



प्रभावी विनियमन – सुगम संचार
Effective Regulation – Ease of Communication

Operator Assisted Drive Test Report Bilaspur City and nearby Area 28/01/2025 to 30/01/2025 By TRAI Regional Office Bhopal

The Operator Assisted Drive Test has been carried out by Regional Office, Bhopal with the help of Telecom Service Providers for Bilaspur City and surrounding areas from 9:00 AM to 8:00 PM from 28/01/2025 to 30/01/2025. The drive test covered drive route of around 320 KMs.

TSP	Network tested
Airtel	2G & VoLTE
BSNL	2G & VoLTE
JIO	VoLTE
VIL	2G, VoLTE

Key Performance Indicators:

KPI	Benchmark	Observations
Drop call rate %	$\leq 2\%$	All TSPs achieved the benchmark.
CSSR %	$\geq 98\%$	All TSPs achieved the benchmark except BSNL in 2G.
Mobility HOSR %	$\geq 95\%$	All TSPs achieved the benchmark except VIL in 2G.
Good RX Quality %	$\geq 95\%$	All TSPs achieved the benchmark except Airtel, BSNL and VIL in VoLTE.

Overview

Regional Office, TRAI Bhopal conducted Operator Assisted Drive Test. The performance of Airtel, BSNL, Vodafone Idea and Jio was monitored across various technologies (2G, 3G, 4G & 5G). 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:

- i. 2G – measurement – UE Locked in 2G
- ii. 3G – measurement – UE in Dual mode (2G and 3G)
- iii. 4G – measurement – UE in Free mode

Calls were made for the **120-sec** duration with a wait time of **10 sec** between calls in all technologies.

Data Tests:

Dynamic data – repeat data file download (to check throughput on the entire route)

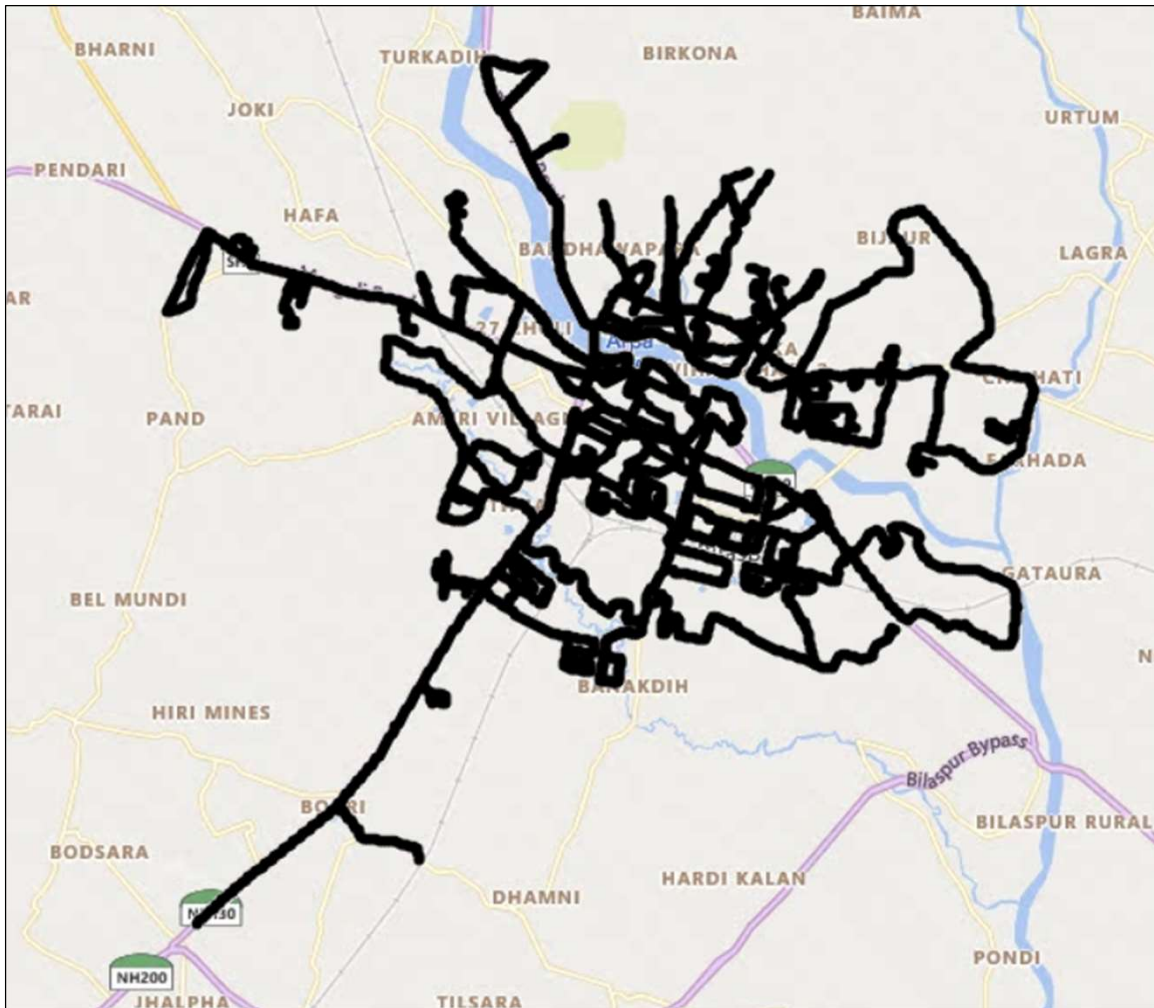
- i. 3G – measurement – UE in 3G File Size- 20MB
- ii. 4G – measurement – UE in LTE File Size- 40MB
- iii. 5G – measurement – UE in 5G File Size- 200MB

Static Data: Download and Upload Throughputs, Web Browsing Delay, Video Streaming Delay, and Latency

- i. Download- 3G - 20 MB, 4G - 40MB, 5G -200 MB
- ii. Upload - 3G - 5 MB, 4G - 10MB, 5G – 100 MB
- iii. Web browsing - 3 links of e-commerce websites <https://www.amazon.in>, <https://www.flipkart.com>, <https://paytm.com>.
- iv. Video Streaming – 130 sec clip
- v. Latency – 32 Bytes on www.google.com.

Overview

Voice & Dynamic Data Test Drive Route



List of important area covered during the drive test

APOLLO HOSPITAL ,R.K NAGAR, MOPKA, VASANT VIHAR, GGU KONI,
SARKANDA, OLD BUS STAND, USLAPUR,TIFRA, SIRGITTI INDUSTRIAL AREA,
CHAKARBHATA, BODRI HIGH COURT, BILASPUR RAILWAY STATION, TARBAHAR,
CHOWKSEY ENGG COLL, SANKAR NAGAR, BANNAK , VYAPAR VIHAR,
TIFRA INDUSTRIAL AREA

Overview

Data Service Test- Static Locations

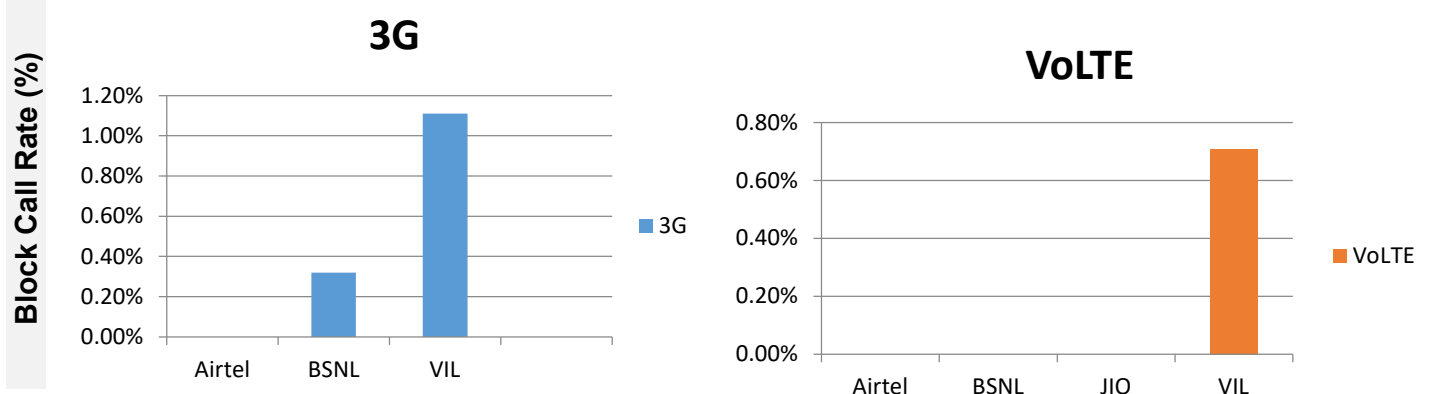
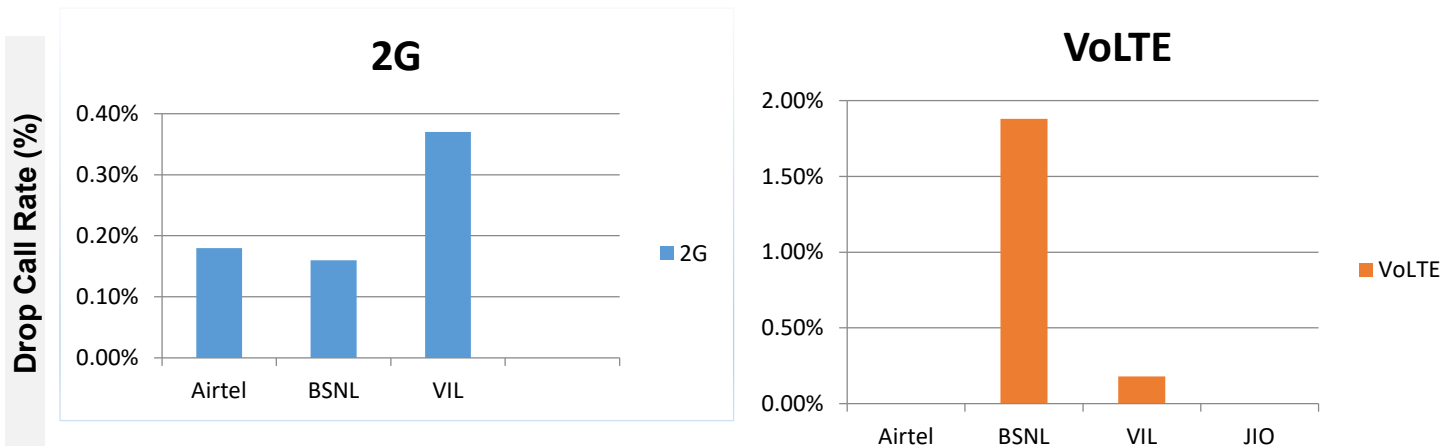


Hotspot Locations
1. Uslapur Railway Station
2. Bilaspur Railway Station
3. Bodri High Court
4. Guru Ghasidas Vishwavidyalaya
5. Bilaspur Old Bus Stand
6. Apollo Hospital

Voice Calls

Key Observations

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



KPIs	2G			VoLTE			
	Airtel	BSNL	VIL	Airtel	BSNL	RJIL	VIL
Drop Call Rate %	0.18	0.16	0.37	0	1.88	0	0.18
Block Call Rate %	0	0.32	1.11	0	0.0	0	0.71

- a) All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%)
- b) Call Block Rate (CBR%) benchmark of 2% 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 %	63.30	92.39	84.23

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

TSPs	3G
	BSNL
Coverage %	NA

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

TSPs	VoLTE			
	Airtel	BSNL	JIO	VIL
Coverage %	98.06	94.65	99.79	89.9

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

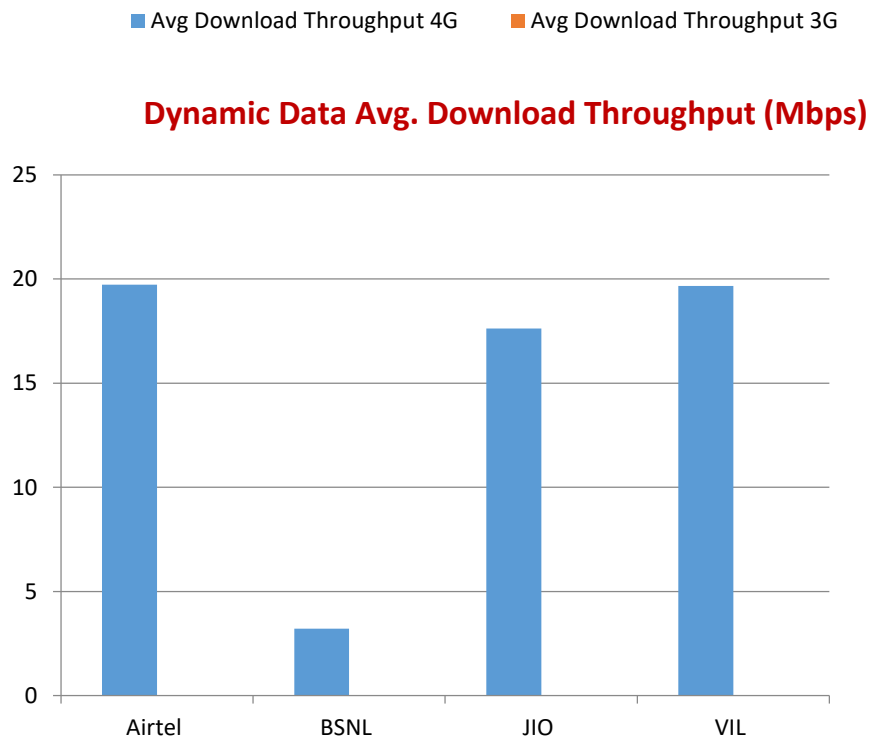
TSPs	VoLTE			
	Airtel	BSNL	VIL	JIO
Time Spent on 3G/4G %	100	95.08	83.27	100

Data Services Dynamic

Key Observations

Dynamic Data -Download Throughput was tested.

