



INDEPENDENT DRIVE TEST REPORT

For

Hyderabad to Bangalore Highway Dec 2017

SOUTH ZONE

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

The Independent Drive Test has been carried out by M/s PhiMetrics Technologies Pvt. Ltd. on behalf of TRAI at Hyderabad to Bangalore Highway from 9:00 AM to 9:00 PM from 6th Dec to 7th 2017. The drive test covered highway of 580 KMs over a period of 2 day. Approximately 430 calls were made for each of the 13 networks: Seven 2G networks, four 3G networks, one CDMA 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 6th Dec to 7th Dec 2017 covering the highway between Hyderabad to Bangalore. 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 Hyderabad to Bangalore Highway:

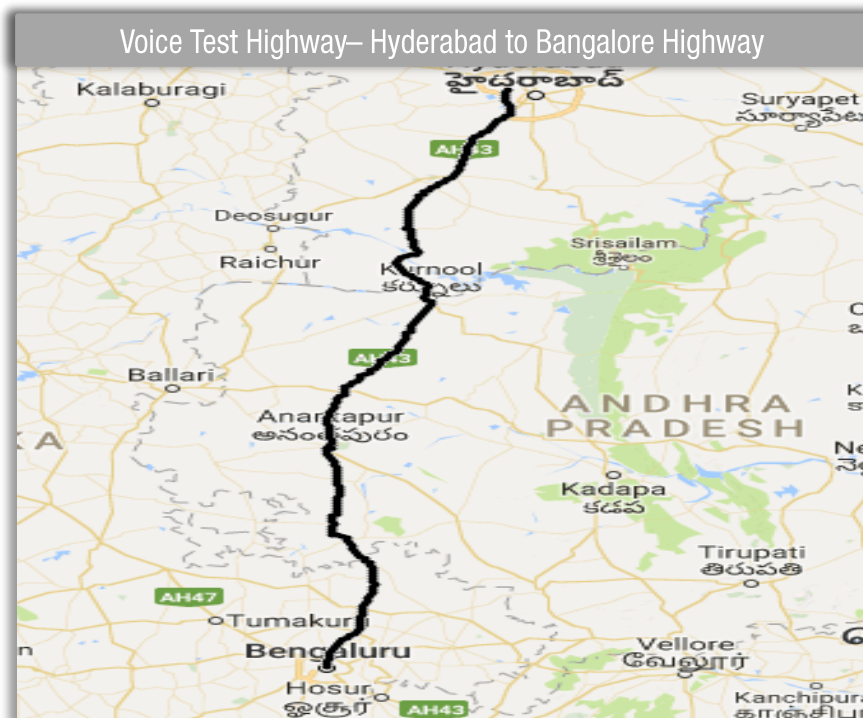
Independent Drive test was conducted for a period of 2 day i.e. 6th Dec to 7th Dec 2017 From Hyderabad to Bangalore Highway from 9:00 AM to 9:00 PM. Calls were made for 90 sec duration with wait time of 10 sec between calls in all technologies.

Voice Tests: The drive test covered a highway of approximately 580 KMs over a period of 2 day on 6th Dec to 7th Dec 17. Approximately 430 calls were made for each of the 13 networks: seven 2G (Lock Mode) networks, four 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.

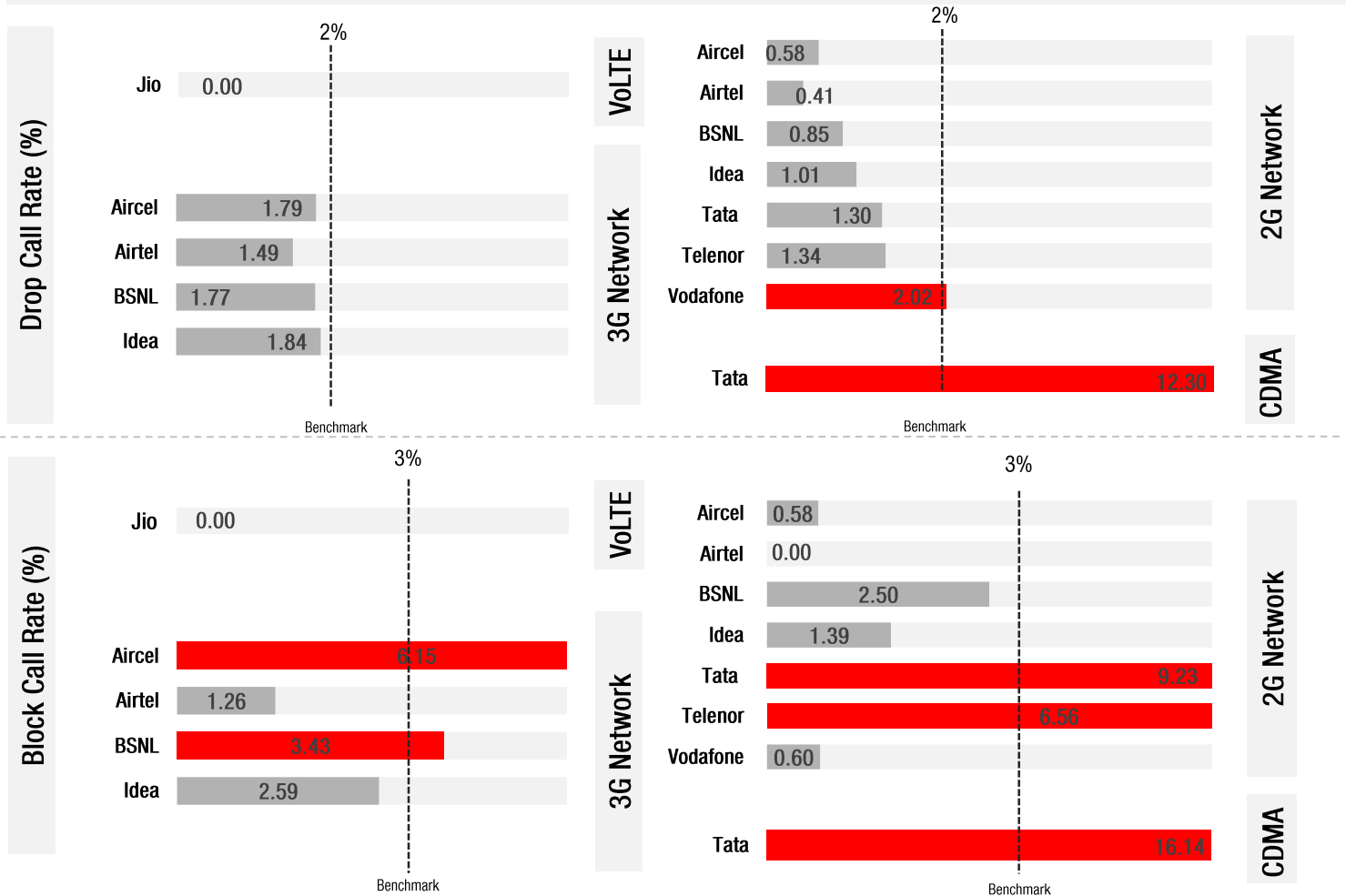
* 3G KPI's which is calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.



Voice Calls

Key Observations

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



KPI	2G Networks						
	Aircel	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
SDCCH Congestion%	0.58%	0.00%	0.63%	0.00%	0.00%	1.25%	0.20%
TCH Congestion %	0.00%	0.00%	1.89%	1.39%	9.23%	5.38%	0.40%

KPI	3G			
	Aircel	Airtel	BSNL	Idea
SDCCH Congestion%	0.56%	0.00%	0.86%	0.00%
RRC Congestion%	4.47%	0.42%	1.07%	2.00%
SDCCH & RRC Congestion%	5.03%	0.42%	1.93%	2.00%
TCH Congestion %	0.59%	0.42%	1.09%	0.00%
RAB Congestion %	0.59%	0.42%	0.44%	0.61%
TCH & RAB Congestion %	1.18%	0.84%	1.53%	0.61%

- All TSPs have met the 2% QoS benchmark of Drop Call Rate (DCR%) except Vodafone 2G & Tata CDMA.
- Call Block Rate (CBR%) benchmark of 3% was achieved by 62% of TSP's.

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%	73.97%	88.50%	85.20%	85.88%	78.02%	55.40%	73.60%	50.92%

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

TSPs	3G				VoLTE
	Aircel	Airtel	BSNL	Idea	Jio
Coverage %	68.15%	58.34%	80.38%	80.78%	95.04%

c) Percentage of time spent on 3G network:

TSPs	3G			
	Aircel	Airtel	BSNL	Idea
% Time Spent on 3G	47.94%	82.55%	35.03%	42.57%

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

TSPs	2G						
	Aircel	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
% of Cells \Rightarrow 48	0.47%	0.00%	48.19%	0.00%	27.27%	1.04%	0.26%

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

Summary

City Level Summary

Voice Call	2G							CDMA
	Aircel*	Airtel	BSNL	Idea	Tata	Telenor	Vodafone	Tata
Call Attempt	172	488	480	502	509	320	499	223
Blocked Call Rate (%)	0.6%	0.0%	2.5%	1.4%	9.2%	6.6%	0.6%	16.1%
CSSR% (Accessibility)	99.4%	100.0%	97.5%	98.6%	90.8%	93.4%	99.4%	83.9%
Drop Call Rate (%)	0.6%	0.4%	0.9%	1.0%	1.3%	1.3%	2.0%	12.3%
Mobility HOSR (%)	98.9%	99.1%	97.0%	98.6%	99.0%	98.4%	98.8%	100.0%
Rx Quality (%)	93.9%	97.3%	98.3%	97.1%	96.6%	95.0%	98.4%	86.9%

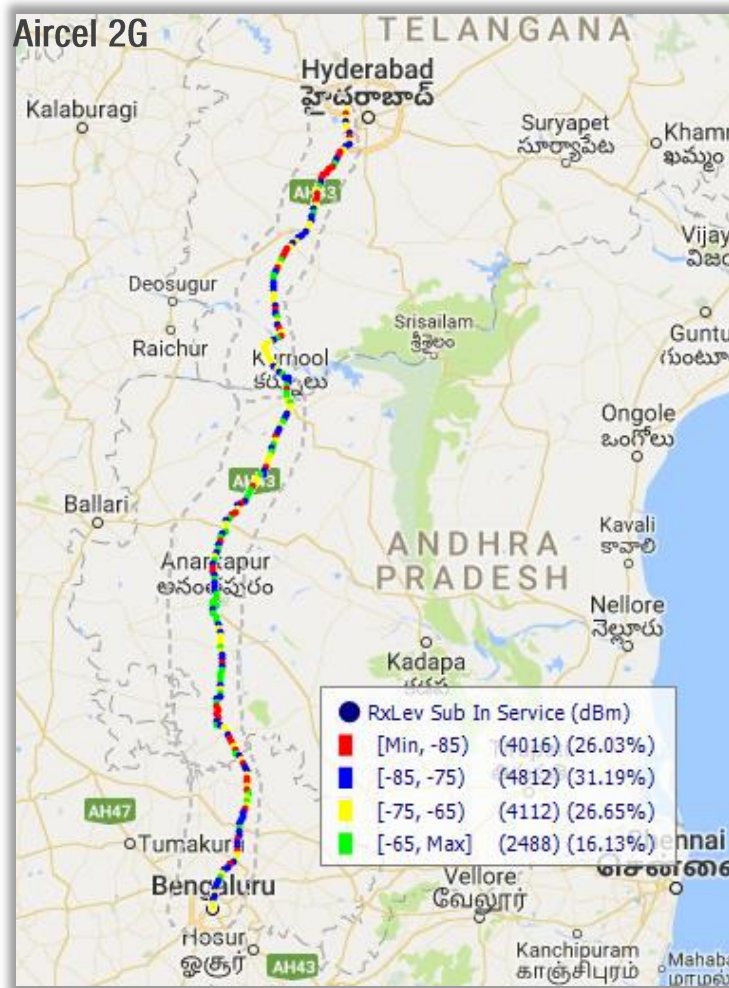
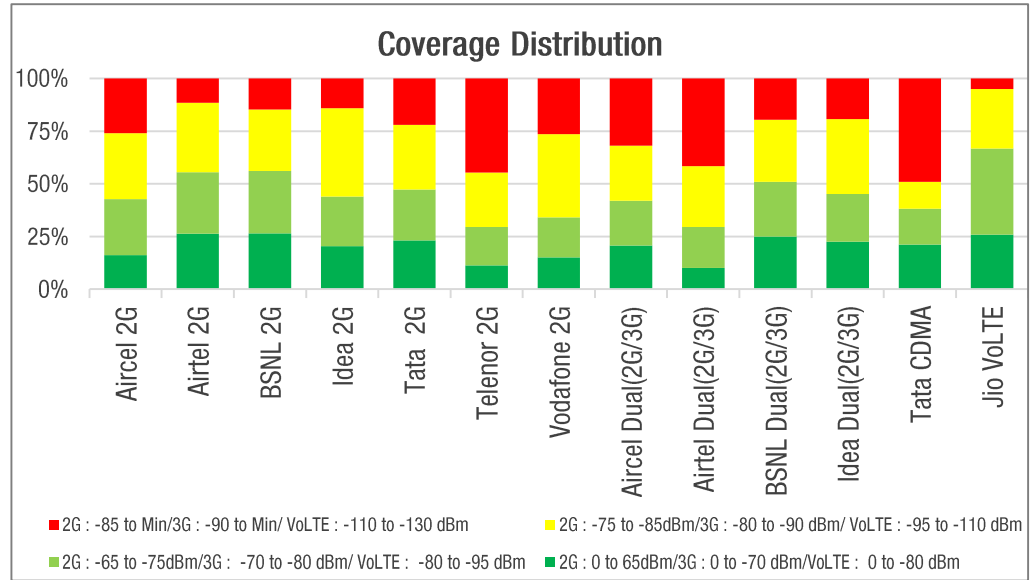
Voice Call	3G				Volte
	Aircel*	Airtel	BSNL	Idea	Jio
Call Attempt	179	476	467	501	491
Blocked Call Rate (%)	6.1%	1.3%	3.4%	2.6%	0.00%
CSSR% (Accessibility)	93.9%	98.7%	96.6%	97.4%	100.0%
Drop Call Rate (%)	1.8%	1.5%	1.8%	1.8%	0.00%
Mobility HOSR (%)	98.5%	99.9%	98.9%	99.7%	99.8%
Rx Quality (%)	89.1%	87.6%	95.9%	94.8%	83.16%

