

Operator Assisted Drive Test Report

Kohima-Tseminyu-Wokha-Mokokchung- Zunheboto City, Nagaland

March, 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-Drop Call Rate in 2G & 3G network, Call Setup Success Rate in 2G & 3G network, Handover Success Rate in 2G & 3G network and Rx Quality in 2G network.

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

VIL- Rx Quality in 4G network.

It is observed that 4G coverage of VIL on some portions of the OADT routes are inadequate

The Operator Assisted Drive Test has been carried out by Regional Office, Kolkata with the help of Service Providers in Kohima-Tseminyu-Wokha-Mokokchung- Zunheboto City, Nagaland and surrounding areas including National Highway (2) on 5th & 6st March 2024 from 08.30 AM to 08.30 PM. The drive test covered drive route of 342 KMs (approx) over a period of 2 days. Approximately 360+ 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

Kohima is the capital of the Indian state of Nagaland. It is the second largest city in the state. Kohima constitutes both a district and a municipality.

Tseminyu is the 13th district of the Indian state of Nagaland. It was created on December 18, 2021. The district headquarter is located in the town of Tseminyu.

Wokha is a town and municipality in the Indian state of Nagaland. It is the headquarters of Wokha District and is located about 75 km north of the state capital Kohima.

Mokokchung is a municipality in the Mokokchung District of the Indian state of Nagaland. It serves as the district headquarters as well as the main urban hub of Mokokchung District.

Zünheboto District is a district in the Indian state of Nagaland. Sümi Nagas are indigenous to this district.

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: Kohima-Tseminyu-Wokha-Mokokchung-Zunheboto City, Nagaland

DAY-1–Japfu Hotel-Oking Hospital--Indira Gandhi Stadium-Tsiesema Village-Tsiese Basa-Meriema Junction-Nerhema-Customary Court Chiephobozou- Chiechama Village Panchayat Hall-Krishi Vigyan Kendra -Tseminyu KVK Kohima-Chunlikha Block Office-Kandinu-K. Station Village-Wokha DC Office-Zero point Wokha-Doyang Bridge-Phishumi-V. K. Town Police Station-Ajiqami-Sastami-Ungma Gate-Sericulture Office Mokokchung-District Hospital Mokokchung-Khensa Gate -Townhall Mokokchung.

DAY-2 –Zero Point (Tinali)-Nagaland University Lumami-ADC office Akhulato-Apukito-Kisakita-Asukhomi Village-DC office Zunheboto-Govt. School Shoixe-Satakha-Kilomi –Sekrezu-Chozuba Village Council Hall- Runguzumi Nasa-Suhgazu Thenyizu village-Chakhabama-Rudi Resort-Altis Pig farm –Administrative Training Institute.

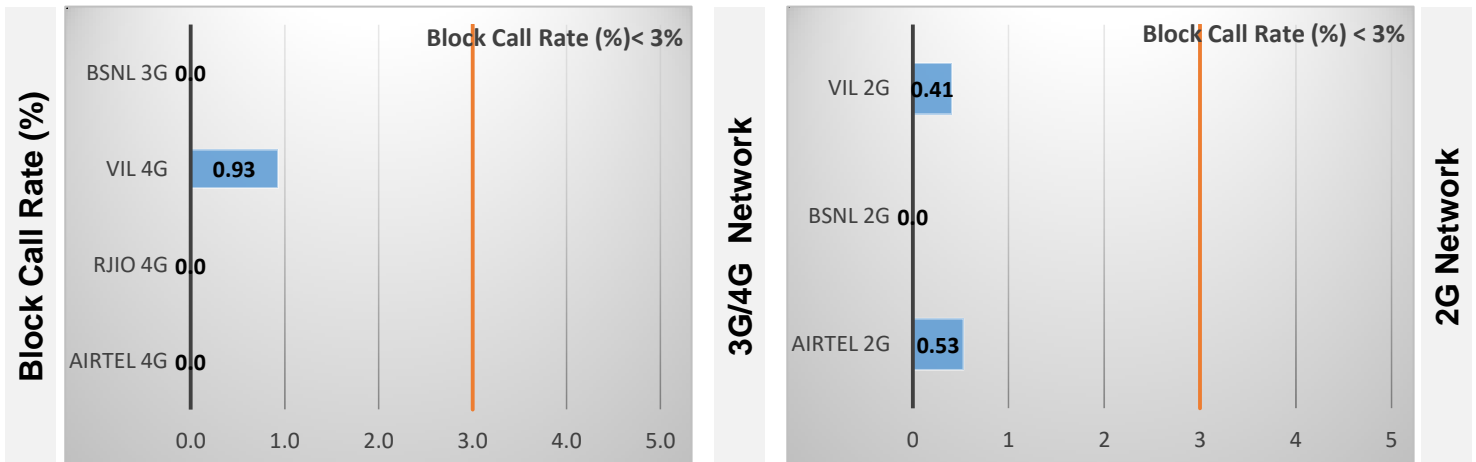
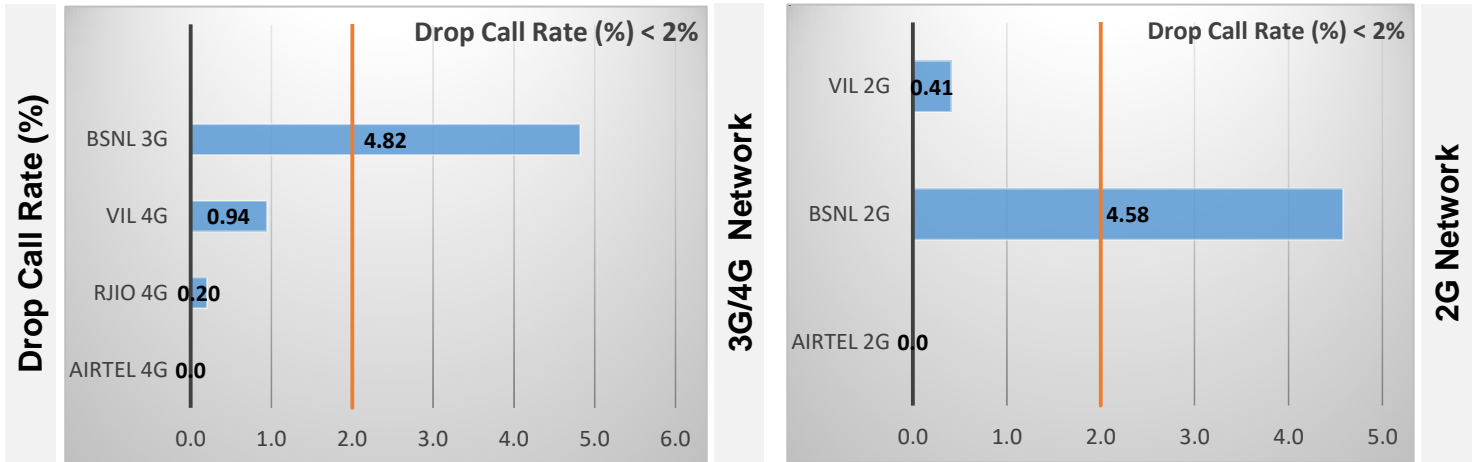
Data Service Test- Static Locations

Static Locations
Japfu Hotel
Mokokchung Town Hall
Zunheboto Town Hall

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	4.58	0.41	4.82	0.0	0.20	0.94
Block Call Rate %	0.53	0.0	0.41	0.0	0.0	0.0	0.93

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

Coverage

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

TSPs	2G		
	AIRTEL	BSNL	VIL
Coverage %	79.89	40.0	92.52

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

TSPs	3G	4G		
	BSNL	AIRTEL	RJIO	VIL
Coverage	55.03	90.09	85.44	89.61

Summary

City Level Summary- Voice

Voice Call	2G		
	AIRTEL	BSNL	VIL
Call Attempt	384.0	503.0	246.0
Blocked Call Rate (%)	0.53	0.0	0.41
CSSR% (Accessibility)	99.48	91.05	99.59
Drop Call Rate (%)	0.0	4.58	0.41
Mobility HOSR (%)	98.0	87.64	100
Rx Quality (%)	95.0	75.0	95.73

Voice Call	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Call Attempt	423.0	364.0	493.0	107.0
Blocked Call Rate (%)	0.0	0.0	0.0	0.93
CSSR% (Accessibility)	83.21	100	100	99.07
Drop Call Rate (%)	4.82	0.0	0.20	0.94
Mobility HOSR (%)	93.92	99.80	99.77	100
Rx Quality (%)	95.0	90.91	89.60	90.32

Summary-Data Services Dynamic

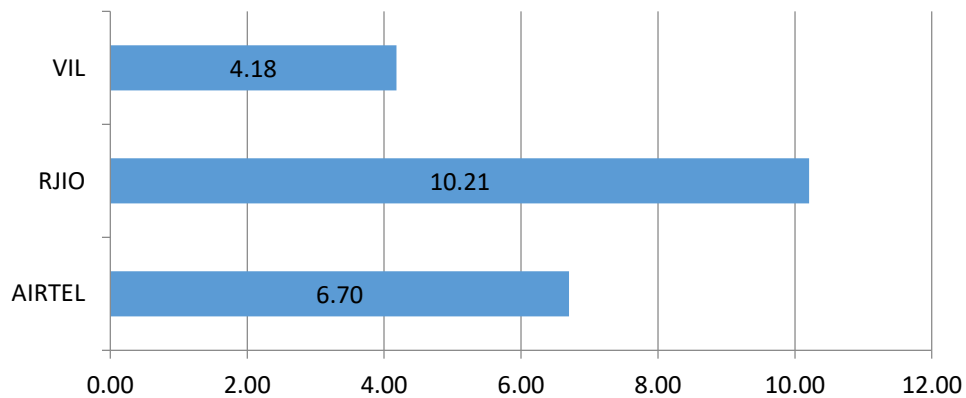
Key Observations

Dynamic Data was tested for 342 Kms. Download Throughput was tested.

