



Operator Assisted Drive Test Report

Bharatpur & Dholpur City

25th to 28th Jun'2024

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 in Bharatpur & Dholpur City and Hotspot from 09:00 AM to 8:00 PM on 25th to 28th Jun'2024. The drive test covered drive route of 90 KMs & 6 no hotspots over a period of 4 day. Approximately 220 calls were made for each of the 7 networks: three 2G networks, one 3G networks and three LTE networks covering four TSPs.

Overview

Voice Summary

Data Summary

Overview

Regional Office, TRAI Jaipur conducted Operator Assisted Drive Test on 25th to 28th Jun'2024 covering Bharatpur & Dholpur city. The performance of Airtel, BSNL, Vodafone Idea and Jio was 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.

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 90 KMs. Approximately 220 calls were made for each of the Jio 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 90 kms for download throughput in all technologies.
2G – measurement – UE Locked in 2G file size- 500KB

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

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

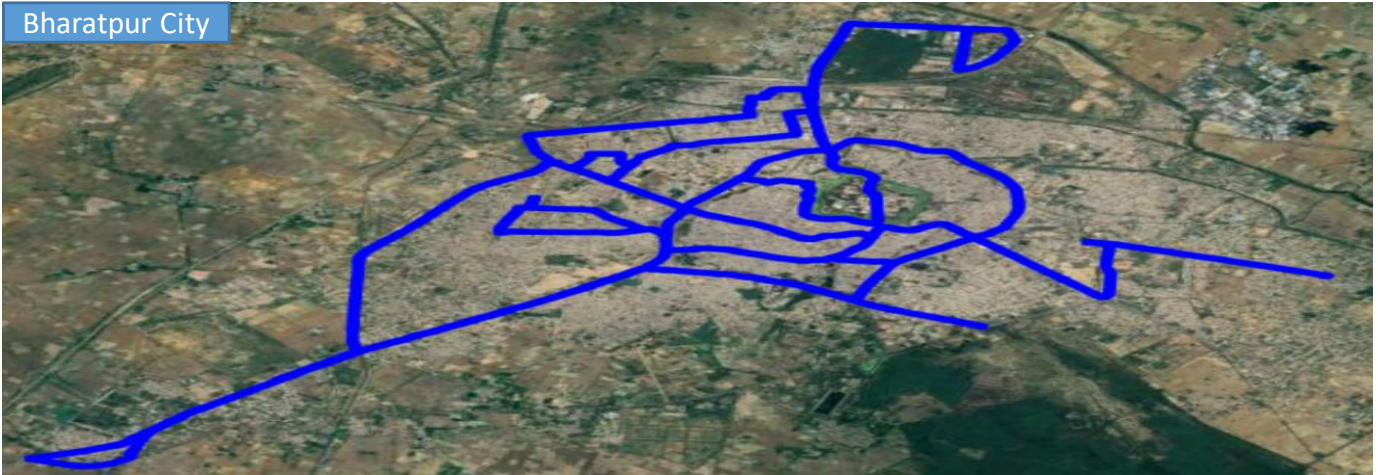
Static data tests on 5 hotspots

1. Bharatpur Bus Stand
2. Shri Bankey Bihari Ji Temple, Bharatpur
3. Laxman Mandir, Bharatpur
4. Dholpur Bus Stand
5. Dholpur Junction, Railway Station
6. Nihal Tower (Ghantaghar), Dholpur

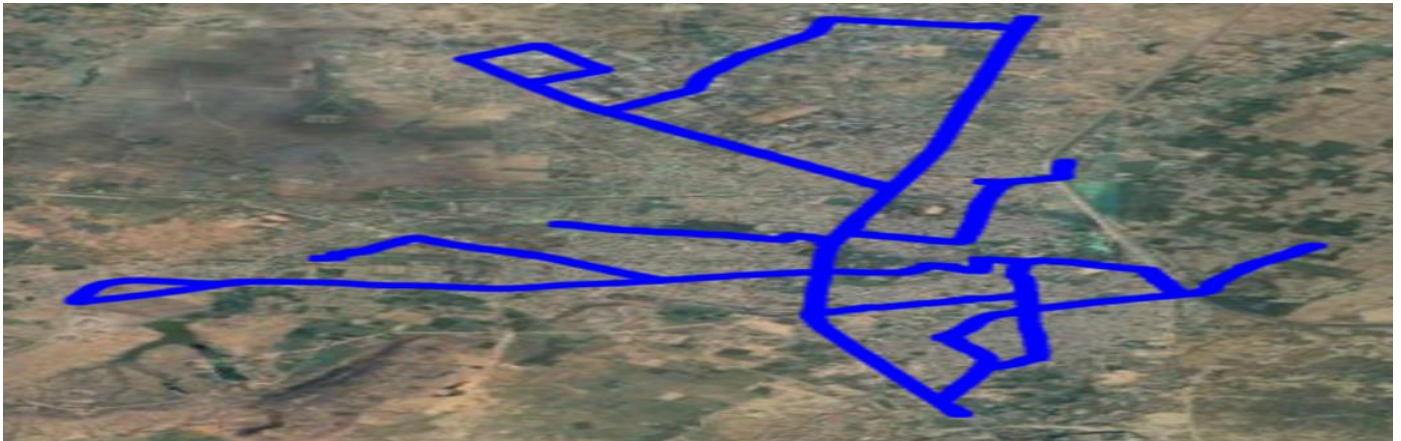
Service	Specifications
Download	2G (Locked) - 500KB, 3G (Dual) - 20 MB, 4G (Free) - 40 MB
Upload	2G (Locked) - 100KB, 3G (Dual) - 5 MB, 4G (Free) - 10 MB
Web Browsing	3 links of e/m commerce website www.amazon.in, www.flipkart.com and PayTm
Latency	32 Bytes on www.google.com

Voice & Dynamic Data Test Drive Route

Bharatpur City



Dholpur City



Date	Test Scenario	Area to be Covered
25-Jun-24	Hot Spots- 2G/3G/4G Static Data Tests	Static Hotspot – 1) Bharatpur Bus Stand, 2) Shri Bankey Bihari Ji Temple, Bharatpur, 3) Laxman Mandir, Bharatpur.
26-Jun-24	2G/3G/4G Voice and 3G/4G Dynamic Data	Starting point: BSNL office—Bijali Ghar, Kali Bagichi Bus Stand, Bharatpur Bus stand, Kummher Gate, Red Cross Circle, Lohagarh Fort, Shri Bihari Ji Temple, Red Cross Circle, BSNL Office.
27-Jun-24	2G/3G/4G Voice and 3G/4G Dynamic Data	Starting point: Dholpur Bus Stand, Gulab Bag Circle, Nihal Tower (Ghantaghar), Jagan Circle, Dholpur Junction Railway Station, Lal Bazar, Gulab Bag Circle.
28-Jun-24	Hot Spots- 2G/3G/4G Static Data Tests	Static Hotspot – 1) Dholpur Bus Stand, 2) Dholpur Junction, Railway Station, 3) Nihal Tower (Ghantaghar), Dholpur.

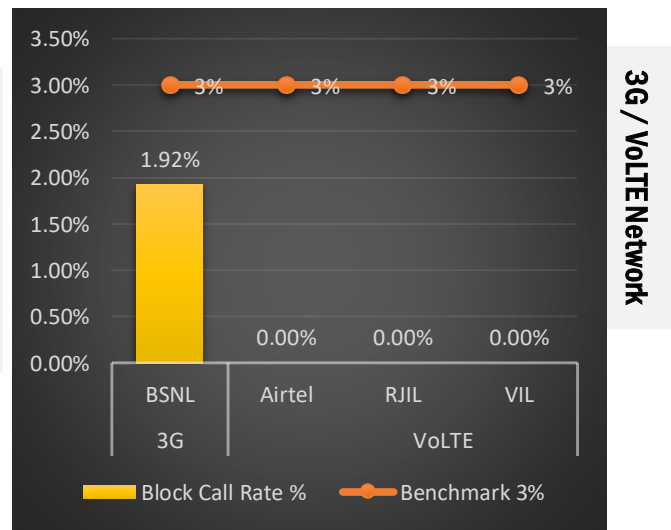
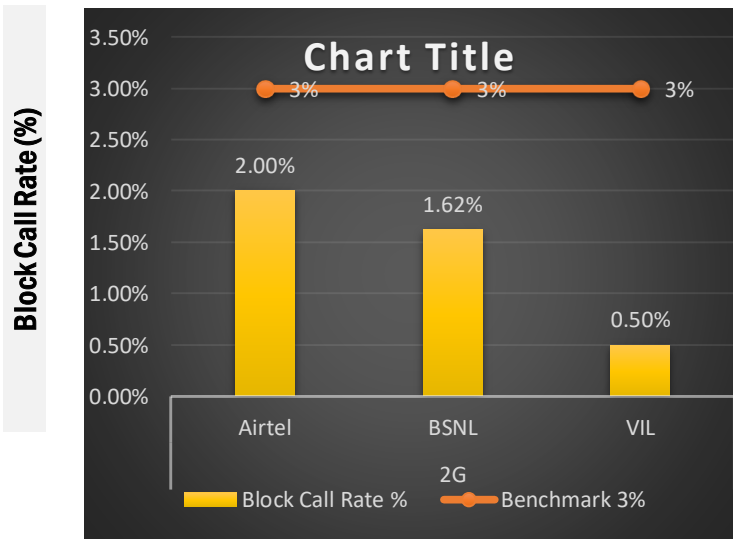
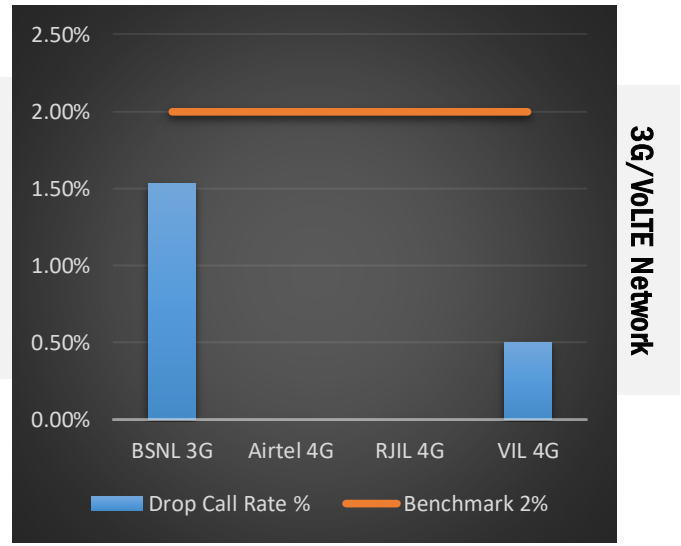
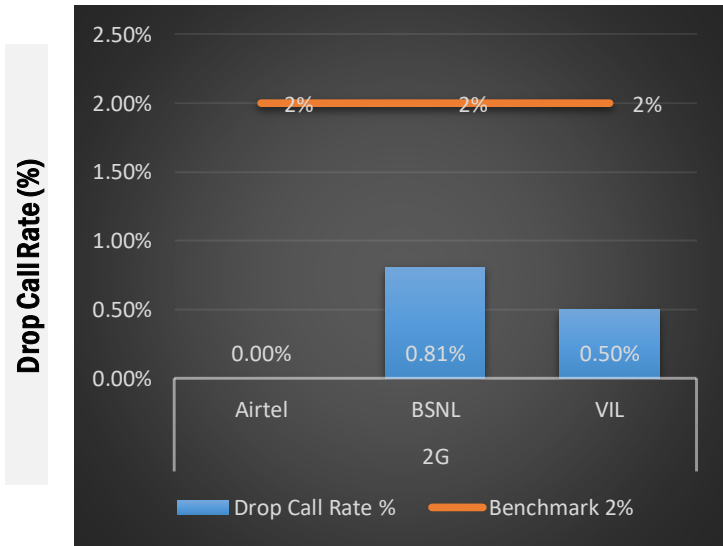
Overview

