



भारतीय दूरसंचार वनियामक प्रा धकरण
Telecom Regulatory Authority of India
क्षेत्रीय कार्यालय, बेंगलुरु
Regional Office, Bengaluru



Operator Assisted DRIVE TEST REPORT

For

KOTTAYAM

Kerala

2021

November

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 Drive Test has been carried out by Service Providers in KOTTAYAM SSA and adjoining SDCA from 9:00 AM to 8:00 PM; 16th November to 19th November 2021. The drive test covered drive route of 380 KMs & 6 hotspot over a period of 4 days. Approximately 450+ calls were made for each of the 9 networks: three 2G networks, two 3G network and four 4G/LTE network covering four TSPs. BSNL has done testing for 4 G network in Kottayam city (as they do not have 3 G) and VIL has all 3 Networks in Kottayam SSA.

Overview

Voice
Summary

Data
Summary

Overview

Regional Office, TRAI Bangalore conducted Operator Assisted Drive Test from 16th to 19th November 2021 covering various locations in KOTTAYAM SSA and adjoining SDCA. The performance of Airtel, BSNL, Vodafone Idea and Jio were monitored across various technologies (2G, 3G, and 4G/VOLTE). 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; important roads having tourist traffic; etc. 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, Video Streaming Delay and Latency

Drive Test Details For Kottayam:

Operator Assisted Drive test was conducted for a period of four days from 16th to 19th November 2021. Calls were made for 90 sec duration with wait time of 10 sec between calls in all technologies.

Voice Tests: The drive test covered a drive route of approximately 380 KMs over a period of 3 days from 16th to 18th November 2021. Approximately 450+ 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: Dynamic data test was conducted for 380 kms over a period of 3 days for download throughput for 3G & 4G technology. Data Tests were performed at 6 static locations & dynamic data test for 60 KMs; three 2G (Lock mode) networks, two 3G (Dual mode) networks and four 4G (Free mode) networks covering 9 unique TSP Networks were tested. All the data through put figure mentioned in the report are based on the average value.

* For Voice and Data KPI's, 2G measurement is done with UE locked on 2G, 3G measurement is done with UE in Dual mode (2G & 3G) and 4G measurement is done with UE in Free Mode.

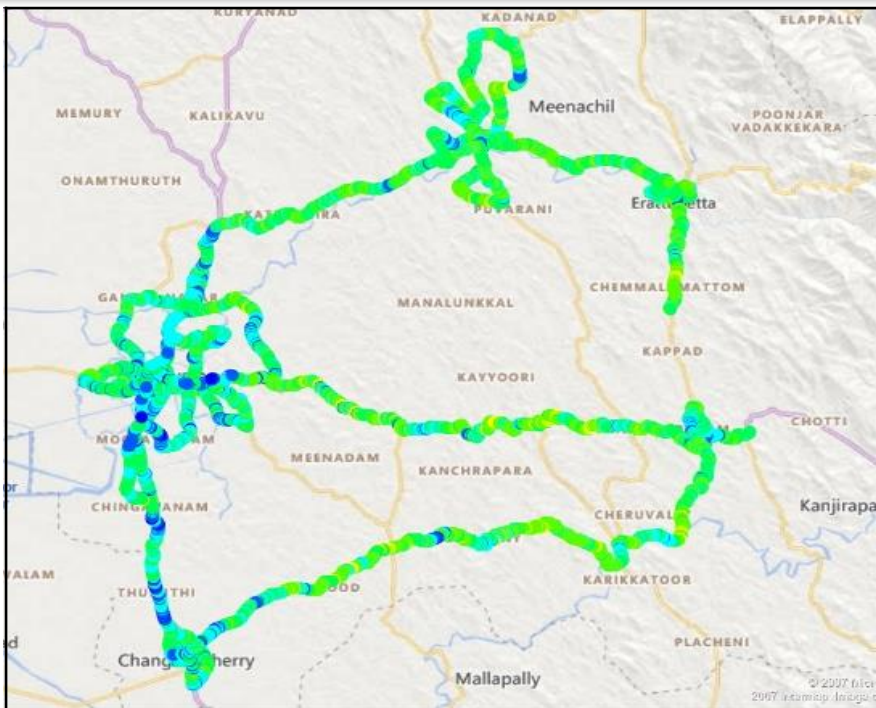
* 3G KPI's which are calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.

* 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
Video Streaming	From any Youtube site of 130 seconds duration
Latency	32 Bytes on www.google.com

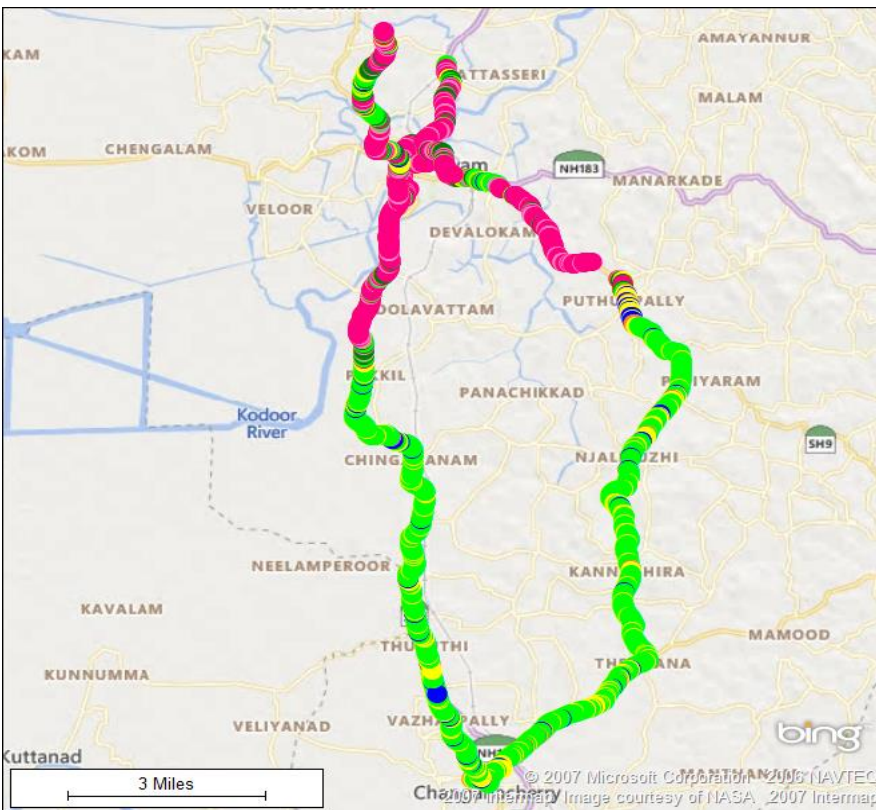
Overview

Voice and Data Test Drive Route



Areas Covered
Kottayam
Kottayam
Karukachal
Kottayam
Pala
Erattupetta
Thidandu
Kottayam City
Kanjirapally
Changanassery
Ettumanoor
Kollapally
Pinnakkanadu

Data Service Test- Dynamic Route (4th Day)

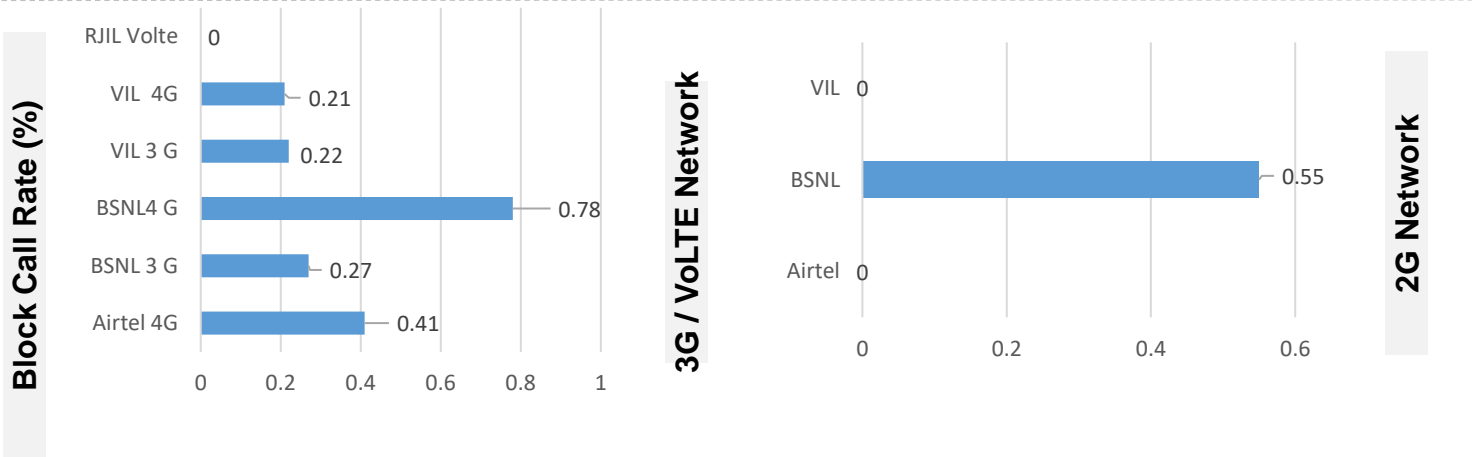
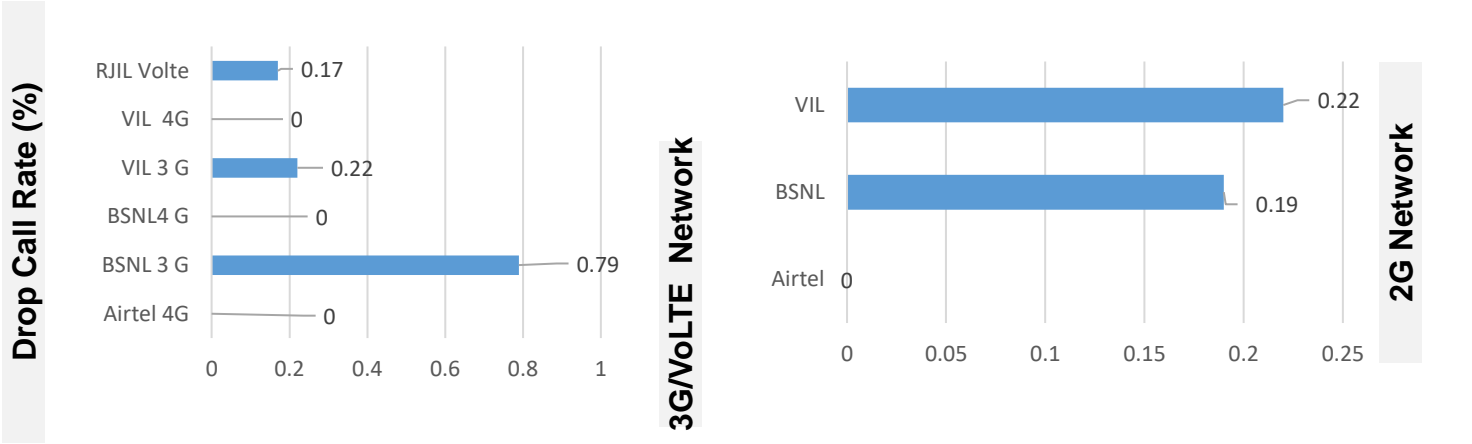


Static Drive Test Locations
Kottayam KSRTC
Kottayam Collectorate
KIMS Hospital
Kanjirapally
Chanaganassery KSRTC
Pala

Voice Calls

Key Observations

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



KPIs	2G			3G		VoLTE			
	Airtel	BSNL	VIL	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0%	0.19%	0.22%	0.79%	0.22%	0%	0%	0.17%	0%
Block Call Rate %	0%	0.55%	0%	0.27%	0.22%	0.78%	0.41%	0%	0.21%

- a) All TSPs have met the **2%** QOS benchmark of Drop Call Rate
- 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%	69.08%	94.5%	99.5%

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

TSPs	3G	3G	4G/VoLTE			
	BSNL	VIL	Airtel	BSNL	JIO	VIL
Coverage %	83.9%	82.27	97.34%	99.1%	97.81%	90.93%

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

TSPs	3G	3G	4G/VoLTE			
	BSNL	VIL	Airtel	BSNL	JIO	VIL
Time Spent %	9.5%	71.34%	100%	11.7%	100%	16.82%

Data Services Static

Key Observations

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

Static Locations
Kottayam KSRTC Bus Stand
Kottayam Collectorate
KIMS Hospital
Kanjirapally
Chanaganassery KSRTC Bus Stand
Pala

Summary

City Level Summary

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	489	541	454
Blocked Call Rate (%)	0	0.55%	0
CSSR% (Accessibility)	100%	99.45	100%
Drop Call Rate (%)	0	0.18%	0.22
Mobility HOSR (%)	97.79%	99.13	99.66%
Rx Quality (%)	95.47%	99.3%	98.6%

Voice Call	3G/VoLTE					
	BSNL 3G	VIL 3G	Airtel VoLTE	BSNL 4G	JIO VoLTE	VIL 4G
Call Attempt	376	449	489	129	575	458
Blocked Call Rate (%)	0.27%	0.22%	0.41%	0.7%	0%	0.21%
CSSR% (Accessibility)	99.73%	99.77%	99.59%	99.19 %	100%	99.78%
Drop Call Rate (%)	0.79%	0.22%	0%	0%	0.17%	0%
Mobility HOSR (%)	99.63%	99.78%	99.49%	98.73%	99.45%	97.53%
Rx Quality (%)	67.4%	99.14%	81.22%	72.9%	95.29%	99.12%

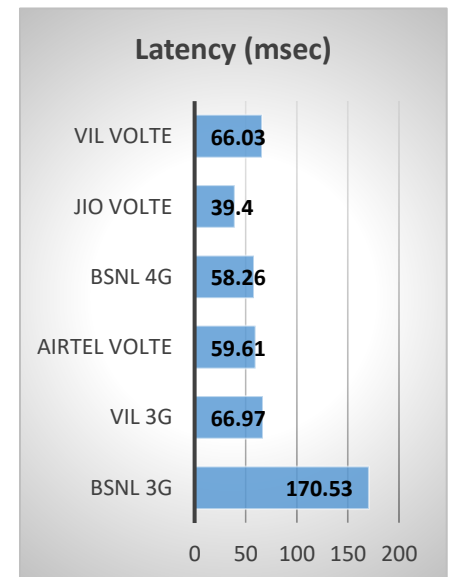
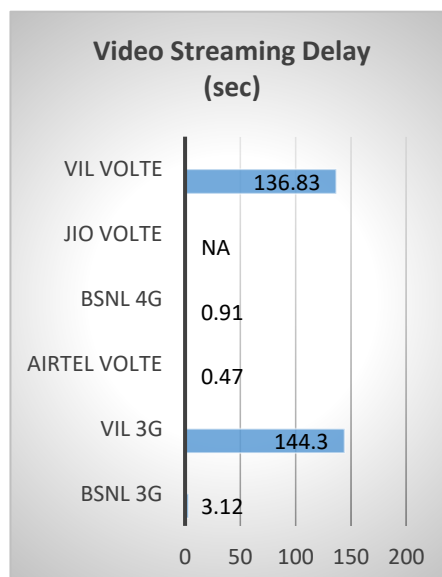
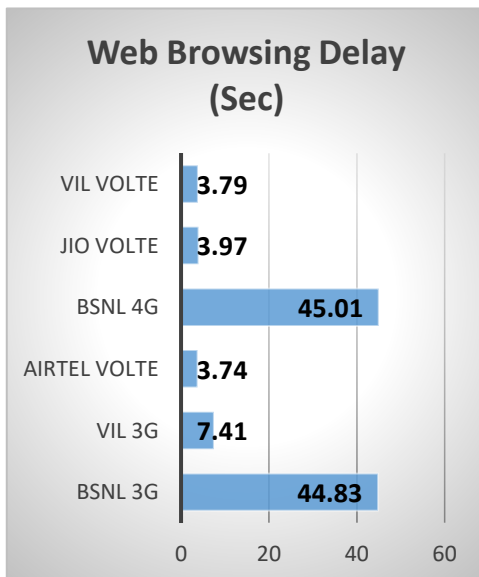
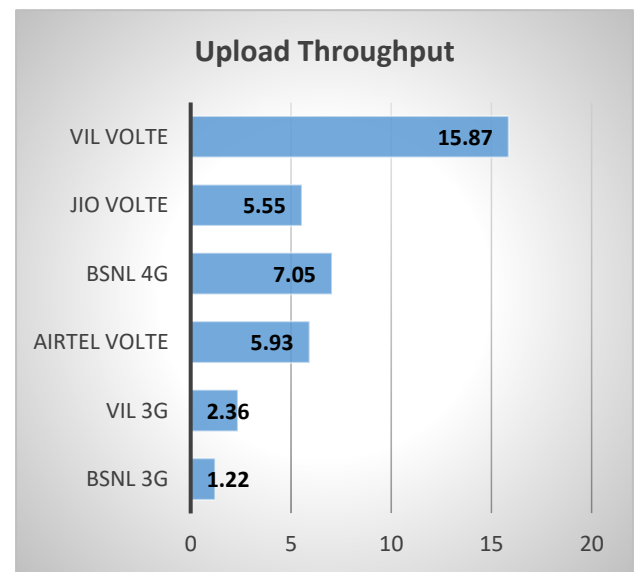
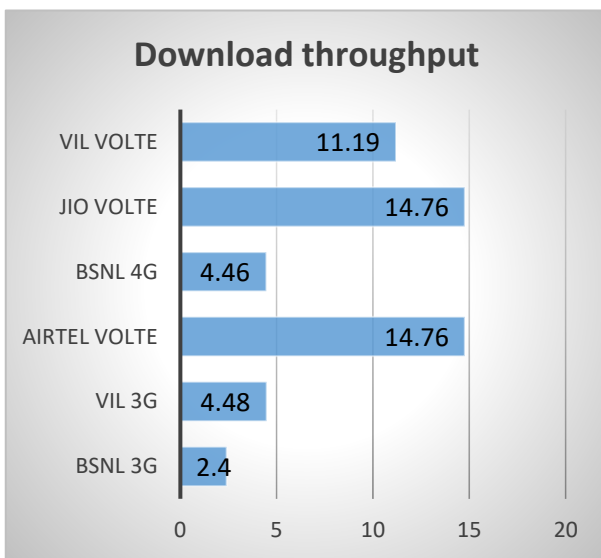
Data Services Static

Key Observations

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

Data Download, Upload Performance (Mbps), Web Browsing delay, Video Streaming and Latency

3G/4G/ Network:



Summary

City Level Summary(contd.)