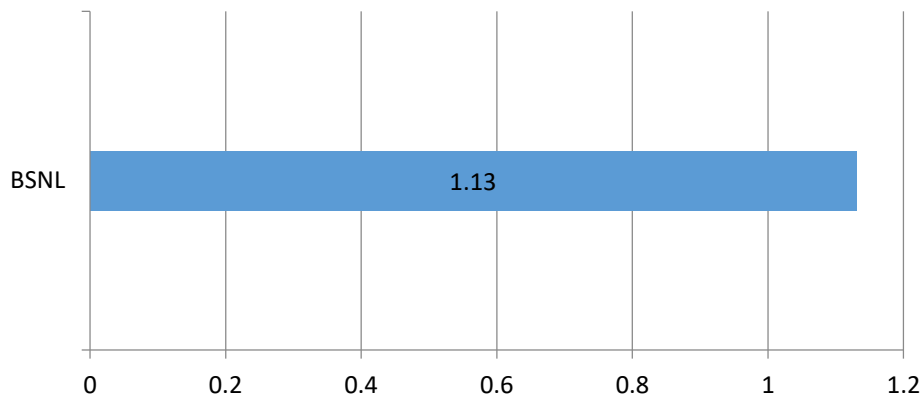
Data Download Performance (Average Throughput in Mbps) - Dynamic Data Testing

4G/3G Network:

4G-Dynamic Download Average Throughput (Mbps)



3G-Dynamic Download Average Throughput (Mbps)



Summary-Data Services Static

City Level Summary-

Average Data Services Static	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	64.43	107.5	120.0
Upload Throughput (kbps)	44.30	0.21	63.0
Web Browsing Delay (sec)	0.0	27.66	6.0
Latency (msec)	182	167	260

Average Data Services Static	3G/ 4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	2.34	16.70	13.33	4.77
Upload Throughput in Mbps	0.10	7.43	6.57	5.09
Video streaming delay (secs)	3.06	0.0	0.0	1.26
Web Browsing Delay (secs)	9.86	0.0	5.44	2.50
Latency (msec)	92	73.66	54.3	55

Summary-Data Services Static

Location Level Summary-

Location:- Japfu hotel	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	65.30	191.0	115.25
Upload Throughput (kbps)	44.50	0.18	66.30
Web Browsing Delay (sec)	0.0	22.0	06
Latency (msec)	188	160	248

Location:-Japfu hotel	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	1.90	18.30	29.23	2.38
Upload Throughput in Mbps	0.12	7.20	6.75	4.53
Video streaming delay (secs)	3.40	0.0	0.0	1.27
Web Browsing Delay (secs)	9.0	0.0	5.44	03 .0
Latency (msec)	75	71	47.10	54

Location:- Mokokchung Town Hall	2G		
	AIRTEL	BSNL	VIL
Download throughput in (kbps)	58.60	83.0	143.52
Upload Throughput in (kbps)	38.90	0.11	71.70
Web Browsing Delay (secs)	0.0	33.0	07 .0
Latency (msec)	187	185	257

Location:- Mokokchung Town Hall	4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in (mbps)	2.50	15.50	3.45	7.15
Upload Throughput in (mbps)	0.09	6.80	7.65	5.64
Video streaming delay (secs)	2.60	0.0	0.0	1.25
Web Browsing Delay (secs)	11.0	0.0	7.34	02 .0
Latency (msec)	109	76	43	56

Summary-Data Services Static

Location Level Summary-

Location:- Zunheboto Town Hall	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	69.40	48.73	102.76
Upload Throughput (kbps)	49.50	0.35	52.20
Web Browsing Delay (sec)	0.0	28.0	06.0
Latency (msec)	171	156	276

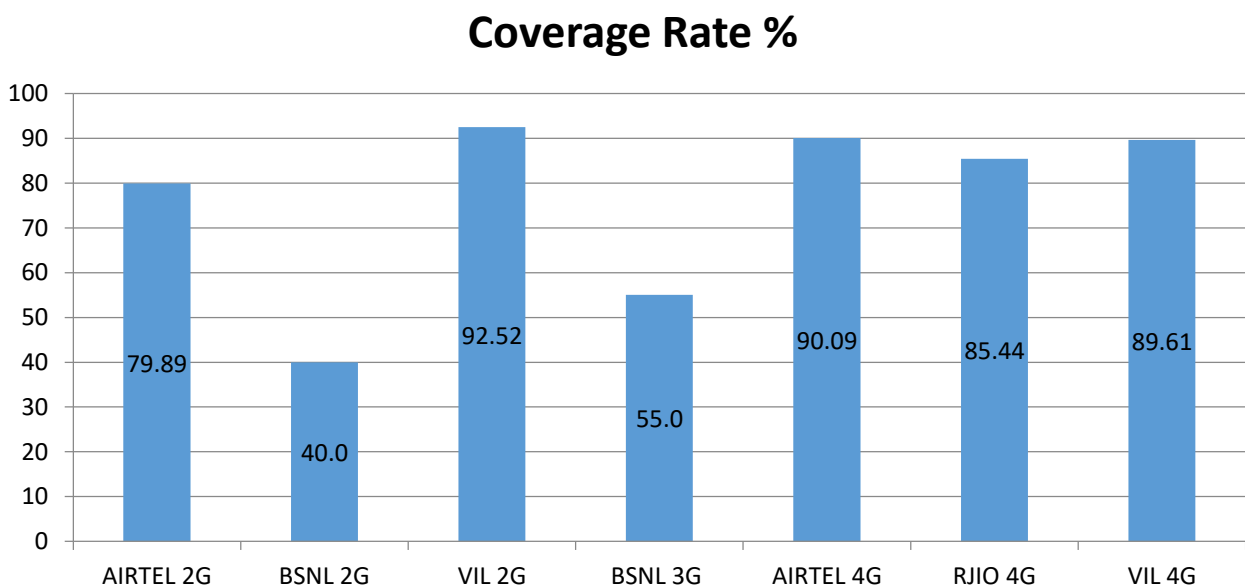
Location:-Zunheboto Town Hall	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	2.63	16.30	7.31	***
Upload Throughput in Mbps	0.10	8.30	5.32	***
Video streaming delay (secs)	3.20	0.0	0.0	***
Web Browsing Delay (secs)	9.60	0.0	3.55	***
Latency (msec)	92	74	72.80	***

***VIL had no 4G coverage

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	79.89
BSNL 2G	40.0
VIL 2G	92.52
BSNL 3G	55.03
AIRTEL 4G	90.09
RJIO 4G	85.44
VIL 4G	89.61



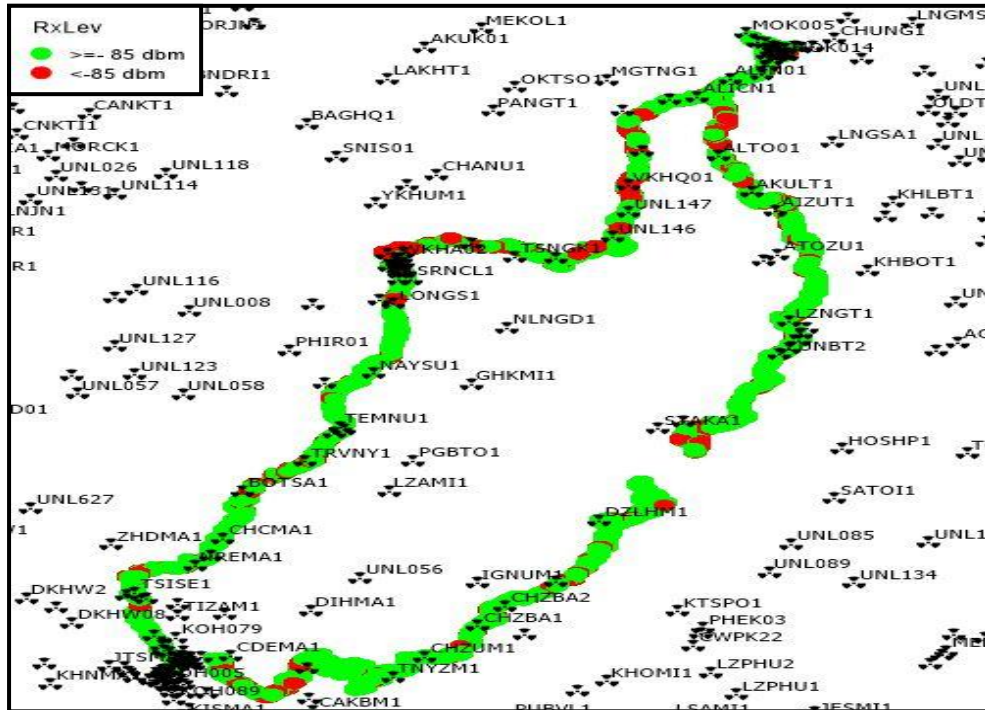
Note- Coverage is the percentage of samples having signal strength more than the threshold value (2G ≥ -85 dbm, 3G ≥ -90 dbm and 4G ≥ -110 dbm). However, these samples are only for the portion of the OADT routes where TSPs have coverage i.e 'no coverage' routes have been excluded.

I. Coverage Details

AIRTEL

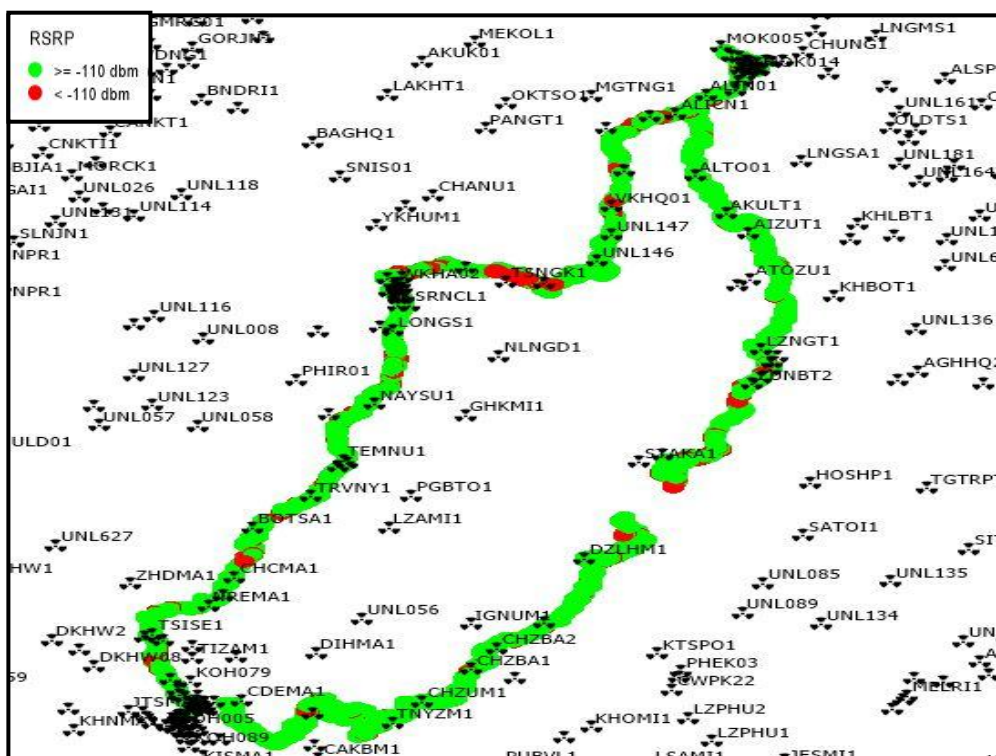
Technology	Coverage Rate %
2G	79.89
4G	90.09

2G



Overall Rx Level	Sample %
[Max >= -75]	43.63
[-75 >= -85)	36.26
[-85 >= -95)	15.21
[-95 >= Min)	4.91
Total	100

