प्रभावी विनियमन – सुगम संचार
Effective Regulation – Ease of Communication

Operator Assisted Drive Test Report

Ayodhya to Lucknow Highway
15/02/2024
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 Ayodhya to Lucknow Highway from 9:00 AM to 8:00 PM. The drive test covered drive route of around 136 KMs.

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

Key Performance Indicators:

KPI	Benchmark	Observations
Block call rate %	≤3%	All TSPs achieved the benchmark. Except BSNL in 3G
Drop call rate %	≤2%	All TSPs achieved the benchmark. Except BSNL in 2G & 3G
CSSR %	≥95 %	All TSPs achieved the benchmark.
Mobility HOSR %	≥95%	All TSPs achieved the benchmark.
Good RX Quality %	≥95%	All TSPs achieved the benchmark. Except BSNL in 3G & Jio 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 **180-sec** duration with a wait time of **10 sec** between calls in all technologies.
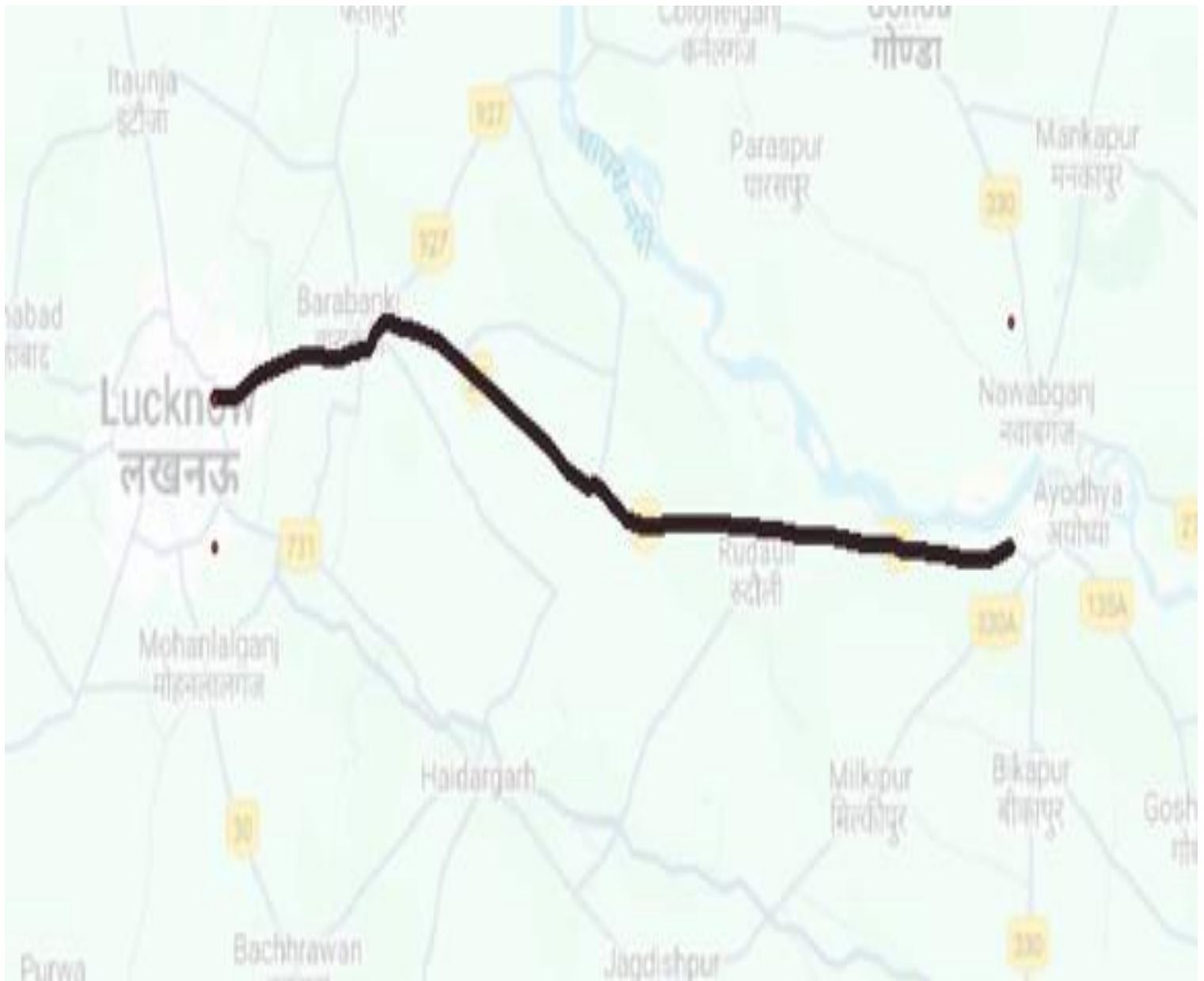
Data Tests:
Dynamic data – repeat data file download (to check throughput on the entire route)

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

Overview Details

Voice & Dynamic Data Test Drive Route

List of important area covered during the drive test
Ayodhya-Lucknow
Sohawal
Rudauli
RamSanehighat
Barabanki

3

Voice Calls

QoS compliance of the TSPs   for Voice across technologies 2G/3G/4G-VoLTE:
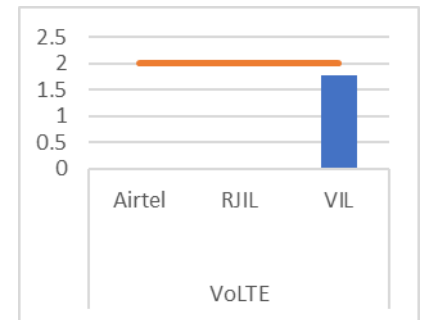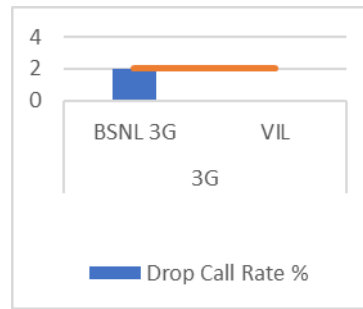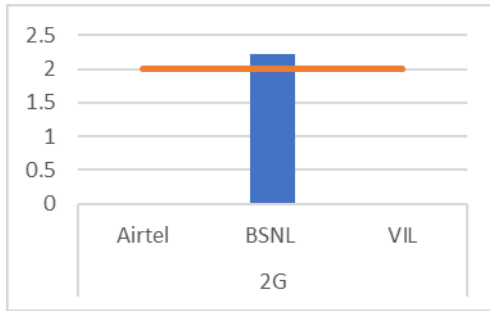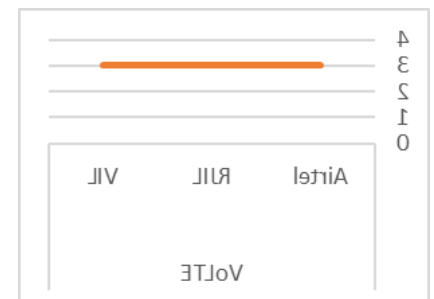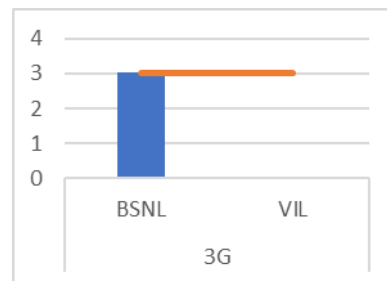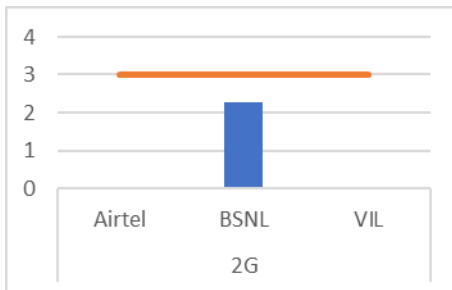
KPIs	2G			3G		VoLTE		
	Airtel	**BSNL**	**VIL**	**BSNL**	**VIL**	**Airtel**	**RJIL**	**VIL**
Drop Call Rate %	0.00	**2.22**	0	**2.02**	NA	0.00	0	1.78
Block Call Rate %	0.00	2.27	0	**3.03**	A	0.00	0	0

a) **All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%) Except BSNL in 2G &3 G**

b) **Call Block Rate (CBR%) benchmark of 3% was achieved by all TSP's. Except BSNL in 3G**

Voice Calls

Coverage

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

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	87.35	73.95	96.84

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

TSPs	3G
	BSNL
Coverage %	60.02

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	98.06	99.92	99.3

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

TSPs	3G		VoLTE		
	BSNL	VIL	Airtel	JIO	VIL
Time Spent on 3G/4G %	91.2	NA	100	100	95.83

Data Services Dynamic

Dynamic Data -Download Throughput was tested.

