Operator Assisted Drive Test Report

BERHAMPUR SSA
JULY 2023

(RO, HYDERABAD)

Key Performance Indicators: **All TSPs have met the Drop Call Rate (DCR) benchmark of 2%. All TSPs have met the Call Setup Success Rate (CSSR) of 95%. All TSPs have met the Rx Quality except BSNL 2G, BSNL 3G, Airtel VoLTE and Jio VoLTE.**

The Operator Assisted Drive Test has been carried out by Regional Office, Hyderabad with the help of Service Providers in Berhampur City and surrounding areas Gopalpur, Bhanjanagar,Jiranga, Aska and Chatrapur including important National Highways and State Highways from 9:00 AM to 8:00 PM during 04th July to 7th July 2023. The drive test covered drive route of 400 KMs & 6 hotspots over a period of 4 days. Approximately 440 calls were made for each of 8 networks: three 2G networks, two 3G networks and Three LTE network covering four TSPs.

Overview   Voice Summary   Data Summary

Overview

Regional Office, TRAI conducted Operator Assisted Drive Test from 04th July to 07th July 2023 covering various locations in Berhamapur City & surrounding regions **Gopalpur, Bhanjanagar, Jiranga, Aska and Chatrapur.**The performance of Airtel, BSNL, Jio and Vodafone Idea were monitored across various technologies (2G, 3G and 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, Handover 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 wait time of 10 sec between calls in all technologies. The drive test covered a drive route of approximately 400 KMs over a period of 4 days from 04th July to 07th July 2023. Approximately 440 calls were made for 2G (Lock Mode) 3G (Free Mode) and VoLTE(Free Mode) network.

Data Tests:

1.Dynamic data test was conducted for 400 kms over a period of 4 days for download throughput for 4G technologies.

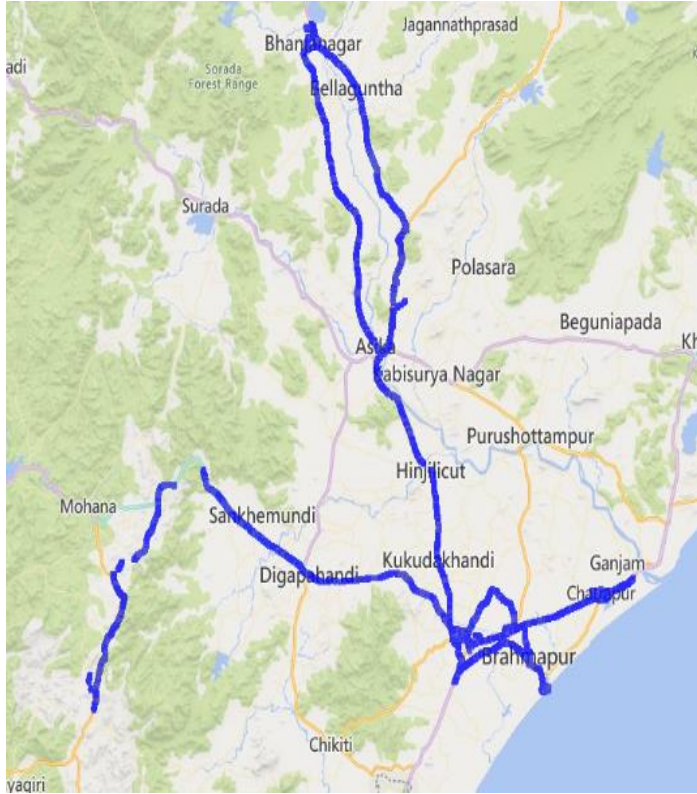2. Data Tests were performed at 6 static locations for 2G, 3G & 4G technologies.

* For Voice and Data KPI's, 2G measurement is done with UE locked mode, 3G Done With 3G preferred Mode and 4G measurement is done with UE in Free Mode.

* 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(Locked) 20MB ,4G (Free) - 40 MB
Upload	2G (Locked) - 100KB, 3G(Locked) 5MB ,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

Overview

Area Covered –Berhampur	
MKCG Hospital	Church Road
Railway station	Corporation Road
Stadium	Gandhinagar
Khalikote square	Nehru park
NCC Quarters	Housing board colony
Areas Covered- Bhanjanagar	
Bus stand	Park
Daspalla road	Govt colony
Forest colony	ITI College road
Nayagarh Road	College Road
Areas covered Chhatarpur & Gopalpur	
RTO office	NTTF College
Stadium	Sea Beach
College Road	Mayfair hotel
Areas covered -Aska	
Ask College	Bus stand
Sugar Factory	Medical chhak
Area Covered -Chandragiri	
Govt high school	Bus stand
Medical	Jiranga
Govt Techers Colony	Budu Hotel

Sl.No	Hot Spot Locations
1	Bhanjanagar Bus stand
2	Gopalpur Sea beach
3	Chandragiri Bus stand
4	Berhampur old bus stand
5	Railway station
6	MKCG Medical College

Voice Calls

Key Observations

QoS compliance of the TSPs in Madurai for Voice across technologies 2G/3G/4G-VoLTE:
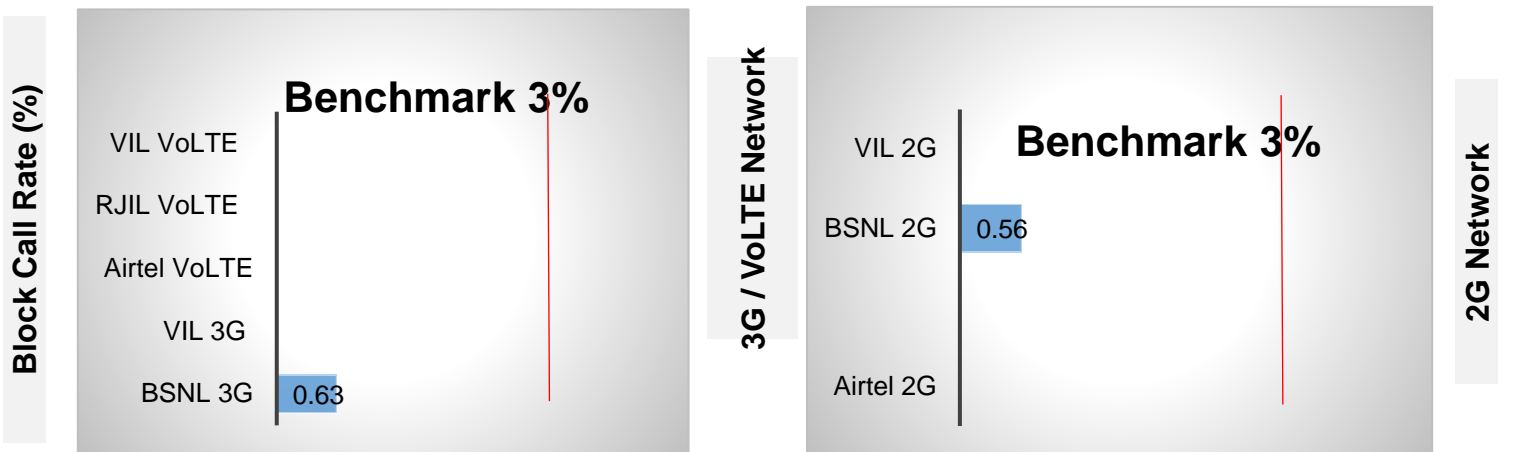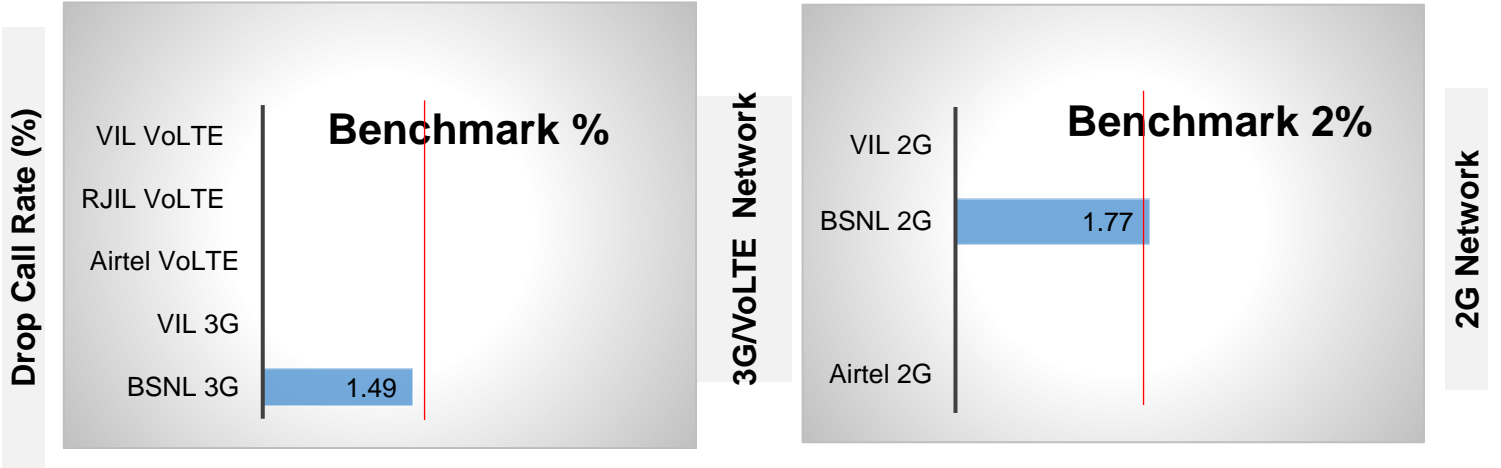
KPIs	2G			3G	3G	VoLTE		
	Airtel	BSNL	VIL	BSNL	VIL	Airtel	RJIL	VIL
Drop Call Rate %	0	1.77	0	1.49	0	0	0	0
Block Call Rate %	0	0.56	0	0.63	0	0	0	0

a) All TSPs have met the 2% QoS benchmark of Drop Call Rate (DCR%).

b) Call Block Rate (CBR%) benchmark of 3% was achieved by all TSP's.

Voice Calls

Coverage

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

TSP	2G		
	Airtel	BSNL	VIL
Coverage %	98.59	69.22	87.21

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

TSPs	3G		VoLTE		
	BSNL	VIL	Airtel	JIO	VIL
Coverage %	74.13	92.98	98.96	97.39	96.59

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

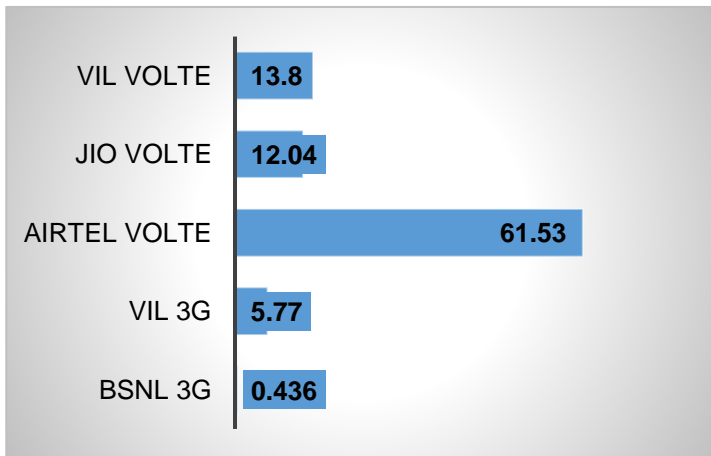| TSPs	3G		VoLTE		
	BSNL	VIL	Airtel	JIO	VIL
Time Spent on 3G/4G %	83	41.88	100	100	62.13

