



Operator Assisted Drive Test Report

Rohtak Dec. 2021

(RO, Jaipur)

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%.

TRAI Regional Office, Jaipur as directed by TRAI HQ has got conducted the operator assisted drive test with the help of Telecom Service Providers of Haryana LSA in Rohtak City and surrounding areas Meham, Sampla SDCAs of Rohtak SSA during 20th to 23rd Dec 2021. The drive test covered drive route of 373 KMs & 7 hotspots over a period of 4 days. Approximately 450+ calls were made for each of the 7 networks: three 2G networks, one 3G network and three LTE network covering four TSPs. The drive test reports were generated through TSPs tools and was compiled by the TRAI RO Jaipur.

Overview

Voice
Summary

Data
Summary

Overview

Regional Office, TRAI Jaipur got conducted Operator Assisted Drive Test from 20th to 23rd Dec 2021 covering various locations in Rohtak City & surrounding areas Meham, Sampla SDCAs of Rohtak SSA. The performance of Airtel, BSNL, Vodafone Idea and Jio were monitored across various technologies (2G, 3G and 4G) by TSP's themselves through their own test kits. The TSP's reports obtained from these drive tests were compiled 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 370 + KMs over a period of 4 days from 20th to 23rd Dec 2021 . Approximately 450 + calls were made for each of the 7 networks: three 2G (Lock Mode) networks, one 3G (Dual mode) networks and three VoLTE network covering 4 unique TSPs.

Data Tests:

1. Dynamic data test was conducted for download throughput for 3G & 4G technologies.

2. Data Tests were performed at 7 static locations for 2G, 3G & 4G technologies. Also screenshots of TRAI MYSPEED APP was taken by TSPs at 7 static locations were attached at Annex V.

* For Voice and Data KPI's, 2G measurement is done with UE locked mode, 3G measurement is done with UE in Dual mode (2G & 3G) and 4G measurement is done with UE in Free Mode.

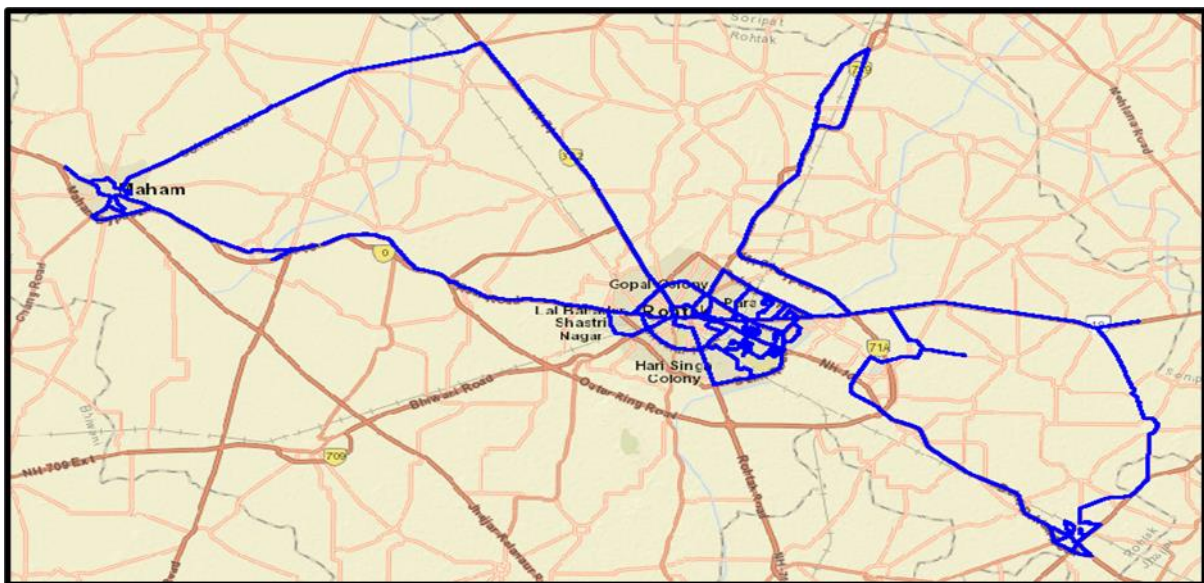
* 3G KPI's which are calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.

* 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 (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

Voice & Dynamic Data Test Drive Route

S.No.	Date	Area Covered	Total Kms.
1	20.12.21	Suncity township, Rajendra Nagar, Para Mohalla, Sec-4 , Babra Mohalla, Arya Nagar, Hari Singh Colony, Janta Colony ,Dev Colony, Sec -1, PGIOPD,MDU University, Delhi Bypass, Sec-1 Market, Sec-2-3 Market ,Sheela Bypass, Ambedkar Chowk, Canal Rest house , old ITI area , Ashoka Chowk, Labor Chowk, Jhajjar Chungi, Kamla Nagar , Kanheli , Jind bypass , Bhiwani Chungi, Railway Station, Anaj mandi, New Bus stand, Old Bus stand, Sukhpura Chowk , Mata Darwaja, Gohana Adda, Civil Hospital, Vita Plant, Laxmi Nagar, Sec-6, Rajeev Gandhi Stadium.	115
2	21.12.21	Bohar, Bhalaut, Kansala, Morkheri, Samchana, Sampla SDCA, Back to Rohtak via Ismaila, Kharawar, Kherisadh, Asthal Bohar, Delhi Bypass, MDU University	110
3	22.12.21	Bahuakberpur, Madina, Kharkhara, Meham SDCA, Nidana, Bainsi, Lakhanmajra and back to Rohtak via Jind road upto Jind bypass	118
4	23.12.21	Bus Stand , Hudda Complex, District Court, PGI Rohtak and Dynamic data testing between them S	30
Total			373

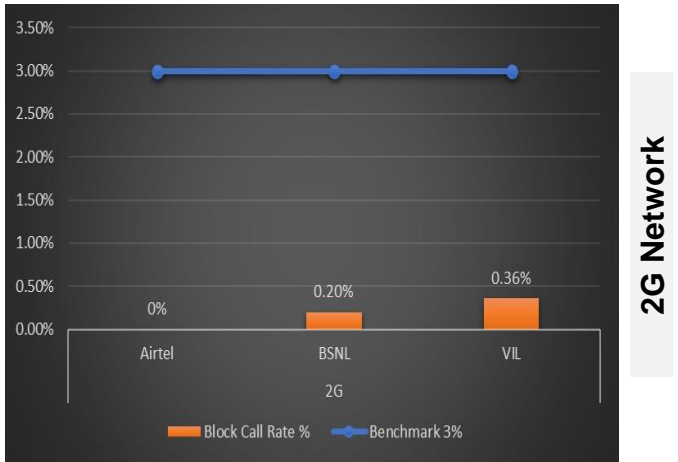
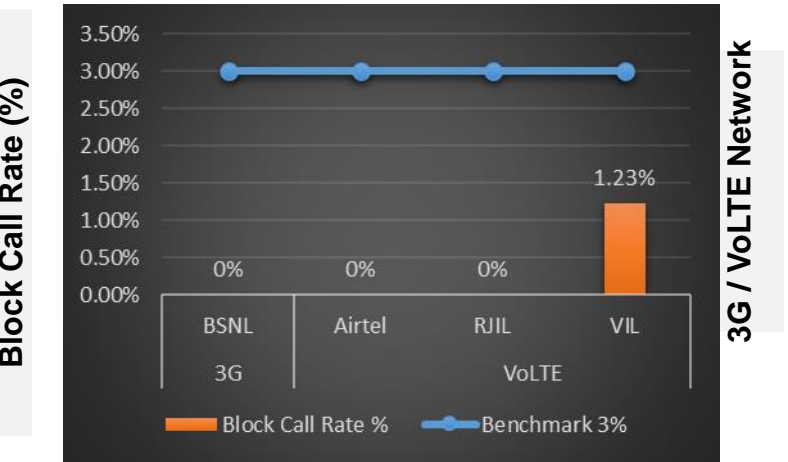
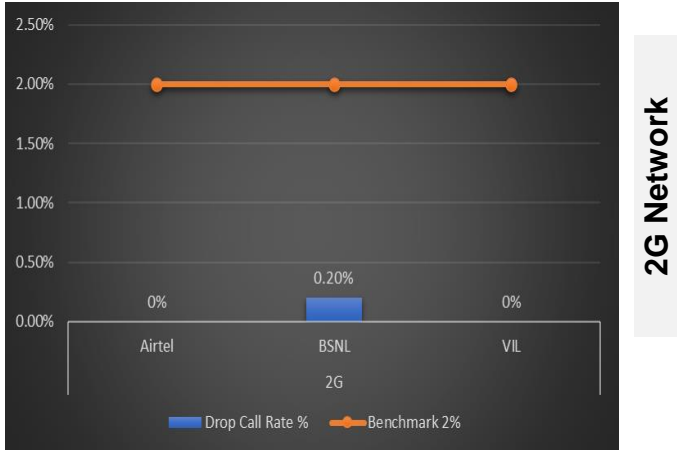
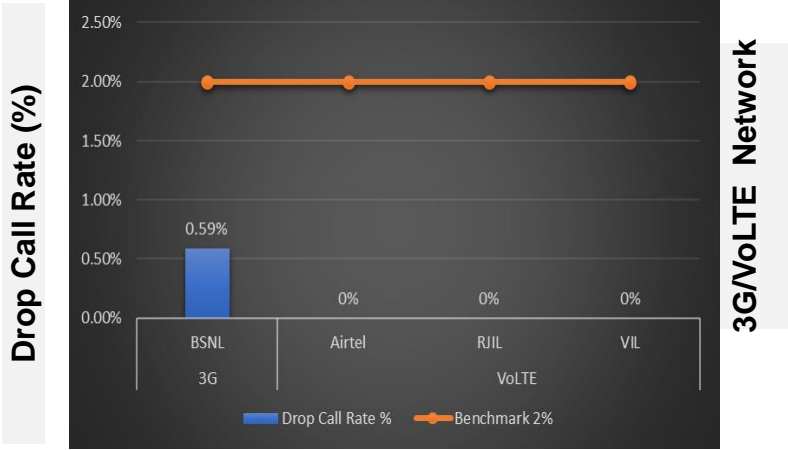


S.No.	Static data Location Name	Area
1	Railway Station Rohtak	Rohtak
2	District Court	Rohtak
3	Bus Stand	Rohtak
4	Hudda Complex	Rohtak
5	PGI Rohtak.	Rohtak
6	Meham Bus Stand	Meham
7	Sampla Main market	Sampla

Voice Calls

Key Observations

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



KPIs	2G			3G	VoLTE		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0%	0.20%	0%	0.59%	0%	0%	0%
Block Call Rate %	0%	0.20%	0.36%	0%	0%	0%	1.23%

- 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 %	98.36%	97.03 %	94.07%

b) Percentage of coverage samples for 3G \geq -90 dBm & LTE \geq -110 dBm.

