Operator Assisted Drive Test Report

For

Vijayapura

14th to 16th Oct 2024

Vijayapura – Gagganakeri – Nidgundi- Vijayapura (NH) - 193Kms
(14th Oct 2024)
Vijayapura & Surrounding Area - 257 Kms
(15th & 16th Oct 2024)

TRAI RO, Bengaluru

Key Performance Indicators:

- All TSPs have met the 2% QOS benchmark of Drop Call Rate.
- All TSPs have met the 3% QOS benchmark of Call Block Rate.
- All 2G/3G/4G TSPs have met the Rx Quality except Airtel 2G, BSNL 3G & 4G and VIL 2G & 4G.
- All 2G/3G/4G TSPs have met the Mobility HOSR except BSNL 2G and VIL 2G.

The Operator Assisted Drive Test has been carried out by the Regional Office, Bangalore with the help of Service Providers from **14th to 16th Oct 2024**. The drive test covered the route of **450 Kms** including NH/SH of **193 Kms** & **6** hotspots. Approximately **400** calls were made for each of the **8** networks: three 2G networks, one 3G network, and four 4G networks covering four TSPs.

Overview

Voice Summary

Data Summary

Overview

Regional Office, TRAI Bengaluru conducted Operator Assisted Drive Test from **14th to 16th Oct 2024** covering various locations in **Vijayapura & Surrounding Region**. The performance of Airtel, BSNL, Vodafone Idea, and Jio were monitored across various technologies (2G, 3G, and 4G/4G). 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, Hand Over Success Rate, Call Setup Success Rate, Drop Call Rate and Block Call Rate.

Data: Download and Upload Throughputs, Web Browsing Delay and Latency

Drive Test Details:

Voice Tests: Calls were made for 90 sec duration with a wait time of 10 sec between calls in all technologies. The drive test covered a drive route of approximately **450 KMs** including **NH/SH** of **193 Kms** over a period of 3 days from **14th to 16th Oct 2024**. Approximately 450 calls were made for each of the 8 networks: three 2G (Lock Mode) networks, one 3G (Dual mode) network, and four 4G networks covering 4 unique TSPs.

Data Tests: Dynamic data test (Test Data on Move) was conducted for **450 KMs** including **NH/SH** of **193 Kms** over a period of 3 days for download throughput for 3G & 4G technology. Data Tests were performed at 6 static locations; three 2G (Lock mode) networks, one 3G (Dual mode) network, and four 4G (Free mode) networks covering 4 unique TSPs were tested. **All the data through put figure mentioned in the report are based on the average value.**

* For Voice and Data KPI's, 2G measurement is done with UE locked on 2G, 3G measurement is done with UE in Dual mode (2G & 3G) and 4G measurement is done with UE in Free Mode.
* 3G KPI's which are calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.
* 4G KPI's which are calculated from the UE in Free Mode included samples and events of 2G & 3G.

Service	Specifications
Download	2G (Locked) - 500KB, 3G (Dual) - 20 MB, 4G (Free) - 40 MB
Upload	2G (Locked) - 100KB, 3G (Dual) - 5 MB, 4G (Free) - 10 MB
Web Browsing	3 links of e/m commerce website www.amazon.in, www.flipkart.com and PayTm
Latency	32 Bytes on www.google.com
Video Streaming	130 secs clip

Overview

Voice & Dynamic Data Test (Data Test on Move) Drive Route
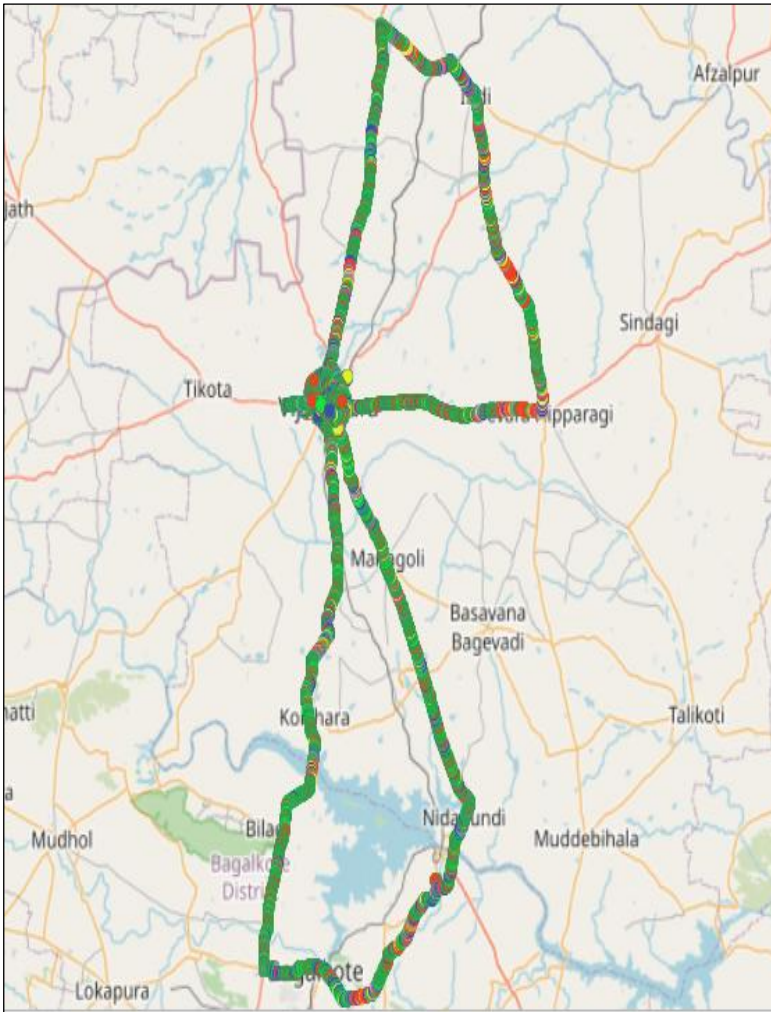
Areas covered	
Bijapur Govt Hospital	Kolhar
Bijapur Gulbarga Highway	Gaddanakeri Cross
Bachi Raichur Highway	Bagalkote
Golasangi	Managuli cross
Bangalore Bypass	Shri Siddeshwar Temple
Bijapur Bus Stand	Devarhipparagi
Indi	Zalki
Horti	Bijapur City

Data Service Test- Static Locations
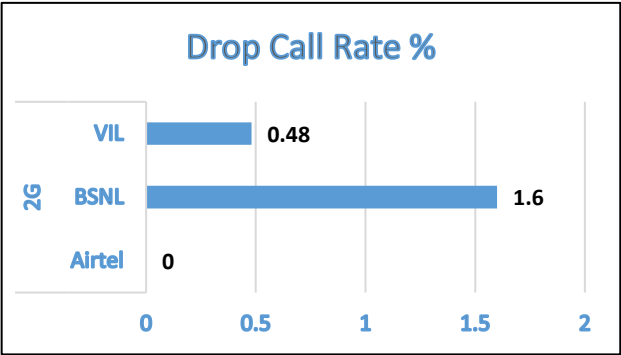

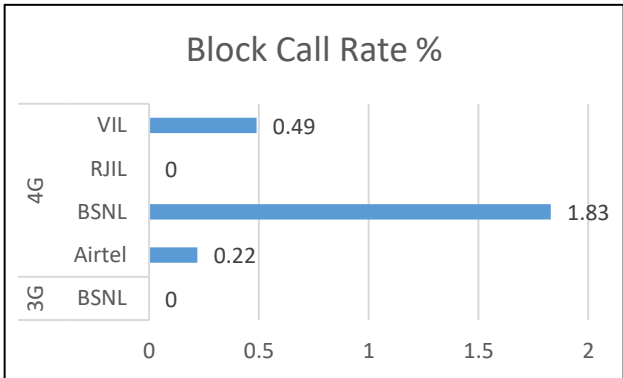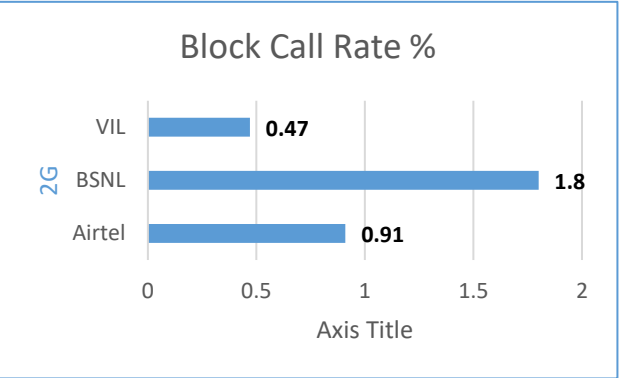| |
|---|
| 1. Government Hospital Bijapur |
| 2. Shri Shiddeshwar Temple Bijapur |
| 3. Bus stand Bijapur |
| 4. DC Office Bijapur |
| 5. Railway Station Bijapur |
| 6. Govt Polytechnic College Bijapur |

Voice Calls

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

Drop Call Rate (%)

Drop Call Rate % (2G)

	Value
VIL	0.48
BSNL	1.6
Airtel	0

Drop Call Rate (%) (3G/4G)

	Value
VIL (4G)	1.23
RJIL (4G)	0.8
BSNL (4G)	0.93
Airtel (4G)	0.22
BSNL (3G)	1.5

Block Call Rate (%)

Block Call Rate % (2G)

	Value
VIL	0.47
BSNL	1.8
Airtel	0.91

Axis Title

Block Call Rate % (3G/4G)

	Value
VIL (4G)	0.49
RJIL (4G)	0
BSNL (4G)	1.83
Airtel (4G)	0.22
BSNL (3G)	0
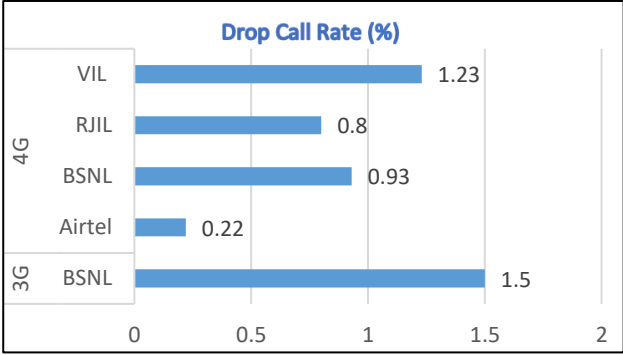
KPIs	2G			3G		4G		
	Airtel	BSNL	VIL	BSNL	Airtel	BSNL	RJIL	VIL
Drop Call Rate %	0	1.6	0.48	1.5	0.22	0.93	0.8	1.23
Block Call Rate %	0.91	1.8	0.47	0	0.22	1.83	0	0.49

a) All TSPs have met the 2% QOS benchmark of Drop Call Rate.
b) All TSPs have met the 3% QOS benchmark of Call Block.

Voice Calls

Coverage

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

TSPs	2G		
	Airtel	**BSNL**	**VIL**
Coverage%	84.89	81.20	75.83

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

TSPs	3G	4G			
	BSNL	**Airtel**	**BSNL**	**JIO**	**VIL**
Coverage %	80.20	99.07	91.80	98.29	87.38

c) Percentage of time spent on 3G/4G network

TSPs	3G		4G		
	BSNL	**Airtel**	**BSNL**	**JIO**	**VIL**
Time Spent on 3G/4G%	25.5	100	44.2	100	99.5

Summary

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	435	496	422
Blocked Call Rate (%)	0.91	1.8	0.47
CSSR% (Accessibility)	99.08	98.2	99.53
Drop Call Rate (%)	0	1.6	0.48
Rx Quality (%)	**93.06**	95.4	**90.2**
Mobility HOSR (%)	98.83	**90.84**	**94.76**

Voice Call	3G/4G				
	BSNL 3G	Airtel 4G	**BSNL 4G**	JIO 4G	VIL 4G
Call Attempt	67	447	218	495	406
Blocked Call Rate (%)	0	0.22	1.83	0	0.49
CSSR% (Accessibility)	100	99.55	98.17	100	99.51
Drop Call Rate (%)	1.5	0.22	0.93	0.8	1.23
Rx Quality (%)	**91.1**	99.1	**84.2**	**90.50**	**93.28**
Mobility HOSR (%)	96.42	96.29	98.48	99.16	98.71

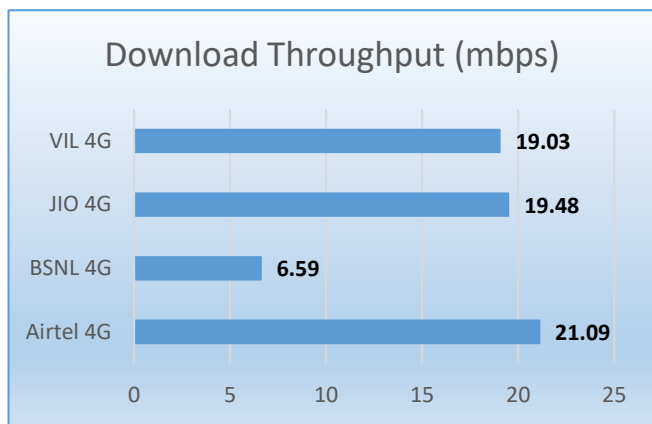# Data Services Static

Data was tested at 6 locations. The following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, Paytm)

