

Operator Assisted Drive Test Report

ONGOLE SSA

JUNE 2023

(RO, HYDERABAD)

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%. All TSPs have met the Rx Quality of 95% except Jio 4G & VIL VoLTE

The Operator Assisted Drive Test (OADT) has been carried out by TRAI RO Hyderabad with the help of Service Providers in Ongole City and surrounding areas Kandhukuru, Markapuram , Chirala etc. from 9:00 AM to 8:00 PM during 26th to 29th June 2023. The drive test covered drive route of 533 KMs & 6 hotspot over a period of 4 days. Approximately 860 calls were made for each of the 7 networks: Three 2G networks, One 3G network and Three LTE network covering four TSPs.

Overview

Voice
Summary

Data
Summary

Overview

TRAI Hyderabad conducted Operator Assisted Drive Test from 26th to 29th June 2023 covering various locations in Ongole City & surrounding regions Kandukuru, Markapuram & Chirala. The performance of Airtel, BSNL, Jio and Vodafone Idea Limited were 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 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 533 KMs over a period of 4 days from 26th to 29th June'2023. Approximately 860 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 533 kms over a period of 3 days for download throughput for 3G & 4G technologies.

Data Tests were performed at 6 static locations for 2G, 3G & 4G technologies of five iterations at each location.

2. 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.

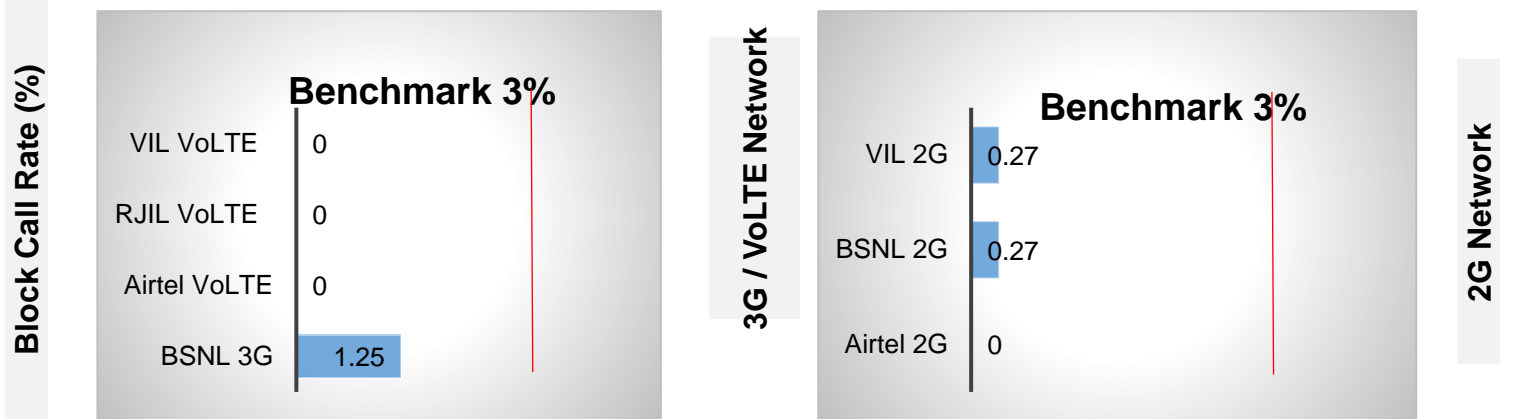
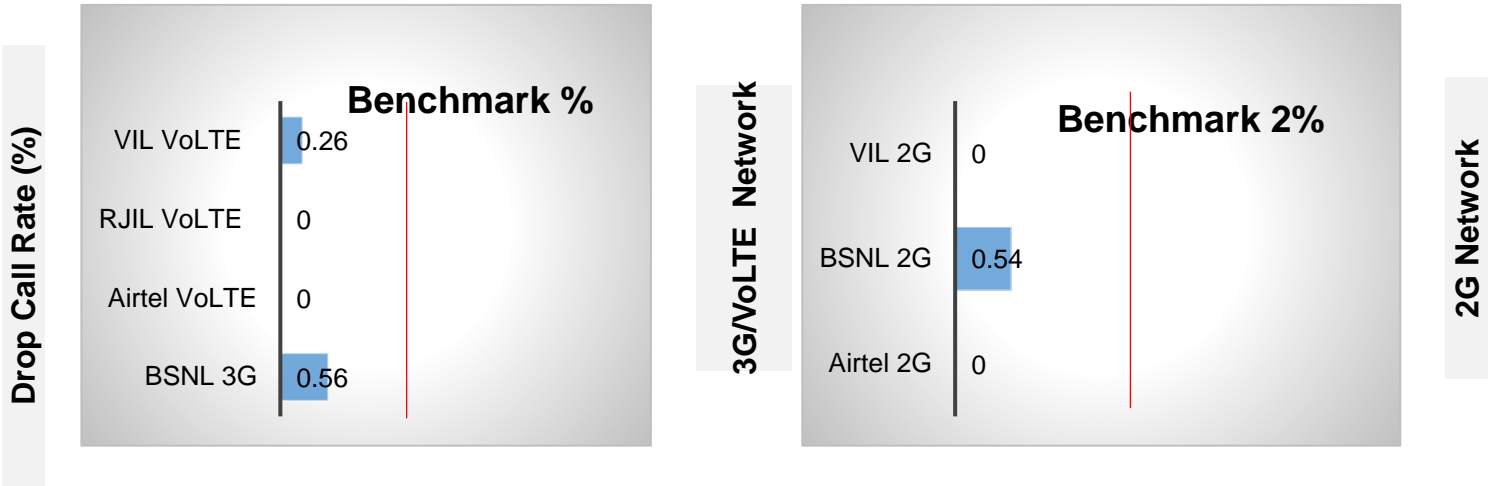
* 4G KPI's which are calculated from the UE in Free Mode included samples and events of 2G & 3G.

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 www.myntra.com
Video Streaming	130 Sec Clip
Latency	32 Bytes on www.google.com

Voice Calls

Key Observations

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



KPIs	2G			3G	VoLTE`		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0	0.54	0	0.56	0	0	0.26
Block Call Rate %	0	0.27	0.27	1.25	0	0	0

- 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 %	89.6	94.2	91.8

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

TSP	3G	VoLTE (\geq -110 dBm)			VoLTE (-110 to \geq -120 dBm)		
	BSNL	Airtel	JIO	VIL	Airtel	JIO	VIL
Coverage %	81.6	98.47	98.26	96.08	1.42	1.63	3.66

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

TSP	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent %	60.2	100	100	99.72

Data Services Static

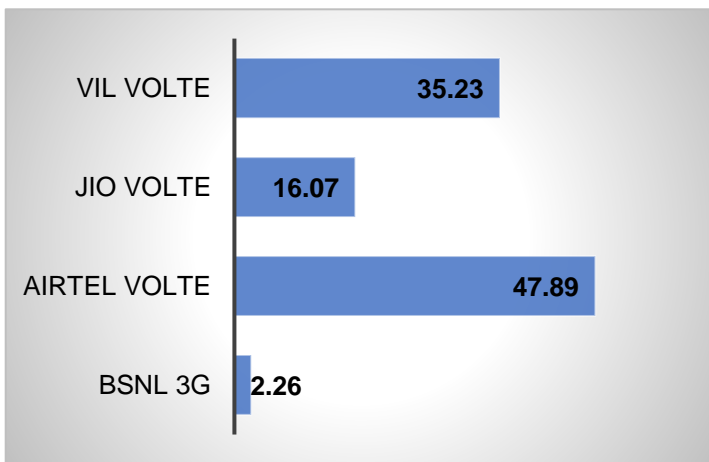
**Key Observations
(Average of 6
Hotspots)**

Data was tested at 6 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing delay (Flipkart, Amazon, PayTm)

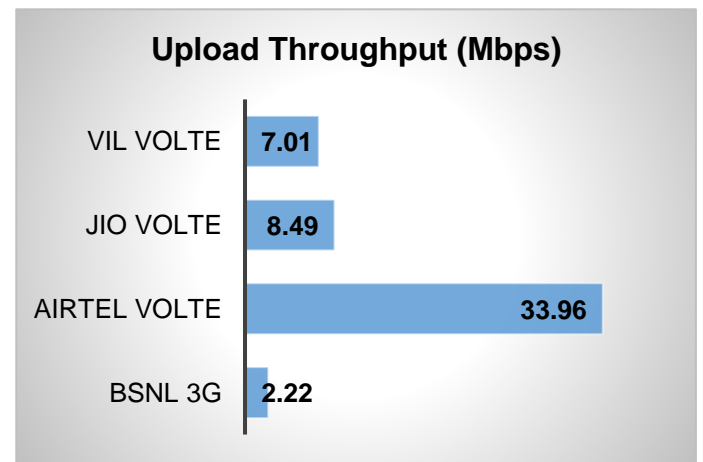
Data Download and Upload Performance (Mbps)

3G/4G/ Network:

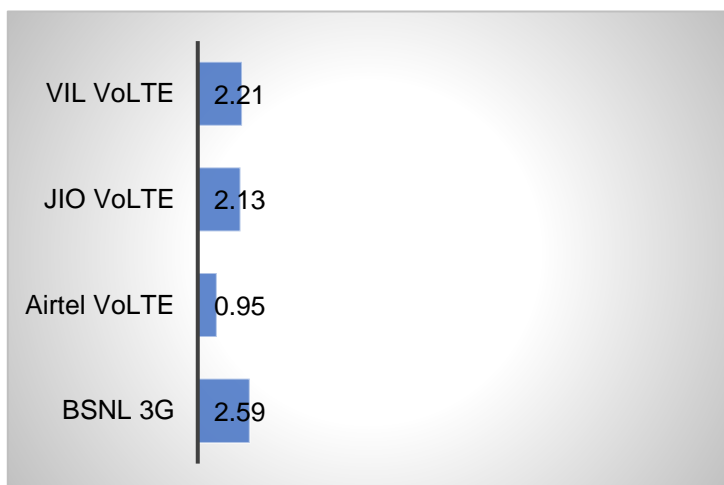
Download Throughput (Mbps)



