INDEPENDENT DRIVE TEST REPORT

For

Portblair to Mayabunder
June 2018

EAST ZONE

Key Performance Indicators: All TSPs have fail to met the Drop Call Rate (DCR) benchmark of 2% except Vodafone 2G . All TSPs have fail to met the Call Setup Success Rate (CSSR) of 95% except Vodafone 2G.

The Independent Drive Test has been carried out by M/s PhiMetrics Technologies Pvt. Ltd. on behalf of TRAI in Portblair to Mayabunder Highway from 7:00 AM to 7:00 PM; 14th June 2018. The drive test covered an drive route of 250KMs over a period of 1day. Approximately 100 calls were made for each of the 5 networks: three 2G networks, one 3G network and one CDMA covering 3 unique TSPs

Overview

Voice 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 **14th June 2018** covering various locations in Portblair to Mayabunder Highway. The performance of **Airtel, BSNL and Vodafone** were monitored across various technologies (2G ,3G and CDMA).
The test results obtained from these drive tests were utilized to assess the network quality for Voice in terms of
Voice: Coverage; Quality, Handover Success Rate, Call Setup Success Rate, Drop Call Rate and Block Call Rate.

Drive Test Details For Portblair to Mayabunder:

Independent Drive test was conducted for a period of one day on 14th June 2018 in Portblair to Mayabunder Highway from 7:00 AM to 7:00 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 250KMs over a period of one day on 14th June 2018. Approximately 100 calls were made for each of the 4 networks: three 2G (Lock Mode) networks, one 3G (Dual mode) network and one CDMA covering 3 unique TSPs.
•In case of multiple call failure in similar geo location in given period of 60sec has been counted as one call failure
* 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.
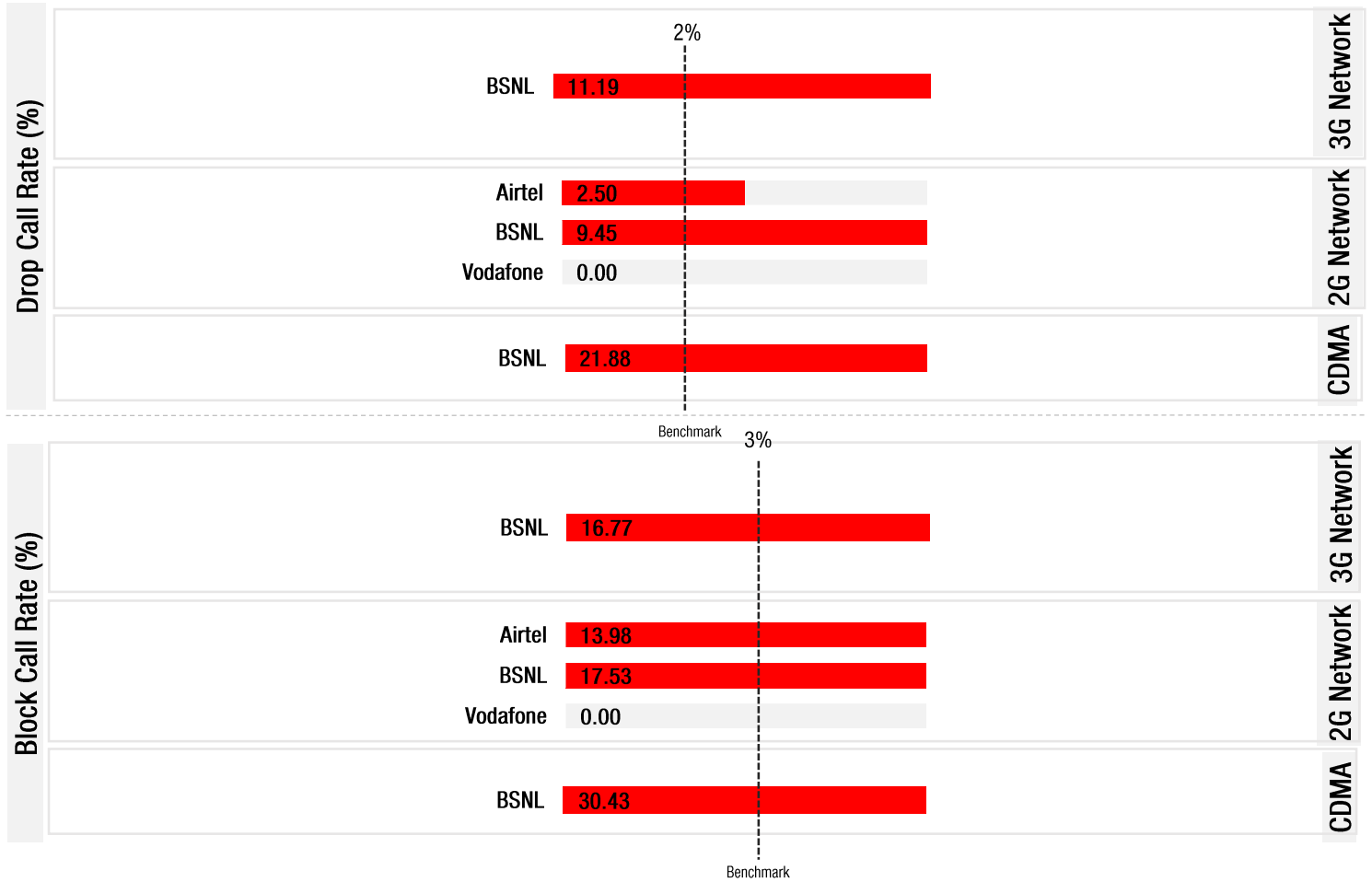* 3G KPI's which are calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.

