

TELECOM REGULATORY AUTHORITY OF INDIA

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

SOUTH 24 PARGANAS DISTRICT

WEST BENGAL LSA

FEBRUARY-2026

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1. Overview

The Operator Assisted Drive Test carried out in in South 24 Parganas District and nearby areas from 12.02.2026 to 13.02.2026 & 9:00 AM to 8:00 PM. The drive test covered drive route of around 260 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 West Bengal License Service Area (LSA from 12.02.2026 to 13.02.2026 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

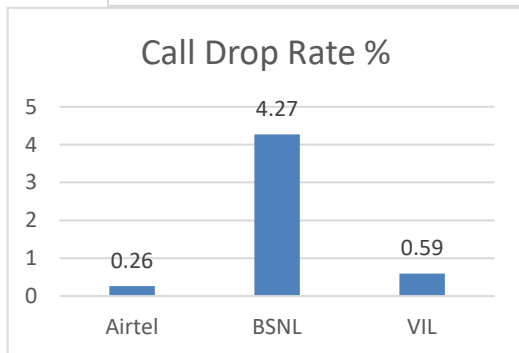
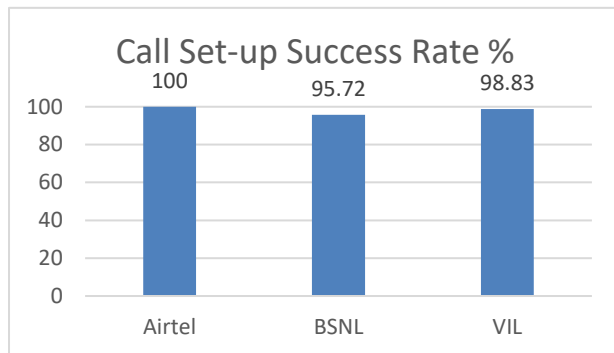
Date	Duration	Drive test route	Distance covered (in Kms)
12.02.2026	9:00 AM to 8:00 PM	Kantatala---Bantala—Malancha—Canning—Dumki—Meraganj—Jamtala—Nimpith—Jaynagar mazlipur—Dakshin barasat—Sarberia--Ramnagar	140
13.02.2026	9:00 AM to 8:00 PM	Fatepur Bazar—Falta—Kalatala Hat More—Sarisha—Dimond harbour—Kulpi—Kakdwip--Bakkhali	120

Date	Time	Hotspot Location	Latitude / Longitude
12.02.2026	09:20	Kantatala Vivekanda Club	22.5082383/88.4996485
12.02.2026	19:50	Dhap Dhapi Dakshneswar Mandir	22.3214647/88.4751673
13.02.2026	09:30	Tatini High School	22.2866260/88.2327780
13.02.2026	16:10	Bakkhali WBTDCL lodge	21.5614525/88.2677150

