

# Operator Assisted Drive Test Report

# Gangtok City Sep. 2021

(RO, Kolkata)

**Key Performance Indicators: All TSPs have met the Drop Call Rate (DCR) benchmark of 2% except BSNL 2G & 4G. All TSPs have met the Block Call Rate (BCR) benchmark of 3% except BSNL 4G. All TSPs have met the Call Setup Success Rate (CSSR) of 95% except BSNL 4G.**

The Operator Assisted Drive Test has been carried out by Regional Office, Kolkata with the help of Service Providers in Gangtok City and surrounding area from 9:00 AM to 7:00 PM during 26<sup>th</sup> Sep. to 28<sup>th</sup> Sep. 2021. The drive test covered drive route of 280 KMs over a period of 3 days. Approximately 200+ calls were made for each of the 8 networks: three 2G (GSM) networks, one 3G (UMTS) network and four 4G LTE network covering four TSPs.

Overview

Voice  
Summary

Data  
Summary

# Overview

Gangtok is a city, municipality, the capital and the largest town of the [Indian](#) state of [Sikkim](#). It is also the headquarters of the [East Sikkim district](#). Gangtok is in the eastern [Himalayan](#) range, at an elevation of 1,650 m (5,410 ft). The town's population of 100,000 are from different ethnicities such as [Bhutia](#), [Lepchas](#) and [Indian Gorkhas](#). Within the higher peaks of the Himalaya and with a year-round mild [temperate](#) climate, Gangtok is at the centre of Sikkim's tourism industry.

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.

**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.

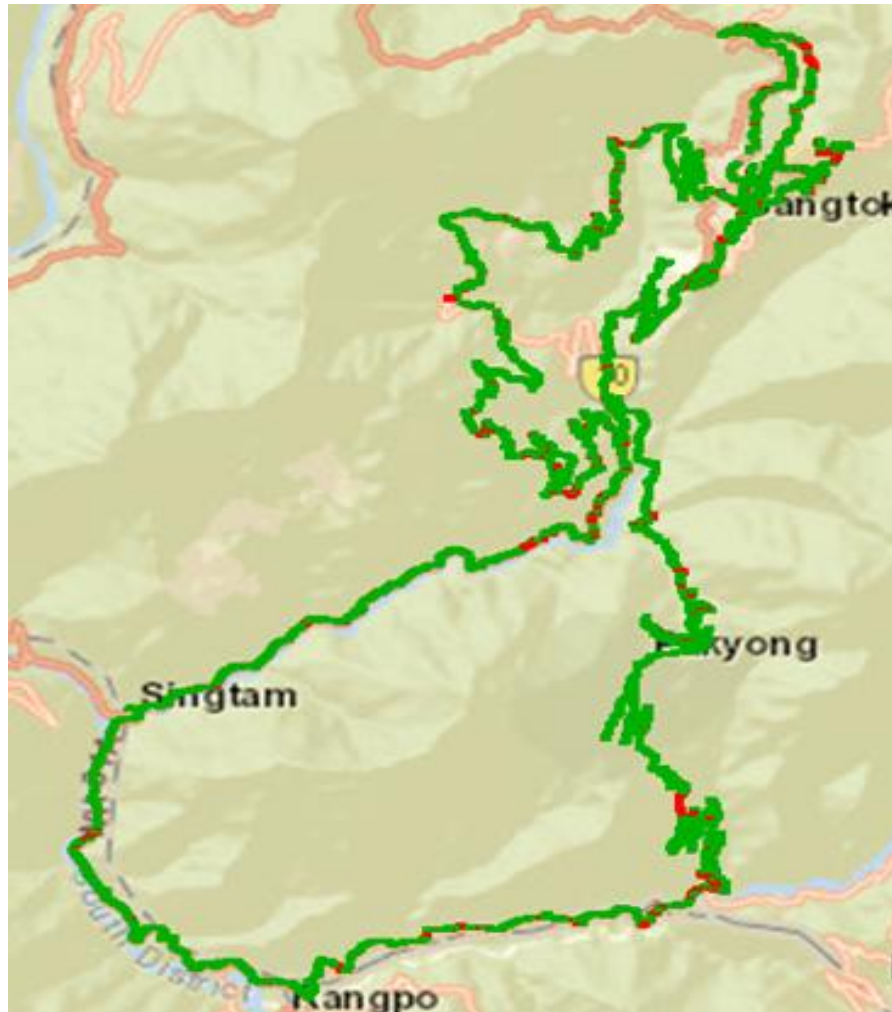
**Video Call Tests:** A Google meeting link was created for this OADT. All TSPs joined the Google meet link through their Handset and this online meeting was continued throughout the Drive Test. This online meeting was monitored by Advisor and other officials of RO Kolkata.

**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	NO	NO	YES
4G	YES	YES	YES	YES
TOOL USED	TEMS	NIMO & TEMS	X-CAL	TEMS

# Overview

## Voice & Dynamic Data Test Drive Route



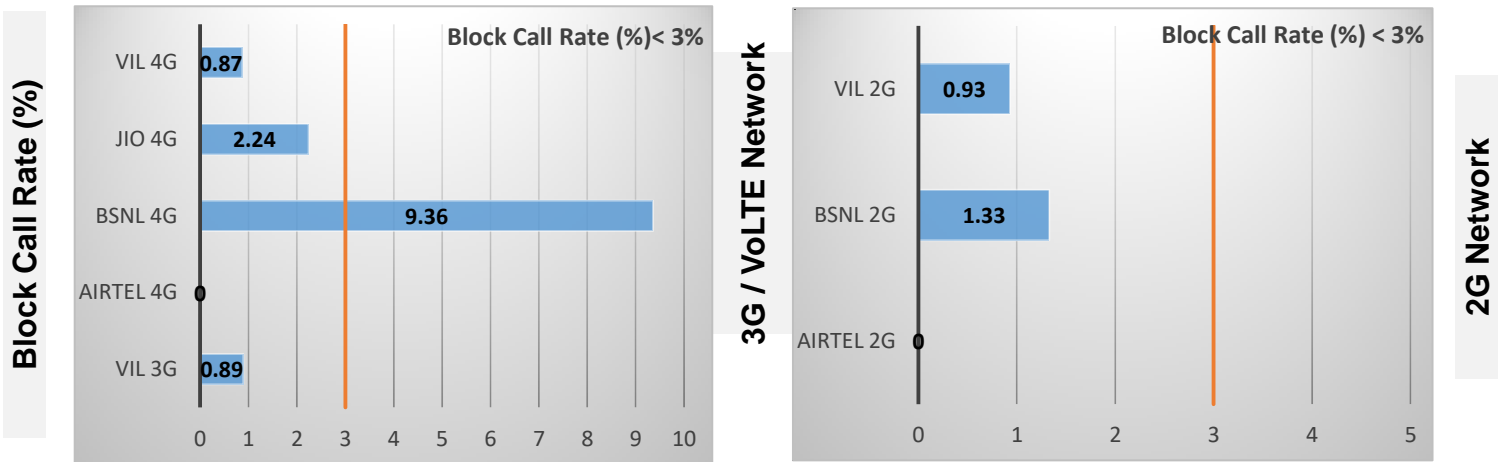
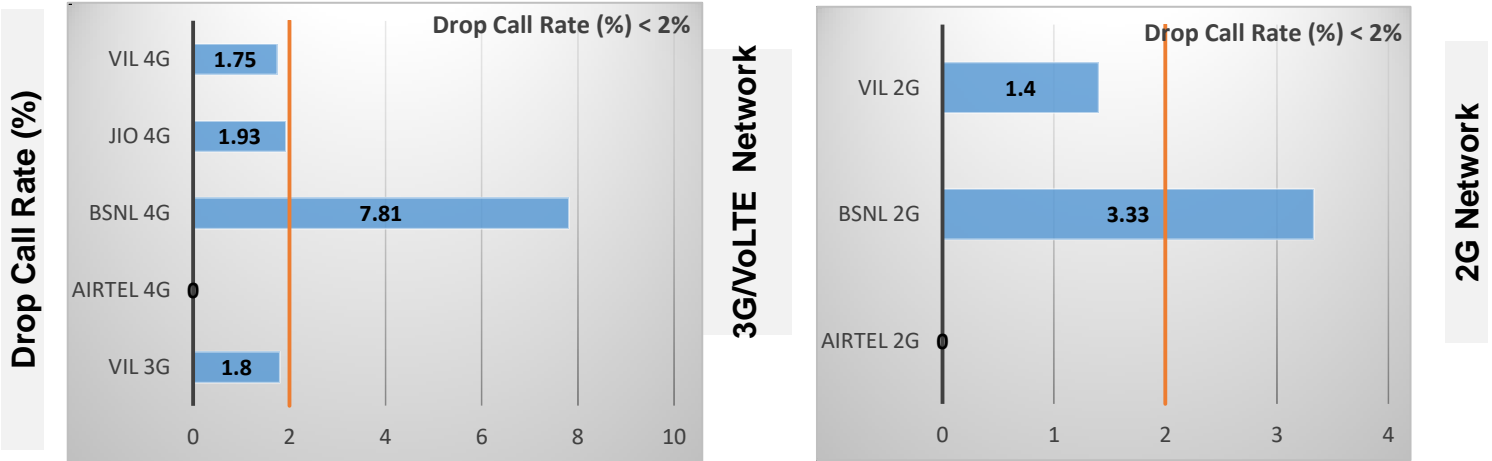
## Data Service Test- Static Locations

Measured through TRAI Myspeed App	
RANGPO	HIGH COURT
SINGTAM	STNM HOSPITAL
TASHI VIEW POINT	RANKA BLOCK OFFICE
GANESH TOK	MANIPAL HOSPITAL
HANUMAN TOK	RUMTEK PHARMA COLLEGE
3RD MILE CHECK POST	RUMTEK MONESTARY
CM BUNGALOW	RANIPOOL TAXI STAND 2
CIRCUIT HOUSE	AIRPORT
CHIEF SECRETARY HOUSE	RANGPO PPST OFFICE
RAJBHABAN	MG MARKET

# Voice Calls

## Key Observations

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



KPIs	2G			3G	VoLTE			
	Airtel	BSNL	VIL	VIL	Airtel	BSNL	RJIO	VIL
Drop Call Rate %	0	3.33	1.4	1.8	0	7.81	1.93	1.75
Block Call Rate %	0	1.33	0.93	0.89	0	9.36	2.24	0.87

- All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%) except BSNL 2G & 4G..
- All TSPs have met the 3% QOS benchmark of Block Call Rate (BCR%) except BSNL 4G..

