



Operator Assisted Drive Test Report

CUTTACK SSA May 2022

(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%.

The Operator Assisted Drive Test has been carried out by Regional Office, Hyderabad with the help of Service Providers in Cuttack SSA and surrounding areas Chandikhola, Kendrapara & Paradeep from 9:00 AM to 8:00 PM during 24th to 27th May 2022. The drive test covered drive route of 385 KMs & 6 hotspot over a period of 4 days. Approximately 410 calls were made for each of the 8 networks: three 2G networks, two 3G networks and three LTE network covering four TSPs.

Overview

Voice
Summary

Data
Summary

Overview

Regional Office, TRAI Hyderabad conducted Operator Assisted Drive Test from 24th to 27th May, 2022 covering various locations in Cuttack SSA & surrounding areas Chandikhol, Kendrapara & Paradeep. The performance of Airtel, BSNL, Vodafone Idea and Jio 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 385 KMs over a period of 4 days from 24th to 27th May 2022. Approximately 410 calls were made for each of the 8 networks: three 2G (Lock Mode) networks, two 3G (Dual mode) networks and three VoLTE network covering 4 unique TSPs.

Data Tests:

1. Dynamic data test was not conducted by all TSPs due to non availability of equipment, they all agreed to arrange in next OADT.

2. Data Tests were performed at 6 static locations for 2G, 3G & 4G technologies.

* 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.

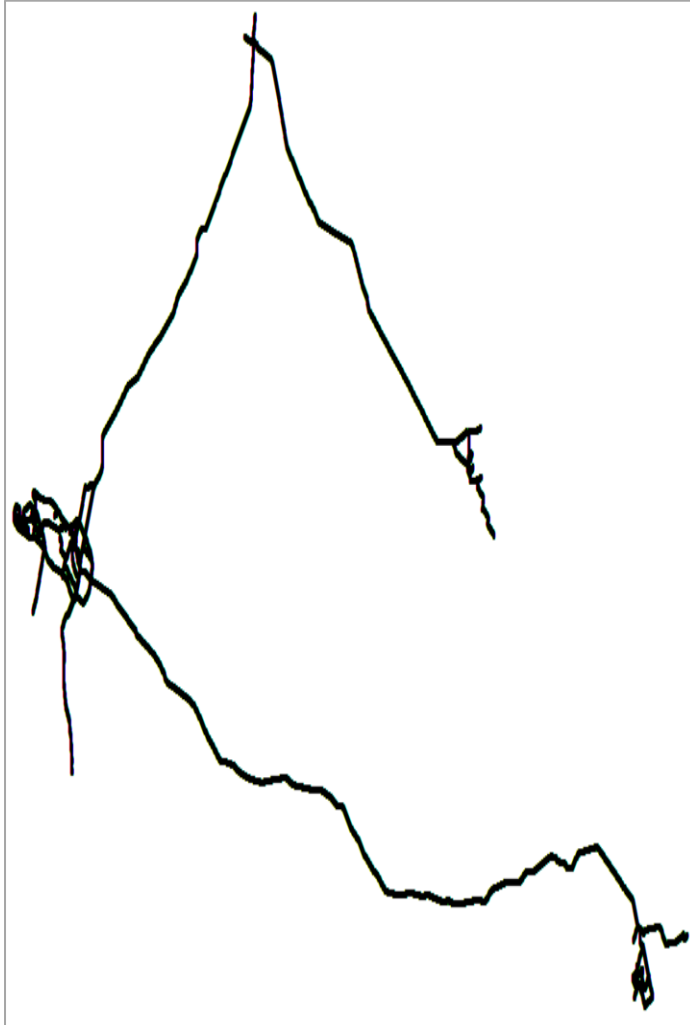
* 3G KPI's which are calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.

* 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.com
Latency	32 Bytes on www.google.com

Overview

Voice & Dynamic Data Test Drive Route



Areas Covered –Cuttack SSA

Netaji Birth Place Museum

Odisha Maritime Museum

Cuttack Chandi Temple

Barabati Stadium

Maa Cuttack Chandi
Mandir.

Deer Park.

Kendrapara

Chandikh

Cuttack High court

Cuttack Railway Station

Ravenshaw University

Paradeep

Hotspots for static data test

1 Chandikhol Traffic Post

2 Baldevjew Temple(Kendrapara)

3 Nehru Bangla(Paradeep)

4 Cuttack High court

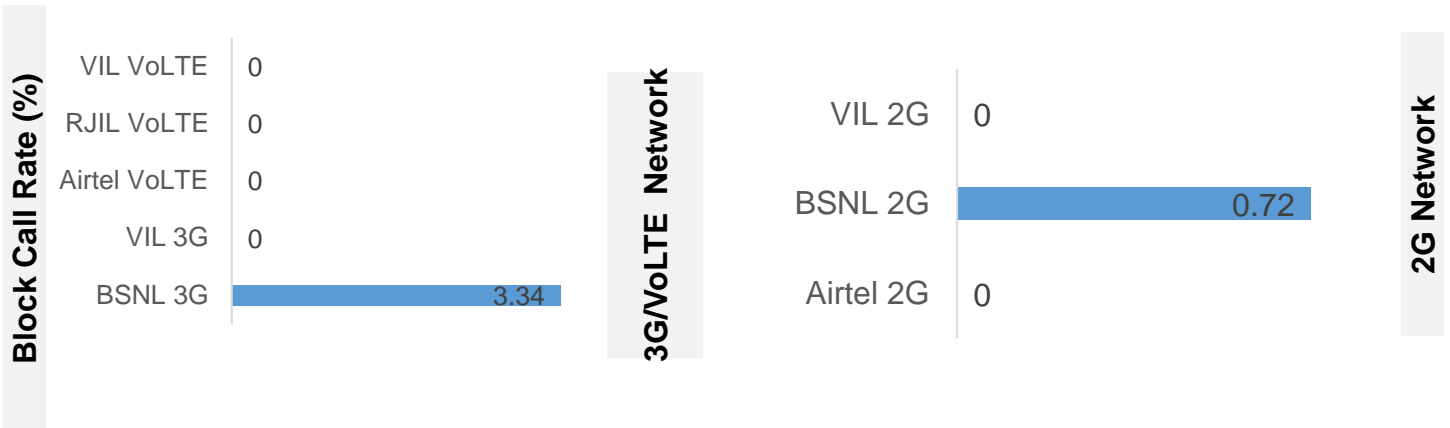
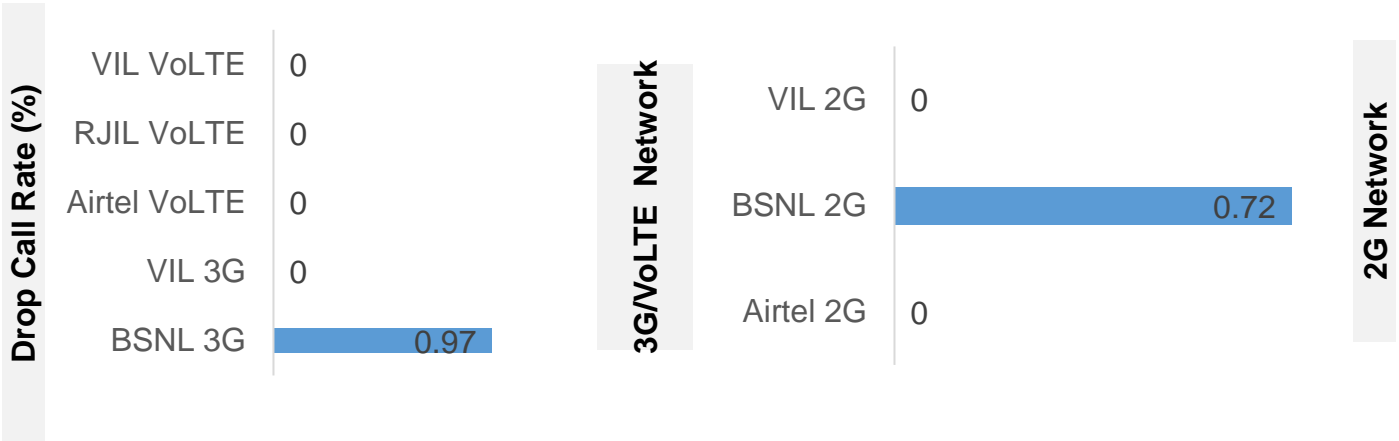
5 Cuttack Railway Station

