

Operator Assisted Drive Test Report

Lakhimpur, Majuli & Dhemaji Districts, Assam

September, 2024 (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 in 3G network, Rx Quality in 2G & 3G (Ec/Io) network, Call Setup Success Rate (2G & 3G), Handover Success Rate (2G)

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

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

The Operator Assisted Drive Test has been carried out by Regional Office, Kolkata with the help of Service Providers in Lakhimpur, Majuli and Dhemaji Districts and surrounding areas including National Highways 15 & 515 on 19th and 20th September 2024 from 08.30 AM to 09.00 PM. The drive test covered drive route of 440 KMs (approx) over a period of two days. Approximately 512 + calls were made for each of the 7 networks: three 2G networks, one 3G network and three 4G networks covering four TSPs.

Overview

Voice
Summary

Data
Summary

Overview

Lakhimpur district is an administrative district in the state of Assam in India. The district headquarter is located at North Lakhimpur. The district is bounded on the North by Siang and Papumpare districts of Arunachal Pradesh and on the East by Dhemaji District and Subansiri River. Majuli District stands on the Southern side and Biswanath District is on the West.

Majuli district is situated on Majuli, the largest river island in the world, in the Brahmaputra River in Northeastern Assam. It is also the first island district of the country.

Dhemaji is a small town and the headquarters of the Dhemaji district in the state of Assam, India. It is situated on the north bank of the Brahmaputra River and serves as an important administrative and commercial centre for the surrounding area.

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, one 3G network, Three 4G networks covering 4 unique TSPs were tested.

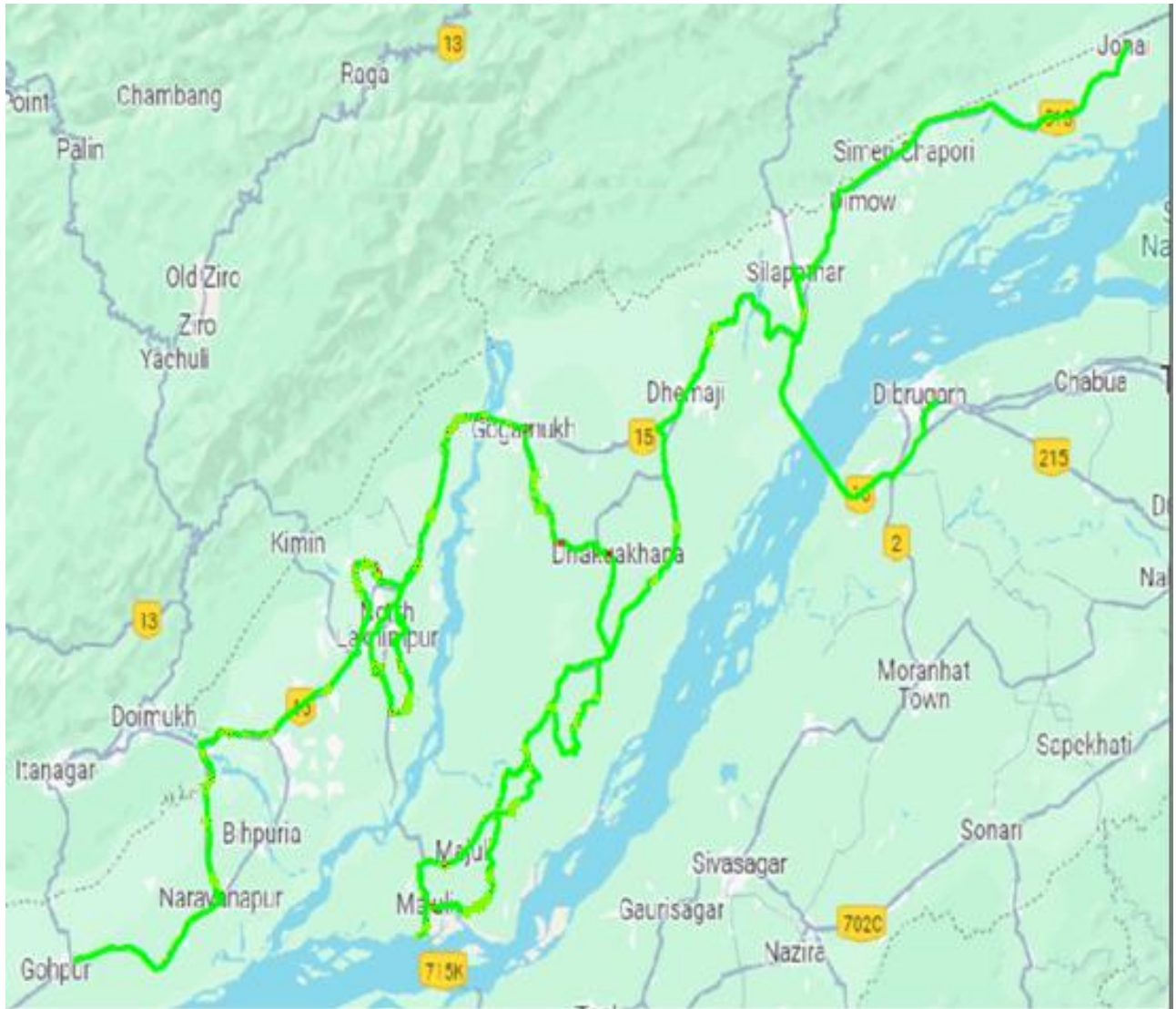
Data Tests: Dynamic Data Service Testing was performed along same route in all technologies. 500 KB file for 2G, 20MB file for 3G and 40MB file for 4G were downloaded from FTTP server in TSP's own server. Static Data Service Testing was also performed. Three 2G (Lock Mode) networks, one 3G (Lock Mode) network, 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	NO
4G	YES	NO	YES	YES
TOOL USED	TEMS	NIMO	X-CAL	TEMS

Overview

Voice & Dynamic Data Test Drive Route



Drive Routes: Lakhimpur, Majuli, Dhemaji Districts

DAY-1– Dibrugarh Railway Station – Mayflower Resort – Bogibeel Bridge – Kulajan Tribal High School –Jama Masjid Silapather - Dhemaji Polytechnic, Simenchapori – Jonai Higher Secondary School– Sissiborgaon College – Pachim Kachari Chuk – Moridhal College – ASTC Bus Stand Dhemaji – Nemetengani Post Office – Harthi College – Dangdhara HS School – Garamur Market, Majuli

DAY-2 – Majuli DC Office – Kamalabari Ferry Terminal – Chamaguri Satra – Phulani Chariali Market – Sonari Chapori – Ghilamara Post Office – Ghilamara Tiniali – NCD Bordoibam College – Missing Autonomous Council, Gogamukh – Rupahi Girl’s ME School – Queen Sati Sadhani Statue – Silvercrest Multi Speciality Hospital – Konwar Gaon Indoor Stadium – DICC Lakhimpur – Azad Academy Junior College – Telahi Block Development Office – Angerkhowa Post Office – North Lakhimpur Commerce College - North Lakhimpur Railway Station - Lilabari Airport, North Lakhimpur – Adivasi Janubasti High School – Gohpur SDO Office

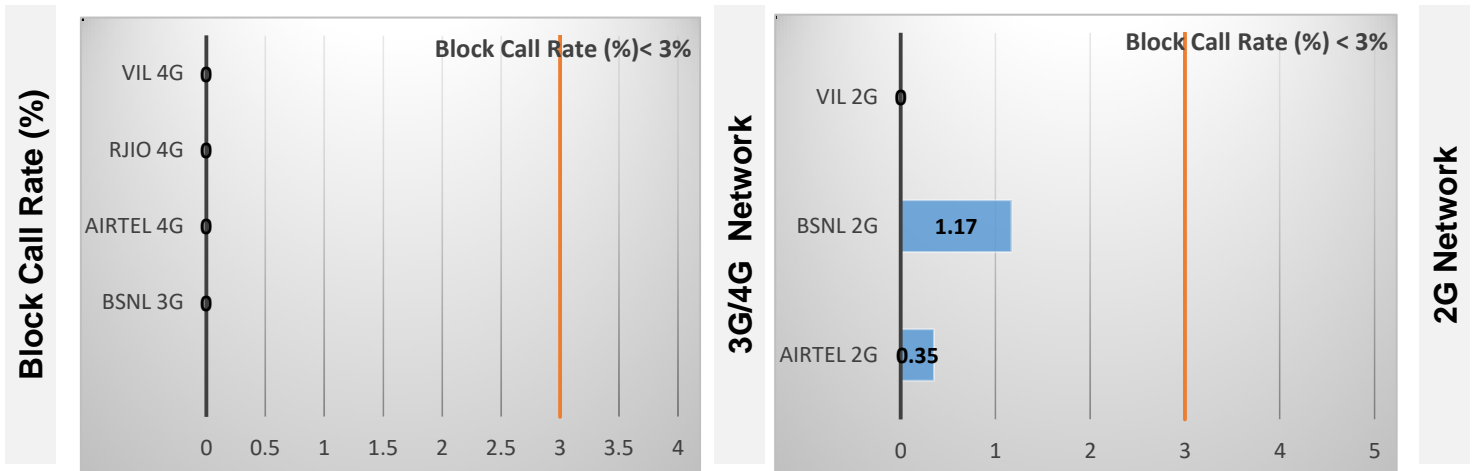
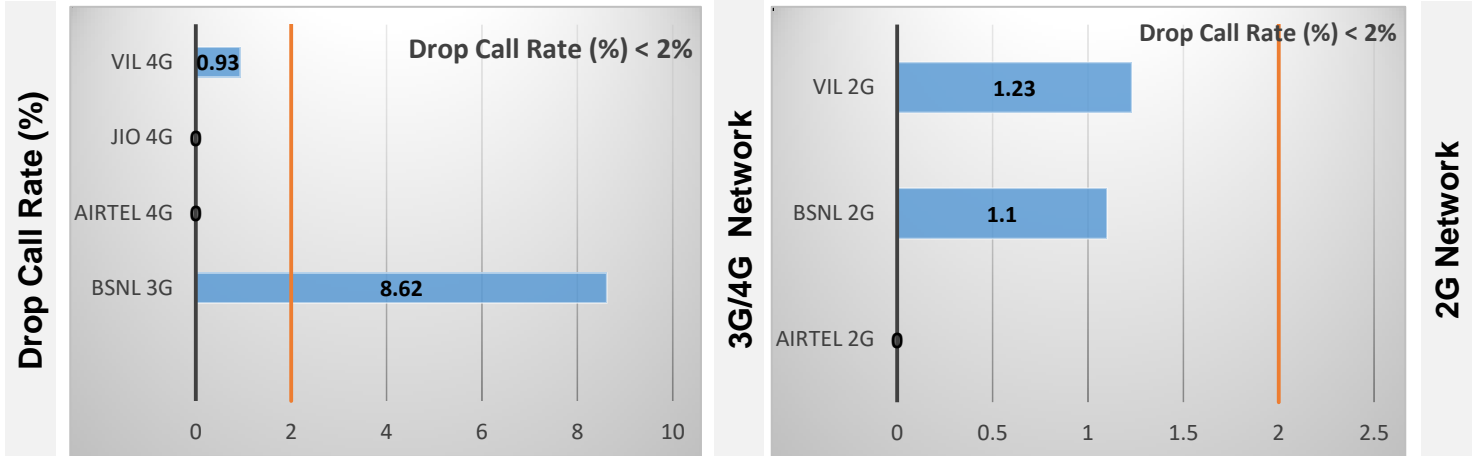
Data Service Test- Static Locations