Data Download Performance – Dynamic 3G/4G/ 5G Network
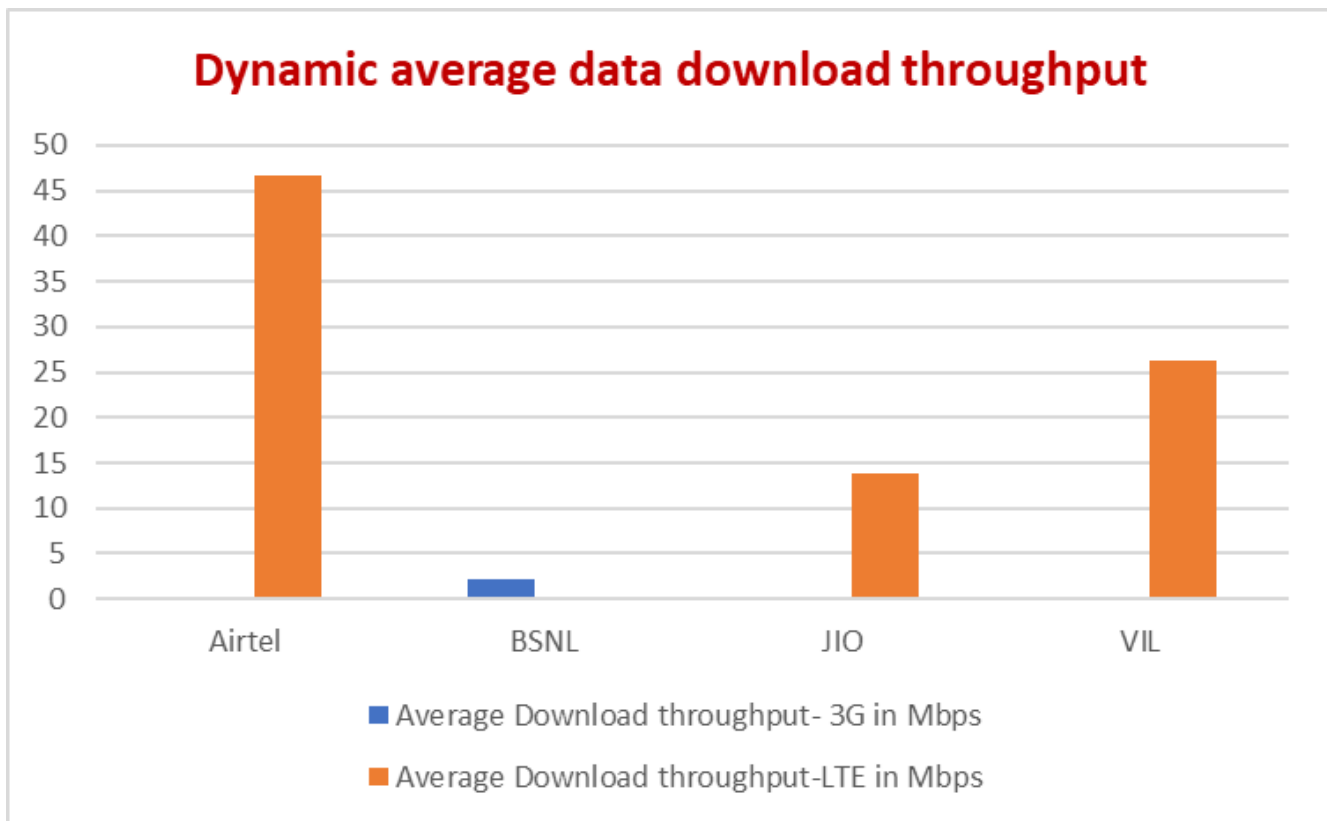
TSP	Airtel	BSNL	JIO	VIL
Average Download throughput- 3G In Mbps	NA	2.234	NA	NA
Average Download throughput-LTE in Mbps	46.74	NA	13.78	26.18
Average Download throughput- 5G in Mbps	NA	NA	NA	NA

Data Summary

Summary

TSP (For 2G)	Airtel	BSNL	VIL
Call attempts	51	45	61
Block call rate %	0.00	2.22	0
CSSR %	100.00	97.78	100
Drop call rate %	0.00	2.27	0
Mobility HOSR %	96.23	96.7	99.21
RX Quality %	97.80	96.12	96.84
Average CST Sec	4	4.1	3.06

TSP (For 3G)	BSNL
Call attempts	99
Block call rate %	3.03
CSSR %	96.97
Drop call rate %	2.02
Mobility HOSR %	96.8
RX Quality %	82.75
Average CST (Sec)	3.8

TSP (For Volte)	Airtel	BSNL	JIO	VIL
Call attempts	51	NA	53	56
Block call rate %	0.00	NA	0	0
CSSR %	100.00	NA	100	100
Drop call rate %	0.00	NA	0	1.78
Mobility HOSR %	100	NA	100	100
RX Quality %	96.04	NA	91.84	95.03
Average CST(Sec)	3	NA	0.62	0.73

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	87.35
BSNI 2G	73.95
VIL 2G	96.84
BSNL 3G	60.02
Airtel VoLTE	98.06
Jio VoLTE	99.92
VIL VoLTE	99.3

Coverage Rate %
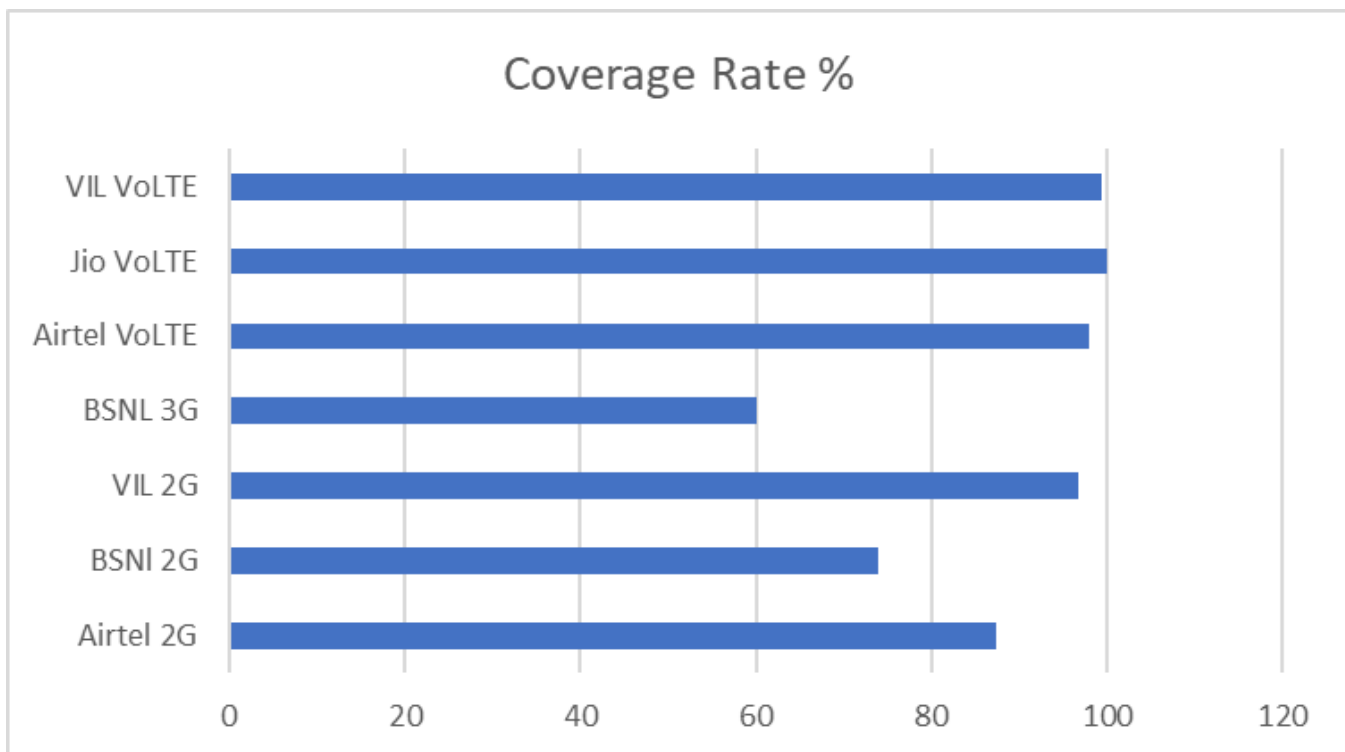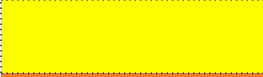
TSP-AIRTEL

Technology	Coverage %
2G	99.98
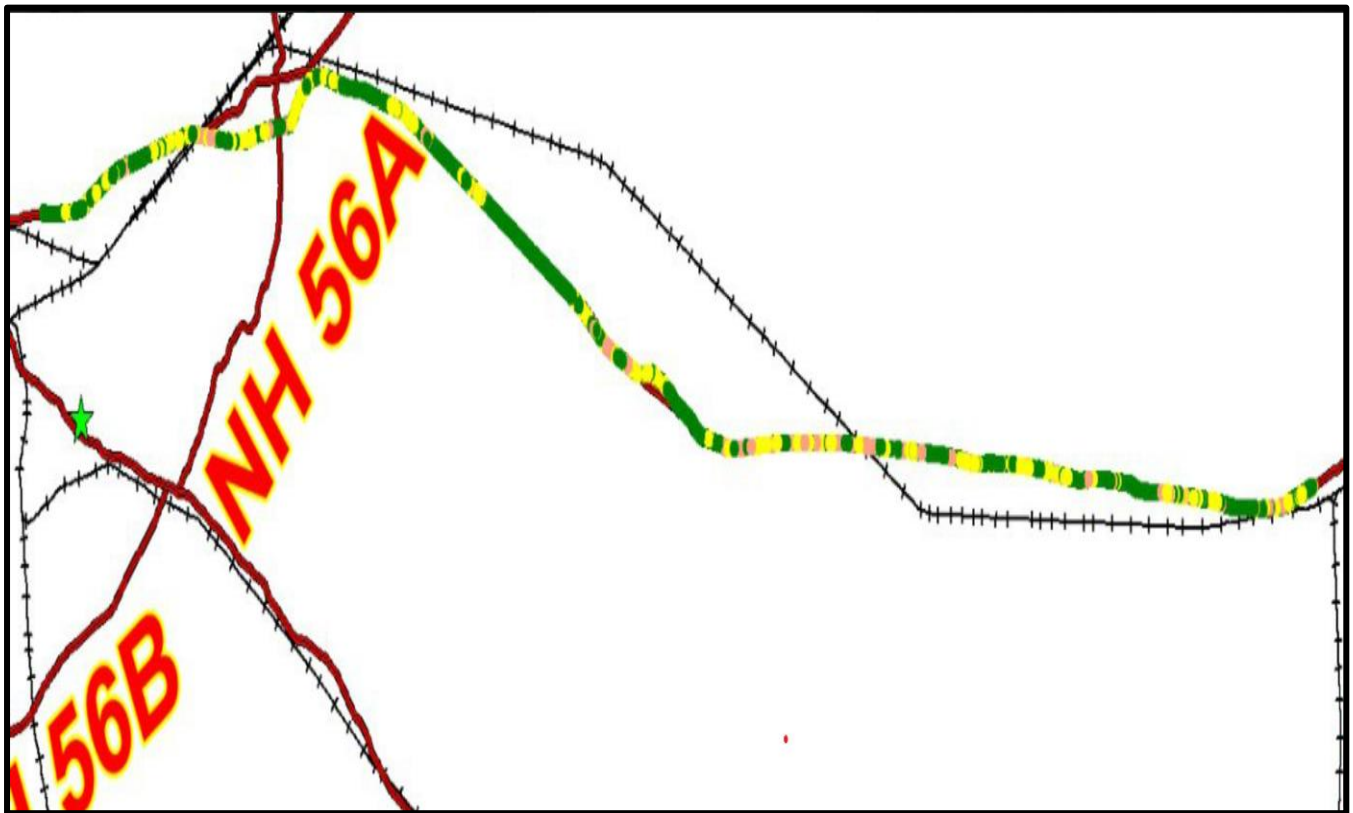
2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	379442	61.16	🟩
[-75, >=-85)	162444	26.18	🟨
[-85, >=-95)	78406	12.63	🟧
[-95, >=Min)	69	0.01	🟥
Total	620361		

