

TELECOM REGULATORY AUTHORITY OF INDIA

**Report on
Operator Assisted Drive Test (OADT)**

DIMA HASAO DISTRICT

ASSAM LSA

MARCH-2026

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1. Overview

The Operator Assisted Drive Test carried out in Dima Hasao District and nearby areas from 11.03.2026 to 12.03.2026 & 9:00 AM to 7:00 PM. The drive test covered drive route of around 337 KMs in 02 days and 4 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	900
2	Bharti Airtel Ltd.	4G	900,1800,2100,2300
3	Bharti Airtel Ltd.	5G	3500
4	BSNL/MTNL	2G	900
5	BSNL/MTNL	3G	2100
6	BSNL/MTNL	4G	700,2100,2500
7	Reliance JIO Infocomm Ltd.	4G	2300,1800&850Mhz
8	Reliance JIO Infocomm Ltd.	5G	3500 & 700Mhz
9	Vodafone Idea Ltd.	2G	900/1800
10	Vodafone Idea Ltd.	3G	---
11	Vodafone Idea Ltd.	4G	900/1800/2100/2500

1.2 Quality of Service parameters measured:

(1) 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

Drive Test Methodology adopted during the Drive test is attached as **Annexure-I**.

2. Executive Summary

This report covers the findings of the OADT undertaken in Assam License Service Area (LSA) from 11.03.2026 to 12.03.2026 under the supervision of TRAI Regional Office (RO), Kolkata Details of route/ area covered during the IDT is as given below:

2.1 Route Map of Drive test & Hotspot locations:



2.2 Drive Test Area detail

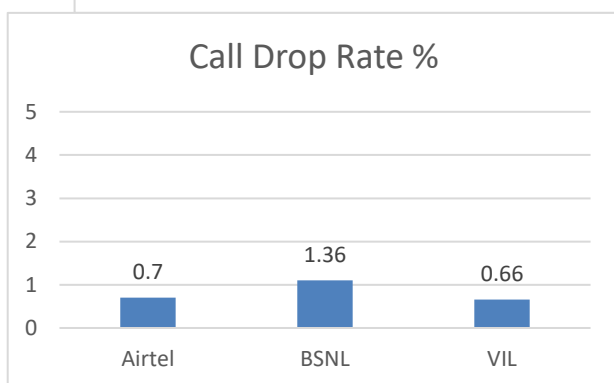
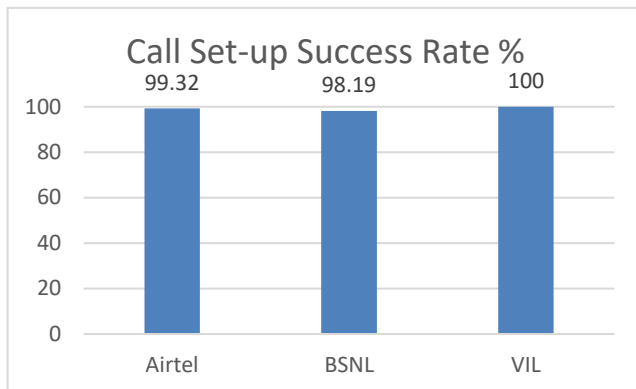
Date	Duration AM to PM	Drive test route	Distance covered (in Kms)
11.03.2026	09:00 AM TO 07:00 PM	Half long Govt College – U lakhon (Bridge)Jatinga – Jungle Basti – Kunapara – Kalachand – Mupa – Langting – Lumding – Lanka Rly Station	149
12.03.2026	09:00 AM TO 07:00 PM	Lanka – Forest Bazar – Haflong Tinali – Panimur -29 Kilo – 16 Kilo – New Sangbar – Dihangi – Gunjung – Lower Haflong – Haflong Bazar	188

Date	Time	Hotspot Location	Latitude / Longitude
11.03.2026	08:45 hrs. to 09:15hrs.	Half Long Govt.School	25.17261°, 93.01718°
11.03.2026	17:00 hrs. to 18:00 hrs.	Lanka Rly.Stn.	25.9155°, 92.95785°
12.03.2026	09:00 hrs. to 10:00 hrs.	Lankeshwari Hospital	25.9278°, 92.9528°
12.03.2026	18:00 hrs. to 19:00hrs.	Muolhoi Gallery	25.1762°, 93.0162°

2.3 Details of Drive Test Tools used: Airtel- TEMS Investigation 27.1, BSNL- Azenqos, RJIO- XCAL and VIL- TEMS Investigation 26.2.2