Data Download, Upload Performance (Mbps), Web Browsing delay, Video Streaming and Latency 3G/4G

3G/4G/ Network:

Download Throughput (mbps)

Network	Value
VIL 4G	19.03
JIO 4G	19.48
BSNL 4G	6.59
Airtel 4G	21.09

Upload Throughput (mbps)

Network	Value
VIL 4G	12.29
JIO 4G	6.57
BSNL 4G	2.74
Airtel 4G	17.92

Web Browsing Delay (sec)

Network	Value
VIL 4G	3.46
JIO 4G	1.68
BSNL 4G	34.86
Airtel 4G	6.44

Video Streaming Delay (sec)

Network	Value
VIL 4G	0.9
JIO 4G	0
BSNL 4G	149.22
Airtel 4G	1.45

Latency (msec)

Network	Value
VIL 4G	48.47
JIO 4G	46.27
BSNL 4G	119.99
Airtel 4G	60.13
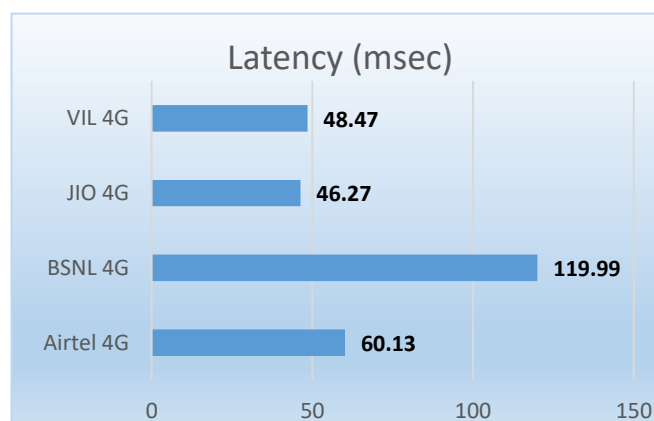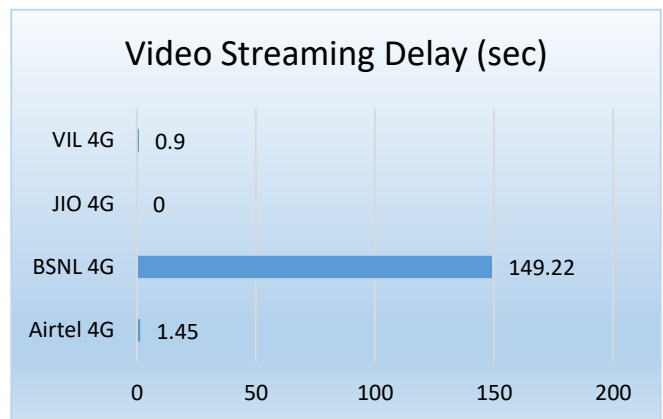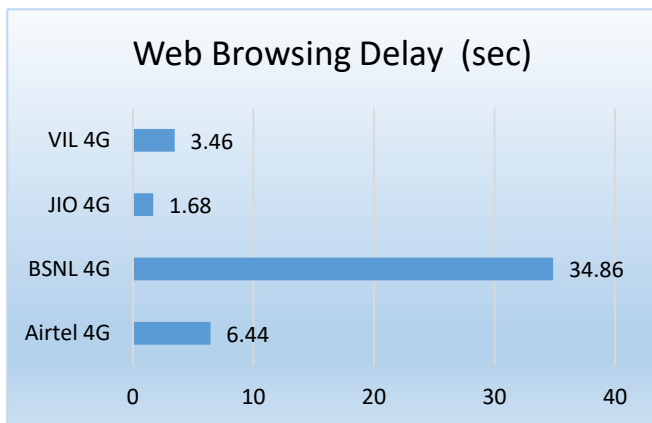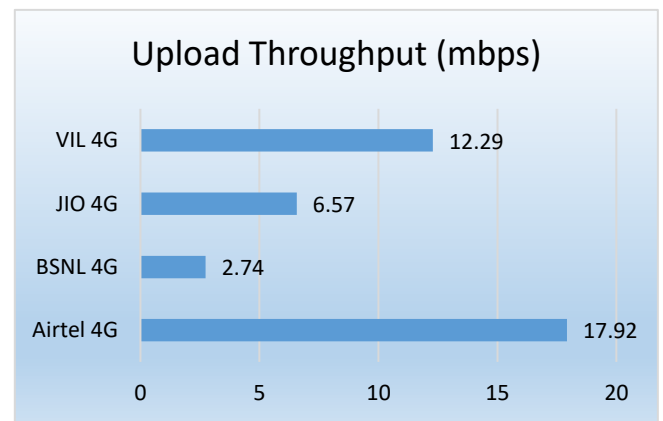
Summary

Data Services Static	4G			
	Airtel	**BSNL**	**JIO**	**VIL**
Download Throughput (mbps)	21.09	6.59	19.48	19.03
Upload Throughput (mbps)	17.92	2.74	6.57	12.29
Web Browsing Delay (sec)	6.44	34.86	1.68	3.46
Video Streaming Delay (sec)	1.45	149.22	0	0.9
Latency (msec)	60.13	119.99	46.27	48.47

Data Services Dynamic (Data Test on Move)	3G	4G			
	BSNL	**Airtel**	**BSNL**	**JIO**	**VIL**
Download Throughput (mbps)	2.42	26.75	6.17	18.92	16.15
Upload Throughput (mbps)	1.14	6.53	3.35	3.58	6.23

Summary

Data Services Static – General Hospital	4G			
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	9.67	24.24	10.7	7.39
Upload Throughput (Mbps)	2.83	18.01	2.59	11.1
Web Browsing Delay (sec)	64.86	9.6	1.69	4.12
Video Streaming Delay (sec)	147.68	2.26	0	0.8
Latency (ms)	129	61.2	59.22	56

Data Services Static - Shri Siddeshwar Temple	4G			
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	5.66	31.61	32.24	8.5
Upload Throughput (Mbps)	2.06	18.11	5.74	9.374
Web Browsing Delay (sec)	27.47	4.96	1.35	3.288
Video Streaming Delay (sec)	146.3	0.91	0	0.796
Latency (ms)	127	62.4	49	69.4

Data Services Static – KSRTC Bus Stand	4G			
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	12.48	7.14	10.83	31.66
Upload Throughput (Mbps)	4.13	15.9	5.78	16.88
Web Browsing Delay (sec)	21.71	6.63	2.13	3.15
Video Streaming Delay (sec)	150.34	1.92	0	1.44
Latency (ms)	146.80	58.2	45	35

Summary

Data Services Static – DC Office	4G			
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	6.37	9.21	20.27	11.84
Upload Throughput (Mbps)	1.91	11.91	6.68	12.83
Web Browsing Delay (sec)	34.52	7.99	1.59	3.02
Video Streaming Delay (sec)	150.84	2.07	0	0.76
Latency (ms)	77	62.8	34	35

Data Services Static – Railway Station	4G			
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	2.4	26.32	23.69	38.78
Upload Throughput (Mbps)	2.95	22.27	4.11	14.63
Web Browsing Delay (sec)	37.33	4.72	1.74	4.03
Video Streaming Delay (sec)	150.01	0.78	0	0.75
Latency (ms)	127	57.2	57	51

Data Services Static – Govt. Polytechnic College	4G			
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	2.95	28	19.16	15.99
Upload Throughput (Mbps)	2.59	21.28	14.54	8.92
Web Browsing Delay (sec)	23.39	4.75	1.61	3.14
Video Streaming Delay (sec)	150.16	0.77	0	0.86
Latency (ms)	114	59	34	44

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	84.80
BSNl 2G	81.20
VIL 2G	75.83
BSNL 3G	80.20
Airtel 4G	99.07
BSNL 4G	91.80
Jio 4G	98.29
VIL 4G	87.38

Coverage Distribution %
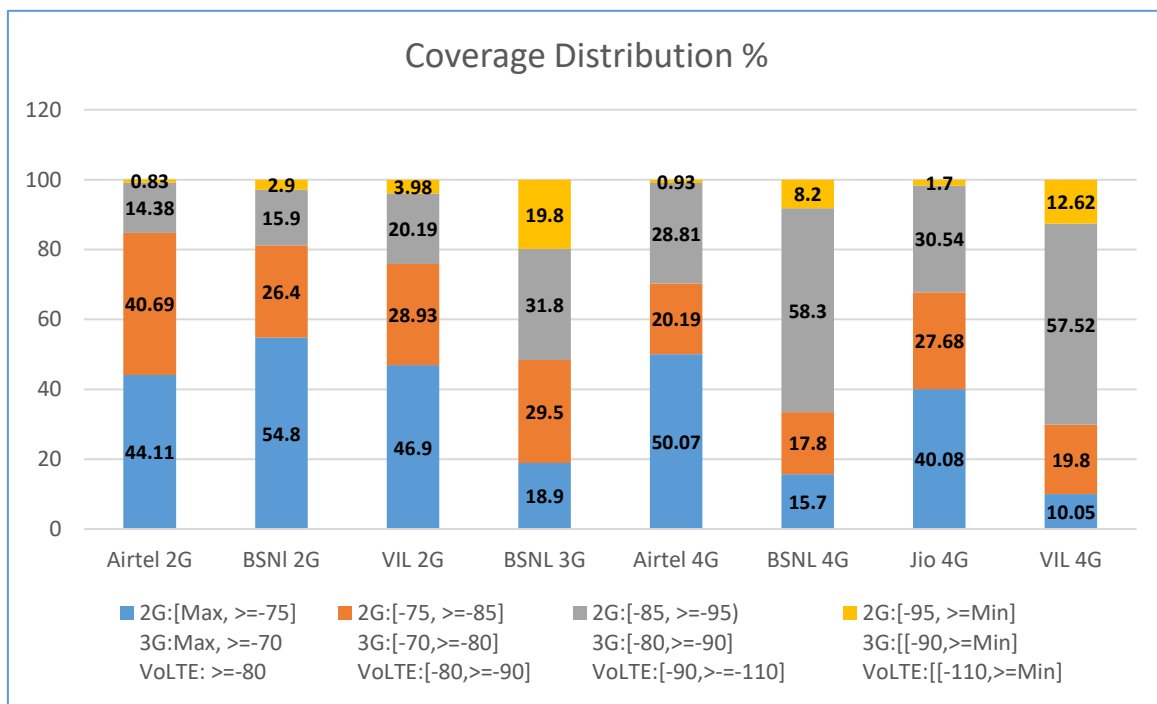
AIRTEL

Technology	Coverage Rate %
2G	84.80
4G	99.07

2G	4G
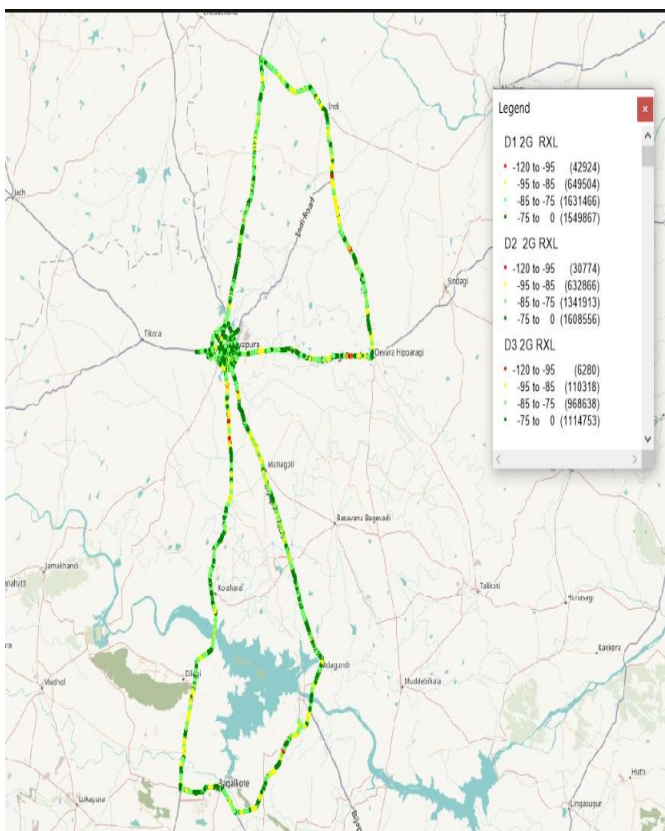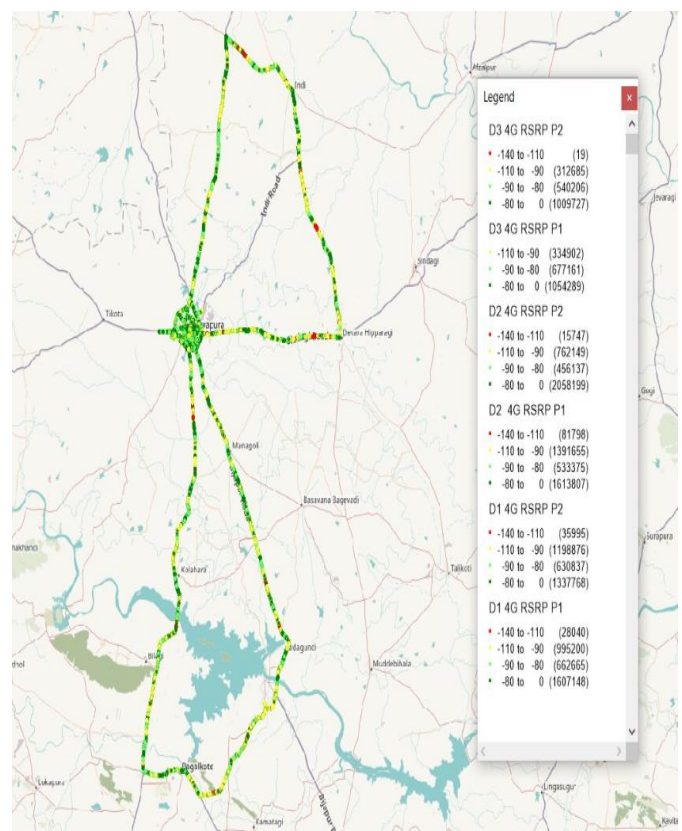
2G		
Overall RxLevel	**# Samples**	**% PDF**
[Max, >=-75]	4273176	44.11
[-75, >=-85)	3942017	40.69
[-85, >=-95)	1392688	14.38
[-95, >=Min)	79978	0.83
Total	**9687859**	**100.00**

