

# Operator Assisted Drive Test Report Dimapur & Kohima Cities, Nagaland February 2023 (RO, Kolkata)

## Key Performance Indicators (KPIs):

The following TSPs could not meet the KPIs benchmark as stated below—

**AIRTEL**- Rx Quality in 4G (SINR) network.

**BSNL**-Drop Call Rate (2G & 3G) network, Call Setup Success Rate (CSSR) in 3G network, Handover Success Rate (HOSR) in 2G network and Rx Quality in 2G & 3G (Ec/Io) network.

**RJIO**-Rx Quality (SINR) in 4G network.

The Operator Assisted Drive Test has been carried out by Regional Office, Kolkata with the help of Service Providers in Dimapur & Kohima Cities and surrounding areas including National Highways 29 & 229 on 10<sup>th</sup> February '23 from 08.30 AM to 08.30 PM. The drive test covered drive route of 171 KMs over a period of 1 day. Approximately 224+ calls were made for each of the 8 networks: three 2G networks, two 3G networks and three 4G networks covering four TSPs.

Overview

Voice  
Summary

Data  
Summary

# Overview

**Dimapur** is the largest city in the Indian state of Nagaland. As of 2011, the municipality had a population of 122,834. The city is the main gateway and commercial centre of Nagaland. Located near the border with Assam along the banks of the Dhansiri River. Its main railway station is the second busiest station in Northeast India.

**Kohima** is the capital of the Northeastern Indian state of Nagaland. With a resident population of almost 100,000, it is the second largest city in the state. Kohima constitutes both a district and a municipality. The city lies on the foothills of Japfü section of the Barail Range located south of the District<sup>1</sup> and has an average elevation of 1,261 metres (4137 feet).

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, Call Setup Success Rate, Drop Call Rate and Block Call Rate.

**Data:** Download Throughputs and Data File Success Rate.

**Voice Tests:** Calls were made for 90 secs duration with wait time of 5 secs between call in all technologies. Three 2G networks, Two 3G networks, Three 4G networks covering 4 unique TSPs were tested.

**Data Tests:** Dynamic Data Service Testing was performed along same route in all technologies. 500 KB file for 2G, 20MB file for 3G and 40MB file for 4G were downloaded from FTTP server in TSP's own server. Static Data Service Testing was also performed. Three 2G (Lock Mode) networks, Two 3G (Lock Mode) networks, Three LTE (Lock Mode) networks covering 4 unique TSPs were tested.

Service	Static Data Service Testing- Specifications
Download	2G (Locked) - 500KB, 3G (Locked) - 20 MB, 4G (Locked) - 40 MB
Upload	2G (Locked) - 100KB, 3G (Locked) - 5 MB, 4G (Locked) - 10 MB
Web Browsing	3 links of e/m commerce website www.amazon.in, www.flipkart.com and PayTm
Video Steaming	130 secs Clip
Latency	32 Bytes on www.google.com

Technology/ TSP	AIRTEL	BSNL	RJIO	VODAFONE-IDEA
2G	YES	YES	NO	YES
3G	NO	YES	NO	YES
4G	YES	NO	YES	YES
TOOL USED	TEMS	NIMO	X-CAL	TEMS

# Overview

## Voice & Dynamic Data Test Drive Route



### DRIVE ROUTES-- DIMAPUR & KOHIMA

**DAY-1**–Airport–Daragajan–Hotel Acacia–Hotel Saramati–United colony–Industrial Vill–Dimapur Govt. High School– Full Nagarjan Road–Electrical Colony–3<sup>rd</sup> Mile–Diphupar Police Station –Agri Expo Ground–Nuiland Dimapur Rd, Naga United Village, Nouno Resort – Suratoni – Patkai Bridge – Chumoukedima Post Office–Chumoukedima Saturday Market – Niathu Resort –Seithekema new – Shouba Old-Medziphema – Pherima Vill –Mengujuma –Kiruphe–Sechu–Meriema–Kohima War Cemetery – Kohima – De Oriental Grand –Hotel Vivor-Kohima College – Don Bosco Higher Secendary School – Tsiituonuoimia Khel-Kohima Village Gate-Hotel Japfu- High Court-Merhulietsa Colony-CMO Office, Kohima-National highway 29, Para Medical-TCP Gate Police Check Post, Kohima-Raj Bhavan Kohima.

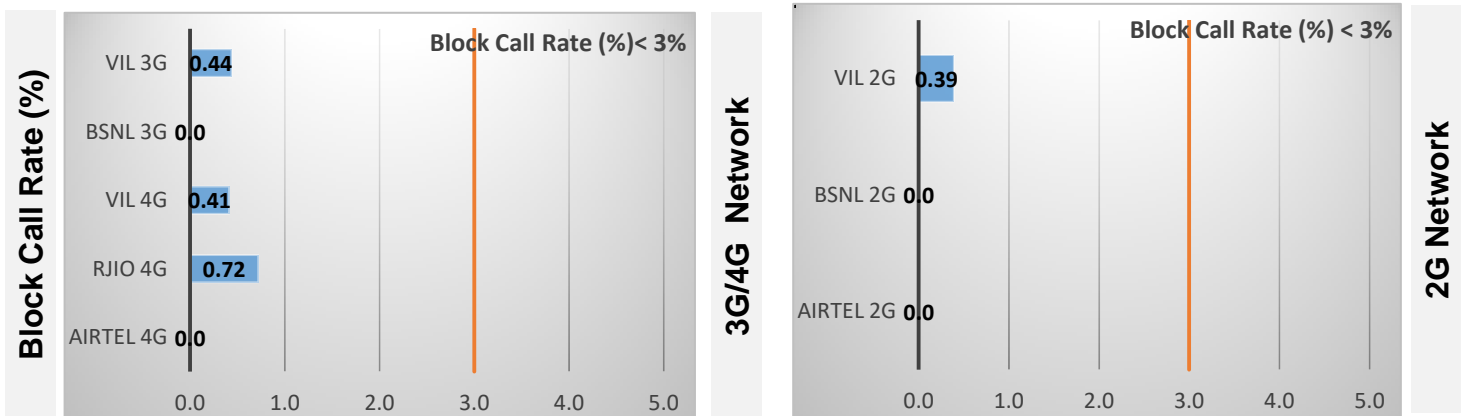
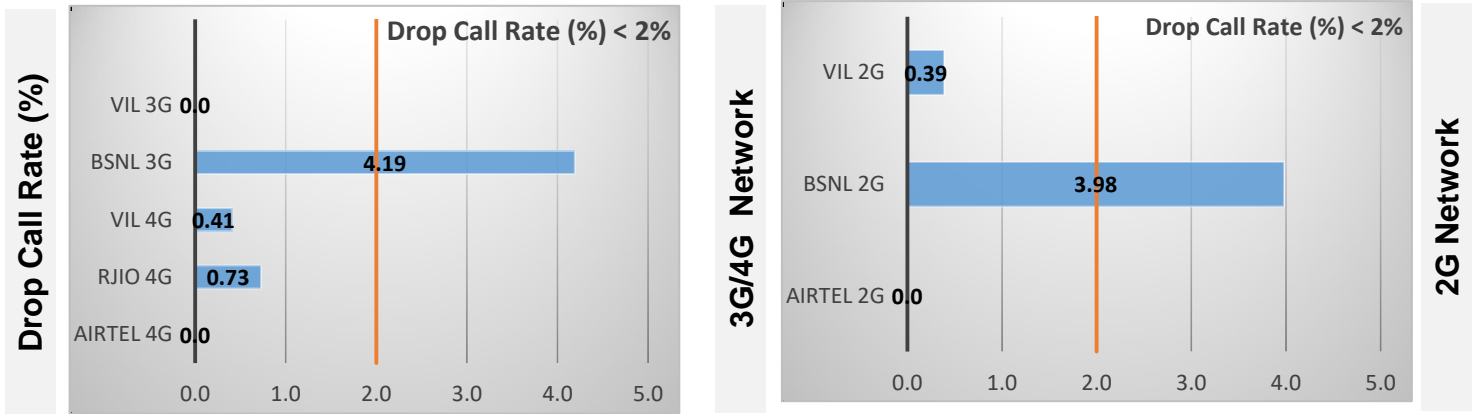
### Data Service Test- Static Locations

Static Location
Dimapur Airport

# Voice Calls

## Key Observations

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



KPIs	2G			3G		4G-VoLTE		
	AIRTEL	BSNL	VIL	BSNL	VIL	AIRTEL	RJIO	VIL
Drop Call Rate %	0.0	3.98	0.39	4.19	0.0	0.0	0.73	0.41
Block Call Rate %	0.0	0.0	0.39	0.0	0.44	0.0	0.72	0.41

- a) All TSPs have met the 2% QoS benchmark of Drop Call Rate (DCR%) except BSNL (2G) & (3G).
- b) All TSPs have met the 3% QoS benchmark of Block Call Rate (DCR%).

### Coverage

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

TSPs	2G		
	AIRTEL	BSNL	VIL
Coverage %	90.02	61.54	86.83

b) Percentage of coverage samples for 3G  $\geq$  -90 dBm & 4G  $\geq$  -110 dBm.

TSPs	3G		4G		
	BSNL	VIL	AIRTEL	RJIO	VIL
Coverage %	30.66	89.37	96.24	87.97	91.73

# Summary

## City Level Summary- Voice

Voice Call	2G		
	AIRTEL	BSNL	VIL
Call Attempt	160	255	256
Blocked Call Rate (%)	0.0	0.00	0.39
CSSR% (Accessibility)	100	98.43	99.61
Drop Call Rate (%)	0.0	3.98	0.39
Mobility HOSR (%)	98.75	80.26	100
Rx Quality (%)	95.00	94.00	95.58

Voice Call	3G/4G				
	BSNL 3G	VIL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Call Attempt	223	224	160	277	242
Blocked Call Rate (%)	0.0	0.44	0.0	0.72	0.41
CSSR% (Accessibility)	64.13	99.55	100	99.28	99.59
Drop Call Rate (%)	4.19	0.0	0.0	0.73	0.41
Mobility HOSR (%)	100	100	99.84	98.19	100
Rx Quality (%)	76.50	96.09	87.60	75.46	95.40

# Summary-Data Services Dynamic

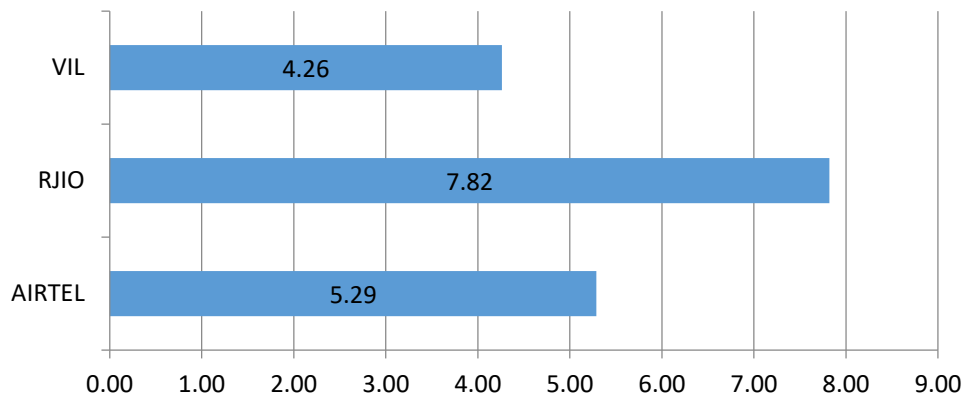
## Key Observations

Dynamic Data was tested for 171 Kms. Download Throughput was tested.

