Operator Assisted Drive Test Report
Deoghar-Dumka-Jamtara, Jharkhand
November, 2023
(RO, Kolkata)

Key Performance Indicators (KPIs):

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

AIRTEL- Rx Quality in 2G & 4G (SINR) network.

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

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

It is observed that 2G & 4G coverage of VIL and 3G coverage of BSNL 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 Deoghar-Dumka-Jamtara and surrounding areas including National Highways (114A, 133) on 1st November 2023 and 2nd November 2023 from 08.30 AM to 08.30 PM. The drive test covered drive route of 673 KMs (approx) over a period of 2 days. Approximately 494+ 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

Deoghar is a major city in Jharkhand, India. The city is administrative headquarter of Deoghar District which comes under Santhal Parganas division of Jharkhand. It is the fifth largest city in Jharkhand and also known as the cultural capital of Jharkhand. **Dumka**, the headquarters of the Dumka district and Santhal Pargana region, is a city in the state of Jharkhand, India.

Jamtara is a city and a notified area in the Jamtara Sadar subdivision of the Jamtara district in the Indian state of Jharkhand.

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.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	NO
4G	YES	NO	YES	YES
TOOL USED	TEMS	NIMO	X-CAL	TEMS

Voice & Dynamic Data Test Drive Route
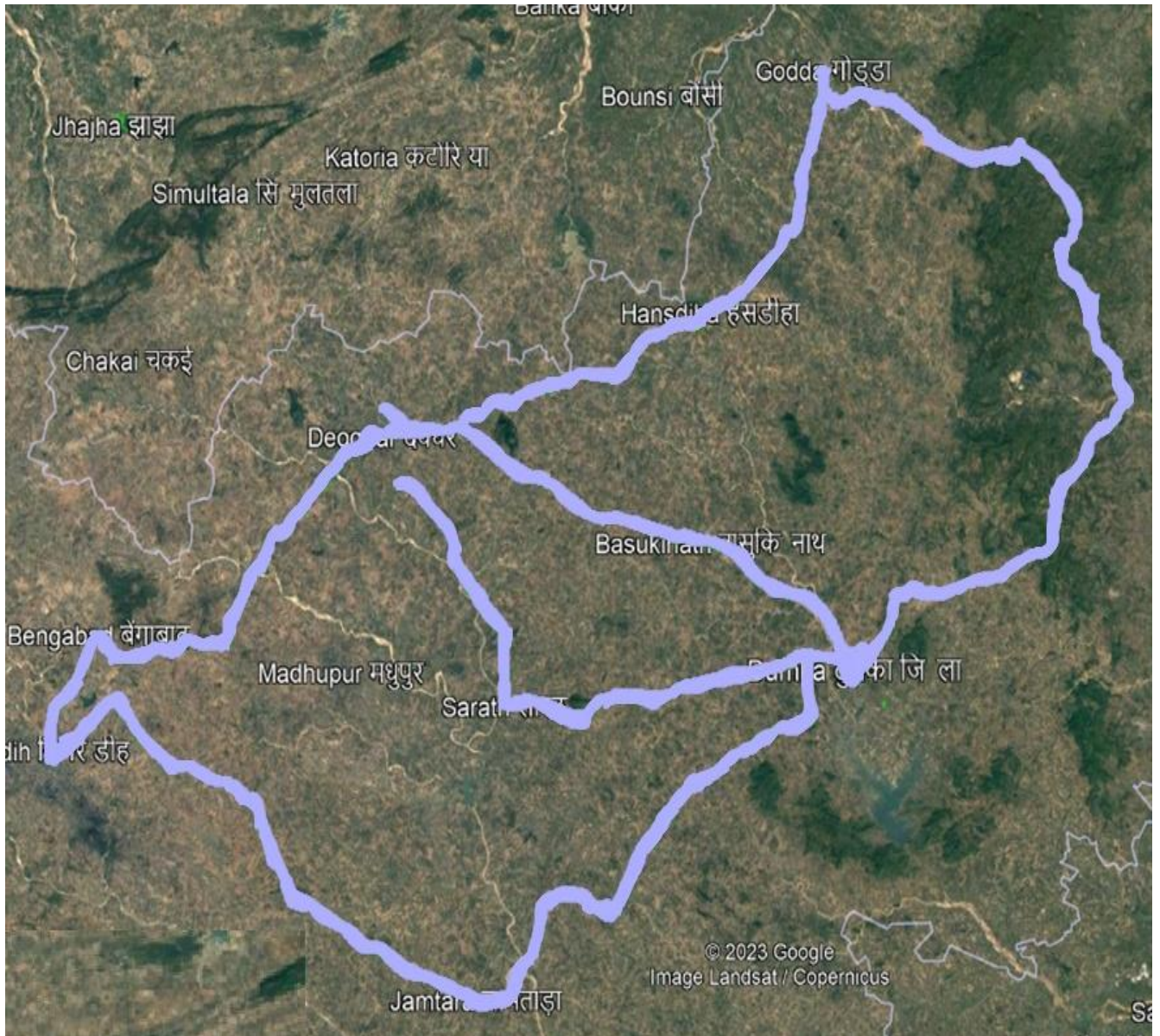
Drive Routes:Deoghar-Dumka-Jamtara

DAY-1–Deoghar Junction-Kabilaspur-Tiurnagar-Ghormara High School-Taljhari Gram Panchayat-Jharmundi-Asanthar-Jama Police Station-Murmala-Dumka Railway Station-Dudhani-Doman Pahari-Nischintpur Primary School-Golbandha-Hathiapathar-Naoasar-Fatehpur Police Station, Jamtara-Chaukunda-Jaridih-Bagdaha Hattola-Paljori-Jamtara Busstand-Sarita Seva Hospital, Jamtara-Mahespur-Bariarpur-Narayanpur Block office-Murlipahari-Gandey Block Office-Maheshmunda-Giridih Bus Stand-Sonbad-Bengabad-Coapuadih Post Office-Pathaljora Panchayat Bhaban-Govt. Primery Health Center, Burhai-AIIMS, Devipur, Deoghar.

DAY-2–Deoghar Bus Stand-Dahijor Post office- Chopa More-Mohanpur-Panchayat Sachivalaya Office, Kordaha-Jamunia-Saraiyahat Police Station-Markunda-Hansdiha-Pareyahat-Bargachhahariymari Primary Health Center-DTO office Godda-Sunderpahari-Salpathra-Post office Amrapara-Gopikandar Police Station-Kathikundu Police Station, Dumka-Bhurkunda-Palajori-Sarath Police Station-Sarawan-Deoghar Airport.
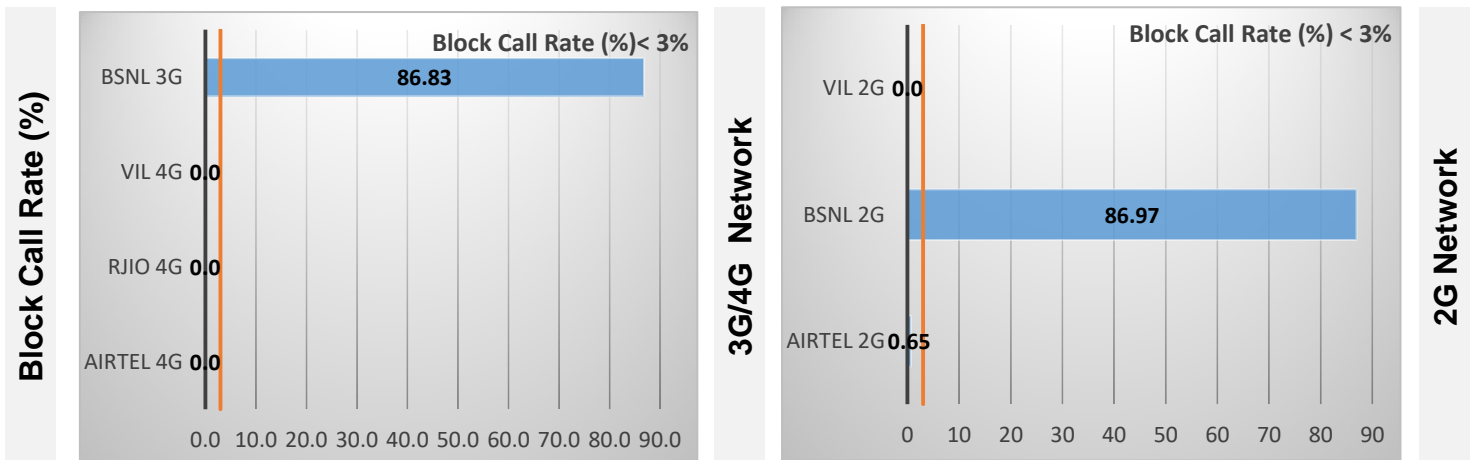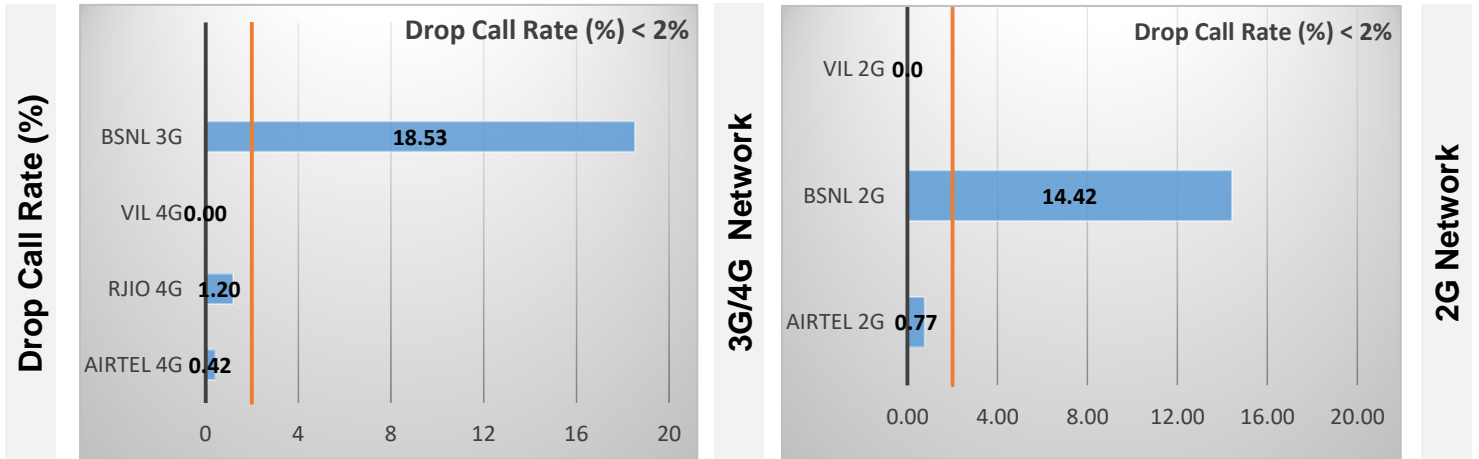
Data Service Test- Static Locations

Static Locations
Deoghar Railway Station
Deoghar Bus Stand

Voice Calls

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

Drop Call Rate (%) — 3G/4G Network
Drop Call Rate (%) < 2%
- BSNL 3G: 18.53
- VIL 4G: 0.00
- RJIO 4G: 1.20
- AIRTEL 4G: 0.42

Drop Call Rate (%) — 2G Network
Drop Call Rate (%) < 2%
- VIL 2G: 0.0
- BSNL 2G: 14.42
- AIRTEL 2G: 0.77

Block Call Rate (%) — 3G/4G Network
Block Call Rate (%) < 3%
- BSNL 3G: 86.83
- VIL 4G: 0.0
- RJIO 4G: 0.0
- AIRTEL 4G: 0.0

Block Call Rate (%) — 2G Network
Block Call Rate (%) < 3%
- VIL 2G: 0.0
- BSNL 2G: 86.97
- AIRTEL 2G: 0.65

KPIs	2G			3G	4G-VoLTE		
	AIRTEL	BSNL	VIL	BSNL	AIRTEL	RJIO	VIL
Drop Call Rate %	0.77	14.42	0.0	18.53	0.42	1.20	0.0
Block Call Rate %	0.65	86.97	0.0	86.83	0.0	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 & 3G) network.

