

Operator Assisted Drive Test Report

Darjeeling, Kalimpong & Siliguri

December 2021

(RO, Kolkata)

Key Performance Indicators (KPIs):

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

Airtel- Drop Call Rate in 2G & 4G, Rx Quality in 2G & 4G.

BSNL- Drop Call Rate in 2G & 3G, Block Call Rate & Call Setup Success Rate in 3G, Rx Quality in 2G & 3G.

RJIO- Drop Call Rate in 4G, Rx Quality in 4G.

VIL- Drop Call Rate in 2G, 3G & 4G, Rx Quality in 3G & 4G

The Operator Assisted Drive Test has been carried out by Regional Office, Kolkata with the help of Service Providers in Darjeeling, Kalimpong and Siliguri Cities and surrounding area for 3 days from 9:00 AM to 7:00 PM during 20th Dec. to 22nd Dec. 2021. The drive test covered drive route of 340 KMs over a period of 3 days. Approximately 320+ calls were made for each of the 8 networks: three 2G networks, two 3G network and three LTE network covering four TSPs.

Overview

Darjeeling is a city and a municipality in the Indian state of West Bengal. It lies in the Lesser Himalayas at an elevation of 2,000 metres (6,560 ft). It is noted for its tea industry, its scenic views of the world's third-highest mountain Kangchenjunga, and the Darjeeling Himalayan Railway, a narrow-gauge mountain railway. It is also a popular tourist destination in India..

Kalimpong is a town and a municipality in the Indian state of West Bengal. It is located at an average elevation of 1,250 metres (4,101 ft). The town is the headquarters of the Kalimpong district.

Siliguri is a major city in West Bengal that forms "Twin Cities" with the neighboring district capital of Jalpaiguri. The city spans areas of the Darjeeling and Jalpaiguri districts in the Indian state of West Bengal Known as the "*Gateway of Northeast 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.

Date: Download Throughputs and Data File Success Rate.

Video Call: Video secession disconnection and poor Video quality.

Voice Tests: Calls were made for 180 secs duration with wait time of 10 sec between call in all technologies. Three 2G (Lock Mode) networks, two 3G (Lock Mode) networks, Three LTE (Lock Mode) networks covering 4 unique TSPs were tested.

Data Tests: Dynamic Data Service Testing was performed along same route in all technologies. 500KB 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, Three LTE (Lock Mode) networks covering 4 unique TSPs were tested.

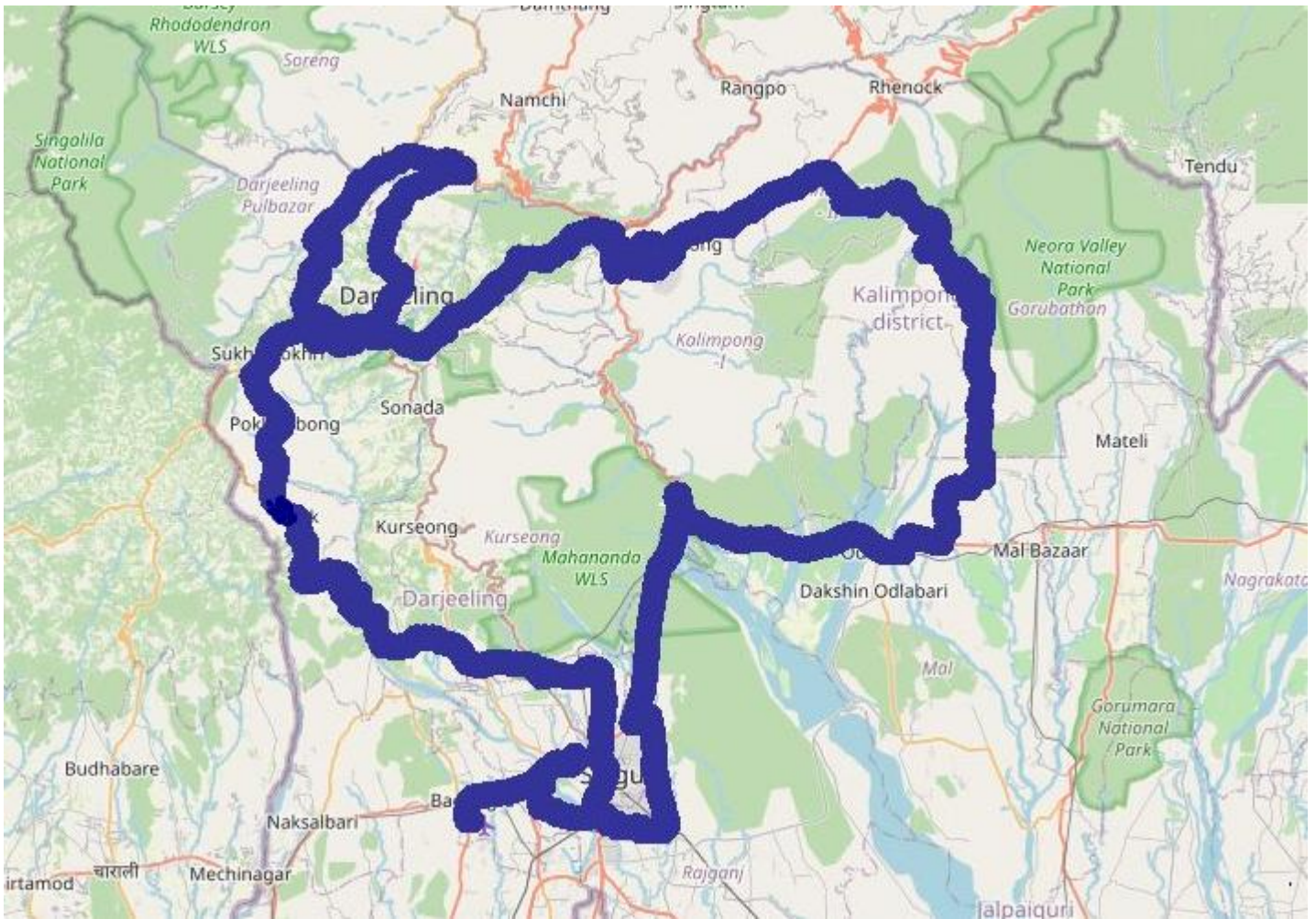
Video Call Tests: A Google meeting link was created for this OADT. All TSPs joined the Google meet link through their Handset and this online meeting was continued throughout the Drive Test. This online meeting was monitored by Advisor and other officials of RO Kolkata.

TRAI Myspeed App: Data download, Data Upload, Signal strength, Packet loss and Latency were measured through this App in the different locations on the drive test route.

Technology/ TSP	AIRTEL	BSNL	RJIO	VODAFONE-IDEA
2G	YES	YES	NO	YES
3G	NO	YES	NO	YES
4G	YES	NO	YES	YES
TOOL USED	TEMS	NIMO & TEMS	X-CAL	TEMS

Overview

Voice & Dynamic Data Test Drive Route



Data Service Test- Static Locations

Static Locations

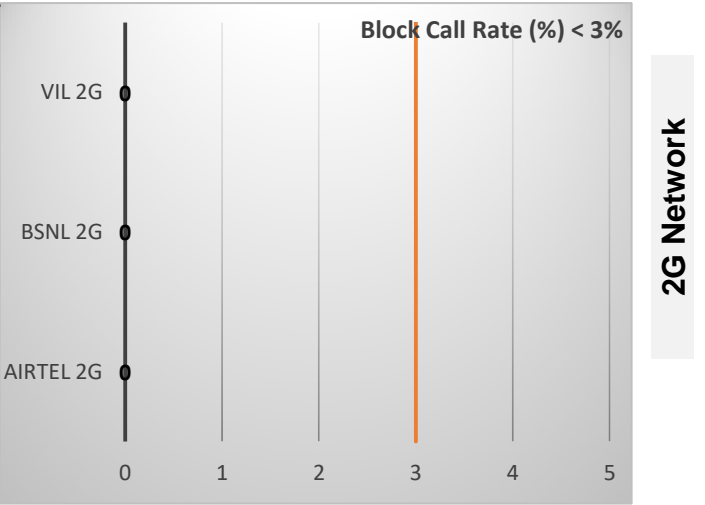
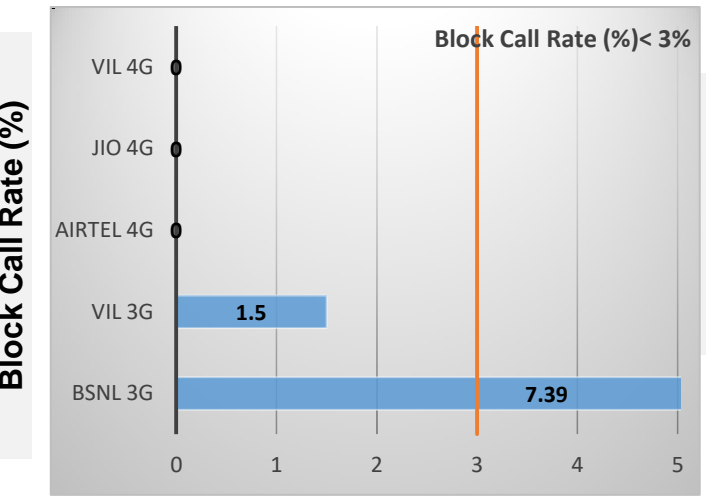
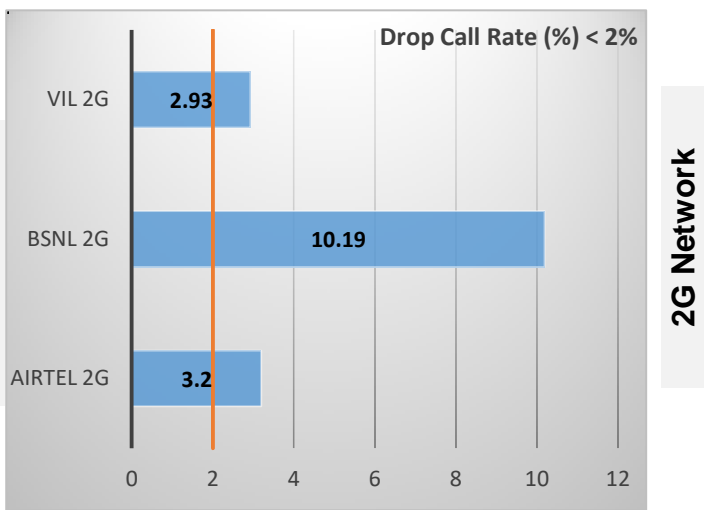
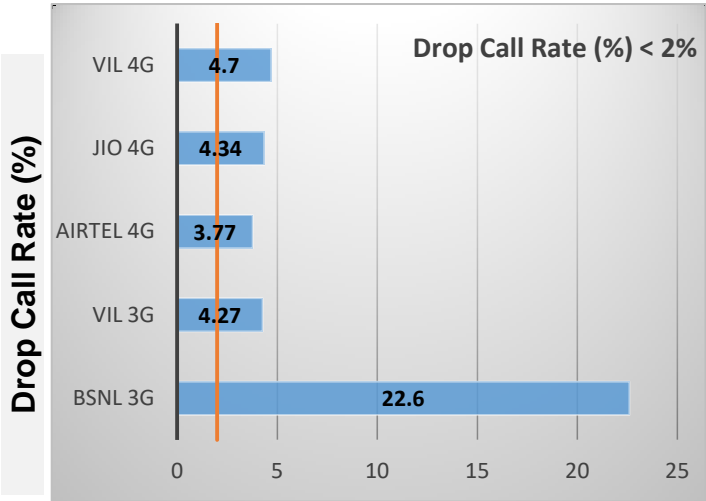
1. BAGDOGRA AIRPORT TAXI STAND	4. DARJEELING RAJBHAVAN
2. SUKNA ARMY CAMP	5. KALIMPONG DIST. HOSPITAL
3. MIRIK LAKE	6. ODLABARI

Service	Specifications
Download	2G (Locked) - 500KB, 3G (Dual) - 20 MB, 4G (Free) - 40 MB
Upload	2G (Locked) - 100KB, 3G (Dual) - 5 MB, 4G (Free) - 10 MB

Voice Calls

Key Observations

QoS compliance of the TSPs for Voice across technologies 2G/3G/4G-VoLTE:



KPIs	2G			3G		VoLTE		
	Airtel	BSNL	VIL	BSNL	VIL	Airtel	RJIO	VIL
Drop Call Rate %	3.20	10.19	2.93	22.6	4.27	3.77	4.34	4.70
Block Call Rate %	0	0	0	7.39	1.50	0	0	0

- a) All TSPs have not met the 2% QOS benchmark of Drop Call Rate (DCR%).
- b) All TSPs have met the Block Call Rate (BCR) of 3% except BSNL 3G..

