Operator Assisted Drive Test Report
Lunglei–Lawngtlai–Siaha, Mizoram
December, 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, Call Setup Success Rate, and Handover Success Rate in 2G network.

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

VIL- Drop Call Rate in 2G network and Rx Quality in 4G (SINR) network.

It is observed that 2G,3G & 4G coverage of VIL on some portions of the OADT routes are inadequate. BSNL did not submit the OADT report of 3G/4G coverage & Quality for Voice Services.

The Operator Assisted Drive Test has been carried out by Regional Office, Kolkata with the help of Service Providers in Lunglei – Lawngtlai – Siaha and surrounding areas including National Highways (302, 2) on 21st and 22nd December 2023 from 08.30 AM to 08.30 PM. The drive test covered drive route of 304 KMs (approx) over a period of 2 days. Approximately 143+ calls were made for each of the 8 networks: three 2G networks, two 3G networks and three 4G networks covering four TSPs.

Overview

Voice Summary

Data Summary

Overview

Lunglei was the Capital of South Lushai Hill Districts for 10 years from 1888, as was Aizawl for the North Hill Districts. The two were united in 1898. Lunglei is the second-largest town in Mizoram.

Lawngtlai district is located in the south western most part of Mizoram having international boundaries with Bangladesh to the west and Myanmar to the south. The district is bounded by Lunglei District to the north and Saiha District to the east.

Siaha is one of the eleven districts of Mizoram state in India. The district is bounded on the northwest by Lunglei district, on the north and west by Lawngtlai District and on the south and east by Myanmar.

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, two 3G networks, 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, two 3G (Lock Mode) networks, 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.com
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	YES
4G	YES	NO	YES	YES
TOOL USED	TEMS	NIMO	X-CAL	TEMS

Voice & Dynamic Data Test Drive Route

Drive Routes: Lunglei–Lawngtlai–Siaha

DAY-1–DC Office Lunglei-Urbar Primary Health Centre Lunglei-Hauruang- Dawn-Pachang- Phairuangkai Health Care-Chhumkhum-Rangte- Lalnutui-South Lungrang-Rualalung-Chawngte-Hmunlai-Mualbu L-Chawngtelui-Diltlang South-Khawmawi-Mampui-Lawngtlai-DC office Lawngtlai.

DAY-2–DC office Lawngtlai-Saikah Primary School-Chawntlangpui-Sitlangpui Govt. Primary School-Kawlchaw Police Station-Serkawr-Tuipang-Tipa Police Station-Siatlai-Zawngling-Theiri-Lower Theiva Health Sub Centre-Maubawk Govt High School, Amobyu B-Zero point-Thingsen-DC Office Siaha.
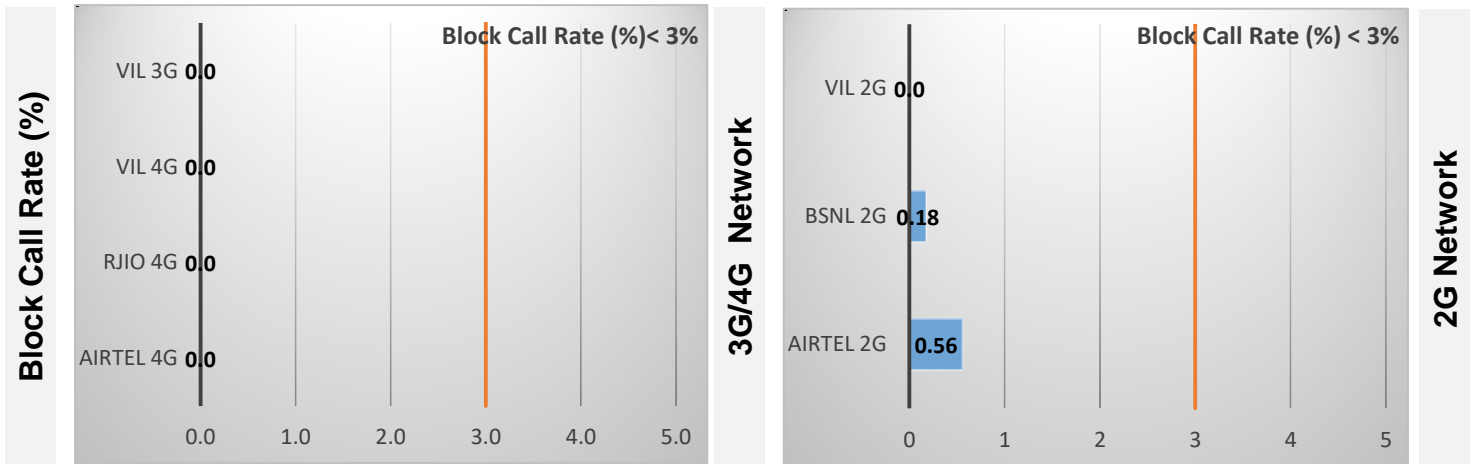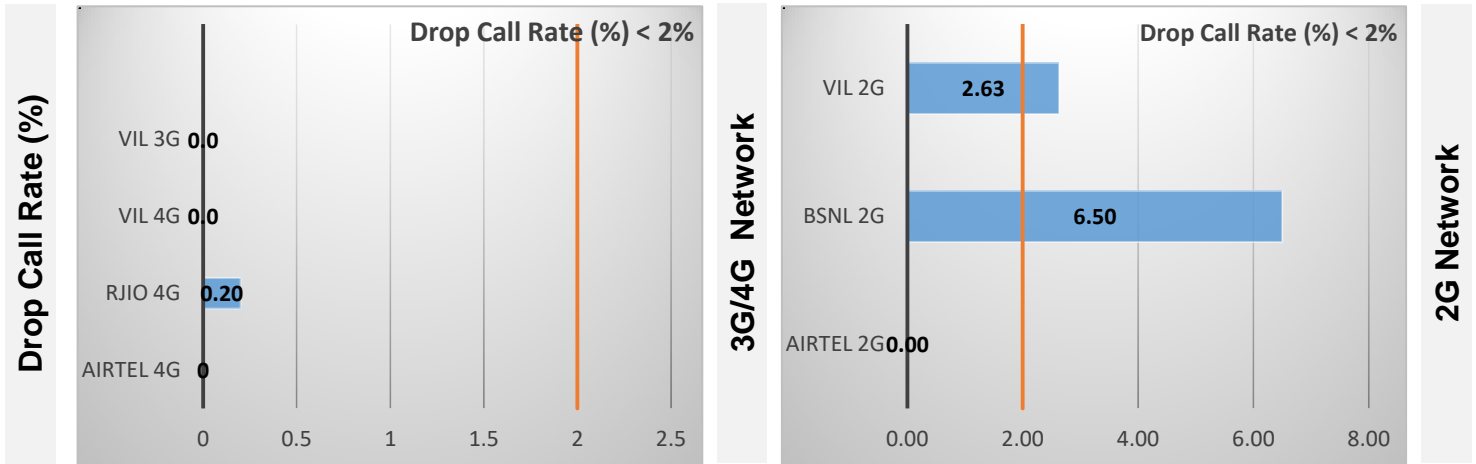
Data Service Test- Static Locations

Static Locations
DC Office Lunglei
DC Office Lawngtlai
DC Office Siaha

Voice Calls

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

KPIs	2G			3G	4G-VoLTE		
	AIRTEL	BSNL	VIL	VIL	AIRTEL	RJIO	VIL
Drop Call Rate %	0.0	6.50	2.63	0.0	0.0	0.20	0.0
Block Call Rate %	0.56	0.18	0.0	0.0	0.0	0.0	0.0

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

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

Voice Calls

Coverage

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

TSPs	2G		
	AIRTEL	BSNL	VIL
Coverage %	63.14	44.84	93.33

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

TSPs	3G	4G		
	VIL	AIRTEL	RJIO	VIL
Coverage	97.26	63.58	84.09	96.05

Summary

Voice Call	2G		
	AIRTEL	BSNL	VIL
Call Attempt	180.0	38.0	38.0
Blocked Call Rate (%)	0.56	0.18	0.0
CSSR% (Accessibility)	99.44	81.58	100
Drop Call Rate (%)	0.0	6.50	2.63
Mobility HOSR (%)	100	3.20	100
Rx Quality (%)	96.89	96.39	96.71

Voice Call	3G/4G			
	VIL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Call Attempt	35.0	191.0	506.0	14.0
Blocked Call Rate (%)	0.0	0.0	0.0	0.0
CSSR% (Accessibility)	100	100	100	100
Drop Call Rate (%)	0.0	0.0	0.20	0.0
Mobility HOSR (%)	100	99.70	98.07	100
Rx Quality (%)	95.74	93.38	92.28	87.91

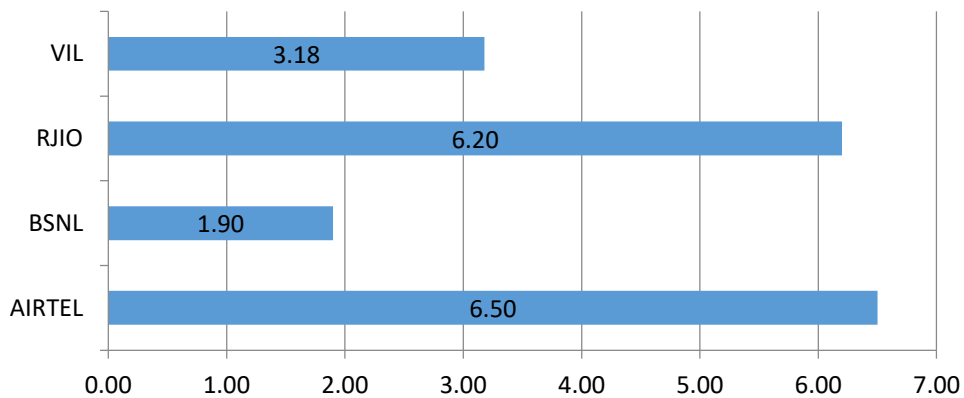Note-BSNL did not submit the OADT report of 3G/4G coverage & Quality for Voice Services.