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	175.34	87.74	174.1
Upload Throughput (kbps)	90.36	63.39	89.46
Web Browsing Delay (sec)	54.38	475.13	45.7
Latency (msec)	364.12	248.8	200.27

Data Services Static	3G/VoLTE					
	BSNL 3G	VIL 3G	Airtel VoLTE	BSNL 4G	JIO VoLTE	VIL VoLTE
Download Throughput (mbps)	2.4	4.48	14.76	4.46	14.76	11.19
Upload Throughput (mbps)	1.22	2.36	5.93	7.05	5.55	15.87
Web Browsing Delay (sec)	44.83	7.41	3.74	45.01	3.97	3.79
Video Streaming Delay (sec)	3.12	144.3	0.47	0.91	NA	136.83
Latency (msec)	170.53	66.97	59.61	58.26	39.4	66.03

Data Services Dynamic	3G/VoLTE				
	BSNL 3G	Airtel Volte	BSNL 4G	JIO VoLTE	VIL VoLTE
Download Throughput (mbps)	1.12	10.84	2.17	7.75	8.61
Upload Throughput (mbps)	1.1	9.17	3.44	1.78	7.6
Web Browsing Delay (sec)	45.24	-	23.60	3.97	-
Latency (msec)	144.72	59.33	97.41	48.38	98

Summary

City Level Summary(contd.)

Data Services Static – Location 1	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	158.54	69.93	199.76
Upload Throughput (kbps)	95.28	35.08	91.72
Web Browsing Delay (sec)	62.094	637.2	40.85
Latency (msec)	322.34	272.4	119.6

Data Services Static – Location 2	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	204.62	74.08	205.31
Upload Throughput (kbps)	111.72	91.84	90.07
Web Browsing Delay (sec)	37.818	458.8	43.66
Latency (msec)	449.856	215	302.2

Data Services Static -- Location 3	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	166.86	63.69	160.59
Upload Throughput (kbps)	76.72	29.67	95.18
Web Browsing Delay (sec)	24.654	601	48.15
Latency (msec)	419.32	235.4	125.8

Data Services Static – Location 4	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	246.54	62.45	106.07
Upload Throughput (kbps)	109.22	33.74	84.75
Web Browsing Delay (sec)	59.476	437.2	53.66
Latency (msec)	305.54	293.6	269

Data Services Static – Location 5	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	177.22	114.97	138.35
Upload Throughput (kbps)	70.46	101.93	69.95
Web Browsing Delay (sec)	70.59	396.8	46.06
Latency (msec)	365.72	257	245.6

Summary

City Level Summary(contd.)

Data Services Static – Location 6	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	98.26	141.33	234.53
Upload Throughput (kbps)	78.74	88.08	105.06
Web Browsing Delay (sec)	71.646	319.8	41.84
Latency (msec)	321.94	219.4	139.4

Data Services Static Location 1	3G		VoLTE		
	BSNL 3G	VIL 3G	Airtel	JIO	VIL
Download Throughput (mbps)	3.63	3.29	19.06	15.56	13.03
Upload Throughput (mbps)	1.28	2.35	5.47	3.41	24.77
Web Browsing Delay (sec)	32.6	7.04	3.896	4.47	3.41
Video Streaming Delay (sec)	3.21	144.3	0.46	0	137.41
Latency (msec)	95.2	63.6	67.4	41.86	68.4

Data Services Static Location 2	3G		VoLTE		
	BSNL 3G	VIL 3G	Airtel	JIO	VIL
Download Throughput (mbps)	1.63	5.29	8.7	16.63	8.25
Upload Throughput (mbps)	1.72	1.75	3.5	5.46	17.51
Web Browsing Delay (sec)	37.4	9.98	3.798	4.66	3.6
Video Streaming Delay (sec)	2.56	146.96	0	0	136.6
Latency (msec)	90.8	72.4	64.32	42.66	58.4

Data Services Static Location 3	3G		VoLTE		
	BSNL 3G	VIL 3G	Airtel	JIO	VIL
Download Throughput (mbps)	9.45	3.04	15.49	15.43	10.39
Upload Throughput (mbps)	6.92	3.19	11.13	9.21	5.69
Web Browsing Delay (sec)	24.36	5.41	4.054	3.45	3.8
Video Streaming Delay (sec)	1.8	140.85	0.8212	0	137.21
Latency (msec)	88.6	66.4	63.18	37.48	74

Summary

City Level Summary(contd.)

Data Services Static Location 4					
	BSNL 4G	VIL 3G	Airtel	JIO	VIL
Download Throughput (mbps)	8.23	6.56	15.92	18.12	13.92
Upload Throughput (mbps)	13.34	3.16	5.09	7.23	23.19
Web Browsing Delay (sec)	20.99	5.41	3.702	3.63	3.68
Video Streaming Delay (sec)	1.13	139.46	0.5392	0	135.5
Latency (msec)	87.8	40.2	59.9	37.48	38.6

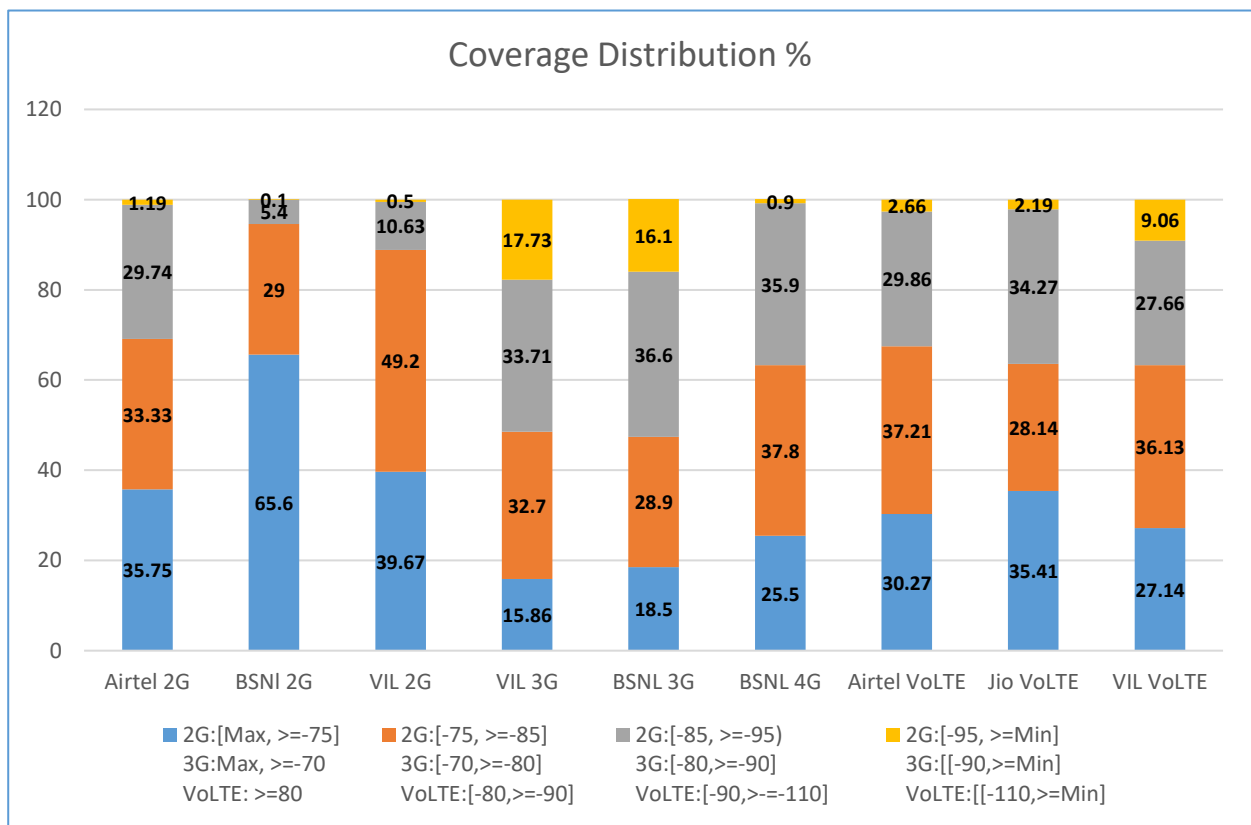
Data Services Static Location 5					
	BSNL 3G	VIL 3G	Airtel	JIO	VIL
Download Throughput (mbps)	1.95	4.51	9.71	10.12	10.08
Upload Throughput (mbps)	0.65	1.92	5.59	3.7	2.2
Web Browsing Delay (sec)	64.5	5.95	3.4	3.73	4.42
Video Streaming Delay (sec)	3.58	149.53	0.5484	0	137.99
Latency (msec)	325.6	73	59.08	42.72	115.2

Data Services Static Location 6					
	BSNL 3G	VIL 3G	Airtel	JIO	VIL
Download Throughput (mbps)	5.11	4.17	19.7	10.28	11.48
Upload Throughput (mbps)	7.8	1.77	4.82	4.32	21.88
Web Browsing Delay (sec)	25.45	10.66	3.572	3.79	3.82
Video Streaming Delay (sec)	1.59	144.7	0.4504	0	136.25
Latency (msec)	86.98	86.2	43.76	33.66	41.6

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	69.08
BSNI 2G	94.5
VIL 2G	88.86
VIL 3G	82.27
BSNL 3G	83.9
BSNL 4G	99.1
Airtel VoLTE	97.34
Jio VoLTE	97.81
VIL VoLTE	90.93



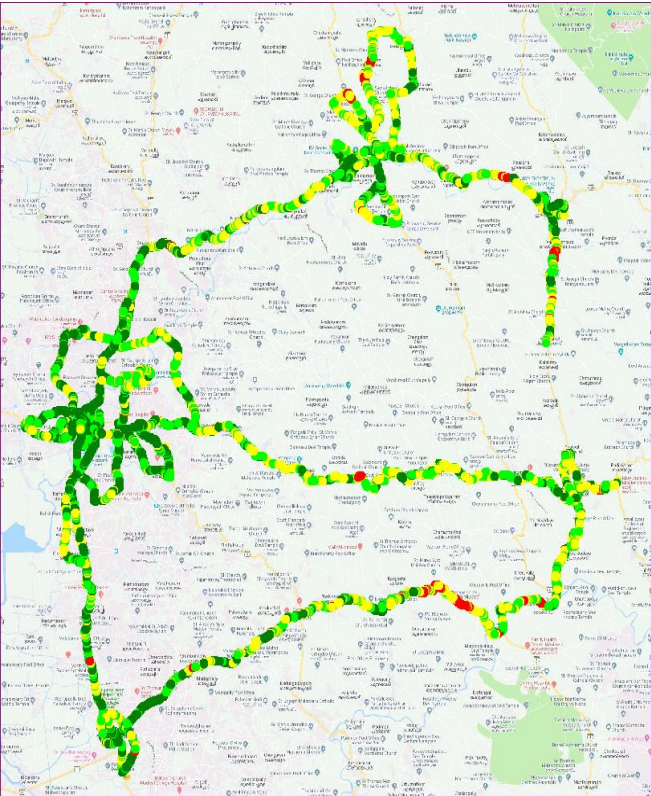
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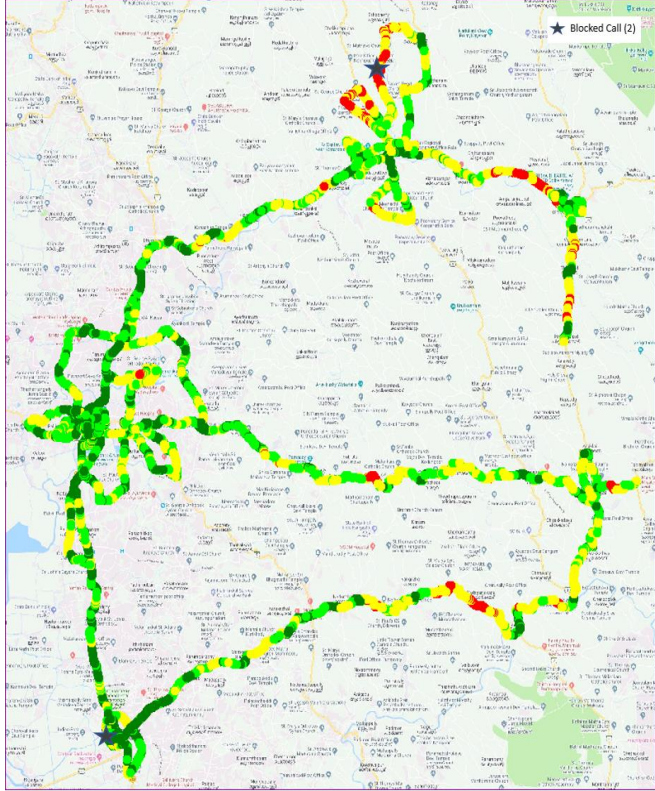
AIRTEL

Technology	Coverage Rate
2G	69.08%
VoLTE	97.34%

2G



VoLTE



2G		
Overall RxLevel	# Samples	% PDF
[Max, ≥ -75]	1567378	35.75
$[-75, \geq -85]$	1461139	33.33
$[-85, \geq -95]$	1303765	29.74
$[-95, \geq \text{Min}]$	52014	1.19
Total	4384296	

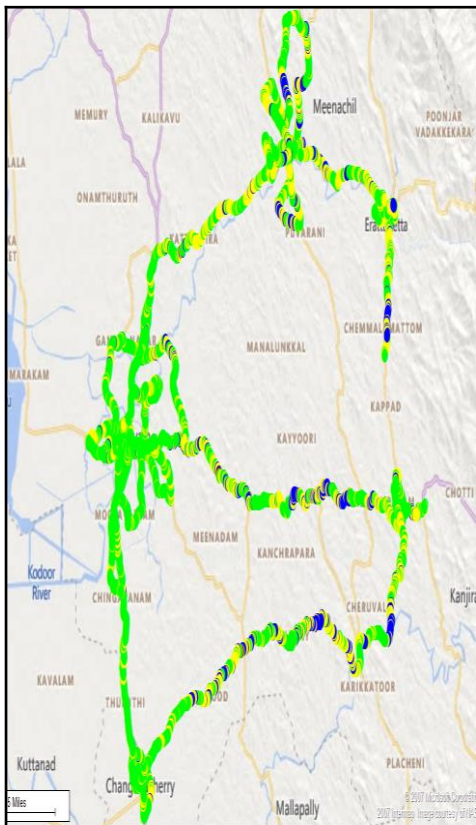
VoLTE		
Overall RSRP	# Samples	% PDF
[Max, ≥ -80]	3217554	30.27
$[-80, \geq -90]$	3955311	37.21
$[-90, \geq -110]$	3173651	29.86
$[-110, \geq \text{Min}]$	282555	2.66
Total	10629071	

I. Coverage Details

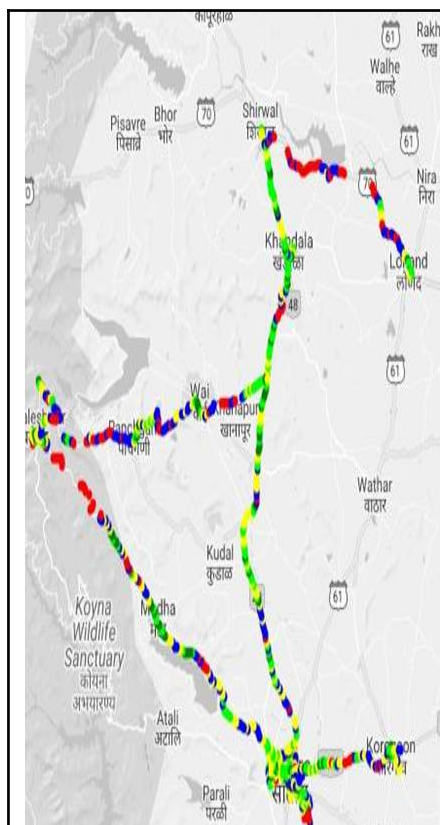
BSNL

Technology	Coverage Rate
2G	94.5 %
3G	83.9 %
4G	99.1 %

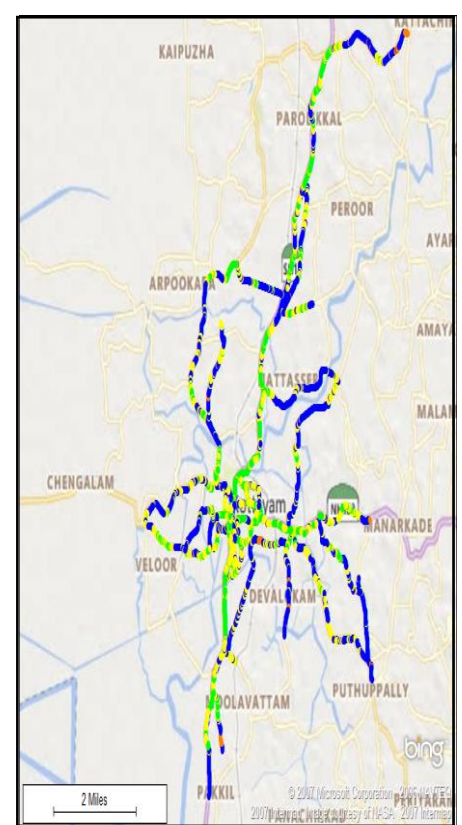
2G



3G



4G



2G		
Overall RxLevel	# Samples	% PDF
[Max, >=-75]	32420	65.6
[-75, >=-85]	14336	29.0
[-85, >=-95]	2653	5.4
[-95, >=Min)	32	0.1
Total	49441	100