TSP-BSNL

Technology	Coverage %
2G	73.95
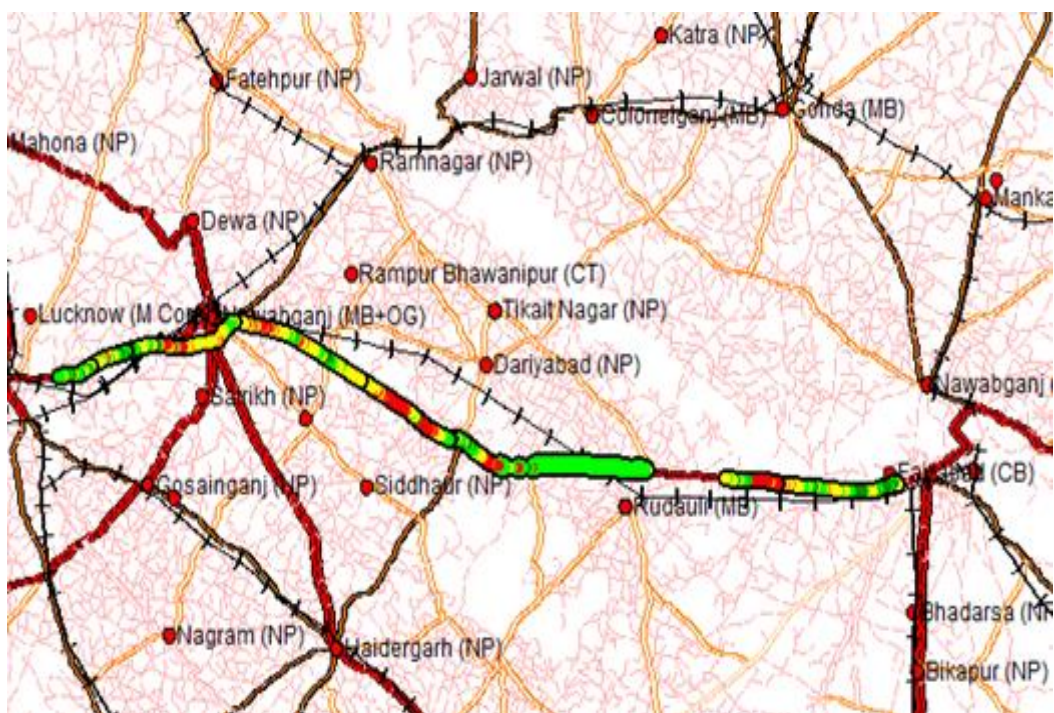
2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	2242	36.38	
[-75, >=-85)	2315	37.57	
[-85, >=-95)	552	8.96	
[-95, >=Min)	1054	17.10	
Total			

TSP- VIL

Technology	Coverage %
2G	96.84%

2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	2667	66.84%	
[-75, >=-85)	1199	30.00%	
[-85, >=-95)	126	3.16%	
[-95, >=Min)	0	0%	
Total	3992	100%	

TSP-BSNL

Technology	Coverage %
3G	60.02
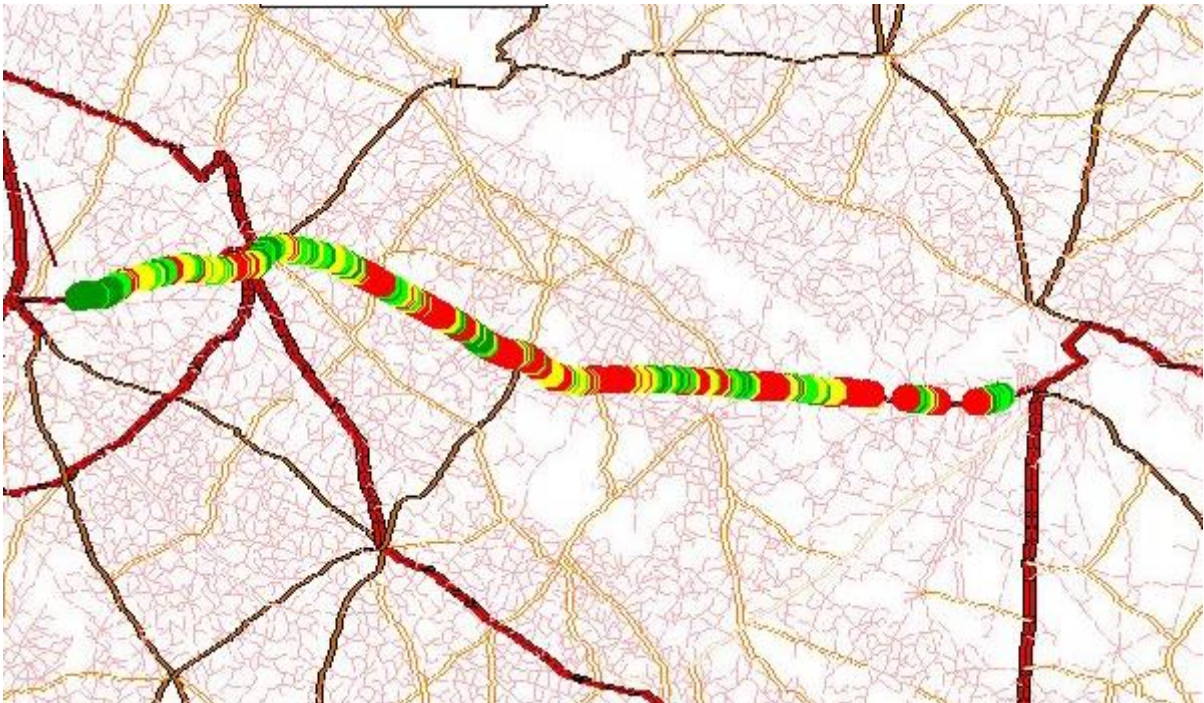
3G			
Overall RSCP	**# Samples**	**% PDF**	**Legends**
[Max, >=-70]	1465	18.17	
[-70, >=-80)	1305	16.19	
[-80, >=-90)	2069	25.66	
[-90, >=Min)	3224	39.98	
Total		**100**	

TSP-AIRTEL.

Technology	Coverage %
VoLTE	98.06
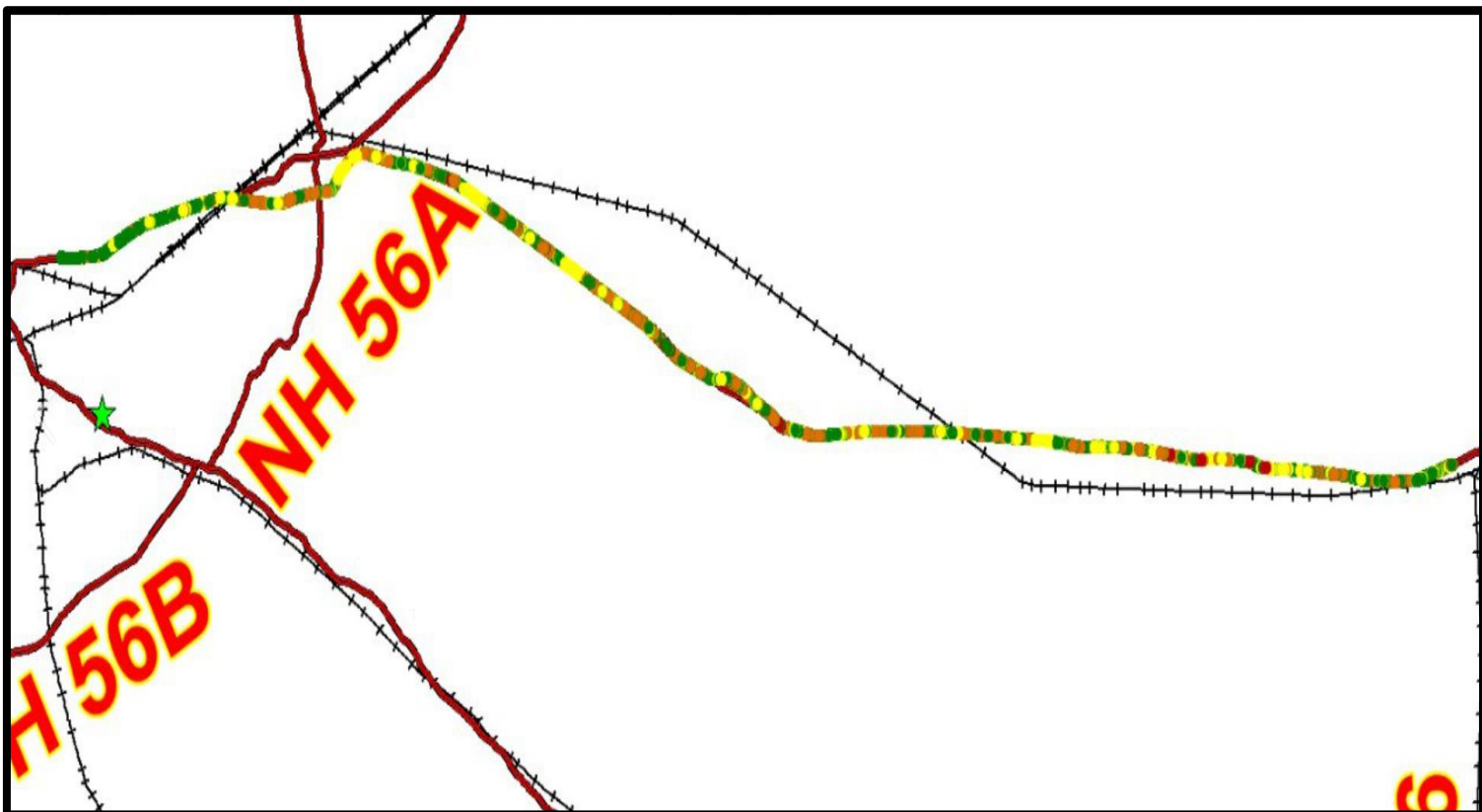
VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	949541	48.81	
[-80, >=-90)	467658	24.04	
[-90, >=-110)	490263	25.20	
[-110, >=Min)	37577	1.9	
Total			

