Operator Assisted Drive Test Report
Itanagar, Arunachal Pradesh
March 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 & 4G) network, Call Setup Success Rate (CSSR%) in 2G & 4G network, and Rx Quality in 4G (SINR) network.

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

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

The Operator Assisted Drive Test has been carried out by Regional Office, Kolkata with the help of Service Providers in Itanagar and surrounding areas including National Highways (15 & 415) on 10th March 2023 from 08.30 AM to 08.30 PM. The drive test covered drive route of 92 KMs (approx) over a period of 1 day. Approximately 119+ calls were made for each of the 8 networks: three 2G networks, one 3G network and four 4G networks covering four TSPs.

Overview | Voice Summary | Data Summary

Overview

Itanagar is the capital and largest town of the Indian state of Arunachal Pradesh. Being the hub of all the major economic bases, Itanagar, along with the adjacent town of Naharlagun comprise the administrative region of Itanagar Capital Complex Region stretching from the Itanagar Municipal limit at Chandranagar Town extended until Nirjuli Town, is a major junction of cultural, economic, fashion, education and recreational activities.

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 networks, four 4G networks covering 4 unique TSPs were tested.

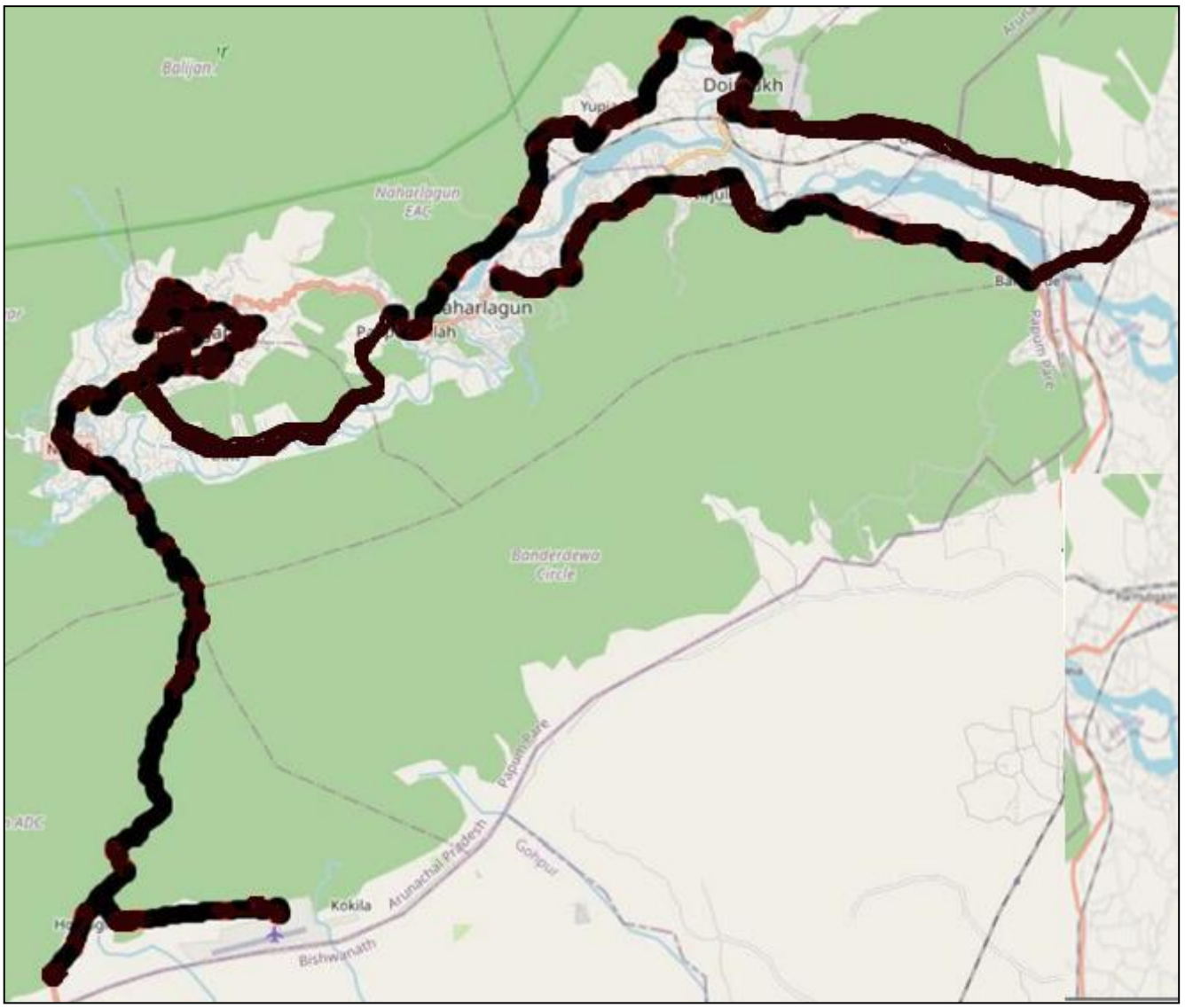
Data Tests: Dynamic Data Service Testing was performed along same route in all technologies. 500 KB file for 2G, 20MB file for 3G and 40MB file for 4G were downloaded from FTTP server in TSP's own server. Static Data Service Testing was also performed. Three 2G (Lock Mode) networks, one 3G (Lock Mode)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

Overview

Voice & Dynamic Data Test Drive Route



DRIVE ROUTES ITANAGAR

DAY-1–Donyi Polo Airport, Itanagar-Dipu forest Camp-NH-415--Hollongi Chariali-Chakma-6-Kendriya Vidyalaya-Hotel Cygnett-Hotel SC continental-Dorjee Khandu-State Convention Centre-Cona County-State Museum-Itanagar Police Station-Doordarshan Kendra Itanagar-C-Sector-Raj Bhawan-Hotel DonyPolo Ashok--Hill top hall-Ramkrishna Mission Hospital, Itanagar-Jully Basti Road-Don Bosco College-Loby Dariya-Samaritan Hormin Hospital-National Institute of Electronics and Information Techonology, Itanagar-Naharlagun Station-Upia- Government College Doimukh-Rajiv Gandhi University-Gomto-I-Banderdewa Police Outpost-Nefa- Eco-Camp-Naharlagun Model Vill-Naharlgaun Helipad.

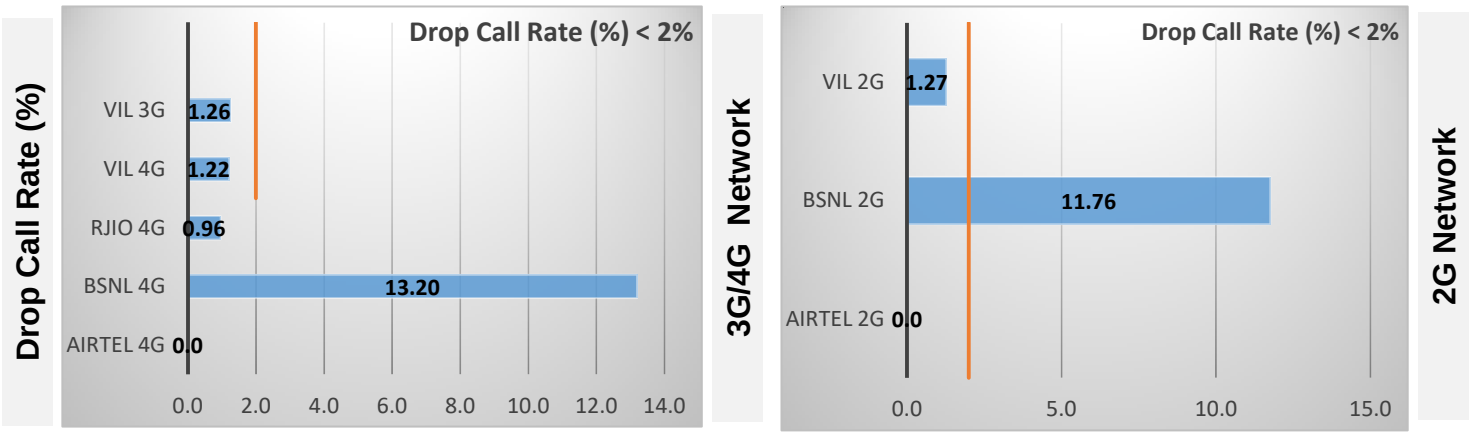
Data Service Test- Static Location

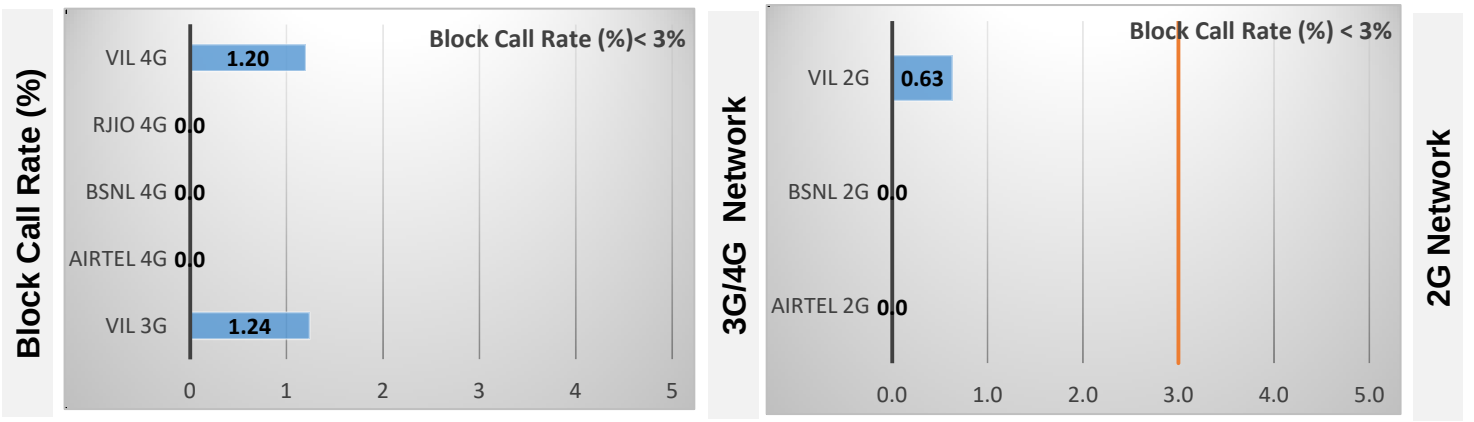
Donyi Polo Airport, Itanagar, Hollongi

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	VIL	AIRTEL	BSNL	RJIO	VIL
Drop Call Rate %	0.0	11.76	1.27	1.26	0.0	13.20	0.96	1.22
Block Call Rate %	0.0	0.0	0.63	1.24	0.0	0.0	0.0	1.20

a) All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%) except BSNL (2G) & (4G).

b) All TSPs have met the 3% QOS benchmark of Block Call Rate (DCR%).

Voice Calls

Key Observations

Coverage

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

TSPs	2G		
	AIRTEL	BSNL	VIL
Coverage %	90.0	50.85	94.01

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

TSPs	3G	4G			
	VIL	AIRTEL	BSNL	RJIO	VIL
Coverage	89.67	92.0	64.57	85.68	81.41

Summary

City Level Summary- Voice

Voice Call	2G		
	AIRTEL	BSNL	VIL
Call Attempt	131	51	158
Blocked Call Rate (%)	0.0	0.0	0.63
CSSR% (Accessibility)	100	88.24	99.37
Drop Call Rate (%)	0.0	11.76	1.27
Mobility HOSR (%)	96.0	96.24	100
Rx Quality (%)	95.0	95.38	95.35

Voice Call	3G/4G				
	VIL 3G	AIRTEL 4G	BSNL 4G	RJIO 4G	VIL 4G
Call Attempt	161	131	53	104	166
Blocked Call Rate (%)	1.24	0.0	0.0	0.0	1.20
CSSR% (Accessibility)	98.76	100	86.79	100.0	98.80
Drop Call Rate (%)	1.26	0.0	13.20	0.96	1.22
Mobility HOSR (%)	100	100	96.07	98.10	100
Rx Quality (%)	94.12	90.0	64.38	73.49	91.34