# Voice Calls

## Key Observations

### Coverage

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

TSPs	2G (GSM)		
	Airtel	BSNL	VIL
Coverage %	90.97	66.3	90.46

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

TSPs	3G (UMTS)	4G (VoLTE)			
	VIL	Airtel	BSNL	JIO	VIL
Coverage %	79.66	93.55	71.89	95.43	85.7

# Data Services Dynamic

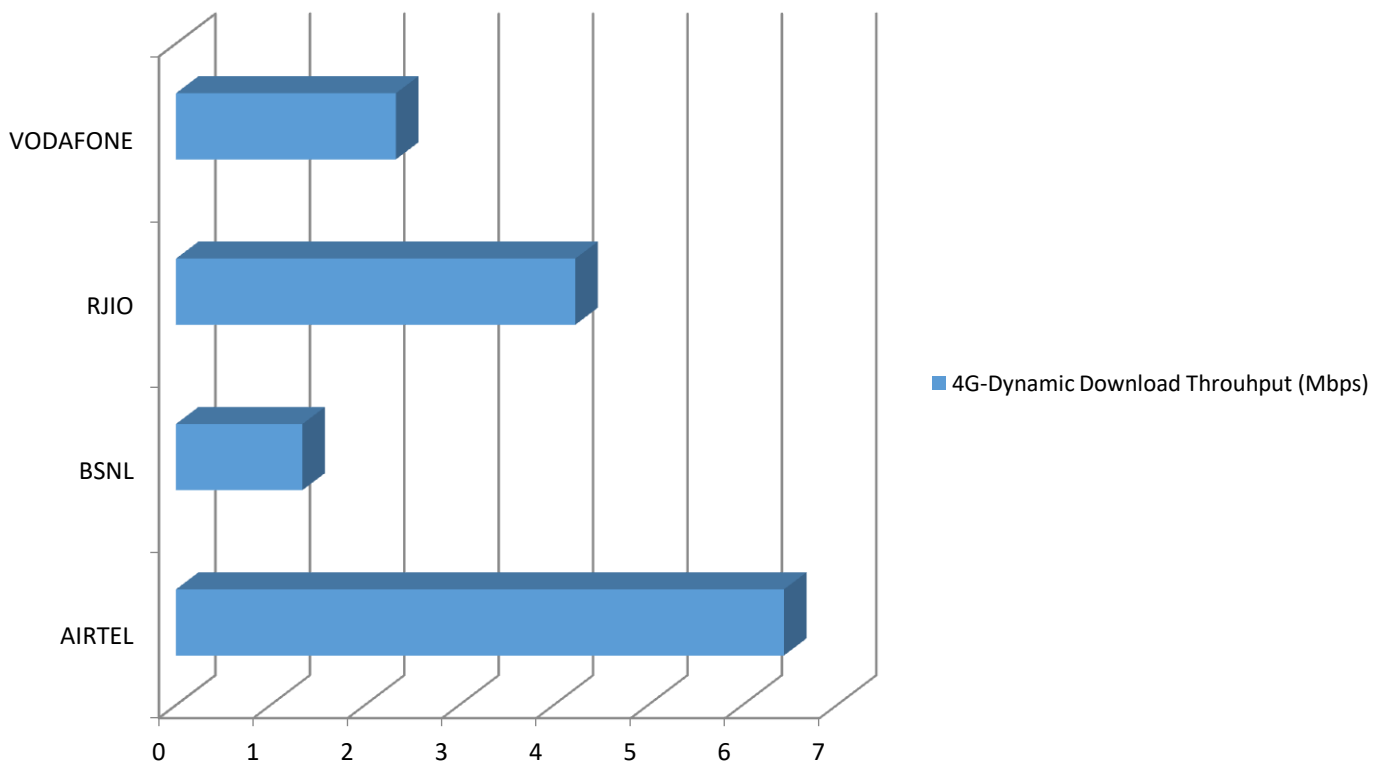
## Key Observations

Dynamic Data was tested for 280 Kms. Download Throughput was tested.

### Data Download Performance (Mbps) - Dynamic

4G/ Network:

#### 4G-Dynamic Download Throuhput (Mbps)



# Summary

## City Level Summary-Voice

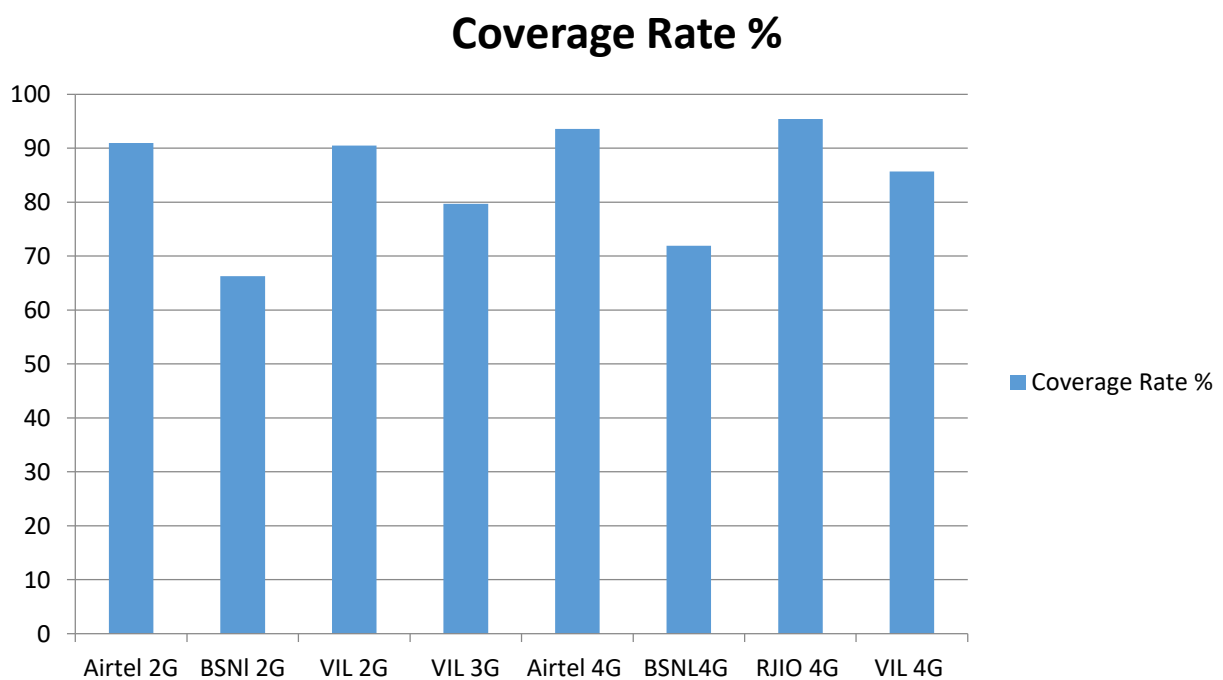
Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	234	150	216
Blocked Call Rate (%)	0	1.33	0.93
CSSR% (Accessibility)	100	98.66	99.07
Drop Call Rate (%)	0	3.33	1.4
Mobility HOSR (%)	100	96	99.1
Rx Quality (%)	91.32	93.2	95.36

Voice Call	3G/4G				
	VIL 3G	Airtel 4G	BSNL 4G	RJIO 4G	VIL 4G
Call Attempt	224	237	128	207	230
Blocked Call Rate (%)	0.89	0	9.36	2.24	0.87
CSSR% (Accessibility)	99.11	100	91.41	96.62	99.13
Drop Call Rate (%)	1.8	0	7.81	1.93	1.75
Mobility HOSR (%)	100	100	74.38	95.48	98.2
Rx Quality (%)	95.87	85.55	53.08	74.66	95.89

# 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  $\geq -85$  dBm, RSCP is  $\geq -90$  dBm & RSRP  $\geq -110$ dBm. The details are as follows.

TSP	Coverage Rate %
Airtel 2G	90.97
BSNI 2G	66.3
VIL 2G	90.46
VIL 3G	79.66
Airtel 4G	93.55
BSNL4G	71.89
RJIO 4G	95.43
VIL 4G	85.7





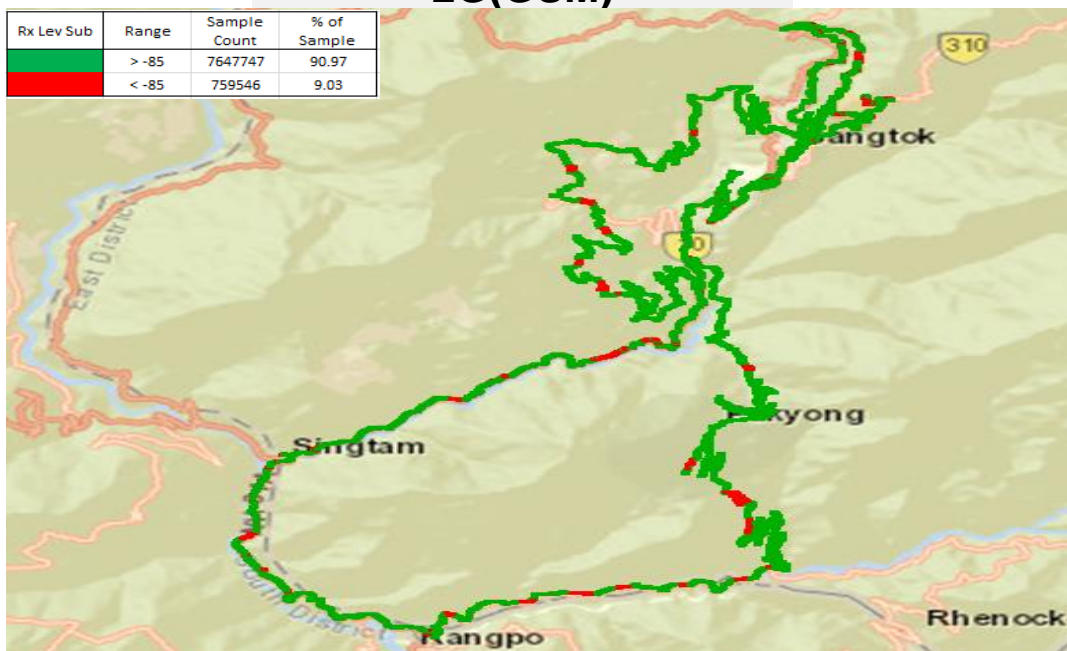
# I. Coverage Details

## AIRTEL

Technology	Coverage Rate %
2G(GSM)	90.97
4G(VoLTE)	93.55

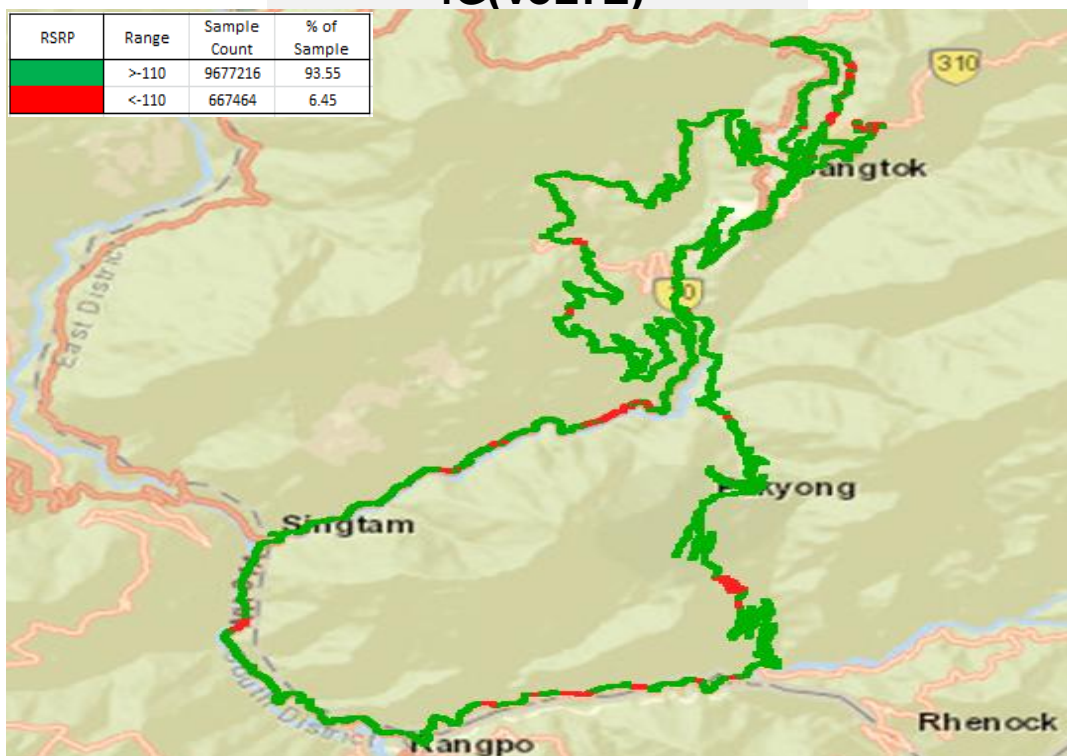
### 2G(GSM)

