Independent Drive Test Report

For

Itanagar

Nov 2017

East Zone

Key Performance Indicators: 55% of the TSPs have met the Drop Call Rate (DCR) benchmark of 2% while all TSPs have met the Call Setup Success Rate (CSSR) of 95% except Aircel 3G and Vodafone 2G & 3G.

The Independent Drive Test has been carried out by M/s PhiMetrics Technologies Pvt. Ltd. on behalf of TRAI in Itanagar City & adjoining areas from 9:00 AM to 9:00 PM; 1st Nov to 3rd Nov 2017. The drive test covered an drive route of approximately 250 KMs and 4 hotspots over a period of 3 days. Approximately 390 calls were made for each of the 11 networks: five 2G networks, five 3G networks, and one LTE network covering 6 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 **1st Nov to 3rd Nov 2017** covering various locations in Itanagar City & surrounding region. The performance of **Aircel, Airtel, BSNL, Idea, Vodafone and Jio** 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:

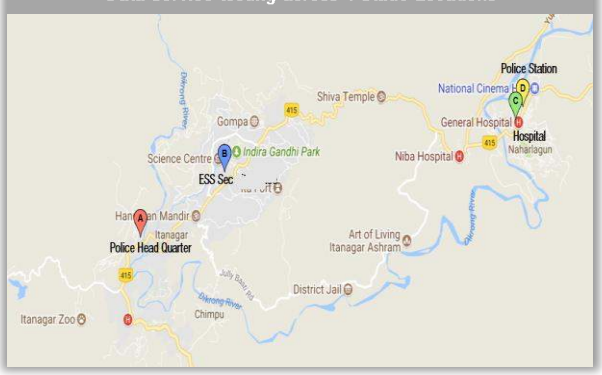
Independent Drive test was conducted for a period of 3 days from 1st Nov to 3rd Nov 2017 in Itanagar city & surrounding areas from 9:00 AM to 9:00 PM. Calls were made for 90 sec duration with wait time of 10 sec between calls in all technologies.
Voice Tests: The drive test covered a drive route of approximately 250 KMs over a period of 2 days from 1st Nov to 2nd Nov 2017. Approximately 390 calls were made for each of the 11 networks: Five 2G networks, five 3G networks and one VoLTE network covering 6 unique TSPs.
* In case of multiple call failure in similar geo location in given period of 60sec has been counted as one call failure.

Data Tests: Data Tests were performed at 4 static locations for 1 day on 3rd Nov; Five 2G (Lock mode) networks, five 3G (Dual mode) networks and four 4G (Free mode) networks covering 6 unique TSPs were tested.
* Outlier values are discarded to calculate the Data KPI's.
* 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 is calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.
* 4G KPI's which is 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	120 sec clip
Latency	32 Bytes on www.google.com

Voice Testing Drive Route

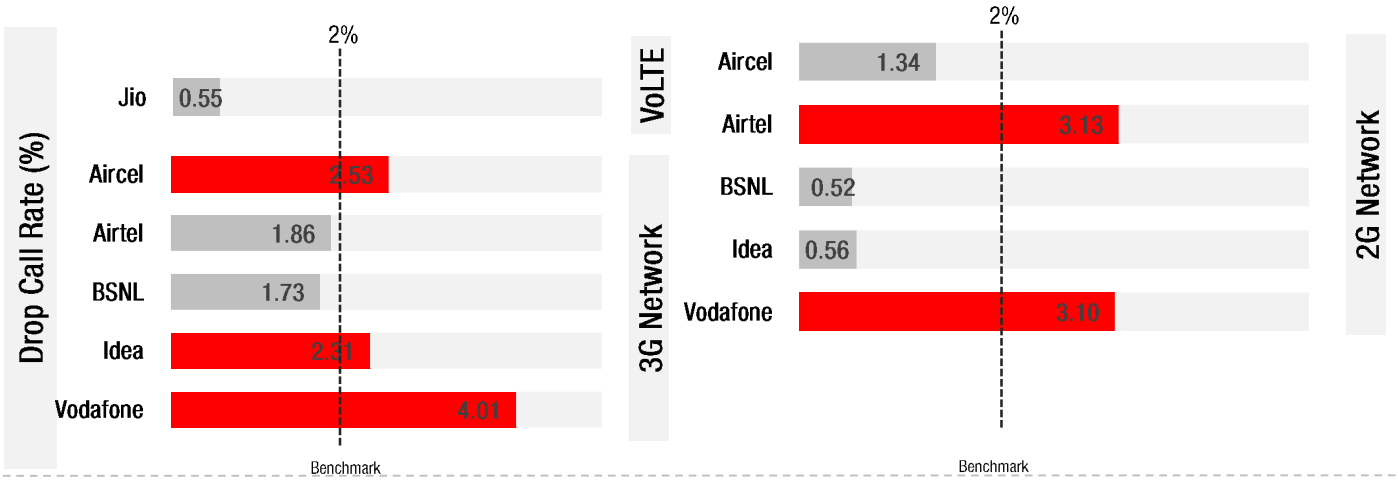
Data Service testing across 4 Static Locations

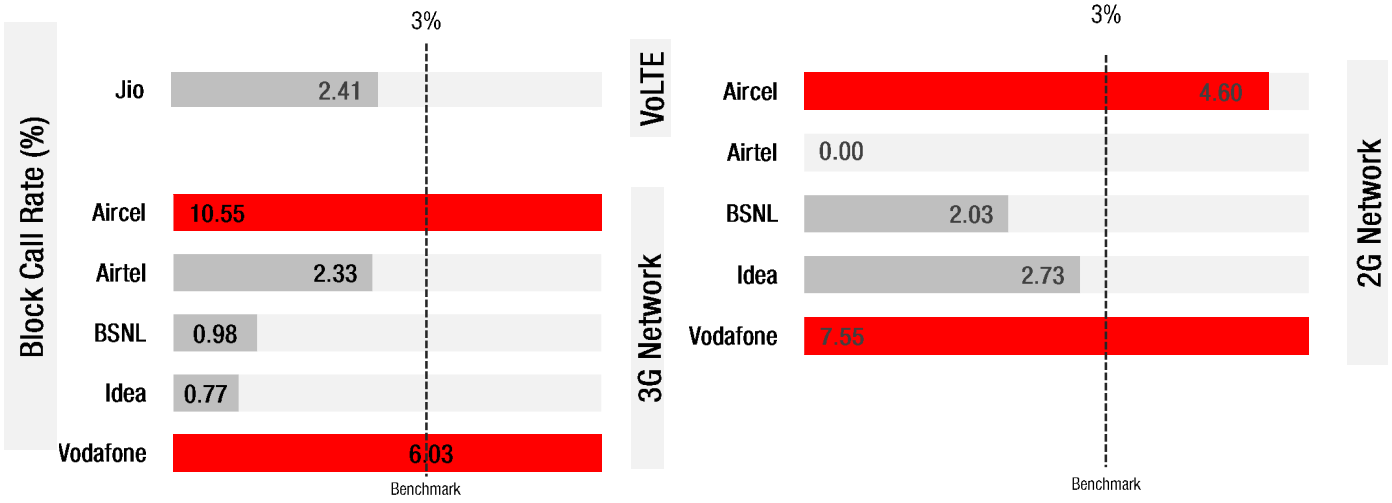


Voice Calls

Key Observations

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





KPI	2G Networks				
	Aircel	Airtel	BSNL	Idea	Vodafone
SDCCH Congestion%	0.77%	0.00%	0.51%	0.00%	0.52%
TCH Congestion %	3.87%	0.00%	1.53%	2.73%	7.07%

KPI	3G				
	Aircel	Airtel	BSNL	Idea	Vodafone
SDCCH Congestion%	0.75%	0.00%	0.25%	0.26%	1.01%
RRC Congestion%	0.25%	0.52%	0.00%	0.51%	0.25%
SDCCH & RRC Congestion%	1.01%	0.52%	0.25%	0.77%	1.26%
TCH Congestion %	3.05%	1.82%	0.74%	0.00%	4.83%
RAB Congestion %	6.60%	2.08%	0.74%	0.26%	0.51%
TCH & RAB Congestion %	9.64%	3.91%	1.47%	0.26%	5.34%

a) 55% of 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 except Aircel 2G & 3G and Vodafone 2G & 3G.

Not meeting Benchmark

Voice Calls

Key Observations

Coverage

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

TSPs	2G				
	Aircel	Airtel	BSNL	Idea	Vodafone
Coverage%	65.39%	81.69%	66.60%	57.60%	70.46%

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

TSPs	3G					VoLTE
	Aircel	Airtel	BSNL	Idea	Vodafone	Jio
Coverage%	63.31%	68.19%	78.02%	63.62%	74.47%	83.15

c) Percentage of time spent on 3G network.

TSPs	3G				
	Aircel	Airtel	BSNL	Idea	Vodafone
% Time Spent on 3G	29.33%	93.91%	29.47%	15.85%	64.12%

d) Percentage of Radio Link Timeout (RLT) => 48

TSPs	2G				
	Aircel	Airtel	BSNL	Idea	Vodafone
% of Cells	3.13%	12.50%	81.03%	0.00%	0.00%

During IDT all TSP's have RLT less than 48 except Aircel, Airtel & BSNL.

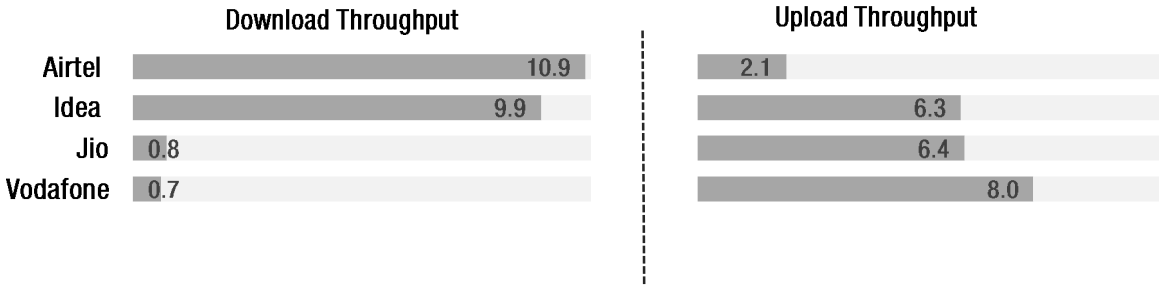
Data Services

Key Observations

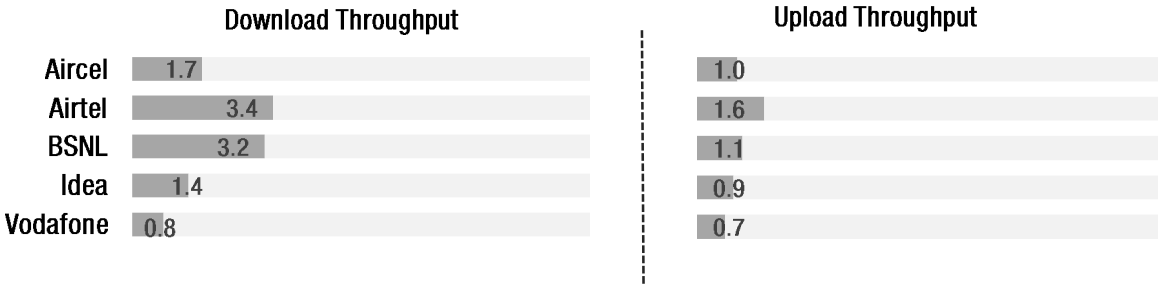
Data was tested at 4 locations viz Police Head Quarter, Hospital, ESS Sec and Police Station. Following services were tested: Data Download/Upload, Latency (www.google.com), Video Streaming (YouTube) and Web browsing (Flipkart, Amazon, PayTm)

Data Download and Upload Performance (Mbps)

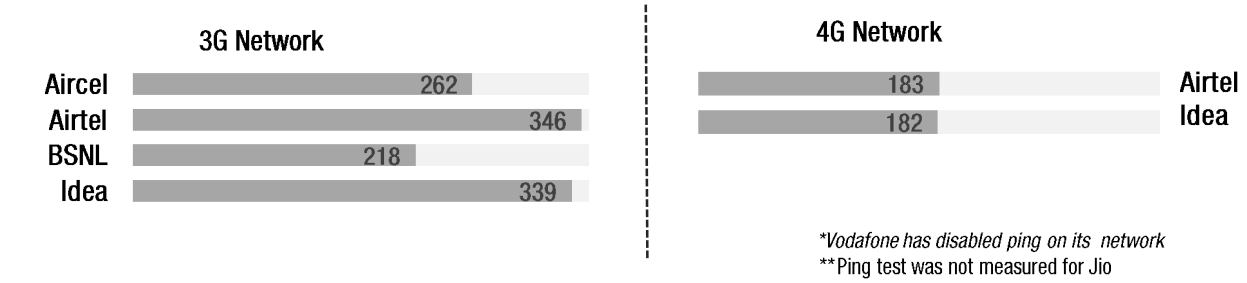
4G Network:



3G Network:



Latency (msec)



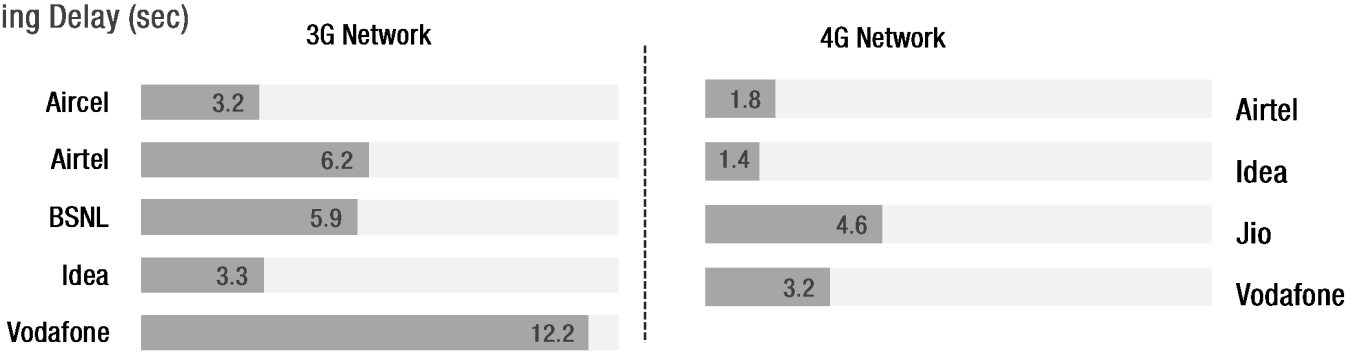
*Vodafone has disabled ping on its network
**Ping test was not measured for Jio

Data Services

Key Observations

Video Streaming Performance (120 sec YouTube video sample sizes)

Streaming Delay (sec)



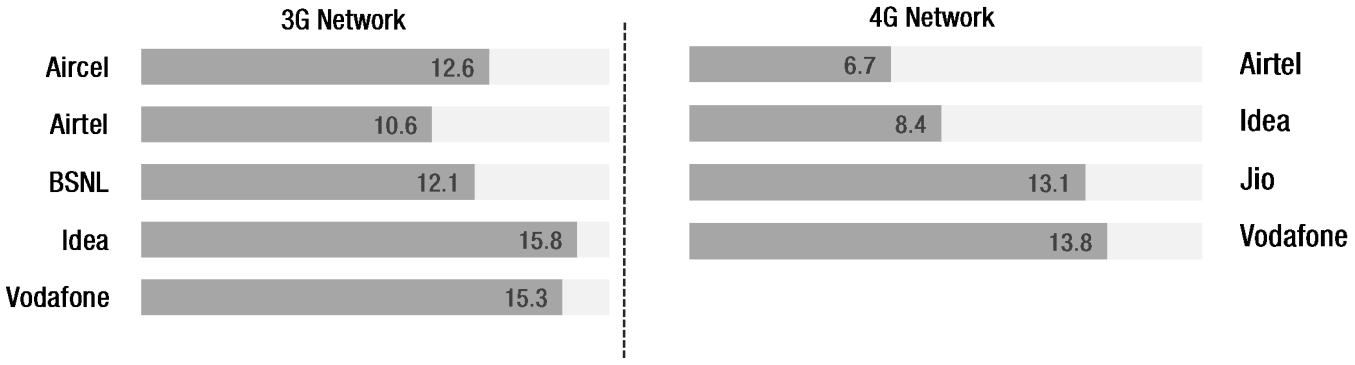
Streaming Delay further broken into 2 parameters which form the end-user perception to assess consistency on Video streaming.

- Initial Start time
- Interruption time while playing the video.