Data Services Static

Data was tested at 6 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing delay (Flipkart, Amazon, PayTm)
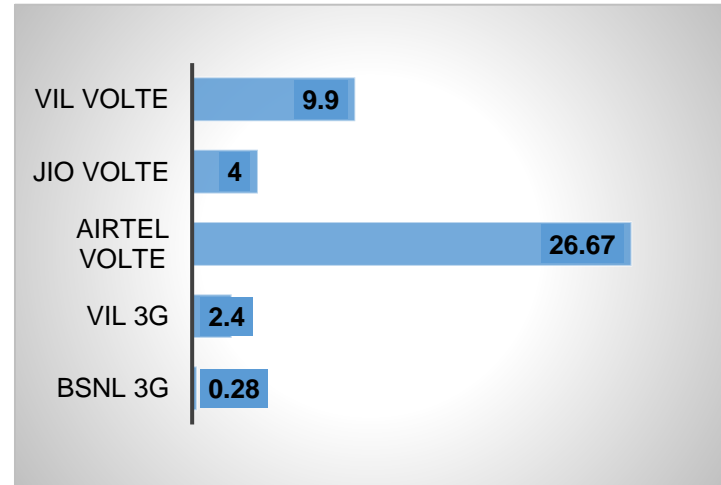
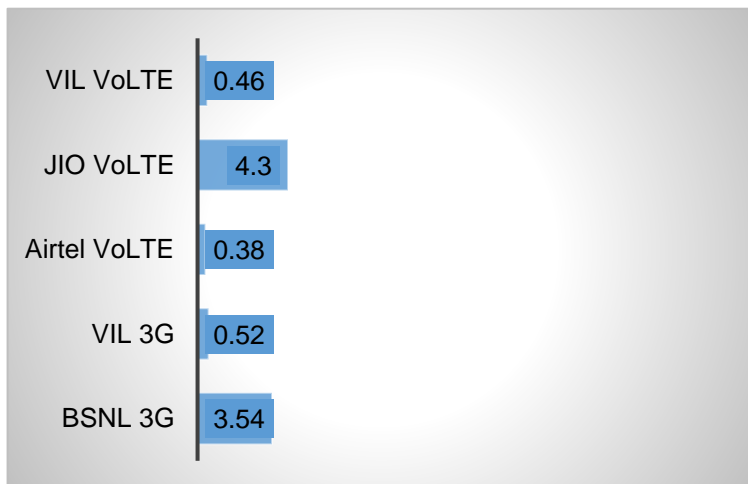## Data Download and Upload Performance (Mbps)

3G/4G/ Network:

Download Throughput (Mbps)

Network	Value
VIL VOLTE	13.8
JIO VOLTE	12.04
AIRTEL VOLTE	61.53
VIL 3G	5.77
BSNL 3G	0.436

Upload Throughput (Mbps)

Network	Value
VIL VOLTE	9.9
JIO VOLTE	4
AIRTEL VOLTE	26.67
VIL 3G	2.4
BSNL 3G	0.28

Web Browsing delay (Sec)

Network	Value
VIL VoLTE	0.46
JIO VoLTE	4.3
Airtel VoLTE	0.38
VIL 3G	0.52
BSNL 3G	3.54

Latency (ms)

Network	Value
VIL VoLTE	34
JIO VoLTE	43
Airtel VoLTE	49.65
VIL 3G	49
BSNL 3G	122.16
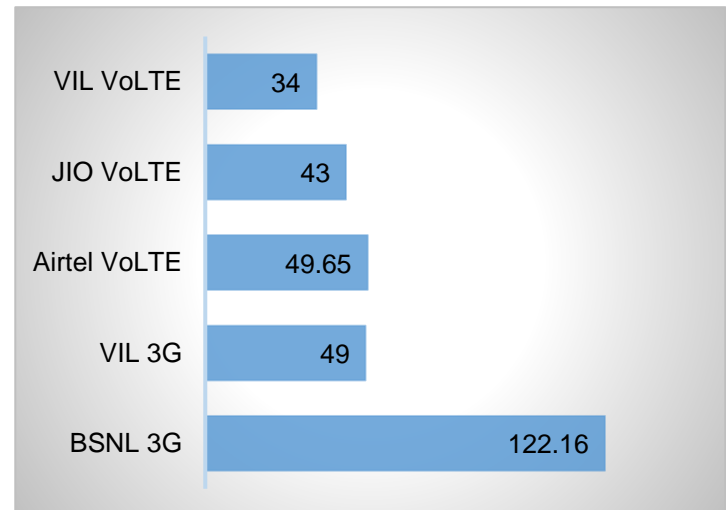
Dynamic Data was tested for 400 Kms. Download Throughput was tested.

Data Download Performance (kbps) - Dynamic

3G/4G/ Network:

Download Throughput (Mbps)

VIL VOLTE	**13.63**
JIO VOLTE	**11.5**
AIRTEL VOLTE	**23.5**
BSNL 3G	**0.43**
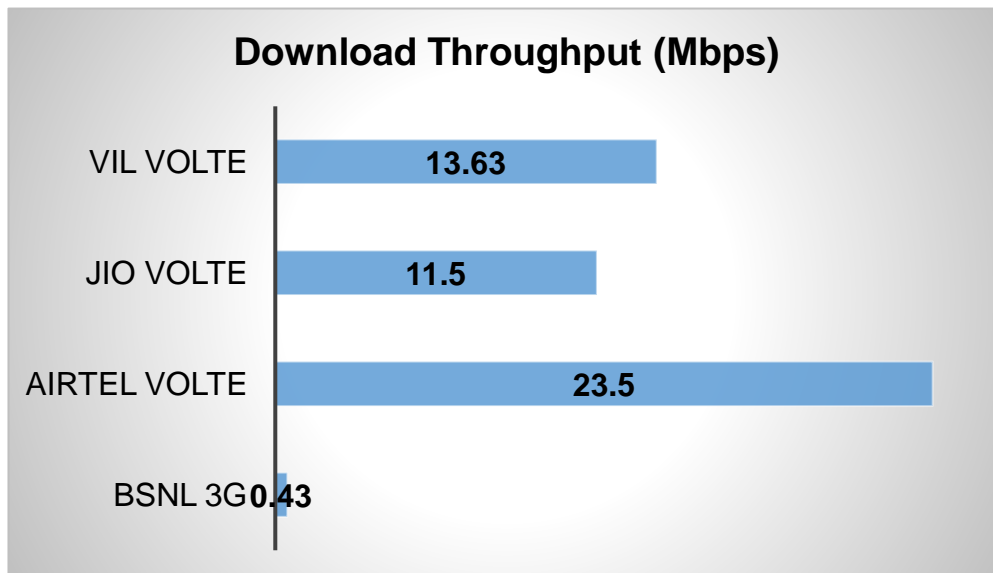
Data Services Dynamic	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	0.43	23.5	11.5	13.63

Summary

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	426	511	286
Blocked Call Rate (%)	0	0.56	0
CSSR% (Accessibility)	100	98.22	100
Drop Call Rate (%)	0	1.77	0.00
Mobility HOSR (%)	100	97.23	98.52
Rx Quality (%)	95.15	81.82	96.02

Voice Call	3G		VoLTE		
	BSNL	VIL	Airtel	JIO	VIL
Call Attempt	472	166	442	340	189
Blocked Call Rate (%)	0.63	0	0	0	0
CSSR% (Accessibility)	99.36	100	100	100	100
Drop Call Rate (%)	1.49	0	0	0	0
Mobility HOSR (%)	97.47	100	100	98.60	100
Rx Quality (%)	73.34	98.22	87.93	86.74	95.91

Summary

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	203.90	27.63	187.57
Upload Throughput (kbps)	131.42	13.57	86.27
Web Browsing Delay (sec)	12.62	45.82	0.57
Latency (msec)	170.73	123.24	128

Data Services Static	3G		4G		
	BSNL	VIL	Airtel	JIO	VIL
Download Throughput (Mbps)	0.43	5.77	61.53	12.04	13.8
Upload Throughput (Mbps)	0.28	2.4	26.67	4.0	9.9
Web Browsing Delay (sec)	3.54	0.52	0.38	4.3	0.46
Latency (msec)	122.16	49	49.65	43	34

Data Services Static

Bhanjanagar Bus stand	2G		
	Airtel	**BSNL**	**VIL**
Download Throughput (kbps)	172.5	32.42	218.12
Upload Throughput (kbps)	155.2	11.3	88.2
Web Browsing Delay (sec)	11.4	35.07	0.67
Latency (msec)	178	119.7	131

Gopalpur Sea Beach	2G		
	Airtel	**BSNL**	**VIL**
Download Throughput (kbps)	240.20	22.10	181.17
Upload Throughput (kbps)	160.6	10.87	75.51
Web Browsing Delay (sec)	15.4	34..92	0.52
Latency (msec)	169.1	115.67	137

Chandragiri Bus stand	2G		
	Airtel	**BSNL**	**VIL**
Download Throughput (kbps)	240.4	27.35	**NA**
Upload Throughput (kbps)	98.20	6.84	**NA**
Web Browsing Delay (sec)	8.3	45.74	**NA**
Latency (msec)	166.8	120.75	**NA**

MKCG Medical college	2G		
	Airtel	**BSNL**	**VIL**
Download Throughput (kbps)	181.34	32.43	192.3
Upload Throughput (kbps)	110.2	24.15	91.21
Web Browsing Delay (sec)	13.11	57.95	0.45
Latency (msec)	167.5	143.45	128

Berhampur Railway Station	2G		
	Airtel	**BSNL**	**VIL**
Download Throughput (kbps)	220.8	28.42	168.13
Upload Throughput (kbps)	154.2	12.84	95.3
Web Browsing Delay (sec)	11.34	41.72	0.59
Latency (msec)	167.2	121.34	125

Berhampur Bus Stand	2G		
	Airtel	**BSNL**	**VIL**
Download Throughput (kbps)	168.2	21.469	178.13
Upload Throughput (kbps)	110.12	15.45	81.11
Web Browsing Delay (sec)	16.22	59.63	0.60
Latency (msec)	175.83	118.96	119

Bhanjanagar Bus stand	3G		LTE		
	BSNL	VIL	Airtel	JIO	VIL
Download Throughput (Mbps)	0.392	NA	45.8	14.11	11.27
Upload Throughput (Mbps)	0.280	NA	12.53	3.5	7.4
Web Browsing Delay (sec)	3.92	NA	0.65	4.1	0.55
Latency (msec)	115	NA	51.6	55	36

Gopalpur Sea Beach	3G		LTE		
	BSNL	VIL	Airtel	JIO	VIL
Download Throughput (Mbps)	0.529	6.11	93.37	10.8	16.8
Upload Throughput (Mbps)	0.28	2.18	31.24	4.06	10.22
Web Browsing Delay (sec)	3.19	0.87	0.43	4.5	0.78
Latency (msec)	132	58	45.1	45	30

Chandragiri Bus stand	3G		LTE		
	BSNL 3G	VIL 3G	Airtel	JIO	VIL
Download Throughput (Mbps)	0.52	NA	98.22	13.23	NA
Upload Throughput (Mbps)	0.46	NA	27.55	3.6	NA
Web Browsing Delay (sec)	3.14	NA	0.10	4.1	NA
Latency (msec)	117	NA	51.4	40	NA

MKCG Medical college	3G		LTE		
	BSNL	VIL	Airtel	JIO	VIL
Download Throughput (Mbps)	0.28	3.7	43.9	12.46	11.1
Upload Throughput (Mbps)	0.26	1.56	35.23	4.3	9.28
Web Browsing Delay (sec)	3.91	0.41	0.12	4.6	0.58
Latency (msec)	123	42	48.2	38.5	33

Berhampur Railway Station	3G		LTE		
	BSNL	VIL	Airtel	JIO	VIL
Download Throughput (Mbps)	0.32	5.77	65.12	11.19	14.19
Upload Throughput (Mbps)	0.12	2.38	34.67	6.1	10.2
Web Browsing Delay (sec)	3.41	0.23	0.9	4.5	0.42
Latency (msec)	132	51	53.3	48.5	34

Berhampur Bus Stand	3G		LTE		
	BSNL	VIL	Airtel	JIO	VIL
Download Throughput (Mbps)	0.58	7.5	22.77	10.5	15.8
Upload Throughput (Mbps)	0.28	3.37	18.84	2.4	12.4
Web Browsing Delay (sec)	4.71	0.58	0.10	4.6	0.35
Latency (msec)	114	44	48.3	40.5	36