Voice Calls

Coverage

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

TSPs	2G		
	AIRTEL	BSNL	VIL
Coverage %	63.02	86.72	68.51

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

TSPs	3G	4G		
	BSNL	AIRTEL	RJIO	VIL
Coverage	58.04	96.70	96.66	92.61

Summary

Voice Call	2G		
	AIRTEL	BSNL	VIL
Call Attempt	771.0	3086.0	190.0
Blocked Call Rate (%)	0.65	86.97	0.0
CSSR% (Accessibility)	98.60	13.03	100
Drop Call Rate (%)	0.77	14.42	0.0
Mobility HOSR (%)	98.32	82.22	96.15
Rx Quality (%)	91.99	97.26	98.67

Voice Call	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Call Attempt	3113.0	704.0	666.0	141.0
Blocked Call Rate (%)	86.83	0.0	0.0	0.0
CSSR% (Accessibility)	13.17	99.71	100	100
Drop Call Rate (%)	18.53	0.42	1.20	0.0
Mobility HOSR (%)	80.80	96.70	99.11	100
Rx Quality (%)	87.04	69.23	87.56	99.47

Dynamic Data was tested for 673 Kms. Download Throughput was tested.

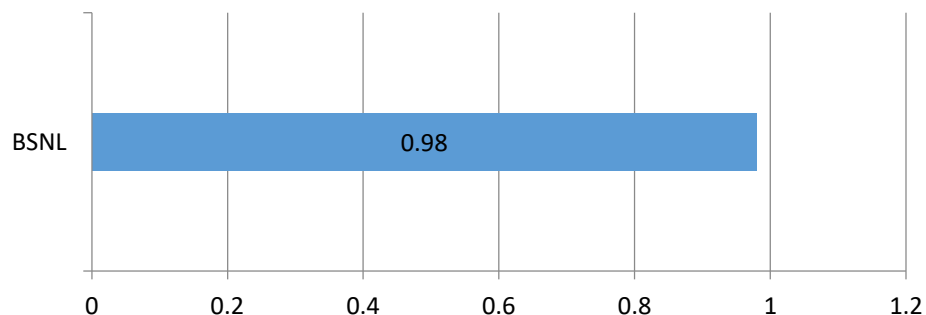## Data Download Performance (Average Throughput in Mbps) - Dynamic Data Testing

4G Network:

4G-Dynamic Download Average Throuhput (Mbps)

Operator	Throughput (Mbps)
VIL	11.80
RJIO	13.31
AIRTEL	20.0
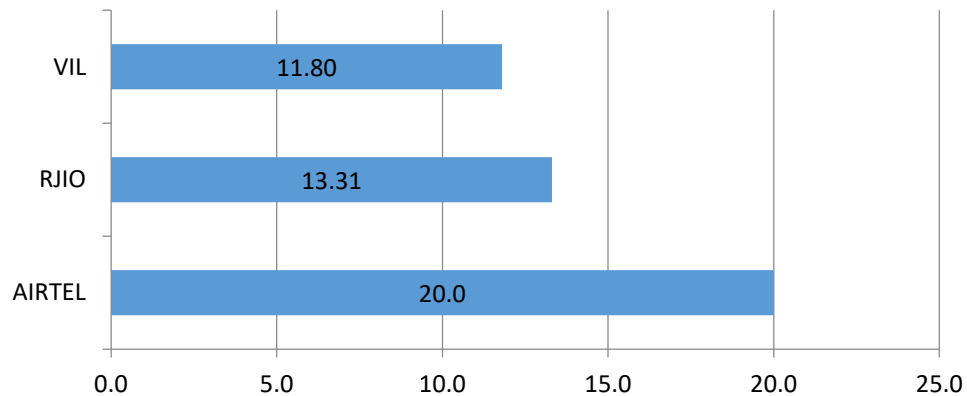
3G Network:

3G-Dynamic Download Average Throuhput (Mbps)

Operator	Throughput (Mbps)
BSNL	0.98

Average Data Services Static	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	126.20	55.45	116.50
Upload Throughput (kbps)	23.41	***	65.10
Web Browsing Delay (sec)	25.20	161.0	12.0
Latency (msec)	437.5	530	149.50

Average Data Services Static	3G/ 4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	5.76	56.03	26.14	23.0
Upload Throughput in Mbps	***	8.86	7.64	9.40
Video streaming delay (secs)	16.0	1.30	0.10	4.0
Web Browsing Delay (secs)	38.50	4.0	1.88	3.0
Latency (msec)	522.5	80	73	93.5

*** TSP did not submit data

Summary-Data Services Static

Location:-Deoghar Railway Station	2G		
	AIRTEL	BSNL	VIL
Download Throughput (kbps)	151.0	54.42	103.0
Upload Throughput (kbps)	26.09	***	48.20
Web Browsing Delay (sec)	44.0	181.0	13.0
Latency (msec)	570	520	155

Location:-Deoghar Railway Station	3G/4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in Mbps	4.58	15.07	14.35	23.50
Upload Throughput in Mbps	***	10.55	7.34	9.30
Video streaming delay (secs)	14 .0	1.40	0.11	3.0
Web Browsing Delay (secs)	40.0	5.0	1.94	4.0
Latency (msec)	510	78	74	93

Location:- Deoghar Bus Stand	2G		
	AIRTEL	BSNL	VIL
Download throughput in (kbps)	101.40	56.49	130.0
Upload Throughput in (kbps)	20.73	***	82.0
Web Browsing Delay (secs)	6.40	141 .0	11.0
Latency (msec)	305	540	144

| Location:- Deoghar Bus Stand	4G			
	BSNL 3G	AIRTEL 4G	RJIO 4G	VIL 4G
Download throughput in (mbps)	6.95	56.03	37.94	22.50
Upload Throughput in (mbps)	***	8.86	7.94	9.50
Video streaming delay (secs)	18 .0	1.30	0.09	5.0
Web Browsing Delay (secs)	37.0	4.0	1.82	2.0
Latency (msec)	535	80	72	94

*** TSP did not submit data

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	63.02
BSNL 2G	86.72
VIL 2G	68.51
BSNL 3G	58.04
AIRTEL 4G	96.70
RJIO 4G	96.66
VIL 4G	92.61

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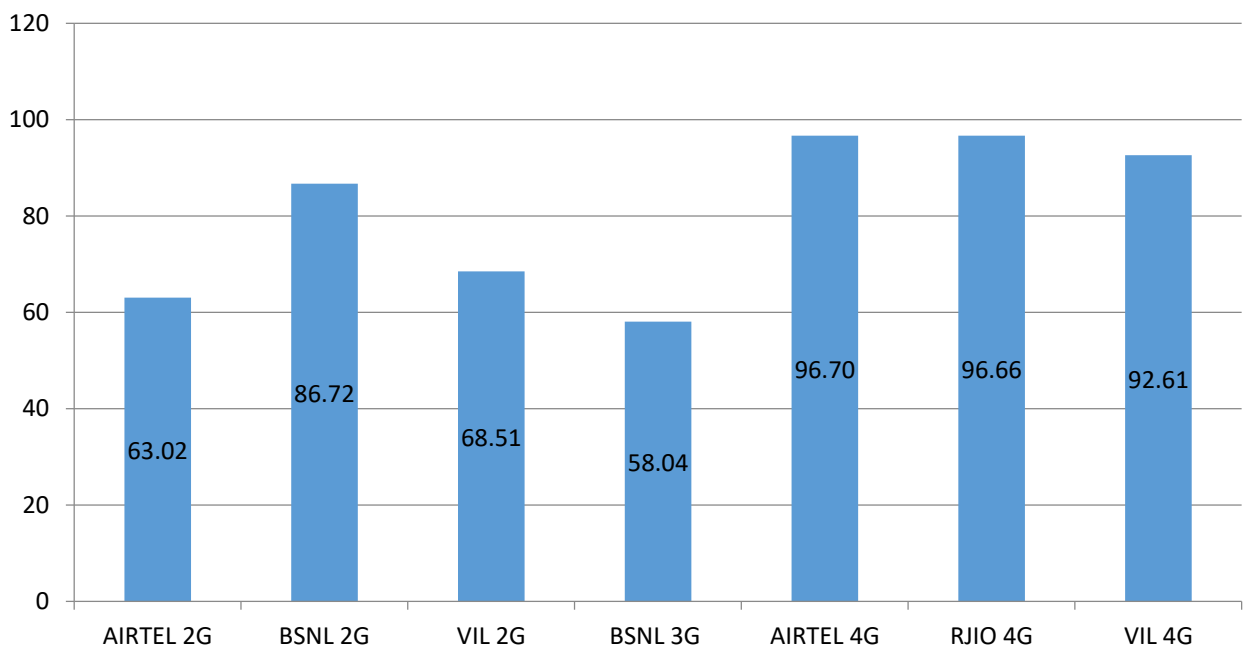
Note- Coverage is the percentage of samples having signal strength more than the threshold value (2G >= -85 dbm, 3G>= -90 dbm and 4G >= -110 dbm). However, these samples are only for the portion of the OADT routes where TSPs have coverage i.e 'no coverage' routes have been excluded.

AIRTEL

Technology	Coverage Rate %
2G	63.02
4G	96.70

2G
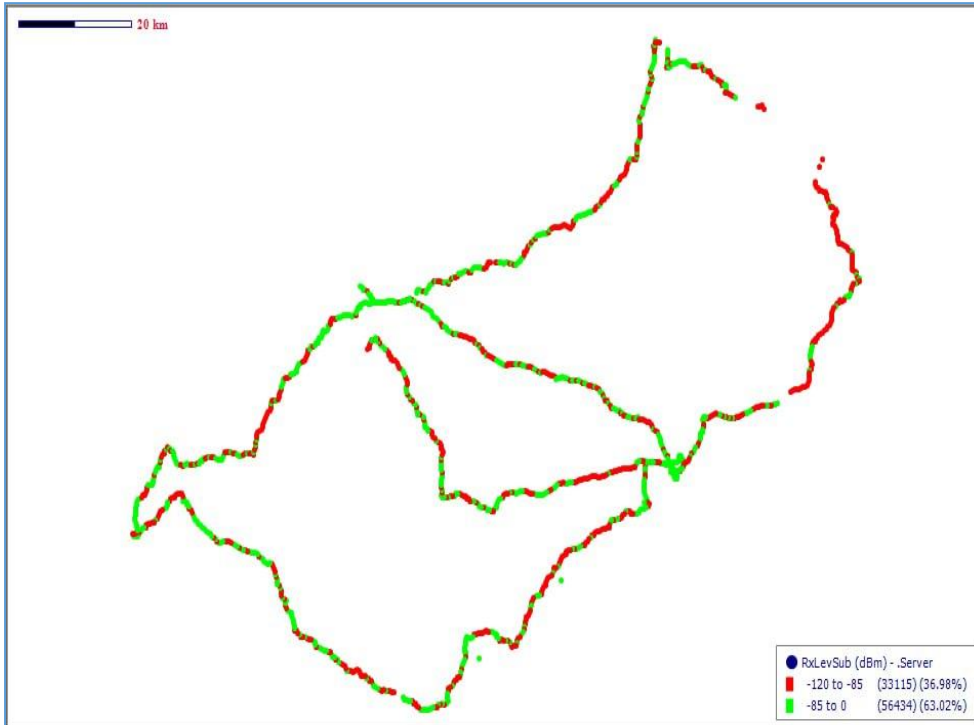
Overall Rx Level	Sample %
[Max >=-75]	34.60
[-75 >=-85)	28.50
[-85 >=-95)	27.50
[-95 >=Min)	9.50
Total	100

