Operator Assisted Drive Test (OADT)

Jodhpur SSA

for

Airtel / BSNL / Reliance Jio / VIL

OADT for Voice & Data – 23rd to 26th August 2021 and

8th and 9th September 2021.

Overview

Telecom Regulatory Authority of India has been entrusted with the task of laying down the standards of quality of service to be provided by the service providers and ensuring its enforcement; and TRAI is responsible for conducting the periodical audit of such services provided by the service providers so as to protect the interest of the consumers of telecommunications service. TRAI is regularly monitoring the performance of Telecom Service Providers (TSP) against the benchmarks for the various Quality of Service (QoS) parameters laid down by the Authority. TSPs submit Performance Monitoring Reports to TRAI every quarter. TRAI also undertakes audit and assessment of Quality of Service to verify the Quality of Service claimed. It conducts drive tests at various places in view of complaints on call drops and other network quality issues.

TRAI Regional Office, Jaipur as directed by TRAI HQ has conducted the drive test with the help of Telecom Service Providers of Rajasthan from 23rd August 2021 to 26th August 2021 covering various locations in Jodhpur City & surrounding areas and two SDCA's of Jodhpur SSA namely Mathania and Pipar on 8th and 9th September 2021 respectively. The drive test reports were generated through TSPs tools and was compiled by the TRAI RO Jaipur.

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Methodology Adopted

The OADT was carried out in Jodhpur SSA as per directions of TRAI HQ according to following methodology.

1. Drive test routes and data hotspots covered in the exercise were discussed and finalized by regional office after discussion with the service providers.

2. The voice drive route was decided on the basis of several factors that include:
    - Major roads, residential and commercial areas.
    - Important landmarks such as major public buildings, tourist spots, important educational institutions etc.
    - Areas from where call drop complaints are commonly received.
    - Areas of heavy usage.
    - Areas where previous drive tests showed network issues; etc.

3. The performance of four licensed operational TSPs namely Airtel, BSNL, Vodafone Idea Limited (VIL) and Reliance Jio were monitored across various available technologies (2G, 3G, and 4G) as mentioned below

- M/s Airtel- 2G and 4G.
- M/s BSNL- 2G and 3G.
- M/s Reliance Jio – 4G.
- M/s Vodafone Idea Ltd.- 2G, 3G and 4G.

4. The measurement for drive test was performed as mentioned below:
    - 2G – measurement – UE Locked in 2G
    - 3G – measurement – UE in Dual mode (2G and 3G)
    - 4G – measurement – UE in Free mode

5. **Voice:** Calls were made for 90 sec duration with wait time of 10 sec between calls in all technologies.

6. Publics places spread all across the city were selected as hotspots for testing data. TRAI My Speed App was used to measure the data performance at the different hotspots.

7. **Data:** Download and Upload Throughputs, Web Browsing Delay, Video Streaming Delay and Latency.
    - Download : 2G(500KB), 3G (20MB), 4G (40 MB)
    - Upload : 2G (100KB) ,3G(5 MB), 4G(10MB)
    - Web browsing - 3 links of e commerce websites https://www.amazon.in, https://www.flipkart.com, https://paytm.com.
    - Video Streaming – 130 sec clip
    - Latency – 32 Bytes on www.google.com.

Drive Test Details

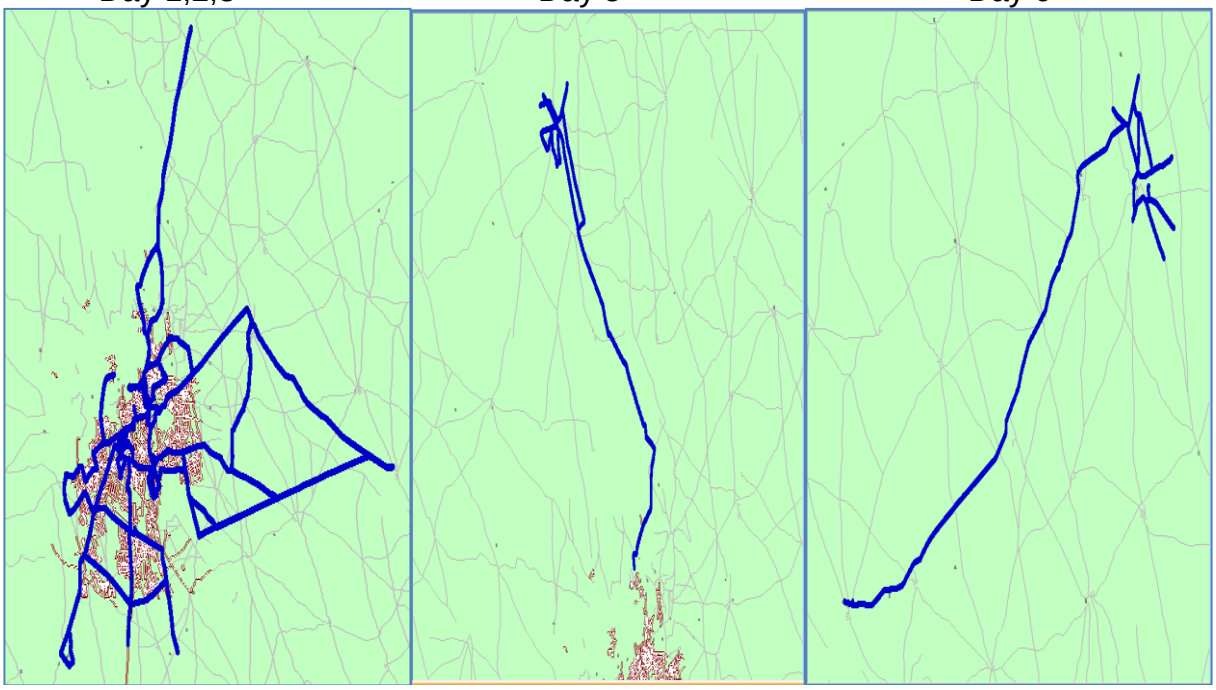
The drive test covered a drive route of 362 KMs & 7 hotspots in Jodhpur city and locations in two SDCAs for six days. Calls were made for 2G/3G/ 4G VoLTE networks (as applicable)

Day wise voice drive details

S.No.	Date	Area Covered	Total Kms.
1	23.08.21	Sardarpura, Shastri Nagar, Bhagat ki kothi , University,AIIMS, Basni, DPS, SoorSagar, Chopasani Housing Board, Jalori Gate, Railway Station etc.	101
2	24.08.21	Sojati gate, Nai sadak,Paota, Busstand , high court, Bhadvasiya,Rasala Road,Mandore, IIT, NLU, NIFT, Circuit House etc.	63
3	25.08.21	Airforce Area, Airport, Shikargarh, Banar, Dangiyawas etc.	103
4	08.09.21	Jodhpur- Mathania Highway, Mathania Town	40
5	09.09.21	Jodhpur- Pipar Highway, Pipar Town	55
		Total	362

