



INDEPENDENT DRIVE TEST REPORT

For

Belgaum to Mumbai Highway Nov 2017

SOUTH ZONE

Key Performance Indicators: 43% of TSPs have met the Drop Call Rate (DCR) benchmark of 2%. All TSPs have met the Call Setup Success Rate (CSSR) of 95% except Aircel 2G.

The Independent Drive Test has been carried out by M/s PhiMetrics Technologies Pvt. Ltd. on behalf of TRAI at Belgaum to Mumbai Highway from 9:00 AM to 9:00 PM; 2nd Nov to 3rd Nov 2017. The drive test covered an drive route of 486KMs over a period of 2 day. Approximately 465 calls were made for each of the 14 networks: seven 2G networks, six 3G networks and one LTE network covering 8 unique TSPs

Overview

Voice Summary

Overview

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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 2nd Nov to 3rd Nov 2017 covering the highway between Belgaum to Mumbai via Kolhapur, Pune & Lonavala. The performance of **Aircel, Airtel, BSNL, Idea, Tata, Telenor, Vodafone and Jio** were monitored across various technologies (2G, 3G and 4G)

The test results obtained from these drive tests were utilized to assess the network quality for Voice services in terms of **Voice: Coverage; Quality; Handover Success Rate; Call Setup Success Rate; Drop Call Rate and Block Call Rate.**

Drive Test Details For Belgaum to Mumbai:

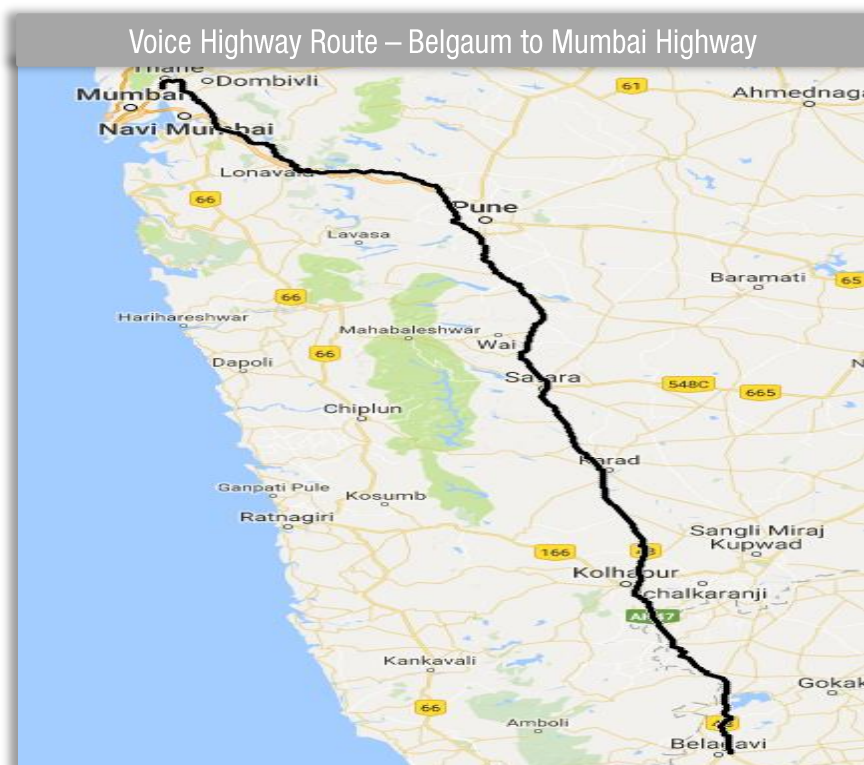
Independent Drive test was conducted for a period of 2 days i.e. 2nd Nov to 3rd Nov 2017 From Belgaum to Mumbai Highway from 9:00 AM to 9:00 PM. Calls were made for 90 sec duration with wait time of 10 sec between calls in all technologies.

Voice Tests: The drive test covered a drive route of approximately 486 KMs over a period of 2 days i.e. 2nd Nov to 3rd Nov 2017. Approximately 465 calls were made for each of the 14 networks: seven 2G (Lock Mode) networks, six 3G (Dual mode) networks and one VoLTE network covering 8 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 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.

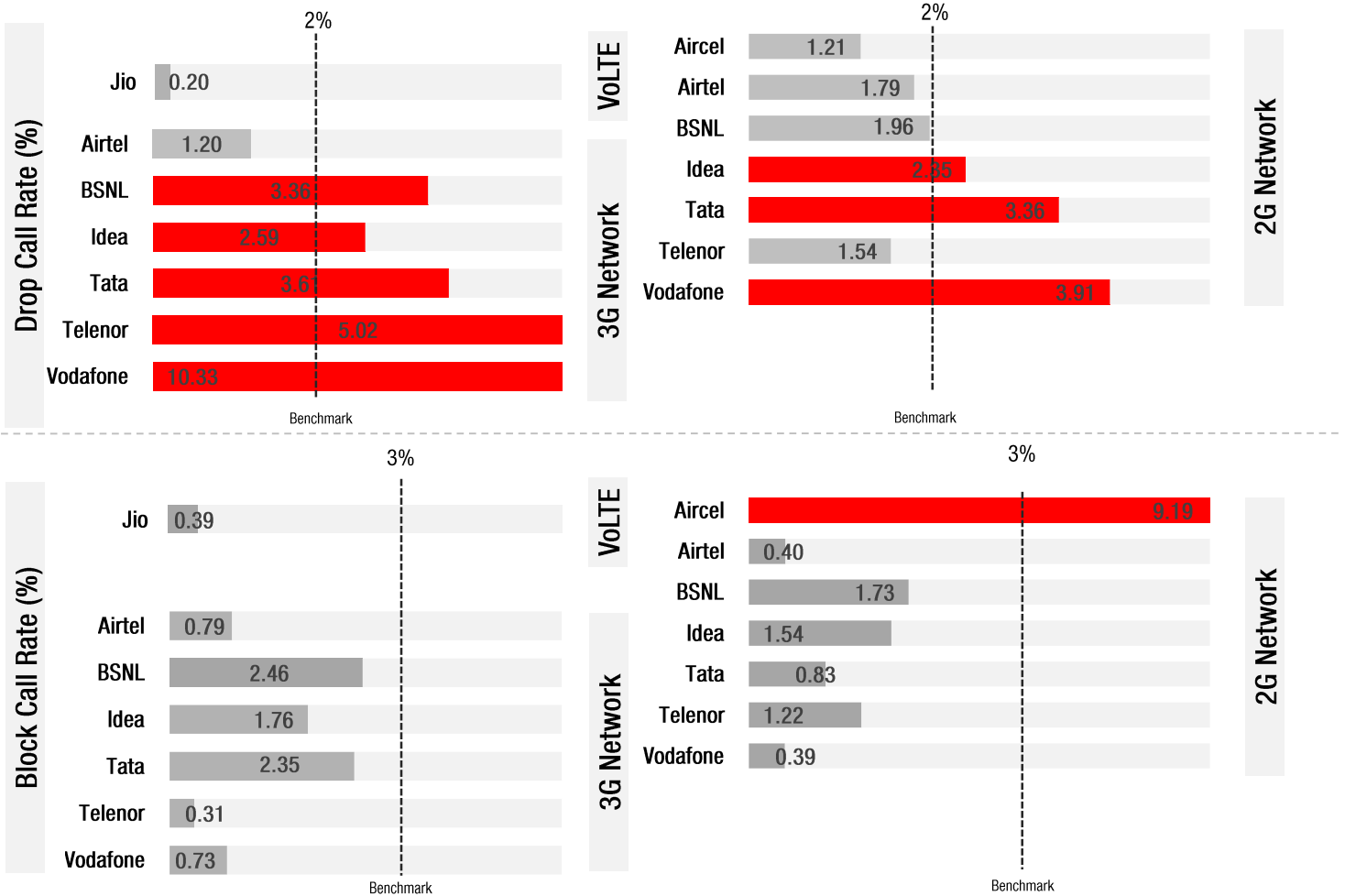
* 3G KPI's which is calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.



Voice Calls

Key Observations

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



KPI	2G Networks						
	Aircel	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
SDCCH Congestion%	9.19%	0.20%	0.39%	0.39%	0.83%	0.91%	0.19%
TCH Congestion %	0.00%	0.20%	1.35%	1.16%	0.00%	0.31%	0.20%

KPI	3G					
	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
SDCCH Congestion%	0.00%	0.41%	0.39%	0.29%	0.31%	0.00%
RRC Congestion%	0.00%	0.82%	0.78%	1.76%	0.00%	0.73%
SDCCH & RRC Congestion%	0.00%	1.23%	1.18%	2.06%	0.31%	0.73%
TCH Congestion %	0.00%	0.41%	0.00%	0.30%	0.00%	0.00%
RAB Congestion %	0.79%	0.83%	0.60%	0.00%	0.00%	0.00%
TCH & RAB Congestion %	0.79%	1.24%	0.60%	0.30%	0.00%	0.00%

- a) Only 43% 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.

Not meeting Benchmark

Voice Calls

Key Observations

Coverage

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

TSPs	2G						
	Aircel	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
Coverage%	76.95%	82.44%	76.07%	87.93%	73.34%	70.38%	79.61%

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

TSPs	3G						Volte
	Airtel	BSNL	Idea	Tata	Telenor	Vodafone	Jio
Coverage %	83.79%	67.54%	84.69%	71.53%	79.21%	86.51%	94.99%

c) Percentage of time spent on 3G network:

TSPs	3G					
	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
% Time Spent on 3G	53.78%	47.41%	64.47%	16.63%	38.53%	72.63%

d) Percentage of Radio Link Timeout (RLT) \Rightarrow 48.

TSPs	2G						
	Aircel	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
% of cells	0.00%	0.17%	26.39%	0.00%	14.32%	75.56%	0.00%

During IDT all TSP's have RLT less than or equal to 48 except Airtel, BSNL, Tata & Telenor.

Summary

City Level Summary

Voice Call	2G						
	Aircel	Airtel	BSNL	Idea	Tata *	Telenor*	Vodafone
Call Attempt	544	504	519	518	360	328	513
Blocked Call Rate (%)	9.2%	0.4%	1.7%	1.5%	0.8%	1.2%	0.4%
CSSR% (Accessibility)	90.8%	99.6%	98.3%	98.5%	99.2%	98.8%	99.6%
Drop Call Rate (%)	1.2%	1.8%	2.0%	2.4%	3.4%	1.5%	3.9%
Mobility HOSR (%)	98.7%	99.3%	92.5%	97.7%	97.7%	97.8%	98.8%
Rx Quality (%)	95.2%	96.3%	96.5%	95.2%	96.0%	96.3%	97.3%

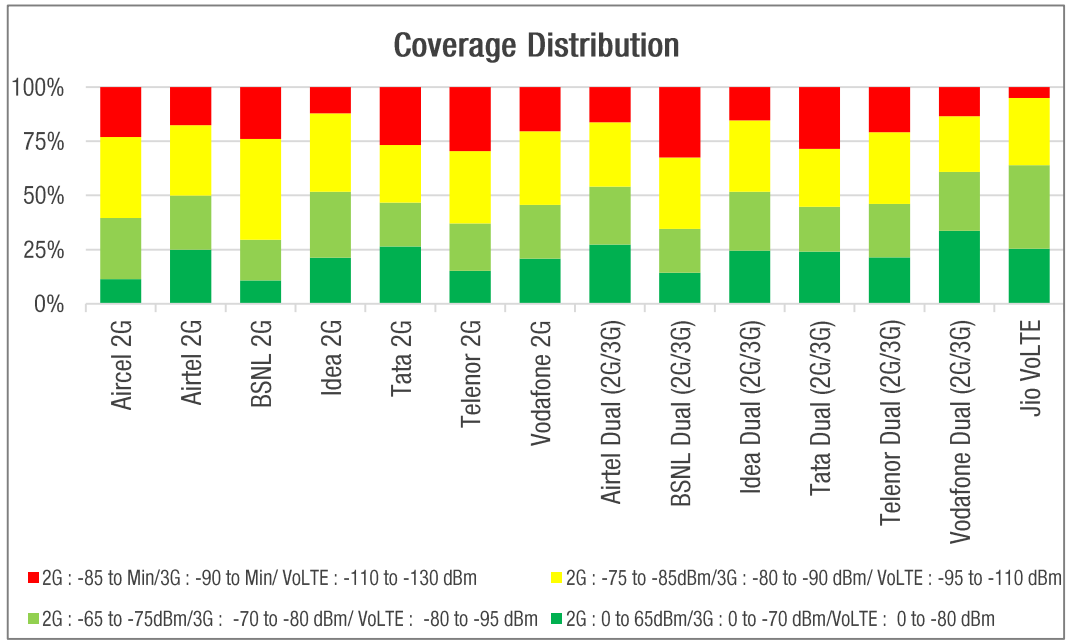
Voice Call	3G						Volte
	Airtel	BSNL	Idea	Tata*	Telenor*	Vodafone	Jio
Call Attempt	504	488	510	340	320	546	510
Blocked Call Rate (%)	0.8%	2.5%	1.8%	2.4%	0.3%	0.7%	0.4%
CSSR% (Accessibility)	99.2%	97.5%	98.2%	97.6%	99.7%	99.3%	99.6%
Drop Call Rate (%)	1.2%	3.4%	2.6%	3.6%	5.0%	10.3%	0.2%
Mobility HOSR (%)	99.6%	97.6%	99.6%	98.6%	99.4%	99.7%	97.5%
Rx Quality (%)	91.0%	94.4%	86.4%	95.7%	94.2%	94.0%	89.4%

* In Tata & Telenor calls did not initiate at some part of highway due to lack of coverage

