



Operator Assisted Drive Test Report

Indore City & Nearby area

27th Jan. to 29th Jan. 2022

By

TRAI Regional office Bhopal

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%.

The Operator Assisted Drive Test has been carried out by Regional Office, Bhopal with the help of Service Providers in Indore City and surrounding areas from 9:00 AM to 8:00 PM from 27th Jan. to 29th Jan. 2022. The drive test covered drive route of 400 KMs & 6 hotspots over a period of 3 days. Approximately 700 calls were made for each of the 2G/3G/4G networks: three 2G networks, two 3G networks, and three LTE networks covering four TSPs.

Overview

Voice
Summary

Data
Summary

Overview

Regional Office, TRAI Bhopal conducted Operator Assisted Drive Test from 27th Jan. 2022 to 29th Jan 2022 covering Indore and surrounding areas. The performance of Airtel, BSNL, Vodafone Idea and Jio was 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.

Voice: Coverage, Quality, Handover Success Rate, Call Setup Success Rate, Drop Call Rate and Block Call Rate.

Data: Download Throughputs,

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 400 KMs. Approximately 700 calls were made for each of the 2G/3G/4G networks: three 2G (Lock Mode) networks, two 3G (Dual mode) networks, and three VoLTE networks covering 4 unique TSPs.

Data Tests:

Dynamic data test was conducted for around 400 kms for download throughput in all technologies.

2G – measurement – UE Locked in 2G file size- 500KB

3G – measurement – UE in 3G File Size- 20MB

4G – measurement – UE in LTE File Size- 40MB

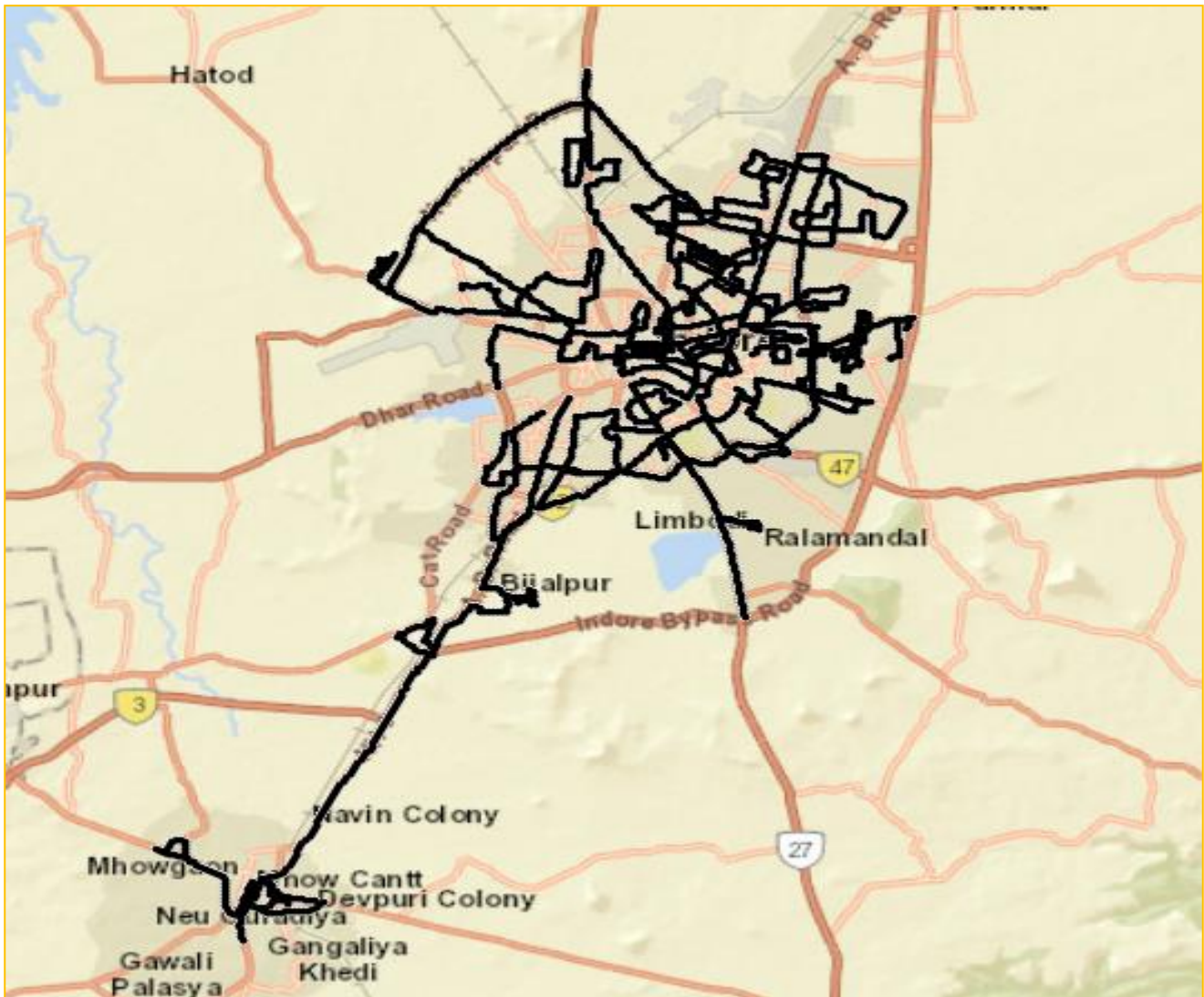
Static data tests on 6 hotspots

1. Vijay Nagar Chouraha Indore
2. Khajrana Ganesh Mandir Indore
3. Rajwada Indore
4. Railway station Indore
5. Airport Indore
6. Mhow

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

Overview

Voice & Dynamic Data Test Drive Route



List of important area covered during the drive test

VIJAY NAGAR, MAHALAXMI NAGAR, SCHEME-54, SCHEME-78, SCHEME-114, DEWAS NAKA, NIRANJANPUR

KHAJARANA, GANESH MANDIR, NIPANIYA, BCM HEIGHTS, AB ROAD, MR-10, MR-9, PATNIPURA, MALWA MILL

RAJWADA, KHAJURI BAZAR, BADA GANPATHI, HARSHIDDHI, COLLETOR OFFICE, NAGAR NIGMA, NEHRU PARK

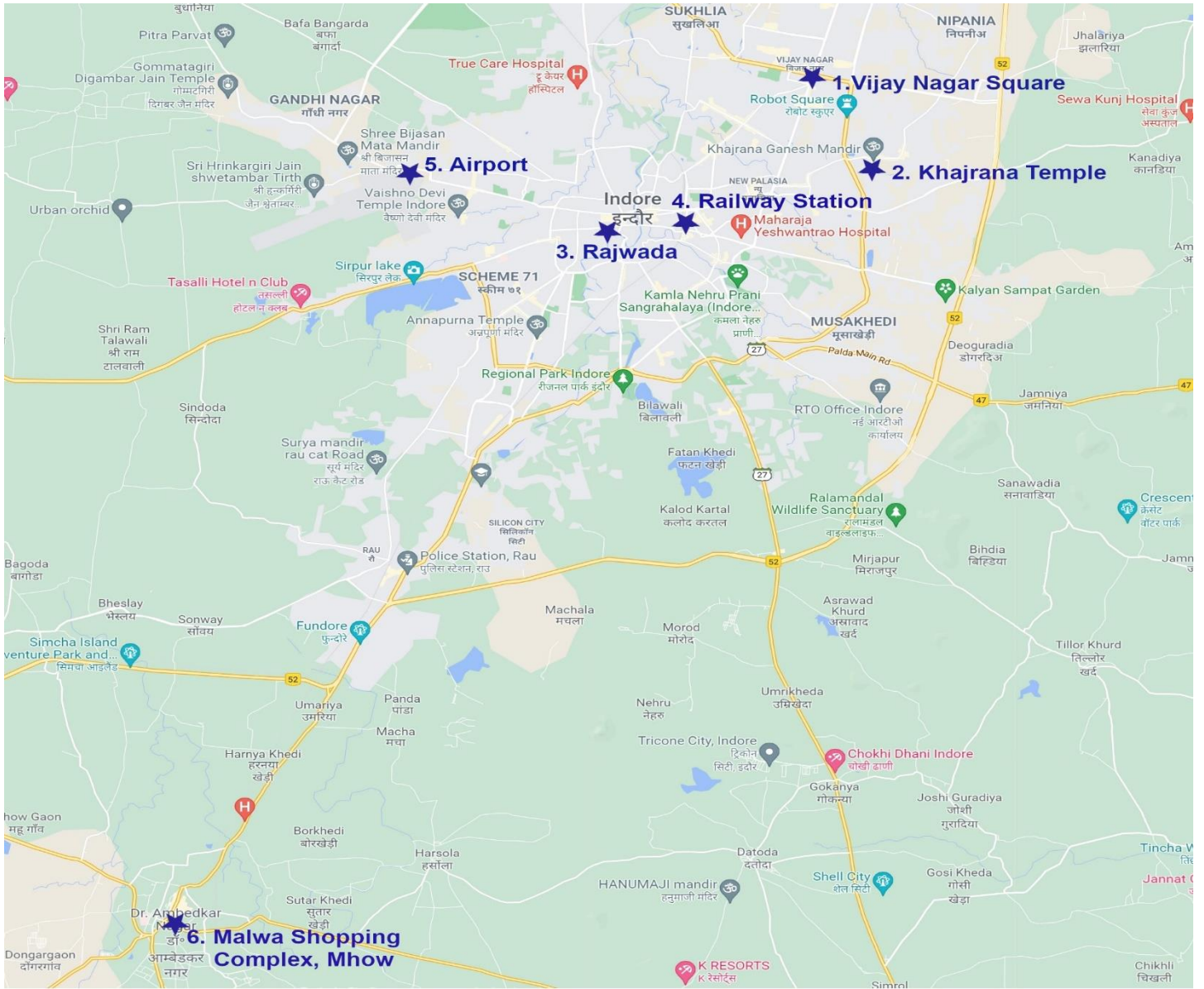
RAILWAY STATION, JINSI, DHAR ROAD, JAWAHAR MARG, OLD INDORE, SAPNA SANGEETA ROAD, MADHUMILAN

GEETA BHAWAN, SAKET NAGAR, OLD PALASIYA, NEW PALASIYA, RESIDENCY AREA, MGM, MY HOSPITAL

CHAWANI, AIRPORT, SUPER CORIDOOR, SAWER INDUSTRIAL AREA, AREODRUM ROAD, RADIO COLONY MHOW CANTT AREA, MALWA SHOPPING COMPLEX, OLD MAHU, MAHU GAON, GAWLIPALASIYA. MG ROAD

Overview

Data Service Test- Static Locations



Hotspot Locations

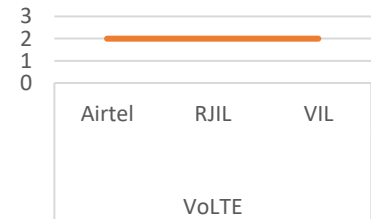
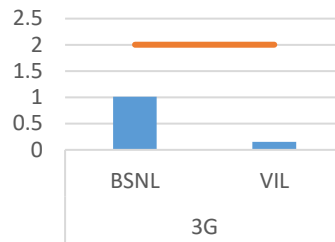
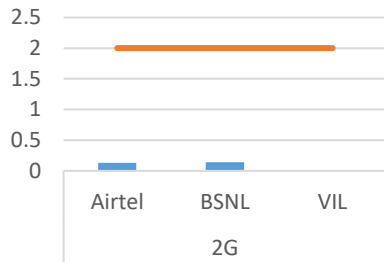
1. Vijay Nagar Chouraha Indore
2. Khajrana Ganesh Mandir Indore
3. Rajwada Indore
4. Railway station Indore
5. Airport Indore
6. Mhow

Voice Calls

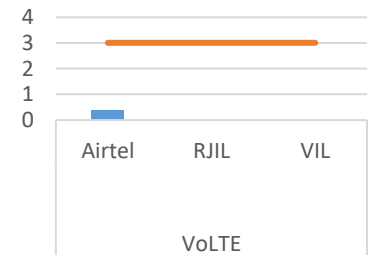
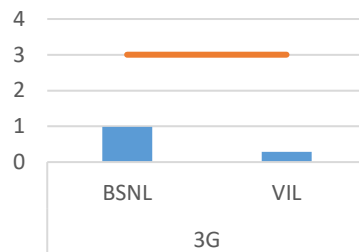
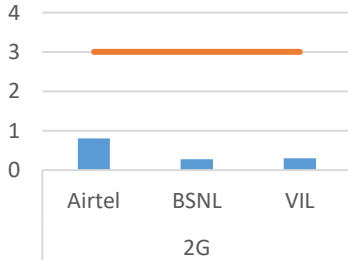
Key Observations

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

Drop Call Rate (%)



Block Call Rate (%)



KPIs	2G			3G		VoLTE		
	Airtel	BSNL	VIL	BSNL	VIL	Airtel	RJIL	VIL
Drop Call Rate %	0.13	0.14	0	1.01	0.15	0	0	0
Block Call Rate %	0.80	0.27	0.3	0.99	0.29	0.38	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

Key Observations

Coverage

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

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	82.91	99.13	92.62

b) Percentage of coverage samples for 3G \geq -90 dBm

TSPs	3G	
	BSNL	VIL
Coverage %	97.34	96.84

b) Percentage of coverage samples for LTE \geq -110 dBm.

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99.12	99.77	99.95

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

TSPs	3G		VoLTE		
	BSNL	VIL	Airtel	VIL	JIO
Time Spent on 3G/4G %	95.78	0	100	100	100

Data Services Dynamic

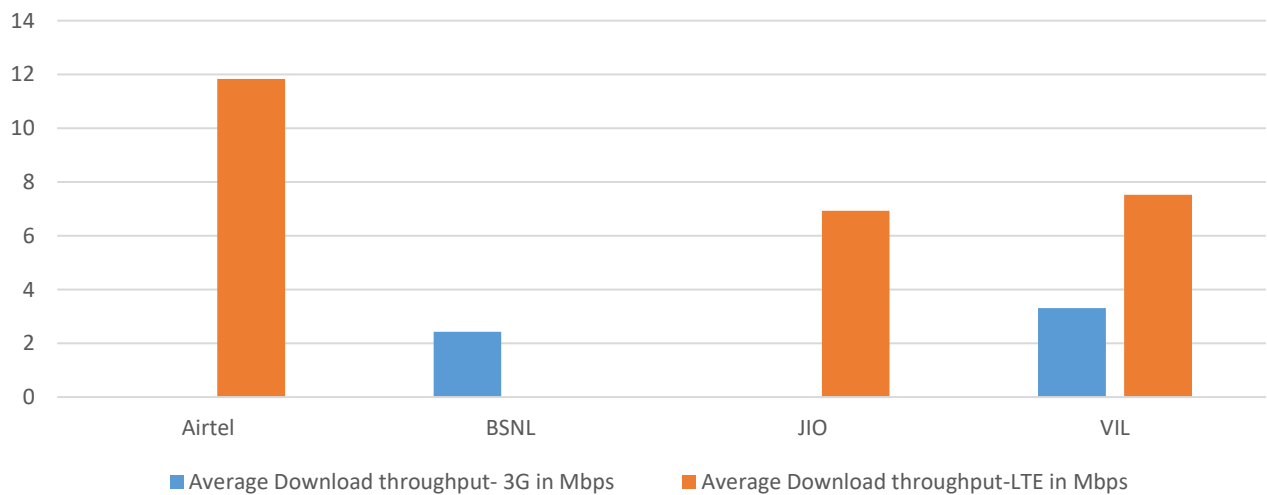
Key Observations

Dynamic Data was tested for 400 Kms. Download Throughput was tested.

