

प्रभावी विनियमन – सुगम संचार Effective Regulation – Ease of Communication

Operator Assisted Drive Test Report

Prayagraj to Banda Highway 04/03/2023 By TRAI Regional Office Bhopal

The Operator Assisted Drive Test has been carried out by Regional Office, Bhopal with the help of Telecom Service Providers for Prayagraj to Banda Highway from 9:00 AM to 8:00 PM on 04/03/2023. The drive test covered drive route of around 192. KMs.

TSP	Network tested
Airtel	2G & Volte
BSNL	2G & 3G
JIO	VoLTE
VIL	2G, 3G & Volte

Key Performance Indicators:

KPI	Benchmark	Observations
Block call rate %	≤3%	All TSPs achieved the benchmark
Drop call rate %	≤2%	All TSPs achieved the benchmark
CSSR %	≥95 %	All TSPs achieved the benchmark
Mobility HOSR %	≥95%	All TSPs achieved the benchmark
Good PX Quality %	≥95%	All TSPs achieved the benchmark, Except Rx
Good RX Quality % $\geq 95\%$	Quality of Airtel, JIO and VIL in VoLTE	

Overview

Regional Office, TRAI Bhopal conducted Operator Assisted Drive Test. 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:

- i. 2G measurement UE Locked in 2G
- ii. 3G measurement UE in Dual mode (2G and 3G)
- iii. 4G measurement UE in Free mode

Calls were made for the **90-sec** duration with a wait time of **10 sec** between calls in all technologies.

Data Tests:

Dynamic data – repeat data file download (to check throughput on the entire route)

- i. 2G measurement UE Locked in 2G file size- 500KB
- ii. 3G measurement UE in 3G File Size- 20MB

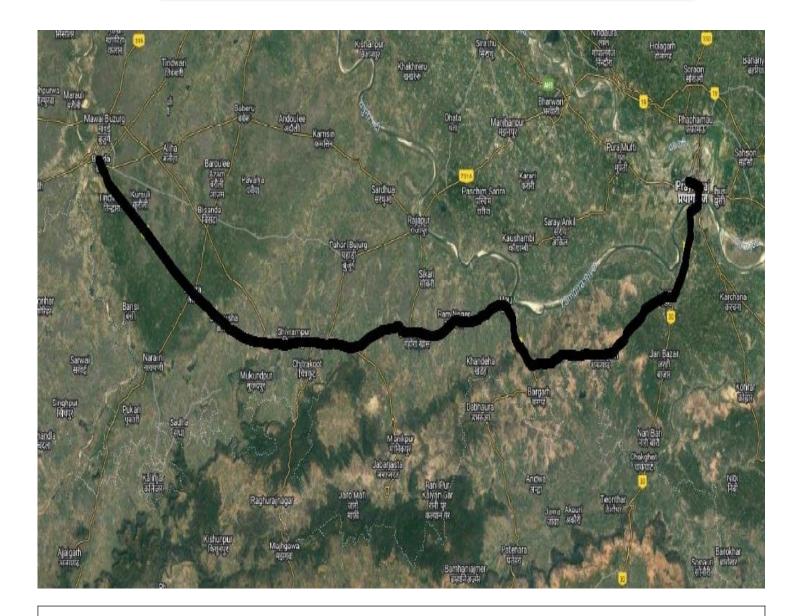
iii. 4G – measurement – UE in LTE File Size- 40MB

Static Data: Download and Upload Throughputs, Web Browsing Delay, Video Streaming Delay, and Latency

- i. Download- 2G 500KB ,3G 20 MB, 4G 40MB
- ii. Upload 2G -100KB ,3G 5 MB, 4G 10MB
- iii. Web browsing 3 links of e-commerce websites <u>https://www.amazon.in</u>, <u>https://www.flipkart.com</u>, <u>https://paytm.com</u>.
- iv. Video Streaming 130 sec clip (only in 3G and LTE)
- v. Latency 32 Bytes on <u>www.google.com</u>.

Overview

Voice & Dynamic Data Test Drive Route

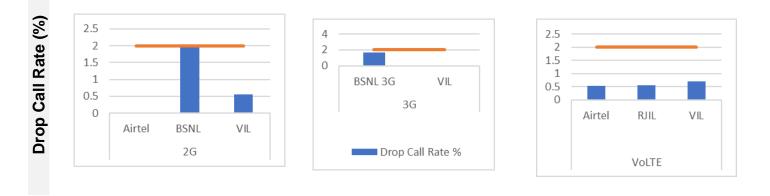


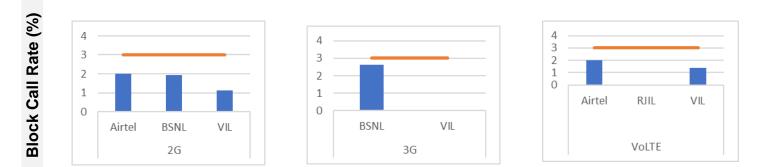
list of important area covered during the drive test

Prayagraj Bus Stand Civil Lines, Ghurpur, Gauhania, Jasra, Mau, Pura, Bandhi, Raipura, Deokali, Bhounri, Khoh, Chitrakot Dham, Ahmad Ganj, Shivrampur, Chitrakot, Bharat Kup, Badausha, Atarra, Khurhand, Mahua, Mathana, Khera, Barokhar Khurd, Banda Bus Deport.

Voice Calls

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





KPIs	2G		3G		VoLTE			
	Airtel	BSNL	VIL	BSNL	VIL	Airtel	RJIL	VIL
Drop Call Rate %	0	1.96	0.55	1.63	NA	0.52	0.55	0.69
Block Call Rate %	2	1.94	1.11	2.63	NA	2	0	1.38

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 $2G \ge -85$ dBm.

