Operator Assisted Drive Test Report
Darjeeling, West Bengal
January, 2024
(RO, Kolkata)

Key Performance Indicators (KPIs):

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

AIRTEL- Rx Quality in 2G & 4G (SINR) network.
BSNL-Drop Call Rate in 3G network, Call Setup Success Rate in 2G & 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 Darjeeling and surrounding areas including National Highway 110 on 13th January 2024 from 08.00 AM to 08.30 PM. The drive test covered drive route of 136 KMs (approx) over a period of one day. Approximately 214+ 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

Darjeeling is a city in the northernmost region of the Indian state of West Bengal. Located in the Eastern Himalayas, it has an average elevation of 2,045 metres (6,709 ft). To the west of Darjeeling lies the easternmost province of Nepal, to the east the Kingdom of Bhutan, to the north the Indian state of Sikkim, and farther north the Tibet Autonomous Region region of China.

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: Darjeeling

DAY-1–Bhanu Bhawan-Tukvar Hospital-Rangeet Panchayat Office-Shree Dwarika Estate-Jamuni Bridge-Post Office Pulbazar-Bijanbari Post Office-Kainjalia-Sumbuck bazar-Lodhoma Bridge-Lodhoma Bazar-Namla-Prakash Nagar--Gumba Dara--Rimbick Gram Panchayat-Sepi Gaon-Srikhola Bridge-Srikhola Daragaon Gram Panchayat Office---Bansbotay-Dhotrey-Gurdum-Majua-Mane Bhanjang-Simana Bazar-Nagari Dara- Sukhia Pokhari -Lepcha Jagat- Ghum Railway Station.

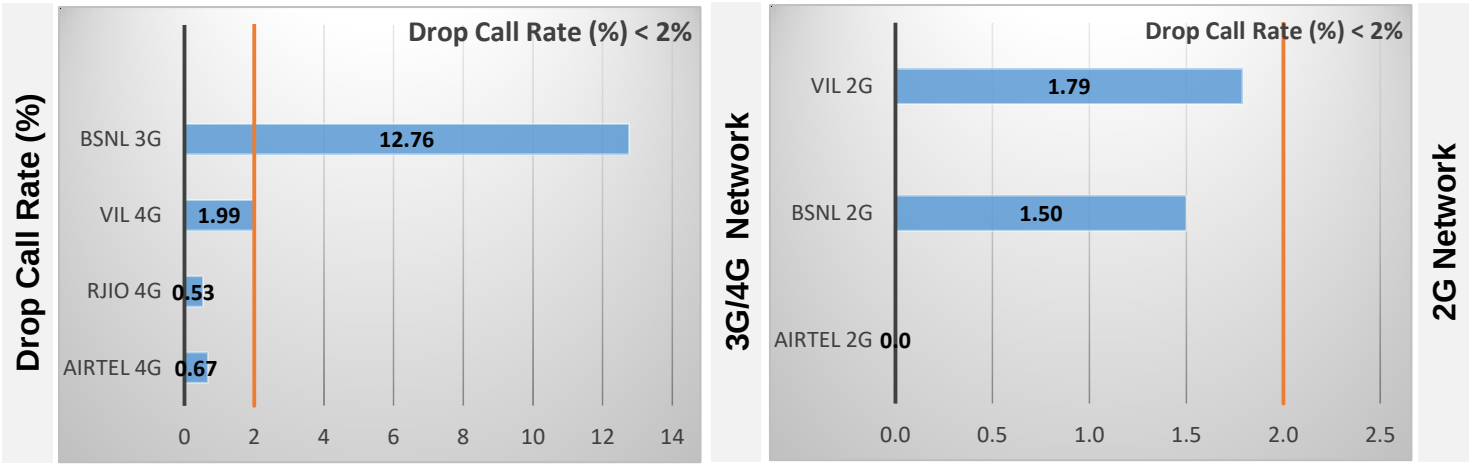
Data Service Test- Static Locations

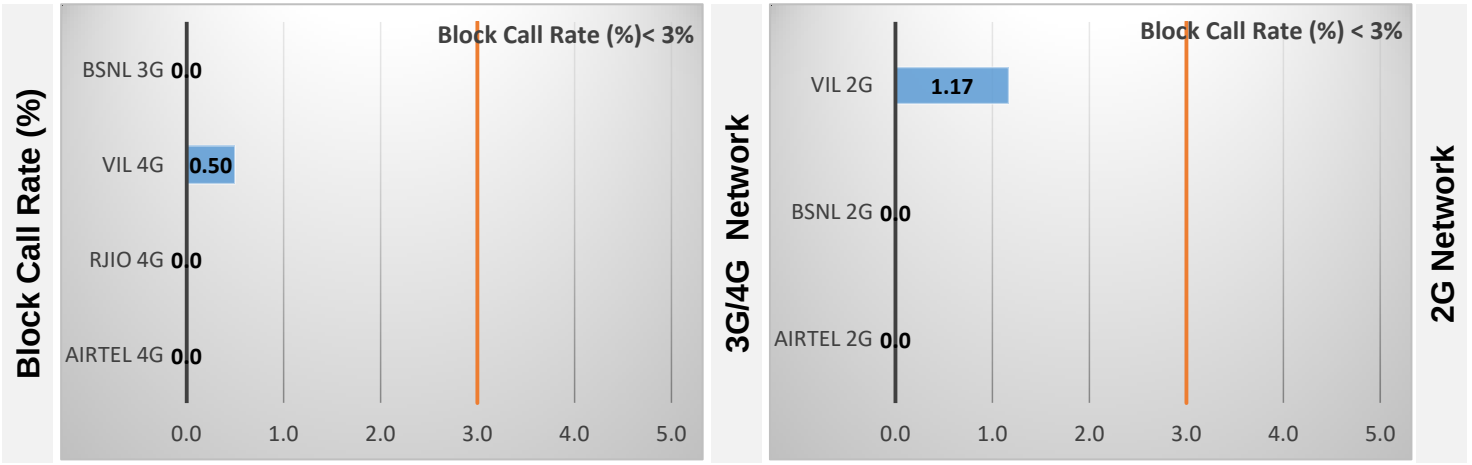
Static Locations
Vanu Bhawan, Darjeeling
Ghum Railway Station

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	1.50	1.79	12.76	0.67	0.53	1.99
Block Call Rate %	0.0	0.0	1.17	0.0	0.0	0.0	0.50

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%).

Voice Calls

Key Observations

Coverage

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

TSPs	2G		
	AIRTEL	BSNL	VIL
Coverage %	91.04	55.28	74.97

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

TSPs	3G	4G		
	BSNL	AIRTEL	RJIO	VIL
Coverage	20.55	91.39	94.01	73.30

Summary

City Level Summary- Voice

Voice Call	2G		
	AIRTEL	BSNL	VIL
Call Attempt	218.0	229.0	172.0
Blocked Call Rate (%)	0.0	0.0	1.17
CSSR% (Accessibility)	100	83.41	97.67
Drop Call Rate (%)	0.0	1.50	1.79
Mobility HOSR (%)	98.82	95.24	100
Rx Quality (%)	94.75	83.83	92.65

Voice Call	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Call Attempt	342	150.0	186.0	202.0
Blocked Call Rate (%)	0.0	0.0	0.0	0.50
CSSR% (Accessibility)	84.79	100	98.92	99.50
Drop Call Rate (%)	12.76	0.67	0.53	1.99
Mobility HOSR (%)	100	98.45	99.03	95.85
Rx Quality (%)	63.32	92.97	85.64	82.49

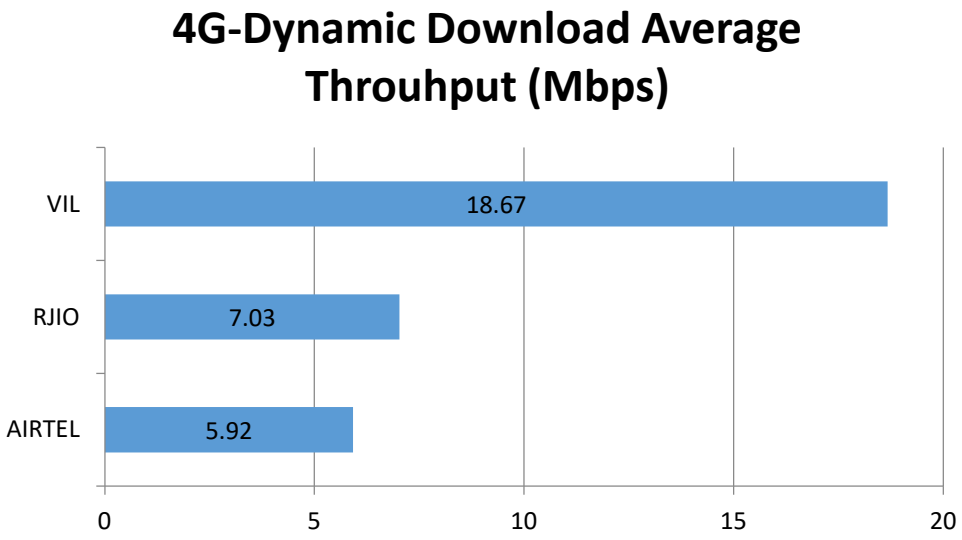
Summary-Data Services Dynamic

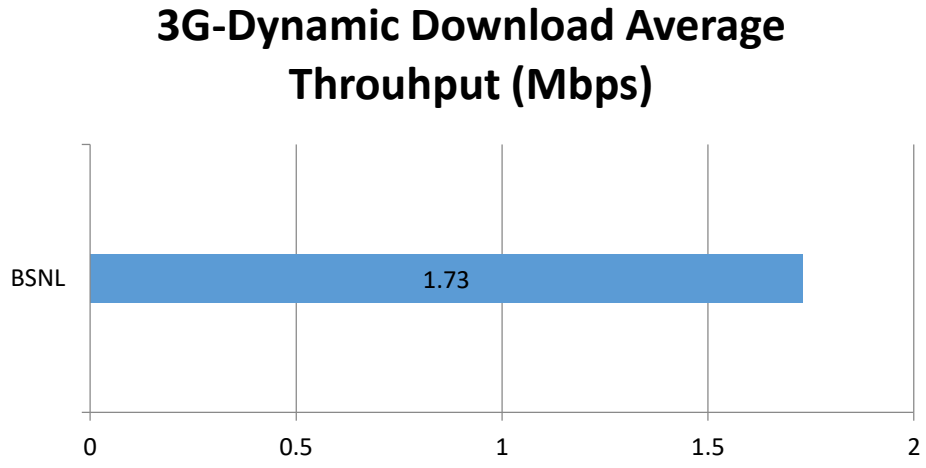
Key Observations

Dynamic Data was tested for 136 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)	83.50	111.01	80.92
Upload Throughput (kbps)	65.95	63.78	52.61
Web Browsing Delay (sec)	1.65	30.84	35.95
Latency (msec)	535.50	262	200.49