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	98.59
BSNL 2G	69.22
VIL 2G	87.21
BSNL 3G	74.13
VIL 3G	92.98
Airtel VoLTE	98.96
Jio VoLTE	97.39
VIL VoLTE	96.59
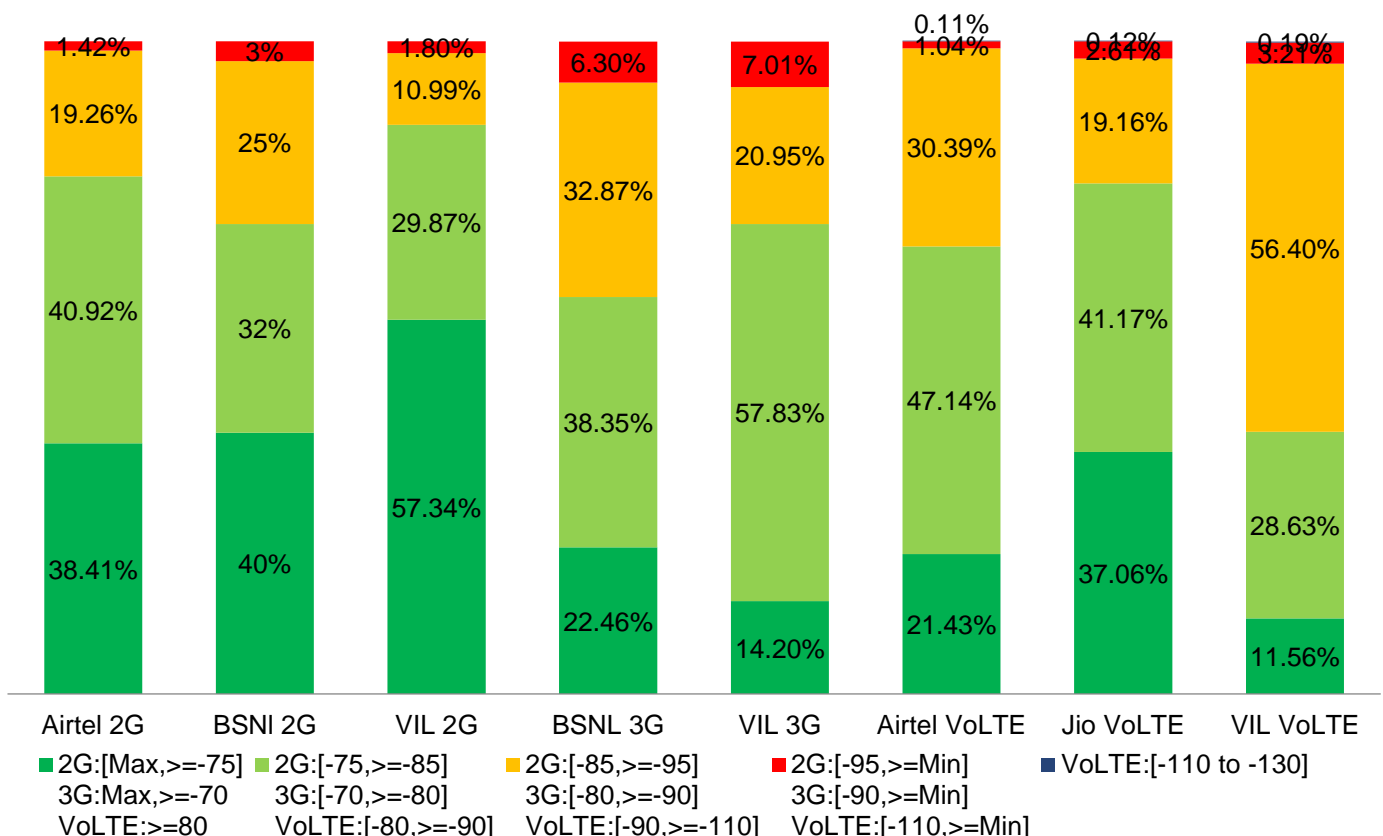
AIRTEL

Technology	Coverage Rate %
2G	98.59
VoLTE	98.96
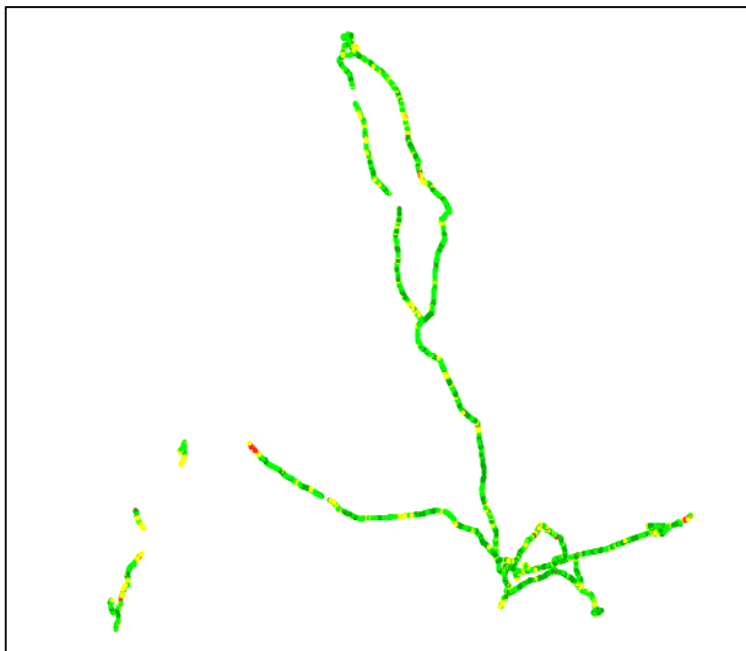
2G	VoLTE
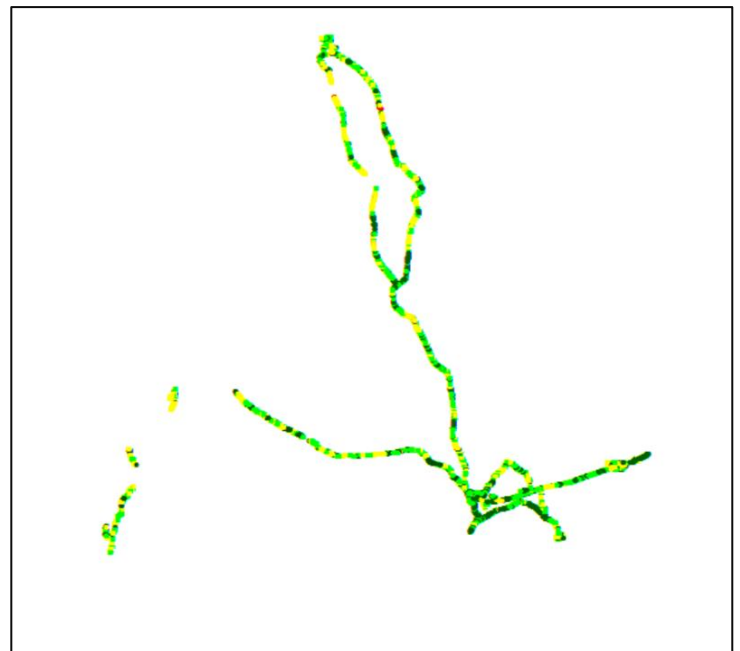
Overall Rx Level	# Samples	%
[Max, >=-75]	4682189	38.41
[-75, >=-85)	4987934	40.92
[-85, >=-95)	2347404	19.26
[-95, >=Min)	172742	1.42
Total	**12280269**	**100**

Overall RSRP	# Samples	%
[Max, >=-80]	3627883	21.43
[-80, >=-90)	7981346	47.14
[-90, >=-110)	5144999	30.39
[-110, >=Min)	176193	1.04
Total	**16930421**	**100**

JIO

Technology	Coverage Rate %
VoLTE	97.39
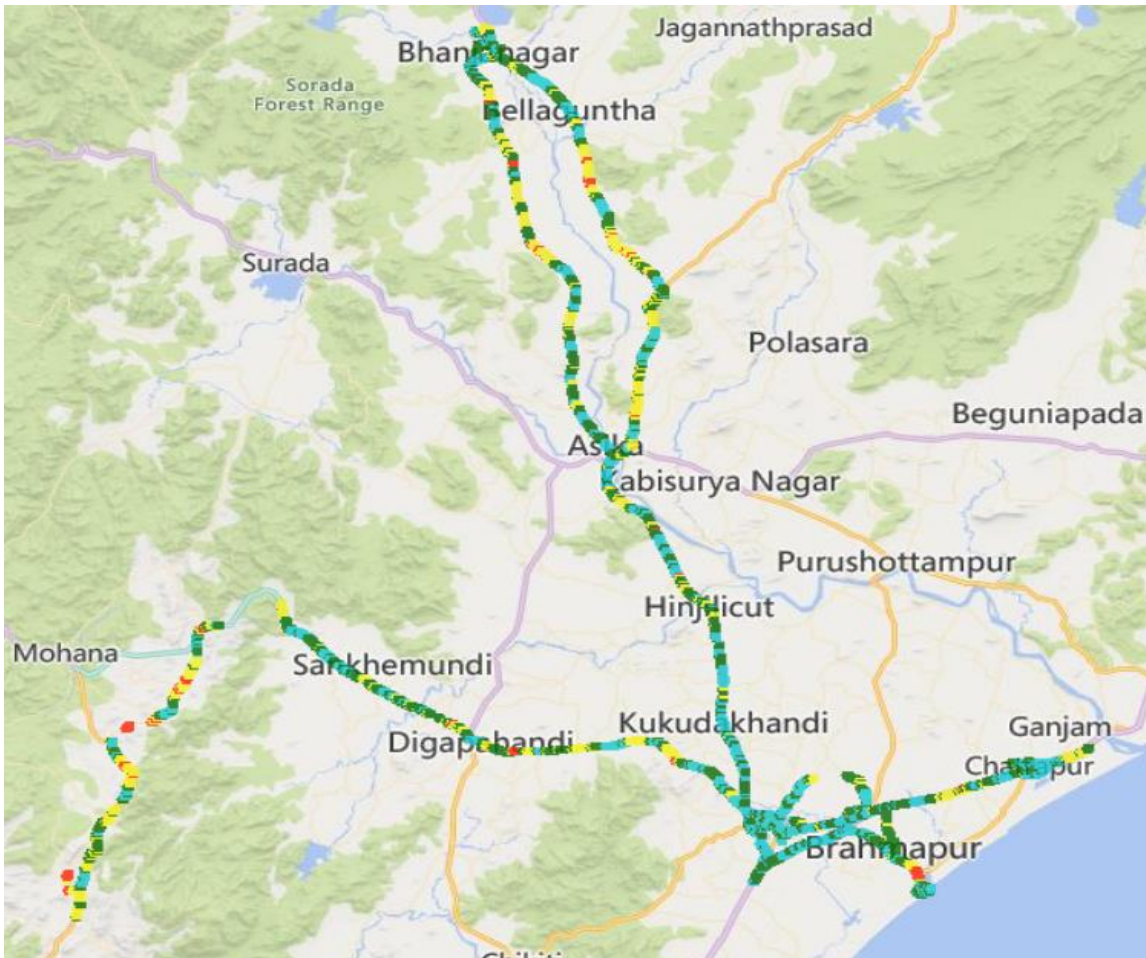
Serving RSRP
- -80 <= x < -40 (11418, 37.06%)
- -95 <= x < -80 (12683, 41.17%)
- -110 <= x < -95 (5902, 19.16%)
- -140 <= x < -110 (803, 2.61%)

Overall RSRP	# Samples	%
[Min,>=-80]	11418	37.06
[-80,=-90]	12683	41.17
[-90,<=-110]	5903	19.16
[-110,>=Min]	803	2.61
Total	30807	100