Data Service Test - Static Locations



Hotspot Locations
1. Bharatpur Bus Stand
2. Shri Bankey Bihari Ji Temple, Bharatpur
3. Laxman Mandir, Bharatpur
4. Dholpur Bus Stand
5. Dholpur Junction, Railway Station
6. Nihal Tower (Ghantaghar), Dholpur

QoS compliance of the TSPs in Bharatpur to Dholpur City for Voice across technologies 2G/3G/4G-VoLTE:



KPIs	2G			3G	4G		
	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL
Drop Call Rate %	0.00%	0.81%	0.50%	1.53%	0.00%	0.00%	0.50%
Block Call Rate %	2.00%	1.62%	0.50%	1.92%	0.00%	0.00%	0.00%

- 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 %	95.74%	97.2%	88.51%

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

TSPs	3G
	BSNL
Coverage %	88.26%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99.93%	99.92%	98.28%

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	99.67%	100%	100%	100%

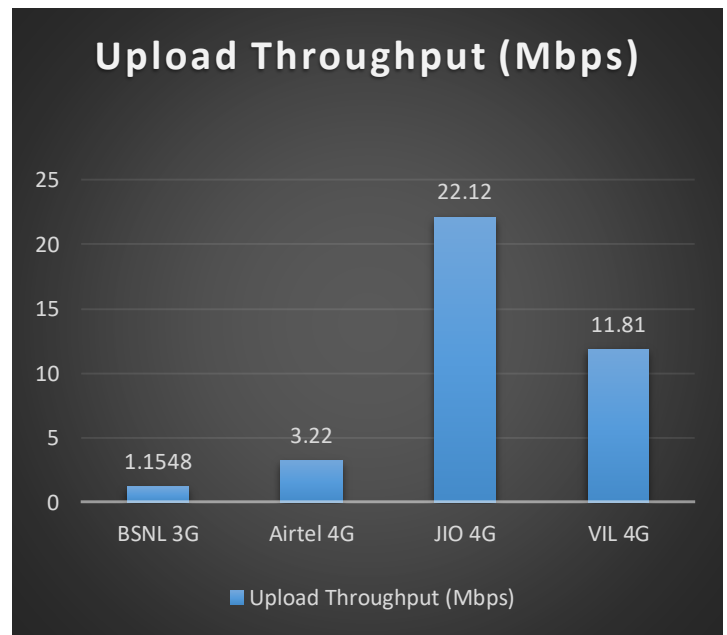
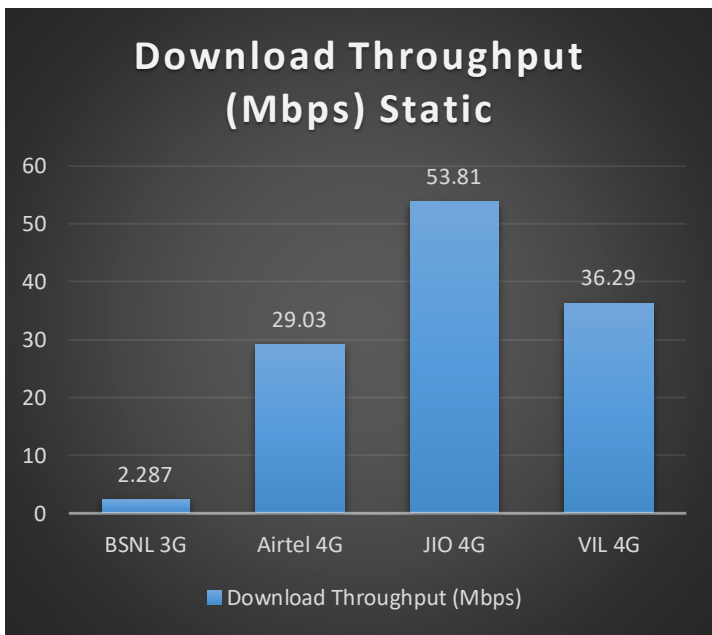
Data Services Static

Key Observations

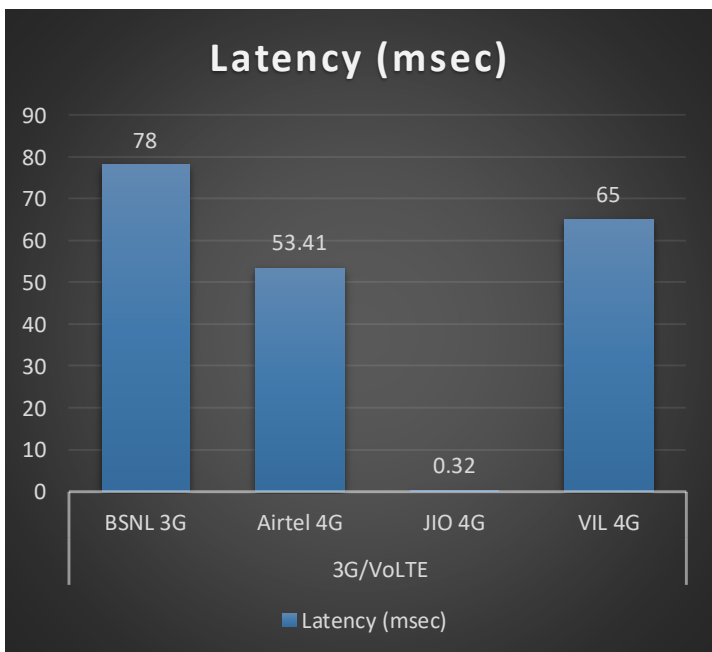
Data was tested at 5 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, Paytm)

Data Download and Upload Performance Static (Mbps)

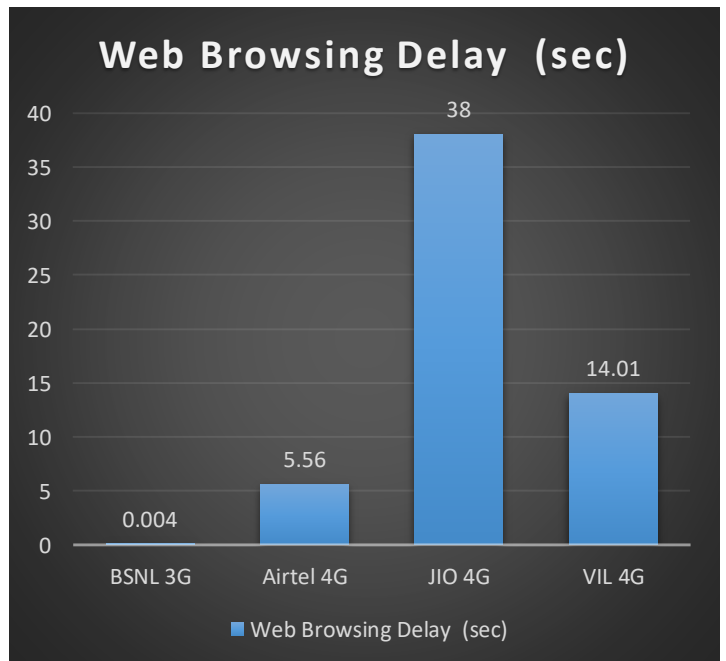
3G/4G/ Network:



Latency (ms)



Web Browsing (Sec)