4G



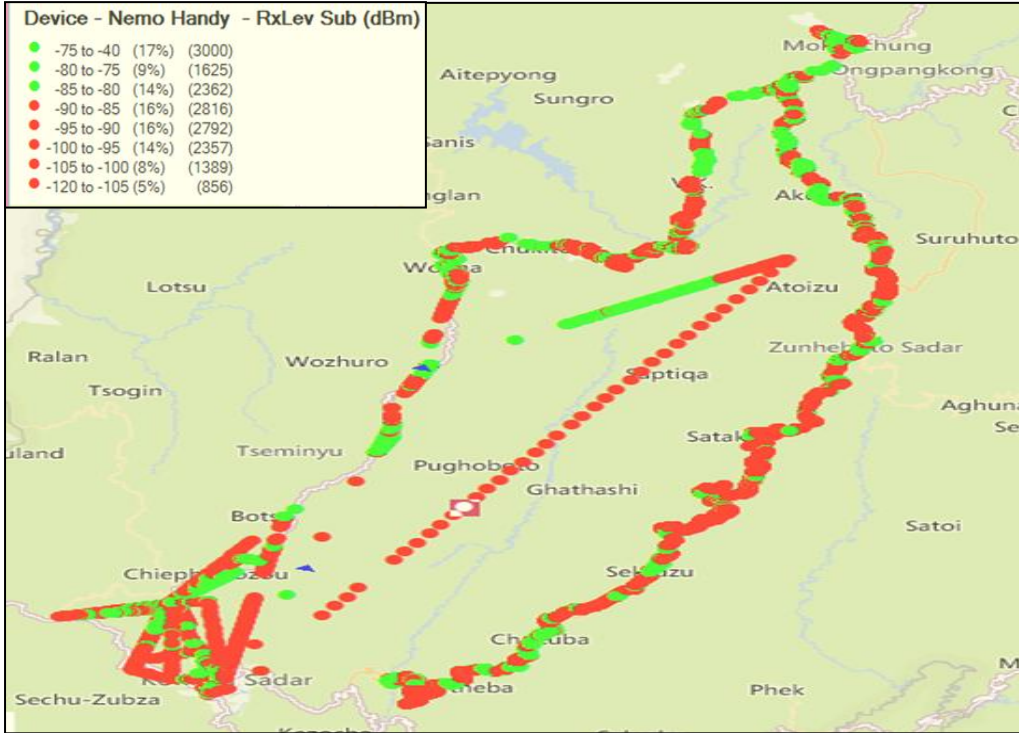
Overall RSRP	Sample %
[Max >= -80]	14.61
[-80 >= -90)	20.65
[-90 >= -110)	54.84
[-110 >= Min)	9.91
Total	100

I. Coverage Details

BSNL

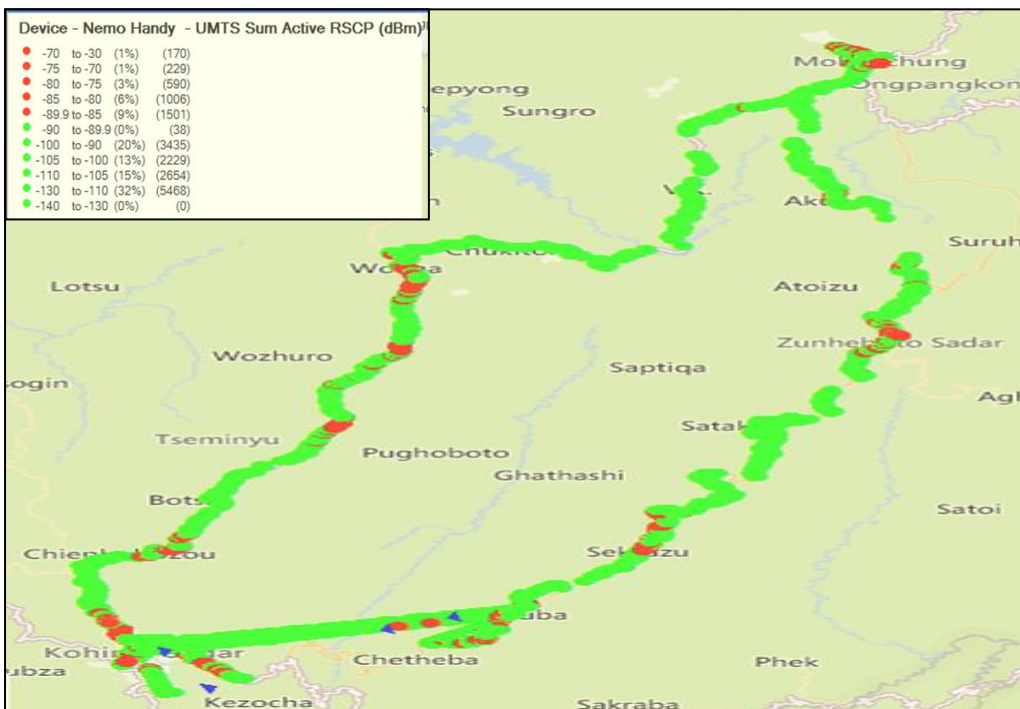
Technology	Coverage Rate %
2G	40.0
3G	55.03

2G



Overall RxLevel	Sample %
[Max >=-75]	17
[-75 >=-85]	23
[-85 >=-95]	32
[-95 >=Min]	28
Total	100

3G



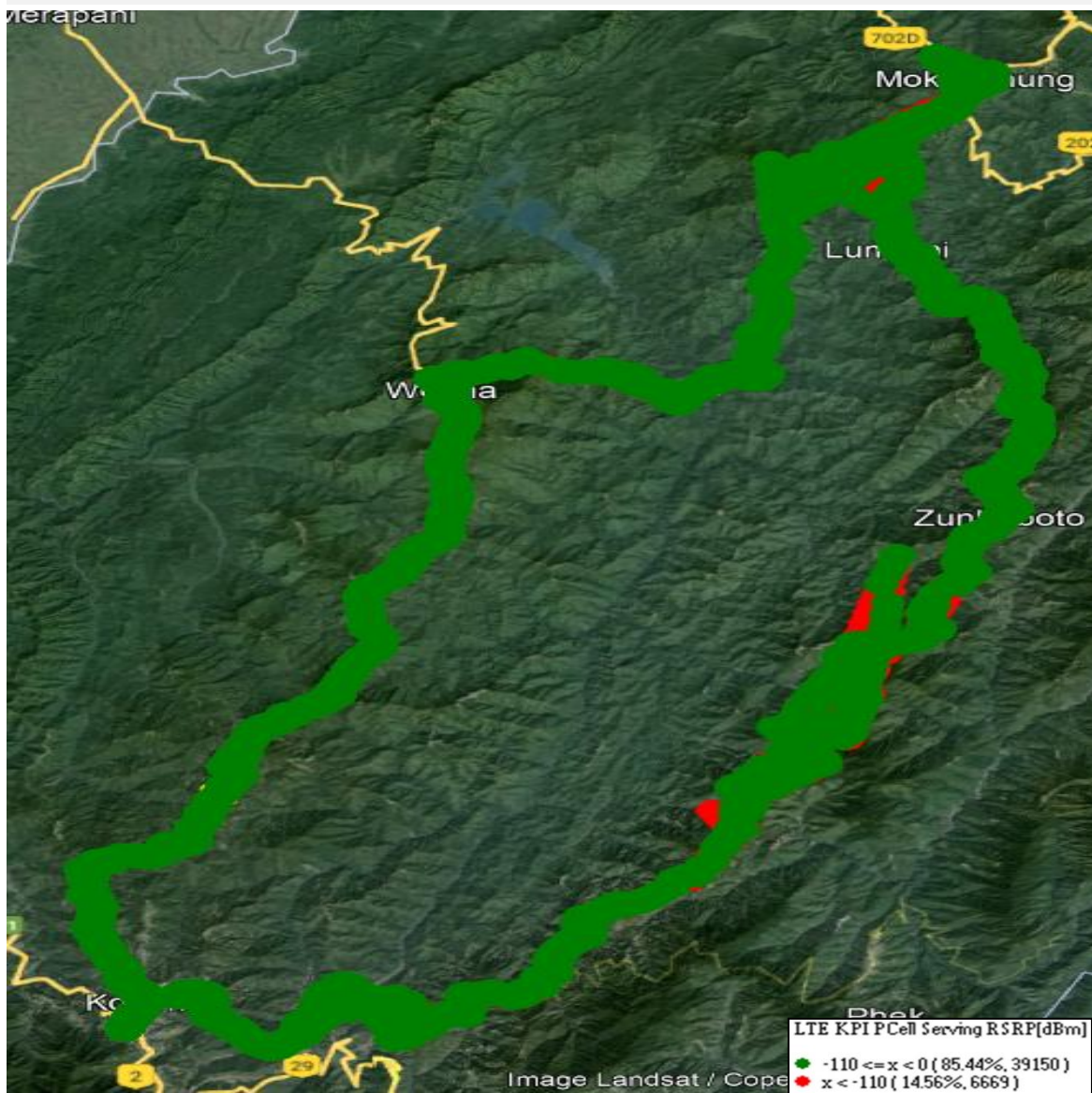
Overall RSCP	Sample %
[Max >=-70]	0.98
[-70 >=-80]	16.27
[-80 >=-90]	37.78
[-90 >=Min]	44.95
Total	100

I. Coverage Details

RJIO

Technology	Coverage Rate %
4G	85.44

4G



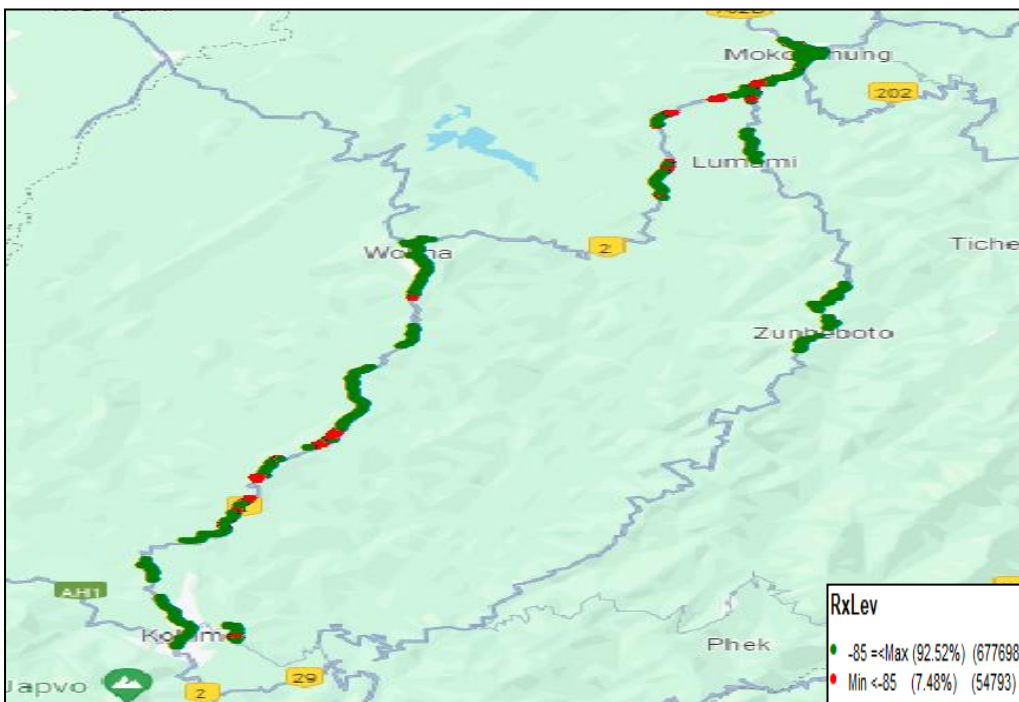
Overall RSRP	Sample %
[Max >=-80]	9.08
[-80 >=-90]	23.57
[-90 >=-110]	52.79
[-110 >=Min)	14.56
Total	100