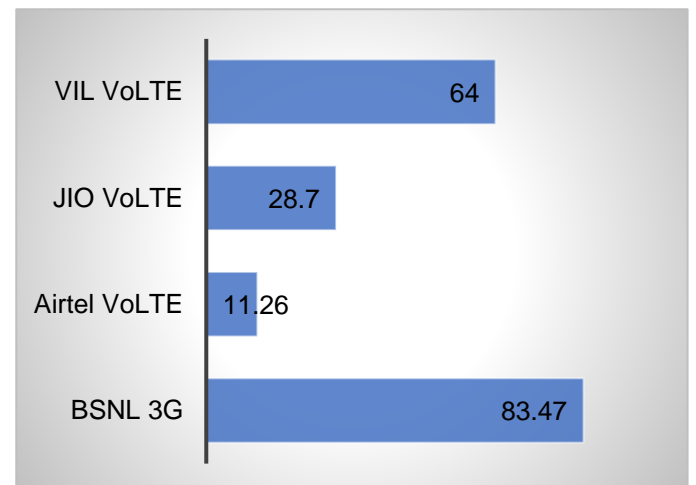
Upload Throughput (Mbps)



Web Browsing delay (Sec)



Latency (ms)



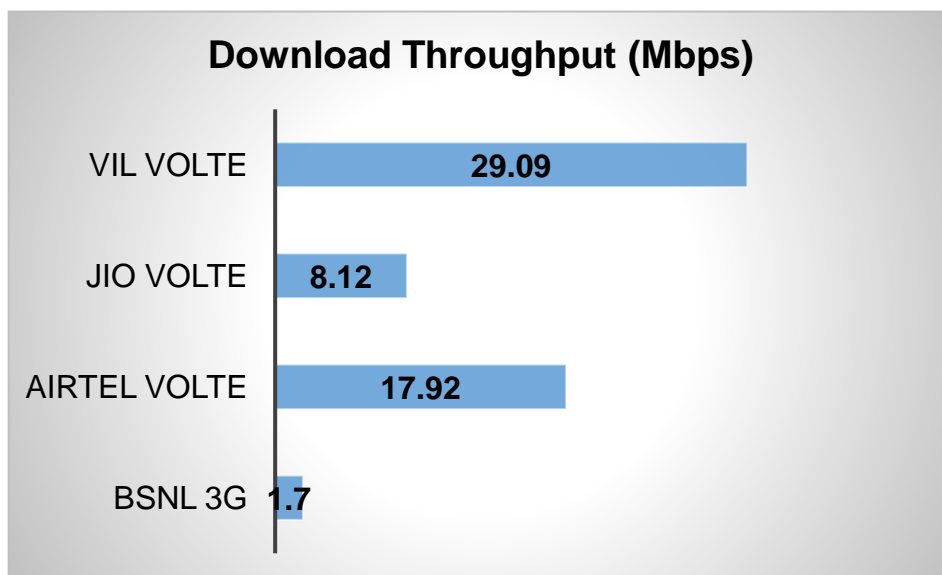
Data Services Dynamic

Key Observations

Dynamic Data was tested for 398 Kms. Download Throughput was tested.

Data Download Performance (kbps) - Dynamic

3G/4G/ Network:



Data Services Dynamic	3G / 4G			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download throughput in Mbps	1.70	17.92	8.12	29.09

Summary

SSA Level Summary-Voice

Voice Calls	2G		
	Airtel	BSNL	VIL
Call attempts	831	731	758
Block call rate %	0.00	0.27	0.27
CSSR %	100	99.72	99.73
Drop call rate %	0.00	0.54	0.00
Mobility HOSR %	97.59	96.95	98.54
RX Quality %	96.24	96.30	96.70

TSP (For 3G)	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Call attempts	718	865	930	770
Block call rate %	1.25	0.00	0.00	0.00
CSSR %	98.74	100	100	100
Drop call rate %	0.56	0.00	0.00	0.26
Mobility HOSR %	99.48	100	100	99.77
RX Quality %	95.20	95.27	88.57	89.49

Summary

SSA Level Summary- (Average of 6 hotspots)- Data Services

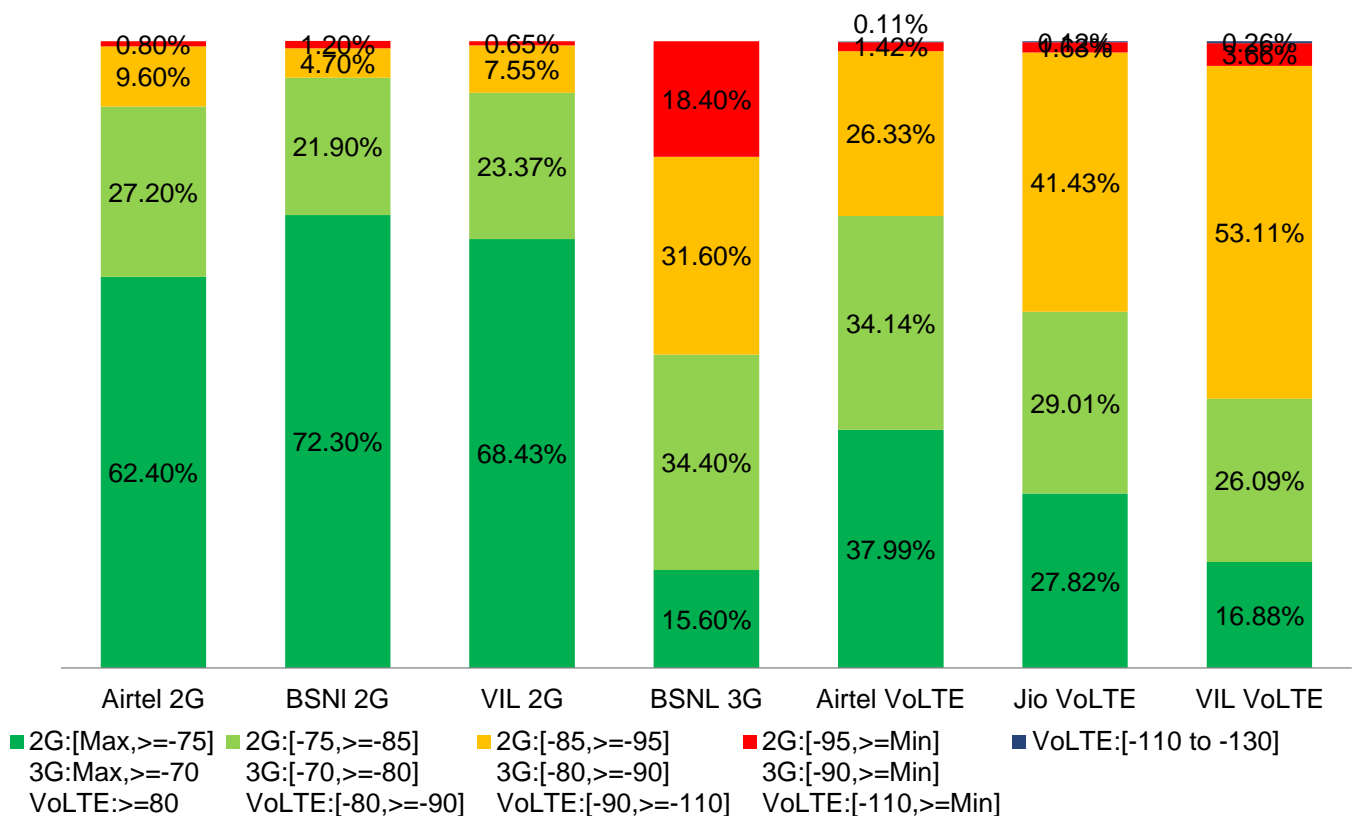
Data Services Static	2G		
	Airtel	BSNL	VIL
Download throughput in Kbps	194.9	165.625	55.6
Upload Throughput in Kbps	30.01	19.373	46.8
Web browsing delay in second	6.23	27.50	11.28
Latency in (msec)	87.19	181.09	138.7

Data Services Static	3G / 4G			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download throughput in Mbps	2.26	47.89	16.07	35.23
Upload Throughput in Mbps	2.22	33.96	8.49	7.01
Web browsing delay in second	2.59	0.95	2.13	2.21
Latency in (msec)	83.47	11.26	28.70	64

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	89.60
BSNL 2G	94.20
VIL 2G	91.80
BSNL 3G	81.60
Airtel VoLTE	98.47
Jio VoLTE	98.26
VIL VoLTE	96.08