VIL

Technology	Coverage Rate %
2G	87.21
3G	92.98
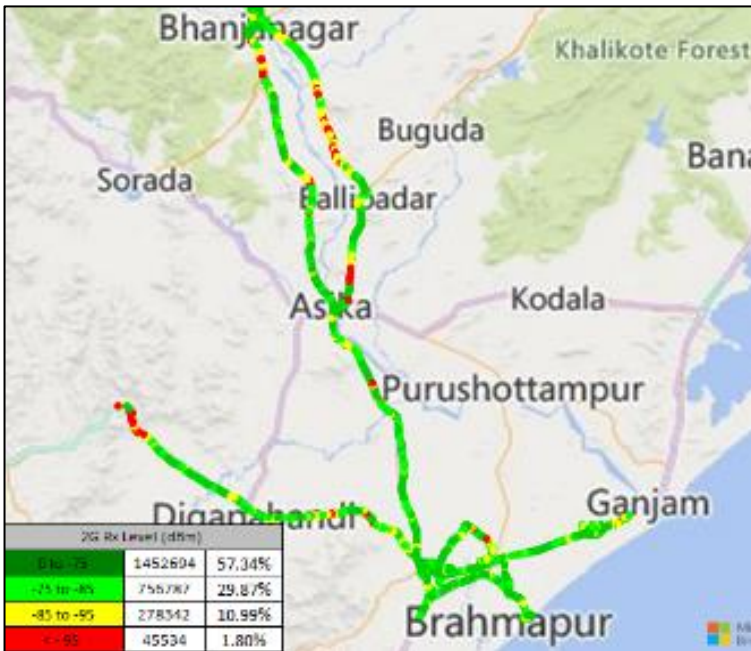
2G	3G
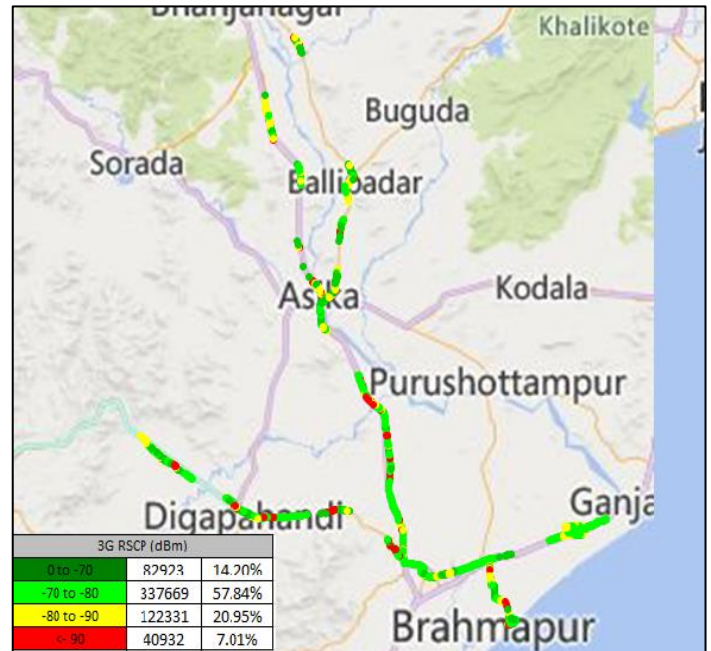
Overall Rx Level	# Samples	%
[Max, >=-75]	1452694	57.34
[-75, >=-85)	756787	29.87
[-85, >=-95)	278342	10.99
[-95, >=Min)	45534	1.80
Total	**2533357**	**100**

Overall RSRP	# Samples	% PDF
[Max, >=-80]	82923	14.20
[-80, >=-90)	337669	57.83
[-90, >=-110)	122331	20.95
[-110, >=Min)	40932	7.01
Total	**583855**	**100**

VIL

Technology	Coverage Rate %
VoLTE	96.59

RSRP Legend (dBm)		
0 to -80	922768	11.56%
-80 to -90	2284906	28.63%
-90 to -110	4501335	56.40%
-110 to -120	256007	3.21%
< -120	15507	0.20%
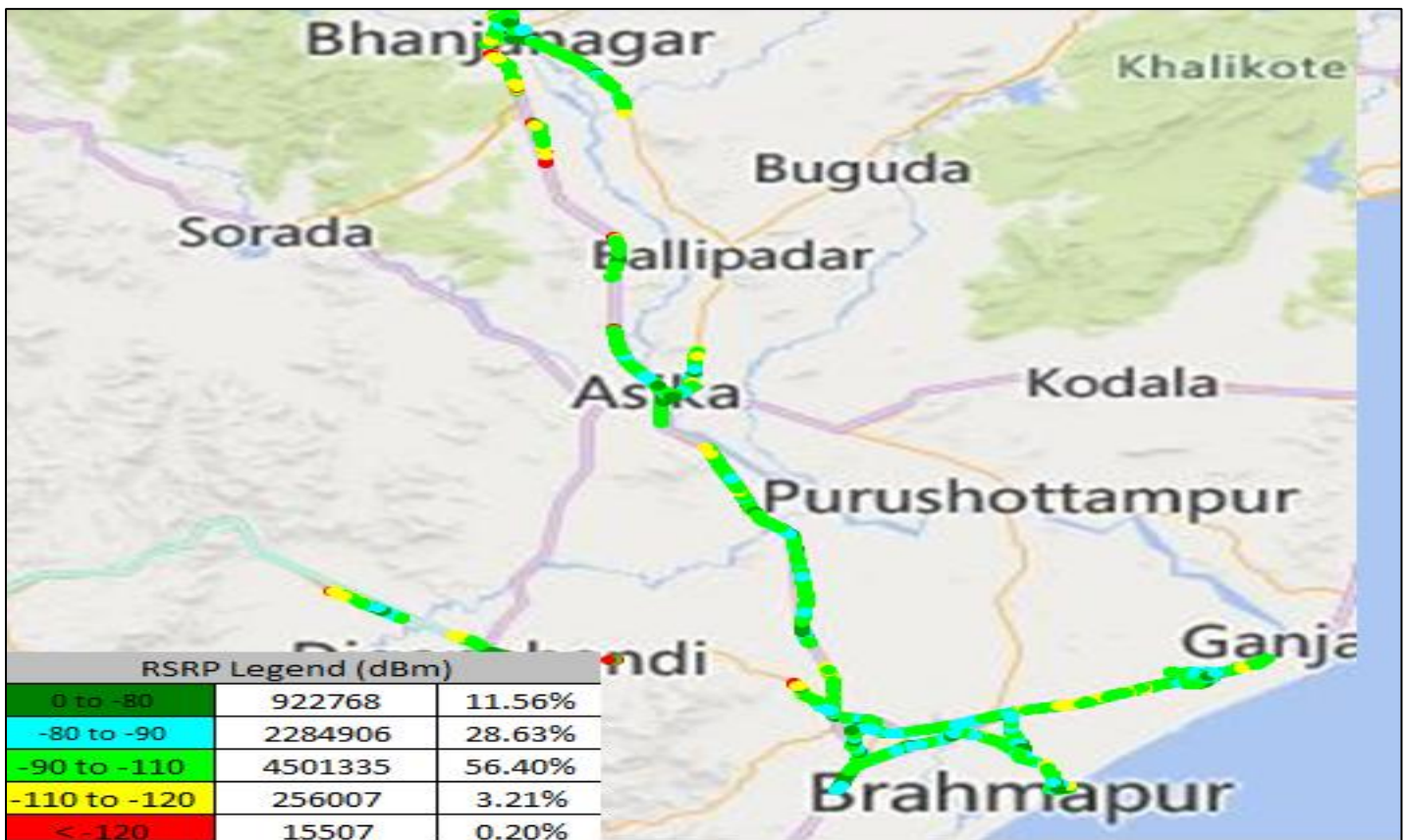
Overall RSRP	# Samples	%
[Max, >=-80]	922768	11.56
[-80, >=-90)	2284906	28.63
[-90, >=110)	4501335	56.40
[110, >=120)	256007	3.21
[120, >=Min)	15507	0.19
Total	**7980523**	**100**

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 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	95.15%
BSNL 2G	**81.82%**
VIL 2G	96.02%
BSNL 3G	**73.34%**
VIL 3G	98.22%
Airtel VoLTE	**87.39%**
Jio VoLTE	**86.74%**
VIL VoLTE	95.91%

RX Quality Distribution

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

Chart data:
- Airtel 2G: 95.15% (green), 4.9% (red)
- BSNl 2G: 81.82% (green), 18.2% (red)
- VIL 2G: 96.02% (green), 4.0% (red)
- BSNL 3G: 73.34% (green), 26.7% (red)
- VIL 3G: 98.22% (green), 1.8% (red)
- Airtel VoLTE: 87.39% (green), 12.6% (red)
- Jio VoLTE: 86.74% (green), 13.3% (red)
- VIL VoLTE: 95.91% (green), 4.1% (red)
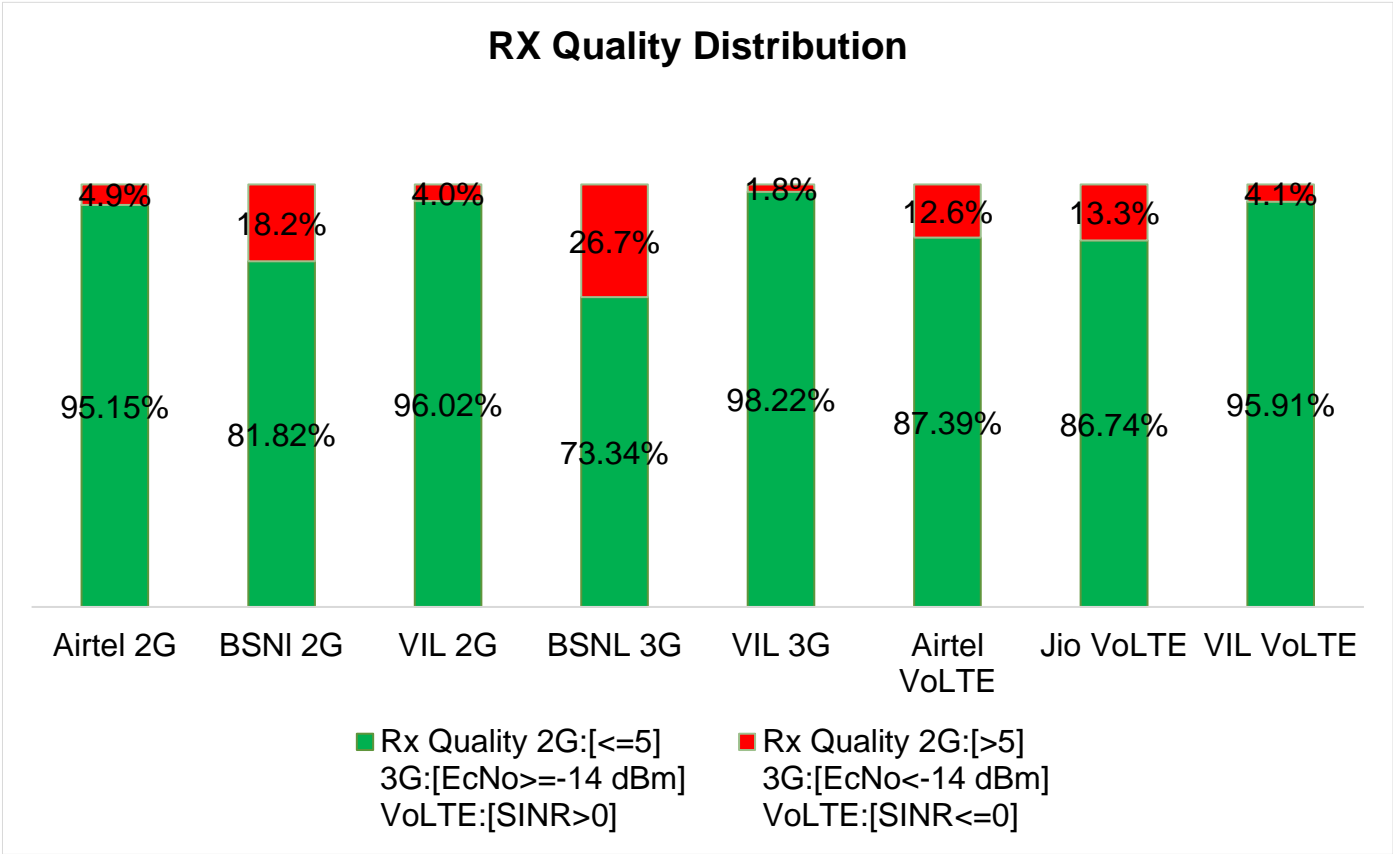
Airtel

