



INDEPENDENT DRIVE TEST REPORT

For

Ahmedabad to Mumbai Railway Route Dec 2017

WEST ZONE

Key Performance Indicators: All TSPs have failed to meet the Drop Call Rate (DCR) benchmark of 2% except Idea 2G, Idea 3G & Jio VoLTE. Only 36% of 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 at Ahmedabad to Mumbai Railway Route on 13th Dec 2017. The drive test covered Railway Route of 500 KMs over a period of 1 day. Approximately 203 calls were made for each of the 14 networks: Seven 2G networks, five 3G networks, one CDMA and one LTE network covering 8 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. On 13th Dec 2017 covering the Railway Route between Ahmedabad to Mumbai. The performance of **Aircel, Airtel, BSNL, Idea, Tata, Telenor, Vodafone and Jio** were monitored across various technologies (2G, 3G, 4G and CDMA).

The test results obtained from these drive tests were utilized to assess the network quality for Voice.

Voice: Coverage; Quality; Handover Success Rate; Call Setup Success Rate; Drop Call Rate and Block Call Rate.

Drive Test Details For Ahmedabad to Mumbai Railway Route:

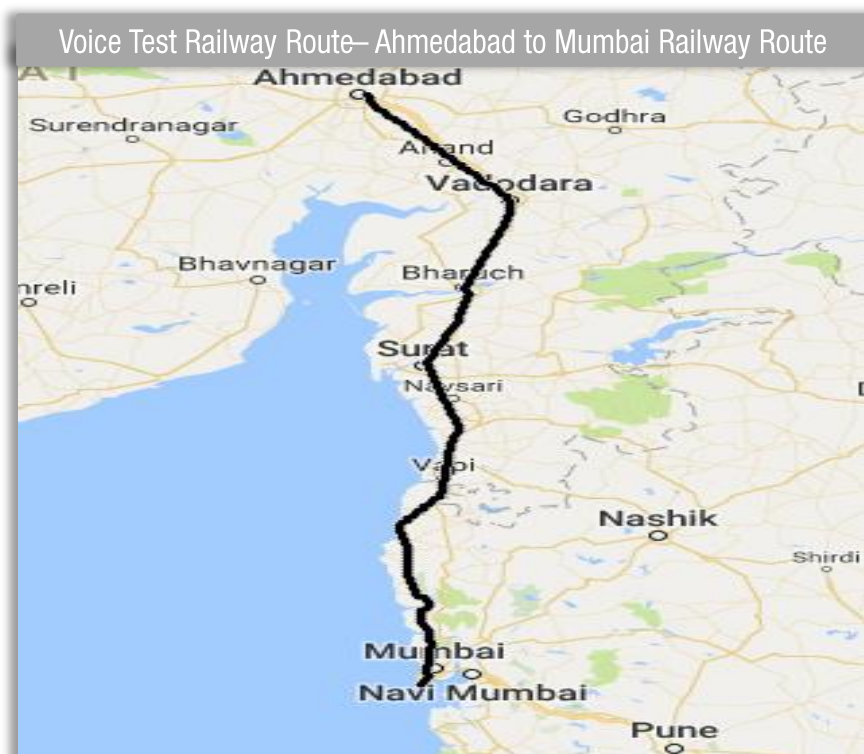
Independent Drive test was conducted for a period of 1 day i.e. 13th Dec 2017 From Ahmedabad to Mumbai Railway Route from. Calls were made for 90 sec duration with wait time of 10 sec between calls in all technologies.

Voice Tests: The drive test covered a Railway Route of approximately 500 KMs over a period of 1 day on 13th Dec 17. Approximately 203 calls were made for each of the 14 networks: seven 2G (Lock Mode) networks, five 3G (Dual mode) networks, one CDMA 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.

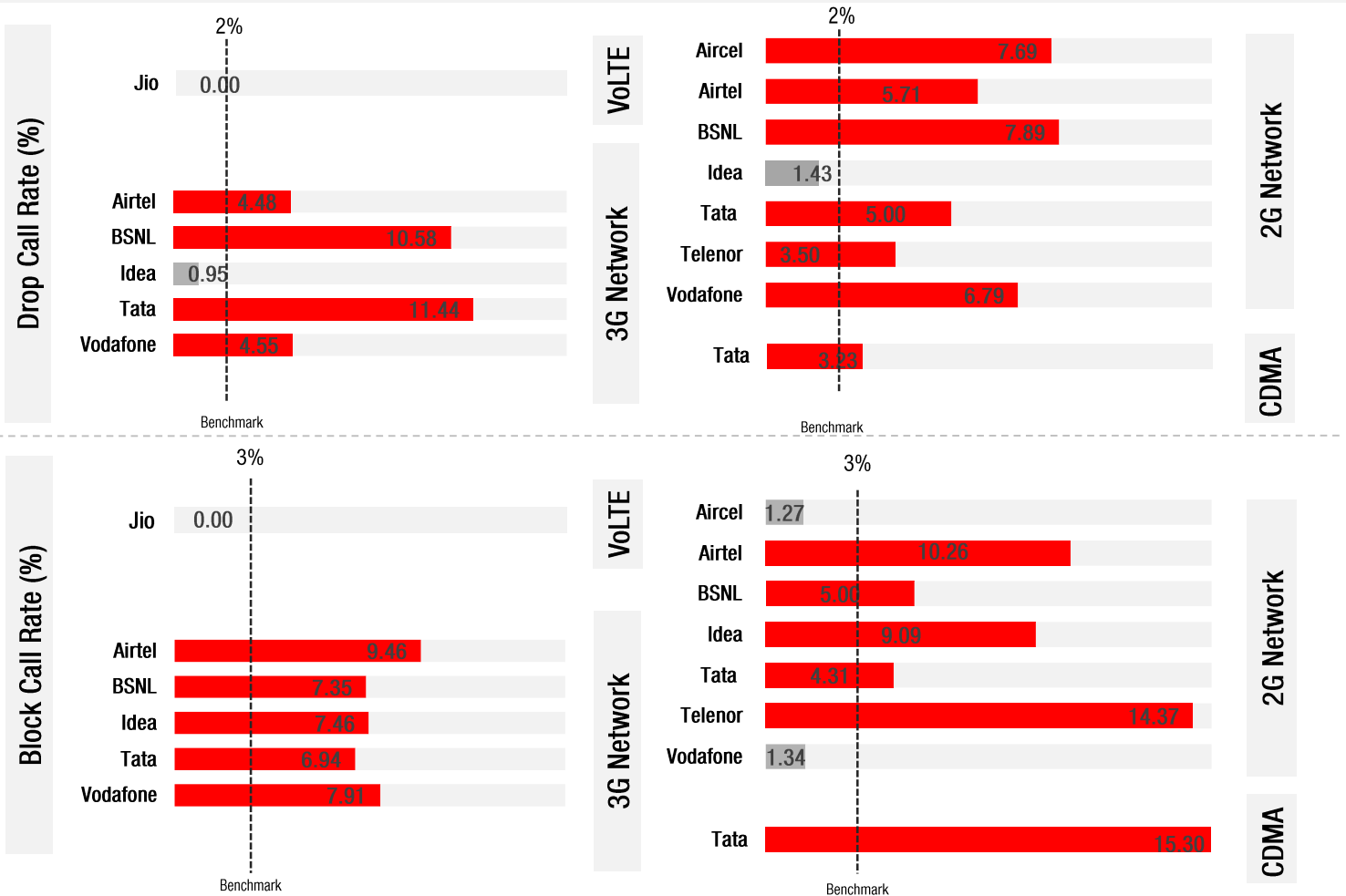
* 3G KPI's which is calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.



Voice Calls

Key Observations

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



KPI	2G Networks						
	Airtel	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
SDCCH Congestion%	1.27%	0.85%	0.00%	0.00%	0.96%	13.17%	0.89%
TCH Congestion %	0.00%	9.48%	5.00%	9.09%	3.38%	1.38%	0.45%

KPI	3G				
	Airtel	BSNL	Idea	Tata	Vodafone
SDCCH Congestion%	0.90%	0.00%	0.00%	0.93%	0.47%
RRC Congestion%	1.35%	1.96%	0.44%	4.17%	3.72%
SDCCH & RRC Congestion%	2.25%	1.96%	0.44%	5.09%	4.19%
TCH Congestion %	5.99%	4.50%	1.32%	0.49%	0.49%
RAB Congestion %	1.38%	1.00%	5.73%	1.46%	3.40%
TCH & RAB Congestion %	7.37%	5.50%	7.05%	1.95%	3.88%

- All TSPs have failed to meet the 2% QoS benchmark of Drop Call Rate (DCR%) except Idea 2G, Idea 3G & Jio VoLTE.
- Call Block Rate (CBR%) benchmark of 3% was achieved by 36% of TSP's only.

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							CDMA
	Aircel	Airtel	BSNL	Idea	Tata	Telenor	Vodafone	Tata
Coverage%	76.84%	77.45%	66.07%	81.51%	76.63%	59.32%	71.00%	60.84%

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	Vodafone	Jio
Coverage %	66.02%	56.77%	73.70%	66.62%	69.70%	93.37%

c) Percentage of time spent on 3G network:

TSPs	3G				
	Airtel	BSNL	Idea	Tata	Vodafone
% Time Spent on 3G	23.37%	51.63%	49.68%	44.27%	51.75%

d) During IDT all TSP's have RLT less than or equal to 48 except Aircel & BSNL

TSPs	2G						
	Aircel	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
Coverage%	0.32%	0.60%	0.43%			29.51%	

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

Summary

City Level Summary

Voice Call	2G							CDMA
	Aircel*	Airtel	BSNL	Idea	Tata	Telenor	Vodafone	Tata
Call Attempt	79	234	200	231	209	167	224	183
Blocked Call Rate (%)	1.3%	10.3%	5.0%	9.1%	4.3%	14.4%	1.3%	15.3%
CSSR% (Accessibility)	98.7%	89.7%	95.0%	90.9%	95.7%	85.6%	98.7%	84.7%
Drop Call Rate (%)	7.7%	5.7%	7.9%	1.4%	5.0%	3.5%	6.8%	3.2%
Mobility HOSR (%)	96.4%	95.7%	93.4%	94.8%	95.2%	95.4%	94.9%	100.0%
Rx Quality (%)	85.9%	90.3%	96.0%	94.4%	90.5%	93.9%	92.1%	85.8%

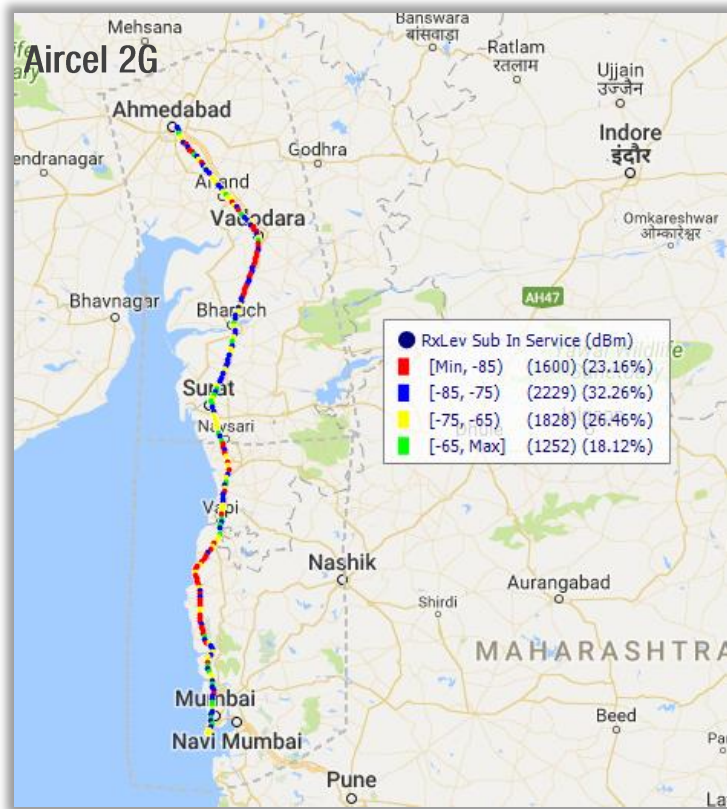
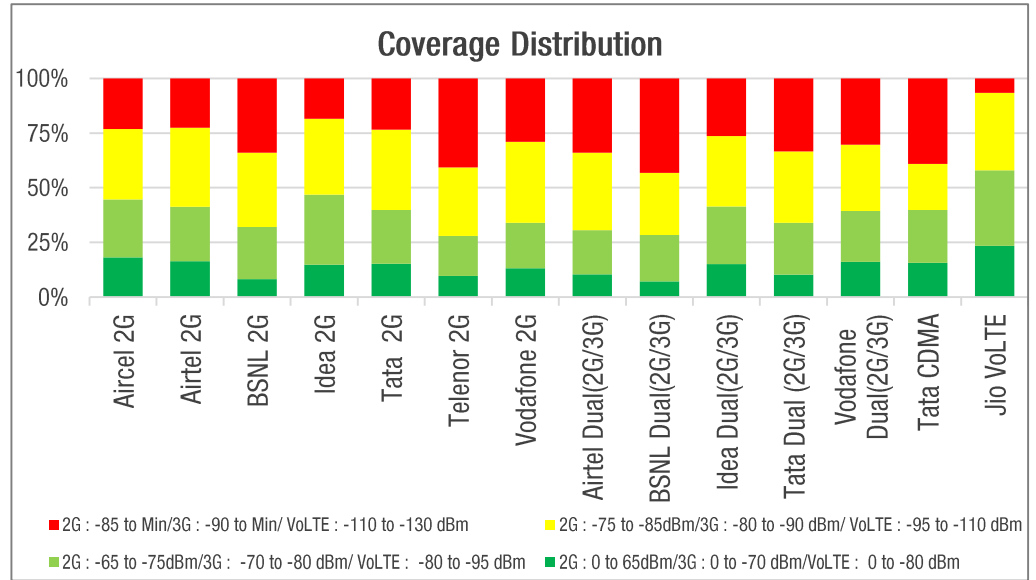
Voice Call	3G					Volte
	Airtel	BSNL	Idea	Tata	Vodafone	Jio
Call Attempt	222	204	228	216	215	221
Blocked Call Rate (%)	9.5%	7.4%	7.5%	6.9%	7.9%	0.0%
CSSR% (Accessibility)	90.5%	92.6%	92.5%	93.1%	92.1%	100.0%
Drop Call Rate (%)	4.5%	10.6%	0.9%	11.4%	4.5%	0.0%
Mobility HOSR (%)	98.0%	98.6%	98.6%	98.8%	97.8%	99.4%
Rx Quality (%)	85.0%	90.8%	87.8%	86.0%	78.1%	74.6%

*Calls did not get initiated at some part of the Railway Route for Aircel 2G & Tata CMDA operators due to lack of coverage.

