

Operator Assisted Drive Test Report

Ranchi-Khunti-Simdega-Gumla

Jharkhand- June, 2023

(RO, Kolkata)

Key Performance Indicators (KPIs):

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

AIRTEL- Hand Over Success Rate (HOSR%) in 4G network and Rx Quality (SINR) in 4G network

BSNL-Drop Call Rate in 2G & 3G network, Block Call Rate in 2G network, Hand over Success Rate (HOSR%) in 2G network and Rx Quality in 2G & 3G (Ec/Io) network.

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

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

It is observed that 2G & 4G coverage of VIL on the majority portion of the OADT routes is inadequate.

The Operator Assisted Drive Test has been carried out by Regional Office, Kolkata with the help of Service Providers in Jharkhand and surrounding areas including National Highway (20, 43 & 143) on 14th June 2023 and 15th June 2023 from 08.30 AM to 08.30 PM. The drive test covered drive route of 574 KMs over a period of 2 days. Approximately 614+ 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

Ranchi is the capital of the Indian state of Jharkhand and it is also one of the oldest cities in Jharkhand. **Khunti** is one of the twenty-four districts in South Chotanagpur division of the Indian state of Jharkhand. The district of Khunti was carved out of Ranchi district on 12 September 2007. **Simdega** is a city in the Indian state of Jharkhand and it is the administrative headquarters of the eponymous district and Subdivision. **Gumla** is one of the twenty-four districts of Jharkhand state, India, and Gumla town is the administrative headquarters of 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.

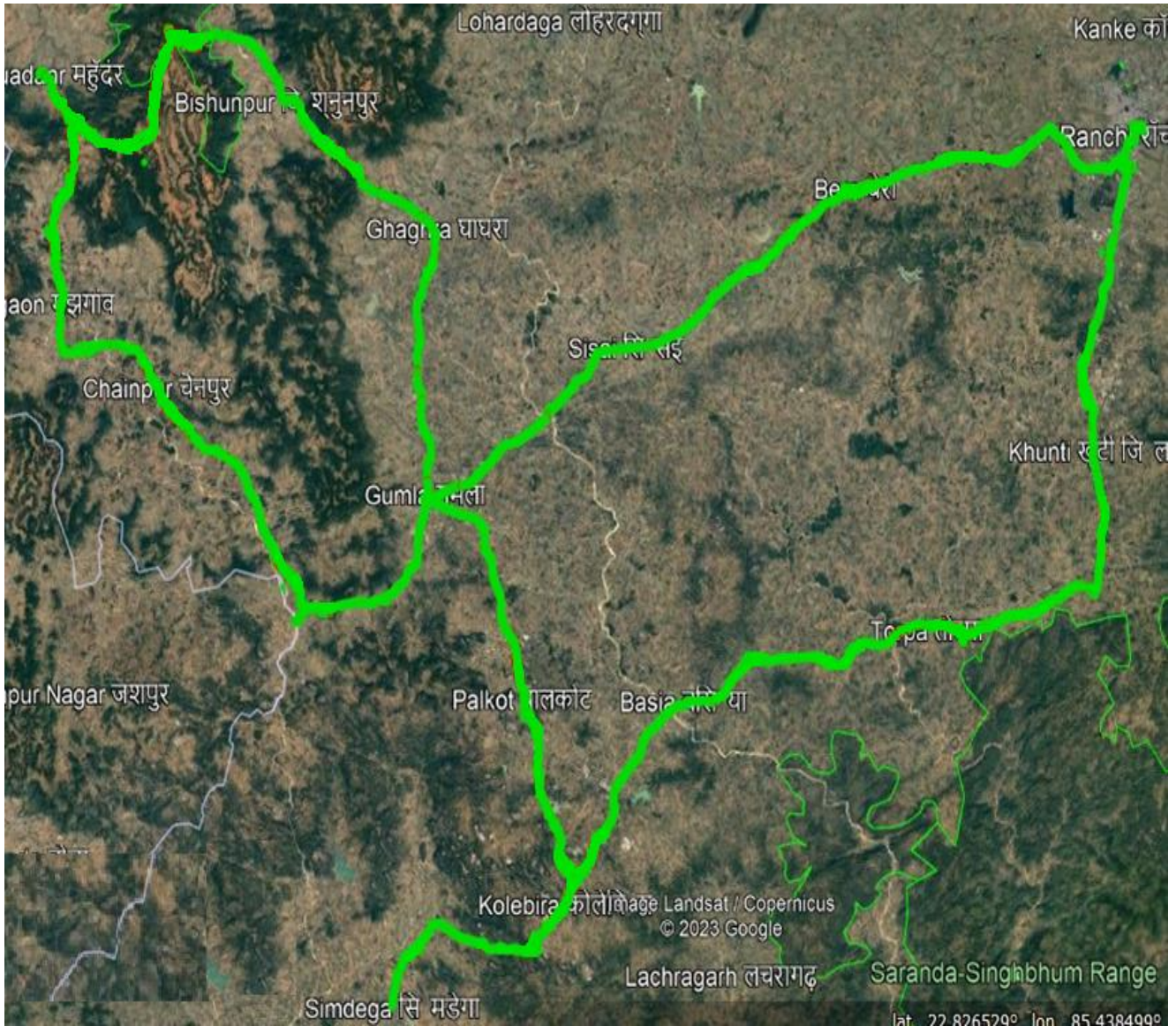
Data Tests: Dynamic Data Service Testing was performed along same route in all technologies. 500 KB file for 2G, 20MB file for 3G and 40MB file for 4G were downloaded from FTTP server in TSP's own server. Static Data Service Testing was also performed. Three 2G (Lock Mode) networks, one 3G (Lock Mode) 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: Ranchi-Khunti-Simdega-Gumla in Jharkhand

DAY-1—Ranchi Junction—Doranda Head Post Office—Bhagwan Birsa Mrig Vihar—Hutar Bazar—Khunti police station—Angrabari—Torpa police station—Kamdara—Basia—Konbirnawatoli post office—Agharma—Kolebira Block office—Kolebira police station—Sadar Hospital Kolebira—Simdega Sadar Hospital—Don Bosco School Jamtoli—Tapkara Dam, Bangru—Palkot police Station—Baghma—K O College Gumla—Gumla post office.

DAY-2—Gumla Bus stand—Silam—Raidih Police Station—Chhattisgarh—Jharkhand Border NH 43,—Chainpur bus stand—Dumri Block Office—Dumardanr—Kurund More—Mahuadanr Police Station—Sohar—Netarhat Diversion Point—Dark Vally—North Koel River Bridge—Banari—Bishunpur police station—Ghaghra Bus Stand—Ghaghra Police Station—Chandali—Gumla Police station—Tatanagar—Bharda School—Silaphari—Nagfeni—Sisai—Jura post office—Bharno—Bero Chowk—Nagri Hospital and Research—Jojpur football stadium—Jagarnathpur—Birsa Munda Airport, Ranchi

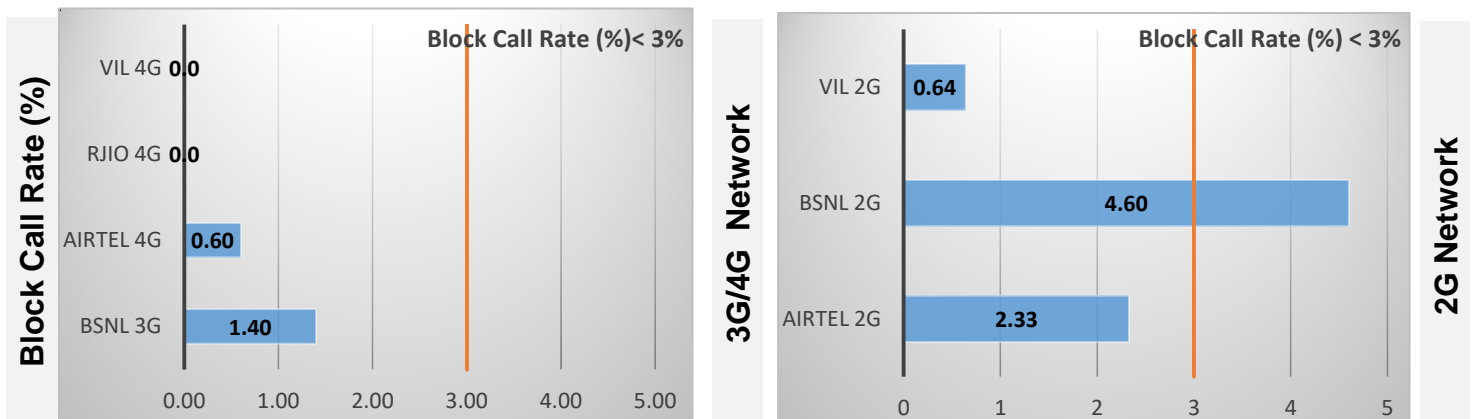
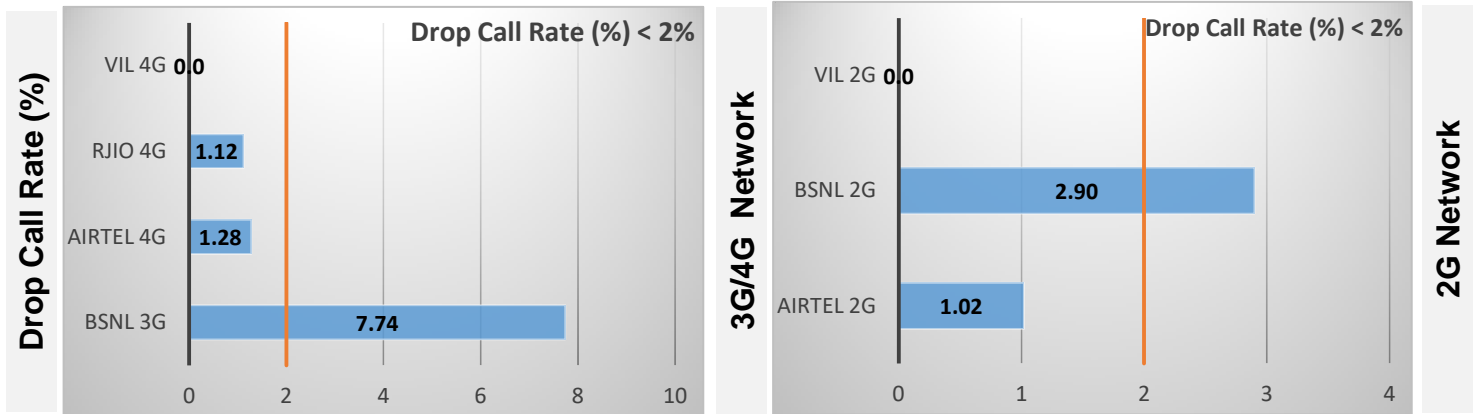
Data Service Test- Static Locations

Static Locations
Ranchi Railway Station
Gumla Bus Stop
Ranchi Airport

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 %	1.02	2.90	0.0	7.74	1.28	1.12	0.0
Block Call Rate %	2.33	4.60	0.64	1.40	0.60	0.0	0.0

- 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%) except BSNL (2G) network.