*Calls did not get initiated at some part of the highway for Aircel 2G, Aircel 3G & Tata CMDA operators due to lack of coverage.

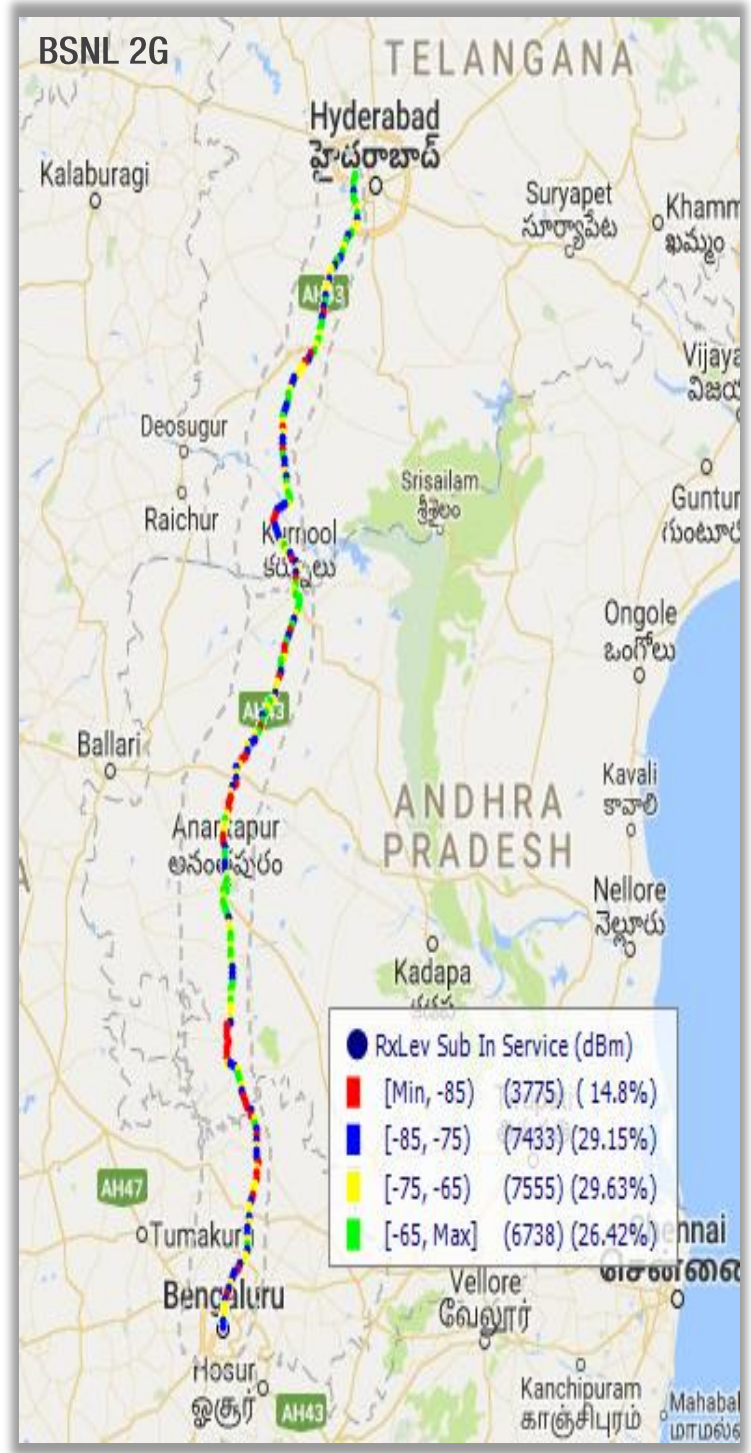
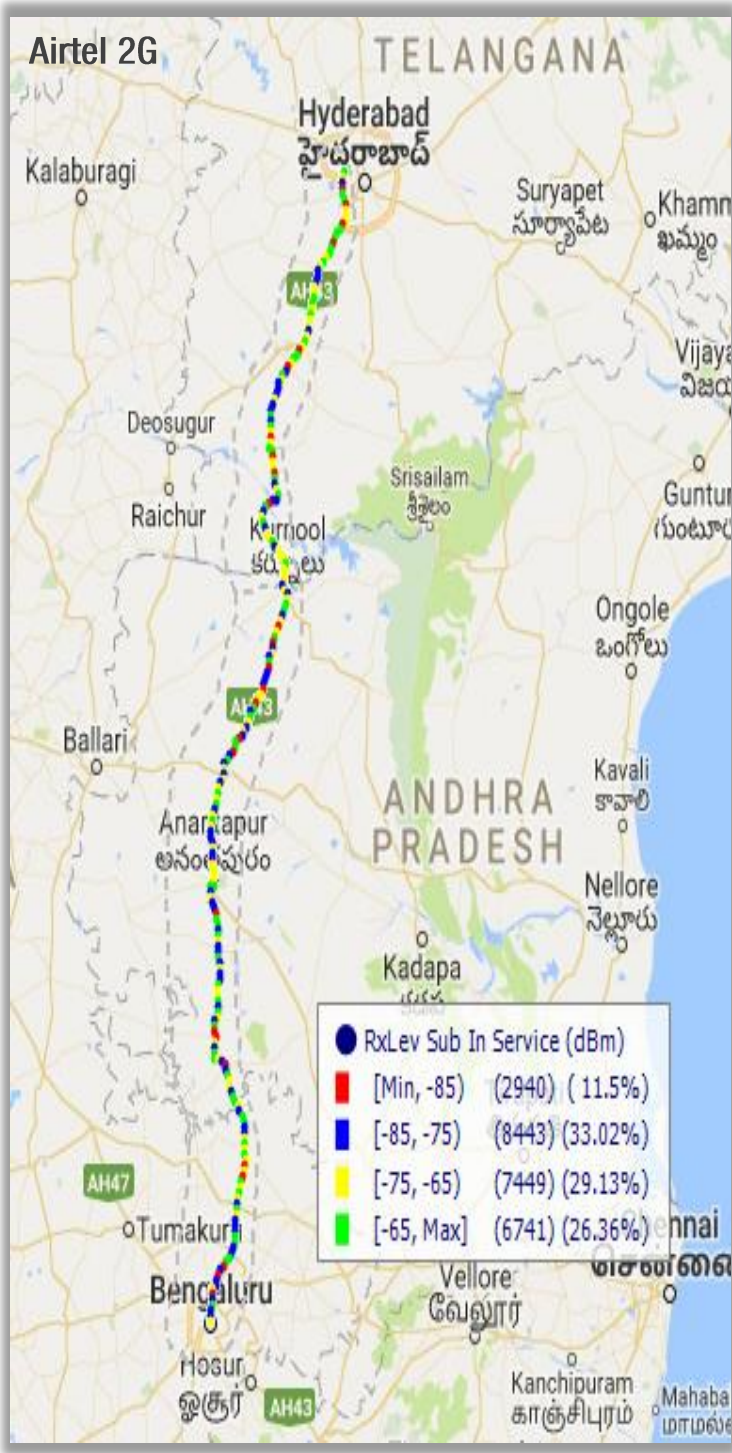
I. Coverage Details

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.