4G/VoLTE		
Overall RSRP	**# Samples**	**% PDF**
[Max, >=-80]	8680938	50.07
[-80, >=-90)	3500381	20.19
[-90, >=-110)	4995467	28.81
[-110, >=Min)	161599	0.93
Total	**17338385**	**100**

BSNL

Technology	Coverage Rate %
2G	81.2
3G	80.2
4G	91.8

2G	3G	4G

2G-ServRxLevSub (dBm)
Below -95 (1589) 2.9%
>= -95 to < -85 (8715) 15.9%
>= -85 to < -75 (14469) 26.4%
Above -75 (30335) 54.8%

3G-Uu_ActiveSet_RSCP_0 (dBm)
Below -80.00 (2437) 19.8%
>= -90.00 to < -80.00 (3914) 31.8%
>= -80.00 to < -70.00 (3630) 29.5%
Above -70.00 (2326) 18.9%

DL-LTE UE RSRP (dBm)
Below -110.00 (2910) 8.2%
>= -110.00 to < -90.00 (20687) 58.3%
>= -90.00 to < -80.00 (6316) 17.8%
Above -80.00 (5571) 15.7%

2G
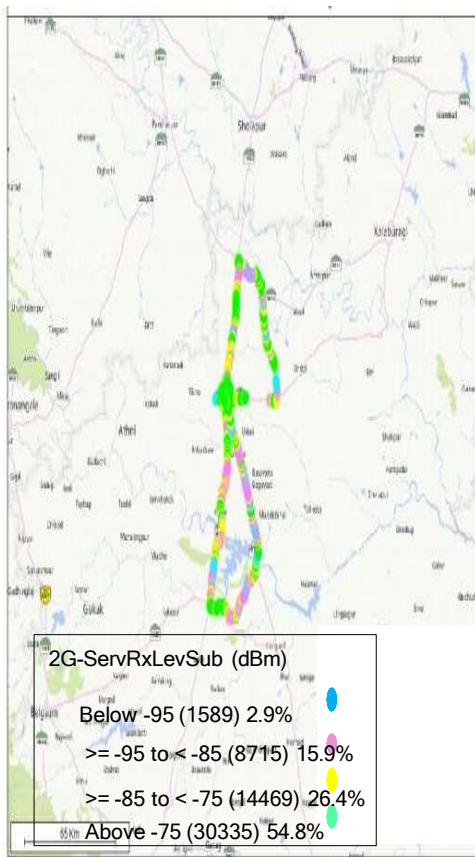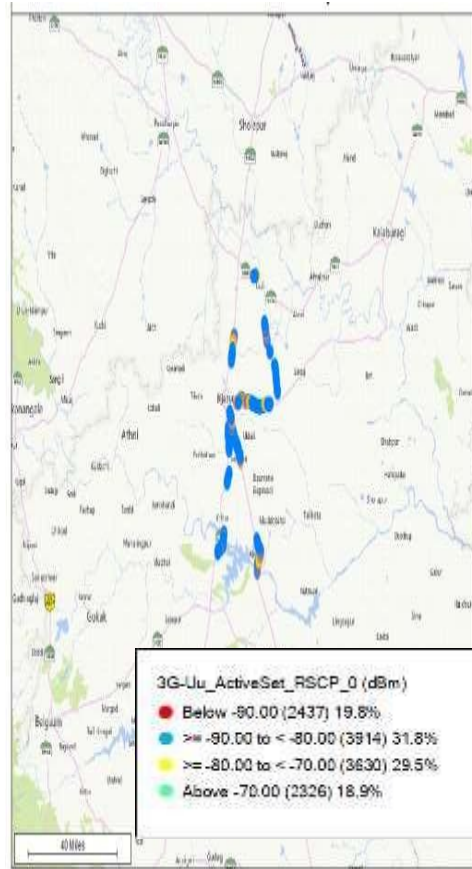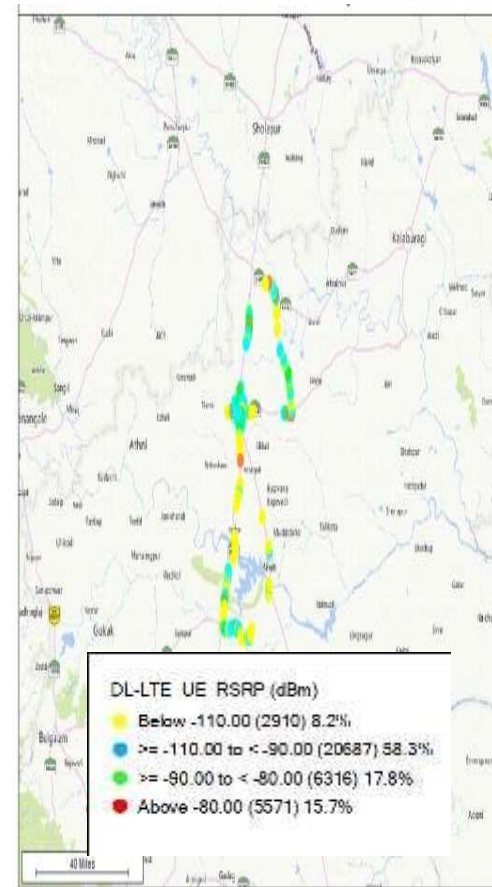
Overall RxLevel	# Samples	% PDF
[Max, >=-75]	30335	54.8
[-75, >=-85]	14469	26.4
[-85, >=-95]	8715	15.9
[-95, >=Min]	1589	2.9
Total	54808	100

3G

Overall RSCP	# Samples	% PDF
[Max, >=-70]	2326	18.9
[-70, >=-80]	3630	29.5
[-80, >=-90]	3914	31.8
[-90, >=Min]	2437	19.8
Total	12307	100

4G/VoLTE

Overall RSRP	# Samples	% PDF
[Max, >=-80]	5571	15.7
[-80, >=-90)	6316	17.8
[-90, >=-110)	20687	58.3
[-110, >=Min)	2910	8.2
Total	35484	100

JIO

Technology	Coverage Rate %
4G	98.29
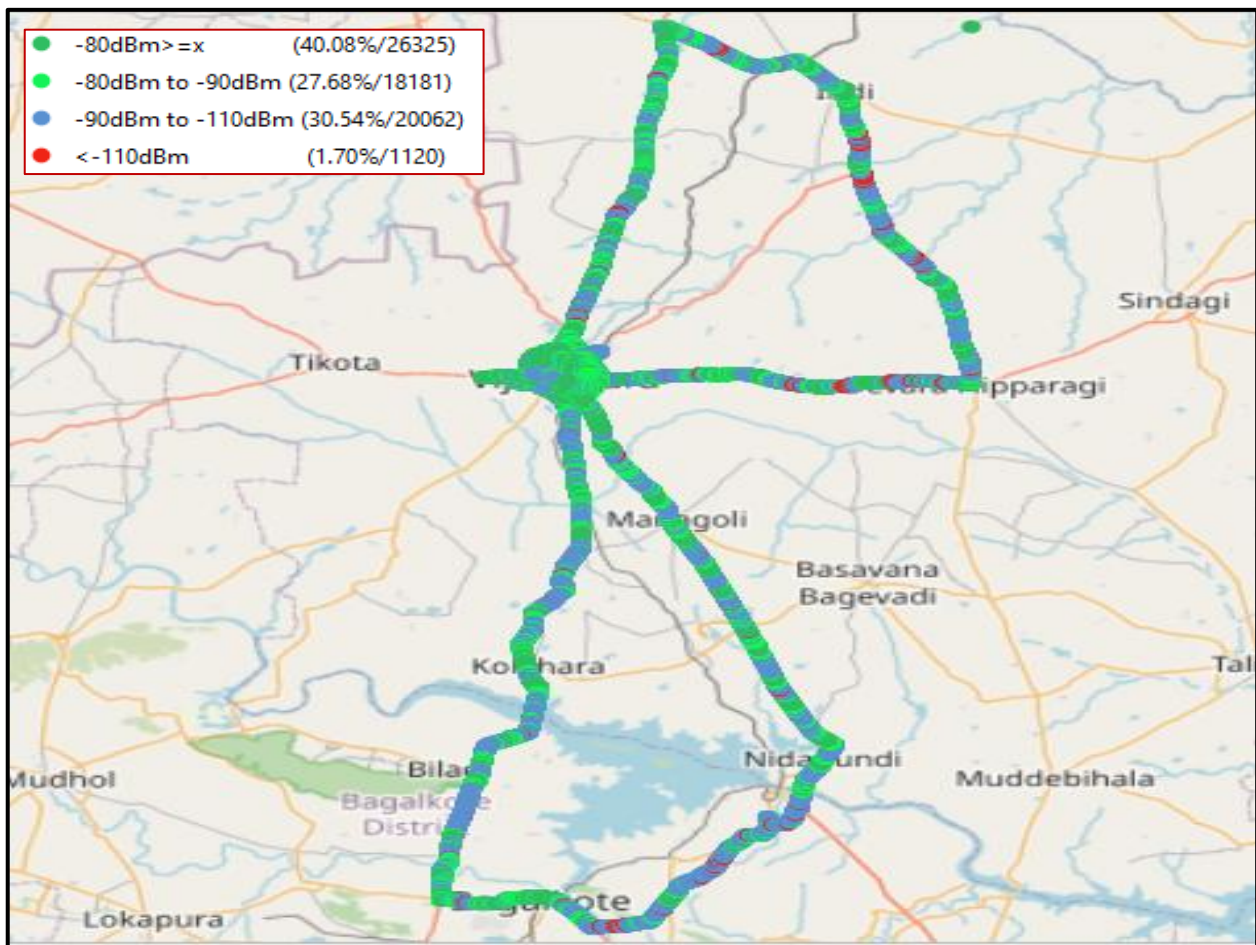
4G/VoLTE		
Overall RSRP	**# Samples**	**% PDF**
[Max, >=-80]	26325	40.08
[-80, >=-90)	18181	27.68
[-90, >=-110)	20062	30.54
[-110, >=Min)	1120	1.7
Total	**65688**	**100**

