Operator Assisted Drive Test Report
Rongpo- Soreng-Melli
(Namchi and Soreng Districts), Sikkim
May, 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-Block Call Rate in 3G, Drop Call Rate in 2G & 3G network, Handover Success Rate in 3G network, Rx Quality in 2G & 3G (Ec /Io) network.
RJIO-Rx Quality in 4G (SINR) network.
VIL- Rx Quality in 2G & 4G (SINR) network.

The Operator Assisted Drive Test has been carried out by Regional Office, Kolkata with the help of Service Providers in Rongpo, Soreng and Melli (Namchi and Soreng districts) in Sikkim and surrounding areas covering National Highway 710 on 16th and 17th May 2024 from 08.30 AM to 06.45 PM. The drive test covered drive route of 301 KMs (approx) over a period of two days. Approximately 320+ 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

Namchi District is a district of the Indian state of Sikkim. Its headquarters is at Namchi. Namchi district lies at an altitude of 400 to 2000 metres.Major urban centres include Namchi, Ravangla, Jorethang and Melli.
Soreng district is a district in the Indian state of Sikkim, administered from Soreng. Soreng District was officially created from Gyalshin District (then West Sikkim) in December 2021. Its shares borders with Nepal on its west, Gyalshing district to north, Namchi district to east and Darjeeling district of West Bengal to the south.

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.

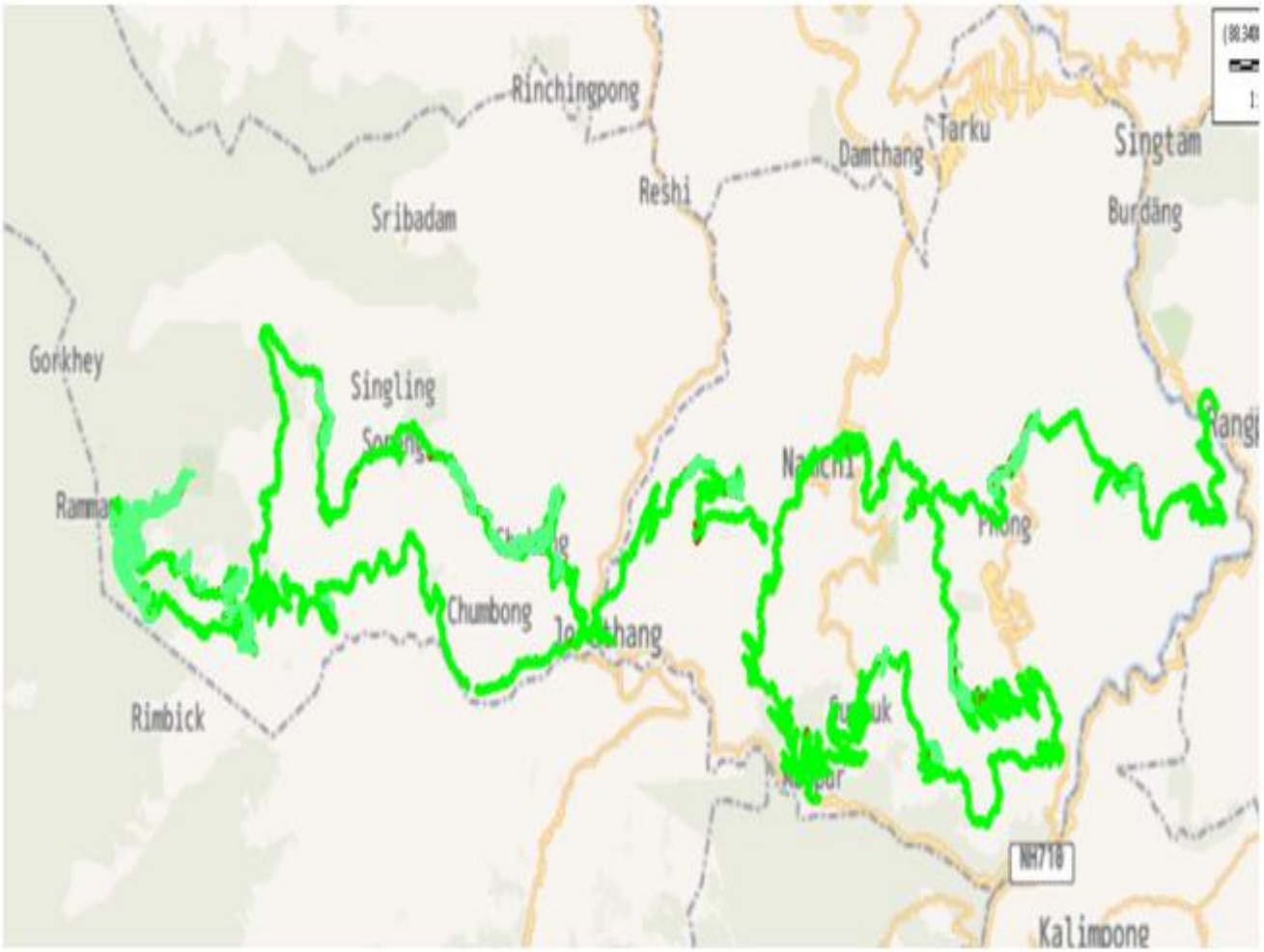
Data Tests: Dynamic Data Service Testing was performed along same route in all technologies. 500 KB file for 2G, 20MB file for 3G and 40MB file for 4G were downloaded from FTTP server in TSP's own server. Static Data Service Testing was also performed. Three 2G (Lock Mode) networks, one 3G (Lock Mode)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

DAY-1 – Rangpo–Namthang–Bhanjyang – Namchi Public School – DC office Namchi –NH710 - Hotel Jorethang – Sumbuk Bus Stop –Model ICDS Centre Middle Lungchok– Melli-Phong Road – Rabitar– Bhangyang– Manpur Khola - Namchi DC Office – Damthang– Temi Tea Estate – NH 510 – Phong Bermiok Road – Chuba – Namchi

DAY – 2 –Namchi Dc Office– Char Dham Temple – Primary Health Center Polok – Jorethang – Zoom Panchayat Office– Chakung GPU – Soreng – Karthok – Council Of Evangelical Church – Sombaria – Okhrey - Sombaria – Hattaban Village - Ribdi GPU - Sombaria – Daramdim - Sikkim Professional University – Maibasey–Jorethang – Melly

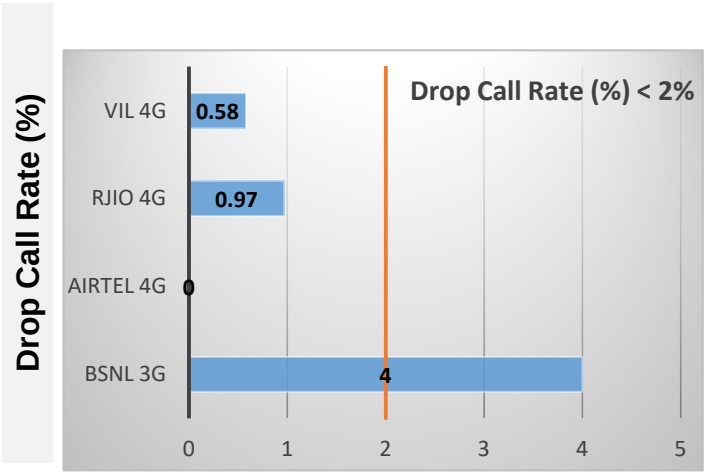
Data Service Test- Static Locations

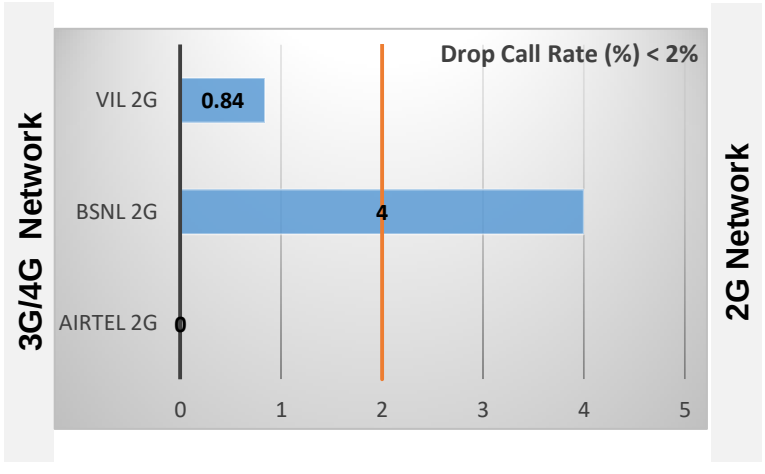
Static Locations
Rongpo Taxi Stand
Namchi DC Office

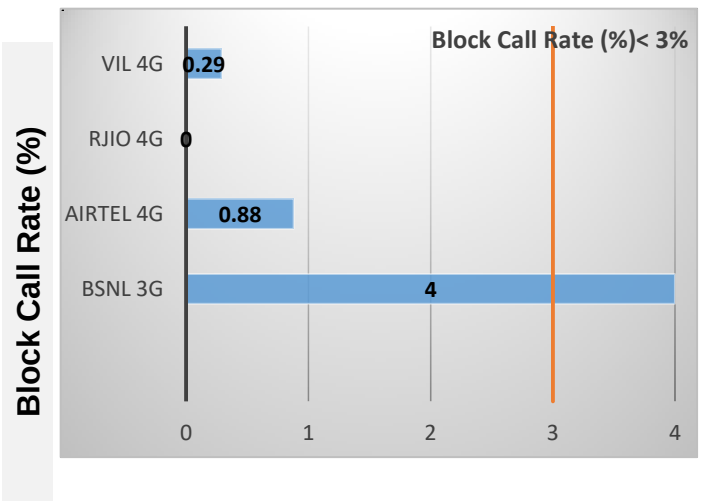
Voice Calls

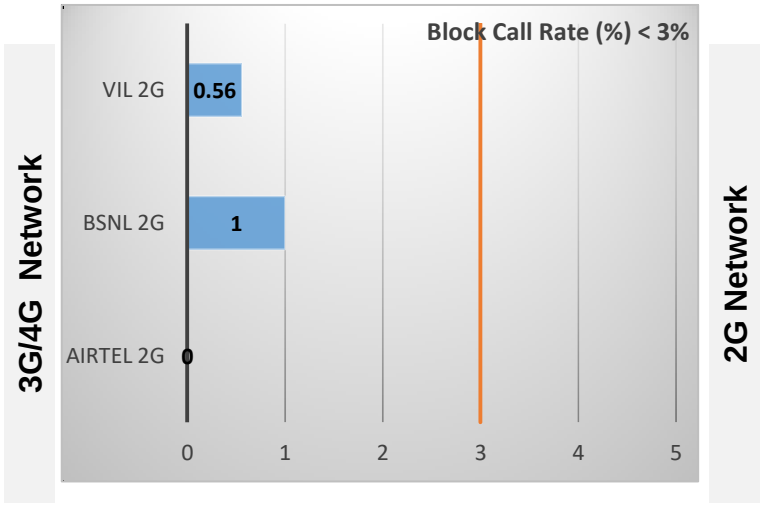
Key Observations

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 %	0.0	4.00	0.84	4.00	0.00	0.97	0.58
Block Call Rate %	0.0	1.00	0.56	4.00	0.88	0.00	0.29

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 (BCR%) except BSNL (3G).

