

# Operator Assisted Drive Test Report

## ADILABAD SSA

FEBRUARY 2024

(RO, HYDERABAD)

**Key Performance Indicators:** All TSPs have met the Drop Call Rate (DCR) benchmark of 2% except BSNL 3G. All TSPs have met the Call Setup Success Rate (CSSR) of 95%. Rx Quality of 95% is not achieved by BSNL 2G & 3G, Airtel VoLTE & VIL VoLTE.

The Operator Assisted Drive Test (OADT) has been carried out by TRAI RO Hyderabad with the help of Service Providers in Adilabad and surrounding areas Nirmal, machiryal, Bellampalle, Kagaznagar, Asifabad, Jainoor, Utnoor, Bainsa, Jannaram, Ichoda, Luxettipet from 9:00 AM to 8:00 PM during 19<sup>th</sup> to 22<sup>nd</sup> Feb 2024. The drive test covered drive route of 640 KMs & 6 hotspot over a period of 4 days. Approximately 740 calls were made for each of the 7 networks: Three 2G networks, One 3G network and Three LTE network covering four TSPs.

Overview

Voice  
Summary

Data  
Summary

# Overview

TRAI Hyderabad conducted Operator Assisted Drive Test from 19<sup>th</sup> to 22<sup>nd</sup> Feb 2024 covering various locations in Adilabad surrounding regions Manchiryal, Utnoor, Khagaznagar, Bellampalle. The performance of Airtel, BSNL, Jio and Vodafone Idea Limited were 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 in terms of

**Voice:** Coverage, Quality, Handover Success Rate, Call Setup Success Rate, Drop Call Rate and Block Call Rate.

**Data:** Download and Upload Throughputs, Video Streaming Interruption delay, Web Browsing Delay and Latency.

## Drive Test Details :

**Voice Tests:** Calls were made for 90 sec duration with wait time of 10 sec between calls in all technologies. The drive test covered a drive route of approximately 640KMs over a period of 4 days from 19<sup>th</sup> to 22<sup>nd</sup> Feb'2024. Approximately 740 calls were made for each of the 4 networks: three 2G (Lock Mode) networks, one 3G (Dual mode) networks and three VoLTE network covering 4 unique TSPs.

## data Tests:

1.Dynamic data test was conducted for 640 kms over a period of 4 days for download throughput for 3G & 4G technologies. BSNL not done the dynamic data test.

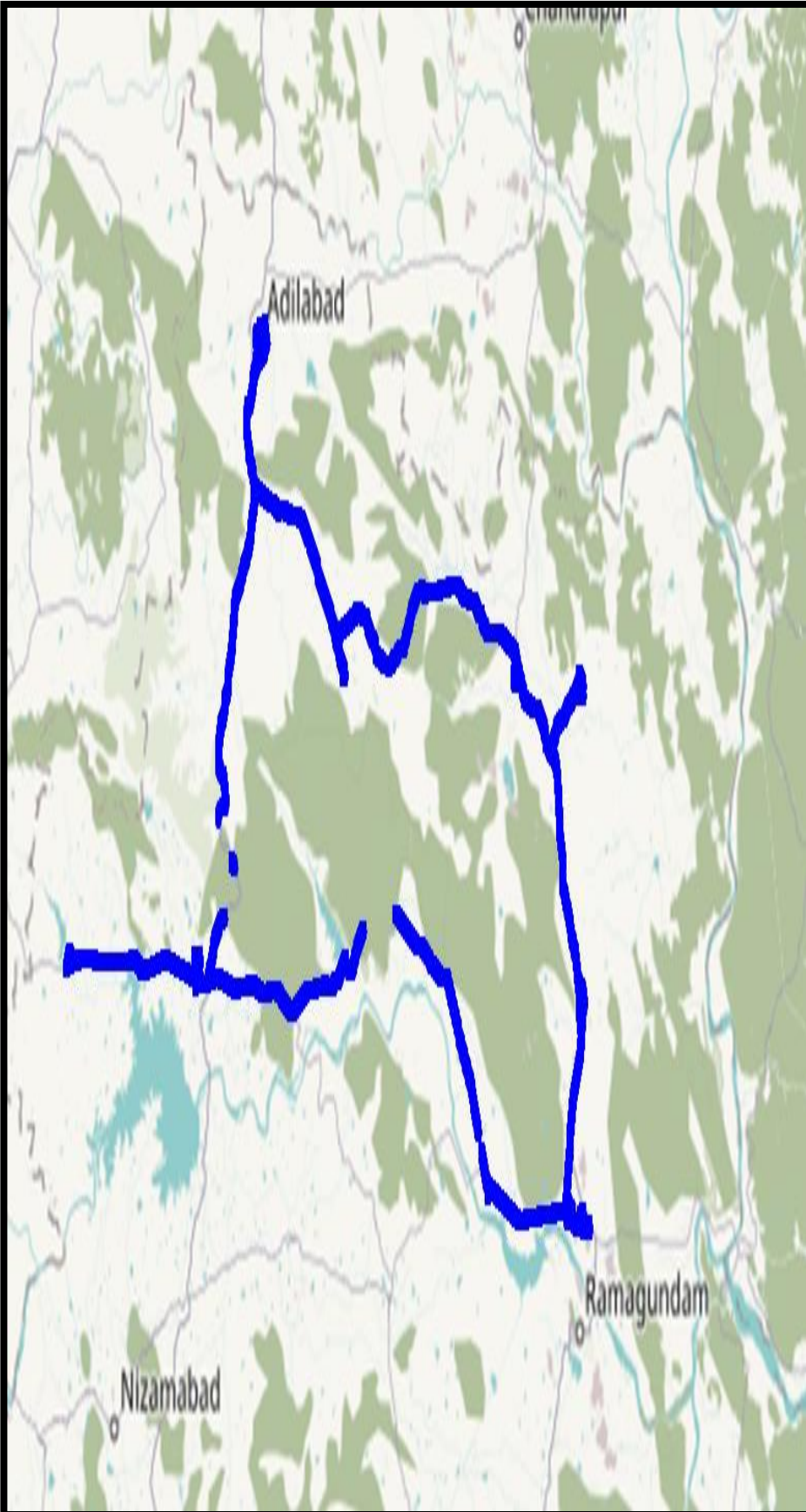
2.Data Tests were performed at 6 static locations for 2G, 3G & 4G technologies of five iterations at each location.

- For Voice and Data KPI's, 2G measurement is done with UE locked mode, 3G measurement is done with UE in Dual mode (2G & 3G) and 4G measurement is done with UE in Free Mode.
- 3G KPI's which are calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.
- 4G KPI's which are calculated from the UE in Free Mode included samples and events of 2G & 3G.

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 www.myntra.com
Video Streaming	130 Sec Clip
Latency	Bytes on www.google.com

# Overview

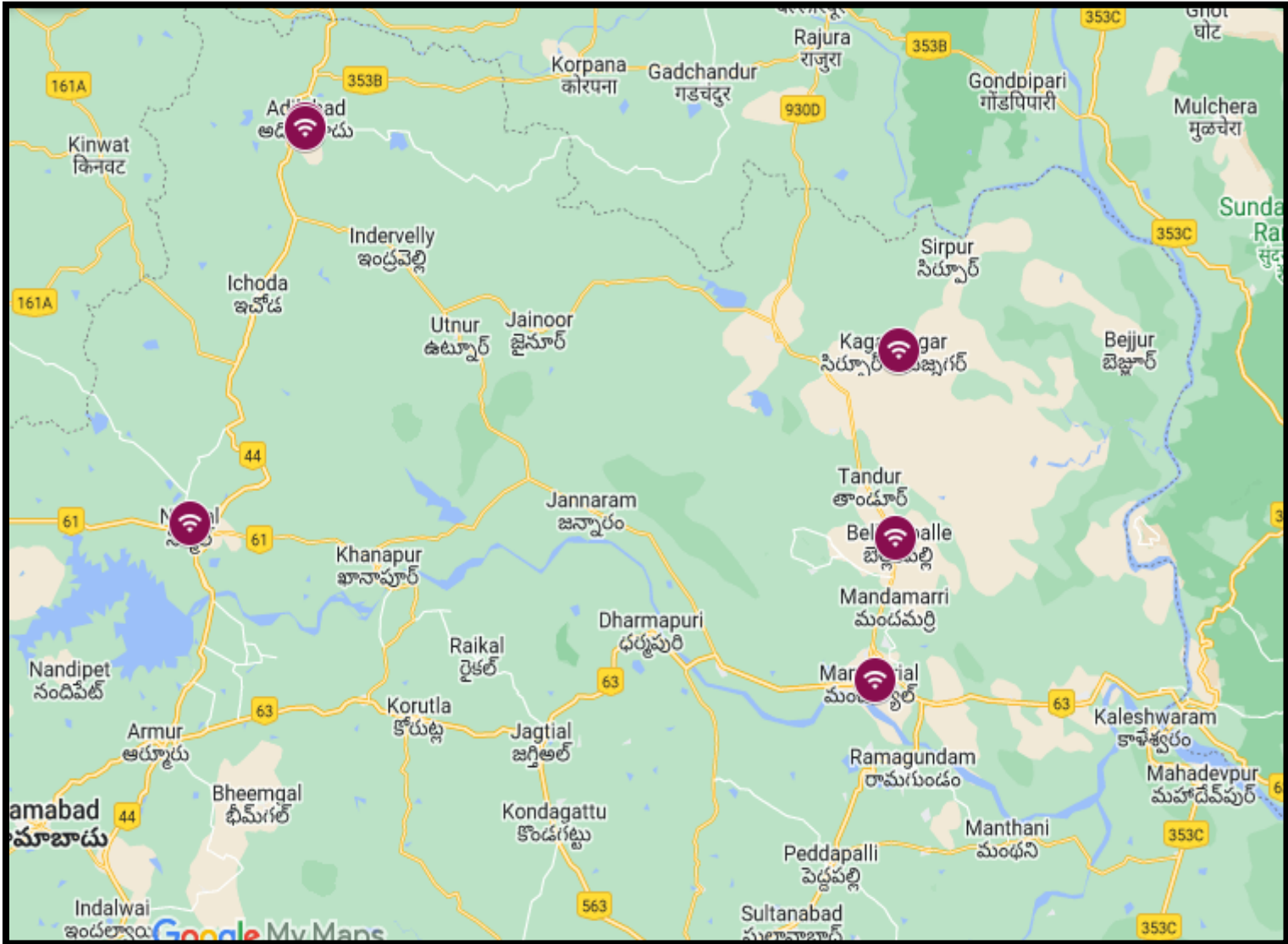
## Voice & Dynamic Data Test Drive Route



Areas Covered -	
Adilabad	
Inchioda	Nirmal Town
Gudihatnoor	Bainsa
Maval	Jannaram
Kunthala	Luxettipet
Shankarapuram	Manchiryal
Vankidi	Buddikonda
<b>Areas Covered-</b>	<b>Areas Covered -</b>
Manchiryal Town	Asifabad
Bellampalle	Karimeri
Kagaznar	Hasnapur
<b>Areas Covered-</b>	<b>Areas Covered-</b>
Indravelli	Gudihatninoor
Adilabad	Maval

