



Operator Assisted Drive Test Report

Hisar to Rohtak Highway

28th April 2023

By

TRAI Regional office Jaipur

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

The Operator Assisted Drive Test has been carried out by Regional Office, Jaipur with the help of Service Providers on Hisar Rohtak Highway , from 9:00 AM to 8:00 PM on **28th April 2023**. The drive test covered drive route of **105** KMs over a period of 1 day. Approximately 120 calls were made for each of the networks: three 2G networks, One 3G networks and three LTE networks covering four TSPs. The Drive test reports were generated through TSPs tools and was compiled by TRAI RO Jaipur.

Overview

Voice Summary

Data Summary

Overview

Regional Office, TRAI Jaipur conducted Operator Assisted Drive Test on 28th March 2023 covering Hisar Rohtak Highway. The performance of Airtel, BSNL, Vodafone Idea and Jio was monitored across various technologies (2G, 3G and 4G) by TSPs themselves through their own test kits. The TSPs reports obtained from these drive tests were compiled to assess the network quality for Voice and Data services in terms of following.

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

Data: Download Throughputs.

Drive Test Details :

Voice Tests: Calls were made for 90 sec duration with a wait time of 10 sec between calls in all technologies. The drive test covered a drive route of approximately 105 KMs. Approximately 120 calls were made for each of the networks: three 2G (Lock Mode) networks, one 3G (Dual mode) networks and three VoLTE networks covering 4 unique TSPs.

Data Tests:

Dynamic data test was conducted for 105 Kms for download throughput in all technologies.

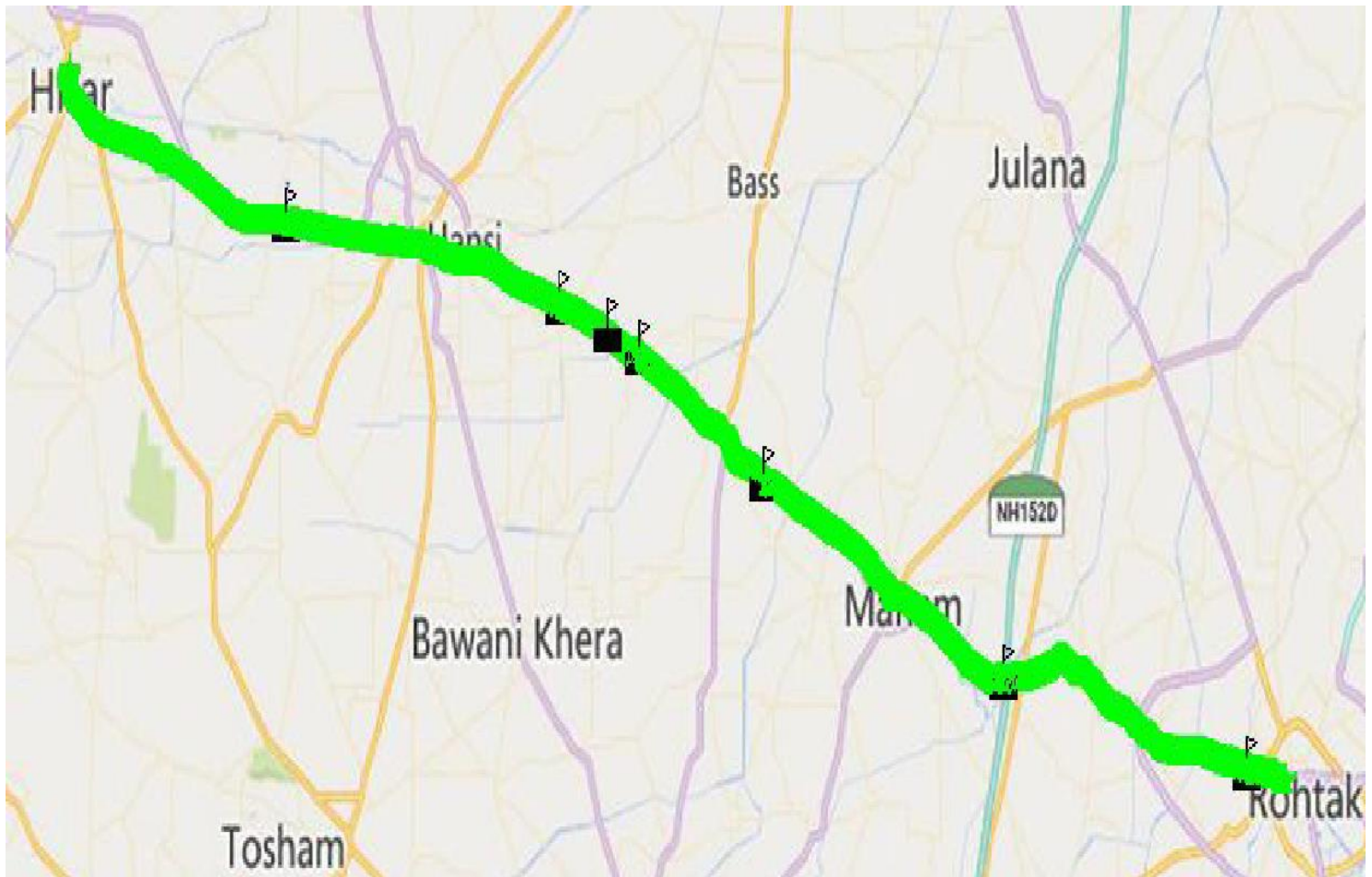
3G – measurement – UE in 3G File Size- 20MB

4G – measurement – UE in LTE File Size- 40MB

Service	Specifications
Download	2G (Locked) - 500KB, 3G (Dual) - 20 MB, 4G (Free) - 40 MB
Upload	2G (Locked) - 100KB, 3G (Dual) - 5 MB, 4G (Free) - 10 MB
Web Browsing	3 links of e/m commerce website www.amazon.in, www.flipkart.com and PayTm
Latency	32 Bytes on www.google.com

Overview

Voice & Dynamic Data Test Drive Route

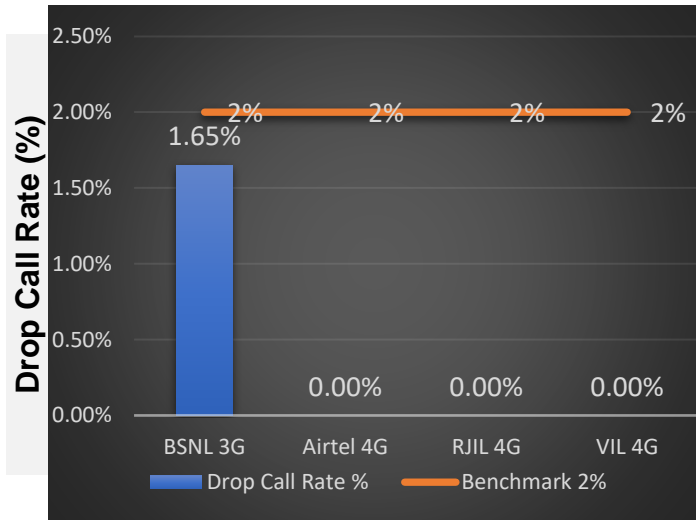


Date	Test Scenario	Area to be Covered
28-Apr-23	2G/3G/4G Voice and 3G/4G Dynamic Data	Starting Point BSNL EXCHANGE at 9.30 AM, HISAR TO ROHTAK HIGHWAY