Coverage

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

TSPs	2G		
	AIRTEL	BSNL	VIL
Coverage %	61.09	60.57	82.30

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

TSPs	3G	4G		
	BSNL	AIRTEL	RJIO	VIL
Coverage	66.78	75.18	91.54	99.15

Summary

City Level Summary- Voice

Voice Call	2G		
	AIRTEL	BSNL	VIL
Call Attempt	602	343	157
Blocked Call Rate (%)	2.33	4.60	0.64
CSSR% (Accessibility)	97.60	98.54	99.36
Drop Call Rate (%)	1.02	2.90	0.0
Mobility HOSR (%)	98.50	85.71	100
Rx Quality (%)	95.37	79.02	98.47

Voice Call	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Call Attempt	142	628	535	51
Blocked Call Rate (%)	1.40	0.60	0.0	0.0
CSSR% (Accessibility)	97.18	99.04	100	100
Drop Call Rate (%)	7.74	1.28	1.12	0.0
Mobility HOSR (%)	97.87	94.42	98.39	97.74
Rx Quality (%)	88.10	90.27	88.35	90.83

Summary-Data Services Dynamic

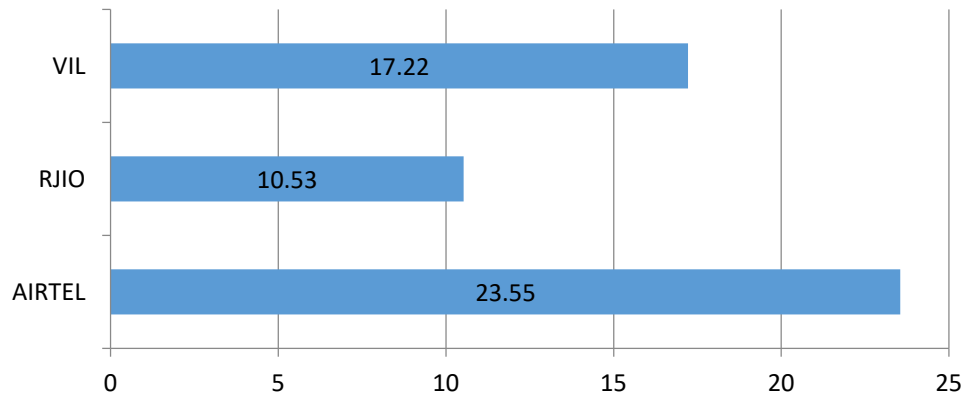
Key Observations

Dynamic Data was tested for 574 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)	206.36	214.49	174.0
Upload Throughput (kbps)	4.06	105.0	60.50
Web Browsing Delay (sec)	1.65	125.16	3.0
Latency (msec)	215.6	79.04	161.3

Average Data Services Static	3G/ 4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	3.16	44.0	16.32	15.50
Upload Throughput in Mbps	1.25	14.48	5.83	6.90
Video streaming delay (secs)	15.0	0.72	1.43	3.0
Web Browsing Delay (secs)	14.69	2.72	2.42	4.50
Latency (msec)	7.96	118	70.67	119

Summary-Data Services Static

Location Level Summary-

Location:-Ranchi Railway Station	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	295.0	200.45	171.40
Upload Throughput (kbps)	35.90	105.0	47.10
Web Browsing Delay (sec)	2.05	141.85	3.0
Latency (msec)	237	78.7	162

Location:-Ranchi Railway Station	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	2.24	37.0	23.35	12.90
Upload Throughput in Mbps	1.11	16.0	5.96	6.40
Video streaming delay (secs)	15.0	1.01	1.31	4.0
Web Browsing Delay (secs)	11.37	2.97	2.34	5.0
Latency (msec)	8.85	116	78	107

Location:- Gumla Bus Stop	2G		
	AIRTEL	BSNL	VIL
Download throughput in (kbps)	114.10	163.20	182.60
Upload Throughput in (kbps)	54.70	98.0	62.10
Web Browsing Delay (secs)	1.03	134.60	4.0
Latency (msec)	212	77.6	173

Location:- Gumla Bus Stop	4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in (mbps)	2.96	31.0	11.96	***
Upload Throughput in (mbps)	1.13	5.46	6.69	***
Video streaming delay (secs)	17	0.52	1.67	***
Web Browsing Delay (secs)	13.85	3.21	2.27	***
Latency (msec)	7.44	131	77	***

*** VIL did not submit the report.

Summary-Data Services Static

Location Level Summary-

Location:-Ranchi Airport	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	210.0	279.84	168.0
Upload Throughput (kbps)	31.60	112.0	72.40
Web Browsing Delay (sec)	1.87	99.04	2.0
Latency (msec)	198	80.82	149

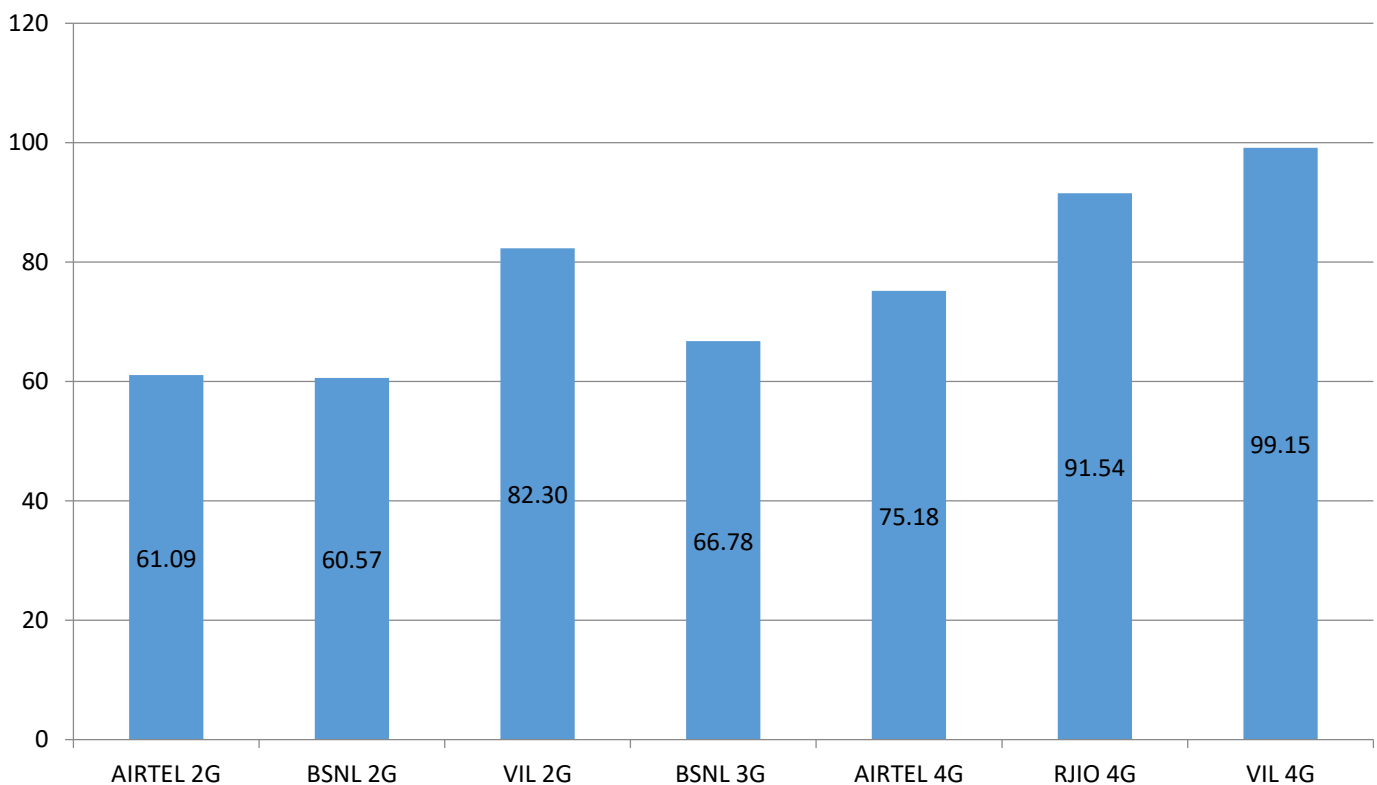
Location:-Ranchi Airport	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	4.28	64.0	13.64	18.20
Upload Throughput in Mbps	1.52	22.0	4.82	7.40
Video streaming delay (secs)	13.0	0.64	1.31	2.0
Web Browsing Delay (secs)	18.85	2.0	2.64	4.0
Latency (msec)	7.60	107	57	131

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	61.09
BSNL 2G	60.57
VIL 2G	82.30
BSNL 3G	66.78
AIRTEL 4G	75.18
RJIO 4G	91.54
VIL 4G	99.15

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.

I. Coverage Details

AIRTEL

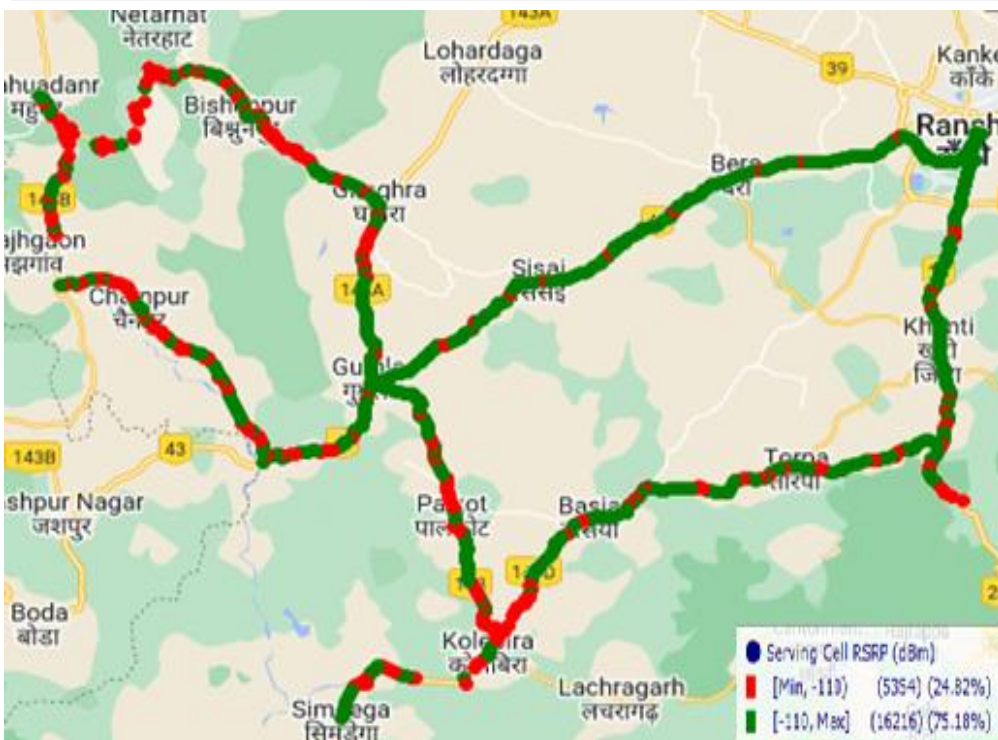
Technology	Coverage Rate %
2G	61.09
4G	75.18

