



Operator Assisted Drive Test (OADT) For

Mumbai

26th to 28th Mar 2026

TRAI RO, Bengaluru

Self-Drive Test by TSP



Drive Test Report
for
Mar Month 2026 Year
Mumbai & Nearby Area
26 Mar to 28 Mar 2026
by
TRAI RO ,Bengaluru

Table of contents

1. Overview

- 1.1 Telecom Service Providers, Technologies and frequency bands captured
- 1.2 Quality of Service parameters measured

2. Executive Summary

- 2.1 Route Map of Drive test & Hotspot locations
- 2.2 Drive Test Area detail
- 2.3 Details of Drive Test Tools
- 2.4 Key Findings (Voice & Data)

3. QoS Performance Analysis - Dynamic

- 3.1 Voice Service Performance (3G/2G Lock mode)
- 3.2 Voice Service Performance (5G/4G/3G/2G - Auto mode)
- 3.3 Data Service performance (5G/4G/3G/2G (Auto mode)
- 3.4 Time spent (Technology Wise)

4. QoS Performance Analysis - Static

- 4.1 Hot spot Locations
- 4.2 Voice Service Performance (5G/4G/3G/2G - Auto mode) – Over all
- 4.3 Data Service Performance (5G/4G/3G/2G - Auto mode) – Over all
- 4.4 Voice Service Performance (5G/4G/3G/2G-Auto mode) at each Static location
- 4.5 Data Service Performance (5G/4G/3G/2G-Auto mode) at each Static location
- 4.6 Signal Strength Distribution (5G/4G/3G/2G - Auto mode) – Over all

5. Improvement plan for shortcoming observed during Drive Test

6. Compliance Report on shortcomings observed during Drive Test

1. Overview

The Operator Assisted Drive Test carried out in Mumbai and nearby areas from date 26/03/26 to 28/03/26 From 10:00 AM to 8:00 PM. The drive test covered drive route of around 185 KMs in 3 days and 6 hotspot locations.

1.1 Telecom Service Providers(TSPs),Technologies and frequency bands captured during Drive Test are as below:

S. No.	Name of TSP	Technology	Frequency Bands (In MHz)
1	Bharti Airtel Ltd.	2G	1800
2	Bharti Airtel Ltd.	4G	900 , 1800 , 2100 , 2300
3	Bharti Airtel Ltd.	5G	3500
4	MTNL	2G	900
5	MTNL	3G	2100
6	MTNL	4G	NA
7	Reliance JIO Infocomm Ltd.	4G	850 ,1800 ,2300
8	Reliance JIO Infocomm Ltd.	5G	700 ,3500
9	Vodafone Idea Ltd.	2G	1800
10	Vodafone Idea Ltd.	4G	900 ,1800 , 2100,2500
11	Vodafone Idea Ltd.	5G	3300 , 2600

(1) Quality of Service parameters measured:

Voice Service:

Dynamic	Static (Hotspot Location)
Call setup time	Call setup time
Call setup success rate (CSSR)	Call setup success rate (CSSR)
Dropped Call rate	Dropped Call rate
Call Silence Rate	
Handover Success Rate (HOSR)	
Packet Drop Rate (Uplink & Downlink)	
Mean Opinion Score (MOS)	
Signal Strength	

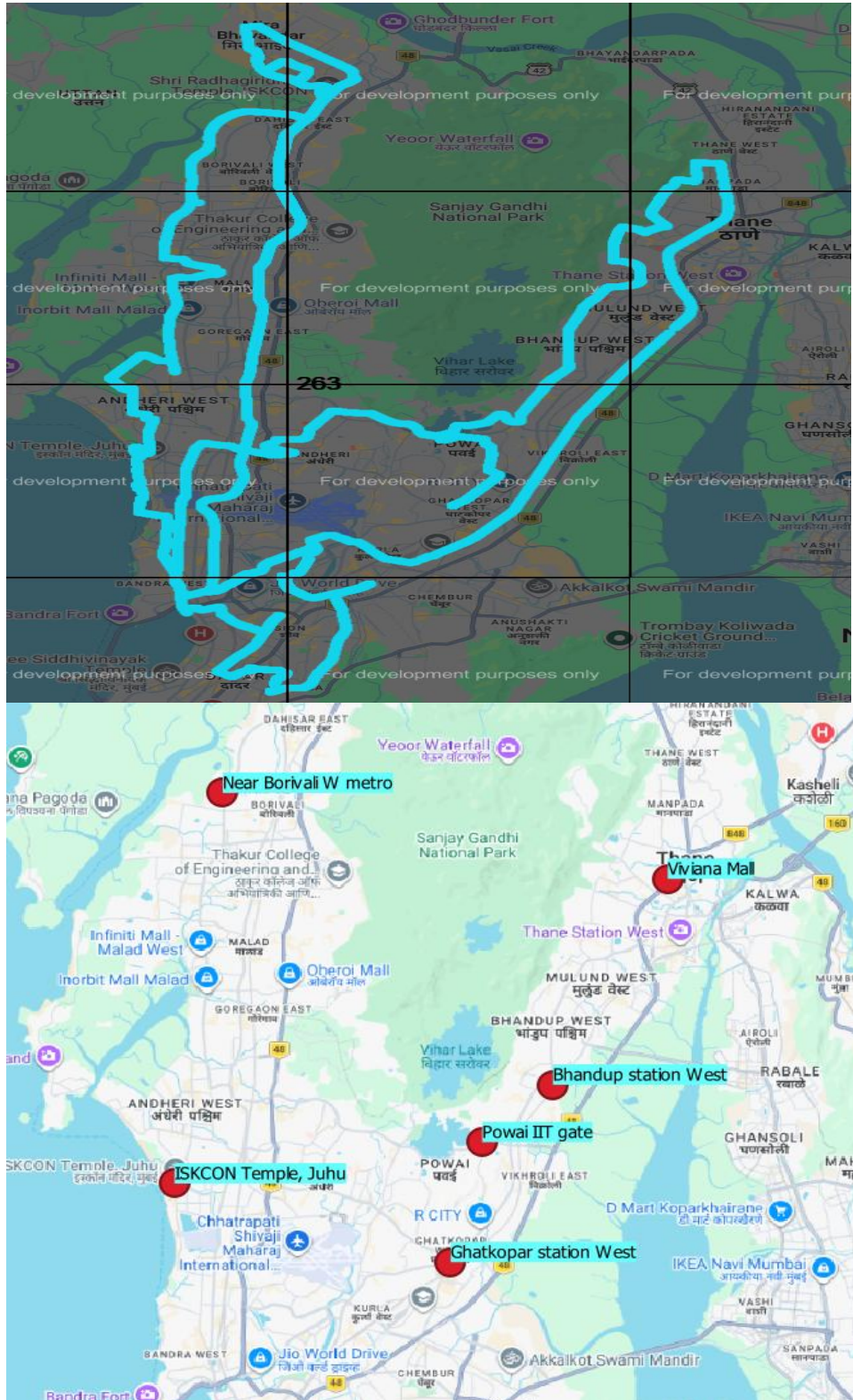
(2) Data Service:

Dynamic	Static (Hotspot Location)
Data speed (DL / UL both)	Data speed (DL/UL both)
Latency	Latency
Jitter	Jitter
	Session Setup Success Rate (DL/UL)
	Packet Drop rate
	Web browsing delay
	Video Streaming performance

2. Executive Summary

This report covers the findings of the OADT undertaken in Mumbai, Mumbai License Service Area (LSA) during the month of Mar (2026) under the supervision of TRAI Regional Office (RO), Bengaluru. Details of route/ area covered during the OADT is as given below:

2.1 Route Map of Drive test & Hotspot locations:



2.2 Drive Test Area detail

Date	Duration	Drive test route	Distance covered (in Kms)
	 AM to PM		
26-March-26	09.00AM to 7.30PM	CST BKC-Mira bhayandar -Malad-Iskon Juhu-basilica-CST BKC	85km
27-March-26	09.00AM to 6.00PM	CST BKC-Tikuji -Ni-Wadi-IBIS Thane-Bhandup West -Powai-Dadar-Wadala-CST BKC	90km
28-March-26	09.00AM to 4.00PM	Ghatkopar -Powai & Hotspot Location	10km

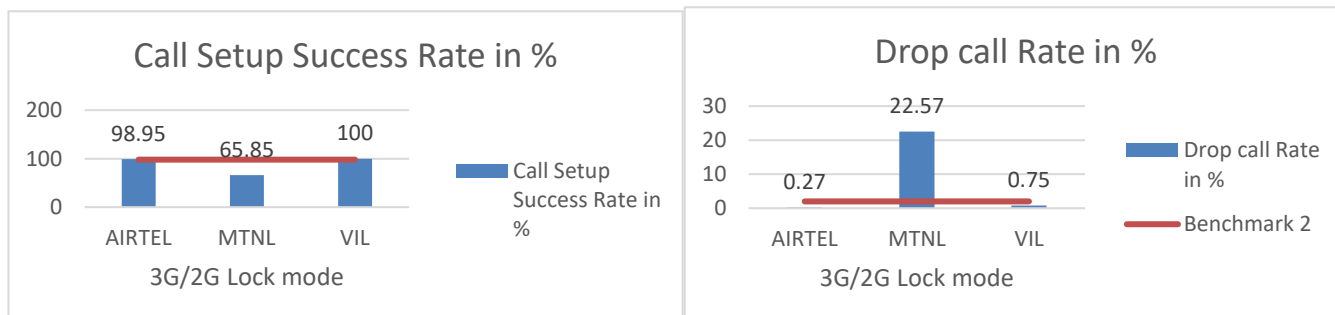
Date	Time	Hotspot Location	Latitude / Longitude
26/03/2026	2:00 PM	Near Borivali W metro	19.235785,72.840723
26/03/2026	5.30 PM	ISKCON Temple, Juhu	19.1132,72.82652
27/03/2026	1.30 PM	Bhandup station West	19.14419873,72.938225
27/03/2026	5.00 PM	Viviana Mall	19.2088197,72.972133
28/03/2026	10.38 AM	Ghatkopar station West	19.088521,72.908017
28/03/2026	01.11 PM	Powai IIT gate	19.1261865,72.917344

2.3 Details of Drive Test Tools used:

Airtel - TEMS Investigation 27.1
MTNL – Azenqos Sigma PA
JIO – XCAL.
VIL – Azenqos Sigma PA