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Coverage %	86.35 %	98.95%	99.41%	99.07%

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time Spent on 3G/4G %	65.06%	100%	100%	100%

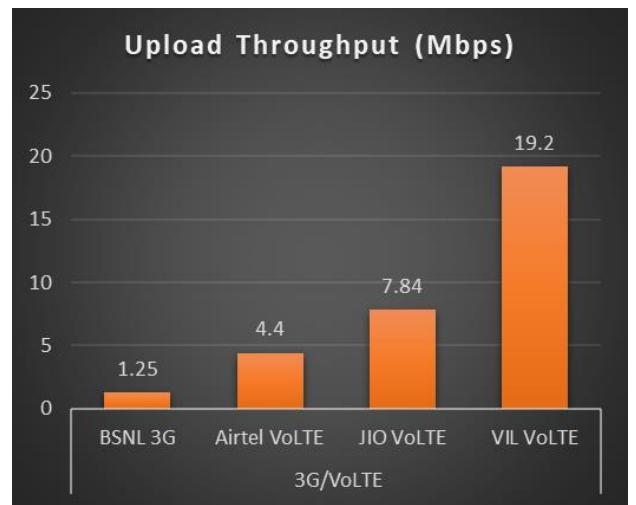
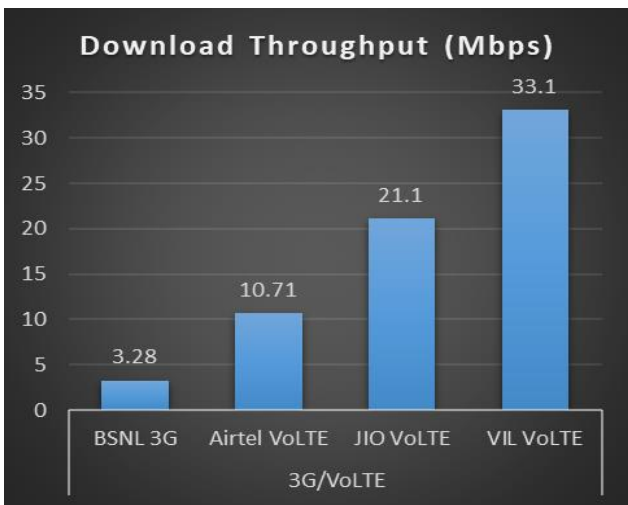
Data Services Static

Key Observations

Data was tested at 7 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, PayTm)

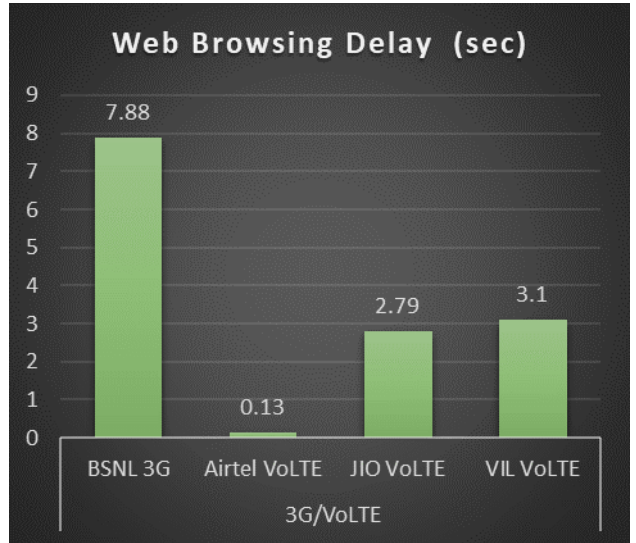
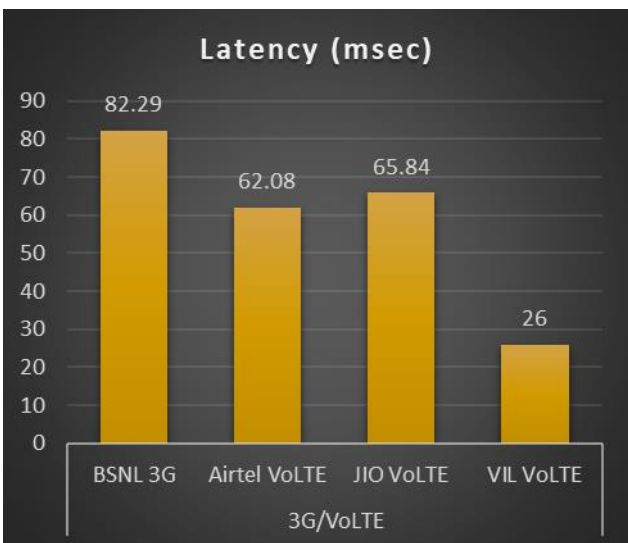
Data Download and Upload Performance Static (Mbps)

3G/4G/ Network:



Latency (ms)

Web Browsing (Sec)



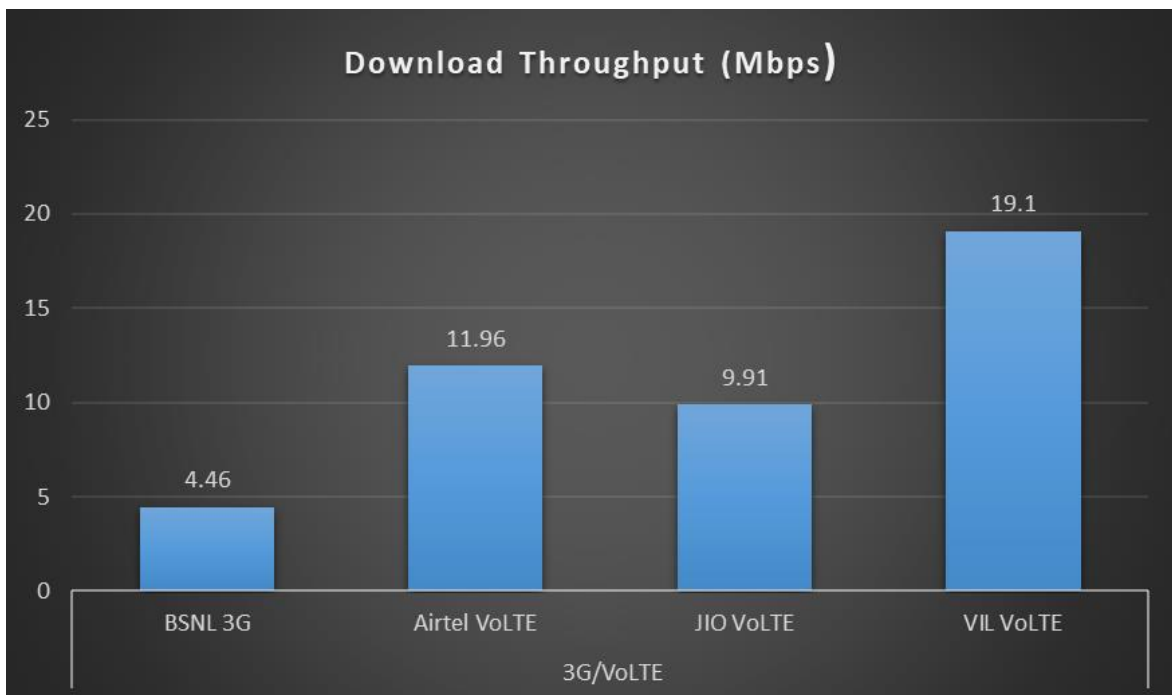
Data Services Dynamic

Key Observations

Dynamic Data was tested for 35 Kms. Download Throughput was tested.

Data Download Performance (kbps) - Dynamic

3G/4G/ Network:



Summary

City Level Summary-Voice

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	503	488	554
Blocked Call Rate (%)	0	0.20	0.36
CSSR% (Accessibility)	100	99.8	99.64
Drop Call Rate (%)	0	0.20	0
Mobility HOSR (%)	98.01	100	97.69
Rx Quality (%)	95.37	98.03	95.56

Voice Call	3G/4G			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	510	520	534	488
Blocked Call Rate (%)	0	0	0	1.23
CSSR% (Accessibility)	100	100	100	98.77
Drop Call Rate (%)	0.59	0	0	0
Mobility HOSR (%)	99.93	99.96	99.03	98.67
Rx Quality (%)	94.31	99.01	98.18	95.1

Summary

City Level Summary- Data Services

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	88.93	151.79	144
Upload Throughput (kbps)	21.93	20.04	84
Web Browsing Delay (sec)	3.16	62.22	30
Latency (msec)	514	196.14	234

Data Services Static	3G/4G			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Download Throughput (Mbps)	3.28	10.71	21.1	33.1
Upload Throughput (Mbps)	1.25	4.4	7.84	19.2
Video Streaming Delay (sec)	4.2	0.79	NA	1
Web Browsing Delay (sec)	7.88	0.13	2.792	3.1
Latency (msec)	82.29	62.08	65.84	26

Data Services Dynamic	3G/4G			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Download Throughput (Mbps)	4.46	11.96	9.91	19.1

<u>Distt. Court, Rohtak</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	153.9	133.4	186
Upload Throughput (kbps)	82.3	13.4	100
Web Browsing Delay (sec)	0.24	64.39	5
Latency (msec)	185	280	199

HUDA Complex , Rohtak	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	101.2	143.4	70
Upload Throughput (kbps)	26.2	20.4	122
Web Browsing Delay (sec)	1.23	41.72	39
Latency (msec)	263	143	249

Railway Station, Rohtak	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	119.8	180.1	185
Upload Throughput (kbps)	25.7	15.11	116
Web Browsing Delay (sec)	0.38	40.25	43
Latency (msec)	256	168	239

Bus Stand, Rohtak	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	111.1	173.4	148
Upload Throughput (kbps)	38.7	21.1	79
Web Browsing Delay (sec)	1.16	62	50
Latency (msec)	261	145	234

<u>PGI, Rohtak</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	158.7	166.1	130
Upload Throughput (kbps)	64.1	24.1	109
Web Browsing Delay (sec)	1.8	85.9	40
Latency (msec)	233	201	250

<u>Sampla Market, Sampla</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	161.8	156.1	139
Upload Throughput (kbps)	24.6	30.9	37
Web Browsing Delay (sec)	1.6	78.8	15
Latency (msec)	401	226	251

<u>Bus Stand, Meham</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	121.4	110	154
Upload Throughput (kbps)	44.6	15.28	28
Web Browsing Delay (sec)	1.42	62.45	19
Latency (msec)	231	210	216

Data Services static

City Level Summary(contd.)

