प्रभावी विनियमन – सुगम संचार
Effective Regulation – Ease of Communication

Operator Assisted Drive Test Report

korba– Raipur Highway
23/09/2023
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 Korba to Raipur Highway from 9:00 AM to 8:00 PM on 23/09/2023. The drive test covered drive route of around 255 KMs.

TSP	Network tested
Airtel	2G & VoLTE
BSNL	2G , 3G & VoLTE
JIO	VoLTE
VIL	2G & VoLTE

Key Performance Indicators:

KPI	Benchmark	Observations
Block call rate %	≤3%	All the TSPs achieved the benchmark
Drop call rate %	≤2%	All the TSPs achieved the benchmark
CSSR %	≥95 %	All the TSPs achieved the benchmark
Mobility HOSR %	≥95%	All the TSPs achieved the benchmark
Good RX Quality %	≥95%	All the TSPs except Airtel & BSNL in VoLTE achieved the benchmark

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 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:

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 **90-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)

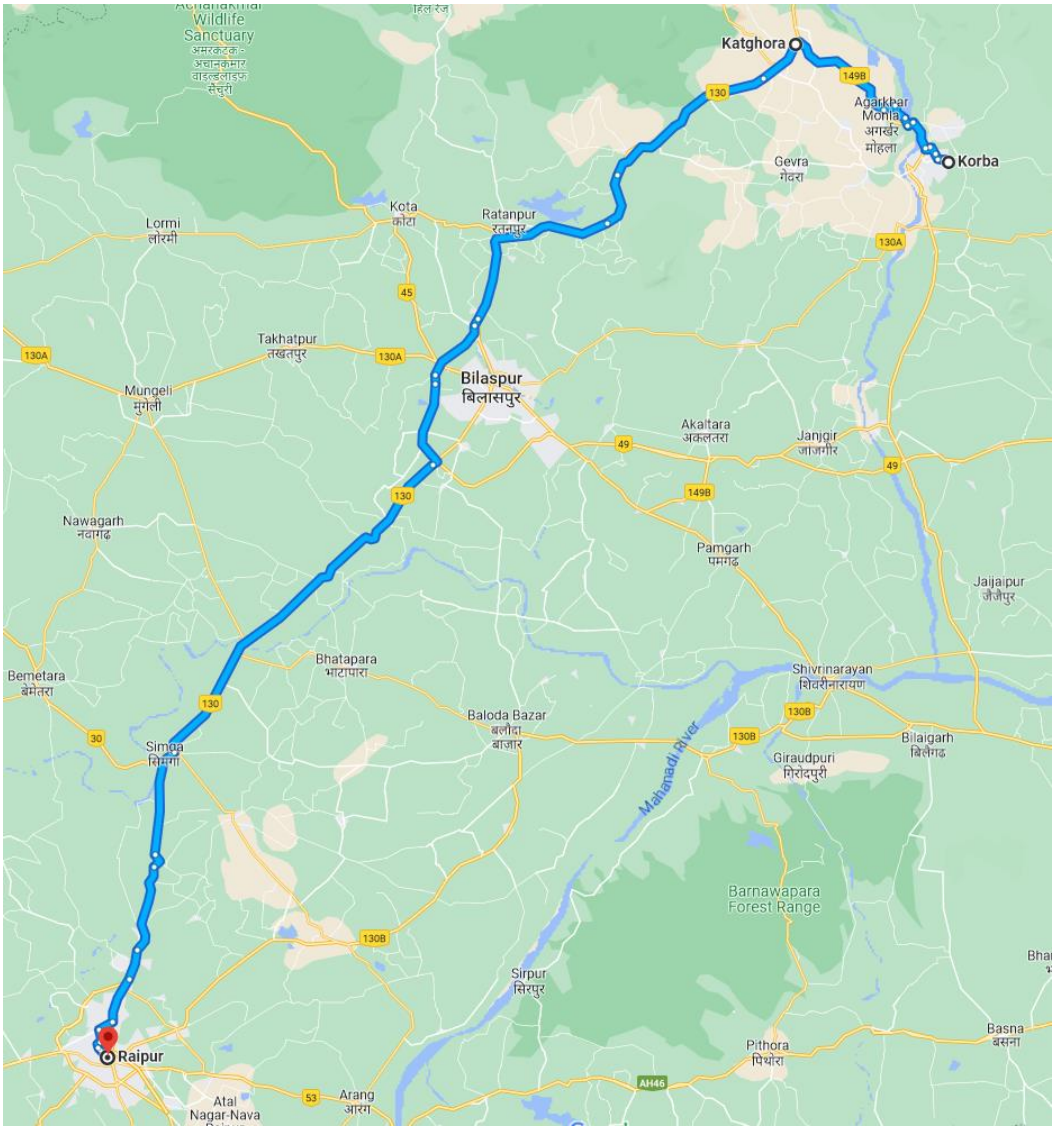
i.2G – measurement – UE Locked in 2G file size- 500KB
ii.3G – measurement – UE in 3G File Size- 20MB
iii.4G – measurement – UE in LTE File Size- 40MB

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

i.Download- 2G - 500KB ,3G - 20 MB, 4G - 40MB
ii.Upload - 2G -100KB ,3G - 5 MB, 4G - 10MB
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 (only in 3G and LTE)
v.Latency – 32 Bytes on www.google.com.

Overview

Voice & Dynamic Data Test Drive Route



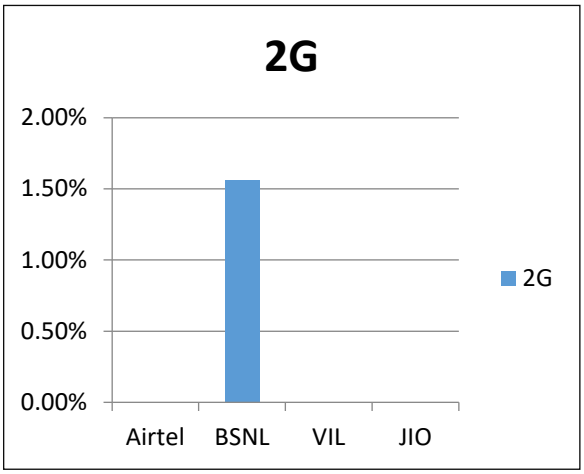
List of important area covered during the drive test
KORBA
KATGHORA
RATANPUR
BILASPUR
NANDGHAT
SIMGA
RAIPUR

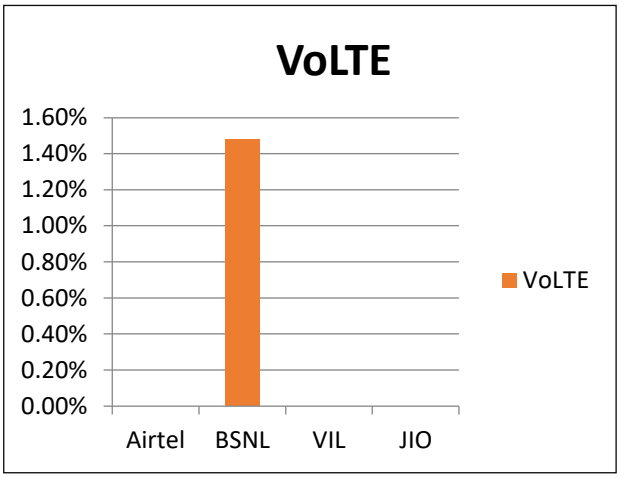
Voice Calls

Key Observations

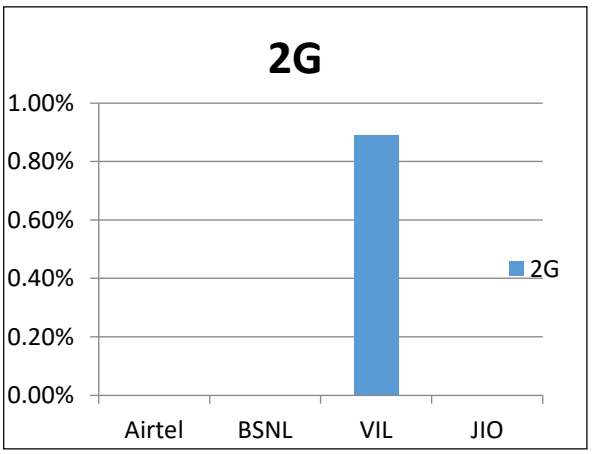
QoS compliance of the TSPs in Indore for Voice across technologies 2G/3G/4G-VoLTE:

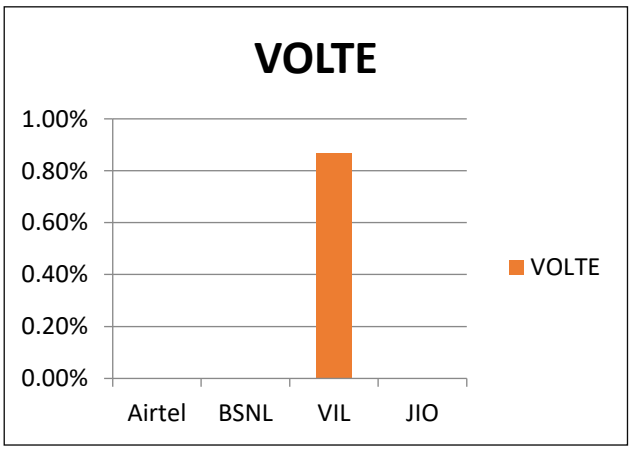
Drop Call Rate (%)





Block Call Rate (%)





KPIs	2G			VoLTE			
	Airtel	BSNL	VIL	Airtel	BSNL	RJIL	VIL
Drop Call Rate %	**0**	**1.56 %**	**0**	**0**	**1.48%**	**0**	**0**
Block Call Rate %	0	**0.00 %**	**0.89**	**0**	**0.00%**	**0**	**0.87**

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 **≥** -85 dBm.