Voice Route

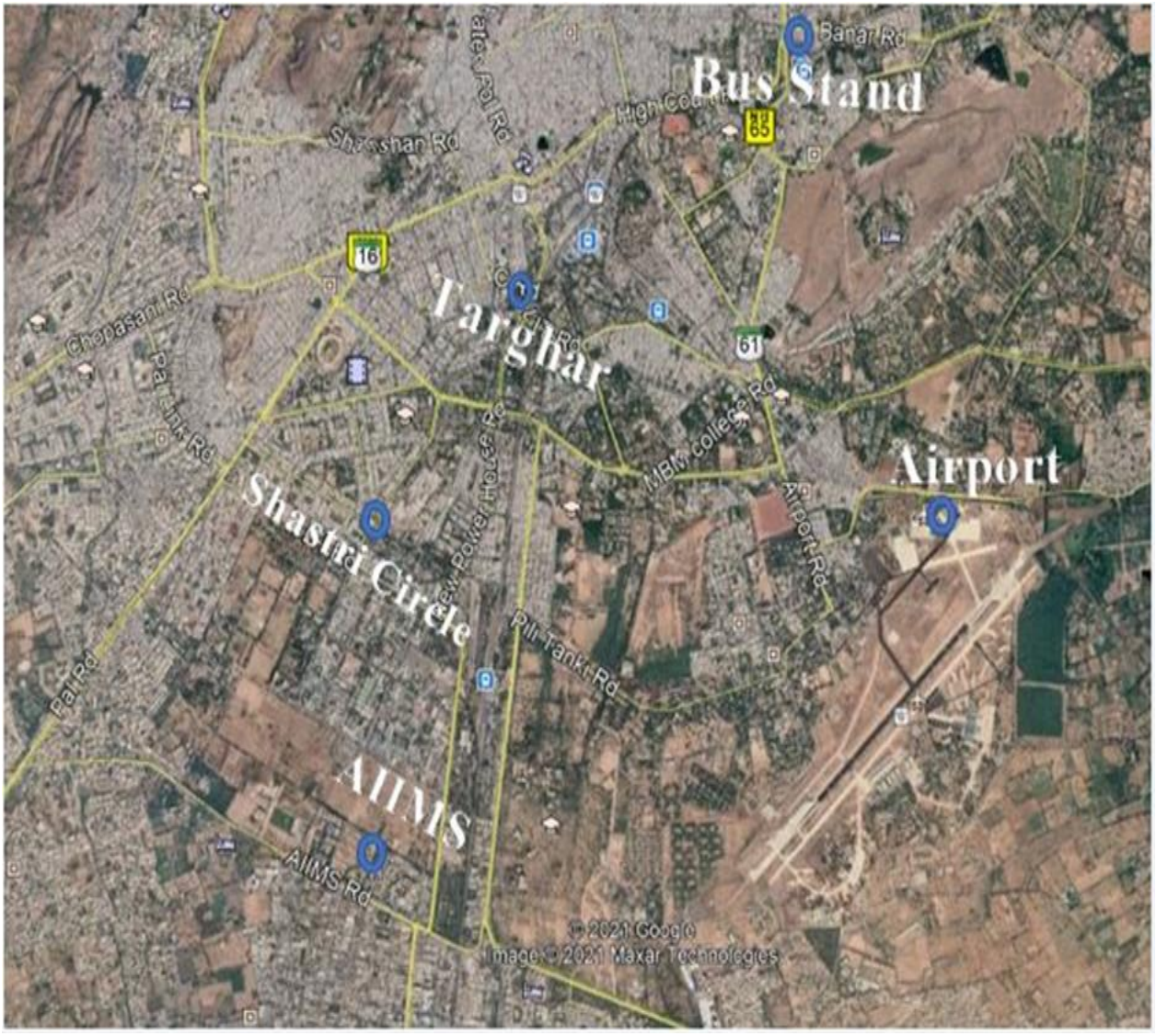
Day 1,2,3 Day 5 Day 6



Data Hotspots Details

S.No.	Location Name	Area
1	Roadways Bus Stand	Jodhpur
2	AIIMS	Jodhpur
3	Targhar, BSNL Exchange	Jodhpur
4	Airport	Jodhpur
5	Shastri Circle	Jodhpur
6	Petrol Pump- Mathania Town	Mathania
7	Sabji Mandi - Piapar City	Pipar City

Data Locations



Data testing hotspot locations: Mathania SDCA

Data testing hotspot locations: Pipar SDCA

Key observations of Voice Call

Drop Call Rate % (Benchmark < 2%)

TSP	VoLTE Network	3G Network	2G Network
Airtel	0 %	NA	0 %
BSNL	NA	0 %	0.19 %
JIO	0%	NA	NA
VIL	0%	0%	0%

Block Call Rate % (Benchmark < 3%)

TSP	VoLTE Network	3G Network	2G Network
Airtel	0 %	NA	0 %
BSNL	NA	0%	0.19%
JIO	0%	NA	NA
VIL	0%	0.98%	0.25%

Technology	Parameter	Airtel	BSNL	JIO	VIL
2G	SDCCH Congestion (<=1%)	0%	0%	NA	0%
	TCH Congestion (<=2%)	0%	0%	NA	0%
3G	CSFB Failure %	NA	NA	NA	0%*
	SDCCH Congestion %	NA	0%	NA	0%*
	RRC Congestion %	NA	0%	NA	0%*
	SDCCH and RRC Congestion % (<=1%)	NA	0%	NA	0%*
	TCH Congestion %	NA	0%	NA	0%*
	RAB Congestion %	NA	0%	NA	0%*
	TCH and RAB Congestion % (<=2%)	NA	0%	NA	0%*

***M/s VIL has 3G coverage only in SDCA's (**Mathania and Pipar)

Coverage

1. **Percentage of Coverage sample of 2G >=- 85 dBm**

TSP	Airtel	BSNL	JIO	VIL
Coverage %	98.61%	87.14%	NA	74.91 %

2. **Percentage of Coverage sample of 3G >= - 90 dBm**

TSP	Airtel	BSNL	JIO	VIL*
Coverage %	NA	80.54%	NA	62.41 %

***M/s VIL has 3G coverage only in SDCA's (**Mathania and Pipar)

3. **Percentage of Coverage sample of VoLTE >= -110 dBm**

TSP	Airtel	BSNL	JIO	VIL
Coverage %	99.72%	NA	96.96%	94.95 %

4. **Percentage of time spent on 3G Network**

TSP	Airtel	BSNL	JIO	VIL
Time spent %	**NA**	**22.0%**	**NA**	49.59 %

5. **Percentage of time spent on VoLTE Network**

TSP	Airtel	BSNL	JIO	VIL
Time spent %	100%	**NA**	**100%**	81.21 %

6. **Percentage of RLT >= 48**

TSP	Airtel	BSNL	JIO	VIL
Percentage of RLT >=48	**0**	**0**	**NA**	**0**

7. **Average CST in second**

TSP	Airtel	BSNL	JIO	VIL
Second in 2G network	3.32	3.161	NA	3.34
Seconds in 3G network	NA	3.417	NA	2.40
Seconds in Volte Network	2.45	NA	0.58	1.14

Voice call summary

TSP (For 2G)	Air tel	BSNL	JIO	VIL
Call attempts	437	503	NA	410
Block call rate %	0%	0.00%	NA	0.25
CSSR %	100%	100%	NA	99.75
Drop call rate %	0%	0.19%	NA	0
Mobility HOSR %	98.26	98.27%	NA	99.57
RX Quality %	96.28	96.78% (<=5)	NA	**91.87**

TSP (For 3G)	Airtel	BSNL	JIO	VIL*
Call attempts	NA	458	NA	101
Block call rate %	NA	0.00%	NA	0.98
CSSR %	NA	100%	NA	99.02
Drop call rate %	NA	0.00%	NA	0
Mobility HOSR %	NA	99.60%	NA	100
RX Quality %	NA	95.37%(3G >=-14)	NA	97.79

***M/s VIL has 3G coverage only in SDCA's (**Mathania and Pipar)

TSP (For VoLTE)	Airtel	BSNL	JIO	VIL
Call attempts	437	NA	435	412
Block call rate %	0%	NA	0%	0
CSSR %	100%	NA	100%	100
Drop call rate %	0%	NA	0.00%	0
Mobility HOSR %	99.63%	NA	98.47%	99.027
RX Quality %	96.91%	NA	96.26%	**94.89**

Data Service Static (on Hotspots)

Hotspot -1 (Location - Roadways Bus Stand, Jodhpur)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	220.34	254	**NA**	258.82
Upload Throughput in Kbps	330.21	149	**NA**	120.71
Web browsing delay in second	5.77	88.6(amazon), 29.4(Flpkart), 15.8(Paytm)	**NA**	2.69
Latency in (msec)	297.75	148	**NA**	223

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	**NA**	11.18	**NA**	NA
Upload Throughput in Mbps	**NA**	1.55	**NA**	NA
Video streaming delay in sec	**NA**	2.592	**NA**	NA
Web browsing delay in second	**NA**	17.6(Amazon), 4.6(Flipkart), 1.8(Paytm)	**NA**	NA
Latency in (msec)	**NA**	127	**NA**	NA

TSP (For 4G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	26.66	NA	24.468	68.40
Upload Throughput in Mbps	25.33	NA	13.88	39.14
Video streaming delay in sec	0.512	NA	1.484	0.35
Web browsing delay in second	4.12	NA	1.85/4.95/2.30	0.42
Latency in (msec)	58.99	NA	51.78	55

Hotspot -2 (Location – AIIMS, Jodhpur)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	160.43	298	**NA**	317.2
Upload Throughput in Kbps	320.37	261	**NA**	79.96
Web browsing delay in second	6.31	29.5(Amazon), 11.0(Flipkart), 3.6(Paytm)	**NA**	3.073
Latency in (msec)	318.75	132	**NA**	228

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	11.3	NA	NA
Upload Throughput in Mbps	NA	1.81	NA	NA
Video streaming delay in sec	NA	1.83	NA	NA

Web browsing delay in second	NA	7.6(Amazon), 3.6(Flipkart),1.8(Paytm)	NA	NA
Latency in (msec)	NA	49	NA	NA

TSP (For 4G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	58.47	NA	27.00	66.61
Upload Throughput in Mbps	53.01	NA	13.83	25.22
Video streaming delay in sec	0.511	NA	1.57	0.36
Web browsing delay in second	4.25	NA	2.15/2.10/2.24	0.52
Latency in (msec)	68.33	NA	46.61	59

