INDEPENDENT DRIVE TEST REPORT

For

Itanagar & Phasighat

2019
APRIL-MAY

EAST ZONE

Key Performance Indicators: All TSPs have met the Drop Call Rate (DCR) benchmark of 2% BSNL 3G & VIL(Vodafone) 3G. All TSPs have met the Call Setup Success Rate (CSSR) of 95%.

The Independent Drive Test has been carried out by M/s PhiMetrics Technologies Pvt. Ltd. on behalf of TRAI in Itanagar & Phasighat City & adjoining areas from 9:00 AM to 9:00 PM; 29th April 2019 to 1st May 2019. The drive test covered a drive route of 241 KMs & 5 hotspot over a period of three days. Approximately 390 calls were made for each of the 8 networks: three 2G networks, three 3G networks and two LTE network covering four unique TSPs

| Overview | Voice Summary | Data Summary |

Overview

Overview:

Telecom Regulatory Authority of India has been entrusted with the task of laying down the standards of quality of service to be provided by the service providers and ensuring its enforcement; and also TRAI is responsible for conducting the periodical audit of such services provided by the service providers so as to protect the interest of the consumers of telecommunications service

TRAI is regularly monitoring the performance of Telecom Service Providers (TSP) against the benchmarks for the various Quality of Service (QoS) parameters laid down by the Authority. TSPs submit Performance Monitoring Reports to TRAI every quarter. TRAI also undertakes audit and assessment of Quality of Service through independent agencies to verify the Quality of Service claimed. The Audit agencies conduct sample 'Drive tests' across various cities in the country as part of audit and assessment of the TSPs' performance.

In view of complaints on call drops and other network quality issues, on behalf of TRAI, an Independent Drive Test (IDT) was conducted by PhiMetrics Technologies Pvt. Ltd. From **29th April 2019 to 1st May 2019**covering various locations in Itanagar & Phasighat City & surrounding region. The performance of **Airtel, BSNL, Jio and Vodafone Idea Limited (VIL(Vodafone))** were monitored across various technologies (2G, 3G, and 4G). The drive test route was defined on the basis of several factors that include - areas from where call drop complaints are commonly received; areas of heavy usage; residential areas away from arterial roads; office areas; areas where previous Drive tests showed network issues; etc.

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 Itanagar & Phasighat:

Independent Drive test was conducted for a period of three days from 29th April 2019 to 1st May 2019 in Itanagar & Phasighat city & surrounding areas from 9:00 AM to 9:00 PM. 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 **241** KMs over a period of three days from 29th April 2019 & 1st May 2019 . Approximately 390 calls were made for each of the 8 networks: three 2G (Lock Mode) networks, three 3G (Dual mode) networks and two VoLTE network covering four unique TSPs.

* In case of multiple call failure in similar geo location in given period of 60secs has been counted as one call failure

Data Tests: Data Tests were performed at five static locations for three day on 29th April 2019, 30th April 2019 & 1st May 2019 ; three 2G (Lock mode) networks, three 3G (Dual mode) networks and three 4G (Free mode) networks covering four unique TSPs were tested.

* 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 Dual 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 Dual 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	130 sec clip
Latency	32 Bytes on www.google.com

Voice Test Drive Route
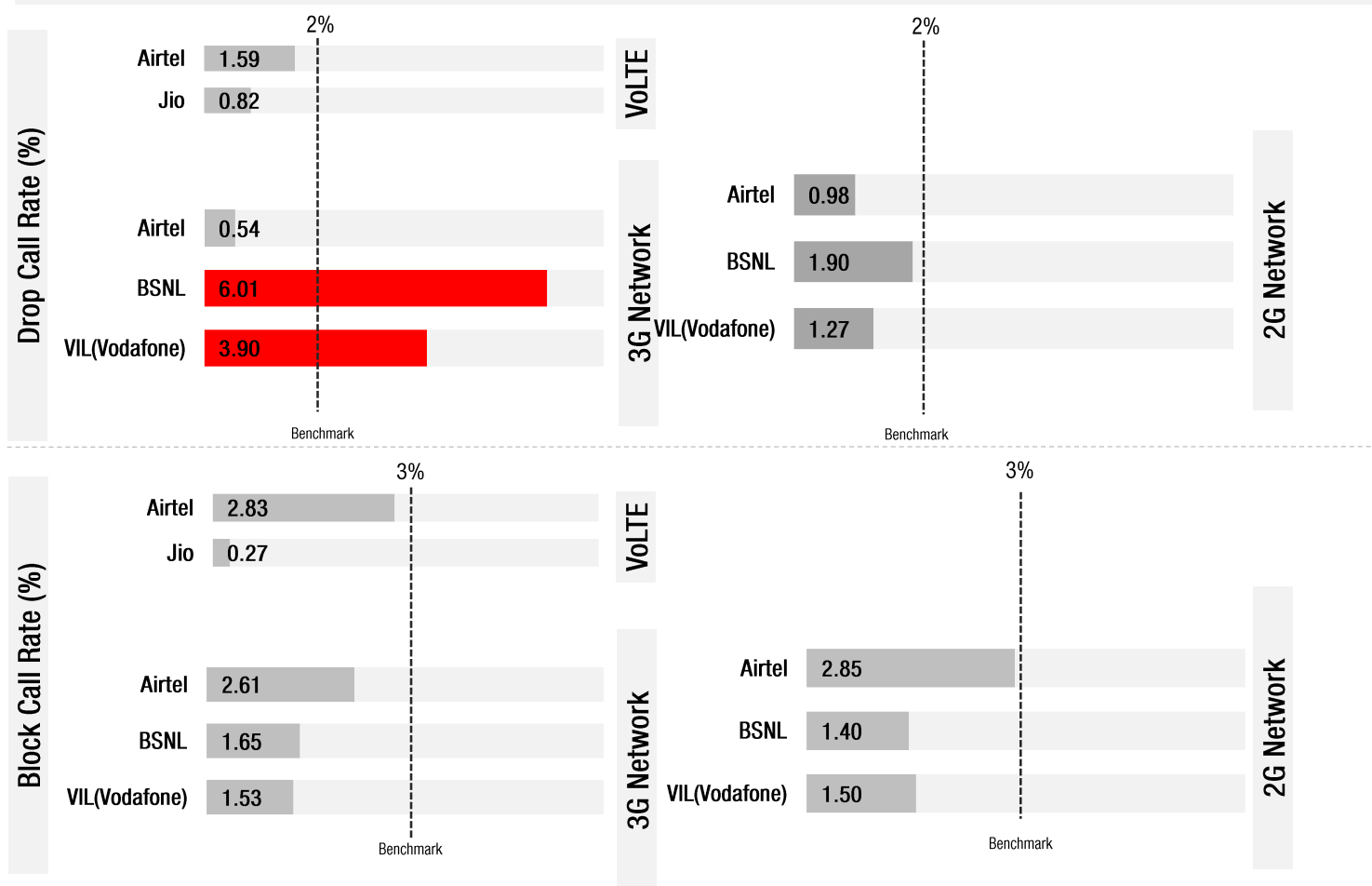#### Itanagar   Phasighat
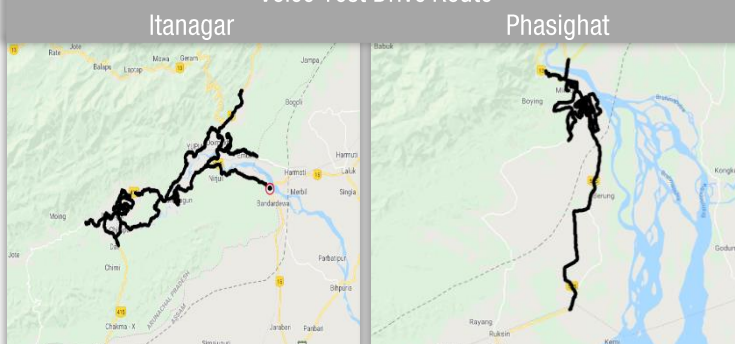
Data Service testing across 5 Static Locations

Voice Calls

Key Observations

QoS compliance of the TSPs in Itanagar & Phasighat for Voice across technologies 2G/3G/4G-VoLTE is given below:

Drop Call Rate (%)

VoLTE (Benchmark 2%):
- Airtel: 1.59
- Jio: 0.82

3G Network (Benchmark 2%):
- Airtel: 0.54
- BSNL: 6.01
- VIL(Vodafone): 3.90

2G Network (Benchmark 2%):
- Airtel: 0.98
- BSNL: 1.90
- VIL(Vodafone): 1.27

Block Call Rate (%)

VoLTE (Benchmark 3%):
- Airtel: 2.83
- Jio: 0.27

3G Network (Benchmark 3%):
- Airtel: 2.61
- BSNL: 1.65
- VIL(Vodafone): 1.53

2G Network (Benchmark 3%):
- Airtel: 2.85
- BSNL: 1.40
- VIL(Vodafone): 1.50

KPI	2G Networks		
	Airtel	BSNL	Vodafone Idea Ltd VIL(Vodafone)
SDCCH Congestion(<=1%)	0.95%	0.93%	1.00%
TCH Congestion (<=2%)	1.90%	0.47%	0.50%

KPI	3G Networks		
	Airtel	BSNL	Vodafone Idea Ltd VIL(Vodafone)
CSFB Failure %	1.57%	NA	0.76%
SDCCH Congestion%	0.26%	0.00%	0.00%
RRC Congestion%	0.52%	0.47%	0.26%
SDCCH & RRC Congestion(<=1%)	0.78%	0.47%	0.26%
TCH Congestion %	0.26%	0.24%	0.00%
RAB Congestion %	0.00%	0.94%	0.51%
TCH & RAB Congestion (<=2%)	0.26%	1.18%	0.51%

a) All TSPs have met the 2% QOS benchmark of Drop Call Rate (DCR%) except BSNL 3G & VIL(Vodafone) 3G.

b) Call Block Rate (CBR%) benchmark of 3% was achieved by all TSP's.

*NA = Not Applicable   Not meeting Benchmark

Voice Calls

Coverage

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

TSPs	2G		
	Airtel	BSNL	VIL(Vodafone)
Coverage%	77.67%	75.55%	63.41%

b) Percentage of coverage samples for 2G ≥ -85 dBm, 3G ≥ -90 dBm & LTE ≥ -110 dBm.