Voice Calls

Key Observations

Coverage

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

TSPs	2G		
	AIRTEL	BSNL	VIL
Coverage %	81.07	53.00	72.75

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

TSPs	3G	4G		
	BSNL	AIRTEL	RJIO	VIL
Coverage	61.00	96.00	91.75	62.63

Summary

City Level Summary- Voice

Voice Call	2G		
	AIRTEL	BSNL	VIL
Call Attempt	349	73	360
Blocked Call Rate (%)	0.0	1.00	0.56
CSSR% (Accessibility)	100	100.0	99.44
Drop Call Rate (%)	0.0	4.0	0.84
Mobility HOSR (%)	96.00	96.0	98.60
Rx Quality (%)	96.00	82.00	86.68

Voice Call	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Call Attempt	129	341	206	346
Blocked Call Rate (%)	4.0	0.88	0.0	0.29
CSSR% (Accessibility)	96.90	99.0	99.51	99.71
Drop Call Rate (%)	4.00	0.0	0.97	0.58
Mobility HOSR (%)	94.00	97.0	99.11	98.58
Rx Quality (%)	73.00	90.0	88.0	63.75

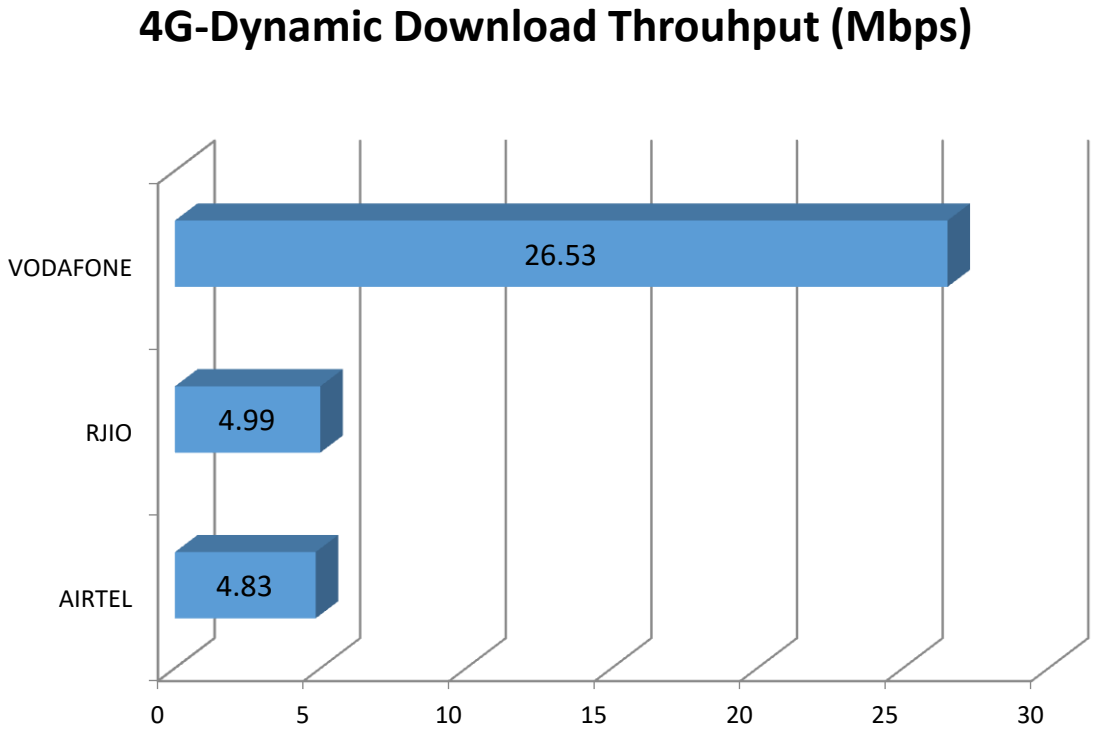
Summary-Data Services Dynamic

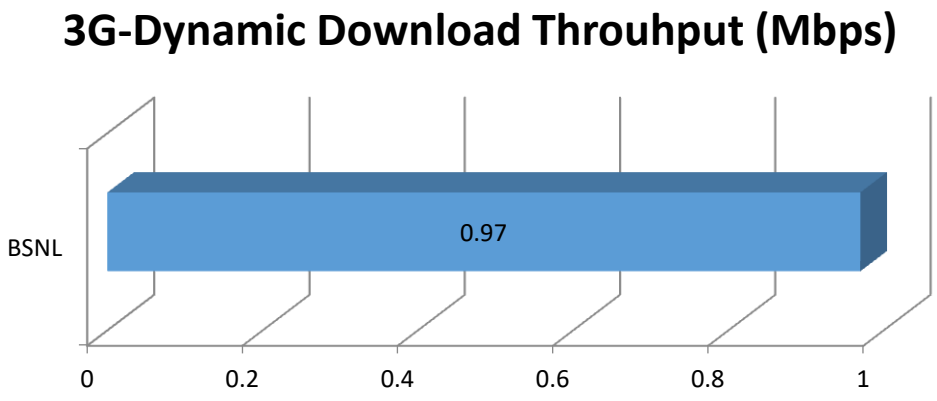
Key Observations

Dynamic Data was tested for 301 Kms. Download Throughput was tested.

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

4G/3G Network:





Summary-Data Services Static

City Level Summary-

Average Data Services Static	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	131.6	40.5	93.05
Upload Throughput (kbps)	23.35	55.0	82.07
Web Browsing Delay (sec)	2.0	9.5	40.17
Latency (msec)	561.5	174.0	199.79

Average Data Services Static	3G/ 4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	0.88	31.3	11.96	11.56
Upload Throughput in Mbps	1.1	15.89	7.04	8.04
Video streaming delay (sec)	7.0	0.38	2.09	1.29
Web Browsing Delay (secs)	4.5	0.56	3.98	1.95
Latency (msec)	120	77.6	43.3	141.3

Summary-Data Services Static

Location Level Summary-

Location:-Rongpo Taxi Stand	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	127.1	25.0	82.03
Upload Throughput (kbps)	33.2	35.0	77.48
Web Browsing Delay (sec)	1.9	11.0	41.67
Latency (msec)	510	189	201.15

Location:-Rongpo Taxi Stand	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	0.8	37.38	12.53	13.47
Upload Throughput in Mbps	0.6	19.37	7.24	8.84
Video streaming delay (secs)	8.0	0.60	2.12	1.13
Web Browsing Delay (secs)	5.0	0.52	4.67	1.87
Latency (msec)	125	78	44.3	127.07

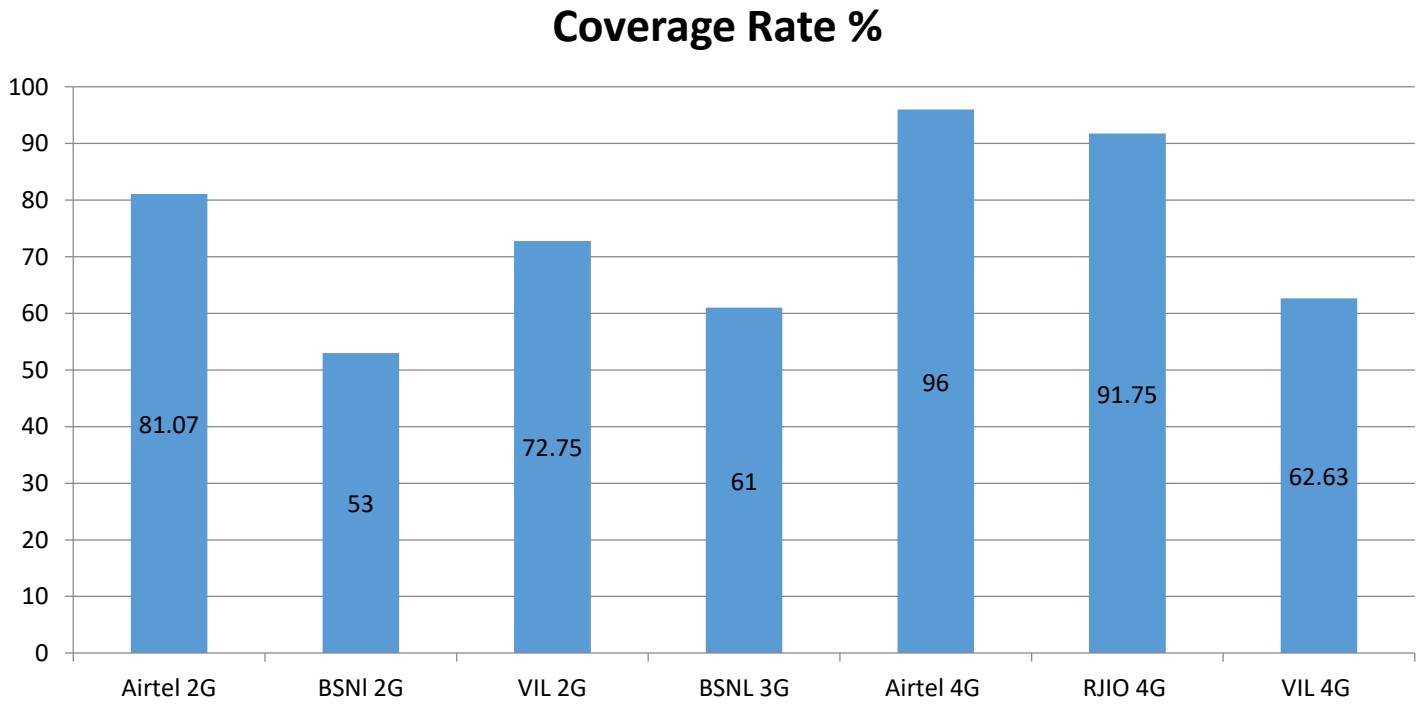
Location:- Namchi DC Office	2G		
	AIRTEL	BSNL	VIL
Download throughput in (kbps)	136.1	56	104.06
Upload Throughput in (kbps)	13.5	75	86.66
Web Browsing Delay (secs)	2.1	15	38.67
Latency (msec)	613	159	198.43

Location:- Namchi DC Office	4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in (mbps)	0.97	25.22	11.4	9.65
Upload Throughput in (mbps)	1.6	12.42	6.85	7.25
Video streaming delay (secs)	6.0	0.21	2.06	1.45
Web Browsing Delay (secs)	4.0	0.37	3.29	2.03
Latency (msec)	115	77.2	42.3	155.54

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	81.07
BSNL 2G	53.00
VIL 2G	72.75
BSNL 3G	61.00
AIRTEL 4G	96.00
RJIO 4G	91.75
VIL 4G	62.63

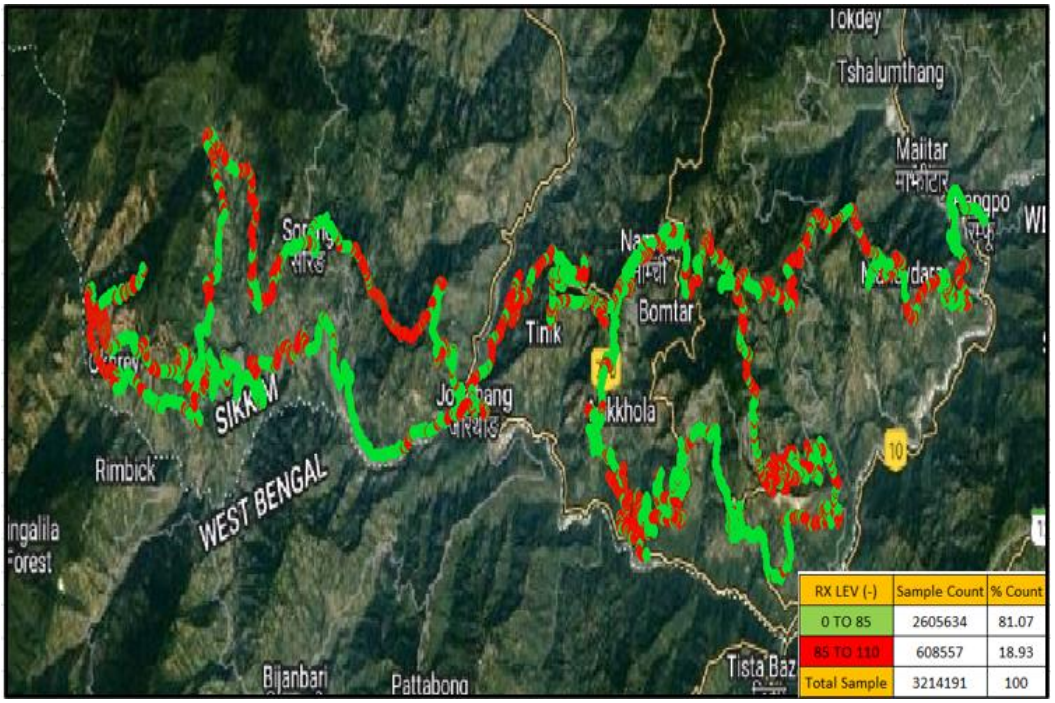


Note- Coverage is the percentage of samples having signal strength more than the threshold value (2G >= -85 dbm, 3G>= -90 dbm and 4G >= -110 dbm). However, these samples are only for the portion of the OADT routes where TSPs have coverage i.e 'no coverage' routes have been excluded.

