

Operator Assisted Drive Test Report

Dibrugarh-Sivasagar-Tinsukia

September, 2023

(RO, Kolkata)

Key Performance Indicators (KPIs):

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

AIRTEL- Rx Quality in 2G network.

BSNL-Drop Call Rate in 2G & 3G network, Block Call Rate in 3G network, Call Set up Success Rate (CSSR%) in 2G & 3G network, Hand Over Success Rate (HOSR%) in 2G network, Rx Quality in 2G & 3G (Ec/Io) network.

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

VIL- Rx Quality in 3G (Ec/Io) & 4G (SINR) network.

It is observed that 2G, 3G & 4G coverage of VIL and 3G/ 4G coverage of BSNL on some portions of the OADT routes are inadequate.

The Operator Assisted Drive Test has been carried out by Regional Office, Kolkata with the help of Service Providers in Dibrugarh-Sivasagar-Tinsukia and surrounding areas including National Highways (2, 702, 215, 315A, 15) on 13th September 2023 and 14th September 2023 from 08.30 AM to 08.30 PM. The drive test covered drive route of 473 KMs (approx) over a period of 2 days. Approximately 486+ 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

Dibrugarh is an industrial city in Upper Assam with sprawling tea gardens. It is located 435 kms East from the state capital of Dispur. It serves as the headquarters of Dibrugarh district in the state of Assam in India.

Sivasagar is a town and headquarter of the Sivasagar district, Assam. Sivasagar is situated about 360 kilometers northeast of Guwahati. It is well known for its Ahom palaces and monuments.

Tinsukia is an industrial town. It is situated 480 kilometres north-east of Guwahati and 84 kilometres away from the border Arunachal Pradesh. It is the administrative headquarters of Tinsukia District of Assam, India.

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 network, Three 4G networks covering 4 unique TSPs were tested.

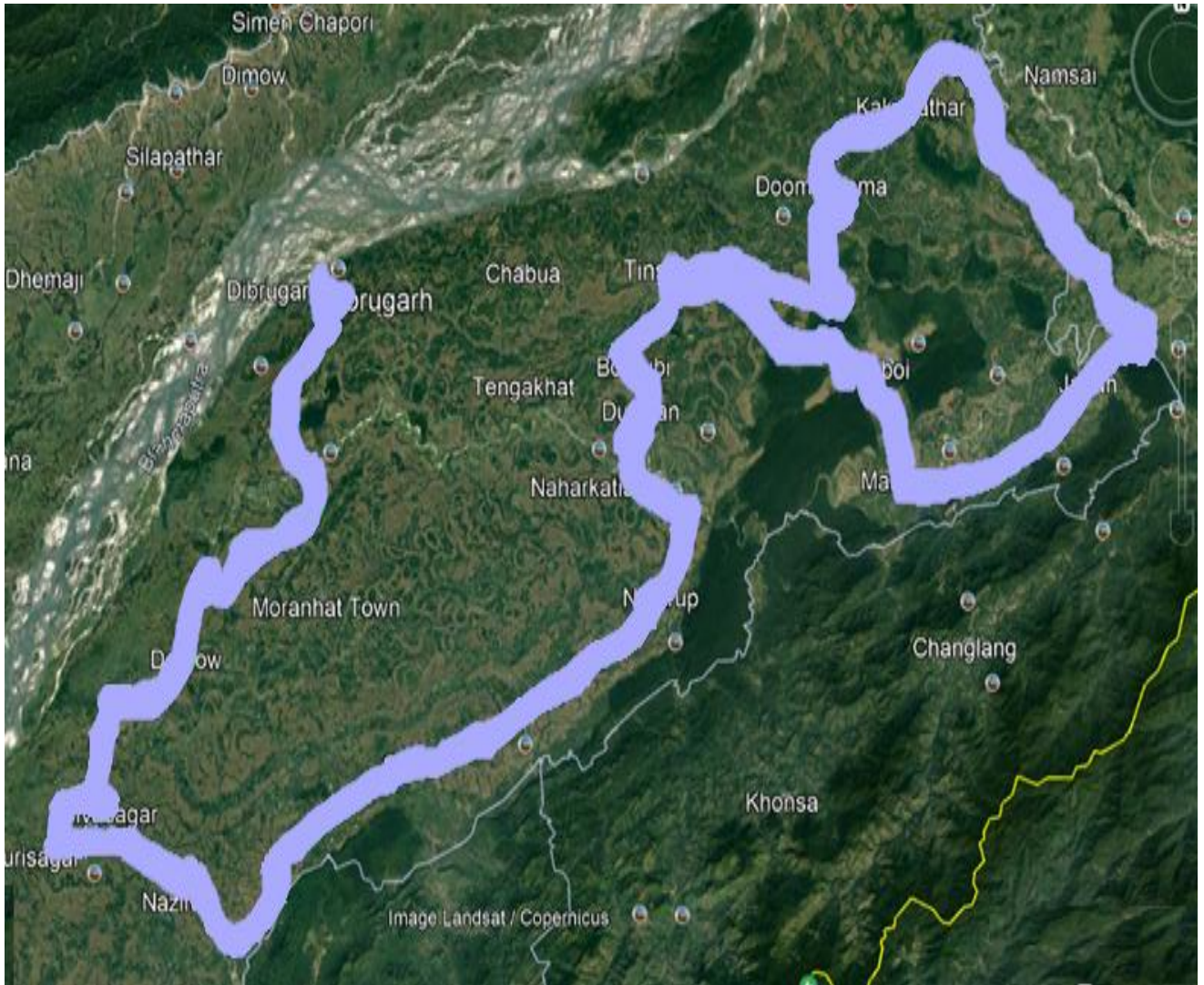
Data Tests: Dynamic Data Service Testing was performed along same route in all technologies. 500 KB file for 2G, 20MB file for 3G and 40MB file for 4G were downloaded from FTTP server in TSP's own server. Static Data Service Testing was also performed. Three 2G (Lock Mode) networks, Two 3G (Lock Mode) networks, Four 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	YES	YES	YES
TOOL USED	TEMS	NIMO	X-CAL	TEMS

Overview

Voice & Dynamic Data Test Drive Route



Drive Routes: Dibrugarh-Sivasagar-Tinsukia

DAY-1–Dibrugarh Railway Station–Office of the Deputy Commissioner, Dibrugarh-Natun Nirmali Gaon- Mankota High School-Lapatkata-Nahazar Branch Post office-Haldibari Gaon Panchayat-HCDC College, Nitai Pukhuri-Dopani Pathar-Demow Chariali-DC Office Sivasagar-Head Post Office Sivasagar-Gamon Bridge-Sensowa-Kaziranga ITI-Sivasagar Civil Hospital-Namati Post Office-Simaluguri-Lingibor Gaon Panchayat-Bhokot Gaon-Sonari ITI-Kala Kata Gaon-Titlagar Sonari-Joypur- Naharkotia police station-Duliajan Town Road-Tinsukia Junction.

DAY-2–Tinsukia Junction-Hebeda Bongali Gaon-Luhari Nepali Gaon-Hebeda Bangali Gaon-Mamorani Forest Village-Lakhipathar Forest-Margherita Duliajan Tinali-Margherita Police Station-Namdanga Tea State Hospital-Ledo-Lekhapani-Jaugun Police Station-Namchick Check Post- Wagun -Bardumsa Police Station-Borhollong-Purvanchal Adarsha High School-Kailashpur Gaon Panchayat-Lajum Binapani LP School-Dumduma Police Station-Panikhowa Gaon Panchayat-Tingrai Railway Station-ASTC Bus Stand , Tinsukia.

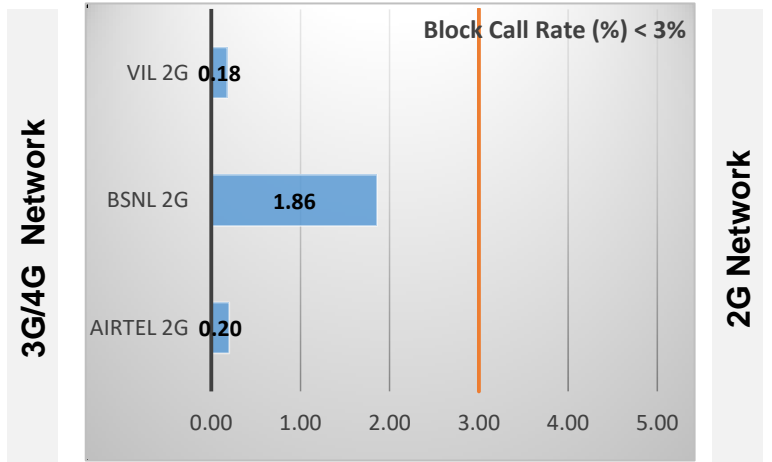
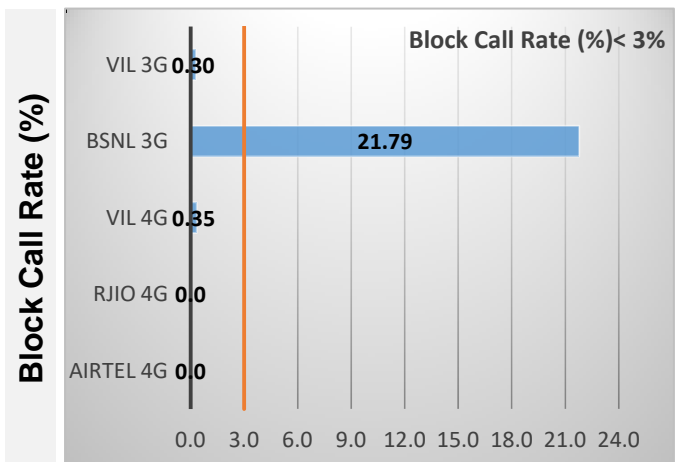
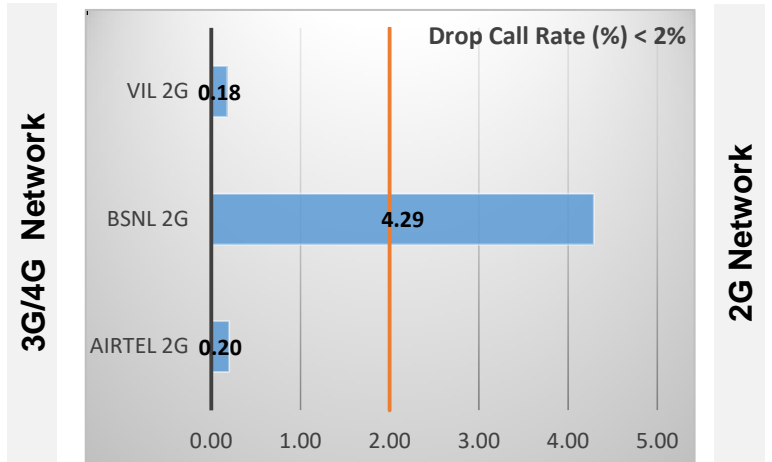
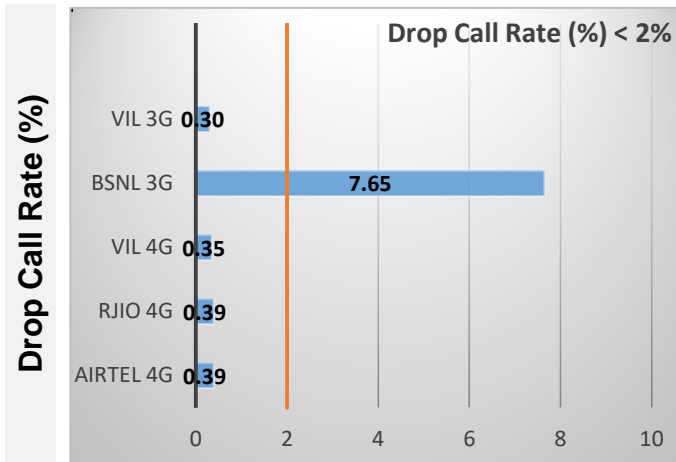
Data Service Test- Static Locations

Static Locations
Dibrugarh Railway Station
Tinsukia Railway Station
ASTC Bus Stand Tinsukia

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 %	0.20	4.29	0.18	7.65	0.30	0.39	0.39	0.35
Block Call Rate %	0.20	1.86	0.18	21.79	0.30	0.0	0.0	0.35

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

Coverage

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

TSPs	2G		
	AIRTEL	BSNL	VIL
Coverage %	88.28	40.49	92.02

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

TSPs	3G		4G			
	BSNL	VIL	AIRTEL	BSNL	RJIO	VIL
Coverage	21.59	91.94	89.52	65.99	97.05	93.98

Summary

City Level Summary- Voice

Voice Call	2G		
	AIRTEL	BSNL	VIL
Call Attempt	493	746	543
Blocked Call Rate (%)	0.20	1.86	0.18
CSSR% (Accessibility)	99.80	93.70	99.82
Drop Call Rate (%)	0.20	4.29	0.18
Mobility HOSR (%)	98.68	87.40	100
Rx Quality (%)	94.71	92.92	95.47

Voice Call	3G/4G				
	BSNL 3G	VIL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Call Attempt	468	338	508	515	284
Blocked Call Rate (%)	21.79	0.30	0.0	0.0	0.35
CSSR% (Accessibility)	78.21	99.70	99.61	99.42	99.65
Drop Call Rate (%)	7.65	0.30	0.39	0.39	0.35
Mobility HOSR (%)	99.38	100	100	99.85	100
Rx Quality (%)	72.64	93.45	96.43	88.39	94.66

Summary-Data Services Dynamic

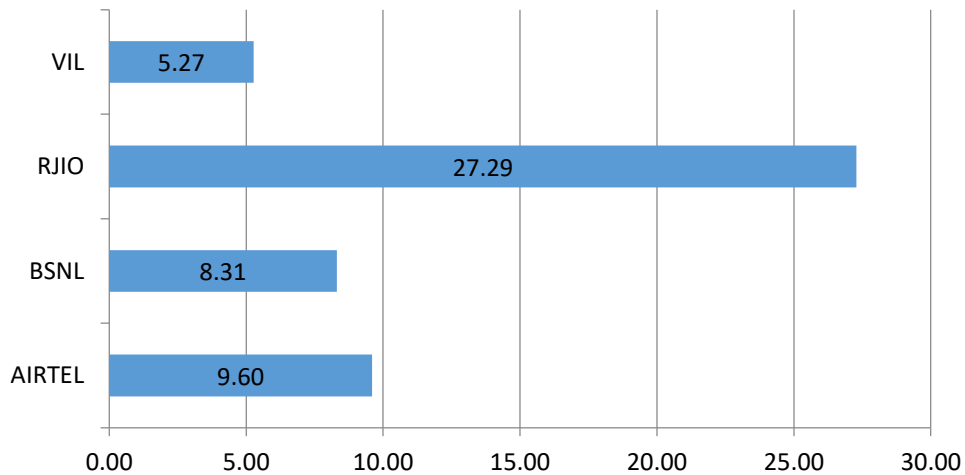
Key Observations

Dynamic Data was tested for 473 Kms. Download Throughput was tested.