I. Coverage Details

VIL

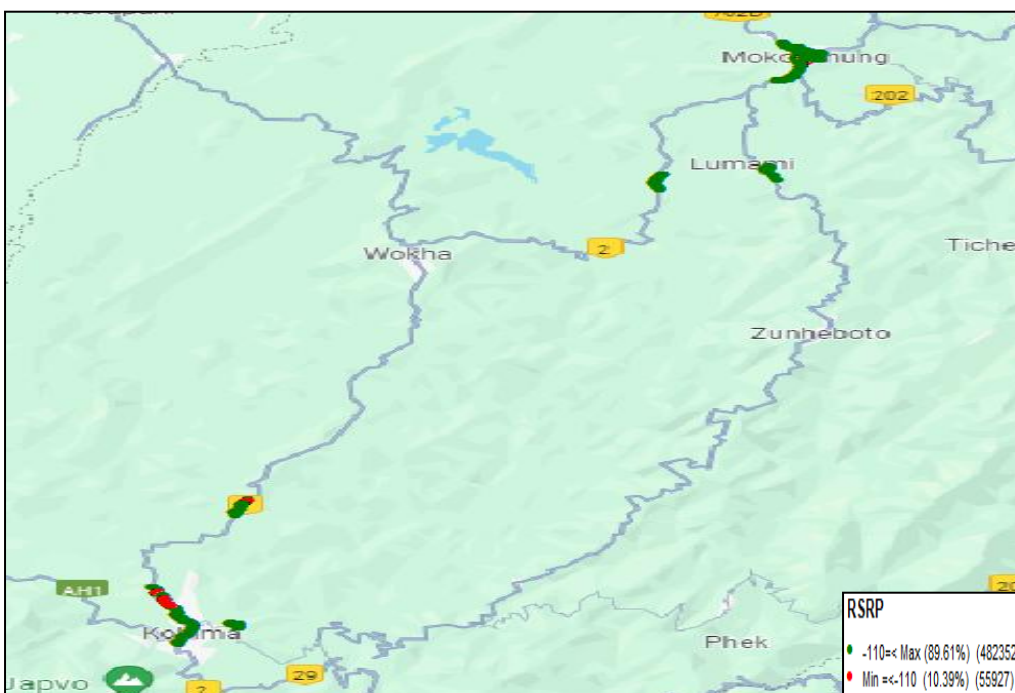
Technology	Coverage Rate %
2G	92.52
4G	89.61

2G



Overall RxLevel	Sample %
[Max >=-75]	30.05
[-75 >=-85]	62.47
[-85 >=-95]	4.11
[-95 =Min)	3.37
Total	100

4G

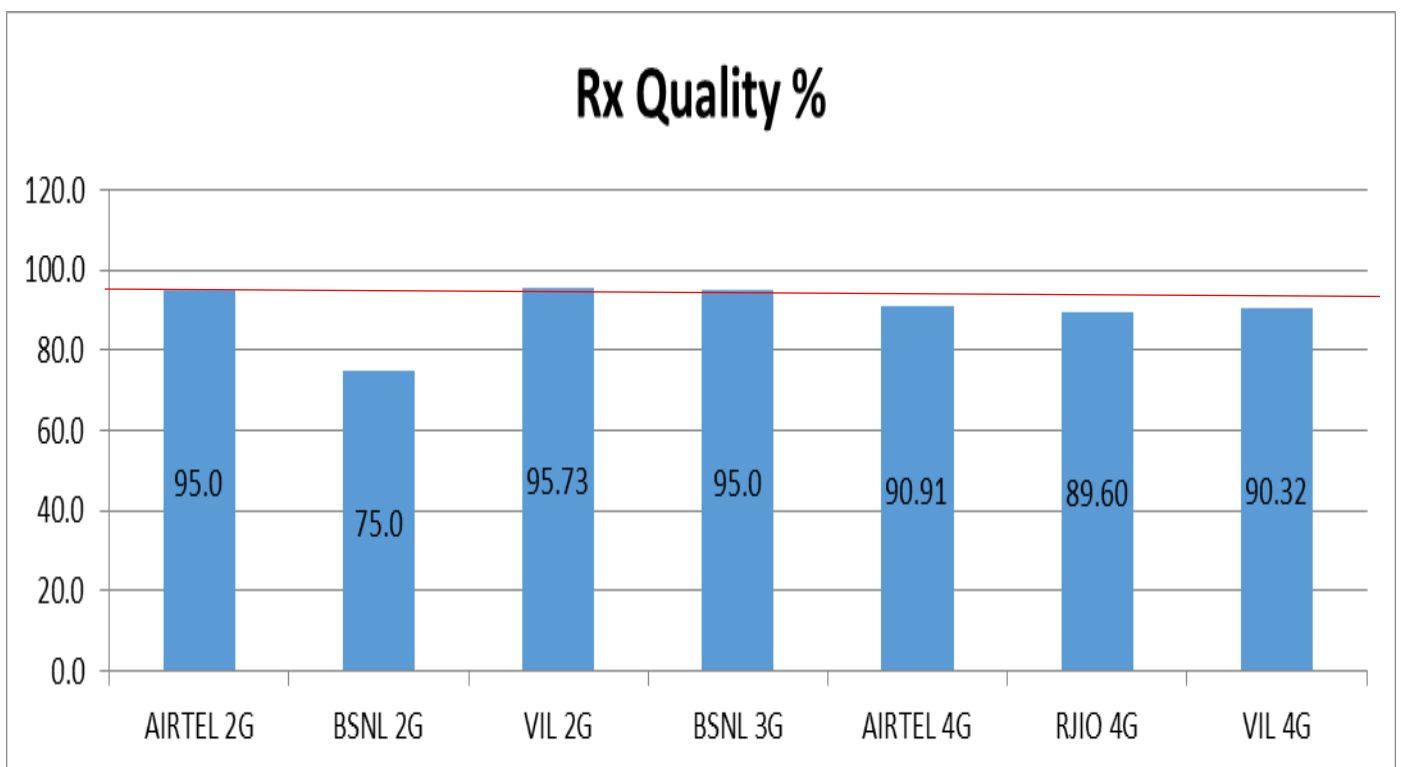


Overall RSRP	Sample %
[Max >=-80]	13.64
[-80 >=-90]	26.82
[-90 >=-110]	49.15
[-110 >=Min)	10.39
Total	100

II. Quality Details

For measuring voice quality, as per the QoS norms, Rx Quality ≤ 5 for GSM, $E_c/N_o \geq -14$ 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 $\geq 95\%$.

TSP	Rx Quality %
AIRTEL 2G	95.0
BSNL 2G	75.0
VIL 2G	95.73
BSNL 3G	95.0
AIRTEL 4G	90.91
RJIO 4G	89.60
VIL 4G	90.32

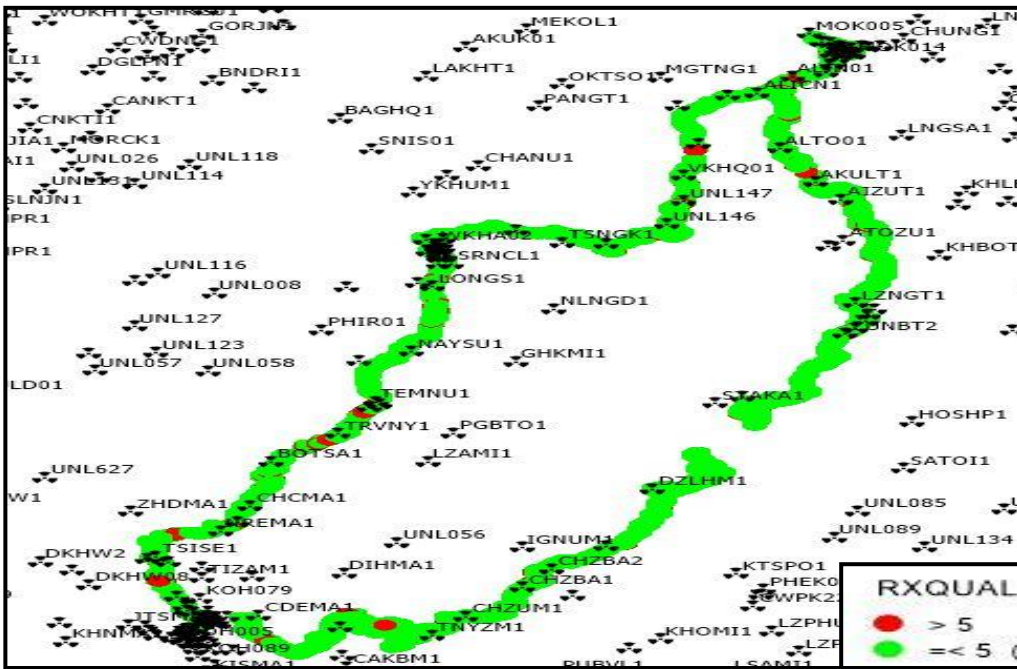


II. Quality Details

AIRTEL

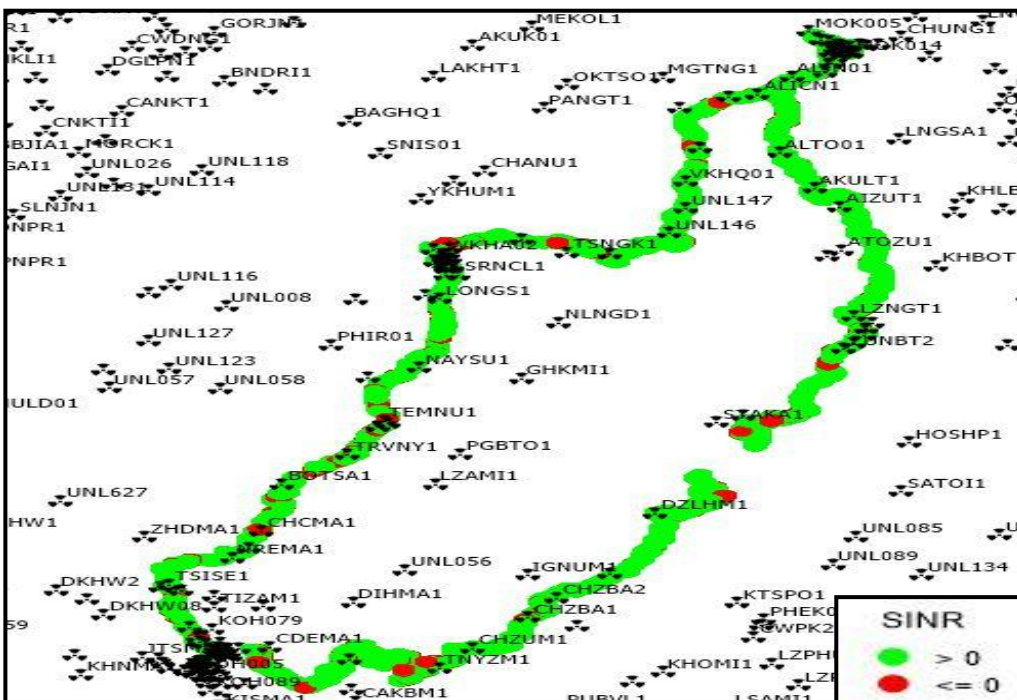
Technology	Rx Quality %
2G	95.0
4G	90.91