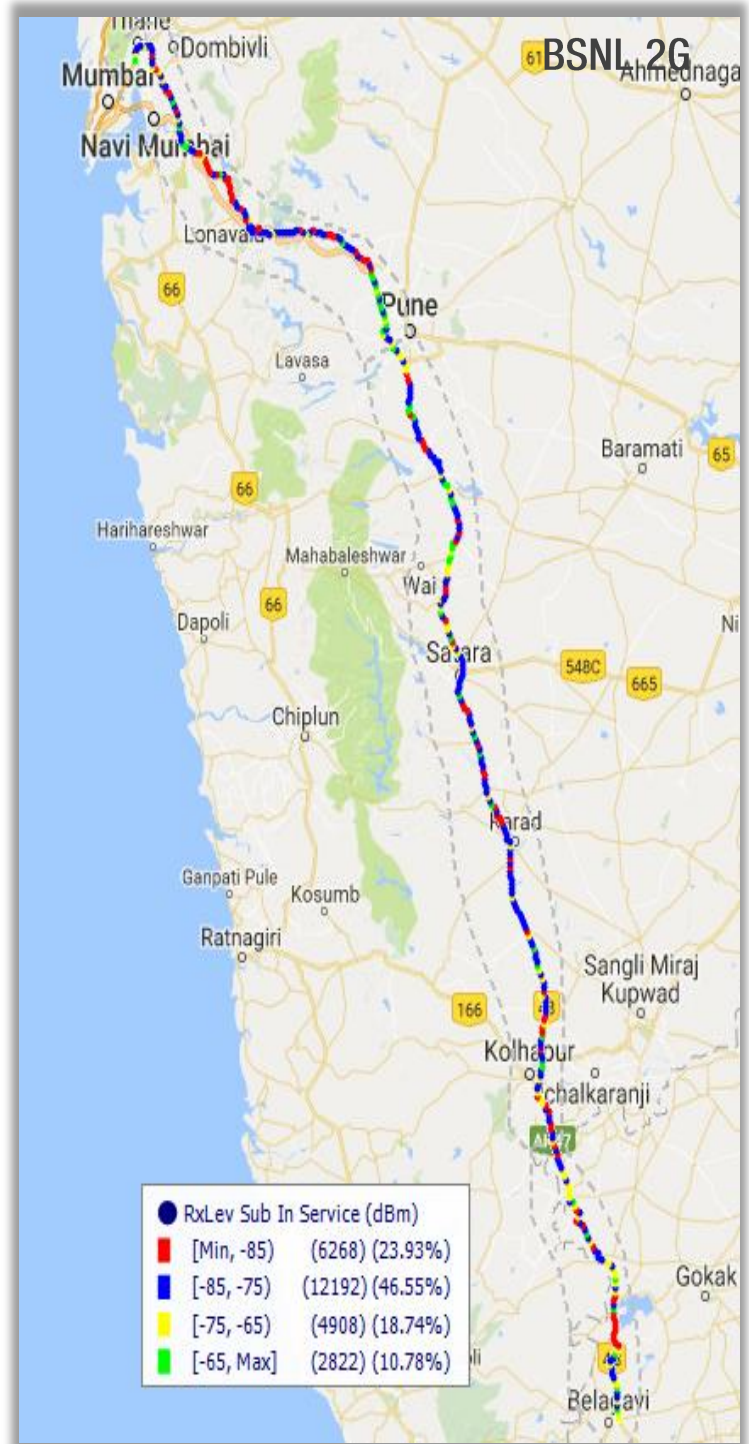
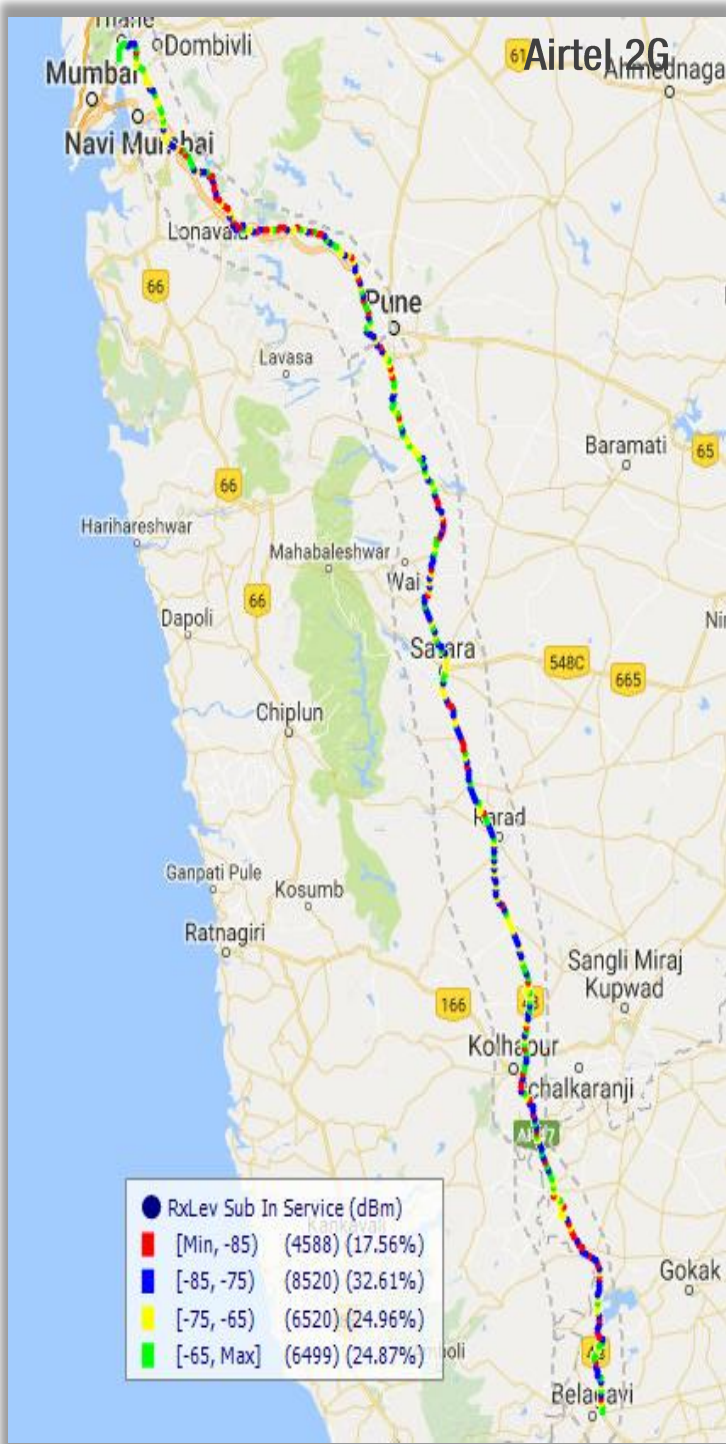
I. Coverage Details

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 dBm, RSCP is ≥ -90 dBm & RSRP ≥ -110 dBm. The details are as follows.

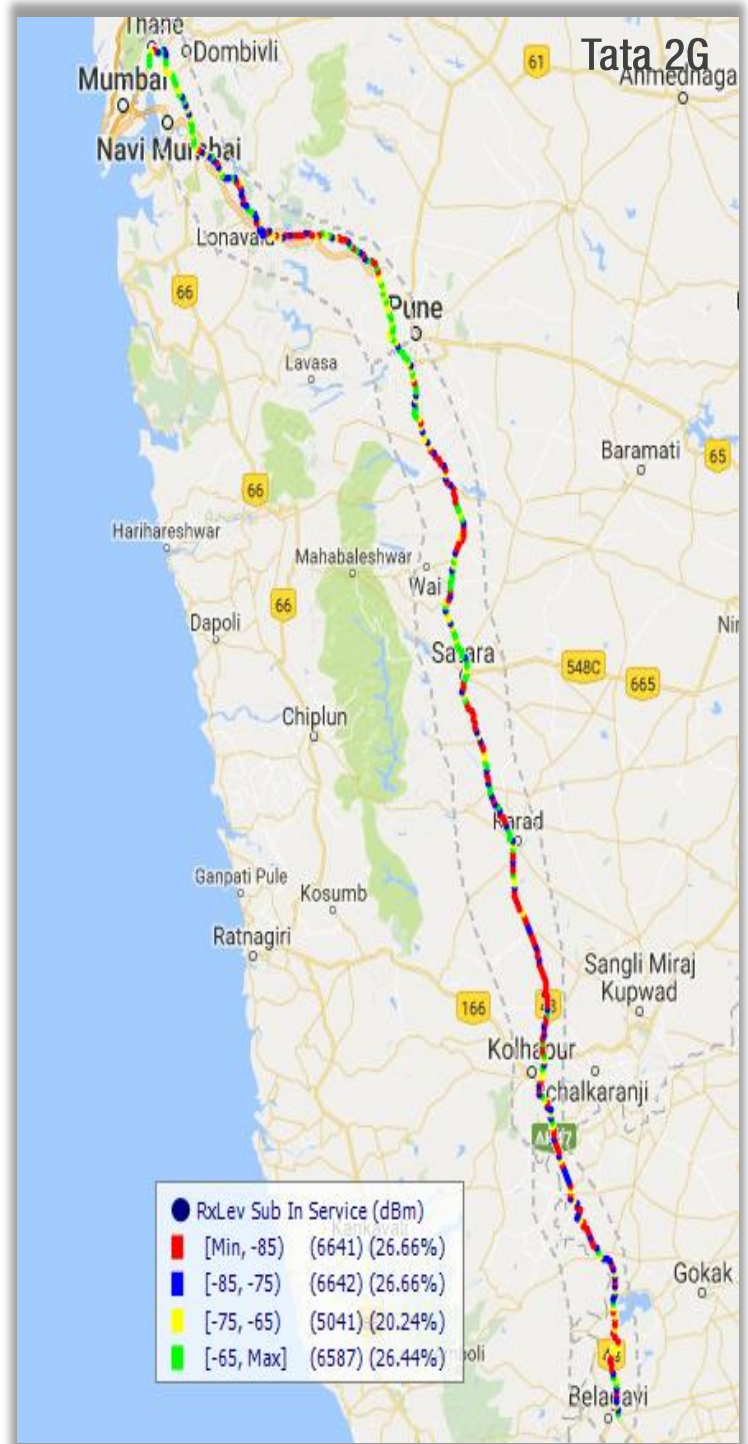
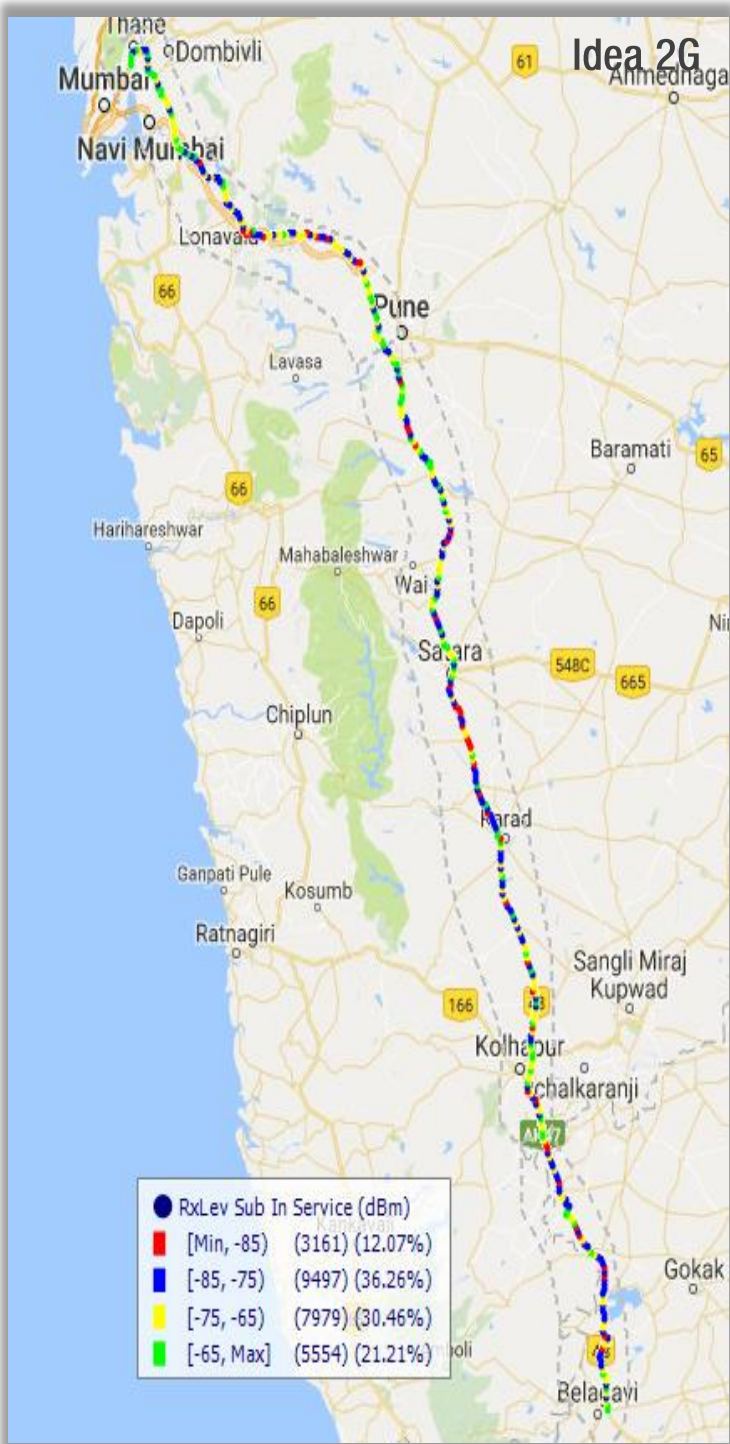
TSP	Coverage Rate
Aircel 2G	76.95%
Airtel 2G	82.44%
BSNL 2G	76.07%
Idea 2G	87.93%
Tata 2G	73.34%
Telenor 2G	70.38%
Vodafone 2G	79.61%
Airtel Dual (2G/3G/)	83.79%
BSNL Dual (2G/3G/)	67.54%
Idea Dual (2G/3G/)	84.69%
Tata Dual (2G/3G/)	71.53%
Telenor Dual (2G/3G/)	79.21%
Vodafone Dual (2G/3G/)	86.51%
Jio VoLTE	94.99%