AIRTEL

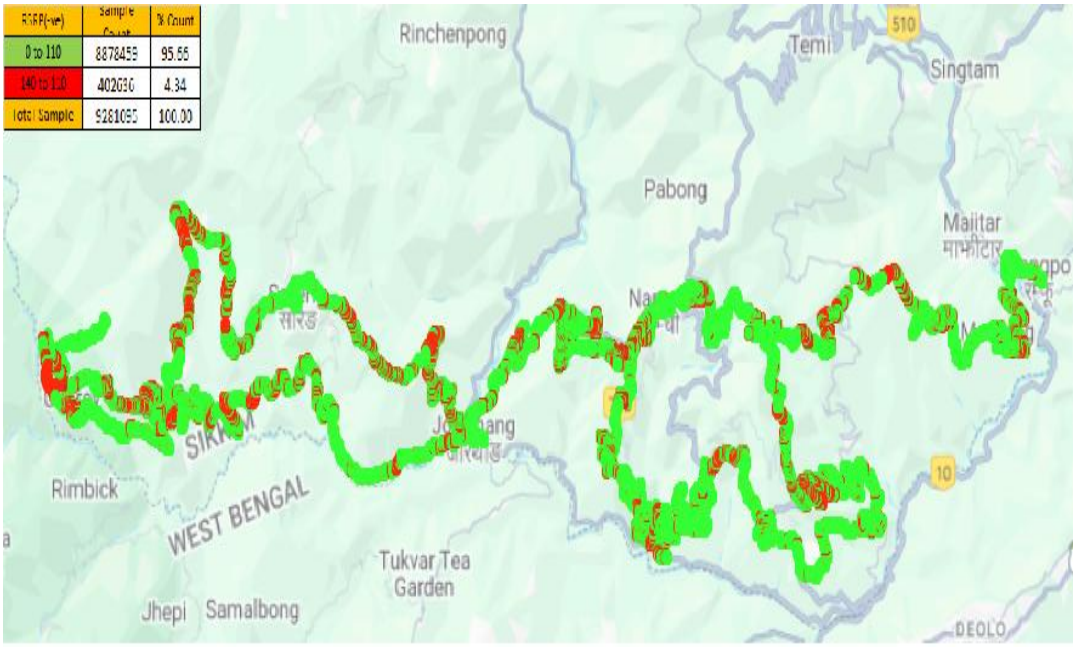
Technology	Coverage Rate %
2G	81.07
4G	96.00

2G



Overall Rx Level	Sample %
[Max >=-75]	20.71
[-75 >=-85)	60.35
[-85 >=-95)	9.34
[-95 >=Min)	9.58
Total	**100**

4G



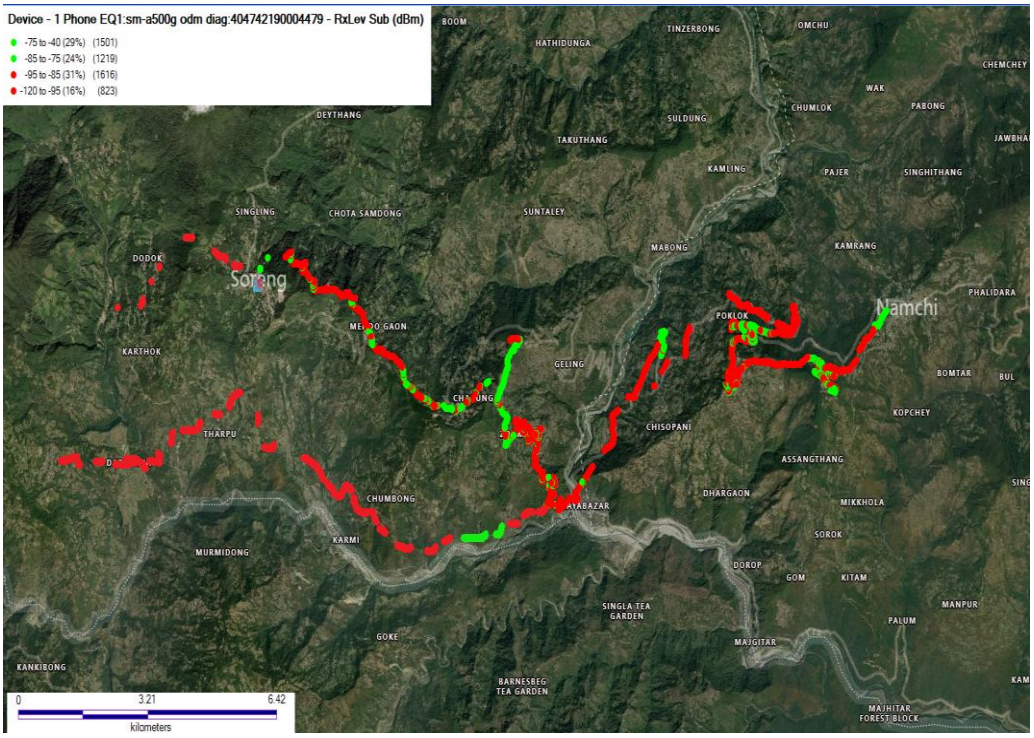
Overall RSRP	Sample %
[Max >=-80]	25.59
[-80 >=-90)	7.66
[-90 >=-110)	62.40
[-110 >=Min)	4.33
Total	**100**

I. Coverage Details

BSNL

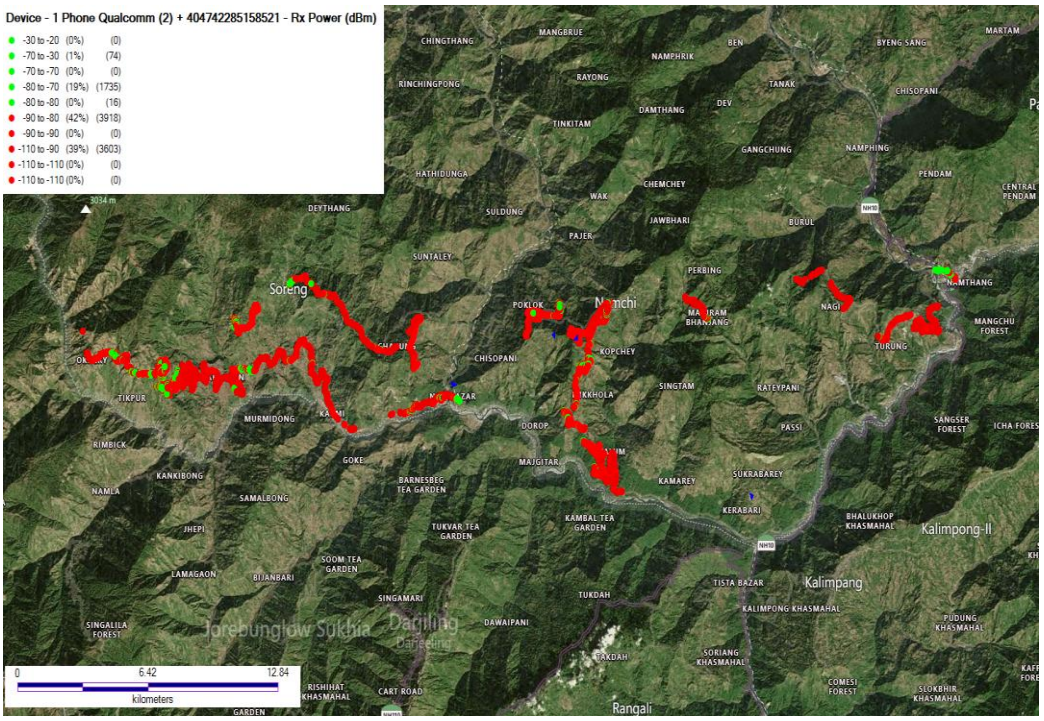
Technology	Coverage Rate %
2G	53.00
3G	61.00

2G



Overall RxLevel	Sample %
[Max >=-75]	29
[-75 >=-85)	24
[-85 >=-95)	31
[-95 >=Min)	16
Total	**100**

3G



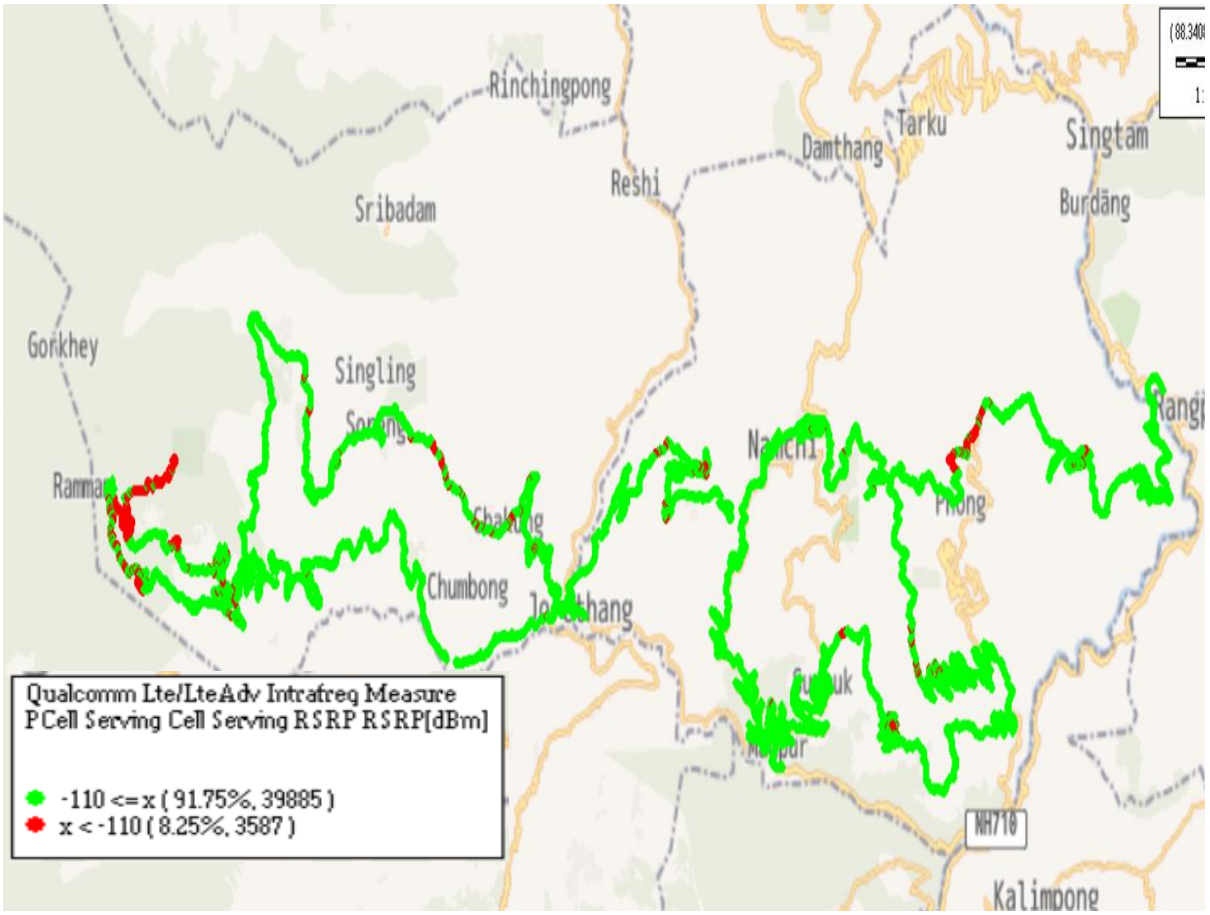
Overall RSCP	Sample %
[Max >=-70]	1%
[-70 >=-80)	19%
[-80 >=-90)	42%
[-90 >=Min)	39%
Total	**100**