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

2.4 Key findings (Voice & Data)

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

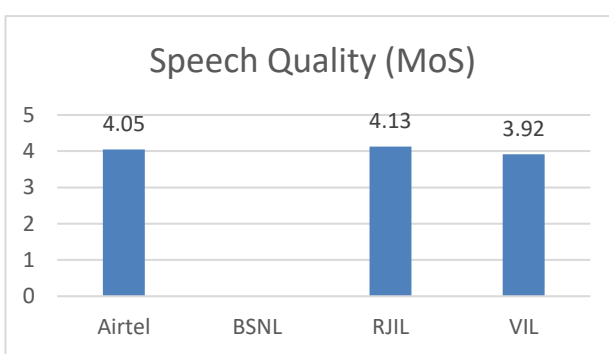
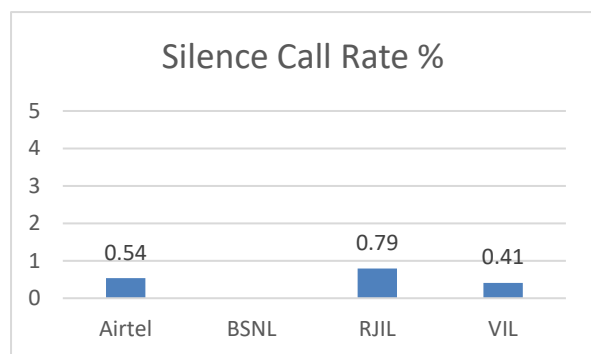
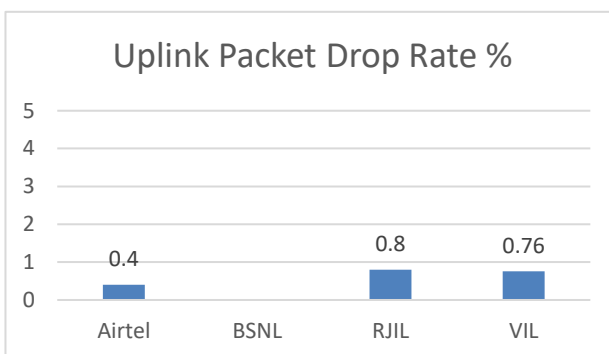
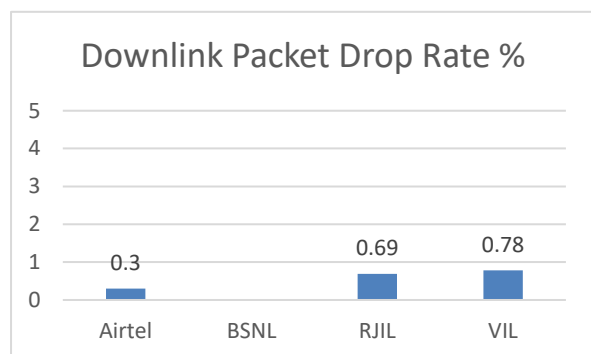
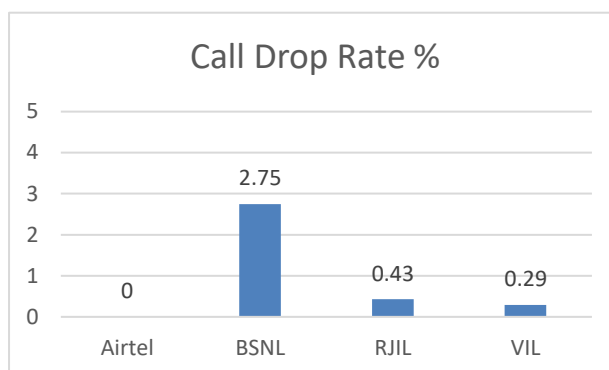
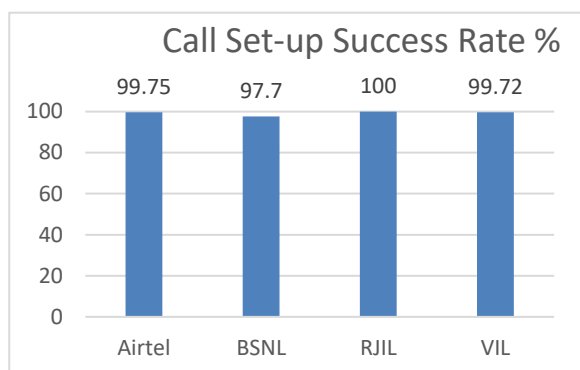


Parameter	Benchmark	AIRTEL	BSNL/MTNL	VIL
Call Attempts		378	125	342
Call Setup Success Rate (in %)	>= 98%	100	95.72	98.83
Drop Call Rate (in %)	<= 2%	0.26	4.27	0.59
Call Setup Time-Average (in Seconds)		3.06	3.38	3.86
Handover Success Rate (in %)	>= 95%	97.47	95.78	97.59