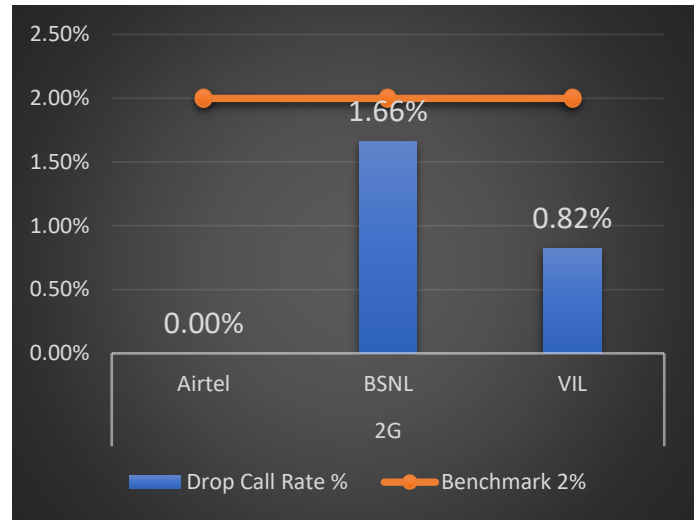
Voice Calls

Key Observations

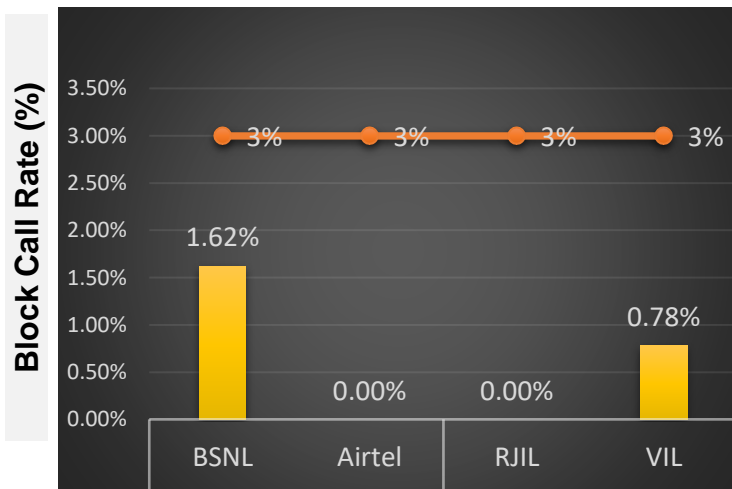
QoS compliance of the TSPs on **Hisar Rohtak Highway** for Voice across technologies 2G/3G/4G-VoLTE :



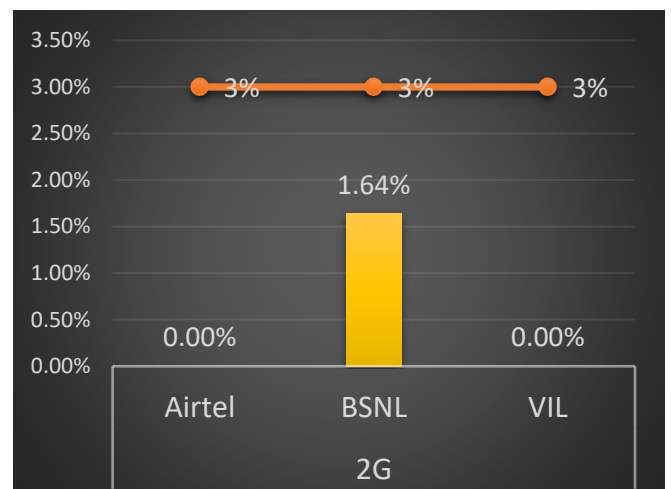
3G/VoLTE Network



2G Network



3G / VoLTE Network



2G Network

KPIs	2G			3G		4G	
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0.00%	1.66%	0.82%	1.65%	0.00%	0.00%	0.00%
Block Call Rate %	0.00%	1.64%	0.00%	1.62%	0.00%	0.00%	0.78%

- a) All 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.

Voice Calls

Key Observations

Coverage

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

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	91.00%	76.68%	81.41%

b) Percentage of coverage samples for 3G \geq -90 dBm

TSPs	3G
	BSNL
Coverage %	53.88%

c) Percentage of coverage samples for LTE \geq -110 dBm.

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99.00%	99.61%	98.81%

d) Percentage of time spent on 3G/4G network

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	81.79%	100.00%	100.00%	100.00%

Data Services Dynamic

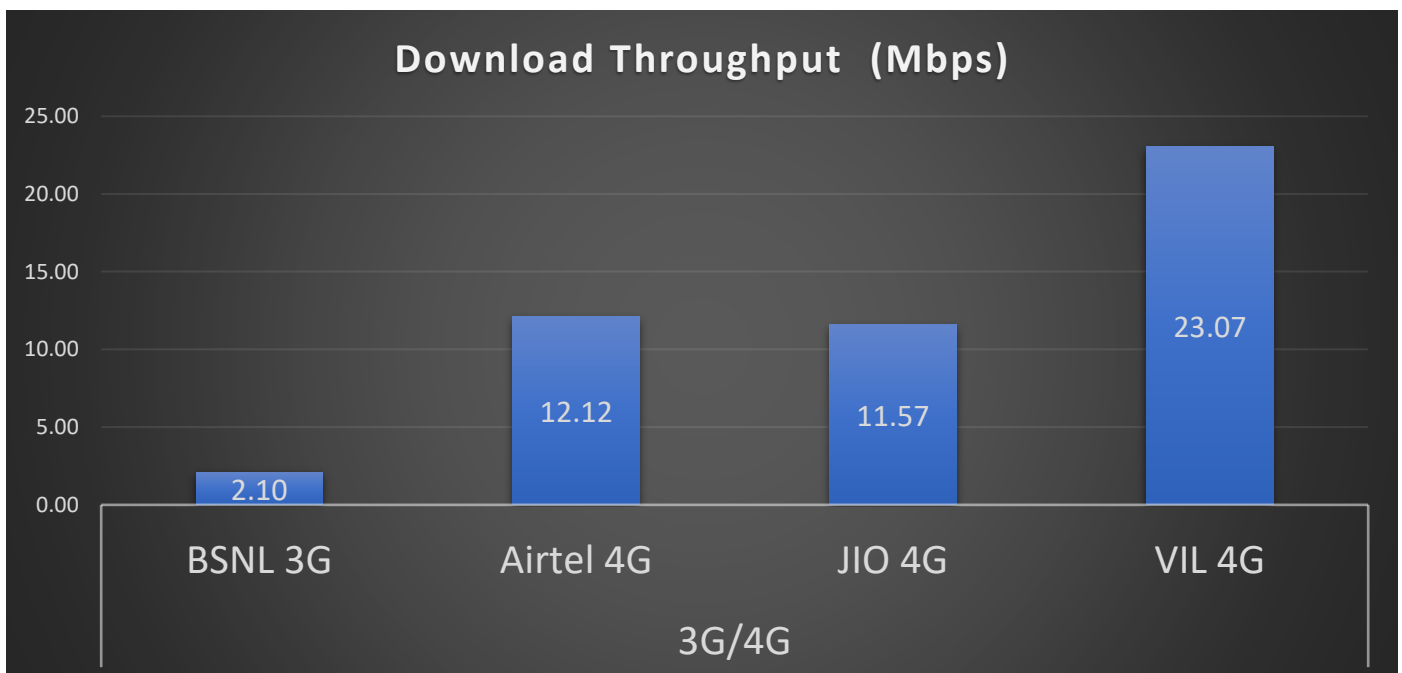
Key Observations

Dynamic Data was tested for whole voice route. Download Throughput was tested.