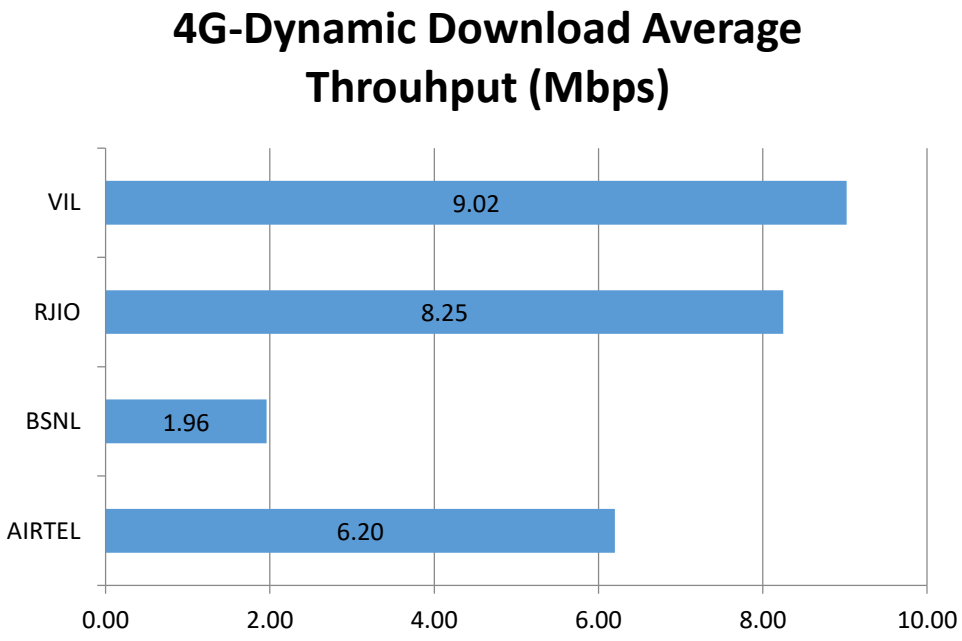
Summary-Data Services Dynamic

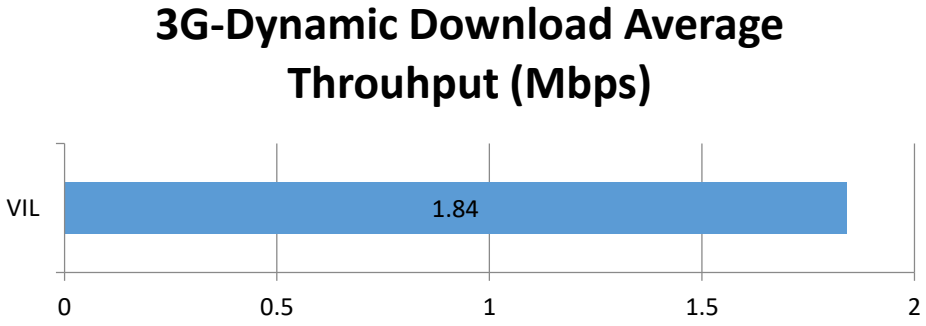
Key Observations

Dynamic Data was tested for 92 Kms. Download Throughput was tested.

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

4G/3G Network:





Summary-Data Services Static

Location Level Summary-

Location:-Donyi Polo Airport, Holongi	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	10.68	252.15	107.30
Upload Throughput (kbps)	6.81	54.69	72.67
Web Browsing Delay (sec)	5.35	219	1.13
Latency (msec)	218	185	289

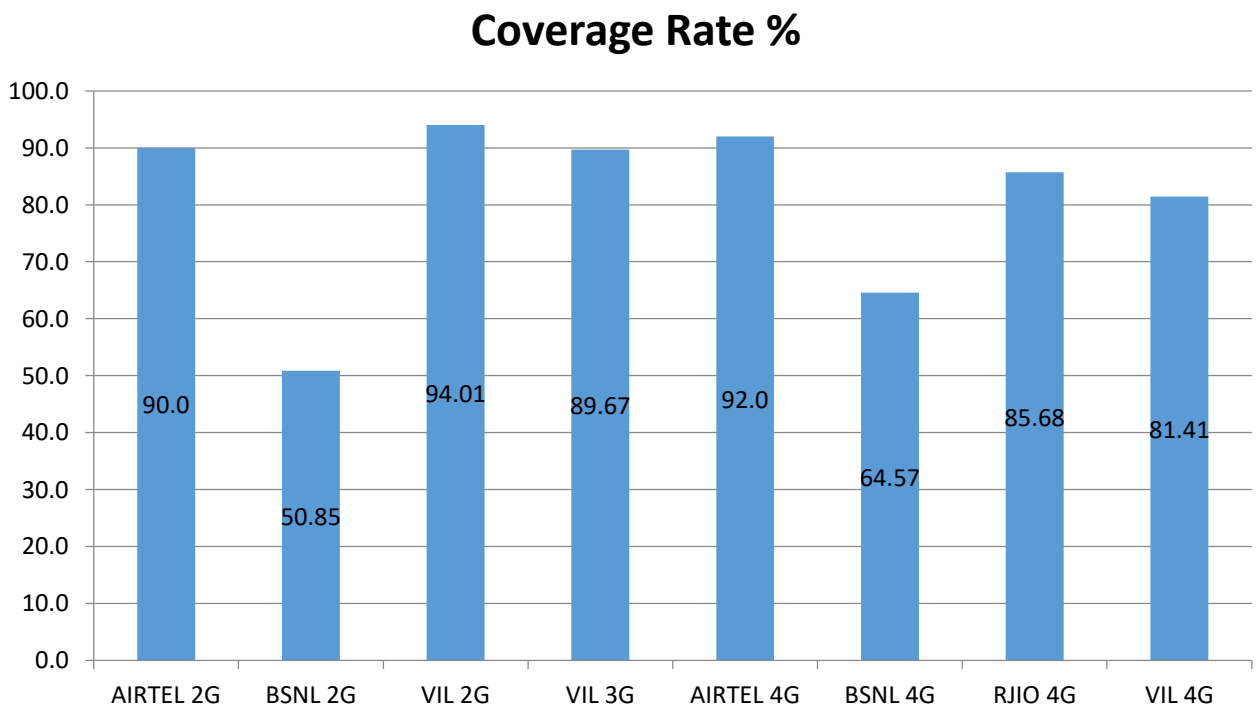
Location:-Donyi Polo Airport, Holongi	3G/4G				
	VIL 3G	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	4.88	2.10	1.69	9.55	4.91
Upload Throughput in Mbps	1.26	0.02	0.94	6.52	0.67
Video streaming delay (secs)	0.96	85.0	***	0.0	02 .0
Web Browsing Delay (secs)	1.21	35.0	6.17	5.10	03 .0
Latency (msec)	137	104	119	55.13	18

***Report not submitted

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 ≥ -110dBm. The details are as follows.

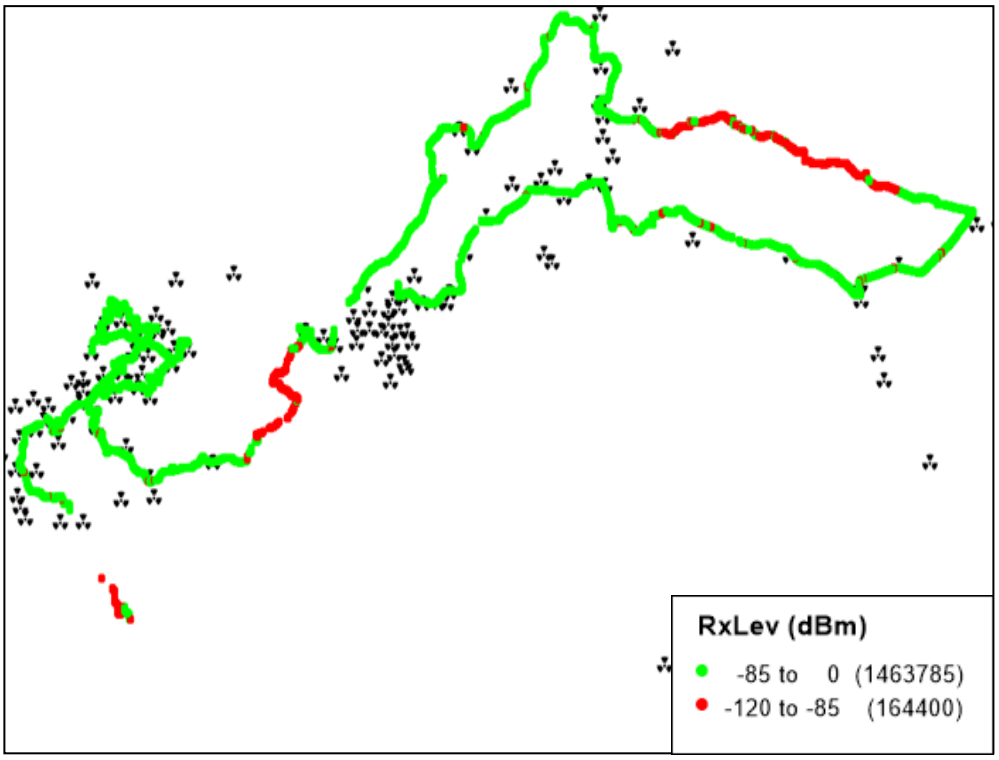
TSP	Coverage Rate %
AIRTEL 2G	90.0
BSNL 2G	50.85
VIL 2G	94.01
VIL 3G	89.67
AIRTEL 4G	92.0
BSNL 4G	64.57
RJIO 4G	85.68
VIL 4G	81.41



AIRTEL

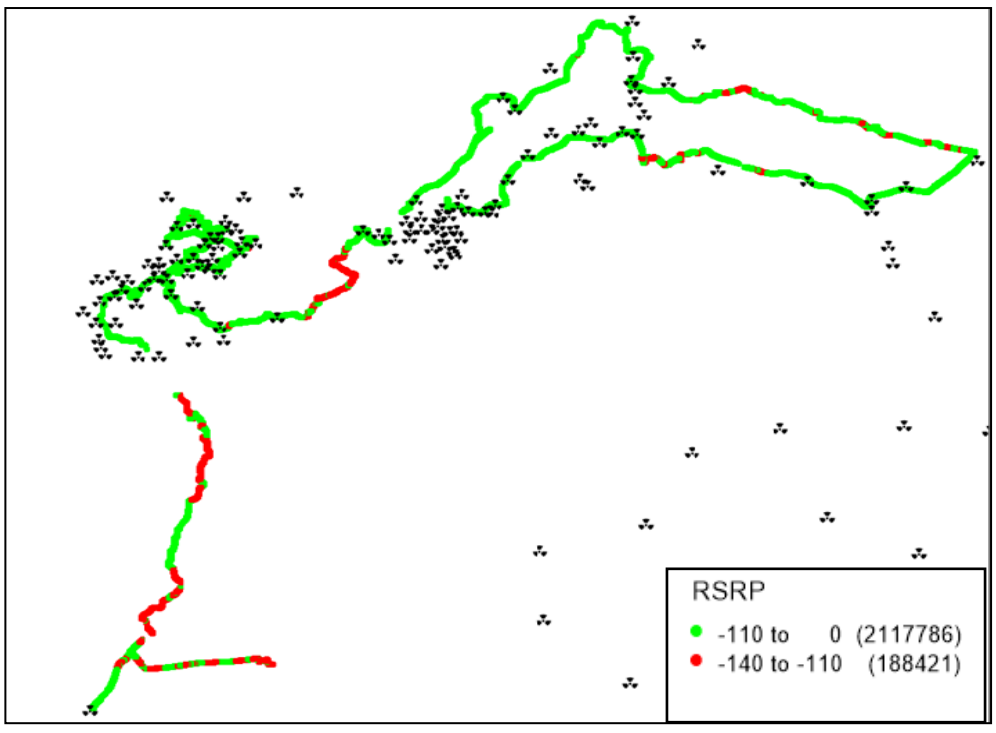
Technology	Coverage Rate %
2G	90.0
4G	92.0

2G



Overall Rx Level	Sample %
[Max >=-75]	63.16%
[-75 >=-85)	26.75%
[-85 >=-95)	8.23%
[-95 >=Min)	1.87%
Total	100

4G



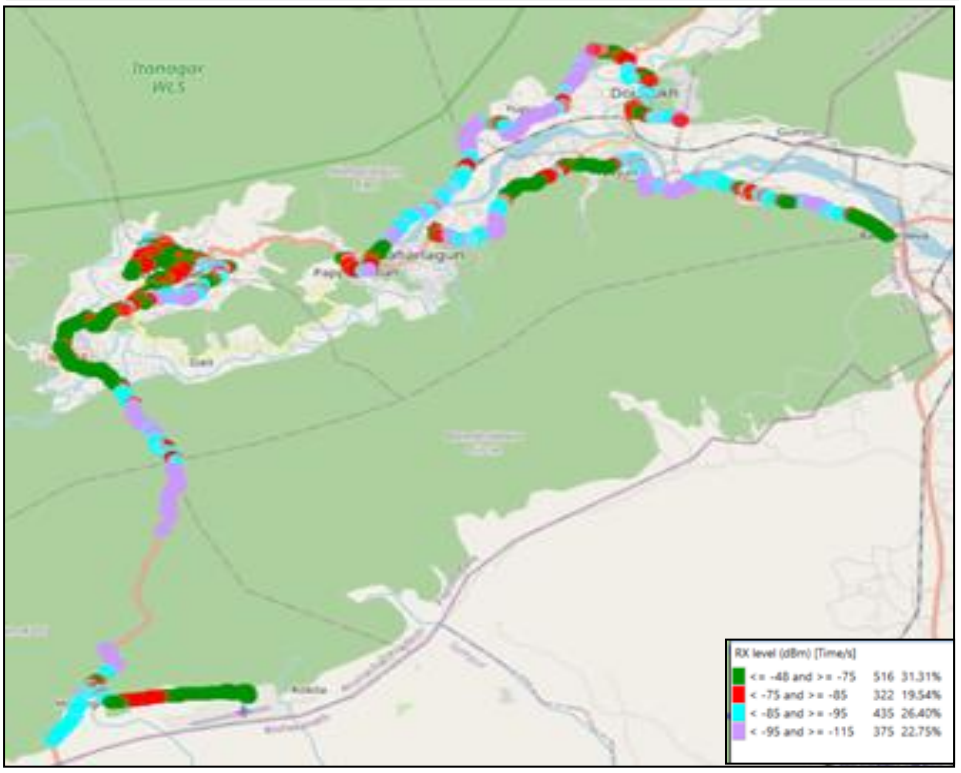
Overall RSRP	Sample %
[Max >=-80]	29.64%
[-80 >=-90)	29.83%
[-90 >=-110)	32.36%
[-110 >=Min)	8.17%
Total	100