Dynamic Data was tested for 304 Kms. Download Throughput was tested.

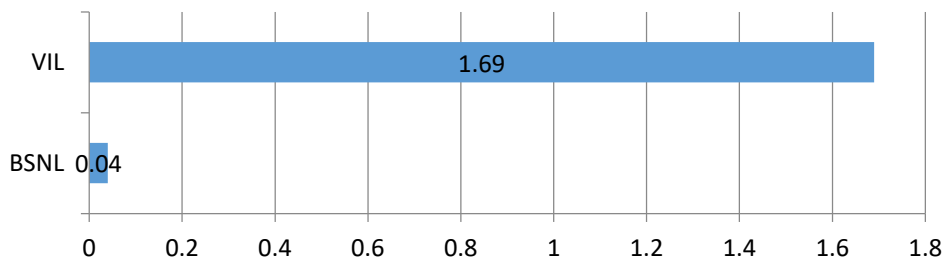**Data Download Performance (Average Throughput in Mbps) - Dynamic Data Testing**

4G Network:

4G-Dynamic Download Average Throuhput (Mbps)

Operator	Throughput (Mbps)
VIL	3.18
RJIO	6.20
BSNL	1.90
AIRTEL	6.50

3G Network:

3G-Dynamic Download Average Throuhput (Mbps)

Operator	Throughput (Mbps)
VIL	1.69
BSNL	0.04

Summary-Data Services Static

Average Data Services Static	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	62.30	73.33	100.52
Upload Throughput (kbps)	39.70	11.33	57.78
Web Browsing Delay (sec)	0.0	31.81	3.28
Latency (msec)	178	483.33	265

Average Data Services Static	3G/ 4G				
	VIL 3G	AIRTEL 4G	BSNL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	4.64	14.43	5.95	9.47	16.71
Upload Throughput in Mbps	1.19	7.70	2.75	2.03	8.43
Video streaming delay (secs)	1.55	0.0	1.60	0.0	0.69
Web Browsing Delay (secs)	1.24	0.0	4.67	0.40	0.31
Latency (msec)	139	70	136.67	43.50	94

Location:-DC Office Lunglei	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	66.20	100.0	98.34
Upload Throughput (kbps)	35.60	9.0	56.73
Web Browsing Delay (sec)	0.0	20.02	1.44
Latency (msec)	179	350	276

Location:-DC Office Lunglei	3G/4G				
	VIL 3G	AIRTEL 4G	BSNL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	5.13	12.30	16.25	23.22	16.72
Upload Throughput in Mbps	1.24	6.80	5.87	2.73	8.44
Video streaming delay (secs)	1.57	0.0	0.80	0.0	0.69
Web Browsing Delay (secs)	1.22	0.0	2.10	1.20	0.31
Latency (msec)	142	77	80	45.5	94

Location:-DC Office Lawngtlai	2G		
	AIRTEL	BSNL	VIL
Download throughput in (kbps)	59.30	50.0	101.06
Upload Throughput in (kbps)	39.50	12.0	54.39
Web Browsing Delay (secs)	0.0	30.10	1.39
Latency (msec)	181	450	259

Location:-DC Office Lawngtlai	3G/4G				
	VIL 3G	AIRTEL 4G	BSNL 4G	RJIO 4G	VIL 4G
Download throughput in (mbps)	4.72	14.30	0.48	3.58	***
Upload Throughput in (mbps)	1.26	7.20	0.30	1.67	***
Video streaming delay (secs)	1.49	0.0	1.50	0.0	***
Web Browsing Delay (secs)	1.30	0.0	5.90	0.0	***
Latency (msec)	136	81	180	41	***

*** VIL has no 4G site

Summary-Data Services Static

Location:- DC Office Saiha	2G		
	AIRTEL	BSNL	VIL
Download throughput in (kbps)	61.40	70.0	102.17
Upload Throughput in (kbps)	44.20	13.0	62.23
Web Browsing Delay (secs)	0.0	45.30	1.36
Latency (msec)	176	650	261

| Location:-DC Office Saiha	3G/4G				
	VIL 3G	AIRTEL 4G	BSNL 4G	RJIO 4G	VIL 4G
Download throughput in (mbps)	4.10	16.70	1.11	1.61	***
Upload Throughput in (mbps)	1.09	9.30	2.07	1.71	***
Video streaming delay (secs)	1.60	0.0	2.50	0.0	***
Web Browsing Delay (secs)	1.21	0.0	6.0	0.0	***
Latency (msec)	139	54	150	44	***

*** VIL has no 4G site

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	63.14
BSNL 2G	44.84
VIL 2G	93.33
VIL 3G	97.26
AIRTEL 4G	63.58
RJIO 4G	84.09
VIL 4G	96.05

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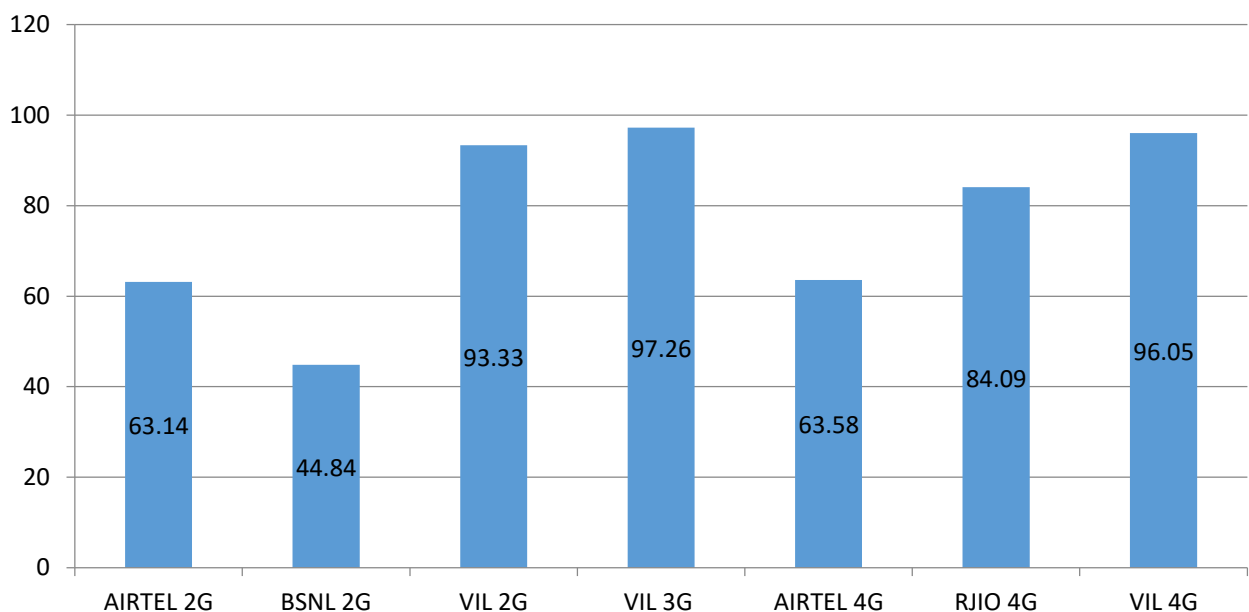
Note- Coverage is the percentage of samples having signal strength more than the threshold value (2G >= -85 dbm, 3G>= -90 dbm and 4G >= -110 dbm). However, these samples are only for the portion of the OADT routes where TSPs have coverage i.e 'no coverage' routes have been excluded.
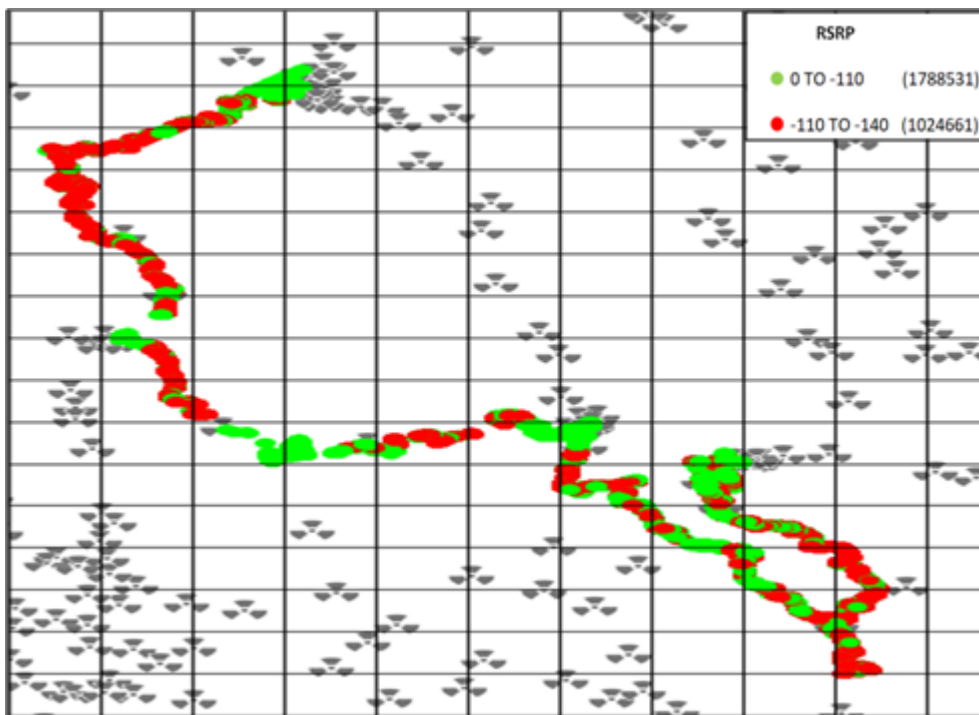
AIRTEL