		2G	
TSPs	Airtel	BSNL	VIL
Coverage %	82	72.14	86

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

TOD	3G	
TSPs	BSNL	VIL
Coverage %	91.4	NA

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

TSDa		VoLTE	
TSPs	Airtel	JIO	VIL
Coverage %	100	NA	89

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

	3G	VoLTE			
TSPs	BSNL	VIL	Airtel	VIL	JIO
Time Spent on 3G/4G %	83.72		100	80.86	100

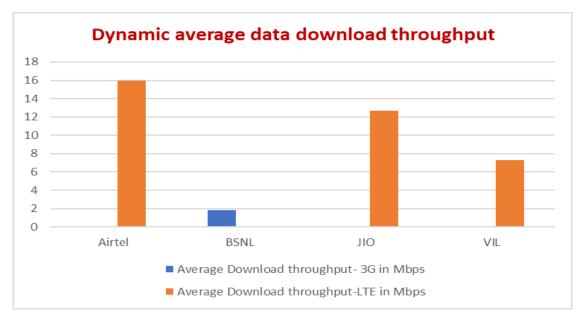
Key Observations

Data Services Dynamic

Dynamic data-download Throughput was tested.

Data Download Performance - Dynamic

3G/4G/ Network:



TSP	Airtel	BSNL	JIO	VIL
Average Download throughput- 2G In Kbps	51	114.21	NA	39.12
Average Download throughput- 3G In Mbps	NA	1.82	NA	NA
Average Download throughput-LTE In Mbps	16	NA	12.69	7.32

Summary

Highway Summary- Voice

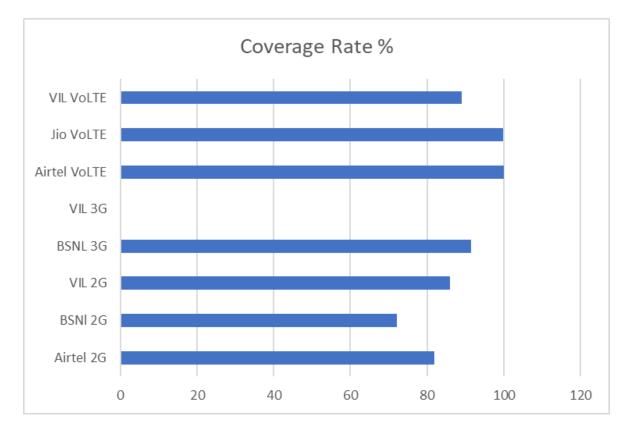
TSP (For 2G)	Airtel	BSNL	JIO	VIL
Call attempts	187	206	NA	180
Block call rate %	2	1.94	NA	1.11
CSSR %	98	99.03	NA	98.33
Drop call rate %	0	1.9	NA	0.55
Mobility HOSR %	0.46	95.62	NA	96.26
RX Quality %	97	95.7	NA	95.15
Average CST Sec	1.20	3.98	NA	7.32

TSP (For 3G)	Airtel	BSNL	JIO	VIL
Call attempts	NA	190	NA	NA
Block call rate %	NA	2.63	NA	NA
CSSR %	NA	96.84	NA	NA
Drop call rate %	NA	1.63	NA	NA
Mobility HOSR %	NA	96.0	NA	NA
RX Quality %	NA	97.5	NA	NA
Average CST (Sec)	NA	2.36	NA	NA

TSP (For VoLTE)	Airtel	BSNL	JIO	VIL
Call attempts	192	NA	182	144
Block call rate %	2	NA	0	1.38
CSSR %	98	NA	99.45	97.91
Drop call rate %	0.52	NA	0.55	0.69
Mobility HOSR %	0.55	NA	99.60	98.71
RX Quality %	66	NA	94.46	88.09
Average CST(Sec)	0.59	NA	0.57	0.261

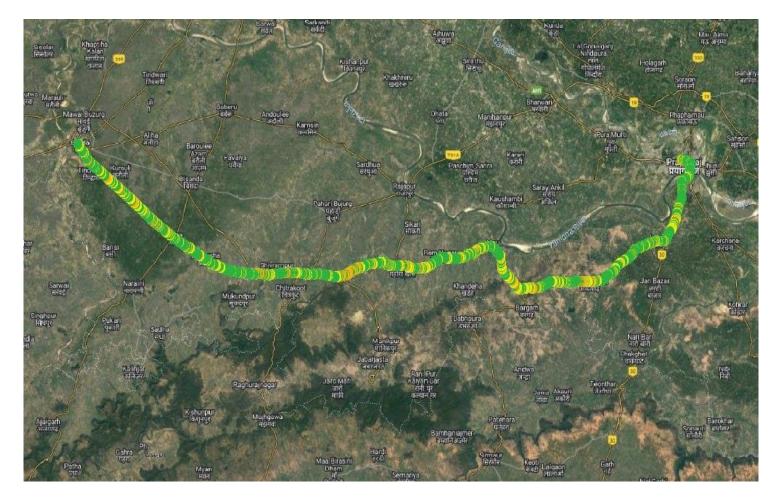
RF Coverage relates to the geographical footprint within the system that has sufficient RF signal strength to provide for a call session. The Coverage rate is calculated on the basis of % of samples in which the Rx level \geq -85 dBm, RSCP is \geq -90 dBm & RSRP \geq -110dBm. The details are as follows.