Rx Lev Sub	Range	Sample Count	% of Sample
Green	> -85	7647747	90.97
Red	< -85	759546	9.03



### 4G(VoLTE)

RSRP	Range	Sample Count	% of Sample
Green	>-110	9677216	93.55
Red	<-110	667464	6.45



# I. Coverage Details

## BSNL

Technology	Coverage Rate %
2G	66.30
4G	71.89

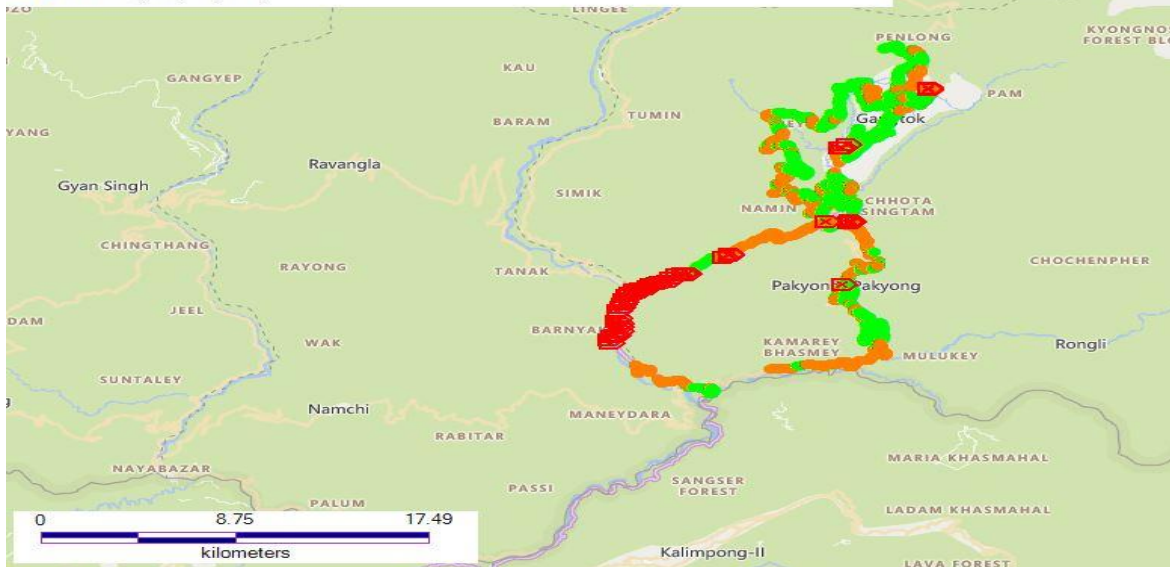
### 2G (GSM)

Device - 1 Phone Qualcomm (1) + 404742282548645 - Events and Symbols

☒ Nemo Call Disconnect - System Failure (47)

Device - 1 Phone Qualcomm (1) + 404742282548645 - RxLev Sub (dBm)

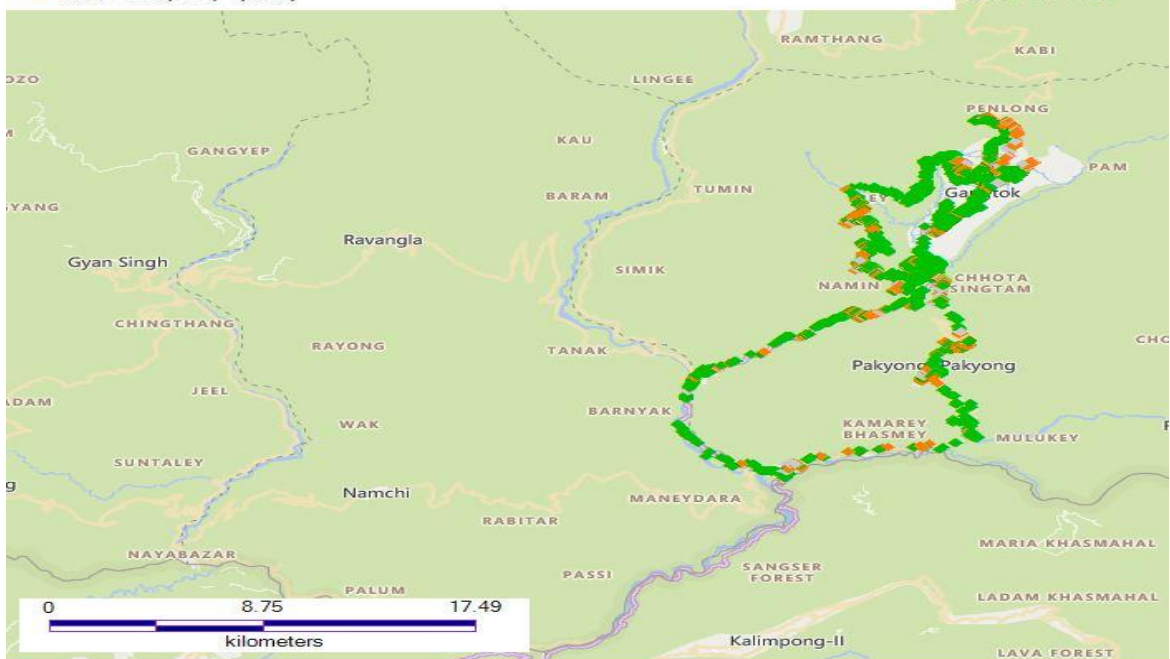
● -85 to -40 (66%) (10435)  
● -120 to -85 (34%) (5303)



### 4G (VoLTE)

Device - 3 LTE UE Qualcomm (2) + 404742285157996 - UE RSRP (dBm)

◆ -110 to -20 (71%) (8554)  
◆ -120 to -110 (29%) (3413)



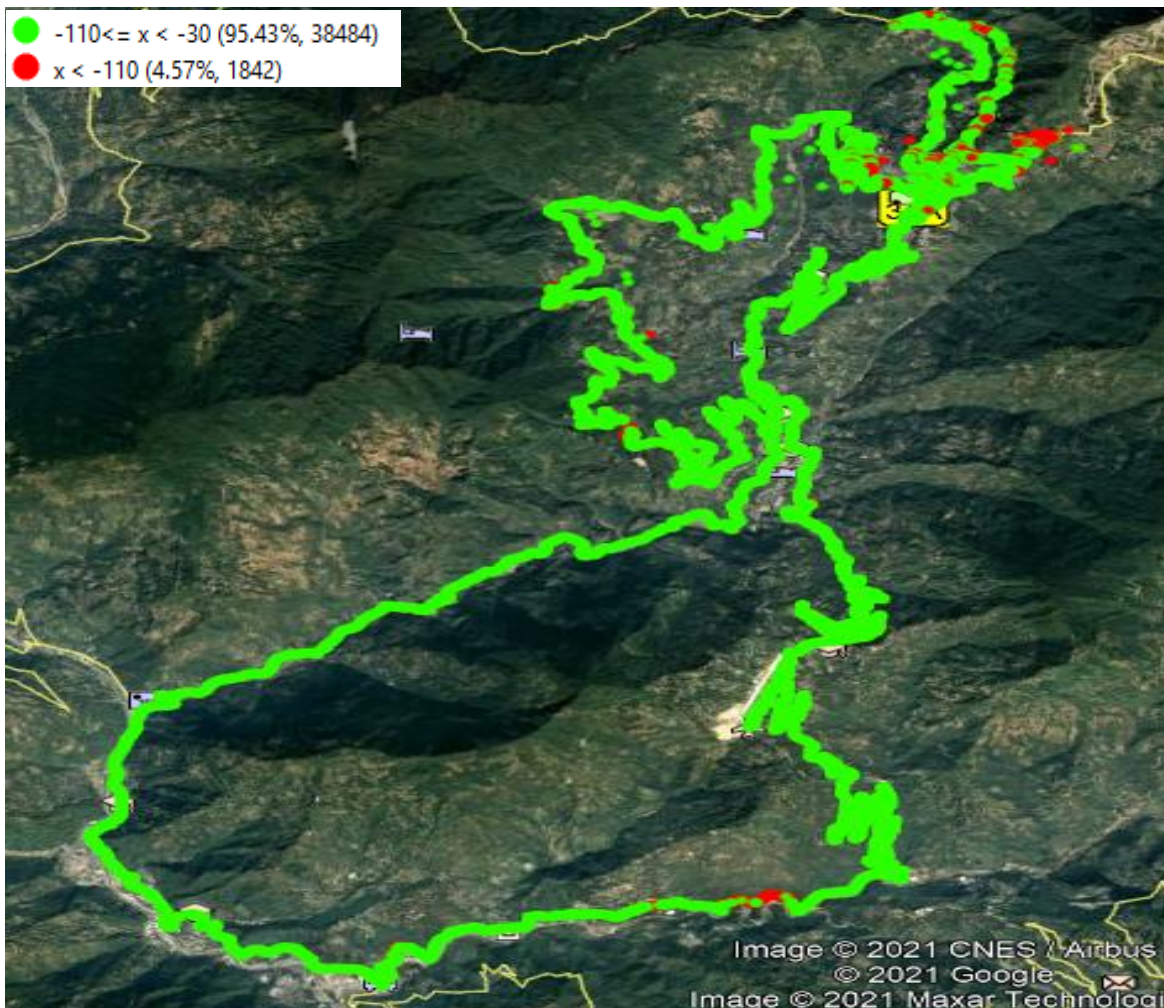


# I. Coverage Details

## JIO

Technology	Coverage Rate %
4G (VoLTE)	95.43

## 4G (VoLTE)



# I. Coverage Details

## VIL

Technology	Coverage Rate %
2G (GSM)	90.46

2G(GSM)