Data Download Performance (mbps) - Dynamic

3G/4G/ Network:

Data Services Dynamic	3G/4G			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	2.10	12.12	11.57	23.07



Summary

City Level Summary- Voice

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	107	122	122
Blocked Call Rate (%)	0.00%	1.64%	0.00%
CSSR% (Accessibility)	100.00%	98.36%	100.00%
Drop Call Rate (%)	0.00%	1.67%	0.82%
Mobility HOSR (%)	98.00%	98.82%	86.76%
Rx Quality (%)	92.20%	98.07%	92.72%
Average CST Sec	3.78	2.90	5.19

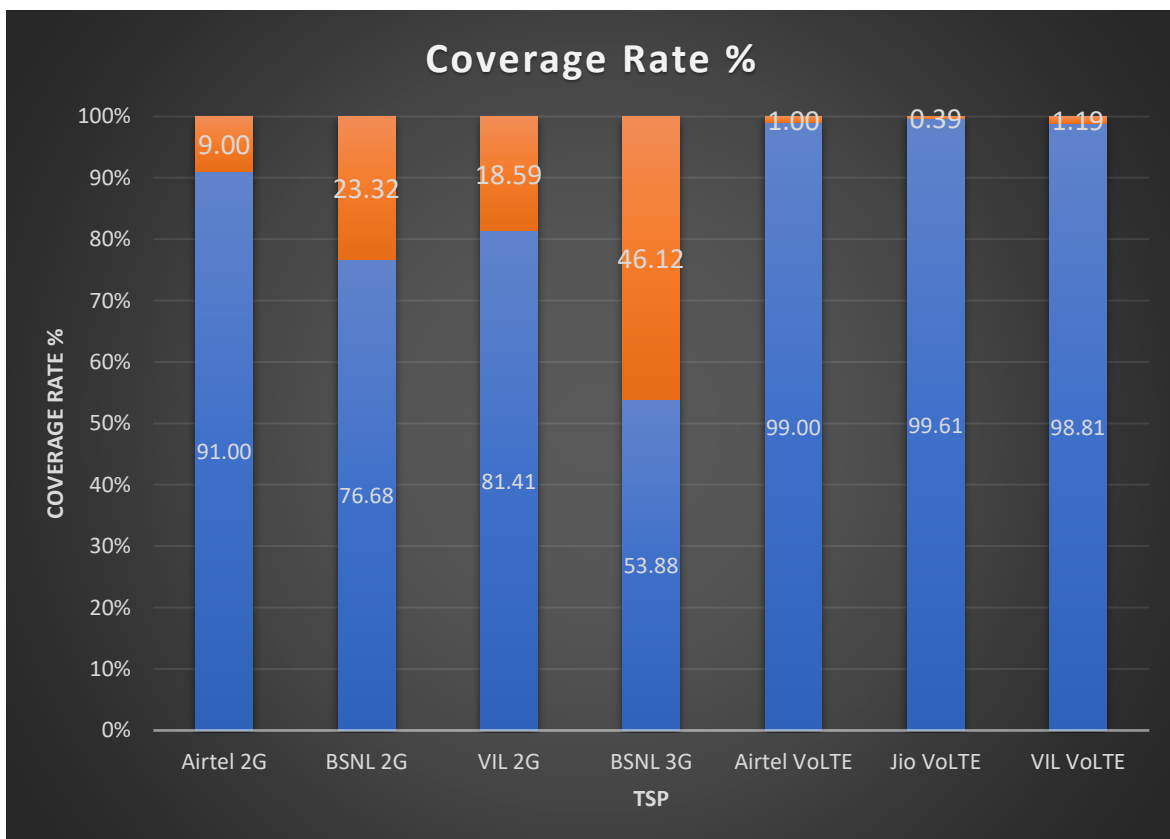
Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	123	118	143	128
Blocked Call Rate (%)	1.62%	0.00%	0.00%	0.78%
CSSR% (Accessibility)	98.38%	100.00%	100.00%	99.22%
Drop Call Rate (%)	1.65%	0.00%	0.00%	0.00%
Mobility HOSR (%)	100.00%	99.80%	99.61%	96.83%
Rx Quality (%)	84.15%	93.00%	94.23%	86.93%
Average CST Sec	2.60	1.40	0.51	2.52

- a) All TSPs have to meet the 95% QOS benchmark of Rx Quality .
b) Drop Call Rate (DCR%) Benchmark is 2% and Call Block Rate (CBR%) benchmark is 3%

Coverage Details

RF Coverage relates to the geographical footprint within the system that has sufficient RF signal strength to provide for a call session. The Coverage rate 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.

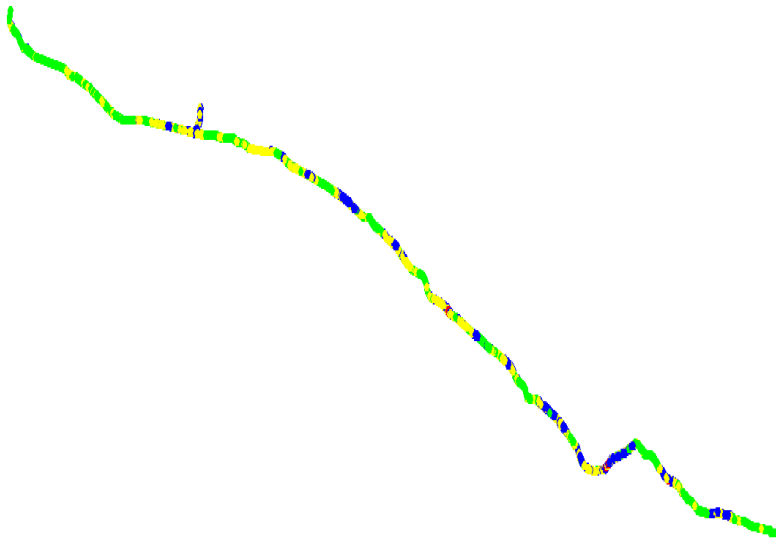
TSP	Coverage Rate %
Airtel 2G	91.00%
BSNL 2G	76.68%
VIL 2G	81.41%
BSNL 3G	53.88%
Airtel VoLTE	99.00%
Jio VoLTE	99.61%
VIL VoLTE	98.81%



TSP-AIRTEL

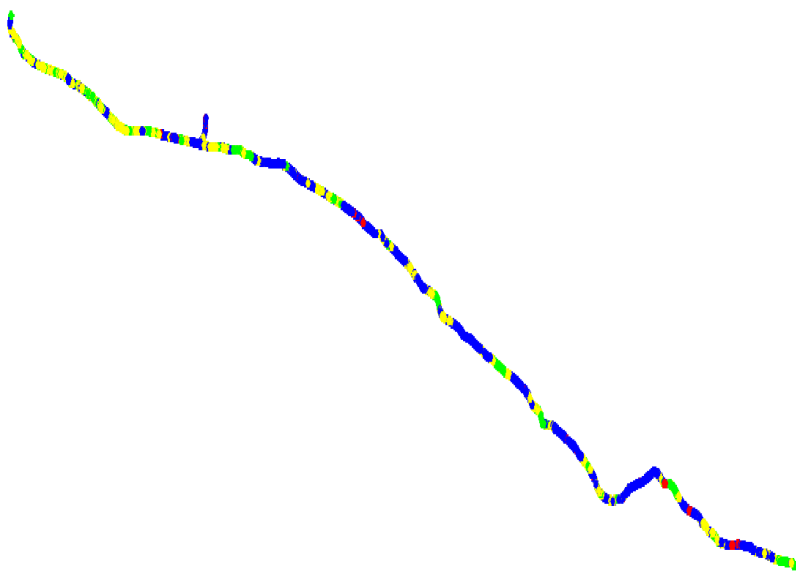
TSP	Coverage Rate %
Airtel 2G	91.00%
Airtel VoLTE	99.00%