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	45.70	87.09 %	54.65%

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

TSPs	VoLTE			
	Airtel		JIO	VIL
Coverage %	88.58	92.37%	96.39%	93.46%

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

TSPs	VoLTE			
	Airtel	BSNL	JIO	VIL
Time Spent on 3G/4G %	100%	55.46%	100 %	64.22%

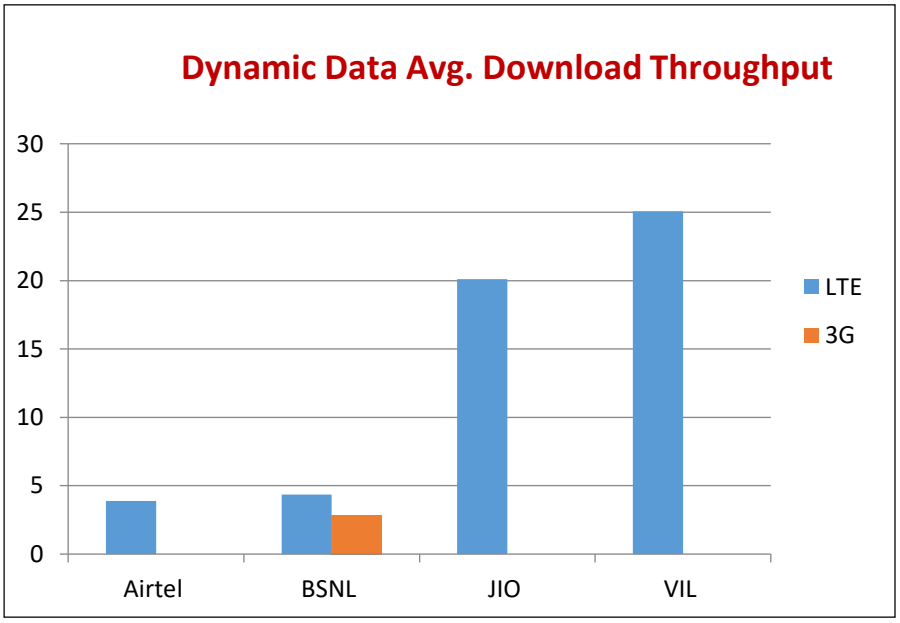
Data Services Dynamic

Key Observations

Dynamic data-download Throughput was tested.

Data Download Performance - Dynamic

3G/4G/ Network:



TSP	Airtel	BSNL	JIO	VIL
Average Download throughput- 3G In Mbps	NA	2.849	NA	NA
Average Download throughput-LTE In Mbps	3.89	4.362	20.21	25.08

Summary

Highway Summary- Voice

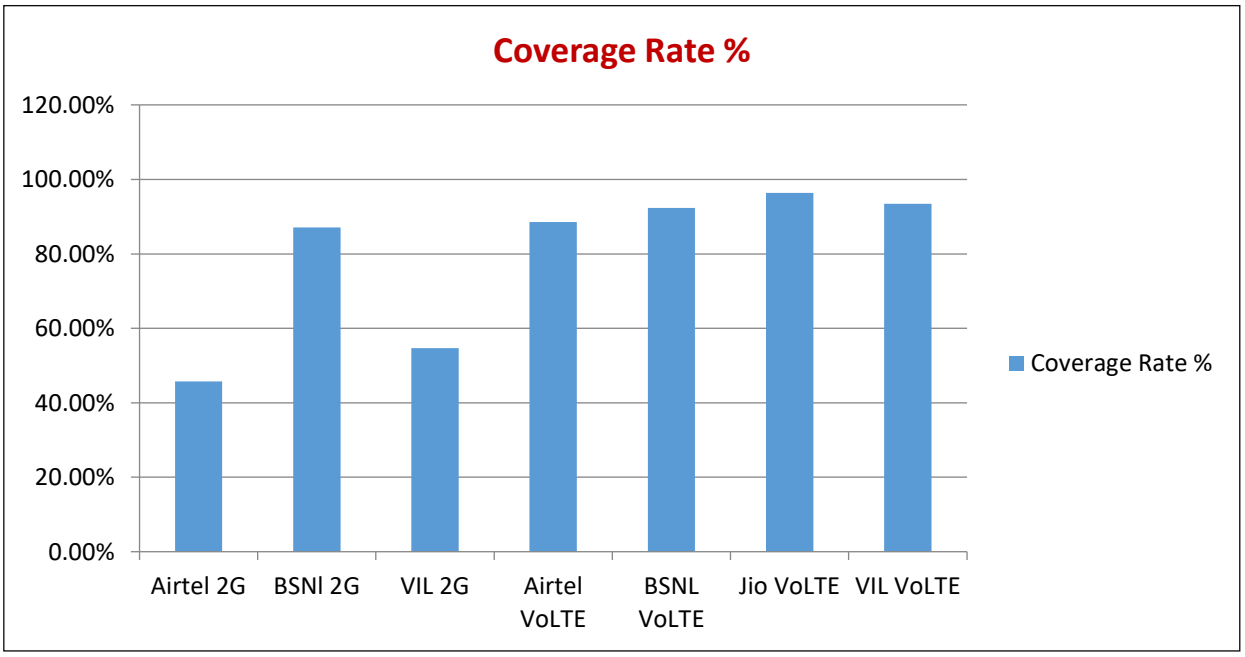
TSP (For 2G)	Airtel	BSNL	JIO	VIL
Call attempts	85	130	NA	112
Block call rate %	0	0.00 %	NA	0.89
CSSR %	100	98.46 %	NA	99.11
Drop call rate %	0	1.56 %	NA	0.00
Mobility HOSR %	100	98.26 %	NA	99.28
RX Quality %	97.30	97.85 %	NA	95.02
Average CST Sec	4.02	5.04 Sec	NA	2.35

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Call attempts	NA	NA	NA	NA
Block call rate %	NA	NA	NA	NA
CSSR %	NA	NA	NA	NA
Drop call rate %	NA	NA	NA	NA
Mobility HOSR %	NA	NA	NA	NA
RX Quality %	NA	NA	NA	NA
Average CST (Sec)	NA	NA	NA	NA

TSP (For VoLTE)	Airtel	BSNL	JIO	VIL
Call attempts	81	137	166	114
Block call rate %	0	0.00%	0%	0.87
CSSR %	100	98.54%	100%	99.13
Drop call rate %	0	1.48%	0%	0.00
Mobility HOSR %	98.97	95.30	98.37%	99.52
RX Quality %	81.72	87.03%	95.02%	95.08
Average CST(Sec)	0.69	4.63 sec	0.69	1.02

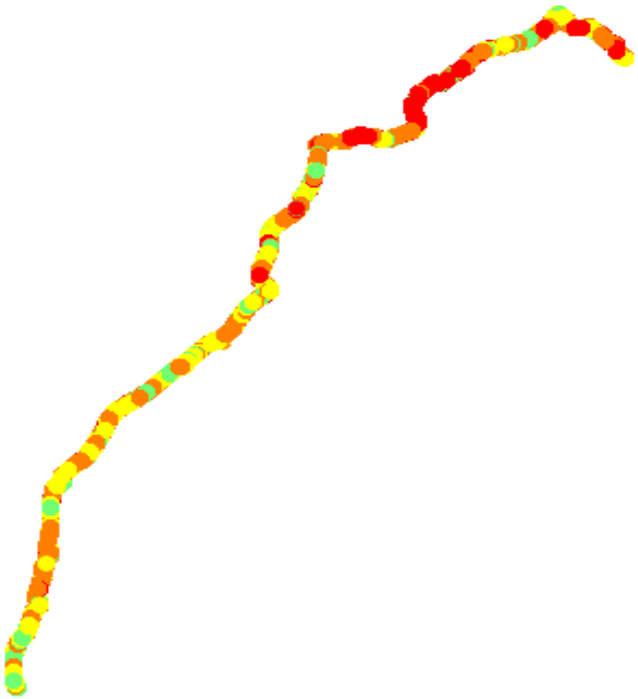
RF Coverage relates to the geographical footprint within the system that has sufficient RF signal strength to provide for a call session. The Coverage rate is calculated on the basis of % of samples in which the Rx level ≥ -85 dBm, RSCP is ≥ -90 dBm & RSRP ≥ -110dBm. The details are as follows.

TSP	Coverage Rate %
Airtel 2G	45.70%
BSNl 2G	87.09 %
VIL 2G	54.65%
Airtel VoLTE	88.58%
BSNL VoLTE	92.37%
Jio VoLTE	96.39%
VIL VoLTE	93.46%