6 Ravenshaw University

Voice Calls

Key Observations

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



KPIs	2G			3G		VoLTE		
	Airtel	BSNL	VIL	BSNL	VIL	Airtel	RJIL	VIL
Drop Call Rate %	0	0.72	0	0.97	0	0	0	0
Block Call Rate %	0	0.72	0	3.34	0	0	0	0

a) All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%).

a) Block Call Rate (BCR%) benchmark of 3% was achieved by all TSPs except BSNL in 3G technology.

Voice Calls

Key Observations

Coverage

a) Percentage of coverage samples for 2G \geq -85 dBm.

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	84.82	92.73	93.64

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

TSPs	3G		VoLTE		
	BSNL	VIL	Airtel	JIO	VIL
Coverage %	49.94	83.92	99.69	99.20	97.56

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

TSPs	3G		VoLTE		
	BSNL	VIL	Airtel	JIO	VIL
Time Spent on 3G/4G %	100	93.63	100	100	100

Data Services Static

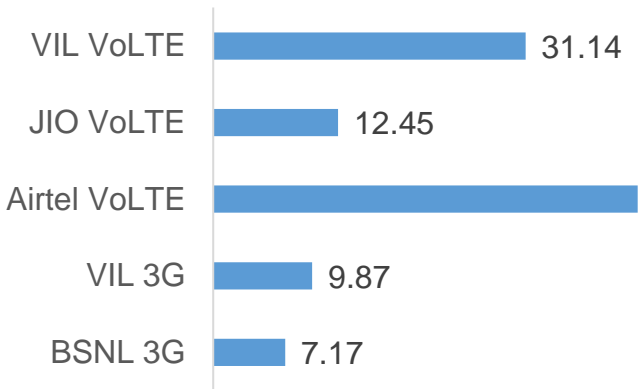
**Key Observations
(Average of 5 Hotspots)**

Data was tested at 5 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, PayTm)

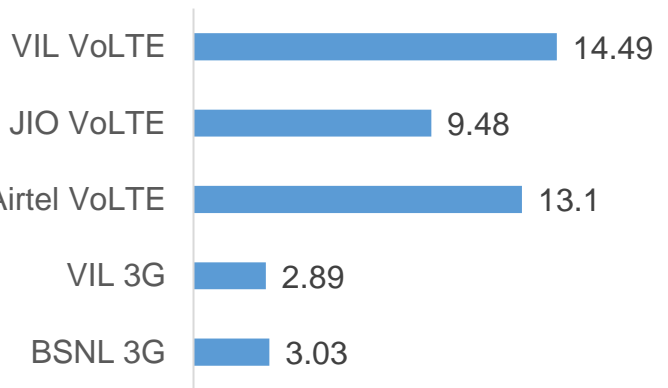
Data Download and Upload Performance (kbps)

3G/4G Network:

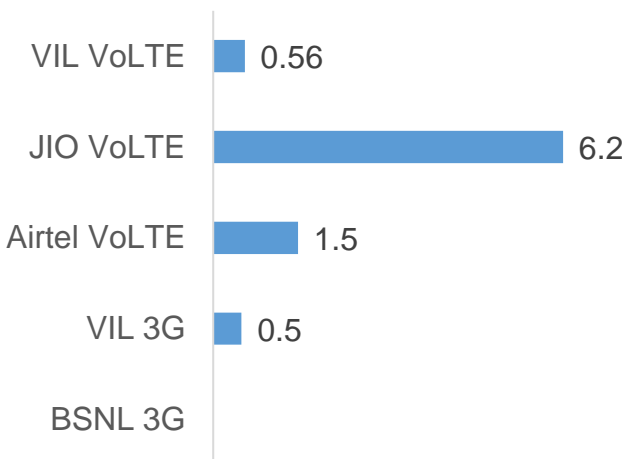
Download Throughput (Mbps)



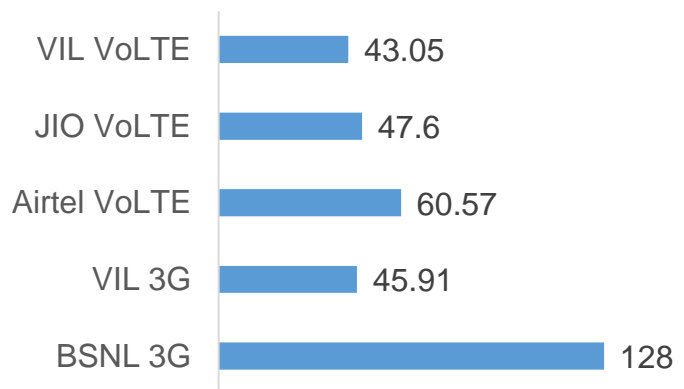
Upload Throughput (Mbps)