13

TSP- JIO

Technology	Coverage %
VoLTE	99.92

DAY4 DL RSRP SINR [19541]
- ● -80 - 0 [9768]
- ● -90 - -80 [5287]
- ● -110 - -90 [4472]
- ● -140 - -110 [14]
- **Google Road**
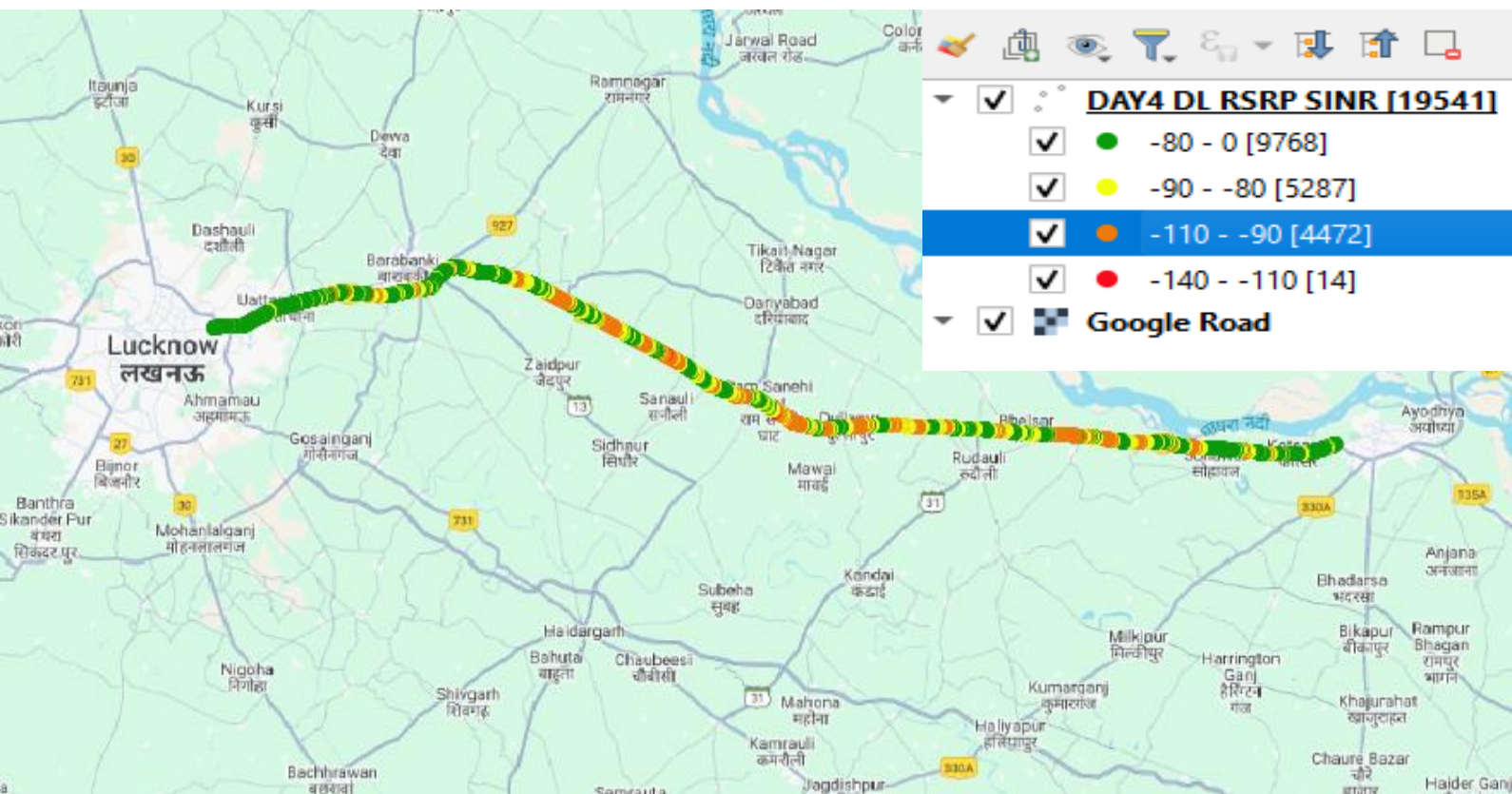
VoLTE			
Overall RSRP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	9768	49.98%	
[-80, >=-90)	5287	27.05%	
[-90, >=-110)	4472	22.88%	
[-110, >=140)	14	0.09%	
Total	19541		

14

TSP- VIL

Technology	Coverage %
2G	96.84%

2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	2667	66.84%	
[-75, >=-85)	1199	30.00%	
[-85, >=-95)	126	3.16%	
[-95, >=Min)	0	0%	
Total	3992	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	97.80
BSNl 2G	96.12
VIL 2G	96.84
BSNL 3G	82.25
Airtel VoLTE	96.04
Jio VoLTE	91.8
VIL VoLTE	95.03
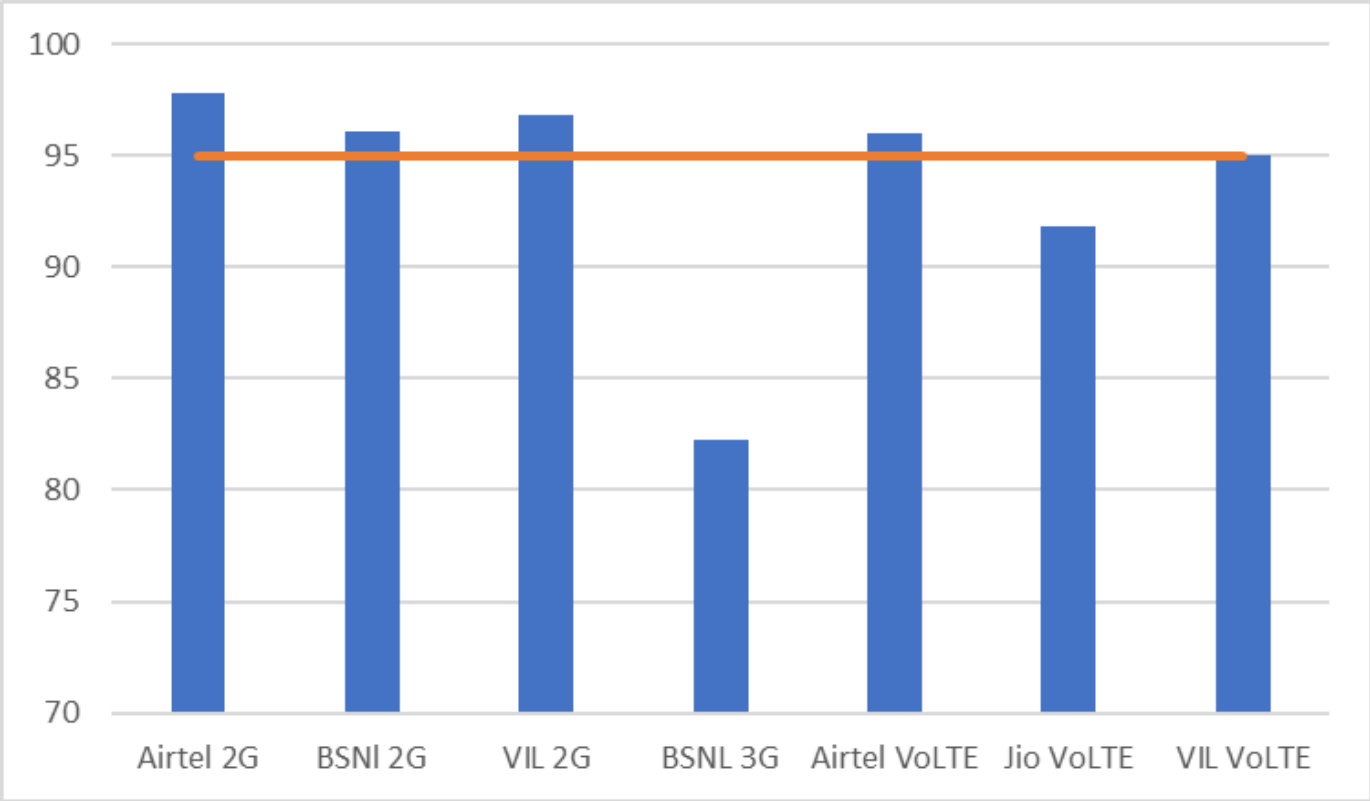
For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -14 dBm for 3G TSP sand SINR >0 in case of VoLTE is considered to be good, where as quality beyond this benchmark is considered to be bad. The benchmark should usually be ≥ 95%.