2G



Overall Rx Level	Sample %
[Max >=-75]	31.15
[-75 >=-85]	29.94
[-85 >=-95]	20.50
[-95 >=Min]	18.41
Total	100

4G



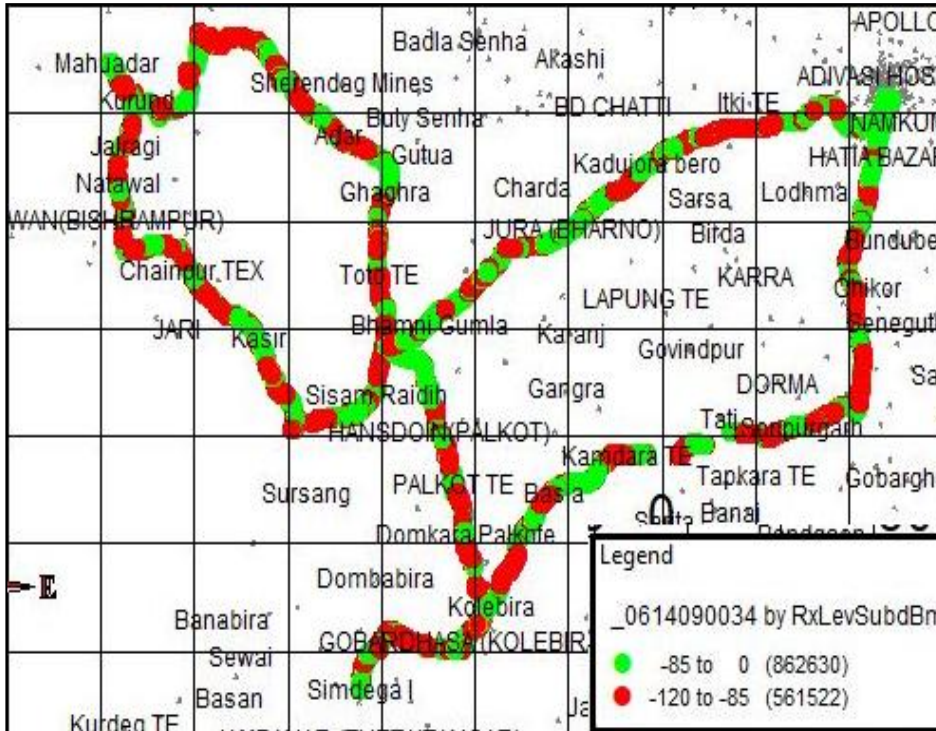
Overall RSRP	Sample %
[Max >=-80]	4
[-80 >=-90]	17
[-90 >=-110]	54
[-110 >=Min]	25
Total	100

I. Coverage Details

BSNL

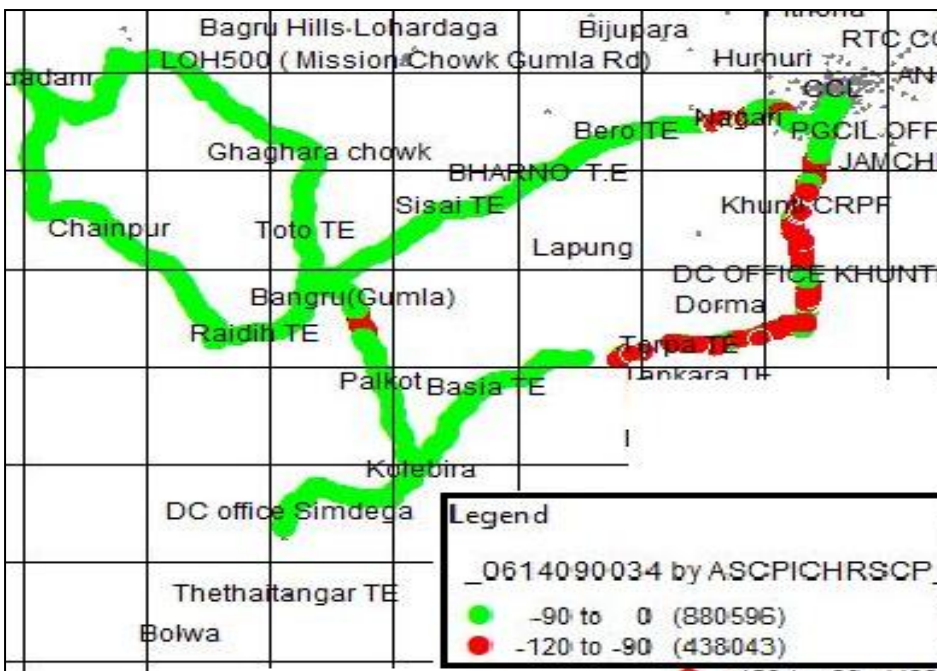
Technology	Coverage Rate %
2G	60.57
3G	66.78

2G



Overall RxLevel	Sample %
[Max >=-75]	34.68
[-75 >=-85]	25.90
[-85 >=-95]	27.46
[-95 >=Min]	11.96
Total	100

3G

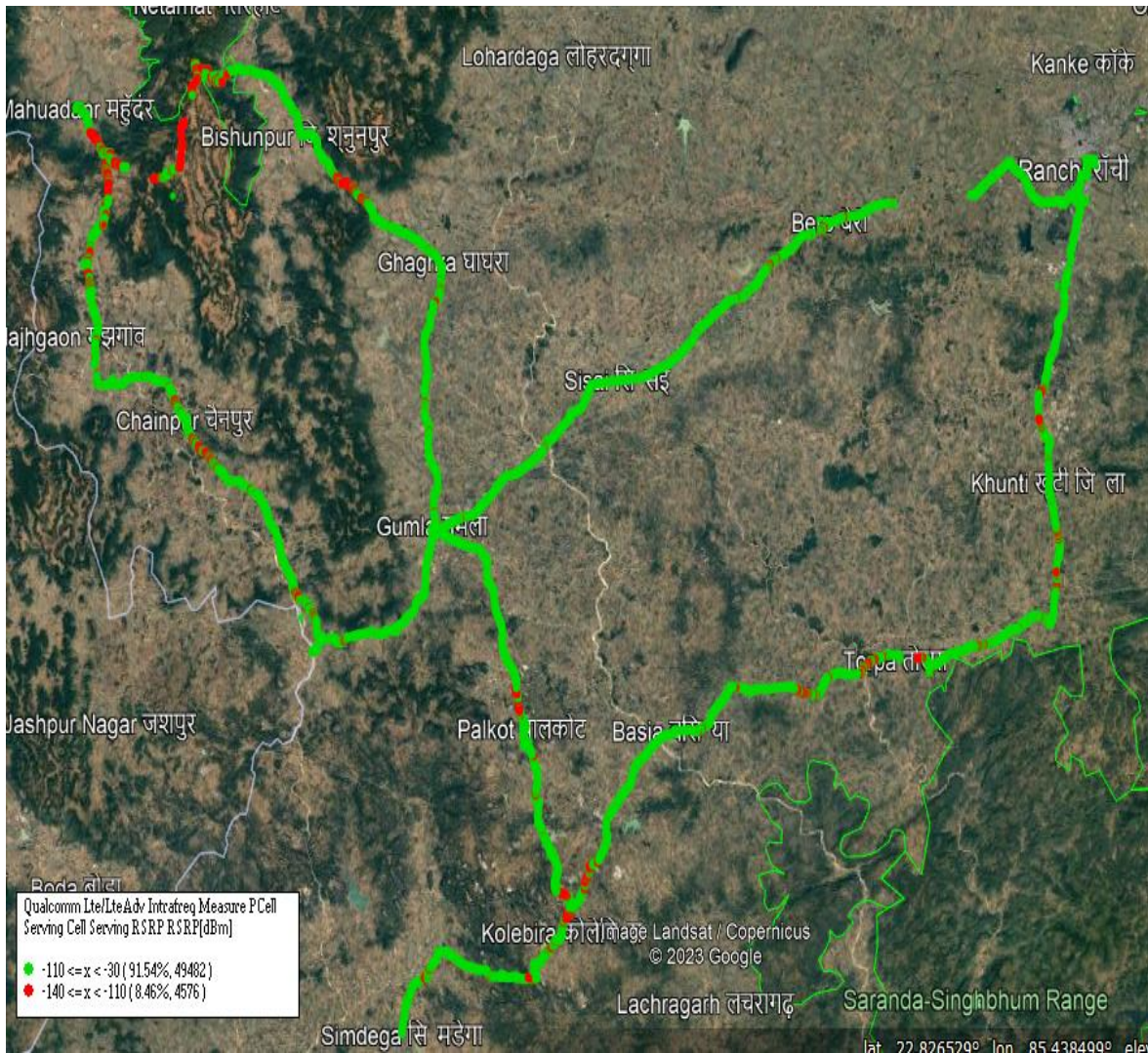


Overall RSCP	Sample %
[Max >=-70]	17.80
[-70 >=-80]	21.65
[-80 >=-90]	27.33
[-90 >=Min]	33.22
Total	100

I. Coverage Details

RJIO

Technology	Coverage Rate %
4G	91.54
4G	



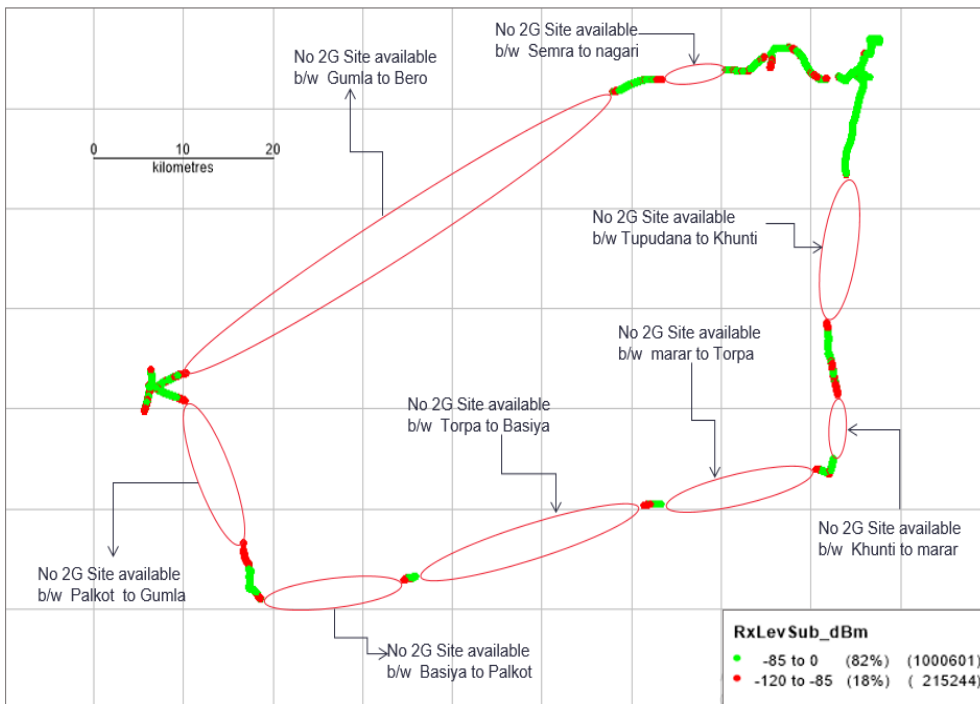
Overall RSRP	Sample %
[Max >= -80]	29.37
[-80 >= -90)	23.65
[-90 >= -110)	38.51
[-110 >= Min)	8.46
Total	100