TSPs	3G			VoLTE	
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio
Coverage %	58.98%	65.31%	68.02%	82.68%	87.42%

c) Percentage of time spent on 3G network:

TSPs	3G		
	Airtel	BSNL	VIL(Vodafone)
Time Spent on 3G%	46.57%	36.93%	48.47%

d) Percentage of RLT >=48:

TSPs	2G		
	Airtel	BSNL	VIL(Vodafone)
%RLT >=48	0.00%	97.26%	0.00%

e) Average CST Second

TSPs	2G		
	Airtel	BSNL	VIL(Vodafone)
CST(sec)	2.50	2.44	2.72

TSPs	3G			VOLTE	
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio
CST(sec)	5.77	2.52	3.96	3.23	0.45

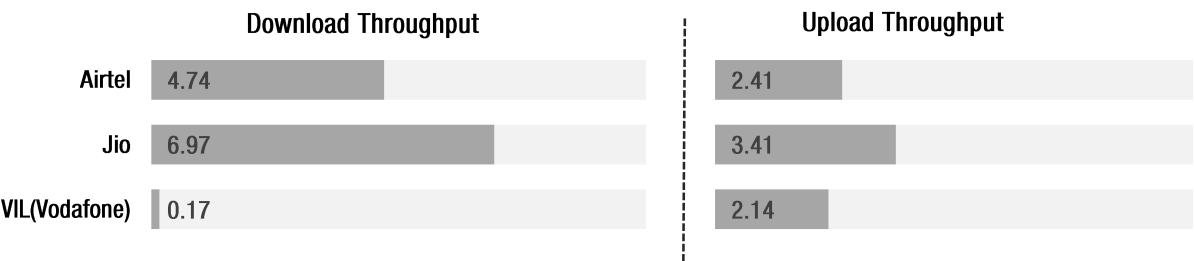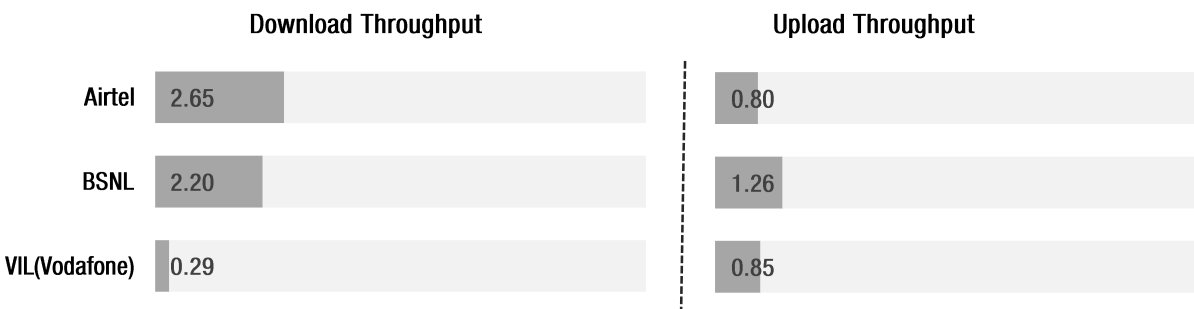# Data
Services Static

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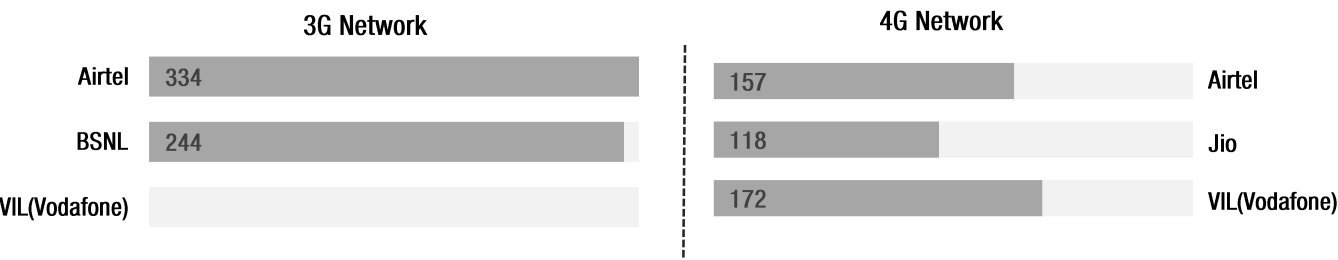
Data Download and Upload Performance (Mbps)

4G Network:

Download Throughput
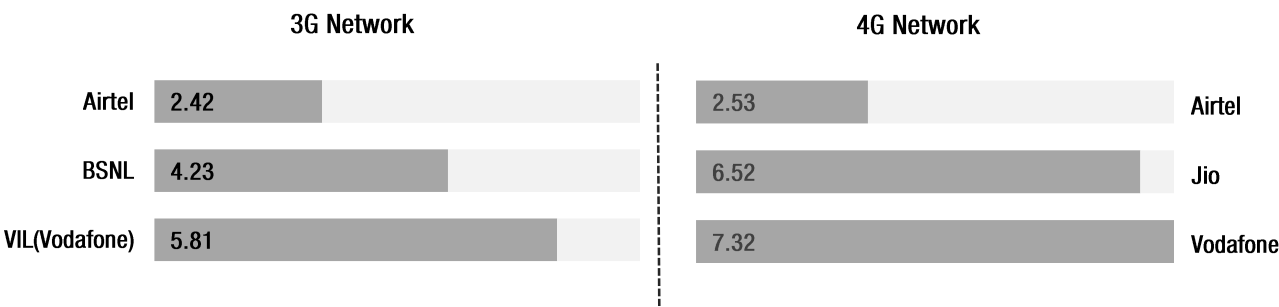
Airtel	4.74
Jio	6.97
VIL(Vodafone)	0.17

Upload Throughput

	2.41
	3.41
	2.14

3G Network:

Download Throughput

Airtel	2.65
BSNL	2.20
VIL(Vodafone)	0.29

Upload Throughput

	0.80
	1.26
	0.85

Latency (msec)

3G Network

Airtel	334
BSNL	244
VIL(Vodafone)	

4G Network

157	Airtel
118	Jio
172	VIL(Vodafone)

Key Observations

Video Streaming Performance (130 sec YouTube video sample sizes)

Streaming (sec)

3G Network

Airtel	2.42
BSNL	4.23
VIL(Vodafone)	5.81

4G Network

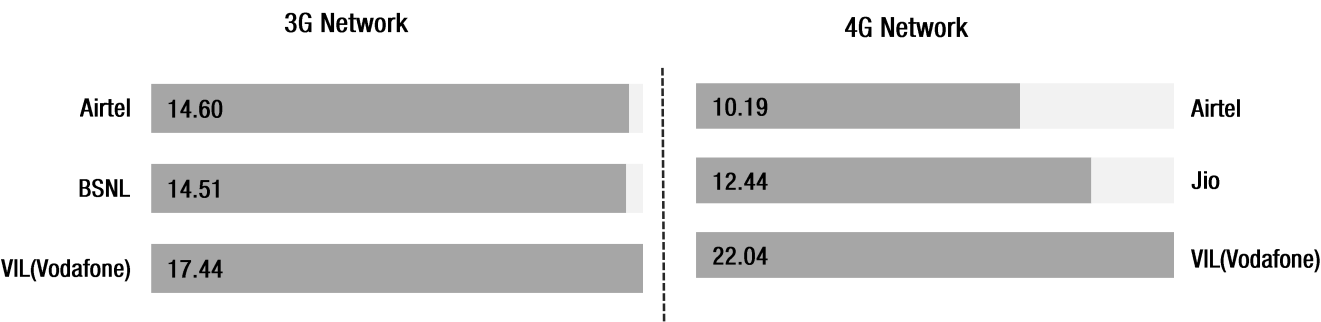|	
2.53	Airtel
6.52	Jio
7.32	Vodafone

Streaming Delay further broken into 2 parameters which form the end-user perception to assess consistency on Video streaming.
- Initial Start time
- Interruption time while playing the video.

Video Streaming	3G			4G		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Avg. Initial Start Time (sec)	2.42	4.23	5.81	2.53	4.33	7.32
Avg. Interruption Time (sec)	0.00	0.00	0.00	0.00	2.19	0.00

Web Page Download Time (sec)

3G Network

Airtel	14.60
BSNL	14.51
VIL(Vodafone)	17.44

4G Network

10.19	Airtel
12.44	Jio
22.04	VIL(Vodafone)

Web browsing experience is the average time taken to fully load the websites tested.

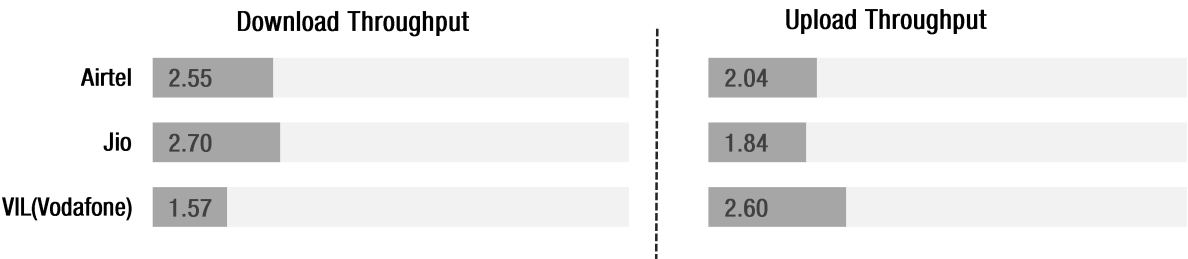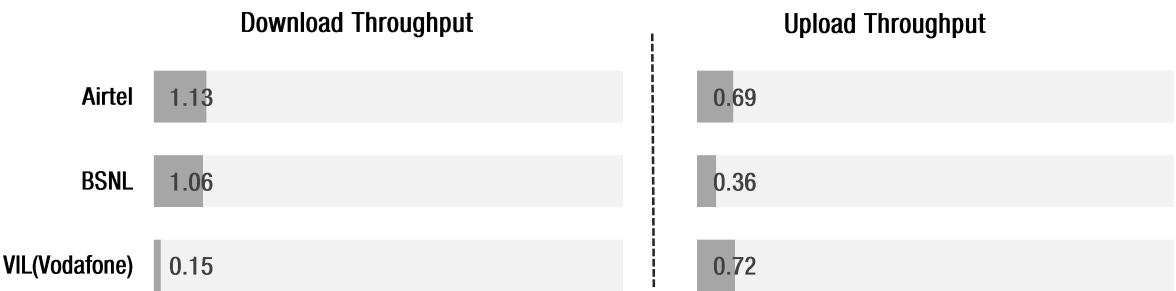# Data Services Dynamic