Data Download Performance (kbps) - Dynamic

3G/4G/ Network:

Dynamic- Data- Average download throughput



TSP (For 2G)	Airtel	BSNL	JIO	VIL
Average Download throughput- 2G in Kbps	62.28	175	NA	62.57
Average Download throughput- 3G In Mbps	NA	2.43	NA	3.31
Average Download throughput-LTE in Mbps	11.84	NA	6.93	7.53

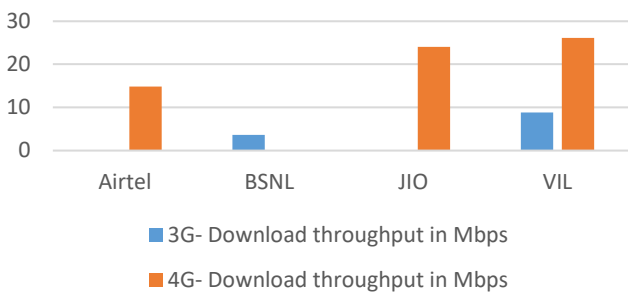
Data Services Static

Key Observations

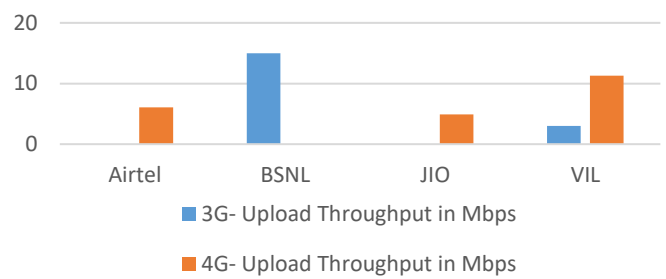
Data was tested at 6 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, PayTm)

3G/4G/ Network:

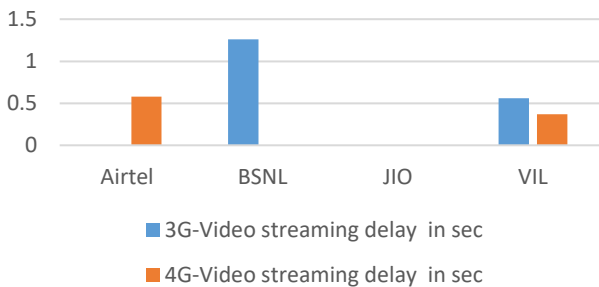
Static - Average download throughput



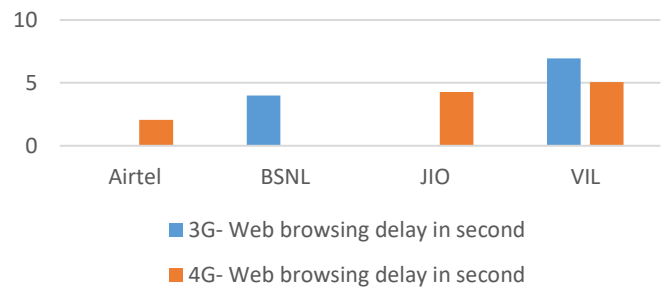
Static - Average download throughput



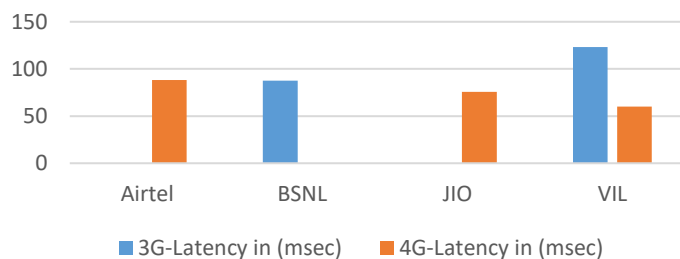
Static- Video streaming delay in sec



Static- Web browsing delay in second



Static -Latency in (msec)



Summary

City Level Summary- Voice

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Call attempts	747	736	NA	661
Block call rate %	0.8	0.27	NA	0.30
CSSR %	99.20	99.59	NA	99.70
Drop call rate %	0.13	0.14	NA	0.00
Mobility HOSR %	99.23	98.32	NA	95.73
RX Quality %	98.23	97.43	NA	95.07
Average CST Sec	3.47	2.2	NA	5.80

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Call attempts	NA	705	NA	677
Block call rate %	NA	0.99	NA	0.29
CSSR %	NA	98.01	NA	99.31
Drop call rate %	NA	1.01	NA	0.15
Mobility HOSR %	NA	99.66	NA	99.90
RX Quality %	NA	96.93	NA	98.68
Average CST (Sec)	NA	2.1	NA	3.05

TSP (For Volte)	Airtel	BSNL	JIO	VIL
Call attempts	781	NA	696	707
Block call rate %	0.38	NA	0.00	0.00
CSSR %	99.62	NA	99.42	100
Drop call rate %	0	NA	0.00	0.00
Mobility HOSR %	99.94	NA	99.32	99.96
RX Quality %	91.89	NA	90.19	96.32
Average CST(Sec)	0.48	NA	0.40	1.72

Summary

City Level Summary- Data Services -Static

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	66.75	199	NA	111.31
Upload Throughput in Kbps	46.72	118	NA	84.96
Web browsing delay in second	35.21	9	NA	48.48
Latency in (msec)	915.13	163	NA	226

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	3.598	NA	8.8
Upload Throughput in Mbps	NA	14.96	NA	3.04
Video streaming delay in sec	NA	1.26	NA	0.56
Web browsing delay in second	NA	4	NA	6.95
Latency in (msec)	NA	87.5	NA	123

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	14.85	NA	24.06	26.1
Upload Throughput in Mbps	6.10	NA	4.89	11.3
Video streaming delay in sec	0.58	NA	NA	0.37
Web browsing delay in second	2.07	NA	4.27	5.06
Latency in (msec)	88.16	NA	75.65	60

Hotspot-1	2G			
Location- Vijay Nagar Chouraha	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	53.75	122	NA	115.4
Upload Throughput in Kbps	40.22	112	NA	75.4
Web browsing delay in second	37.82	14	NA	52.2
Latency in (msec)	371.1	164	NA	247

Hotspot-1	3G			
Location- Vijay Nagar Chouraha	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	2.49	NA	7.99
Upload Throughput in Mbps	NA	1.5	NA	3.26
Video streaming delay in sec	NA	1.5	NA	0.4
Web browsing delay in second	NA	8	NA	8.1
Latency in (msec)	NA	87	NA	108

Hotspot-1	LTE			
Location- Vijay Nagar Chouraha	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	21.5	NA	17.56	16.15
Upload Throughput in Mbps	11.11	NA	5.22	6.32
Video streaming delay in sec	0.52	NA	NA	0.2
Web browsing delay in second	1.84	NA	5.35	7.2
Latency in (msec)	78.88	NA	56.00	75

Hotspot-2	2G			
Location- Khajrana Ganesh Mandir	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	83.07	167	NA	140.5
Upload Throughput in Kbps	57.34	115	NA	127.0
Web browsing delay in second	37.22	10	NA	48.9
Latency in (msec)	348.5	136	NA	180

Hotspot-2	3G			
Location-Khajrana Ganesh Mandir	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	2.61	NA	7.53
Upload Throughput in Mbps	NA	1.19	NA	3.13
Video streaming delay in sec	NA	1.02	NA	0.8
Web browsing delay in second	NA	5	NA	5.8
Latency in (msec)	NA	84	NA	120

Hotspot-2	LTE			
Location- Khajrana Ganesh Mandir	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	12.11	NA	33.95	17.96
Upload Throughput in Mbps	7.21	NA	38.56	18.49
Video streaming delay in sec	0.47	NA	NA	0.7
Web browsing delay in second	1.99	NA	3.97	4.7
Latency in (msec)	87.91	NA	83.00	54

Hotspot-3	2G			
Location- Rajwada	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	75.56	236	NA	133.4
Upload Throughput in Kbps	24.98	129	NA	83.1
Web browsing delay in second	37.75	5	NA	44.4
Latency in (msec)	430.7	169	NA	242

Hotspot-3	3G			
Location- Rajwada	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	6.93	NA	7.66
Upload Throughput in Mbps	NA	1.48	NA	3.02
Video streaming delay in sec	NA	1.1	NA	0.8
Web browsing delay in second	NA	2	NA	6.2
Latency in (msec)	NA	91	NA	116

Hotspot-3	LTE			
Location- Rajwada	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	14.62	NA	38.37	35.36
Upload Throughput in Mbps	5.66	NA	8.02	19.62
Video streaming delay in sec	0.56	NA	NA	0.3
Web browsing delay in second	2.17	NA	3.27	4.5
Latency in (msec)	79.56	NA	82.00	44

Hotspot-4	2G			
Location- Railway station Indore	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	47.66	160	NA	106.8
Upload Throughput in Kbps	56..3	114	NA	84.0
Web browsing delay in second	36.21	8	NA	54.3
Latency in (msec)	1686.98	152	NA	229

Hotspot-4	3G			
Location- Railway Station Indore	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	2.33	NA	7.09
Upload Throughput in Mbps	NA	1.59	NA	3.77
Video streaming delay in sec	NA	1.8	NA	0.4
Web browsing delay in second	NA	4	NA	6.7
Latency in (msec)	NA	106	NA	110

Hotspot-4	LTE			
Location- Railway station Indore	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	11.08	NA	18.53	25.55
Upload Throughput in Mbps	3.01	NA	3.60	7.54
Video streaming delay in sec	0.72	NA	NA	0.1
Web browsing delay in second	2.44	NA	4.81	0.7
Latency in (msec)	99.15	NA	72.00	71

Hotspot-5	2G			
Location- Airport	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	76.78	253	NA	107.9
Upload Throughput in Mbps	51.75	117	NA	80.2
Web browsing delay in second	30.63	7	NA	43
Latency in (msec)	379.1	188	NA	220

Hotspot-5	3G			
Location- Airport	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	4.57	NA	13.26
Upload Throughput in Mbps	NA	1.77	NA	2.29
Video streaming delay in sec	NA	1.2	NA	0.7
Web browsing delay in second	NA	2	NA	7.2
Latency in (msec)	NA	77	NA	131

Hotspot-5	LTE			
Location- Airport	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	8.34	NA	48.32	46.74
Upload Throughput in Mbps	7.94	NA	7.4	11.46
Video streaming delay in sec	0.41	NA	NA	0.4
Web browsing delay in second	1.69	NA	4.41	6.8
Latency in (msec)	87.32	NA	141.70	55

Hotspot-6	2G			
Location- Mhow	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	63.67	255	NA	63.9
Upload Throughput in Mbps	49.7	123	NA	60.1
Web browsing delay in second	35.32	11	NA	48.1
Latency in (msec)	2277.3	169	NA	239

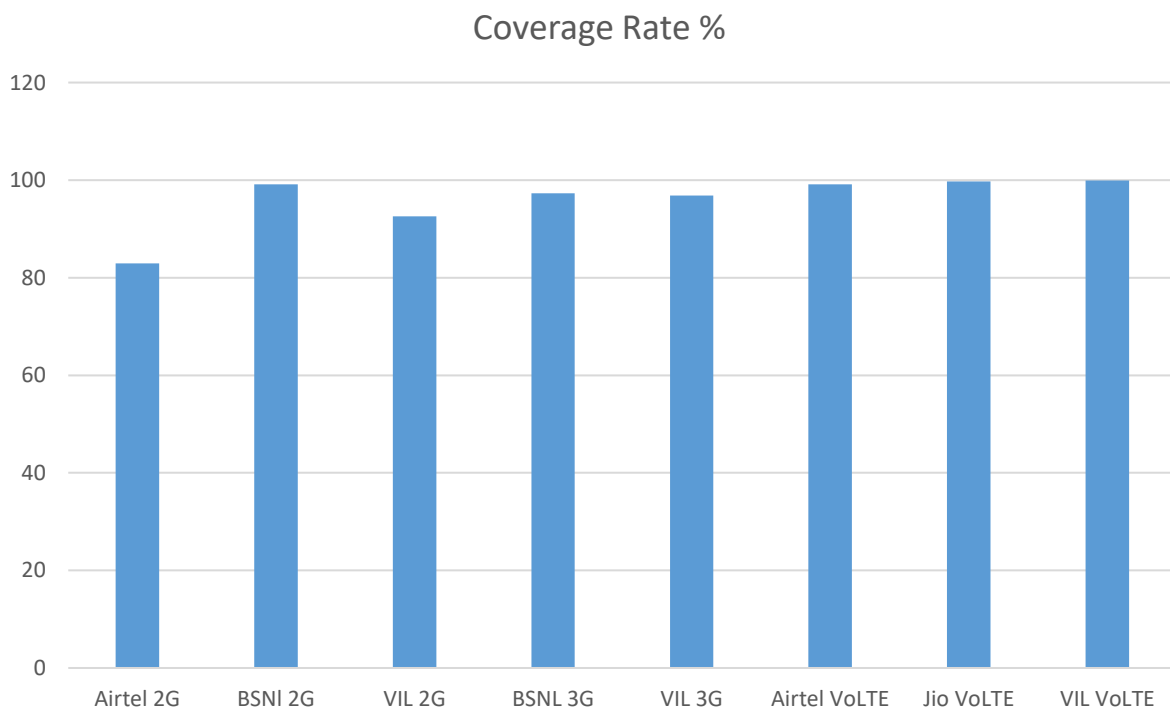
Hotspot-6	3G			
Location- Mhow	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	2.23	NA	9.28
Upload Throughput in Mbps	NA	1.39	NA	2.81
Video streaming delay in sec	NA	0.99	NA	0.3
Web browsing delay in second	NA	3	NA	7.7
Latency in (msec)	NA	80	NA	156

Hotspot-6	LTE			
Location- Mhow	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	17.66	NA	22.16	14.68
Upload Throughput in Mbps	2.24	NA	2.73	4.45
Video streaming delay in sec	0.79	NA	NA	0.5
Web browsing delay in second	2.28	NA	4.37	6.5
Latency in (msec)	96.11	NA	92.60	62

Coverage Details

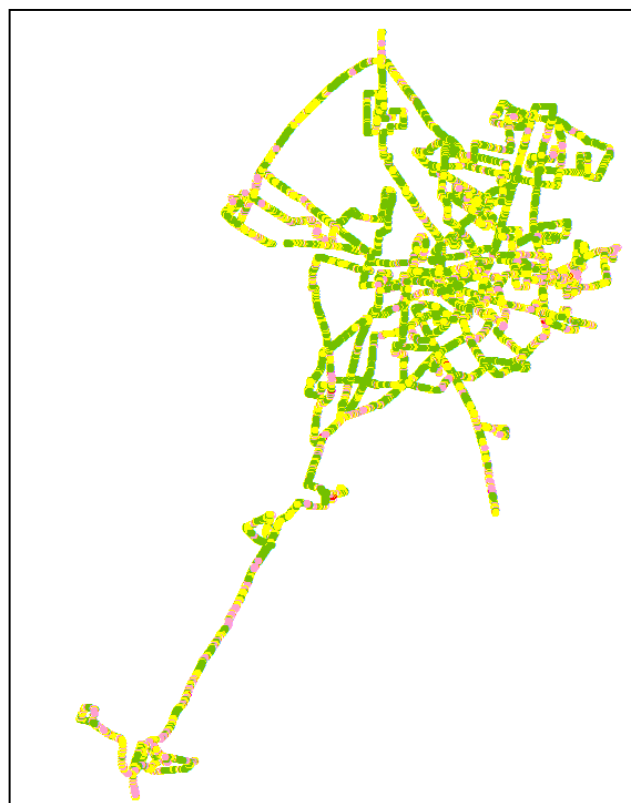
RF Coverage relates to the geographical footprint within the system that has sufficient RF signal strength to provide for a call session. The Coverage rate is calculated on the basis of % of samples in which the Rx level \geq -85 dBm, RSCP is \geq -90 dBm & RSRP \geq -110dBm. The details are as follows.