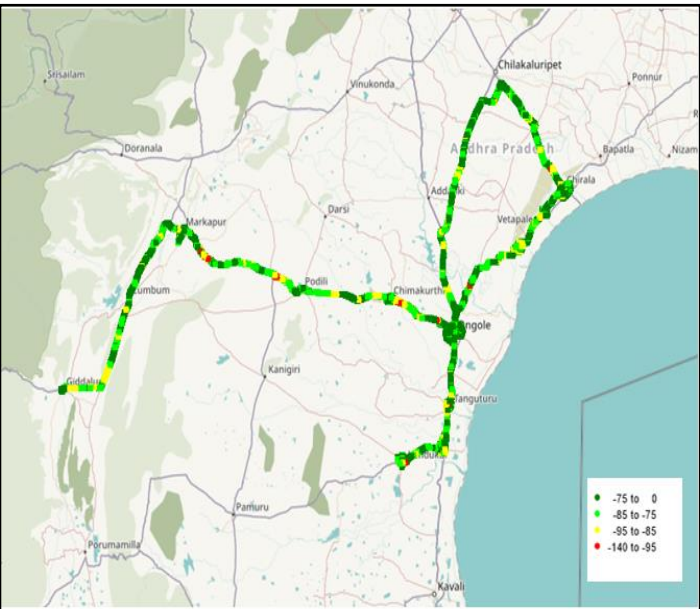


I. Coverage Details

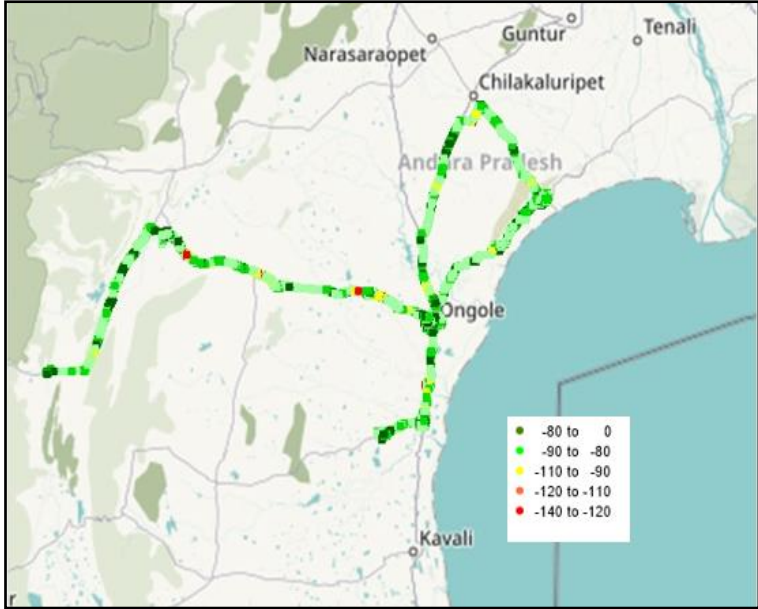
AIRTEL

TSP	Coverage Rate %
Airtel 2G	89.60
Airtel VoLTE	98.47

2G



VoLTE



2G		
Overall RxLevel	# Samples	%
[Max, >=-75]	4566544	62.4
[-75, >=-85]	1990826	27.2
[-85, >=-95]	705188	9.6
[-95, >=Min]	55648	0.8
Total	7318206	

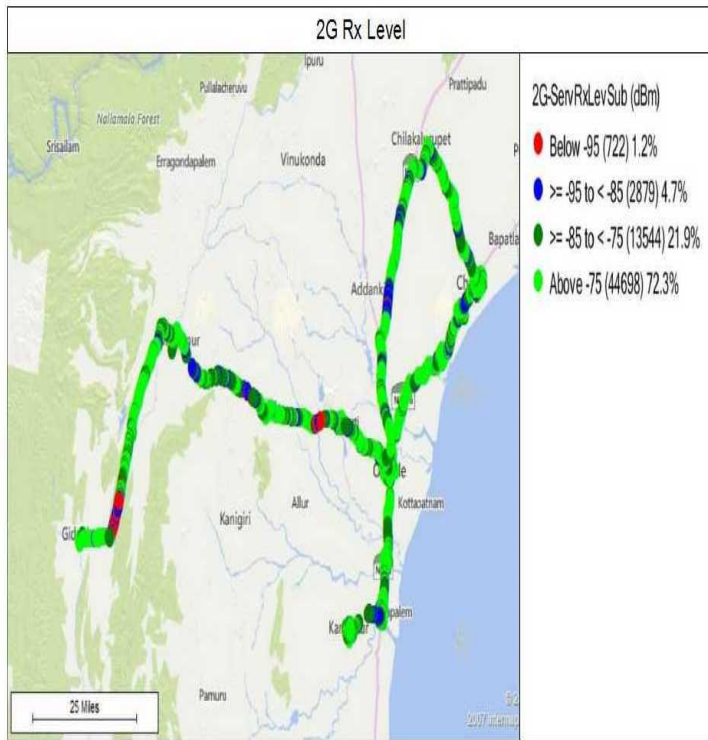
VoLTE		
Overall RSRP	# Samples	%
[Max, >=-80]	9257514	37.99
[-80, >=-90]	8320098	34.14
[-90, >=-110]	6416651	26.33
[-110, >=-120]	346303	1.42
[-120, >=Min]	27078	0.11
Total	24367644	

I. Coverage Details

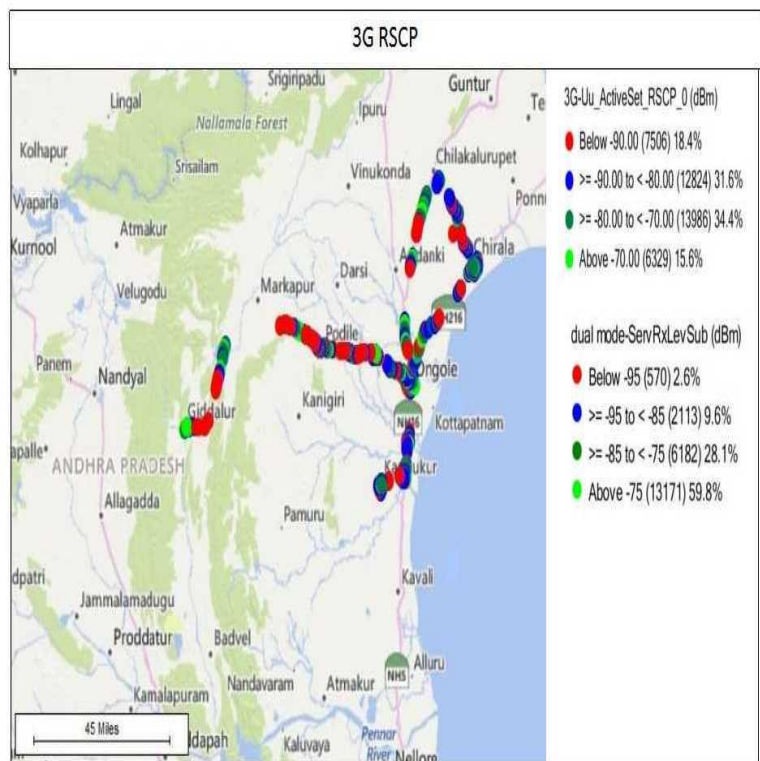
BSNL

Technology	Coverage Rate %
2G	94.2
3G	81.6

2G



3G/VoLTE



2G

Overall RxLevel	# Samples	%
[Max, ≥ -75]	44698	72.3
$[-75, \geq -85)$	13544	21.9
$[-85, \geq -95)$	2879	4.7
$[-95, \geq \text{Min})$	722	1.2
Total	52009	100

3G

Overall RSCP	# Samples	%
[Max, ≥ -70]	6329	15.6
$[-70, \geq -80)$	13986	34.4
$[-80, \geq -90)$	12824	31.6
$[-90, \geq \text{Min})$	7506	18.4
Total	37180	100

I. Coverage Details

JIO

Technology	Coverage Rate %
VoLTE	98.26



VoLTE		
Overall RSRP	# Samples	%
[Max, >=-80]	24096	27.82%
[-80, >=-90]	25126	29.01%
[-90, >=-110]	35889	41.43%
[-110, >=-120]	1415	1.63%
[-120, >=Min]	100	0.12%
Total	86626	100%

I. Coverage Details

VIL

Technology

Coverage Rate %

2G

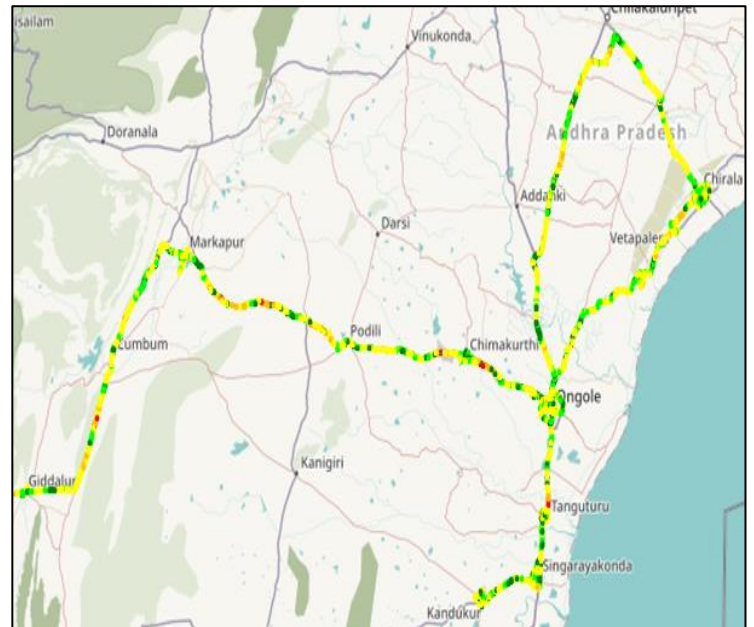
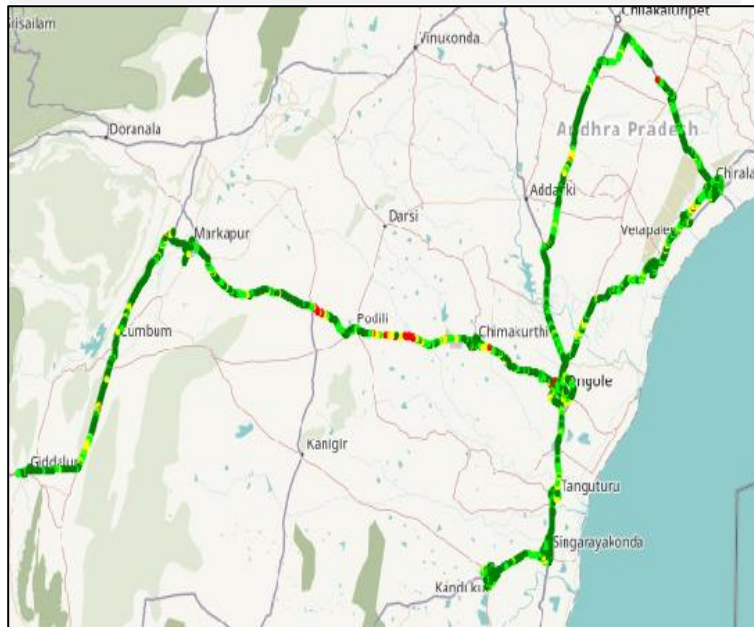
91.80