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

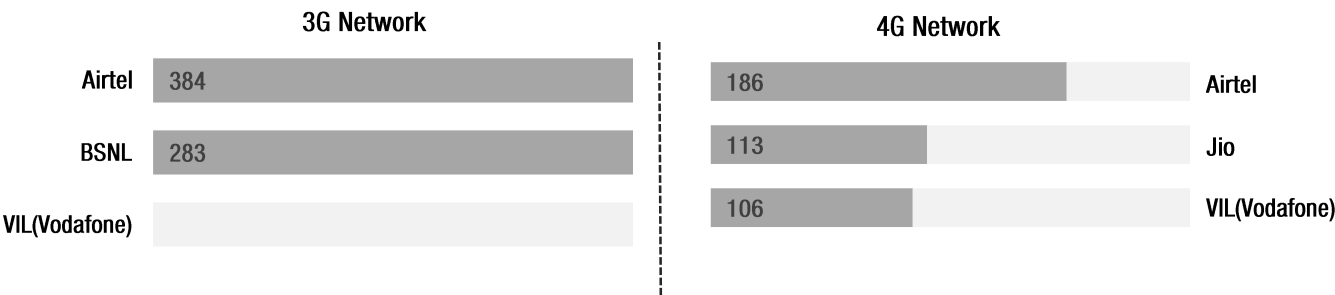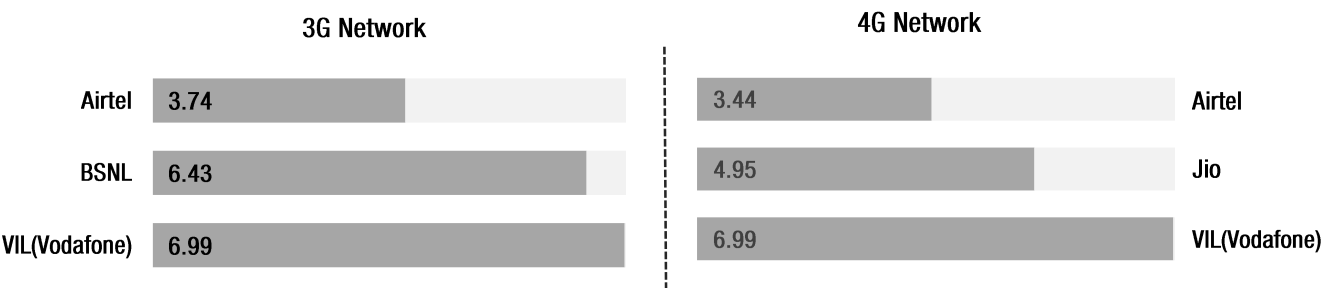## Data Download and Upload Performance (Mbps)

4G Network:

Download Throughput

Airtel	2.55
Jio	2.70
VIL(Vodafone)	1.57

Upload Throughput

Airtel	2.04
	1.84
	2.60

3G Network:

Download Throughput

Airtel	1.13
BSNL	1.06
VIL(Vodafone)	0.15

Upload Throughput

	0.69
	0.36
	0.72

Latency (msec)

3G Network

Airtel	384
BSNL	283
VIL(Vodafone)	

4G Network

186		Airtel
113		Jio
106		VIL(Vodafone)

Data Services Dynamic

Video Streaming Performance (130 sec YouTube video sample sizes)

Streaming (sec)

3G Network

Operator	Value
Airtel	3.74
BSNL	6.43
VIL(Vodafone)	6.99

4G Network

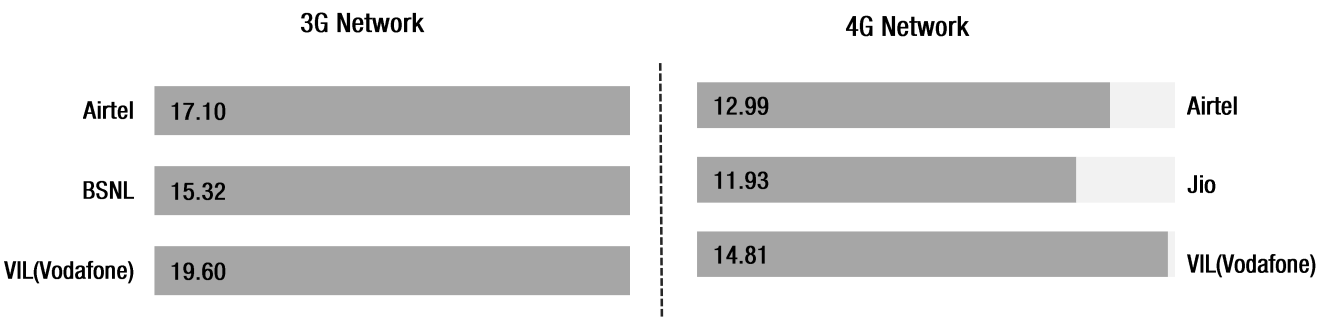| Value	Operator
3.44	Airtel
4.95	Jio
6.99	VIL(Vodafone)

Streaming Delay further broken into 2 parameters which form the end-user perception to assess consistency on Video streaming.
- Initial Start time
- Interruption time while playing the video.

Video Streaming	3G			4G		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Avg. Initial Start Time (sec)	3.74	6.43	6.99	3.44	4.95	6.99
Avg. Interruption Time (sec)	0.00	0.00	0.00	0.00	0.00	0.00

Web Page Download Time (sec)

3G Network

Operator	Value
Airtel	17.10
BSNL	15.32
VIL(Vodafone)	19.60

4G Network

Value	Operator
12.99	Airtel
11.93	Jio
14.81	VIL(Vodafone)

Web browsing experience is the average time taken to fully load the websites tested.

Summary

Voice Call	2G		
	Airtel	BSNL	VIL(Vodafone)
Call Attempt	421	428	401
Blocked Call Rate (%)	2.85%	1.40%	1.50%
CSSR% (Accessibility)	97.15%	98.60%	98.50%
Drop Call Rate (%)	0.98%	1.90%	1.27%
Mobility HOSR (%)	96.37%	92.78%	97.38%
Rx Quality (%)	90.56%	95.68%	93.51%

Voice Call	3G			VoLTE	
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio
Call Attempt	383	423	391	389	368
Blocked Call Rate (%)	2.61%	1.65%	1.53%	2.83%	0.27%
CSSR% (Accessibility)	97.39%	98.35%	98.47%	97.17%	99.73%
Drop Call Rate (%)	0.54%	6.01%	3.90%	1.59%	0.82%
Mobility HOSR (%)	99.42%	97.62%	99.21%	99.86%	99.34%
Rx Quality (%)	86.75%	93.82%	80.61%	73.17%	76.49%

Summary

Data Test - Stationary

Data Services Static	2G		
	Airtel	BSNL	VIL(Vodafone)
Download Throughput (Kbps)	135.54	110.02	64.83
Upload Throughput (kbps)	171.18	84.96	81.42
Web Browsing Delay (sec)	27.28	36.91	54.24
Latency (msec)	300	452	TO

Data Services Static	3G			4G		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Download Throughput (Mbps)	2.65	2.20	0.29	4.74	6.97	0.17
Upload Throughput (Mbps)	0.80	1.26	0.85	2.41	3.41	2.14
Web Browsing Delay (sec)	14.60	14.51	17.44	10.19	12.44	22.04
Video Streaming Delay (sec)	2.42	4.23	5.81	2.53	6.52	7.32
Latency (msec)	334	244	TO	157	118	172

Data Test - Mobility

Data Services Dynamic	3G			4G		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Download Throughput (Mbps)	1.13	1.06	0.15	2.55	2.70	1.57
Upload Throughput (Mbps)	0.69	0.36	0.72	2.04	1.84	2.60
Web Browsing Delay (sec)	17.10	15.32	19.60	12.99	11.93	14.81
Video Streaming Delay (sec)	3.74	6.43	6.99	3.44	4.95	6.99
Latency (msec)	384	283	TO	186	113	106

*TO=Timeout

Summary

Naharlagun High court	2G		
	Airtel	BSNL	VIL(Vodafone)
Download Throughput (Kbps)	175.71	134.04	6.29
Upload Throughput (kbps)	166.66	87.52	13.03
Web Browsing Delay (sec)	21.36	29.20	47.28
Latency (msec)	296	249	TO

Naharlagun High court	3G			4G		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Download Throughput (Mbps)	0.06	0.70	0.04	3.01	0.24	0.29
Upload Throughput (Mbps)	0.58	0.89	0.32	1.94	2.08	1.05
Web Browsing Delay (sec)	18.91	14.60	19.70	6.70	13.97	17.47
Video Streaming Delay (sec)	TO	4.30	16.48	2.40	11.56	12.81
Latency (msec)	351	433	TO	135	112	109

Naharlagun Railway station	2G		
	Airtel	BSNL	VIL(Vodafone)
Download Throughput (Kbps)	23.05	50.95	70.53
Upload Throughput (kbps)	148.58	79.99	91.88
Web Browsing Delay (sec)	22.90	56.54	47.18
Latency (msec)	371	544	TO

Naharlagun Railway station	3G			4G		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Download Throughput (Mbps)	2.81	3.03	0.08	0.09	0.40	0.07
Upload Throughput (Mbps)	1.08	1.34	0.29	3.34	0.46	1.04
Web Browsing Delay (sec)	13.25	12.97	11.13	16.38	20.68	20.08
Video Streaming Delay (sec)	4.02	3.60	10.08	3.08	16.25	9.31
Latency (msec)	409	139	TO	302	133	TO

*TO=Timeout

Summary

Pasighat market	2G		
	Airtel	BSNL	VIL(Vodafone)
Download Throughput (Kbps)	TO	107.83	66.65
Upload Throughput (kbps)	TO	88.52	65.99
Web Browsing Delay (sec)	TO	43.81	62.06
Latency (msec)	TO	754	TO