Distt. Court, Rohtak	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	5.38	31.6	28.19	65.3
Upload Throughput (Mbps)	1.8	4.3	8.39	24.8
Video Streaming Delay (sec)	4.01	1.30	NA	0
Web Browsing Delay (sec)	5.67	3.19	2.87	4
Latency (msec)	44	66	69.6	23

HUDA Complex, Rohtak	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	3.31	21.7	15.438	72.6
Upload Throughput (Mbps)	0.980	3.21	5.672	24.9
Video Streaming Delay (sec)	3.8	1.30	NA	0.56
Web Browsing Delay (sec)	7.97	3.7	3.31	3
Latency (msec)	64	67	53.2	29

Railway Station, Rohtak	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	2.049	31.8	16.79	17
Upload Throughput (Mbps)	1.12	3.21	5.319	12.6
Video Streaming Delay (sec)	4.78	1.32	NA	2
Web Browsing Delay (sec)	6.427	2.8	2.53	4
Latency (msec)	68	103	76.6	30

Data Services static

City Level Summary(contd.)

Bus Stand, Rohtak	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	2.24	111.1	18.599	24
Upload Throughput (Mbps)	0.94	38.7	13.585	16.7
Video Streaming Delay (sec)	6.0	1.16	NA	0
Web Browsing Delay (sec)	8.97	261	2.25	3
Latency (msec)	151	111.1	67.6	29

PGI, Rohtak	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	2.11	28.9	26.5	27.5
Upload Throughput (Mbps)	1.12	5.1	6.27	25,1
Video Streaming Delay (sec)	4.5	3.5	NA	3
Web Browsing Delay (sec)	10.98	1.1	2.76	3
Latency (msec)	78	271	62.2	25

Data Services static

City Level Summary(contd.)

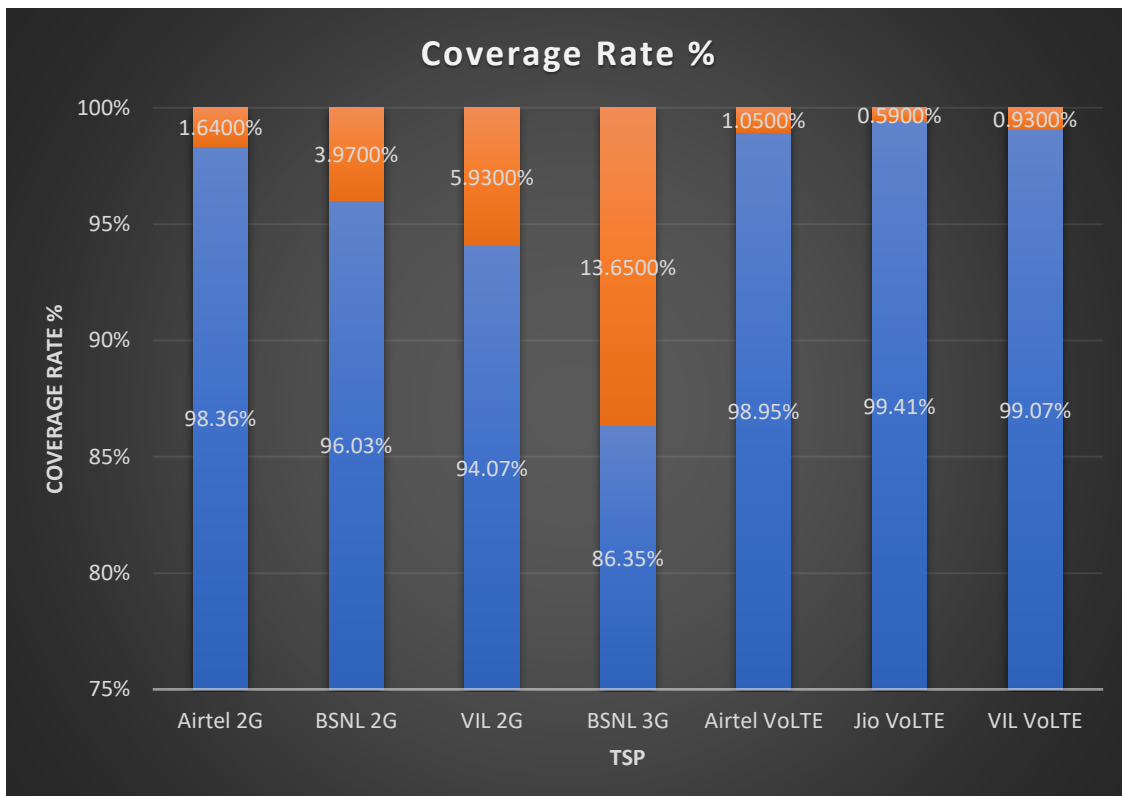
Bus Stand, Meham	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	3.75	18.9	28.203	10.7
Upload Throughput (Mbps)	1.07	3.4	7.894	13.5
Video Streaming Delay (sec)	2.9	2.8	NA	1
Web Browsing Delay (sec)	7.48	2.4	2.70	3
Latency (msec)	110	110	81.4	25

Sampla Market, Sampla	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	4.128	22.9	11.985	15.2
Upload Throughput (Mbps)	1.7	4.4	5.739	17.2
Video Streaming Delay (sec)	3.4	2.1	NA	1
Web Browsing Delay (sec)	7.63	1.8	2.97	4
Latency (msec)	61	77	58.8	24

I. 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 ≥ -85 dBm, RSCP is ≥ -90 dBm & RSRP ≥ -110 dBm. The details are as follows.

TSP	Coverage Rate %
Airtel 2G	98.36%
BSNL 2G	96.03 %
VIL 2G	94.07 %
BSNL 3G	86.35 %
Airtel VoLTE	98.95%
Jio VoLTE	99.41 %
VIL VoLTE	99.07 %