TSP	Coverage Rate %
Airtel 2G	82.91
BSNI 2G	99.13
VIL 2G	92.62
BSNL 3G	97.34
VIL 3G	96.84
Airtel VoLTE	99.12
Jio VoLTE	99.77
VIL VoLTE	99.95



TSP- Airtel

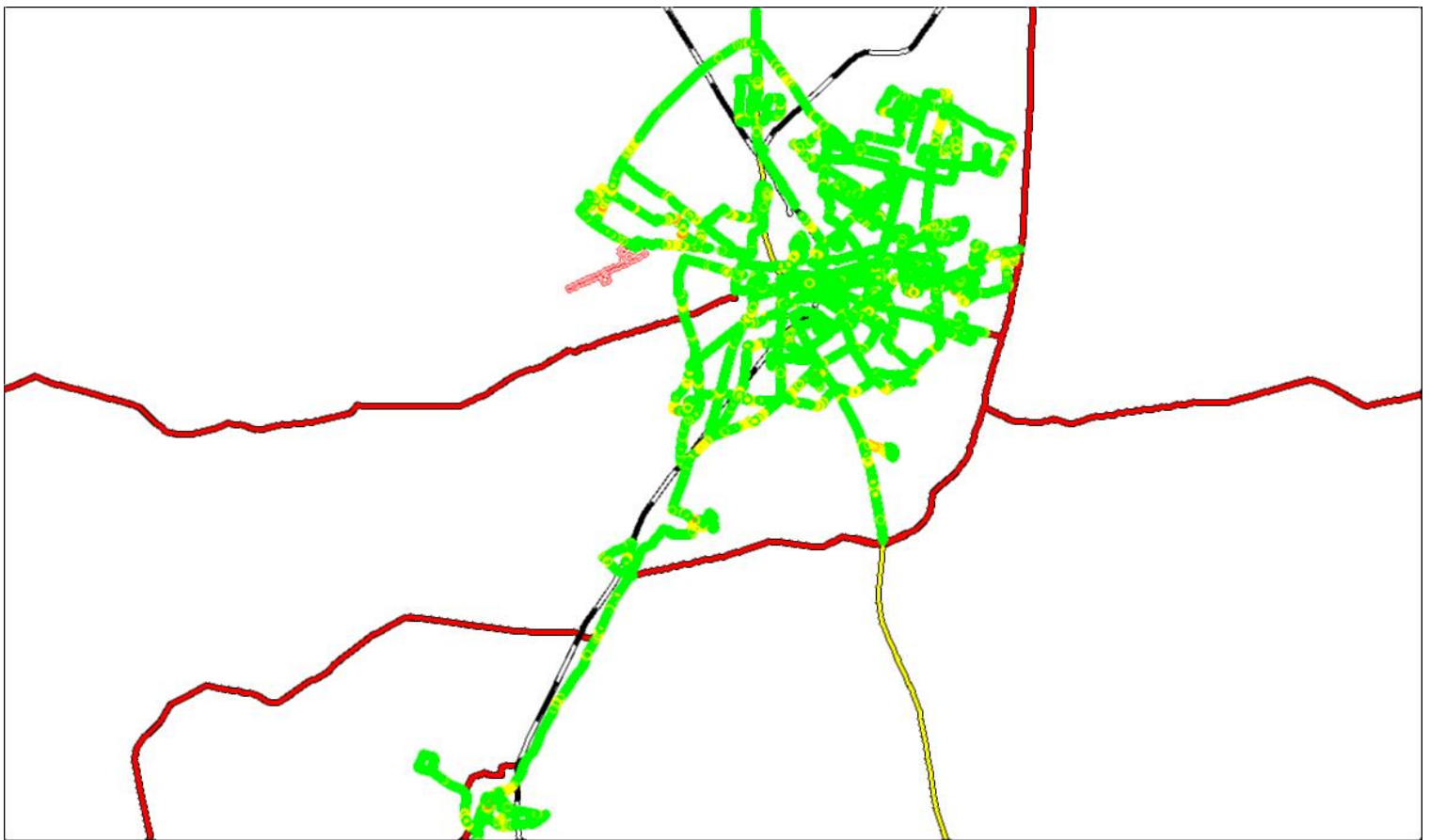
Technology	Coverage %
2G	82.91







2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	7154937	42.92	
[-75, >=-85)	6667635	39.99	
[-85, >=-95)	2812277	16.87	
[-95, >=Min)	37197	0.22	
Total	16672046	100%	

TSP- BSNL

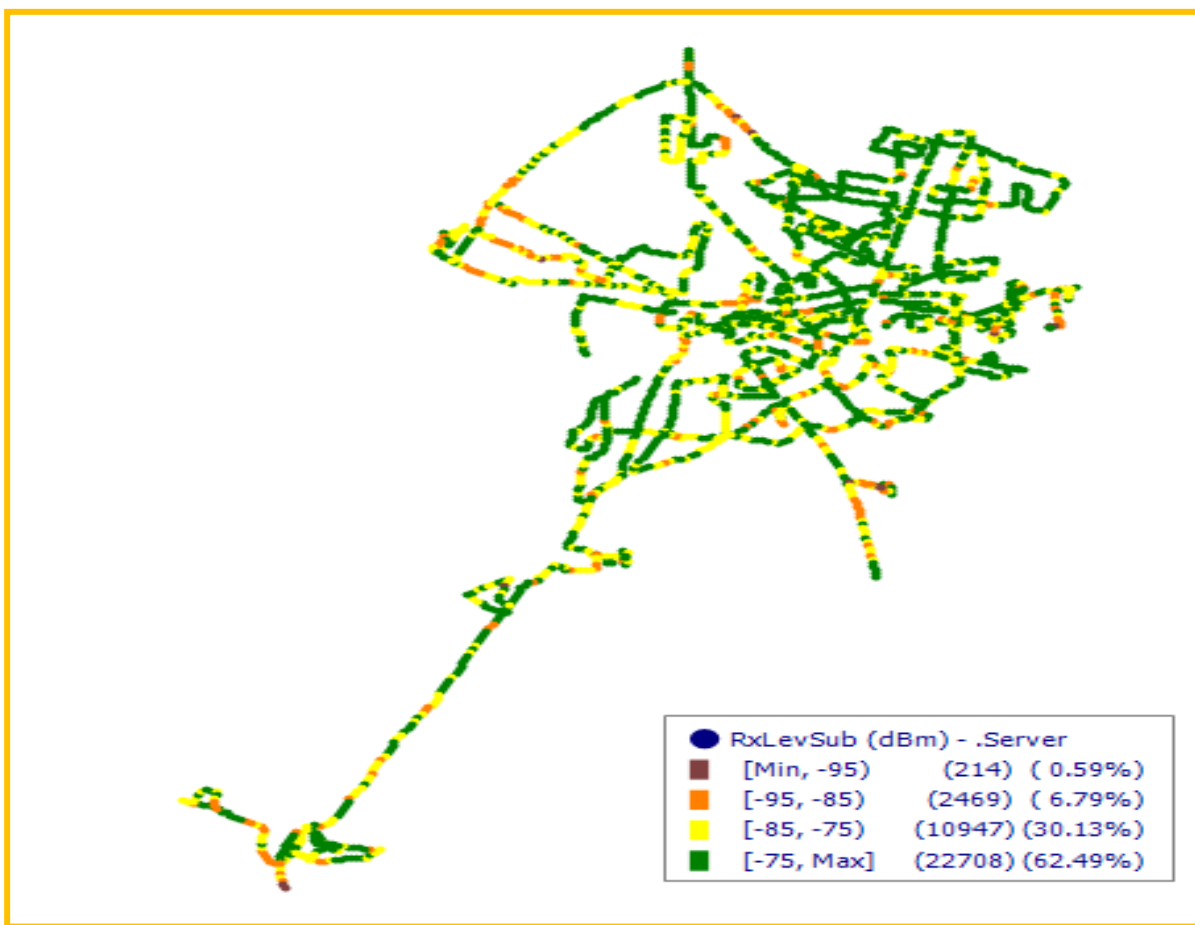
Technology	Coverage %
2G	100%



Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	1489985	88.12%	
[-75, >=-85)	186296	11.02%	
[-85, >=-95)	14659	0.86%	
[-95, >=Min)			
Total	1690940	100%	

TSP-VIL

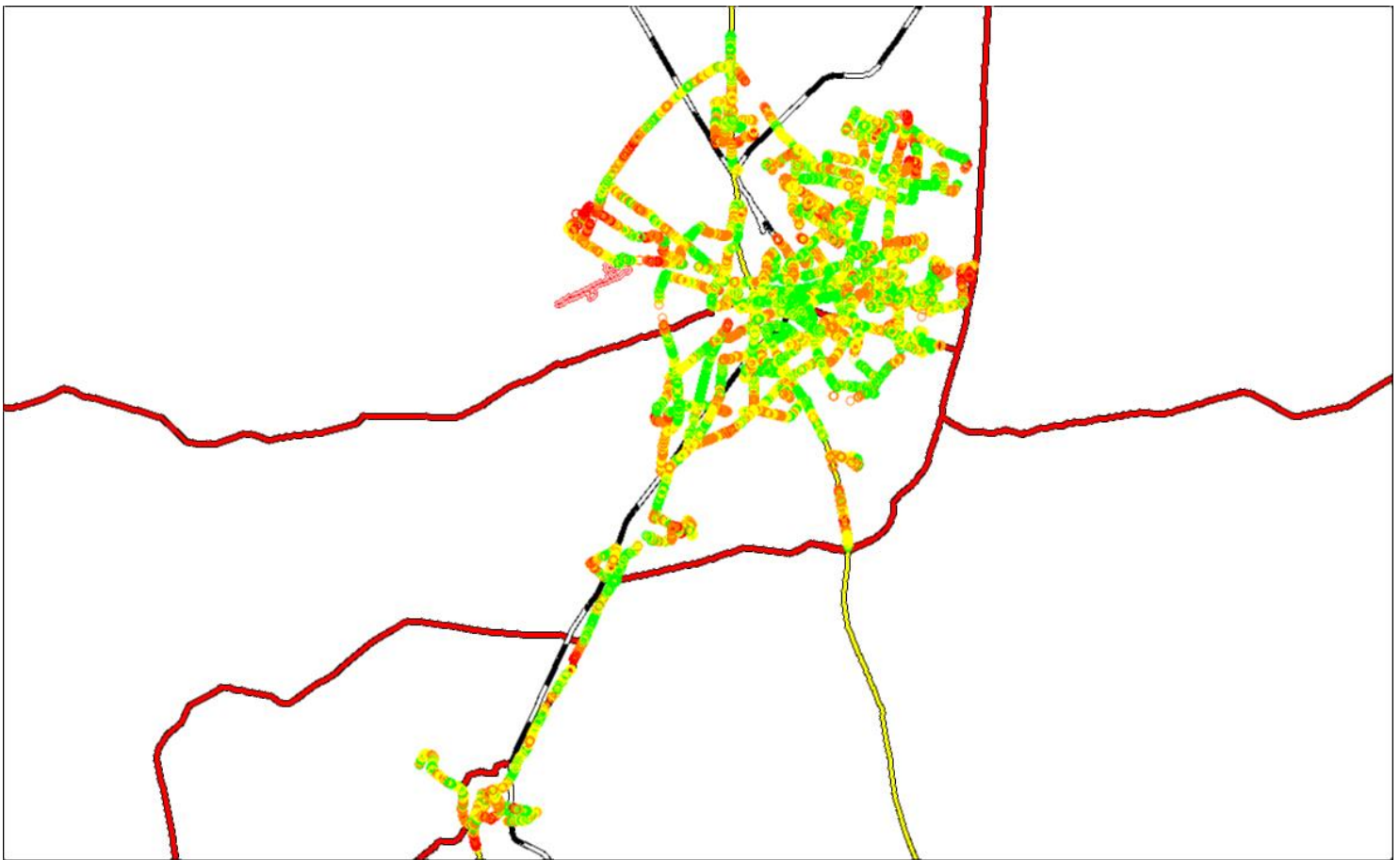
Technology	Coverage %
2G	92.62







2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	22708	62.49%	
[-75, >=-85)	10947	30.13%	
[-85, >=-95)	2469	6.79%	
[-95, >=Min)	214	0.59%	
Total	36338	100%	

TSP- BSNL

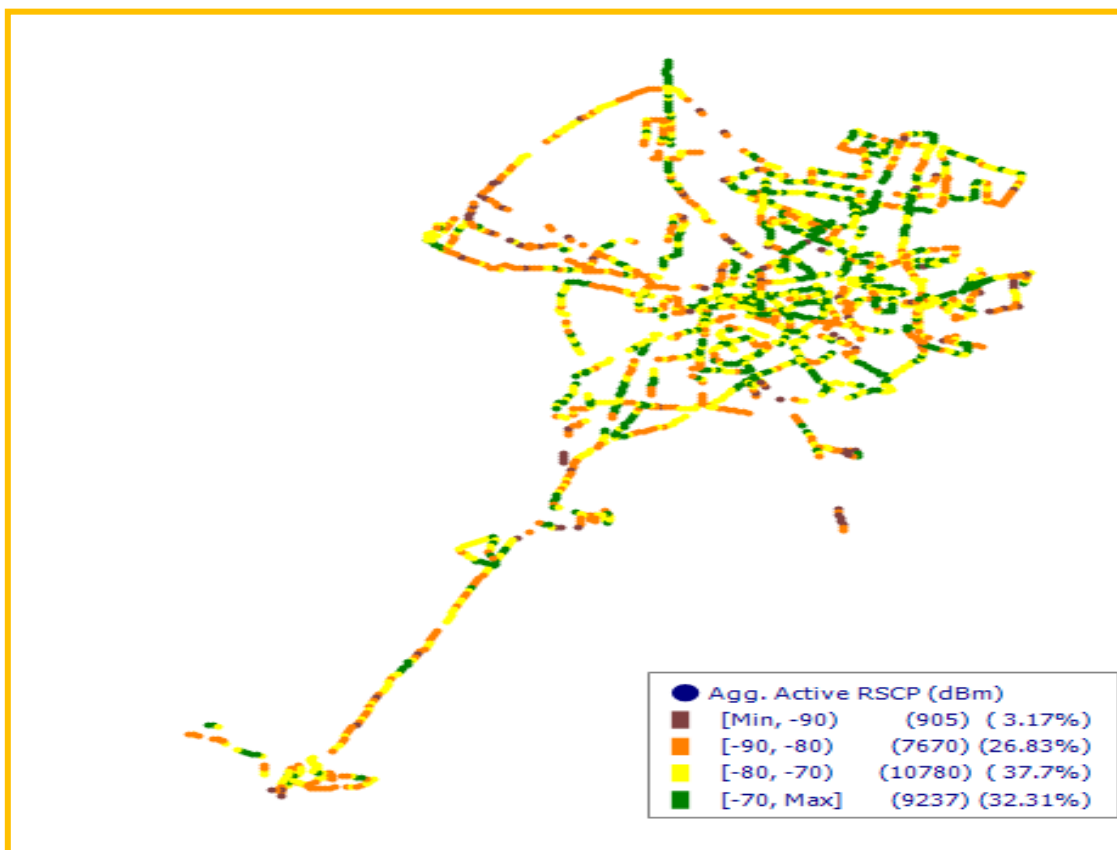
Technology	Coverage %
3G	100%







Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	1141320	35.86%	
[-70, >=-80)	1281081	40.25%	
[-80, >=-90)	675481	21.23%	
[-90, >=Min)	84568	2.66%	
Total	3182450	100%	

