

Operator Assisted Drive Test Report

Rajkot Feb. 2022

(RO, 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%.

TRAI Regional Office, Jaipur as directed by TRAI HQ has got conducted the operator assisted drive test with the help of Telecom Service Providers of Gujarat LSA in Rajkot City and surrounding areas Gondal, Padadhari SDCAs of Rajkot SSA during 15th to 18th Feb 2022. The drive test covered drive route of 420 KMs & 7 hotspots over a period of 4 days. Approximately 500+ calls were made for each of the 7 networks: three 2G networks, one 3G network and three LTE network covering four TSPs. The drive test reports were generated through TSPs tools and was compiled by the TRAI RO Jaipur.

Voice Summary Data Summary

Overview

Regional Office, TRAI Jaipur got conducted Operator Assisted Drive Test from **15th to 18th Feb 2022** covering various locations in Rajkot City & surrounding areas **Gondal**, **Padadhari**SDCAs of Rajkot SSA. The performance of Airtel, BSNL, Vodafone Idea and Jio were
monitored across various technologies (2G, 3G and 4G) by TSP's themselves through their
own test kits. The TSP's reports obtained from these drive tests were complied 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 and Upload Throughputs, Web Browsing Delay and Latency

Drive Test Details:

Voice Tests: Calls were made for 90 sec duration with wait time of 10 sec between calls in all technologies. The drive test covered a drive route of approximately 400 + KMs over a period of 4 days from **15th to 18th Feb 2022**. Approximately 500 + calls were made for each of the 7 networks: three 2G (Lock Mode) networks, one 3G (Dual mode) networks and three VoLTE network covering 4 unique TSPs.

Data Tests:

- 1. Dynamic data test was conducted for download throughput for 3G & 4G technologies.
- 2. Data Tests were performed at 7 static locations for 2G, 3G & 4G technologies. Also screenshots of TRAI MYSPEED APP was taken by TSPs at 7 static locations were attached at Annex V.
- * For Voice and Data KPI's, 2G measurement is done with UE locked mode, 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 are calculated from UE in Dual Mode (2G & 3G) includes samples and events of 2G.
- * 4G KPI's which are calculated from the UE in Free Mode included samples and events of 2G & 3G.

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					

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Overview

Voice & Dynamic Data Test Drive Route

Day Wise Vales and Data Drive pasts Dataile							
	Day Wise Voice and Data Drive route Details						
Date	Drive Cat	Area Covered	Kms Approx.				
15-02-2022	Voice Dynamic (2G, 3G, 4G)	Starting Point : Bahumali Bhavan at 9:30AM : Jubilee Circle, Dr. Yagnik Road, Mahila College Chowk, Indira Circle, Mavdi Chowk, Mavdi, Nana Mava, Kotecha Nagar, Laxmi Nagar, Chandresh Park, Karan Park, Gondal Chowkdi, Kothariya, Sapar GIDC, Gondal Town.	130				
16-02-2022	Voice Dynamic (2G, 3G, 4G)	Starting Point: Kishan Para Chowk at 9:30 AM: Raiya, Indian Park, Suncity, Yogi Nagar, Sadguru Nagar, Ravi Park Society, Kalawad Road, Metoda GIDC, Gandhigram, Bajrangwadi, Bhomeshwar Plot, Chotu Nagar, Sakhiya Nagar, Madhapar Circle, Padadhari Town	130				
17-02-2022	Voice Dynamic (2G, 3G, 4G)	Starting Point: Jam Tower at 9:30AM: Junction Plot, Railnagar, Madhapar Circle, Bedi ByPass, Marwadi University, Greenland Chowk, Kuvadava, Patel Nagar, Ranchhod Nagar, Dana Pith, Diwan Para, Karan Para, Laxmiwadi, Sorathiyawadi, Gopal Nagar, Anand Nagar, Meghani Nagar, Hudco Chowkdi, Aji Vasahat, Ambedkar Nagar, Aji Industrial, Shakti Industrial Zone, Arya Nagar	130				
18-02-2022	Data Static & Dynamic (2G, 3G, 4G) - Hotspots	Starting Point at Railway Station at 9:30 AM, CP Bungalow near Race Course, Central Bus Deopt, Big Bazaar, Crystal Mall and Dynamic Data Testing between them. BAPS Swaminarayan Temple at Gondal (15-02-2022) and Civil Hospital Padadhari (16-02-2022)	30-40 Арргох				