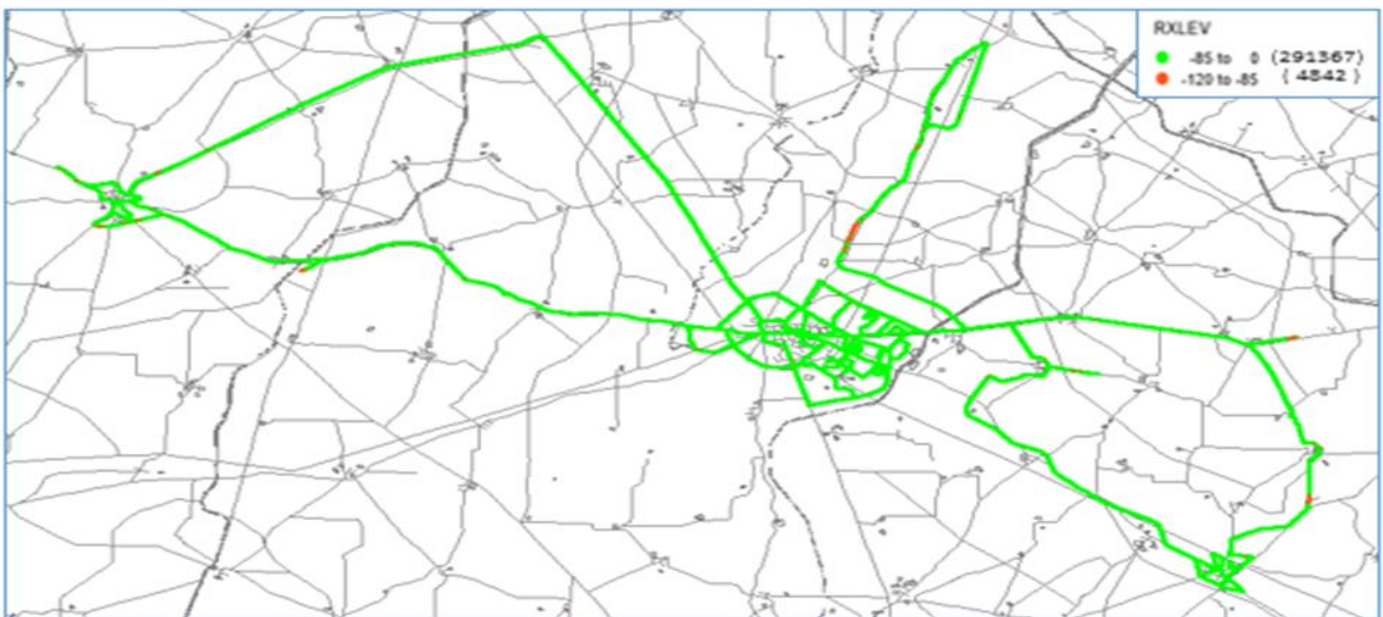


I. Coverage Details

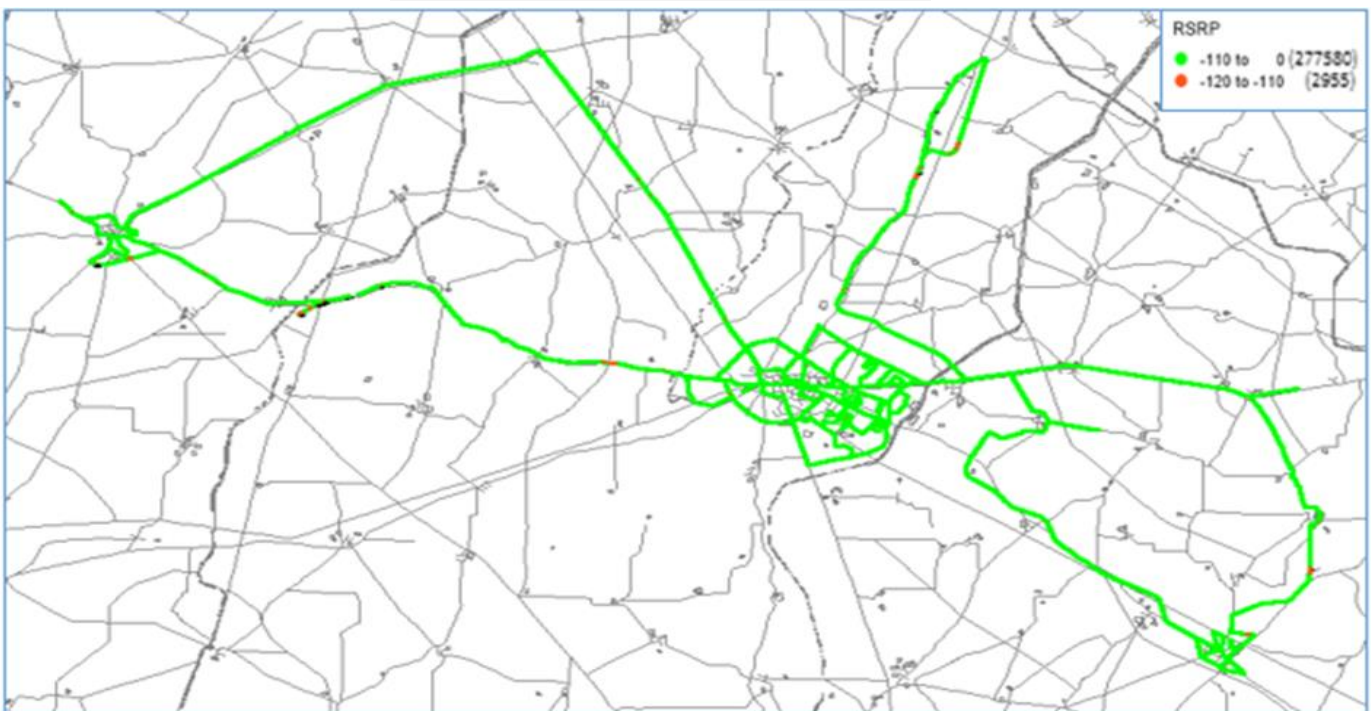
AIRTEL

Technology	Coverage Rate %
2G	98.36%
VoLTE	98.94%

2G



VoLTE

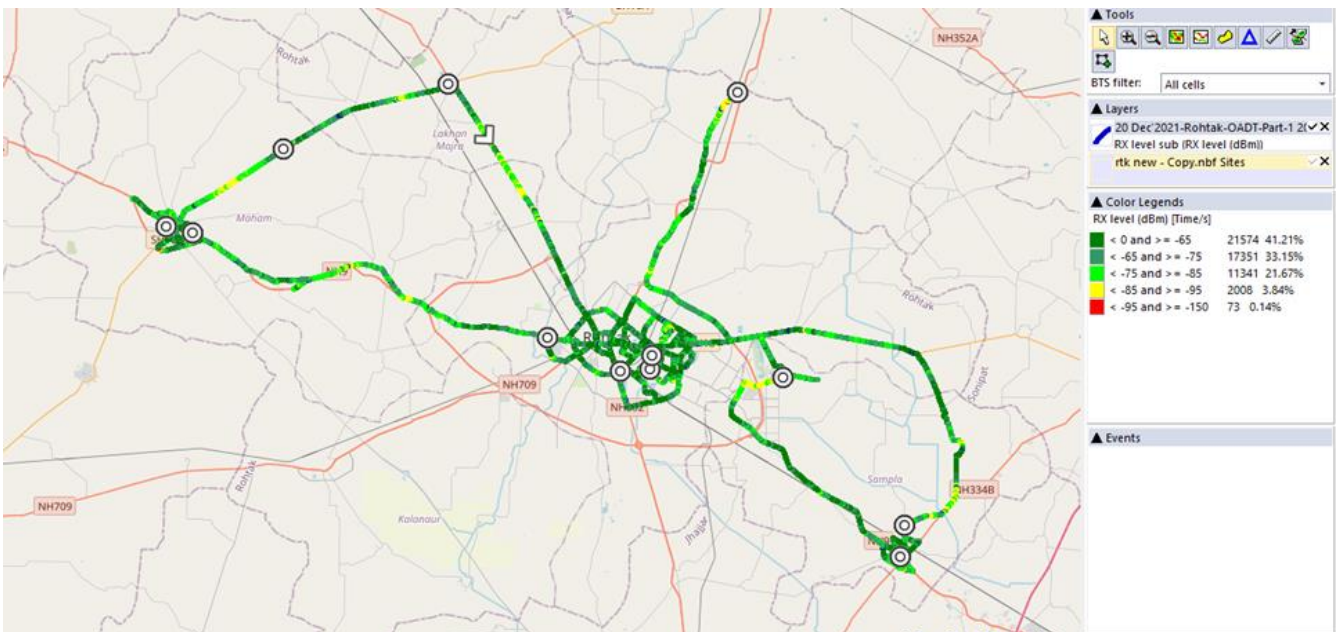


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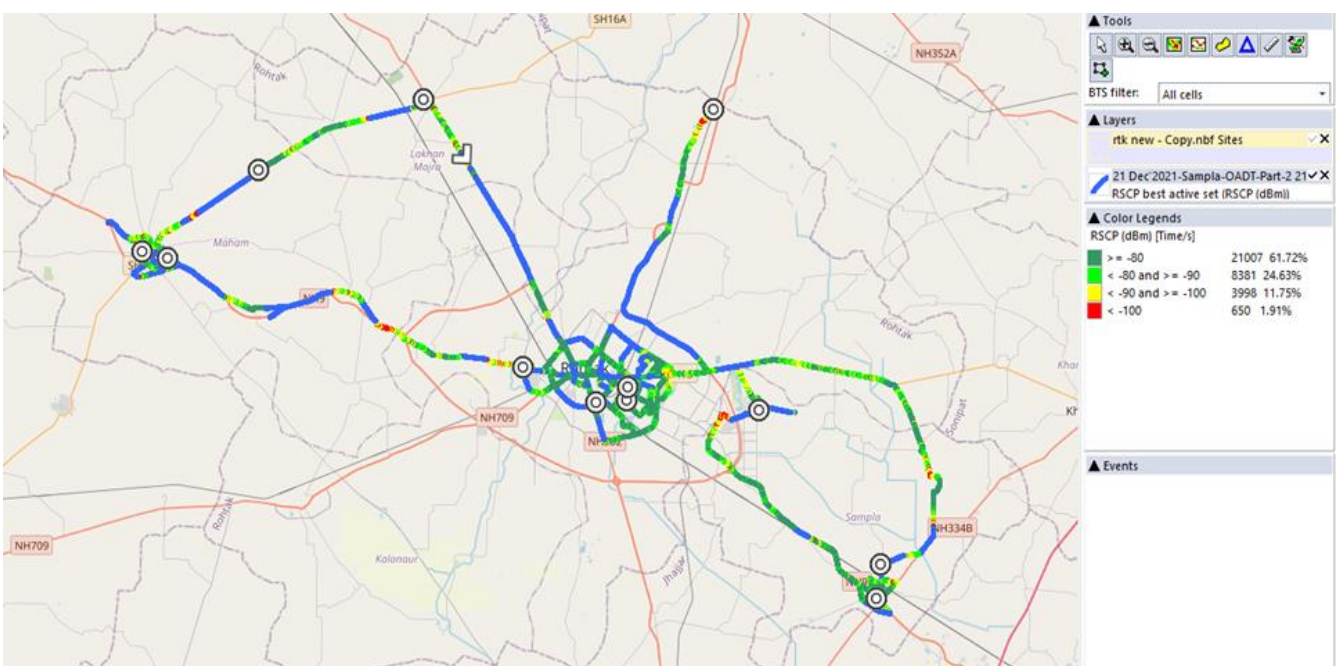
BSNL