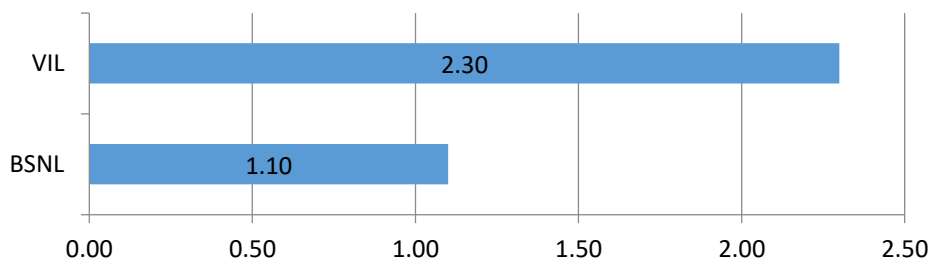
Data Download Performance (Average Throughput in Mbps) - Dynamic Data Testing

4G/3G Network:

4G-Dynamic Download Average Throughput (Mbps)



3G-Dynamic Download Average Throughput (Mbps)



Summary-Data Services Static

City Level Summary-

Average Data Services Static	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	109.48	102.43	101.77
Upload Throughput (kbps)	65.19	27.67	59.90
Web Browsing Delay (sec)	3.33	0.01	2.90
Latency (msec)	187	418.5	212

Average Data Services Static	3G/ 4G					
	BSNL 3G	VIL 3G	AIRTEL 4G	BSNL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	2.25	3.44	13.45	4.46	6.50	14.35
Upload Throughput in Mbps	0.21	1.99	6.26	2.24	3.61	6.31
Video streaming delay (secs)	4.0	1.83	0.0	1.25	0.0	1.67
Web Browsing Delay (secs)	0.09	1.27	0.0	0.01	4.30	0.38
Latency (msec)	367.5	108.5	54.60	86	62	92.5

Summary-Data Services Static

Location Level Summary-

Location:-Dibrugarh Railway Station	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	118.11	95.20	101.13
Upload Throughput (kbps)	78.23	43.20	73.06
Web Browsing Delay (sec)	5.0	0.01	2.42
Latency (msec)	184	210.5	218

Location:-Dibrugarh Railway Station	3G/4G				
	VIL 3G	AIRTEL 4G	BSNL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	3.72	11.8	4.46	4.50	15.13
Upload Throughput in Mbps	2.66	6.65	2.24	2.43	8.13
Video streaming delay (secs)	1.82	0	1.25	0.0	1.56
Web Browsing Delay (secs)	1.26	0	0.01	3.46	0.52
Latency (msec)	103	56	86	62	99

Location:- Tinsukia Railway Station	2G		
	AIRTEL	BSNL	VIL
Download throughput in (kbps)	116.14	133.14	102.40
Upload Throughput in (kbps)	71.07	20.70	46.73
Web Browsing Delay (secs)	0.0	0.02	3.37
Latency (msec)	186	343	206

Location:- Tinsukia Railway Station	4G				
	BSNL 3G	VIL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in (mbps)	3.58	3.16	14.50	10.97	13.56
Upload Throughput in (mbps)	0.23	1.34	6.29	4.73	4.49
Video streaming delay (secs)	3.50	1.83	0.0	0.0	1.78
Web Browsing Delay (secs)	0.15	1.28	0.0	5.90	0.24
Latency (msec)	202	114	54	65	86

Summary-Data Services Static

Location Level Summary-

Location:-ASTC Bus Stand Tinsukia	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	94.21	78.94	***
Upload Throughput (kbps)	46.29	19.10	***
Web Browsing Delay (sec)	5.0	0.01	***
Latency (msec)	192	702	***

Location:-ASTC Bus Stand Tinsukia	3G/4G				
	BSNL 3G	VIL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	0.93	***	14.07	4.05	***
Upload Throughput in Mbps	0.19	***	5.84	3.68	***
Video streaming delay (secs)	4.50	***	0.0	0.0	***
Web Browsing Delay (secs)	0.02	***	0.0	3.65	***
Latency (msec)	533	***	54	60	***

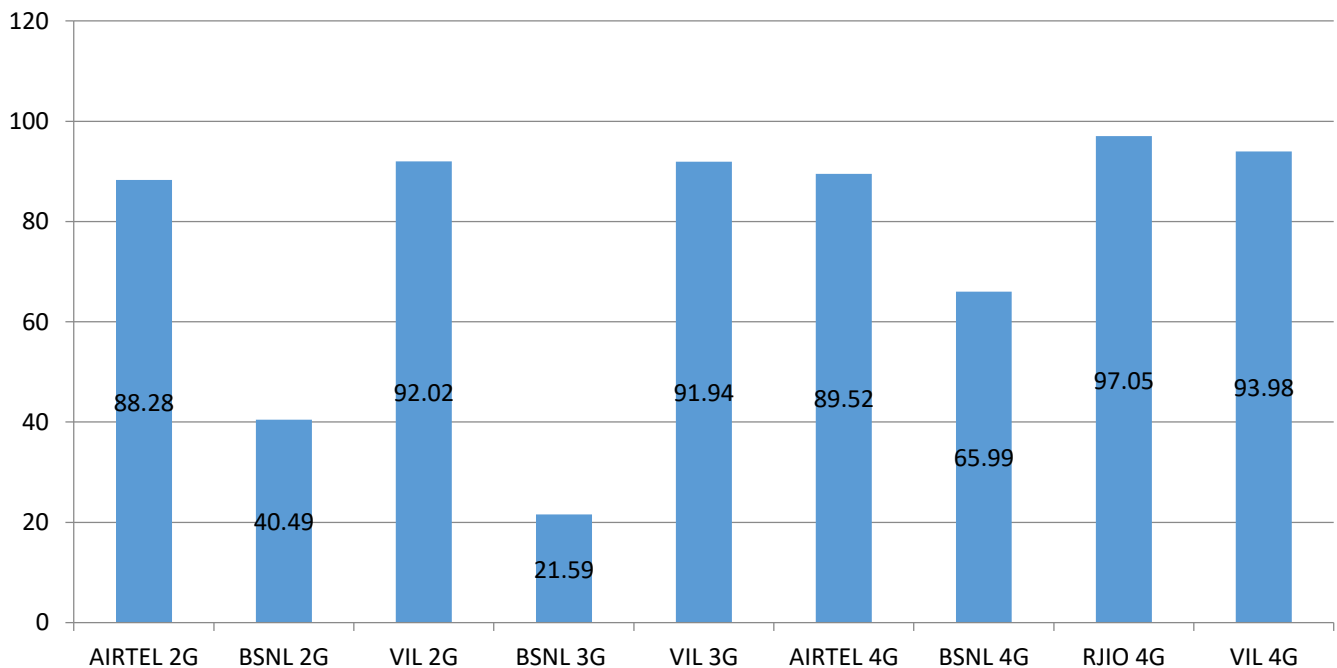
*** VIL did not submit data

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 ≥ -85 dBm, RSCP is ≥ -90 dBm & RSRP ≥ -110 dBm. The details are as follows.

TSP	Coverage Rate %
AIRTEL 2G	88.28
BSNL 2G	40.49
VIL 2G	92.02
BSNL 3G	21.59
VIL 3G	91.94
AIRTEL 4G	89.52
BSNL 4G	65.99
RJIO 4G	97.05
VIL 4G	93.98

Coverage Rate %



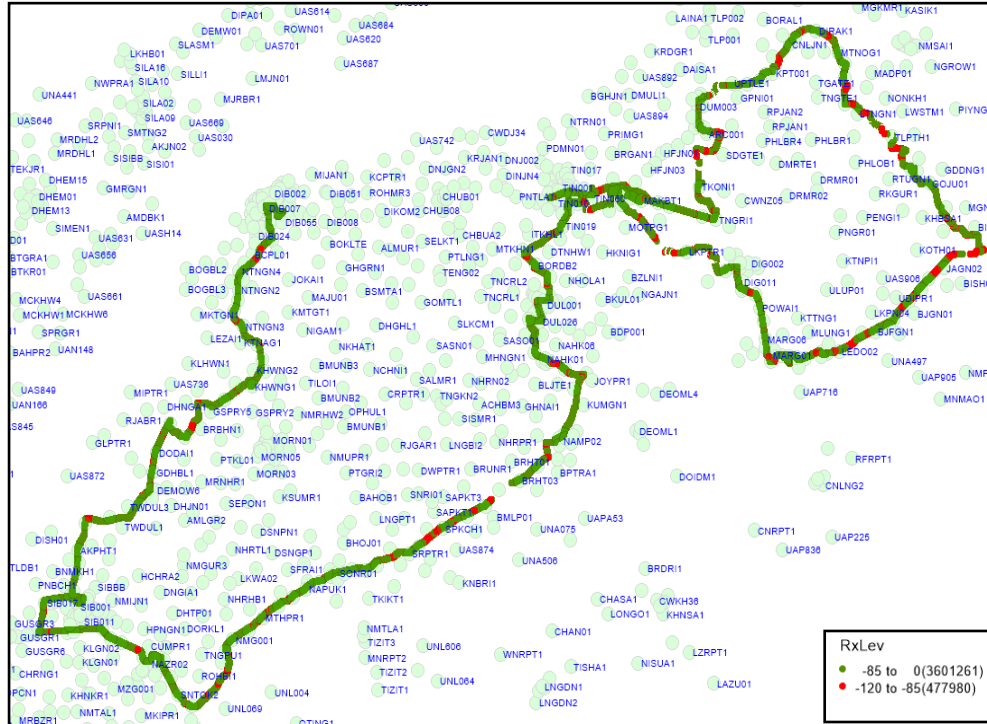
Note- Coverage is the percentage of samples having signal strength more than the threshold value (2G ≥ -85 dbm, 3G ≥ -90 dbm and 4G ≥ -110 dbm). However, these samples are only for the portion of the OADT routes where TSPs have coverage i.e 'no coverage' routes have been excluded.

I. Coverage Details

AIRTEL

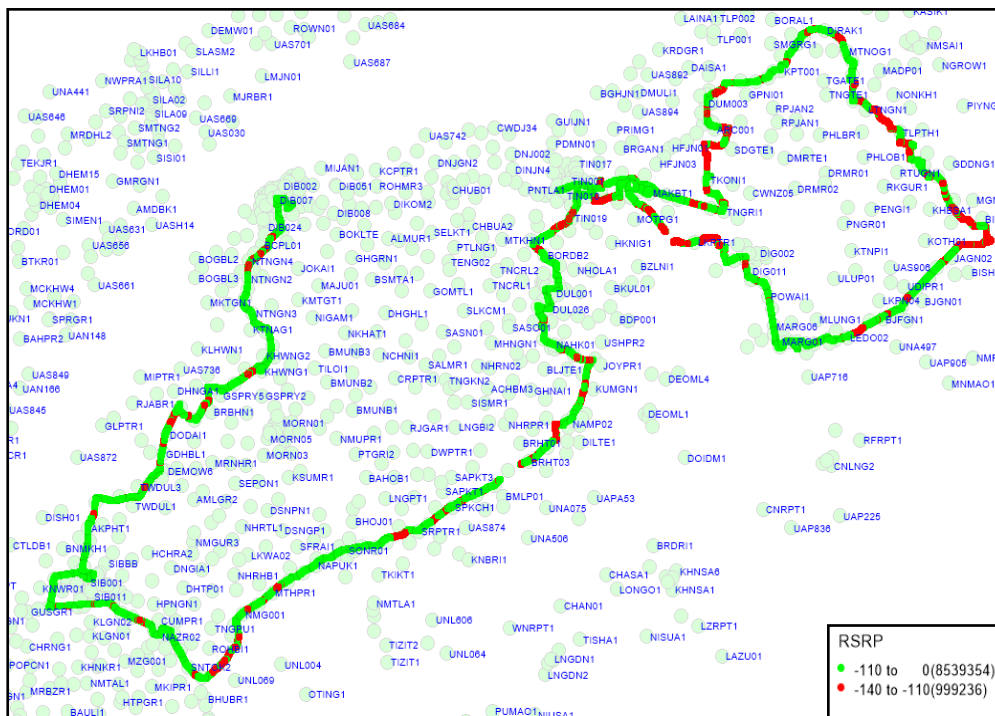
Technology	Coverage Rate %
2G	88.28
4G	89.52

2G



Overall Rx Level	Sample %
[Max >=-75]	42.75
[-75 >=-85]	45.53
[-85 >=-95]	5.67
[-95 >=Min]	6.05
Total	100

4G



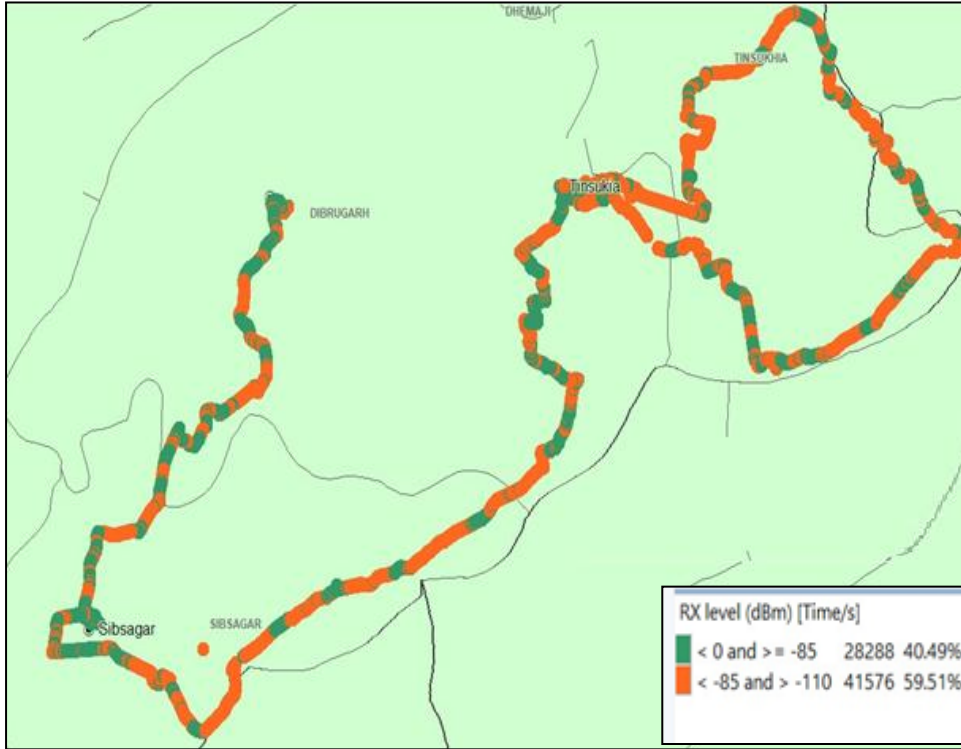
Overall RSRP	Sample %
[Max >=-80]	10.15
[-80 >=-90]	22.33
[-90 >=-110]	57.04
[-110 >=Min]	10.48
Total	100

