



Operator Assisted Drive Test Report

Puducherry SSA October. 2021

(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 Puducherry City and surrounding area viz. Ariyankuppam, Nettapakam, Auroville Villanur, kalapet Sellipattu , Embalam, Sedarapet etc. from 9:00 AM to 9:00 PM during 18th October to 20th October 2021. The drive test covered drive route of 250 plus KMs & 5 hotspot over a period of 3 days. Approximately 400+ 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

Regional Office, TRAI Hyderabad conducted Operator Assisted Drive Test from 18th to 20^h October. 2021 covering various locations in Puducherry City & surrounding regions area viz. Ariyankuppam, Nettapakam, Auroville Villanur, kalapet Sellipattu , Embalam, Sedarapet etc. The performance of Airtel, BSNL, Vodafone Idea and Rjio 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 250plus KMs over a period of 3 days from 18th to 20th Oct. 2021. Approximately 400 + 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 Test:

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.

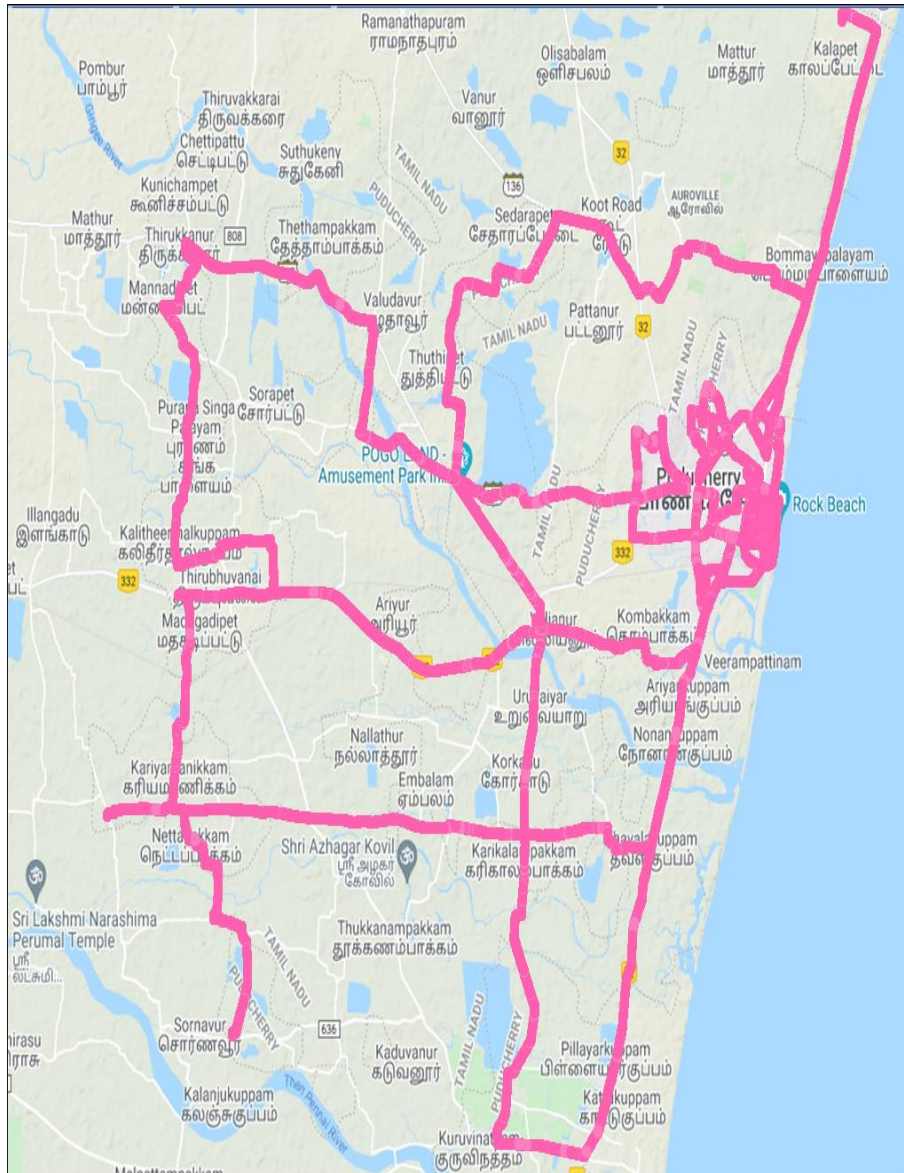
* 3G KPI's which are calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.

* 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
Latency	32 Bytes on www.google.com

Overview

Voice & Dynamic Data Test Drive Route



Areas Covered –Pondicherry Urban - White Town Area

Gingee Salai	Anna Salai
JN Street	Railway station Road
Mahatma Gandhi Street	Mission Street
Bharathi Street	Bussy Street
SV Patel Salai	Uzhavarsanthai
Beach Road	South Boulevard Road
Rangapillai Street	Laporte Street
Vysal Street	Easwaran Koil Street

Areas Covered – Pondicherry – Urban

Muthialpet	Kottakuppam
Krishna Nagar	Rainbow Nagar
Thattanchavadi	Kamaraj Salai
100 Feet Road	Mudaliarpet

Kholas Nagar	Bus stand Road
Lawspet including Airport	Moolakulam
Mettupalayam	JIPMER
Murunganpakkam	Nellithope

Areas Covered – Pondicherry – RURAL

Ariyankuppam	Odhiyampet
Thavalakuppam	Kirumampakkam
Mullodai	Bahour
Aranganur	Karikalampakkam
Villianur	Ariyur
Thirubuvanai	Madagadipet
Kariyamanikkam	Madukarai
Embalam	Kariyamputhur
Thirukanur	Vazhudavur
Sellipattu	Krumampet
Ossudu	Karasur
Sedarapet	PIPDIC
Thiruchiramabalam	Auroville
Boommayapalayam	Kalapet
Nettapakkam	