Technology	Coverage Rate %
2G	96.03
3G	86.35

2G



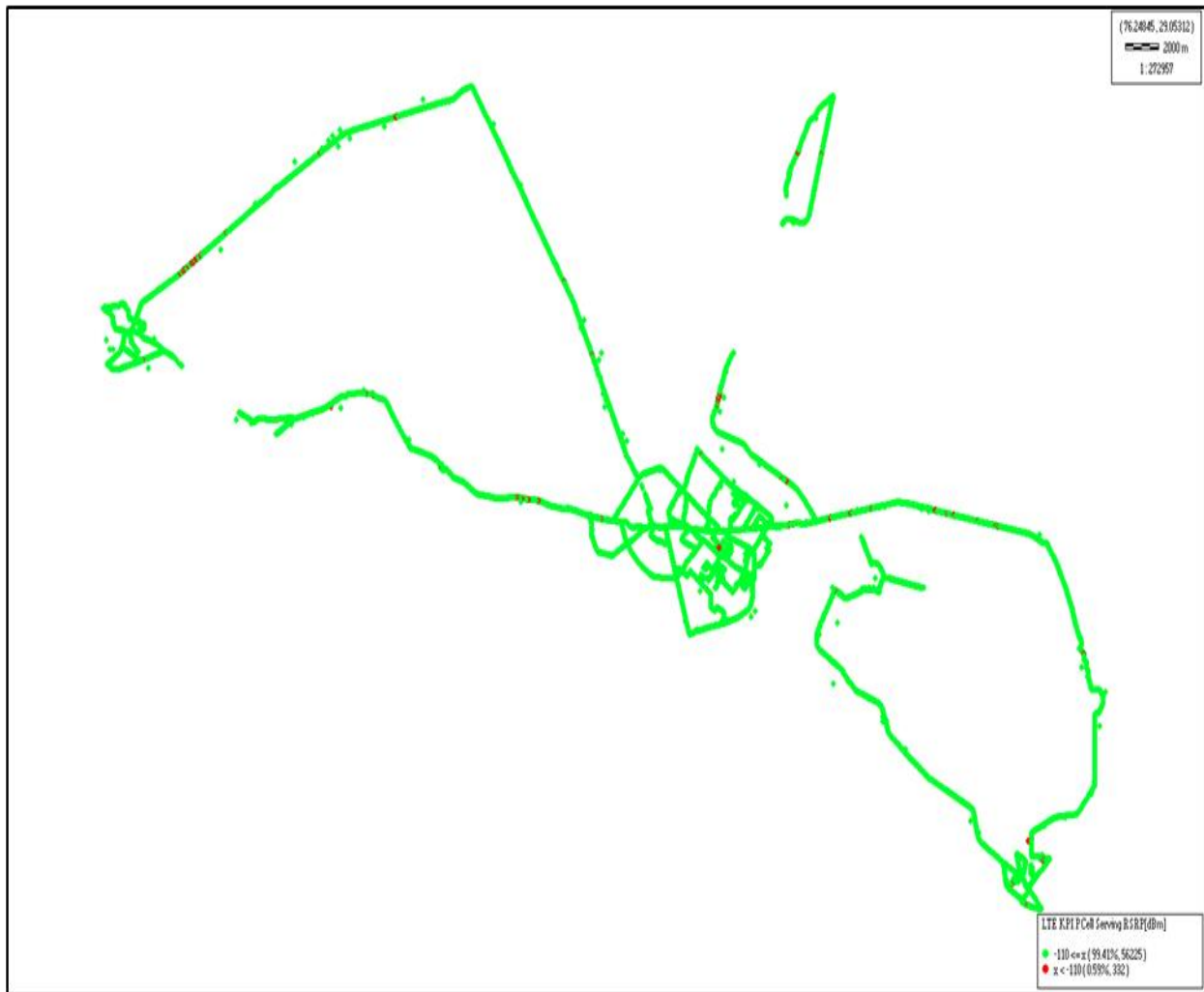
3G



I. Coverage Details

JIO

Technology	Coverage Rate %
VoLTE	99.41

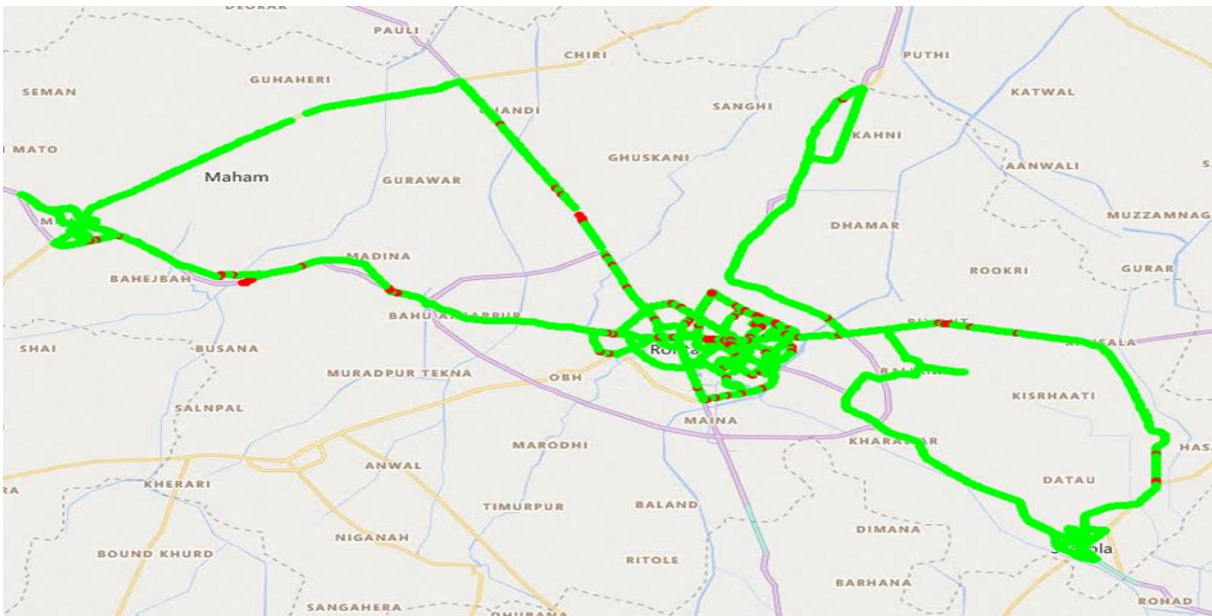


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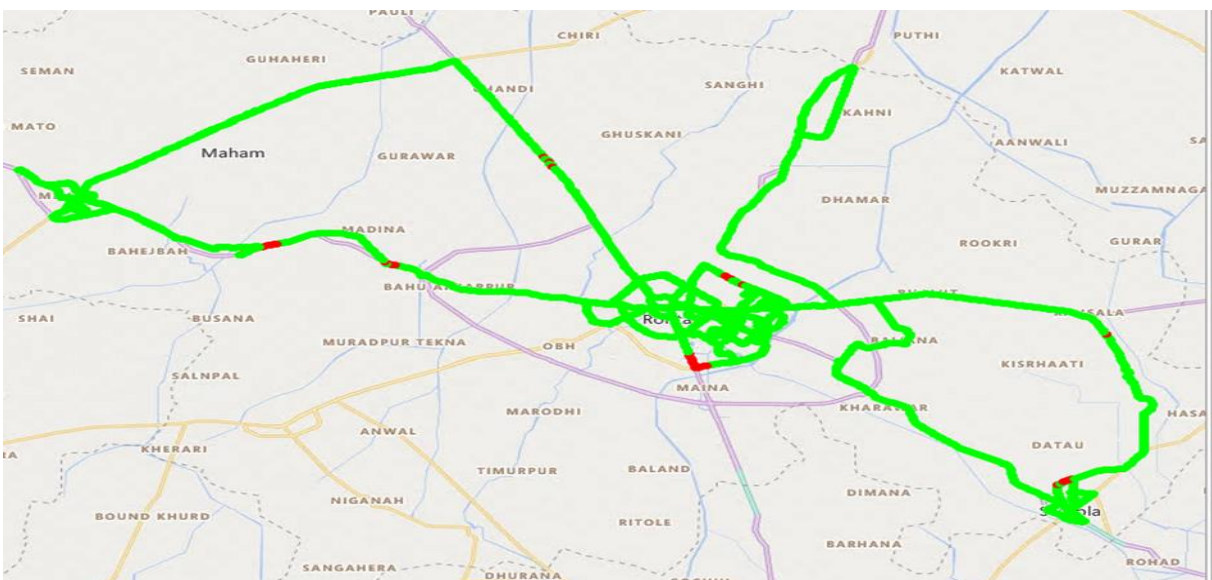
VIL

Technology	Coverage Rate %
2G	94.07 %
VoLTE	99.07 %

2G



VoLTE



II. 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	95.37
BSNL 2G	98.03
VIL 2G	95.56
BSNL 3G	94.31
Airtel VoLTE	99
Jio VoLTE	98.18
VIL VoLTE	95.1

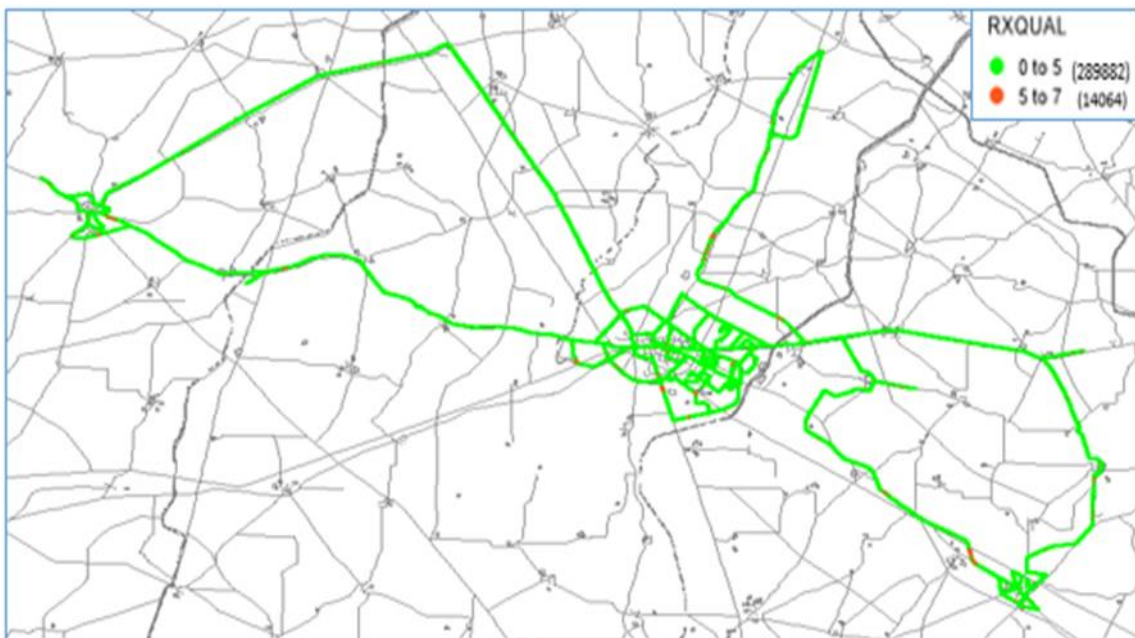


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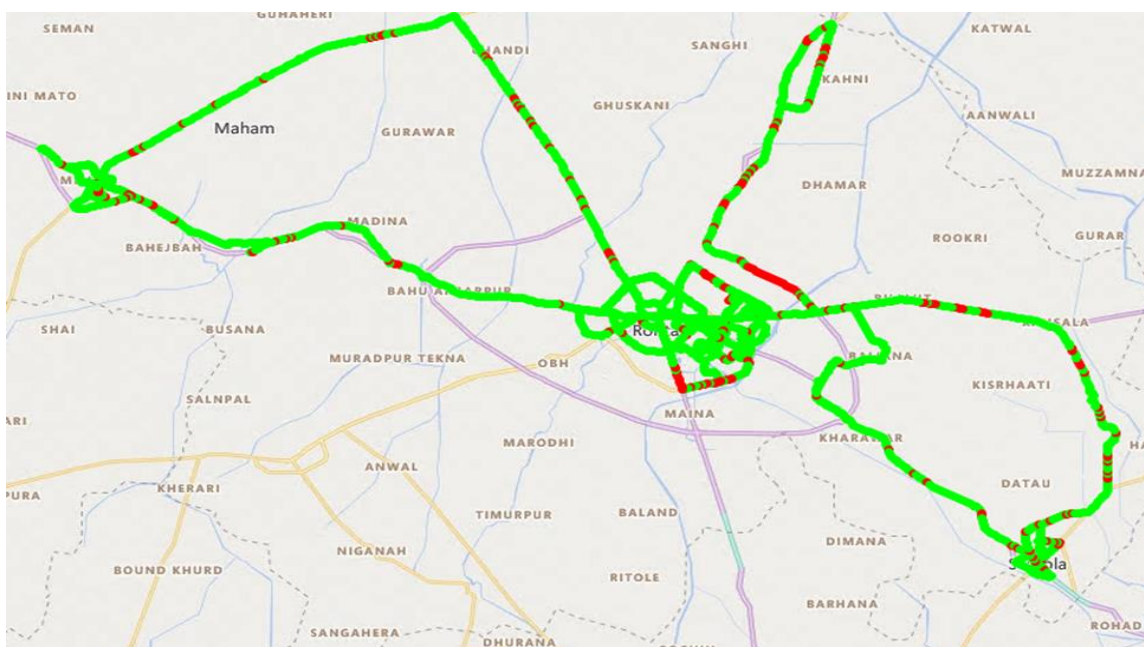
Airtel