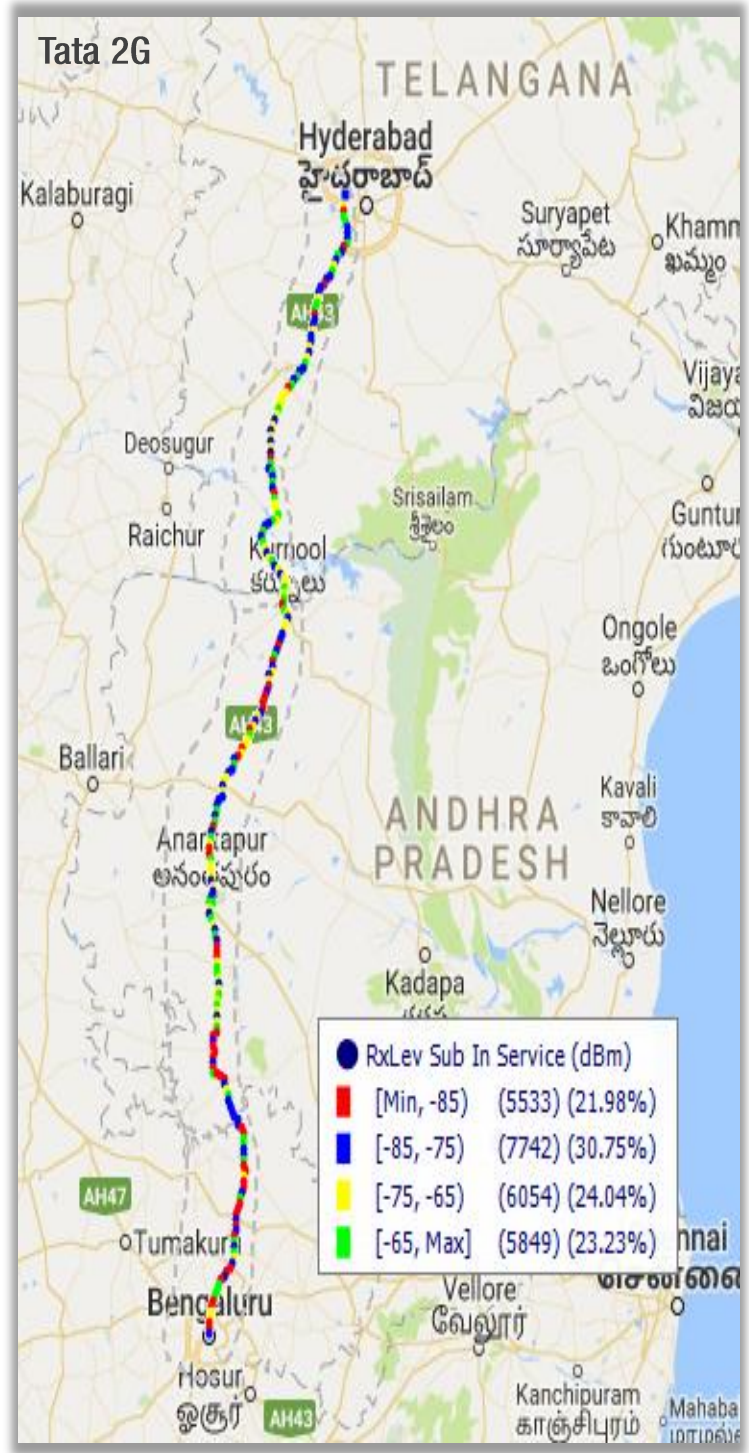
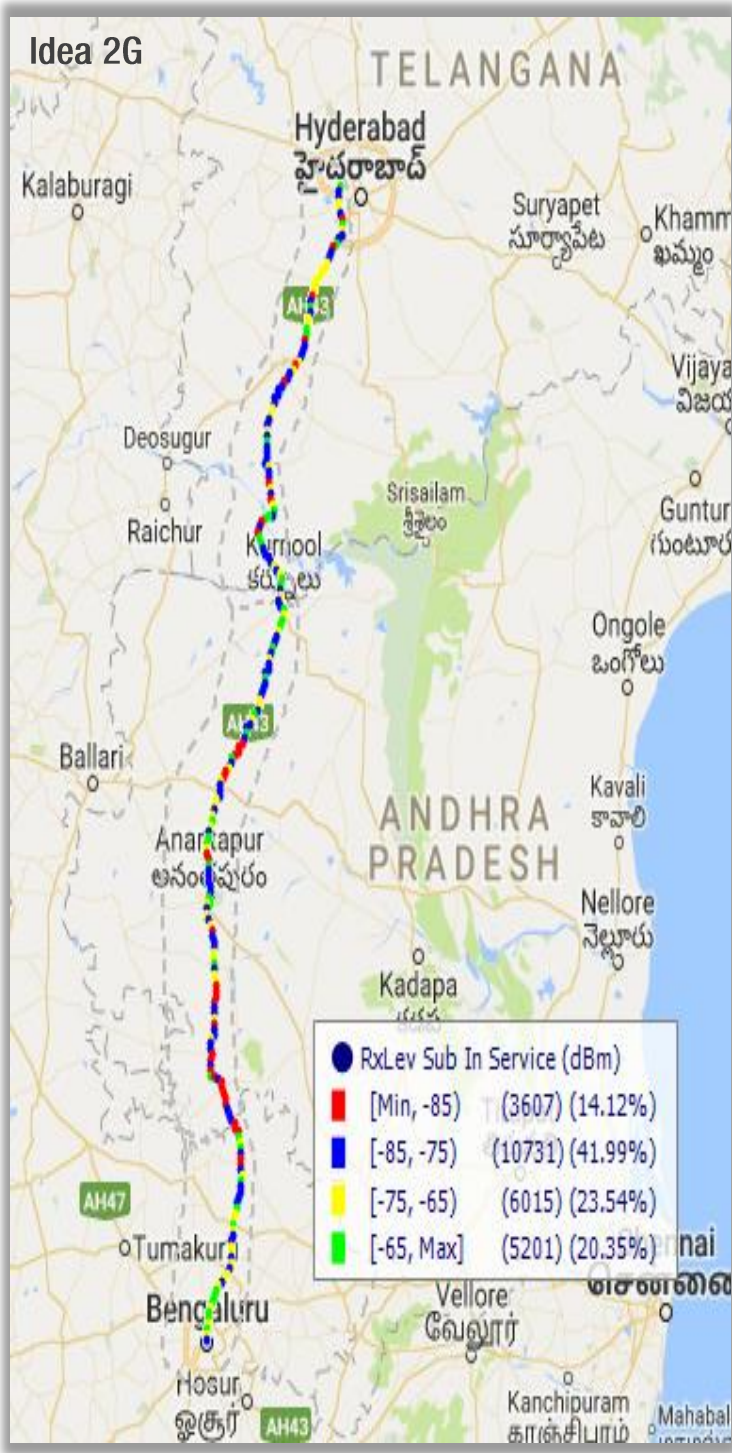
TSP	Coverage Rate
Aircel 2G	73.97%
Airtel 2G	88.50%
BSNL 2G	85.20%
Idea 2G	85.88%
Tata 2G	78.02%
Telenor 2G	55.40%
Vodafone 2G	73.60%
Aircel Dual(2G/3G)	68.15%
Airtel Dual(2G/3G)	58.34%
BSNL Dual(2G/3G)	80.38%
Idea Dual(2G/3G)	80.78%
Tata CDMA	50.92%
Jio VoLTE	95.04%