Static Locations
Dibrugarh Railway Station
D.C. Office Majuli

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	AIRTEL	RJIO	VIL
Drop Call Rate %	0	1.1	1.23	8.62	0	0	0.93
Block Call Rate %	0.35	1.17	0	0	0	0	0

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

Coverage

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

TSPs	2G		
	AIRTEL	BSNL	VIL
Coverage %	64.43	45.77	93.31

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

TSPs	3G	4G		
	BSNL	AIRTEL	RJIO	VIL
Coverage	21.06	92.04	86.65	88.62

Summary

City Level Summary- Voice

Voice Call	2G		
	AIRTEL	BSNL	VIL
Call Attempt	534	731	162
Blocked Call Rate (%)	0.35	1.17	0
CSSR% (Accessibility)	99.83	93.16	100
Drop Call Rate (%)	0	1.1	1.23
Mobility HOSR (%)	100	92.30	100
Rx Quality (%)	97	88.53	96.22

Voice Call	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Call Attempt	948	541	559	108
Blocked Call Rate (%)	0	0	0	0
CSSR% (Accessibility)	53.8	100	98.03	100
Drop Call Rate (%)	8.62	0	0	0.93
Mobility HOSR (%)	100	99.8	96.08	100
Rx Quality (%)	80.45	92.53	83.87	90.75

Summary-Data Services Dynamic

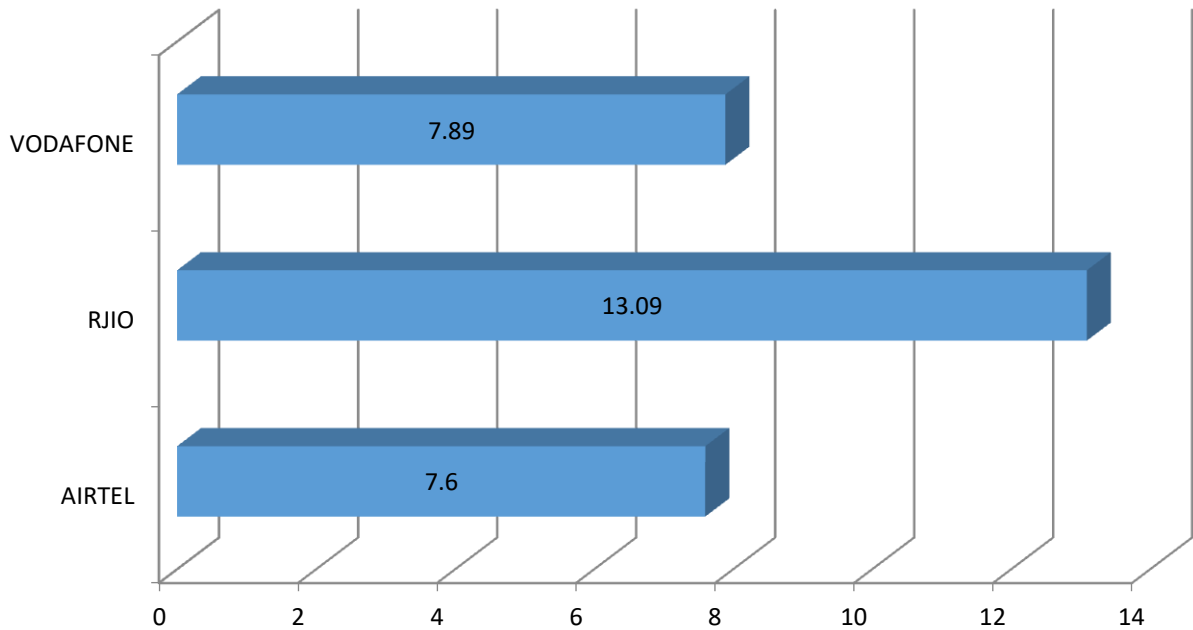
Key Observations

Dynamic Data was tested for 440 Kms. Download Throughput was tested.

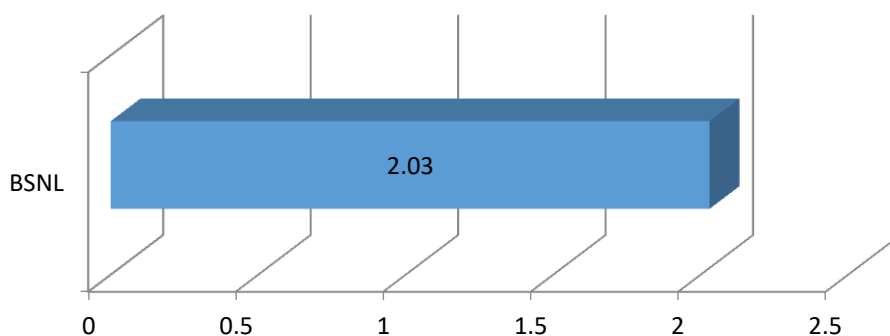
Data Download Performance (Average Throughput in Mbps) - Dynamic Data Testing

4G/3G Network:

4G-Dynamic Download Throuhput (Mbps)



3G-Dynamic Download Throuhput (Mbps)



Summary-Data Services Static

City Level Summary-

Average Data Services Static	3G/ 4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	2.73	14.43	18.79	10.9
Upload Throughput in Mbps	1.22	7.7	4.35	5.02
Video streaming delay (sec)	3.75	0	0	0.73
Web Browsing Delay (secs)	0.34	0	1.85	0.76
Latency (msec)	101	70	48.6	82

Summary-Data Services Static

Location Level Summary-

Location:-Dibrugarh Railway Station	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	2.73	12.3	8.69	16.7
Upload Throughput in Mbps	1.23	6.8	4.5	8.31
Video streaming delay (secs)	3.5	0	0	0.49
Web Browsing Delay (secs)	0.36	0	1.6	0.23
Latency (msec)	88	77	50.4	38

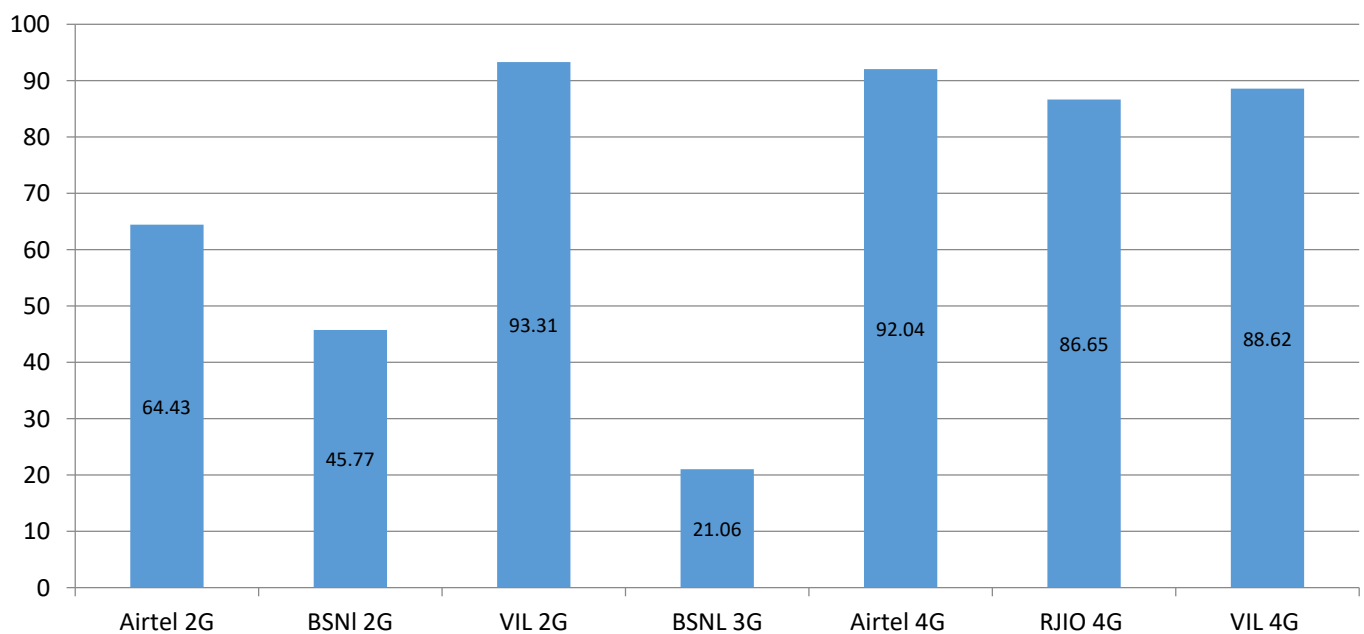
Location:- D.C. Office Majuli	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in (mbps)	2.73	14.3	28.9	5.1
Upload Throughput in (mbps)	1.22	7.2	4.19	1.73
Video streaming delay (secs)	4	0	0	0.97
Web Browsing Delay (secs)	0.32	0	2.1	1.30
Latency (msec)	114	81	46.8	126

