Operator Assisted Drive Test Report

Jaipur City & Nearby area
12-15 June. 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 in Jaipur City & Nearby area from 9:00 AM to 8:00 PM during 12th June to 15th June 2023. The drive test covered drive route of 414 KMs & 6 no hotspots over a period of 4 days. Approximately 330 calls were made for each of the 07 networks: three 2G networks, one 3G networks and three LTE /5G networks covering four TSPs.

Overview

Voice Summary

Data Summary

Overview

Regional Office, TRAI Jaipur conducted Operator Assisted Drive Test from 12 June 2023 to 15 June 2023 covering Jaipur city. The performance of Airtel, BSNL, Vodafone Idea and Jio was monitored across various technologies (2G, 3G, 4G and 5G). 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, Upload Throughputs, Web Browsing Delay and Latency.

Drive Test Details :

Voice Tests: Calls were made for **180** sec duration with a wait time of 10 sec between calls in all technologies. The drive test covered a drive route of approximately 414 KMs. Approximately 330 calls were made for each of the 07 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 414 kms for download throughput in all technologies.

2G – measurement – UE Locked in 2G file size- 500KB

3G – measurement – UE in 3G   File Size- 20MB
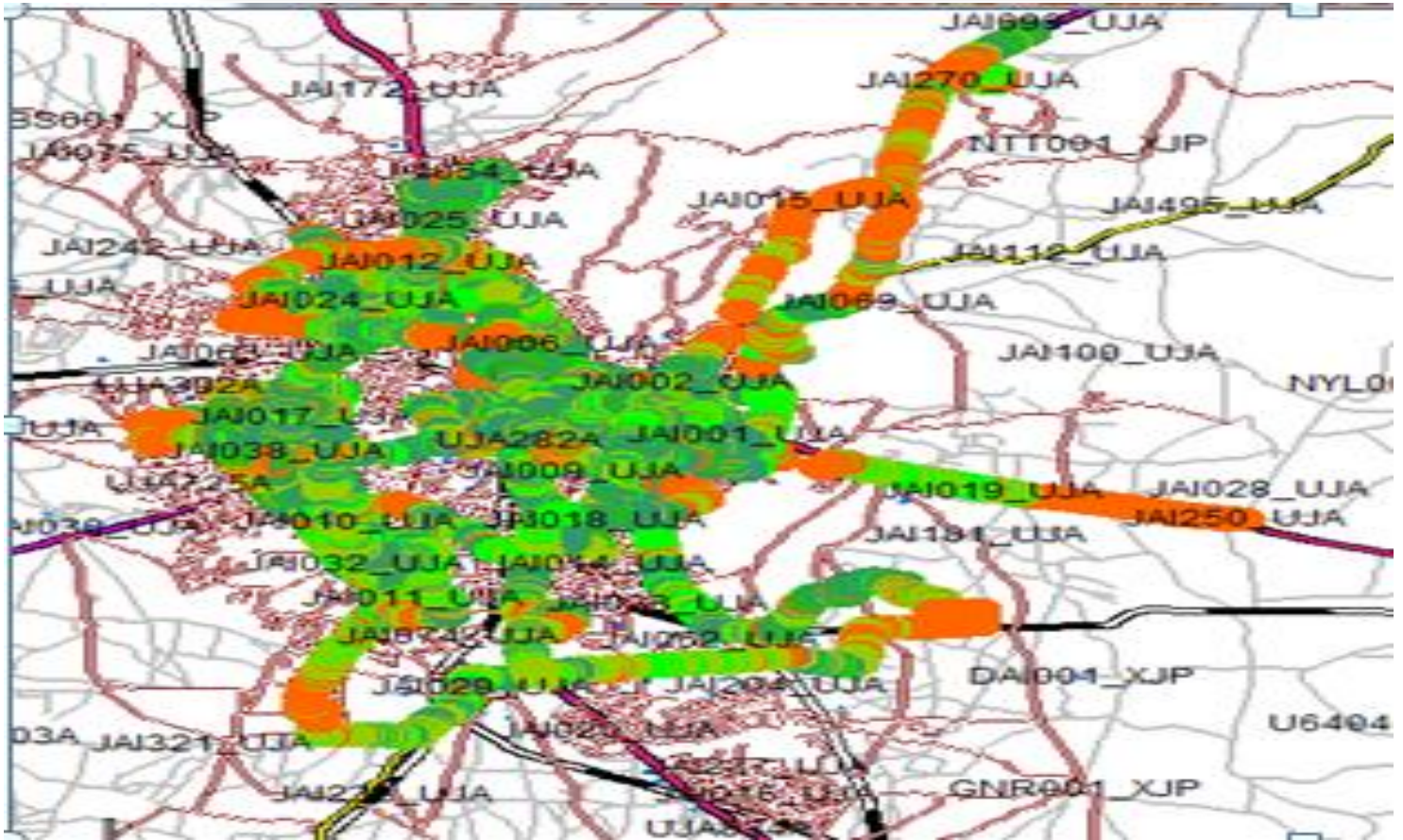
4G – measurement – UE in LTE File Size- 40MB

Static data tests on 6 hotspots

1.   Govind Dev Ji Temple
2.   Amer Fort
3.   Pink Square Mall
4.   Railway Station
5.   Jaipur International Airport
6.   City Park, Mansarovar

| 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

Date	Test Scenario	Area to be Covered
12 Jun 2023	2G/3G/4G Voice and 3G/4G Dynamic Data	Dot/TRAI Office,Jhalana,Apex circle,Jagatpura,JNU Campus,Indra Gandhi Nagar,Khatipura Railway Station,Goner puliya,Bombay hospital,Akshaypatra,7No Bus stand,SKIT College,Cheelgadi Restaurant,Airport T-1,Sanganer,Muhana mandi,Mansarovar,Banyan tree School,Metro Mas Hospital,HCG Hospital,New Aatish Market,Gopalpura Mode,Tonk road,Chokhi Dhani,MG Hospital,Sitapura Ind. Area,RUHS,Narayana Hridyal Hospital,Pratap Nagar,Kumbha Marg,Jagatpura Kachchi Basti,Airport T-2,Jawahar Circle,JLN marg,Fortis Hospital,Malviya Nagar,Pradhan Marg.
13 Jun 2023	2G/3G/4G Voice and 3G/4G Dynamic Data Hot Spots- 2G/3G/4G Static Data Tests	Dot/TRAI Office Jhalana,Danik Bhaskar,Gandhi Nagar Railway Station,Rambagh Circle,SMS Hospital,Maharaja & Maharani College, Govt. Hospital,BSNL Circle office,Under Elevated Ajmer Road,Chitrakoot,Vaishali Queens Road,Gandhi Path,Rangoli Garden,Kalwar Road,Bhankrota,AjmerRoad,SikarRoad,Sodala,Vidhyadharnagar,VKI,Harmada,Khatipura,Jhotwara,Khirni Phatak,Jhotwara Ind. Area,Shastri Nagar,C-Scheme,Moti Dungri to DoT Office.
14 Jun 2023	2G/3G/4G Voice and 3G/4G Dynamic Data Hot Spots- 2G/3G/4G Static Data Tests	DoT/TRAI Office Jhalana,Military Hospital,Bani Park,Civil Lines,Collectorate,Raj Bhawan,Vidhan Sabha, High Court,Agresen Circle,Jaipur Junction,Chandpole,Sindhi Camp,MI road,Johri Bazar,Subhash Chowk,Jal Mahal,Amer Fort top,Delhi Road,Kukas Ind. Area,Khole ke Hanuman ji,Galta Gate,Transport Nagar,Raj Park,Choti Chopad,Badi Chopad,Ajmeri Gate,JLN Marg,University Campus to DoT Office Nagar.
15 Jun 2023	2G/3G/4G Voice and 3G/4G Dynamic Data Hot Spots- 2G/3G/4G Static Data Tests	1) **Starting at Govind Dev ji Temple premises** 2) **Amer fort** 3) **Pink City Square Mall** 4) **Jaipur Main Railway Station /Bus stand** 5) **Jaipur Airport** 6) **End at City Park Mansarovar (19 to 19.30 evening busy hours)**