I. Coverage Details

BSNL

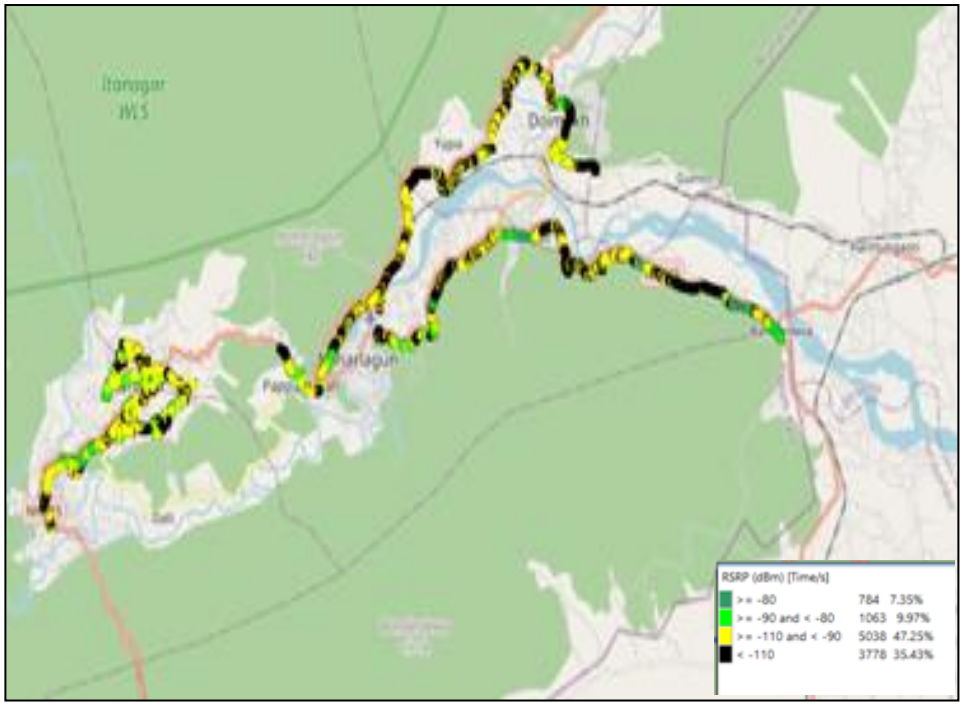
Technology	Coverage Rate %
2G	50.85
4G	64.57

2G



Overall Rx Level	Sample %
[Max >=-75]	31.31
[-75 >=-85)	19.54
[-85 >=-95)	26.40
[-95 >=Min)	22.75
Total	**100**

4G



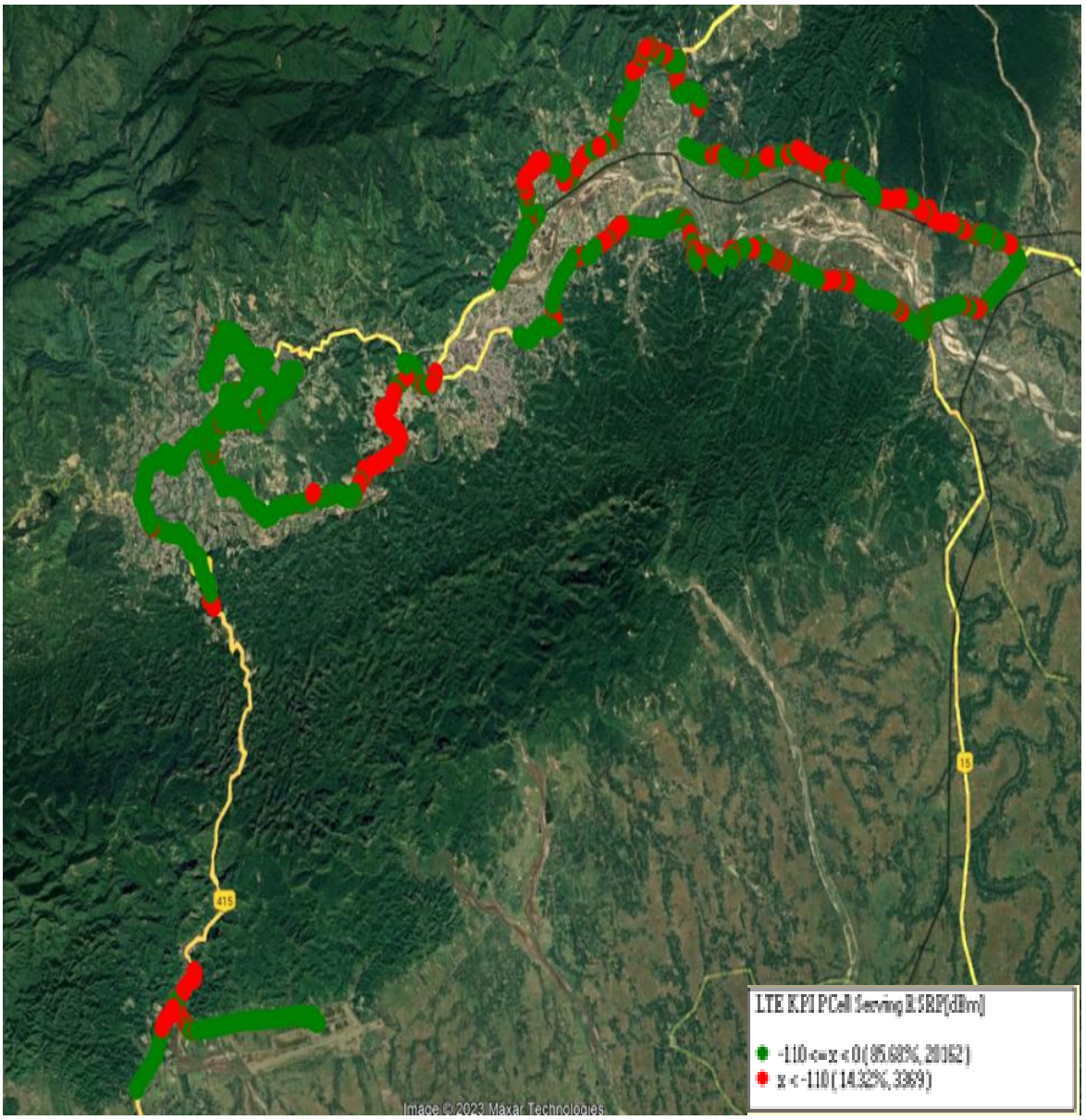
Overall RSRP	Sample %
[Max >=-80]	7.35
[-80 >=-90)	9.97
[-90 >=-110)	47.25
[-110 >=Min)	35.43
Total	100

I. Coverage Details

RJIO

Technology	Coverage Rate %
4G	85.68

4G



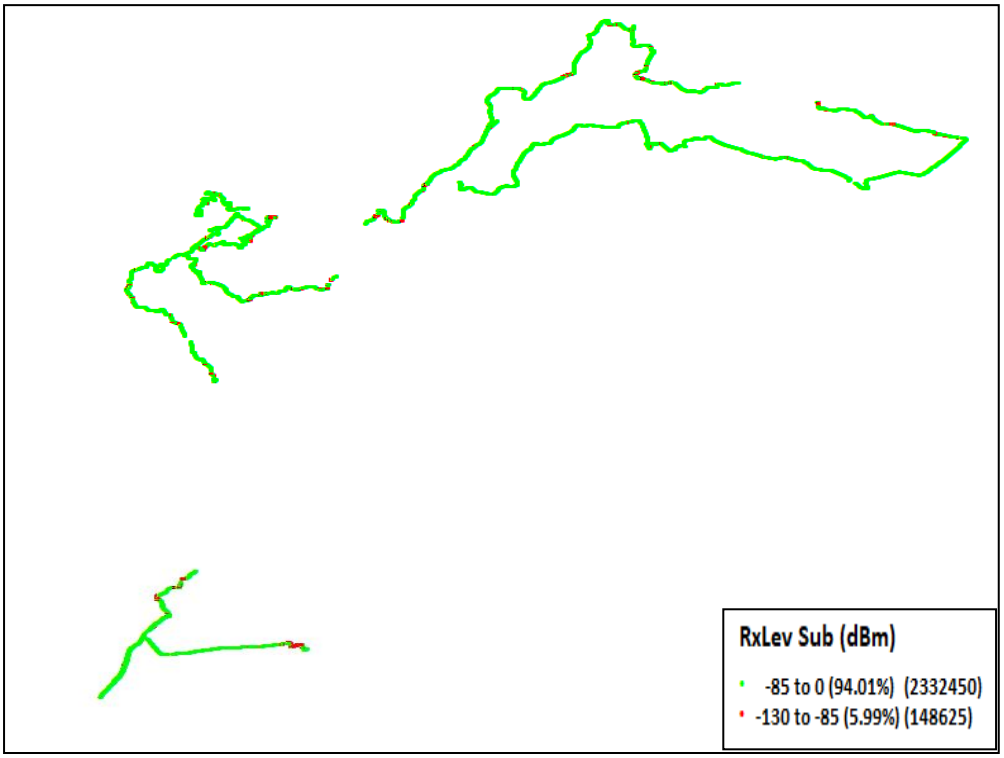
Overall RSRP	Sample %
[Max >=-80]	14%
[-80 >=-90)	23%
[-90>=-110)	48%
[-110 >=Min)	14%
Total	100

I. Coverage Details

VIL

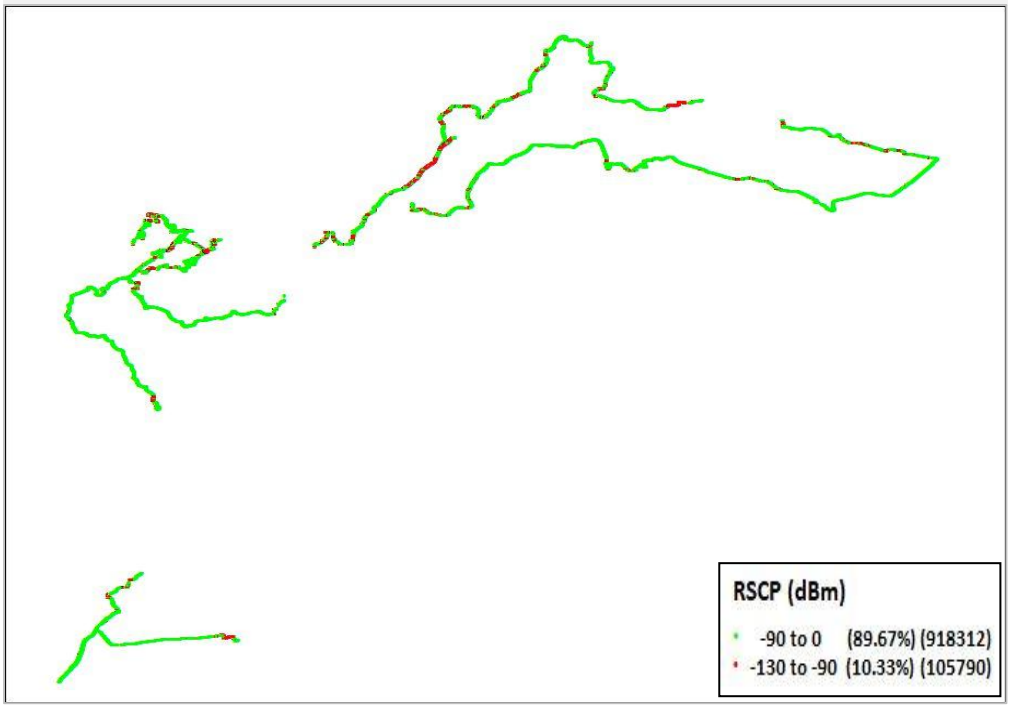
Technology	Coverage Rate %
2G	94.01
3G	89.67

2G



Overall RxLevel	Sample %
[Max >=-75]	43.28%
[-75 >=-85)	50.73%
[-85 >=-95)	1.35%
[-95 =Min)	4.64%
Total	**100**