Average Data Services Static	3G/ 4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	4.40	10.24	7.57	6.96
Upload Throughput in Mbps	1.57	2.84	6.63	7.70
Video streaming delay (secs)	12.90	0.25	0.50	1.23
Web Browsing Delay (secs)	10.75	0.63	3.93	2.24
Latency (msec)	154	271	45.5	100.74

Summary-Data Services Static

Location Level Summary-

Location:-Bhanu Bhawan	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	79.7 0	108.18	79.97
Upload Throughput (kbps)	81.90	59.58	51.87
Web Browsing Delay (sec)	1.40	23.17	36.65
Latency (msec)	493	255	202.72

Location:-Bhanu Bhawan	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	5.06	9.68	9.03	9.31
Upload Throughput in Mbps	1.74	4.08	8.76	12.45
Video streaming delay (secs)	8.7	0.31	0.45	1.18
Web Browsing Delay (secs)	7.13	0.85	3.66	1.92
Latency (msec)	123	347	42.5	94.53

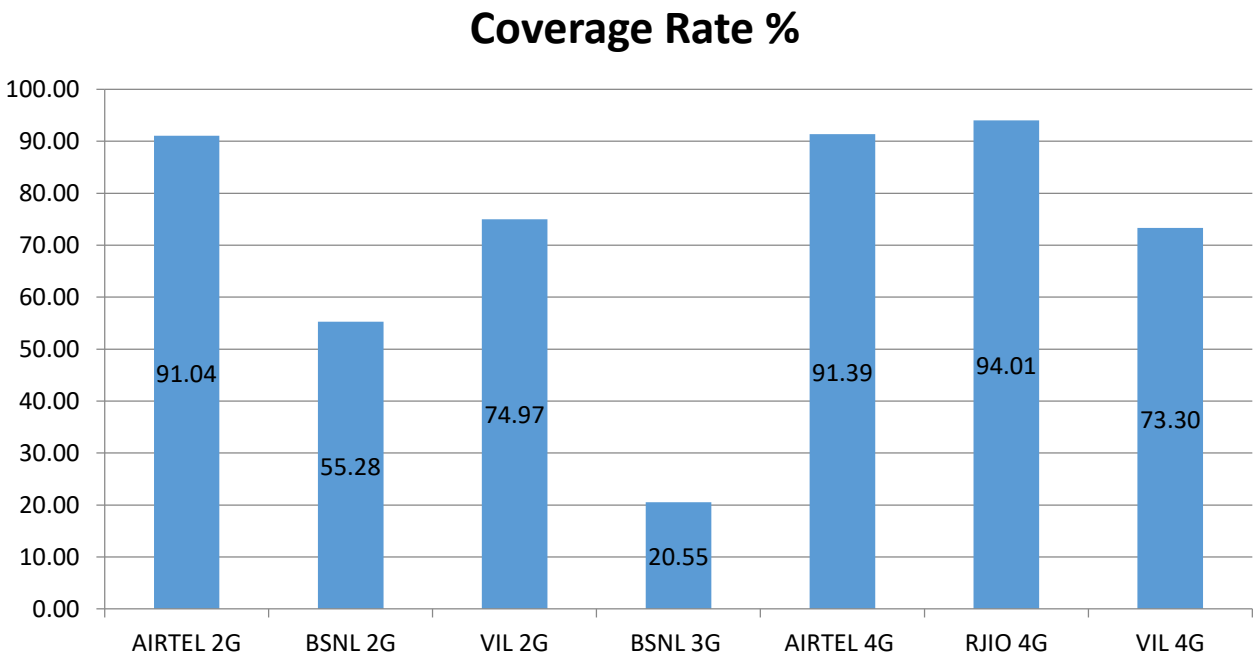
Location:- Ghum Railway Station	2G		
	AIRTEL	BSNL	VIL
Download throughput in (kbps)	87.30	113.84	81.88
Upload Throughput in (kbps)	50 .0	67.98	53.35
Web Browsing Delay (secs)	1.90	38.52	35.25
Latency (msec)	578	270	198.25

Location:- Ghum Railway Station	4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in (mbps)	3.75	10.80	6.11	4.63
Upload Throughput in (mbps)	1.40	1.60	4.50	2.95
Video streaming delay (secs)	17.10	0.19	0.55	1.28
Web Browsing Delay (secs)	14.38	0.41	4.20	2.56
Latency (msec)	185	195	48.5	106.95

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	91.04
BSNL 2G	55.28
VIL 2G	74.97
BSNL 3G	20.55
AIRTEL 4G	91.39
RJIO 4G	94.01
VIL 4G	73.30

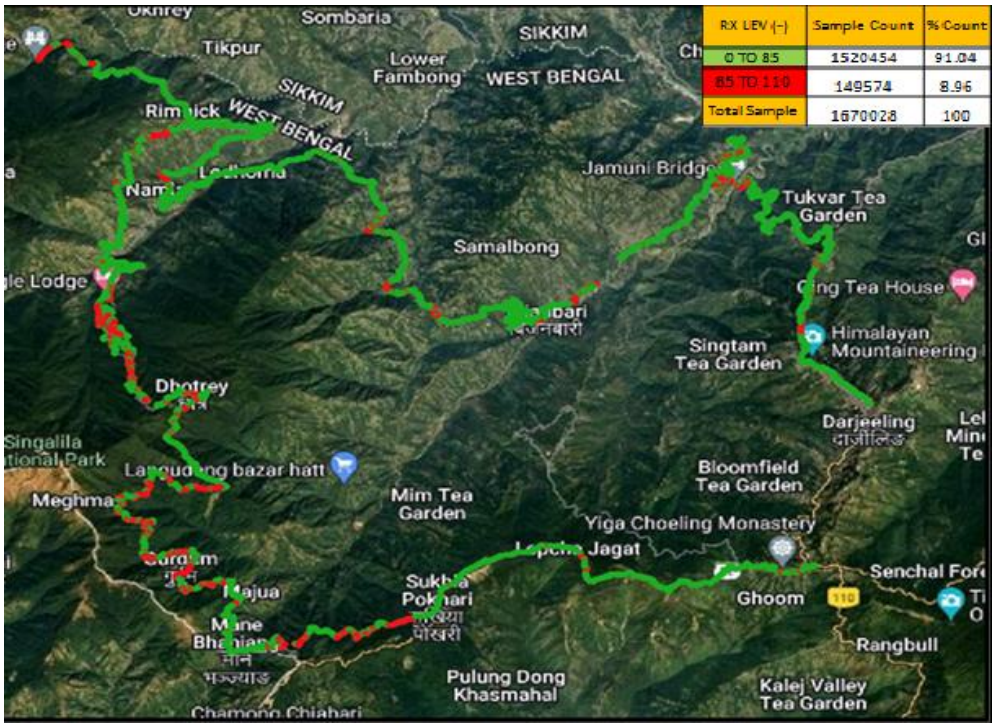


Note- Coverage is the percentage of samples having signal strength more than the threshold value (2G >= -85 dbm, 3G>= -90 dbm and 4G >= -110 dbm). However, these samples are only for the portion of the OADT routes where TSPs have coverage i.e 'no coverage' routes have been excluded.

AIRTEL

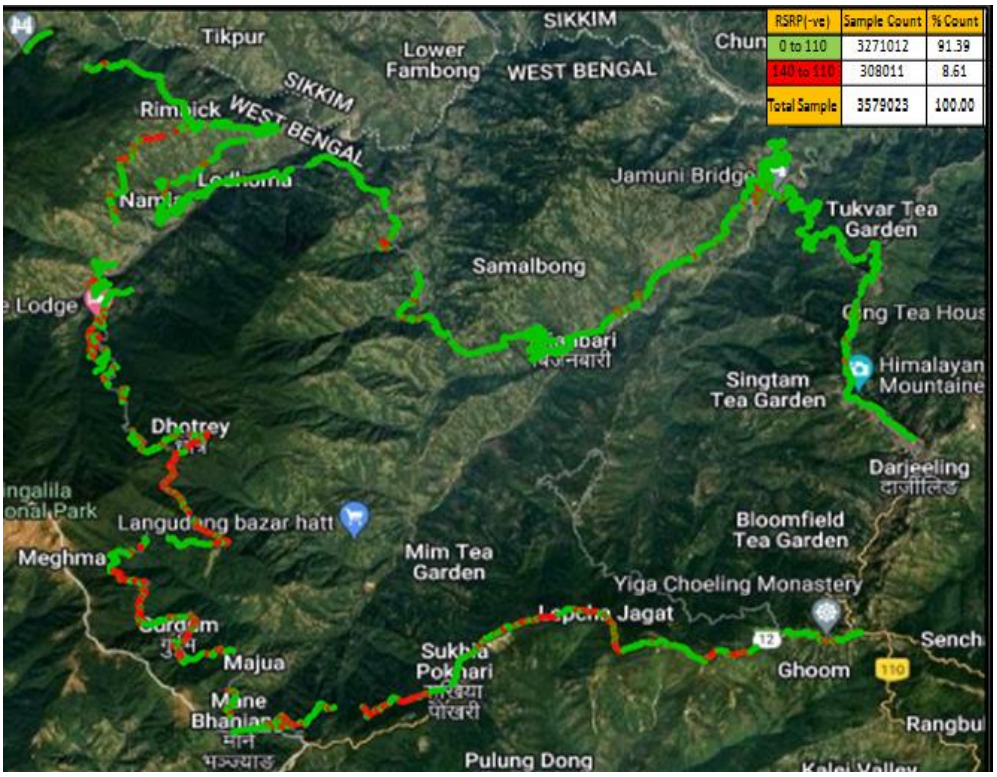
Technology	Coverage Rate %
2G	91.04
4G	91.39

2G



Overall Rx Level	Sample %
[Max >=-75]	21.0
[-75 >=-85)	70.04
[-85 >=-95)	2.96
[-95 >=Min)	6.0
Total	**100**