# Overview

## Data Service Test- Static Locations

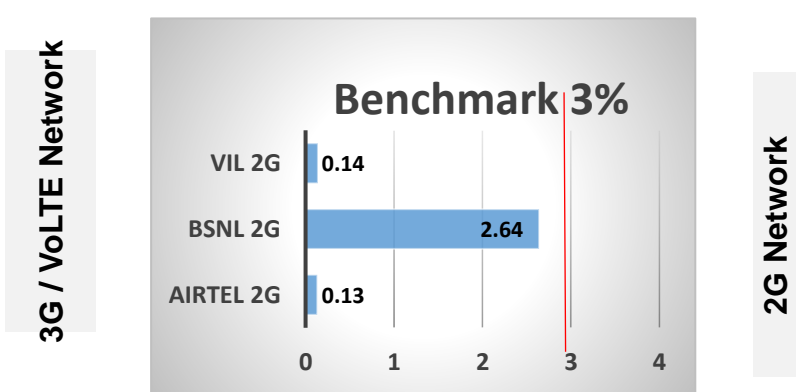
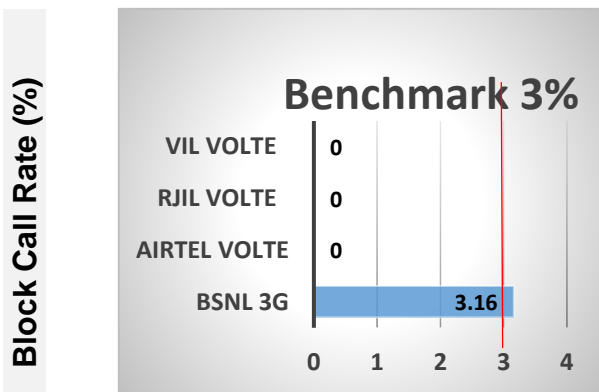
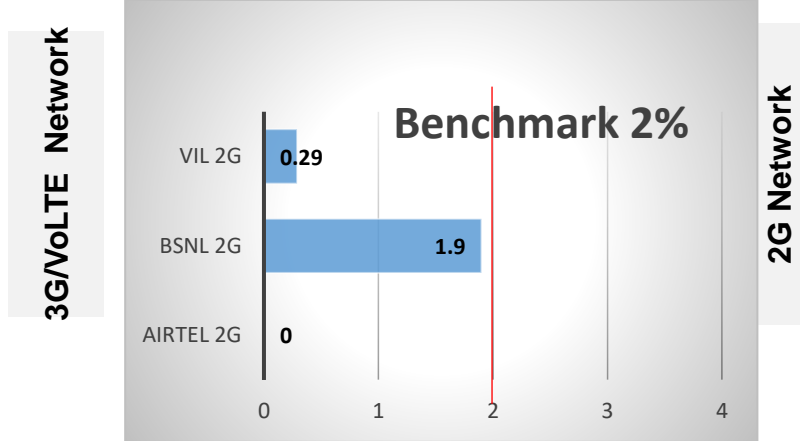
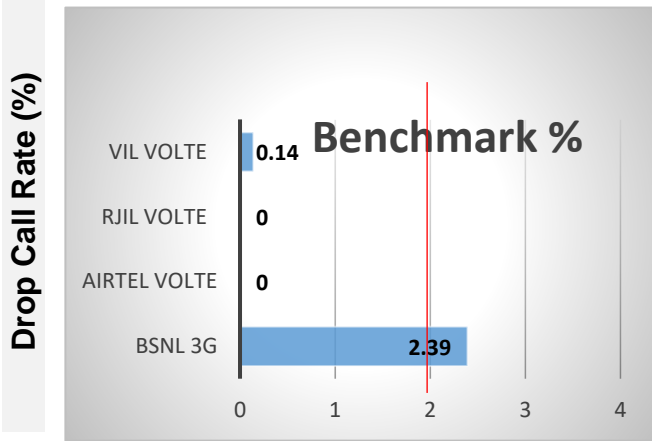


<b>6 Static Locations</b>
Nirmal Bus Stand
Manchiryal Rly Station
Bellampalli New Bus Stand
Kagaznagar RLY Station
Govt Hospital RMIS Adilabad
Adilabad Bus Stand

# Voice Calls

## Key Observations

QoS compliance of the TSPs in ADILABAD SSA for Voice across technologies 2G/3G/VoLTE:



	2G			3G	VoLTE		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
<b>Drop Call Rate %</b>	0	1.90	0.29	2.39	0	0	0.14
<b>Block Call Rate %</b>	0.13	2.64	0.14	3.16	0	0	0

- a) All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%) except BSNL 3G.
- b) Block Call Rate (CBR%) benchmark of 3% was achieved by all TSP's except BSNL 3G.

# Voice Calls

## Key Observations

### Coverage

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

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	85.7	86.50	82.84

b) Percentage of coverage samples for 3G  $\geq$  -90 dBm & LTE  $\geq$  -110 dBm

TSPs	3G/ VoLTE	VoLTE		
	BSNL	Airtel	JIO	VIL
Coverage %	74.56	98.65	99.12	96.33

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

TSPs	3G/VoLTE			
	Airtel	BSNL	JIO	VIL
% of Time Spent on 3G/4G	100	67.8	100	99.05

# Summary

## SSA Level Summary-Voice

Voice Calls	2G		
	Airtel	BSNL	VIL
Call attempts	735	885	688
Block call rate %	0.13	2.64	0.14
CSSR %	99.87	97.68	99.57
Drop call rate %	0	1.90	0.29
Mobility HOSR %	97.91	97.06	99.65
RX Quality %	95.29	92.47	97.09

Voice Calls	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Call attempts	581	748	992	672
Block call rate %	3.35	0	0	0.00
CSSR %	97.48	100	100	99.86
Drop call rate %	2.58	0	0	0.14
Mobility HOSR %	100	99.83	99.19	99.86
RX Quality %	90.6	94.04	96.67	93.76

# Data Services Dynamic

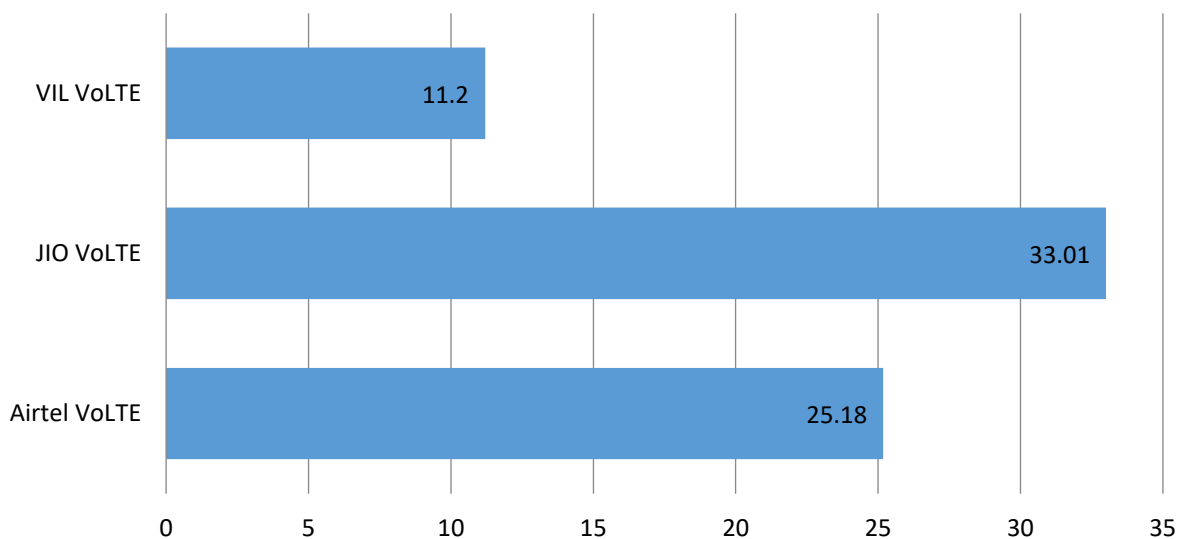
**Key Observations**

Dynamic Data was tested for 640Kms. Download Throughput was tested.

## Data Download Performance (Mbps) - Dynamic

**4G/ 3G Network:**

### Download Throughput (Mbps)



3G / VOLTE				
Data Services Dynamic	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Download Throughput (Mbps)	Not Done	25.18	33.01	11.20



# Data Services Static

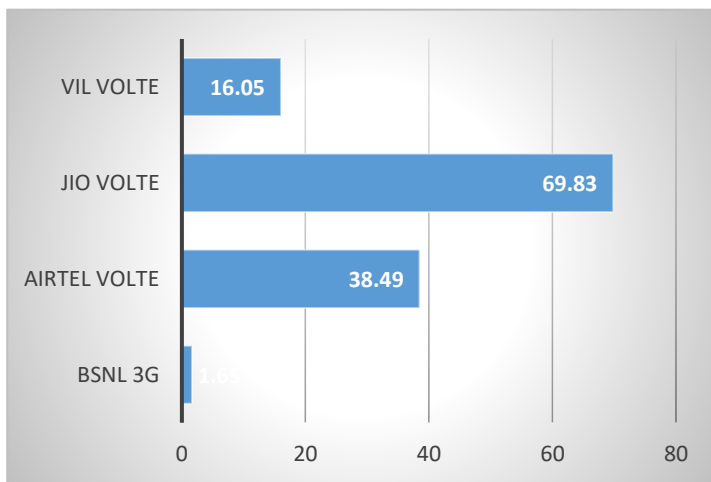
## Key Observations (Average of 6 Hotspots)

Data was tested at 6 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing delay (Flipkart, Amazon, Myntra)

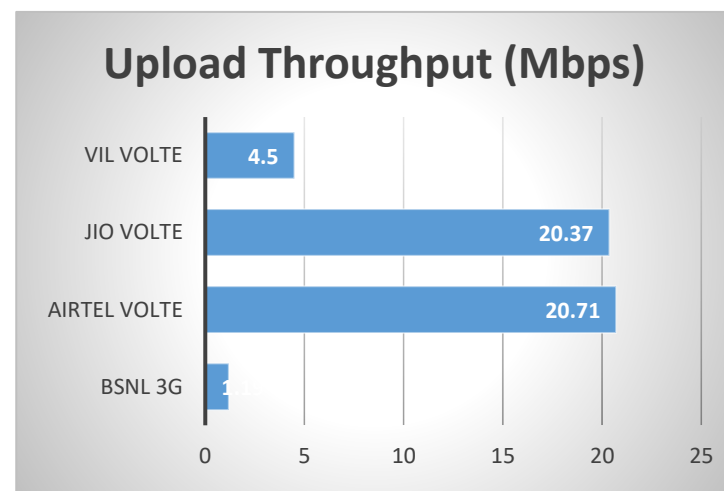
### Data Download and Upload Performance (Mbps)

3G/4G Network:

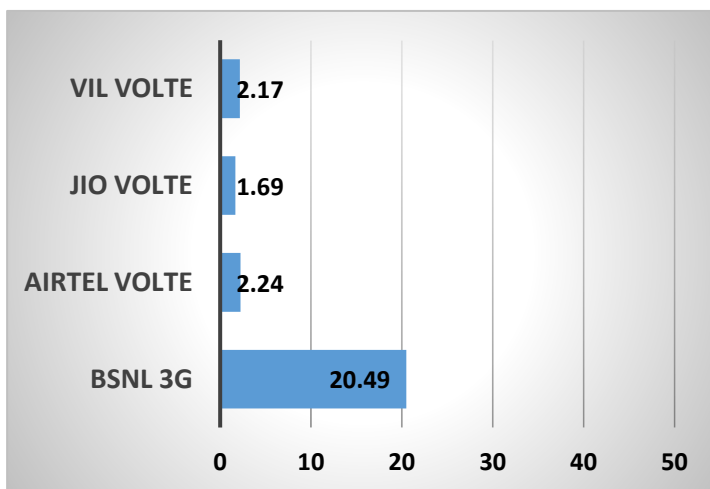
#### Download Throughput (Mbps)



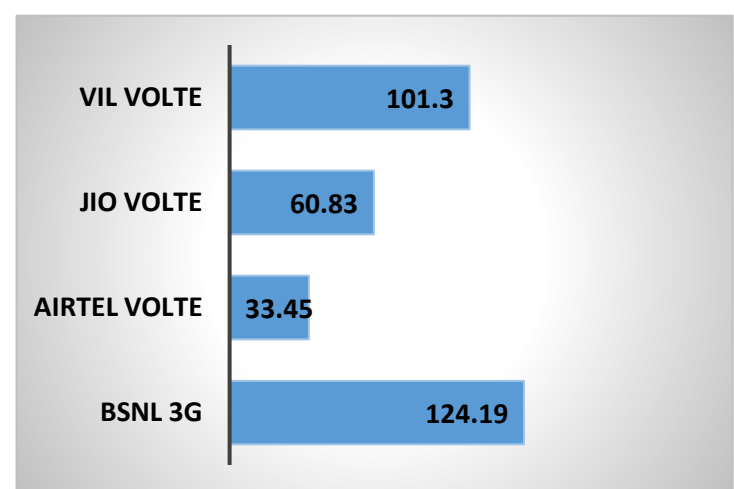
#### Upload Throughput (Mbps)