TSP	Coverage Rate %
Airtel 2G	82
BSNI 2G	72.14
VIL 2G	86
BSNL 3G	91.4
VIL 3G	NA
Airtel VoLTE	100
Jio Volte	99.83
VIL VoLTE	89



TSP-Airtel

Technology	Coverage %
2G	82%



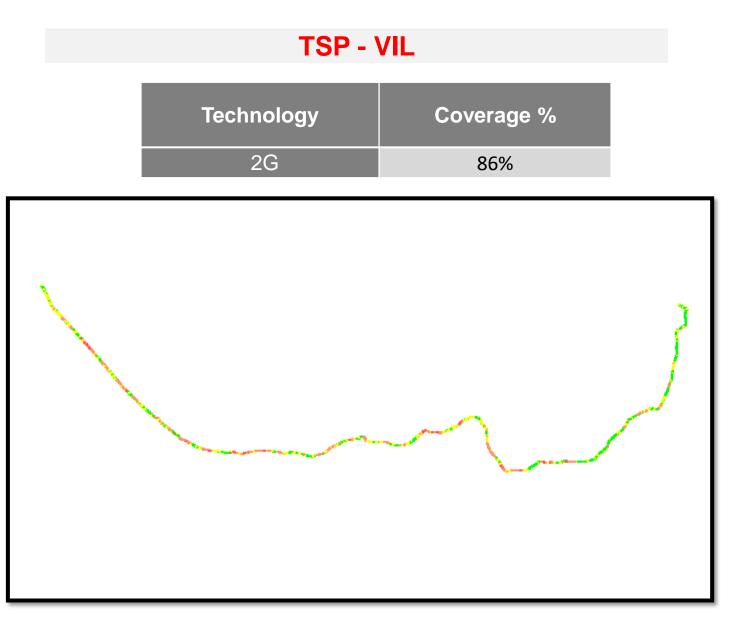
2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	65078	45%	
[-75, >=-85]	52370	37%	
[-85, >=-95]	25746	18%	
[-95, >=Min]	0	0%	
Total	143194	100%	

TSP-BSNL

Technology	Coverage %
2G	72.14%



2G			
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	729511	55.94%	
[-75, >=-85)	211237	16.20%	
[-85, >=-95)	251248	19.27%	
[-95, >=Min)	112116	8.60%	
Total			



	2G		
Overall RxLevel	# Samples	% PDF	Legends
[Max, >=-75]	4960453	70%	
[-75, >=-85)	1142768	16%	
[-85, >=-95)	852409	12%	
[-95, >=Min)	169466	2%	
Total	7125096	100%	

TSP-BSNL

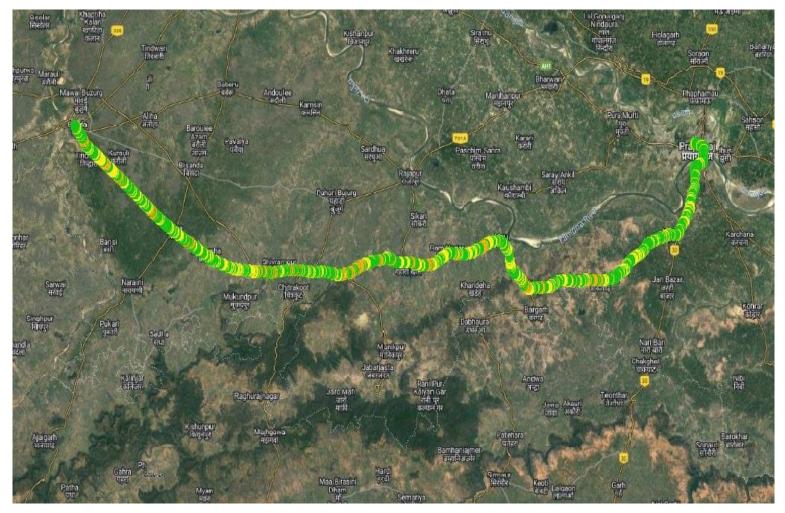
Technology	Coverage %
3G	91.4%

|--|

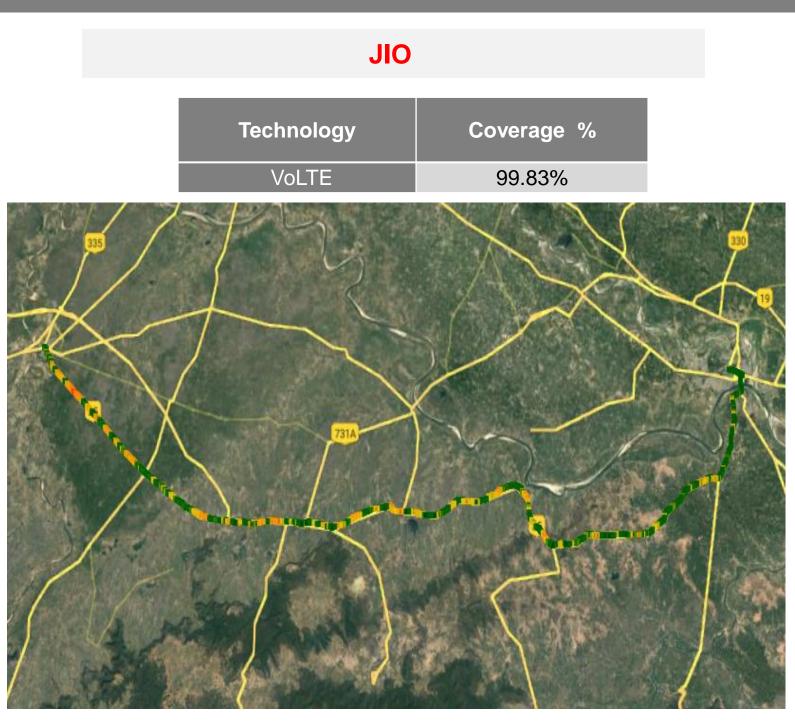
	3G		
Overall RSCP	# Samples	% PDF	Legends
[Max, >=-70]	1291546	75.1%	
[-70, >=-80)	143855	8.4%	
[-80, >=-90)	135532	7.9%	
[-90, >=Min)	148118	8.6%	
Total			

Airtel





102		VoLTE			
# Samples	% PDF	Legends			
125401	50%				
84448	34%				
40658	16%				
0	0%				
250507	100%				
	125401 84448 40658 0	125401 50% 84448 34% 40658 16% 0 0% 250507 100%			