4G
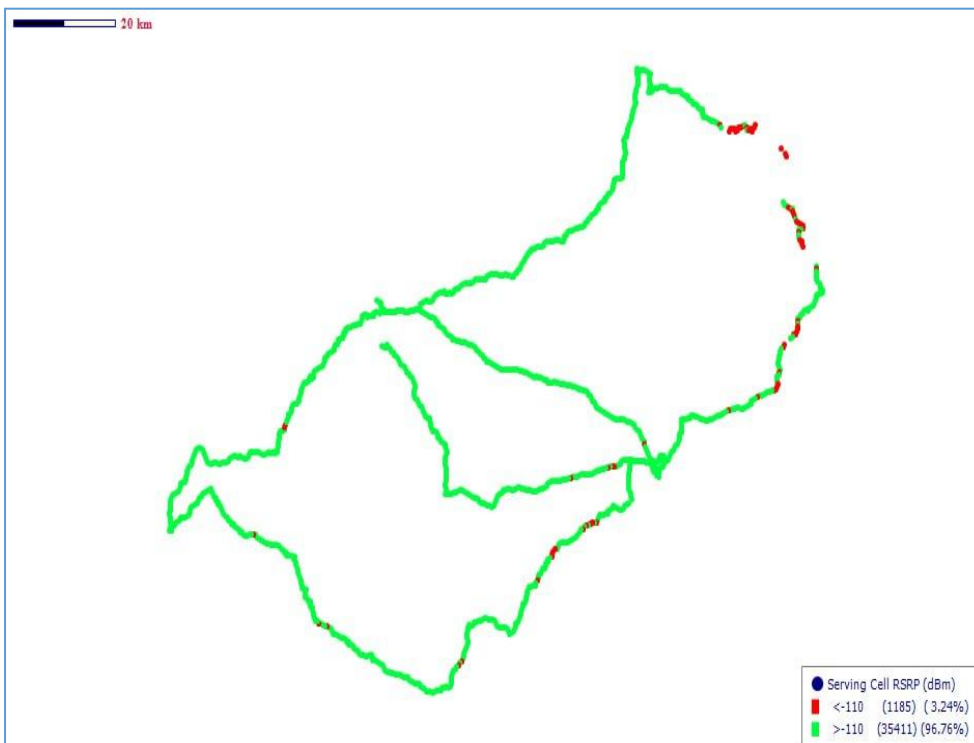
Overall RSRP	Sample %
[Max >=-80]	21.0
[-80 >=-90)	34.0
[-90 >=-110)	41.80
[-110 >=Min)	3.20
Total	**100**

BSNL

Technology	Coverage Rate %
2G	86.72
3G	58.04

2G
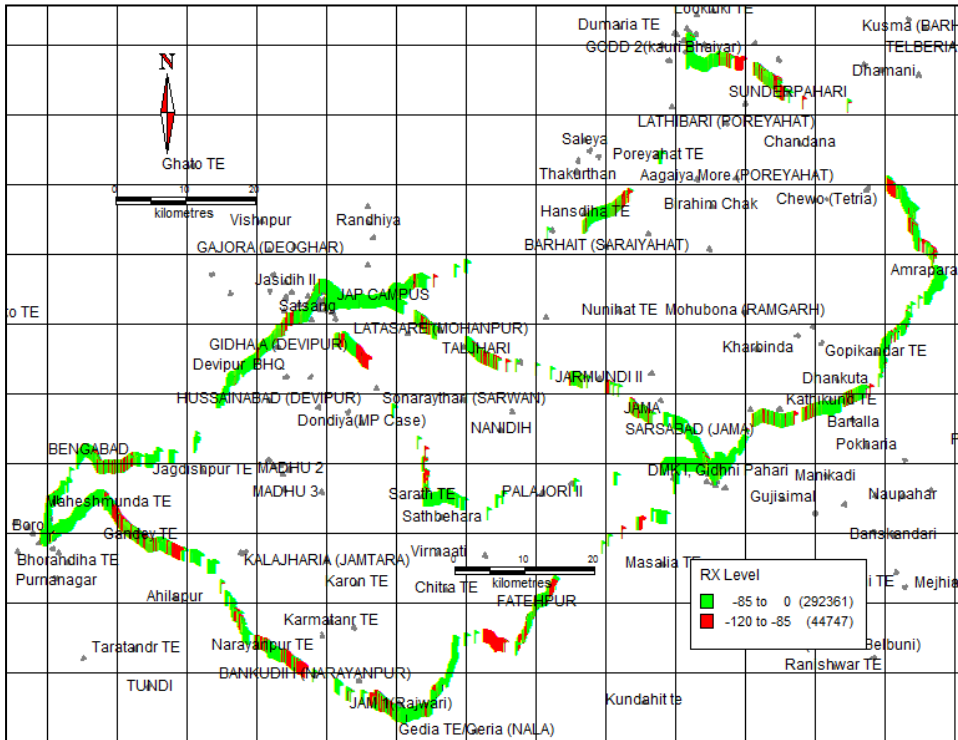
Overall RxLevel	Sample %
[Max >=-75]	0.91
[-75 >=-85)	85.82
[-85 >=-95)	1.34
[-95 >=Min)	11.94
Total	100

3G
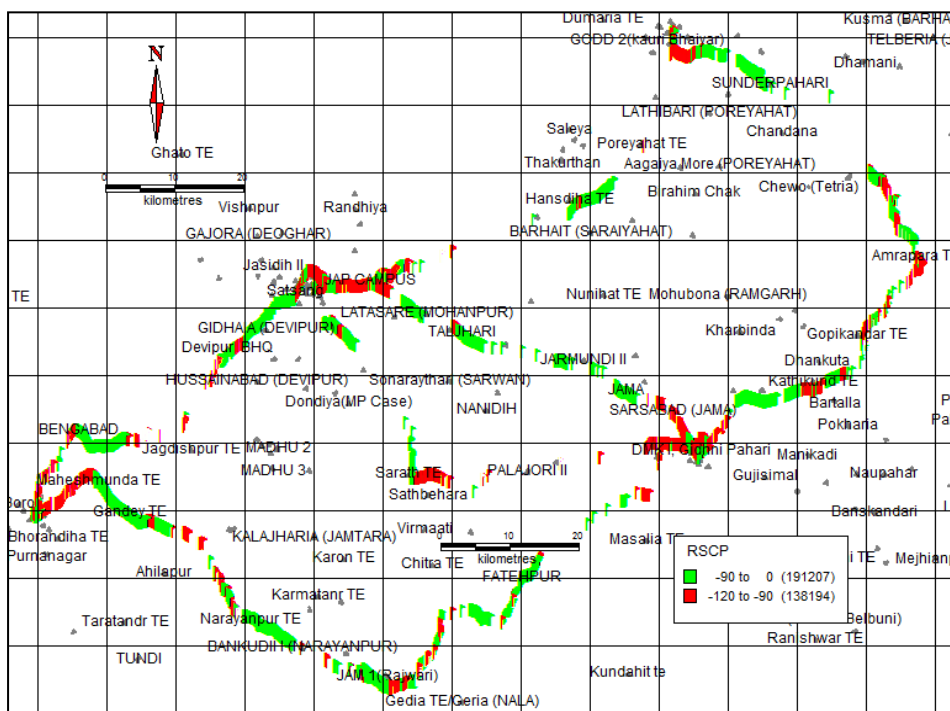
Overall RSCP	Sample %
[Max >=-70]	3.40
[-70 >=-80)	4.56
[-80 >=-90)	50.09
[-90 >=Min)	41.95
Total	100

RJIO

Technology	Coverage Rate %
4G	96.66

4G	
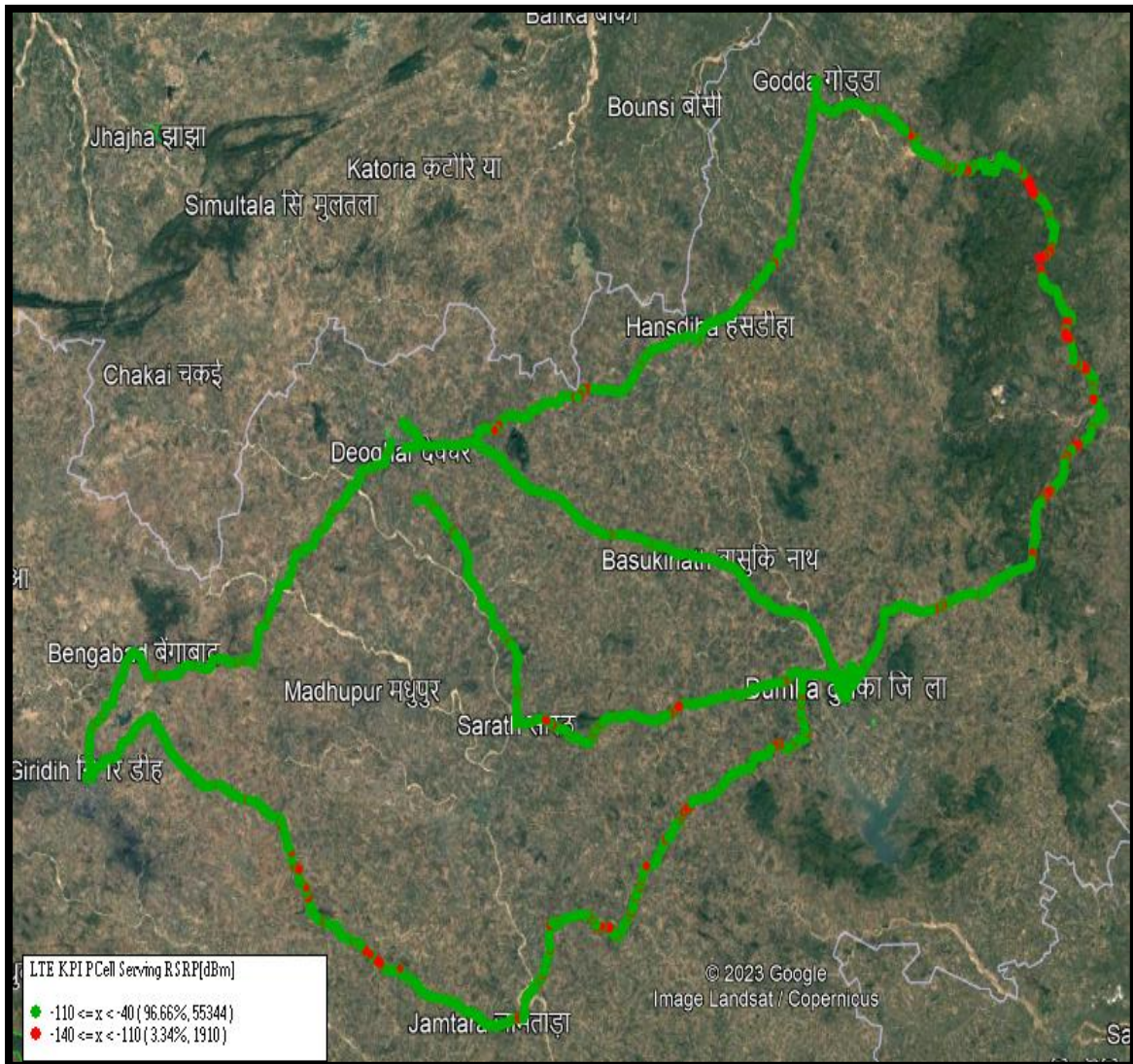
Overall RSRP	Sample %
[Max >=-80]	30.20
[-80 >=-90)	26.54
[-90>=-110)	39.93
[-110 >=Min)	3.34
Total	**100**