#### Web Browsing delay (Sec)



#### Latency (ms)



# Summary

## SSA Level Summary- (Average of 6 hotspots)- Data Services

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	214.8	92.71	47.45
Upload Throughput (kbps)	89.20	71.56	36.02
Web Browsing Delay (sec)	8.15	88.61	14.1
Latency (msec)	111.4	546.78	193.5

Data Services Static	3G	LTE		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	1.65	38.49	69.83	16.05
Upload Throughput (Mbps)	1.19	20.71	20.37	4.5
Web Browsing Delay (sec)	20.49	2.24	1.69	2.17
Latency (msec)	124.19	33.45	60.83	101.3

Nirmal Bus Stand	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	213.6	98.79	52.24
Upload Throughput (kbps)	83.4	151.14	31.28
Web Browsing Delay (sec)	6.2	35.22	14.5
Latency (msec)	125.9	339.69	205

Manchiryal Rly Station	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	232	75.9	43.8
Upload Throughput (kbps)	75.4	25.73	43.02
Web Browsing Delay (sec)	9.9	118.75	13.6
Latency (msec)	92.8	559.31	187.4

Bellampalli New Bus Stand	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	220.4	54.82	46.63
Upload Throughput (kbps)	49.6	61.49	52.41
Web Browsing Delay (sec)	6.9	49.5	13.6
Latency (msec)	120.4	672.8	193.7

Kagaznagar RLY Station	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	201	97.6	36.78
Upload Throughput (kbps)	109.2	59.83	34.94
Web Browsing Delay (sec)	8.9	169.07	14.8
Latency (msec)	126	750.818	201.4

Govt Hospital RMIS Adilabad	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	208.13	114.38	53.22
Upload Throughput (kbps)	105.2	66.84	29
Web Browsing Delay (sec)	8.3	64.09	13.5
Latency (msec)	98.6	426.2	195

Adilabad Bus Stand	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	213.4	114.79	52.02
Upload Throughput (kbps)	112.4	64.34	25.48
Web Browsing Delay (sec)	8.7	95.07	14.6
Latency (msec)	104.7	531.88	179

Nirmal Bus Stand	3G	LTE		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	1.12	25.2	52.31	16.21
Upload Throughput (Mbps)	0.65	19.2	14.73	2.19
Web Browsing Delay (sec)	13.21	1.70	1.39	2.12
Latency (msec)	139.69	33.6	60.33	75.2

Manchiryal Rly Station	3G	LTE		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	*BSNL is not offering 3G services in Mancherial Town	45.6	78.16	15.2
Upload Throughput (Mbps)		22.8	24.15	1.87
Web Browsing Delay (sec)		1.56	1.79	1.98
Latency (msec)		31.4	63.0	75.4

Bellampalli New Busstand	3G	LTE		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	2.12	50.6	62.49	7.6
Upload Throughput (Mbps)	1.42	26.0	26.28	2.53
Web Browsing Delay (sec)	36.52	2.07	1.77	2.33
Latency (msec)	117.42	34.8	62.0	122.0

Kagaznagar RLY Station	3G	LTE		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	1.87	45.4	99.90	24.66
Upload Throughput (Mbps)	1.36	19.4	12.45	8.02
Web Browsing Delay (sec)	13.34	2.12	1.63	2.67
Latency (msec)	114.04	34.8	63.67	109.2

Govt Hospital RMIS	3G	LTE		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	*BSNL is not offering 3G services in Adilabad Town	30.64	43.11	19.08
Upload Throughput (Mbps)		18.46	22.38	10.5
Web Browsing Delay (sec)		3.37	1.92	1.94
Latency (msec)		31.9	65.67	88.0

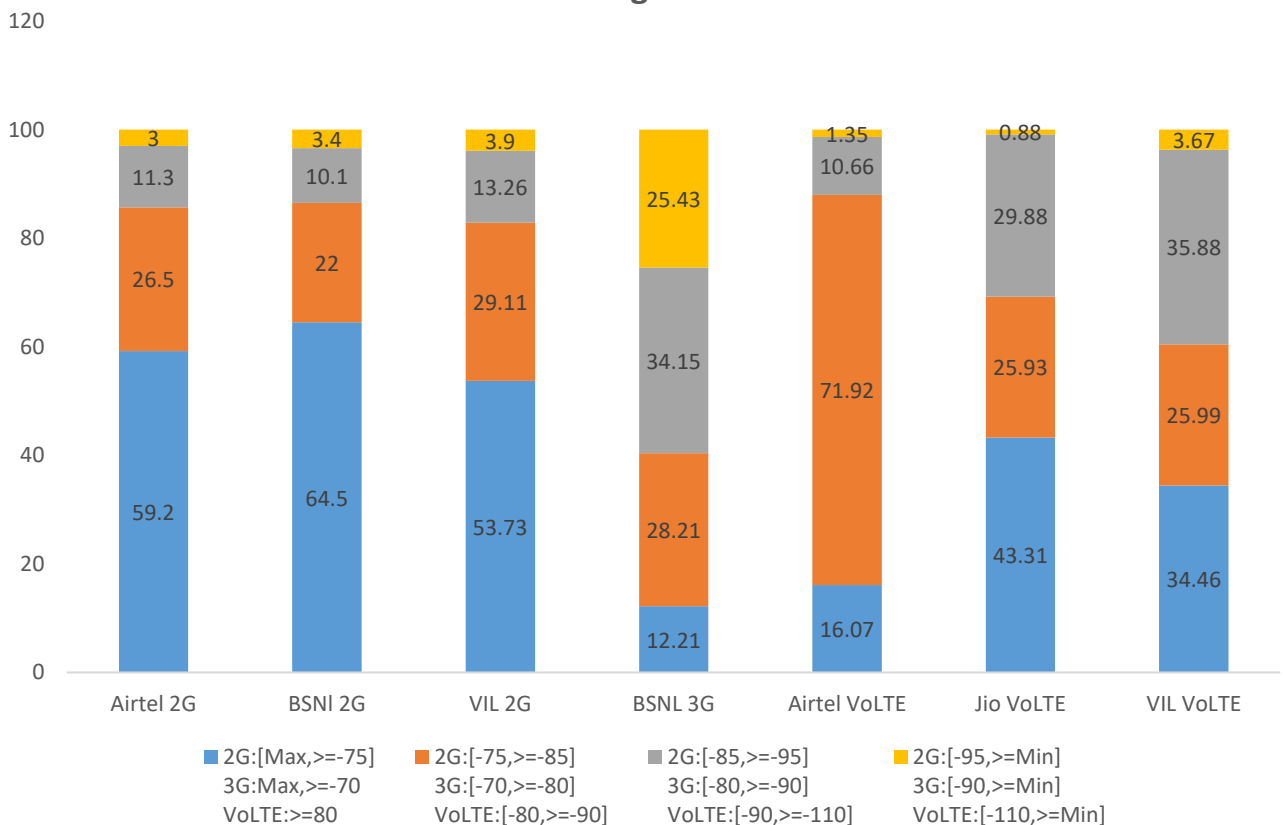
Adilabad Bus Stand	3G	LTE		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	*BSNL is not offering 3G services in Adilabad Town	33.5	83.02	13.6
Upload Throughput (Mbps)		18.2	22.24	1.92
Web Browsing Delay (sec)		2.64	1.65	1.98
Latency (msec)		34.2	50.33	138.2

# I. 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	85.7
BSNL 2G	86.50
VIL 2G	82.84
BSNL 3G	74.56
Airtel VoLTE	98.65
Jio VoLTE	99.12
VIL VoLTE	96.33

Coverage Distribution

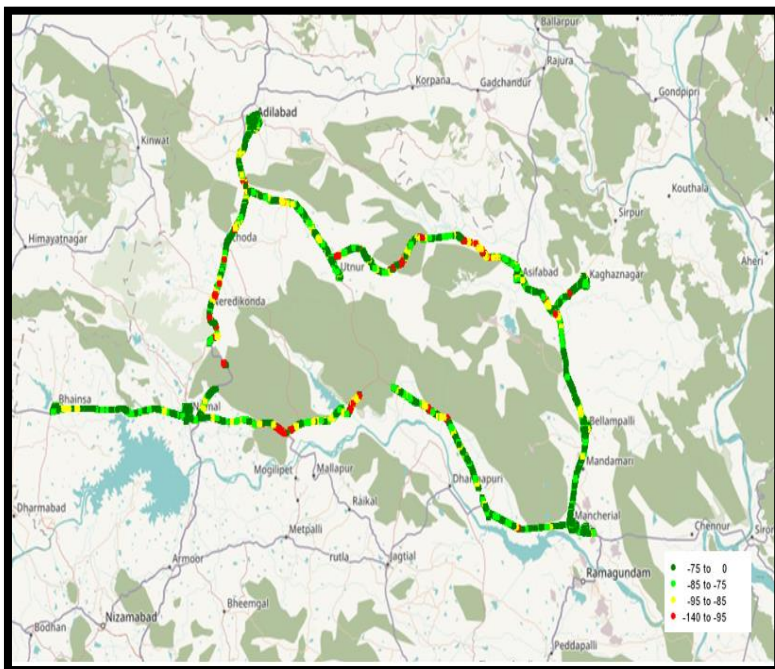


# I. Coverage Details

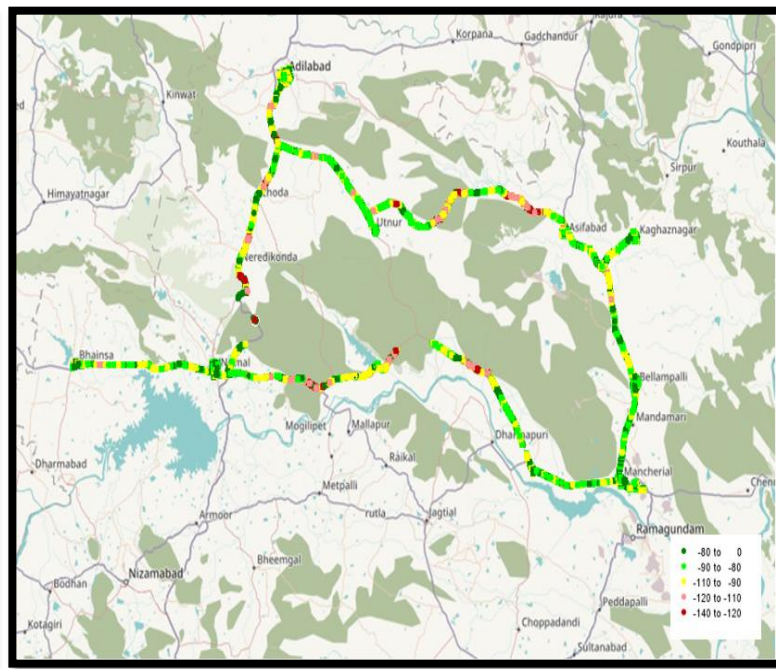
## AIRTEL

Technology	99.2	Coverage Rate %	
2G		<b>85.7</b>	
VoLTE		<b>98.65</b>	

### 2G



### VoLTE



### 2G

Overall RxLevel	# Samples	%
[Max, >=-75]	3221599	59.2
[-75, >=-85]	1442300	26.5
[-85, >=-95]	615541	11.3
[-95, >=Min]	162818	3.0
<b>Total</b>	<b>5442258</b>	<b>100</b>

### VoLTE

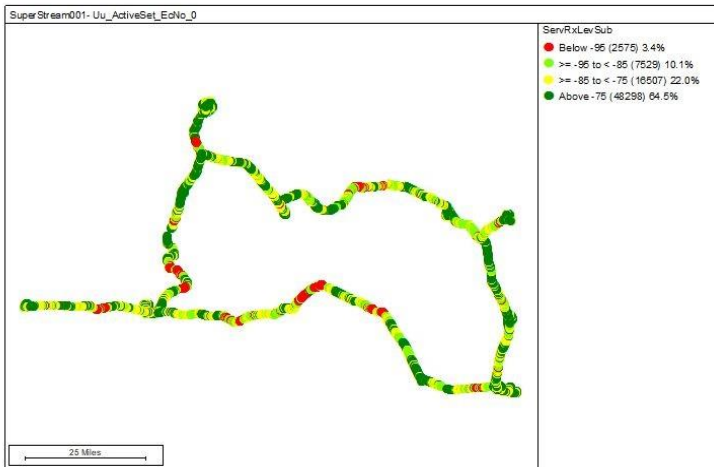
Overall RSRP	# Samples	%
[Max, >=-80]	3296477	16.07
[-80, >=-90]	14757063	71.92
[-90, >=-110]	2187669	10.66
[-110, >=-Min]	207147	1.35
<b>Total</b>	<b>20517448</b>	<b>100</b>