Technology	Rx Quality %
2G	95.15
VoLTE	87.39

2G	VoLTE
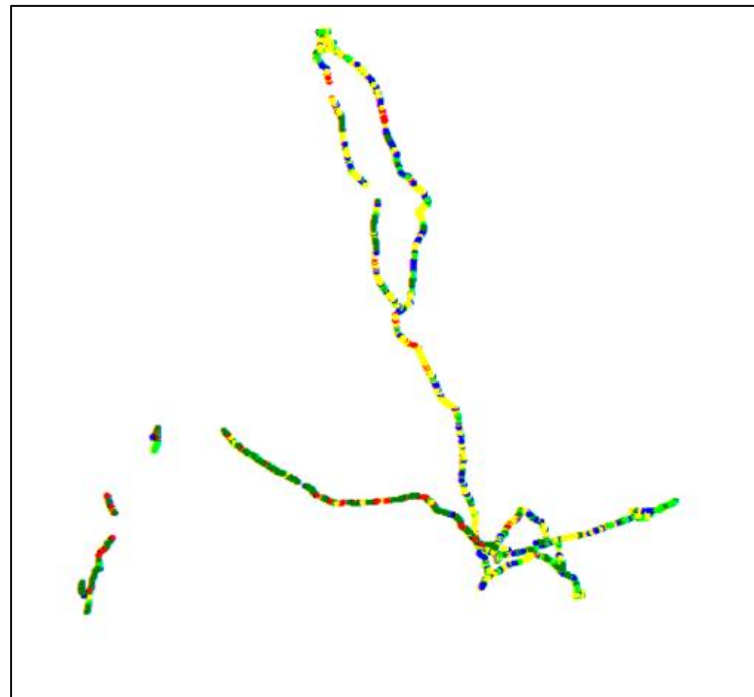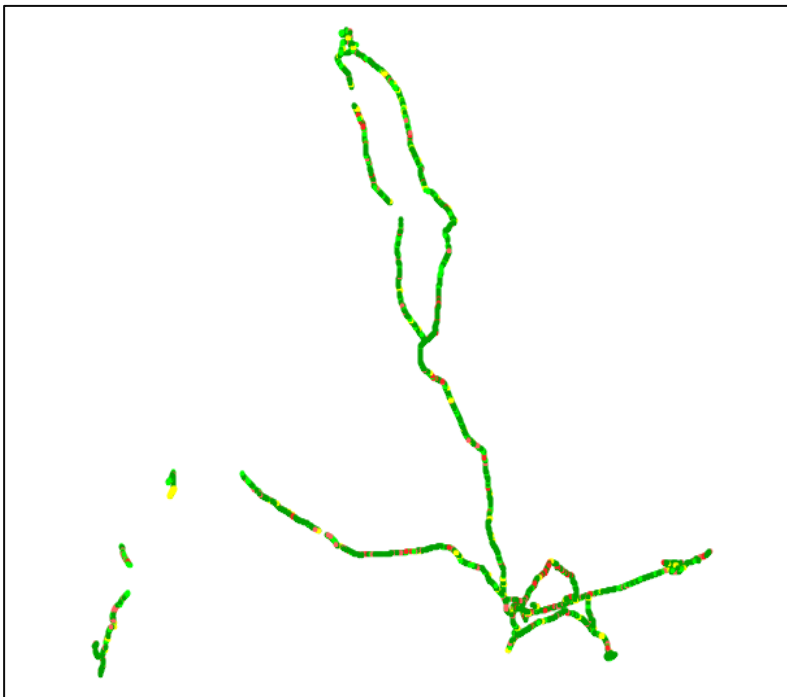
Overall Rx Quality	# Samples	% PDF
(Min, <=2)	8070687	65.72%
(2, <=3)	2162831	17.61%
(3 , <=4)	647530	5.27%
(4 , <=5)	804120	6.55%
(5 , <=Max)	595101	4.85%
Total	12280269	100%

Overall SINR	# Samples	%PDF
(Min, <=-3)	665175	3.93%
(-3, <=0)	1468538	8.67%
(0, <=5)	7194375	42.49%
(5, <=10)	3118289	19.60%
(10, <=15)	2194984	12.96%
(15,<=Max	2089060	12.34%
Total	16930421	100

BSNL

Technology	Rx Quality %
2G	81.82
3G	73.34
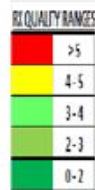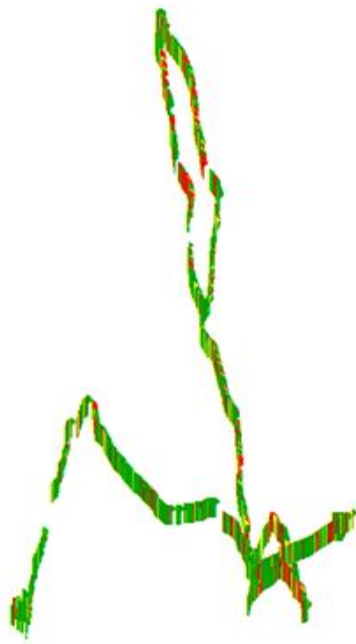
2G	3G
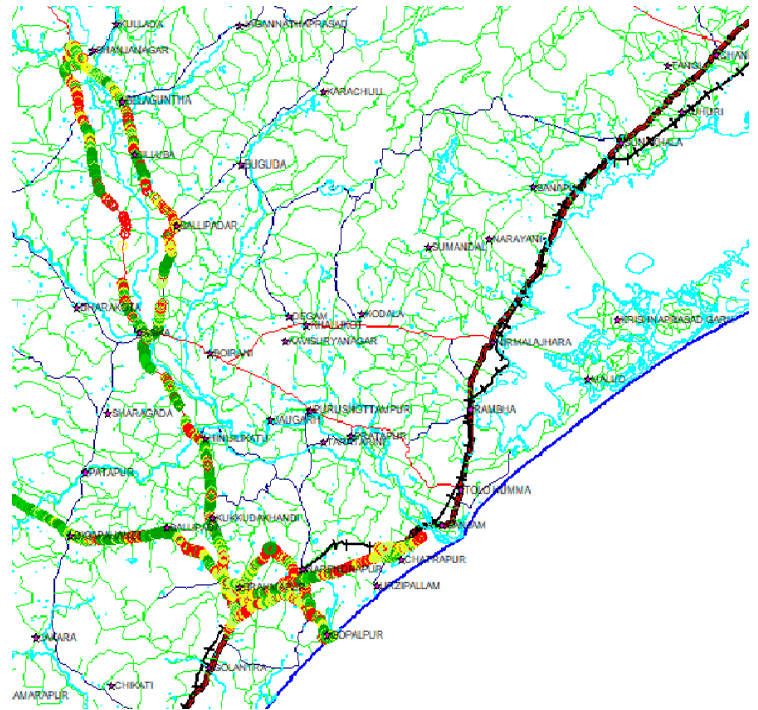
Overall Rx Quality	# Samples	%
(Min, <=2)	31624	61
(2, <=3)	3007	6
(3 , <=4)	13377	7
(4 , <=5)	3462	7
(5 , <=Max)	10066	19
Total	**51553**	**100**

Overall EcNo	# Samples	%
(Max, <=-6)	40346	16
(-6, <=-9)	47518	18
(-9, <=-11)	47271	18
(-11, <=-14)	55173	21
(-14, <= Min)	69499	27
Total	**259807**	**100**

JIO

Technology	Rx Quality %
VoLTE	86.74

Serving SINR
- 15 <= x < 30 (6153, 19.97%)
- 10 <= x < 15 (6214, 20.17%)
- 5 <= x < 10 (7615, 24.72%)
- 0 <= x < 5 (6740, 21.88%)
- -30 <= x < 0 (4085, 13.26%)
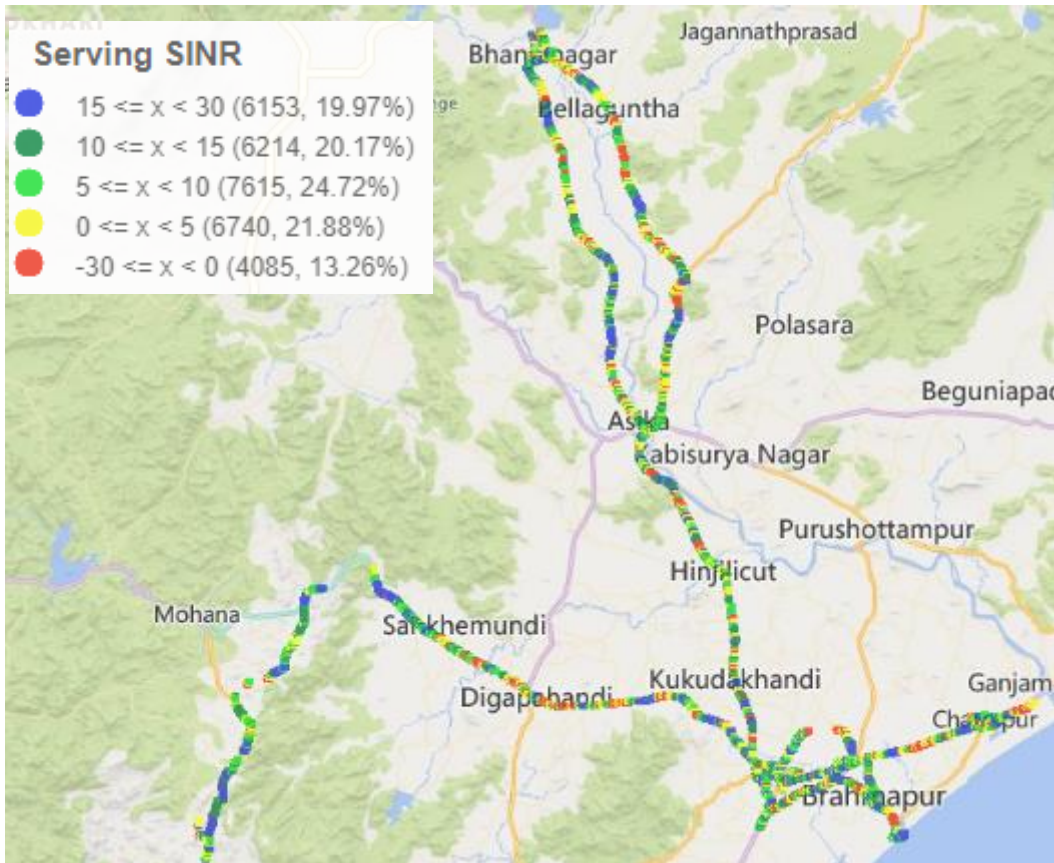
VoLTE		
Overall SINR	**# Samples**	**%**
(Min, <=0)	4085	13.26
(0, <=5)	6740	21.88
(5, <=10)	7615	24.72
(10, <=15)	6214	20.17
(15, <=Max)	6153	19.97
Total	**30807**	**100**

VIL

Technology	Rx Quality %
2G	96.02
3G	98.22

2G	3G

RxQual Legend (dB)		
0 to 2	2367621	93.46%
2 to 3	15476	0.61%
3 to 4	22723	0.90%
4 to 5	26621	1.05%
5 to 50	100916	3.98%