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	64.43
BSNL 2G	45.77
VIL 2G	93.31
BSNL 3G	21.06
AIRTEL 4G	92.04
RJIO 4G	86.65
VIL 4G	88.62

Coverage Rate %



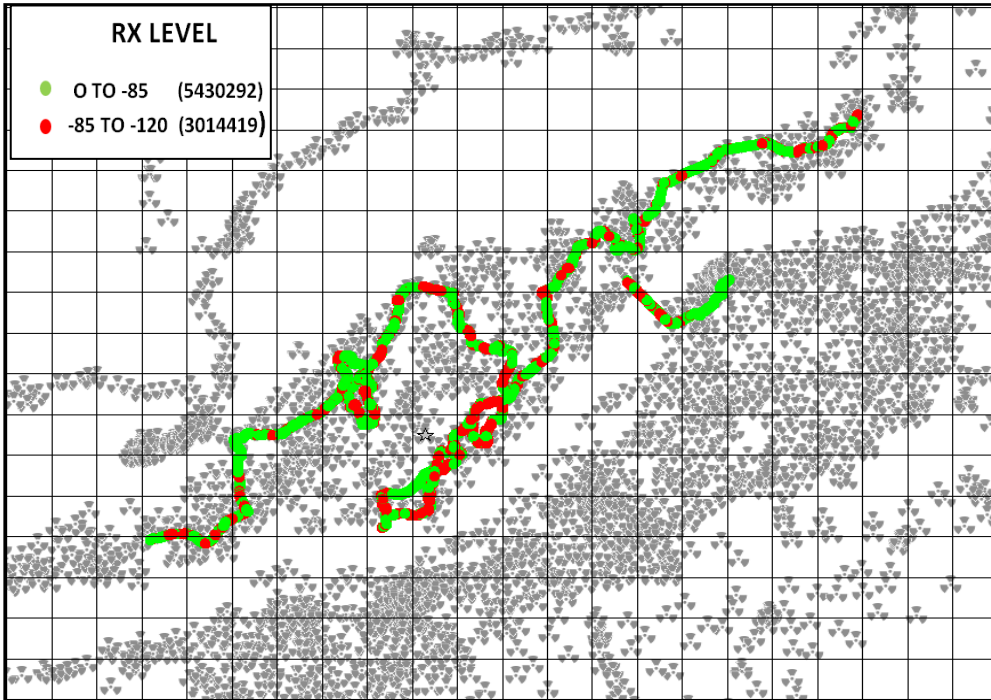
Note- Coverage is the percentage of samples having signal strength more than the threshold value (2G ≥ -85 dbm, 3G ≥ -90 dbm and 4G ≥ -110 dbm). However, these samples are only for the portion of the OADT routes where TSPs have coverage i.e 'no coverage' routes have been excluded.

I. Coverage Details

AIRTEL

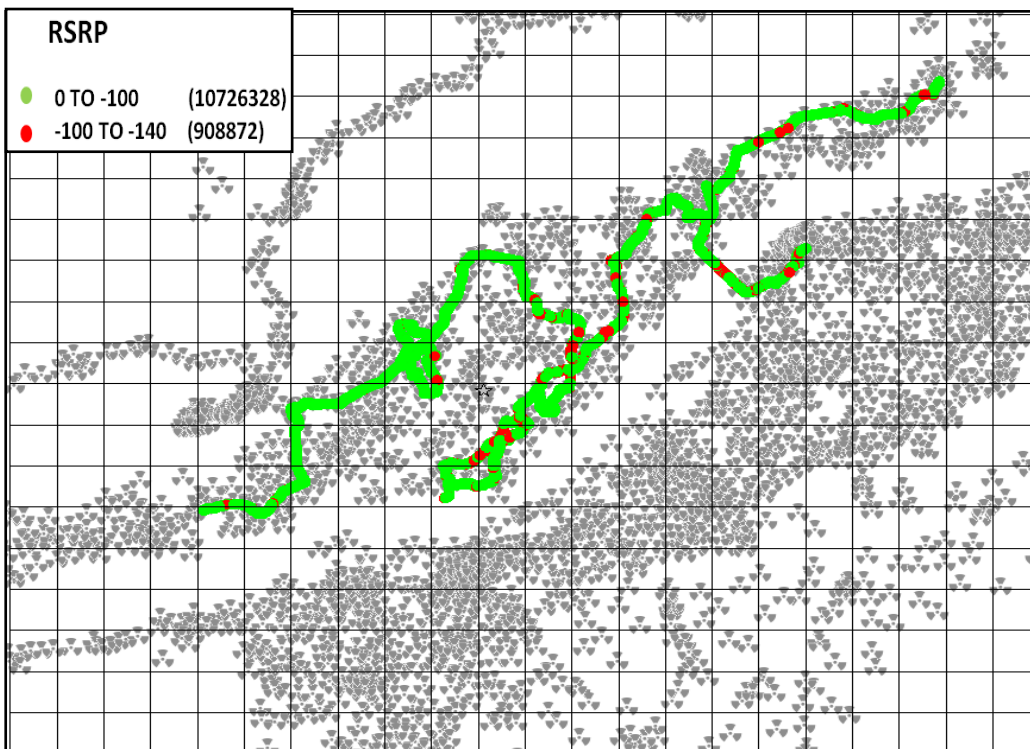
Technology	Coverage Rate %
2G	64.43
4G	92.04

2G



Overall Rx Level	Sample %
[Max >=-75]	27.9
[-75 >=-85)	36.4
[-85 >=-95)	28.1
[-95 >=Min)	7.6
Total	100

4G



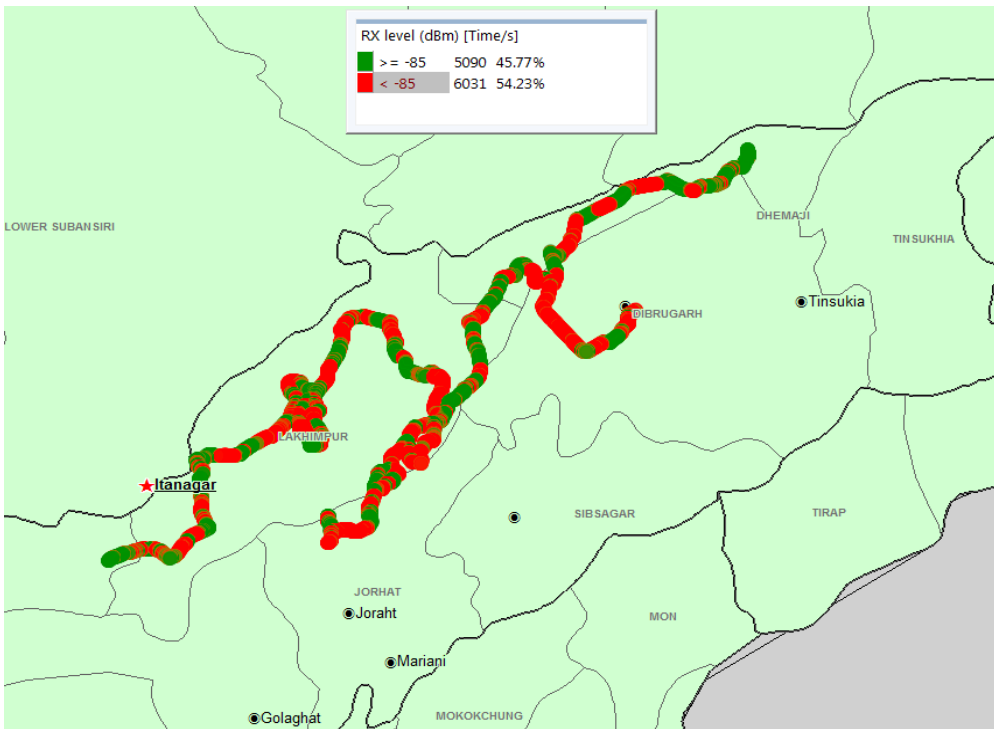
Overall RSRP	Sample %
[Max >=-80]	11.6
[-80 >=-90)	22.9
[-90 >=-110)	57.7
[-110 >=Min)	7.8
Total	100

I. Coverage Details

BSNL

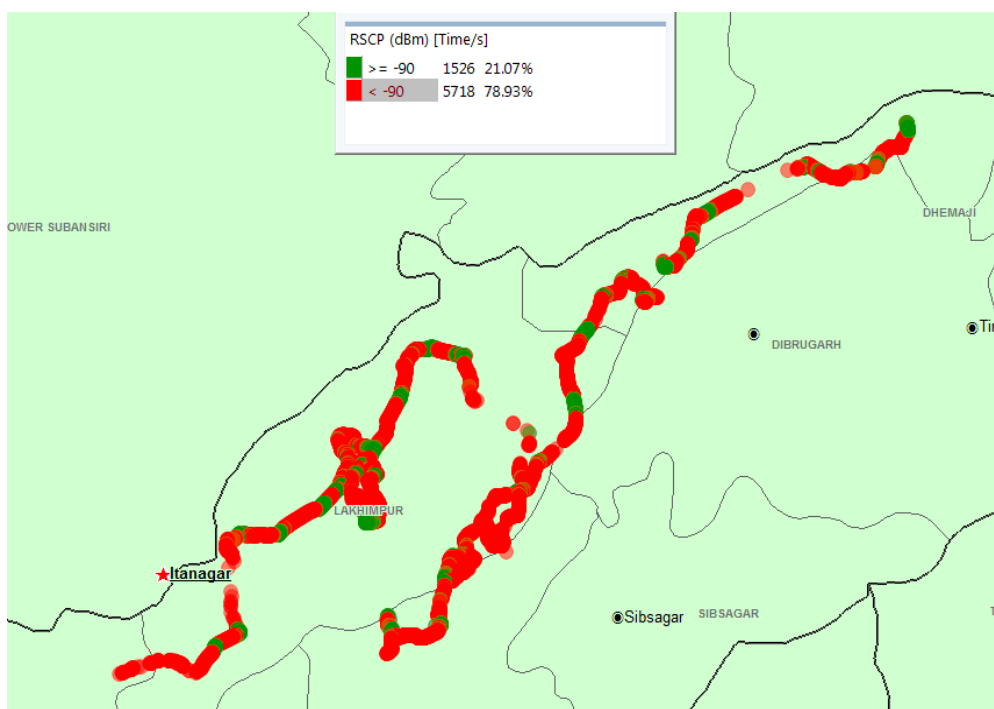
Technology	Coverage Rate %
2G	45.77
3G	21.06