2.4 Key findings (Voice & Data)

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

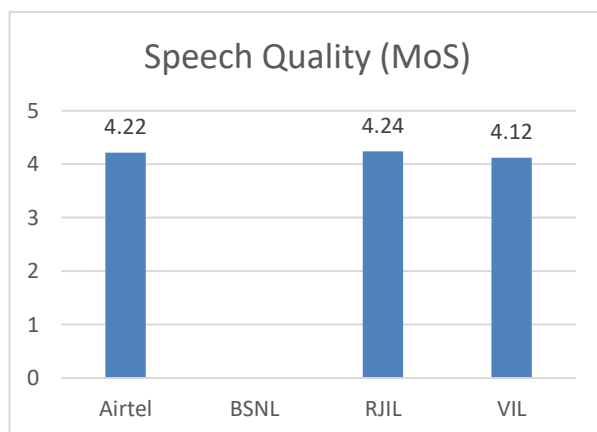
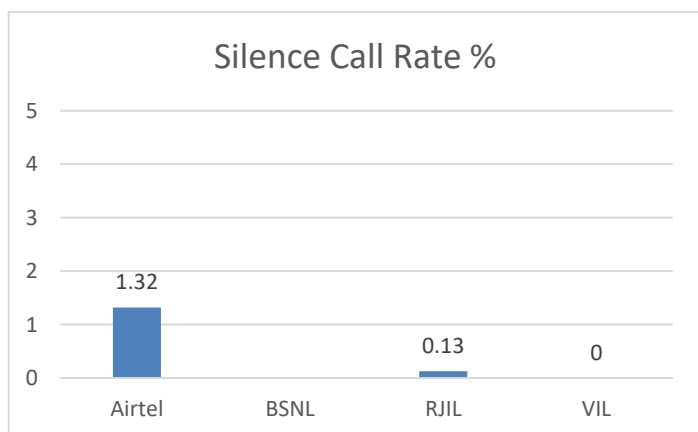
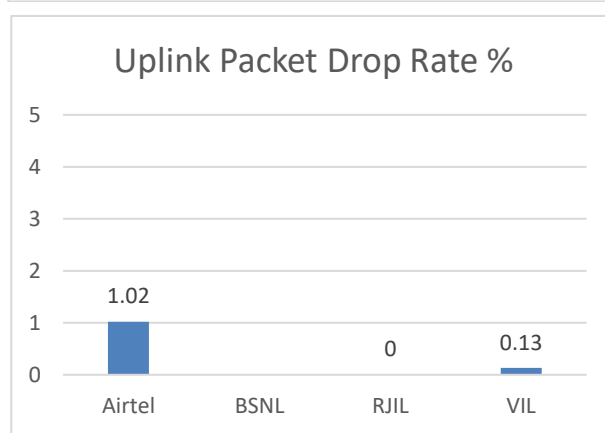
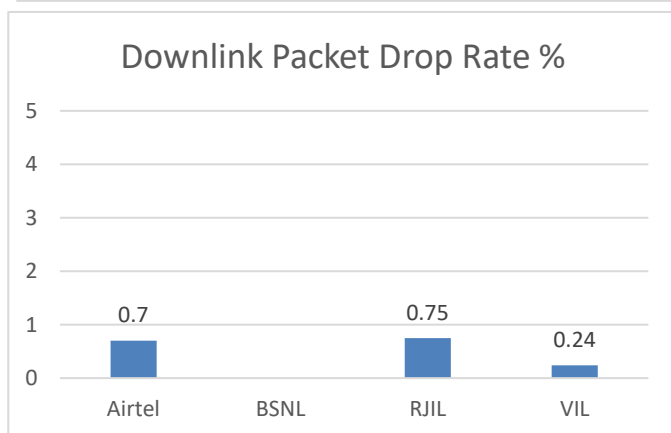
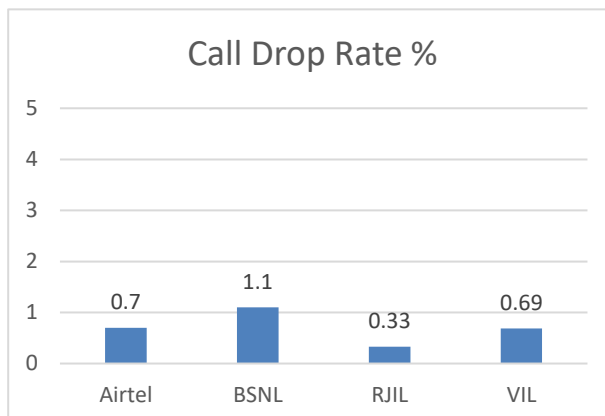
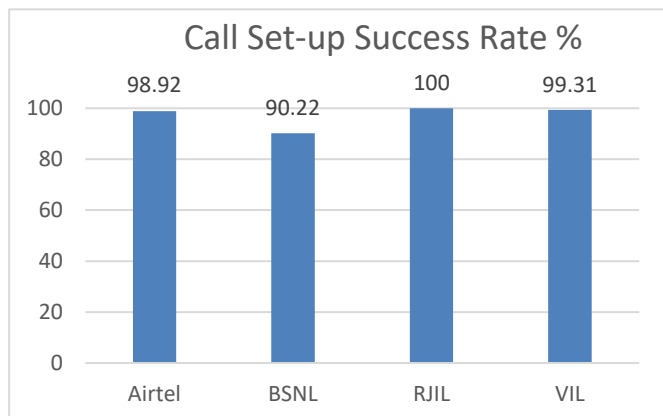


Parameter	Benchmark	AIRTEL	BSNL/MTNL	VIL
Call Attempts		298	265	152
Call Setup Success Rate (in %)	>= 98%	99.32%	98.19	100
Drop Call Rate (in %)	<= 2%	0.7%	1.36	0.66
Call Setup Time-Average (in Seconds)		3.29	5.10	3.33
Handover Success Rate (in %)	>= 95%	98.25%	92.80	100

2.4.2. Number of Cell ids latched during drive test

Technology	AIRTEL	BSNL/MTNL	VIL
3G	NA	30	NA
2G	277	43	111

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



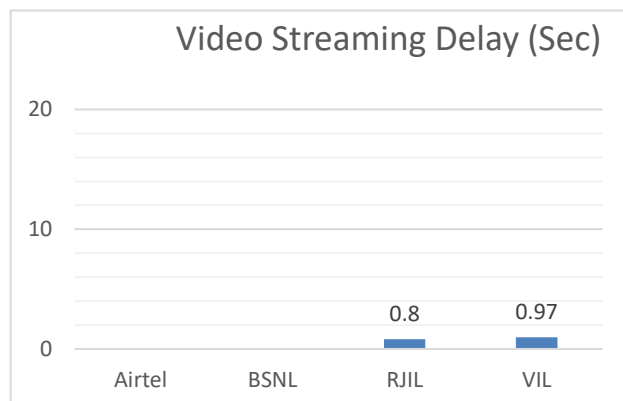
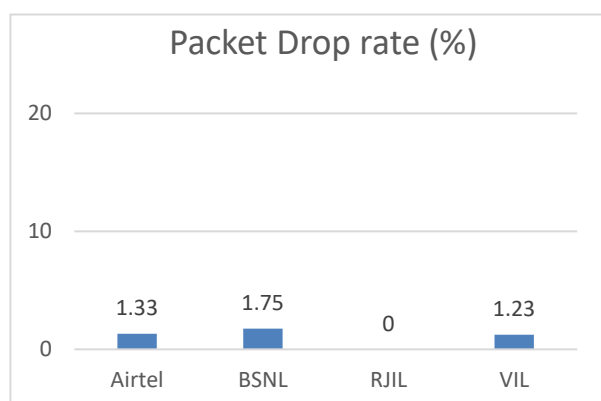
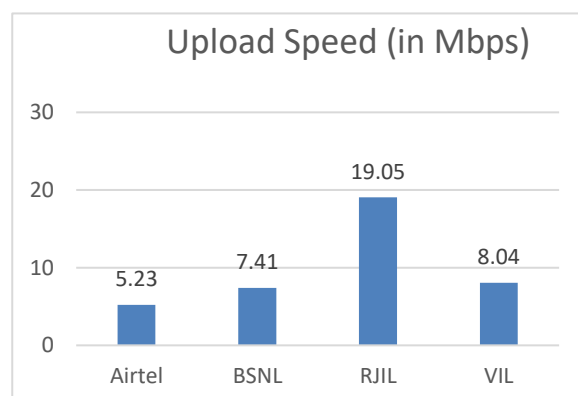
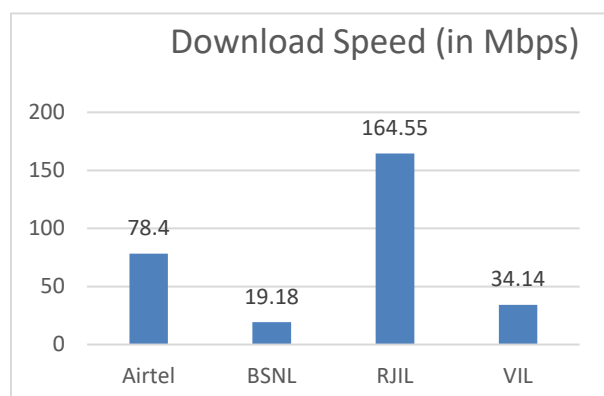
Parameter	AIRTEL	BSNL	RJIL	VIL
Call Attempts	279	290	301	145
Call Setup Success Rate %	98.92%	90.22	100.00	99.31
Drop Call Rate%	0.7%	1.1	0.33	0.69
Call Setup Time-Average (Second)	1.4	2.10	1.85	1.32
Handover Success Rate %	99.8%	97.55	98.14	100
Downlink Packet drop rate %	0.7	**	0.75	0.24
Uplink Packet drop rate %	1.02	**	0.00	0.13
Silence Call Rate %*	1.32	**	0.13	0
Speech Quality (Average MOS)	4.22	**	4.24	4.12