Coverage

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

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	91.07	66.4	93.42

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

TSPs	3G		4G		
	BSNL	VIL	Airtel	JIO	VIL
Coverage %	46.03	56.64	89.97	95.47	82.80

Data Services Dynamic

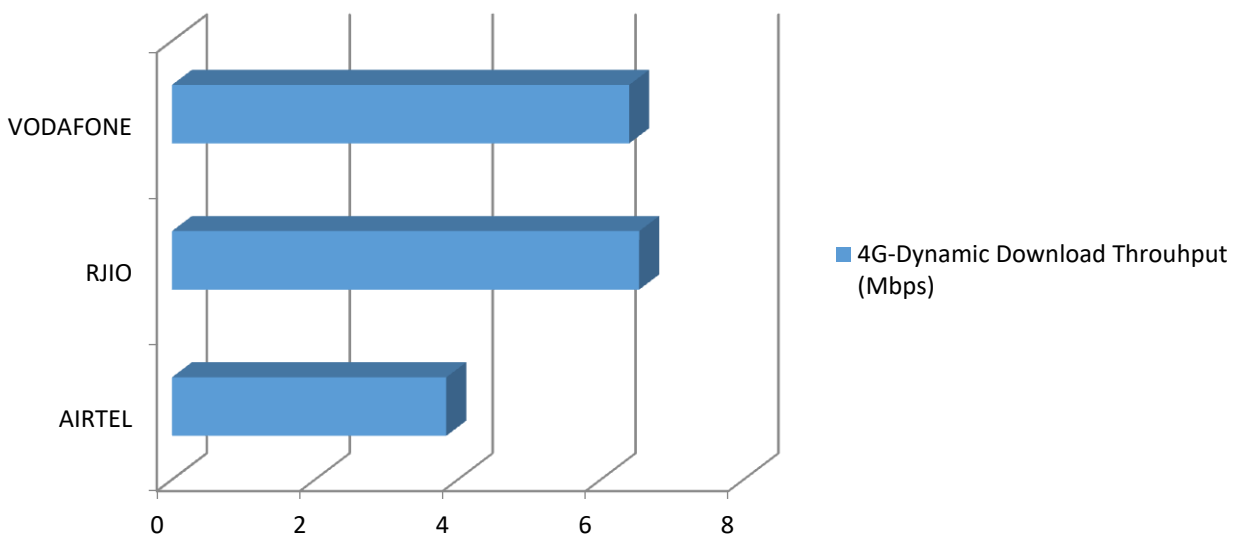
Key Observations

Dynamic Data was tested for 340 Kms. Download Throughput was tested.

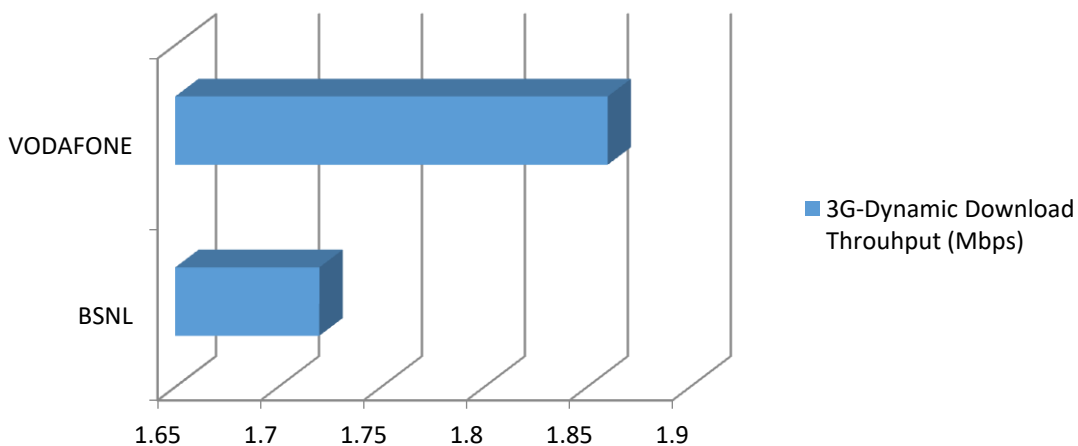
Data Download Performance (Average Throughput in Mbps) - Dynamic Data Testing

4G/3G/ Network:

4G-Dynamic Download Throughput (Mbps)



3G-Dynamic Download Throughput (Mbps)



LOCATION-	BAGDOGRA AIRPORT TAXI STAND			
TSP	AIRTEL -4G	RJIO -4G	VODAFONE-IDEA -4G	BSNL -3G
Download throughput in Mbps	21.23	14.39	8.46	2.59
Upload Throughput in Mbps	2.50	4.01	1.06	1.21

LOCATION-	SUKNA ARMY CAMP			
TSP	AIRTEL -4G	RJIO -4G	VODAFONE-IDEA -4G	BSNL -3G
Download throughput in Mbps	10.01	10.31	31.32	4.62
Upload Throughput in Mbps	6.50	1.94	27.38	1.49

LOCATION-	MIRIK LAKE			
TSP	AIRTEL -4G	RJIO -4G	VODAFONE-IDEA -4G	BSNL -3G
Download throughput in Mbps	9.71	8.14	35.82	1.48
Upload Throughput in Mbps	2.39	9.56	3.62	0.37

LOCATION-	DARJEELING RAJBHAVAN			
TSP	AIRTEL -4G	RJIO -4G	VODAFONE-IDEA -4G	BSNL -3G
Download throughput in Mbps	15.81	6.21	32.30	1.94
Upload Throughput in Mbps	1.12	15.39	7.30	0.46

LOCATION-	KALIMPONG DIST. HOSPITAL			
TSP	AIRTEL -4G	RJIO -4G	VODAFONE-IDEA -4G	BSNL -3G
Download throughput in Mbps	8.65	24.68	15.59	1.14
Upload Throughput in Mbps	1.50	9.85	13.95	1.37

LOCATION-	ODLABARI			
TSP	AIRTEL -4G	RJIO -4G	VODAFONE-IDEA -4G	BSNL -3G
Download throughput in Mbps	7.30	9.09	14.50	2.00
Upload Throughput in Mbps	1.70	31.59	9.14	1.17

Summary

City Level Summary-Voice

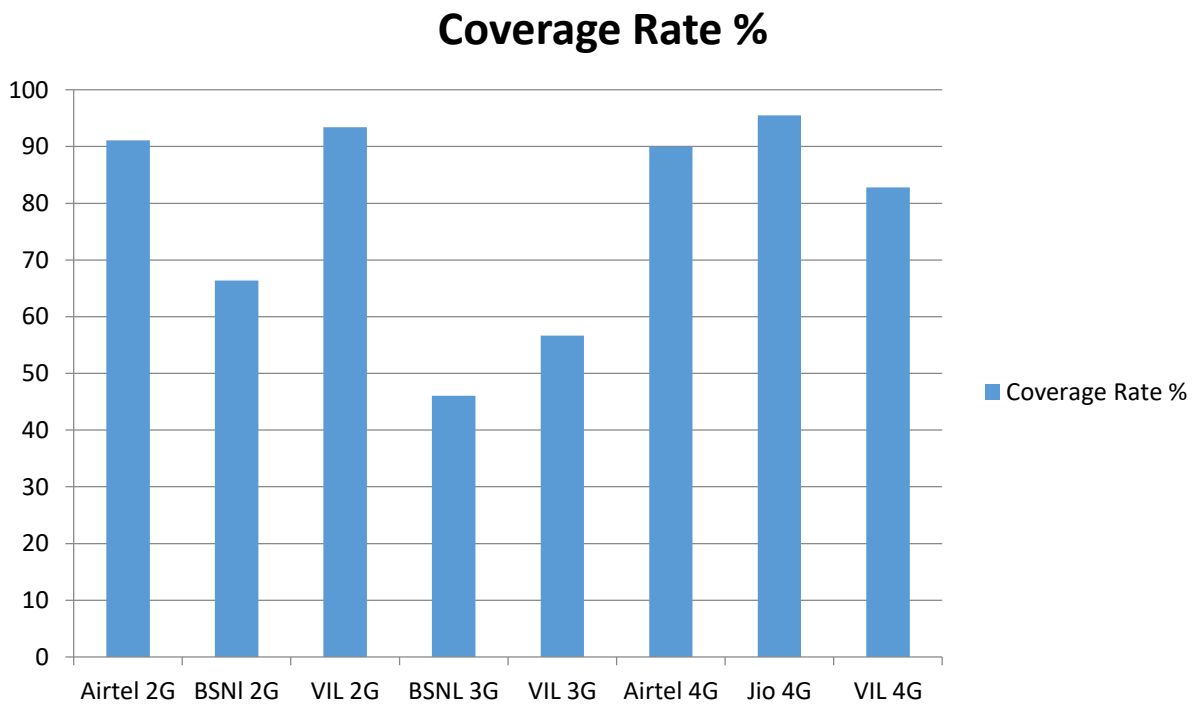
Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	316	304	410
Blocked Call Rate (%)	0	0	0
CSSR% (Accessibility)	98.43	98.02	100
Drop Call Rate (%)	3.20	10.19	2.93
Mobility HOSR (%)	100	90.32	97.43
Rx Quality (%)	82.83	86.95	97.41

Voice Call	3G/4G				
	BSNL 3G	VIL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	373	333	330	254	319
Blocked Call Rate (%)	7.39	1.50	0	0	0
CSSR% (Accessibility)	92.5	98.50	98.79	96.45	100
Drop Call Rate (%)	22.6	4.27	3.77	4.34	4.70
Mobility HOSR (%)	100	99.45	100	97.56	97.83
Rx Quality (%)	74.53	76.75	82.29	86.18	87.60

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	91.07
BSNI 2G	66.4
VIL 2G	93.42
BSNL 3G	46.03
VIL 3G	56.64
Airtel 4G	89.97
Jio 4G	95.47
VIL 4G	82.80

