



INDEPENDENT DRIVE TEST REPORT

For

Delhi to Gorakhpur Railway June 2018

NORTH ZONE

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

The Independent Drive Test has been carried out by M/s PhiMetrics Technologies Pvt. Ltd. on behalf of TRAI in Delhi to Gorakhpur Railway on 5th & 6th June 2018. The drive test covered an drive route of 780 KMs over a period of 2 days. Approximately 450 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

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. On 5th & 6th June 2018 covering various locations in Delhi to Gorakhpur Railway. The performance of **Airtel, BSNL, Idea, Tata, 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 and Data 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 Delhi to Gorakhpur Railway:

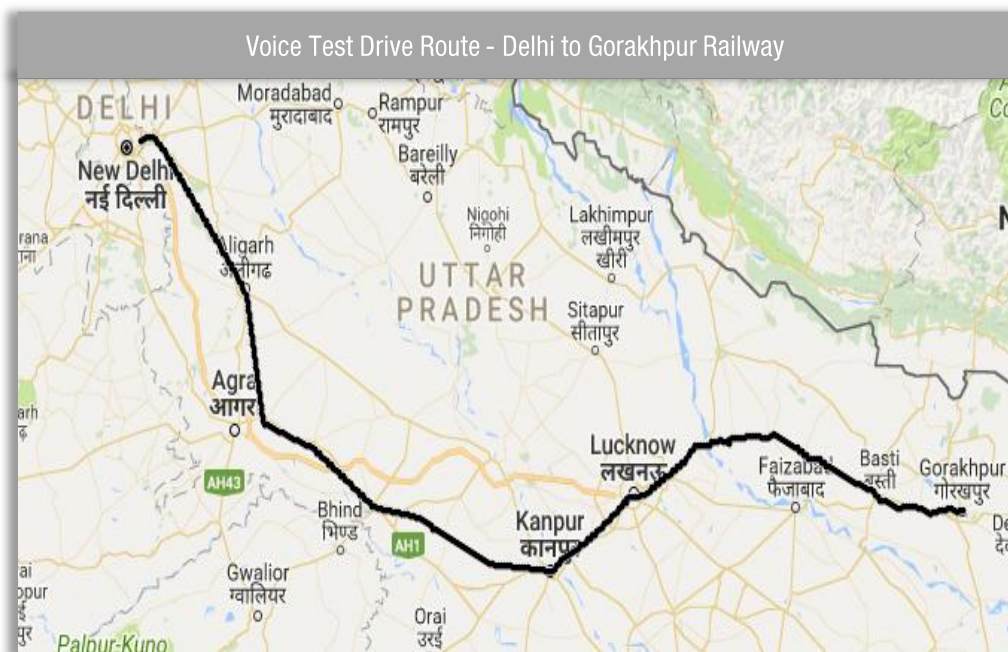
Independent Drive test was conducted for a period of 2 day on 5th & 6th June 2018 in Delhi to Gorakhpur Railway. Calls were made for 90 sec duration with wait time of 10 sec between calls in all technologies.

Voice Tests: The drive test covered a drive route of approximately 780 KMs over a period of 2 day on 5th & 6th June 2018. Approximately 450 calls were made for each of the 11 networks: five 2G (Lock Mode) networks, five 3G (Dual mode) networks and 1 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

* For Voice 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.

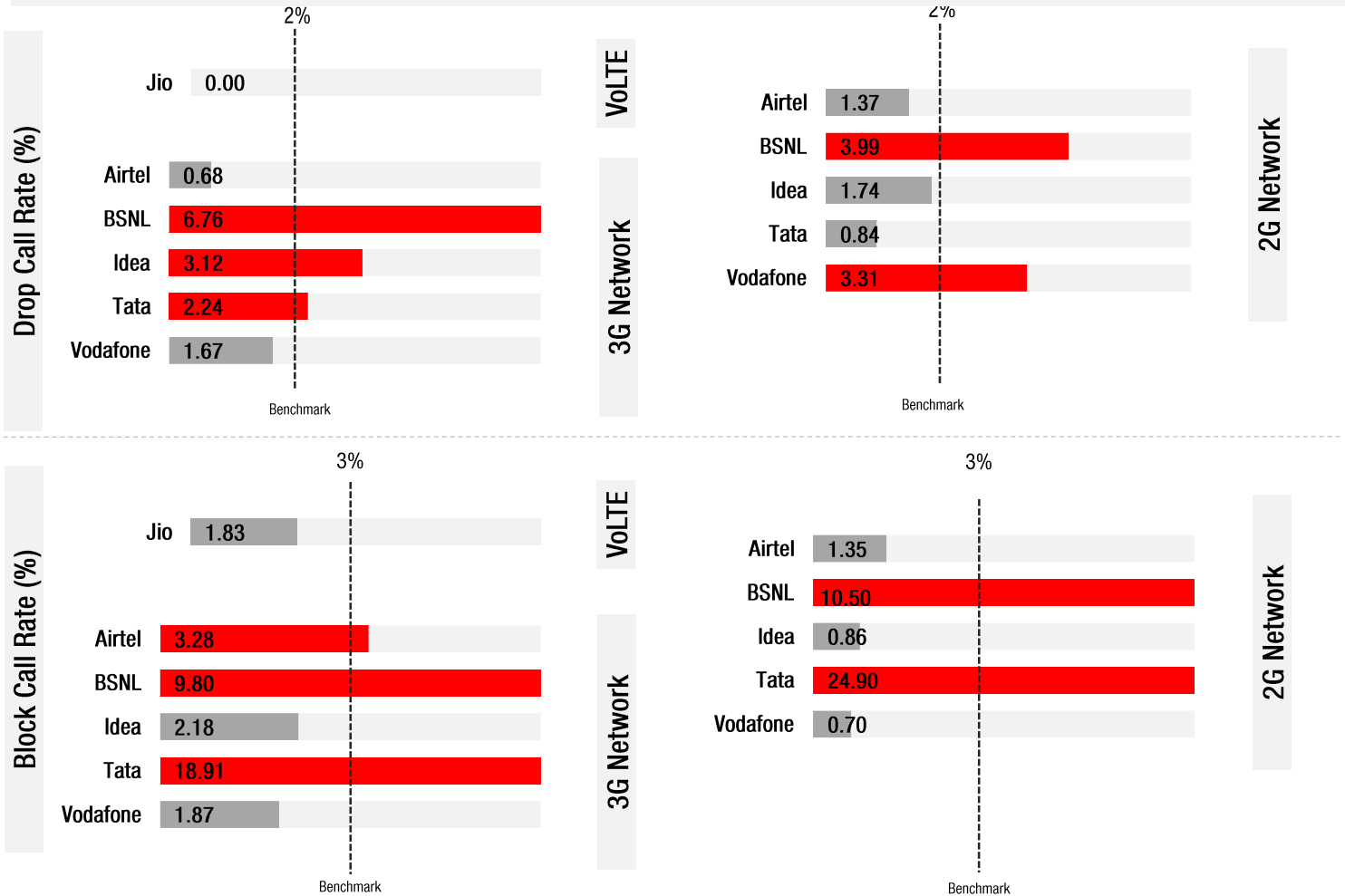
* 3G KPI's which are calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.



Voice Calls

Key Observations

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



KPI	2G Networks				
	Airtel	BSNL	Idea	Tata	Vodafone
SDCCH Congestion%	0.45%	0.21%	0.21%	0.42%	0.00%
TCH Congestion %	0.90%	10.29%	0.65%	24.48%	0.70%

KPI	3G Networks				
	Airtel	BSNL	Idea	Tata	Vodafone
SDCCH Congestion%	0.00%	0.44%	0.44%	0.00%	0.00%
RRC Congestion%	1.53%	0.43%	0.21%	1.04%	0.70%
SDCCH & RRC Congestion%	1.53%	0.87%	0.65%	1.04%	0.70%
TCH Congestion %	1.53%	8.71%	1.09%	5.96%	0.70%
RAB Congestion %	0.22%	0.22%	0.44%	11.91%	0.47%
TCH & RAB Congestion %	1.75%	8.93%	1.53%	17.87%	1.17%

- a) All TSPs have failed to meet the 2% QoS benchmark of Drop Call Rate (DCR%) except Airtel 2G, Idea 2G, Tata 2G, Airtel 3G, Vodafone 3G & Jio
- b) Call Block Rate (CBR%) benchmark of 3% was achieved by all TSP's except BSNL 2G, Tata 2G, Airtel 3G, BSNL 3G and Tata 3G

Not meeting Benchmark

Voice Calls

Key Observations

Coverage

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

TSPs	2G				
	Airtel	BSNL	Idea	Tata	Vodafone
Coverage%	72.87%	67.31%	79.44%	69.26%	77.70%

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 %	73.25%	65.32%	66.85%	72.31%	55.62%	92.66%

c) Percentage of time spent on 3G network:

TSPs	3G				
	Airtel	BSNL	Idea	Tata	Vodafone
Time Spent on 3G%	46.65%	37.36%	20.38%	52.50%	54.98%

d) Percentage of RLT spent on \geq 48:

TSPs	2G				
	Airtel	BSNL	Idea	Tata	Vodafone
%RLT \geq 48%	0.00%	20.05%	0.00%	0.00%	0.00%

Summary

Overall Summary

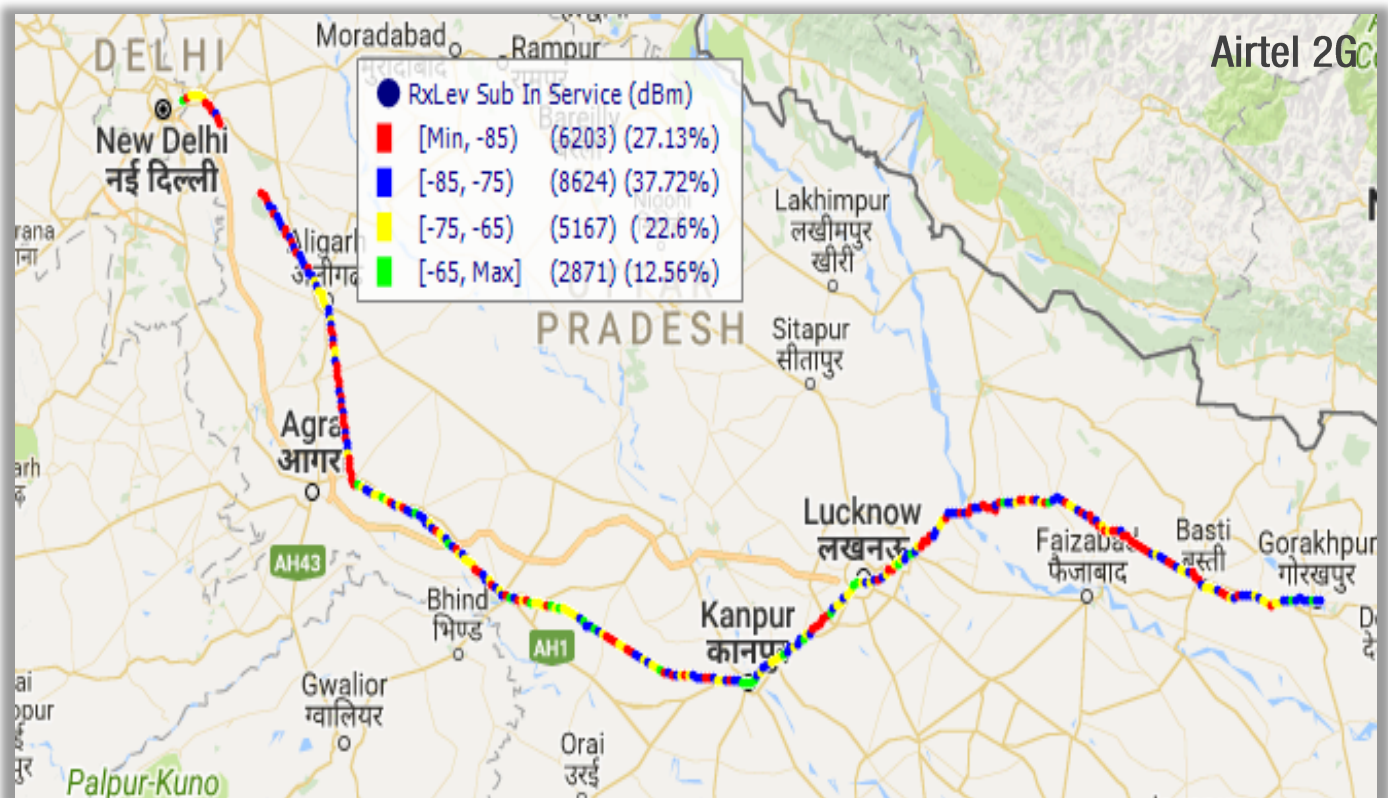
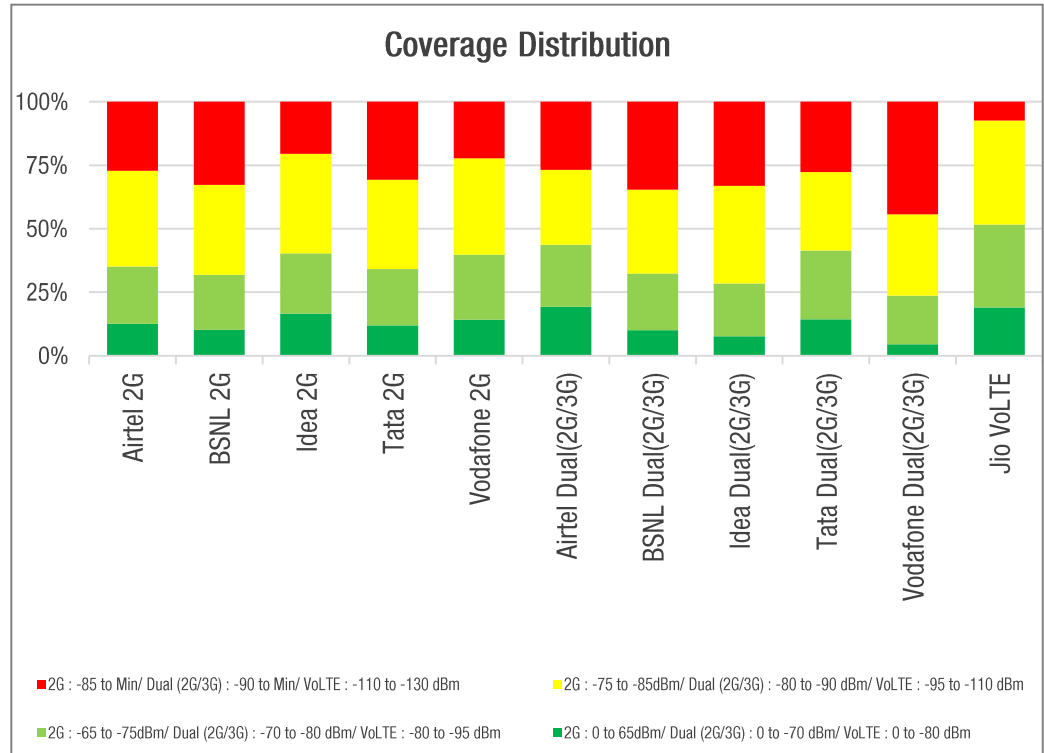
Voice Call	2G				
	Airtel	BSNL	Idea	Tata	Vodafone
Call Attempt	444	476	463	478	426
Blocked Call Rate (%)	1.35%	10.50%	0.86%	24.90%	0.70%
CSSR% (Accessibility)	98.65%	89.50%	99.14%	75.10%	99.30%
Drop Call Rate (%)	1.37%	3.99%	1.74%	0.84%	3.31%
Mobility HOSR (%)	97.78%	87.06%	98.07%	96.80%	97.08%
Rx Quality (%)	92.86%	94.95%	96.04%	92.95%	93.36%