2G



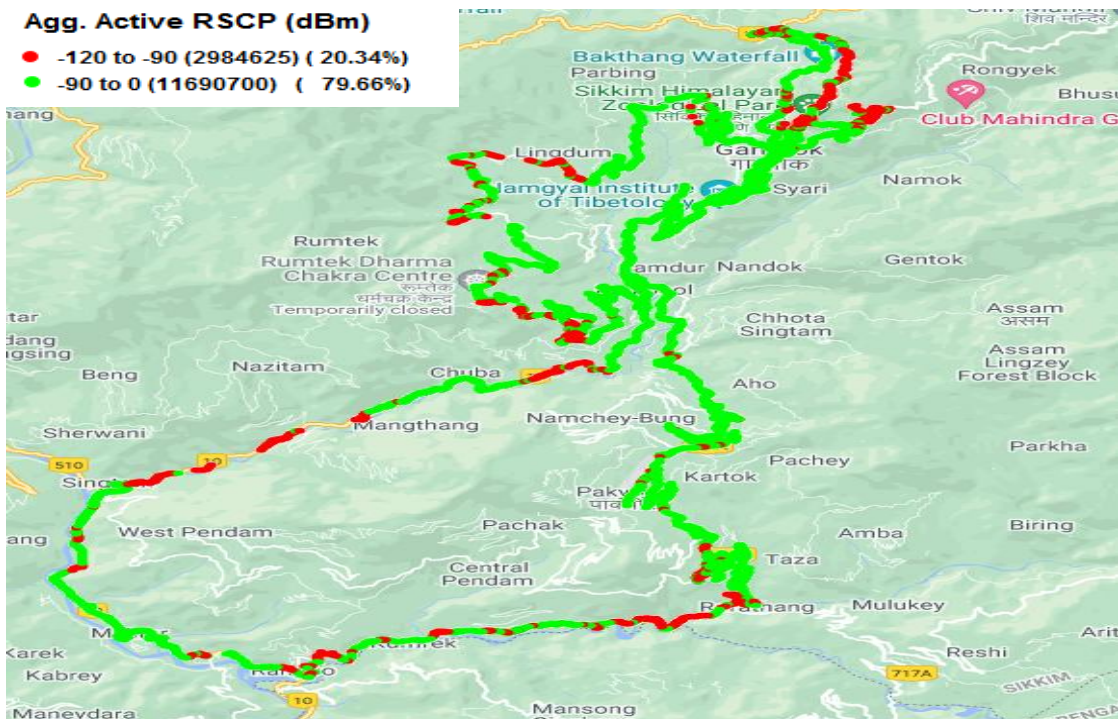


# I. Coverage Details

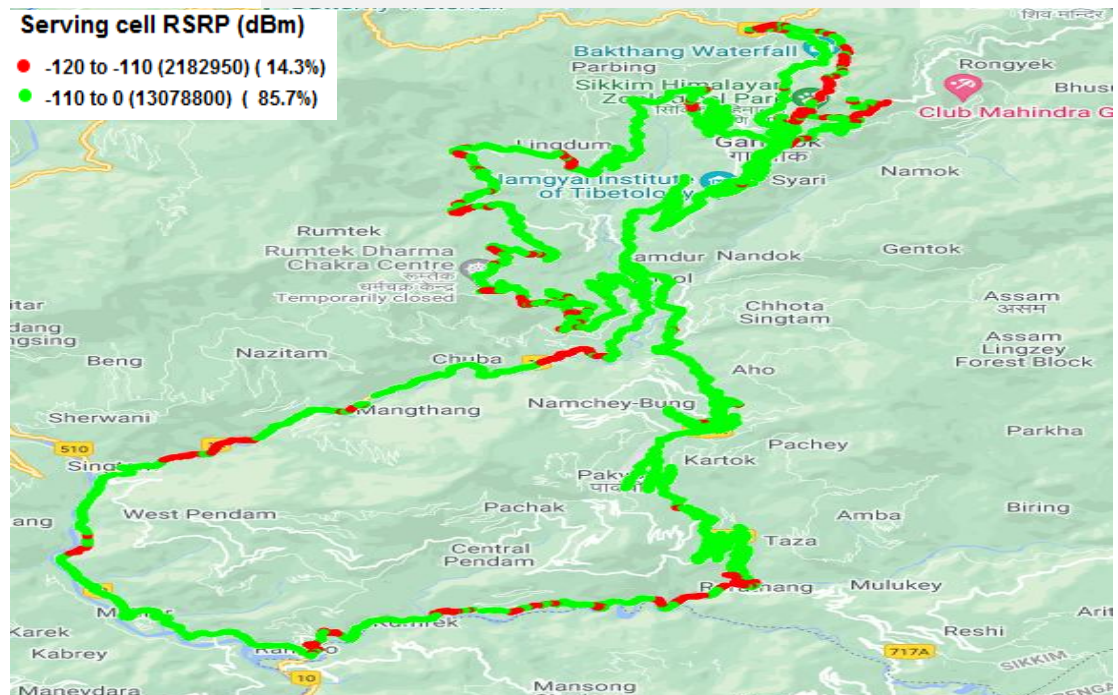
## VIL

Technology	Coverage Rate %
3G (UMTS)	79.66
4G (VoLTE)	85.7

## 3G



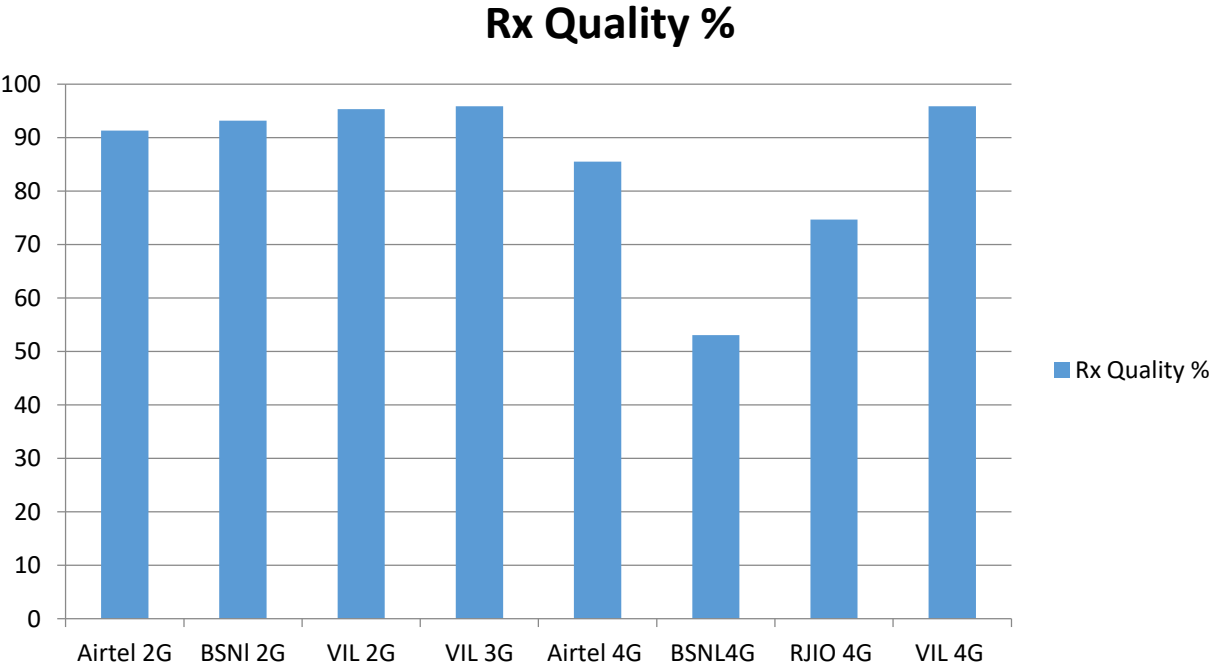
## 4G



## II. Quality Details

For measuring voice quality, as per the QoS norms, RxQual  $\leq 5$  for GSM TSPs, EcNo  $\geq -14$  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	91.32
BSNI 2G	93.2
VIL 2G	95.36
VIL 3G	95.87
Airtel 4G	85.55
BSNL4G	53.08
RJIO 4G	74.66
VIL 4G	95.89