Video Streaming	3G					4G			
	Aircel	Airtel	BSNL	Idea	Vodafone	Airtel	Idea	Jio	Vodafone
Avg. Initial Start Time (sec)	3.2	2.2	5.9	3.3	4.9	1.8	1.4	4.6	3.2
Avg. Interruption Time (sec)	-	4.0	-	-	7.3	-	-	-	-

Web Page Download Time (sec)

Idea has shown better web page download performance on both the technologies



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

Summary

City Level Summary

Voice Call	2G				
	Aircel	Airtel	BSNL	Idea	Vodafone
Call Attempt	391	383	395	366	384
Blocked Call Rate (%)	4.6%	0.0%	2.0%	2.7%	7.6%
CSSR% (Accessibility)	95.4%	100.0%	98.0%	97.3%	92.4%
Drop Call Rate (%)	1.3%	3.1%	0.5%	0.6%	3.1%
Mobility HOSR (%)	95.5%	99.0%	87.9%	99.8%	99.4%
Rx Quality (%)	97.40%	97.19%	96.95%	97.62%	96.83%

Voice Call	3G					VoLTE
	Aircel	Airtel	BSNL	Idea	Vodafone	Jio
Call Attempt	398	386	408	392	398	374
Blocked Call Rate (%)	10.6%	2.3%	0.98%	0.77%	6.03%	2.41%
CSSR% (Accessibility)	89.4%	97.7%	99.0%	99.2%	94.0%	97.6%
Drop Call Rate (%)	2.5%	1.9%	1.7%	2.3%	4.0%	0.5%
Mobility HOSR (%)	97.9%	100.0%	96.2%	100.0%	100.0%	99.55%
Rx Quality (%)	96.21%	66.96%	96.42%	95.28%	83.40%	81.03%

** BSNL CDMA not measured for Voice test as there is only 3 site is radiating in Itanagar.*

City Level Summary

Data Services	2G					CDMA
	Aircel 2G	Airtel 2G	BSNL 2G	Idea 2G	Vodafone 2G	BSNL
Download Throughput (Kbps)	65.6	11.8	87.5	163.6	115.9	92.5
Upload Throughput (Kbps)	73.3	93.1	90.8	164.7	120.5	55.9
Web Browsing Delay (sec)	21.1	18.9	17.0	28.4	22.2	50.9
Latency (msec)	291	401	405	430	-	868

Data Services	3G					4G			
	Aircel	Airtel	BSNL	Idea	Vodafone	Airtel	Idea	Jio	Vodafone
Download Throughput (Mbps)	1.7	3.4	3.2	1.4	0.8	10.9	9.9	0.8	0.7
Upload Throughput (Mbps)	1.0	1.6	1.1	0.9	0.7	2.1	6.3	6.4	8.0
Web Browsing Delay (sec)	12.6	10.6	12.1	15.8	15.3	6.7	8.4	13.1	13.8
Video Streaming Delay (sec)	3.2	6.2	5.9	3.3	12.2	1.8	1.4	4.6	3.2
Latency (msec)	262	346	218	339	-	183	182	-	-

**Vodafone has disabled ping on its network*
***Ping test was not measured for Jio*

Summary

City Level Summary(contd.)

ESS SEC	2G					CDMA
	Aircel	Airtel	BSNL	Idea	Vodafone	BSNL
Download Throughput (kbps)	111.0	Fail	78.2	167.3	57.9	91.8
Upload Throughput (kbps)	95.0	79.3	112.1	191.6	112.1	23.1
Web Browsing Delay (sec)	17.0	Fail	19.0	27.5	20.5	55.7
Latency (msec)	211	646	367	399	-	Fail

ESS SEC	3G					4G			
	Aircel	Airtel	BSNL	Idea	Vodafone	Airtel	Idea	Jio	Vodafone
Download Throughput (Mbps)	1.8	5.6	1.7	1.3	1.1	7.7	13.2	2.1	2.0
Upload Throughput (Mbps)	1.3	2.1	1.2	1.5	1.5	0.6	6.5	8.7	11.3
Web Browsing Delay (sec)	12.6	9.2	10.6	15.2	13.7	5.9	6.9	9.7	9.1
Video Streaming Delay (sec)	2.8	2.2	3.2	2.9	3.5	1.2	1.1	6.2	1.5
Latency (msec)	265	313	184	361	-	160	192	-	-

Hospital	2G					CDMA
	Aircel	Airtel	BSNL	Idea	Vodafone	BSNL
Download Throughput (kbps)	61.1	22.9	75.8	145.0	131.6	107.5
Upload Throughput (kbps)	91.2	23.0	67.4	182.5	152.8	Fail
Web Browsing Delay (sec)	14.8	26.0	11.4	26.6	17.3	53.3
Latency (msec)	215	224	458	398	-	Fail

Hospital	3G					4G			
	Aircel	Airtel	BSNL	Idea	Vodafone	Airtel	Idea	Jio	Vodafone
Download Throughput (Mbps)	1.8	3.3	0.6	0.3	0.6	25.2	2.7	0.2	0.3
Upload Throughput (Mbps)	0.9	2.3	0.6	0.4	0.4	4.7	7.5	3.0	3.1
Web Browsing Delay (sec)	13.0	10.4	12.0	16.7	17.8	5.2	10.6	15.7	13.4
Video Streaming Delay (sec)	3.0	2.7	5.1	3.8	12.1	1.0	2.3	Fail	8.3
Latency (msec)	416	349	186	473	0	218	166	-	-

*Vodafone has disabled ping on its network
**Ping test was not measured for Jio

Summary

City Level Summary(contd.)

Police Head Quarter	2G					CDMA
	Aircel	Airtel	BSNL	Idea	Vodafone	BSNL
Download Throughput (kbps)	12.4	0.6	67.9	170.0	147.3	20.1
Upload Throughput (kbps)	40.5	78.2	103.7	116.2	104.3	31.8
Web Browsing Delay (sec)	33.2	19.7	18.8	29.1	26.5	46.0
Latency (msec)	270	470	366	468	-	0.9

Police Head Quarter	3G					4G			
	Aircel	Airtel	BSNL	Idea	Vodafone	Airtel	Idea	Jio	Vodafone
Download Throughput (Mbps)	1.5	5.0	6.2	3.4	0.9	8.1	17.6	0.8	0.2
Upload Throughput (Mbps)	0.9	1.2	2.5	1.2	0.5	0.5	5.0	10.6	12.6
Web Browsing Delay (sec)	11.5	9.5	7.0	12.8	12.1	5.7	6.7	10.1	15.1
Video Streaming Delay (sec)	3.2	9.7	3.2	1.4	10.7	1.4	0.9	2.9	1.0
Latency (msec)	213	327	125	234	0	180	169	-	-

Police Station	2G					CDMA
	Aircel	Airtel	BSNL	Idea	Vodafone	BSNL
Download Throughput (kbps)	76.3	Fail	128.0	174.3	126.9	102.3
Upload Throughput (kbps)	72.6	191.6	80.0	168.8	112.8	117.3
Web Browsing Delay (sec)	15.5	13.9	18.0	30.2	24.2	46.5
Latency (msec)	392	332	427	450	-	Fail

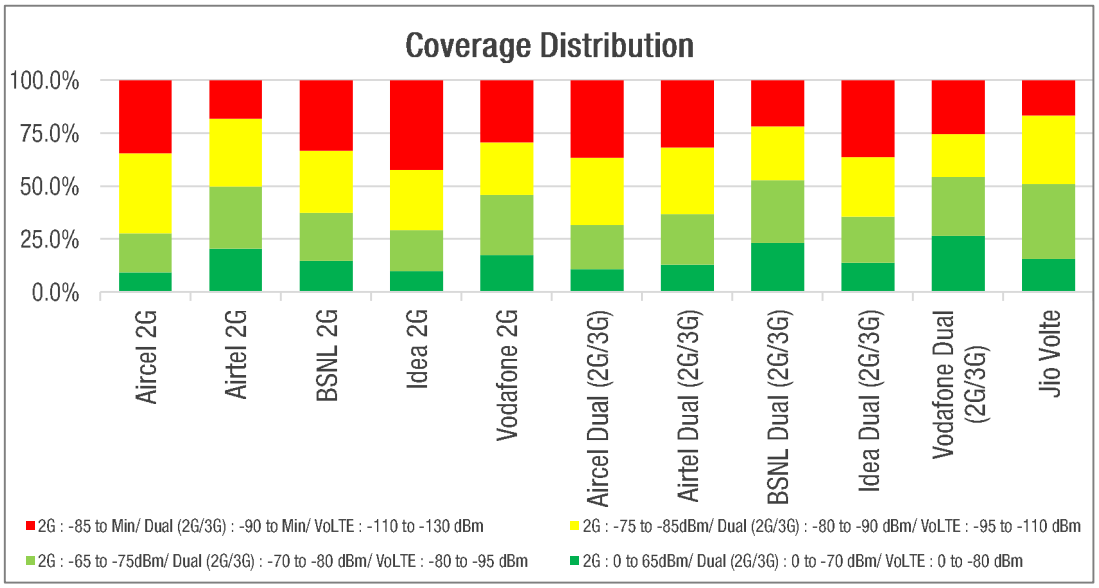
Police Station	3G					4G			
	Aircel	Airtel	BSNL	Idea	Vodafone	Airtel	Idea	Jio	Vodafone
Download Throughput (Mbps)	1.6	0.8	0.9	0.1	0.4	1.8	5.9	0.2	0.2
Upload Throughput (Mbps)	0.7	0.9	0.1	0.3	0.4	2.6	6.1	3.2	5.0
Web Browsing Delay (sec)	13.6	13.2	19.7	18.7	17.4	9.8	9.2	17.3	17.9
Video Streaming Delay (sec)	3.7	10.1	12.0	5.6	22.4	3.6	1.3	Fail	1.4
Latency (msec)	241	421	424	245	-	174	201	-	-

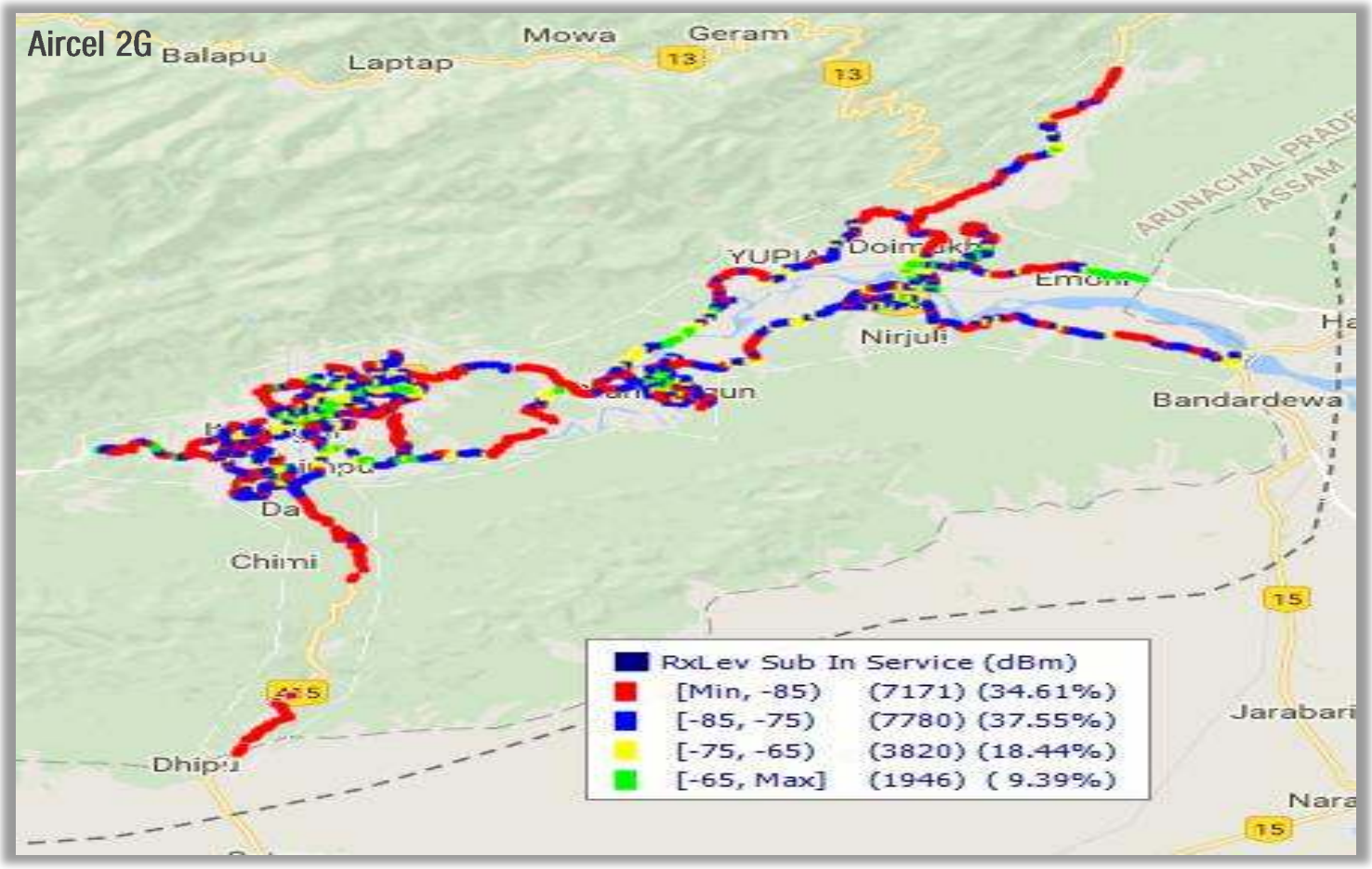
Vodafone has disabled ping on its network
**Ping test was not measured for Jio

