



TELECOM REGULATORY AUTHORITY OF INDIA
Regional Office – Hyderabad

Operator Assisted Drive Test (OADT)

Mahaboobnagar SSA

OADT for Voice - 6th, 7th and 8th Sep 2021

OADT for Data - 7th, 8th and 9th Sep 2021

The Operator Assisted Drive Test (OADT) has been carried out by TRAI in Mahaboobnagar SSA from 9:00 AM to 9:00 PM of 6th September to 9th September 2021. The drive test covered a drive route of 380 KMs & 5 Hotspot over a period of 4 working days. Approximately 600 calls were made for each of 8 networks: Three 2G networks, Two 3G networks, Three LTE networks covering 4 unique TSPs.

Hotspots locations for Data Testing

- 1 Nagar Kurnool Market Yard
- 2 Gadwal Bus stop
- 3 Jadcherla Bus stop
- 4 Mahaboobnagar Railway station
- 5 Mahaboobnagar Clock Tower

Technology	Airtel	BSNL	RJIL	VIL
2G	Y	Y	N	Y
3G	Y	Y	N	N
4G	Y	N	Y	Y
Tools used	TEMS Investigation 22.3.1	AGILENT 16.2	X-CAL Version 4.09.601	TEMS Investigation 19.2.3

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 also 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. In view of complaints on call drops and other network quality issues as per the instructions of TRAI HQ, TRAI Regional Office Hyderabad has conducted the drive test with the help of telecom Service Providers of AP LSA (Mahaboobnagar SSA) from 6^h Sep 2021 to 9th Sep 2021 covering various locations in Mahaboobnagar SSA & surrounding region. The performance of Airtel, BSNL, Vodafone Idea Limited (VIL) and Jio were monitored across various technologies (2G, 3G, and 4G). The drive test route was defined on the basis of several factors that include - areas from where call drop complaints are commonly received; areas of heavy usage; residential areas away from arterial roads; office areas; areas where previous Drive tests showed network issues; etc.

Drive Test Details for Mahaboobnagar SSA:

2G – measurement – UE Locked in 2G

3G – measurement – UE in Dual mode (2G and 3G)

4G – measurement – UE in Free mode

Voice -Calls were made for 90 sec durations with wait time of 10 sec between calls in all technologies.

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

Download- 2G (500KB), 3G - 20 MB, 4G - 40MB

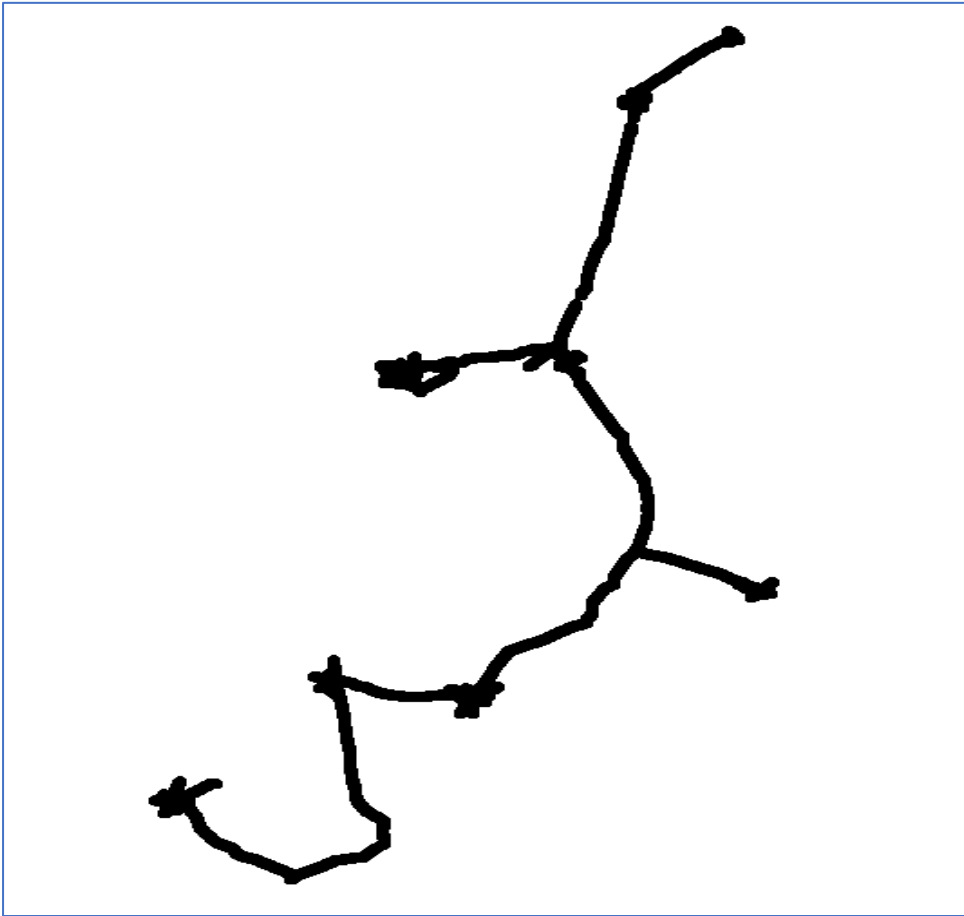
Upload - 2G (100KB), 3G - 5 MB, 4G - 10MB

Web browsing - 3 links of e commerce websites <https://www.amazon.in>, <https://www.flipkart.com>, <https://paytm.com>.