3G



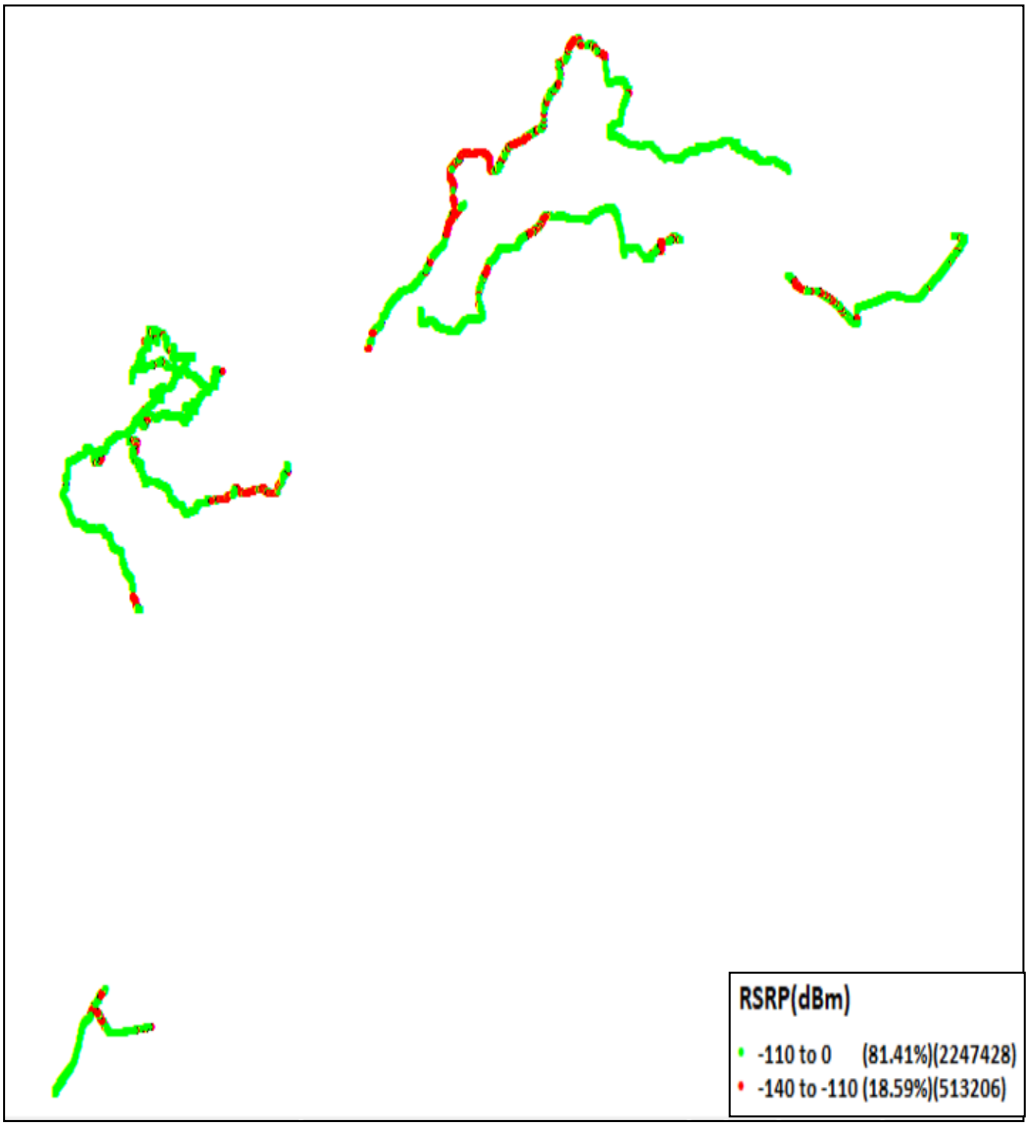
Overall RSCP	Sample %
[Max >=-70]	35.24%
[-70 >=-80)	22.12%
[-80 >=-90)	32.31%
[-90 >=Min)	10.33%
Total	**100**

I. Coverage Details

VIL

Technology	Coverage Rate %
4G	81.41

4G

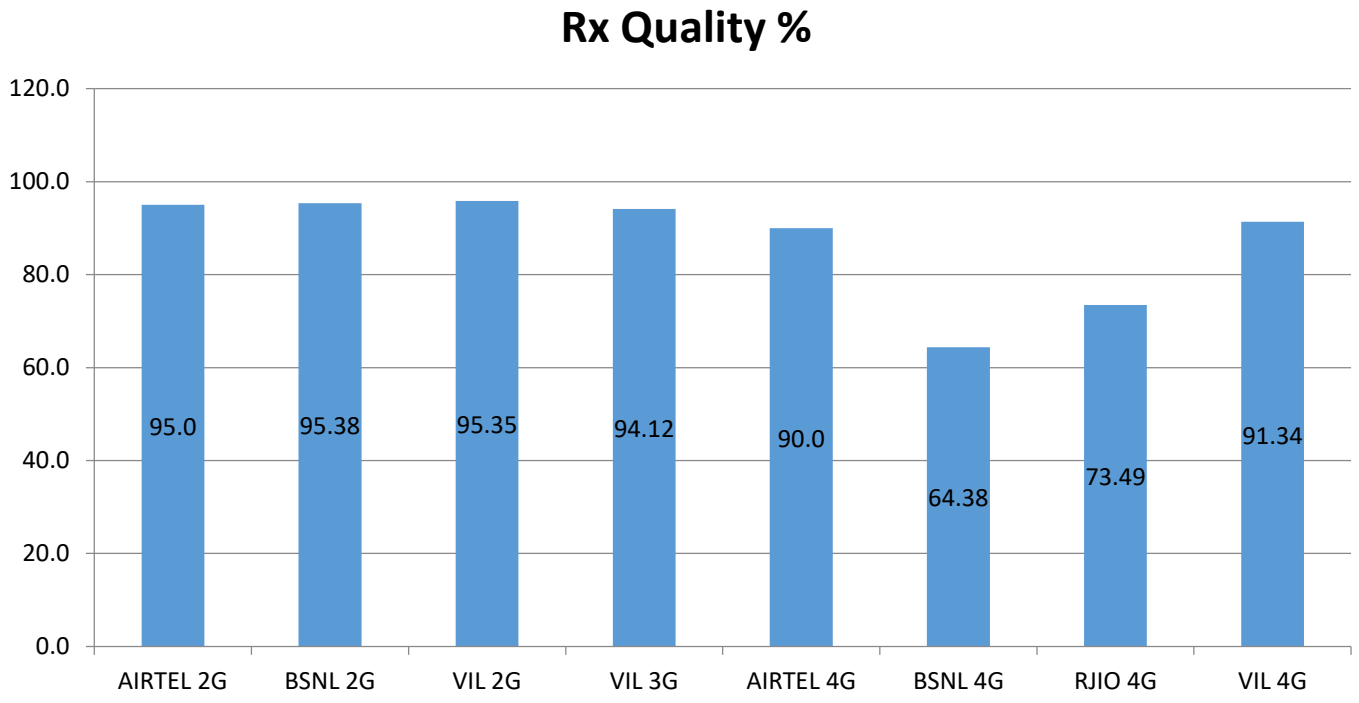


Overall RSRP	Sample %
[Max >=-80]	30.94%
[-80 >=-90)	32.56%
[-90>=-110)	17.91%
[-110 >=Min)	18.59%
Total	**100**

II. Quality Details

For measuring voice quality, as per the QoS norms, Rx Quality<=5 for GSM, Ec/No >= -14 dBm for 3G 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 ≥ 95%.

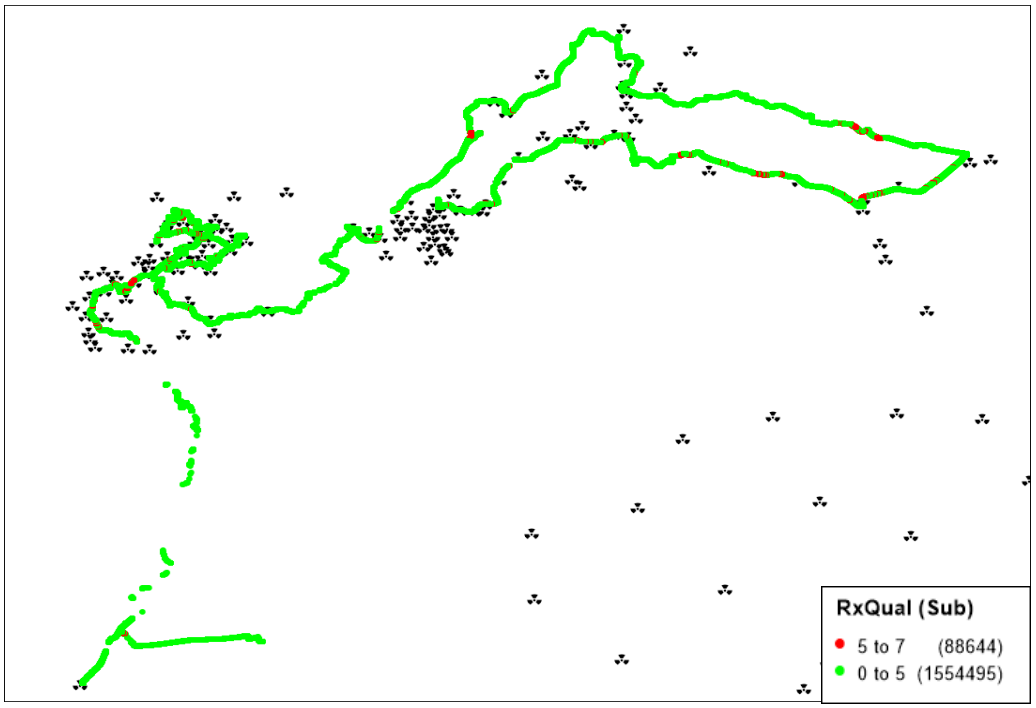
TSP	Rx Quality %
AIRTEL 2G	95.0
BSNL 2G	95.38
VIL 2G	95.35
VIL 3G	94.12
AIRTEL 4G	90.0
BSNL 4G	64.38
RJIO 4G	73.49
VIL 4G	91.34



AIRTEL

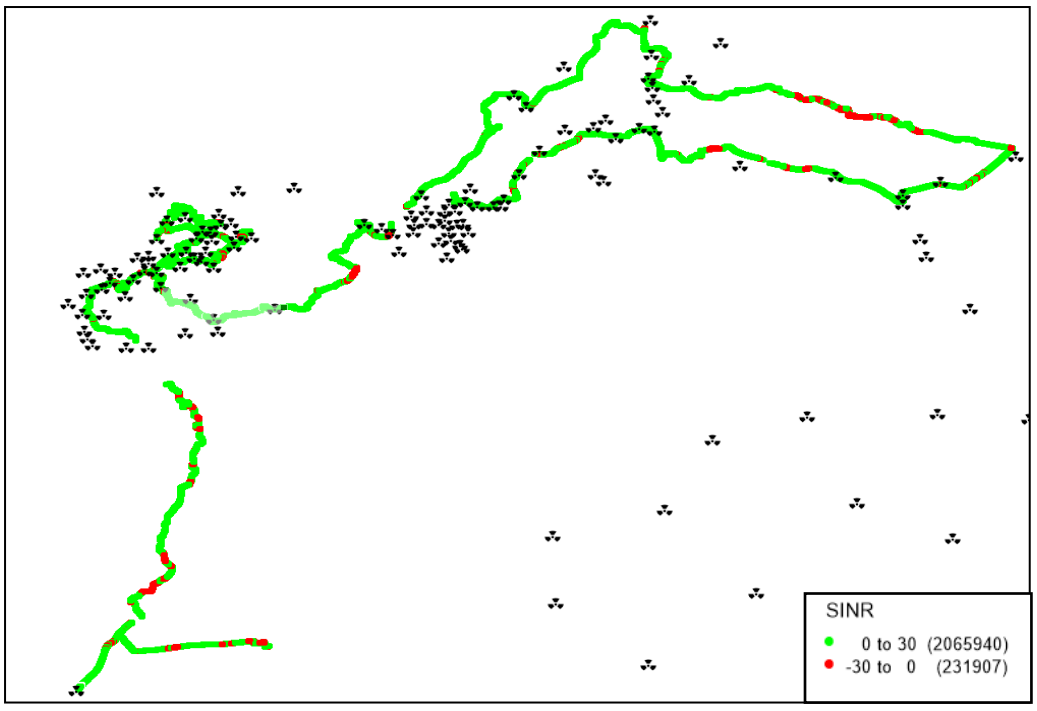
Technology	Rx Quality %
2G	95.0
4G	90.0

2G



Overall Rx Quality	Sample %
(Min <=2)	85.93%
(2 <=3)	2.36%
(3 <=4)	3.52%
(4 <=5)	2.80%
(5 <=Max)	5.39%
Total	100