Data Services Dynamic

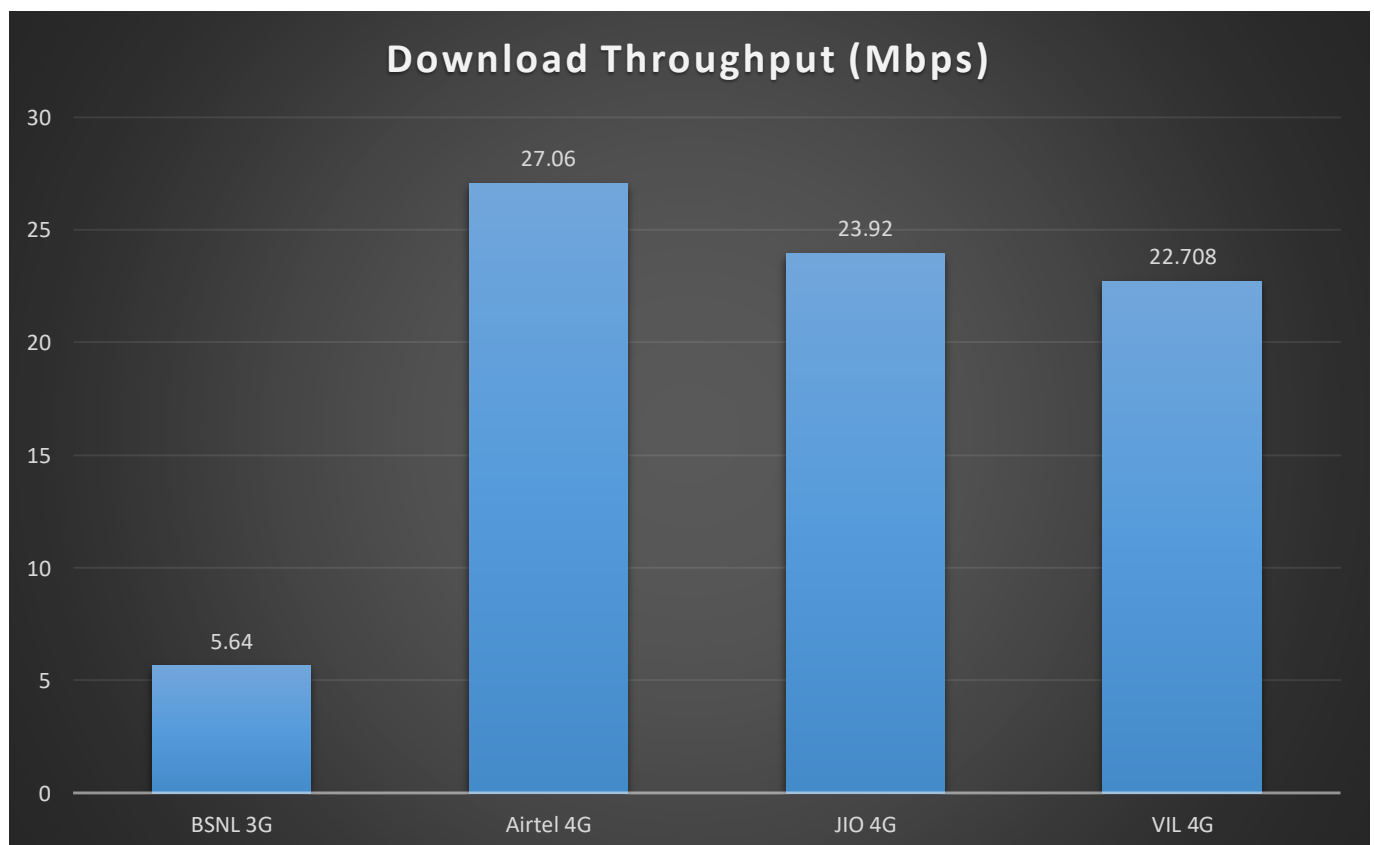
Key Observations

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

Data Download Performance (kbps) - Dynamic

3G/4G/ Network:

Data Services Dynamic	3G/VoLTE			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	5.64	27.06	23.92	22.71



Summary

City Level Summary- Voice

Voice Call	2G		
	Airtel	BSNL	VIL
Call Attempt	212	246	205
Blocked Call Rate (%)	2%	0.87%	0.5%
CSSR% (Accessibility)	98%	99.13%	99.5%
Drop Call Rate (%)	0%	1.62%	0.5%
Mobility HOSR (%)	97.9%	97.78%	99.57%
Rx Quality (%)	96.45%	98.78%	95.72%
Average CST Sec	3.36	3.41	1.743

Voice Call	3G/VoLTE			
	BSNL 3G	Airtel VoLTE	JIO VoLTE	VIL VoLTE
Call Attempt	260	223	219	205
Blocked Call Rate (%)	1.54%	0%	0%	0%
CSSR% (Accessibility)	98.46%	100%	100%	100%
Drop Call Rate (%)	1.92%	0%	0%	0.5%
Mobility HOSR (%)	95.24%	100%	99.38%	100%
Rx Quality (%)	95.28%	91.19%	90.78%	95.21%
Average CST Sec	3.14	1.88	0.65	0.496

Summary

City Level Summary- Data Services

Data Services Static	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	142.25	108.16	266.6
Upload Throughput (kbps)	74.79	37.46	190.76
Web Browsing Delay (sec)	73.65	0.003	62.355
Latency (msec)	183.25	136	171.17

Data Services Static	3G / 4G			
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G
Download Throughput (Mbps)	2.287	29.03	53.81	36.29
Upload Throughput(Mbps)	1.1548	3.22	22.12	11.81
Video Streaming Delay (sec)	3.685	0	1.29	0
Web Browsing Delay (sec)	0.004	5.56	38	14.01
Latency (msec)	78	53.41	0.32	65

<u>Bus Stand Bharatpur</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	120.02	108.16	252.15
Upload Throughput (kbps)	92.5	37.46	160.89
Web Browsing Delay (sec)	78.3	0.003	62.15
Latency (msec)	193.56	136	220

<u>Bihari Ji Temple</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	142.2	120.69	284.54
Upload Throughput (kbps)	139.5	27.44	154.82
Web Browsing Delay (sec)	74.2	0.0036	51.63
Latency (msec)	232.08	158	140

<u>Laxman Ji Temple</u>	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	185.43	63.74	262.66
Upload Throughput (kbps)	94.27	34	216.09
Web Browsing Delay (sec)	69.58	0.003	61.383
Latency (msec)	133.87	138	166

<u>Dholpur</u> Bus Stand	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	138.43	158.71	262.57
Upload Throughput (kbps)	53.9	16.76	204.72
Web Browsing Delay (sec)	148.21	0.026	76.897
Latency (msec)	318.14	188	170

Dholpur Junction	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	184.83	209.51	240.77
Upload Throughput (kbps)	74.15	27.28	279.83
Web Browsing Delay (sec)	82.62	0.003	65.753
Latency (msec)	257.87	174	160

<u>Nihal</u> Tower (Dholpur)	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	182.63	93.19	296.91
Upload Throughput (kbps)	94.45	11.13	128.2
Web Browsing Delay (sec)	63.2	0.003	56.32
Latency (msec)	196.1	180	171

Data Services static

<u>Bus Stand</u> Bharatpur	3G		4G	
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	2.287	24.63	59.66	38.95
Upload Throughput (mbps)	0.11	4.97	21.92	9.91
Video Streaming Delay (Secs.)	0	0	1.4	0
Web Browsing Delay (sec)	0.004	5.92	40	14.792
Bihari Ji Temple	3G		4G	
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	2.643	28.76	59.79	36.22
Upload Throughput (mbps)	0.29	14.31	22.94	16.83
Video Streaming Delay (Secs.)	0	0	1.28	0
Web Browsing Delay (sec)	1.055	6.15	39	14.61
Latency (msec)	92	62.5	0.32	45
<u>Laxman Ji Temple</u>	3G		4G	
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	2.41	36.23	39.24	31.8
Upload Throughput (mbps)	0.17	12.62	22.86	16.76
Video Streaming Delay (Secs.)	0	0	1.21	0
Web Browsing Delay (sec)	0.03	7.85	41	13.608
Latency (msec)	93.66	65.53	0.32	63

<u>Dholpur</u> Bus Stand	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	1.24	30.65	55.43	35.17
Upload Throughput (mbps)	0.083	0.83	20.26	8.72
Video Streaming Delay (Secs.)	0	0	1.25	0
Web Browsing Delay (sec)	0.003	6.59	39	13.799
Latency (msec)	138	67.1	0.32	78

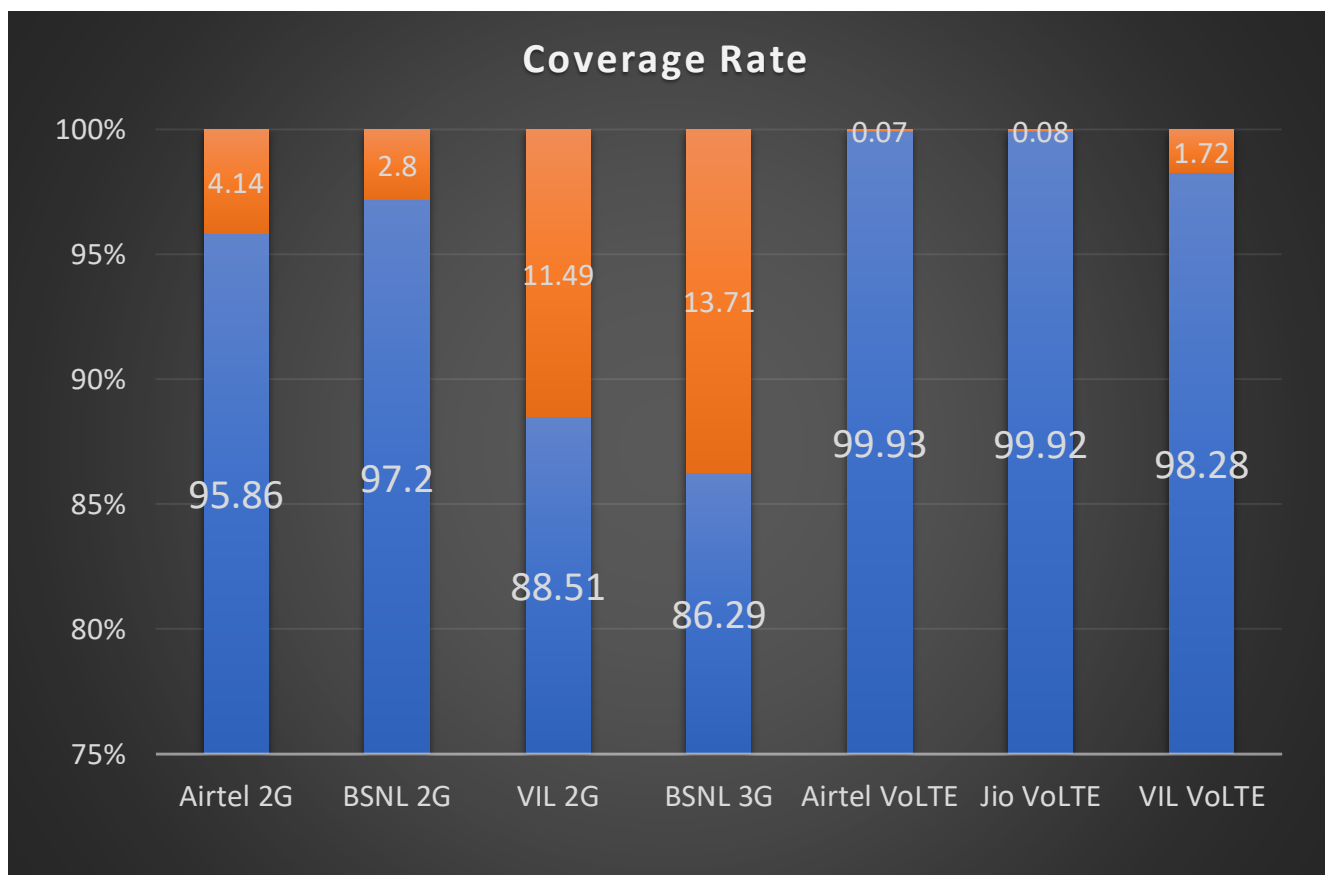
<u>Dholpur</u> Junction	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	1.32	42.58	53.03	38.94
Upload Throughput (mbps)	0.22	0.3	21.25	12.02
Video Streaming Delay (Secs.)	0	0	1.29	0
Web Browsing Delay (sec)	0.026	0	36	13.676
Latency (msec)	134	0	0.3	57