2.4.2. Number of Cell ids latched during drive test

Technology	AIRTEL	BSNL/MTNL	VIL
3G	NA	0	NA
2G	337	45	166

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



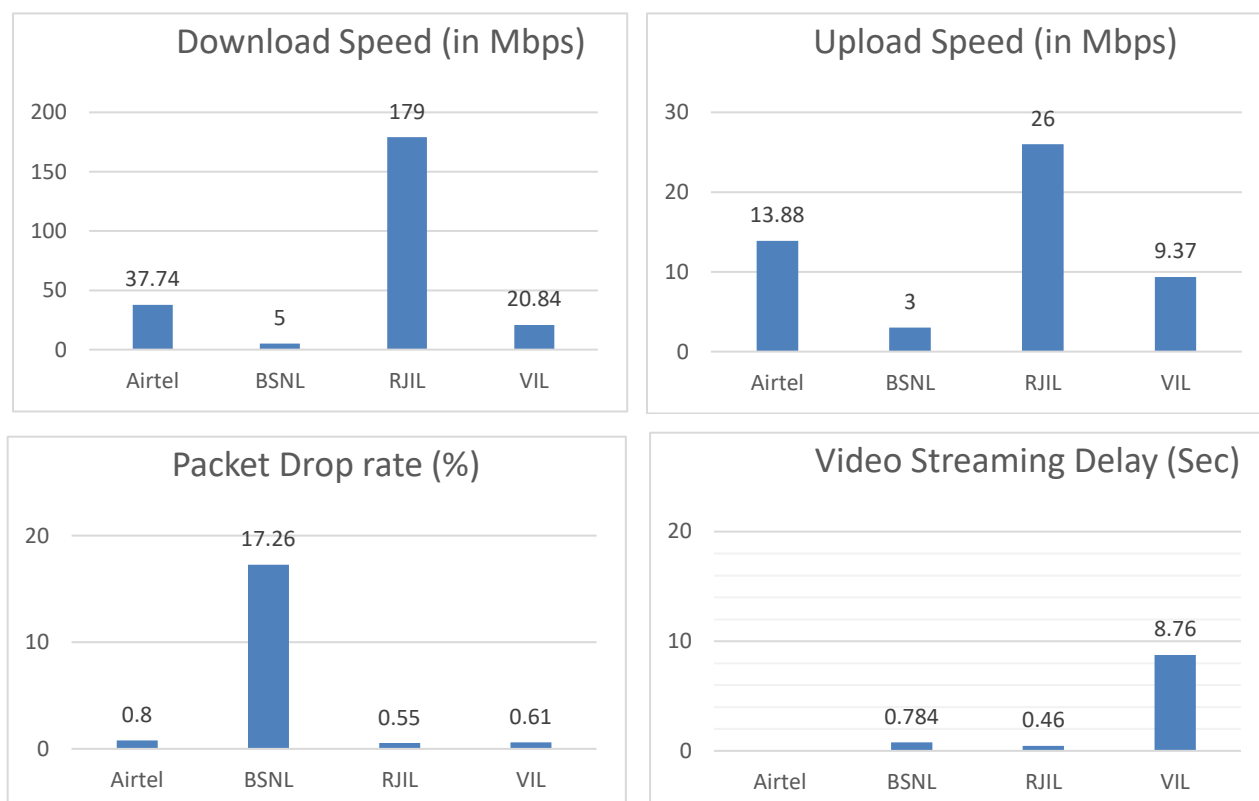
Parameter	AIRTEL	BSNL	RJIL	VIL
Call Attempts	397	218	469	351
Call Setup Success Rate %	99.75	97.70	100	99.72
Drop Call Rate%	0	2.75	0.43	0.29
Call Setup Time-Average (Second)	1.38	5.29	1.44	0.73
Handover Success Rate %	100	99.75	99.35	98.78
Downlink Packet drop rate %	0.3	**	0.69	0.78
Uplink Packet drop rate %	0.4	**	0.80	0.76
Silence Call Rate %*	0.54	**	0.79	0.41
Speech Quality (Average MOS)	4.05	**	4.13	3.92

****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	159	NA	98	NA
4G	701	346	777	243
3G	NA	0	NA	NA
2G	NA	45	NA	12

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



QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Typical	9.87	5	***	15
	Average	37.74	4.19	179	20.84
	80th Percentile	57.67	7.49	344	33.47
Download Session Setup Success Rate %		94.7	95.32	100%	95.48
Upload speed (Mbps/s)	Typical	5.72	3	***	8
	Average	13.88	3.18	26	9.37
	80th Percentile	20.54	5.41	47	18.34
Upload Session Setup Success Rate %		97.41	93.13	100%	95.76

Latency (in ms)	50th Percentile	46	48.49	24	47.5
Jitter (in ms)	Average	11.65	17.26	8	1.04
Packet Drop Rate %		0.8	5.31	0.55	0.61
Web browsing delay (in sec)		NA	0.784	1.38	7.21
Video Streaming performance for video		NA	1.753	0.46	8.76

*****TSPs have not submitted the Report**

2.4.6 TSP-wise Key Findings:

AIRTEL-

Voice

- 100% call setup success rate and 0% call drop rate have been observed in (3G/2G) lock mode.
- 99.74% call setup success rate and 0.5% drop call rate have been observed in (5G/4G/3G/2G) auto selection mode.