4G



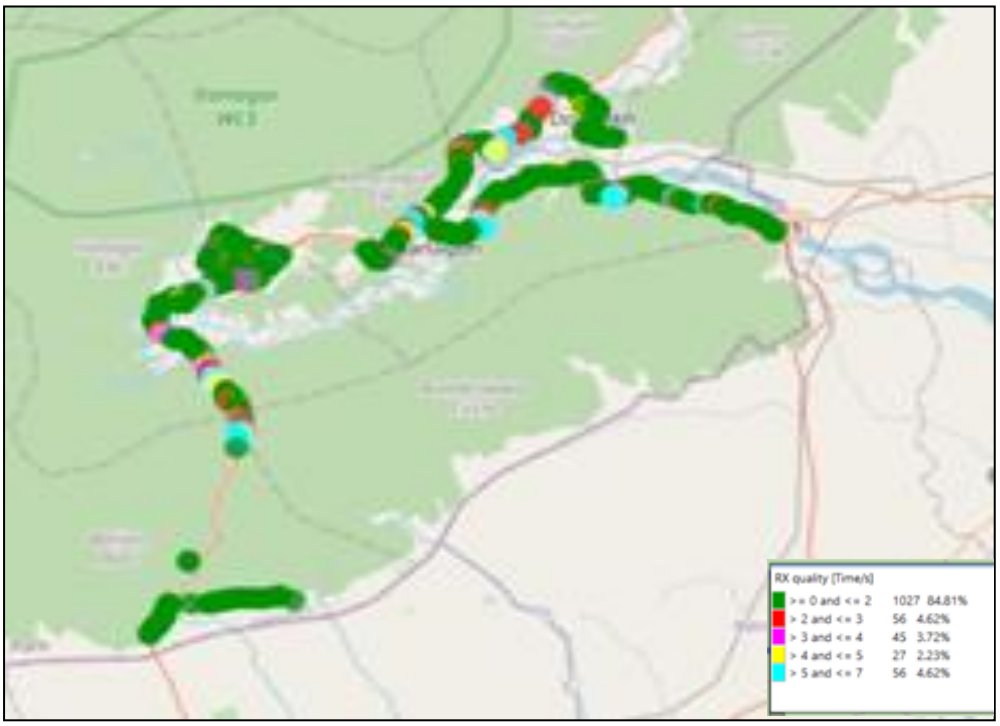
Overall SINR	Sample %
(Min <=0)	10.39%
(0 <=5)	30.78%
(5 <=10)	23.74%
(10 <=15)	17.75%
(15 <=Max)	17.34%
Total	100.00

II. Quality Details

BSNL

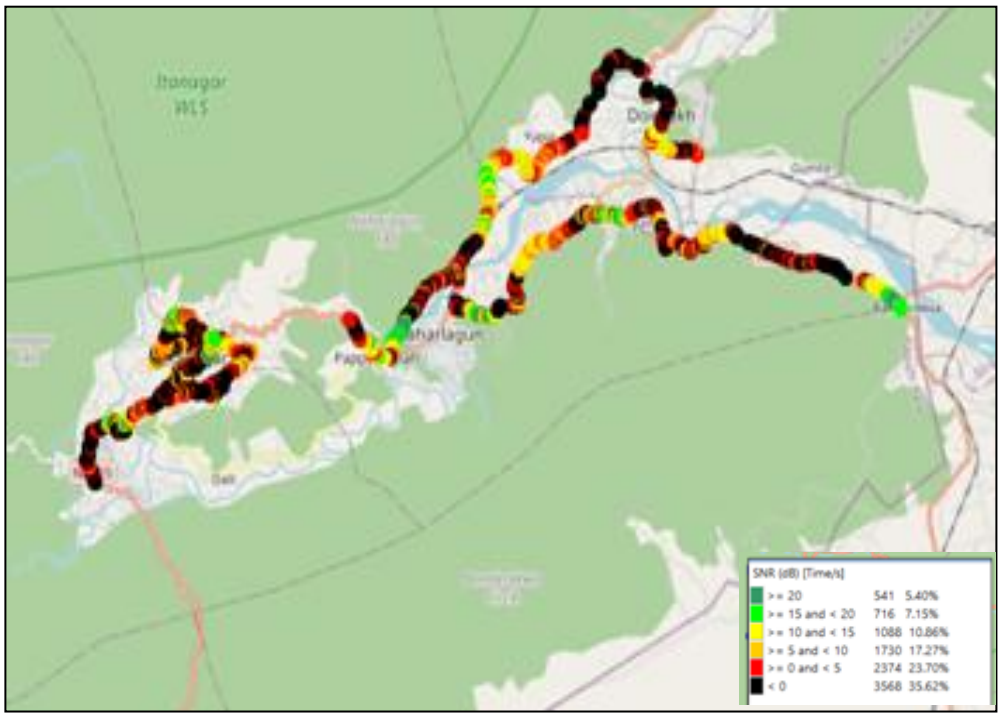
Technology	Rx Quality %
2G	95.38
4G	64.38

2G



Overall Rx Quality	Sample %
(Min <=2)	84.81
(2 <=3)	4.62
(3 <=4)	3.72
(4 <=5)	2.23
(5 <=Max)	**4.62**
Total	**100**

4G



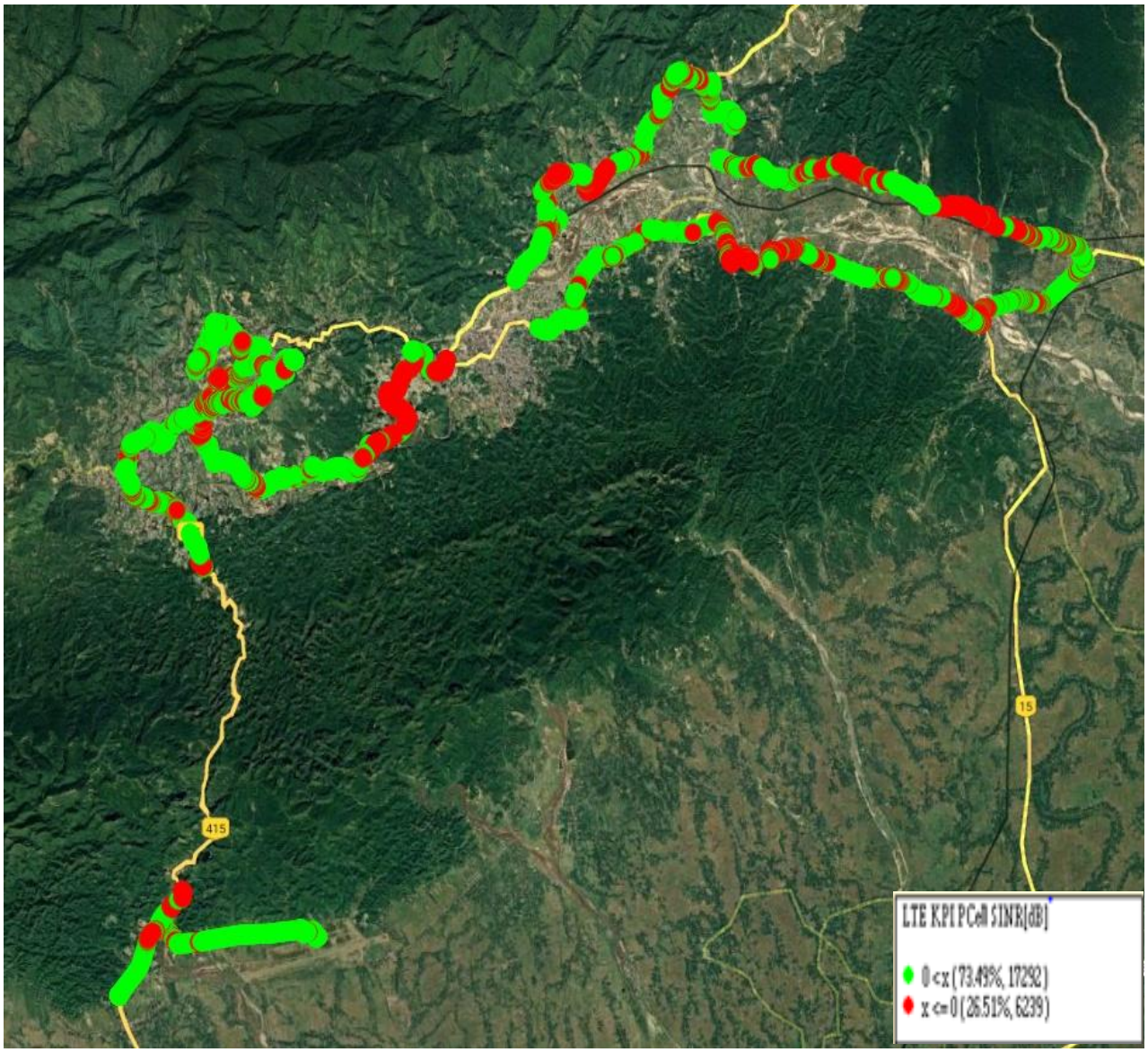
Overall SINR	Sample %
(Min <=0)	35.62
(0 <=5)	23.7
(5 <=10)	17.27
(10 <=15)	10.86
(15 <=Max)	12.55
Total%	100

II. Quality Details

RJIO

Technology	Rx Quality %
4G	73.49

4G



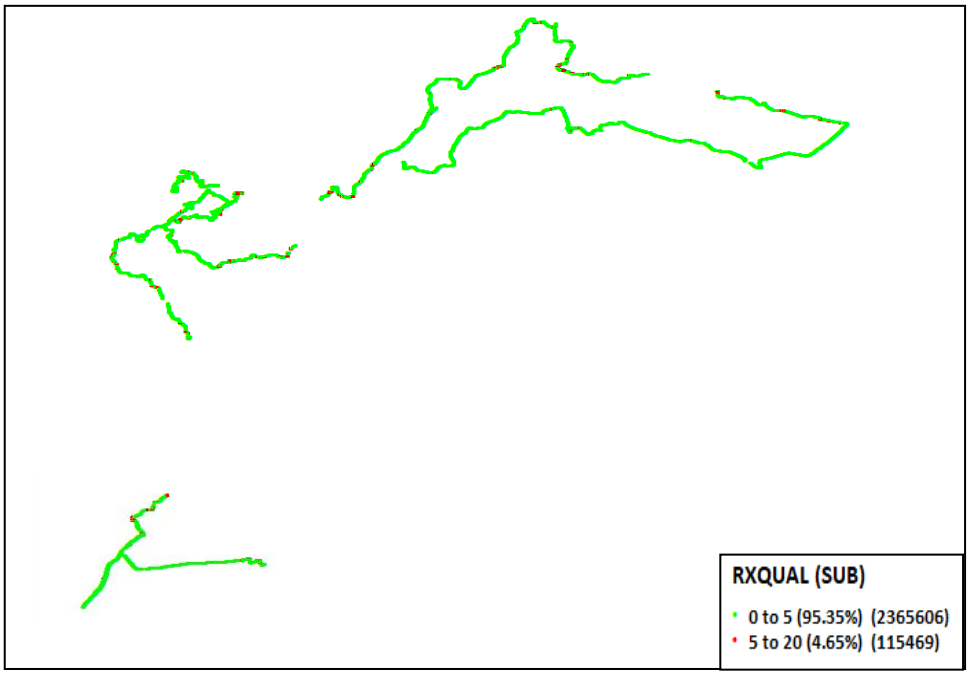
Overall SINR	Sample %
(Min <=0)	16%
(0 <=5)	15%
(5 <=10)	18%
(10 <=15)	25%
(15 <=Max)	27%
Total	100%

II. Quality Details

VIL

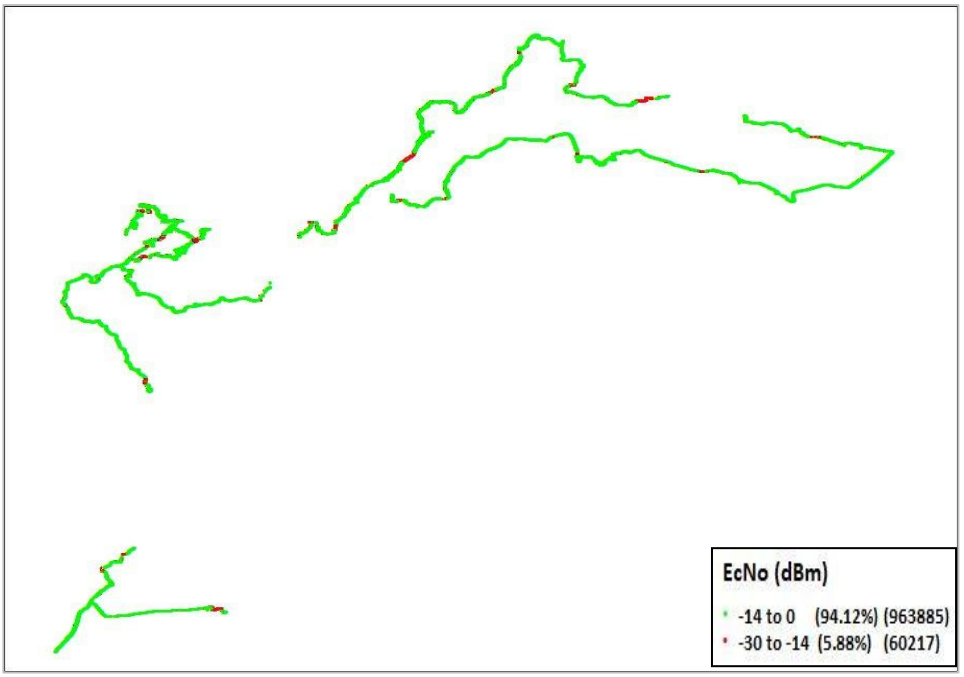
Technology	Rx Quality %
2G	95.35
3G	94.12