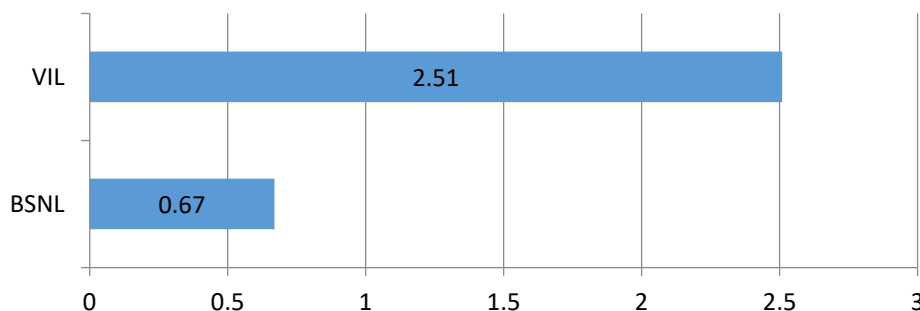
### Data Download Performance (Average Throughput in Mbps) - Dynamic Data Testing

#### 4G/3G Network:

#### 4G-Dynamic Download Average Throughput (Mbps)



#### 3G-Dynamic Download Average Throughput (Mbps)



# Summary-Data Services Static

## Location Level Summary-

Location:- Dimapur Airport	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	95.79	262.18	164.40
Upload Throughput (kbps)	58.34	53.69	47.63
Web Browsing Delay (sec)	0.0	220	0.37
Latency (msec)	184	192	413

Location:- Dimapur Airport	3G/4G				
	BSNL 3G	VIL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	1.78	2.20	16.50	14.82	11.61
Upload Throughput in Mbps	0.03	2.56	1.62	10.06	7.15
Video streaming delay (secs)	90	2.32	0.0	0.0	1.66
Web Browsing Delay (secs)	40	0.25	0.0	3.25	0.15
Latency (msec)	105	102	42	51.31	99

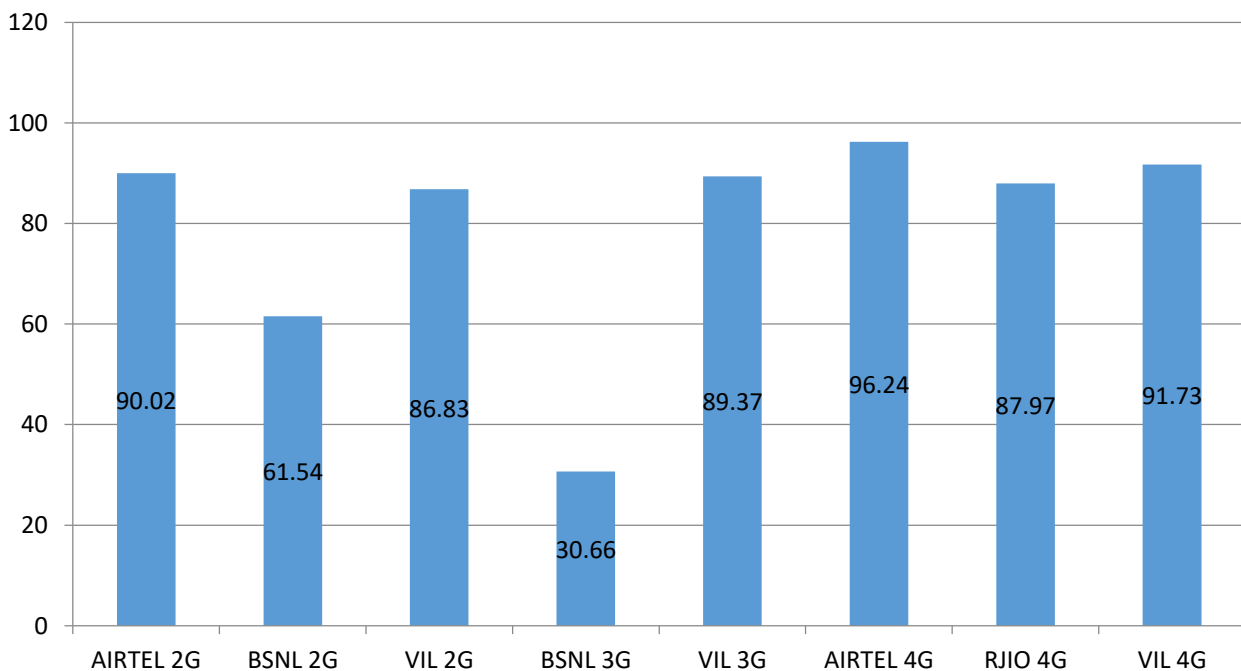


# I. Coverage Details

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	90.02
BSNL 2G	61.54
VIL 2G	86.83
BSNL 3G	30.66
VIL 3G	89.37
AIRTEL 4G	96.24
RJIO 4G	87.97
VIL 4G	91.73

## Coverage Rate %

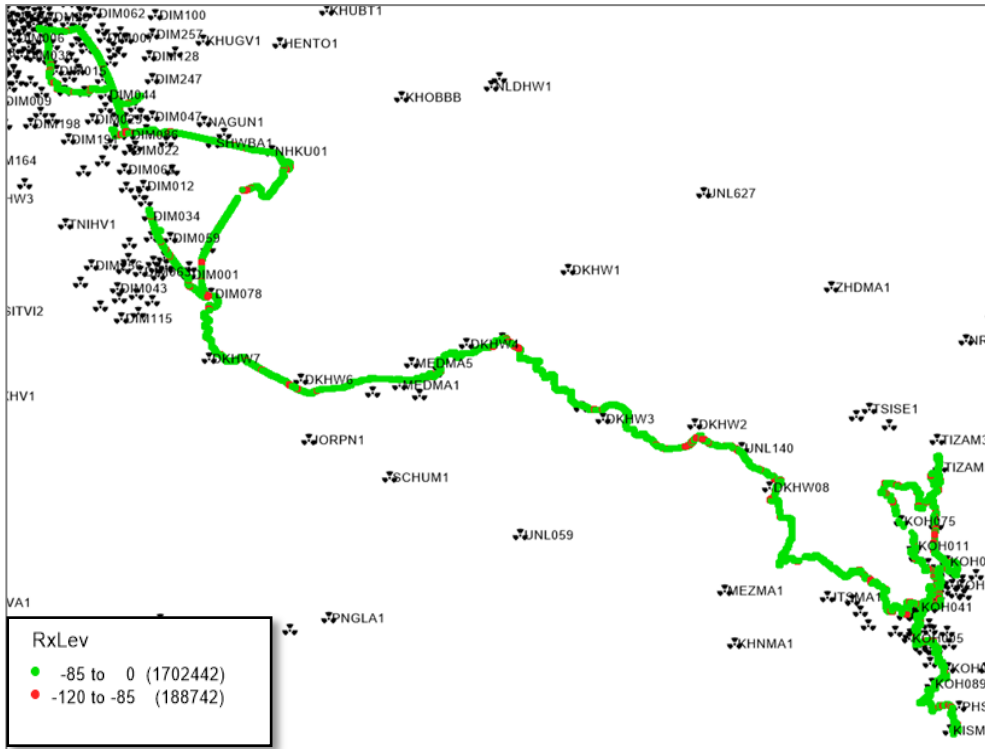


# I. Coverage Details

## AIRTEL

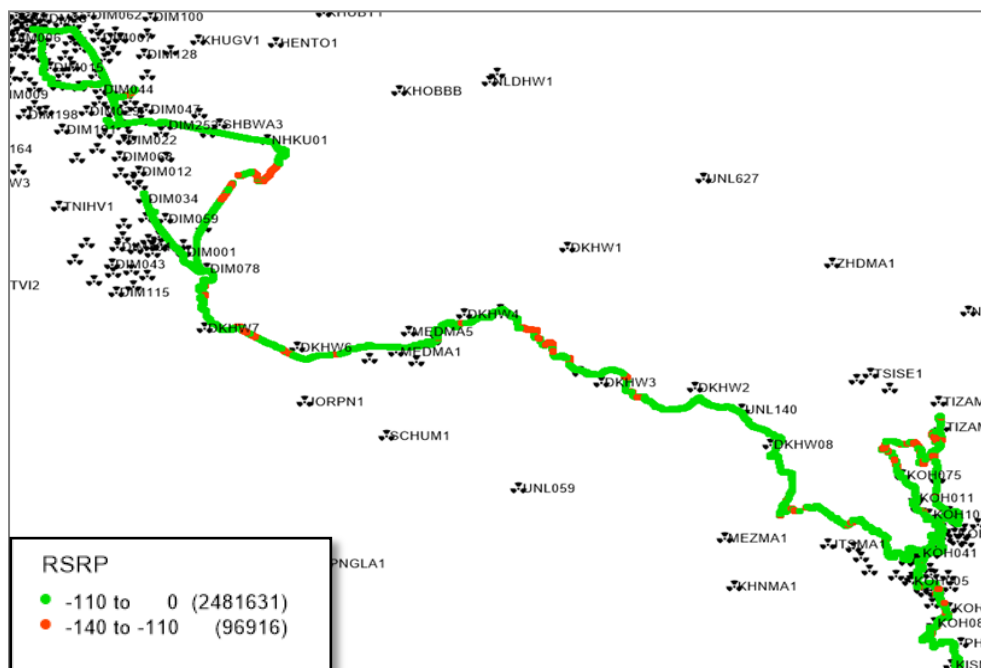
Technology	Coverage Rate %
2G	90.02
4G	96.24

### 2G



Overall Rx Level	Sample %
[Max >=-75]	31.34
[-75 >=-85)	58.67
[-85 >=-95)	9.28
[-95 >=Min)	0.69
<b>Total</b>	<b>100%</b>

### 4G



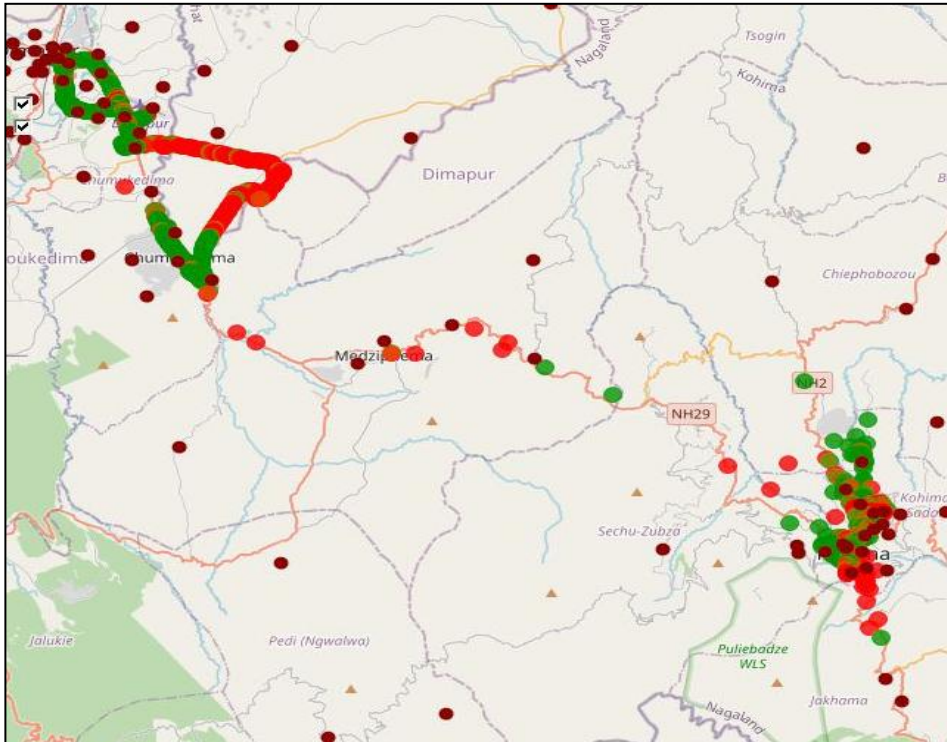
Overall RSRP	Sample %
[Max >=-80]	20.99
[-80 >=-90)	30.25
[-90 >=-110)	44.99
[-110 >=Min)	3.75
<b>Total</b>	<b>100%</b>

# I. Coverage Details

## BSNL

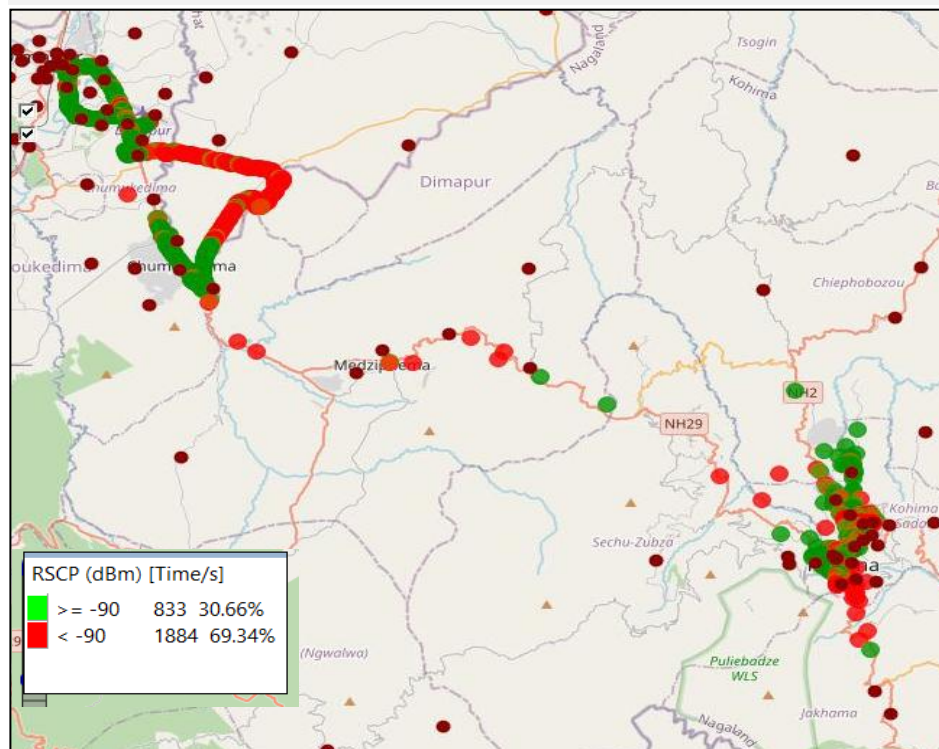
Technology	Coverage Rate %
2G	61.54
3G	30.66