Pasighat market	3G			4G		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Download Throughput (Mbps)	TO	2.35	0.58	7.38	13.41	0.26
Upload Throughput (Mbps)	0.02	2.28	0.31	1.50	5.96	1.63
Web Browsing Delay (sec)	21.86	19.74	22.25	9.55	10.18	28.84
Video Streaming Delay (sec)	TO	4.42	TO	1.41	TO	TO
Latency (msec)	TO	570	TO	132	143	388

Ramkrishna Mission Hospital Itanagar	2G		
	Airtel	BSNL	VIL(Vodafone)
Download Throughput (Kbps)	131.52	126.53	48.59
Upload Throughput (kbps)	177.90	88.19	65.16
Web Browsing Delay (sec)	30.96	28.53	50.11
Latency (msec)	282	323	TO

Ramkrishna Mission Hospital Itanagar	3G			4G		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Download Throughput (Mbps)	2.58	4.06	0.47	2.56	9.16	0.18
Upload Throughput (Mbps)	0.58	0.74	1.99	2.18	4.41	3.69
Web Browsing Delay (sec)	13.38	10.07	16.98	11.80	7.74	21.22
Video Streaming Delay (sec)	1.47	1.04	4.25	4.43	1.67	2.72
Latency (msec)	215	163	TO	129	96	84

*TO=Timeout

Summary

Reliance Trands Market Itanagar	2G		
	Airtel	BSNL	VIL(Vodafone)
Download Throughput (Kbps)	TO	130.76	93.67
Upload Throughput (kbps)	191.59	80.59	125.45
Web Browsing Delay (sec)	32.89	34.67	59.66
Latency (msec)	259	404	TO

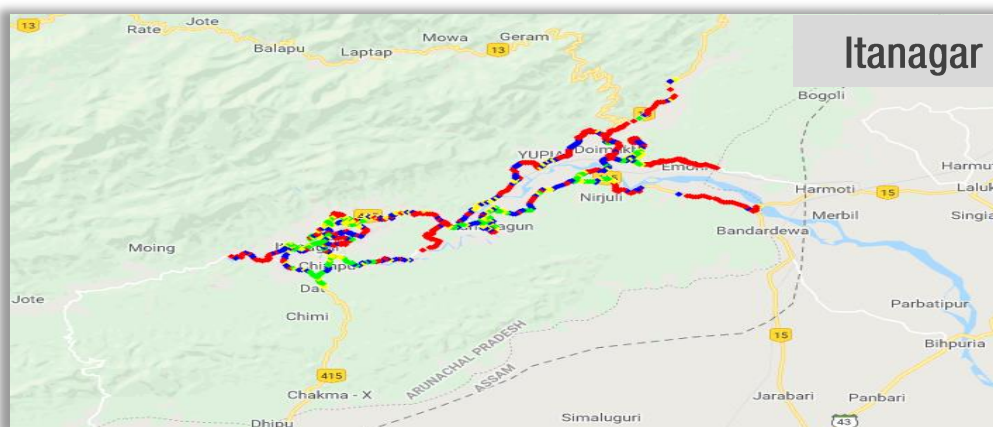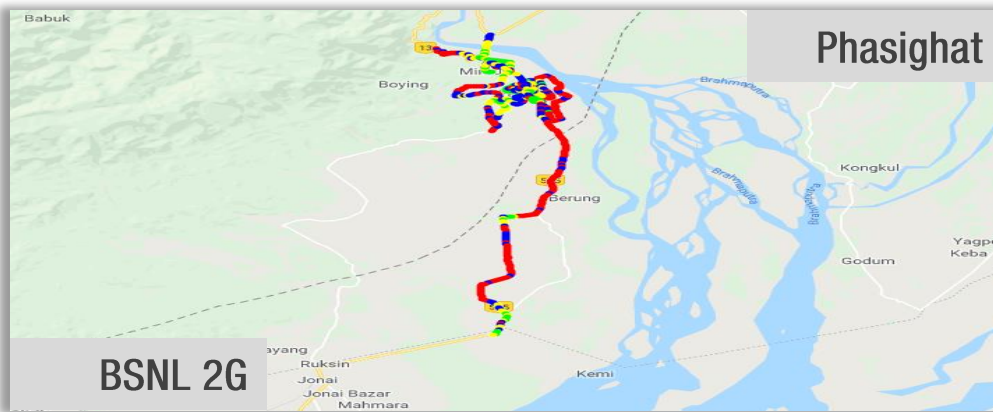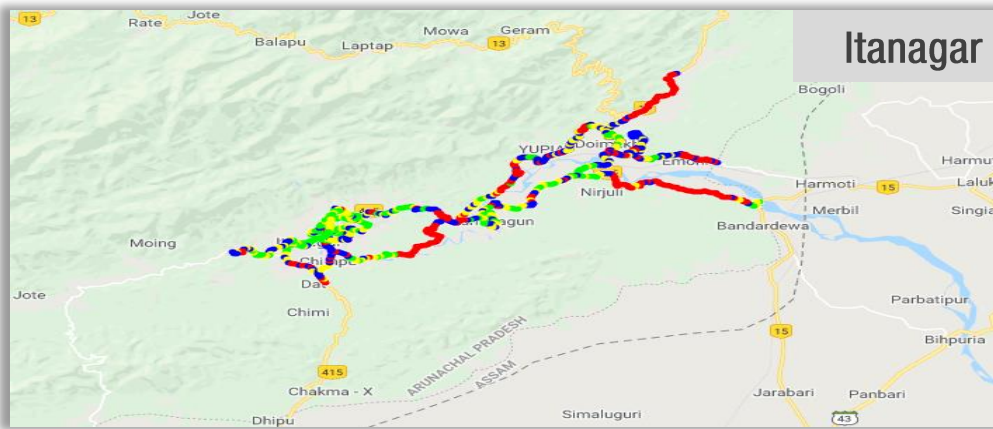| Reliance Trands Market Itanagar	3G			4G		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Download Throughput (Mbps)	4.86	0.87	0.28	9.08	9.38	0.08
Upload Throughput (Mbps)	1.15	1.06	1.34	3.08	4.54	3.32
Web Browsing Delay (sec)	11.46	15.89	17.88	7.55	8.18	23.79
Video Streaming Delay (sec)	1.77	7.85	0.96	1.31	1.46	6.27
Latency (msec)	325	94	TO	103	99	94

*TO=Timeout

RF Coverage relates to the geographical footprint within the system that has sufficient RF signal strength to provide for a call/data session. The Coverage rate of an TSP is calculated on the basis of % of samples in which the Rx level ≥ -85 dBm, RSCP is ≥ -90 dBm & RSRP ≥ -110dBm. The details are as follows.
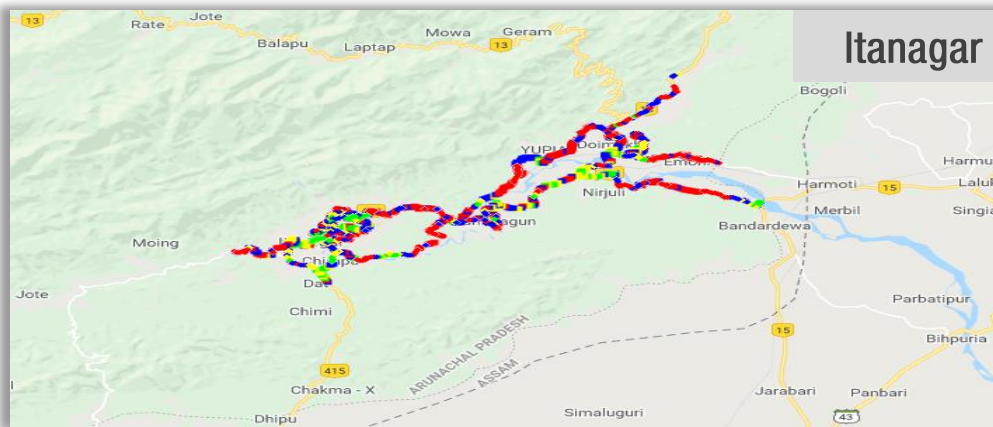
TSP	Coverage Rate
Airtel 2G	77.67%
BSNL 2G	75.55%
VIL(Vodafone) 2G	63.41%
Airtel Dual(2G/3G)	58.98%
BSNL Dual(2G/3G)	65.31%
VIL(Vodafone) Dual(2G/3G)	68.02%
Airtel VoLTE	82.68%
Jio VoLTE	87.42%

Coverage Distribution

Legend:
- 2G : -85 to Min/ Dual (2G/3G) : -90 to Min/ VoLTE : -110 to -130 dBm
- 2G : -75 to -85dBm/ Dual (2G/3G) : -80 to -90 dBm/ VoLTE : -95 to -110 dBm
- 2G : -65 to -75dBm/ Dual (2G/3G) : -70 to -80 dBm/ VoLTE : -80 to -95 dBm
- 2G : 0 to 65dBm/ Dual (2G/3G) : 0 to -70 dBm/ VoLTE : 0 to -80 dBm

Itanagar

Phasighat

Airtel 2G

RxLev Sub In Service (dBm)
- [Min, -85)   (4729) (22.33%)
- [-85, -75)   (6797) (32.1%)
- [-75, -65)   (4887) (23.08%)
- [-65, Max]   (4763) (22.49%)

Itanagar

Phasighat

BSNL 2G

RxLev Sub In Service (dBm)
- [Min, -85)   (5219) (24.45%)
- [-85, -75)   (5901) (27.65%)
- [-75, -65)   (5075) (23.78%)
- [-65, Max]   (5148) (24.12%)

Itanagar

Phasighat

VIL(Vodafone) 2G

RxLev Sub In Service (dBm)
- [Min, -85)   (7691) (36.59%)
- [-85, -75)   (5597) (26.62%)
- [-75, -65)   (4264) (20.28%)
- [-65, Max]   (3470) (16.51%)

Itanagar

Phasighat

Airtel Dual(2G/3G)

RxLev Sub In Service (dBm)

◆		
■	[Min, -85)	(3795) (42.54%)
■	[-85, -75)	(2597) (29.11%)
■	[-75, -65)	(1344) (15.07%)
■	[-65, Max]	(1184) (13.27%)