I. Coverage Details

VIL

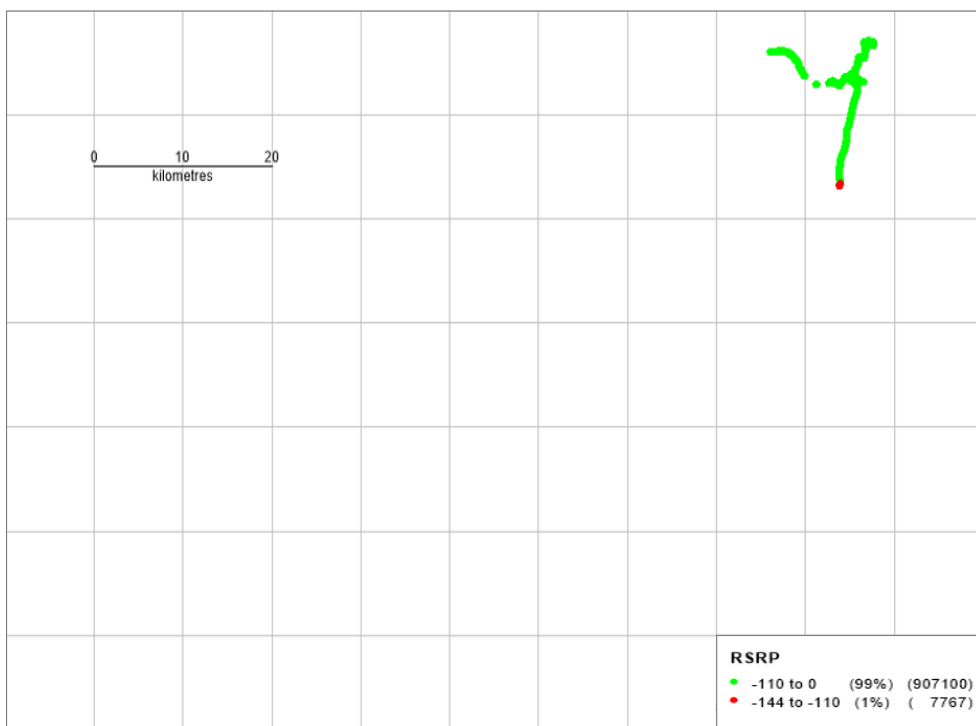
Technology	Coverage Rate %
2G	82.30
4G	99.15

2G



Overall RxLevel	Sample %
[Max >=-75]	45.39
[-75 >=-85]	36.91
[-85 >=-95]	14.17
[-95 =Min)	3.53
Total	100

4G

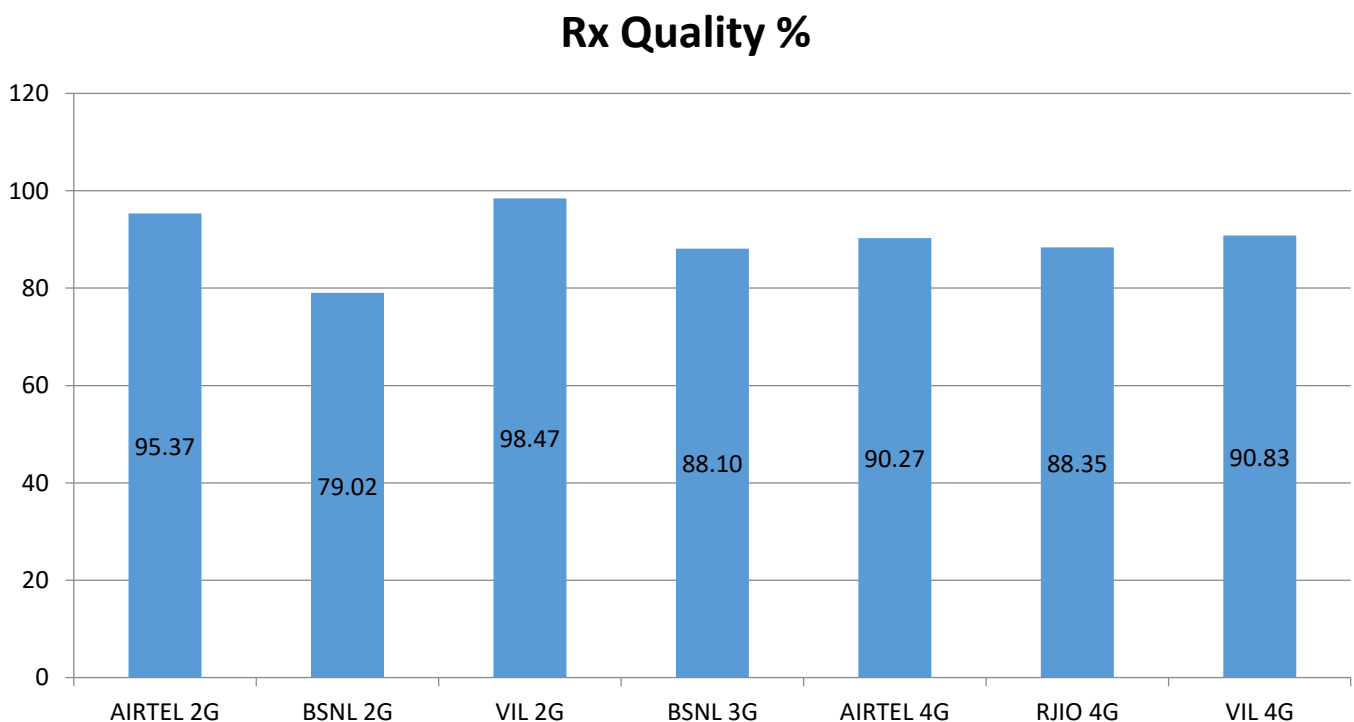


Overall RSRP	Sample %
[Max >=-80]	29.10
[-80 >=-90]	34.12
[-90 >=-110]	35.93
[-110 >=Min)	0.85
Total	100

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	95.37
BSNL 2G	79.02
VIL 2G	98.47
BSNL 3G	88.10
AIRTEL 4G	90.27
RJIO 4G	88.35
VIL 4G	90.83

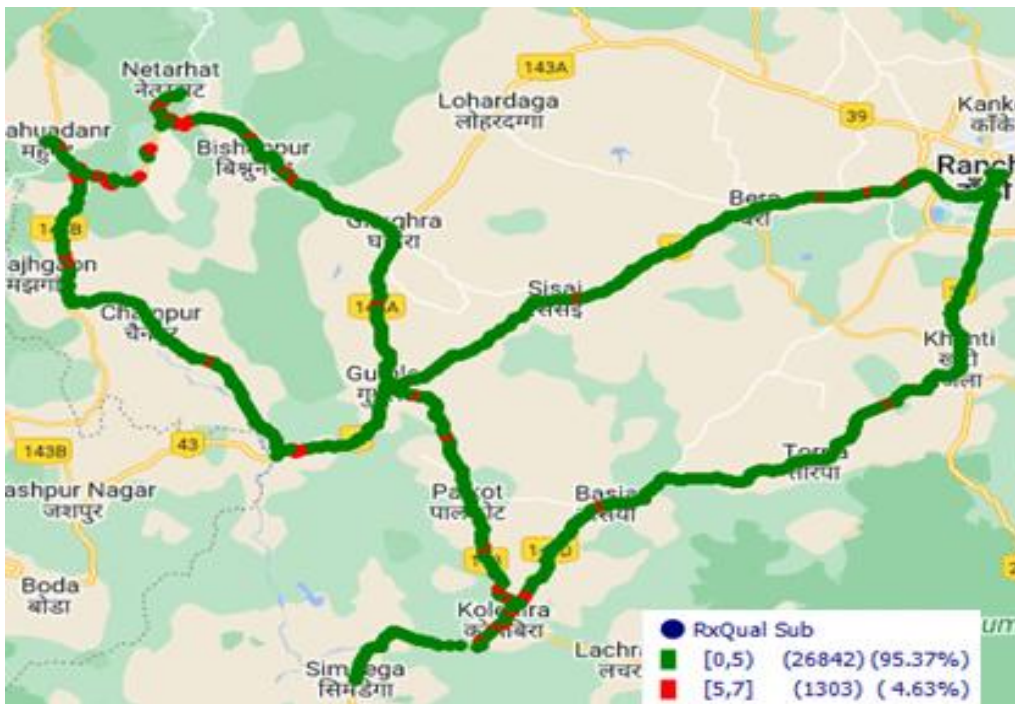


II. Quality Details

AIRTEL

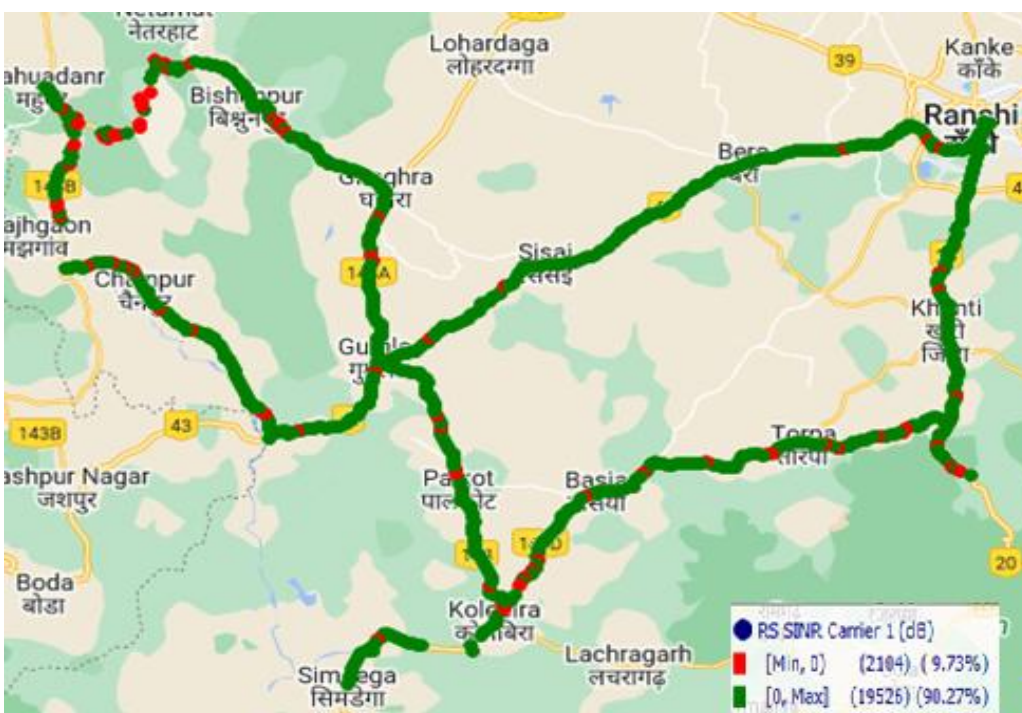
Technology	Rx Quality %
2G	95.37
4G	90.27