Technology	Coverage Rate %
2G	63.14
4G	63.58

2G
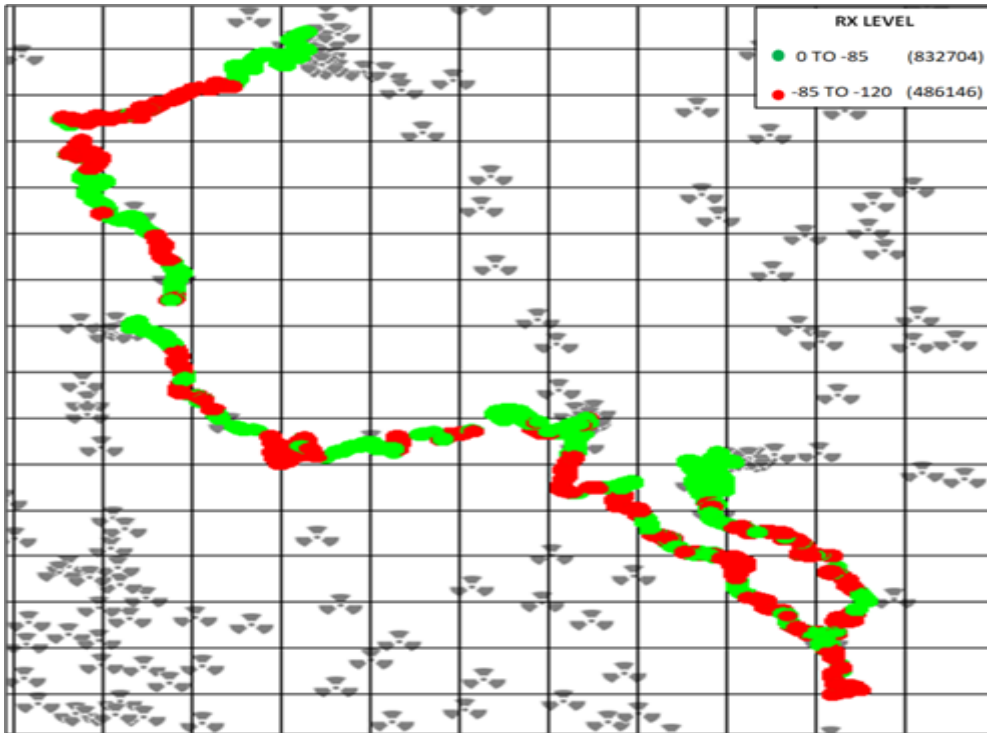
Overall Rx Level	Sample %
[Max >=-75]	20.10
[-75 >=-85)	43.0
[-85 >=-95)	21.70
[-95 >=Min)	15.20
Total	100

4G

Overall RSRP	Sample %
[Max >=-80]	4.34
[-80 >=-90)	19.64
[-90 >=-110)	39.59
[-110 >=Min)	36.42
Total	100

BSNL

Technology	Coverage Rate %
2G	44.84

2G
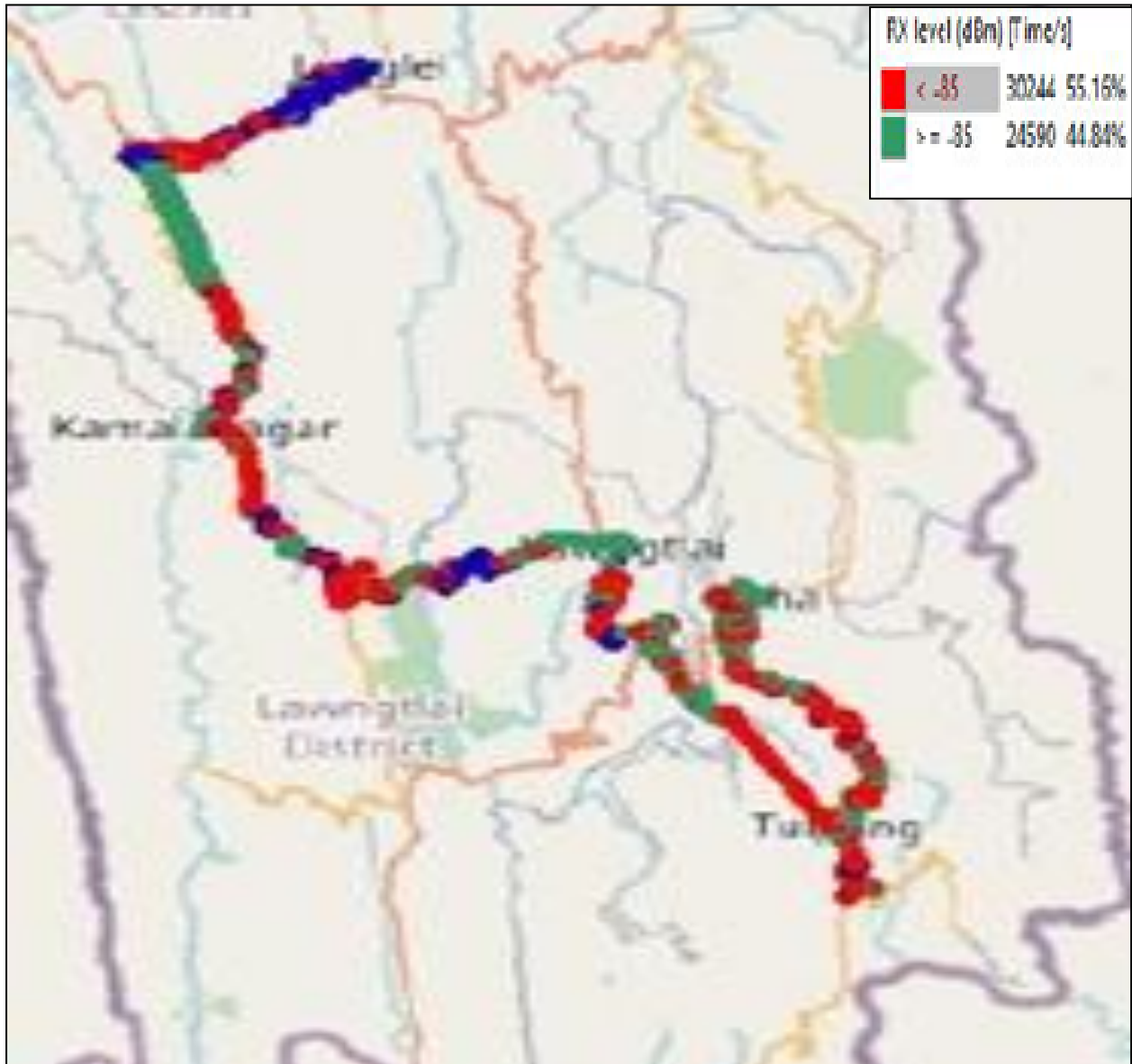
Overall RxLevel	Sample %
[Max >=-75]	25.96
[-75 >=-85)	18.89
[-85 >=-95)	31.86
[-95 >=Min)	23.29
Total	**100**

RJIO

Technology	Coverage Rate %
4G	84.09

4G

LTE KPI PCell Serving RSRP[dBm]
● -110 <= x < 0 (84.10%, 39848)
● x < -110 (15.90%, 7531)
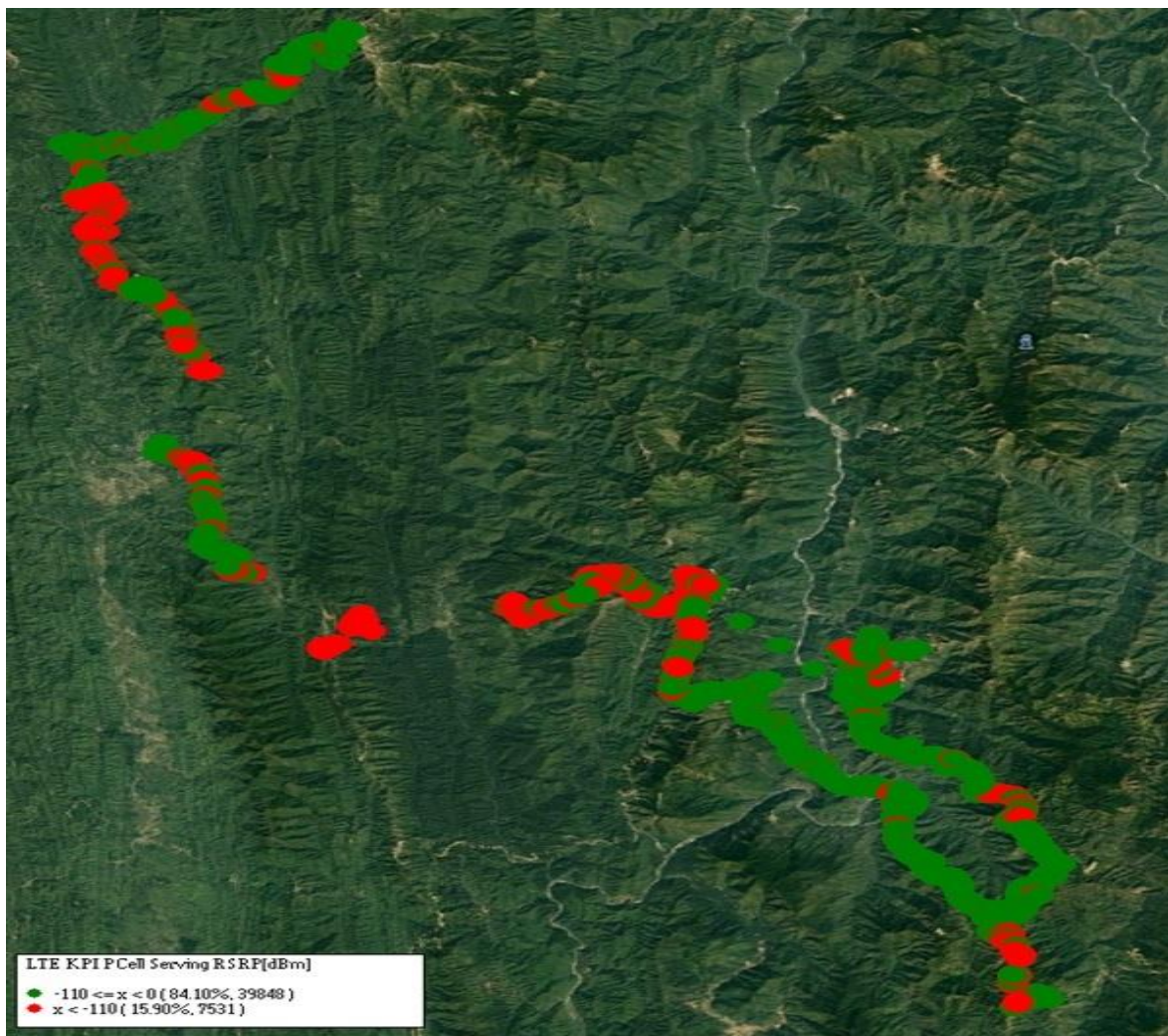
Overall RSRP	Sample %
[Max >=-80]	9.0
[-80 >=-90)	15.0
[-90>=-110)	61.0
[-110 >=Min)	16.0
Total	**100**