4G

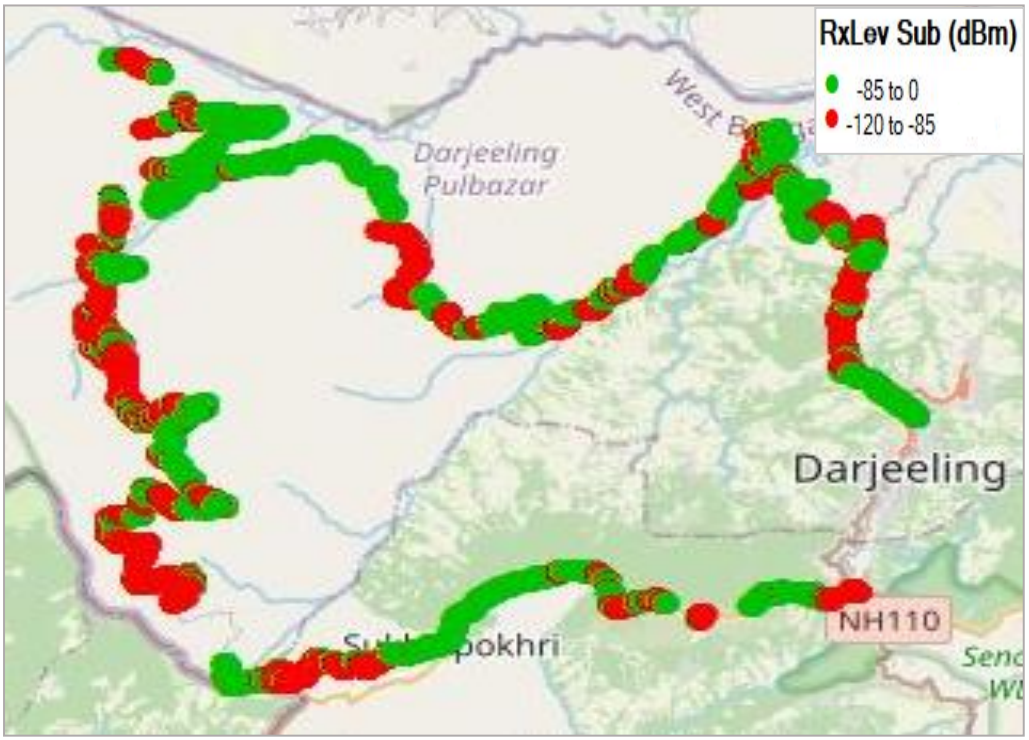


Overall RSRP	Sample %
[Max >=-80]	35.0
[-80 >=-90)	23.0
[-90 >=-110)	33.39
[-110 >=Min)	8.61
Total	**100**

BSNL

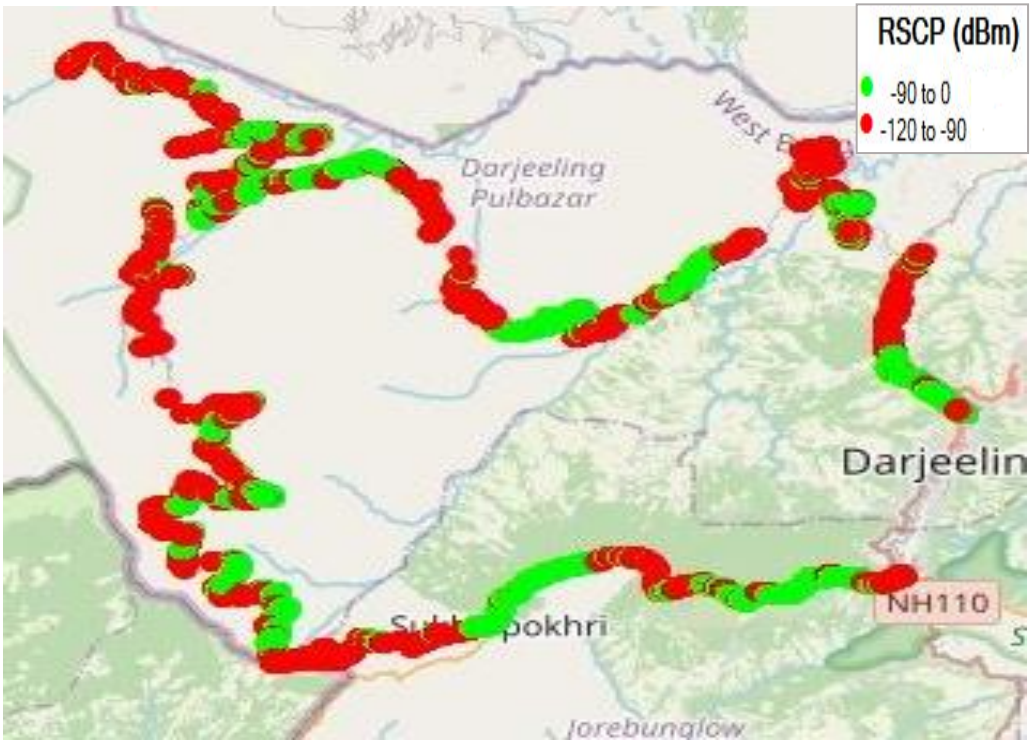
Technology	Coverage Rate %
2G	55.28
3G	20.55

2G



Overall RxLevel	Sample %
[Max >=-75]	22.58
[-75 >=-85)	32.70
[-85 >=-95)	36.28
[-95 >=Min)	8.44
Total	**100**

3G



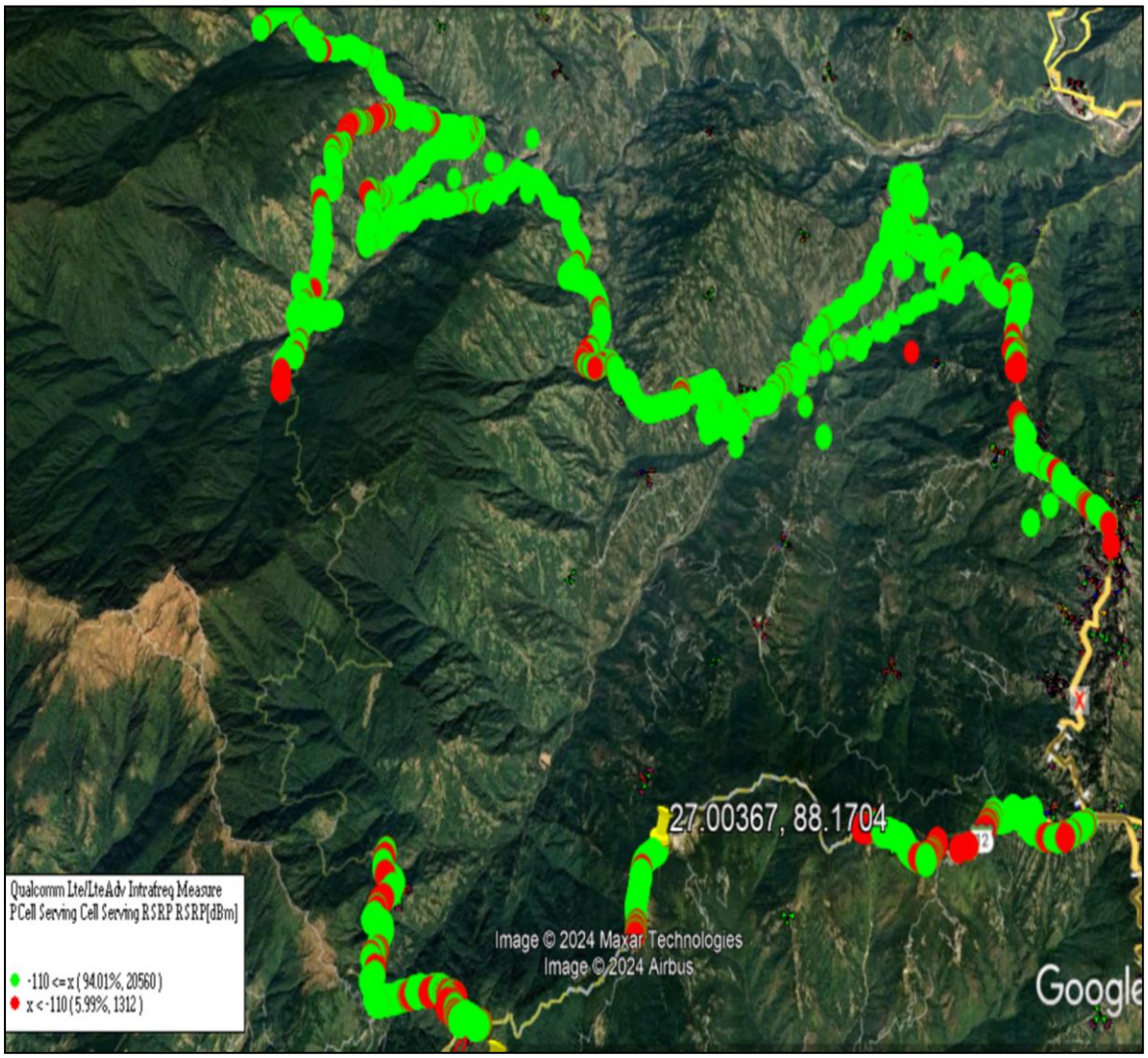
Overall RSCP	Sample %
[Max >=-70]	1.84
[-70 >=-80)	4.31
[-80 >=-90)	14.40
[-90 >=Min)	79.45
Total	**100**

I. Coverage Details

RJIO

Technology	Coverage Rate %
4G	94.01

4G



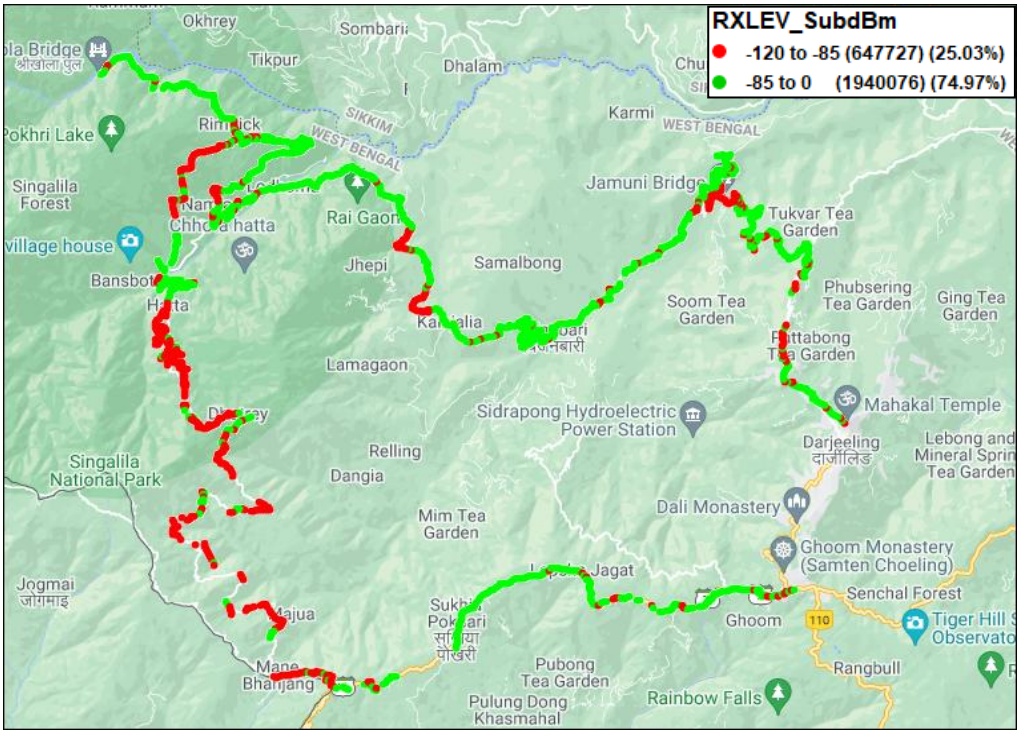
Overall RSRP	Sample %
[Max >=-80]	12.0
[-80 >=-90)	20.0
[-90>=-110)	62.0
[-110 >=Min)	6.0
Total	**100**