2G



Overall Rx Quality	Sample %
(Min <=2)	84.59
(2 <=3)	3.87
(3 <=4)	4.64
(4 <=5)	2.27
(5 <=Max)	4.63
Total	100

4G



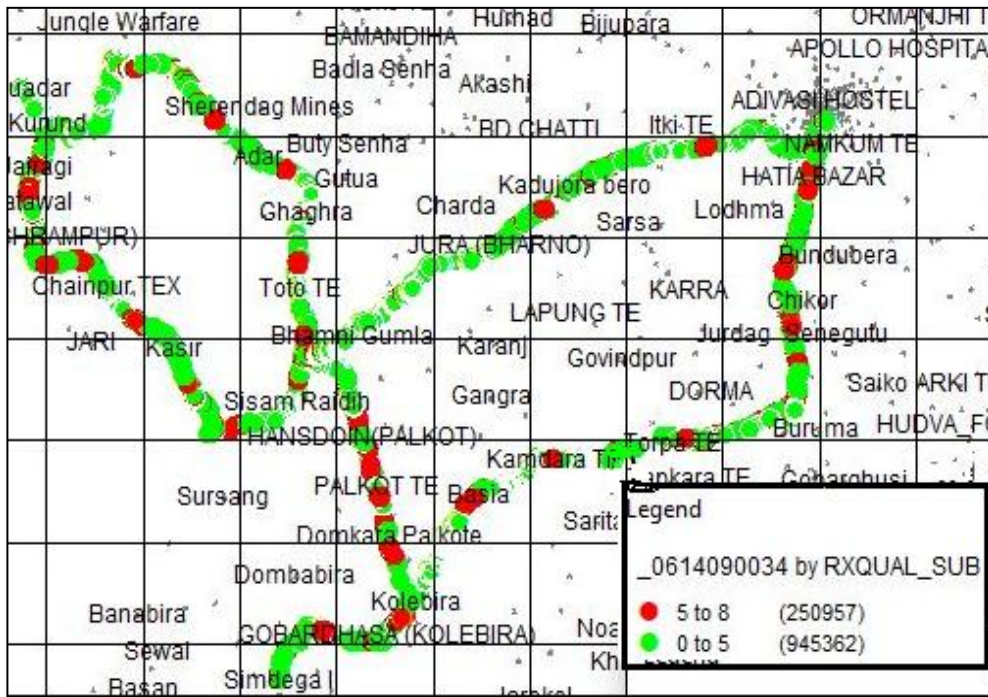
Overall SINR	Sample %
(Min <=0)	10
(0 <=5)	18
(5 <=10)	20
(10 <=15)	20
(15 <=Max)	32
Total	100

II. Quality Details

BSNL

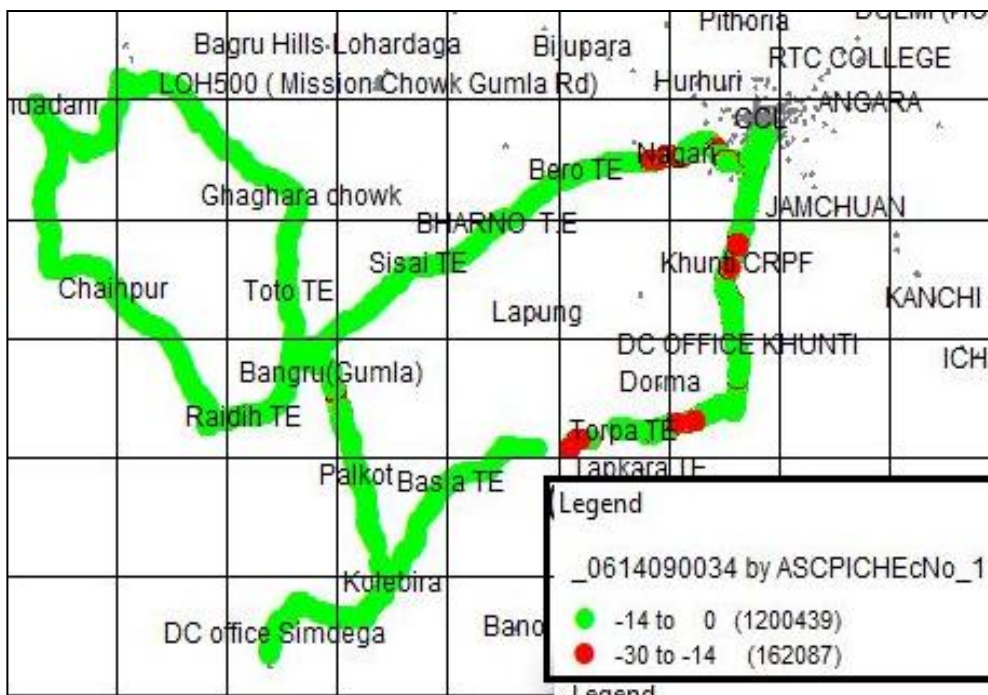
Technology	Rx Quality %
2G	79.02
3G	88.10

2G



Overall Rx Quality	Sample %
(Min <=2)	63.01
(2 <=3)	4.39
(3 <=4)	5.45
(4 <=5)	6.17
(5 <=Max)	20.98
Total	100

3G



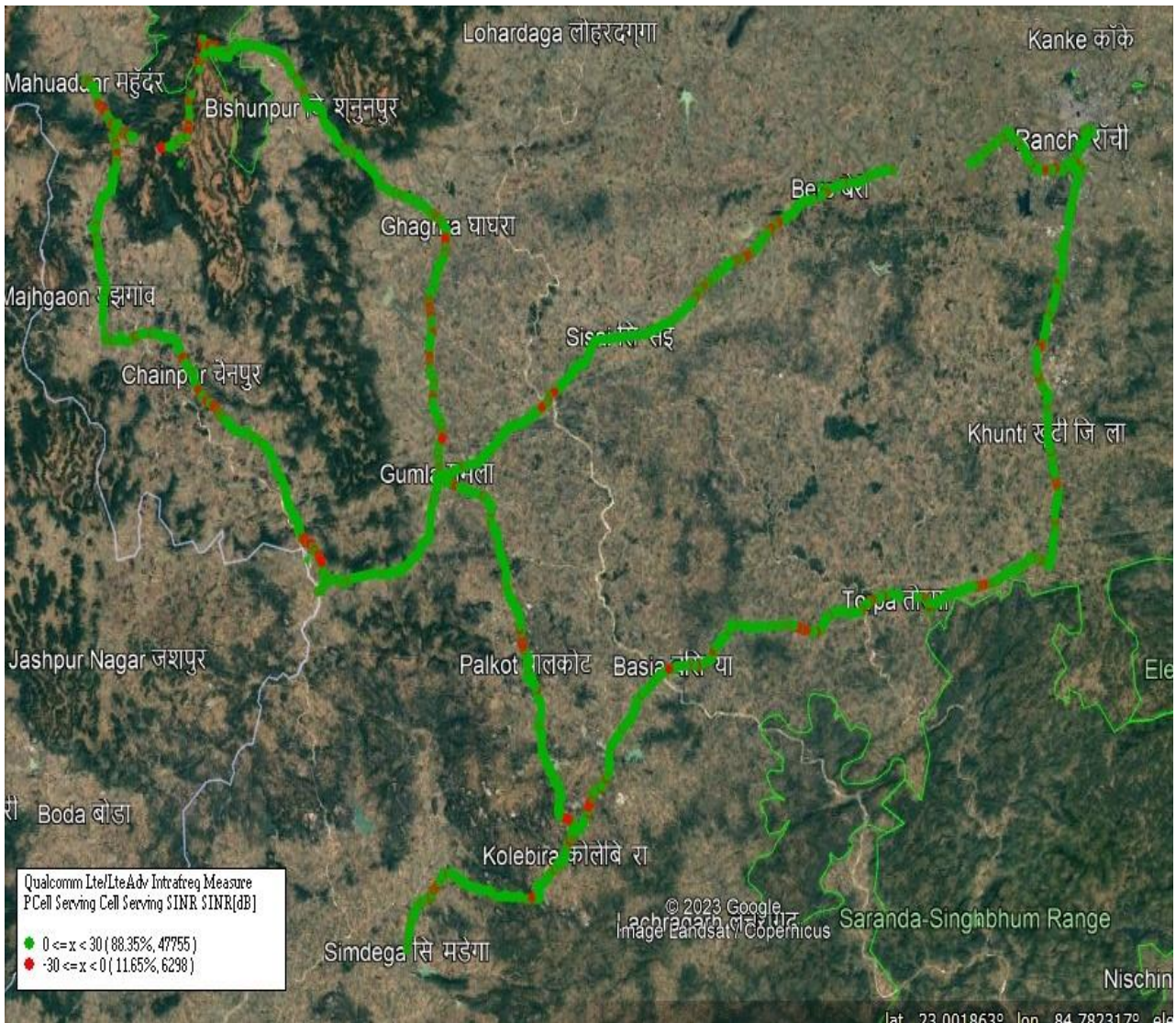
Overall EcNo	Sample %
(Max <=-6)	20.51
(-6 <=-9)	24.65
(-9 <=-11)	22.97
(-11 <=-14)	19.97
(-14 <= Min)	11.90
Total	100

II. Quality Details

RJIO

Technology	Rx Quality %
4G	88.35

4G



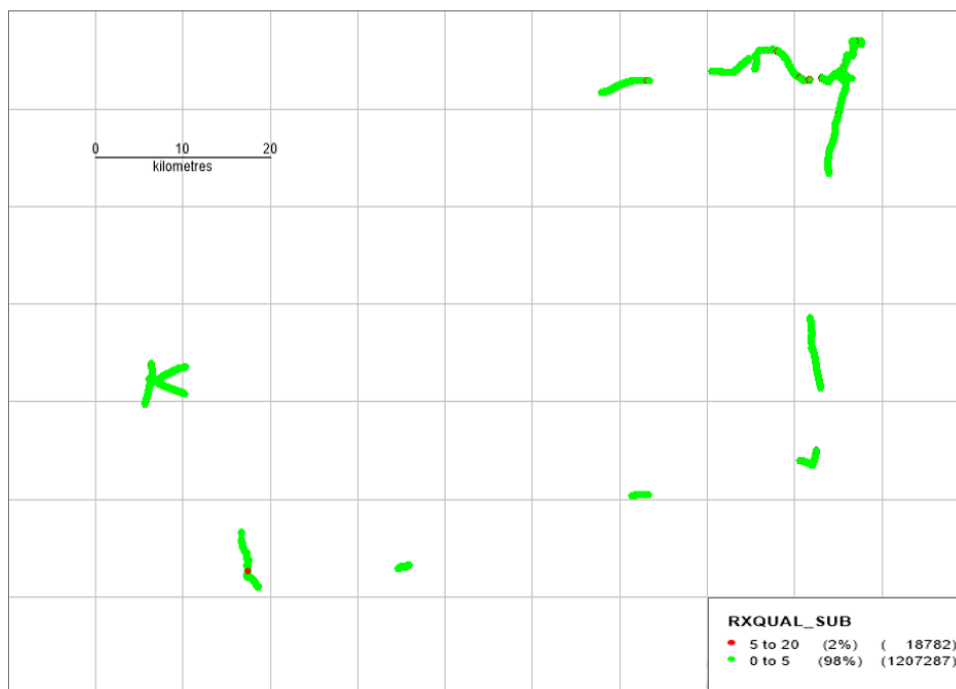
Overall SINR	Sample %
(Min <=0)	11.65
(0 <=5)	17.76
(5 <=10)	21.89
(10 <=15)	21.32
(15 <=Max)	27.38
Total	100