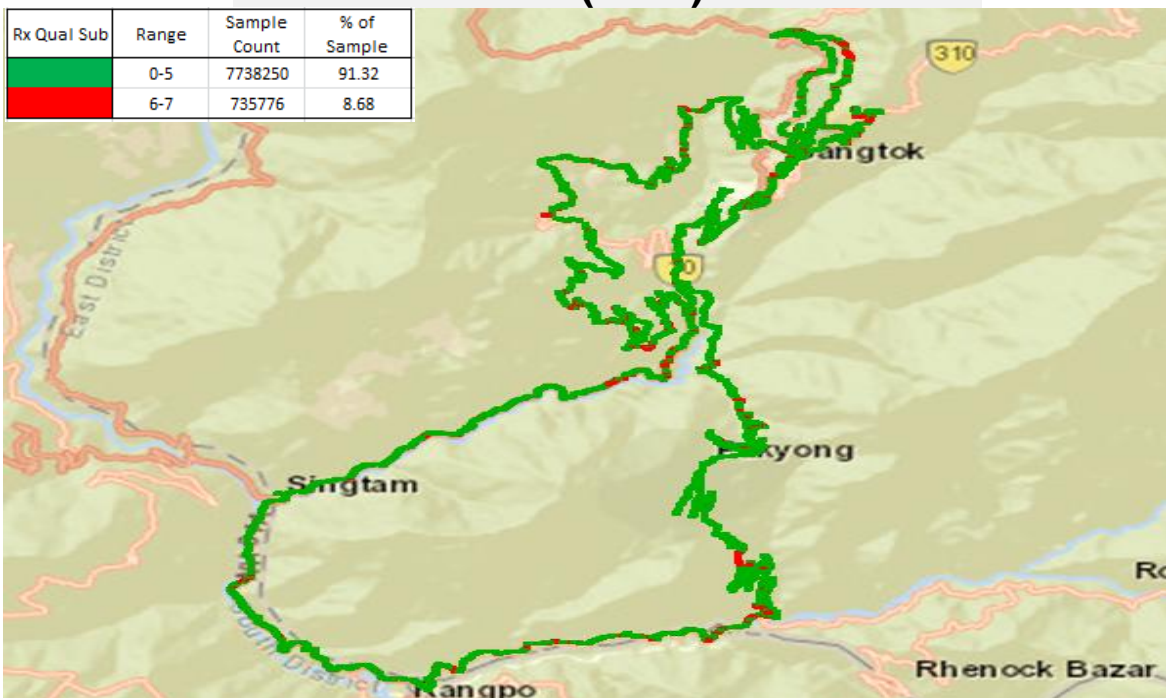
## II. Quality Details

### Airtel

Technology	Rx Quality %
2G (GSM)	<b>91.32</b>
4G (VoLTE)	<b>85.55</b>

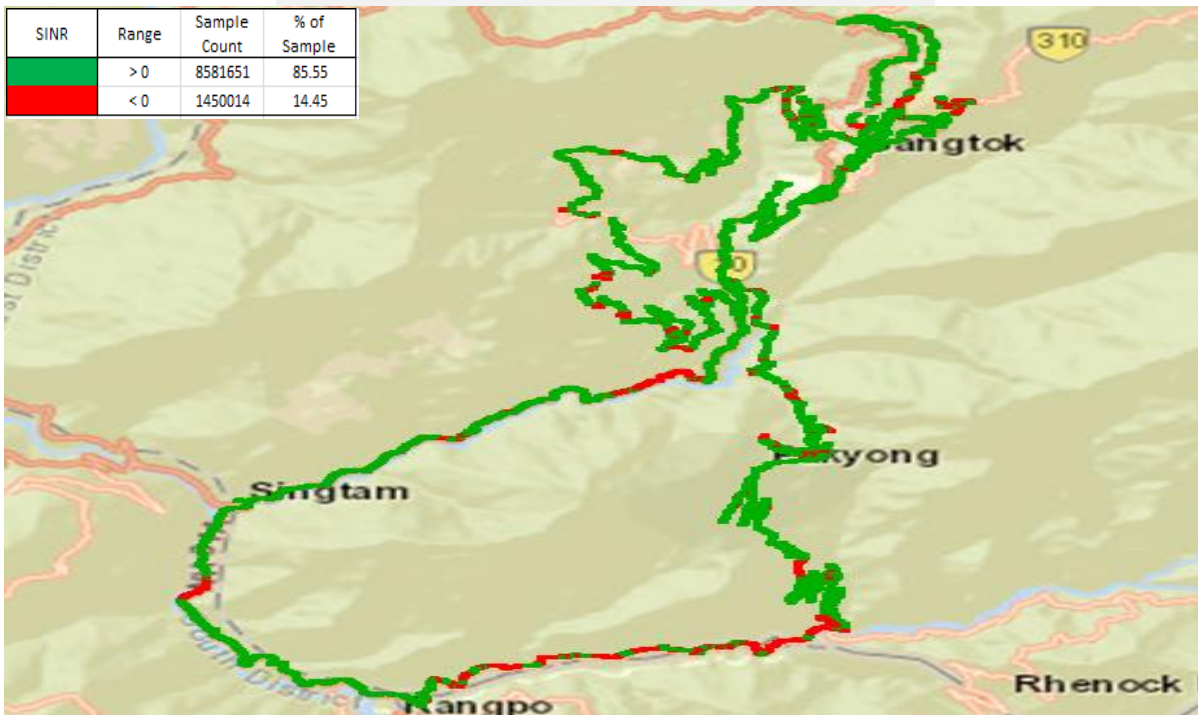
### 2G (GSM)

Rx Qual Sub	Range	Sample Count	% of Sample
Green	0-5	7738250	91.32
Red	6-7	735776	8.68



### 4G (VoLTE)

SINR	Range	Sample Count	% of Sample
Green	> 0	8581651	85.55
Red	< 0	1450014	14.45





## II. Quality Details

### BSNL

Technology	Rx Quality %
2G (GSM)	93.20
4G (LTE)	53.08

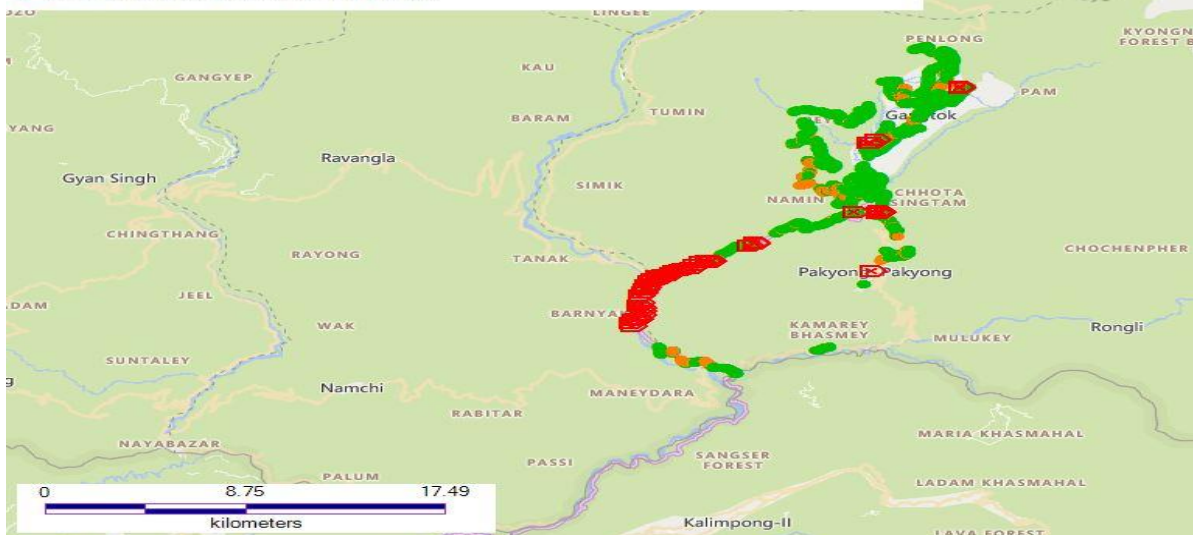
### 2G (GSM)

Device - 1 Phone Qualcomm (1) + 404742282548645 - RxQual Sub

- 5 to 7 (7%) (706)
- 0 to 5 (93%) (9676)

Device - 1 Phone Qualcomm (1) + 404742282548645 - Events and Symbols

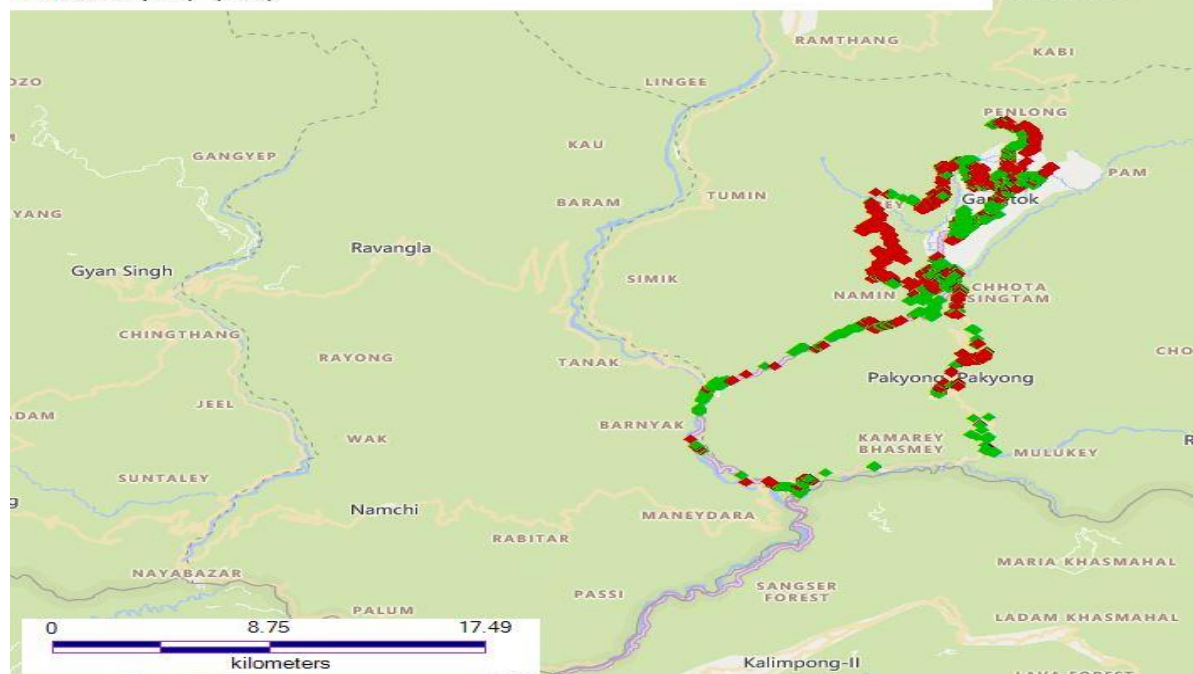
- 🚫 Nemo Call Disconnect - System Failure (47)



### 4G (LTE)

Device - 3 LTE UE Qualcomm (2) + 404742285157996 - Serving SINR (dB)

- ◆ 0 to 50 (53%) (6418)
- ◆ -50 to 0 (47%) (5763)