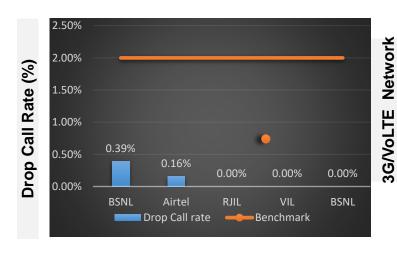


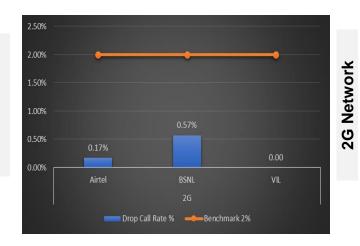
Data Service Test- Static Locations

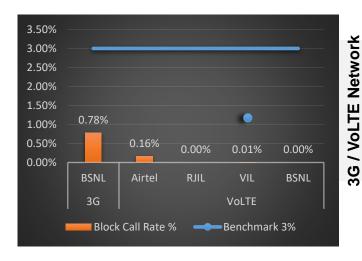
S.No.	Static data Location Name	Area
1	Railway Station,Rajkot	Rajkot
2	C.P. Bunglow,Rajkot	Rajkot
3	Bus Station,Rajkot	Rajkot
4	Big Bazar,Rajkot	Rajkot
5	Crystal Mall,Rajkot	Rajkot
6	Swaminarayan Temple-Gondal	Gondal
7	CHC hospital-Padadhari	Padadhari

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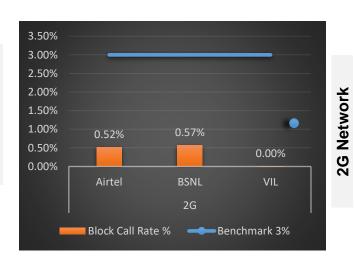
QoS compliance of the TSPs in Rajkot for Voice across technologies 2G/3G/4G-VoLTE:







Block Call Rate (%)



		2G		3G			VoĽ	TE
KPIs	Airtel	BSNL	VIL	BSNL	Airtel	RJIL	VIL	BSNL (Gondal)
Drop Call Rate %	0.17%	0.57%	0.00%	0.39%	0.16%	0.00%	0.00%	0.00%
Block Call Rate %	0.52%	0.57%	0.00%	0.78%	0.16%	0.00%	0.01%	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.

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Voice Calls

Key Observations

Coverage

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

	2G				
TSPs	Airtel	BSNL	VIL		
Coverage %	98.41	90.49	95.24		

b) Percentage of coverage samples for 3G ≥ -90 dBm & LTE ≥ -110 dBm.

TCDe	3G	Volte			
TSPs	BSNL	Airtel	JIO	VIL	BSNL (Gondal)
Coverage %	76.39	99.79	99.93	99.01	94.23

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

TSPs	3G		VolTE			
	BSNL	Airtel	JIO	VIL	BSNL (Gondal)	
Time Spent on 3G/4G %	94.9	100	100	99.8	99.48	

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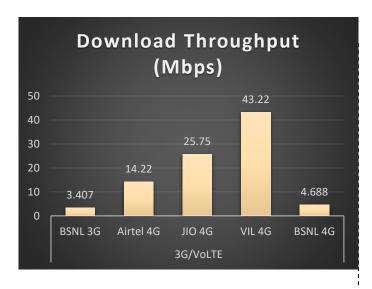
Data Services Static

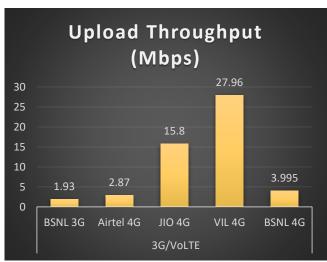
Key Observations

Data was tested at 7 locations .Following services were tested: Data Download/Upload, Latency (www.google.com), and Web browsing (Flipkart, Amazon, PayTm)

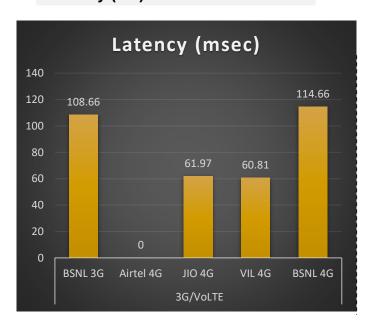
Data Download and Upload Performance Static (Mbps)

3G/4G/ Network:

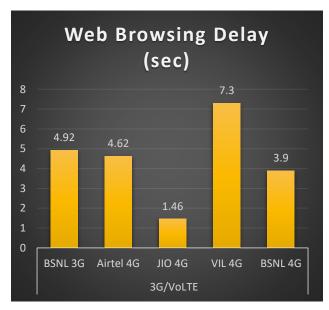




Latency (ms)



Web Browsing (Sec)



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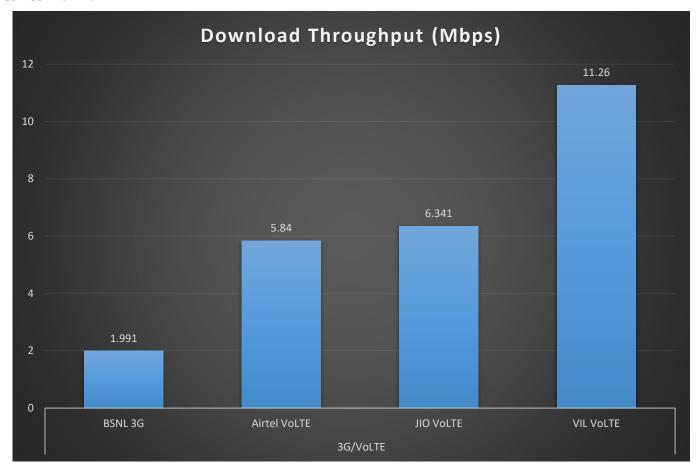
Data Services Dynamic

Key Observations

Dynamic Data was tested for 35 Kms. Download Throughput was tested.