Voice Call	3G					VoLTE
	Airtel	BSNL	Idea	Tata	Vodafone	Jio
Call Attempt	457	459	459	386	427	443
Blocked Call Rate (%)	3.28%	9.80%	2.18%	18.91%	1.87%	2.93%
CSSR% (Accessibility)	96.72%	90.20%	97.82%	81.09%	98.13%	97.07%
Drop Call Rate (%)	0.68%	6.76%	3.12%	2.24%	1.67%	0.23%
Mobility HOSR (%)	99.17%	97.17%	98.63%	99.78%	99.22%	99.22%
Rx Quality (%)	90.75%	93.38%	93.00%	88.09%	89.34%	79.59%

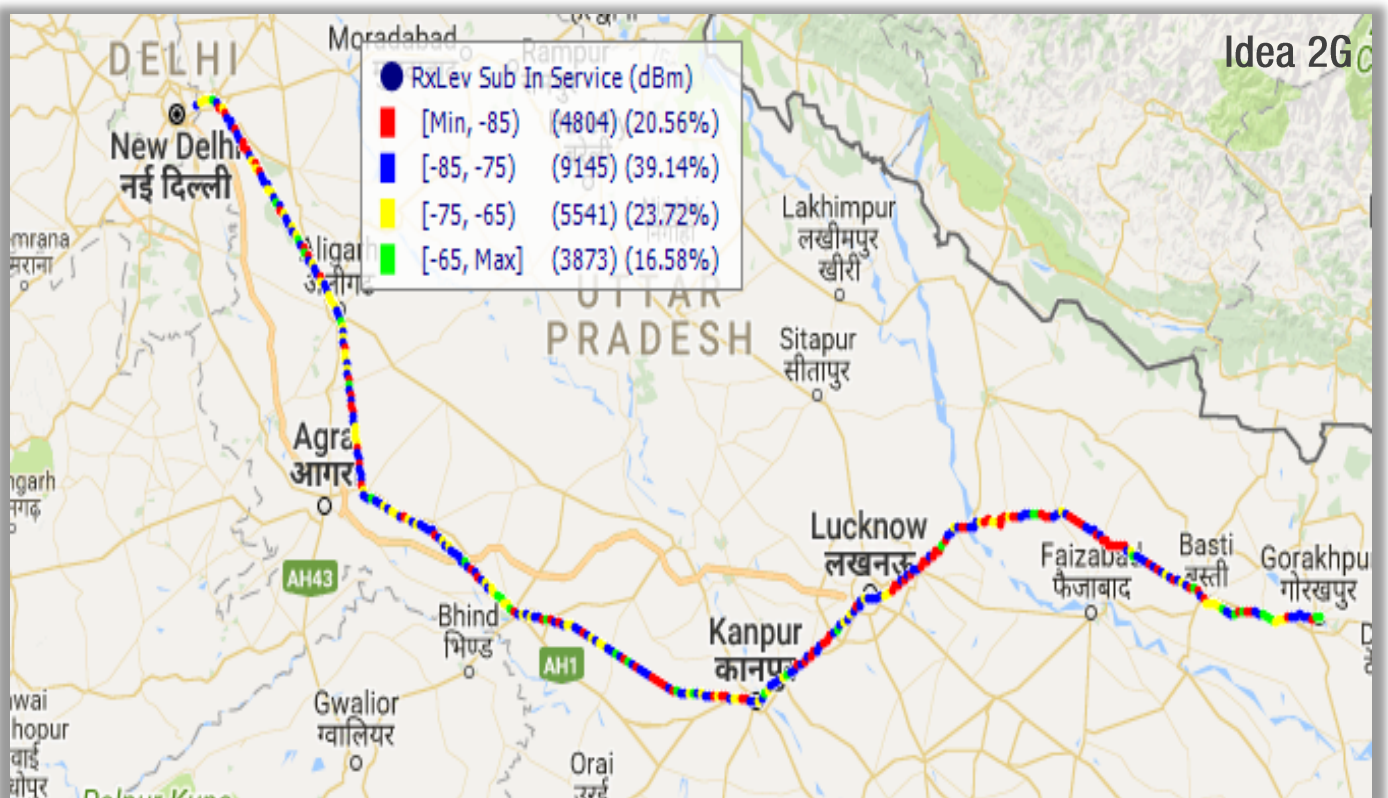
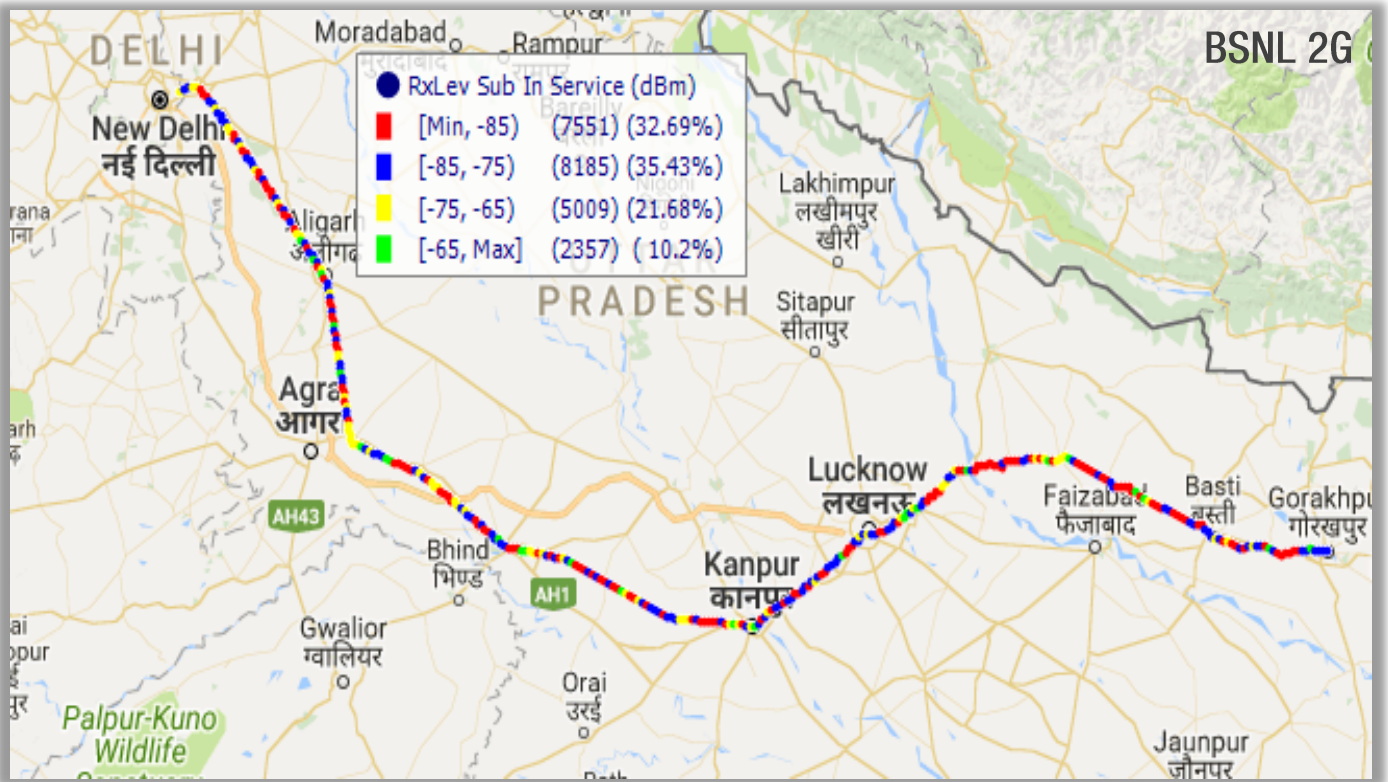
I. Coverage Details

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.