### 2G



Overall Rx Level	Sample %
[-48 >=-75]	35.33
[-75 >=-85]	26.21
[-85 >=-95]	26.57
[-95 >=-111]	11.89
<b>Total</b>	<b>100%</b>

### 3G



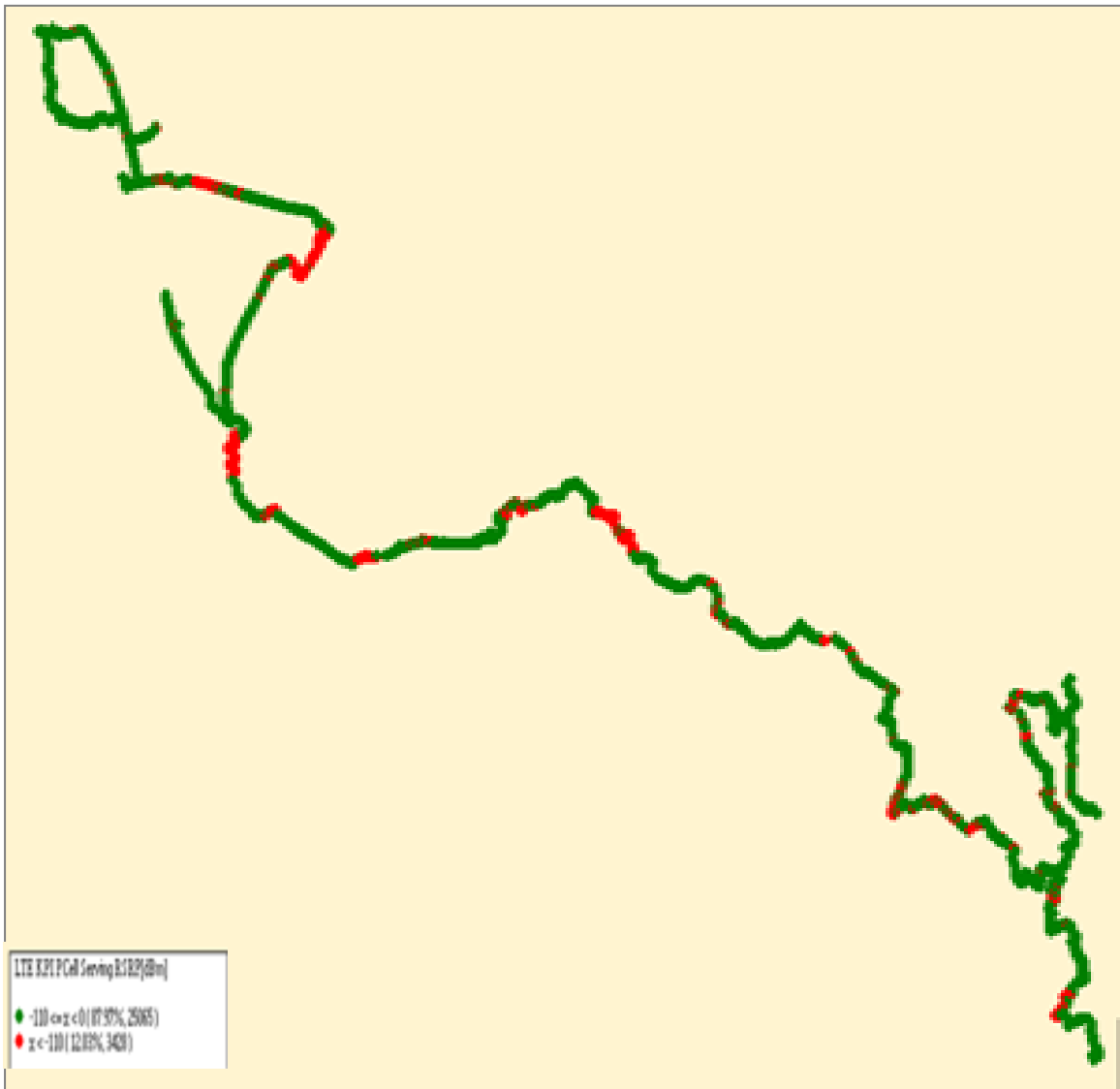
Overall RSCP	Sample %
[-44.9 >=-70]	1.55
[-70 >=-80]	8.94
[-80 >=-90]	20.17
[-90 >=-131.9]	69.34
<b>Total</b>	<b>100%</b>

# I. Coverage Details

## RJIO

Technology	Coverage Rate %
4G	87.97

### 4G



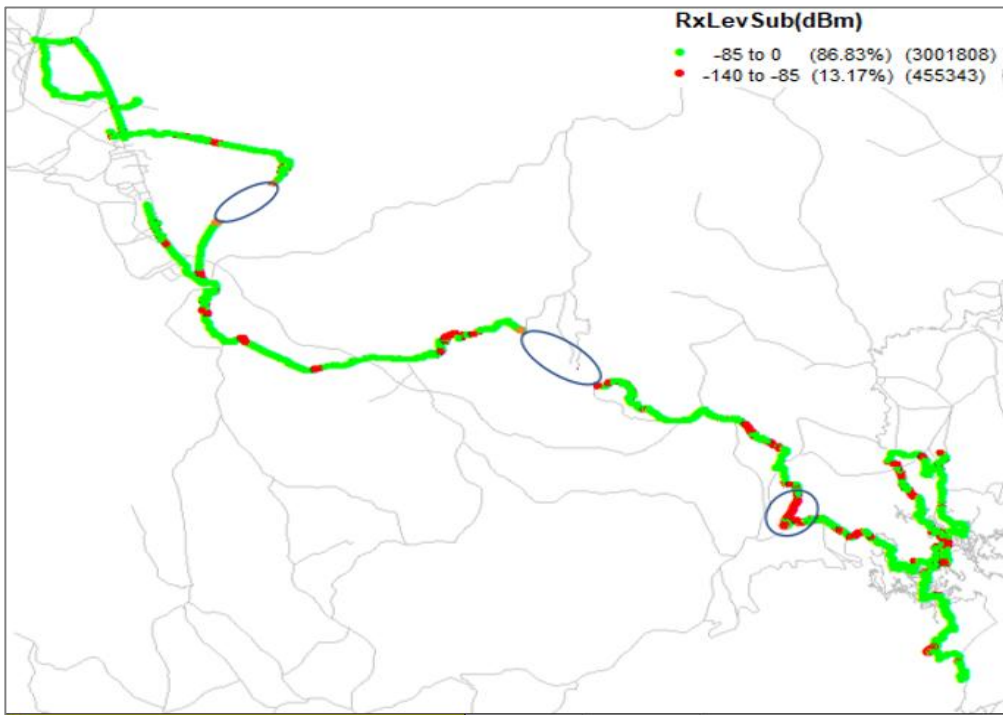
Overall RSRP	Sample %
[Max >=-80]	21.08
[-80 >=-90)	19.11
[-90 >=-110)	47.78
[-110 >=Min)	12.03
<b>Total</b>	<b>100%</b>

# I. Coverage Details

## VIL

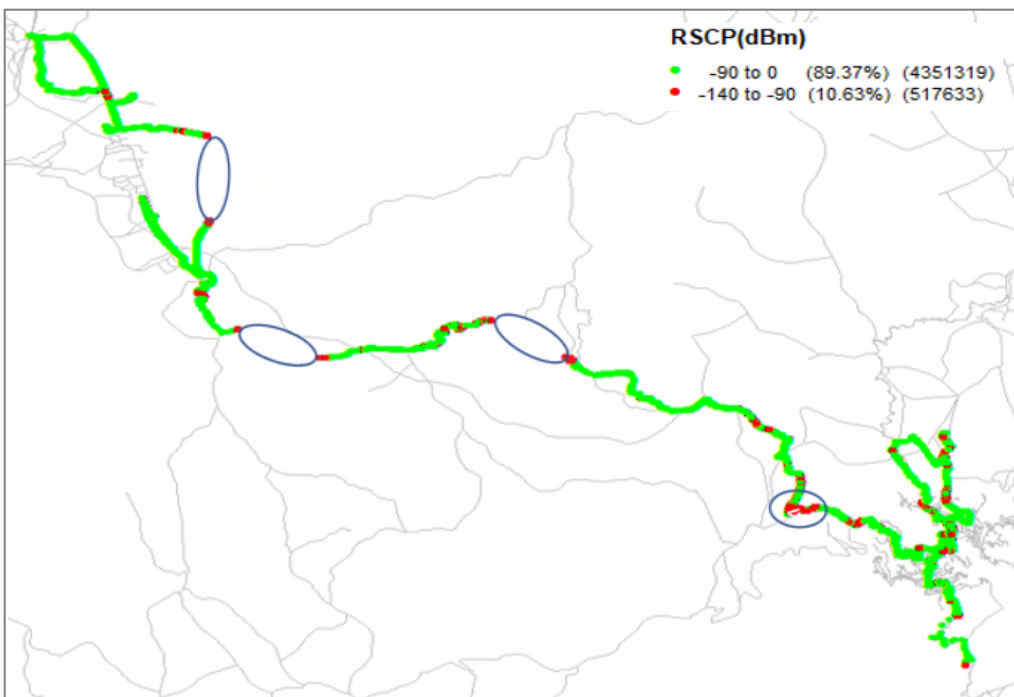
Technology	Coverage Rate %
2G	86.83
3G	89.37

### 2G



Overall Rx Level	Sample %
[Max >=-75]	53.27
[-75 >=-85)	33.56
[-85 >=-95)	10.72
[-95 =Min)	2.45
<b>Total</b>	<b>100%</b>

### 3G

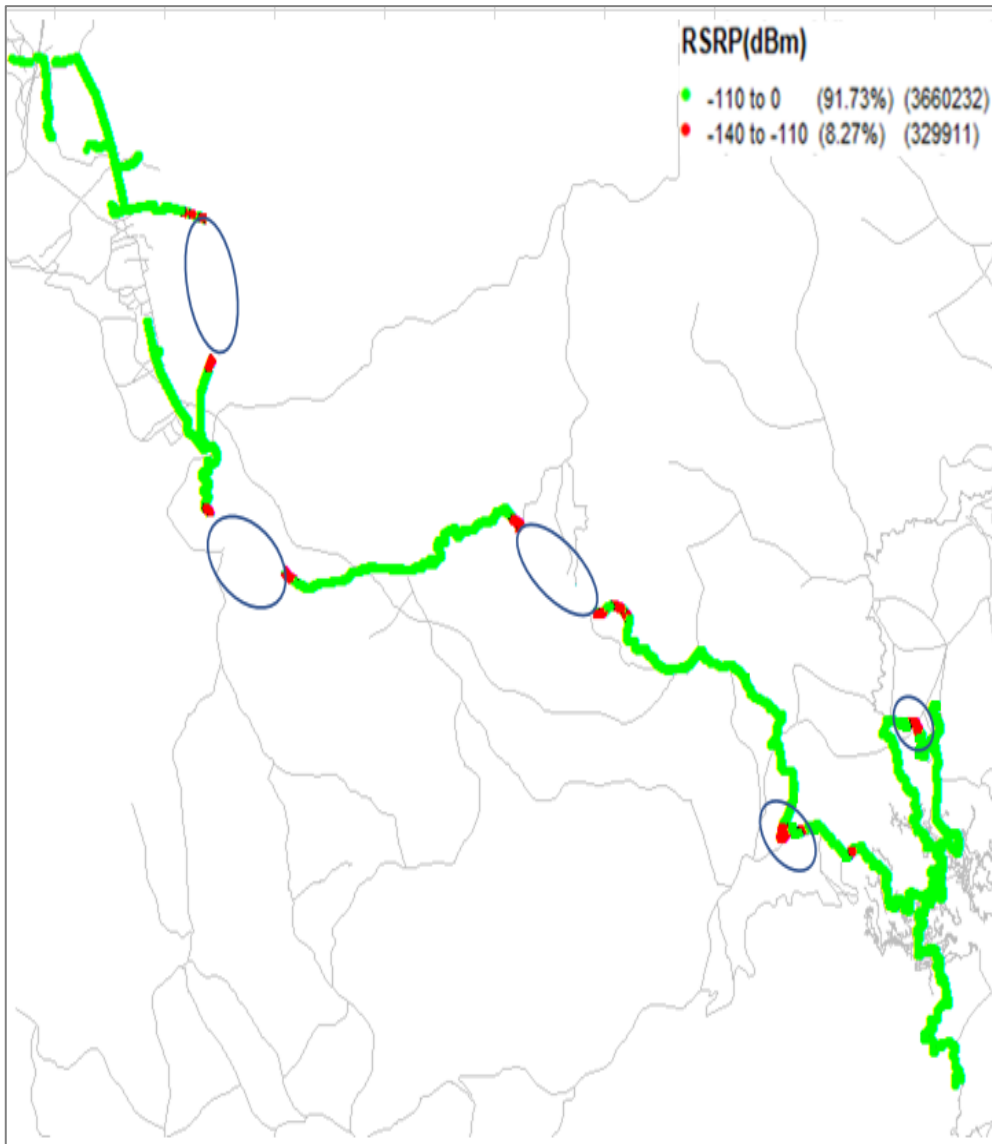


Overall RSCP	Sample %
[Max >=-70]	55.42
[-70 >=-80)	23.37
[-80 >=-90)	10.58
[-90 >=-Min)	10.63
<b>Total</b>	<b>100%</b>