2G



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	683686	59%	Green
[-75, >=-85]	375313	32%	Yellow
[-85, >=-95]	98950	8%	Blue
[-95, >=Min)	6710	1%	Red
Total	1164659	100%	

VoLTE

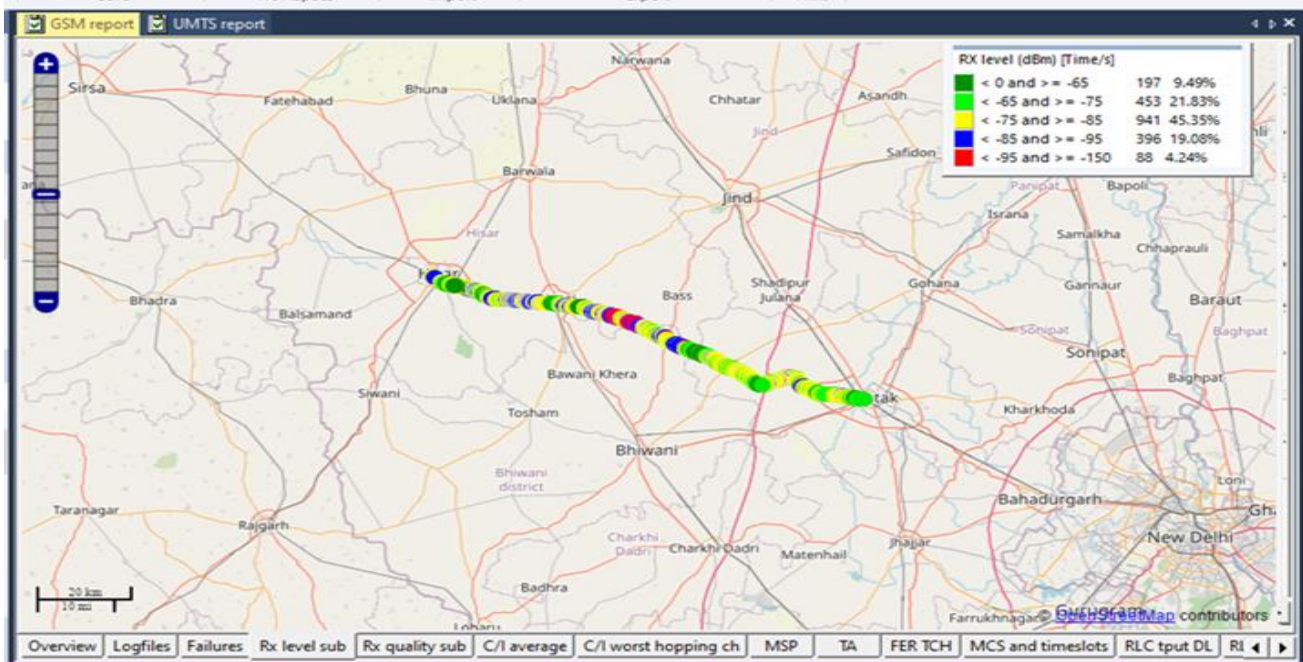


VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	214362	17%	Green
[-80, >=-90]	453716	35%	Yellow
[-90, >=-110]	598048	47%	Blue
[-110, >=Min)	16411	1%	Red
Total	1282537	100%	