<u>Nihal Tower</u> (Dholpur)	3G	4G		
	BSNL	Airtel	JIO	VIL
Download Throughput (mbps)	0.67	40.08	55.71	36.64
Upload Throughput (mbps)	0.076	0.27	23.5	6.6
Video Streaming Delay (Secs.)	0	0	1.33	0
Web Browsing Delay (sec)	0.003	6.86	33	13.6
Latency (msec)	138	71.67	0.31	77

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.

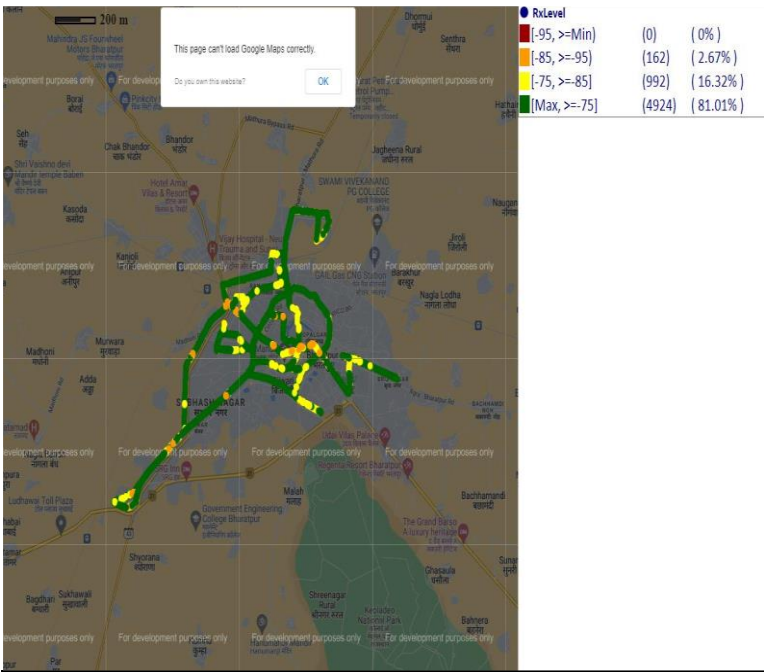
TSP	Coverage Rate %
Airtel 2G	95.86%
BSNL 2G	97.2%
VIL 2G	88.51%
BSNL 3G	86.29%
Airtel VoLTE	99.93%
Jio VoLTE	99.92%
VIL VoLTE	98.28%



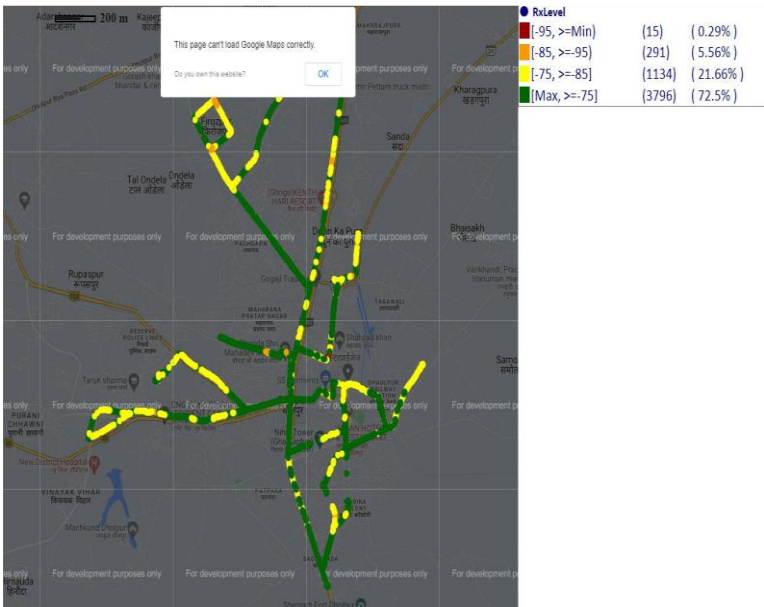
TSP-AIRTEL

Technology	Coverage %
2G	95.86%

2G



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	4924	81.01%	Green
[-75, >=-85)	992	16.32%	Yellow
[-85, >=-95)	162	2.67%	Orange
[-95, >=Min)	0	0.00%	Red
Total	6078	100%	



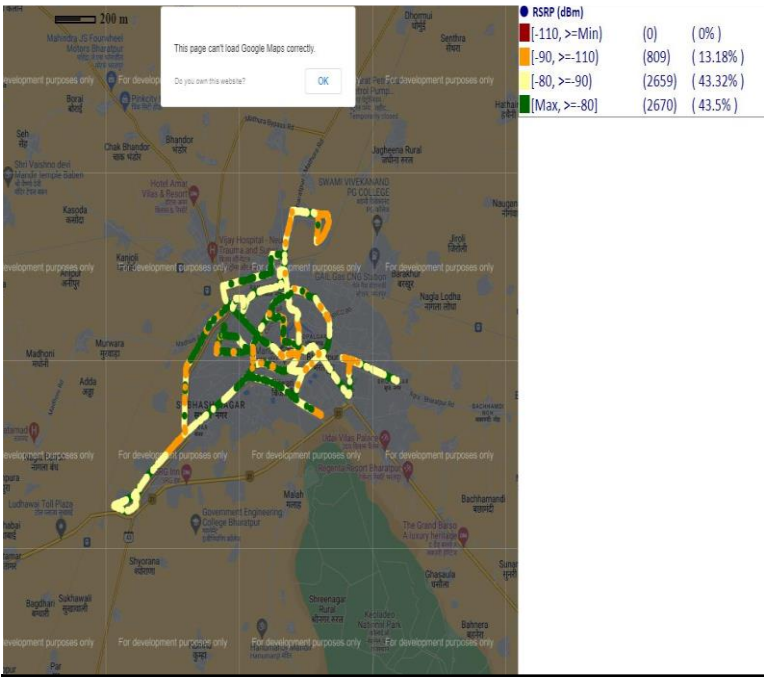
2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	3796	72.50%	Green
[-75, >=-85)	1134	21.66%	Yellow
[-85, >=-95)	291	5.56%	Orange
[-95, >=Min)	15	0.28%	Red
Total	5236	100%	