4G

96.08

2G

4G



2G

VoLTE

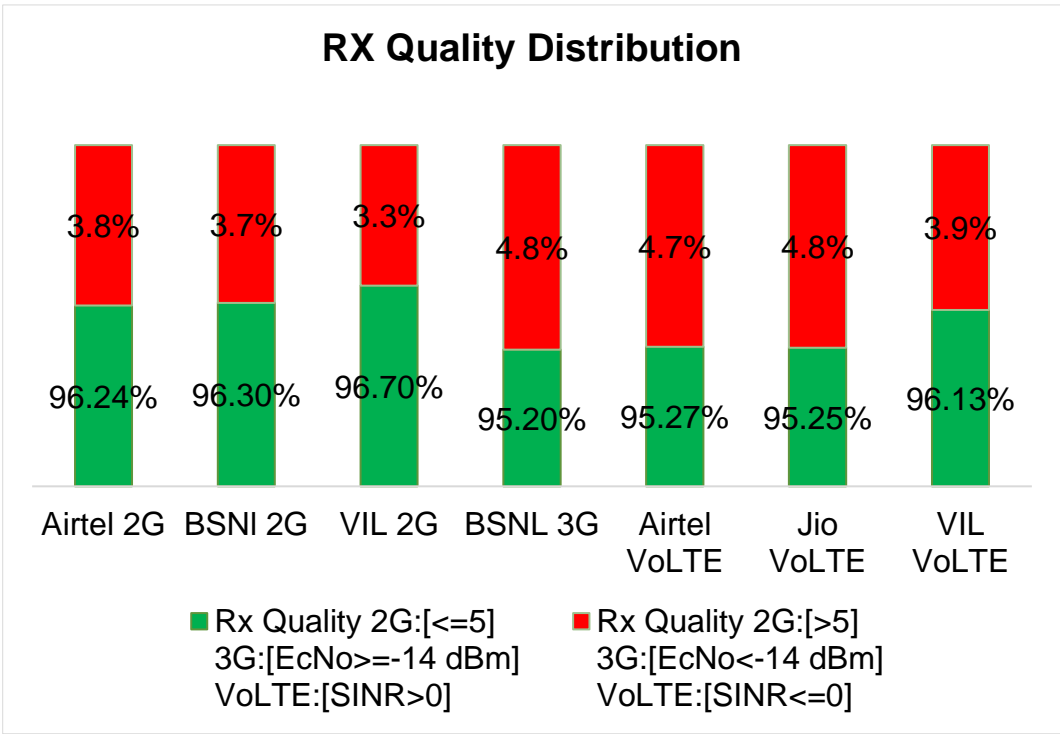
Overall RxLevel	# Samples	%
[Max, >=-75]	5449705	68.43
[-75, >=-85]	1861541	23.37
[-85, >=-95]	601041	7.55
[-95, >=Min]	51930	0.65
Total		

Overall RSRP	# Samples	%
[Max, >=-80]	2566746	16.88
[-80, >=-90]	3968573	26.09
[-90, >=-110]	8078073	53.11
[-110, >=-120]	556112	3.66
[-120, >=Min]	40273	0.26
Total		

II. Quality Details

For measuring voice quality, as per the QoS norms, Rx Qual ≤ 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 $\geq 95\%$.

TSP	Rx Quality %
Airtel 2G	96.24
BSNL 2G	96.30
VIL 2G	96.70
BSNL 3G	95.20
Airtel VoLTE	95.27
Jio VoLTE	88.57
VIL VoLTE	89.49



II. Quality Details

Airtel

Technology

Rx Quality %

2G

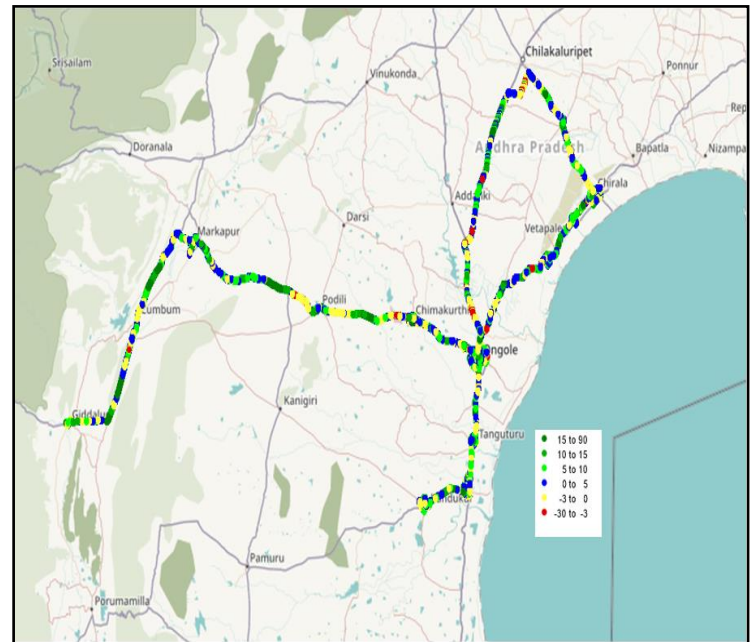
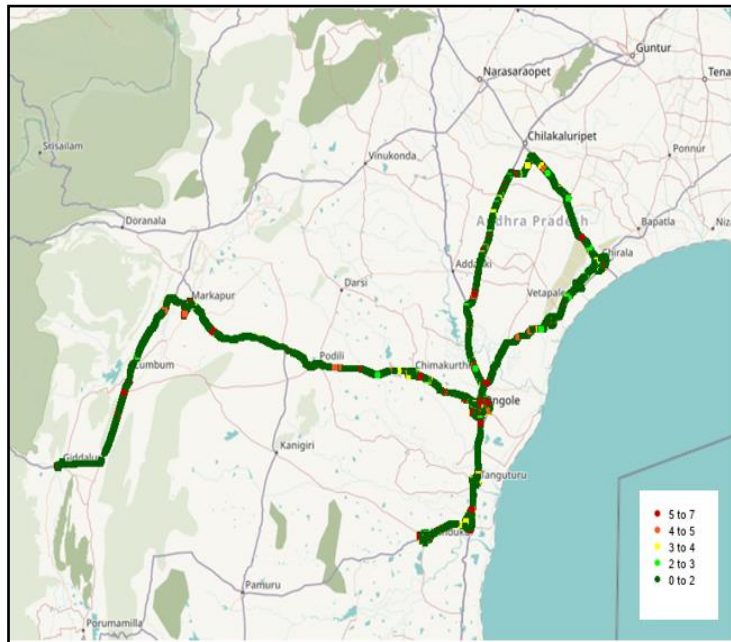
96.24

VoLTE

95.27

2G

VoLTE



Overall Rx Quality	# Samples	%
(Min, <=2)	6061206	88.45
(2, <=3)	209897	3.06
(3, <=4)	191286	2.79
(4, <=5)	132726	1.94
(5, <=Max)	257514	3.76
Total	6852629	100

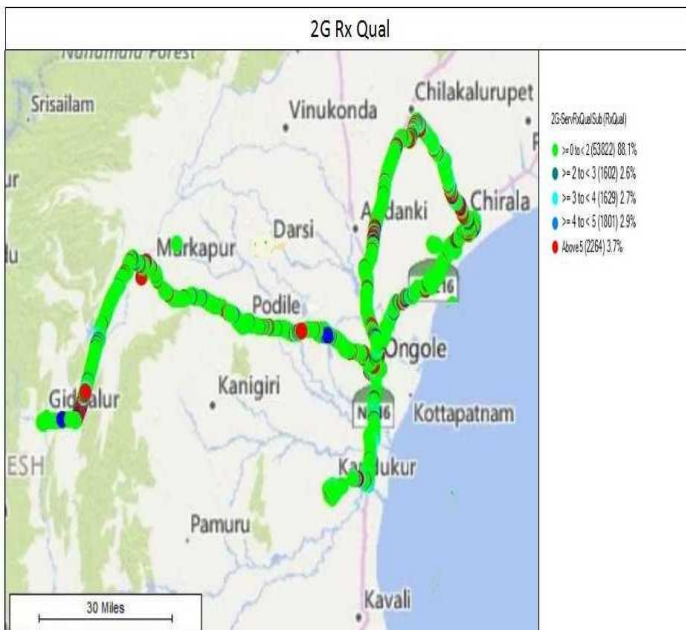
Overall SINR	# Samples	%
(Min, <=-3)	341123	1.40
(-3, <=0)	813216	3.34
(0, <=5)	11477862	47.08
(5, <=10)	5696582	23.37
(10, <=15)	2760633	11.32
(15, <=Max)	3290055	13.50
Total	24379471	100

II. Quality Details

BSNL

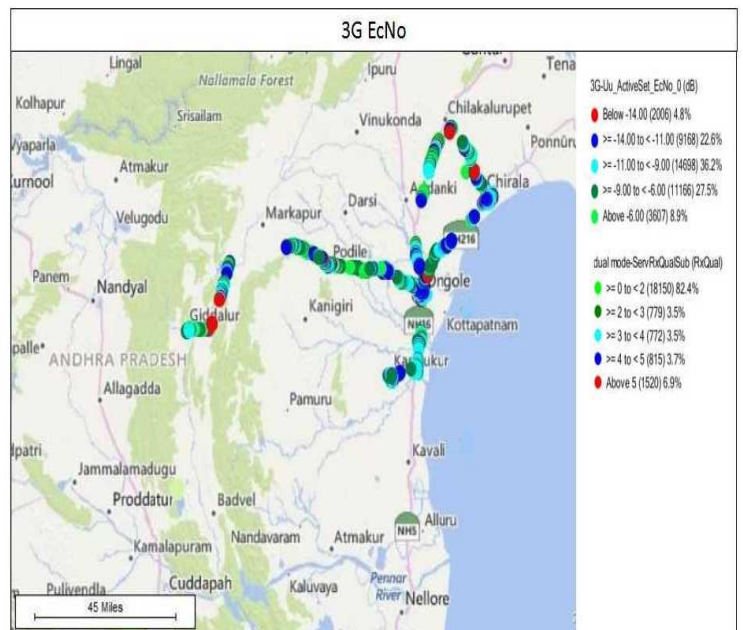
Technology	Rx Quality %
2G	96.3
3G	95.2

2G



Overall Rx Quality	# Samples	%
(Min, <=2)	53822	88.1
(2, <=3)	1602	2.6
(3, <=4)	1629	2.7
(4, <=5)	1801	2.9
(5, <=Max)	2264	3.7
Total	52009	100