Data Download Performance (kbps) - Dynamic

3G/4G/ Network:



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Summary

City Level Summary-Voice

Voice Call	2G					
voice Cali	Airtel	BSNL	VIL			
Call Attempt	582	528	647			
Blocked Call Rate (%)	0.52	0.57	0			
CSSR% (Accessibility)	99.48	99.43	100			
Drop Call Rate (%)	0.17	0.57	0			
Mobility HOSR (%)	97.57	96.37	98.1			
Rx Quality (%)	92.74	97.94	92.53			

Voice Call		3G/4G					
	BSNL 3G	Airtel JIO VoLTE VIL Vo		VIL VoLTE	BSNL 4G (Gondal)		
Call Attempt	514	608	660	659	16		
Blocked Call Rate (%)	0.78	0.16	0	0	0		
CSSR% (Accessibility)	99.22	99.84	100	100	100		
Drop Call Rate (%)	0.39	0.16	0	0	0		
Mobility HOSR (%)	96.51	99.61	99.72	99.85	100		
Rx Quality (%)	97.6	77	90.06	77.34	95.92		

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Summary

City Level Summary-Data Services

Data Services Static	2G			
Data Services Static	Airtel	BSNL	VIL	
Download Throughput (kbps)	147.4	111.89	130.04	
Upload Throughput (kbps)	35.86	73.59	52.75	
Web Browsing Delay (sec)	30.15	12.96	31.41	
Latency (msec)	327.24	248.77	336.65	

	3G/4G						
Data Services Static	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G	BSNL Gondal 4G		
Download Throughput (Mbps)	3.407	14.22	25.75	43.22	4.688		
Upload Throughput (Mbps)	1.93	2.87	15.8	27.96	3.995		
Video Streaming Delay (sec)	4.33	NA	0.35	0.007	1.23		
Web Browsing Delay (sec)	4.92	4.62	1.46	7.3	3.90		
Latency (msec)	108.66	NA	61.97	60.81	114.66		

Data Services Dynamic	3G/4G					
	BSNL 3G	Airtel 4G	JIO 4G	VIL 4G		
Download Throughput (Mbps)	1.991	5.84	6.341	11.26		

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- 1 - 11	2G			
Swaminarayan Temple-Gondal	Airtel	BSNL	VIL	
Download Throughput (kbps)	229.9	105.92	220	
Upload Throughput (kbps)	36.1	63.02	270	
Web Browsing Delay (sec)	27.35	12.98	27.5	
Latency (msec)	351	183	365	

CUC bespital Dadadbari	2G			
CHC hospital-Padadhari	Airtel	BSNL	VIL	
Download Throughput (kbps)	86	53.39	160.1	
Upload Throughput (kbps)	39.4	34.13	53.74	
Web Browsing Delay (sec)	28.64	13.91	27.02	
Latency (msec)	344.33	676.33	275.8	

Deilmen Station Beilest	2G			
Railway Station, Rajkot	Airtel	BSNL	VIL	
Download Throughput (kbps)	149	86.13	117.6	
Upload Throughput (kbps)	39	159.74	108.2	
Web Browsing Delay (sec)	26.66	12.89	28.09	
Latency (msec)	294.67	166.66	342.4	

	2G			
Crystal Mall, Rajkot	Airtel	BSNL	VIL	
Download Throughput (kbps)	173	78.13	44.13	
Upload Throughput (kbps)	33	63.85	33.99	
Web Browsing Delay (sec)	30.47	12.87	41.94	
Latency (msec)	222.67	164.33	326.8	

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Die Bereit Beileet	2G			
<u>Big Bazar, Rajkot</u>	Airtel	BSNL	VIL	
Download Throughput (kbps)	133	161.65	78.44	
Upload Throughput (kbps)	29	61.44	30.02	
Web Browsing Delay (sec)	28.99	12.66	36.96	
Latency (msec)	272.67	200.33	388	

C.D. Bunglow Boilest	2G			
C.P. Bunglow,Rajkot	Airtel	BSNL	VIL	
Download Throughput (kbps)	103	141.59	224.6	
Upload Throughput (kbps)	41	58.59	43.98	
Web Browsing Delay (sec)	41.31	13.08	28	
Latency (msec)	478	198.33	329	

	2G			
Bus Station,Rajkot	Airtel	BSNL	VIL	
Download Throughput (kbps)	158	156.42	155.4	
Upload Throughput (kbps)	34	74.41	46.59	
Web Browsing Delay (sec)	27.62	12.38	30.42	
Latency (msec)	327.33	149.66	329.6	

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City Level Summary(contd.)