****Due to the non-availability of the MOS test tool with BSNL, the MOS test could not be carried out by BSNL**

2.4.4 Number of Cell ids latched during drive test

Technology	AIRTEL	BSNL/MTNL	RJIL	VIL
5G	18		125	NA
4G	588	215	500	22
3G		17	NA	NA
2G	0	22	NA	102

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



QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Typical	6.79	13.90	NA	17.53
	Average	78.4	19.18	164.55	34.14
	80th Percentile	135	36.90	364.75	43.77
Download Session Setup Success Rate %		94.7	99.50	100	96.77
Upload speed (Mbps/s)	Typical	0.6	9.85	NA	7.80
	Average	5.23	7.41	19.05	8.04
	80th Percentile	4.2	17.45	30.29	8.18
Upload Session Setup Success Rate		91.3	96.80	100	86.84

%					
Latency (in ms)	50th Percentile	27	60	22.97	48
Jitter (in ms)	Average	11.2	13	18.68	3.59
Packet Drop Rate %		1.33	1.75	0.00	1.23
Web browsing delay (in sec)		***	2.1	1.54	2.91
Video Streaming performance for video		***	***	0.80	0.97

*** Data not provided

2.4.6 TSP-wise Key Findings:

AIRTEL-

Voice

- 99.32% call setup success rate and 0.7% call drop rate have been observed in (3G/2G) lock mode.
- 98.92% call setup success rate and 0.7% drop call rate have been observed in (5G/4G/3G/2G) auto selection mode.

Data

- 78.4 Mbps average download speed & 5.23 Mbps average upload speed across the measured routes for city drive test in (5G/4G/3G/2G) auto selection mode

BSNL-

Voice

- 98.19% call setup success rate and 1.36% drop call rate have been observed in (3G/2G) lock mode.
- 90.22% call setup success rate and 1.1% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G).

Data

- 19.18 Mbps average download speed & 7.41 Mbps average upload speed across the measured routes for city drive test in (5G/4G/3G/2G) auto selection mode.

RJIO-

Voice-

- 100% call setup success rate and 0.33% drop call rate have been observed in (5G/4G/3G/2G) auto selection mode.

Data-

- 164.55 Mbps average download speed & 19.05 Mbps average upload speed across the measured routes for city drive test in (5G/4G/3G/2G) auto selection mode.

VIL

Voice

- 100% call setup success rate and 0.66% call drop rate have been observed in (3G/2G) lock mode.
- 99.31% call setup success rate and 0.69% drop call rate have been observed in (5G/4G/3G/2G) auto selection mode.

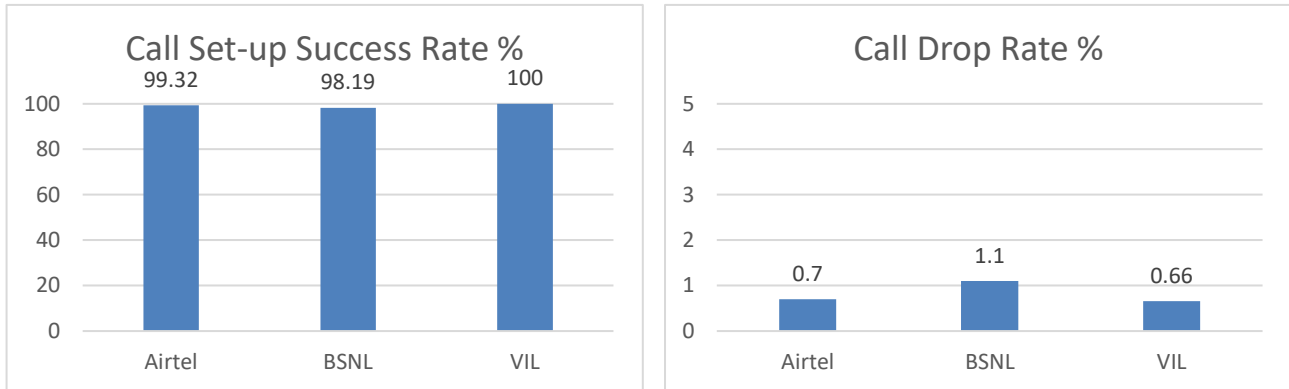
Data

- 34.14 Mbps average download speed & 8.04 Mbps average upload speed across the measured routes for city drive test in (5G/4G/3G/2G) auto selection mode.