I. Coverage Details

VIL

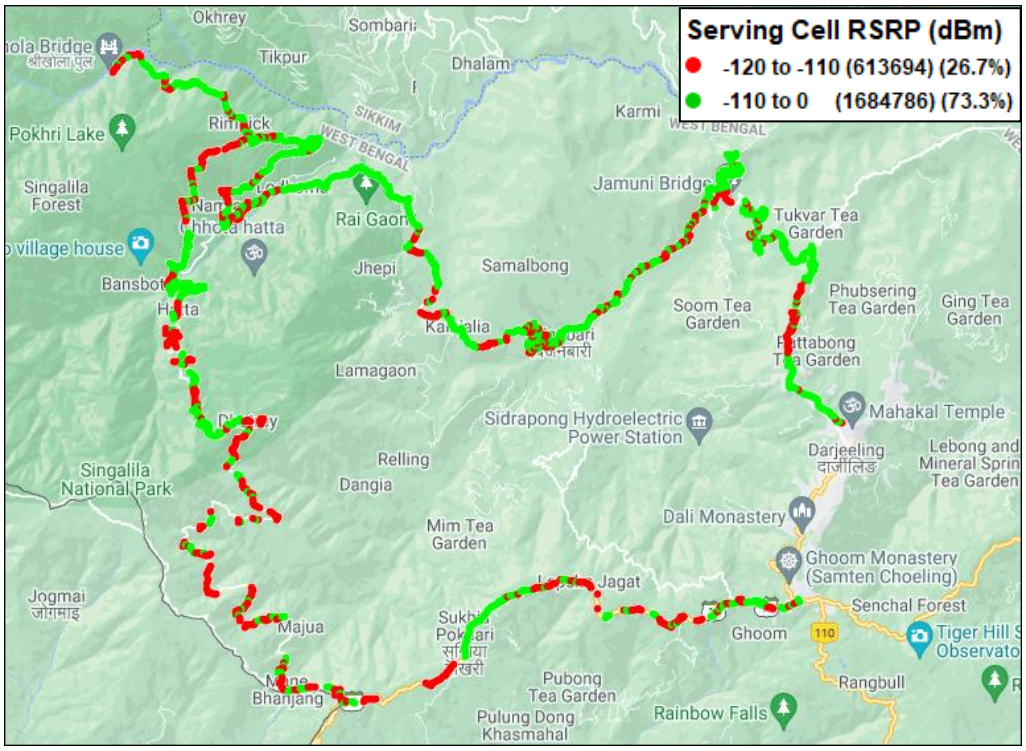
Technology	Coverage Rate %
2G	74.97
4G	73.30

2G



Overall RxLevel	Sample %
[Max >=-75]	34.11
[-75 >=-85)	40.86
[-85 >=-95)	15.47
[-95 =Min)	9.56
Total	**100**

4G

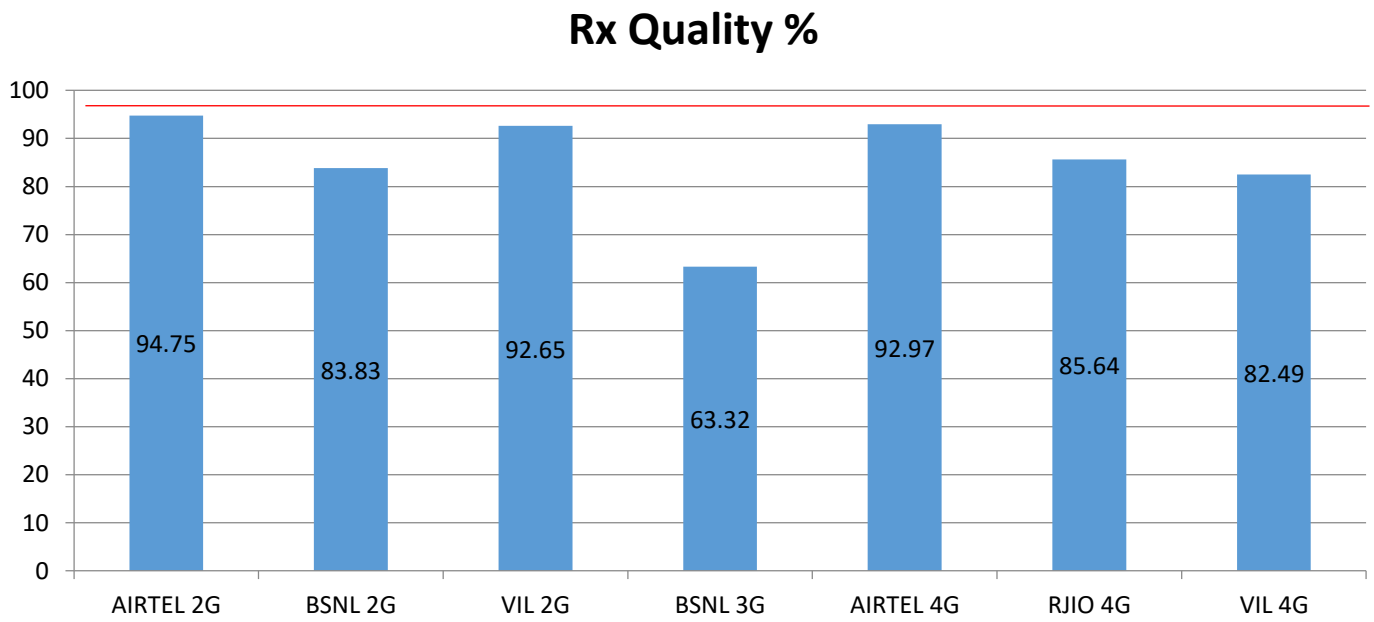


Overall RSRP	Sample %
[Max >=-80]	2.94
[-80 >=-90)	8.85
[-90>=-110)	61.51
[-110 >=Min)	26.70
Total	**100**

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	94.75
BSNL 2G	83.83
VIL 2G	92.65
BSNL 3G	63.32
AIRTEL 4G	92.97
RJIO 4G	85.64
VIL 4G	82.49



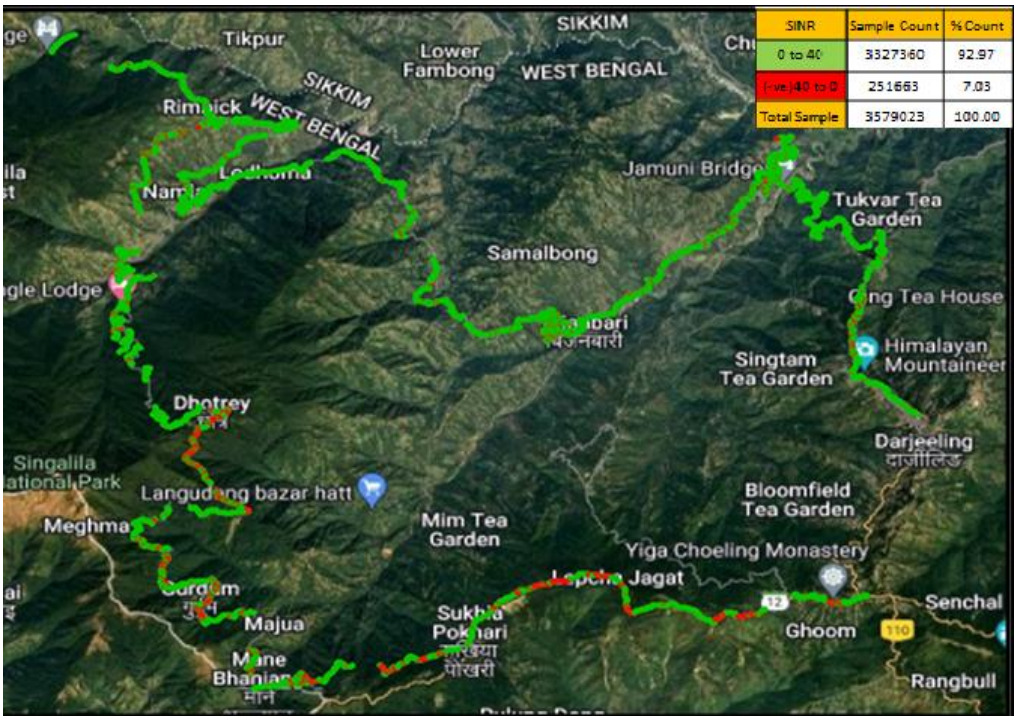
AIRTEL

Technology	Rx Quality %
2G	94.75
4G	92.97

2G

Overall Rx Quality	Sample %
(Min <=2)	88.0
(2 <=3)	2.0
(3 <=4)	2.0
(4 <=5)	2.0
(5 <=Max)	5.0
Total	100