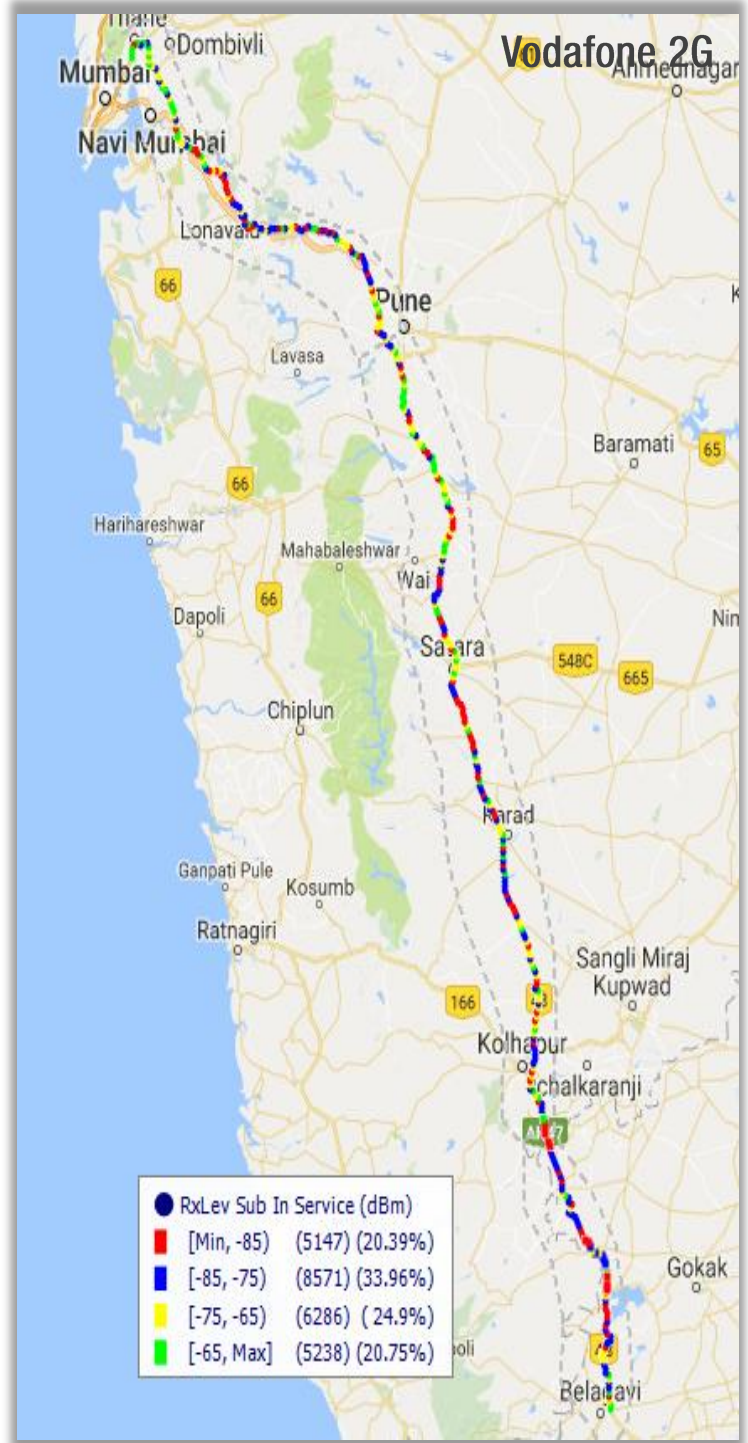
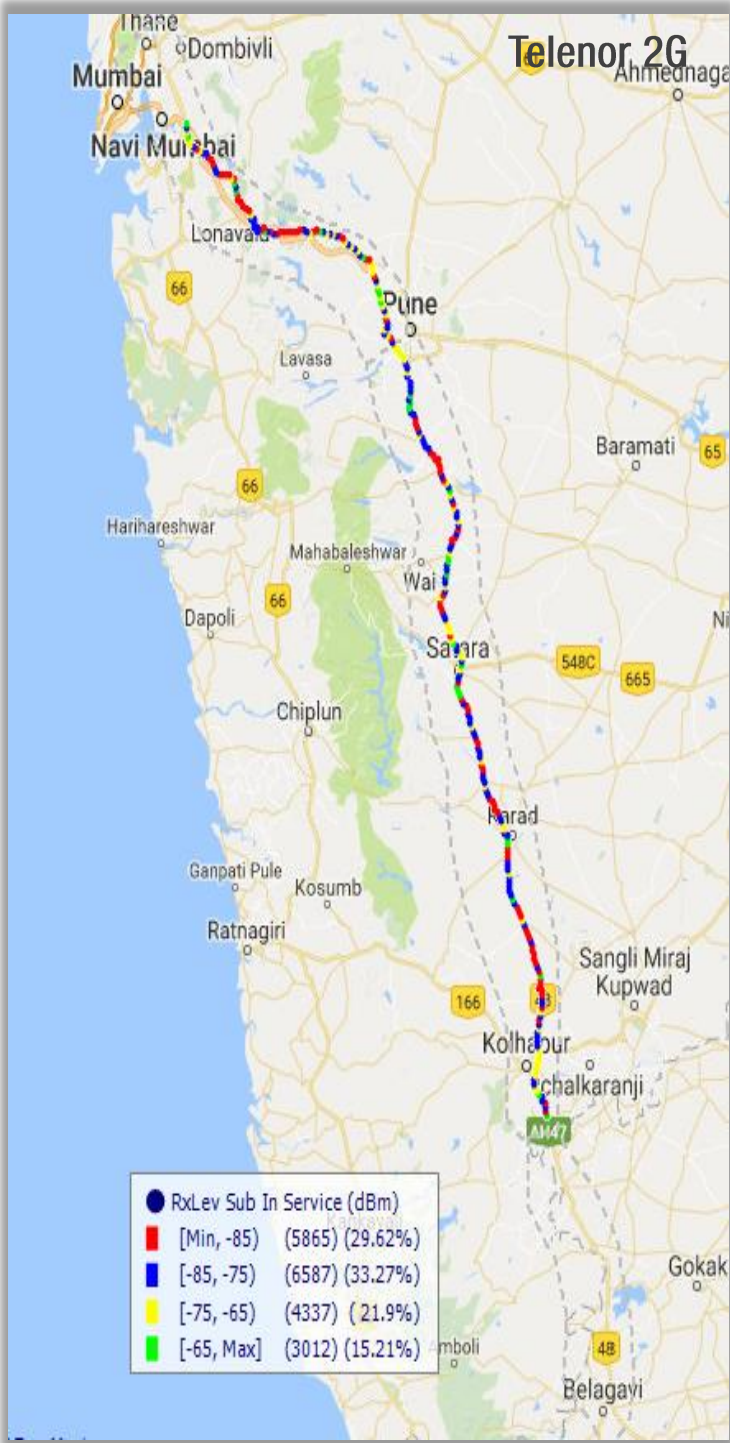
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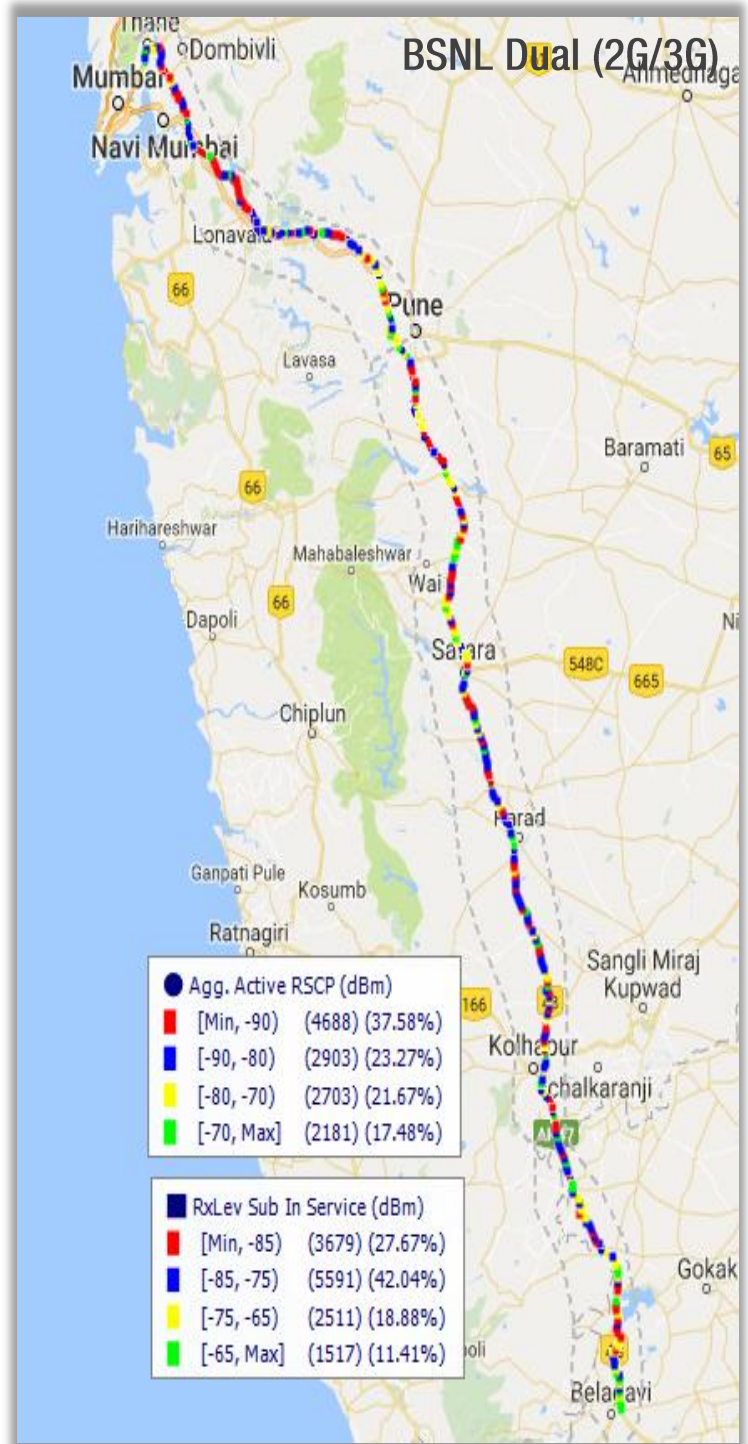
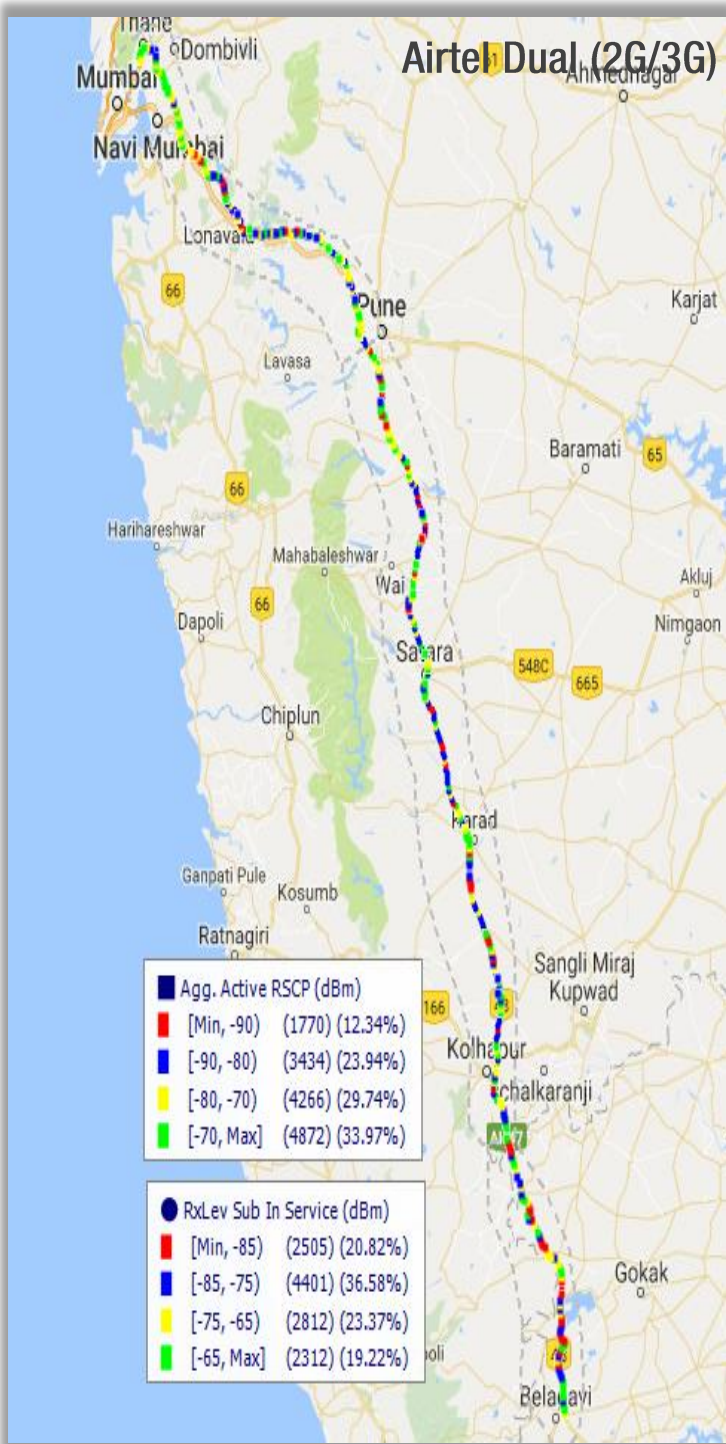
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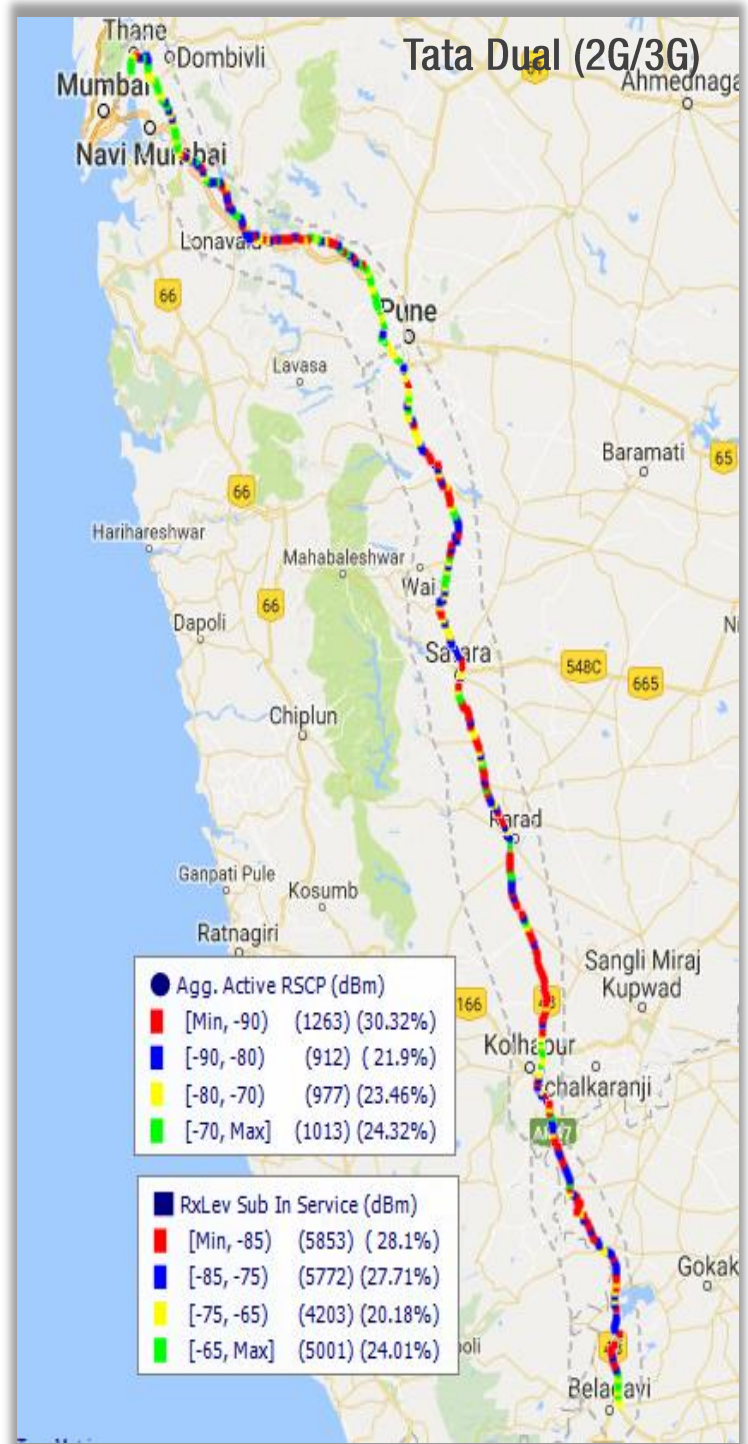
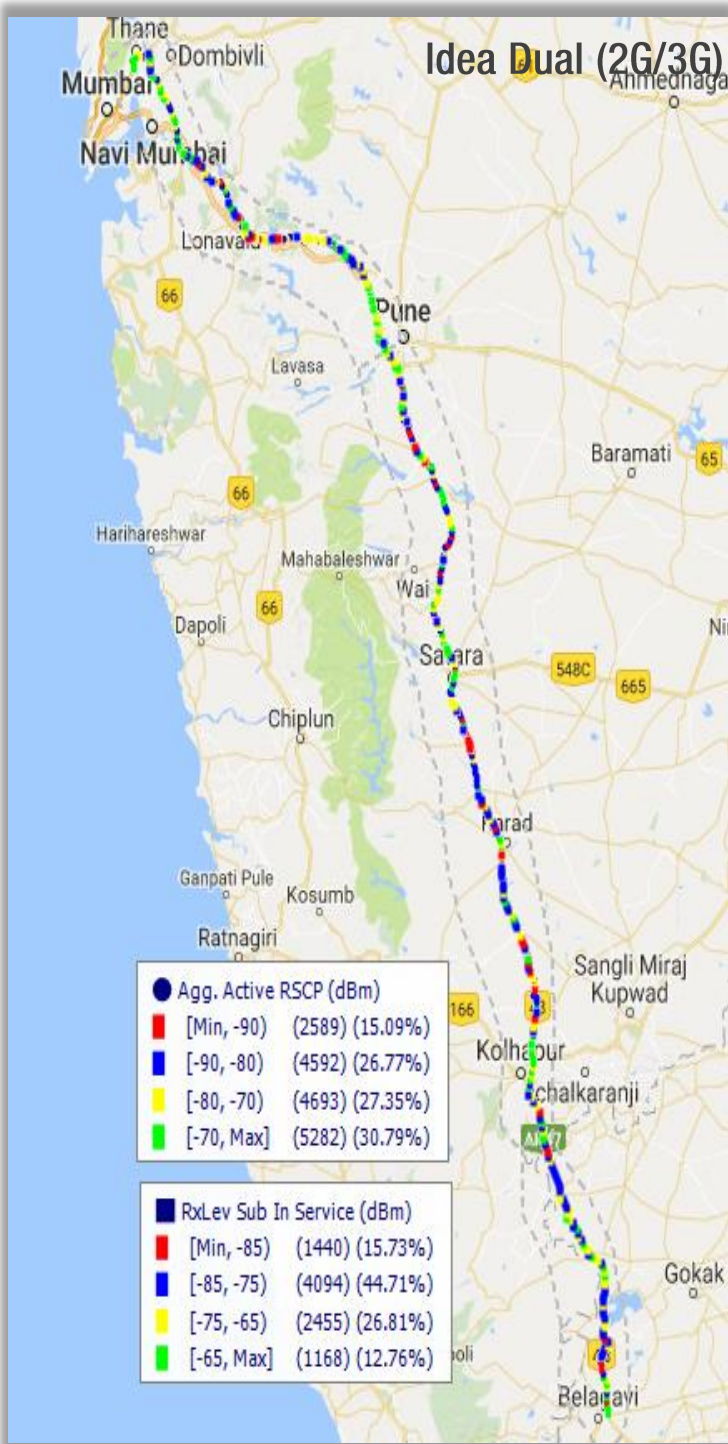
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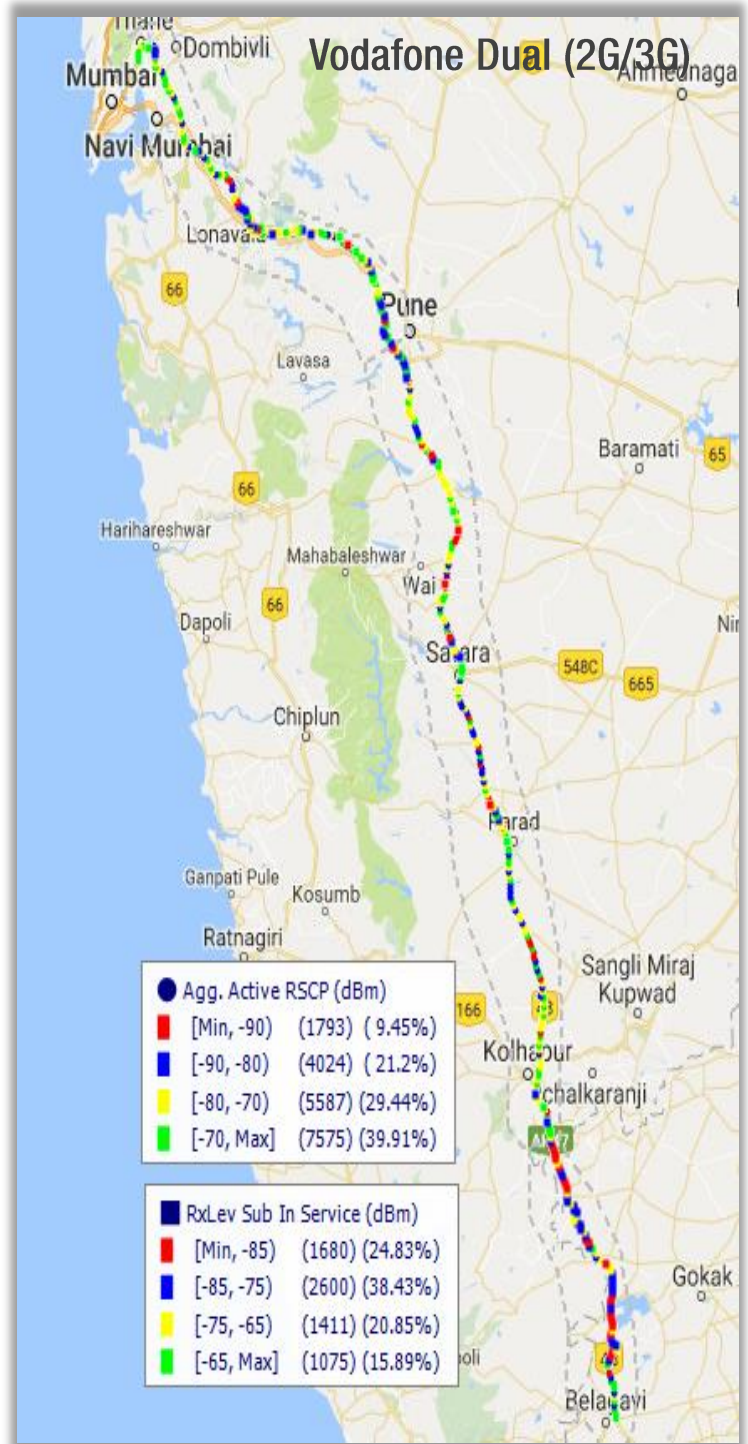
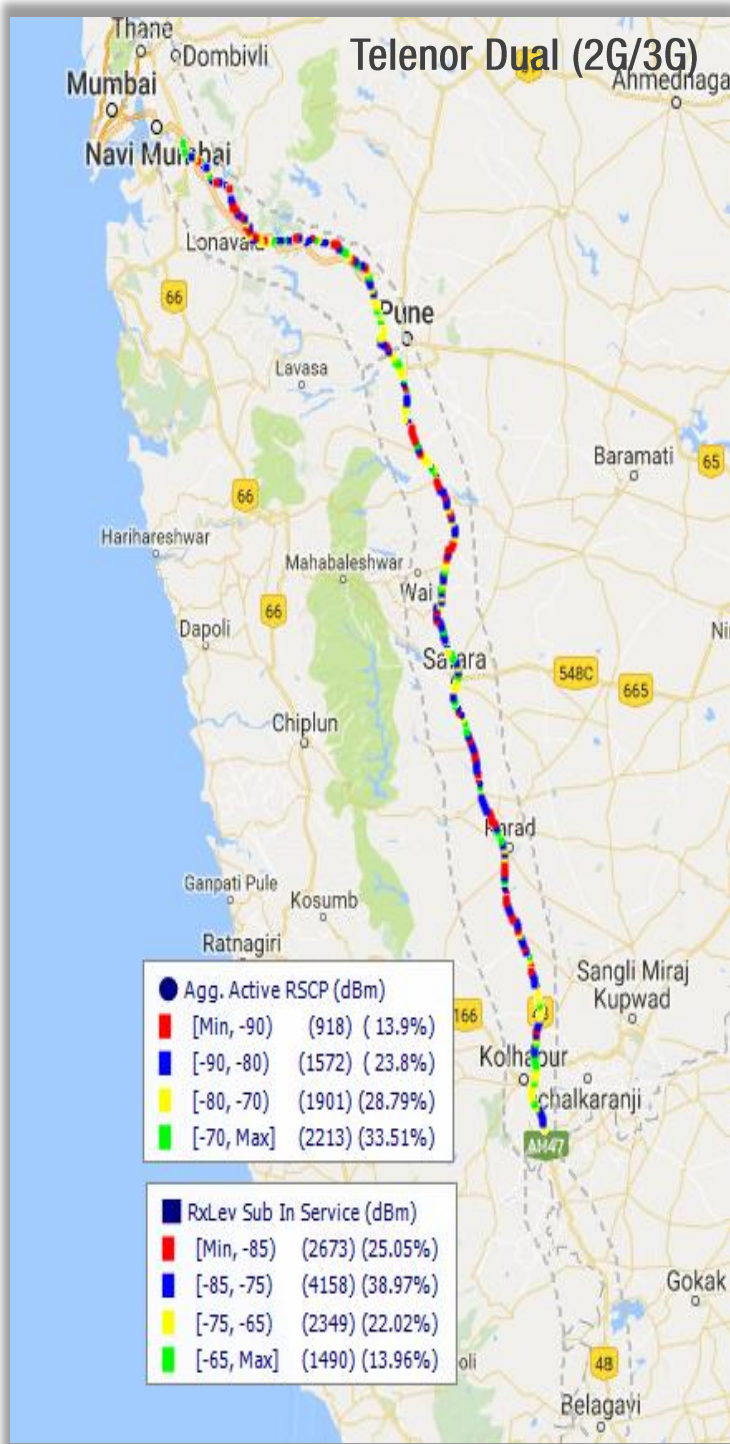
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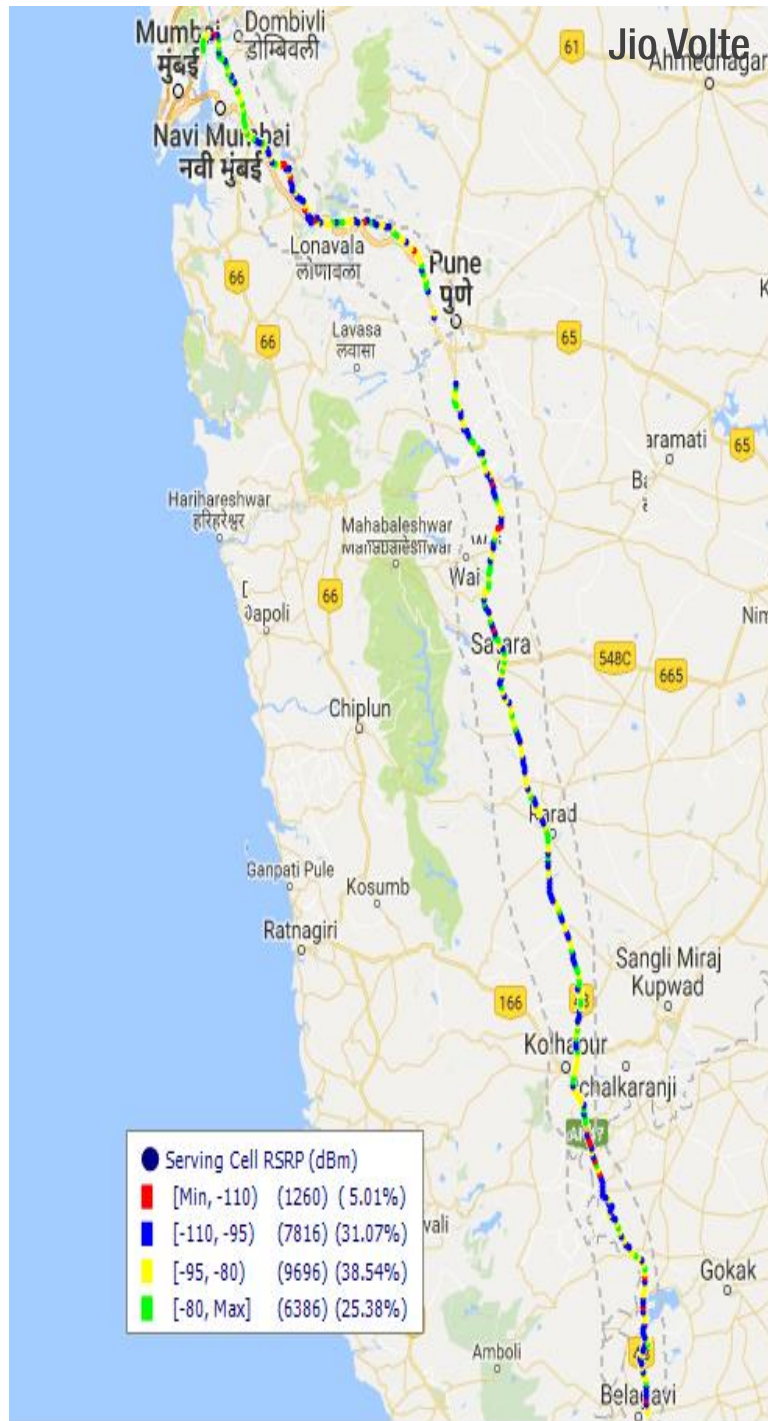
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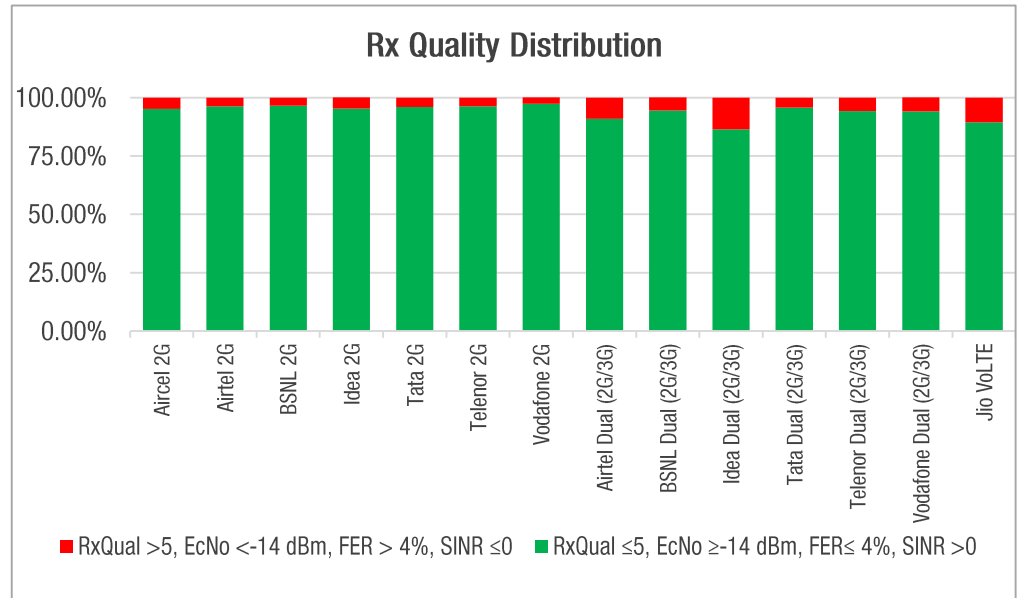
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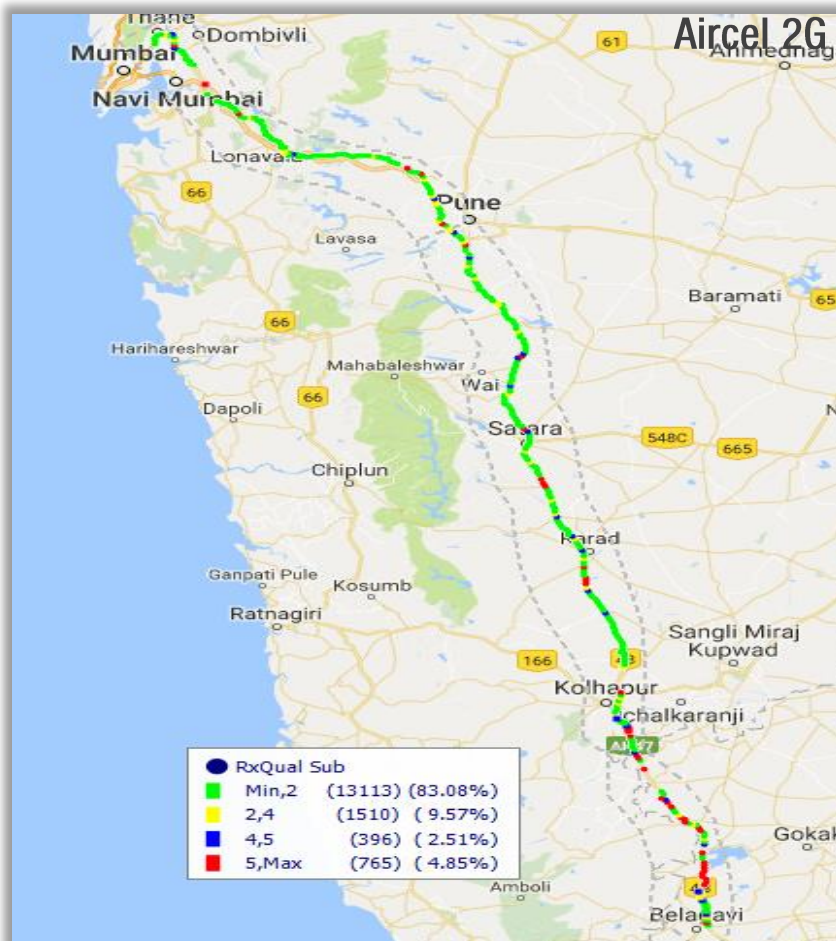
II. Quality Details