Data

- 37.74 Mbps average download speed & 13.88 Mbps average upload speed across the measured routes for city drive test in (5G/4G/3G/2G) auto selection mode

BSNL-

Voice

- 95.72% call setup success rate and 4.27% drop call rate have been observed in (3G/2G) lock mode, not meeting the benchmarks prescribed in the QoS Regulations.
- 97.70% call setup success rate and 2.75% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G). Performance is not meeting the benchmark of 98.00% & 2.00% respectively.

Data

- 5 Mbps average download speed & 3 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 0.43% drop call rate have been observed in (5G/4G/3G/2G) auto selection mode

Data-

- 179 Mbps average download speed & 26 Mbps average upload speed across the measured routes for city drive test in (5G/4G/3G/2G) auto selection mode

VIL

Voice

- 98.83% call setup success rate and 0.59% call drop rate have been observed in (3G/2G) lock mode.
- 96.94% call setup success rate and 1.53% drop call rate have been observed in (5G/4G/3G/2G) auto selection mode. Performance is not meeting the benchmark of 98.00%.

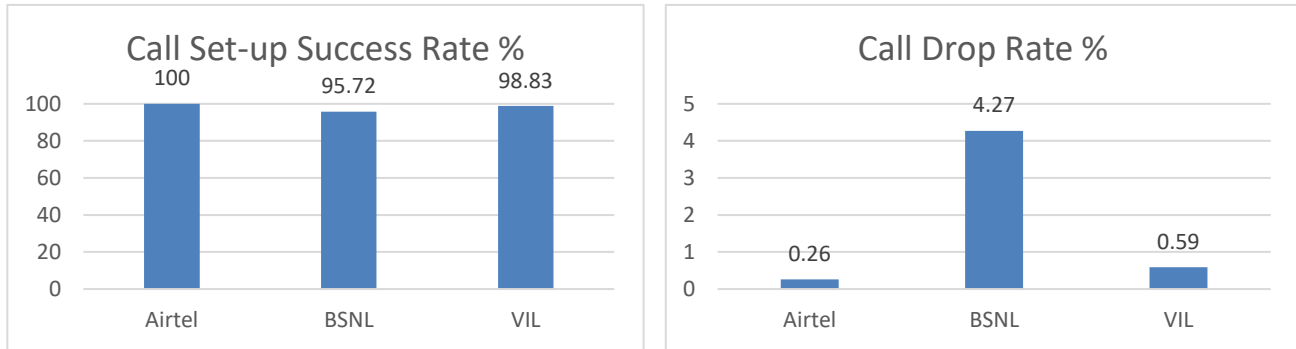
Data

- 20.84 Mbps average download speed & 9.37 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