Web Browsing Delay (sec)



Latency (msec)



Summary

SSA Level Summary-Voice

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	421	414	490
Blocked Call Rate (%)	0	0.72	0
CSSR% (Accessibility)	100	99.27	100
Drop Call Rate (%)	0	0.72	0
Mobility HOSR (%)	100	98.23	98.55
Rx Quality (%)	95.7	98.74	96.32

Voice Call	3G/VoLTE				
	BSNL 3G	VIL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	418	427	437	389	438
Blocked Call Rate (%)	3.34	0	0	0	0
CSSR% (Accessibility)	96.66	100	100	100	100
Drop Call Rate (%)	0.97	0	0	0	0
Mobility HOSR (%)	100	100	100	98.42	100
Rx Quality (%)	66.69	95.76	77.24	94.84	93.01

Summary

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

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	270.3	166.67	186.05
Upload Throughput (kbps)	161.45	81.67	94.22
Web Browsing Delay (sec)	7.07		0.41
Latency (msec)	162.80	327.67	140

Data Services Static	3G/VoLTE				
	BSNL 3G	VIL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Download Throughput (Mbps)	7.17	9.87	42.3	12.45	31.14
Upload Throughput (Mbps)	3.03	2.89	13.1	9.48	14.49
Video streaming delay (sec)		1.55	0	2.7	2.20
Web Browsing Delay (sec)		0.50	1.50	6.2	0.56
Latency (msec)	128	45.91	60.57	47.6	43.05

Chandikhhol Traffic Post	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	272.33	200	214.08
Upload Throughput (kbps)	158.18	40	102.6
Web Browsing Delay (sec)	5.04		0.83
Latency (msec)	164.2	482	106.5

Baldevjew Temple, Kendrapara	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	273.78	150	171.85
Upload Throughput (kbps)	162.4	150	59.15
Web Browsing Delay (sec)	8.10		0.36
Latency (msec)	158.7	175	230.5

Nehru Bangla,Paradeep	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	283.45	180	208.67
Upload Throughput (kbps)	181.7	110	109.11
Web Browsing Delay (sec)	6.21		0.26
Latency (msec)	171.9	193	146

Cuttack Highcourt	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	249.16	160	218.09
Upload Throughput (kbps)	161.62	120	83.03
Web Browsing Delay (sec)	8.7		0.59
Latency (msec)	186.2	145	102

Cuttack Railway Station	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	272.5	150	160.95
Upload Throughput (kbps)	160.2	110	110.43
Web Browsing Delay (sec)	10.3		0.35
Latency (msec)	170.1	139	111

Ravenshaw University	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	268.24	160	142.71
Upload Throughput (kbps)	173.10	110	101.03
Web Browsing Delay (sec)	10.2		0.12
Latency (msec)	166	832	147

Chandikhol Traffic Post	3G		VoLTE		
	BSNL	VIL 3G	Airtel	JIO	VIL
Download throughput in Mbps	0.67	6.58	48.20	13.36	26.06
Upload Throughput in Mbps	2.15	3.01	13.56	10.4	19.90
Video streaming delay in second		4.3	0	2.9	0.98
Web browsing delay in second		0.47	1.43	8.13	0.72
Latency in (msec)	295	66	56.24	46.7	36.3

Baldevjew Temple, Kendrapara	3G		VoLTE		
	BSNL	VIL 3G	Airtel	JIO	VIL
Download throughput in Mbps	6.03	13.41	35.25	12.29	57.28
Upload Throughput in Mbps	2.30	4.04	10.12	10.4	7.16
Video streaming delay in second		0.66	0	2.6	0.89
Web browsing delay in second		0.92	1.69	5.5	0.93
Latency in (msec)	88	54	60.20	38	25

Nehru Bangla,Paradeep	3G		VoLTE		
	BSNL	VIL 3G	Airtel	JIO	VIL
Download throughput in Mbps	12.79	1.97	48.36	16.2	50.32
Upload Throughput in Mbps	2.50	1.44	28.22	13.9	11.28
Video streaming delay in second		1.99	0	3.4	0.40
Web browsing delay in second		0.34	1.72	6.9	0.52
Latency in (msec)	75	36	62.34	46	57

Cuttack Highcourt	3G		VoLTE		
	BSNL	VIL 3G	Airtel	JIO	VIL
Download throughput in Mbps	13.18	17.76	28.32	12.7	19.49
Upload Throughput in Mbps	4.30	3.56	14.10	5.9	22.62
Video streaming delay in second		0.74	0	2.7	0.32
Web browsing delay in second		0.91	1.66	5.7	0.37
Latency in (msec)	97	50.5	59.33	72	46

Cuttack Railway Station	3G		VoLTE		
	BSNL	VIL 3G	Airtel	JIO	VIL
Download throughput in Mbps	5.14	10.74	43.74	9.1	17.73
Upload Throughput in Mbps	3.64	3.13	12.6	11.9	13.55
Video streaming delay in second		0.97	0	2.3	0.35
Web browsing delay in second		0.13	1.34	5.7	0.47
Latency in (msec)	79	33	60.2	9.1	45

