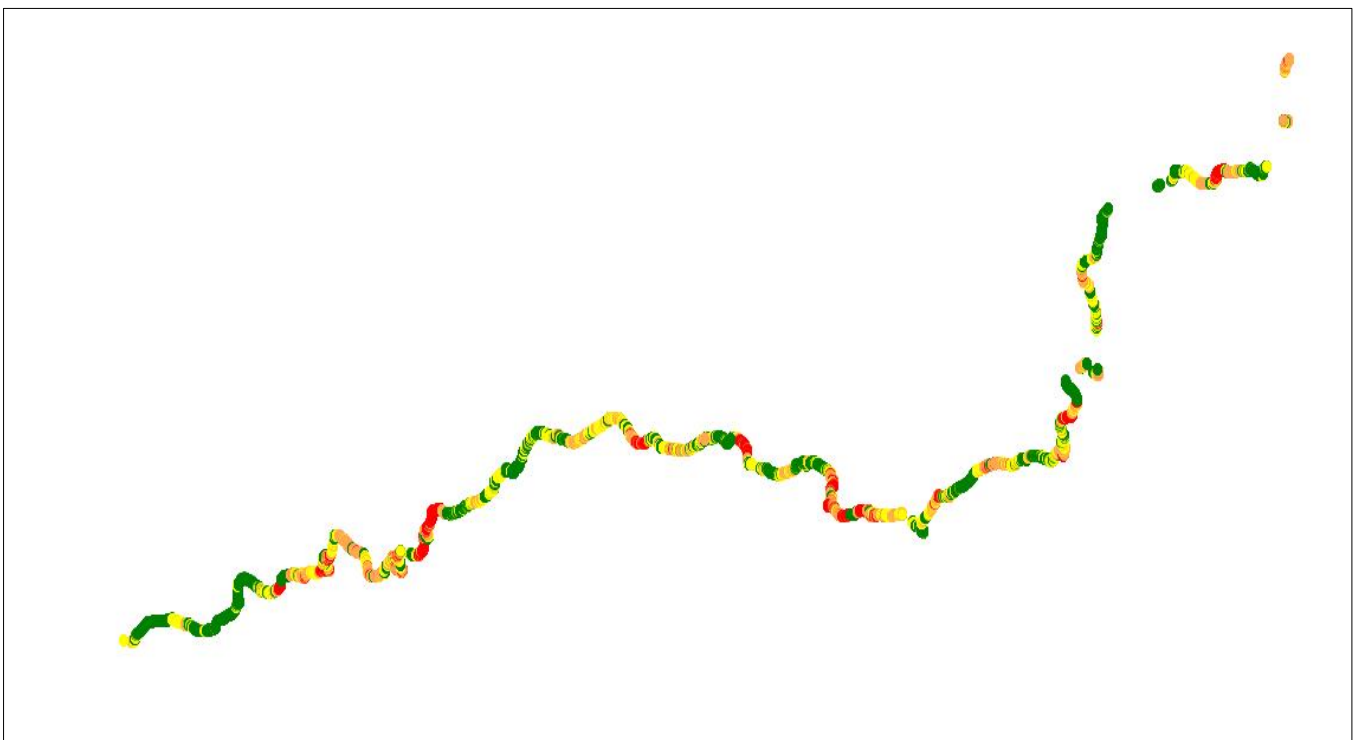
<b>TSP</b>	<b>Coverage Rate %</b>
<b>Airtel 2G</b>	<b>67</b>
<b>BSNI 2G</b>	<b>70.34</b>
<b>VIL 2G</b>	<b>68</b>
<b>BSNL 3G</b>	<b>94.78</b>
<b>Airtel VoLTE</b>	<b>77.49</b>
<b>Jio VoLTE</b>	<b>84.55</b>
<b>VIL VoLTE</b>	<b>87.27</b>









## TSP-Airtel

Technology	Coverage %
2G	

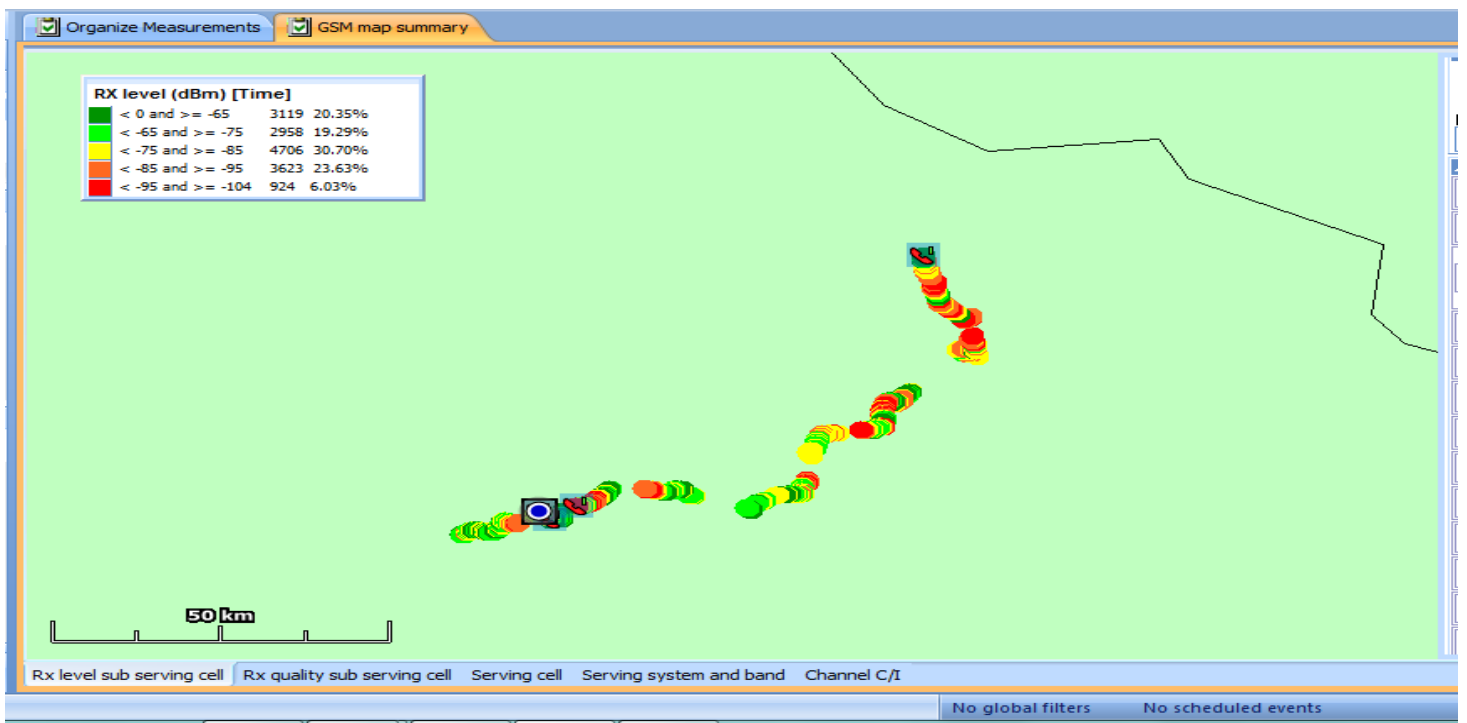






2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	32895	38%	
[-75, >=-85]	24935	29%	
[-85, >=-95]	21633	25%	
[-95, >=Min]	6577	8%	
<b>Total</b>			

# Coverage Details

## TSP- BSNL

Technology	Coverage %
2G	95.12

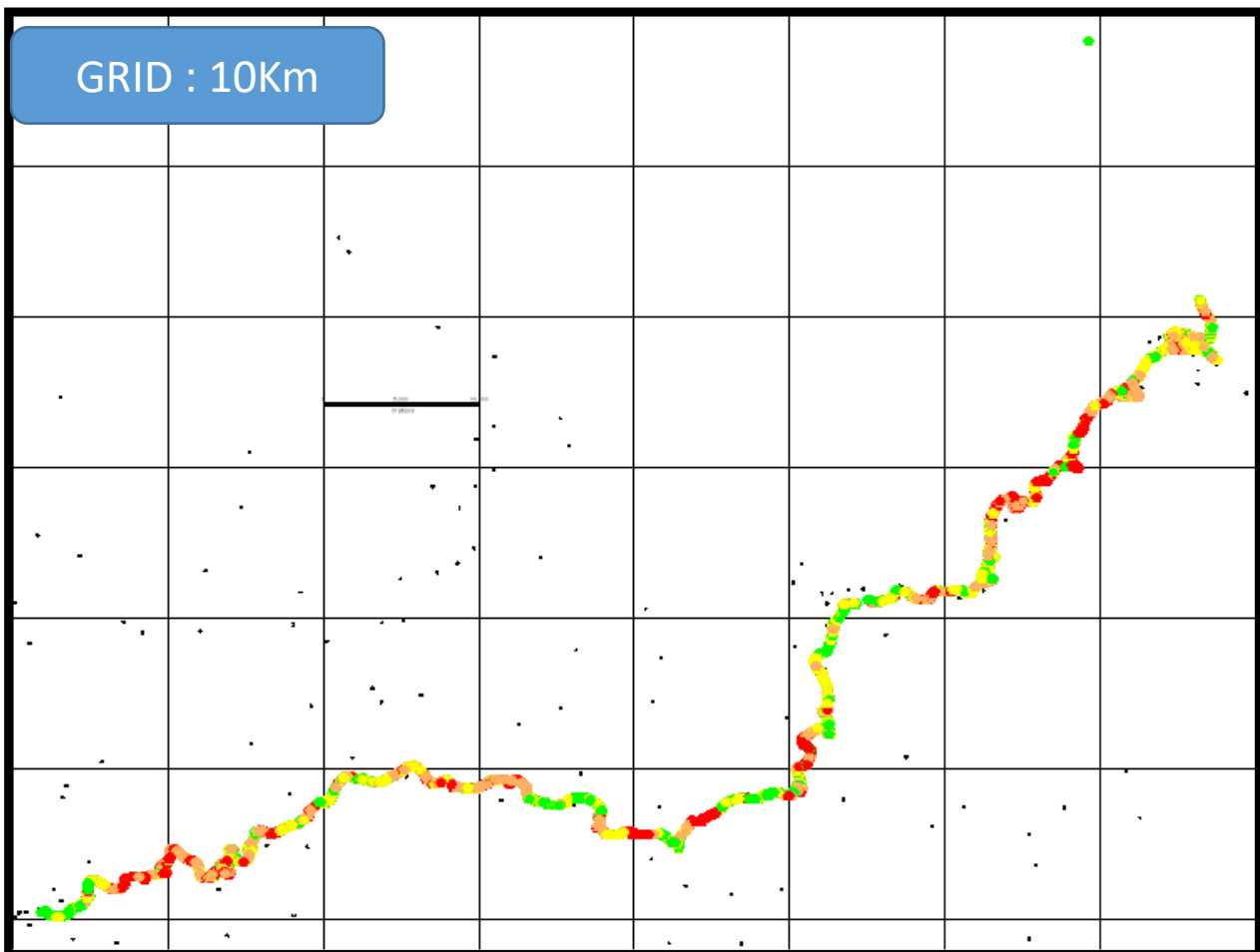


2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	6077	39.64	
[-75, >=-85)	4706	30.70	
[-85, >=-95)	3623	23.63	
[-95, >=Min)	924	6.03	
<b>Total</b>	<b>15330</b>	<b>100</b>	