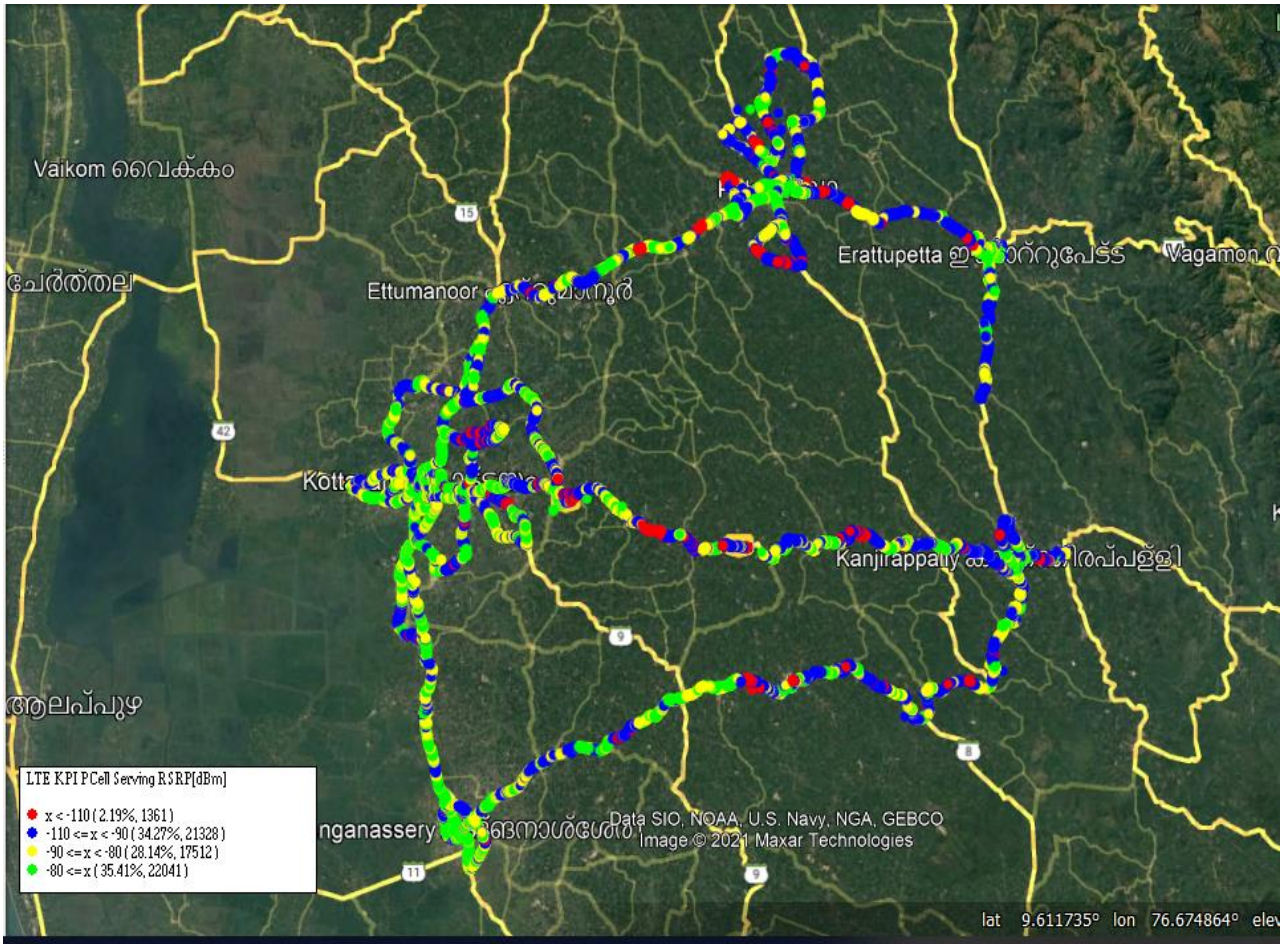
3G		
Overall RSCP	# Samples	% PDF
[Max, >=-70]	7372	18.5
[-70, >=-80]	11501	28.9
[-80, >=-90]	14566	36.6
[-90, >=Min)	6412	16.1
Total	39851	100

VoLTE		
Overall RSRP	# Samples	% PDF
[Max, >=-80]	6407	25.5
[-80, >=-90]	9497	37.8
[-90, >=-110]	9020	35.9
[-110, >=Min)	215	0.9
Total	25139	100

I. Coverage Details

JIO

Technology	Coverage Rate
4G	97.81



4GVoLTE		
Overall RSRP	# Samples	% PDF
[Max, >=-80]	22039	35.41
[-80, >=-90)	17513	28.14
[-90, >=-110)	21329	34.27
[-110, >=Min)	1361	2.19
Total	62242	100.00

I. Coverage Details

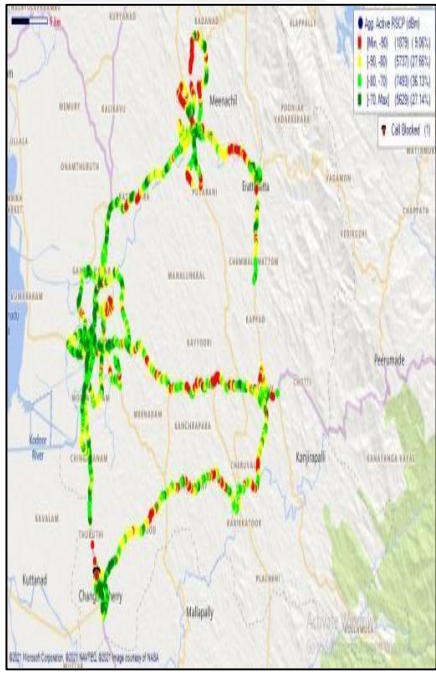
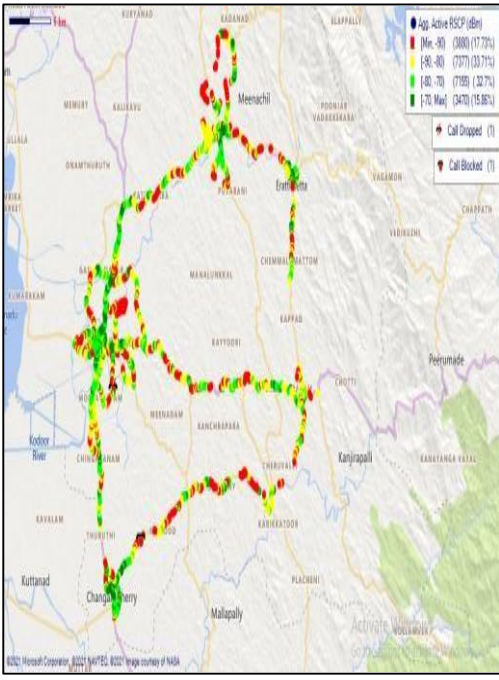
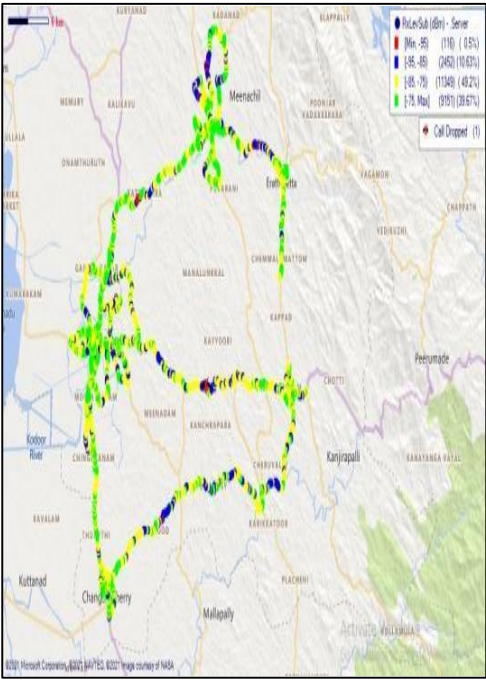
VIL

Technology	Coverage Rate
2G	88.86 %
3G	82.27 %
VoLTE	90.93 %

2G

3G

4G/CSFB



2G		
Overall RxLevel	# Samples	% PDF
[Max, >=-75]	9151	39.67
[-75, >=-85]	11349	49.2
[-85, >=-95]	2452	10.63
[-95, >=Min)	116	0.5
Total	23068	100

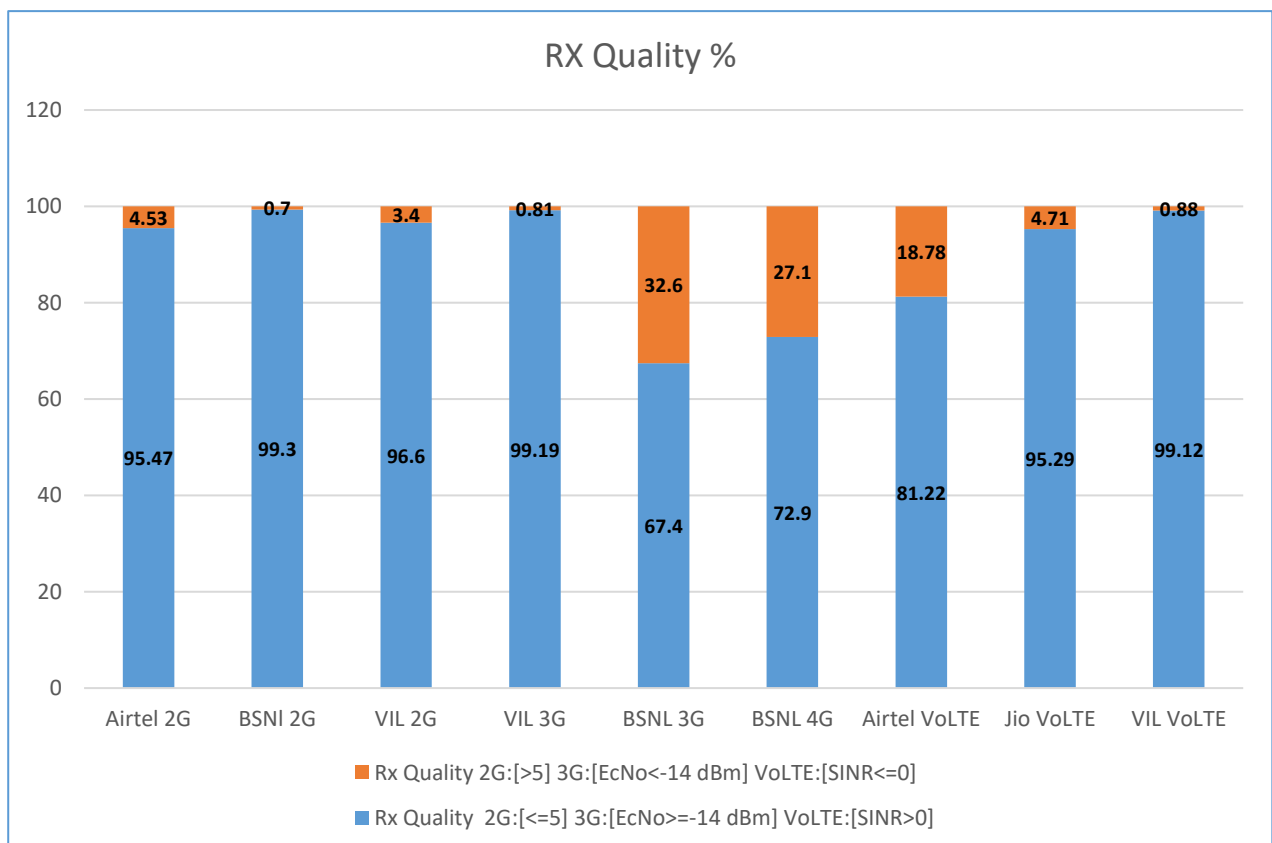
3G		
Overall RxLevel	# Samples	% PDF
[Max, >=-70]	3470	15.86
[-70, >=-80]	7155	32.70
[-80, >=-90]	7377	33.71
[-90, >=Min)	3880	17.73
Total	21882	100

4G CSFB		
Overall RSRP	# Samples	% PDF
[Max, >=-70]	5629	27.14
[-70, >=-80]	7493	36.13
[-80, >=-90]	5737	27.66
[-90, >=Min)	1879	9.06
Total	20738	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	95.47
BSNI 2G	99.3
VIL 2G	96.60
VIL 3G	99.19
BSNL 3G	67.4
BSNL 4G	72.9
Airtel VoLTE	81.22
Jio VoLTE	95.29
VIL VoLTE	99.12



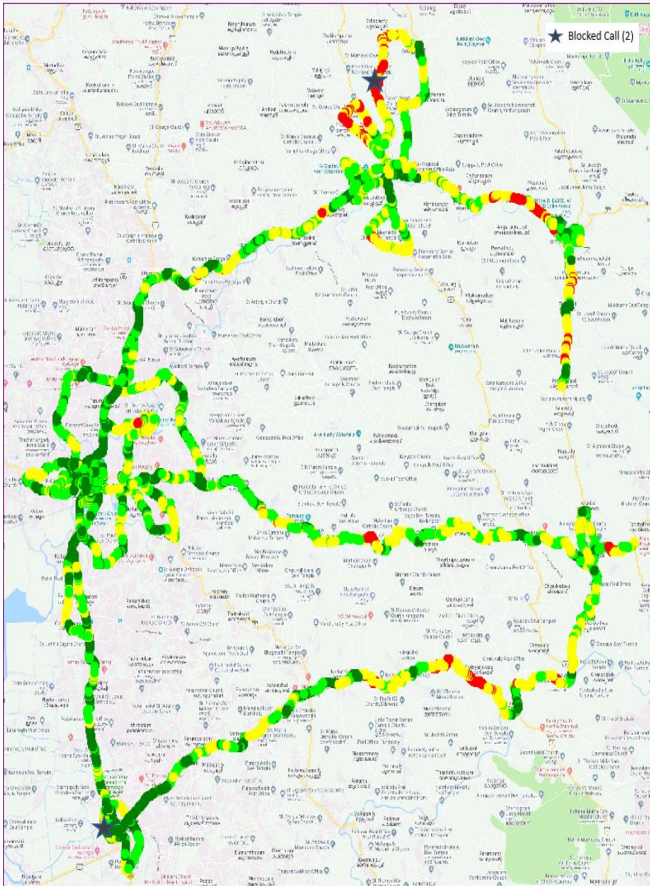
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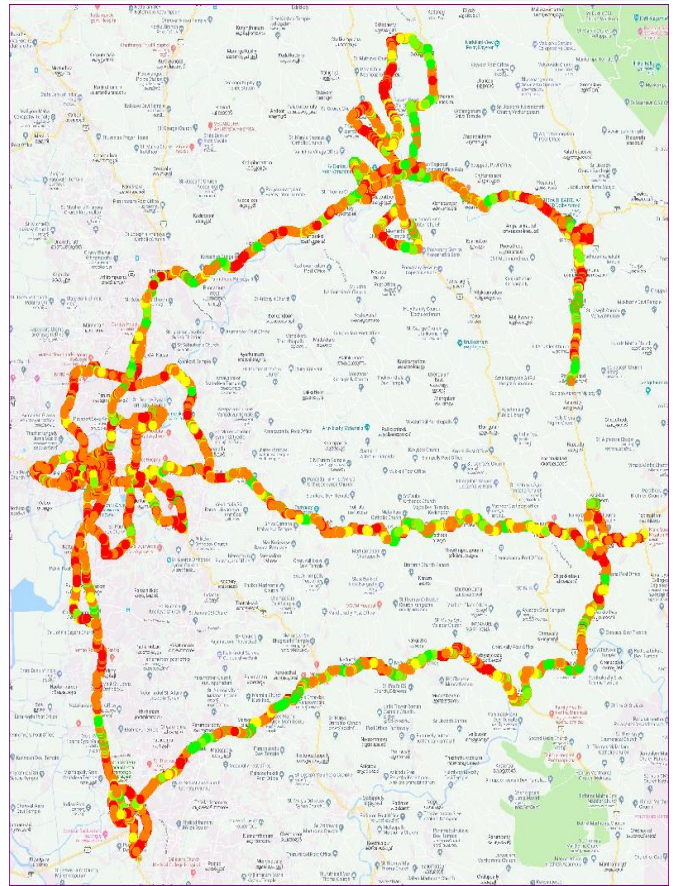
Airtel

Technology	Rx Quality
2G	95.47%
VoLTE	81.22%

2G



VoLTE



Overall Rx Quality	# Samples	% PDF
(Min, ≤ 2)	3683602	83.41
(2, ≤ 3)	243054	5.50
(3, ≤ 4)	185777	4.21
(4, ≤ 5)	104036	2.36
(5, \leq Max)	199898	4.53
Total	4416367	

Overall SINR	# Samples	% PDF
(Min, ≤ 0)	2718246	18.78
(0, ≤ 5)	6888804	47.59
(5, ≤ 10)	2367374	16.35
(10, ≤ 15)	1400581	9.67
(15, \leq Max)	1101802	7.61
Total	14476807	

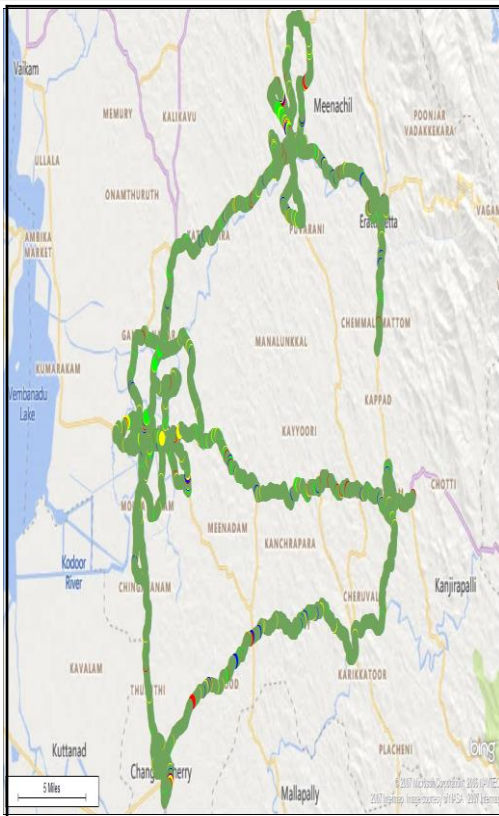
II. Quality Details

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 $\geq 95\%$.