# I. Coverage Details

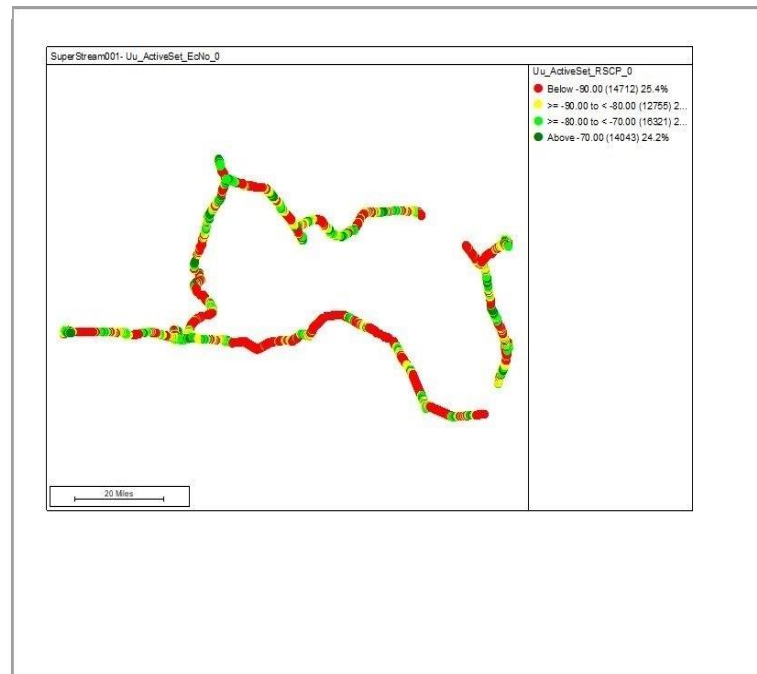
## BSNL

Technology	Coverage Rate %
2G	86.5
3G	74.56

### 2G



### 3G



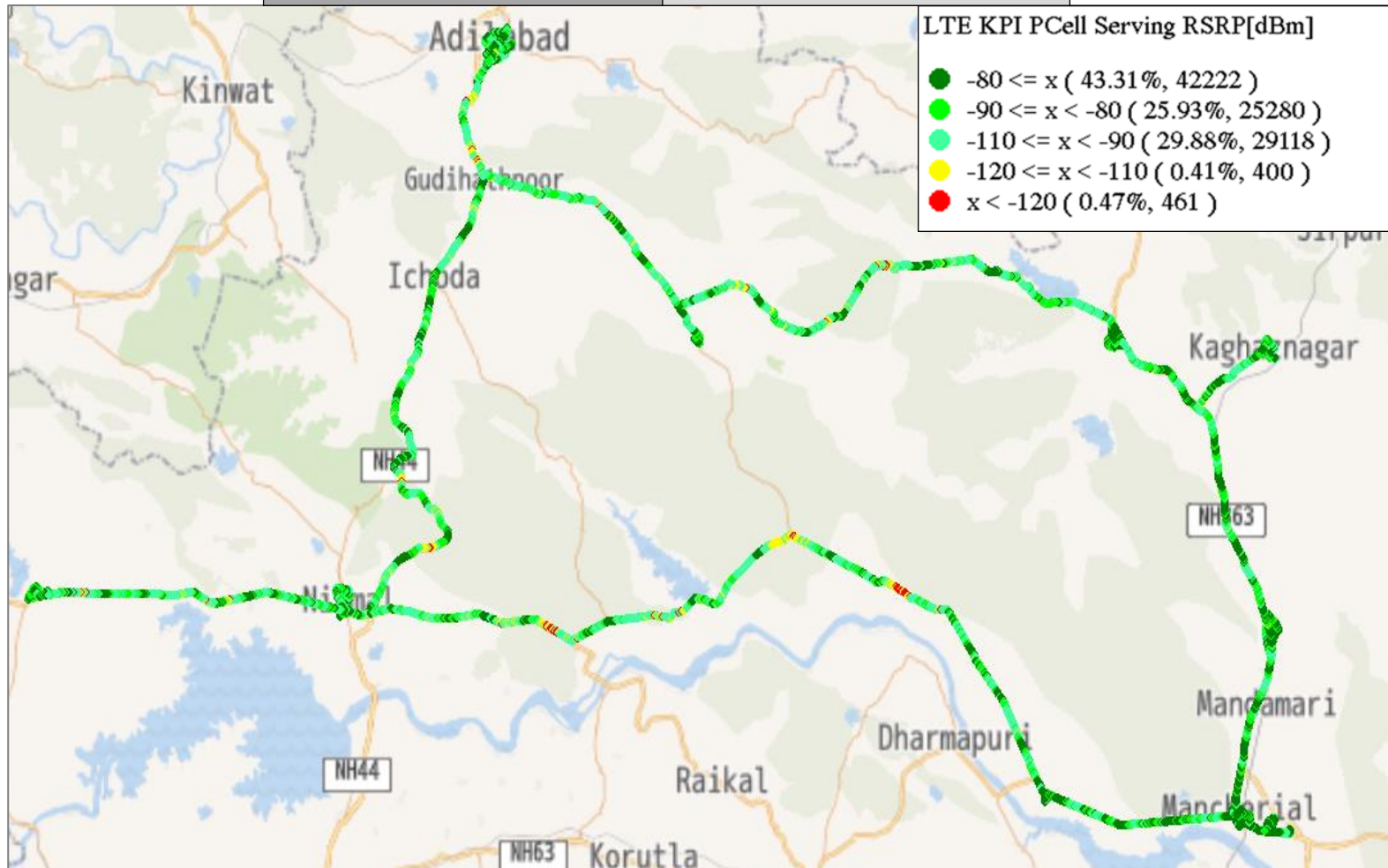
2G		
Overall RxLevel	# Samples	% PDF
[Max, >=-75]	48298	64.5
[-75, >=-85)	16507	22.0
[-85, >=-95)	7529	10.1
[-95, >=Min)	2575	3.4
<b>Total</b>	<b>55682</b>	<b>100</b>

3G		
Overall RSCP	# Samples	% PDF
[Max, >=-70]	7043	12.20
[-70, >=-80)	16321	28.21
[-80, >=-90)	19755	34.15
[-90, >=Min)	114712	25.44
<b>Total</b>	<b>27101</b>	<b>100</b>

# I. Coverage Details

## RJIL

Technology	Coverage Rate %
2G	
3G	
VoLTE	99.12



VoLTE		
Overall RSRP	# Samples	%
[Max, >=-80]	42222	43.31
[-80, >=-90]	25280	25.93
[-90, >=-110]	29118	29.88
[-110, >=-Min]	400	0.88
<b>Total</b>	<b>97481</b>	<b>100</b>

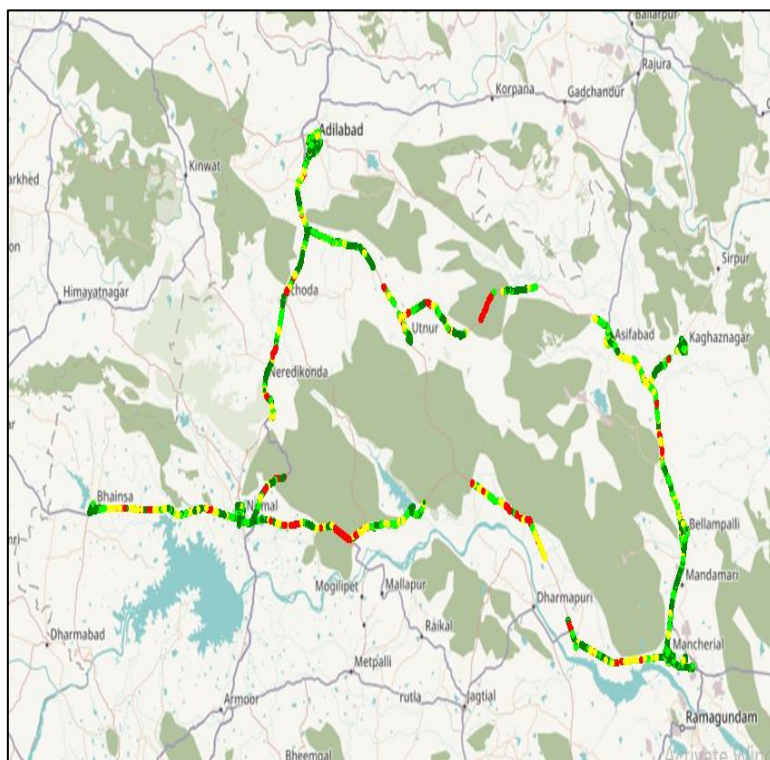


# I. Coverage Details

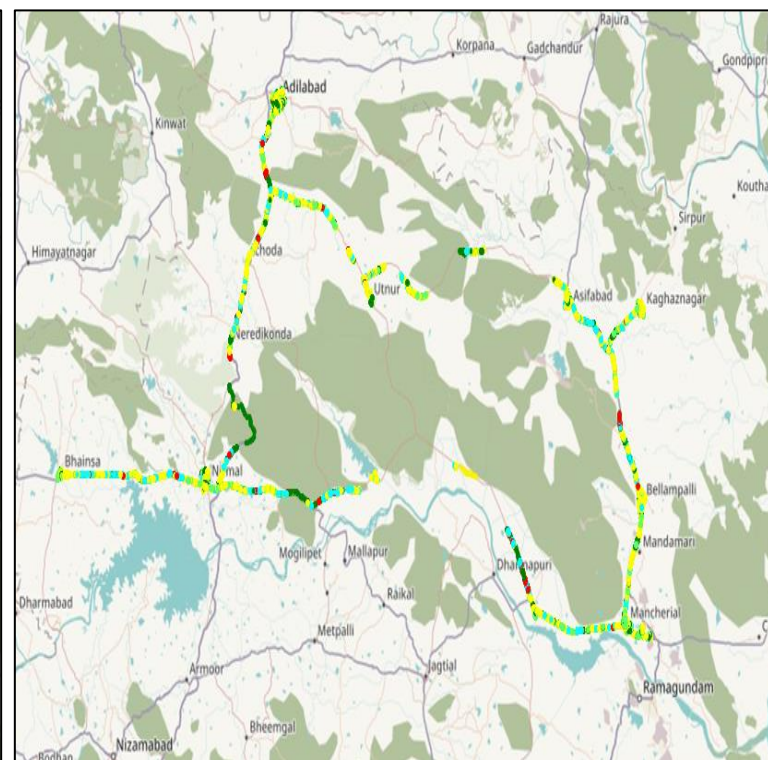
## VIL

Technology	Coverage Rate %
2G	<b>82.84</b>
VoLTE	<b>96.33</b>

### 2G



### VoLTE



### 2G

Overall RxLevel	# Samples	%
[Max, >=-75]	4283840	53.73
[-75, >=-85]	2320837	29.11
[-85, >=-95]	1057572	13.26
[-95, >=Min]	310656	3.90
<b>Total</b>	<b>7972905</b>	<b>100</b>