I. Coverage Details

RJIO

Technology	Coverage Rate %
4G	91.75

4G



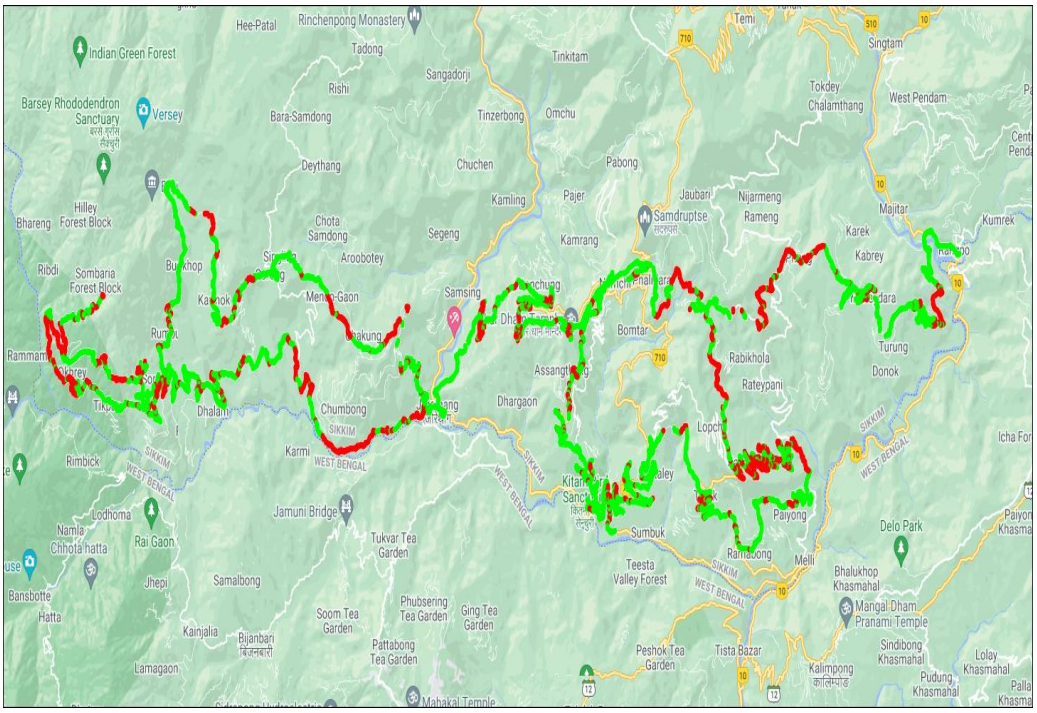
Overall RSRP	Sample %
[Max >=-80]	10%
[-80 >=-90)	21%
[-90>=-110)	61%
[-110 >=Min)	8%
Total	**100**

I. Coverage Details

VIL

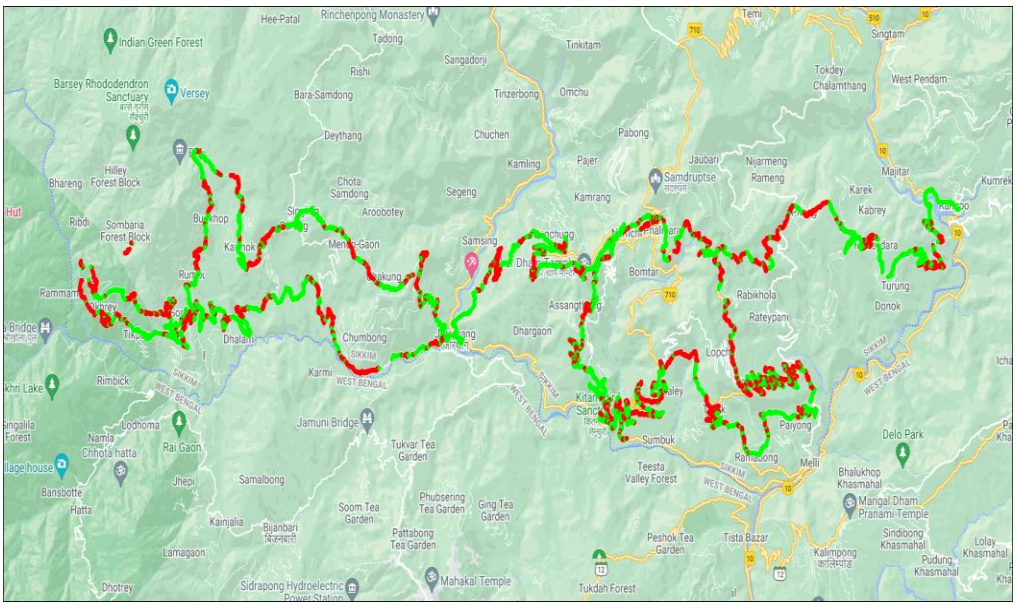
Technology	Coverage Rate %
2G	72.75
4G	62.63

2G



Overall RxLevel	Sample %
[Max >=-75]	26.35
[-75 >=-85)	46.40
[-85 >=-95)	18.20
[-95 =Min)	9.05
Total	**100**

4G

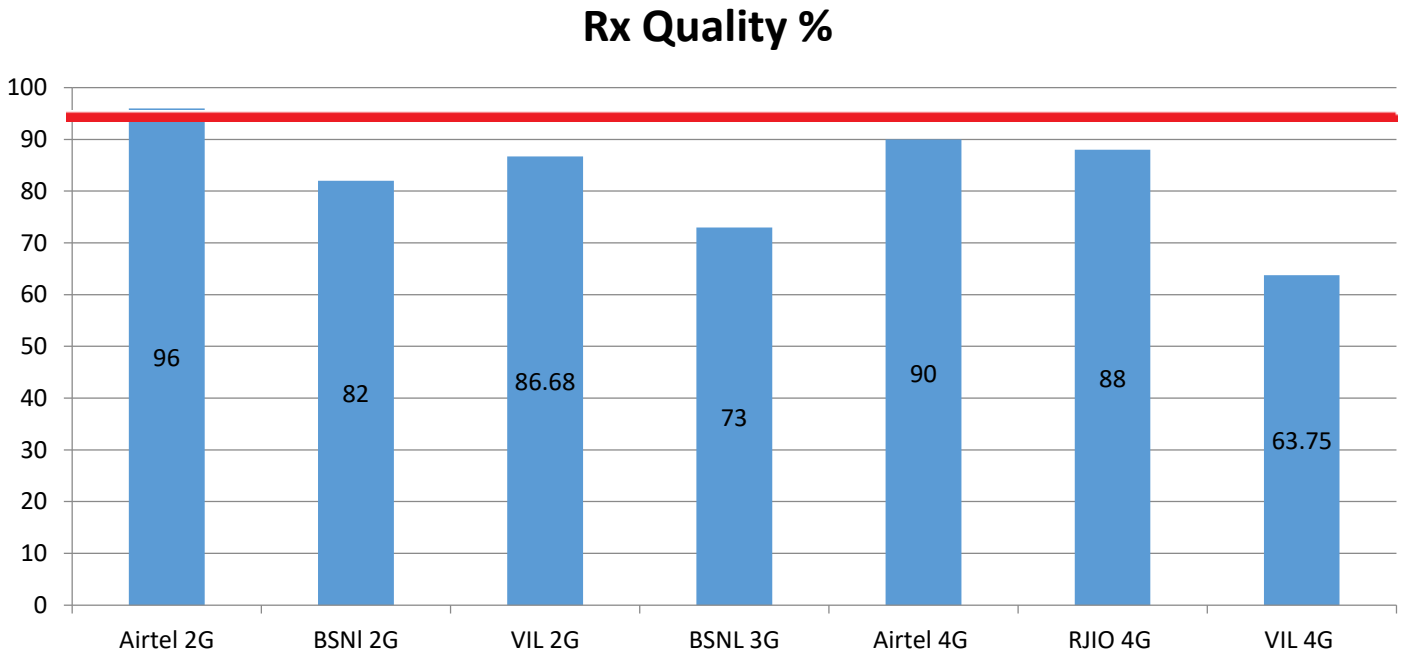


Overall RSRP	Sample %
[Max >=-80]	6.20
[-80 >=-90)	20.16
[-90>=-110)	36.27
[-110 >=Min)	37.37
Total	**100**

II. Quality Details

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

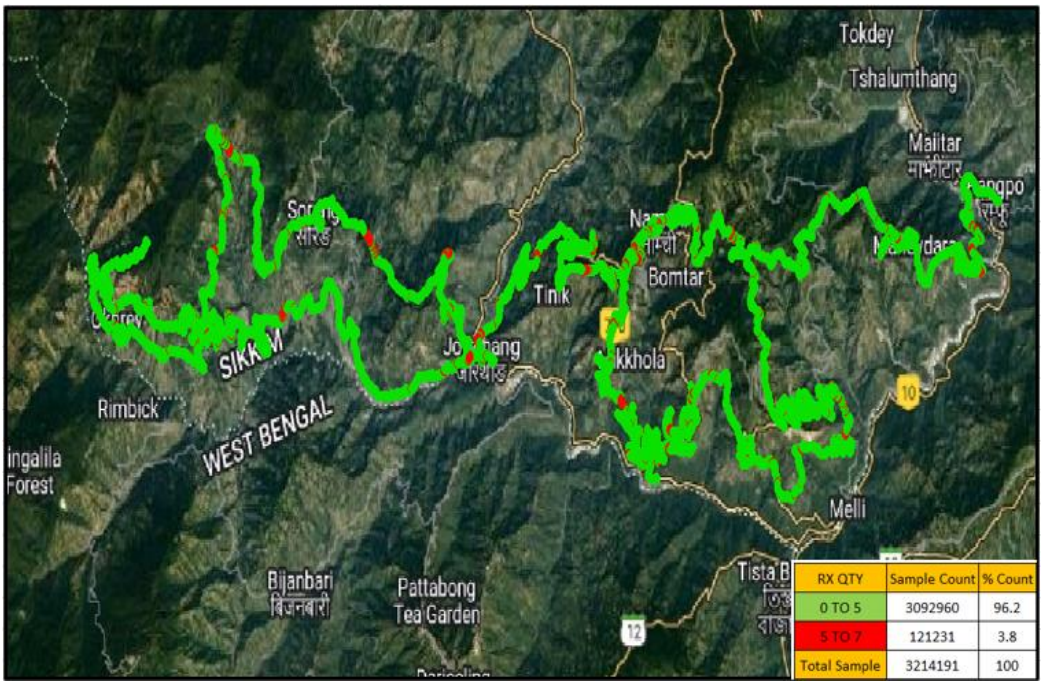
TSP	Rx Quality %
AIRTEL 2G	96.00
BSNL 2G	82.00
VIL 2G	86.68
BSNL 3G	73.00
AIRTEL 4G	90.00
RJIO 4G	88.00
VIL 4G	63.75