VIL

Technology	Coverage Rate %
2G	75.83
4G	87.38

2G	4G
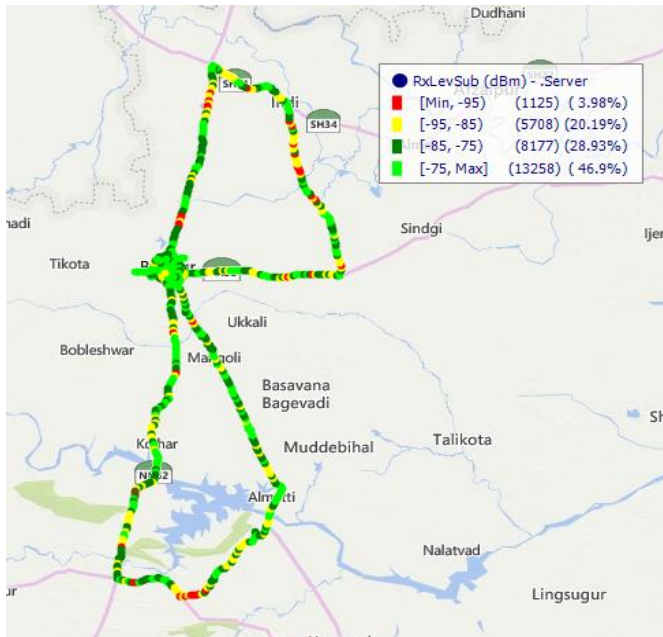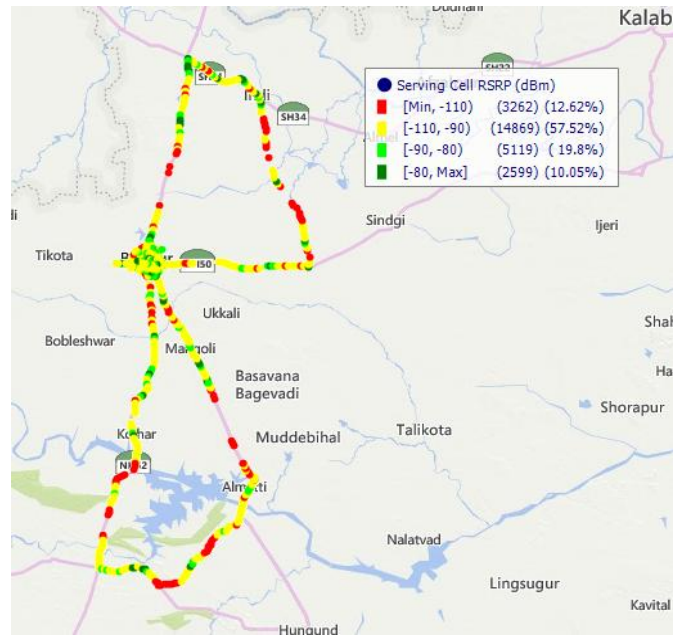
2G		
Overall RxLevel	**# Samples**	**% PDF**
[Max, >=-75]	13258	46.90
[-75, >=-85)	8177	28.93
[-85, >=-95)	5708	20.19
[-95, >=Min)	1125	3.98
Total	**28268**	**100.00**

4G/VoLTE		
Overall RSRP	**# Samples**	**% PDF**
[Max, >=-80]	2599	10.05
[-80, >=-90)	5119	19.80
[-90, >=-110)	14869	57.52
[-110, >=Min)	3262	12.62
Total	**25849**	**100.00**

For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -14 dBm for 3G TSP sand SINR >0 in case of 4G 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	93.06
BSNI 2G	95.40
VIL 2G	90.20
BSNL 3G	91.10
Airtel 4G	99.10
BSNL 4G	84.20
Jio 4G	90.50
VIL 4G	93.28

Rx Quality

Legend:
- Rx Quality
- Rx Quality 2G:[>5] 3G:[EcNo<-14 dBm] VoLTE:[SINR<=0]
- Rx Quality 2G:[<=5] 3G:[EcNo>=-14 dBm] VoLTE:[SINR>0]
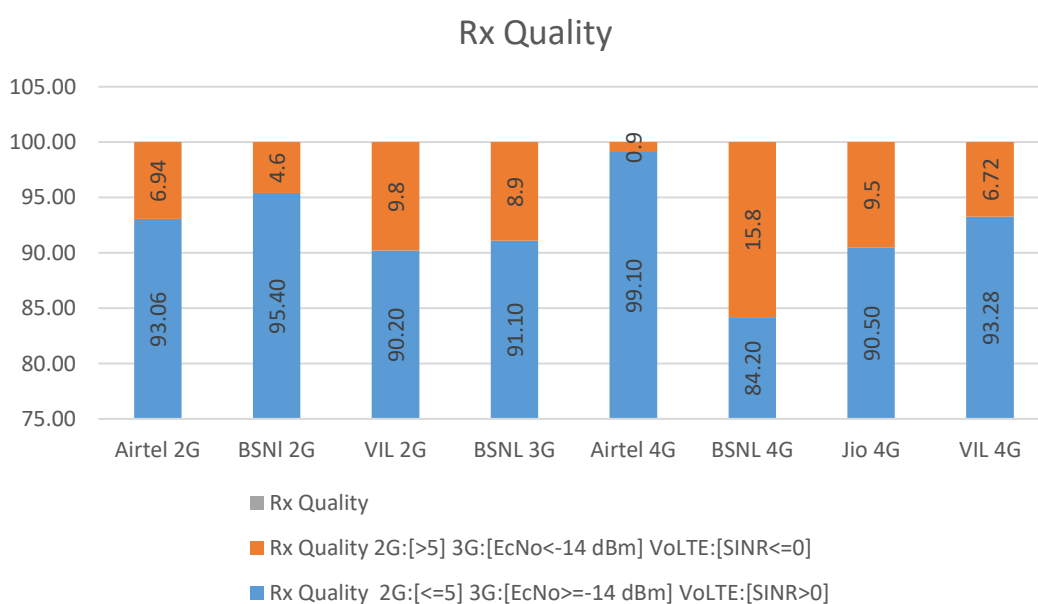
Airtel

Technology	Rx Quality %
2G	93.06
4G	99.10

2G

4G
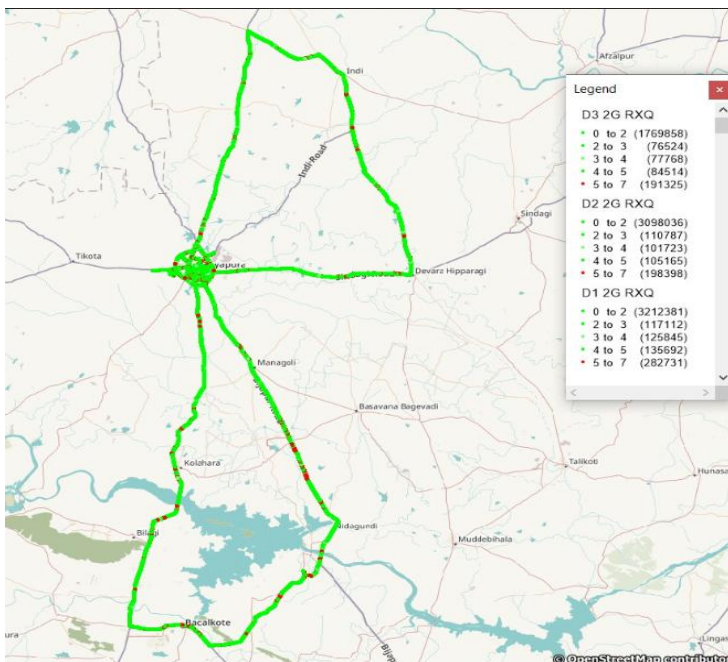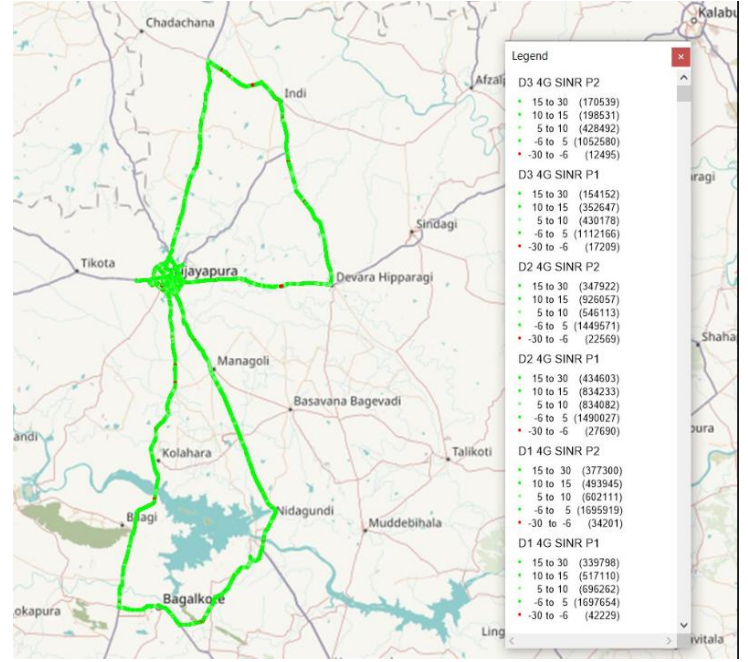
Overall Rx Quality	# Samples	% PDF
(Min, <=2)	8080275	83.41
(2, <=3)	304324	3.14
(3 , <=4)	305336	3.15
(4 , <=5)	325371	3.36
(5 , <=Max)	672454	6.94
Total	9687760	100

Overall SINR	# Samples	% PDF
(Min, <=0)	156393	0.66
(0, <=5)	8497917	48.45
(5, <=10)	3537238	18.89
(10, <=15)	3322523	14.55
(15, <=Max)	1824314	17.44
Total	17338385	100

BSNL

Technology	Rx Quality %
2G	95.4
3G	91.1
4G	84.2

2G
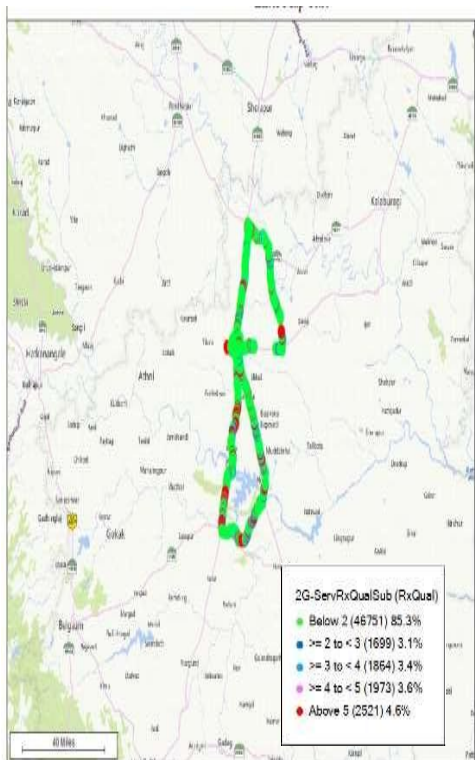
3G

4G
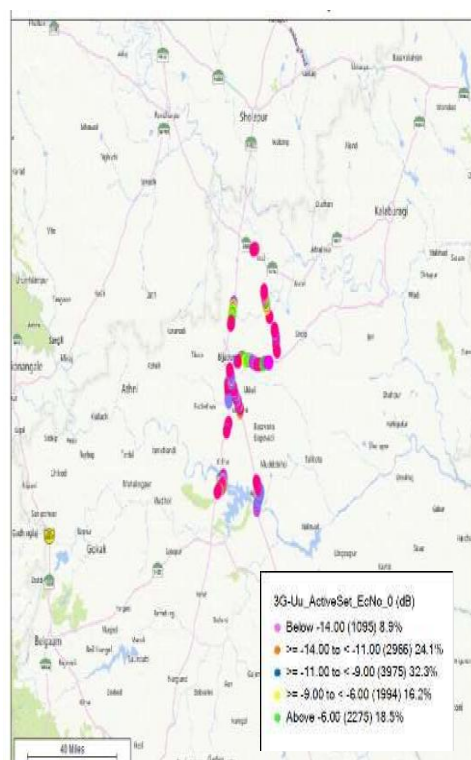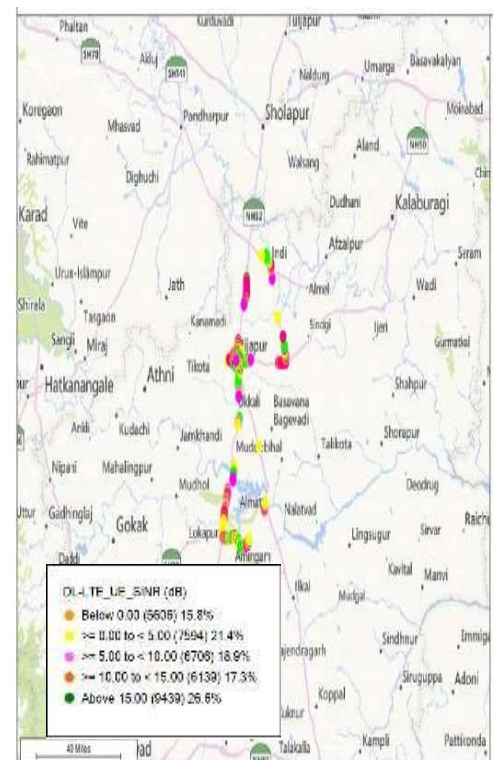
Overall Rx Quality	# Samples	% PDF
(Min, <=2)	46751	85.3
(2, <=3)	1699	3.1
(3 , <=4)	1864	3.4
(4 , <=5)	1973	3.6
(5 , <=Max)	2521	4.6
Total	54808	100