Agg. Active RSCP (dBm)

■	[Min, -90)	(4069) (40.73%)
■	[-90, -80)	(2734) (27.36%)
■	[-80, -70)	(1969) (19.71%)
■	[-70, Max]	(1219) (12.2%)

Serving Cell RSRP (dBm)

●	[Min, -110)	(731) (35.82%)
■	[-110, -95)	(928) (45.47%)
■	[-95, -80)	(348) (17.05%)
■	[-80, Max]	(34) (1.67%)

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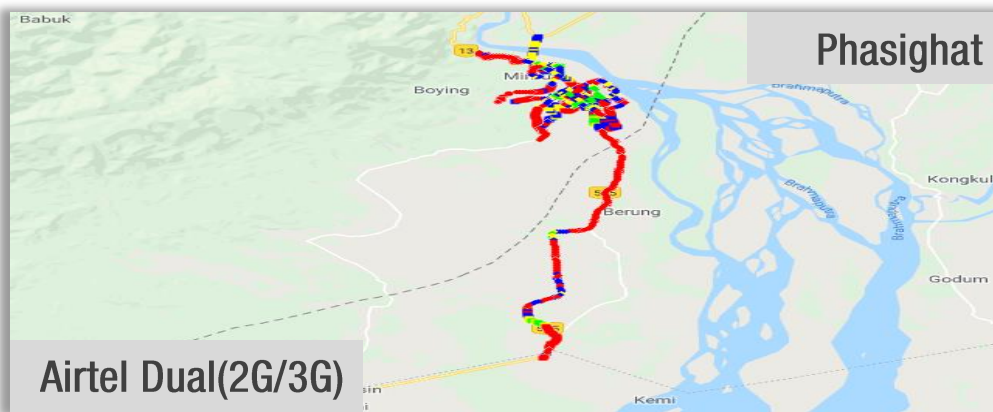
BSNL Dual(2G/3G)
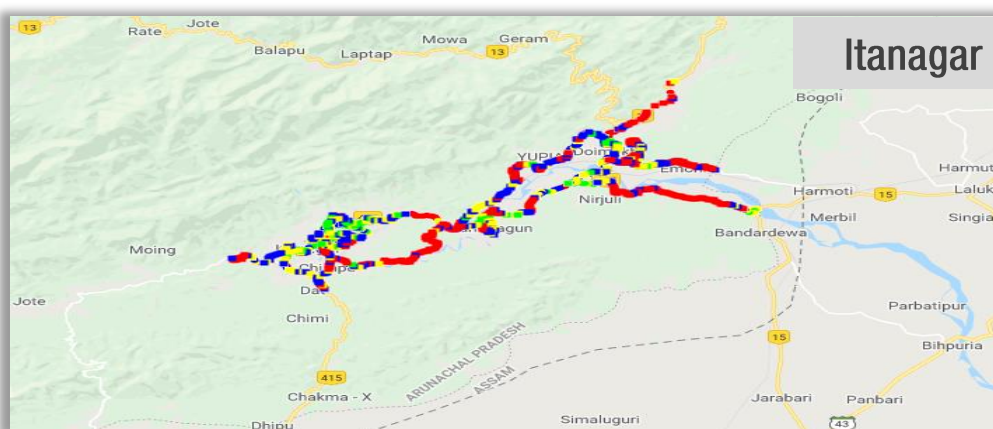
RxLev Sub In Service (dBm)

■	[Min, -85)	(5390) (40.36%)
■	[-85, -75)	(4151) (31.08%)
■	[-75, -65)	(2696) (20.19%)
■	[-65, Max]	(1119) (8.38%)

Agg. Active RSCP (dBm)

●	[Min, -90)	(2039) (25.3%)
■	[-90, -80)	(2583) (32.06%)
■	[-80, -70)	(2524) (31.32%)
■	[-70, Max]	(912) (11.32%)

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VIL(Vodafone) Dual(2G/3G)
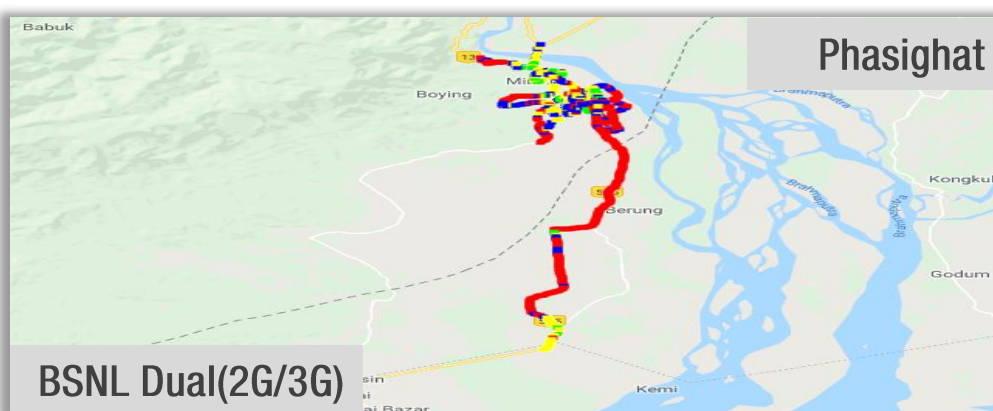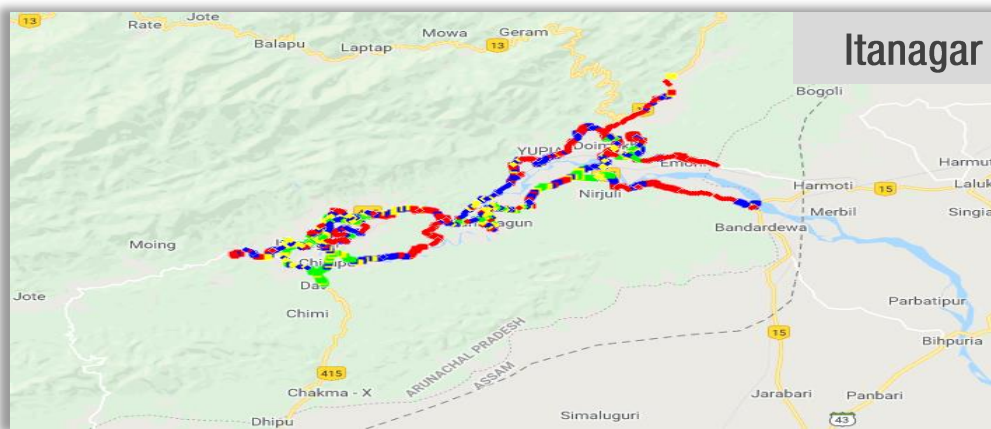
RxLev Sub In Service (dBm)
[Min, -85)	(3299)	(41.84%)
[-85, -75)	(2546)	(32.29%)
[-75, -65)	(1395)	(17.69%)
[-65, Max]	(645)	(8.18%)

Agg. Active RSCP (dBm)
[Min, -90)	(2767)	(26.35%)
[-90, -80)	(2476)	(23.58%)
[-80, -70)	(2318)	(22.08%)
[-70, Max]	(2939)	(27.99%)

Serving Cell RSRP (dBm)
[Min, -110)	(608)	(24.46%)
[-110, -95)	(1047)	(42.12%)
[-95, -80)	(587)	(23.61%)
[-80, Max]	(244)	(9.81%)

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Airtel VoLTE
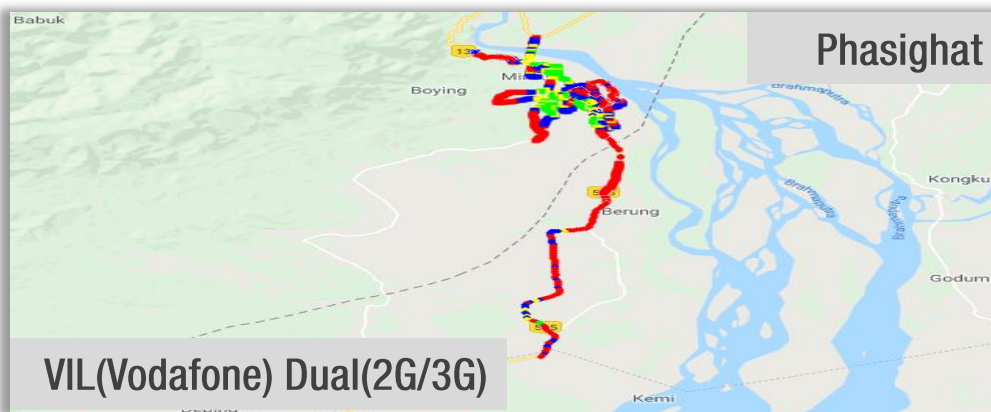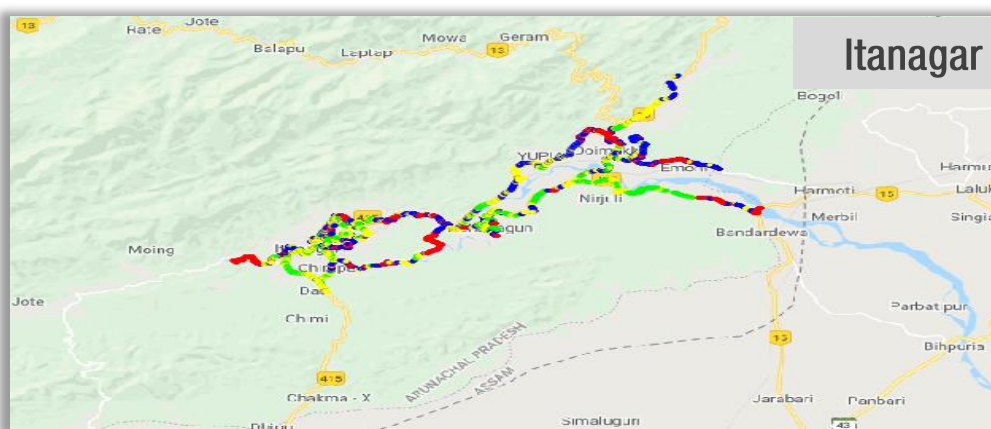
RxLev Sub In Service (dBm)
[Min, -85)	(672)	(56.14%)
[-85, -75)	(247)	(20.63%)
[-75, -65)	(186)	(15.54%)
[-65, Max]	(92)	(7.69%)