4G



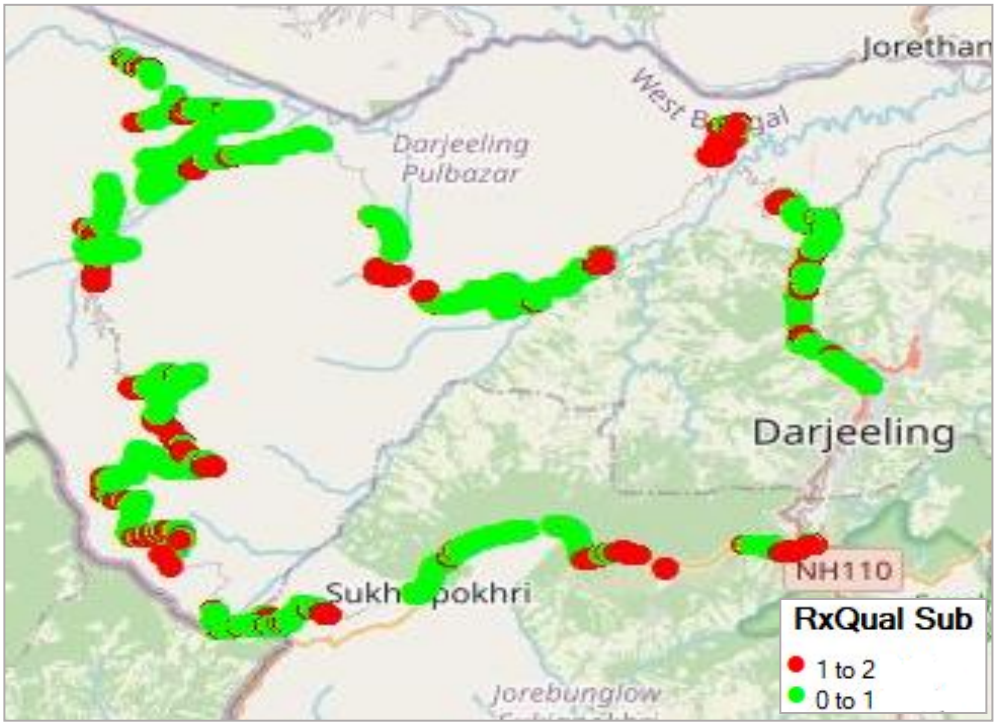
Overall SINR	Sample %
(Min <=0)	7.0
(0 <=5)	47.0
(5 <=10)	23.0
(10 <=15)	13.0
(15 <=Max)	11.0
Total	**100**

II. Quality Details

BSNL

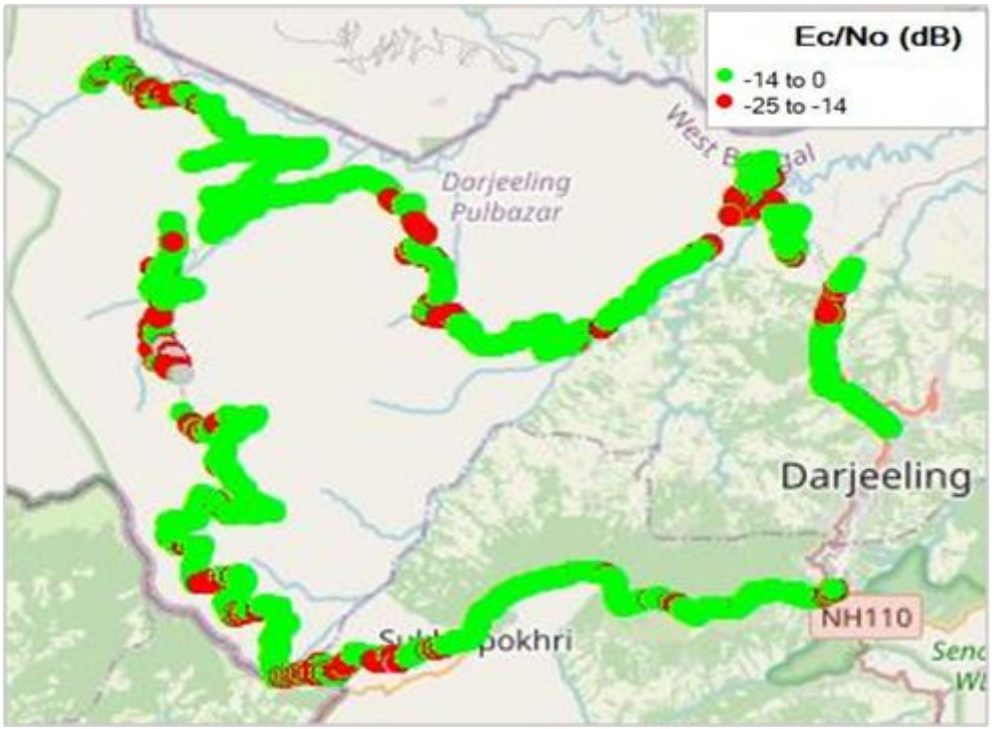
Technology	Rx Quality %
2G	83.83
3G	63.32

2G



Overall Rx Quality	Sample %
(Min <=2)	63.43
(2 <=3)	6.14
(3 <=4)	7.50
(4 <=5)	6.76
(5 <=Max)	16.17
Total	**100**

3G



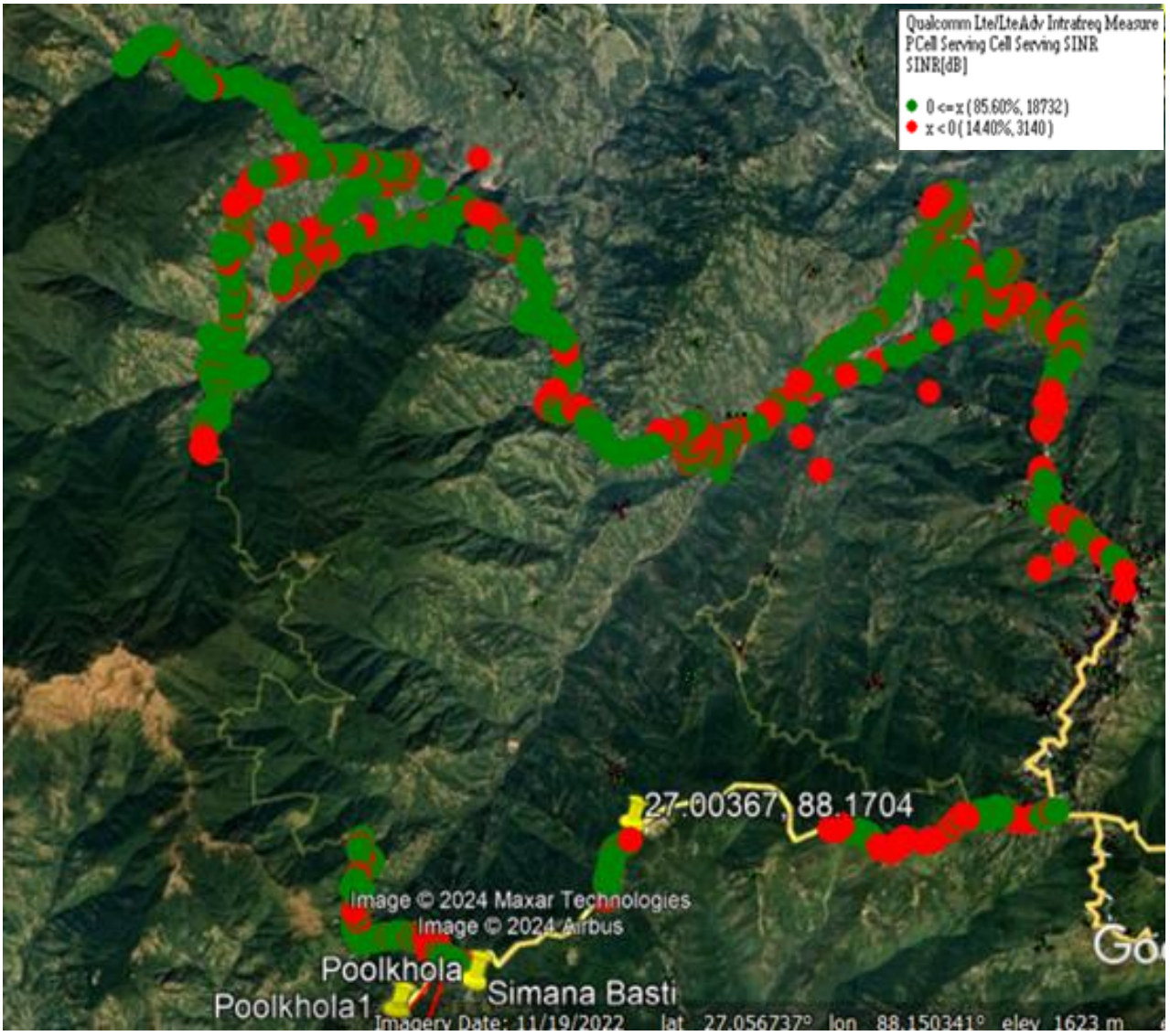
Overall EcNo	Sample %
(Max <=-6)	10.74
(-6 <=-9)	13.41
(-9 <=-11)	20.60
(-11 <=-14)	18.58
(-14 <= Min)	36.68
Total	**100**

II. Quality Details

RJIO

Technology	Rx Quality %
4G	85.64

4G



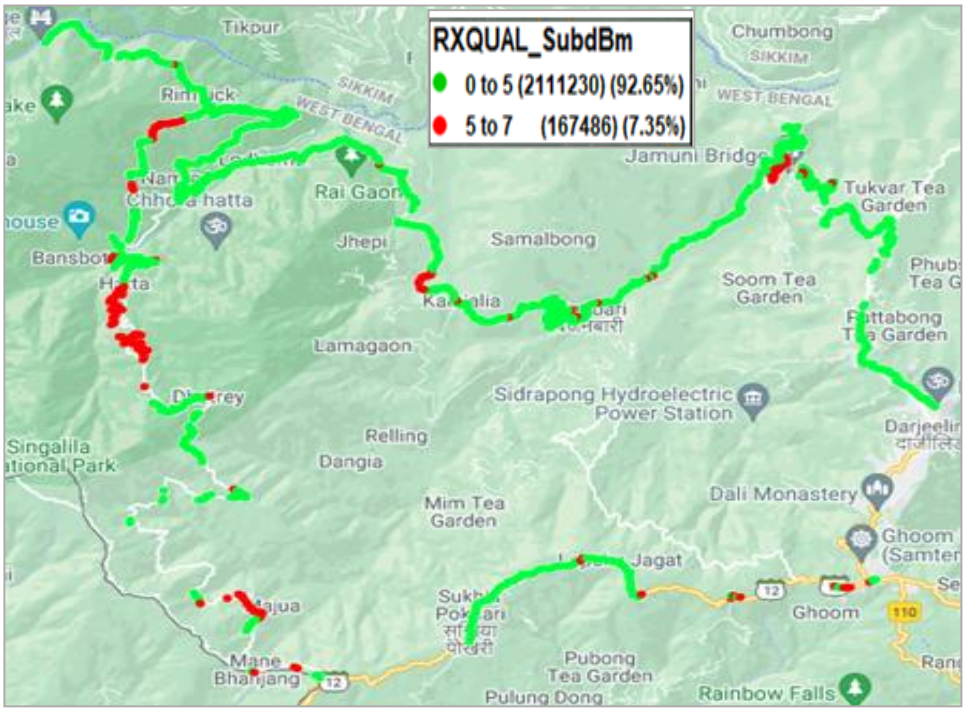
Overall SINR	Sample %
(Min <=0)	14.0
(0 <=5)	37.0
(5 <=10)	22.0
(10 <=15)	13.0
(15 <=Max)	13.0
Total	**100**