For measuring voice quality, as per the QoS norms, RxQual ≤ 5 for GSM TSPs, EcNo ≥ -14 dBm for 3G TSPs, FER $\leq 4\%$ 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 $\geq 95\%$.

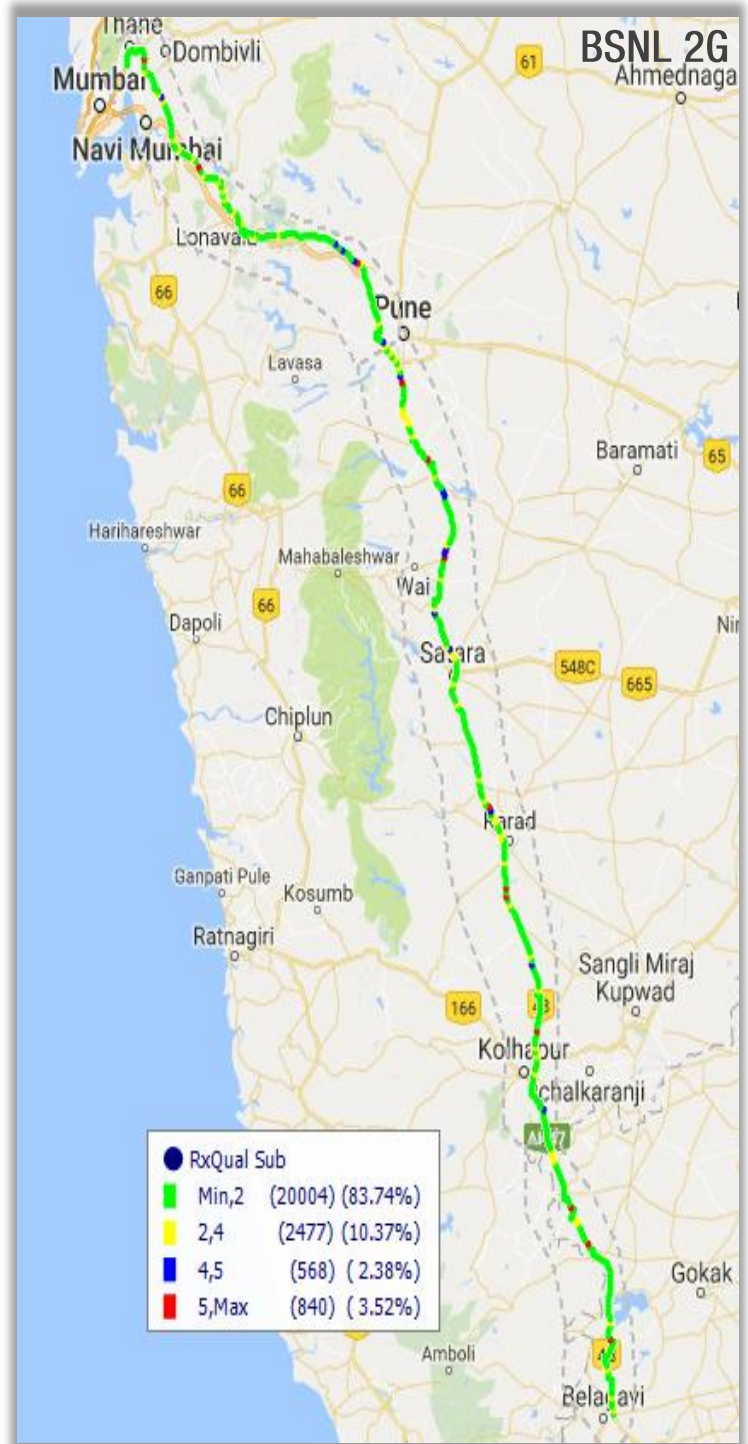
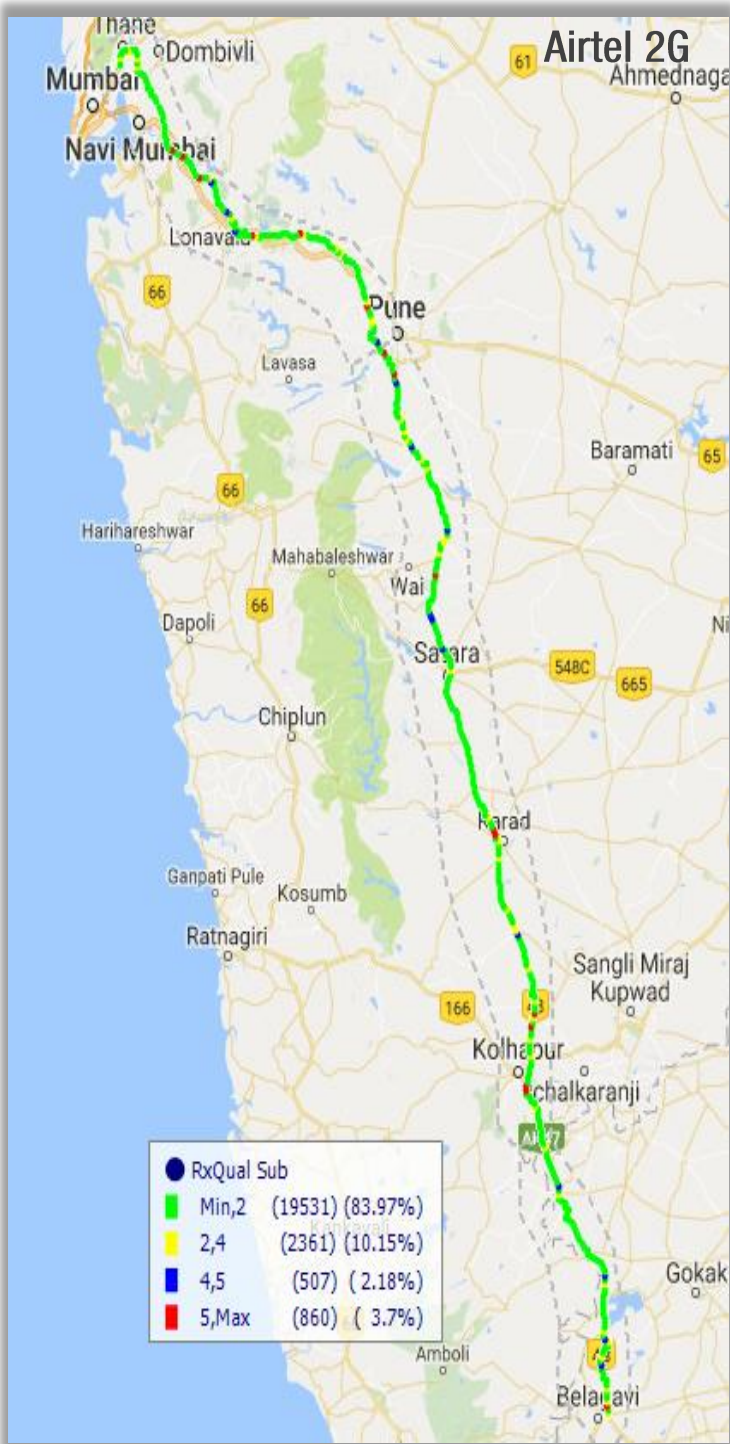
TSP	Rx Quality
Aircel 2G	95.15%
Airtel 2G	96.30%
BSNL 2G	96.48%
Idea 2G	95.25%
Tata 2G	95.96%
Telenor 2G	96.29%
Vodafone 2G	97.34%
Airtel Dual (2G/3G)	90.96%
BSNL Dual (2G/3G)	94.43%
Idea Dual (2G/3G)	86.36%
Tata Dual (2G/3G)	95.66%
Telenor Dual (2G/3G)	94.16%
Vodafone Dual (2G/3G)	94.05%
Jio Volte	89.36%



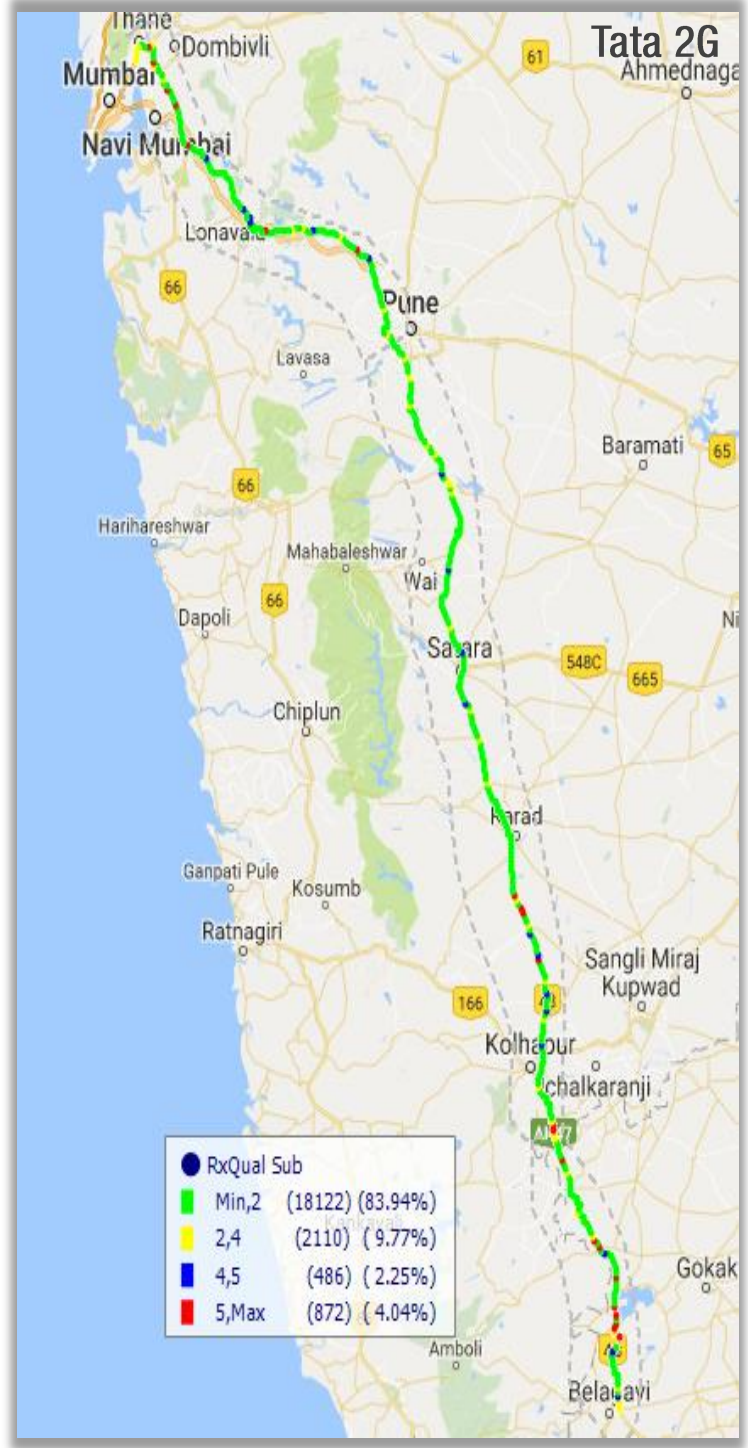
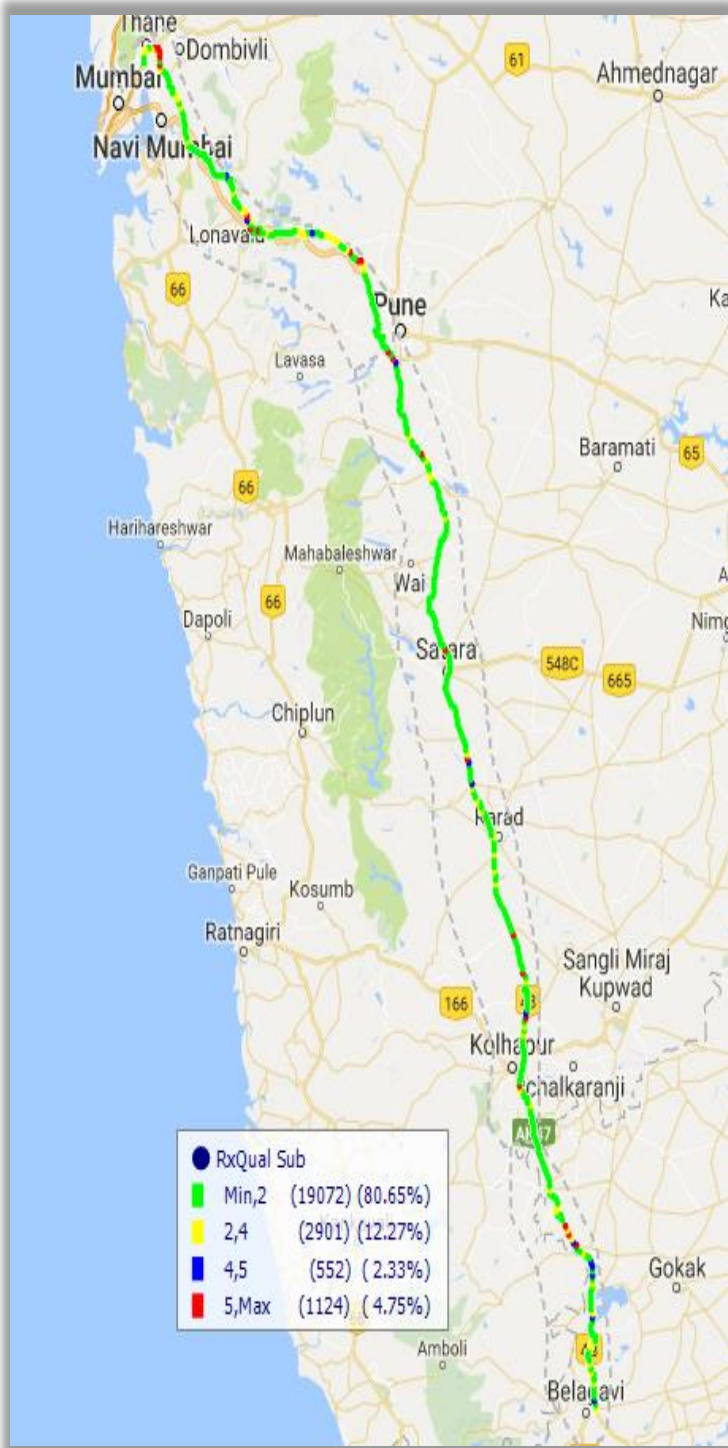
— TSPs not meeting the Benchmark