Agg. Active RSCP (dBm)
[Min, -90)	(1299)	(47.18%)
[-90, -80)	(499)	(18.13%)
[--80, -70)	(516)	(18.74%)
[-70, Max]	(439)	(15.95%)

Serving Cell RSRP (dBm)
[Min, -110)	(1422)	(9.09%)
[-110, -95)	(5293)	(33.85%)
[-95, -80)	(6217)	(39.76%)
[-80, Max]	(2703)	(17.29%)

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Jio VoLTE

Serving Cell RSRP (dBm)

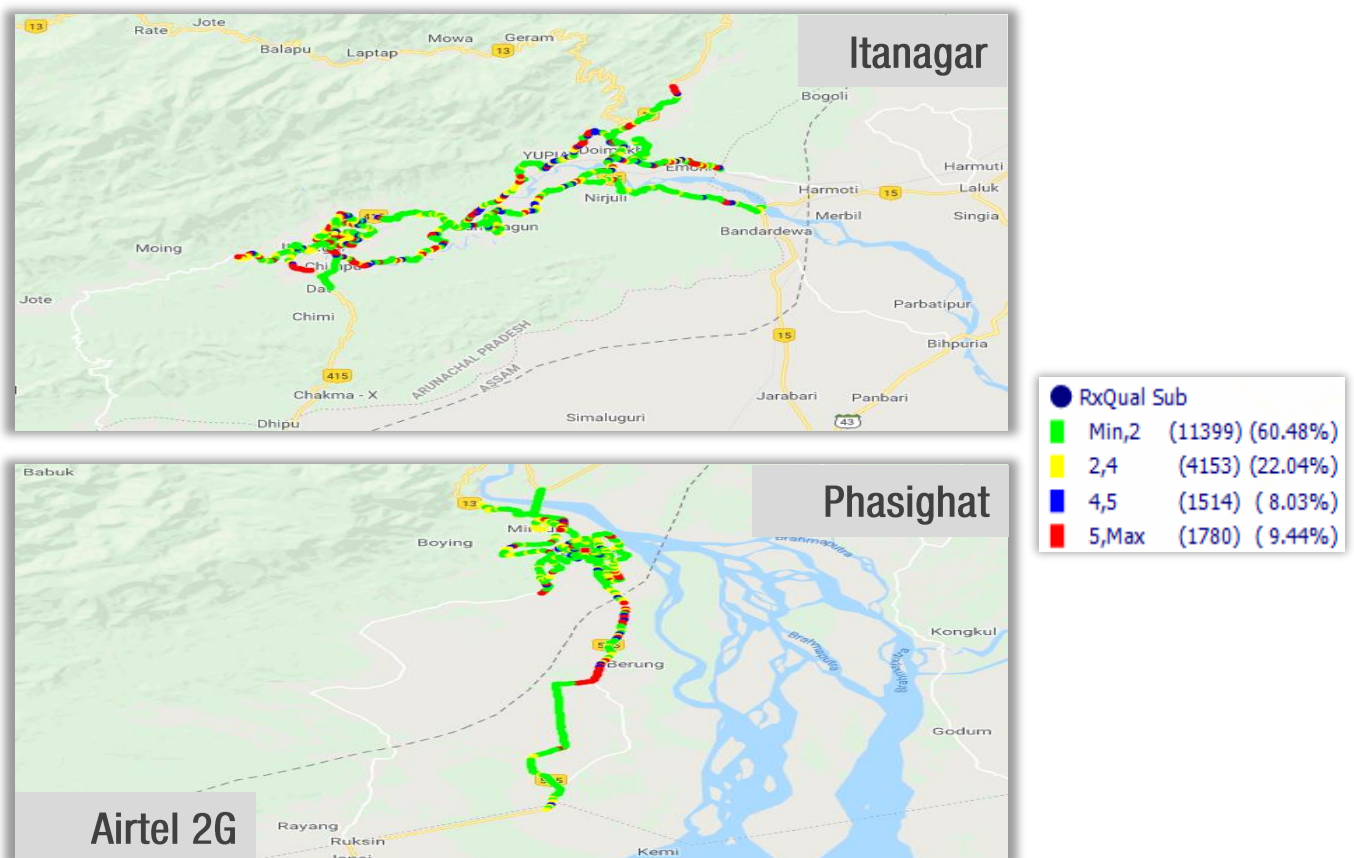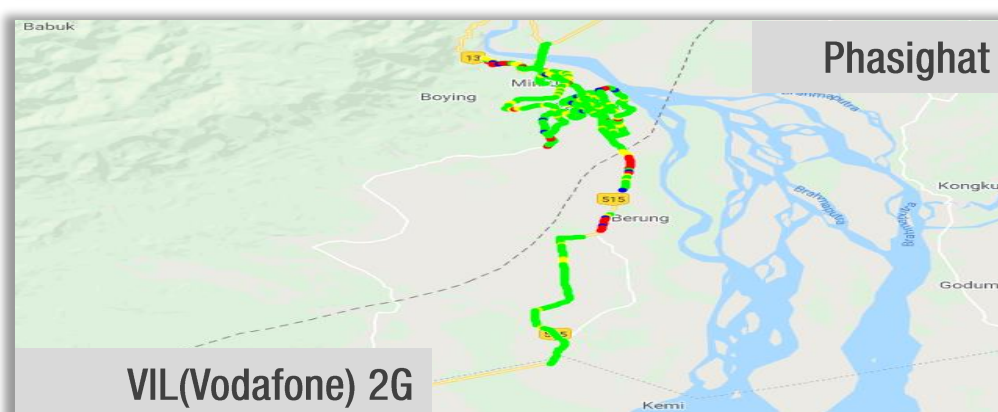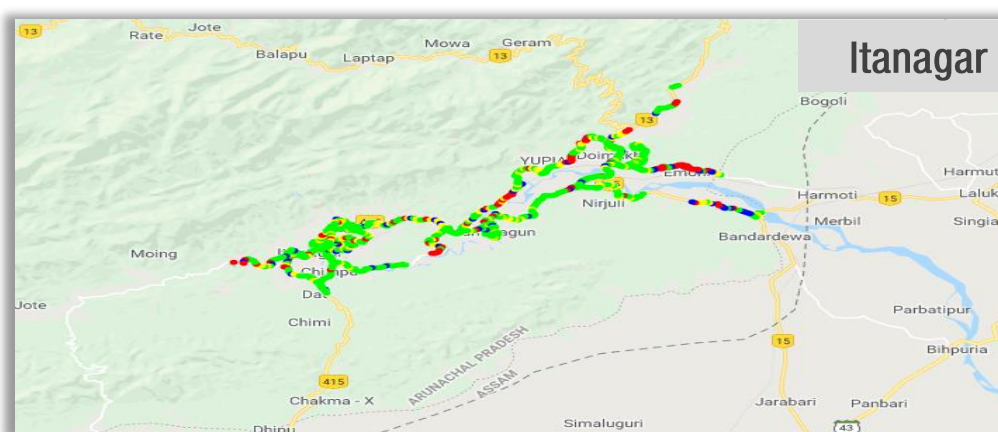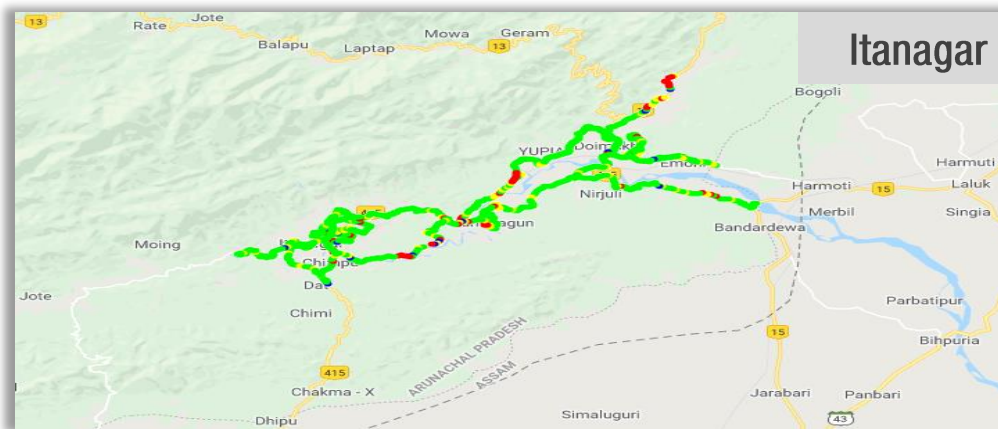|			
🔴	[Min, -110)	(2458)	(12.58%)
🔵	[-110, -95)	(6591)	(33.74%)
🟡	[-95, -80)	(6705)	(34.33%)
🟢	[-80, Max]	(3778)	(19.34%)
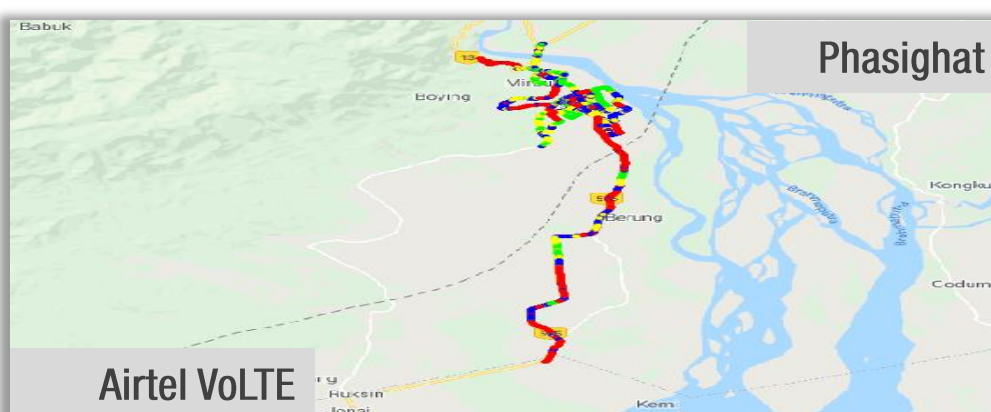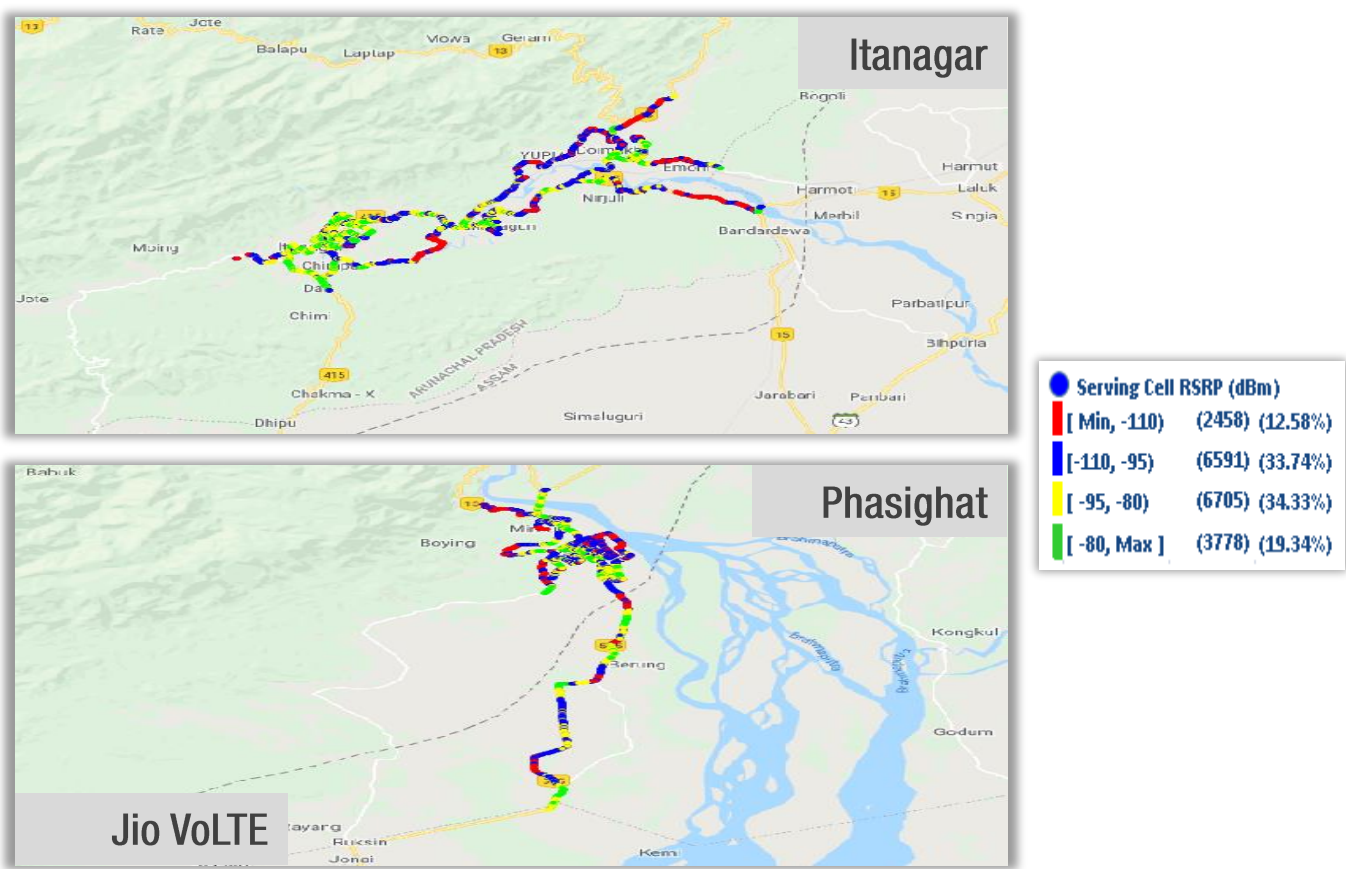
For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -14 dBm for 3G TSP sand SINR >0 in case of VoLTE is considered to be good, where as quality beyond this benchmark is considered to be bad. The benchmark should usually be ≥ 95%.