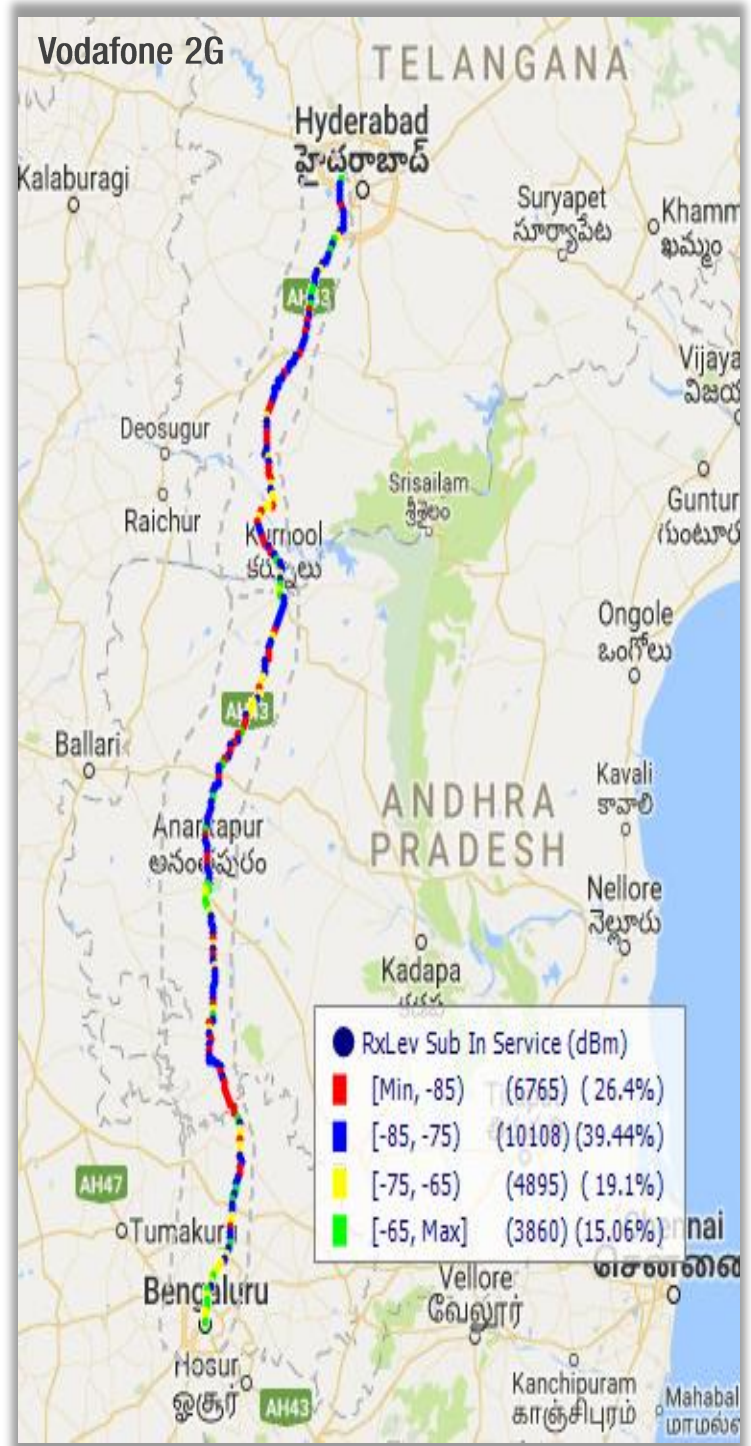
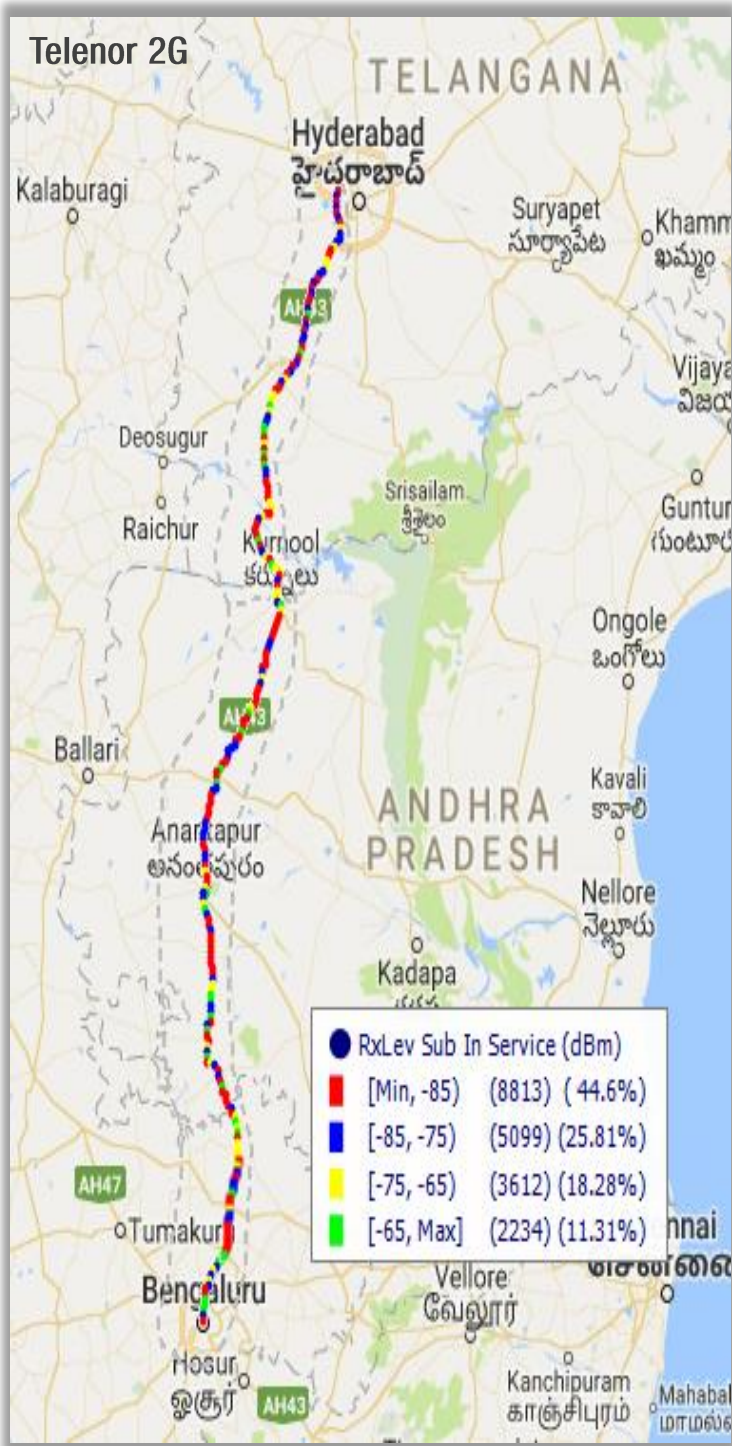
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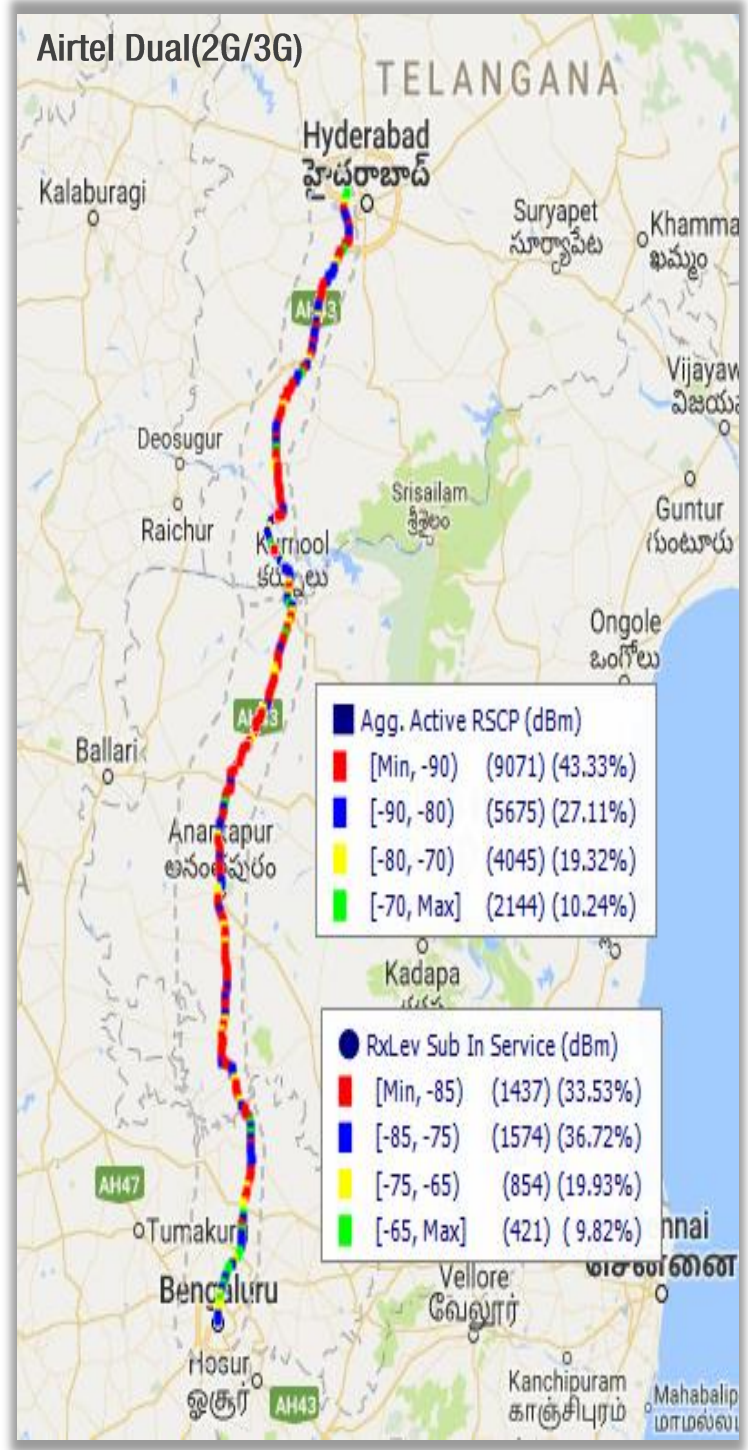
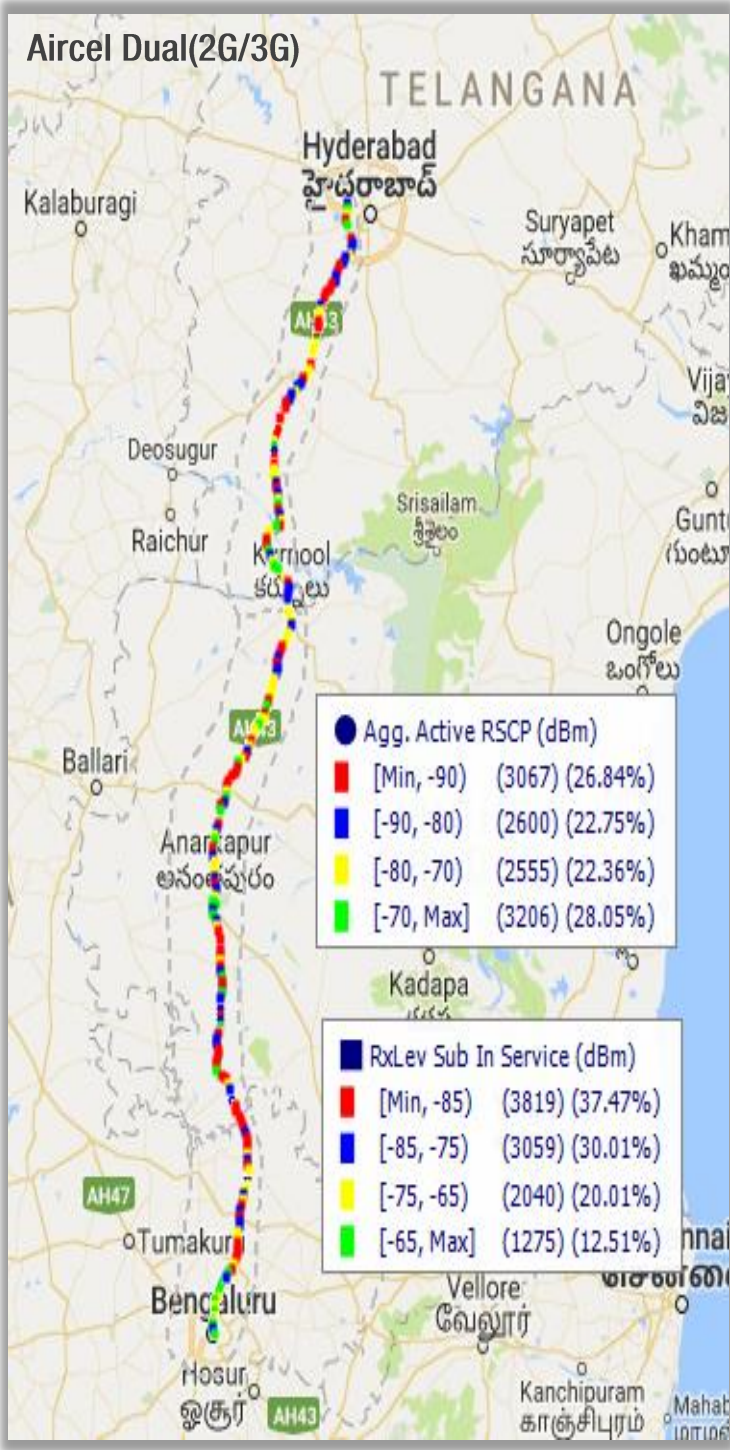
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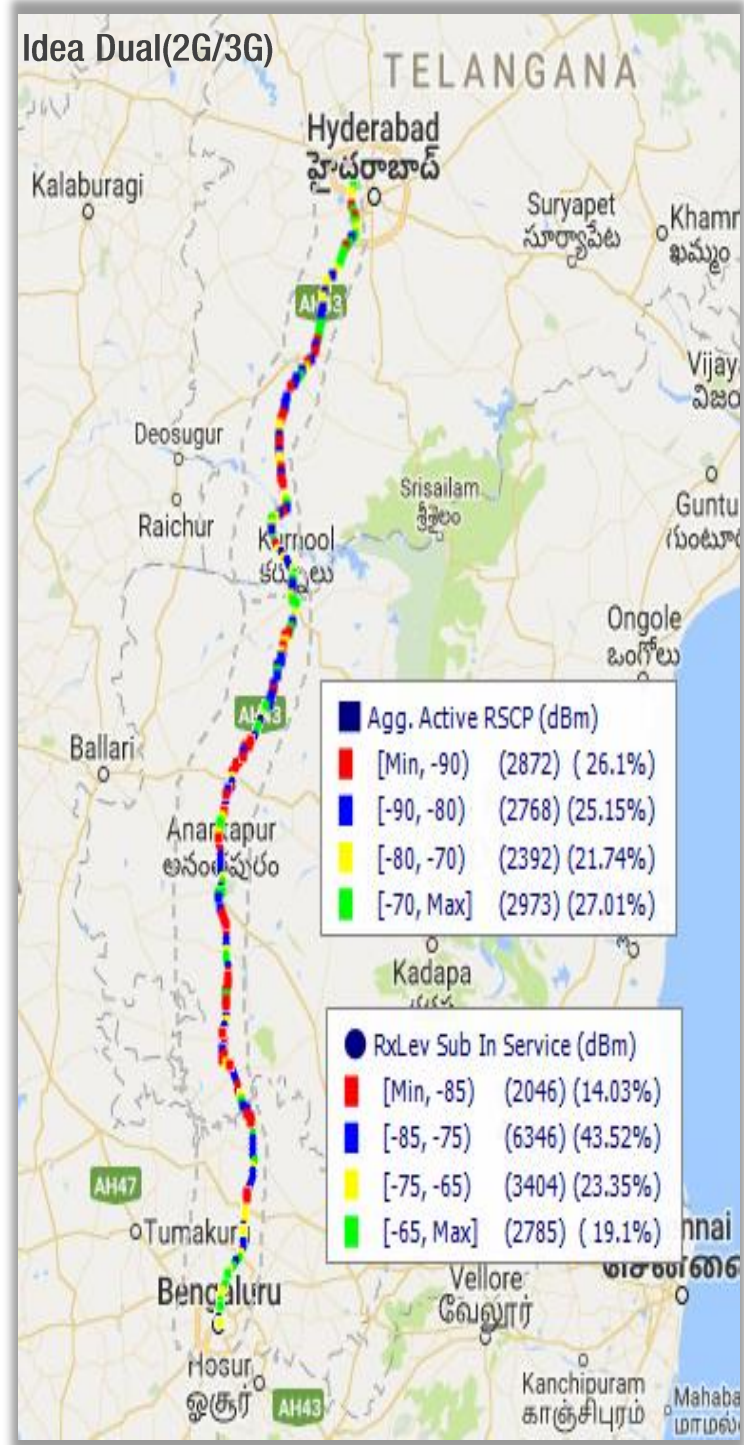
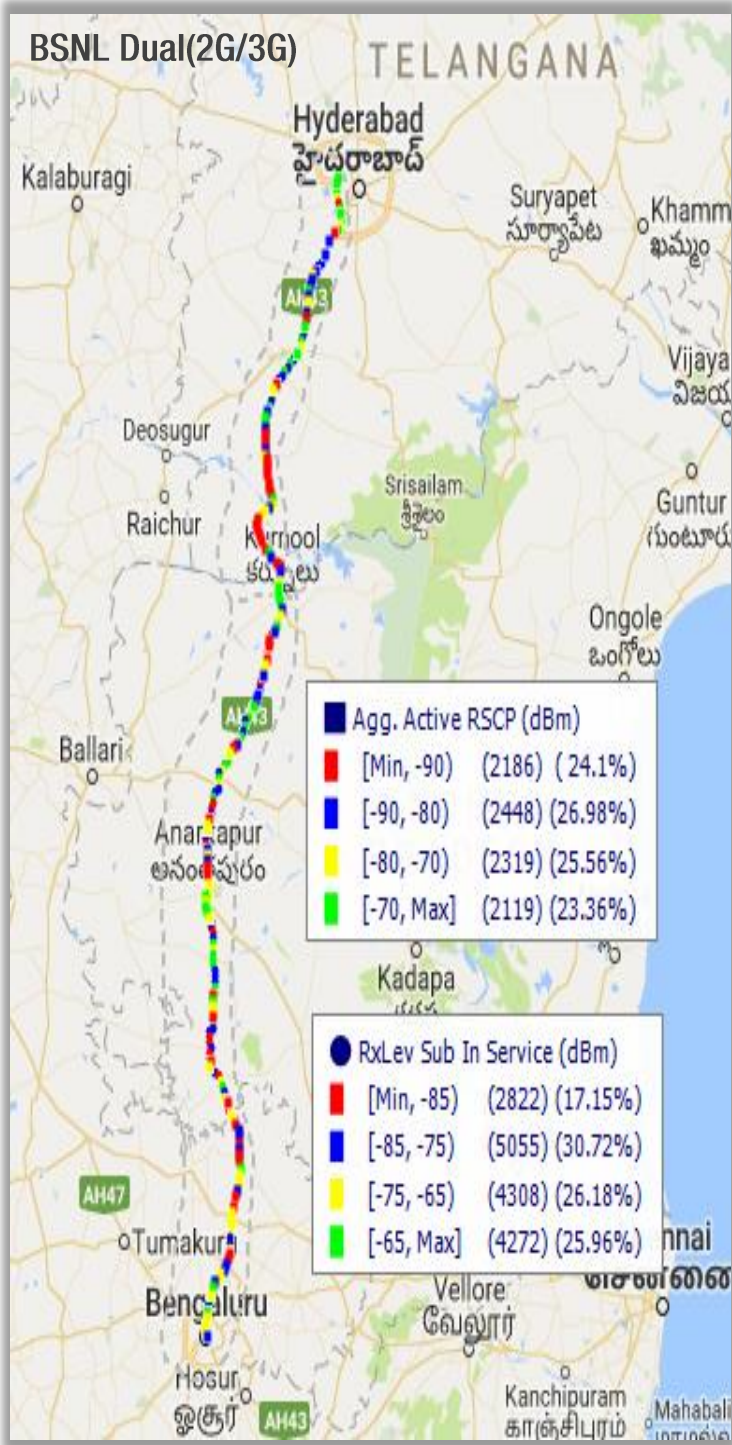