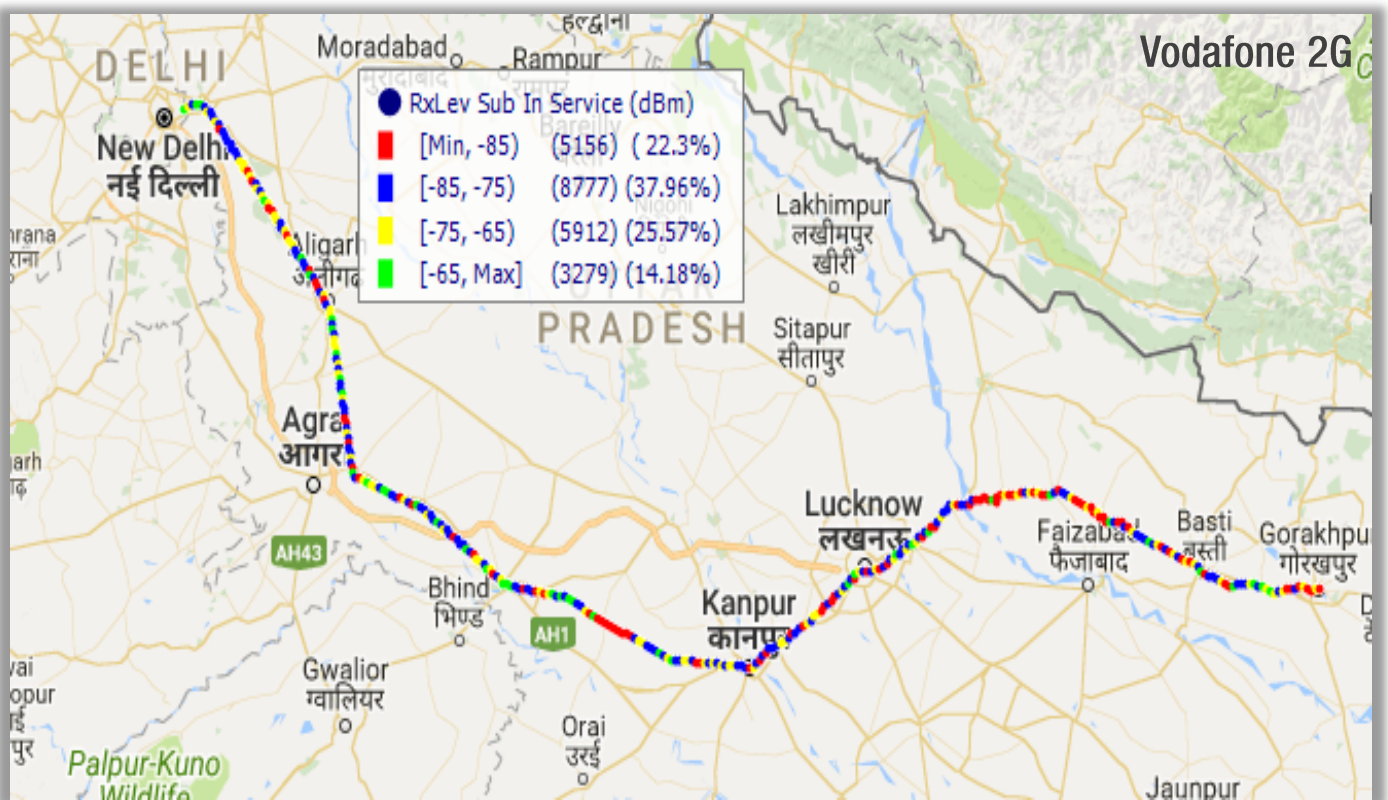
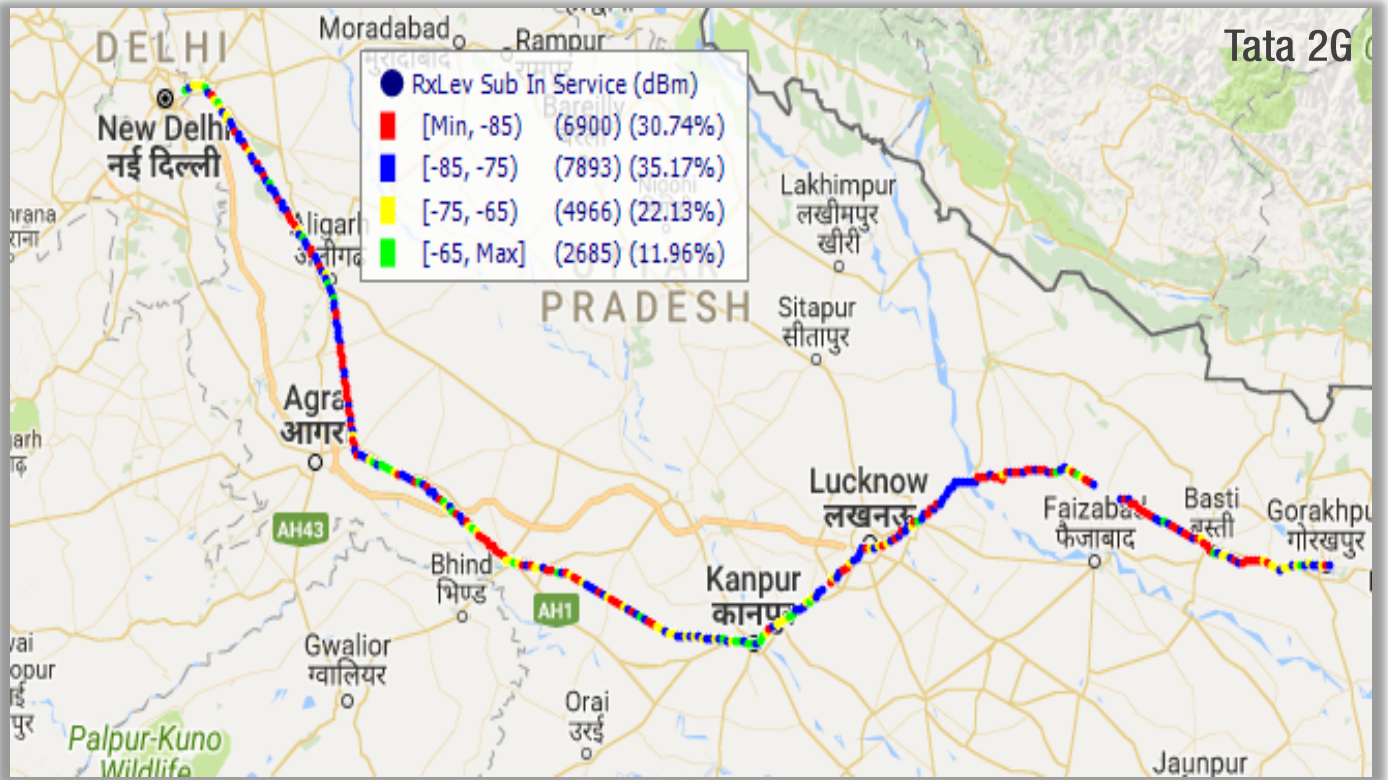
TSP	Coverage Rate
Airtel 2G	72.87%
BSNL 2G	67.31%
Idea 2G	79.44%
Tata 2G	69.26%
Vodafone 2G	77.70%
Airtel Dual(2G/3G)	73.25%
BSNL Dual(2G/3G)	65.32%
Idea Dual(2G/3G)	66.85%
Tata Dual(2G/3G)	72.31%
Vodafone Dual(2G/3G)	55.62%
Jio VoLTE	92.66%