TSP-AIRTEL

Technology	Rx Quality %
2G	97.80

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	563577	90.85	
(2, <=3)	14567	2.35	
(3 , <=4)	16398	2.64	
(4 , <=5)	12152	1.96	
(5 , <=Max)	13667	2.20	
Total	620361		

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%.
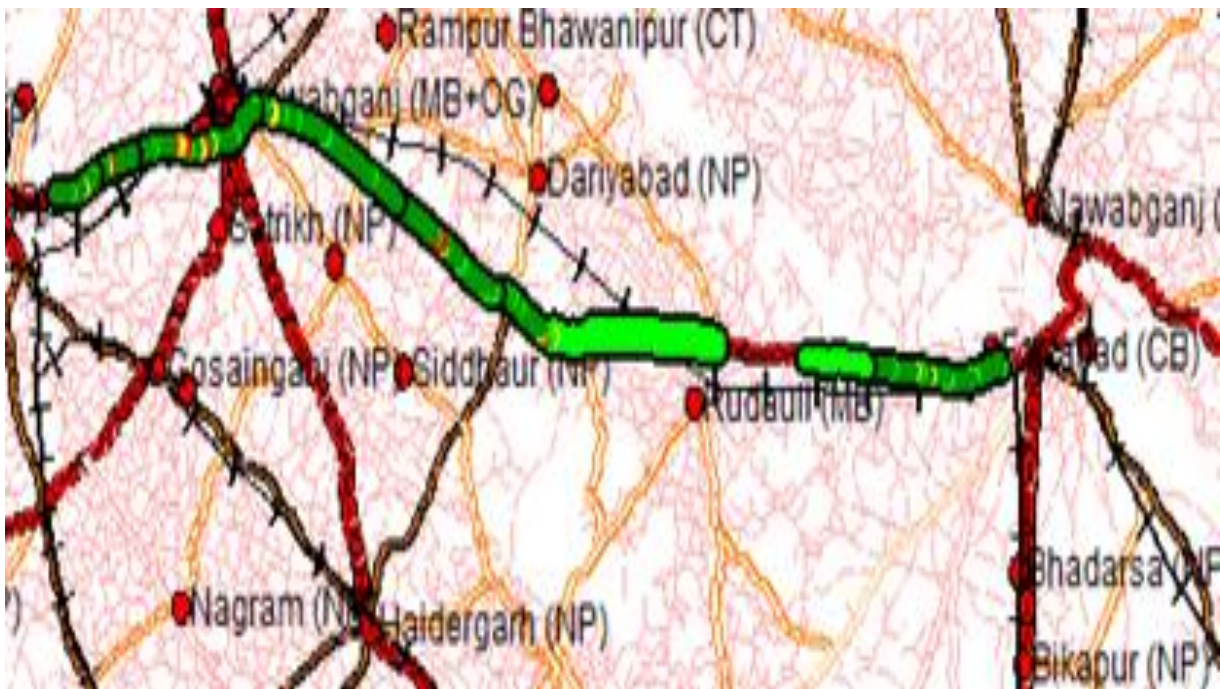
TSP-BSNL

Technology	Rx Quality %
2G	96.12

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	4455	89.27	🟩
(2, <=3)	103	2.07	🟨
(3 , <=4)	130	2.61	🟦
(4 , <=5)	108	2.17	🟧
(5 , <=Max)	194	3.88	🟥
Total			

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- VIL

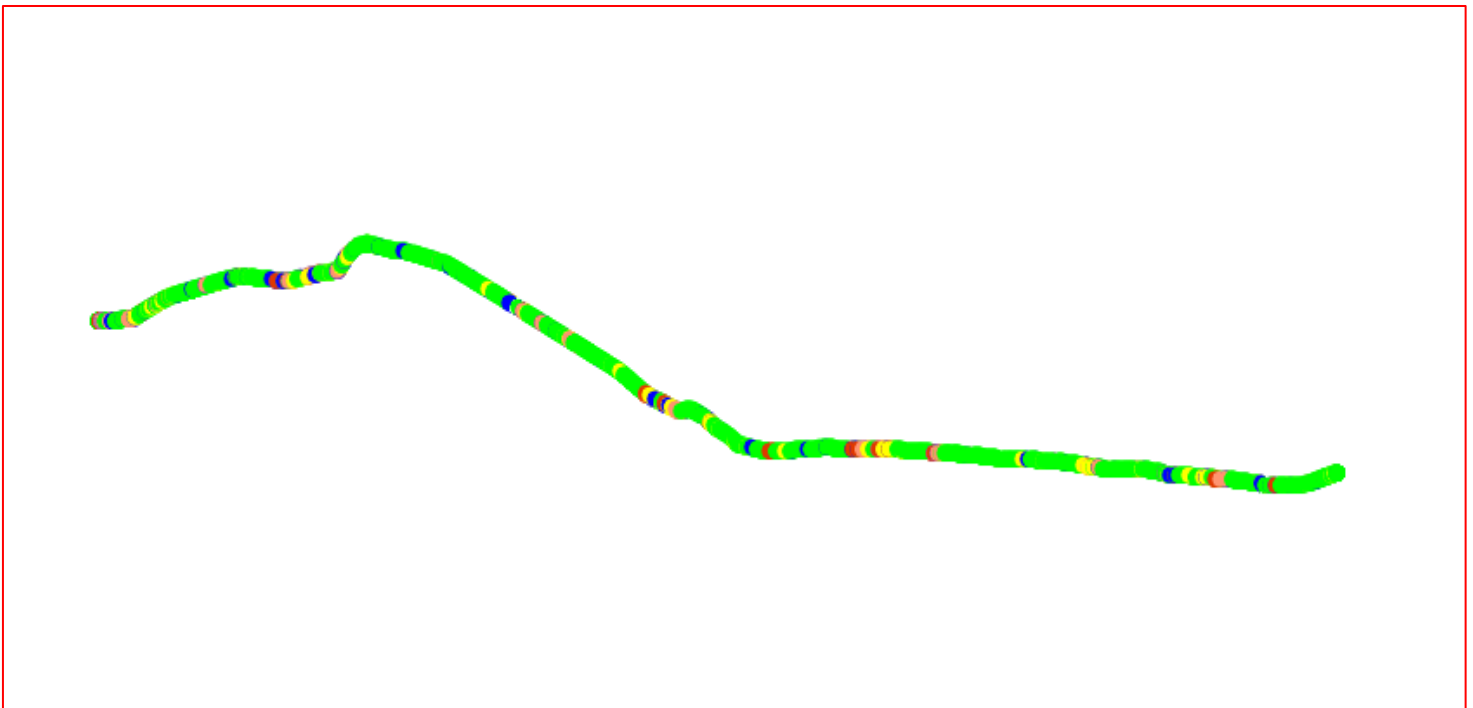| Technology	Rx Quality %
2G	96.84%

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	2815	77.36%	
(2, <=3)	238	6.54%	
(3 , <=4)	262	7.20%	
(4 , <=5)	209	5.74%	
(5 , <=Max)	115	3.16%	
Total	3639	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-BSNL

Technology	Rx Quality %
3G	82.25

Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	1897	31.03	
(-6, <=-9)	1301	21.28	
(-9, <=-11)	97	1.59	
(-11, <=-14)	1733	28.36	
(-14, <= Min)	1086	17.75	
Total		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%.
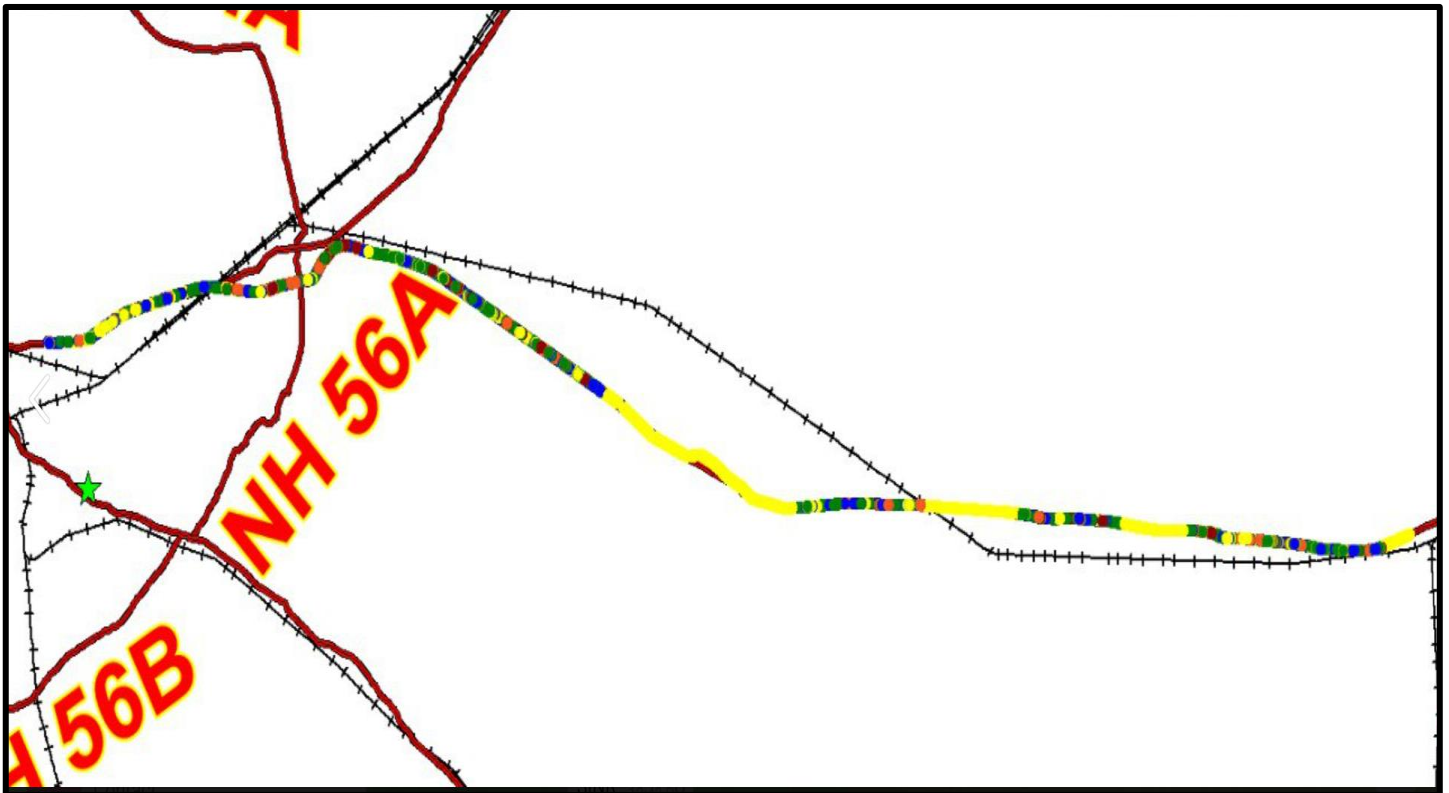
TSP-AIRTEL