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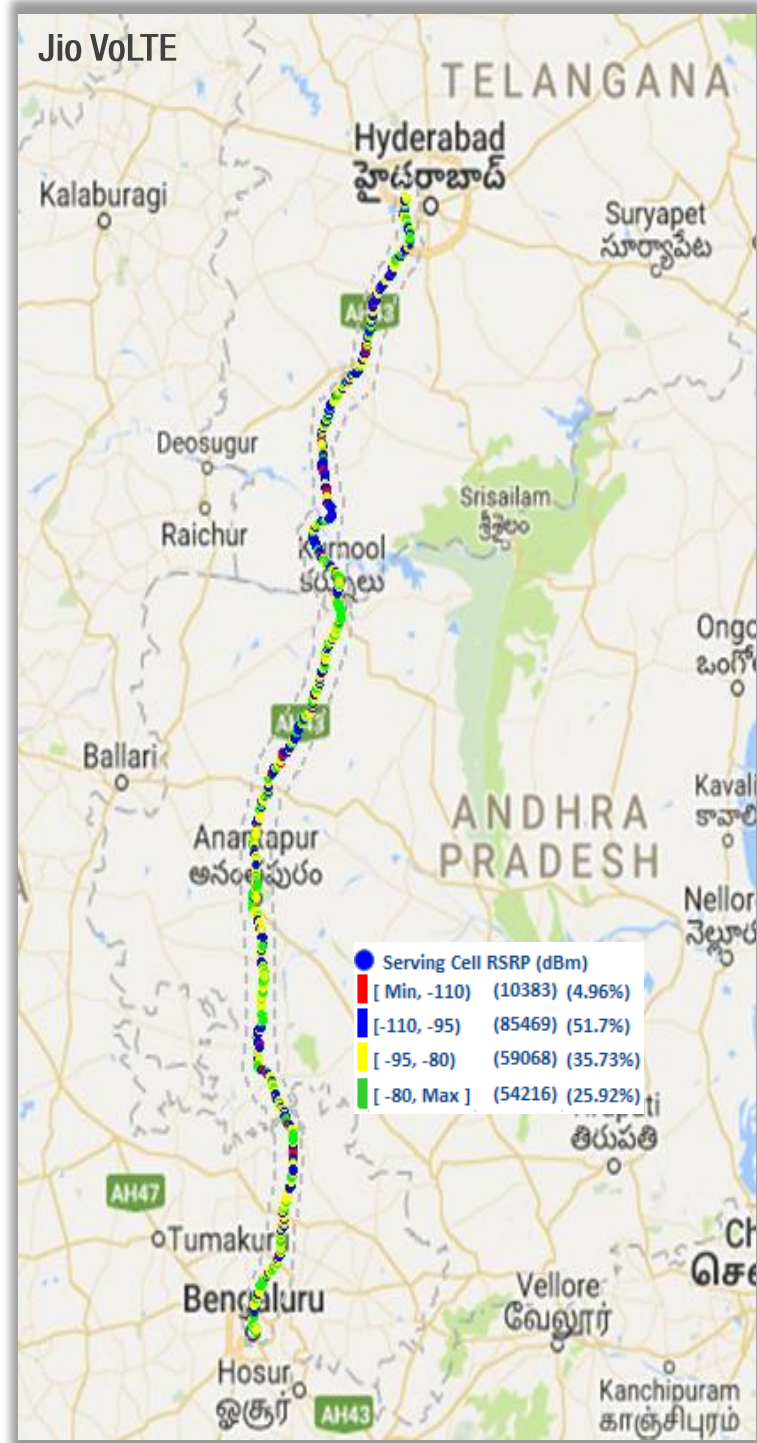
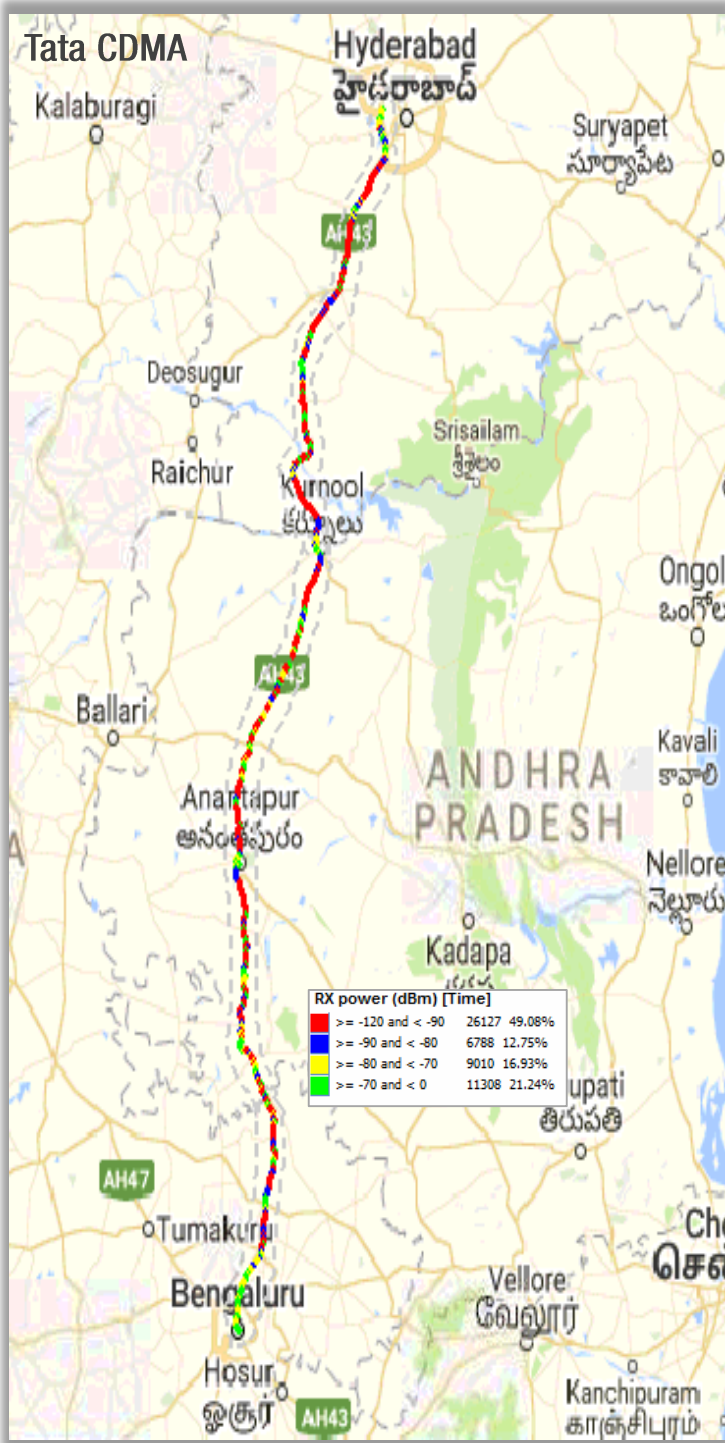
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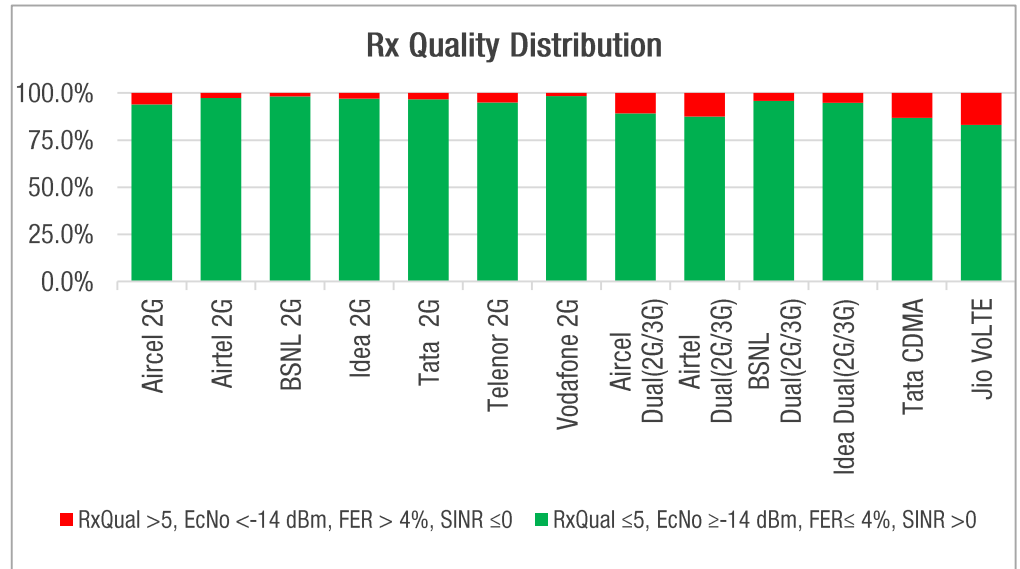
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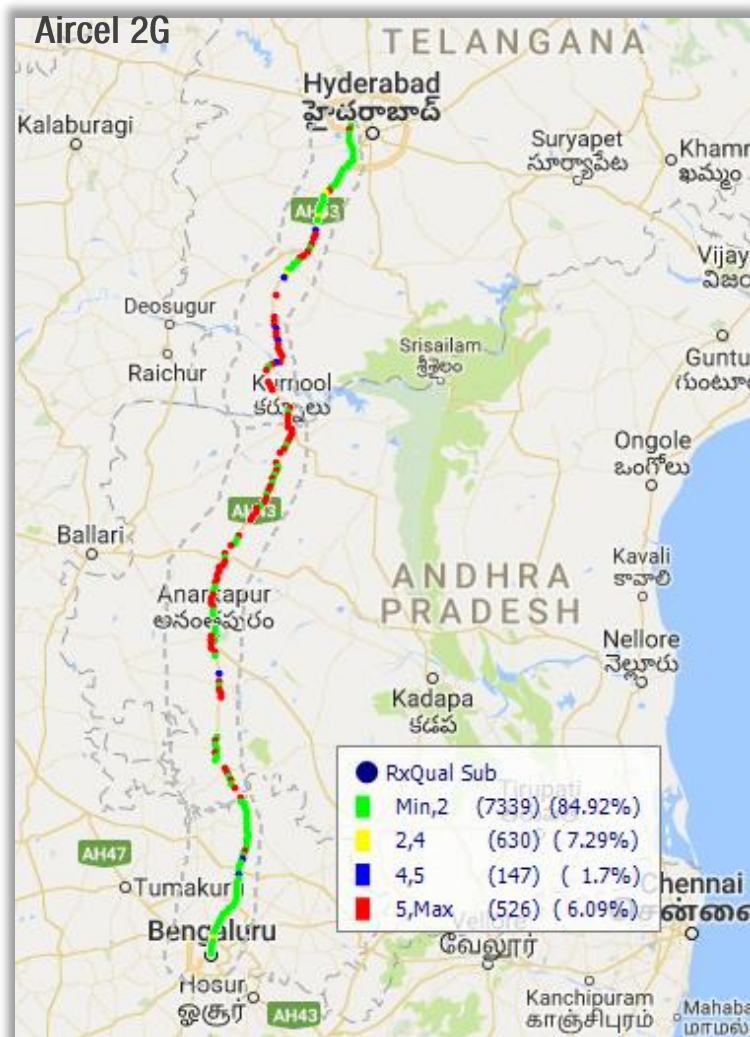
II. Quality Details