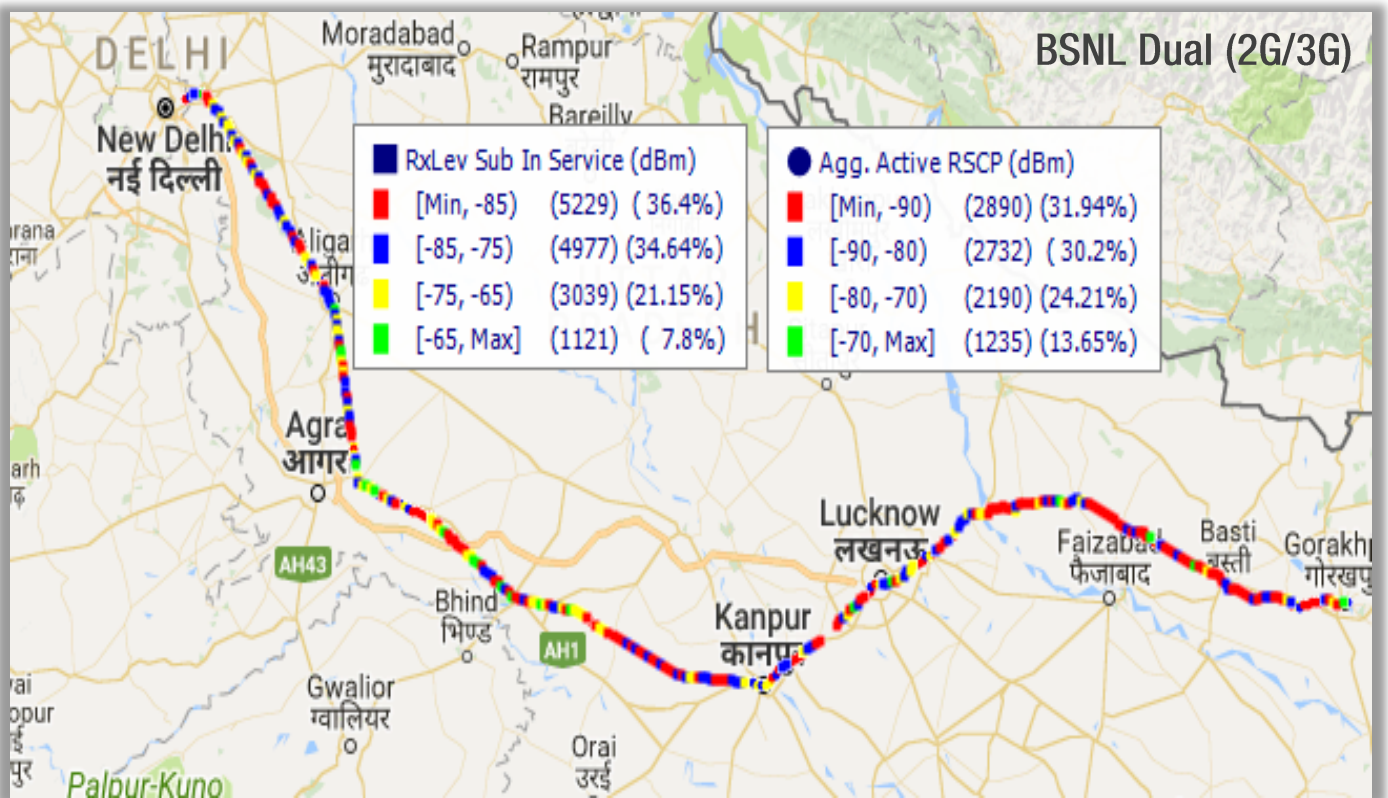
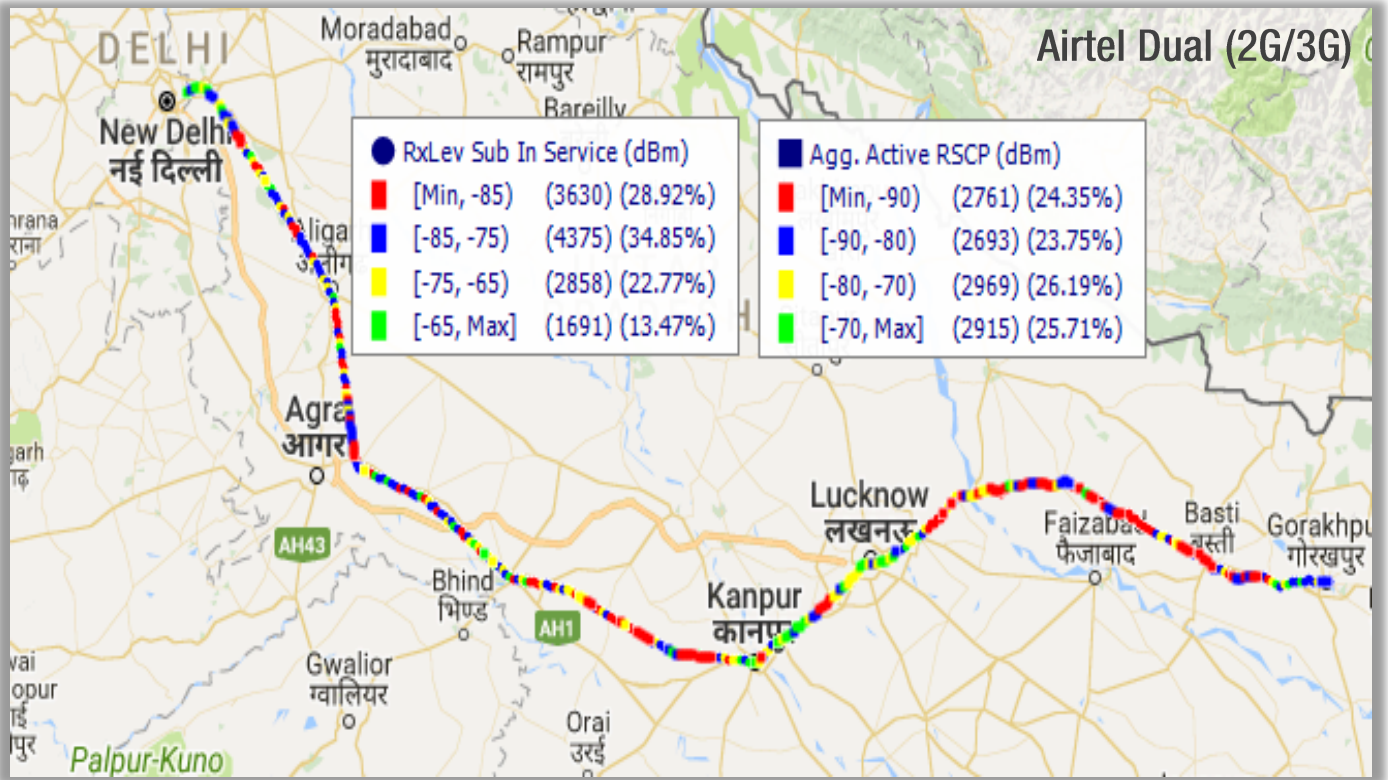
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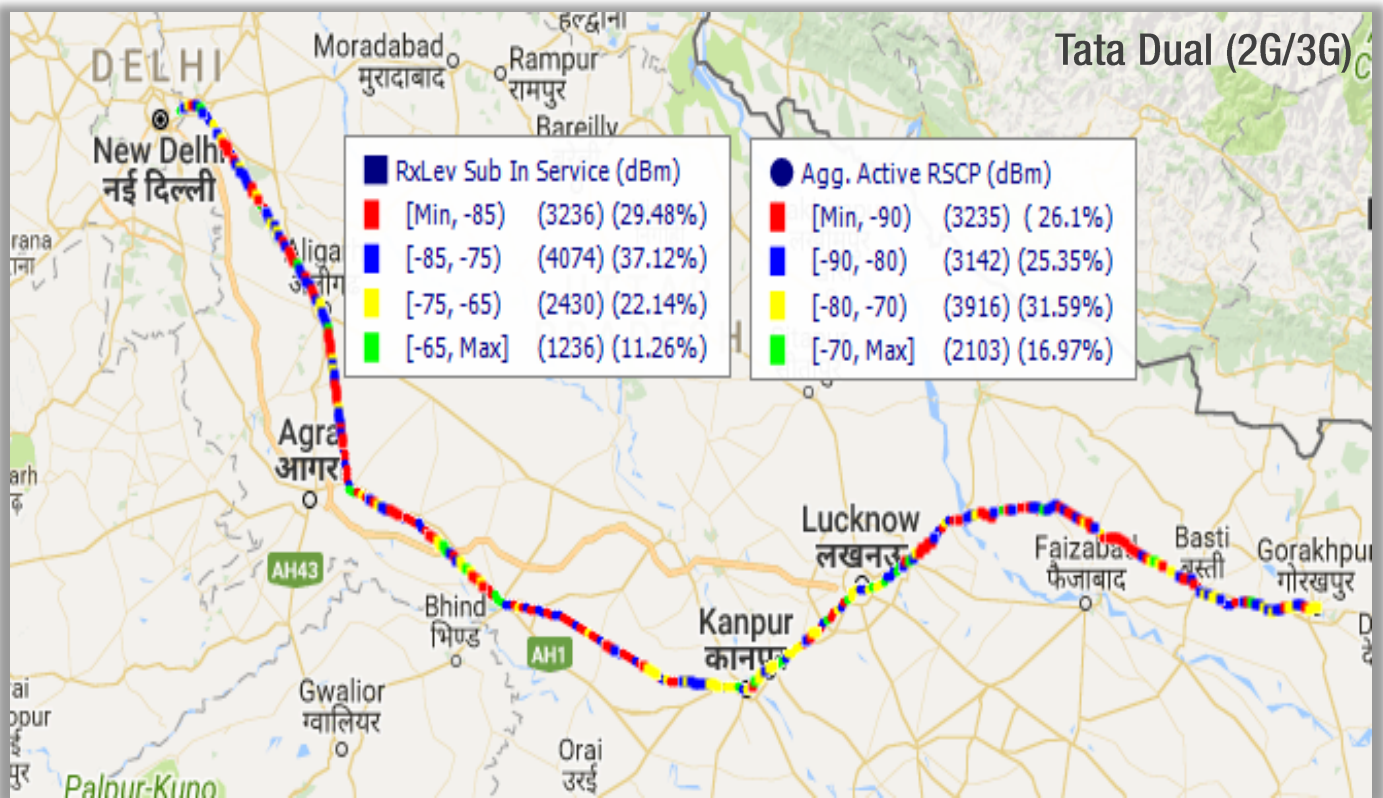
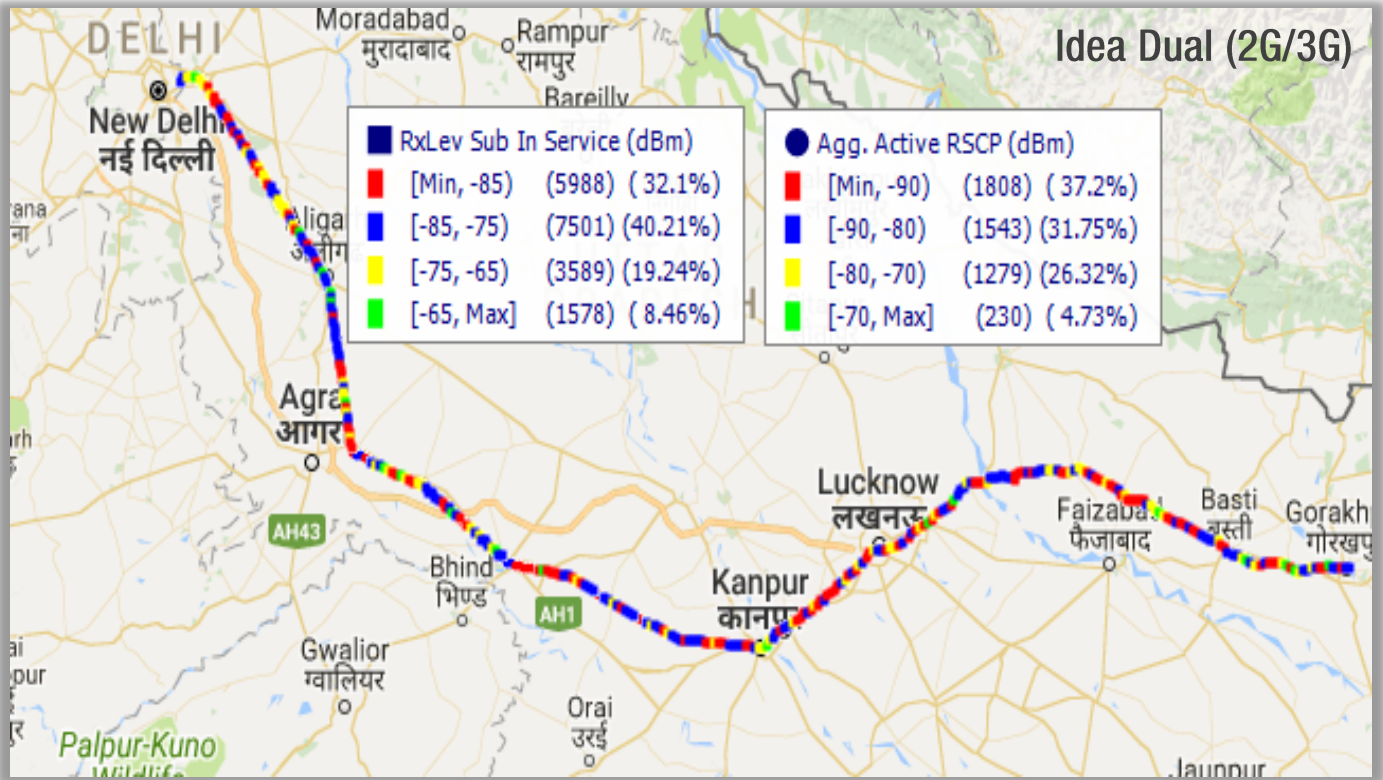
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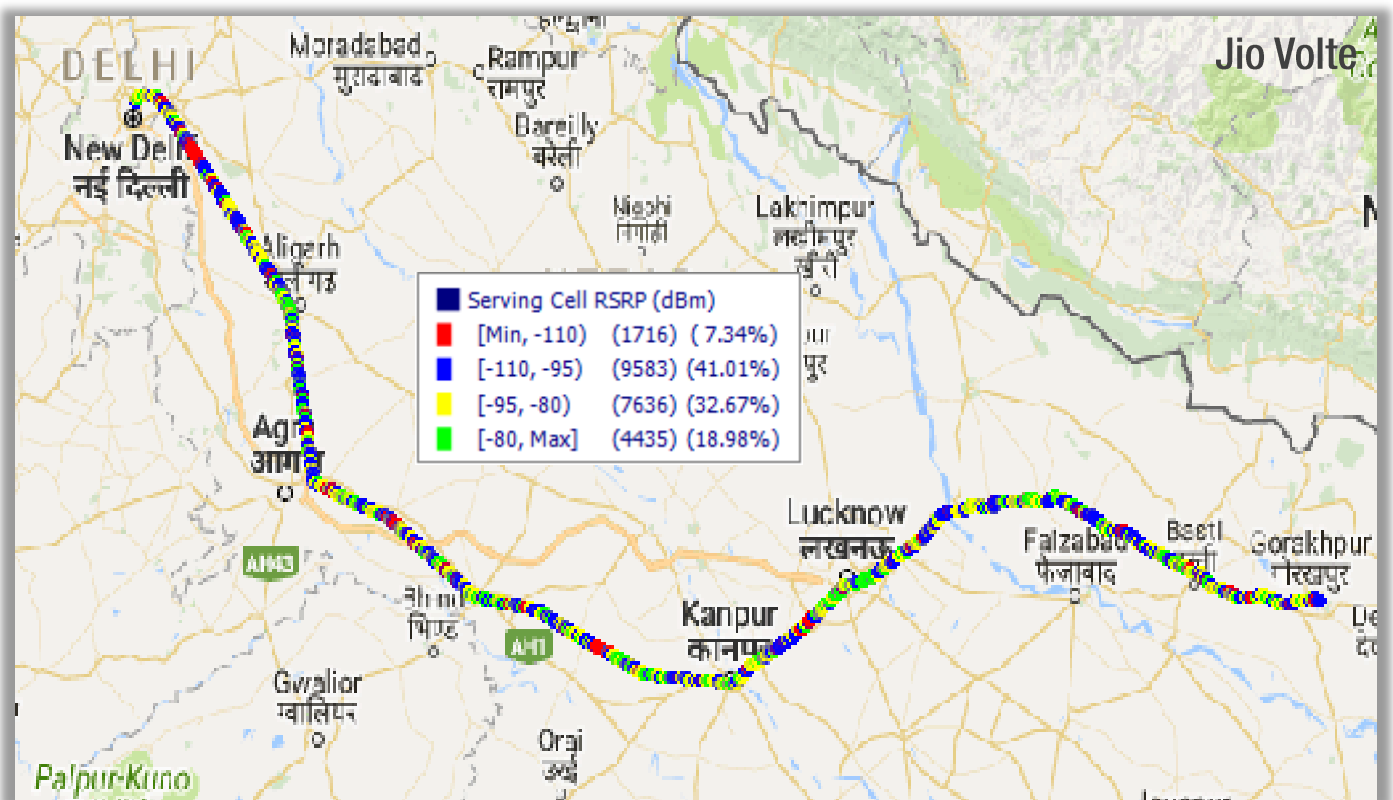
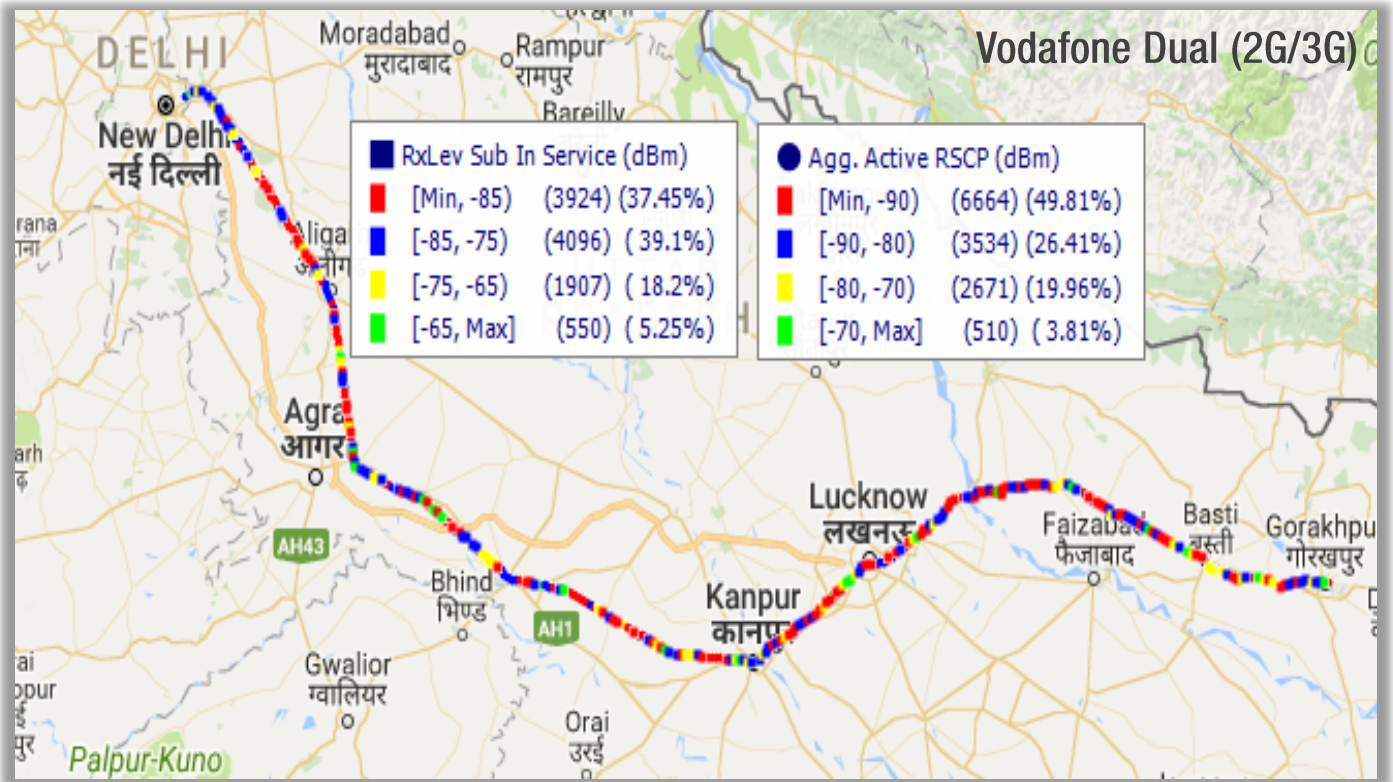
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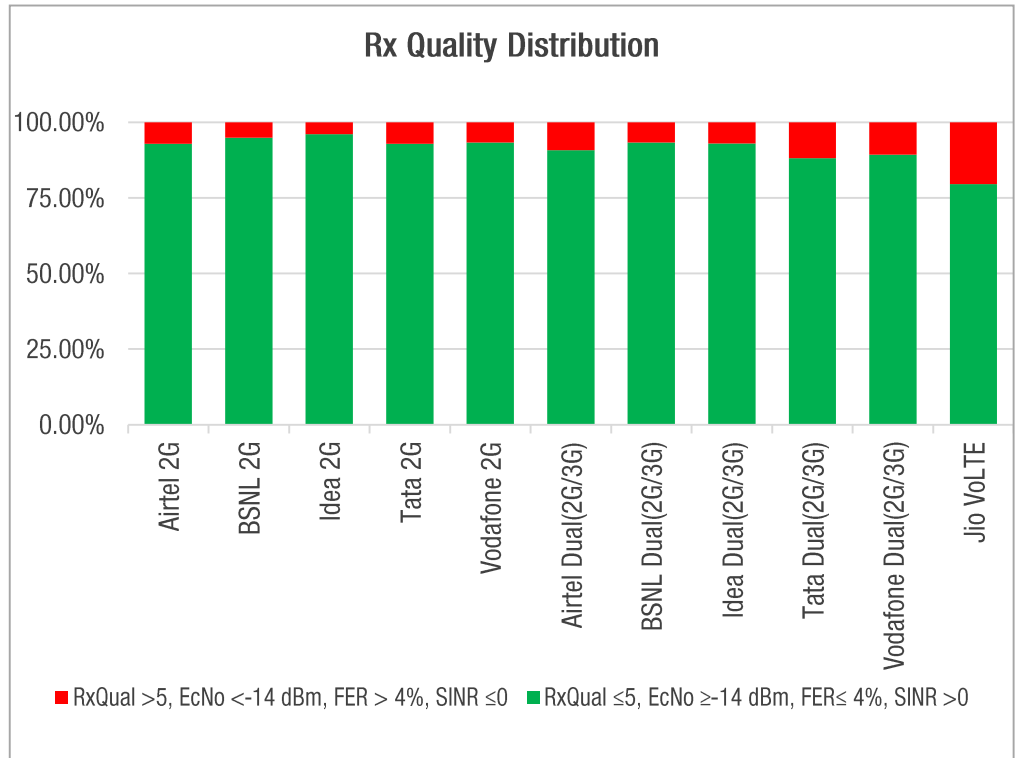
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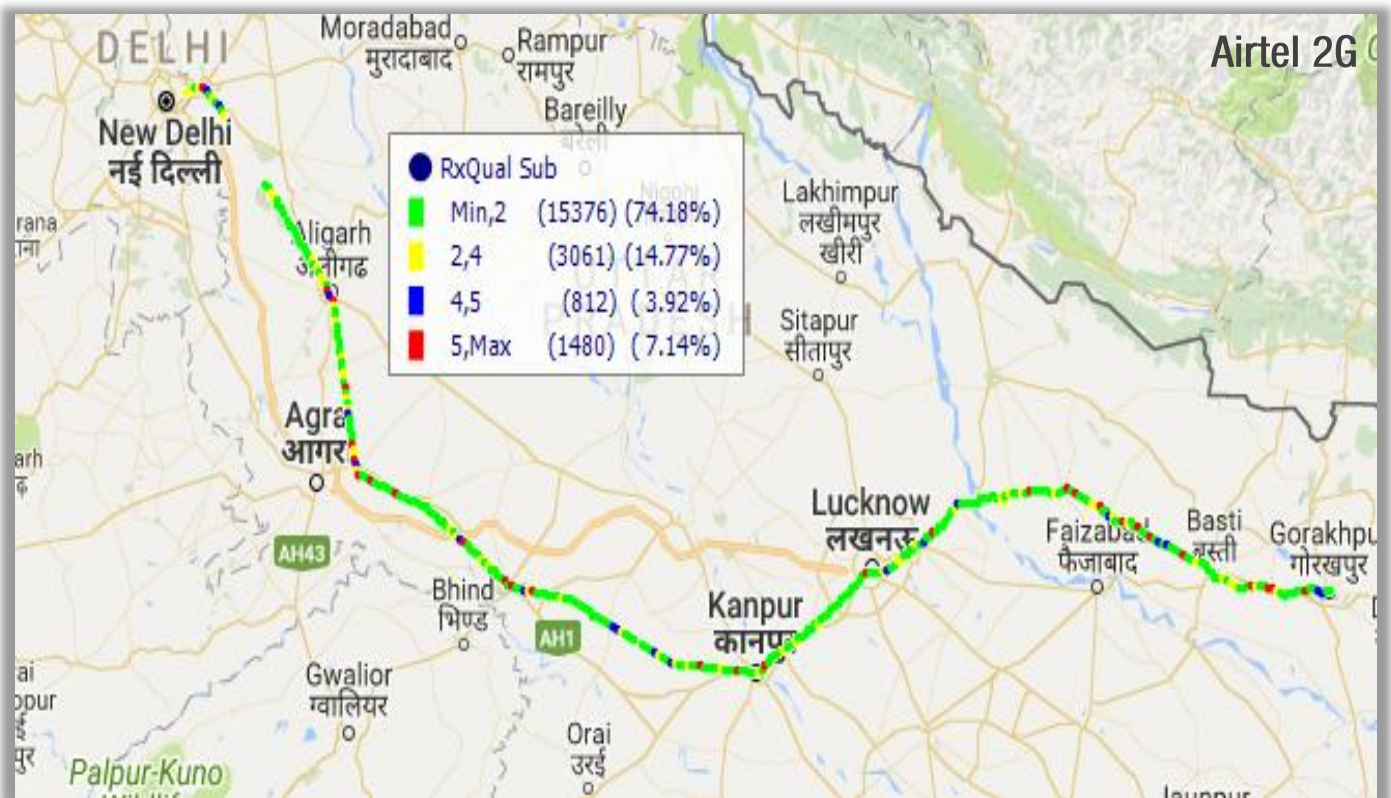
II. Quality Details