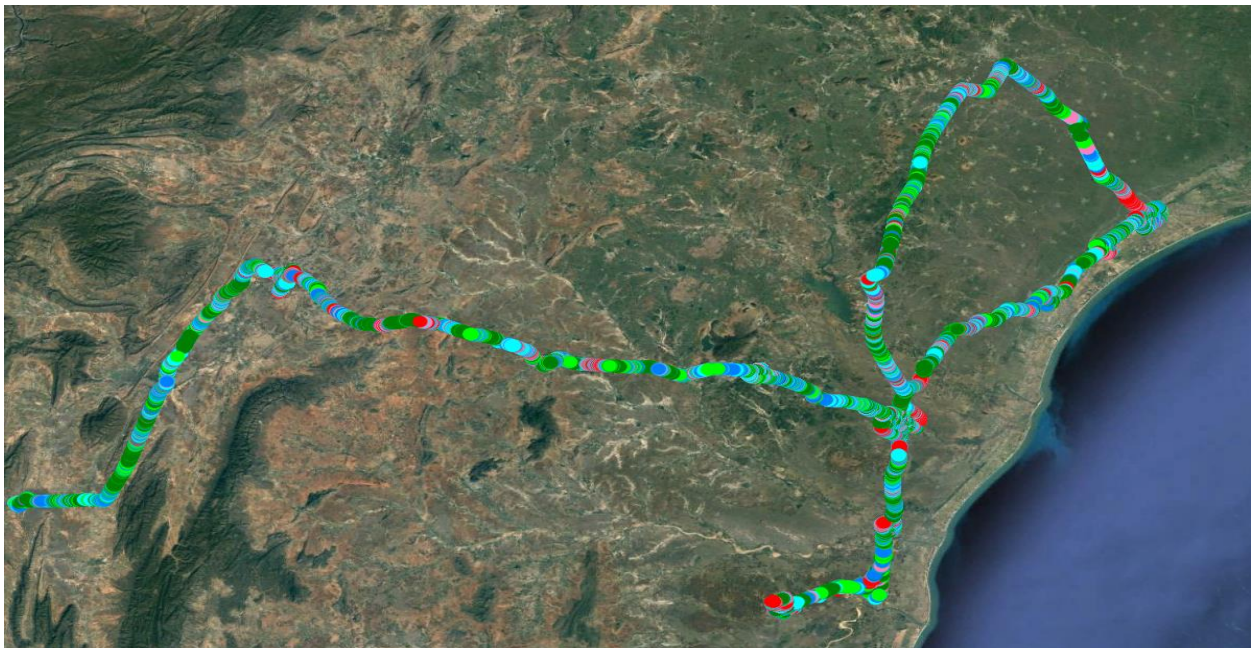
3G



3G		
Overall EcNo	# Samples	%
(Max, <=-6)	3607	8.9
(-6, <=-9)	11166	27.5
(-9, <=-11)	14698	36.2
(-11, <=-14)	9168	22.6
(-14, <= Min)	2006	4.8
Total	40645	100

II. Quality Details

JIO	
Technology	Rx Quality %
VoLTE	88.57



Overall SINR	# Samples	%
(Min, <=-3)	4115	4.75
(-3, <=0)	5780	6.67
(0, <=5)	16020	18.49
(5, <=10)	20349	23.49
(10, <=15)	18789	21.69
(15, <=Max)	21573	24.90
Total	86626	100

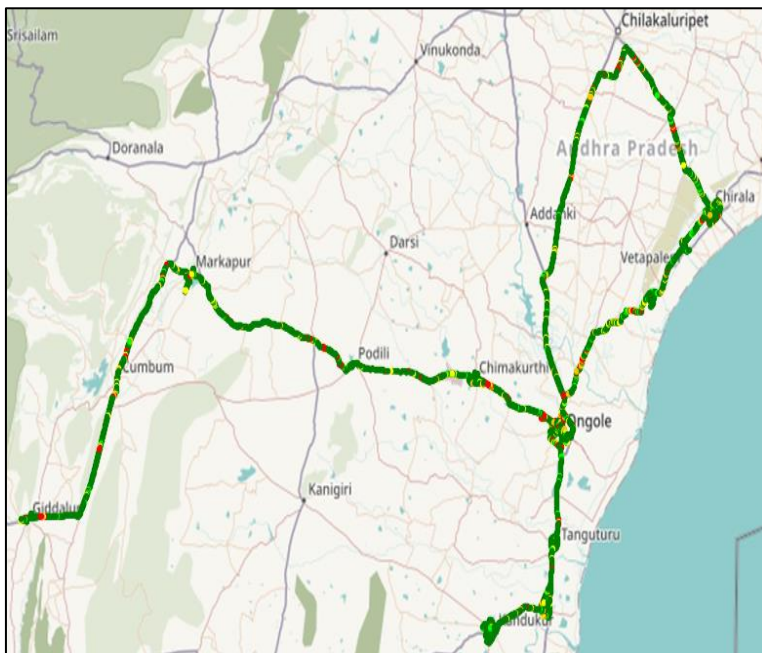
II. Quality Details

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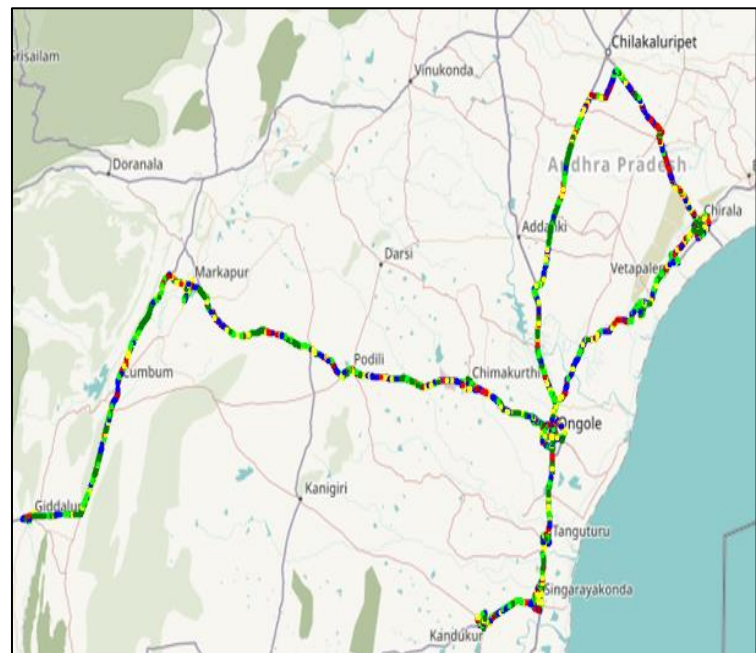
VIL

Technology	Rx Quality %
2G	96.70
4G	89.49

2G



4G

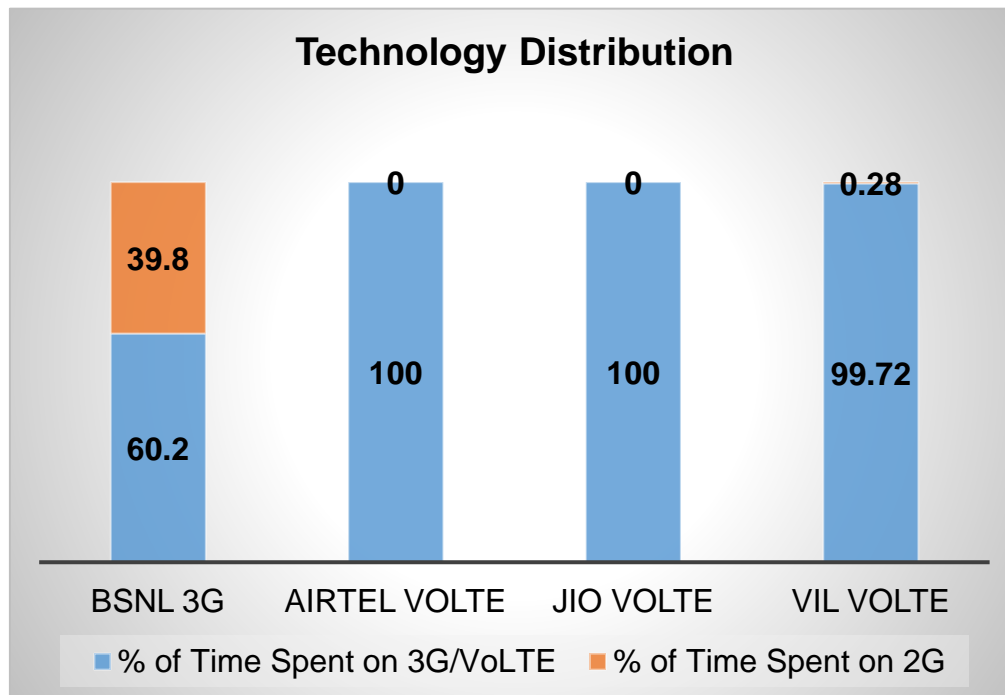


Overall Rx Quality	# Samples	%
(Min, ≤ 2)	6845457	85.95
(2, ≤ 3)	332250	4.17
(3, ≤ 4)	341139	4.28
(4, ≤ 5)	180237	2.26
(5, \leq Max)	265133	3.33
Total		

Overall SINR	# Samples	%
(Min, ≤ -3)	588625	3.87
(-3, ≤ 0)	1010925	6.65
(0, ≤ 5)	3158344	20.77
(5, ≤ 10)	3490146	22.95
(10, ≤ 15)	2973850	19.55
(15, \leq Max)	3987887	26.22
Total		