Data Download Performance – Dynamic 3G/4G/ 5G Network



TSP	Airtel	BSNL	JIO	VIL
Average Download throughput-LTE in Mbps	19.73	3.22	17.63	19.67
Average Download throughput- 5G in Mbps	NA	NA	NA	NA

Summary

City Level Summary- Voice

TSP (For 2G)	Airtel	BSNL	VIL
Call attempts	544	627	541
Block call rate %	0	0.32	1.11
CSSR %	100	97.93	98.89
Drop call rate %	0.18	0.16	0.37
Mobility HOSR %	97.51	98.24	93.33
RX Quality %	98.39	98.37	95.36
Average CST Sec	3.79	5.16	2.55

TSP (For Volte)	Airtel	BSNL	JIO	VIL
Call attempts	575	542	552	560
Block call rate %	0	0.0	0	0.71
CSSR %	100	98.34	100	99.29
Drop call rate %	0	1.88	0	0.18
Mobility HOSR %	99.94	95.35	99.25	96.74
RX Quality %	90.68	68.74	96.82	91.68
Average CST(Sec)	1.60	6.56	0.71	0.88

Summary

City Level Summary- Data Services -Static

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	17.42	4.76	27.4	26.77
Upload Throughput in Mbps	4.29	3.52	6.68	20.66
Video streaming delay in sec	0.74	NA	0	1.06
Web browsing delay in second	1.83	0.023	2	5.80
Latency in (msec)	55.69	44.72	51.65	72.3

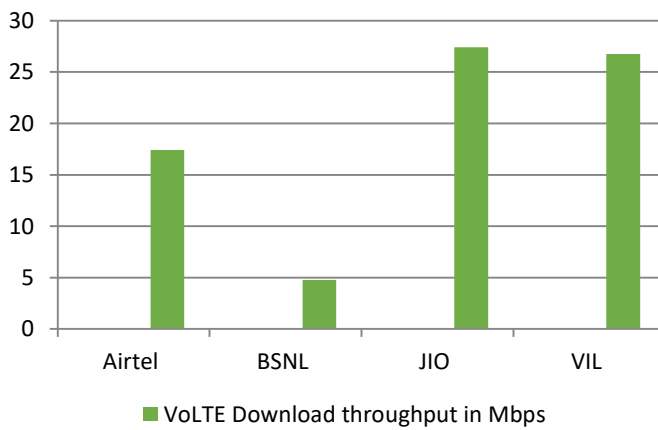
Data Services Static

Key Observations

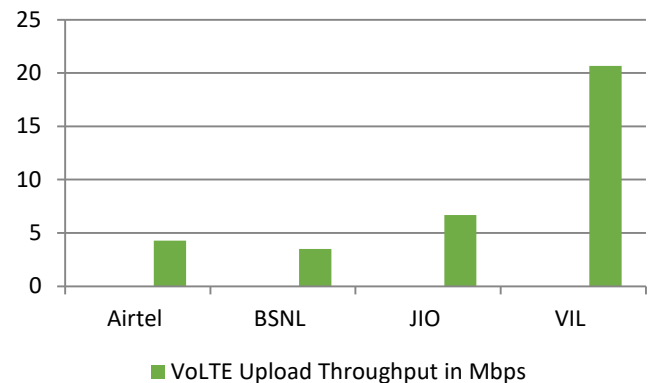
Data was tested at 6 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, PayTm)

3G/4G/ 5G Network

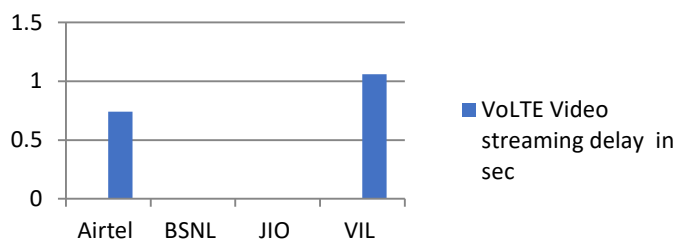
Static Avg. Data download throughput



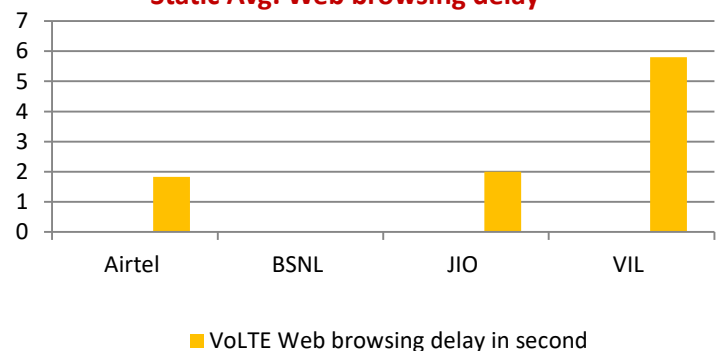
Static Avg. Data Upload Throughput



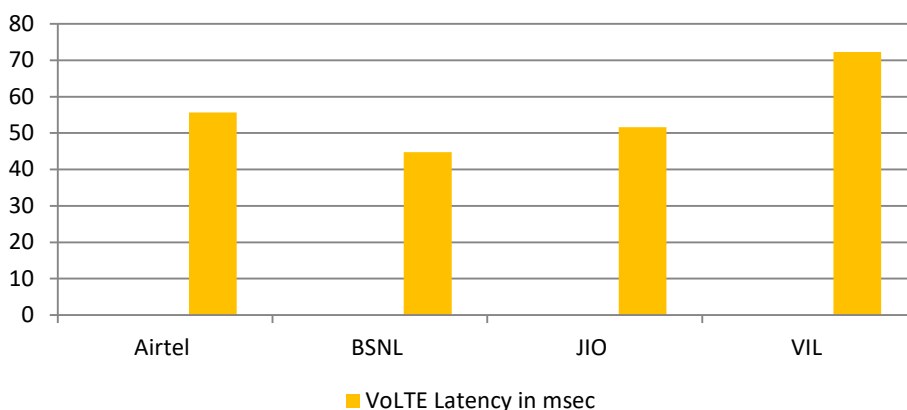
Static Avg. Video Streaming Delay



Static Avg. Web browsing delay



Static Latency in (msec)



1. Hotspot Location- Apollo Hospital

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	11.81	4.29	24	10.83
Upload Throughput in Mbps	4.76	2.87	9.22	10.46
Video streaming delay in sec	0.64	NA	0	0.94
Web browsing delay in second	1.80	0.02	2.0	7.2
Latency in (msec)	51.54	50.94	26	77

2. Hotspot Location- Guru Ghasidas University

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	19.52	4.14	43.01	21.47
Upload Throughput in Mbps	4.03	2.74	10.25	11.67
Video streaming delay in sec	0.89	NA	0	1.15
Web browsing delay in second	1.87	0.02	1.8	5.1
Latency in (msec)	53.23	44.42	24.4	51

3. Hotspot Location- Old Bus Stand

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	16.58	7.95	18.95	32.19
Upload Throughput in Mbps	4.38	4.13	4.46	36.07
Video streaming delay in sec	0.71	NA	0	1.11
Web browsing delay in second	1.90	0.02	2.1	5.56
Latency in (msec)	52.43	47.26	25.1	76

4. Hotspot Location- Uslapur Railway Station

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	19.95	4.11	38.68	40.91
Upload Throughput in Mbps	4.32	2.92	8.38	33.67
Video streaming delay in sec	0.78	NA	0	0.89
Web browsing delay in second	1.80	0.03	2.1	5.41
Latency in (msec)	56.43	41.70	26.1	70

5. Hotspot Location- Bodri High Court

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	22.76	3.46	10.45	26.31
Upload Throughput in Mbps	3.79	2.91	2.78	11.48
Video streaming delay in sec	0.81	NA	0	1.17
Web browsing delay in second	1.78	0.02	2.1	5.93
Latency in (msec)	67.22	42.30	22.3	63

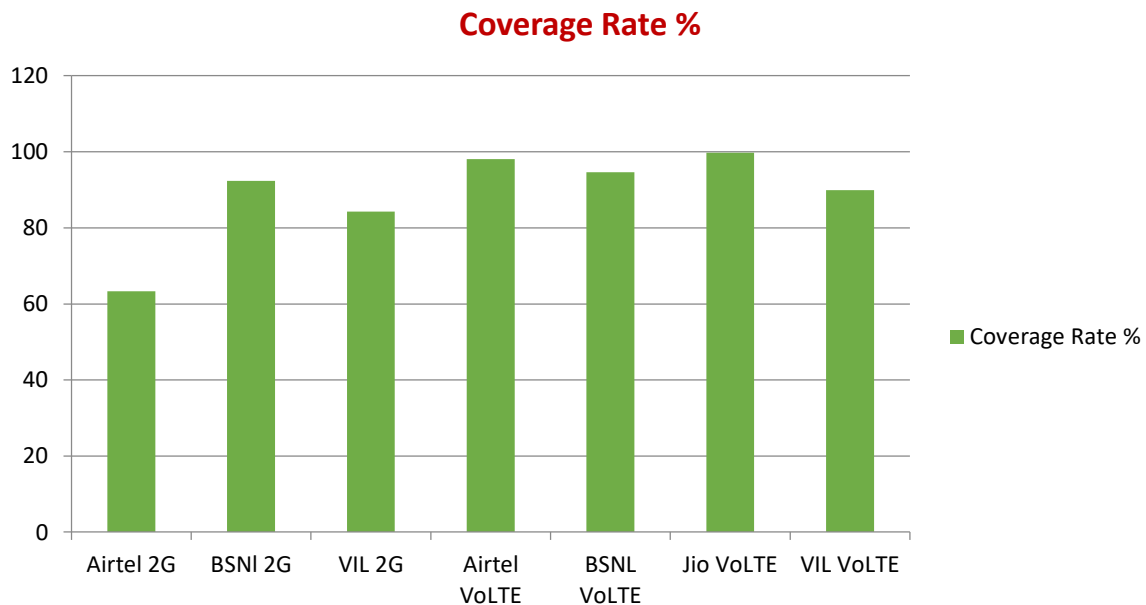
6. Hotspot Location- Bilaspur Railway Station

	LTE			
	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	13.87	4.61	29.32	28.93
Upload Throughput in Mbps	4.44	5.52	5.04	20.61
Video streaming delay in sec	0.59	NA	0	1.14
Web browsing delay in second	1.81	0.03	1.9	5.62
Latency in (msec)	53.31	41.70	25.5	97

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.