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 $\geq 95\%$.

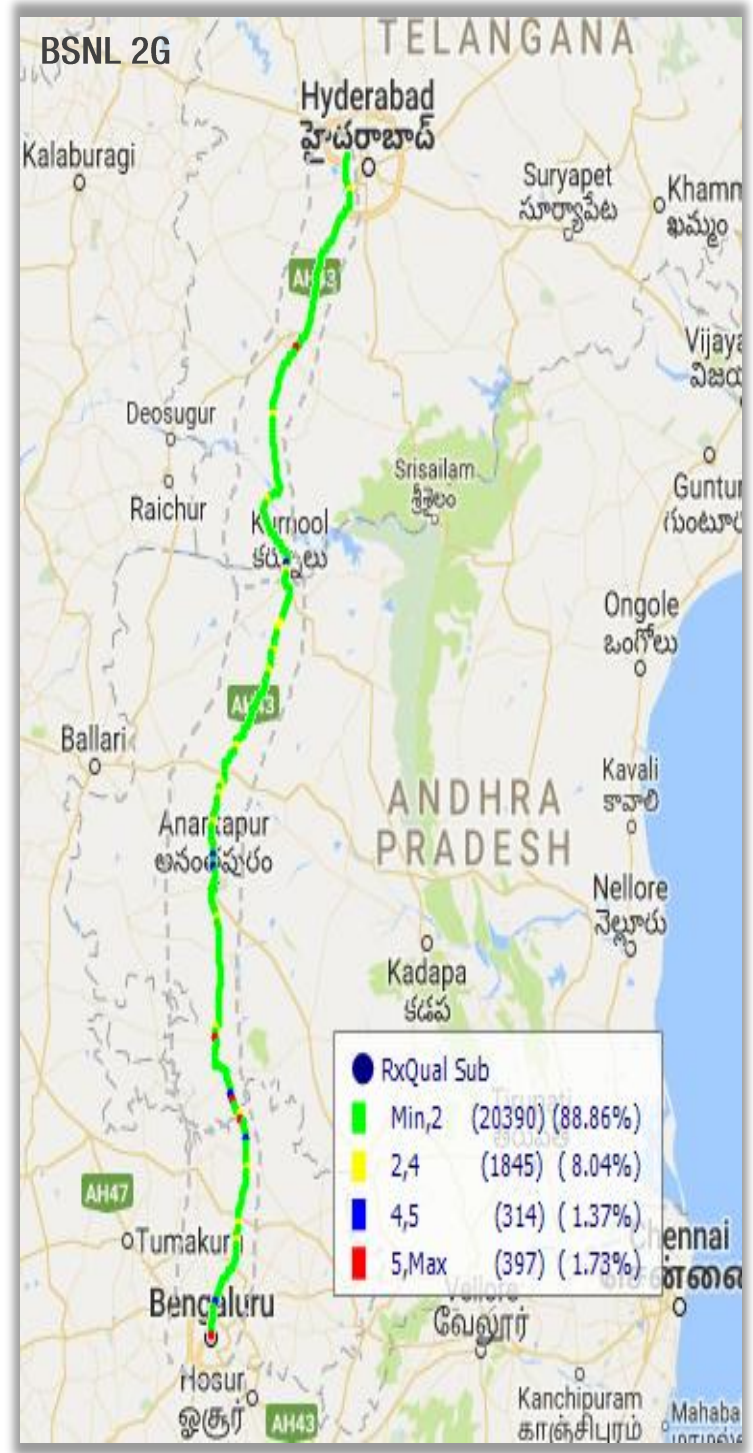
TSP	Rx Quality
Aircel 2G	93.91%
Airtel 2G	97.31%
BSNL 2G	98.27%
Idea 2G	97.05%
Tata 2G	96.59%
Telenor 2G	95.01%
Vodafone 2G	98.41%
Aircel Dual(2G/3G)	89.15%
Airtel Dual(2G/3G)	87.57%
BSNL Dual(2G/3G)	95.89%
Idea Dual(2G/3G)	94.79%
Tata CDMA	86.86%
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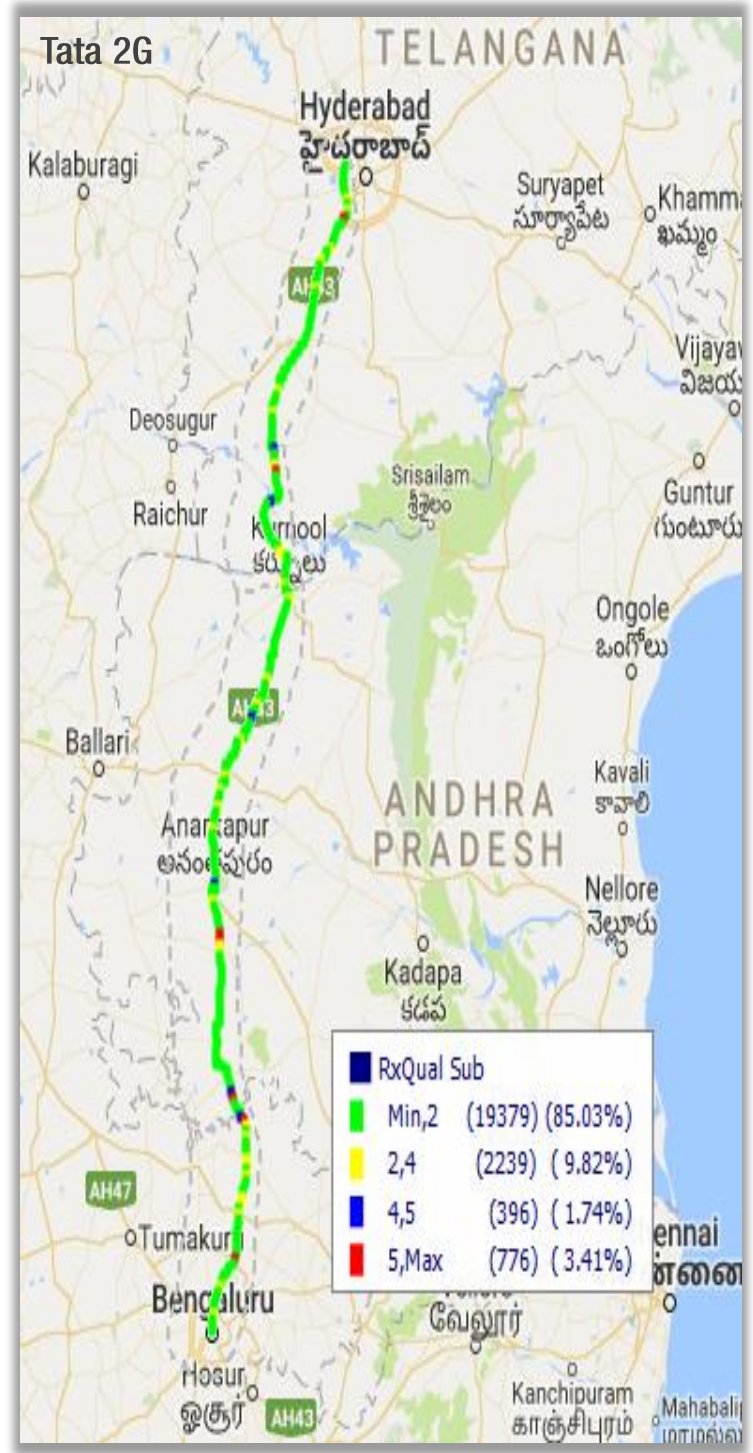
— TSPs not meeting the Benchmark