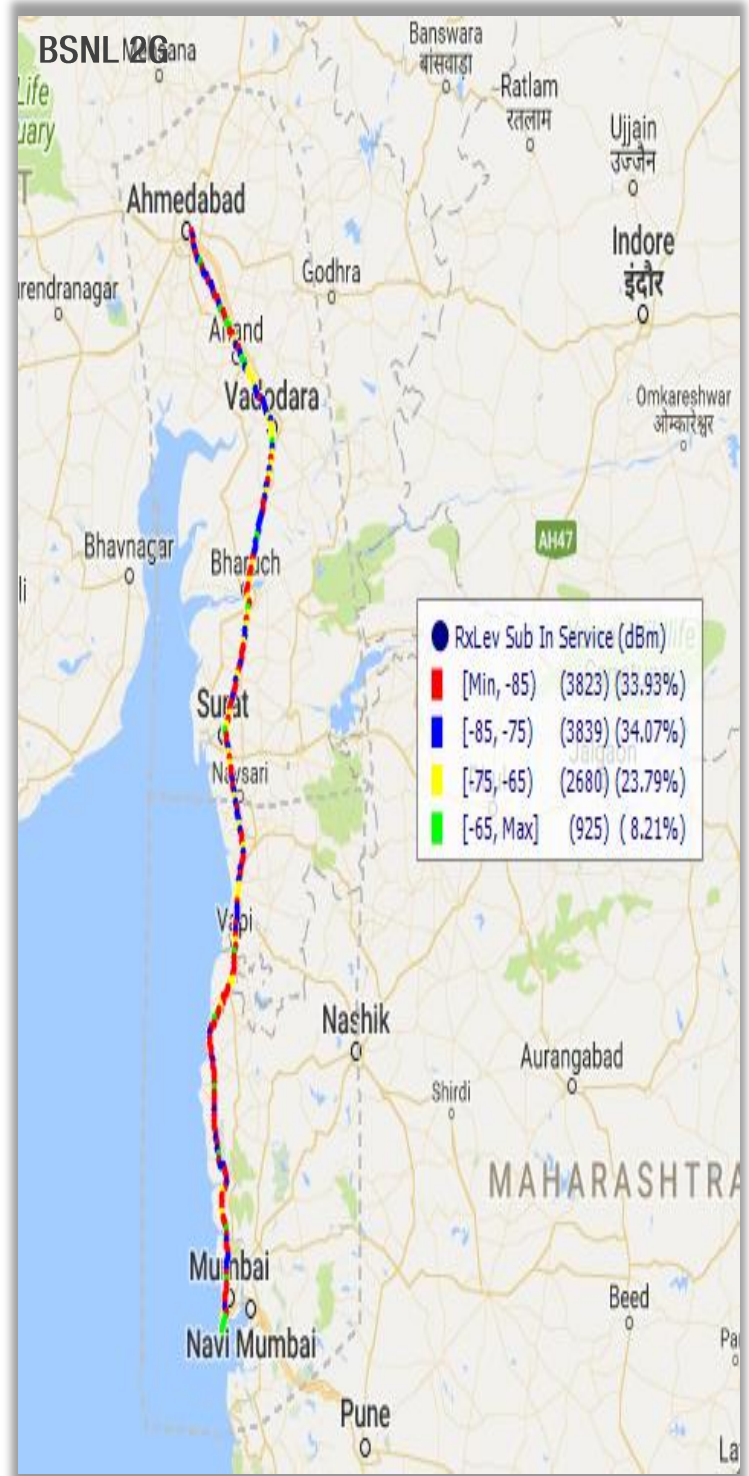
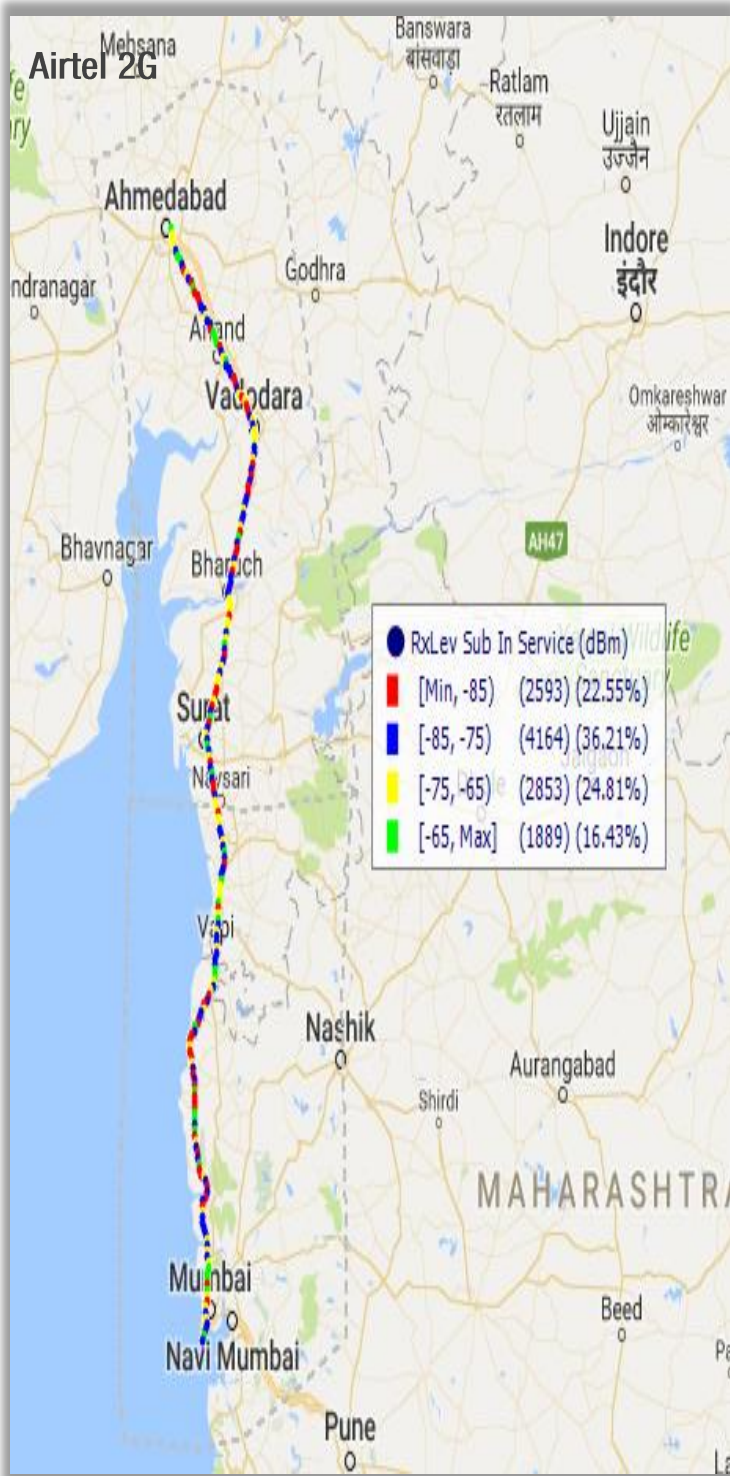
I. Coverage Details

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.

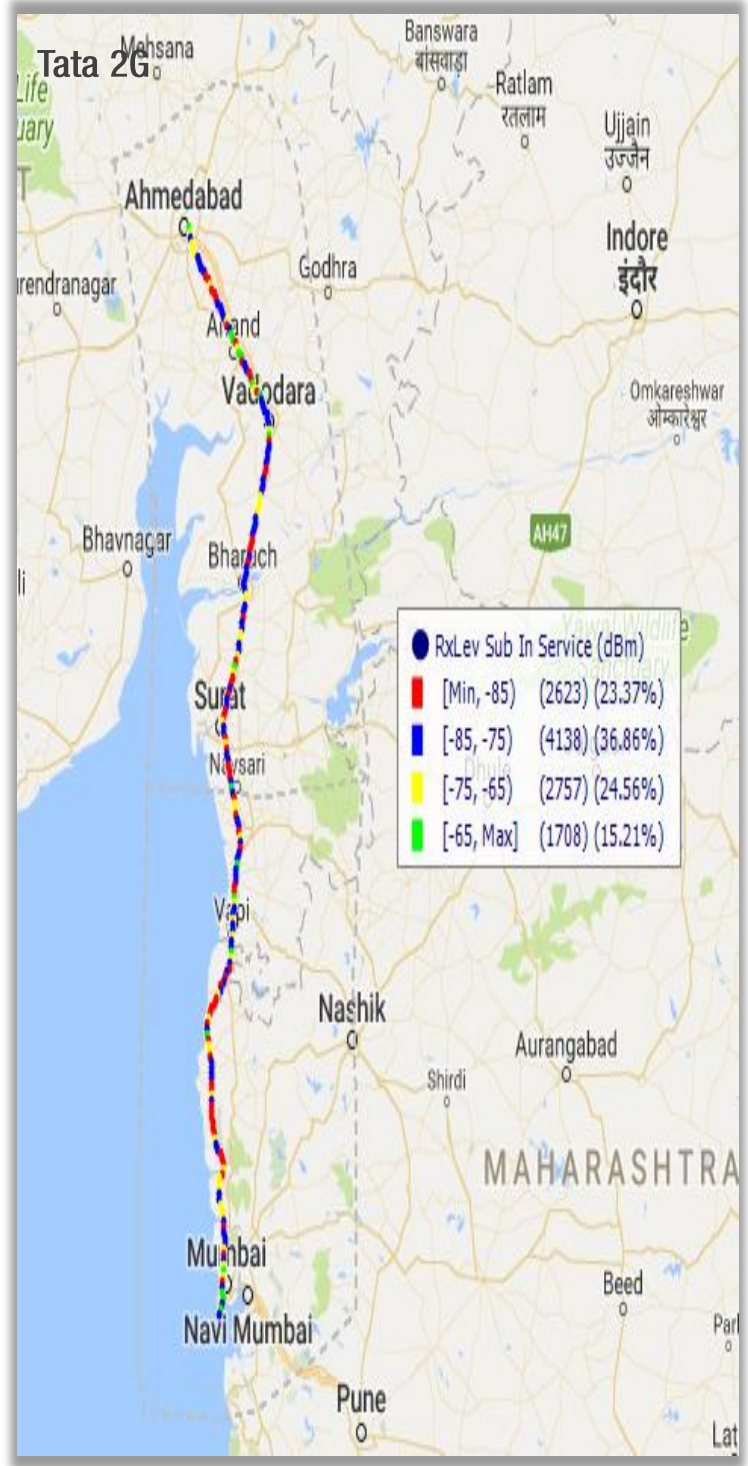
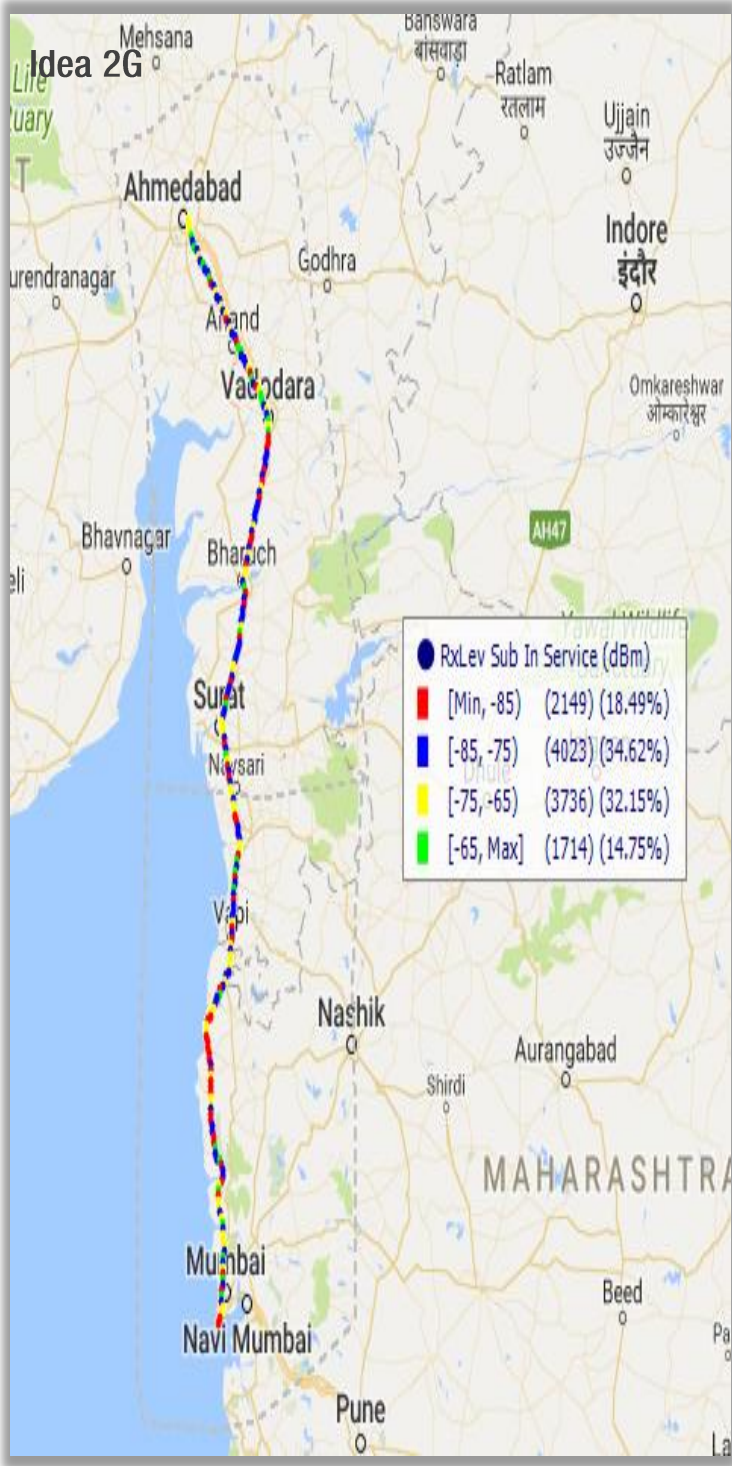
TSP	Coverage Rate
Aircel 2G	76.84%
Airtel 2G	77.45%
BSNL 2G	66.07%
Idea 2G	81.51%
Tata 2G	76.63%
Telenor 2G	59.32%
Vodafone 2G	71.00%
Airtel Dual(2G/3G)	66.02%
BSNL Dual(2G/3G)	56.77%
Idea Dual(2G/3G)	73.70%
Tata Dual (2G/3G)	66.62%
Vodafone Dual(2G/3G)	69.70%
Tata CDMA	60.84%
Jio VoLTE	93.37%