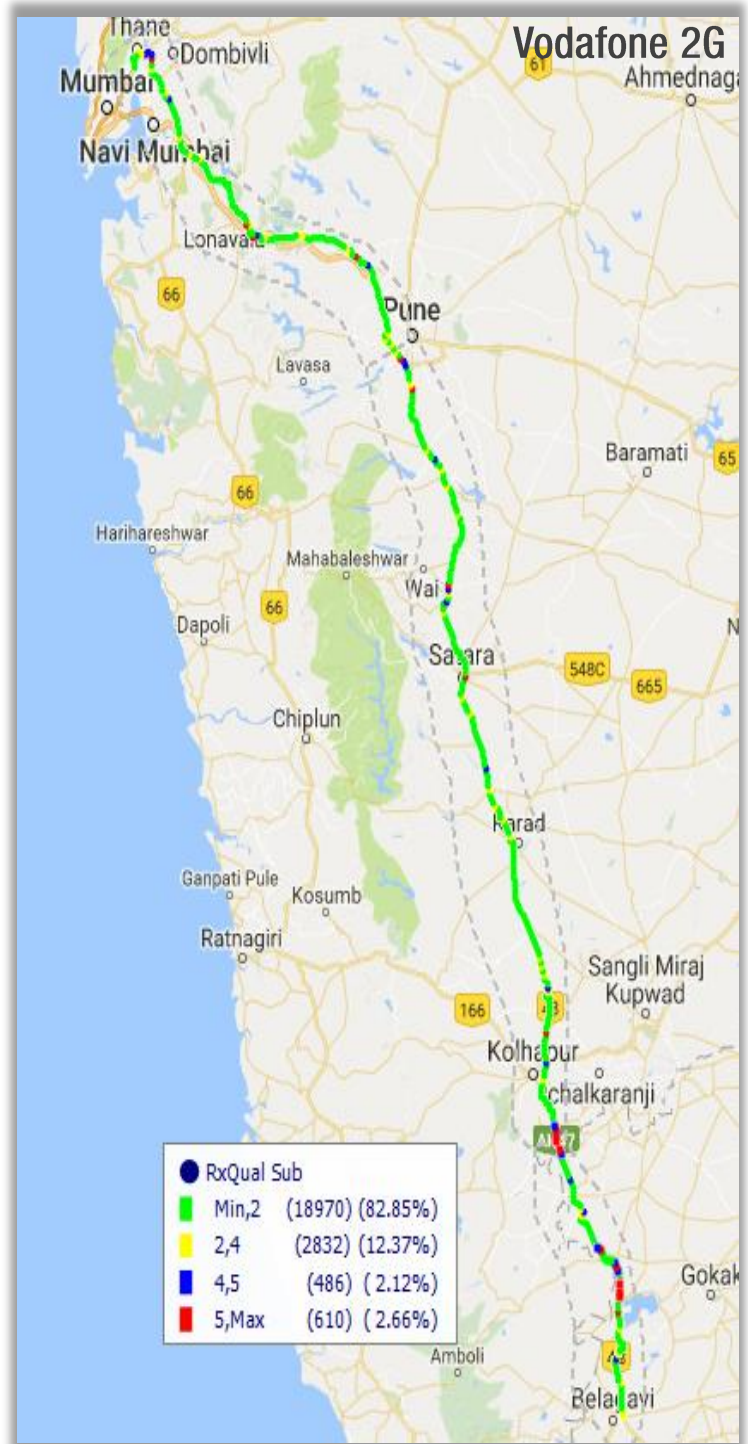
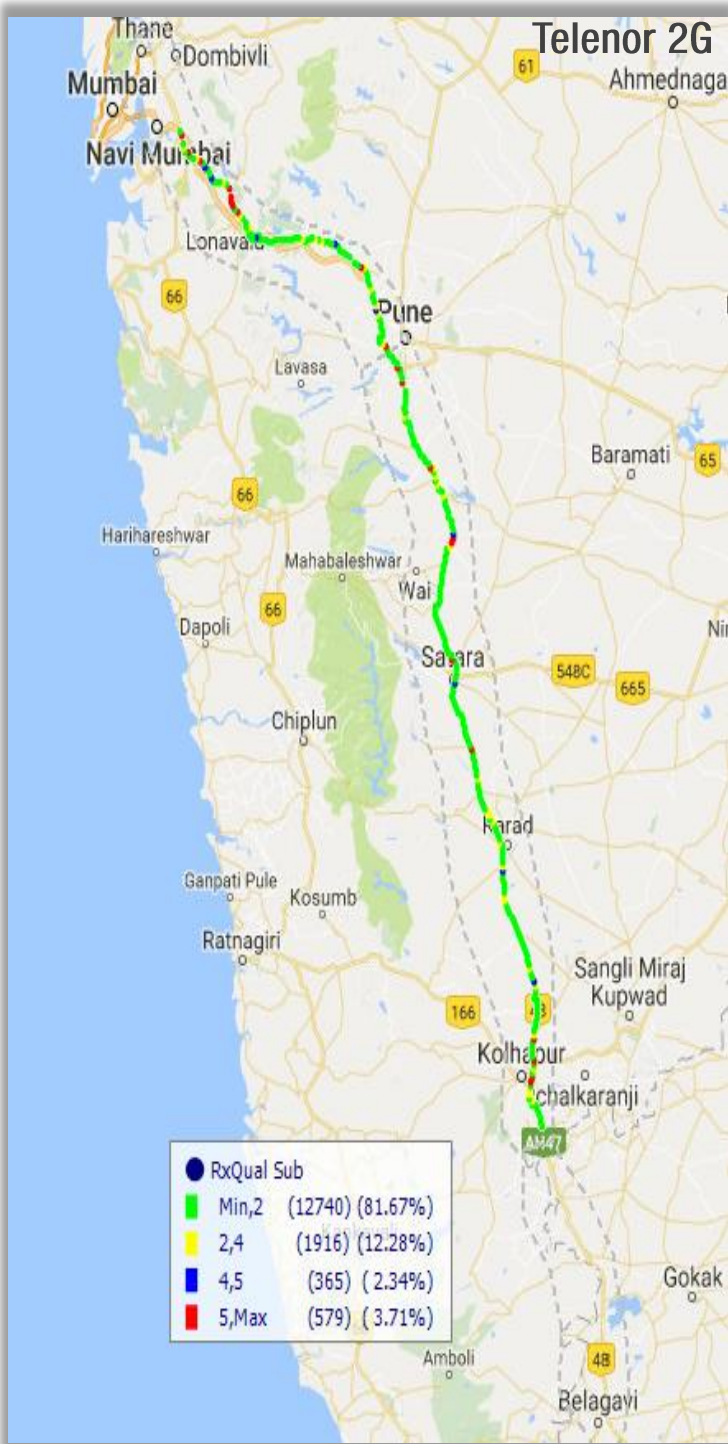
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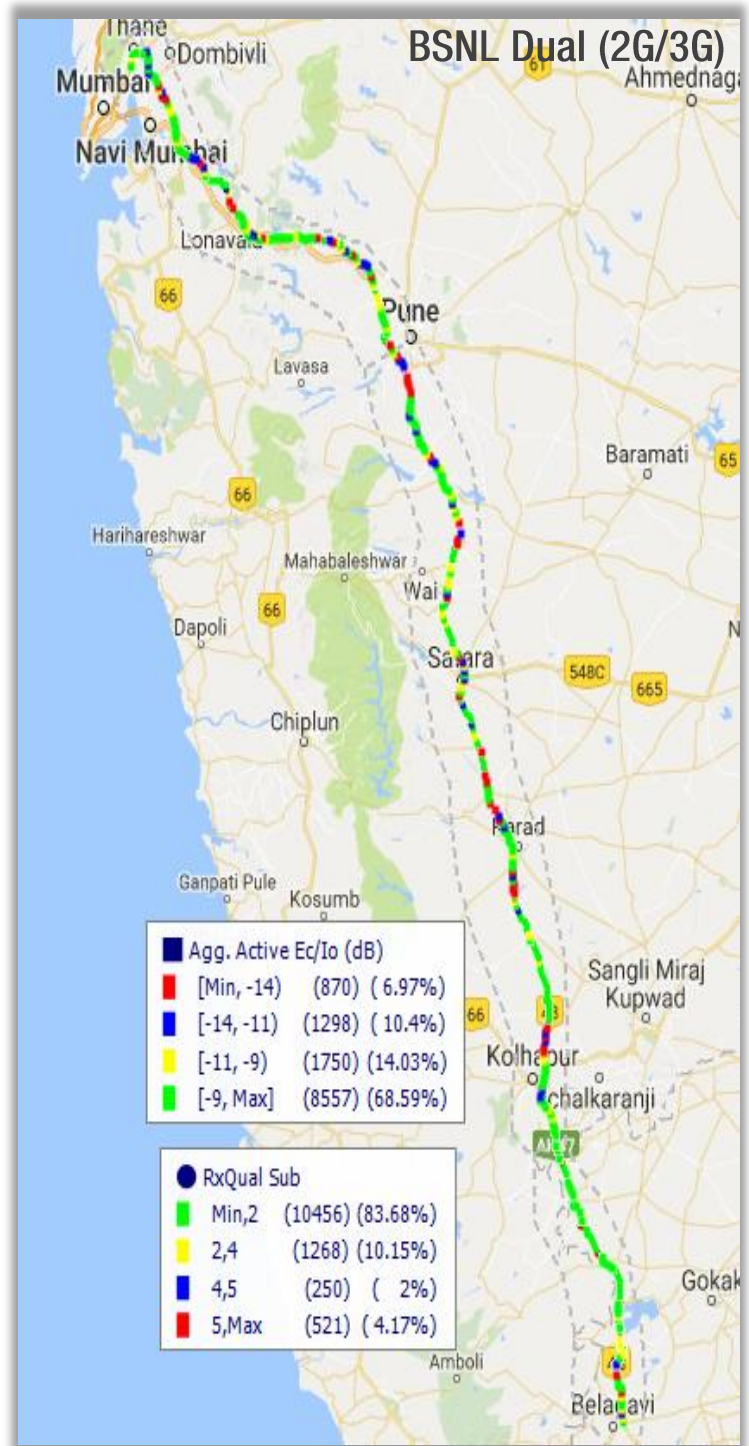
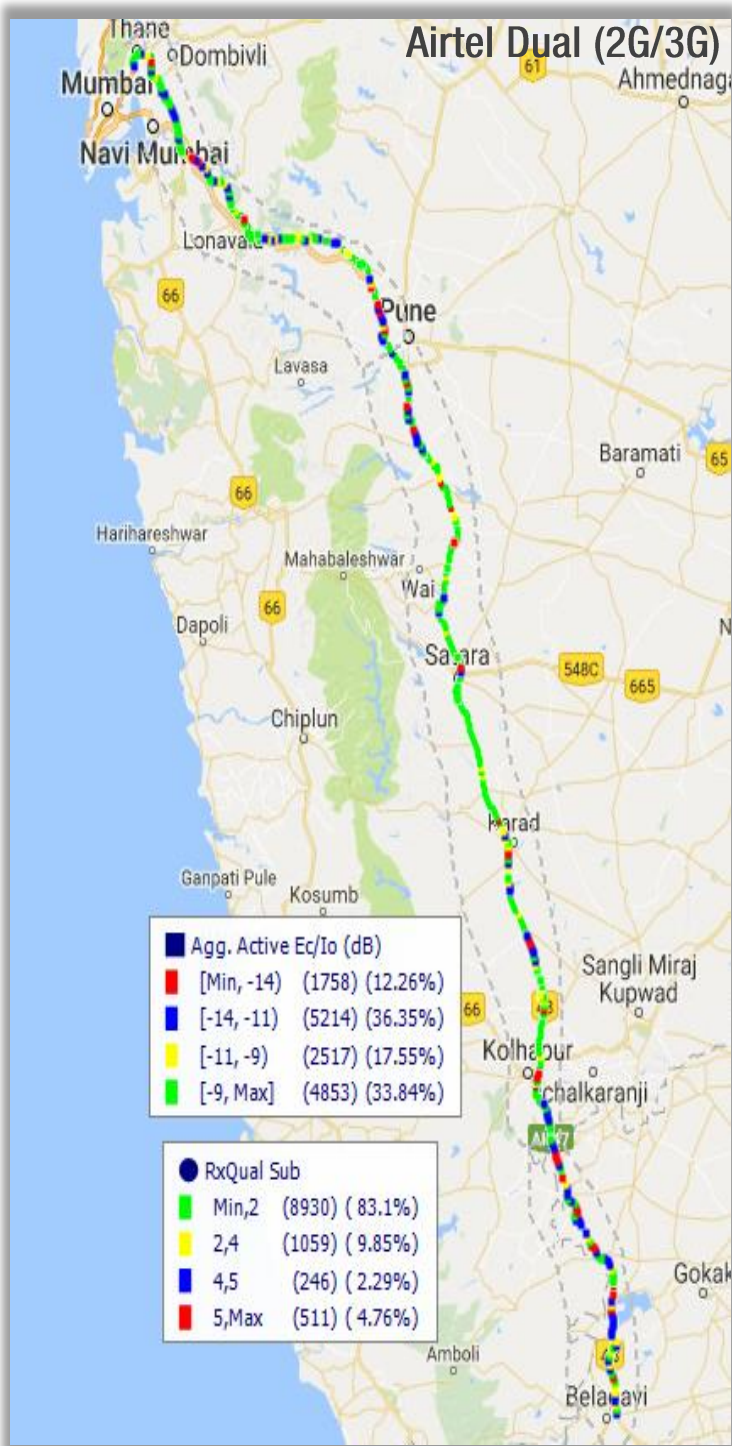
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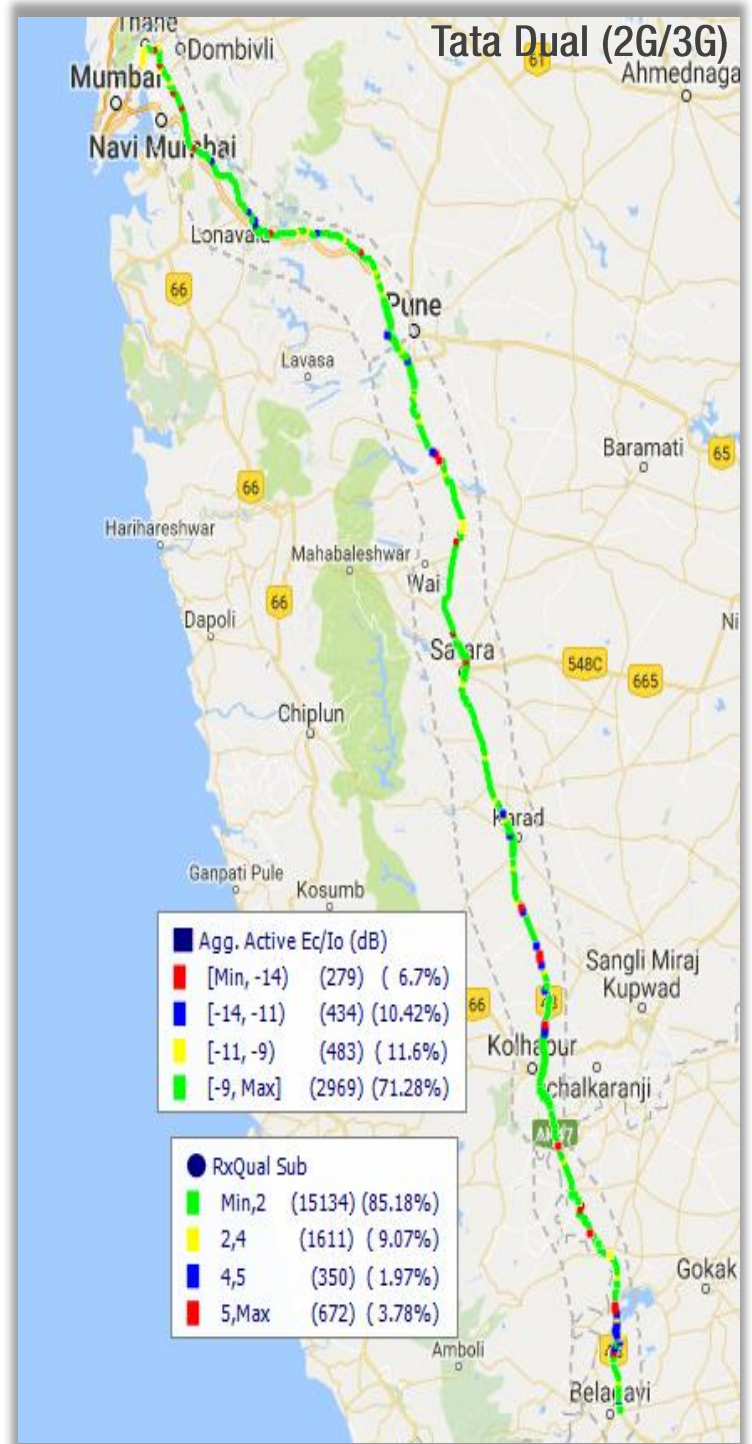
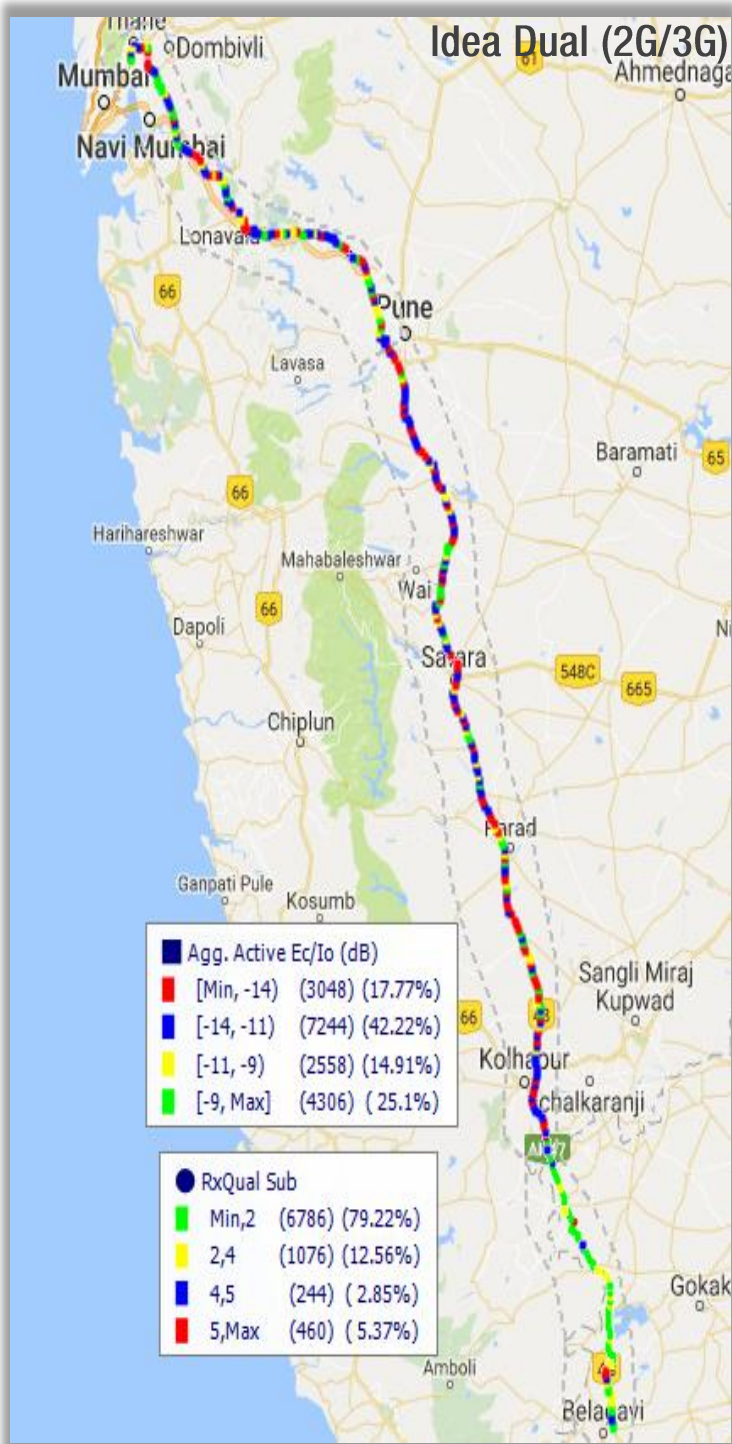