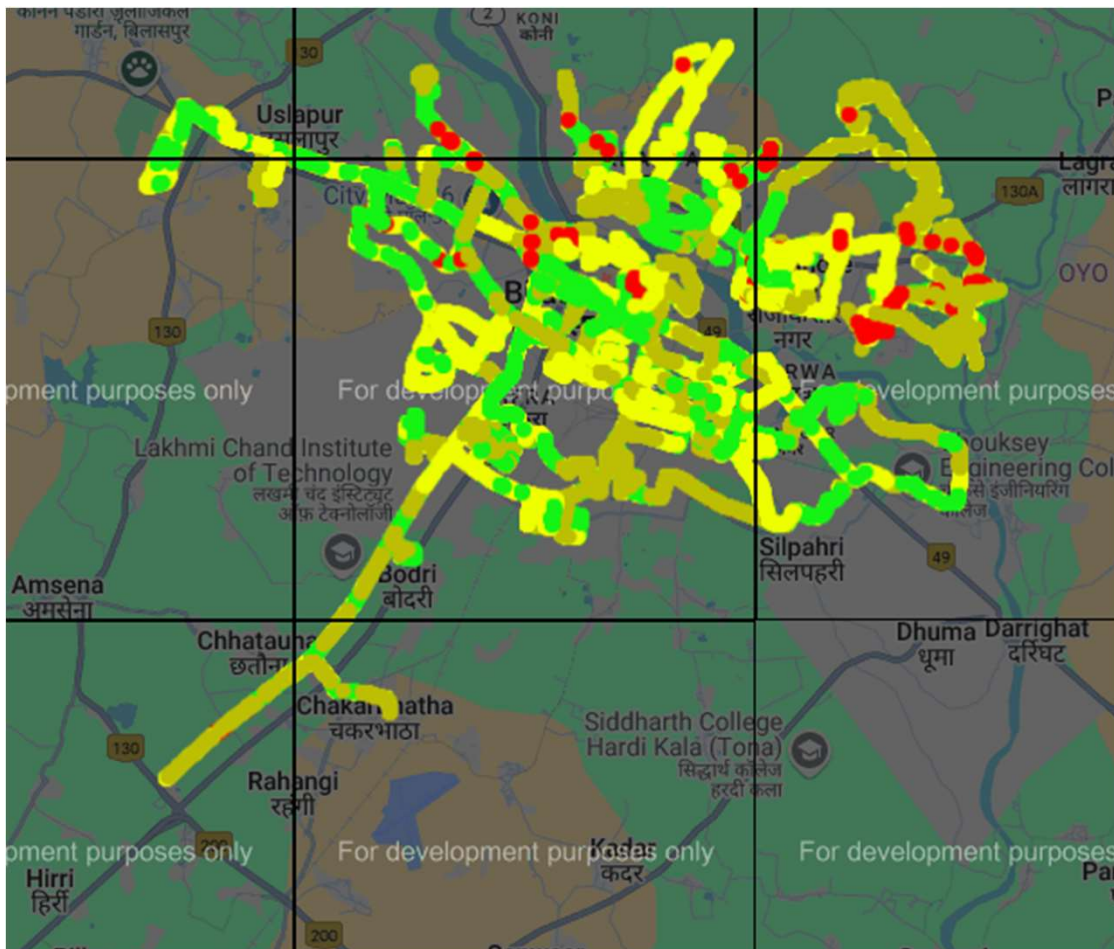
TSP	Coverage Rate %
Airtel 2G	63.30
BSNI 2G	92.39
VIL 2G	84.24
Airtel VoLTE	98.06
BSNL VoLTE	94.65
Jio VoLTE	99.79
VIL VoLTE	89.9



Coverage Details

TSP- AIRTEL

Technology	Coverage %
2G	63.30

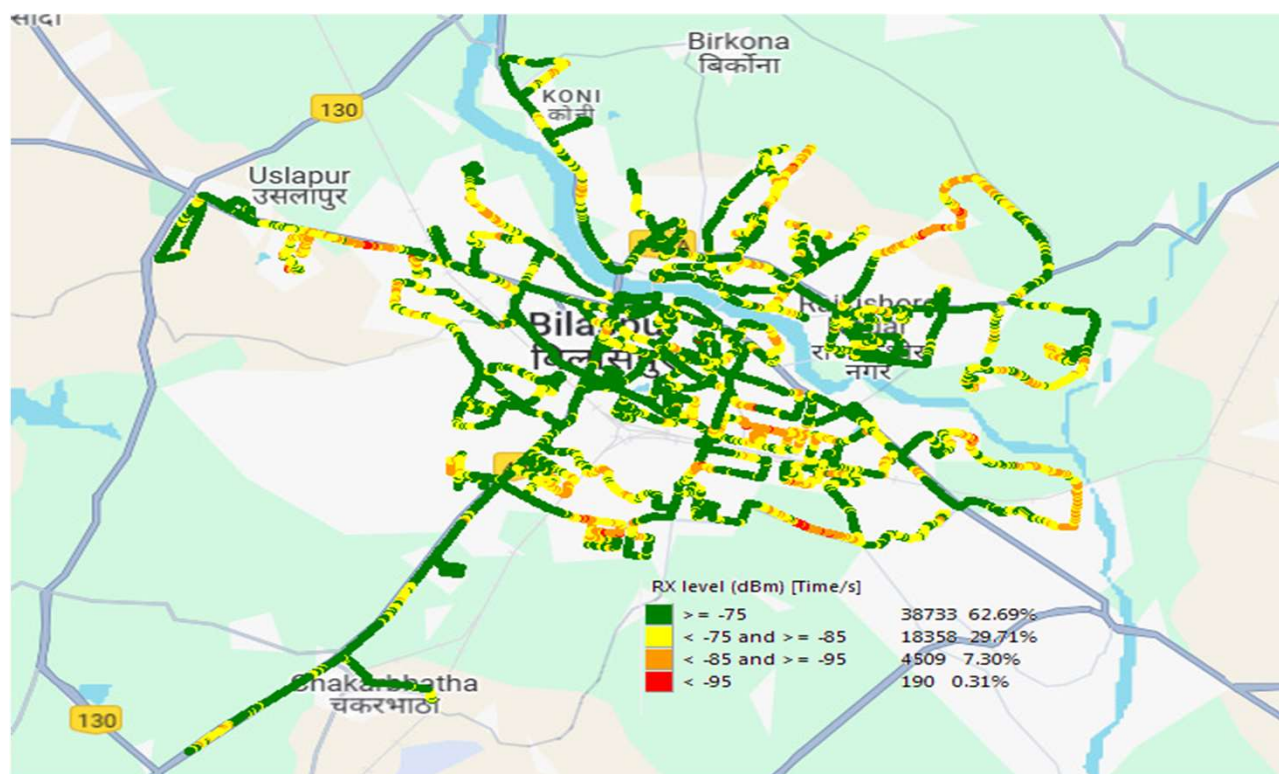


Color	Range	Count	Per
	[Min to -95]	(469)	(1.56%)
	[-95 to -85]	(10547)	(35.14%)
	[-85 to -75]	(10239)	(34.11%)
	[-75,0]	(8763)	(29.19%)

Coverage Details

TSP- BSNL

Technology	Coverage %
2G	92.39

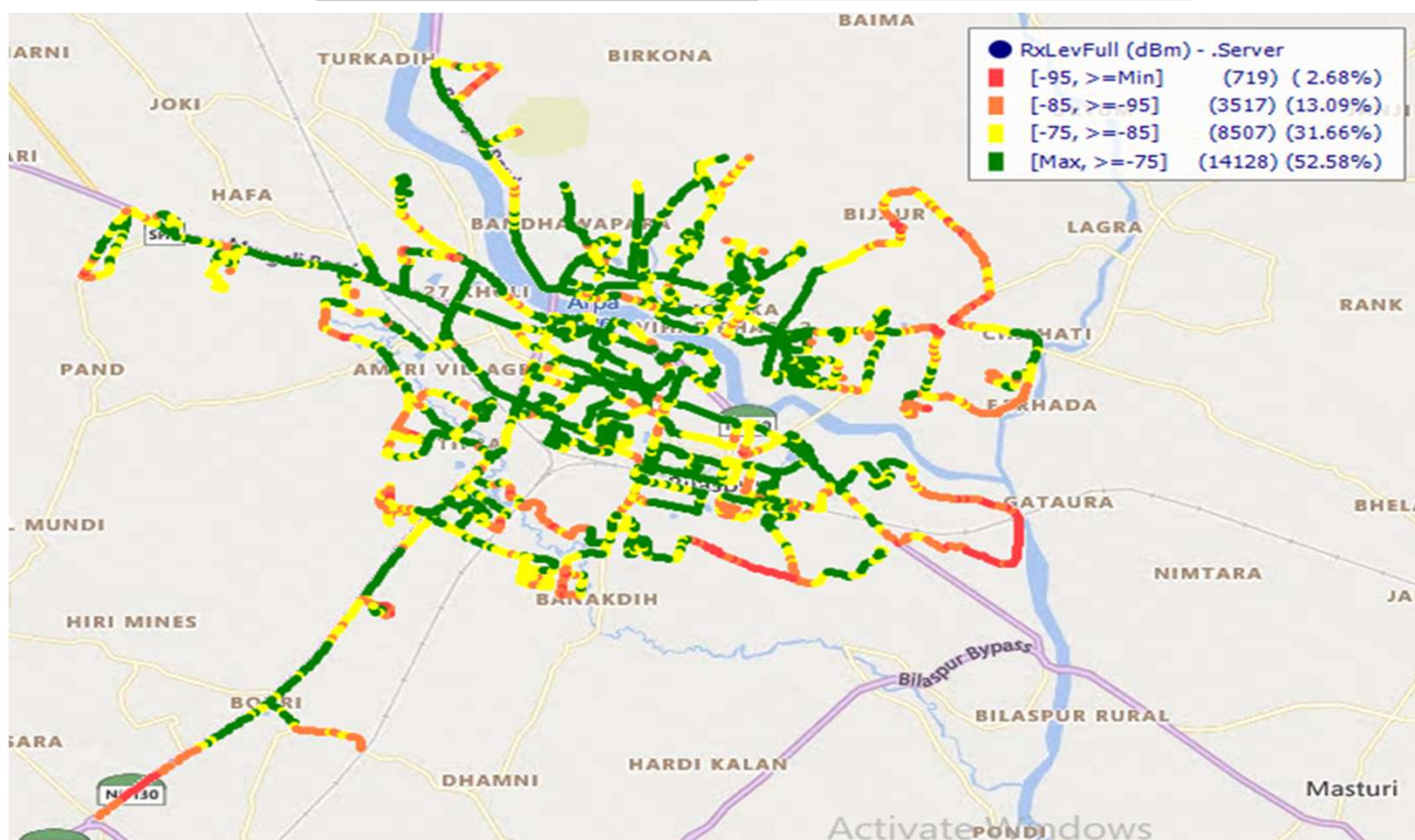


2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	38733	62.69%	
[-75, >=-85)	18358	29.71%	
[-85, >=-95)	4509	7.30%	
[-95, >=Min)	190	0.31%	
Total			

Coverage Details

TSP-VI

Technology	Coverage %
2G	84.24

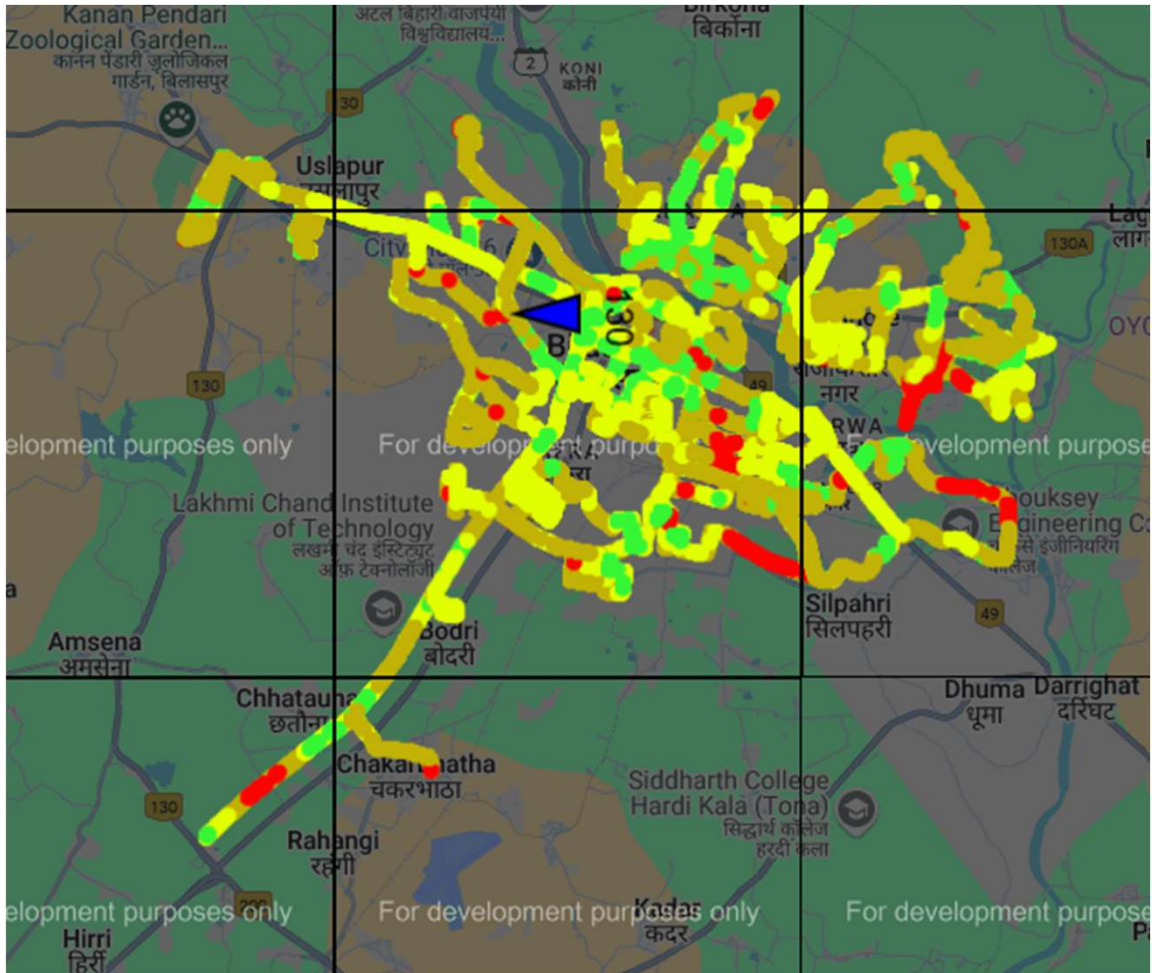


2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	14128	52.58	
[-75, >=-85)	8507	31.66	
[-85, >=-95)	3517	13.09	
[-95, >=Min)	719	2.68	
Total	26871	100	