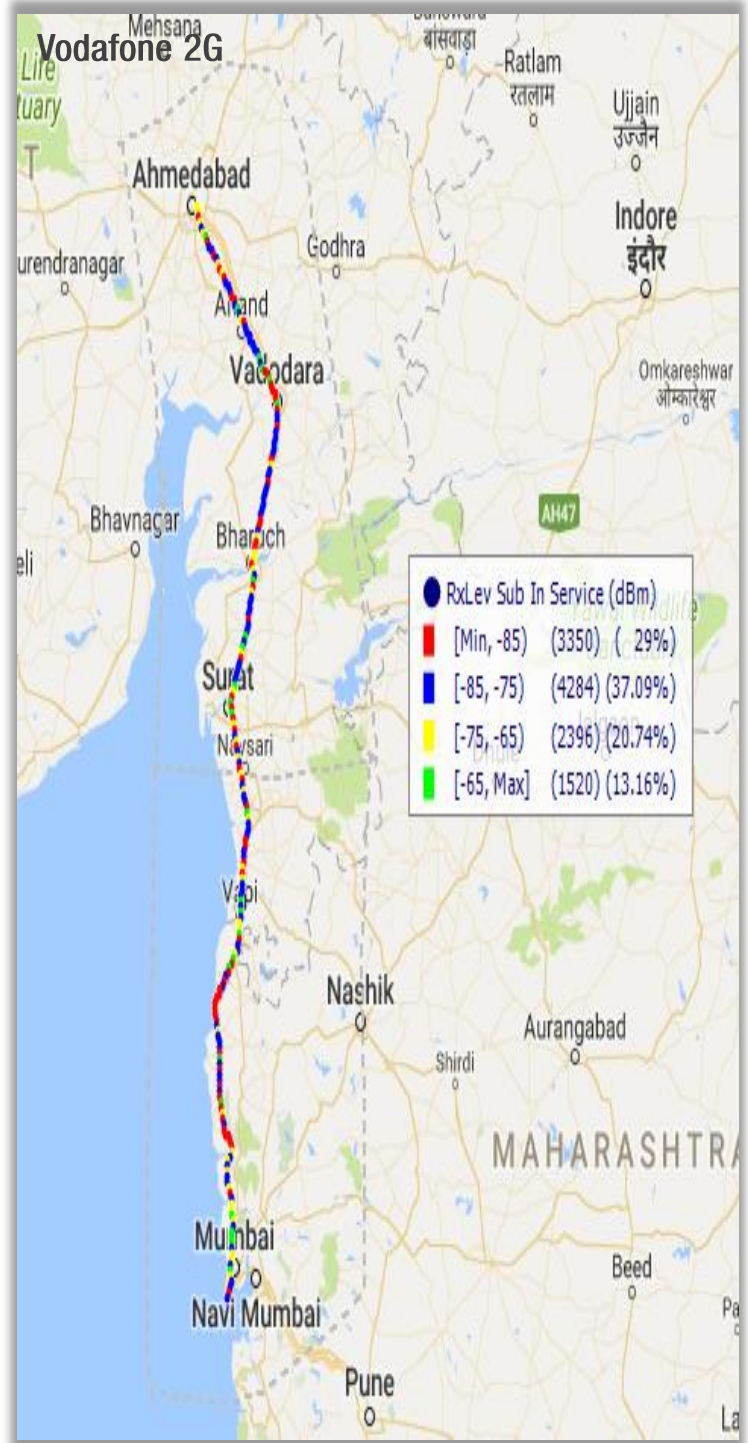
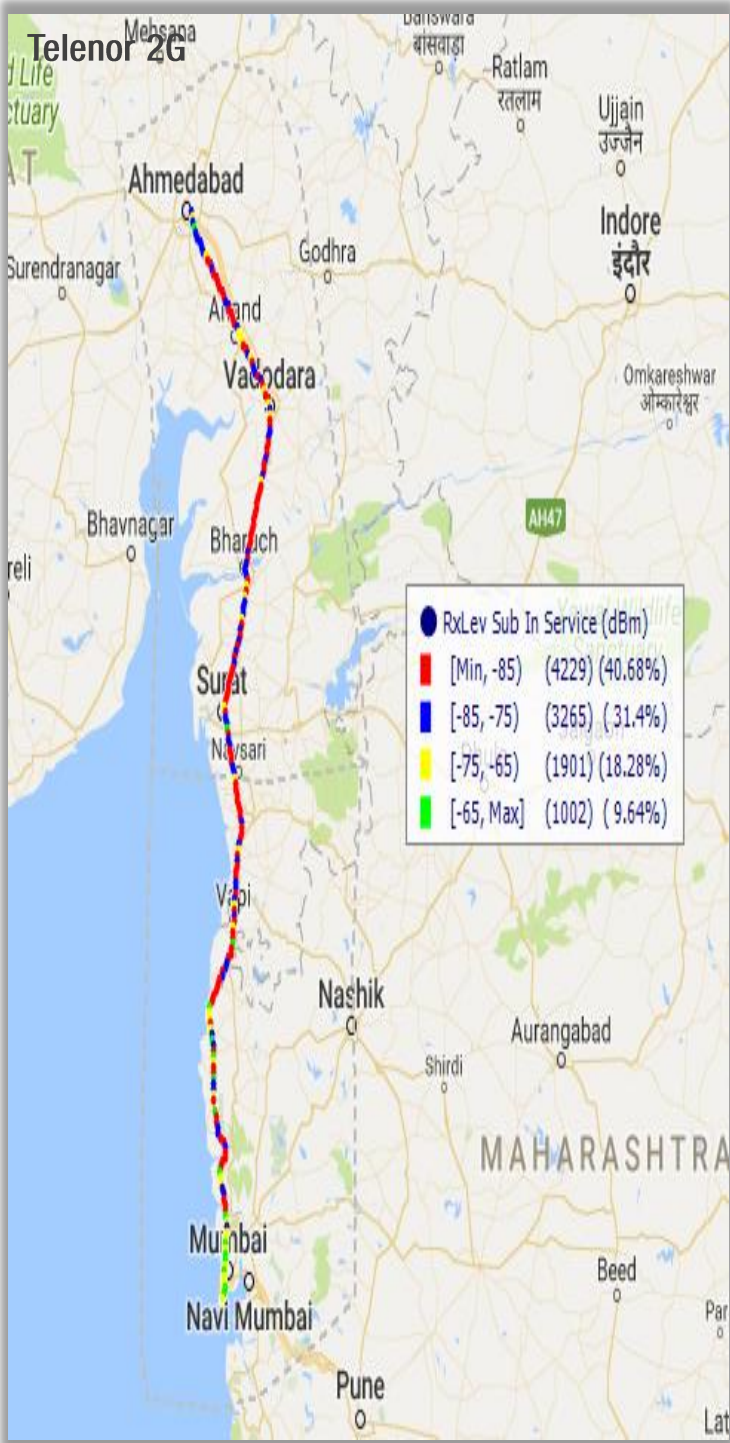
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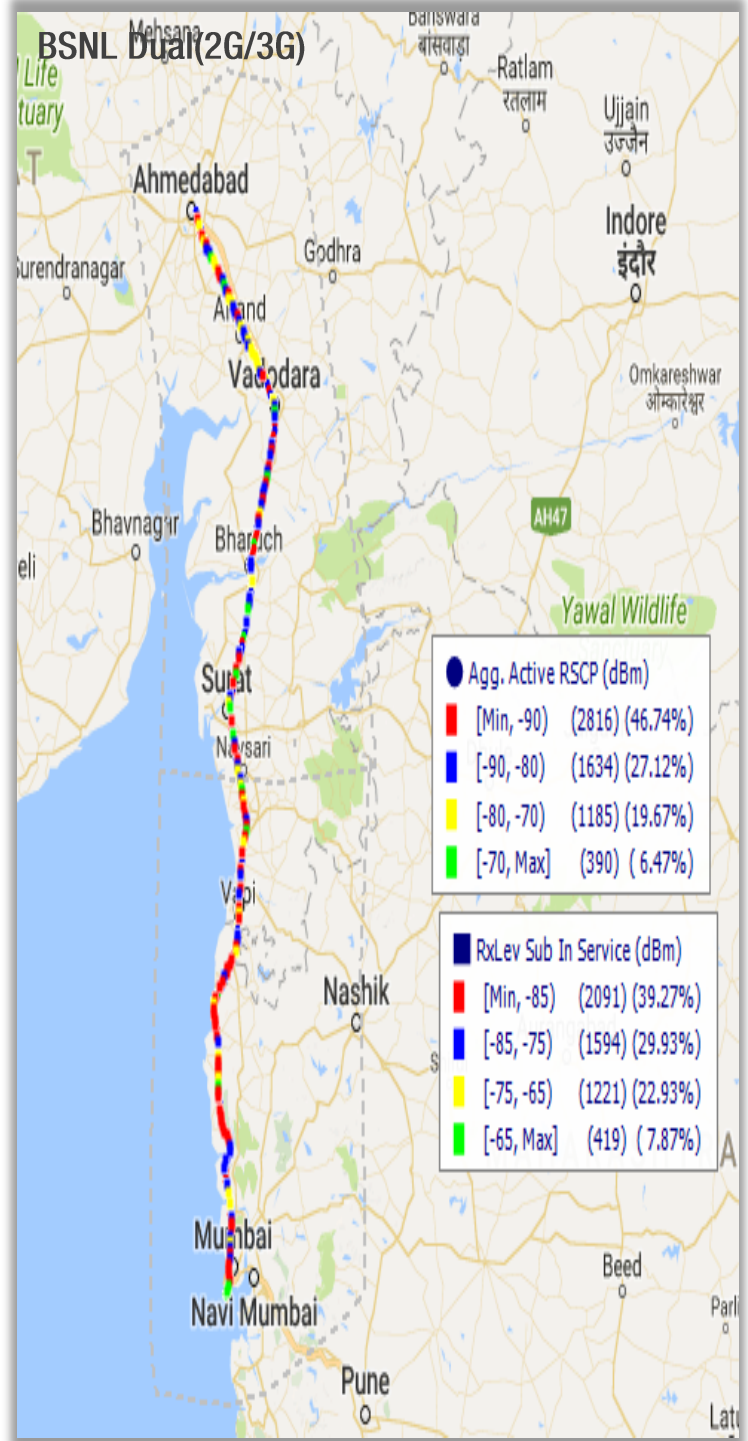
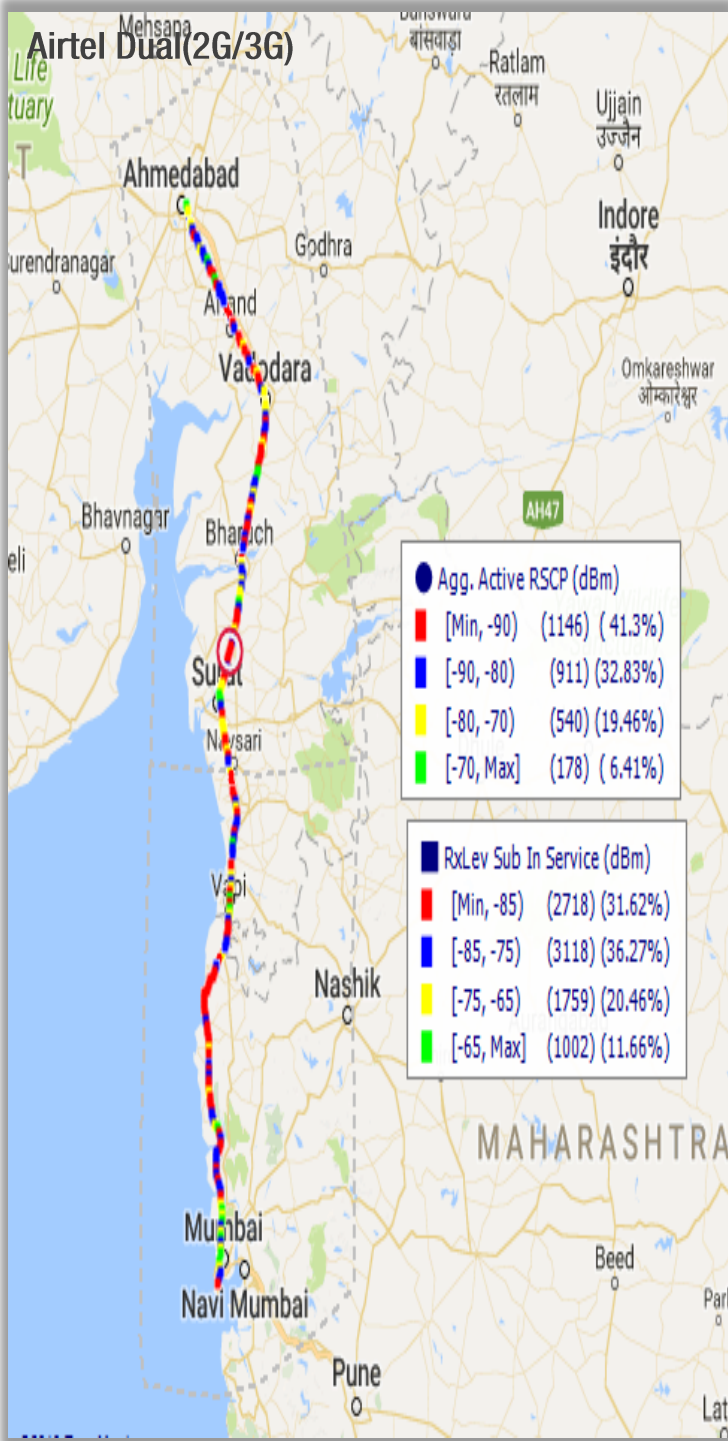
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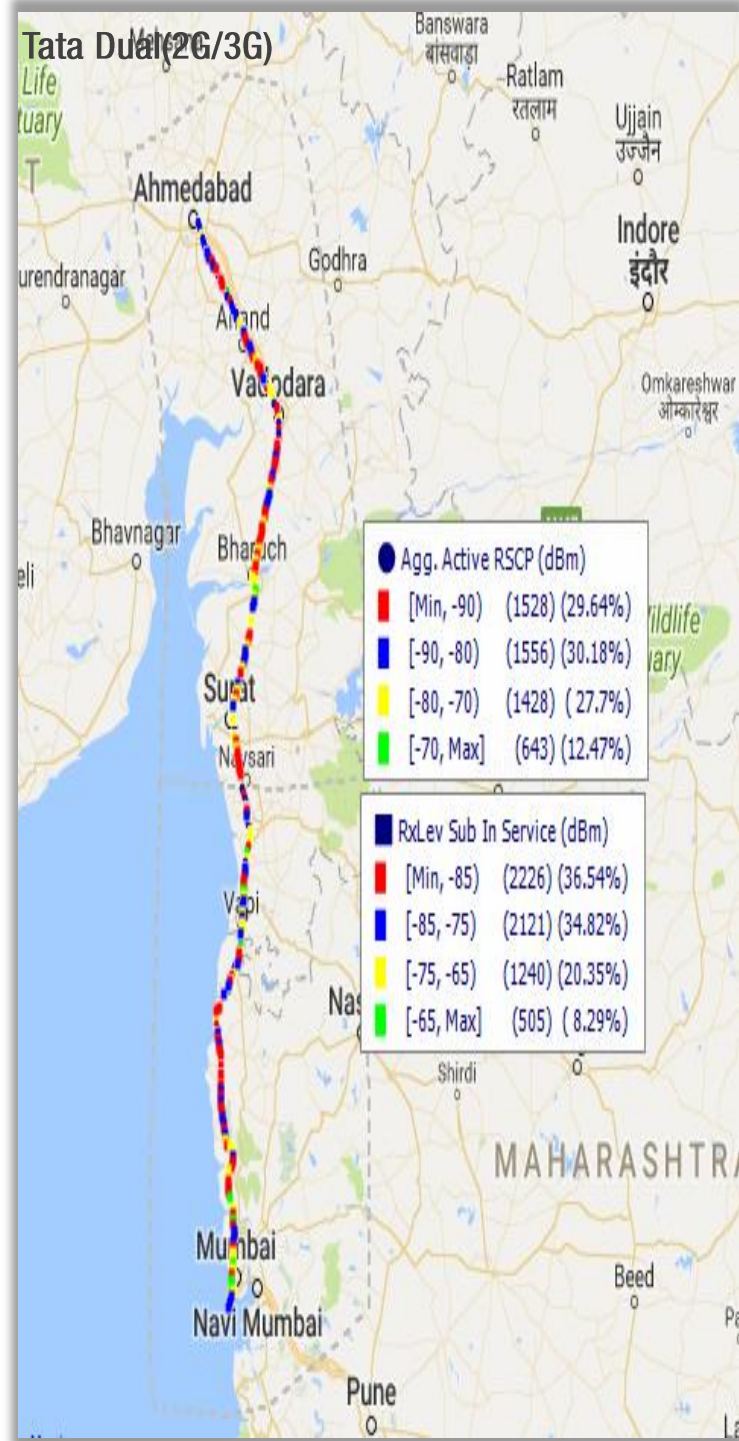
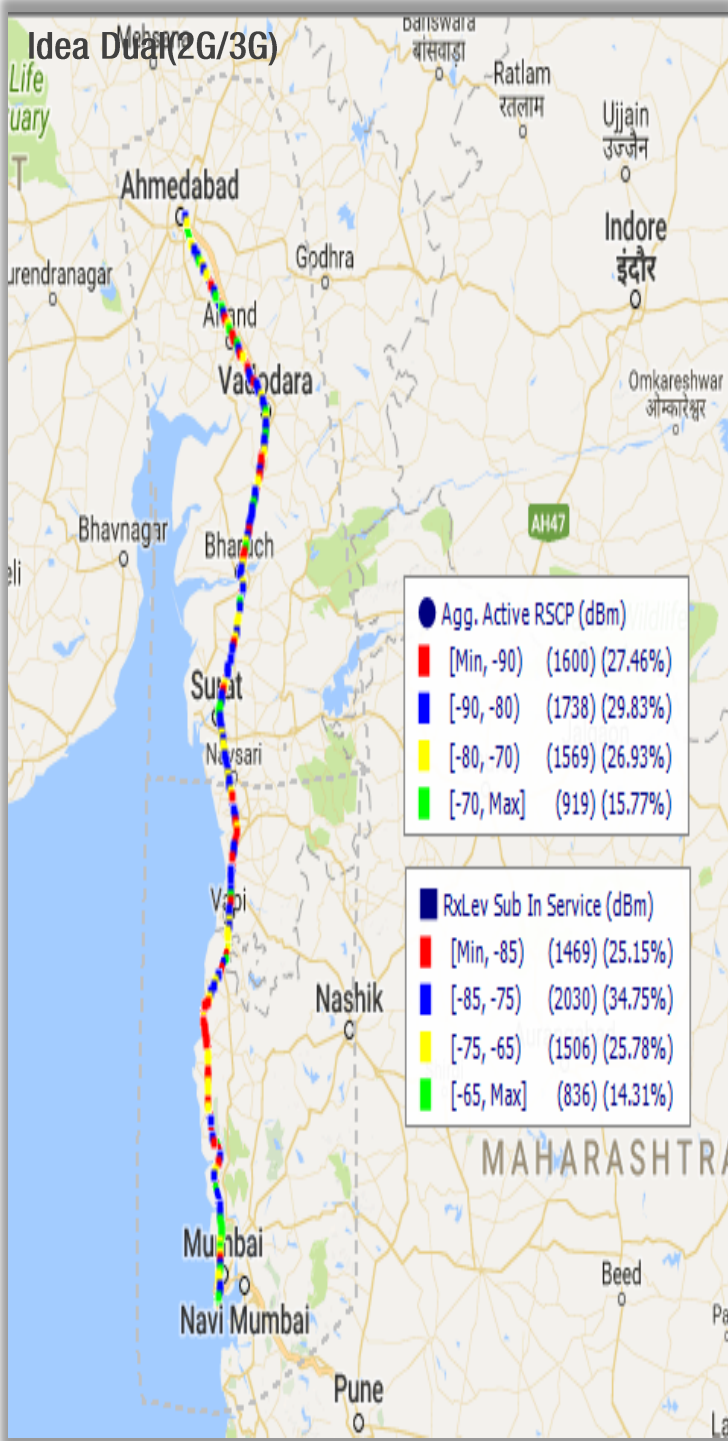