2G



Overall Rx Level	Sample %
[Max >=-75]	25.81
[-75 >=-85)	19.96
[-85 >=-95)	30.56
[-95 >=Min)	23.67
Total	100

3G



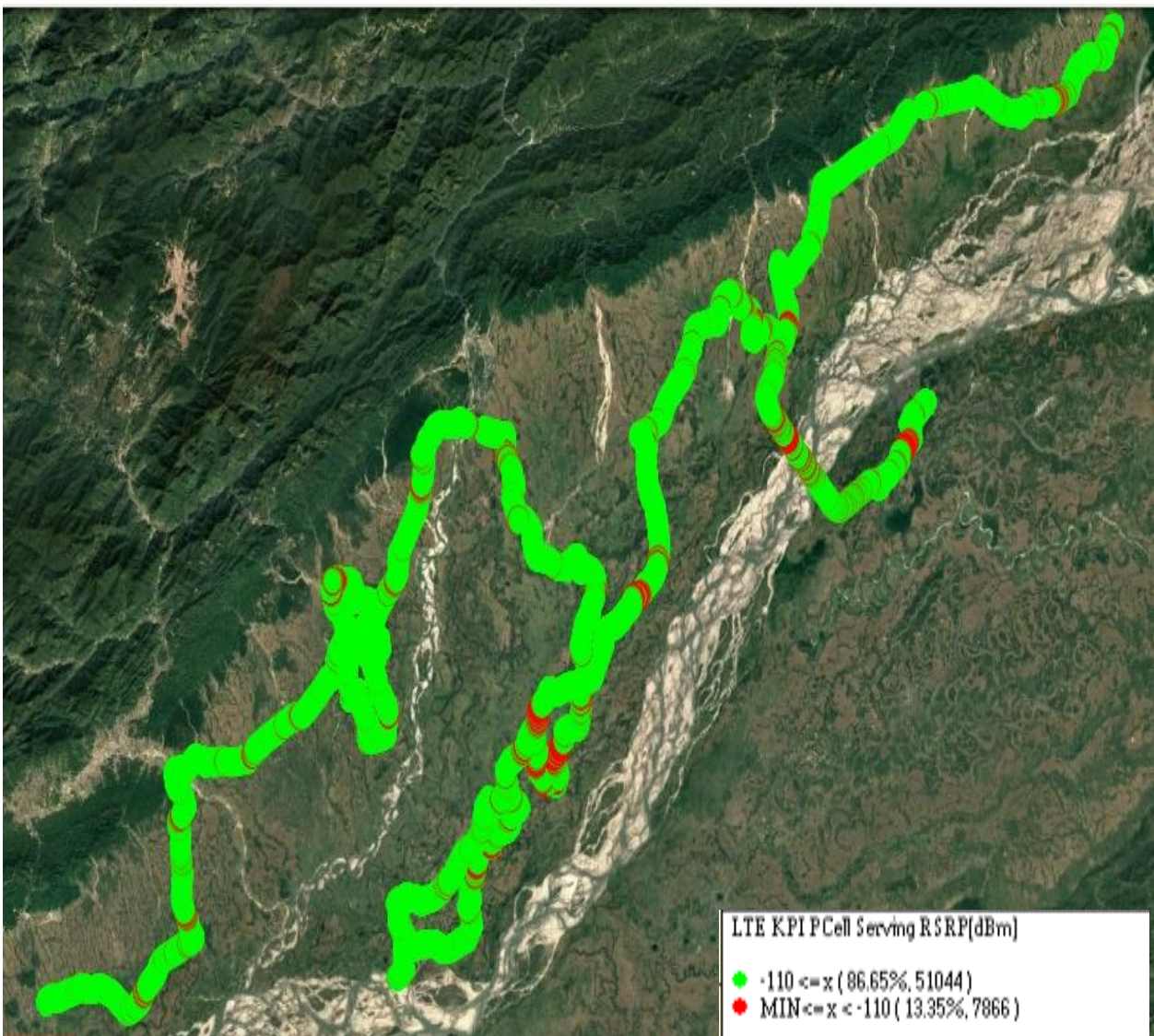
Overall RSCP	Sample %
[Max >=-70]	4.06
[-70 >=-80)	6.99
[-80 >=-90)	10.02
[-90 >=Min)	78.93
Total	100

I. Coverage Details

RJIO

4G

Technology	Coverage Rate %
4G	86.65

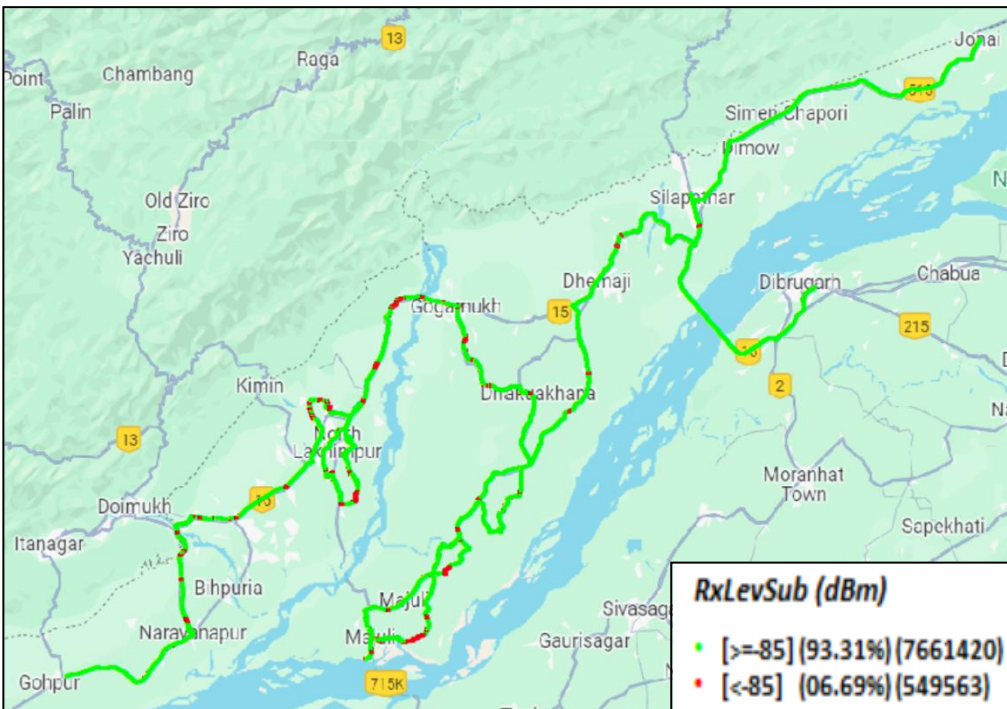


I. Coverage Details

VIL

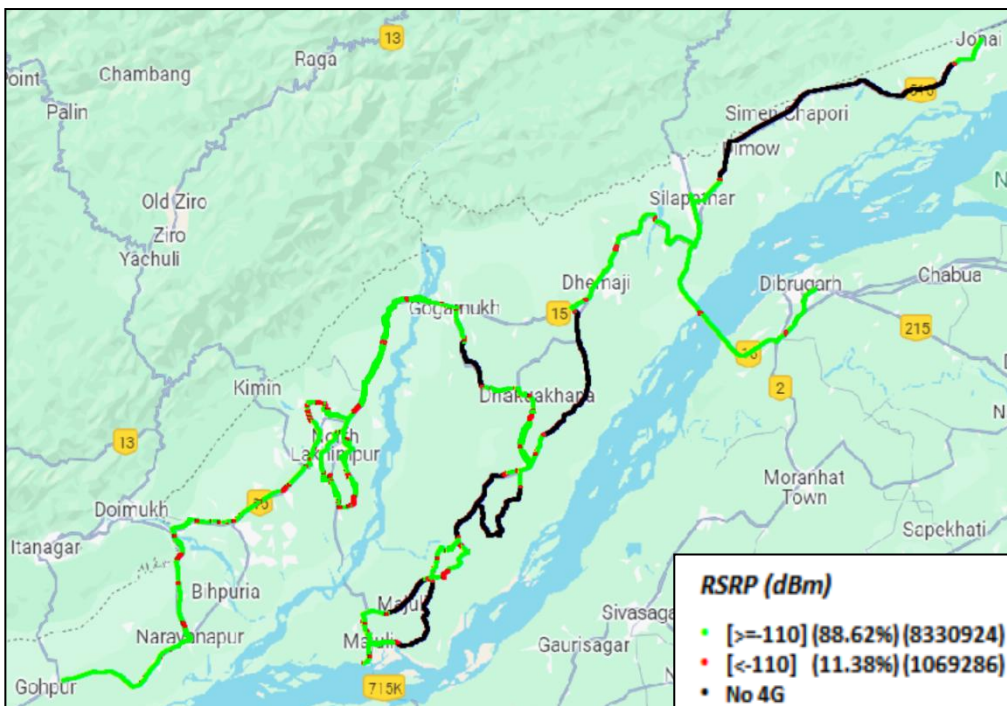
Technology	Coverage Rate %
2G	93.31
4G	88.62