II. Quality Details

VIL

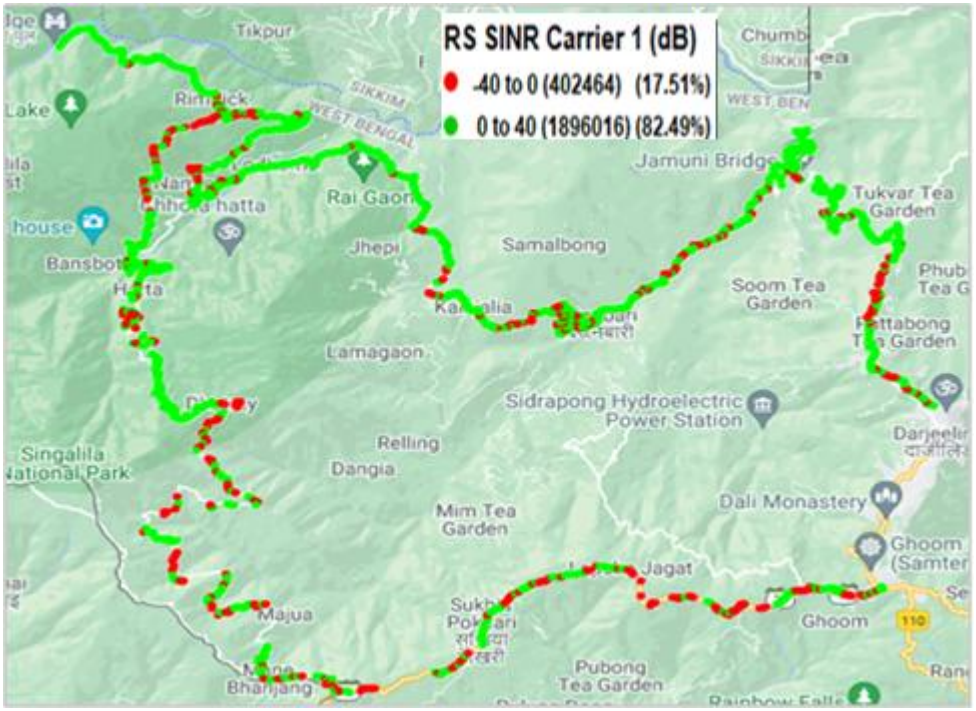
Technology	Rx Quality %
2G	92.65
4G	82.49

2G



Overall Rx Quality	Sample %
(Min <=2)	48.78
(2 <=3)	17.62
(3 <=4)	12.27
(4 <=5)	13.98
(5 <=Max)	7.35
Total	**100**

4G



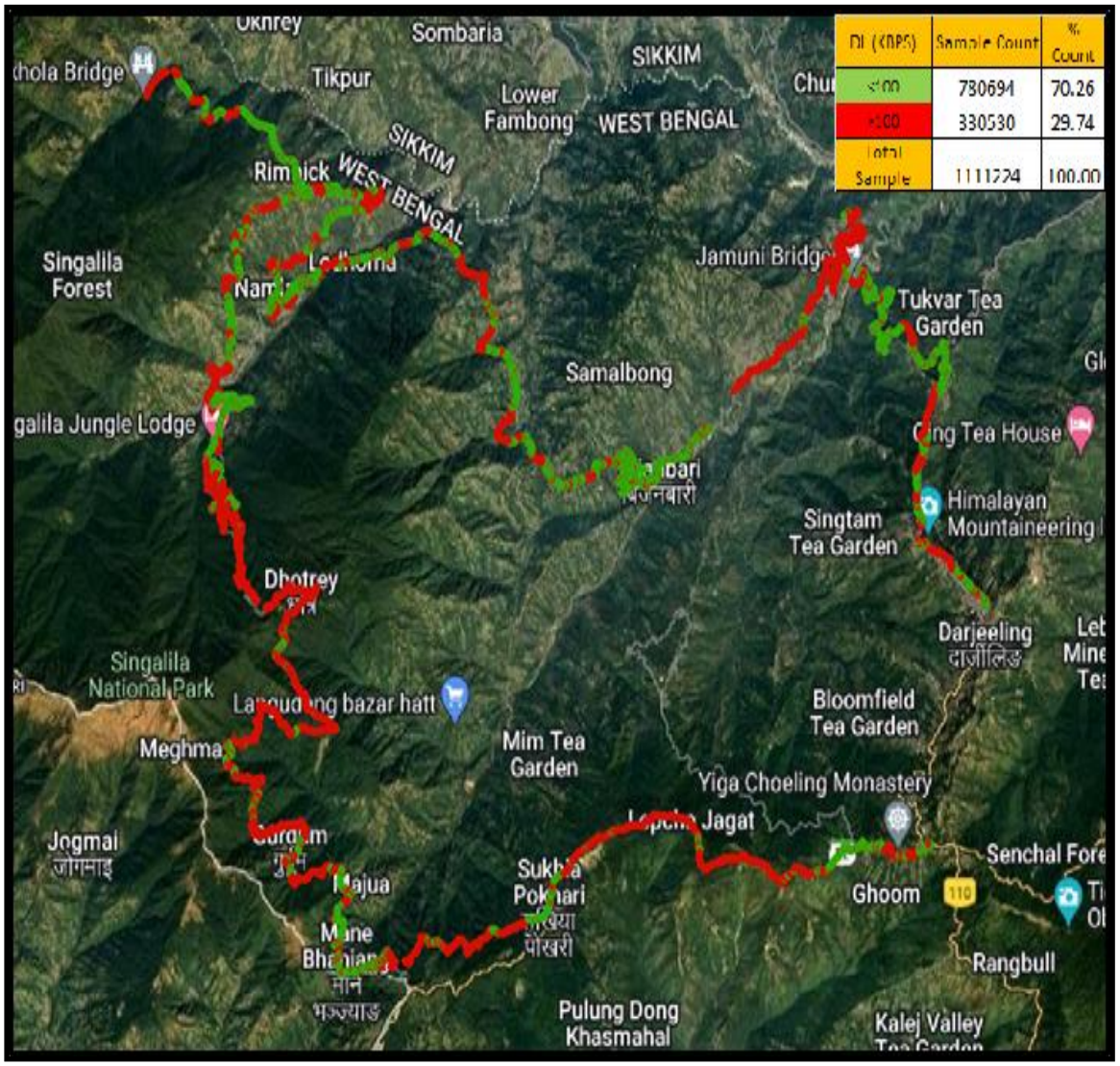
Overall SINR	Sample %
(Min <=0)	17.51
(0 <=5)	23.74
(5 <=10)	26.38
(10 <=15)	16.91
(15 <=Max)	15.46
Total	**100**

AIRTEL

Dynamic Data Testing Complete 136 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	35.40

2G



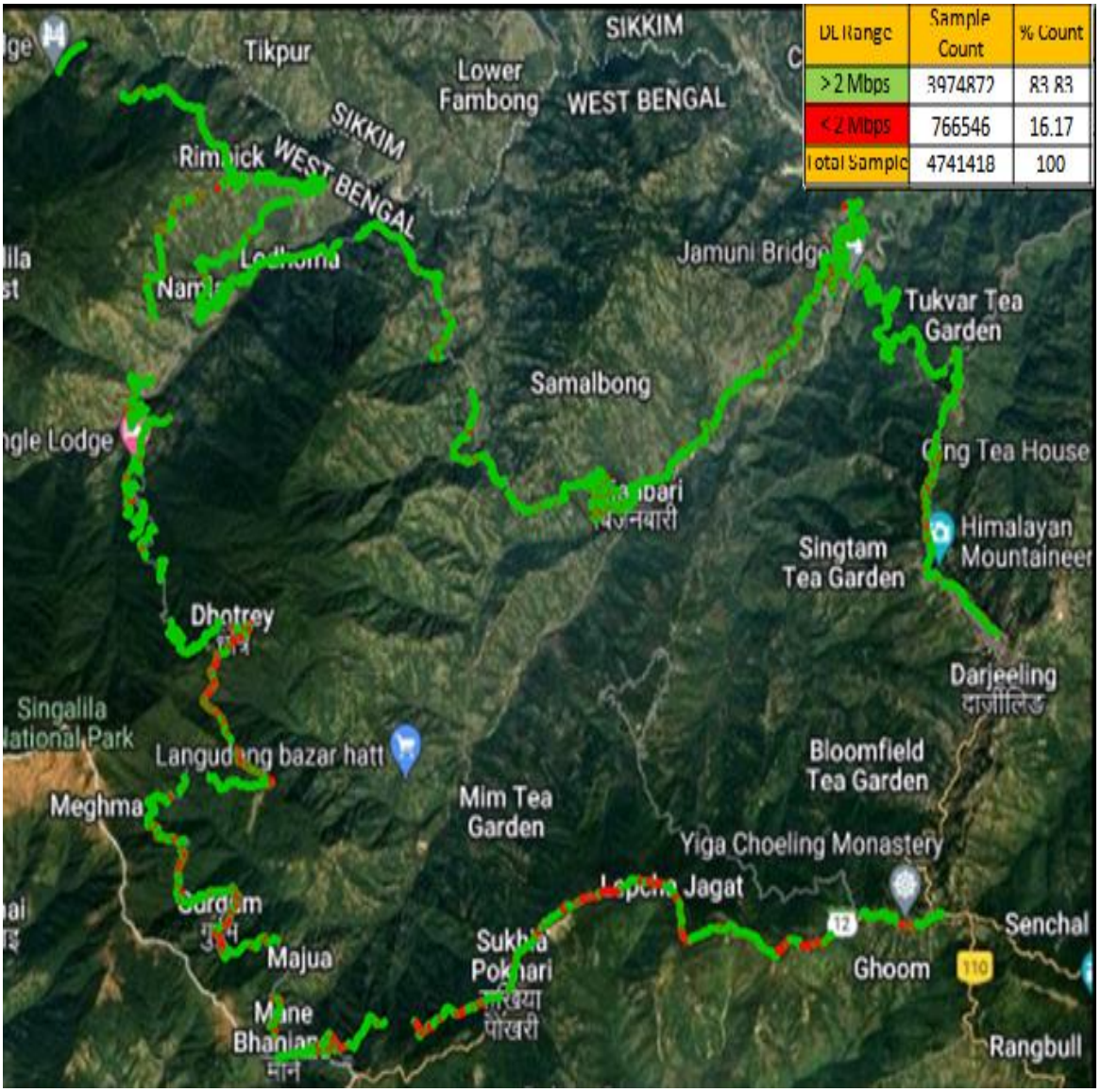
AVG. DOWNLOAD SPEED (Kbps)	35.40
% FILE TRANSFER COMPLETE	95.80
DL throughput	**Sample %**
0 to 50 Kbps	57.28
50 to 100 Kbps	12.97
100 to 200 Kbps	19.86
200 to 300 Kbps	9.35
>300 Kbps	0.52
Total	**100**