Coverage Details

TSP- AIRTEL

Technology	Coverage %
VoLTE	98.06

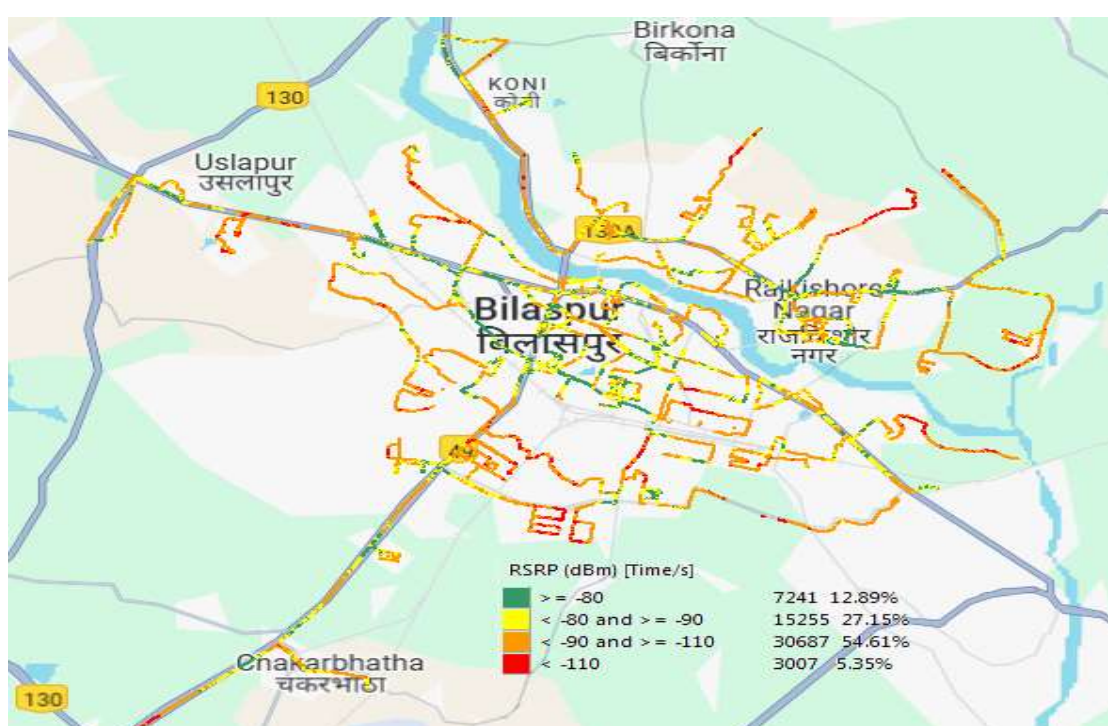


Color	Range	Count	Per
Red	[140, -110]	(587)	(1.94%)
Orange	[-110, -90]	(16491)	(54.42%)
Yellow	[-90, -80]	(10423)	(34.39%)
Green	[-80, 0]	(2803)	(9.25%)

Coverage Details

TSP-BSNL

Technology	Coverage %
VoLTE	94.65

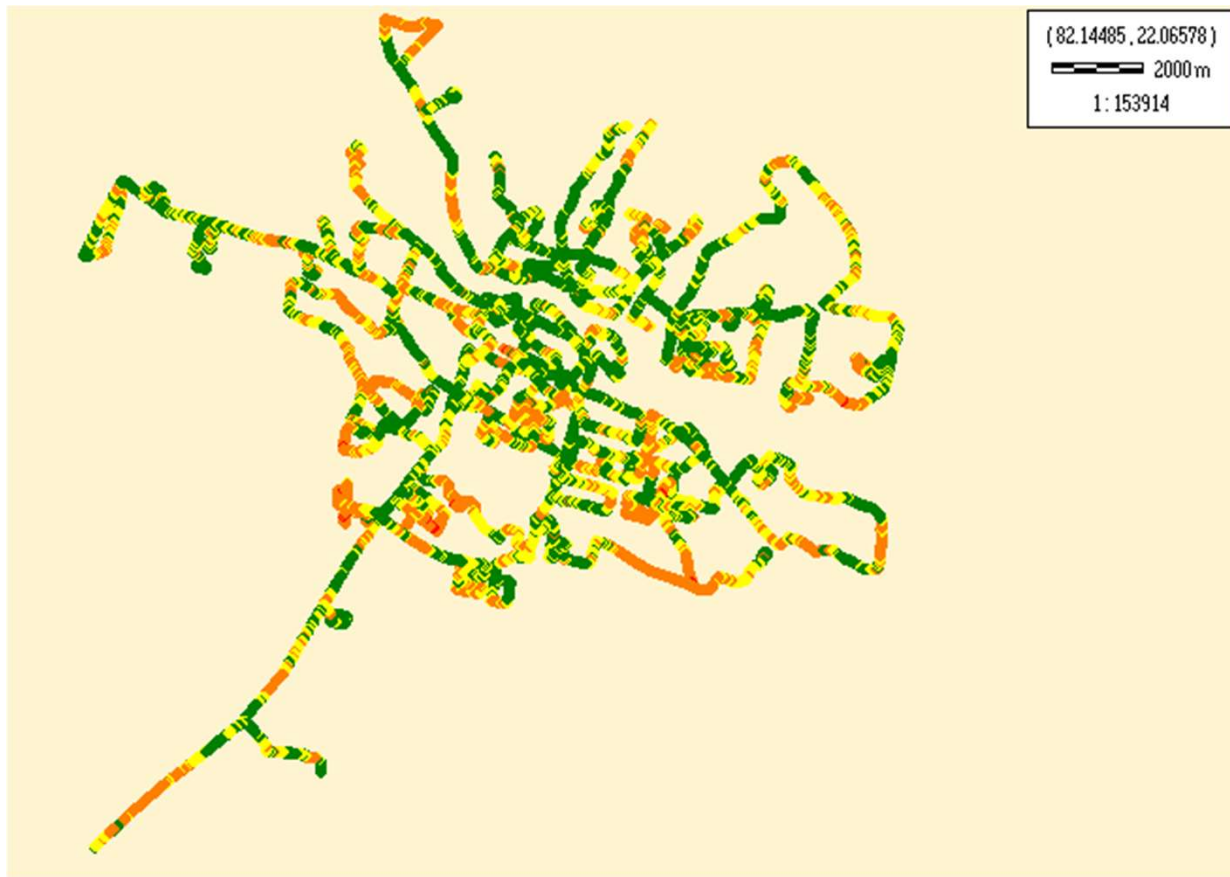


VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	7241	12.89	Green
[-80, >=-90)	15255	27.15	Yellow
[-90, >=-110)	30687	54.61	Orange
[-110, >=Min)	3007	5.35	Red
Total			

Coverage Details

TSP-JIO

Technology	Coverage %
VoLTE	99.79

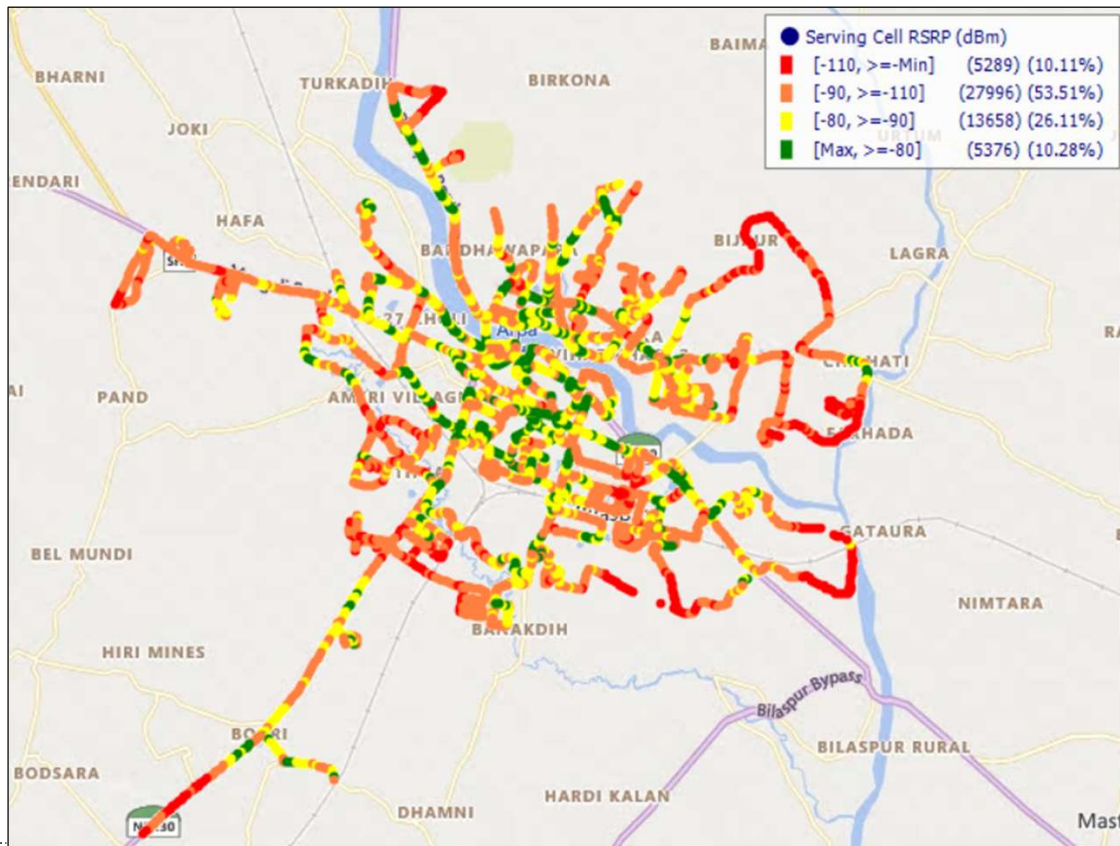


Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	28707	45.5	
[-80, >=-90)	20971	33.2	
[-90, >=-110)	13281	21.05	
[-110, >=Min)	130	0.21	
Total	63089	100	

Coverage Details

TSP-VI

Technology	Coverage %
VoLTE	89.9



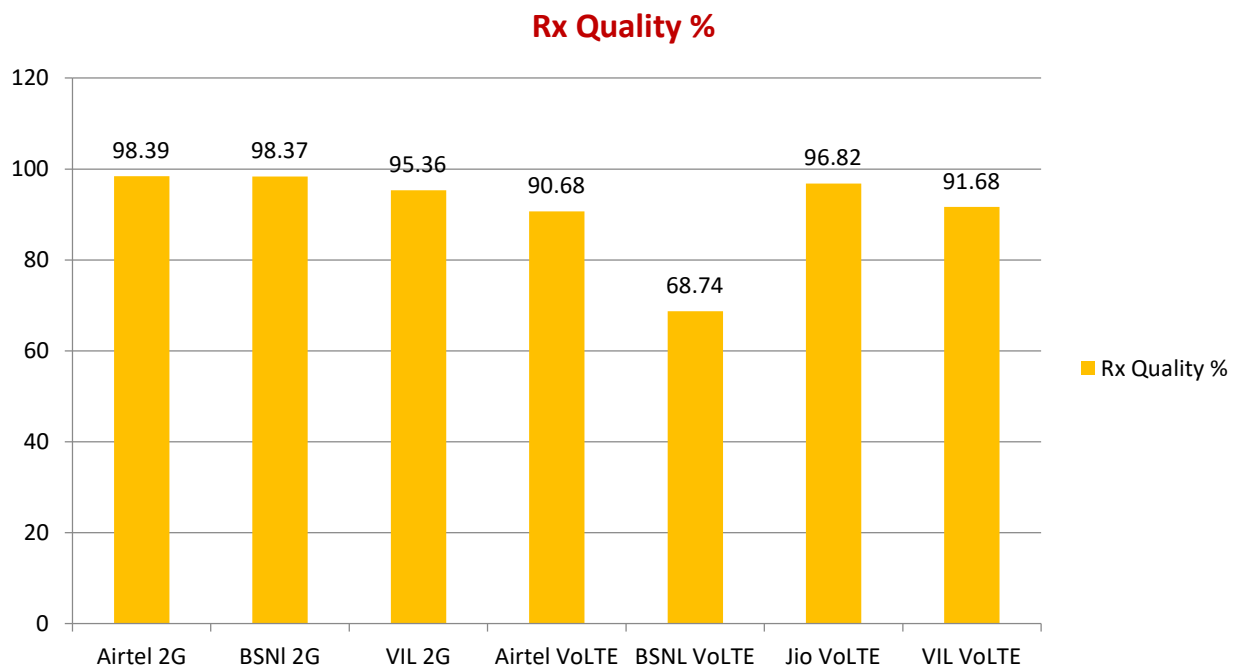
VoLTE

Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	5376	10.28	
[-80, >=-90)	13658	26.11	
[-90, >=-110)	27996	53.51	
[-110, >=Min)	5289	10.11	
Total	52318	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	Rx Quality %
Airtel 2G	98.39
BSNI 2G	98.37
VIL 2G	95.36
Airtel VoLTE	90.68
BSNL VoLTE	68.74
Jio VoLTE	96.82
VIL VoLTE	91.68