TSP-Airtel

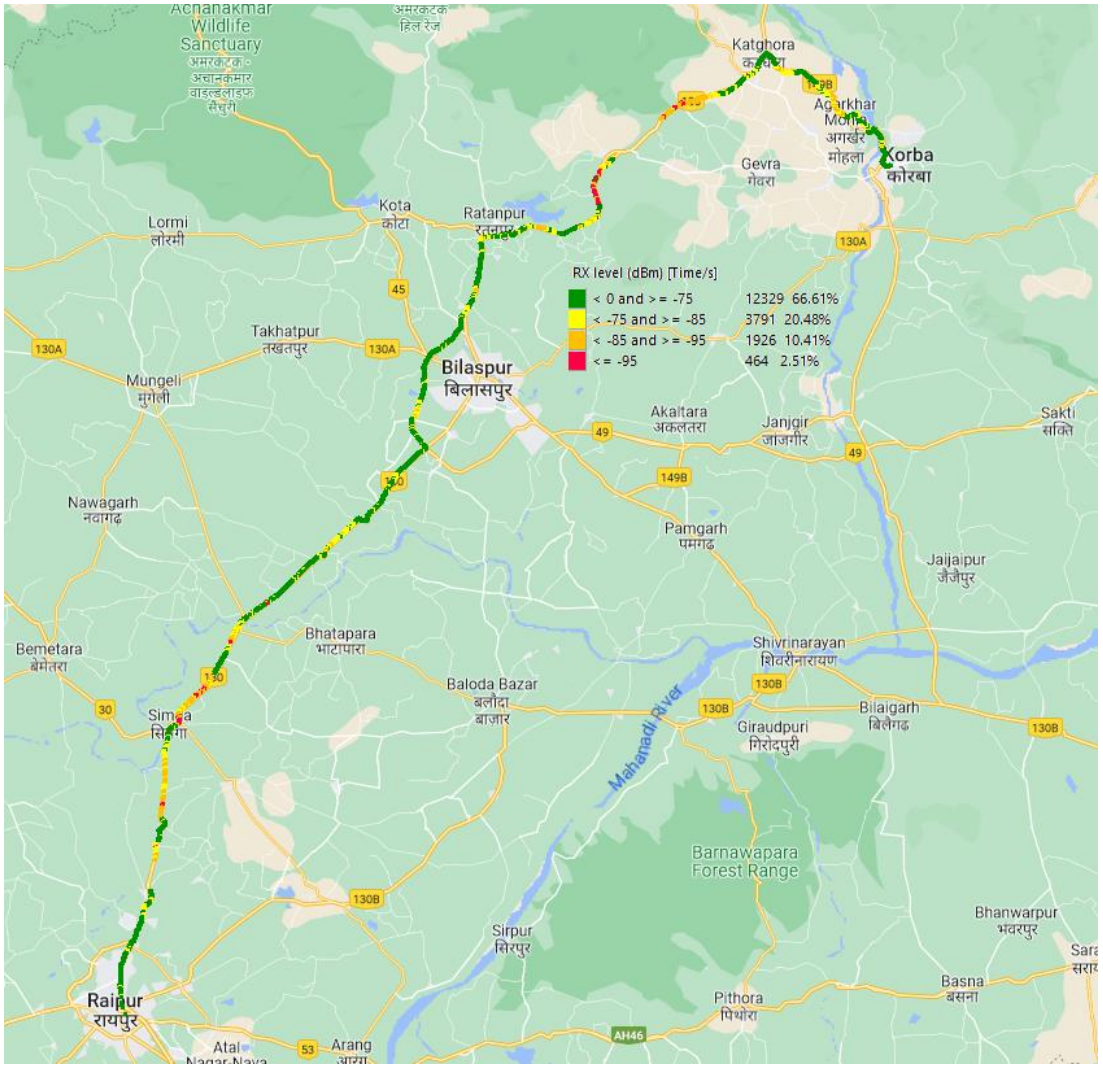
Technology	Coverage %
2G	45.70



2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	252079	14.29	
[-75, >=-85)	554001	31.41	
[-85, >=-95)	748083	42.41	
[-95, >=Min)	209817	11.89	
Total	1763980	100	

TSP- BSNL

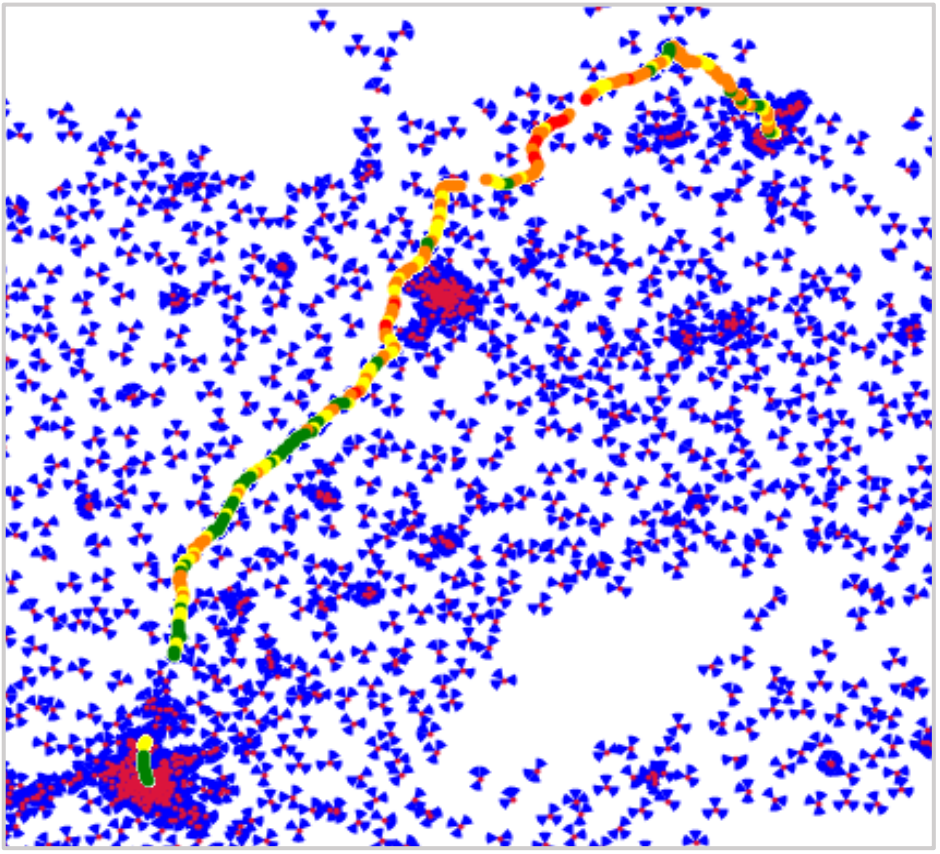
Technology	Coverage %
2G	**87.09 %**



2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	**12329**	**66.61**	
[-75, >=-85)	**3791**	**20.48**	
[-85, >=-95)	**1926**	**10.41**	
[-95, >=Min)	**464**	**2.50**	
Total	**18510**	**100**	

TSP-VI

Technology	Coverage %
2G	54.65



2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	**2737**	**28.26**	
[-75, >=-85)	**2556**	**26.39**	
[-85, >=-95)	**3968**	**40.97**	
[-95, >=Min)	**424**	**4.38**	
Total	**9685**	**100**	

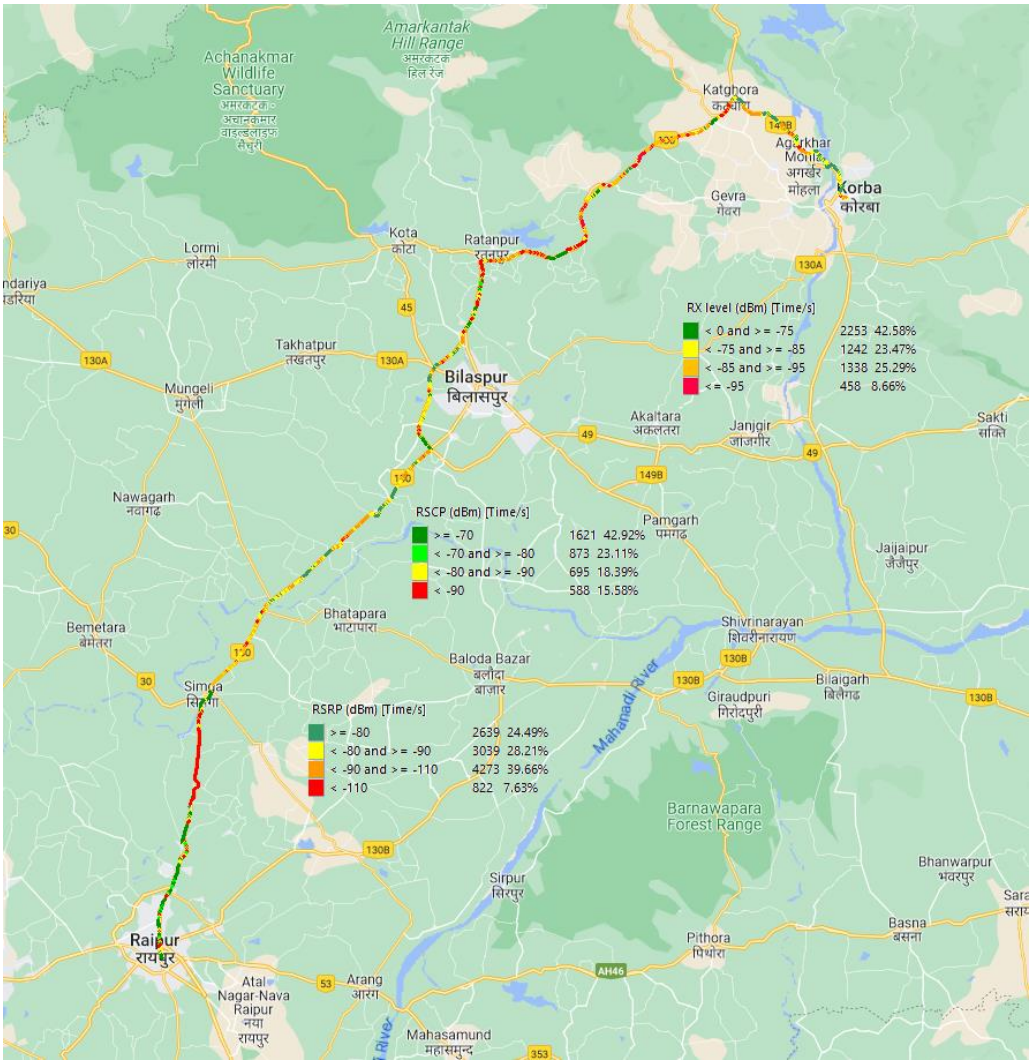
TSP- Airtel

Technology	Coverage %
VoLTE	88.58

VoLTE			
Overall RSRP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	417434	10.28	
[-80, >=-90)	901801	22.20	
[-90, >=-110)	2278515	56.10	
[-110, >=Min)	463927	11.42	
Total	4061677	100	

TSP-BSNL

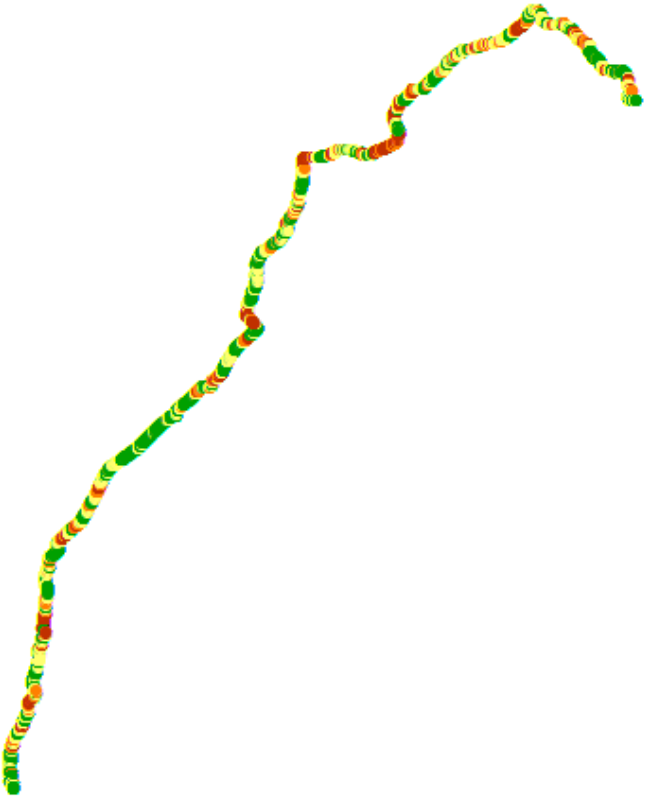
Technology	Coverage %
VoLTE	92.37 %



VoLTE			
Overall RSRP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	**2639**	**24.49%**	
[-80, >=-90)	**3039**	**28.21%**	
[-90, >=-110)	**4273**	**39.67%**	
[-110, >=Min)	**822**	**7.63%**	
Total	**10773**	**100.00%**	