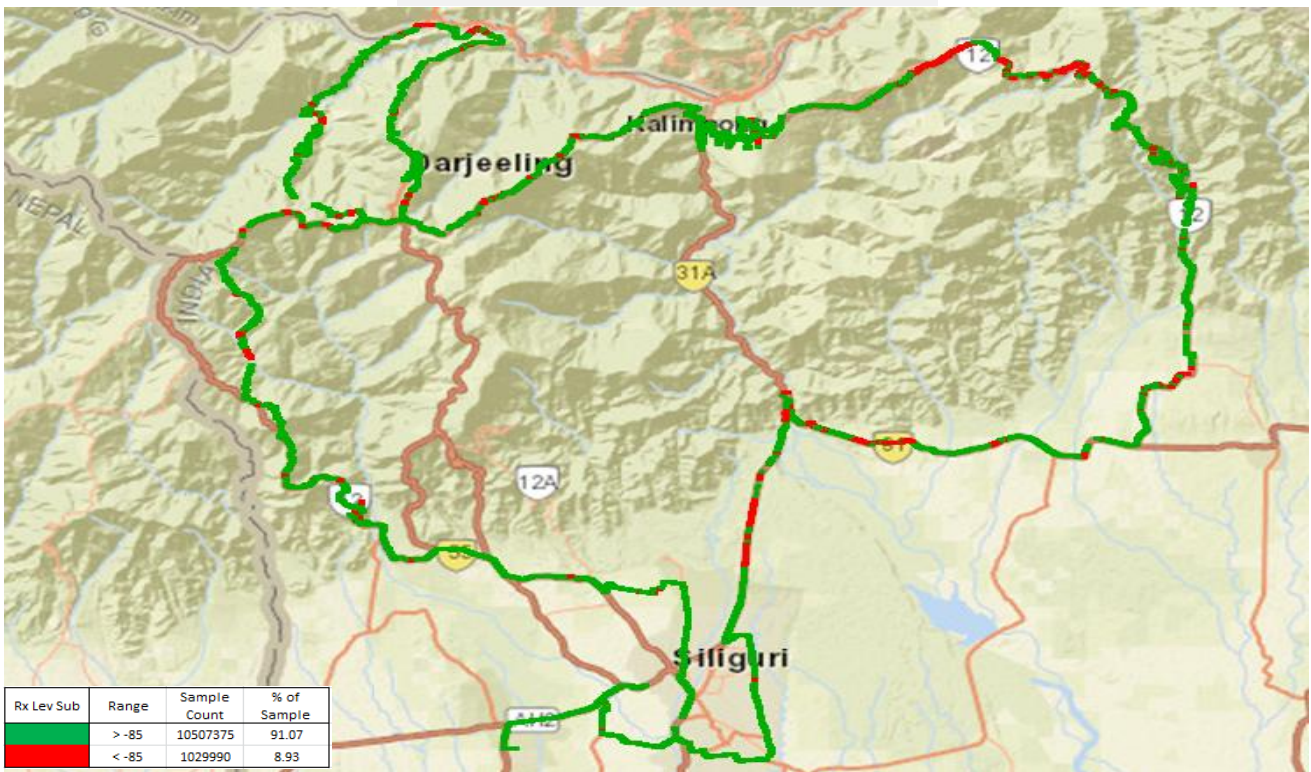


I. Coverage Details

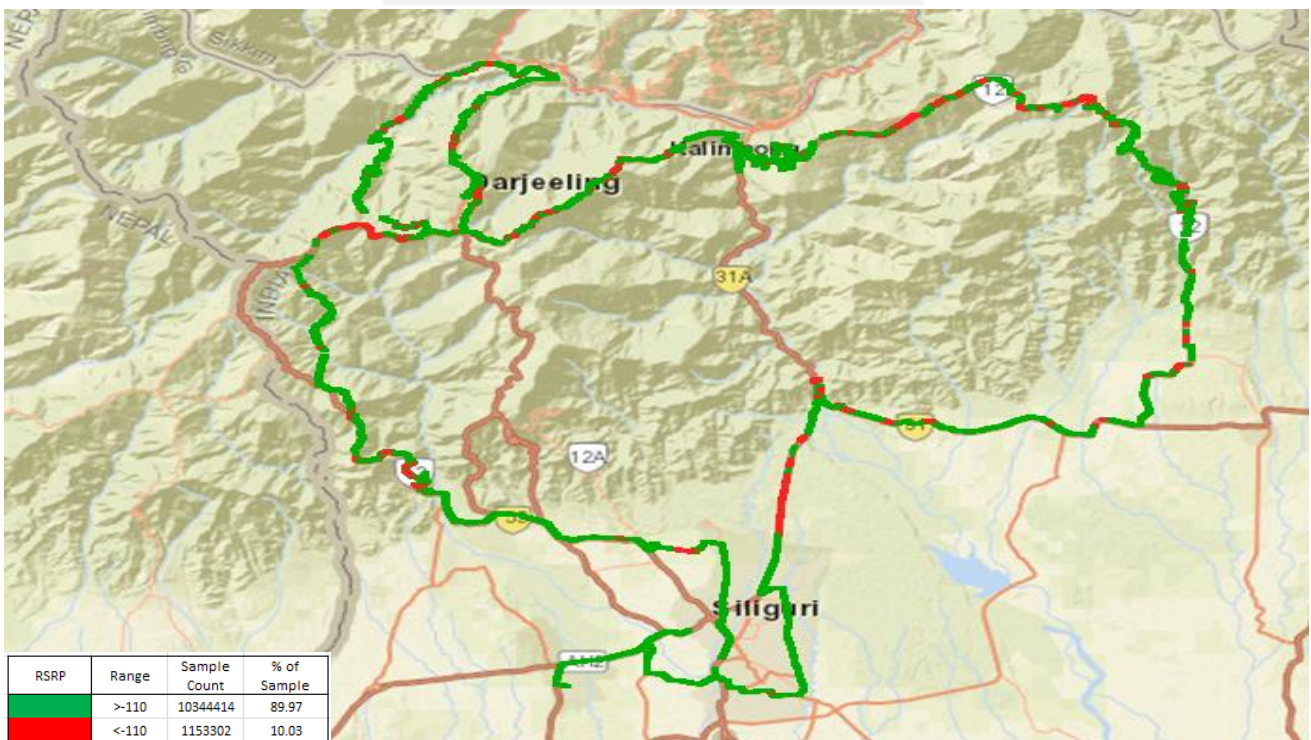
AIRTEL

Technology	Coverage Rate %
2G	91.07
4G	89.97

2G



4G

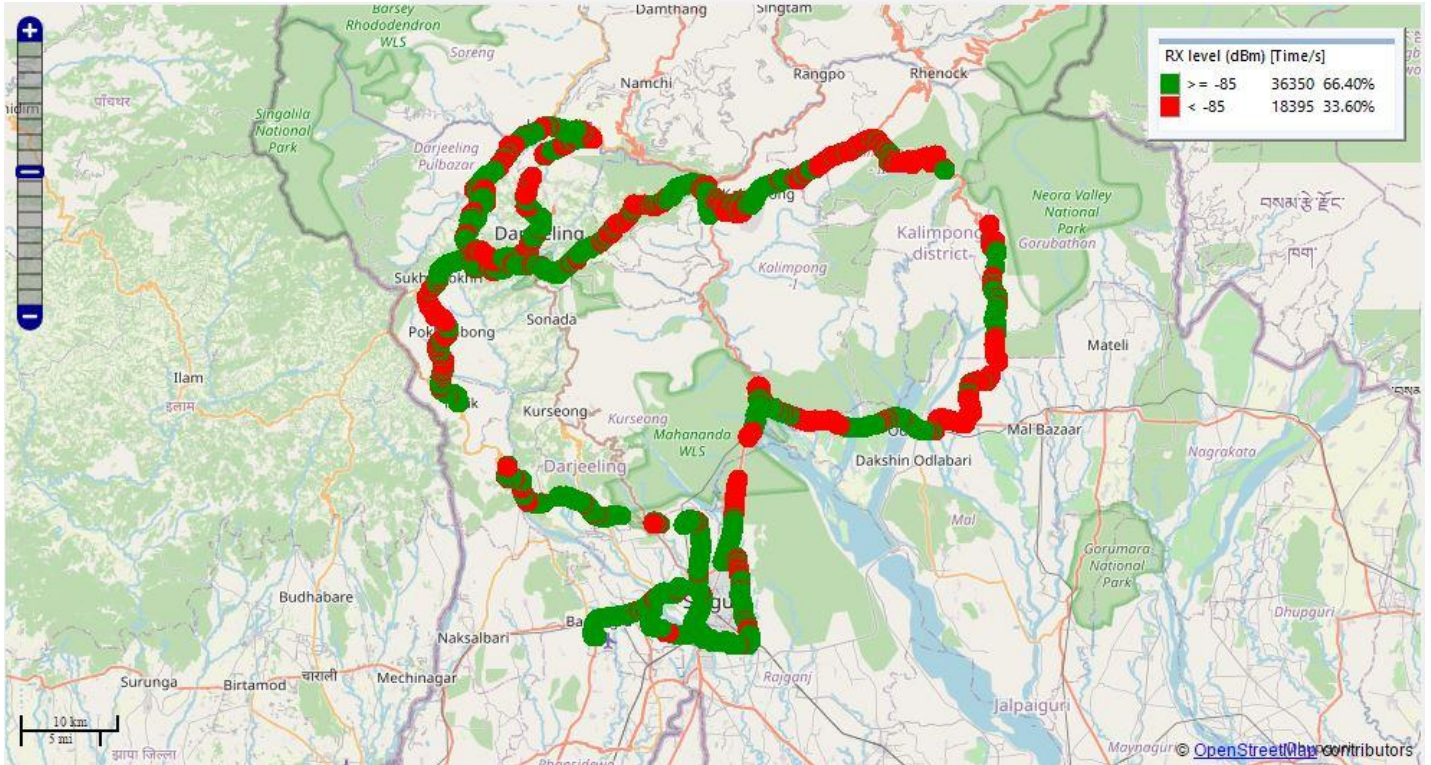


I. Coverage Details

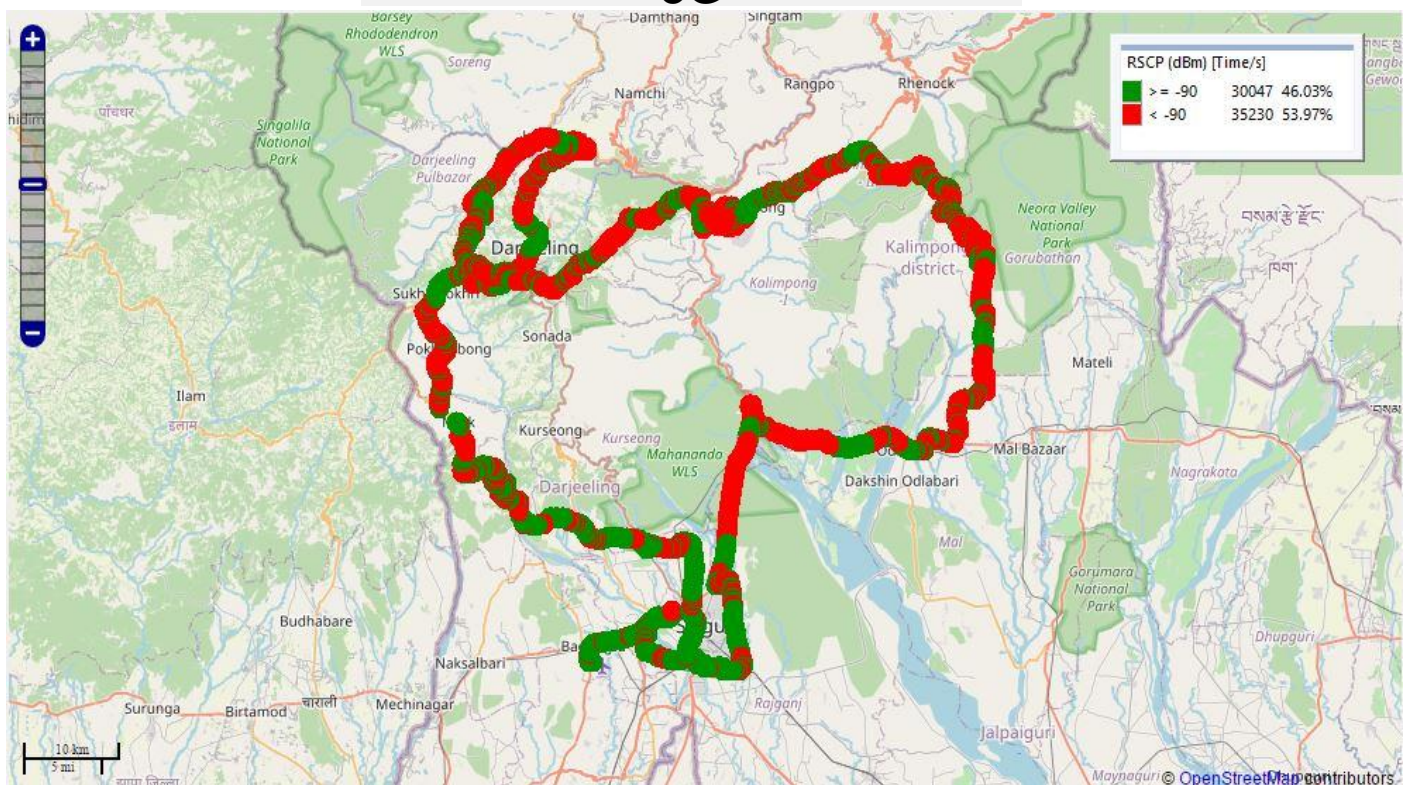
BSNL

Technology	Coverage Rate %
2G	66.40
3G	46.03

2G



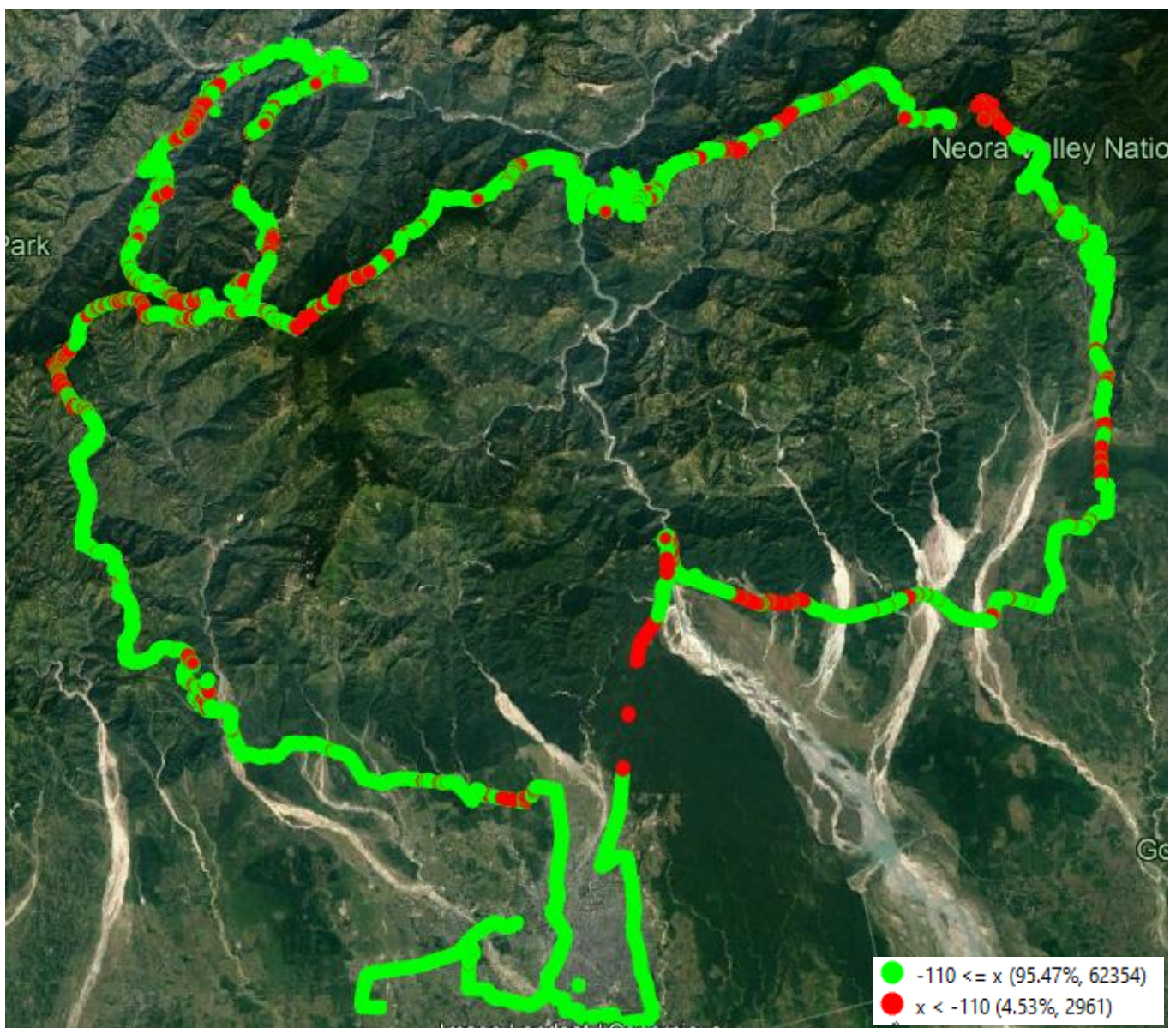
3G



I. Coverage Details

JIO

Technology	Coverage Rate %
4G	95.47

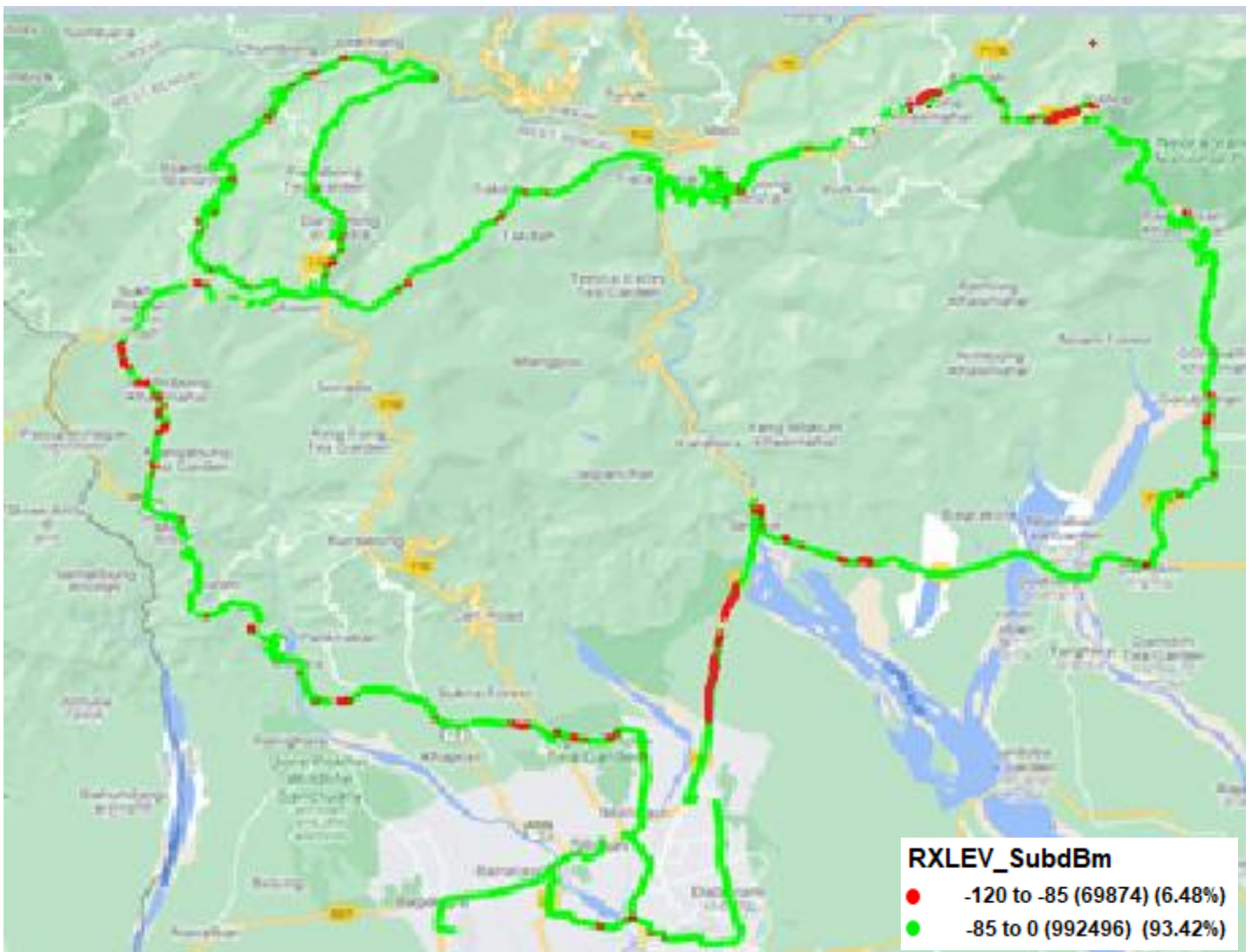