Overview

Data Service Test- Static Locations
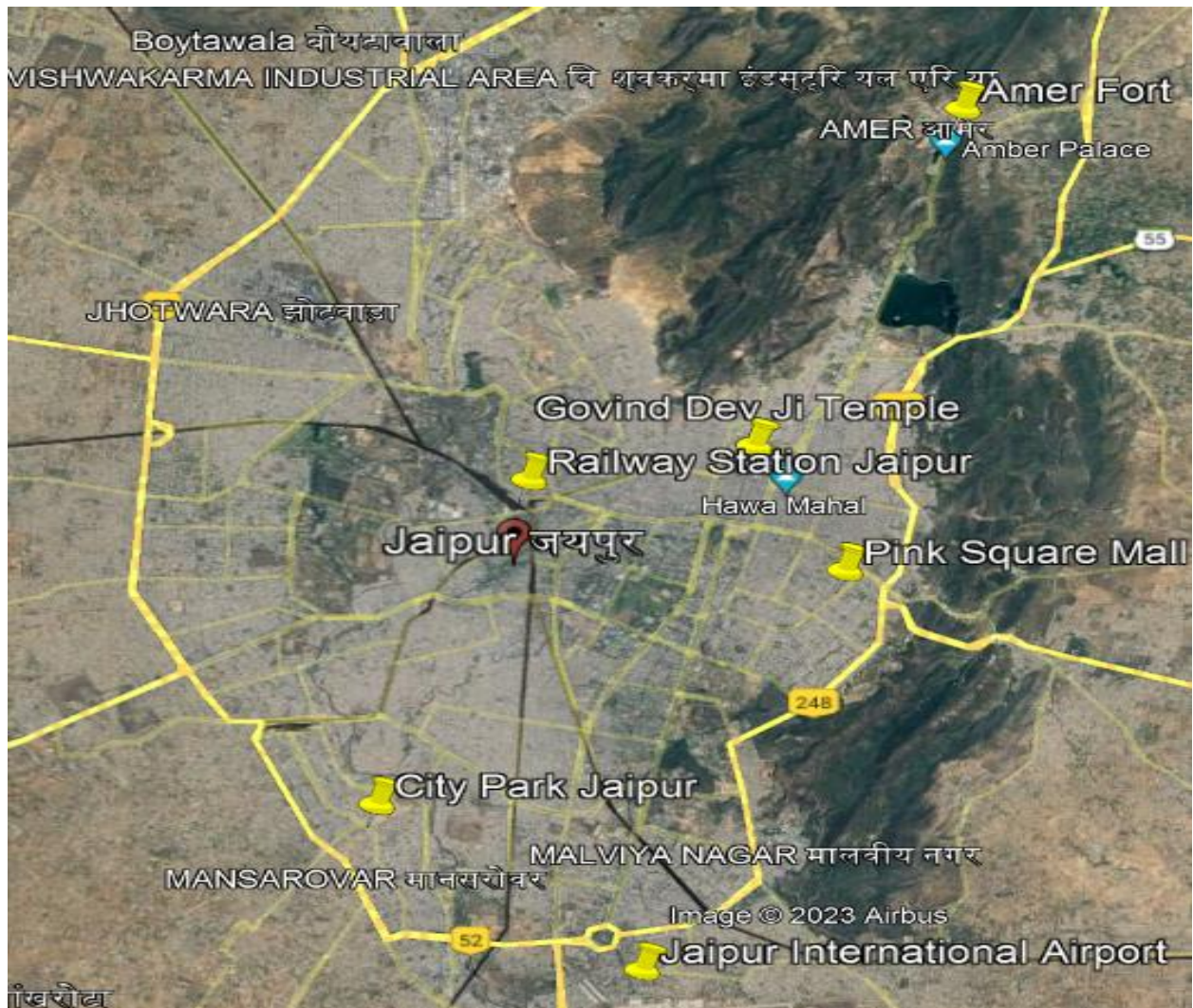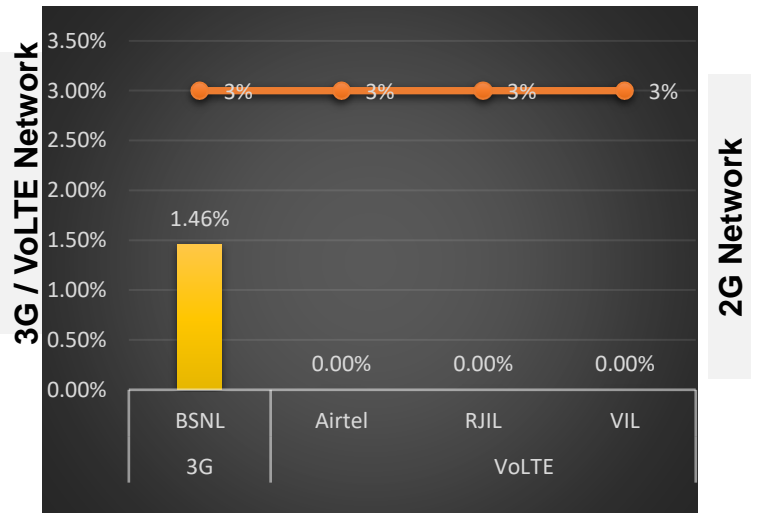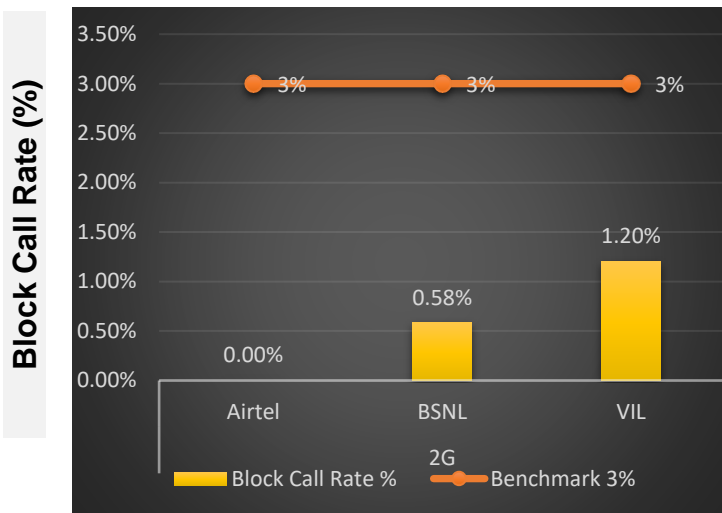

Hotspot Locations
1) **Starting at Govind Dev ji Temple premises**
2) **Amer fort**
3) **Pink City Square Mall**
4) **Jaipur Main Railway Station /Bus stand**
5) **Jaipur Airport**
6) **City Park Mansarovar**

Voice Calls

QoS compliance of the TSPs in **Jaipur** for Voice across technologies 2G/3G/4G-VoLTE:

3G/VoLTE Network — **2G Network**
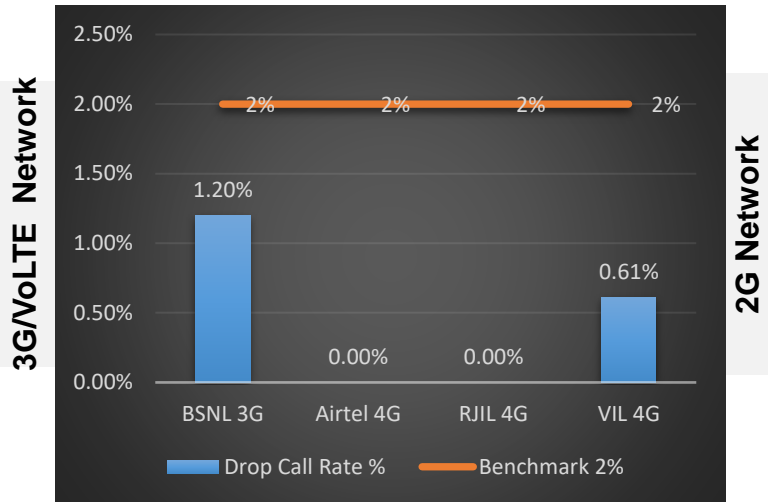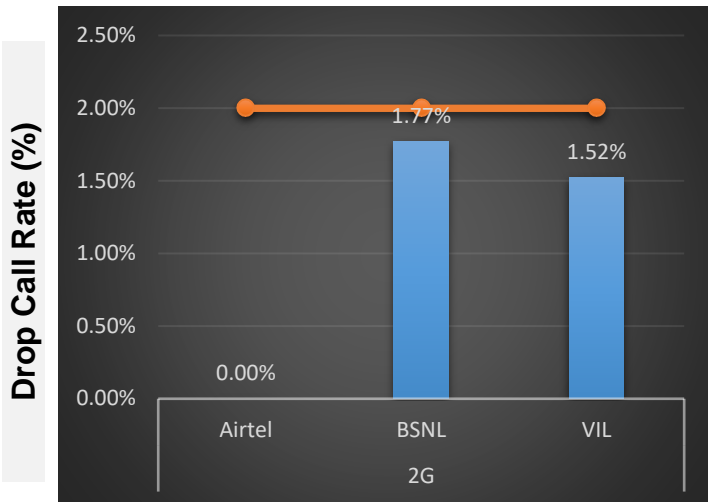
KPIs	2G			3G	4G		
	Airtel	**BSNL**	**VIL**	**BSNL**	**Airtel**	**RJIL**	**VIL**
Drop Call Rate %	0.00%	1.77%	1.52%	1.20%	0.00%	0.00%	0.61%
Block Call Rate %	0.00%	0.58%	1.20%	1.46%	0.00%	0.00%	0.00%

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

Coverage

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

TSPs	2G		
	Airtel	BSNL	VIL
Coverage %	99.16%	95.70%	97.14%

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

TSPs	3G
	BSNL
Coverage %	92.36%

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

TSPs	VoLTE		
	Airtel	JIO	VIL
Coverage %	99.98%	99.69%	99.11%

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

TSPs	3G	VoLTE		
	BSNL	Airtel	JIO	VIL
Time spent on 3G/4G Network %	93.10%	100.00%	100.00%	100.00%

Data Services Static

Data was tested at 6 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:

Download Throughput (Mbps) Static
- BSNL 3G: 4.24
- Airtel 4G: 46.92
- JIO 4G: 52.14
- VIL 4G: 15.73

Upload Throughput (Mbps)
- BSNL 3G: 2.43
- Airtel 4G: 25.52
- JIO 4G: 20.60
- VIL 4G: 15.28

Latency (ms)

Latency (msec) — 3G/VoLTE
- BSNL 3G: 39.20
- Airtel 4G: 36.33
- JIO 4G: 45.17
- VIL 4G: 77.00

Web Browsing (Sec)

Web Browsing Delay (sec)
- BSNL 3G: 1.05
- Airtel 4G: 1.35
- JIO 4G: 2.16
- VIL 4G: 10.07
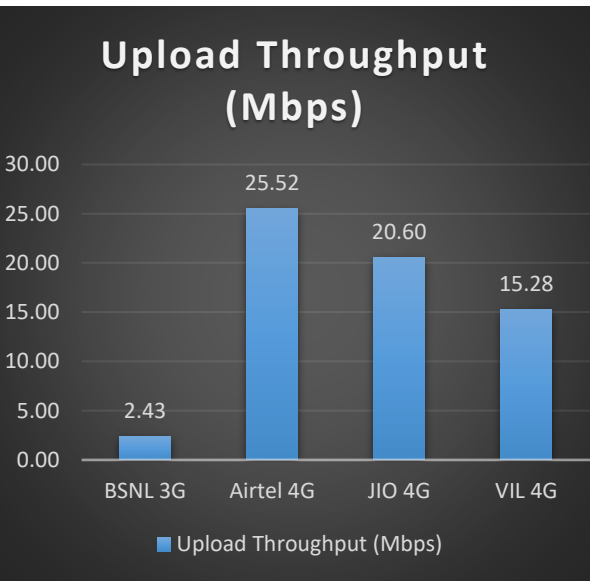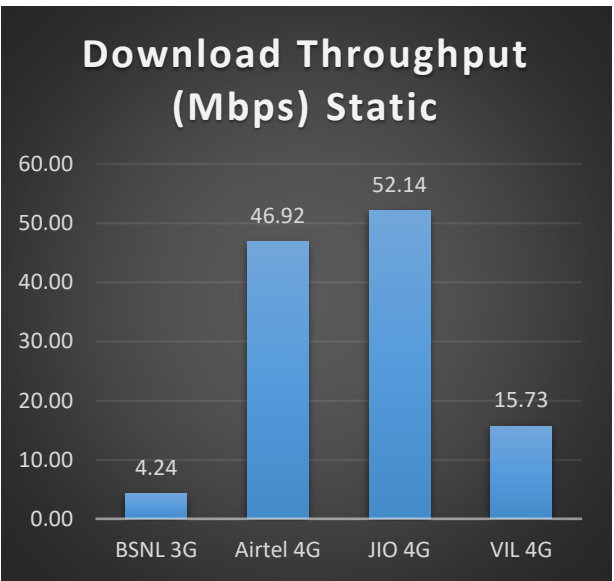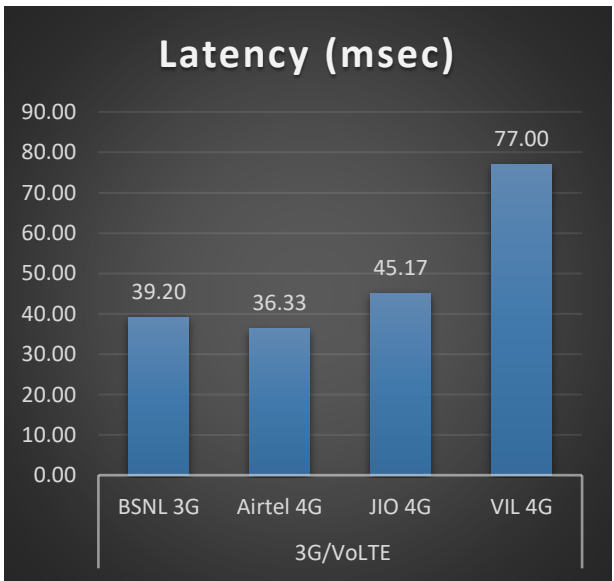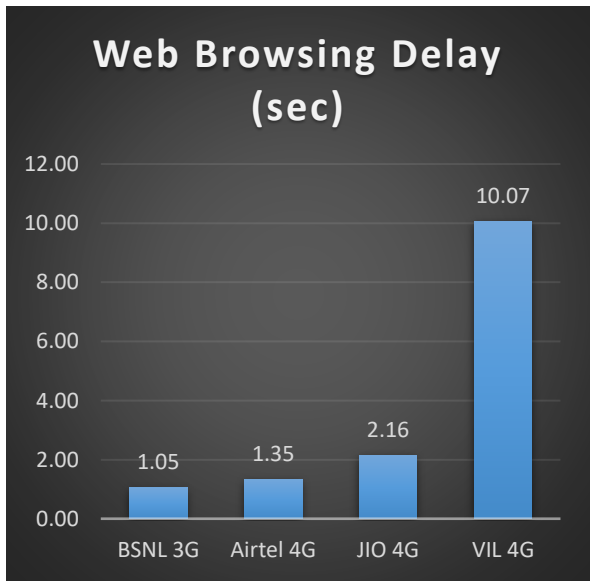
Data Services Dynamic