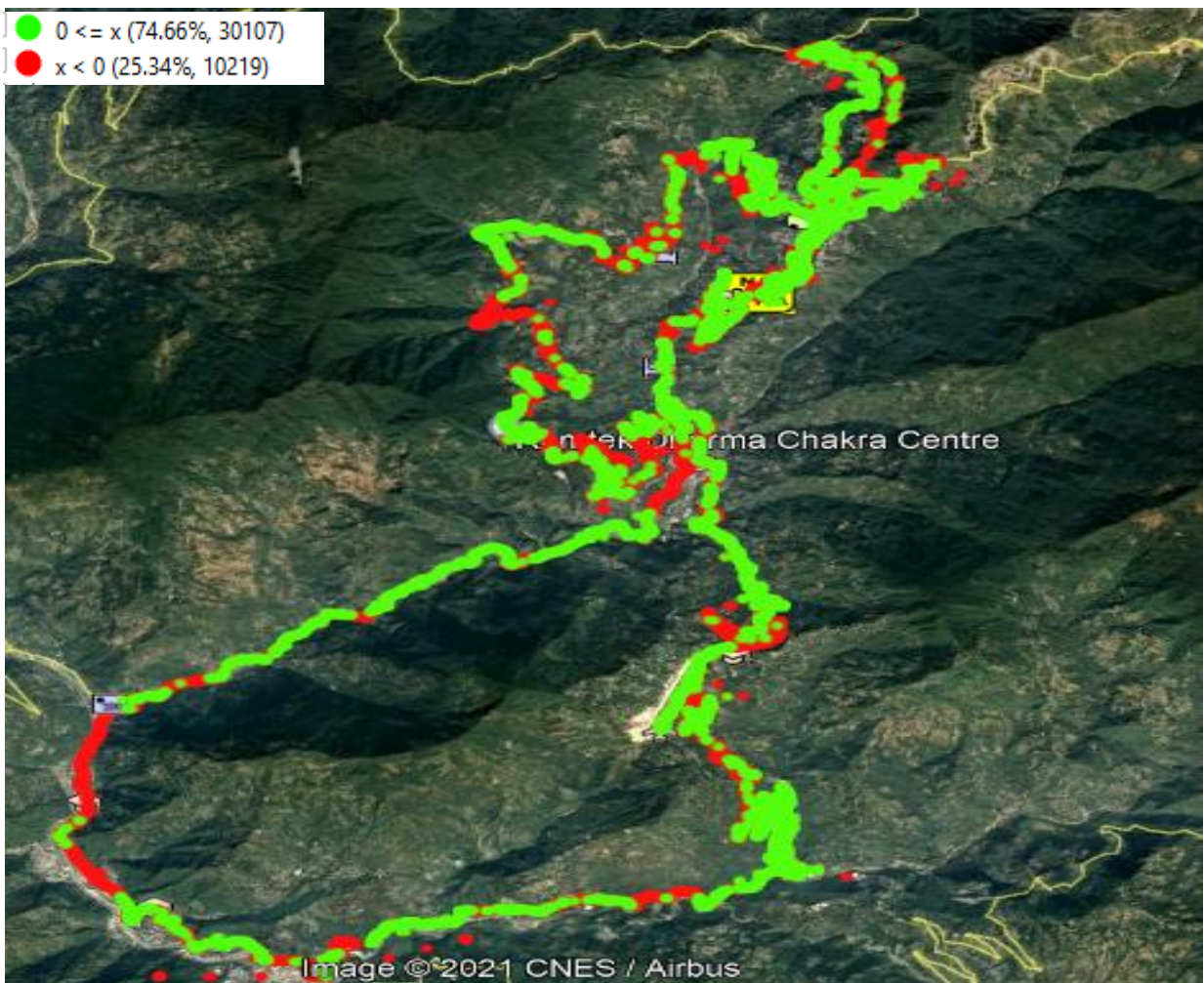


## II. Quality Details

### JIO

Technology	Rx Quality %
4G (VoLTE)	<b>74.66</b>

### 4G (VoLTE)



## II. Quality Details

### VIL

Technology	Rx Quality %
2G (GSM)	95.36

### 2G (GSM)



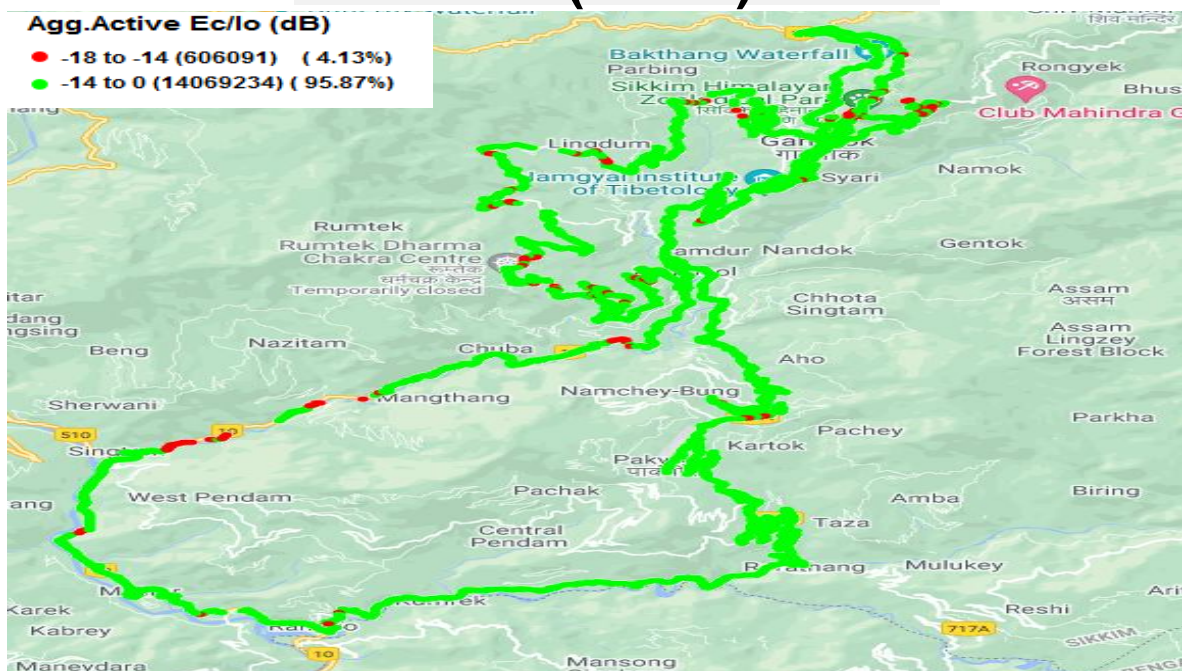


## II. Quality Details

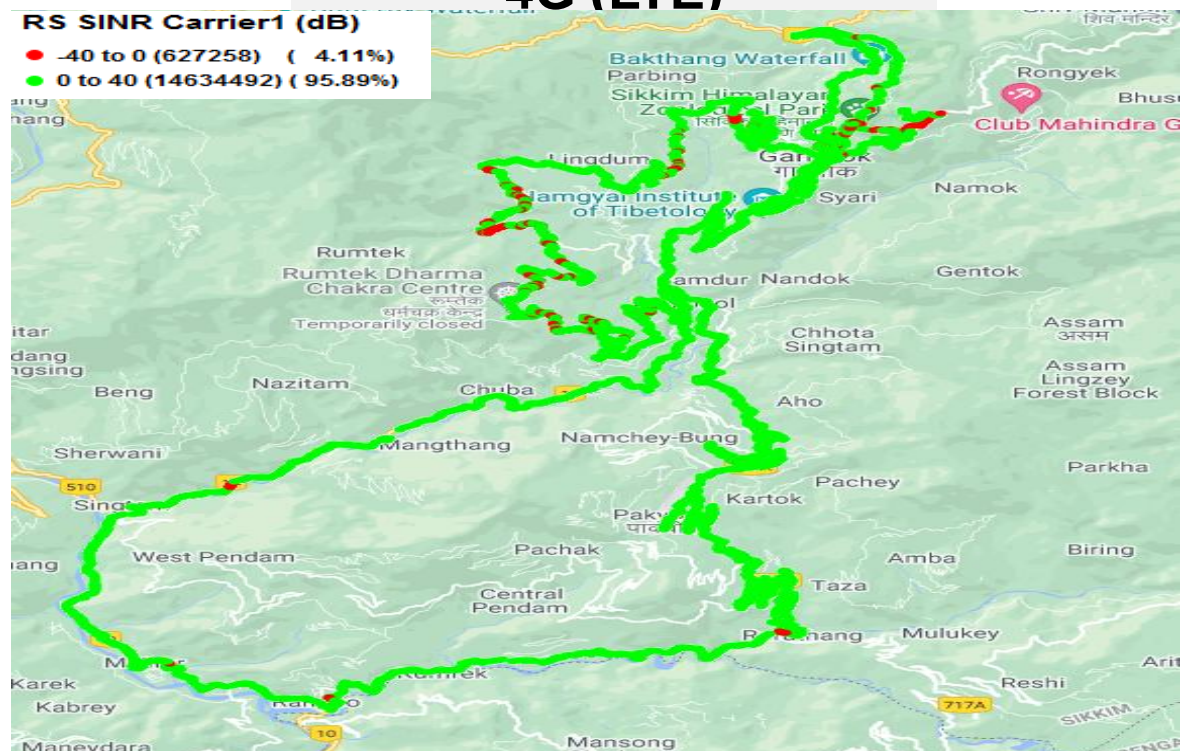
### VIL

Technology	Rx Quality %
3G (UMTS)	95.87
4G (LTE)	95.89

### 3G (UMTS)



### 4G (LTE)

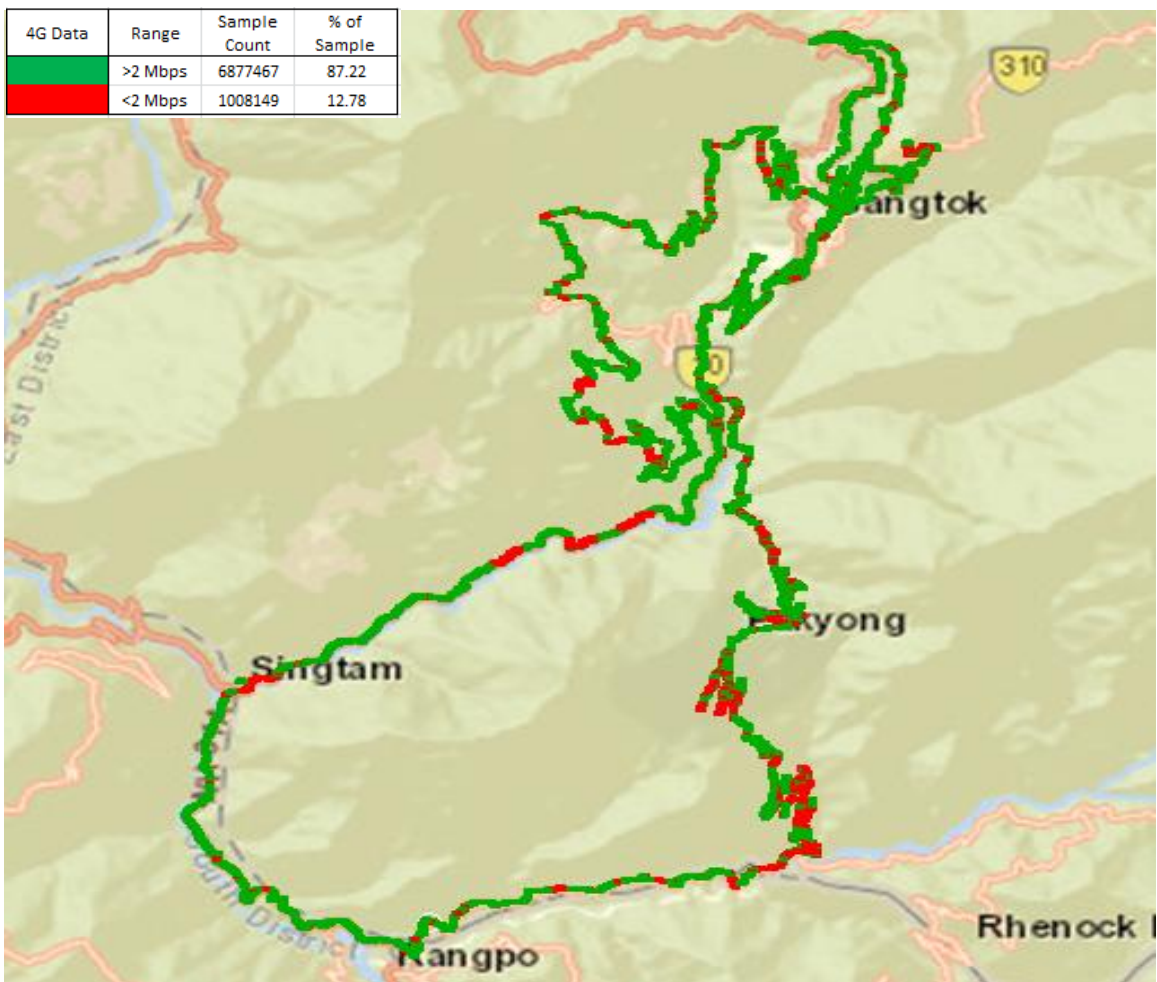


# IV. Dynamic Data Test- 4G DL Details

## Airtel

### Data Statistics - Dynamic Complete 280 Kms

Data KPIs - Overall	4G
Download Throughput (Mbps)	<b>6.44</b>



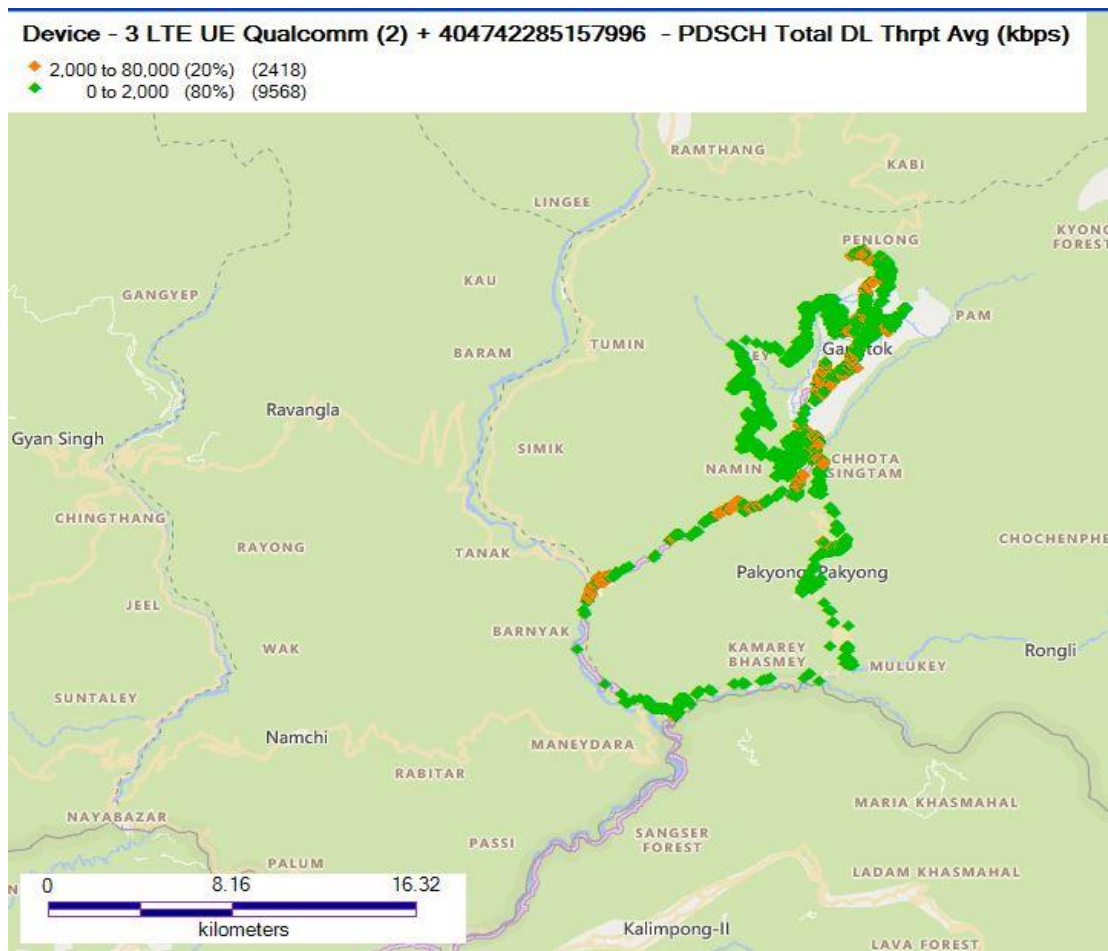
TSPS	AIRTEL
AVG. SPEED Mbps	6.44
NO. OF SAMPLES =< 2 MBPS	1008149
NO. OF SAMPLES > 2 MBPS	6877467
FILE DOWNLOAD SUCCESS RATE%	100.00

# IV. Dynamic Data Test- 4G DL Details

## BSNL

### Data Statistics - Dynamic Complete 280 Kms

Data KPIs - Overall	4G
Download Throughput (Mbps)	1.34



TSPS	BSNL
AVG. SPEED Mbps	1.34
NO. OF SAMPLES =< 2 Mbps	9568
NO. OF SAMPLES > 2 Mbps	2418
FILE DOWNLOAD SUCCESS RATE%	77.90

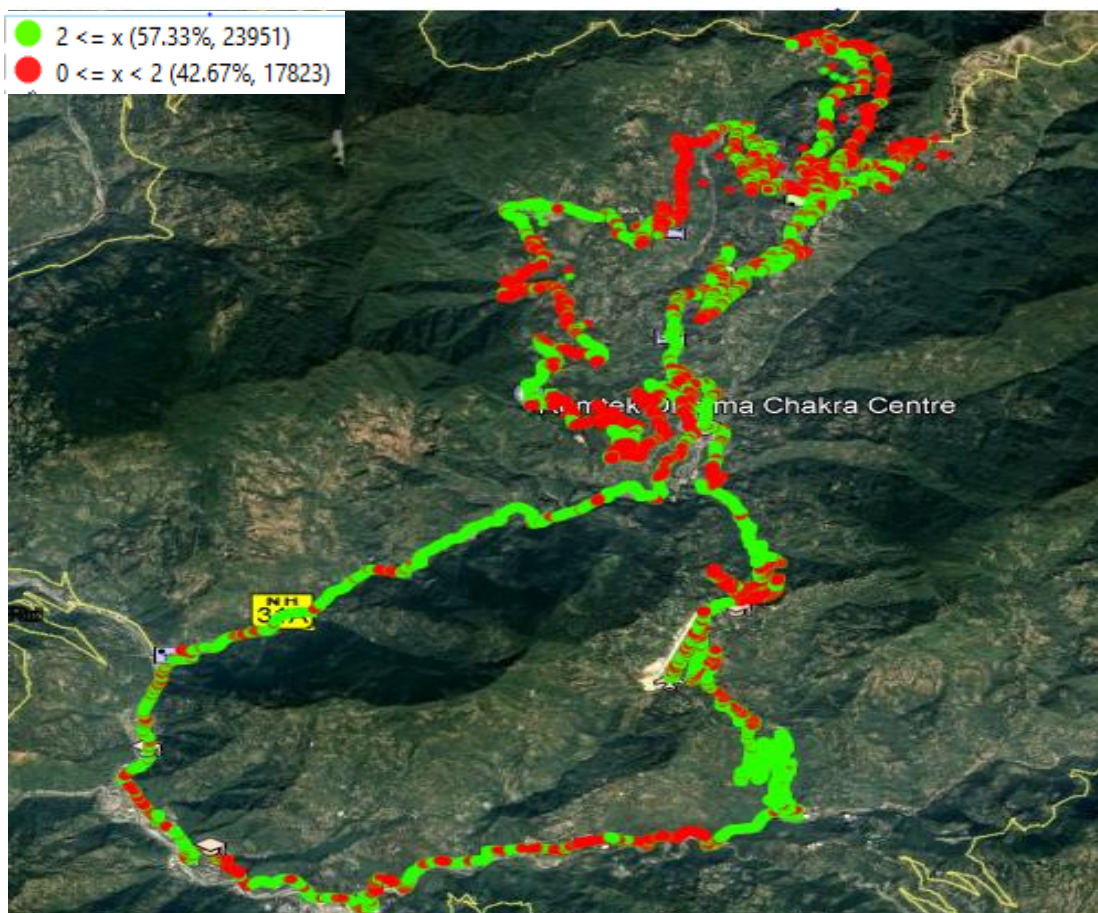


# IV. Dynamic Data Test- 4G DL Details

## Jio

### Data Statistics - Dynamic Complete 280 Kms

Data KPIs - Overall	4G
Download Throughput (Mbps)	<b>4.23</b>



TSPTS	JIO
AVG. SPEED Mbps	4.23
NO. OF SAMPLES =< 2 Mbps	17823
NO. OF SAMPLES > 2 Mbps	23951
FILE DOWNLOAD SUCCESS RATE%	92.83

# IV. Dynamic Data Test-4G DL Details

## VIL

### Data Statistics - Dynamic Complete 280 Kms

Data KPIs - Overall	4G
Download Throughput (Mbps)	<b>2.33</b>



TSPS	VIL
AVG. SPEED Mbps	2.33
NO. OF SAMPLES =< 1 Mbps	1083075
NO. OF SAMPLES > 1 Mbps	13970775
FILE DOWNLOAD SUCCESS RATE%	96.73

## •DATA SPEED TESTING REPORT THROUGH TRAI MY SPEED APP

The Snap Shots measurements of TRAI Myspeed App are furnished in Table-1.

(Only these Snap Shots of TRAI Myspeed which are taken below where download speed in 4G is less than 5 Mbps)

LOCATION	DATE	TIME	TSP	SIGNAL STRENGTH (-dbm)	DOWNLOAD SPEED(Mbps)	UPLOAD SPEED(Mbps)
RANGPO	26.09.21	06.59 PM	BSNL	77	3.44	1.23