I. Coverage Details

BSNL

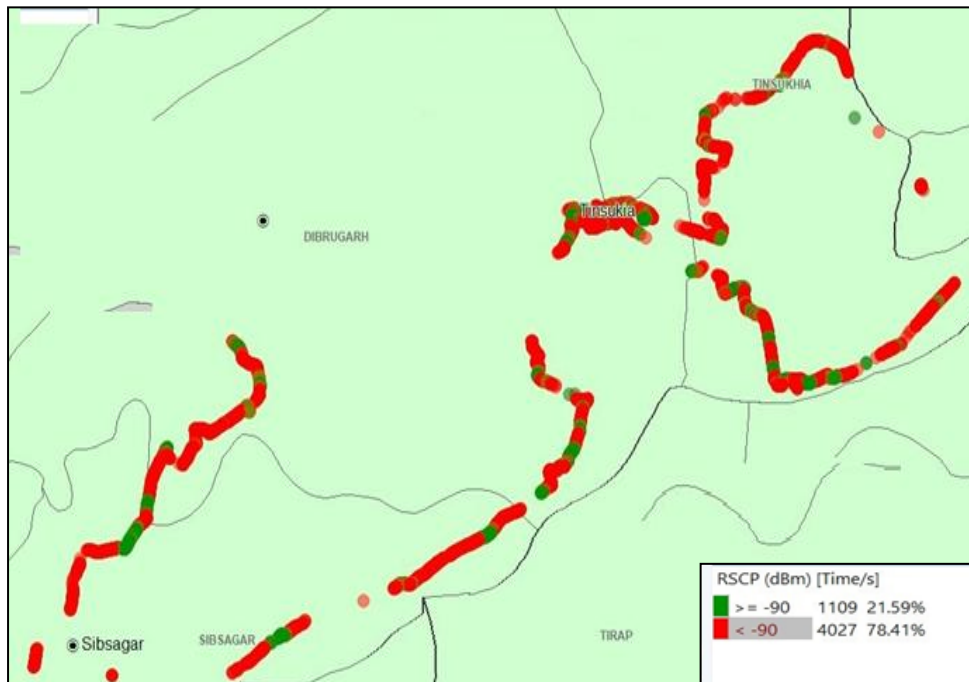
Technology	Coverage Rate %
2G	40.49
3G	21.59

2G



Overall RxLevel	Sample %
[Max >=-75]	20.61
[-75 >=-85)	19.88
[-85 >=-95)	32.19
[-95 >=Min)	27.32
Total	100

3G



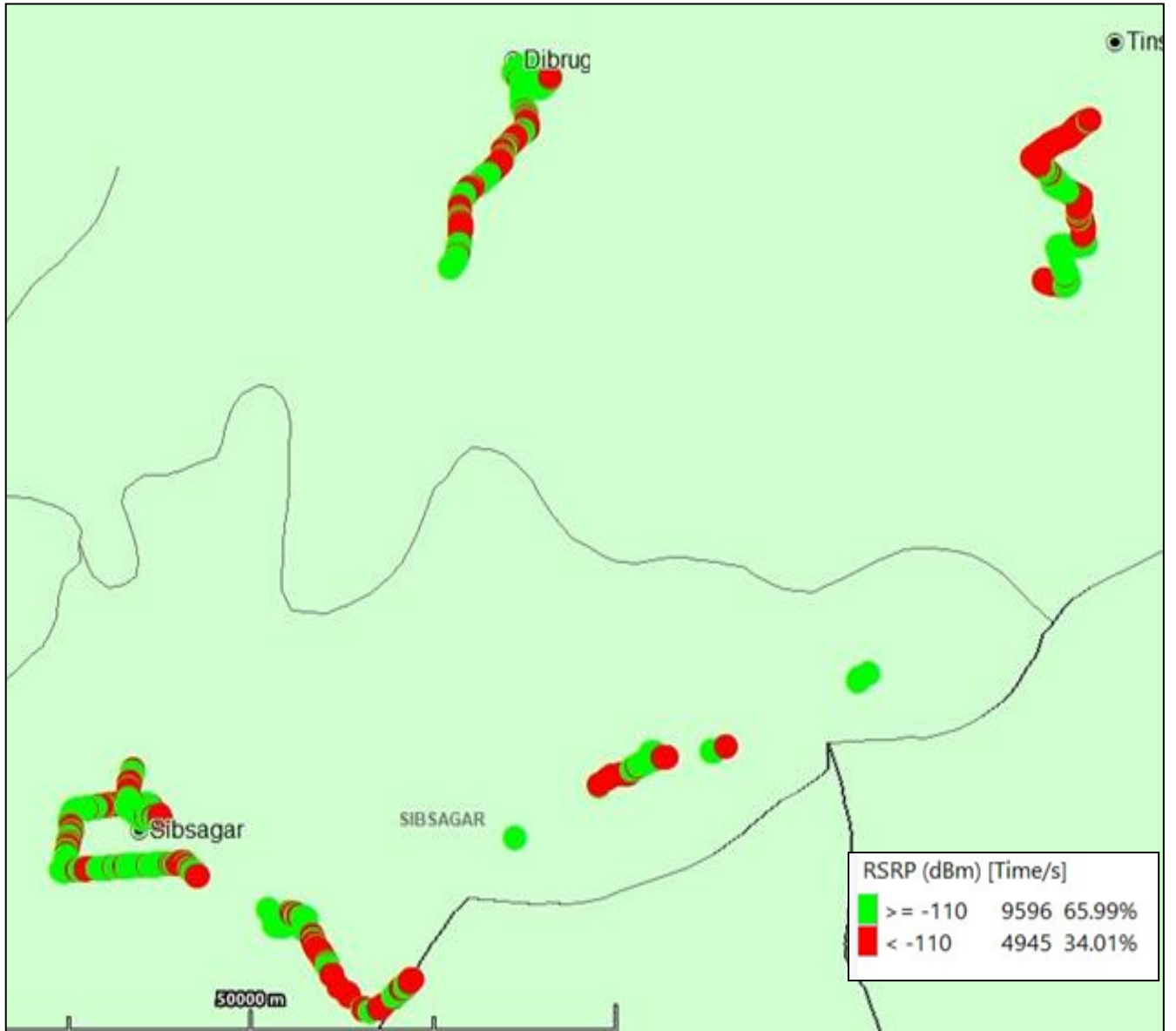
Overall RSCP	Sample %
[Max >=-70]	1.89
[-70 >=-80)	6.60
[-80 >=-90)	13.10
[-90 >=Min)	78.41
Total	100

I. Coverage Details

BSNL

Technology	Coverage Rate %
4G	65.99

4G

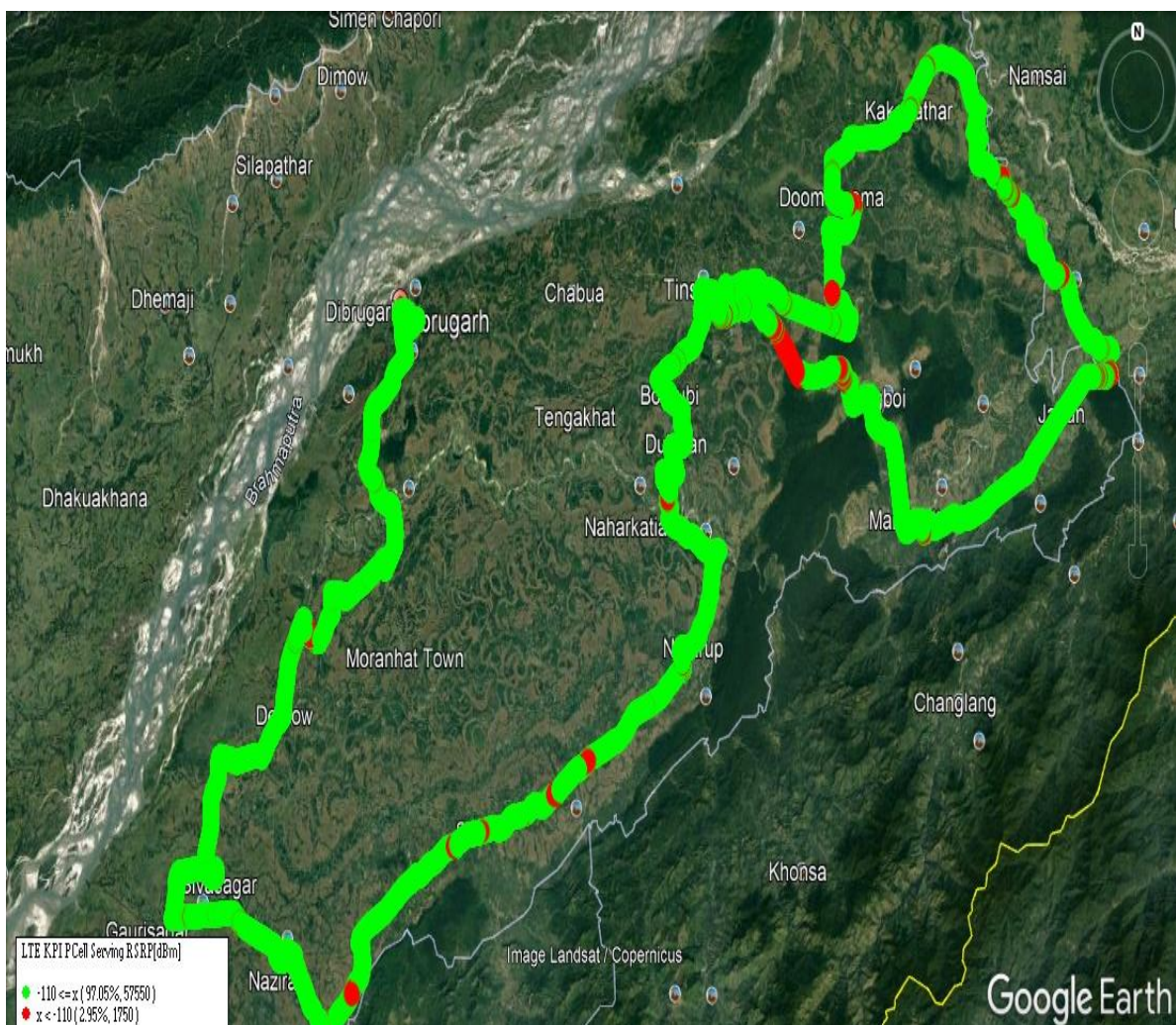


Overall RSRP	Sample %
[Max >= -80]	7.50
[-80 >= -90)	13.57
[-90 >= -110)	44.93
[-110 >= Min)	34.01
Total	100

I. Coverage Details

RJIO

Technology	Coverage Rate %
4G	97.05
4G	



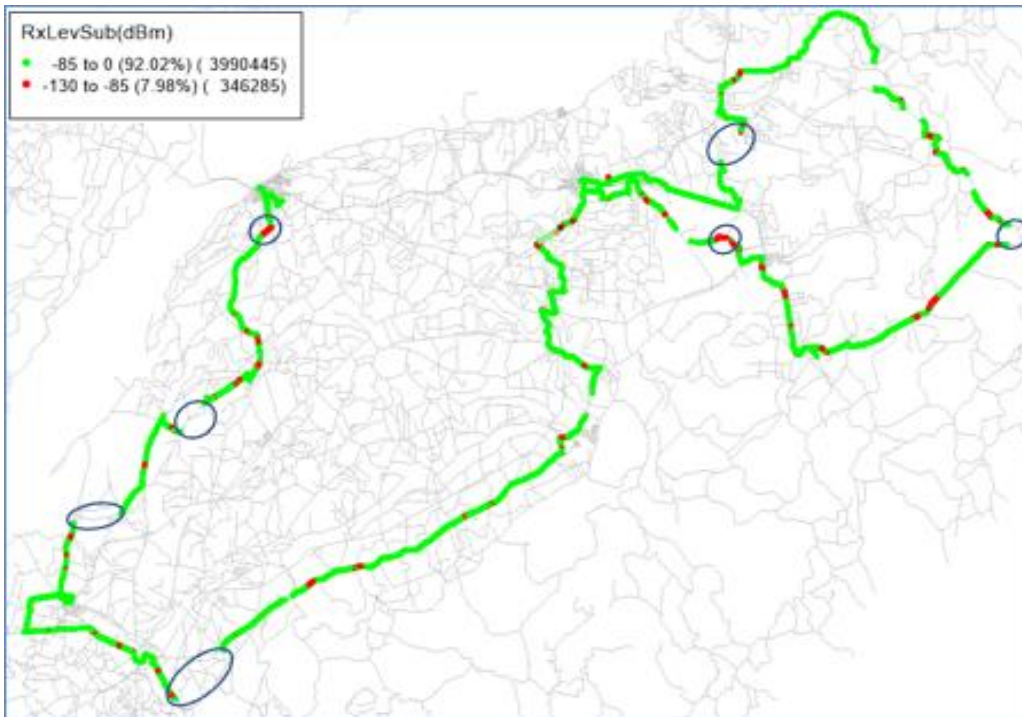
Overall RSRP	Sample %
[Max \geq -80]	21.90
[-80 \geq -90)	22.67
[-90 \geq -110)	47.03
[-110 \geq Min)	8.40
Total	100