Overall EcNo	# Samples	% PDF
(Max, <=-6)	2275	18.5
(-6, <=-9)	1994	16.2
(-9, <=-11)	3975	32.3
(-11, <=-14)	2966	24.1
(-14, <= Min)	1095	8.9
Total	12307	100

Overall SINR	# Samples	% PDF
(Min, <=0)	5606	15.8
(0, <=5)	7594	21.4
(5, <=10)	6706	18.9
(10, <=15)	6139	17.3
(15, <=Max)	9439	26.6
Total	35484	100

JIO

Technology	Rx Quality (%)
4G/4G	**90.50**

Legend:
- >15 dB Max (18.8%/12346)
- 10 dB <=15 dB (22.18%/14567)
- 5 dB<=10 dB (27.99%/18378)
- 0 dB <=5 dB (21.53%/14140)
- -6 dB <=0 dB (8.82%/5794)
- Min, <=-6 dB (0.68%/444)
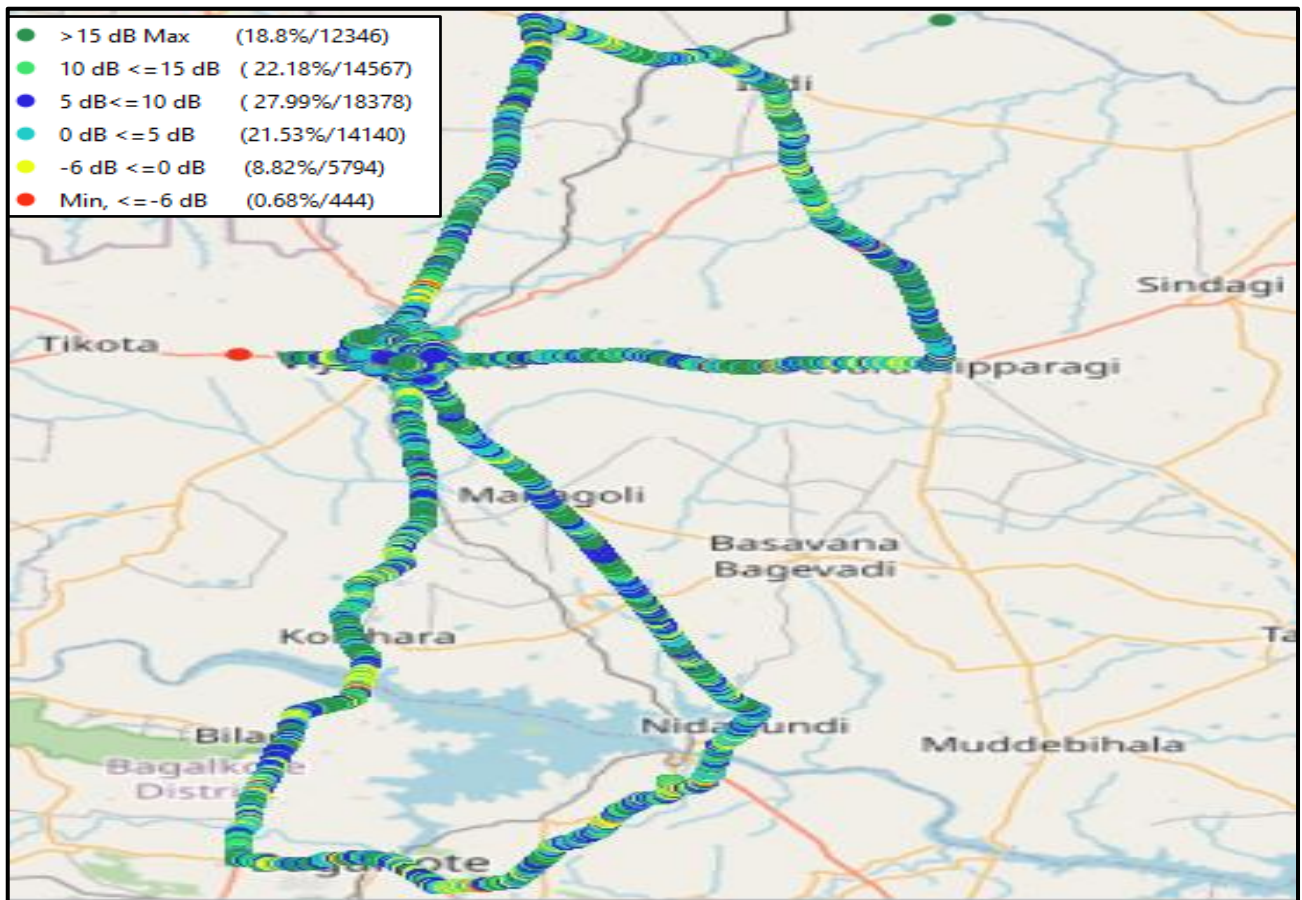
Overall SINR	# Samples	% PDF
(Min, <=0)	**6238**	**9.5**
(0, <=5)	14140	21.53
(5, <=10)	18378	27.99
(10, <=15)	14567	22.18
(15, <=Max)	12346	18.8
Total	**65669**	**100**

VIL

Technology	Rx Quality %
2G	90.20
4G	93.28

2G	4G
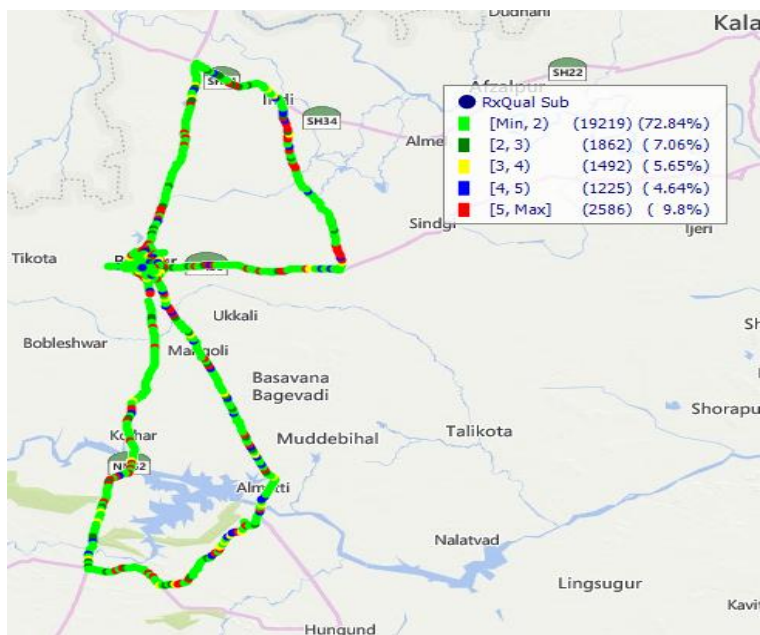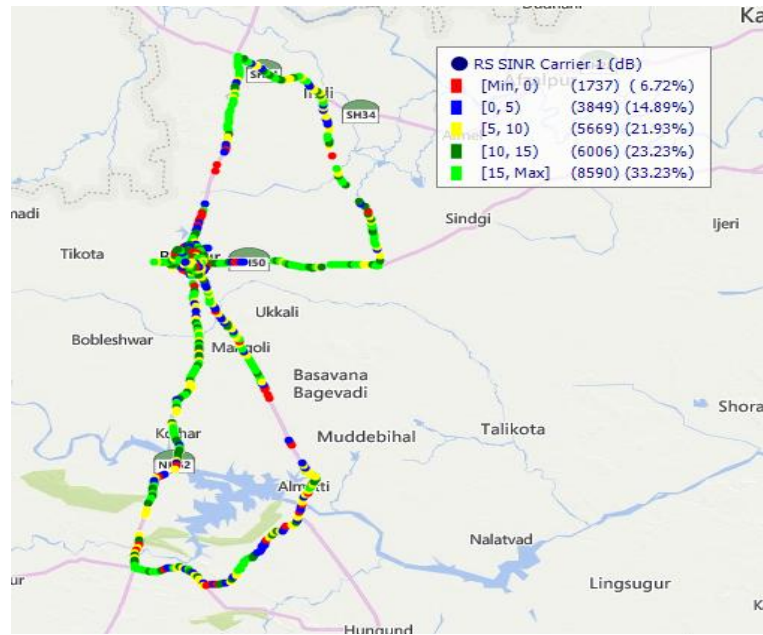
Overall Rx Quality	# Samples	% PDF		Overall SINR	# Samples	% PDF
(Min, <=2)	19219	72.84		(Min, <=0)	1737	6.72
(2, <=3)	1862	7.06		(0, <=5)	3849	14.89
(3 , <=4)	1492	5.65		(5, <=10)	5669	21.93
(4 , <=5)	1225	4.64		(10, <=15)	6006	23.23
(5 , <=Max)	2586	9.80		(15, <=Max)	8590	33.23
Total	26384	100.00		Total	25851	100.00

TSP	Time Spent on 3G/4G %
BSNL 3G	25.5
Airtel 4G	100
BSNL 4G	44.2
Jio 4G	100
VIL 4G	99.5

Percentage of time spent on 3G/4G/4G
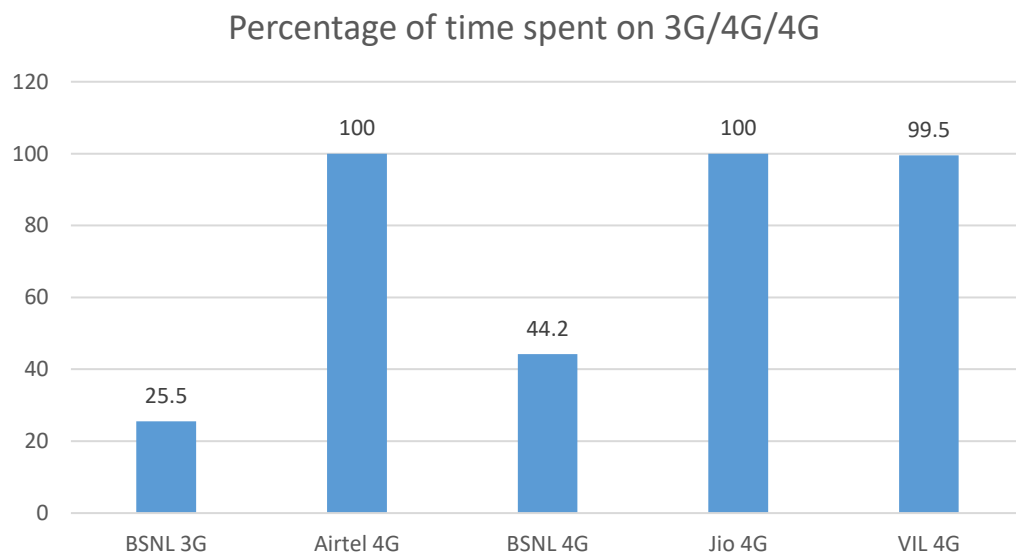
Airtel