Data Services static

Swaminarayan Temple-	4G			
<u>Gondal</u>	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	4.688	39.35	47.2	57.87
Upload Throughput (Mbps)	3.995	28.29	19.6	41.29
Video Streaming Delay (sec)	1.23	NA	0.355	0.01
Web Browsing Delay (sec)	3.9	4.63	1.76	4.41
Latency (msec)	114.66	86.33	71.4	57.8
CHC hospital-Padadhari	3G		4G	
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	0.59	12.7	16	50.94
Upload Throughput (Mbps)	2.65	29.68	18	29.37
Video Streaming Delay (sec)	1.26	NA	0.204	0.01
Web Browsing Delay (sec)	4.47	5.2	1.35	4.27
Latency (msec)	161.33	93.67	49	59.33
Railway Station, Rajkot	3G		4G	
	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	3.65	5.77	29.5	43.47
Upload Throughput (Mbps)	2 19	3 46	16.7	7 19

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16.7

0.265

1.63

70.6

3.46

NA

5.2

93.7

7.19

0.01

4.55

65.8

2.19

7.11

3.51

65.33

Video Streaming Delay (sec)

Web Browsing Delay (sec)

Latency (msec)

City Level Summary(contd.)

Data Services static

Crystal Mall,Rajkot	3 G	4 G		
Ci ystai iviali, najkut	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	4.11	10.87	18.9	43.43
Upload Throughput (Mbps)	1.58	2.56	10.6	21.32
Video Streaming Delay (sec)	4.27	NA	0.26	0
Web Browsing Delay (sec)	5.29	4.6	1.46	8.69
Latency (msec)	58.66	91.7	66	62.33

Big Bazar, Rajkot	3G	4G		
, ,	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	6.76	9.76	31.1	51.2
Upload Throughput (Mbps)	1.89	2.93	13.7	32.55
Video Streaming Delay (sec)	1.19	NA	0.33	0.01
Web Browsing Delay (sec)	5.6	4.7	1.31	9.46
Latency (msec)	185.0	69.7	51.6	57.8

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City Level Summary(contd.)

Data Services static

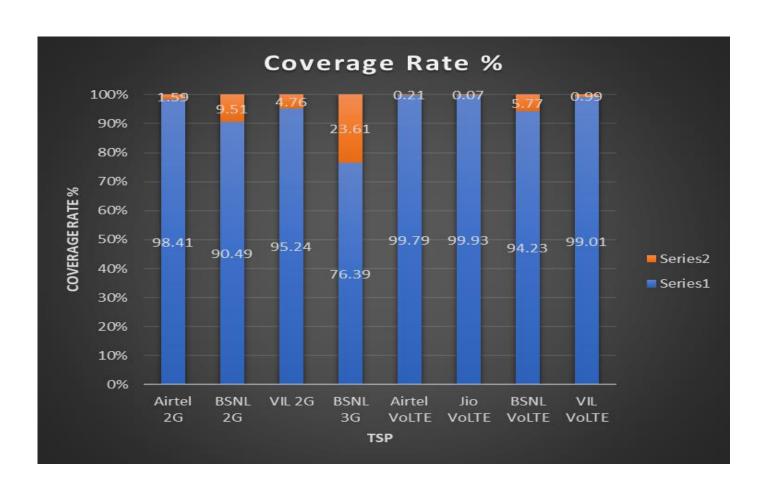
C.P. Bunglow, Rajkot	3G	4G			
C.P. Bullglow, Najkot	BSNL	Airtel	JIO	VIL	
Download Throughput (Mbps)	2.1	14.06	21.9	21.15	
Upload Throughput (Mbps)	1.72	3	13.7	34.34	
Video Streaming Delay (sec)	7.97	NA	0.427	0.01	
Web Browsing Delay (sec)	5.54	4.3	1.28	5.52	
Latency (msec)	129	81	70.2	61.86	

Pus Station Paikot	3G	4G		
Bus Station,Rajkot	BSNL	Airtel	JIO	VIL
Download Throughput (Mbps)	3.22	7.02	15.6	33.07
Upload Throughput (Mbps)	1.54	2.28	18.3	23.58
Video Streaming Delay (sec)	4.2	NA	0.62	0
Web Browsing Delay (sec)	5.11	4.5	1.49	7.16
Latency (msec)	52.66	86	55	60.8

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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.