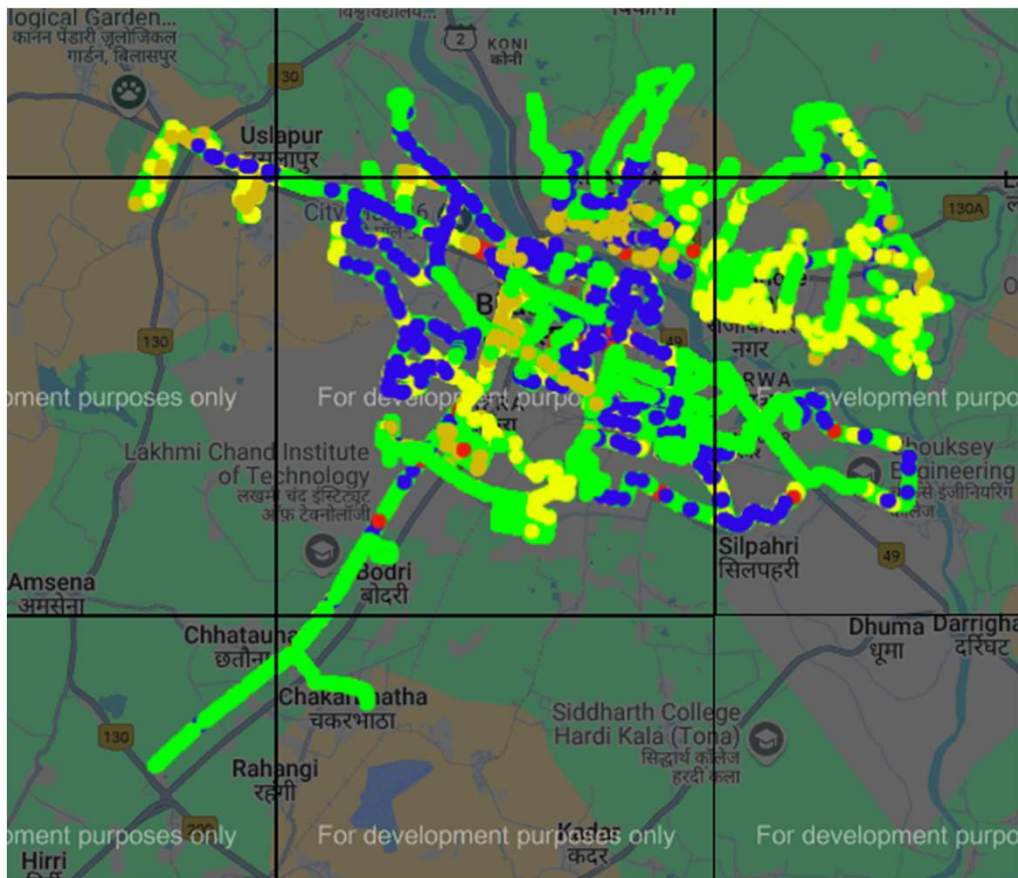


Quality Details

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	98.39



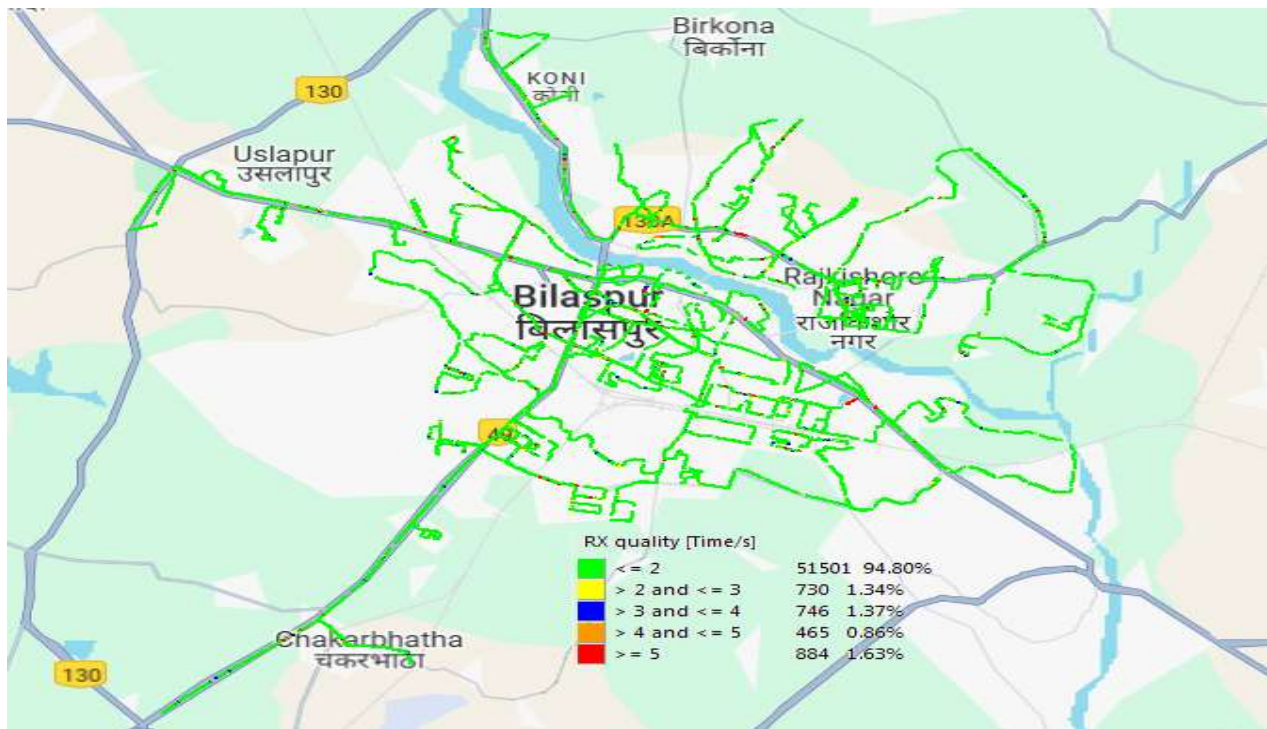
Color	Range	Count	Per
Green	[Min, 2)	(20366)	(77.18%)
Yellow	[2, 3)	(2419)	(9.17%)
Blue	[3, 4)	(1908)	(7.23%)
Orange	[4, 6)	(1271)	(4.82%)
Red	[6, Max)	(424)	(1.61%)

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	98.37



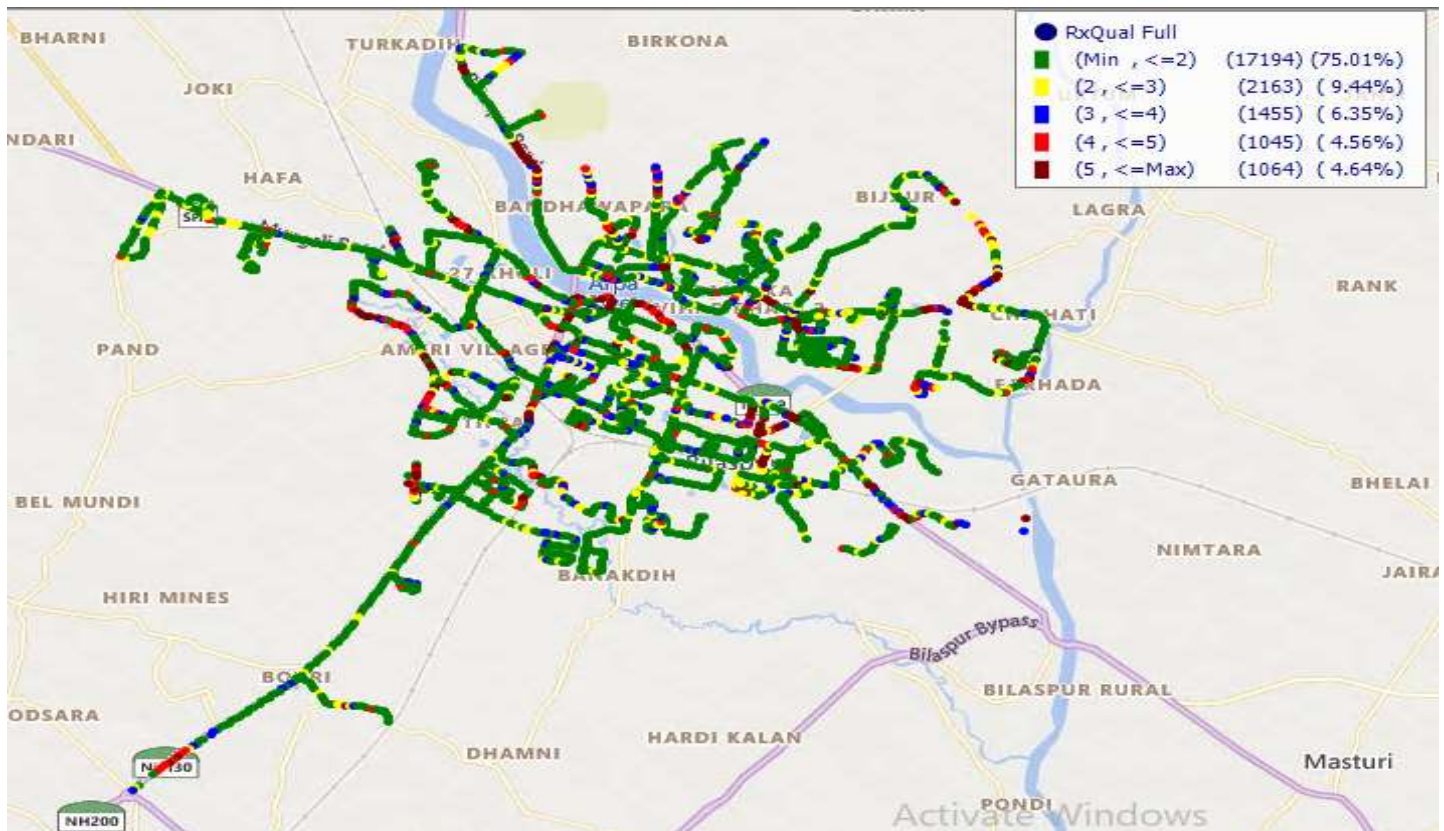
Overall Rx Quality	# Samples	% PDF	Legends
(Min, ≤ 2)	51501	94.80	
(2, ≤ 3)	730	1.34	
(3, ≤ 4)	746	1.37	
(4, ≤ 5)	465	0.86	
(5, \leq Max)	884	1.63	
Total			

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	95.36



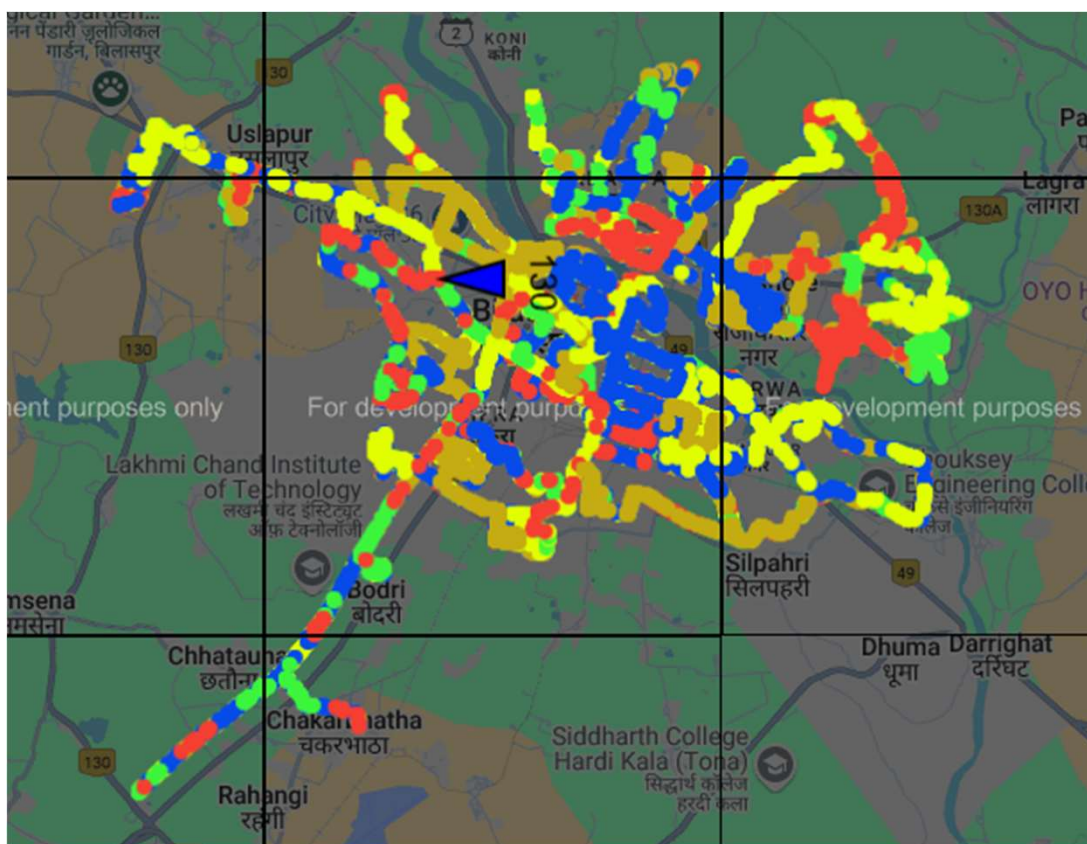
Overall Rx Quality	# Samples	% PDF	Legends
(Min, ≤ 2)	17194	75.01	
(2, ≤ 3)	2163	9.44	
(3, ≤ 4)	1455	6.35	
(4, ≤ 5)	1045	4.56	
(5, $\leq \text{Max}$)	1064	4.64	
Total	22921	100	