AIRTEL

Dynamic Data Testing Complete 136 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	5.92

4G



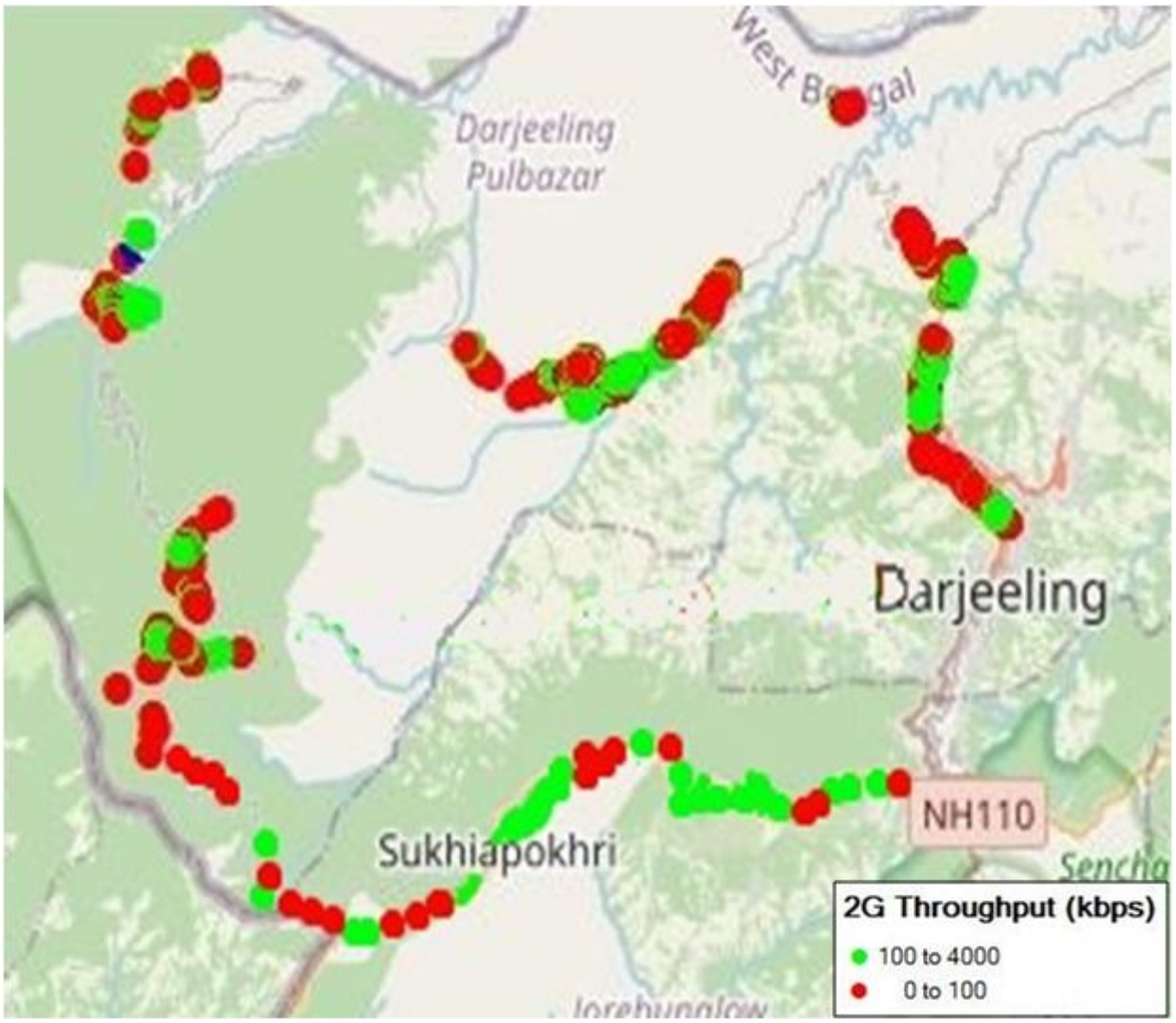
AVG. DOWNLOAD SPEED (Mbps)	5.92
% FILE TRANSFER COMPLETE	97.63
DL throughput	**Sample %**
0 to 1 Mbps	13.24
1 to 2 Mbps	2.91
2 to 5 Mbps	6.29
5 to 10 Mbps	8.82
>10 Mbps	68.71
Total	**100**

BSNL

Dynamic Data Testing Complete 136 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	101.30

2G



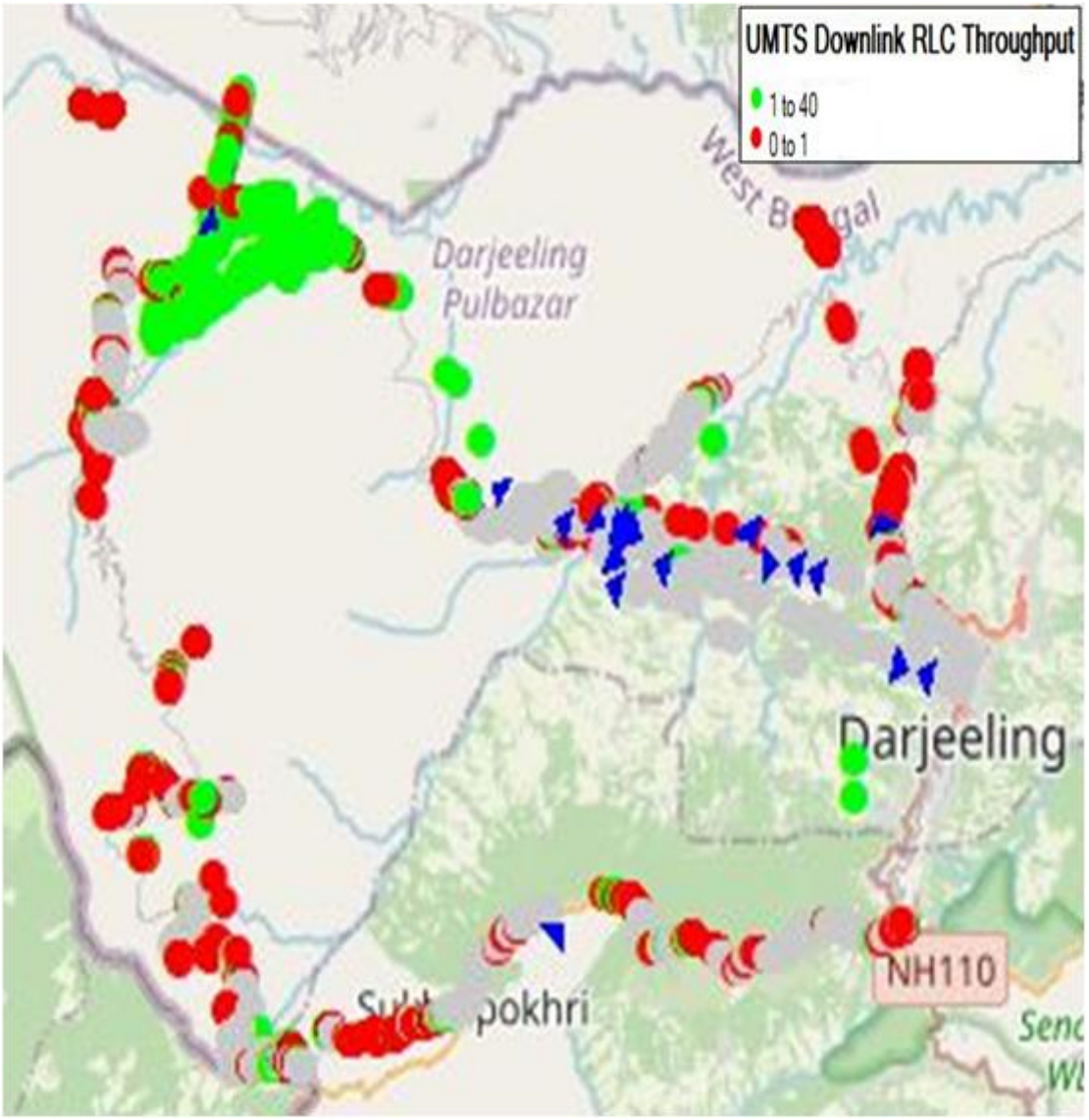
AVG. DOWNLOAD SPEED (Kbps)	101.30
% FILE TRANSFER COMPLETE	62.20
DL throughput	**Sample %**
0 to 50 Kbps	5.38
50 to 100 Kbps	51.16
100 to 200 Kbps	41.56
200 to 300 Kbps	1.58
>300 Kbps	0.32
Total	**100**

BSNL

Dynamic Data Testing Complete 136 Kms

Data KPIs - Overall	**3G**
Average Download Throughput (Mbps)	1.73

3G



AVG. DOWNLOAD SPEED (Mbps)	1.73
% FILE TRANSFER COMPLETE	58.68
DL throughput	**Sample %**
0 to 0.5 Mbps	6.95
0.5 to 1 Mbps	52.75
1 to 2 Mbps	26.91
2 to 5 Mbps	7.38
>5 Mbps	6.01
Total	**100**