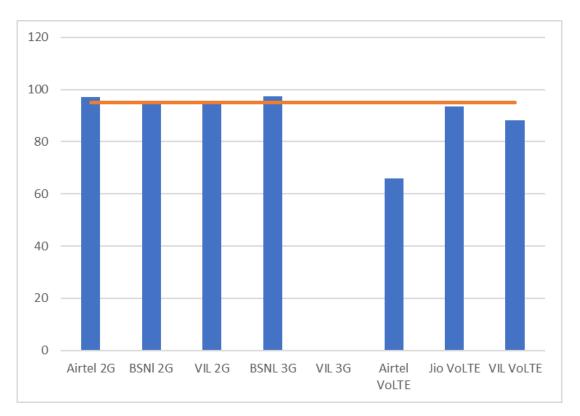


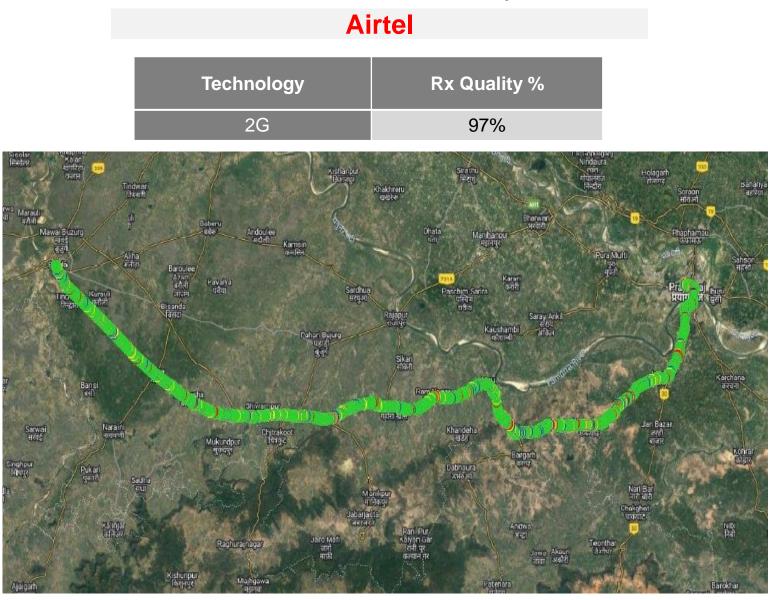
	VoLTE			
Overall RSRP	# Samples	% PDF	Legends	
[Max, >=-80]	12322	65.33%		
[-80, >=-90)	58886	31.21%		
[-90, >=-110)	621	3.29%		
[-110, >=Min)	33	0.17%		
Total	18862			

TSP - VIL Technology Coverage % VoLTE 89%

	VoLTE		
Overall RSRP	# Samples	% PDF	Legends
[Max, >=-80]	2815	18%	
[-80, >=-90)	4098	26%	
[-90, >=-110)	7107	45%	
[-110, >=Min)	1729	11%	
Total	15749	100%	

TSP	Rx Quality %
Airtel 2G	97
BSNI 2G	95.7
VIL 2G	95.15
BSNL 3G	97.5
VIL 3G	NA
Airtel VoLTE	66
Jio VoLTE	93.46
VIL VoLTE	88.09





Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	1516711	86%	
(2, <=3)	65844	4%	
(3 , <=4)	65460	4%	
(4 , <=5)	59076	3%	
(5 , <=Max)	57863	3%	
Total	1764954	100%	