VIL

Technology	Coverage Rate %
2G	68.51
4G	92.61

2G
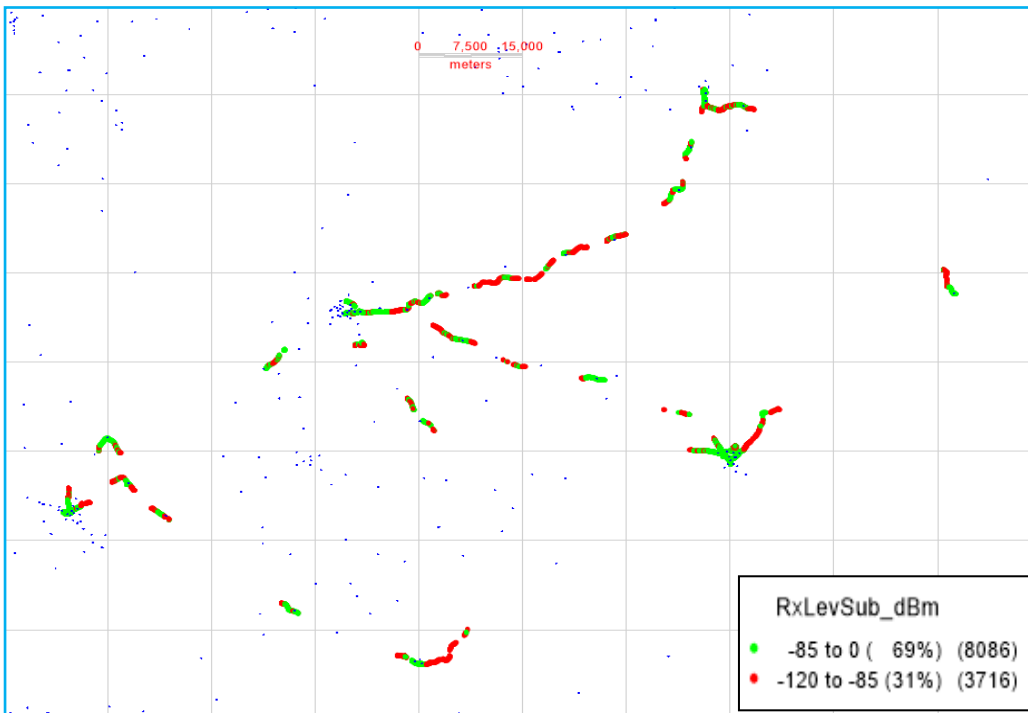
Overall RxLevel	Sample %
[Max >=-75]	38.97
[-75 >=-85)	29.55
[-85 >=-95)	22.14
[-95 =Min)	9.35
Total	**100**

RxLevSub_dBm
- -85 to 0 (69%) (8086)
- -120 to -85 (31%) (3716)

4G
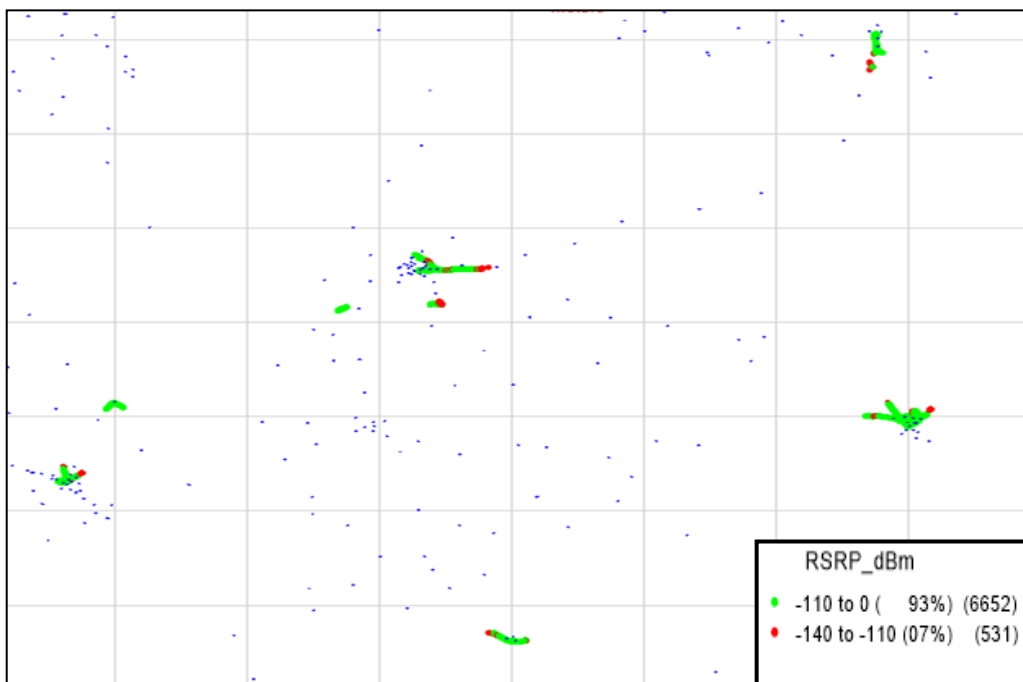
Overall RSRP	Sample %
[Max >=-80]	6.99
[-80 >=-90)	22.48
[-90>=-110)	63.14
[-110 >=Min)	7.39
Total	**100**

RSRP_dBm
- -110 to 0 (93%) (6652)
- -140 to -110 (07%)   (531)

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	91.99
BSNL 2G	97.26
VIL 2G	98.67
BSNL 3G	87.04
AIRTEL 4G	69.23
RJIO 4G	87.56
VIL 4G	99.47

Rx Quality %
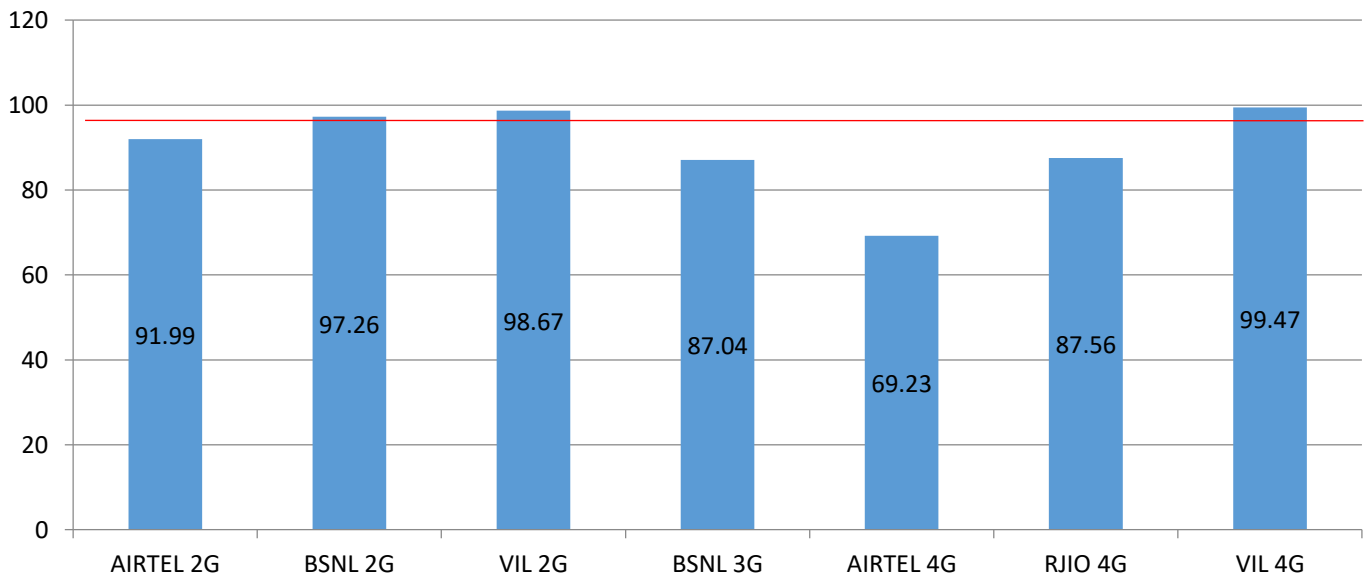
AIRTEL

Technology	Rx Quality %
2G	91.99
4G	69.23

2G
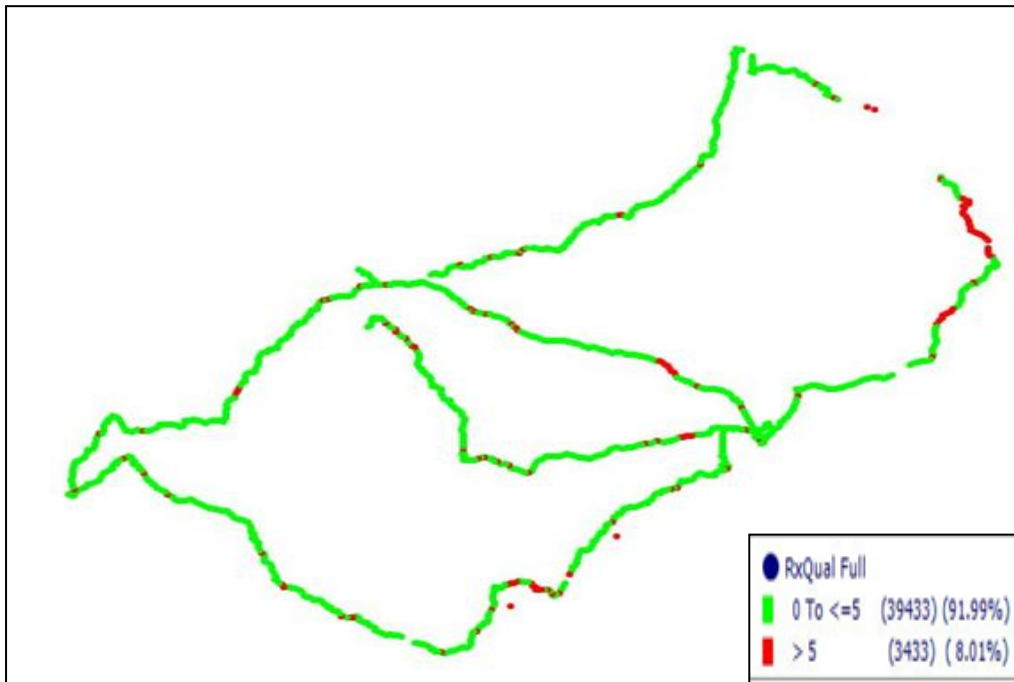
Overall Rx Quality	Sample %
(Min <=2)	54.9
(2 <=3)	11.6
(3 <=4)	12.4
(4 <=5)	13.1
(5 <=Max)	8.0
Total	**100%**

RxQual Full
0 To <=5 (39433) (91.99%)
> 5 (3433) (8.01%)