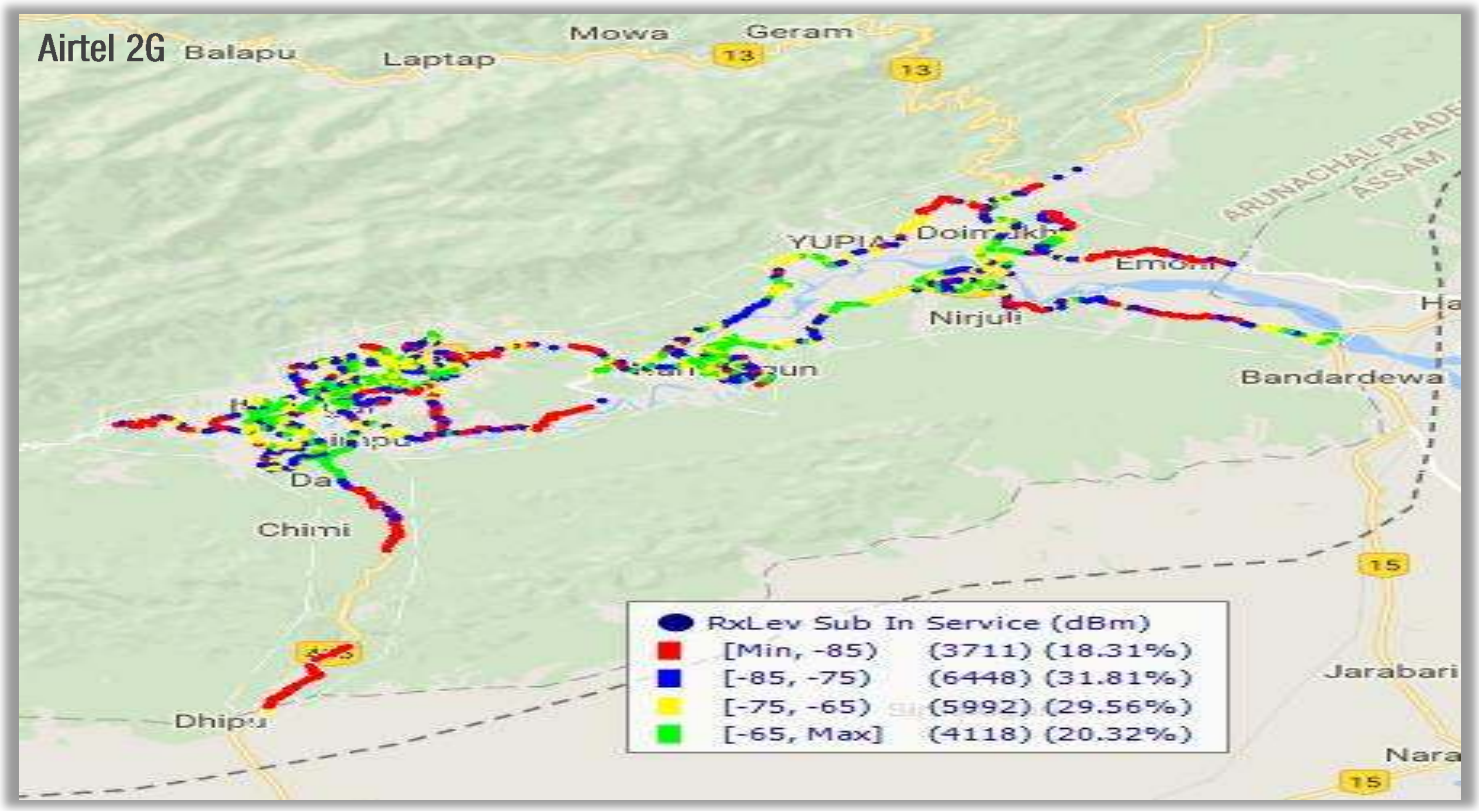
I. Coverage Details

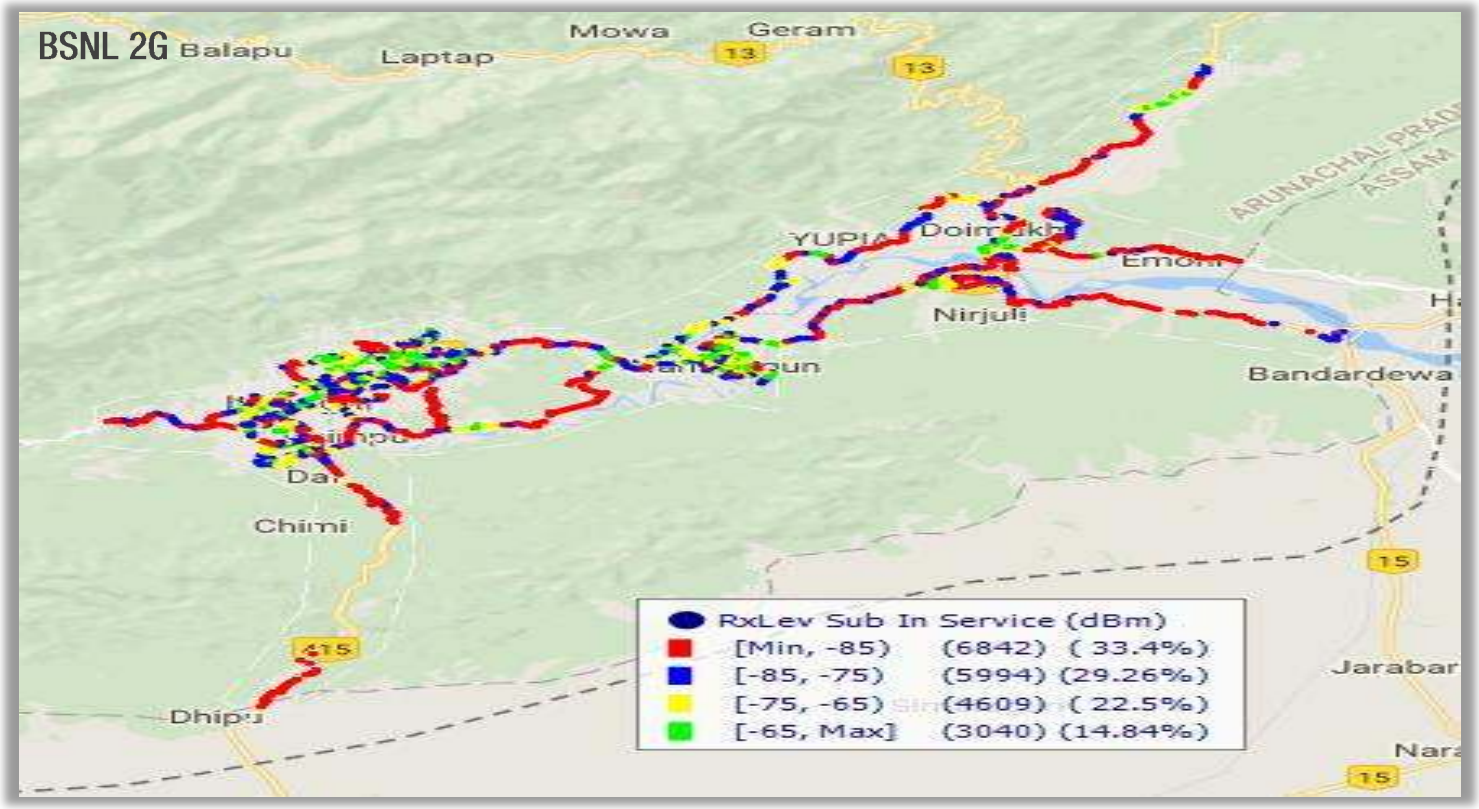
RF Coverage relates to the geographical footprint within the system that has sufficient RF signal strength to provide for a call/data session. The Coverage rate of an TSP is calculated on the basis of % of samples in which the Rx level ≥ -85, RSCP is ≥ -90 dBm & RSRP ≥ -110dBm. The details are as follows.

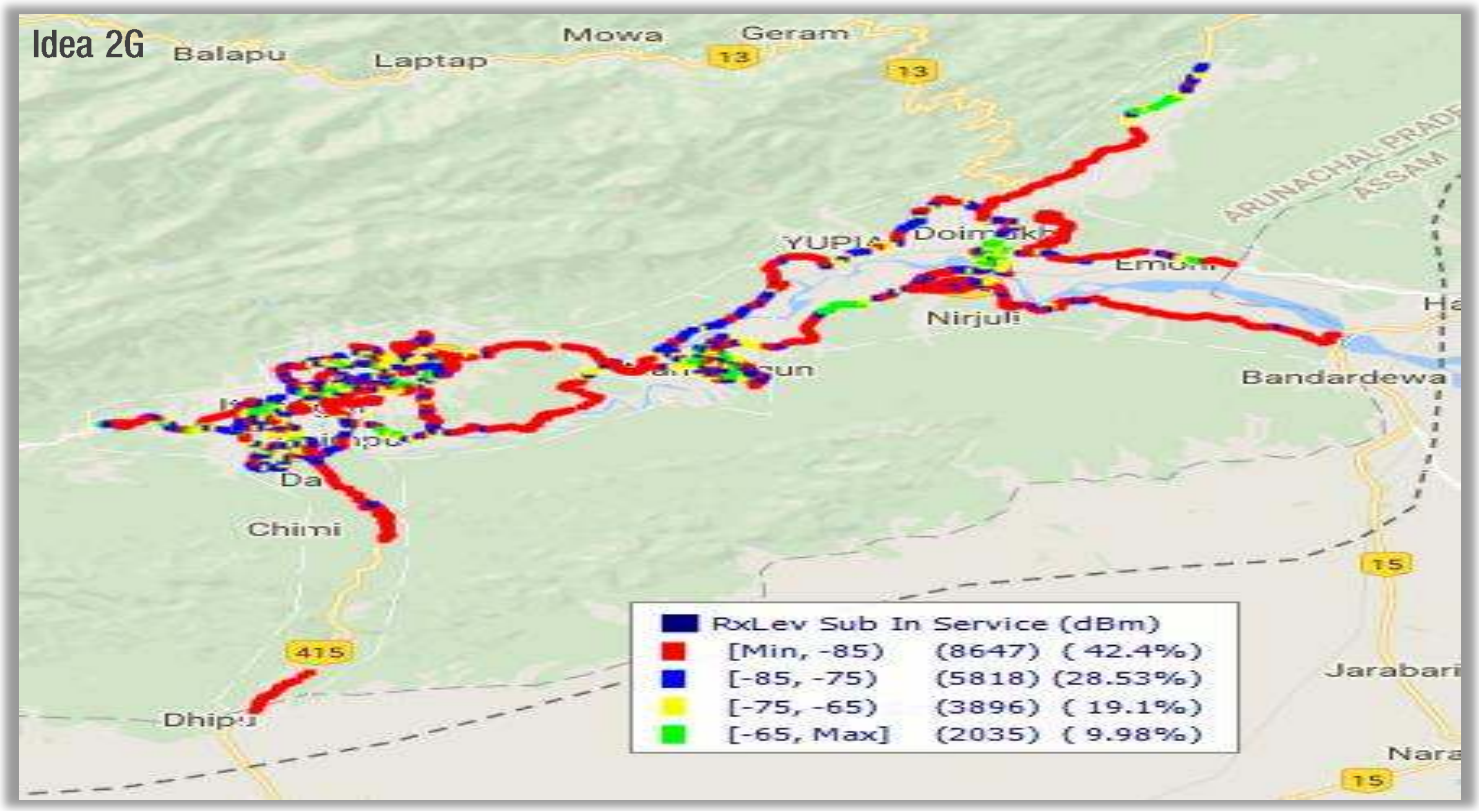
TSP	Coverage Rate
Aircel 2G	65.39%
Airtel 2G	81.69%
BSNL 2G	66.60%
Idea 2G	57.60%
Vodafone 2G	70.46%
Aircel Dual (2G/3G)	63.31%
Airtel Dual (2G/3G)	68.19%
BSNL Dual (2G/3G)	78.02%
Idea Dual (2G/3G)	63.62%
Vodafone Dual (2G/3G)	74.47%
Jio VoLTE	83.15%