Detailed QoS Performance Analysis

3 QoS Performance Analysis - Dynamic

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



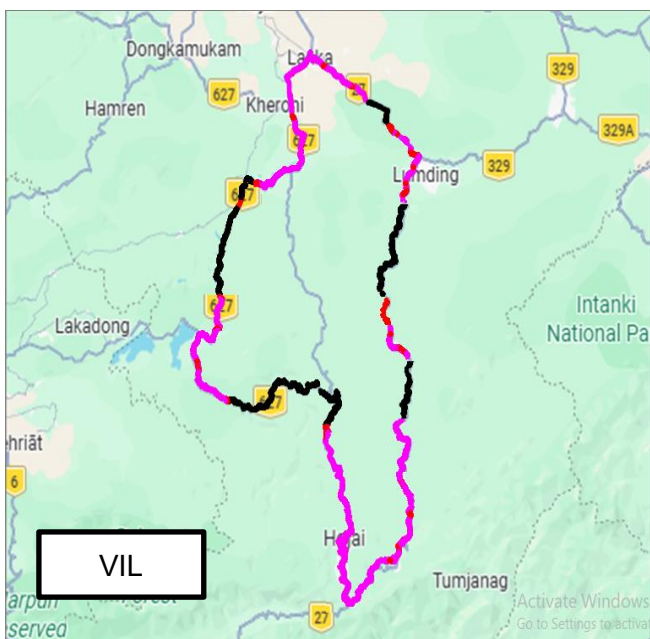
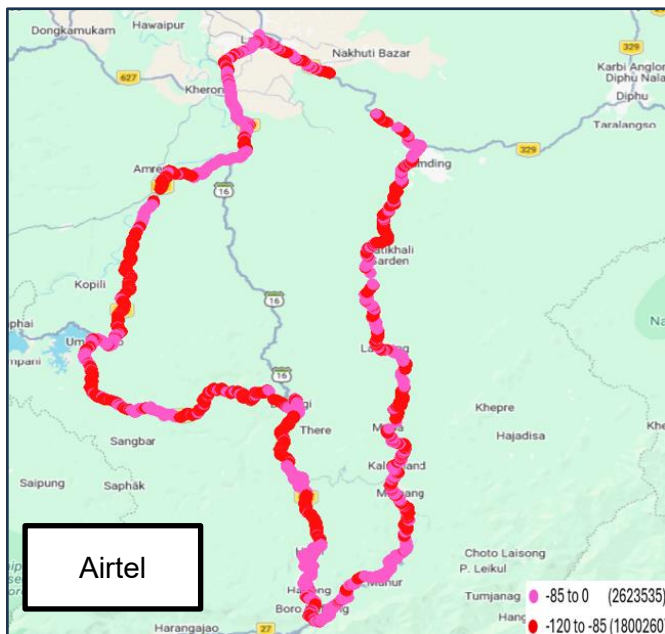
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
Total Distance covered (in Kms)	337	340	N/A	330
No. of Call Attempts	298	260	N/A	152
No. of Call Established	296	256	N/A	152
Call setup success rate (CSSR) %	99.32	98.78	N/A	100
No. of Drop Call	2	2	N/A	1
Drop Call Rate %	0.7	1.10	N/A	0.66
Call Setup Time Average (Sec.)	3.29	5.41	N/A	3.33
No. of Handover Attempts	229	180	N/A	92
No. of Handover success	225	162	N/A	92
HOSR %	98.25	92.87	N/A	100
Total no of RLT Occurrence	45432	89	N/A	
No of RLT > 48	0	4	N/A	0

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

Number of unique Cell ids covered in Voice test				
Technology	AIRTEL	BSNL/MTNL	RJIL	VIL
3G	NA	31	NA	NA
2G	277	44	NA	111

3.1.2 Signal Strength Map: (3G/2G - Lock mode)

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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3.1.3 Signal Strength distribution: (3G/2G - Lock mode)

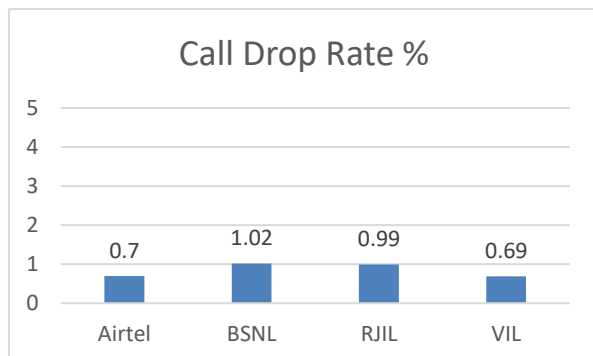
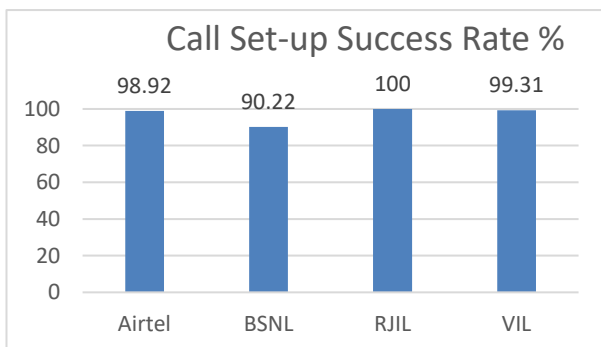
Rx Level - 2G								
Overall Rx Level	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-65]	245724	***	NA	609463	5.6	***	NA	26
[-65, ≥-75)	1388813	***	NA	703227	31.4	***	NA	30
[-75, ≥-85)	988998	***	NA	890753	22.4	***	NA	38
[-85, ≥Min)	1800260	***	NA	140645	40.7	***	NA	06
Total	4423795	***	NA	2344088	100	***	NA	100