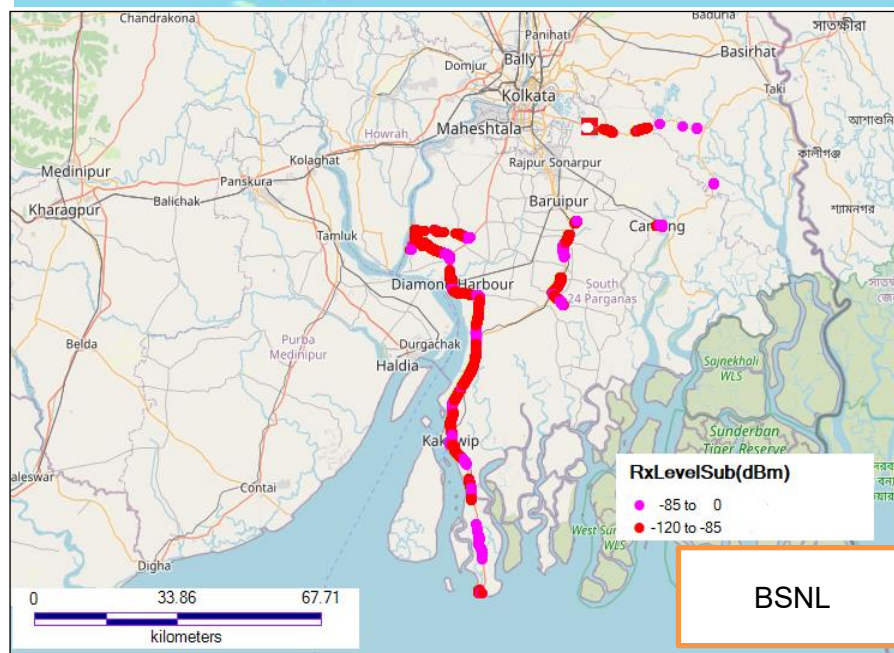
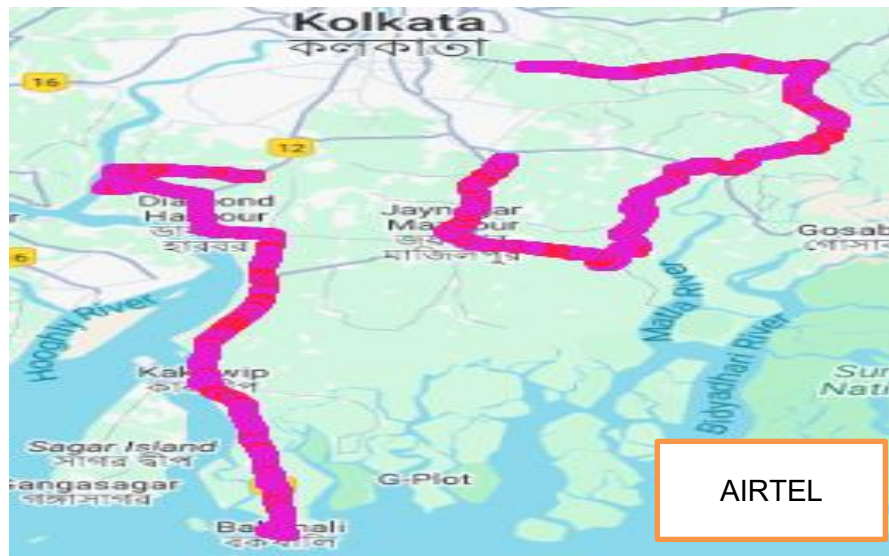
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
Total Distance covered (in Kms)	260	253	N/A	247.41
No. of Call Attempts	378	117	N/A	342
No. of Call Established	378	112	N/A	338
Call setup success rate (CSSR) %	100	95.72	N/A	98.83
No. of Drop Call	1	5	N/A	2
Drop Call Rate %	0.26	4.27	N/A	0.59
Call Setup Time Average (Sec.)	3.06	3.39	N/A	3.86
No. of Handover Attempts	594	95	N/A	997
No. of Handover success	579	91	N/A	973
HOSR %	97.47	95.78	N/A	97.59
Total no of RLT Occurrence	74169	7524	N/A	4821
No of RLT > 48	0	0	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	0	NA	NA
2G	337	45	NA	166