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 $\geq 95\%$.

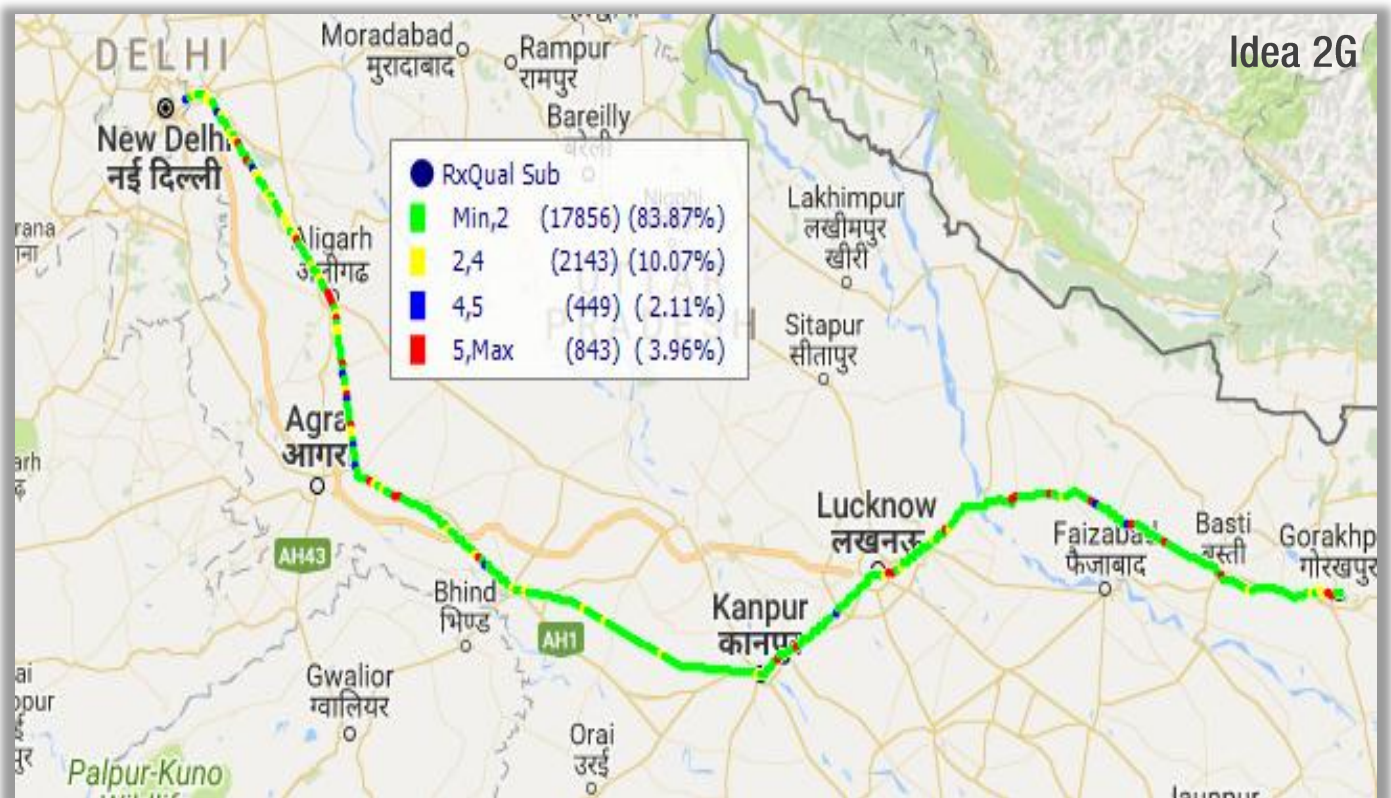
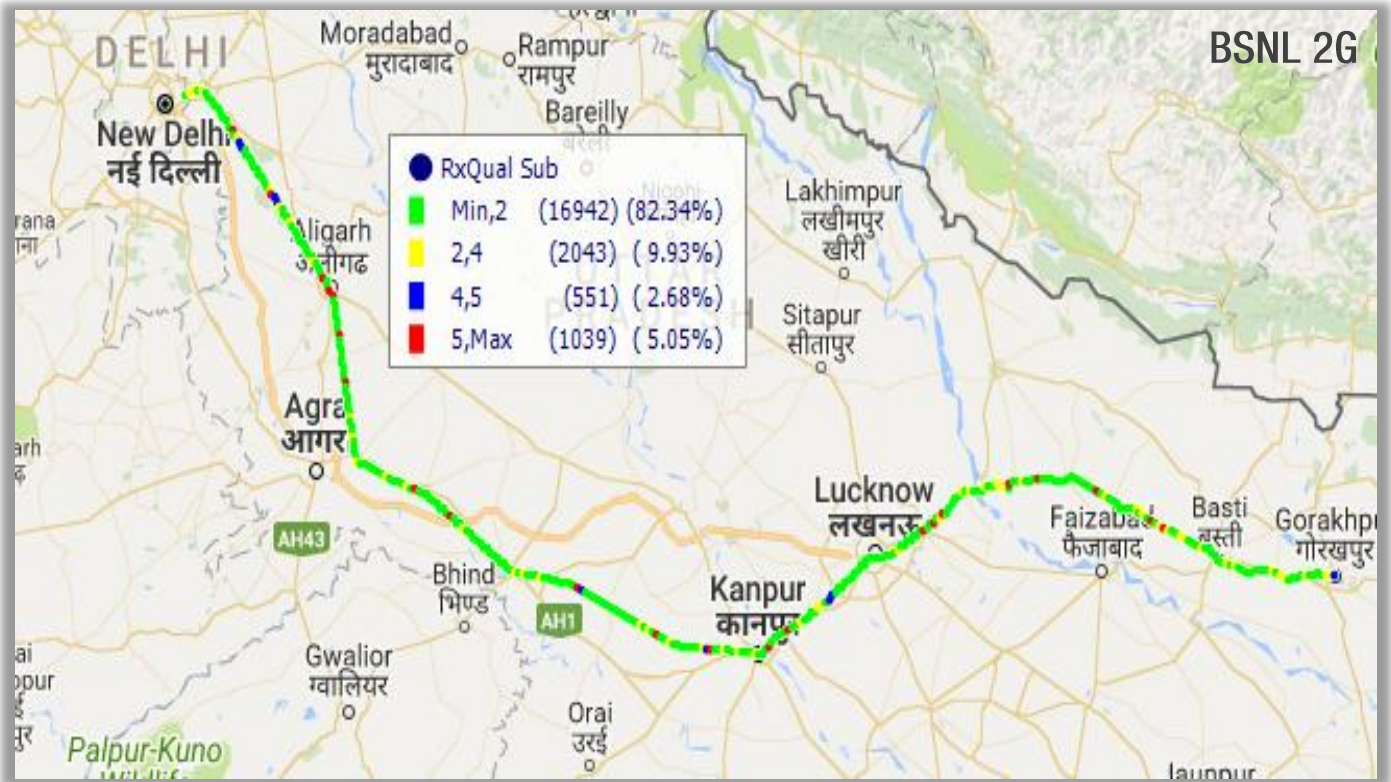
TSP	Rx Quality
Airtel 2G	92.86%
BSNL 2G	94.95%
Idea 2G	96.04%
Tata 2G	92.95%
Vodafone 2G	93.36%
Airtel Dual(2G/3G)	90.75%
BSNL Dual(2G/3G)	93.38%
Idea Dual(2G/3G)	93.00%
Tata Dual(2G/3G)	88.09%
Vodafone Dual(2G/3G)	89.34%
Jio VoLTE	79.59%