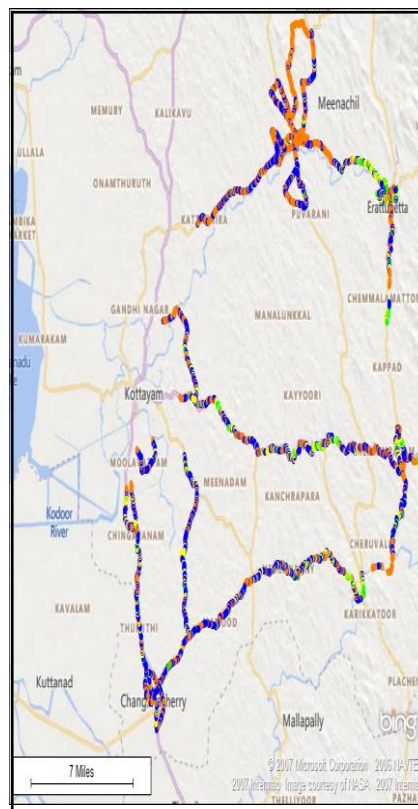
BSNL

Technology	RxQuality
2G	99.3 %
3G	67.4 %
4G	72.9 %

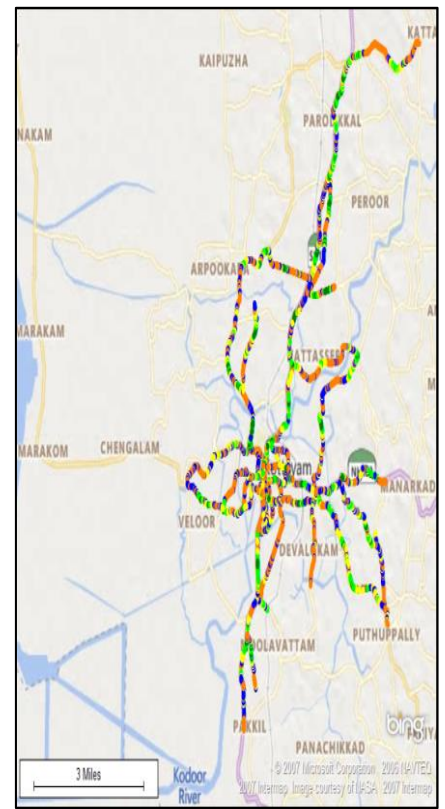
2G



3G



4G



Overall Rx Quality	# Samples	% PDF
(Min, ≤ 2)	46334	94.0
(2, ≤ 3)	1219	2.5
(3, ≤ 4)	877	1.8
(4, ≤ 5)	505	1.0
(5, \leq Max)	346	0.7
Total	49281	100

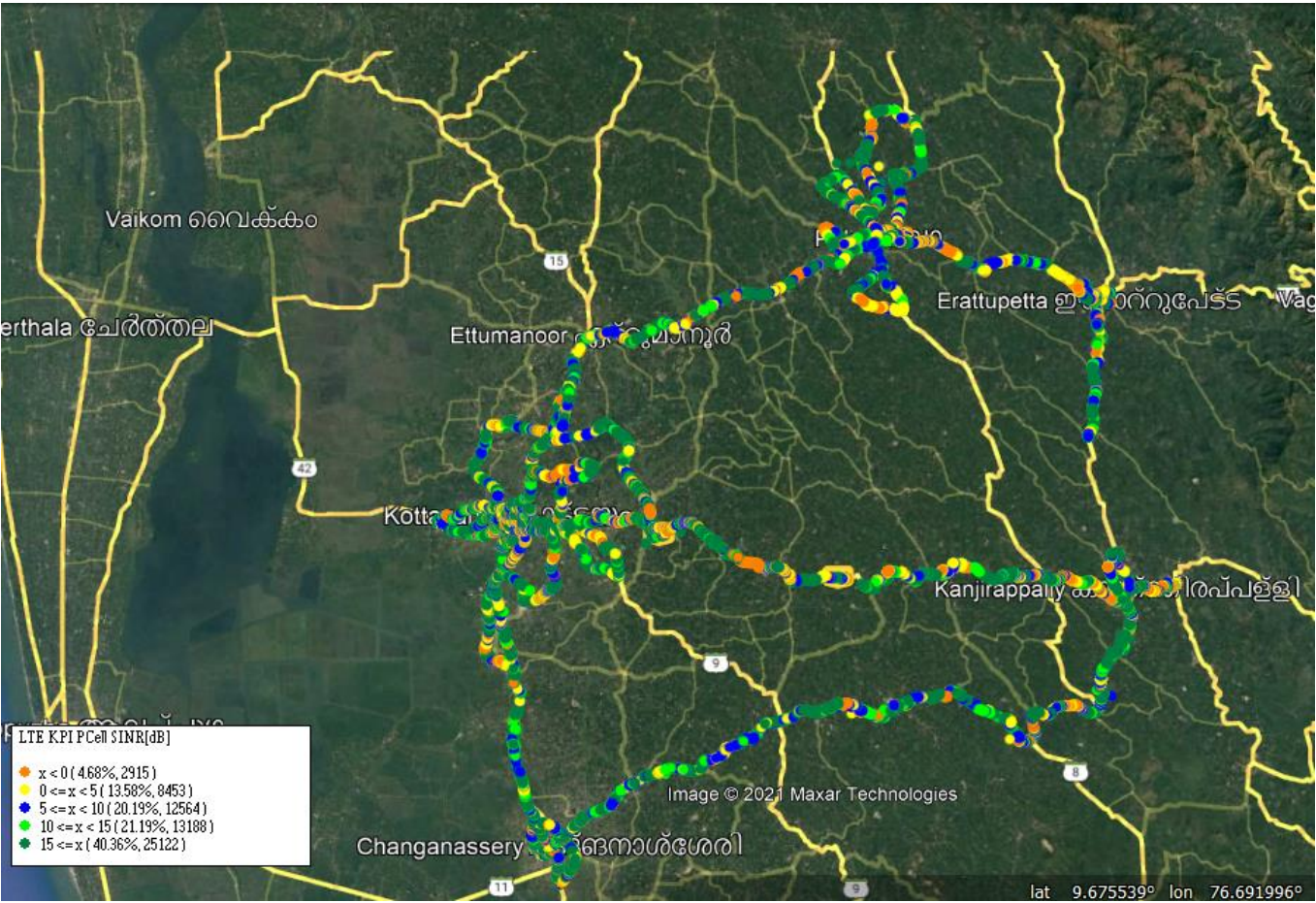
Overall EcNo	# Samples	% PDF	Overall SINR	# Samples	% PDF
(Max, ≤ -6)	234	0.6	(Min, ≤ 0)	6796	27.1
(-6, ≤ -9)	1901	4.8	(0, ≤ 5)	6336	25.3
(-9, ≤ -11)	6089	15.3	(5, ≤ 10)	6135	24.5
(-11, ≤ -14)	18611	46.7	(10, ≤ 15)	3887	15.5
(-14, \leq Min)	12989	32.6	(15, \leq Max)	1894	7.6
Total	39824	100	Total	25048	100

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 $\geq 95\%$.

JIO

Technology	Rx Quality
4G	95.29



Overall SINR	# Samples	% PDF
(Min, <=0)	2930	4.71
(0, <=5)	8469	13.61
(5, <=10)	12564	20.19
(10, <=15)	13200	21.21
(15, <=Max)	25079	40.29
Total	62242	100

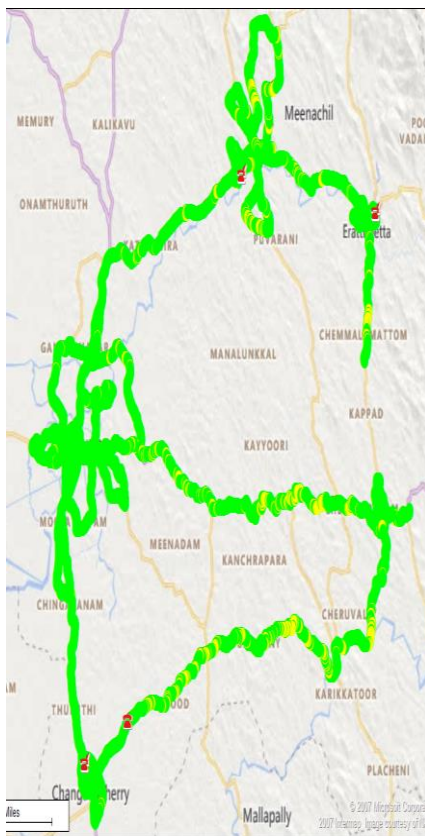
II. Quality Details

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 $\geq 95\%$.

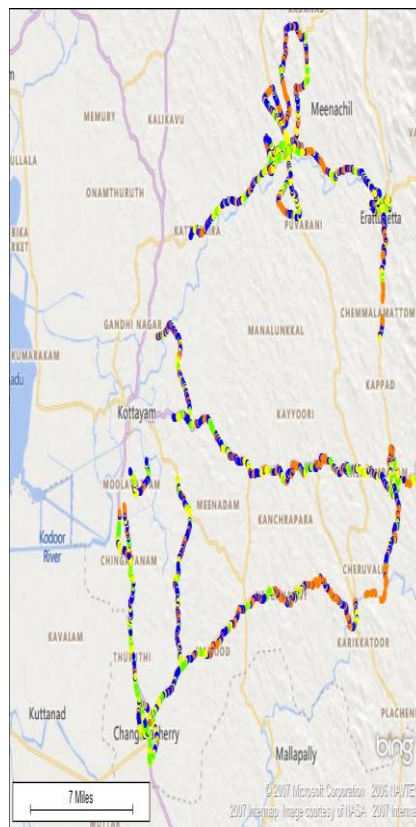
VIL

Technology	RxQuality
2G	98.60%
3G	99.19%
4G/VoLTE	99.12%

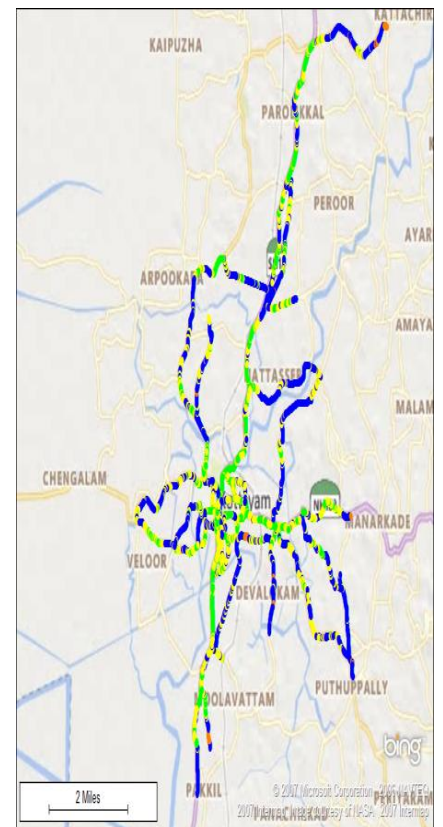
2G



3G



4G



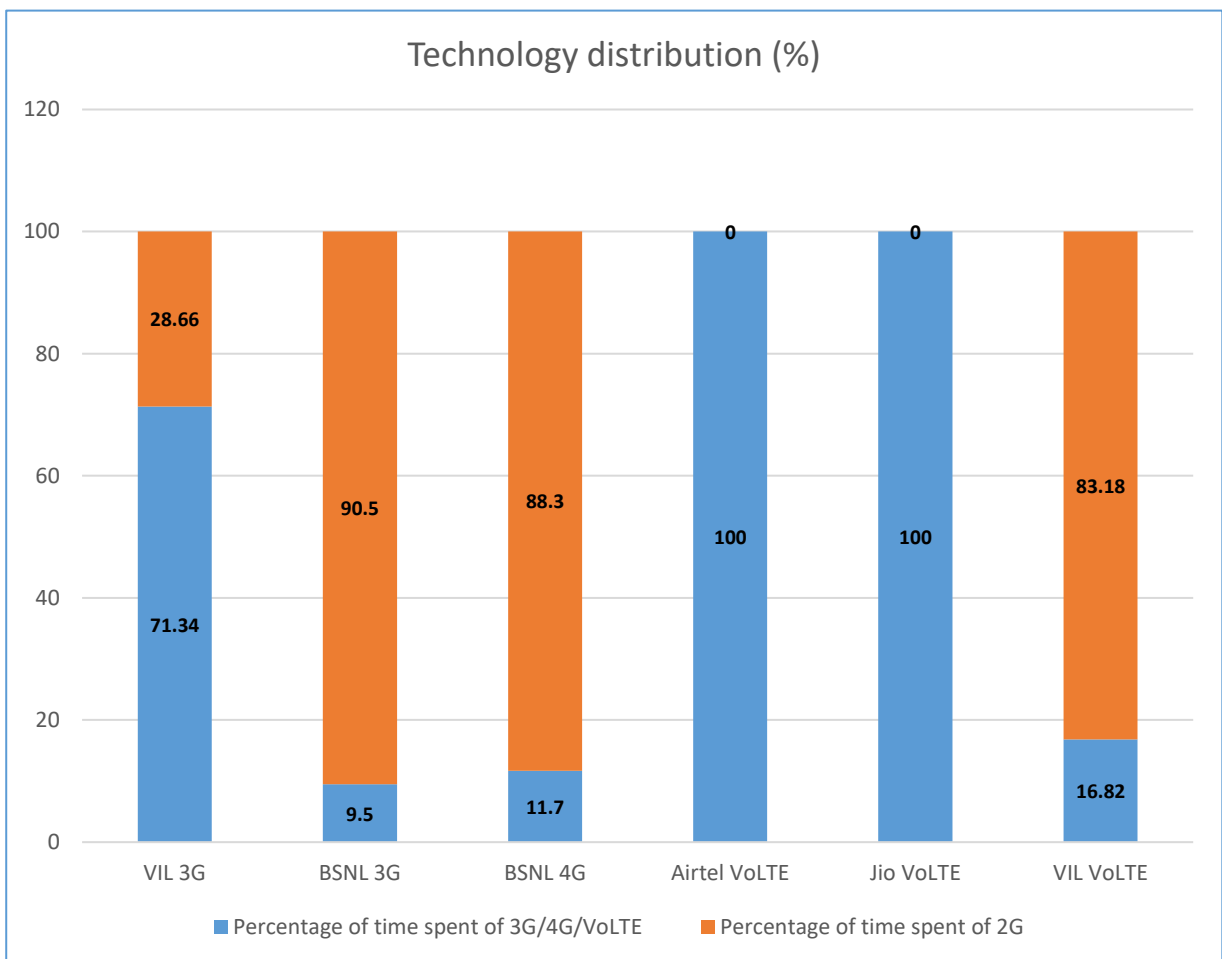
Overall Rx Quality	# Samples	%PDF
(Min, ≤ 2)	17680	86.88
(2, ≤ 3)	1619	7.96
(3, ≤ 4)	489	2.40
(4, ≤ 5)	276	1.36
(5, \leq Max)	285	1.40
Total	20349	100

Overall EcNo	# Samples	%PDF
(Max, ≤ -6)	5074	23.17
(-6, ≤ -9)	11020	50.32
(-9, ≤ -11)	4429	20.22
(-11, ≤ -14)	1200	5.48
(-14, \leq Min)	178	0.81
Total	21901	100.00

Overall EcNo	# Samples	%PDF
(Max, ≤ -6)	4733	22.82
(-6, ≤ -9)	10669	51.45
(-9, ≤ -11)	4069	19.62
(-11, ≤ -14)	1085	5.23
(-14, \leq Min)	182	0.88
Total	20738	100.00