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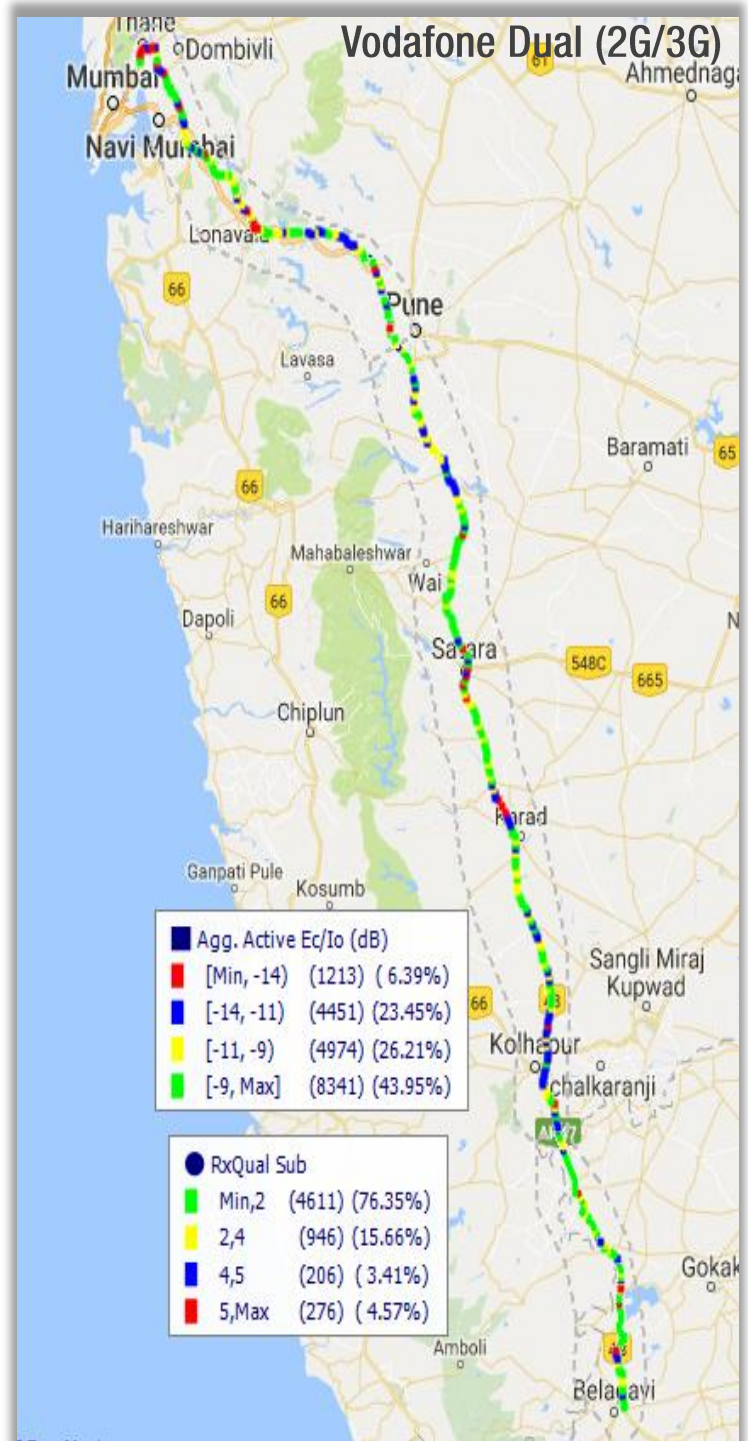
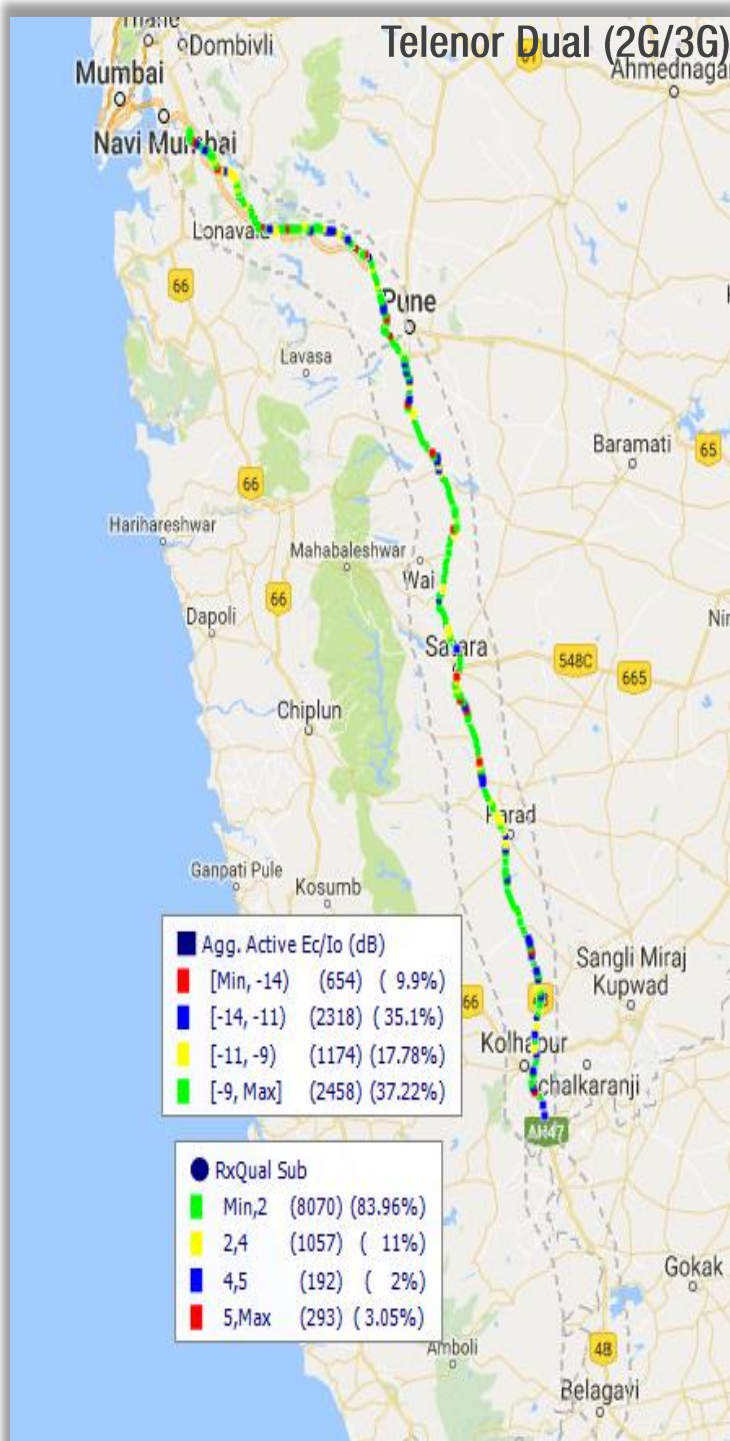
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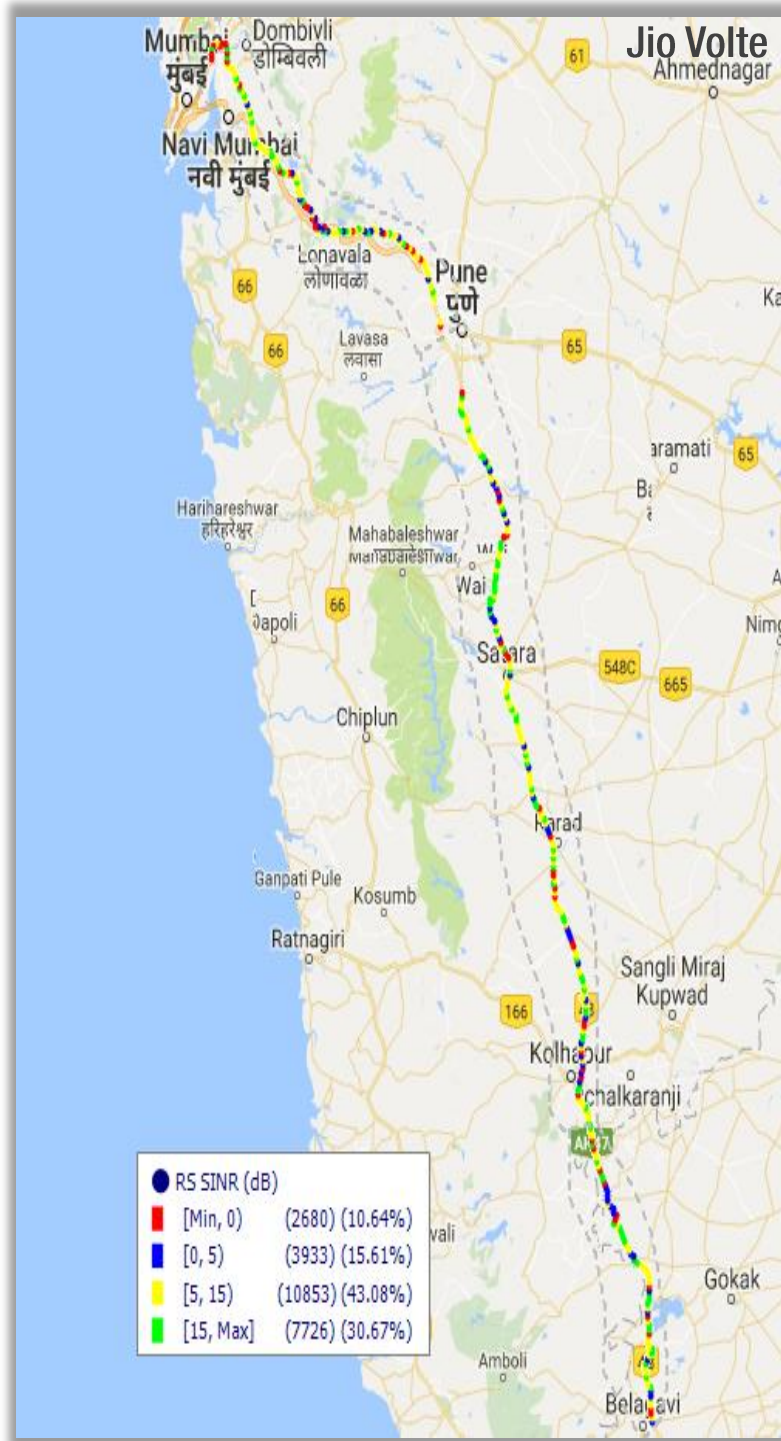
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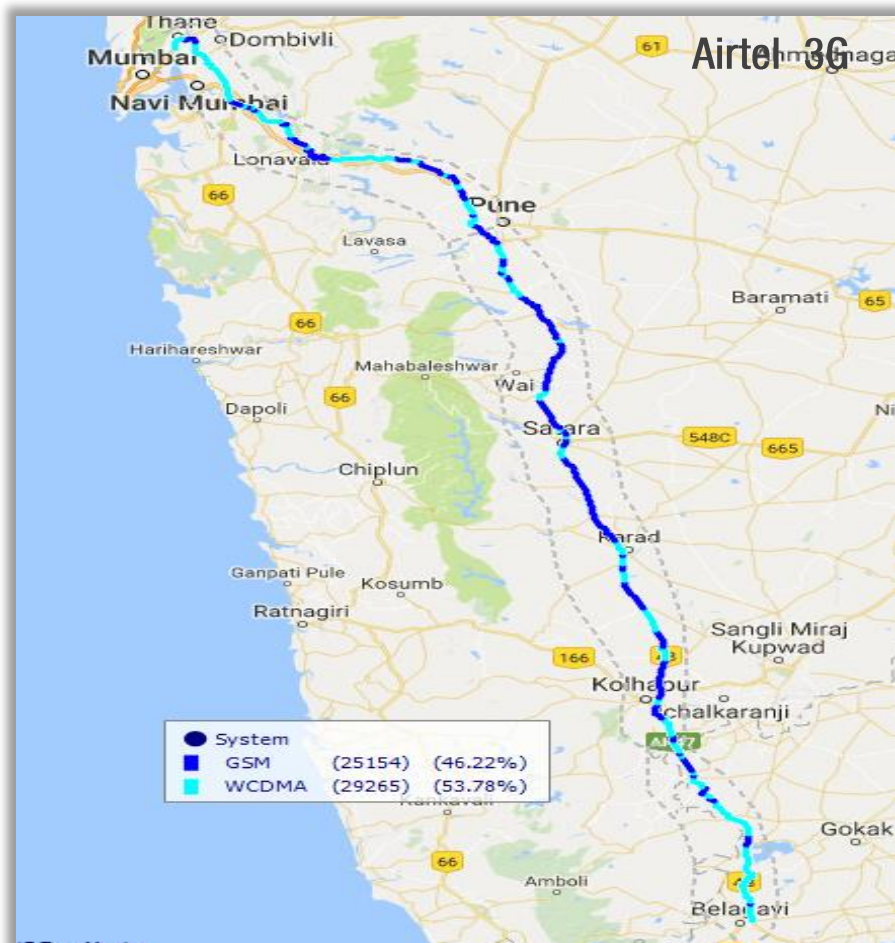
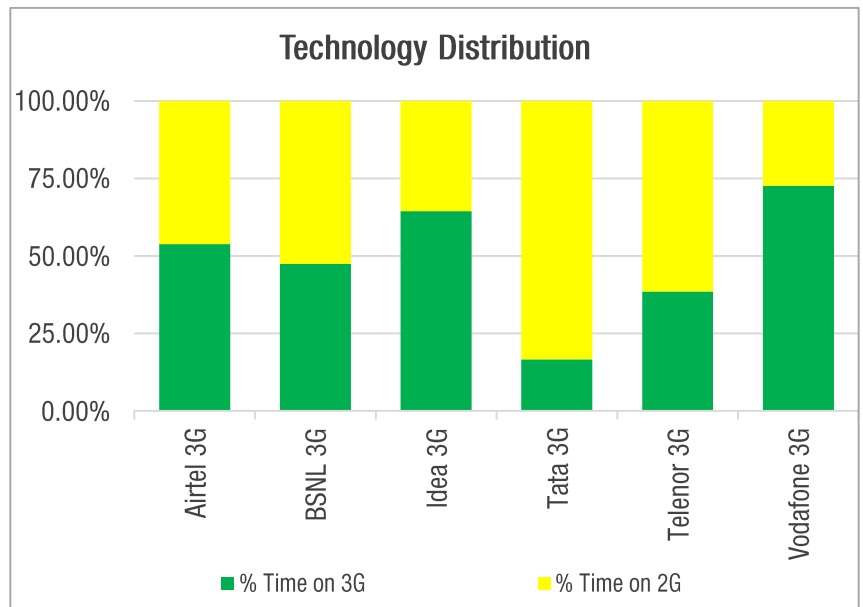