II. Quality Details

VIL

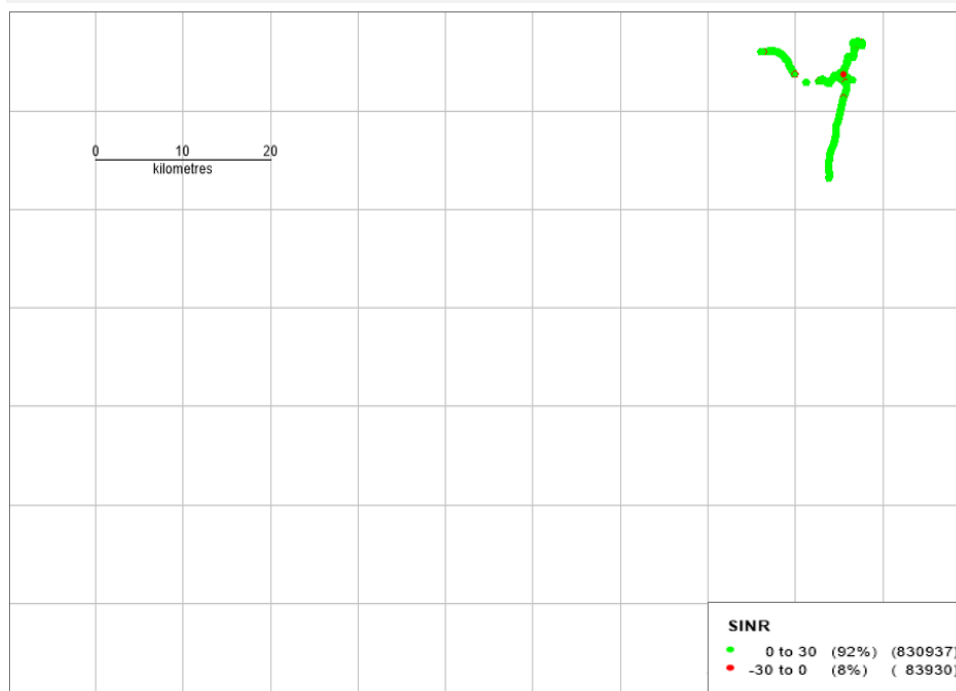
Technology	Rx Quality %
2G	98.47
4G	90.83

2G



Overall Rx Quality	Sample %
(Min <=2)	95.35
(2 <=3)	0.73
(3 <=4)	1.22
(4 <=5)	1.18
(5 <=Max)	1.53
Total	100

4G



Overall SINR	Sample %
(Min <=0)	9.17
(0 <=5)	16.57
(5 <=10)	20.01
(10 <=15)	23.32
(15 <=Max)	30.92
Total	100

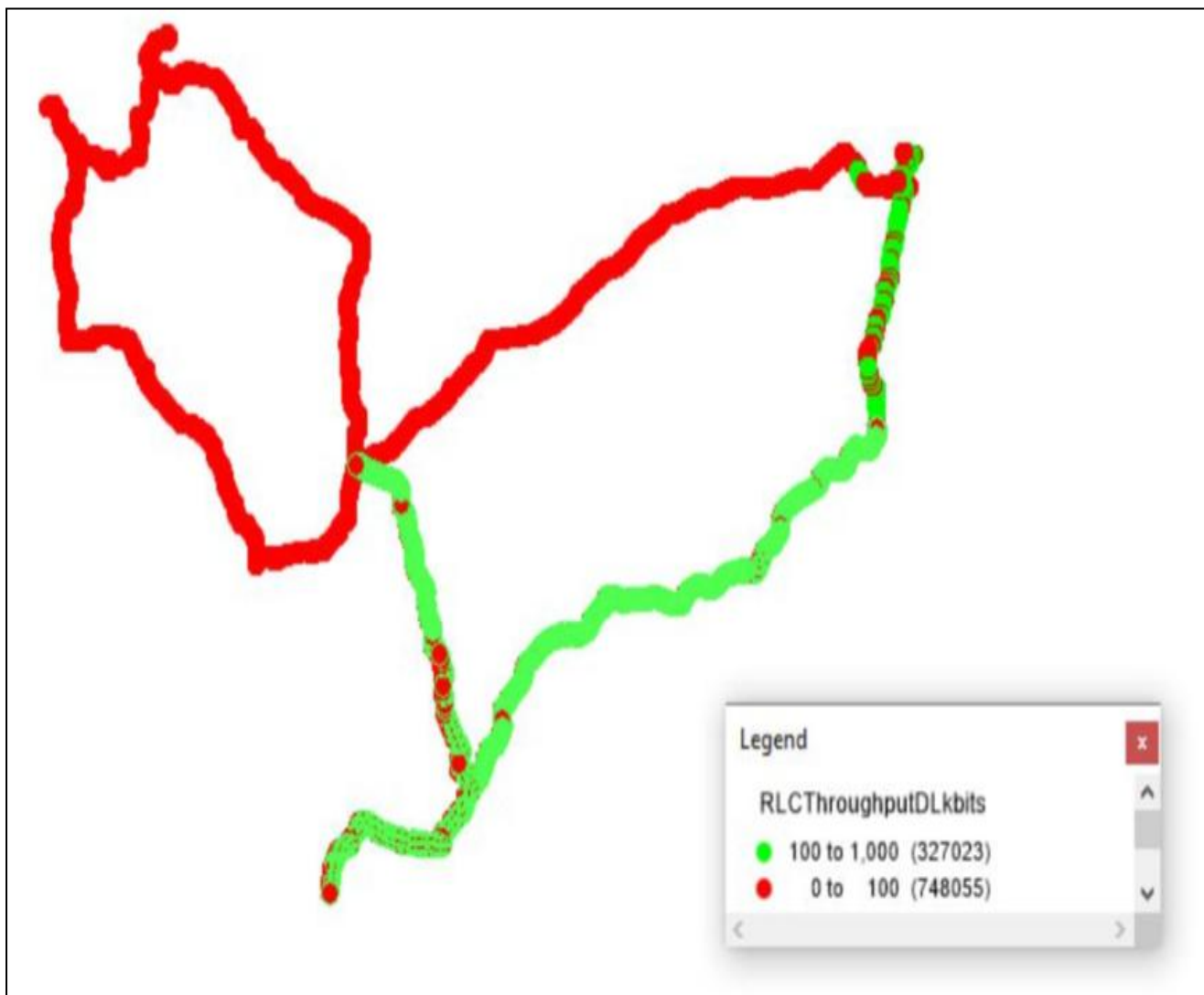
IV. Dynamic Data Test- 2G DL Details

AIRTEL

Dynamic Data Testing Complete 574 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	88.0

2G



AVG. DOWNLOAD SPEED (Kbps)	88.0
% FILE TRANSFER COMPLETE	99.0
DL throughput	Sample %
0 to 50 Kbps	84
50 to 100 Kbps	13
100 to 200 Kbps	3
200 to 300 Kbps	0
>300 Kbps	0
Total	100

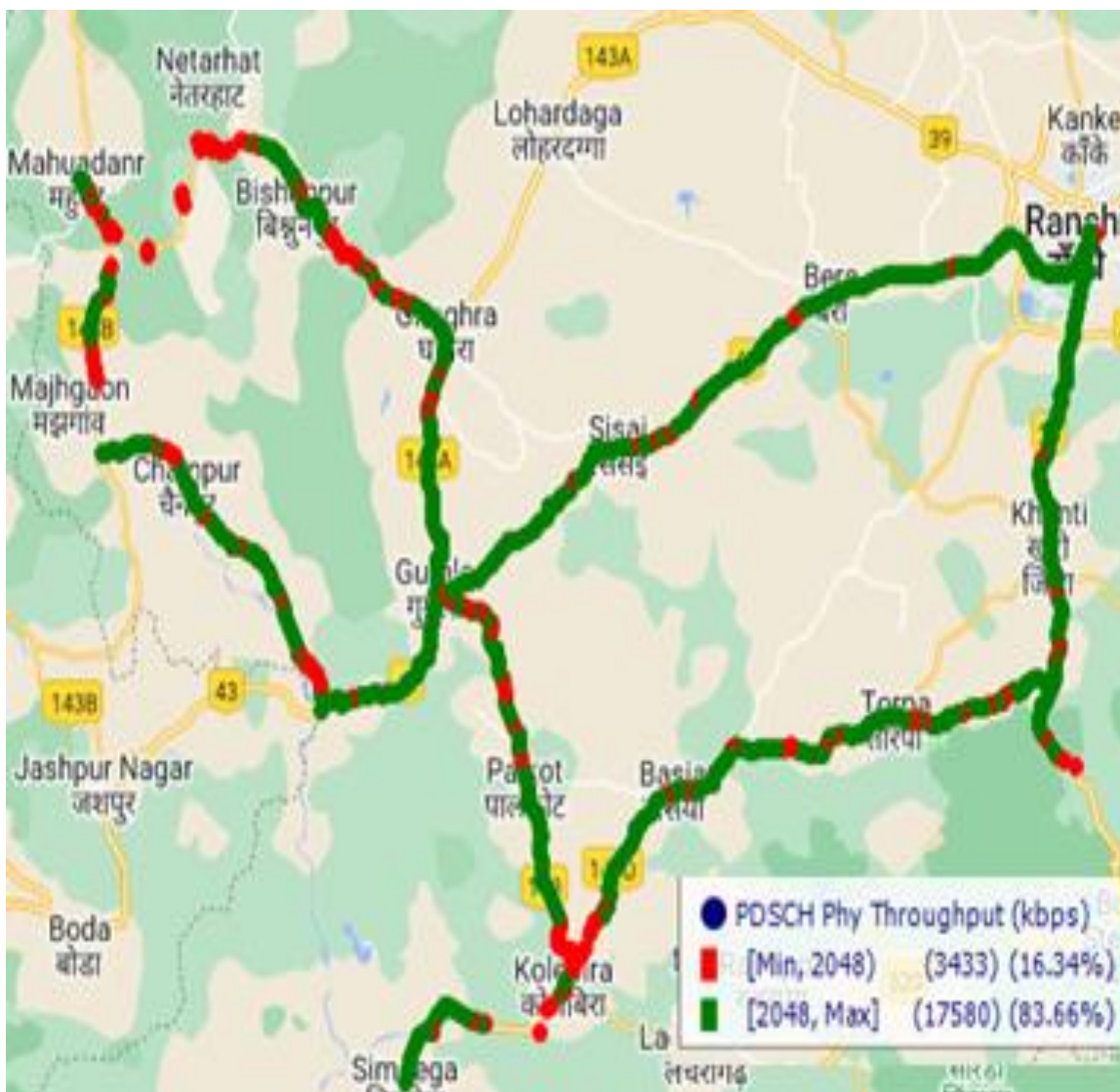
IV. Dynamic Data Test- 4G DL Details

AIRTEL

Dynamic Data Testing Complete 574 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	23.55