# I. Coverage Details

## VIL

Technology	Coverage Rate %
4G	91.73
<b>4G</b>	



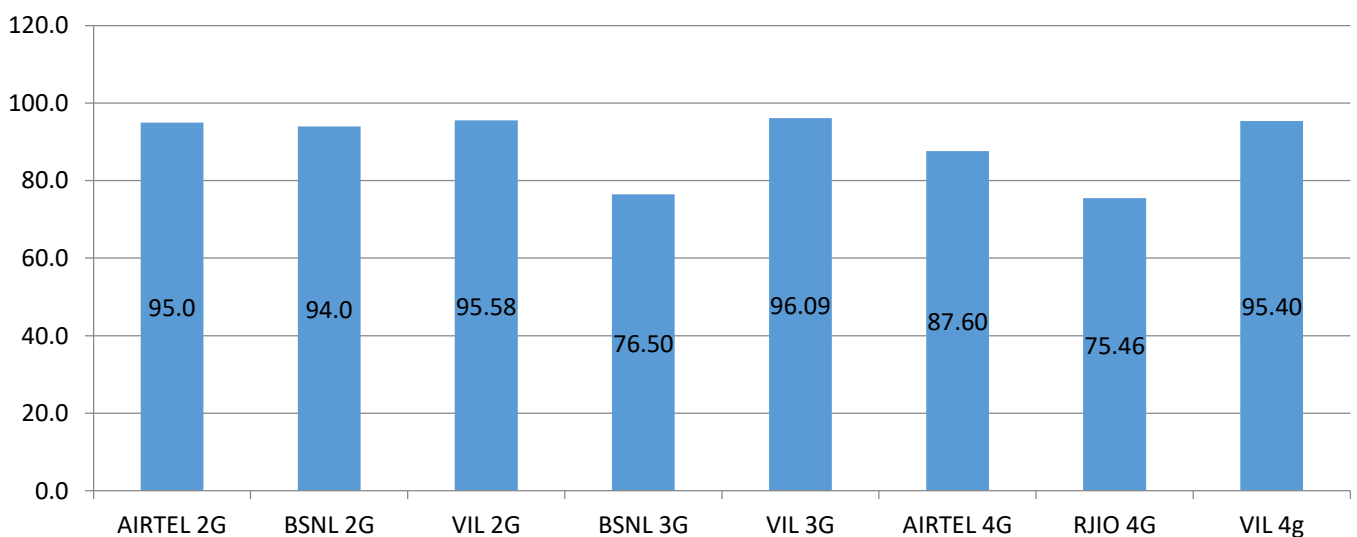
Overall RSRP	Sample %
[Max >=-80]	38.31
[-80 >=-90)	34.27
[-90 >=-110)	19.15
[-110 >=Min)	8.27
<b>Total</b>	<b>100%</b>

## II. Quality Details

For measuring voice quality, as per the QoS norms, Rx Quality  $\leq 5$  for GSM,  $E_c/N_o \geq -14$  dBm for 3G 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	95.0
BSNL 2G	94.00
VIL 2G	95.58
BSNL 3G	76.50
VIL 3G	96.09
AIRTEL 4G	87.60
RJIO 4G	75.46
VIL 4G	95.40

### Rx Quality %



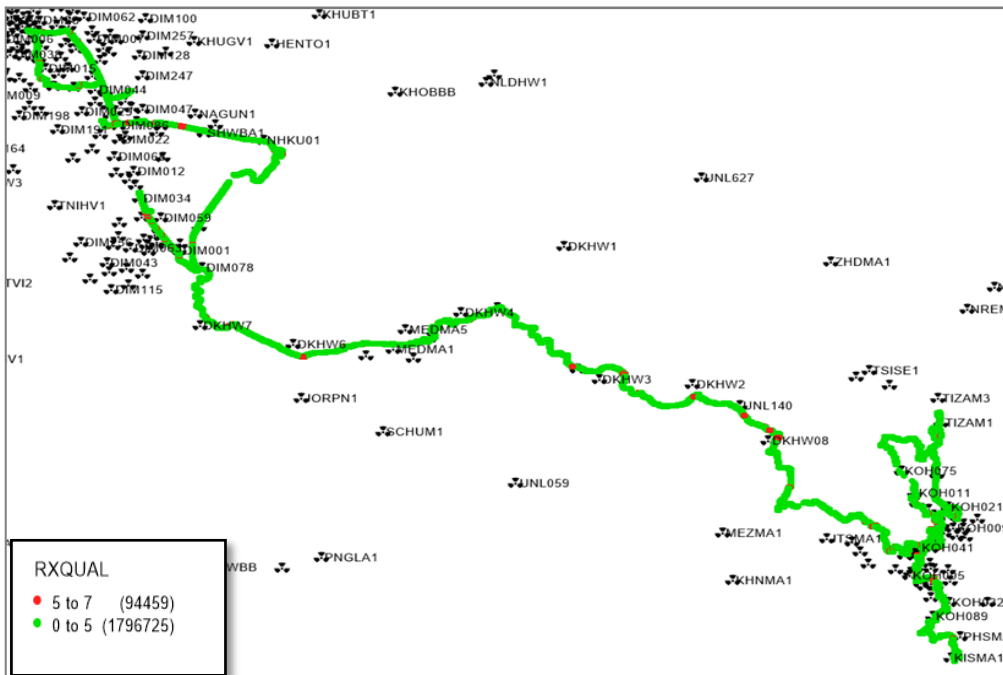


## II. Quality Details

### AIRTEL

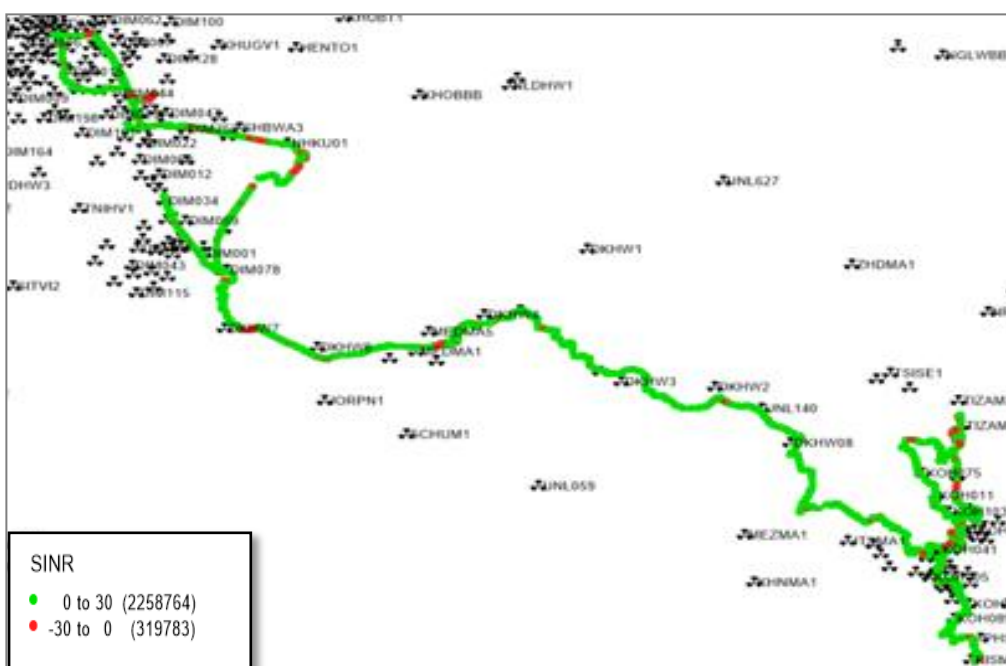
Technology	Rx Quality %
2G	95.00
4G	87.60

#### 2G



Overall Rx Quality	Sample %
(Min <=2)	84.98
(2 <=3)	3.19
(3 <=4)	3.75
(4 <=5)	3.06
(5 <=Max)	4.99
Total	100%

#### 4G



Overall SINR	Sample %
(Min <=0)	12.40
(0 <=5)	29.98
(5 <=10)	19.70
(10 <=15)	21.51
(15 <=Max)	16.39
Total	100%