I. Coverage Details

VIL

Technology	Coverage Rate %
2G	93.42

2G

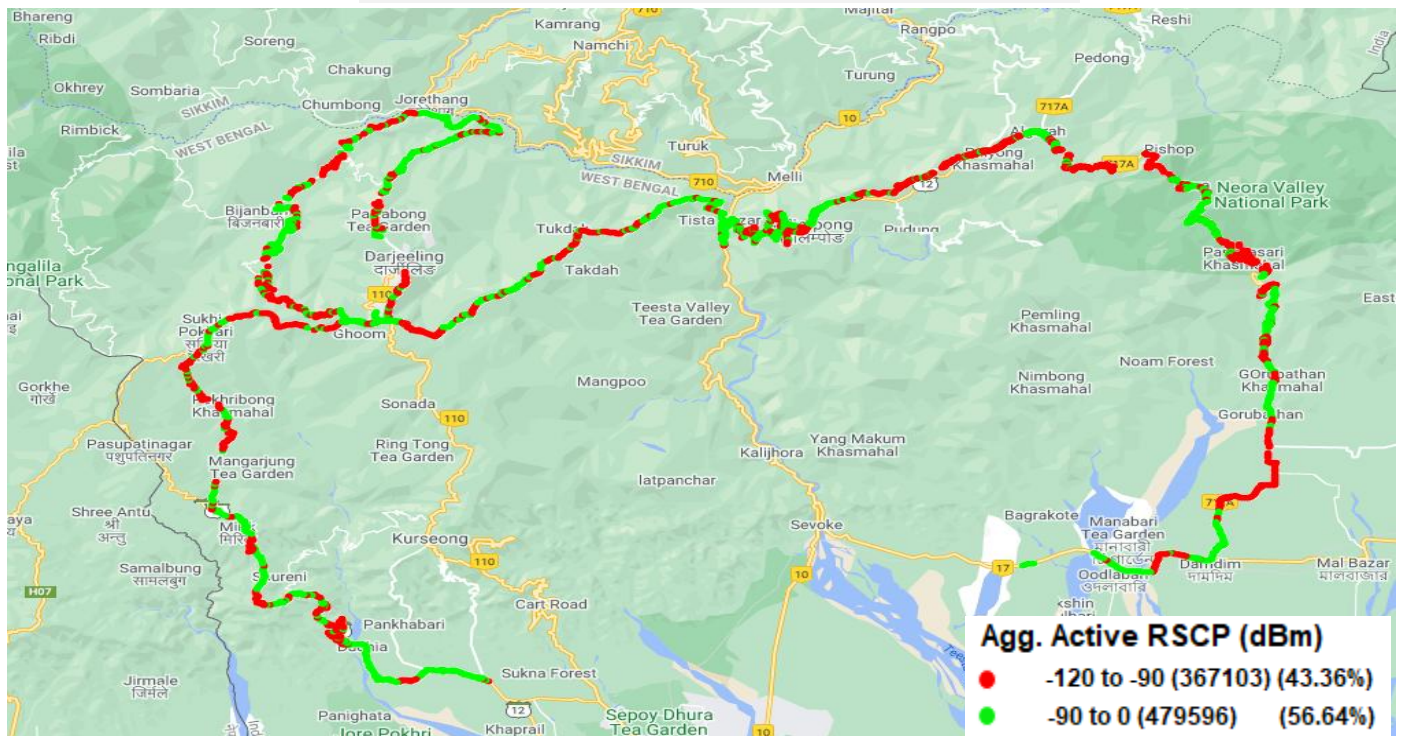


I. Coverage Details

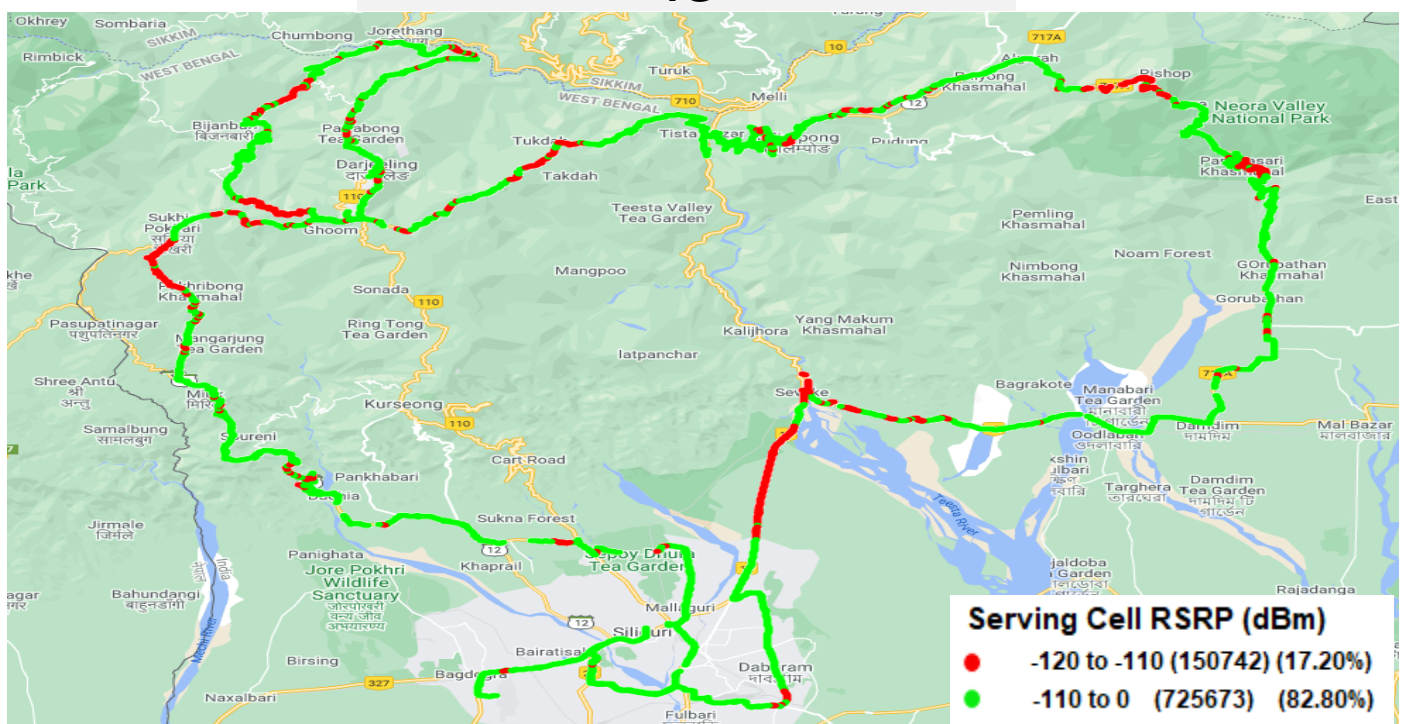
VIL

Technology	Coverage Rate %
3G	56.64
4G	82.80

3G



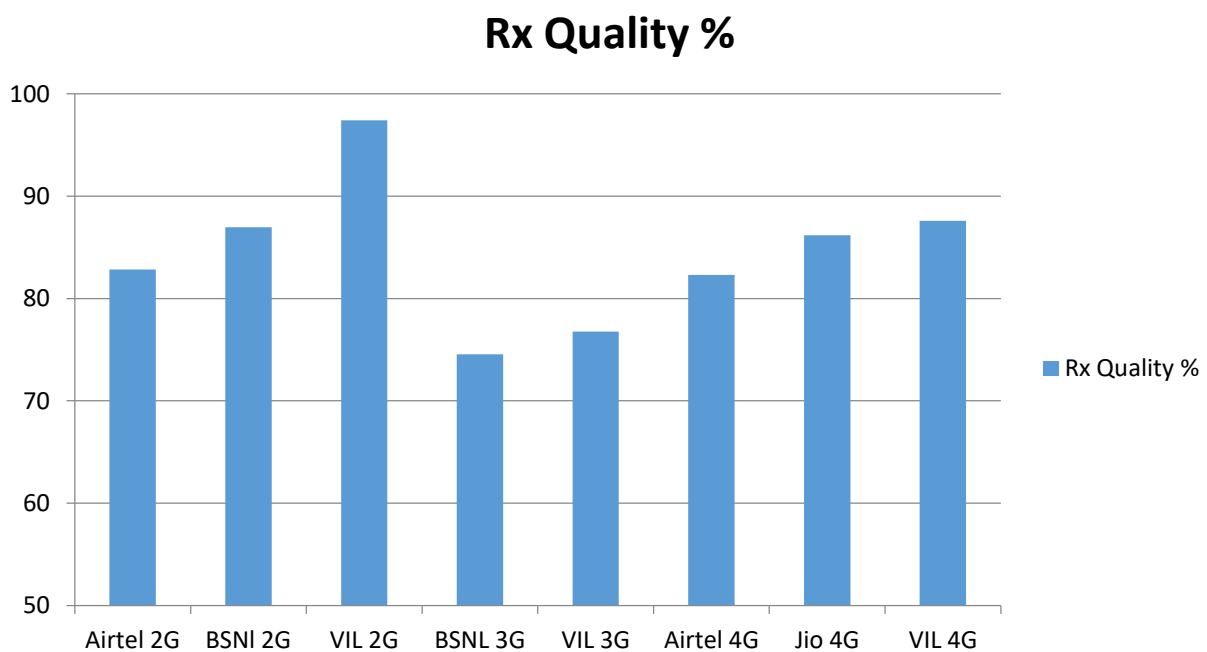
4G



II. Quality Details

For measuring voice quality, as per the QoS norms, RxQual ≤ 5 for GSM TSPs, EcNo ≥ -14 dBm for 3G TSP 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 $\geq 95\%$.