III. Technology Details

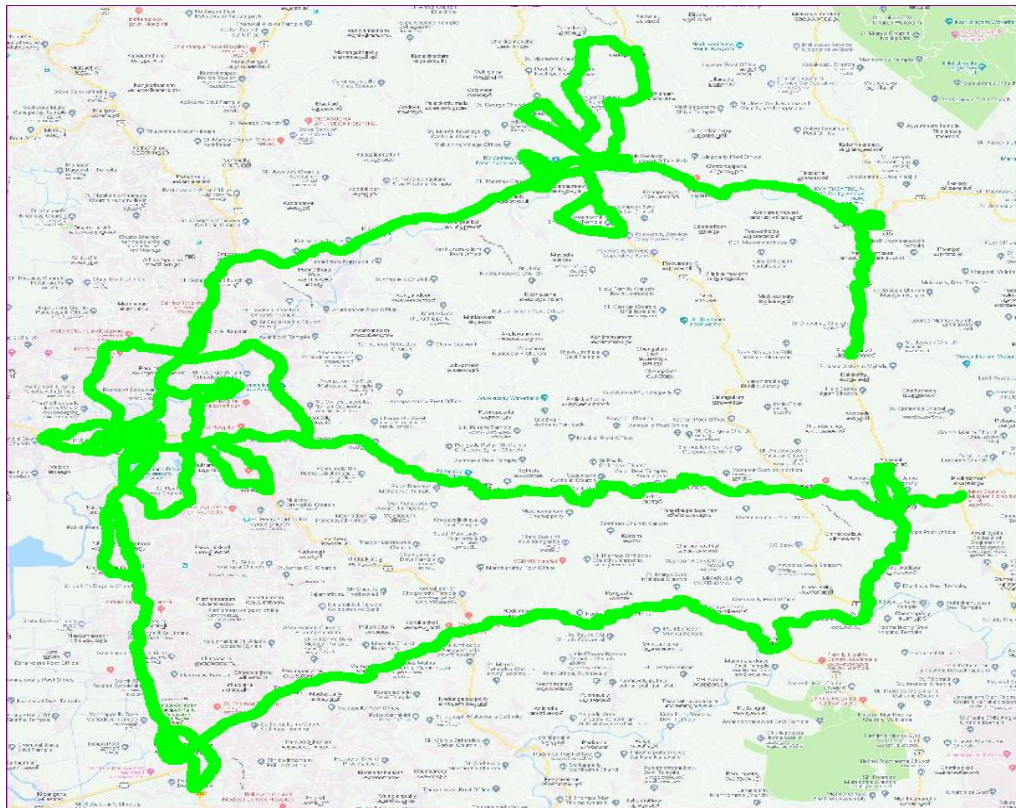
TSP	Percentage of time spent on 3G/4G/VoLTE
VIL 3G	71.34
BSNL 3G	9.5
BSNL 4G	11.7
Airtel VoLTE	100
Jio VoLTE	100
VIL VoLTE	16.82



III. Technology Details

Airtel

Technology	Time Spent on 4G
4G/VoLTE	100 %



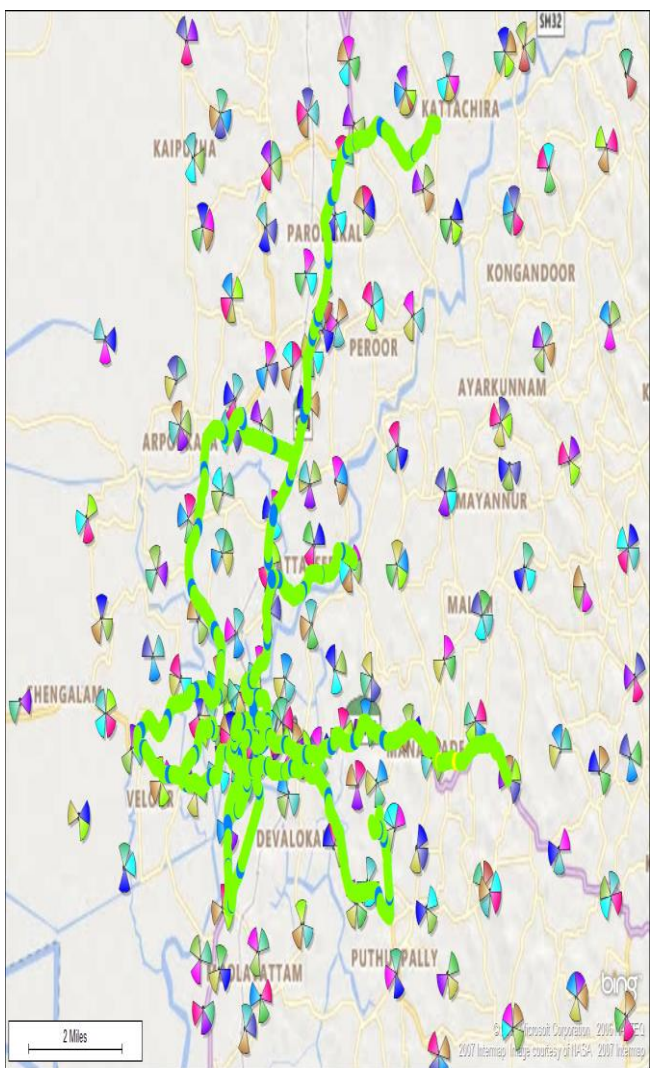
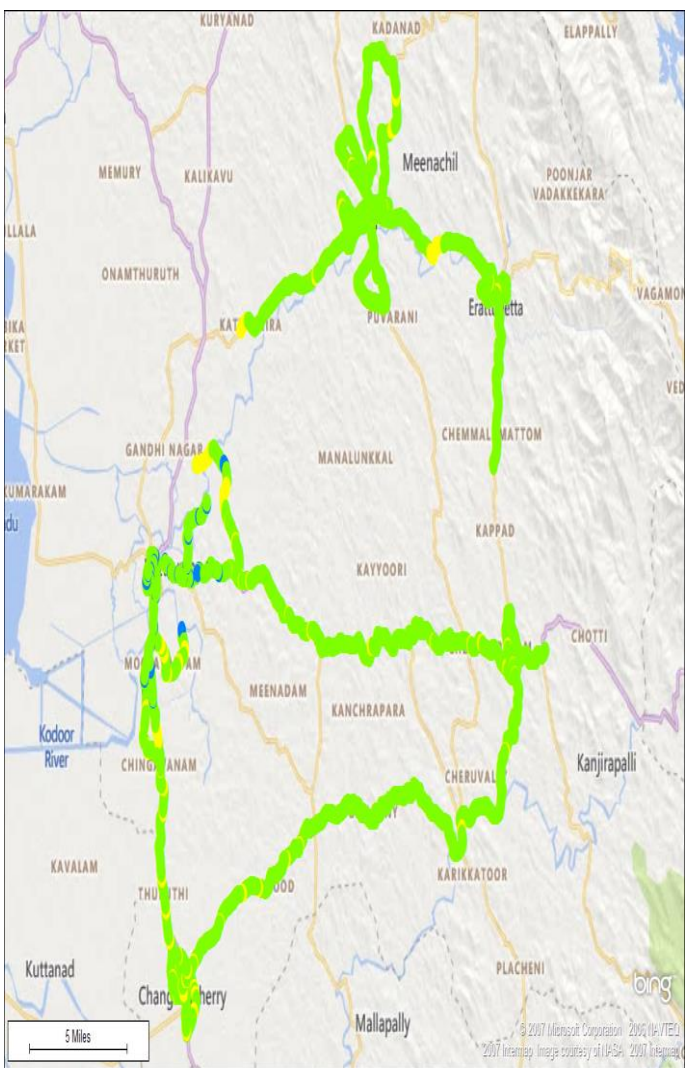
III. Technology Details

BSNL

Technology	Time Spent on 3G/4G
3G	9.5 %
4G	11.7 %

3G

4G

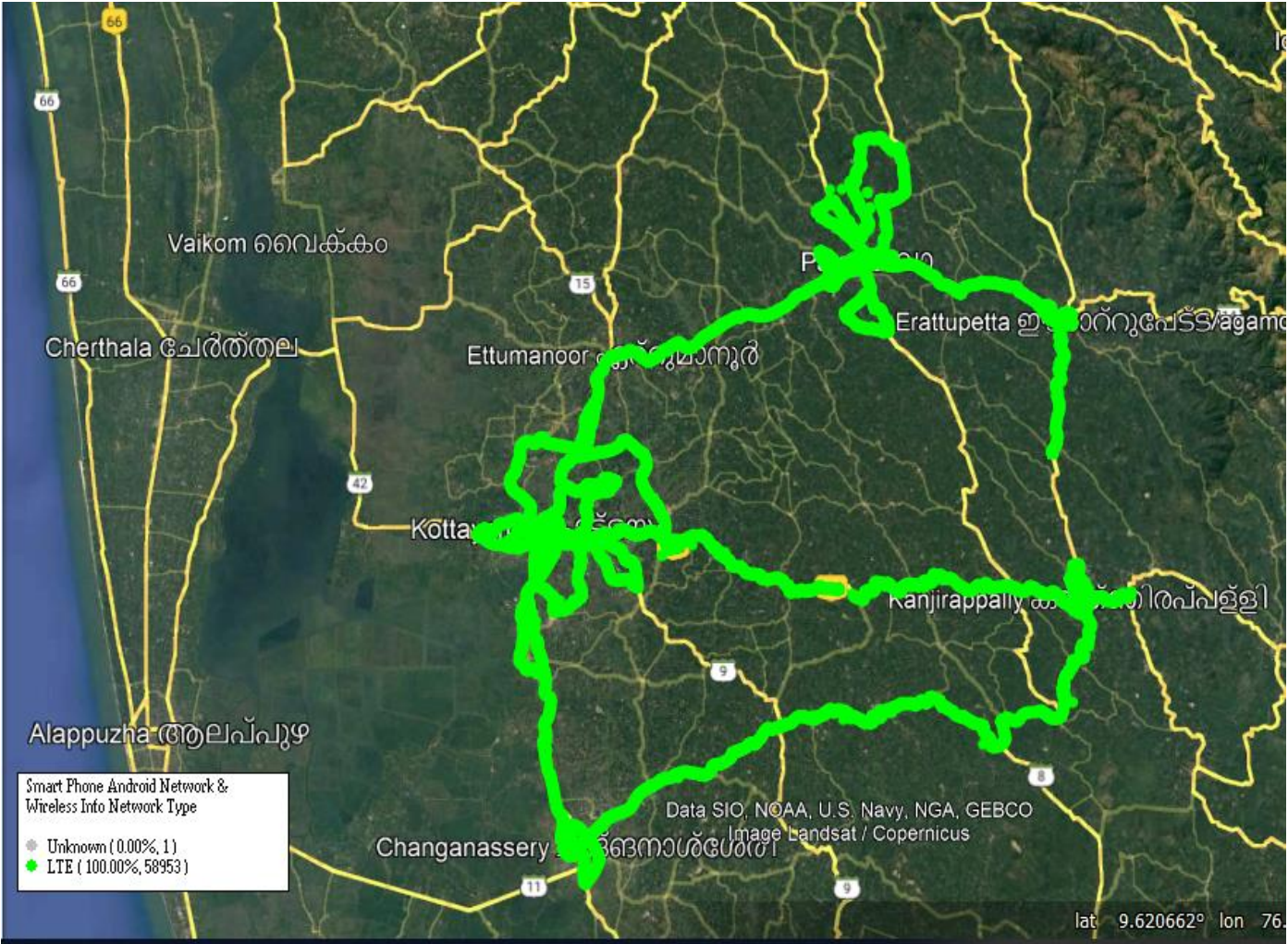


III. Technology Details

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 $\geq 95\%$.

JIO

Technology	Time Spent on 4G
4G	100



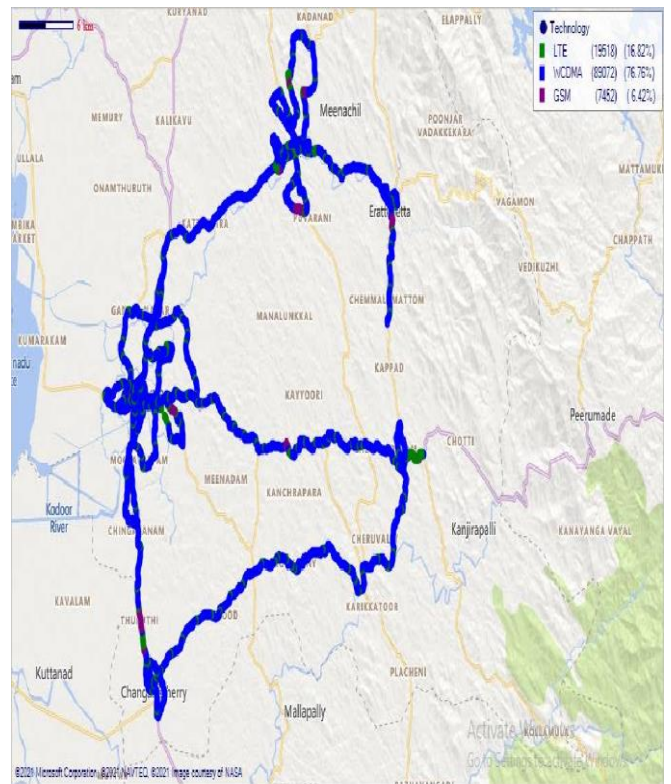
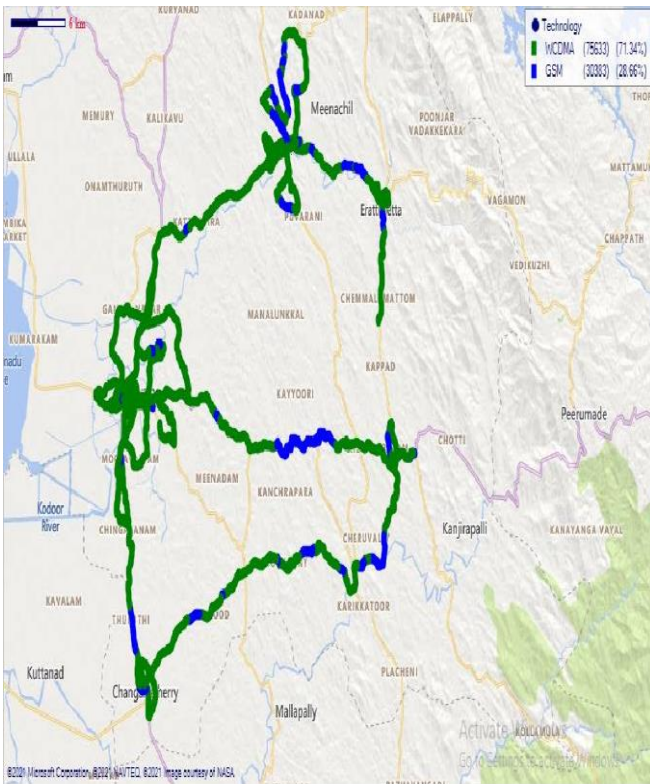
III. Technology Details

VIL

Technology	Time Spent on 4G
3G	71.34%
4G	16.82%

3G

4G



Data Services

IV. Key Observations Dynamic Route 3 Days

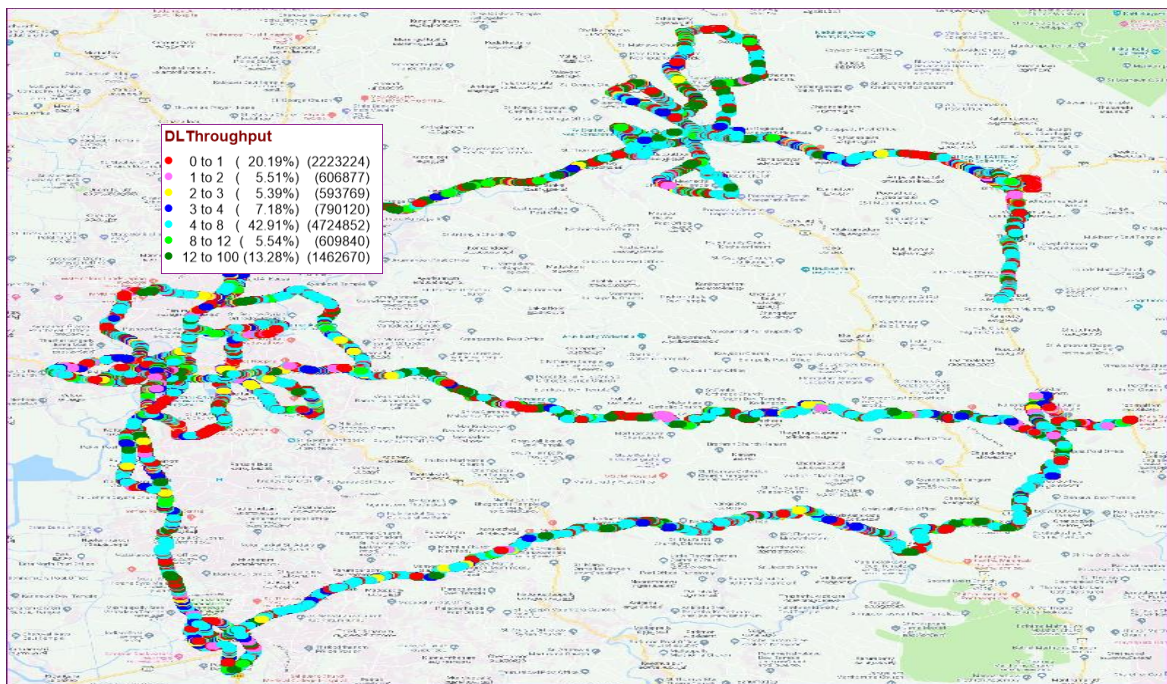
Dynamic Data test conducted for 308Kms and tested for Download Speed

Airtel

Data Statistics - Dynamic Complete SSA 308 KMS (Date 16th to 18th November 2021)

Data KPIs - Overall	4G
DL Throughput (Kbps)	11629.61

4G



DL throughput	No of Sample	%
0 to 1 Mbps	2223224	20.19
1 to 2 Mbps	606877	5.51
2 to 3 Mbps	593769	5.39
3 to 4 Mbps	790120	7.18
4 to 8 Mbps	4724852	42.91
8 to 12 Mbps	609840	5.54
>12 Mbps	1462670	13.28
Total	11011352	