TSP-Jio

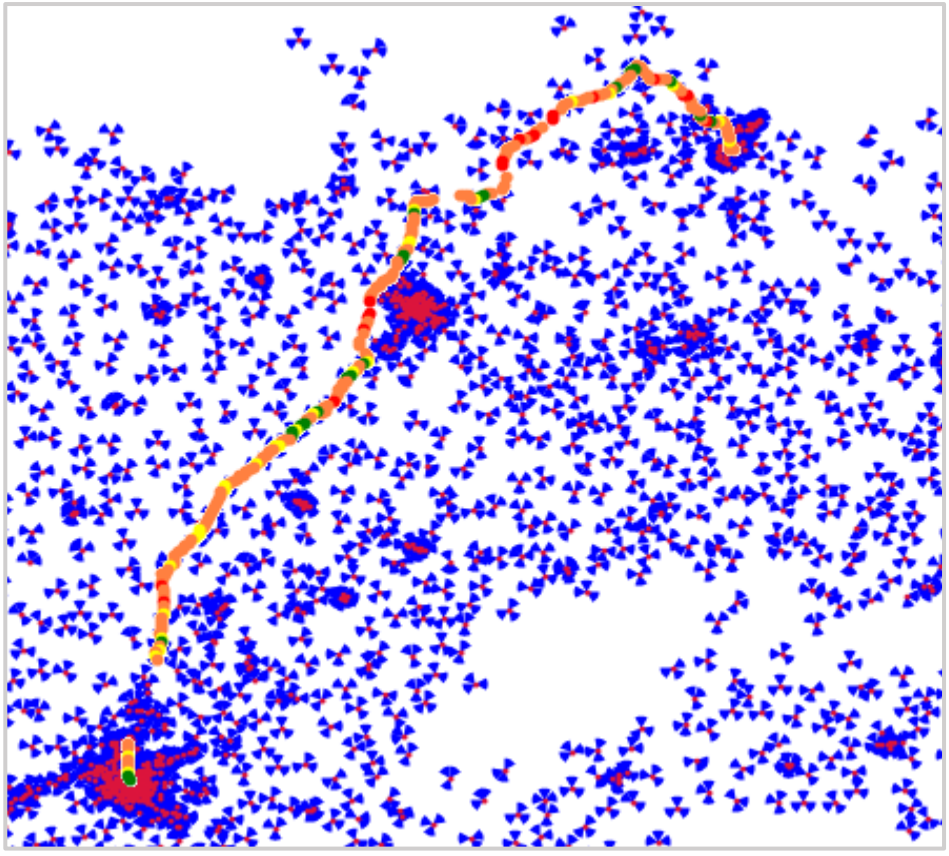
Technology	Coverage %
VoLTE	96.39



VoLTE			
Overall RSRP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	**8456**	**49.45**	
[-80, >=-90)	**4643**	**27.15**	
[-90, >=-110)	**3383**	**19.78**	
[-110, >=Min)	**617**	**3.61**	
Total	**17099**		

TSP-VI

Technology	Coverage %
VoLTE	93.46

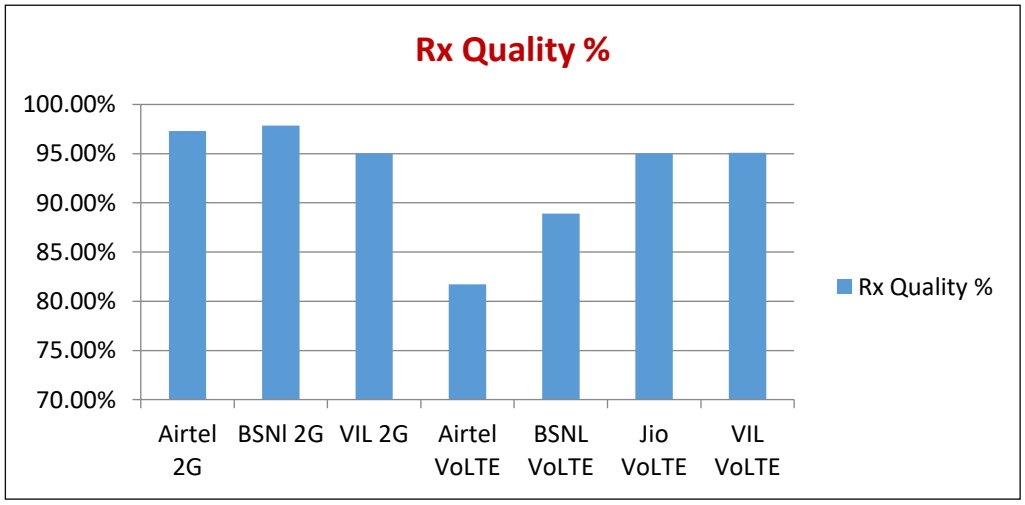


VoLTE			
Overall RSRP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	**814**	**9.1**	
[-80, >=-90)	**1434**	**16.03**	
[-90, >=-110)	**6113**	**68.33**	
[-110, >=Min)	**585**	**6.54**	
Total	**8946**	**100**	

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 ≥ 95%.

TSP	Rx Quality %
Airtel 2G	97.30%
BSNl 2G	**97.85 %**
VIL 2G	**95.02%**
Airtel VoLTE	81.72%
BSNL VoLTE	88.91%
Jio VoLTE	**95.02%**
VIL VoLTE	**95.08%**



Quality Details

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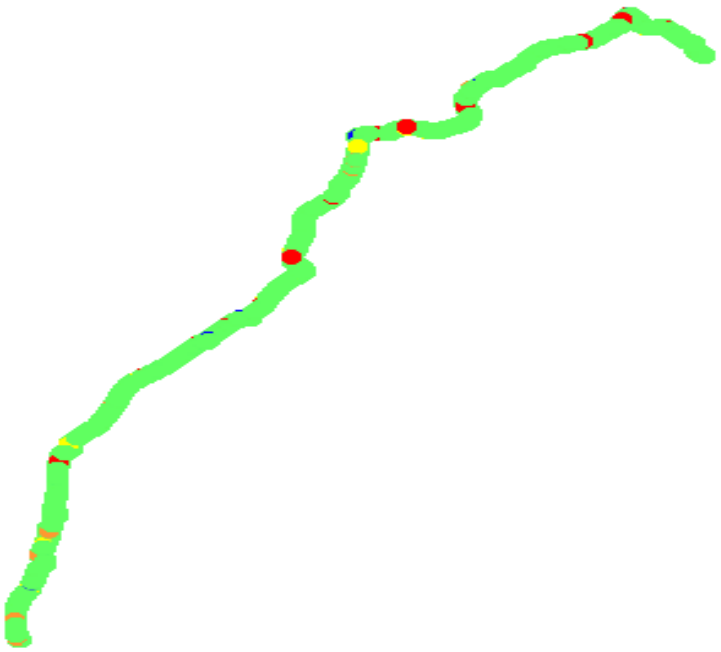
TSP-Airtel

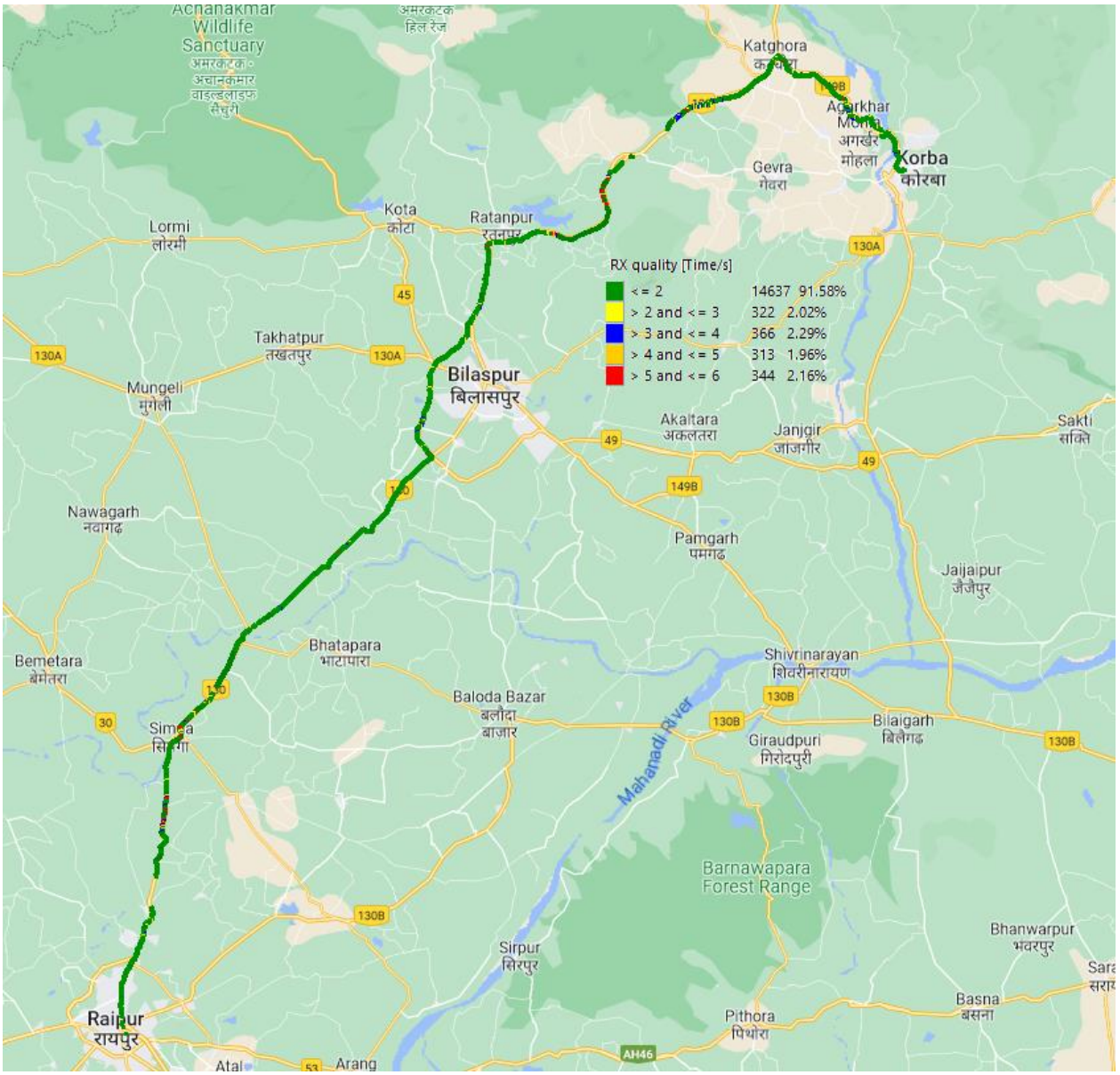
Technology	Rx Quality %
2G	97.30



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	1509104	85.55	
(2, <=3)	67879	3.85	
(3 , <=4)	54675	3.10	
(4 , <=5)	84641	4.80	
(5 , <=Max)	47681	2.70	
Total	1763980	100	