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)	2.21	18.20	15.80	17.96

Download Throughput (Mbps)

Summary

Voice Call	2G		
	Airtel	**BSNL**	**VIL**
Call Attempt	336	341	332
Blocked Call Rate (%)	0.00%	0.58%	1.20%
CSSR% (Accessibility)	100.00%	99.42%	98.80%
Drop Call Rate (%)	0.00%	1.76%	1.52%
Mobility HOSR (%)	100.00%	98.36%	96.06%
Rx Quality (%)	98.75%	98.25%	97.56%
Average CST Sec	2.20	3.09	3.24

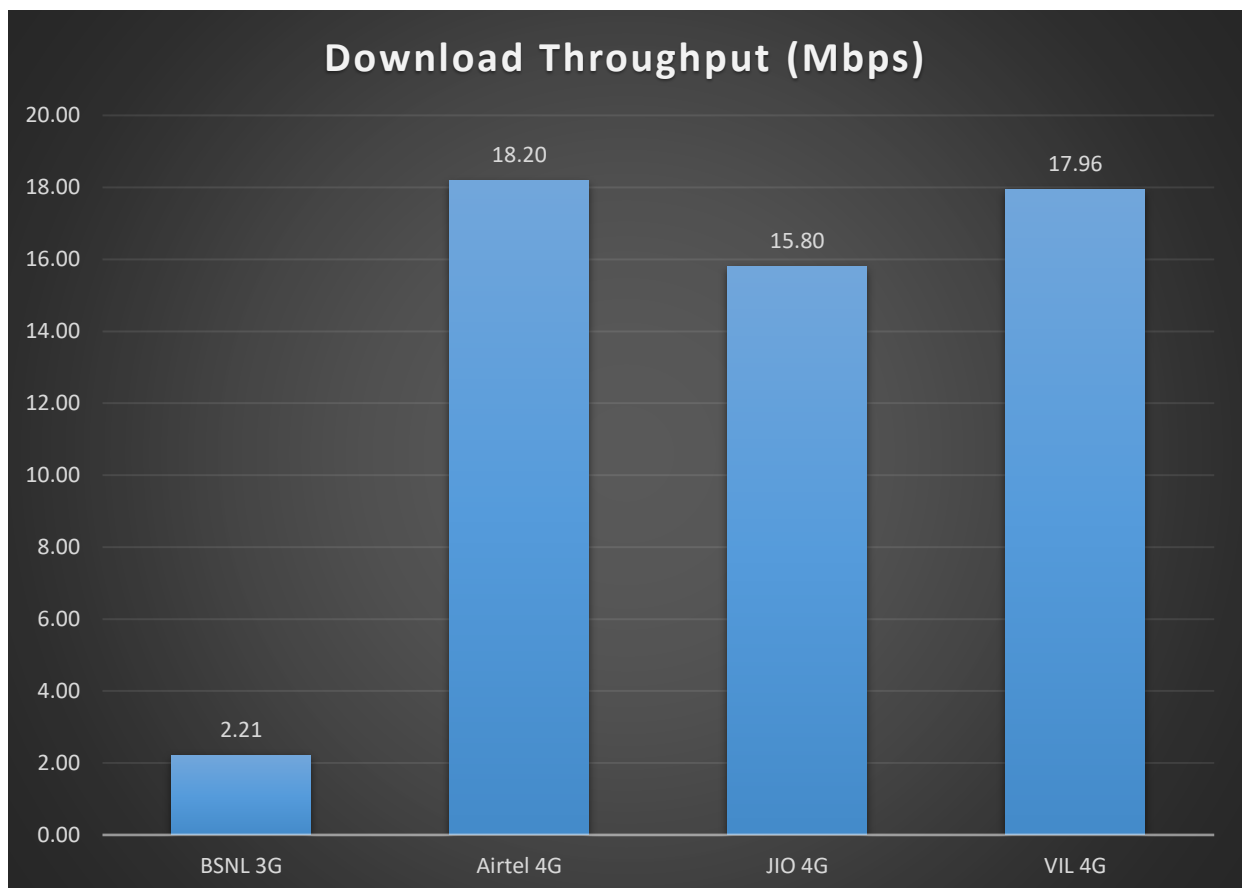| Voice Call	3G/VoLTE			
	BSNL 3G	**Airtel VoLTE**	**JIO VoLTE**	**VIL VoLTE**
Call Attempt	341	336	334	328
Blocked Call Rate (%)	1.46%	0.00%	0.00%	0.00%
CSSR% (Accessibility)	98.54%	100.00%	100.00%	100.00%
Drop Call Rate (%)	1.20%	0.00%	0.00%	0.61%
Mobility HOSR (%)	100.00%	100.00%	99.46%	99.74%
Rx Quality (%)	95.10%	98.14%	**92.92%**	96.09%
Average CST Sec	2.75	0.30	0.43	0.38

Summary

Data Services Static	2G		
	Airtel	**BSNL**	**VIL**
Download Throughput (kbps)	**219.33**	**155.01**	**118.87**
Upload Throughput (kbps)	**206.67**	**110.36**	**54.65**
Web Browsing Delay (sec)	**12.12**	**1.26**	**29.85**
Latency (msec)	**209.17**	**186.17**	**423.00**

Data Services Static	3G / 4G			
	BSNL 3G	**Airtel 4G**	**JIO 4G**	**VIL 4G**
Download Throughput (Mbps)	**4.24**	**46.92**	**52.14**	**15.73**
Upload Throughput(Mbps)	**2.43**	**25.52**	**20.60**	**15.28**
Video Streaming Delay (sec)	**8.80**	**0.25**	**0.35**	**1.15**
Web Browsing Delay (sec)	**1.05**	**1.35**	**2.16**	**10.07**
Latency (msec)	**39.20**	**36.33**	**45.17**	**77.00**

Data Services Static

Govind dev Ji Temple	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	206.00	190.00	95.16
Upload Throughput (kbps)	200.00	90.00	33.68
Web Browsing Delay (sec)	12.11	1.20	34.09
Latency (msec)	201.00	249.20	346.00

Amer Fort	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	230.00	130.10	113.20
Upload Throughput (kbps)	220.00	90.00	34.79
Web Browsing Delay (sec)	11.78	1.20	22.18
Latency (msec)	182.00	298.00	325.00