2.4 Key findings(Voice & Data)

2.4.1 Voice Service performance in 3G/2G mode only

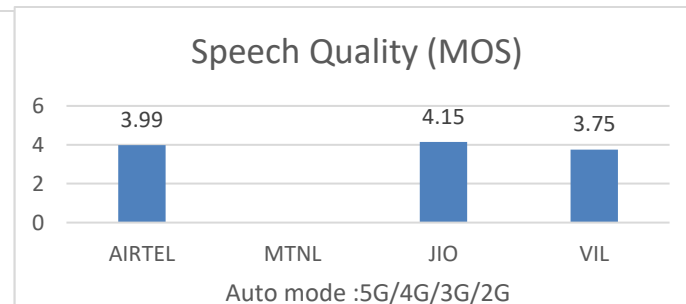
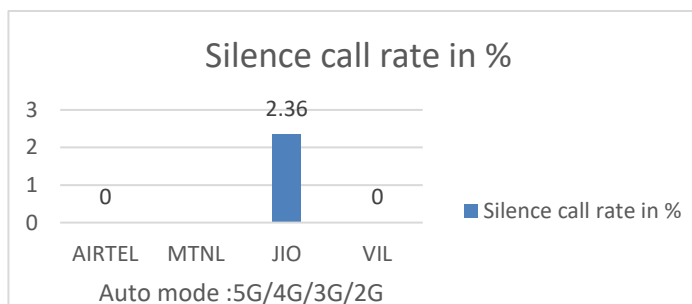
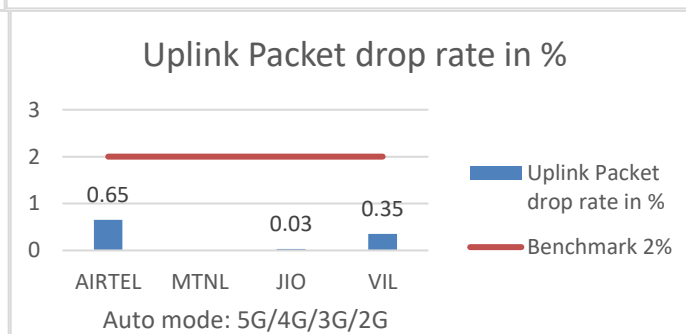
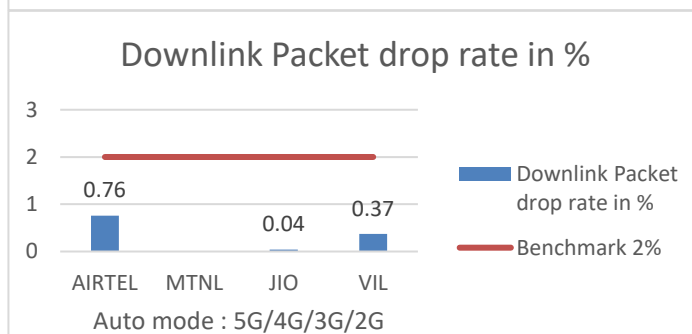
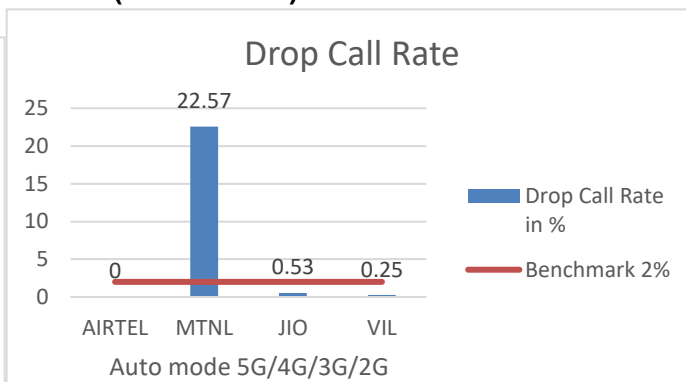
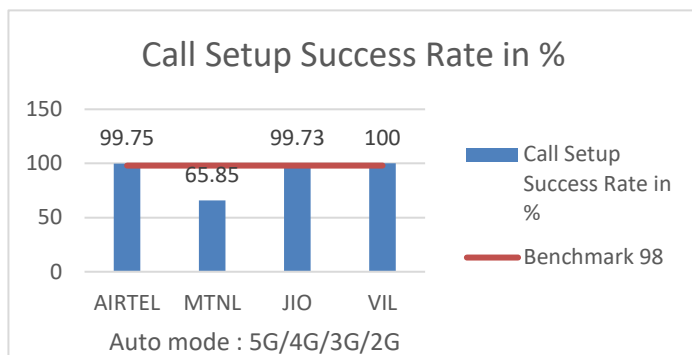


Parameter	Benchmark	AIRTEL	MTNL	VIL
Call Attempts		380	536	402
Call Setup Success Rate(in%)	$\geq 98.0\%$	98.95	65.85	100
Drop Call Rate(in%)	$\leq 2\%$	0.27	22.57	0.75
Call Setup Time-Average(in Seconds)		4.35	4.85	3.29
Handover Success Rate(in %)	$\geq 95\%$	97.62	56.12	96.22

2.4.2 Number of Cell ids latched during drive test (3G/2G)

Technology	AIRTEL	MTNL	VIL
3G	NA	88	-
2G	776	112	726

2.4.3 Voice Service performance in 5G/4G/3G/2G (Auto mode)

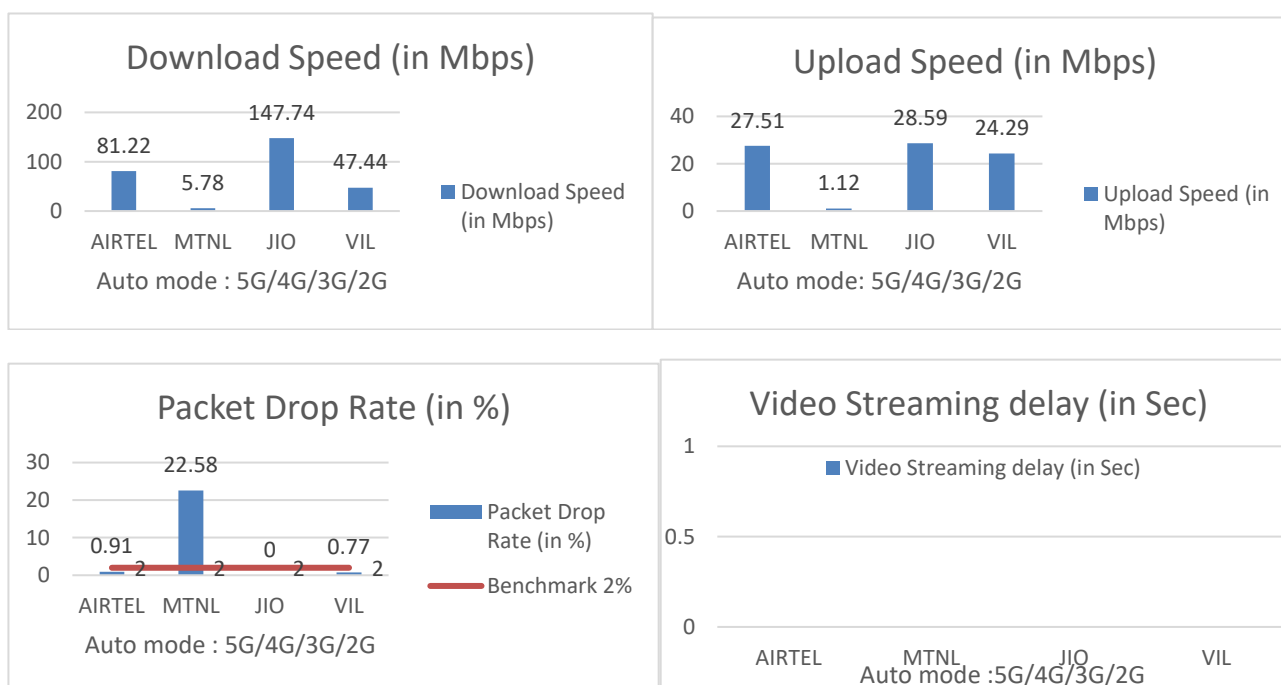


Parameter	AIRTEL	MTNL	RJIL	VIL
Call Attempts	403	536	375	400
Call Setup Success Rate%	99.75	65.85	99.73	100
Drop Call Rate%	0	22.57	0.53	0.25
Call Setup Time-Average(Second)	1.35	4.85	1.11	0.3
Handover Success Rate%	99.96	76.12	99.71	100
Downlink Packet drop rate %	0.76	NA	0.04	0.37
Uplink Packet drop rate%	0.65	NA	0.03	0.35
Silence Call Rate%*	0	-	2.36	0
Speech Quality (AverageMOS)	3.99	-	4.15	3.75

2.4.4 Number of Cell ids latched during drive test (Automode)

Technology	AIRTEL	MTNL	RJIL	VIL
5G	0	NA	691	187
4G	1738	NA	710	459
3G	-	88	NA	-
2G	0	112	NA	-

2.4.5 Data performance in 5G/4G/3G/2G(Automode)

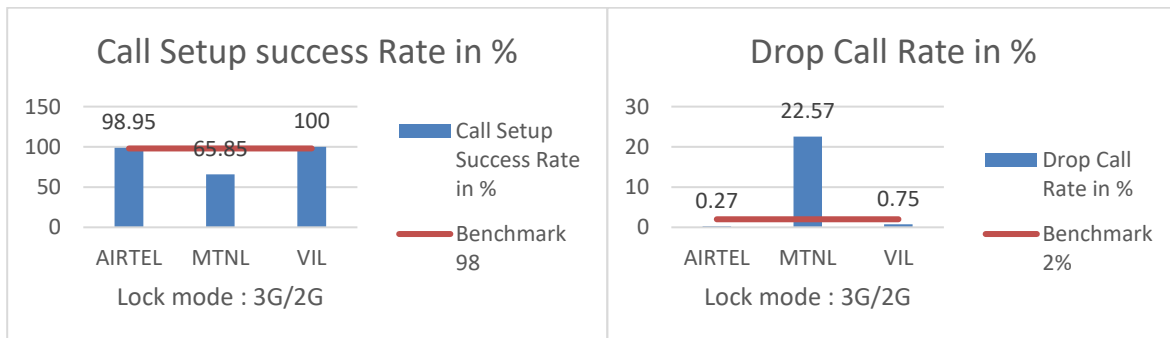


QoS Parameters		AIRTEL	MTNL	RJIL	VIL
Download speed (Mbps/s)	Typical	35.28	11.52		22.15
	Average	81.22	5.78	147.74	47.44
	80thPercentile	120.46	22.36	330.76	69.99
Download Session Setup Success Rate%		96.57	55.88	100%	100
Upload speed (Mbps/s)	Typical	14.38	2.58		5.91
	Average	27.51	1.12	28.59	24.29
	80thPercentile	41.23	25.96	57.62	34.96
Upload Session Setup Success Rate%		96.79	48.47	100%	100
Latency(in ms)	50thPercentile	11	56.34	35	26.55
Jitter(in ms)	Average	6.22	21.85	14.69	8.69
Packet Drop Rate%		0.91	22.58	0.14	0.77
Web browsing delay(in sec)		-	NA	2.37	NA
Video Streaming performance for video		-	NA	0.38	NA