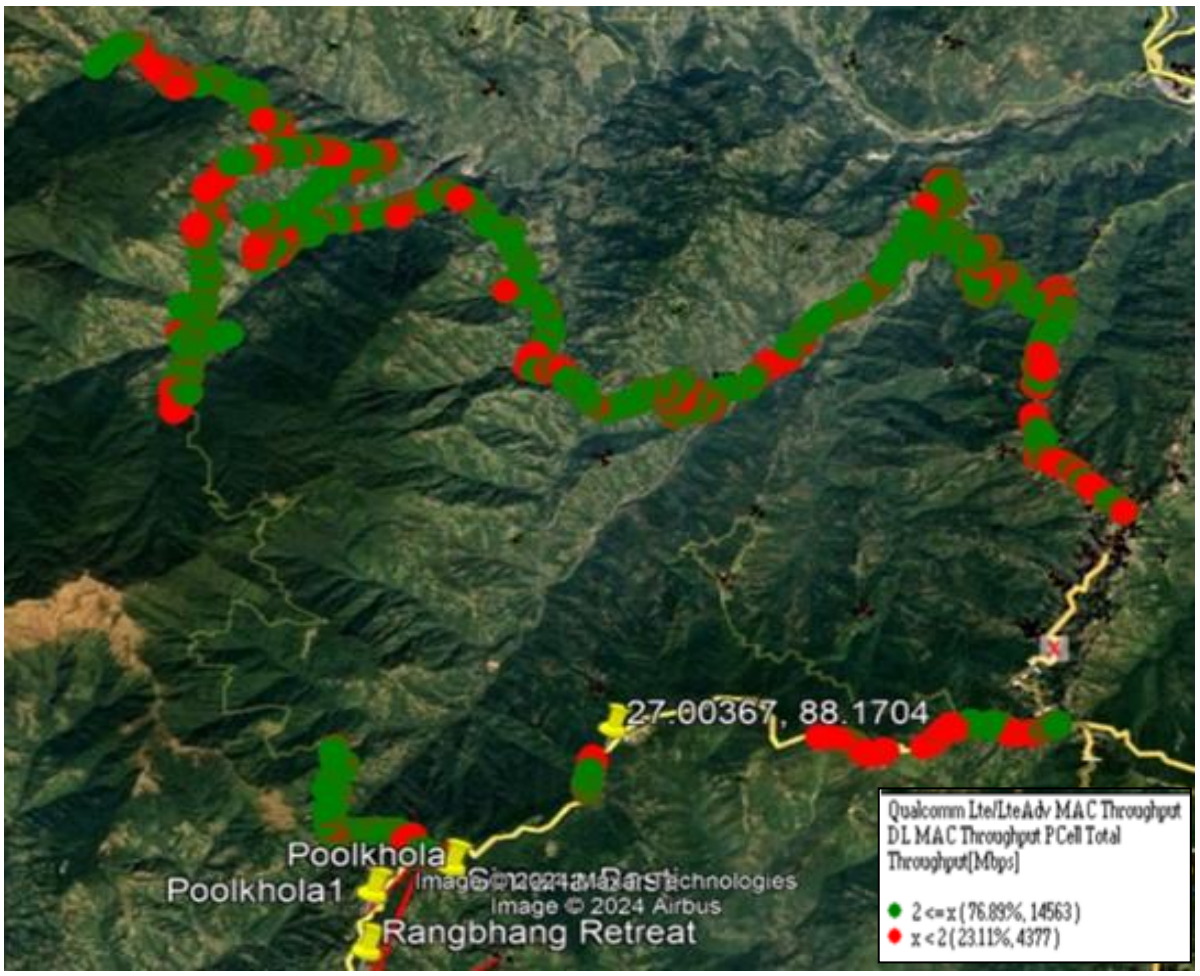
IV. Dynamic Data Test- 4G DL Details

RJIO

Dynamic Data Testing Complete 136 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	7.03

4G

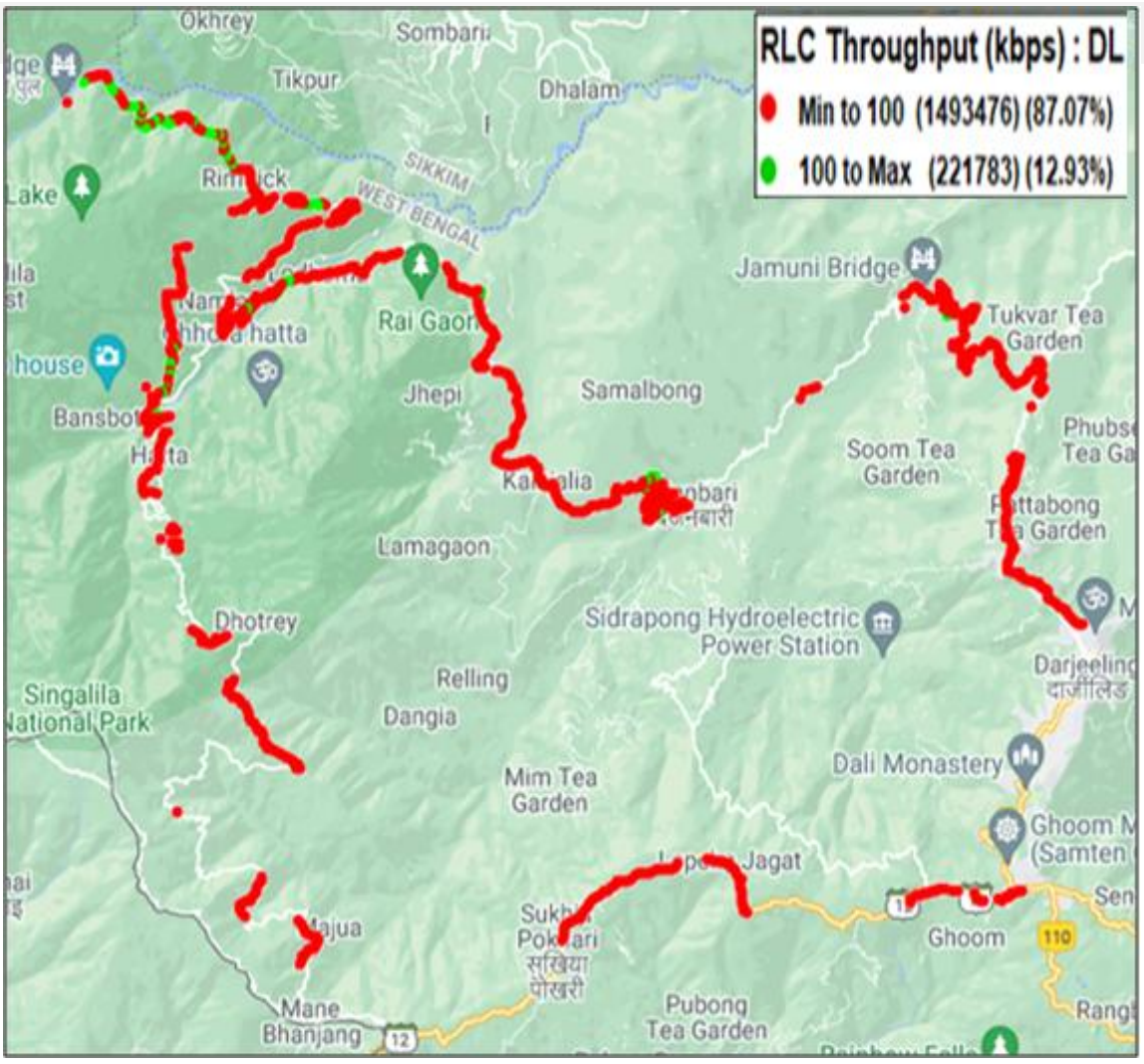


AVG. DOWNLOAD SPEED (Mbps)	7.03
% FILE TRANSFER COMPLETE	97.50
DL throughput	**Sample %**
0 to 1 Mbps	8.66
1 to 2 Mbps	14.45
2 to 5 Mbps	32.17
5 to 10 Mbps	27.09
>10 Mbps	17.63
Total	**100**

VIL

Dynamic Data Testing Complete 136 Kms

Data KPIs – Overall	2G
Average Download Throughput (Kbps)	73.85



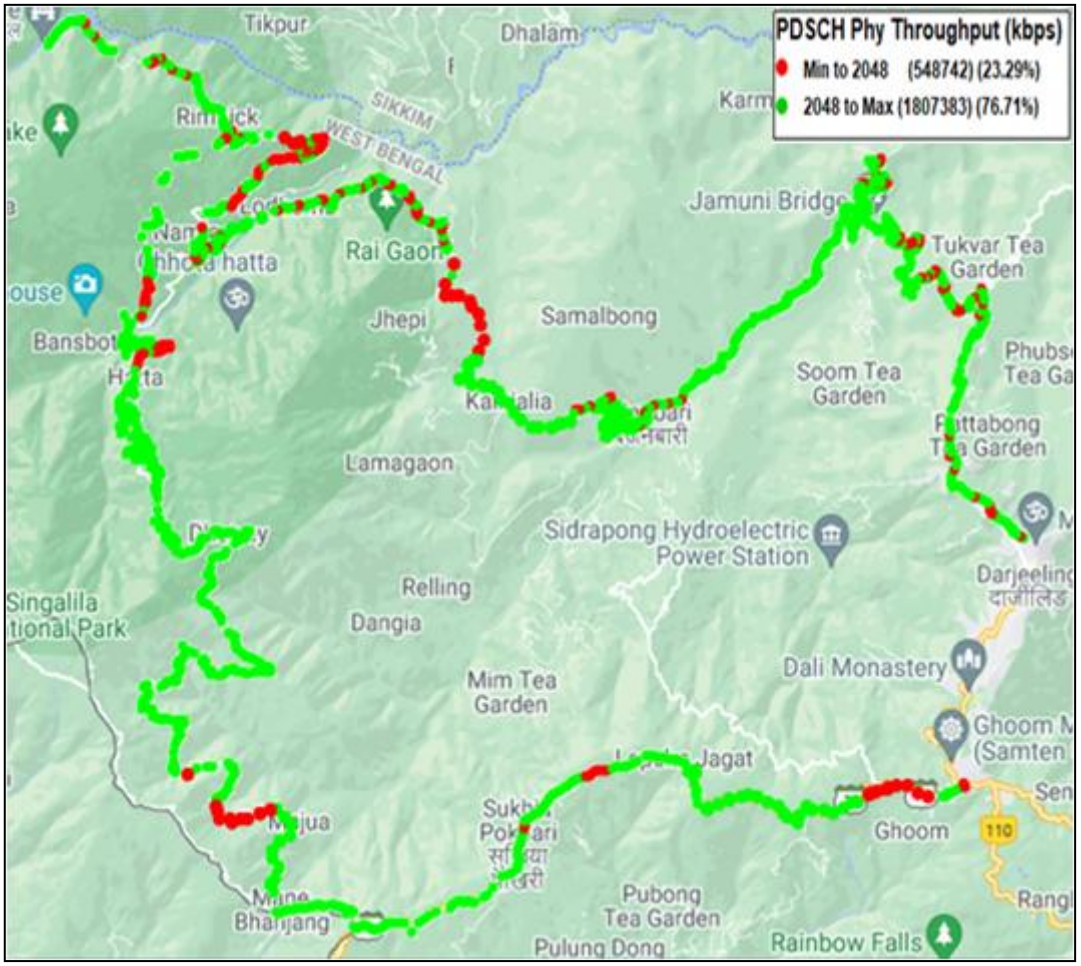
AVG. DOWNLOAD SPEED (Kbps)	73.85
% FILE TRANSFER COMPLETE	81.33
DL throughput	**Sample %**
0 to 50 Kbps	39.84
50 to 100 Kbps	47.23
100 to 200 Kbps	8.37
200 to 300 Kbps	4.52
>300 Kbps	0.04
Total	**100**

VIL

Dynamic Data Testing Complete 136 Kms

Data KPIs – Overall	4G
Average Download Throughput (Mbps)	18.67

4G



AVG. DOWNLOAD SPEED (Mbps)	18.67
% FILE TRANSFER COMPLETE	97.98
DL throughput	**Sample %**
0 to 1 Mbps	6.06
1 to 2 Mbps	17.23
2 to 5 Mbps	32.37
5 to 10 Mbps	30.15
>10 Mbps	14.19
Total	**100**