# Coverage Details

## TSP-VIL

Technology	Coverage %
2G	68%



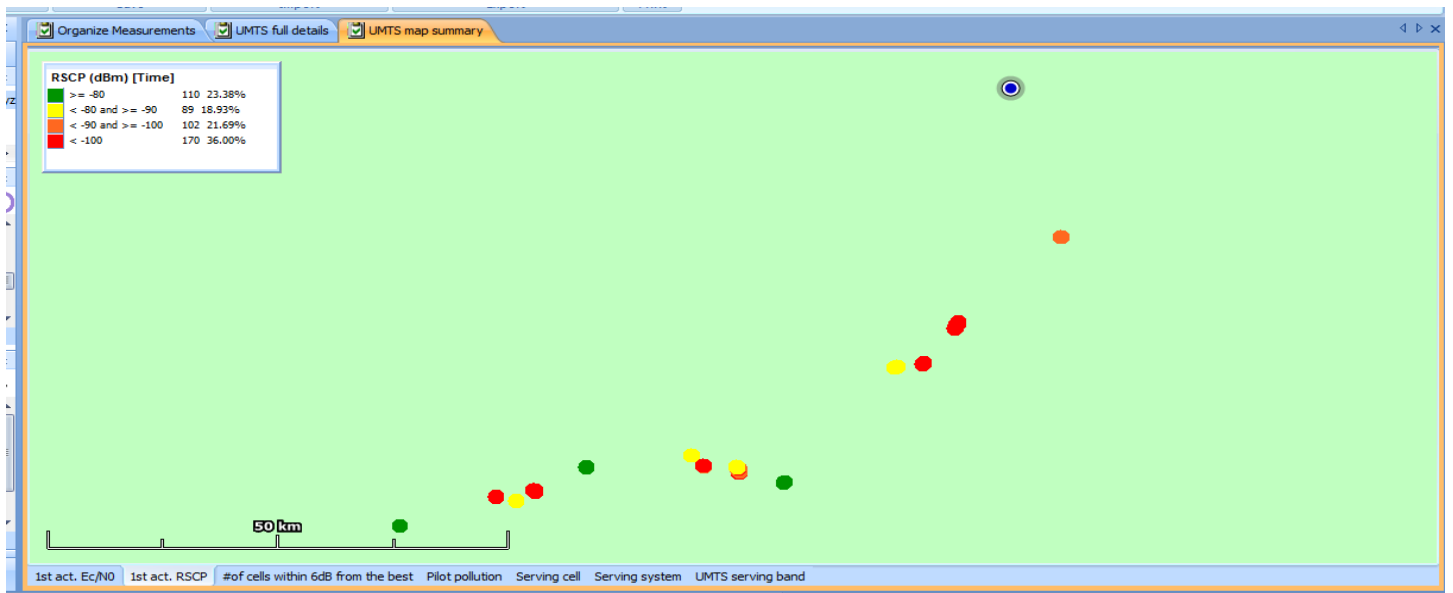
2G





Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	450337	28.4	
[-75, >=-85)	626008	39.5	
[-85, >=-95)	380506	24	
[-95, >=Min)	126942	8.02	
<b>Total</b>	<b>1583793</b>		

# Coverage Details

## TSP- BSNL

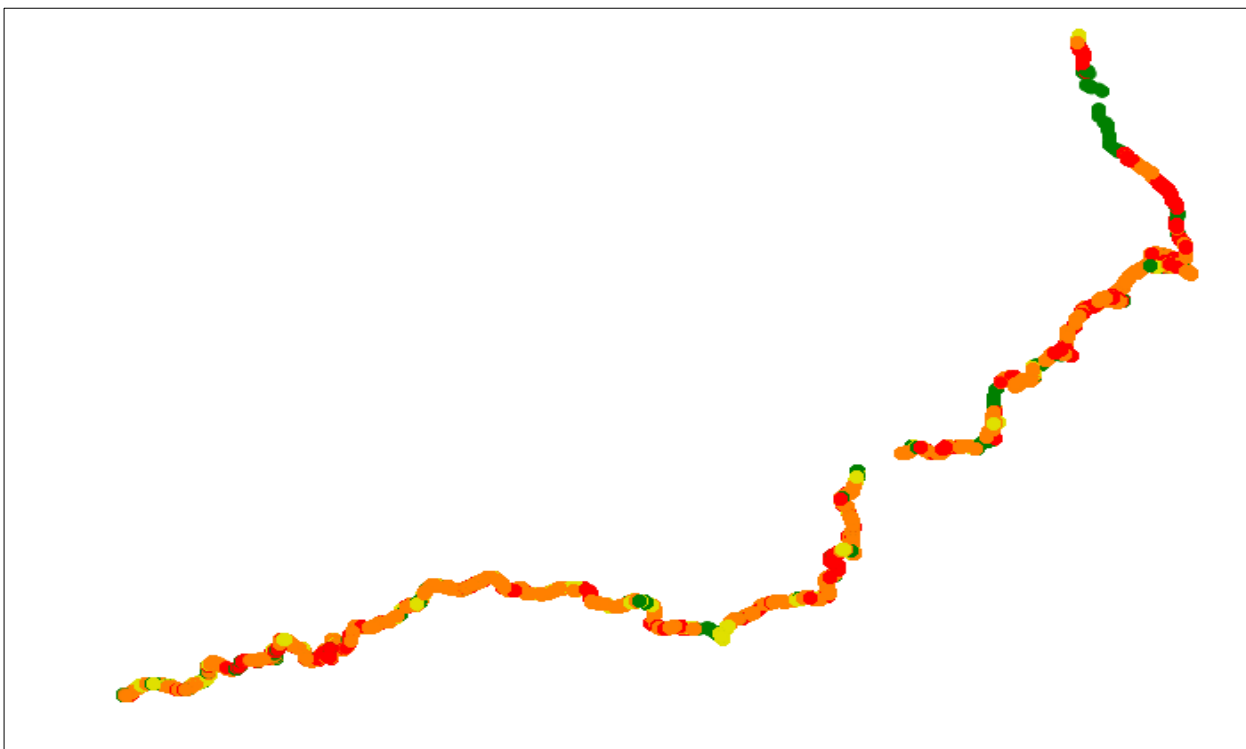
Technology	Coverage %
3G	94.78



3G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	110	23.38	
[-70, >=-80)			
[-80, >=-90)	89	18.93	
[-90, >=Min)	272	5.22	
<b>Total</b>	<b>18360</b>	<b>100</b>	