AIRTEL

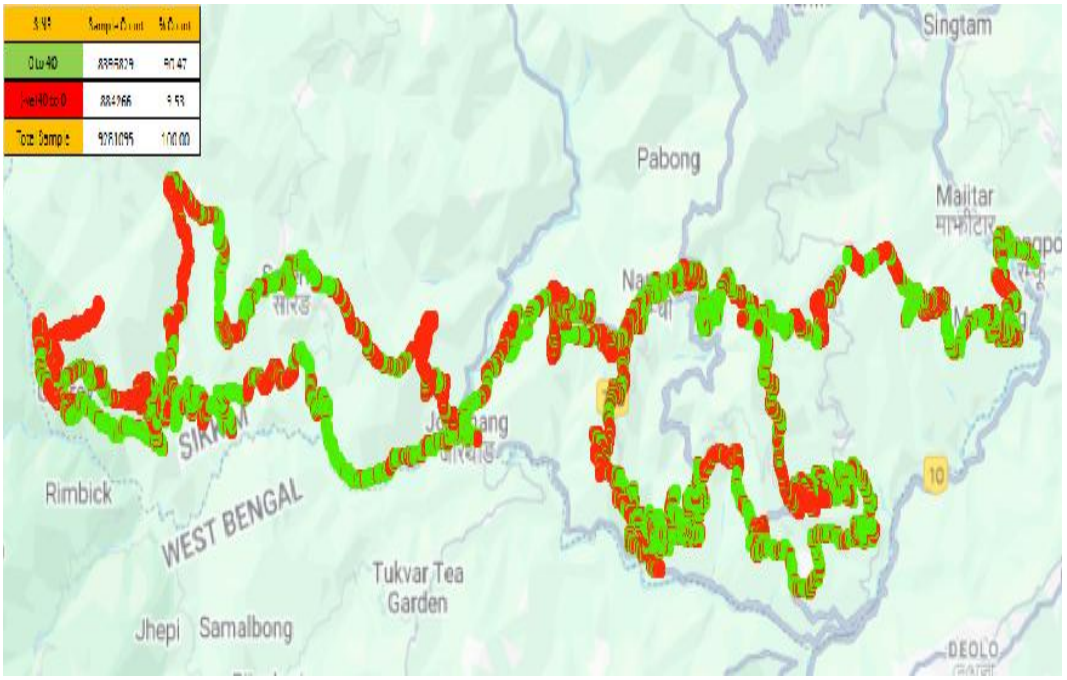
Technology	Rx Quality %
2G	96.00
4G	90.00

2G



Overall Rx Quality	Sample %
(Min <=2)	90.53
(2 <=3)	2.07
(3 <=4)	2.15
(4 <=5)	1.48
(5 <=Max)	3.77
Total	100

4G

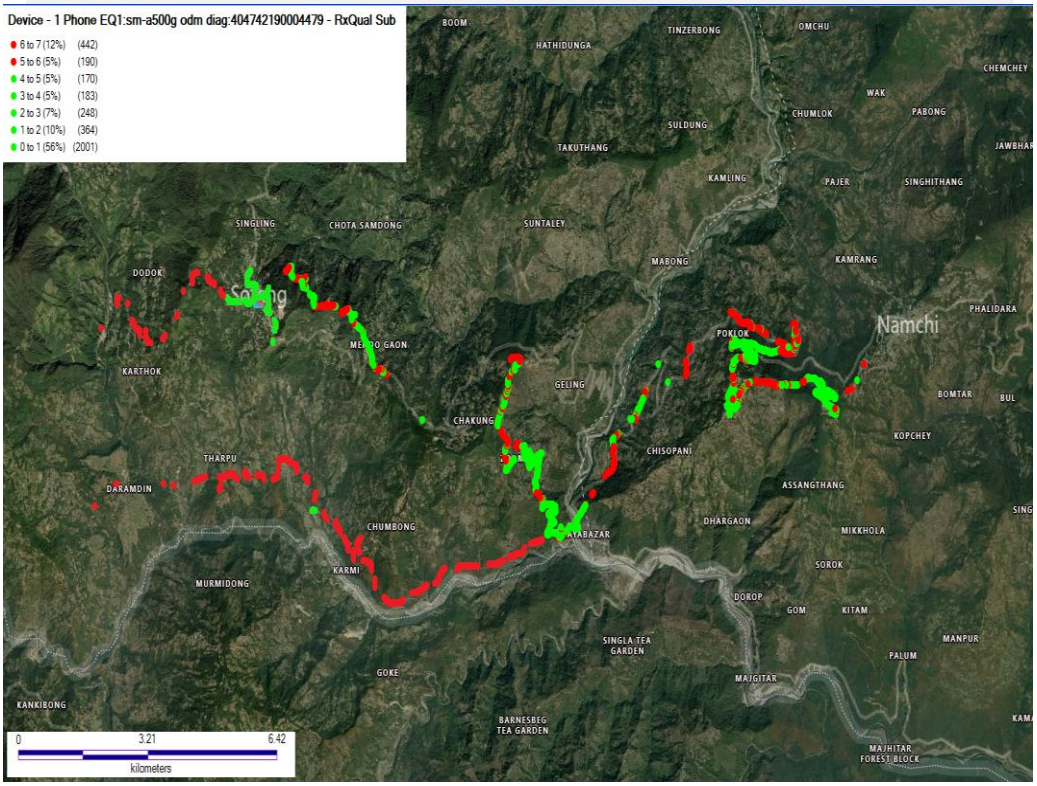


Overall SINR	Sample %
(Min <=0)	9.52
(0 <=5)	47.34
(5 <=10)	18.92
(10 <=15)	15.95
(15 <=Max)	8.23
Total	**100**

II. Quality Details

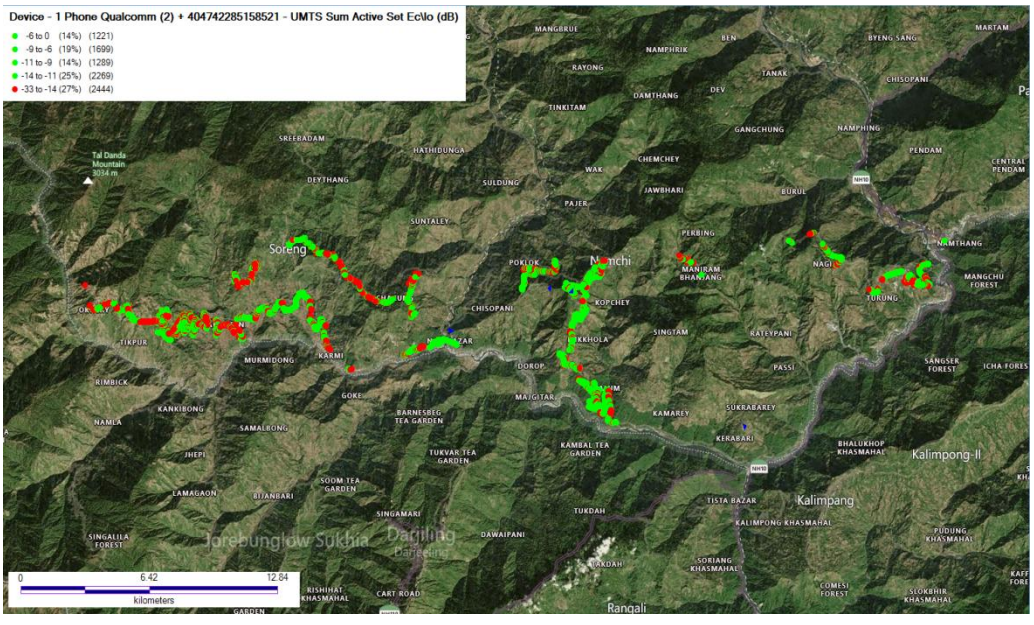
BSNL

Technology	Rx Quality %
2G	82.00
3G	73.00



Overall Rx Quality	Sample %
(Min <=2)	65
(2 <=3)	7
(3 <=4)	5
(4 <=5)	5
(5 <=Max)	18
Total	100

3G



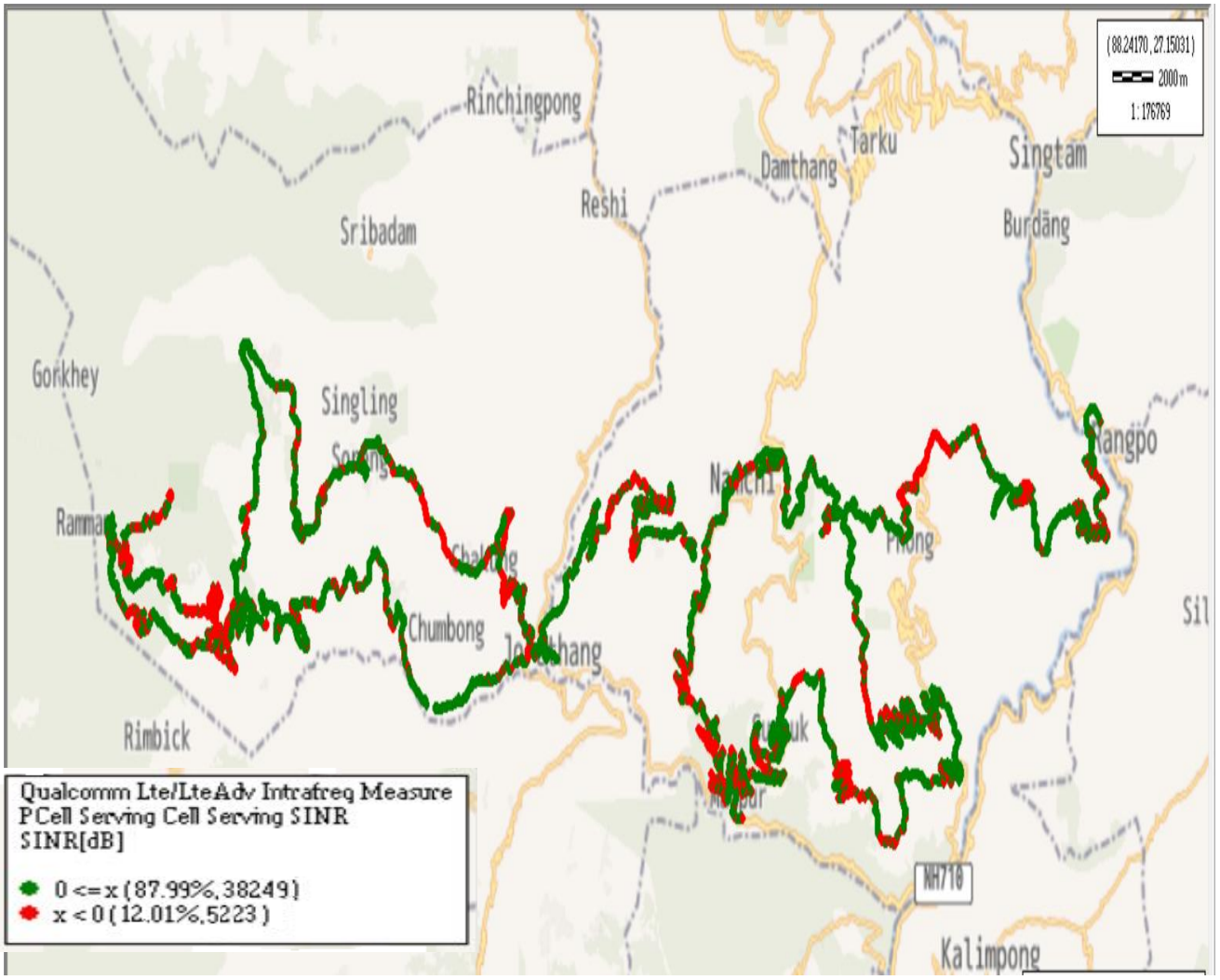
Overall EcNo	Sample %
(Max <=-6)	15
(-6 <=-9)	19
(-9 <=-11)	14
(-11 <=-14)	25
(-14 <= Min)	27
Total	100