Data Services

IV. Key Observations Dynamic Route 3 Days

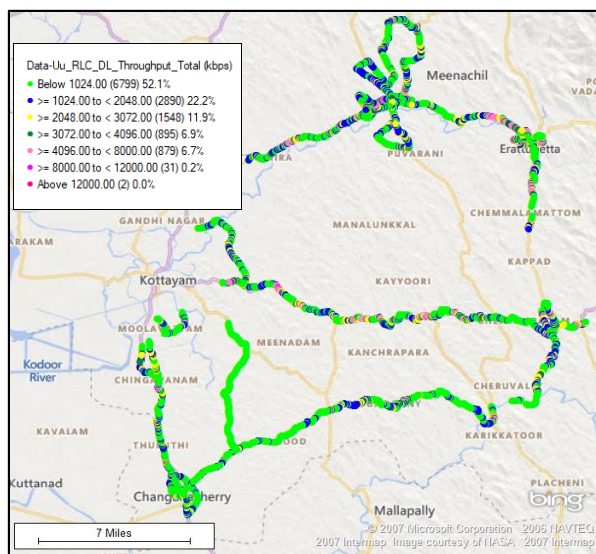
Dynamic Data test conducted for 380 Kms and tested for Download Speed from 16th Nov to 8th Nov

BSNL

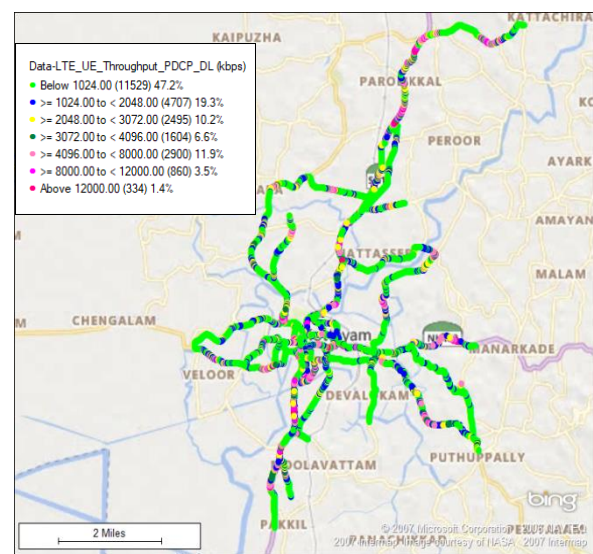
Data Statistics - Dynamic Complete SSA 380 KMS (Date 16th to 19th November 2021)

Data KPIs - Overall	3G	4G
DL Throughput (Kbps)	1428.49	1872.28

3G



4G



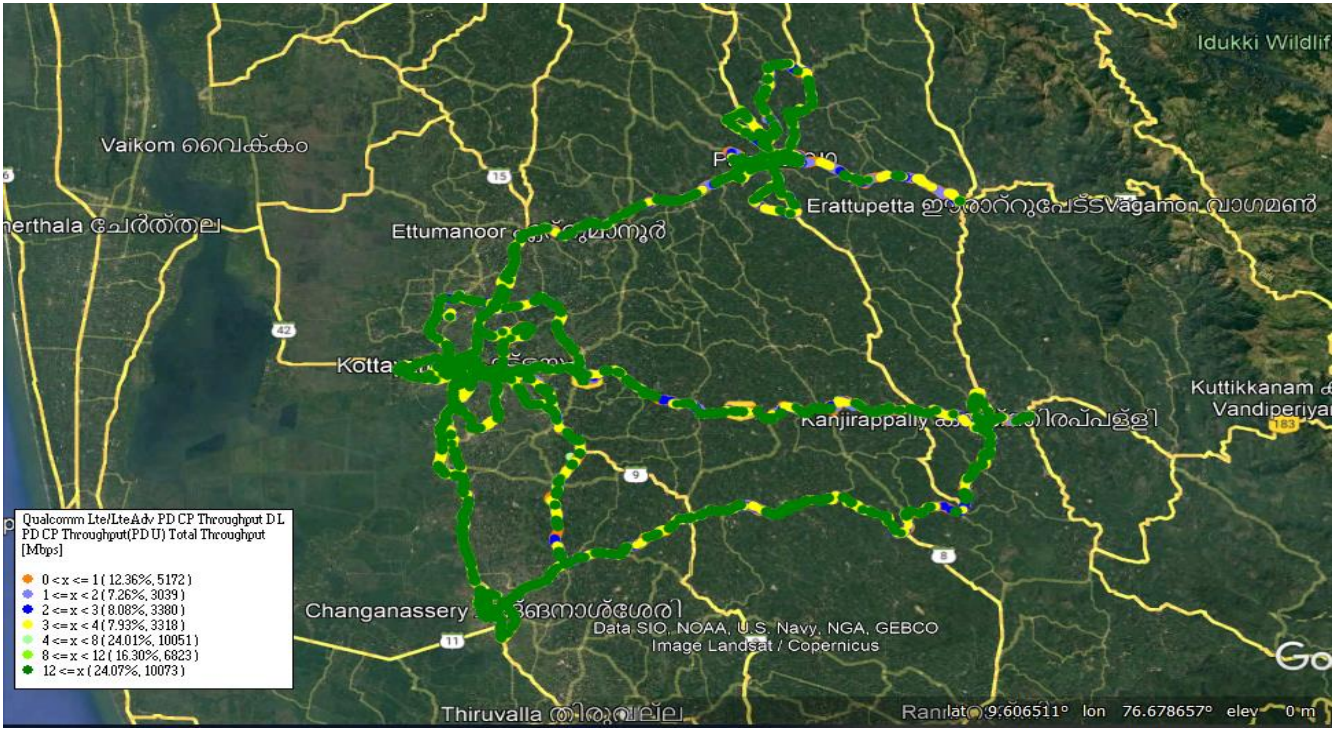
DL throughput	No of Sample	%
0 to 1 Mbps	6799	52.1
1 to 2 Mbps	2890	22.2
2 to 3 Mbps	1548	11.9
3 to 4 Mbps	895	6.9
4 to 8 Mbps	879	6.7
8 to 12 Mbps	31	0.2
>12 Mbps	2	0
Total	13044	100

DL throughput	No of Sample	%
0 to 1 Mbps	11529	47.2
1 to 2 Mbps	4707	19.3
2 to 3 Mbps	2495	10.2
3 to 4 Mbps	1604	6.6
4 to 8 Mbps	2900	11.9
8 to 12 Mbps	860	3.5
>12 Mbps	334	1.4
Total	24429	100

JIO

Data Statistics - Dynamic Complete SSA 380 KMS (Date 16th to 19th November 2021)

Data KPIs - Overall	4G
DL Throughput (Kbps)	7139.64



DL throughput	No of Sample	%
0 to 1 Mbps	5172	12.36%
1 to 2 Mbps	3039	7.26%
2 to 3 Mbps	3380	8.08%
3 to 4 Mbps	3318	7.93%
4 to 8 Mbps	10051	24.01%
8 to 12 Mbps	6823	16.30%
>12 Mbps	10073	24.07%
Total	41856	100.00%

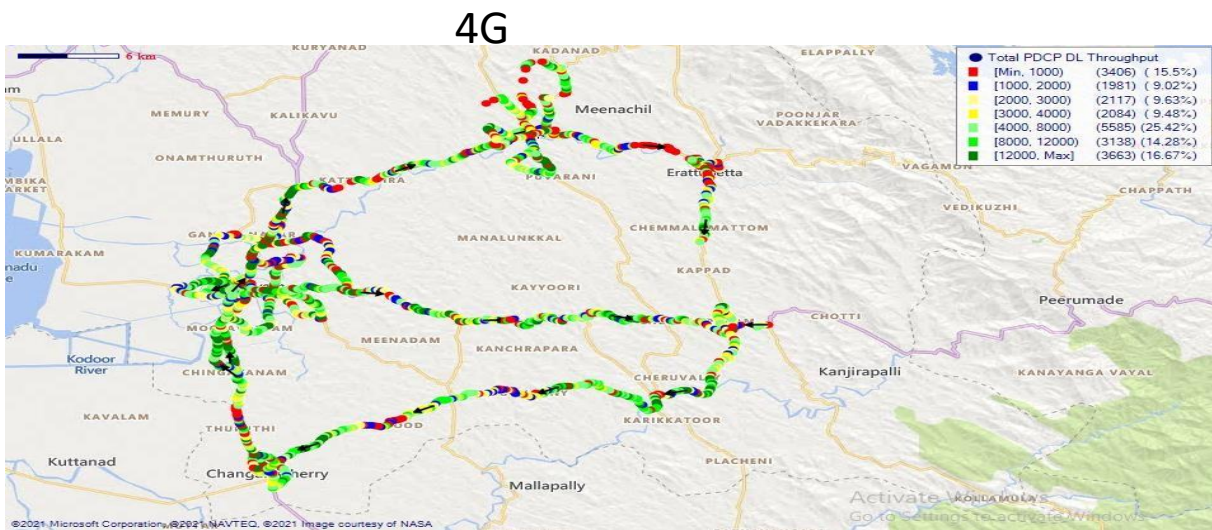
Data Services

IV. Key Observations Dynamic Route 3 Days

VIL

Data Statistics - Dynamic Complete SSA 303 KMS (Date 16th to 18th November 2021)

Data KPIs - Overall	4G
DL Throughput (Kbps)	10395.58



DL throughput	No of Sample	%
0 to 1 Mbps	3406	15.50
1 to 2 Mbps	1981	9.02
2 to 3 Mbps	2117	9.63
3 to 4 Mbps	2084	9.48
4 to 8 Mbps	5585	25.42
8 to 12 Mbps	3138	14.28
>12 Mbps	3663	16.67
Total	21974	100

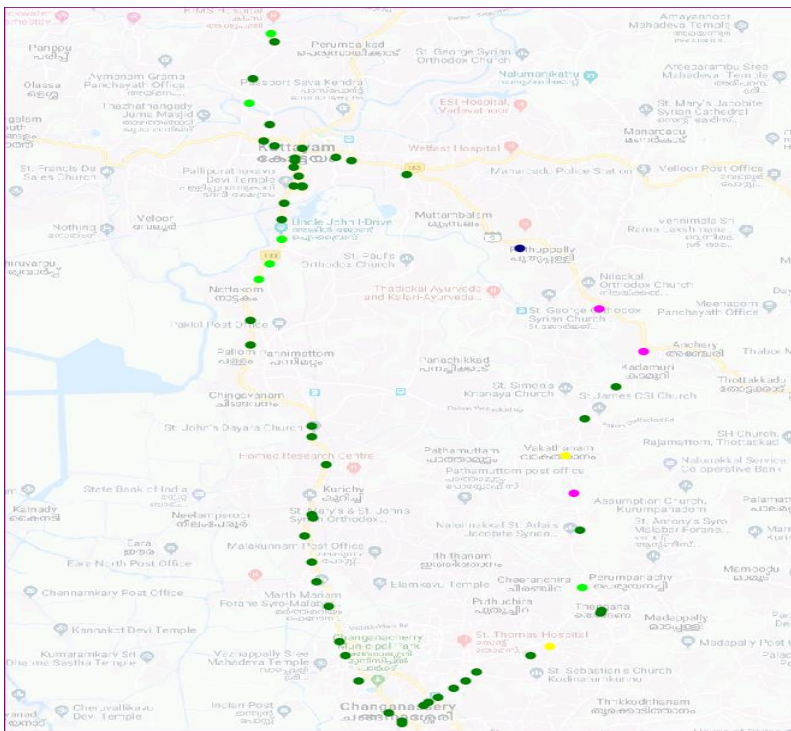
V. Dynamic Data Test- 4G DL/UL (4th Day) Details

Airtel



DL throughput	No of Sample	%
0 to 1 Mbps	0	0.00
1 to 2 Mbps	1	1.64
2 to 3 Mbps	3	4.92
3 to 4 Mbps	4	6.56
4 to 8 Mbps	20	32.79
8 to 12 Mbps	12	19.67
>12 Mbps	21	34.43
Total	61	100.00

Download

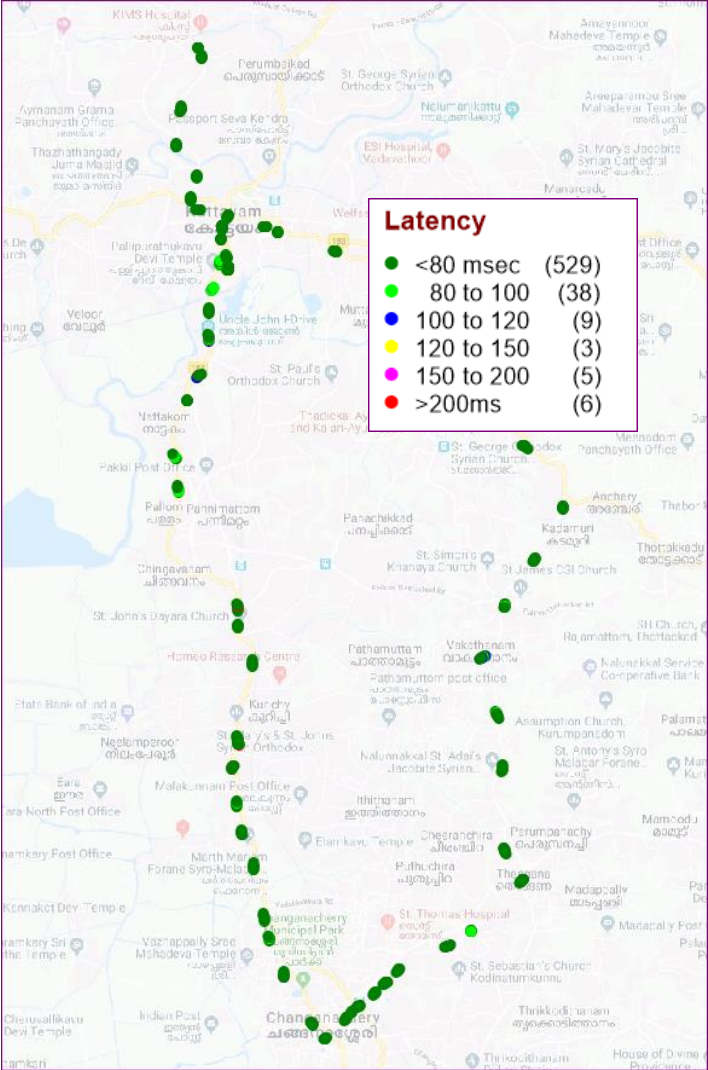


Upload Throughput	No.of samples	%
0 to 256 kbps Mbps	0	0.00
256 to 512 kbps	1	1.67
512 Kbpsto 1 Mbps	3	5.00
1 to 2 Mbps	2	3.33
2 to 3 Mbps	6	10.00
3 to 4 Mbps	4	6.67
>4Mbps	44	73.33
Total	60	100.00

Upload

V. Latency Test- Details

Airtel

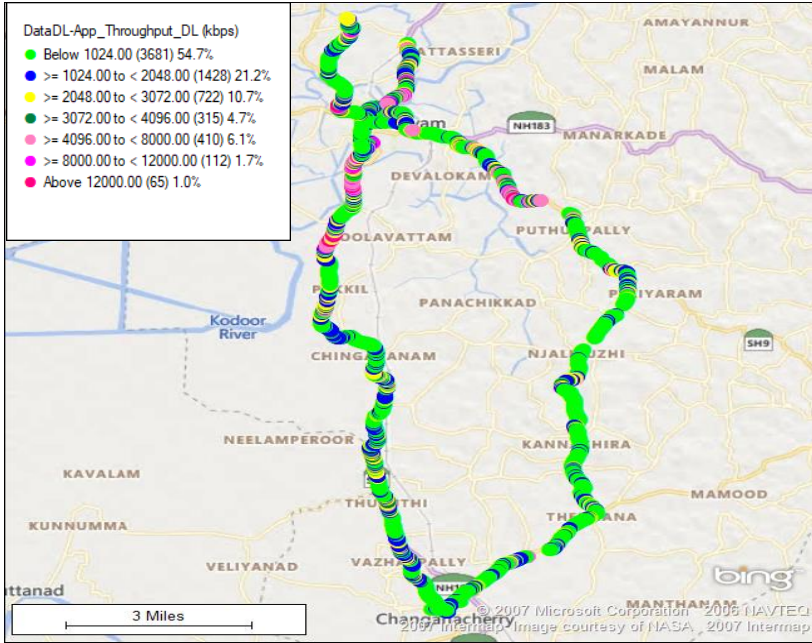


Latency	No. of samples	%
<80 msec	529	89.66
80-100 ms	38	6.44
100-120 ms	9	1.53
120-150 ms	3	0.51
150-200 ms	5	0.85
>200ms	6	1.02