2G



Overall Rx Quality	Sample %
(Min <=2)	38.39%
(2 <=3)	26.81%
(3 <=4)	14.75%
(4 <=5)	15.40%
(5 <=Max)	4.65%
Total	**100**

3G



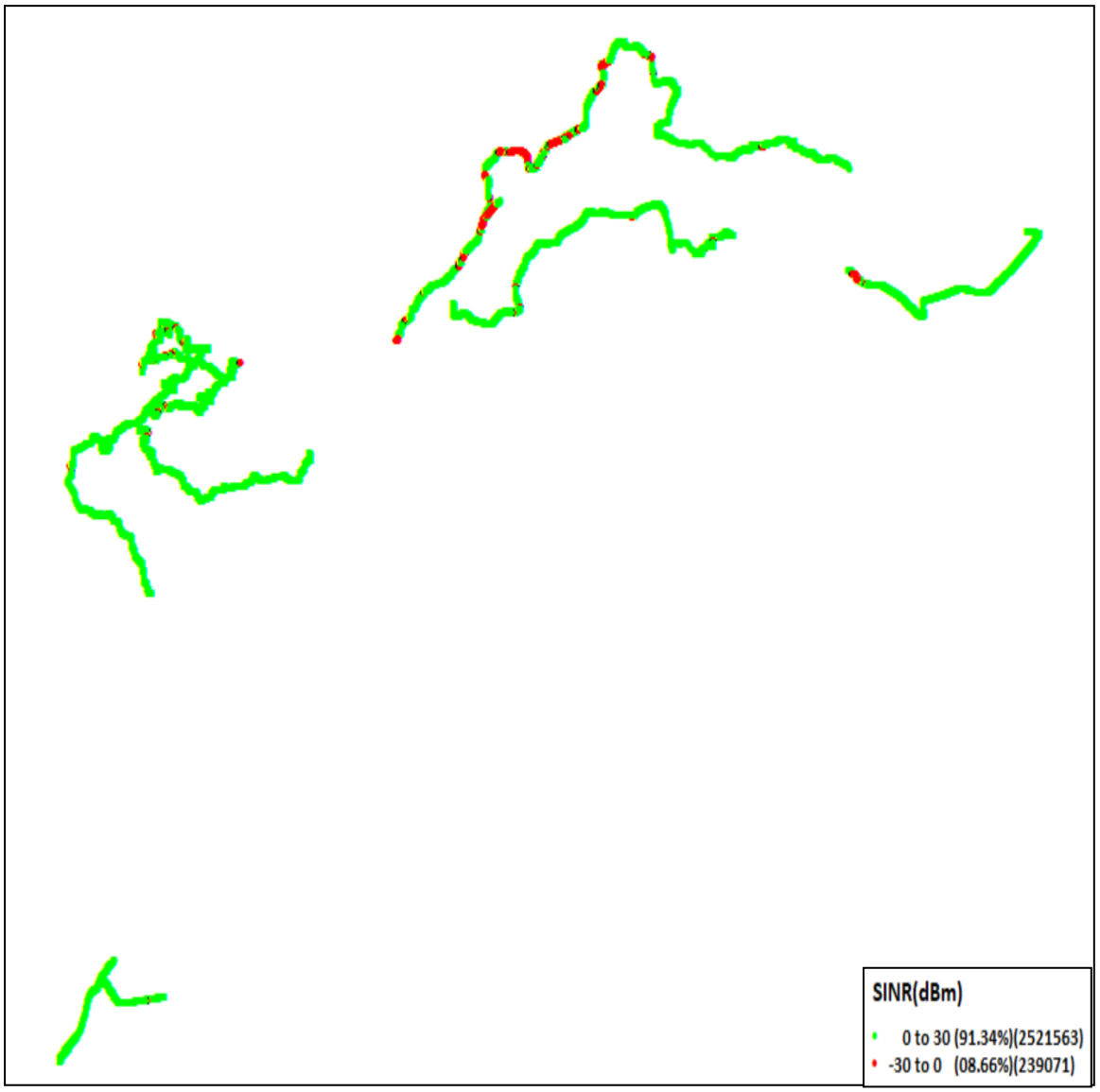
Overall EcNo	Sample %
(Max <=-6)	37.85%
(-6 <=-9)	25.43%
(-9 <=-11)	19.17%
(-11 <=-14)	11.67%
(-14 <= Min)	5.88%
Total	**100**

II. Quality Details

VIL

Technology	Rx Quality %
4G	91.34

4G



Overall SINR	Sample %
(Min <=0)	8.66%
(0 <=5)	13.70%
(5 <=10)	23.75%
(10 <=15)	28.32%
(15 <=Max)	**25.58%**
Total	**100**

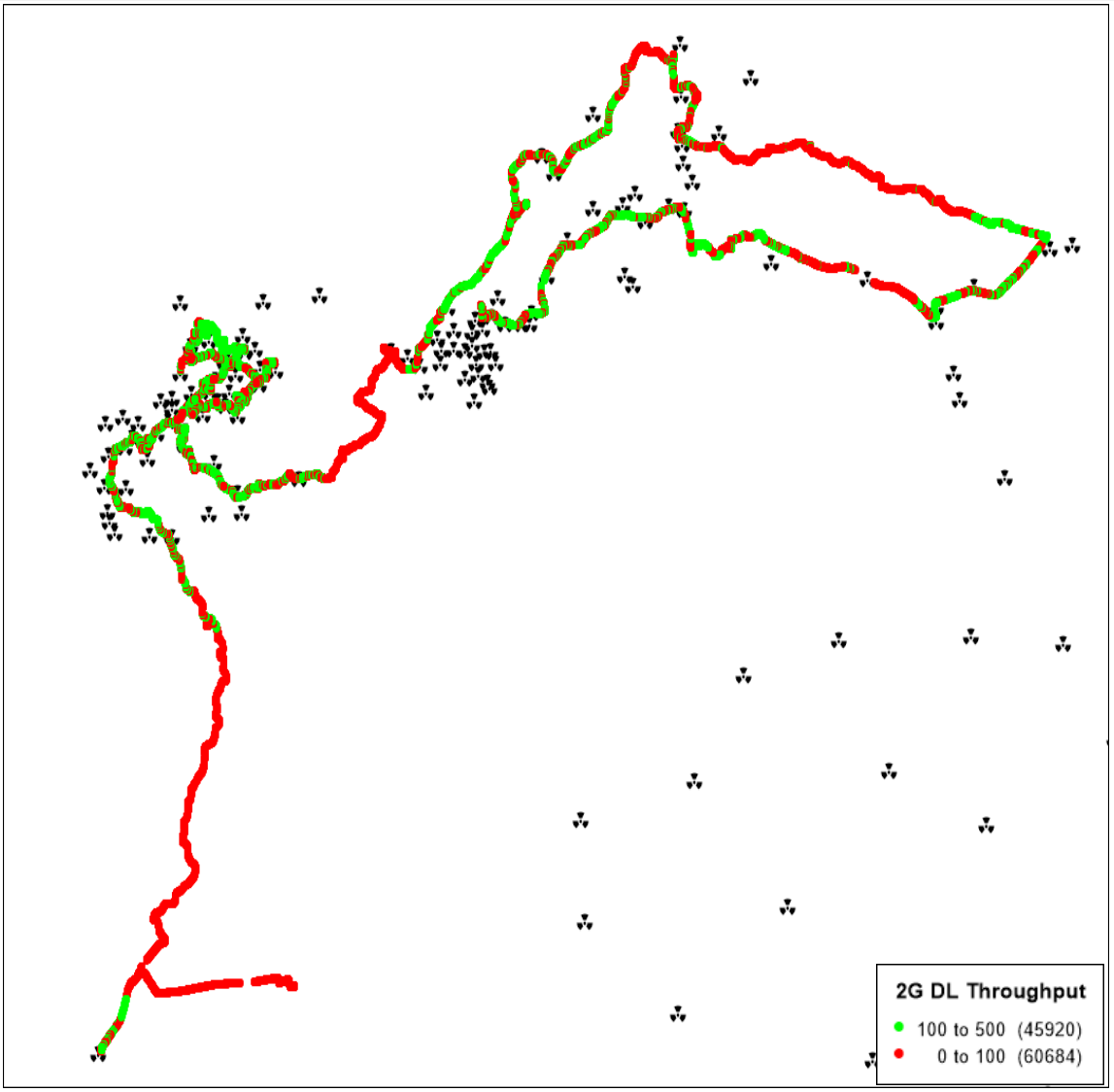
IV. Dynamic Data Test-DownLoad Details

AIRTEL

Dynamic Data Testing Complete 92 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	80.68

2G



AVG. DOWNLOAD SPEED (Kbps)	80.68
% FILE TRANSFER COMPLETE	75%
DL throughput	**Sample %**
0 to 50 Kbps	24.06
50 to 100 Kbps	32.87
100 to 200 Kbps	36.46
200 to 300 Kbps	0.00
>300 Kbps	0.00
Total	100

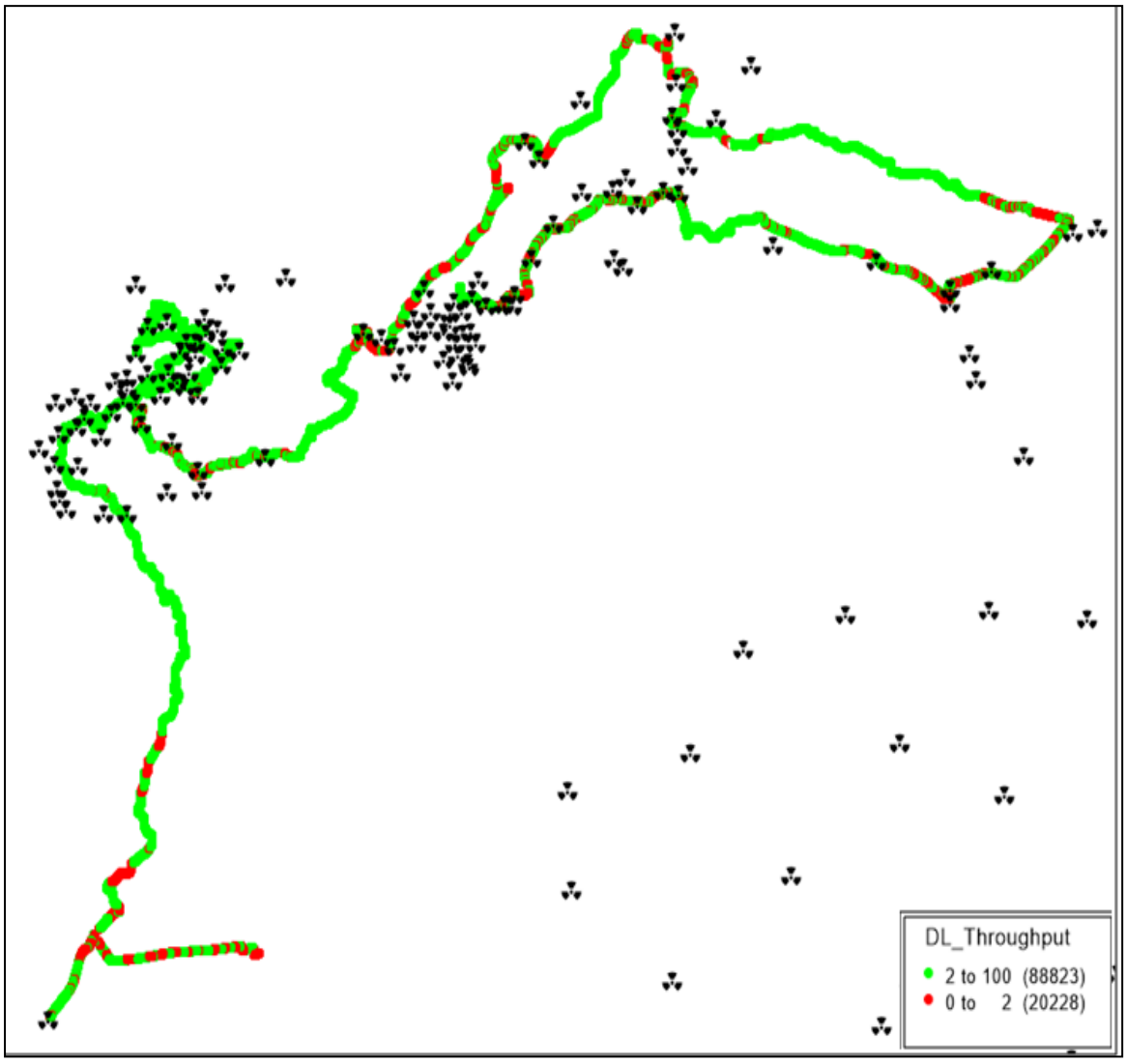
IV. Dynamic Data Test-DownLoad Details

AIRTEL

Dynamic Data Testing Complete 92 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	6.20