Voice Test Drive Route - Port Blair to Maya Bandar

Voice Calls

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

Drop Call Rate (%)

3G Network	BSNL	11.19
2G Network	Airtel	2.50
	BSNL	9.45
	Vodafone	0.00
CDMA	BSNL	21.88

Benchmark 2%

Block Call Rate (%)

3G Network	BSNL	16.77
2G Network	Airtel	13.98
	BSNL	17.53
	Vodafone	0.00
CDMA	BSNL	30.43

Benchmark 3%

KPI	2G Networks		
	Airtel	BSNL	Vodafone
SDCCH Congestion%	1.08%	1.95%	0.00%
TCH Congestion %	12.90%	15.58%	0.00%

KPI	3G Networks
	BSNL
SDCCH Congestion%	0.00%
RRC Congestion%	0.00%
SDCCH & RRC Congestion%	0.00%
TCH Congestion %	11.18%
RAB Congestion %	5.59%
TCH & RAB Congestion %	16.77%

a) All TSPs have fail to met the 2% QOS benchmark of Drop Call Rate (DCR%) except Vodafone 2G.
b) Call Block Rate (CBR%) benchmark of 3% was failed to achieved by all TSP's except Vodafone 2G.

Not meeting Benchmark

Voice Calls

Coverage

a) Percentage of coverage samples for 2G ≥ -85 dBm and CDMA ≥ -90 dBm.

TSPsc	2G			CDMA
	Airtel	BSNL	Vodafone	BSNL
Coverage%	59.80%	58.89%	64.24%	63.59%

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

TSPs	3G
	BSNL
Coverage %	56.87%

c) Percentage of time spent on 3G network:

TSPs	3G
	BSNL
Time Spent on 3G%	10.30%

d) Percentage of RLT spent on >=48:

TSPs	2G		
	Airtel	BSNL	Vodafone
%RLT >=48%	0.00%	50.95%	0.00%

Summary

Voice Call	2G			CDMA
	Airtel	BSNL	Vodafone	BSNL
Call Attempt	93	154	49	46
Blocked Call Rate (%)	14.0%	17.5%	0.0%	30.4%
CSSR% (Accessibility)	86.0%	82.5%	100.0%	69.6%
Drop Call Rate (%)	2.5%	9.4%	0.0%	21.9%
Mobility HOSR (%)	96.7%	99.3%	100.0%	100.0%
Rx Quality (%)	90.77%	92.5%	94.5%	79.0%

Voice Call	3G
	BSNL
Call Attempt	161
Blocked Call Rate (%)	16.8%
CSSR% (Accessibility)	83.2%
Drop Call Rate (%)	11.2%
Mobility HOSR (%)	99.5%
Rx Quality (%)	88.6%