RANGPO	26.09.21	07.01 PM	AIRTEL	83	0.31	5.41
RANGPO	26.09.21	07.01 PM	VI	89	0.35	5.4
SINGTAM	26.09.21	07.38 PM	BSNL	73	4.63	2.12
SINGTAM	26.09.21	07.41PM	JIO	93	2.08	0.3
RANIPOOL AREA	26.09.21	08.26PM	BSNL	92	2.13	3.03
RANIPOOL AREA	26.09.21	08.33PM	AIRTEL	86	3.12	5.51
TASHI VIEW POINT	27.09.21	10.30AM	AIRTEL	113	3.45	0.48
TASHI VIEW POINT	27.09.21	10.33AM	BSNL	112	0.79	1.25
TASHI VIEW POINT	27.09.21	10.36AM	AIRTEL	116	3.15	0.84
TASHI VIEW POINT	27.09.21	10.37AM	VI	117	1.02	0.79
TASHI VIEW POINT	27.09.21	10.39AM	VI	112	2.73	0.24
GANESH TOK	27.09.21	10.48AM	JIO	96	2.99	2.59
TASHI VIEW POINT	27.09.21	10.33AM	BSNL	112	0.79	1.25
HANUMAN TOK	27.09.21	11.11AM	AIRTEL	109	2.45	1.74
TOURIST INFORMATION CENTER	27.09.21	10.52AM	VI	108	0.35	0.5
3RD MILE CHECK POST	27.09.21	11.23AM	JIO	115	2.39	0.51
3RD MILE CHECK POST	27.09.21	11.43AM	AIRTEL	103	1.49	3.6
CM HOUSE	27.09.21	11.57AM	AIRTEL	109	1.9	1.76
CM BUNGALOW	27.09.21	11.56AM	JIO	108	0.58	0.12
CM BUNGALOW	27.09.21	12.00PM	VI	91	1.32	0.37
VIP COLONY GATE	27.09.21	12.02PM	VI	108	0.98	1.16
INSIDE VIP COLONY	27.09.21	12.06PM	BSNL	98	4.88	3.24
MINISTER BANGLOW	27.09.21	12.18PM	VI	106	4.91	0.11
CHIEF SECRETARY BUNGALOW	27.09.21	12.31PM	BSNL	108	0.78	1.18
BACK SIDE OF CHIEF SECRETARY BUNGALOW	27.09.21	12.43PM	BSNL	102	2.79	2.36
BACK SIDE OF CHIEF SECRETARY BUNGALOW	27.09.21	12.47PM	VI	93	0.19	0.12
CIRCUIT HOUSE	27.09.21	12.53PM	BSNL	101	3.11	3.91
CIRCUIT HOUSE	27.09.21	12.52PM	VI	117	2.02	0.99
CHIEF SECRETARY HOUSE	27.09.21	01.05PM	VI	93	2.38	0.01
CS BUNGALOW FRONT	27.09.21	01.06PM	BSNL	109	0.85	1.53
CS RESIDENCY	27.09.21	01.10PM	VI	95	2.43	2.38
RAJBHABAN	27.09.21	02.16PM	JIO	112	2.81	0.25
RAJBHABAN	27.09.21	02.16PM	AIRTEL	105	4.99	1.26
MANIPAL HOSPITAL	27.09.21	05.18PM	VI	99	4.49	2.81
HIGH COURT GATE	27.09.21	05.36PM	VI	108	3.33	2.47
HIGH COURT	27.09.21	05.35PM	AIRTEL	105	4.47	4.47
HIGHCOURT FRONTGATE	27.09.21	05.40PM	VI	110	4.08	1.57
HIGH COURT	27.09.21	05.44PM	BSNL	104	1.65	1.18
MG MARG 2	27.09.21	06.17PM	BSNL	65	4.26	3.99
STNM HOSPITAL	28.09.21	10.13AM	AIRTEL	107	3.34	2.97
STNM HOSPITAL	28.09.21	10.12AM	AIRTEL	100	3.6	1.7