3G Ec/No Legend (dB)		
0 to -6	391334	67.03%
-9 to -6	105441	18.06%
-11 to -9	54855	9.40%
-14 to -11	21767	3.73%
-30 to -14	10458	1.79%
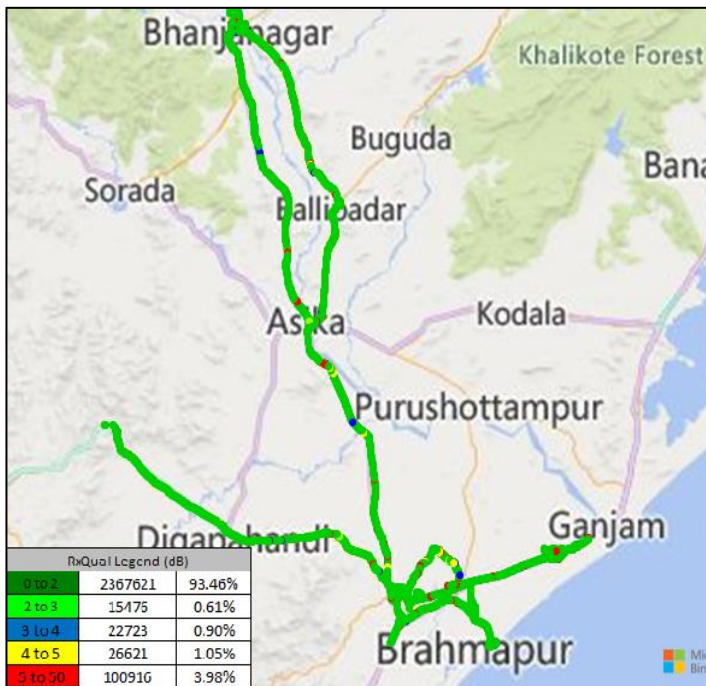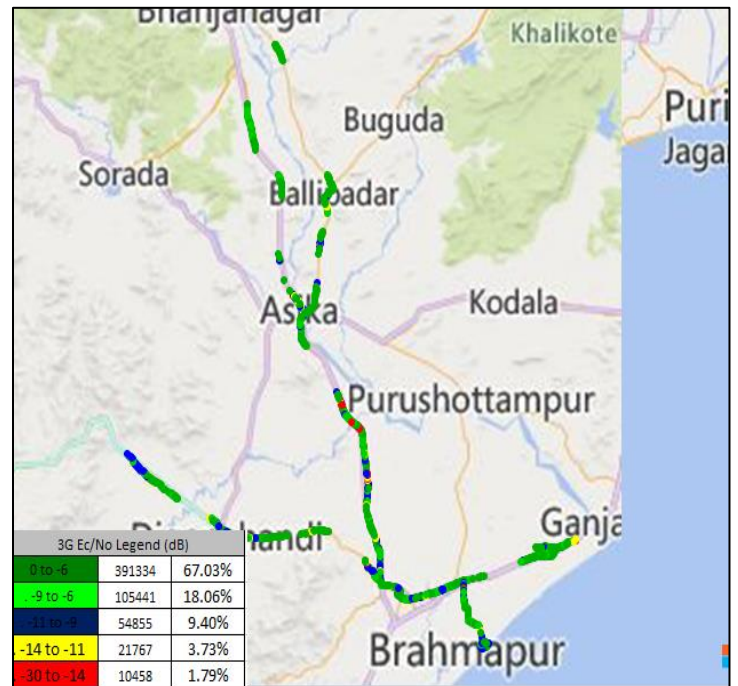
Overall Rx Quality	# Samples	%
(Min, <=2)	2367621	93.46
(2, <=3)	15476	0.61
(3 , <=4)	22723	0.90
(4 , <=5)	26621	1.05
(5 , <=Max)	100916	3.98
Total	**2533357**	**100**

Overall Ec/No	# Samples	%
[Max, >=-6]	391334	67.03
[-6, >=-9]	105441	18.06
[-9, >=-11]	54855	9.40
[-11, >=-14]	21767	3.73
-14, <=Min	10458	1.79
Total	**583855**	**100**

VIL

Technology	Rx Quality %
VoLTE	95.91

VoLTE

SINR Legend (dB)		
15 to max	3177391	39.81%
10 to 15	1948672	24.42%
5 to 10	1629557	20.42%
0 to 5	898388	11.26%
-3 to 0	222644	2.79%
min to -3	103871	1.30%
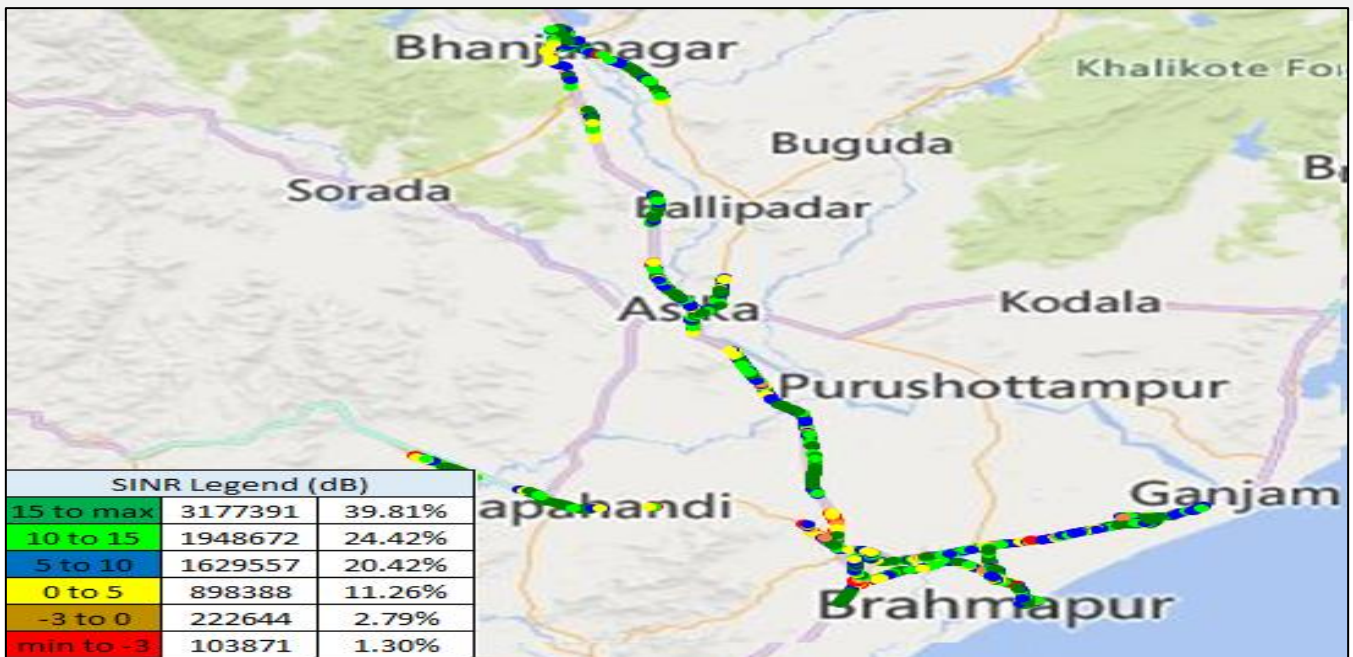
4G		
Overall SINR	# Samples	%
[Min, <=-3]	103871	1.3
[-3, <=0)	222644	2.79
[0, <=5)	898388	11.26
[5, <=10)	1629557	20.42
[10, <=15)	1948672	24.42
[15, <=Max)	3177391	39.81
Total	**7980523**	**100**

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	83
Airtel VoLTE	100
Jio VoLTE	100
VIL 3G	41.88
VIL VoLTE	62.13
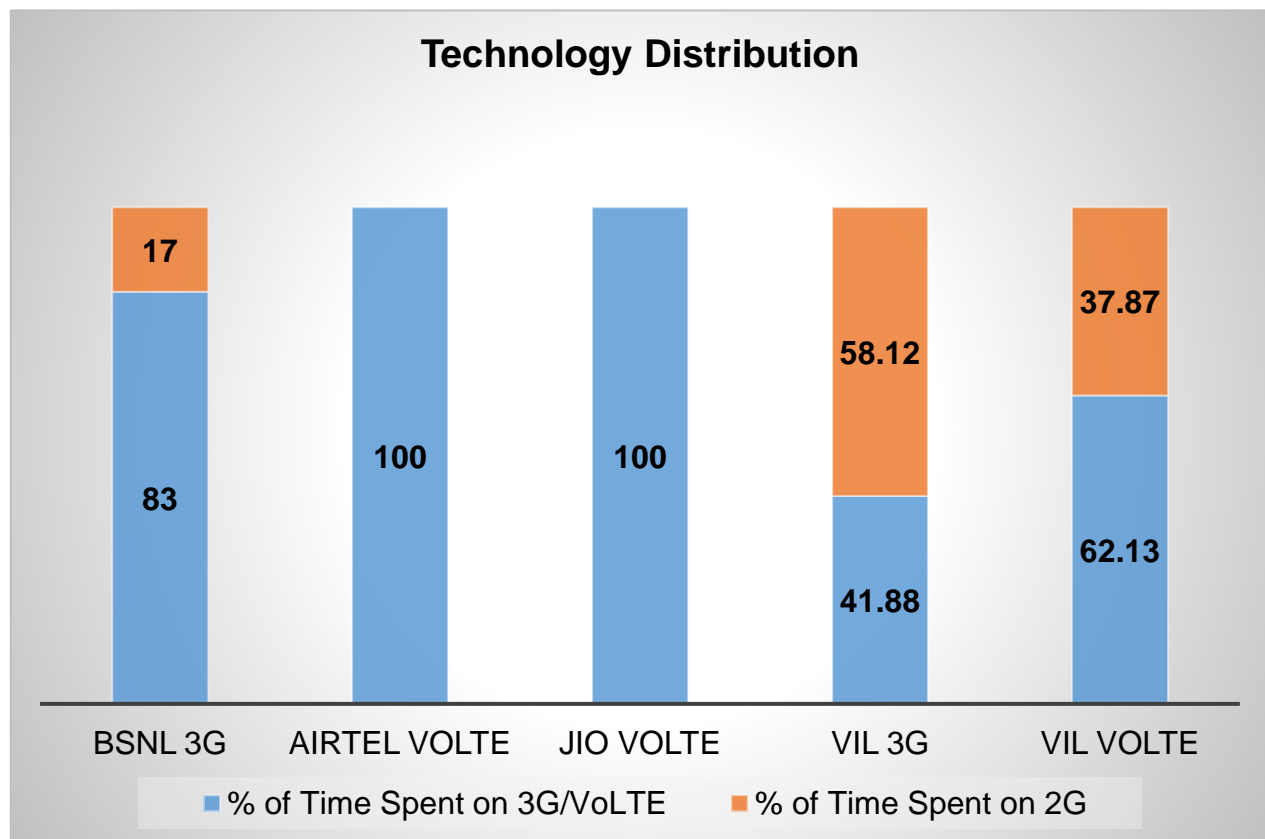
Technology Distribution