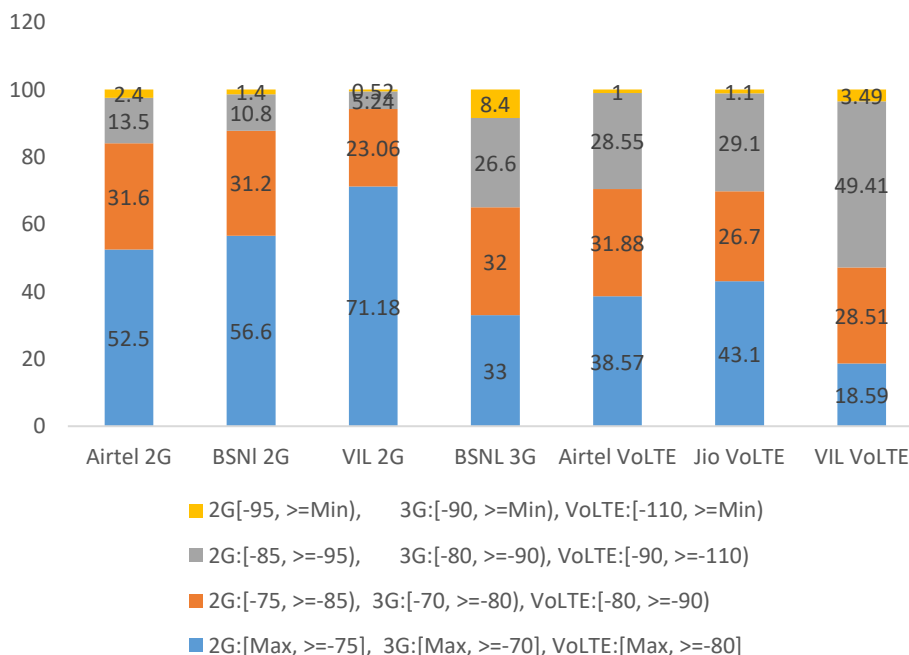
Ravenshaw University	3G		VoLTE		
	BSNL	VIL 3G	Airtel	JIO	VIL
Download throughput in Mbps	5.25	8.79	65.3	11.1	15.99
Upload Throughput in Mbps	3.30	2.18	13.5	4.4	12.47
Video streaming delay in second		0.64	0	2.3	0.28
Web browsing delay in second		0.28	1.34	5.8	0.40
Latency in (msec)	134	36	59.2	44	49

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

TSP	Coverage Rate %
Airtel 2G	84.82
BSNI 2G	92.73
VIL 2G	93.64
BSNL 3G	49.94
VIL 3G	83.92
Airtel VoLTE	99.69
Jio VoLTE	99.20
VIL VoLTE	97.56

Coverage Distribution

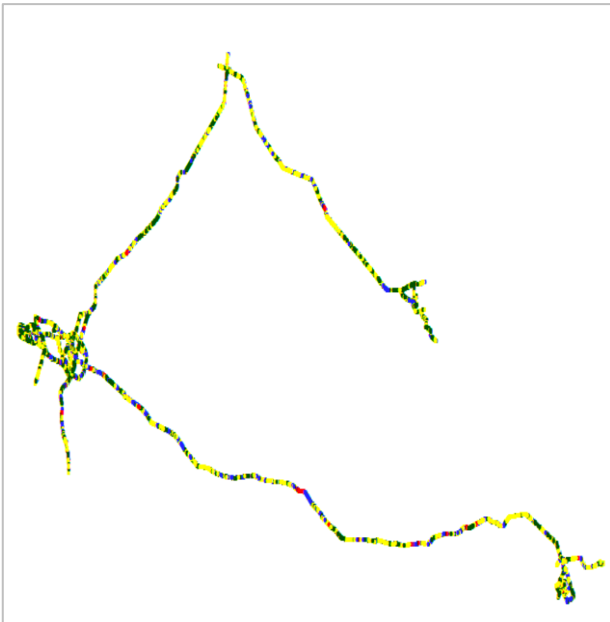


I. Coverage Details

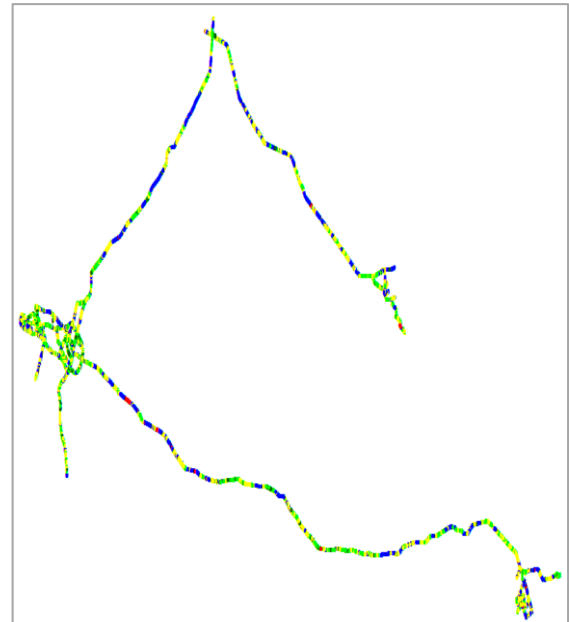
AIRTEL

Technology	Coverage Rate %
2G	84.82
VoLTE	99.69

2G



VoLTE



Rxlevel	Samples	%
0-75	3113031	35.21
75-85	4386579	49.61
85-95	1170613	13.24
95-130	171776	1.94

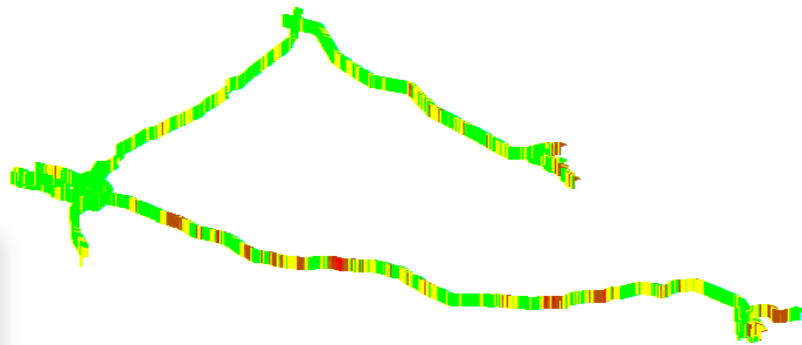
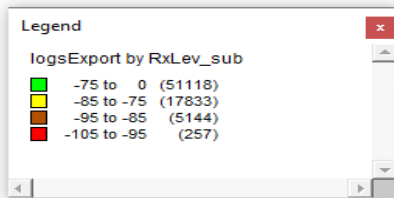
RSRP	Total Samples	%
0-75	684424	7.00
75-85	2919295	29.85
85-95	3801833	38.88
95-110	2245950	22.97
110-130	127745	1.31

I. Coverage Details

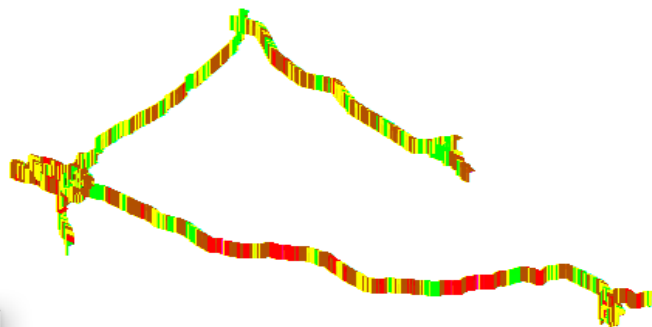
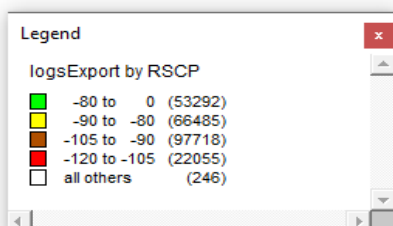
BSNL