Detailed QoS Performance Analysis

3. Performance Analysis-Dynamic

3.1 Voice Service Performance(3G/2GLockmode)-Dynamic



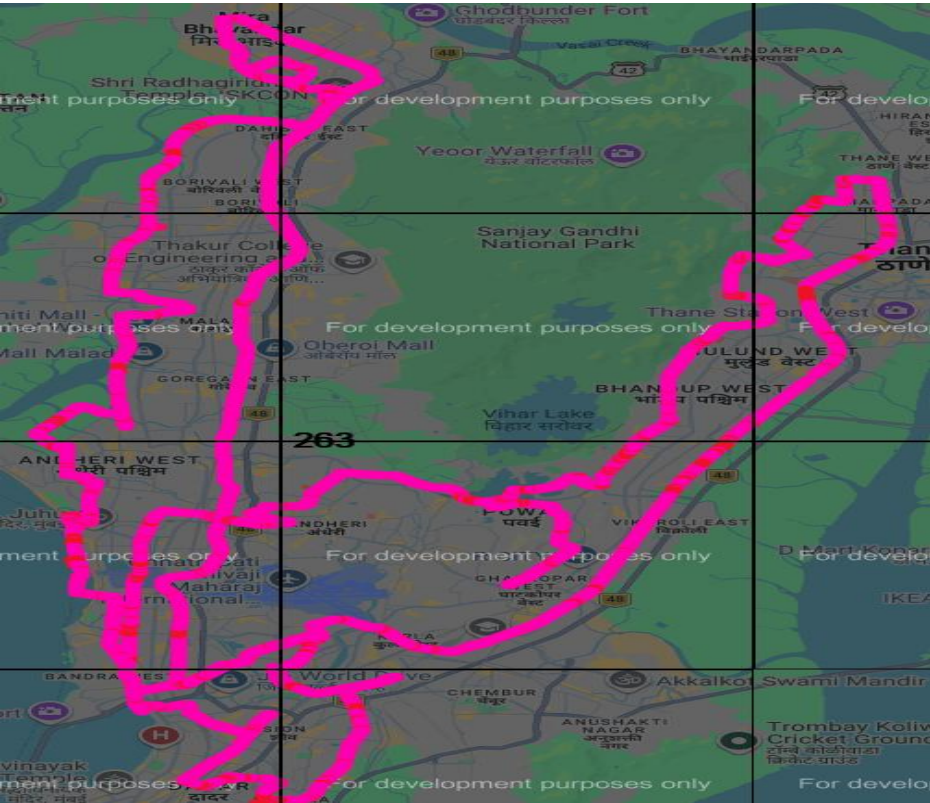
Parameters	Airtel	MTNL	RJIL	VIL
Total Distance covered(in Kms)	185	180	NA	182
No .of Call Attempts	380	536	NA	402
No. of Call Established	376	353	NA	402
Call setup success rate(CSSR)%	98.95	65.85	NA	100
No. of Drop Call	1	79	NA	3
Drop Call Rate%	0.27	22.57	NA	0.75
Call Setup Time Average(Sec.)	4.35	4.85	NA	3.29
No. of Handover Attempts	842	435	NA	635
No .of Handover success	822	244	NA	611
HOSR%	97.62	56.12	NA	96.22
Total no of RLT Occurrence	76344	NA	NA	8
No of RLT>48	0	NA	NA	0

3.1.1 Number of Cell ids latched during drive test (3G/2G-Lockmode)

Number of unique Cell ids covered in Voice test				
Technology	AIRTEL	MTNL	RJIL	VIL
3G	NA	180	NA	NA
2G	776	536	NA	

3.1.2 Signal Strength Map:(3G/2G-Lockmode) Airtel

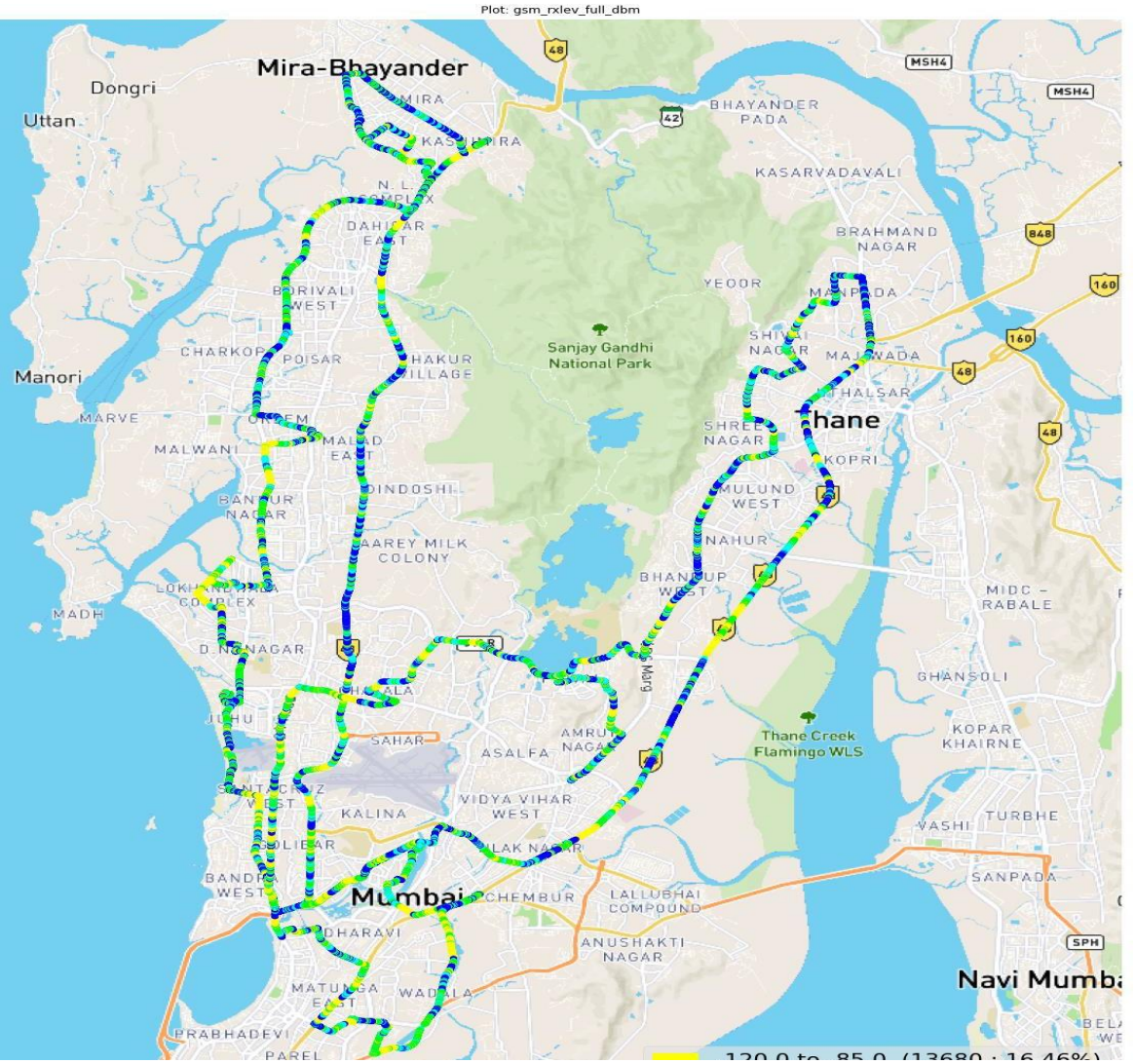
Signal Strength Map (for each TSP)	Map Legend: 2G- Pink (Rx Level $\geq$ -85 dBm), 3G- Sky blue (RSCP Level $\geq$ -90 dBm) Red (Rx Level $<$ -85 dBm) Dark Blue (RSCP Level $<$ -90 dBm)
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Color	Range	Count	Per
Red	[-94 to -85)	(1830)	(8.45%)
Pink	[Min to -94)	(19827)	(91.55%)

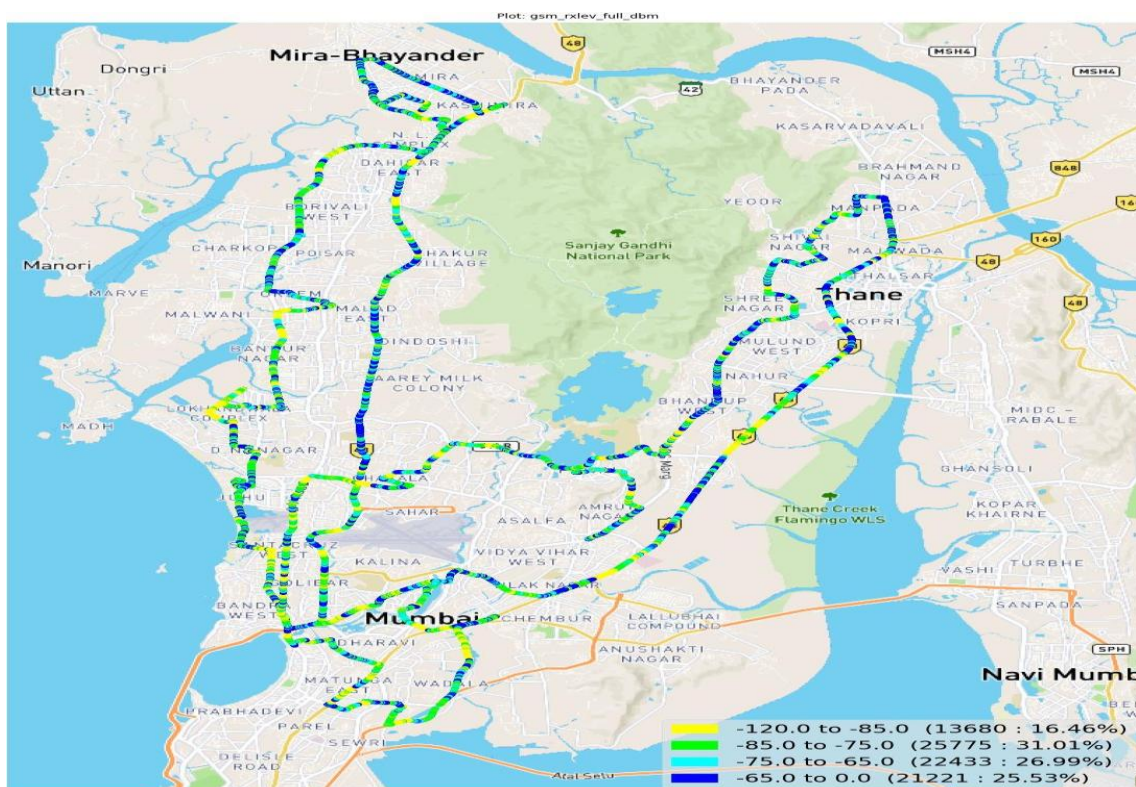
Signal Strength Map:(3G/2G-Lockmode) MTNL

Signal Strength Map (for each TSP)	Map Legend: 2G- Pink (Rx Level $\geq$ -85 dBm), 3G- Sky blue (RSCP Level $\geq$ -90 dBm) Red (Rx Level $<$ -85 dBm) Dark Blue (RSCP Level $<$ -90 dBm)
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Signal Strength Map:(3G/2G-Lockmode) VIL

Signal Strength Map (for each TSP)	Map Legend:
	2G- Pink (Rx Level ≥ -85 dBm), Red (Rx Level < -85 dBm)
	3G- Sky blue (RSCP Level ≥ -90 dBm) Dark Blue (RSCP Level < -90 dBm)