I. Coverage Details

VIL

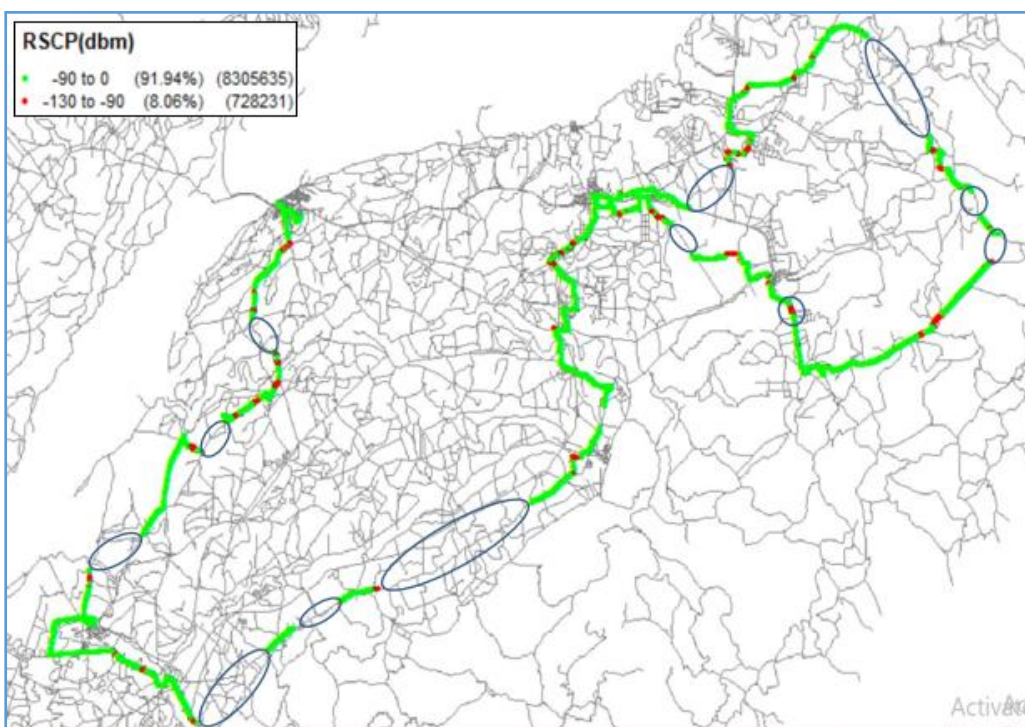
Technology	Coverage Rate %
2G	92.02
3G	91.94

2G



Overall RxLevel	Sample %
[Max >=-75]	52.26
[-75 >=-85]	39.75
[-85 >=-95]	7.28
[-95 =Min)	0.71
Total	100

3G



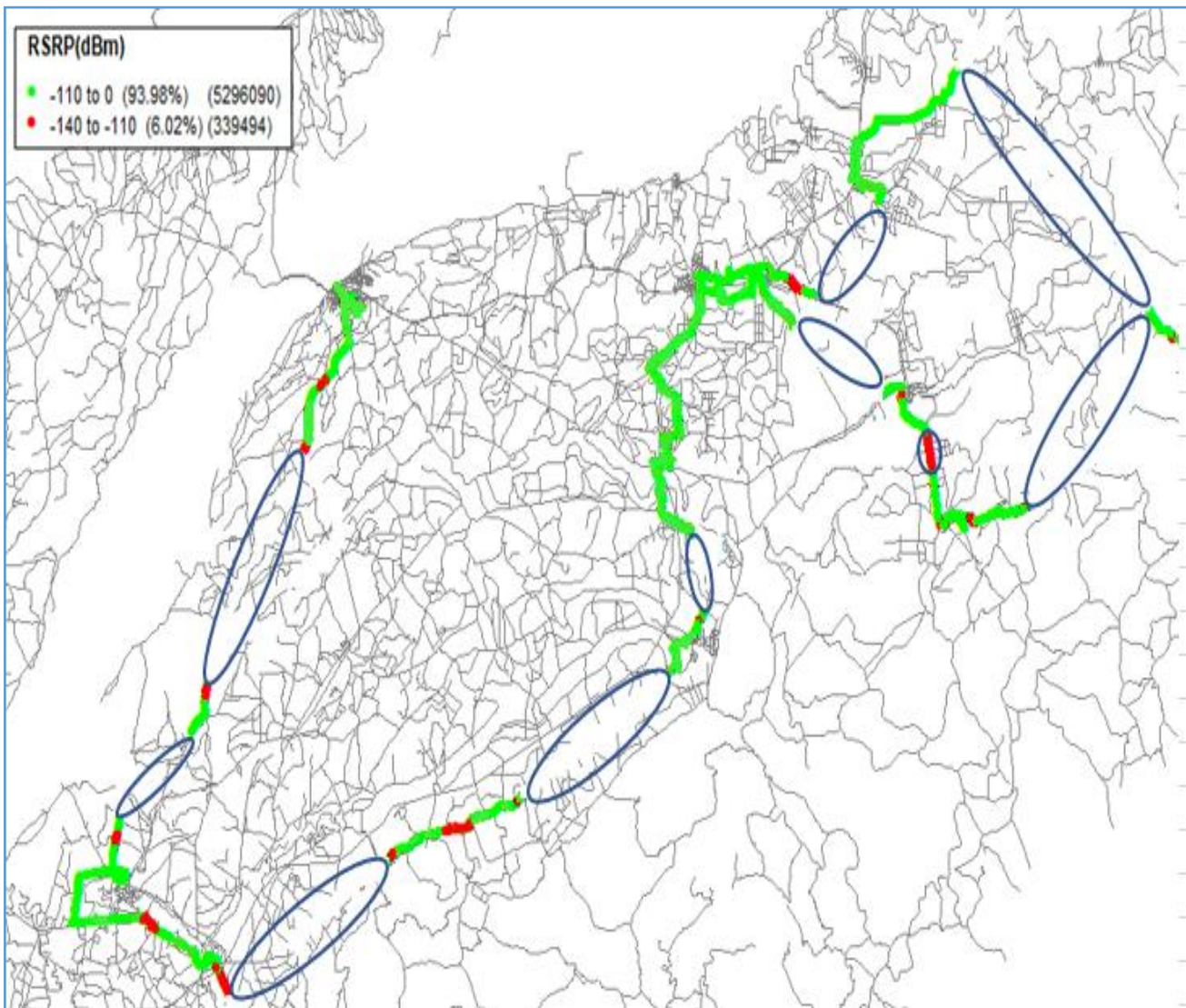
Overall RSCP	Sample %
[Max >=-70]	15.97
[-70 >=-80]	43.96
[-80 >=-90]	32.01
[-90 >=Min)	8.06
Total	100

I. Coverage Details

VIL

Technology	Coverage Rate %
4G	93.98

4G



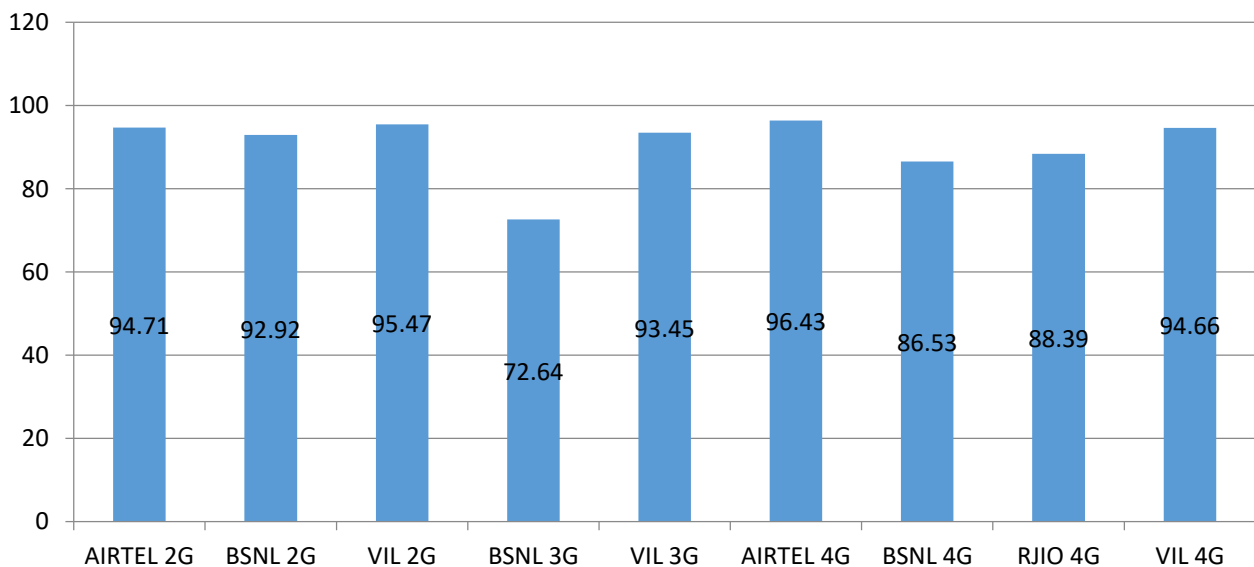
Overall RSRP	Sample %
[Max >=-80]	26.39
[-80 >=-90)	21.53
[-90 >=-110)	46.06
[-110 >=Min)	6.02
Total	100

II. Quality Details

For measuring voice quality, as per the QoS norms, Rx Quality ≤ 5 for GSM, $E_c/N_0 \geq -14$ 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	94.71
BSNL 2G	92.92
VIL 2G	95.47
BSNL 3G	72.64
VIL 3G	93.45
AIRTEL 4G	96.43
BSNL 4G	86.53
RJIO 4G	88.39
VIL 4G	94.66

Rx Quality %

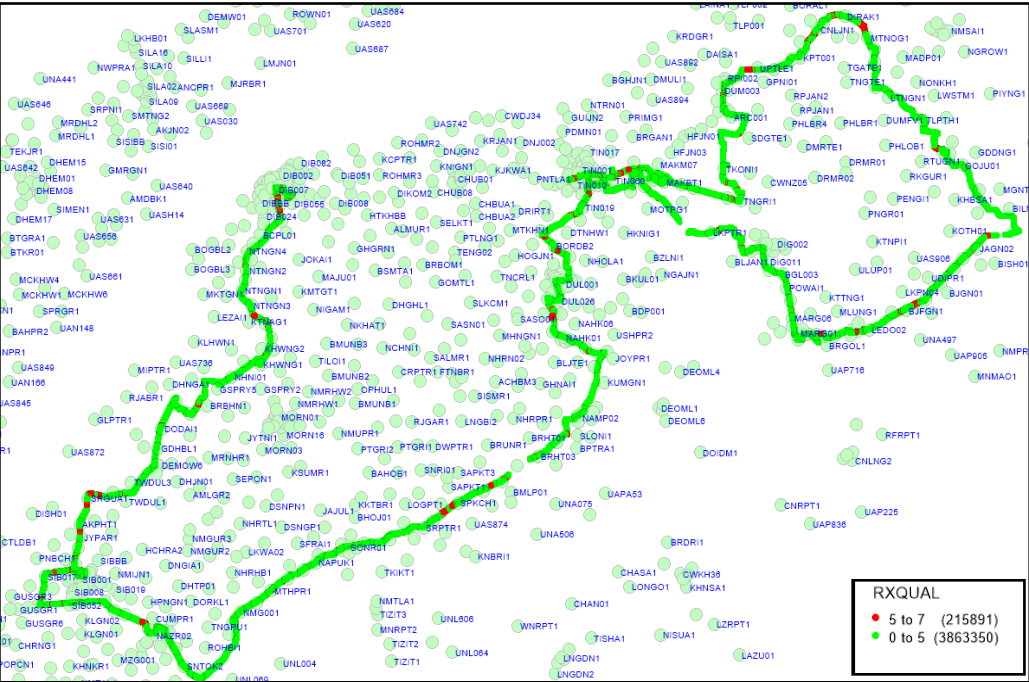


II. Quality Details

AIRTEL

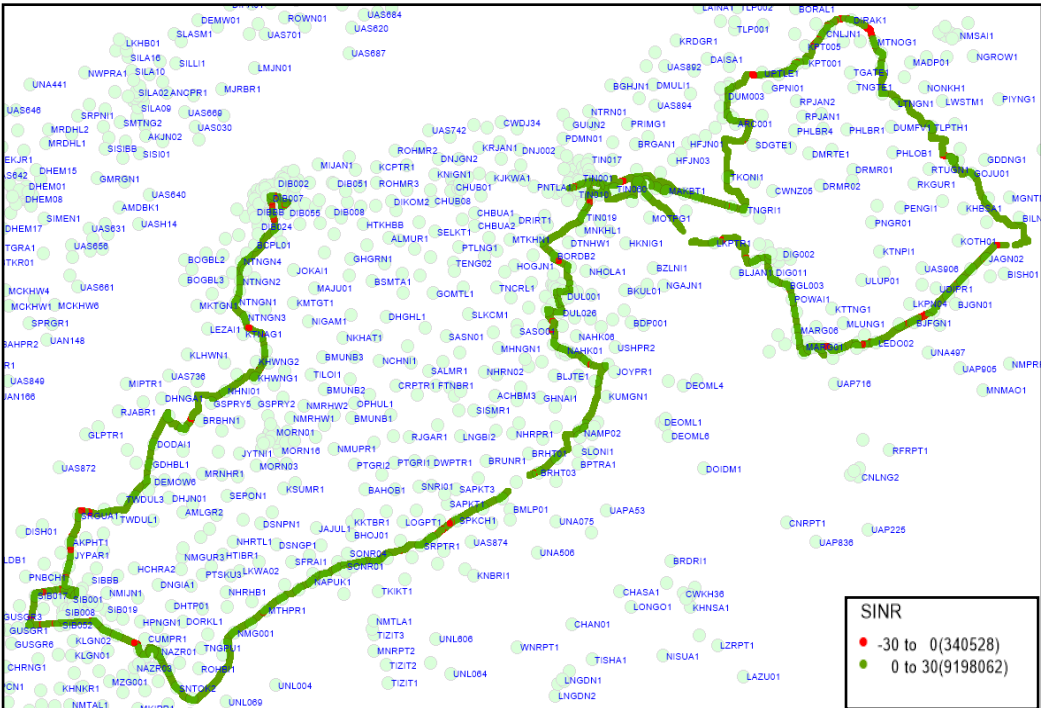
Technology	Rx Quality %
2G	94.71
4G	96.43

2G



Overall Rx Quality	Sample %
(Min <=2)	86.22
(2 <=3)	2.19
(3 <=4)	3.34
(4 <=5)	2.96
(5 <=Max)	5.29
Total	100