Technology	Coverage Rate %
2G	92.73
3G	49.94

2G



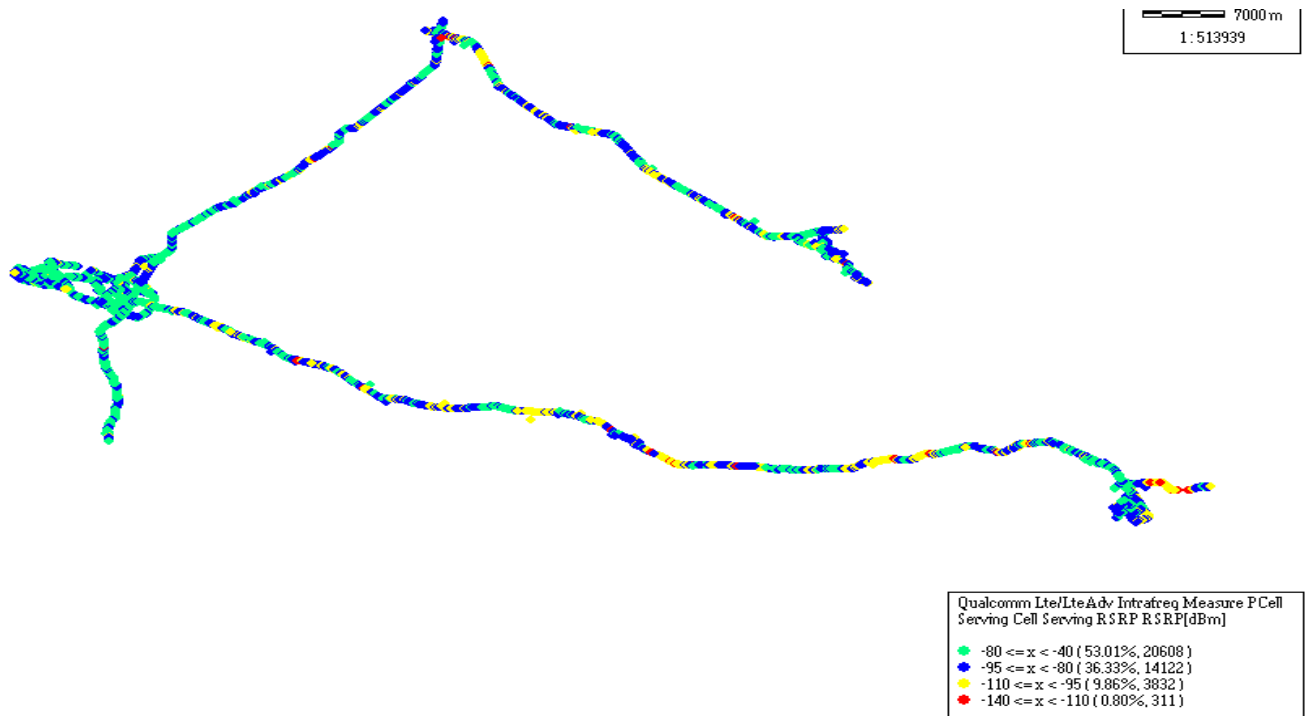
3G



I. Coverage Details

JIO

Technology	Coverage Rate %
VoLTE	99.20

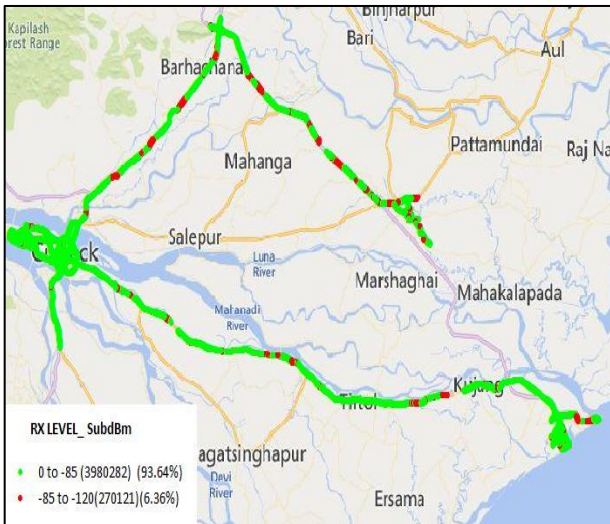


VoLTE		
Overall RSRP	#Samples	%
[Max, >=-80]	25321	43.1
[-80, >=-90)	15711	26.7
[-90, >=-110)	17077	29.1
[-110, >=Min)	642	1.1
Total	58751	100