Coverage Details

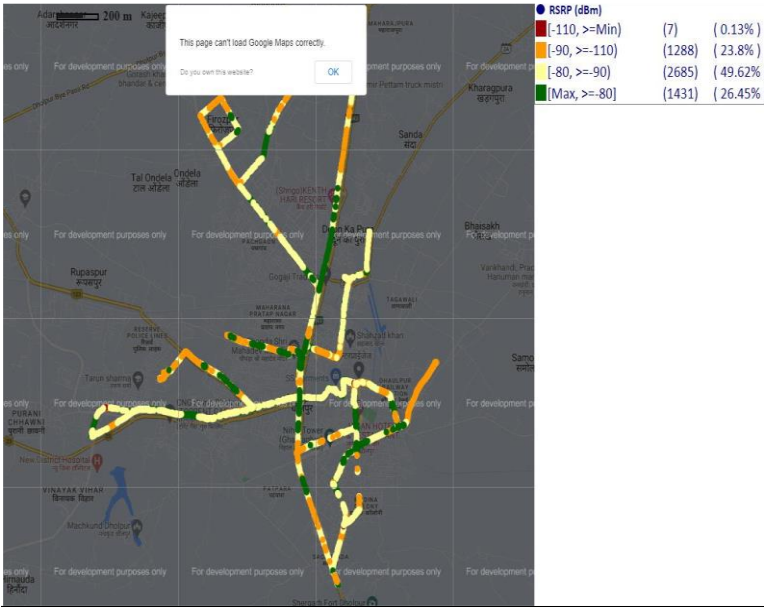
TSP-AIRTEL

VoLTE

Technology	Coverage %
VoLTE	99.93%



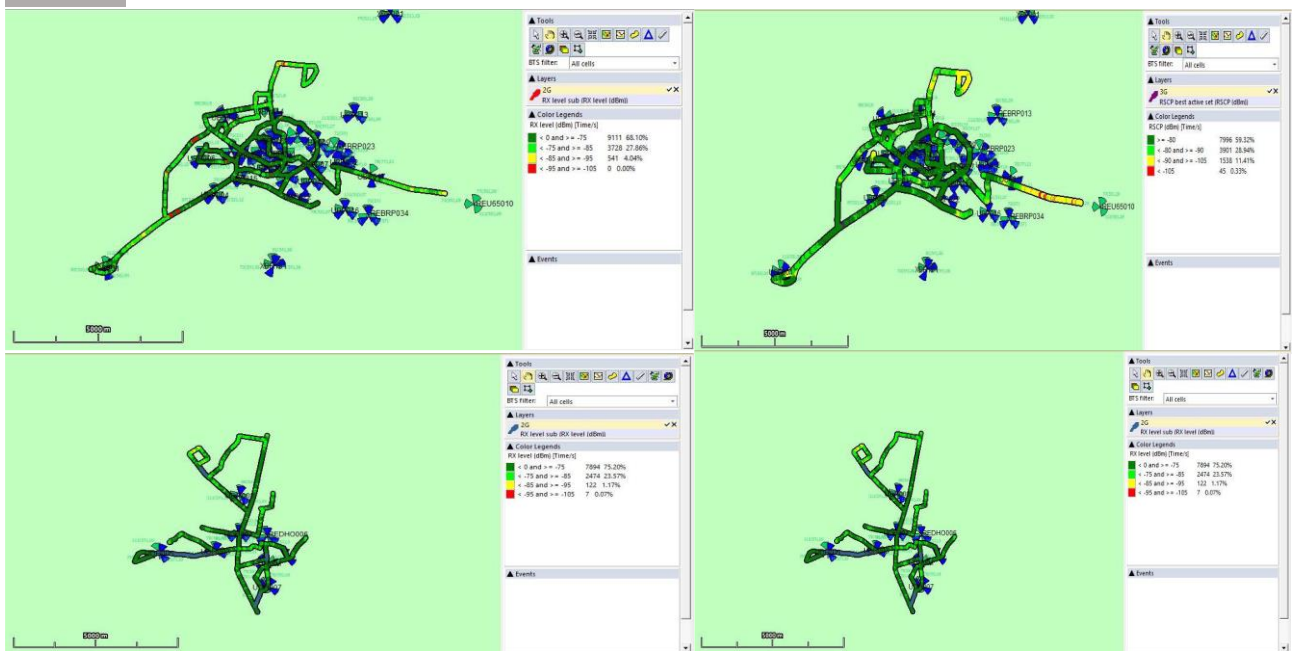
VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	2670	43.50%	Green
[-80, >=-90)	2659	43.32%	Yellow
[-90, >=-110)	809	13.18%	Orange
[-110, >=Min)	0	0.00%	Red
Total	6138	100%	



VoLTE			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	1431	26.45%	Green
[-80, >=-90)	2685	49.62%	Yellow
[-90, >=-110)	1288	23.80%	Orange
[-110, >=Min)	7	0.13%	Red
Total	5411	100%	

TSP- BSNL

Technology	Coverage %
2G	97.2%
3G	86.29%

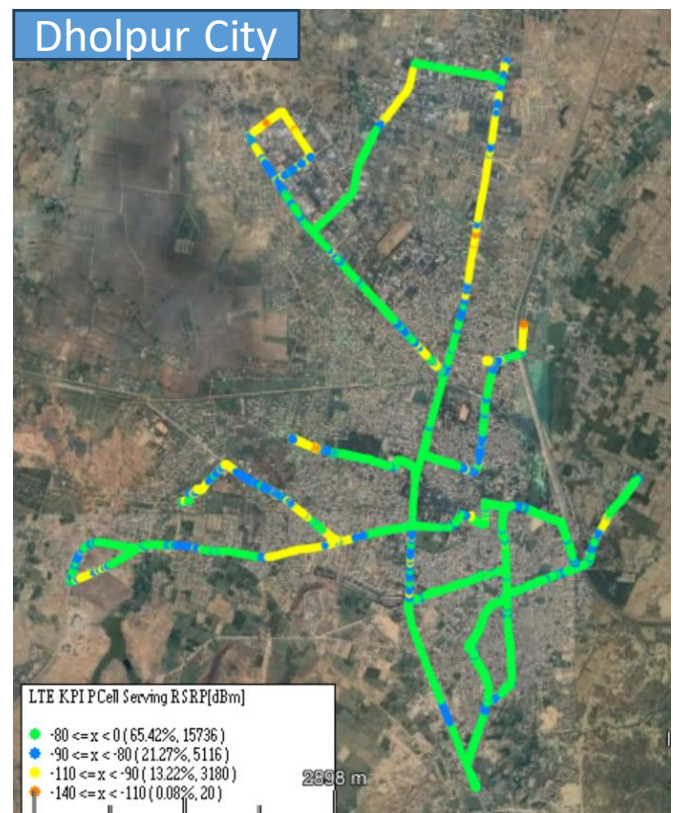
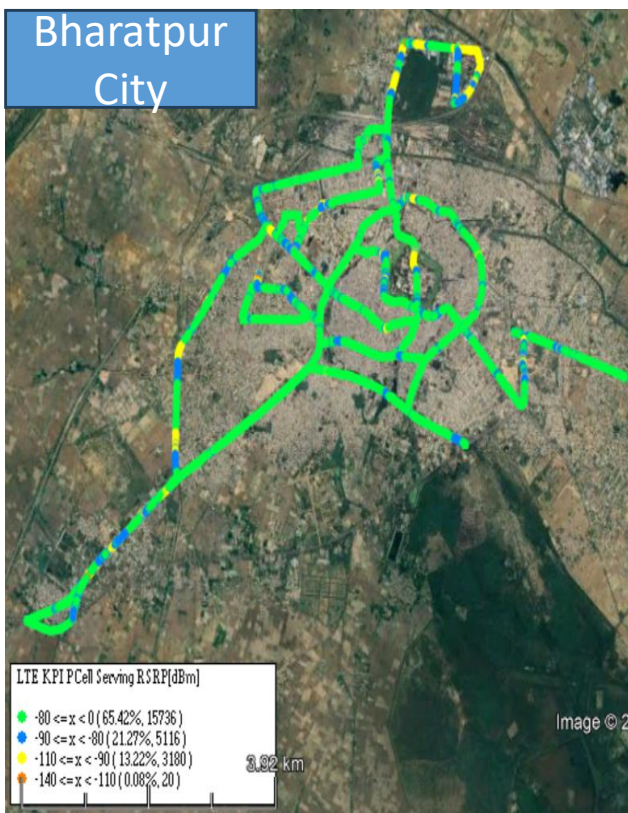


2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	17143	71.28%	
[-75, >=-85)	6233	25.92%	
[-85, >=-95)	664	2.76%	
[-95, >=Min)	11	0.04%	
Total	24051	100%	

3G			
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-80]	13998	57.86%	
[-80, >=-90)	6878	28.43%	
[-90, >=-105)	3237	13.38%	
[-105, >=Min)	79	0.33%	
Total	24192	100%	

JIO

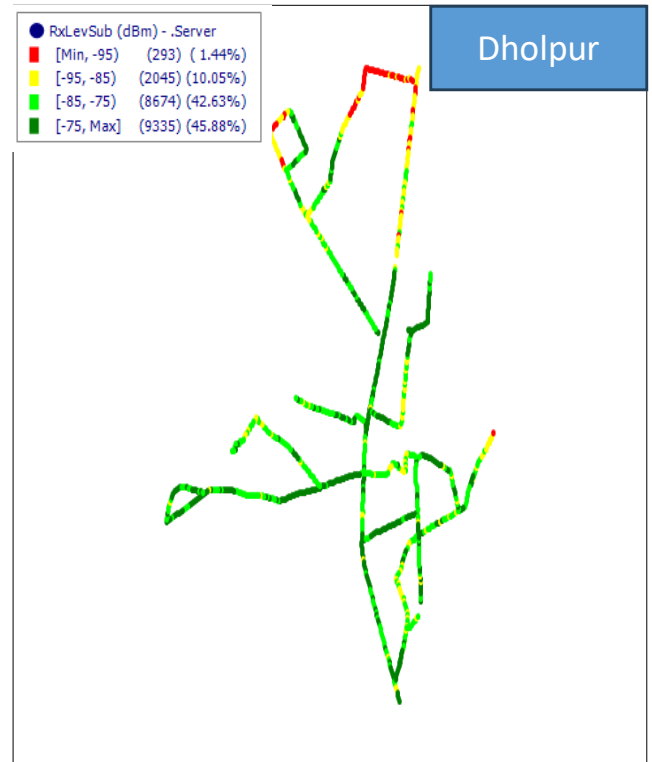
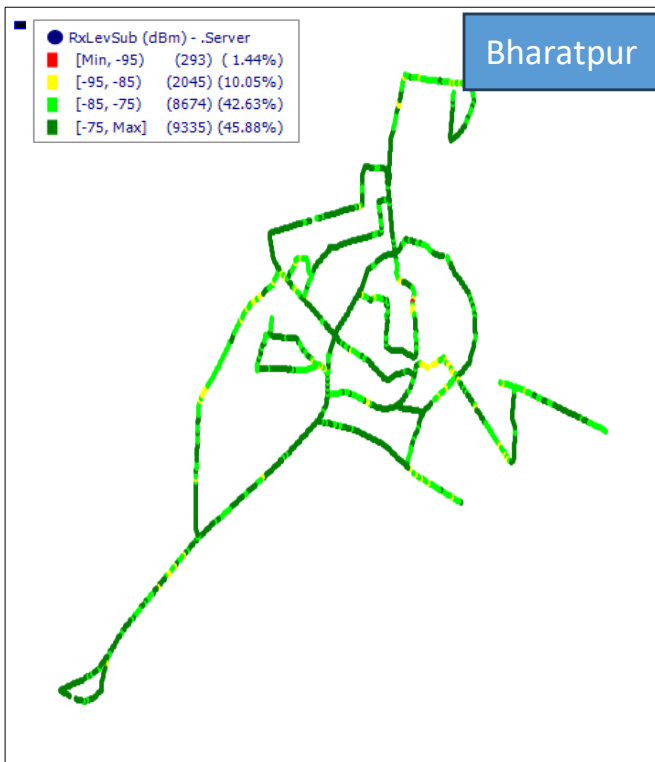
Technology	Coverage %
VoLTE	99.92%