Technology	Rx Quality %
2G	95.37%
VoLTE	99.01%

2G



VoLTE

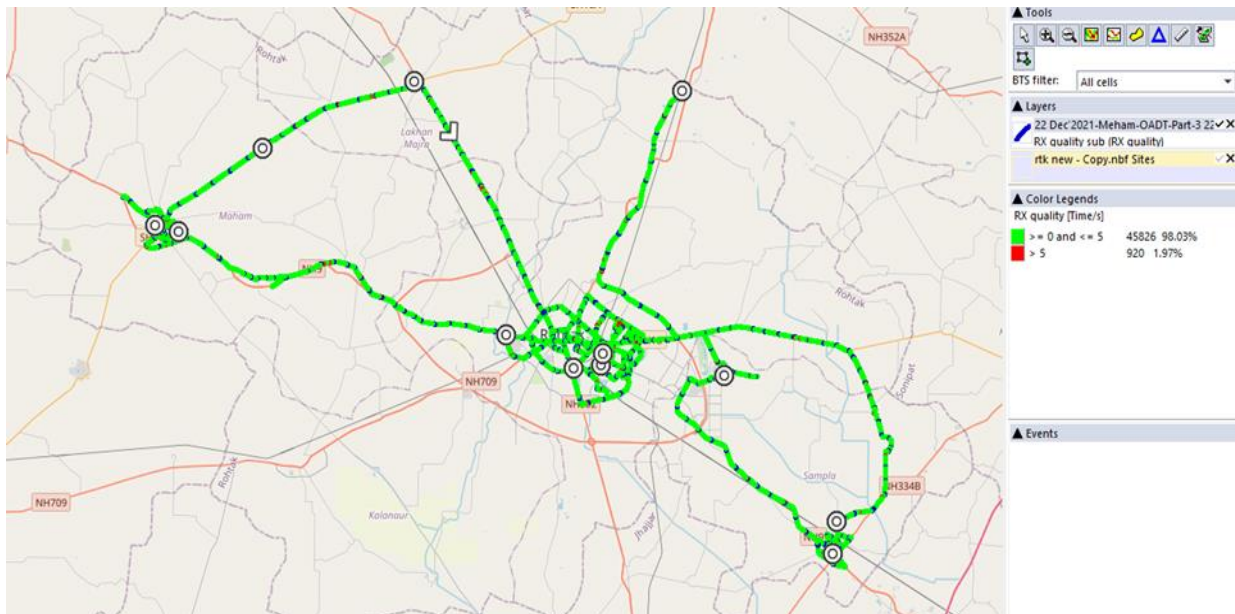


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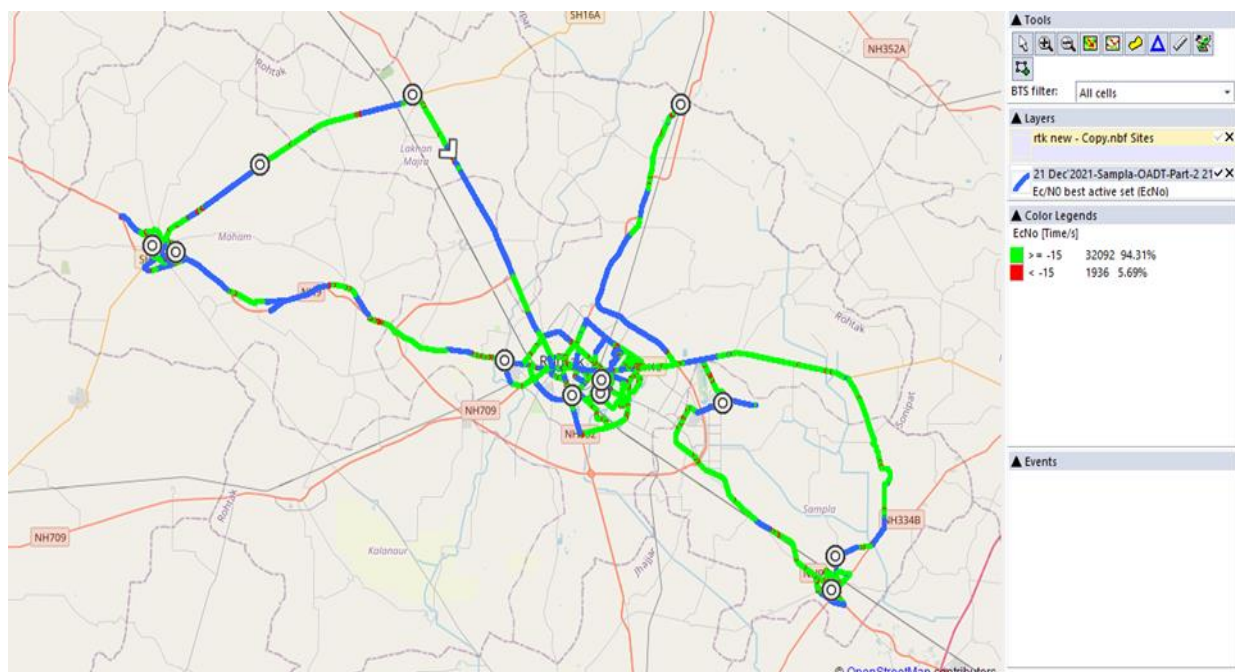
BSNL

Technology	Rx Quality %
2G	98.03
3G	94.31

2G



3G



II. Quality Details

JIO

Technology	Rx Quality %
VoLTE	98.18

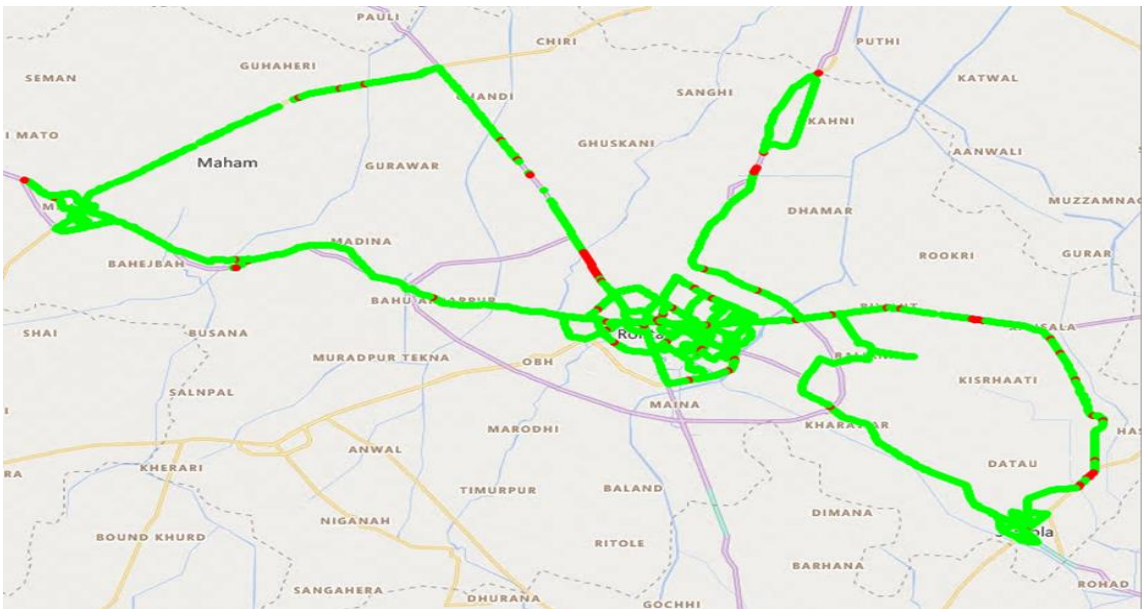


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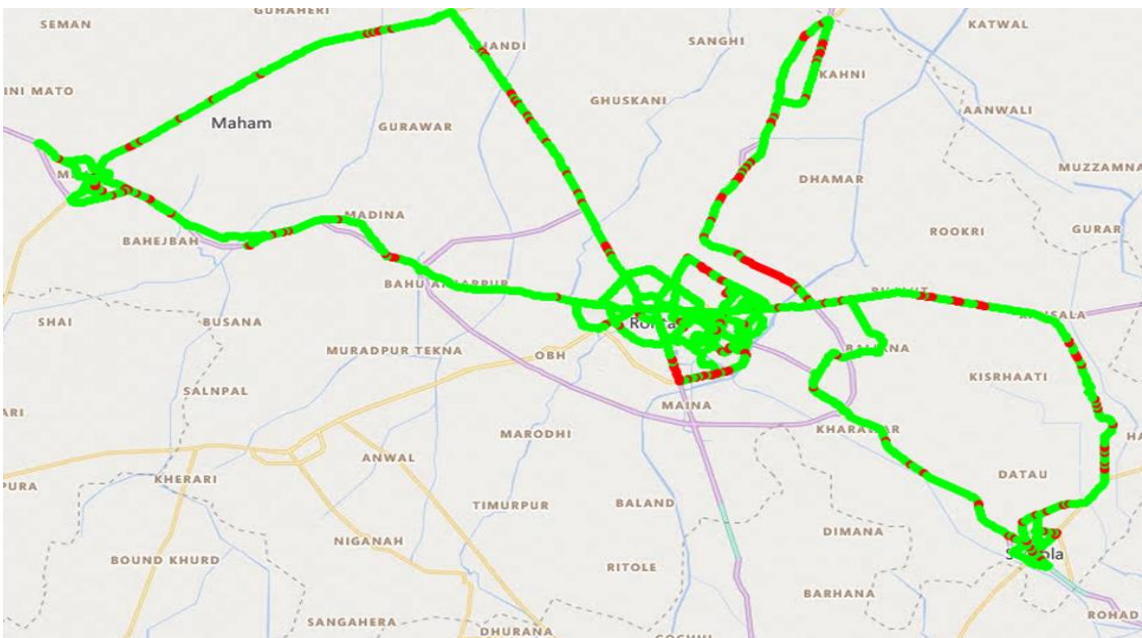
VIL