VIL

Technology	Coverage Rate %
2G	93.33
3G	97.26

2G

RxLevSub (dBm)
- >=-85 (93.33%) (361726)
- <-85 (06.67%) (25810)

Overall RxLevel	Sample %
[Max >=-75]	51.07
[-75 >=-85)	42.26
[-85 >=-95)	4.07
[-95 =Min)	2.60
Total	**100**

3G

RSCP (dbm)
- >=-90 (97.26%) (49509)
- <-90 (02.74%) (1395)

Overall RSCP	Sample %
[Max, >=-70]	61.54
[-70, >=-80)	30.33
[-80, >=-90)	5.39
[-90, >=Min)	2.74
Total	**100**

VIL

Technology	Coverage Rate %
4G	96.05

4G

Overall RSRP	Sample %
[Max >=-80]	57.23
[-80 >=-90)	32.24
[-90>=-110)	6.58
[-110 >=Min)	3.95
Total	**100**

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	96.89
BSNL 2G	96.39
VIL 2G	96.71
VIL 3G	95.74
AIRTEL 4G	93.38
RJIO 4G	92.28
VIL 4G	87.91

Rx Quality %
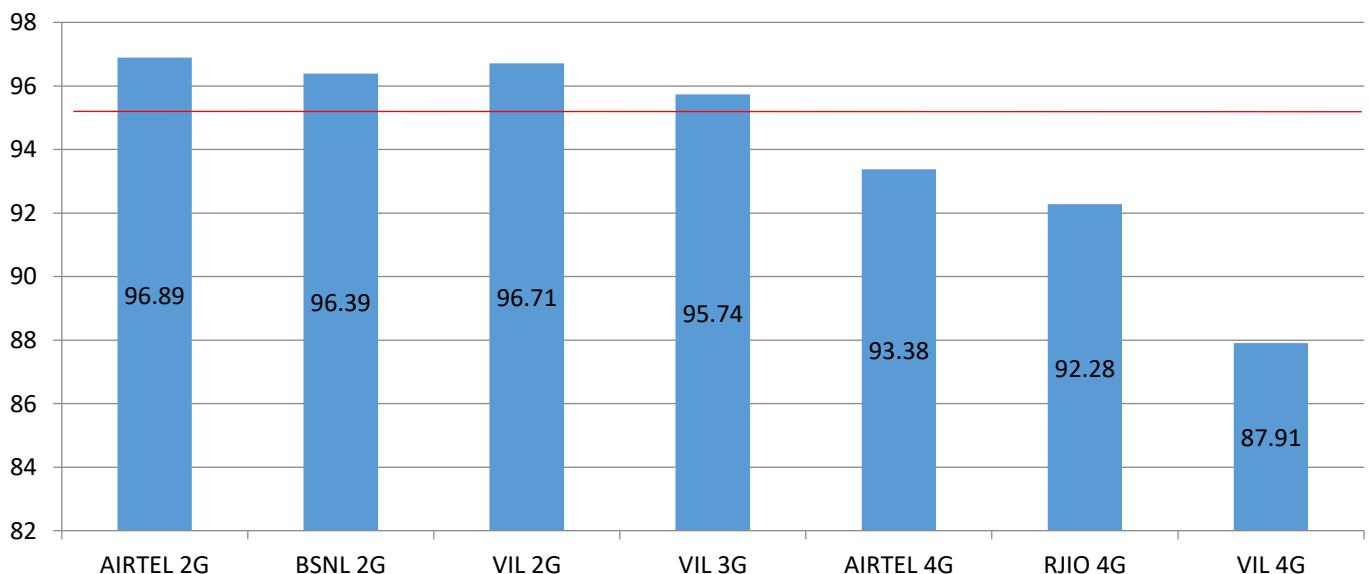
AIRTEL

Technology	Rx Quality %
2G	96.89
4G	93.38

2G
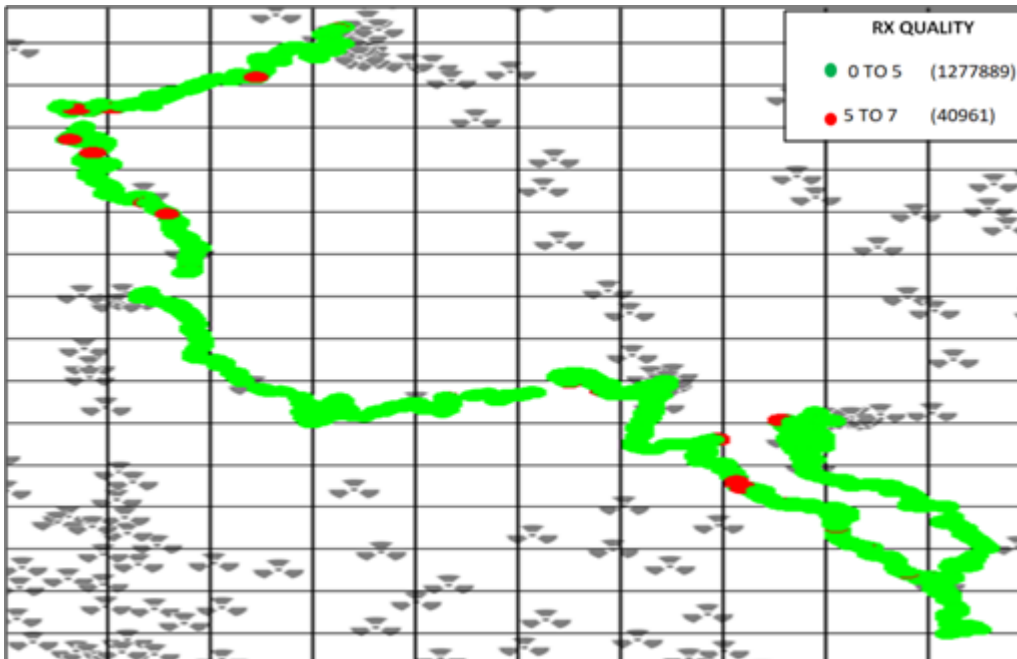
Overall Rx Quality	Sample %
(Min <=2)	84.16
(2 <=3)	4.32
(3 <=4)	3.18
(4 <=5)	5.23
(5 <=Max)	3.10
Total	**100**

4G
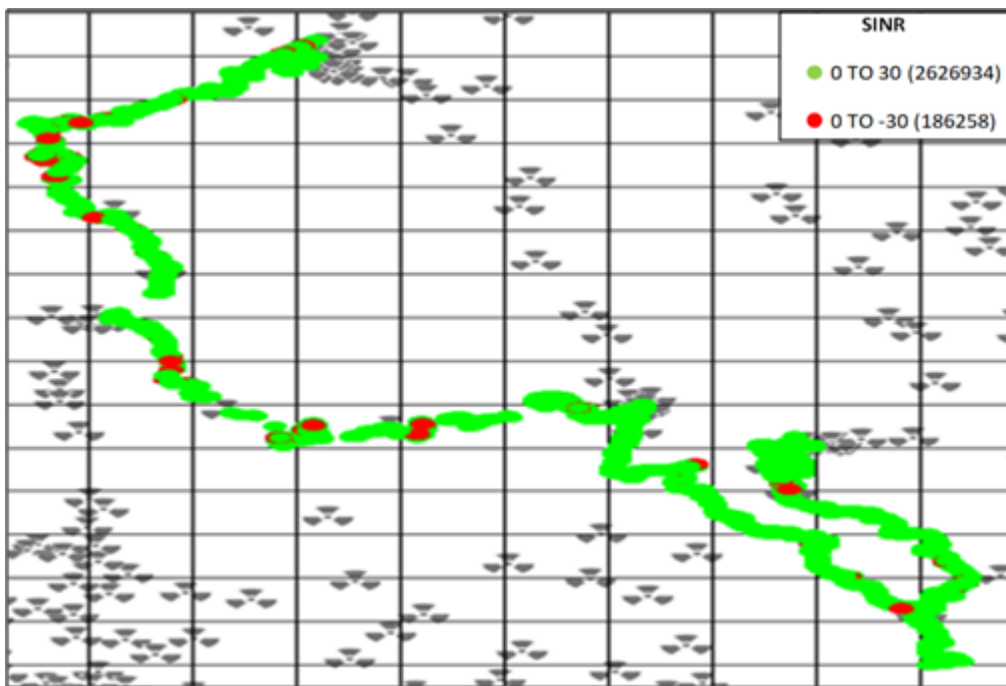
Overall SINR	Sample %
(Min <=0)	6.62
(0 <=5)	34.85
(5 <=10)	22.88
(10 <=15)	19.72
(15 <=Max)	15.92
Total	**100**