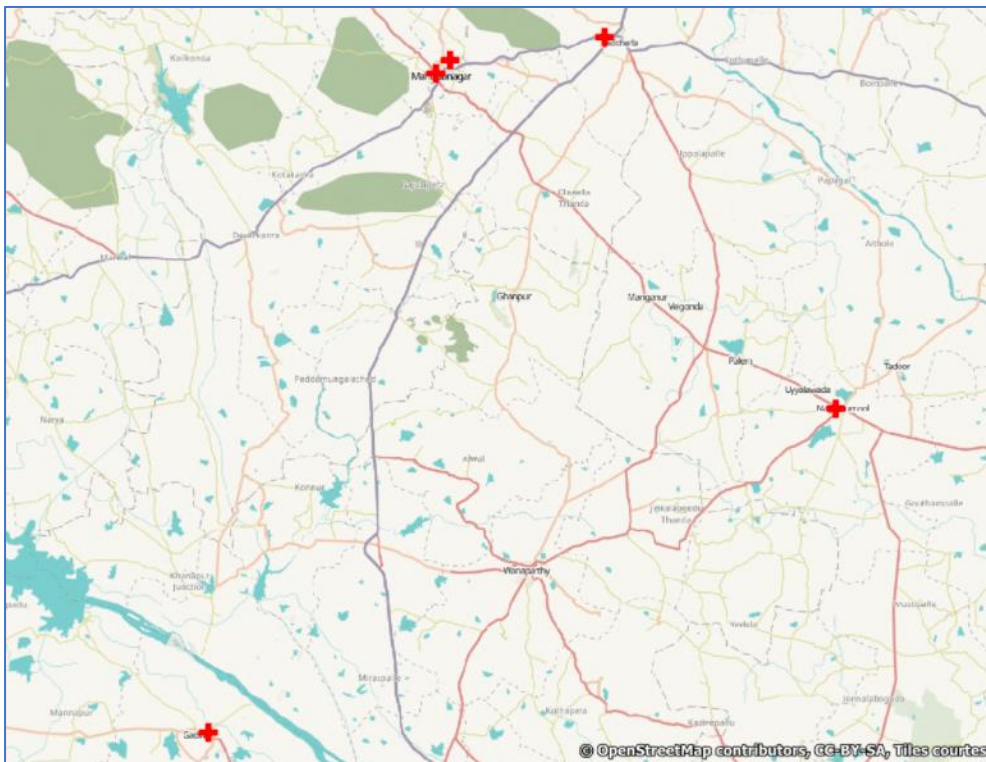
Video Streaming – 130 sec clip

Latency – 32 Bytes on www.google.com.

Voice drive test route (Map)



Data testing hotspot locations (Map)



Key observations of Voice Call

Drop Call Rate % (Bench mark < 2%)

TSP	VoLTE Network	3G Network	2G Network
Airtel	0%	0%	0%
BSNL	NA	0.645%	0.127%
JIO	0.32	NA	NA
VIL	0.31	NA	0

Block Call Rate % (Bench mark < 3%)

TSP	VoLTE Network	3G Network	2G Network
Airtel	0%	0%	0.15%
BSNL	NA	1.273%	0.380%
JIO	NA	NA	NA
VIL	0.31	NA	0.321

Technology	Parameter	Airtel	BSNL	JIO	VIL
2G	SDCCH Congestion (<=1%)	0%	0%	NA	NA
	TCH Congestion (<=2%)	0.15%	0.253%	NA	NA
3G	CSFB Failure %	0%		NA	NA
	SDCCH Congestion %	0%		NA	NA
	RRC Congestion %	0%		NA	NA
	SDCCH and RRC Congestion % (<=1%)	0%	0.534%	NA	NA
	TCH Congestion %	0%		NA	NA
	RAB Congestion %	0%		NA	NA
	TCH and RAB Congestion % (<=2%)	0%	0.739%	NA	NA

Coverage

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

TSP	Airtel	BSNL	JIO	VIL
Coverage %	85	92.7	NA	88.24

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

TSP	Airtel	BSNL	JIO	VIL
Coverage %	84	74.6	NA	NA

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

TSP	Airtel	BSNL	JIO	VIL
Coverage %	98	NA	95.52	95.66

4. Percentage of time spent on 3G Network

TSP	Airtel	BSNL	JIO	VIL
Time spent %	50.5%	85.05	NA	NA

5. Percentage of time spent on VoLTE Network

TSP	Airtel	BSNL	JIO	VIL
Time spent %	100%	NA	100	97.58

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
2G network	3.3	2.563	NA	3.27
3G network	3.6	2.455	NA	NA
VoLTE Network	0.8	NA	1.36	0.65

Voice call summary

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Call attempts	664	789	NA	624
Block call rate %	0.15%	0.380%	NA	0.32
CSSR %	99.85%	99.62%	NA	99.68
Drop call rate %	0%	0.13%	NA	0
Mobility HOSR %	99.6%	98.76%	NA	97.43
RX Quality %	95%	94.3%	NA	97.56

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Call attempts	652	157	NA	NA
Block call rate %	0%	1.273%	NA	NA
CSSR %	100%	98.73%	NA	NA
Drop call rate %	0%	0.64%	NA	NA
Mobility HOSR %	99.38%	99.9%	NA	NA
RX Quality %	97%	93.9%	NA	NA

TSP (For VoLTE)	Airtel	BSNL	JIO	VIL
Call attempts	722	NA	612	636
Block call rate %	0%	NA	NA	0.31
CSSR %	100%	NA	98.83	99.69
Drop call rate %	0%	NA	0.32	0.31
Mobility HOSR %	100%	NA	98.07	99.28
RX Quality %	94.5%	NA	92.08	74.37

Data Service Static (on Hotspots)

Hotspot -1 (Location – Nagar Kurnool Market Yard)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	124.69	187.61	NA	308.25
Upload Throughput in Kbps	24.43	108.95	NA	209.68
Web browsing delay in second	3.05	15.1575	NA	33.56
Latency in (msec)	152.33	239.083	NA	224

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	6.15	NA	NA	NA
Upload Throughput in Mbps	0.68	NA	NA	NA
Video streaming delay in sec	0	NA	NA	NA
Web browsing delay in second	2.10	NA	NA	NA
Latency in (msec)	105.88	NA	NA	NA

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	13.28	NA	34.25	22.14
Upload Throughput in Mbps	4.50	NA	4.81	20.63
Video streaming delay in sec	0	NA	NA	0.77
Web browsing delay in second	1.41	NA	3.41	3.24
Latency in (msec)	60.83	NA	95.5	84

Hotspot -2 (Location – Gadwal Bus Stand)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	334.18	189.36	NA	233.59
Upload Throughput in Kbps	22.61	97.84	NA	193.77
Web browsing delay in second	3.29	18.588	NA	32.37
Latency in (msec)	175.5	358.833	NA	331

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	NA	NA	NA
Upload Throughput in Mbps	NA	NA	NA	NA
Video streaming delay in sec	NA	NA	NA	NA
Web browsing delay in second	NA	NA	NA	NA
Latency in (msec)	NA	NA	NA	NA

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	56.53	NA	36.96	24.63
Upload Throughput in Mbps	4.75	NA	5.12	19.56
Video streaming delay in sec	0	NA	NA	0.74
Web browsing delay in second	7.42	NA	3.69	2.72
Latency in (msec)	51.36	NA	95.83	147