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

Signal Strength Map (for each TSP)	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)
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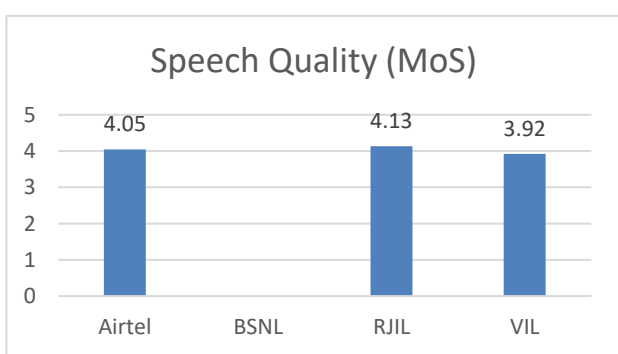
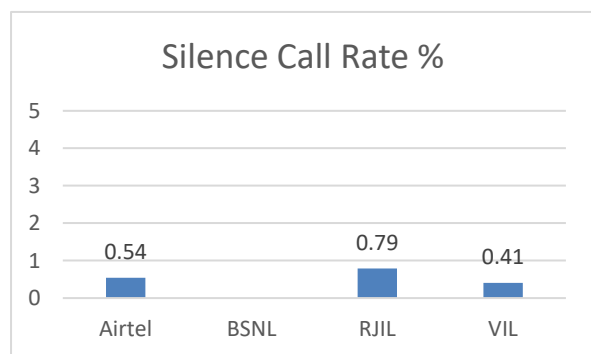
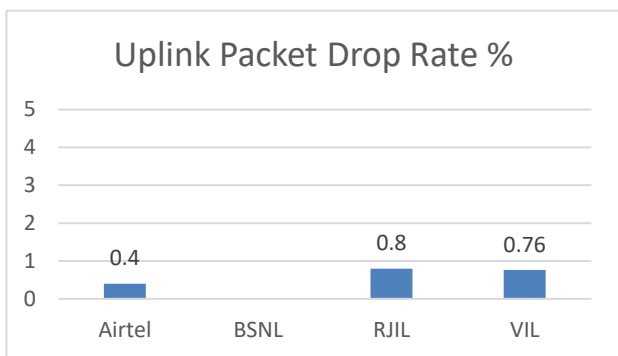
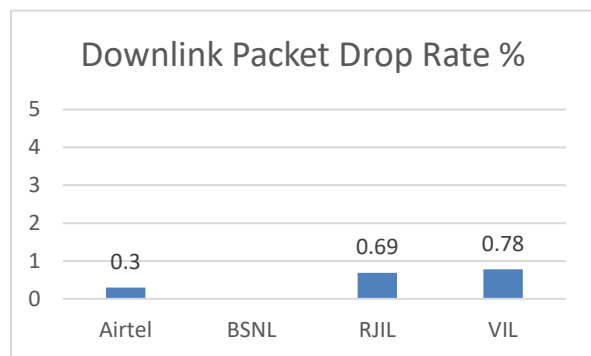
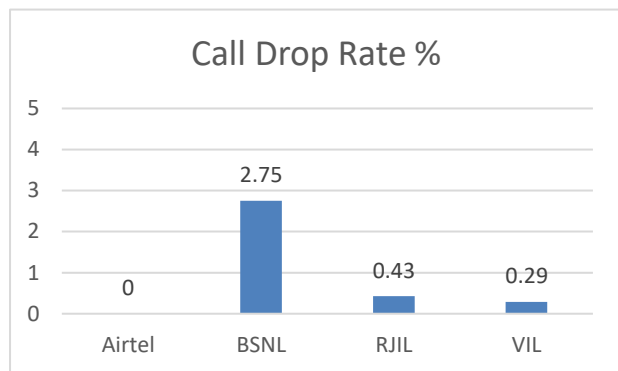
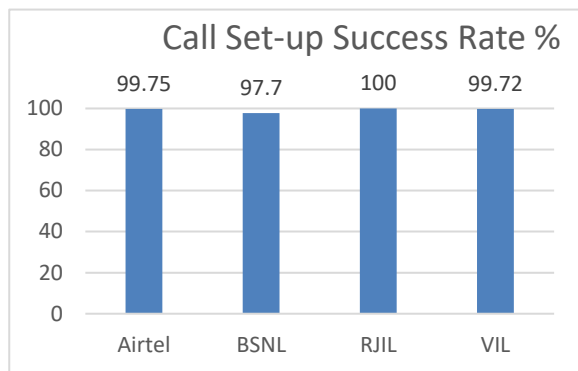


3.1.3 Signal Strength distribution: (3G/2G - Lock mode)

Rx Level - 2G								
Overall Rx Level	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-65]	16094	347	NA	2962	15.56	5.11	NA	15.57
[-65, ≥-75]	30361	712	NA	6926	29.36	10.49	NA	36.42
[-75, ≥-85]	37224	1172	NA	6713	36.00	17.2	NA	35.30
[-85, ≥Min)	19727	4563	NA	2418	19.08	67.2	NA	12.71
Total	103406	6794	NA	19019	100.00	100	NA	100

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	NA	NA	NA	NA
[-70, ≥-80]	NA	NA	NA	NA	NA	NA	NA	NA
[-80, ≥-90]	NA	NA	NA	NA	NA	NA	NA	NA
[-90, ≥Min)	NA	NA	NA	NA	NA	NA	NA	NA
Total	NA	NA	NA	NA	NA	NA	NA	NA