V. Dynamic Data Test- 3G/4G DL/UL (4th Day) Details

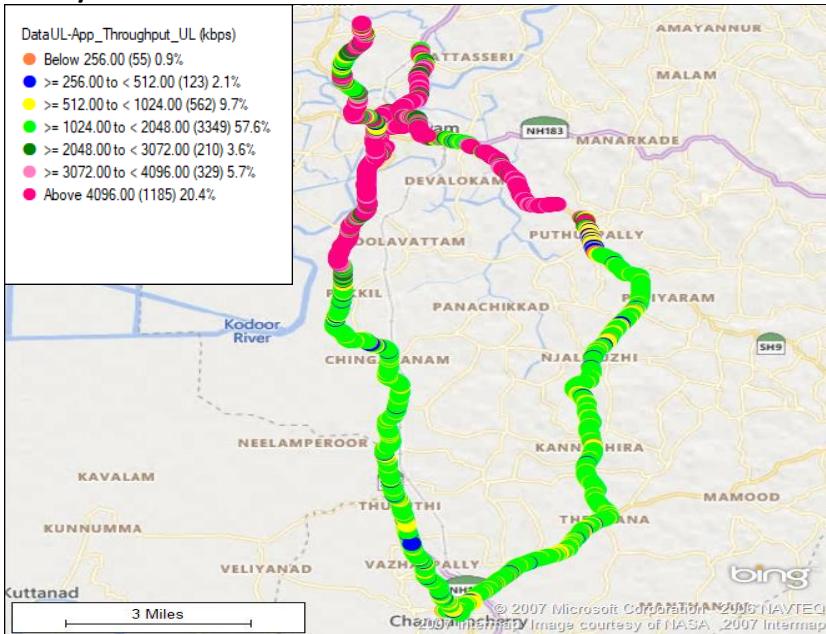
BSNL

3G/4G DL



Download Throughput	No. of samples	%
0 to 1 Mbps	3681	54.7
1 to 2 Mbps	1428	21.2
2 to 3 Mbps	722	10.7
3 to 4 Mbps	315	4.7
4 to 8 Mbps	410	6.1
8 to 12 Mbps	112	1.7
>12 Mbps	65	1

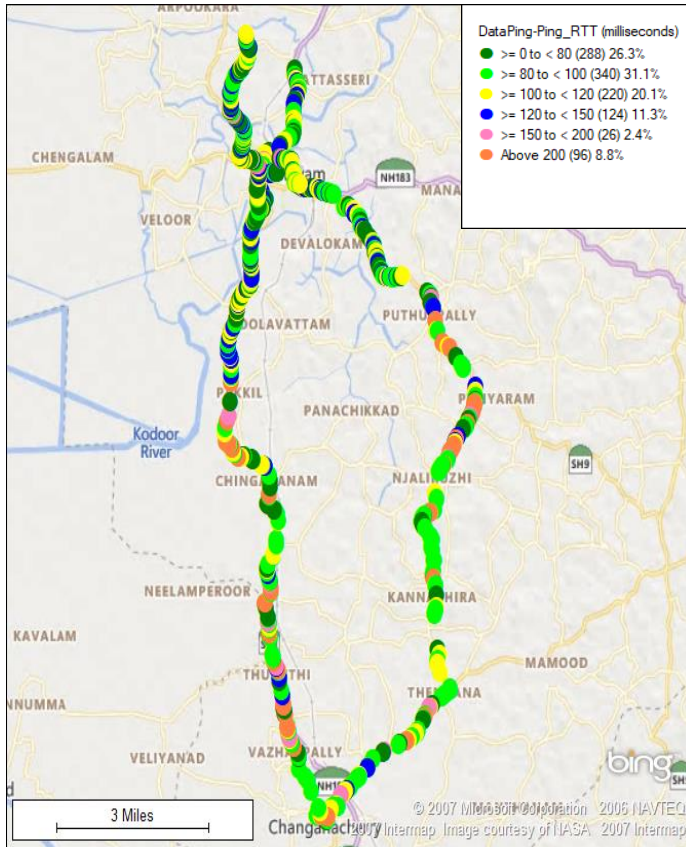
3G/4G UL



Upload Throughput	No. of samples	%
0 to 256 kbps	55	0.9
256 to 512 kbps	123	2.1
512 Kbps to 1 Mbps	562	9.7
1 to 2 Mbps	3349	57.6
2 to 3 Mbps	210	3.6
3 to 4 Mbps	329	5.7
>4Mbps	1185	20.4

V. Latency Test- Details

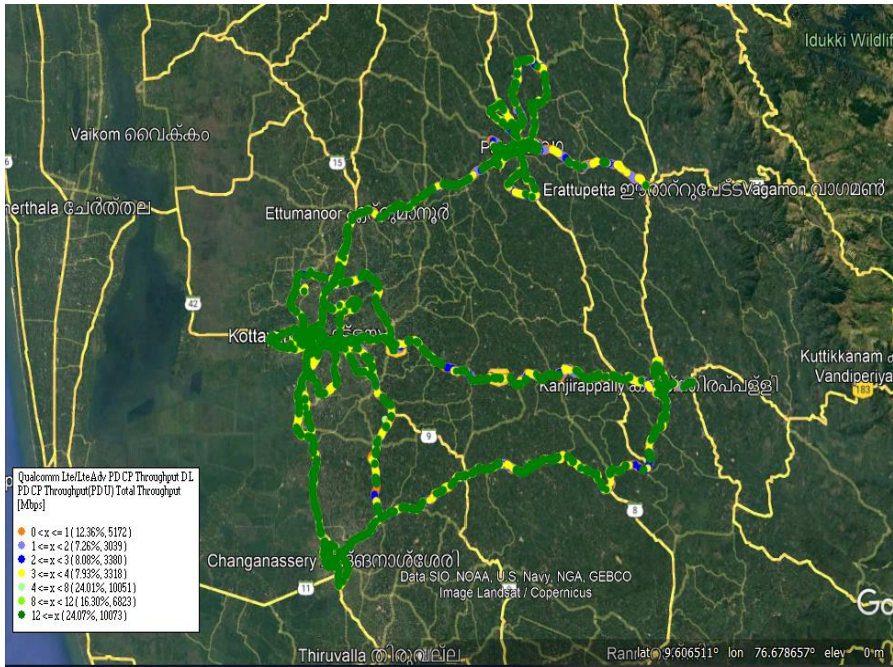
BSNL



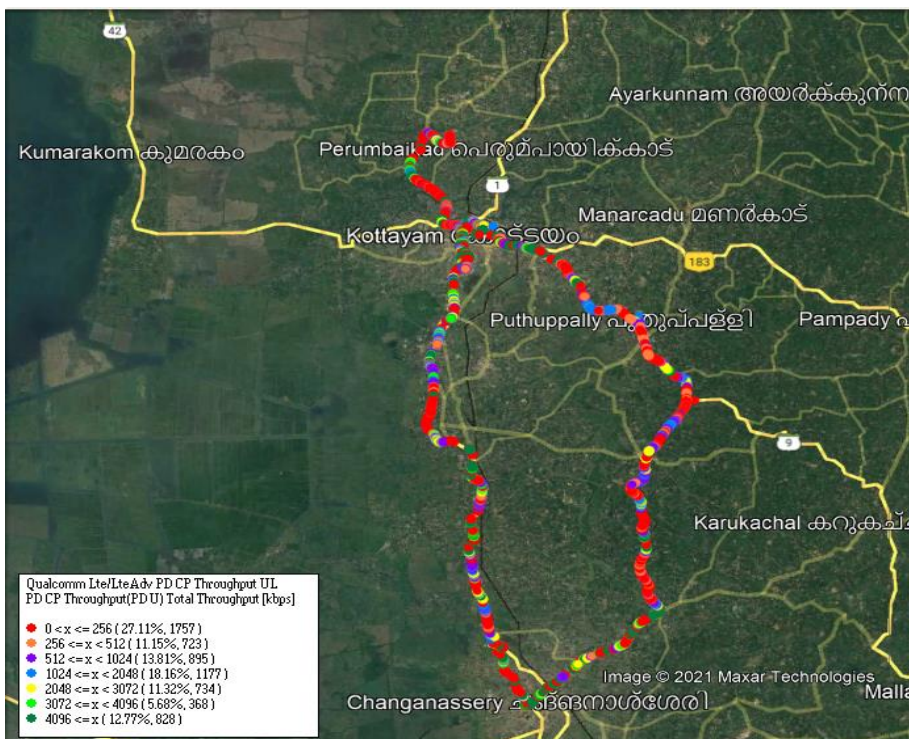
Latency	No. of samples	%
<80 msec	288	26.3
80-100 ms	340	31.1
100-120 ms	220	20.1
120-150 ms	124	11.3
150-200 ms	26	2.4
>200ms	96	8.8

V. Dynamic Data Test- 4G DL/UL Details

JIO



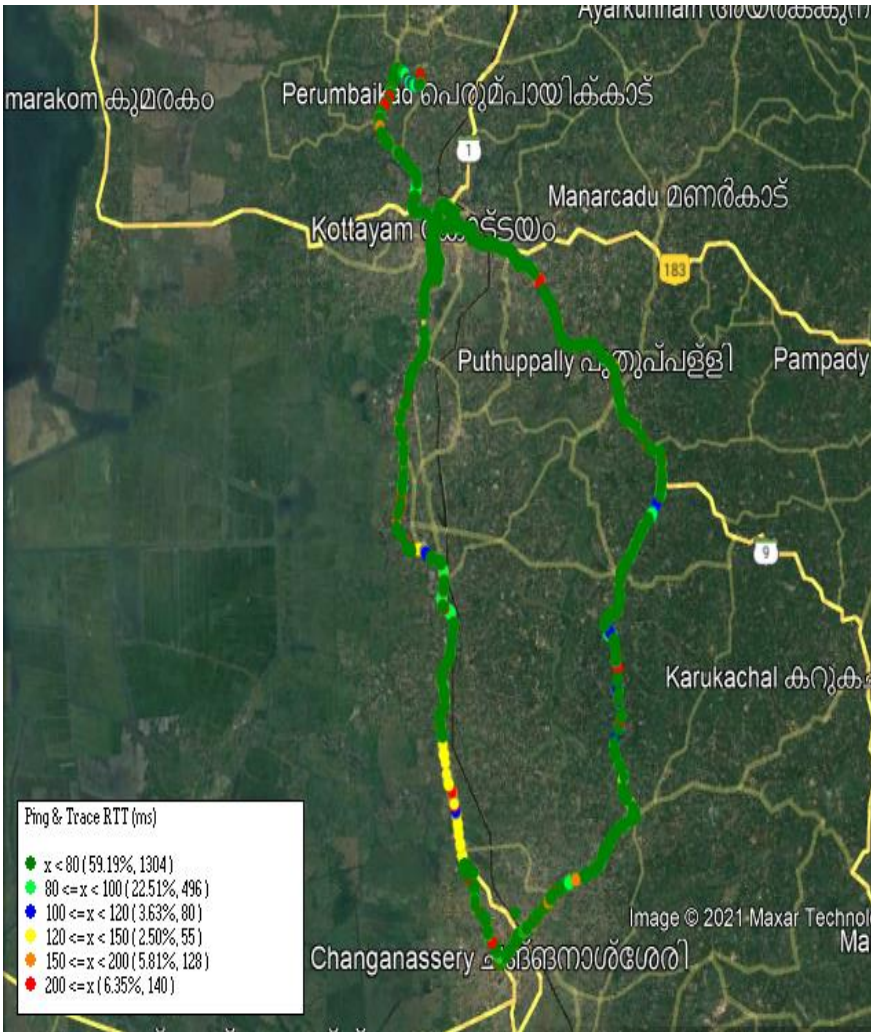
Download Throughput	No. of samples	%
0 to 1 Mbps	5172	12.36%
1 to 2 Mbps	3039	7.26%
2 to 3 Mbps	3380	8.08%
3 to 4 Mbps	3318	7.93%
4 to 8 Mbps	10051	24.01%
8 to 12 Mbps	6823	16.30%
>12 Mbps	10073	24.07%



Upload Throughput	No. of samples	%
0 to 256 kbps	1757	27.11%
250 to 512 kbps	723	11.15%
512 Kbpsto 1 Mbps	895	13.81%
1 to 2 Mbps	1177	18.16%
2 to 3 Mbps	734	11.32%
3 to 4 Mbps	368	5.68%
>4Mbps	828	12.77%

V. Latency Test- Details

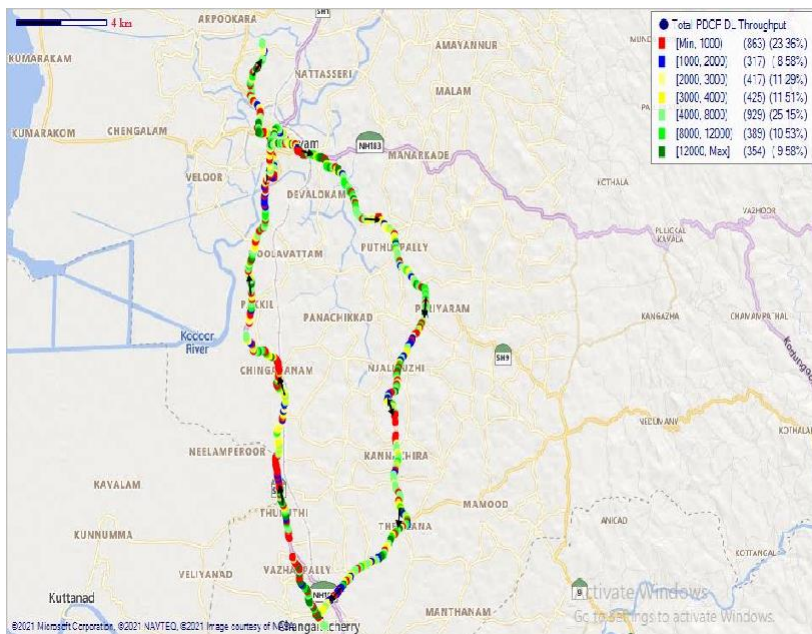
JIO



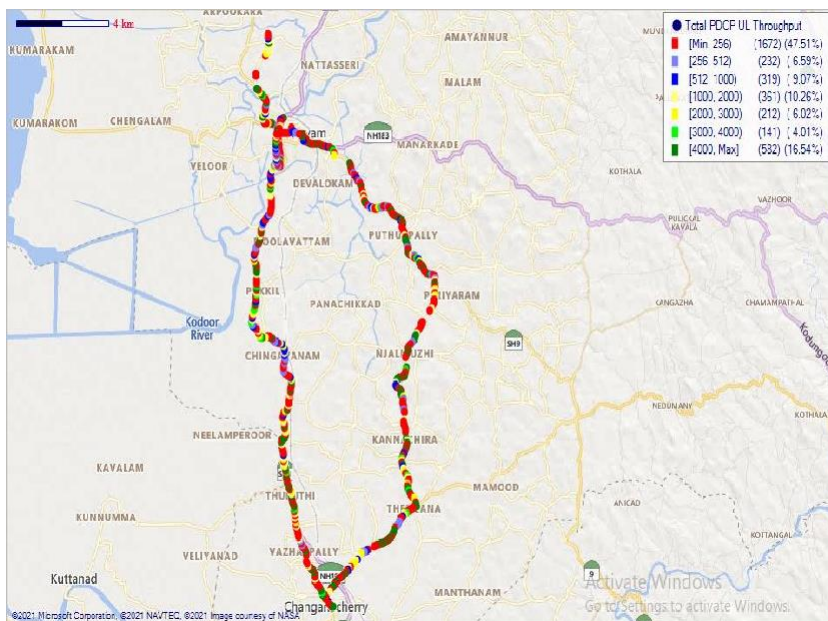
Latency	No. of samples	%
<80 msec	1304	59.19%
80-100 ms	496	22.51%
100-120 ms	80	3.6%
120-150 ms	55	2.50%
150-200 ms	128	5.81%
>200ms	140	6.35%

V. Dynamic Data Test- 4G DL/UL (4th Day) Details

Airtel



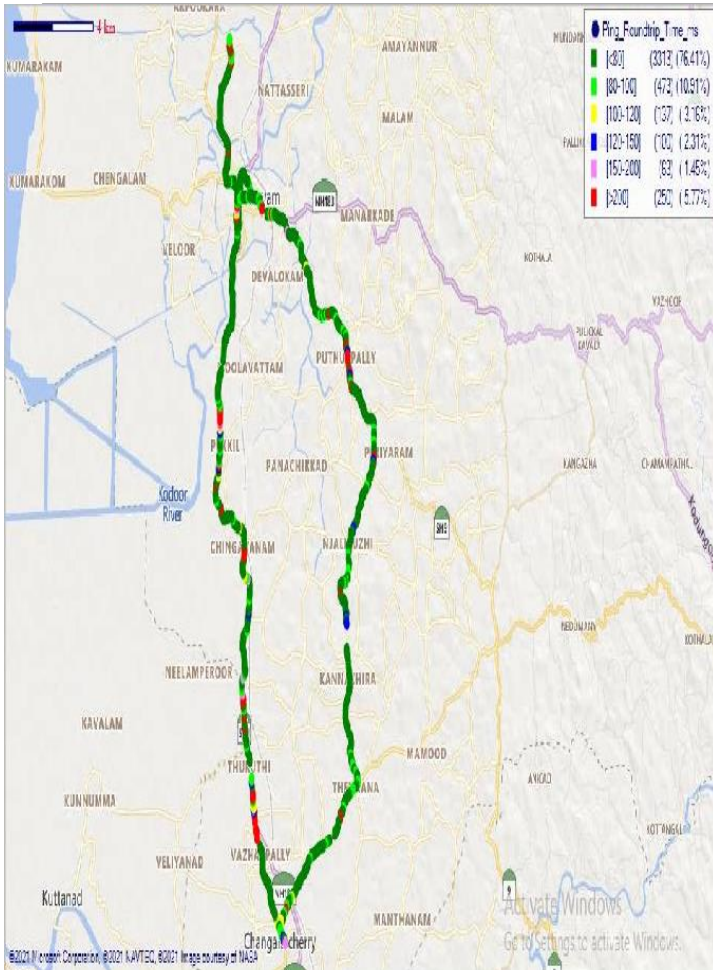
Download Throughput	No. of samples	%
0 to 1 Mbps	863	23.36
1 to 2 Mbps	317	8.58
2 to 3 Mbps	417	11.29
3 to 4 Mbps	425	11.51
4 to 8 Mbps	929	25.15
8 to 12 Mbps	389	10.53
>12 Mbps	354	9.58