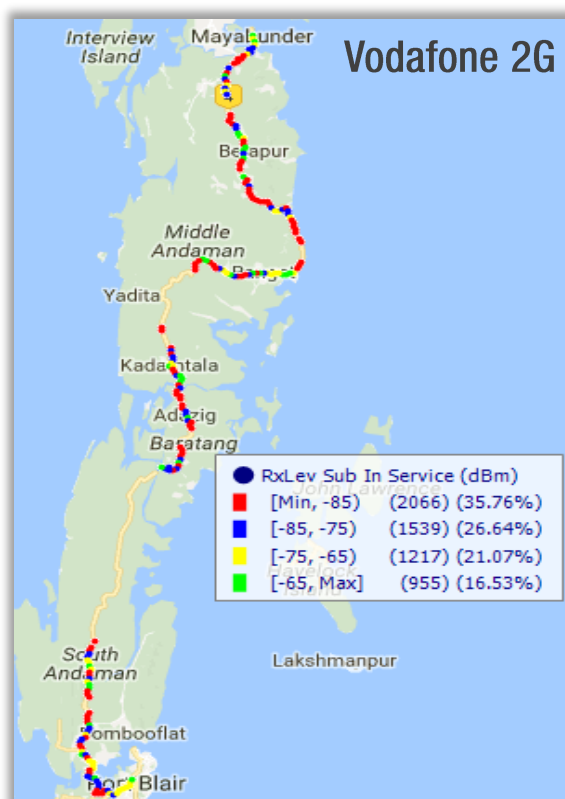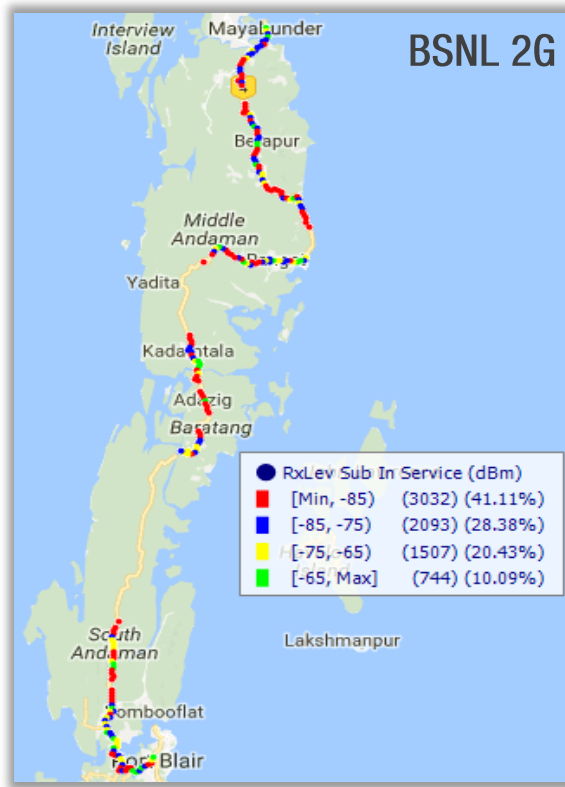** Call attempts for Vodafone 2G and BSNL CDMA is comparatively less due to lack of network coverage area*

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 $\geq$ -85 dBm, RSCP is $\geq$ -90 dBm & RSRP $\geq$ -110dBm. The details are as follows.
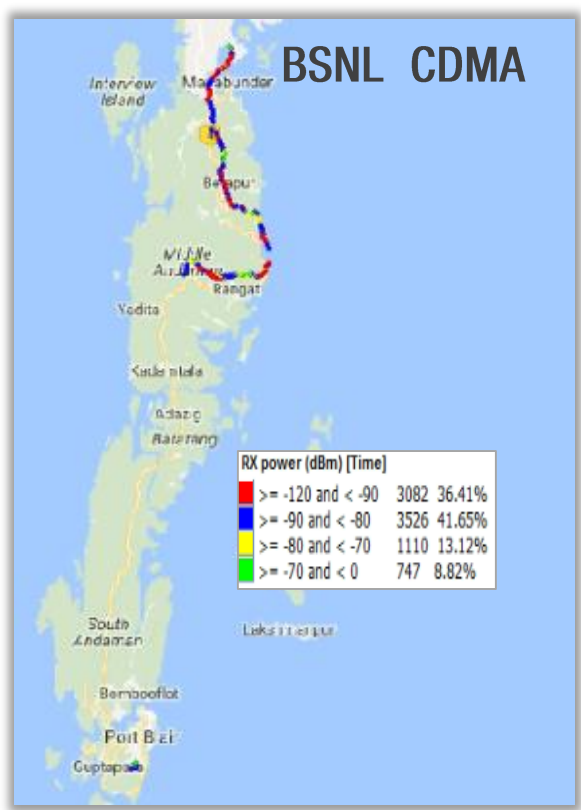
TSP	Coverage Rate
Airtel 2G	59.80%
BSNL 2G	58.89%
Vodafone 2G	64.24%
BSNL Dual(2G/3G	56.87%
BSNL CDMA	63.59%