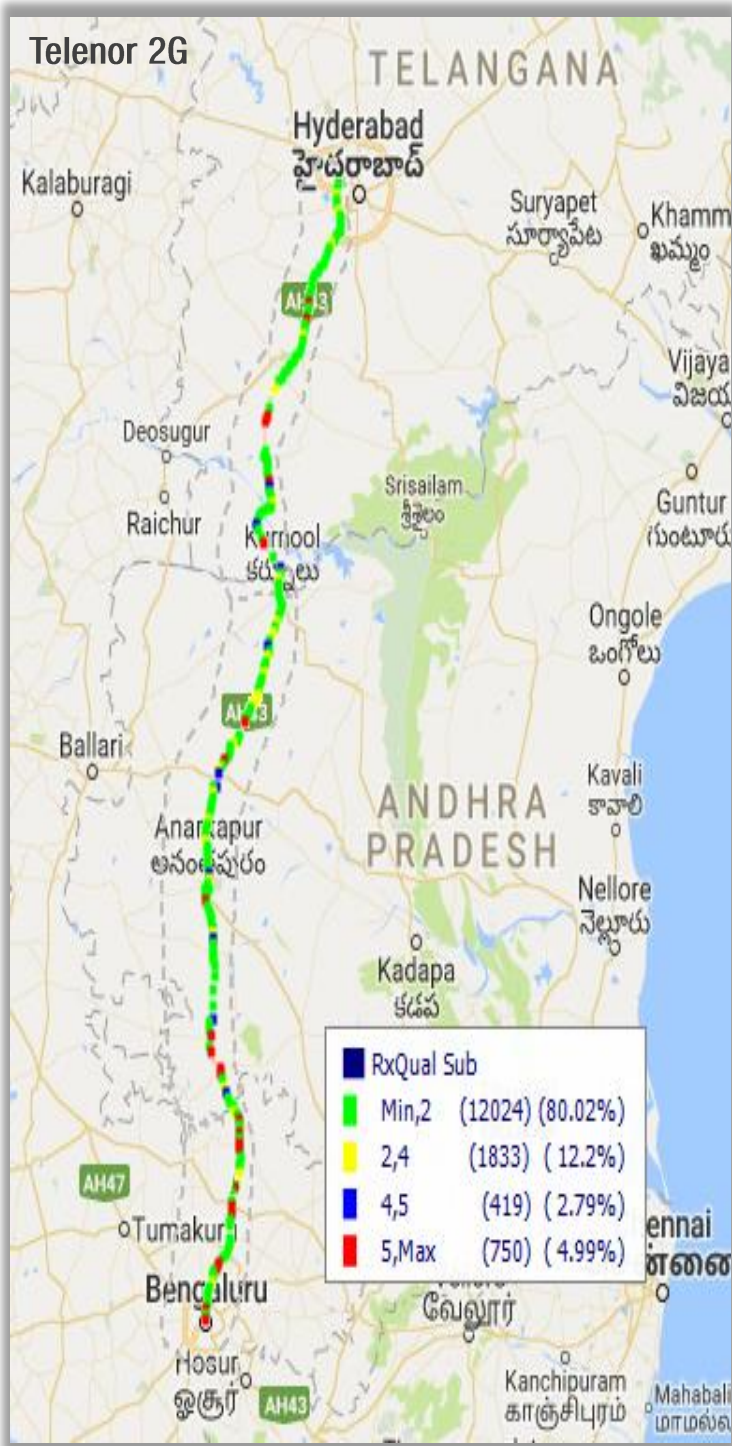
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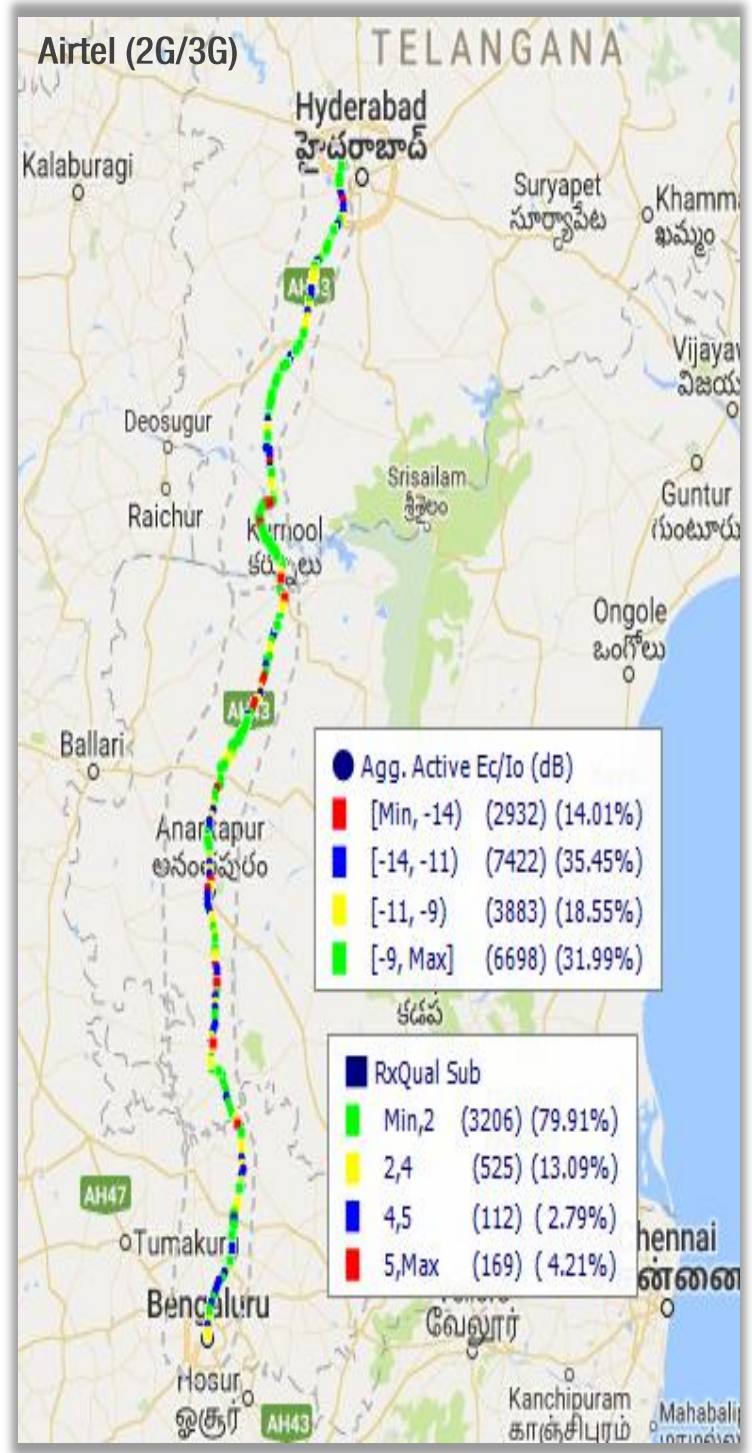
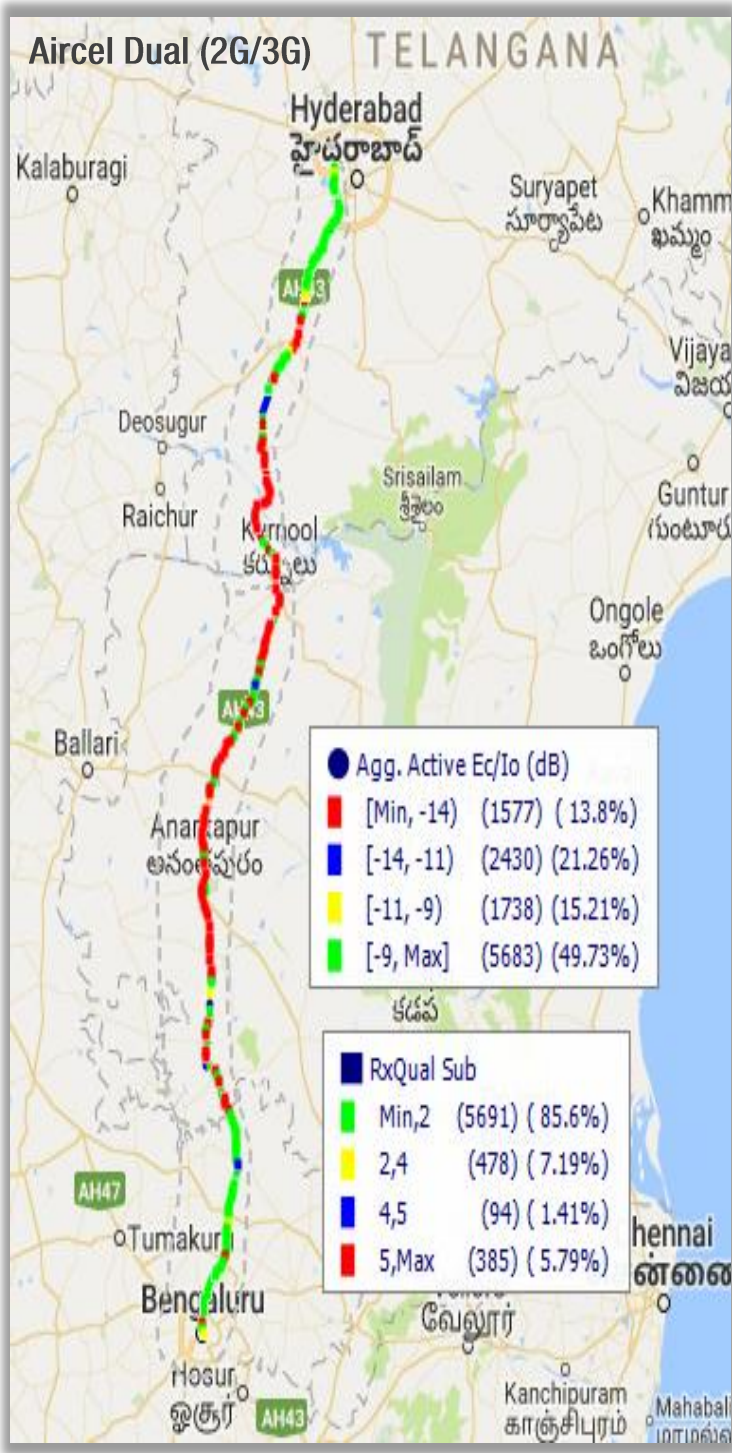
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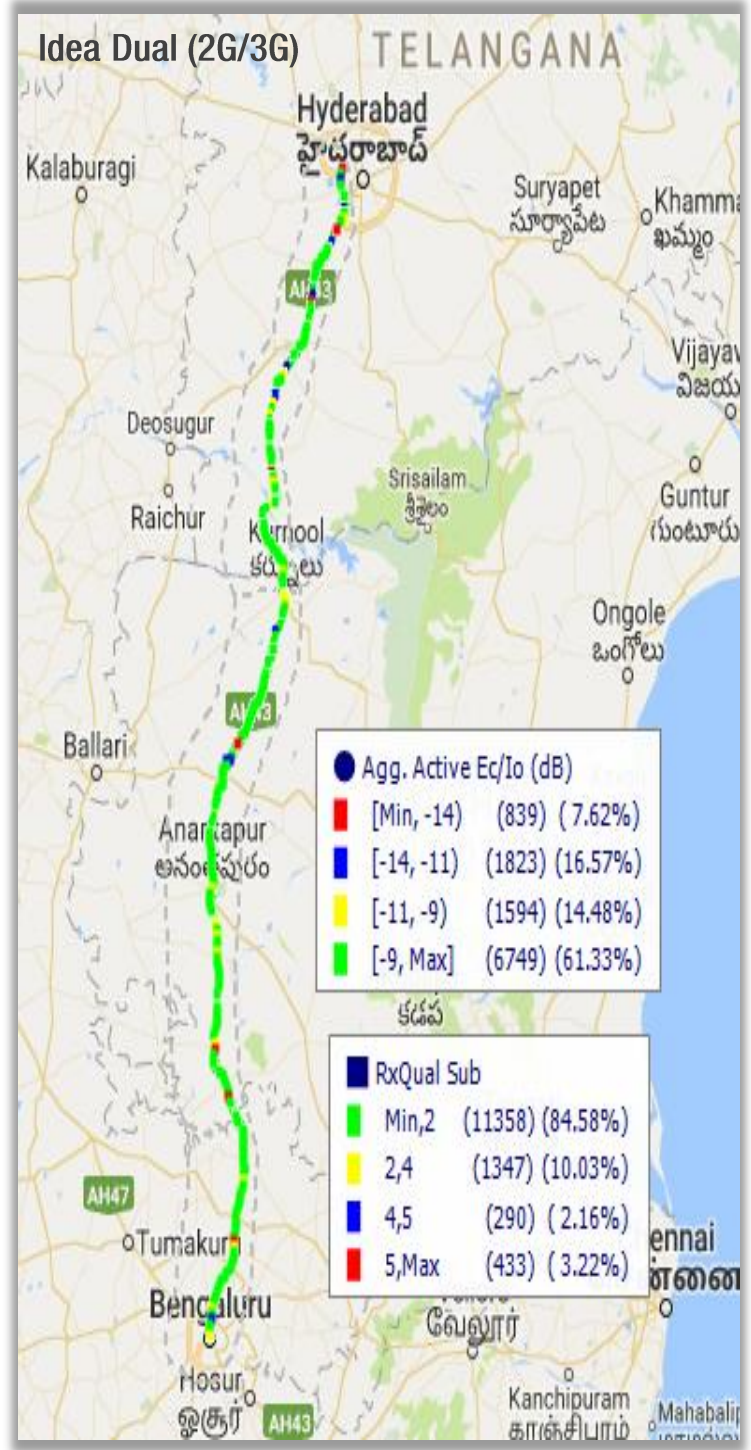
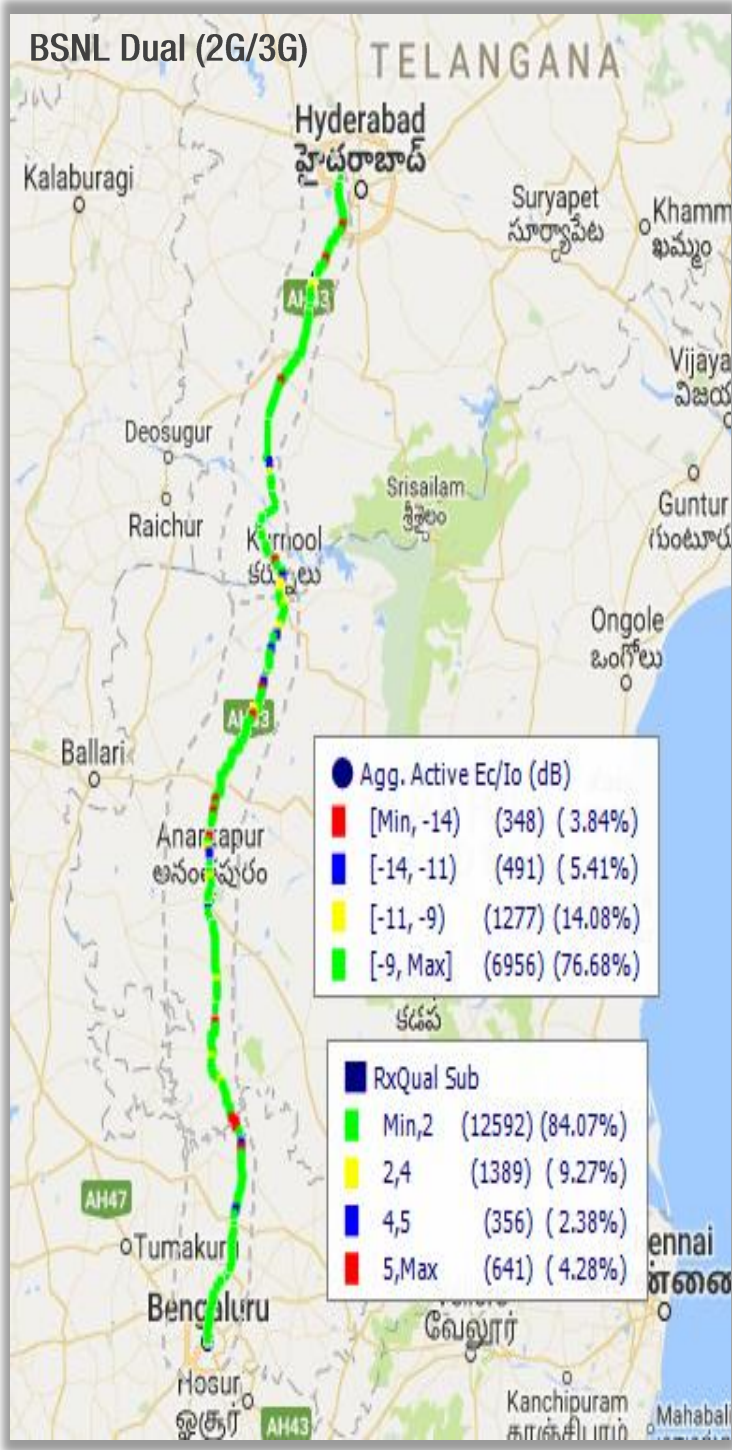
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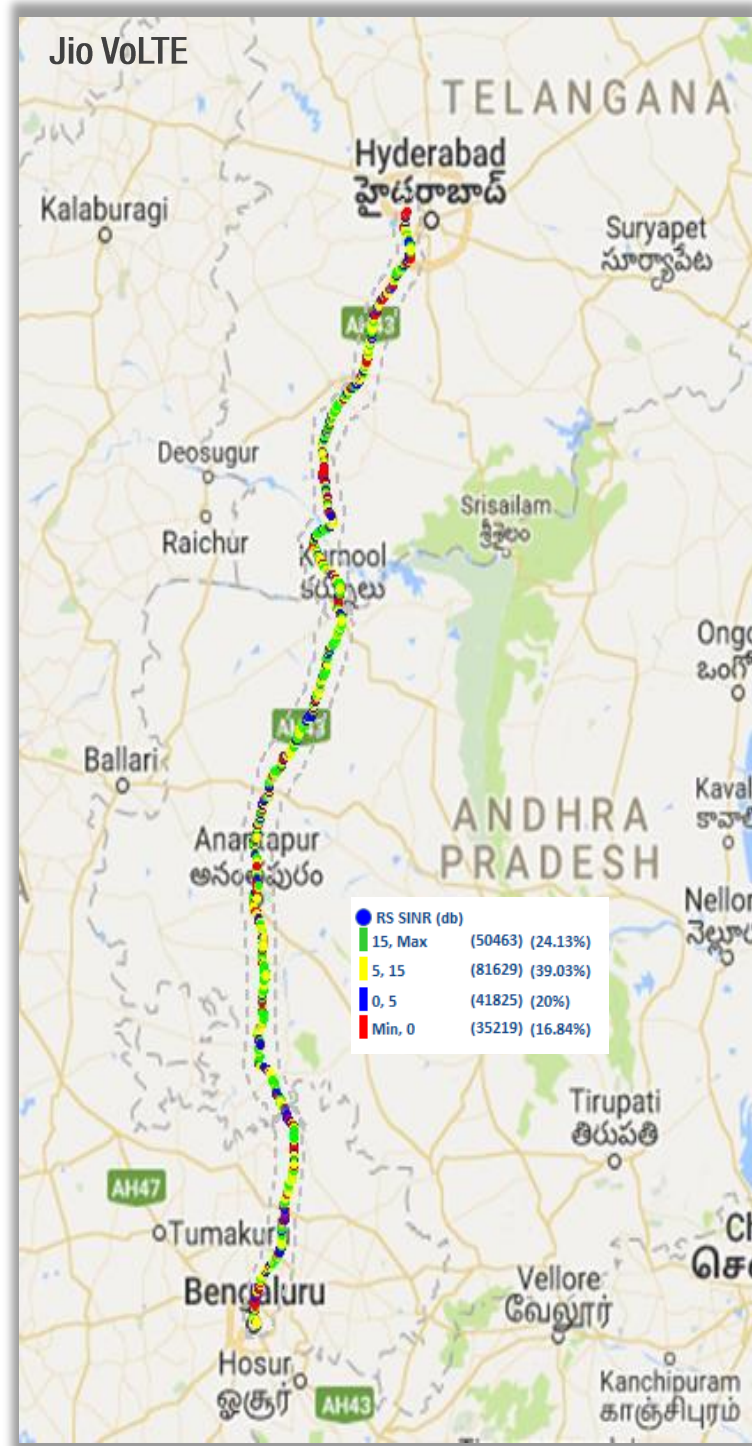
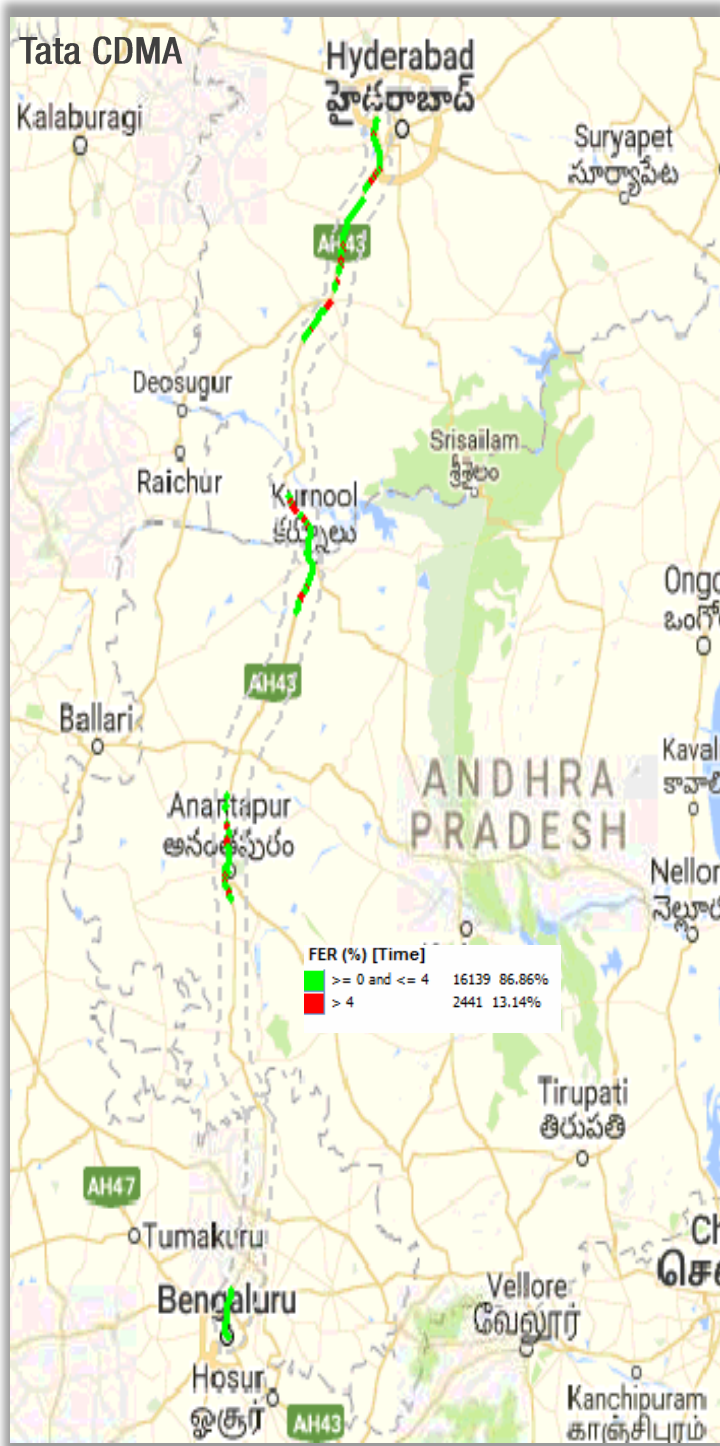
II. Quality Details (contd.)