4G
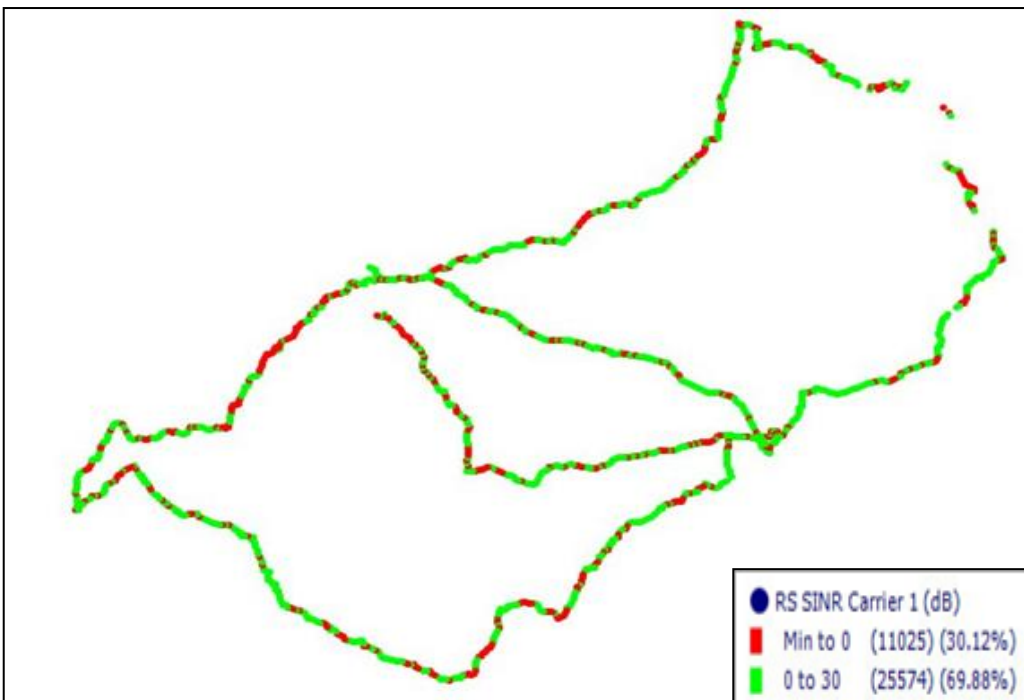
Overall SINR	Sample %
(Min <=0)	30.1
(0 <=5)	25.5
(5 <=10)	19.5
(10 <=15)	12.7
(15 <=Max)	12.2
Total	**100%**

RS SINR Carrier 1 (dB)
Min to 0 (11025) (30.12%)
0 to 30 (25574) (69.88%)

BSNL

Technology	Rx Quality %
2G	97.26
3G	87.04

2G
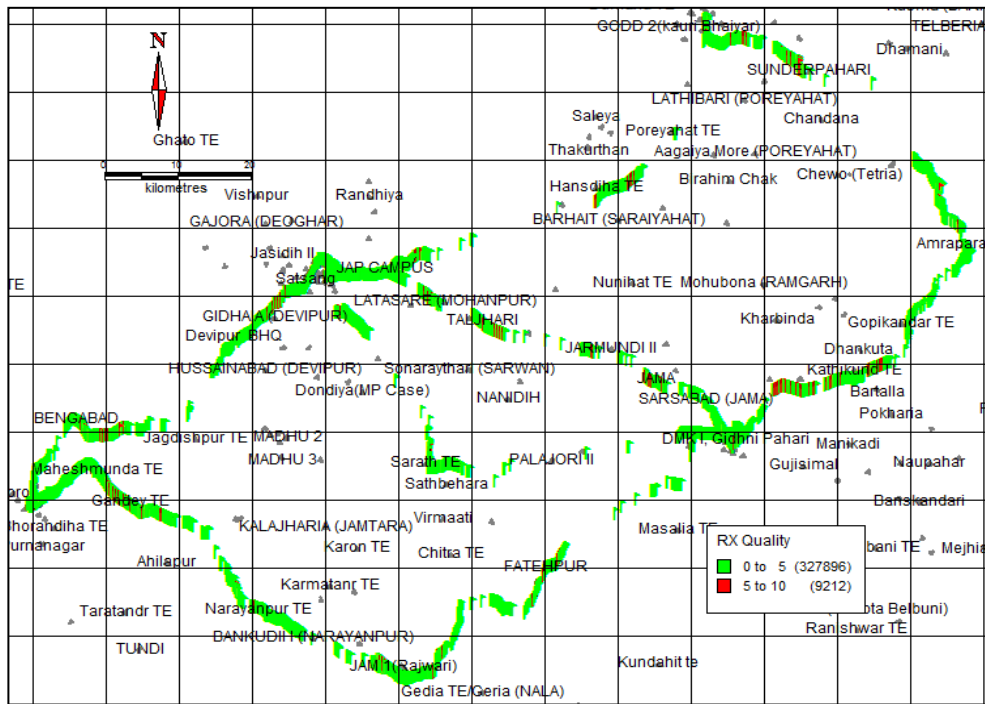
Overall Rx Quality	Sample %
(Min <=2)	0.09
(2 <=3)	0.32
(3 <=4)	1.04
(4 <=5)	6.82
(5 <=Max)	88.99
(>5 samples)	2.73
Total	**100**

3G
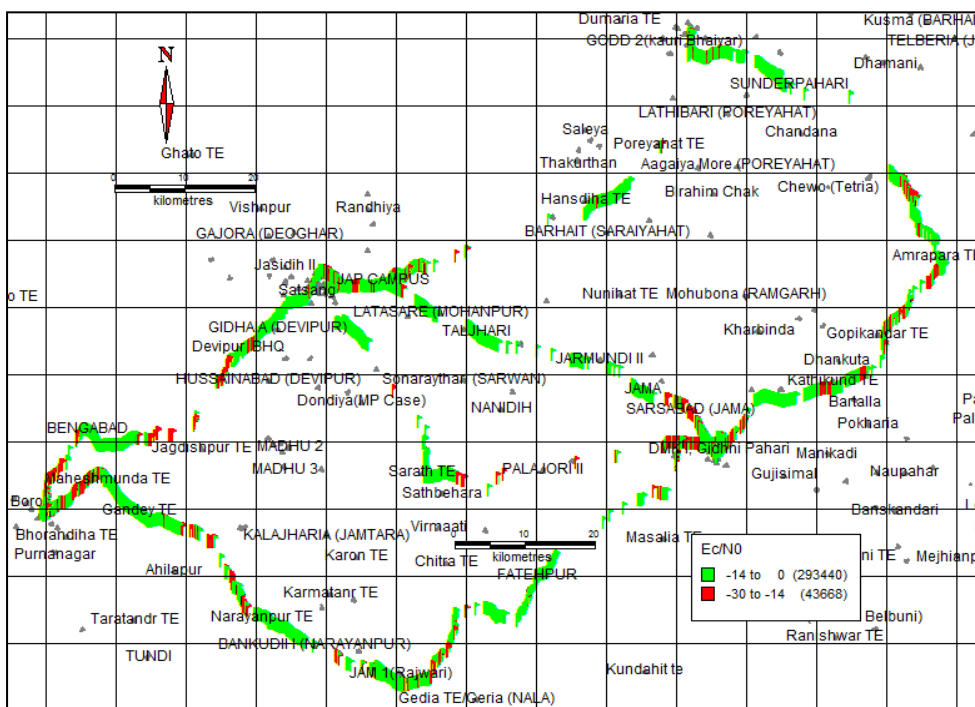
Overall EcNo	Sample %
(Max <=-6)	0.29
(-6 <=-9)	2.97
(-9 <=-11)	26.4
(-11 <=-14)	57.38
(-14 <= Min)	12.95
Total	**100**

RJIO

Technology	Rx Quality %
4G	87.56

4G
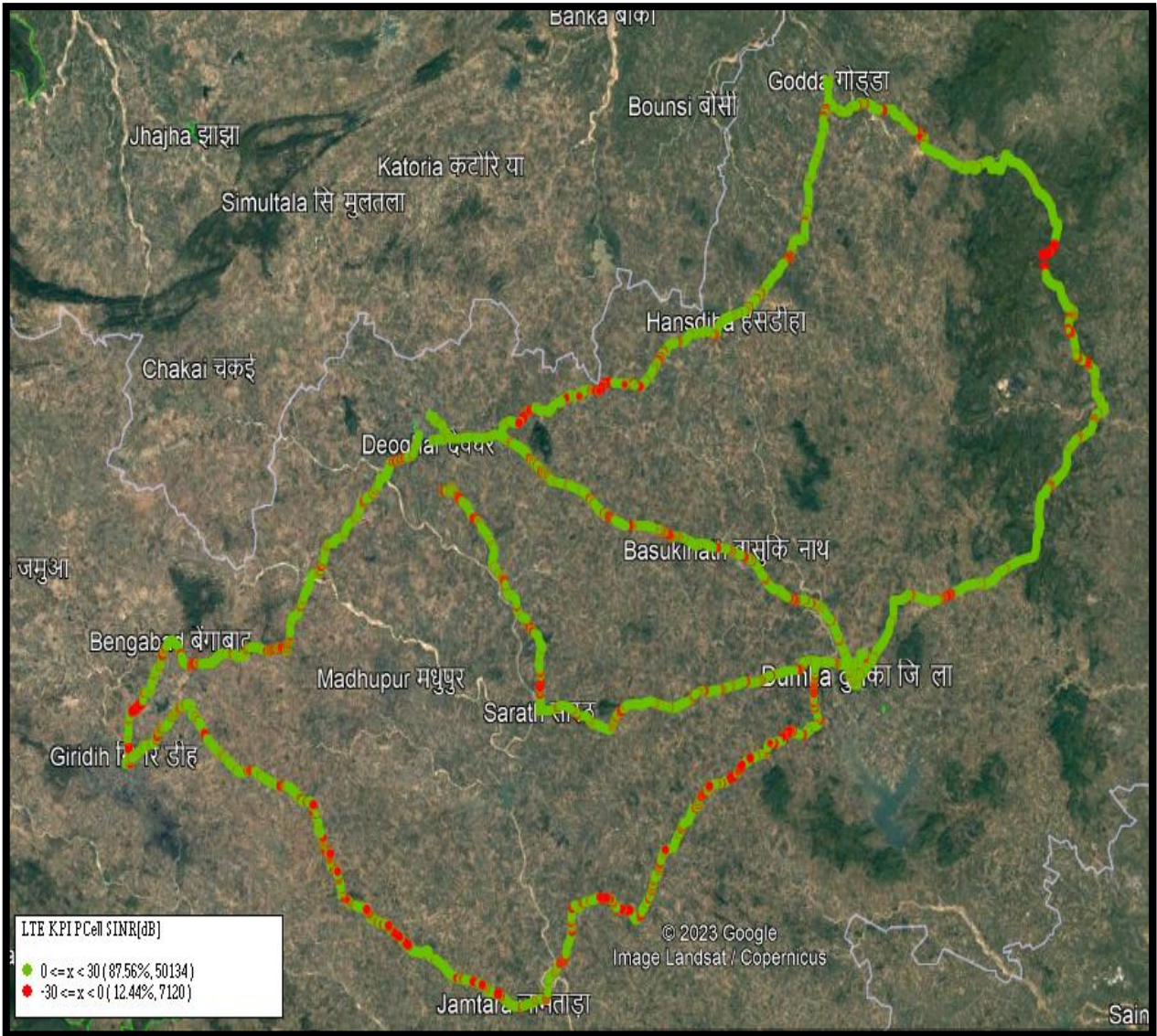
Overall SINR	Sample %
(Min <=0)	12.44
(0 <=5)	19.34
(5 <=10)	25.82
(10 <=15)	23.01
(15 <=Max)	19.39
Total	**100**