4G



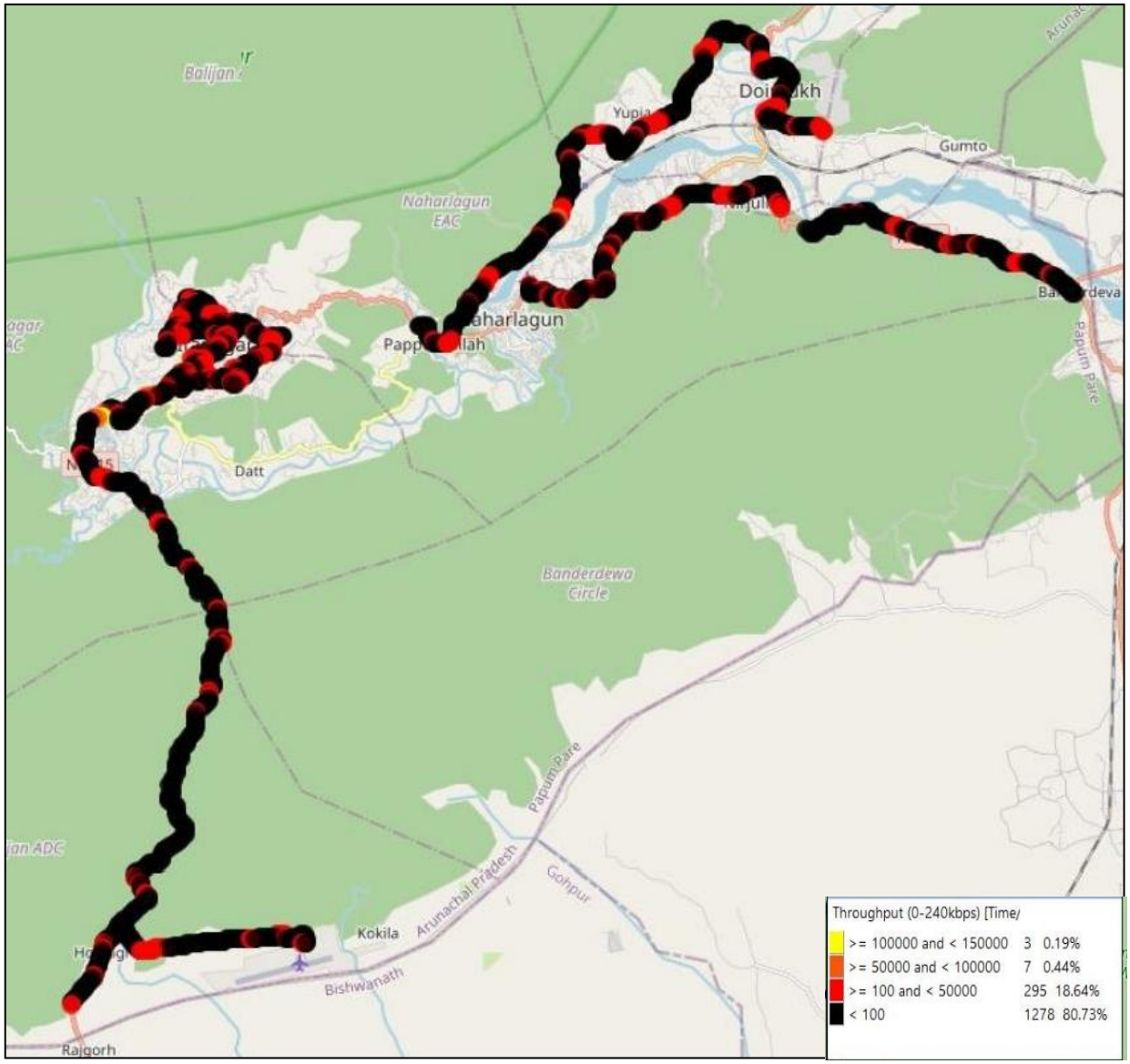
AVG. DOWNLOAD SPEED (Kbps)	6.20
% FILE TRANSFER COMPLETE	84%
DL throughput	**Sample %**
0 to 1 Mbps	4.98
1 to 2 Mbps	13.57
2 to 5 Mbps	34.33
5 to 10 Mbps	26.66
>10 Mbps	20.46
Total	100

BSNL

Dynamic Data Testing Complete 92 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	30.12

2G



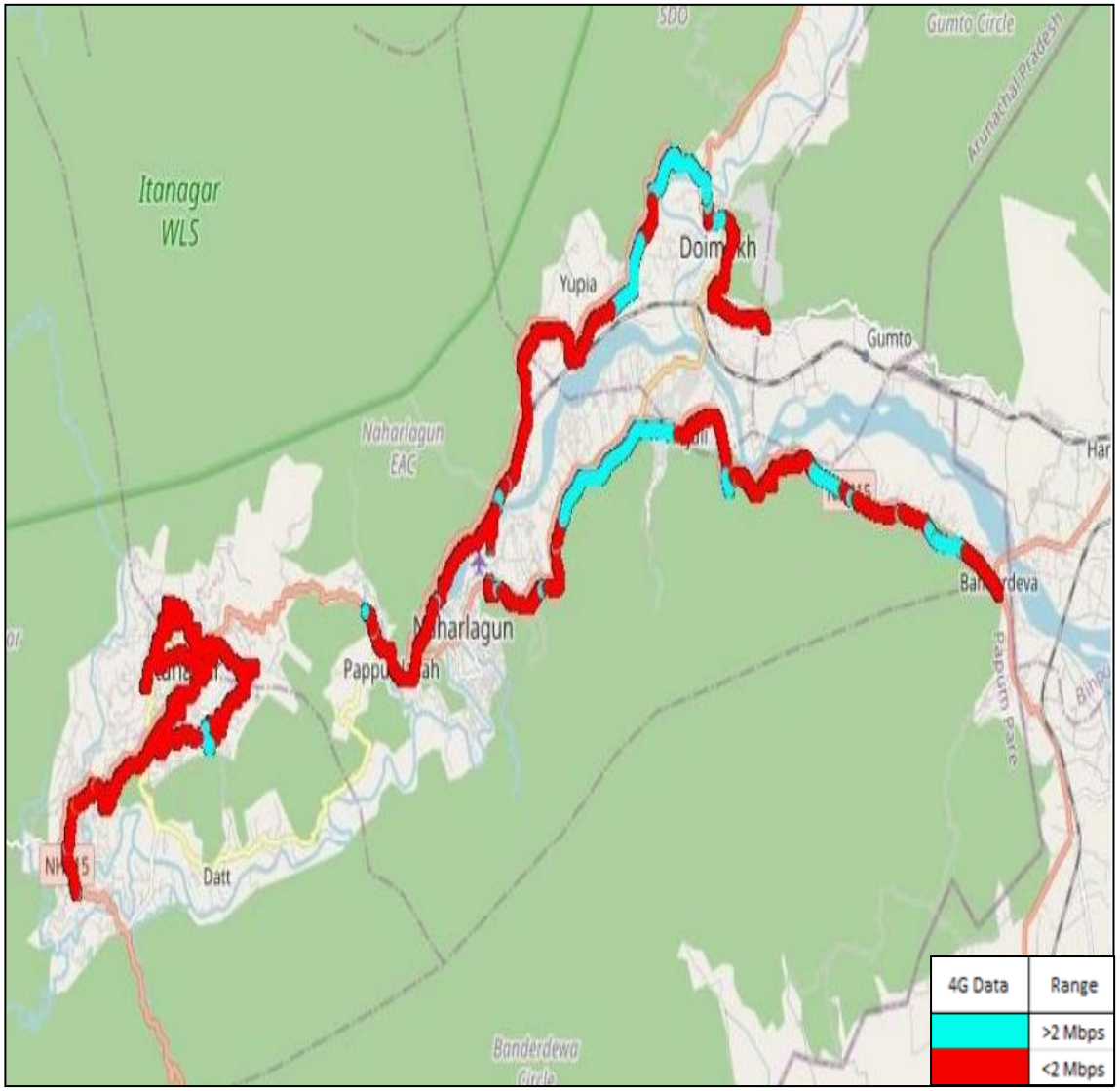
AVG. DOWNLOAD SPEED (Kbps)	30.12
% FILE TRANSFER COMPLETE	89.26
DL throughput	**Sample %**
0 to 50 Kbps	85.83
50 to 100 Kbps	7.61
100 to 200 Kbps	5.25
200 to 300 Kbps	1.28
>300 Kbps	0
Total	**100**

BSNL

Dynamic Data Testing Complete 92 Kms

Data KPIs - Overall	**4G**
Average Download Throughput (Mbps)	1.96

4G



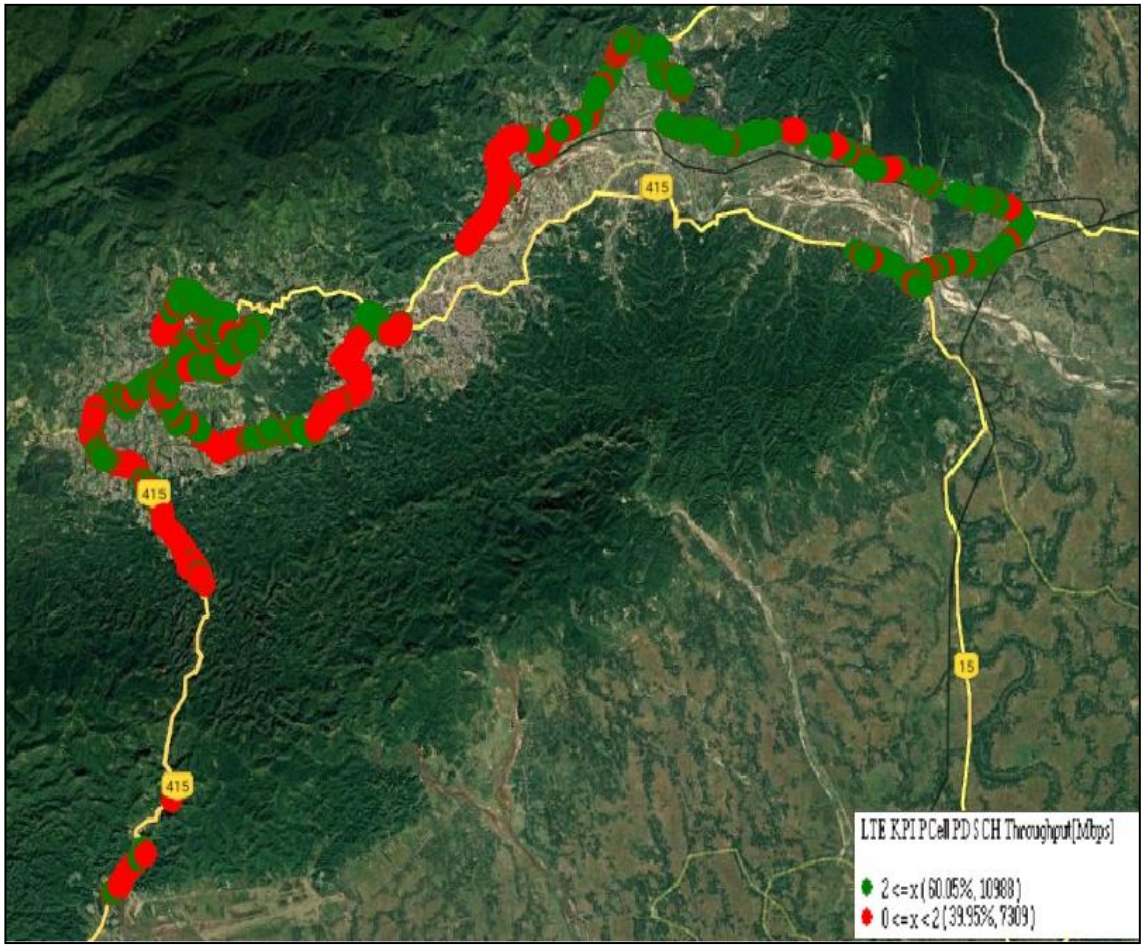
AVG. DOWNLOAD SPEED (Mbps)	1.96
% FILE TRANSFER COMPLETE	91.59
DL throughput	**Sample %**
0 to 0.5 Mbps	10.25
0.5 to 1 Mbps	70.51
1 to 2 Mbps	19.23
2 to 5 Mbps	0
>5 Mbps	0
Total	**100**

RJIO

Dynamic Data Testing Complete 92 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	8.25