4G



AVG. DOWNLOAD SPEED (Mbps)	23.55
% FILE TRANSFER COMPLETE	99.0
DL throughput	Sample %
0 to 1 Mbps	13.4
1 to 2 Mbps	3.0
2 to 5 Mbps	8.6
5 to 10 Mbps	11.4
>10 Mbps	63.7
Total	100

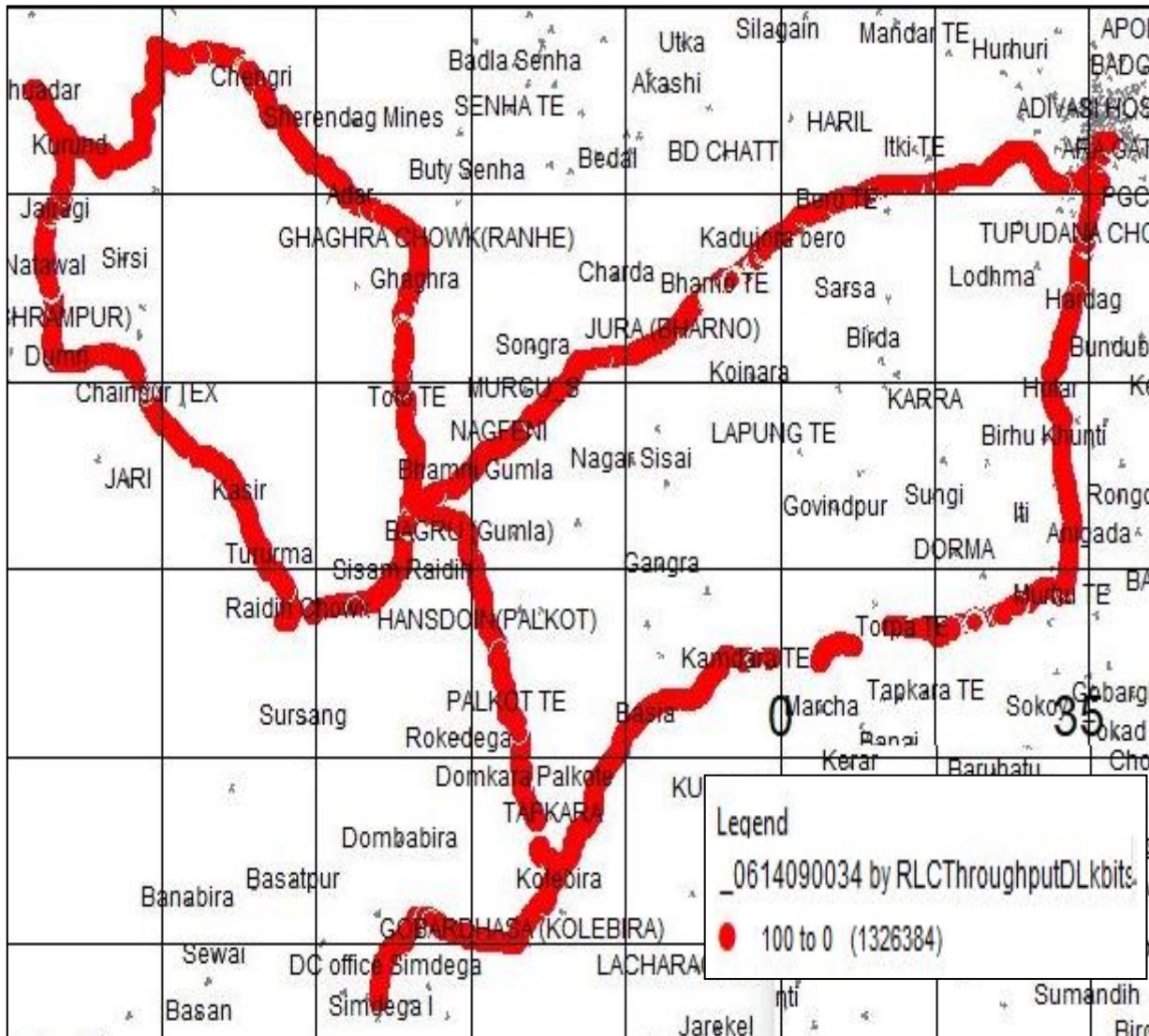
IV. Dynamic Data Test- 2G DL Details

BSNL

Dynamic Data Testing Complete 574 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	214.49

2G



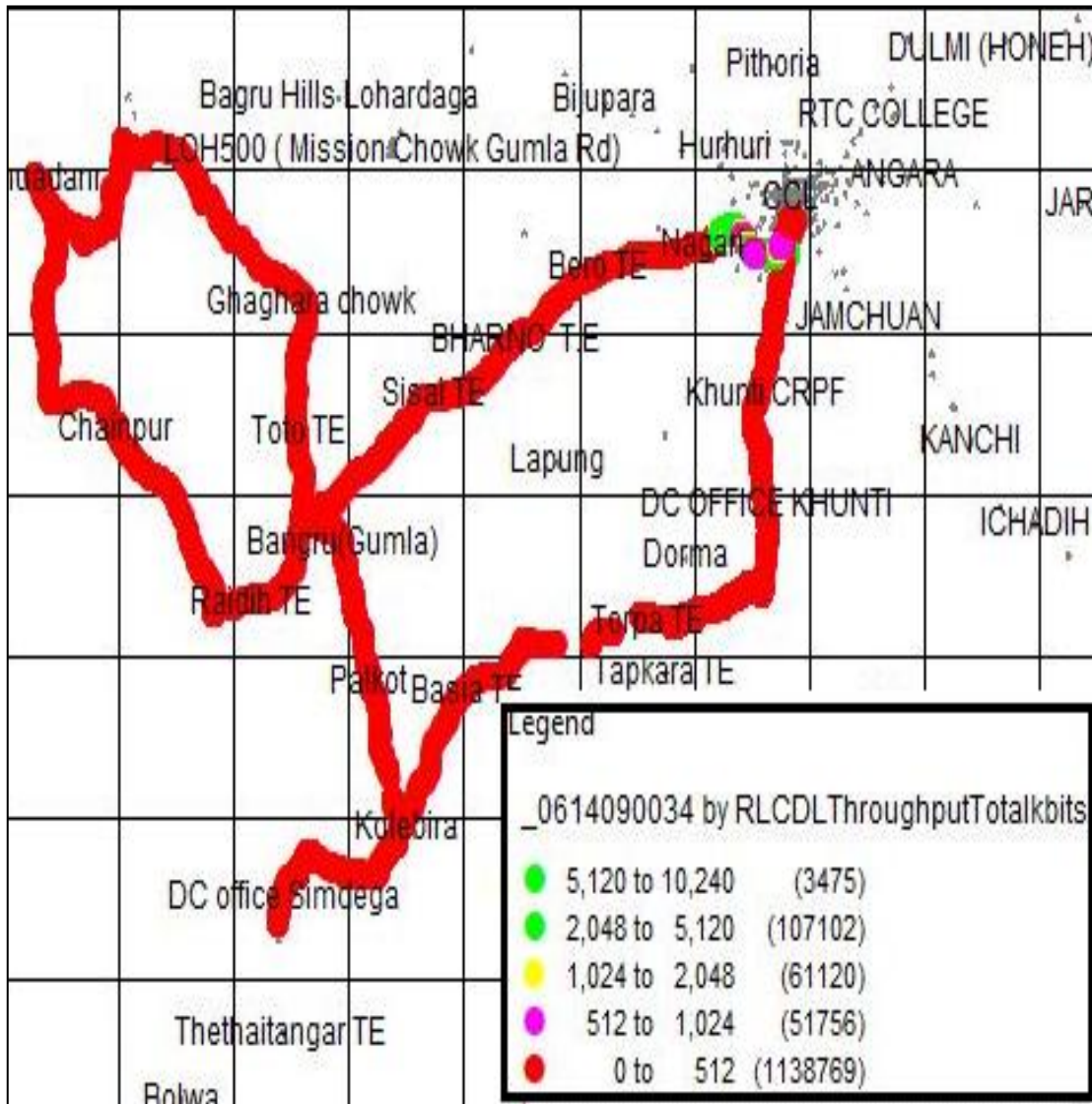
AVG. DOWNLOAD SPEED (Kbps)	214.49
% FILE TRANSFER COMPLETE	100
DL throughput	Sample %
0 to 50 Kbps	0
50 to 100 Kbps	0
100 to 200 Kbps	100
200 to 300 Kbps	0
>300 Kbps	0
Total	100

IV. Dynamic Data Test- 3G DL Details

BSNL

Dynamic Data Testing Complete 574 Kms

Data KPIs - Overall	3G
Average Download Throughput (Mbps)	3.16
3G	



AVG. DOWNLOAD SPEED (Mbps)	3.16
% FILE TRANSFER COMPLETE	100
DL throughput	Sample %
0 to 0.5 Mbps	83.60
0.5 to 1 Mbps	3.80
1 to 2 Mbps	4.49
2 to 5 Mbps	7.86
>5 Mbps	0.26
Total	100