TSP -VIL

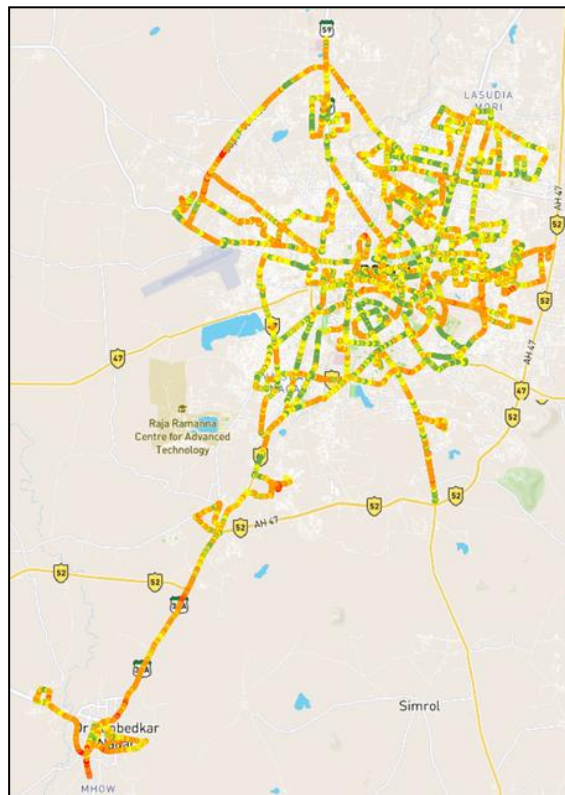
Technology	Coverage %
3G	96.84%



3G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	9237	32.31%	
[-70, >=-80)	10780	37.7%	
[-80, >=-90)	7670	26.83%	
[-90, >=Min)	905	3.17%	
Total	28592	100%	

TSP- Airtel

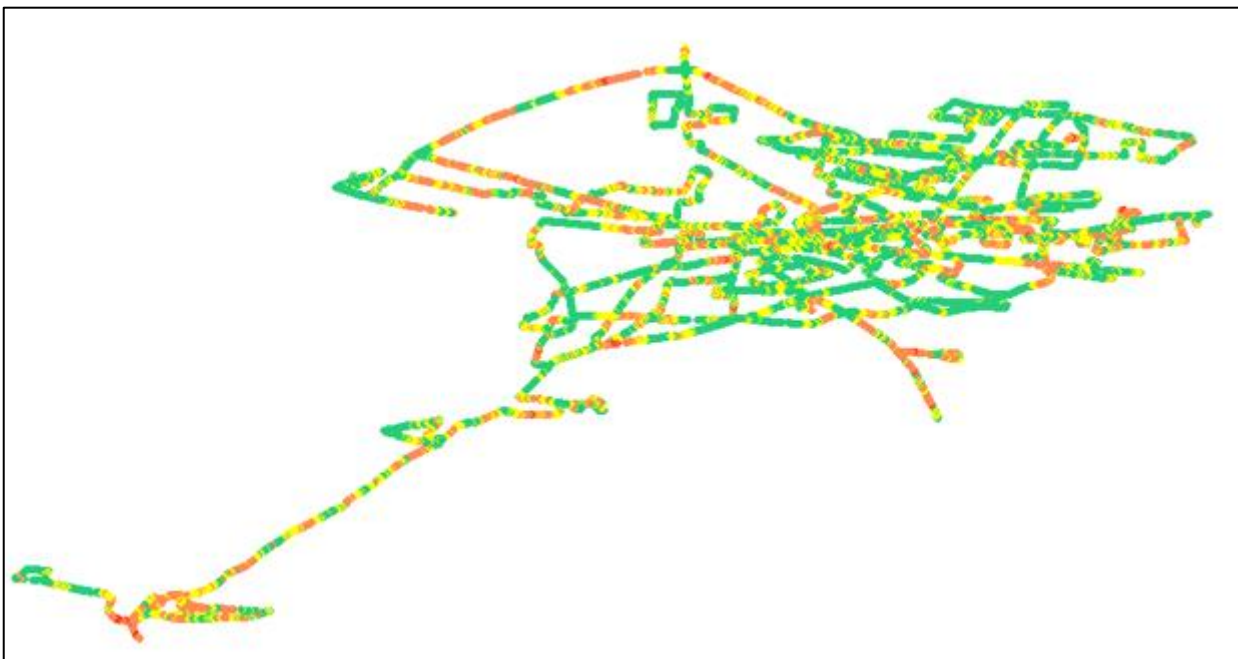
Technology	Coverage %
VoLTE	99.12



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	86543	22.34	
[-80, >=-90)	141731	36.59	
[-90, >=-110)	155673	40.19	
[-110, >=Min)	3410	0.88	
Total	387357	100%	

TSP- JIO

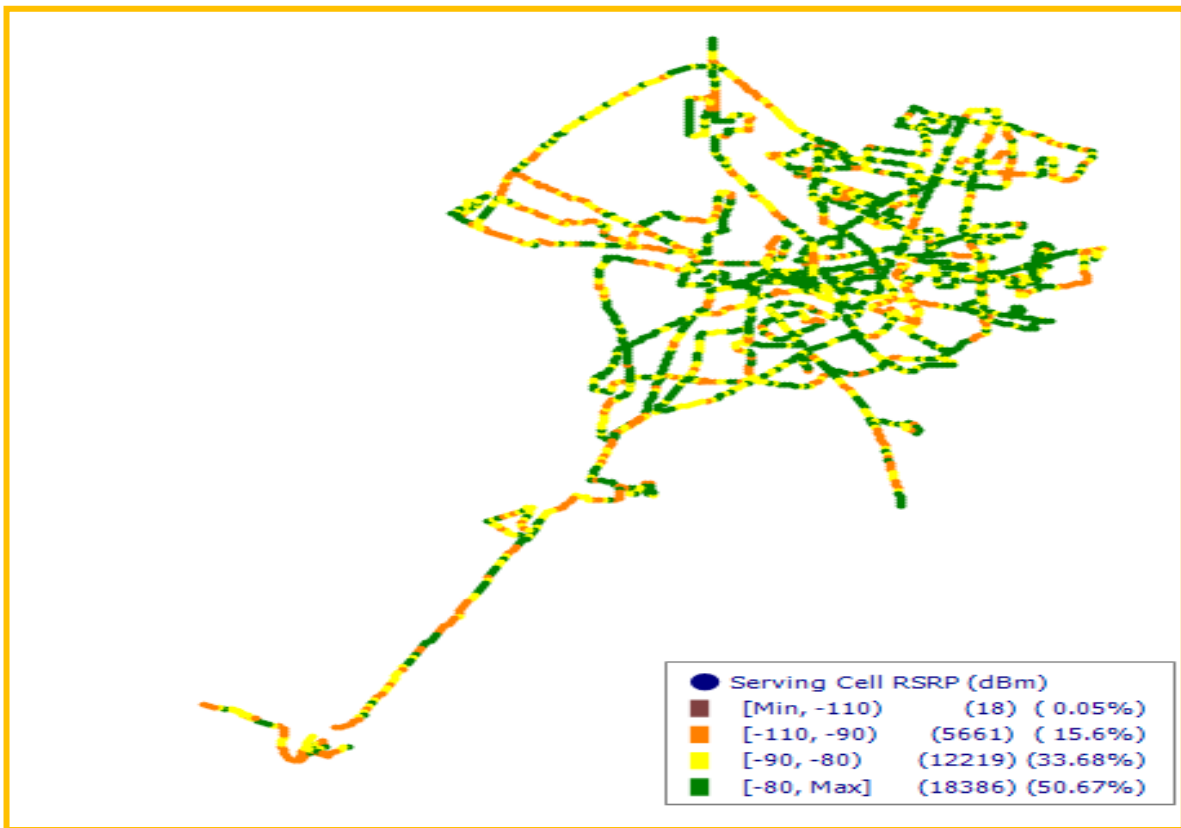
Technology	Coverage %
VoLTE	99.77



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	42107	53.87	
[-80, >=-90)	20664	26.44	
[-90, >=-110)	15213	19.46	
[-110, >=Min)	176	0.23	
Total	78160	100%	

TSP- VIL

Technology	Coverage %
VoLTE	99.95

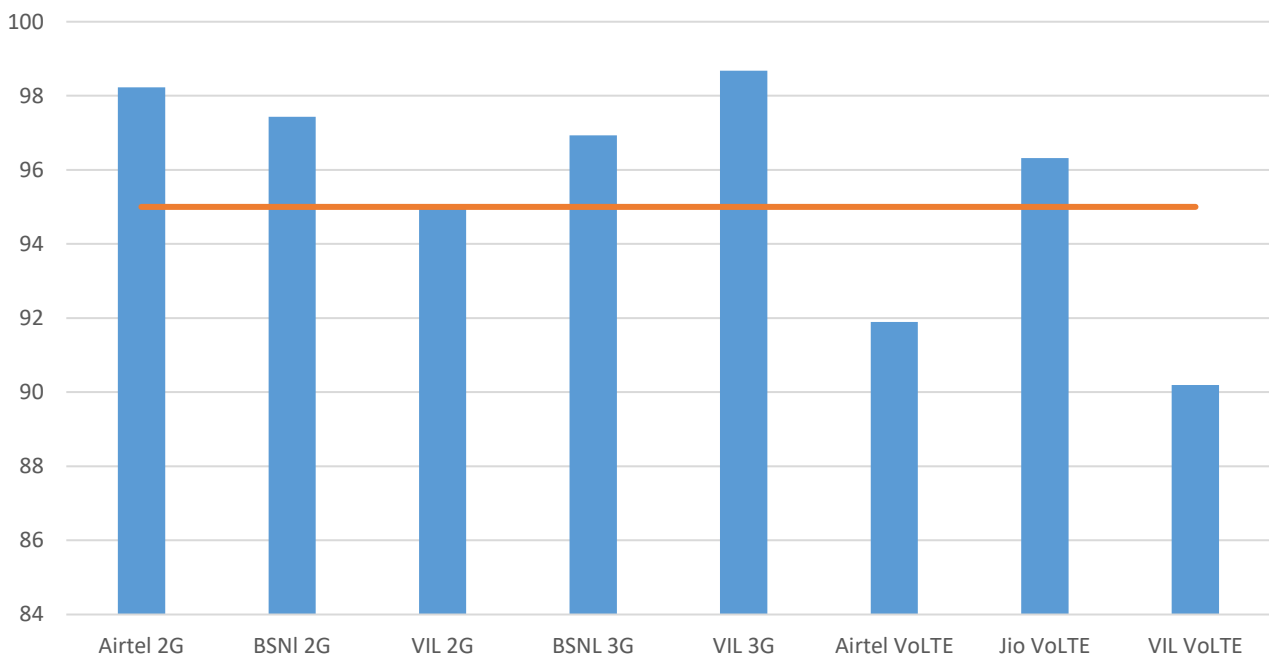


VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	18386	50.67%	
[-80, >=-90)	12219	33.68%	
[-90, >=-110)	5661	15.6%	
[-110, >=Min)	18	0.05%	
Total	36284	100%	

Quality Details

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 $\geq 95\%$.

TSP	Rx Quality %
Airtel 2G	98.23
BSNI 2G	97.43
VIL 2G	95.07
BSNL 3G	96.93
VIL 3G	98.68
Airtel VoLTE	91.89
Jio VoLTE	96.32
VIL VoLTE	90.19








Quality Details

For measuring voice quality, as per the QoS norms, RxQual ≤ 5 for GSM TSPs, EcNo ≥ -14 dBm for 3G TSP 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- Airtel

Technology	Rx Quality %
2G	98.23



Overall Rx Quality	# Samples	% PDF	Legends
(Min, ≤ 2)	15783417	94.67	
(2, ≤ 3)	242501	1.45	
(3, ≤ 4)	171824	1.03	
(4, ≤ 5)	179355	1.08	
(5, $\leq \text{Max}$)	294977	1.77	
Total	16672074	100%	






Quality Details

For measuring voice quality, as per the QoS norms, RxQual ≤ 5 for GSM TSPs, EcNo ≥ -14 dBm for 3G TSP 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-BSNL

Technology	Rx Quality %
2G	97.43%



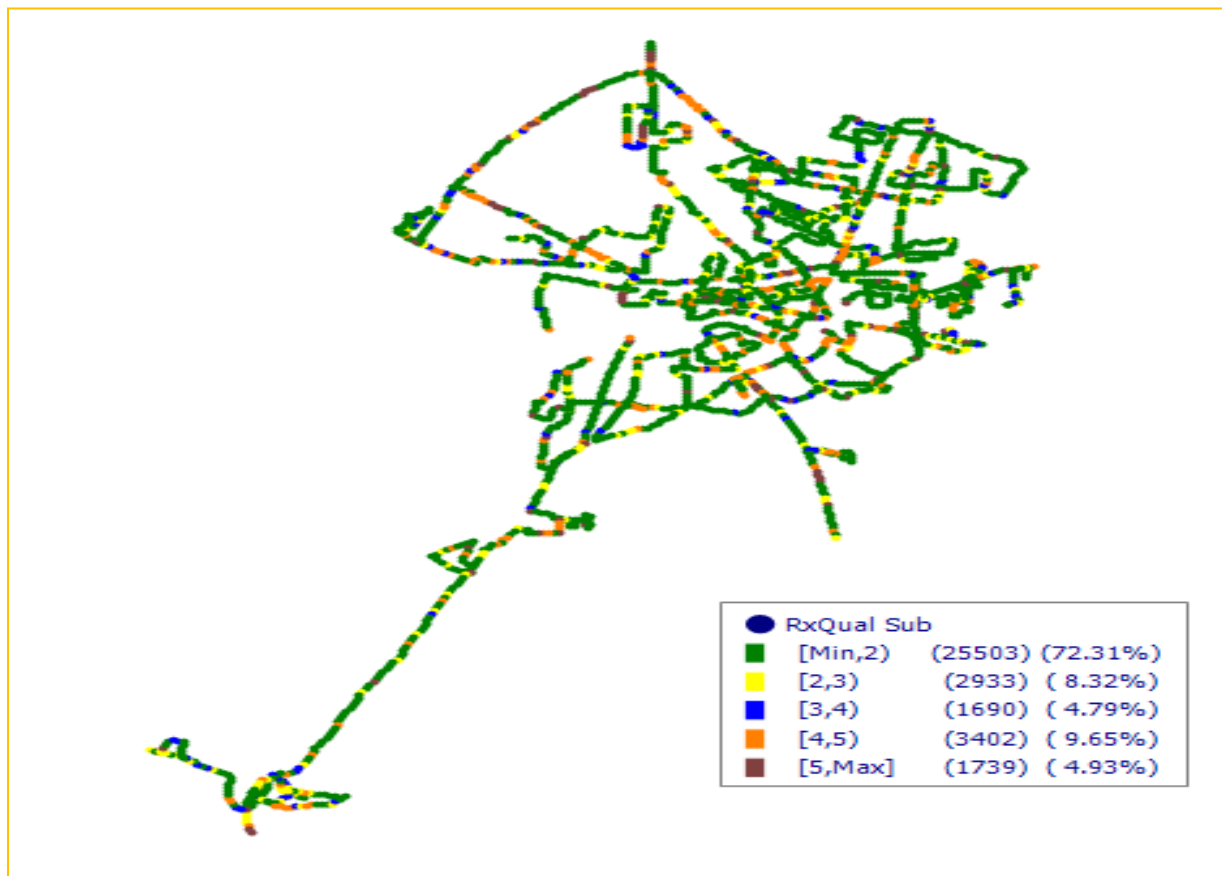
Overall Rx Quality	# Samples	% PDF	Legends
(Min, ≤ 2)	7149801	93.46%	
(2, ≤ 3)	99610	1.30%	
(3, ≤ 4)	106056	1.39%	
(4, ≤ 5)	98489	1.29%	
(5, $\leq \text{Max}$)	196315	2.57%	
Total	7650271	100%	