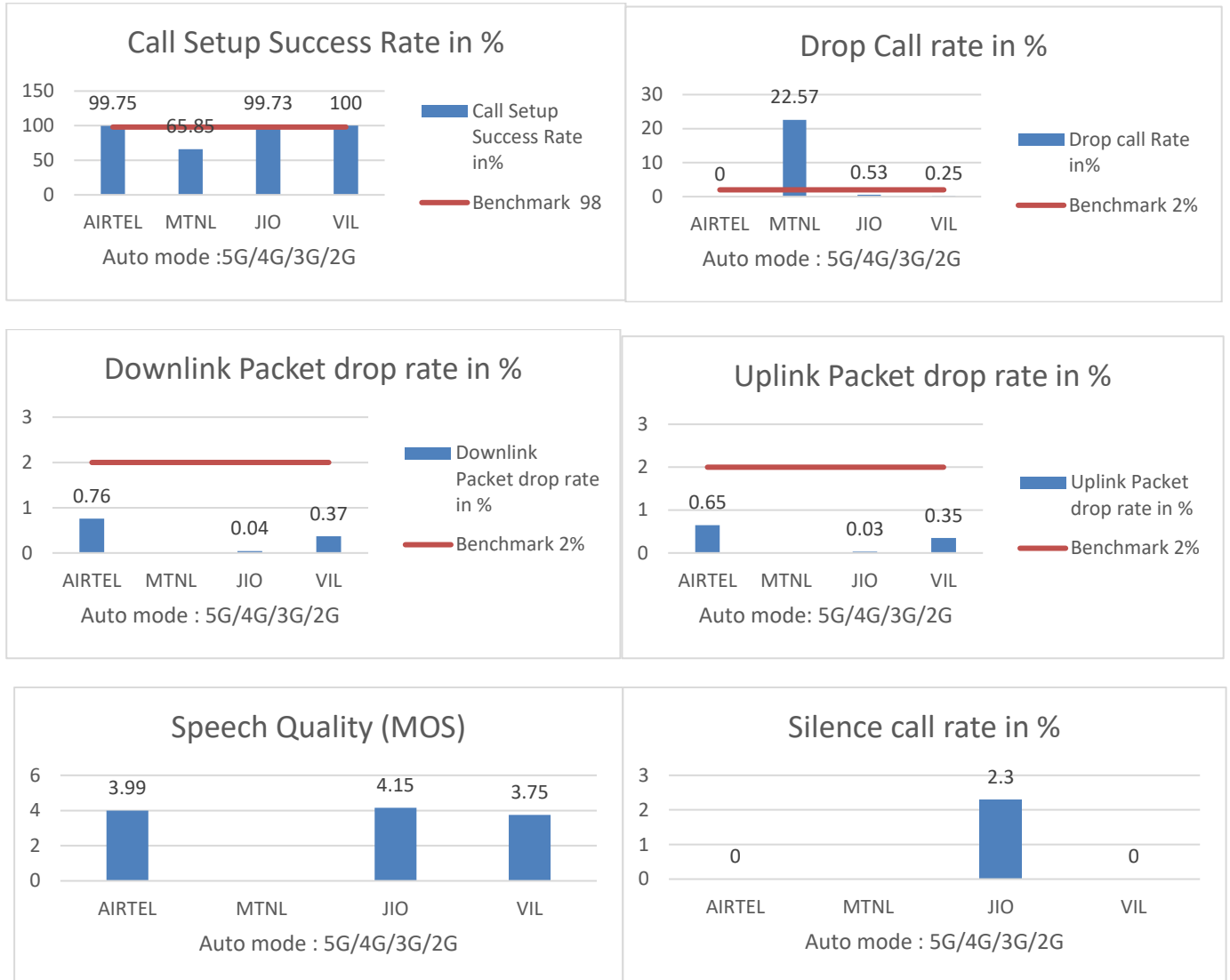


3.1.3 Signal Strength Distribution:(3G/2G-Lockmode)

RxLevel-2G								
Overall Rx Level	No of Sample				Sample%			
	Airtel	MTNL	RJIL	VIL	Airtel	MTNL	RJIL	VIL
[Max,≥-65]	7022	9857	NA	21221	32.42	11.93	NA	25.53
[-65,≥-75)	6524	11528	NA	22433	30.13	13.95	NA	26.99
[-75,≥-85)	6281	14587	NA	25775	29	17.65	NA	31.01
[-85,≥Min)	1830	46635	NA	13680	8.45	56.45	NA	16.46
Total	21657	82607	NA	83109	100	100	NA	100

RxLevel-3G								
Overall RSCP	No of Sample				Sample%			
	Airtel	MTNL	RJIL	VIL	Airtel	MTNL	RJIL	VIL
[Max,≥-70]	NA	6589	NA	NA	NA	7.76	NA	NA
[-70,≥-80)	NA	8247	NA	NA	NA	9.72	NA	NA
[-80,≥-90)	NA	16857	NA	NA	NA	19.86	NA	NA
[-90,≥Min)	NA	53146	NA	NA	NA	62.64	NA	NA
Total	NA	84839	NA	NA	NA	100	NA	NA

3.2 Voice Service Performance in 5G/4G/3G/2G(Automode)-Dynamic



3.2 Voice Service Performance in 5G/4G/3G/2G(Automode)-Dynamic

Parameters	Airtel	MTNL	RJIL	VIL
Total Distance covered(in Kms)	185	180	185	182
No. of Call Attempts	403	536	375	400
No. of Call Established	402	353	374	400
Call setup success rate(CSSR)%	99.75	65.85	99.73%	100
No. of Drop Call	0	79	2	1
Drop Call Rate%	0	22.57	0.53%	0.25
Call Setup Time Average(Sec.)	1.35	4.85	1.11	0.3
No. of Handover Attempts	2689	435	2803	1612
No. of Handover success	2688	244	2795	1612
HOSR%	99.96	56.12	99.71	100
Packet Drop Rate (Downlink)	0.76	NA	0.04	0.37
Packet Drop Rate (Uplink)	0.65	NA	0.03	0.35
Number of silence call for>2sec.	0	NA	15	3
Silence Call Rate%	0	NA	2.3	0
Number of MOS samples	2281	NA	3303	2603
Average MOS score	3.99	NA	4.15	3.75

3.2.1 Number of Cell ids latched during drive test 5G/4G/3G/2G-Automode)

Number of unique cell ids covered in Voice test				
Technology	Service Provider			
	AIRTEL	MTNL	RJIL	VIL
3G	NA	88	-	NA
2G	0	112	-	-
4G	1738	NA	710	459
5G	0	NA	691	187

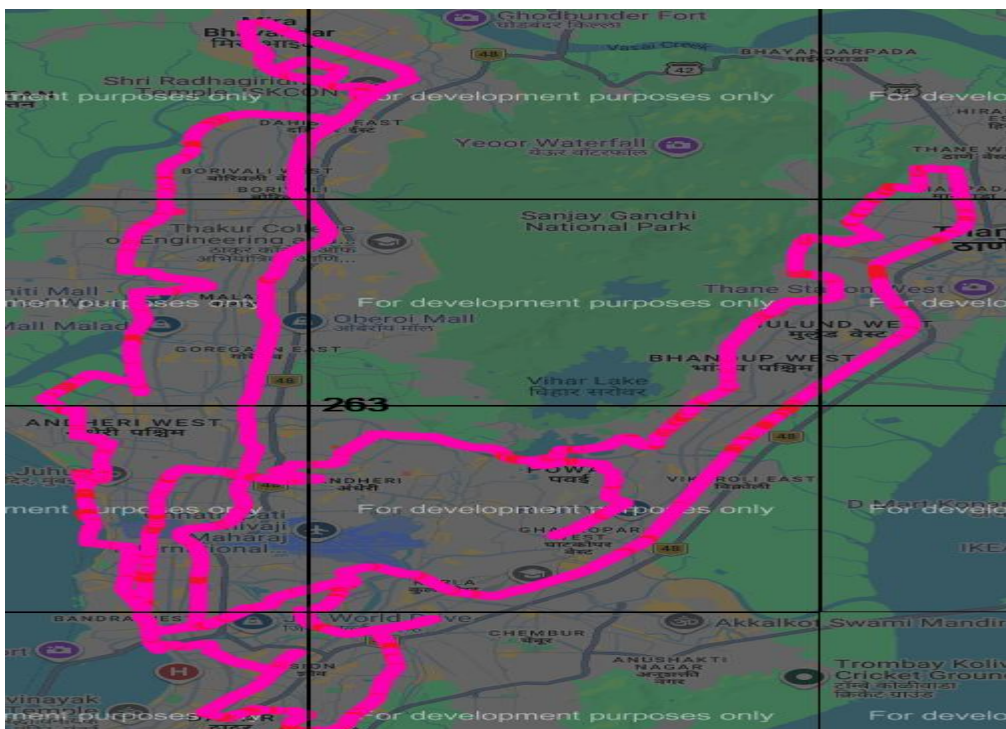
3.2.2 Signal Strength Map:(5G/4G/3G/2G-Automode)

Signal Strength Map	Map Legend- 2G- Pink (Rx Level ≥ -85 dBm), 3G- Sky blue (RSCP Level ≥ -90 dBm)	Red (Rx Level < -85 dBm) Dark Blue (RSCP Level < -90 dBm)
	Map Legend- 4G- Light Green (RSRP Level ≥ -110 dBm), 5G- Light Yellow (RSRP Level ≥ -110 dBm),	Dark Green (RSRP Level < -110 dBm) Dark Yellow (RSRP Level < -110 dBm)

Technology	Parameter	Range	Colour
2G	Rx Level	≥ -85 dBm	Pink
		< -85 dBm	Red
3G	RSCP	≥ -90 dBm	Sky blue
		< -90 dBm	Dark Blue
4G	RSRP	≥ -110 dBm	Light Green
		< -110 dBm	Dark Green
5G	RSRP	≥ -110 dBm	Light Yellow
		< -110 dBm	Dark Yellow

Signal Strength Map - Airtel :(5G/4G/3G/2G-Automode)

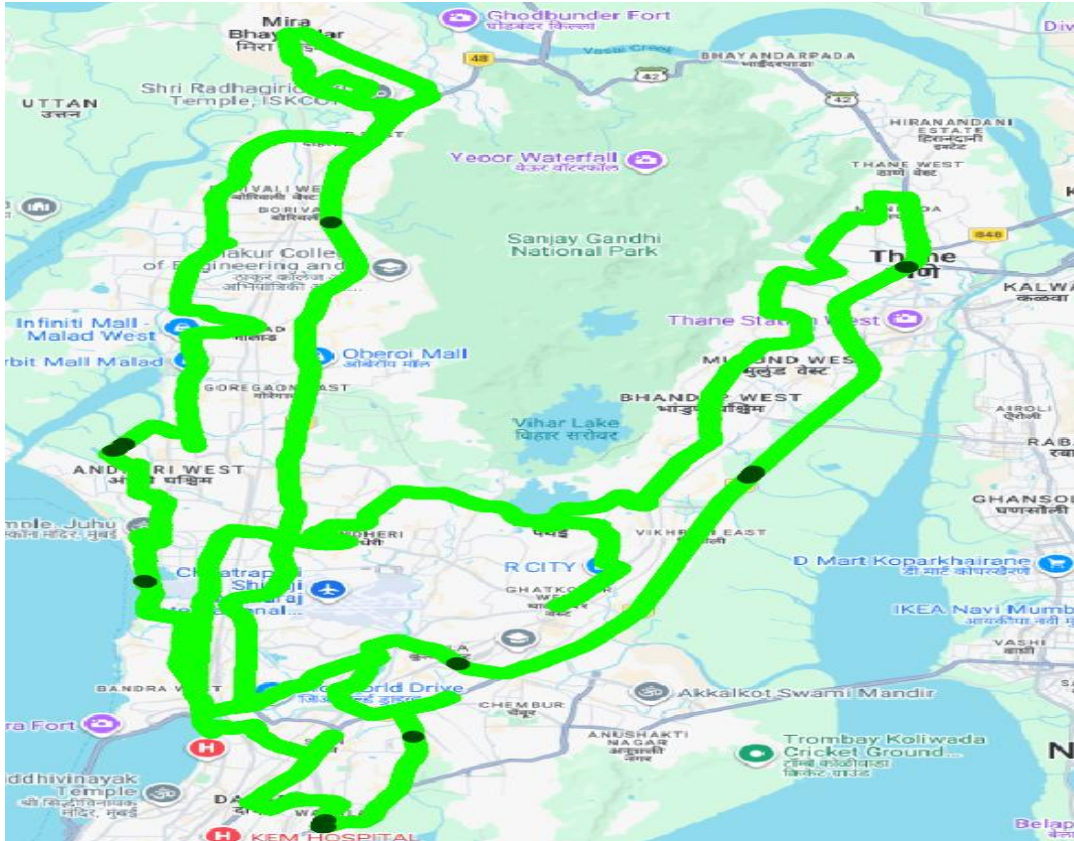
2G Rx Level:



Color	Range	Count	Per
Red	[-94 to -85]	(1830)	(8.45%)
Pink	[Min to -94]	(19827)	(91.55%)

Signal Strength Map - Airtel : (5G/4G/3G/2G-Automode)

4G RSRP:

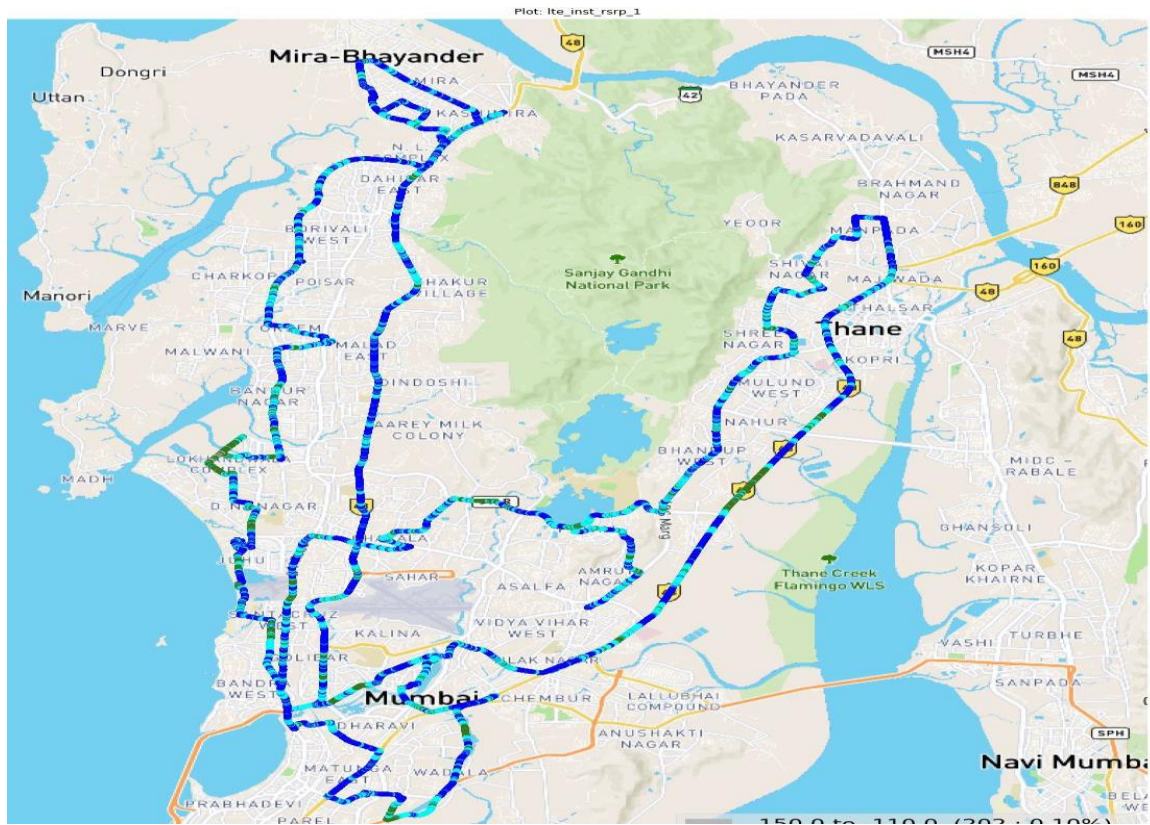


4G RSRP [29284]

- -140 - -110 [42]
- -110 - -0 [29242]

Signal Strength Map - MTNL : (5G/4G/3G/2G-Automode)

SignalStrength Map	MapLegend- 2G- Pink (RxLevel $\geq$ -85dBm), 3G- Skyblue (RSCPLLevel $\geq$ -90dBm)	Red (RxLevel $<$ -85dBm) DarkBlue (RSCPLLevel $<$ -90dBm)
	MapLegend- 4G- Light Green (RSRPLLevel $\geq$ -110 dBm), Light Yellow (RSRP Level $\geq$ -110 dBm),	DarkGreen (RSRPLLevel $<$ -110 dBm) 5G- DarkYellow (RSRPLLevel $<$ -110dBm)



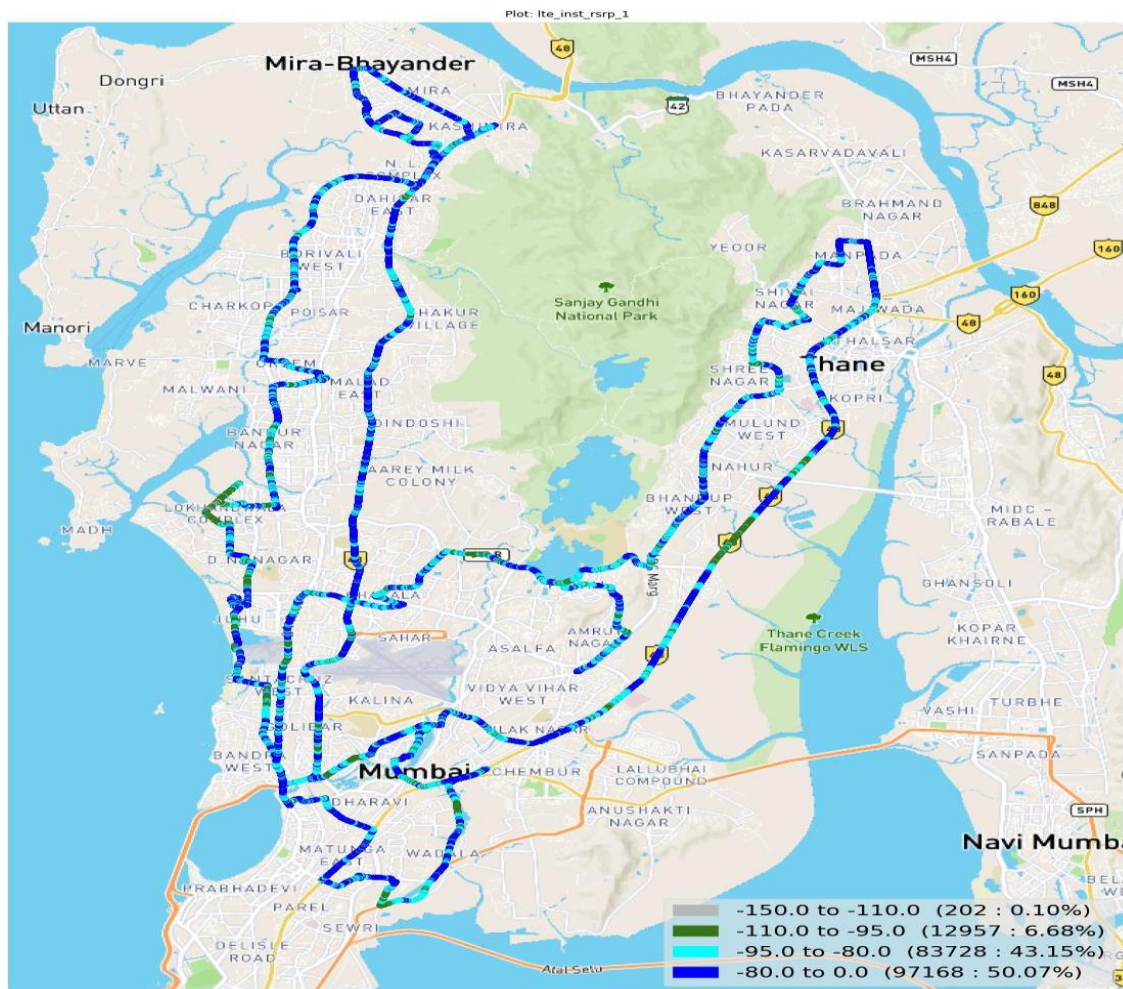
Signal Strength Map: JIO (5G/4G/3G/2G-Automode)

Signal Strength Map	Map Legend- 2G- Pink (Rx Level $\geq$ -85 dBm), 3G- Sky blue (RSCP Level $\geq$ -90 dBm)	Red (Rx Level $<$ -85 dBm) Dark Blue (RSCP Level $<$ -90 dBm)
	Map Legend- 4G- Light Green (RSRP Level $\geq$ -110 dBm), 5G- Light Yellow (RSRP Level $\geq$ -110 dBm),	Dark Green (RSRP Level $<$ -110 dBm) Dark Yellow (RSRP Level $<$ -110 dBm)



Signal Strength Map: VIL (5G/4G/3G/2G-Automode)

Signal Strength Map	Map Legend-
	2G- Pink (Rx Level ≥ -85 dBm), Red (Rx Level < -85 dBm)
	3G- Sky blue (RSCP Level ≥ -90 dBm), Dark Blue (RSCP Level < -90 dBm)
	Map Legend-
	4G- Light Green (RSRP Level ≥ -110 dBm), Dark Green (RSRP Level < -110 dBm)
	5G- Light Yellow (RSRP Level ≥ -110 dBm), Dark Yellow (RSRP Level < -110 dBm)