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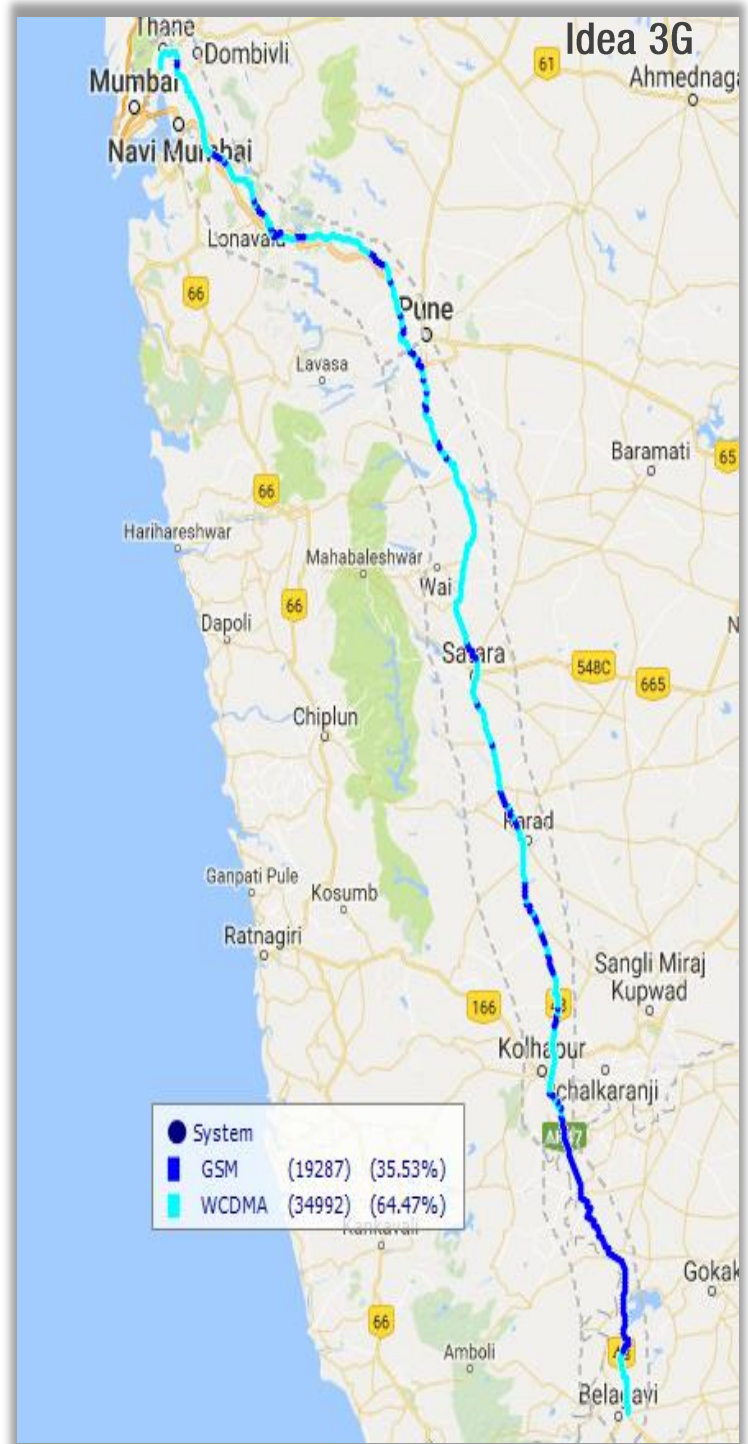
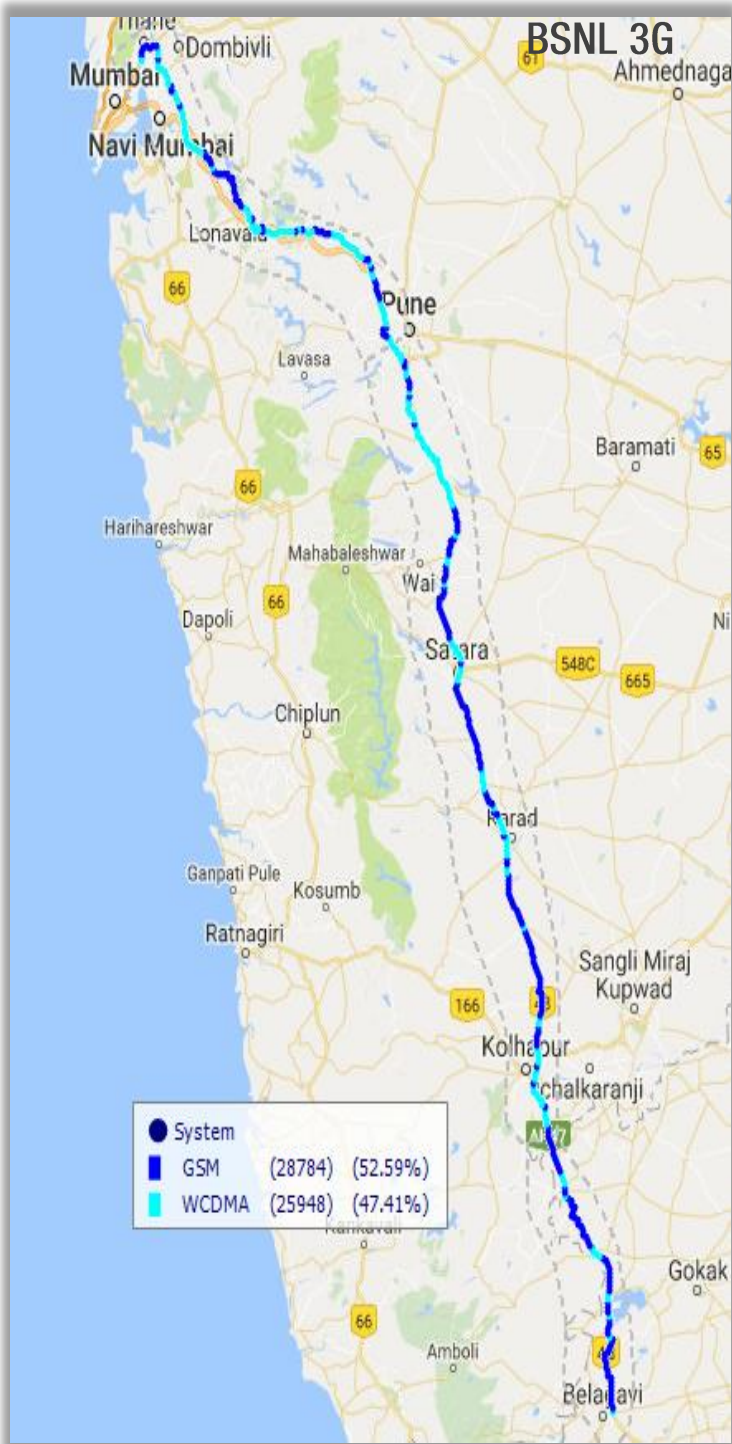