Technology	Time Spent %
4G	100
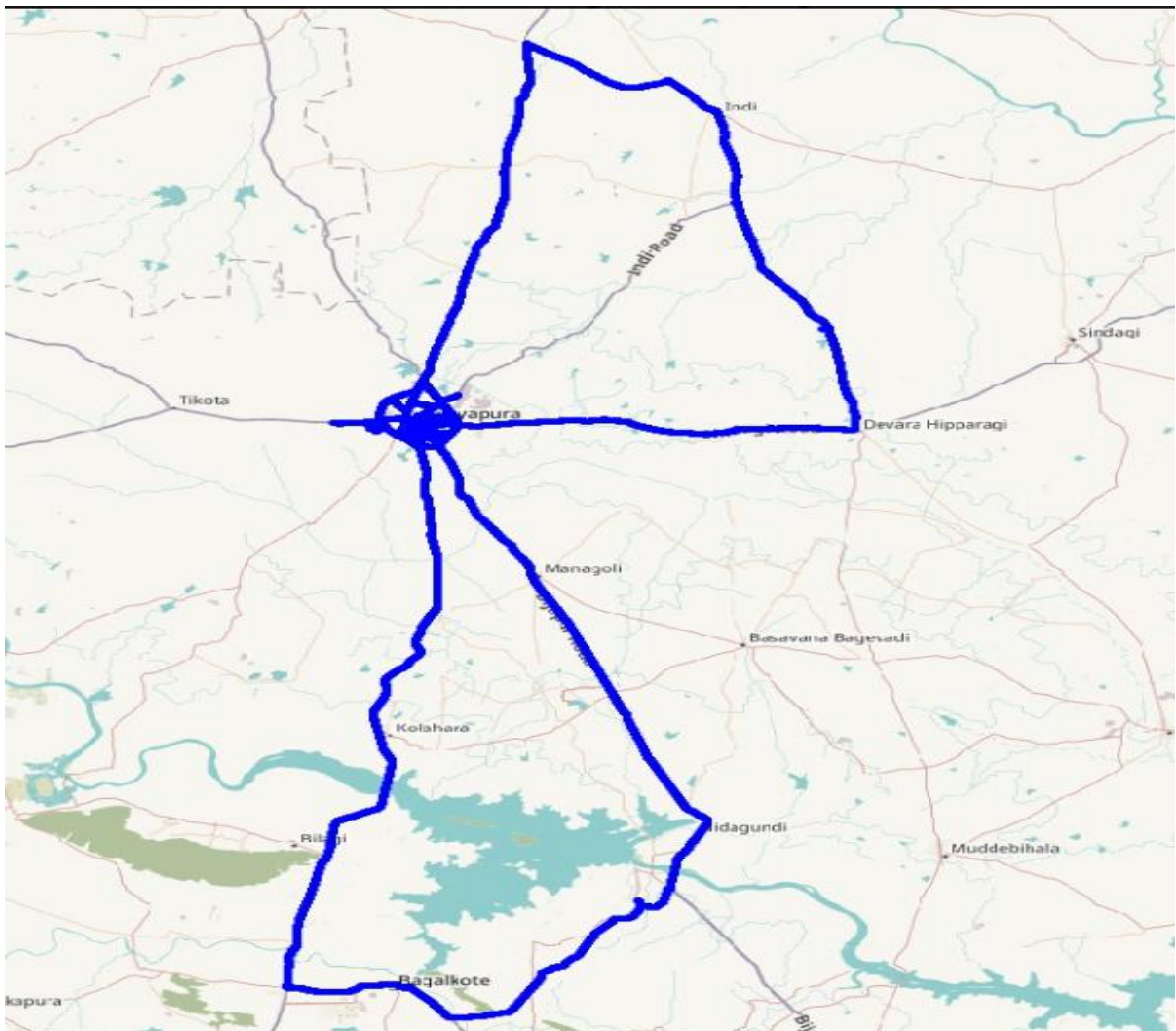
BSNL

Technology	Time Spent %
3G	25.5
4G	44.2
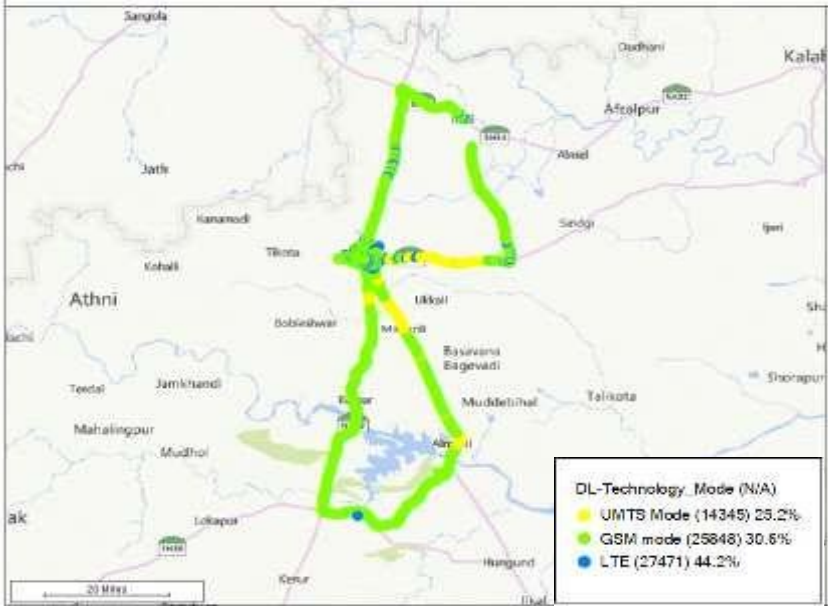
JIO

Technology	Time Spent %
4G	100
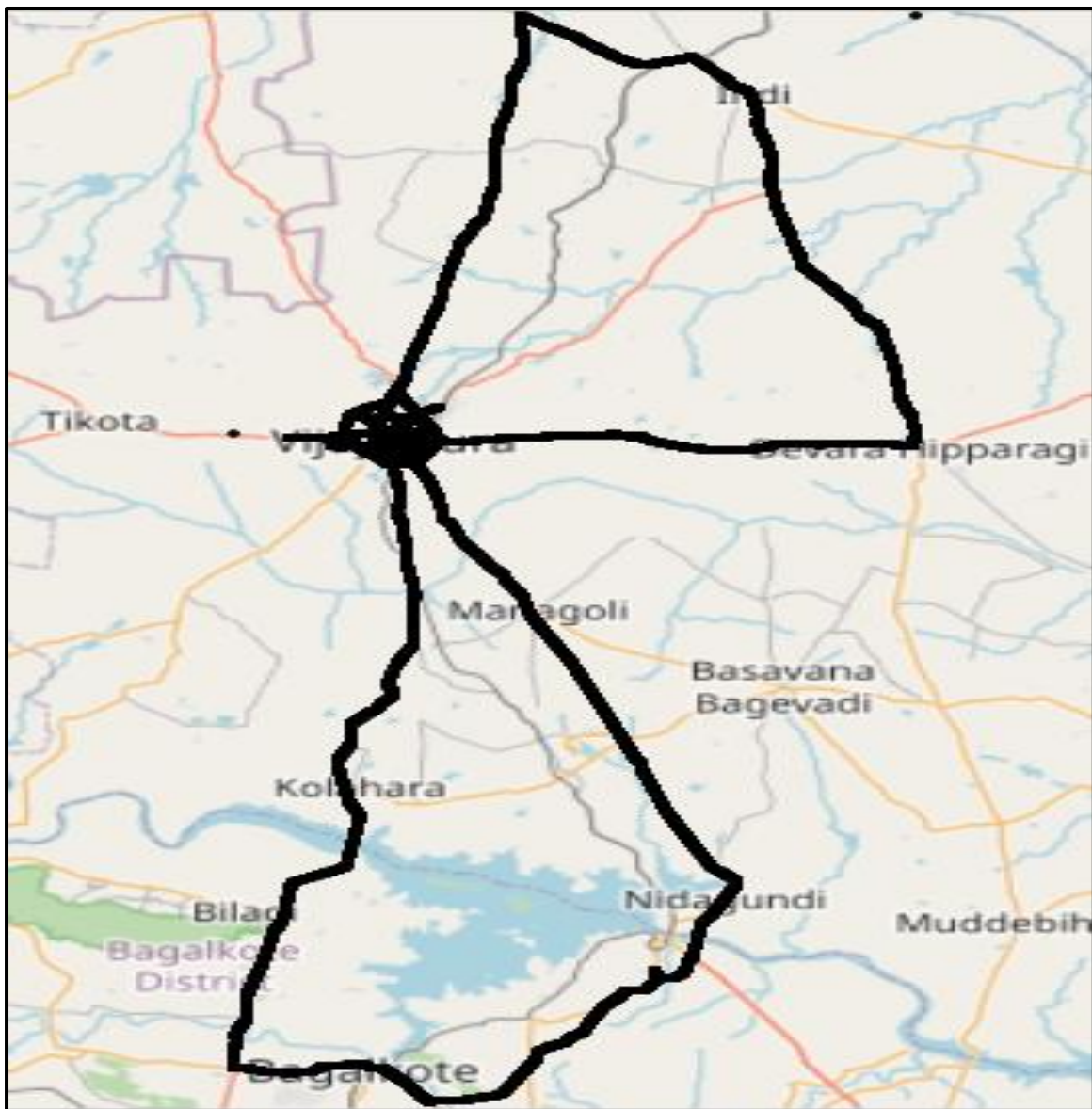
VIL

Technology	Time Spent
4G	99.50
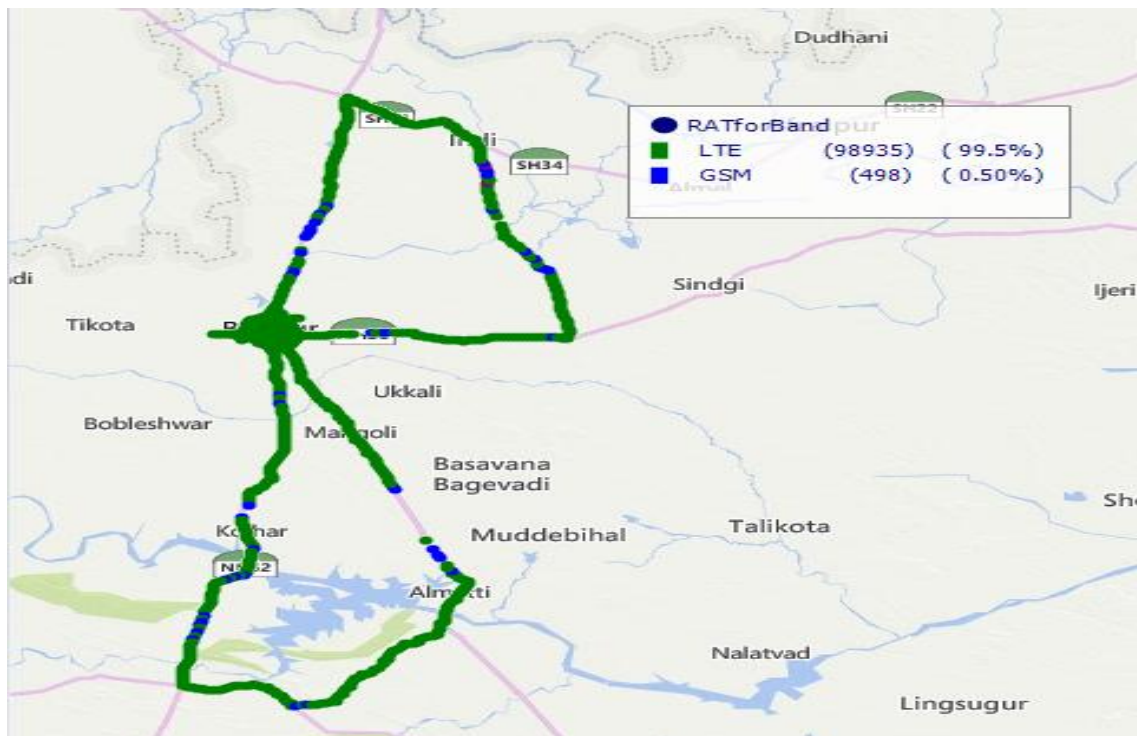
Airtel
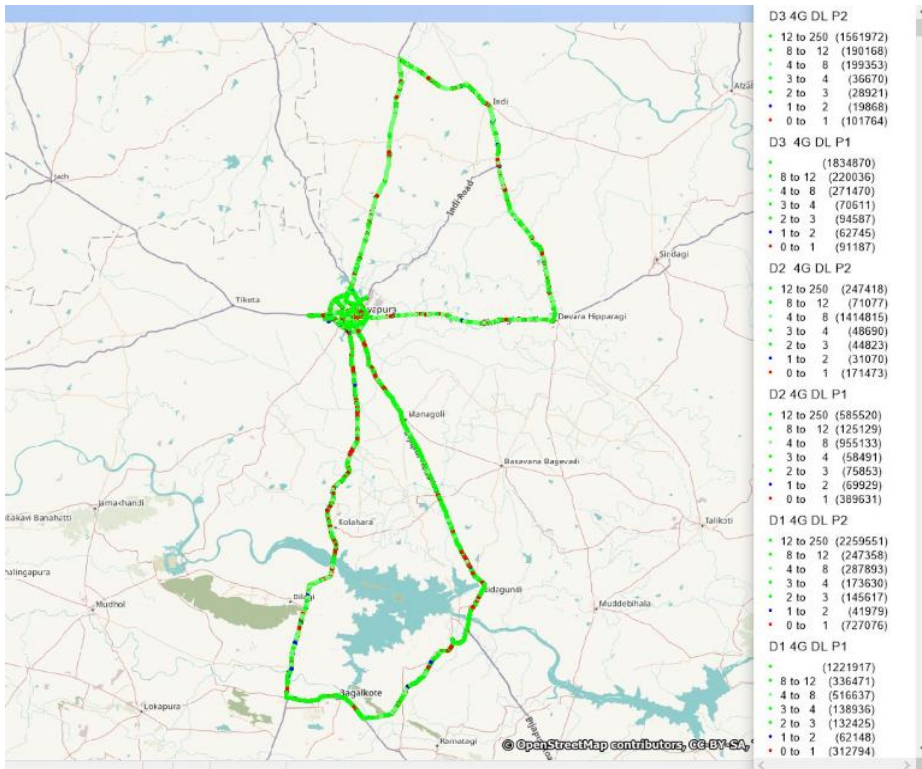
DL throughput	No. of Samples	%
0 to 1 Mbps	1793925	11.44
1 to 2 Mbps	287739	1.84
2 to 3 Mbps	522226	3.33
3 to 4 Mbps	527028	3.36
4 to 8 Mbps	3645301	23.25
8 to 12 Mbps	1190239	7.59
>12 Mbps	7711248	49.19
Total	15677706	100.00
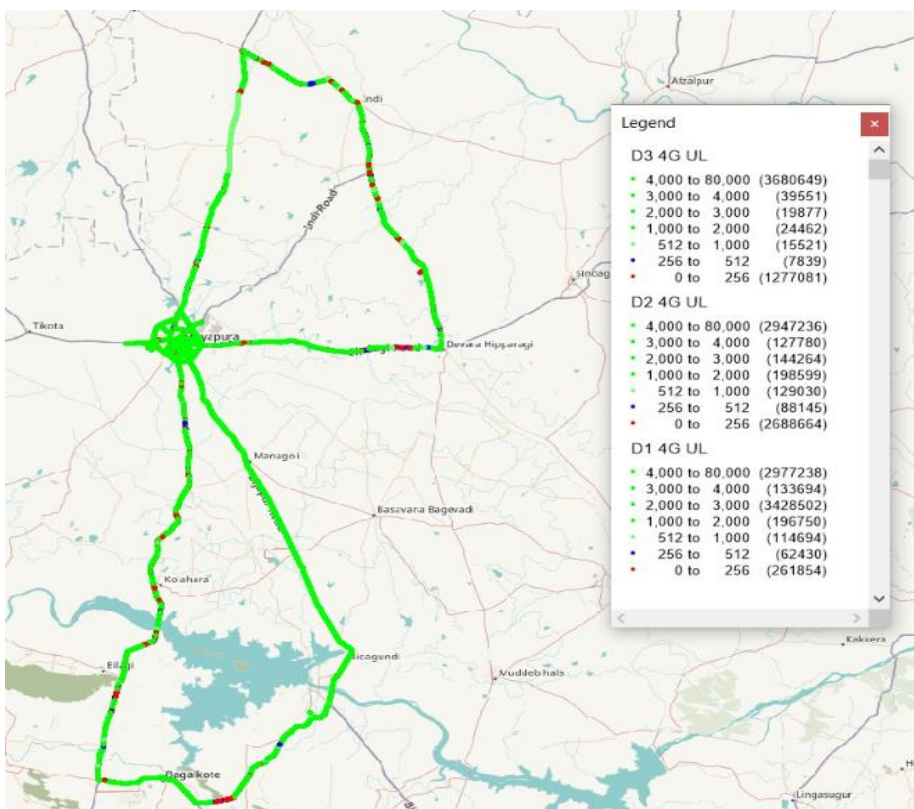
UL throughput	No. of samples	%
0 to 256 Kbps	4227599	22.77
250 to 512 Kbps	158414	0.85
512 Kbps to 1 Mbps	259245	1.40
1 to 2 Mbps	419811	2.26
2 to 3 Mbps	3592643	19.35
3 to 4 Mbps	301025	1.62
>4 Mbps	9605123	51.74
Total	18563860	100.00