II. Quality Details

RJIO

Technology	Rx Quality %
4G	88.0

4G



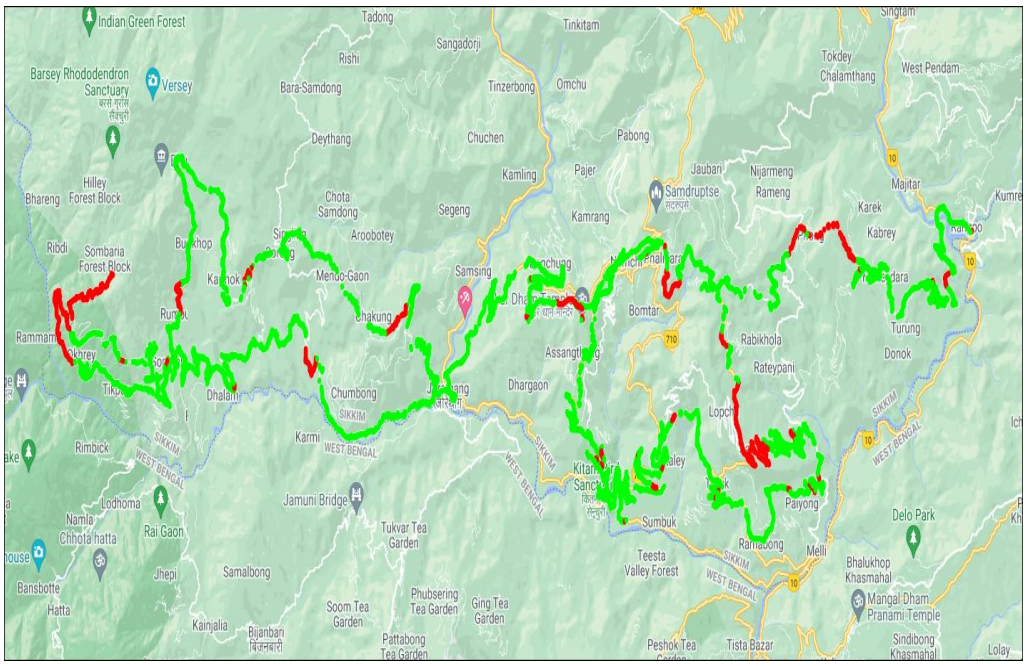
Overall SINR	Sample %
(Min <=0)	13
(0 <=5)	46
(5 <=10)	22
(10 <=15)	13
(15 <=Max)	6
Total	100

II. Quality Details

VIL

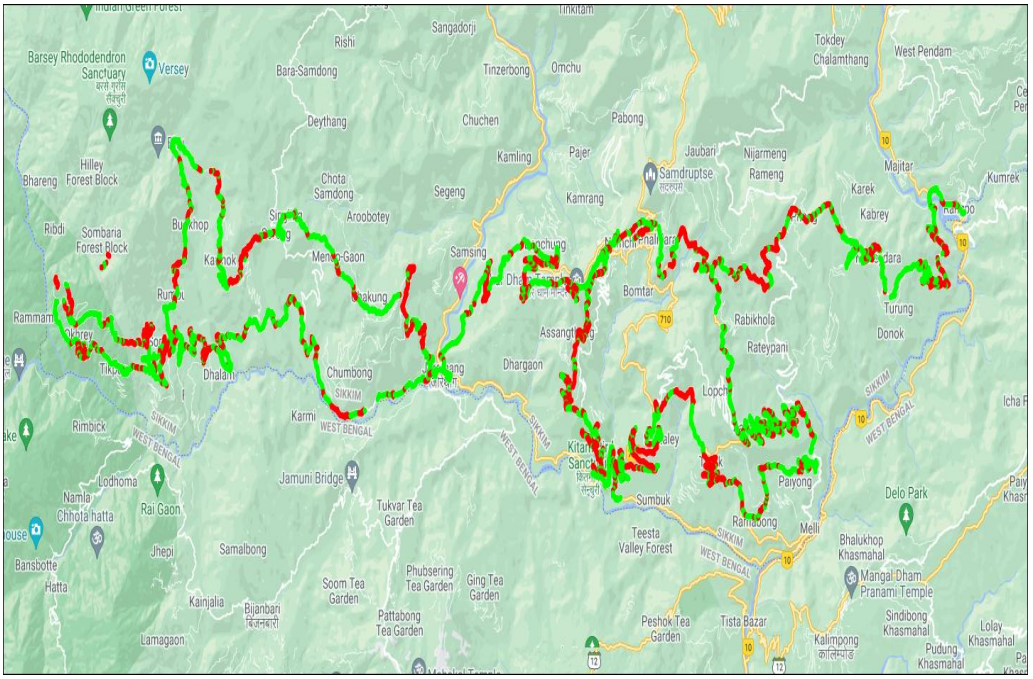
Technology	Rx Quality %
2G	86.68
4G	63.75

2G



Overall Rx Quality	Sample %
(Min <=2)	68.24
(2 <=3)	6.34
(3 <=4)	5.70
(4 <=5)	6.40
(5 <=Max)	13.32
Total	**100**

4G



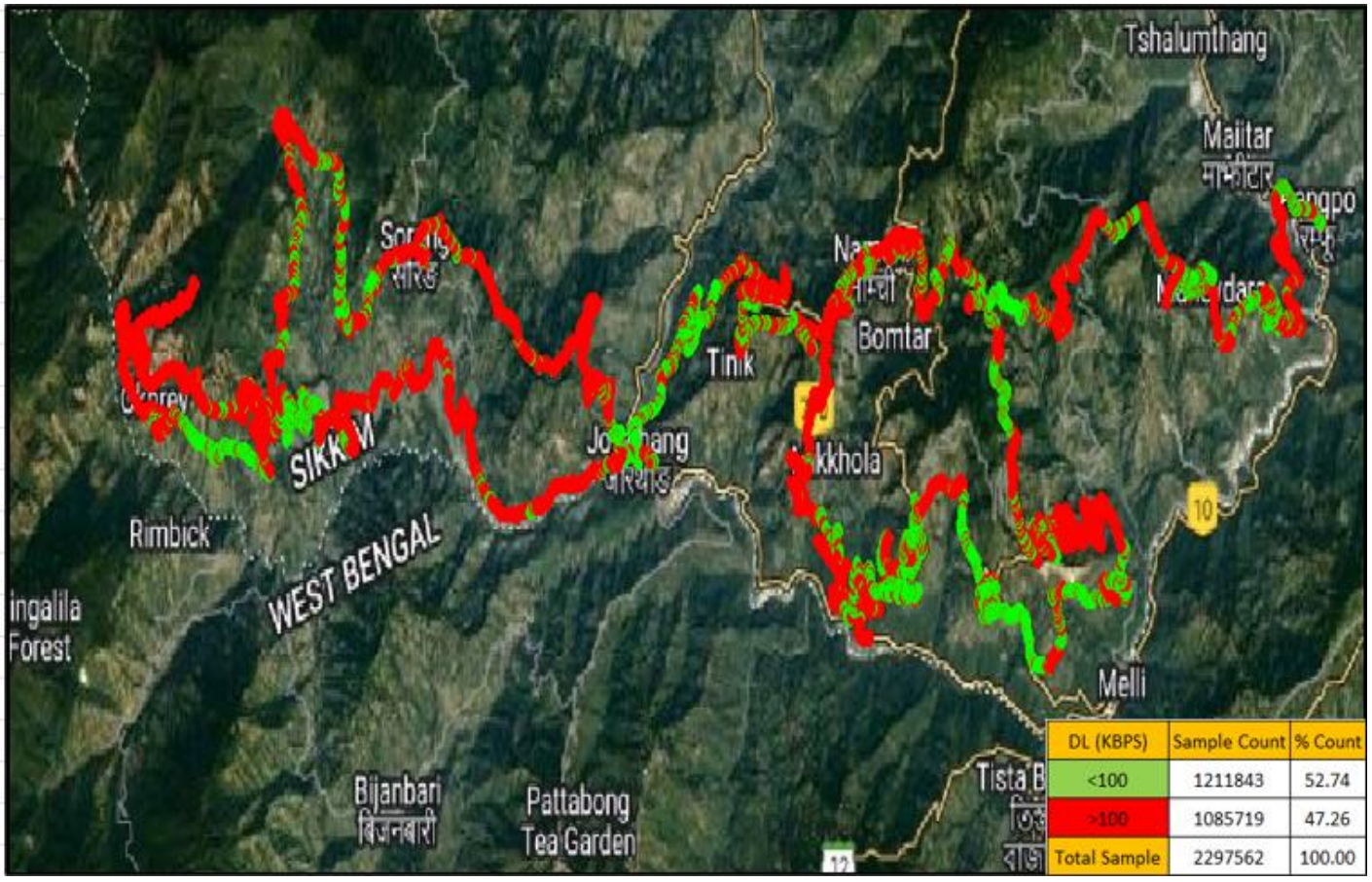
Overall SINR	Sample %
(Min <=0)	36.25
(0 <=5)	24.35
(5 <=10)	18.74
(10 <=15)	12.86
(15 <=Max)	7.80
Total	**100**