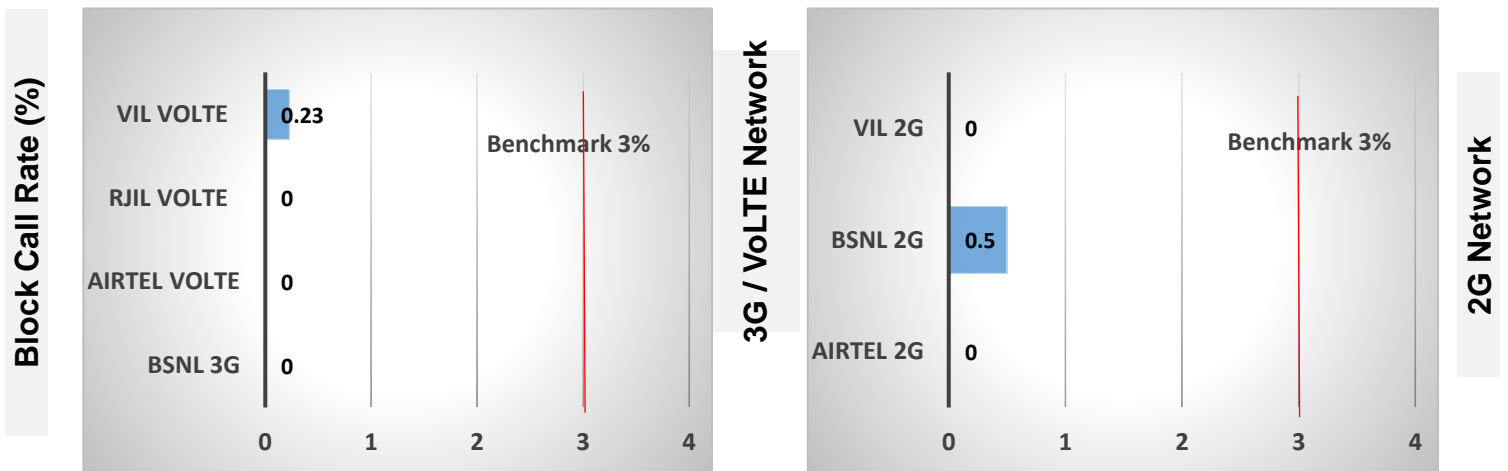
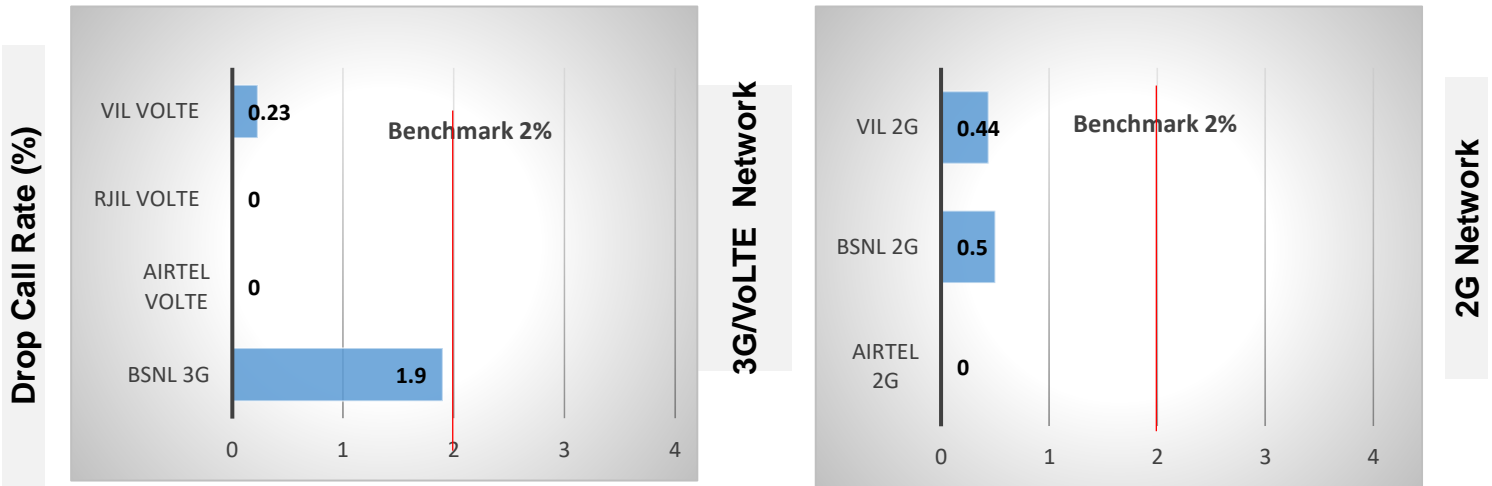
Data Service Test- Static Locations

Static Locations
JAWAHARLAL NEHRU STREET MARKET
RAILWAY STATION-PUDUCHERRY
BUS STAND-PUDUCHERRY
UNIVERSITY OF PUDUCHERRY
PROVIDENCE MALL- PUDUCHERRY

Voice Calls

Key Observations

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



KPIs	2G			3G	VoLTE		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0	0.50	0.44	1.9	0	0	0.23
Block Call Rate %	0	0.5	0	0	0	0	0.23

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 %	82.24	83.13	87.26

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Coverage %	74.22	99.55	96.67	97.26

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

TSPs	3G	VoLTE		
	BSNL	Airtel	VIL	JIO
Time Spent on 3G/4G %	100	100	96.5	100

Data Services Static

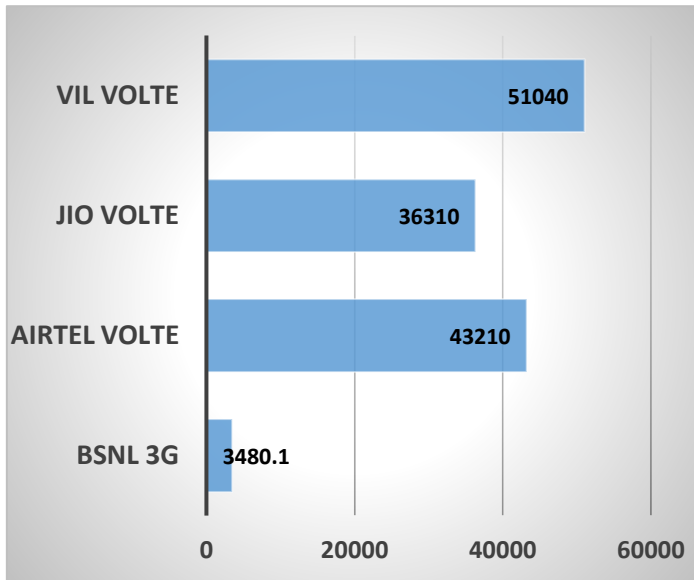
Key Observations

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

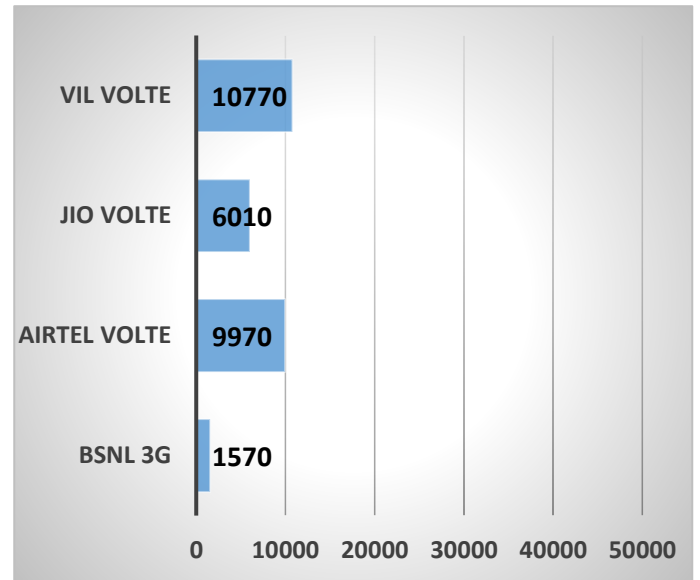
Data Download and Upload Performance (kbps)