Hotspot -3 (Location- Targhar, Jodhpur)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	210.43	235	NA	355.87
Upload Throughput in Kbps	350.12	241	NA	253.58
Web browsing delay in second	5.86	113.6(Amazon), 29.5(Flipkart), 3.4(Paytm)	NA	2.92
Latency in (msec)	470.10	139	NA	221

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	8.21	NA	NA
Upload Throughput in Mbps	NA	1.76	NA	NA
Video streaming delay in sec	NA	2.075	NA	NA
Web browsing delay in second	NA	7.8(Amazon), 13.1(Flipkart), 3.1(Paytm)	NA	NA
Latency in (msec)	NA	149	NA	NA

TSP (For 4G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	26.62	NA	17.25	60.97
Upload Throughput in Mbps	27.27	NA	10.22	26.94
Video streaming delay in sec	0.543	NA	1.36	0.43
Web browsing delay in second	4.13	NA	2.59/5.01/2.36	0.55
Latency in (msec)	46.16	NA	55.37	68

Hotspot -4 (Location – Airport, Jodhpur)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	220.43	255	NA	291.77
Upload Throughput in Kbps	350.23	136	NA	186.77
Web browsing delay in second	5.94	73.1(Amazon),34.8(Flipkart),4.7(Paytm)	NA	3.56
Latency in (msec)	564.66	136	NA	225

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	9.93	NA	NA
Upload Throughput in Mbps	NA	1.94	NA	NA
Video streaming delay in sec	NA	1.773	NA	NA
Web browsing delay in second	NA	6.8(Amazon), 3.8(Flipkart), 1.6(Paytm)	NA	NA
Latency in (msec)	NA	49	NA	NA

TSP (For 4G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	85.23	NA	18.53	77.50
Upload Throughput in Mbps	76.98	NA	6.36	40.07
Video streaming delay in sec	0.315	NA	1.486	0.42
Web browsing delay in second	4.08	NA	2.20/4.31/2.22	0.47
Latency in (msec)	49.16	NA	48.54	52

Hotspot -5 (Location – Shastri Circle, Jodhpur)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	220.34	255	NA	287.33
Upload Throughput in Kbps	221.26	225	NA	247.11
Web browsing delay in second	5.46	39.8(Amazon), 41.6(Flipkart), 5.8(Paytm)	NA	3.47
Latency in (msec)	201.33	157	NA	233

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	3.34	NA	NA
Upload Throughput in Mbps	NA	1.74	NA	NA
Video streaming delay in sec	NA	15.85	NA	NA
Web browsing delay in second	NA	8.8(Amazon), 18.6(Flipkart), 5.8(Paytm)	NA	NA
Latency in (msec)	NA	150	NA	NA

TSP (For 4G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	34.40	NA	17.25	37.98
Upload Throughput in Mbps	29.11	NA	10.22	26.49
Video streaming delay in sec	0.411	NA	1.36	0.34
Web browsing delay in second	3.90	NA	2.59/5.01/2.36	0.47
Latency in (msec)	52.83	NA	55.37	36

SDCA Day 1 Hotspot - (Location – Petrol Pump, Mathania)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	210.37	211	NA	312.74
Upload Throughput in Kbps	220.12	120	NA	133.87
Web browsing delay in second	5.47	23.5(Amazon),46.1(Flipkart), 5.0(Paytm)	NA	5.89
Latency in (msec)	378.25	234	NA	321

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	6.40	NA	7.5
Upload Throughput in Mbps	NA	1.17	NA	5.2
Video streaming delay in sec	NA	2.28	NA	2.23
Web browsing delay in second	NA	8.9(Amazon), 6.1(Flipkart), 2.0(Paytm)	NA	2.52
Latency in (msec)	NA	80	NA	70

TSP (For 4G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	57.93	NA	24.61	28.5
Upload Throughput in Mbps	53.13	NA	4.39	13.2
Video streaming delay in sec	0.53	NA	1.49	1.46
Web browsing delay in second	4.19	NA	2.58/1.35/1.89	0.40
Latency in (msec)	57.2	NA	48.52	57

SDCA Day 2 Hotspot - (Location – Sabji Mandi, Pipar City)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	210.27	258	NA	219.5
Upload Throughput in Kbps	300.32	233	NA	236.2
Web browsing delay in second	5.28	114.3(Amazon), 31.4(Flipkart), 3.2(Paytm)	NA	3.38
Latency in (msec)	294.25	276	NA	301

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	2.44	NA	11.9
Upload Throughput in Mbps	NA	1.90	NA	5.2
Video streaming delay in sec	NA	2.114	NA	2.27
Web browsing delay in second	NA	7.6(Amazon), 5.5(Flipkart), 1.8(Paytm)	NA	0.72
Latency in (msec)	NA	88	NA	60

TSP (For 4G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	64.4	NA	27.534	38.5
Upload Throughput in Mbps	44.2	NA	8.49	15.2
Video streaming delay in sec	0.437	NA	1.34	1.48
Web browsing delay in second	3.8	NA	2.13/1.11/1.98	0.47
Latency in (msec)	44.16	NA	33.00	51

Summary Data report static

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	207.516	252.28	NA	284.69
Upload Throughput in Kbps	298.947	195	NA	181.1
Web browsing delay in second	5.72714	68.91(Amazon),31.97(Flipkart), 5.92(Paytm)	NA	3.88
Latency in (msec)	360.727	174.57	NA	263.5

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	7.54	NA	9.7
Upload Throughput in Mbps	NA	1.69	NA	5.2
Video streaming delay in sec	NA	4.07	NA	2.25
Web browsing delay in second	NA	9.3 (Amazon), 7.9(Flipkart), 2.55(Paytm)	NA	1.62
Latency in (msec)	NA	98.85	NA	65

TSP (For 4G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	50.53	NA	23.24	47.94
Upload Throughput in Mbps	44.1471	NA	9.09	23.28
Video streaming delay in sec	0.46557	NA	1.46	1.04
Web browsing delay in second	4.06714	NA	2.39/3.19/2.25	0.45
Latency in (msec)	53.8329	NA	47.79	54

Streaming delay

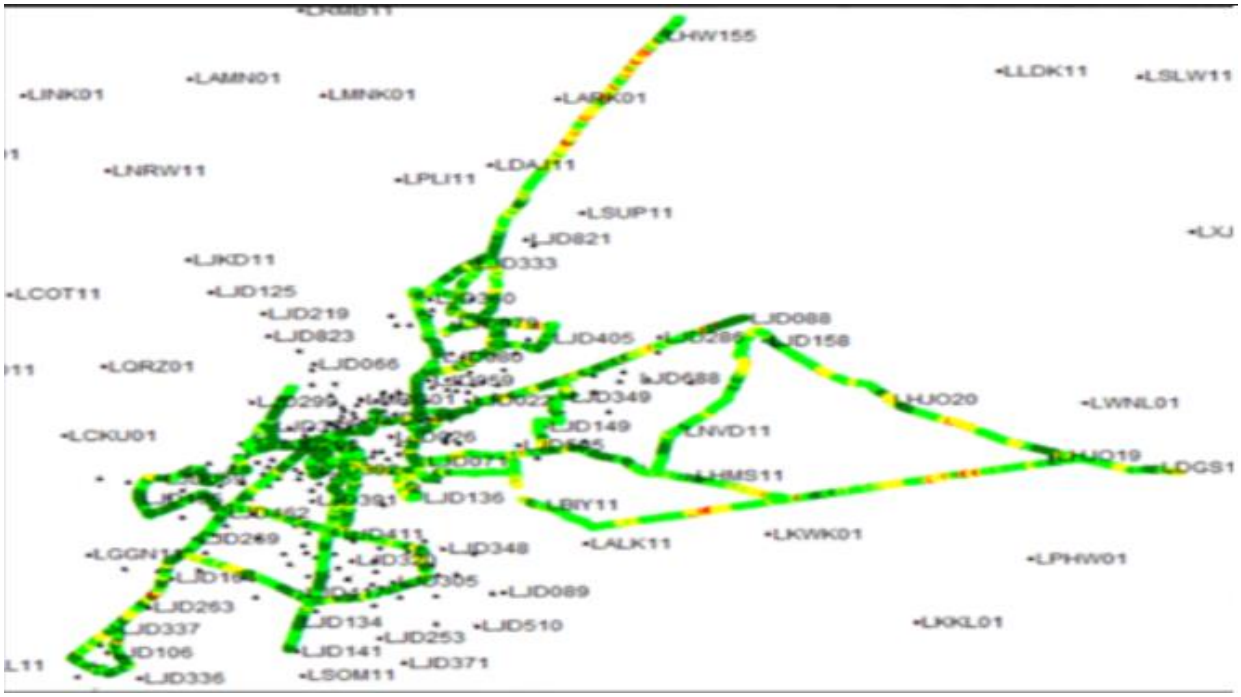
TSP (For 3G)	Airtel	BSNL	JIO	VIL
Average Initial Start Time (Sec)	NA	4.07	NA	1.62
Average Interruption time in Second	NA	0	NA	0