BSNL

Technology	Rx Quality %
2G	96.39

2G
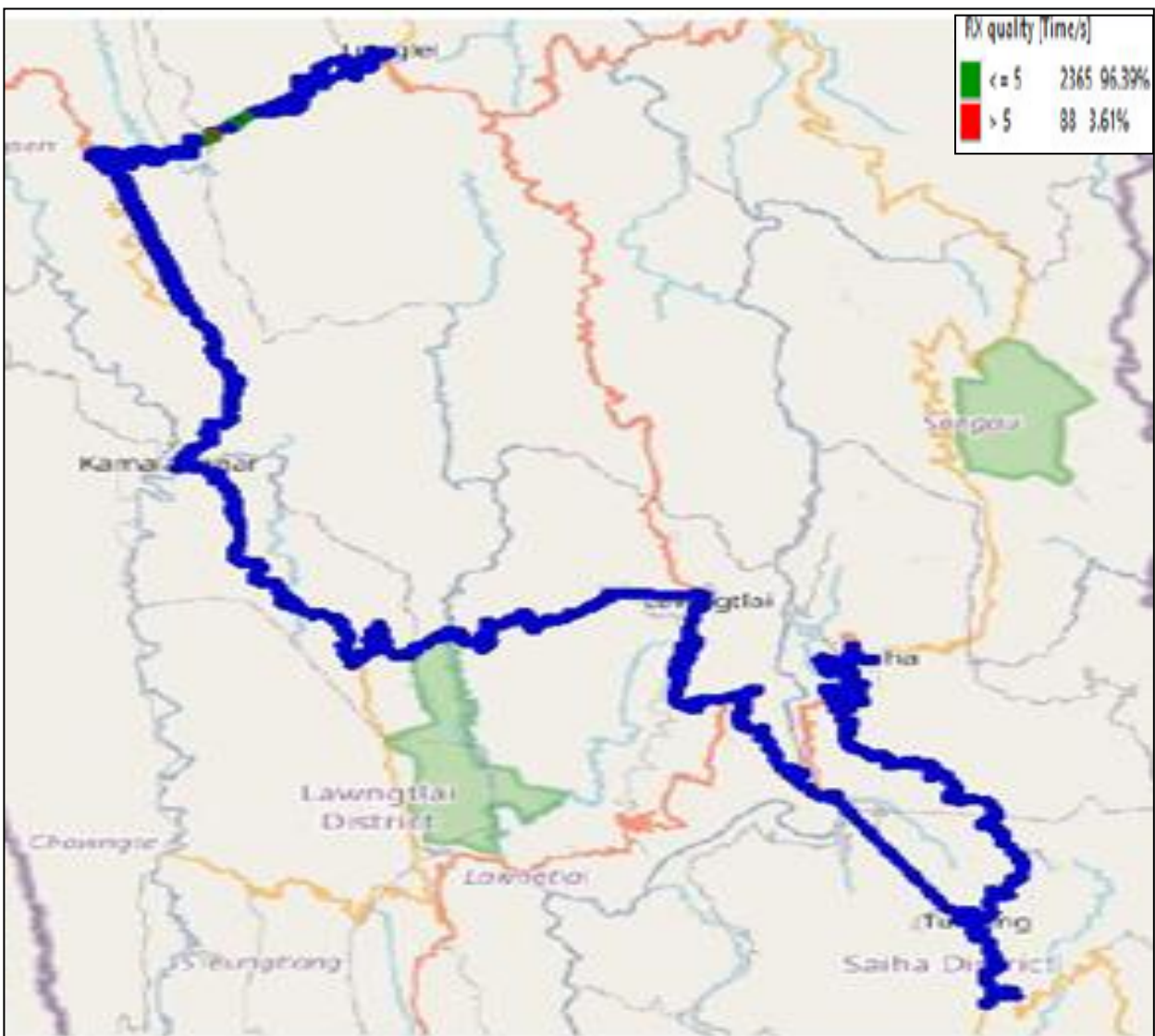
Overall Rx Quality	Sample %
(Min <=2)	86.10
(2 <=3)	4.73
(3 <=4)	3.14
(4 <=5)	2.45
(5 <=Max)	3.59
Total	**100**

RJIO

Technology	Rx Quality %
4G	92.28

4G

LTE KPI PCell SINR[dB]
- ● 0 <x (92.28%, 43720)
- ● x <= 0 (7.72%, 3659)
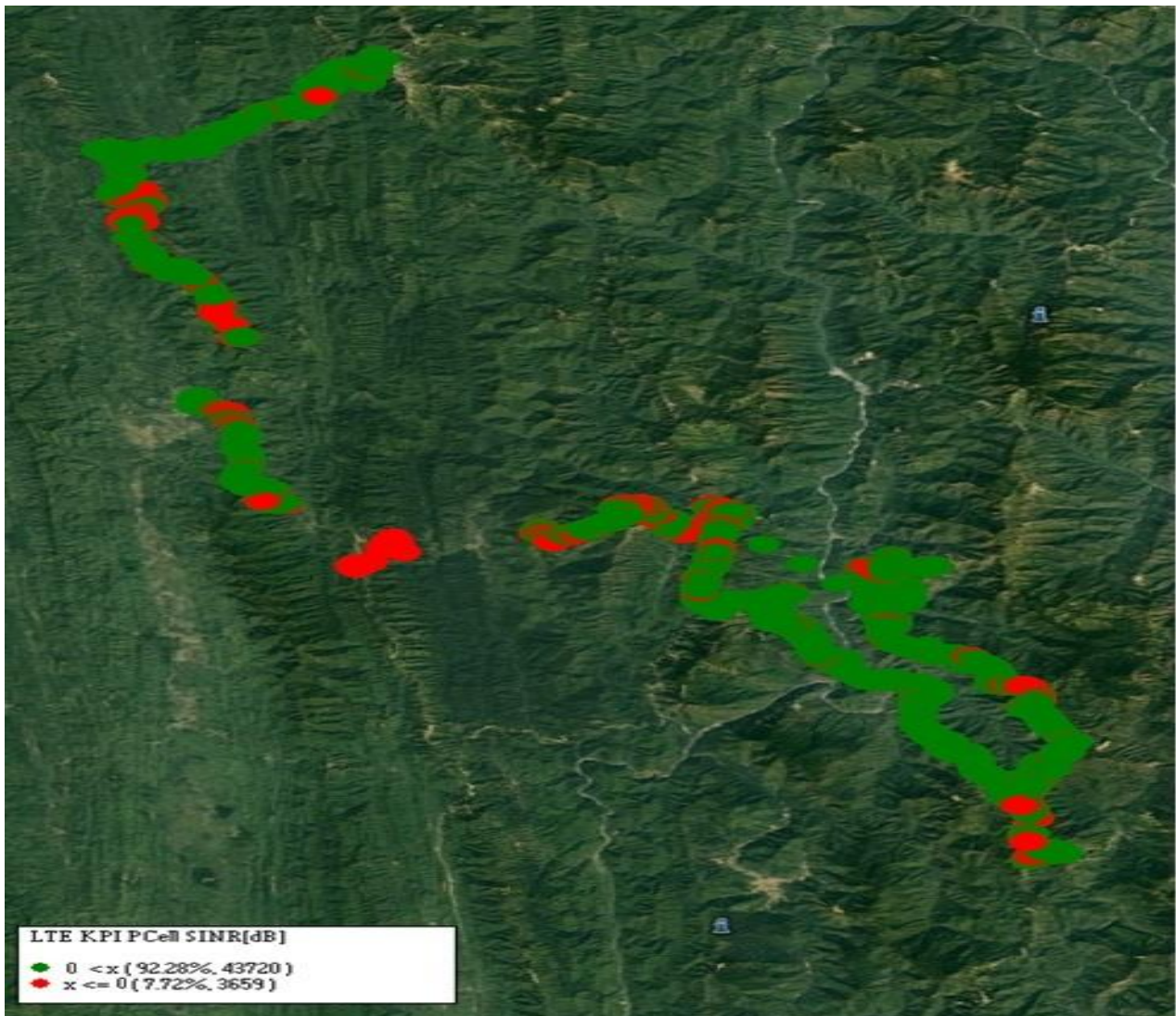
Overall SINR	Sample %
(Min <=0)	7.72
(0 <=5)	34.66
(5 <=10)	21.71
(10 <=15)	15.45
(15 <=Max)	20.46
Total	**100**

VIL

Technology	Rx Quality %
2G	96.71
3G	95.74

2G

RxQual_Sub
- =<5 (96.71%) (374786)
- >5 (03.29%) (12750)

Overall Rx Quality	Sample %
(Min <=2)	19.32
(2 <=3)	29.32
(3 <=4)	25.31
(4 <=5)	22.76
(5 <=Max)	3.29
Total	100

3G

EcNo (dbm)
- >=-14 (95.74%) (48735)
- <-14 (04.26%) (2169)

Overall EcNo	Sample %
(Max <=-6)	20.07
(-6 <=-9)	28.12
(-9 <=-11)	22.65
(-11 <=-14)	24.9
(-14 <= Min)	4.26
Total	100