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



Parameters	Airtel	BSNL/MTNL	RJIL	VIL
Total Distance covered (in Kms)	260	253	253	247.41
No. of Call Attempts	397	218	469	351
No. of Call Established	396	213	469	350
Call setup success rate (CSSR) %	99.75	97.70	100	99.72
No. of Drop Call	0	5	2	1
Drop Call Rate %	0	2.75	0.43	0.29
Call Setup Time Average (Sec.)	1.38	5.29	1.44	0.73
No. of Handover Attempts	1232	414	2006	578
No. of Handover success	1232	413	1993	571

HOSR %	100	99.75	99.35	98.78
Packet Drop Rate (Downlink)	0.3	**	0.67	0.78
Packet Drop Rate (Uplink)	0.4	**	0.80	0.76
Number of silence call for > 2 sec.	2	**	7	08
Silence Call Rate %	0.54	**	0.79	0.41
Number of MOS samples	2426	**	3949	1953
Average MOS score	4.05	**	4.13	3.92

****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)

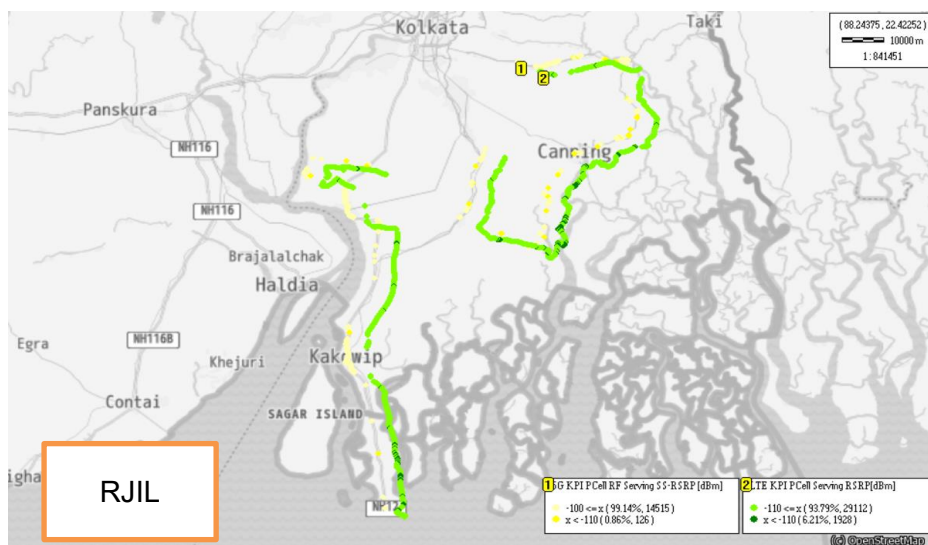
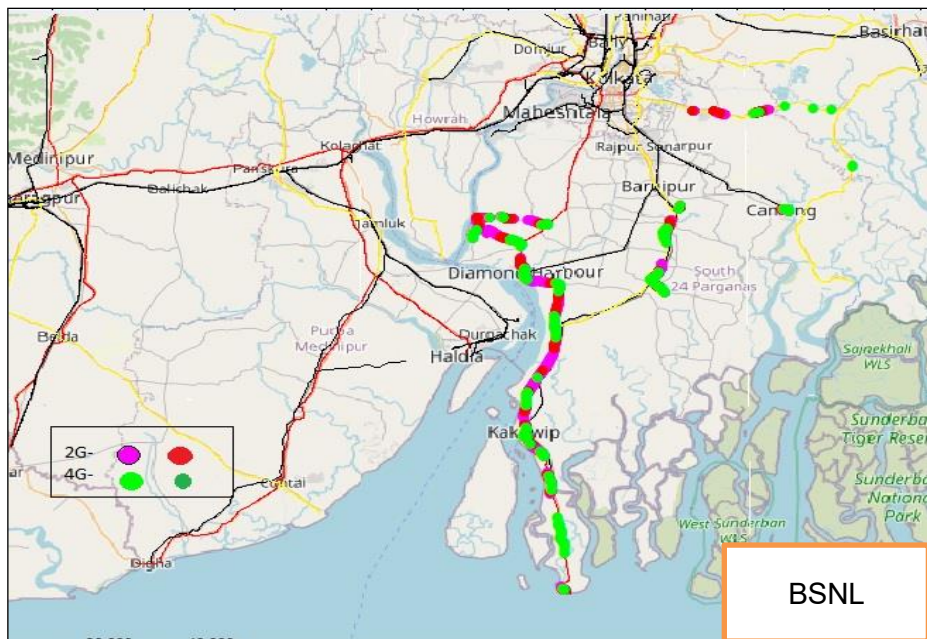
Number of unique cell ids covered in Voice test				
Technology	Service Provider			
	AIRTEL	BSNL/MTNL	RJIL	VIL
3G	NA	0	NA	NA
2G	0	45	NA	12
4G	701	119	342	243
5G	159	NA	37	NA