TSP (For 4G)	Airtel	BSNL	JIO	VIL
Average Initial Start Time (Sec)	0.479	NA	1.84	0.94
Average Interruption time in Second	0.0	NA	0	0

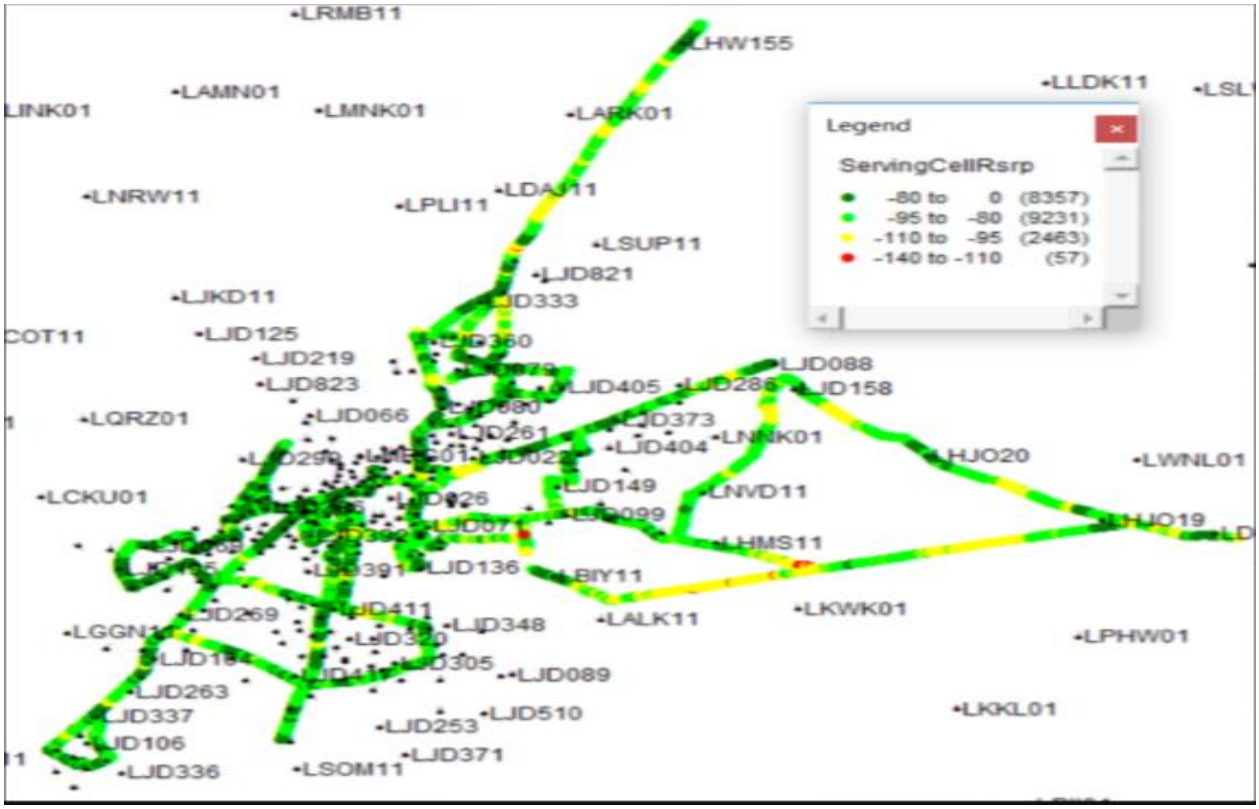
TSPs Coverage and Quality Plots

AIRTEL Coverage plots

1. 2G

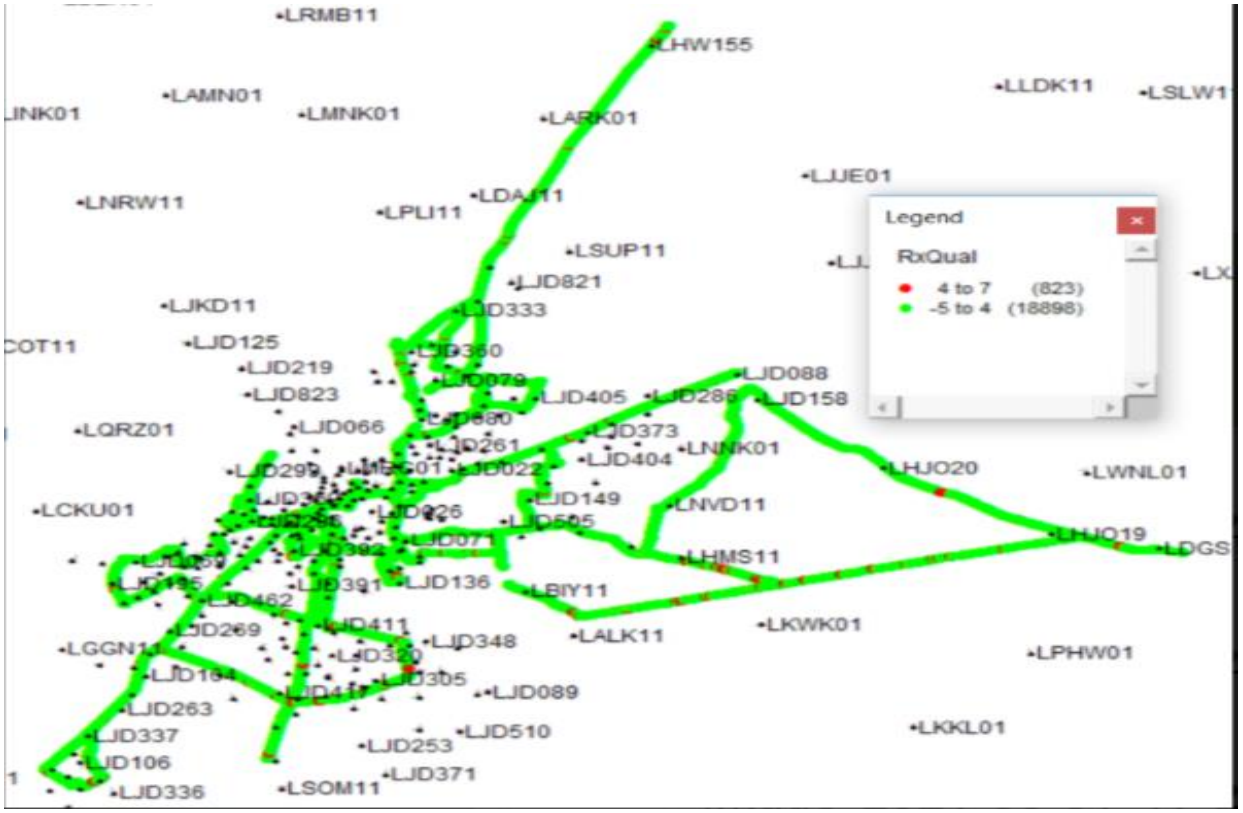