VIL

Technology	Rx Quality %
4G	87.91

4G
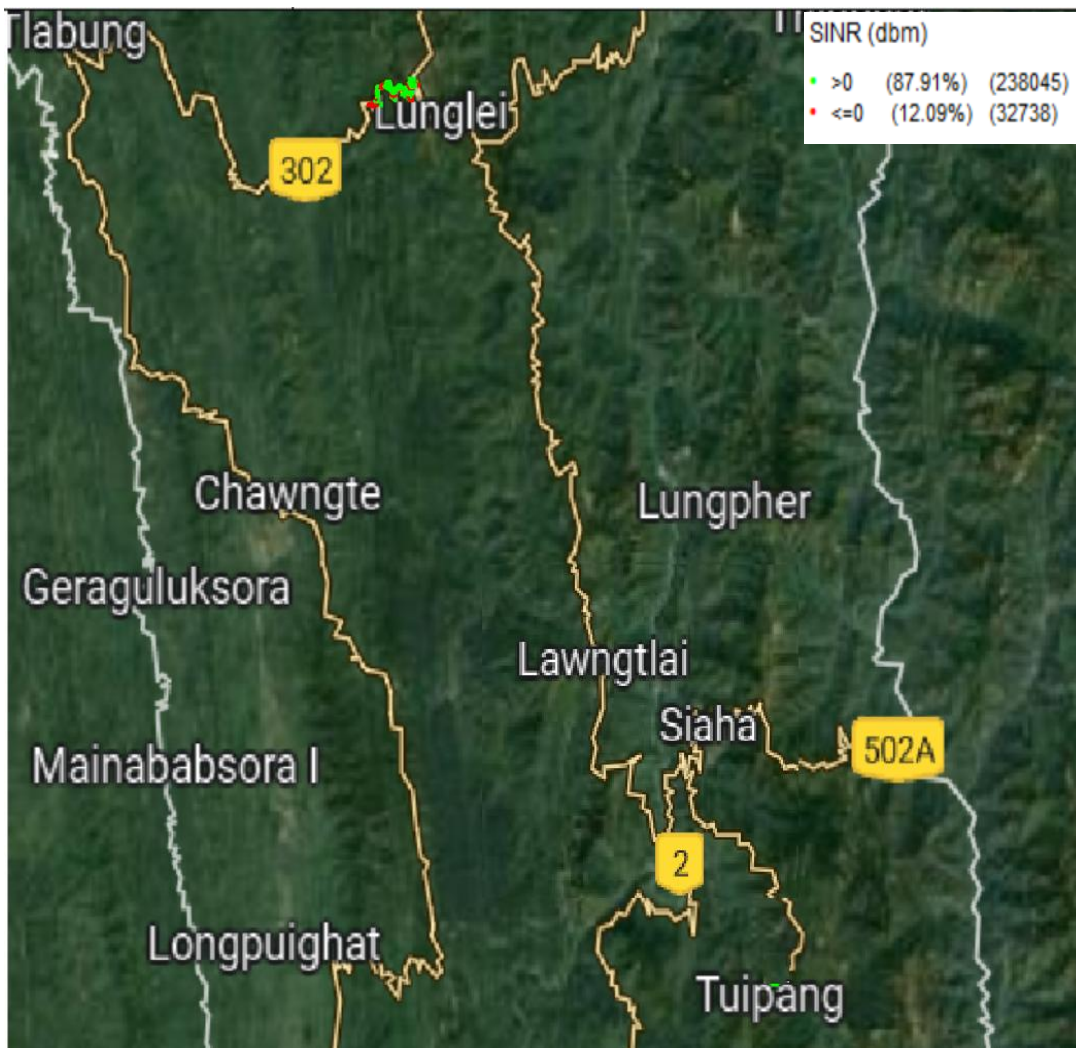
Overall SINR	Sample %
(Min <=0)	12.09
(0 <=5)	20.36
(5 <=10)	23.87
(10 <=15)	27.14
(15 <=Max)	16.54
Total	**100**

AIRTEL

Dynamic Data Testing Complete 304 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	56.50

2G

2G DL	
● 100 TO 500	(1074317)
● 0 TO 100	(713431)
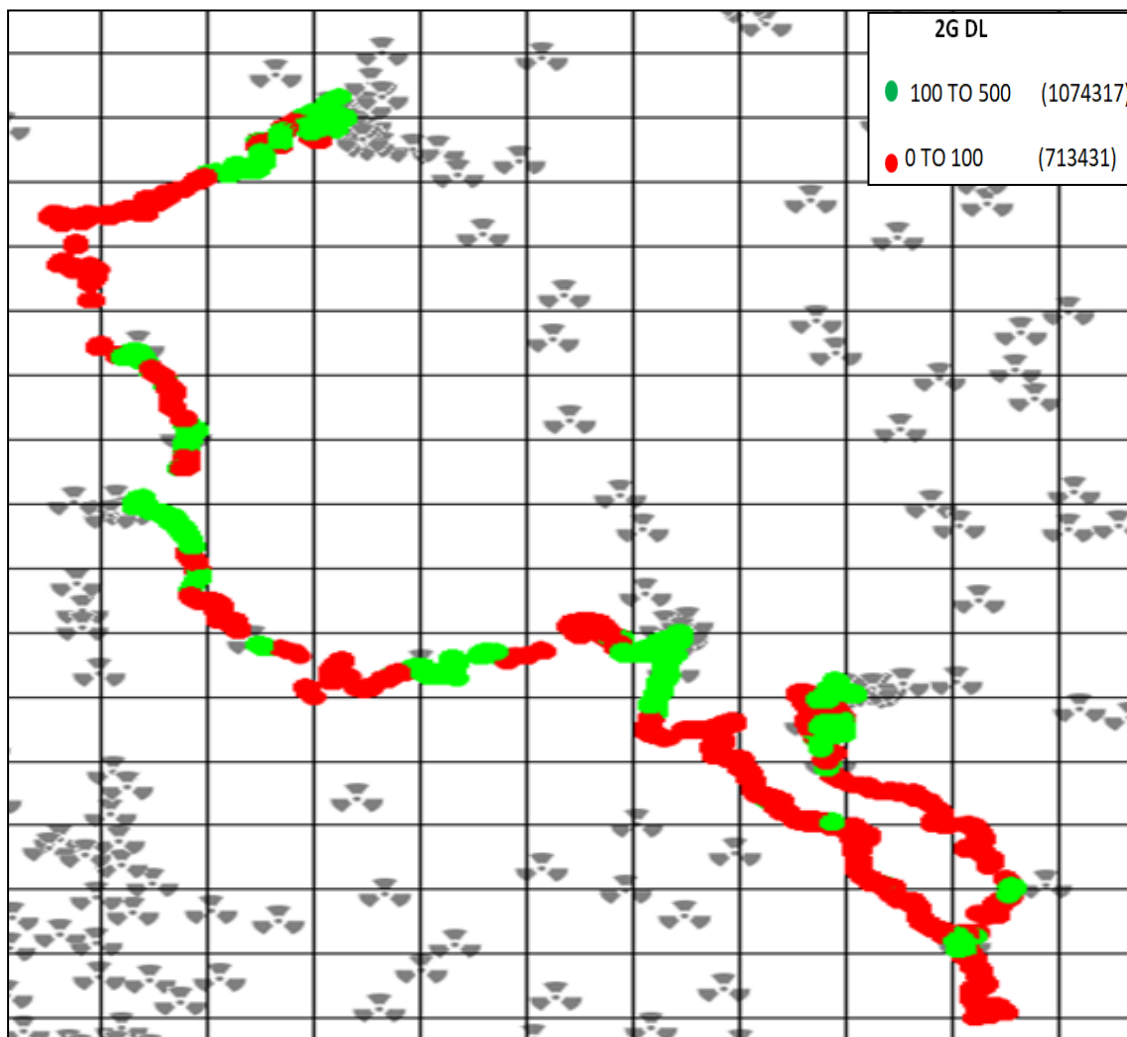
AVG. DOWNLOAD SPEED (Kbps)	56.50
% FILE TRANSFER COMPLETE	53.14
DL throughput	Sample %
0 to 50 Kbps	29.50
50 to 100 Kbps	10.40
100 to 200 Kbps	60.0
200 to 300 Kbps	0.10
>300 Kbps	0.0
Total	**100**

AIRTEL

Dynamic Data Testing Complete 304 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	6.50

4G
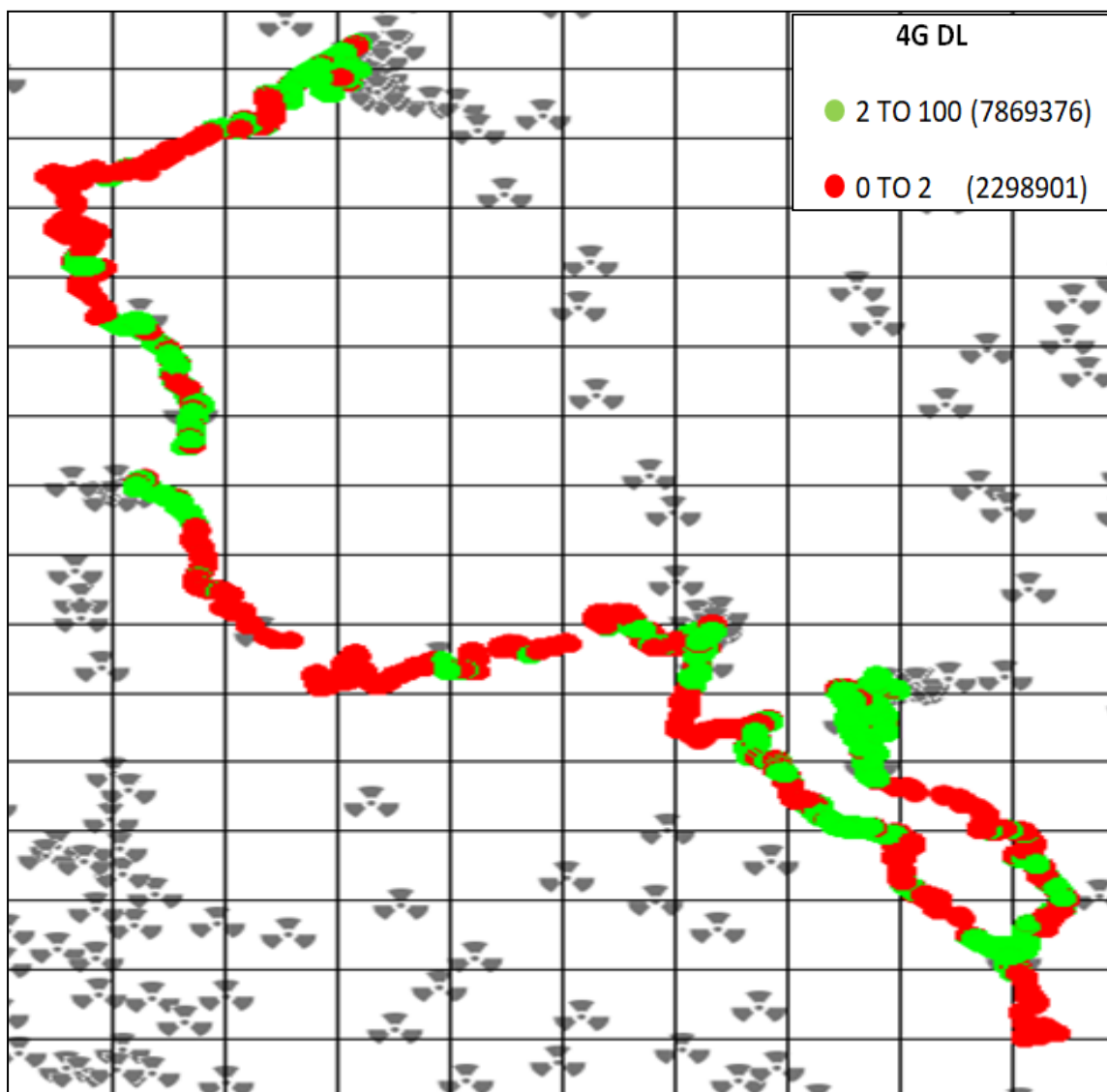
AVG. DOWNLOAD SPEED (Mbps)	6.50
% FILE TRANSFER COMPLETE	72.73
DL throughput	Sample %
0 to 1 Mbps	16.10
1 to 2 Mbps	6.50
2 to 5 Mbps	21.20
5 to 10 Mbps	10.90
>10 Mbps	45.20
Total	100