Pink City Square Mall	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	240.00	170.00	129.20
Upload Throughput (kbps)	200.00	71.00	94.02
Web Browsing Delay (sec)	11.64	1.85	27.31
Latency (msec)	240.00	198.00	431.00

Data Services Static

Railway Station	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	210.00	130.00	95.87
Upload Throughput (kbps)	210.00	89.00	30.35
Web Browsing Delay (sec)	12.66	1.45	36.02
Latency (msec)	152.00	269.00	523.00

Jaipur Airport	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	220.00	200.00	96.61
Upload Throughput (kbps)	210.00	150.00	31.16
Web Browsing Delay (sec)	11.98	1.85	35.59
Latency (msec)	242.00	214.00	309.00

City Park Mansarovar	2G		
	Airtel	BSNL	VIL
Download Throughput (kbps)	210.00	110.00	159.49
Upload Throughput (kbps)	200.00	71.00	82.93
Web Browsing Delay (sec)	12.34	2.26	28.14
Latency (msec)	238.00	241.00	527.00

Data Services static

Govind dev Ji Temple	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	5.85	60.82	75.24	29.72
Upload Throughput (mbps)	2.43	28.78	16.45	16.31
Video Streaming Delay (Secs.)	5.00	0.16	0.36	1.45
Web Browsing Delay (sec)	0.85	1.30	2.22	9.51
Latency (msec)	25.36	31.00	48.00	60.00

Amer Fort	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	3.05	44.46	52.81	15.48
Upload Throughput (mbps)	2.83	21.82	20.78	13.32
Video Streaming Delay (Secs.)	11.25	0.20	0.36	1.44
Web Browsing Delay (sec)	1.10	1.10	2.01	8.99
Latency (msec)	39.20	38.00	46.00	46.00

Pink City Square Mall	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	3.61	50.14	53.73	15.94
Upload Throughput (mbps)	1.52	29.37	19.48	17.20
Video Streaming Delay (Secs.)	9.90	0.34	0.31	1.31
Web Browsing Delay (sec)	1.20	1.00	1.99	9.71
Latency (msec)	56.00	37.00	47.00	111.00

Data Services static

Railway Station	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	4.64	42.72	46.42	11.08
Upload Throughput (mbps)	4.14	29.74	22.66	17.12
Video Streaming Delay (Secs.)	1.10	0.39	0.33	1.43
Web Browsing Delay (sec)	0.98	1.60	2.23	9.37
Latency (msec)	36.00	40.00	43.00	56.00

Jaipur Airport	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	4.44	42.68	57.61	6.73
Upload Throughput (mbps)	1.67	25.54	25.69	13.16
Video Streaming Delay (Secs.)	11.25	0.11	0.32	0.57
Web Browsing Delay (sec)	0.85	1.20	2.04	10.47
Latency (msec)	38.10	34.00	39.00	108.00

City Park Mansarovar	3G	4G		
	BSNL	Airtel	Jio	VIL
Download Throughput (mbps)	3.94	40.72	27.05	15.43
Upload Throughput (mbps)	2.01	22.86	18.55	14.62
Video Streaming Delay (Secs.)	5.25	0.30	0.43	0.72
Web Browsing Delay (sec)	1.10	1.90	2.45	12.37
Latency (msec)	41.00	38.00	48.00	81.00

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 ≥ -85 dBm, RSCP is ≥ -90 dBm & RSRP ≥ -110dBm. The details are as follows.

TSP	Coverage Rate %
Airtel 2G	99.16%
BSNL 2G	95.70%
VIL 2G	97.14%
BSNL 3G	93.39%
Airtel VoLTE	99.98%
Jio VoLTE	99.69%
VIL VoLTE	99.11%

Coverage Rate
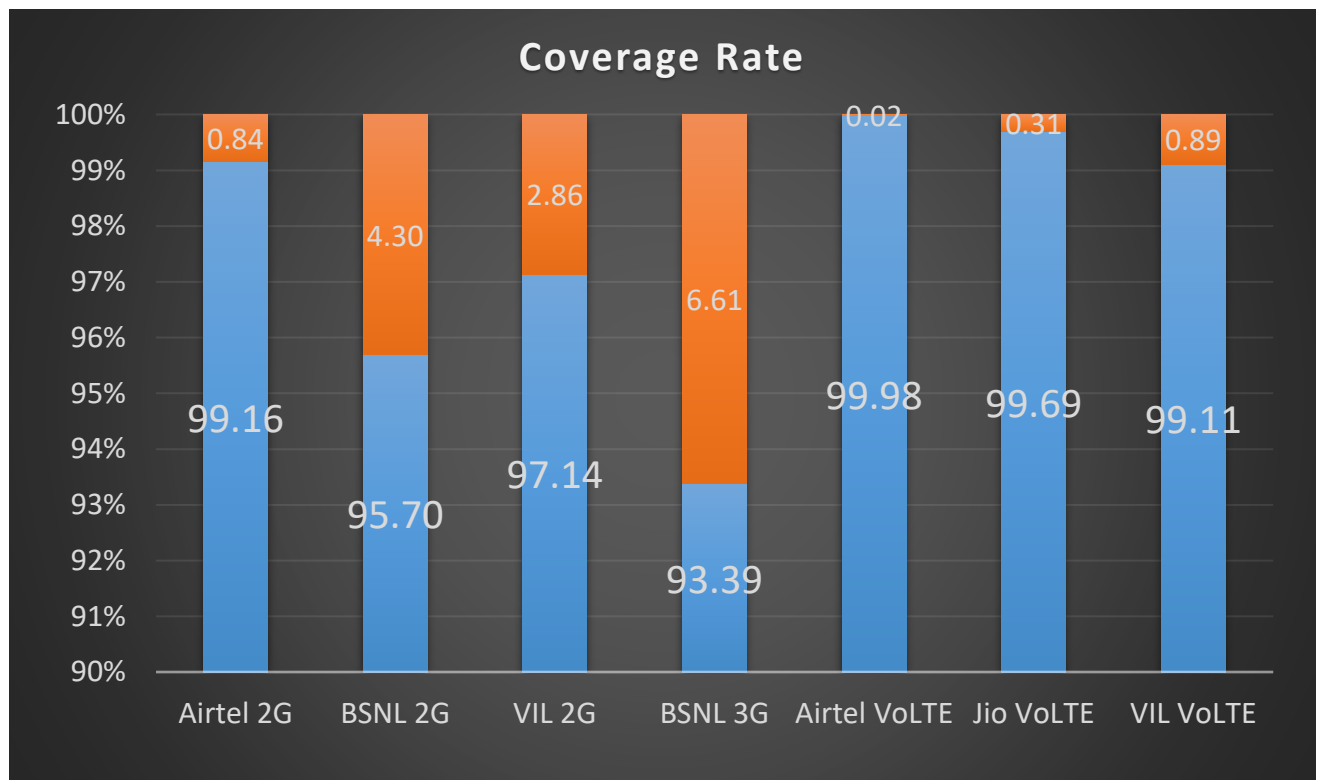
TSP-AIRTEL

Technology	Coverage %
2G	99.16%
VoLTE	99.98%

2G

2G			
Overall RxLevel	**# Samples**	**% PDF**	**Legends**
[Max, >=-75]	12142	70.34	
[-75, >=-85)	4975	28.82	
[-85, >=-95)	103	O.60	
[-95, >=Min)	41	0.24	
Total	**17261**	**100%**	