2. 2G/4G dual

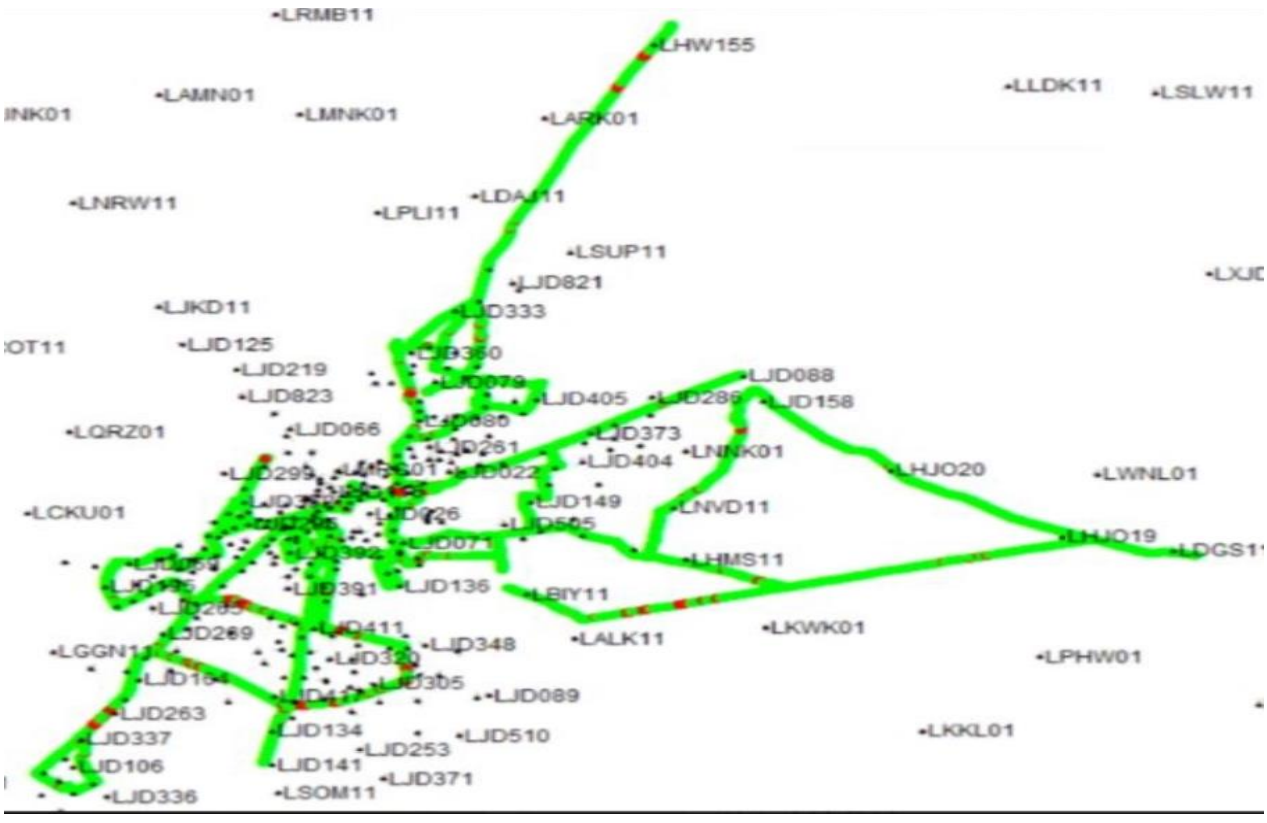


AIRTEL Quality plots

1. 2G

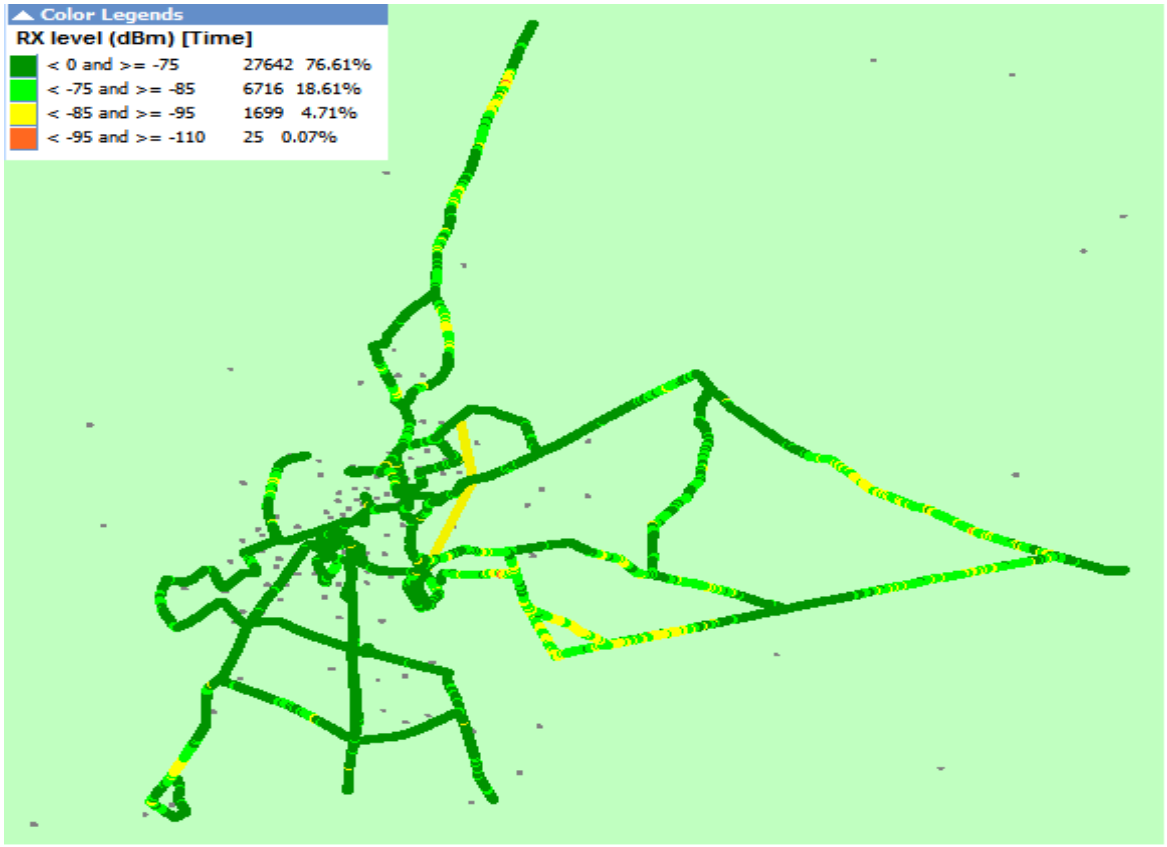


2. 2G/4G dual

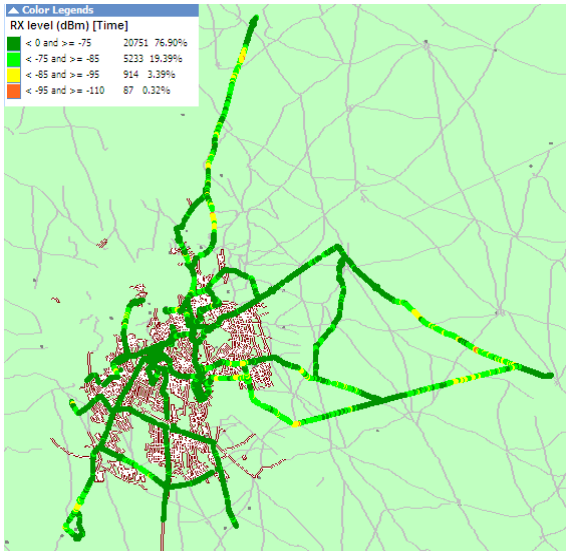


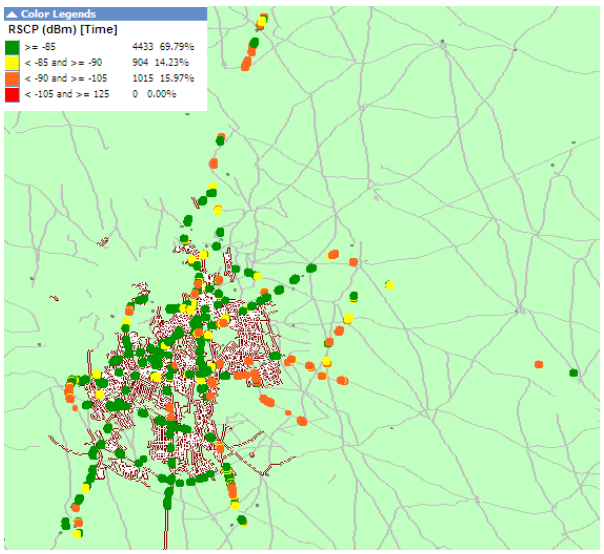
BSNL Coverage plots

3. 2G