2G



Overall Rx Quality	Sample %
(Min <=2)	83.80
(2 <=3)	3.61
(3 <=4)	3.47
(4 <=5)	3.63
(5 <=Max)	5.48
Total	100

4G



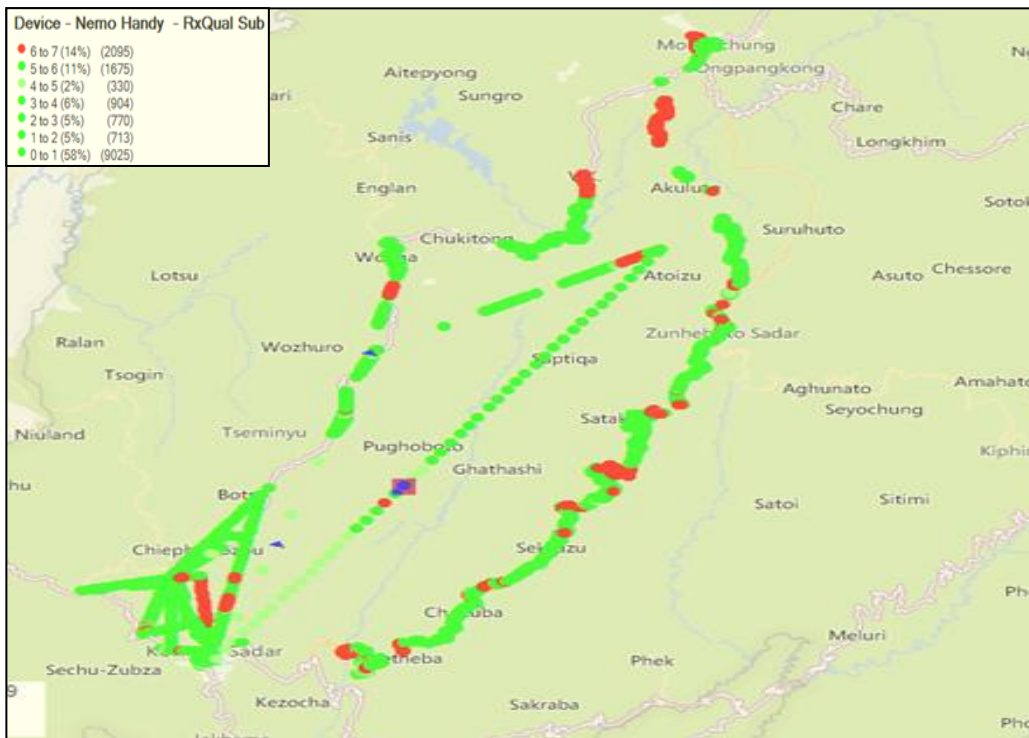
Overall SINR	Sample %
(Min <=0)	9.08
(0 <=5)	24.84
(5 <=10)	22.05
(10 <=15)	17.29
(15 <=Max)	26.71
Total	100

II. Quality Details

BSNL

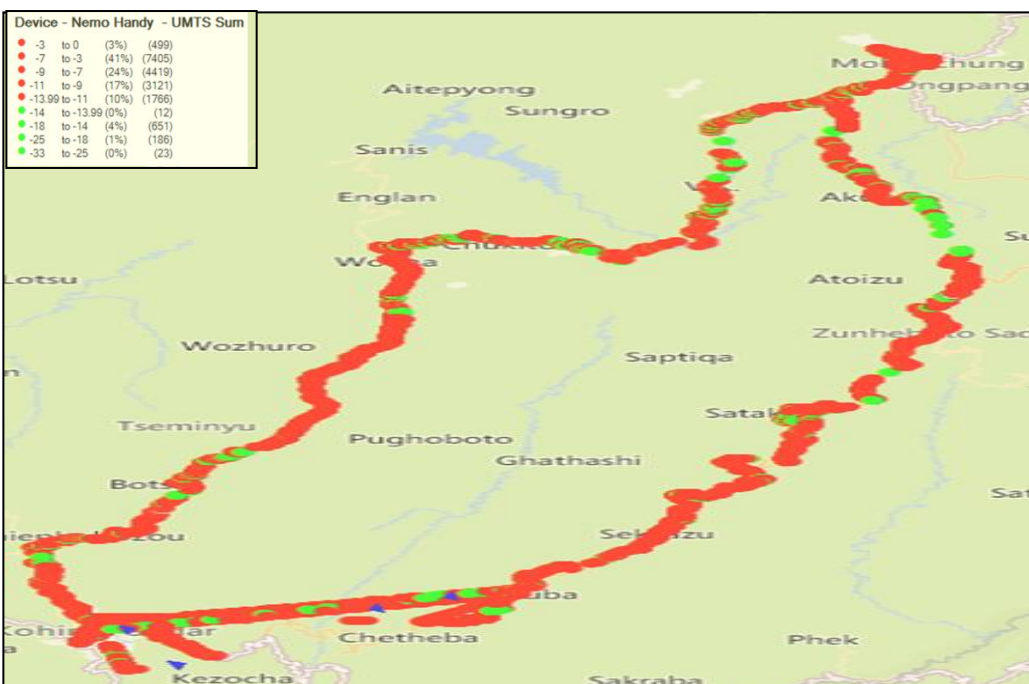
Technology	Rx Quality %
2G	75.0
3G	95.0

2G



Overall Rx Quality	Sample %
(Min <=2)	62
(2 <=3)	5
(3 <=4)	6
(4 <=5)	2
(5 <=Max)	25
Total	100

3G



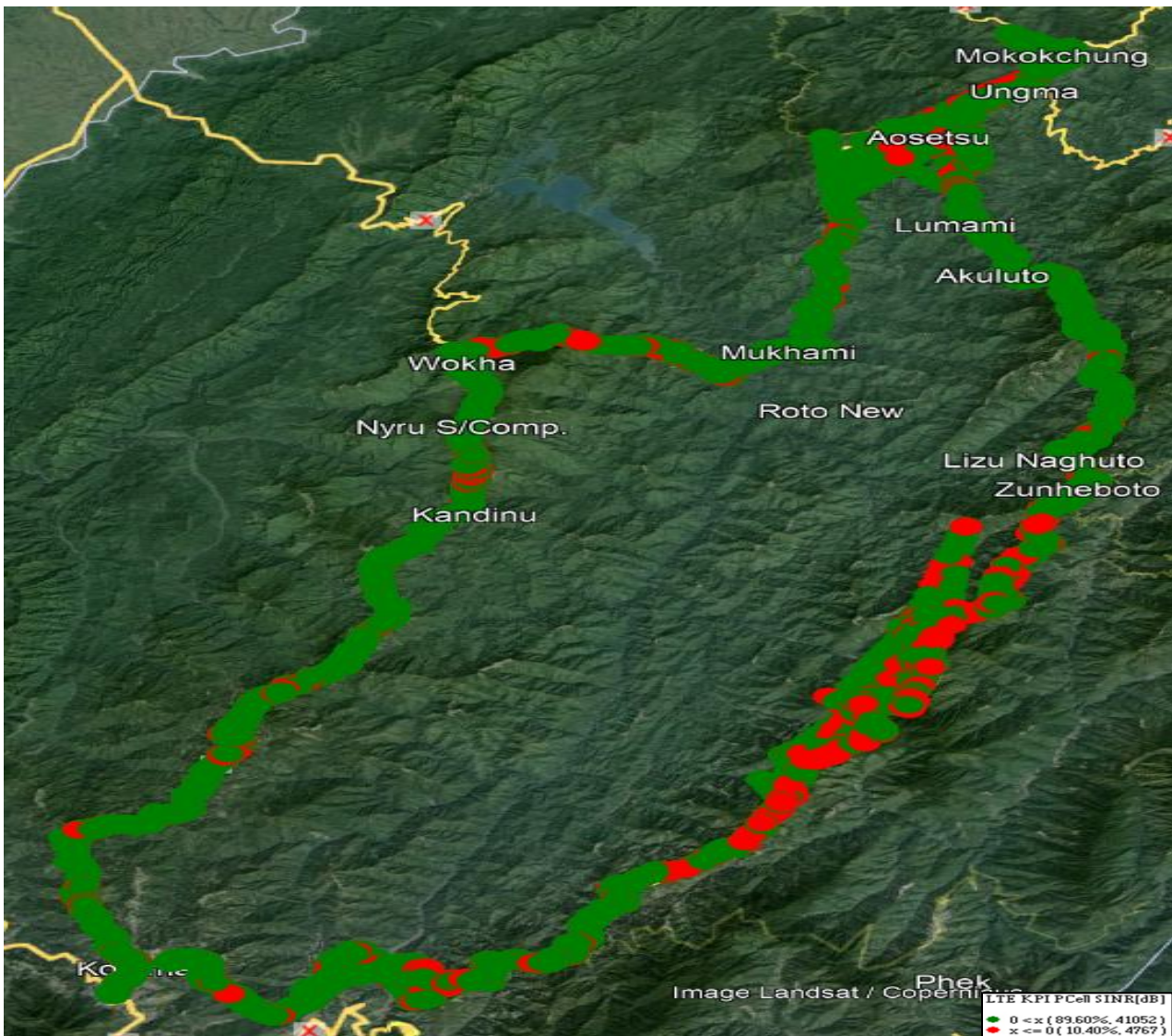
Overall EcNo	Sample %
(Max <=-6)	31
(-6 <=-9)	37
(-9 <=-11)	17
(-11 <=-14)	10
(-14 <= Min)	5
Total	100

II. Quality Details

RJIO

Technology	Rx Quality %
4G	89.60

4G



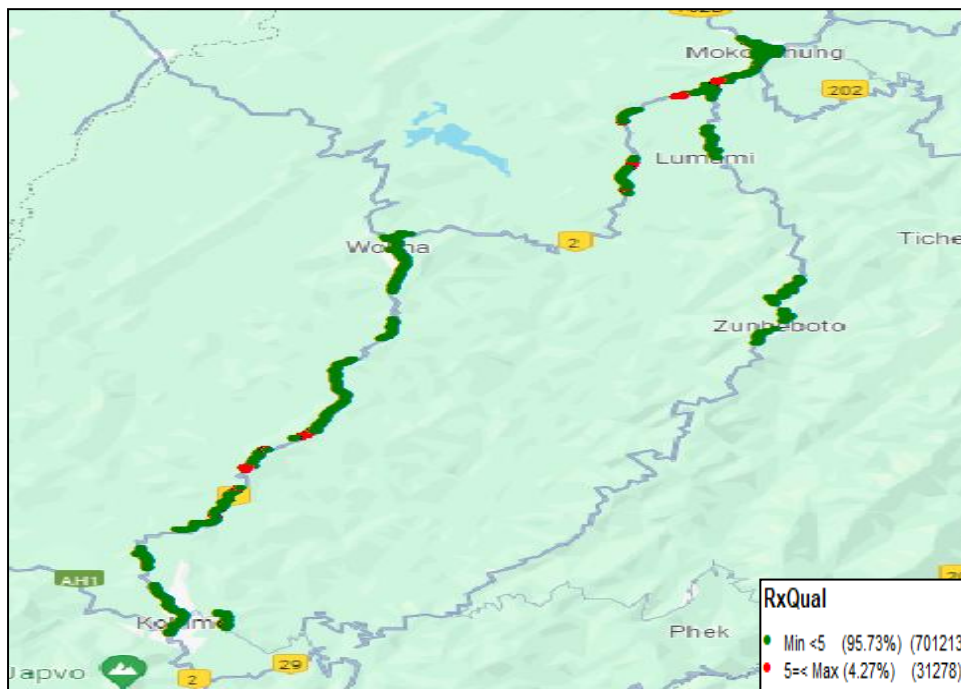
Overall SINR	Sample %
(Min <=0)	10.40
(0 <=5)	39.94
(5 <=10)	19.34
(10 <=15)	12.89
(15 <=Max)	17.44
Total	100