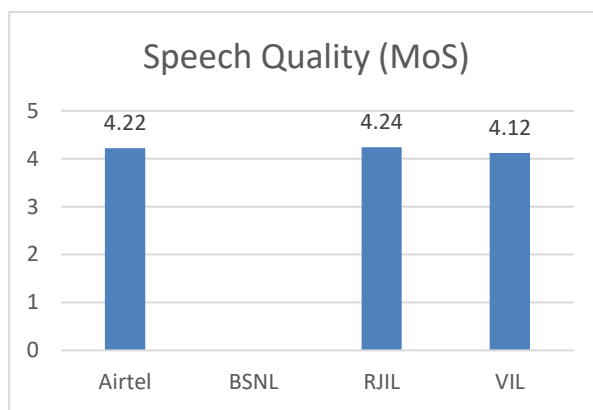
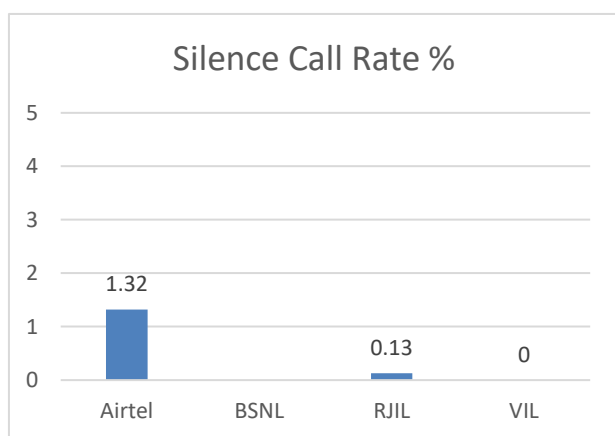
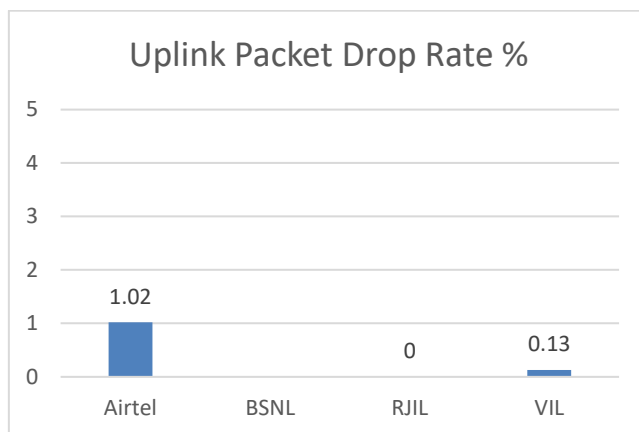
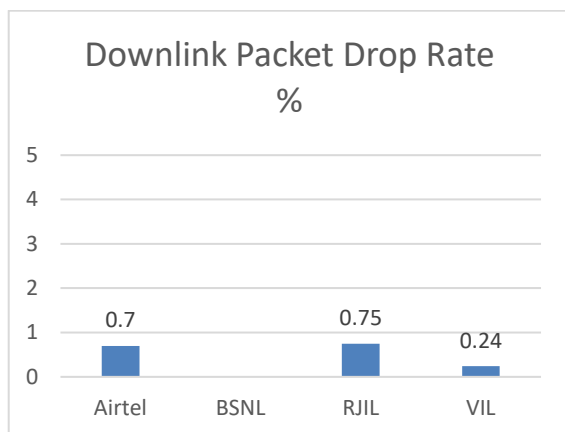
*** Data not provided

Rx Level - 3G								
Overall I RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-70]	NA	***	NA	***	NA	***	NA	
[-70, ≥-80)	NA	***	NA	***	NA	***	NA	
[-80, ≥-90)	NA	***	NA	***	NA	***	NA	
[-90, ≥Min)	NA	***	NA	***	NA	***	NA	
Total	NA	***	NA	***	NA	***	NA	

*** Data not provided

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





Parameters	Airtel	BSNL/MTNL	RJIL	VIL
Total Distance covered (in Kms)	337	313	321	330
No. of Call Attempts	279	259	301	145
No. of Call Established	276	255	301	144
Call setup success rate (CSSR) %	98.92	98.44	100	99.31
No. of Drop Call	2	4	1	1
Drop Call Rate %	0.7	1.02	0.99	0.69
Call Setup Time Average (Sec.)	1.4	5.41	1.85	1.32
No. of Handover Attempts	1087	185	4252	157
No. of Handover success	1085	162	4173	157
HOSR %	99.8	92.87	98.14	100
Packet Drop Rate (Downlink)	0.7	**	0.75	0.24
Packet Drop Rate (Uplink)	1.02	**	0.00	0.13
Number of silence call for > 2 sec.	11	**	14	0

Silence Call Rate %	1.32	**	0.13	0
Number of MOS samples	2156	**	1204	693
Average MOS score	4.22	**	4.24	4.12

****Due to the non-availability of the MOS test tool with BSNL, the MOS test could not be carried out by BSNL**

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

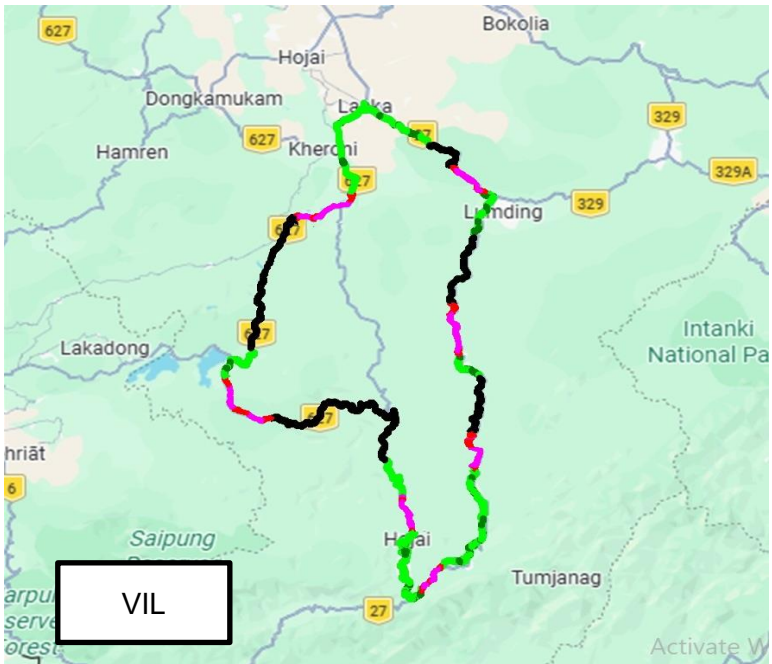
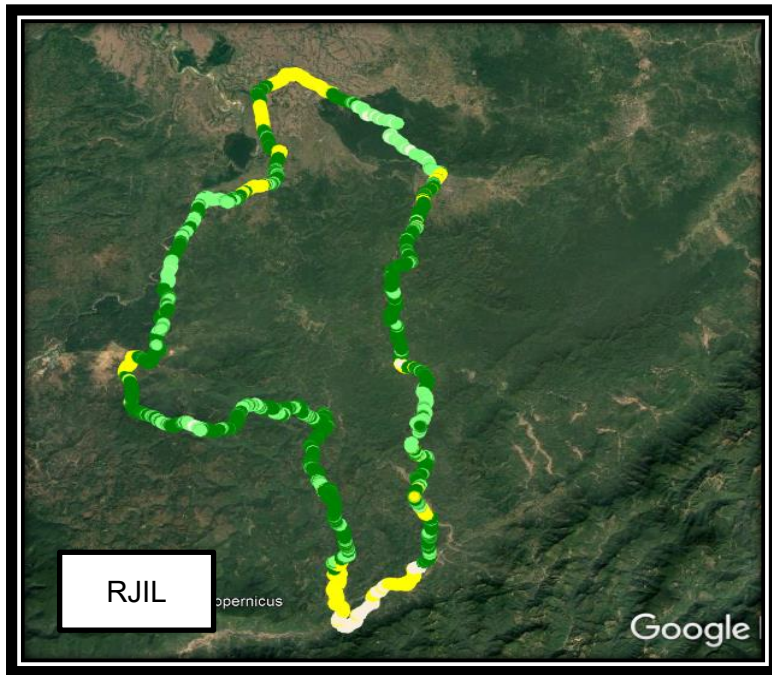
Number of unique cell ids covered in Voice test				
Technology	Service Provider			
	AIRTEL	BSNL/MTNL	RJIL	VIL
3G	NA	32	NA	NA
2G	0	24	NA	22
4G	588	212	500	102
5G	18	NA	125	NA