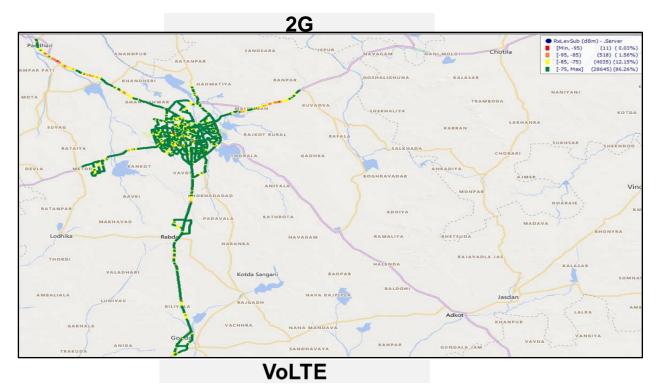
TSP	Coverage Rate %
Airtel 2G	98.41
BSNL 2G	90.49
VIL 2G	95.24
BSNL 3G	76.39
Airtel VoLTE	99.79
Jio VoLTE	99.93
BSNL VoLTE	94.23
VIL VoLTE	99.01

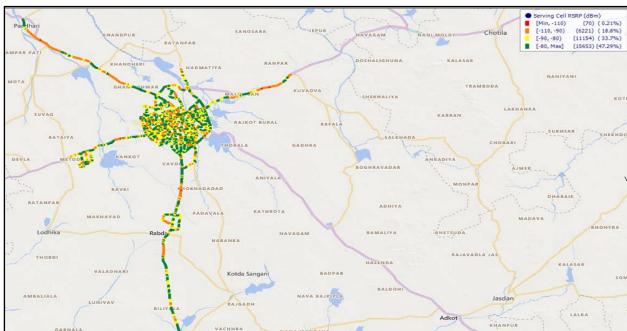


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AIRTEL

Technology	Coverage Rate %
2G	98.41
VolTE	99.79



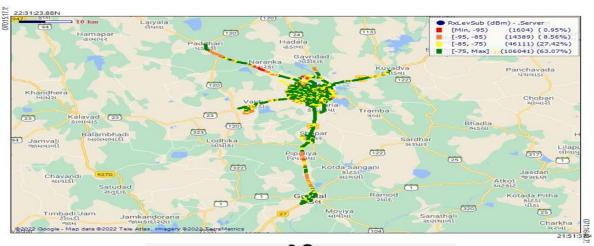


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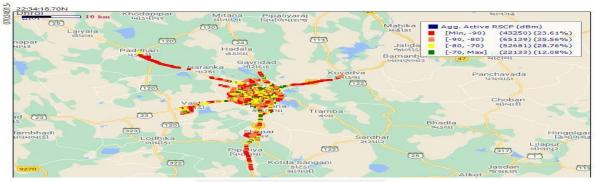
BSNL