Upload Throughput	No. of samples	%
0 to 256 kbps	1672	47.51
250 to 512 kbps	232	6.59
512 Kbps to 1 Mbps	319	9.07
1 to 2 Mbps	361	10.26
2 to 3 Mbps	212	6.02
3 to 4 Mbps	141	4.01
>4Mbps	582	16.54

V. Latency Test- Details

Airtel



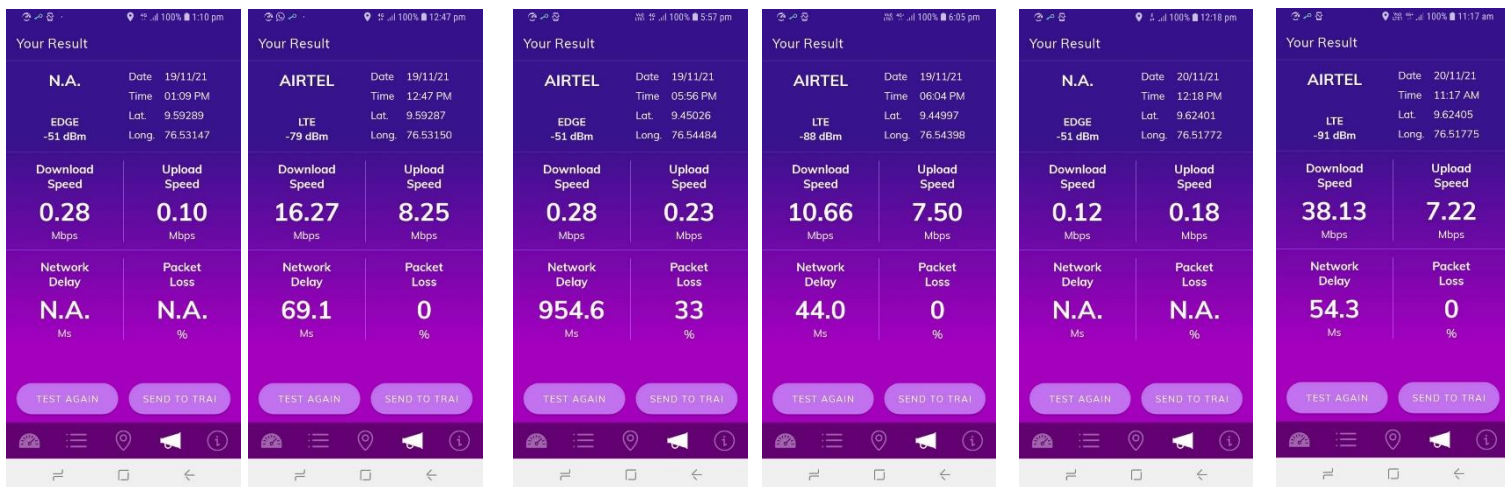
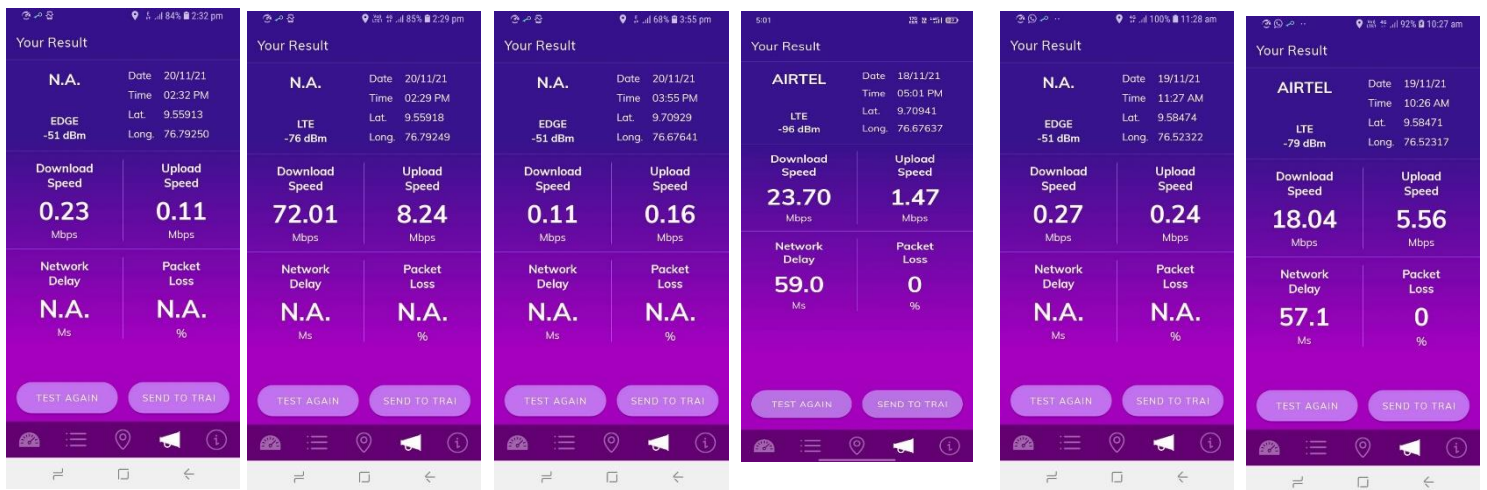
Latency	No. of samples	%
<80 msec	3313	76.41
80-100 ms	473	10.91
100-120 ms	137	3.16
120-150 ms	100	2.31
150-200 ms	63	1.45
>200ms	250	5.77

VI. TRAI MySpeed App Test Details

Airtel

Techology-2G	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6
Download Speed (Mbps)	0.23	0.11	0.27	0.28	0.28	0.12
Upload Speed (Mbps)	0.11	0.16	0.24	0.10	0.23	0.18
Latency (Msec)						

Techology-4G	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6
Download Speed (Mbps)	72.1	23.70	18.04	16.27	10.66	38.13
Upload Speed (Mbps)	8.24	1.47	5.56	8.25	7.50	7.22
Latency (Msec)						



VI. TRAI MySpeed App Test Details

BSNL

Technology-4G Mbps	Collectorate KTM	KSRTC Kottayam	KIMS Kottayam	Changanassery BUS Stand	Pala Bus stand	Kanjirapally BUS Stand
Download Speed (mbps)	4.90	7.97	6.43	NA	NA	NA
Upload Speed (mbps)	4.87	5.87	5.12	NA	NA	NA
Latency (msec)				NA	NA	NA

Technology-3G	Collectorate KTM	KSRTC Kottayam	KIMS Kottayam	Changanassery BUS Stand	Pala Bus stand	Kanjirapally BUS Stand
Download Speed (mbps)	NA	NA	NA	4.57	2.34	0.81
Upload Speed (mbps)	NA	NA	NA	2.11	1.13	2.01
Latency (msec)	NA	NA	NA			

Technology-2G	Collectorate KTM	KSRTC Kottayam	KIMS Kottayam	Changanassery BUS Stand	Pala Bus stand	Kanjirapally BUS Stand
Download Speed (mbps)	0.17	0.18	0.19	0.15	0.11	0.08
Upload Speed (mbps)	0.04	0.16	0.13	0.06	0.05	0.06
Latency (msec)						

KSRTC, Kottayam

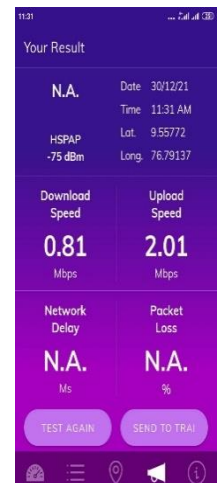
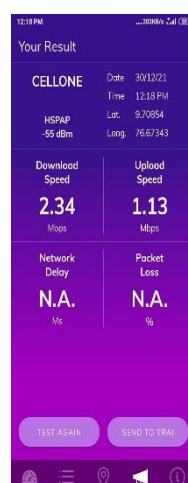
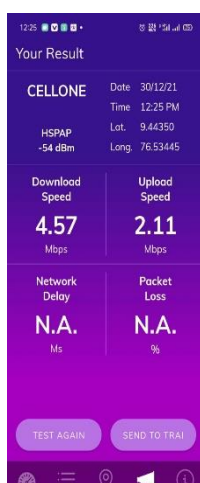
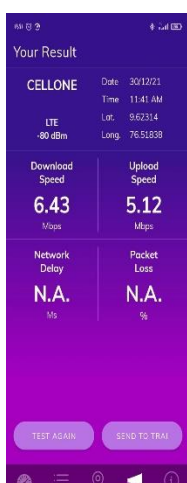
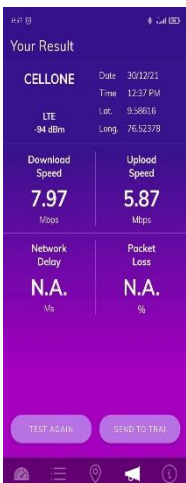
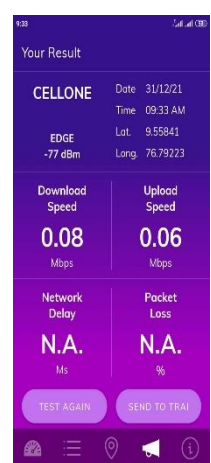
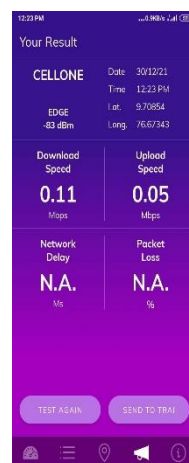
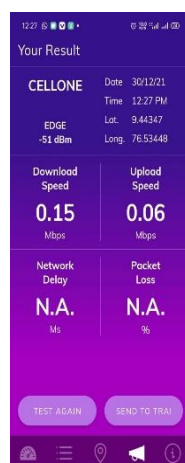
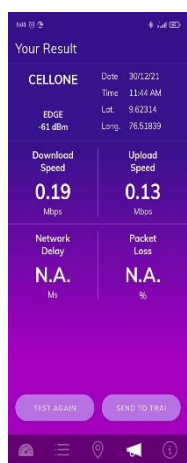
Collectorate, Kottayam

KIMS, Kottayam

Changanassery Bus stand

Pala Bus Stand

Kanjirapally Busstand



VI. TRAI MySpeed App Test Details

BSNL

Techology-2G Mbps	Collectorate KTM	KSRTC Kottayam	KIMS Kottayam	Changanassery BUS Stand	Pala Bus stand	Kanjirapally BUS Stand
Download Speed (mbps)	0.17	0.18	0.19	0.15	0.11	0.08
Upload Speed (mbps)	0.04	0.16	0.13	0.06	0.05	0.06
Latency (msec)						

Techology-3G Mbps	Collectorate KTM	KSRTC Kottayam	KIMS Kottayam	Changanassery BUS Stand	Pala Bus stand	Kanjirapally BUS Stand
Download Speed (mbps)	NA	NA	NA	4.57	2.34	0.81
Upload Speed (mbps)	NA	NA	NA	2.11	1.13	2.01
Latency (msec)	NA	NA	NA			

Techology-4G Mbps	Collectorate KTM	KSRTC Kottayam	KIMS Kottayam	Changanassery BUS Stand	Pala Bus stand	Kanjirapally BUS Stand
Download Speed (mbps)	4.90	7.97	6.43	NA	NA	NA
Upload Speed (mbps)	4.87	5.87	5.12	NA	NA	NA
Latency (msec)				NA	NA	NA

KSRTC, Kottayam

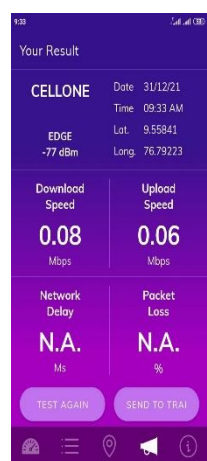
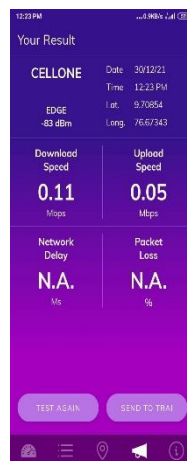
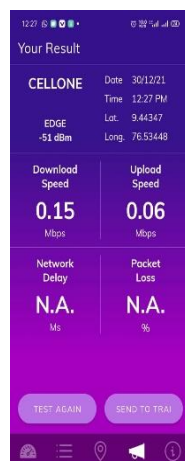
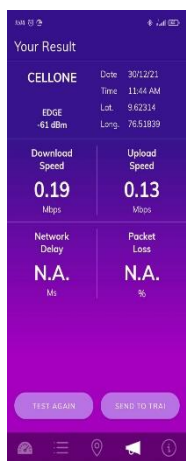
Collectorate, Kottayam

KIMS, Kottayam

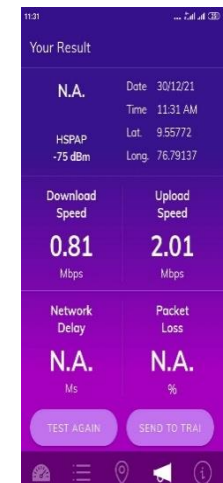
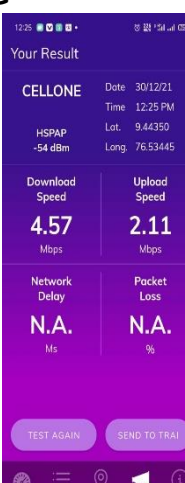
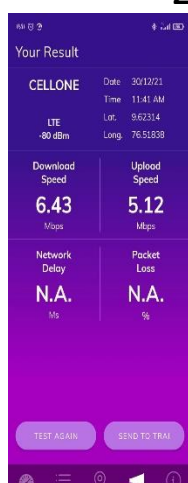
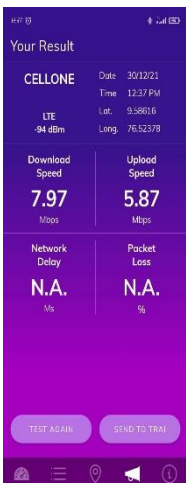
3G/4G Changanassery Bus stand

Pala Bus Stand

Kanjirapally Busstand



2G



VI. TRAI MySpeed App Test Details

JIO

Technology-4G	Kanjirappally Private Bus stand	Pala Private Bus stand	Kottayam KSRTC Bus Stand	Kottayam Collectorate	Changannassery KSRTC Bus stand	KIMS Kottayam
Download Speed (Mbps)	24.81 Mbps	22.09 Mbps	17.39 Mbps	23.15 Mbps	13.19 Mbps	15.28 Mbps
Upload Speed (Mbps)	3.44 Mbps	6.95 Mbps	7.19 Mbps	5.22 Mbps	6.59 Mbps	1.81 Mbps
Latency (Msec)	20.4 ms	42 ms	39.3 ms	42.3 ms	37.3 Ms	63.9 ms

Kanjirappally Private Bus Stand

JIO		Date	17/11/21
LTE -62 dBm		Time	12:40 PM
		Lat.	9.55715
		Long.	76.79177
Download Speed	Upload Speed		
24.81 Mbps	3.44 Mbps		
Network Delay	Packet Loss		
20.4 Ms	0 %		

Pala Private Bus Stand

JIO		Date	18/11/21
LTE -70 dBm		Time	04:31 PM
		Lat.	9.70829
		Long.	76.67297
Download Speed	Upload Speed		
22.09 Mbps	6.95 Mbps		
Network Delay	Packet Loss		
42.0 Ms	0 %		

Kottayam KSRTC Bus Stand

JIO		Date	19/11/21
LTE -92 dBm		Time	06:18 PM
		Lat.	9.58524
		Long.	76.52323
Download Speed	Upload Speed		
17.39 Mbps	7.19 Mbps		
Network Delay	Packet Loss		
39.3 Ms	0 %		

Kottayam Collectorate

JIO		Date	19/11/21
LTE -95 dBm		Time	06:09 PM
		Lat.	9.58890
		Long.	76.53442
Download Speed	Upload Speed		
23.15 Mbps	5.22 Mbps		
Network Delay	Packet Loss		
42.3 Ms	0 %		

Changanassery KSRTC Bus Stand

JIO		Date	19/11/21
LTE -61 dBm		Time	06:23 PM
		Lat.	9.44506
		Long.	76.54094
Download Speed	Upload Speed		
13.19 Mbps	6.59 Mbps		
Network Delay	Packet Loss		
37.3 Ms	0 %		


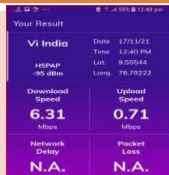




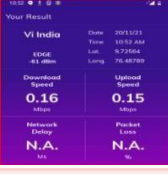








KIMS Kottayam

JIO		Date	19/11/21
LTE -103 dBm		Time	06:39 PM
		Lat.	9.62064
		Long.	76.52092
Download Speed	Upload Speed		
15.28 Mbps	1.81 Mbps		
Network Delay	Packet Loss		
63.9 Ms	0 %		

VI. TRAI MySpeed App Test Details

VIL

Techology-2G	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6
Download Speed (Mbps)	0.25	0.17	0.16	0.14	0.19	0.18
Upload Speed (Mbps)	0.16	0.14	0.15	0.14	0.07	0.13
Latency (Msec)						
Techology-3G	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6
Download Speed (Mbps)	6.31	1.50	4.19	4.65	3.94	4.81
Upload Speed (Mbps)	0.71	0.15	4.07	3.88	2.90	2.21
Latency (Msec)						
Techology-4G	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6
Download Speed (Mbps)	18.68	17.19	11.79	10.19	10.25	9.31
Upload Speed (Mbps)	17.81	13.01	8.82	27.71	2.64	
Latency (Msec)						

LOCATION	2G	3G	4G
KANJIRAPPALY			
PALA			
KOTTAYAM COLLECTRATE			
KSRTC			
KIMS MULTI SPECILATY HOSPITAL			
CHANGNASSERY	