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

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)

Technology	Parameter	Range	Colour
2G	Rx Level	$\geq$ -85 dBm	
		$<$ -85 dBm	
3G	RSCP	$\geq$ -90 dBm	
		$<$ -90 dBm	
4G	RSRP	$\geq$ -110 dBm	
		$<$ -110 dBm	
5G	RSRP	$\geq$ -110 dBm	
		$<$ -110 dBm	





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

Rx Level - 2G								
Overall Rx Level	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-65]	0	1120	NA	59494	0	9.50	NA	18.23
[-65, ≥-75)	0	2461	NA	98402	0	21.1	NA	30.14
[-75, ≥-85)	0	1264	NA	133575	0	10.73	NA	40.92
[-85, ≥Min)	0	6889	NA	34967	0	58.52	NA	10.71
Total	0	11764	NA	326438	0	102	NA	100

Rx Level -3G								
Overall I RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-70]	NA	235	NA	NA	NA	6.20	NA	NA
[-70, ≥-80)	NA	554	NA	NA	NA	14.46	NA	NA
[-80, ≥-90)	NA	648	NA	NA	NA	17.08	NA	NA
[-90, ≥Min)	NA	2370	NA	NA	NA	62.10	NA	NA
Total	NA	3815	NA	NA	NA	101	NA	NA

Rx Level -4G								
Overall I RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	523886	590	3697	441709	9.6	3.60	15.2	21.05
[-80, ≥-95]	1757237	4560	6582	896049	32.1	28.43	27.1	42.70
[-95, ≥-110]	2116056	5410	8641	586581	38.7	33.68	35.5	27.96
[-110, ≥Min]	1074649	5531	5400	173953	19.6	34.48	22.2	8.29
Total	5471828	16124	24320	2098292	100	104	100.00	100

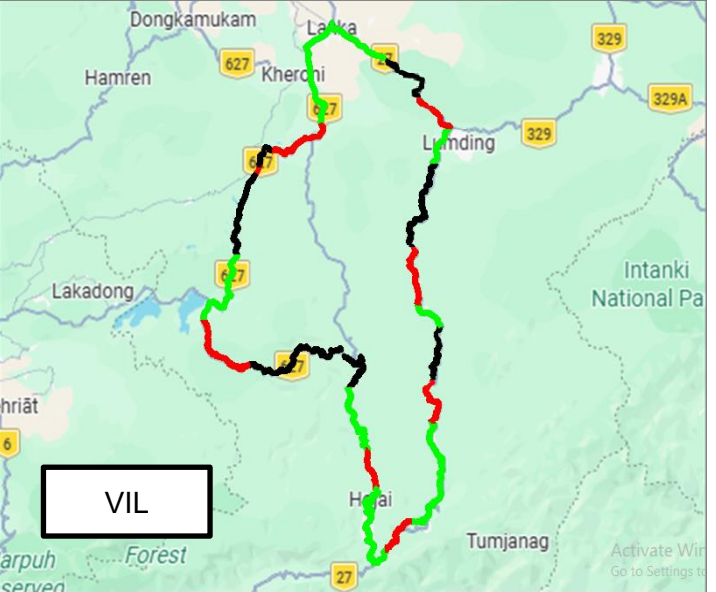
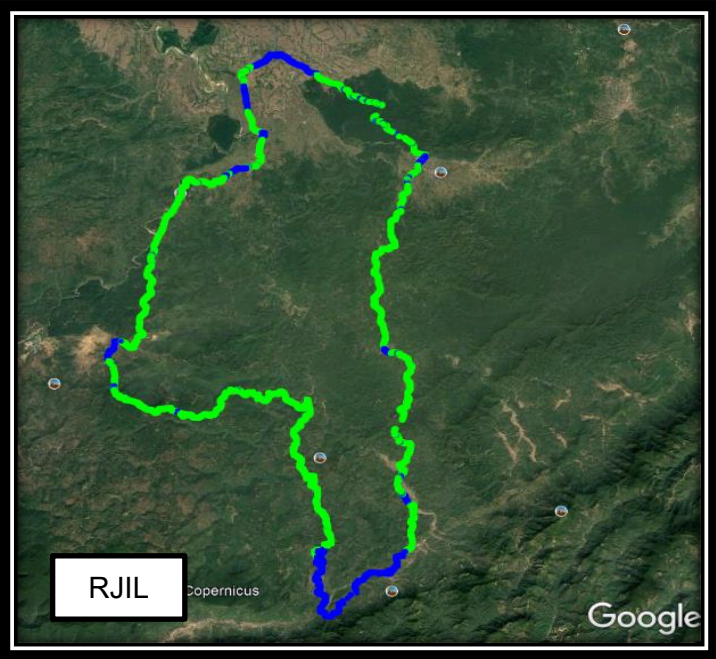
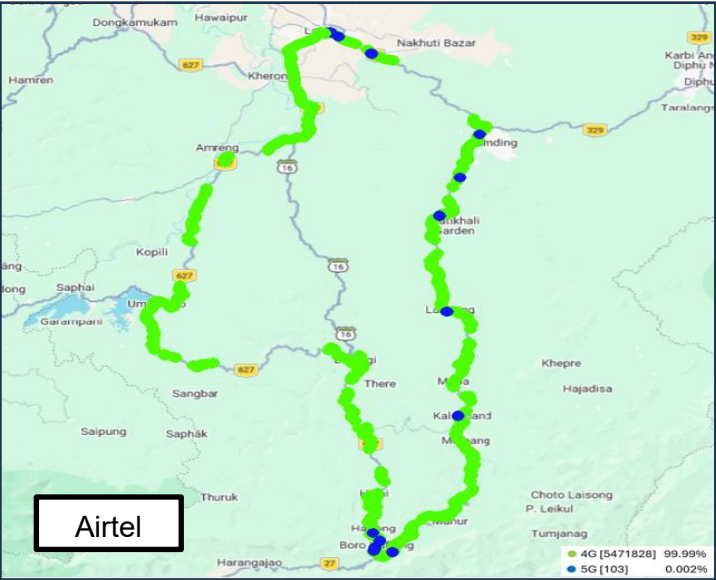
Rx Level -5G								
Overall I RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	10	NA	4173	NA	7.69	NA	38.15	NA
[-80, ≥-95]	34	NA	4224	NA	33.33	NA	38.62	NA
[-95, ≥-110]	48	NA	1567	NA	43.59	NA	14.33	NA
[-110, ≥Min]	11	NA	973	NA	15.38	NA	8.90	NA
Total	78	NA	10937	NA	100	NA	100.00	NA