Quality Details

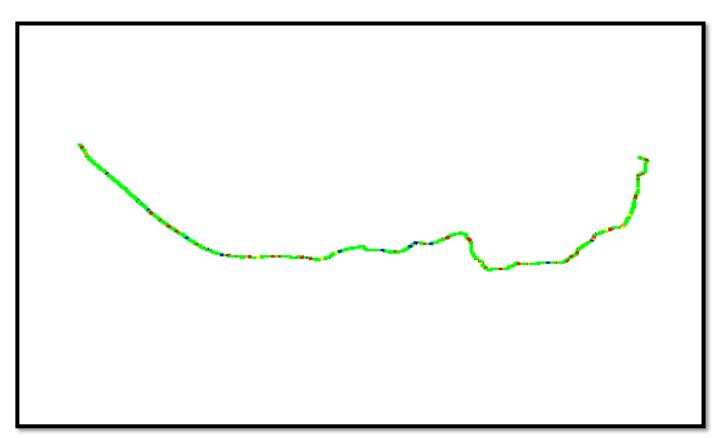
TSP-BSNL

Technology	Rx Quality %
2G	95.7%
1A KRR001A FTATM1A DPG001A JGN001A KRA001A FTBER1A 1A KRC001A FTCHA1A FTCHA1A FTCAF1A FAT001A FTBER1A 1A KAC001A FTCHA1A FTCAF1A FAT001A SHF001A HSW001A 1A NRP001A BNKAN1B BAH001A SHF001A HSW001A FTCAF1A 1A KMR001A BRS001A JSP001A BAH001A FTCAF1A FTCAF1A 1A KMR001A BNAMA1A CL1001A FTCAF1A FTCAF1A FTCAF1A BEW001A HPPAN1A BNAMA1A CL1001A FTCAF1A FTCAF1A Cazon1A R1A KMR001A BNAMA1A CL1001A Egend PRAYACRAJ-BAI MA001A SSL001A BNKHA1A BNSIM S16 4 (16463) 0 16 4 (16463) 0 16 4 (16463) GYN001A HPKAR1A BNLAM1A BNSIM 0 16 4 (16463) 0 16 4 (16463) 0 16 4 (16463) SUH001A BNIAM1A BNDO14 BNO14 BOCL 0 16 4 (16463) 0 16 4 (16463) 0 16 4 (16463) 0 16 4 (16463) 0 16 4 (16463) 0	UPTAPTA MIJUOTA WATERCOURSE CVL001A RBSAW1B RLP001A PTJAGIA LAG001A PTPOMIA DWN001A PTU RBKRNTA UPTSA1A BBJ001A NOG001A DPP001A RJ TSWE1A APR001A KSU001A BNJ001A DEA001A MOG001A DPP001A RJ UPTRM1B PTBHA1A MAN001A RAN001A BLA001A UJNK UPTRM1B PTBHA1A MAN001A RAN001A BLA001A SUJ0I NDA-HIGHWAY-RXQUAL BIH801A ADMUK1A ADDHN1A FTN001A NO01A ADAAN1A ADMUK1A ADBHA1A ADMA1A ADMA1A N001A ADAAN1A ADBHA1A ADMUK1A ADBHA1A ADMA1A ADJATA ADAUNTA ADBHA1A ADMUK1A ADBHA1A ADMA1A N001A ADAAN1A ADBHA1A ADMA1A ADMUK1A ADMUH1A N001A ADAAN1A ADJE1B ADMUL1A GNH001A JNPAW N001A ADAAN1A ADBHA1A ADMA1A ADMUH1A ADJATA ADAUNTA ADBA1A ADMUK1A ADMUH1A ADMUH1A N001A ADAAN1A ADGAD1A BRE001A ADMUH1A ADMUH1A N001A ADAAN1A ADGAD1A BRE001A ADMUH1A ADMUH1A N001A ADAAN1A ADGAD1A BRE001A ADAKA1A ADMUH1A N001A ADAAN1A ADGAD1A BRE001A ADKA1A ADMUH1A ADBA1A ADMUA1A O ADASR1A ALG008A ADKOT1A ADBHE1A C NED001A ADASR1A ADGATA ADKA1A ADGHU1A ADDH1A NED001A ADASR1A ADGATA ADKA1A ADCHI1A ADCHI1A SDD001A BNJAFIA WADGA1A ADAKA1A ADAUN1A S RAJ001A BNJAFIA ADCHL1A ADKA1A ADAUN1A ADAUN1A BNKES1A ADAUN1A ADAU

Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	1194722	91.6%	
(2, <=3)	15636	1.2%	
(3 , <=4)	16463	1.3%	
(4 , <=5)	21371	1.6%	
(5 , <=Max)	55920	4.3%	
Total			

TSP - VIL

Technology	Rx Quality %
2G	95.15%



Overall Rx Quality	# Samples	% PDF	Legends
(Min, <=2)	6465700	90.90%	
(2, <=3)	143318	2.01%	
(3 , <=4)	80082	1.12%	
(4 , <=5)	79491	1.12%	
(5 , <=Max)	356501	4.85%	
Total	7125092	100%	

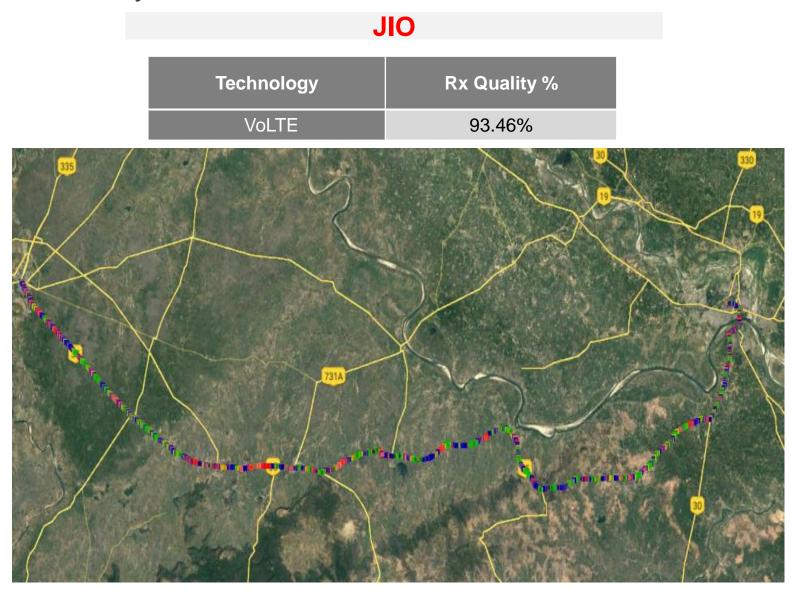
TSP-BSNL

Technology	Rx Quality %	
3G	97.5%	
KRR001A FTATM1A JCN001A KRA001A KRA001A FTBER1A UFTAP1) 01A FTBAP1A FTAT01A CVL001 01A PUH001A HPPAD19 FTZAF1A FAT091A CVL001 BAC1A NRP001A BNS001A JSP001A SHF001A HSW001A CNI601A BRS001A JSP001A GA2001A FTSWE1A CNI601A BRS001A JSP001A GA2001A FTSWE1A W001AHPPAN1B BNAMA1A CL0001A FTSUK1A AS0001A A KMR001A BNAMA1A CL001A FTSUK1A AS0001A J01A SSL001A BNKHA1A BNJAU1A BNCAMAA VIJ001A J01A SSL001A BNKHA1A BNSIM1A BH QYN001A HPKAR1A BNCHK1A BBR001A ->6 (1306968) UH001A HPKAR1A BNCHK1A BD0001A ->6 (1306968) UH001A HPKAR1A BNCHK1A BD0001A ->11 to -9 (139500) -14 to -11 (5318) UH001A HPKAR1A BNBAR1A BNCHA1A BNAA1A CN001A	A-HIGHWAY-ECNO A-HIGHWAY-ECNO A-ADRANTA A-HIGHWAY-ECNO A-ADRANTA A-HIGHWAY-ECNO A-ADRANTA A-HIGHWAY-ECNO A-HIGHWAY-ECNO A-HIGHWAY-ECNO A-HIGHWAY-ECNO A-HIGHWAY-ECNO A-HIGHWAY-ECNO A-HIGHWAY-ECNO A-HIGHWAY-ECNO A-ADSIK1A A-DSIK1A A-ADSIK	MRUUU1A ASD001, PTUSH1 IA DUNN001A PTUSH1 TA DPP001A RJA00 MRUU1A UJNSA1A VUSH1 TA DPP001A UJNSA1A MRU01A BLA00TA UJNSA1A ARAN001A BLA00TA SUJ001B IDDHN1A FTN001A MULA NUL1A GNH001A JN IUDEN1A FTN01A SUJ001B IDDHN1A FTN01A SUJ001B IDDHN1A FTN01A SUJ001B IDDHN1A FTN01A SUJ001B IDDHN1A FTN01A SUJ001A ADBEN1A GA0001A DDI ADBEN1A OADEA1A DAS0 BSA ADUATA SBS0 ADKOT1A ADBHE1A DAS0 BSA ADAUN1A SMD00 ADAUN1A ADD031A SMD00 ADAUN1A ADD031A G