### VoLTE

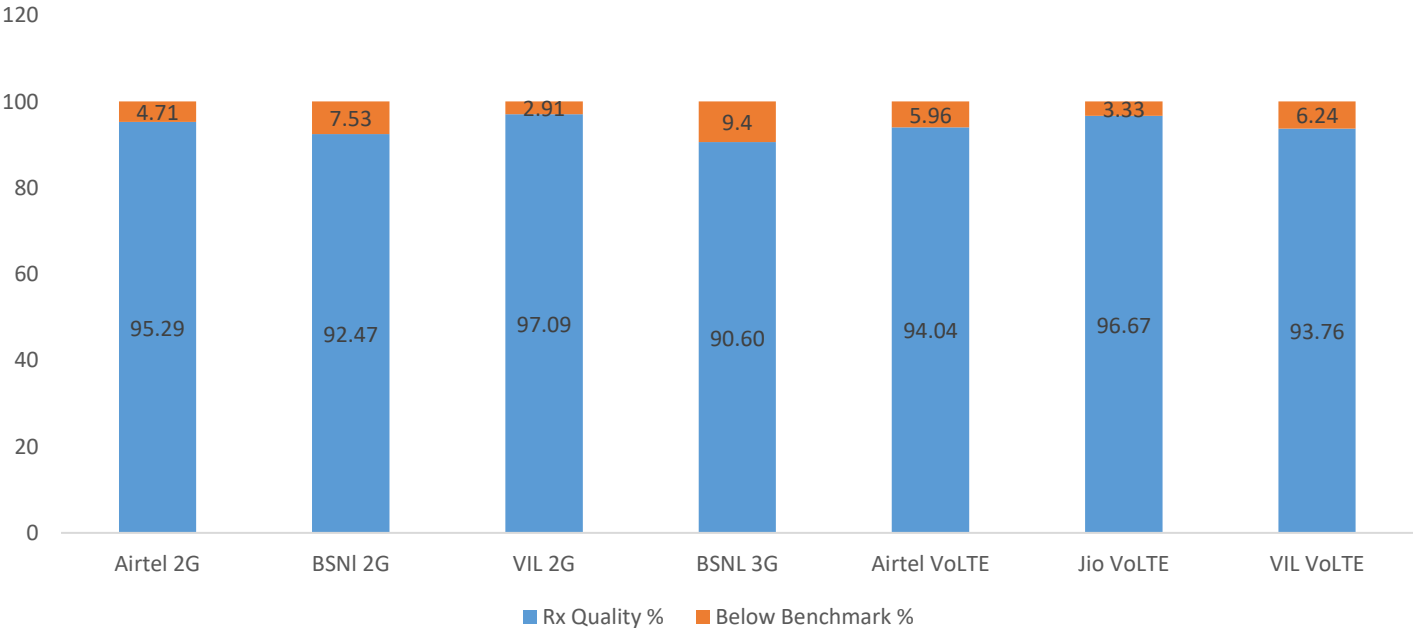
Overall RSRP	# Samples	%
[Max, >=-80]	7055742	34.46
[-80, >=-90]	5321450	25.99
[-90, >=-110]	7346555	35.88
[-110, >=Min]	700179	3.67
<b>Total</b>	<b>20475990</b>	<b>100</b>

## II. Quality Details

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

TSP	Rx Quality %
Airtel 2G	95.29
BSNL 2G	92.47
VIL 2G	97.09
BSNL 3G	90.6
Airtel VoLTE	94.04
Jio VoLTE	96.67
VIL VoLTE	93.76

**RX Quality Distribution**

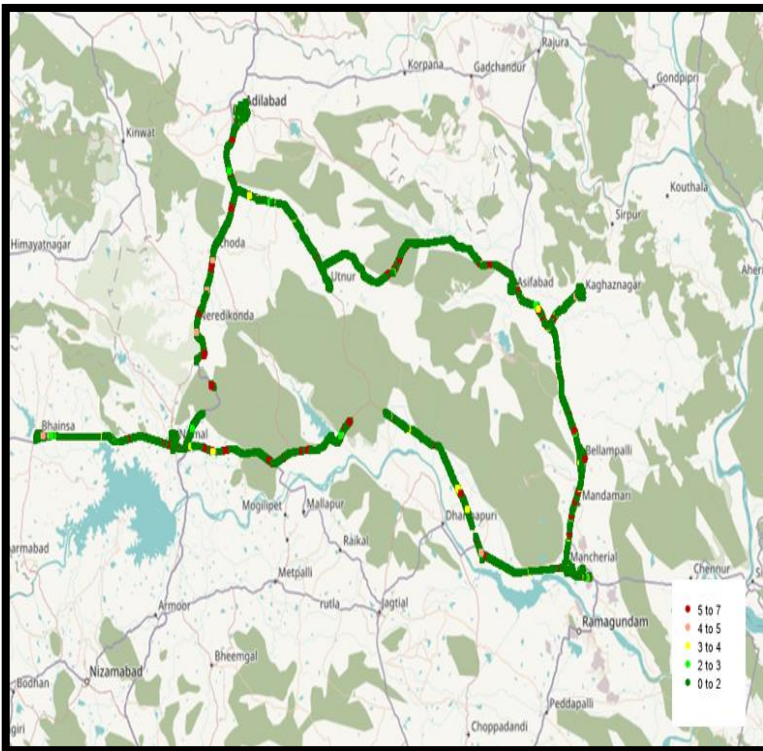


## II. Quality Details

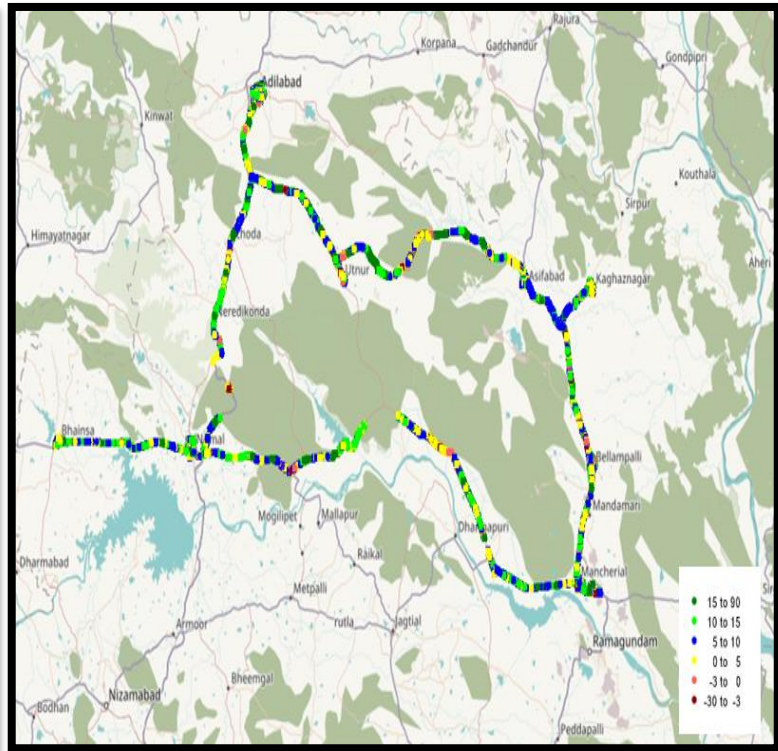
### Airtel

Technology	Rx Quality %
2G	95.29
3G	
VoLTE	94.04

#### 2G



#### VoLTE



Overall Rx Quality	# Samples	%
(Min, <=2)	4342638	89.82
(2, <=3)	101391	2.10
(3, <=4)	90971	1.88
(4, <=5)	72296	1.50
(5, <=Max)	227617	4.71
<b>Total</b>	<b>4834913</b>	<b>100</b>

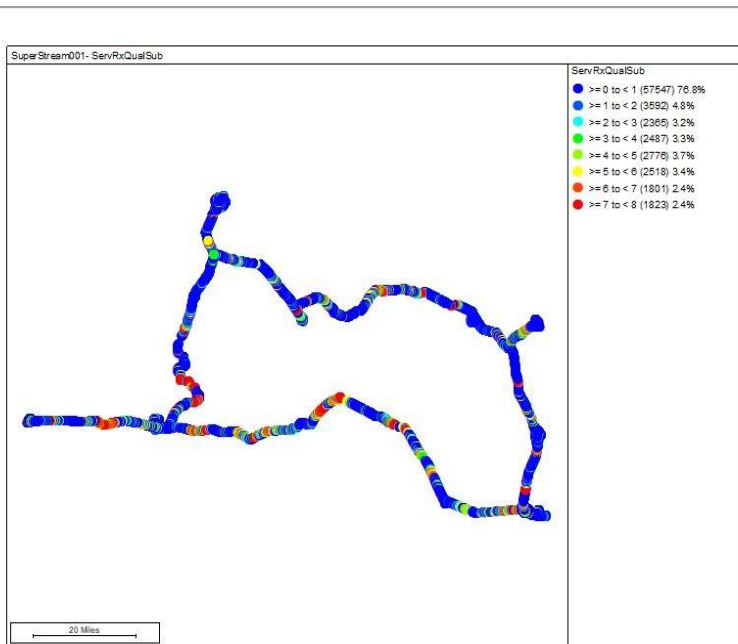
Overall SINR	# Samples	%
(Min, <=-3)	169316	1.96
(-3, <=0)	441811	4.00
(0, <=5)	2228281	22.00
(5, <=10)	3153192	31.04
(10, <=15)	2570666	25.00
(15, <=Max)	1688450	16.00
<b>Total</b>	<b>10251716</b>	<b>100</b>

## II. Quality Details

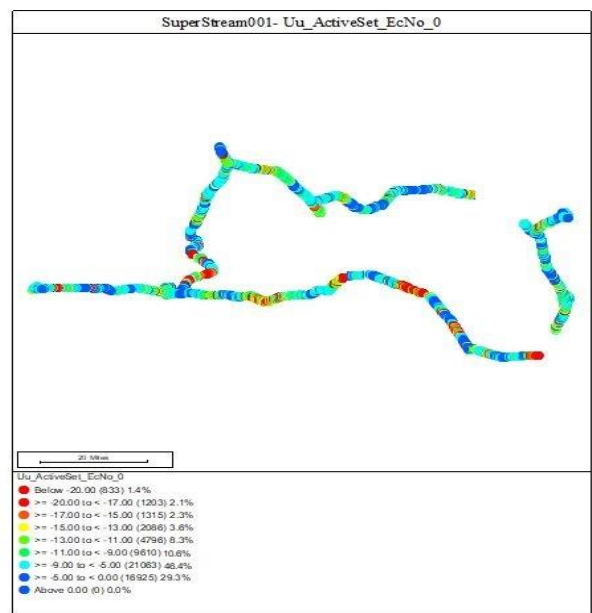
### BSNL

Technology	Rx Quality %
2G	92.47
3G	90.6

### 2G



### 3G



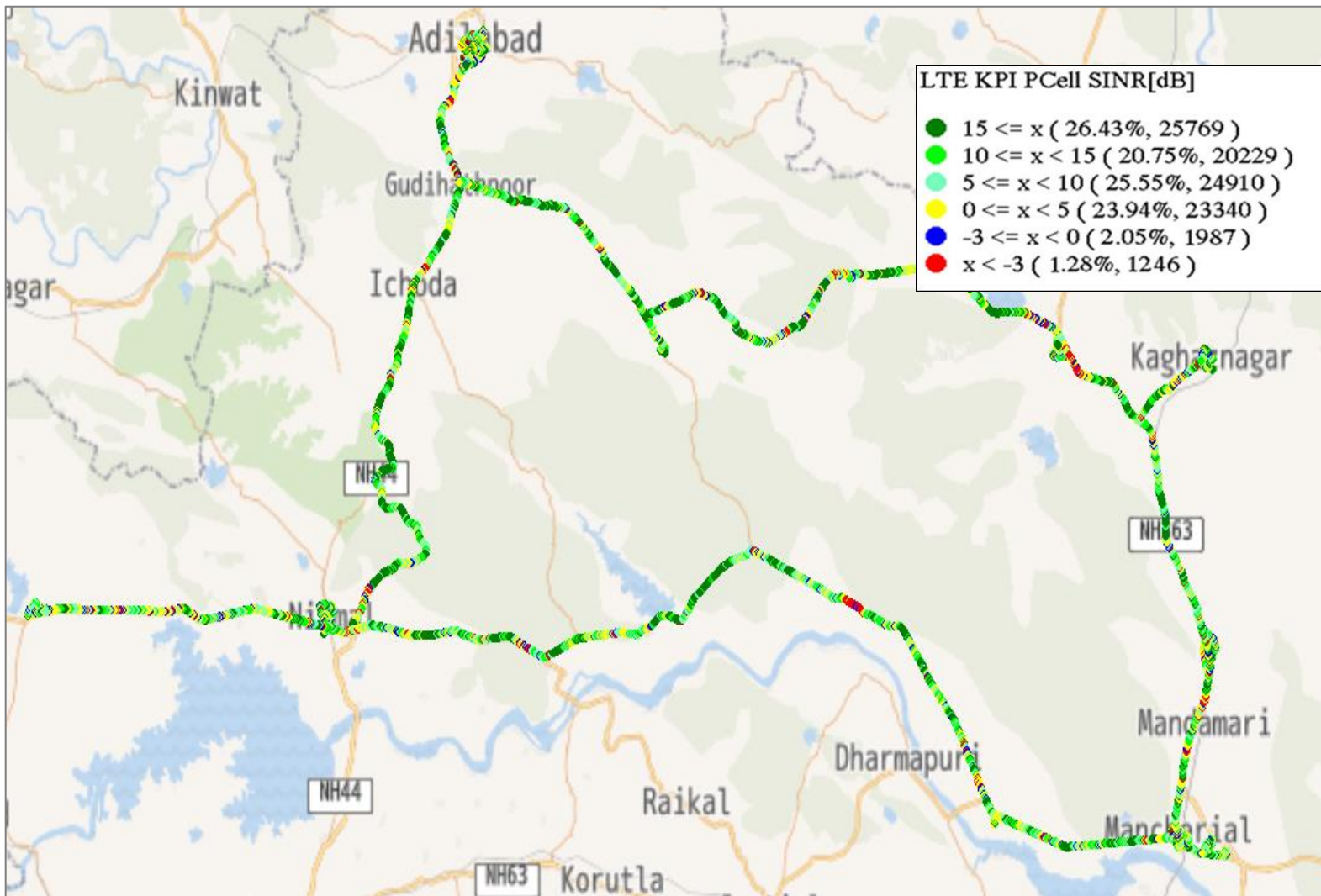
Overall Rx Quality	# Samples	% PDF
(Min, <=2)	61139	81.57
(2, <=3)	2365	3.2
(3, <=4)	2487	3.3
(4, <=5)	3276	4.3
(5, <=Max)	5642	7.53
<b>Total</b>	<b>75936</b>	<b>100</b>