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- AIRTEL

Technology	Rx Quality %
VoLTE	90.68



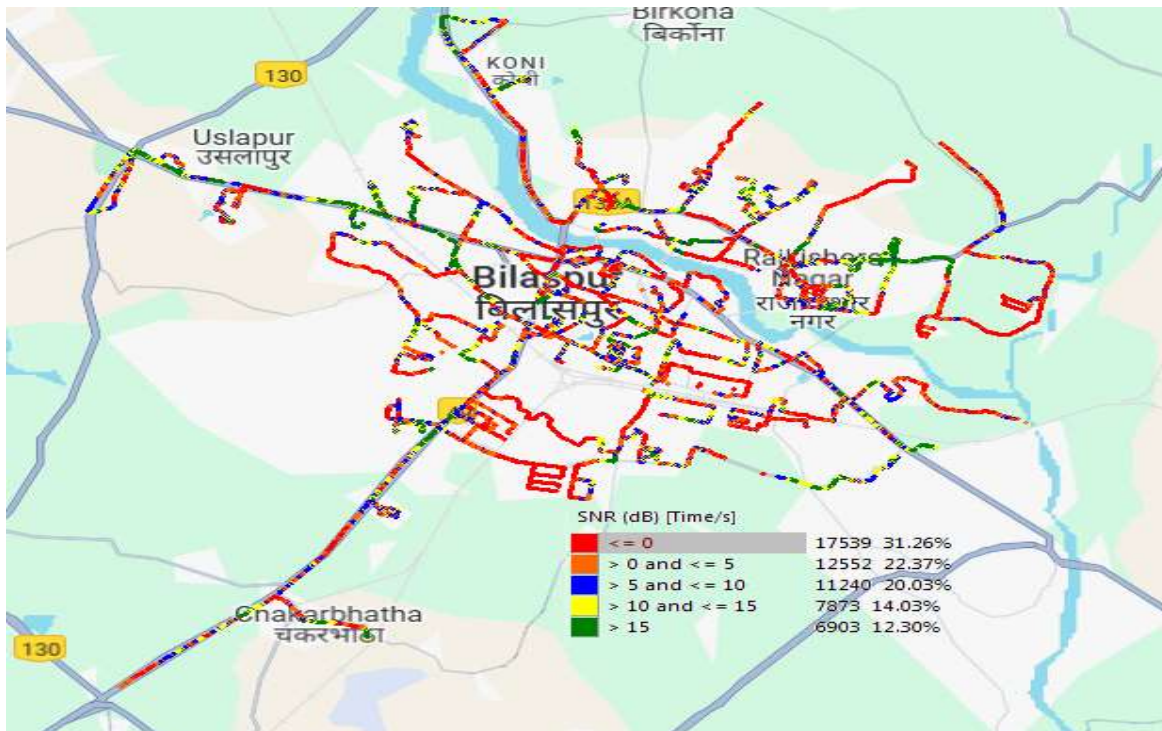
Color	Range	Count	Per
Red	Min, 0)	(2818)	(9.32%)
Yellow	(0, 5)	(8254)	(27.31%)
Blue	(5, 10)	(10074)	(33.34%)
Green	(10, 15)	(6361)	(21.05%)
Orange	(15, Max)	(2713)	(8.98%)

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 %
VoLTE	68.74



Overall SINR	# Samples	% PDF	Legends
(Min, ≤ 0)	17539	31.26	
(0, ≤ 5)	12552	22.57	
(5, ≤ 10)	11240	20.03	
(10, ≤ 15)	7873	14.03	
(15, \leq Max)	6903	12.30	
Total			

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 JIO

Technology	Rx Quality %
VoLTE	96.82



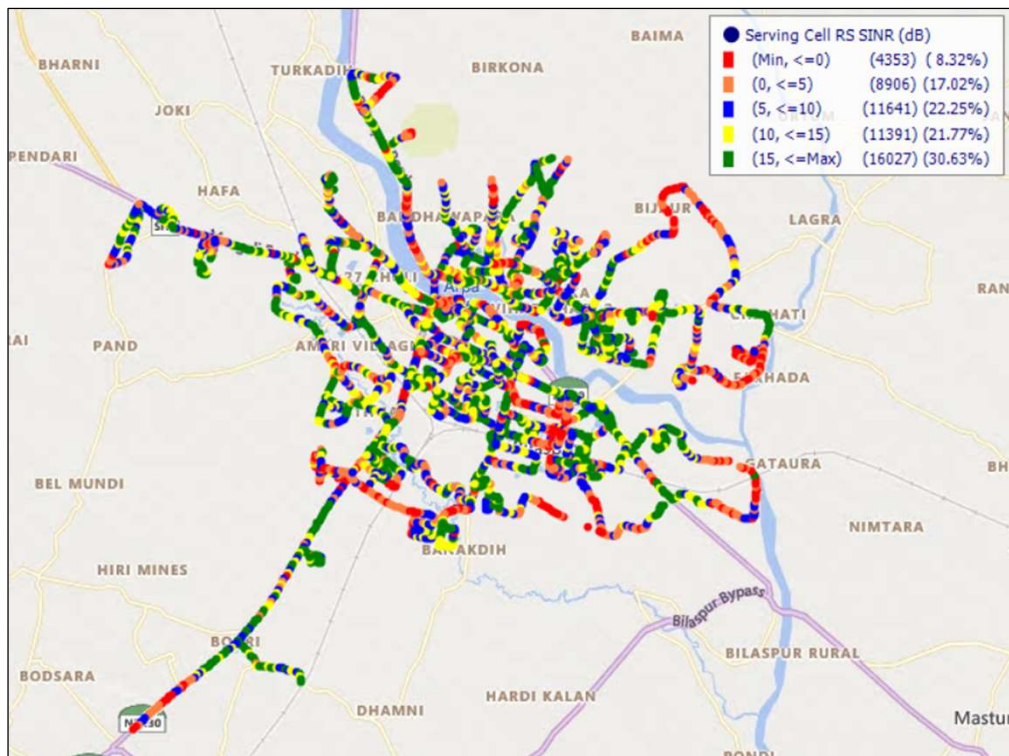
Overall SINR	# Samples	% PDF	Legends
(Min, ≤ -6)	1998	3.16	
$(-6, \leq 5)$	16036	25.41	
$(5, \leq 10)$	20257	32.11	
$(10, \leq 15)$	15294	24.24	
$(15, \leq \text{Max})$	9504	15.06	
Total	63089	100	

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 $\geq 95\%$.

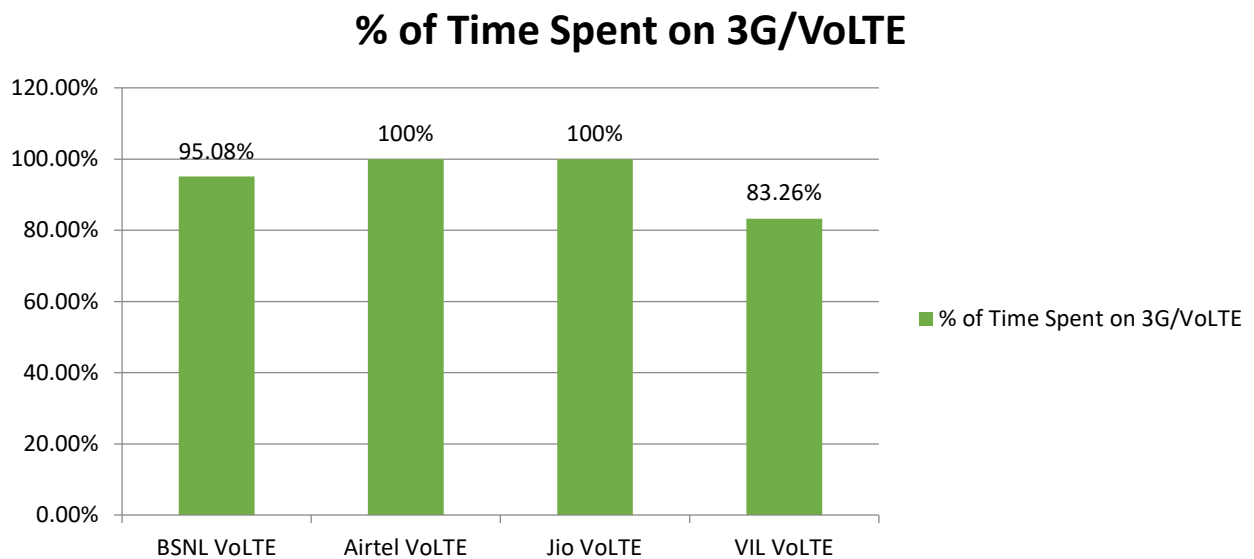
TSP-VI

Technology	Rx Quality %
VoLTE	91.68



Overall SINR	# Samples	% PDF	Legends
(Min, ≤ 0)	4353	8.32	
(0, ≤ 5)	8906	17.02	
(5, ≤ 10)	11641	22.25	
(10, ≤ 15)	11391	21.77	
(15, $\leq \text{Max}$)	16027	30.63	
Total	52318	100	

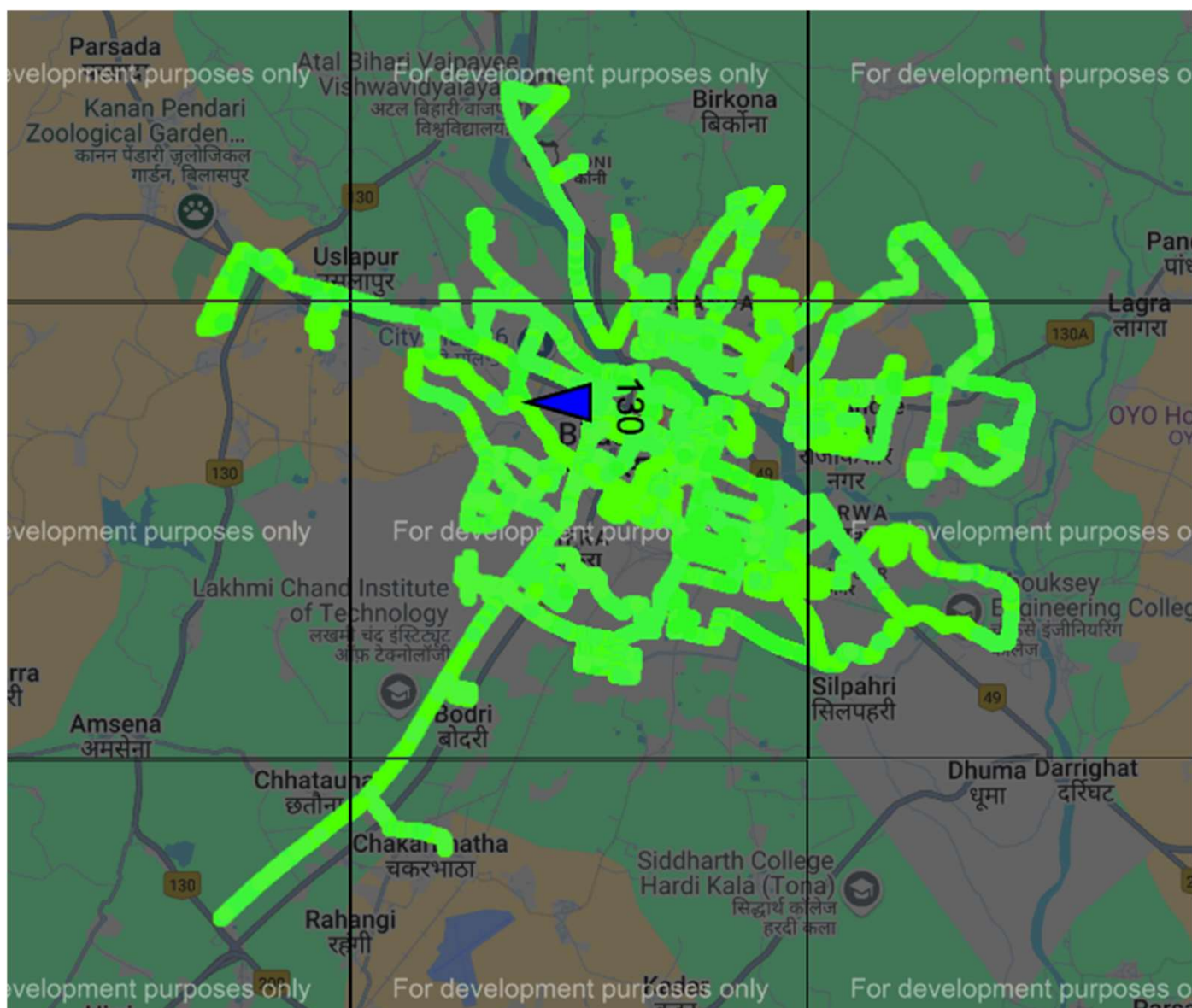
TSP	% of Time Spent on 3G/VoLTE
BSNL VoLTE	95.08%
Airtel VoLTE	100%
Jio VoLTE	100%
VIL VoLTE	83.26%