III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	60.20
Airtel VoLTE	100
Jio VoLTE	100
VIL VoLTE	99.72



III. Technology Details

Airtel

Technology	Time Spent on 4G
4G	100%

BSNL

Technology	Time Spent on 3G/4G
3G	60.20%

JIO

Technology	Time Spent on 4G
4G	100%

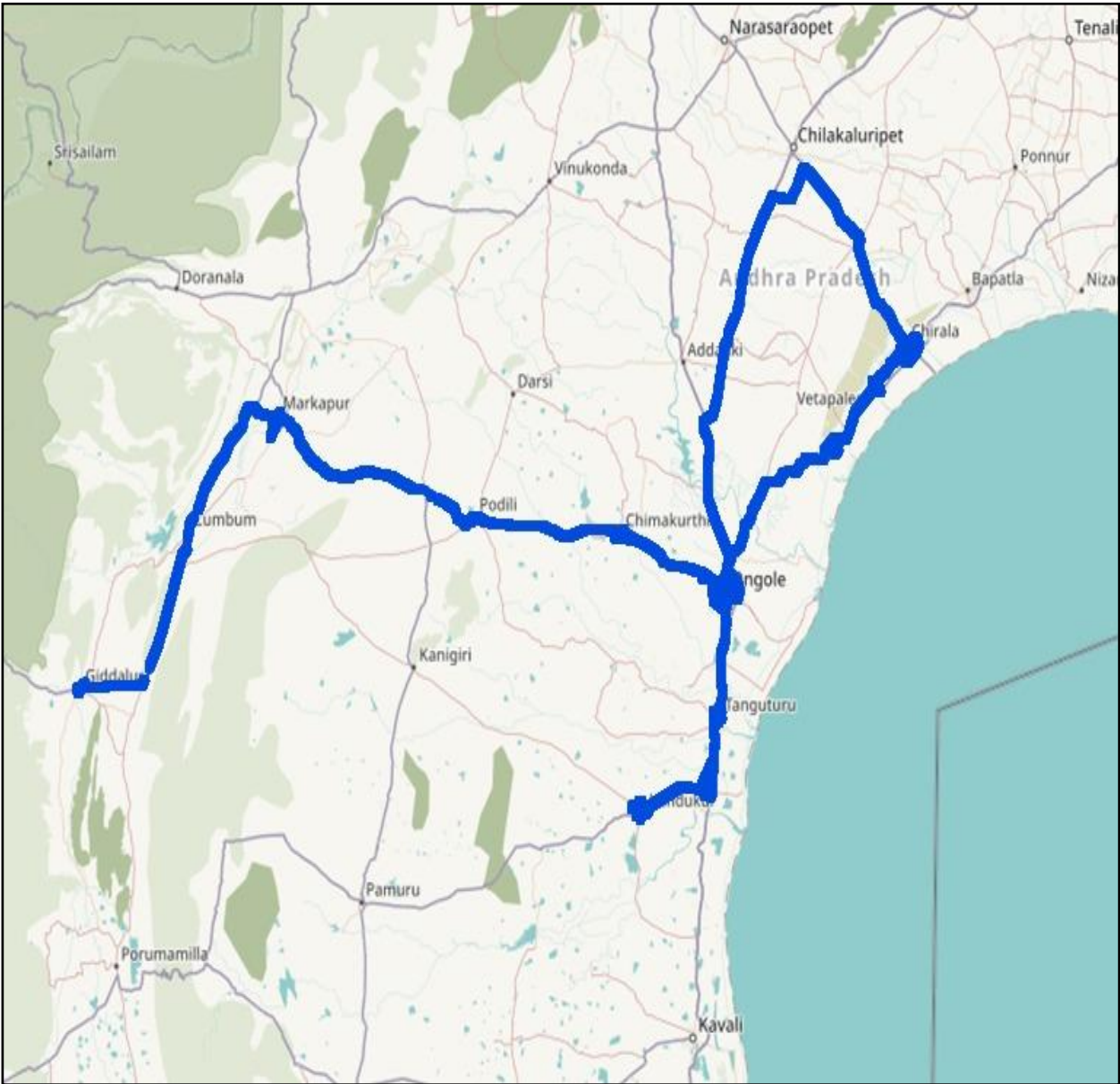
VIL

Technology	Time Spent on 4G
3G/4G	99.72%

III. Technology Details

Airtel

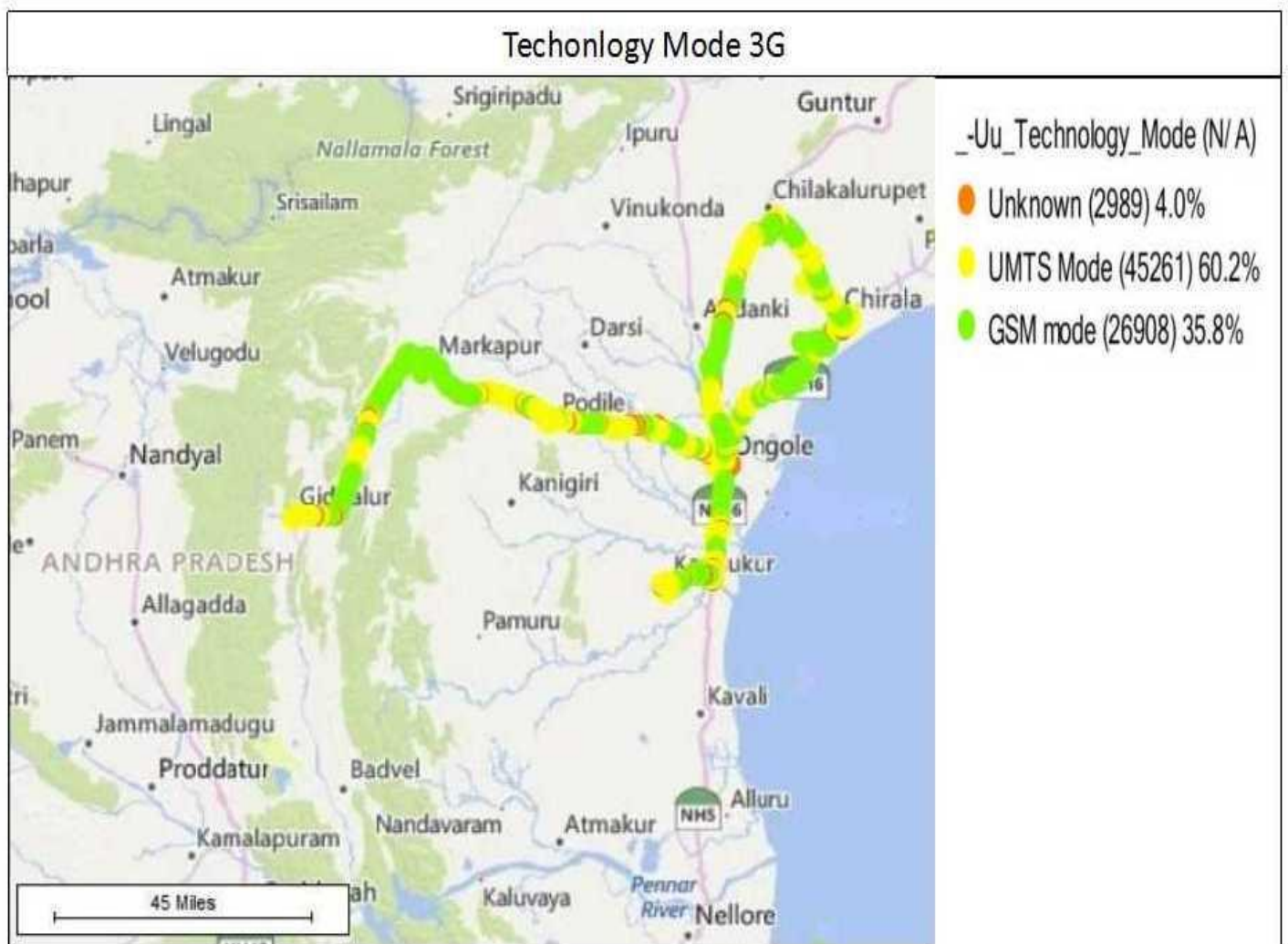
Technology	Time Spent on 4G
4G	100%



III. Technology Details

BSNL

Technology	Time Spent on 3G
3G	60.20%



III. Technology Details

JIO

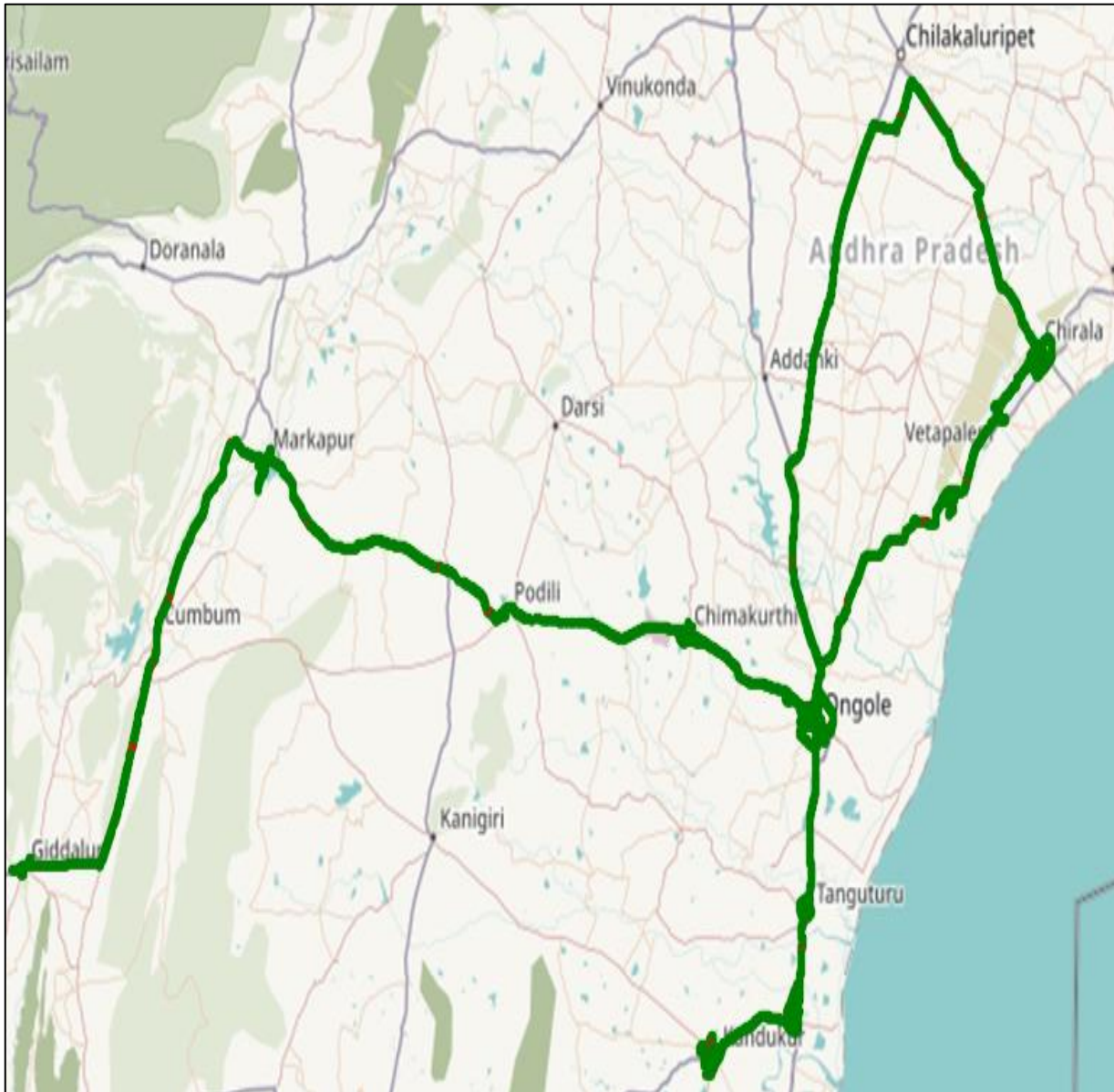
Technology	Time Spent on 4G
4G	100%



III. Technology Details

VIL

Technology	Time Spent on 4G
4G	99.72%