Legend: ■ % of Time Spent on 3G/VoLTE ■ % of Time Spent on 2G

Airtel

Technology	Time Spent on 4G
4G	100

BSNL

Technology	Time Spent n 3G
3G	83

JIO

Technology	Time Spent on 4G
4G	100

VIL

Technology	Time Spent on 4G
4G	62.13

Airtel

Technology	Time Spent on 4G
4G	100

BSNL

Technology	Time Spent on 3G
3G	83
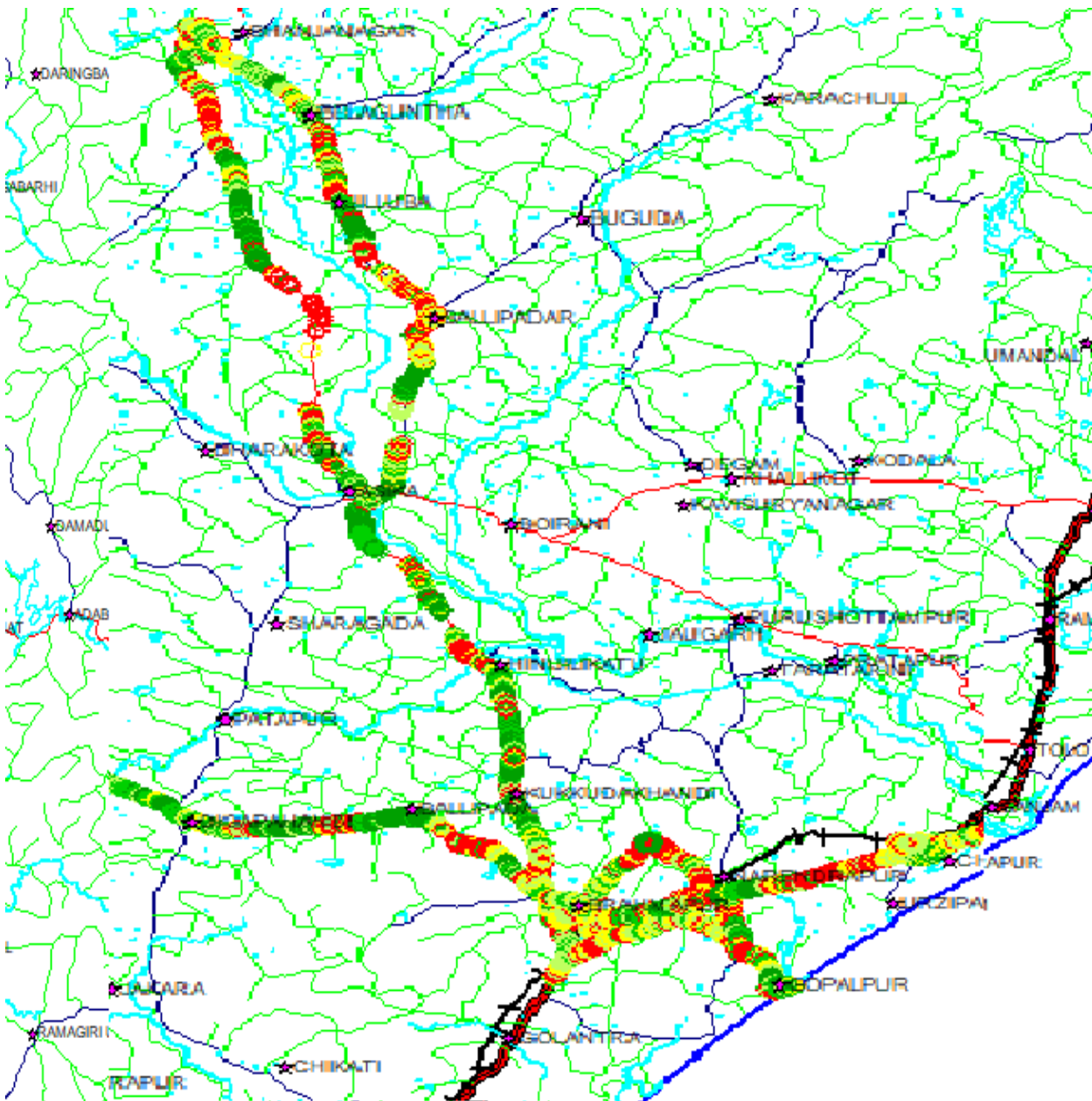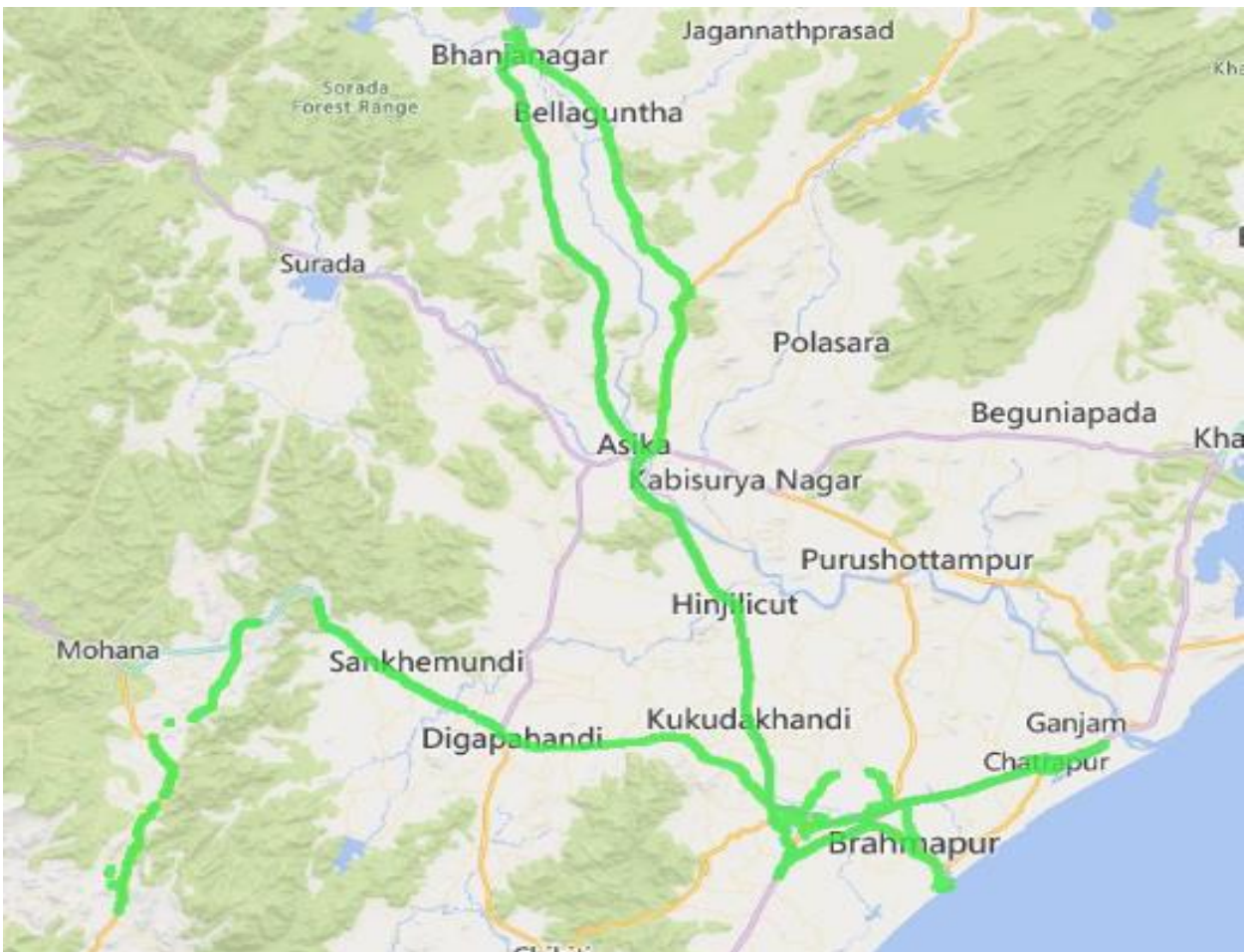
JIO

Technology	Time Spent on 4G
4G	100

VIL

Technology	Time Spent on 4G
4G	66.13
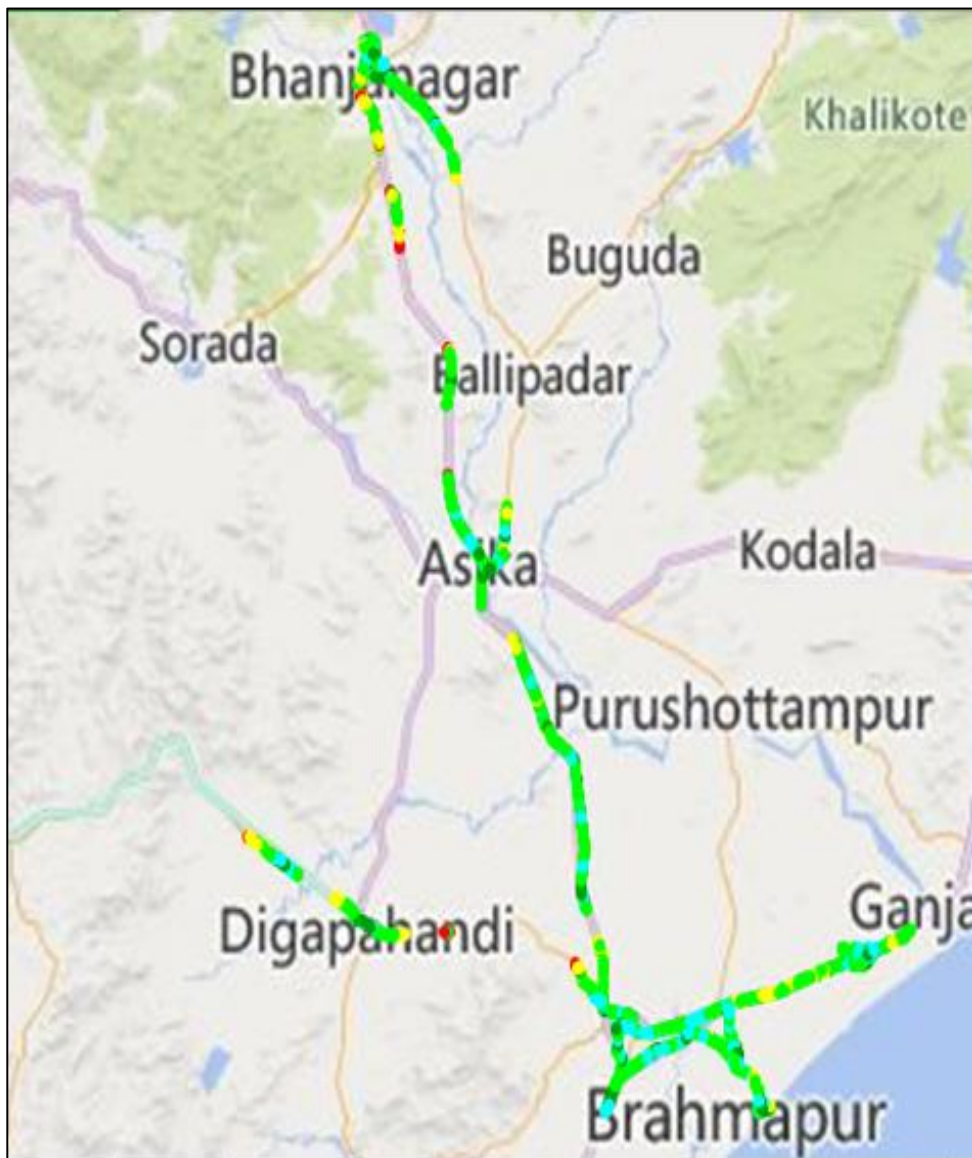
Airtel

Data Statistics - Dynamic Complete SSA

Data KPIs – Overall	4G
Download Throughput (Mbps)	23.5
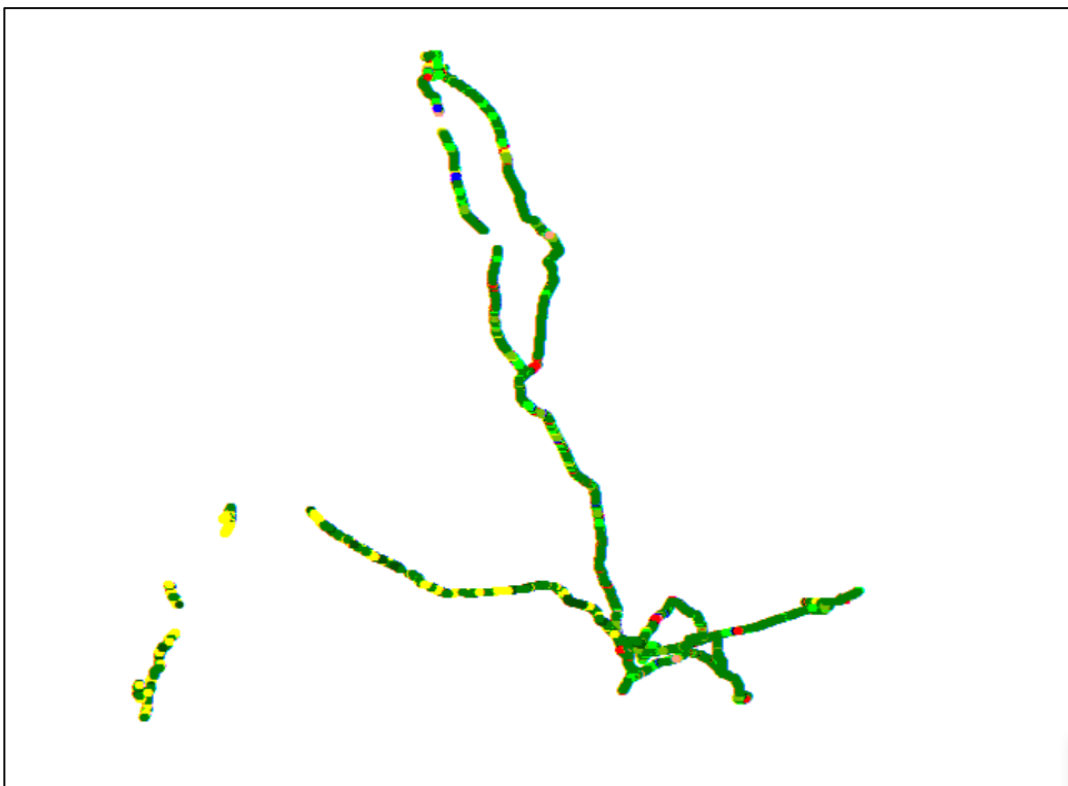
DL throughput C	No of Sample	%
0 to 1 Mbps	899261	5.31
1 to 2 Mbps	334800	1.98
2 to 3 Mbps	736131	4.35
3 to 4 Mbps	361876	2.14
4 to 8 Mbps	1614938	9.54
8 to 12 Mbps	5362308	31.67
>12 Mbps	7621107	45.01
Total	**16930421**	**100**