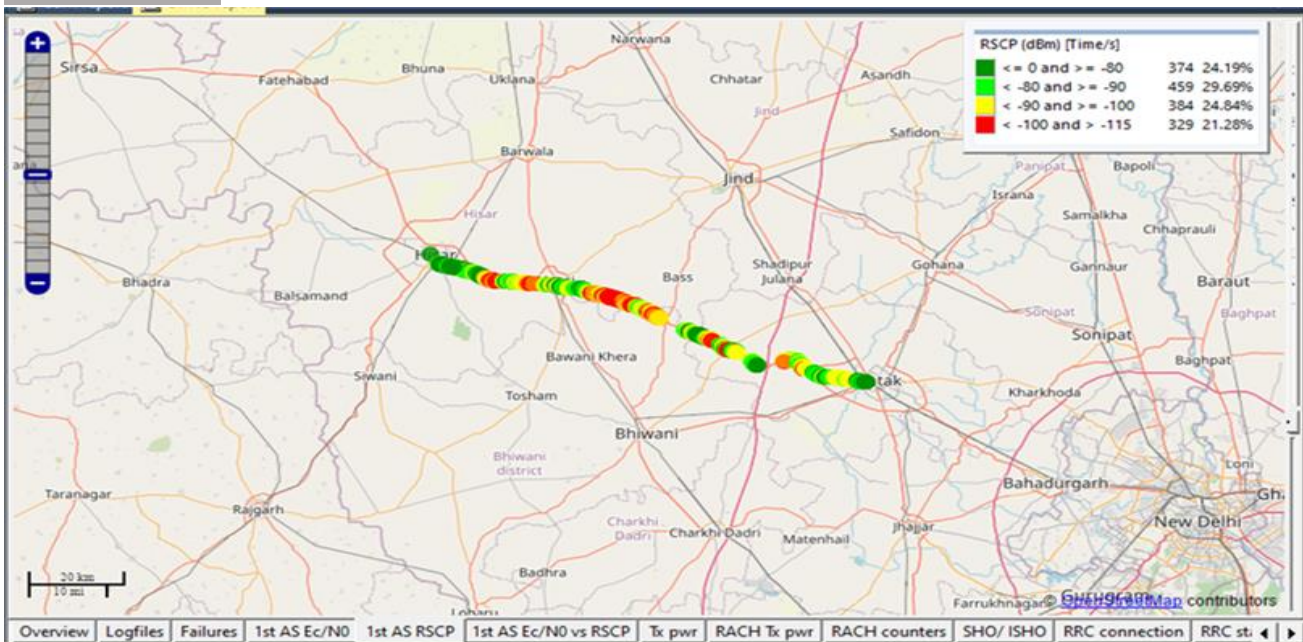
TSP- BSNL

Technology	Coverage %
2G	76.68%
3G	53.88%

2G

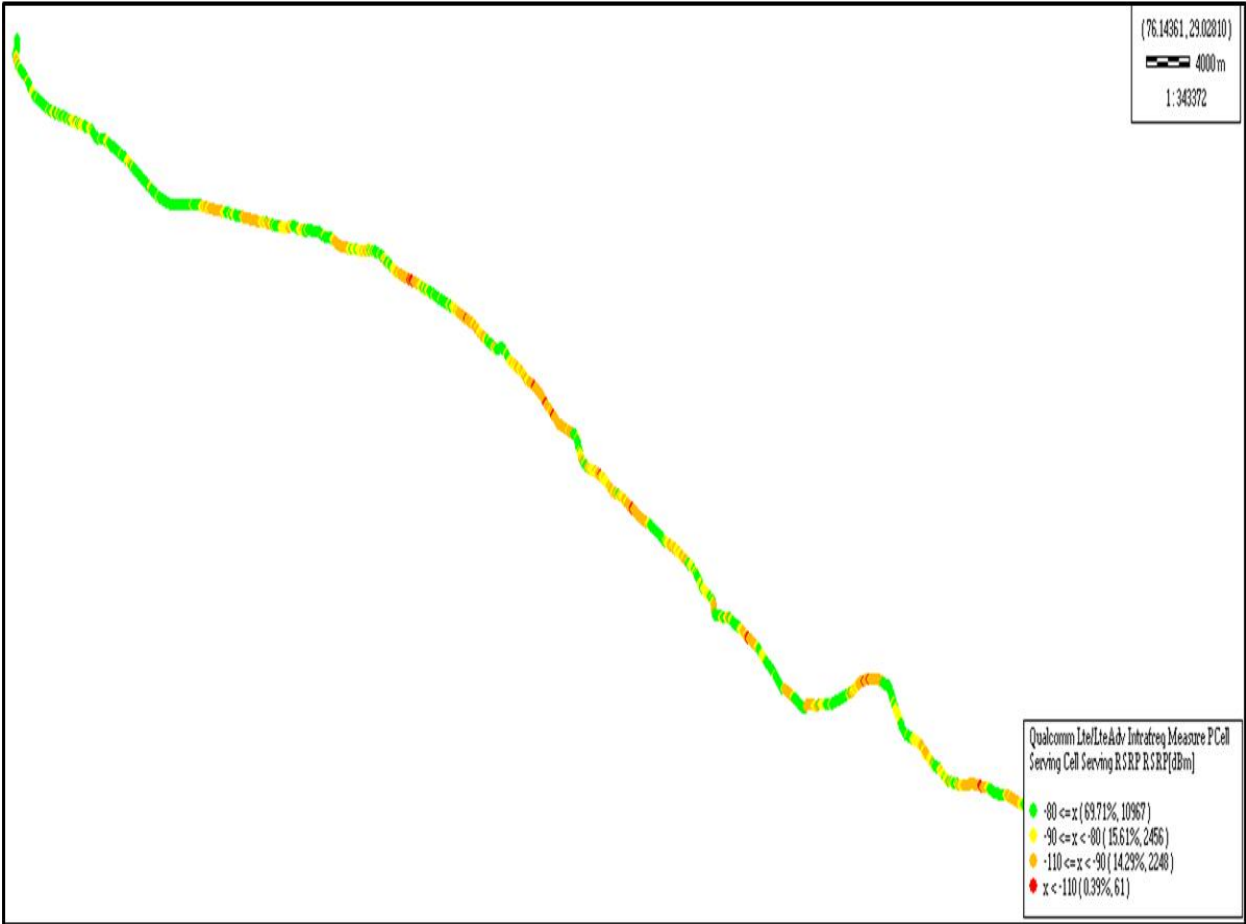


3G



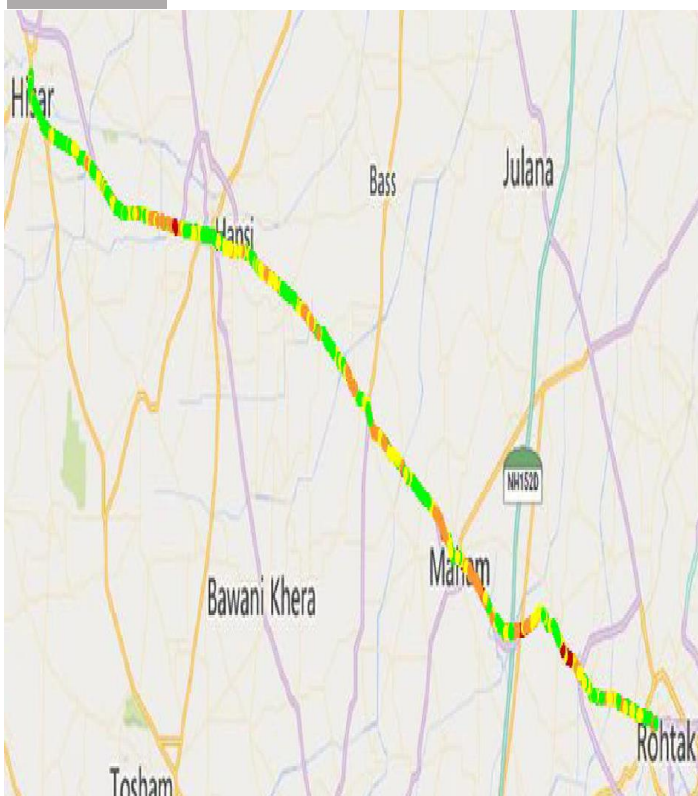
JIO

Technology	Coverage %
VoLTE	99.61%



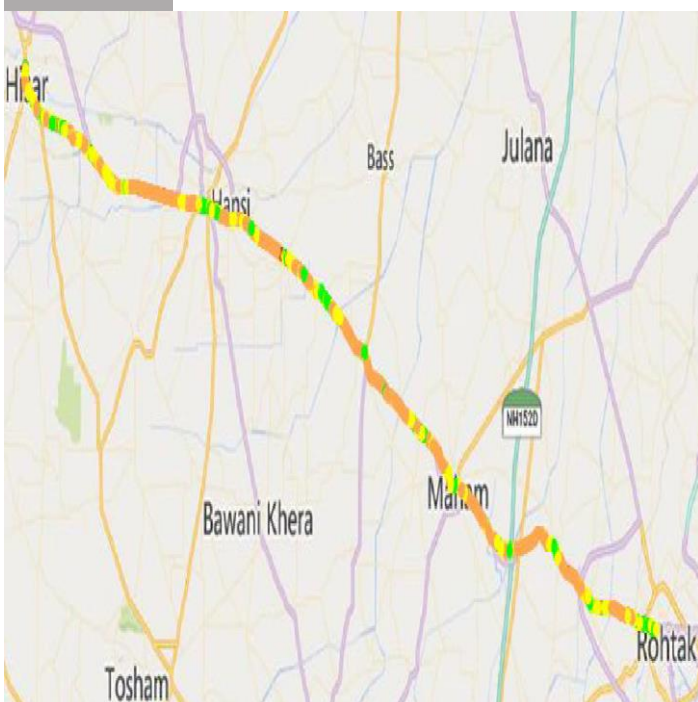
VIL

	Technology	Coverage Rate %
	2G	81.41%
2G	VoLTE	98.81%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	435146	44.11	Green
[-75, >=-85)	367973	37.30	Yellow
[-85, >=-95)	166350	16.86	Orange
[-95, >=Min)	17125	1.74	Red
Total	986594	100%	