TSP	Rx Quality %
Airtel 2G	82.83
BSNI 2G	86.95
VIL 2G	97.41
BSNL 3G	74.53
VIL 3G	76.75
Airtel 4G	82.29
Jio 4G	86.18
VIL 4G	87.60

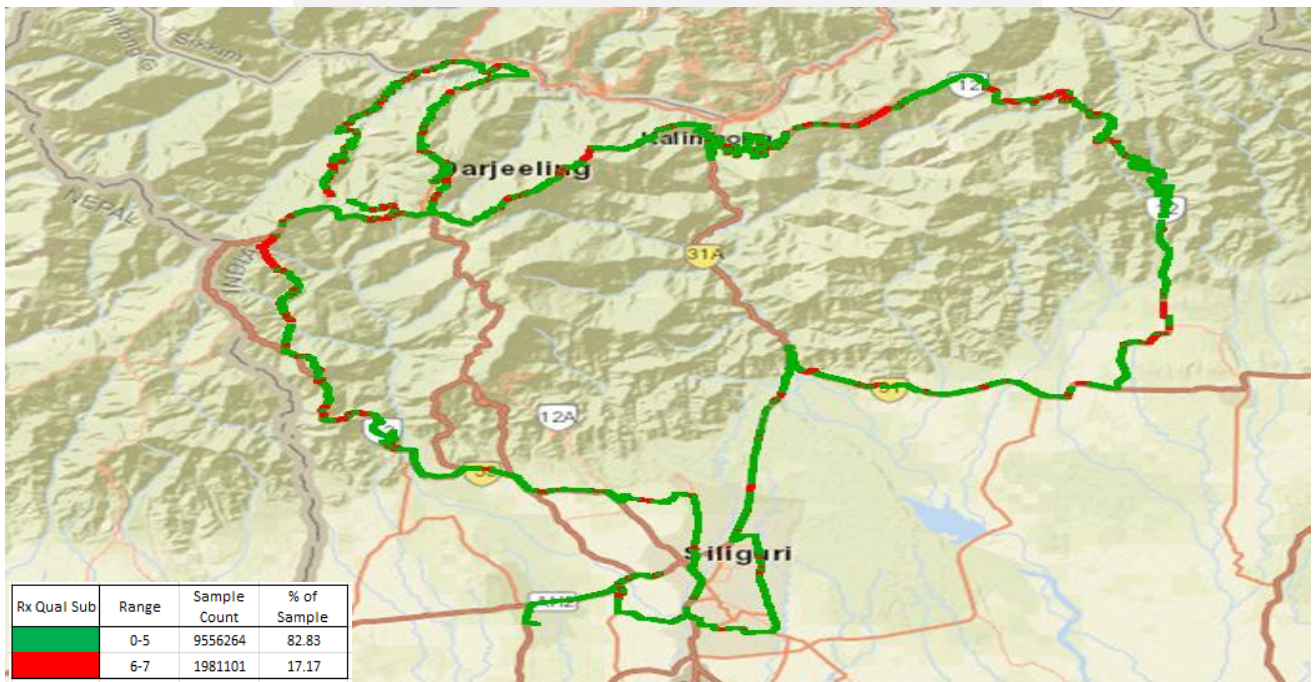


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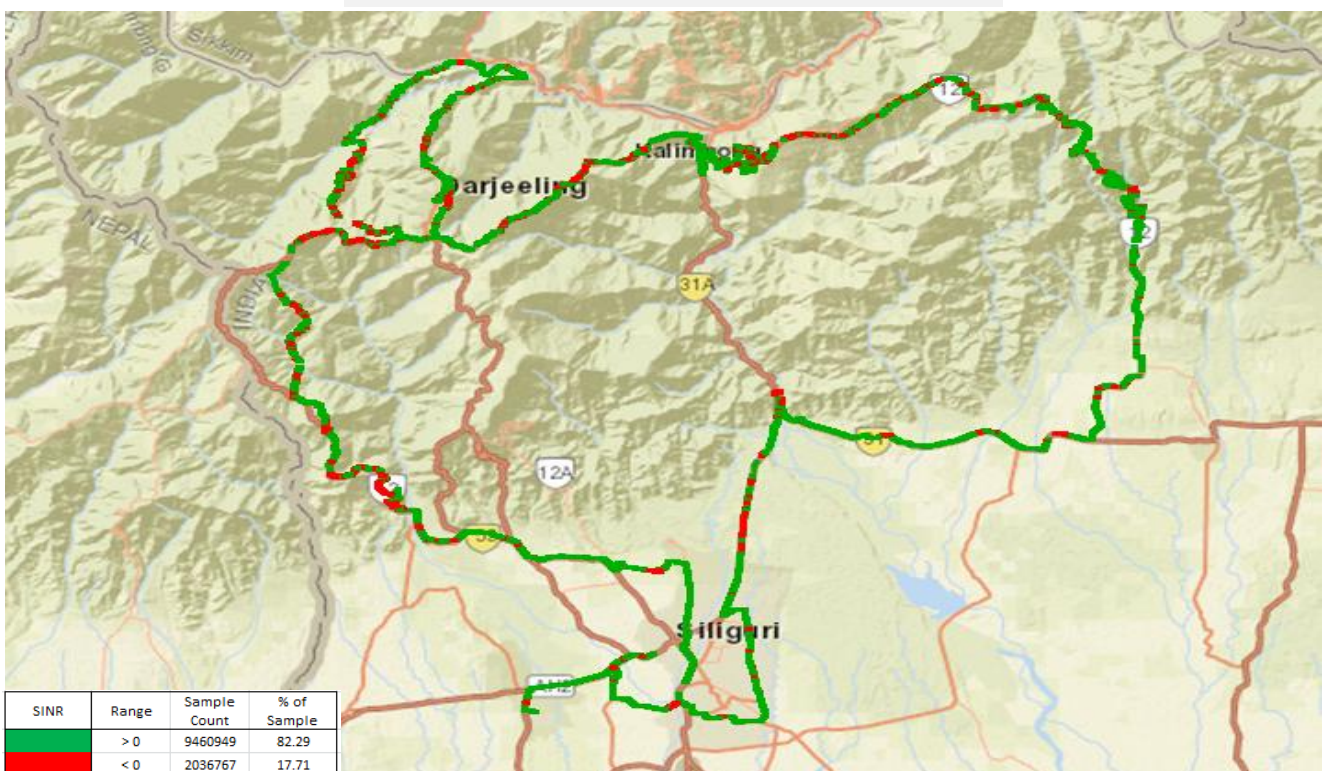
Airtel