2G



Overall Rx Level	Sample %
[Max >=-75]	64.91
[-75 >=-85]	28.4
[-85 >=-95]	5.48
[-95 =Min)	1.21
Total	100

4G



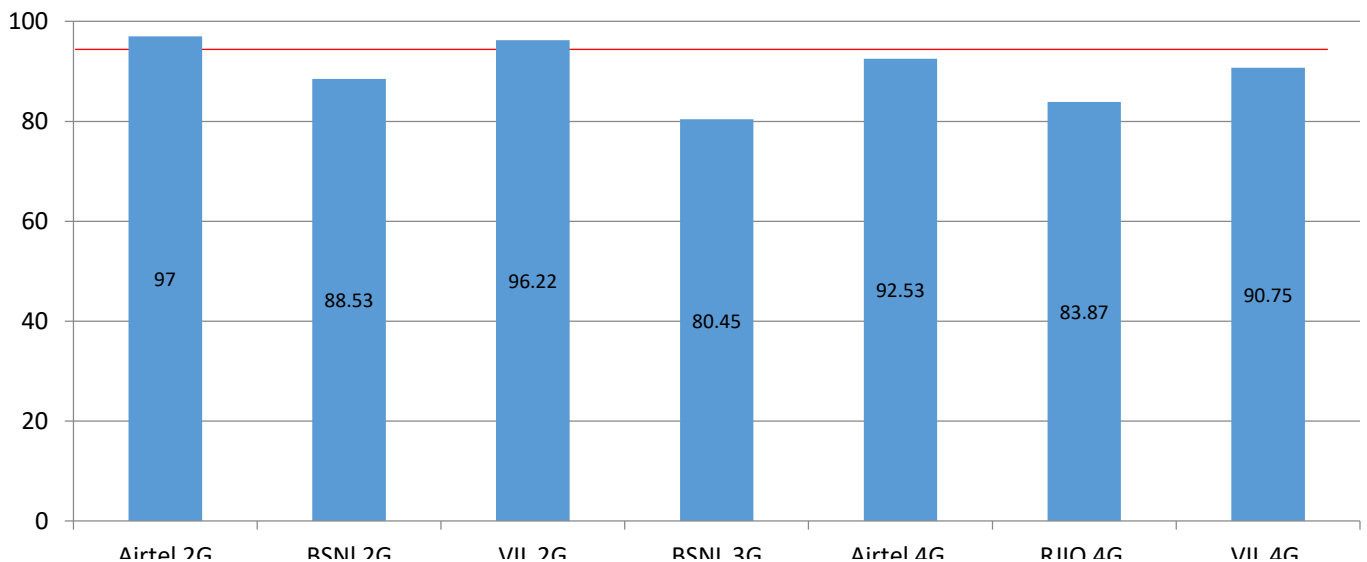
Overall RSRP	Sample %
[Max >=-80]	25.69
[-80 >=-90]	23.8
[-90 >=-110]	39.13
[-110 >=Min)	11.38
Total	100

II. Quality Details

For measuring voice quality, as per the QoS norms, Rx Quality ≤ 5 for GSM, $E_c/N_o \geq -14$ dBm for 3G 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	Rx Quality %
AIRTEL 2G	97.0
BSNL 2G	88.53
VIL 2G	96.22
BSNL 3G	80.45
AIRTEL 4G	92.53
RJIO 4G	83.87
VIL 4G	90.75

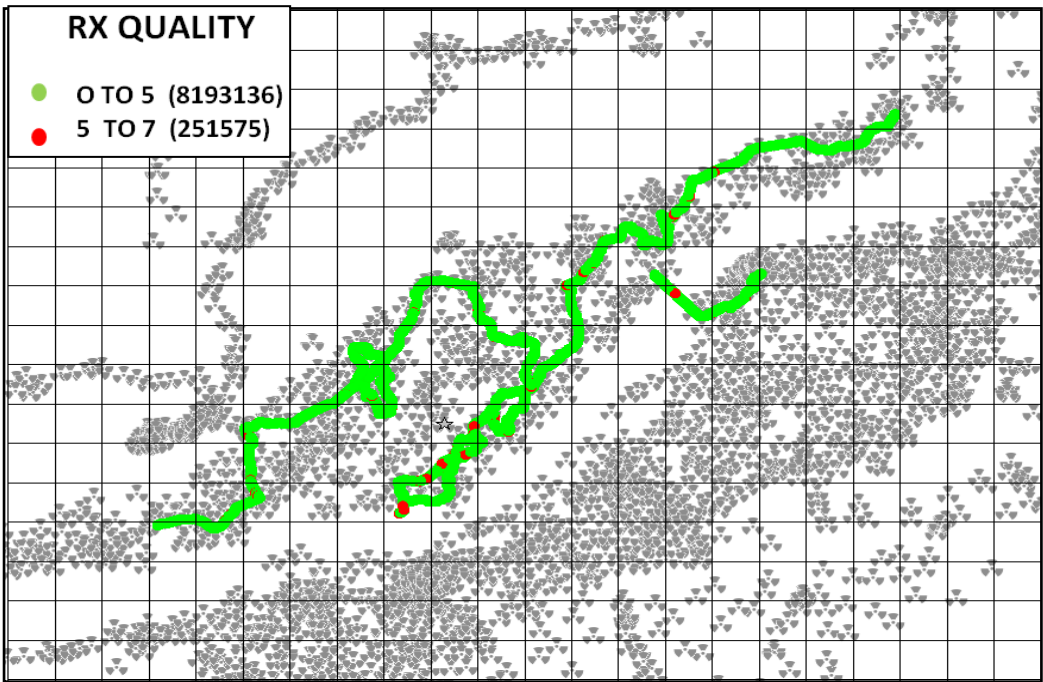
Rx Quality %



AIRTEL

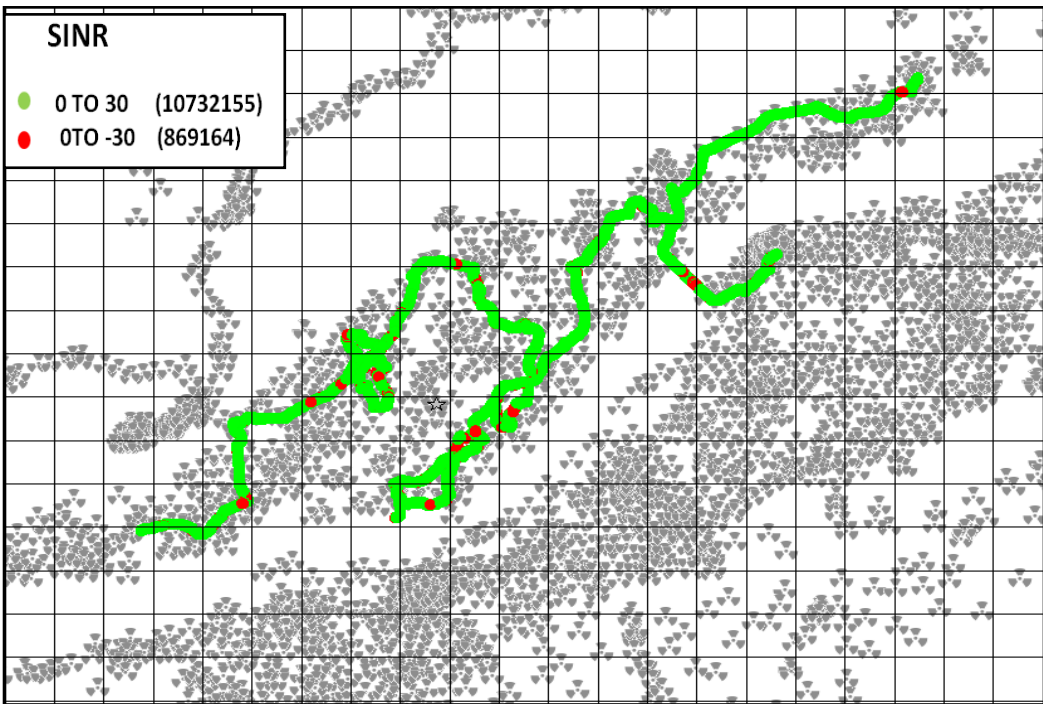
Technology	Rx Quality %
2G	97.0
4G	92.53

2G



Overall Rx Quality	Sample %
(Min <=2)	90.4
(2 <=3)	2.2
(3 <=4)	2.1
(4 <=5)	2.3
(5 <=Max)	3.0
Total	100

4G



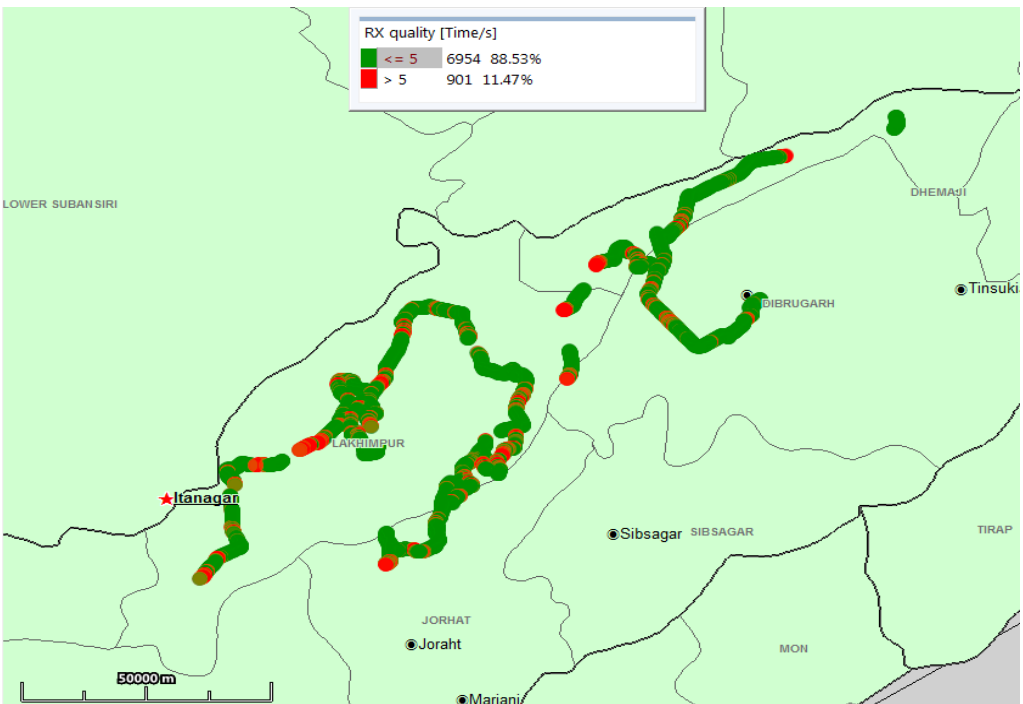
Overall SINR	Sample %
(Min <=0)	7.47
(0 <=5)	17.23
(5 <=10)	20.73
(10 <=15)	43.68
(15 <=Max)	10.89
Total	100