Technology	Rx Quality %
VoLTE	**96.04**

Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	77070	3.96	
(0, <=5)	262596	13.50	
(5, <=10)	327374	16.83	
(10, <=15)	717684	26.90	
(15, <=Max)	560315	28.21	
Total	1945039		

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%.
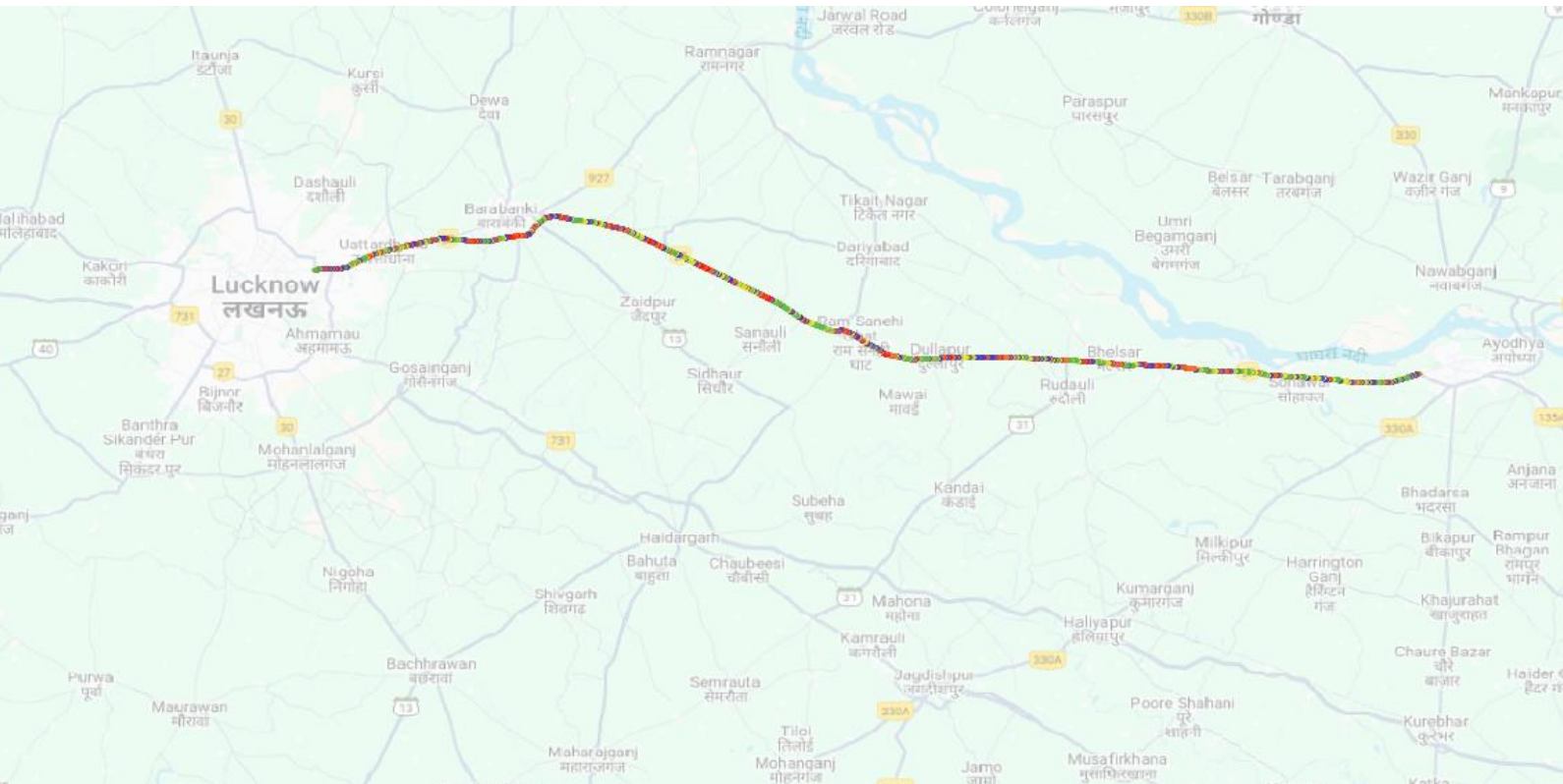
TSP - JIO

Technology	Rx Quality %
VoLTE	91.8

Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1724	8.2%	
(0, <=5)	4953	23.5%	
(5, <=10)	5506	26.1%	
(10, <=15)	4661	22.1%	
(15, <=Max)	4272	20.2%	
Total	21116		

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- VIL

Technology	Rx Quality %
VoLTE	**95.05%**
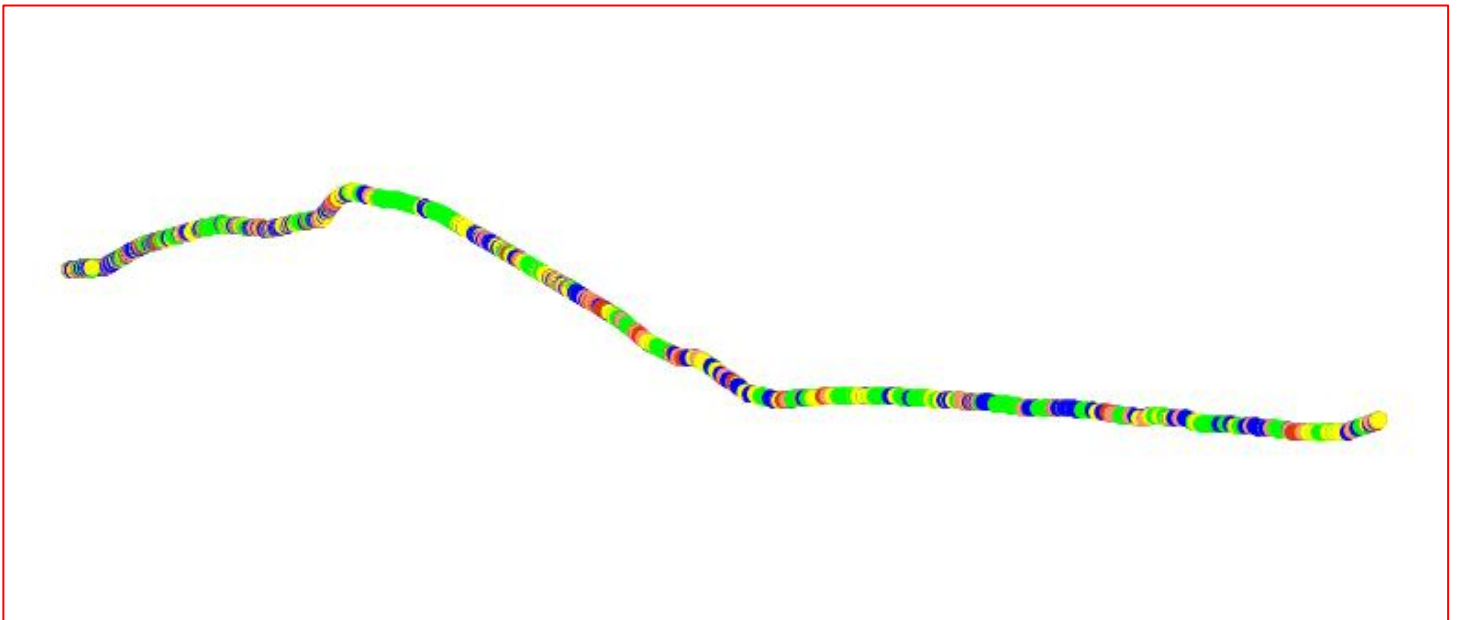
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	240	4.95%	
(0, <=5)	679	14.01%	
(5, <=10)	1257	25.94%	
(10, <=15)	1285	26.52%	
(15, <=Max)	1385	28.58%	
Total	4847	100%	

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	91.2
Airtel VoLTE	100
Jio VoLTE	100
VIL VoLTE	95.83