TSP- BSNL

Technology	Rx Quality %
2G	97.85 %



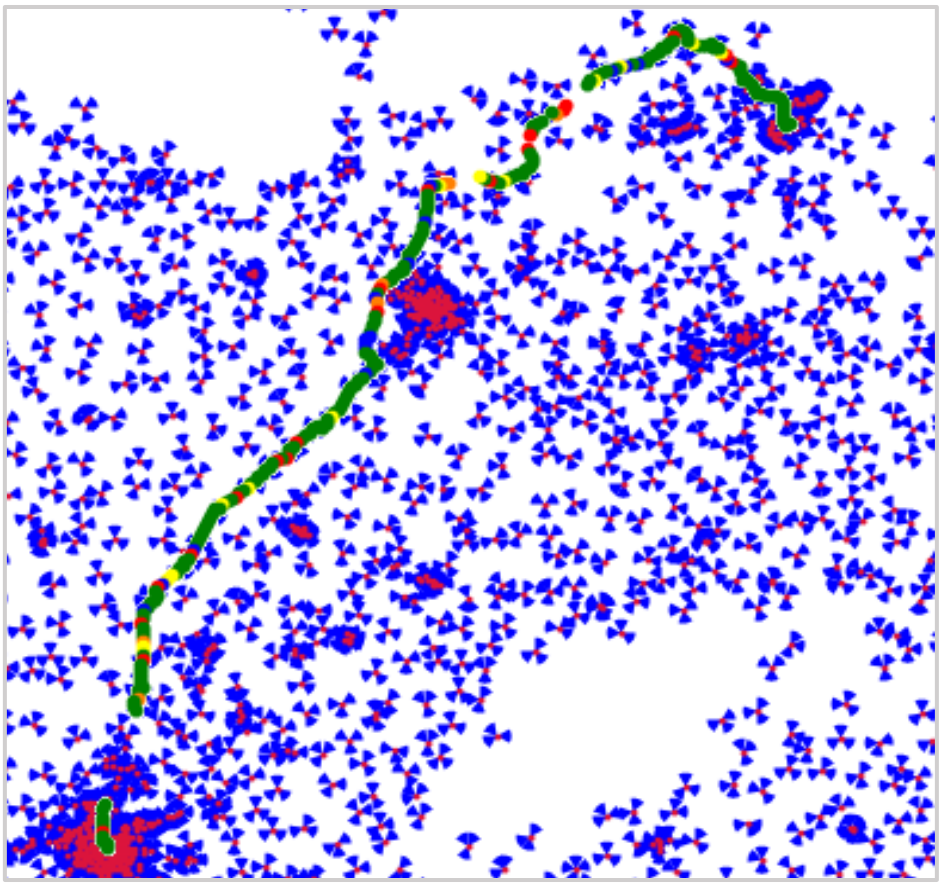
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	14637	91.58 %	
(2, <=3)	322	2.02 %	
(3 , <=4)	366	2.29 %	
(4 , <=5)	313	1.96 %	
(5 , <=Max)	344	2.15 %	
Total	15982	100%	

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 ≥ 95%.

TSP-VI

Technology	Rx Quality %
2G	95.02

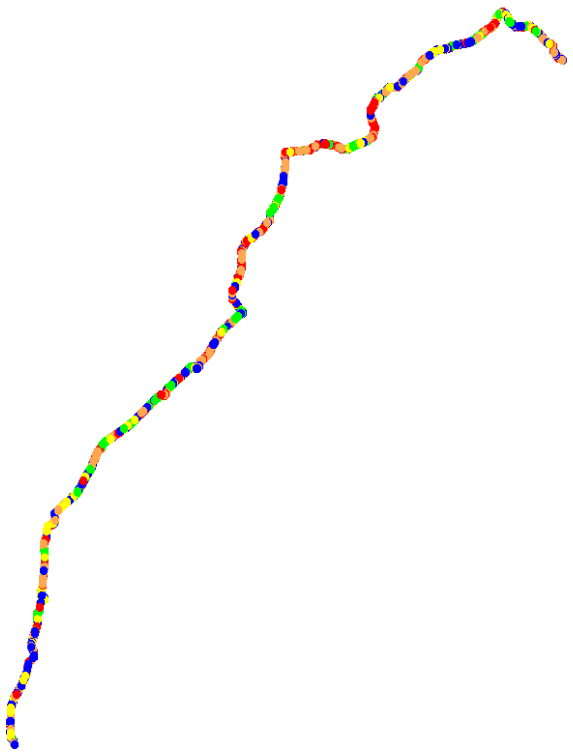


Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	6894	80.97	
(2, <=3)	490	5.76	
(3 , <=4)	436	5.12	
(4 , <=5)	270	3.17	
(5 , <=Max)	424	4.98	
Total	8514	100	

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-Airtel

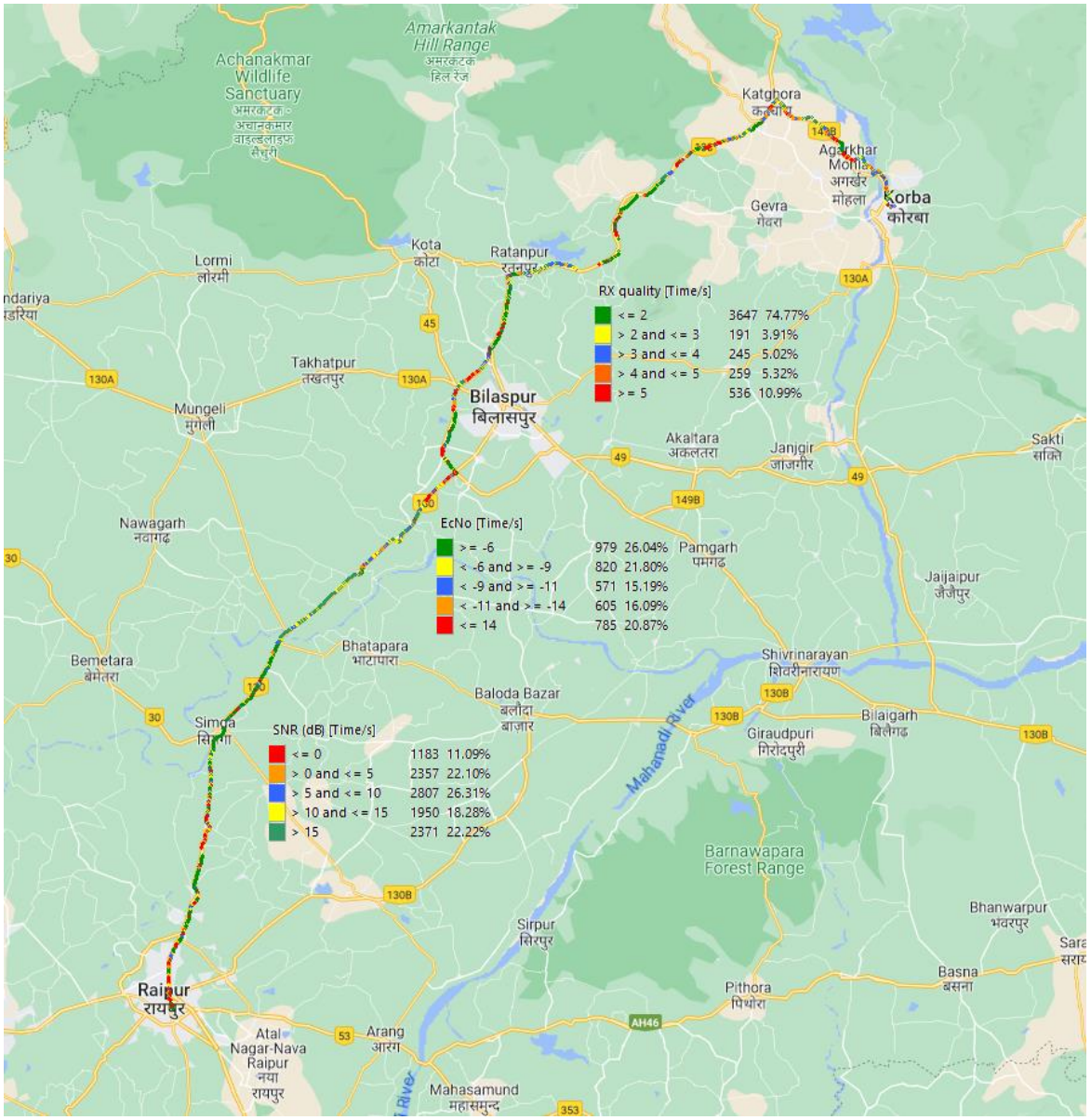
Technology	Rx Quality %
VoLTE	81.72



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	742549	18.28	
(0, <=5)	1046007	25.75	
(5, <=10)	972223	23.94	
(10, <=15)	741758	18.26	
(15, <=Max)	559140	13.77	
Total	4061677	**100**	

TSP- BSNL

Technology	Rx Quality %
VoLTE	88.91%



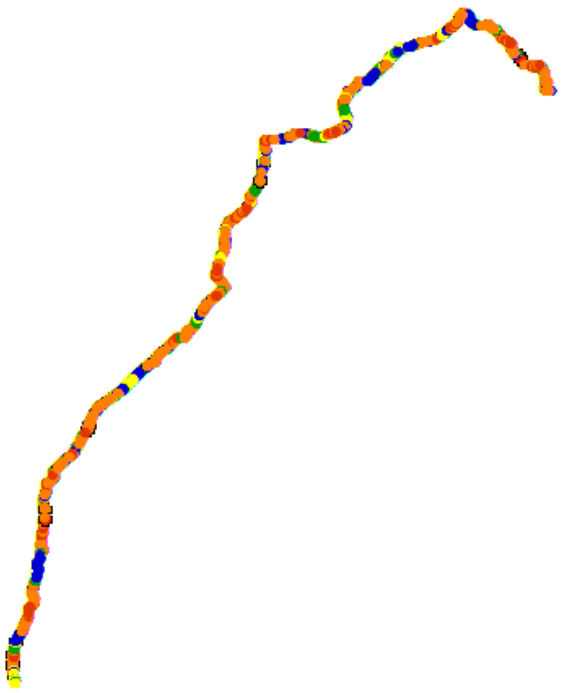
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1183	11.09%	
(0, <=5)	2357	22.10%	
(5, <=10)	2807	26.31%	
(10, <=15)	1950	18.28%	
(15, <=Max)	2371	22.22%	
Total	10668	100.00%	

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 ≥ 95%.