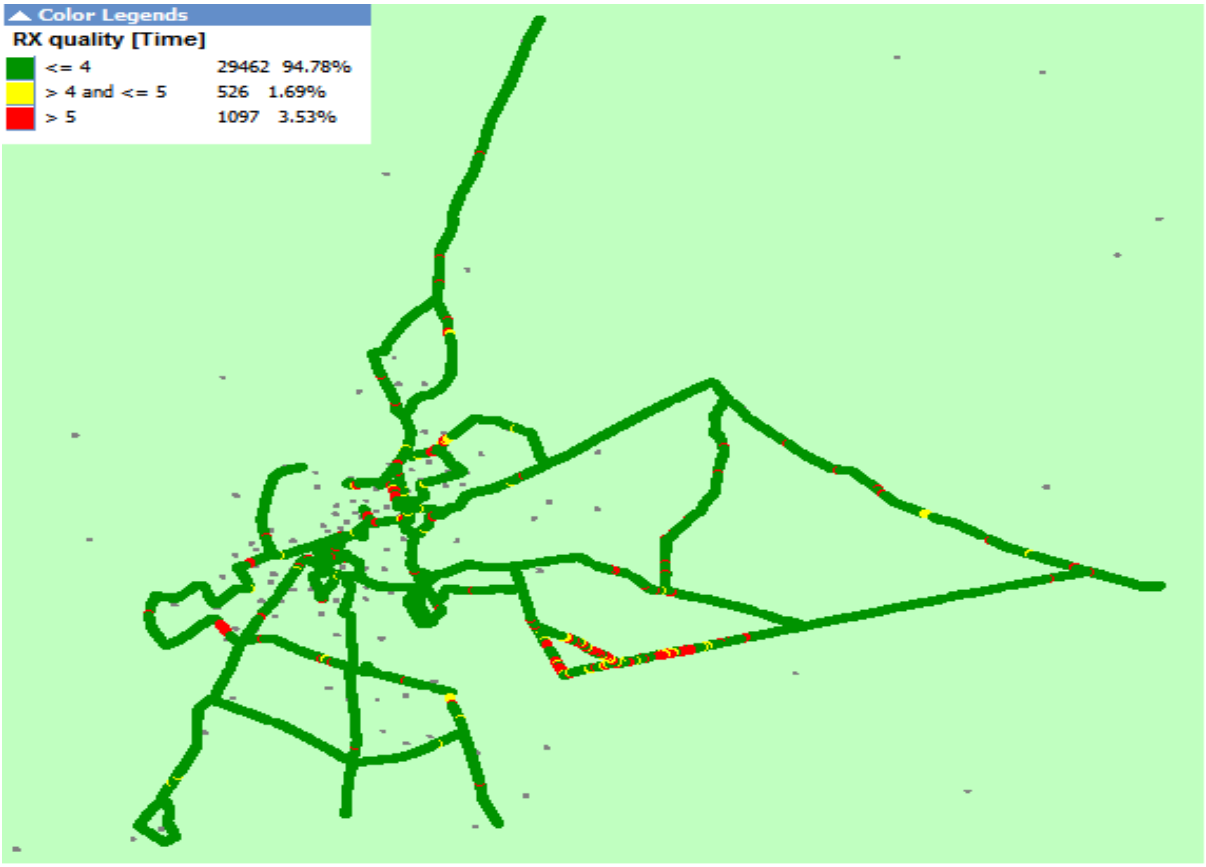
4. 2G/3G dual



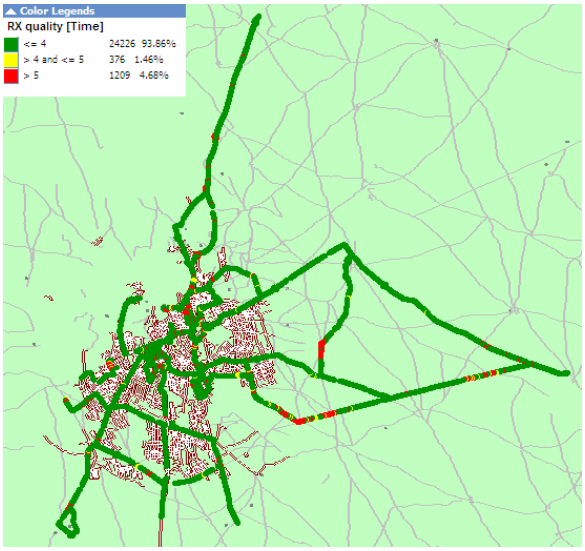


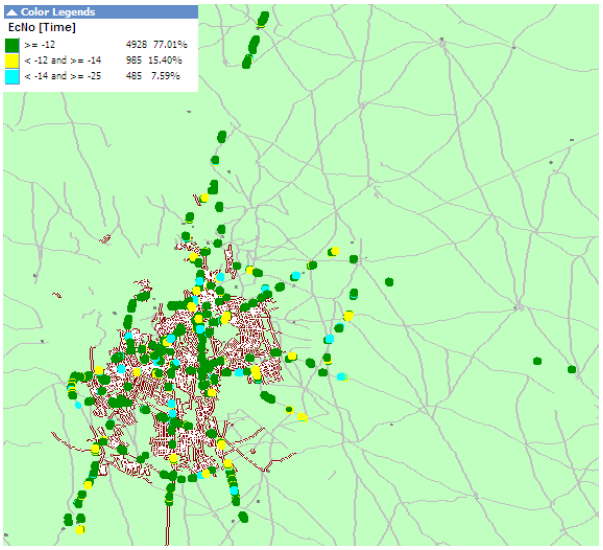
BSNL Quality plots

3. 2G



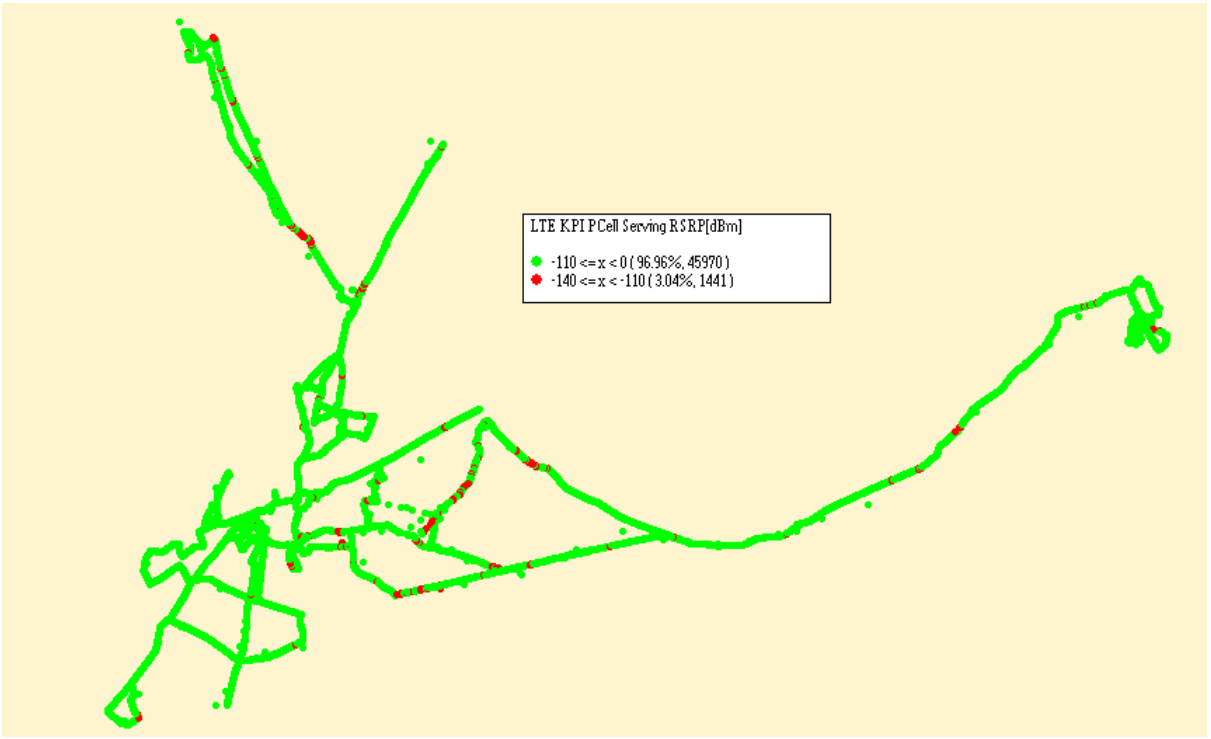
4. 2G/3G dual





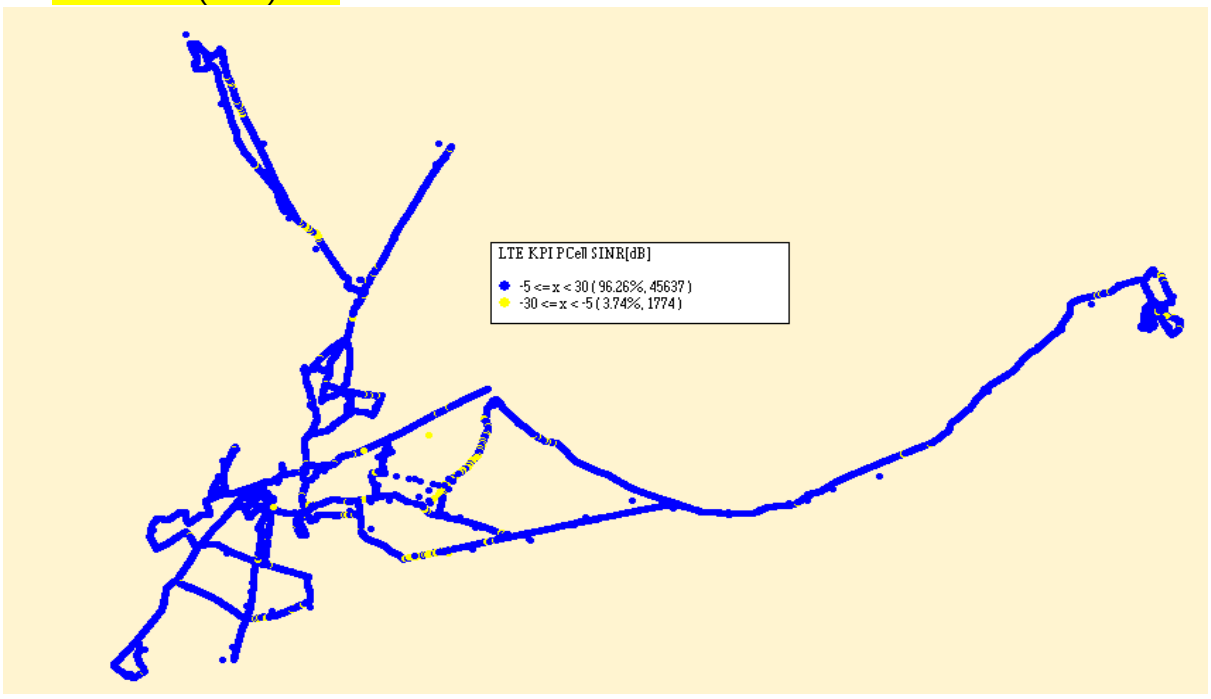