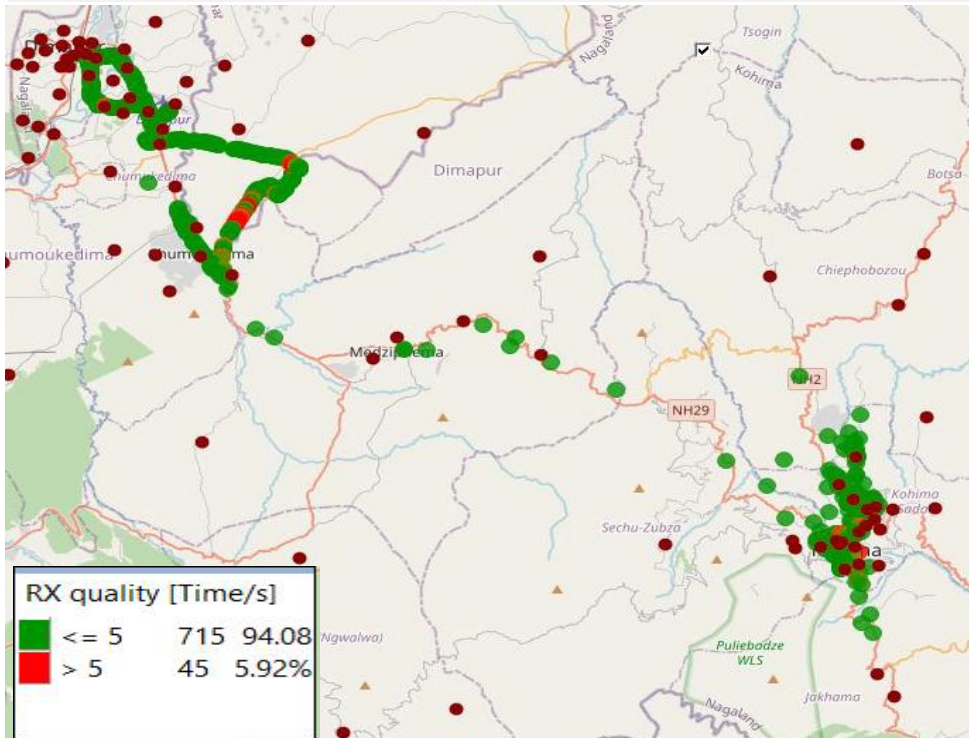


## II. Quality Details

### BSNL

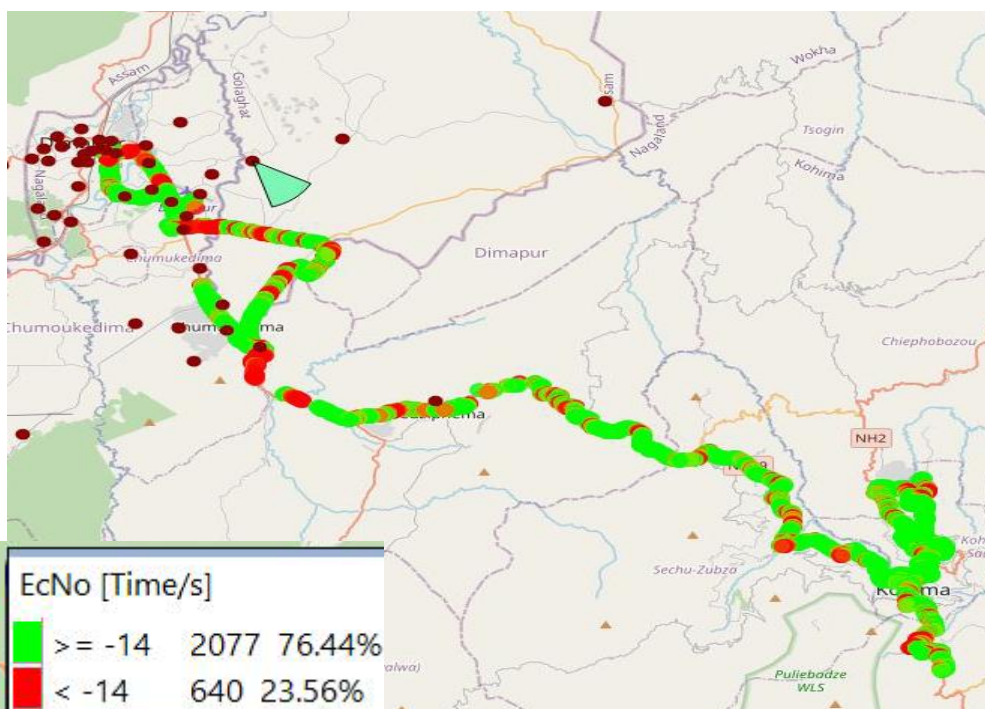
Technology	Rx Quality %
2G	94.00
3G	76.50

#### 2G



Overall Rx Quality	Sample %
(0 <=2)	85.13
(2 <=3)	4.08
(3 <=4)	2.76
(4 <=5)	2.11
(5 <=7)	5.92
<b>Total</b>	<b>100%</b>

#### 3G



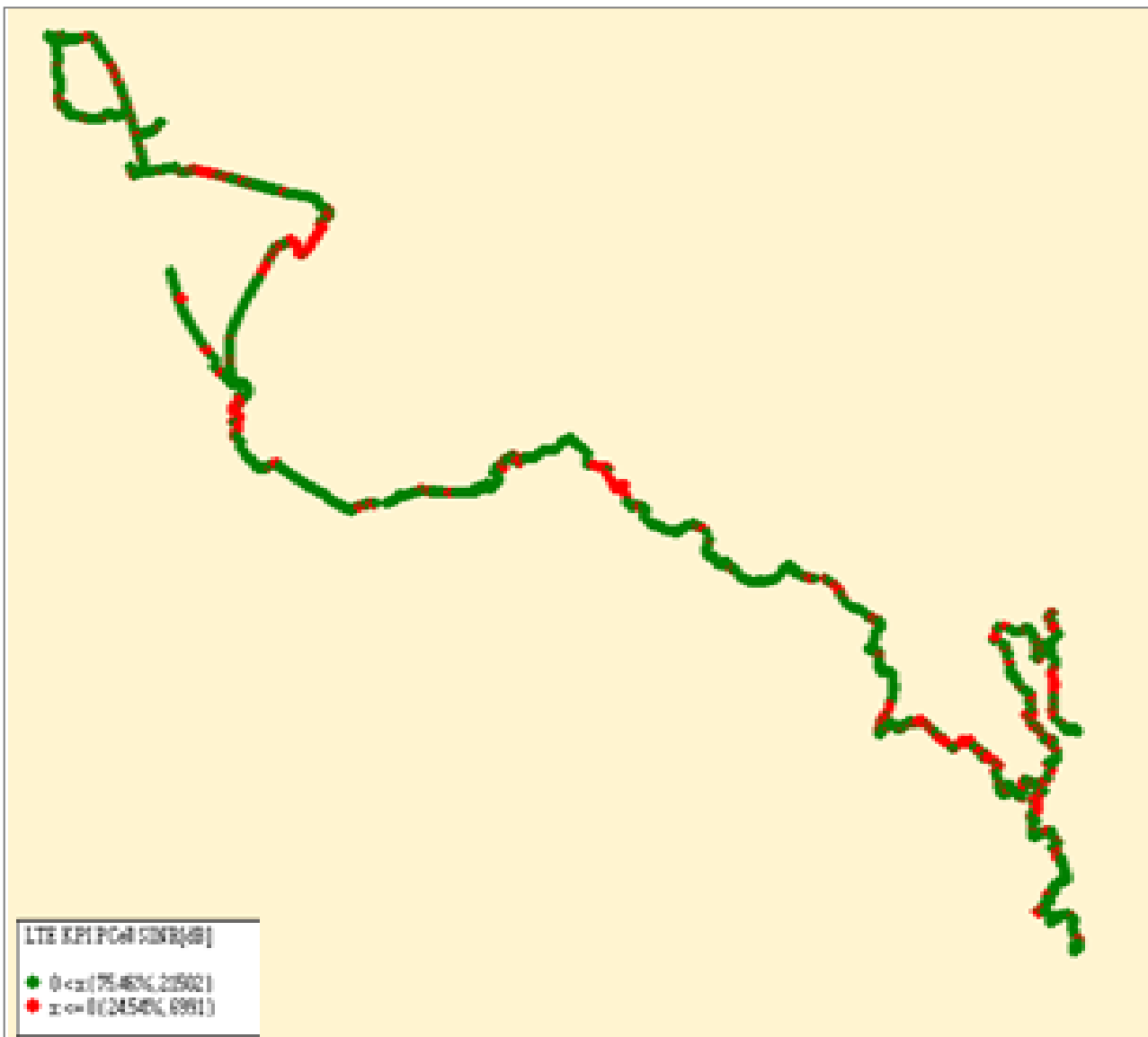
Overall EcNo	Sample %
(-0.9 <=-6)	11.93
(-6 <=-9)	14.48
(-9 <=-11)	20.74
(-11 <=-14)	29.28
(-14 <=-25.9)	23.57
<b>Total</b>	<b>100%</b>

## II. Quality Details

### RJIO

Technology	Rx Quality %
4G	75.46

### 4G



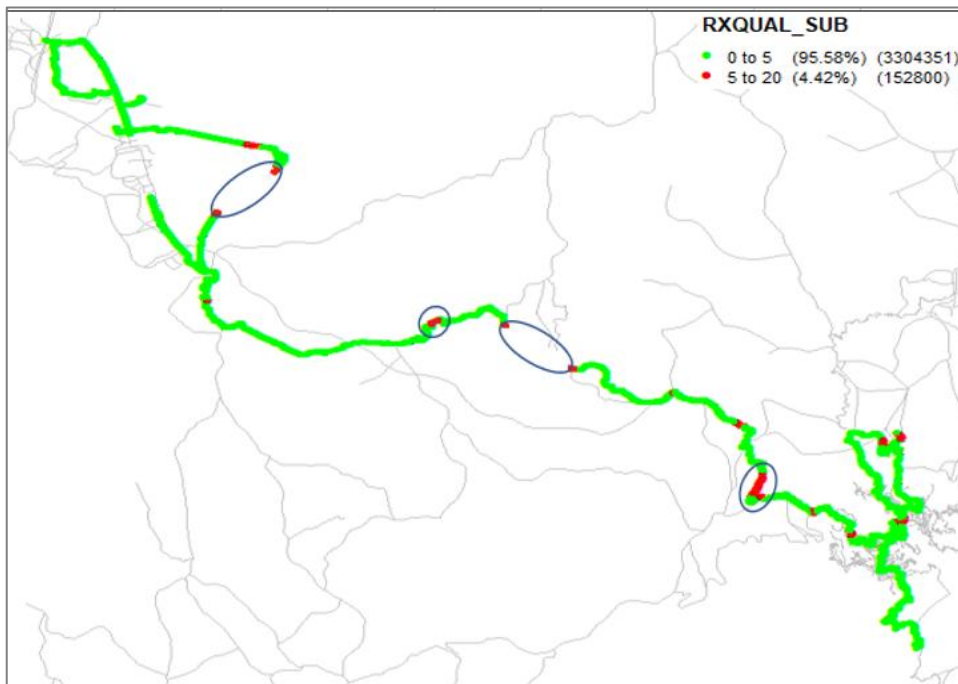
Overall SINR	Sample %
(Min <=0)	24.54
(0 <=5)	18.35
(5 <=10)	17.4
(10 <=15)	13.98
(15 <=Max)	25.73
<b>Total</b>	<b>100%</b>

## II. Quality Details

### VIL

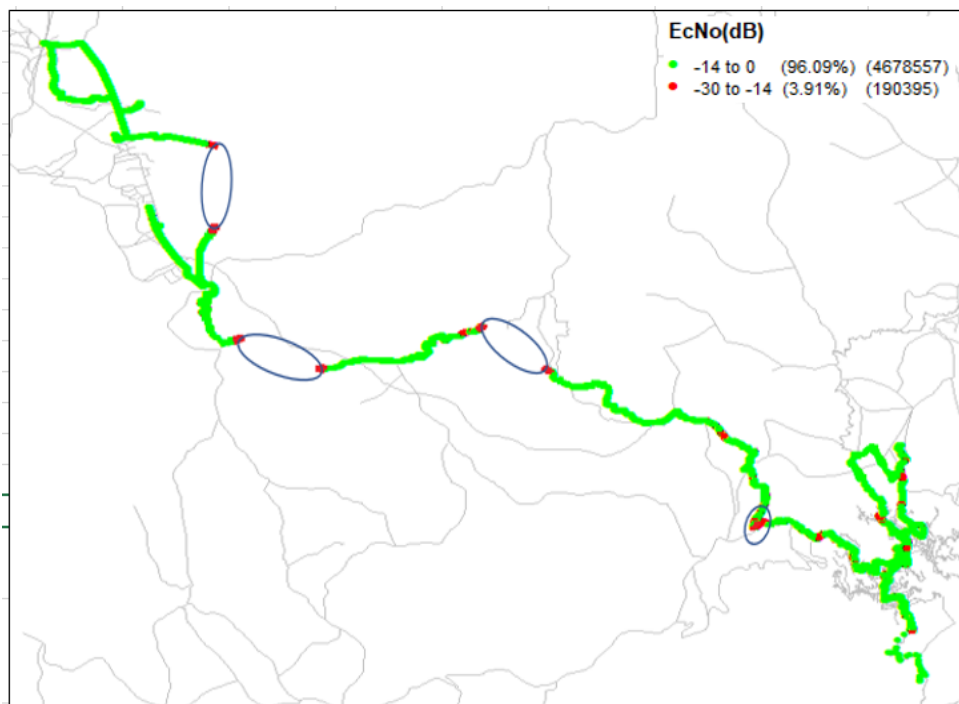
Technology	Rx Quality %
2G	95.58
3G	96.09

#### 2G



Overall Rx Quality	Sample %
(Min <=2)	75.28
(2 <=3)	10.46
(3 <=4)	5.29
(4 <=5)	4.55
<b>(5 &lt;=Max)</b>	<b>4.42</b>
<b>Total</b>	<b>100%</b>