II. Quality Details

VIL

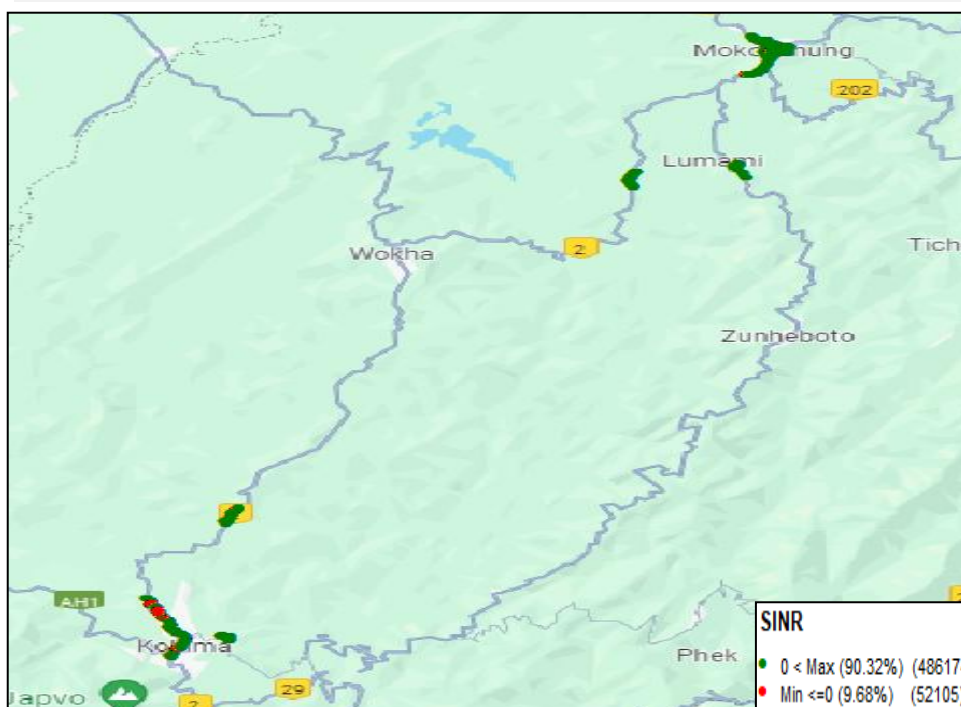
Technology	Rx Quality %
2G	95.73
4G	90.32

2G



Overall Rx Quality	Sample %
(Min <=2)	90.36
(2 <=3)	2.49
(3 <=4)	1.25
(4 <=5)	1.63
(5 <=Max)	4.27
Total	100

4G



Overall SINR	Sample %
(Min <=0)	9.68
(0 <=5)	18.87
(5 <=10)	34.62
(10 <=15)	24.41
(15 <=Max)	12.42
Total	100

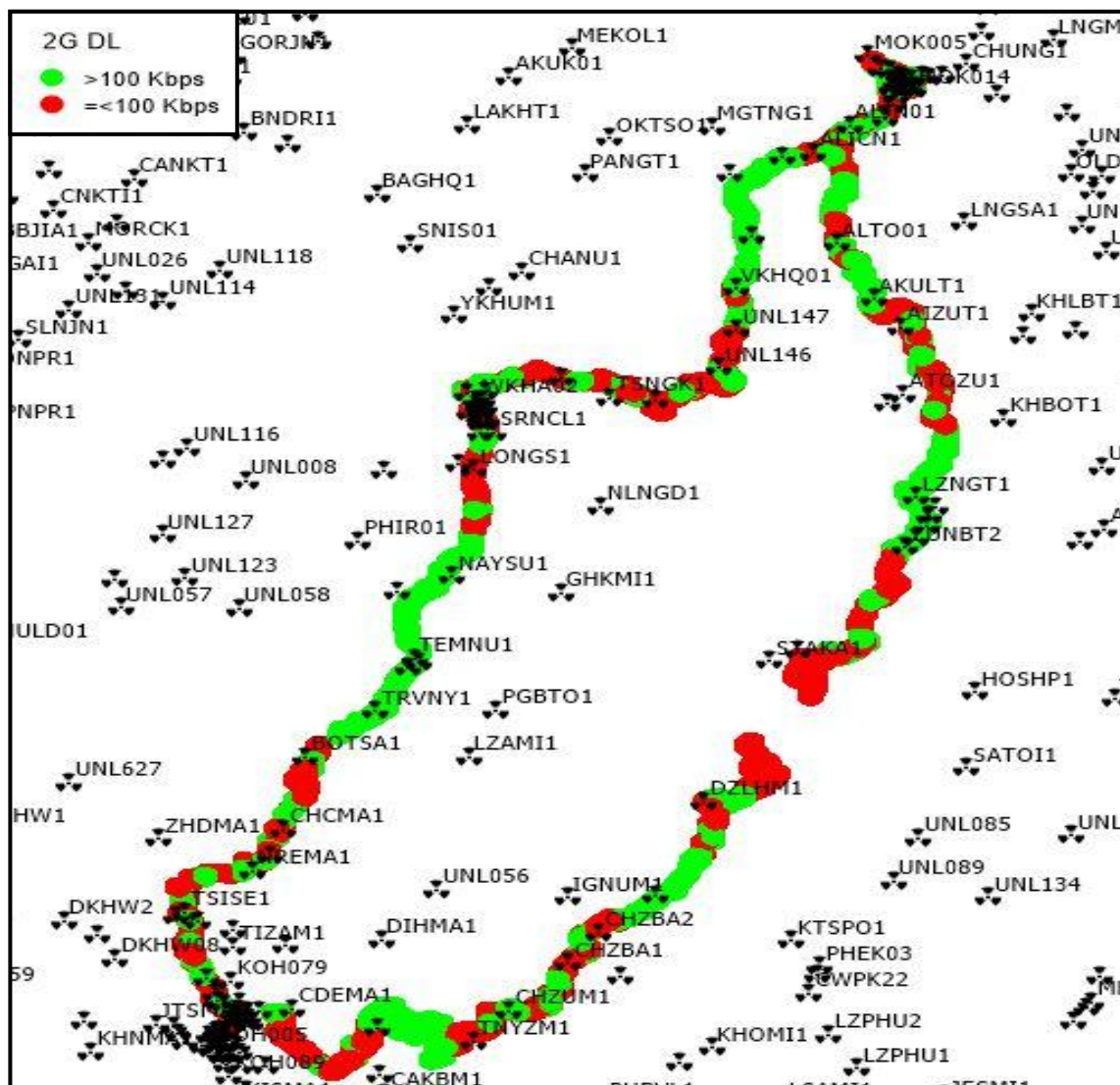
IV. Dynamic Data Test- 2G DL Details

AIRTEL

Dynamic Data Testing Complete 342 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	59.50

2G



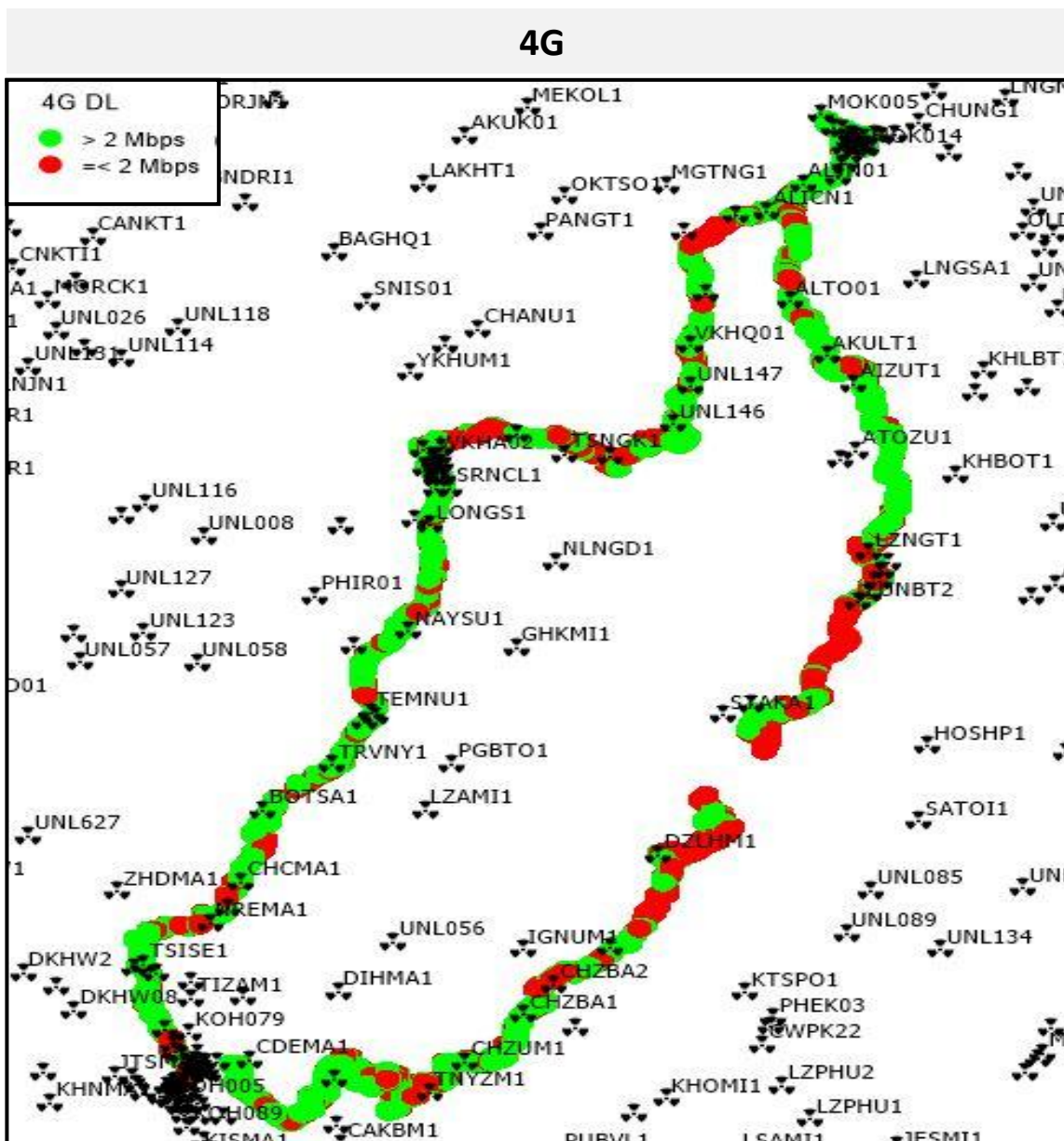
AVG. DOWNLOAD SPEED (Kbps)	59.50
% FILE TRANSFER COMPLETE	57.59
DL throughput	Sample %
0 to 50 Kbps	8.09
50 to 100 Kbps	38.83
100 to 200 Kbps	53.03
200 to 300 Kbps	0.02
>300 Kbps	0.00
Total	100