Jio Coverage plots

5. VoLTE (Free) : Jio



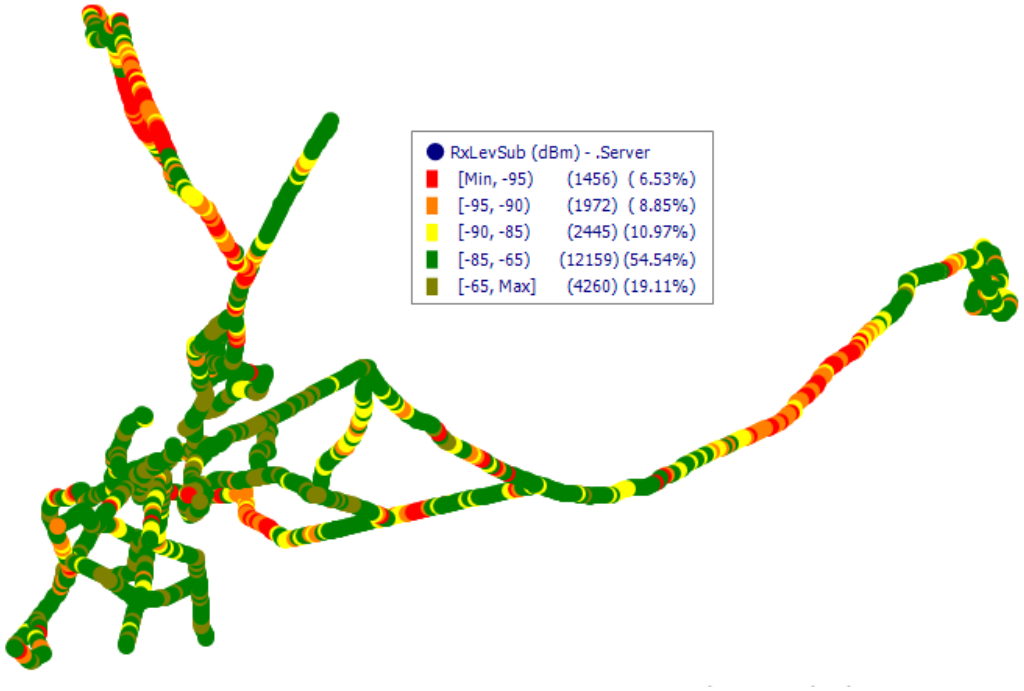
Jio Quality plots

5. VoLTE (Free) : Jio

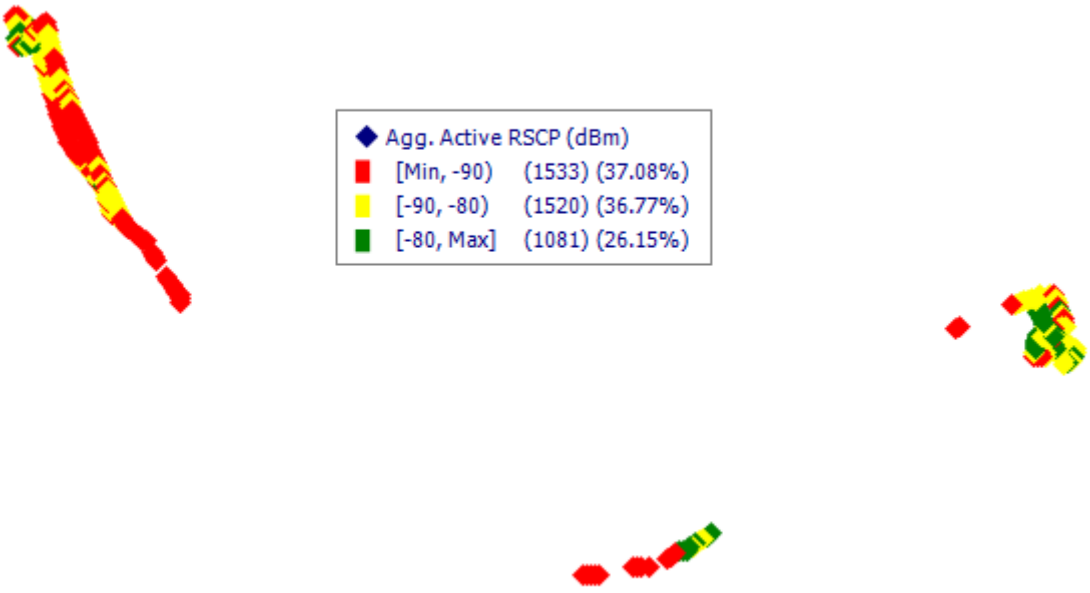


Voda Idea Coverage plots

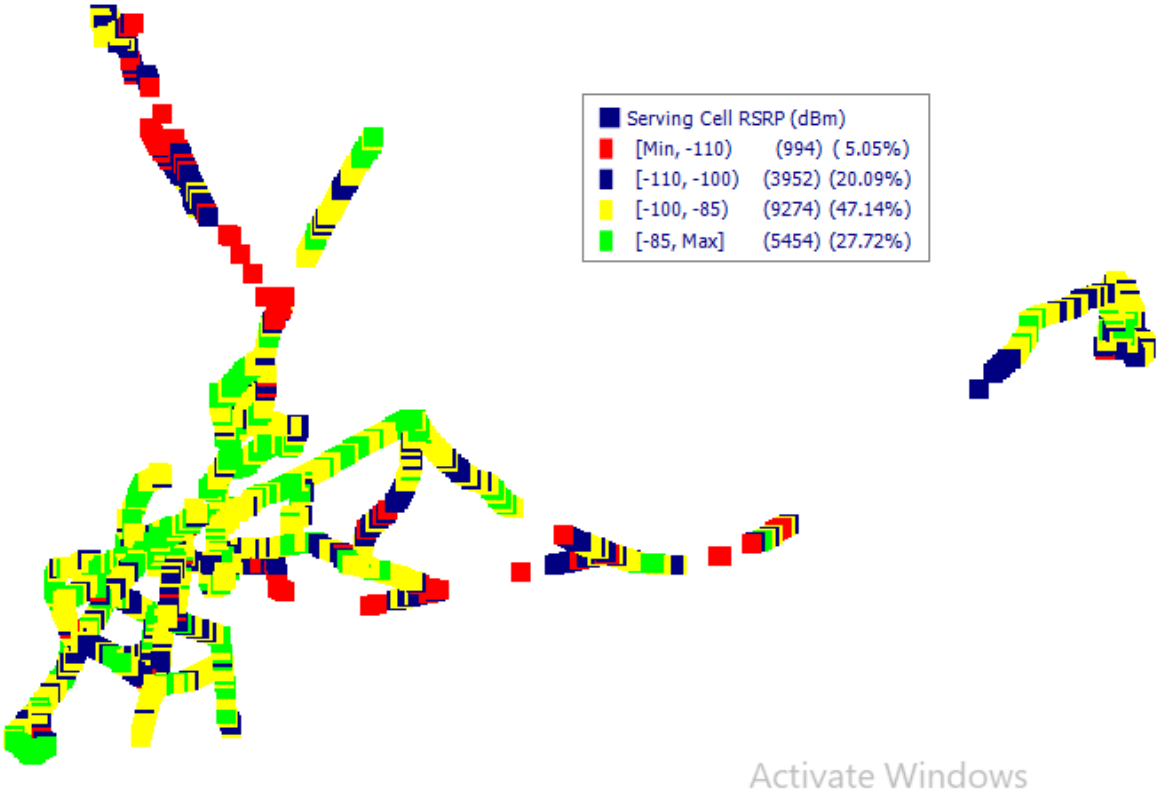
2G



6. 3G (WCDMA)
7.