4G



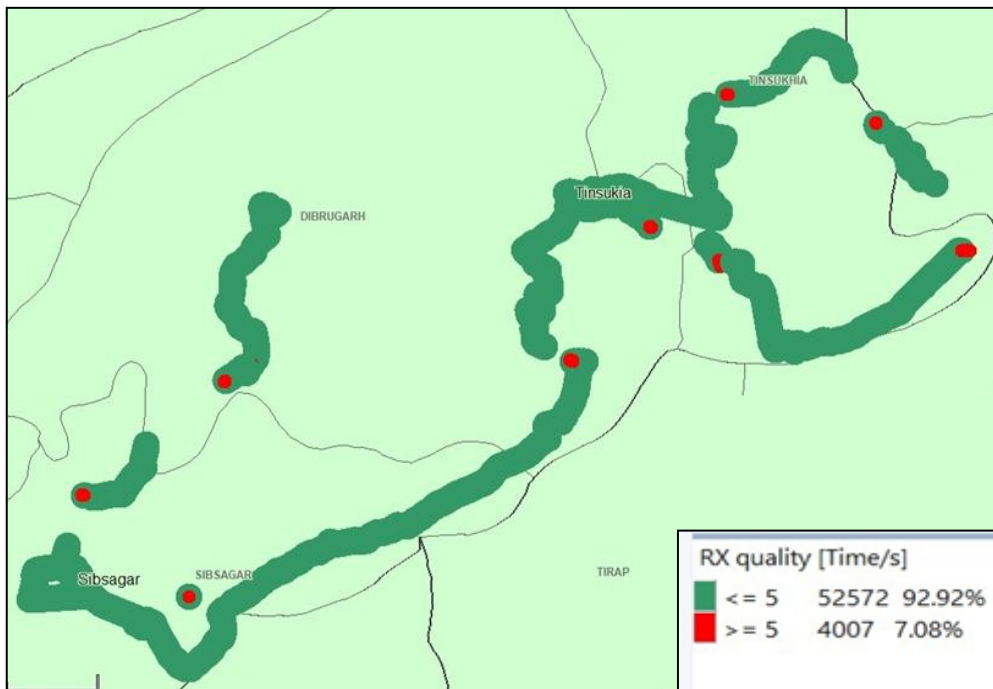
Overall SINR	Sample %
(Min <=0)	3.57
(0 <=5)	15.32
(5 <=10)	64.78
(10 <=15)	14.44
(15 <=Max)	1.89
Total	100

II. Quality Details

BSNL

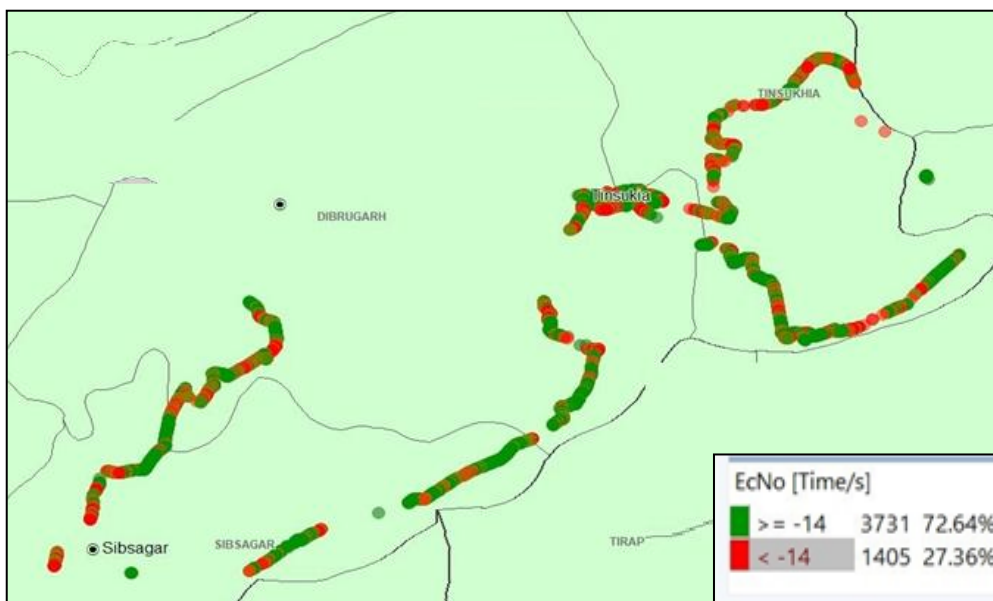
Technology	Rx Quality %
2G	92.92
3G	72.64

2G



Overall Rx Quality	Sample %
(Min <=2)	83.82
(2 <=3)	2.95
(3 <=4)	3.29
(4 <=5)	2.86
(5 <=Max)	7.08
Total	100

3G



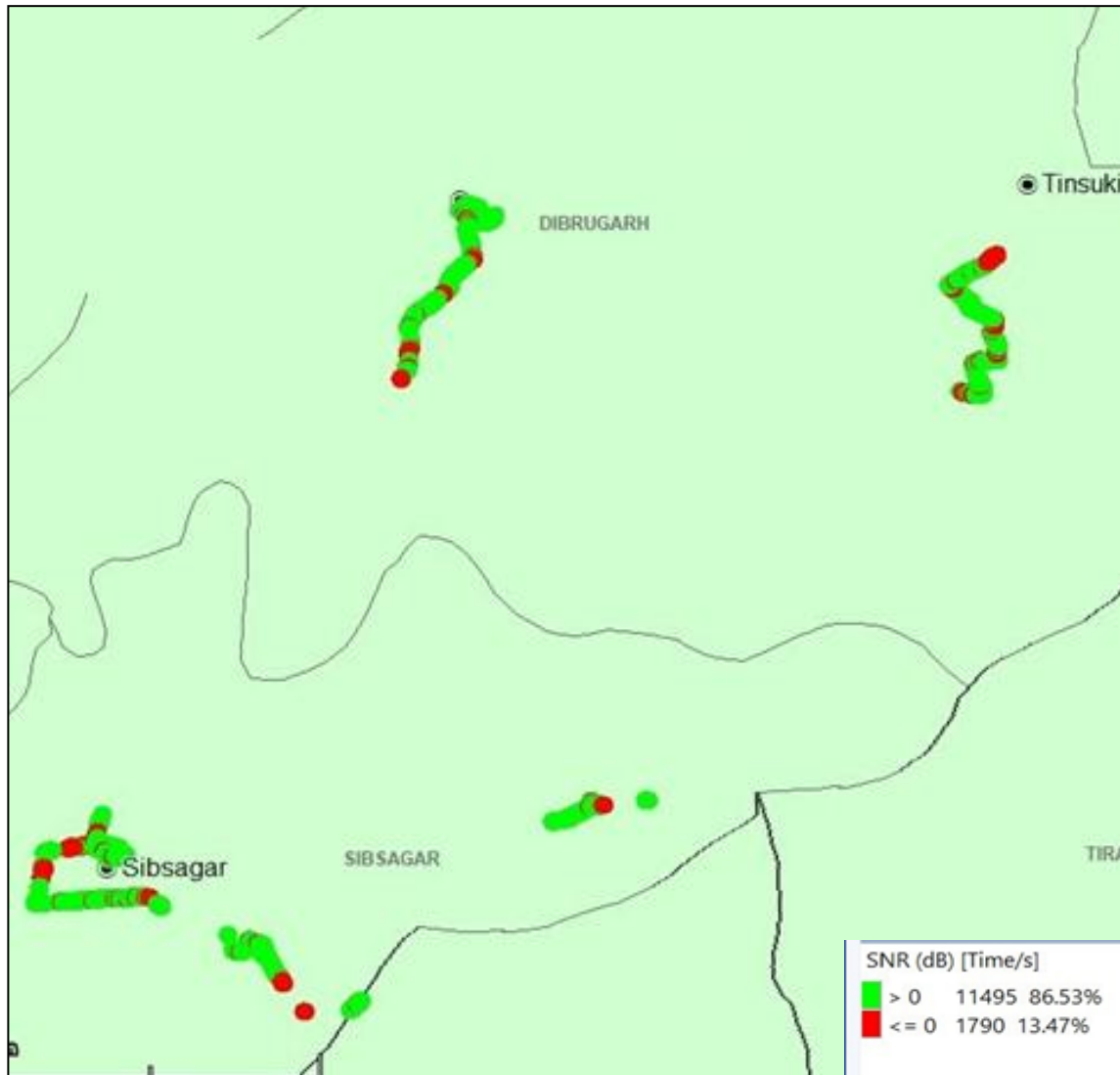
Overall EcNo	Sample %
(Max <=-6)	8.27
(-6 <=-9)	16.20
(-9 <=-11)	15.87
(-11 <=-14)	32.30
(-14 <= Min)	27.36
Total	100

II. Quality Details

BSNL

Technology	Rx Quality %
4G	86.53

4G

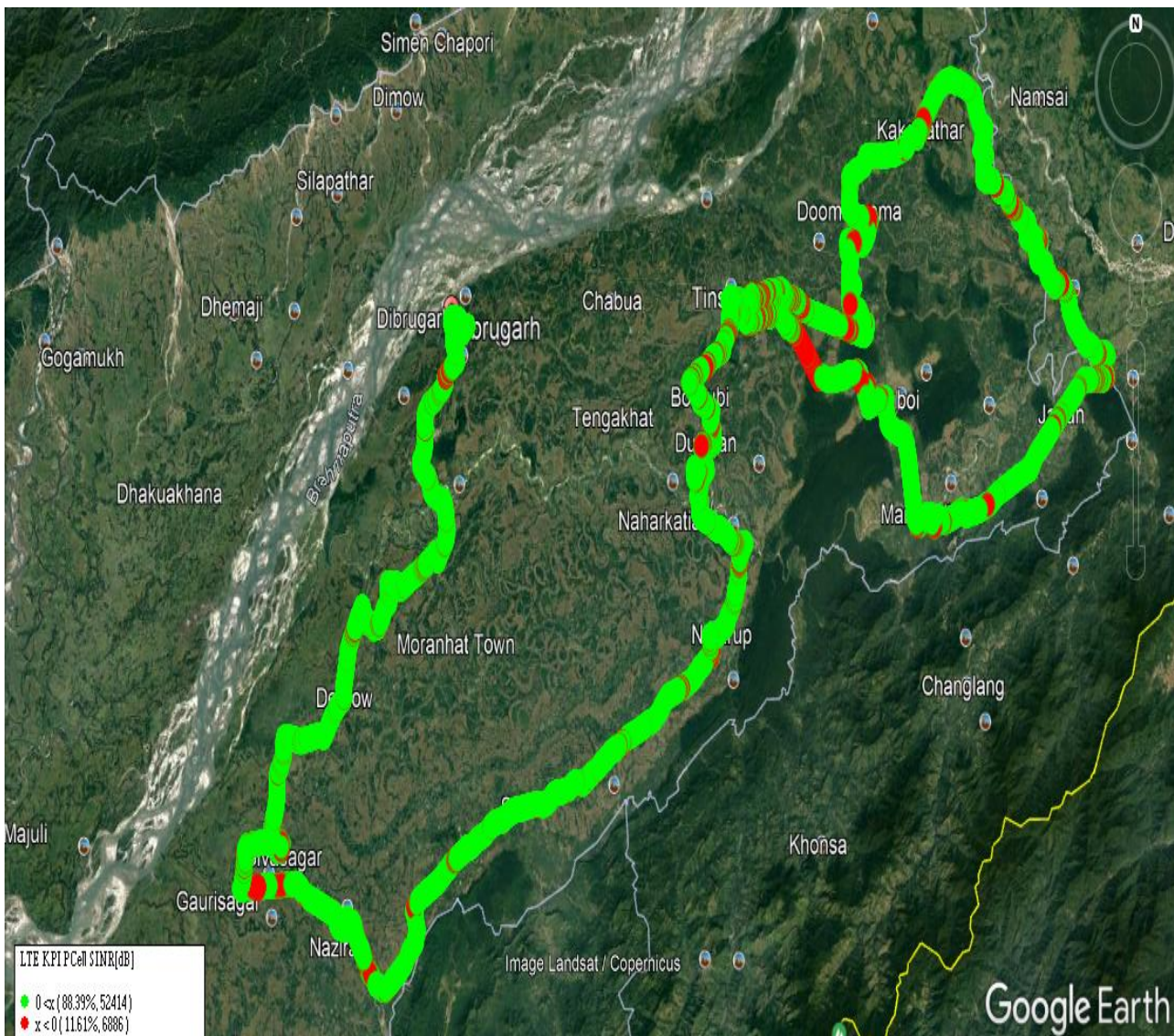


Overall SINR	Sample %
(Min <=0)	13.11
(0 <=5)	22.42
(5 <=10)	25.25
(10 <=15)	23.62
(15 <=Max)	15.59
Total	100

II. Quality Details

RJIO

Technology	Rx Quality %
4G	88.39
4G	



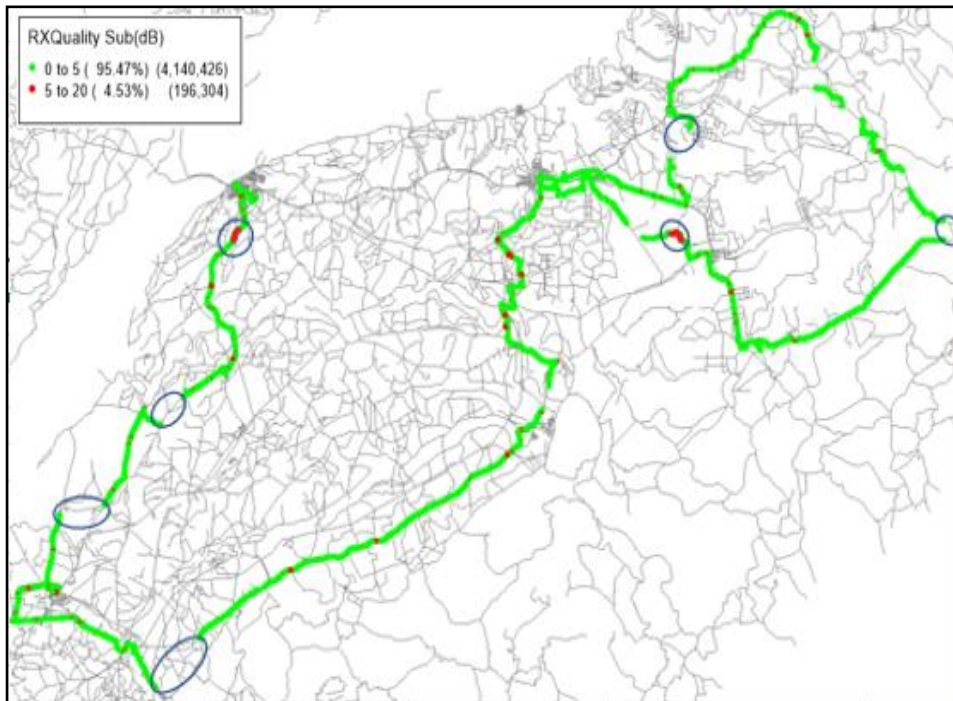
Overall SINR	Sample %
(Min <=0)	11.56
(0 <=5)	20.59
(5 <=10)	25.92
(10 <=15)	20.27
(15 <=Max)	21.65
Total	100