Technology	Coverage Rate %
2G	90.49
3G	76.39
4G (Gondal SDCA only)	94.23

2G



3G

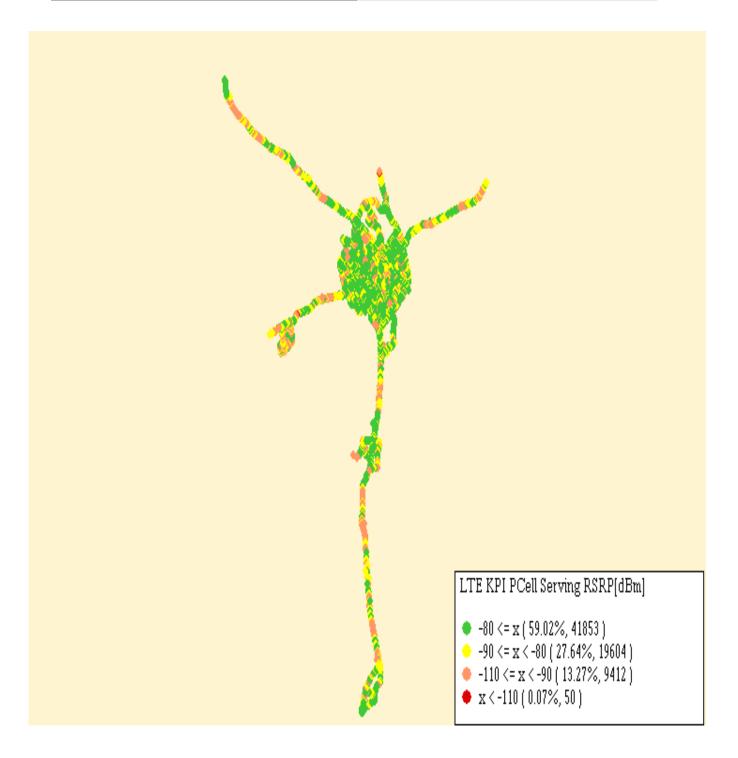




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JIO

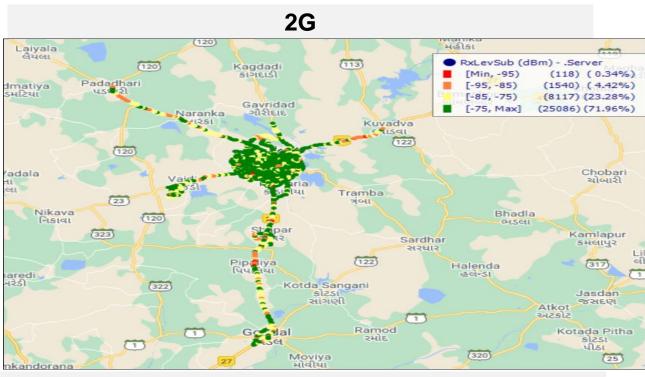
Technology	Coverage Rate %
VoLTE	99.93

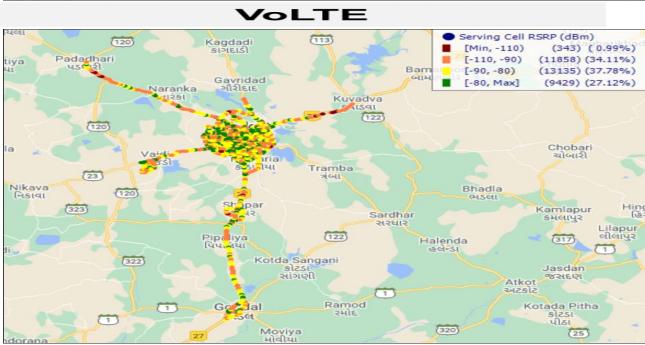


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VIL

Technology	Coverage Rate %
2G	95.24 %
VoLTE	99.01 %

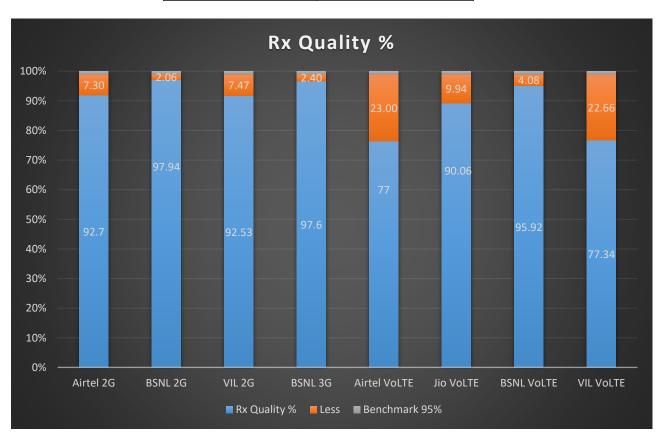




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For measuring voice quality, as per the QoS norms, RxQual <=5 for GSM TSPs, EcNo >= - 14 dBm for 3G TSP sand SINR >0 in case of VoLTE is considered to be good, where as quality beyond this benchmark is considered to be bad. The benchmark should usually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

TSP	Rx Quality %
Airtel 2G	92.70
BSNL 2G	97.94
VIL 2G	92.53
BSNL 3G	97.60
Airtel VoLTE	77.00
Jio VoLTE	90.06
BSNL VoLTE	95.92
VIL VoLTE	77.34

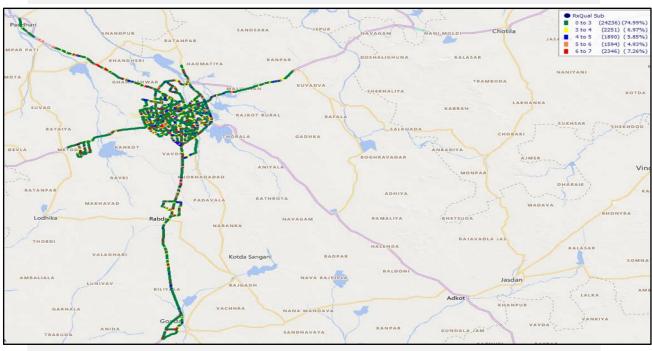


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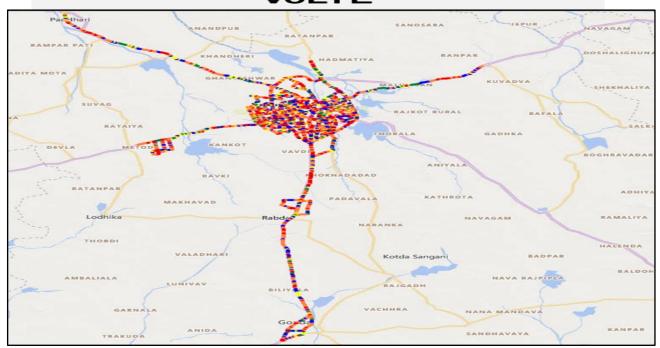
Airtel

Technology	Rx Quality %
2G	92.7%
VoLTE	77%

2G



VoLTE



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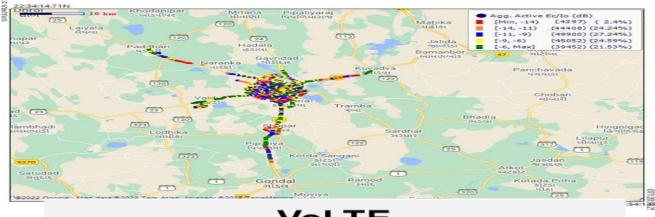
BSNL