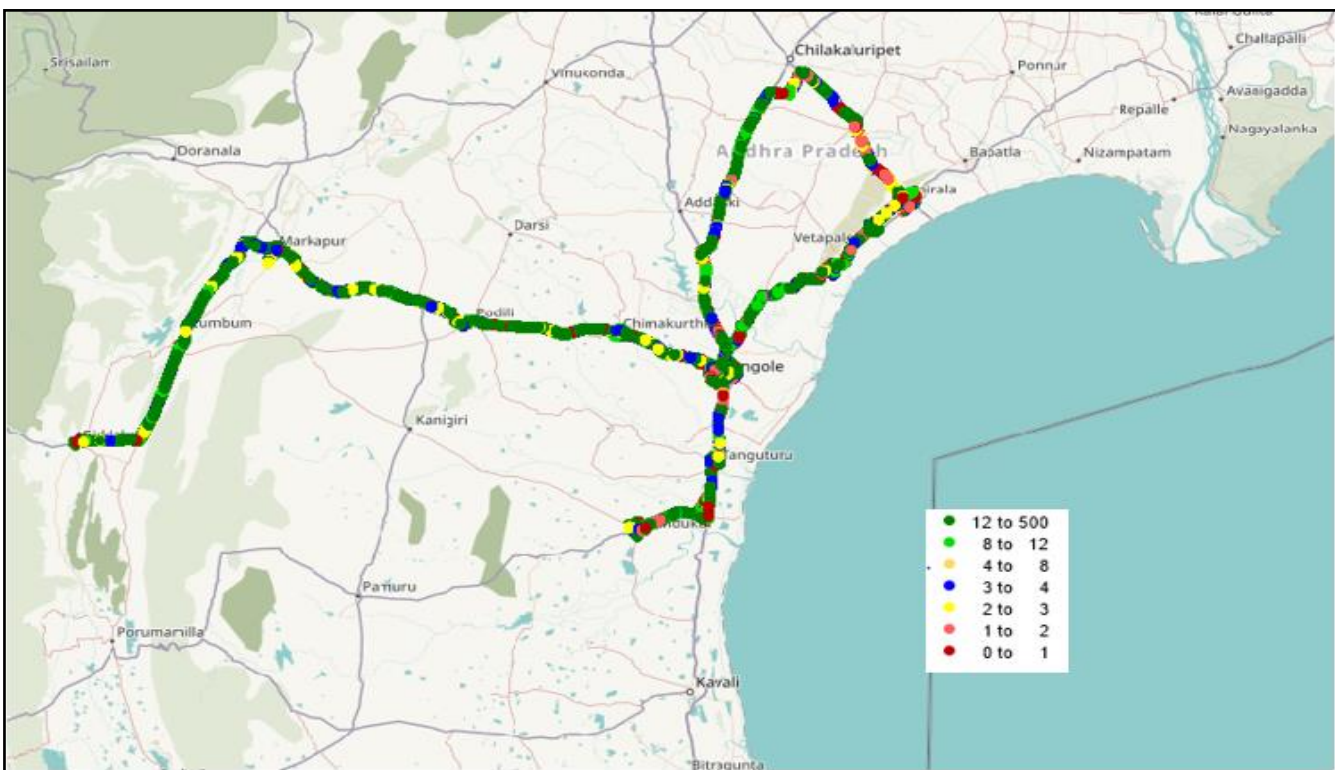


IV. Dynamic Data Test- 4G DL Details

Airtel

Data Statistics - Dynamic

Data KPIs – Overall	4G
Download Throughput (Mbps)	17.92



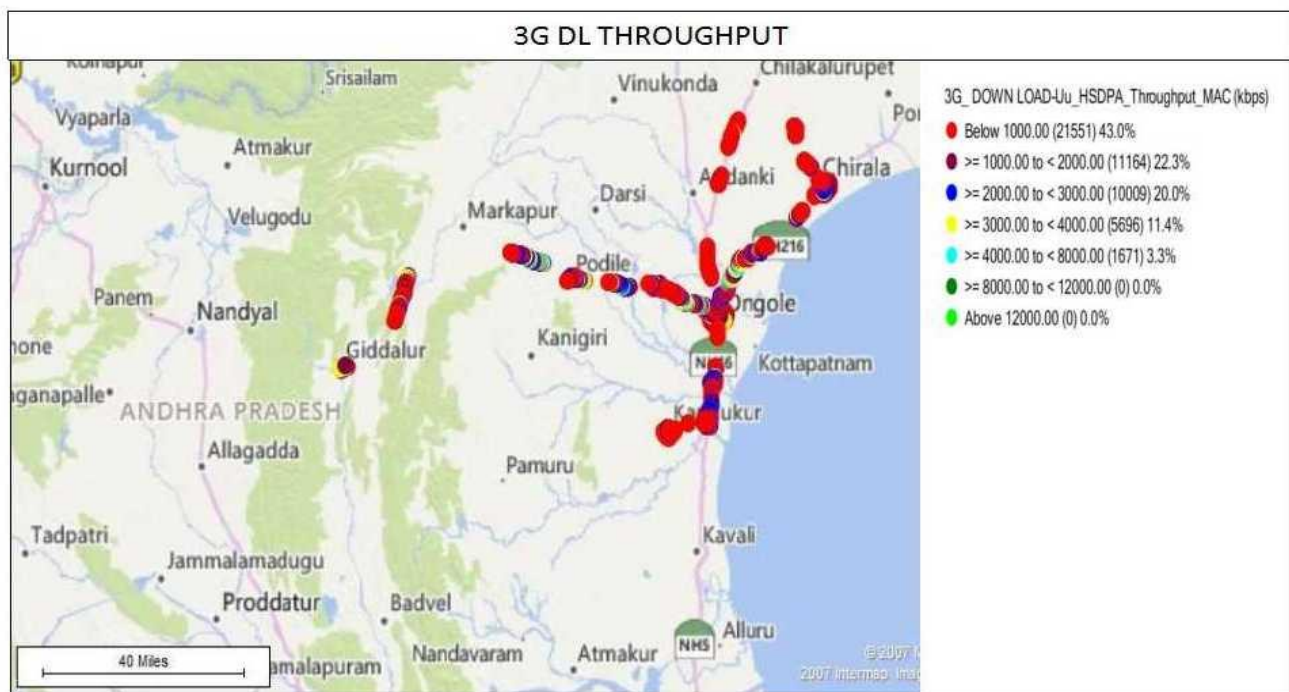
DL throughput	No of Sample	%
0 to 1 Mbps	2003620	10.7
1 to 2 Mbps	1663588	8.9
2 to 3 Mbps	2157425	11.5
3 to 4 Mbps	2622091	14.0
4 to 8 Mbps	6553132	34.9
8 to 12 Mbps	1356468	7.2
>12 Mbps	2420372	12.89
Total	18776696	

IV. Dynamic Data Test- 3G DL Details

BSNL

Data Statistics - Dynamic

Data KPIs - Overall	3G
Download Throughput (Mbps)	1.70



DL throughput	No of Sample	%
0 to 1 Mbps	21551	43.0
1 to 2 Mbps	11164	22.3
2 to 3 Mbps	10009	20.0
3 to 4 Mbps	5696	11.4
4 to 8 Mbps	1671	3.3
8 to 12 Mbps		
>12 Mbps		
Total	21551	