3G/4G/ Network:

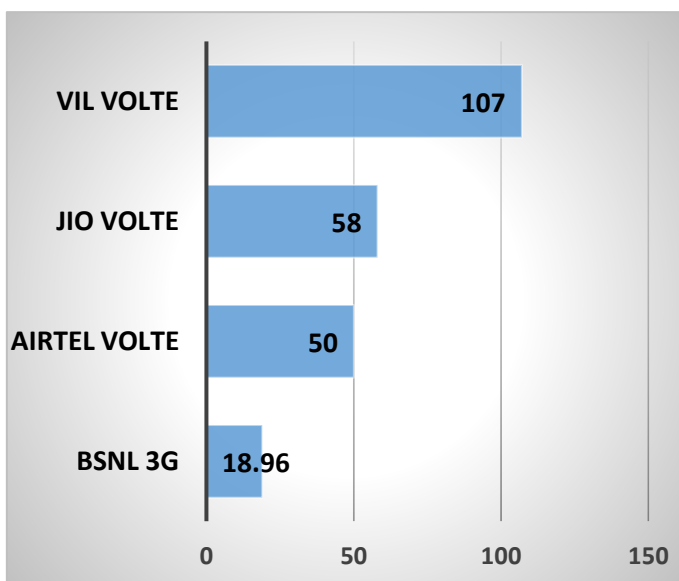
Download Throughput (kbps)



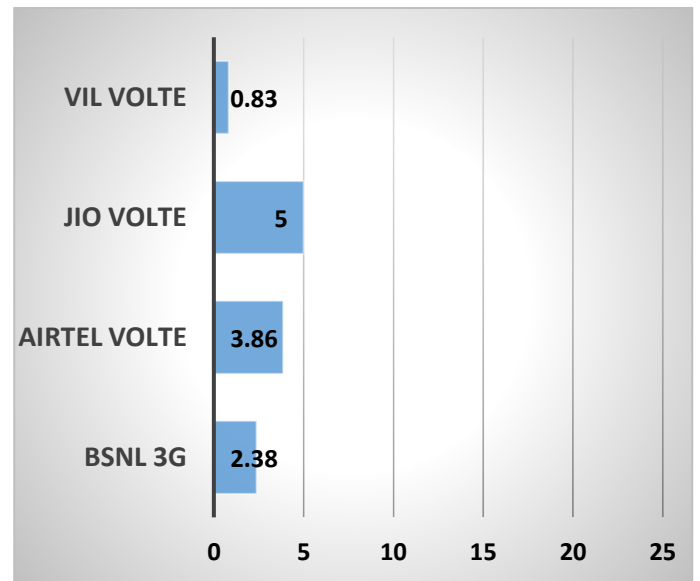
Upload Throughput (kbps)



Latency (ms)



Web Browsing delay (Sec)



Summary

SSA Level Summary-Voice

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	388	400	425
Blocked Call Rate (%)	0.00	0.50	0
CSSR% (Accessibility)	100	99.50	100
Drop Call Rate (%)	0.00	0.50	0.44
Mobility HOSR (%)	96.59	97.97	98.09
Rx Quality (%)	90.4	97.00	97.70

Voice Call				
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	402	396	378	431
Blocked Call Rate (%)	0	0	0	0.23
CSSR% (Accessibility)	100	100	99.48	99.77
Drop Call Rate (%)	0.49	0	0	0.23
Mobility HOSR (%)	99.86	99.92	98.5	99.87
Rx Quality (%)	93.61	80.5	89.07	94.51

Summary

SSA Level Summary (Average of 5 hotspots)- Data services

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	112.4	90.50	187.17
Upload Throughput (kbps)	76.1	55.90	68.43
Web Browsing Delay (sec)	70.8	212.51	64.44
Latency (msec)	471	462	523

Data Services Static				
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Download Throughput (kbps)	3480.1	43210	36310	51040
Upload Throughput (kbps)	1570	9970	6010	10770
Web Browsing Delay (sec)	2.38	3.86	5	0.83
Latency (msec)	18.96	50	58	107

PUDUCHERRY J N STREET MARKET	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	112.4	90.50	187.17
Upload Throughput (kbps)	76.1	55.90	68.43
Web Browsing Delay (sec)	70.8	212.51	64.44
Latency (msec)	471	462	523

PUDUCHERRY RAILWAY STATION	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	151.0	26.91	199.00
Upload Throughput (kbps)	111.6	27.91	112.87
Web Browsing Delay (sec)	44.04	648.75	49.56
Latency (msec)	224	515	491

PUDUCHERRY BUS STAND	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	205.2	60.81	180.20
Upload Throughput (kbps)	95.1	45.91	99.30
Web Browsing Delay (sec)	39.28	301.27	70.12
Latency (msec)	173	328	477

PUDUCHERRY UNIVERSITY	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	132.64	78.41	229.37
Upload Throughput (kbps)	107.0	48.16	117.67
Web Browsing Delay (sec)	48.11	428.77	50.14
Latency (msec)	520	627	423

PUDUCHERRY PROVIDENCE MALL	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	244.3	59.60	230.90
Upload Throughput (kbps)	100.3	45.69	109.53
Web Browsing Delay (sec)	46.33	336	52.49
Latency (msec)	580	571	533

Data Services static

SSA Level Summary(contd.)

PUDUCHERRY J N STREET MARKET	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Download Throughput (kbps)	3480	43210	36310	51040
Upload Throughput (kbps)	1570	9970	6010	10770
Web Browsing Delay (sec)	18.96	3.86	5	0.83
Latency (msec)	77	50	58	107.00

PUDUCHERRY RAILWAY STATION	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Download Throughput (kbps)	1187	27820	35580	64230
Upload Throughput (kbps)	2830	9830	5150	11250
Web Browsing Delay (sec)	50.73	3.23	4.7	0.82
Latency (msec)	146	53	47.3	92.67

PUDUCHERRY BUS STAND	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Download Throughput (kbps)	710	39360	32830	45240
Upload Throughput (kbps)	680	4560	12490	11130
Web Browsing Delay (sec)	83.97	3.36	4.6	0.77
Latency (msec)	152	44	68	90

Summary

SSA Level Summary(contd.)