Overall EcNo	# Samples	% PDF
(Max, <=-5)	16925	29.3
(-5, <=-9)	21063	36.4
(-9, <=-11)	9610	16.6
(-11, <=-13)	4796	8.3
(-13, <= Min)	5434	9.4
<b>Total</b>	<b>57831</b>	<b>100%</b>

## II. Quality Details

### RJIL

Technology	Rx Quality %
VoLTE	96.67



Overall SINR	# Samples	%
(Min, ≤-3)	1246	1.28
(-3, ≤0)	1987	2.05
(0, ≤5)	23340	23.94
(5, ≤10)	24910	25.55
(10, ≤15)	20229	20.75
(15, ≤Max)	25769	26.43
<b>Total</b>	<b>97481</b>	<b>100</b>

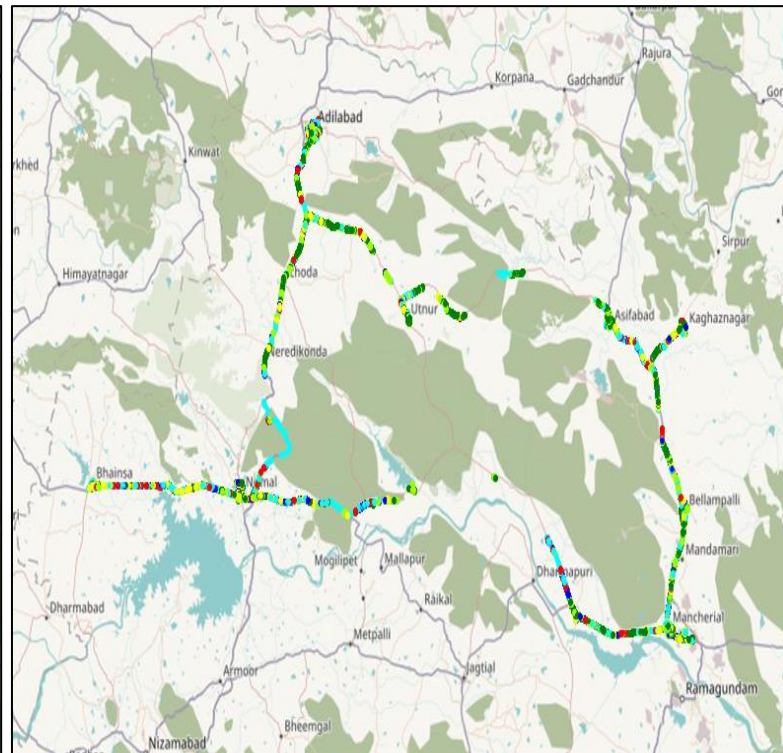
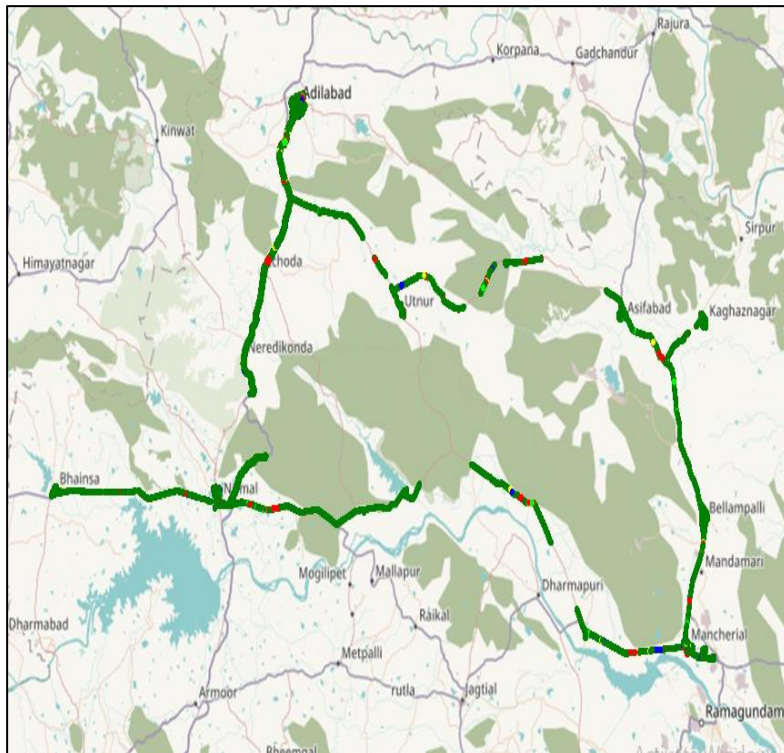
## II. Quality Details

### VIL

Technology	Rx Quality %
2G	97.09
VoLTE	93.76

### 2G

### VoLTE

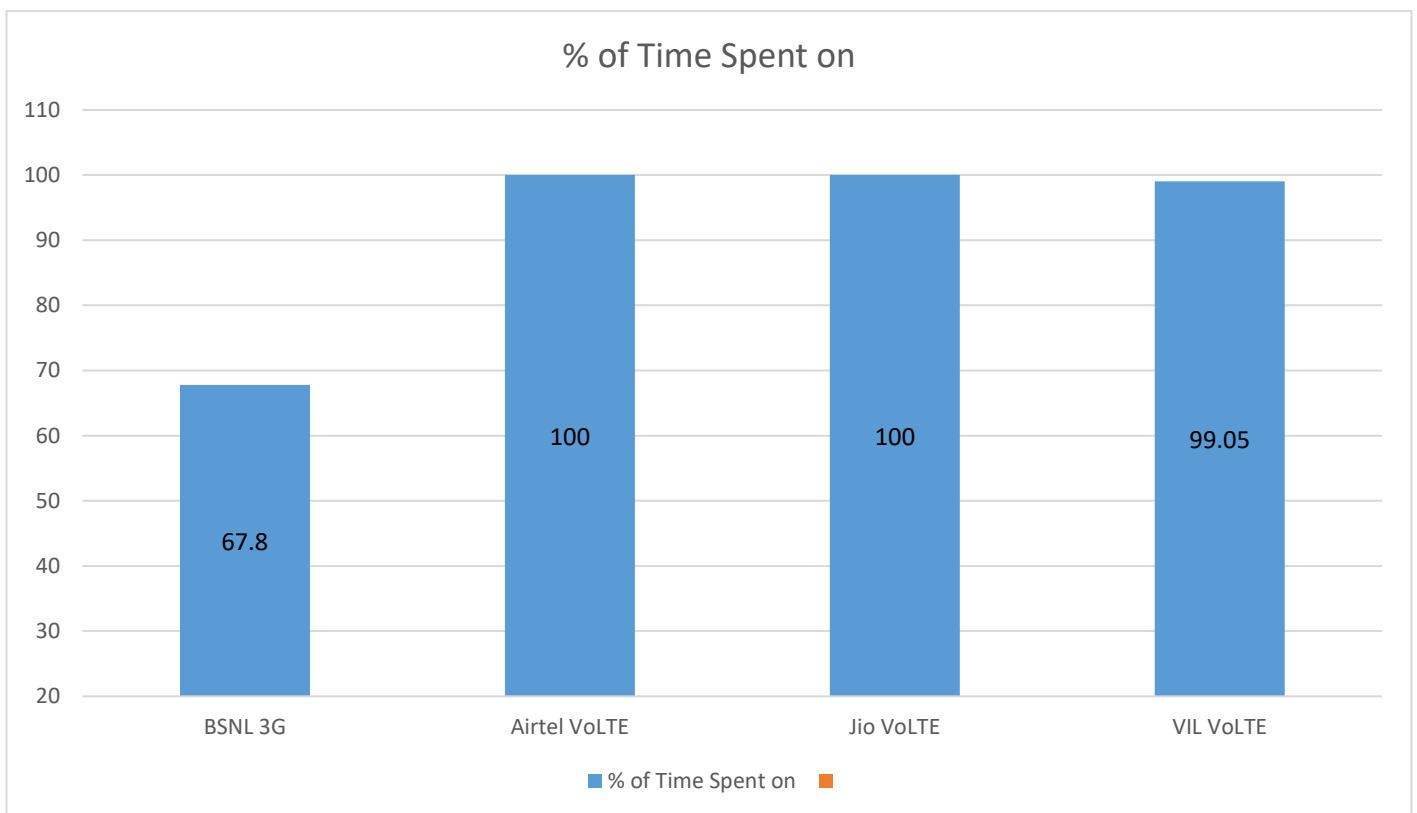


Overall Rx Quality	# Samples	%
(Min, <=2)	7502821	94.10
(2, <=3)	102275	1.28
(3, <=4)	71205	0.89
(4, <=5)	64691	0.81
(5, <=Max)	231913	2.91
<b>Total</b>	<b>7972905</b>	

Overall SINR	# Samples	%
(Min, <=-3)	749621	3.88
(-3, <=0)	456077	2.36
(0, <=5)	2159824	11.17
(5, <=10)	2766027	14.31
(10, <=15)	3232903	16.72
(15, <=Max)	9969532	51.56
<b>Total</b>	<b>19333984</b>	