3.2.3 Signal Strength distribution:(5G/4G/3G/2G-Automode)

RxLevel-2G								
Overall Rx Level	No of Sample				Sample%			
	Airtel	MTNL	RJIL	VIL	Airtel	MTNL	RJIL	VIL
[Max,≥-65]	7132	9857	NA	NA	32.5	11.93	NA	NA
[-65,≥-75)	6555	11528	NA	NA	29.9	13.95	NA	NA
[-75,≥-85)	6384	14587	NA	NA	29.1	17.65	NA	NA
[-85, ≥Min)	1873	46635	NA	NA	8.5	56.45	NA	NA
Total	21944	82607	NA	NA	100	100	NA	NA
RxLevel-3G								
Overall RSCP	No of Sample				Sample%			
	Airtel	MTNL	RJIL	VIL	Airtel	MTNL	RJIL	VIL
[Max,≥-70]	NA	6589	NA	NA	NA	7.76	NA	NA
[-70,≥-80)	NA	8247	NA	NA	NA	9.72	NA	NA
[-80,≥-90)	NA	16857	NA	NA	NA	19.86	NA	NA
[-90, ≥Min)	NA	53146	NA	NA	NA	62.64	NA	NA
Total	NA	84839	NA	NA	NA	100	NA	NA
RxLevel-4G								
Overall RSRP	No of Sample				Sample%			
	Airtel	MTNL	RJIL	VIL	Airtel	MTNL	RJIL	VIL
[Max,≥-80]	10622	NA	4233	97168	48.51	NA	46.18%	50.07
[-80,≥-95]	10046	NA	3787	83728	45.88	NA	41.32%	43.15
[-95,≥-110]	1188	NA	1130	12957	5.43	NA	12.33%	6.68
[-110,≥Min]	41	NA	16	202	0.18	NA	0.17%	0.1
Total	21897	NA	9166	194055	100	NA	100.00%	100
RxLevel-5G								
Overall RSRP	No of Sample				Sample%			
	Airtel	MTNL	RJIL	VIL	Airtel	MTNL	RJIL	VIL
[Max,≥-80]	NA	NA	14520	2223	NA	NA	45.60%	51.99
[-80,≥-95]	NA	NA	15162	1647	NA	NA	47.62%	38.52
[-95,≥-110]	NA	NA	2060	395	NA	NA	6.47%	9.24
[-110,≥Min]	NA	NA	100	11	NA	NA	0.31%	0.25
Total	NA	NA	31842	4276	NA	NA	100.00%	100

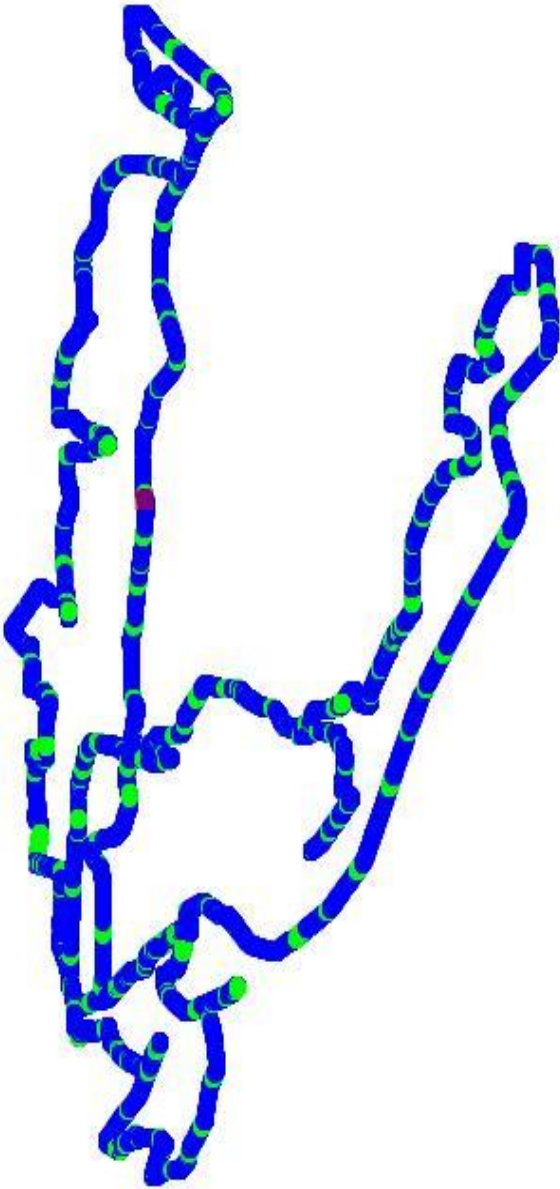
3.3 Data Service performance in 5G/4G/3G/2G(Automode)-Dynamic

QoS Parameters		AIRTEL	MTNL	RJIL	VIL
Download speed (M bits/s)	Average	81.22	10.25	147.74	47.44
	80thPercentile	120.46	32.25	330.76	69.99
	20thPercentile	35.28	28.25	0.58	22.15
Upload speed (M bits/s)	Average	27.51	2.1	28.59	24.29
	80thPercentile	41.23	25.36	57.62	34.96
	20thPercentile	14.38	36.47	1.88	5.91
Latency (ms)	Average		NA	-	28.23
	50thPercentile	11	NA	-	26.55
Jitter(ms)	Average	6.22	NA	-	8.687

3.4 Time Spent(Technology-wise) Airtel

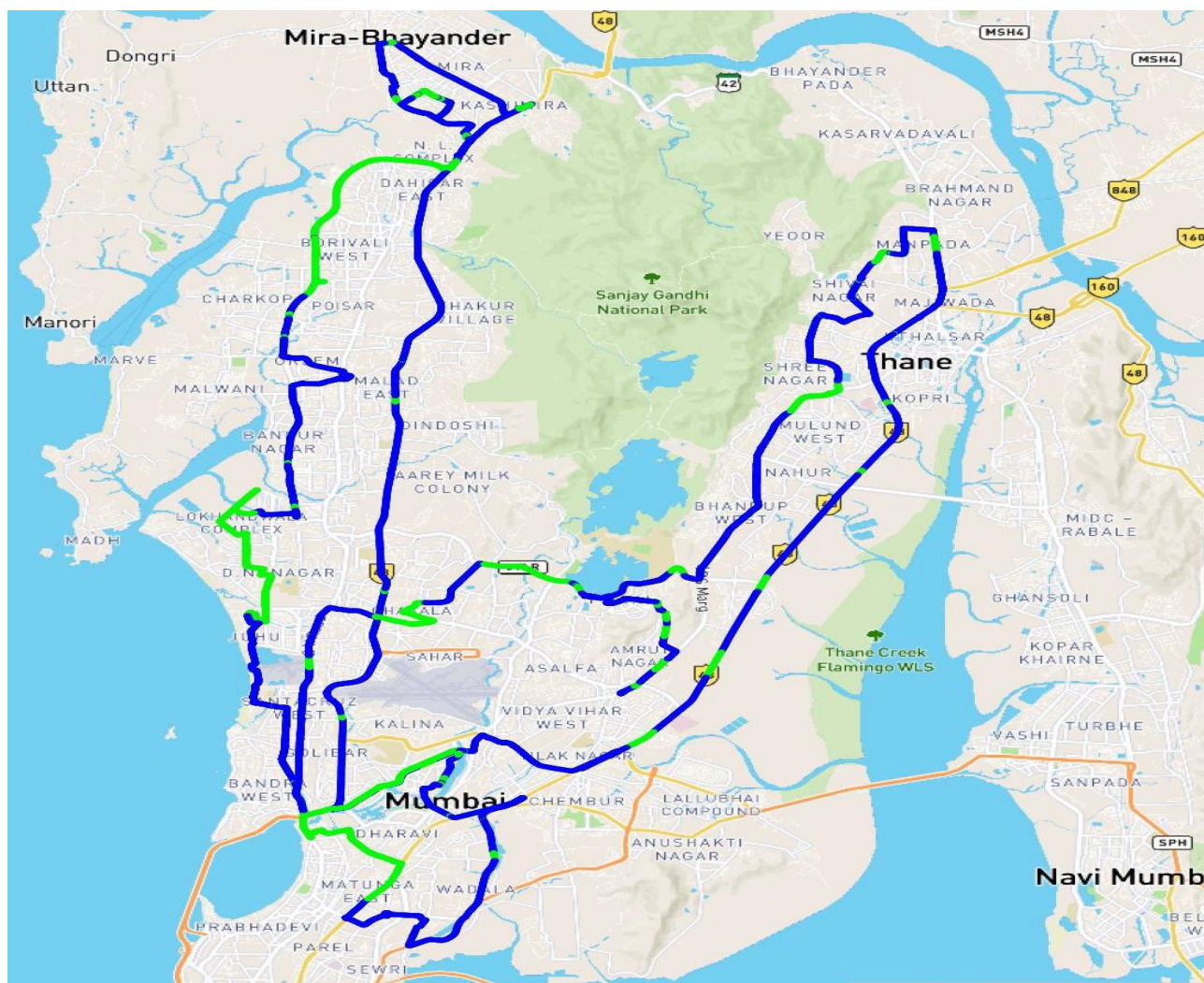
Time Spent Map (for each TSP)	Map Legend: 2G – Red 3G – Yellow 4G – Green 5G - Blue
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Technology-wise	
	4G
	5G



Time Spent(Technology-wise) MTNL

Time Spent Map (for each TSP)	Map Legend: 5G – Red 2G – Green 4G – Yellow 3G – Blue
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Time Spent(Technology-wise) JIO

Time Spent Map (RJIL)