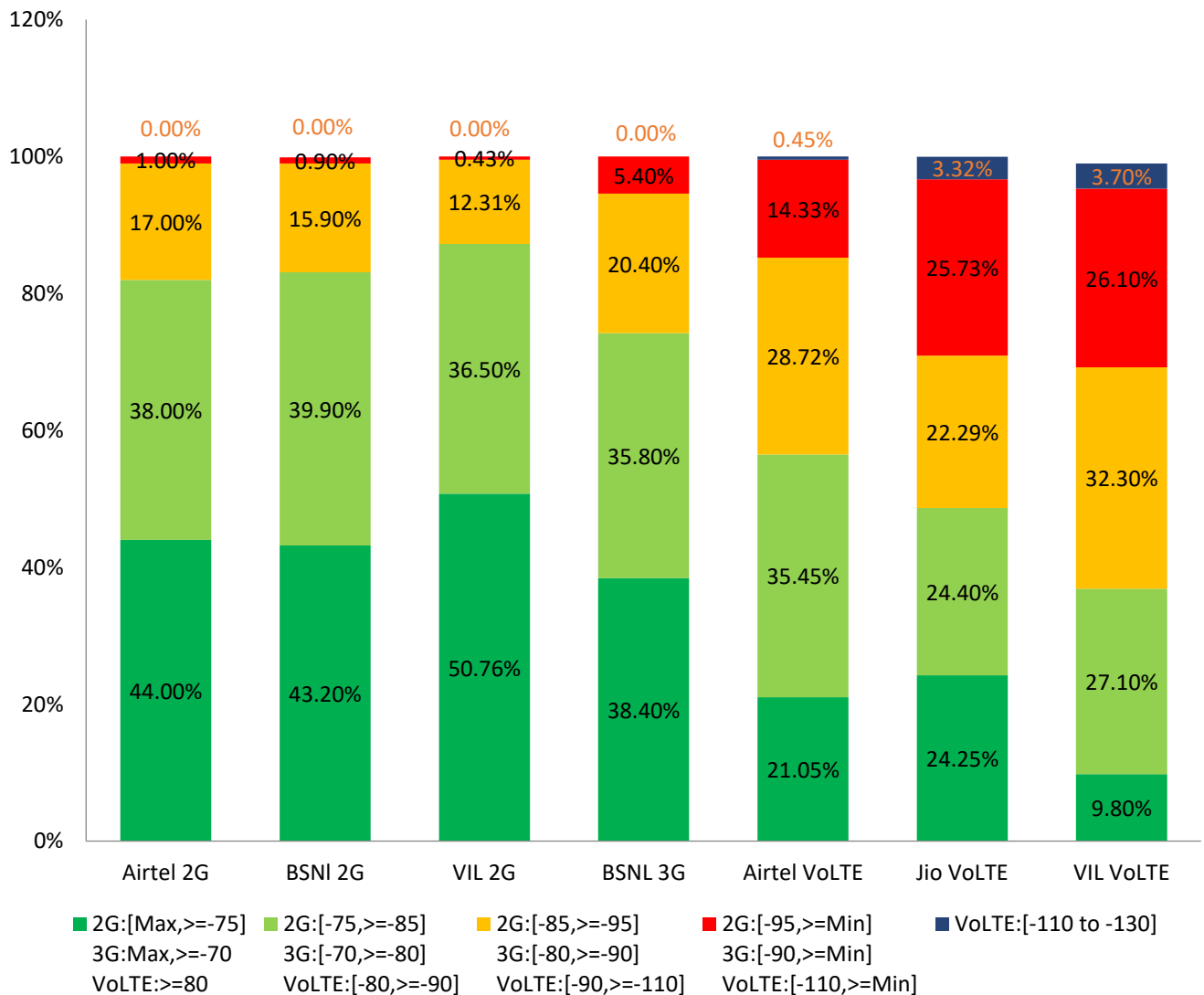
PUDUCHERRY UNIVERSITY	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Download Throughput (kbps)	1120	34640	43280	49000
Upload Throughput (kbps)	1510	18630	6570	10770
Web Browsing Delay (sec)	45.23	3.59	5.2	0.57
Latency (msec)	83	57	74.3	91

PUDUCHERRY PROVIDENCE MALL	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Download Throughput (kbps)	1600	42610	32650	64240
Upload Throughput (kbps)	1500	5890	6620	10890
Web Browsing Delay (sec)	42.23	4.94	4.7	0.54
Latency (msec)	74	67	66.7	91

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	82.24
BSNI 2G	83.13
VIL 2G	87.26
BSNL 3G	74.22
Airtel VoLTE	99.55
Jio VoLTE	96.67
VIL VoLTE	97.26