IV. Dynamic Data Test- 4G DL Details

JIO

Data Statistics - Dynamic

Data KPIs - Overall	4G
Download Throughput (Mbps)	8.12



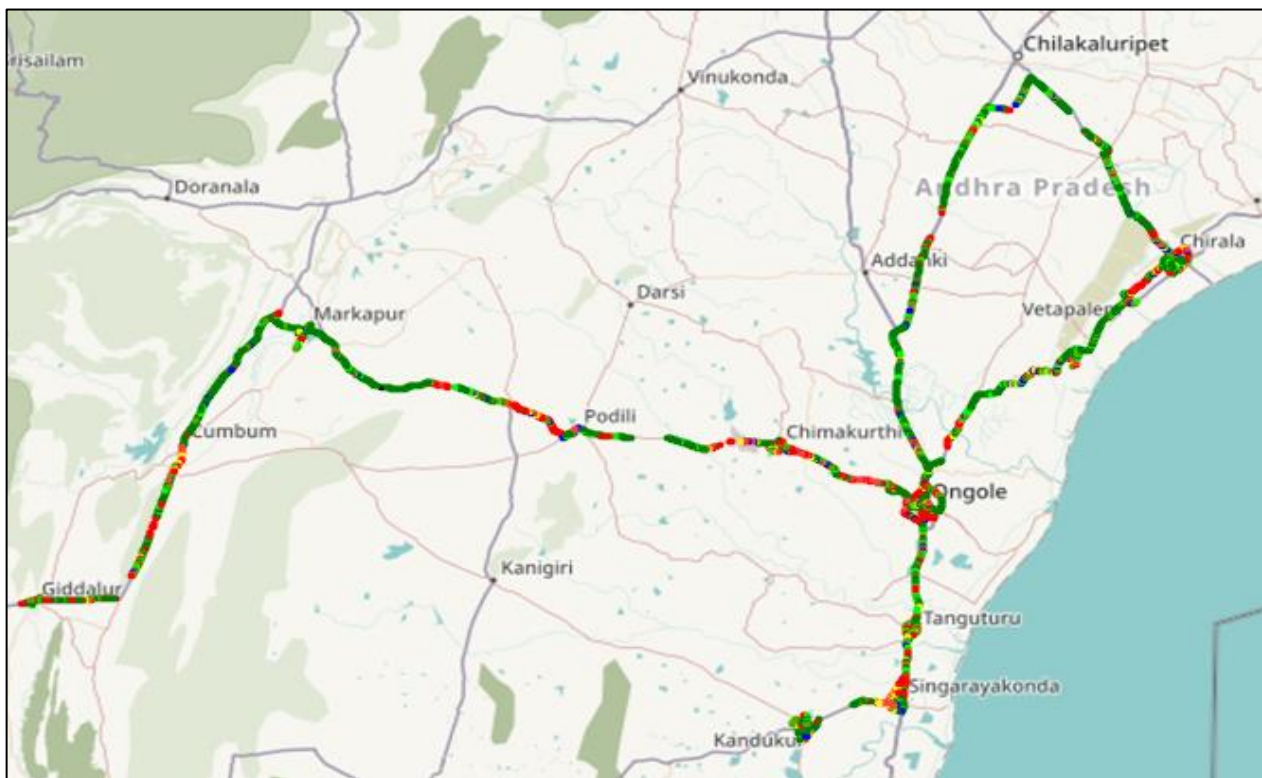
DL throughput	No. of samples	%
0 to 1 Mbps	16448	24.42
1 to 2 Mbps	5603	8.32
2 to 3 Mbps	5780	8.58
3 to 4 Mbps	5764	8.56
4 to 8 Mbps	18126	26.91
8 to 12 Mbps	11051	16.41
>12 Mbps	4584	6.81
Total	16448	

IV. Dynamic Data Test- 4G DL Details

VIL

Data Statistics - Dynamic Complete SSA - 394 Kms

Data KPIs - Overall	4G
Download Throughput (Mbps)	21.09



DL throughput	No of Sample	%
0 to 1 Mbps	1107101	14
1 to 2 Mbps	557442	7
2 to 3 Mbps	471407	6
3 to 4 Mbps	388947	5
4 to 8 Mbps	1253719	16
8 to 12 Mbps	908736	11
>12 Mbps	3336029	42
Total	8023382	

Kandukuru Bustand	2G		
	Airtel	BSNL	VIL
Download throughput in Kbps	170.20	154.19	60.10
Upload Throughput in Kbps	32.70	14.05	47.20
Web browsing delay in second	5.62	34.88	12.80
Latency in (msec)	165	246.27	145.0

Markapur Railway Station	2G		
	Airtel	BSNL	VIL
Download throughput in Kbps	216.40	181.98	50.60
Upload Throughput in Kbps	46.50	18.84	69.80
Web browsing delay in second	7.50	21.40	11.28
Latency in (msec)	150	190.765	180.0

Chirala Sangam Theatre centre	2G		
	Airtel	BSNL	VIL
Download throughput in Kbps	215.40	166.99	55.30
Upload Throughput in Kbps	23.40	18.04	43.80
Web browsing delay in second	5.28	26.11	14.30
Latency in (msec)	179.15	185.40	131.0

Ongole Bustand	2G		
	Airtel	BSNL	VIL
Download throughput in Kbps	189.50	173.72	61.40
Upload Throughput in Kbps	30.20	20.10	40.20
Web browsing delay in second	5.69	25.84	13.50
Latency in (msec)	181.95	150.36	123.0

Ongole Railway Station	2G		
	Airtel	BSNL	VIL
Download throughput in Kbps	116.10	148.37	89.60
Upload Throughput in Kbps	22.70	22.68	36.00
Web browsing delay in second	7.31	28.287	10.50
Latency in (msec)	184.30	152.34	111

Ongole Collectorate	2G		
	Airtel	BSNL	VIL
Download throughput in Kbps	262.0	168.48	61.0
Upload Throughput in Kbps	24.5	22.53	49.0
Web browsing delay in second	5.99	28.50	8.9
Latency in (msec)	185.90	161.41	142

Kandukuru Bus stand	3G	4G		
	BSNL	Airtel	JIO	VIL
Download throughput in Mbps	1.97	69.80	20.91	51.3
Upload Throughput in Mbps	2.30	15.29	7.42	4.01
Web browsing delay in second	2.50	0.90	2.25	2.05
Latency in (msec)	102.11	21.60	31.50	60

Markapur Railway Station	3G	4G		
	BSNL	Airtel	JIO	VIL
Download throughput in Mbps	2.92	37.46	11.13	57.55
Upload Throughput in Mbps	2.36	19	6.43	5.16
Web browsing delay in second	2.22	0.75	3.01	2.58
Latency in (msec)	96.96	22.15	30.50	69

Chirala Sangam Theatre centre	3G	4G		
	BSNL	Airtel	JIO	VIL
Download throughput in Mbps	1.76	53.29	8.82	17.78
Upload Throughput in Mbps	1.94	42.46	7.15	11.00
Web browsing delay in second	2.77	1.54	1.45	3.09
Latency in (msec)	77.80	23.24	25.50	68

Ongole Bustand	3G	4G		
	BSNL	Airtel	JIO	VIL
Download throughput in Mbps	2.75	29.2	18.19	30.93
Upload Throughput in Mbps	2.20	32.60	9.92	7.12
Web browsing delay in second	2.30	0.73	1.66	2.18
Latency in (msec)	69.39	18.80	27.50	75

Ongole Railway Station	3G	4G		
	BSNL	Airtel	JIO	VIL
Download throughput in Mbps	1.94	50.87	13.50	30.05
Upload Throughput in Mbps	2.53	44.14	10.32	9.26
Web browsing delay in second	2.73	0.93	2.72	2.33
Latency in (msec)	78.93	21.37	28	55

Ongole Collectorate	3G	4G		
	BSNL	Airtel	JIO	VIL
Download throughput in Mbps	2.21	46.73	23.91	28.73
Upload Throughput in Mbps	1.99	50.32	9.73	2.91
Web browsing delay in second	3.07	0.87	1.68	1.02
Latency in (msec)	75.64	28.03	29	68

V. TRAI MySpeed App

Airtel

Technology -3G / 4G	1. Kandukuru Bus stand	2. Markapur Railway station	3. Chirala Sangam Theatre center	4. Main bustand Ongole	5. . Railway station Ongole	6. Collectorate Ongole
Download in Mbps	38.17	67.34	59.59	41.27	50.45	58.93
Upload in Mbps	15.33	19.86	7.34	6.66	6.84	16.81

BSNL

Technology -3G / 4G	1. Kandukuru Bus stand	2. Markapur Railway station	3. Chirala Sangam Theatre center	4. Main bustand Ongole	5. . Railway station Ongole	6. Collectorate Ongole
Download in Mbps	3.32	4.30	3.72	3.81	3.29	2.48
Upload in Mbps	1.65	1.68	2.12	3.25	2.81	2.67

JIO

Technology -3G / 4G	1. Kandukuru Bus stand	2. Markapur Railway station	3. Chirala Sangam Theatre center	4. Main bustand Ongole	5. . Railway station Ongole	6. Collectorate Ongole
Download in Mbps	46.59	38.33	66.92	82.43	71.40	83.69
Upload in Mbps	12.23	20.52	18.20	16.85	24.48	22.95

VIL

Technology -3G / 4G	1. Kandukuru Bus stand	2. Markapur Railway station	3. Chirala Sangam Theatre center	4. Main bustand Ongole	5. . Railway station Ongole	6. Collectorate Ongole
Download in Mbps	38.87	46.87	138.71	32.09	50.78	25.57
Upload in Mbps	4.61	18.32	51.83	8.96	15.50	2.74

VI. NH/SH Routes covered

NH/SH Routes covered in OADT by Airtel / BSNL / RJIL / VIL				
S.No	No of NH/SH routes	NH routes	SH routes	Distance(Km)
1	Ongole to Singarayakonda	NH 16		34 kms
2	Singarayakonda to Kandukuru		SH 167B	14 Kms
3	Ongole to Podili		SH 39	51 Kms
4	Podili to Markapuram	NH 565	SH 39	44 Kms
5	Markapuram to Giddaluru	NH 544D/544F		65 Kms
6	Ongole to Chirala	NH 216		57 Kms
7	Chirala to Marturu	NH 167 A		44
8	Marturu to Ongole	NH 16		64 Kms