VIL

Technology	Rx Quality %
2G	98.67
4G	99.47

2G
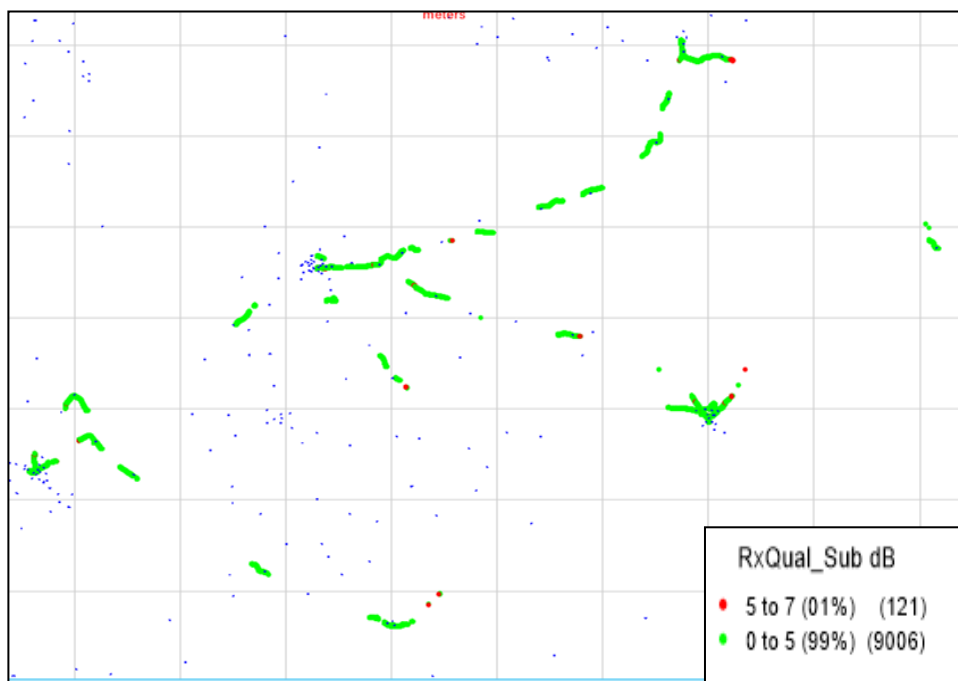
Overall Rx Quality	Sample %
(Min <=2)	90.91
(2 <=3)	3.19
(3 <=4)	3.30
(4 <=5)	1.28
(5 <=Max)	1.33
Total	**100**

4G
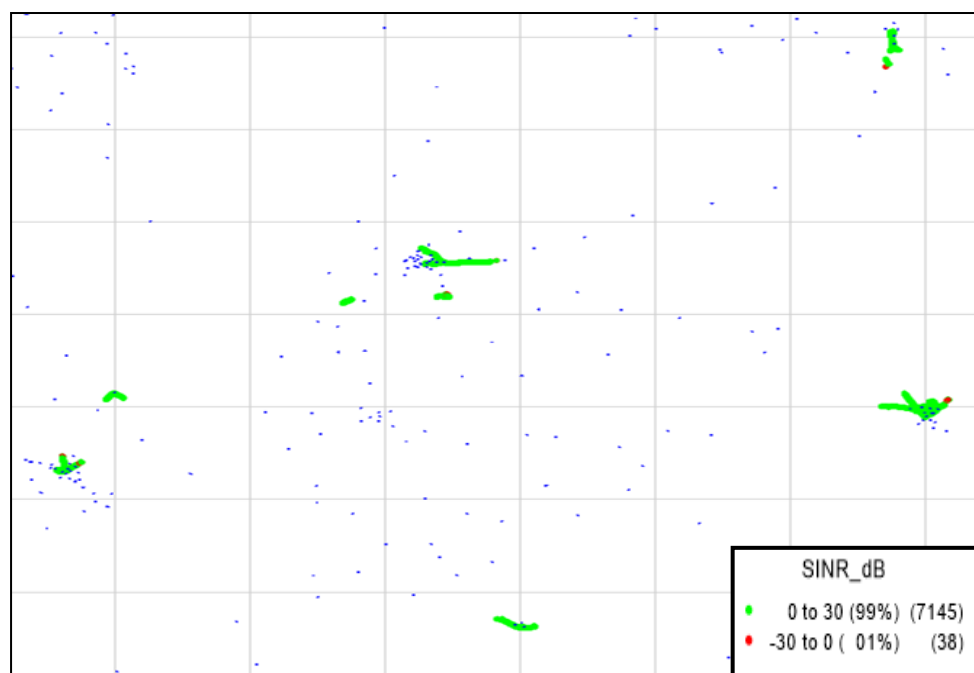
Overall SINR	Sample %
(Min <=0)	0.53
(0 <=5)	5.08
(5 <=10)	21.13
(10 <=15)	22.40
(15 <=Max)	50.86
Total	**100**

AIRTEL

Dynamic Data Testing Complete 673 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	89.60

2G

RLC Throughput (kbps):DL
0 To 100   (28152) (65.53%)
100 To 2000   (14811) (34.47%)
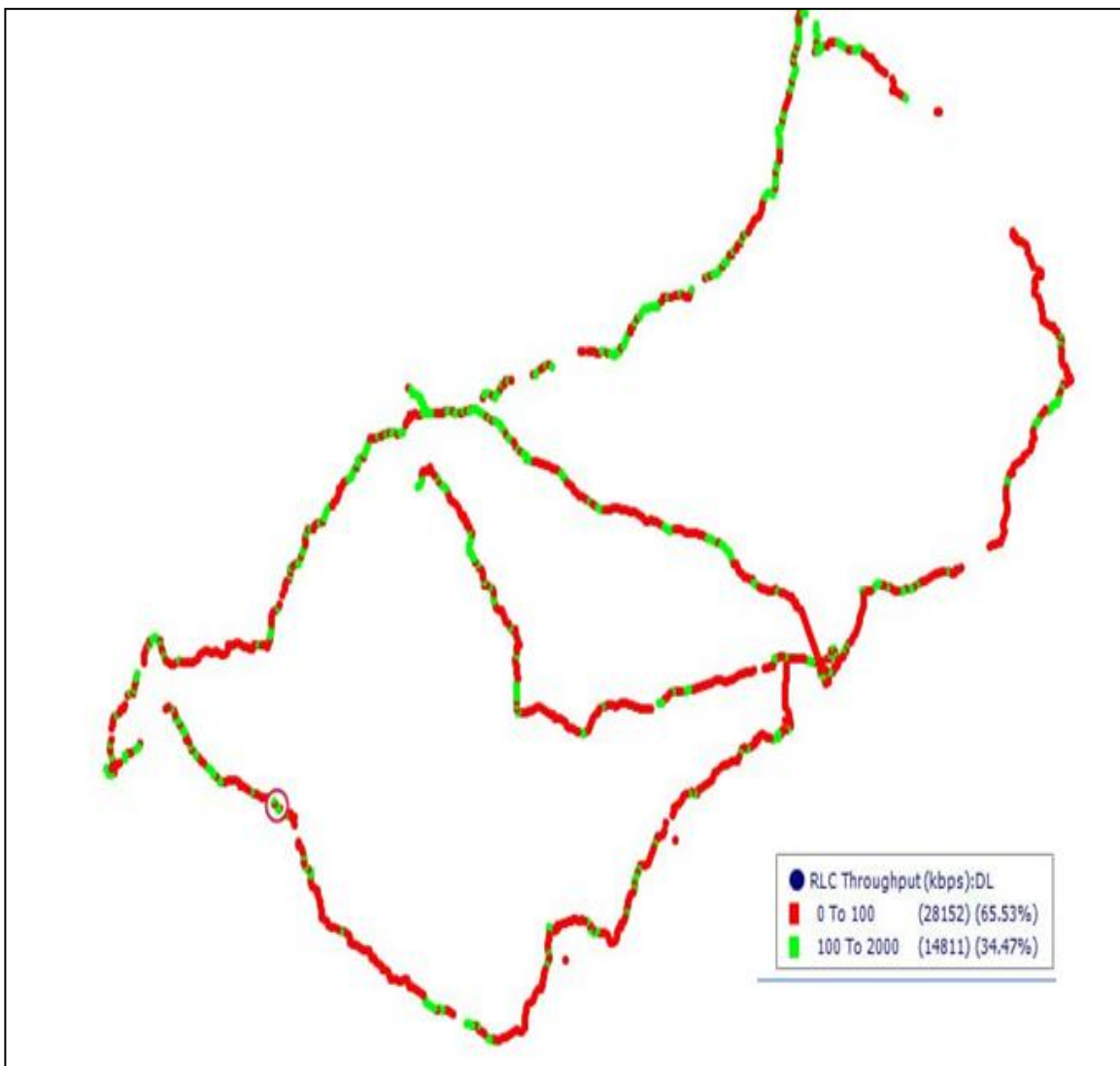
AVG. DOWNLOAD SPEED (Kbps)	89.60
% FILE TRANSFER COMPLETE	98.13
DL throughput	Sample %
0 to 50 Kbps	52.70
50 to 100 Kbps	12.68
100 to 200 Kbps	17.62
200 to 300 Kbps	16.60
>300 Kbps	0.39
Total	100

AIRTEL

Dynamic Data Testing Complete 673 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	20.0