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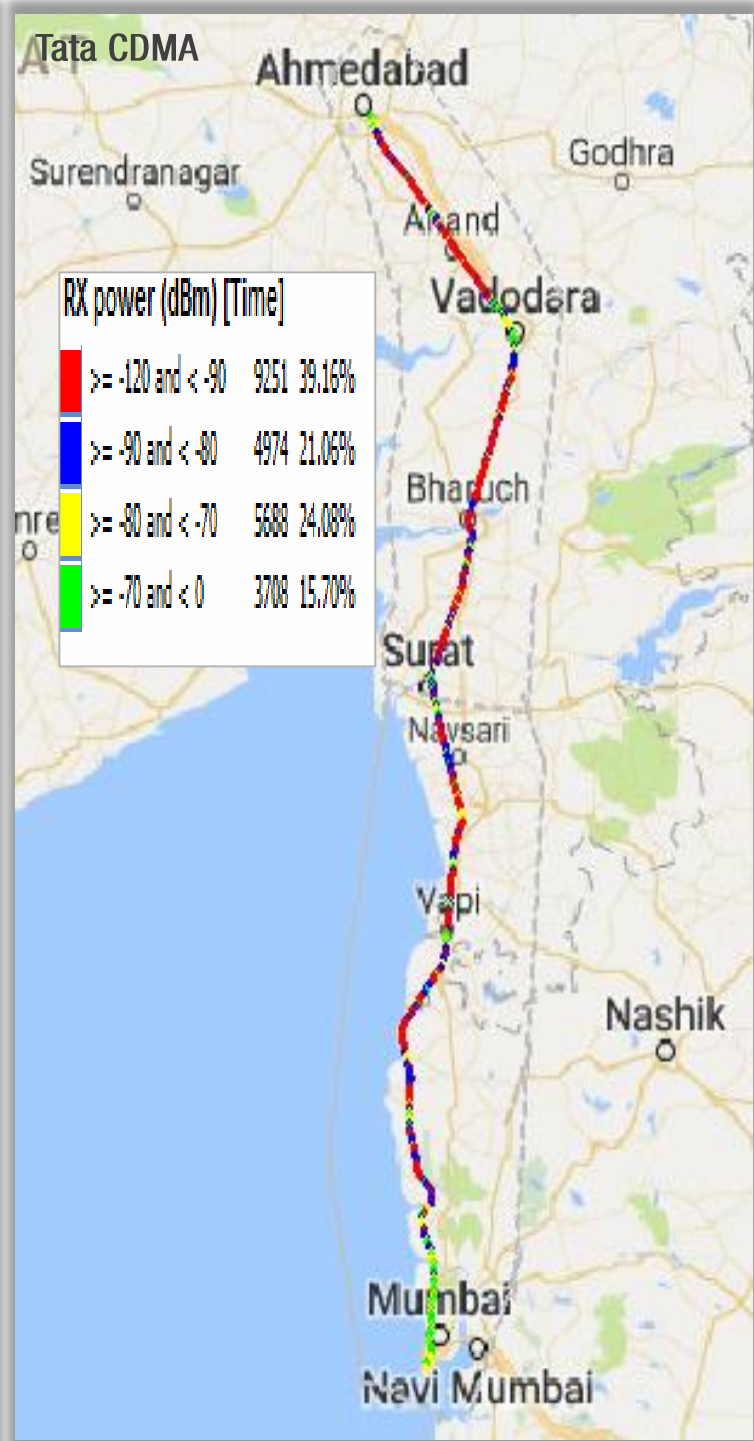
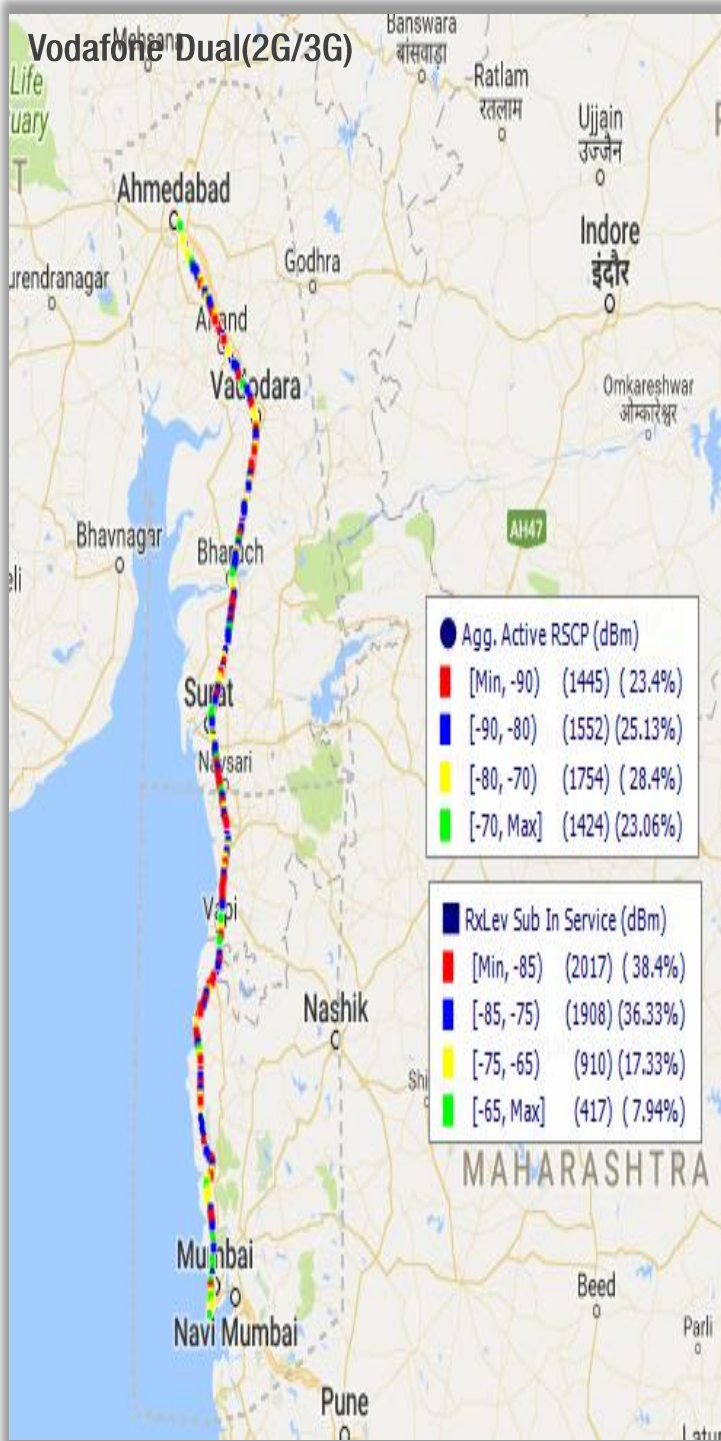
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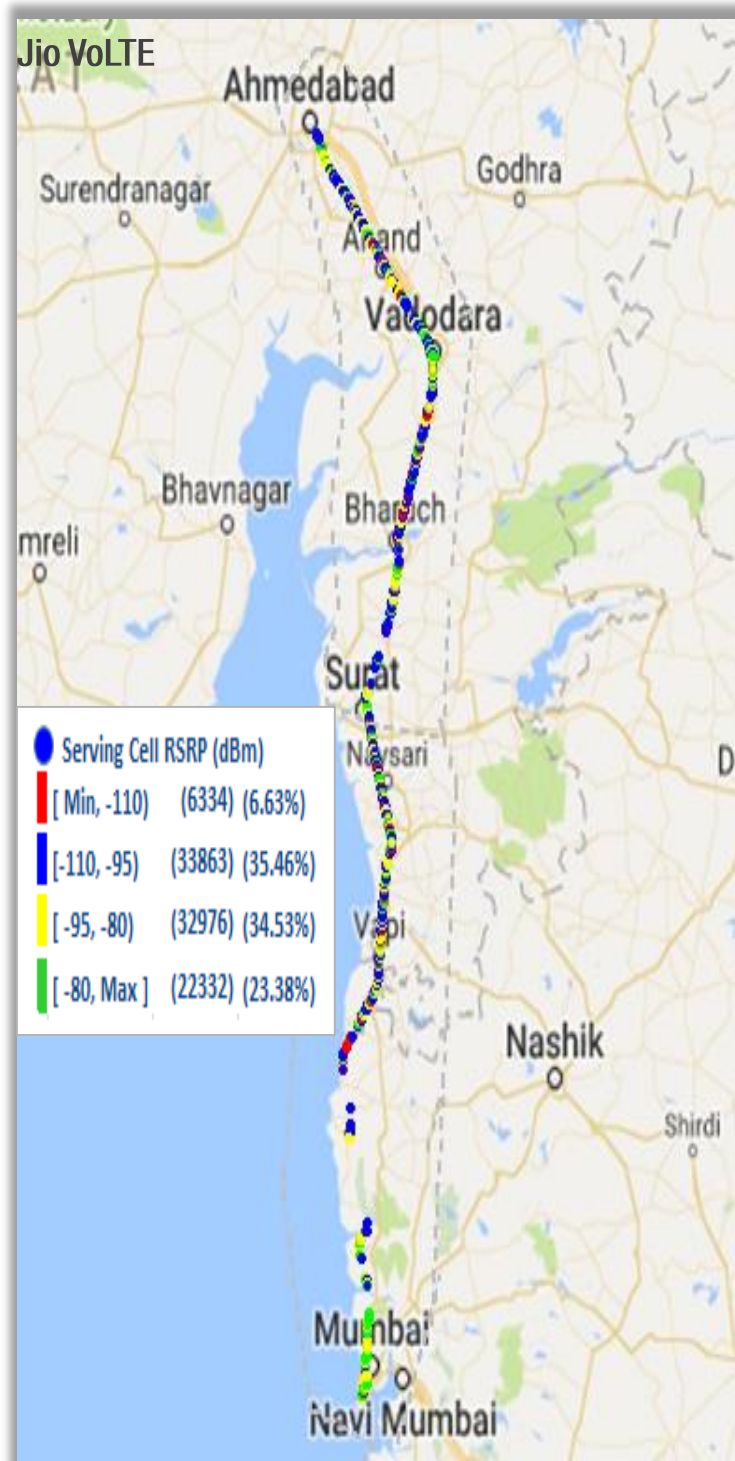
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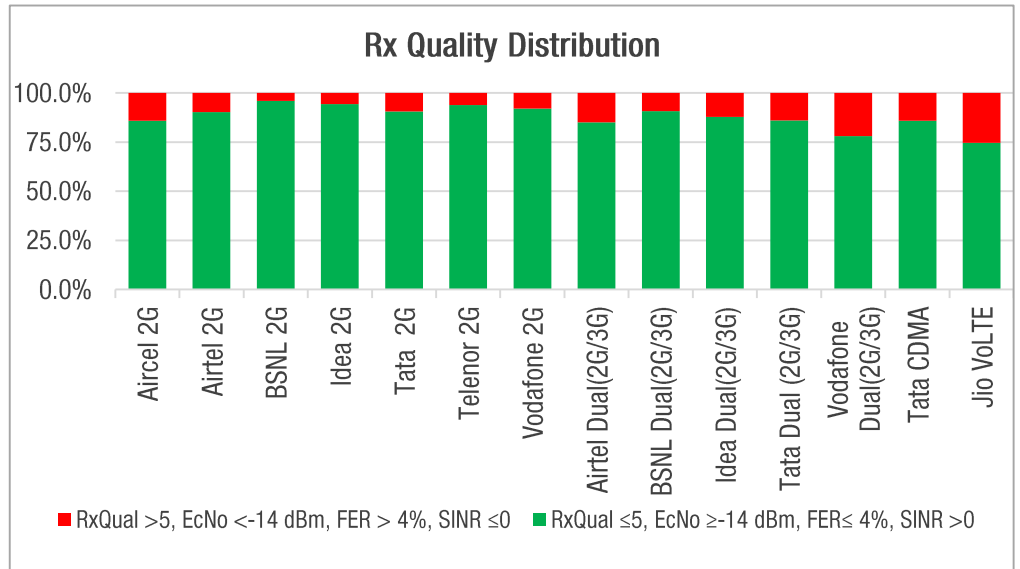
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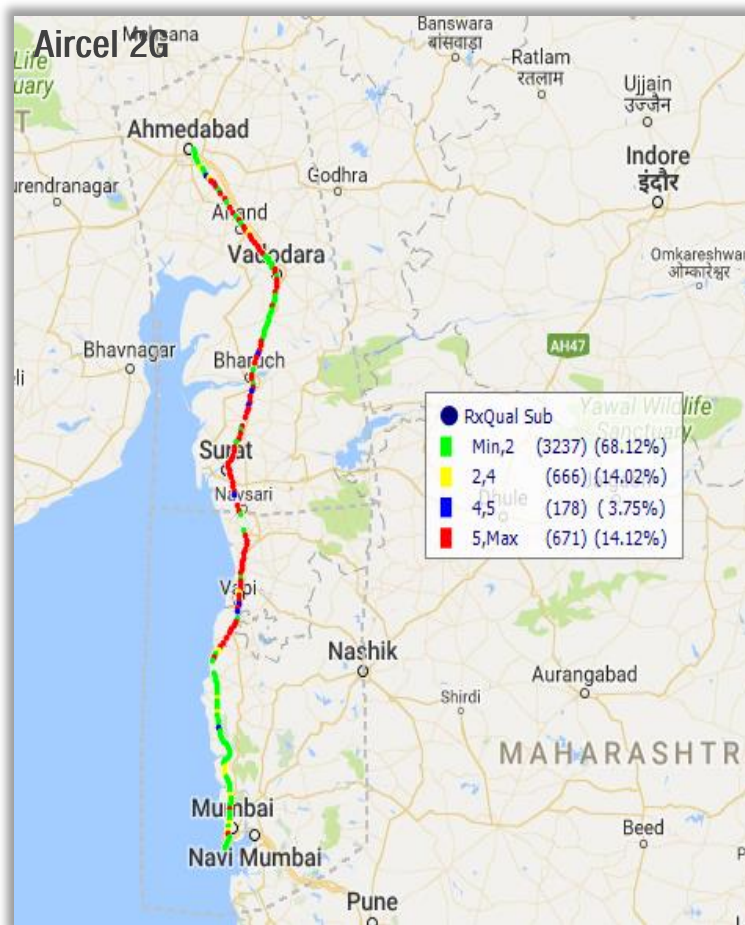
II. Quality Details