## TSP-Airtel

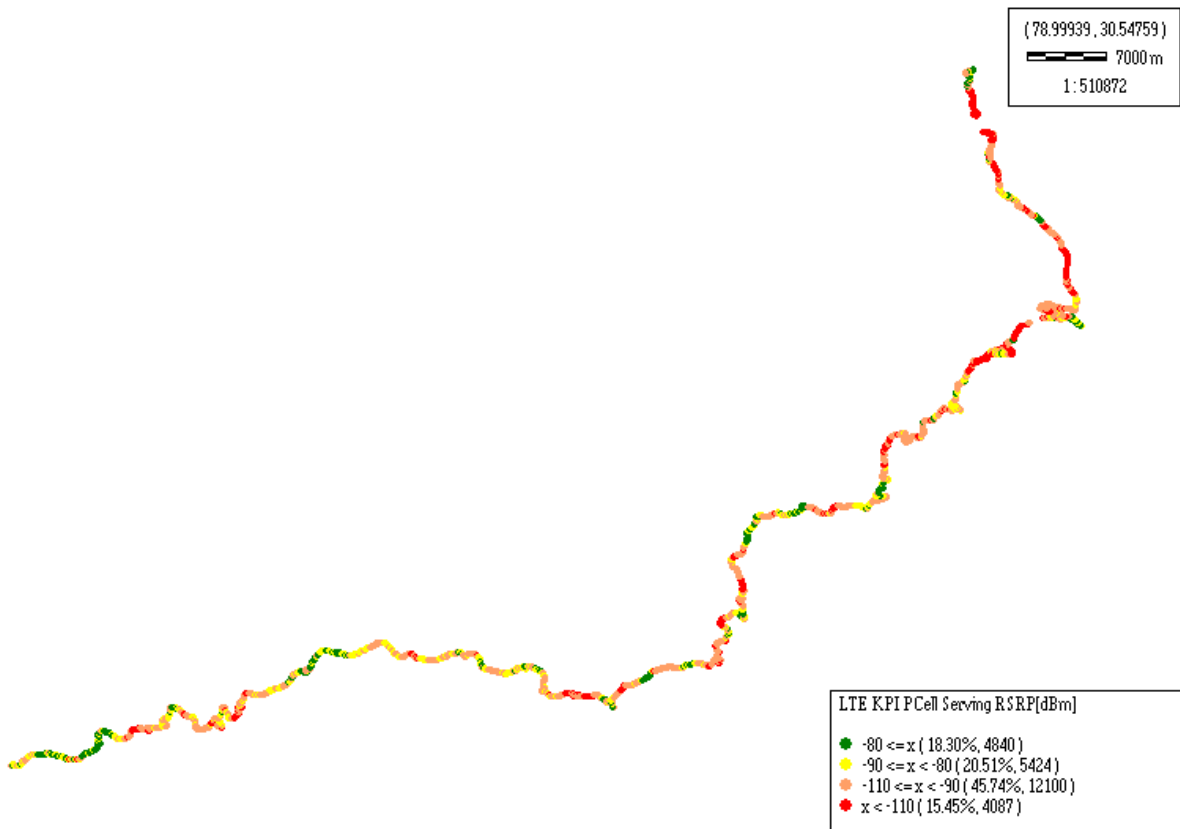
Technology	Coverage %
VoLTE	



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	221081	5.81	<span style="background-color: green; width: 20px; height: 10px; display: inline-block;"></span>
[-80, >=-90)	603401	15.79	<span style="background-color: yellow; width: 20px; height: 10px; display: inline-block;"></span>
[-90, >=-110)	2135565	55.89	<span style="background-color: orange; width: 20px; height: 10px; display: inline-block;"></span>
[-110, >=Min)	860339	22.51	<span style="background-color: red; width: 20px; height: 10px; display: inline-block;"></span>
<b>Total</b>	<b>3820386</b>		

## TSP JIO

Technology	Coverage %
VoLTE	84.55

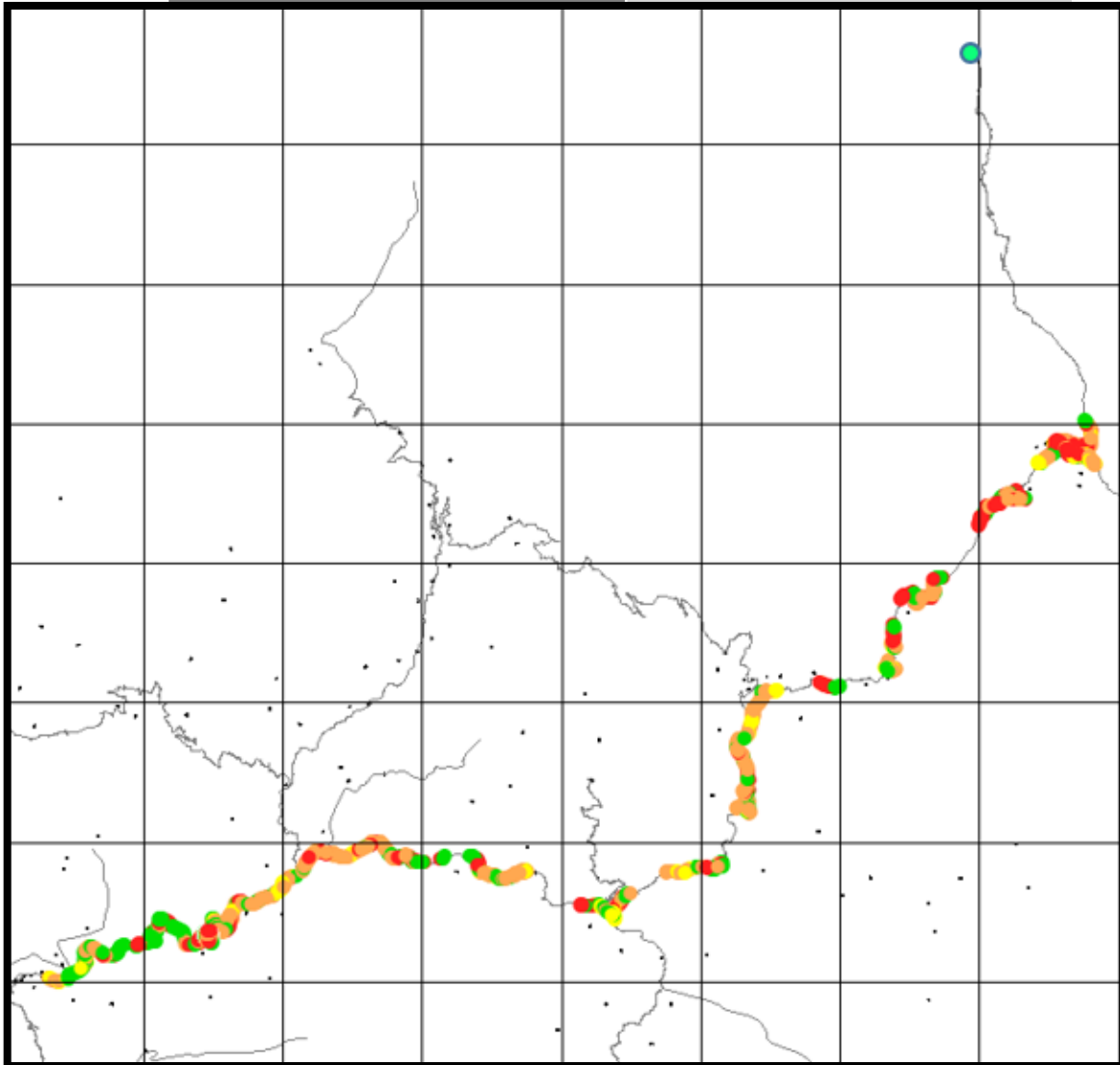






VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	4840	18.30	
[-80, >=-90)	5424	20.51	
[-90, >=-110)	12100	45.74	
[-110, >=Min)	4087	15.45	
<b>Total</b>	<b>26451</b>	<b>100</b>	

# Coverage Details

## TSP-VIL

Technology	Coverage %
VoLTE	87.27%

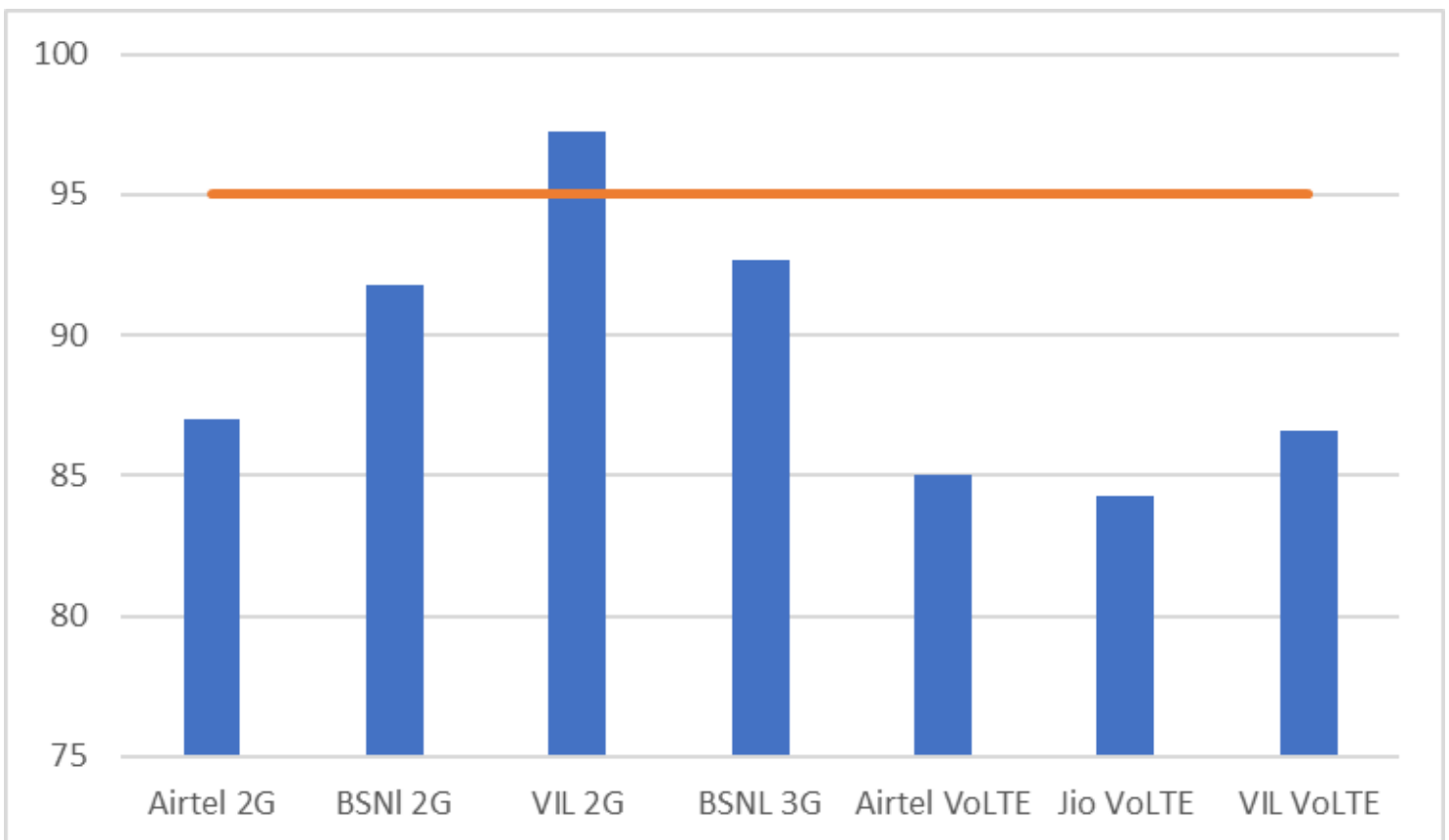


Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	173165	6.46	
[-80, >=-90)	741537	27.64	
[-90, >=-110)	1426235	53.17	
[-110, >=Min)	341455	12.73	
<b>Total</b>	<b>2682392</b>		

# Quality Details

For measuring voice quality, as per the QoS norms, RxQual  $\leq 5$  for GSM TSPs, EcNo  $\geq -14$  dBm for 3G TSP 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  $\geq 95\%$ .