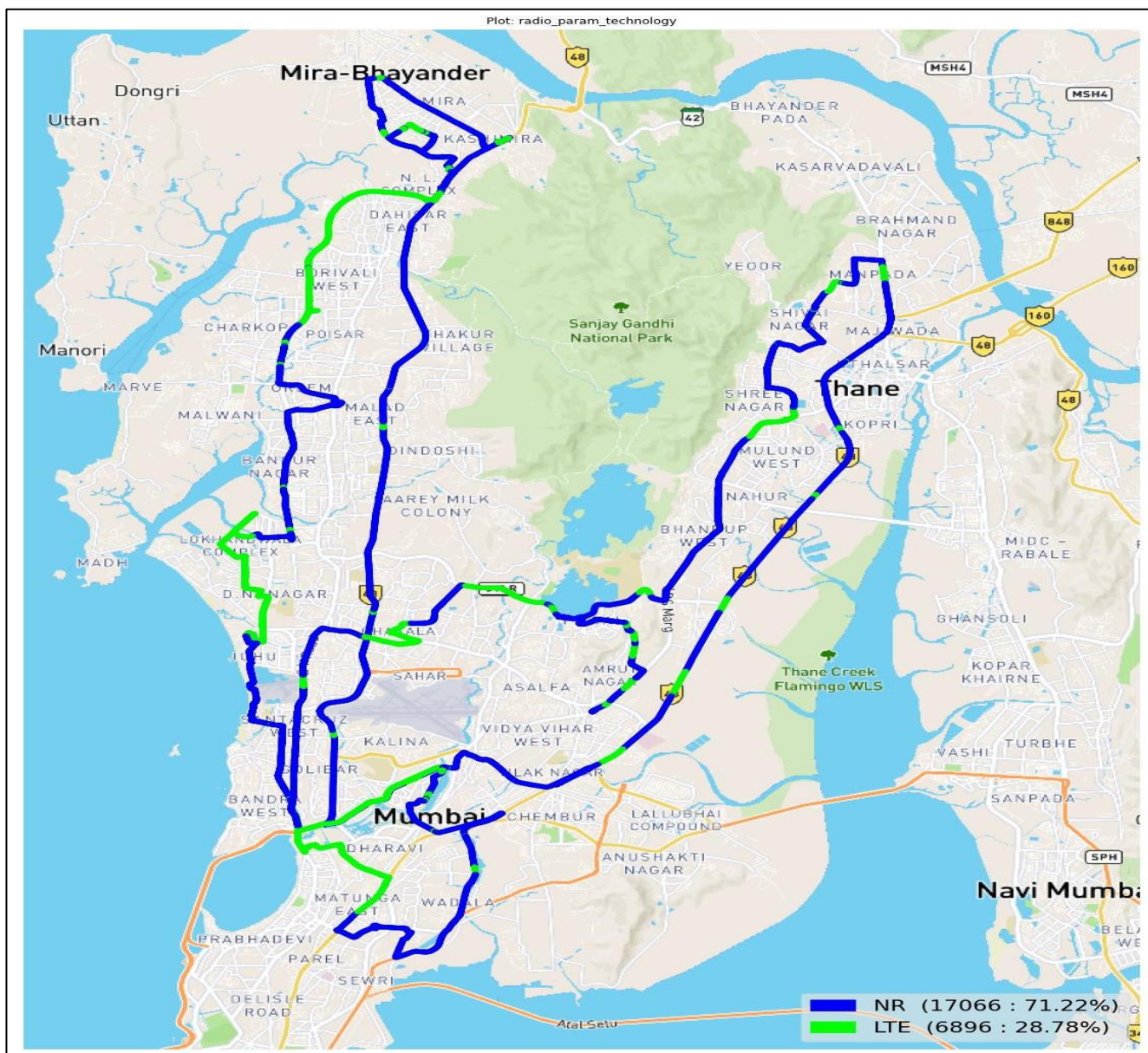
Map Legend:
4G – Green

5G - Blue



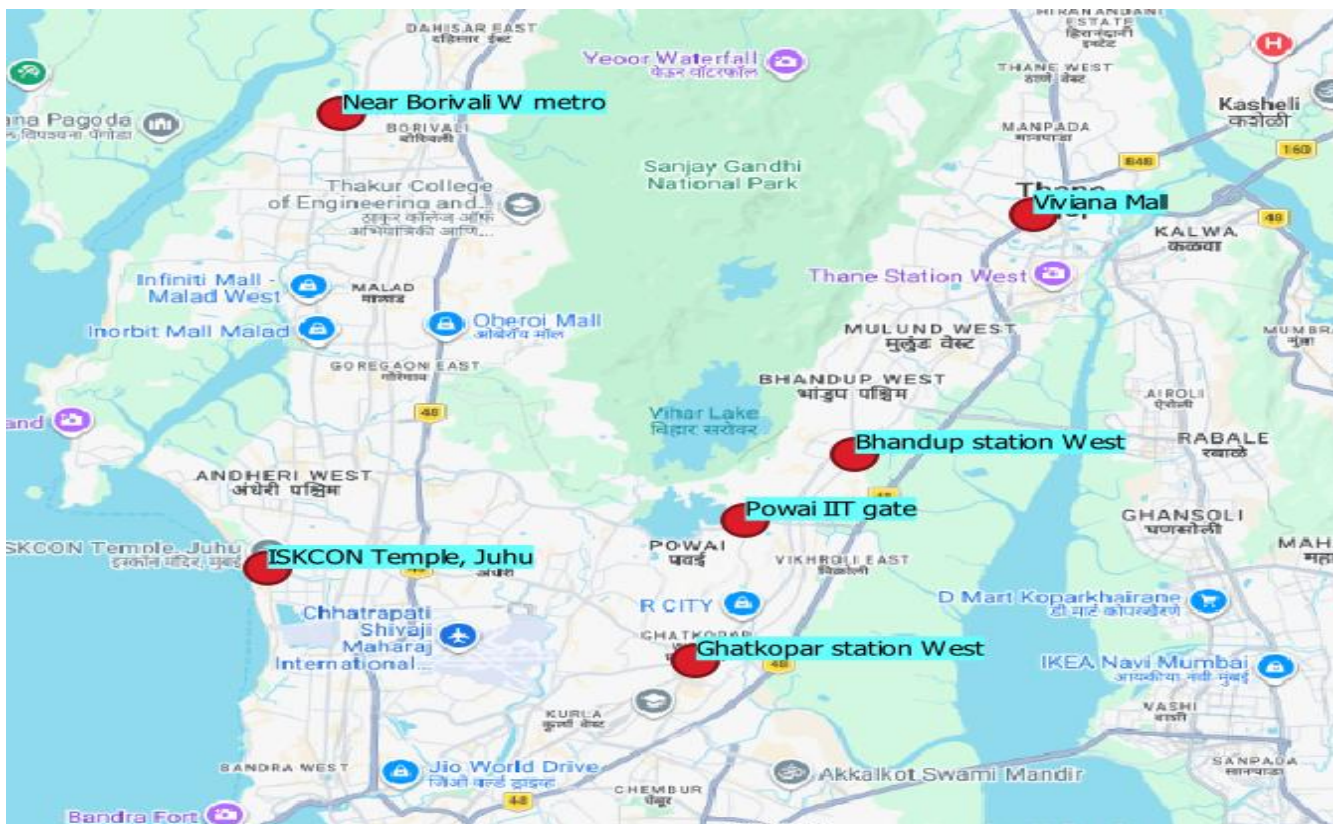
Time Spent(Technology-wise) VIL

Time Spent Map (for each TSP)	Map Legend:	
	2G – Red	3G – Yellow
	4G – Green	5G - Blue



QoS Performance Analysis-Static

4.1 Hotspot Locations



Date	Time	Hotspot Location	Latitude / Longitude
26/03/2026	2:00 PM	Near Borivali W metro	19.235785,72.840723
26/03/2026	5.30 PM	ISKCON Temple, Juhu	19.1132,72.82652
27/03/2026	1.30 PM	Bhandup station West	19.14419873,72.938225
27/03/2026	5.00 PM	Viviana Mall	19.2088197,72.972133
28/03/2026	10.38 AM	Ghatkopar station West	19.088521,72.908017
28/03/2026	01.11 PM	Powai IIT gate	19.1261865,72.917344

4.2 Voice Service Performance(5G/4G/3G/2G-Automode)–Overall

Parameters	Airtel	MTNL	RJIL	VIL
No of Call Attempts	60	60	60	60
No of Call Established	60	22	60	60
Call setup success rate(CSSR)%	100	36.66	100	100
No. of Drop Call	0	5	0	0
Drop Call Rate%	0	15.62	0	0
Call Setup Time Average(.)	1.25	3.4	0.98	0.28

4.3 Data Service Performance(5G/4G/3G/2G-Automode)–Overall

QoS Parameters		AIRTEL	MTNL	RJIL	VIL
Download speed(M bits/s)	Typical	123.72	11.52	-	26.69
	Average	157.98	5.78	89.4	59
	80thPercentile	206.37	22.36	75.37	80.24
Download Session Setup Success Rate%		100	55.88	100	100
Upload speed (M bits/s)	Typical	26.28	2.58	-	11.39
	Average	34.75	1.12	20.97	23.04
	80thPercentile	42.95	25.96	12.78	31.19
Upload Session Setup Success Rate%		100	48.47	100	100
Latency(in ms)	50thPercentile	11.43	56.34	35	28.13
Jitter(in ms)	Average	7.3	21.85	14.69	5.44
Packet Drop Rate%		0.02	22.58	0.14	0.47
Web browsing delay(in)		6.74	NA	2.37	2.05
Video Streaming performance for video		0.82	NA	0.38	0.85

4.4 Voice Service Performance (5G/4G/3G/2G-Automode) at Borivali West.

Name of Hotspot Location 1	Borivali West			
Parameters	Airtel	MTNL	RJIL	VIL
No of Call Attempts	10	10	10	10
No of Call Established	10	3	10	10
Call setup success rate(CSSR)%	100	30	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate%	0	0	0	0
Call Setup Time Average(.)	1.34	2.5	0.98	0.27
Total no of RLT Occurrence	-	-	-	-
No of RLT>48	-	-	-	-

Data Service Performance (5G/4G/3G/2G-auto mode) at Borivali West.

Name of Hotspot Location 1		Borivali West			
QoS Parameters		AIRTEL	MTNL	RJIL	VIL
Download speed(M bits/s)	Typical	48	13.52		19.74
	Average	86.22	6.25	78.29	42.74
	80thPercentile	157.04	2.25	64.23	58.55
Download Session Setup Success Rate%		100	45.25	100	100
Upload speed (M bits/s)	Typical	25.56	2.4		11.39
	Average	35.52	1.1	19.71	23.91
	80thPercentile	44.32	12.25	52.37	32.58
Upload Session Setup Success Rate%		100	56.25	100	100
Latency(in ms)	50thPercentile	11.5	NA	34	28.49
Jitter(in ms)	Average	6.16	NA	5.79	6.67
Packet Drop Rate%		0	27.25	0.4	0.2
Web browsing delay(in)		4.6	9	3.38	2.33
Video Streaming performance for video		0.62	NA	0.36	1.06

Voice Service Performance (5G/4G/3G/2G-Automode) at ISKON JUHU

Name of Hotspot Location 2	ISKON JUHU			
Parameters	Airtel	MTNL	RJIL	VIL
No of Call Attempts	10	10	10	10
No of Call Established	10	6	10	10
Call setup success rate(CSSR)%	100%	60	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate%	0%	0	0	0
Call Setup Time Average(sec.)	1.19	3.2	0.96	0.27
Total no of RLT Occurrence	-	-	-	-
No of RLT>48	-	-	-	-

Data Service Performance (5G/4G/3G/2G-auto mode) at ISKON JUHU

Name of Hotspot Location 2		ISKON JUHU			
QoS Parameters		AIRTEL	MTNL	RJIL	VIL
Download speed(M bits/s)	Typical	162.78	12.36		62.62
	Average	226.34	5.64	179.8	81.11
	80thPercentile	309.7	22.26	545.96	89.22
Download Session Setup Success Rate%		100	55.48	100	100
Upload speed (M bits/s)	Typical	41.94	2.58		8.91
	Average	56.26	0.57	30.66	25.67
	80thPercentile	68.36	32.25	114.13	35.6
Upload Session Setup Success Rate%		100	41.68	100	100
Latency(in ms)	50thPercentile	10.8	NA	32	39.55
Jitter(in ms)	Average	8.16	NA	6.03	7.12
Packet Drop Rate%		0	35.68	0	0
Web browsing delay(in)		7.4	NA	2.79	1.82
Video Streaming performance for video		0.78	NA	0.34	0.81

Voice Service Performance (5G/4G/3G/2G-Automode) at Bhandup Station

Name of Hotspot Location 3	Bhandup Station			
Parameters	Airtel	MTNL	RJIL	VIL
No of Call Attempts	10	10	10	10
No of Call Established	10	2	10	10
Call setup success rate(CSSR)%	100	20	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate%	0%	0	0%	0
Call Setup Time Average(.)	1.28	2.5	0.92	0.28
Total no of RLT Occurrence	-	-	-	-
No of RLT>48	-	-	-	-