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

QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	78.4	18.34	164.55	34.14
	80th Percentile	135	29.26	364.75	43.77
	20th Percentile	6.42	3.08	8.28	20.37
Upload speed (Mbps/s)	Average	5.23	8.60	19.05	8.04
	80th Percentile	4.2	10.42	30.29	8.18
	20th Percentile	0.8	1.10	1.0	8.17
Latency (ms)	Average	31.32	50	34.50	49.37
	50th Percentile	27	76	62.5	48
Jitter (ms)	Average	11.2	16	18.68	3.59

3.4 Time Spent (Technology-wise)

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

4.1 Hot spot Locations



Hotspot Name	Latitude & Longitude	Date of Measurement	Time of Measurement
Half Long Govt.School	25.17261°, 93.01718°	11.03.2026	08:45 hrs. to 09:15hrs.
Lanka Rly.Stn.	25.9155°, 92.95785°	11.03.2026	17:00 hrs. to 18:00 hrs.
Lankeshwari Hospital	25.9278°, 92.9528°	12.03.2026	09:00 hrs. to 10:00 hrs.
Muolhoi Gallery	25.1762°, 93.0162°	12.03.2026	18:00 hrs. to 19:00hrs.

4.2 Voice Service Performance (5G/ 4G/ 3G/ 2G - Auto mode) – Over all

Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	279	265	20	42
No of Call Established	276	263	20	42
Call setup success rate (CSSR) %	98.92	98.78	100.00	100
No. of Drop Call	2	2	0	0
Drop Call Rate %	0.7	0.98	0.00	0
Call Setup Time Average (Sec.)	1.4	5.51	1.25	1.18

4.3. Data Service Performance (5G/ 4G/ 3G/ 2G - Auto mode) – Over all

QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Typical	6.79	13.90	NA	14.78
	Average	78.4	19.18	213.64	22.59
	80th Percentile	135	36.90	337.07	43.26
Download Session Setup Success Rate %		94.7	99.50	100.00	50
Upload speed (Mbps/s)	Typical	0.6	9.85	NA	8.17
	Average	5.23	7.41	31.73	8.17
	80th Percentile	4.2	17.45	39.14	8.18
Upload Session Setup Success Rate %		91.3	96.80	100.00	100
Latency (in ms)	50th Percentile	91.3	60	28.74	47.5
Jitter (in ms)	Average	11.2	13	18.31	3.23
Packet Drop Rate %		1.33	1.75	0.75	1.03
Web browsing delay (in sec)		2.9	2.1	1.54	2.52
Video Streaming performance for video		***	***	0.80	0.75

*** Data not provided

4.4. Voice Service Performance (5G/ 4G/ 3G/ 2G - Auto mode) at each Hotspot Location

Name of Hotspot Location	Half Long Government College			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	10	13	5	10
No of Call Established	10	13	5	10
Call setup success rate (CSSR) %	100	101	100.00	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0.00	0.00	0
Call Setup Time Average (Sec.)	1.6	4.51	1.30	1.25
Total no of RLT Occurrence	***	NA	-	
No of RLT > 48	***	NA	-	0

*** Data not provided

Name of Hotspot Location	Lanka Railway Station			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	10	11	5	10
No of Call Established	10	11	5	10
Call setup success rate (CSSR) %	100	101	100.00	100
No. of Drop Call	0	0	0	0

Drop Call Rate %	0	0.00	0.00	0
Call Setup Time Average (Sec.)	1.2	3.10	1.32	1.42
Total no of RLT Occurrence	***	NA	-	
No of RLT > 48	***	NA	-	0

*** Data not provided

Name of Hotspot Location	Lankeshwari Hospital			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	10	11	5	11
No of Call Established	10	11	5	11
Call setup success rate (CSSR) %	100	101	100.00	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0.00	0.00	0
Call Setup Time Average (Sec.)	1.5	2.11	1.28	1.15
Total no of RLT Occurrence	***	NA	-	
No of RLT > 48	***	NA	-	0

*** Data not provided

Name of Hotspot Location	Muolhoi Gallery			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	10	12	5	11
No of Call Established	10	12	5	10
Call setup success rate (CSSR) %	100	102	100.00	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0.00	0.00	0
Call Setup Time Average (Sec.)	1.7	5.21	1.13	1.22
Total no of RLT Occurrence	***	NA	-	
No of RLT > 48	***	NA	-	0