III. Technology Details

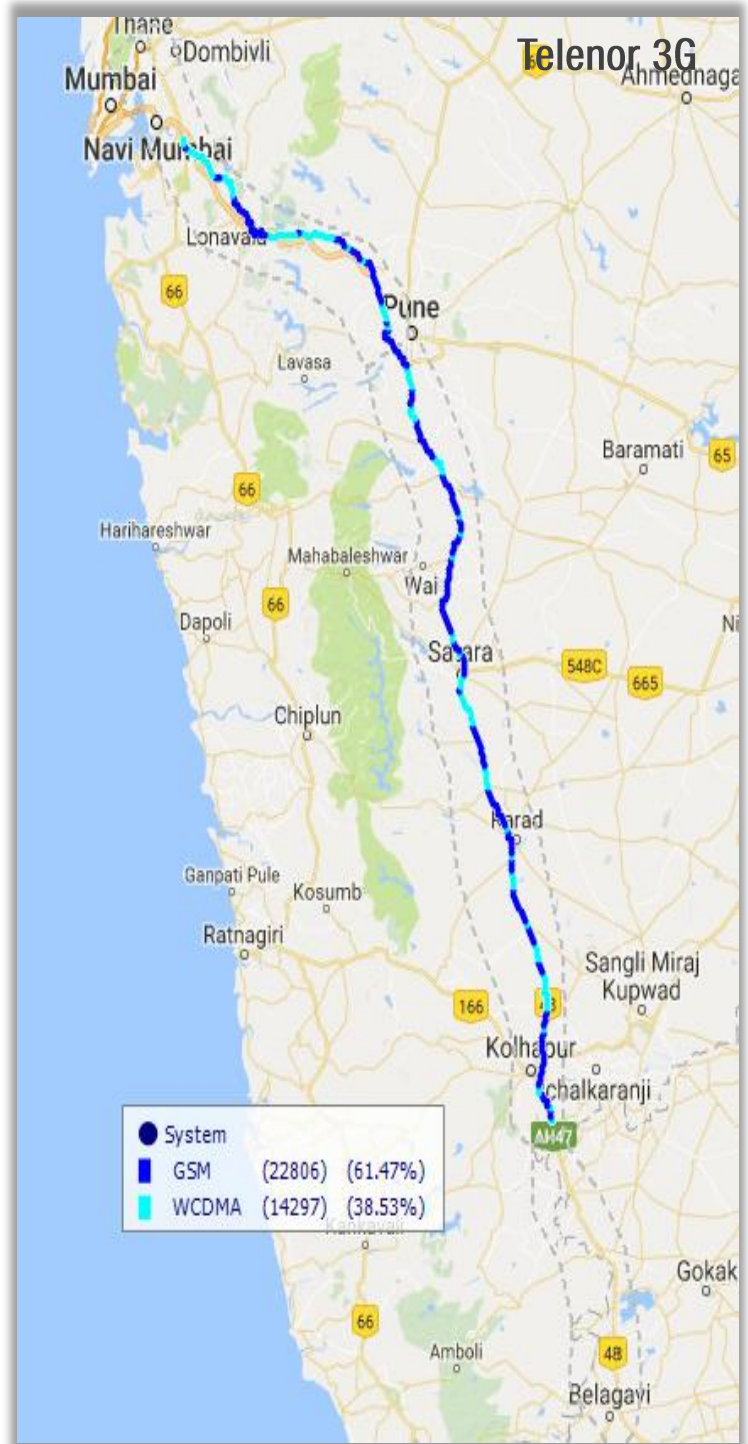
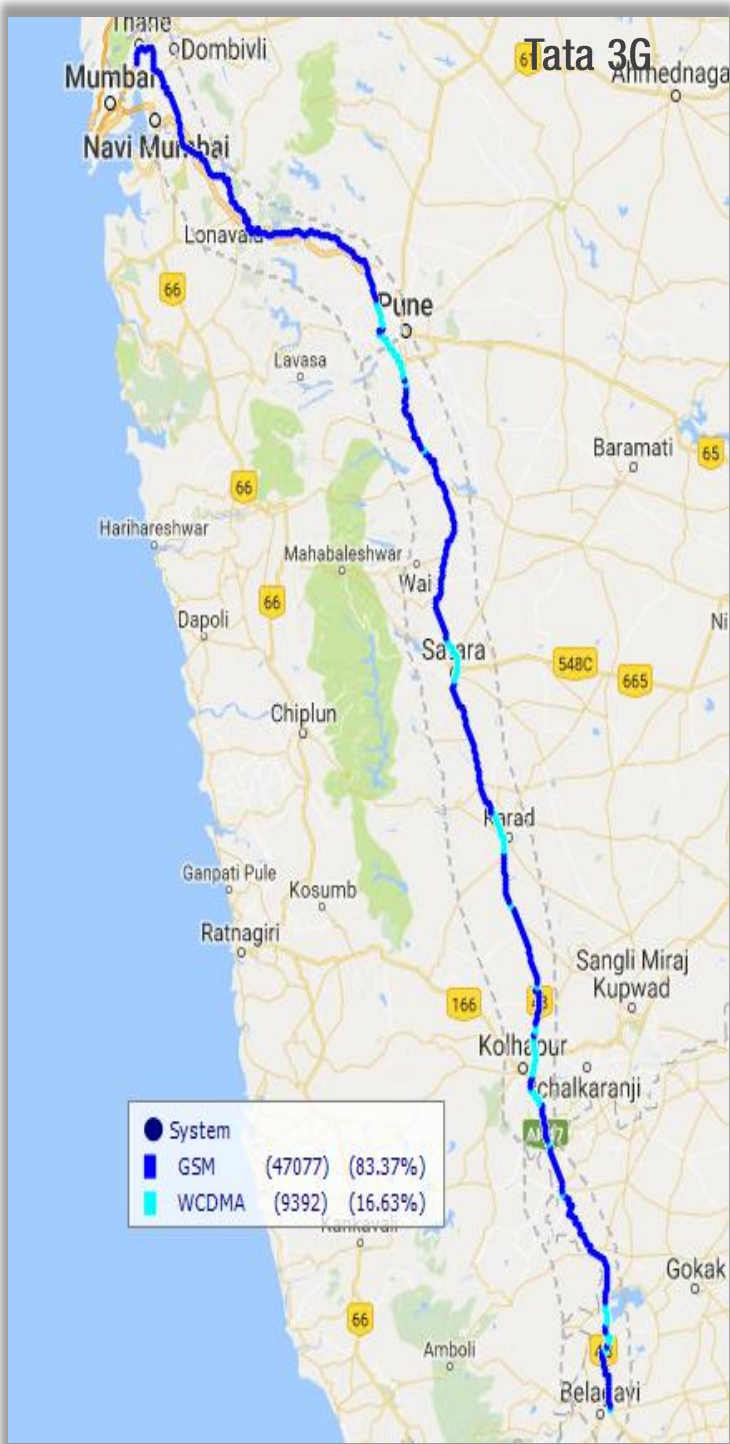
TSP	% Time on 3G
Airtel 3G	53.78%
BSNL 3G	47.41%
Idea 3G	64.47%
Tata 3G	16.63%
Telenor 3G	38.53%
Vodafone 3G	72.63%



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