II. Quality Details

BSNL

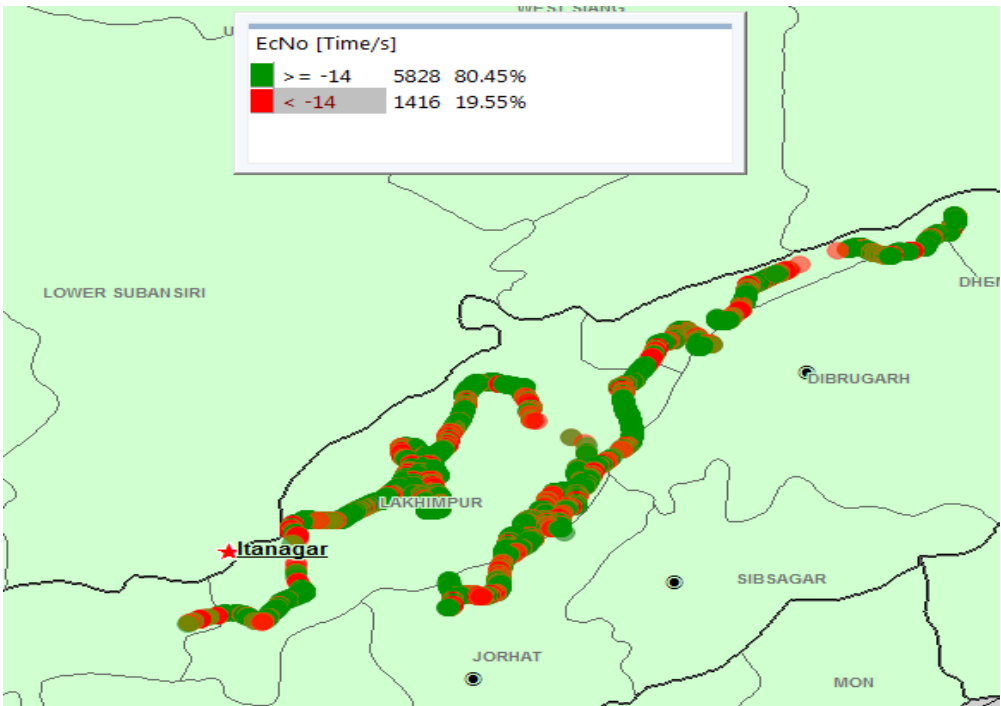
Technology	Rx Quality %
2G	88.53
3G	80.45

2G



Overall Rx Quality	Sample %
(Min ≤=2)	68.44
(2 ≤=3)	7.63
(3 ≤=4)	6.25
(4 ≤=5)	6.21
(5 ≤=Max)	11.47
Total	100

3G



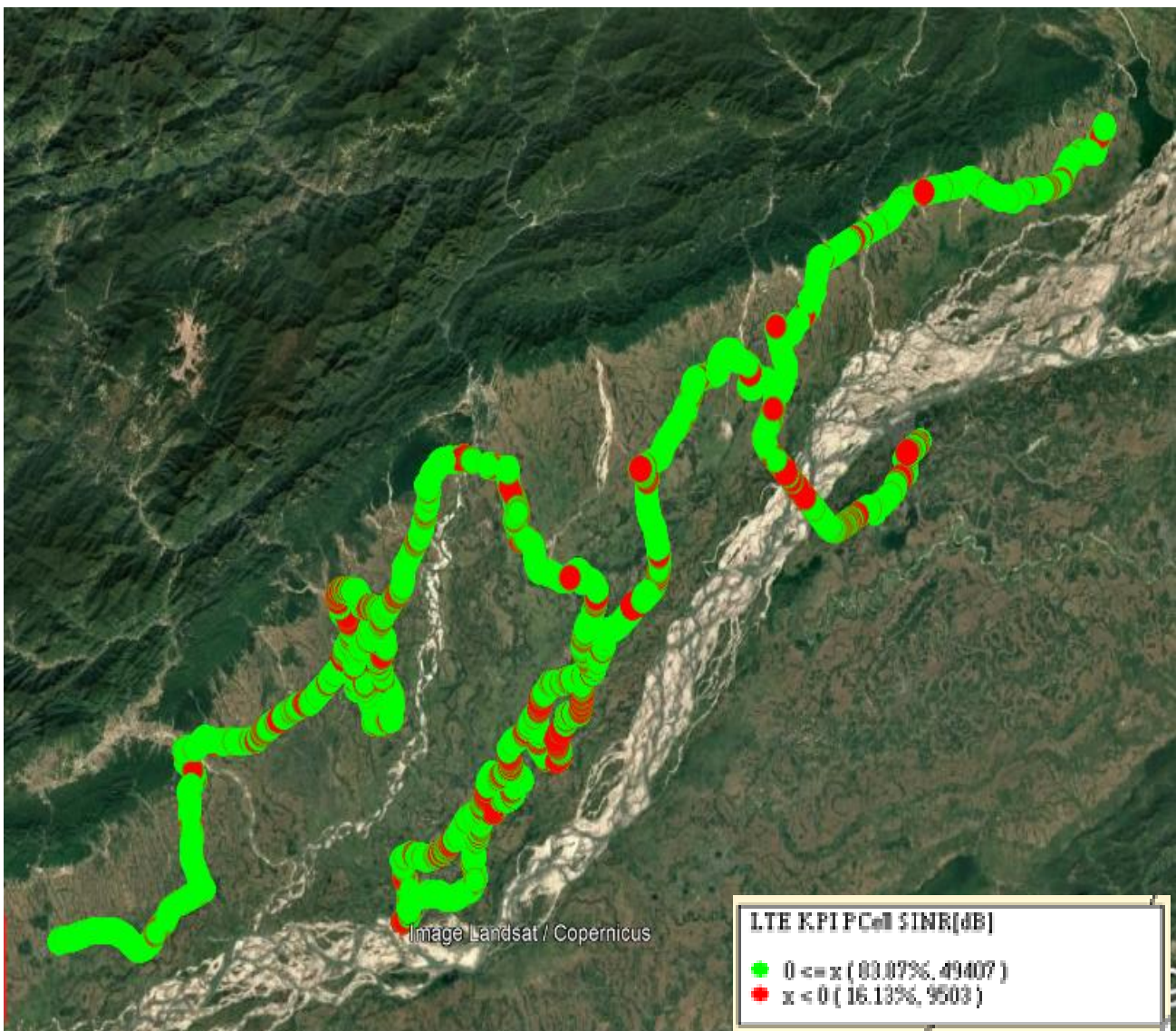
Overall EcNo	Sample %
(Min ≤=0)	9.26
(0 ≤=5)	22.54
(5 ≤=10)	27.08
(10 ≤=15)	21.56
(15 ≤=Max)	19.55
Total	100