Technology	Rx Quality %
2G	82.83
4G	82.29

2G



4G

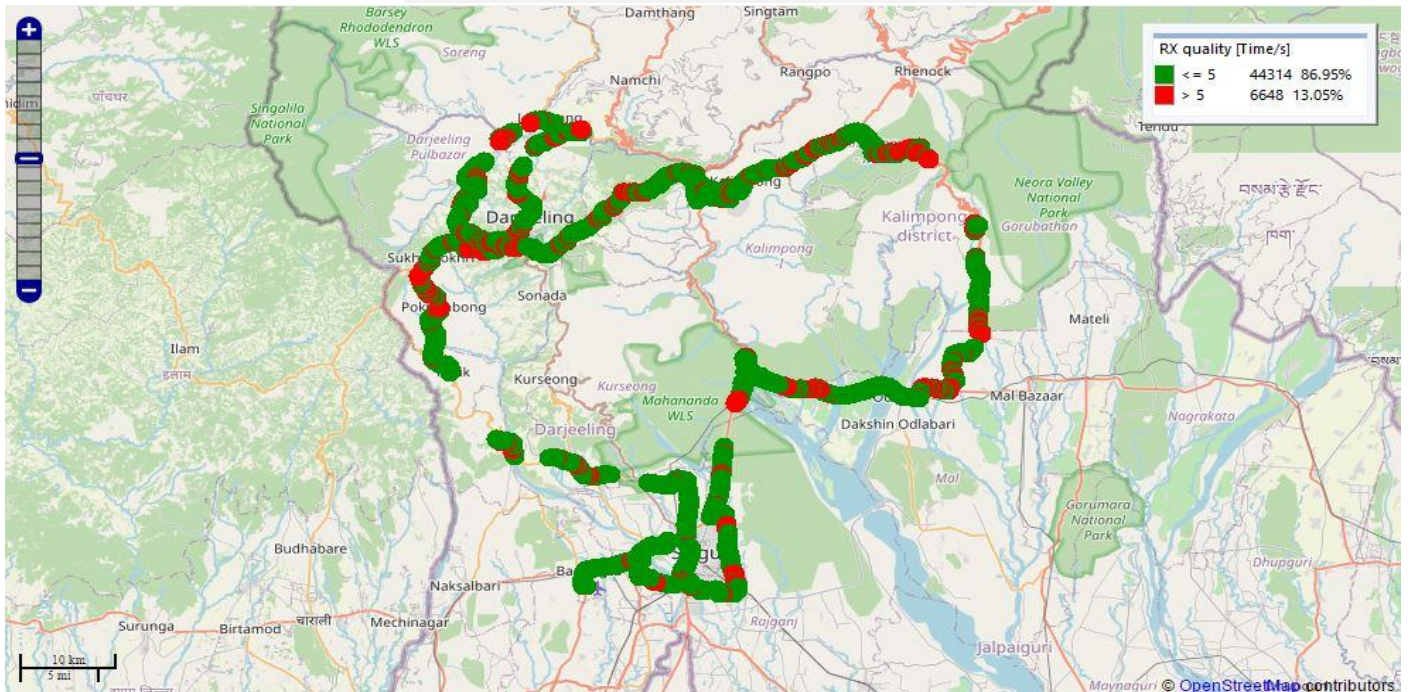


II. Quality Details

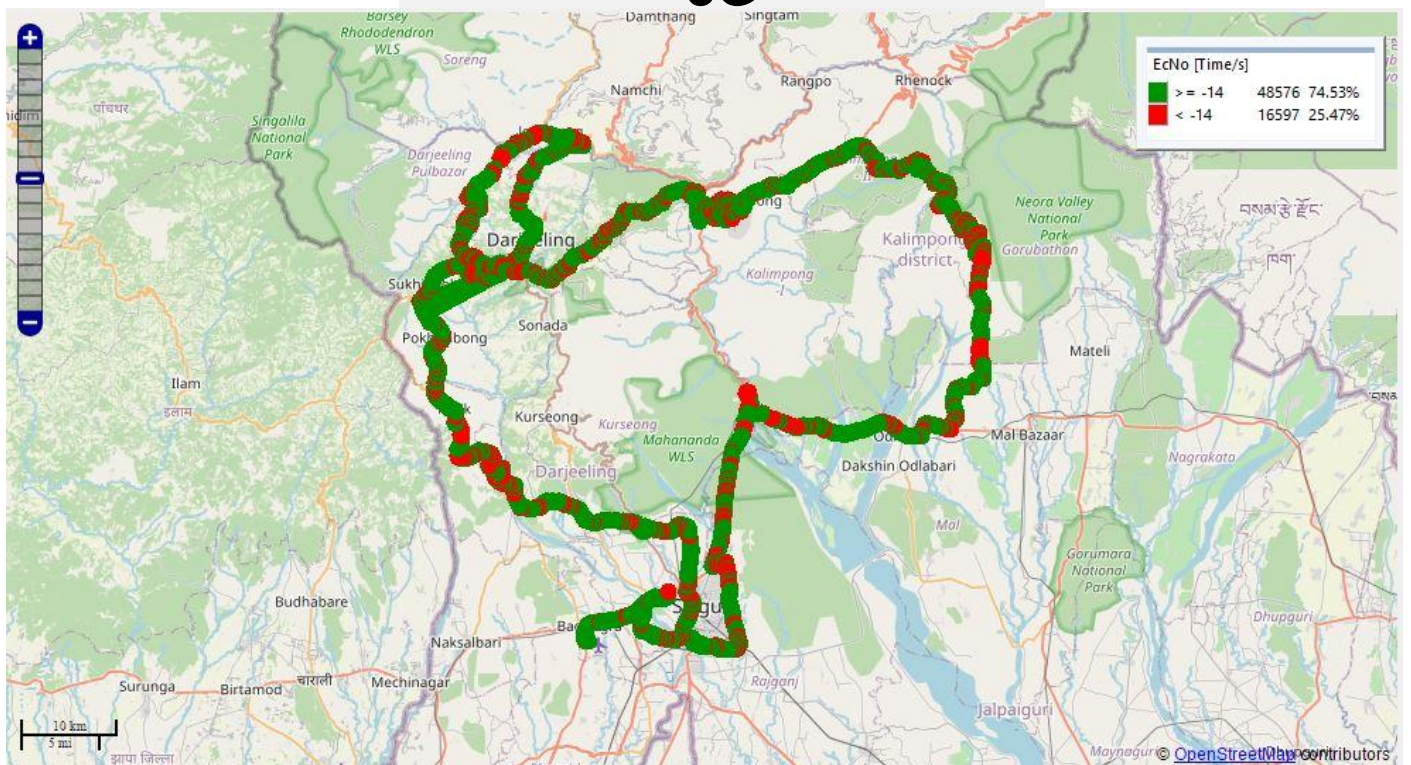
BSNL

Technology	Rx Quality %
2G	86.95
3G	74.53

2G



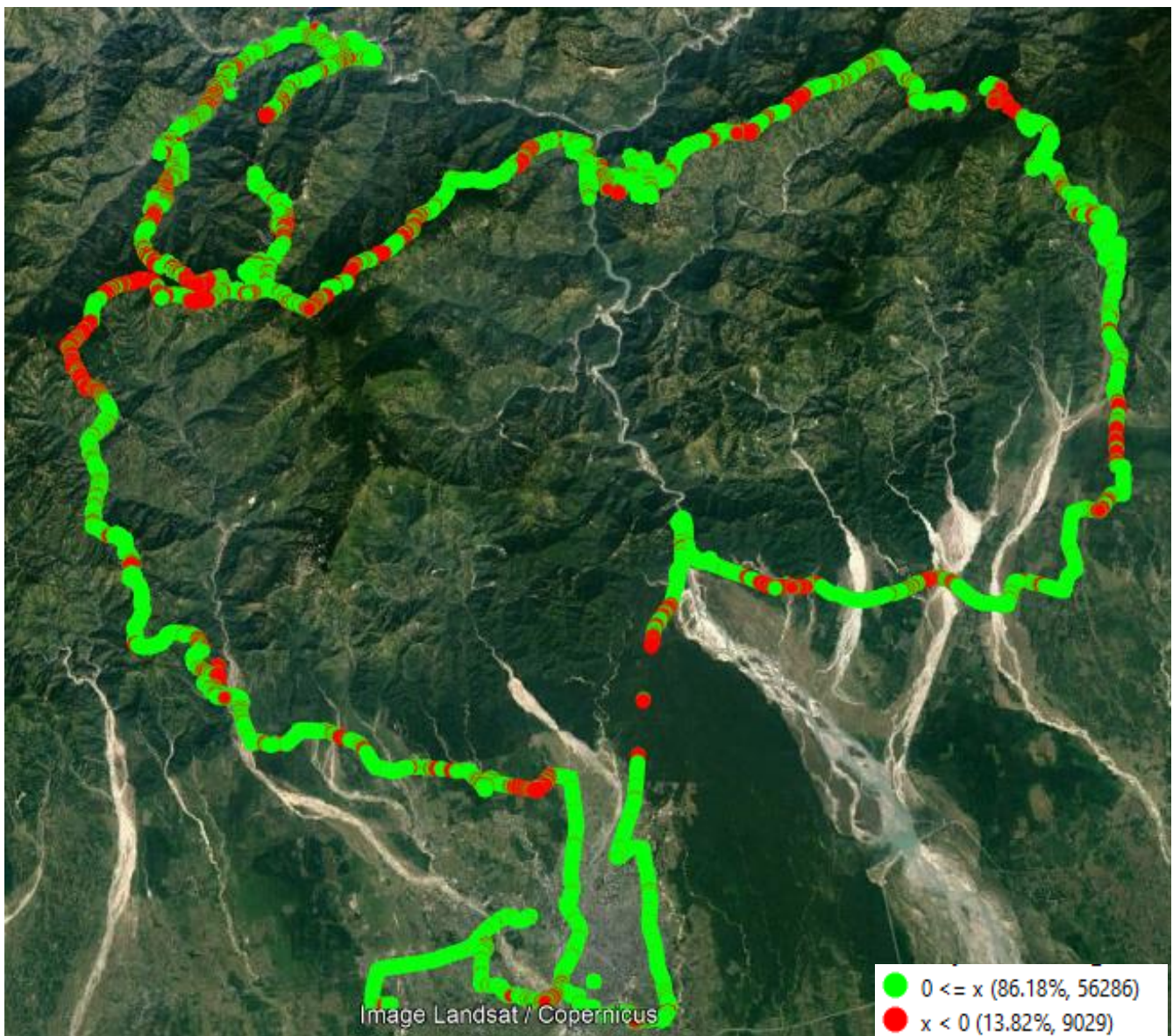
3G



II. Quality Details

JIO

Technology	Rx Quality %
VoLTE	86.18

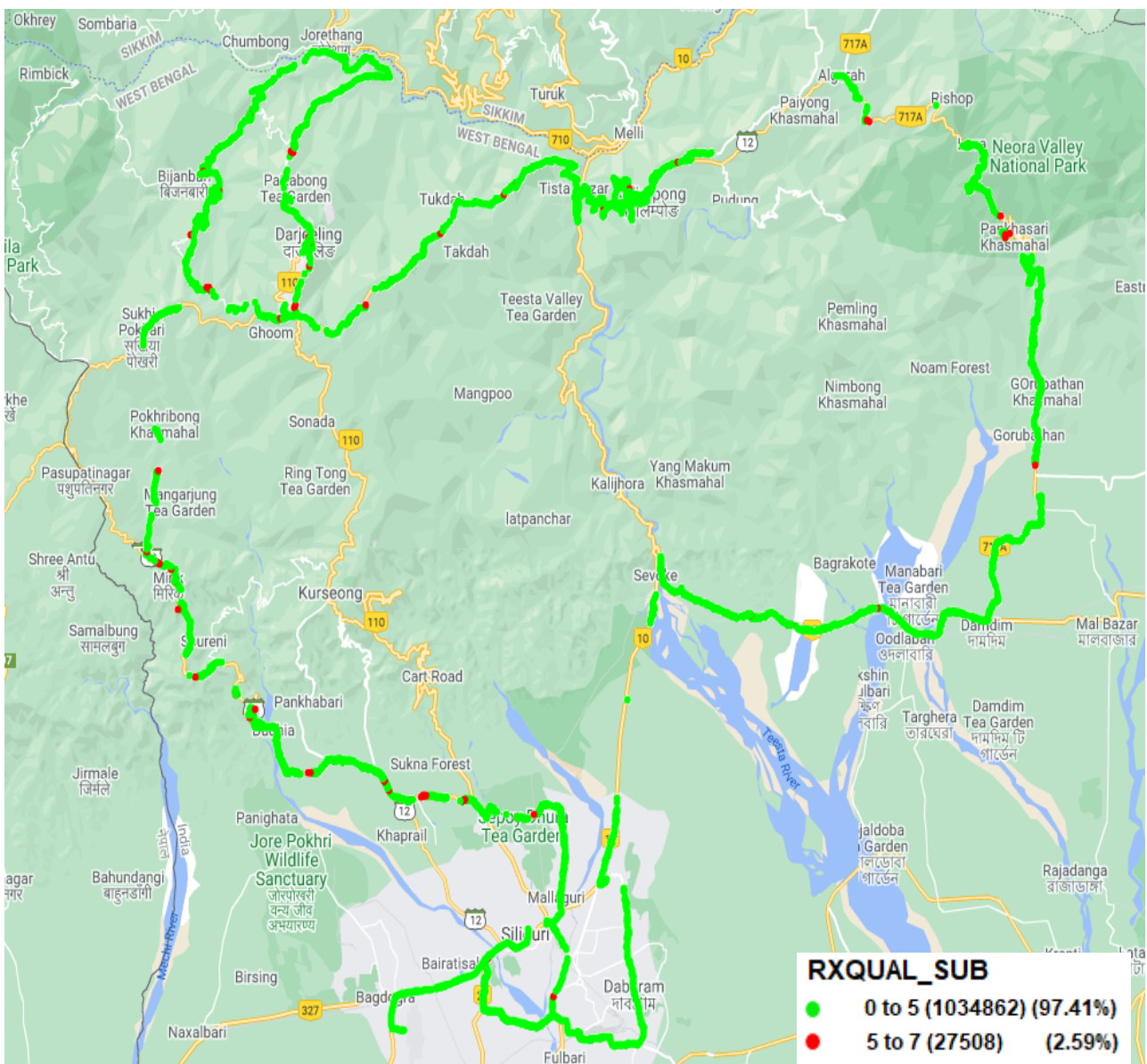


II. Quality Details

VIL

Technology	Rx Quality %
2G	97.41

2G

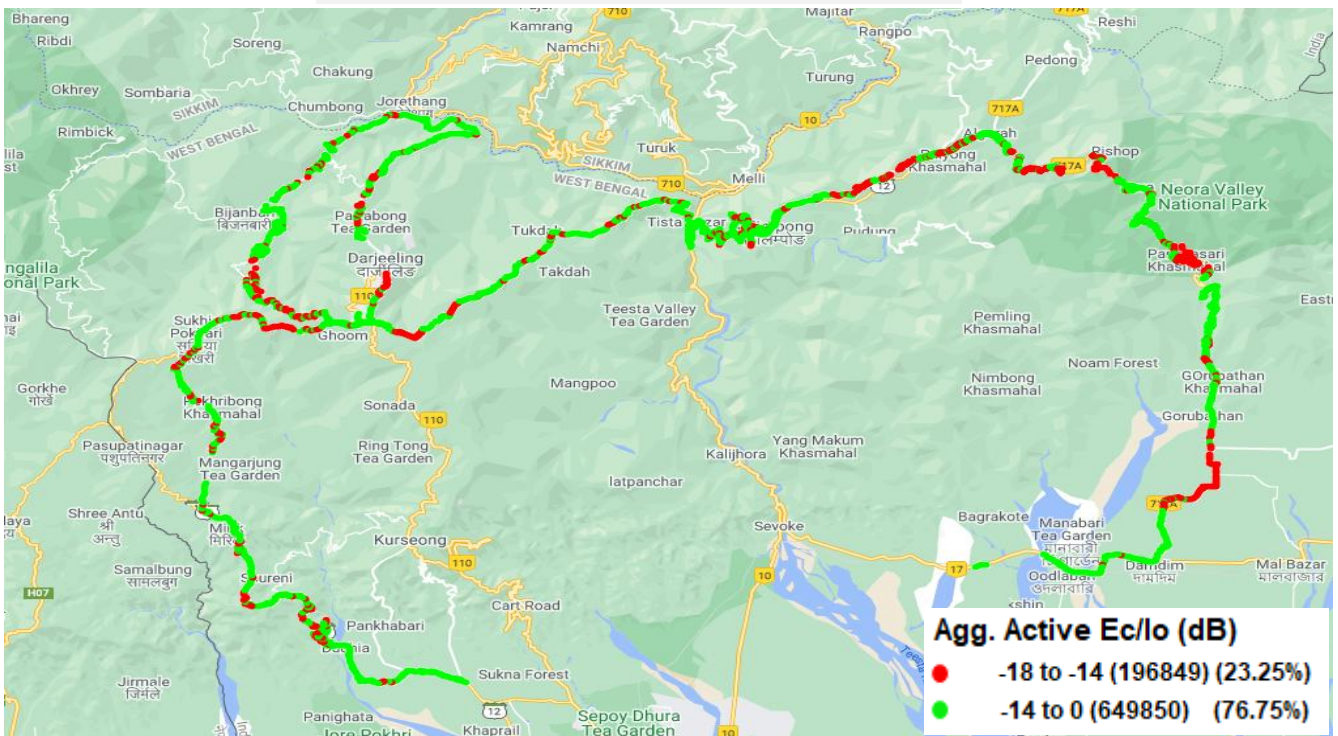


II. Quality Details

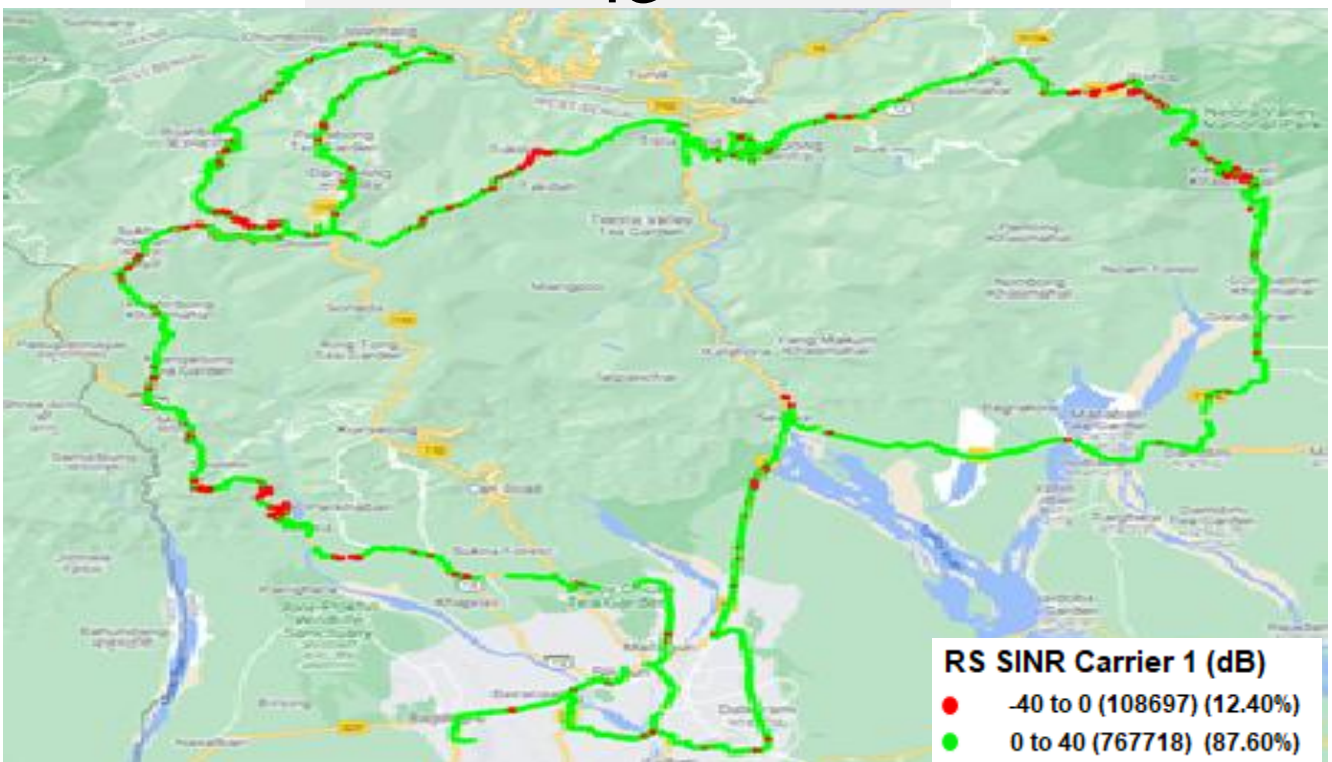
VIL

Technology	Rx Quality %
3G	76.75
4G	87.60

3G



4G

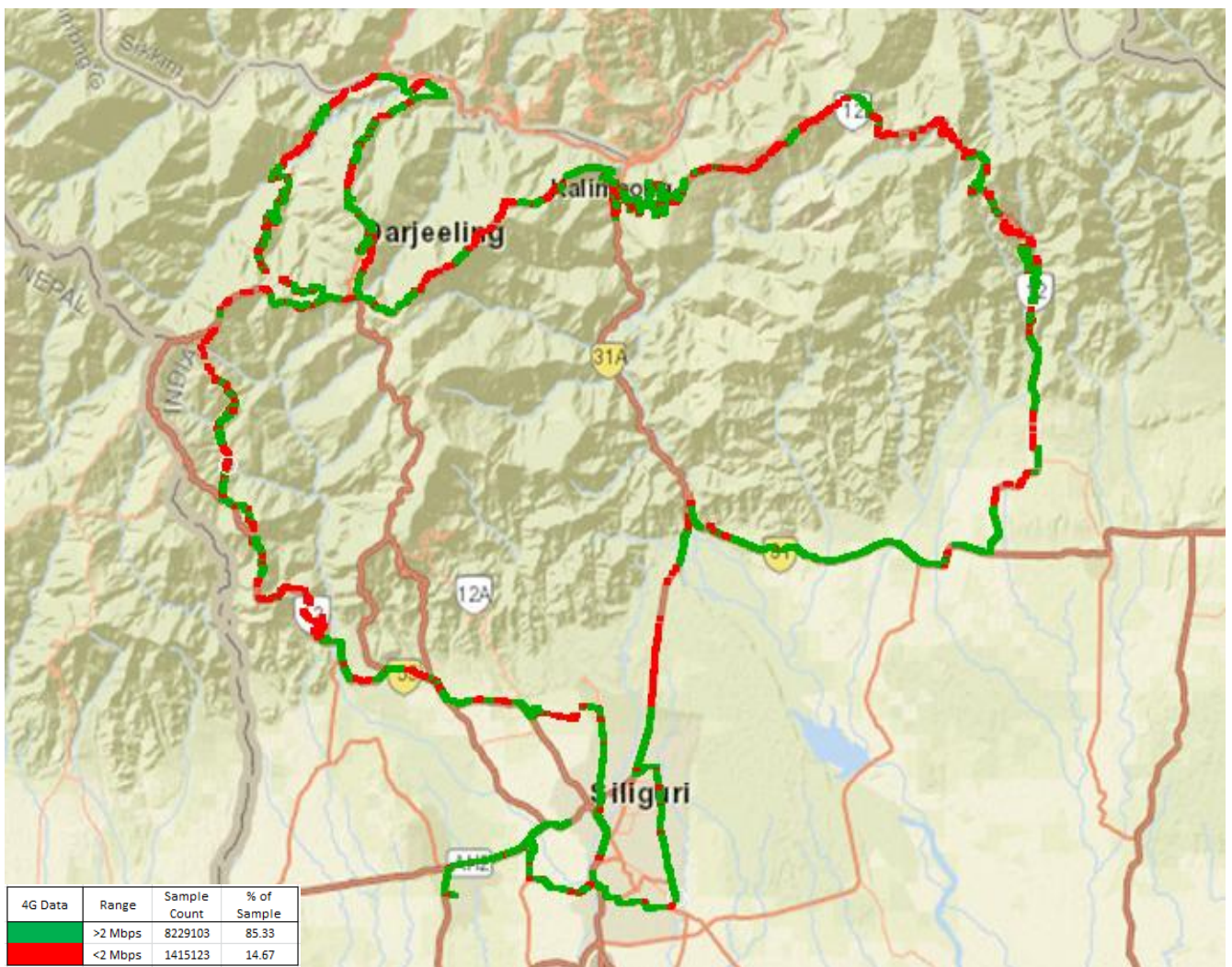


IV. Dynamic Data Test- 4G DL Details

Airtel

Data Statistics - Dynamic Complete 340 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	3.84