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(Only these Snap Shots of TRAI Myspeed which are taken below where download speed in 4G is less than 5 Mbps)

LOCATION	DATE	TIME	TSP	SIGNAL STRENGTH (-dbm)	DOWNLOAD SPEED(Mbps)	UPLOAD SPEED(Mbps)
STNM HOSPITAL	28.09.21	10.06AM	BSNL	100	0.25	0.11
SICHEY DC COURT	28.09.21	10.21AM	BSNL	110	2.5	1.07
INSIDE RANKA GPU	28.09.21	11.01AM	JIO	100	3.45	2.11
RANKA BLOCK OFFICE OUT SIDE	28.09.21	10.59AM	BSNL	98	0.27	2.12
RANKA BLOCK OFFICE INSIDE	28.09.21	11.05AM	BSNL	100	0.67	1.23
2ND TEST	28.09.21	11.06AM	JIO	94	3.19	2.44
INDOOR	28.09.21	11.05AM	AIRTEL	102	3.14	1.7
OUTDOOR	28.09.21	11.09AM	AIRTEL	90	4.92	3.73
RUMTEK PHARMA COLLEGE	28.09.21	11.45AM	BSNL	104	0.14	0.13
GOVT.PHARMACY COLLEGE RUMTEK	28.09.21	11.45AM	AIRTEL	104	2.03	1.27
GOVT.PHARMACY COLLEGE RUMTEK	28.09.21	11.46AM	VI	107	0.42	0.14
GOVT.PHARMACY COLLEGE RUMTEK	28.09.21	11.43AM	JIO	109	1.5	2.18
2ND TEST	28.09.21	11.49AM	JIO	111	2.32	2.45
RUMTEK MONETARY OUTDOOR	28.09.21	12.01PM	BSNL	97	0.34	1
INSIDE MONESTRY	28.09.21	12.14PM	JIO	108	5	4.58
RUMTEK MONETARY INDOOR	28.09.21	12.16PM	BSNL	104	0.44	0.21
RUMTEK MONETARY INDOOR	28.09.21	12.15PM	AIRTEL	109	1.53	0.95
2ND TEST INSIDE	28.09.21	12.23PM	BSNL	106	1.54	0.81
RANIPOOL TAXI STAND 2	28.09.21	01.39PM	BSNL	84	3.37	6.54
AIRPORT	28.09.21	04.13PM	AIRTEL	86	1.81	1.74
AIRPORT 2	28.09.21	04.16PM	JIO	84	4.15	4.45
AIRPORT	28.09.21	04.16PM	AIRTEL	69	1.32	16.71
PAKYONG AIRPORT	28.09.21	04.25PM	BSNL	112	0.51	0.03
RODATHANG	28.09.21	05.16PM	AIRTEL	104	1.28	1.59
RODATHANG	28.09.21	05.18PM	VI	114	2.45	0.79
RANGPO PPST OFFICE	28.09.21	07.01PM	VI	99	0.52	3.35
RANGPO PPST OFFICE	28.09.21	07.01PM	VI	101	0.43	4.39

# VI. Video Call Testing

## •VEDIO CALL TESTING REPORT

Video Call Testing Report where Video Call disconnection and poor Video quality/ Video freeze found (Table-2)-

Observations of Video Calls on the way from Rangpo to Gangtok			
DATE	TIME	TSP NAME	Remarks
26.09.2021	19.25	BSNL & VI	Video freeze and disconnect
26.09.2021	19.28	RJIO	Video call Disconnect
26.09.2021	19.38	AIRTEL	Video call Disconnect
26.09.2021	19.41	BSNL	Video call Disconnect
26.09.2021	19.51	RJIO	Video freeze
26.09.2021	19.56	VI	Video call Disconnect
26.09.2021	19.58	BSNL	Video call Disconnect (No 3G/4G)
26.09.2021	20.12	RJIO	Video call Disconnect
26.09.2021	20.15	AIRTEL	Ranipool PS -Video freeze and disconnect
26.09.2021	20.5	BSNL	Video call Disconnect
Observations of Video Calls in Gangtok City & surrounding areas			
DATE	TIME	TSP NAME	Remarks
27.09.2021	10.15	AIRTEL	Video freeze- Near Borjokhal
27.09.2021	10.15	VI	Video freeze- Near Borjokhal
27.09.2021	10.15	RJIO	Video freeze- Near Borjokhal
27.09.2021	10.25	VI	Video call Disconnect
27.09.2021	10.45	BSNL	Video call Disconnect
27.09.2021	10.48	VI	Video call Disconnect
27.09.2021	10.55	VI & BSNL	(No signal VI-4G, BSNL-3G/4G), Ganesh Tok
27.09.2021	11.00	RJIO, VI & BSNL	(No signal -RJIO & VI-4G, BSNL-3G/4G), Hanuman Tok
27.09.2021	11.06	VI & BSNL	(No signal VI-4G, BSNL-3G/4G), Tourist Center
27.09.2021	14.15	BSNL	Video freeze and disconnect
Observations of Video Calls on the way from Gangtok to Rangpo via Pakyong Airport and Rumtek Monastery			
DATE	TIME	TSP NAME	Remarks
28.09.2021	10.05	RJIO & AIRTEL	Video freeze
28.09.2021	10.17	RJIO	Video freeze
28.09.2021	10.31	BSNL	Video call Disconnect
28.09.2021	10.35	RJIO	Video call Disconnect
28.09.2021	10.38	AIRTEL	Video freeze
28.09.2021	10.45	BSNL,RJIO & AIRTEL	Video freeze
28.09.2021	11.2	VI	Video freeze- Near Ranka BDO
28.09.2021	11.30 to 11.45	BSNL,RJIO & AIRTEL	Video freeze & disconnect- RANKA GPU to RUMTEK
28.09.2021	12.52 to 13.20	BSNL,RJIO & VI	Video freeze & disconnect- RUMTEK to RANIPOOL
28.09.2021	15.30 to 15.50	VI & BSNL	No signal VI-4G, BSNL-3G/4G(AIRPORT TO RORATHAG)
28.09.2021	15.55	VI	Video call Disconnect

## 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-

#### AIRTEL

Rx Quality (91.32%) in 2G network and SINR (85.55%) in 4G network do not meet the benchmarks.

Total Data service (4G) of Airtel was poor on 26.09.21 by 19.00 Hrs at Rangpo due to failure of TX link (OFC). Airtel has been asked to ensure redundant path for improving availability and QoS of Data Services.

Data service and 4G signal was extremely poor near Ranipool Police Station.

The outdoor signal strength around VIP colony and Raj Bhawan area was not very good and therefore indoor coverage will be extremely poor. The signal strength from the new tower of Airtel at VIP colony was also not very good in front of the residence of Chief Secretary even if the distance is around only 200 mtr. M/s Airtel has been asked to resolve the issues.

Poor video quality and poor coverage was observed from Ranka GPU to Rumtek, Rumtek Government Pharmacy College and inside the Rumtek Monastery.

Airtel has been asked to take necessary action including software/ hardware optimization to improve Rx Quality (2G), SINR (4G), Video calls disconnections, poor Video quality, coverage/ download throughputs and all important locations on the drive test route. An action taken report is to be submitted by 10.12.2021.

#### BSNL

Call Drop rate (3.33%) and Rx Quality (93.2%) in 2G network and CSSR (91.41%), Call Drop rate (7.81%), SINR (53.08%), RRC Cong.(2.79%), Block Call rate (9.36%), HOSR (74.38%) in 4G network do not meet the benchmarks.

Average download data speed (4G network- Locked mode) is 1.34 Mbps throughout the drive test route.

The outdoor signal strength around VIP colony area and residence of Chief Secretary is not very good and therefore indoor coverage will be extremely poor.

There was no signal/ very poor coverage of 4G/ 3G at Ganseh Tok, Tourist center, Hanuman Tok, CMO, from Ranka GPU to Rumtek, inside the Rumtek Monastery, Rumtek Government Pharmacy College, Airport, Rumtek to Ranipool (only 2G)

BSNL has been asked to take necessary action including software/ hardware optimization to improve Call Drop rate (3.33%) and Rx Quality (93.2%) in 2G network and CSSR (91.41%), Call Drop rate (7.81%), SINR (53.08%), Block Call rate (9.36%), HOSR (74.38%) in 4G network, Video calls disconnections, poor Video quality, coverage/ download throughputs and all important locations on the drive test route. An action taken report is to be submitted by 10.12.2021.

## 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 (74.66%) in 4G network do not meet the benchmarks.

Average download data speed (4G network- Locked mode) is 4.23 Mbps throughout the drive test route.

The outdoor signal strength around Raj Bhawan area and residence of Chief Secretary area was not very good and therefore indoor coverage will be extremely poor.

There was no signal/ very poor coverage of 4G at Hanuman Tok, inside Ranka BDO office, from Ranka GPU to Rumtek, Rumtek Government Pharmacy College, inside the Rumtek Monastery, Rumtek to Ranipool.

RJIO has been asked to take necessary action including software/ hardware optimization to improve SINR (74.66%) in 4G network, Video calls disconnections, poor Video quality, coverage/ download throughputs and all important locations on the drive test route. An action taken report is to be submitted by 10.12.2021.

#### VIL

Average download data speed (4G network- Locked mode) is 2.33 Mbps throughout the drive test route.

Total Data service (4G) of VIL was poor on 26.09.21 by 19.00 Hrs at Rangpo due to failure of TX link (OFC). VIL has been asked to ensure redundant path for improving availability and QoS of Data Services.

The outdoor signal strength around VIP colony, Raj Bhawan area and residence of Chief Secretary was not very good and therefore indoor coverage will be extremely poor.

There was no signal/ very poor coverage of 4G at Ganesh Tok, Tourist Center, Hanuman Tok, inside Ranka BDO office, from Ranka GPU to Rumtek, Rumtek Government Pharmacy College, inside the Rumtek Monastery, Rumtek to Ranipool.

VIL has been asked to take necessary action including software/ hardware optimization to improve Video calls disconnections, poor Video quality, coverage/ download throughputs and all important locations on the drive test route. An action taken report is to be submitted by 10.12.2021.

#### 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. There are many routes where coverage is very poor or nil.

**VIL-** 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.