TSP- JIO

Technology	Rx Quality %
VoLTE	95.02



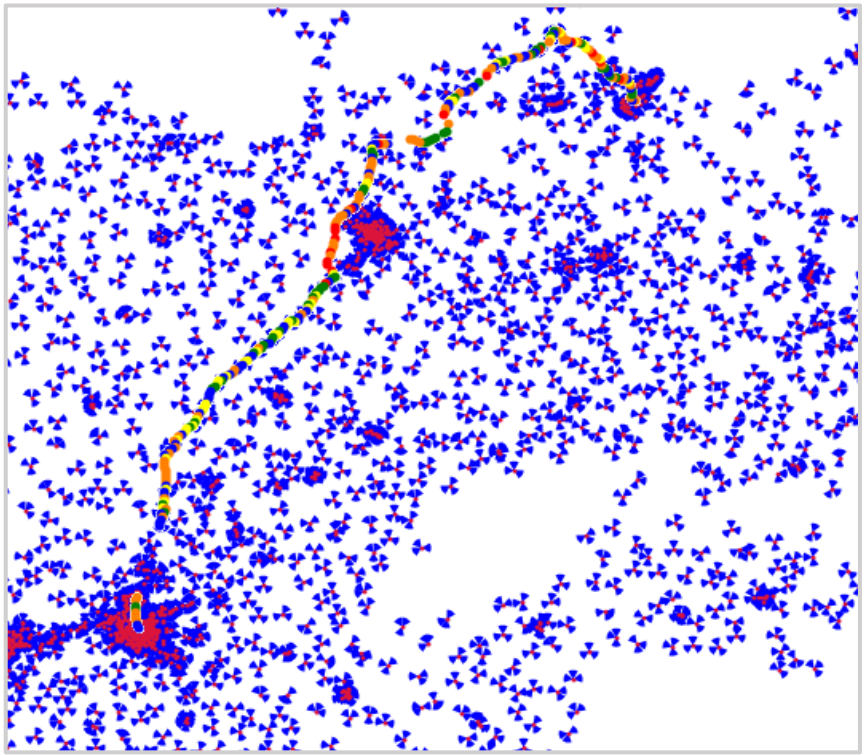
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	852	4.98	
(0, <=5)	3982	23.27	
(5, <=10)	4332	25.32	
(10, <=15)	3398	19.86	
(15, <=Max)	4548	26.58	
Total	17112		

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 ≥ 95%.

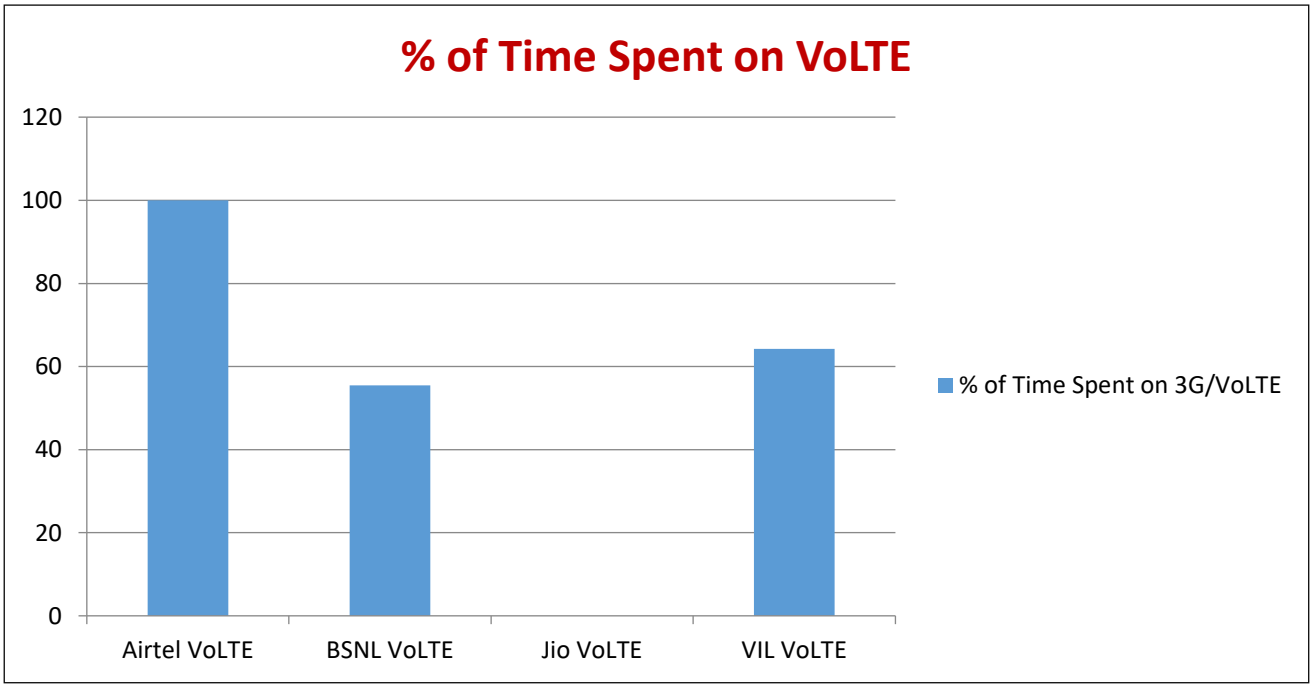
TSP-VI

Technology	Rx Quality %
VoLTE	**95.08**



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	439	4.91	
(0, <=5)	2820	31.60	
(5, <=10)	2259	25.32	
(10, <=15)	1655	18.55	
(15, <=Max)	1750	19.61	
Total	8923	100	

TSP	% of Time Spent on 3G/VoLTE
Airtel VoLTE	100
BSNL VoLTE	55.46 %
Jio VoLTE	100
VIL VoLTE	64.22