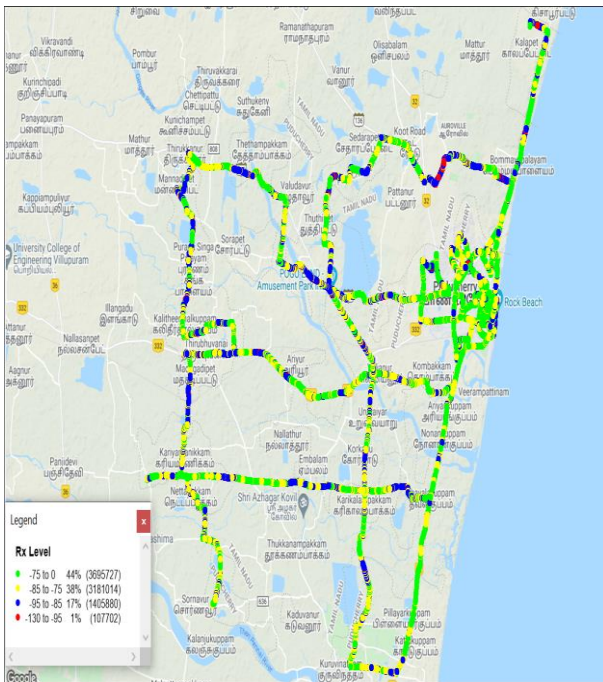


I. Coverage Details

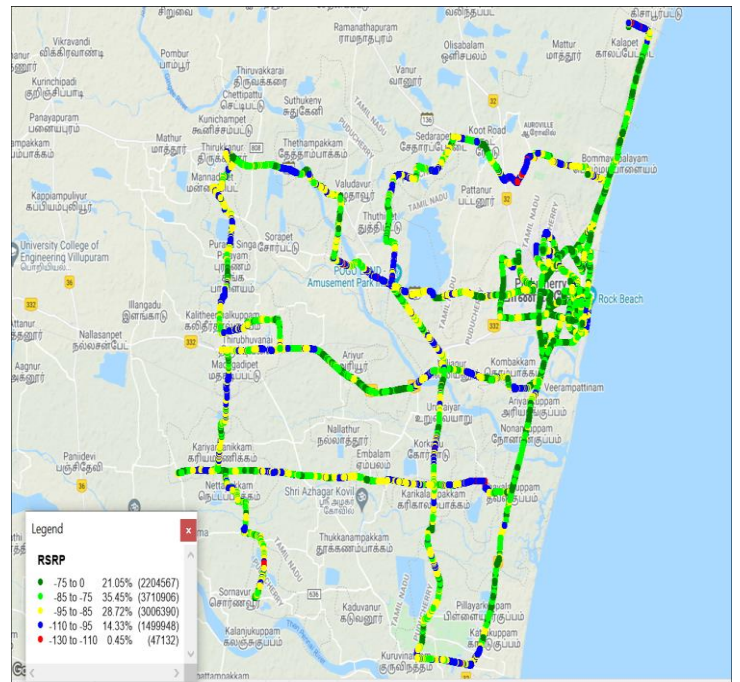
AIRTEL

Technology	Coverage Rate %
2G	82.24
VoLTE	99.55

2G



VoLTE



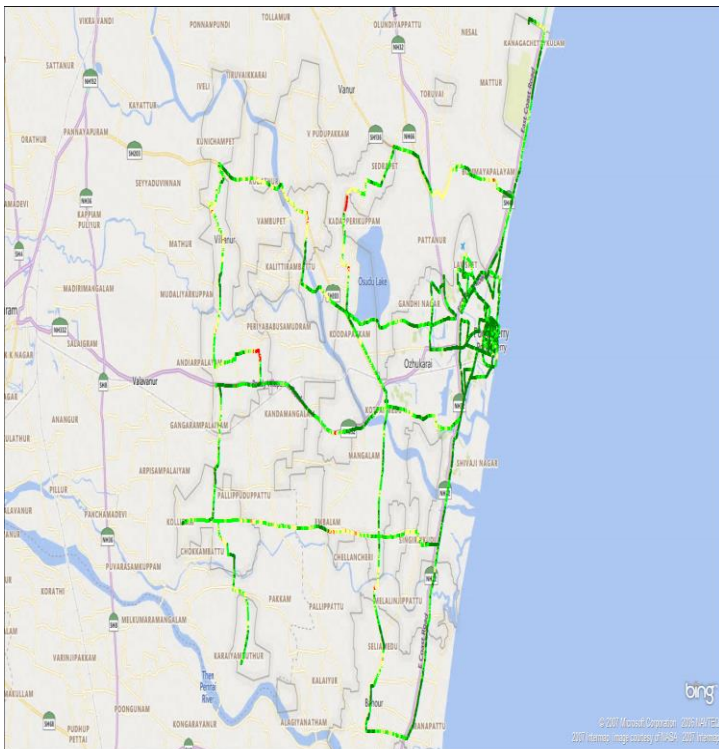
2G			VoLTE		
Overall RxLevel	# Samples	% PDF	Overall RSRP	# Samples	% PDF
[Max, >=-75]	3695727	44	-75 to 0	2204567	21.05%
[-75, >=-85)	3181014	38	-85 to -75	3710906	35.45%
[-85, >=-95)	1405880	17	-95 to -85	3006390	28.72%
[-95, >=Min)	107702	1	-110 to -95	1499948	14.33%
Total	8390323	100 %	-130 to -110	47132	0.45%
			Total	10468943	100%

I. Coverage Details

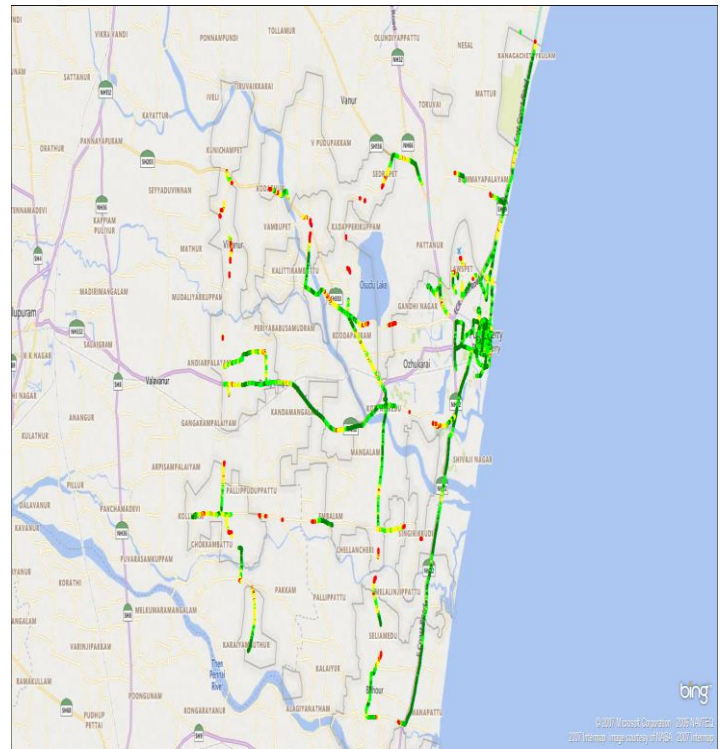
BSNL

Technology	Coverage Rate %
2G	83.13
3G	74.22

2G



3G



2G

Overall RxLevel	# Samples	% PDF
[Max, >=-75]	15914	43.2
[-75, >=-85)	14712	39.9
[-85, >=-95)	5872	15.9
[-95, >=Min)	341	0.9
Total	36839	100%

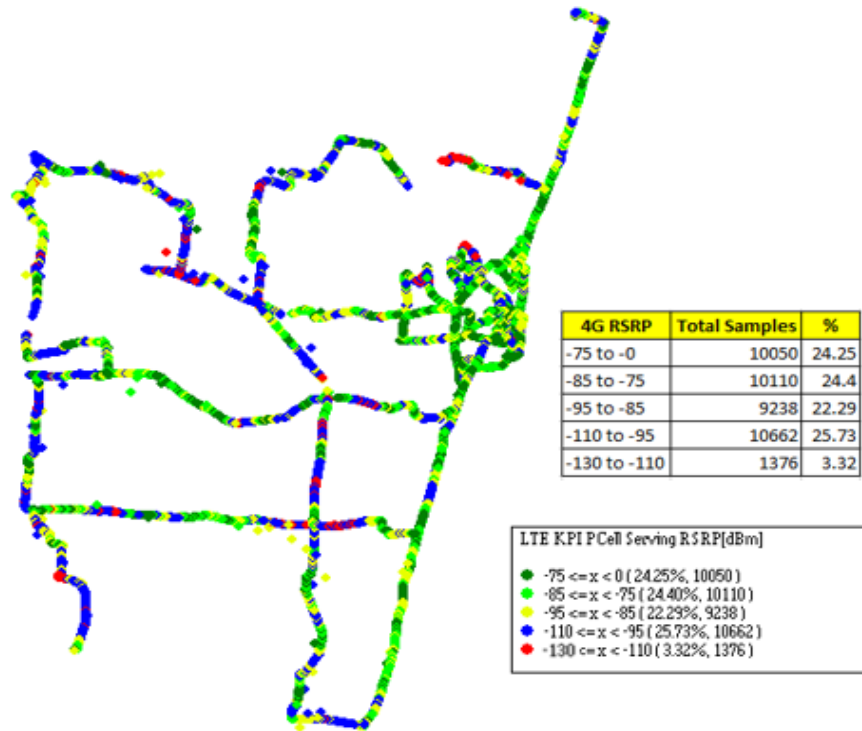
3G

Overall RSCP	# Samples	% PDF
[Max, >=-75]	10592	38.4
[-75, >=-85)	9863	35.8
[-85, >=-95)	5619	20.4
[-95, >=Min)	1485	5.4
-95>=-110	0	0
Total	27559	100%