Technology	Rx Quality %
2G	97.94
3G	97.60
VoLTE (Gondal)	95.92

2G



3G



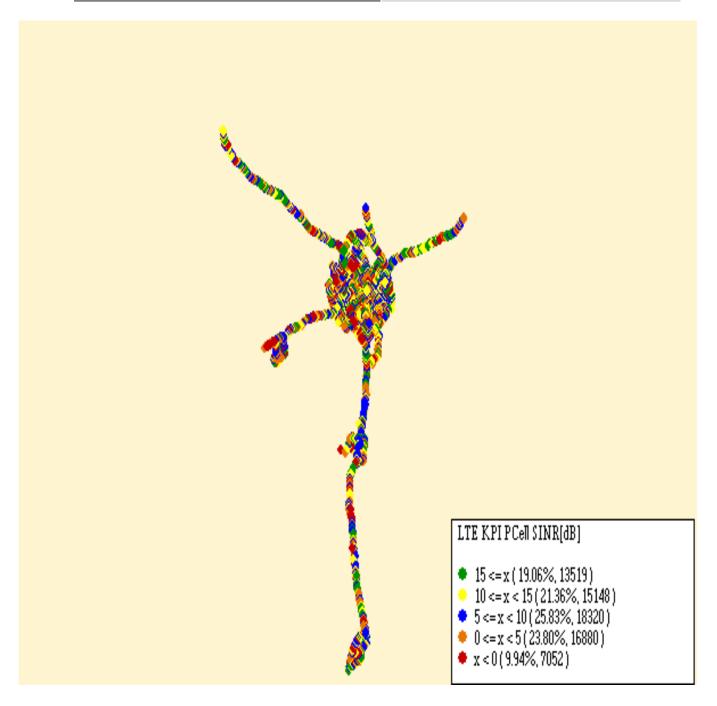
VoLTE



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JIO

Technology	Rx Quality %
VoLTE	90.06

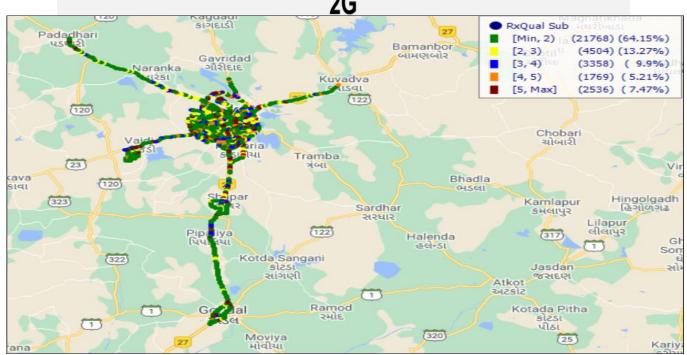


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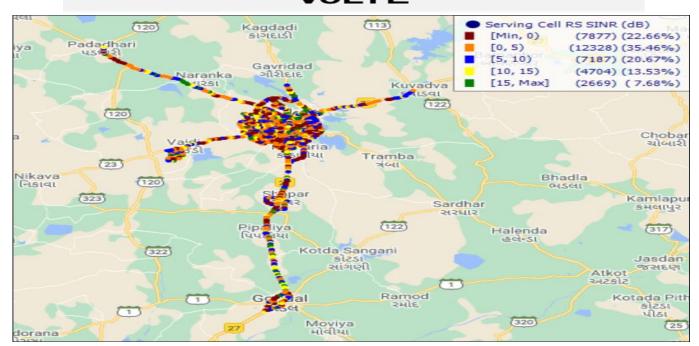
VIL

Technology	Rx Quality %
2G	92.53
4G	77.34

2G



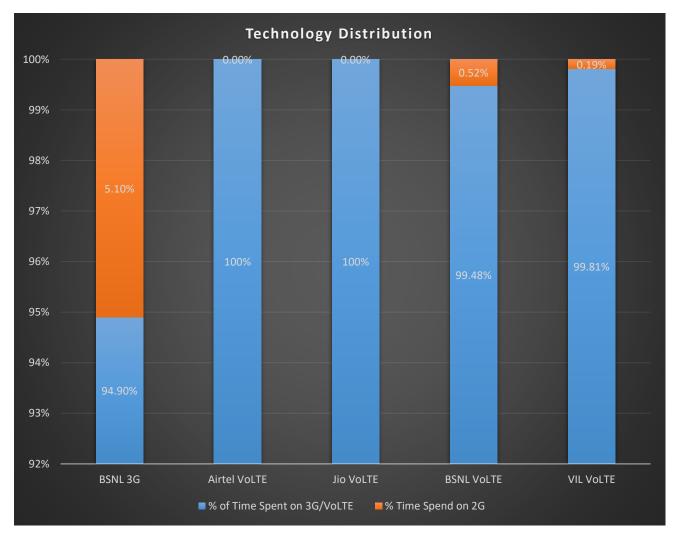
Volte



Page 24 of 30 **Quality Details**

III. Technology Details

TSP	% of Time Spent on 3G/VoLTE
BSNL 3G	94.90%
Airtel VoLTE	100%
Jio VoLTE	100%
BSNL VoLTE (Gondal)	99.48%
VIL VoLTE	99.81%