Coverage Distribution

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

Airtel 2G

RxLev Sub In Service (dBm)
[Min, -85)   (2285) (40.2%)
[-85, -75)   (1269) (22.33%)
[-75, -65)   (1000) (17.59%)
[-65, Max]   (1130) (19.88%)

BSNL 2G

RxLev Sub In Service (dBm)
- ■ [Min, -85) (3032) (41.11%)
- ■ [-85, -75) (2093) (28.38%)
- ■ [-75, -65) (1507) (20.43%)
- ■ [-65, Max] (744) (10.09%)

Vodafone 2G

RxLev Sub In Service (dBm)
- ■ [Min, -85) (2066) (35.76%)
- ■ [-85, -75) (1539) (26.64%)
- ■ [-75, -65) (1217) (21.07%)
- ■ [-65, Max] (955) (16.53%)

BSNL Dual (2G/3G)

RxLev Sub In Service (dBm)		
▪ [Min, -85)	(2912)	(43.15%)
▪ [-85, -75)	(1739)	(25.77%)
▪ [-75, -65)	(1348)	(19.98%)
▪ [-65, Max]	(749)	(11.1%)

● Agg. Active RSCP (dBm)		
▪ [Min, -90)	(474)	(42.97%)
▪ [-90, -80)	(317)	(28.74%)
▪ [-80, -70)	(205)	(18.59%)
▪ [-70, Max]	(107)	(9.7%)

BSNL CDMA

RX power (dBm) [Time]		
▪ >= -120 and < -90	3082	36.41%
▪ >= -90 and < -80	3526	41.65%
▪ >= -80 and < -70	1110	13.12%
▪ >= -70 and < 0	747	8.82%

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%.