I. Coverage Details

JIO

Technology	Coverage Rate %
VoLTE	96.68



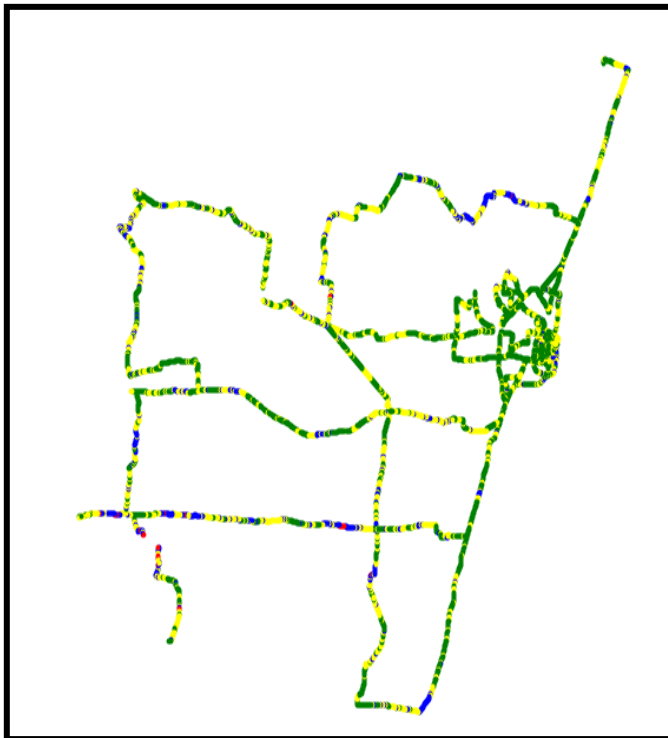
VoLTE		
Overall RSRP	# Samples	% PDF
[Max, >=-75]	10050	24.25%
[-75, >=-85)	10110	24.4%
[-85, >=-95)	9238	22.29%
[-95, >=-110)	10662	25.73%
-110 to -130	1376	3.32
Total	41436	100%

I. Coverage Details

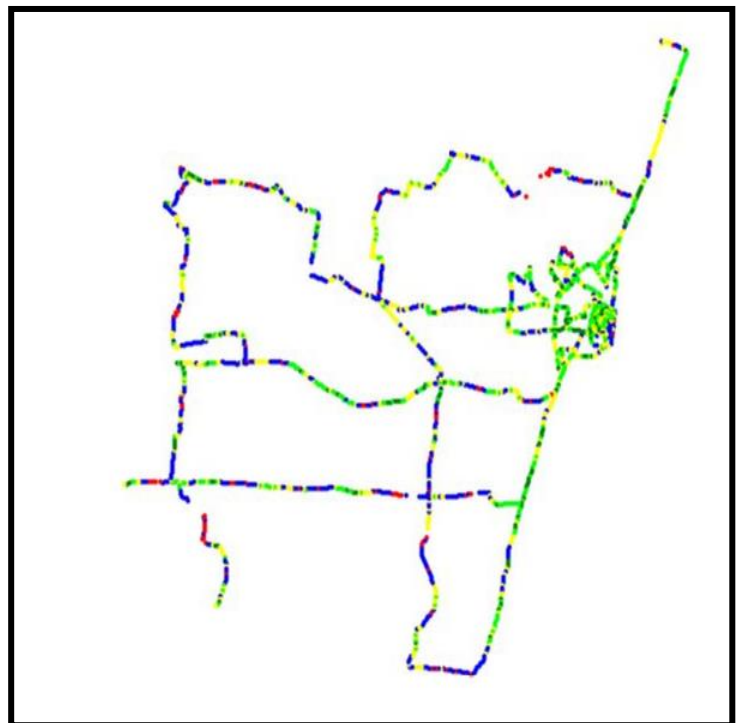
VIL

Technology	Coverage Rate %
2G	87.26
VoLTE	97.26

2G



VoLTE



2G

Overall RxLevel	# Samples	% PDF
[Max, >=-75]	12729	50.76%
[-75, >=-85)	9152	36.5%
[-85, >=-95)	3086	12.31%
[-95, >=Min)	108	0.43%
Total	25075	100 %