TSP	Rx Quality %
Airtel 2G	87
BSNI 2G	91.76
VIL 2G	97.26
BSNL 3G	92.65
Airtel VoLTE	85
Jio VoLTE	84.24
VIL VoLTE	86.6



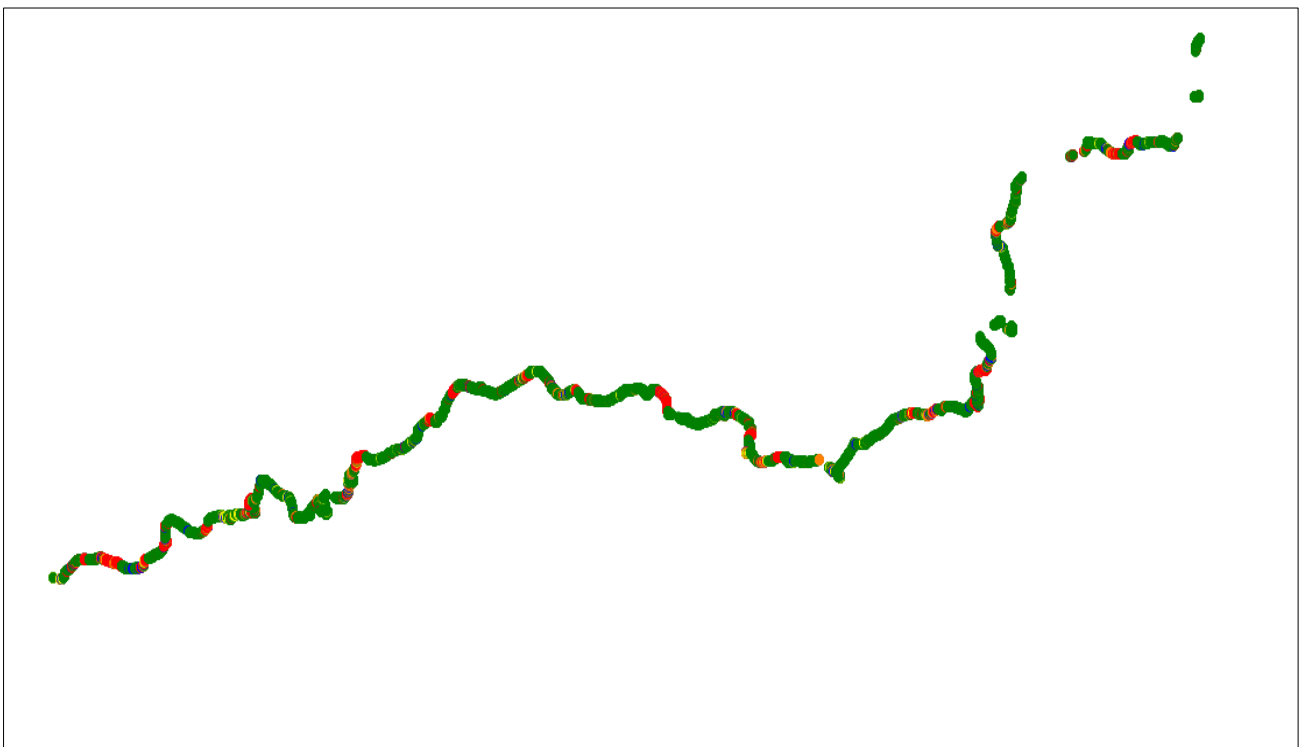


## Quality Details

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  $\geq 95\%$ .

### TSP-Airtel

Technology	Rx Quality %
2G	



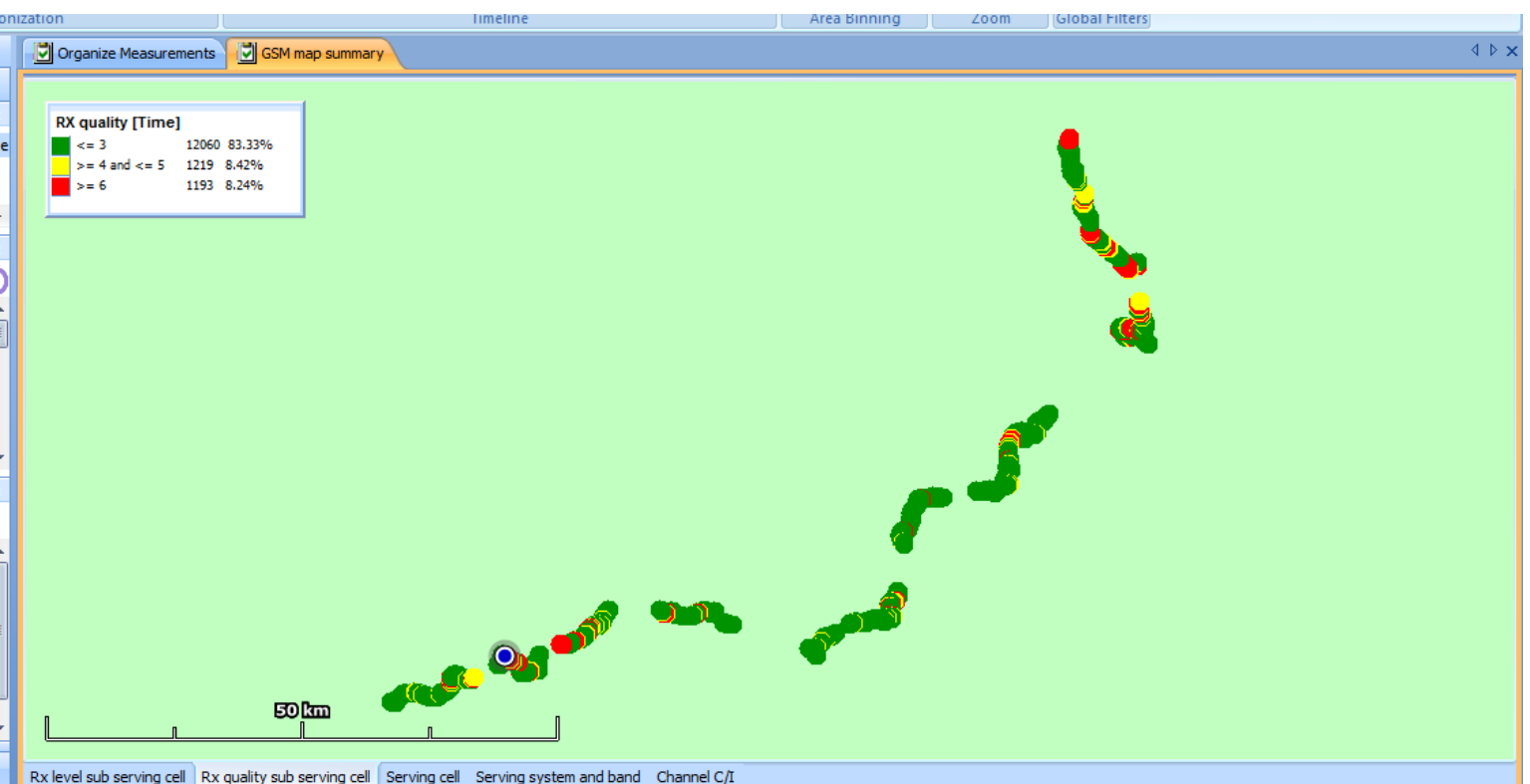
Overall Rx Quality	# Samples	% PDF	Legends
(Min, $\leq 2$ )	70787	82%	
(2, $\leq 3$ )	1764	2%	
(3, $\leq 4$ )	2464	3%	
(4, $\leq 5$ )	2715	3%	
(5, $\leq \text{Max}$ )	8310	10%	
<b>Total</b>			

## 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  $\geq 95\%$ .

### TSP- BSNL

Technology	Rx Quality %
2G	92.65



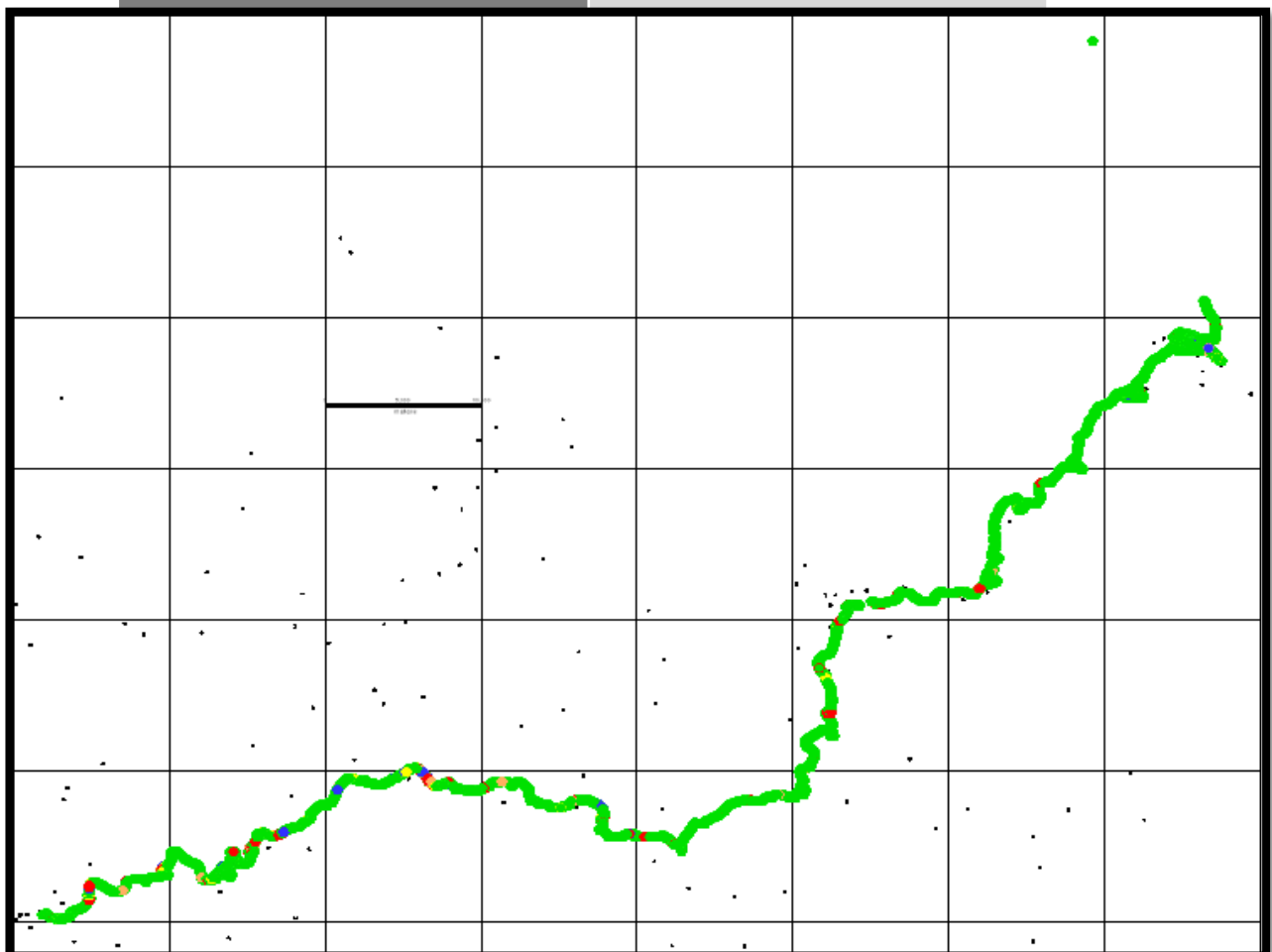
Overall Rx Quality	# Samples	% PDF	Legends
(Min, $\leq 2$ )			
(2, $\leq 3$ )	12060	83.33	
(3, $\leq 4$ )			
(4, $\leq 5$ )	1219	8.42	
(5, $\leq$ Max)	1193	8.23	
Total	14472	100	