Quality Details

For measuring voice quality, as per the QoS norms, RxQual ≤ 5 for GSM TSPs, EcNo ≥ -14 dBm for 3G TSP 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- VIL

Technology	Rx Quality %
2G	95.07



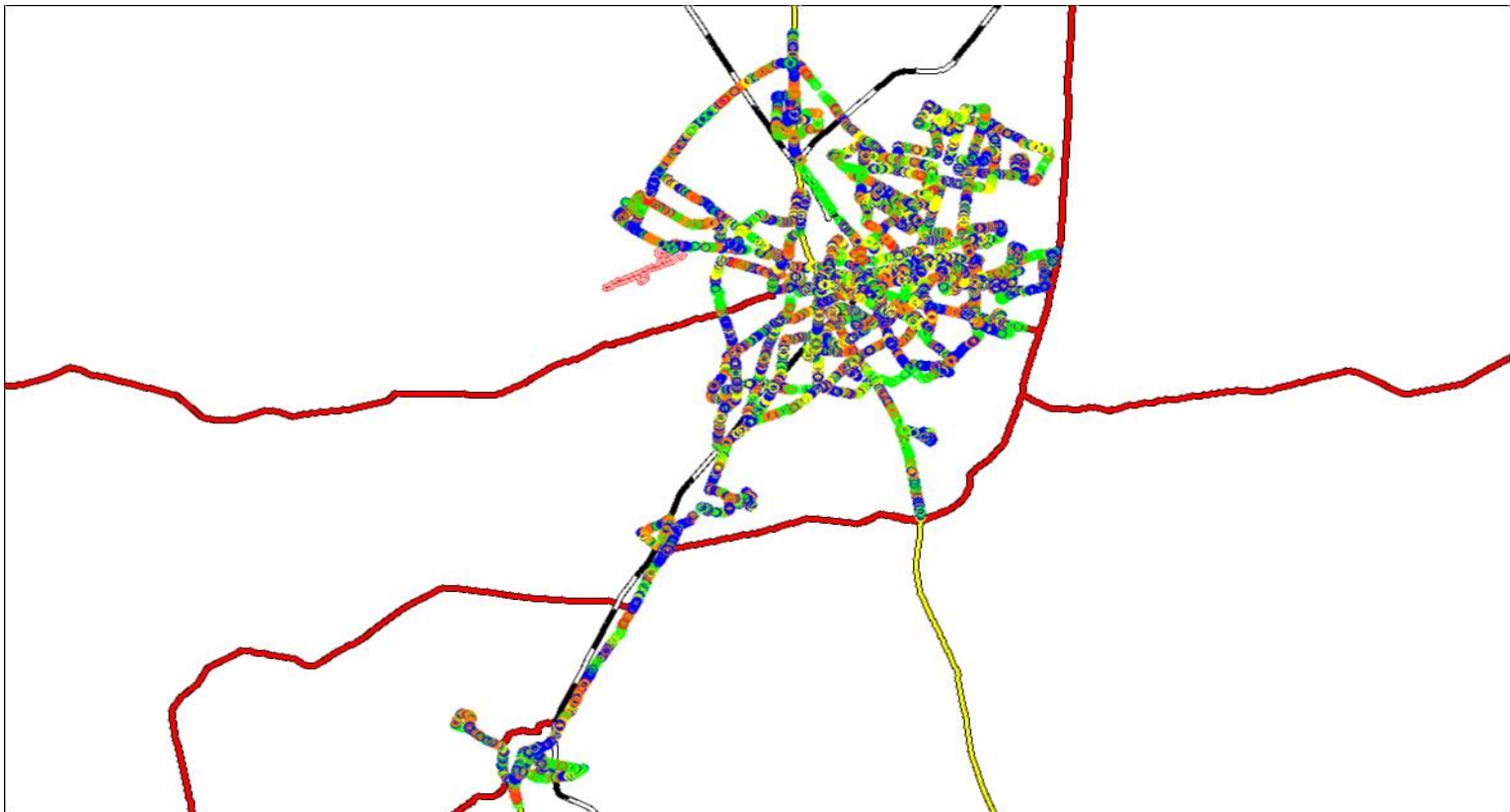
Overall Rx Quality	# Samples	% PDF	Legends
(Min, ≤ 2)	25503	72.31%	
(2, ≤ 3)	2933	8.32%	
(3, ≤ 4)	1690	4.79%	
(4, ≤ 5)	3402	9.65%	
(5, $\leq \text{Max}$)	1739	4.93%	
Total	35267	100%	

Quality Details

For measuring voice quality, as per the QoS norms, RxQual ≤ 5 for GSM TSPs, EcNo ≥ -14 dBm for 3G TSP 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-BSNL

Technology	Rx Quality %
3G	96.93



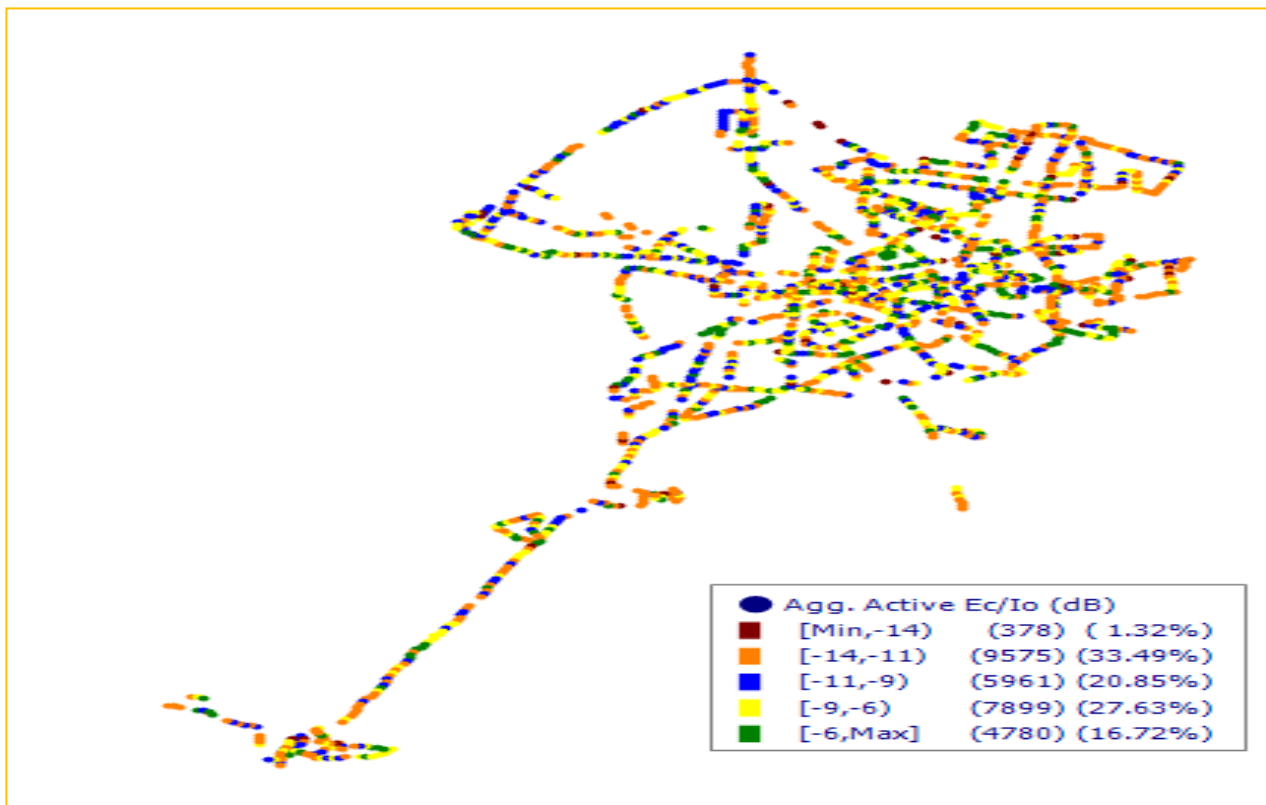
Overall Ec/No	# Samples	% PDF	Legends
(Max, ≤ -6)	320958	9.82%	
(-6, ≤ -9)	881851	26.98%	
(-9, ≤ -11)	1264781	38.69%	
(-11, ≤ -14)	700974	21.44%	
(-14, \leq Min)	100507	3.07%	
Total	3269071	100%	

Quality Details

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 $\geq 95\%$.

TSP- VIL

Technology	Rx Quality %
3G	98.68



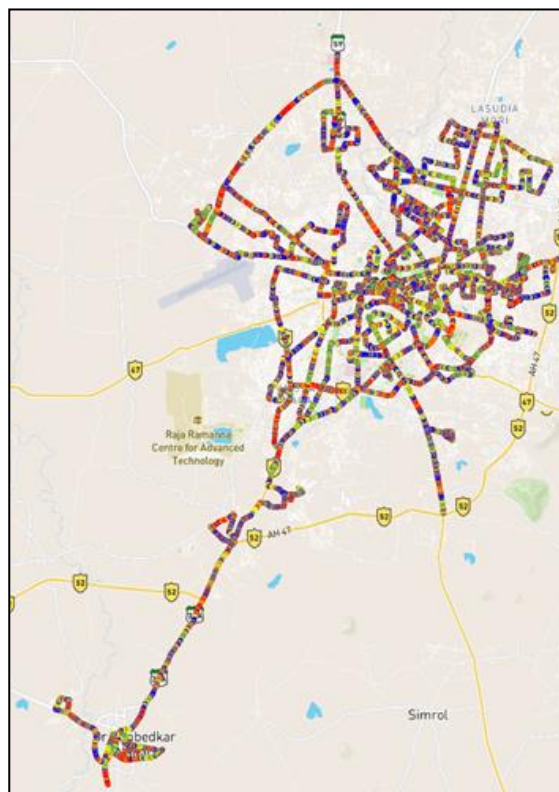
Overall Ec/No	# Samples	% PDF	Legends
(Max, ≤ -6)	4780	16.72%	
(-6, ≤ -9)	7899	27.63%	
(-9, ≤ -11)	5961	20.85%	
(-11, ≤ -14)	9575	33.49%	
(-14, \leq Min)	378	1.32%	
Total	28593	100%	

Quality Details

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 $\geq 95\%$.

TSP- Airtel

Technology	Rx Quality %
VoLTE	91.89



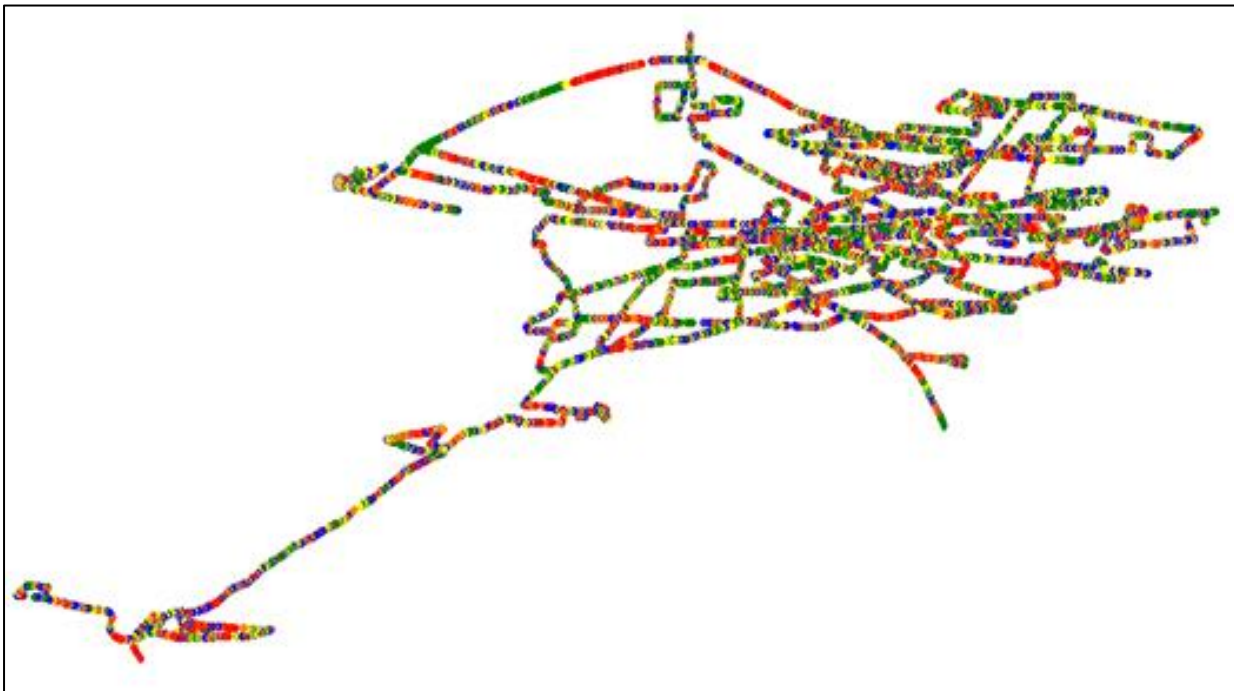
Overall SINR	# Samples	% PDF	Legends
(Min, ≤ 0)	31387	8.11	Red
(0, ≤ 5)	94222	23.34	Orange
(5, ≤ 10)	126480	32.67	Blue
(10, ≤ 15)	86202	22.27	Yellow
(15, $\leq \text{Max}$)	48797	12.61	Green
Total	387088	100%	

Quality Details

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 $\geq 95\%$.