***Data not provided

4.5. Data Service Performance (5G/4G/3G/2G - auto mode) at each Hotspot Location

Name of Hotspot Location		Half Long Government College			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Typical	5.67	10.69	***	13.46
	Average	78.9	16.84	267.26	24.62
	80th Percentile	132.05	26.87	284.14	44.65

Download Session Setup Success Rate %		100	97.22	100.00	50
Upload speed (Mbits/s)	Typical	2.34	7.95	NA	8.3
	Average	10.2	5.51	50.04	8.36
	80th Percentile	14.6	11.55	54.36	8.36
Upload Session Setup Success Rate %		100	95.90	100.00	100
Latency (in ms)	50th Percentile	29	72	21.7	47
Jitter (in ms)	Average	10.1	14	13.5	2.60
Packet Drop Rate %		0	1.54	0.0	1.06
Web browsing delay (in sec)		1.8	1.01	1.5	2.49
Video Streaming performance for video		***	***	0.85	0.72

***Data not provided

Name of Hotspot Location		Lanka Railway Station			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbits/s)	Typical	5.16	8.35	***	14.34
	Average	64.9	14.50	343.2	25.72
	80th Percentile	33.6	25.78	407.4	42.12
Download Session Setup Success Rate %		100	98.99	100.00	75
Upload speed (Mbits/s)	Typical	8.27	8.95	NA	8.12
	Average	13.6	6.51	59.17	8.33
	80th Percentile	19.6	10.33	60.51	8.36
Upload Session Setup Success Rate %		100	97.79	100.00	100
Latency (in ms)	50th Percentile	32	68	23	49
Jitter (in ms)	Average	8.19	14	18.7	2.57
Packet Drop Rate %		0	1.89	0.0	1.00
Web browsing delay (in sec)		2.6	1.99	1.48	2.53
Video Streaming performance for video		***	***	0.74	0.44

***Data not provided

Name of Hotspot Location		Lankeshwari Hospital			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
	Typical	6.18	7.88	***	15.54
	Average	66.19	13.11	288.18	26.45

Download speed (Mbps/s)	80th Percentile	45.8	19.16	343.05	46.72
Download Session Setup Success Rate %		100	95.34	100.00	100
Upload speed (Mbps/s)	Typical	6.71	7.10	NA	8.36
	Average	17.8	5.99	31.48	8.36
	80th Percentile	13.2	9.11	34.34	8.37
Upload Session Setup Success Rate %		100	94.65	100.00	100
Latency (in ms)	50th Percentile	34	69	24	48.5
Jitter (in ms)	Average	12.6	13	19.8	2.50
Packet Drop Rate %		1	1.33	0.0	0.93
Web browsing delay (in sec)		3.1	1.88	1.51	2.46
Video Streaming performance for video		***	***	0.83	0.84

*** Data not provided

Name of Hotspot Location		Muolhoi Gallery			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Typical	2.13	11.15	***	15.78
	Average	11.2	16.95	152.31	24.53
	80th Percentile	9.67	27.17	203.07	42.32
Download Session Setup Success Rate %		100	99.76	100.00	50
Upload speed (Mbps/s)	Typical	2.6	10.70	NA	8.01
	Average	9.45	8.99	36.98	8.36
	80th Percentile	7.23	12.88	42.74	8.36
Upload Session Setup Success Rate %		100	99.10	100.00	100
Latency (in ms)	50th Percentile	36.50	58	24.4	47.5
Jitter (in ms)	Average	12.52	12	19.9	2.51
Packet Drop Rate %		1.40	1.90	0.00	1.10
Web browsing delay (in sec)		2.8	1.10	1.69	2.55
Video Streaming performance for video		***	***	0.79	0.99

*** Data not provided

4.6 Signal Strength distribution at Static location – Over all

Rx Level -2G								
Overall Rx Level	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTN L	RJIL	VIL
[Max, ≥-65]	NA	1120	NA	NA	NA	9.5	NA	NA
[-65, ≥-75]	NA	2461	NA	NA	NA	20.9	NA	NA
[-75, ≥-85]	NA	1264	NA	NA	NA	10.74	NA	NA
[-85, ≥Min)	NA	6889	NA	NA	NA	58.56	NA	NA
Total	NA	11764	NA	NA	NA	100	NA	NA

Rx Level -3G								
Overall I RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTN L	RJIL	VIL
[Max, ≥-70]	NA	235	NA	NA	NA	6.20	NA	NA
[-70, ≥-80)	NA	554	NA	NA	NA	14.46	NA	NA
[-80, ≥-90)	NA	648	NA	NA	NA	17.08	NA	NA
[-90, ≥Min)	NA	2370	NA	NA	NA	62.10	NA	NA
Total	NA	3815	NA	NA	NA	100	NA	NA

Rx Level -4G								
Overall I RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTN L	RJIL	VIL
[Max, ≥-80]	1043	590	***	1120	15.90	3.60	***	48.28
[-80, ≥-95]	2988	4560	***	570	45.56	28.43	***	24.57
[-95, ≥-110]	2460	5410	***	630	37.51	33.68	***	27.16
[-110, ≥Min]	67	5531	***	0	1.02	34.48	***	0
Total	6558	16124	***	2320	100	100	***	100

*** Data not provided

Rx Level -5G								
Overall I RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTN L	RJIL	VIL
[Max, ≥-80]	456	NA	398	NA	9.26	NA	54.97	NA
[-80, ≥-95]	3411	NA	321	NA	69.26	NA	44.34	NA
[-95, ≥-110]	1056	NA	5	NA	21.44	NA	0.69	NA
[-110, ≥Min]	2	NA	0	NA	0.04	NA	0.00	NA
Total	20480	NA	724	NA	100	NA	100.00	NA

Drive Test Methodology adopted during the Drive test:

(1) Voice Tests:

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): 90/180 sec. 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 (in 5G/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 Mbits/s (DL/UL both)	Download Speed = Total bytes transferred during download / Total time for transfer Upload 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 (Multithread 3- TCP Connection at a time for both DL & UL)
2	Latency (in ms)	Latency is the time taken by a packet to reach the receiving end point 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) >90 ms considered as packet loss and included in Packet drop rate. - The measurement 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 page 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