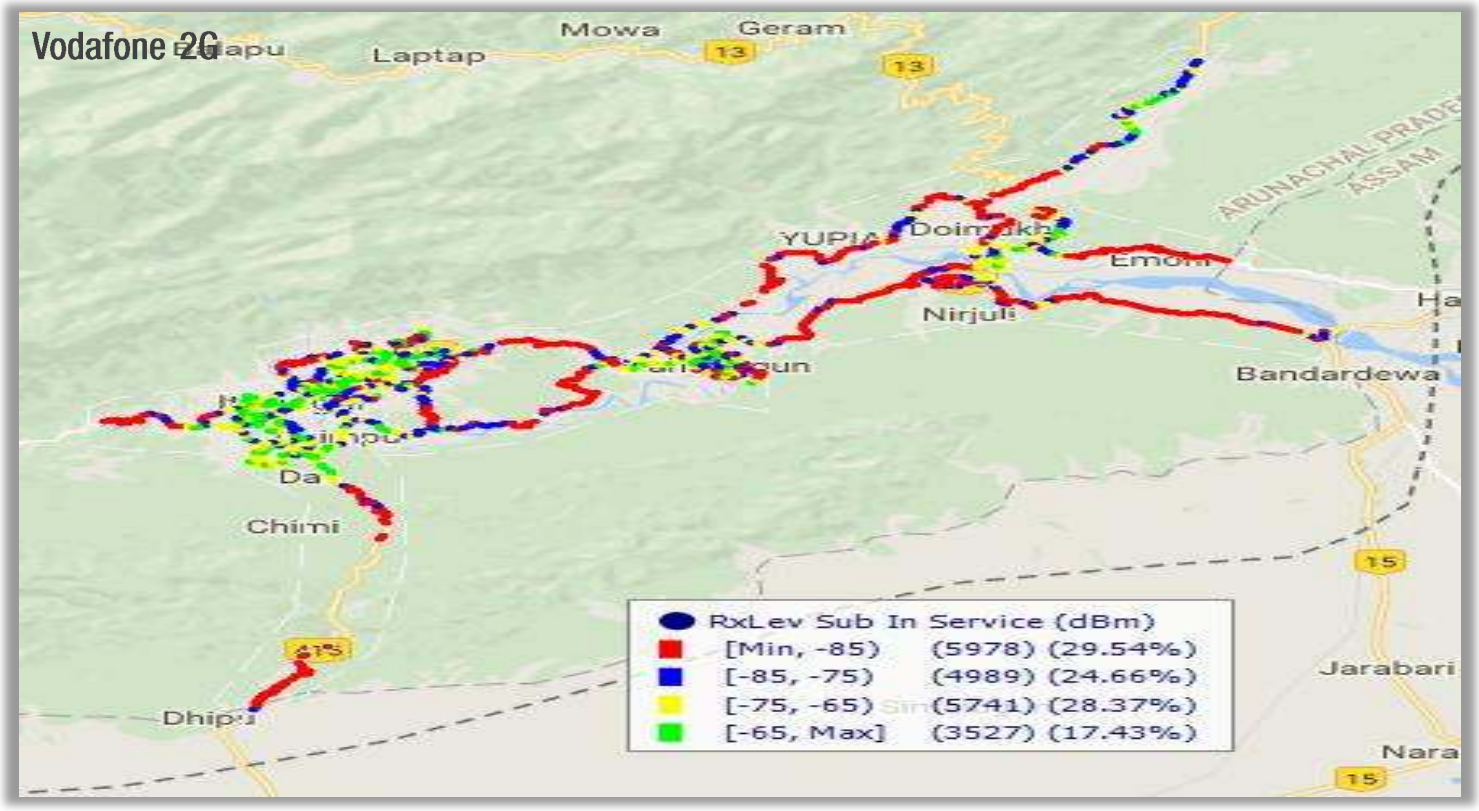


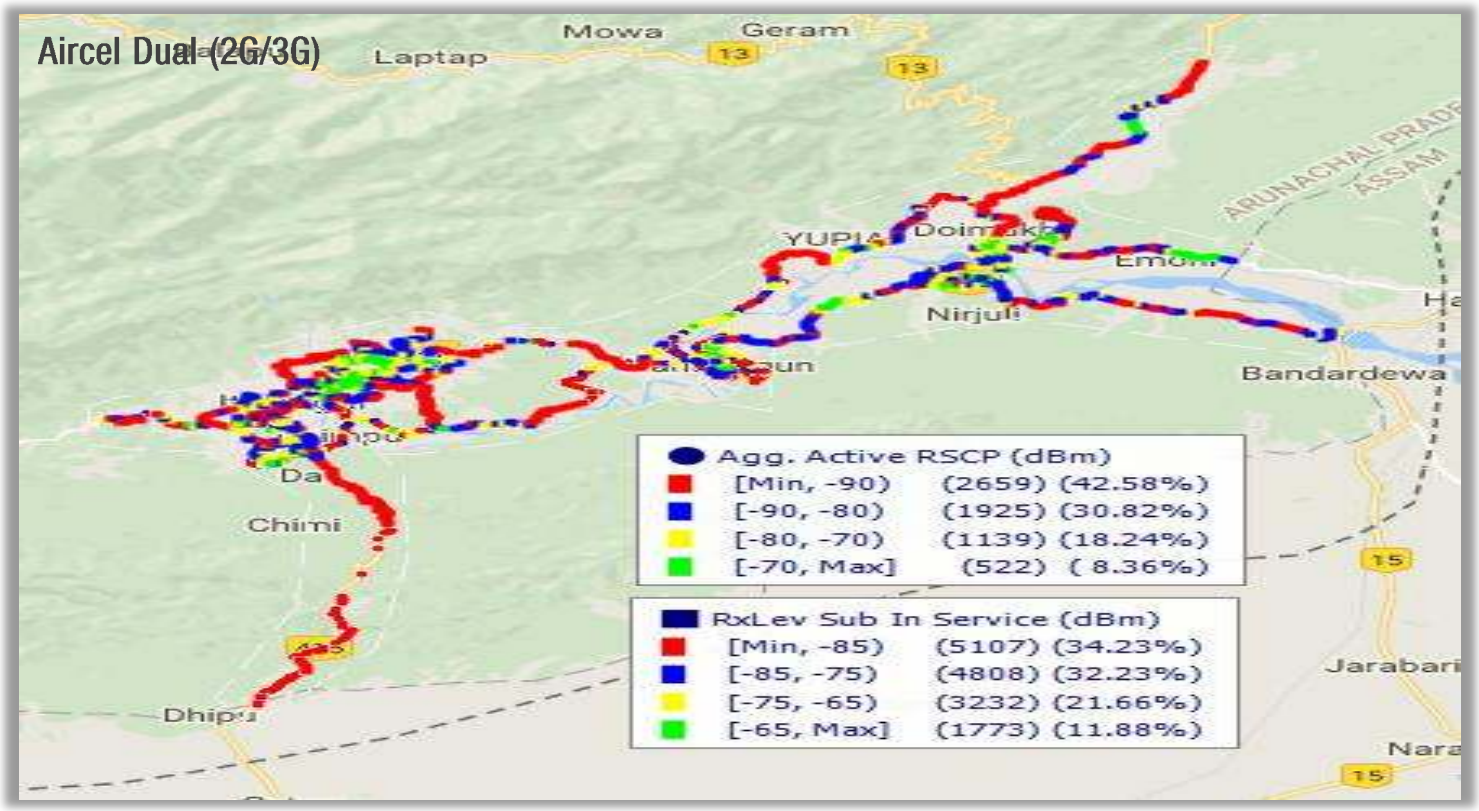


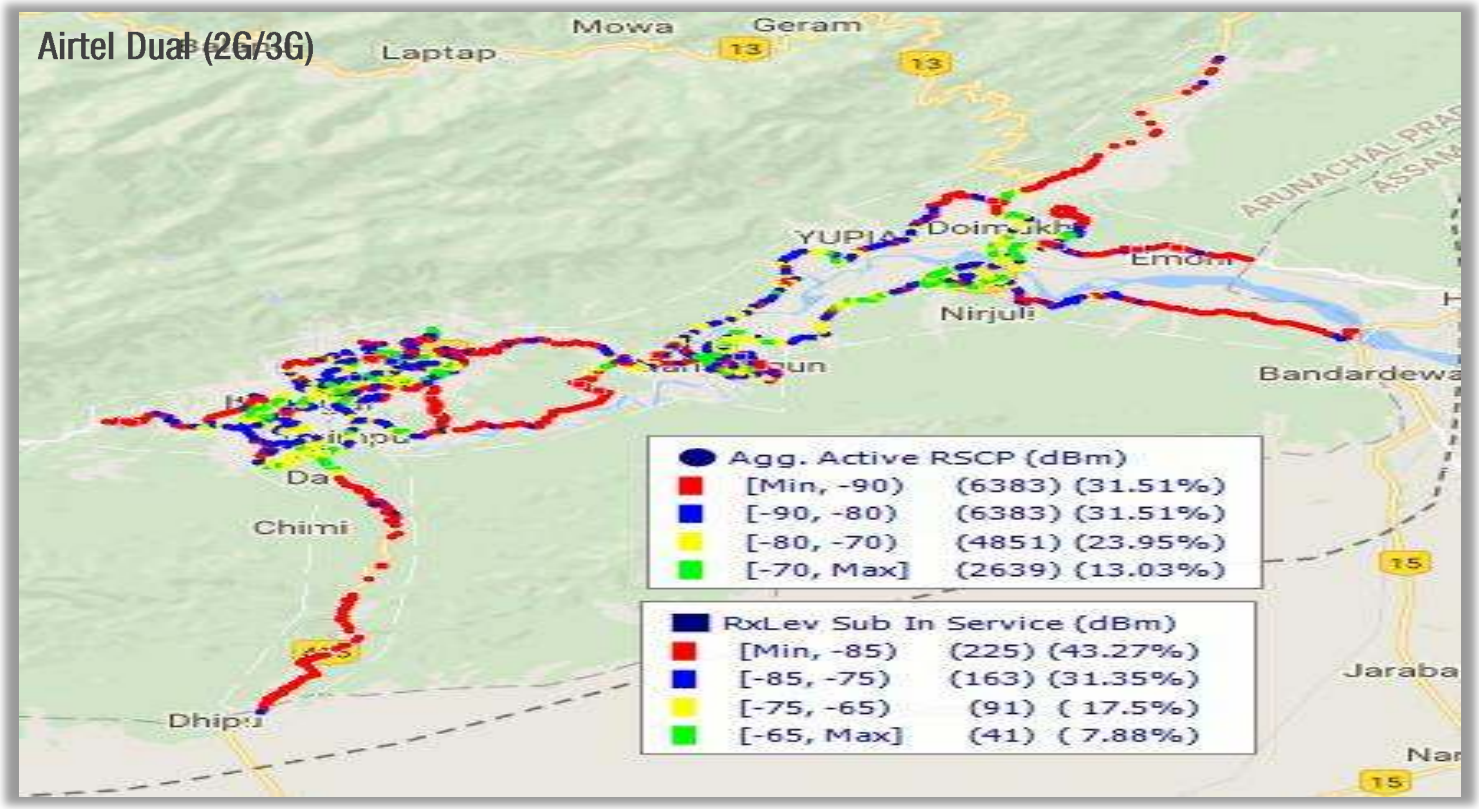

Airtel 2G
Balapu
Laptap
Mowa
Geram
13
YUPIA
Nirjuli
Bandardewa
Chimi
15
Jarabari
Nara
RxLev Sub In Service (dBm)
[Min, -85) (3711) (18.31%)
[-85, -75) (6448) (31.81%)
[-75, -65) (5992) (29.56%)
[-65, Max] (4118) (20.32%)


BSNL 2G
Balapu
Laptap
Mowa
Geram
13
YUPIA
Nirjuli
Bandardewa
Chimi
15
Jarabar
Nara
RxLev Sub In Service (dBm)
[Min, -85) (6842) (33.4%)
[-85, -75) (5994) (29.26%)
[-75, -65) (4609) (22.5%)
[-65, Max] (3040) (14.84%)

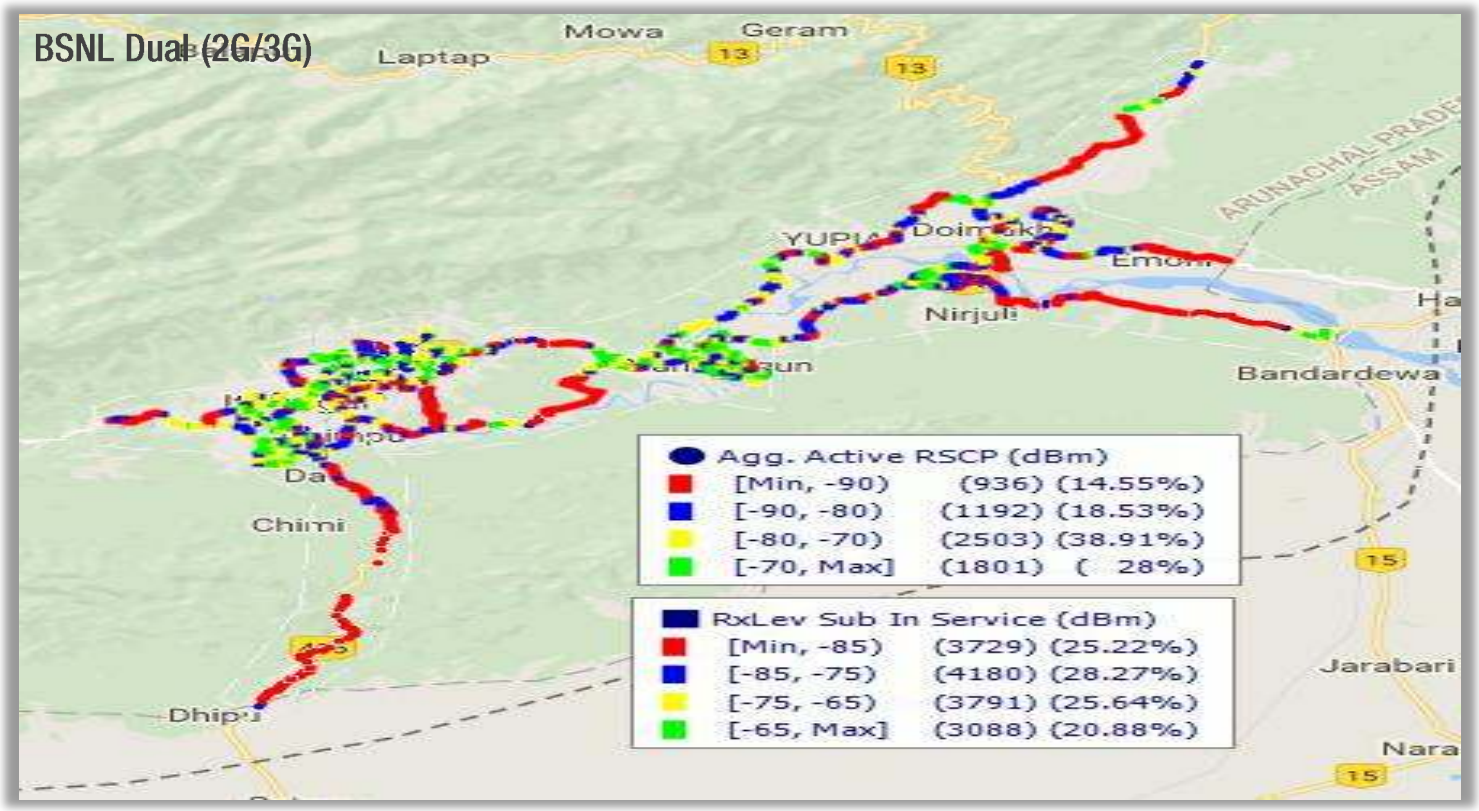

Idea 2G
Balapu
Laptap
Mowa
Geram
13
YUPIA
Doimukh
Emoi
Nirjuli
Bandardewa
Chimi
415
15
Jarabari
Dhipu
RxLev Sub In Service (dBm)
[Min, -85) (8647) (42.4%)
[-85, -75) (5818) (28.53%)
[-75, -65) (3896) (19.1%)
[-65, Max] (2035) (9.98%)


Vodafone 2G
Laptap
Mowa
Geram
13
YUPIA
Doimukh
Emoi
Nirjuli
Bandardewa
Chimi
415
15
Jarabari
Dhipu
RxLev Sub In Service (dBm)
[Min, -85) (5978) (29.54%)
[-85, -75) (4989) (24.66%)
[-75, -65) (5741) (28.37%)
[-65, Max] (3527) (17.43%)

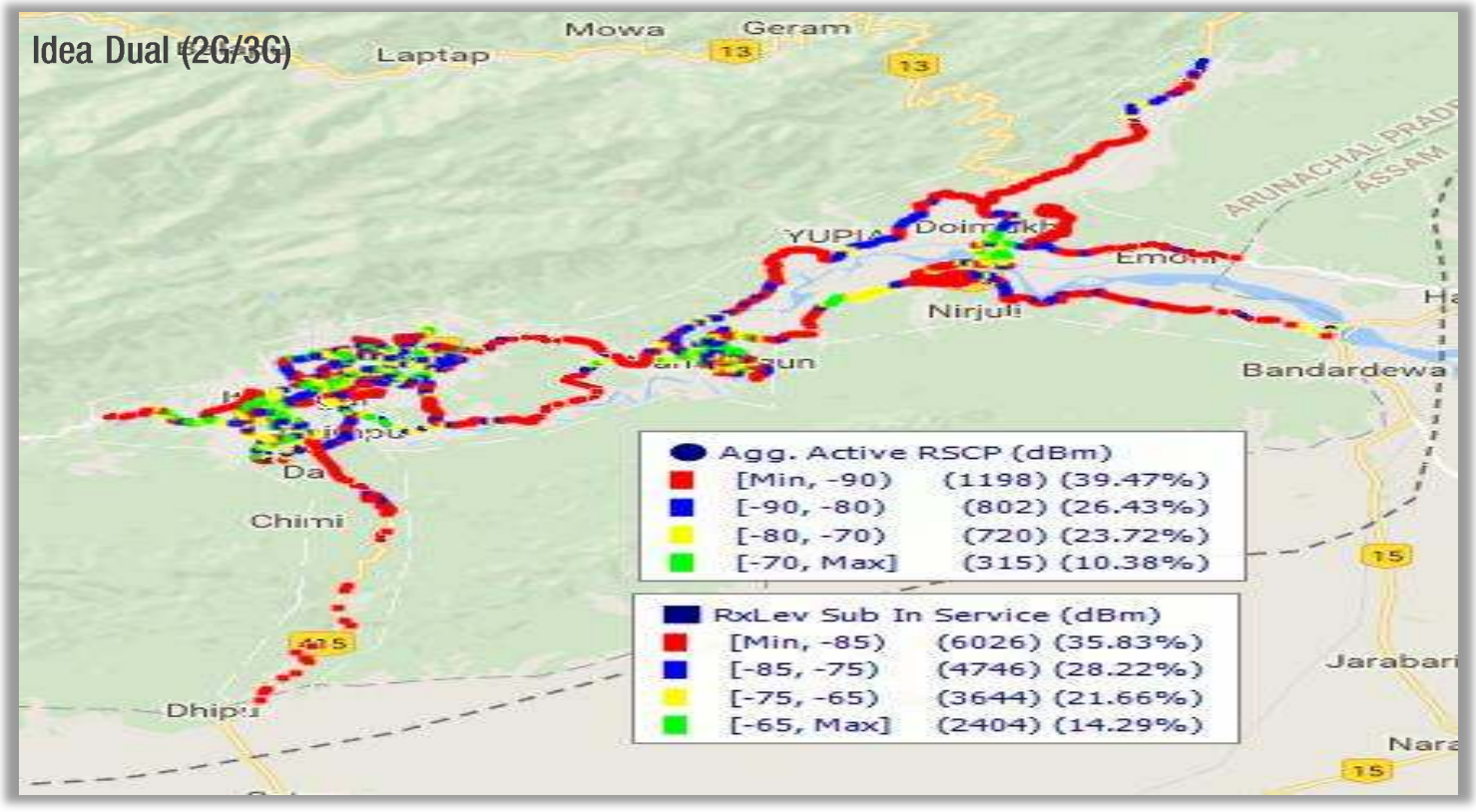

Aircel Dual (2G/3G)
Mowa
Geram
Laptap
13
YUPIA
Doimukh
Emoni
Nirjuli
Bandardewa
Chimi
15
Jarabari
Agg. Active RSCP (dBm)
[Min, -90) (2659) (42.58%)
[-90, -80) (1925) (30.82%)
[-80, -70) (1139) (18.24%)
[-70, Max] (522) (8.36%)
RxLev Sub In Service (dBm)
[Min, -85) (5107) (34.23%)
[-85, -75) (4808) (32.23%)
[-75, -65) (3232) (21.66%)
[-65, Max] (1773) (11.88%)

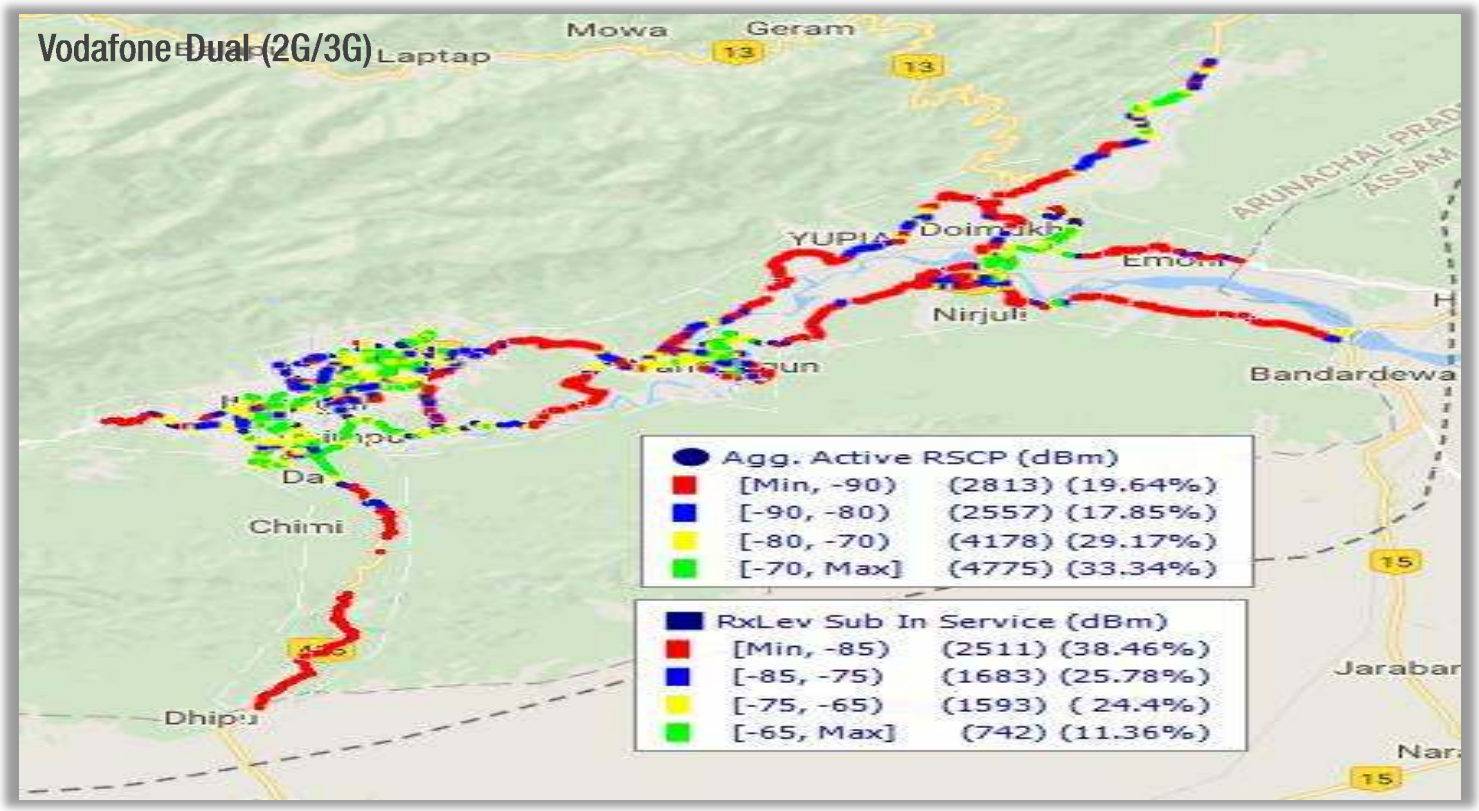

Airtel Dual (2G/3G)
Mowa
Geram
Laptap
13
YUPIA
Doimukh
Emoni
Nirjuli
Bandardewa
Chimi
15
Agg. Active RSCP (dBm)
[Min, -90) (6383) (31.51%)
[-90, -80) (6383) (31.51%)
[-80, -70) (4851) (23.95%)
[-70, Max] (2639) (13.03%)
RxLev Sub In Service (dBm)
[Min, -85) (225) (43.27%)
[-85, -75) (163) (31.35%)
[-75, -65) (91) (17.5%)
[-65, Max] (41) (7.88%)