TSP- JIO

Technology	Rx Quality %
VoLTE	90.19



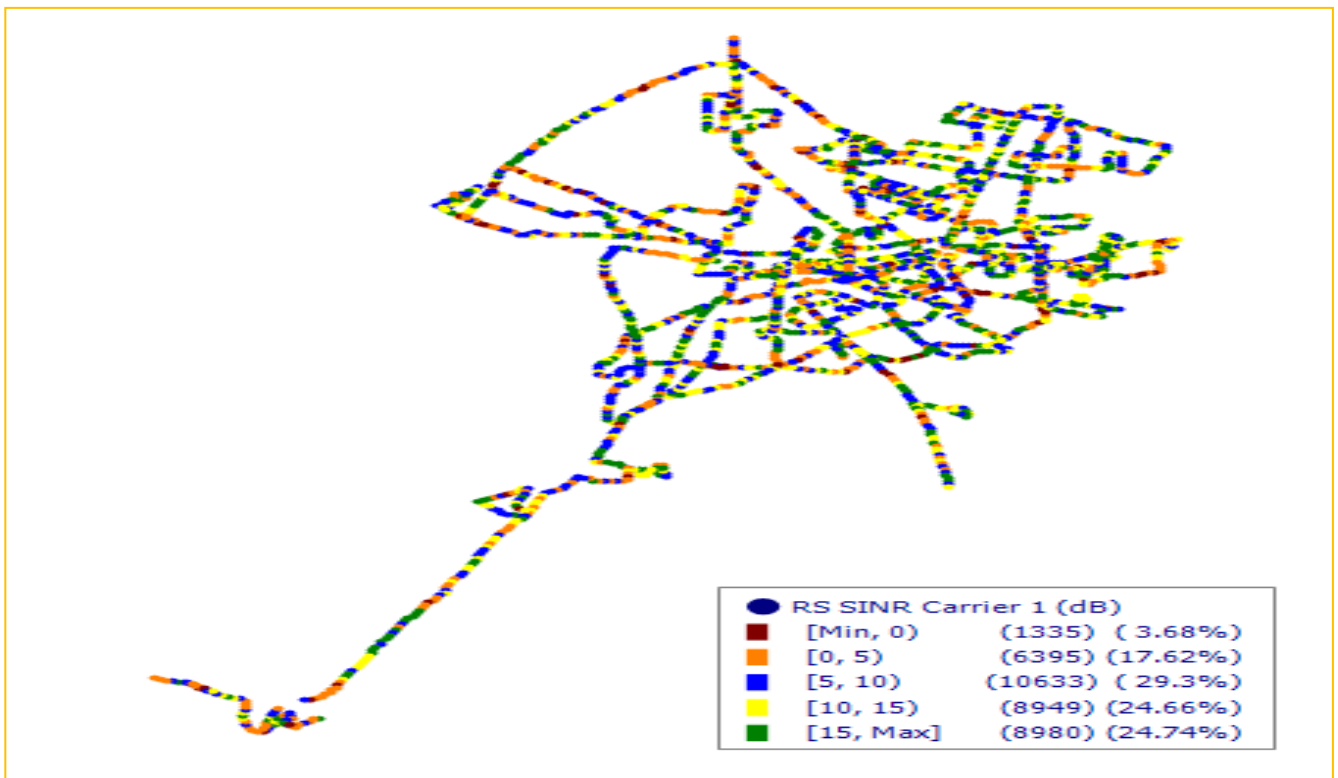
Overall SINR	# Samples	% PDF	Legends
(Min, ≤ 0)	7670	9.81	
(0, ≤ 5)	15960	20.42	
(5, ≤ 10)	20160	25.79	
(10, ≤ 15)	16975	21.72	
(15, $\leq \text{Max}$)	17395	22.26	
Total	78160	100%	

Quality Details

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 $\geq 95\%$.

TSP- VIL

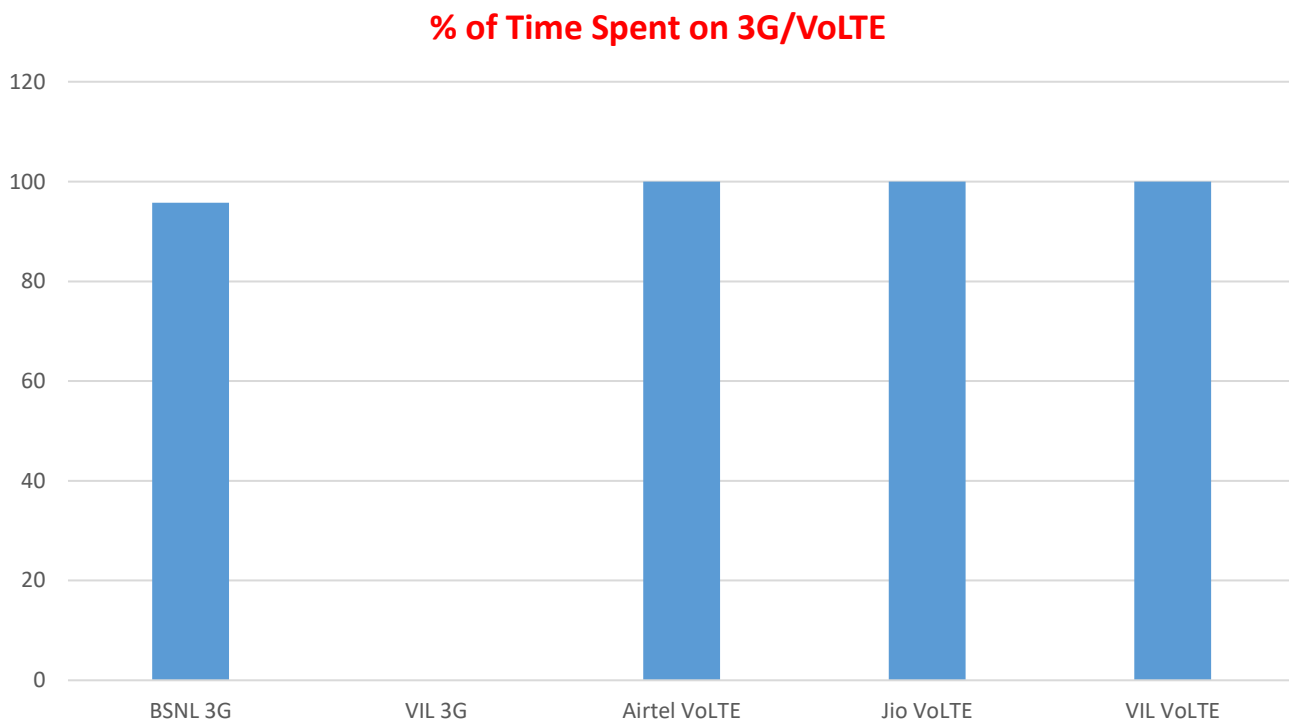
Technology	Rx Quality %
VoLTE	96.32



Overall SINR	# Samples	% PDF	Legends
(Min, ≤ 0)	1335	3.68%	
(0, ≤ 5)	6395	17.62%	
(5, ≤ 10)	10633	29.3%	
(10, ≤ 15)	8949	24.66%	
(15, $\leq \text{Max}$)	8980	24.74%	
Total	36292	100%	

Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	95.78
VIL 3G	0
Airtel VoLTE	100
Jio VoLTE	100
VIL VoLTE	100



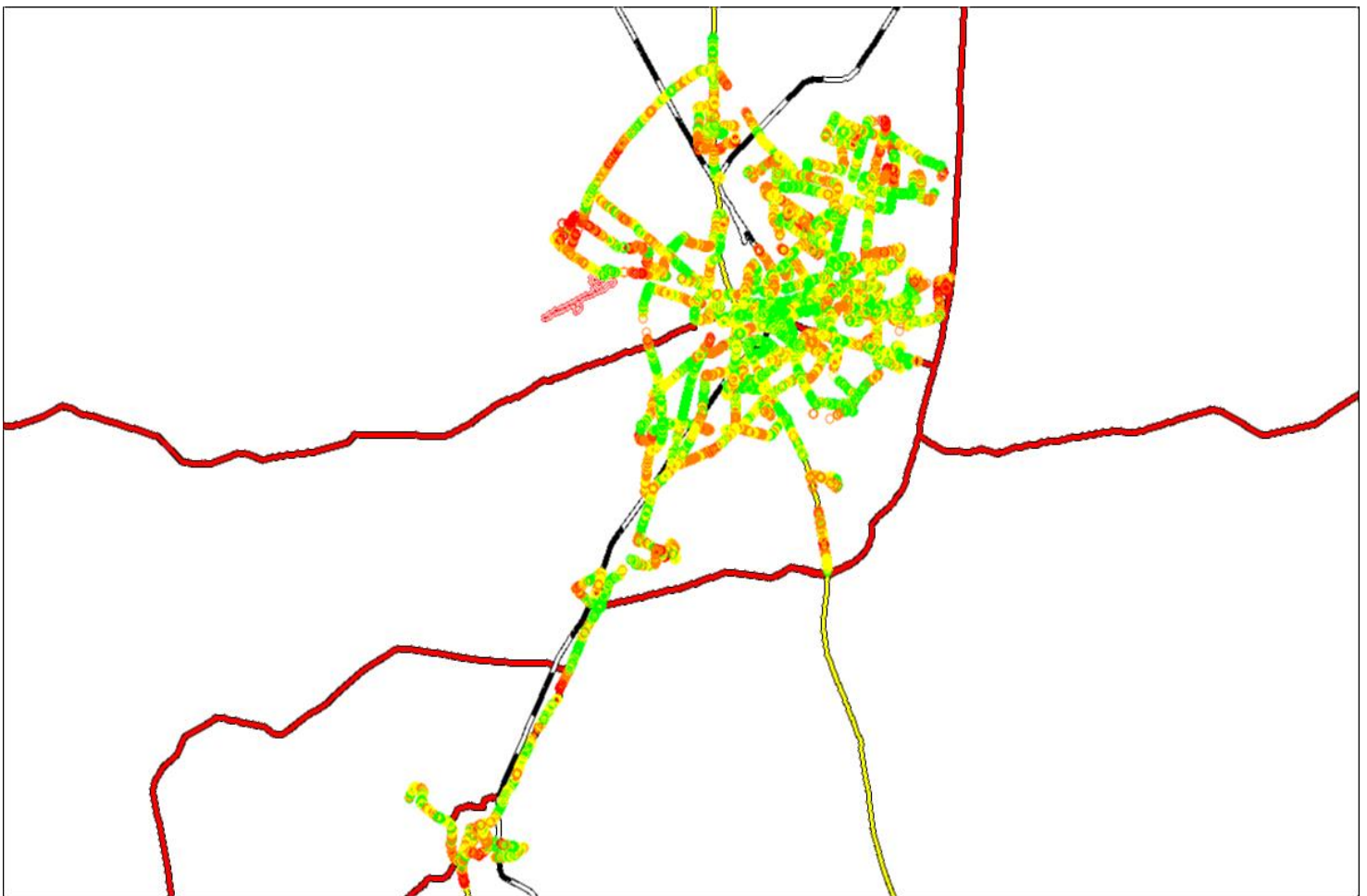
TSP- Airtel

Technology	% of Time Spent on
3G	
VoLTE	100



TSP- BSNL

Technology	% of Time Spent on
3G	95.78%
VoLTE	



TSP- JIO

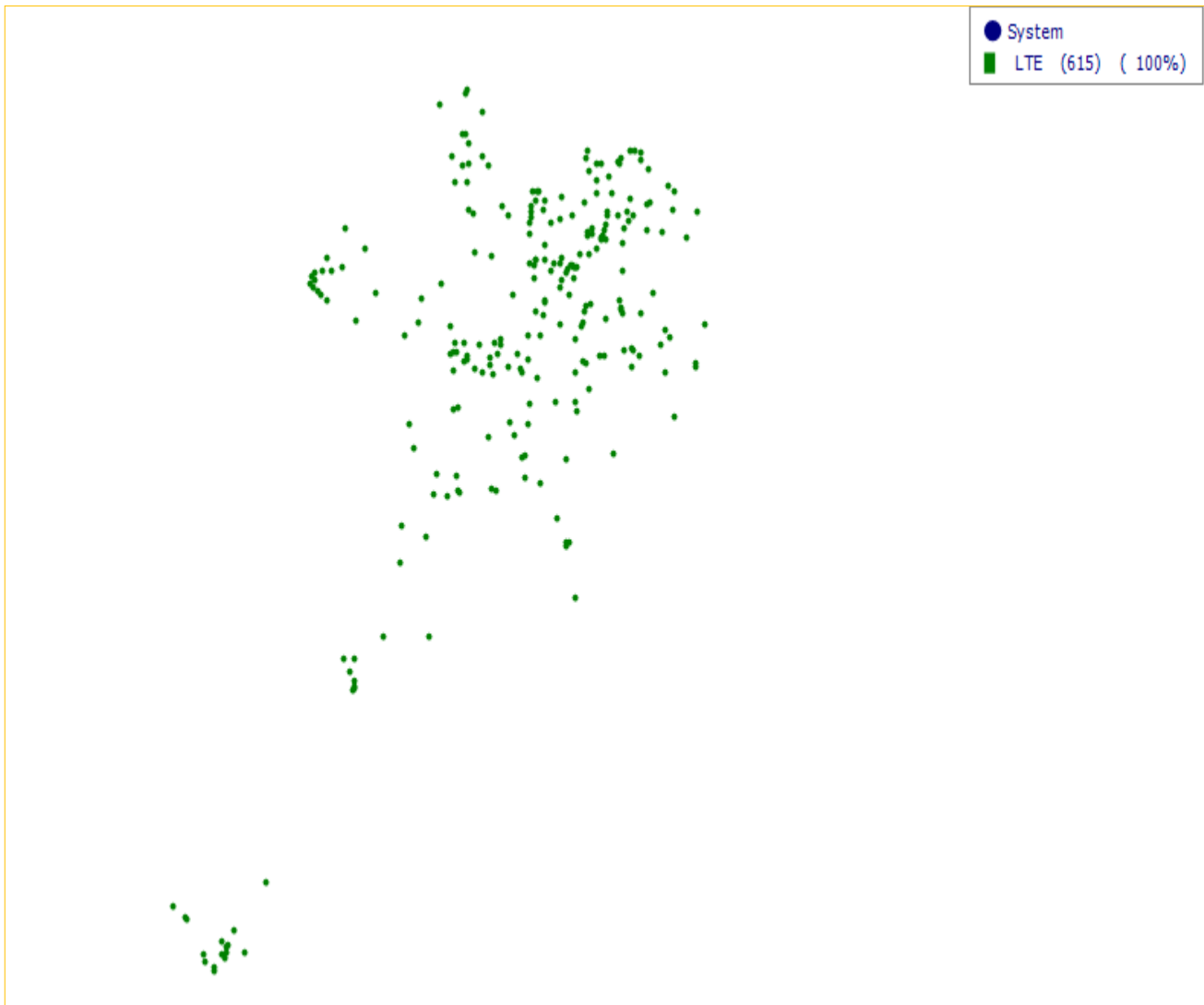
Technology	% of Time Spent on
3G	
VoLTE	100