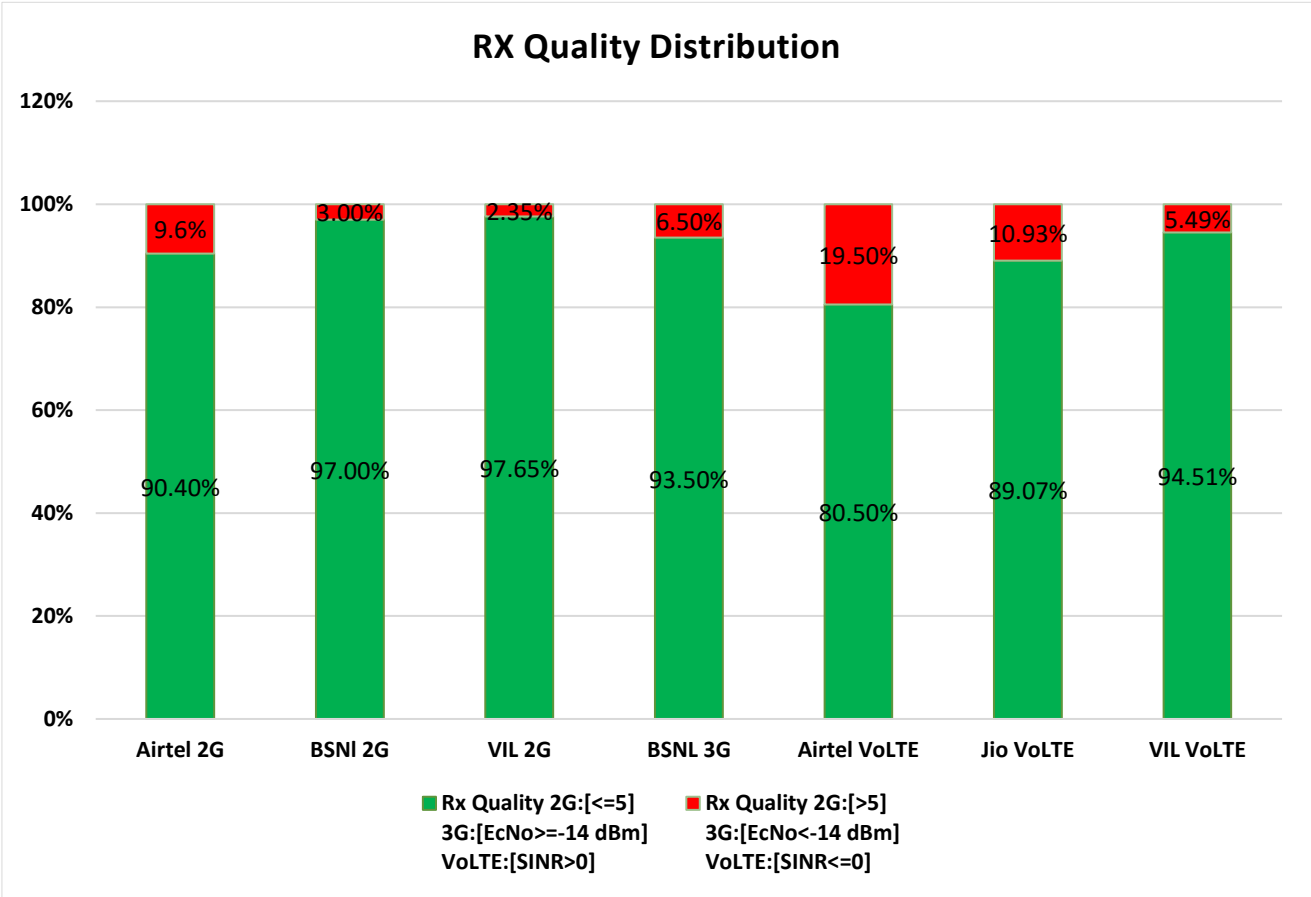
VoLTE

Overall RSRP	# Samples	% PDF
-75 <= x < 0	2249	9.8%
-85 <= x < -75	6225	27.1%
-95 <= x < -85	8068	33.3%
-110 <= x < -95	7736	26.1%
-130 <= x < -110	683	3.8%
Total	24961	100%

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	90.4
BSNI 2G	97.0
VIL 2G	97.65
BSNL 3G	93.61
Airtel VoLTE	80.5
Jio VoLTE	89.07
VIL VoLTE	94.51

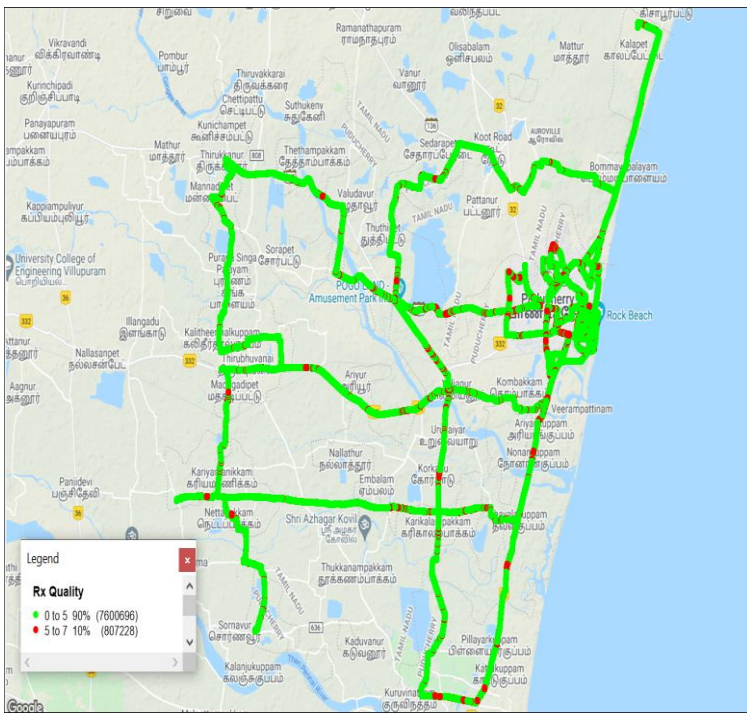


II. Quality Details

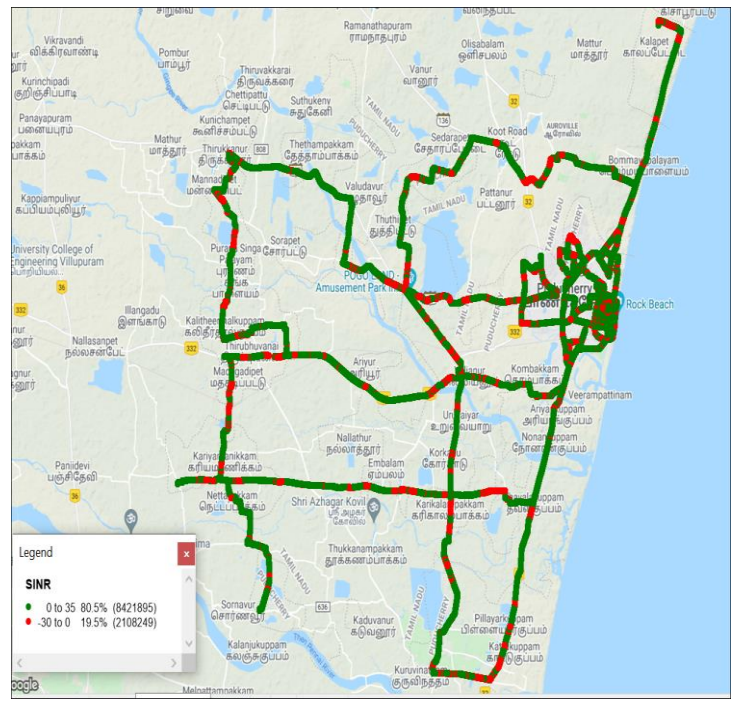
Airtel

Technology	Rx Quality %
2G	90.4
VoLTE	80.5

2G



VoLTE



Overall Rx Quality	# Samples	% PDF
0-5	7600696	90.40%
>5	807228	3.60%

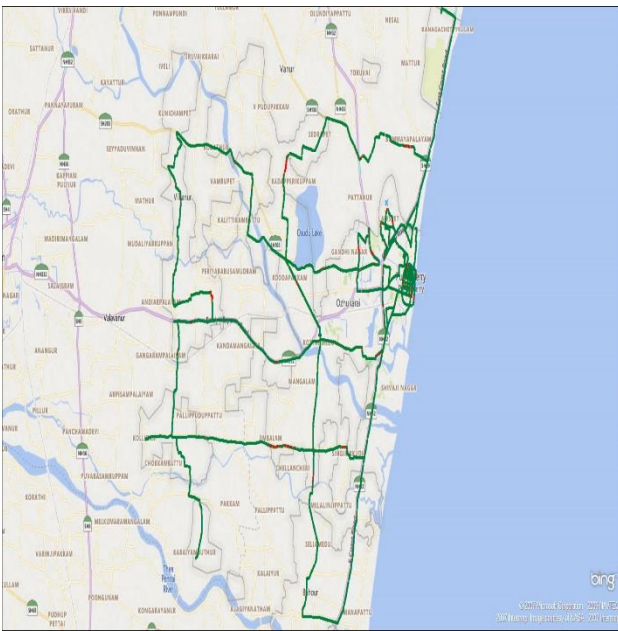
Overall SISR	# Samples	% PDF
0-30	8421895	80.5%
<0	2108249	19.5%