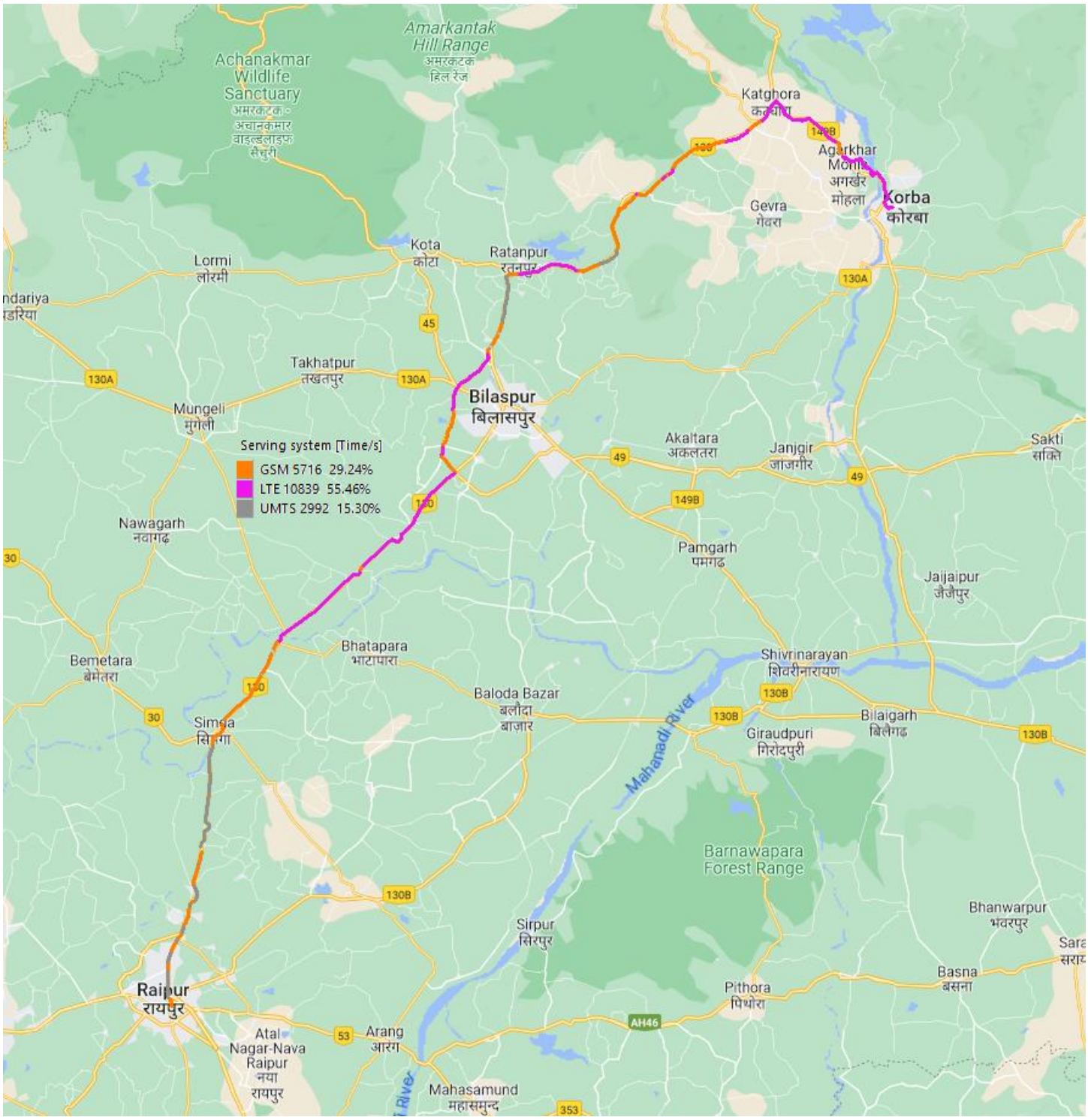


TSP-Airtel

Technology	% of Time Spent on
VoLTE	100

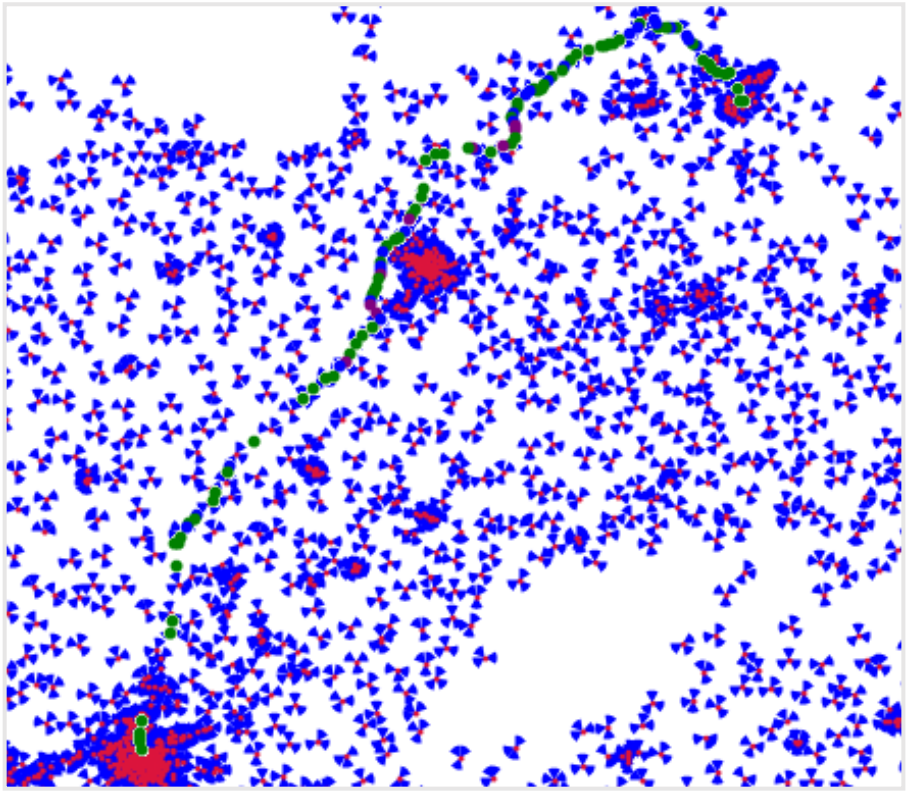
TSP-BSNL

Technology	% of Time Spent on
2G	**29.24%**
3G	**15.30 %**
VoLTE	**55.46 %**



TSP-VI

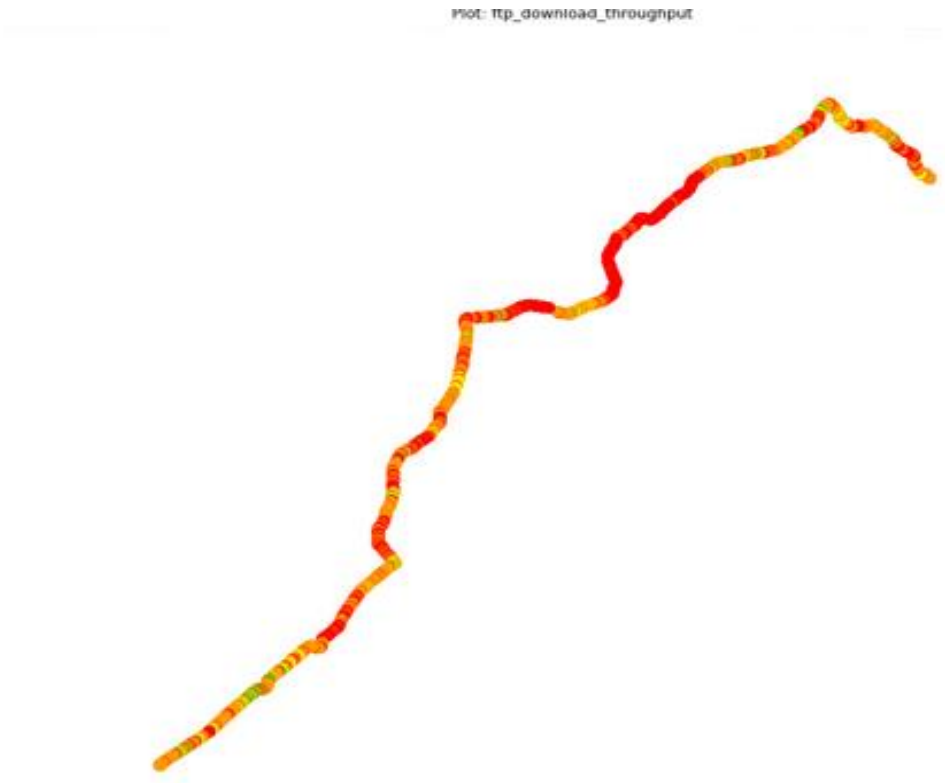
Technology	% of Time Spent on
VoLTE	64.22



TSP-Airtel

Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	3.89

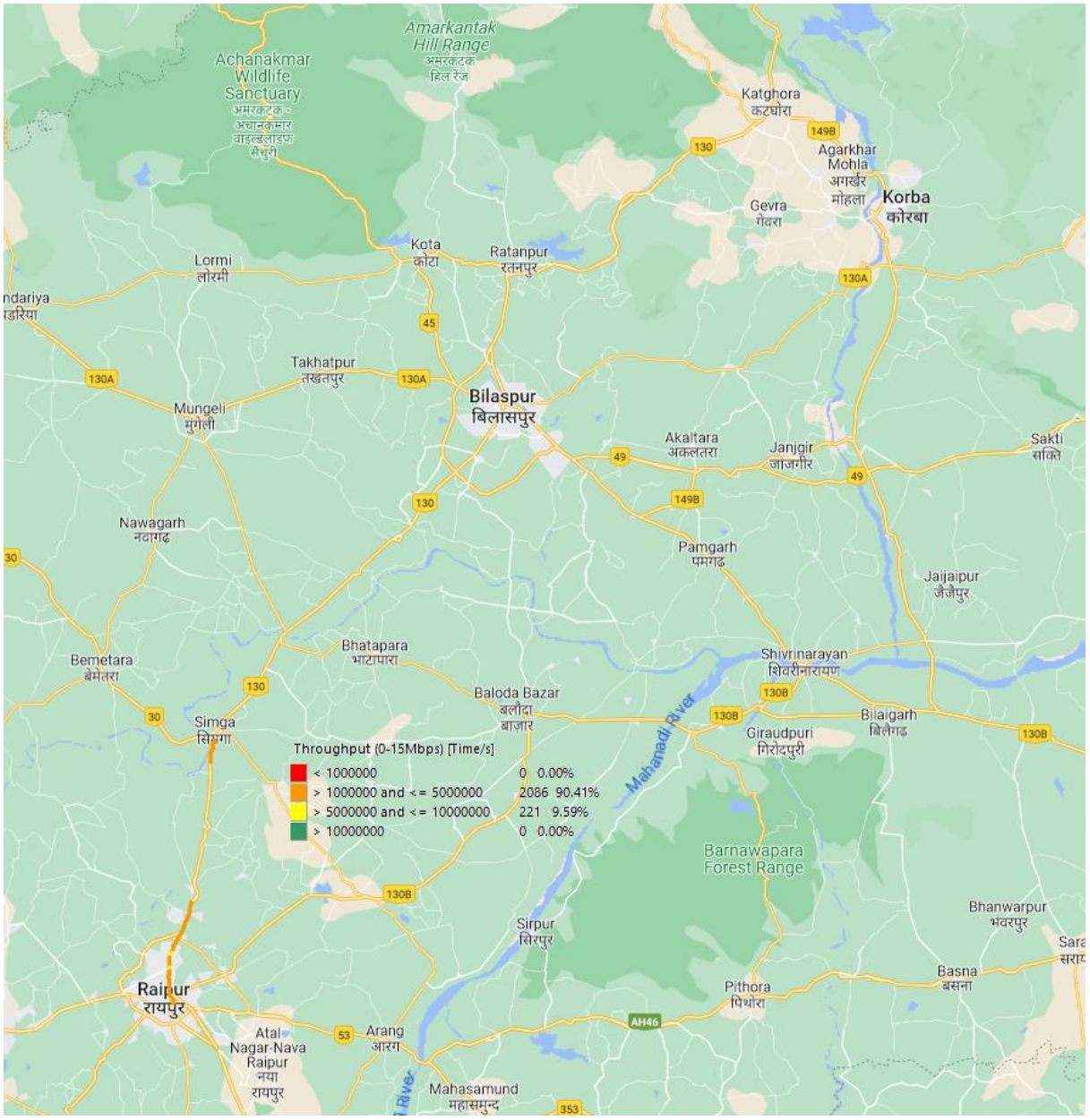


DL throughput	No of Sample	%	Legends
< 2Mbps	4527	36.21	
2-5 Mbps	6188	49.49	
5-10 Mbps	1413	11.30	
>10Mbps	375	3.00	