Technology Details

TSP- AIRTEL

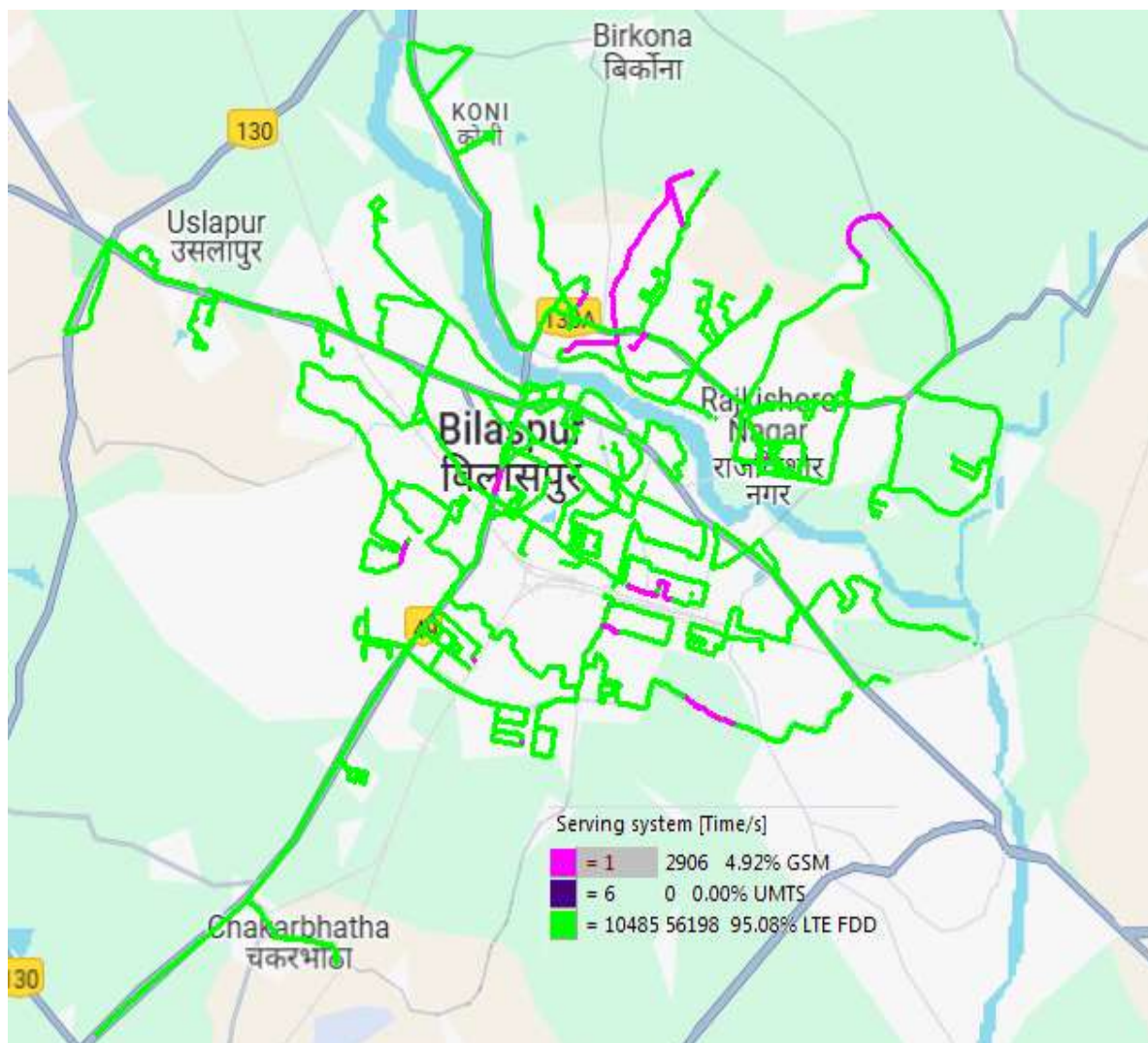
Technology	% of Time Spent on
VoLTE	100%



Technology Details

TSP-BSNL

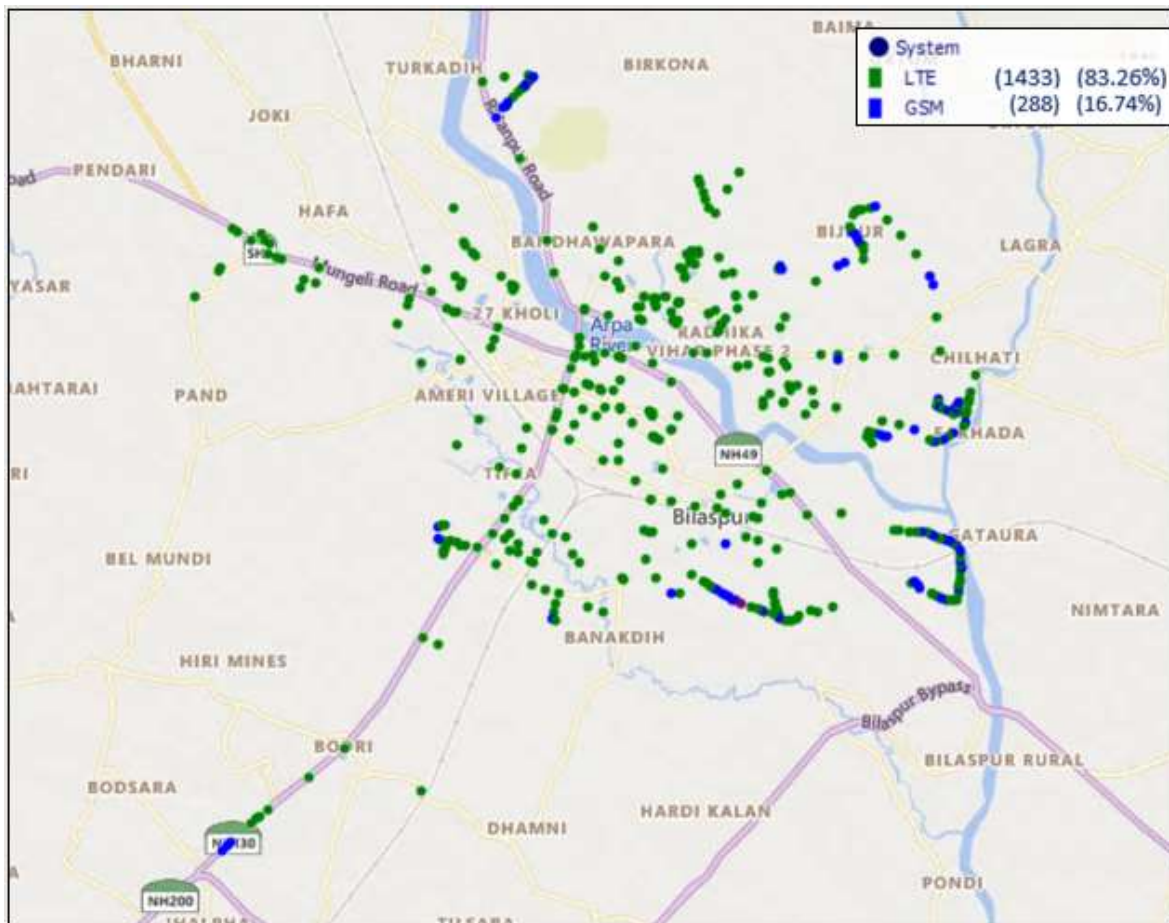
Technology	% of Time Spent on
2G	4.92
VoLTE	95.08



Technology Details

TSP-VI

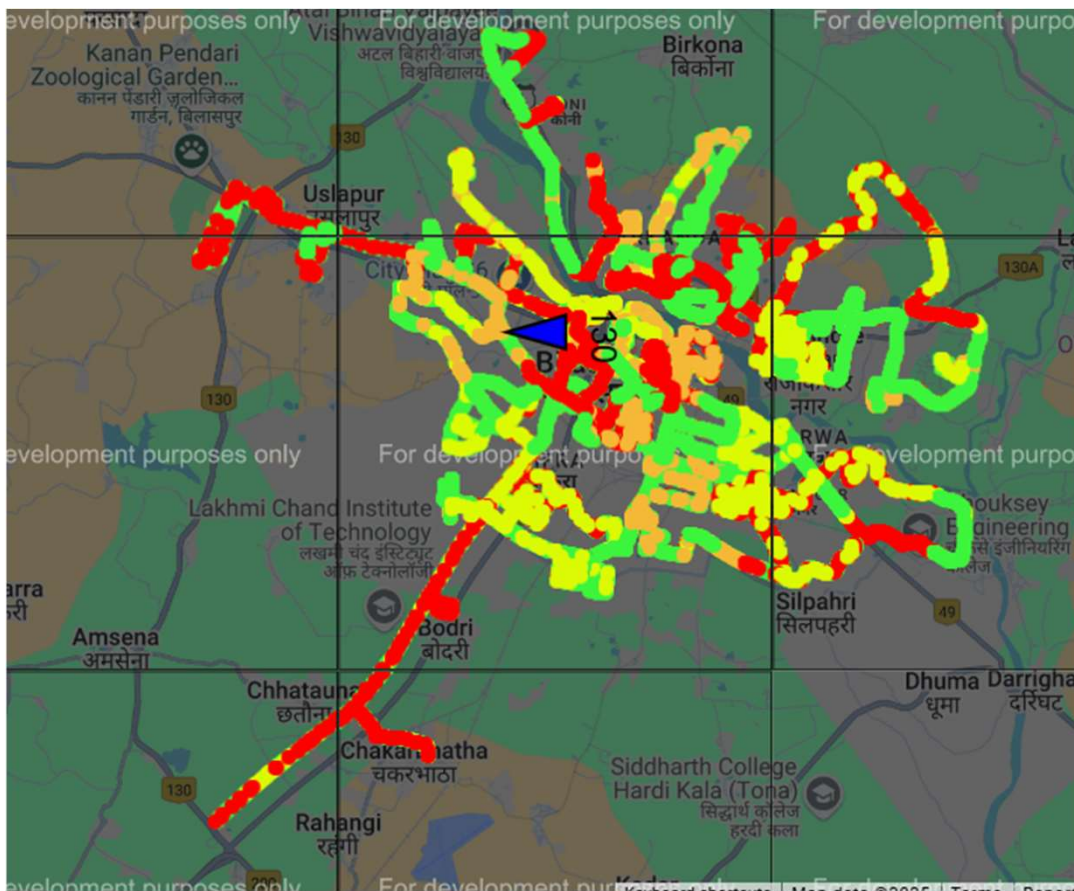
Technology	% of Time Spent on
VoLTE	83.26