Hotspot -3 (Location – Jadcherla Bus Stand.)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	283.06	193.92	NA	276.16
Upload Throughput in Kbps	33.16	80.54	NA	168.99
Web browsing delay in second	3.23	15.972	NA	35.43
Latency in (msec)	174.6	242.243	NA	445

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	6.30	NA	NA	NA
Upload Throughput in Mbps	0.68	NA	NA	NA
Video streaming delay in sec	0	NA	NA	NA
Web browsing delay in second	2.07	NA	NA	NA
Latency in (msec)	106.14	NA	NA	NA

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	38.96	NA	25.33	20.05
Upload Throughput in Mbps	14.37	NA	10.47	3.75
Video streaming delay in sec	0	NA	NA	0.90
Web browsing delay in second	1.0	NA	2.92	2.32
Latency in (msec)	47.4	NA	66.67	91

Hotspot -4 (Location – Mahaboobnagar Rly Station.)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	246.01	125.45	NA	238.21
Upload Throughput in Kbps	33.52	85.01	NA	165.12
Web browsing delay in second	2.82	21.72	NA	34.44
Latency in (msec)	164	336.75	NA	429

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	NA	NA	NA
Upload Throughput in Mbps	NA	NA	NA	NA
Video streaming delay in sec	NA	NA	NA	NA
Web browsing delay in second	NA	NA	NA	NA
Latency in (msec)	NA	NA	NA	NA

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	49.68	NA	36.58	14.68
Upload Throughput in Mbps	12.68	NA	6.9	17.78
Video streaming delay in sec	0	NA	NA	0.85
Web browsing delay in second	1.33	NA	3.23	2.23
Latency in (msec)	52.46	NA	86.83	184

Hotspot -5 (Location – Mahaboobnagar Clock Tower....)

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	256.71	112.03	NA	272.18
Upload Throughput in Kbps	14.43	74.11	NA	178.20
Web browsing delay in second	3.07	27.35	NA	33.49
Latency in (msec)	193	255.66	NA	276

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	NA	NA	NA	NA
Upload Throughput in Mbps	NA	NA	NA	NA
Video streaming delay in sec	NA	NA	NA	NA
Web browsing delay in second	NA	NA	NA	NA
Latency in (msec)	NA	NA	NA	NA

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	38.49	NA	32.22	13.74
Upload Throughput in Mbps	4.49	NA	9.81	18.51
Video streaming delay in sec	0	NA	NA	0.60
Web browsing delay in second	1.42	NA	4.2	2.28
Latency in (msec)	58.95	NA	94	141

Summary Data report static

TSP (For 2G)	Airtel	BSNL	JIO	VIL
Download throughput in Kbps	248.93	161.67	NA	265.67
Upload Throughput in Kbps	25.63	89.29	NA	183.15
Web browsing delay in second	3.09	19.76	NA	33.85
Latency in (msec)	171.9	268.435	NA	341

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	6.22	NA	NA	NA
Upload Throughput in Mbps	0.68	NA	NA	NA
Video streaming delay in sec	0	NA	NA	NA
Web browsing delay in second	2.09	NA	NA	NA
Latency in (msec)	106.04	NA	NA	NA

TSP (For LTE)	Airtel	BSNL	JIO	VIL
Download throughput in Mbps	39.39	NA	33.06	19.04
Upload Throughput in Mbps	8.16	NA	7.42	16.04
Video streaming delay in sec	0	NA	NA	0.772
Web browsing delay in second	2.51	NA	3.49	2.55
Latency in (msec)	54.20	NA	87.76	129.4

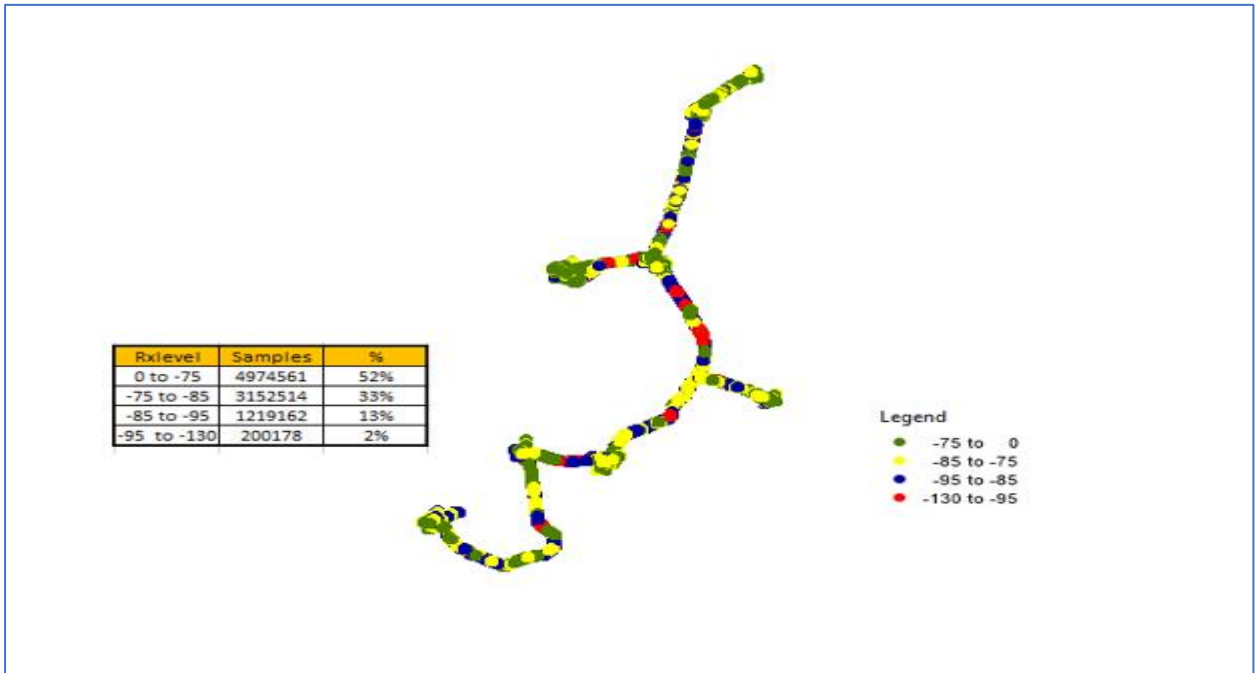
Streaming delay

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Average Initial Start Time (Sec)	1.24	NA	NA	NA
Average Interruption time in Second	0	NA	NA	NA