TSP- BSNL

Data Statistics - Dynamic data testing

Data KPIs - Overall	3G
Download Throughput (Mbps)	2.849

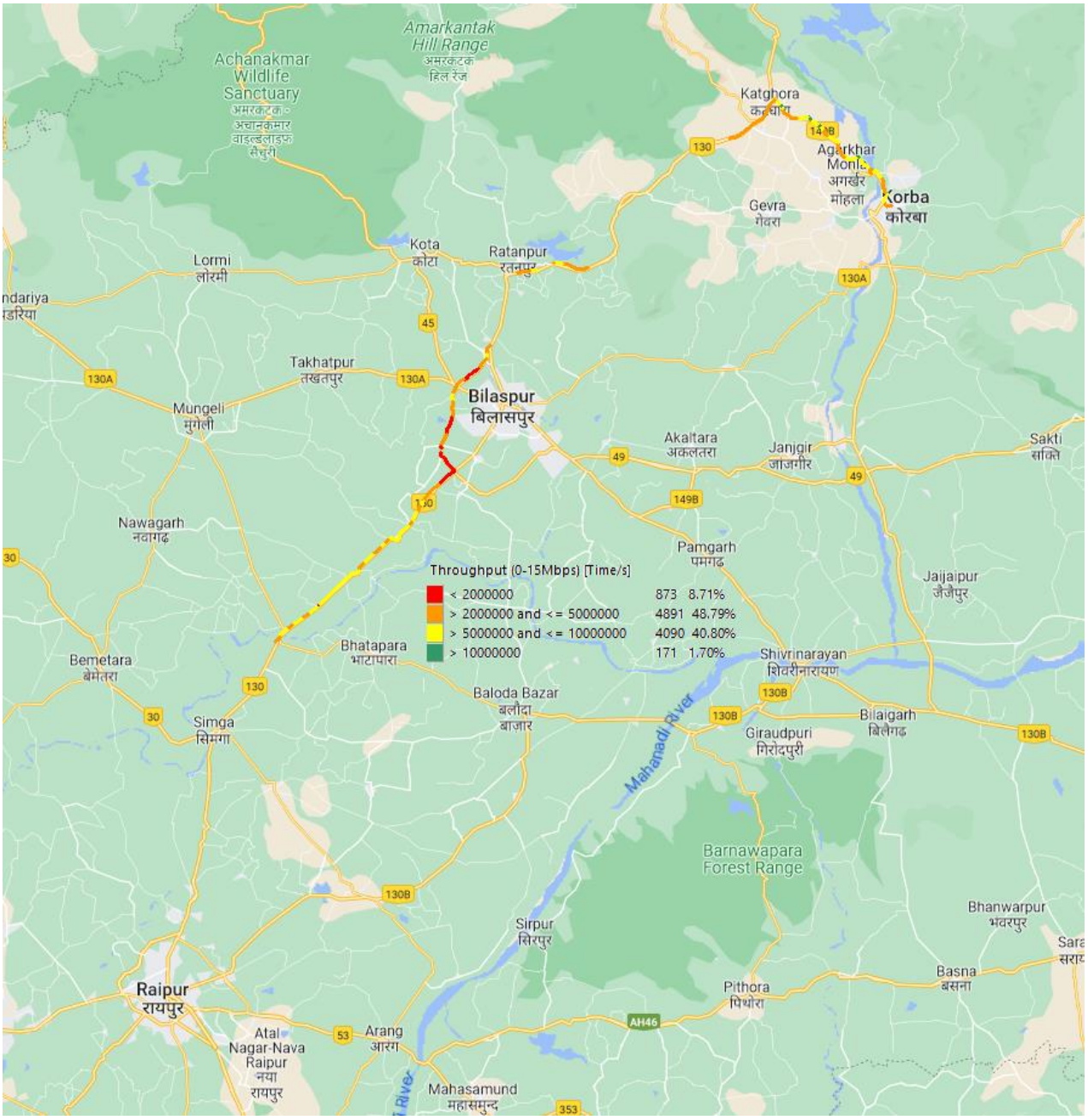


DL throughput	No of Sample	%	Legends
< 1 Mbps	0	0.00%	
1-5 Mbps	2086	90.41%	
5-10 Mbps	221	9.59%	
>10Mbps	0	0.00%	

TSP-BSNL

Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	4.362

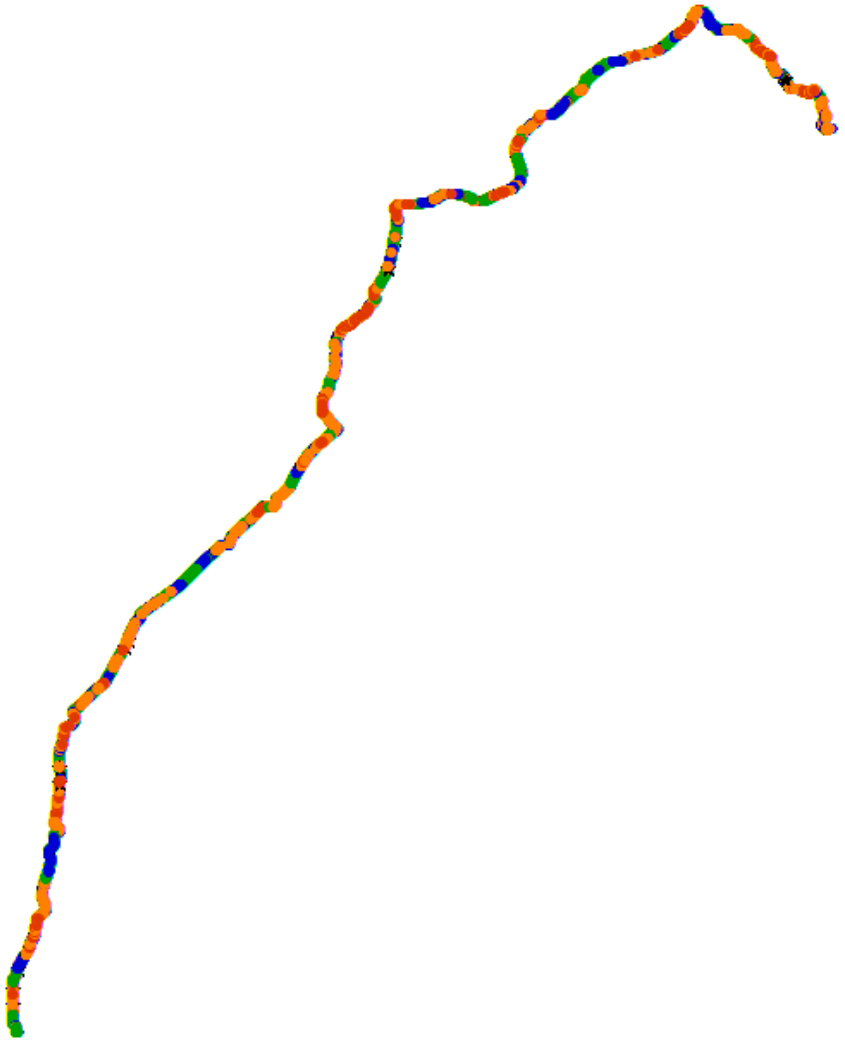


DL throughput	No of Sample	%	Legends
< 2Mbps	873	8.71%	
2-5 Mbps	4891	48.79%	
5-10 Mbps	4090	40.80%	
>10Mbps	171	1.70%	

TSP-JIO

Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	20.21

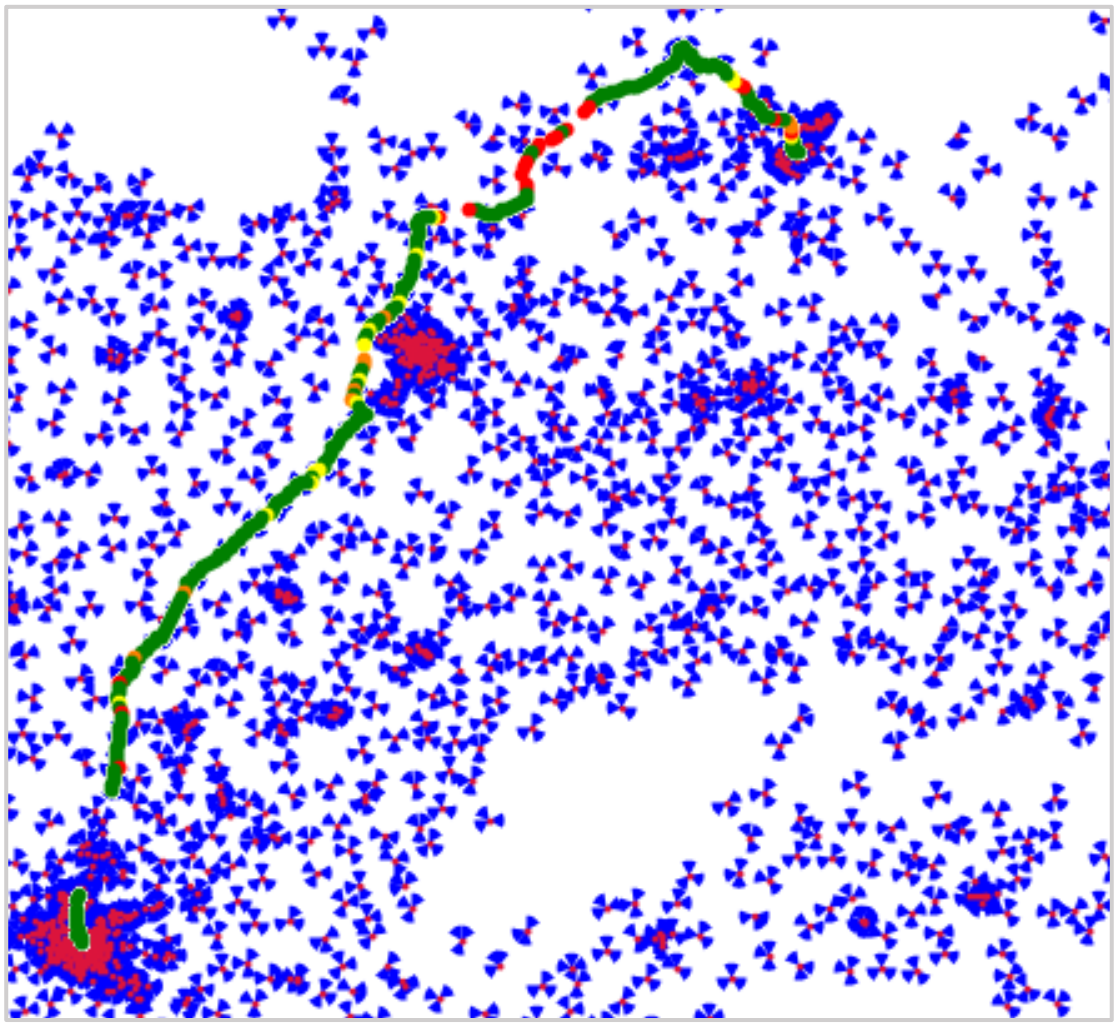


DL throughput	No of Sample	%	Legends
< 2Mbps	1192	7.0%	
2-5 Mbps	3642	21.3%	
5-10 Mbps	4332	25.3%	
>10Mbps	7946	46.4%	

TSP-VI

Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	25.08



DL throughput	No of Sample	%	Legends
< 2Mbps	618	6.36	
2-5 Mbps	392	4.04	
5-10 Mbps	808	8.32	
>10Mbps	7892	81.28	