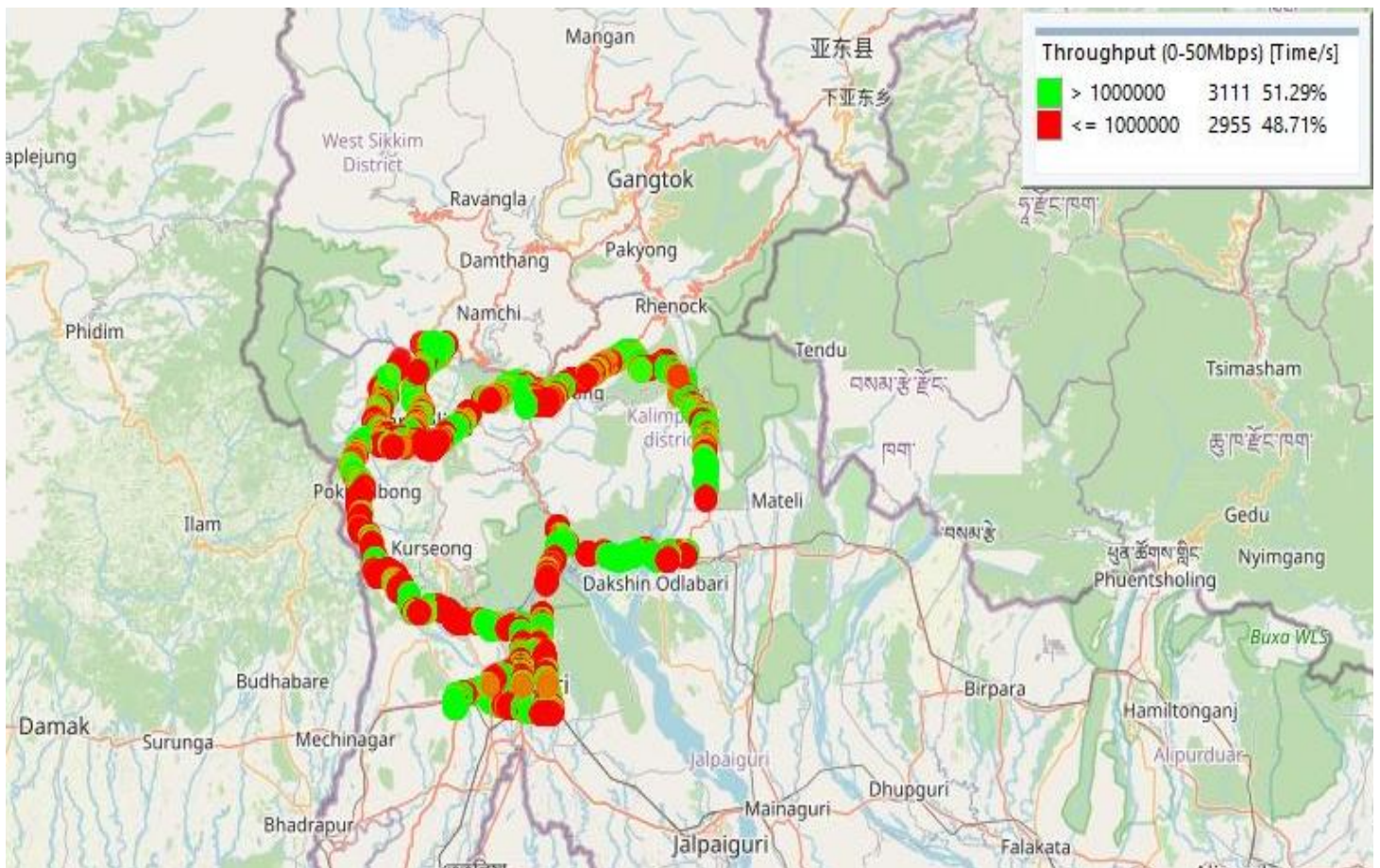
TSPS	AIRTEL
AVG. SPEED Mbps	3.84
NO. OF SAMPLES > 2 Mbps%	85.33
FILE DOWNLOAD SUCCESS RATE%	93.13

IV. Dynamic Data Test- 3G DL Details

BSNL

Data Statistics - Dynamic Complete 340 Kms

Data KPIs - Overall	3G
Average Download Throughput (Mbps)	1.72



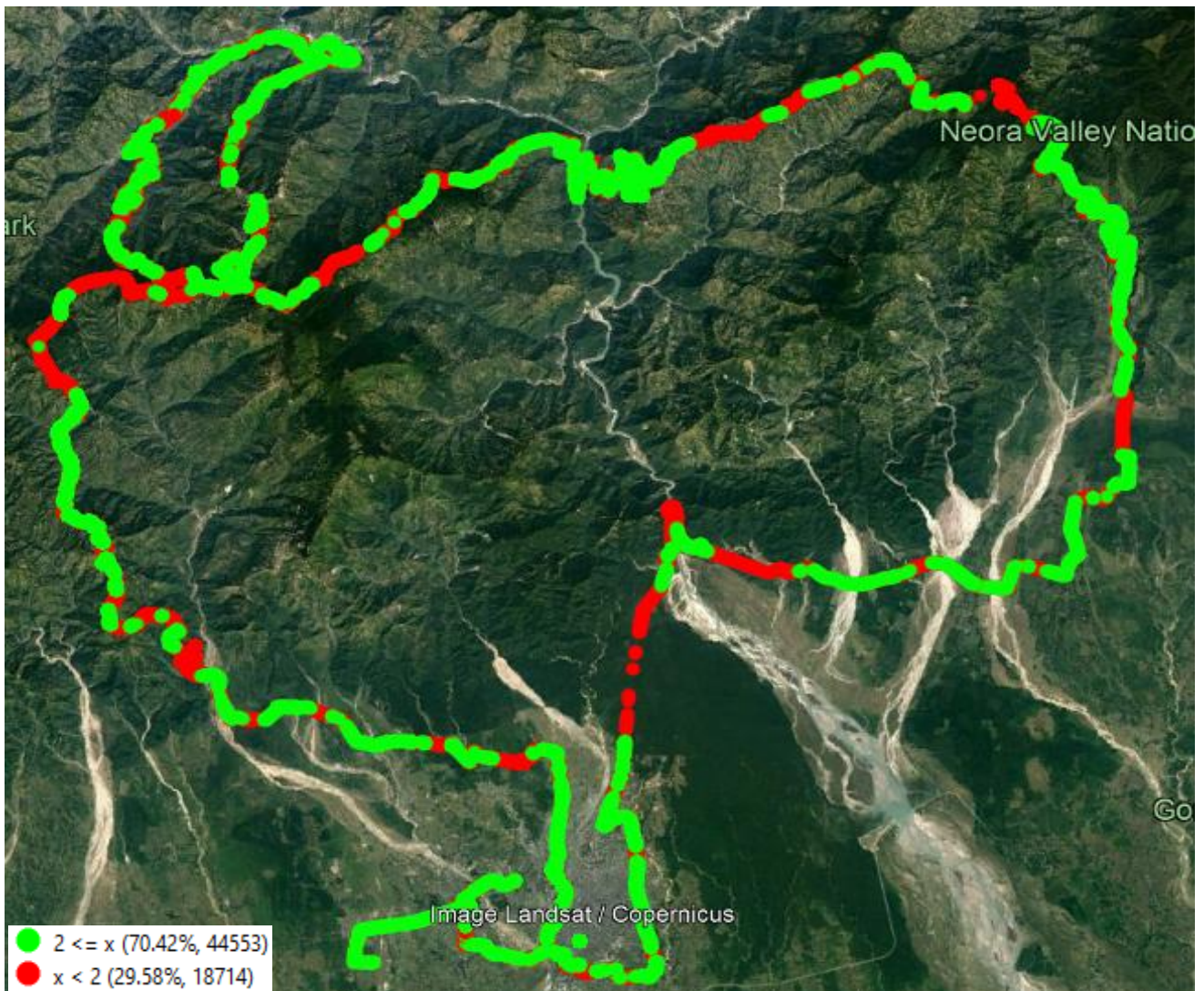
TSPS	BSNL
AVG. SPEED Mbps	1.72
NO. OF SAMPLES > 1 Mbps%	51.29
FILE DOWNLOAD SUCCESS RATE%	74.72

IV. Dynamic Data Test- 4G DL Details

Jio

Data Statistics - Dynamic Complete 340 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	6.54



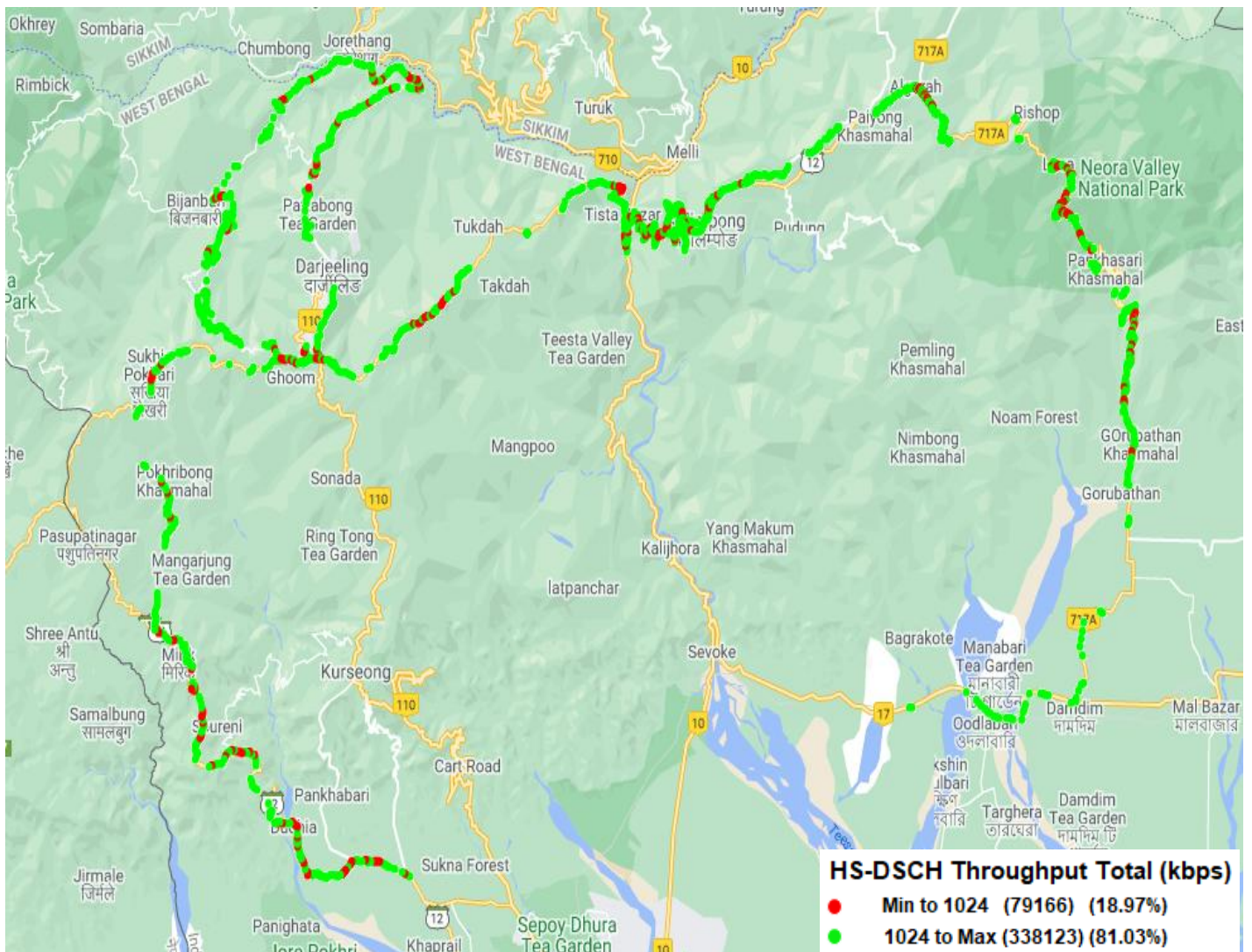
TSPS	JIO
AVG. SPEED Mbps	6.54
NO. OF SAMPLES > 2 Mbps%	70.42
FILE DOWNLOAD SUCCESS RATE%	100