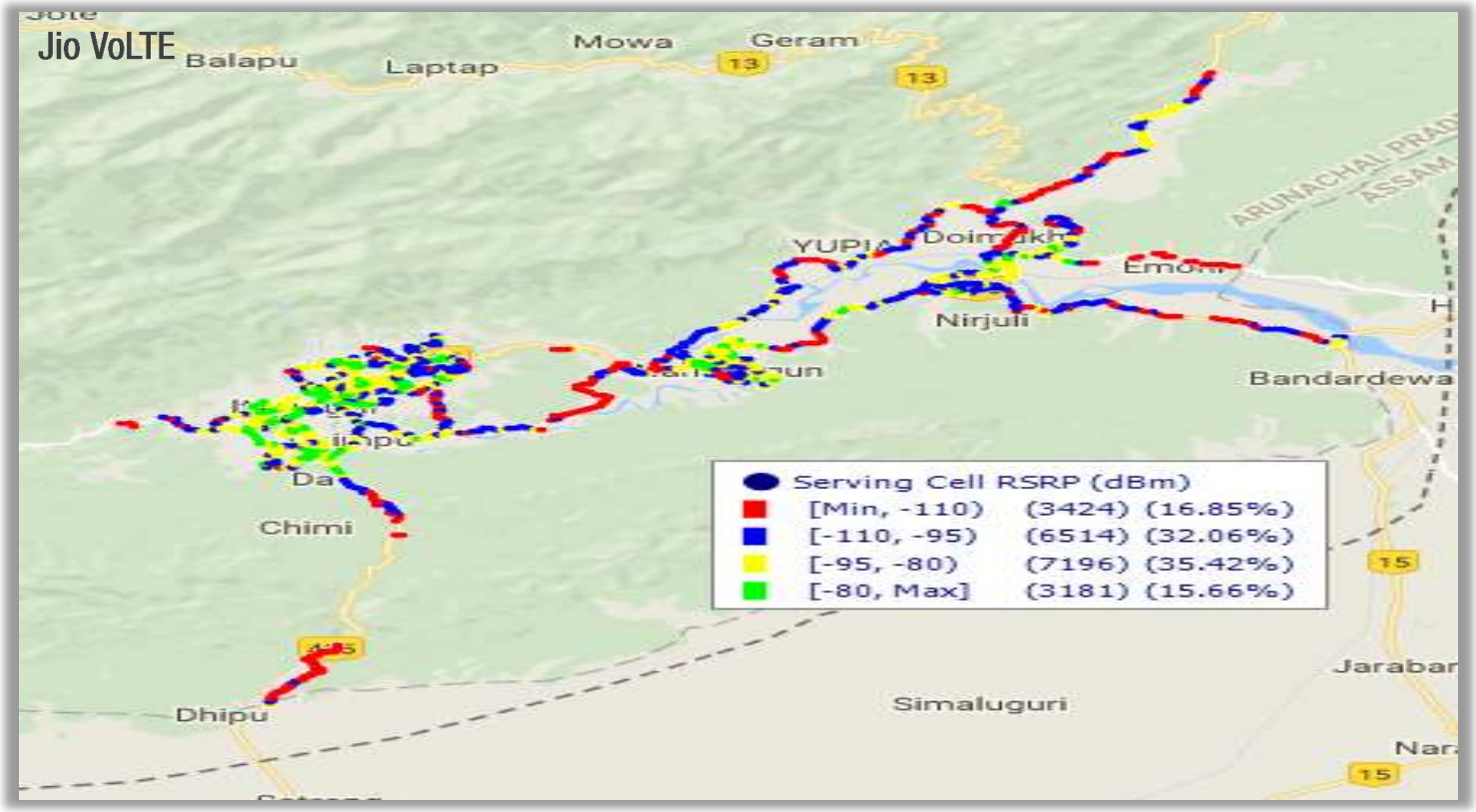
BSNL Dual (2G/3G)



Idea Dual (2G/3G)



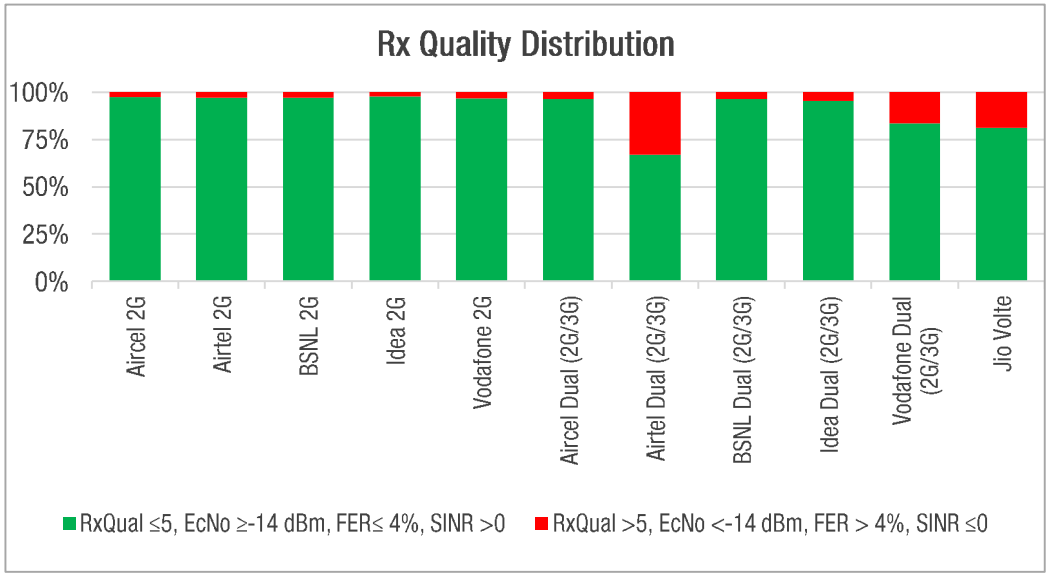

Vodafone Dual (2G/3G)
Mowa
Geram
Laptap
YUPIA
Doimukh
Nirjuli
Bandardewa
Chimi
Dhipu
Jarabar
Agg. Active RSCP (dBm)
[Min, -90) (2813) (19.64%)
[-90, -80) (2557) (17.85%)
[-80, -70) (4178) (29.17%)
[-70, Max] (4775) (33.34%)
RxLev Sub In Service (dBm)
[Min, -85) (2511) (38.46%)
[-85, -75) (1683) (25.78%)
[-75, -65) (1593) (24.4%)
[-65, Max] (742) (11.36%)


Jio VoLTE
Balapu
Laptap
Mowa
Geram
YUPIA
Doimukh
Nirjuli
Bandardewa
Chimi
Dhipu
Simaluguri
Jarabar
Serving Cell RSRP (dBm)
[Min, -110) (3424) (16.85%)
[-110, -95) (6514) (32.06%)
[-95, -80) (7196) (35.42%)
[-80, Max] (3181) (15.66%)

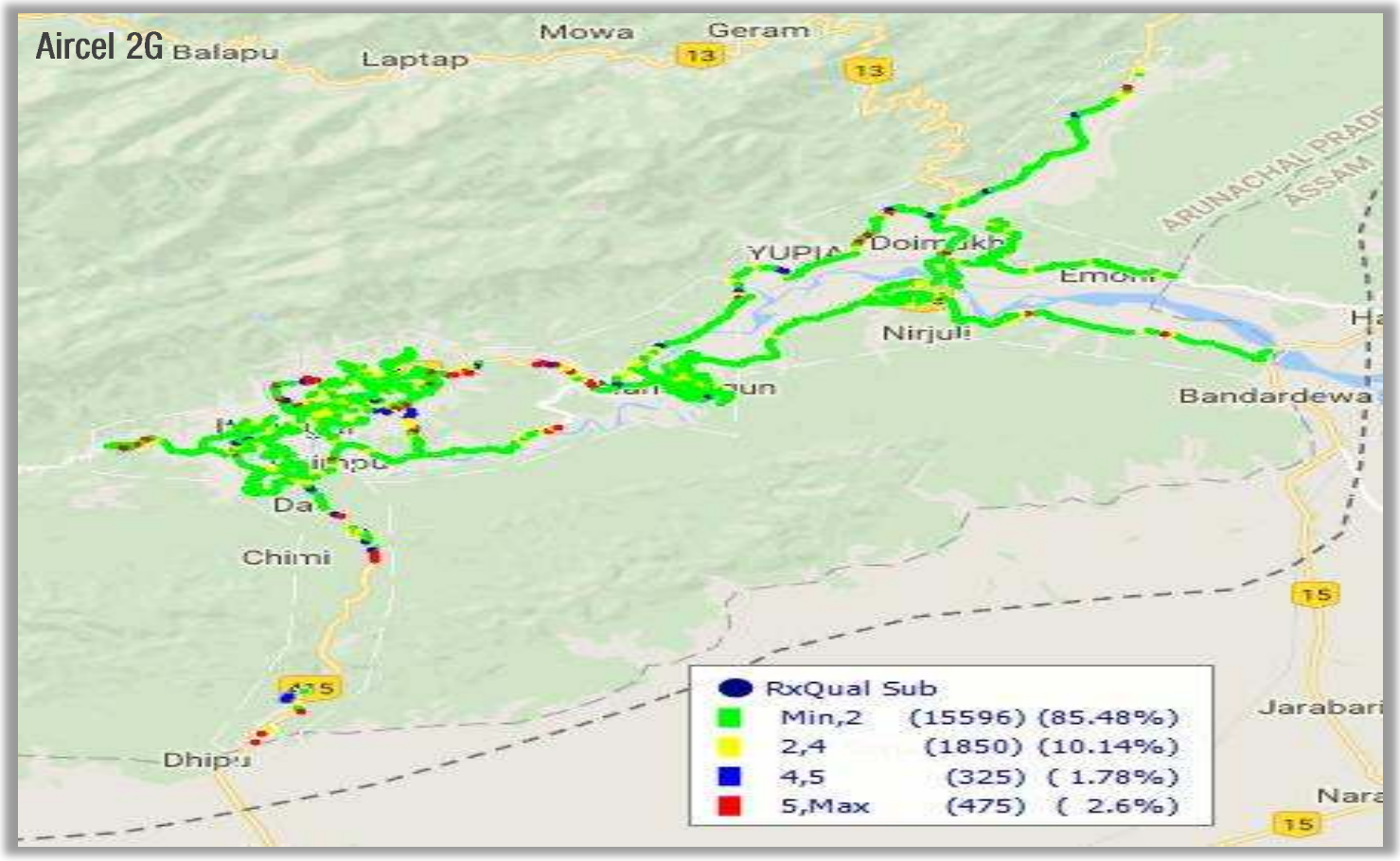
II. Quality Details

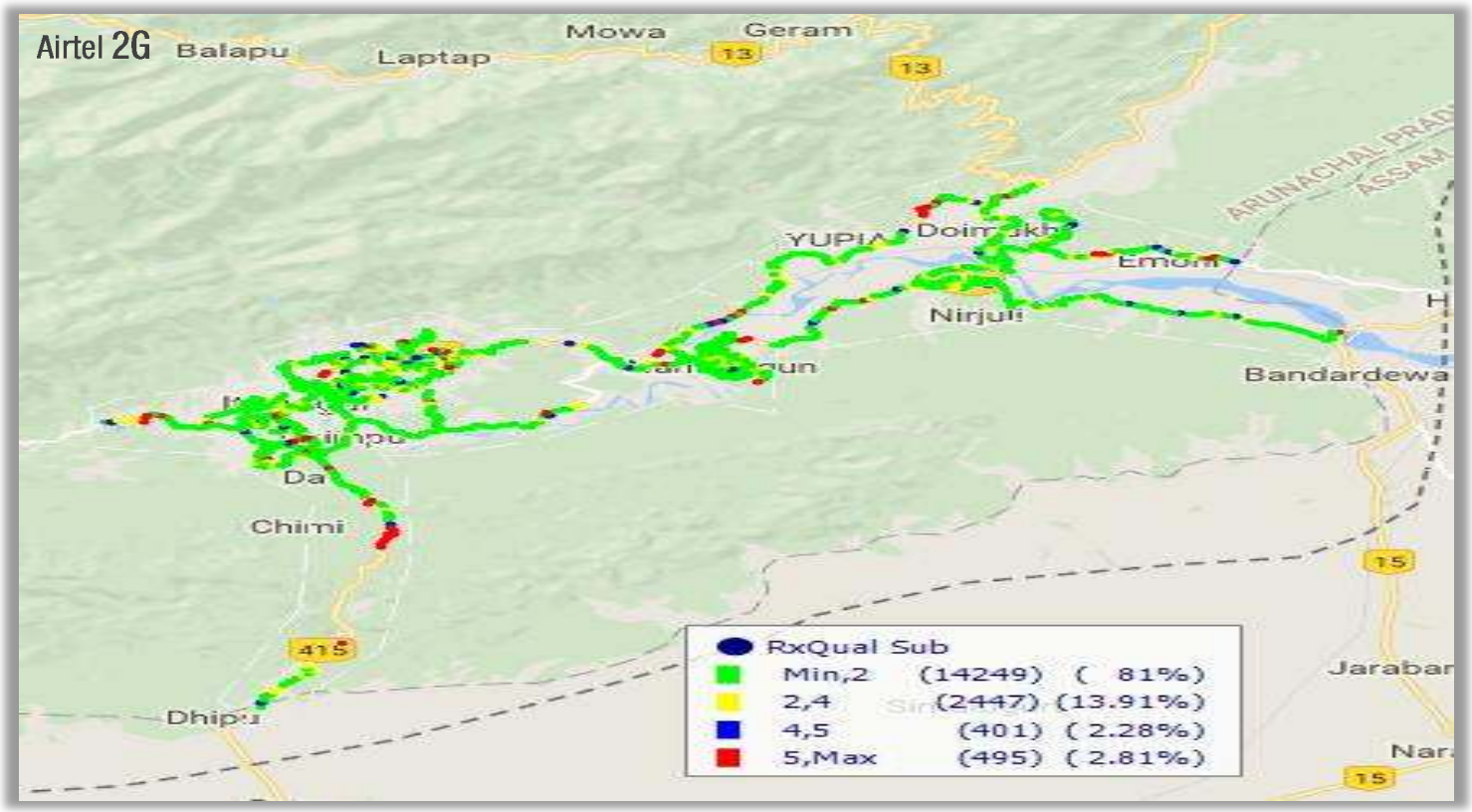
For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= -14 dBm for 3G TSPs, FER <=4% for CDMA TSPs and SINR >0 in case of VoLTE is considered to be good, where as quality beyond this benchmark is considered to be bad. The benchmark should usually be ≥ 95%.