Overall Ec/No	# Samples	% PDF	Legends
(Max, <=-6)	1306968	76.03%	
(-6, <=-9)	176614	10.3%	
(-9, <=-11)	139500	8.1%	
(-11, <=-14)	53198	3.1%	
(-14, <= Min)	42771	2.5%	
Total			

	Airtel				
	Technology	Rx Quality %			
	VoLTE	66%			
Singhpur Telayo Ohandla eccel	Alangar Raghuranagar, Usro Man ord and Kalangur Raghura Raghuranagar Nangowa ngarat) Karan	n Heigann Bernard Bernard Bernard Height Hei		

Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	972645	34%	
(0, <=5)	678535	24%	
(5, <=10)	502806	18%	
(10, <=15)	350374	12%	
(15, <=Max)	316896	11%	
Total	2821256	100%	



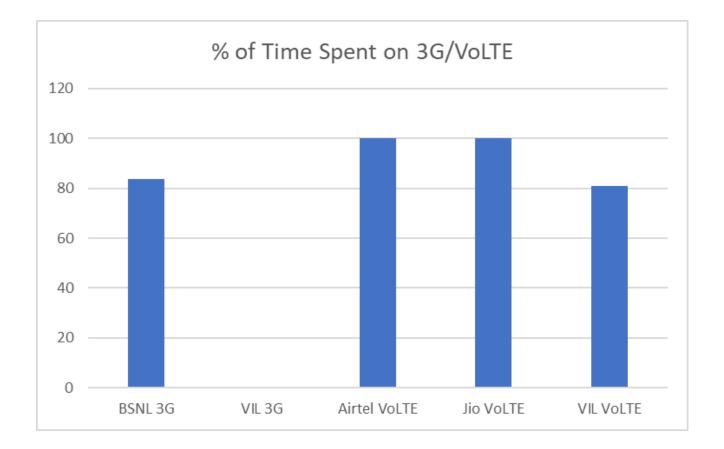
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1233	6.54%	
(0, <=5)	2754	14.60%	
(5, <=10)	7054	37.40%	
(10, <=15)	3756	19.91%	
(15, <=Max)	4065	21.55%	
Total	18862		

TSP - VIL

Те	chnology VoLTE	Rx Quality % 88.09%	6

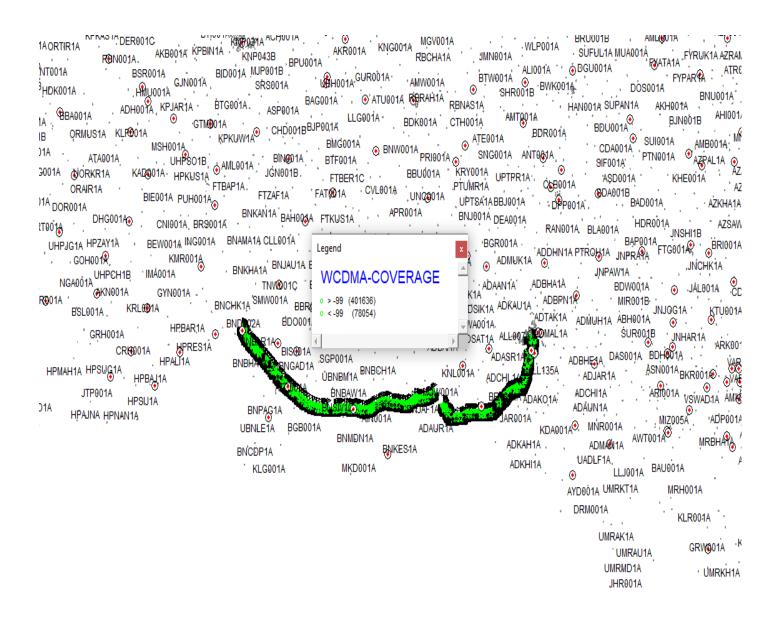
Overall SINR	# Samples	% PDF	Legends
(Min, <=0)	1867	11.91%	
(0, <=5)	2067	13.18%	
(5, <=10)	3388	21.60%	
(10, <=15)	3208	20.45%	
(15, <=Max)	5154	32.86%	
Total	15684	100%	

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	83.72
VIL 3G	NA
Airtel VoLTE	100
Jio VoLTE	100
VIL VoLTE	80.86