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Airtel data testing on hotspots using Trai my speed app

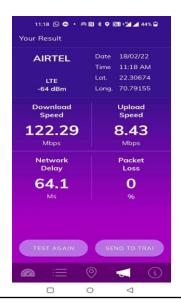
Rajkot_Railway Station



Padadhari_CHC hospital



Rajkot_C.P. Bunglow



Gondal_Swaminarayan temple



Rajkot_Big Bazar



Rajkot_Bus Station

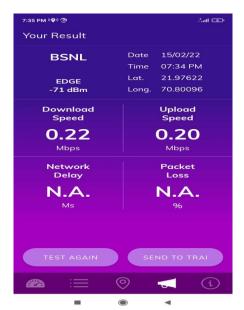


Rajkot_Crystal Mall

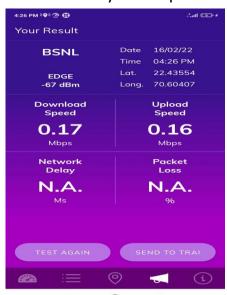




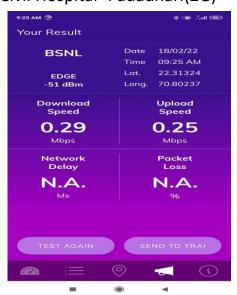
BSNL Screenshots of TRAI MySpeed App



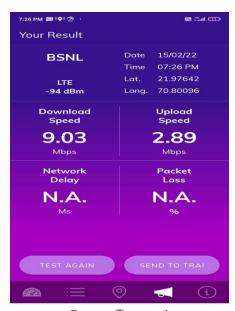
BAPS Swaminarayan Temple-Gondal(2G)



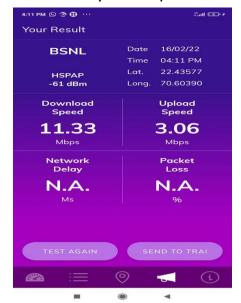
Civil Hospital-Padadhari(2G)



Railway Station - Rajkot (2G)



BAPS Swaminarayan Temple-Gondal(4G)



Civil Hospital-Padadhari(3G)



Railway Station-Rajkot (3G)

JIO Screenshots of TRAI MySpeed App

JIO

RAILWAY STATION

18/02/22 JIO 09:24 AM Time 22.31358 Lat. LTE Long. 70.80206 -62 dBm Download Upload Speed Speed 95.95 7.80 Mbps Mbps Network Packet Delay Loss 26.3 Ms

BUS STAND

Jio	Date	18/02/22
	Time	01:21 PM
LTE	Lat.	22.29014
-87 dBm	Long.	70.80240
Download Speed		Upload Speed
30.13	20.55	
Mbps		Mbps
Network		Packet
Delay		Loss
32.3		0
Ms		96

RACE COURSE

JIO	Date	18/02/22
	Time	11:29 AM
LTE	Lat	22.30730
-72 dBm	Long.	70.79173
Download Speed	Upload Speed 17.09	
34.01		
Mbps		Mbps
Network		Packet
Delay		Loss
27.4	0	
Ms		96

BIG BAZZAR

JIO	Date	18/02/22
	Time	03:37 PM
LTE	Lat.	22.27970
-69 dBm	Long.	70.77528
Download Speed		Upload Speed
61.56	8.26	
Mbps		Mbps
Network	Packet Loss	
Delay		
35.7	0	
Ms		96

V. Screenshots of TRAI MySpeed App

JIO

CRYSTAL MALL

Date 18/02/22 JIO 05:00 PM Time Lat. 22.27991 LTE -44 dBm 70.76358 Long. Download Upload Speed Speed 32.14 53.35 Mbps Mbps Network **Packet** Delay Loss 24.8 0 96

SWAMINARAYAN MANDIR

JIO	Date	15/02/22
	Time	07:07 PM
LTE	Lat.	21.97580
-70 dBm	Long.	70.80122
Download Speed		Upload Speed
93.28	9.76	
Mbps		Mbps
Network		Packet
Delay	Loss	
26.7	0	
Ms		96

PADDHARI



VI Data testing on hotspots using Trai my speed app

Rajkot_Railway Station



Padadhari_CHC hospital



Rajkot C.P. Bunglow



Gondal_Swaminarayan temple



Rajkot_Big Bazar



Rajkot Bus Station



Rajkot_Crystal Mall