#### 3G



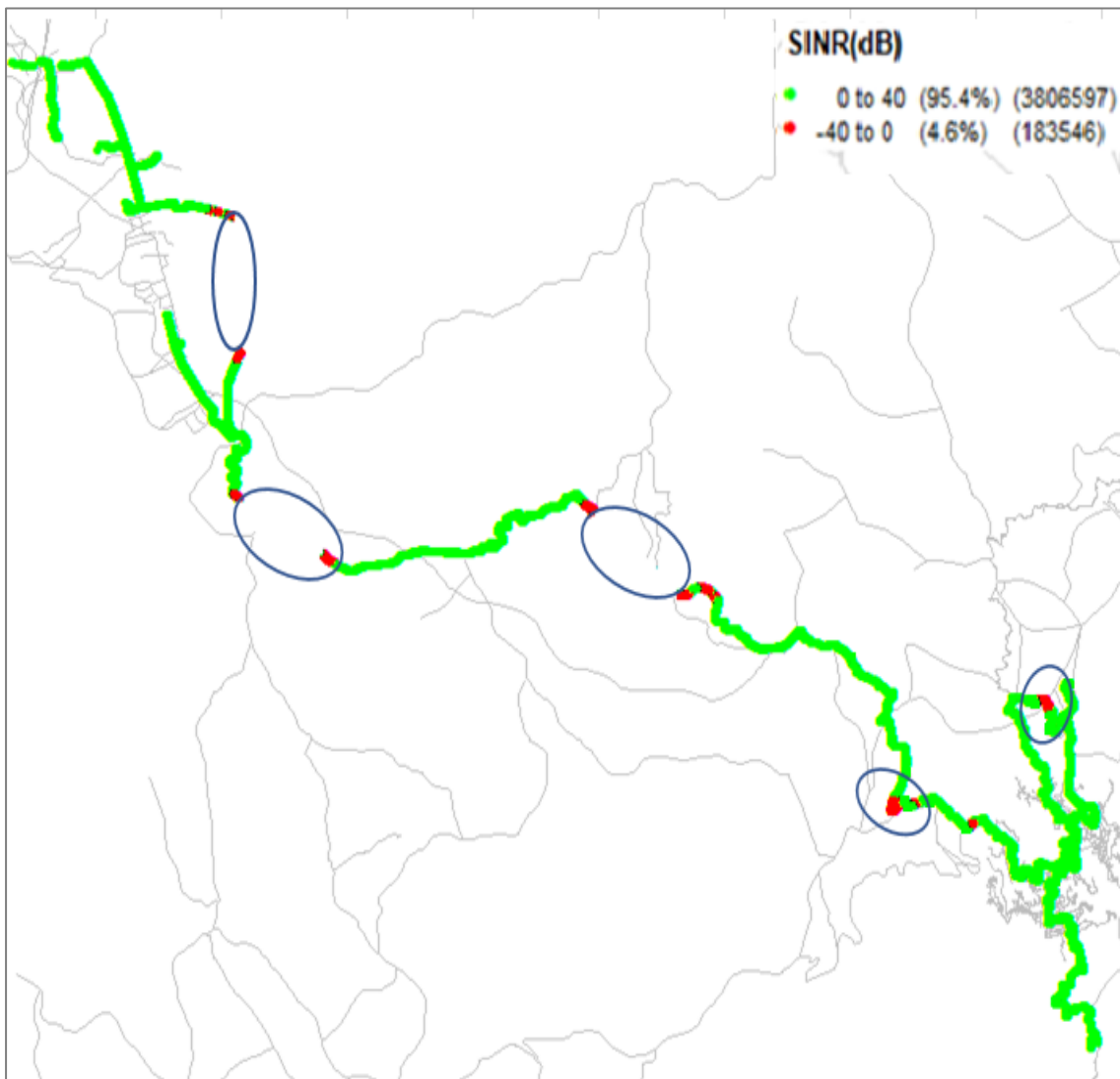
Overall EcNo	Sample %
(Max <=-6)	63.58
(-6 <=-9)	15.26
(-9 <=-11)	10.12
(-11 <=-14)	7.13
<b>(-14 &lt;= Min)</b>	<b>3.91</b>
<b>Total</b>	<b>100%</b>

## II. Quality Details

### VIL

Technology	Rx Quality %
4G	95.40

### 4G



Overall SINR	Sample %
(Min <=0)	4.60
(0 <=5)	17.32
(5 <=10)	24.78
(10 <=15)	20.10
<b>(15 &lt;=Max)</b>	33.20
<b>Total</b>	<b>100%</b>

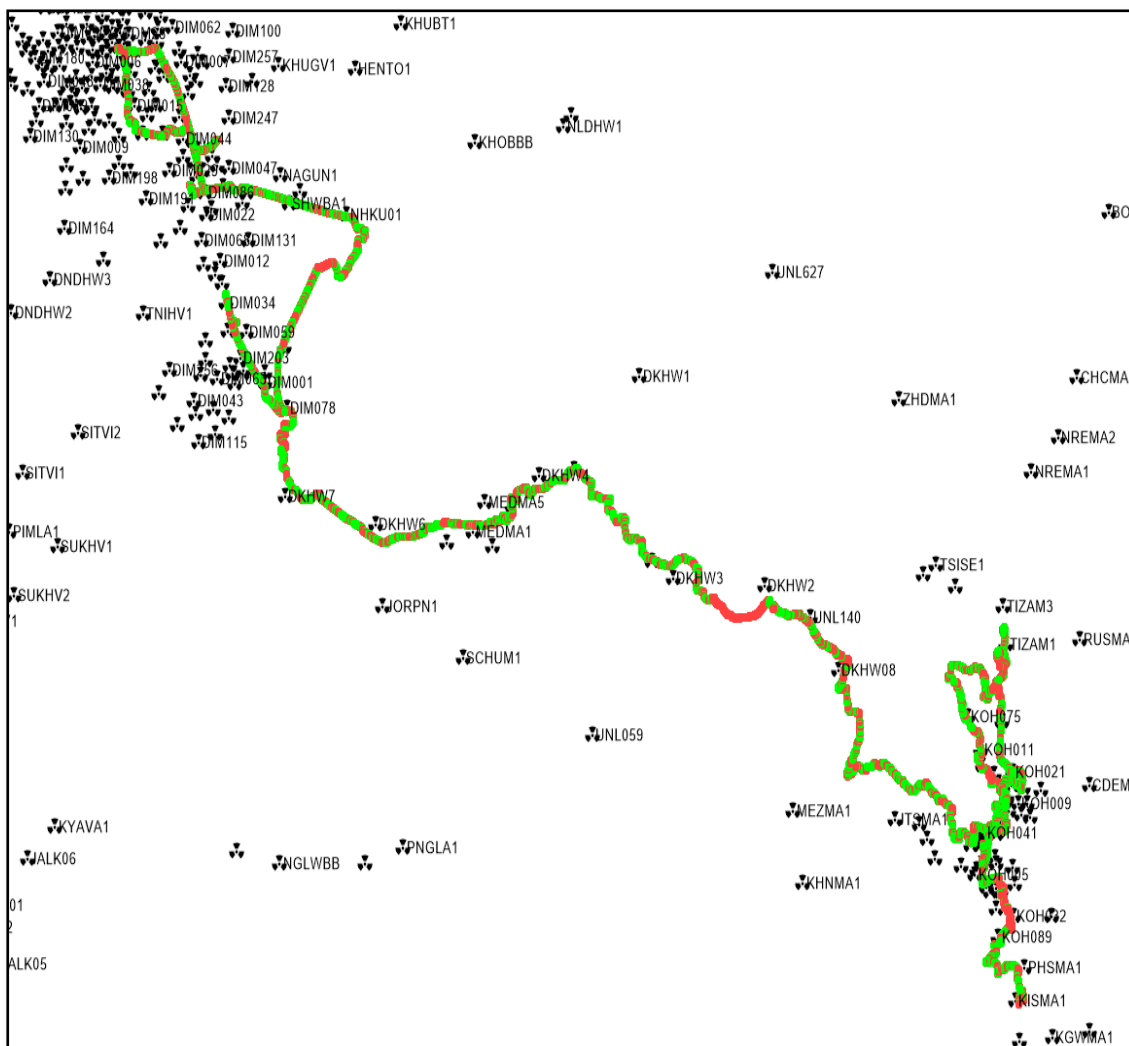
# IV. Dynamic Data Test- 2G DL Details

## AIRTEL

### Dynamic Data Testing Complete 171 Kms

Data KPIs - Overall	<b>2G</b>
Average Download Throughput (Kbps)	65.59

### 2G



AVG. DOWNLOAD SPEED (Kbps)	65.59
% FILE TRANSFER COMPLETE	66.11
DL throughput	<b>Sample %</b>
0 to 50 Kbps	28.13
50 to 100 Kbps	19.21
100 to 200 Kbps	52.02
200 to 300 Kbps	0.62
>300 Kbps	0
<b>Total</b>	<b>100%</b>

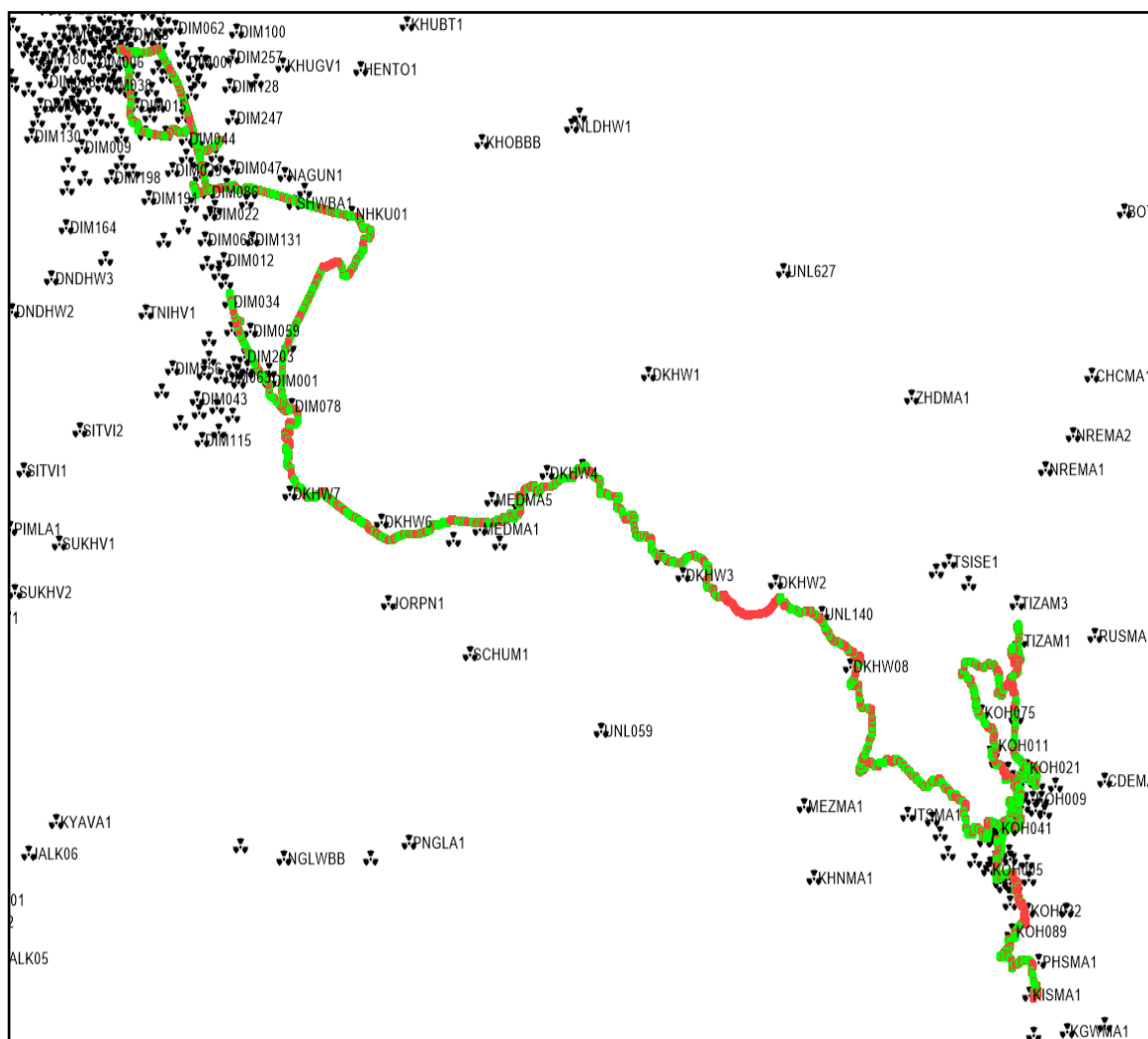
# IV. Dynamic Data Test- 4G DL Details

## AIRTEL

### Dynamic Data Testing Complete 171 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	5.29

### 4G



AVG. DOWNLOAD SPEED (Mbps)	5.29
% FILE TRANSFER COMPLETE	79.24
DL throughput	<b>Sample %</b>
0 to 1 Mbps	44.25
1 to 2 Mbps	1.18
2 to 5 Mbps	35.20
5 to 10 Mbps	11.61
>10 Mbps	7.74
<b>Total</b>	<b>100%</b>