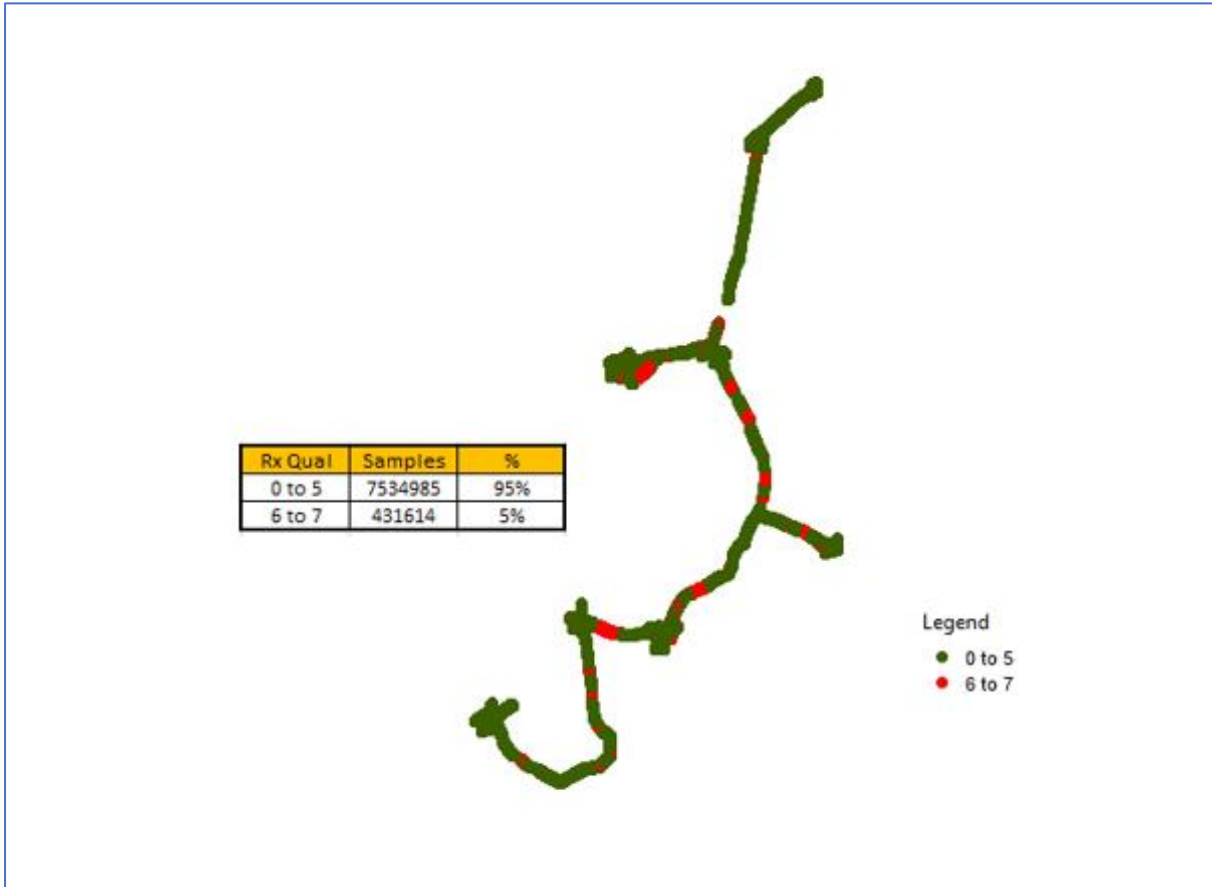
TSP (For LTE)	Airtel	BSNL	JIO	VIL
Average Initial Start Time (Sec)	0.41	NA	NA	0.233
Average Interruption time in Second	0	NA	NA	0

Service	Specifications
Download	2G (Locked) - 500KB ,3G (Dual)- 20 MB, 4G (Free)- 40MB
Upload	2G (Locked) - 100KB ,3G (Dual)- 5 MB, 4G (Free)- 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 .

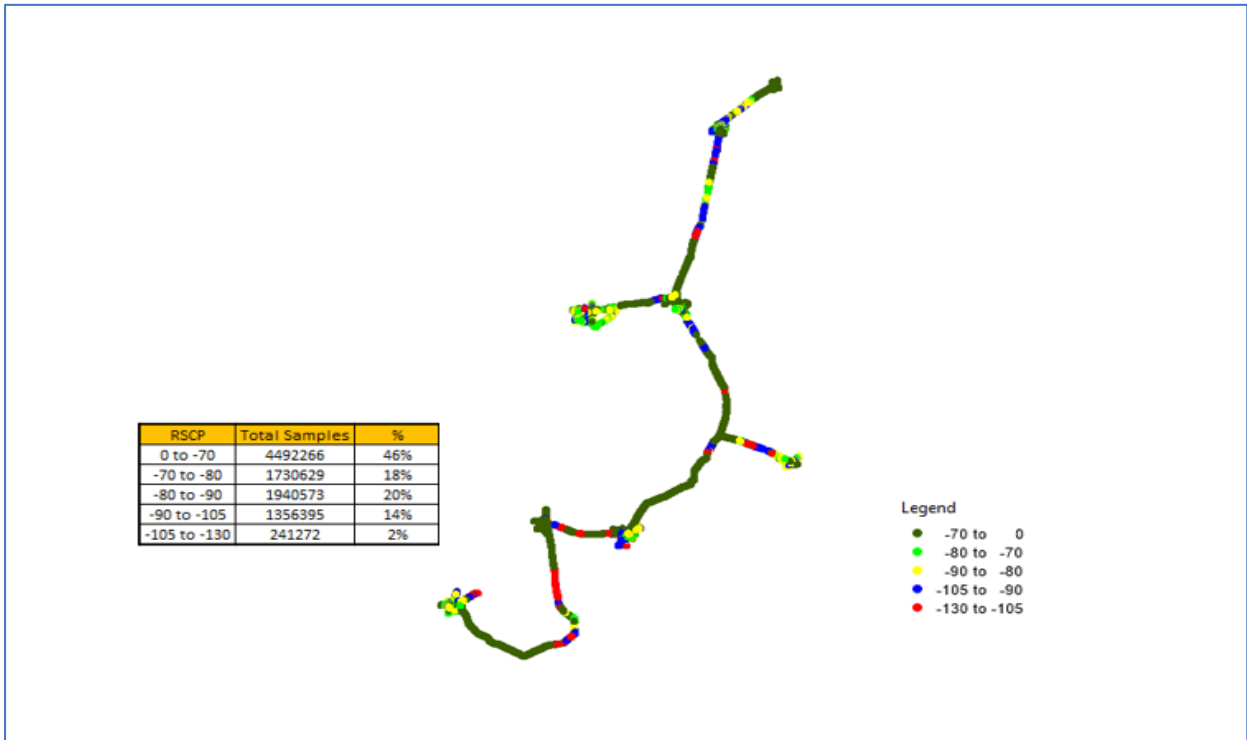
Coverage plots – 2G (Rx Level) --- AIRTEL