4G

Legend:
- Total PDCP DL Throughput
- <=2 (3205) (9.05%)
- >2 (32222) (90.95%)
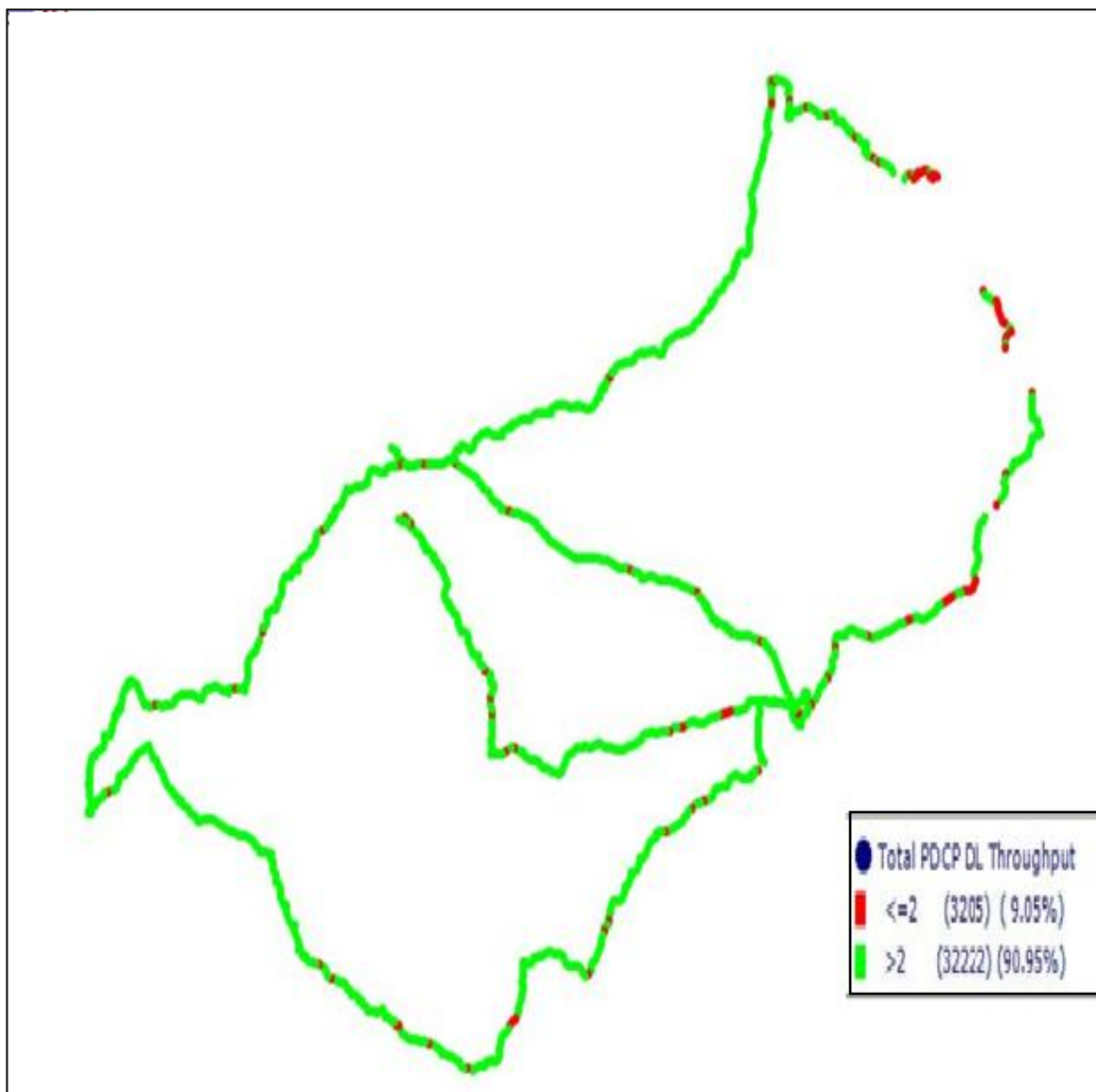
AVG. DOWNLOAD SPEED (Mbps)	20.0
% FILE TRANSFER COMPLETE	96.0
DL throughput	Sample %
0 to 1 Mbps	8.42
1 to 2 Mbps	0.62
2 to 5 Mbps	1.34
5 to 10 Mbps	1.83
>10 Mbps	87.79
Total	100

BSNL

Dynamic Data Testing Complete 673 Kms

Data KPIs - Overall	2G
Average Download Throughput (Kbps)	56.39

2G
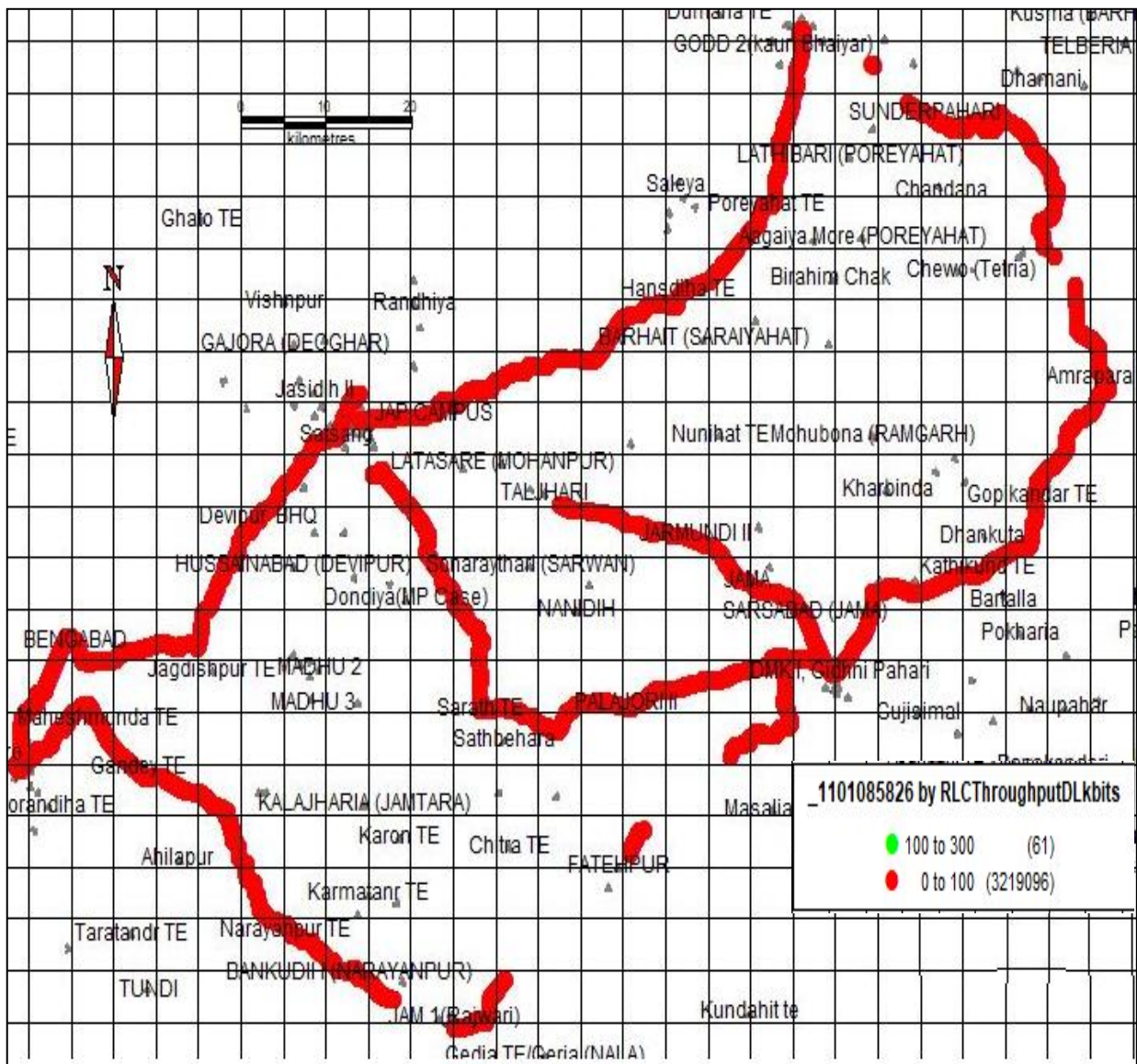
AVG. DOWNLOAD SPEED (Kbps)	56.39
% FILE TRANSFER COMPLETE	2.65
DL throughput	Sample %
0 to 50 Kbps	99.93
50 to 100 Kbps	0.07
100 to 200 Kbps	0.0
200 to 300 Kbps	0.0
>300 Kbps	0.0
Total	100

BSNL

Dynamic Data Testing Complete 673 Kms

Data KPIs - Overall	3G
Average Download Throughput (Mbps)	0.98

3G
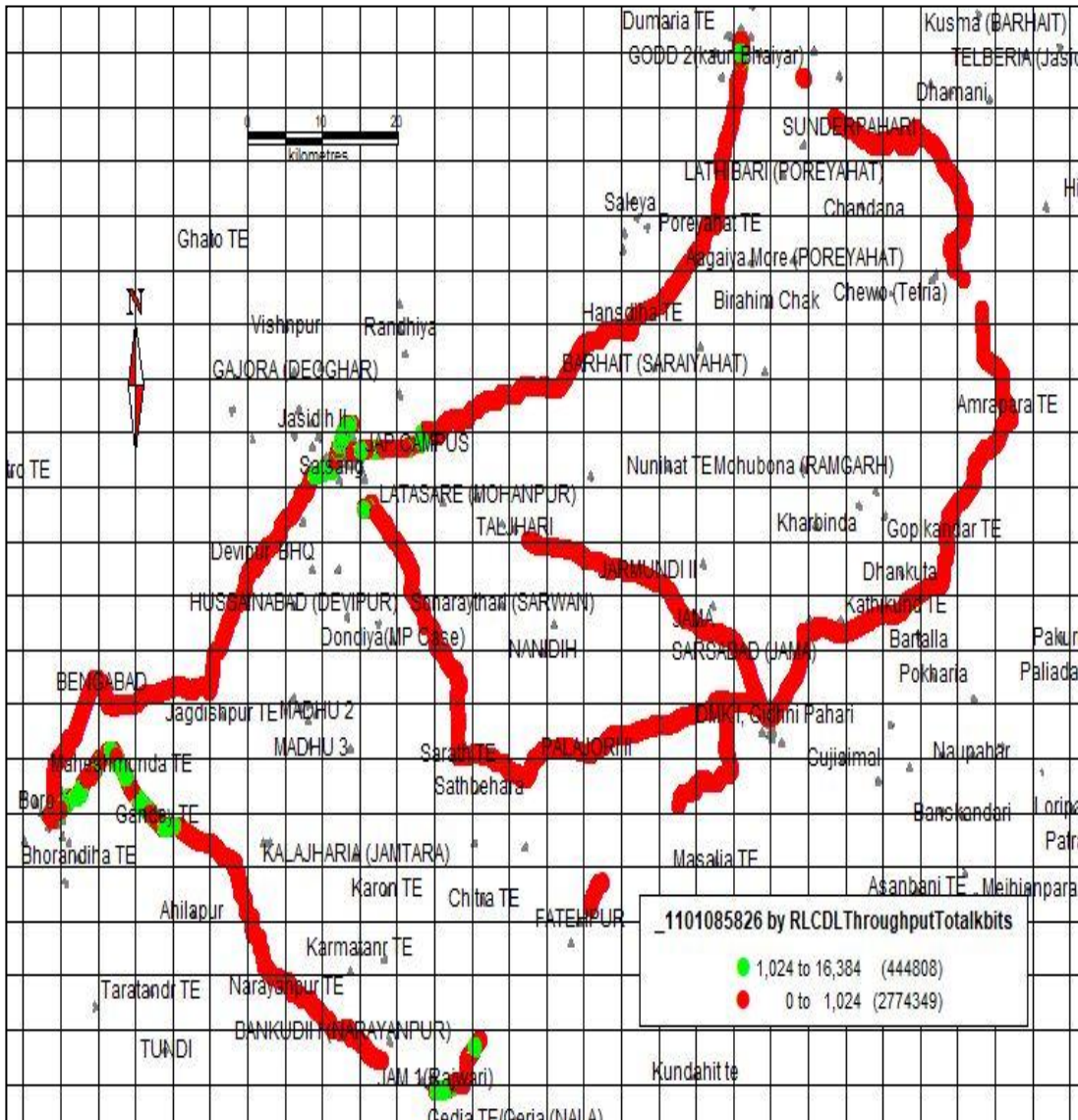
AVG. DOWNLOAD SPEED (Mbps)	0.98
% FILE TRANSFER COMPLETE	7.07
DL throughput	**Sample %**
0 to 0.5 Mbps	83.59
0.5 to 1 Mbps	2.60
1 to 2 Mbps	5.48
2 to 5 Mbps	5.23
>5 Mbps	3.11
Total	**100**