Technology Details

TSP- VIL

Technology	% of Time Spent on
3G	0
VoLTE	100%

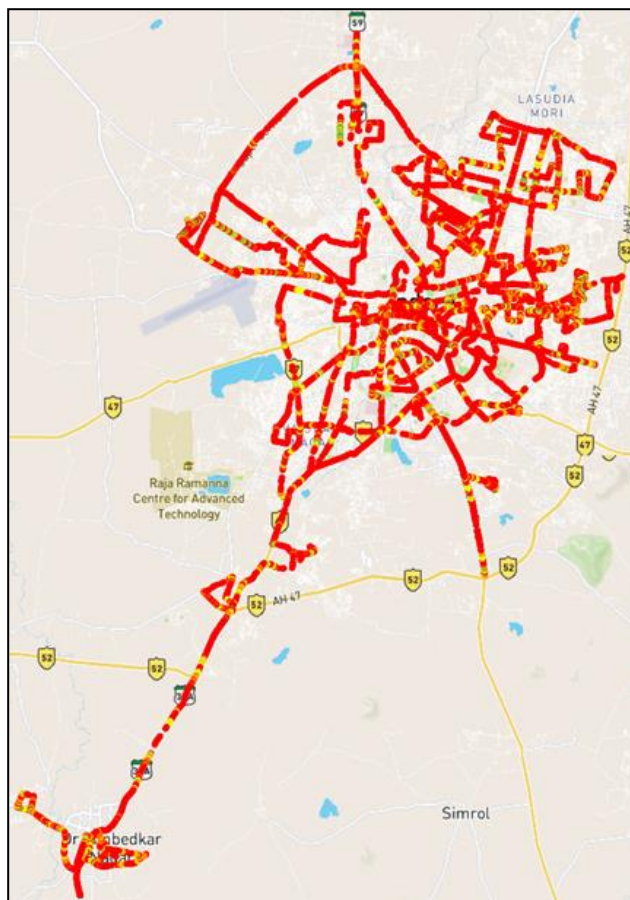


Dynamic Data Test

TSP- Airtel

Data Statistics - Dynamic data testing - 390 Kms

Data KPIs - Overall	2G
Download Throughput (Kbps)	68.28



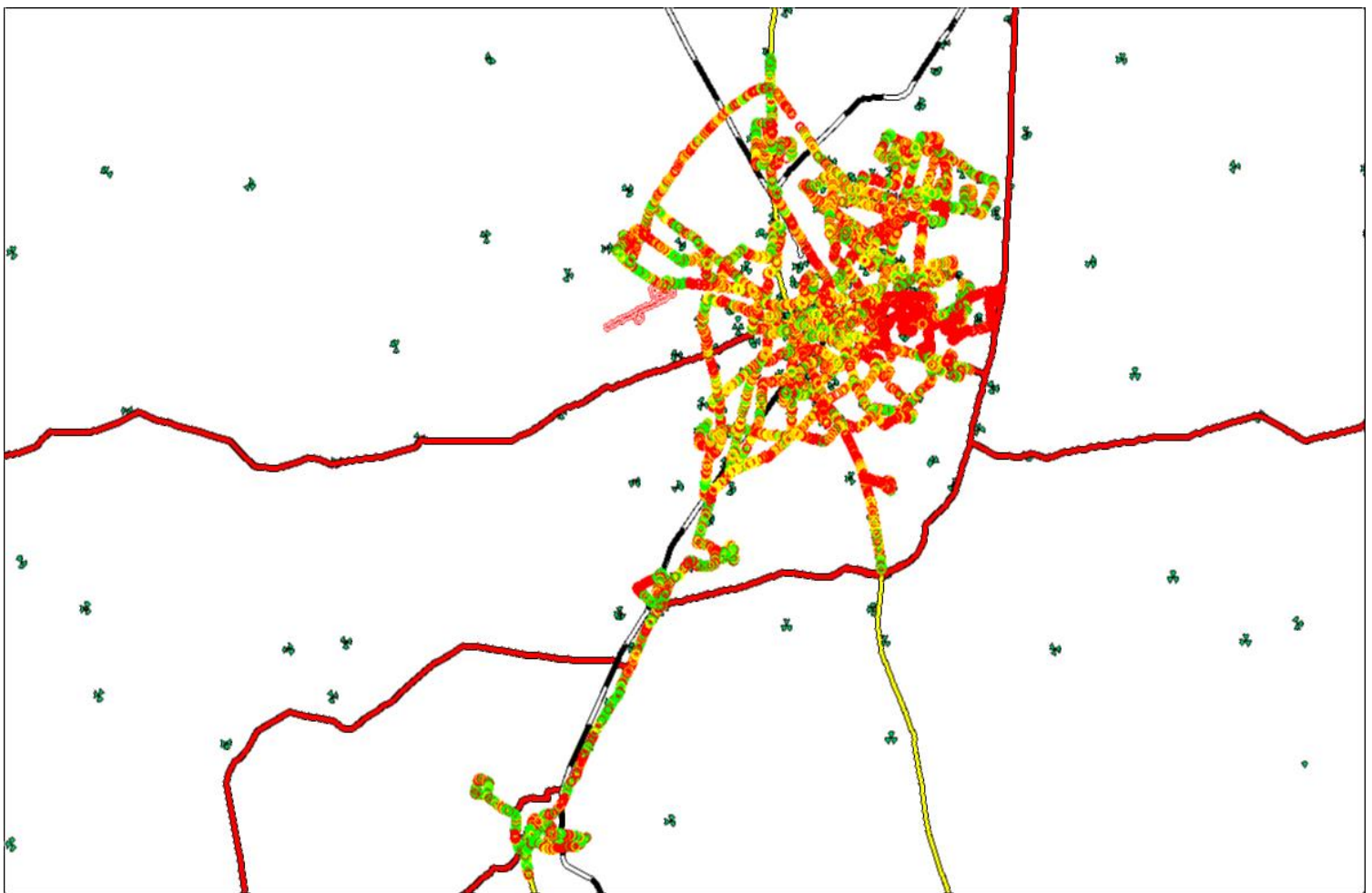
DL throughput	No of Sample	%	Legends
< 100 Kbps	41855	69.09	Red
100-150Kbps	6366	10.51	Orange
150-200Kbps	8613	14.22	Yellow
>200Kbps	3745	6.18	Green

Dynamic Data Test

TSP- BSNL

Data Statistics - Dynamic data testing - 390 Kms

Data KPIs - Overall	2G
Download Throughput (Kbps)	175 Kbps



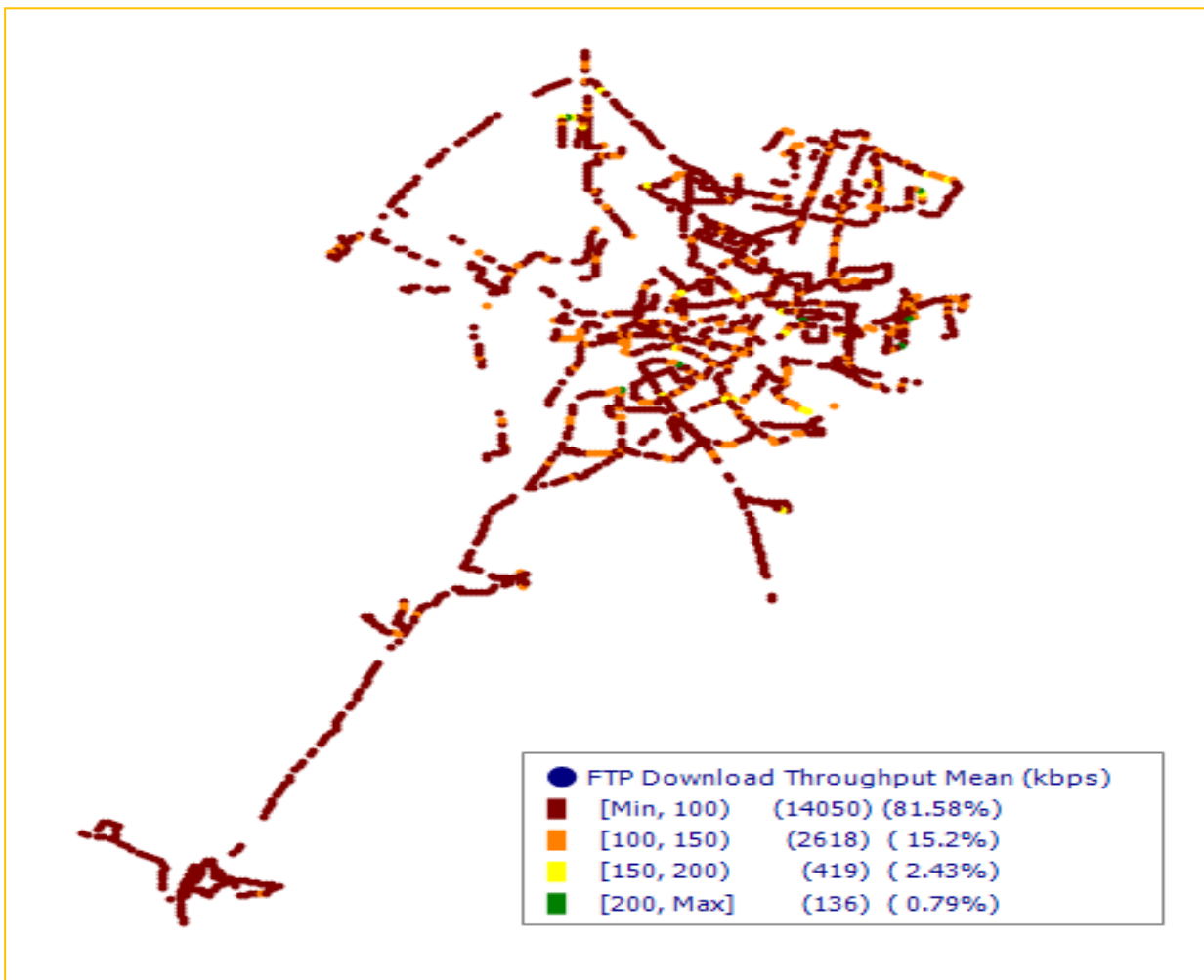
DL throughput	No of Sample	%	Legends
< 100 Kbps	3959582	22.74%	Red
100-150Kbps	3662952	21.03%	Orange
150-200Kbps	4867405	27.95%	Yellow
>200Kbps	4923793	28.28%	Green

Dynamic Data Test

TSP- VIL

Data Statistics - Dynamic data testing - 390 Kms

Data KPIs - Overall	2G
Download Throughput (Kbps)	62.57



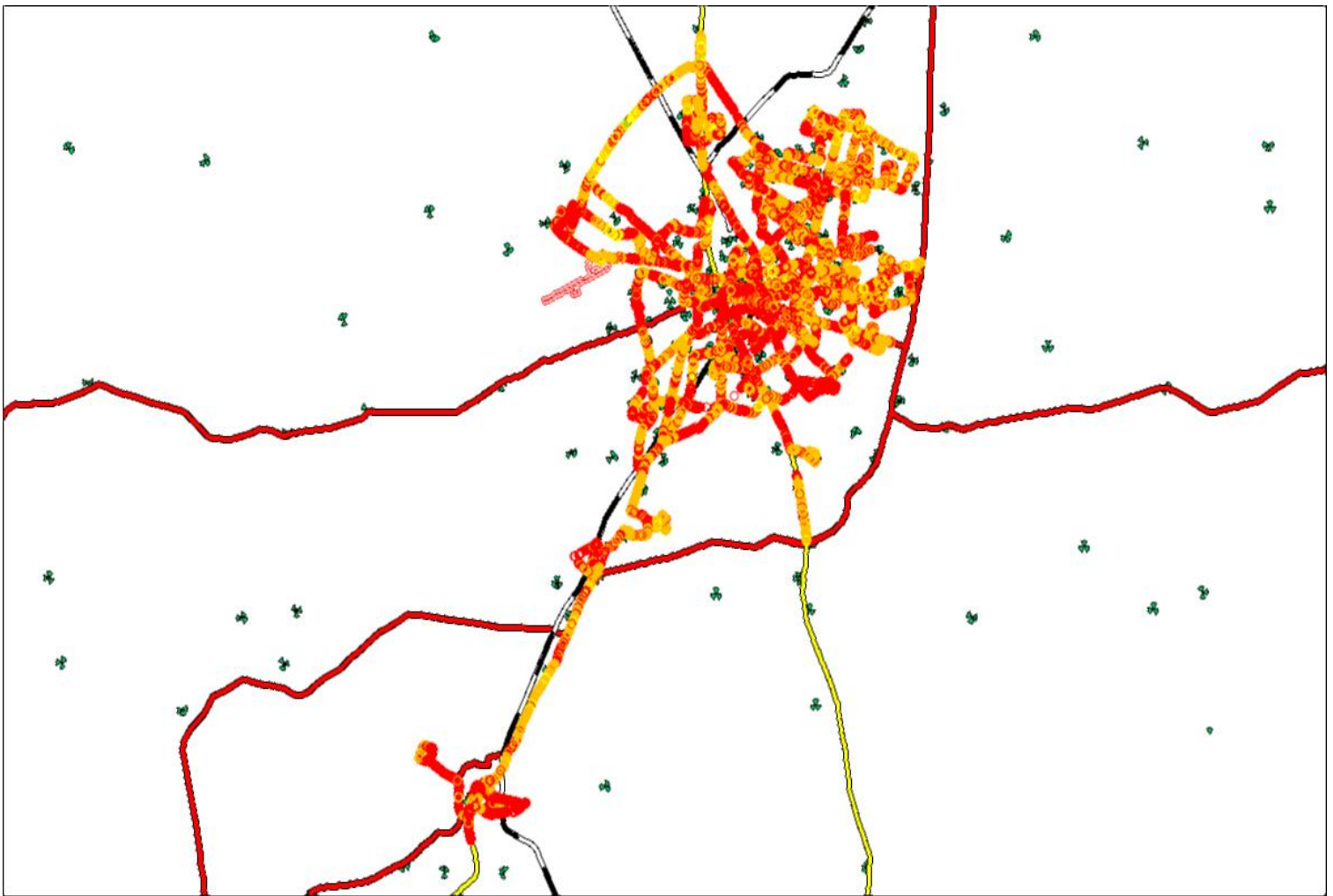
DL throughput	No of Sample	%	Legends
< 100 Kbps	14050	81.58%	
100-150Kbps	2618	15.2%	
150-200Kbps	419	2.43%	
>200Kbps	136	0.79%	

Dynamic Data Test

TSP-BSNL

Data Statistics - Dynamic data testing - 390 Kms

Data KPIs - Overall	3G
Download Throughput (Mbps)	2.43 Mbps

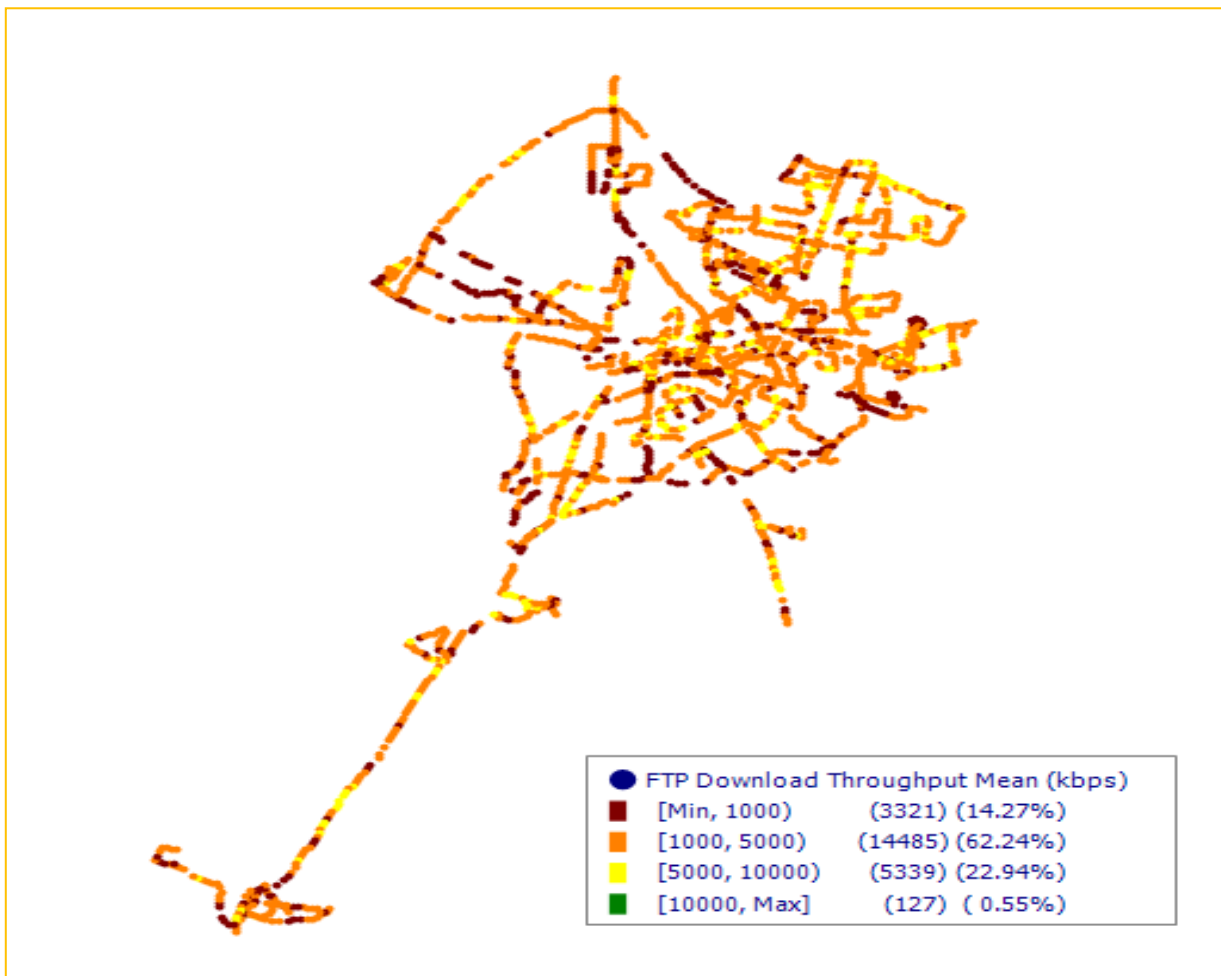


DL throughput	No of Sample	%	Legends
< 1 Mbps	2990032	44.50%	Red
1-5 Mbps	3416844	50.85%	Orange
5-10 Mbps	295425	4.40%	Yellow
>10Mbps	16513	0.25%	Green