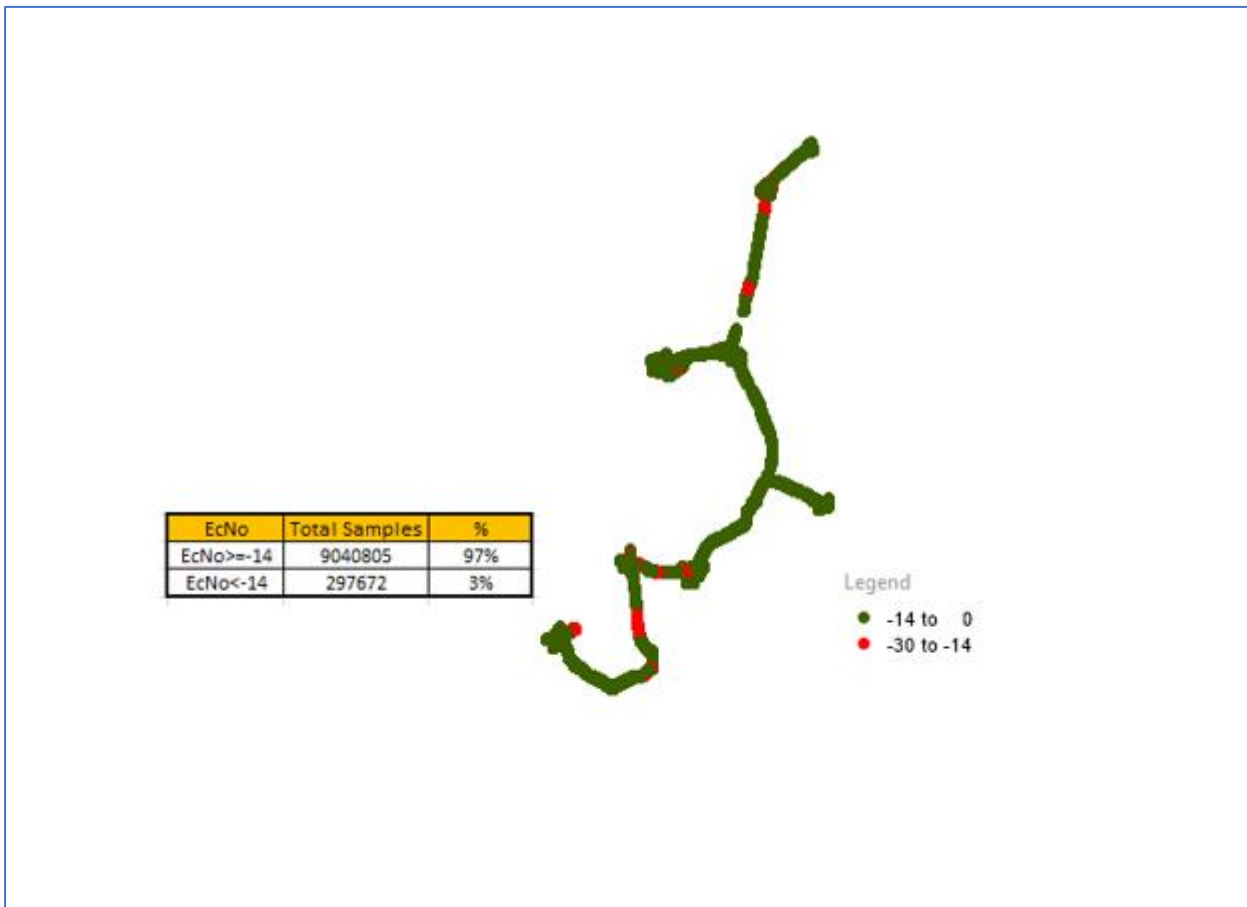
Quality plots – 2G (Rx Quality) --- AIRTEL