VoLTE

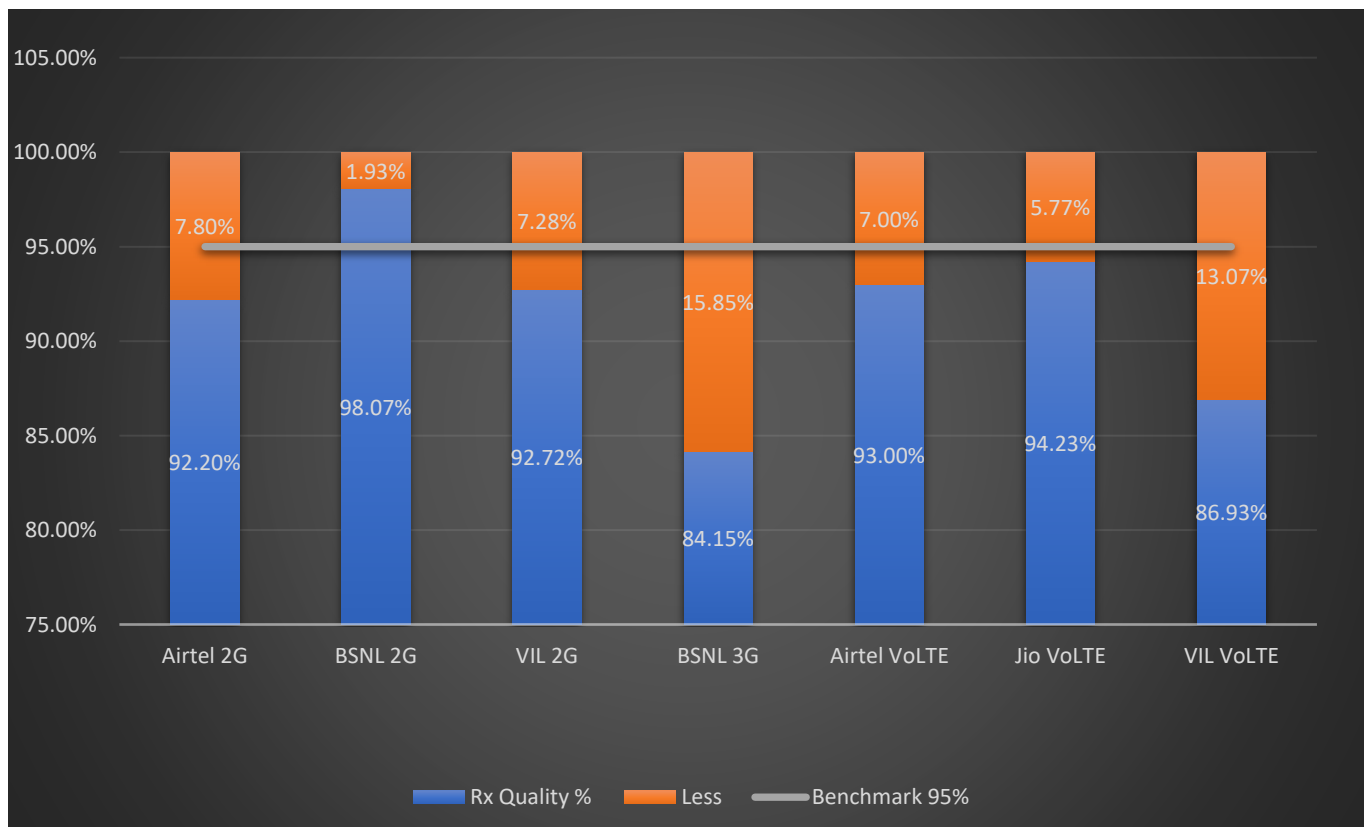


VoLTE /5G			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	354182	11.58%	Green
[-80, >=-90)	1283385	41.95%	Yellow
[-90, >=-110)	1385319	45.28%	Orange
[-110, >=Min)	36516	1.19%	Red
Total	3059402	100%	

II. Quality Details

For measuring voice quality, as per the QoS norms, RxQual ≤ 5 for GSM TSPs, EcNo ≥ -14 dBm for 3G TSP sand SINR > 0 in case of VoLTE is considered to be good, where as quality beyond this benchmark is considered to be bad.

TSP	Rx Quality %
Airtel 2G	92.20%
BSNL 2G	98.07%
VIL 2G	92.72%
BSNL 3G	84.15%
Airtel VoLTE	93.00%
Jio VoLTE	94.23%
VIL VoLTE	86.93%



II. Quality Details

Airtel

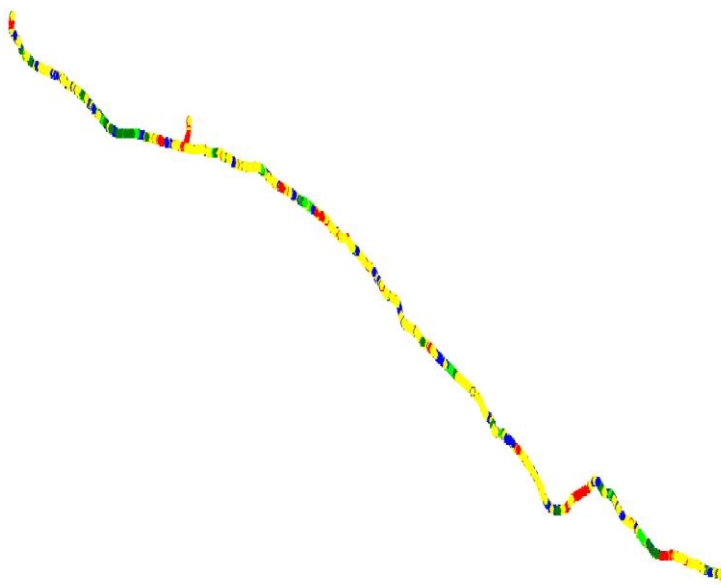
Technology	Rx Quality %
2G	92.20%
VoLTE	93.00%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	935153	79.2%	Green
(2, <=3)	41816	3.5%	Light Green
(3, <=4)	41901	3.6%	Yellow
(4, <=5)	69428	5.9%	Blue
(5, <=Max)	91883	7.8%	Red
Total	1180181	100%	

VoLTE



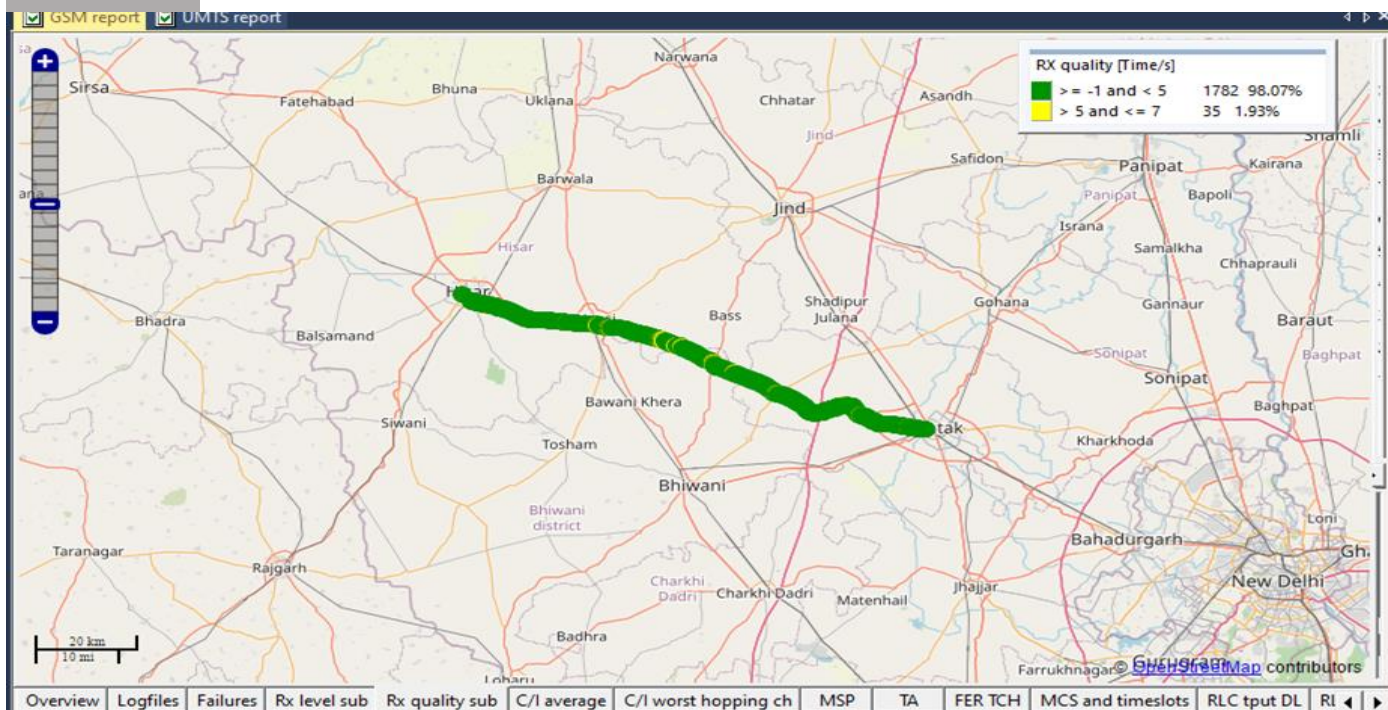
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	158559	7%	Red
(0, <=5)	1302762	57%	Yellow
(5, <=10)	495982	22%	Blue
(10, <=15)	230446	10%	Green
(15, <=Max)	112669	5%	Light Green
Total	998719	100%	