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 $\geq 95\%$.

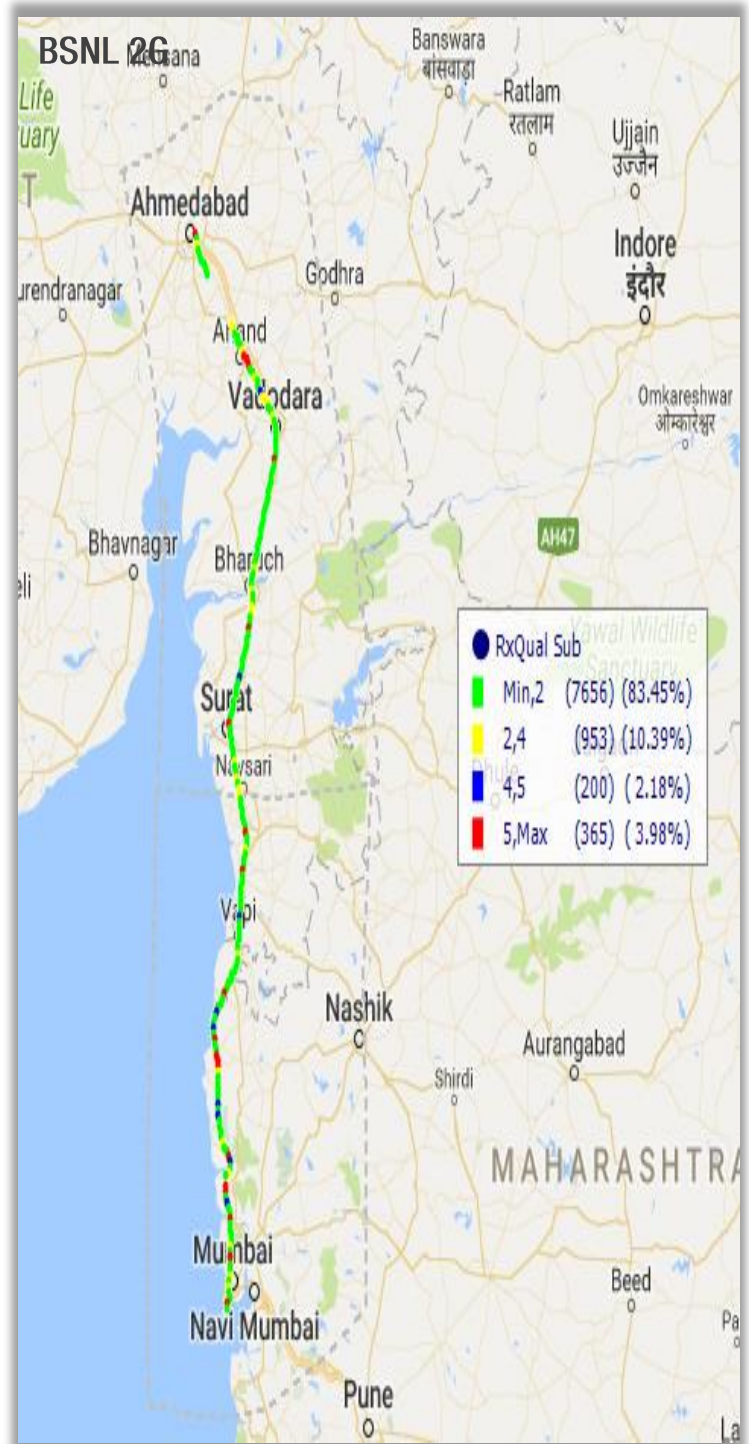
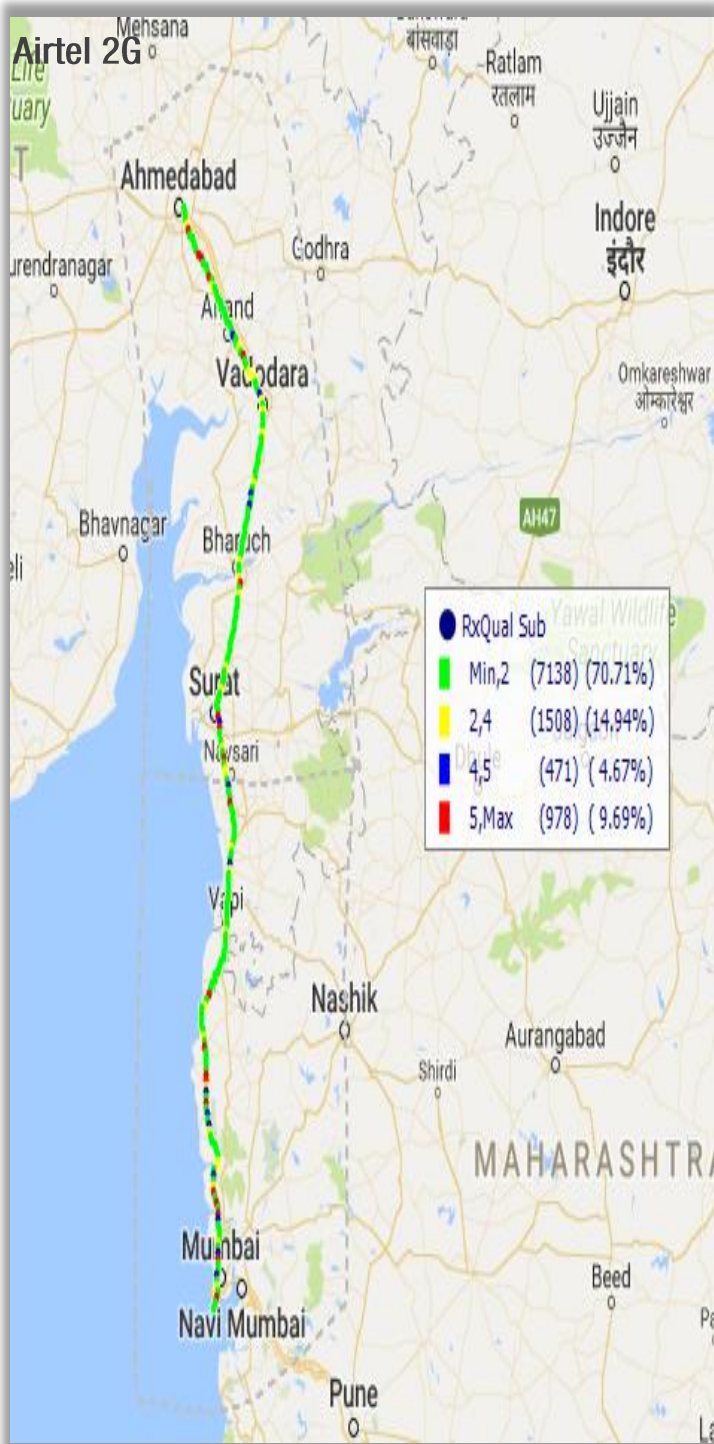
TSP	Rx Quality
Aircel 2G	85.88%
Airtel 2G	90.31%
BSNL 2G	96.02%
Idea 2G	94.39%
Tata 2G	90.55%
Telenor 2G	93.91%
Vodafone 2G	92.11%
Airtel Dual(2G/3G)	85.02%
BSNL Dual(2G/3G)	90.78%
Idea Dual(2G/3G)	87.77%
Tata Dual (2G/3G)	86.05%
Vodafone Dual(2G/3G)	78.07%
Tata CDMA	85.84%
Jio VoLTE	74.58%