BSNL

Data Statistics - Dynamic Complete SSA

Data KPIs - Overall	3G
Download Throughput (Mbps)	0.43
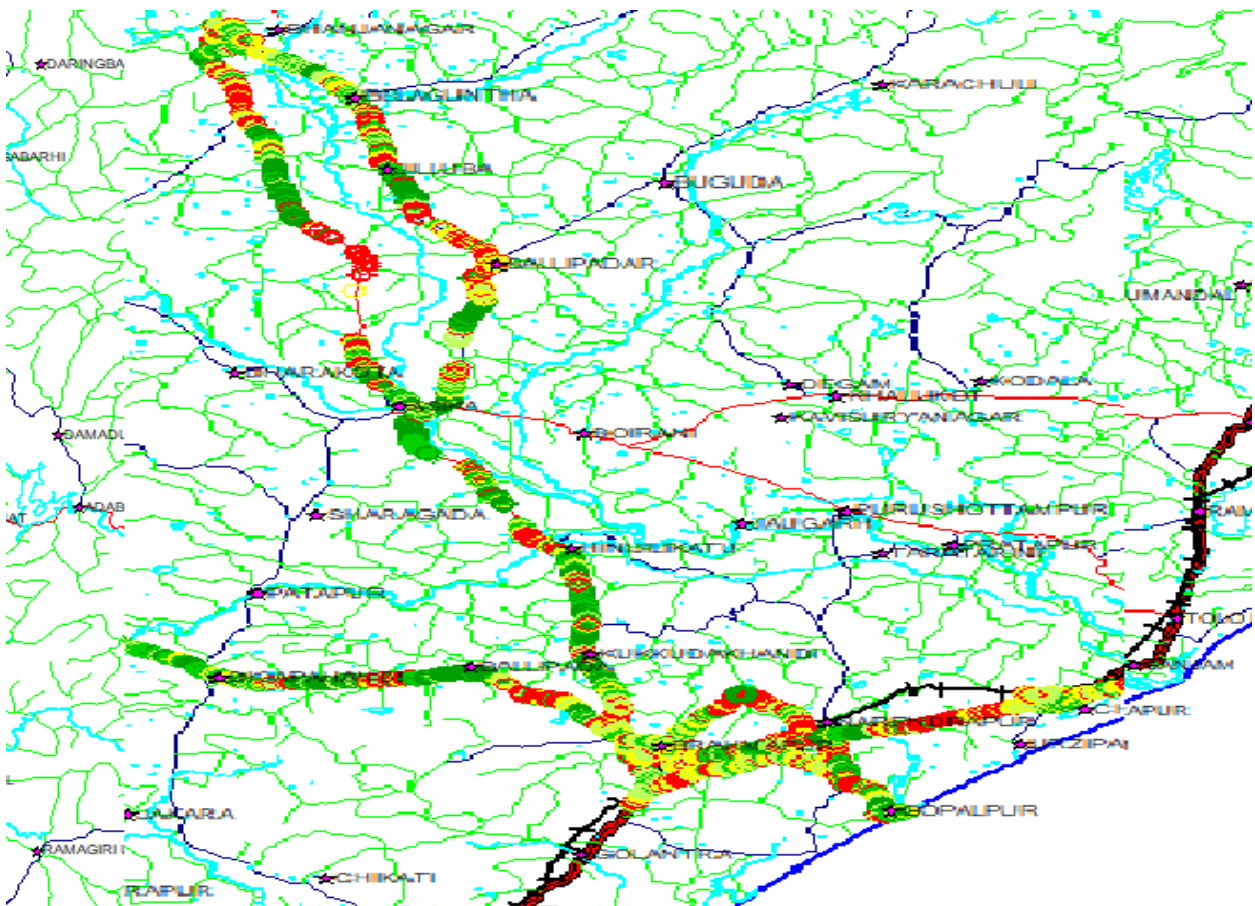
JIO

Data Statistics - Dynamic Complete SSA

Data KPIs - Overall	4G
Download Throughput (Mbps)	11.5
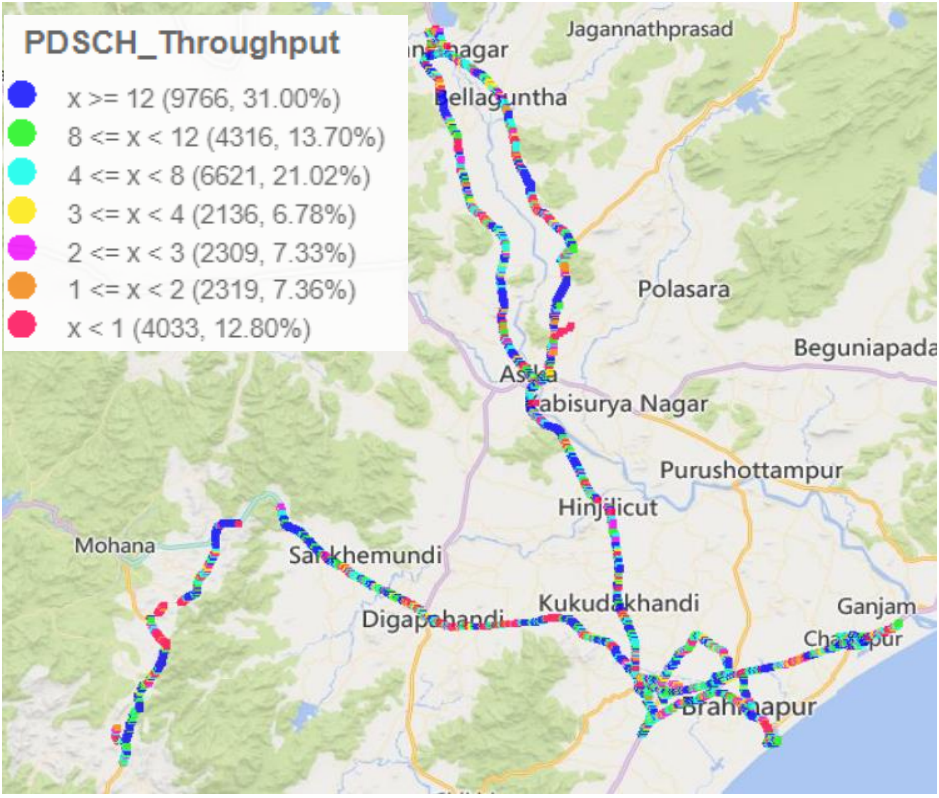
DL Throughput	No of Samples	%
0 to 1Mbps	4033	12.80
1 to 2Mbps	2319	7.36
2 to 3Mbps	2309	7.33
3 to 4Mbps	2136	6.78
4 to 8Mbps	6621	21.02
8 to 12 Mbps	4316	13.70
>12Mbps	9766	31.00

VIL

Data Statistics - Dynamic Complete SSA

Data KPIs - Overall	4G
Download Throughput (Mbps)	13.63

DL Throughput (Mbps)		
12 to max	2297985	28.84%
8 to 12	1148739	14.42%
4 to 8	2214929	27.80%
3 to 4	727615	9.13%
2 to 3	645296	8.10%
1 to 2	372840	4.68%
0 to 1	561331	7.04%
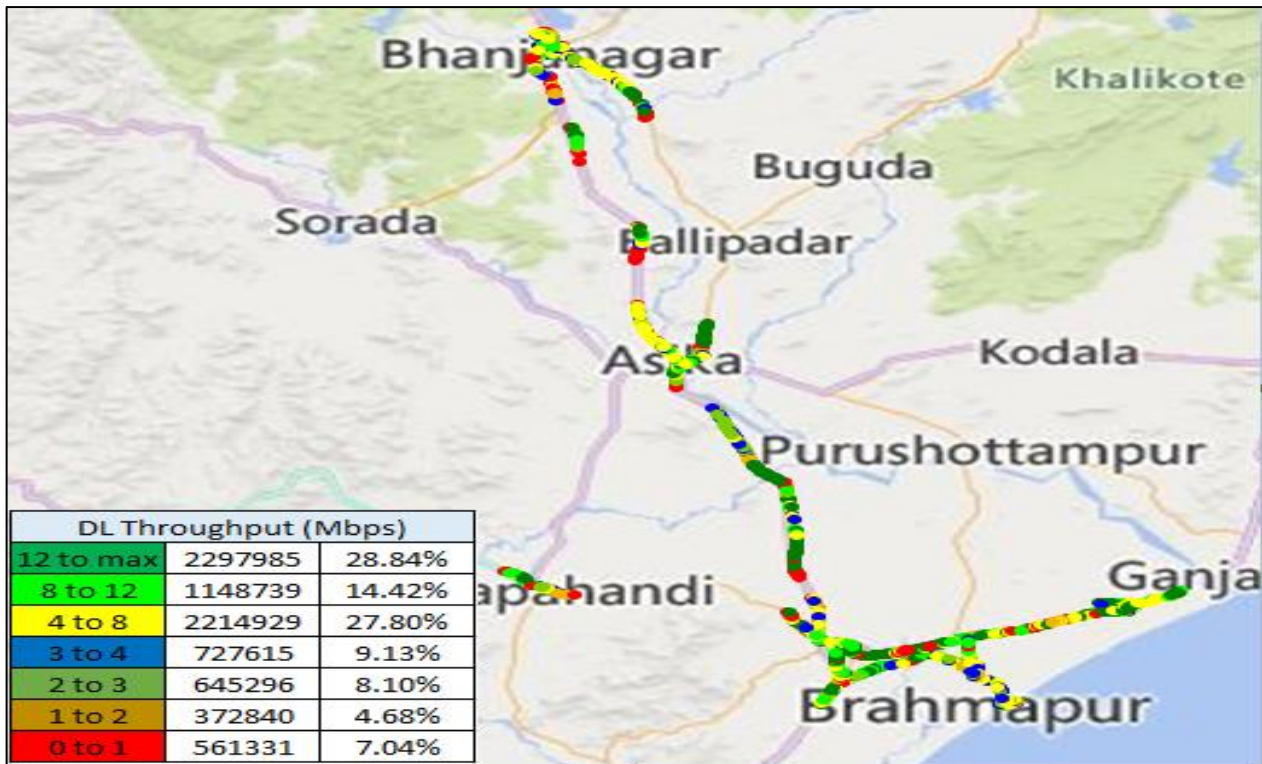
DL throughput	No of Sample	%
0 to 1 Mbps	2297985	28.84
1 to 2 Mbps	1148739	14.42
2 to 3 Mbps	2214929	27.80
3 to 4 Mbps	727615	9.13
4 to 8 Mbps	645296	8.10
8 to 12 Mbps	372840	4.68
>12 Mbps	561331	7.04
Total	7968735	100

Airtel

Technology- 4G	Bhanjanagar Bus stand	Gopalpur Sea Beach	Chandragiri Bus stop	MKCG Medical college	Railway Station	Bus Stand
Download Speed Mbps	39.96	99.37	140.74	44.39	75.12	26.77
Upload Speed Mbps	12.53	35.94	37.82	38.59	34.67	21.84

BSNL

Technology- 3G	Bhanjanagar Bus stand	Gopalpur Sea Beach	Chandragiri Bus stop	MKCG Medical college	Railway Station	Bus Stand
Download Speed Mbps	0.39	0.52	0.52	0.28	0.32	0.28
Upload Speed Mbps	0.28	0.29	0.46	0.12	0.12	0.12

JIO

Technology- 4G	Bhanjanagar Bus stand	Gopalpur Sea Beach	Chandragiri Bus stop	MKCG Medical college	Railway Station	Bus Stand
Download Speed Mbps	13.65	29.01	90.54	18.19	18.19	23.27
Upload Speed Mbps	5.8	17.09	7.3	4.17	4.17	5.49

VIL

Technology- 4G	Bhanjanagar Bus stand	Gopalpur Sea Beach	Chandragiri Bus stop	MKCG Medical college	Railway Station	Bus Stand
Download Speed Mbps	13.55	12.99	NA	12.39	12.75	12.33
Upload Speed Mbps	17.72	17.24	NA	0.84	17.81	11.18

NH/SH Routes covered in OADT by Airtel / BSNL / RJIL / VIL				
SI No	No of NH/SH routes	NH routes	SH routes	Distance(Km)
1	Berhampur to Bhanjanagar	NH59	SH33	90
2	Berhampur to Chhatrapur and Gopalpur	NH45		25
3	Berhampur to Jeerang		SH17	110
11				
12				