II. Quality Details

VIL

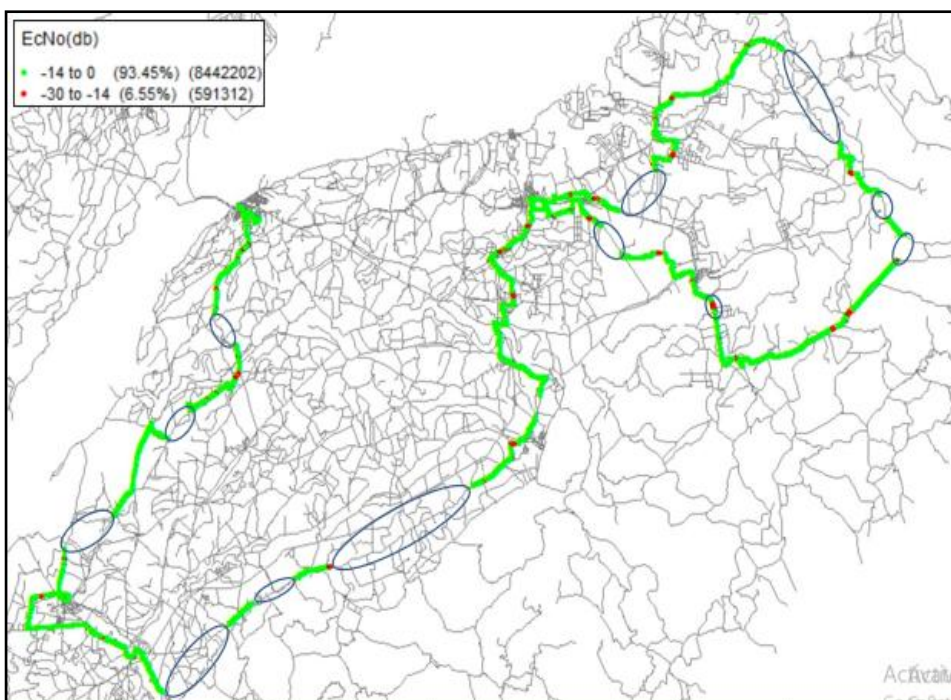
Technology	Rx Quality %
2G	95.47
3G	93.45

2G



Overall Rx Quality	Sample %
(Min <=2)	70.02
(2 <=3)	21.12
(3 <=4)	2.10
(4 <=5)	2.24
(5 <=Max)	4.53
Total	100

3G

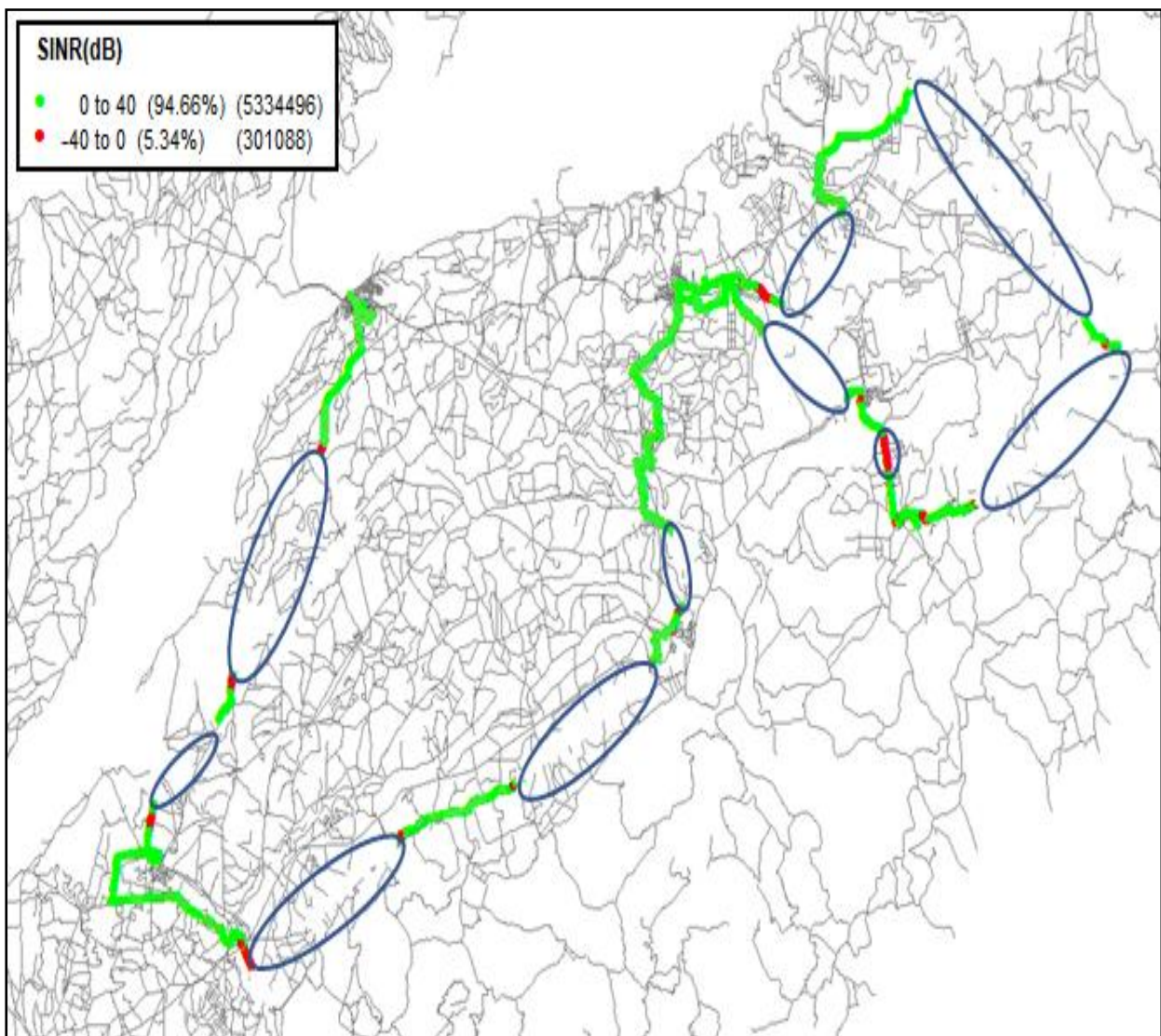


Overall EcNo	Sample %
(Max <=-6)	41.99
(-6 <=-9)	26.23
(-9 <=-11)	15.22
(-11 <=-14)	10.01
(-14 <= Min)	6.55
Total	100

II. Quality Details

VIL

Technology	Rx Quality %
4G	94.66
4G	



Overall SINR	Sample %
(Min <=0)	5.34
(0 <=5)	15.11
(5 <=10)	39.23
(10 <=15)	22.18
(15 <=Max)	18.14
Total	100

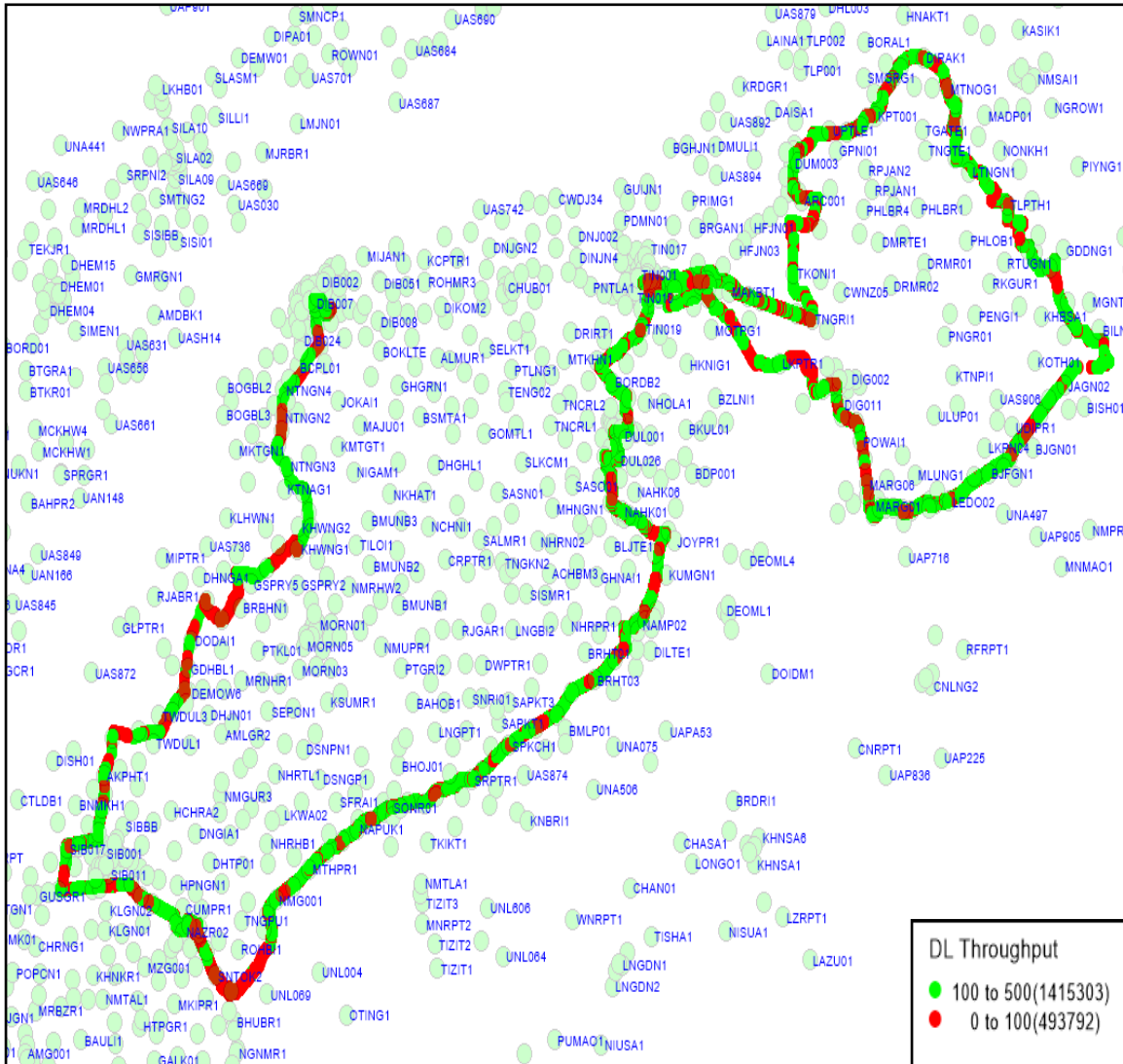
IV. Dynamic Data Test- 2G DL Details

AIRTEL

Dynamic Data Testing Complete 473 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	86.10

2G



AVG. DOWNLOAD SPEED (Kbps)	86.10
% FILE TRANSFER COMPLETE	79.65
DL throughput	Sample %
0 to 50 Kbps	1.33
50 to 100 Kbps	24.53
100 to 200 Kbps	65.66
200 to 300 Kbps	8.22
>300 Kbps	0.25
Total	100

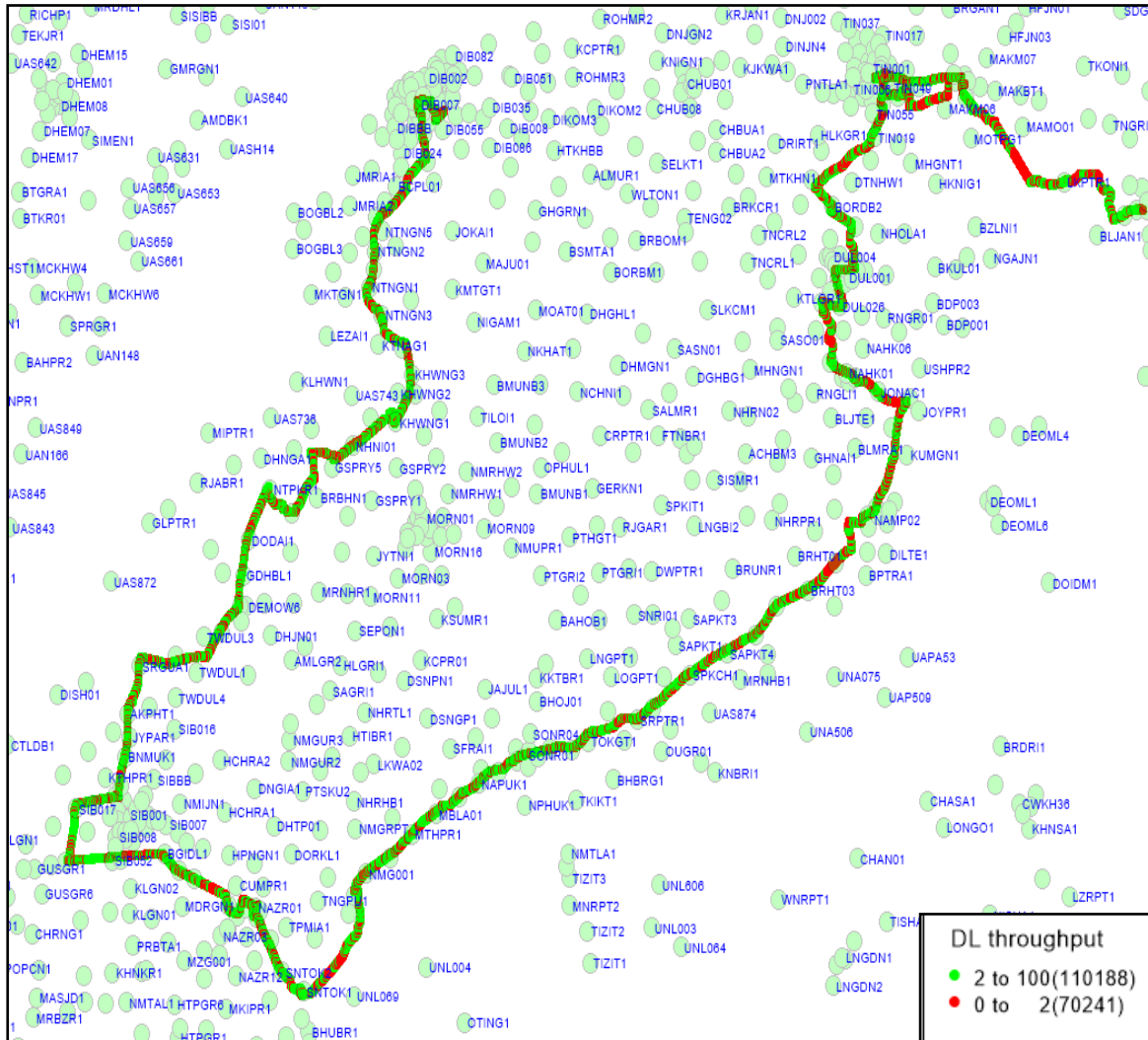
IV. Dynamic Data Test- 4G DL Details

AIRTEL

Dynamic Data Testing Complete 473 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	9.60

4G



AVG. DOWNLOAD SPEED (Mbps)	9.60
% FILE TRANSFER COMPLETE	84.39
DL throughput	Sample %
0 to 1 Mbps	35.79
1 to 2 Mbps	3.14
2 to 5 Mbps	9.36
5 to 10 Mbps	11.28
>10 Mbps	40.43
Total	100