BSNL

Dynamic Data Testing Complete 304 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	0.50

2G
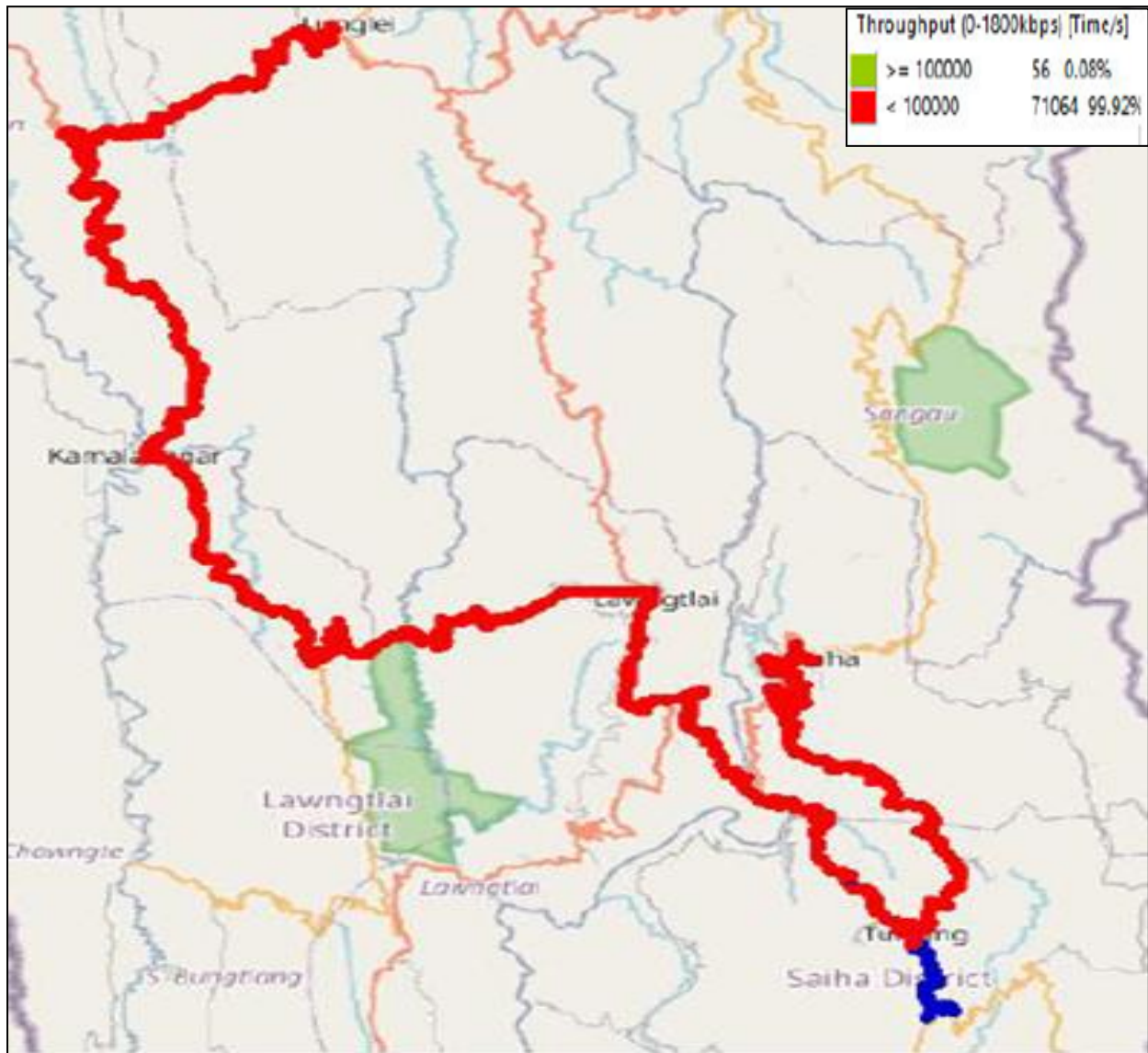
AVG. DOWNLOAD SPEED (Kbps)	0.50
% FILE TRANSFER COMPLETE	27.50
DL throughput	**Sample %**
0 to 50 Kbps	97.40
50 to 100 Kbps	1.81
100 to 200 Kbps	0.67
200 to 300 Kbps	0.12
>300 Kbps	0.00
Total	**100**

BSNL

Dynamic Data Testing Complete 304 Kms

Data KPIs - Overall	3G
Average Download Throughput (Mbps)	0.04

3G

AVG. DOWNLOAD SPEED (Mbps)	0.04
% FILE TRANSFER COMPLETE	25.0
DL throughput	Sample %
0 to 0.5 Mbps	97.64
0.5 to 1 Mbps	1.27
1 to 2 Mbps	0.36
2 to 5 Mbps	0.73
>5 Mbps	0.00
Total	100

BSNL

Dynamic Data Testing Complete 304 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	1.90

4G

AVG. DOWNLOAD SPEED (Mbps)	1.90
% FILE TRANSFER COMPLETE	60.0
DL throughput	**Sample %**
0 to 1 Mbps	93.48
1 to 2 Mbps	2.94
2 to 5 Mbps	3.22
5 to 10 Mbps	0.36
>10 Mbps	0
Total	**100**

RJIO

Dynamic Data Testing Complete 304 Kms

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

4G

LTE KPI PCell PD S CH Throughput[Mbps]
- 2 <= x (54.59%, 18623)
- 0 <= x < 2 (45.41%, 15489)
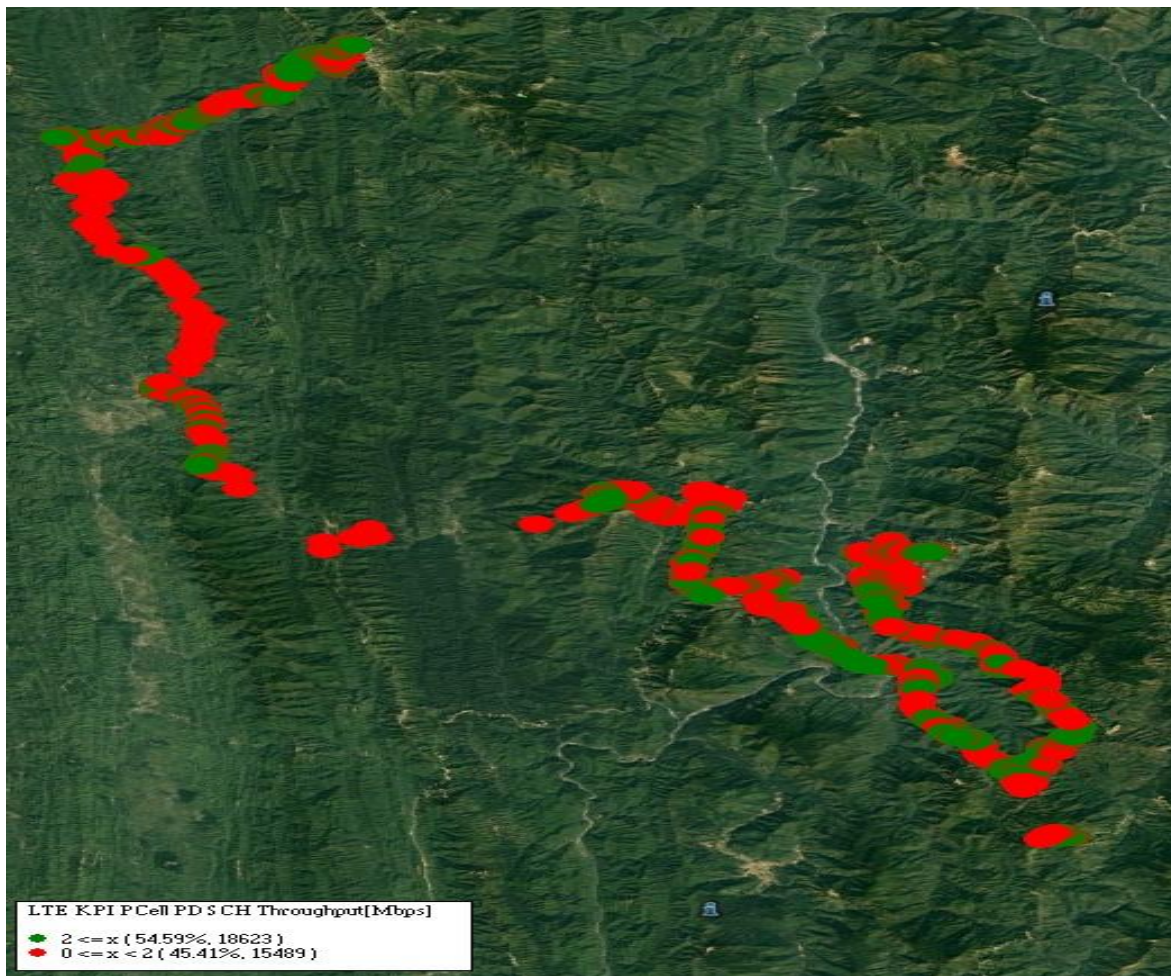
AVG. DOWNLOAD SPEED (Mbps)	6.20
% FILE TRANSFER COMPLETE	100
DL throughput	Sample %
0 to 1 Mbps	36
1 to 2 Mbps	10
2 to 5 Mbps	20
5 to 10 Mbps	16
>10 Mbps	18
Total	**100**