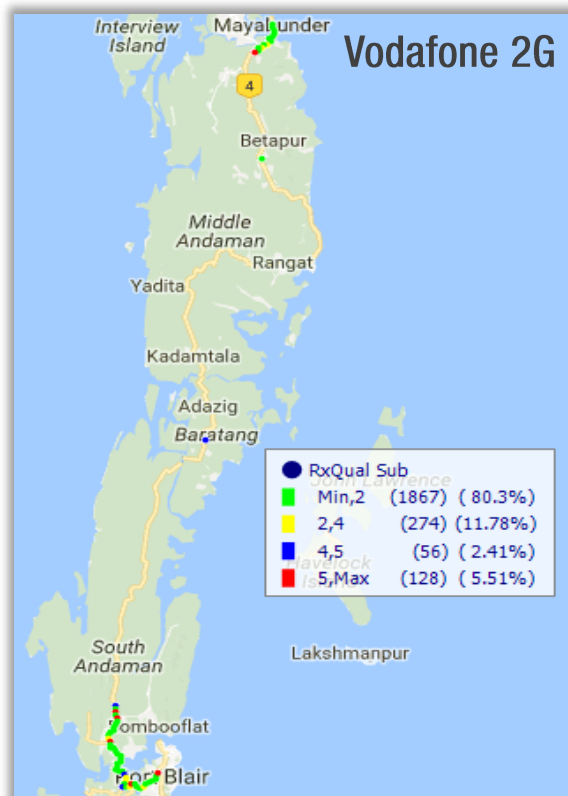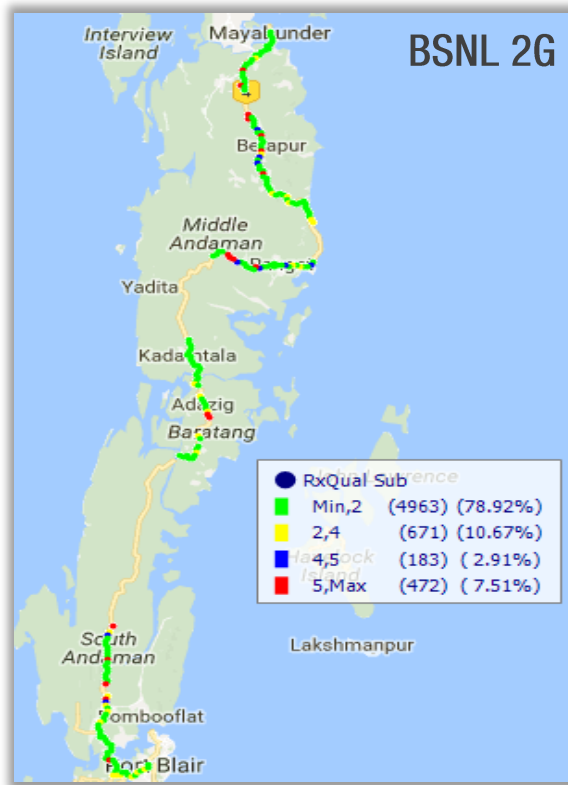| TSP	Rx Quality
Airtel 2G	90.77%
BSNL 2G	92.49%
Vodafone 2G	94.49%
BSNL Dual(2G/3SG)	88.61%
BSNL CDMA	79.01%
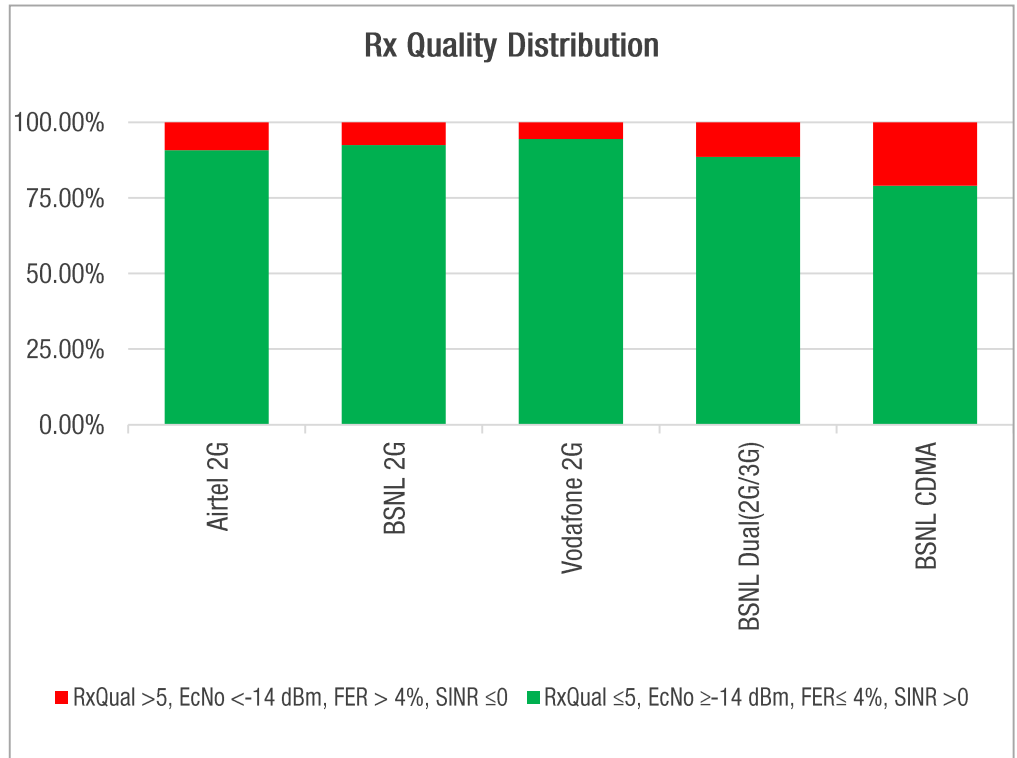
—— TSPs not meeting the Benchmark
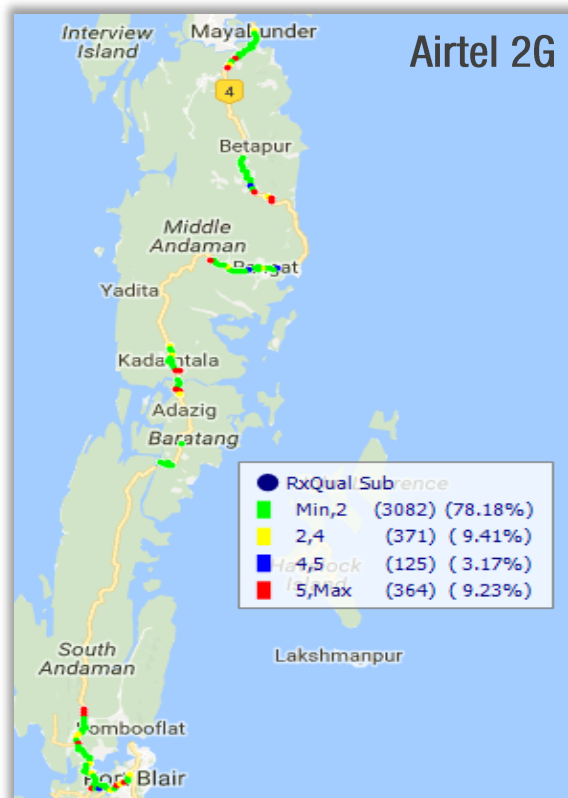
Rx Quality Distribution