VoLTE
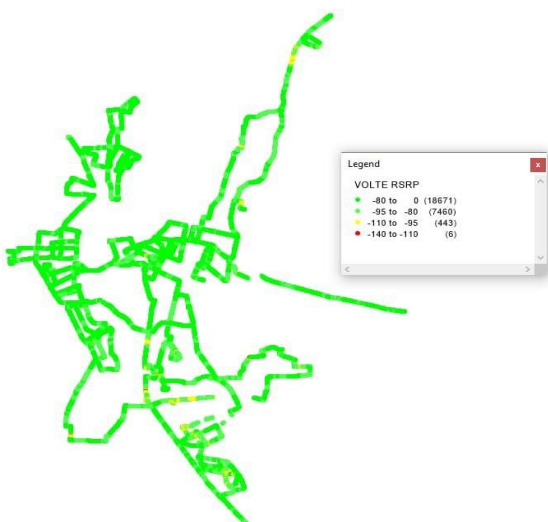
VoLTE			
Overall RSRP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	18671	70.24	
[-80, >=-90)	7460	28.06	
[-90, >=-110)	443	1.68	
[-110, >=Min)	6	0.02	
Total	**26580**	**100%**	

TSP- BSNL

Technology	Coverage %
2G	**95.70%**
3G	**93.39%**

2G

3G

RX level (dBm)

< 0 and >= -75	3923	57.13%
< -75 and >= -85	2404	35.01%
< -85 and >= -95	526	7.66%
< -95 and >= -104	14	0.20%

2G
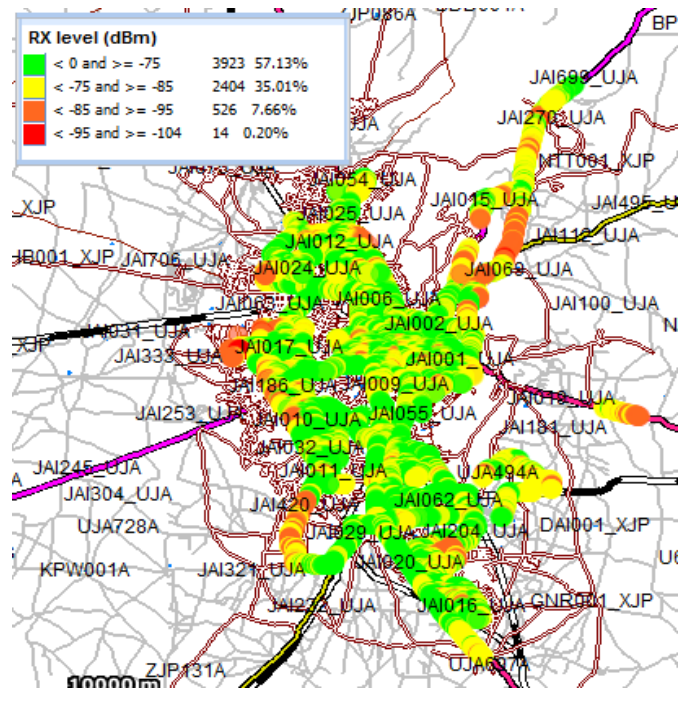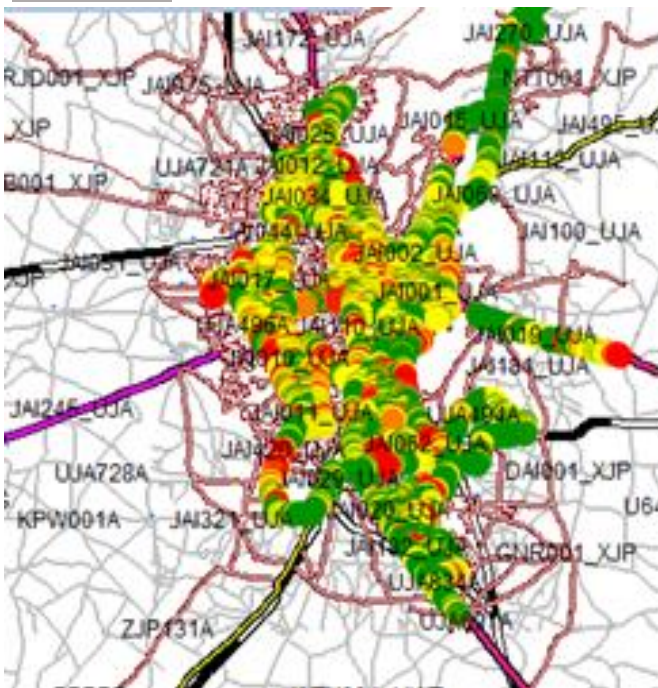
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	4604	60.11%	
[-75, >=-85)	2723	35.55%	
[-85, >=-95)	320	4.18%	
[-95, >=Min)	12	0.16%	
Total	7659	100%	

Dual Mode

Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	1664	34.25%	
[-70, >=-80)	1787	36.78%	
[-80, >=-90)	1086	22.36%	
[-90, >=Min)	321	6.61%	
Total	**4858**	**100%**	

JIO

Technology	Coverage %
VoLTE	99.69%
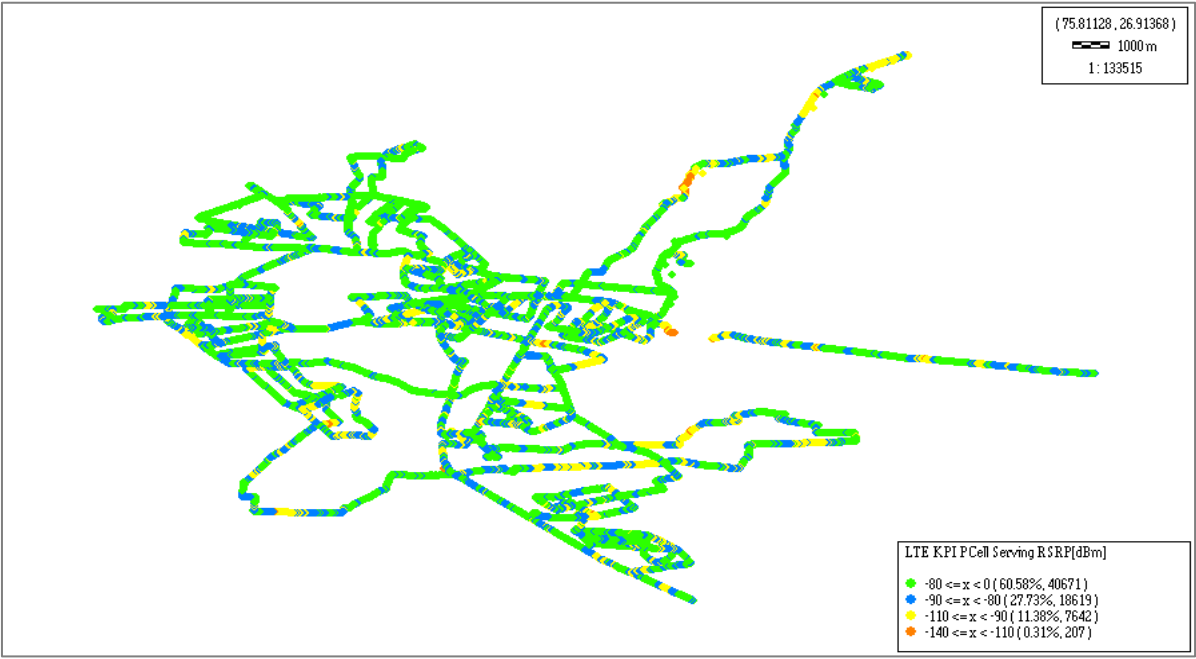
VoLTE			
Overall RSRP	**# Samples**	**% PDF**	**Legends**
[Max, >=-80]	40671	60.58	
[-80, >=-90)	18619	27.73	
[-90, >=-110)	7642	11.38	
[-110, >=Min)	207	0.31	
Total		**100%**	