## 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  $\geq 95\%$ .

### TSP-...VIL

Technology	Rx Quality %
2G	97.26%



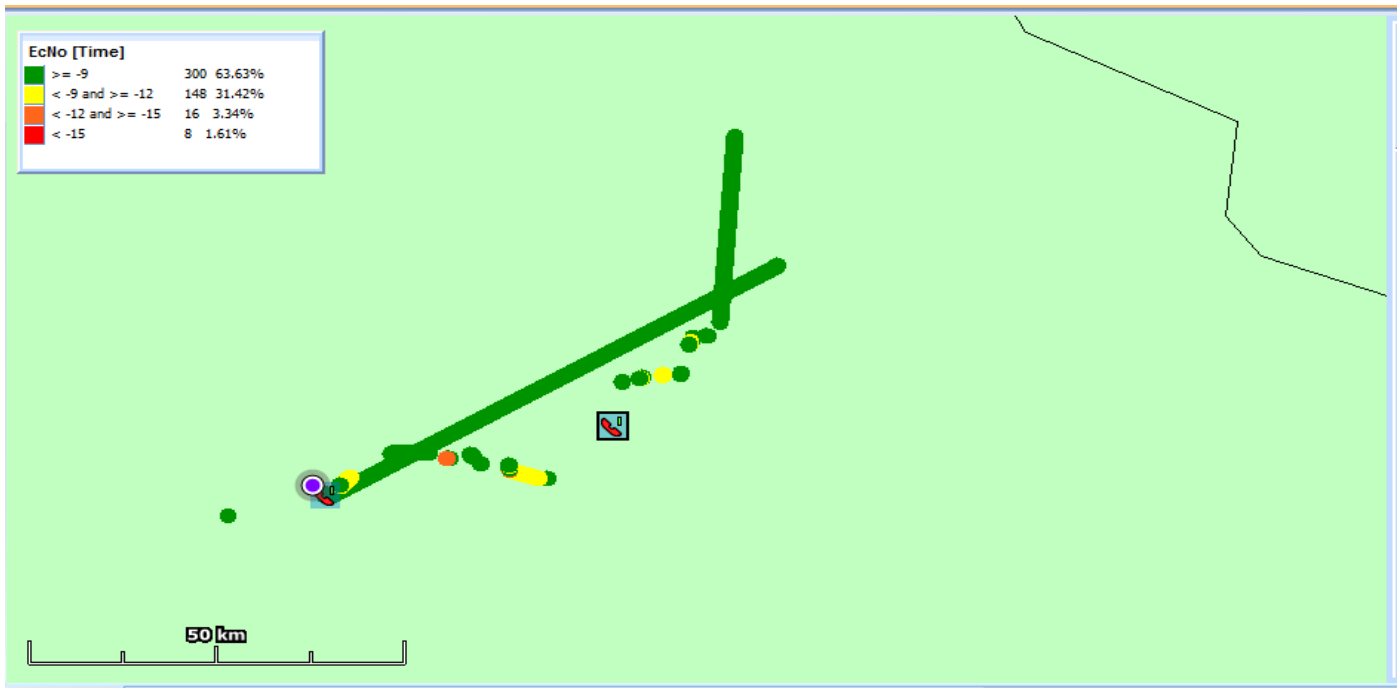
Overall Rx Quality	# Samples	% PDF	Legends
(Min, $\leq 2$ )	1482798	93.62	Green
(2, $\leq 3$ )	18757	1.18	Yellow
(3, $\leq 4$ )	19423	1.23	Blue
(4, $\leq 5$ )	19380	1.22	Orange
(5, $\leq \text{Max}$ )	43435	2.74	Red
<b>Total</b>	<b>1583793</b>		

## 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  $\geq 95\%$ .

### TSP-BSNL

Technology	Rx Quality %
3G	98.39



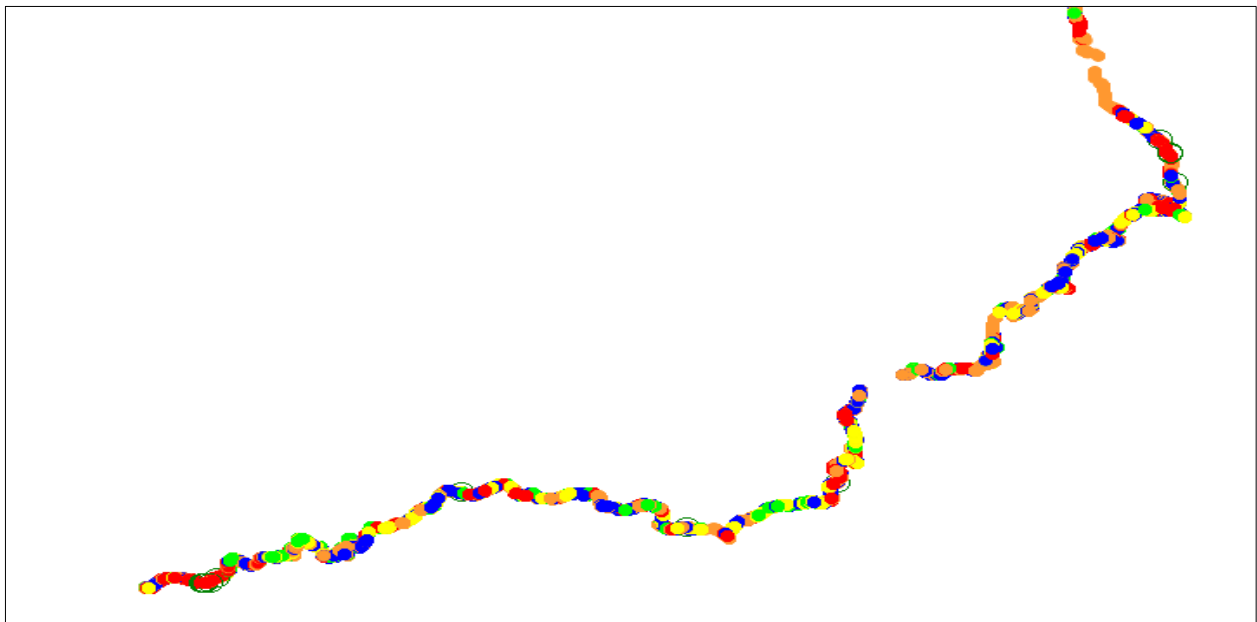
Overall Ec/No	# Samples	% PDF	Legends
(Max, $\leq -6$ )	300	63.63	
(-6, $\leq -9$ )			
(-9, $\leq -11$ )	148	31.42	
(-11, $\leq -14$ )	16	3.34	
(-14, $\leq$ Min)	8	1.61	
<b>Total</b>	<b>472</b>	<b>100</b>	






## Quality Details

For measuring voice quality, as per the QoS norms, RxQual  $\leq 5$  for GSM TSPs, EcNo  $\geq -14$  dBm for 3G TSP 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  $\geq 95\%$ .