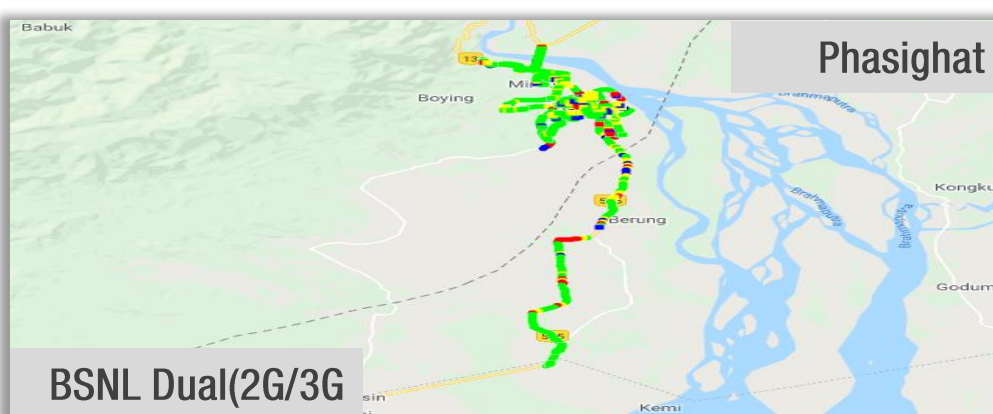| TSP	Rx Quality
Airtel 2G	90.56%
BSNL 2G	95.68%
VIL(Vodafone) 2G	93.51%
Airtel Dual(2G/3G)	86.75%
BSNL Dual(2G/3G)	93.82%
VIL(Vodafone) Dual(2G/3G)	80.61%
Airtel VoLTE	73.17%
Jio VoLTE	76.49%
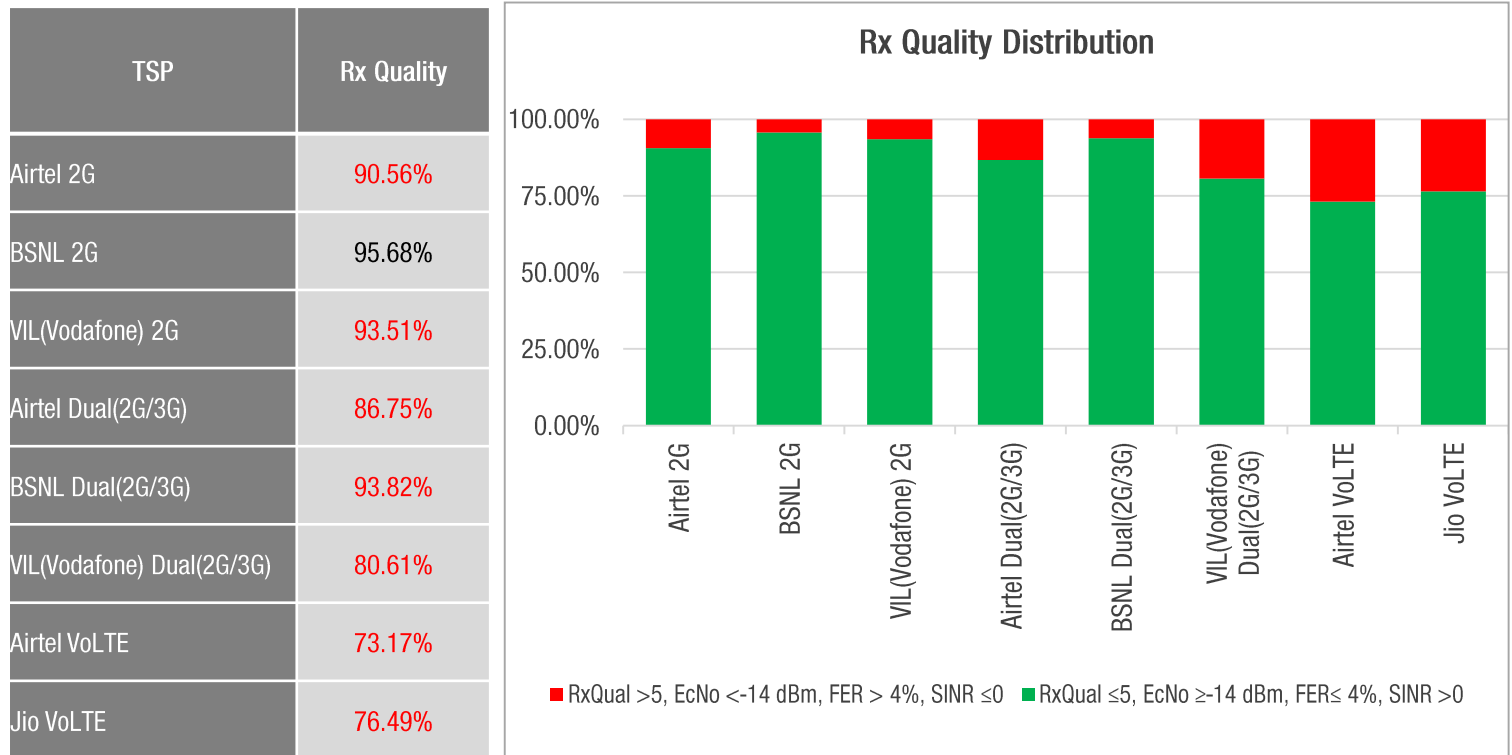
—— TSPs not meeting the Benchmark

Rx Quality Distribution

■ RxQual >5, EcNo <-14 dBm, FER > 4%, SINR ≤0   ■ RxQual ≤5, EcNo ≥-14 dBm, FER≤ 4%, SINR >0

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Airtel 2G

RxQual Sub
■ Min,2   (11399) (60.48%)
■ 2,4   (4153) (22.04%)
■ 4,5   (1514) (8.03%)
■ 5,Max   (1780) (9.44%)

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BSNL 2G

RxQual Sub
- Min,2   (15925) (82.83%)
- 2,4   (2015) (10.48%)
- 4,5   (455) (2.37%)
- 5,Max   (830) (4.32%)

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VIL(Vodafone) 2G

RxQual Sub
- Min,2   (14169) (77.06%)
- 2,4   (2339) (12.72%)
- 4,5   (685) (3.73%)
- 5,Max   (1193) (6.49%)