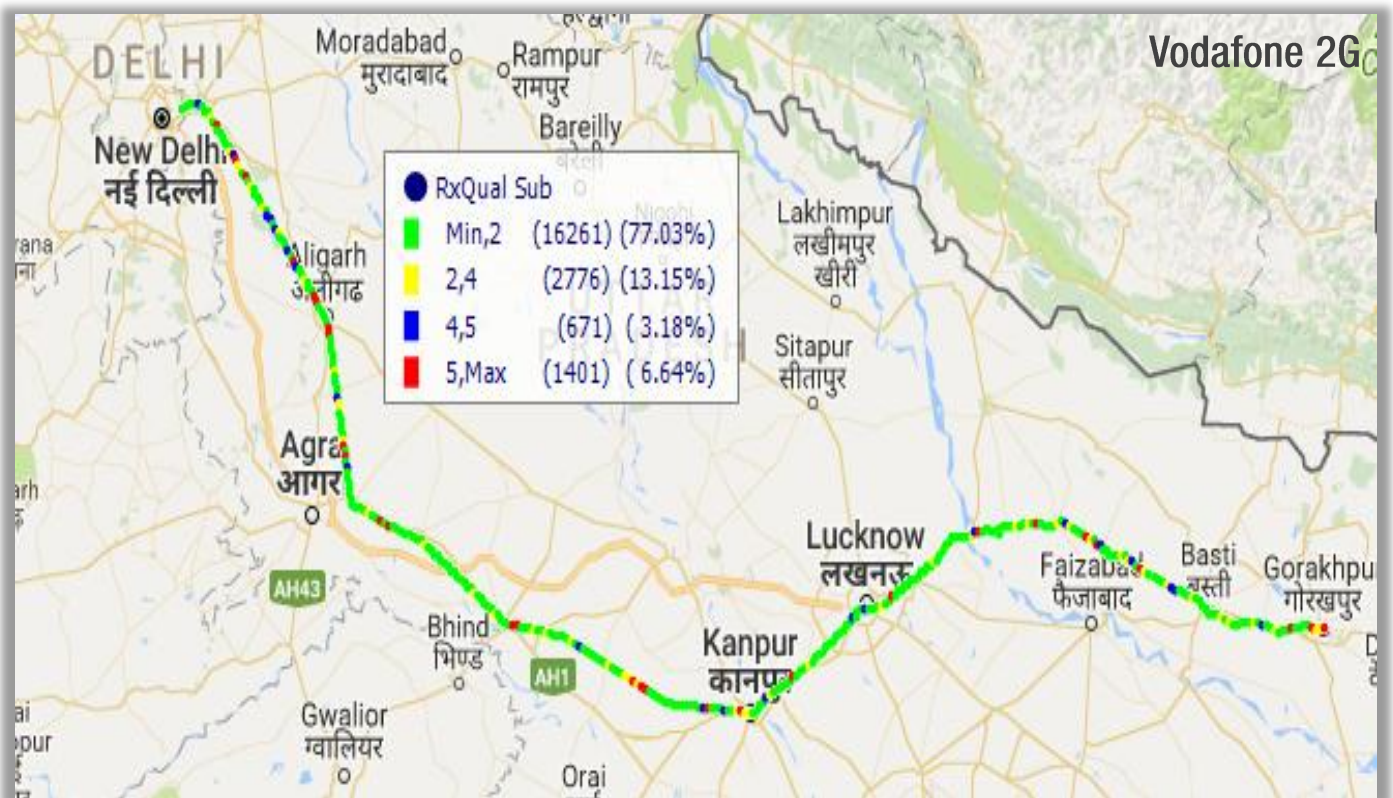
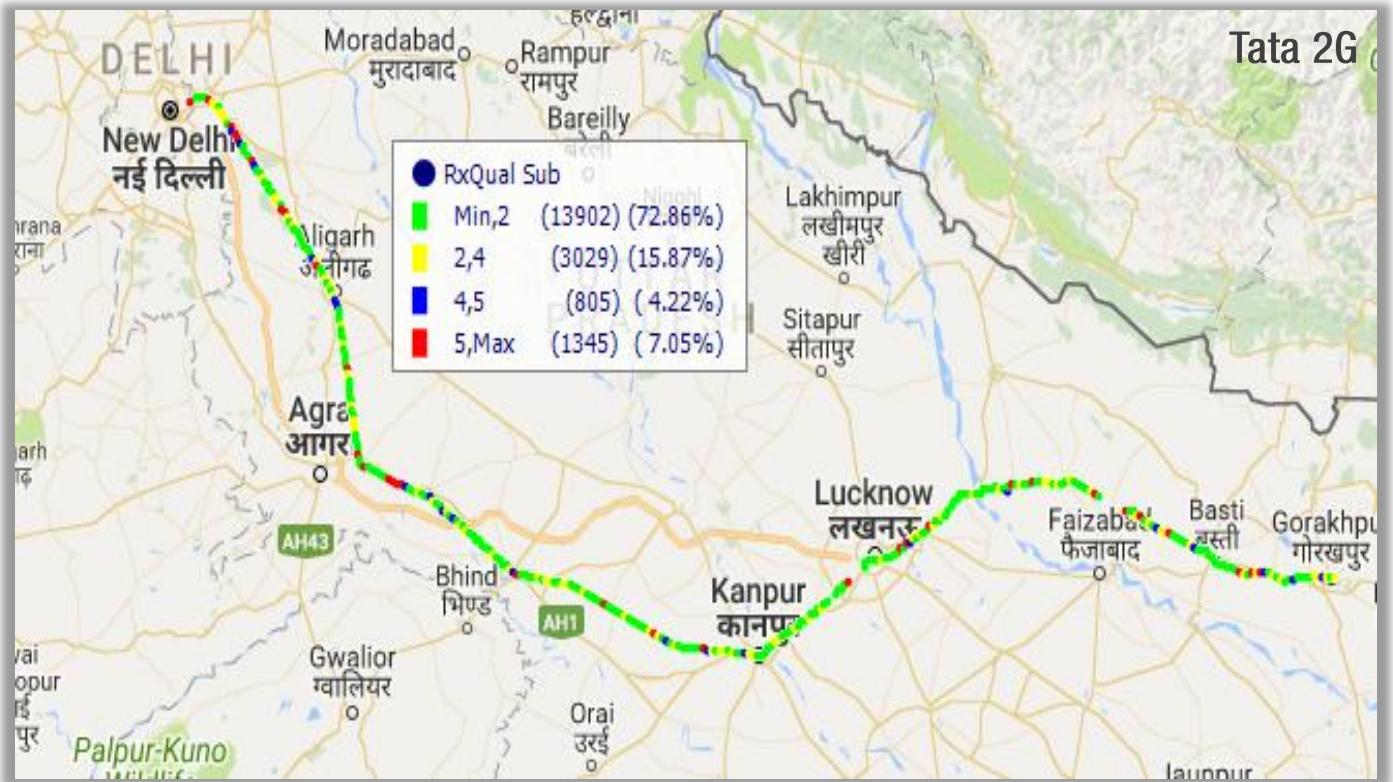
— TSPs not meeting the Benchmark