II. Quality Details

RJIO

4G

Technology	Rx Quality %
4G	83.87

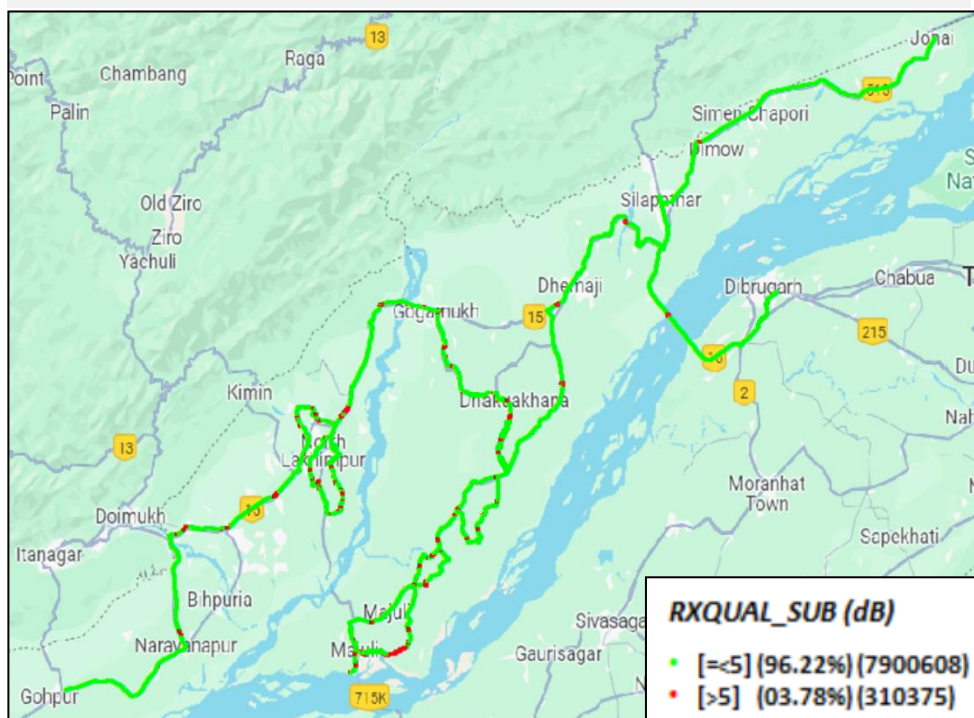


II. Quality Details

VIL

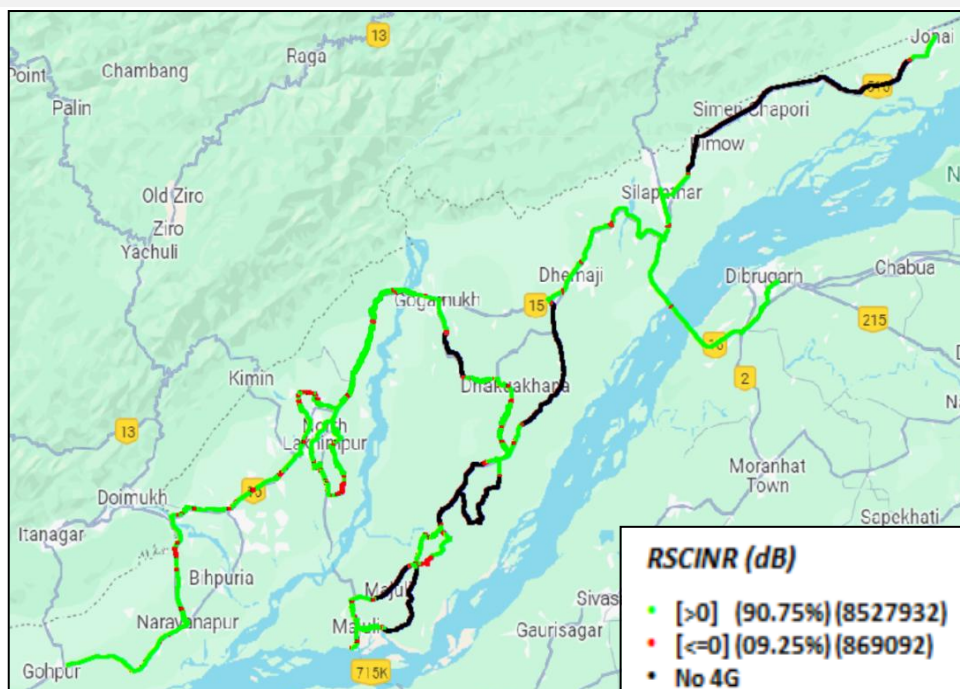
Technology	Rx Quality %
2G	96.22
4G	90.75

2G



Overall Rx Quality	Sample %
(Min ≤2)	38.64
(2 ≤3)	26.17
(3 ≤4)	17.28
(4 ≤5)	14.13
(5 ≤Max)	3.78
Total	100

4G



Overall SINR	Sample %
(Min ≤0)	9.25
(0 ≤5)	14.65
(5 ≤10)	21.54
(10 ≤15)	29.83
(15 ≤Max)	24.73
Total	100

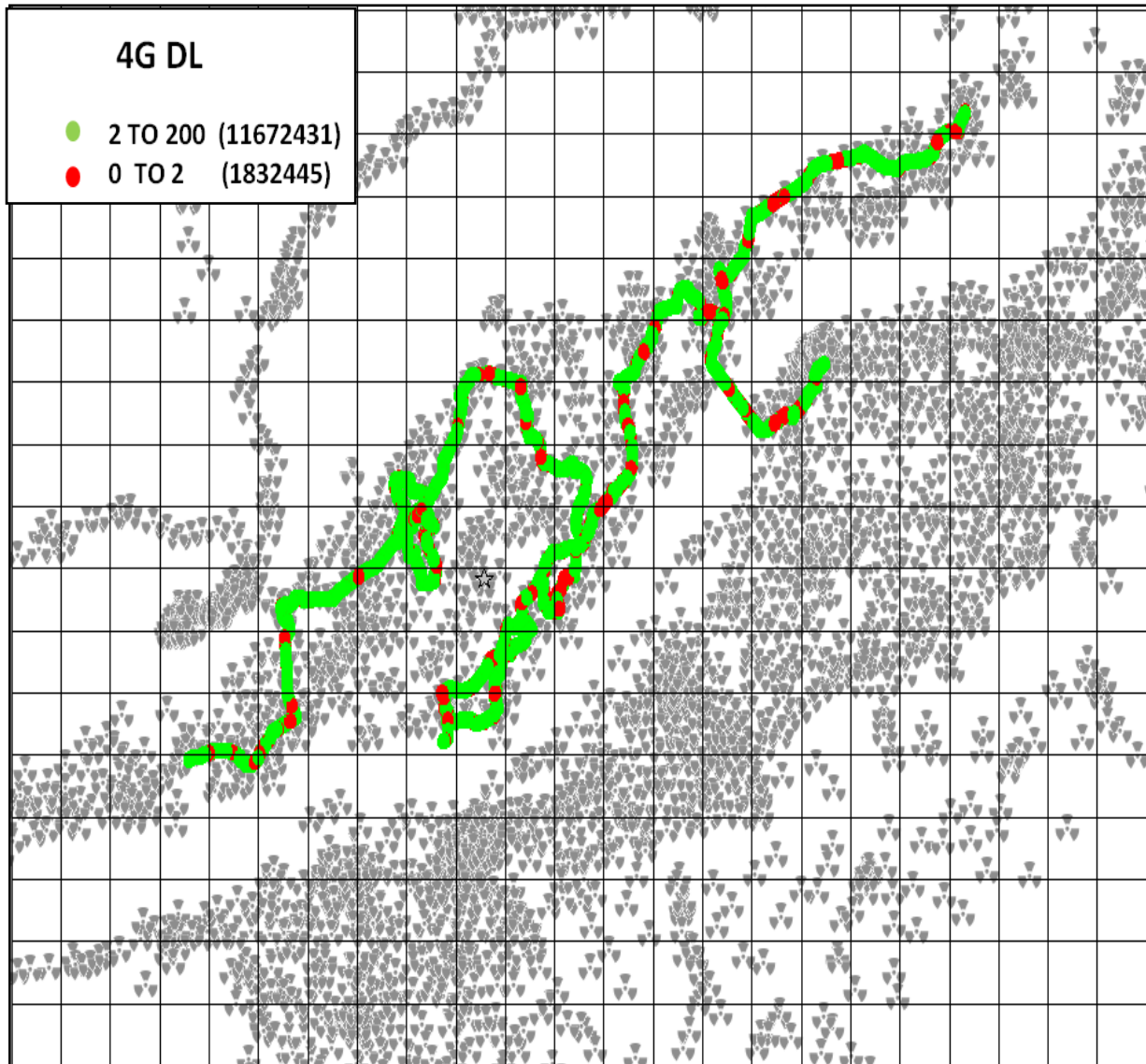
IV. Dynamic Data Test- 4G DL Details

AIRTEL

Dynamic Data Testing Complete 440 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	7.6

4G



AVG. DOWNLOAD SPEED (Mbps)	7.6
% FILE TRANSFER COMPLETE	73.51
DL throughput	Sample %
0 to 1 Mbps	9.3
1 to 2 Mbps	4.3
2 to 5 Mbps	9.2
5 to 10 Mbps	11.3
>10 Mbps	66.0
Total	100