II. Quality Details

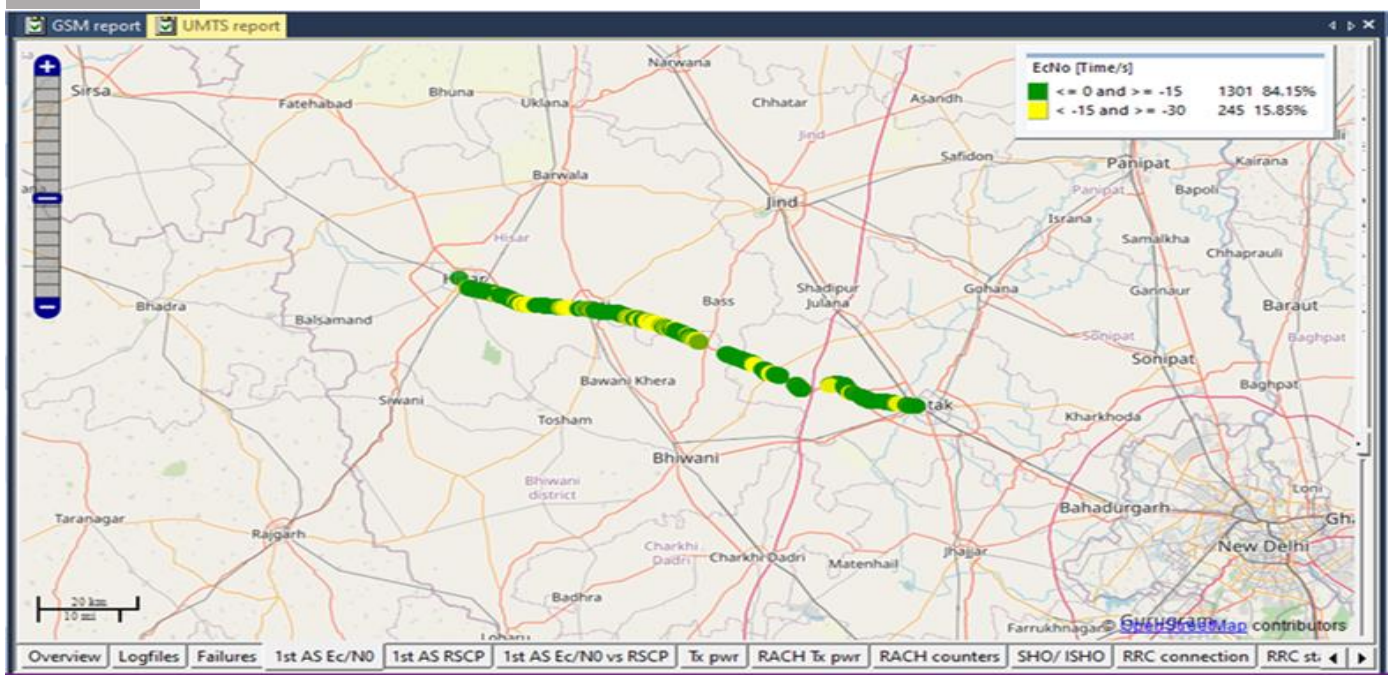
BSNL

Technology	Rx Quality %
2G	98.07%
3G	84.15%

2G



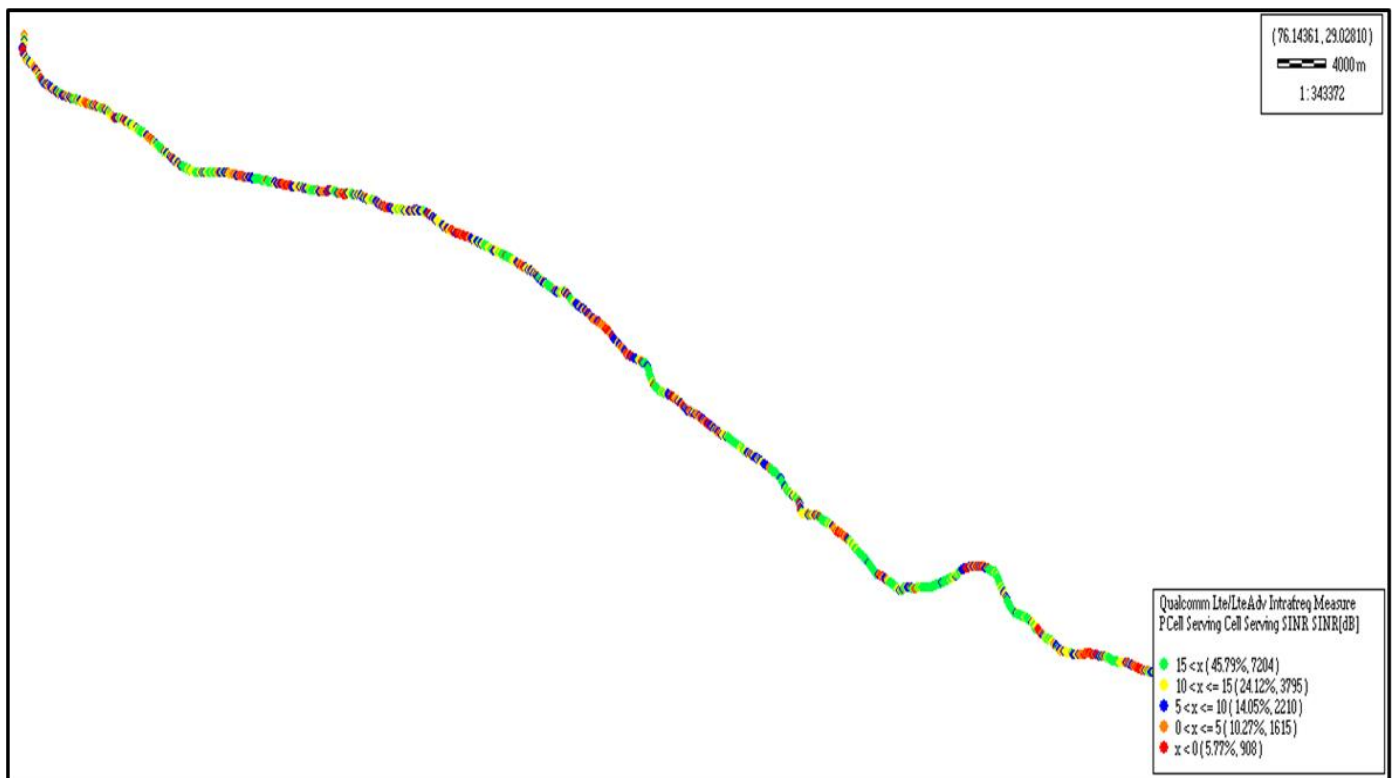
3G



Quality Details

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

JIO	
Technology	Rx Quality %
VoLTE	94.23%



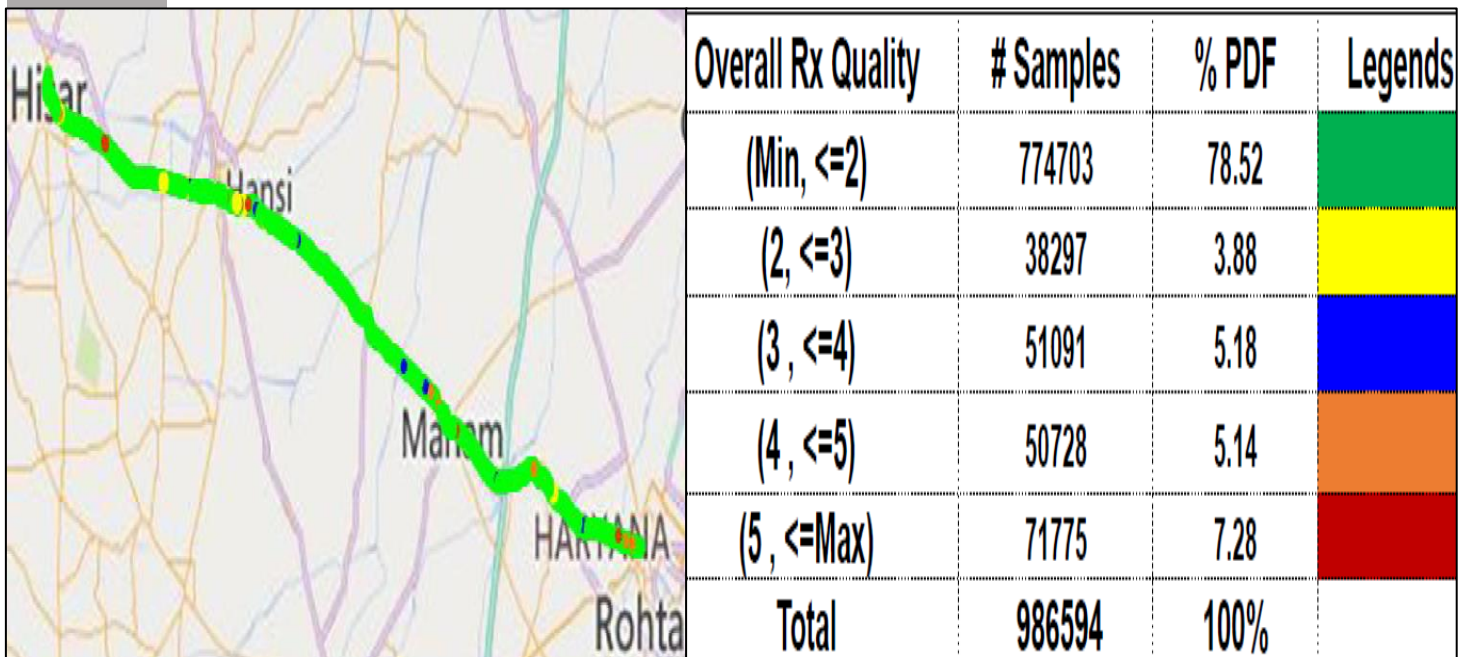
Overall SINR	# Samples	% PDF	Legends