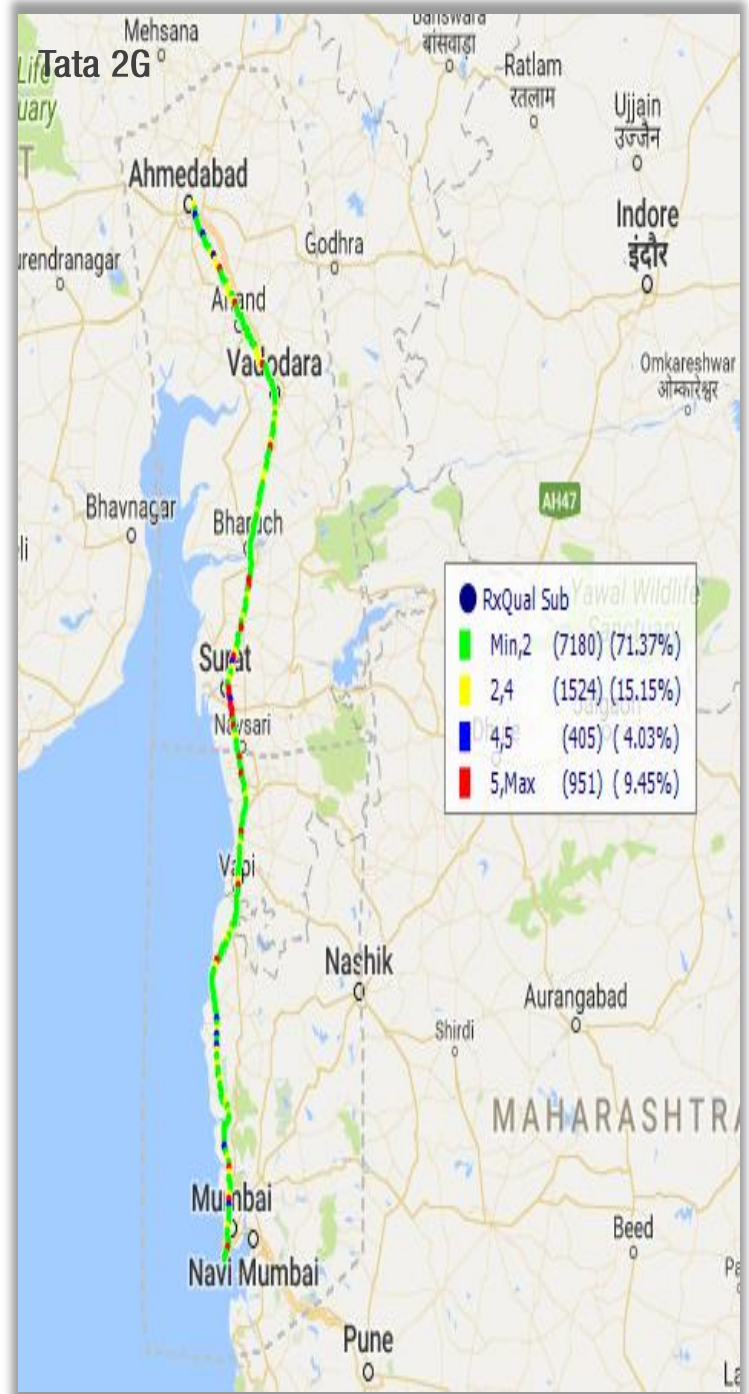
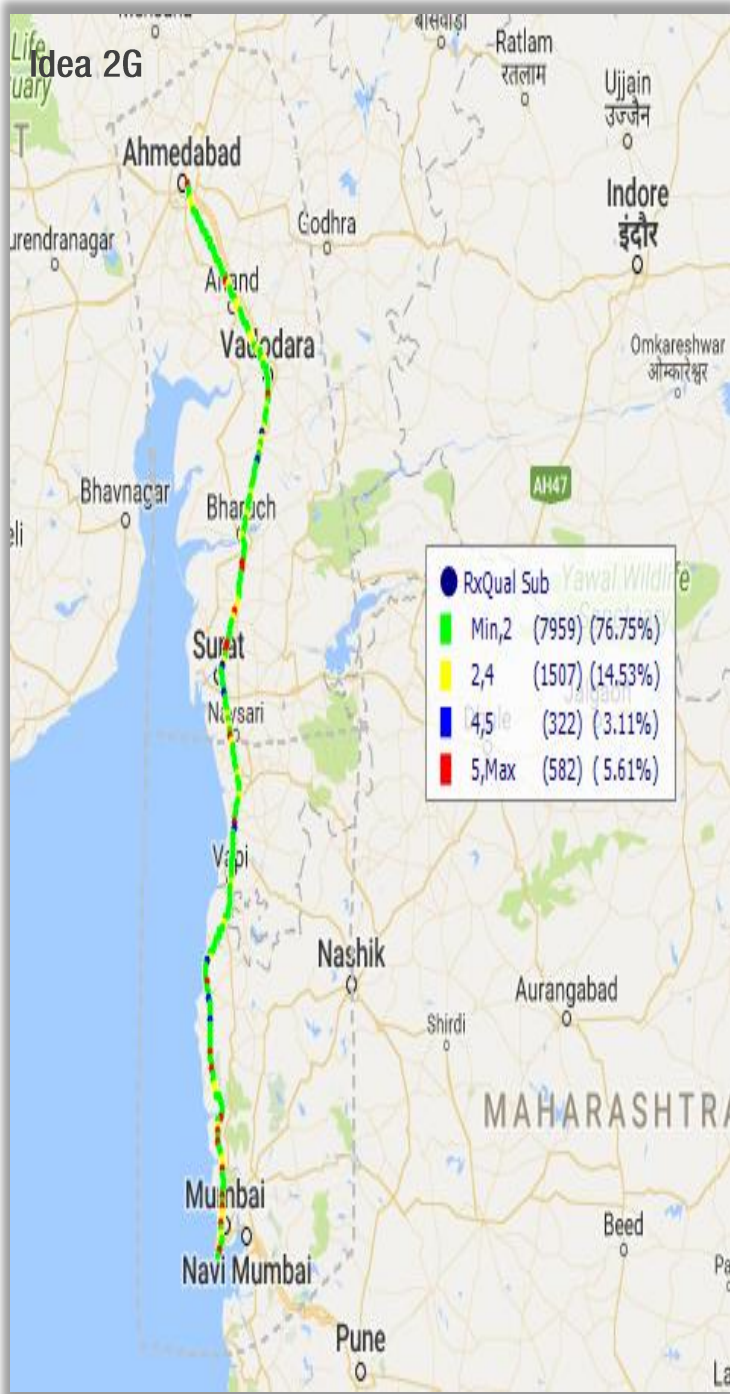
— TSPs not meeting the Benchmark