BSNL
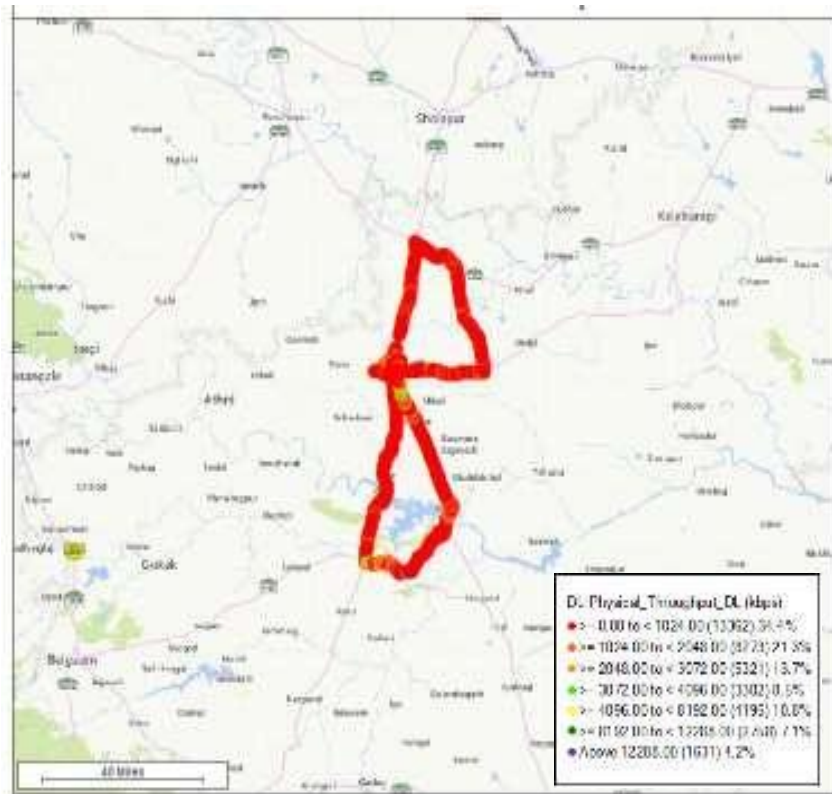
DL throughput	No. of Samples	%
0 to 1 Mbps	13362	34.4
1 to 2 Mbps	8273	21.3
2 to 3 Mbps	5321	13.7
3 to 4 Mbps	3302	8.5
4 to 8 Mbps	4195	10.8
8 to 12 Mbps	2758	7.1
>12 Mbps	1631	4.2
Total	38842	100
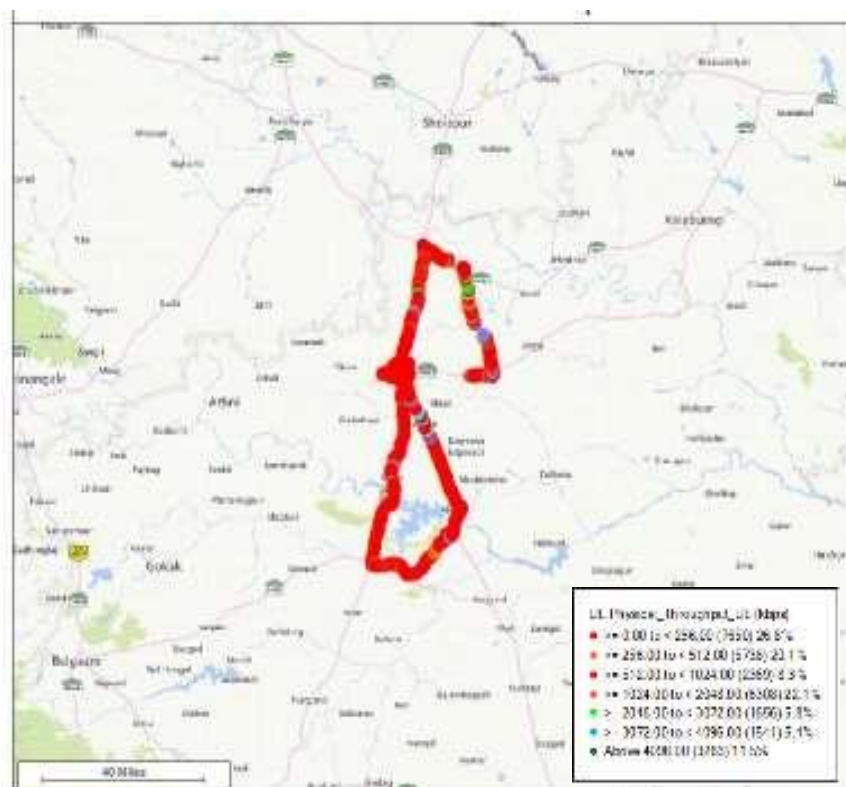
UL throughput	No. of Samples	%
0 to 256 kbps	7650	26.8
250 to 512 kbps	5738	20.1
512 Kbps to 1 Mbps	2369	8.3
1 to 2 Mbps	6308	22.1
2 to 3 Mbps	1656	5.8
3 to 4 Mbps	1541	5.4
>4Mbps	3283	11.5
Total	28545	100

JIO
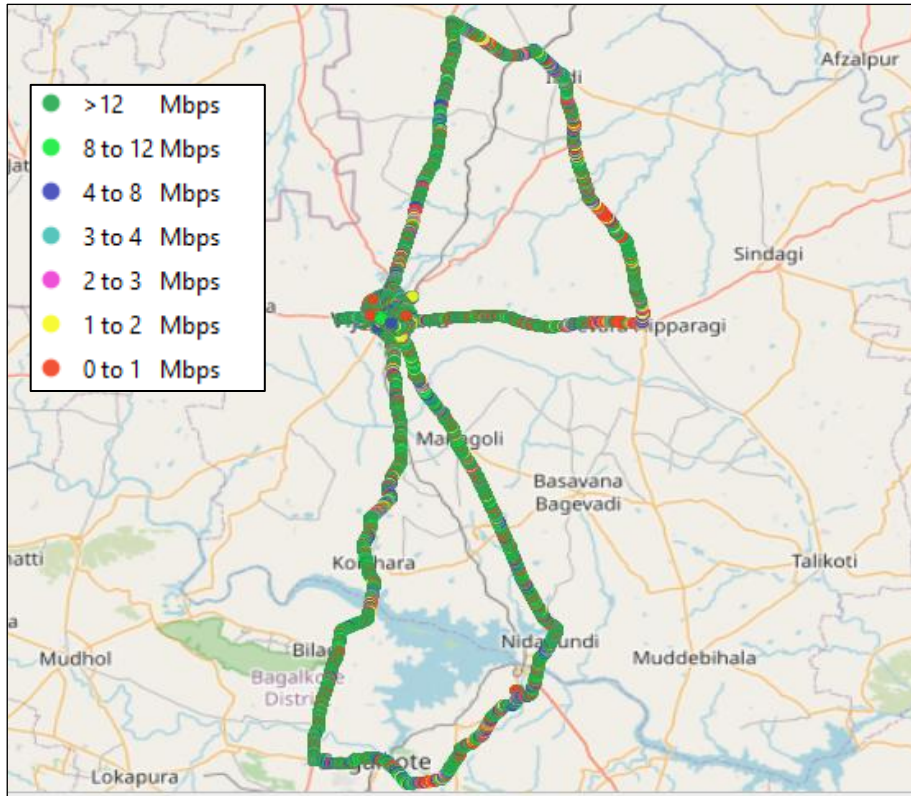
DL throughput	No. of Samples	%
0 to 1 Mbps	4720	10.66
1 to 2 Mbps	1951	4.41
2 to 3 Mbps	1748	3.95
3 to 4 Mbps	1503	3.39
4 to 8 Mbps	4787	10.81
8 to 12 Mbps	5261	11.88
>12 Mbps	24311	54.9
Total	44281	100
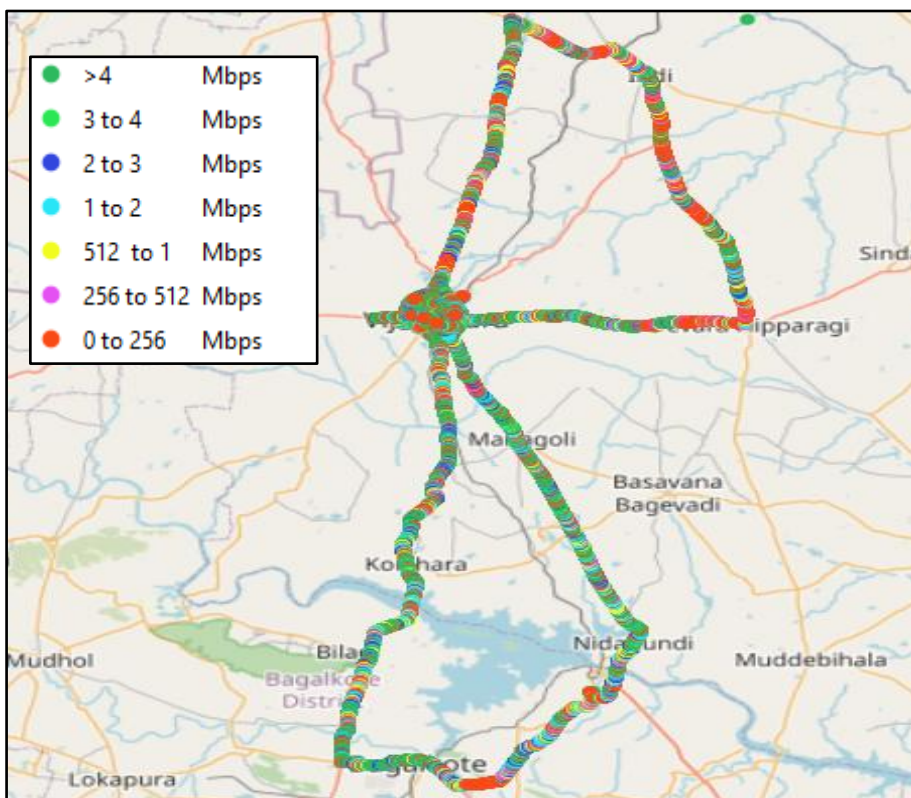
UL throughput	No. of samples	%
0 to 256 kbps Mbps	8073	17.2
256 to 512 kbps	2786	5.94
512 Kbps to 1 Mbps	3904	8.32
1 to 2 Mbps	6203	13.22
2 to 3 Mbps	5060	10.79
3 to 4 Mbps	4197	8.95
>4Mbps	16694	35.58
Total	46917	100