(Min, ≤ 0)	908	5.77	
(0, ≤ 5)	1615	10.27	
(5, ≤ 10)	2210	14.05	
(10, ≤ 15)	3795	24.12	
(15, \leq Max)	7204	45.79	
Total	15732	100%	

II. Quality Details

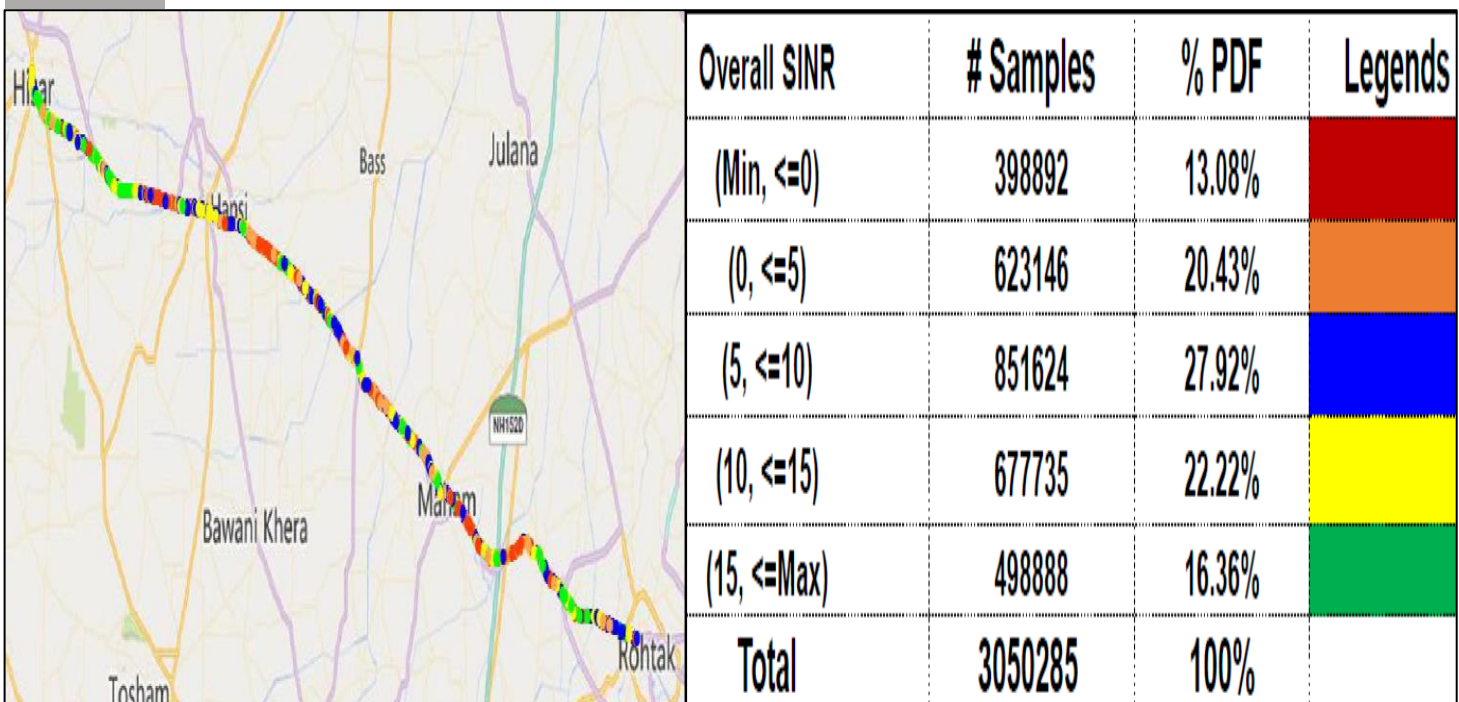
VIL

Technology	Rx Quality %
2G	92.72%
4G	86.93%

2G



VoLTE



III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	81.79%
Airtel VoLTE	100.00%
Jio VoLTE	100.00%
VIL VoLTE	100.00%