### TSP-Airtel

Technology	Rx Quality %
VoLTE	77.49



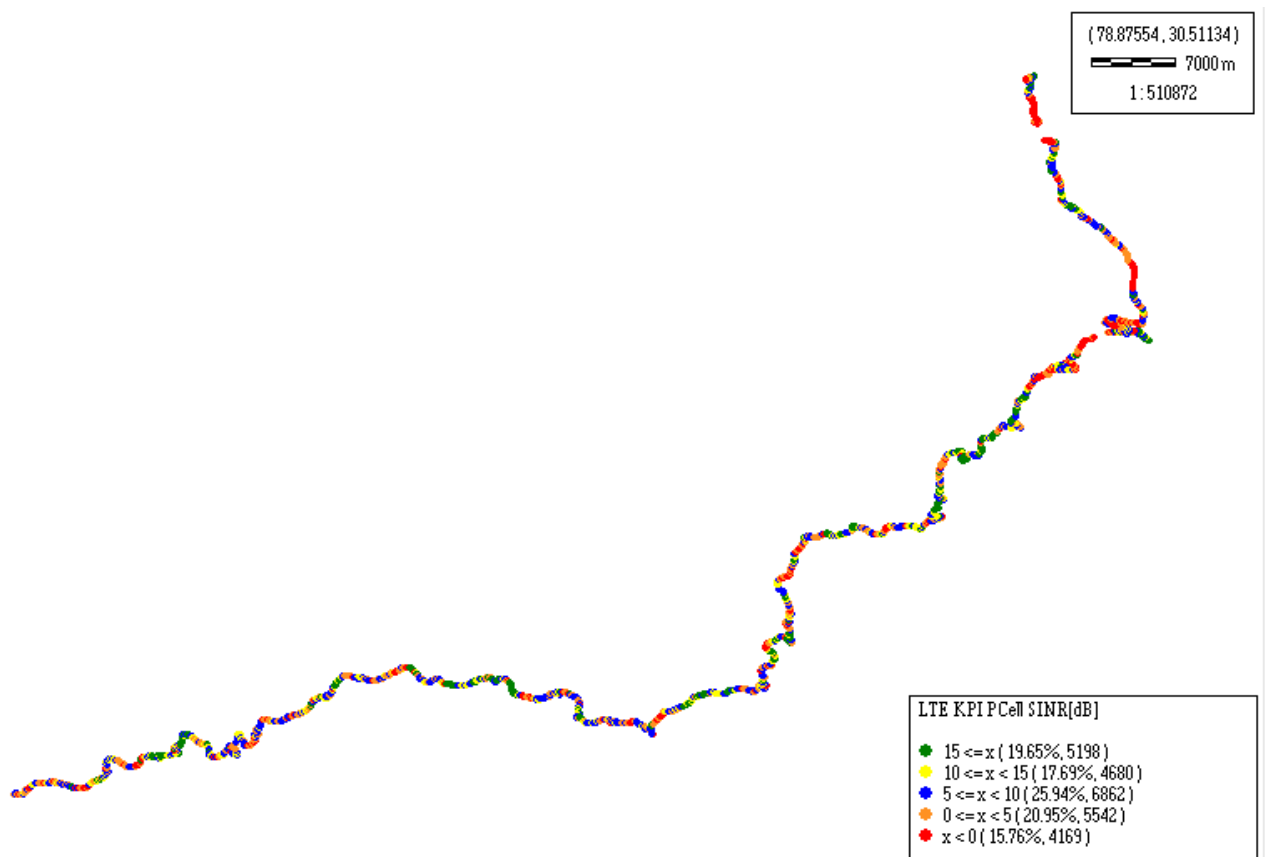
Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	604274	16	
(0, $\leq 5$ )	958658	25	
(5, $\leq 10$ )	1127971	30	
(10, $\leq 15$ )	749627	20	
(15, $\leq \text{Max}$ )	379756	10	
<b>Total</b>			

# Quality Details

For measuring voice quality, as per the QoS norms, RxQual  $\leq 5$  for GSM TSPs, EcNo  $\geq -14$  dBm for 3G TSP 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  $\geq 95\%$ .

## TSP JIO

Technology	Rx Quality %
VoLTE	<b>84.24</b>



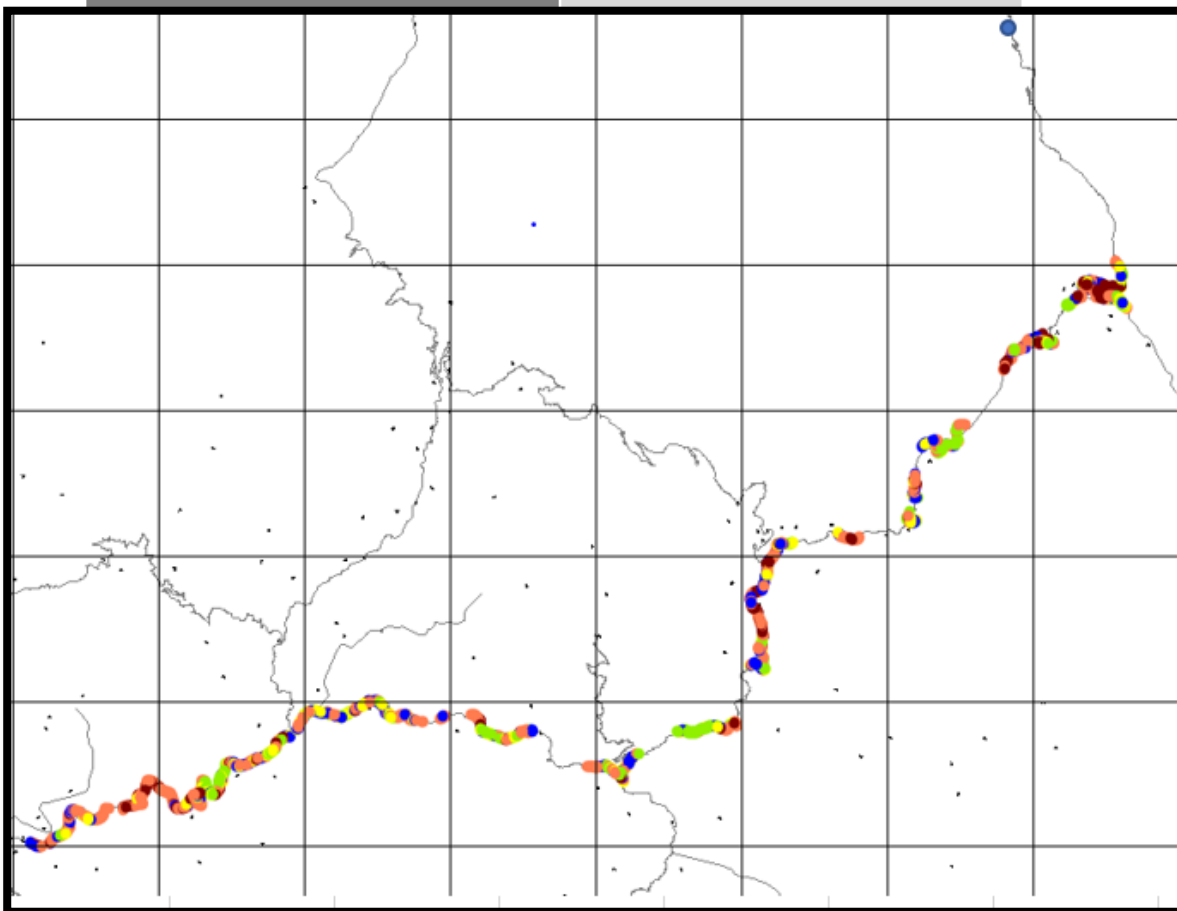
Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	4169	15.76	
(0, $\leq 5$ )	5542	20.95	
(5, $\leq 10$ )	6862	25.94	
(10, $\leq 15$ )	4680	17.69	
(15, $\leq \text{Max}$ )	5198	19.65	
<b>Total</b>	<b>26451</b>	<b>100</b>	






## 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  $\geq 95\%$ .

### TSP-VIL

Technology	Rx Quality %
VoLTE	<b>86.6%</b>

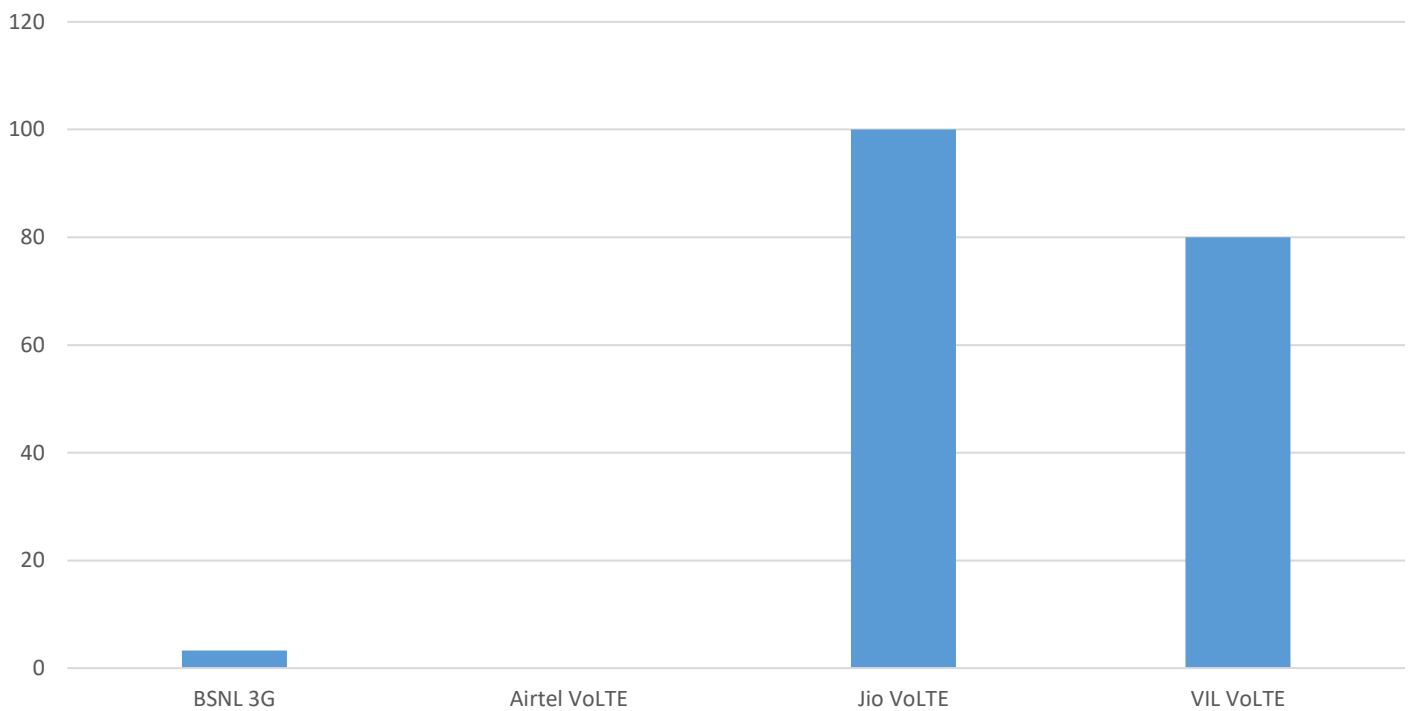


Overall SINR	# Samples	% PDF	Legends
(Min, $\leq 0$ )	361540	13.40	
(0, $\leq 5$ )	833299	30.87	
(5, $\leq 10$ )	630331	23.35	
(10, $\leq 15$ )	432084	16.01	
(15, $\leq \text{Max}$ )	441742	16.37	
<b>Total</b>			