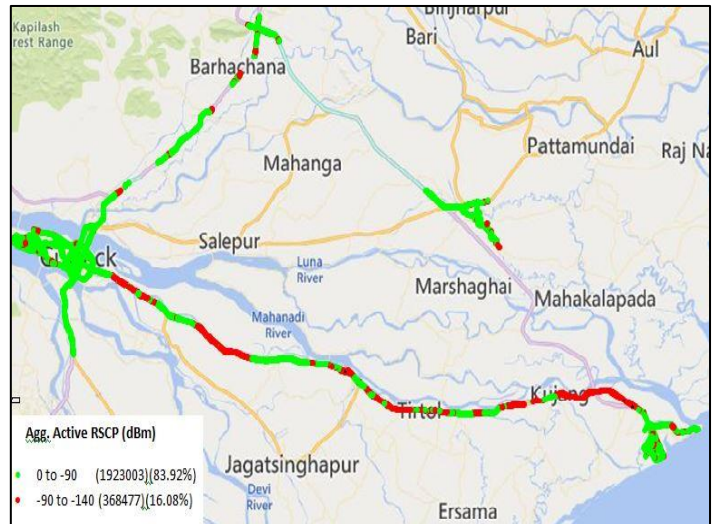
I. Coverage Details

Technology	Coverage Rate %
2G	93.64
3G	83.92
VoLTE	97.56

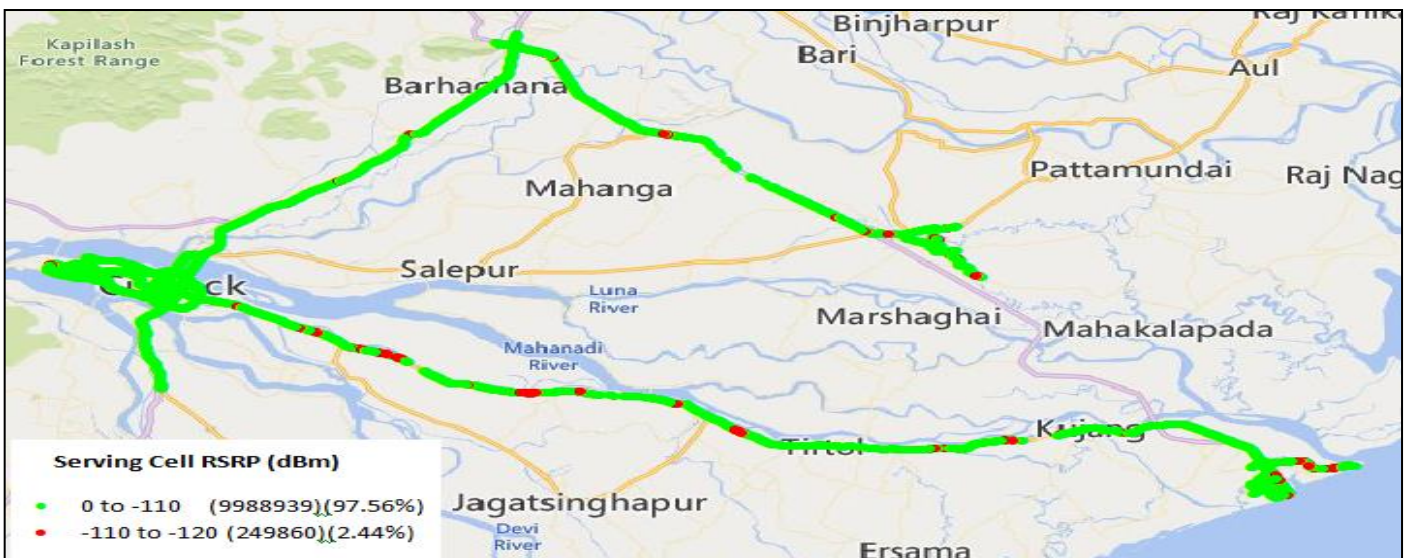
2G



3G



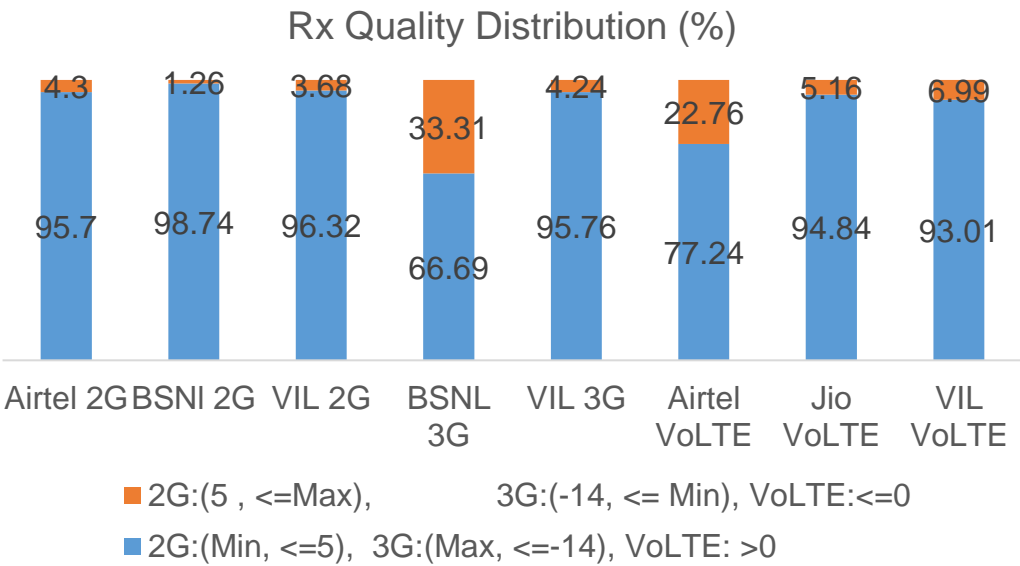
VoLTE



II. Quality Details

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 $\geq 95\%$.

TSP	Rx Quality %
Airtel 2G	95.7
BSNI 2G	98.74
VIL 2G	96.32
BSNL 3G	66.69
VIL 3G	95.76
Airtel VoLTE	77.24
Jio VoLTE	94.84
VIL VoLTE	93.01