Technology	Rx Quality %
2G	95.56
4G	95.1

2G

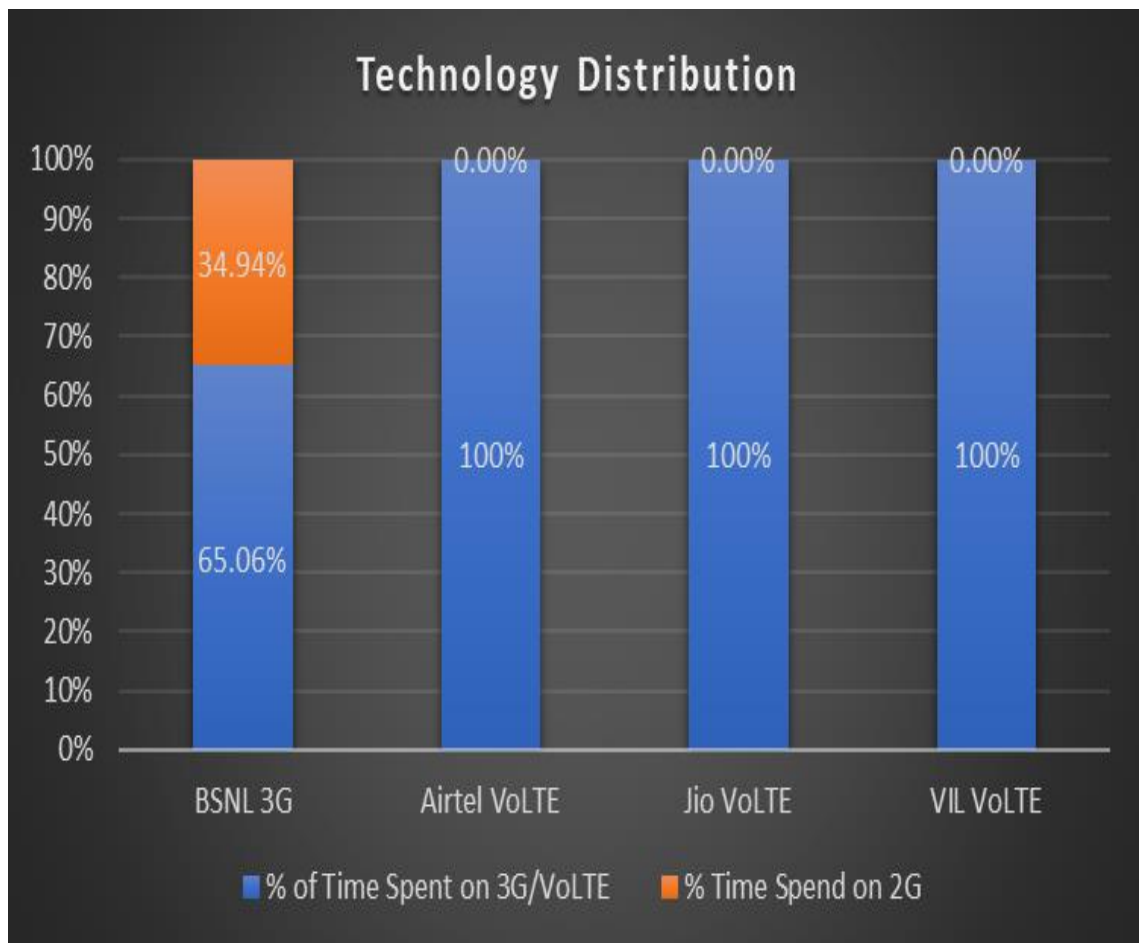


VoLTE



III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	65.06 %
Airtel VoLTE	100%
Jio VoLTE	100%
VIL VoLTE	100%



V. Screenshots of TRAI MySpeed App

Airtel

(SAMPLA Market)

2G

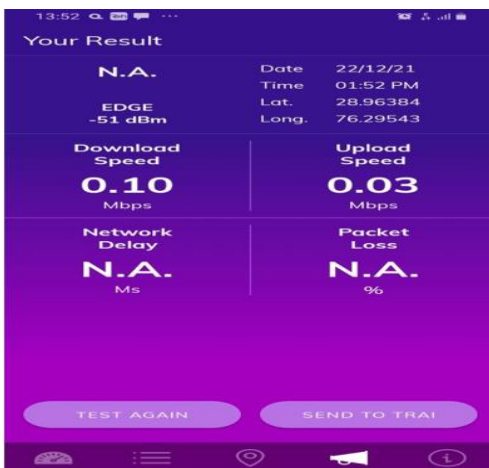


LTE

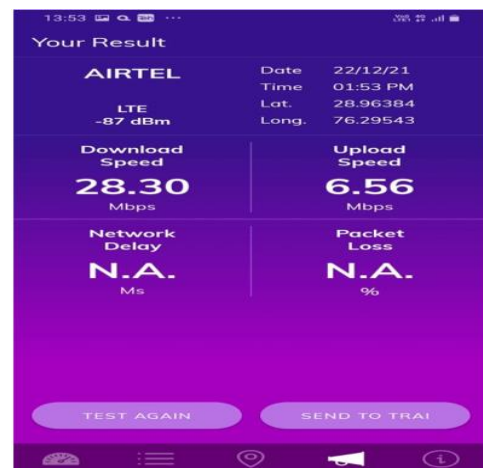


(Meham Bus Stand)

2G

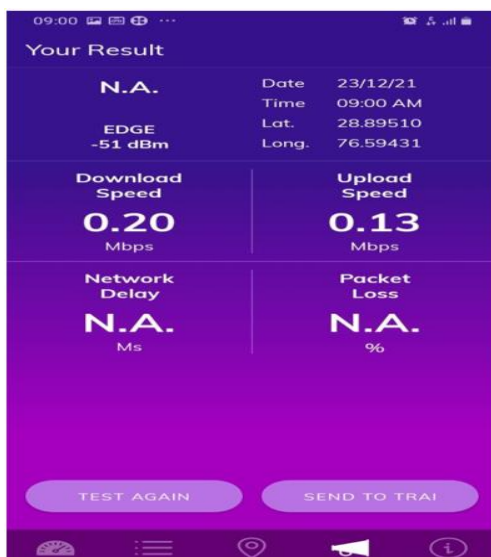


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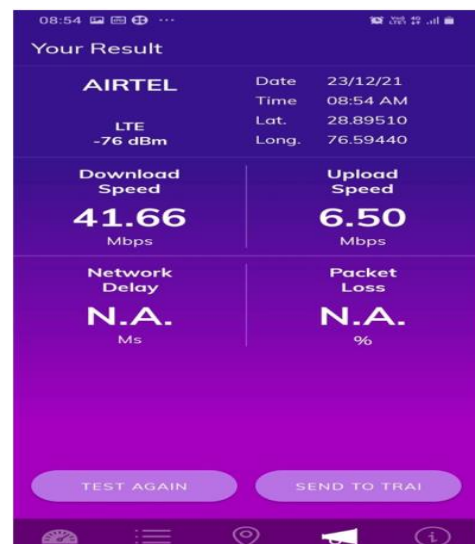


(Dist.Court, Rohtak)

2G



LTE



V. Screenshots of TRAI MySpeed App

Airtel

(Hudda Complex -Rohtak)

2G

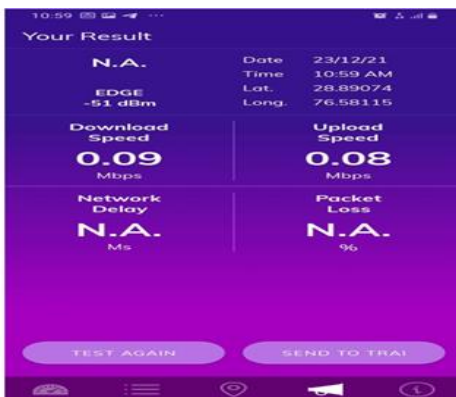


LTE



(Railway Station -Rohtak)

2G

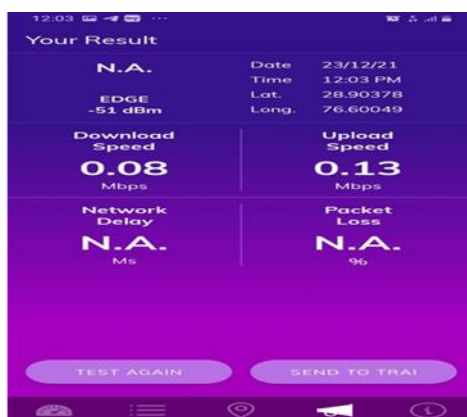


LTE

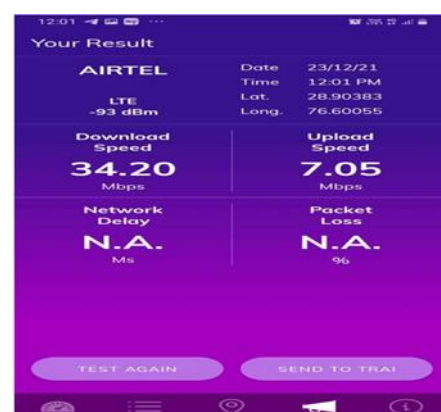


(Rohtak -Bus stand)

2G



LTE



V. Screenshots of TRAI MySpeed App

Airtel

Hotspot location 7 (PGI -Rohtak)

2G



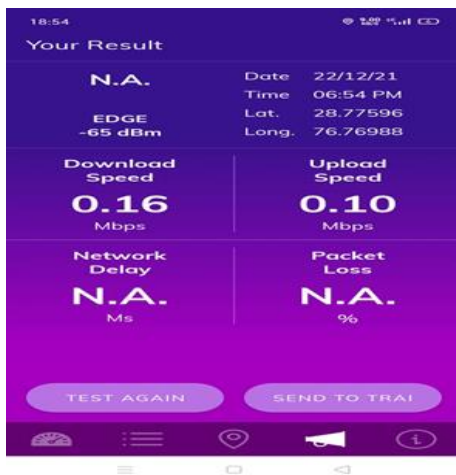
LTE



BSNL

(Sampla Main Market)

2G



3G



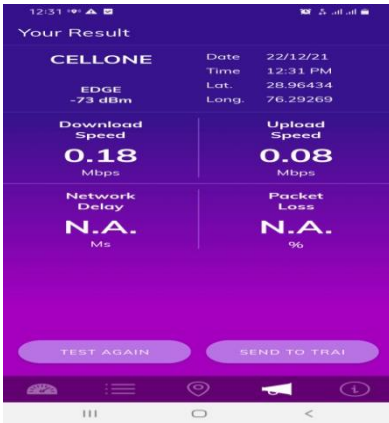
V. Screenshots of TRAI MySpeed App

BSNL

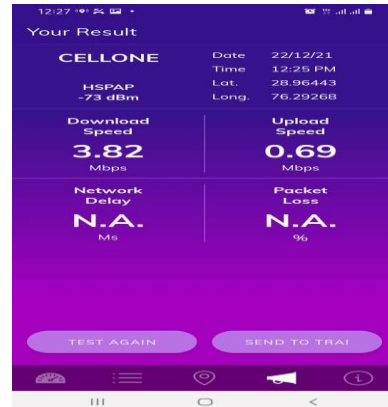
2G

(Meham Bus Stand)