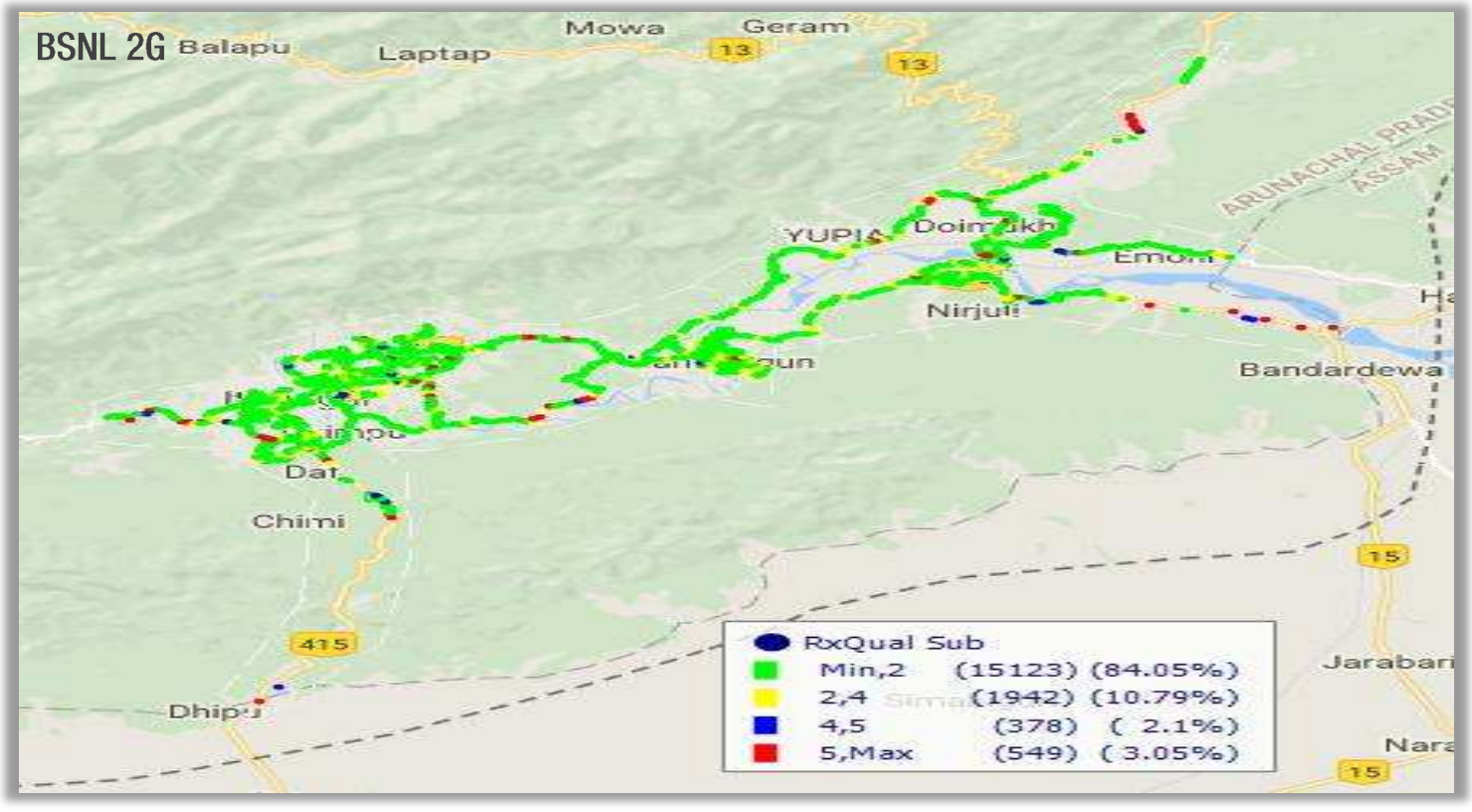
TSP	Rx Quality
Aircel 2G	97.40%
Airtel 2G	97.19%
BSNL 2G	96.95%
Idea 2G	97.62%
Vodafone 2G	96.83%
Aircel Dual (2G/3G)	96.21%
Airtel Dual (2G/3G)	66.96%
BSNL Dual (2G/3G)	96.42%
Idea Dual (2G/3G)	95.28%
Vodafone Dual (2G/3G)	83.40%
Jio VoLTE	81.03%

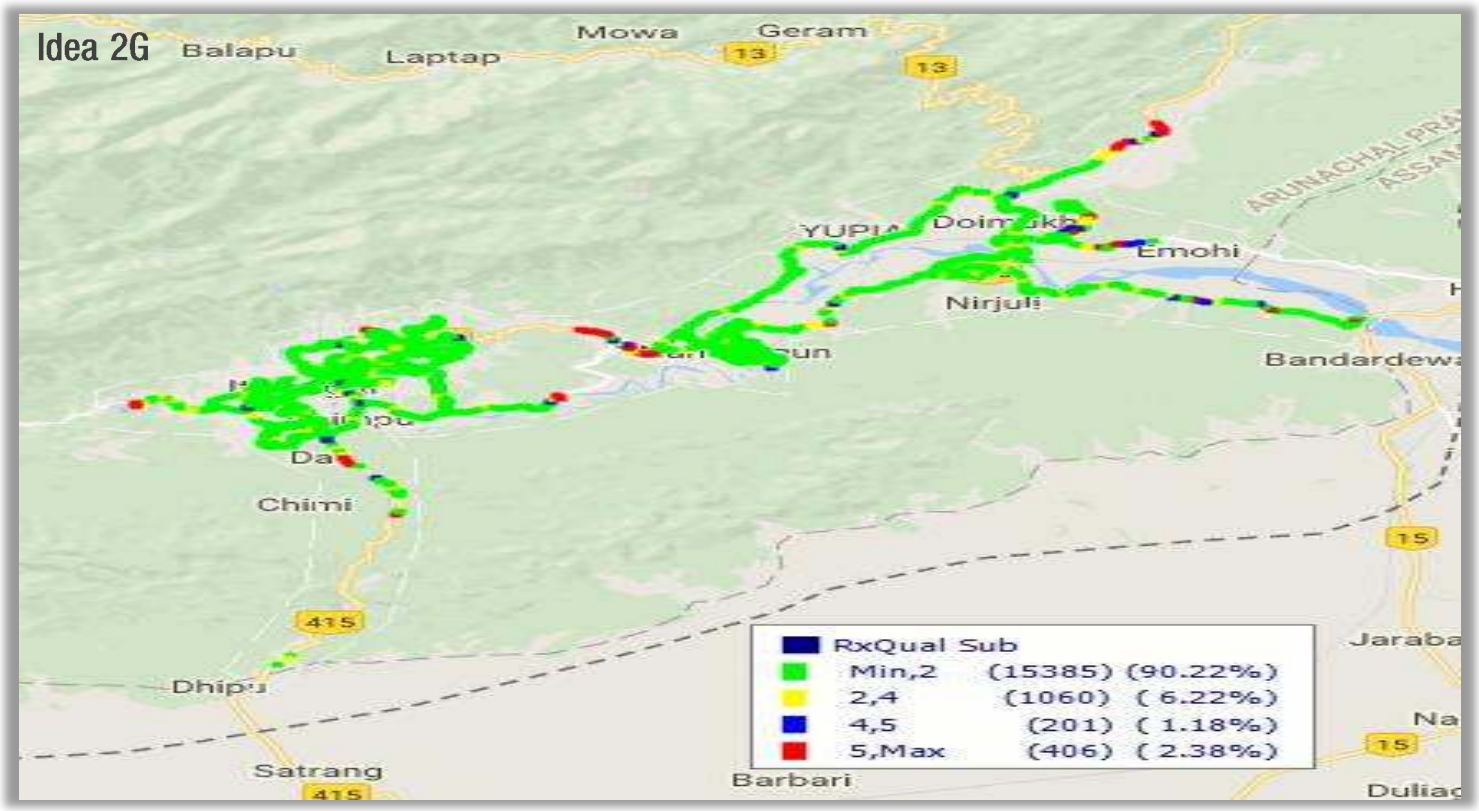


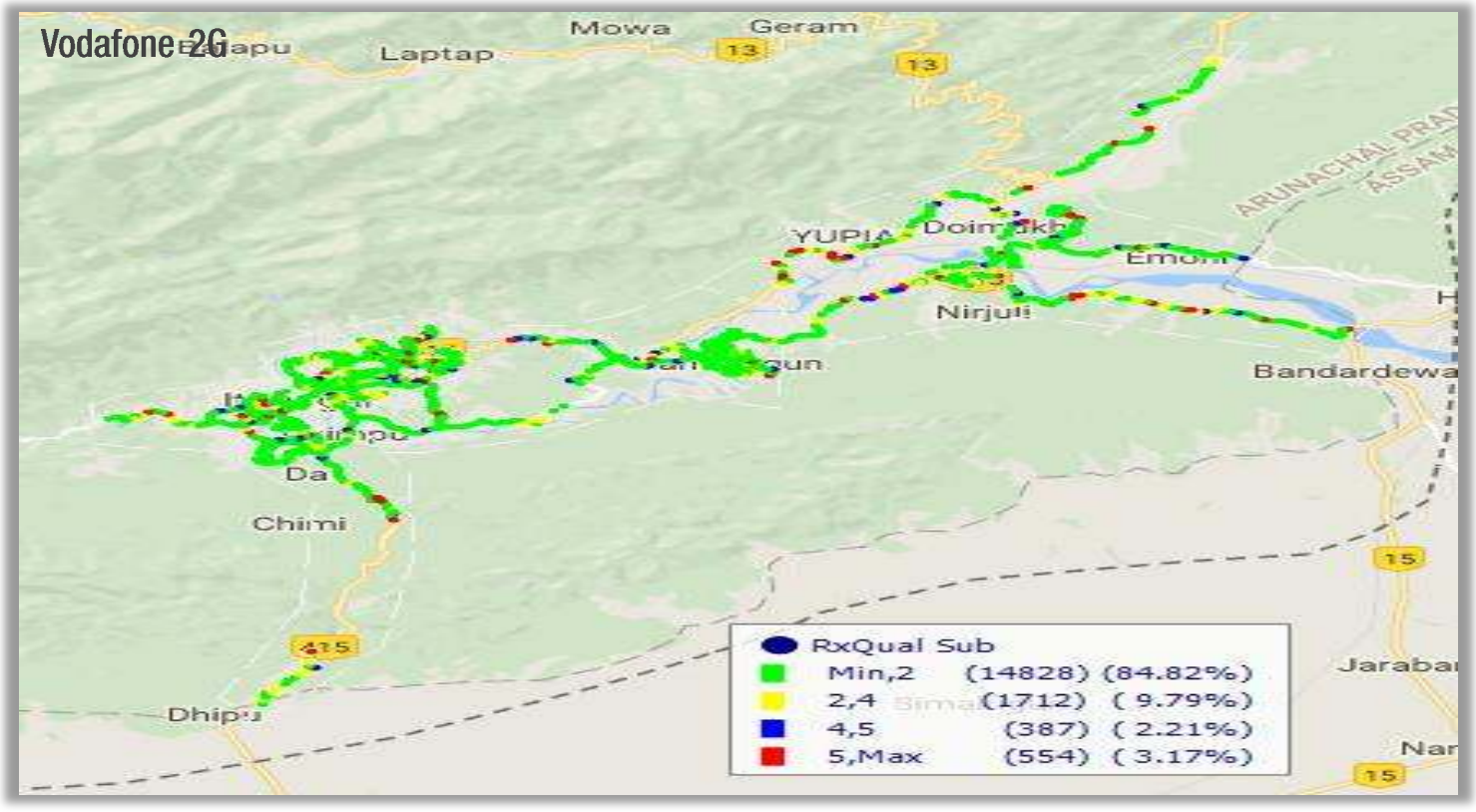
TSPs not meeting the benchmark

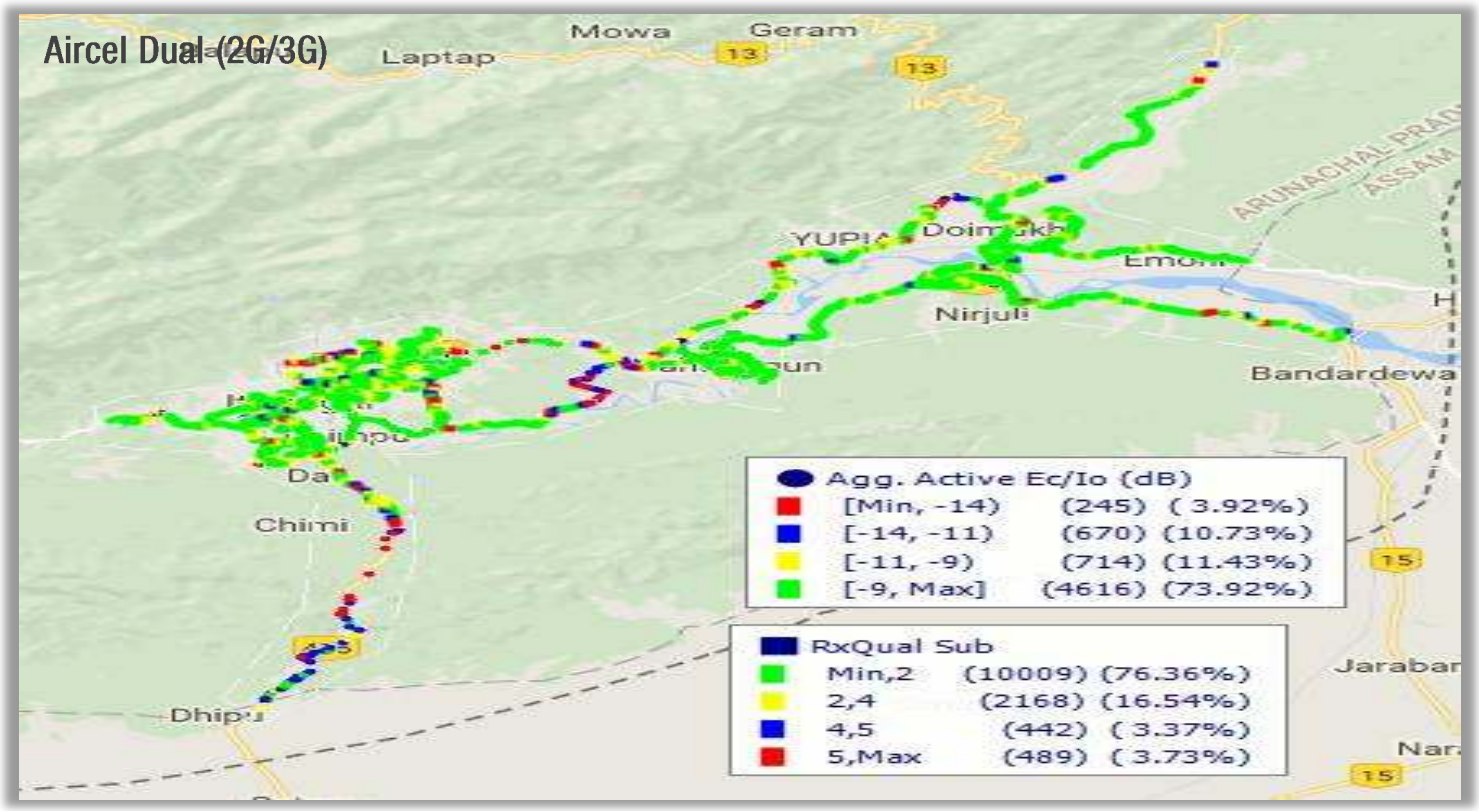


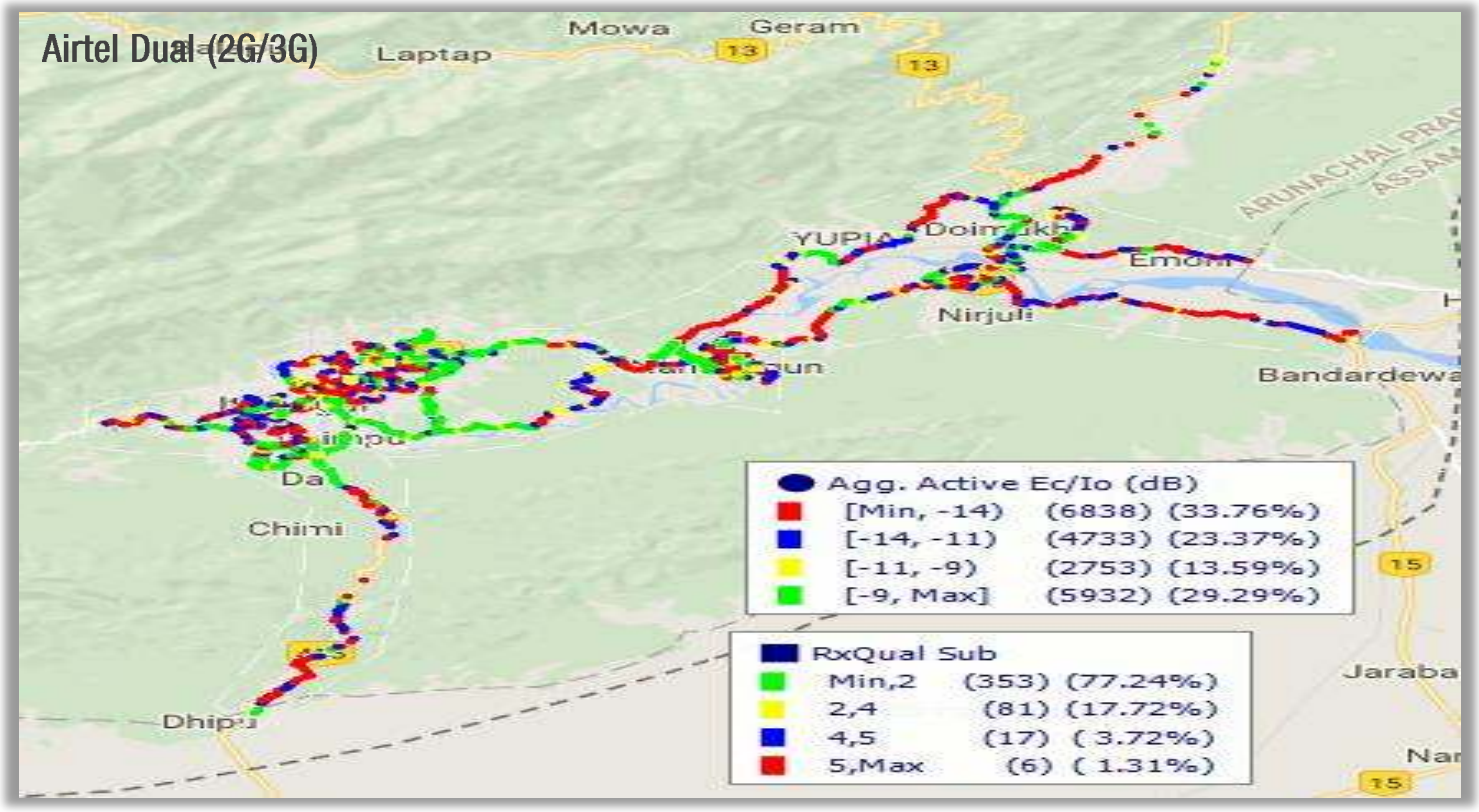

Airtel 2G
Balapu
Laptap
Mowa
Geram
13
13
YUPIA
Doimukh
Emoni
Nirjuli
Bandardewa
Chimi
415
15
Jarabari
RxQual Sub
Min,2 (14249) (81%)
2,4 (2447) (13.91%)
4,5 (401) (2.28%)
5,Max (495) (2.81%)