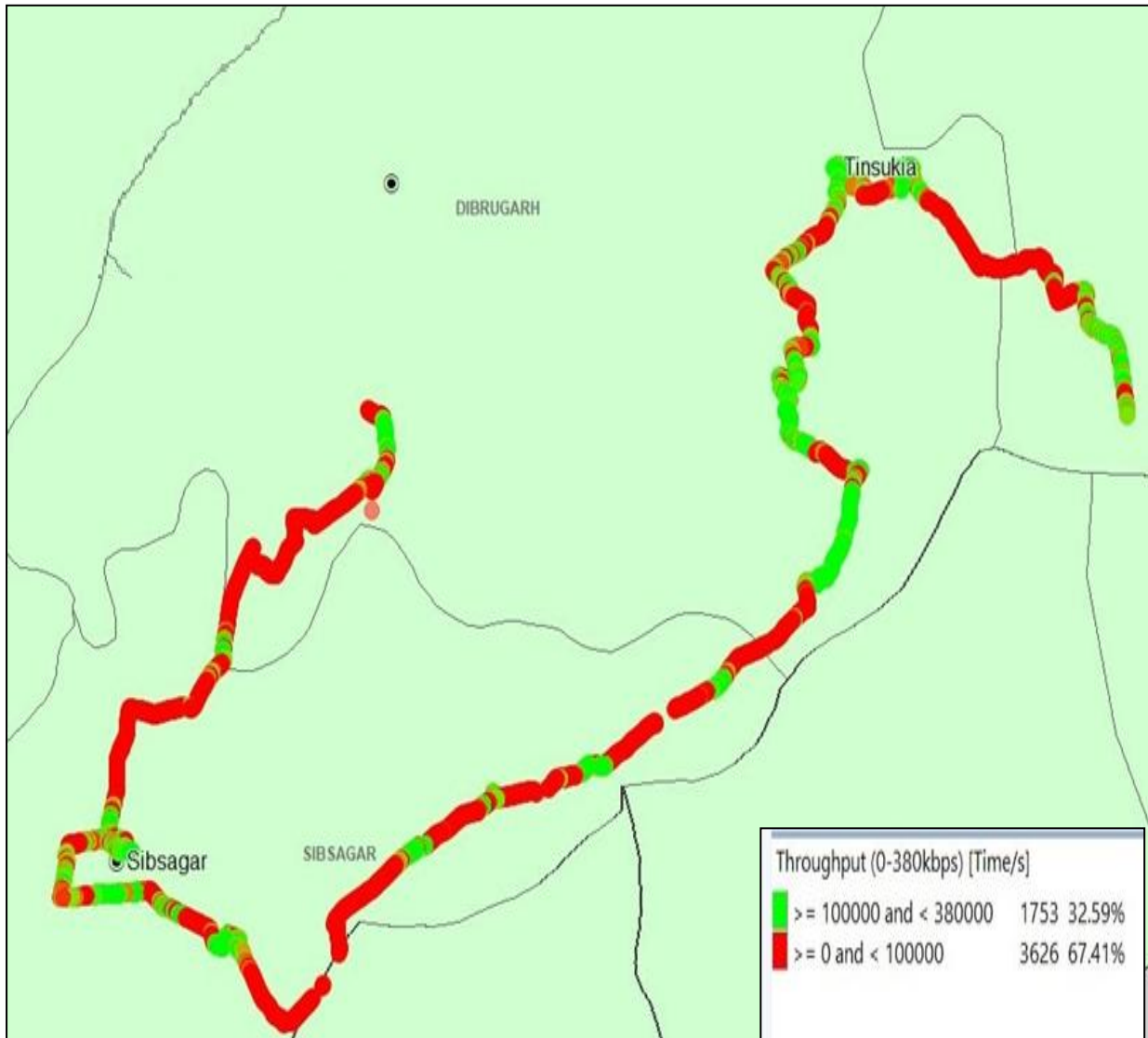
IV. Dynamic Data Test- 2G DL Details

BSNL

Dynamic Data Testing Complete 473 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	74.79

2G



AVG. DOWNLOAD SPEED (Kbps)	74.79
% FILE TRANSFER COMPLETE	89.64
DL throughput	Sample %
0 to 50 Kbps	58.73
50 to 100 Kbps	8.68
100 to 200 Kbps	19.59
200 to 300 Kbps	12.99
>300 Kbps	0
Total	100

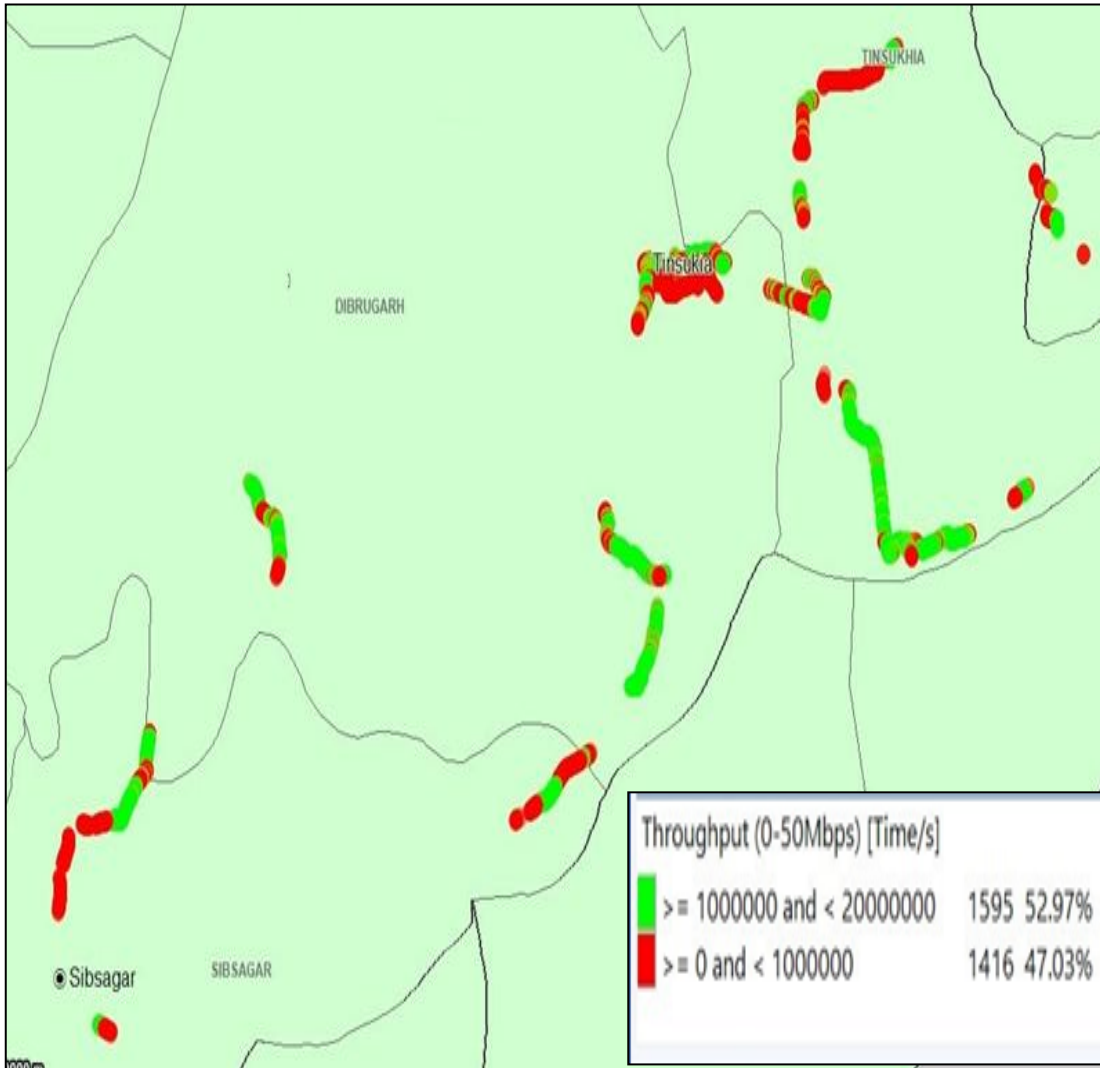
IV. Dynamic Data Test- 3G DL Details

BSNL

Dynamic Data Testing Complete 473 Kms

Data KPIs - Overall	3G
Average Download Throughput (Mbps)	1.10

3G



AVG. DOWNLOAD SPEED (Mbps)	1.10
% FILE TRANSFER COMPLETE	87.96
DL throughput	Sample %
0 to 0.5 Mbps	39.16
0.5 to 1 Mbps	7.87
1 to 2 Mbps	14.05
2 to 5 Mbps	22.88
>5 Mbps	16.04
Total	100%

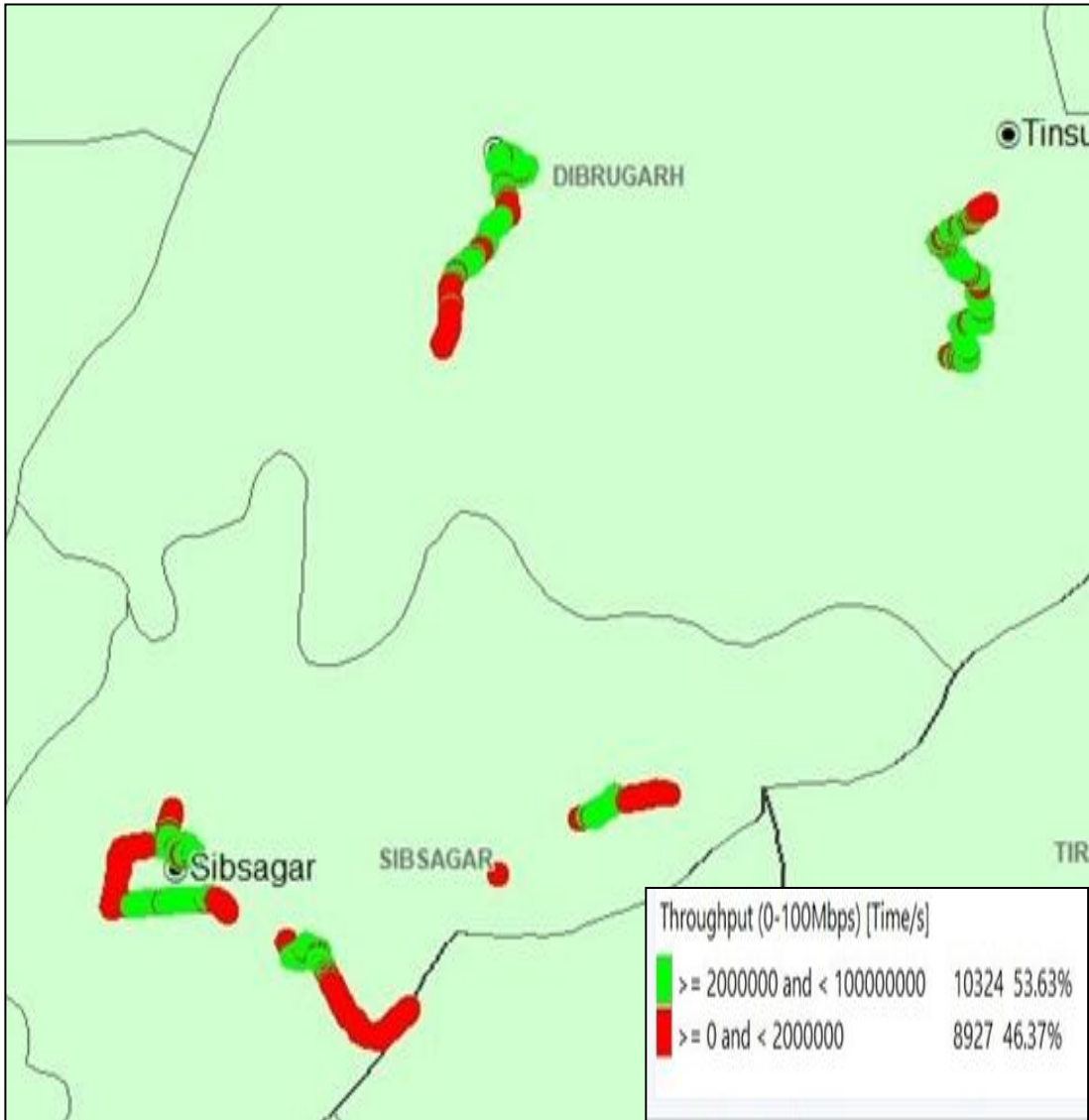
IV. Dynamic Data Test- 4G DL Details

BSNL

Dynamic Data Testing Complete 473 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	8.31

4G



AVG. DOWNLOAD SPEED (Mbps)	8.31
% FILE TRANSFER COMPLETE	95.39
DL throughput	Sample %
0 to 0.5 Mbps	40.88
0.5 to 1 Mbps	5.49
1 to 2 Mbps	20.45
2 to 5 Mbps	12.28
>5 Mbps	20.90
Total	100