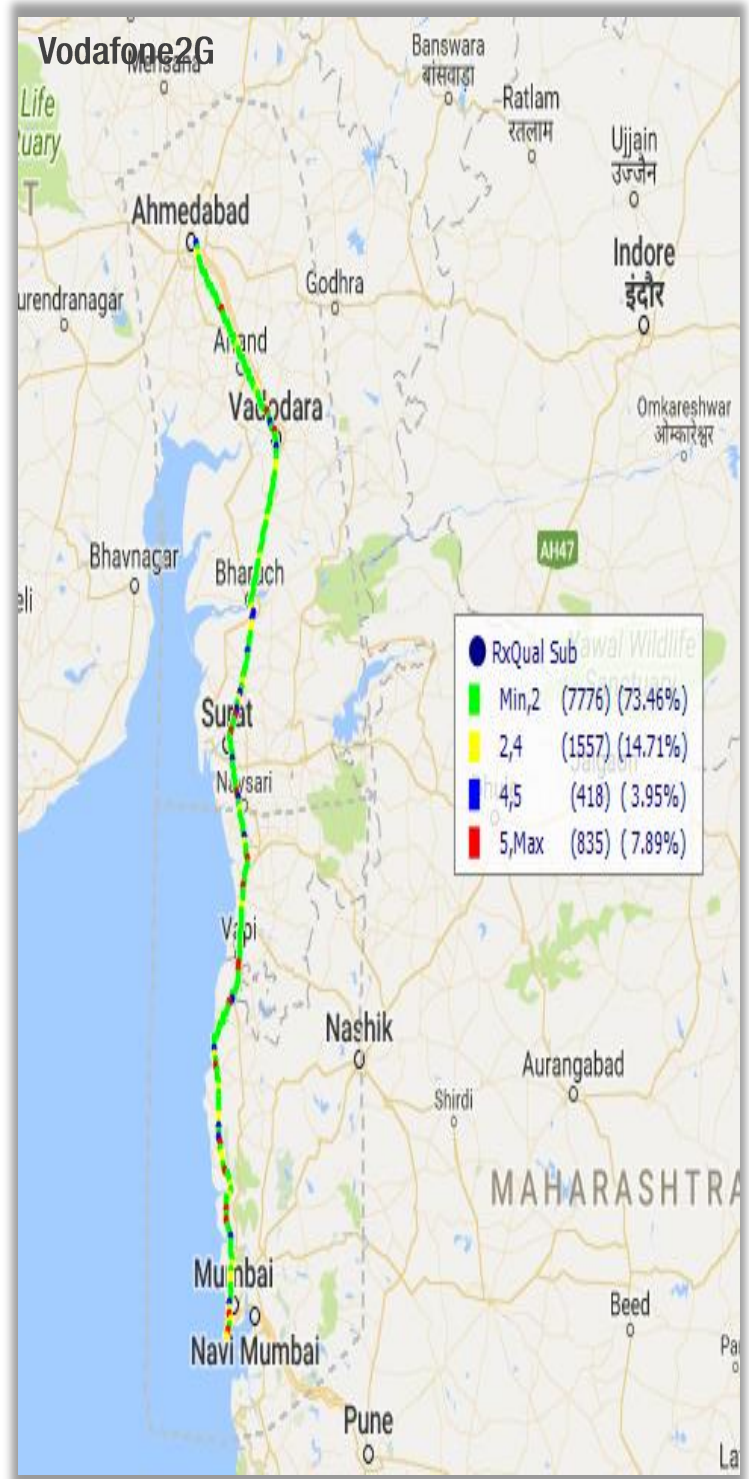
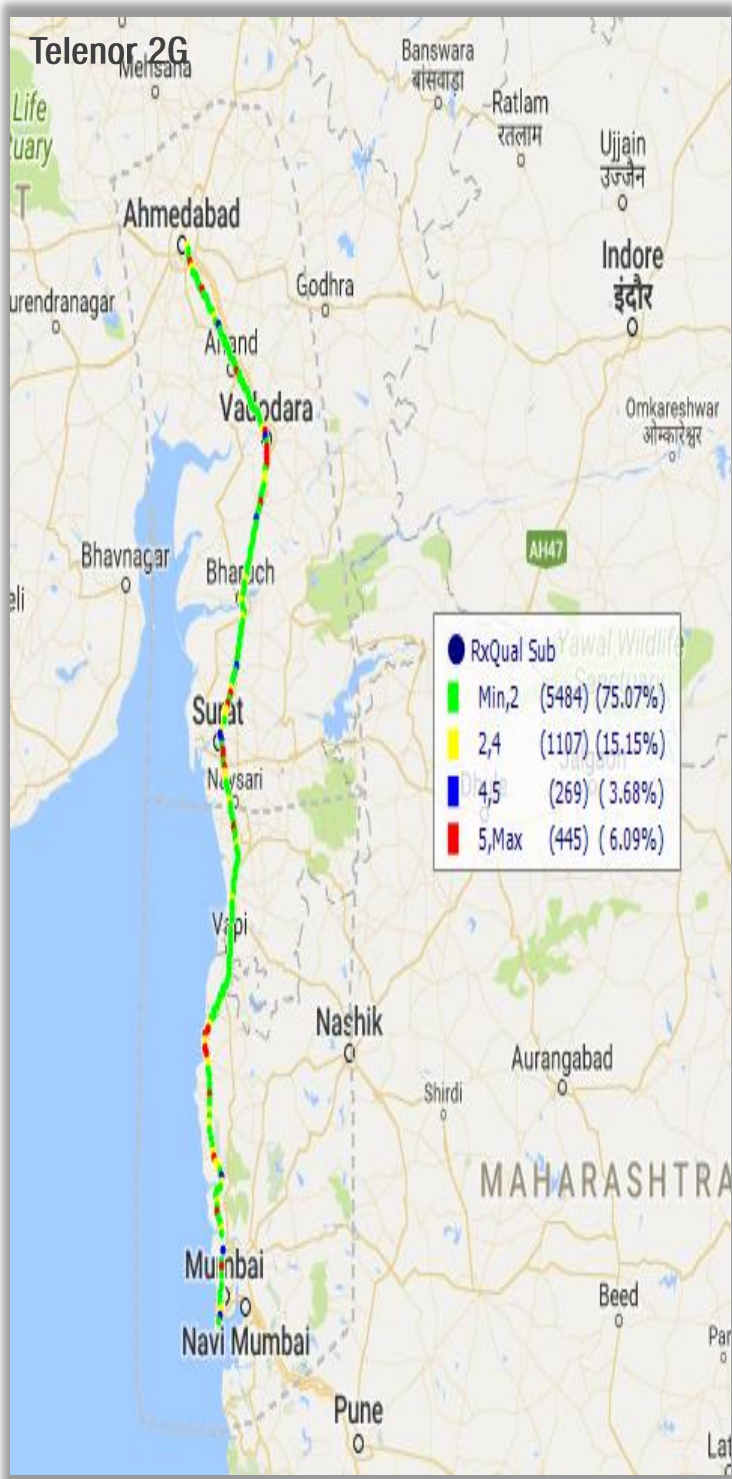
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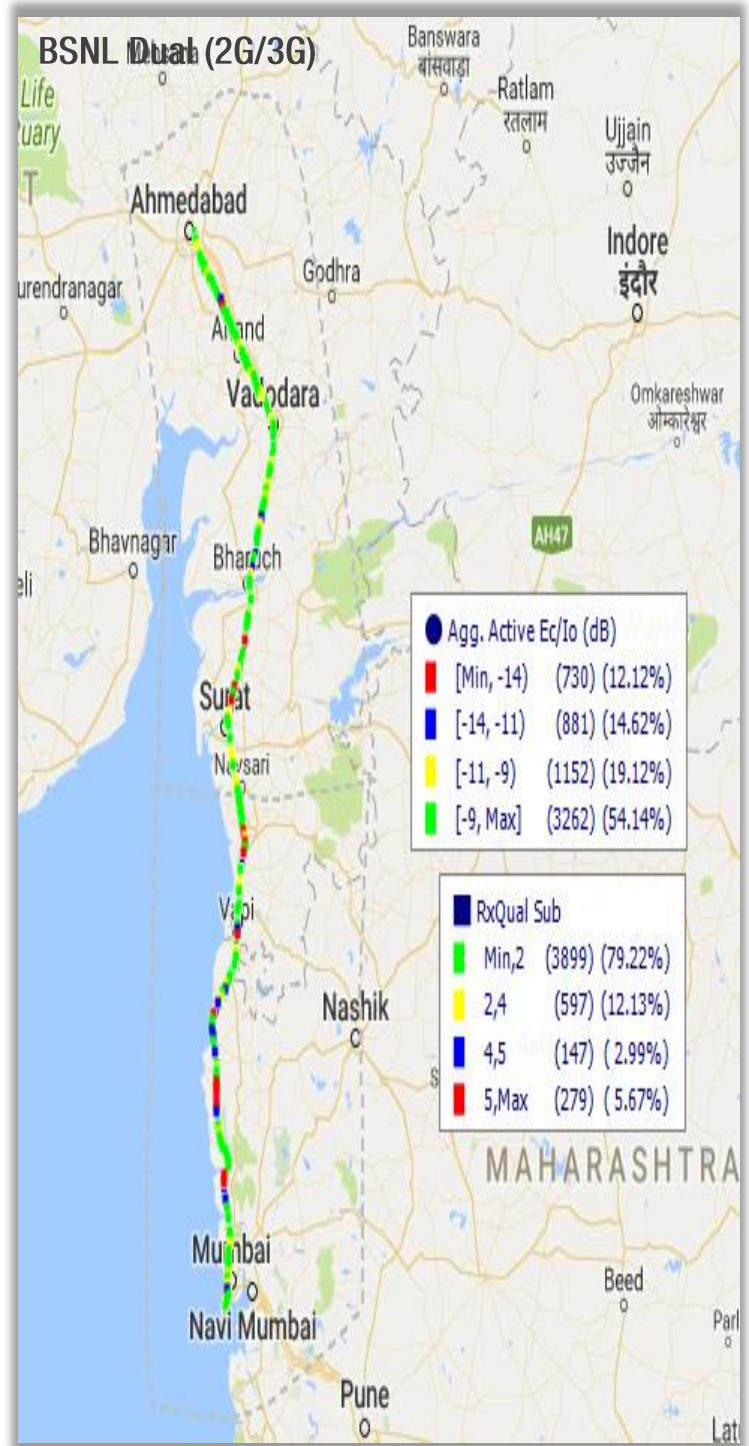
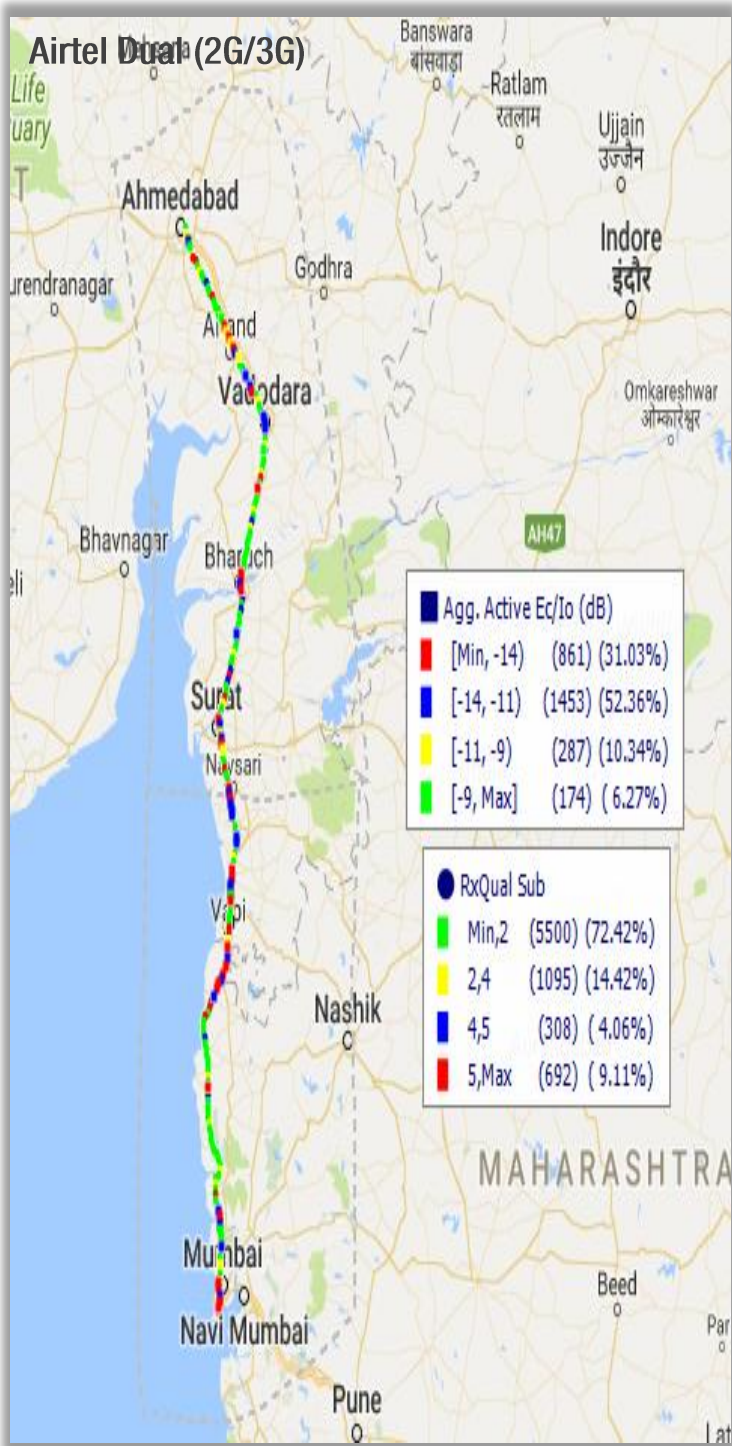
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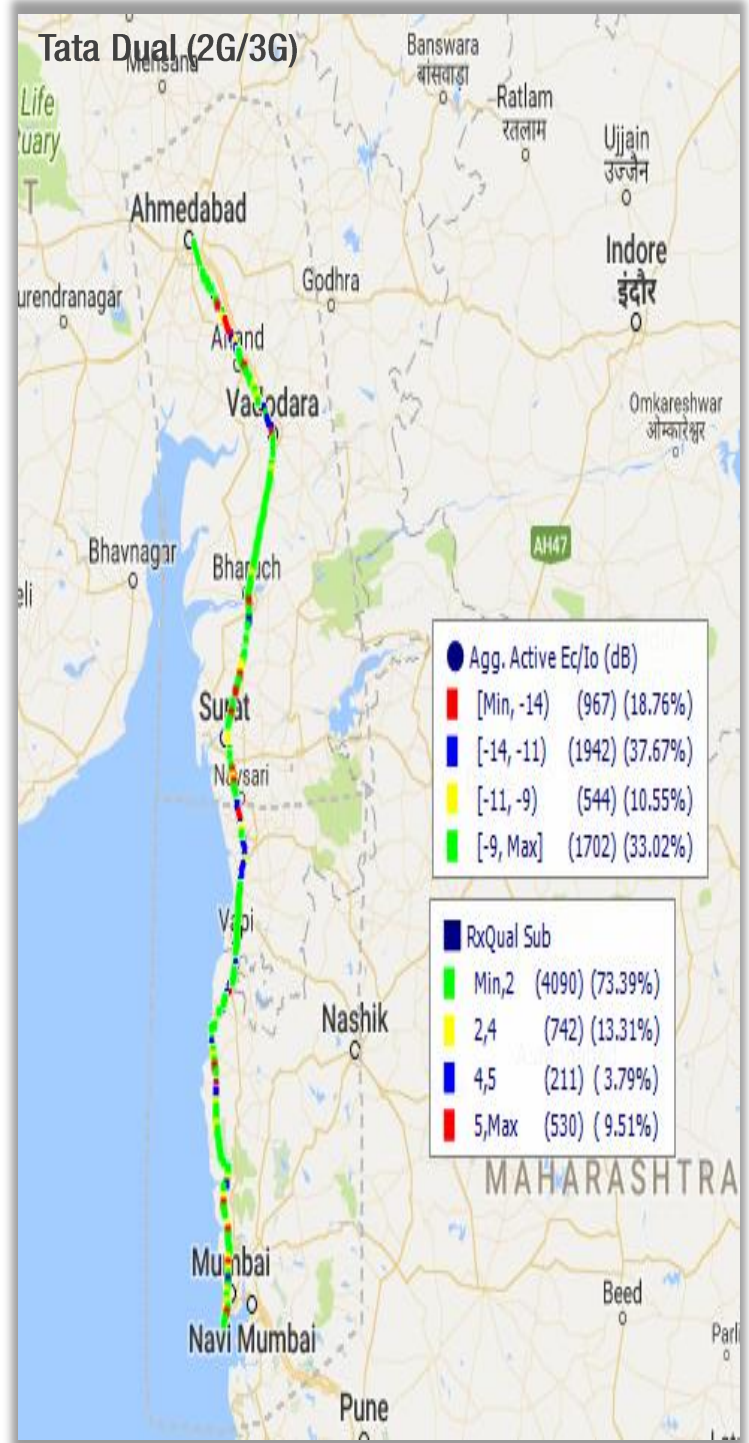
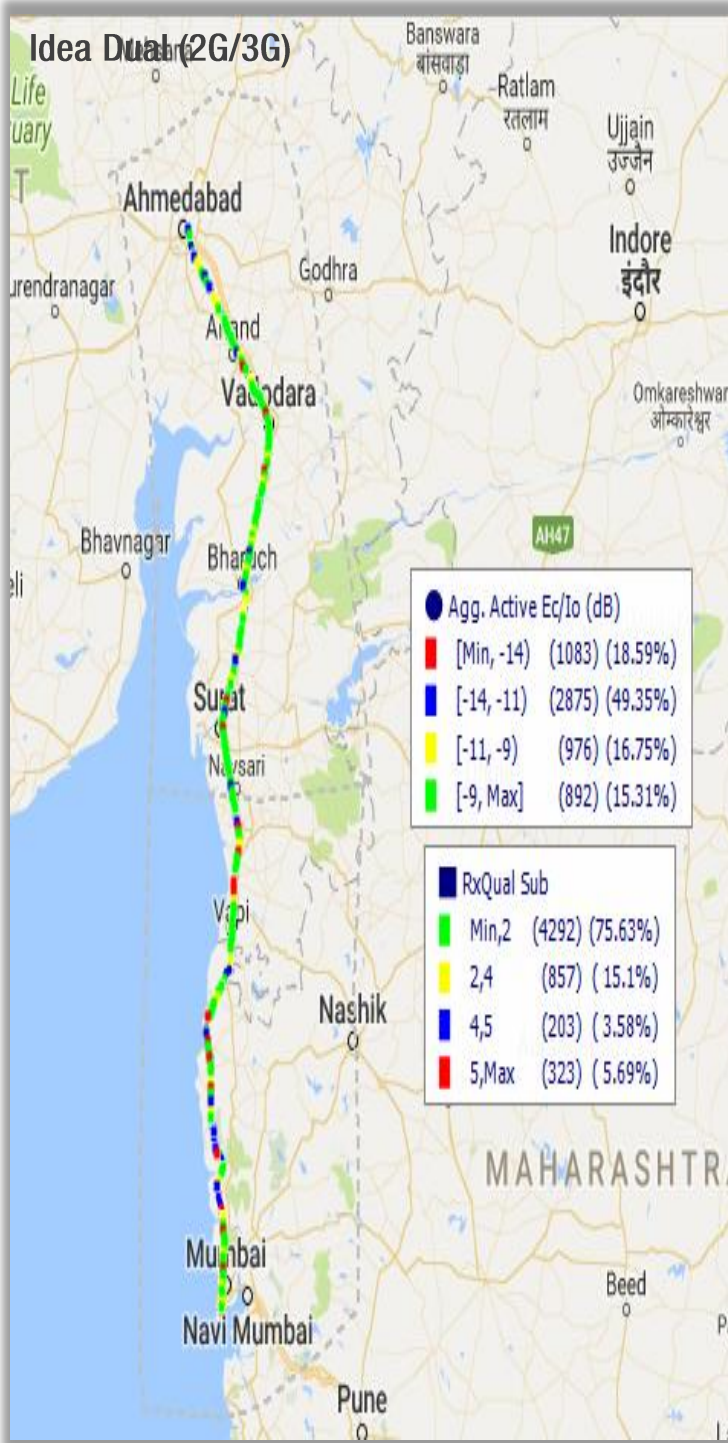
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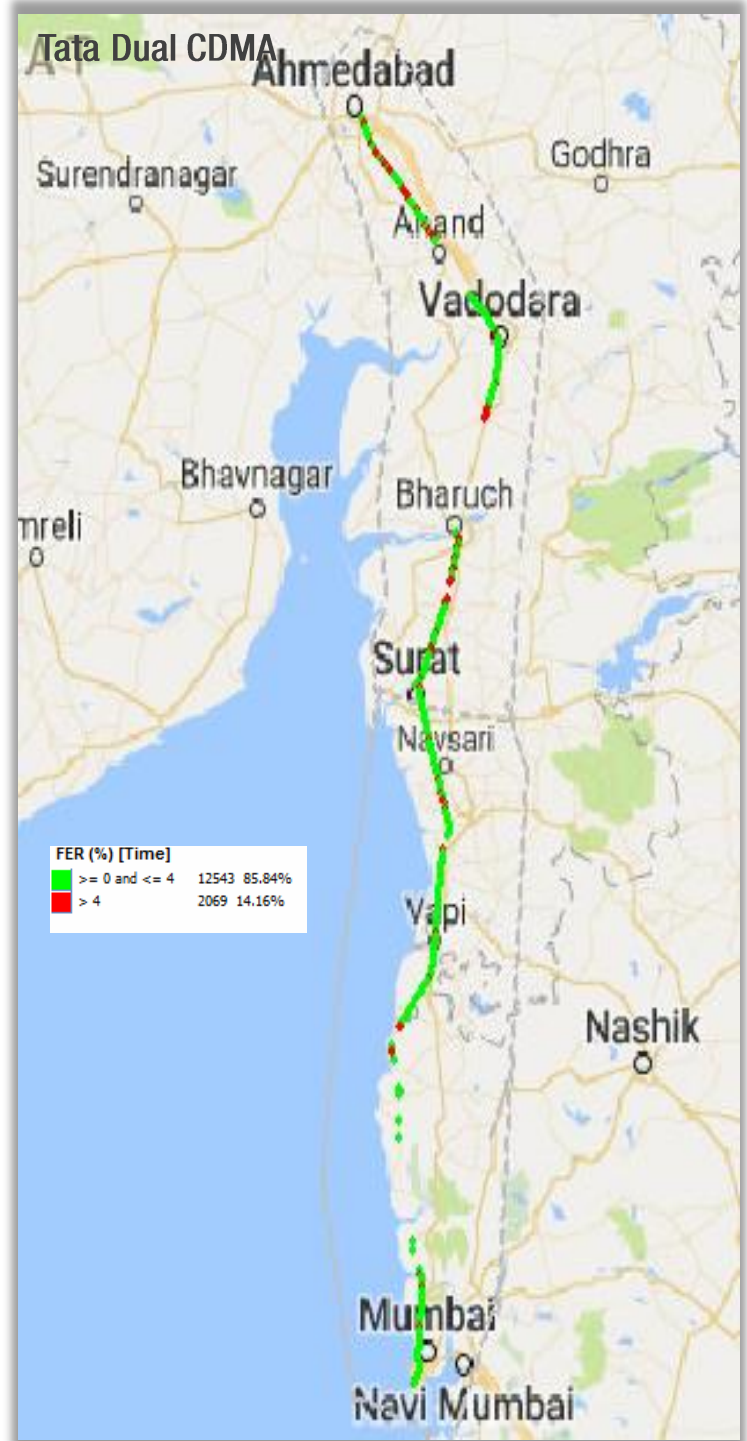
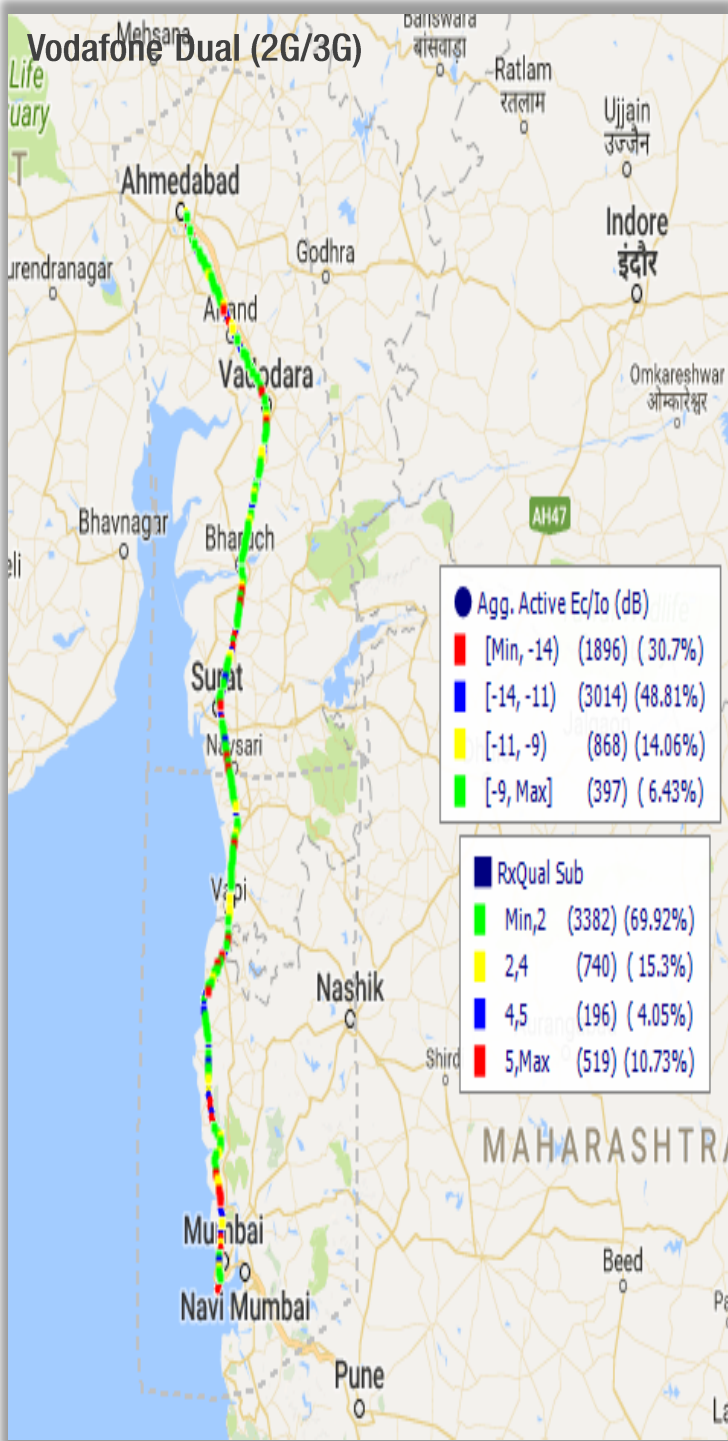