IV. Dynamic Data Test- 4G DL Details

AIRTEL

Dynamic Data Testing Complete 342 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	6.70



AVG. DOWNLOAD SPEED (Mbps)	6.70
% FILE TRANSFER COMPLETE	76.51
DL throughput	Sample %
0 to 1 Mbps	10.85
1 to 2 Mbps	3.75
2 to 5 Mbps	15.41
5 to 10 Mbps	16.22
>10 Mbps	53.77
Total	100

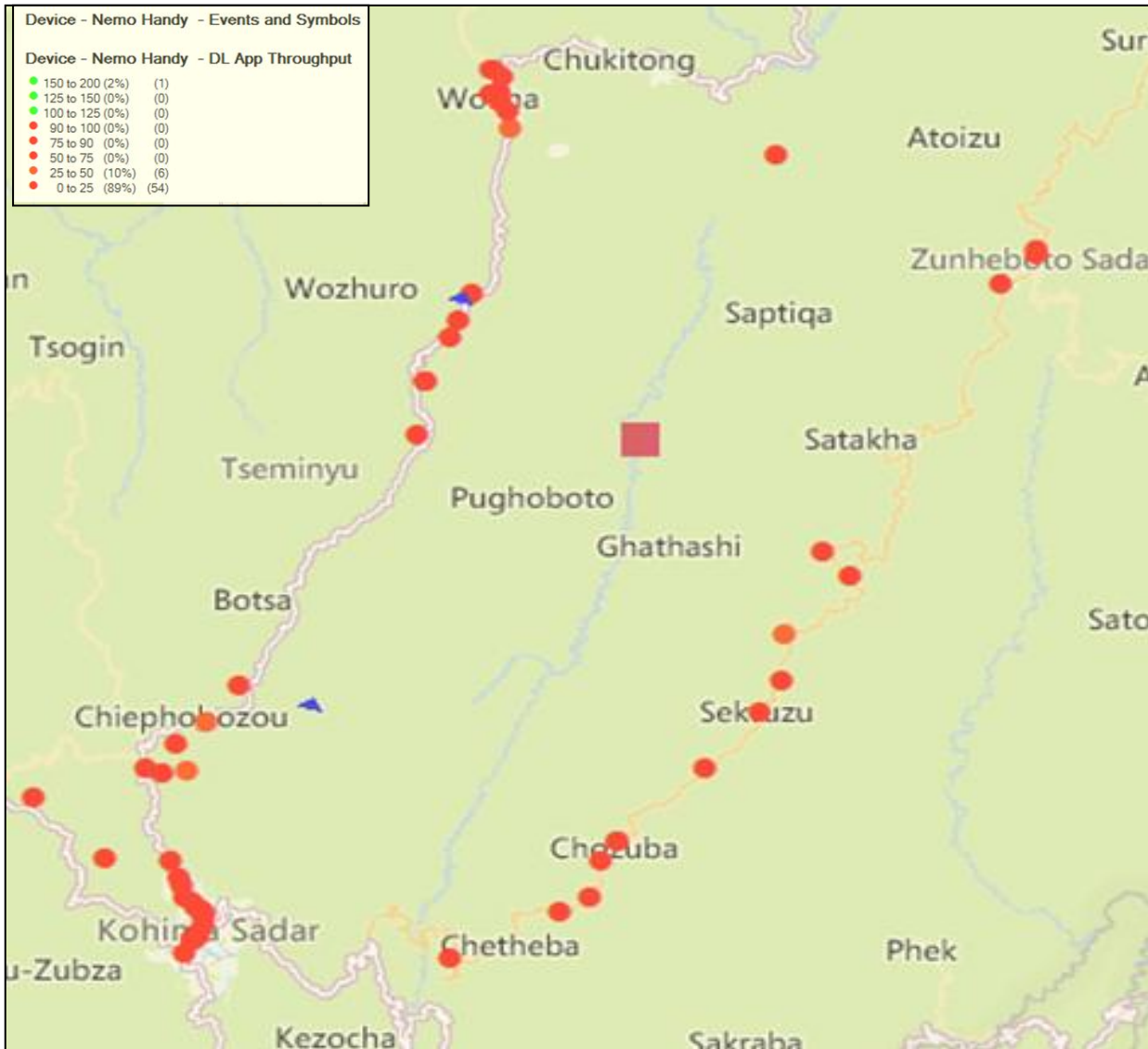
IV. Dynamic Data Test- 2G DL Details

BSNL

Dynamic Data Testing Complete 342 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	2.45

2G



AVG. DOWNLOAD SPEED (Kbps)	2.45
% FILE TRANSFER COMPLETE	0
DL throughput	Sample %
0 to 50 Kbps	99
50 to 100 Kbps	0
100 to 200 Kbps	1
200 to 300 Kbps	0
>300 Kbps	0
Total	100

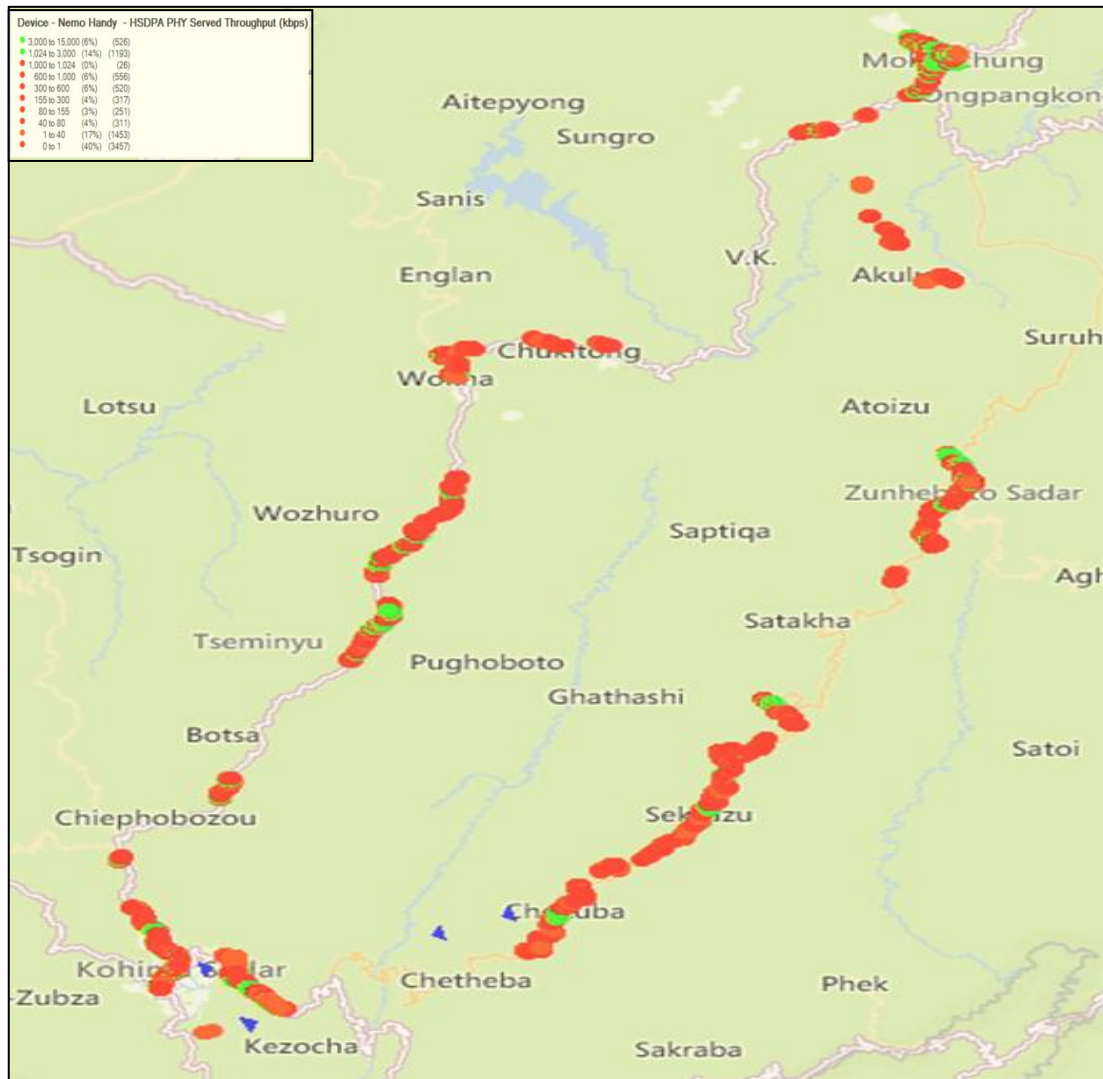
IV. Dynamic Data Test- 3G DL Details

BSNL

Dynamic Data Testing Complete 342 Kms

Data KPIs - Overall	3G
Average Download Throughput (Mbps)	1.13

3G



AVG. DOWNLOAD SPEED (Mbps)	1.13
% FILE TRANSFER COMPLETE	83.80
DL throughput	Sample %
0 to 0.5 Mbps	71
0.5 to 1 Mbps	8
1 to 2 Mbps	10
2 to 5 Mbps	9
>5 Mbps	2
Total	100