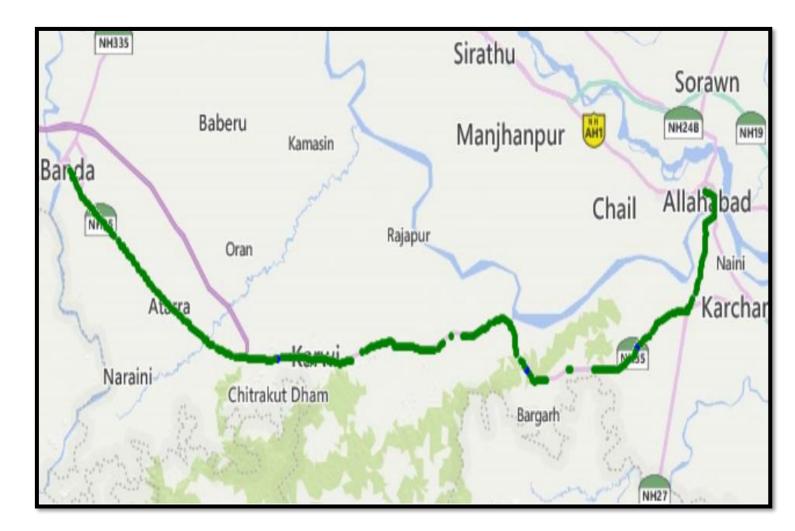
TSP-BSNL

Technology	% of Time Spent on
3G	83.72%
VoLTE	



TSP-VIL

Technology	% of Time Spent on
3G	
VoLTE	80.86%

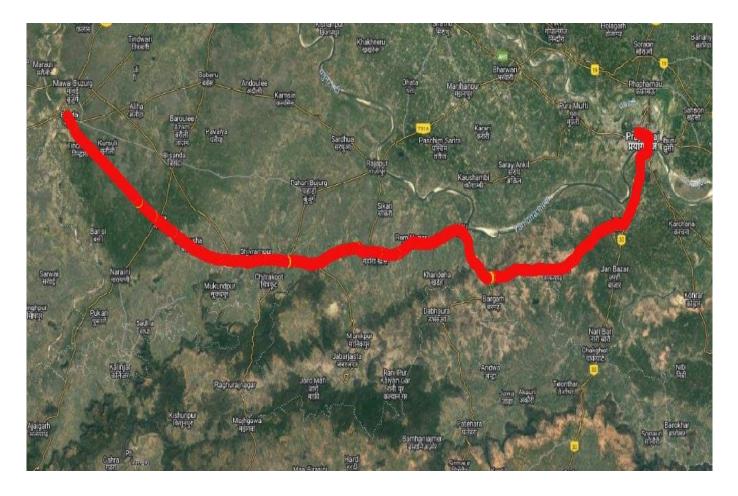


Dynamic Data Test

Airtel

Data Statistics - Dynamic data testing

Data KPIs - Overall	2G
Download Throughput (Kbps)	51kbps



	No of Comple	0/	Levende
DL throughput	No of Sample	%	Legends
< 100 Kbps	101044	99.16%	
100-150Kbps	306	0.30%	
150-200Kbps	344	0.34%	
>200Kbps	208	0.20%	
Total	101902	100%	
	27		

Dynamic Data Test Details

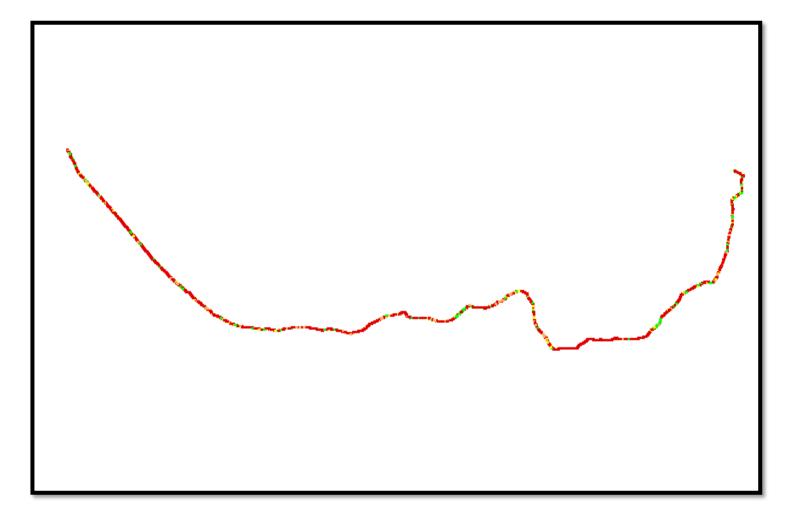
TSP-BSNL

Data KPIs - Overall	2G
Download Throughput (Kbps)	114.21

DL throughput	No of Sample	%	Legends
< 100 Kbps	7279830	50	
	5260899	36.13	
100-150Kbps	1123767	7.71	
150-200Kbps	701682	4.81	
>200Kbps	193481	1.32	

TSP - VIL

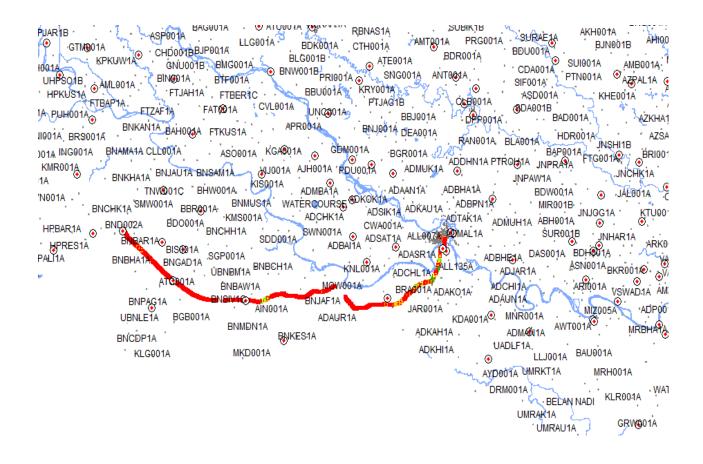
Data KPIs - Overall	2G
Download Throughput (Kbps)	39.12