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Airtel Dual(2G/3G)

RxQual Sub

●	RxQual Sub	
■	Min,2	(4793) (56.39%)
■	2,4	(1751) (20.6%)
■	4,5	(666) (7.84%)
■	5,Max	(1290) (15.18%)

■	Agg. Active Ec/Io (dB)	
■	[Min, -14]	(804) (7.88%)
■	[-14, -11)	(2639) (25.86%)
■	[-11, -9)	(3197) (31.33%)
■	[-9, Max]	(3564) (34.93%)

◆	RS SINR (dB)	
■	[Min, 0)	(654) (32.03%)
■	[0, 5)	(515) (25.22%)
■	[5, 15)	(668) (32.71%)
■	[15, Max]	(205) (10.04%)

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BSNL Dual(2G/3G

●	RxQual Sub	
■	Min,2	(9376) (77.32%)
■	2,4	(1462) (12.06%)
■	4,5	(409) (3.37%)
■	5,Max	(880) (7.26%)

■	Agg. Active Ec/Io (dB)	
■	[Min, -14)	(374) (4.59%)
■	[-14, -11)	(1284) (15.76%)
■	[-11, -9)	(3110) (38.16%)
■	[-9, Max]	(3381) (41.49%)

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VIL(Vodafone) Dual(2G/3G)

RxQual Sub

●	Min,2	(5469)	(71.64%)
■ green	2,4	(1099)	(14.4%)
■ yellow	4,5	(344)	(4.51%)
■ blue	5,Max	(722)	(9.46%)

Agg. Active Ec/Io (dB)

■ red	[Min, -14)	(2300)	(21.6%)
■ blue	[-14, -11)	(3892)	(36.55%)
■ yellow	[-11, -9)	(1796)	(16.87%)
■ green	[-9, Max]	(2660)	(24.98%)

RS SINR (dB)

◆ red	[Min, 0)	(1005)	(40.41%)
◆ blue	[0, 5)	(674)	(27.1%)
◆ yellow	[5, 15)	(619)	(24.89%)
◆ green	[15, Max]	(189)	(7.6%)

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Airtel VoLTE
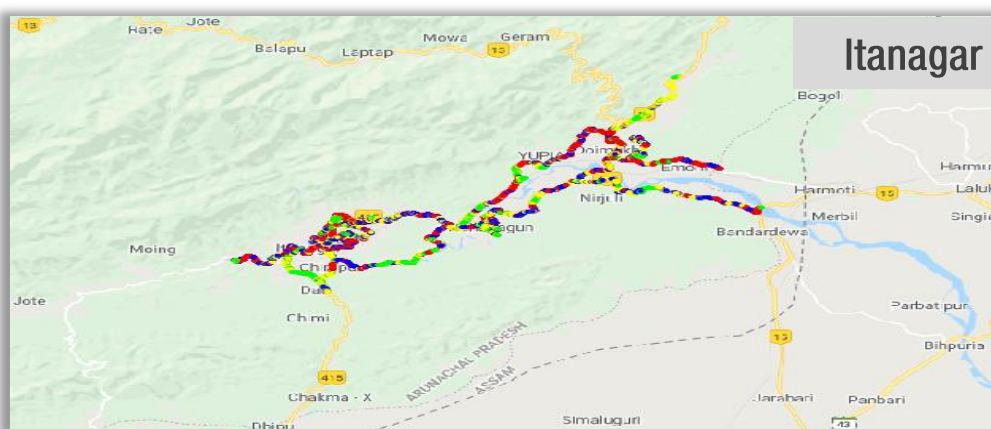
RxQual Sub

●	Min, 2	(679)	(58.33%)
■ green	2, 4	(128)	(11%)
■ yellow	4,5	(86)	(7.39%)
■ blue	5, Max	(271)	(23.28%)

Agg. Acticve Ec/Io (dB)
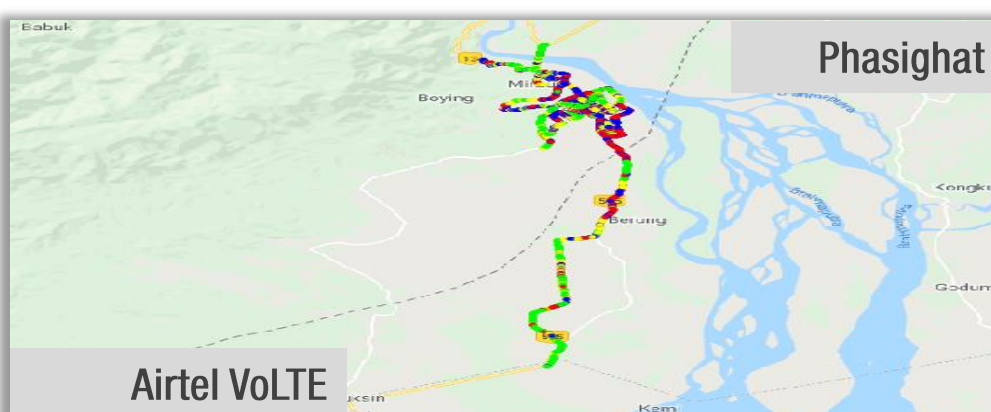
■ red	[Min, -14)	(702)	(25.5%)
■ blue	[-14, -11)	(1132)	(41.12%)
■ yellow	[-11, -9)	(456)	(16.56%)
■ green	[-9, Max)	(463)	(16.82%)

RS SINR (dB)

■ green	15 to Max	(1950)	(12.49%)
■ yellow	5 to 15	(5343)	(34.23%)
■ blue	0 to 5	(4053)	(25.96%)
■ red	Min to 0	(4264)	(27.32%)

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Jio VoLTE

RS SINR (dB)

15 to Max	(3015)	(15.44%)
5 to 15	(7387)	(37.84%)
0 to 5	(4531)	(23.21%)
Min to 0	(4589)	(23.51%)

TSP	% Time on 3G
Airtel 3G	46.57%
BSNL3G	36.93%
VIL(Vodafone) 3G	48.47%

Technology Distribution

% Time on 3G   % Time on 2G   % Time on 4G

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Airtel 3G
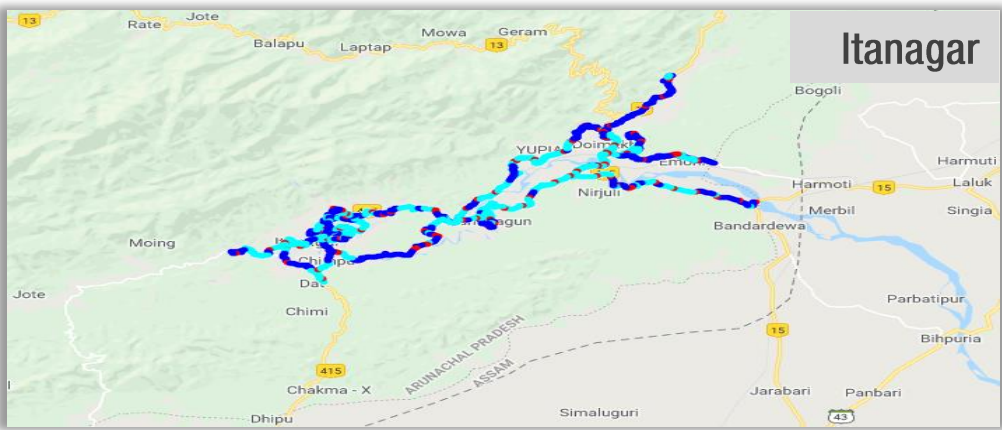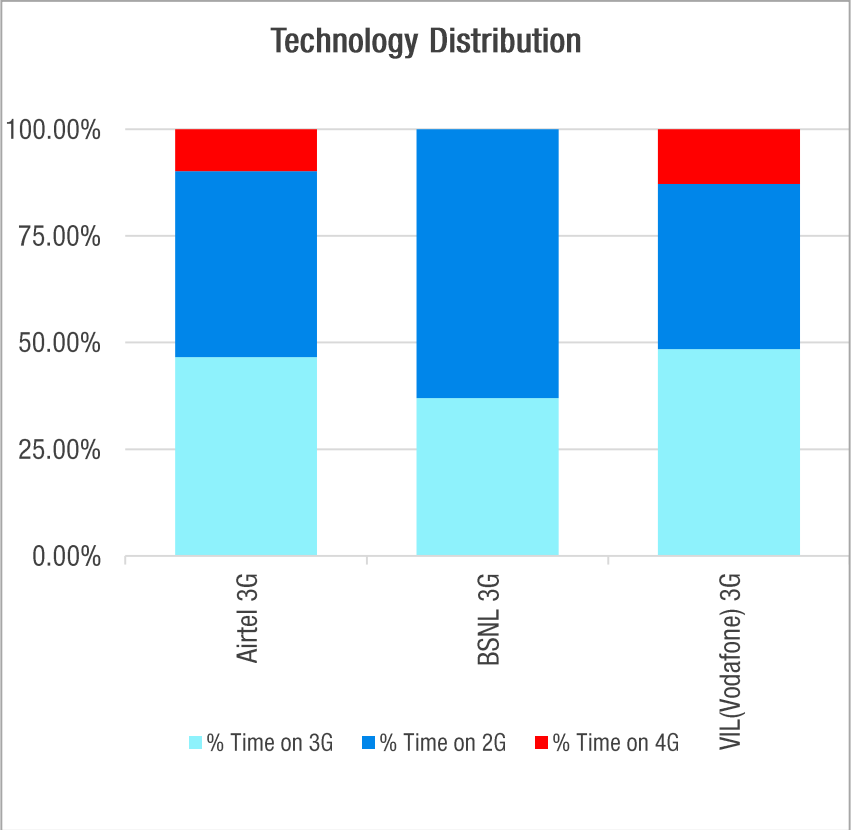
System		
GSM	(19386)	(43.6%)
WCDMA	(20706)	(46.57%)
LTE	(4370)	(9.83%)

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BSNL 3G

System		
GSM	(28189)	(63.07%)
WCDMA	(16505)	(36.93%)

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VIL(Vodafone) 3G

System		
GSM	(17284)	(38.64%)
WCDMA	(21680)	(48.47%)
LTE	(5764)	(12.89%)