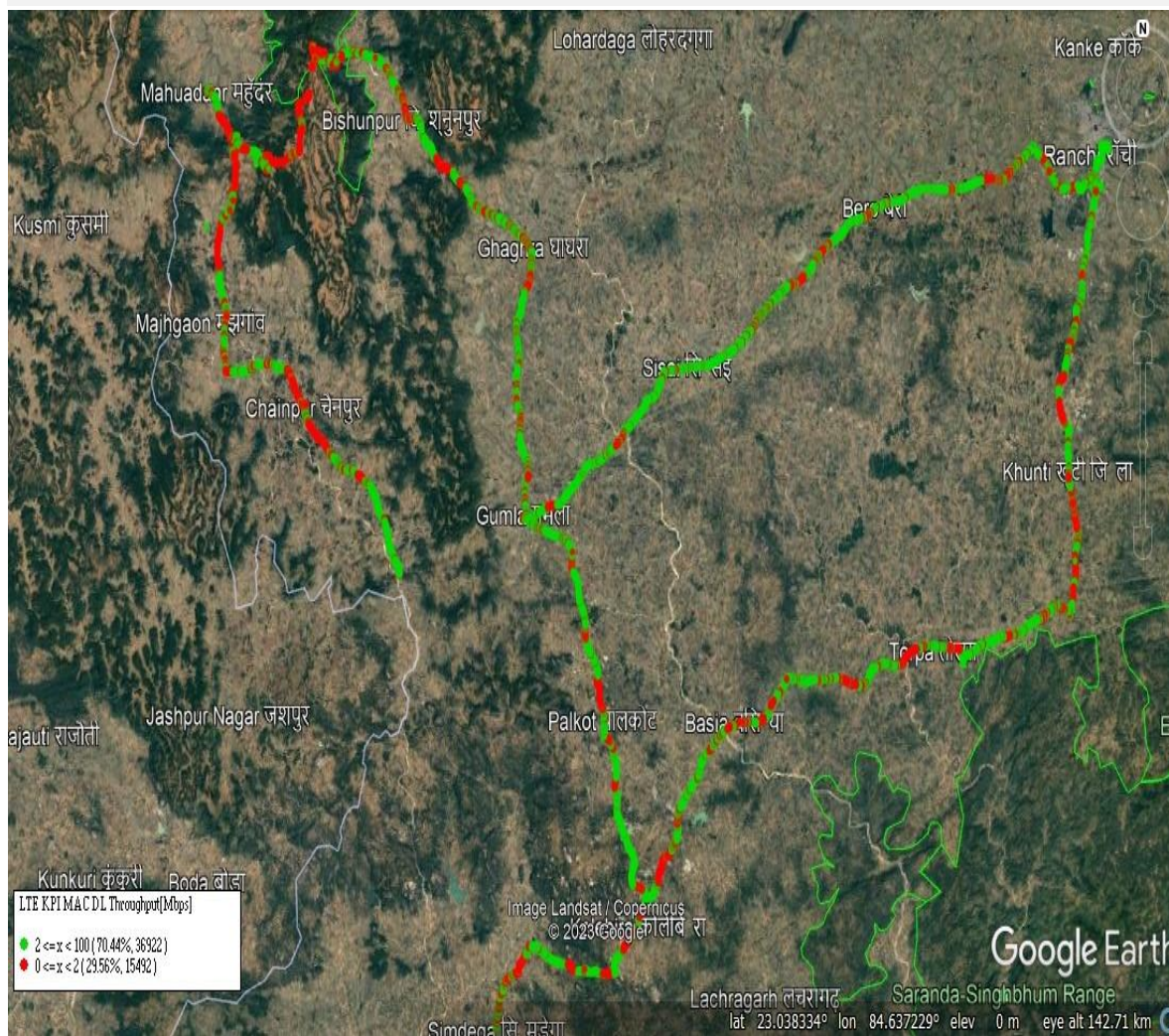
IV. Dynamic Data Test- 4G DL Details

RJIO

Dynamic Data Testing Complete 574 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	10.53

4G



AVG. DOWNLOAD SPEED (Mbps)	10.53
% FILE TRANSFER COMPLETE	100
DL throughput	Sample %
0 to 1 Mbps	19.80
1 to 2 Mbps	9.76
2 to 5 Mbps	21.67
5 to 10 Mbps	19.91
>10 Mbps	28.87
Total	100

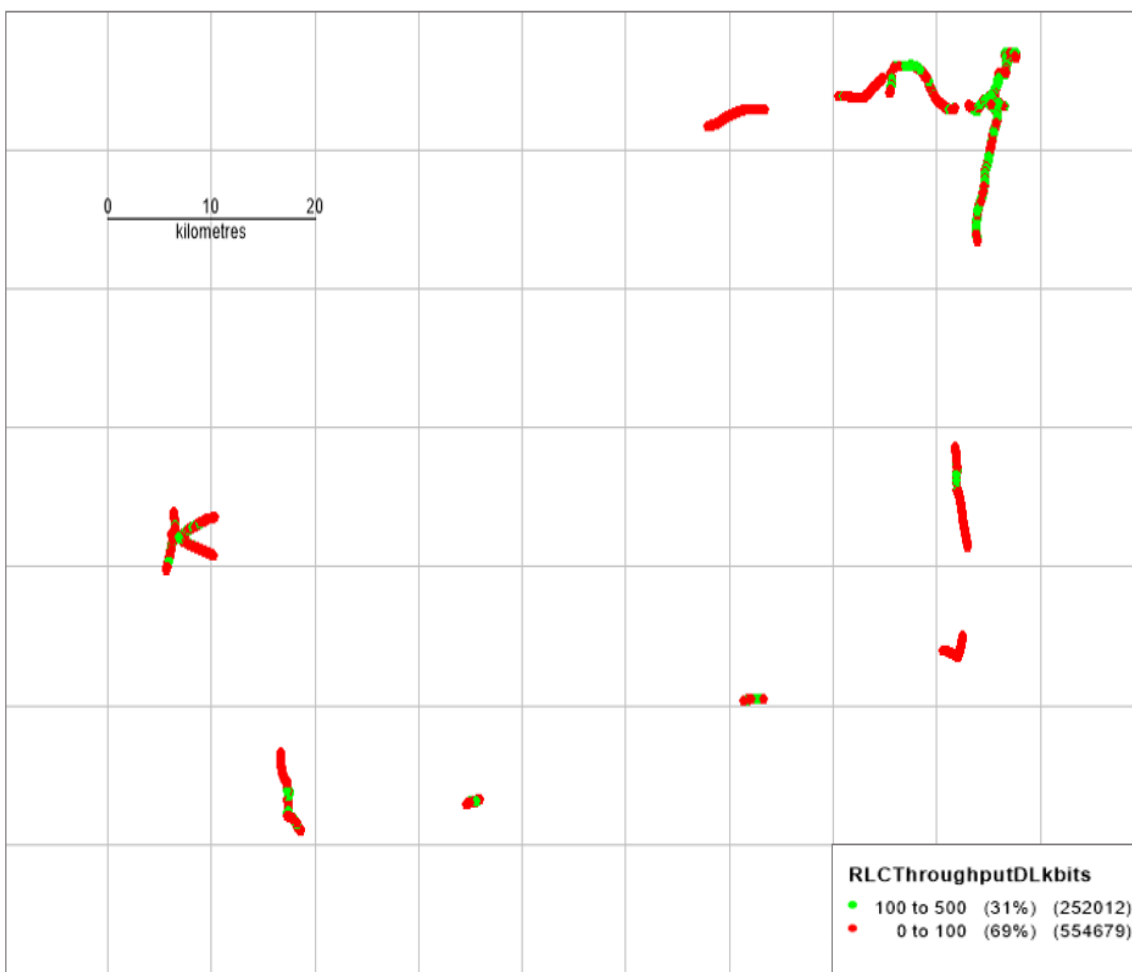
IV. Dynamic Data Test-2G DL Details

VIL

Dynamic Data Testing Complete 574 Kms

Data KPIs – Overall	2G
Average Download Throughput (Kbps)	121

2G



AVG. DOWNLOAD SPEED (Kbps)	121
% FILE TRANSFER COMPLETE	100
DL throughput	Sample %
0 to 50 Kbps	38.30
50 to 100 Kbps	30.46
100 to 200 Kbps	27.45
200 to 300 Kbps	3.79
>300 Kbps	0.00
Total	100

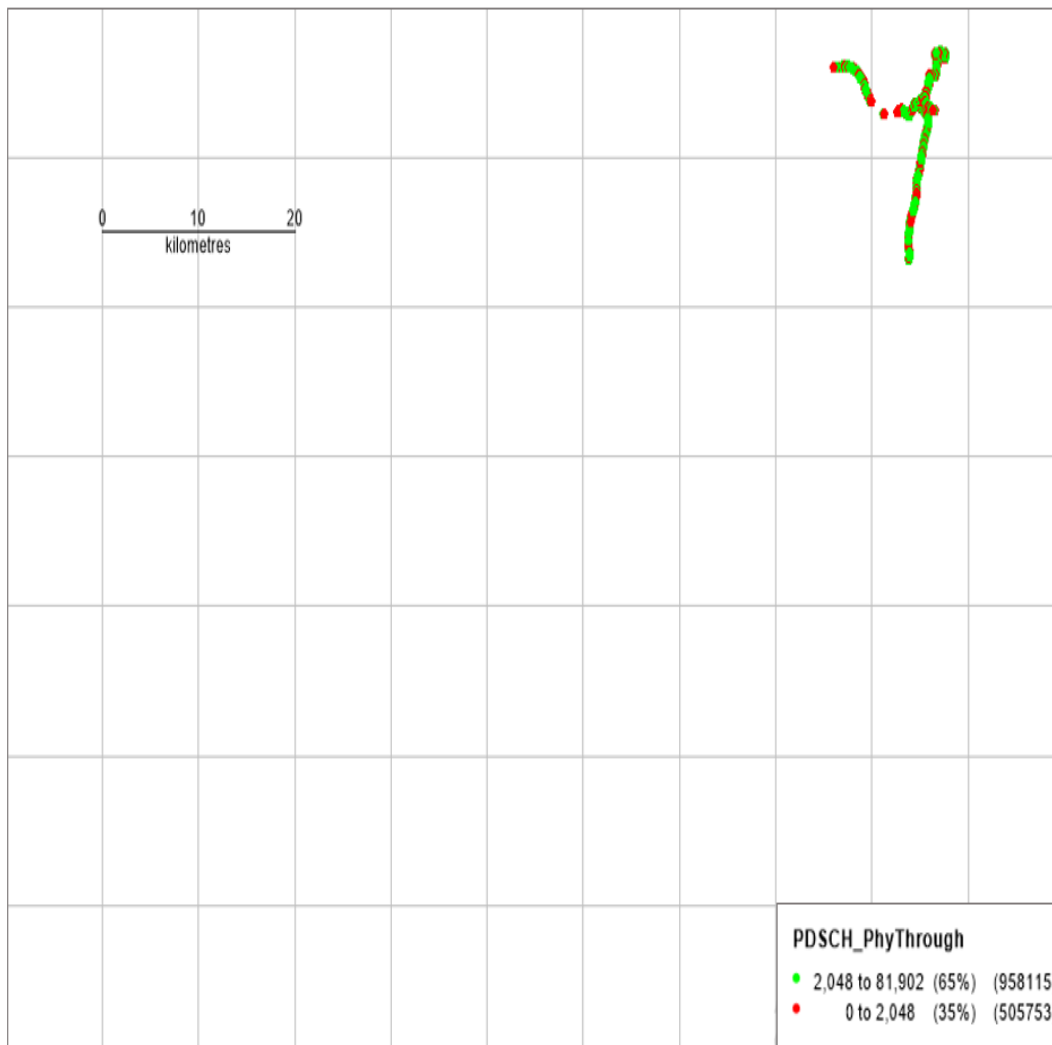
IV. Dynamic Data Test- 4G DL Details

VIL

Dynamic Data Testing Complete 574 Kms

Data KPIs – Overall	4G
Average Download Throughput (Mbps)	17.22

4G



AVG. DOWNLOAD SPEED (Mbps)	17.22
% FILE TRANSFER COMPLETE	99.06
DL throughput	Sample %
0 to 1 Mbps	28.61
1 to 2 Mbps	5.94
2 to 5 Mbps	14.33
5 to 10 Mbps	21.27
>10 Mbps	29.86
Total	100