VIL
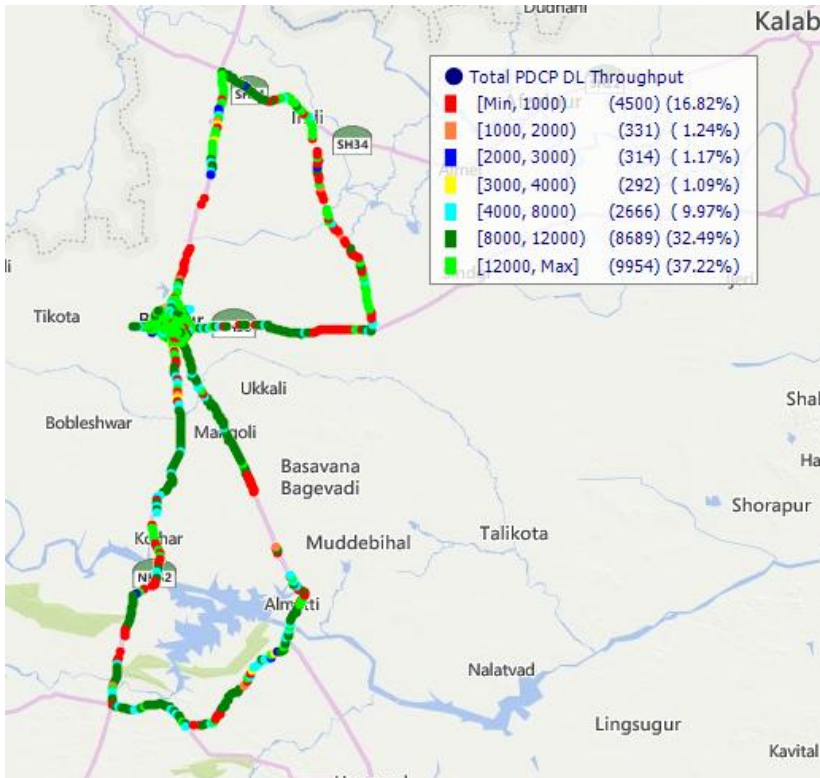
DL throughput	No. of Samples	%
0 to 1 Mbps	4500	16.82
1 to 2 Mbps	331	1.24
2 to 3 Mbps	314	1.17
3 to 4 Mbps	292	1.09
4 to 8 Mbps	2666	9.97
8 to 12 Mbps	8689	32.49
>12 Mbps	9954	37.22
Total	26746	100.00
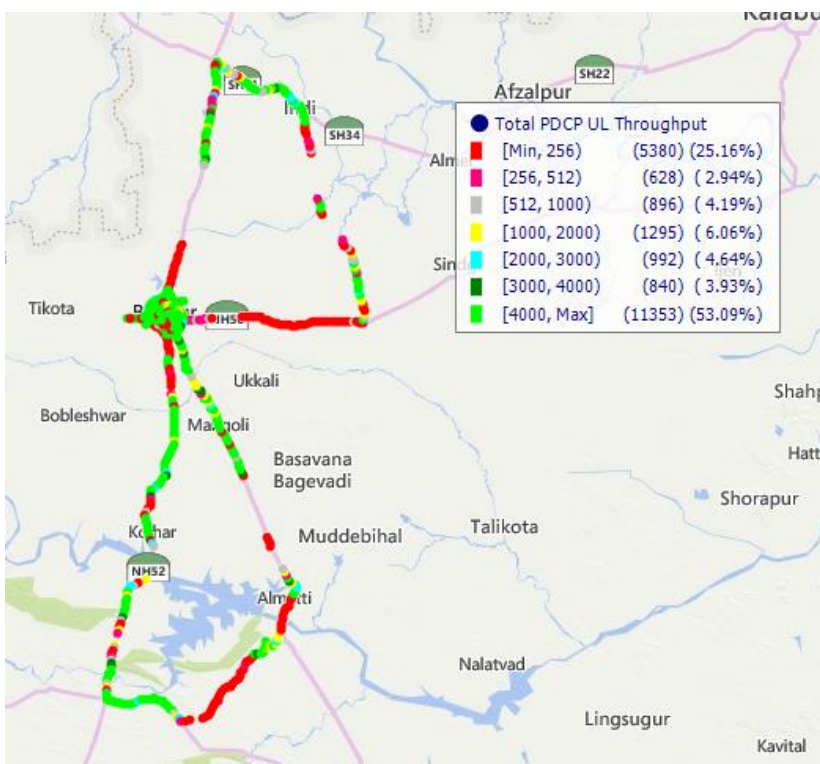
UL throughput	No. of samples	%
0 to 256 Kbps	5380	25.16
250 to 512 Kbps	628	2.94
512 Kbps to 1 Mbps	896	4.19
1 to 2 Mbps	1295	6.06
2 to 3 Mbps	992	4.64
3 to 4 Mbps	840	3.93
>4Mbps	11353	53.09
Total	21384	100.00

V. TRAI My Speed App Test Details-4G

Techology-4G	Govt Hospital	Shri Siddeshwar Temple	KSRTC Bus Stand	DC Office	Railway Station	Govt Polytechnic College
Download Speed (Mbps)	24.83	84.76	21.75	13.84	14.57	27.68
Upload Speed (Mbps)	37.38	30.33	30.98	6.11	24.99	34.86
Latency (ms)	35.5	38.9	35.1	55.9	52.1	51.6

Govt Hospital

Shri Siddeshwar Temple
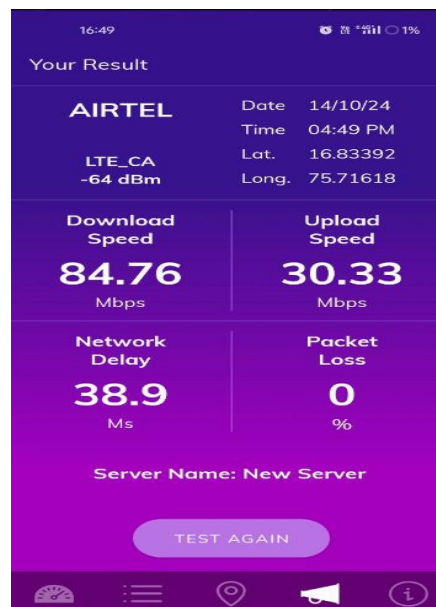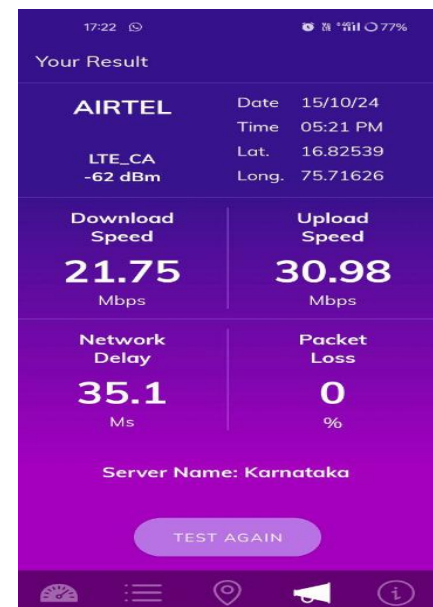
KSRTC Bus Stand

DC Office
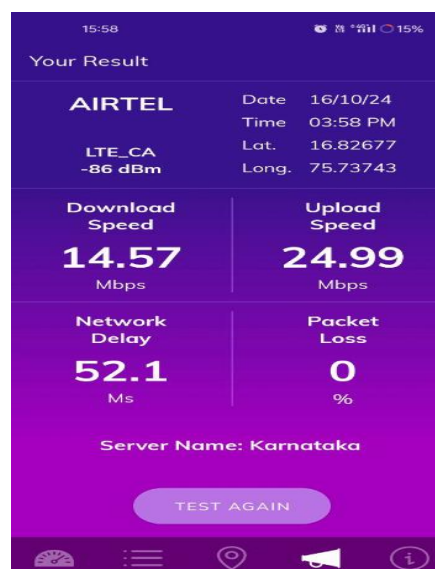
Railway Station

Govt Polytechnic College

V. TRAI My Speed App Test Details- 3G/4G

Techology-4G	Govt Hospital	Shri Siddeshwar Temple	KSRTC Bus Stand	DC Office	Railway Station	Govt Polytechnic College
Download Speed (Mbps)	3.03	5.89	12.75	8.02	2.18	2.34
Upload Speed (Mbps)	1.39	0.47	6.69	3.45	2.86	2.75
Latency (ms)	69.4	51.6	83.3	56.8	78.1	76.1

Govt Hospital

Shri Siddeshwar Temple

KSRTC Bus Stand

DC Office

Railway Station

Govt Polytechnic College

Techology-4G	Govt Hospital	Shri Siddeshwar Temple	KSRTC Bus Stand	DC Office	Railway Station	Govt Polytechnic College
Download Speed (Mbps)	17.65	44.16	20.11	24.04	39.59	32.56
Upload Speed (Mbps)	4.62	8.99	15.34	8.41	7.95	21.01
Latency (ms)	48.2	40.8	45.4	47.4	49.7	42

Govt Hospital

Shri Siddeshwar Temple

KSRTC Bus Stand

DC Office

Railway Station
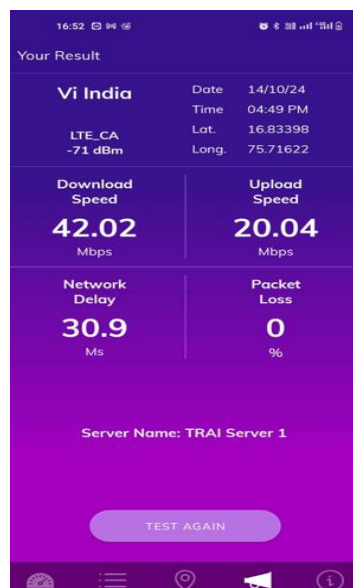

Govt Polytechnic College

V. TRAI My Speed App Test Details-4G
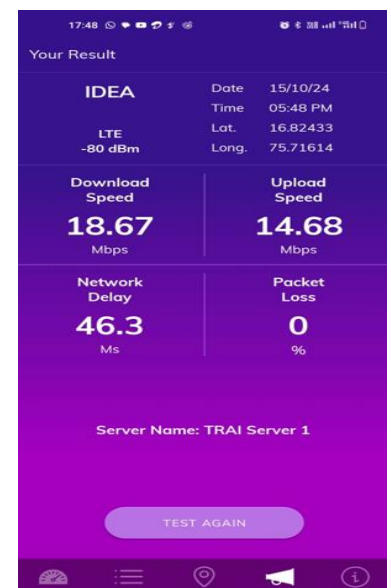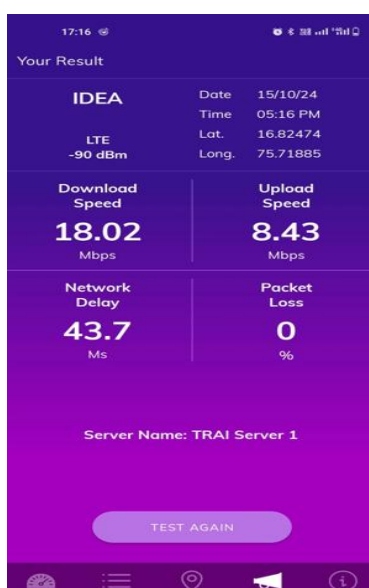
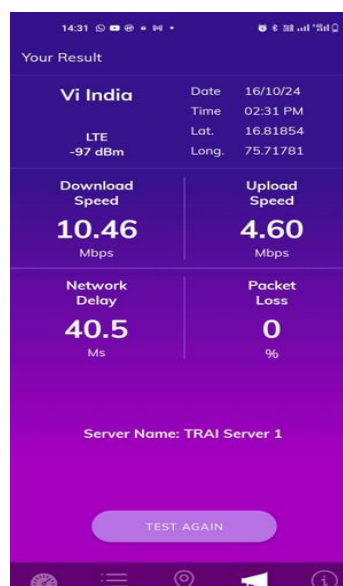| Techology-4G	Govt Hospital	Shri Siddeshwar Temple	KSRTC Bus Stand	DC Office	Railway Station	Govt Polytechnic College
Download Speed (Mbps)	19.70	42.02	18.67	18.02	10.46	10.46
Upload Speed (Mbps)	8.42	20.04	14.68	8.43	4.60	4.60
Latency (ms)	38.10	30.90	46.3	43.70	40.50	40.50

Govt Hospital

Shri Siddeshwar Temple

KSRTC Bus Stand

DC Office

Railway Station

Govt Polytechnic College