II. Quality Details

BSNL

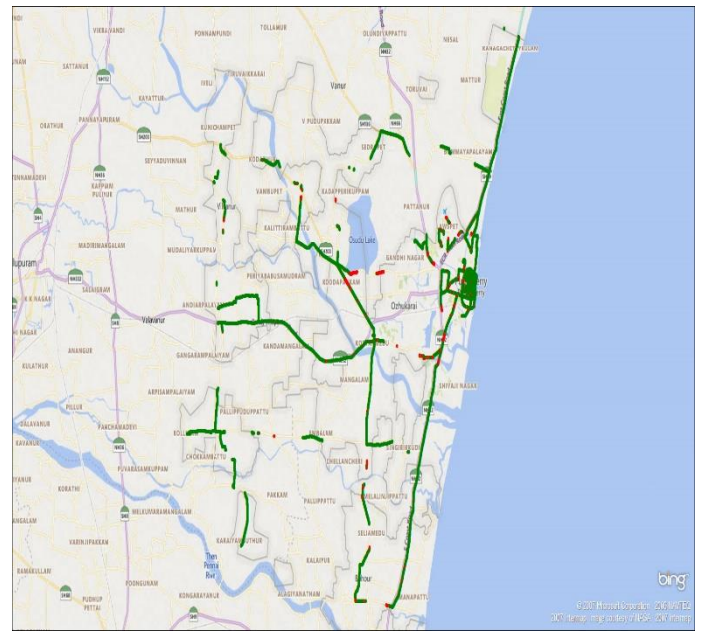
Technology	Rx Quality %
2G	97.0
3G	93.61

2G



Overall Rx Quality	# Samples	% PDF
0 to 5	35724	97.0
6 to 7	1115	3.0

3G



Overall EcNo	# Samples	% PDF
0 to -14	25769	93.50
-14 to -30	1797	6.5

II. Quality Details

JIO

Technology	Rx Quality %
VoLTE	89.07



Overall SINR	# Samples	% PDF
>0	36906	89.07
<=0	4530	10.93

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 $\geq 95\%$.

VIL

Technology	Rx Quality %
2G	97.65
VoLTE	94.51

2G



VoLTE



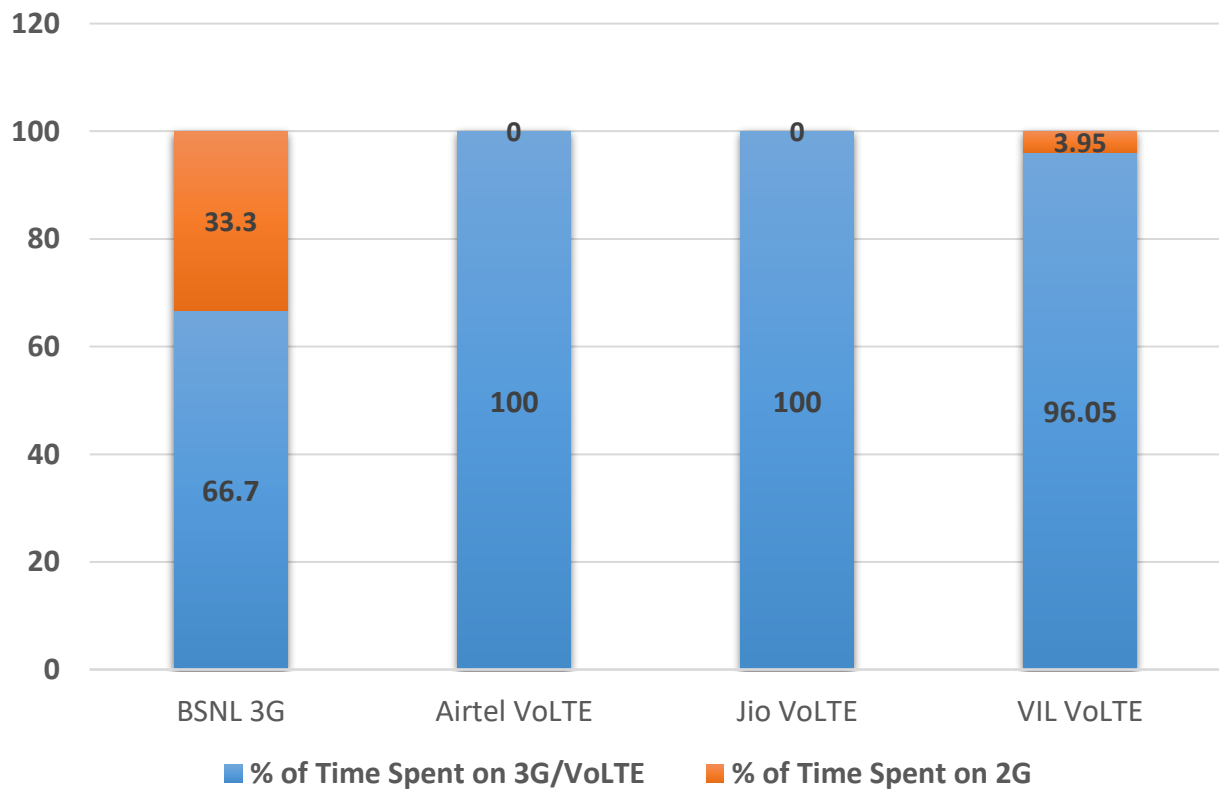
Overall Rx Quality	# Samples	% PDF
0 to 5	18708	97.65
6 to 7	451	2.38

Overall SINR	# Samples	% PDF
0 to 30	23576	94.51
-30 to 0	1370	5.49

III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	66.7
Airtel VoLTE	100
Jio VoLTE	100
VIL VoLTE	96.05

Technology Distribution



III. Technology Details

Airtel

Technology	Time Spent on 4G
4G	100%

BSNL

Technology	Time Spent on 3G
3G	66.7%

JIO

Technology	Time Spent on 4G
4G	100%

VIL

Technology	Time Spent on 4G
4G	96.05%

V. TRAI MySpeed App

Airtel

Technology - 4G	JN Street Market Puducherry	Railway Station Puducherry	Bus Stand Puducherry	University of Puducherry	Providence Mall Puducherry
Download in Mbps	81.92	50.28	91.21	86.12	74.92
Upload in Mbps	26.86	11.99	7.22	27.44	4.87

BSNL

Technology - 3G	JN Street Market Puducherry	Railway Station Puducherry	Bus Stand Puducherry	University of Puducherry	Providence Mall Puducherry
Download in Mbps	0.48	0.47	0.70	0.33	0.47
Upload in Mbps	0.63	0.60	2.13	0.58	0.64

JIO

Technology - 4G	JN Street Market Puducherry	Railway Station Puducherry	Bus Stand Puducherry	University of Puducherry	Providence Mall Puducherry
Download in Mbps	46.08	93.80	68.55	50.34	40.65
Upload in Mbps	9.19	27.04	24.52	5.84	6.01

VIL

Technology - 4G	JN Street Market Puducherry	Railway Station Puducherry	Bus Stand Puducherry	University of Puducherry	Providence Mall Puducherry
Download in Mbps	71.52	121.21	73.20	25.76	89.41
Upload in Mbps	36.85	48.79	33.23	47.42	6.02