### III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
Airtel VoLTE	100
BSNL 3G	67.8
Jio VoLTE	100
VIL VoLTE	99.05



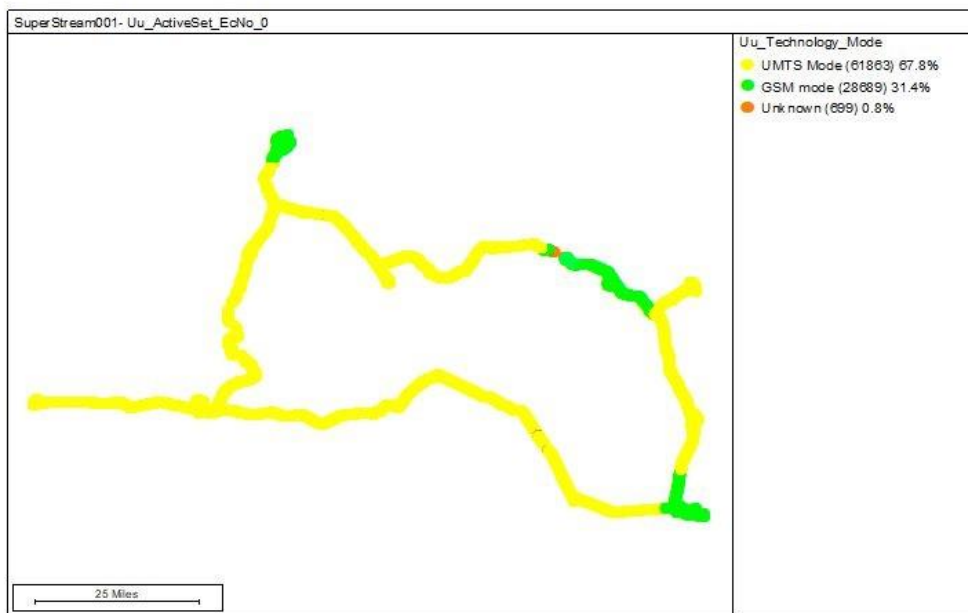




### III. Technology Details

#### BSNL

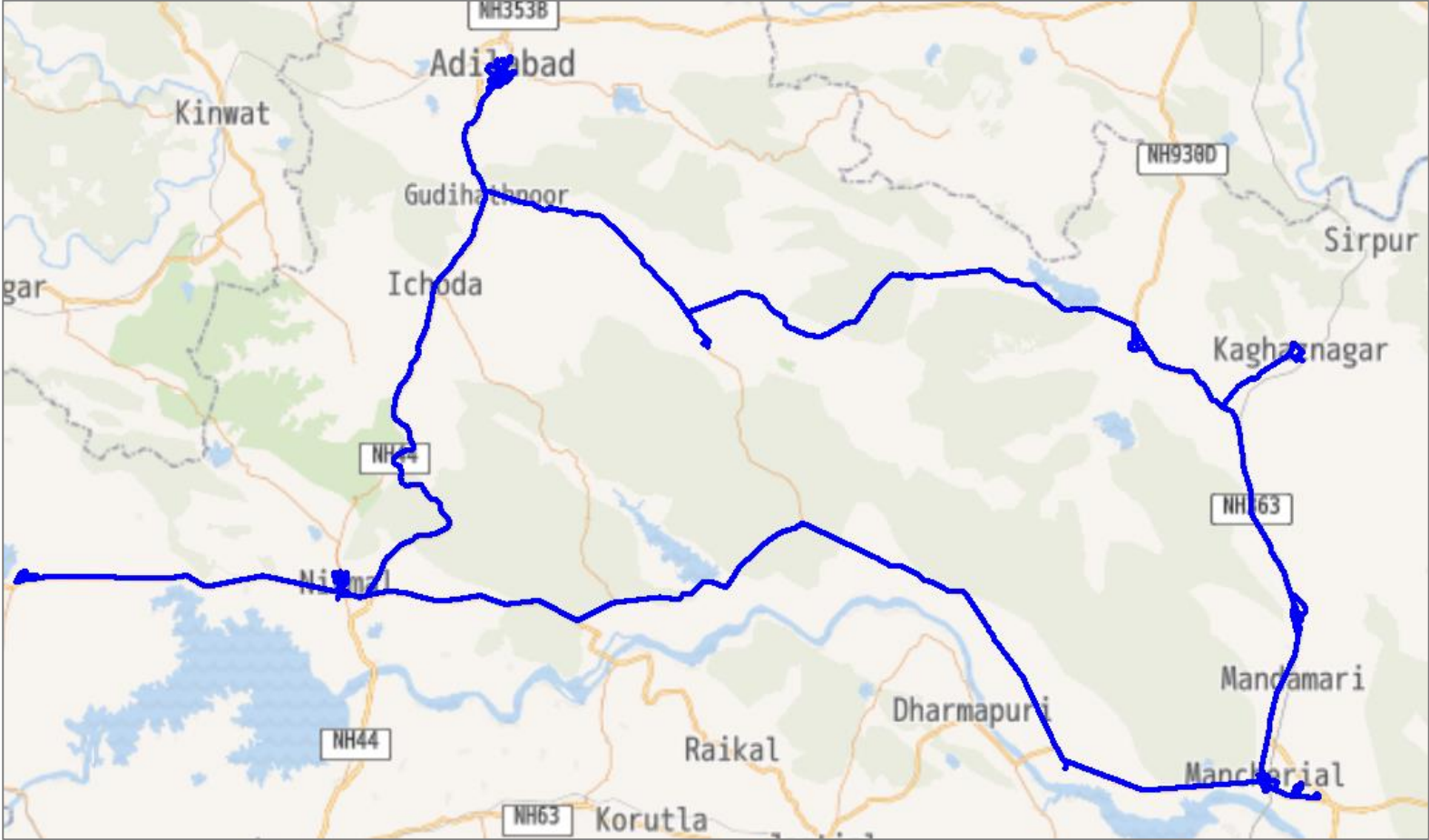
Technology	Time Spent on 3G
3G	67.8



### III. Technology Details

#### RJIL

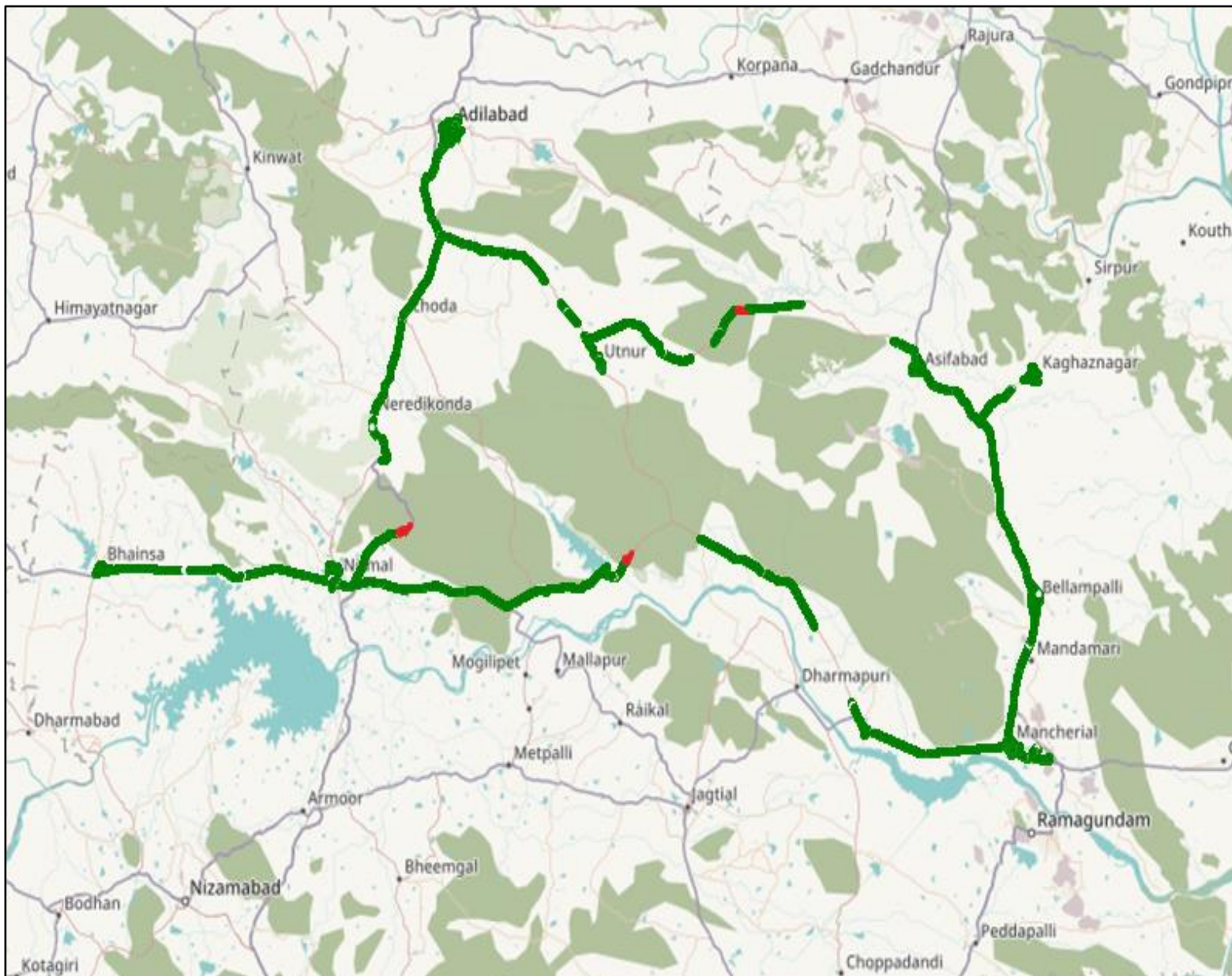
Technology	Time Spent %
VoLTE	100



### III. Technology Details

#### VIL

Technology	Time Spent %
3G / VoLTE	99.05%

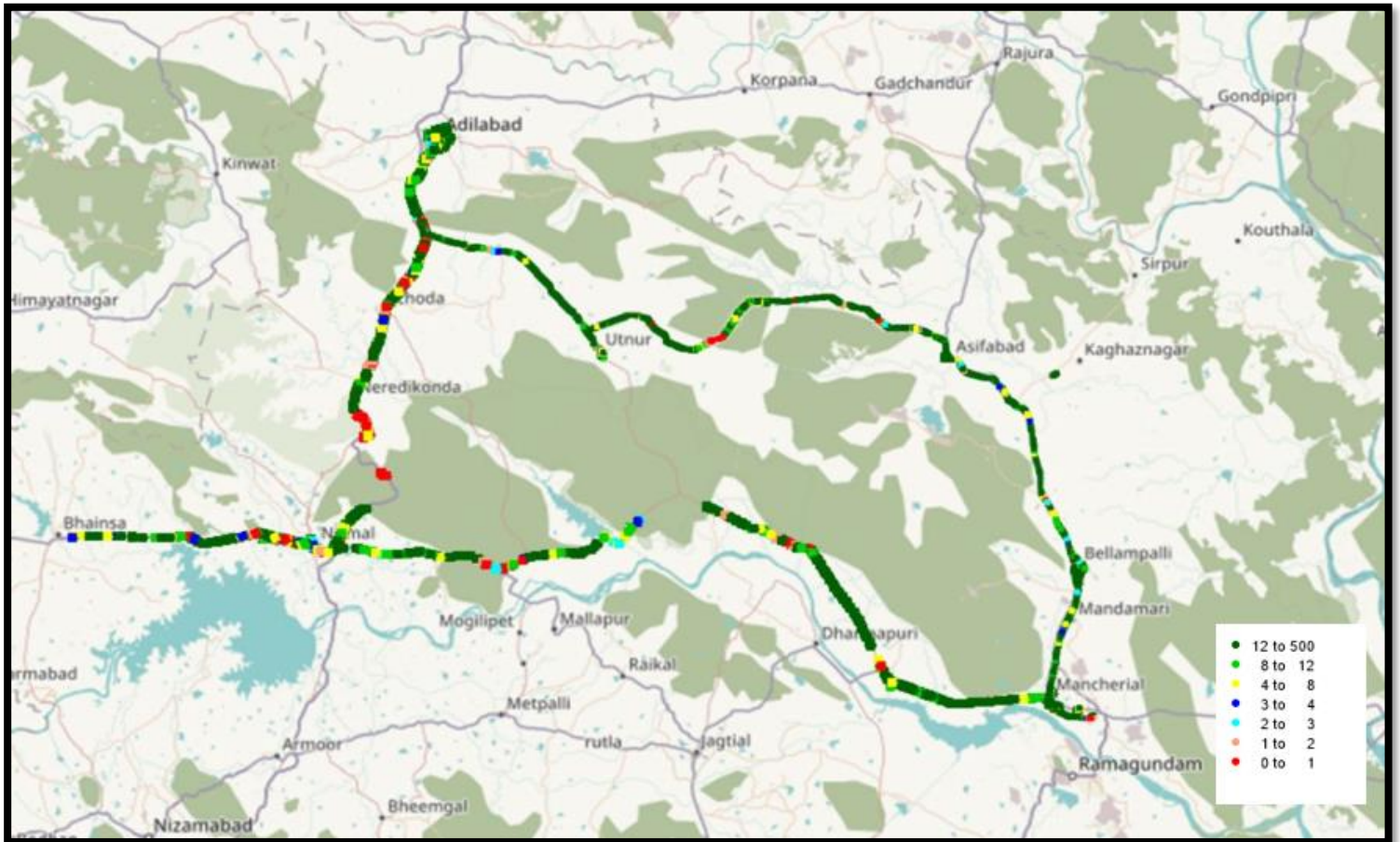


# IV. Dynamic Data Test- 3G / 4G DL Details

## Airtel

### Data Statistics - Dynamic Complete SSA 640 Kms

Data KPIs - Overall	3G / 4G
Download Throughput (Mbps)	25.18



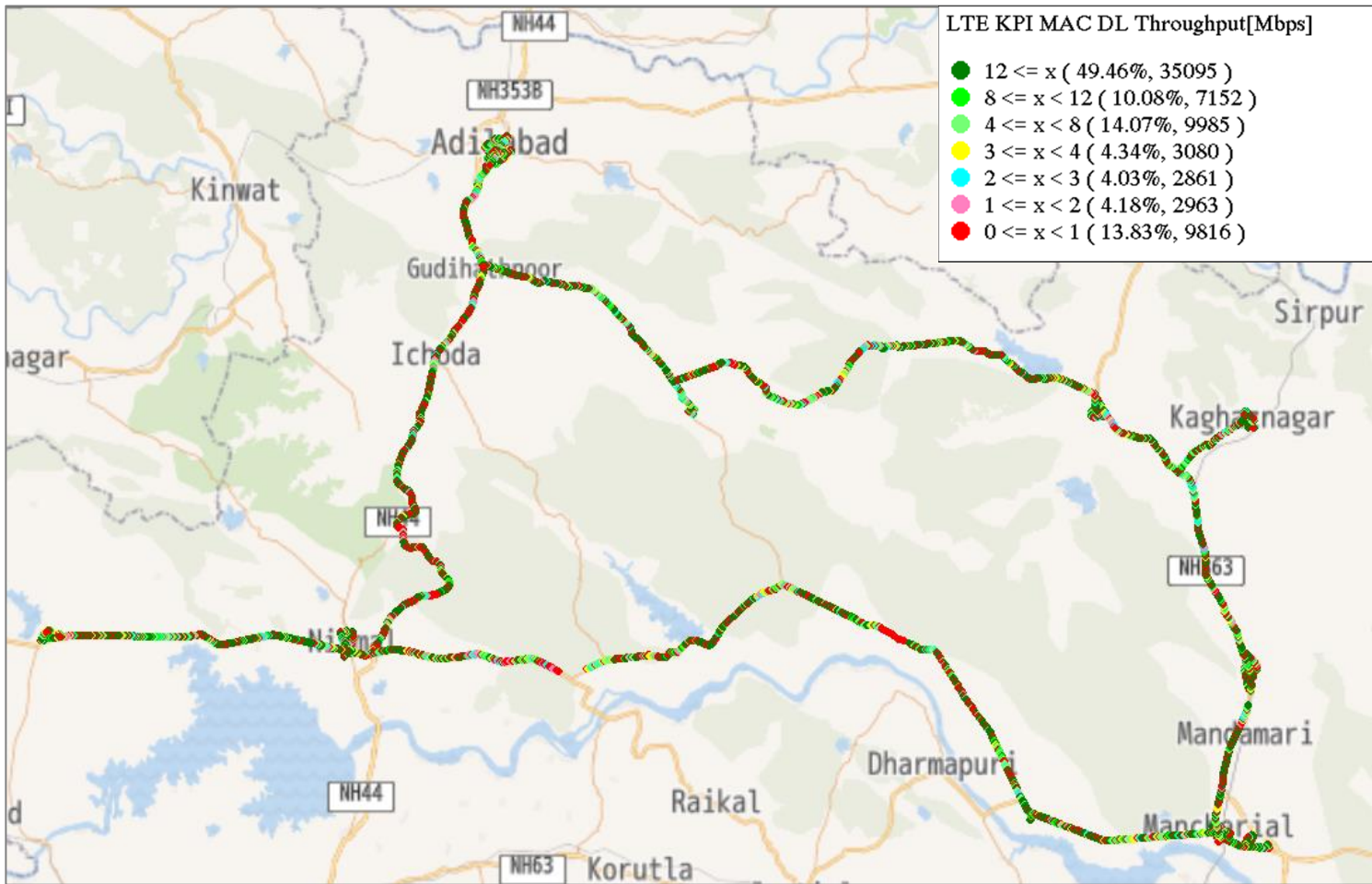
DL throughput	No of Sample	%
>12 Mbps	19520150	80.10
8 to 12 Mbps	1764407	7.20
4 to 8 Mbps	1650301	6.80
3 to 4 Mbps	403257	1.70
2 to 3 Mbps	403054	1.70
1 to 2 Mbps	284773	1.20
0 to 1 Mbps	357059	1.46
<b>Total</b>	<b>24383001</b>	<b>100</b>

# IV. Dynamic Data Test- 3G / 4G DL Details

## RJIL

### Data Statistics - Dynamic Complete SSA 640 Kms

Data KPIs - Overall	4G
Download Throughput (Mbps)	33.01



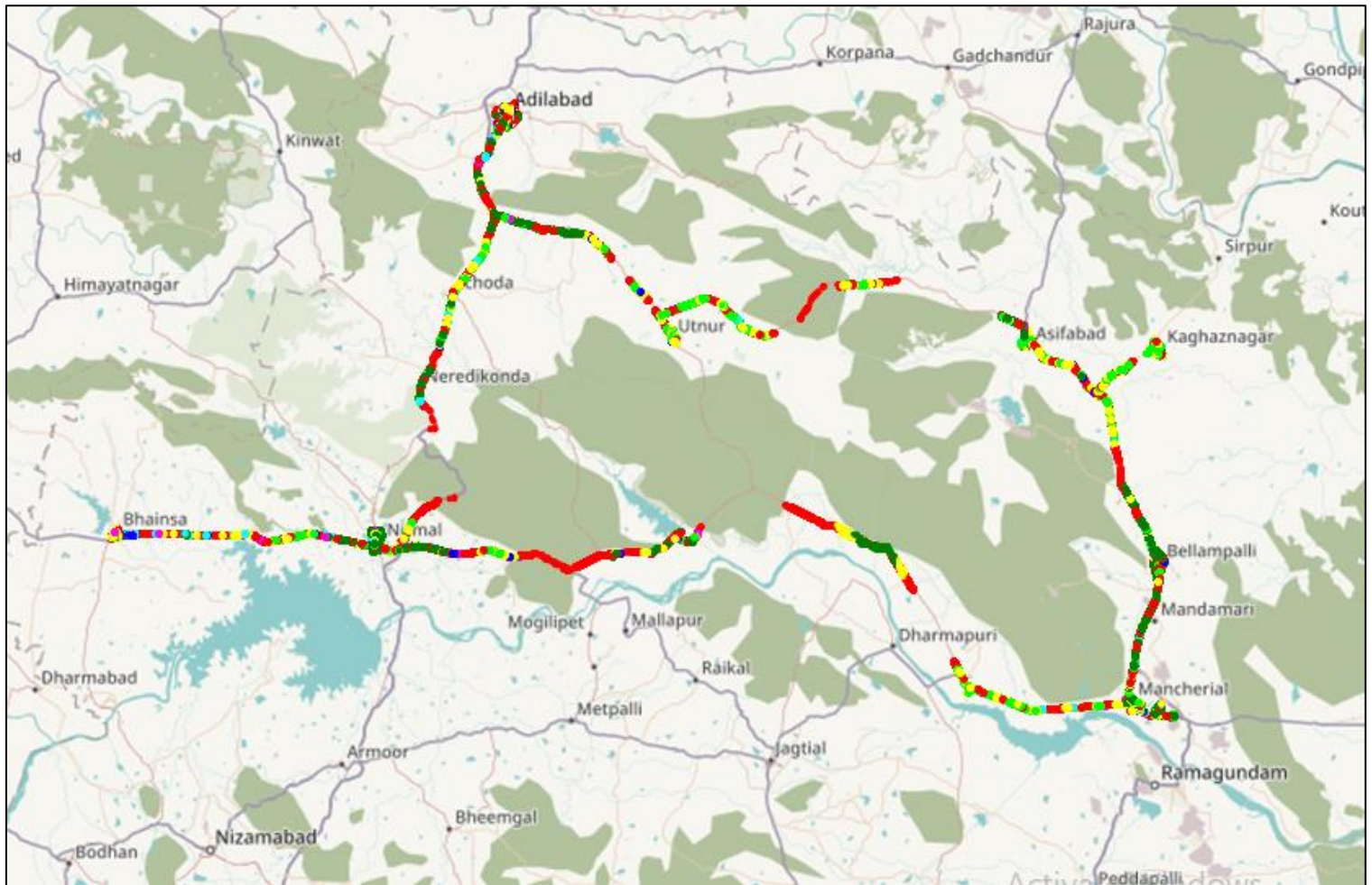
DL throughput	No. of Samples	%
0 to 1 Mbps	9816	13.83
1 to 2 Mbps	2963	4.18
2 to 3 Mbps	2861	4.04
3 to 4 Mbps	3080	4.34
4 to 8 Mbps	9985	14.07
8 to 12 Mbps	7152	10.08
>12 Mbps	35095	49.46
<b>Total</b>	<b>70952</b>	<b>100</b>

# IV. Dynamic Data Test- 3G / 4G DL Details

## VIL

### Data Statistics - Dynamic Complete SSA 640 Kms

Data KPIs - Overall	3G / 4G
Download Throughput (Mbps)	11.2



DL throughput	No of Sample	%
0 to 1 Mbps	1513554	6.28
1 to 2 Mbps	568458	2.36
2 to 3 Mbps	568857	2.36
3 to 4 Mbps	566847	2.35
4 to 8 Mbps	3664726	15.21