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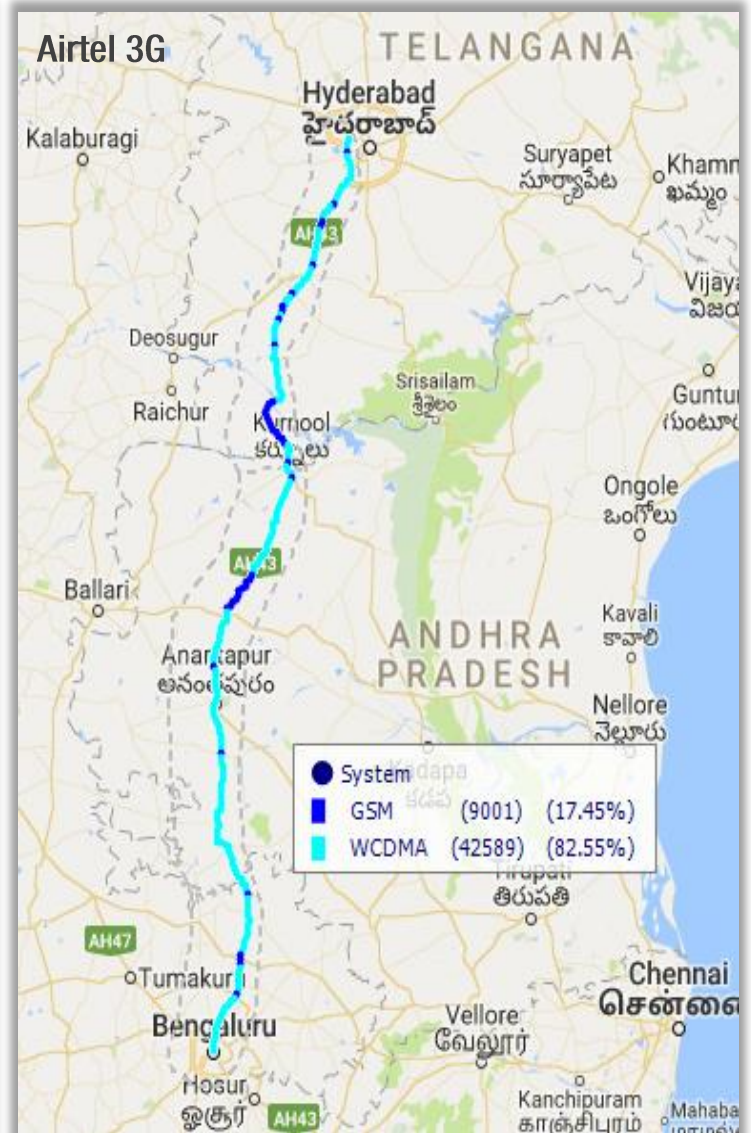
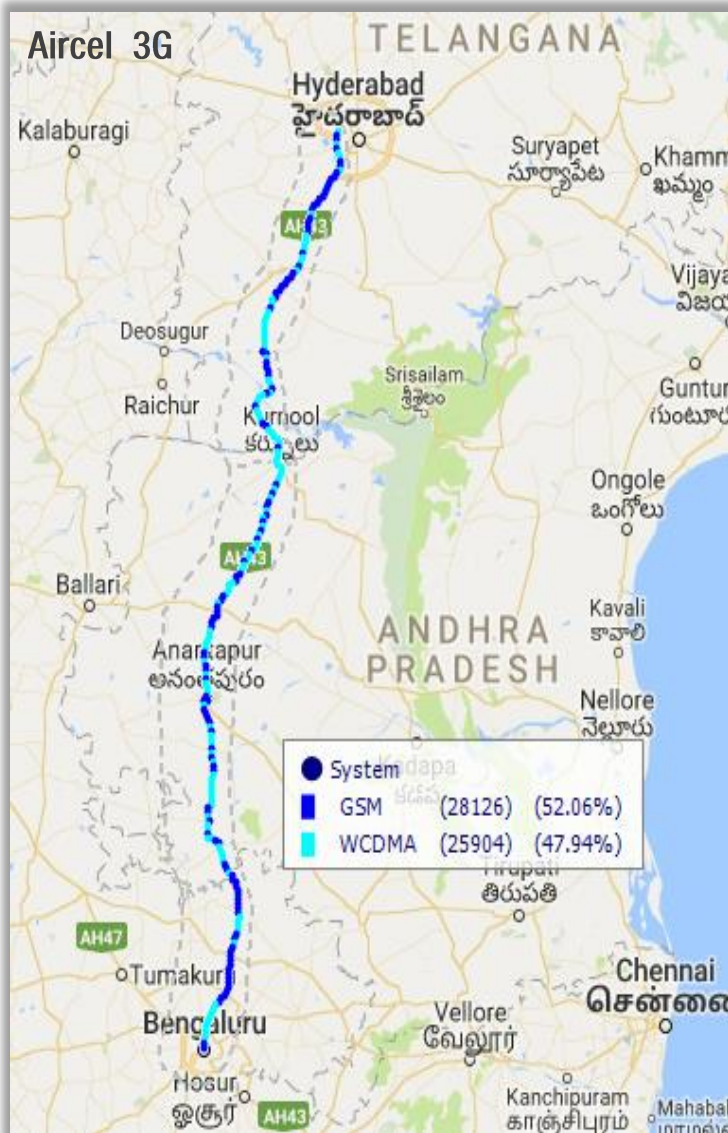
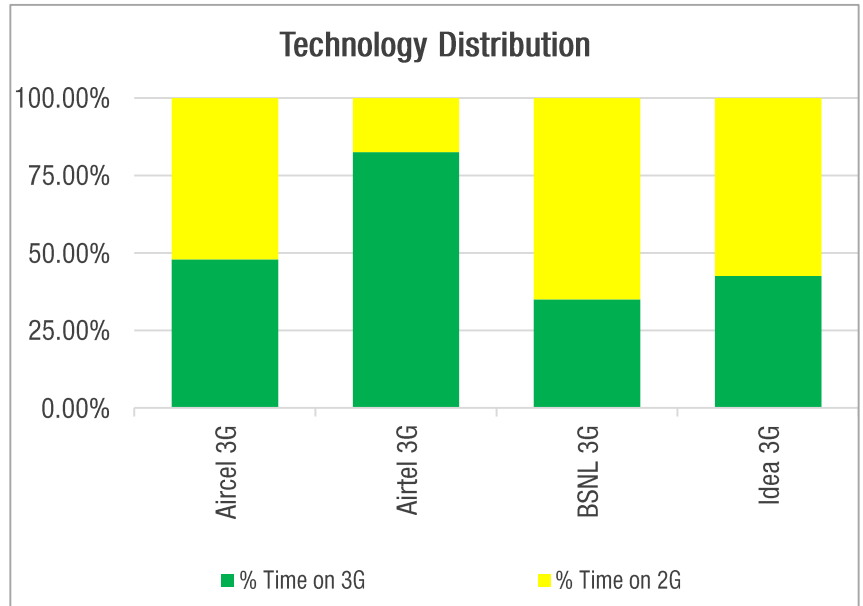


II. Quality Details (contd.)



III. Technology Details

TSP	% Time on 3G
Aircel 3G	47.94%
Airtel 3G	82.55%
BSNL 3G	35.03%
Idea 3G	42.57%



III. Technology Details(contd.)