VoLTE /			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	15736	65.43%	
[-80, >=-90)	5116	21.27%	
[-90, >=-110)	3180	13.22%	
[-110, >=Min)	20	0.08%	
Total	24052	100%	

VIL

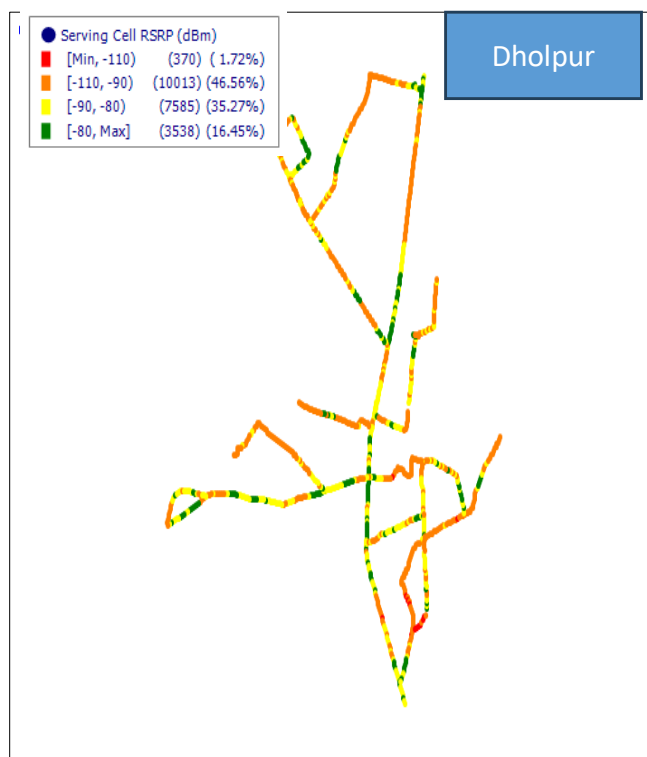
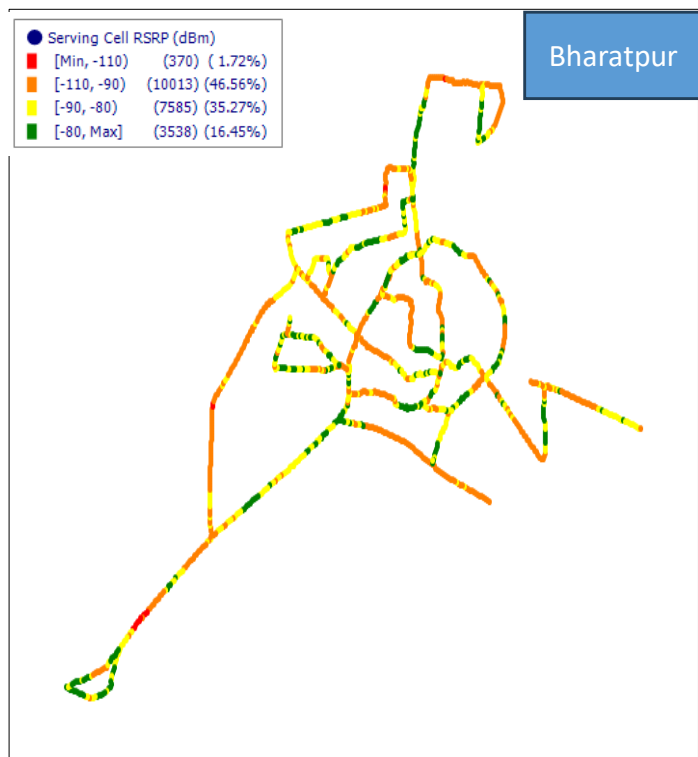
	Technology	Coverage Rate %
2G	2G	88.51%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	9335	45.88%	
[-75, >=-85)	8674	42.63%	
[-85, >=-95)	2045	10.05%	
[-95, >=Min)	293	1.44%	
Total	20347	100%	

VIL

	Technology	Coverage Rate %
VoLTE	VoLTE /	98.28%

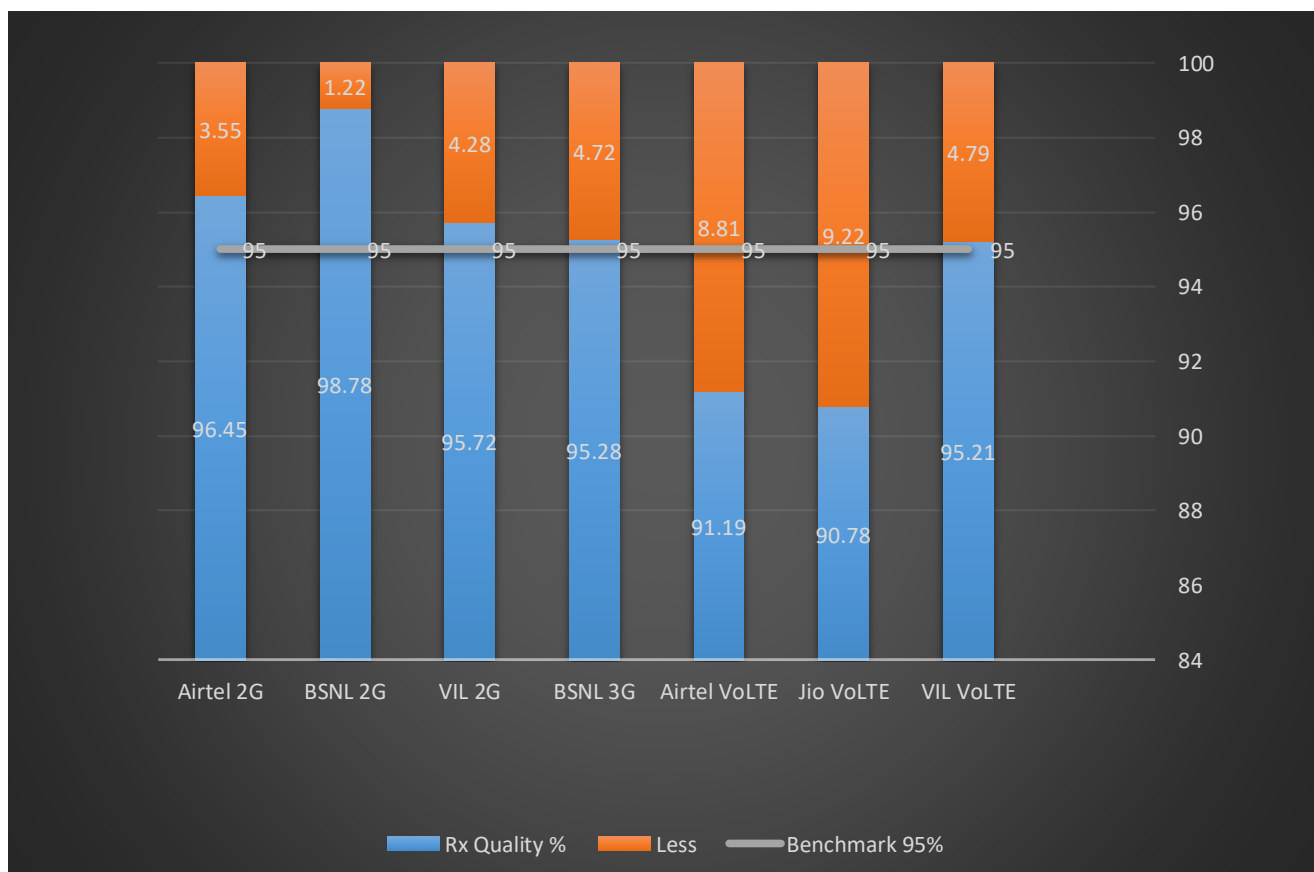


VoLTE /			
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	3538	16.45%	
[-80, >=-90)	7585	35.27%	
[-90, >=-110)	10013	46.56%	
[-110, >=Min)	370	1.72%	
Total	21506	100%	

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. The benchmark should usually be $\geq 95\%$.

<u>TSP</u>	<u>Rx Quality %</u>
Airtel 2G	96.45%
BSNL 2G	98.78%
VIL 2G	95.72%
BSNL 3G	95.28%
Airtel VoLTE	91.19%
Jio VoLTE	90.78%
VIL VoLTE	95.21%

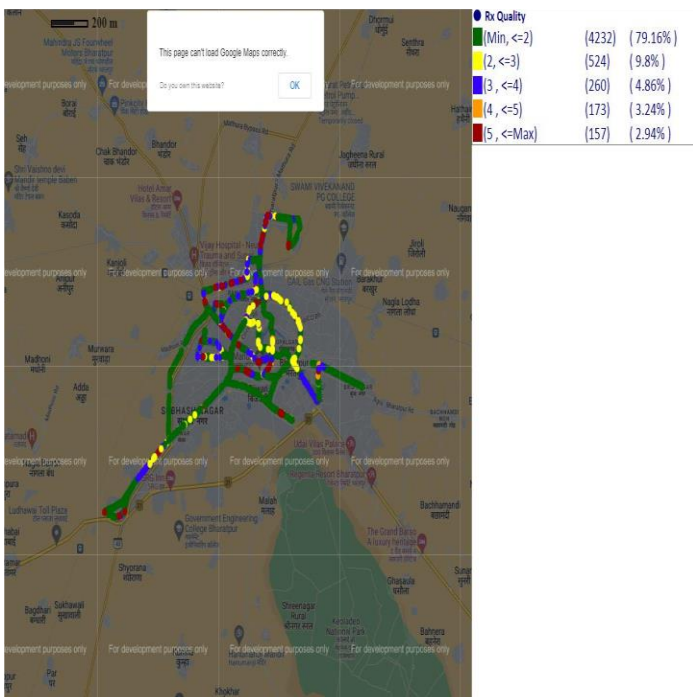


II. Quality Details

Airtel

Technology	Rx Quality %
2G	96.45%

2G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	4232	79.16%	
(2, <=3)	524	9.80%	
(3, <=4)	260	4.86%	
(4, <=5)	173	3.24%	
(5, <=Max)	157	2.94%	
Total	5346	100%	