BSNL 2G
Balapu
Laptap
Mowa
Geram
13
13
YUPIA
Doimukh
Emoni
Nirjuli
Bandardewa
Chimi
415
15
Jarabari
RxQual Sub
Min,2 (15123) (84.05%)
2,4 (1942) (10.79%)
4,5 (378) (2.1%)
5,Max (549) (3.05%)

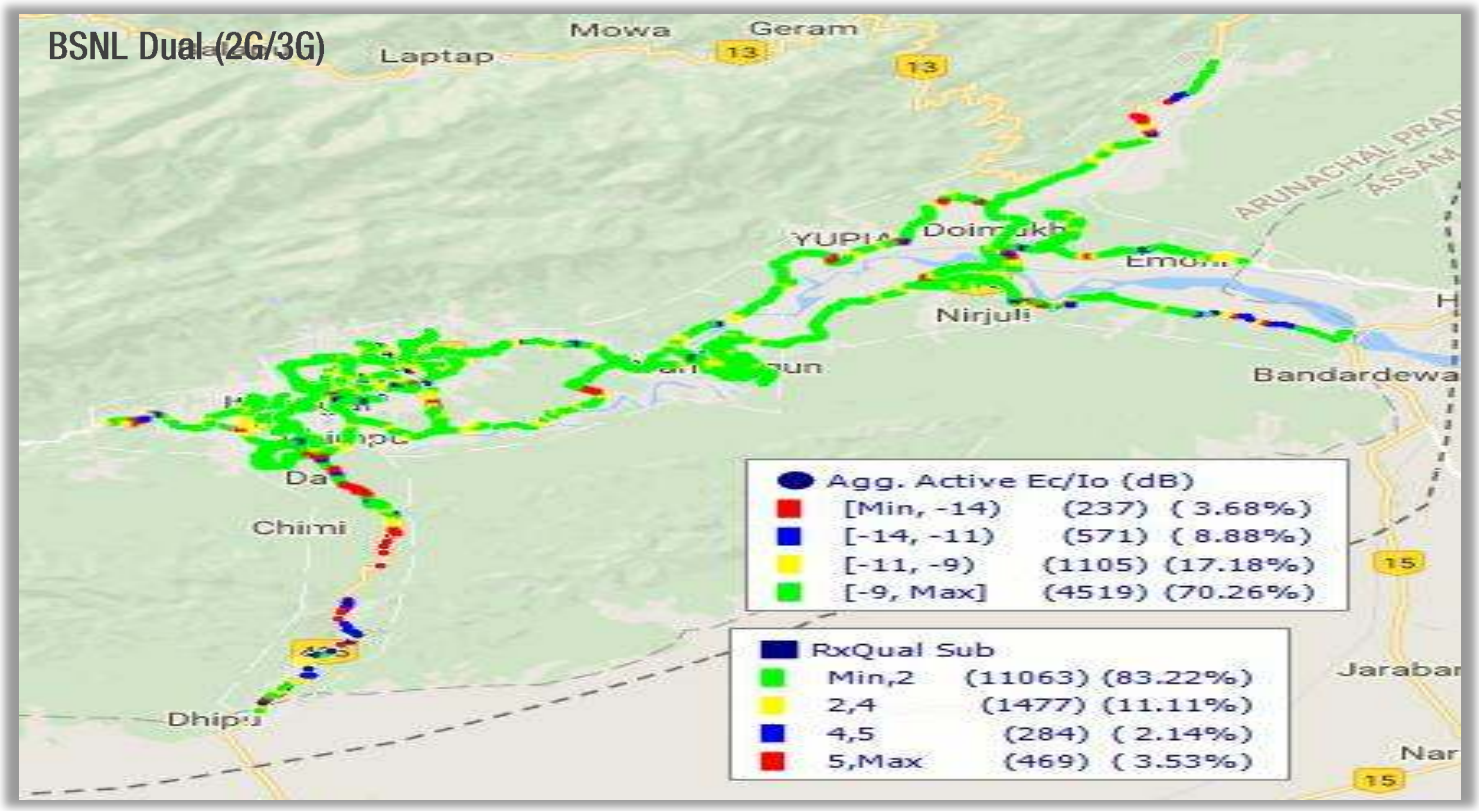

Idea 2G
Balapu
Laptap
Mowa
Geram
13
13
YUPIA
Emohi
Nirjuli
Bandardewa
Chimi
415
15
Dhipu
Satrang
Barbari
Jaraba
RxQual Sub
Min,2 (15385) (90.22%)
2,4 (1060) (6.22%)
4,5 (201) (1.18%)
5,Max (406) (2.38%)


Vodafone 2G
Laptap
Mowa
Geram
13
13
YUPIA
Nirjuli
Bandardewa
Chimi
415
15
Dhipu
Jaraba
RxQual Sub
Min,2 (14828) (84.82%)
2,4 (1712) (9.79%)
4,5 (387) (2.21%)
5,Max (554) (3.17%)

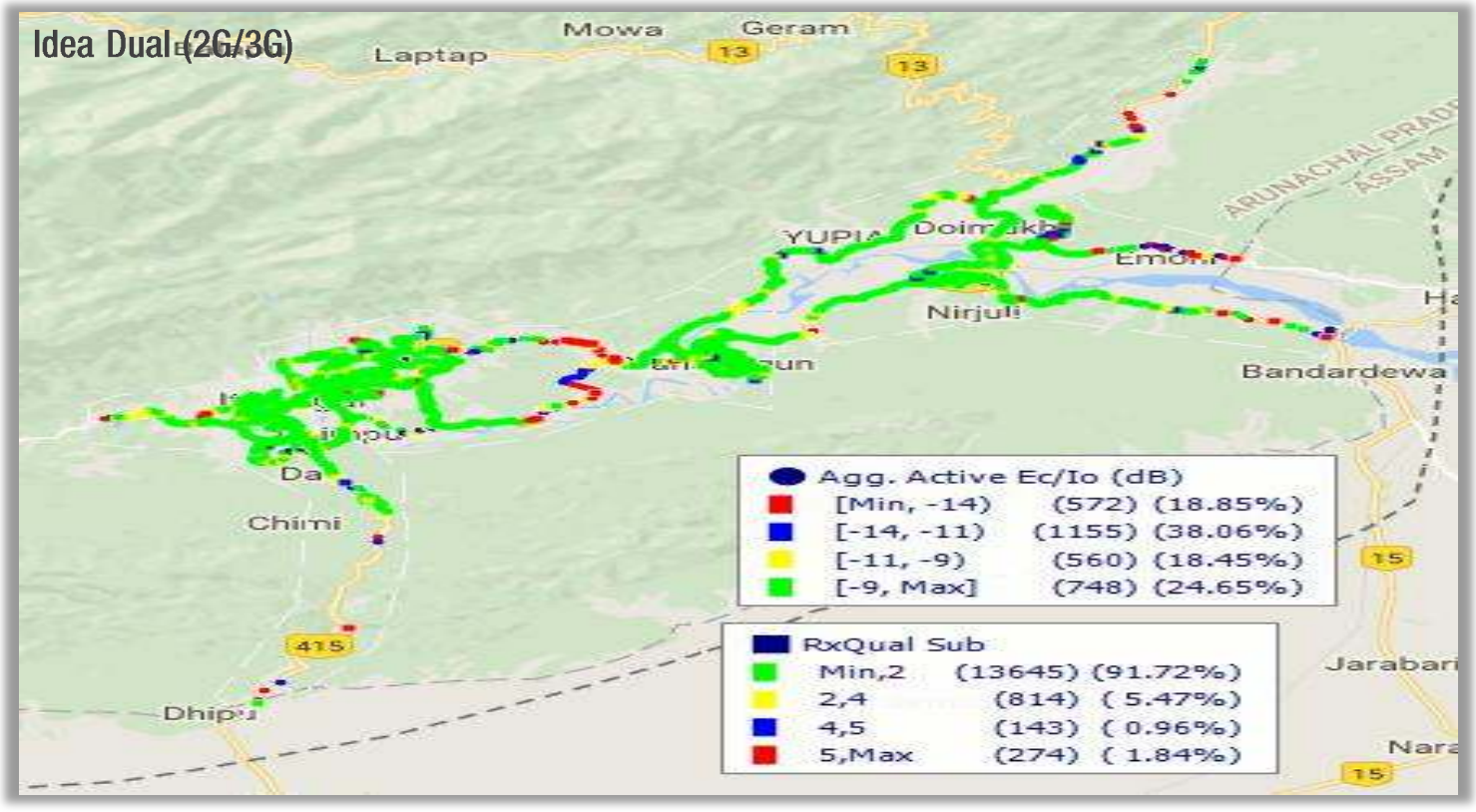

Aircel Dual (2G/3G)
Mowa
Geram
Laptap
13
YUPIA
Nirjuli
Bandardewa
Chimi
Dhipu
15
Agg. Active Ec/Io (dB)
[Min, -14) (245) (3.92%)
[-14, -11) (670) (10.73%)
[-11, -9) (714) (11.43%)
[-9, Max] (4616) (73.92%)
RxQual Sub
Min,2 (10009) (76.36%)
2,4 (2168) (16.54%)
4,5 (442) (3.37%)
5,Max (489) (3.73%)

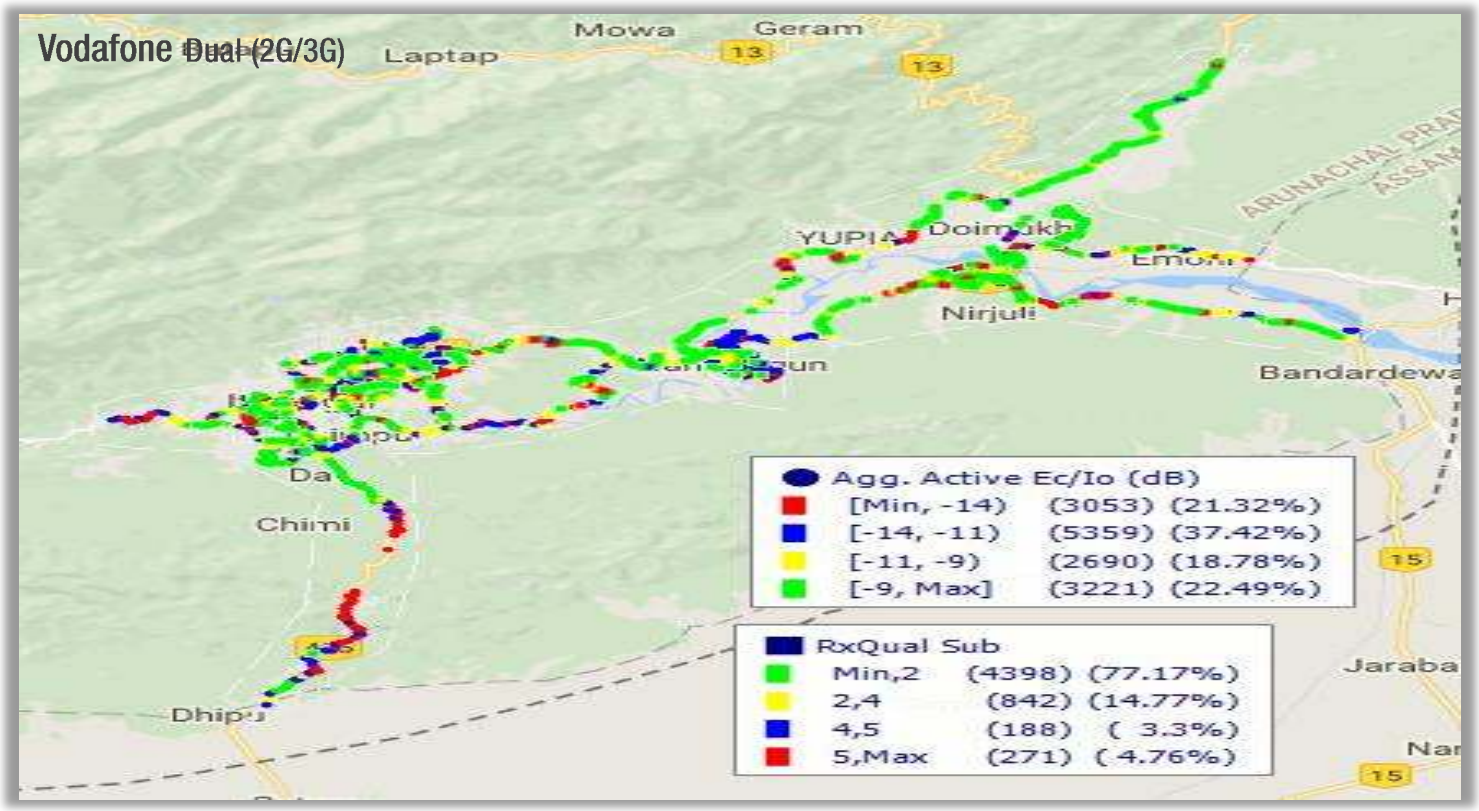

Airtel Dual (2G/3G)
Mowa
Geram
Laptap
13
YUPIA
Nirjuli
Bandardewa
Chimi
Dhipu
15
Agg. Active Ec/Io (dB)
[Min, -14) (6838) (33.76%)
[-14, -11) (4733) (23.37%)
[-11, -9) (2753) (13.59%)
[-9, Max] (5932) (29.29%)
RxQual Sub
Min,2 (353) (77.24%)
2,4 (81) (17.72%)
4,5 (17) (3.72%)
5,Max (6) (1.31%)

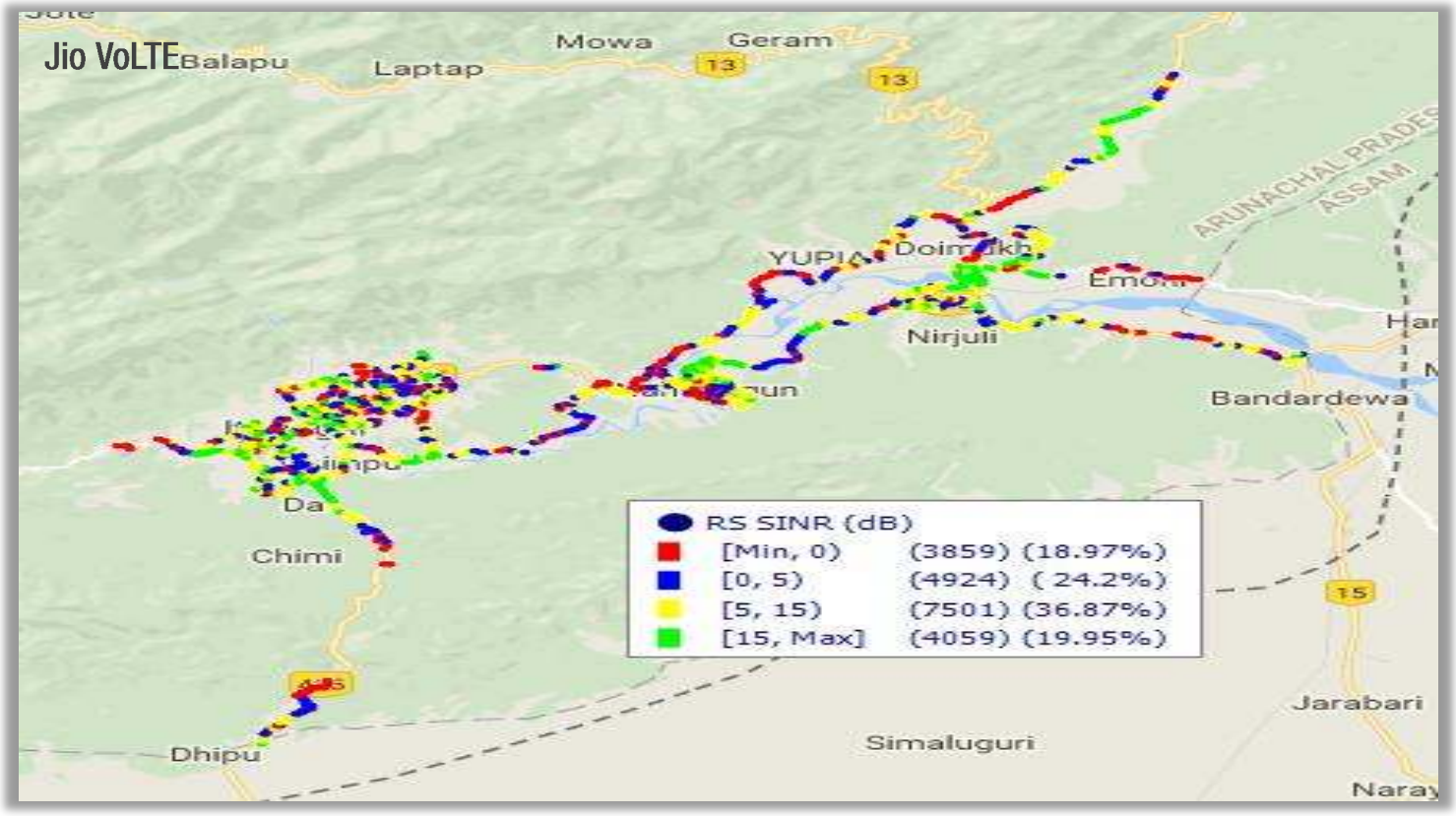
BSNL Dual (2G/3G)