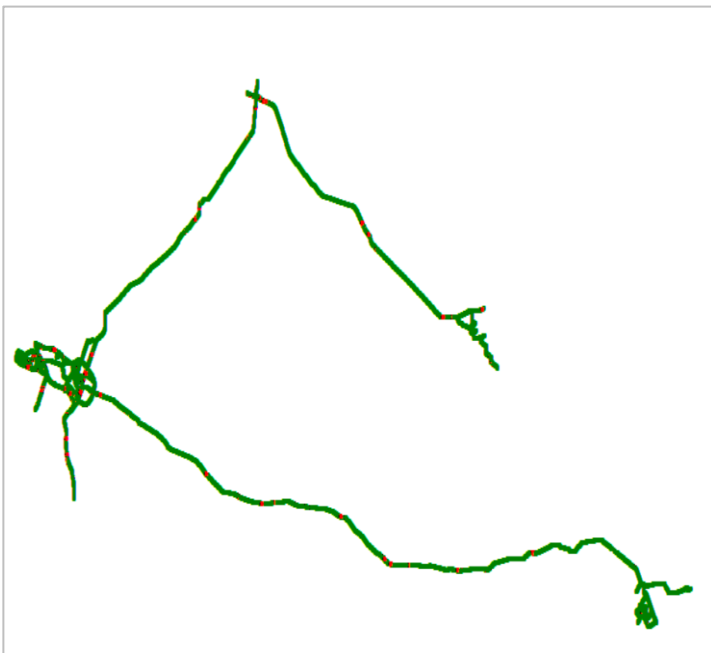


II. Quality Details

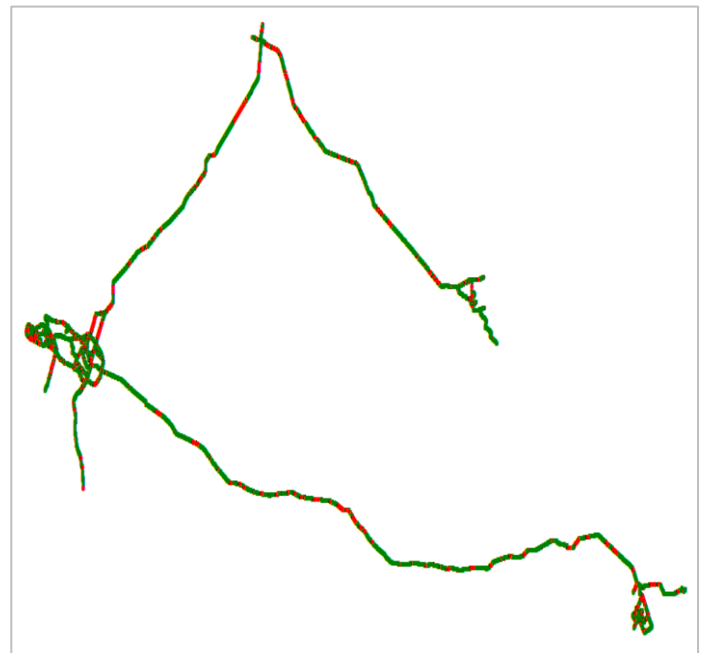
Airtel

Technology	Rx Quality %
2G	95.7
VoLTE	77.24

2G



VoLTE



Rxqual	Samples	%
0-5	8463106	95.7
5-7	378893	4.3

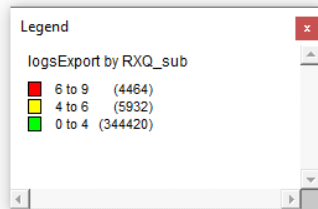
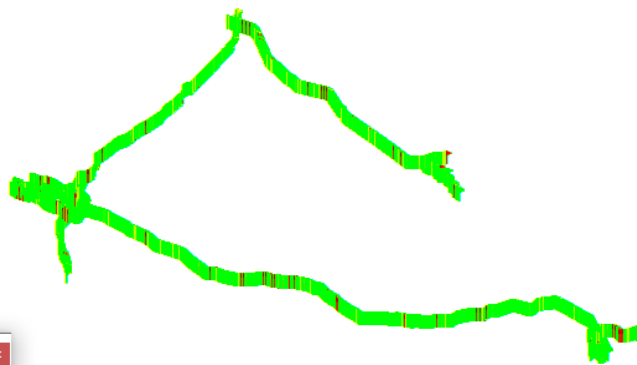
SINR	Total Samples	%
SINR>0	7553691	77.24
SINR<=0	2225556	22.76

II. Quality Details

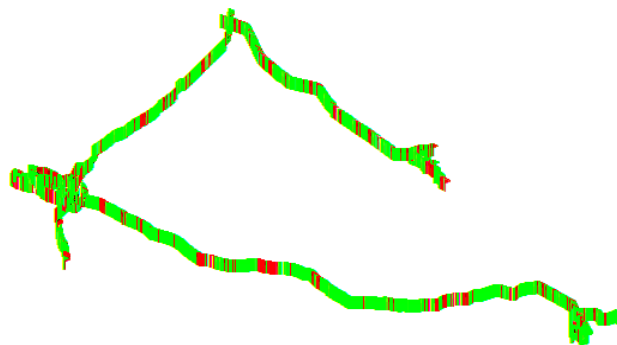
BSNL

Technology	Rx Quality %
2G	98.74
3G	66.69

2G



3G (Dual mode)

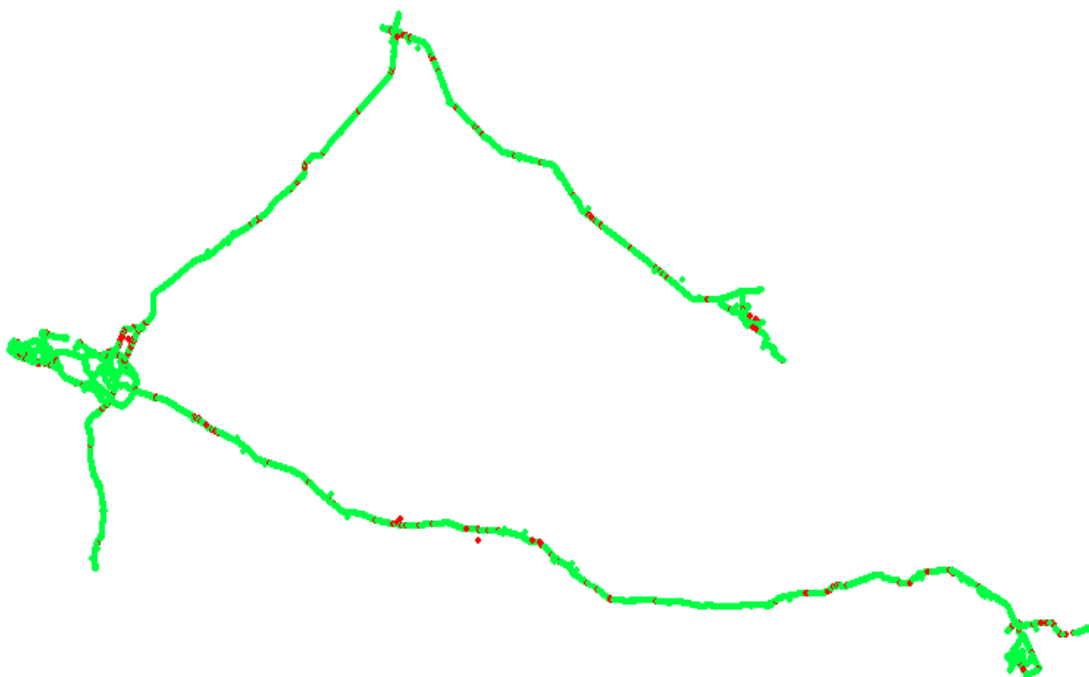


II. Quality Details

JIO

Technology	Rx Quality %
VoLTE	94.84

VoLTE



Qualcomm Lte/LteAdv Intrafreq Measure PCell
Serving Cell Serving SINR SINR[dB]