TSP- AIRTEL

Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	19.73

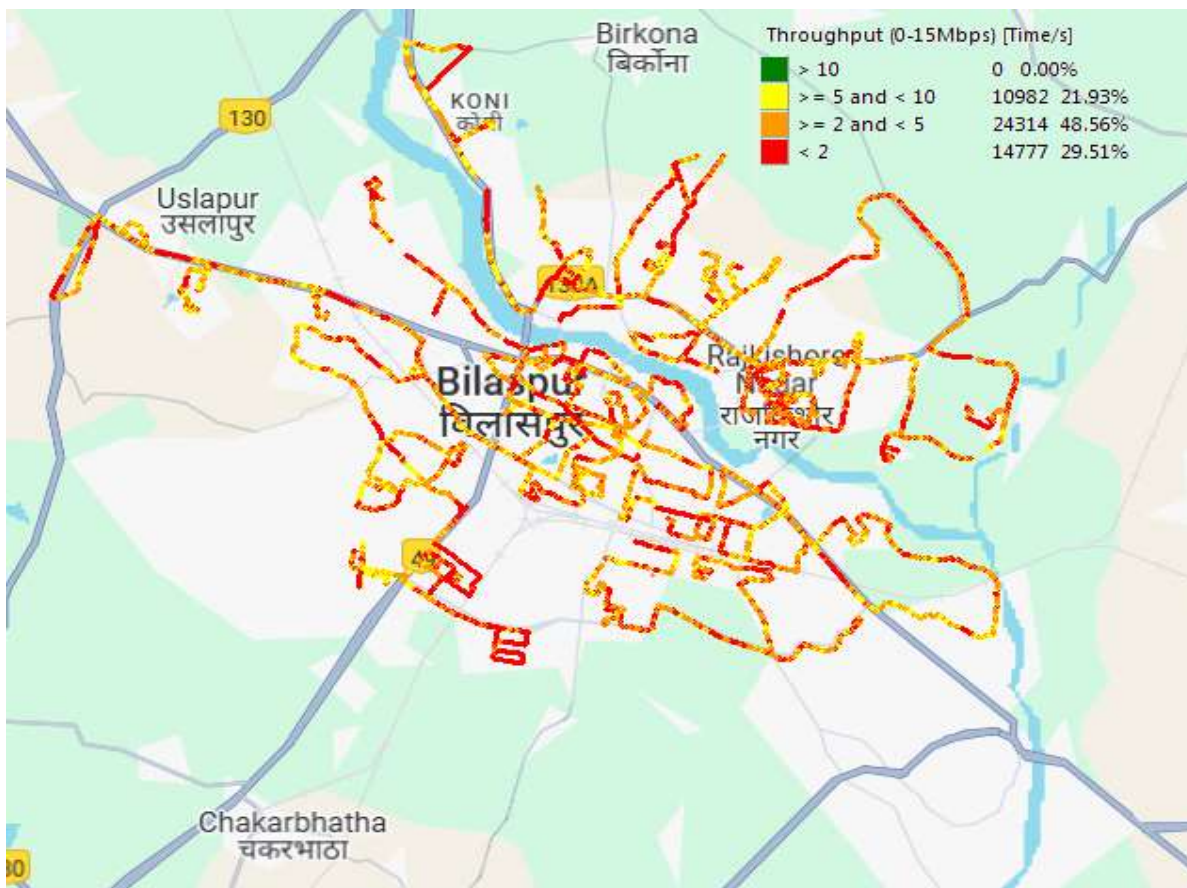


Color	Range	Count	Per
Red	(Min,2000)	(6965)	(23.39%)
Orange	(2000,5000)	(2047)	(6.88%)
Yellow	(5000,10000)	(3120)	(10.48%)
Green	(10000,Max)	(17641)	(59.25%)

TSP-BSNL

Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	3.22

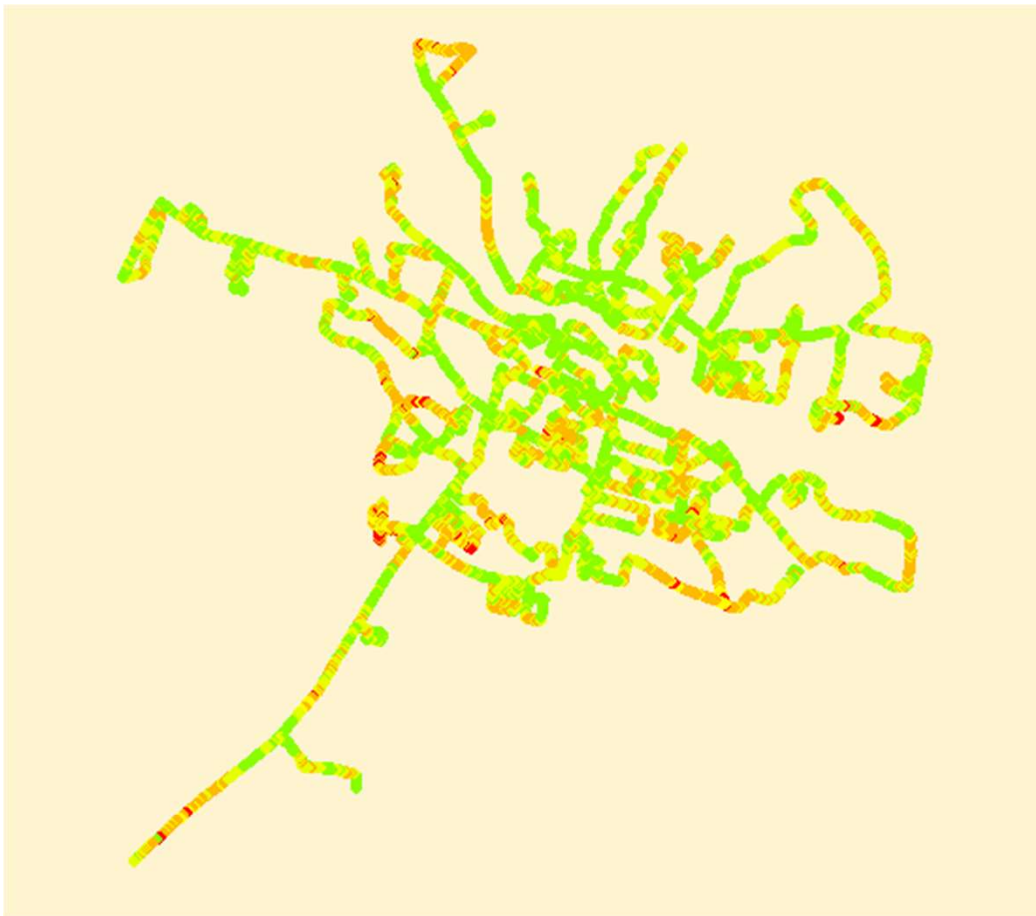


DL throughput	No of Sample	%	Legends
< 2Mbps	14777	29.51	
2-5 Mbps	24314	48.56	
5-10 Mbps	10982	21.93	
>10Mbps	0	0.00	

TSP-JIO

Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	17.63

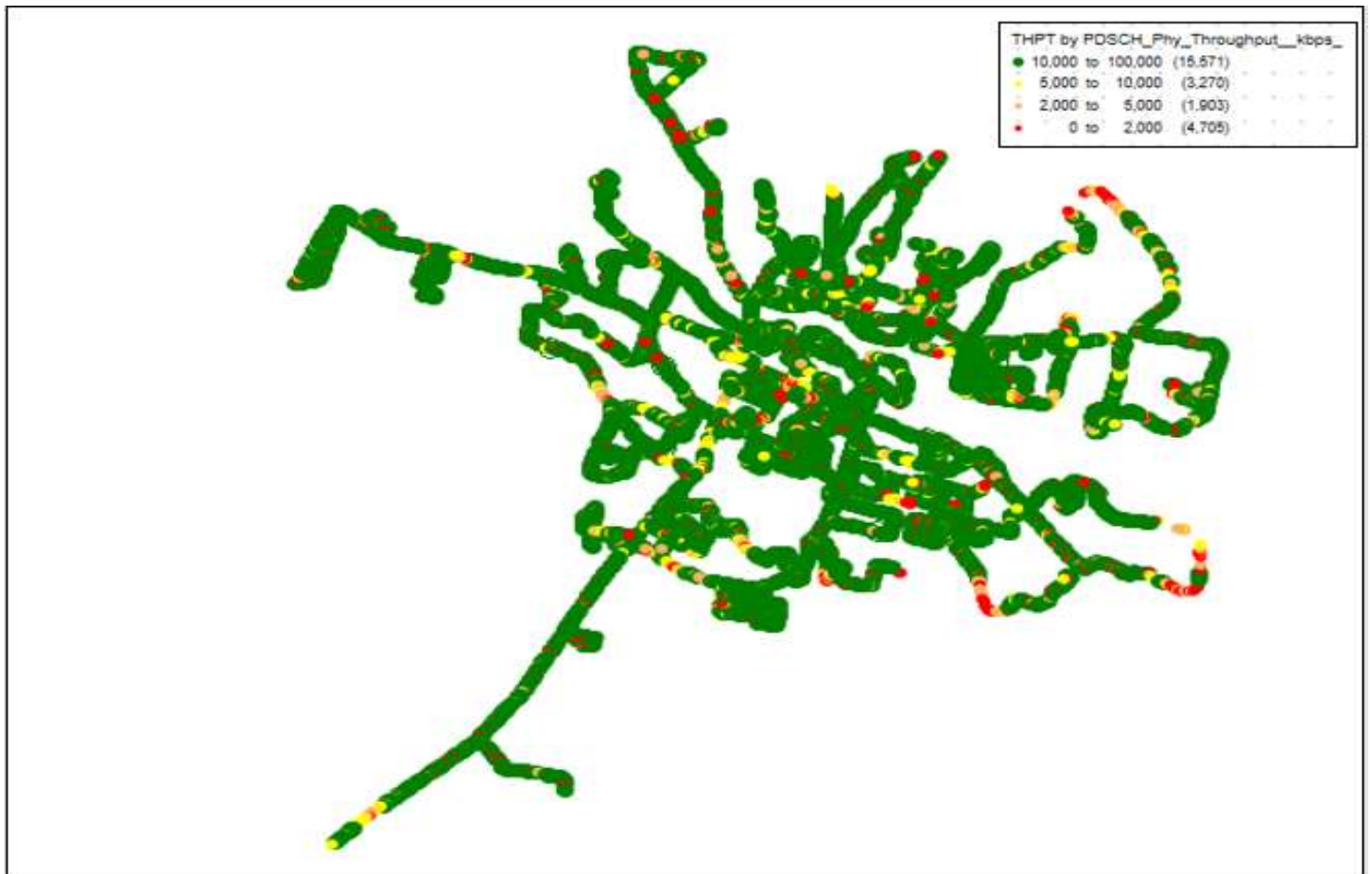


DL throughput	No of Sample	%	Legends
< 2Mbps	1660	0.89	
2-5 Mbps	11192	17.74	
5-10 Mbps	22631	35.87	
>10Mbps	28707	45.5	

TSP- VI

Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	19.67



DL throughput	No of Sample	%	Legends
< 2Mbps	4705	18.49	
2-5 Mbps	1903	7.48	
5-10 Mbps	3270	12.85	
>10Mbps	15571	61.19	

Data testing on hotspots using traimyspeed app

Hotspot		Airtel	BSNL	JIO	VIL
1 – Apollo Hospital	3G download in Mbps	NA	NA	NA	NA
	3G upload in Mbps	NA	NA	NA	NA
	4G download in Mbps	31.26	8.20	24.0	29.24
	4G upload in Mbps	4.75	6.12	9.22	5.88
	5G download in Mbps	63.18	NA	NA	NA
	5G upload in Mbps	24.60	NA	NA	NA
2- Guru Ghasidas	3G download in Mbps	NA	NA	NA	NA
	3G upload in Mbps	NA	NA	NA	NA
	4G download in Mbps	47.11	8.44	43.01	12.11
	4G upload in Mbps	16.52	7.77	10.25	7.69
	5G download in Mbps	47.99	NA	NA	NA
	5G upload in Mbps	23.41	NA	NA	NA

Data testing on hotspots using traимyspeed app

Hotspot		Airtel	BSNL	JIO	VIL
3- Old Bus Stand Bilaspur	3G download in Mbps	NA	NA	NA	NA
	3G upload in Mbps	NA	NA	NA	NA
	4G download in Mbps	31.10	7.43	18.95	17.86
	4G upload in Mbps	6.40	4.17	4.46	10.33
	5G download in Mbps	62.68	NA	NA	NA
	5G upload in Mbps	7.93	NA	NA	NA
4.Uslapur Railway Station	3G download in Mbps	NA	NA	NA	NA
	3G upload in Mbps	NA	NA	NA	NA
	4G download in Mbps	29.7	6.45	38.68	9.77
	4G upload in Mbps	5.89	11.82	8.38	3.12
	5G download in Mbps	86.43	NA	NA	NA
	5G upload in Mbps	19.76	NA	NA	NA

Data testing on hotspots using traимyspeed app

Hotspot		Airtel	BSNL	JIO	VIL
5- Bodri High Court	3G download in Mbps	NA	NA	NA	NA
	3G upload in Mbps	NA	NA	NA	NA
	4G download in Mbps	24.78	10.61	10.45	25.17
	4G upload in Mbps	3.27	7.23	2.71	10.59
	5G download in Mbps	51.70	NA	NA	NA
	5G upload in Mbps	9.78	NA	NA	NA
6- Bilaspur Railway Staion	3G download in Mbps	NA	NA	NA	NA
	3G upload in Mbps	NA	NA	NA	NA
	4G download in Mbps	38.79	4.34	29.32	21.4
	4G upload in Mbps	15.29	4.50	5.04	2.73
	5G download in Mbps	133.29	NA	NA	NA
	5G upload in Mbps	28.17	NA	NA	NA