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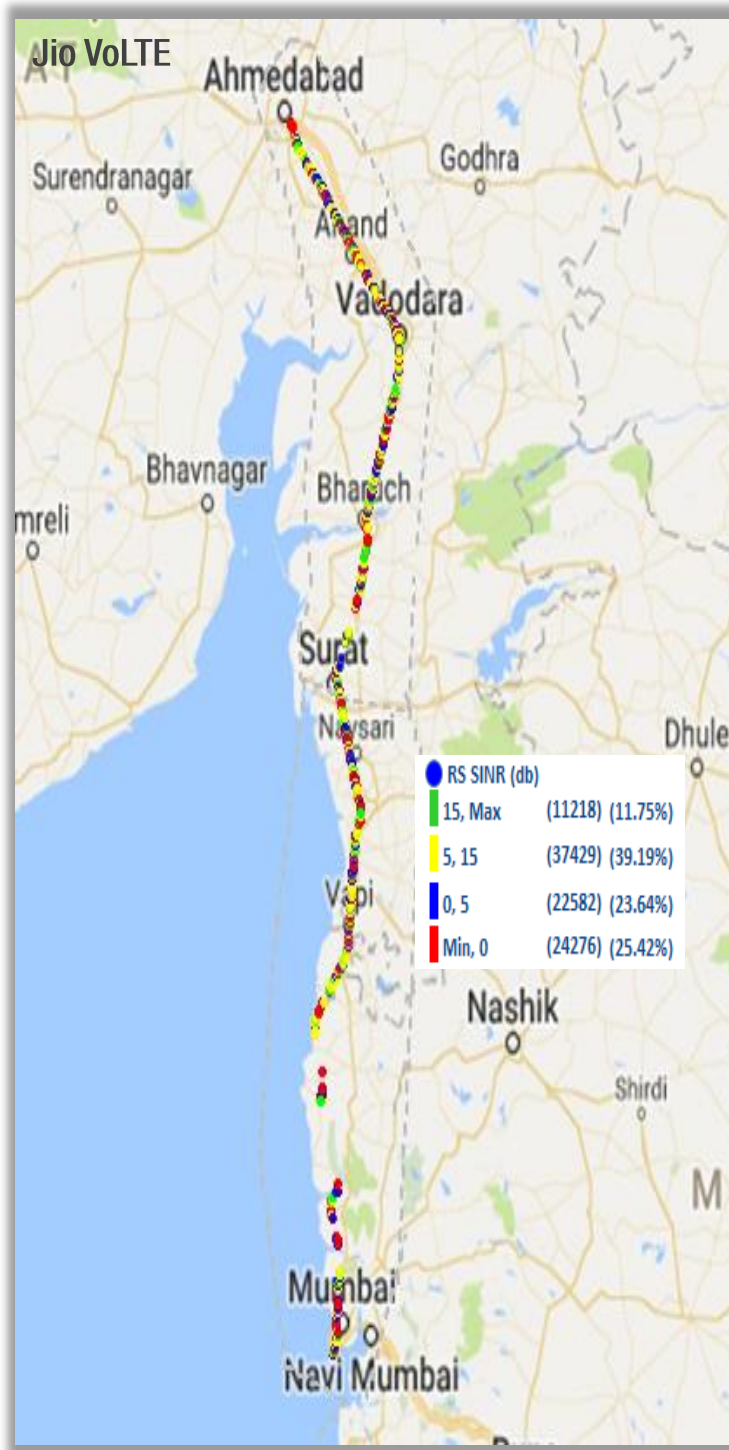
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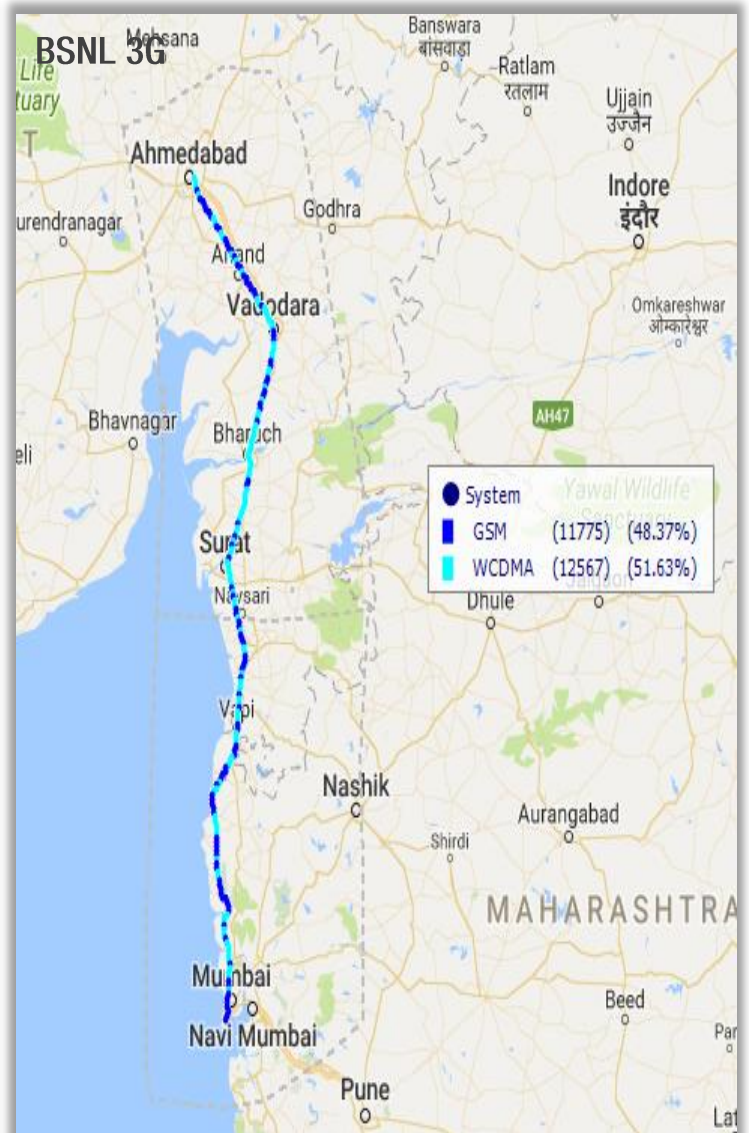
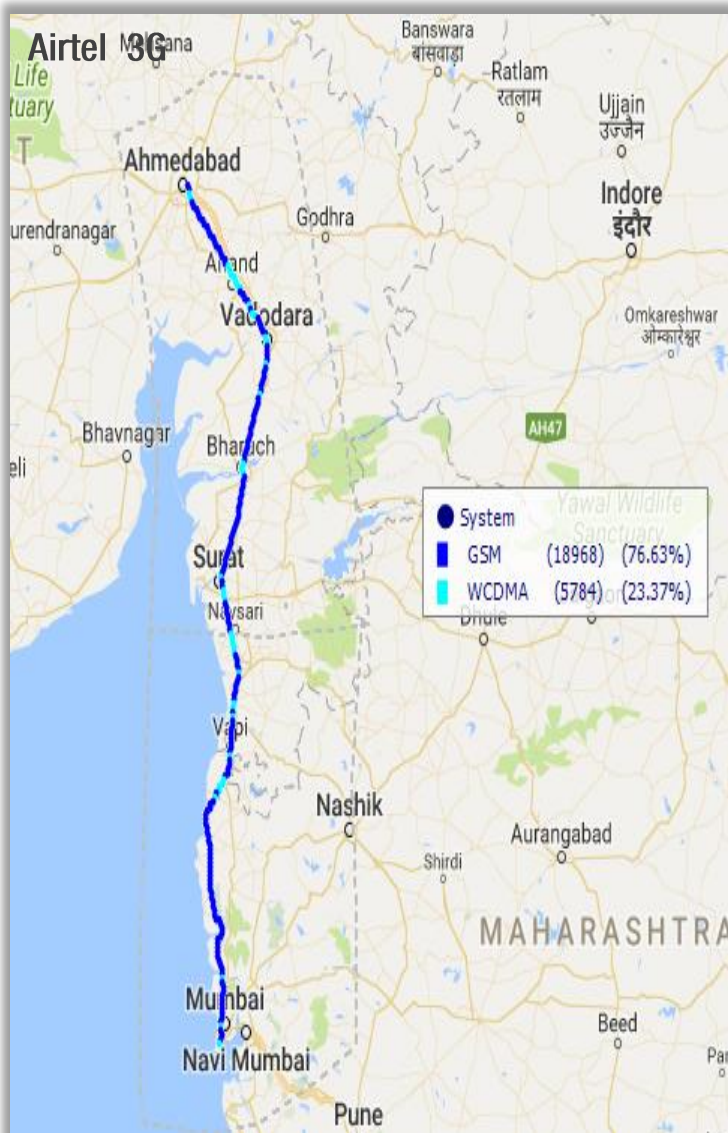
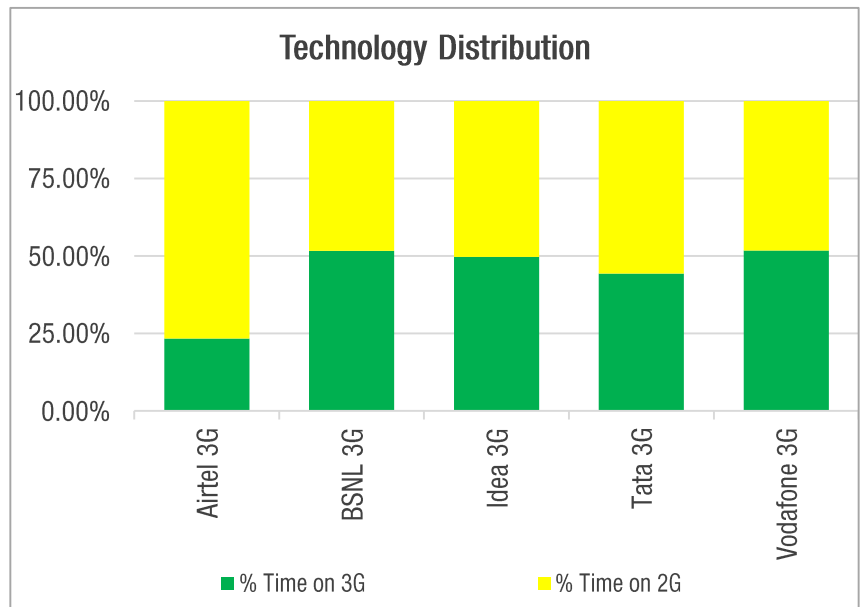


II. Quality Details (contd.)



III. Technology Details

TSP	% Time on 3G
Airtel 3G	23.37%
BSNL 3G	51.63%
Idea 3G	49.68%
Tata 3G	44.27%
Vodafone 3G	51.75%



III. Technology Details_(contd.)