# Technology Details

<b>TSP</b>	<b>% of Time Spent on 3G/VoLTE</b>
<b>BSNL 3G</b>	<b>3.273</b>
<b>Airtel VoLTE</b>	<b>NA</b>
<b>Jio VoLTE</b>	<b>100</b>
<b>VIL VoLTE</b>	<b>80</b>

% of Time Spent on 3G/VoLTE

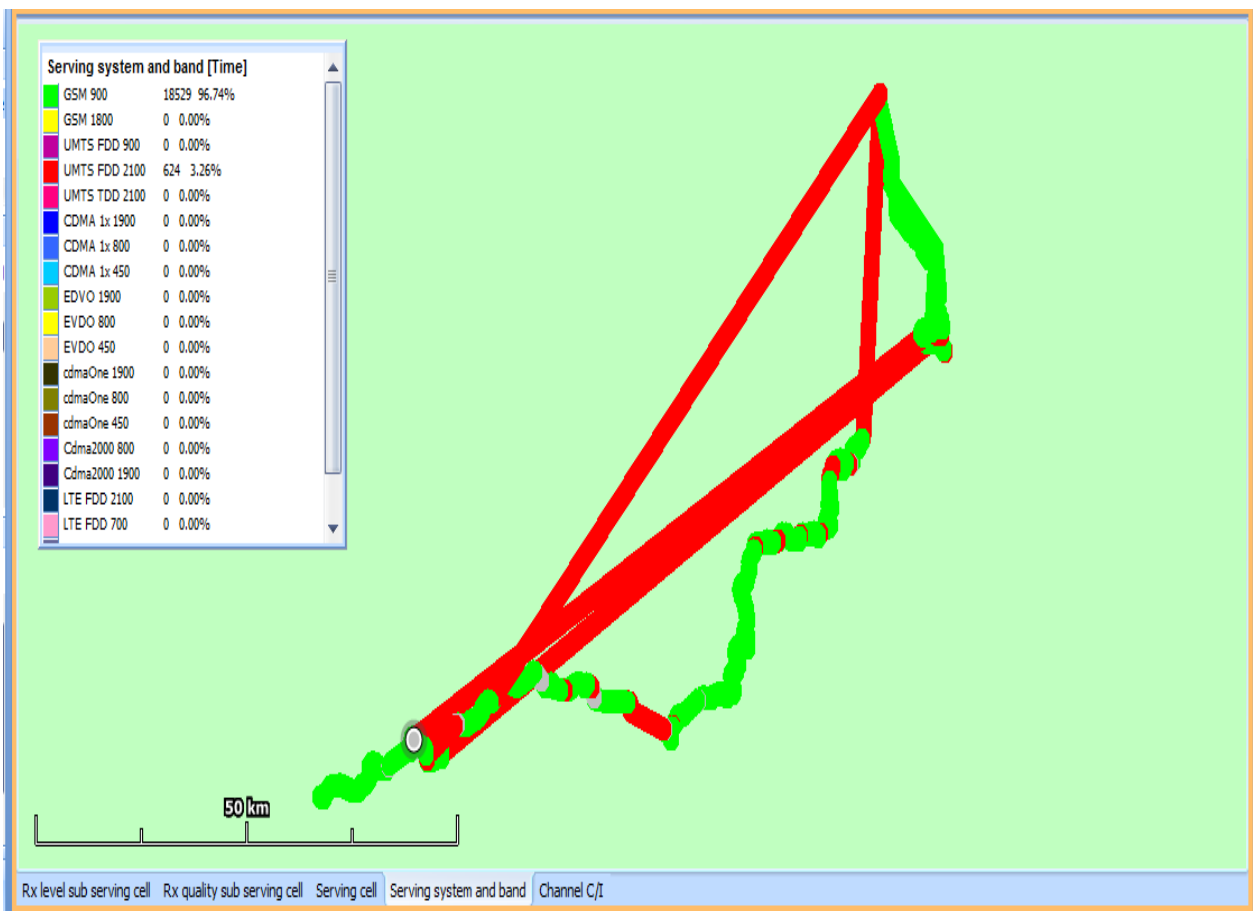




# Technology Details

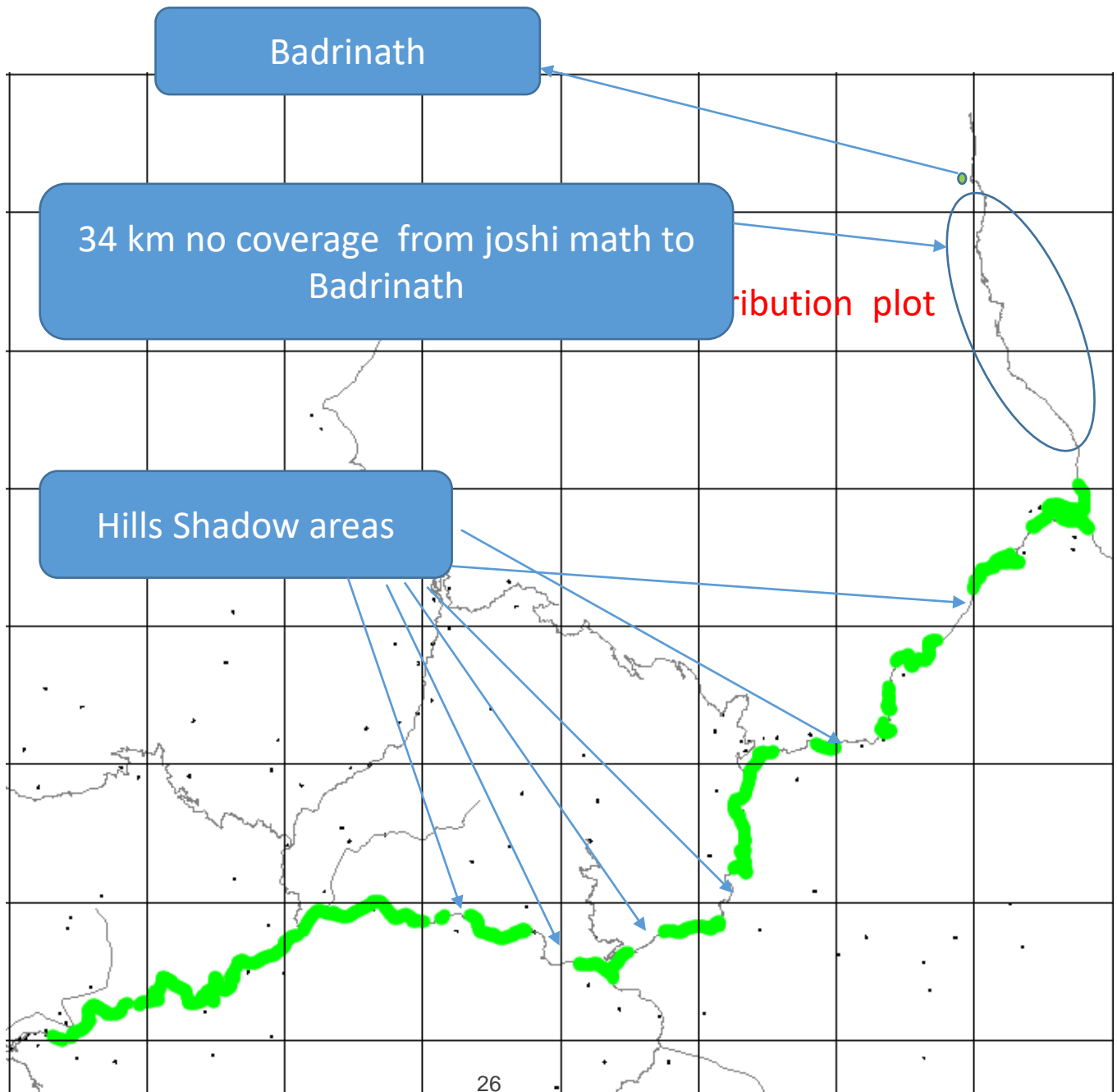
## TSP- BSNL

Technology	% of Time Spent on
3G	3.273
VoLTE	



## TSP VII.

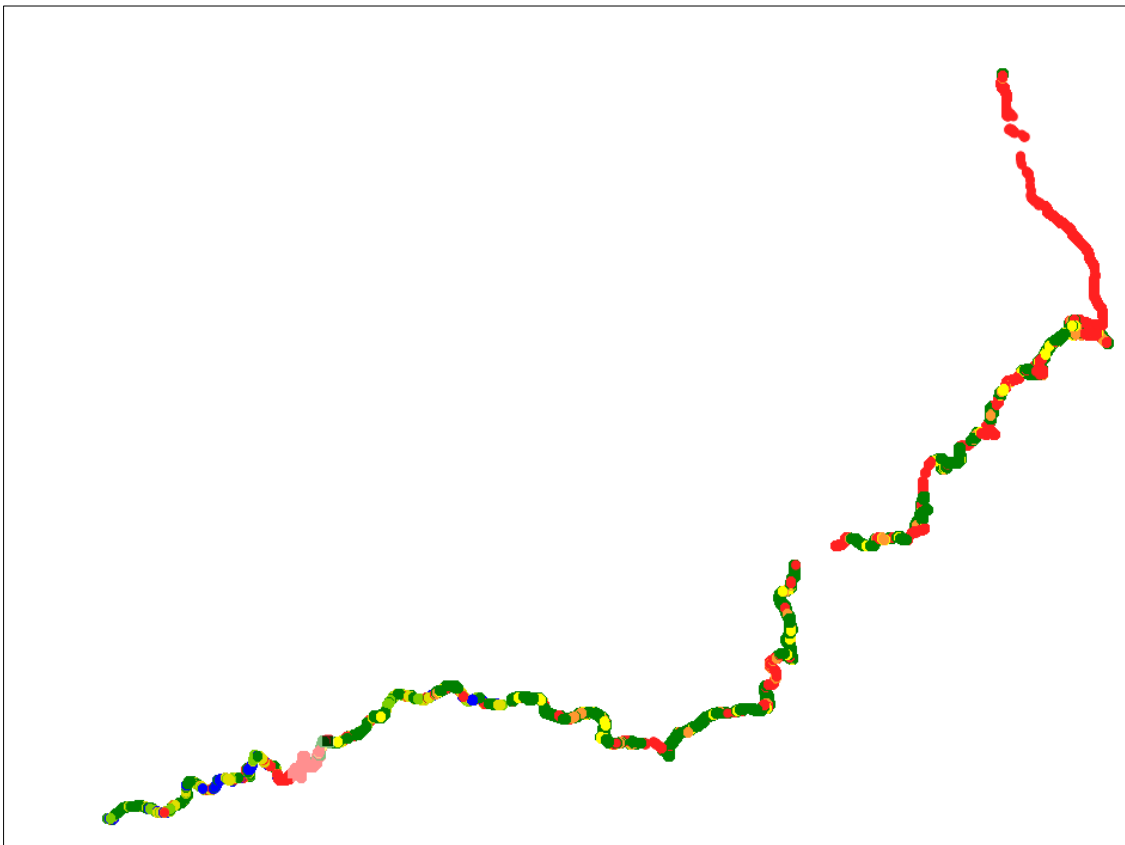
Technology	% of Time Spent on
2G	10%
VoLTE	80%