Coverage plots – 3G(RSCP) --- AIRTEL



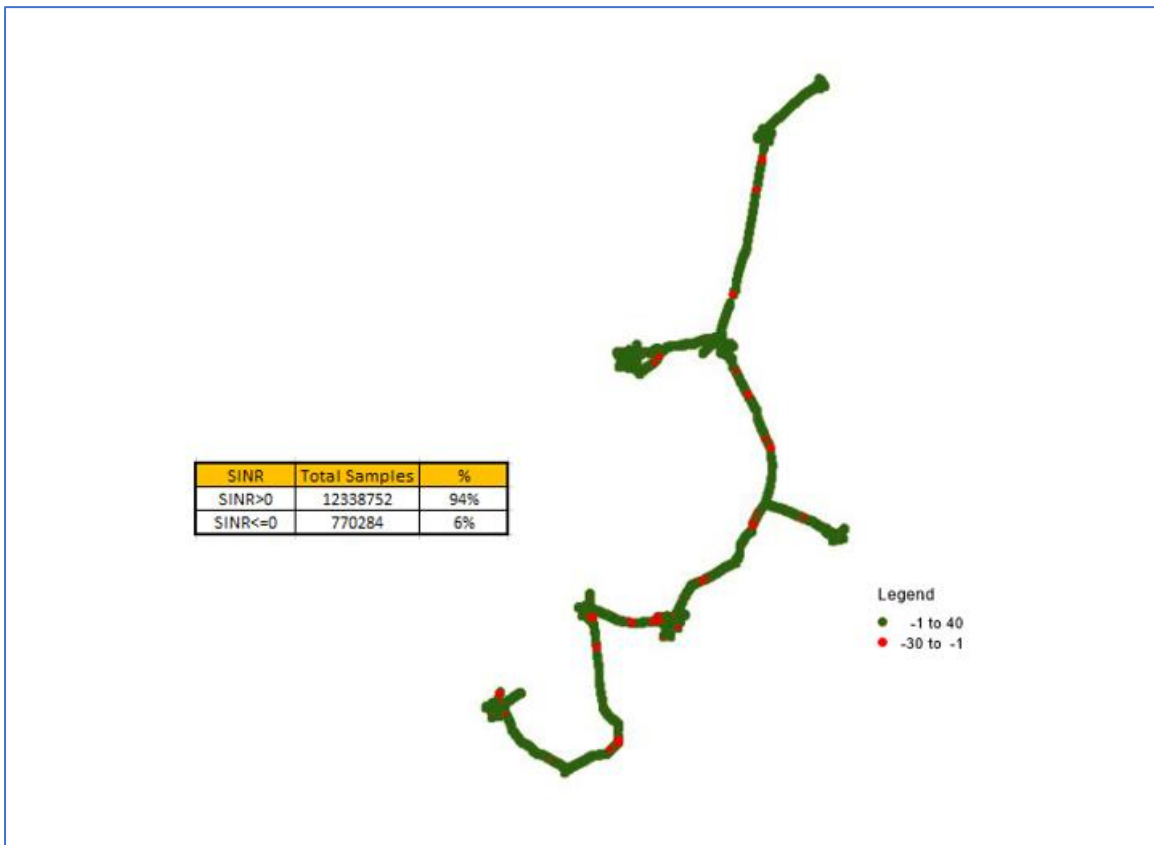
Quality plots – 3G(Ec/No) --- AIRTEL



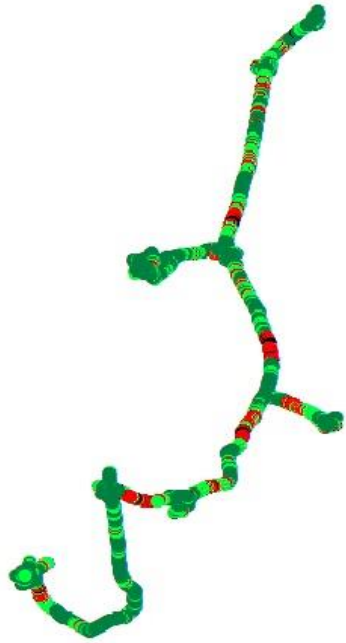
Coverage plots – VoLTE(RSRP) --- AIRTEL



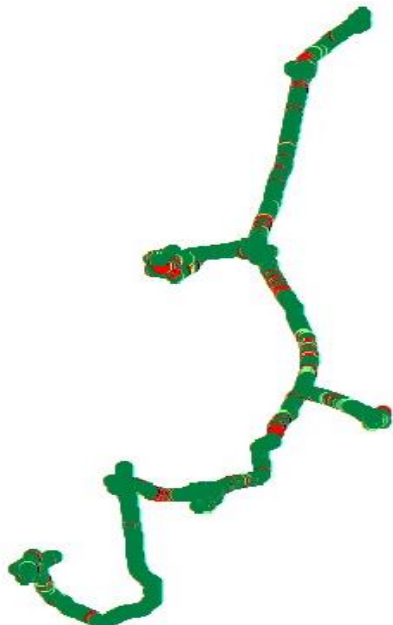
Quality plots- VoLTE(SINR) --- AIRTEL



2G RX Level Map --- BSNL



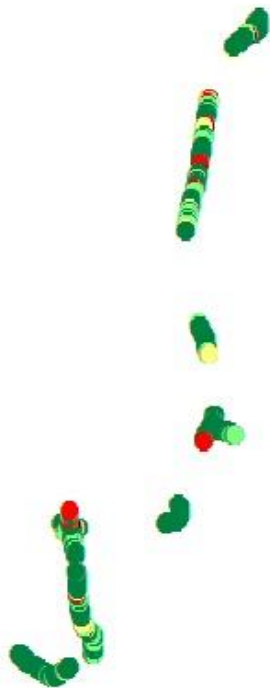
2G Rx Quality Map --- BSNL



3G Mobile Level Map --- BSNL