IV. Dynamic Data Test- 4G DL Details

VIL

Data Statistics - Dynamic Complete 340 Kms

Data KPIs - Overall	3G
Average Download Throughput (Mbps)	1.86



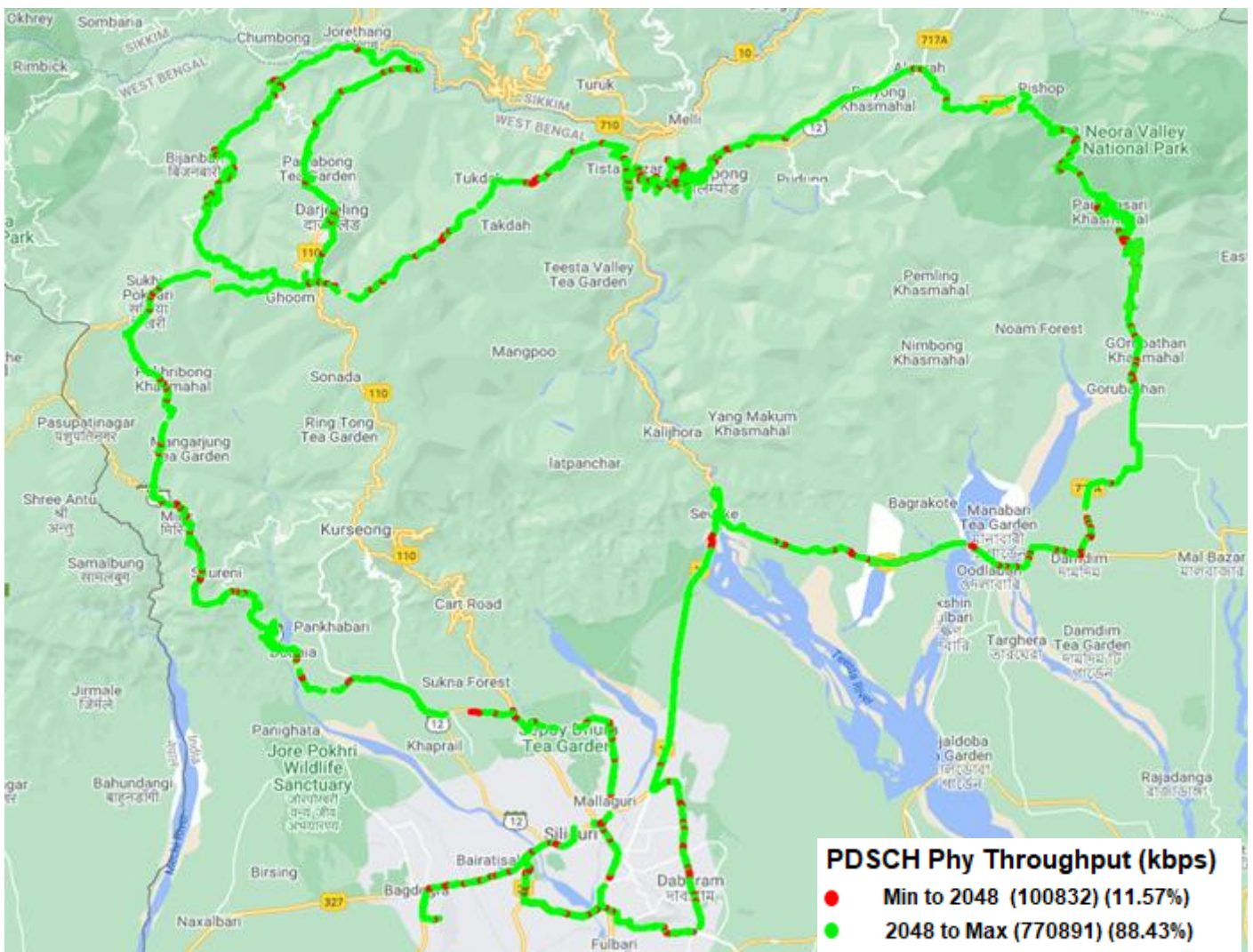
TSPS	VIL
AVG. SPEED Mbps	1.86
NO. OF SAMPLES > 1 Mbps%	81.03
FILE DOWNLOAD SUCCESS RATE%	91.54

IV. Dynamic Data Test- 4G DL Details

VIL

Data Statistics - Dynamic Complete 340 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	6.40



TSPS	VIL
AVG. SPEED Mbps	6.40
NO. OF SAMPLES > 2 Mbps%	88.43
FILE DOWNLOAD SUCCESS RATE%	97.88

V. TRAI MySpeed App

DATA SPEED TESTING REPORT THROUGH TRAI MY SPEED APP is given below as Table-1. Only those Snap Shots measurements of TRAI Myspeed App where download speed in 4G network is less than 5 Mbps and in 3G network is less than 2 Mbps is furnished in Table-1.

LOCATION	DATE	TIME	TSP	SIGNAL STRENGTH (-dbm)	DOWNLOAD SPEED(Mbps)	UPLOAD SPEED(Mbps)
DESUN HOSPITAL, SILIGURI	20-12-2021	10:01AM	BSNL	78	0.38	0.06
DESUN HOSPITAL, SILIGURI	20-12-2021	10:00AM	JIO	92	4.34	1.99
DESUN HOSPITAL, SILIGURI	20-12-2021	10:02AM	JIO	91	2.39	0.78
MIRIK LAKE	20-12-2021	01:41PM	BSNL	70	1.85	1.30
NEAR RAJBHAWAN DARJEELING	20-12-2021	06:11PM	JIO	82	2.26	14.27
NEAR RAJBHAWAN DARJEELING	20-12-2021	06:08PM	JIO	83	3.21	15.39
SADAR POLICE STATION DARJEELING	21-12-2021	09:15AM	BSNL	24	1.62	2.05
DARJEELING TOYTRAIN STATION	21-12-2021	09:31AM	JIO	76	3.32	10.08
DARJEELING TOYTRAIN STATION	21-12-2021	09:30AM	JIO	73	3.55	13.37
DARJEELING TOYTRAIN STATION	21-12-2021	09:32AM	VI	91	4.27	14.45
BARNESBERG	21-12-2021	11:04AM	JIO	95	0.56	1.66
BARNESBERG	21-12-2021	11:03AM	JIO	112	1.95	0.70
SINGLA BAZAR	21-12-2021	11:05AM	BSNL	101	1.21	0.28
NEAR GOKE PANCHAYET OFFICE	21-12-2021	12:56PM	BSNL	83	0.01	0.02
PULBAZAR	21-12-2021	01:29PM	AIRTEL	90	2.02	6.51
MERYBONG CHURCH	21-12-2021	03:32PM	BSNL	88	0.71	0.00
MERYBONG CHURCH	21-12-2021	03:37PM	VI	109	0.96	1.12
KALIMPONG DIST. HOSPITAL	22-12-2021	09:25AM	BSNL	77	0.30	2.12
6TH MILE	22-12-2021	12:22PM	BSNL	110	0.76	0.11
LAVA BUS STAND	22-12-2021	12:50AM	AIRTEL	106	4.88	0.66
LAVA BAZAR	22-12-2021	12:54PM	JIO	101	2.76	3.73
LAVA BAZAR	22-12-2021	12:51PM	JIO	100	4.58	0.77
LAVA BAZAR	22-12-2021	12:39PM	BSNL	97	0.56	0.05
PAPERKHETI	22-12-2021	01:42PM	BSNL	96	0.46	0.7
GORUBATHAN	22-12-2021	02:13PM	VI	75	1.78	18.55
GORUBATHAN MARKET	22-12-2021	02:22PM	JIO	89	2.33	0.72
GORUBATHAN MARKET	22-12-2021	02:21PM	JIO	93	1.89	1.16
10TH KILE FOREST RANGE OFFICE	22-12-2021	04:35PM	BSNL	105	0.16	0.11
NEAR ASHIGHAR MORE	22-12-2021	05:12PM	BSNL	82	0.39	0.02
CITYCENTER, SILIGURI	22-12-2021	06:42PM	BSNL	48	1.51	1.90

VI. Video Call Observations

•Observations of Regional Office, Kolkata on the Operator Assisted Drive Test and action to be taken by TSPs to improve the QoS-

Video Call Testing -- Statistics

No. of Locations where Poor Video Quality & Video Freezing Observed				
DAY ROUTE DETAILS/ TSP	AIRTEL	BSNL	RJIO	VI
DAY-1 (20.12.2021) Bagdogra Airport to Darjeeling via Mirik	6	3	4	5
DAY-2 (21.12.2021)Darjeeling to Kalimpong via Pashupathi Nagara	6	2	4	5
DAY-3 (23.12.2021)Kalimpong to Siliguri via Lava	7	3	10	8

No. of Location where Video Call Disconnected				
DAY ROUTE DETAILS/ TSP	AIRTEL	BSNL	RJIO	VI
DAY-1 (20.12.2021) Bagdogra Airport to Darjeeling via Mirik	8	14	9	12
DAY-2 (21.12.2021)Darjeeling to Kalimpong via Pashupathi Nagara	6	18	7	10
DAY-3 (23.12.2021)Kalimpong to Siliguri via Lava	4	14	3	11

VIDEO CALL TESTING --3G & 4G NETWORKS—

AIRTEL- Video calls were disconnected several times and the Video picture quality was poor many times throughout the drive routes.

BSNL- Video calls were disconnected several times and the Video picture quality was poor many times throughout the drive routes. There are many routes where coverage is very poor or nil.

RJIO- - Video calls were disconnected several times and the Video picture quality was poor many times throughout the drive routes.

VIL- Video calls were disconnected several times and the Video picture quality was poor many times throughout the drive routes.

•Observations of Regional Office, Kolkata on the Operator Assisted Drive Test and action to be taken by TSPs to improve the QoS-

Network Issues- Poor/ No Coverage

- Darjeeling to Namchi/Pelling in Sikkim is very important tourist route and all the TSPs have only few site between last site of Darjeeling town (i.e. near North Point Darjeeling) and the border location between WB and Sikkim. All TSPs are requested to install new sites along the route to improve 4G coverage.

Only RJio is connected intermittently and all others are disconnected. BSNL/VI/Airtel was connected only for few minutes.

- All TSPs have no tower near Shree Dwarika Tea factory or near Kerabari or Patliabas Forest and near Radha Soami Satsang Beas, North Tukbar PS.

- From Goke to Pulbazar none of the TSP has any site on the route, coverage and video quality is not satisfactory.

- No TSP has site in between Marybong and to the NH connecting Ghoom. All TSPs TSPs are requested to install new sites near salu Tea garden or on NH in between Sukhia Pokhari and Ghoom.

- All TSPs have no network/ poor coverage beyond Dudhia Picnic spot (in between Sukna & Mirik).

- There is one Gram Panchayat Office called Goke on the route where RJio has good 4G coverage outside the Gram Panchayat building but VI & Airtel have 4G coverage but not very good. BSNL has no coverage in this route.

- No good coverage between Algarah and Lava town.

•Observations of Regional Office, Kolkata on the Operator Assisted Drive Test and action to be taken by TSPs to improve the QoS-

AIRTEL

Rx Quality (82.83%) in 2G network and SINR (87.33%) in 4G network do not meet the benchmark (95%).

DCR (3.20%) in 2G network and DCR (3.77%) in 4G network do not meet the benchmark (2%).

Airtel has been asked to take necessary action including software/ hardware optimization to improve the above SINR, Rx Quality, Drop Call Rate (2G & 4G), Video calls disconnections, poor Video quality and poor coverage/ download throughputs on the drive test routes and at all important locations.

An action taken report is to be submitted by 20.03.2022.

BSNL

Rx Quality (86.95%) in 2G network and Ec/No (74.53%) in 3G network do not meet the benchmark (95%).

DCR (10.19%) in 2G network and DCR (22.6%) in 3G network do not meet the benchmark (2%).

HOSR (90.32%) in 2G network and CBR (7.39%) & CSSR (92.5%) in 3G network do not meet the benchmark.

BSNL has been asked to take necessary action including software/ hardware optimization to improve the above Ec/No (3G), Rx Quality (2G), Drop Call Rate (2G & 3G), HOSR (2G), CSSR (3G), BCR(3G), Video calls disconnections, poor Video quality and poor coverage/ download throughputs on the drive test routes and at all important locations.

An action taken report is to be submitted by 20.03.2022.

VI. Observations of RO, Kolkata

•Observations of Regional Office, Kolkata on the Operator Assisted Drive Test and action to be taken by TSPs to improve the QoS-

RJIO

SINR (86.18%) in 4G network does not meet the benchmark (95%).

DCR (4.34%) in 4G network does not meet the benchmark (2%).

RJIO has been asked to take necessary action including software/ hardware optimization to improve the above SINR, Drop Call Rate, Video calls disconnections, poor Video quality and poor coverage/ download throughputs on the drive test routes and at all important locations.

An action taken report is to be submitted by 20.03.2022.

VIL

SINR (87.6%) in 4G network and Ec/No(76.75%) in 3G network do not meet the benchmark (95%).

DCR (4.70%) in 4G network, DCR (4.27%) in 3G and DCR (2.93%) in 2G network do not meet the benchmark (2%).

VIL has been asked to take necessary action including software/ hardware optimization to improve the above Ec/No (3G), SINR(4G), Drop Call Rate (2G,3G & 4G),Video calls disconnections, poor Video quality and poor coverage/ download throughputs on the drive test routes and at all important locations.

An action taken report is to be submitted by 20.03.2022.