Data Service Performance (5G/4G/3G/2G-auto mode) at Bhandup Station

Name of Hotspot Location 3		Bhandup Station			
QoS Parameters		AIRTEL	MTNL	RJIL	VIL
Download speed(M bits/s)	Typical	217.32	10.25		55.21
	Average	262.52	4.25	42.54	78.08
	80thPercentile	341.46	25.46	96.9	90.01
Download Session Setup Success Rate%		100	40.12	100	100
Upload speed (Mbits/s)	Typical	39.17	1.52		16.84
	Average	44.47	0.8	3.46	27.35
	80thPercentile	50.048	25.36	5.81	33.98
Upload Session Setup Success Rate%		100	39.25	100	100
Latency(in ms)	50thPercentile	9.8	NA	33	19.7
Jitter(in ms)	Average	6.16	NA	6.31	2.99
Packet Drop Rate%		0	31.25	0.2	0
Web browsing delay(in)		5.6	NA	1.26	2.81
Video Streaming performance for video		0.82	NA	0.32	0.7

Voice Service Performance (5G/4G/3G/2G-Automode) at Vivian Mall

Name of Hotspot Location 4	Vivian Mall			
Parameters	Airtel	MTNL	RJIL	VIL
No of Call Attempts	10	10	10	10
No of Call Established	10	7	10	10
Call setup success rate(CSSR)%	100%	70	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate%	0%	0	0	0
Call Setup Time Average(.)	1.29	2.8	0.99	0.29
Total no of RLT Occurrence	-	-	-	-
No of RLT>48	-	-	-	-

Data Service Performance (5G/4G/3G/2G-auto mode) at Vivian Mall

Name of Hotspot Location 4		Vivian Mall			
QoS Parameters		AIRTEL	MTNL	RJIL	VIL
Download speed(M bits/s)	Typical	9.95	8.56		21.09
	Average	21.65	3.5	15.93	40.84
	80thPercentile	33.54	25.36	21.103	53.63
Download Session Setup Success Rate%		100	32.54	100	100
Upload speed (Mbits/s)	Typical	2.074	1.8		6.46
	Average	9.01	0.65	3.93	15.42
	80thPercentile	15.47	35.69	11.41	18.83
Upload Session Setup Success Rate%		100	54.68	100	100
Latency(in ms)	50thPercentile	10.2	NA	62	30.31
Jitter(in ms)	Average	7.12	NA	21.57	8.73
Packet Drop Rate%		0.1	NA	0	0
Web browsing delay(in)		7.15	NA	1.807	1.7
Video Streaming performance for video		0.95	NA	0.48	0.95

Voice Service Performance (5G/4G/3G/2G-Automode) at Ghatkopar Station.

Name of Hotspot Location 5	Ghatkopar Station			
Parameters	Airtel	MTNL	RJIL	VIL
No of Call Attempts	10	10	10	10
No of Call Established	10	4	10	10
Call setup success rate(CSSR)%	100	40	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate%	0	0	0	0
Call Setup Time Average(.)	1.24	2.2	1	0.28
Total no of RLT Occurrence	-	-	-	-
No of RLT>48	-	-	-	-

Data Service Performance (5G/4G/3G/2G-auto mode) at Ghatkopar Station

Name of Hotspot Location 5		Ghatkopar Station			
QoS Parameters		AIRTEL	MTNL	RJIL	VIL
Download speed(M bits/s)	Typical	250.79	12.68		20.06
	Average	282.9	5.26	107.73	41.63
	80thPercentile	314.1	58.35	339.29	55.44
Download Session Setup Success Rate%		100	45.28	100	100
Upload speed (M bits/s)	Typical	38.29	2.15		12.36
	Average	47.74	0.85	33.18	21.85
	80thPercentile	58.634	32.56	105.22	28.74
Upload Session Setup Success Rate%		100	54.85	100	100
Latency(in ms)	50thPercentile	11.77	NA	32	39.96
Jitter(in ms)	Average	7.02	NA	4.53	20.2
Packet Drop Rate%		0	45.35	0	2.5
Web browsing delay(in)		6.8	NA	1.76	1.85
Video Streaming performance for video		0.79	NA	0.39	0.72

Voice Service Performance (5G/4G/3G/2G-Automode) at IIT Powai.

Name of Hotspot Location 6	IIT Powai			
Parameters	Airtel	MTNL	RJIL	VIL
No of Call Attempts	10	10	10	10
No of Call Established	10	0	10	10
Call setup success rate(CSSR)%	100	0	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate%	0	0	0	0
Call Setup Time Average(.)	1.18	0	0.99	0.29
Total no of RLT Occurrence	-	-	-	-
No of RLT>48	-	-	-	-

Data Service Performance (5G/4G/3G/2G-auto mode) at IIT Powai.

Name of Hotspot Location 6		IIT Powai			
QoS Parameters		AIRTEL	MTNL	RJIL	VIL
Download speed(M bits/s)	Typical	53.46	NA		42.41
	Average	68.26	NA	118.99	66.14
	80thPercentile	82.37	NA	385.83	80
Download Session Setup Success Rate%		100	NA	100	100
Upload speed (Mbits/s)	Typical	10.66	NA		11.9
	Average	15.52	NA	39.37	23.56
	80thPercentile	20.88	NA	123.88	30.19
Upload Session Setup Success Rate%		100	NA	100	100
Latency(In ms)	50thPercentile	14.5	NA	62.5	19.12
Jitter(in ms)	Average	9.16	NA	22.77	3.92
Packet Drop Rate%		0	NA	0	0.1
Web browsing delay(in)		8.89	NA	2.05	1.72
Video Streaming performance for video		0.94	NA	0.39	0.8

4.3 Signal Strength distribution at Static location–Overall

RxLevel-2G								
Overall Rx Level	No of Sample				Sample%			
	Airtel	MTNL	RJIL	VIL	Airtel	MTNL	RJIL	VIL
[Max,≥-65]	NA	9857	NA	NA	NA	11.93	NA	NA
[-65,≥-75)	NA	11528	NA	NA	NA	13.95	NA	NA
[-75,≥-85)	NA	14587	NA	NA	NA	17.65	NA	NA
[-85, ≥Min)	NA	46635	NA	NA	NA	56.45	NA	NA
Total	NA	82607	NA	NA	NA	100	NA	NA

RxLevel-3G								
Overall RSCP	No of Sample				Sample%			
	Airtel	MTNL	RJIL	VIL	Airtel	MTNL	RJIL	VIL
[Max,≥-70]	NA	6589	NA	NA	NA	7.76	NA	NA
[-70,≥-80)	NA	8247	NA	NA	NA	9.72	NA	NA
[-80,≥-90)	NA	16857	NA	NA	NA	19.86	NA	NA
[-90, ≥Min)	NA	53146	NA	NA	NA	62.64	NA	NA
Total	NA	84839	NA	NA	NA	100	NA	NA

RxLevel-4G								
Overall RSRP	No of Sample				Sample%			
	Airtel	MTNL	RJIL	VIL	Airtel	MTNL	RJIL	VIL
[Max,≥-80]	3746	NA	204	21364	81.03	NA	100	72.46
[-80,≥-95]	877	NA		8091	18.97	NA		27.44
[-95,≥-110]	0	NA		28	0	NA		0.09
[-110,≥Min]	0	NA		0	0	NA		0
Total	4623	NA		29483	100	NA		100

RxLevel-5G								
Overall RSRP	No of Sample				Sample%			
	Airtel	MTNL	RJIL	VIL	Airtel	MTNL	RJIL	VIL
[Max,≥-80]	NA	NA	10816	768	NA	NA	54.73%	76.8
[-80,≥-95]	NA	NA	7033	198	NA	NA	35.59%	19.8
[-95,≥-110]	NA	NA	1910	34	NA	NA	9.67%	3.4
[-110,≥Min]	NA	NA	2	0	NA	NA	0.01%	0
Total	NA	NA	19761	1000	NA	NA	100.00%	100



5 Improvement plan for short coming observed during Drive Test

6 Compliance Report for short comings observed during Drive Test Airtel



Drive Test Methodology adopted during the Drive test:

(1) VoiceTests:

Sl.No.	QoS Parameter	Measurement Criteria and methodology
1	Call setup time	Time taken from call initiate to call alerting/ringing.
2	Call setup success rate	CSSR=(Total Call Established/Total Call Attempt)*100 Call Setup attempt time: 30 sec. Call duration(City/Highway):90/180sec. Wait/ Guard Time: 15sec.
3	Dropped Call rate(DCR)	Call Drop Rate=(Total Call Drop/Total Call Established)*100
4	Call Silence Rate (Muting)	Silence call rate=(count of silence/Total calls established)*100 Continuous RTP gap ≥ 2 sec
5	Handover Success Rate	Handover Success Rate = Count of successful handovers (All Technology Handover combined) / Total count of Handover Attempt (All Technology Handover combined) *100 Handover types which are considered- 2G Inter & Intra cell, 3G Soft & IRAT, 4G Inter & Intra frequency & SRVCC, 5G Inter & Intra frequency & 5G to 4G handovers.
6	Packet Drop Rate(DL& UL)for Packet Switched Network (4G & 5G)	Number of RTP (Real-time Transport Protocol) Packets lost divided by total RTP packet received (against each source SSRC and sequence number) at call originating handset. This KPI will be calculated from MOS call for packet call only (VoNR/VoLTE)
7	Mean Opinion Score (MOS) Performance(in5G/4G/3G/2G:Auto mode)	Voice quality in mobile networks is measured with algorithms based on ITU-T P.863 (POLQA) Excellent: MOS ≥ 4 and < 5 , Good :MOS ≥ 3 and < 4 , Fair: MOS ≥ 2 and < 3 ,Poor :MOS ≥ 1 and < 2

(2) Data Tests:

Sl. No.	QoS Parameter	Measurement Criteria and methodology
1	Data speed in M bits/s (DL/UL both)	DownloadSpeed=Totalbytes transferred during download/Total time for transfer Speed = Total bytes transferred during upload / Total time for transfer. Download: File Size: 500 MB for 120 sec, 30 Sec Timeout Upload: File size: 250 MB for 120 sec, 30 Sec Timeout (Multithread3-TCPConnection at a time for both DL&UL)
2	Latency(in ms)	Latency is the time taken by a packet to reach the receiving endpoint after being transmitted from the sending point in broadband service. Test with Packet of size of 512 Bytes - 1000 count on TSP's Test server using UDP packets (TWAMP)
3	Jitter(in ms)	Test with Packet of size of 512/256 Bytes - 1000 count on TSP's own Test server using UDP (TWAMP) & RTP packets separately
4	Session Setup Success Rate(in %)(DL/UL)	(Total DL or UL session established (successfully connected to server)/ Total DL or UL session attempt) x100
5	Packet drop rate (in %)	No. of packets lost out of total packet transferred during the testing. - Packet loss rate=(Total packet lost/Total packet sent)x100 - Packet delay(RTT)>90ms considered as packet loss and included in Packet drop rate. - The measurements should include all major types of packets i.e., TCP, UDP and RTP in their representative ratio. The 90th percentile value of the packet drop measurements shall be considered the Packet drop rate.
6	Web browsing delay(in seconds)	Time taken to open the web pages successfully is considered as web browsing delay/ web page download time. LSA-wise 3 popular websites to be taken
7	Video Streaming performance (in seconds)	TRAI Prescribed Video of 20 Sec with 25 sec Timeout & without caching https://www.youtube.com/watch?v=rH2RjvI0DFs