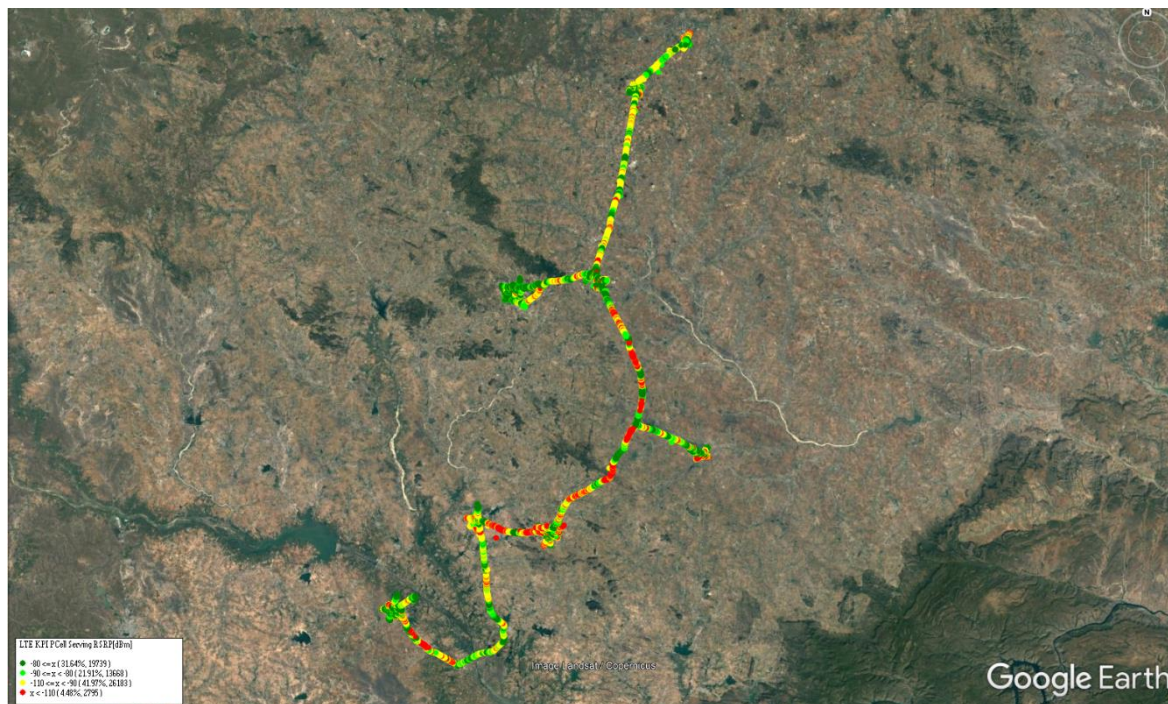


3G Mobile Quality Map --- BSNL



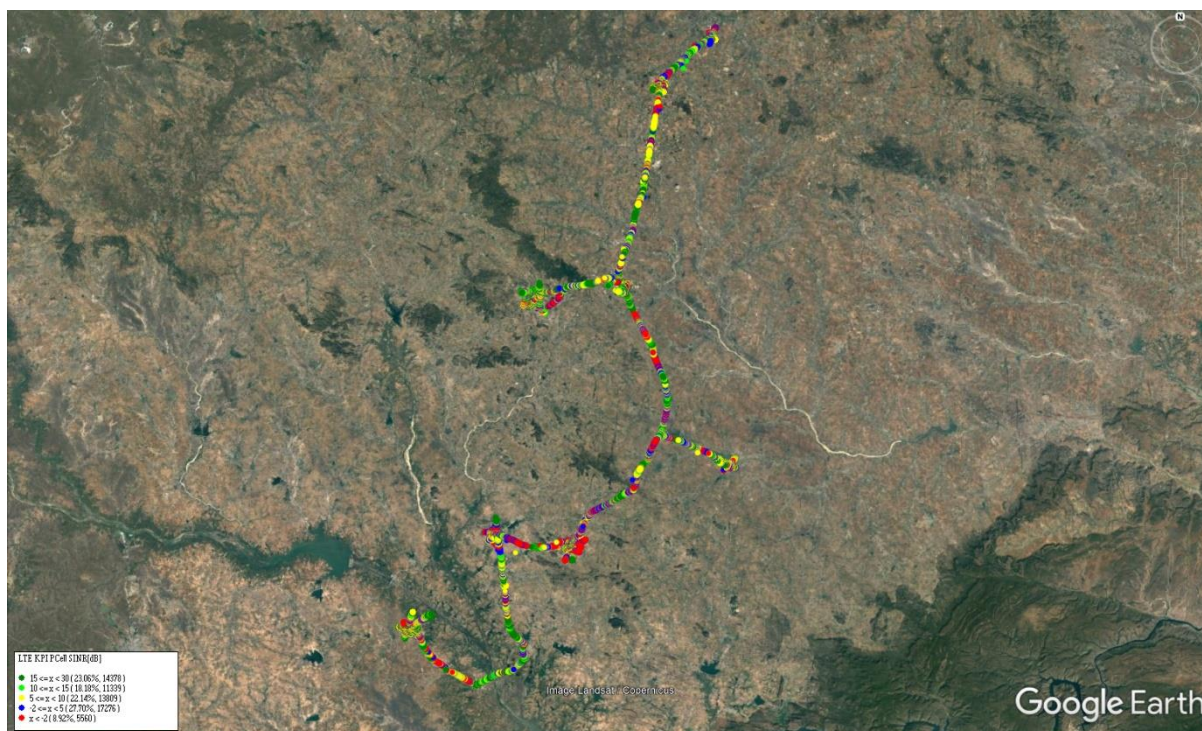
Coverage plots

1. VoLTE (Free) --- Jio



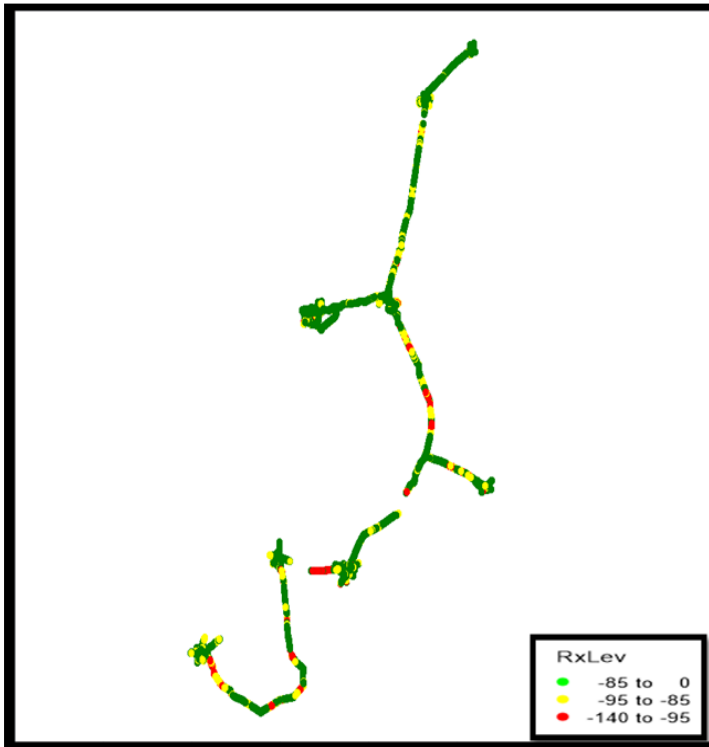
Quality plots

1. VoLTE (Free) --- Jio



Coverage plots:

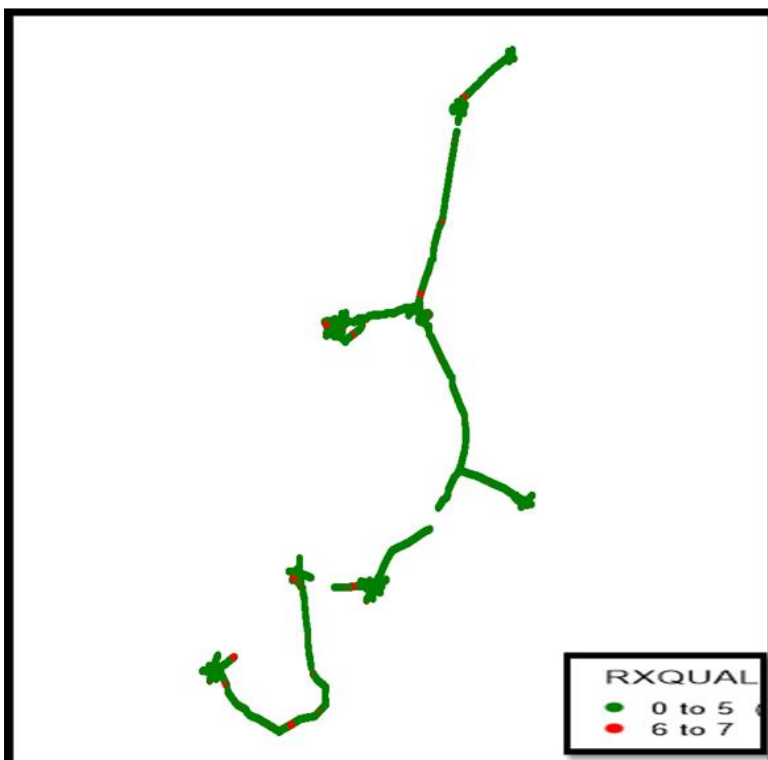
2G RX Level --- VIL



RX level	Samples	Percentage
0 to -85	5483750	88.24
-85 to -95	635796	10.23
-95 to -120	94965	1.53
Total	6214511	100