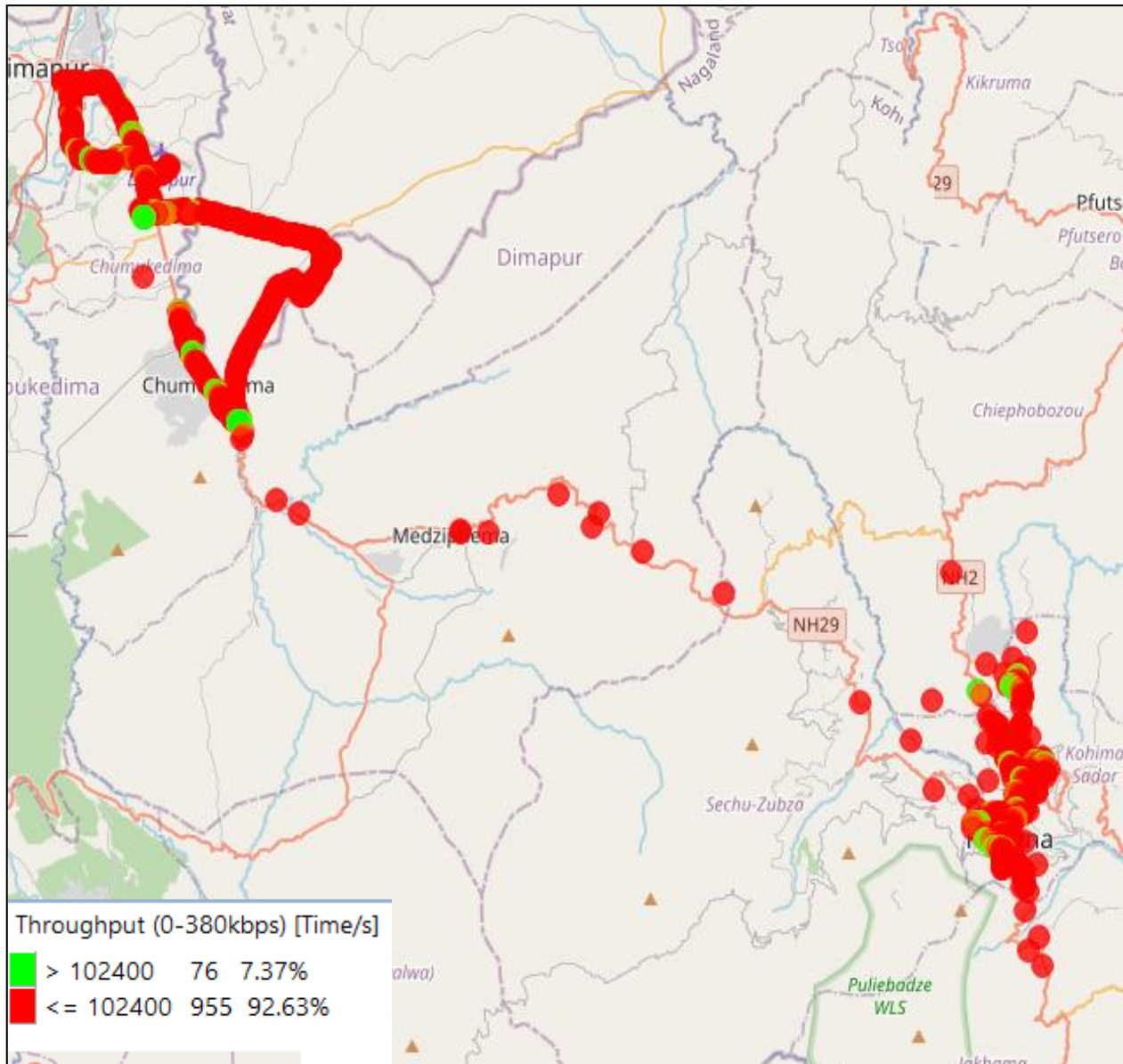
# IV. Dynamic Data Test- 2G DL Details

## BSNL

### Dynamic Data Testing Complete 171 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	25.40

### 2G



AVG. DOWNLOAD SPEED (Kbps)	25.40
% FILE TRANSFER COMPLETE	88.68
DL throughput	<b>Sample %</b>
0 to 50 Kbps	85.26
50 to 100 Kbps	7.37
100 to 200 Kbps	5.14
200 to 300 Kbps	2.23
>300 Kbps	0
<b>Total</b>	<b>100%</b>

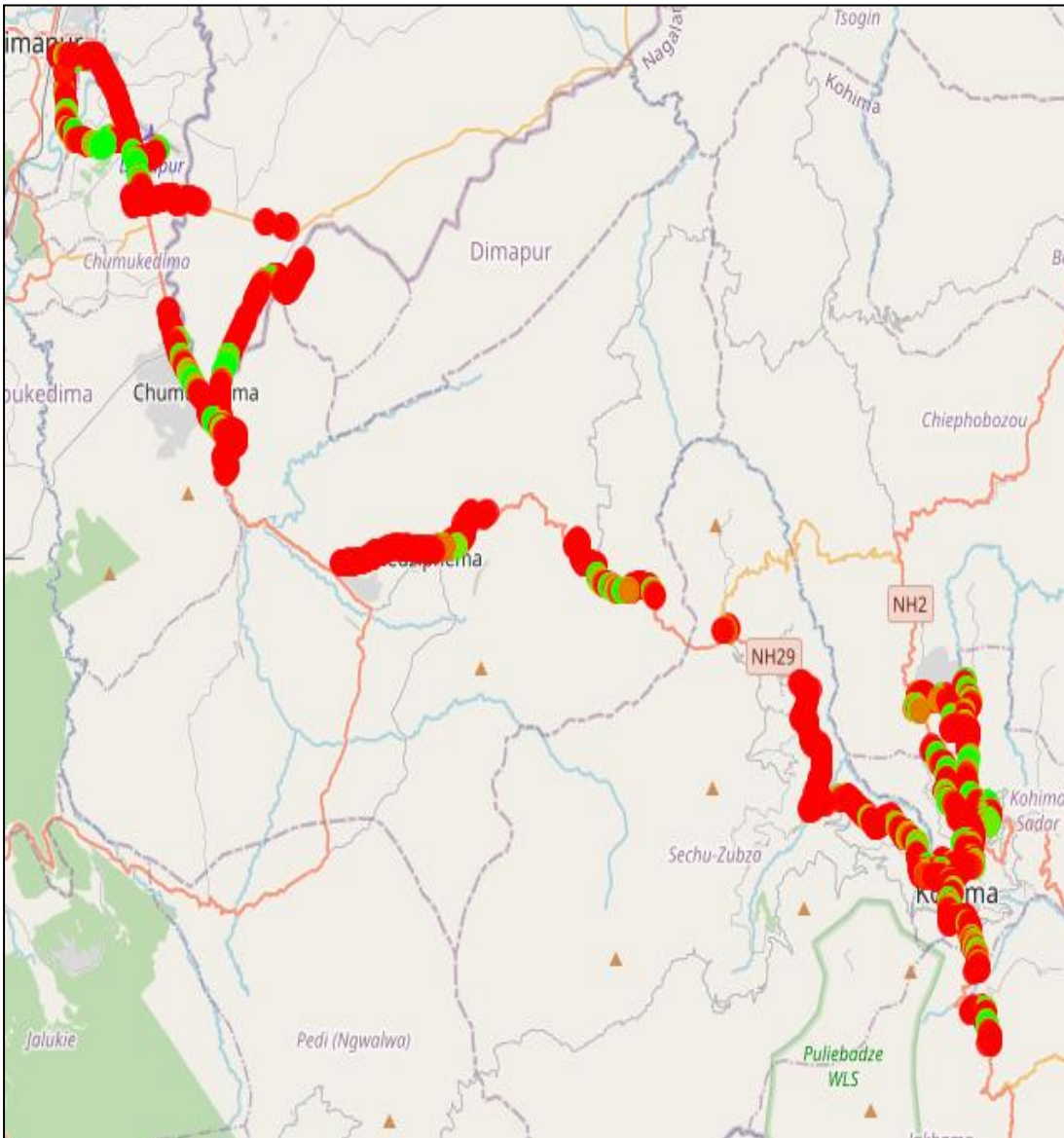
# IV. Dynamic Data Test- 3G DL Details

## BSNL

### Dynamic Data Testing Complete 171 Kms

Data KPIs - Overall	<b>3G</b>
Average Download Throughput (Mbps)	0.67

### 3G



AVG. DOWNLOAD SPEED (Mbps)	0.67
% FILE TRANSFER COMPLETE	88.52
DL throughput	<b>Sample %</b>
0 to 0.5 Mbps	75.43
0.5 to 1 Mbps	7.47
1 to 2 Mbps	7.89
2 to 5 Mbps	7.15
>5 Mbps	2.05
<b>Total</b>	<b>100%</b>



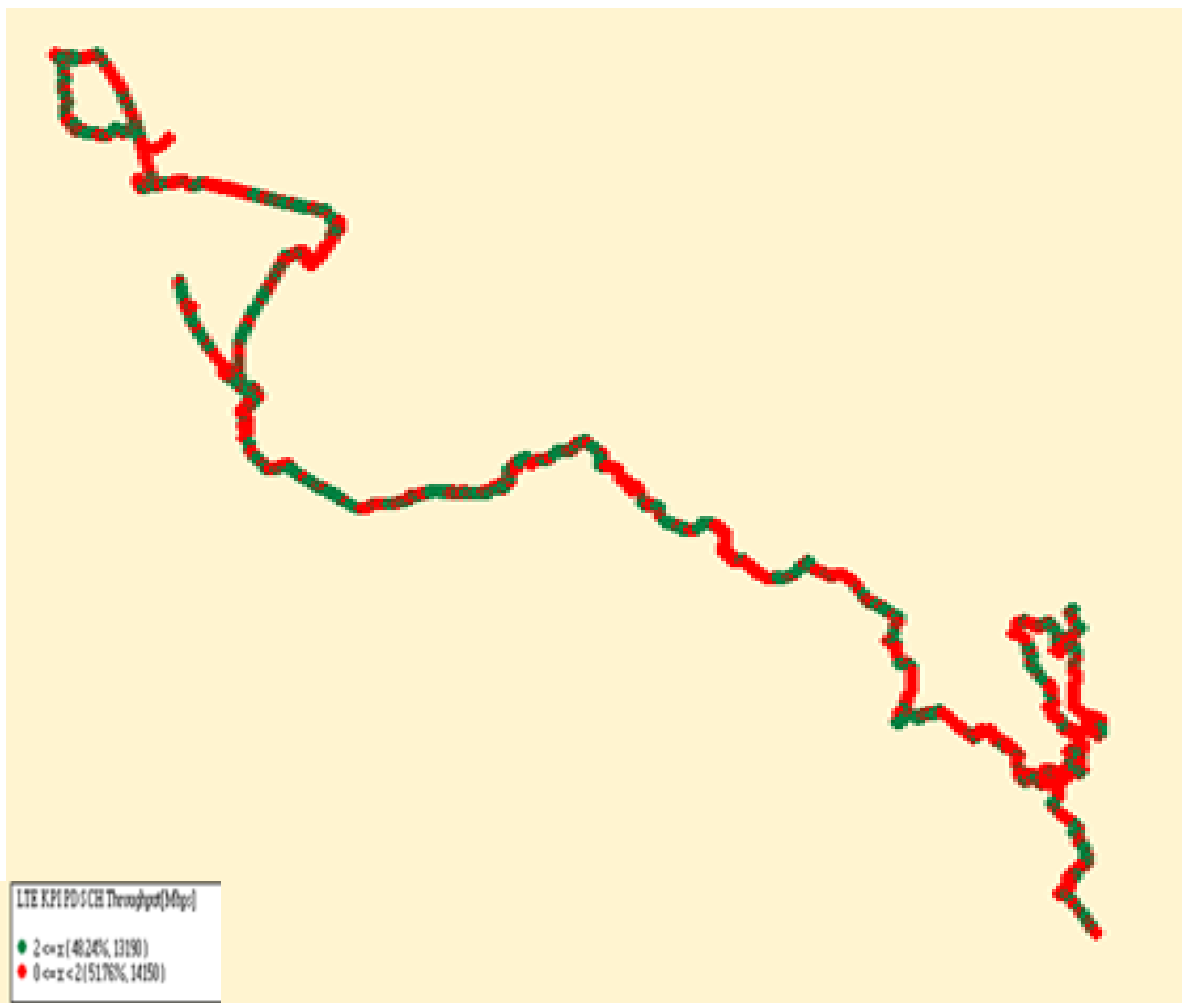
# IV. Dynamic Data Test- 4G DL Details

## RJIO

### Dynamic Data Testing Complete 171 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	7.82

4G



AVG. DOWNLOAD SPEED (Mbps)	7.82
% FILE TRANSFER COMPLETE	100
DL throughput	Sample %
0 to 1 Mbps	39.14
1 to 2 Mbps	12.62
2 to 5 Mbps	18.43
5 to 10 Mbps	12.59
>10 Mbps	17.23
Total	100%