DL throughput	No of Sample	%	Legends
< 100 Kbps	2296355	72%	
100-150Kbps	395565	12%	
150-200Kbps	178828	6%	
>200Kbps	323981	10%	

TSP-BSNL

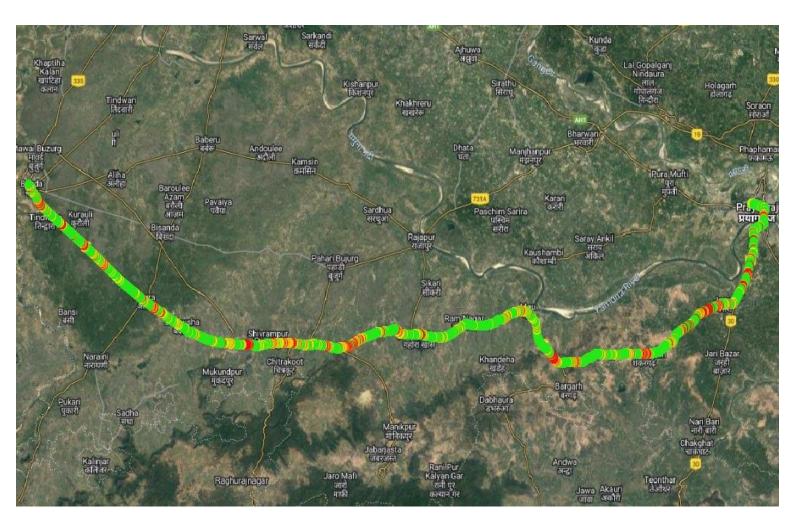
Data KPIs - Overall	3G
Download Throughput (Mbps)	1.82



DL throughput	No of Sample	%	Legends
< 1 Mbps	3379258	50	
	2289507	33.87	
1-5 Mbps	824628	12.20	
5-10 Mbps	258124	3.81	
>10Mbps	6997	0.10	

Airtel

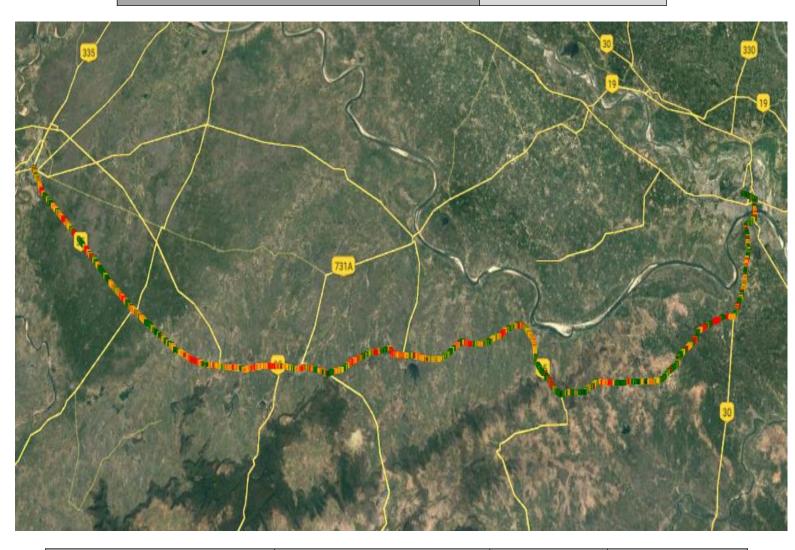
Data KPIs - Overall	LTE
Download Throughput (Mbps)	16Mbps



DL throughput	No of Sample	%	Legends
< 2Mbps	9029	13%	
2-5 Mbps	8121	12%	
5-10 Mbps	10059	15%	
>10Mbps	40041	60%	
Total	67250	100%	
	31		

JIO

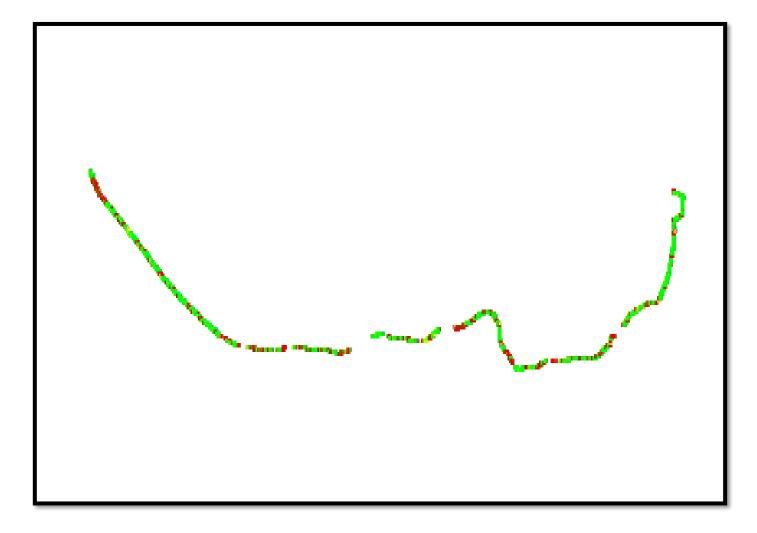
Data KPIs - Overall	LTE
Download Throughput (Mbps)	12.69



DL throughput	No of Sample	%	Legends
< 2Mbps	3240	16.90%	
2-5 Mbps	3612	18.84%	
5-10 Mbps	3826	19.95%	
>10Mbps	8897	44.31%	
Total	18862		
	32		

TSP - VIL

Data KPIs - Overall	LTE
Download Throughput (Mbps)	7.32



DL throughput	No of Sample	%	Legends
< 2Mbps	3433	24%	
2-5 Mbps	306	2%	
5-10 Mbps	283	2%	
>10Mbps	10357	72%	