% of Time Spent on 3G/VoLTE
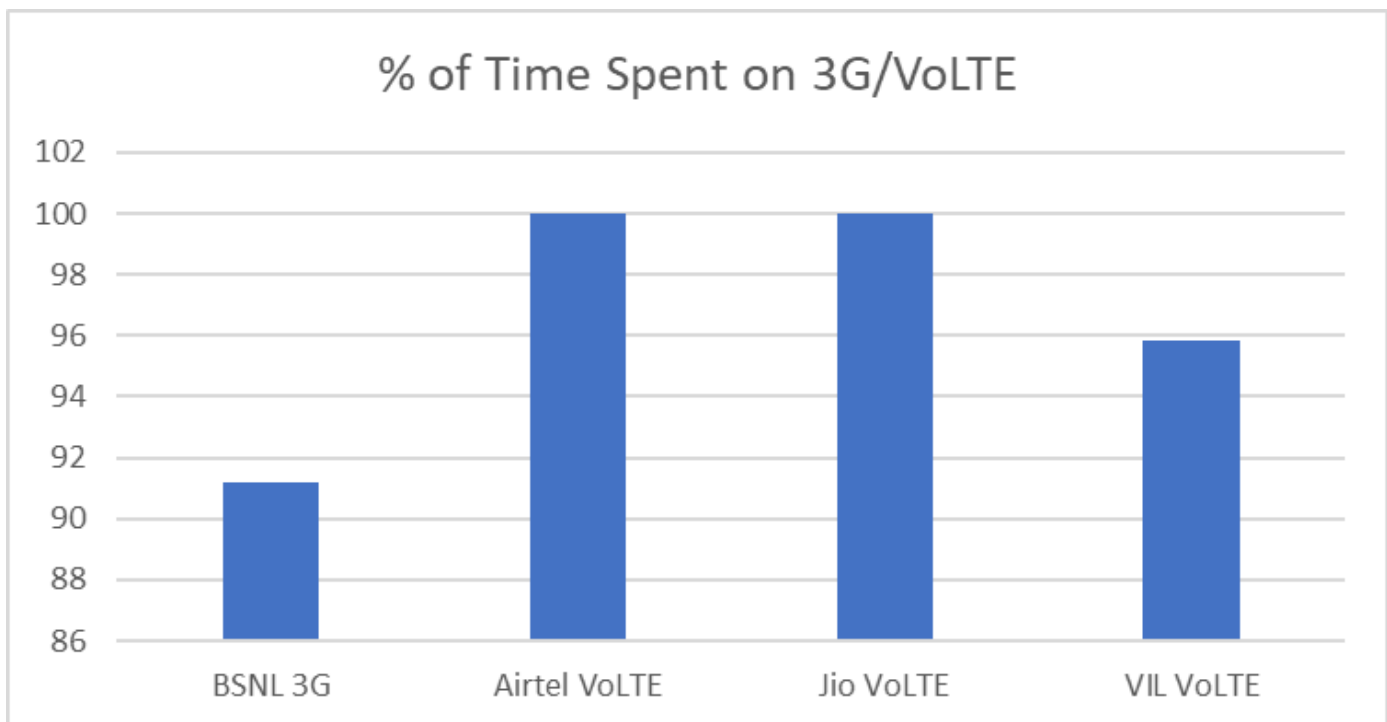
TSP-AIRTEL.

Technology	% of Time Spent on
3G	
VoLTE	100
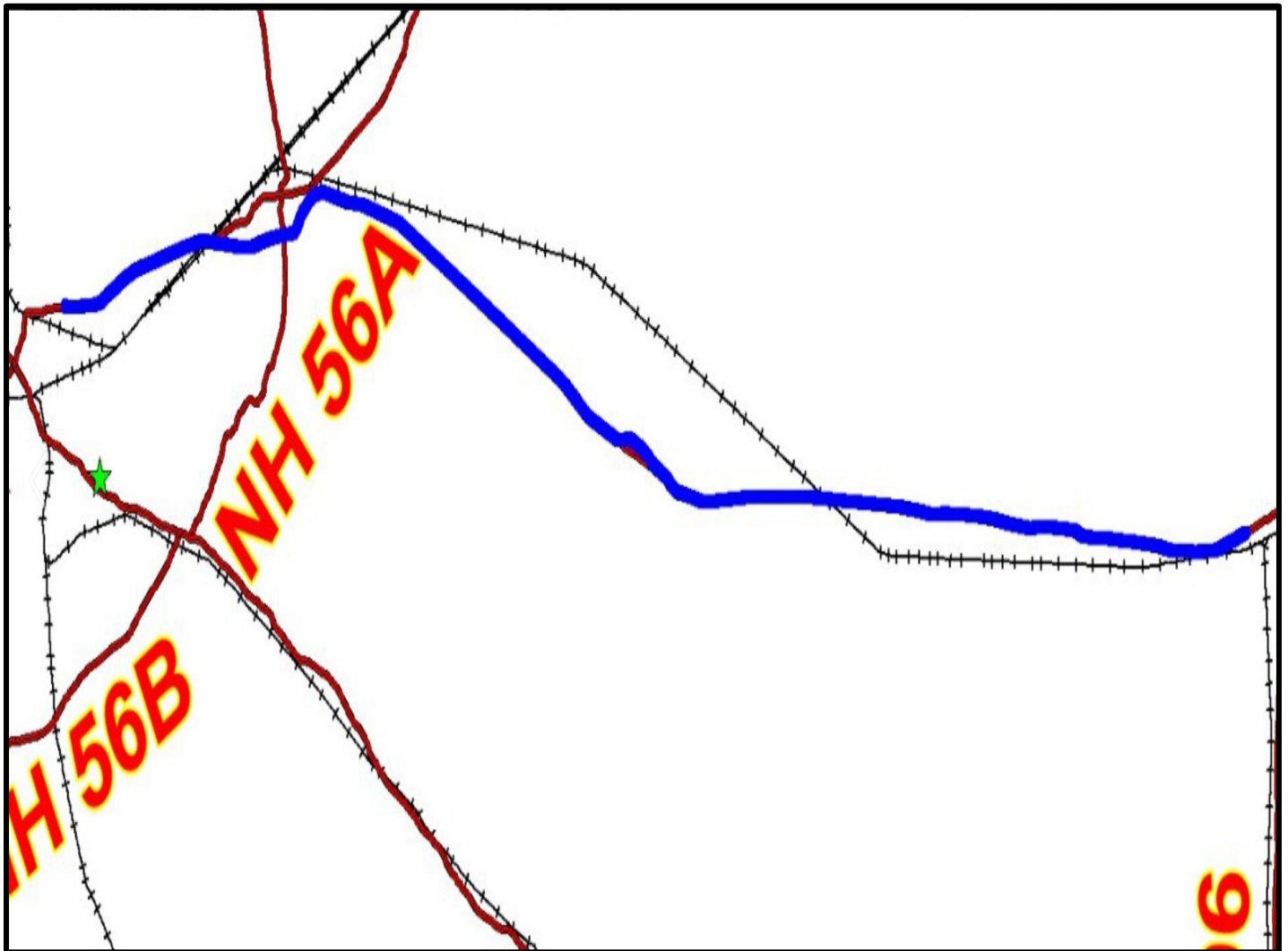
TSP-BSNL

Technology	% of Time Spent on
3G	91.2
VoLTE	

GSM 900	14	8.8%
UMTS FDD 2100	145	91.2%
Total:	159	100.0%
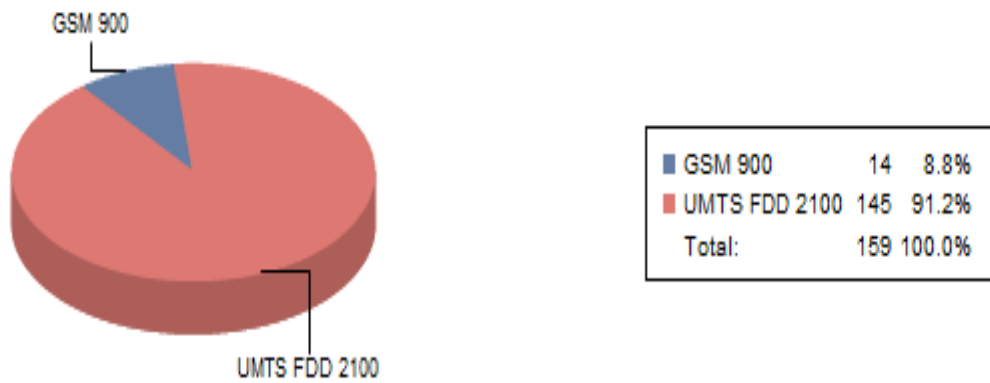
TSP-AIRTEL

Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	95.76
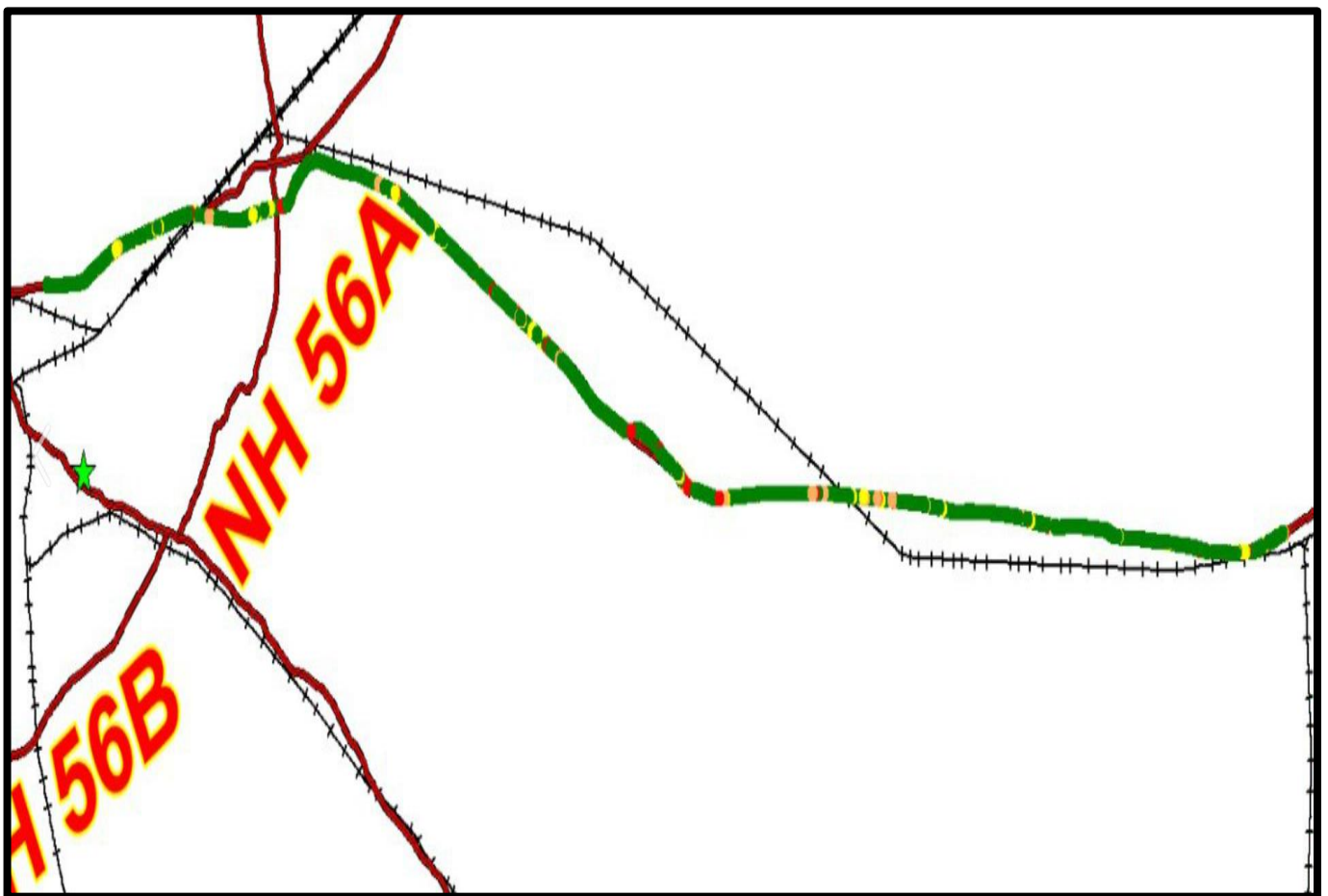
DL throughput	No of Sample	%	Legends
< 2Mbps	108559	4.23	
2-5 Mbps	111541	4.34	
5-10 Mbps	204909	7.98	
>10Mbps	2139727	83.42	