VIL

Dynamic Data Testing Complete 304 Kms

Data KPIs – Overall	2G
Average Download Throughput (Kbps)	100.52

2G

AVG. DOWNLOAD SPEED (Kbps)	100.52
% FILE TRANSFER COMPLETE	92.68
DL throughput	**Sample %**
0 to 50 Kbps	4.72
50 to 100 Kbps	3.64
100 to 200 Kbps	66.44
200 to 300 Kbps	15.08
>300 Kbps	10.12
Total	**100**

VIL

Dynamic Data Testing Complete 304 Kms

Data KPIs – Overall	3G
Average Download Throughput (Mbps)	1.69

3G
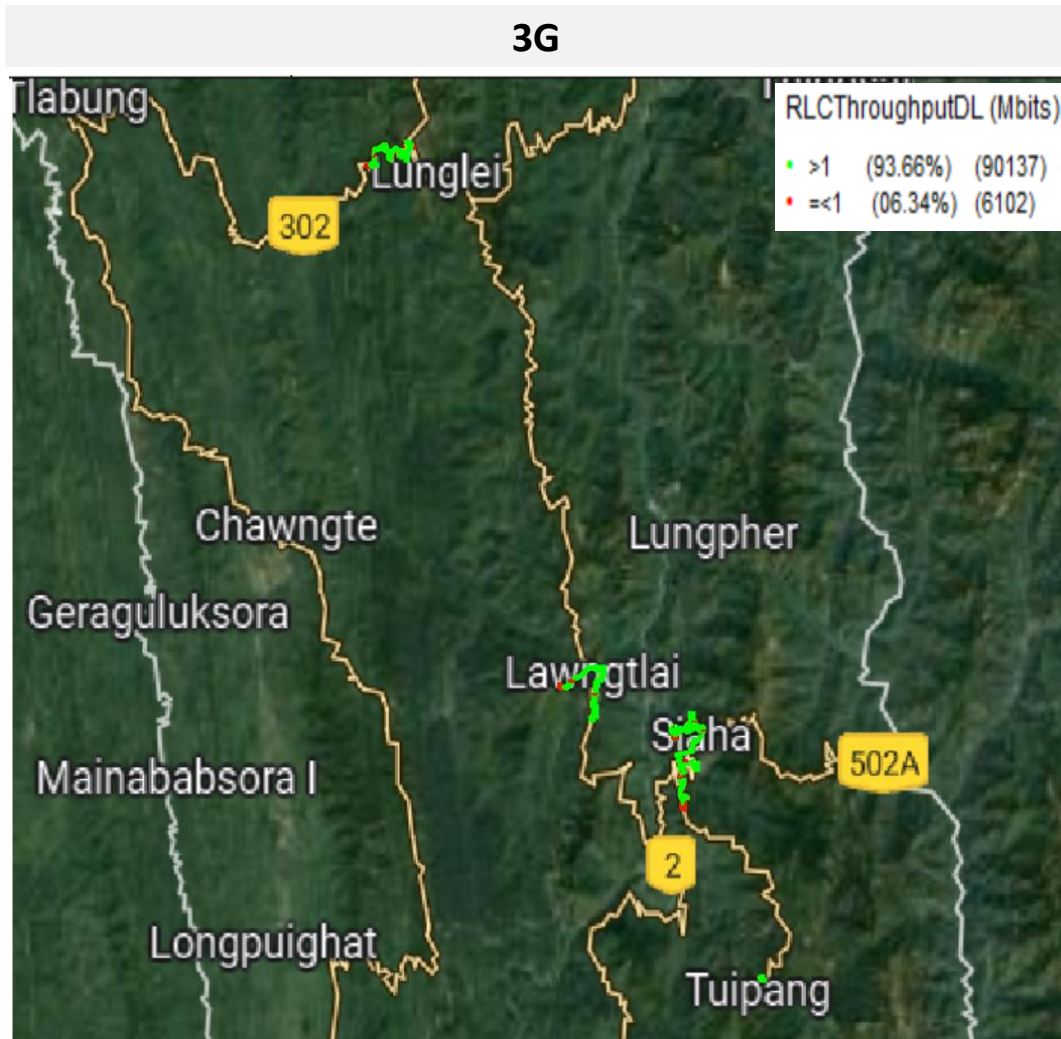
AVG. DOWNLOAD SPEED (Mbps)	1.69
% FILE TRANSFER COMPLETE	98.46
DL throughput	No of Sample
0 to 0.5 Mbps	3.73
0.5 to 1 Mbps	2.61
1 to 2 Mbps	64.55
2 to 5 Mbps	20.46
>5 Mbps	8.65
Total	**100**

VIL

Dynamic Data Testing Complete 304 Kms

Data KPIs – Overall	4G
Average Download Throughput (Mbps)	3.18

4G
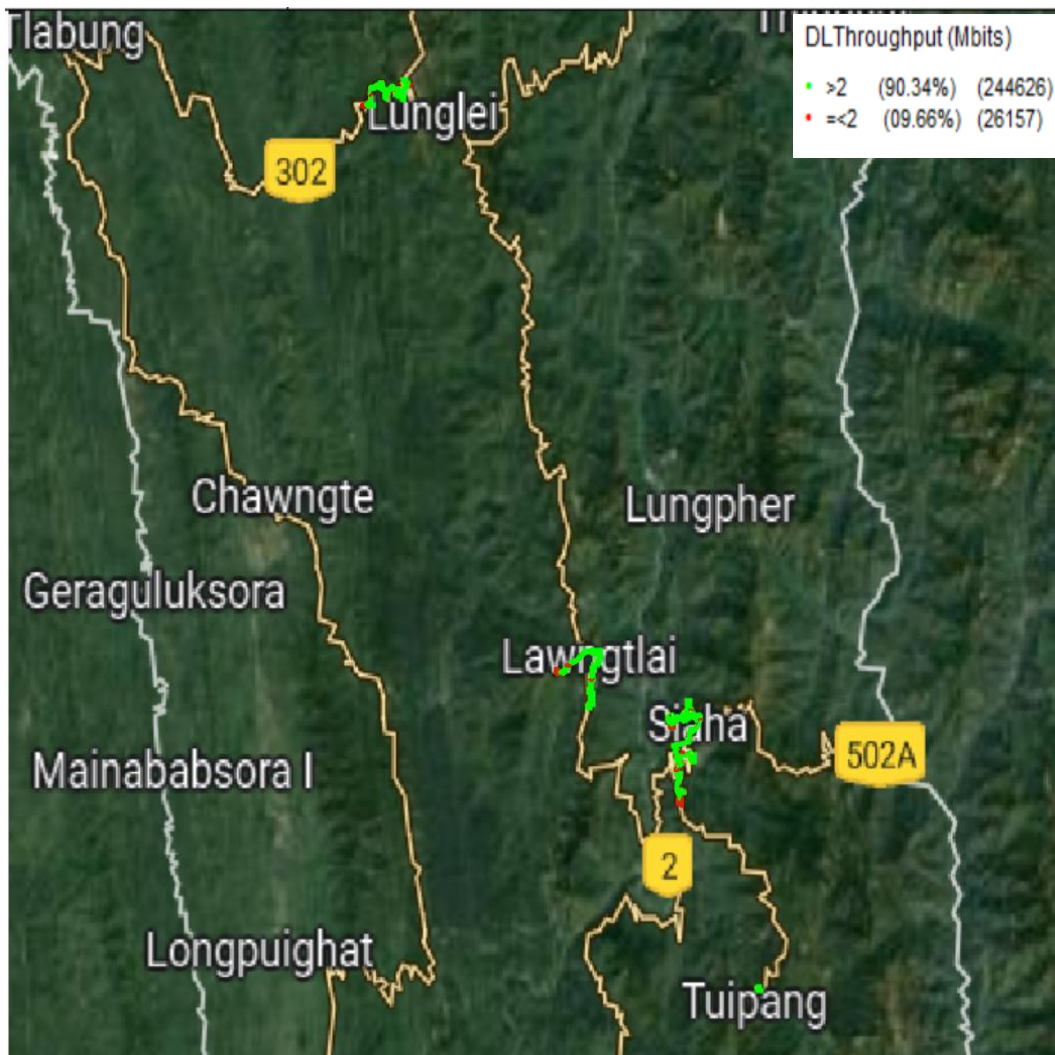
AVG. DOWNLOAD SPEED (Mbps)	3.18
% FILE TRANSFER COMPLETE	97.44
DL throughput	Sample %
0 to 1 Mbps	5.29
1 to 2 Mbps	4.37
2 to 5 Mbps	57.86
5 to 10 Mbps	20.59
>10 Mbps	11.89
Total	100