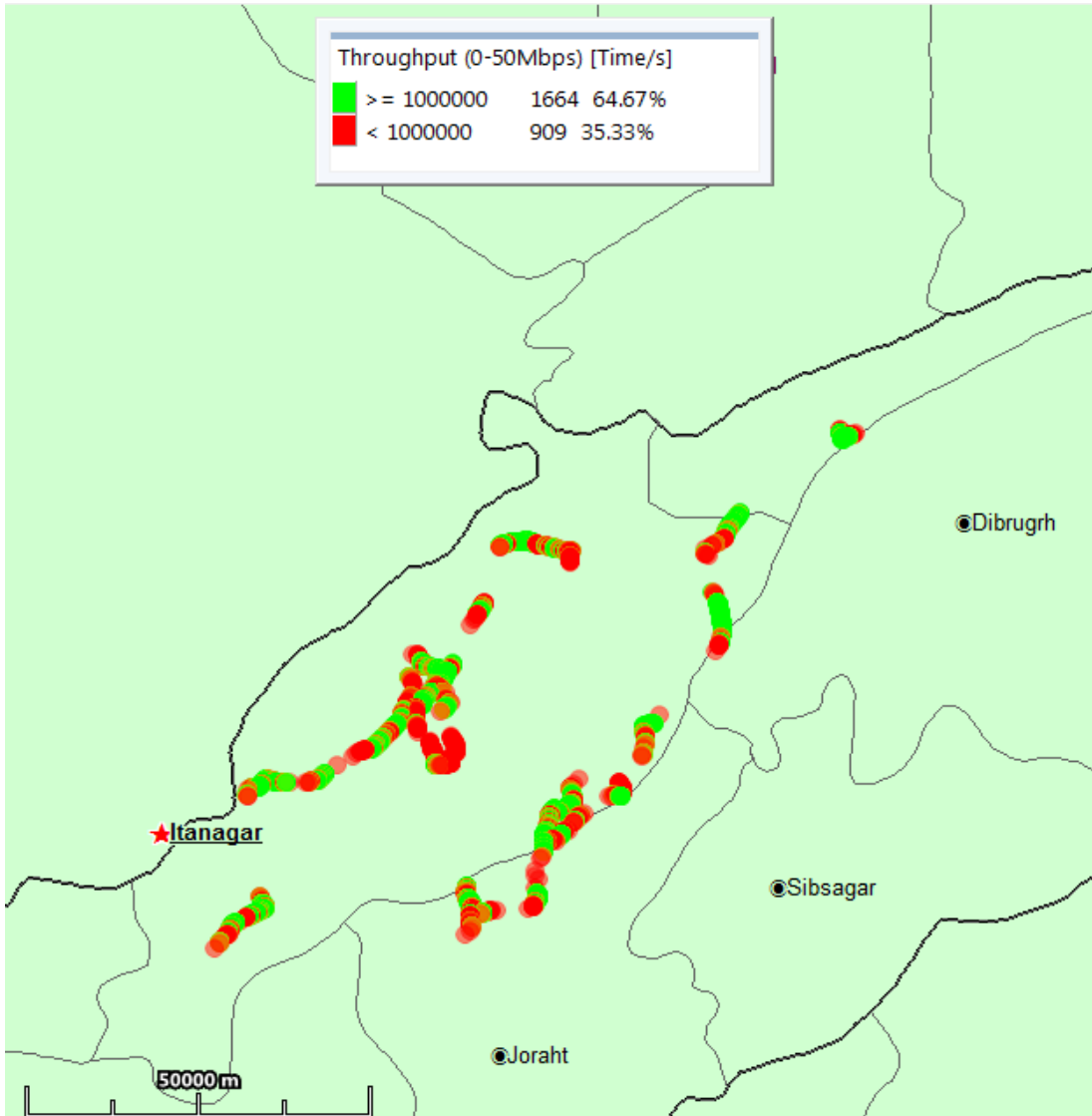
IV. Dynamic Data Test- 3G DL Details

BSNL

Dynamic Data Testing Complete 440 Kms

Data KPIs - Overall	3G
Average Download Throughput (Mbps)	2.03

3G



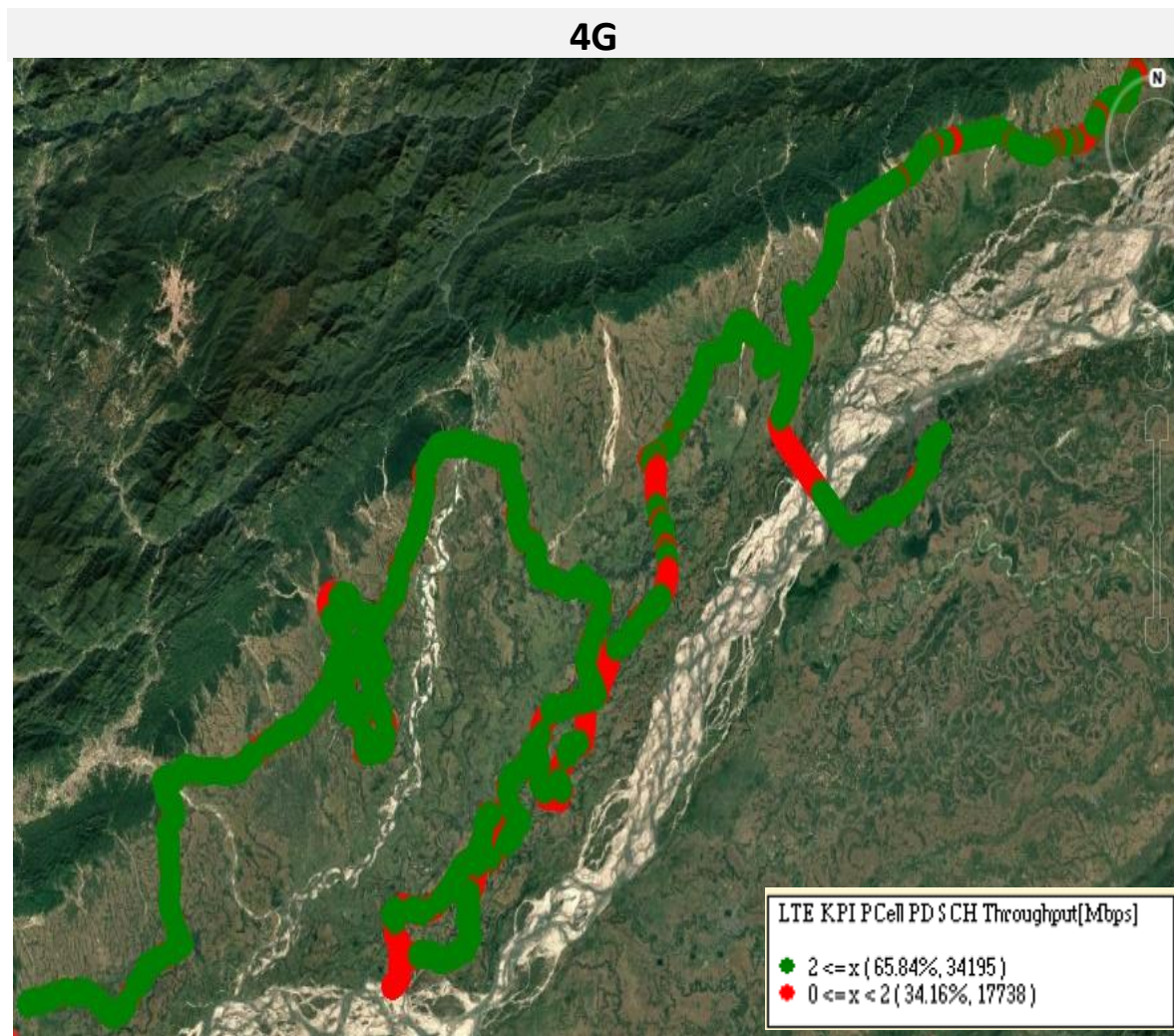
AVG. DOWNLOAD SPEED (Mbps)	2.03
% FILE TRANSFER COMPLETE	83.53
DL throughput	Sample %
0 to 0.5 Mbps	24.25
0.5 to 1 Mbps	11.08
1 to 2 Mbps	23.71
2 to 5 Mbps	31.17
>5 Mbps	9.79
Total	100

IV. Dynamic Data Test- 4G DL Details

RJIO

Dynamic Data Testing Complete 440 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	13.09



AVG. DOWNLOAD SPEED (Mbps)	13.09
% FILE TRANSFER COMPLETE	100
DL throughput	Sample %
0 to 1 Mbps	27.5
1 to 2 Mbps	6.1
2 to 5 Mbps	14.2
5 to 10 Mbps	14.4
>10 Mbps	37.8
Total	100

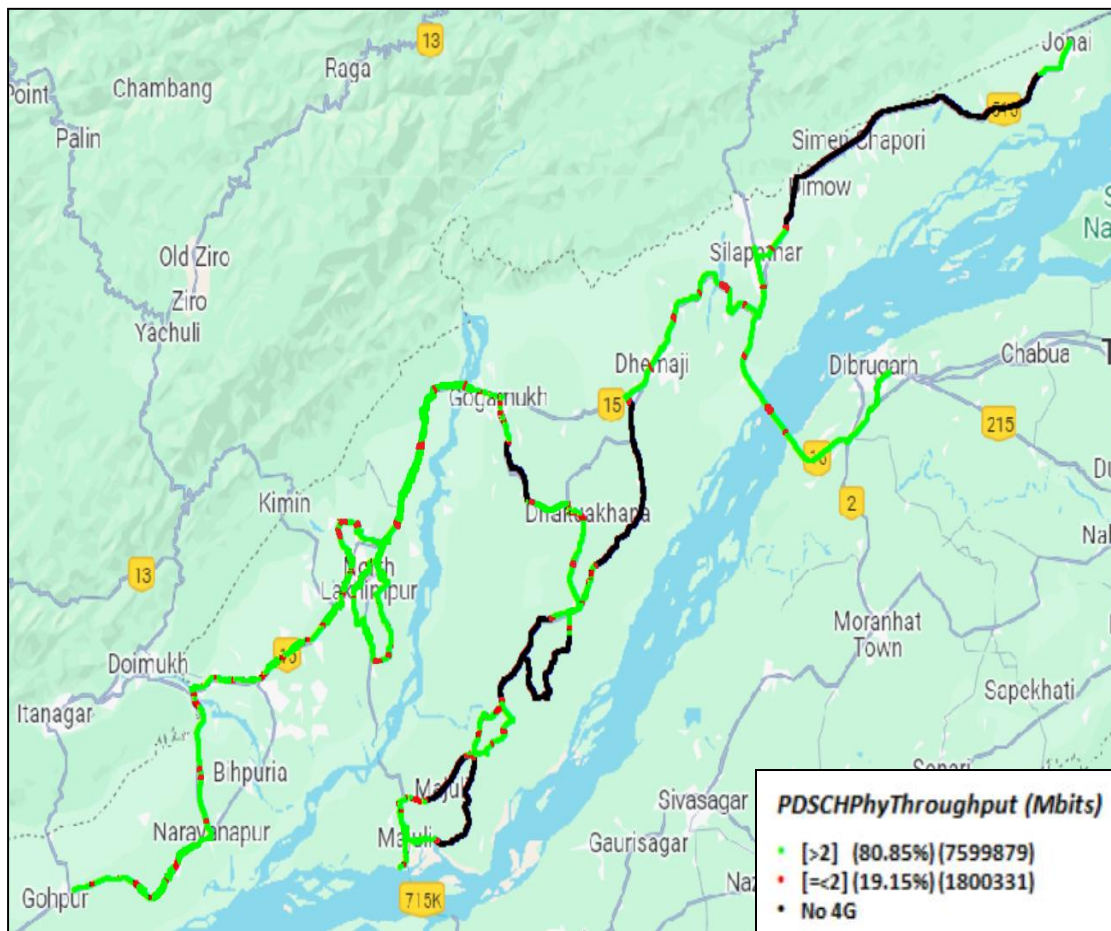
IV. Dynamic Data Test- 4G DL Details

VIL

Dynamic Data Testing Complete 440 Kms

Data KPIs – Overall	4G
Average Download Throughput (Mbps)	7.89

4G



AVG. DOWNLOAD SPEED (Mbps)	7.89
% FILE TRANSFER COMPLETE	95.17
DL throughput	Sample %
0 to 1 Mbps	4.28
1 to 2 Mbps	14.87
2 to 5 Mbps	18.27
5 to 10 Mbps	29.47
>10 Mbps	33.11
Total	100