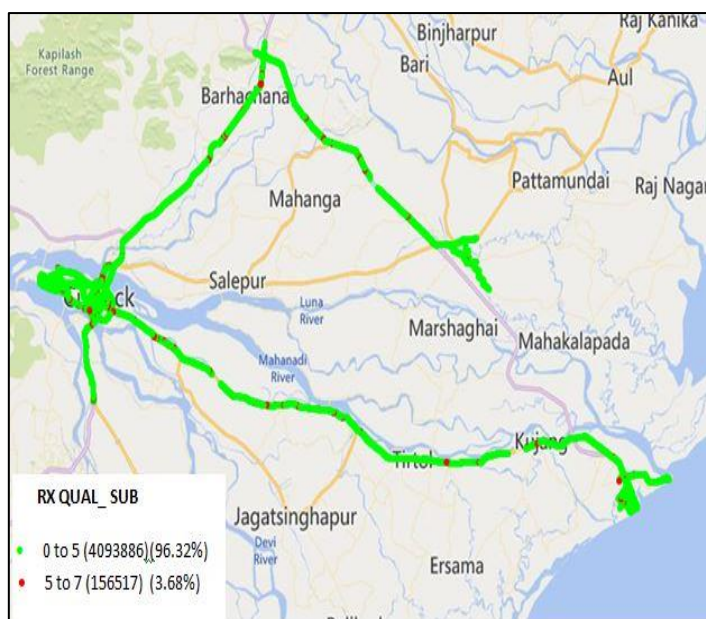
- 4 <= x < 30 (94.84%, 36866)
- 30 <= x < -4 (5.16%, 2007)

II. Quality Details

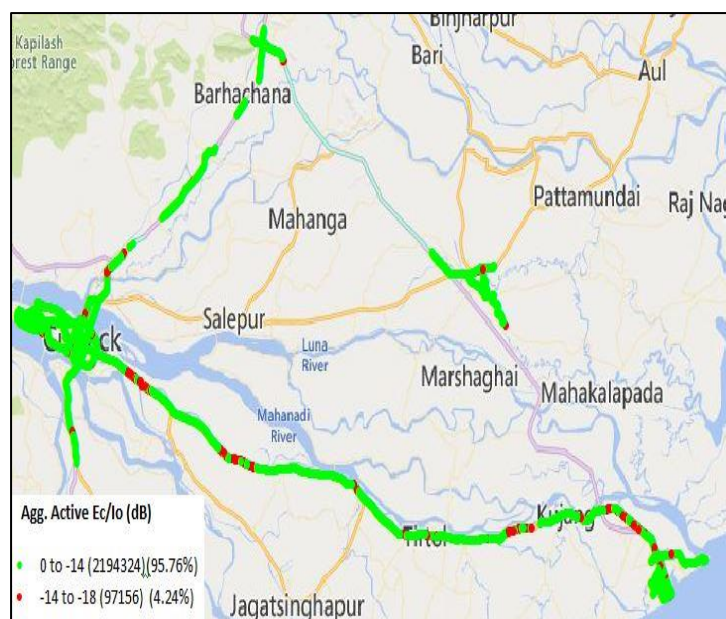
VIL

Technology	Rx Quality %
2G	96.32
3G	95.76
VoLTE	93.01

2G



3G



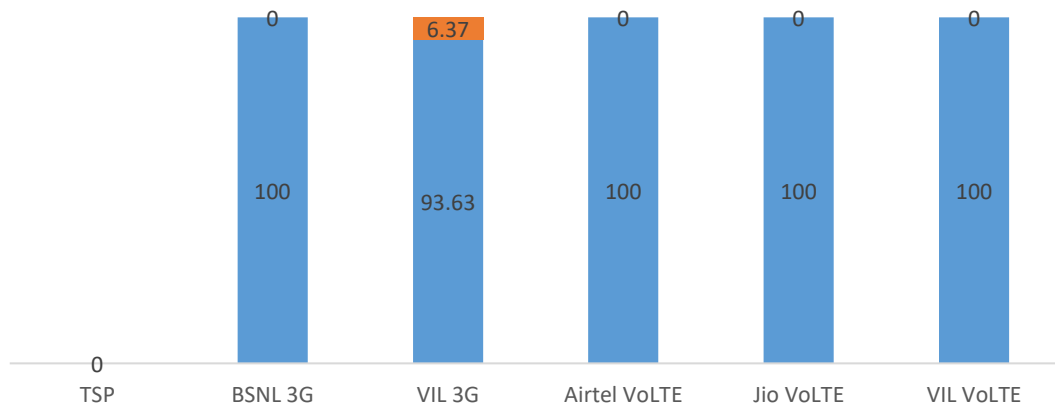
VoLTE



III. Technology Details

TSP	% of Time Spent
BSNL 3G	100
VIL 3G	93.63
Airtel VoLTE	100
Jio VoLTE	100
VIL VoLTE	100

Technology Distribution



V. Screenshots of TRAI MySpeed App

Airtel

Technology - 4G	Chandikhol Traffic Post	Baldevjew Temple(Ke ndrapara)	Nehru Bangla, Paradeep	Cuttack High court	Cuttack Railway Station	Ravenshaw University
Download Speed Mbps	96.26	89.14	78.35	53.69	84.07	79.69
Upload Speed Mbps	27.64	28.28	20.20	26.24	21.07	18.03

BSNL

Technology- 3G	Chandikhol Traffic Post	Baldevjew Temple(Ke ndrapara)	Nehru Bangla, Paradeep	Cuttack High court	Cuttack Railway Station	Ravenshaw University
Download Speed Mbps	0.67	6.03	12.79	13.18	5.14	5.25
Upload Speed Mbps	2.15	2.30	2.50	4.30	3.64	3.30

JIO

Technology - 4G	Chandikhol Traffic Post	Baldevjew Temple(Ke ndrapara)	Nehru Bangla, Paradeep	Cuttack High court	Cuttack Railway Station	Ravenshaw University
Download Speed Mbps	66.74	65.87	48.11	65.47	63.90	26.68
Upload Speed Mbps	21.27	5.94	14.74	22.11	24.46	9.70

VIL

Technology - 4G	Chandikhol Traffic Post	Baldevjew Temple(Ke ndrapara)	Nehru Bangla, Paradeep	Cuttack High court	Cuttack Railway Station	Ravenshaw University
Download Speed Mbps	55.25	62.23	31.98	35.08	57.89	31.51
Upload Speed Mbps	53.12	7.69	44.80	45.96	46.99	48.04