8 to 12 Mbps	7154068	29.70
>12 Mbps	10053376	41.73
<b>Total</b>	<b>24089886</b>	<b>100.00</b>

## V. TRAI MySpeed App

### AIRTEL

Technology- 4G	Nirmal Bus Stand	Manchiryal Rly Station	Bellampalli New Bus Stand	Kagaznagar RLY Station	Govt Hospital RMIS Adilabad	Adilabad Bus Stand
Download Speed Mbps	46.82	62.27	64.99	59.82	57.01	58.53
Upload Speed Mbps	22.49	19.06	41.72	18.45	17.25	14.11

### BSNL

Technology- 3G/4G	Nirmal Bus Stand	Manchiryal Rly Station	Bellampalli New Bus Stand	Kagaznagar RLY Station	Govt Hospital RMIS Adilabad	Adilabad Bus Stand
Download Speed Mbps	1.46	11.59	3.15	7.58	4.36	6.61
Upload Speed Mbps	0.35	6.05	0.44	1.81	7.77	7.18

### JIO

Technology 4G	Nirmal Bus Stand	Manchiryal Rly Station	Bellampalli New Bus Stand	Kagaznagar RLY Station	Govt Hospital RMIS Adilabad	Adilabad Bus Stand
Download Speed Mbps	61.01	82.52	90.54	123.42	91.3	96.4
Upload Speed Mbps	23.23	25.02	24.46	27.2	27.37	22.59

### VIL

Technology- 4G	Nirmal Bus Stand	Manchiryal Rly Station	Bellampalli New Bus Stand	Kagaznagar RLY Station	Govt Hospital RMIS Adilabad	Adilabad Bus Stand
Download Speed Mbps	27.93	21.29	37.14	34.52	22.16	34.96
Upload Speed Mbps	12.08	2.55	17.24	8.78	11.24	4.42

## VI. NH/SH Routes covered

<b>NH/SH Routes covered in OADT by Airtel / BSNL / RJIL / VIL</b>				
<b>S.No</b>	<b>No of NH/SH routes</b>	<b>NH routes</b>	<b>SH routes</b>	<b>Distance(Km)</b>
<b>1</b>	<b>Adilabad to Nirmal</b>	<b>NH 44</b>		<b>81.5 KMS</b>
<b>2</b>	<b>Bhaisa to Khanapur</b>	<b>NH 61</b>		<b>75 KMS</b>
<b>3</b>	<b>Luxettipet to Mancherial</b>	<b>NH 63</b>		<b>26.5 kms</b>
<b>4</b>	<b>Mancherial to Asifabad</b>	<b>NH363</b>		<b>65 Kms</b>
<b>5</b>	<b>Khanapur to Luxettipet</b>		<b>SH24</b>	<b>82 kms</b>