AIRTEL

Dynamic Data Testing Complete 301 Kms

Data KPIs - Overall	**2G**
Average Download Throughput (Kbps)	24.7

2G



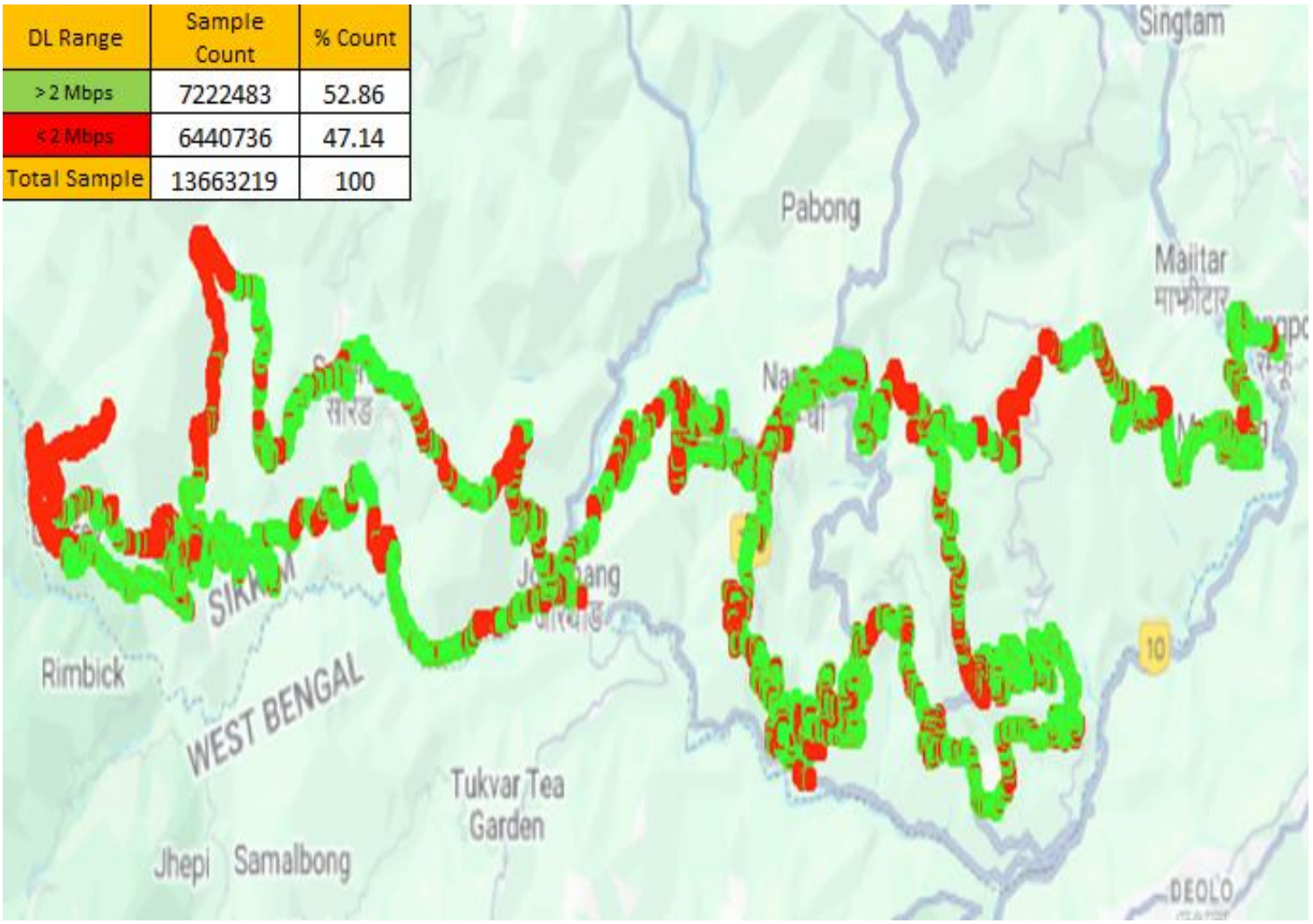
AVG. DOWNLOAD SPEED (Kbps)	24.7
% FILE TRANSFER COMPLETE	93
DL throughput	**Sample %**
0 to 50 Kbps	38.47
50 to 100 Kbps	10.20
100 to 200 Kbps	2.29
200 to 300 Kbps	1.76
>300 Kbps	47.25
Total	**100**

AIRTEL

Dynamic Data Testing Complete 301 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	4.83

4G



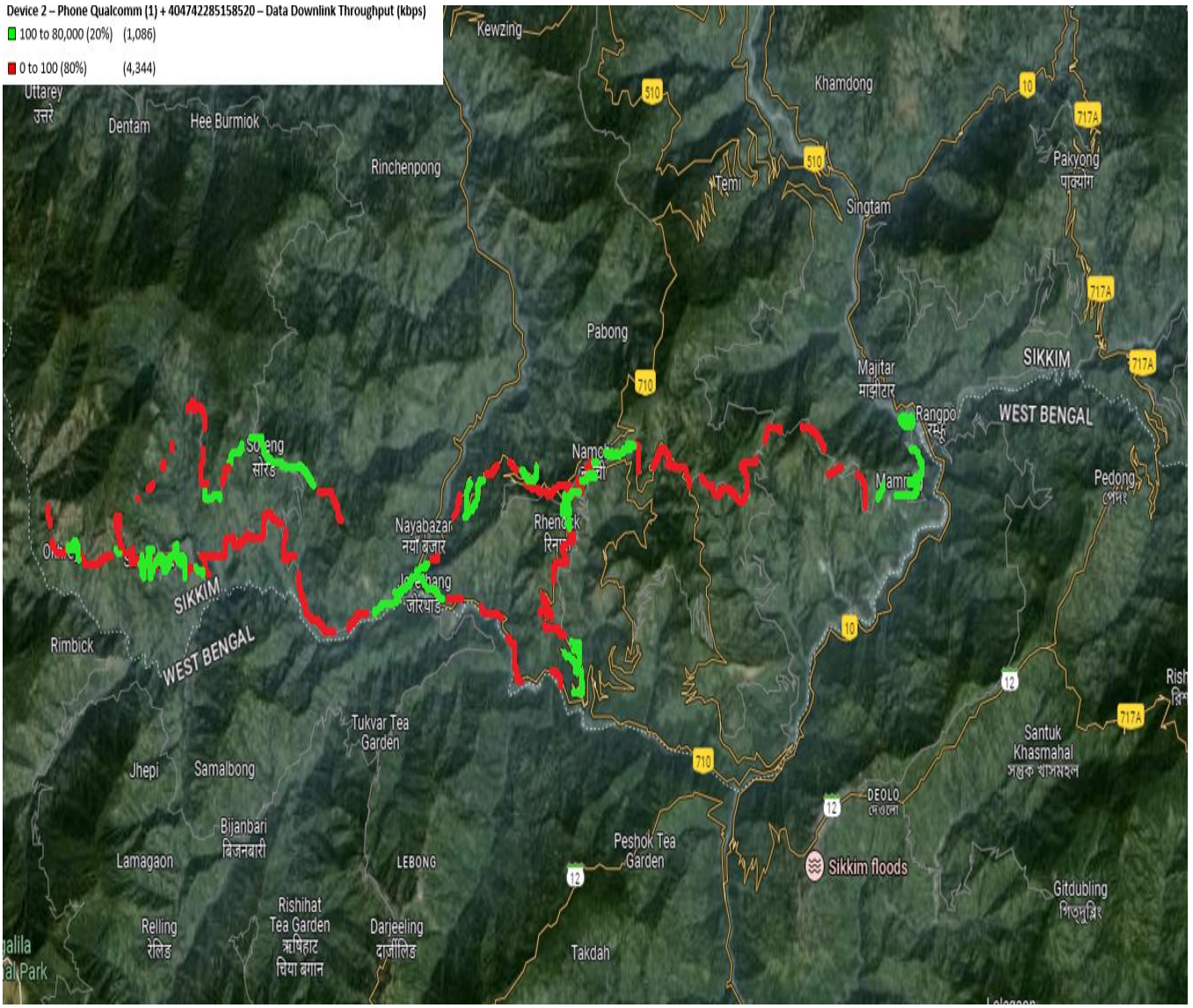
AVG. DOWNLOAD SPEED (Mbps)	4.83
% FILE TRANSFER COMPLETE	95
DL throughput	**Sample %**
0 to 1 Mbps	42.62
1 to 2 Mbps	4.50
2 to 5 Mbps	13.98
5 to 10 Mbps	2.77
>10 Mbps	36.10
Total	**100**

BSNL

Dynamic Data Testing Complete 301 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	77.6

2G



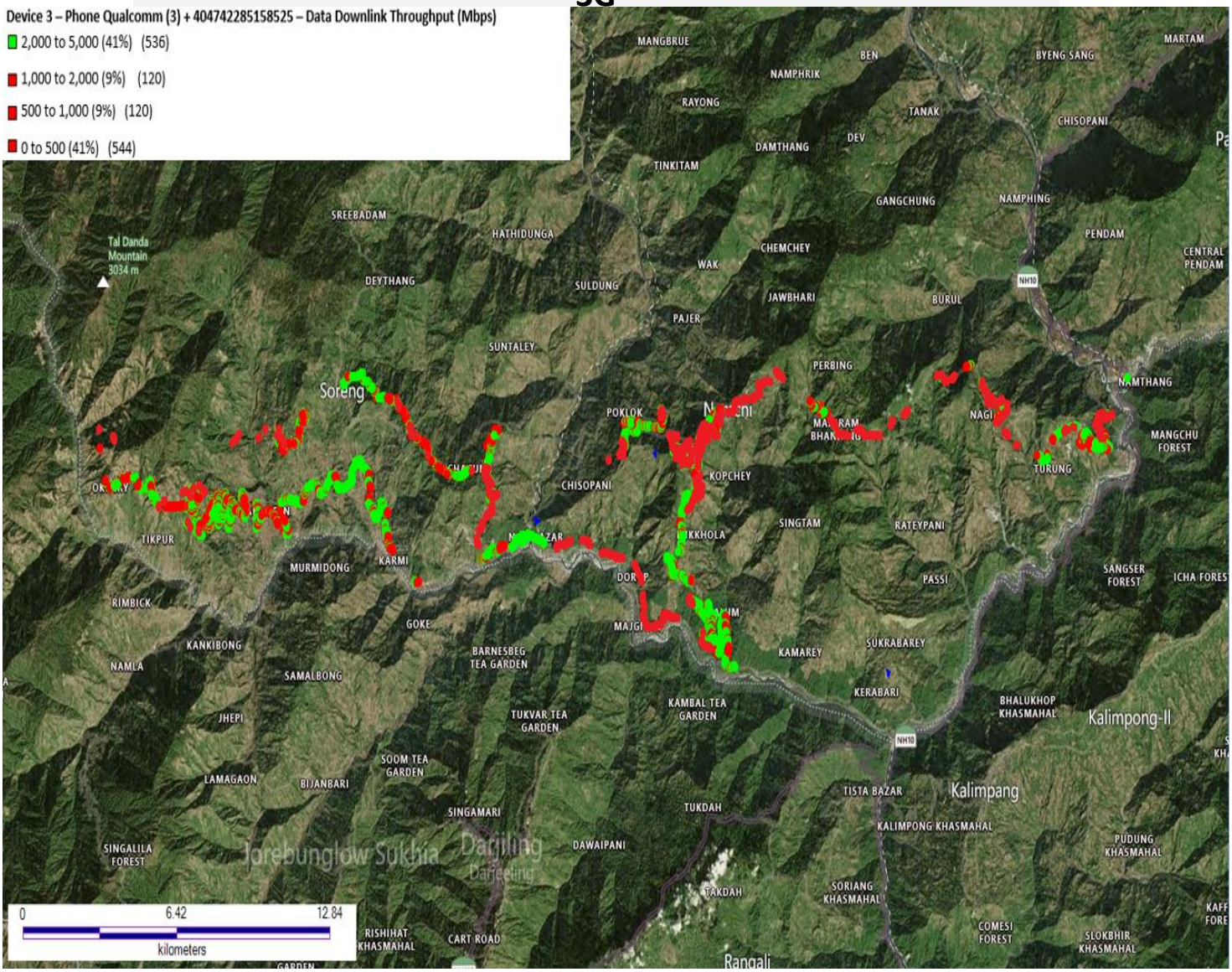
AVG. DOWNLOAD SPEED (Kbps)	77.6
% FILE TRANSFER COMPLETE	84
DL throughput	**Sample %**
0 to 50 Kbps	40
50 to 100 Kbps	39
100 to 200 Kbps	19
200 to 300 Kbps	1
>300 Kbps	0
Total	**100**

BSNL

Dynamic Data Testing Complete 301 Kms

Data KPIs - Overall	**3G**
Average Download Throughput (Mbps)	0.97

3G



AVG. DOWNLOAD SPEED (Mbps)	0.97
% FILE TRANSFER COMPLETE	81
DL throughput	**Sample %**
0 to 0.5 Mbps	41
0.5 to 1 Mbps	9
1 to 2 Mbps	9
2 to 5 Mbps	41
>5 Mbps	0
Total	**100**