3G

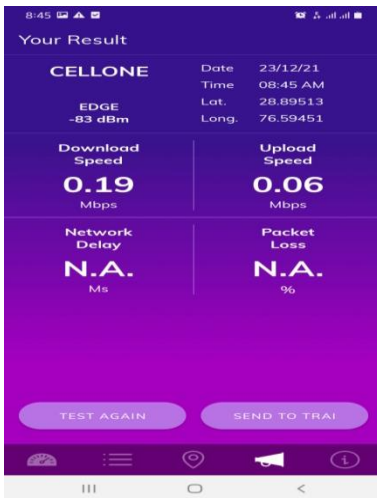


2G

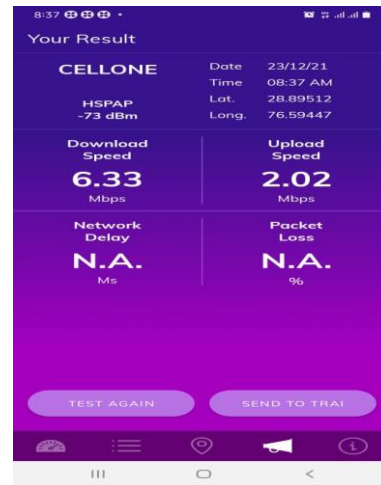


3G

(Distt. court)

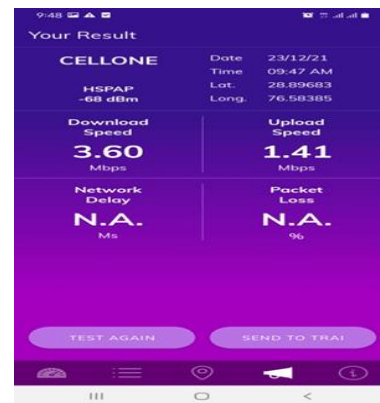
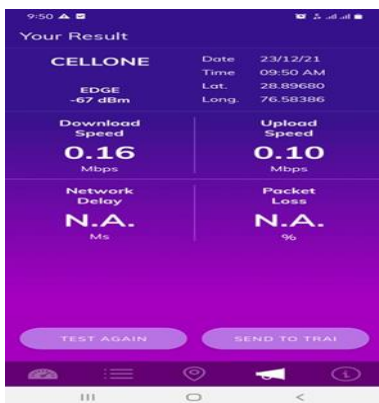


2G



3G

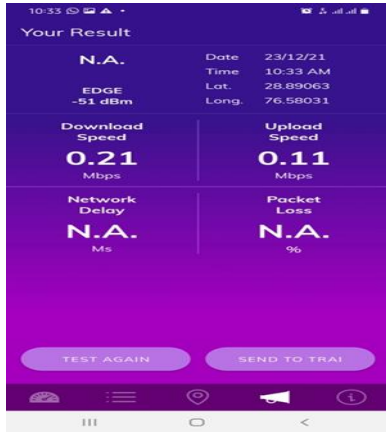
(Huda Complex)



V. Screenshots of TRAI MySpeed App

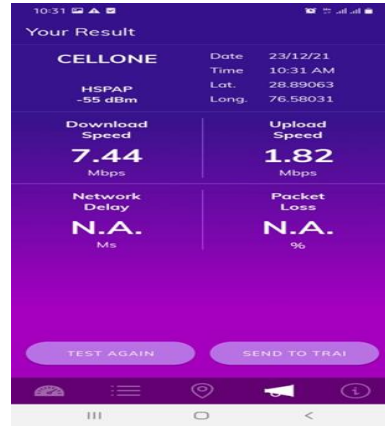
BSNL

2G

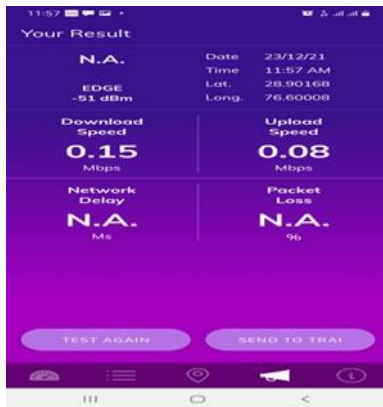


(Railway Station)

3G

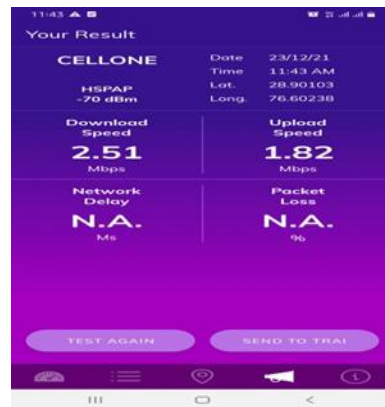


2G

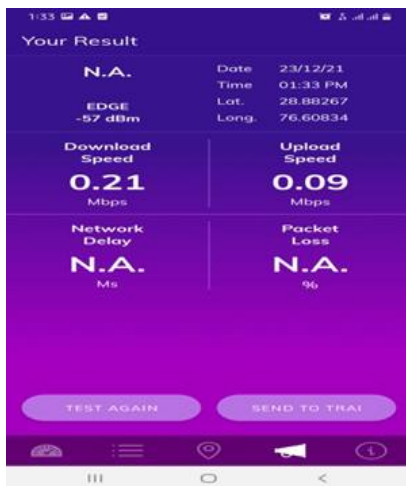


(Bus Stand)

3G

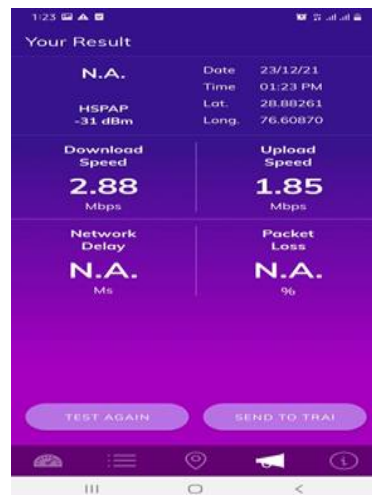


2G



(PGI)

3G



V. Screenshots of TRAI MySpeed App

JIO 4G

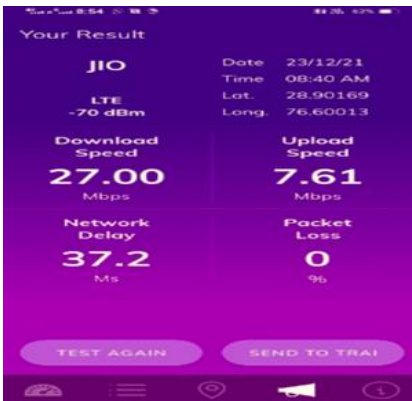
District Court, Rohtak



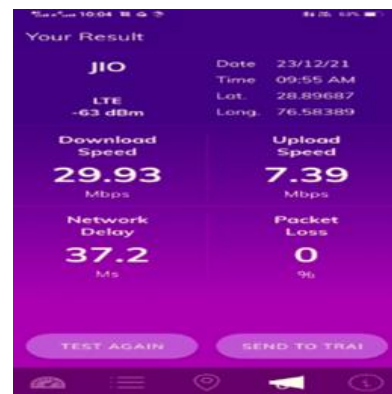
Railway Station, Rohtak



Bus Stand, Rohtak



Huda Complex, Rohtak



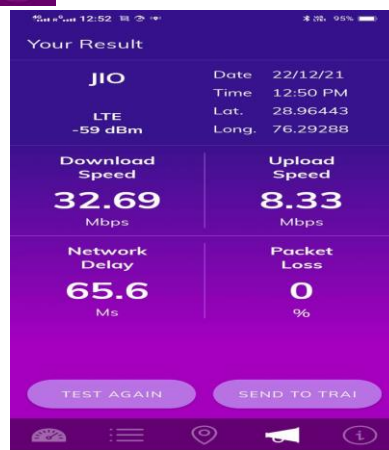
PGI, Rohtak



Sampla SDCA



Meham SDCA



V. Screenshots of TRAI MySpeed App

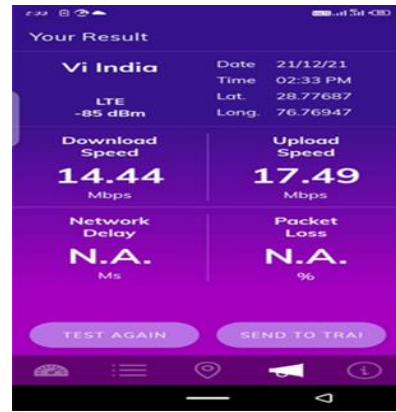
VIL

(SAMPLA Market)

2G

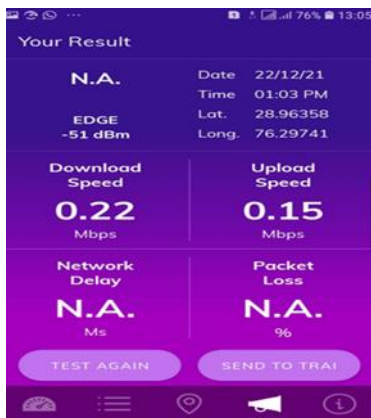


LTE



(Meham Bus Stand)

2G



LTE



(Dist.Court, Rohtak)

2G



LTE



V. Screenshots of TRAI MySpeed App

VIL

(Huda complex)

2G

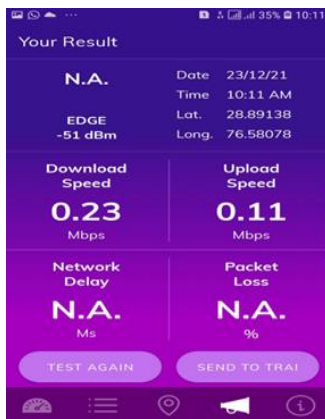


LTE

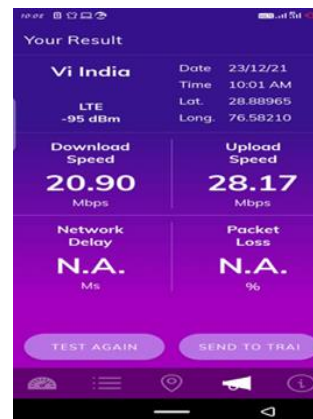


(Railway Station)

2G



LTE



(Bus stand)

2G



LTE



V. Screenshots of TRAI MySpeed App

VIL

(PGI Rohtak)

2G

LTE