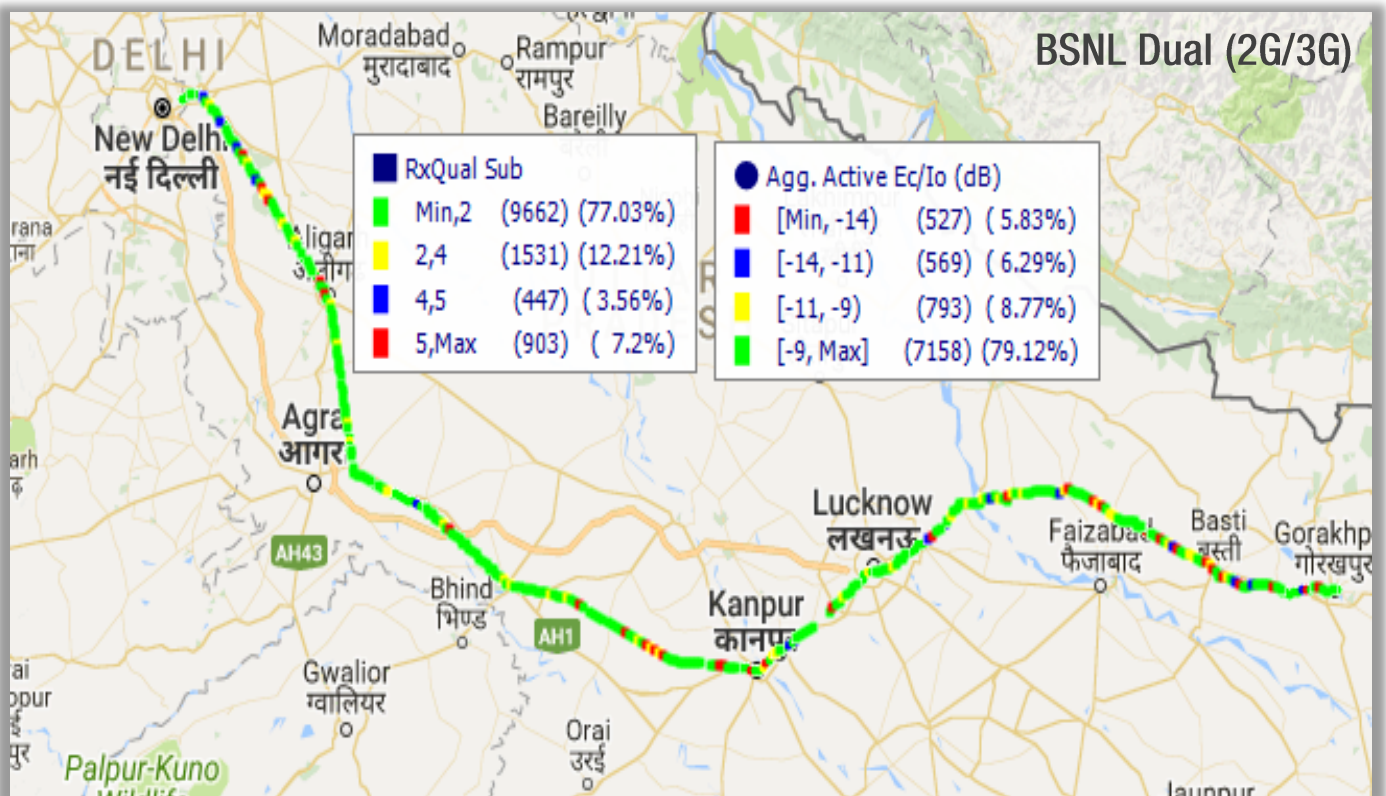
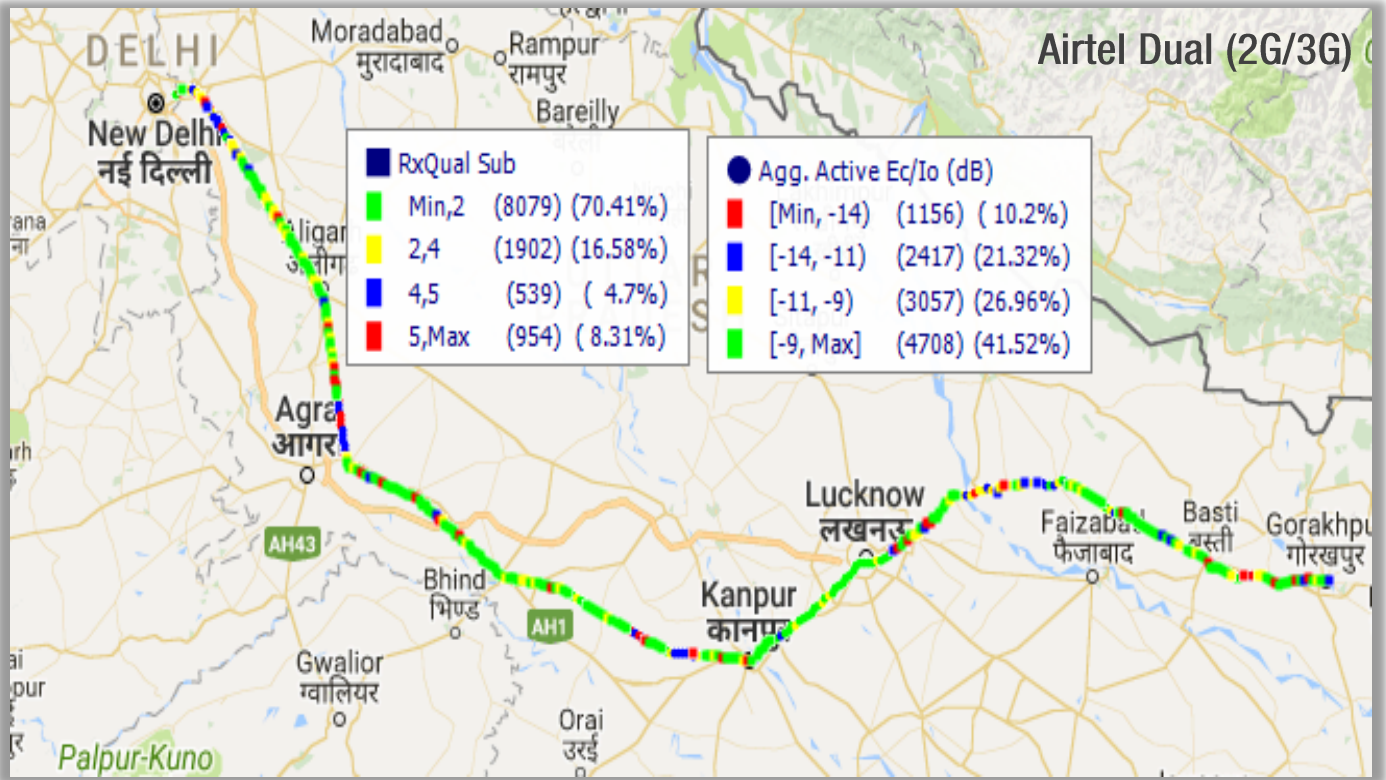
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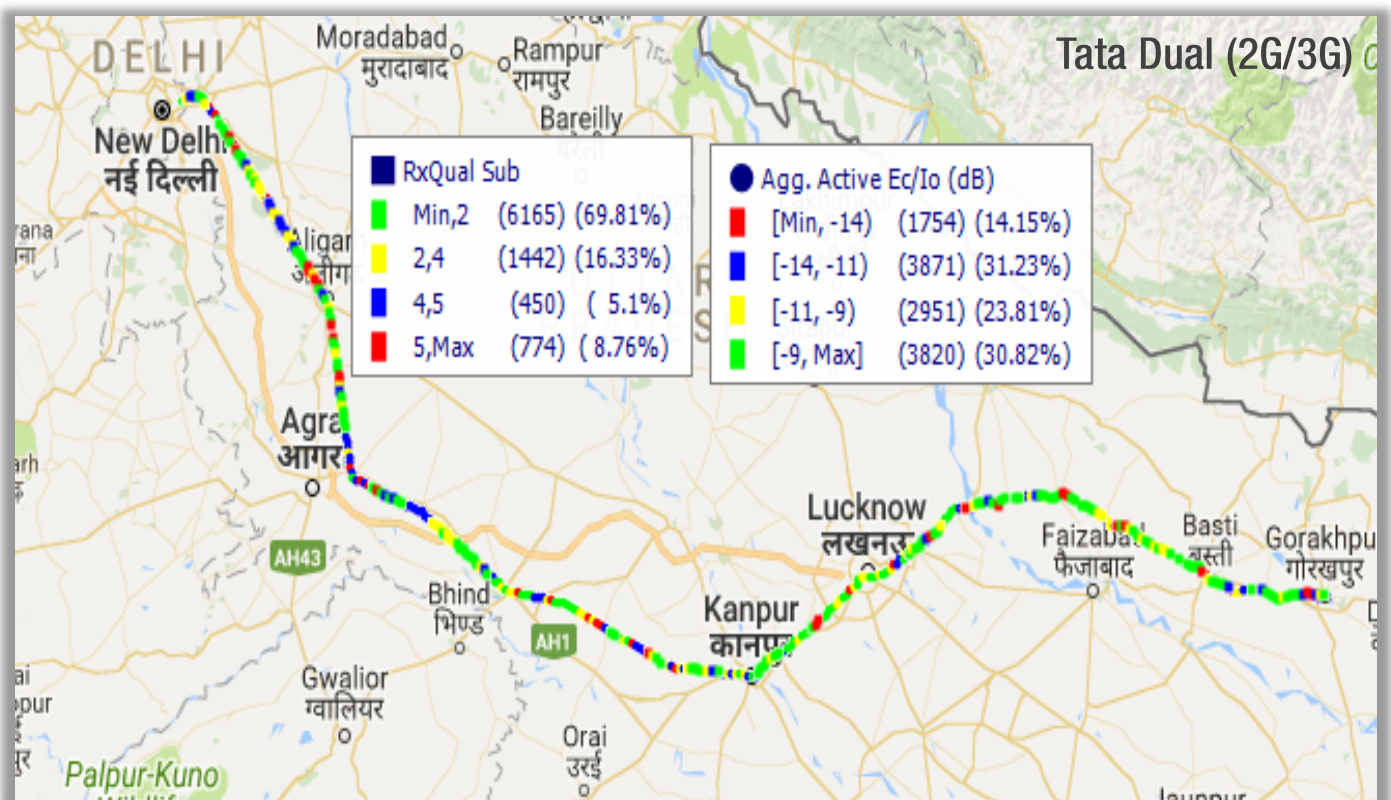
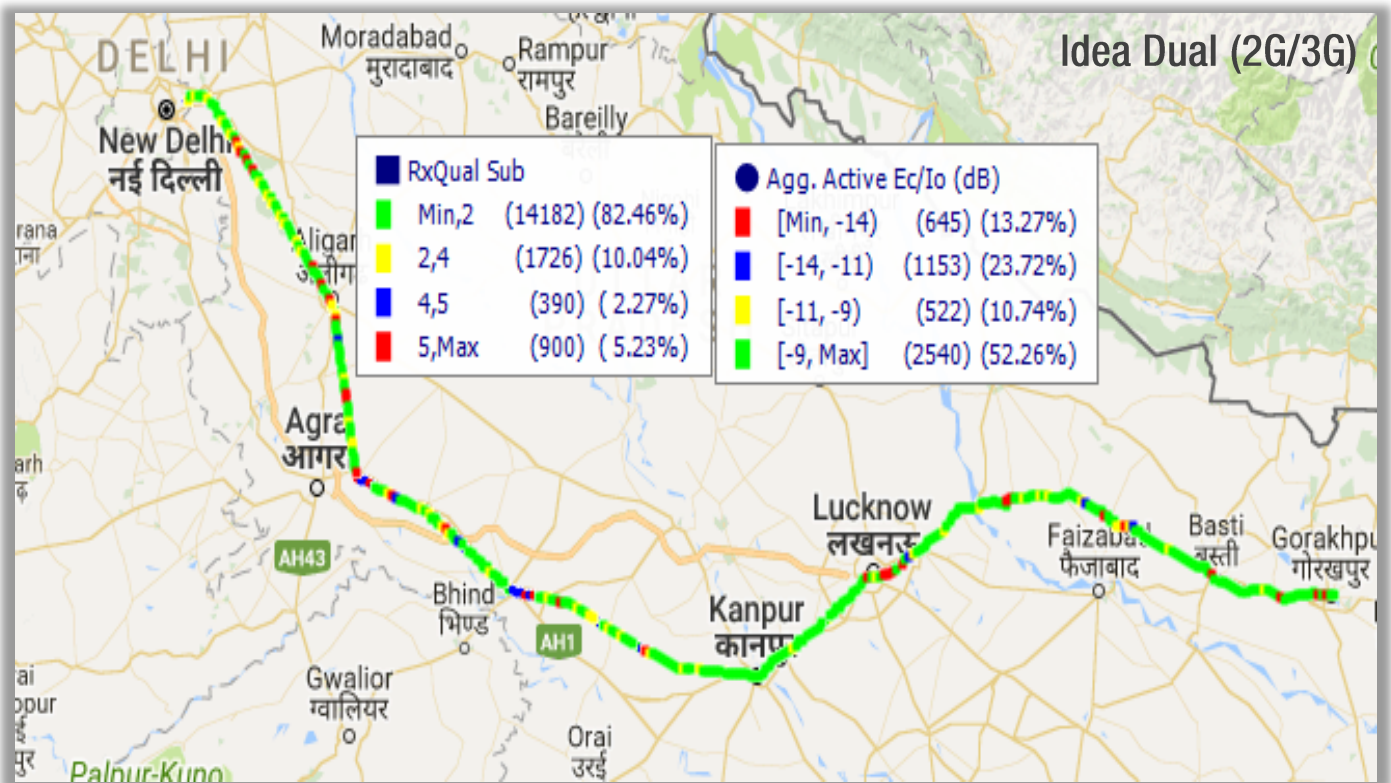
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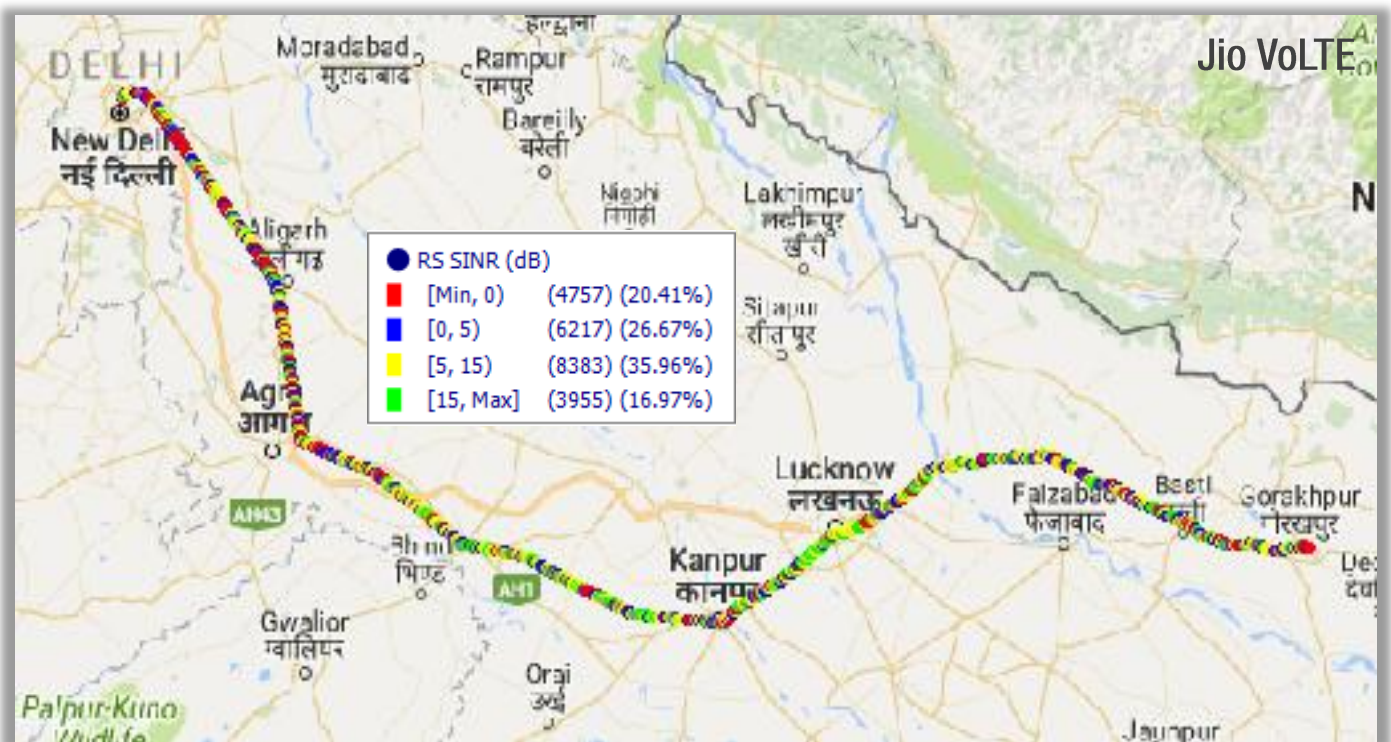
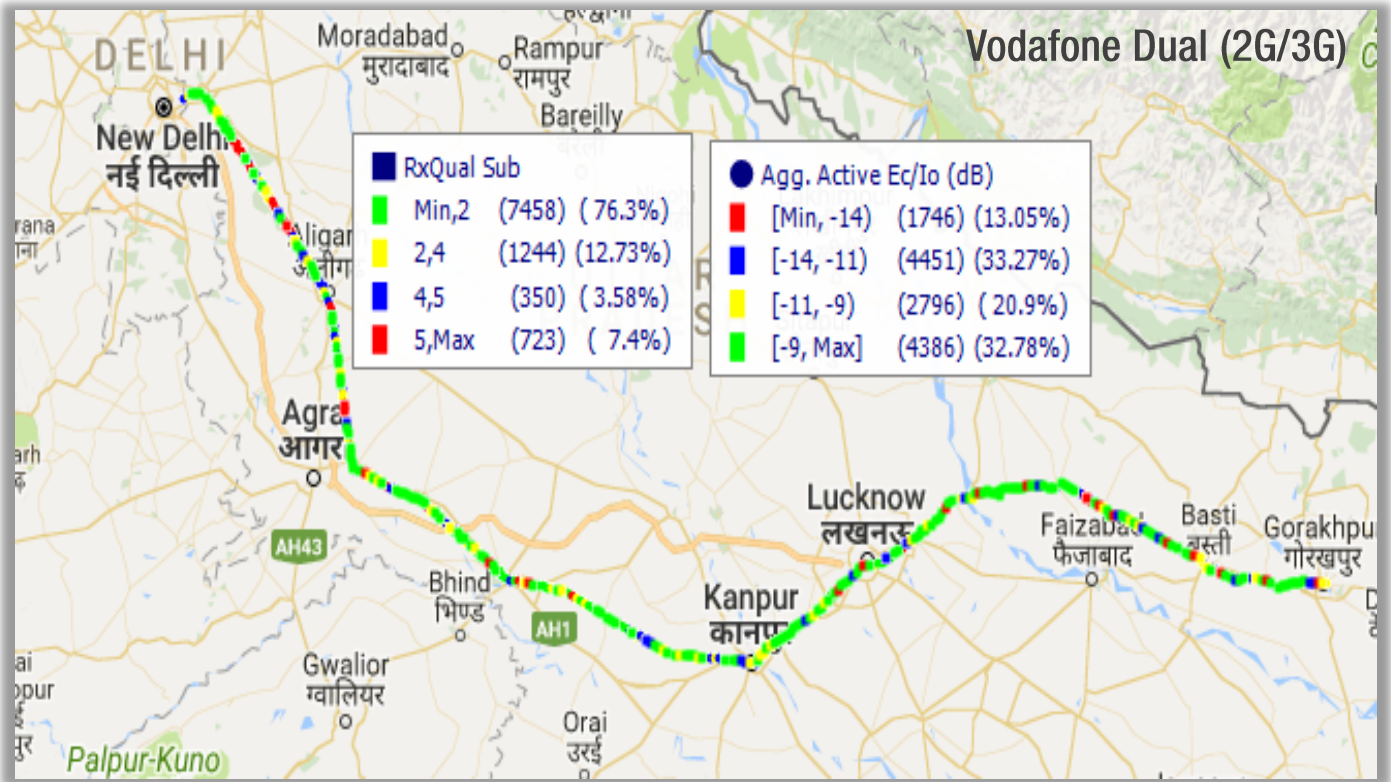
II. Quality Details (contd.)