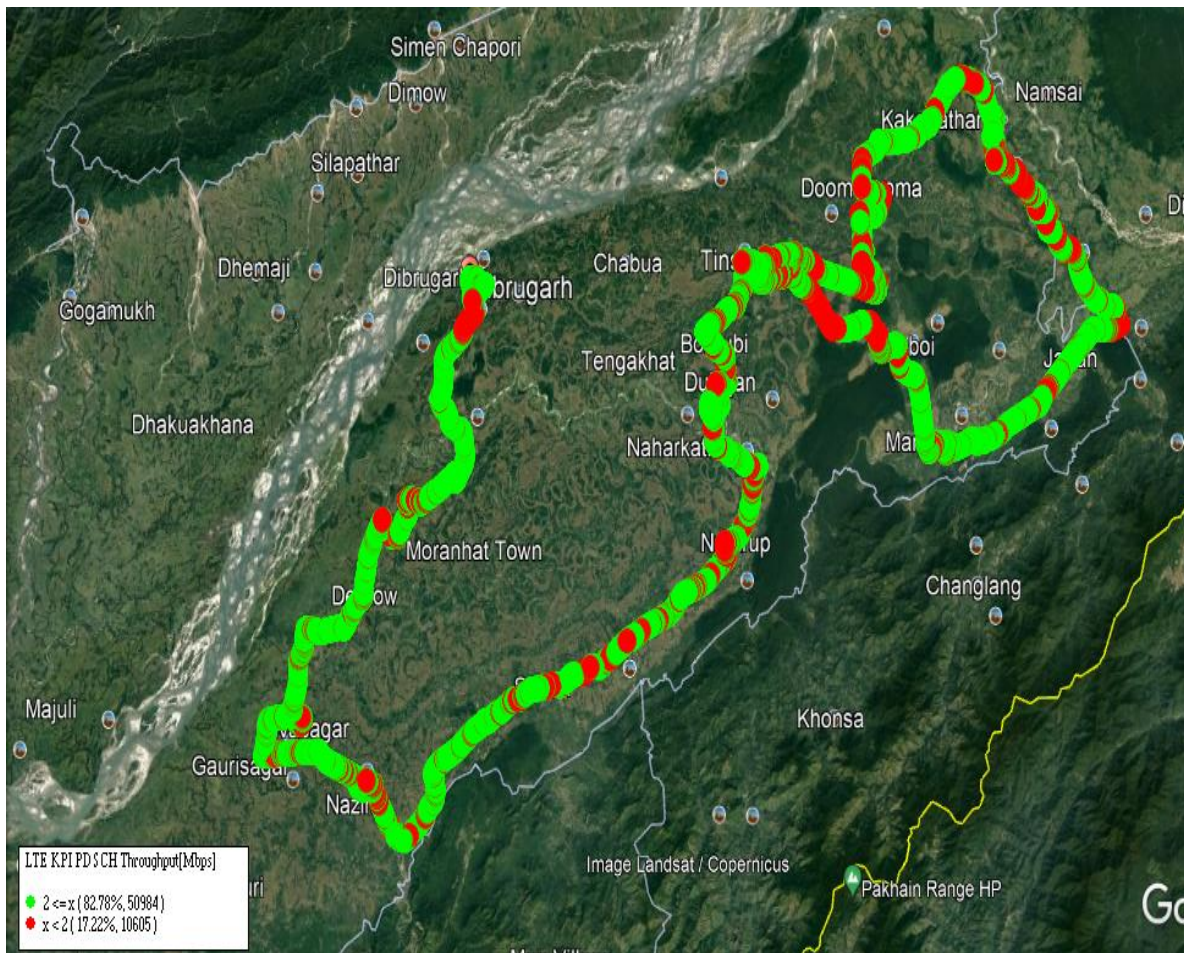
IV. Dynamic Data Test- 4G DL Details

RJIO

Dynamic Data Testing Complete 473 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	27.29

4G



AVG. DOWNLOAD SPEED (Mbps)	27.29
% FILE TRANSFER COMPLETE	100
DL throughput	Sample %
0 to 1 Mbps	13.55
1 to 2 Mbps	3.87
2 to 5 Mbps	8.94
5 to 10 Mbps	10.43
>10 Mbps	63.41
Total	100

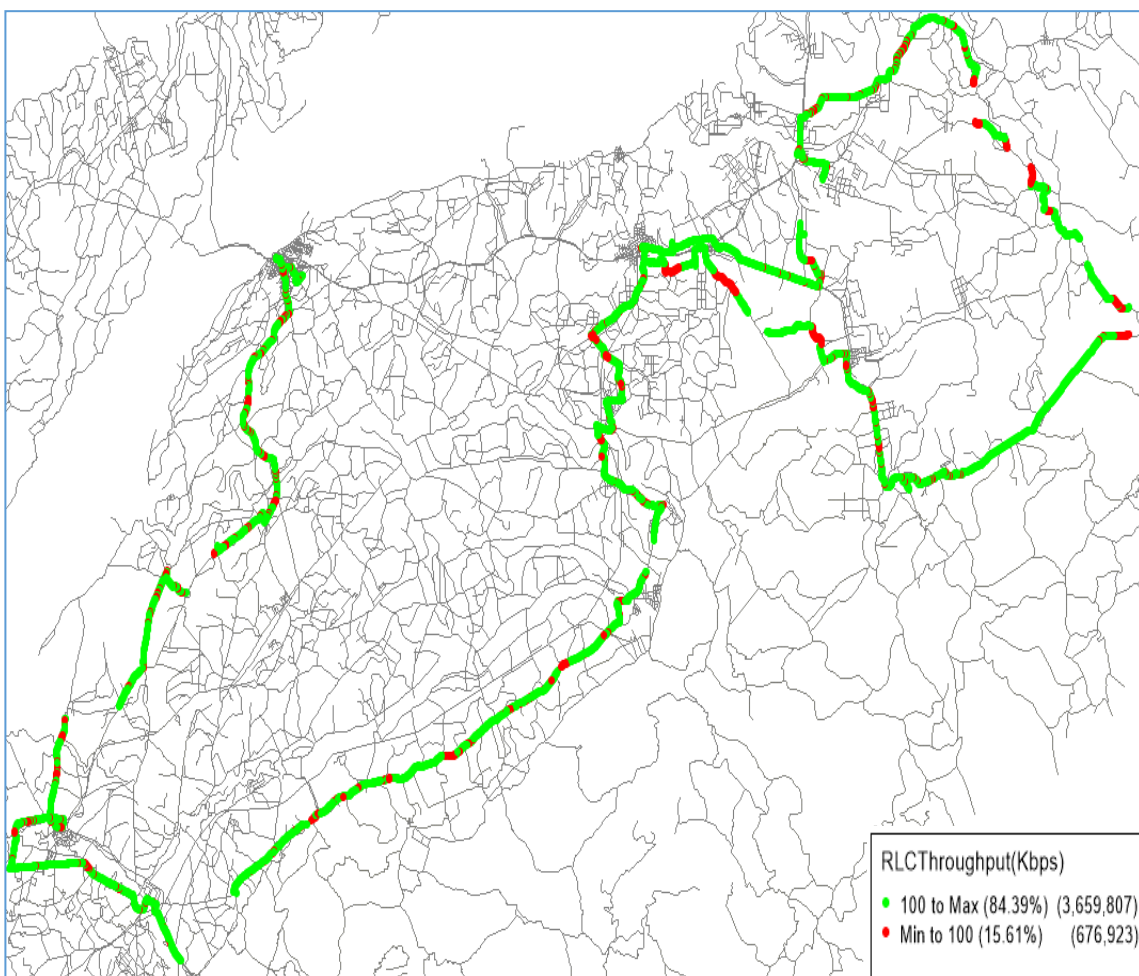
IV. Dynamic Data Test-2G DL Details

VIL

Dynamic Data Testing Complete 473 Kms

Data KPIs – Overall	2G
Average Download Throughput (Kbps)	146.34

2G



AVG. DOWNLOAD SPEED (Kbps)	146.34
% FILE TRANSFER COMPLETE	98.45
DL throughput	Sample %
0 to 50 Kbps	5.02
50 to 100 Kbps	10.59
100 to 200 Kbps	53.76
200 to 300 Kbps	23.04
>300 Kbps	7.59
Total	100

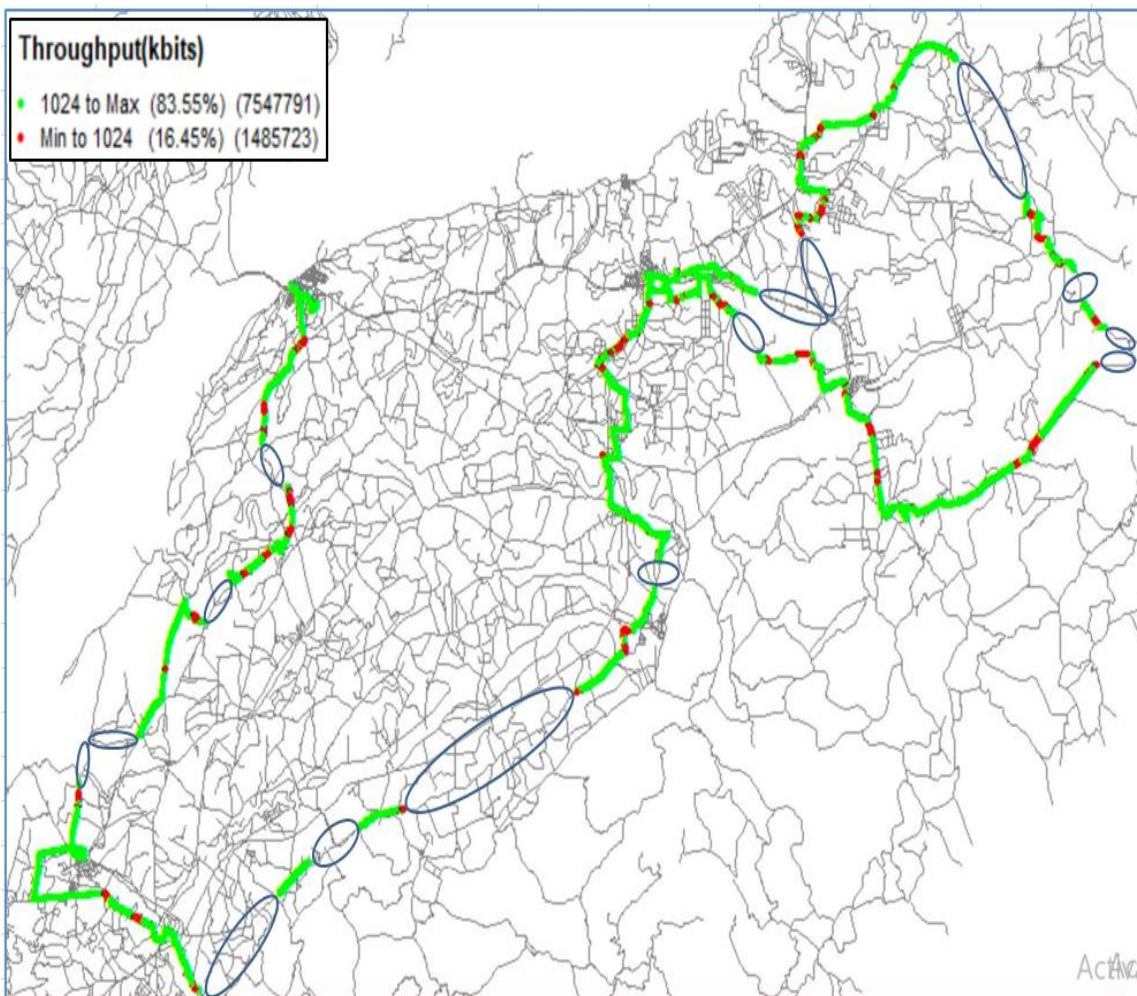
IV. Dynamic Data Test-3G DL Details

VIL

Dynamic Data Testing Complete 473 Kms

Data KPIs – Overall	3G
Average Download Throughput (Mbps)	2.30

3G



AVG. DOWNLOAD SPEED (Kbps)	2.30
% FILE TRANSFER COMPLETE	99.70
DL throughput	Sample %
0 to 0.5 Mbps	4.11
0.5 to 1 Mbps	12.34
1 to 2 Mbps	26.43
2 to 5 Mbps	42.01
>5 Mbps	15.11
Total	100%

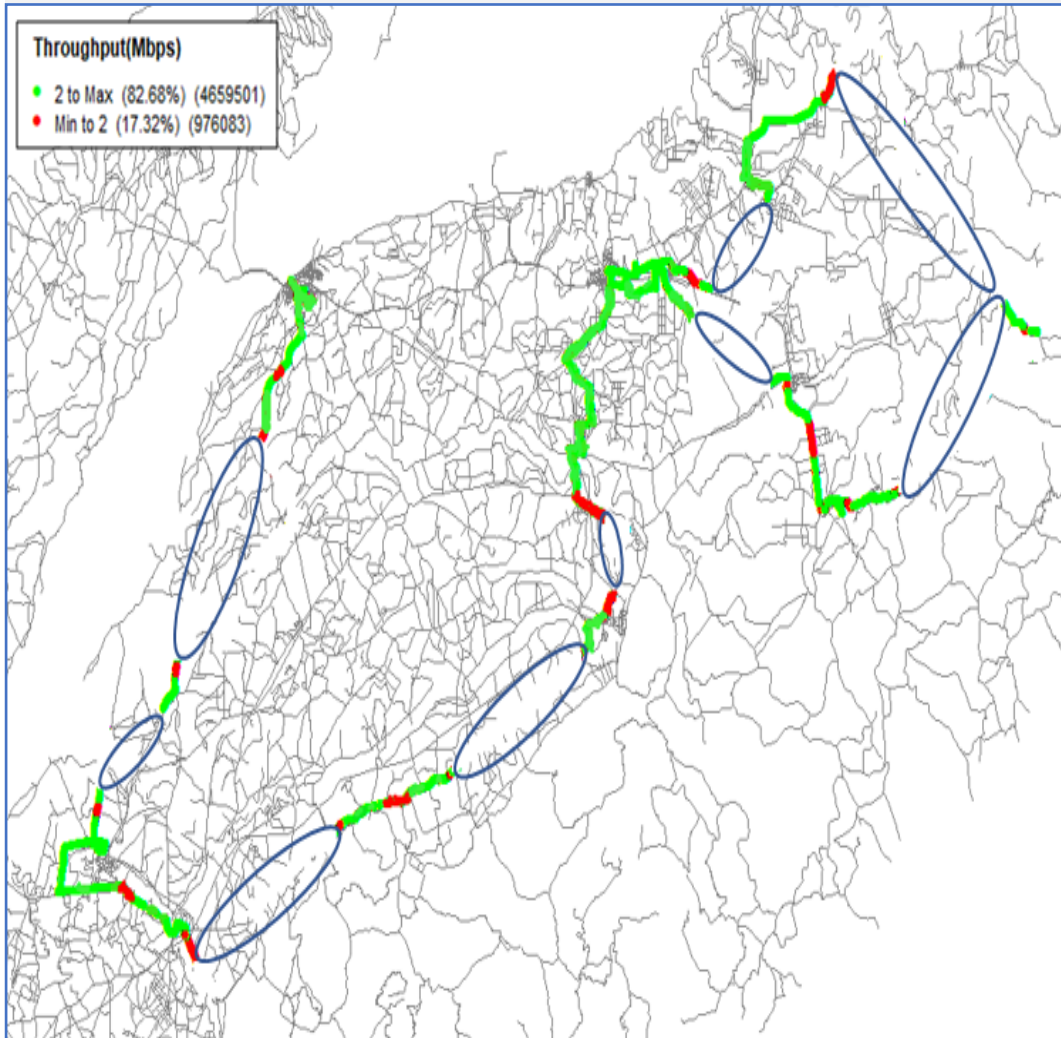
IV. Dynamic Data Test- 4G DL Details

VII

Dynamic Data Testing Complete 473 Kms

Data KPIs – Overall	4G
Average Download Throughput (Mbps)	5.27

4G



AVG. DOWNLOAD SPEED (Mbps)	5.27
% FILE TRANSFER COMPLETE	99.64
DL throughput	Sample %
0 to 1 Mbps	8.03
1 to 2 Mbps	9.29
2 to 5 Mbps	19.94
5 to 10 Mbps	41.43
>10 Mbps	21.31
Total	100