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

Airtel 2G

RxQual Sub		
●	Min,2	(3082) (78.18%)
	2,4	(371) (9.41%)
	4,5	(125) (3.17%)
■	5,Max	(364) (9.23%)

BSNL 2G

RxQual Sub		
●	Min,2	(4963) (78.92%)
■	2,4	(671) (10.67%)
■	4,5	(183) (2.91%)
■	5,Max	(472) (7.51%)

Vodafone 2G

RxQual Sub		
●	Min,2	(1867) (80.3%)
■	2,4	(274) (11.78%)
■	4,5	(56) (2.41%)
■	5,Max	(128) (5.51%)

Technology Distribution
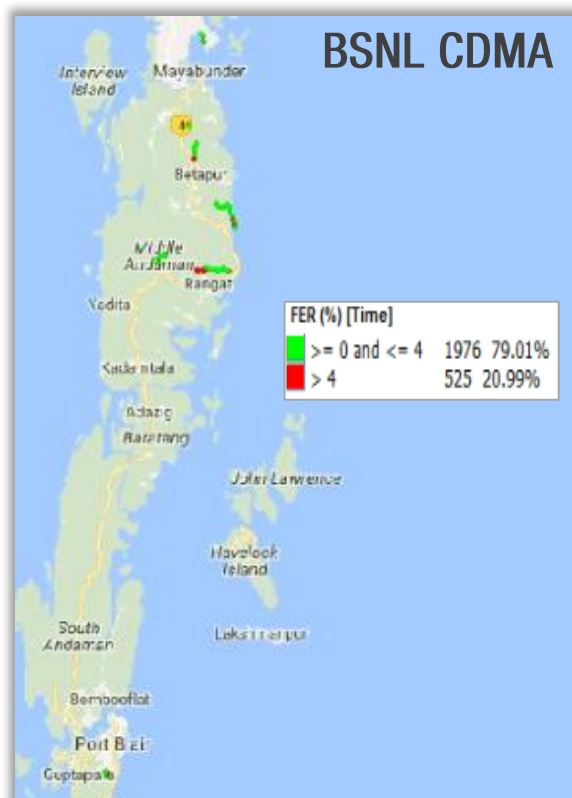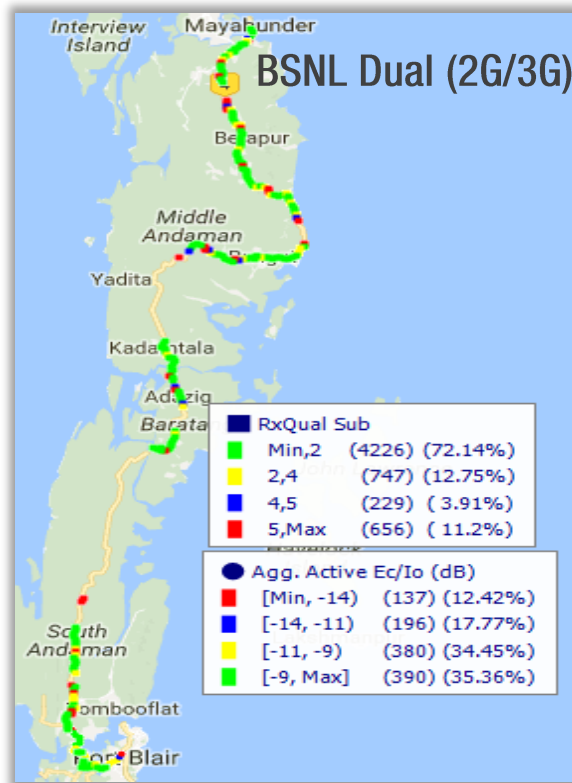
TSP	% Time on 3G
BSNL3G	10.30%

Technology Distribution chart (BSNL 3G): % Time on 3G, % Time on 2G

BSNL 3G

System
GSM (19493) (89.7%)
WCDMA (2239) (10.3%)