VIL

Technology	Coverage Rate %
2G	**97.14%**
VoLTE	**99.11%**

2G

2G

Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	26374	89.38	
[-75, >=-85)	2290	7.76	
[-85, >=-95)	843	2.86	
[-95, >=Min)	2	0.01	
Total	**29509**	**100%**	

VoLTE
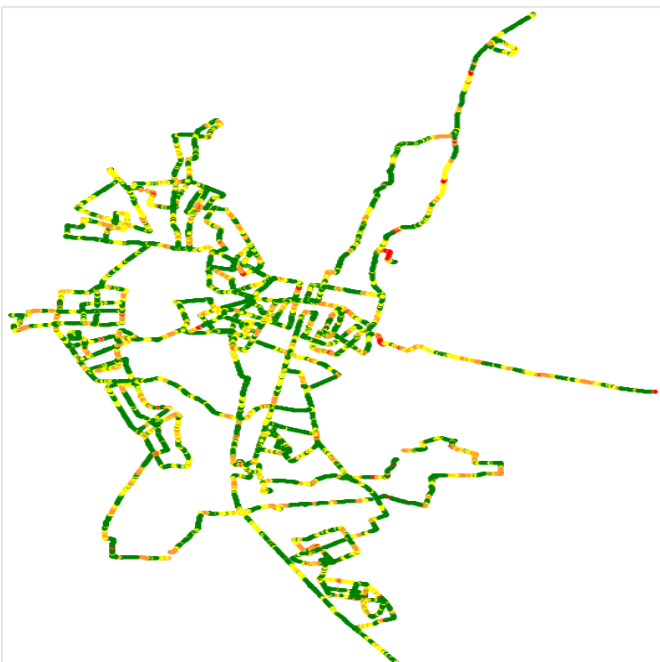
VoLTE /5G

Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	16792	22.76	
[-80, >=-90)	8528	28.73	
[-90, >=-110)	4096	13.80	
[-110, >=Min)	264	0.89	
Total	**29680**	**100%**	

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 ≥ 95%.

TSP	Rx Quality %
Airtel 2G	98.76
BSNL 2G	98.25
VIL 2G	97.56
BSNL 3G	96.33
Airtel VoLTE	98.23
Jio VoLTE	92.92
VIL VoLTE	96.09
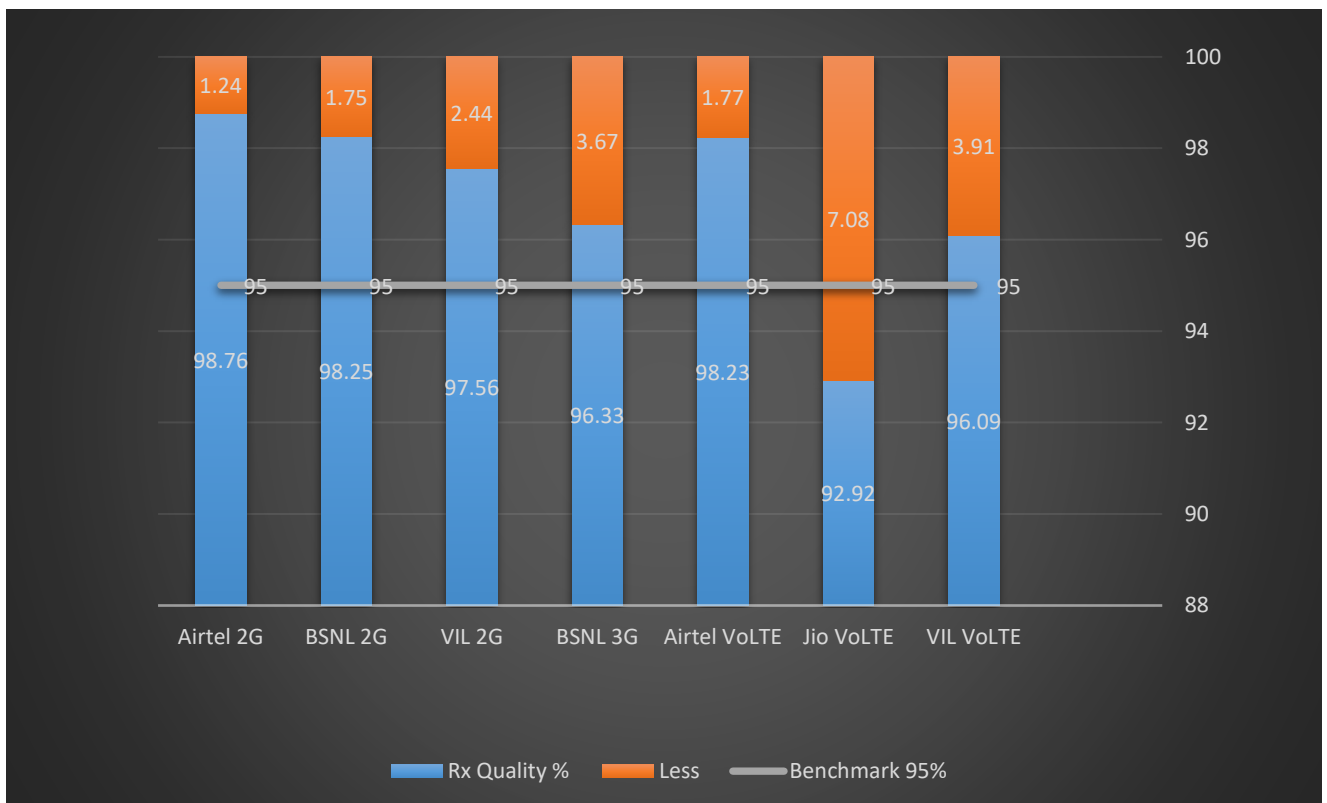
Airtel

Technology	Rx Quality %
2G	98.76%
VoLTE	98.23%

2G

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	9458	5732	
(2, <=3)	4168	25.27	
(3 , <=4)	2044	12.39	
(4 , <=5)	624	3.78	
(5 , <=Max)	206	1.24	
Total	16500	100%	

VoLTE

Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	332	1.25	
(0, <=5)	1827	6.88	
(5, <=10)	2883	10.85	
(10, <=15)	5031	18.92	
(15, <=Max)	16506	62.10	
Total	26579	100%	