Quality plots:

2G RX QUALITY --- VIL



2G Quality	Samples	%PDF
0 to 5	6062602	97.56
6 to 7	151909	2.44
Total	6214511	100

Coverage plots:

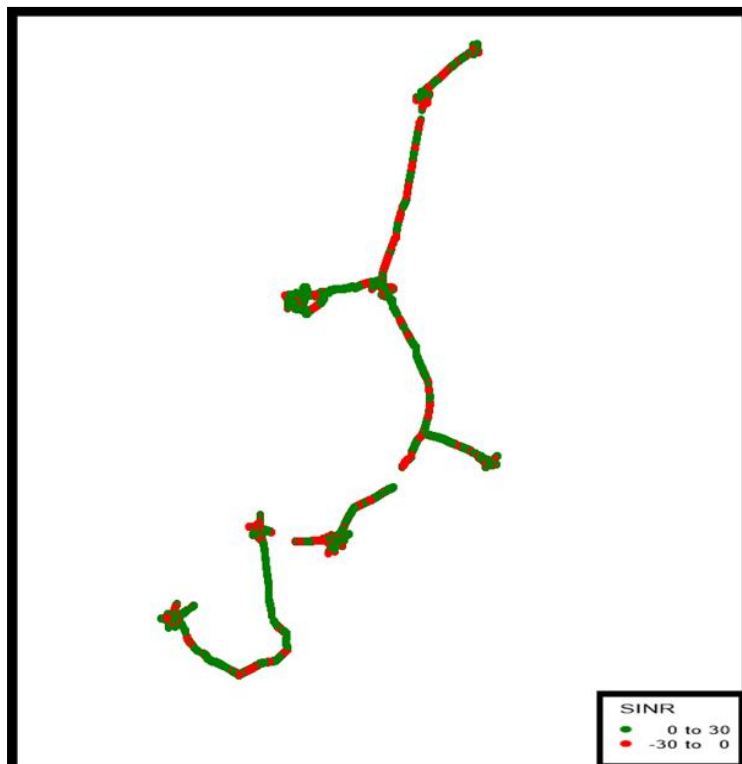
4G RSRP --- VIL



4G RSRP	Samples	Percentage
0 to- 110	16120890	95.66
-110 to -120	635633	3.77
-120 to -140	96119	0.57
Total	16852642	100

Quality plots:

4G SINR --- VIL



4G SINR	Samples	%PDF
0 to 30	12580509	74.37
-30 to 0	4334680	25.63
Total	16915189	100

Data speed testing by "TRAI My Speed" App					
Hotspot	Network type	Airtel	BSNL	RJIL	VIL
Nagar Kurnool Market Yard	2G download in Mbps	0.06			0.17
	2G upload in Mbps	0.01			0.06
	3G download in Mbps	6.05			
	3G upload in Mbps	4.14			
	4G download in Mbps	42.33	8.6	39.63	8.53
	4G upload in Mbps	4.75	9.16	19.87	10.69
Gadwal Bus Stop	2G download in Mbps	0.17			0.26
	2G upload in Mbps	0.11			0.23
	3G download in Mbps				
	3G upload in Mbps				
	4G download in Mbps	32.5	9.18	49.12	26.83
	4G upload in Mbps	27.15	9.42	17.04	20.06
Jadcherla Bus Stop	2G download in Mbps	0.21			0.21
	2G upload in Mbps	0.10			0.16
	3G download in Mbps	5.66			
	3G upload in Mbps	4.23			
	4G download in Mbps	27.71	13.78	36.18	24.93
	4G upload in Mbps	27.30	9.71	23.06	4.15
Mahaboobnagar Railway station	2G download in Mbps	0.21			0.16
	2G upload in Mbps	0.11			0.18
	3G download in Mbps				
	3G upload in Mbps				
	4G download in Mbps	27.52	16.77	47.95	24.42
	4G upload in Mbps	26.84	9.66	10.13	2.73
Mahaboobnagar clock Tower	2G download in Mbps	0.07			0.19
	2G upload in Mbps	0.03			0.15
	3G download in Mbps				
	3G upload in Mbps				
	4G download in Mbps	15.34	9.87	42.73	20.68
	4G upload in Mbps	27.28	7.6	18.18	16.20

Test Numbers for Drive Test

TSP		Calling number	Called number
Airtel	Voice 2G	7893009954	9849080077
	Voice 3G	9154698949	9849080077
	Voice VoLTE	7093001682	9849080077
	Data 2G	7995001641	
	Data 3G	7995001641	
	Data LTE	7995002894	
BSNL	Voice 2G	7382014195	127161
	Voice 3G	9490000309	127161
	Voice VoLTE		
	Data 2G		
	Data 3G		
	Data LTE		
JIO	Voice VoLTE	6301752277	56287
	Data LTE	6301752277	
VIL	Voice 2G	7095611633	4000
	Voice 3G		
	Voice VoLTE	8367446295	4000
	Data 2G	7095611633, 7036006396	
	Data 3G		
	Data LTE	8367447695, 7036006396, 8367446295	

Observations:

1. All TSPs have met the benchmarks with reference to DCR (2%), BCR(3%) and Call Setup Success Rate (CSSR) of 95% parameters.
2. The following TSPs have not met the Rx Quality (must be >= 95%) with reference their Networks.
 - a) Airtel for 4G network is 94.5%
 - b) BSNL for 2G network is 94.3%
 - c) BSNL for 3G network is 93.9%
 - d) RJio for 4G network is 92.08%
 - e) VIL for 4G network is 74.37%