RJIO

Dynamic Data Testing Complete 673 Kms

Data KPIs - Overall	4G
Average Download Throughput (Mbps)	13.31

4G
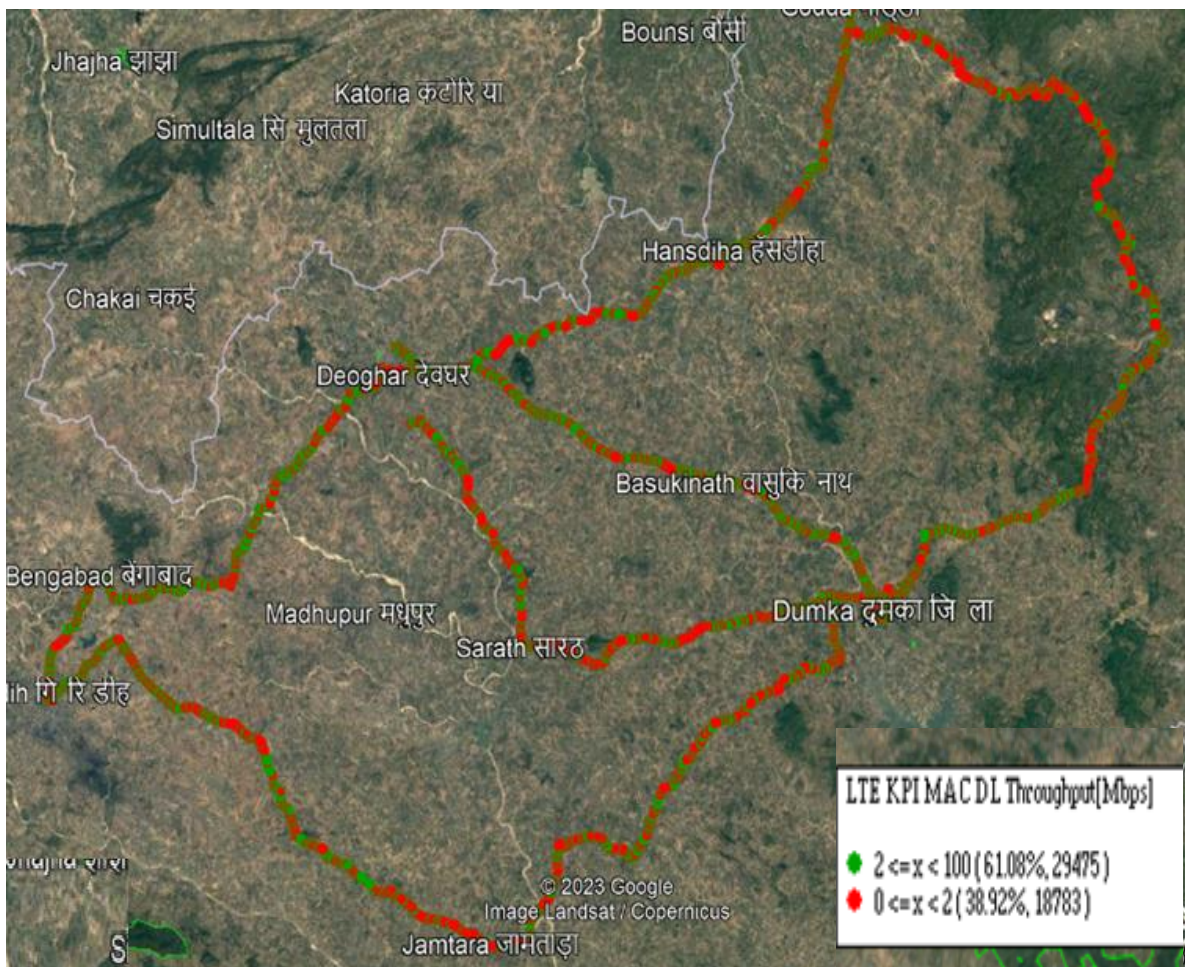
AVG. DOWNLOAD SPEED (Mbps)	13.31
% FILE TRANSFER COMPLETE	100
DL throughput	**Sample %**
0 to 1 Mbps	31.42
1 to 2 Mbps	7.50
2 to 5 Mbps	15.58
5 to 10 Mbps	15.31
>10 Mbps	30.19
Total	**100**

VIL

Dynamic Data Testing Complete 673 Kms

Data KPIs – Overall	2G
Average Download Throughput (Kbps)	72.20

2G

Http Throughput
- 100 to 700 (28%) (3027)
- 0 to 100 (72%) (7946)
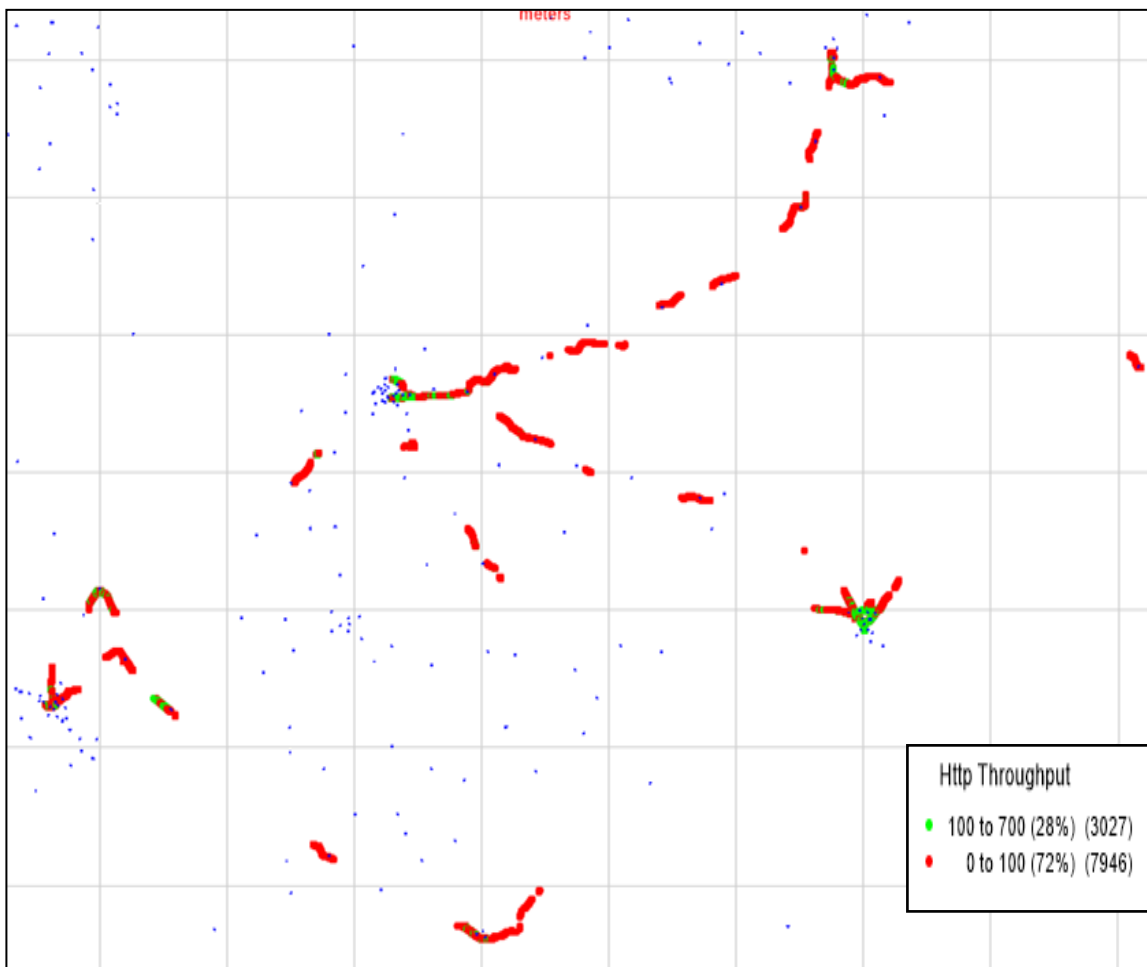
AVG. DOWNLOAD SPEED (Kbps)	72.20
% FILE TRANSFER COMPLETE	90.64
DL throughput	Sample %
0 to 50 Kbps	53.74
50 to 100 Kbps	18.67
100 to 200 Kbps	15.02
200 to 300 Kbps	12.57
>300 Kbps	0.00
Total	**100**

VIL

Dynamic Data Testing Complete 673 Kms

Data KPIs – Overall	4G
Average Download Throughput (Mbps)	11.80

4G

PDSCH Throughput
- 2,048 to 90,000 (67%) (4576)
- 0 to 2,048 (33%) (2216)
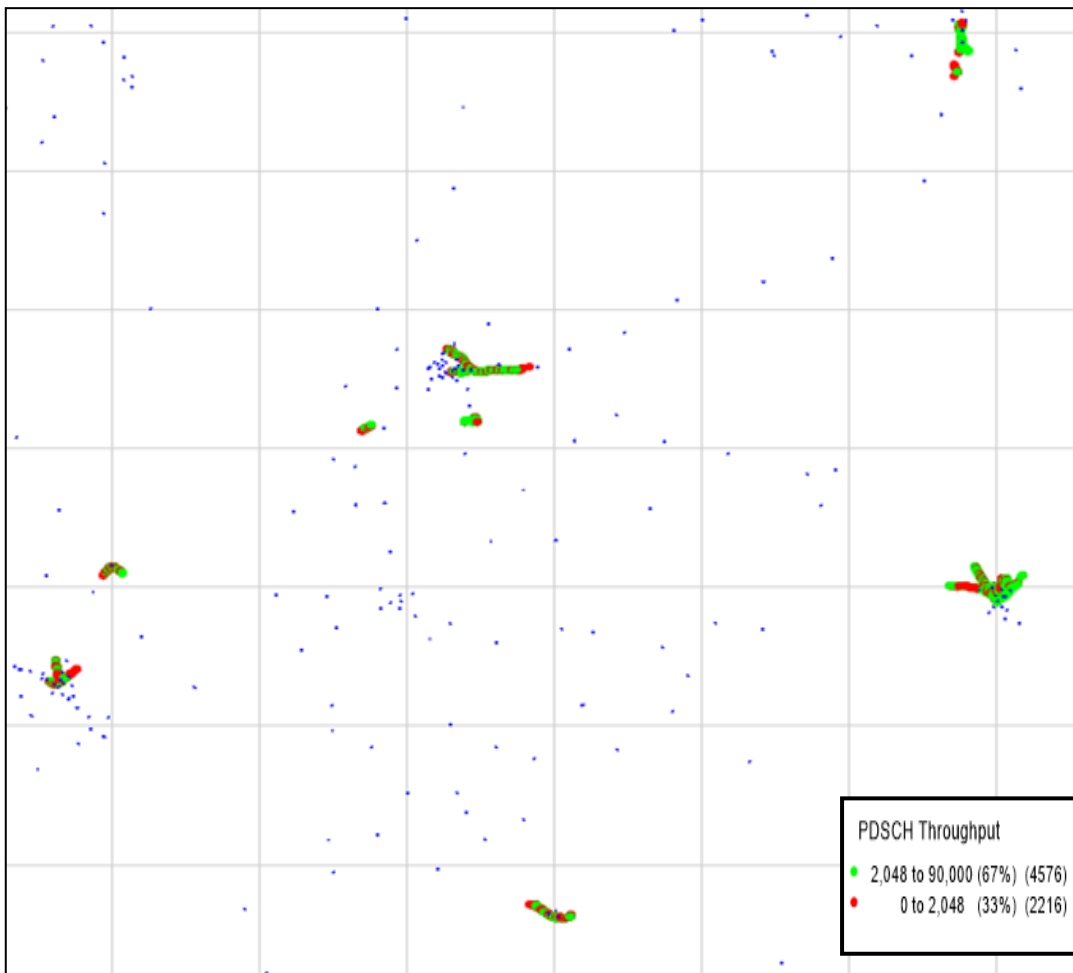
AVG. DOWNLOAD SPEED (Mbps)	11.80
% FILE TRANSFER COMPLETE	97.78
DL throughput	Sample %
0 to 1 Mbps	31.20
1 to 2 Mbps	1.43
2 to 5 Mbps	5.82
5 to 10 Mbps	14.31
>10 Mbps	47.25
Total	**100**