## TSP-Airtel

### Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	



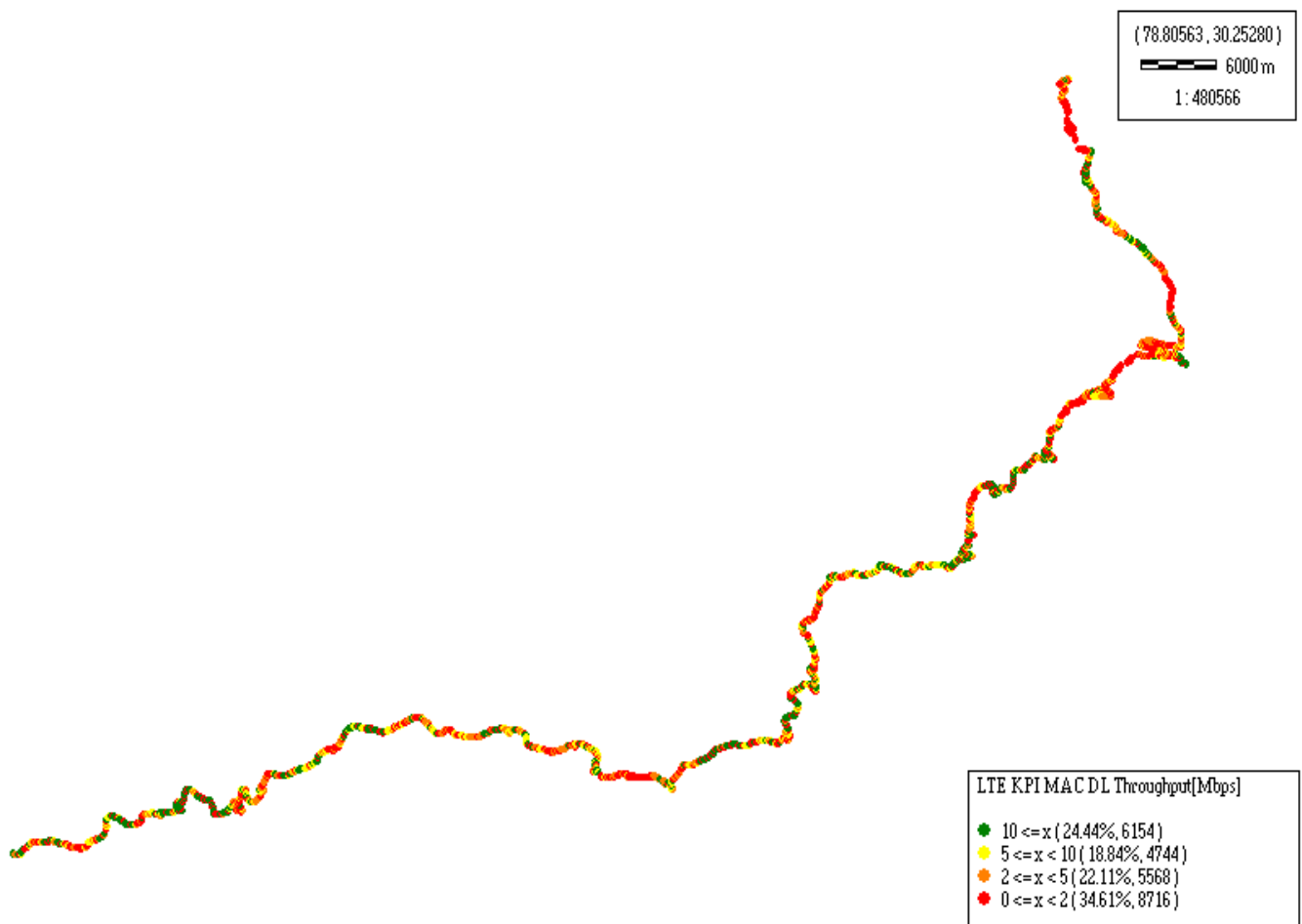
DL throughput	No of Sample	%	Legends
< 2Mbps	1027105	27%	Red
2-5 Mbps	432821	11%	Orange
5-10 Mbps	529702	14%	Yellow
>10Mbps	1837204	48%	Green

# Dynamic Data Test

## TSP- JIO

### Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	15.75



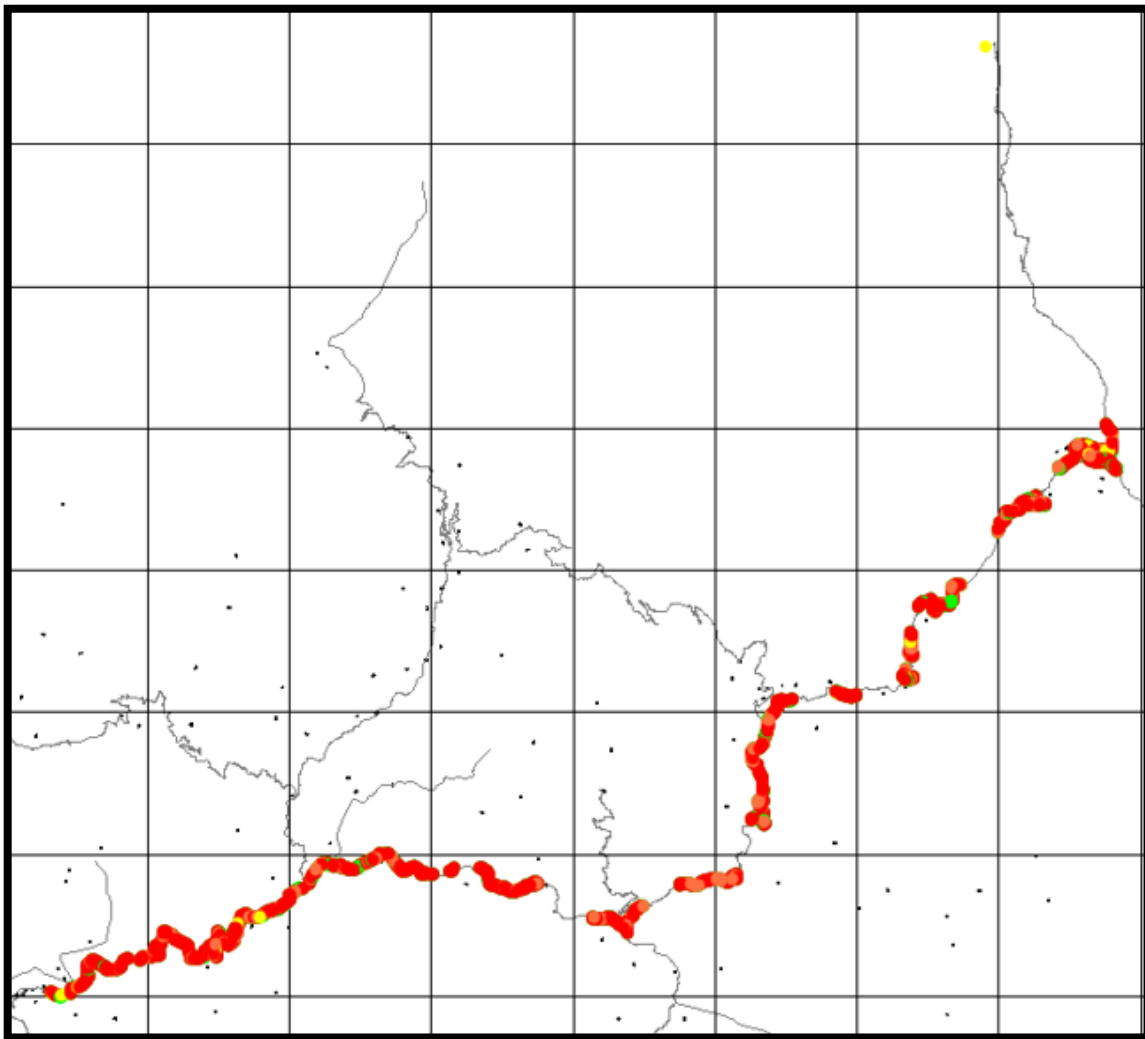
DL throughput	No of Sample	%	Legends
< 2Mbps	8716	34.61	Red
2-5 Mbps	5568	22.11	Orange
5-10 Mbps	4744	18.84	Yellow
>10Mbps	6154	24.44	Green

# Dynamic Data Test

## TSP- VIL

### Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	4.98 Mbps



DL throughput	No of Sample	%	Legends
< 2Mbps	1238662	36.5	Red
2-5 Mbps	1304346	38.5	Orange
5-10 Mbps	427479	12.6	Yellow
>10Mbps	421288	12.4	Green