TSP-VIL

Data Statistics - Dynamic data testing - 390 Kms

Data KPIs - Overall	3G
Download Throughput (Mbps)	3.31



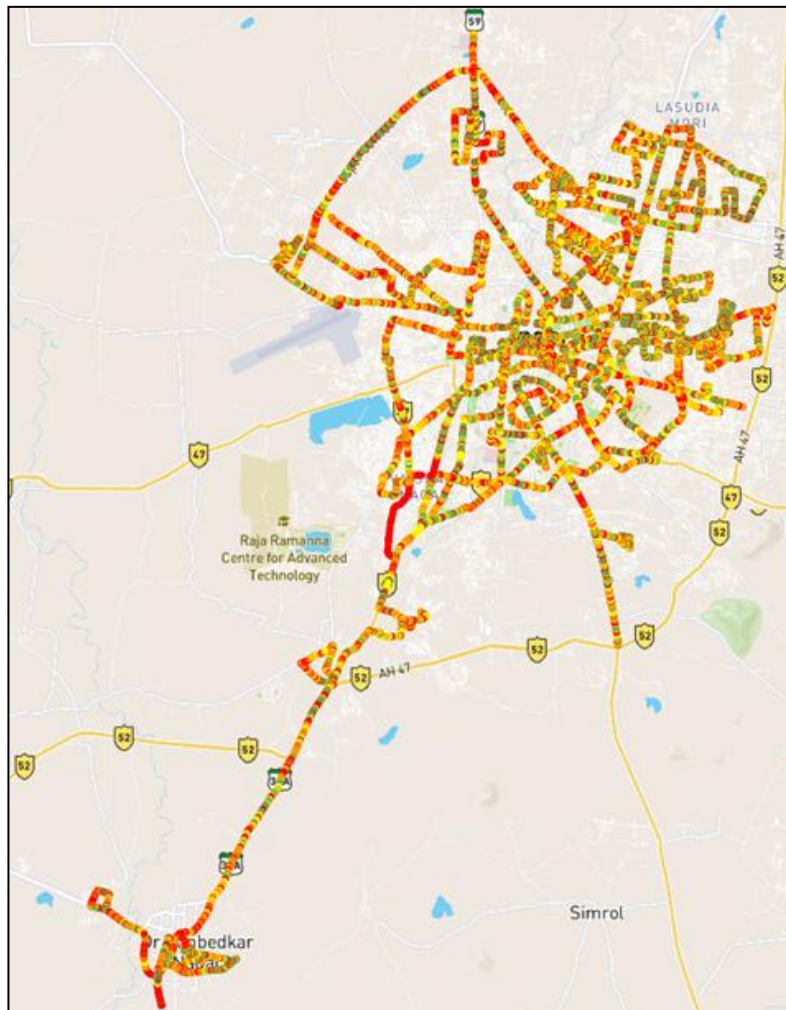
DL throughput	No of Sample	%	Legends
< 1 Mbps	3321	14.27%	■
1-5 Mbps	14485	62.24%	■
5-10 Mbps	5339	22.94%	■
>10Mbps	127	0.55%	■

Dynamic Data Test

TSP- Airtel

Data Statistics - Dynamic data testing - 390 Kms

Data KPIs - Overall	LTE
Download Throughput (Mbps)	11.84



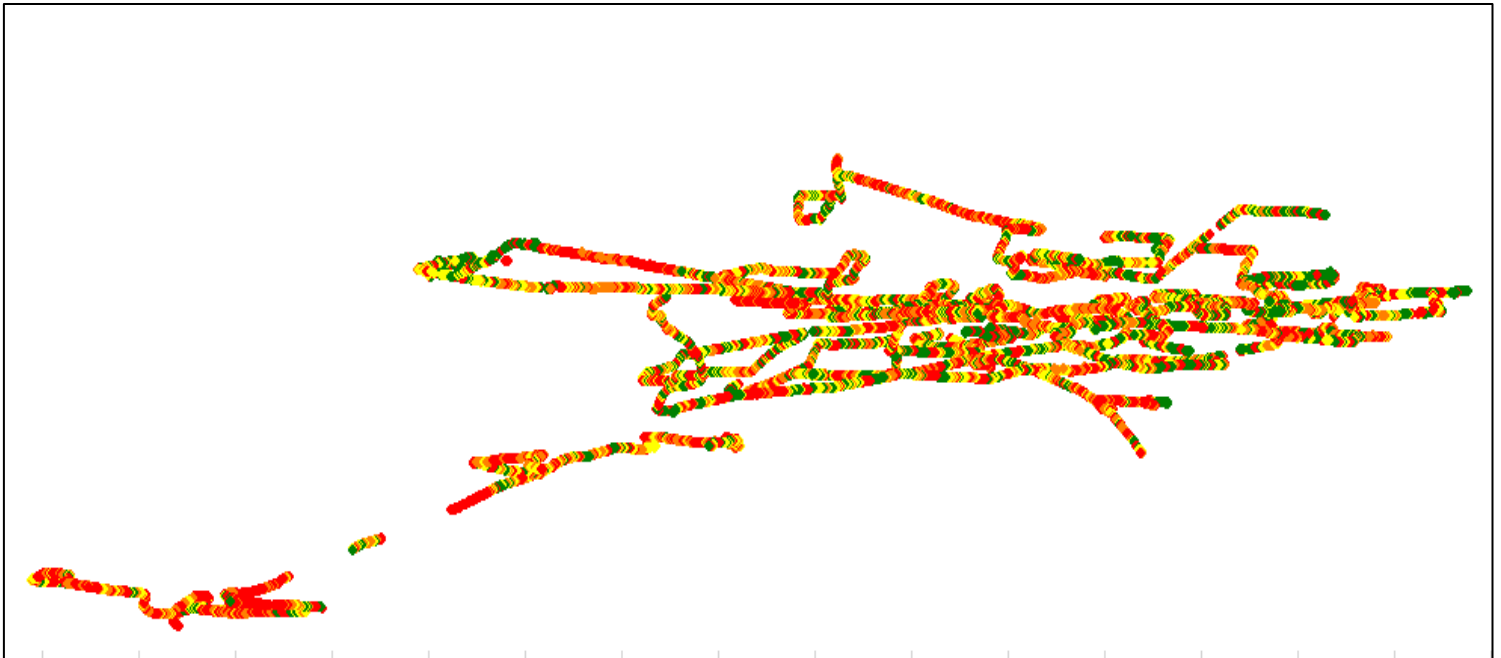
DL throughput	No of Sample	%	Legends
< 2Mbps	18414	23.71	Red
2-5 Mbps	18809	24.22	Orange
5-10 Mbps	20532	26.44	Yellow
>10Mbps	19896	25.62	Green

Dynamic Data Test

TSP- JIO

Data Statistics - Dynamic data testing - 390 Kms

Data KPIs - Overall	LTE
Download Throughput (Mbps)	6.93



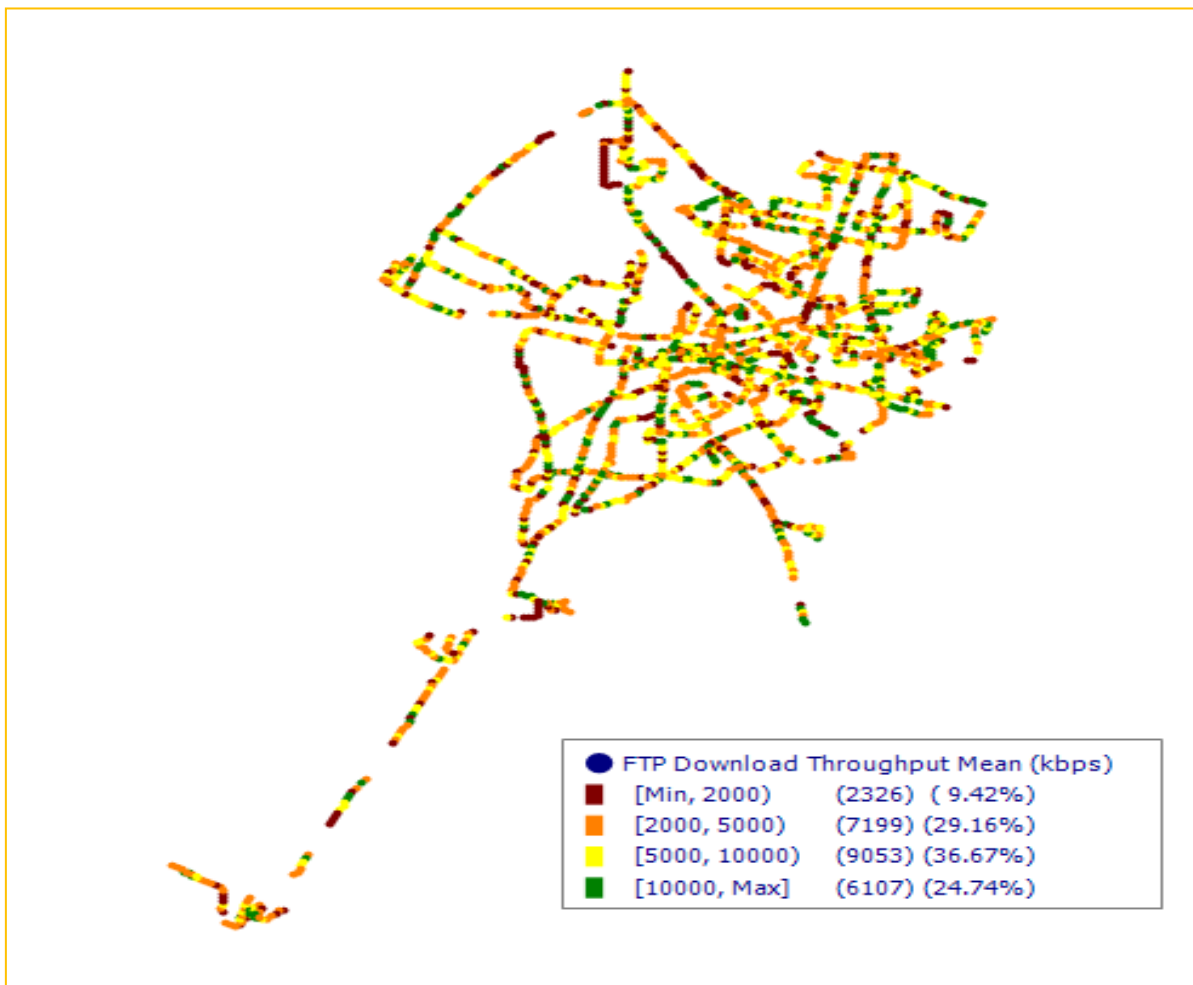
DL throughput	No of Sample	%	Legends
< 2Mbps	16026	30.15	Red
2-5 Mbps	12038	22.65	Orange
5-10 Mbps	11603	21.83	Yellow
>10Mbps	13490	25.38	Green

Dynamic Data Test

TSP- VIL

Data Statistics - Dynamic data testing - 390 Kms

Data KPIs - Overall	LTE
Download Throughput (Mbps)	7.53



DL throughput	No of Sample	%	Legends
< 2Mbps	2326	9.42%	
2-5 Mbps	7199	29.16%	
5-10 Mbps	9053	36.67%	
>10Mbps	6107	24.74%	

Data testing on hotspots using traимyspeed app

Hotspot		Airtel	BSNL	JIO	VIL
1.Vijaynagar churaha	2G download in Mbps	0.07	0.21	NA	0.22
	2G upload in Mbps	0.05	0.14	NA	0.31
	3G download in Mbps	NA	2.97	NA	7.78
	3G upload in Mbps	NA	2.15	NA	6.33
	4G download in Mbps	28.05	NA	17.56	93.11
	4G upload in Mbps	8.03	NA	5.22	37.62
2.Khajrana mandir	2G download in Mbps	0.21	0.21	NA	0.13
	2G upload in Mbps	0.05	0.06	NA	0.13
	3G download in Mbps	NA	4.57	NA	12.12
	3G upload in Mbps	NA	1.99	NA	9.08
	4G download in Mbps	26.63	NA	33.95	35.63
	4G upload in Mbps	22.10	NA	38.57	23.43

Data testing on hotspots using traимyspeed app

Hotspot		Airtel	BSNL	JIO	VIL
3. Rajwada	2G download in Mbps	0.06	0.34	NA	0.11
	2G upload in Mbps	0.01	0.24	NA	0.10
	3G download in Mbps	NA	7.93	NA	10.06
	3G upload in Mbps	NA	2.17	NA	9.10
	4G download in Mbps	9.91	NA	38.37	74.59
	4G upload in Mbps	4.30	NA	8.02	28.78
4. Railway station	2G download in Mbps	0.09	0.36	NA	0.16
	2G upload in Mbps	0.03	0.19	NA	0.23
	3G download in Mbps	NA	4.33	NA	7.28
	3G upload in Mbps	NA	2.06	NA	9.14
	4G download in Mbps	28.43	NA	18.13	44.67
	4G upload in Mbps	4.08	NA	3.60	6.32

Data testing on hotspots using traимyspeed app

Hotspot		Airtel	BSNL	JIO	VIL
5.Airport	2G download in Mbps	0.09	0.35	NA	0.13
	2G upload in Mbps	0.03	0.25	NA	0.14
	3G download in Mbps	NA	4.59	NA	12.16
	3G upload in Mbps	NA	2.23	NA	9.09
	4G download in Mbps	26.27	NA	48.32	65.64
	4G upload in Mbps	14.30	NA	7.40	19.79
6.Mhow	2G download in Mbps	0.21	0.27	NA	0.03
	2G upload in Mbps	0.12	0.19	NA	0.02
	3G download in Mbps	NA	5.18	NA	8.76
	3G upload in Mbps	NA	2.15	NA	7.60
	4G download in Mbps	34.99	NA	22.16	21.46
	4G upload in Mbps	3.63	NA	2.73	16.34