4G



AVG. DOWNLOAD SPEED (Mbps)	8.25
% FILE TRANSFER COMPLETE	100.00
DL throughput	Sample %
0 to 1 Mbps	23.11%
1 to 2 Mbps	16.84%
2 to 5 Mbps	26.71%
5 to 10 Mbps	22.31%
>10 Mbps	11.03%
Total	**100**

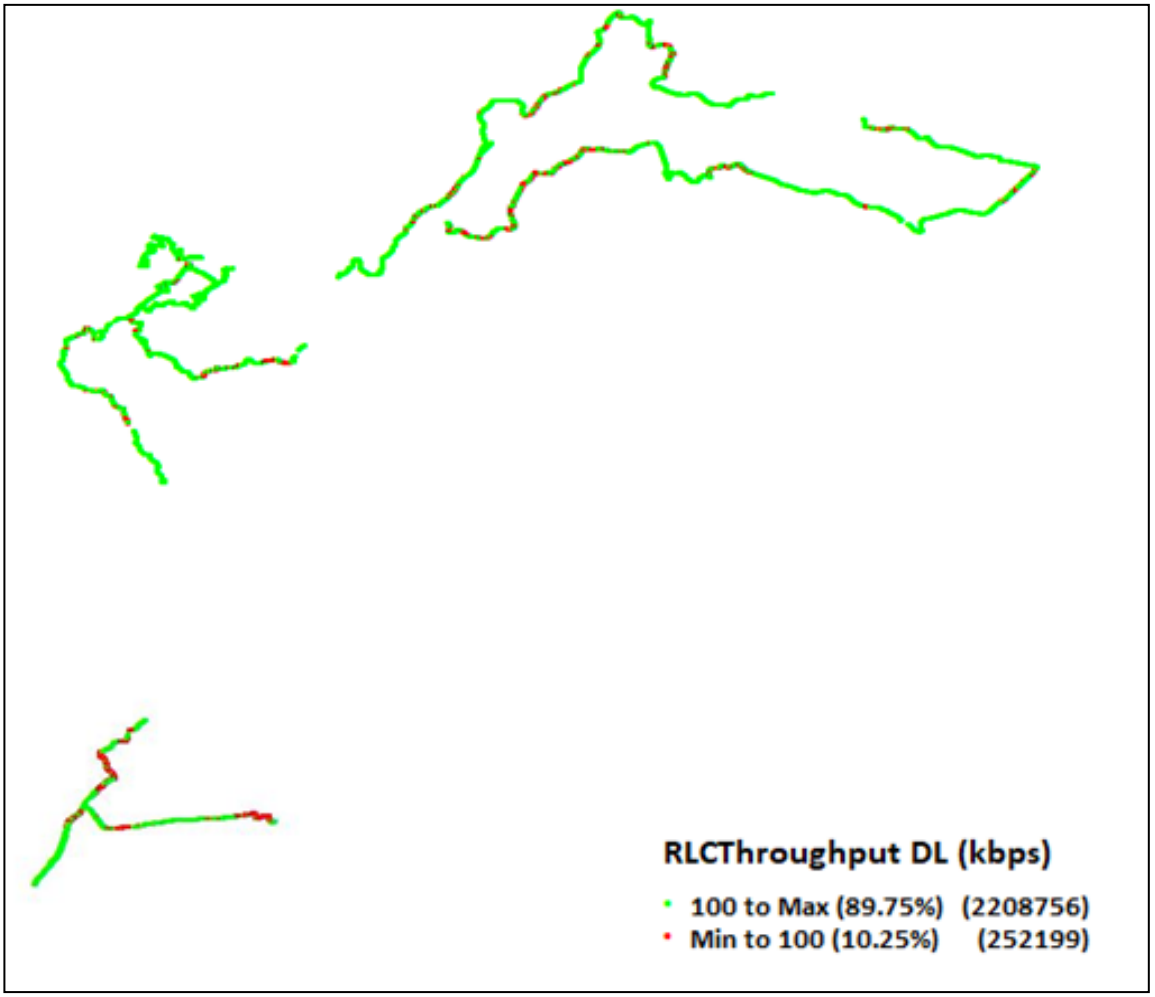
IV. Dynamic Data Test-DownLoad Details

VIL

Dynamic Data Testing Complete 92 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	87.46

2G



AVG. DOWNLOAD SPEED (Kbps)	87.46
% FILE TRANSFER COMPLETE	96.84%
DL throughput	**Sample %**
0 to 50 Kbps	5.41%
50 to 100 Kbps	4.84%
100 to 200 Kbps	37.41%
200 to 300 Kbps	39.59%
>300 Kbps	12.75%
Total	**100**

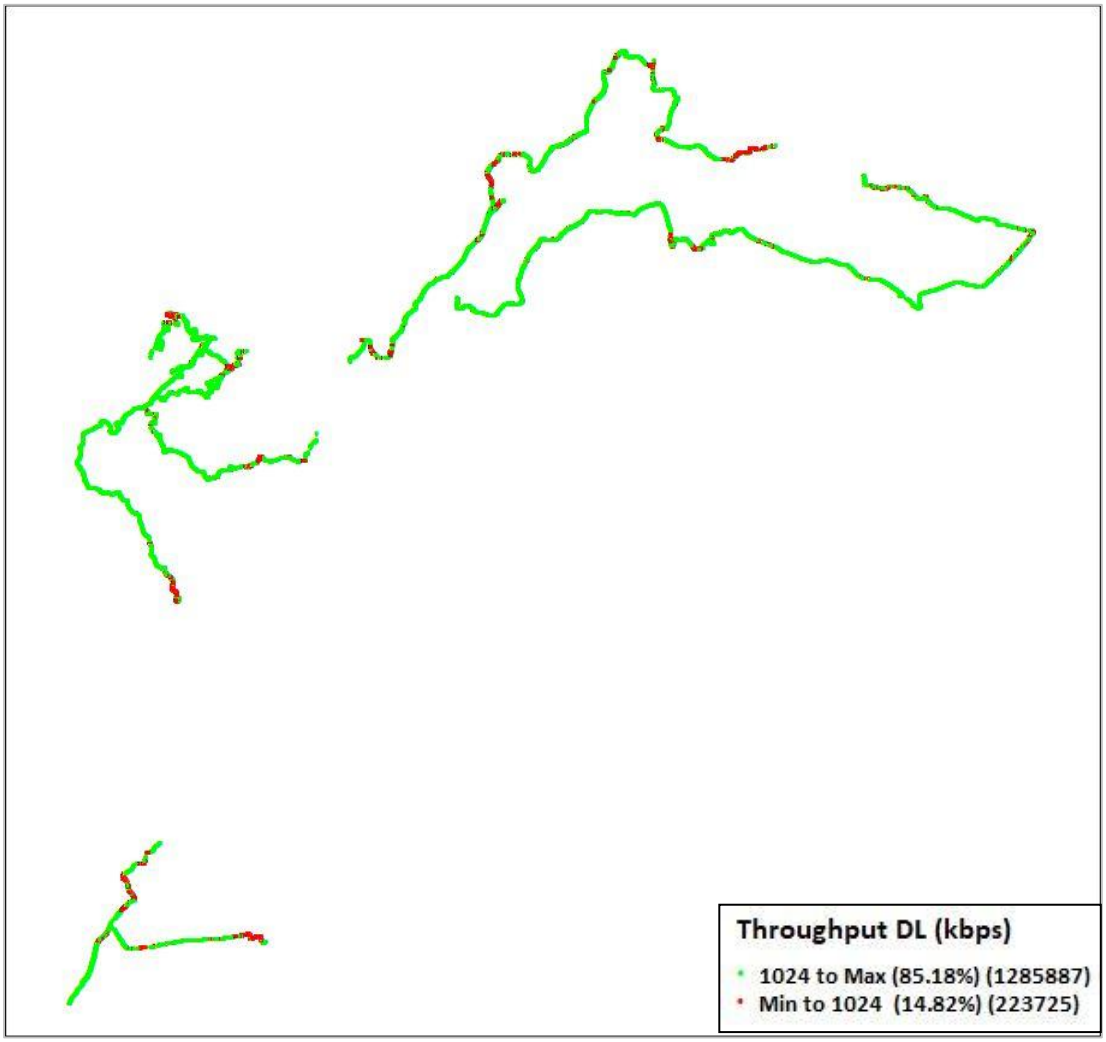
IV. Dynamic Data Test-DownLoad Details

VIL

Dynamic Data Testing Complete 92 Kms

Data KPIs - Overall	3G
Average Download Throughput (Mbps)	1.84

3G



AVG. DOWNLOAD SPEED (mbps)	1.84
% FILE TRANSFER COMPLETE	93.97%
DL throughput	**Sample %**
0 to 0.5 Mbps	9.11%
0.5 to 1 Mbps	5.71%
1 to 2 Mbps	23.68%
2 to 5 Mbps	31.36%
>5 Mbps	30.14%
Total	**100**

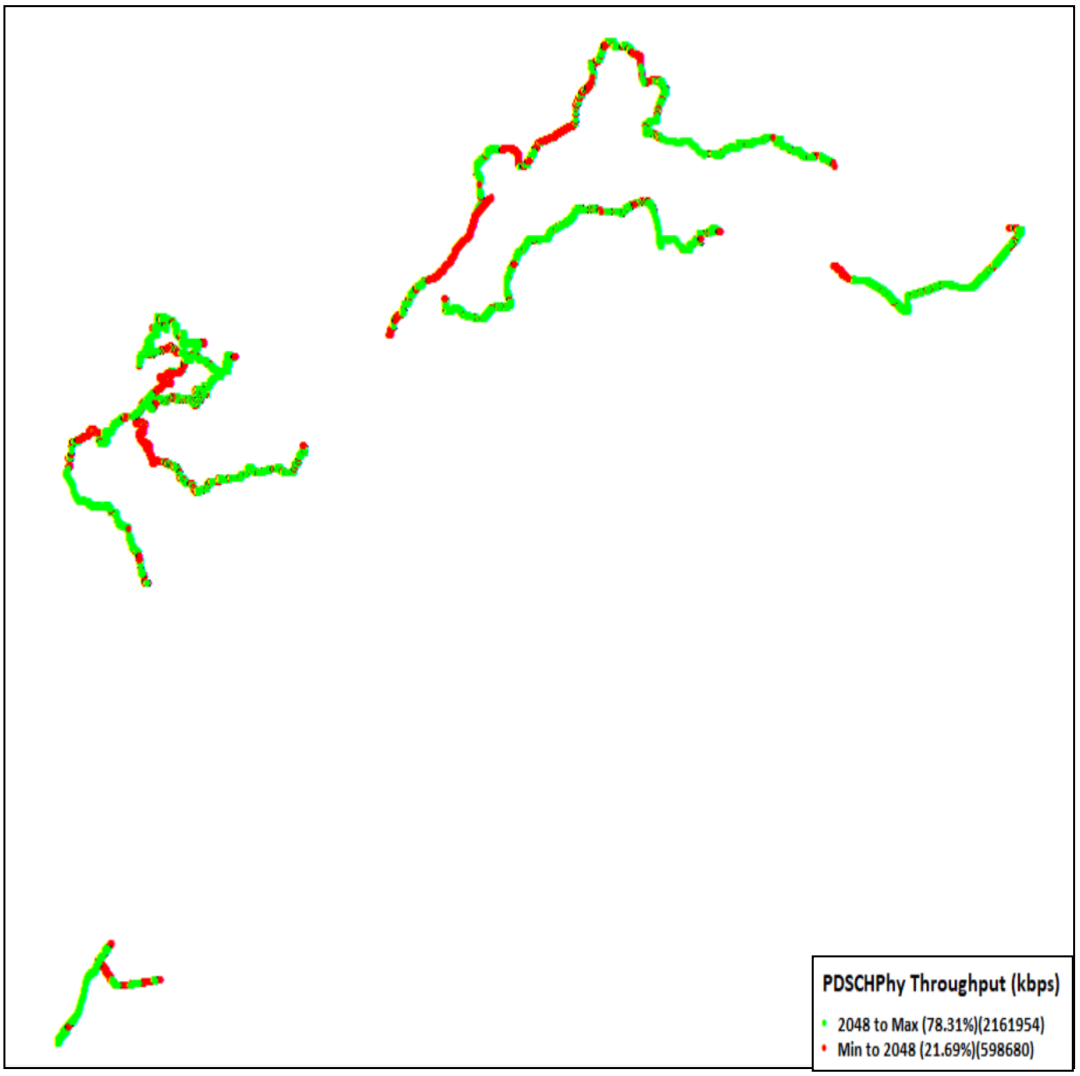
IV. Dynamic Data Test-DownLoad Details

VIL

Dynamic Data Testing Complete 92 Kms

Data KPIs – Overall	4G
Average Download Throughput (Mbps)	9.02

4G



AVG. DOWNLOAD SPEED (Mbps)	9.02
% FILE TRANSFER COMPLETE	97.62%
DL throughput	**Sample %**
0 to 1 Mbps	9.94%
1 to 2 Mbps	11.74%
2 to 5 Mbps	25.06%
5 to 10 Mbps	20.38%
>10 Mbps	32.88%
Total	**100**