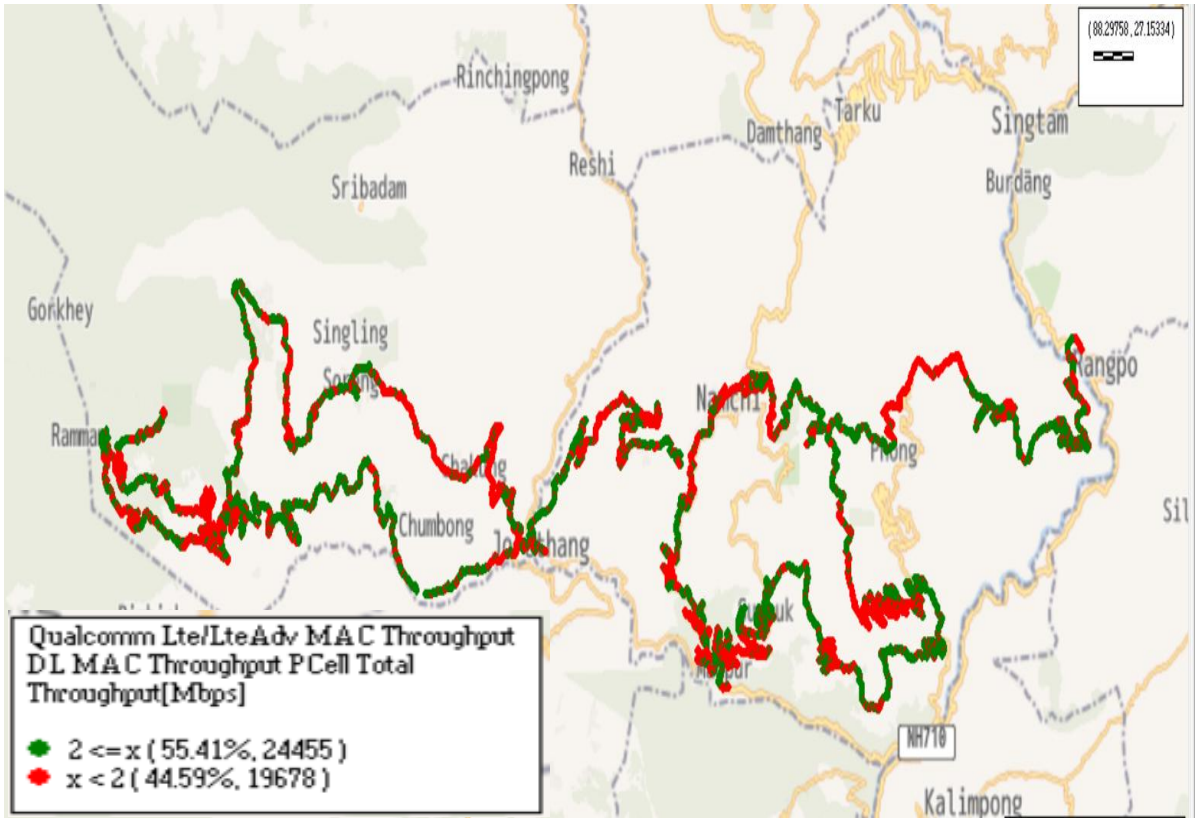
IV. Dynamic Data Test- 4G DL Details

RJIO

Dynamic Data Testing Complete 301 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	4.99

4G



AVG. DOWNLOAD SPEED (Mbps)	4.997
% FILE TRANSFER COMPLETE	100.00
DL throughput	**Sample %**
0 to 1 Mbps	30
1 to 2 Mbps	15
2 to 5 Mbps	24
5 to 10 Mbps	17
>10 Mbps	15
Total	**100**

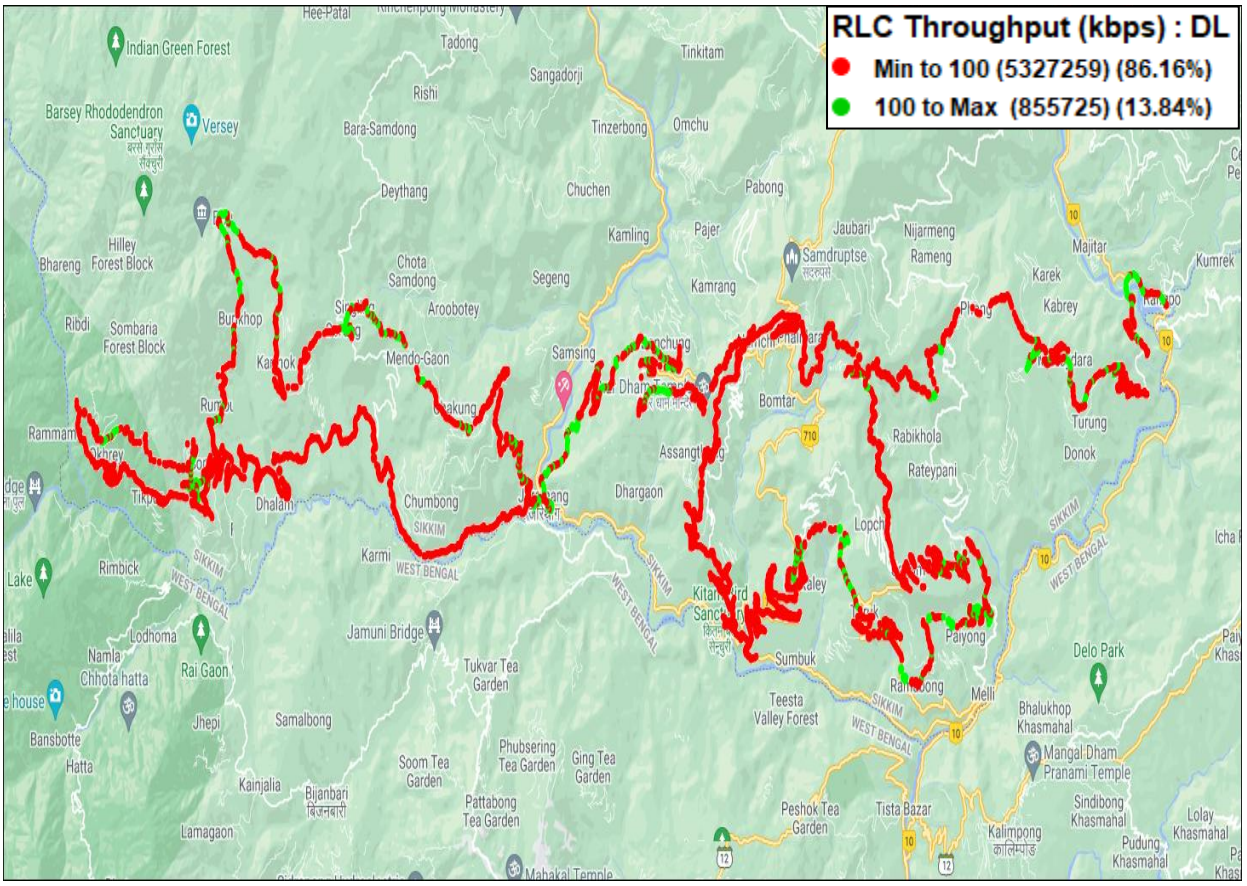
IV. Dynamic Data Test-2G DL Details

VIL

Dynamic Data Testing Complete 301 Kms

Data KPIs – Overall	2G
Average Download Throughput (Kbps)	78.28

2G



AVG. DOWNLOAD SPEED (Kbps)	78.28
% FILE TRANSFER COMPLETE	77.46
DL throughput	**Sample %**
0 to 50 Kbps	66.92
50 to 100 Kbps	19.24
100 to 200 Kbps	13.84
200 to 300 Kbps	0
>300 Kbps	0
Total	**100**

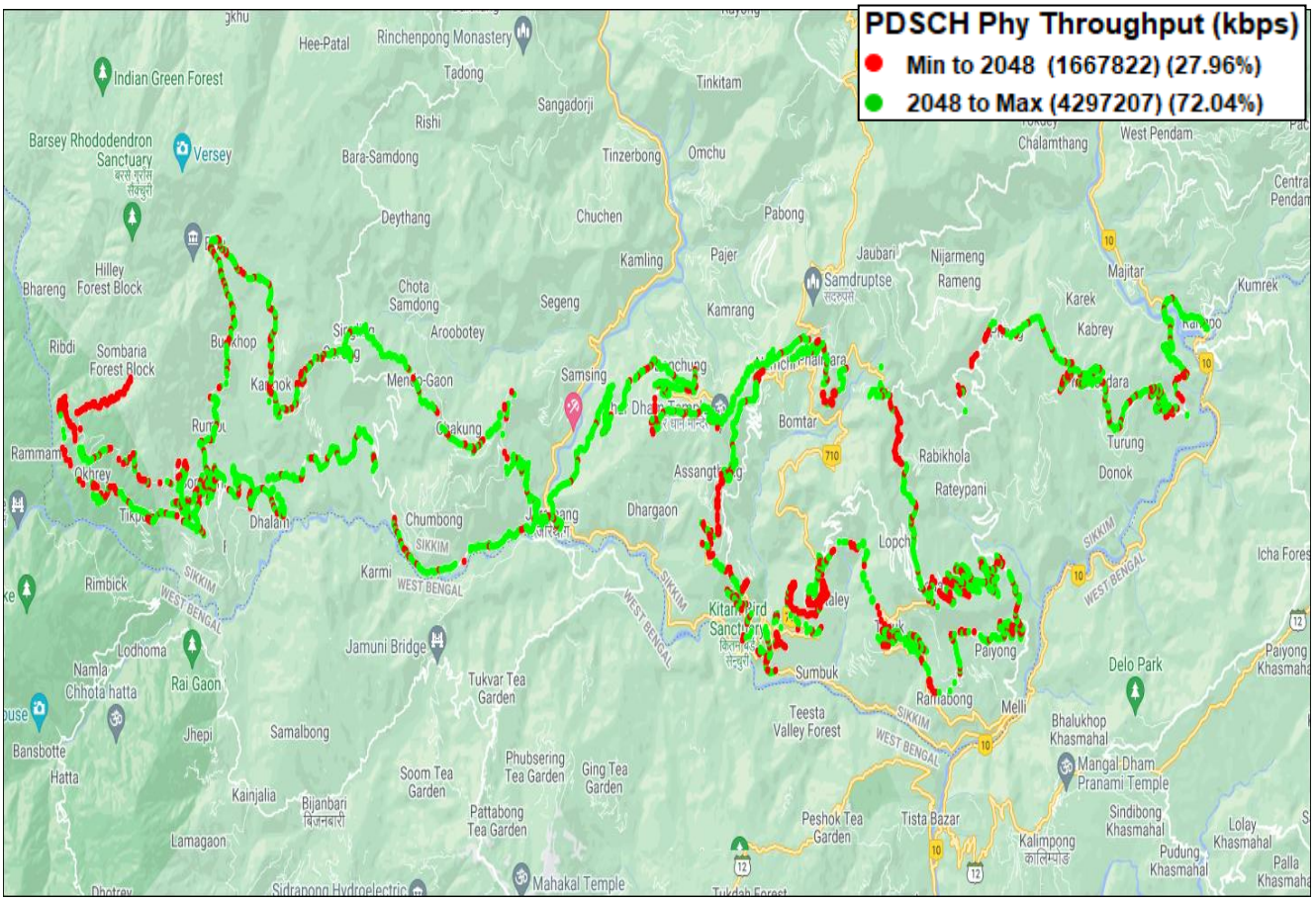
IV. Dynamic Data Test- 4G DL Details

VIL

Dynamic Data Testing Complete 301 Kms

Data KPIs – Overall	4G
Average Download Throughput (Mbps)	26.53

4G



AVG. DOWNLOAD SPEED (Mbps)	26.53
% FILE TRANSFER COMPLETE	95.56
DL throughput	**Sample %**
0 to 1 Mbps	20.42
1 to 2 Mbps	7.54
2 to 5 Mbps	17.03
5 to 10 Mbps	22.64
>10 Mbps	32.37
Total	**100**