Idea Dual (2G/3G)

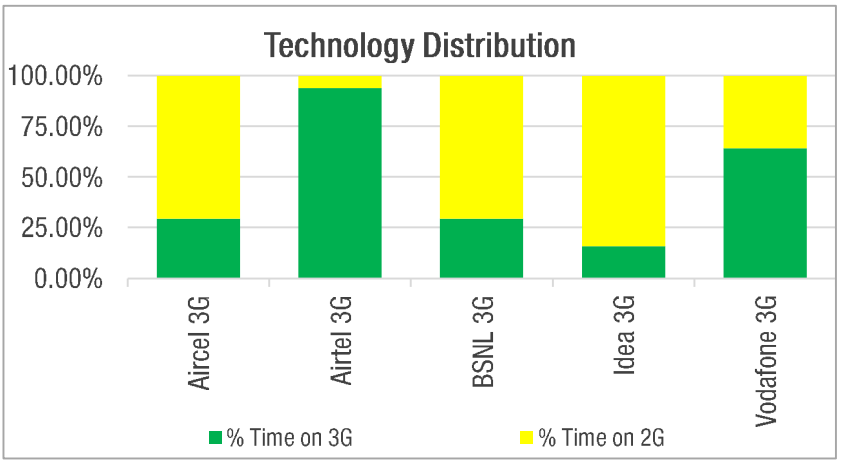


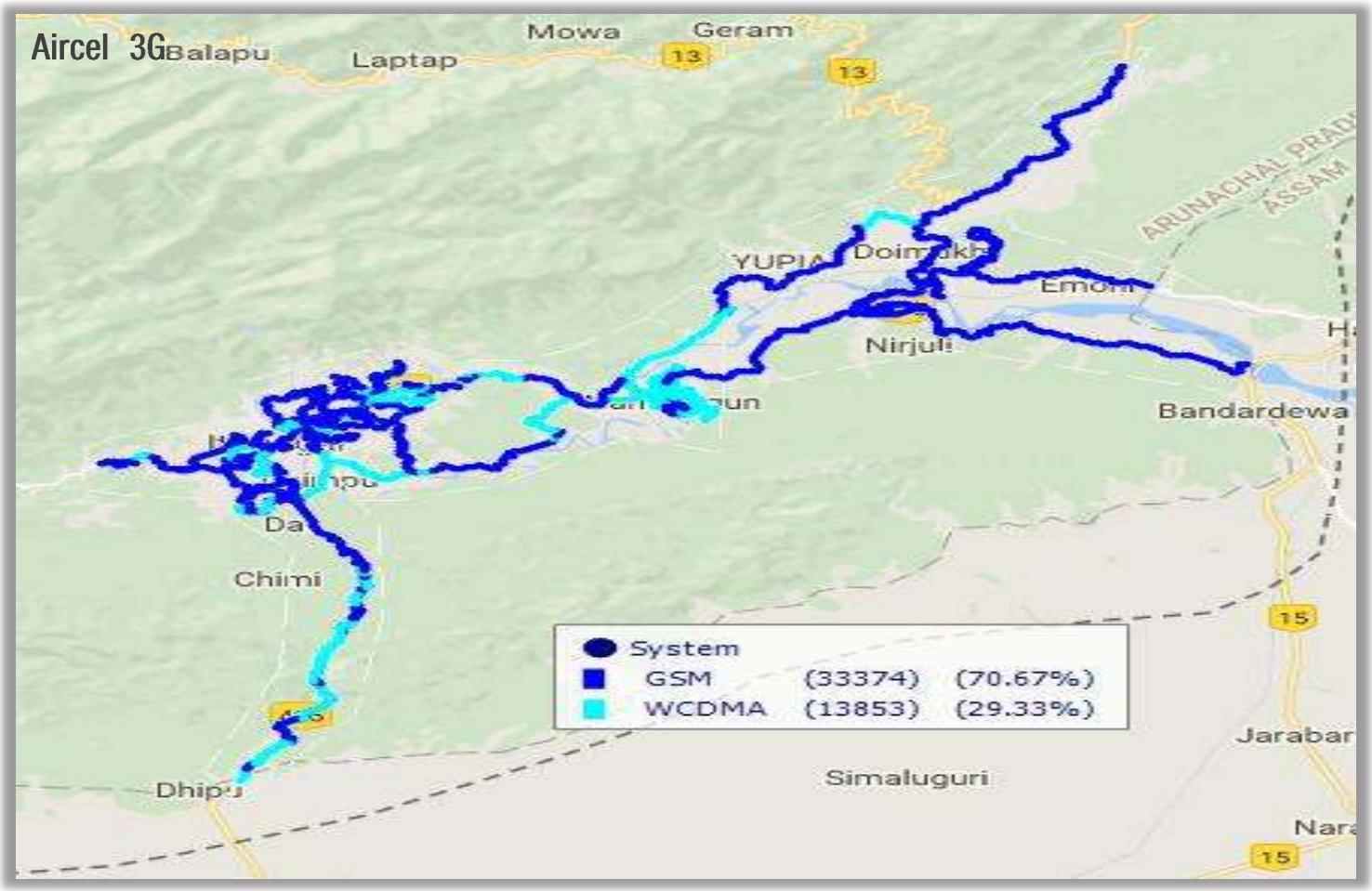

Vodafone Dual (2G/3G)
Mowa
Geram
Laptap
13
YUPIA
Doimukh
Nirjuli
Bandardewa
Chimi
Dhipu
Jaraba
15
Agg. Active Ec/Io (dB)
[Min, -14) (3053) (21.32%)
[-14, -11) (5359) (37.42%)
[-11, -9) (2690) (18.78%)
[-9, Max] (3221) (22.49%)
RxQual Sub
Min,2 (4398) (77.17%)
2,4 (842) (14.77%)
4,5 (188) (3.3%)
5,Max (271) (4.76%)


Jio VoLTE
Balapu
Mowa
Geram
Laptap
13
YUPIA
Doimukh
Nirjuli
Bandardewa
Chimi
Dhipu
Jarabari
Simaluguri
15
RS SINR (dB)
[Min, 0) (3859) (18.97%)
[0, 5) (4924) (24.2%)
[5, 15) (7501) (36.87%)
[15, Max] (4059) (19.95%)

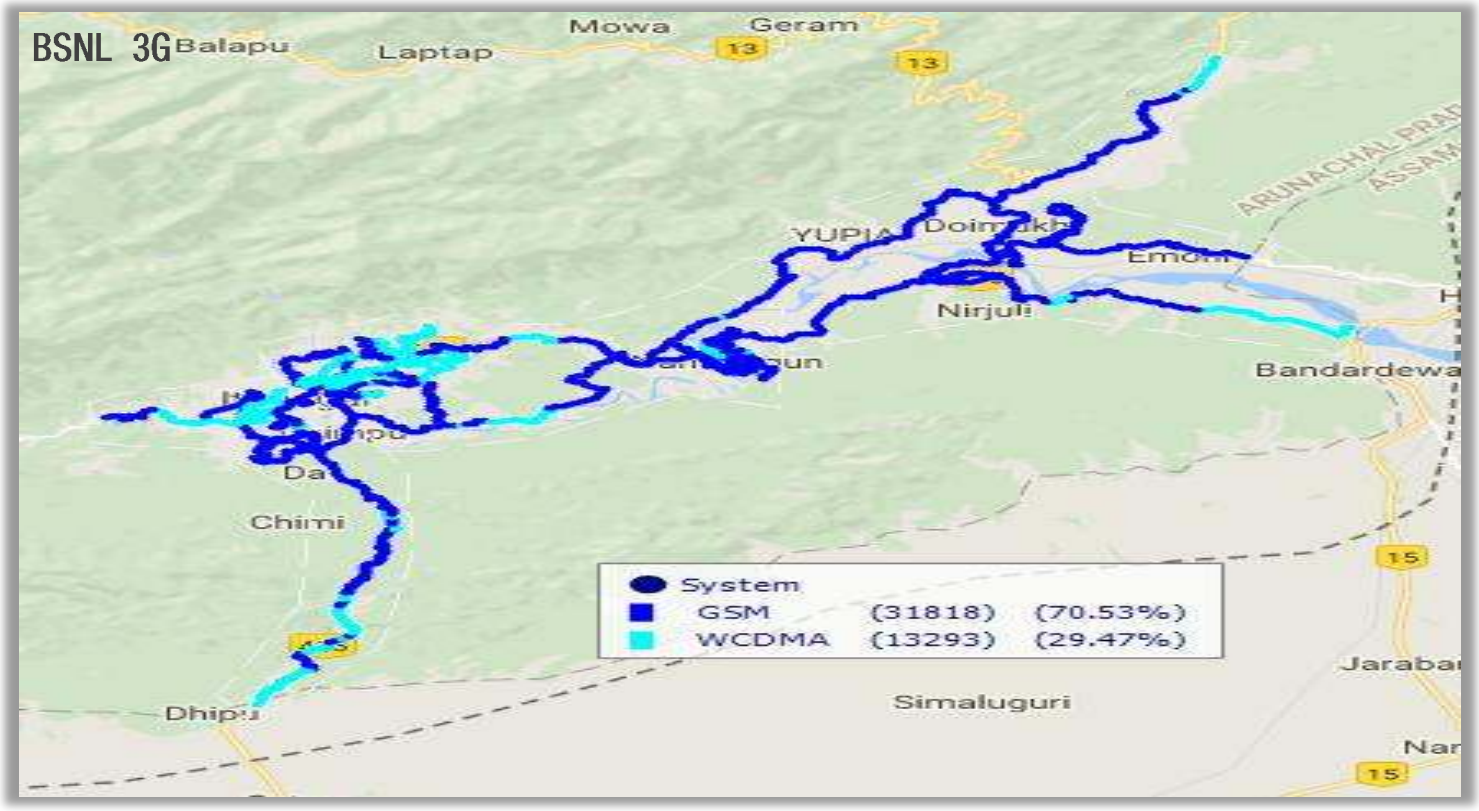
III. Technology Details

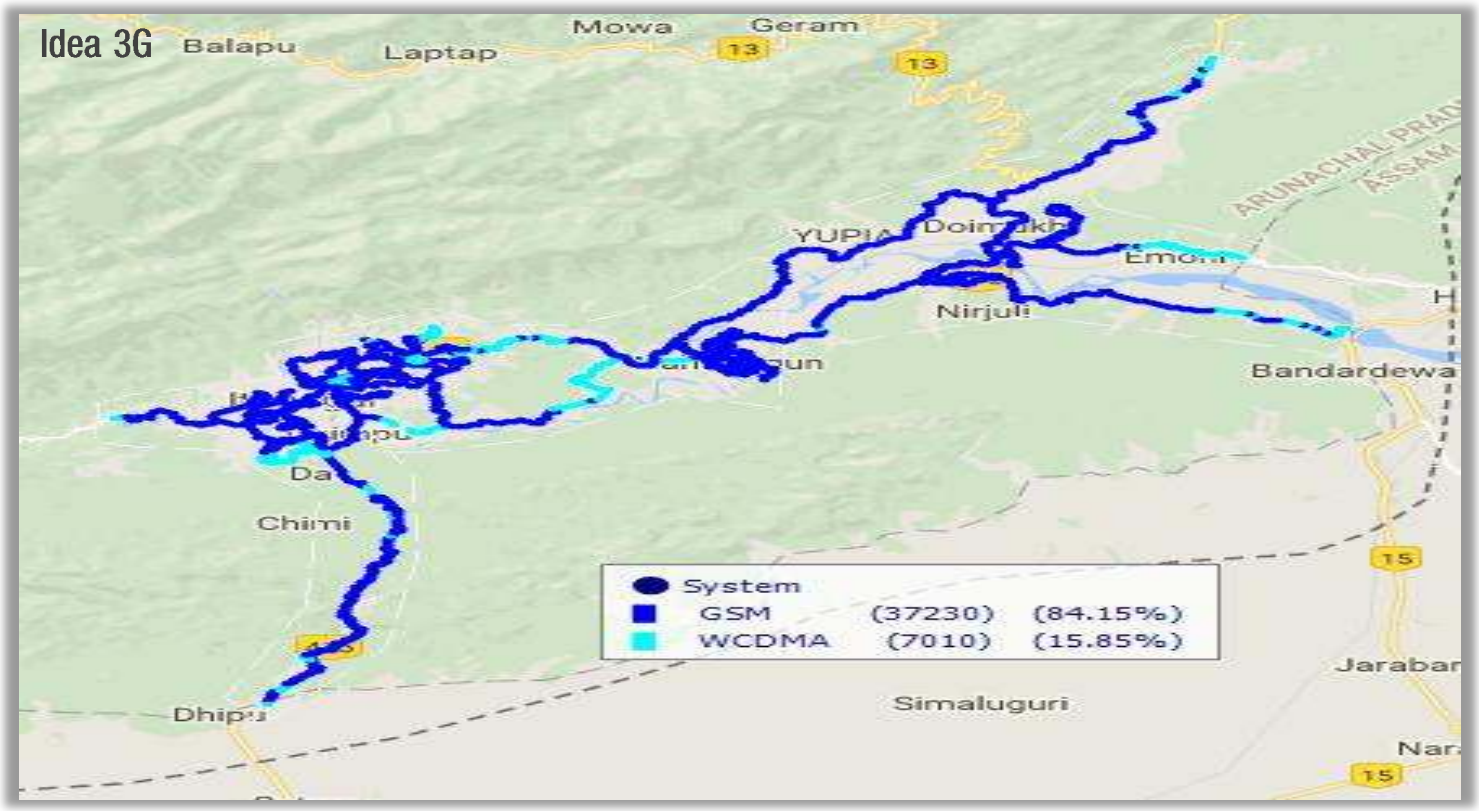
TSP	% Time on 3G
Aircel 3G	29.33%
Airtel 3G	93.91%
BSNL 3G	29.47%
Idea 3G	15.85%
Vodafone 3G	64.12%





Airtel 3G
Balapu
Laptap
Mowa
Geram
13
13
YUPIA
Nirjuli
Bandardewa
Chimi
15
System
GSM (2798) (6.09%)
WCDMA (43116) (93.91%)
Simaluguri
15


BSNL 3G
Balapu
Laptap
Mowa
Geram
13
13
YUPIA
Nirjuli
Bandardewa
Chimi
15
System
GSM (31818) (70.53%)
WCDMA (13293) (29.47%)
Simaluguri
15


Idea 3G
Balapu
Laptap
Mowa
Geram
13
YUPIA
Nirjuli
Bandardewa
Chimi
Simaluguri
Jarabari
15
System
GSM (37230) (84.15%)
WCDMA (7010) (15.85%)

Vodafone 3G
Laptap
Mowa
Geram
13
YUPIA
Nirjuli
Bandardewa
Chimi
Simaluguri
Jarabari
15
System
GSM (16976) (35.88%)
WCDMA (30341) (64.12%)

Critical Finding

Possible Cause	2G			3G		
	Aircel	Idea	Vodafone	Aircel	Airtel	Vodafone
Termination End Issue due to Roaming at Assam Border	11	9	-	11	7	-
Fibre Cut/Temporary Technical Issue	-	-	24	24	-	19

Possible Cause	2G (2 Nov 2017)			3G(2 Nov 2017)		
	Aircel	Idea	Vodafone	Aircel	Airtel	Vodafone
Termination End Issue due to Roaming at Assam Border	15:03 to 16:04	15:03 to 16:04	-	15:03 to 16:04	15:03 to 16:04	-
Fibre Cut/Temporary Technical Issue	-	-	16:16 to 18:38	11:31 to 12:40	-	16:16 to 18:38