BSNL

Technology	Rx Quality %
2G	**98.25%**
3G	**96.33%**

2G   **3G**
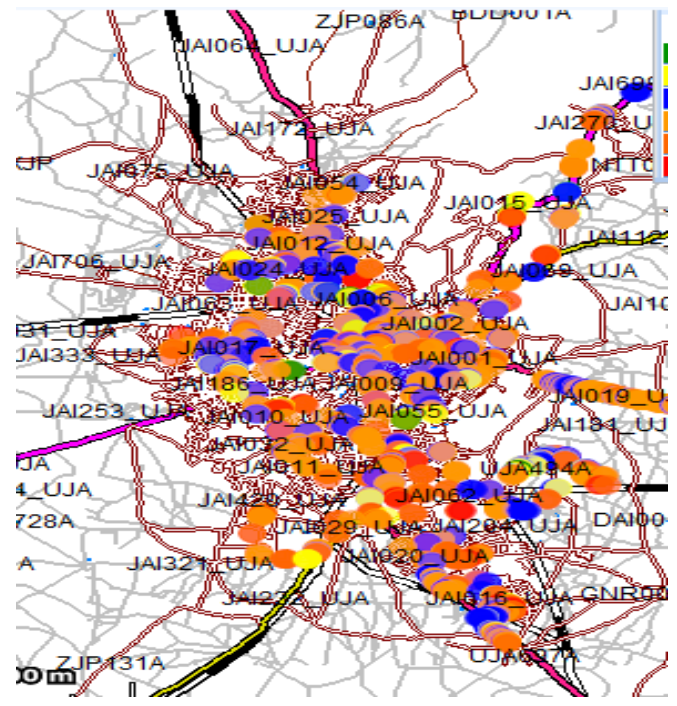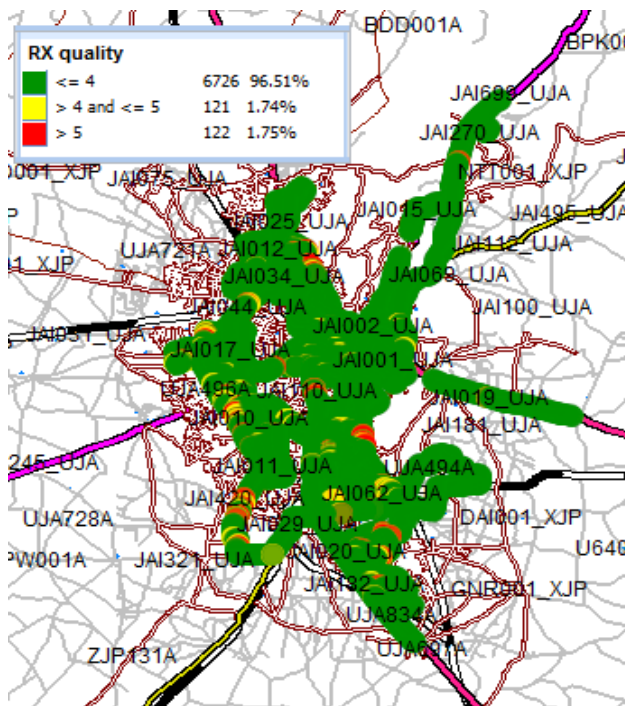
Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	5895	86.99%	🟩
(2, <=3)	463	6.83%	🟨
(3 , <=4)	181	2.67%	🟦
(4 , <=5)	119	1.76%	🟧
(5 , <=Max)	119	1.76%	🟥
Total		100%	

Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	432	8.90%	🟩
(-6, <=-9)	539	11.09%	🟨
(-9, <=-11)	2363	48.65%	🟦
(-11, <=-14)	1345	27.69%	🟧
(-14, <= Min)	179	3.67%	🟥
Total	4858	100.00%	

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 ≥ 95%.

JIO

Technology	Rx Quality %
VoLTE	**92.92%**

(75.81787 , 26.92716)
1000 m
1 : 127815

LTE KPI PCell SINR[dB]
- 15 < x <= 30 (24.43%, 16403)
- 10 < x <= 15 (26.29%, 17649)
- 5 < x <= 10 (24.94%, 16743)
- 0 < x <= 5 (17.26%, 11591)
- -30 < x <= 0 (7.08%, 4753)
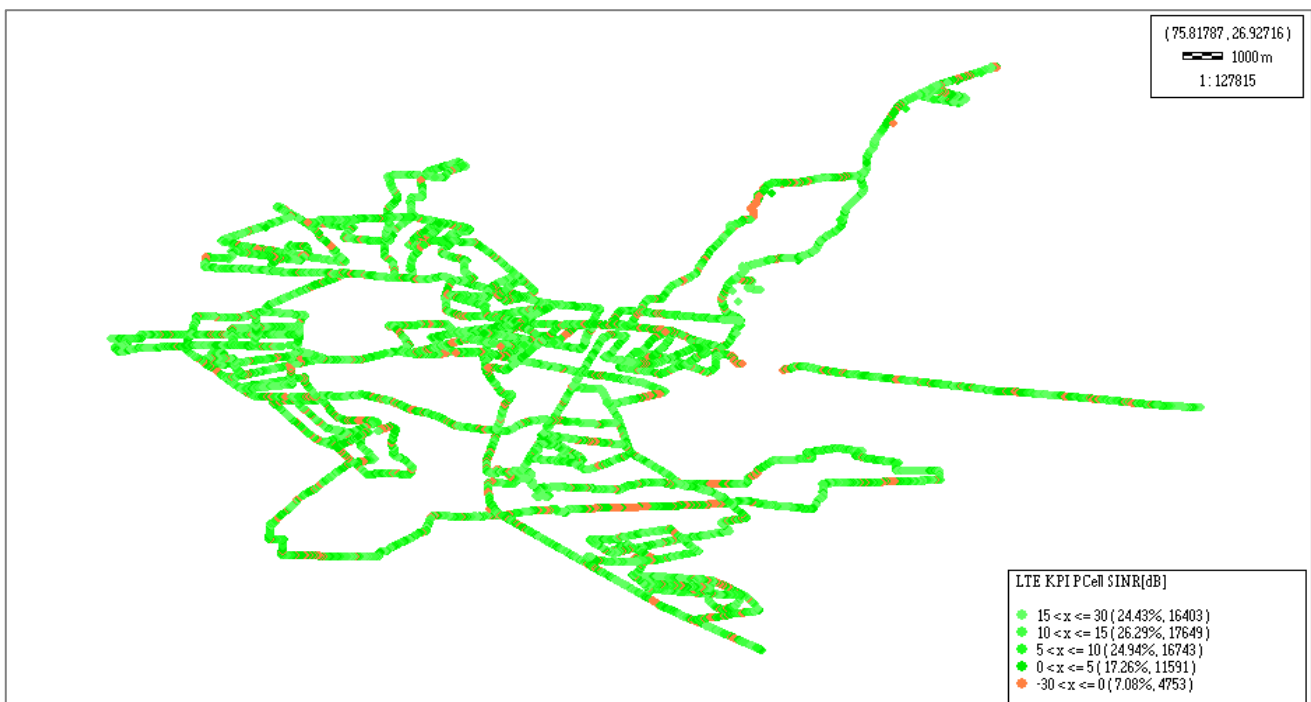
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	4753	7.08	
(0, <=5)	11591	17.26	
(5, <=10)	16743	24.94	
(10, <=15)	17649	26.29	
(15, <=Max)	16403	24.43	
Total		100%	

VIL

Technology	Rx Quality %
2G	97.56%
4G	96.09%

2G

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	20540	73.72	🟩
(2, <=3)	3402	12.21	🟨
(3 , <=4)	2468	8.86	🟦
(4 , <=5)	774	2.78	🟧
(5 , <=Max)	679	2.44	🟥
Total	27863	100%	

VoLTE

Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1160	3.91	🟥
(0, <=5)	4790	16.14	🟧
(5, <=10)	7450	25.10	🟦
(10, <=15)	7360	24.80	🟨
(15, <=Max)	8920	30.05	🟩
Total	29680	100%	

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	93.10%
Airtel VoLTE	100.00%
Jio VoLTE	100.00%
VIL VoLTE	100.00%

Time Spent On 3G/4G