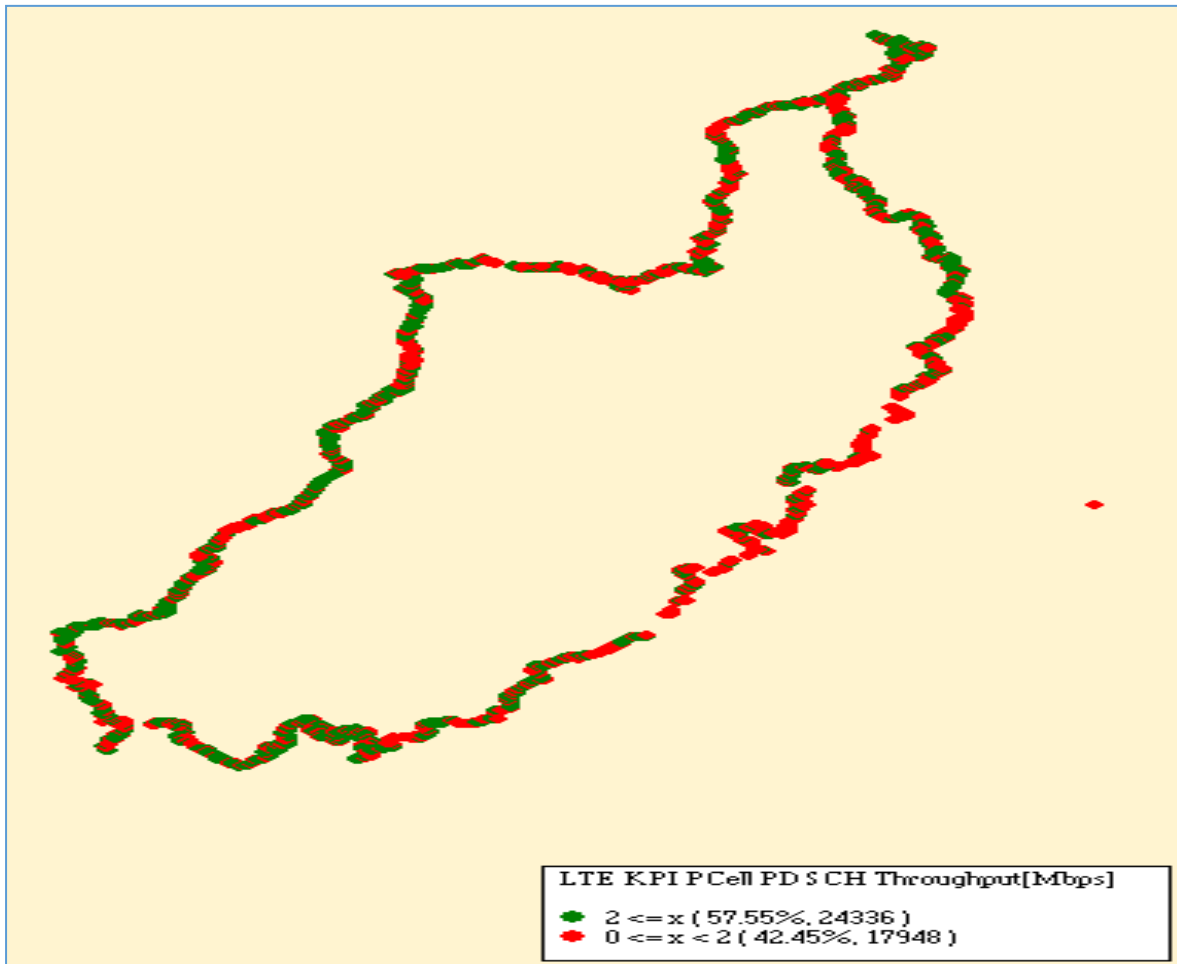
IV. Dynamic Data Test- 4G DL Details

RJIO

Dynamic Data Testing Complete 342 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	10.21

4G



AVG. DOWNLOAD SPEED (Mbps)	10.21
% FILE TRANSFER COMPLETE	100
DL throughput	Sample %
0 to 1 Mbps	31.30
1 to 2 Mbps	11.15
2 to 5 Mbps	21.16
5 to 10 Mbps	15.16
>10 Mbps	21.22
Total	100

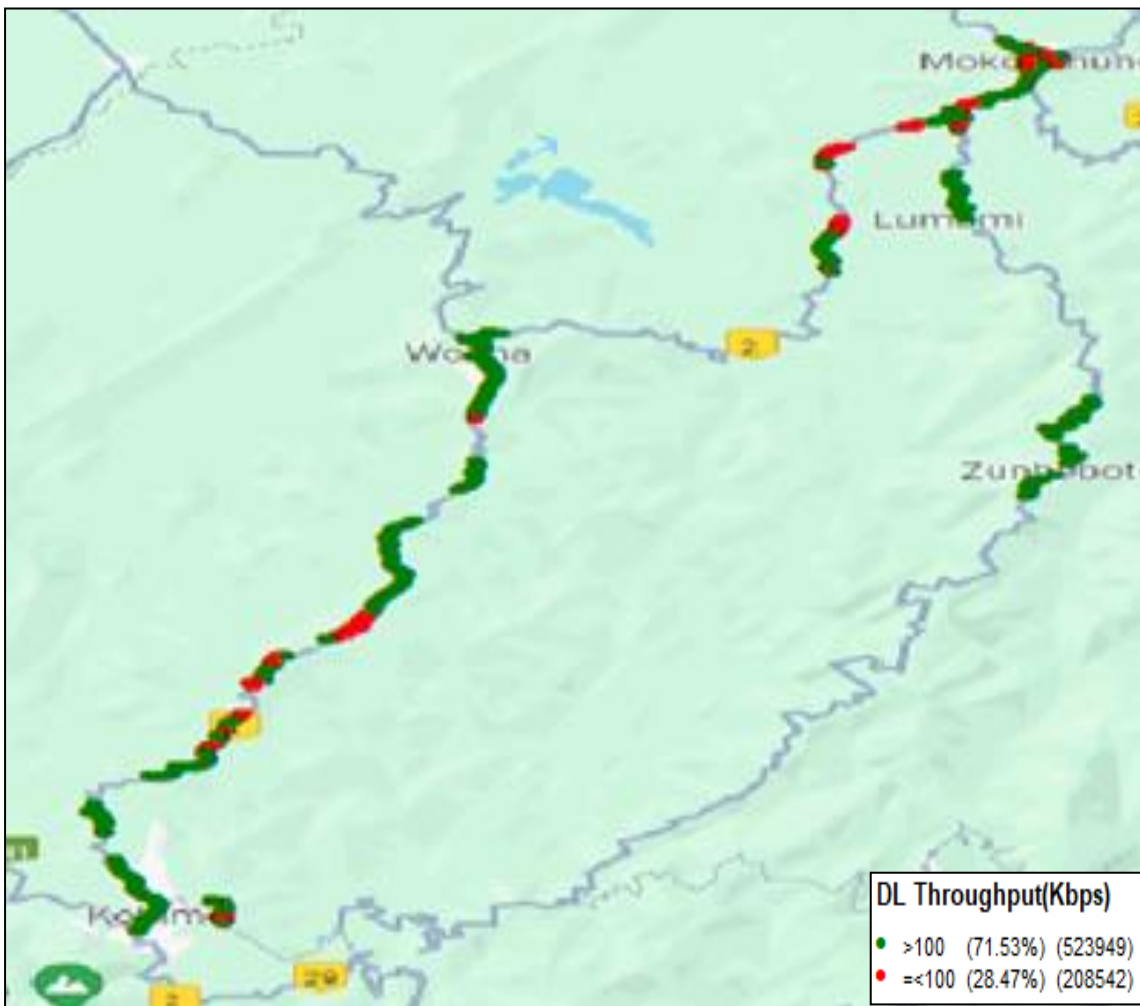
IV. Dynamic Data Test-2G DL Details

VIL

Dynamic Data Testing Complete 342 Kms

Data KPIs – Overall	2G
Average Download Throughput (Kbps)	184

2G



AVG. DOWNLOAD SPEED (Kbps)	184
% FILE TRANSFER COMPLETE	97.16
DL throughput	Sample %
0 to 50 Kbps	11.73
50 to 100 Kbps	16.74
100 to 200 Kbps	47.97
200 to 300 Kbps	16.42
>300 Kbps	7.14
Total	100

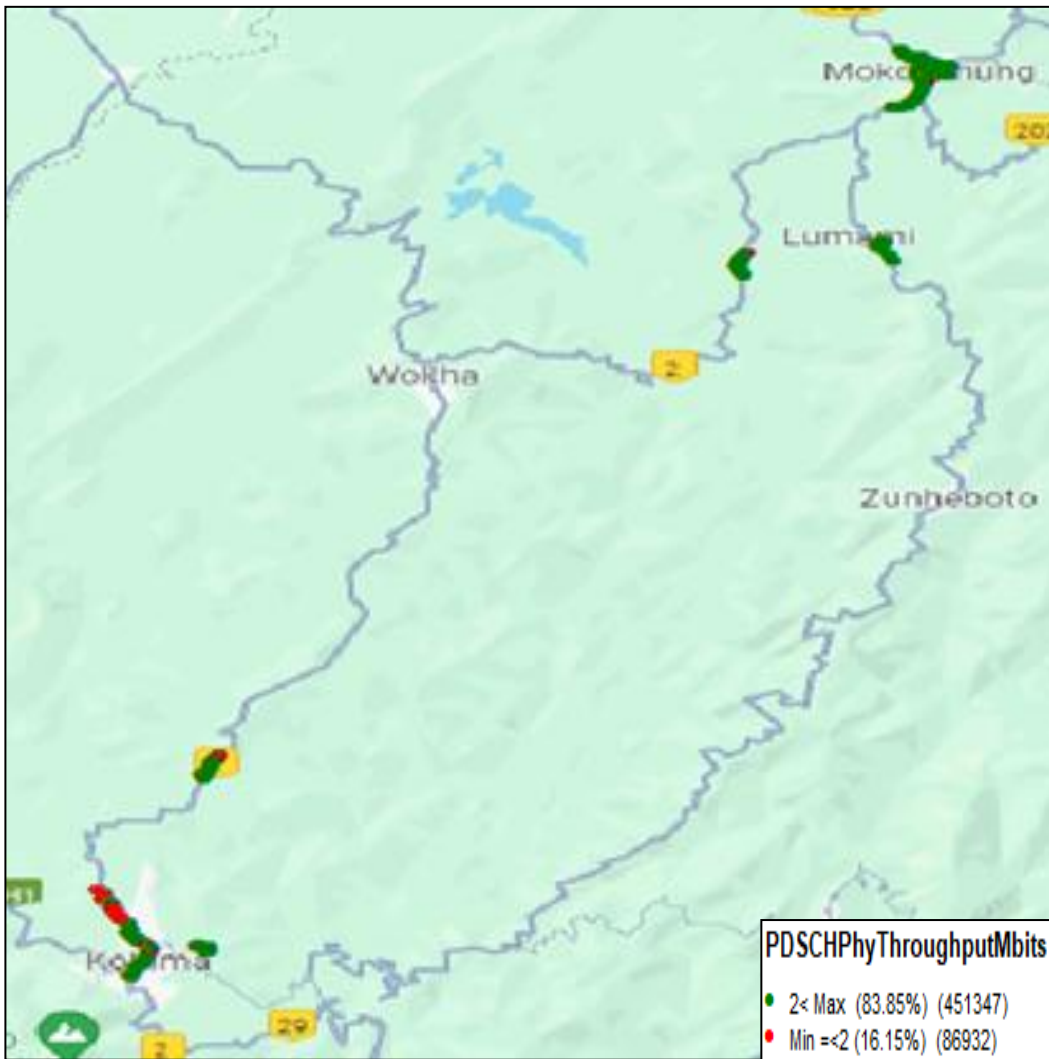
IV. Dynamic Data Test- 4G DL Details

VIL

Dynamic Data Testing Complete 342 Kms

Data KPIs – Overall	4G
Average Download Throughput (Mbps)	4.18

4G



AVG. DOWNLOAD SPEED (Mbps)	4.18
% FILE TRANSFER COMPLETE	98.56
DL throughput	Sample %
0 to 1 Mbps	7.5
1 to 2 Mbps	8.65
2 to 5 Mbps	52.71
5 to 10 Mbps	21.21
>10 Mbps	9.93
Total	100