Dynamic Data Test Details

TSP-BSNL

Data Statistics - Dynamic data testing

Data KPIs - Overall	3G
Download Throughput (Mbps)	**2.324**
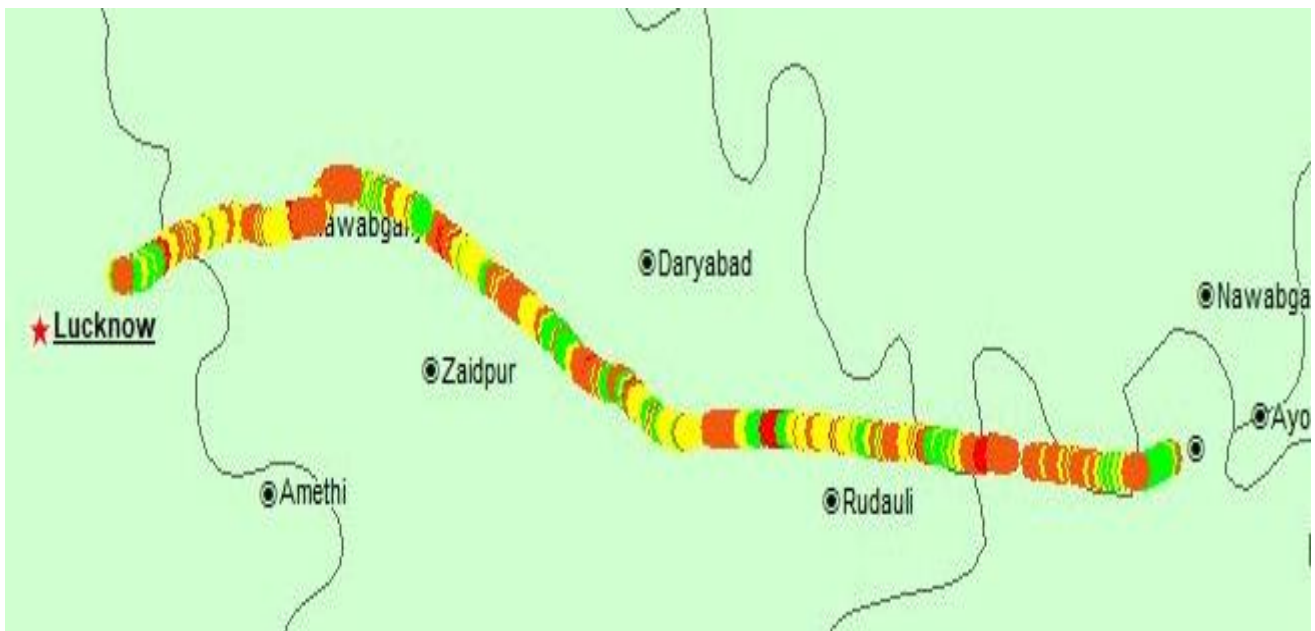
DL throughput	No of Sample	%	Legends
< 1 Mbps	121	6.22	
1-5 Mbps	774	39.77	
5-10 Mbps	757	3890	
>10Mbps	294	15.11	

TSP - JIO

Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	13.78
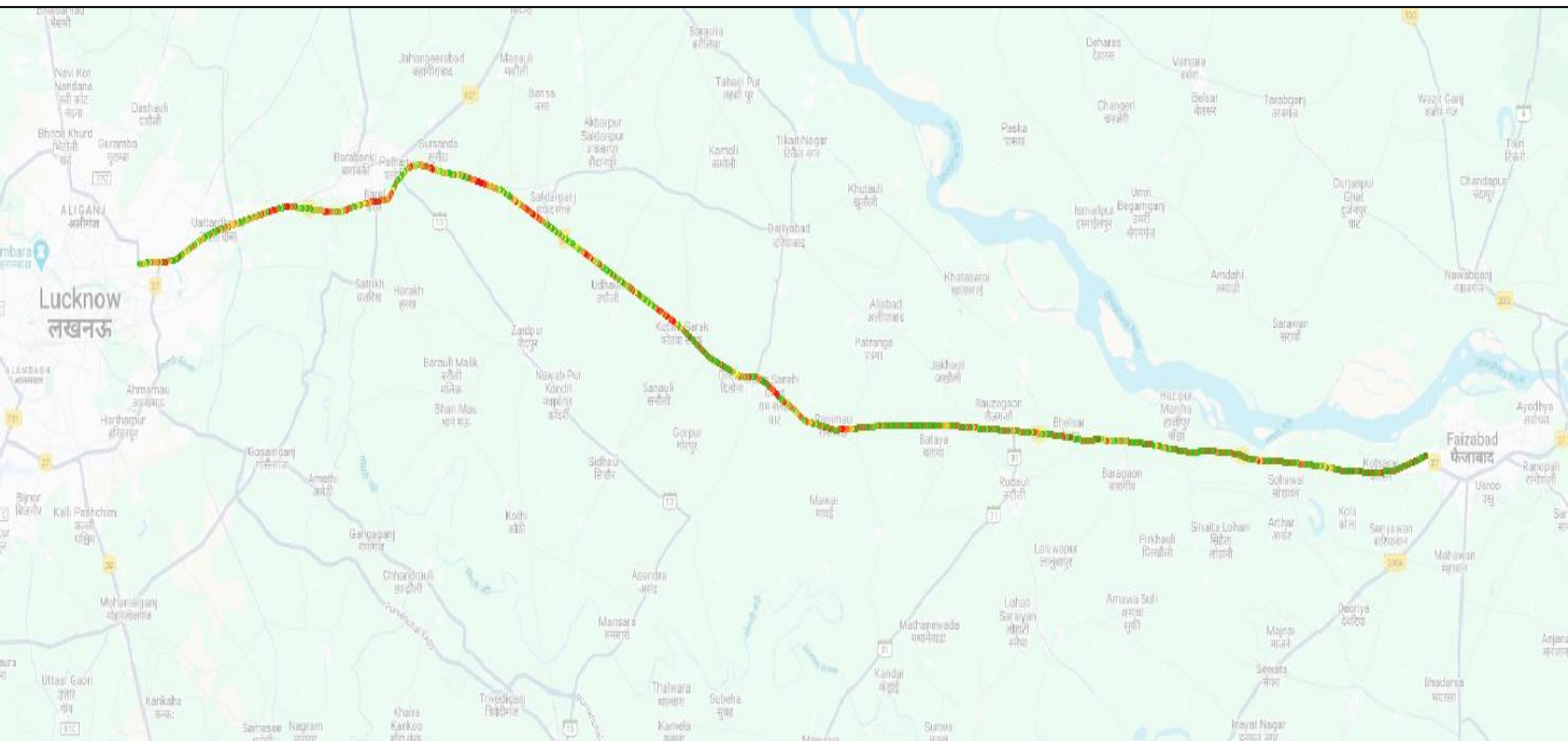
DL throughput	No of Sample	%	Legends
< 2Mbps	1394	14.9%	
2-5 Mbps	2081	22.3%	
5-10 Mbps	1951	20.9%	
>10Mbps	3926	42.0%	

TSP- VIL

Data Statistics - Dynamic data testing

Data KPIs - Overall	LTE
Download Throughput (Mbps)	26.18
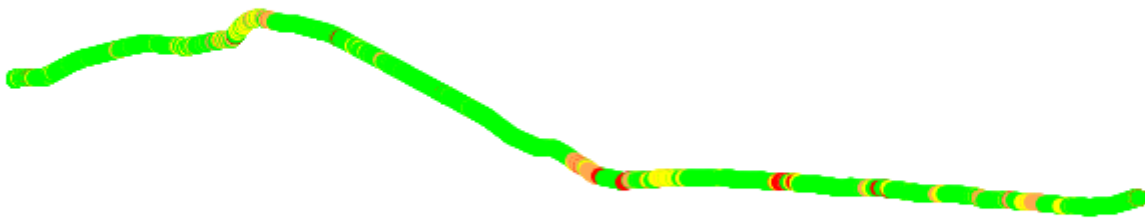
DL throughput	No of Sample	%	Legends
< 2Mbps	240	4.94%	
2-5 Mbps	232	4.78%	
5-10 Mbps	467	9.61%	
>10Mbps	3919	80.67%	

30