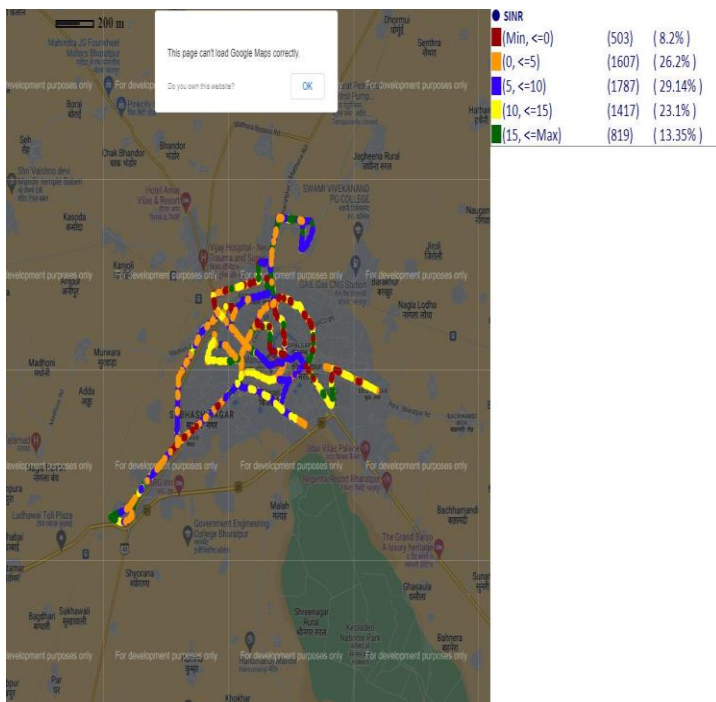


Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	3701	80.11%	
(2, <=3)	379	8.20%	
(3, <=4)	223	4.83%	
(4, <=5)	125	2.71%	
(5, <=Max)	192	4.15%	
Total	4620	100%	

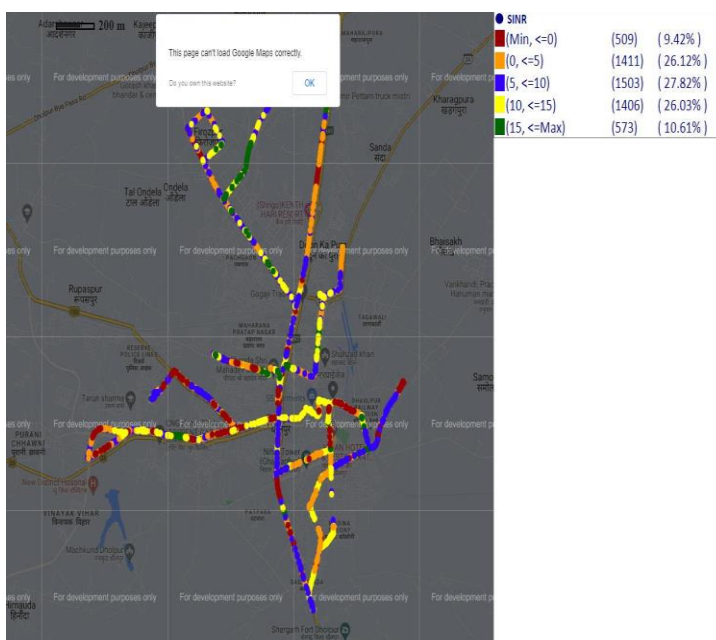
II. Quality Details

Airtel

	Technology	Rx Quality %
VoLTE	VoLTE	91.19%



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	503	8.20%	
(0, <=5)	1607	26.20%	
(5, <=10)	1787	29.14%	
(10, <=15)	1417	23.10%	
(15, <=Max)	819	13.35%	
Total	6133	100%	

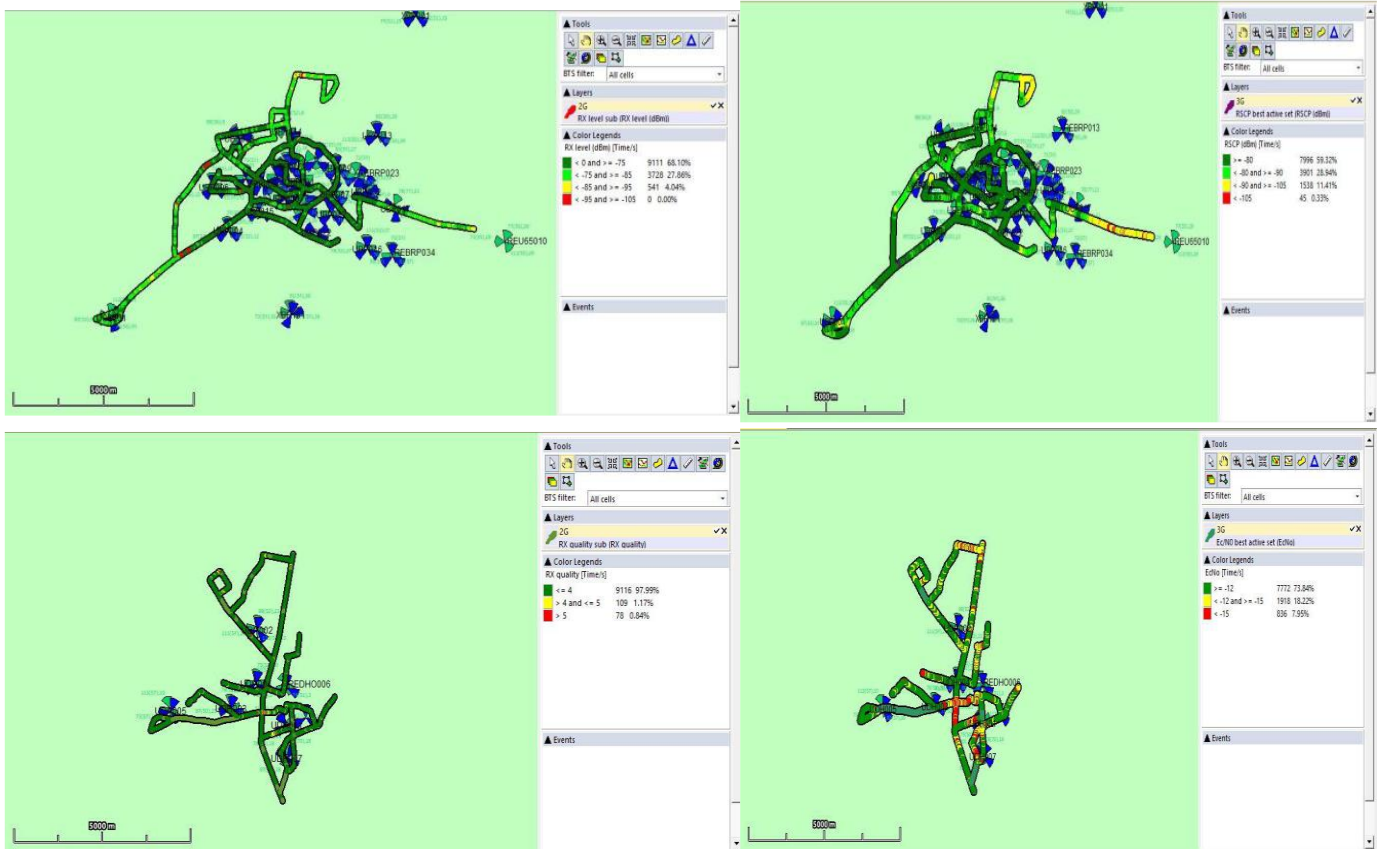


Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	509	9.42%	
(0, <=5)	1411	26.12%	
(5, <=10)	1503	27.82%	
(10, <=15)	1406	26.03%	
(15, <=Max)	573	10.61%	
Total	5402	100%	