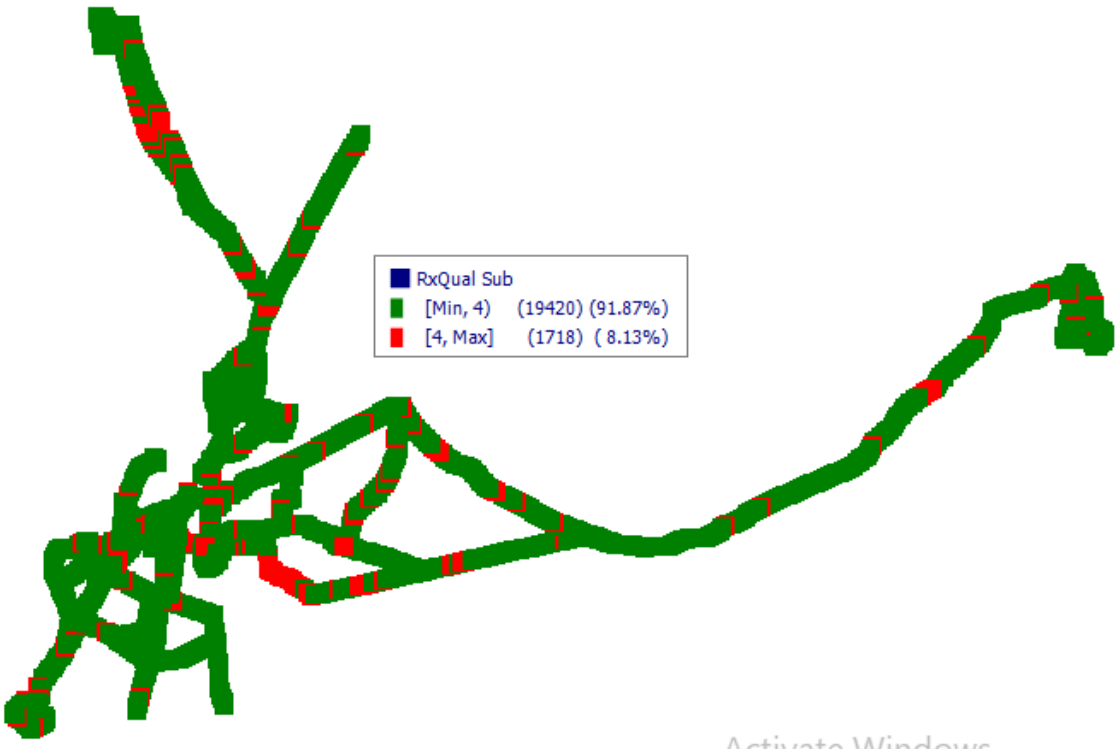


8. Volte (Free)



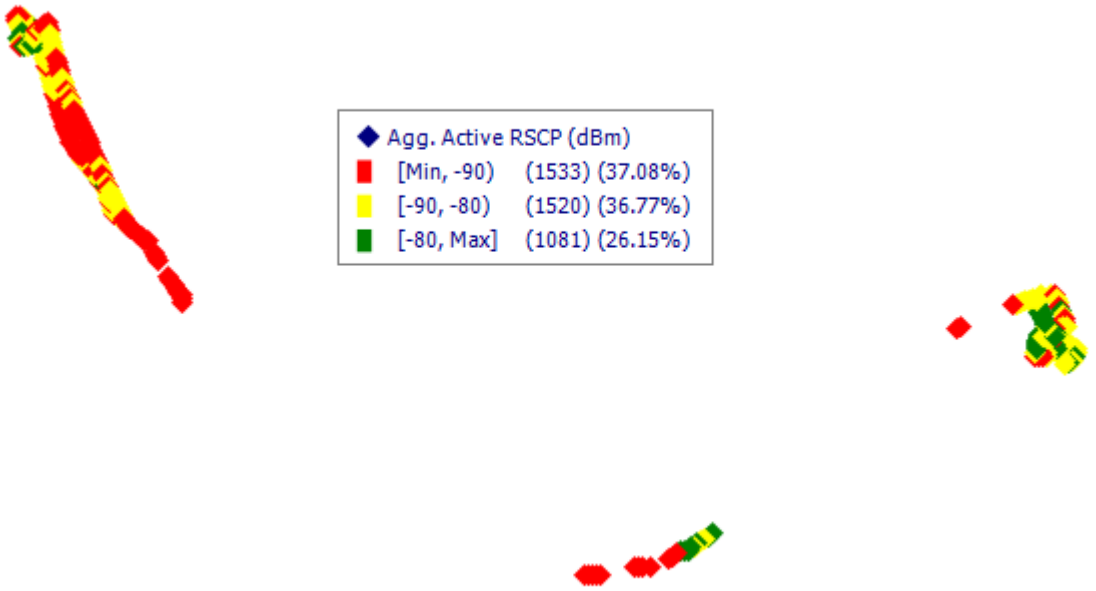
Activate Windows

Voda Idea Quality plots 2G

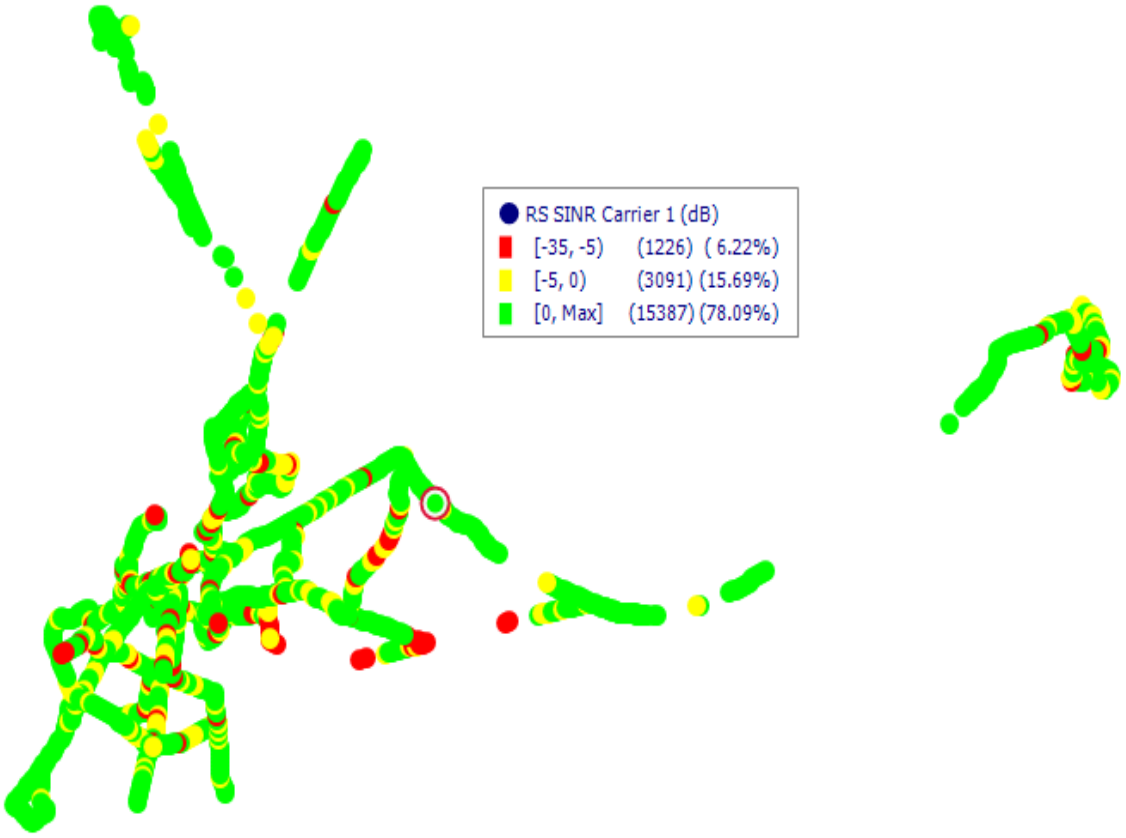


Activate Windows

6. 3G (WCDMA)



3 Volte (Free)



Activate Windows