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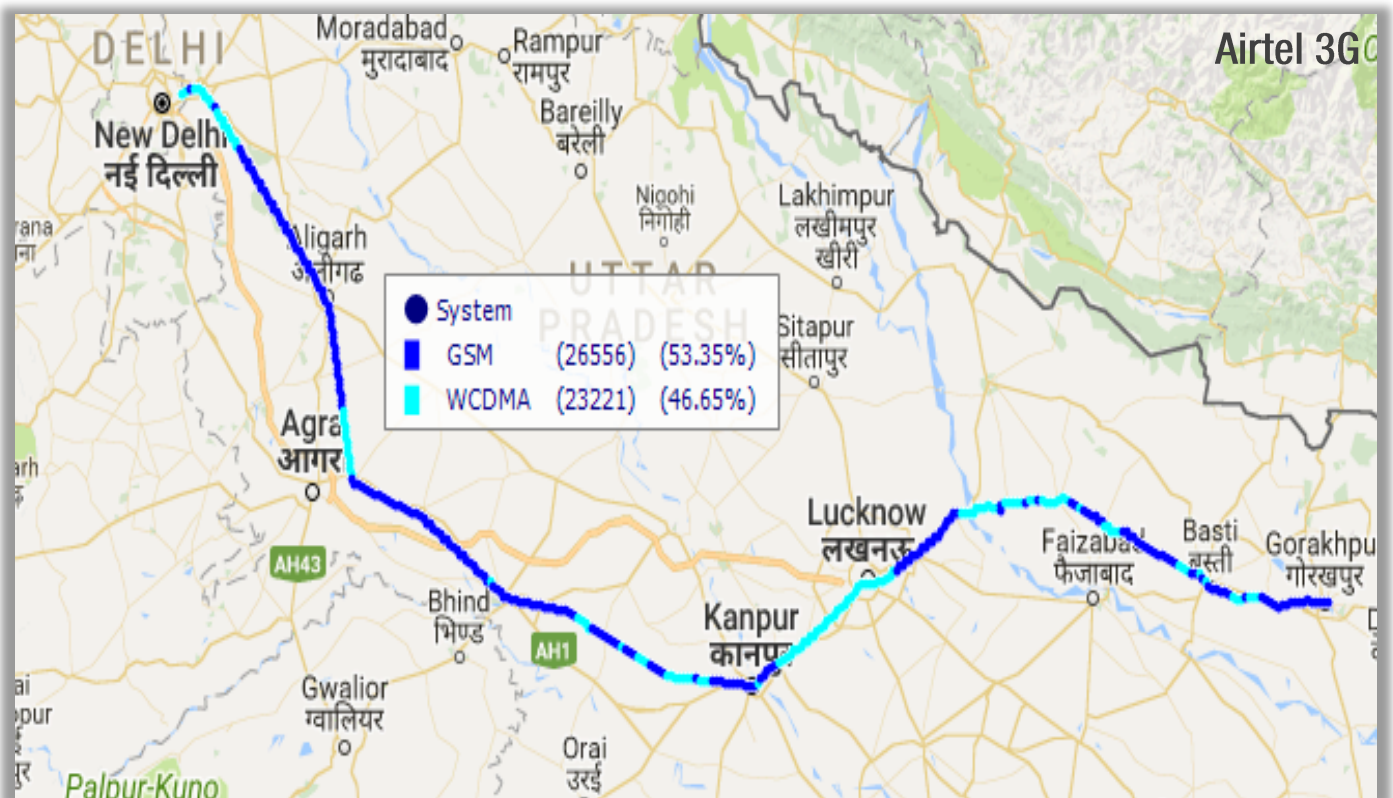
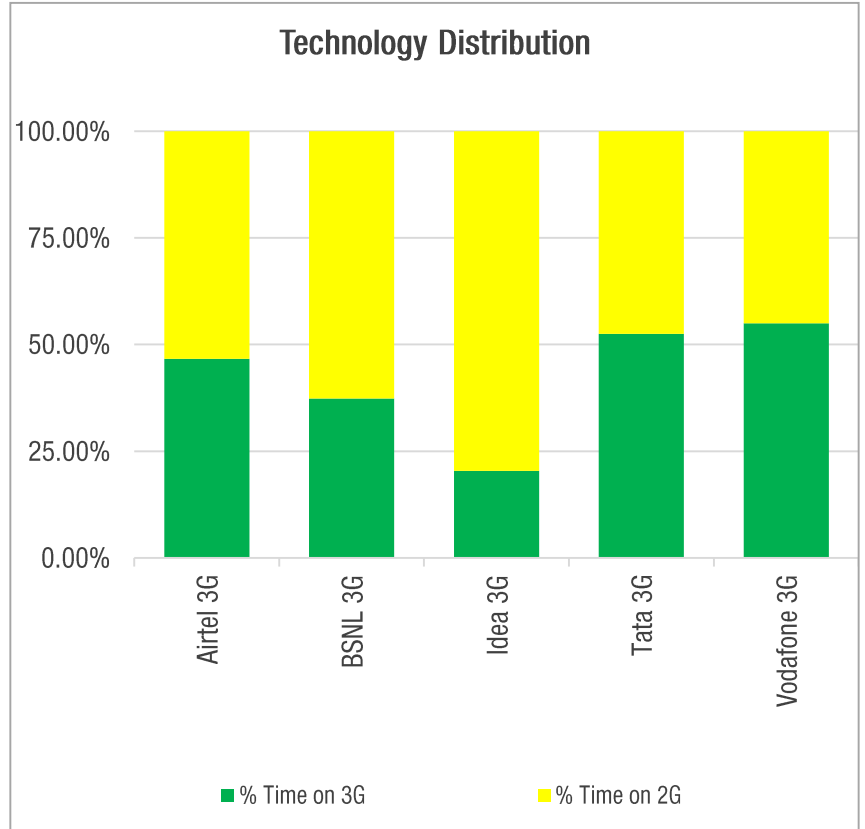


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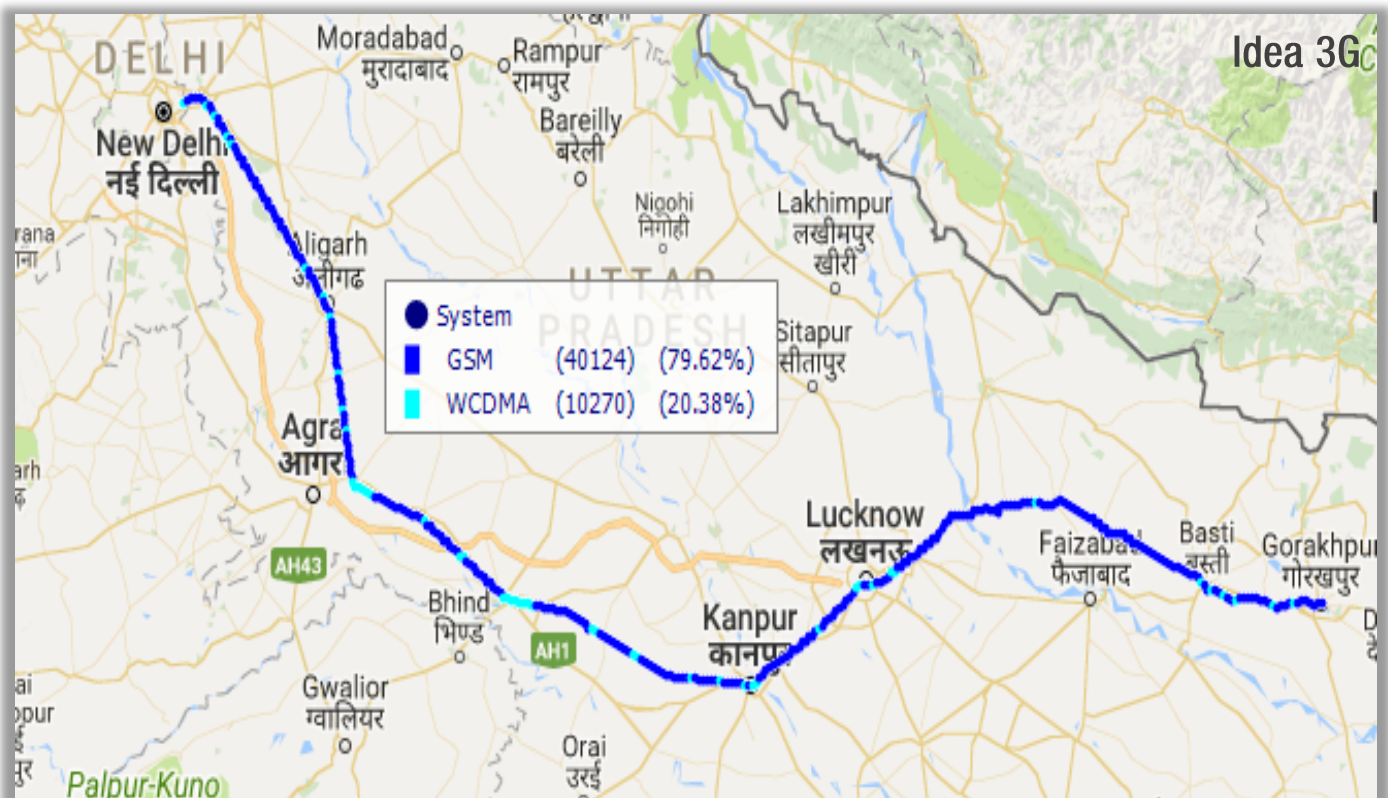
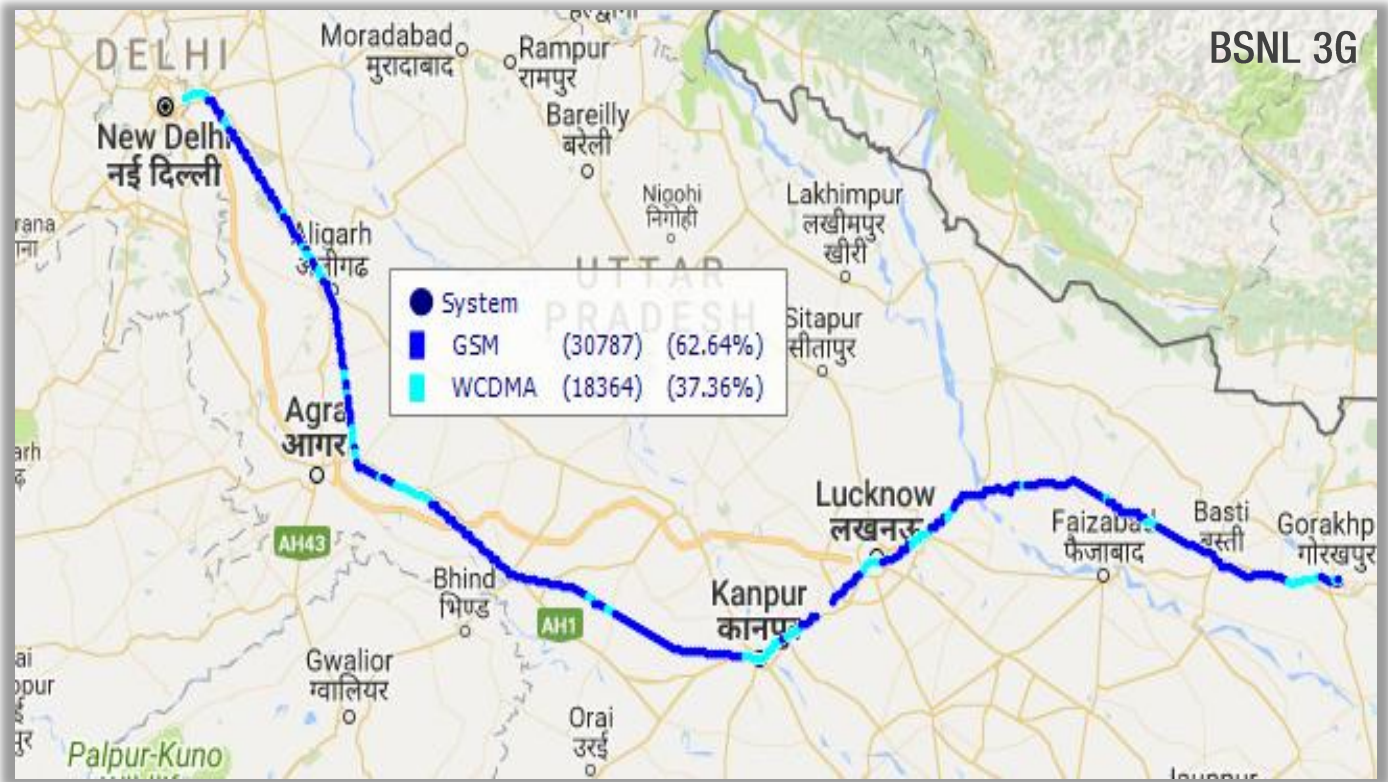


III. Technology Details

TSP	% Time on 3G
Airtel 3G	46.65%
BSNL3G	37.36%
Idea 3G	20.38%
Tata 3G	52.50%
Vodafone 3G	54.98%



III. Technology Details(contd.)



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