II. Quality Details

BSNL

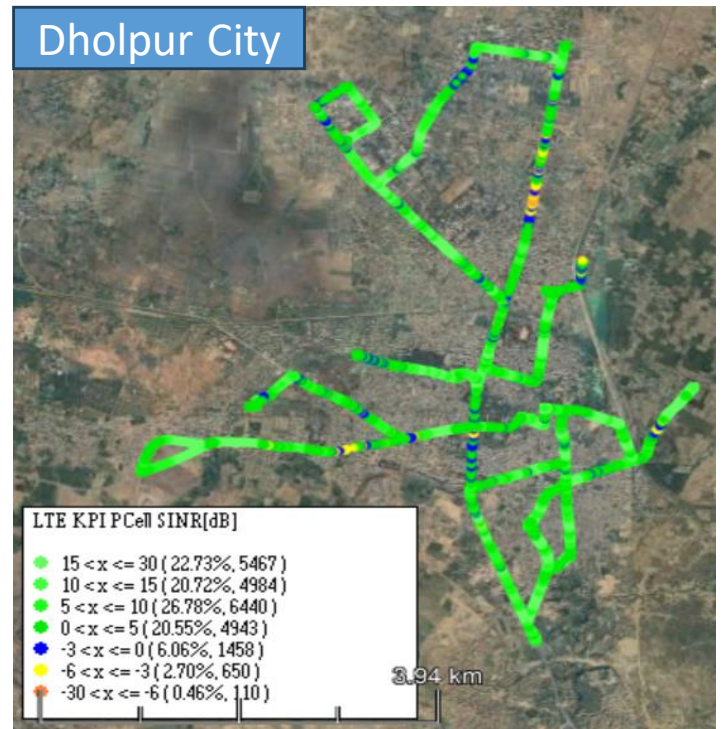
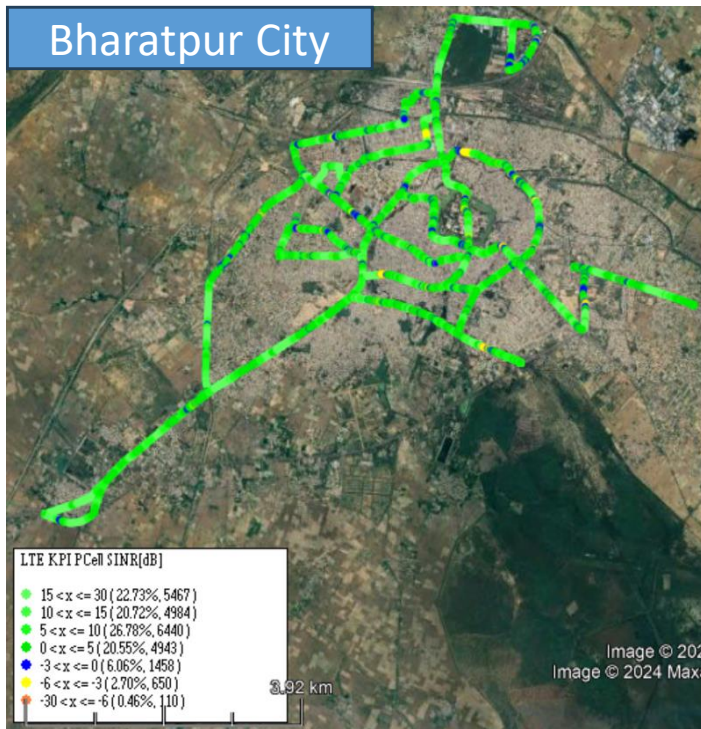
	Technology	Rx Quality %	
	2G	98.78%	
2G	3G	95.28%	3G



Overall Rx Quality	# Samples	% PDF	Legends
(Min, ≤ 4)	20659	96.94%	
(4, ≤ 5)	392	1.84%	
(5, $\le \text{Max}$)	260	1.22%	
Total	21311	100%	
Overall Ec/No	# Samples	% PDF	Legends
(Min, ≤ -11)	17095	70.68%	
(-11, ≤ -14)	5951	24.60%	
(-14, $\le \text{Max}$)	1140	4.72%	
Total	24186	100%	

JIO

Technology	Rx Quality %
VoLTE	90.78%



Overall SINR	# Samples	% PDF	Legends
(Min, <=-6)	110	0.46%	
(-6, <=-3)	650	2.7%	
(-3, <=0)	1458	6.06%	
(0, <=5)	4943	20.55%	
(5, <=10)	6440	26.78%	
(10, <=15)	4984	20.72%	
(15, <=Max)	5467	22.73%	
Total	24052	100%	

II. Quality Details

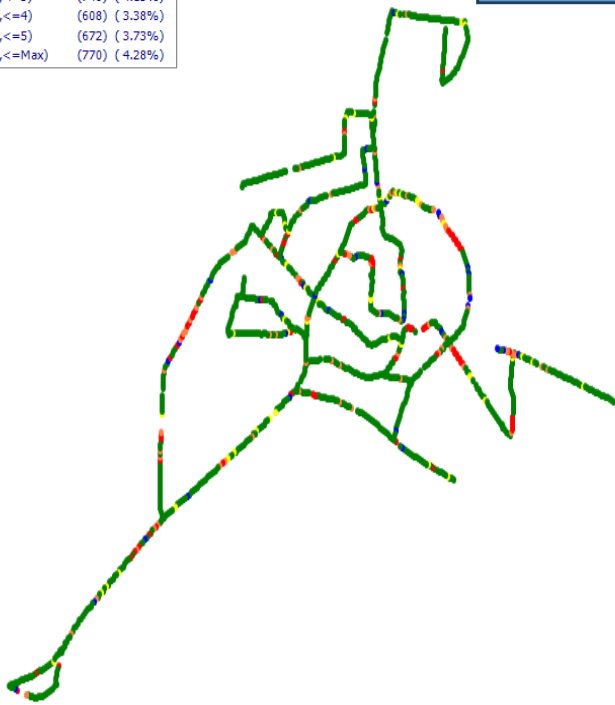
VIL

2G

Technology	Rx Quality %
2G	95.72%

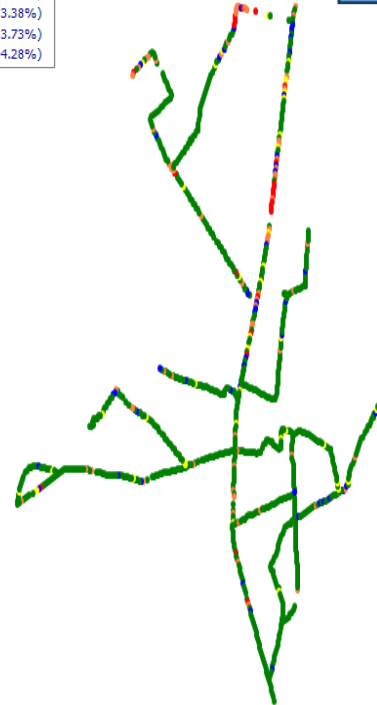
RxQual Sub	(Min, <=2)	(15211)	(84.46%)
(2, <=3)	(748)	(4.15%)	
(3, <=4)	(608)	(3.38%)	
(4, <=5)	(672)	(3.73%)	
(5, <=Max)	(770)	(4.28%)	

Bharatpur



RxQual Sub	(Min, <=2)	(15211)	(84.46%)
(2, <=3)	(748)	(4.15%)	
(3, <=4)	(608)	(3.38%)	
(4, <=5)	(672)	(3.73%)	
(5, <=Max)	(770)	(4.28%)	

Dholpur



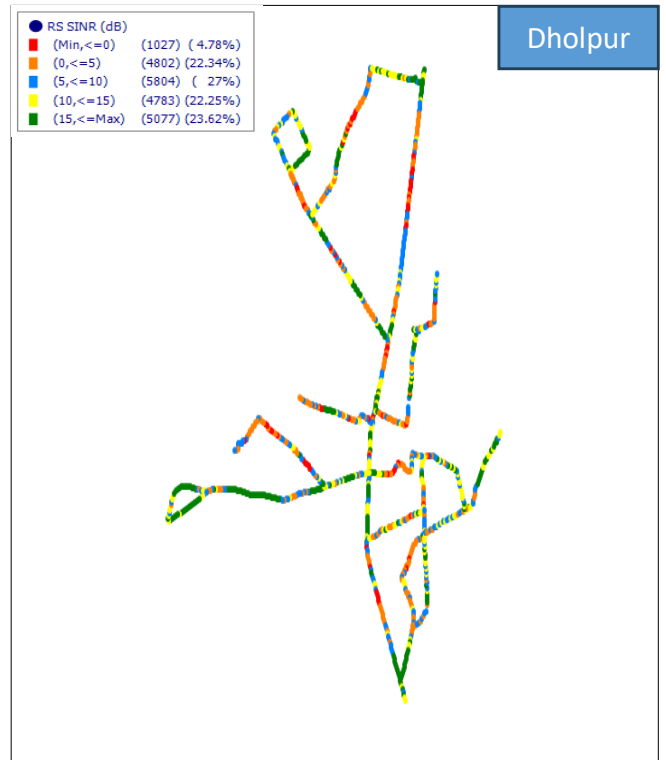
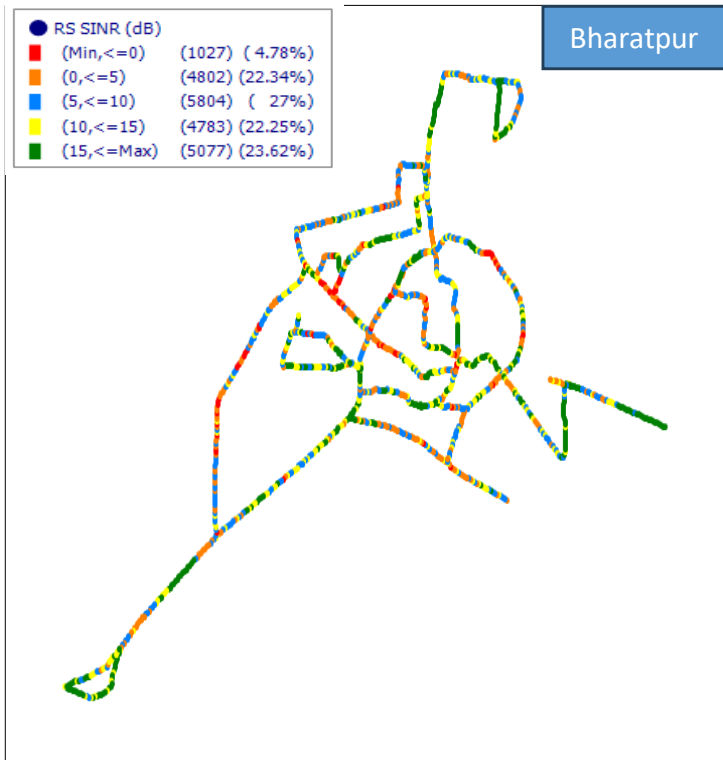
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	15211	84.46%	
(2, <=3)	748	4.15%	
(3, <=4)	608	3.38%	
(4, <=5)	672	3.73%	
(5, <=Max)	770	4.28%	
Total	18009	100%	

II. Quality Details

VIL

Volte

Technology	Rx Quality %
4G	95.21%



Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1027	4.78%	
(0, <=5)	4802	22.34%	
(5, <=10)	5804	27%	
(10, <=15)	4783	22.25%	
(15, <=Max)	5077	23.63%	
Total	21493	100%	

III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	99.67%
Airtel VoLTE	100%
Jio VoLTE	100%
VIL VoLTE	100%