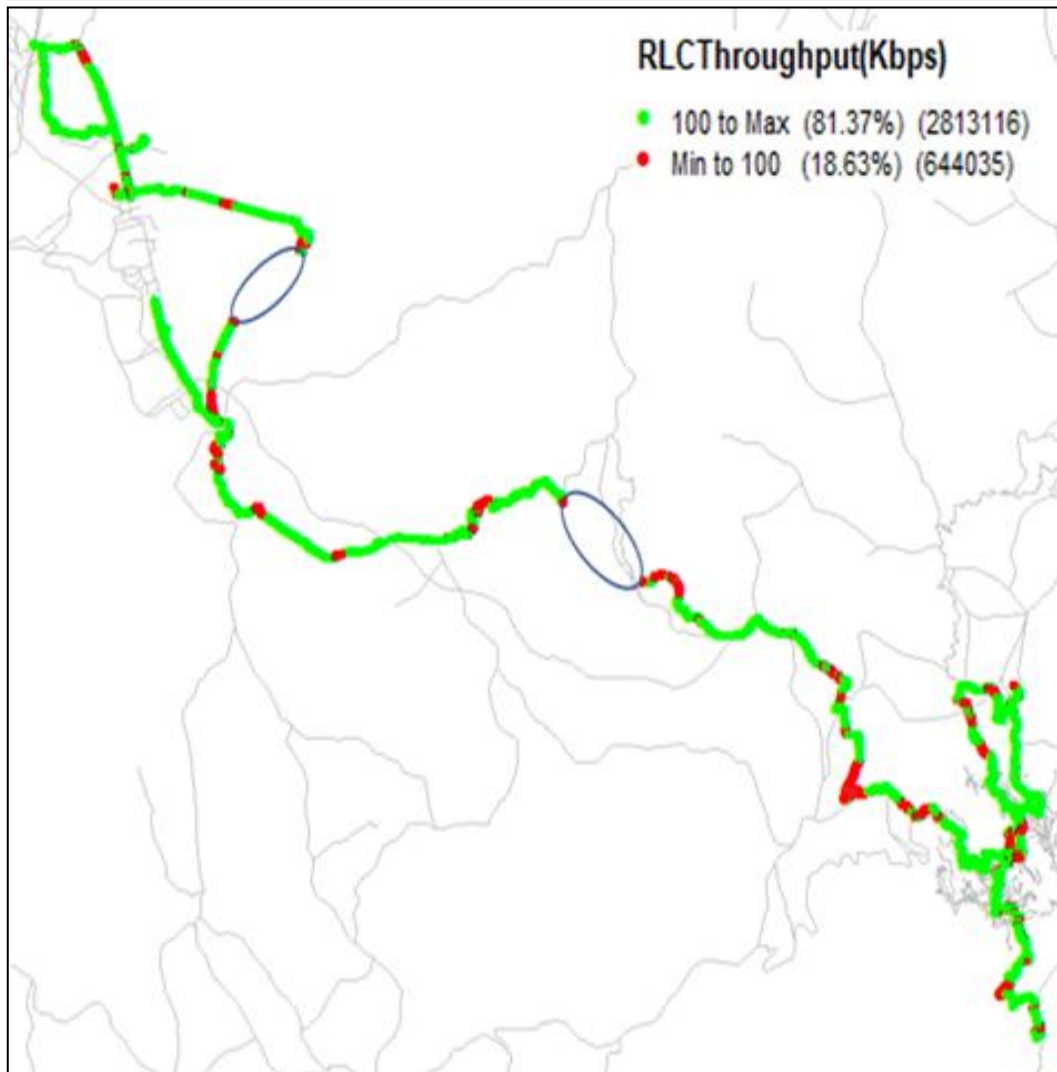
# IV. Dynamic Data Test- 2G DL Details

## VIL

### Dynamic Data Testing Complete 171 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	102.34

### 2G



AVG. DOWNLOAD SPEED (Kbps)	102.34
% FILE TRANSFER COMPLETE	95.95%
DL throughput	Sample %
0 to 50 Kbps	7.04
50 to 100 Kbps	11.59
100 to 200 Kbps	48.03
200 to 300 Kbps	27.71
>300 Kbps	5.63
Total	100%

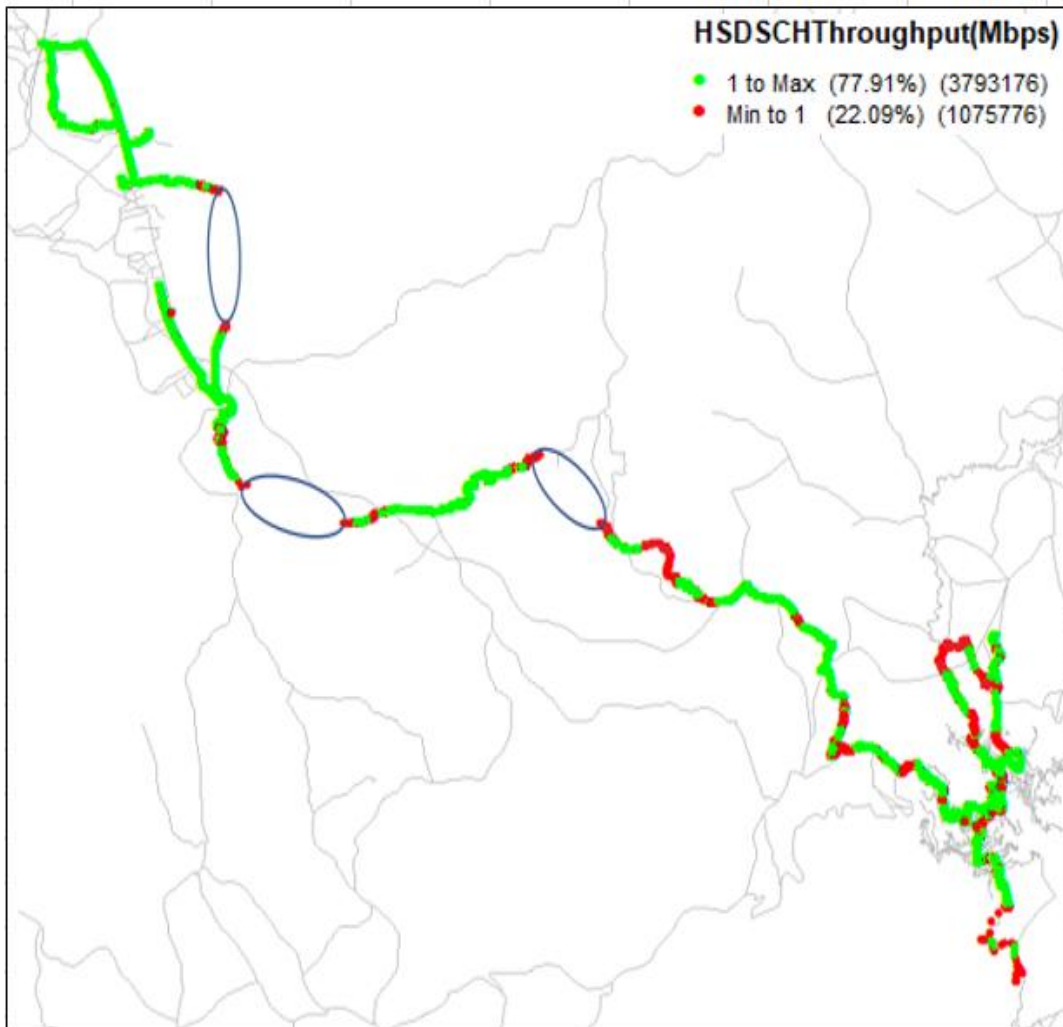
# IV. Dynamic Data Test- 3G DL Details

## VIL

### Dynamic Data Testing Complete 171 Kms

Data KPIs - Overall	3G
Average Download Throughput (Mbps)	2.51

### 3G



AVG. DOWNLOAD SPEED (Mbps)	2.51
% FILE TRANSFER COMPLETE	99.86
DL throughput	<b>Sample %</b>
0 to 0.5 Mbps	7.02
0.5 to 1 Mbps	15.07
1 to 2 Mbps	33.04
2 to 5 Mbps	38.41
>5 Mbps	6.46
<b>Total</b>	<b>100%</b>

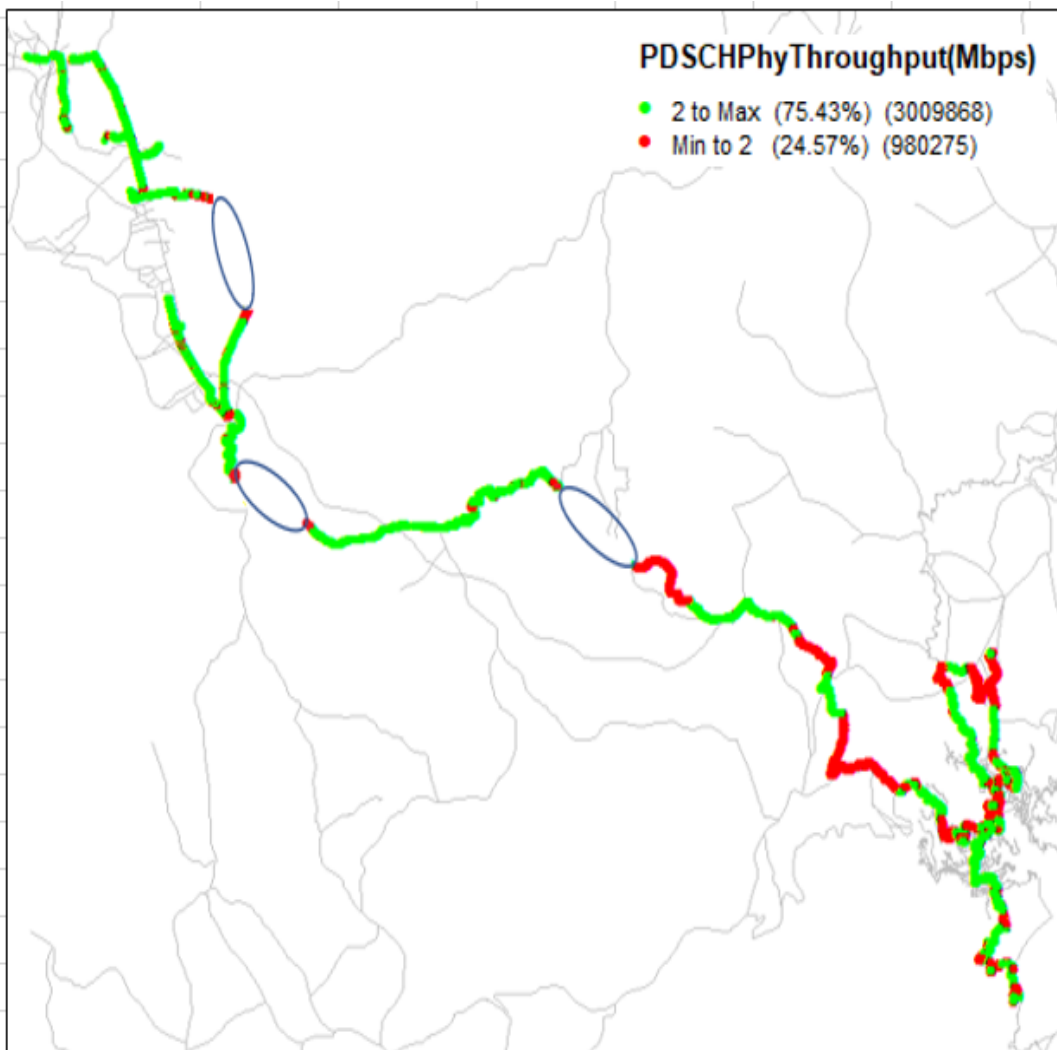
# IV. Dynamic Data Test- 4G DL Details

## VIL

### Dynamic Data Testing Complete 171 Kms

Data KPIs – Overall	4G
Average Download Throughput (Mbps)	4.62

### 4G



AVG. DOWNLOAD SPEED (Mbps)	4.62
% FILE TRANSFER COMPLETE	99.82
DL throughput	<b>Sample %</b>
0 to 1 Mbps	9.21
1 to 2 Mbps	15.36
2 to 5 Mbps	35.43
5 to 10 Mbps	22.78
>10 Mbps	17.22
<b>Total</b>	<b>100%</b>