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	Pink
		$<$ -85 dBm	Red
3G	RSCP	$\geq$ -90 dBm	Sky blue
		$<$ -90 dBm	Dark Blue
4G	RSRP	$\geq$ -110 dBm	Light Green
		$<$ -110 dBm	Dark Green
5G	RSRP	$\geq$ -110 dBm	Light Yellow
		$<$ -110 dBm	Dark Yellow





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	341	NA	NA	0	5.02	NA	NA
[-65, ≥-75)	0	711	NA	NA	0	10.48	NA	NA
[-75, ≥-85)	0	1172	NA	NA	0	17.27	NA	NA
[-85, ≥Min)	0	4563	NA	NA	0	67.23	NA	NA
Total	0	6787	NA	NA	0	100	NA	NA

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	NA	NA	NA	NA
[-70, ≥-80)	NA	NA	NA	NA	NA	NA	NA	NA
[-80, ≥-90)	NA	NA	NA	NA	NA	NA	NA	NA
[-90, ≥Min)	NA	NA	NA	NA	NA	NA	NA	NA
Total	NA	NA	NA	NA	NA	NA	NA	NA

Rx Level -4G								
Overall I RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	2818	22408	5517	778	5.77	15.13	18	3.96
[-80, ≥-95]	23110	36229	11785	6780	47.32	24.47	38	34.49
[-95, ≥-110]	20922	47909	11810	10028	42.84	32.36	38	51.01
[-110, ≥Min]	1986	41525	1928	2072	4.07	28.04	6	10.54
Total	48836	148071	31040	19658	100	100	100	100

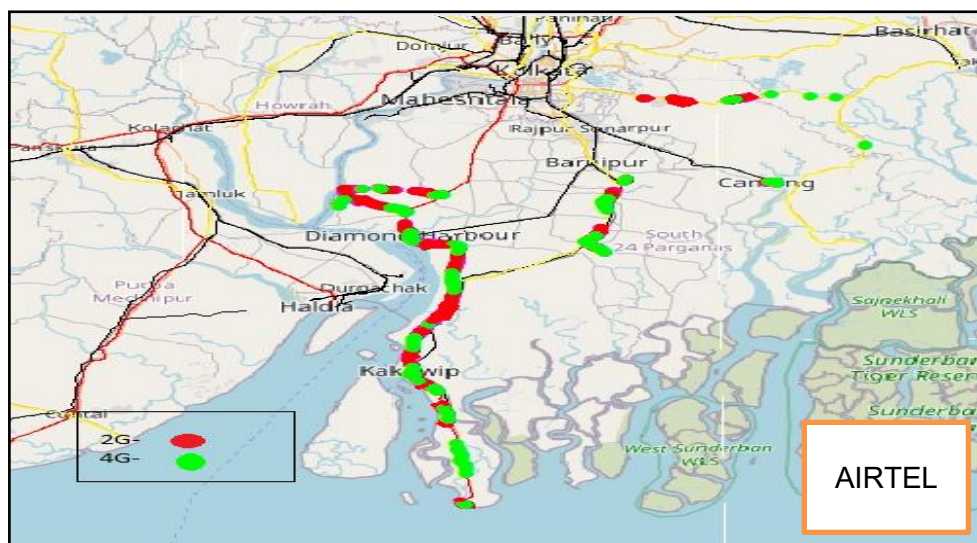
Rx Level -5G								
Overall I RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	1570	NA	5200	NA	15.60	NA	34	NA
[-80, ≥-95]	2582	NA	8202	NA	25.65	NA	53	NA
[-95, ≥-110]	3888	NA	1861	NA	38.62	NA	12	NA
[-110, ≥Min]	2027	NA	126	NA	20.14	NA	1	NA
Total	10067	NA	15389	NA	100	NA	100	NA

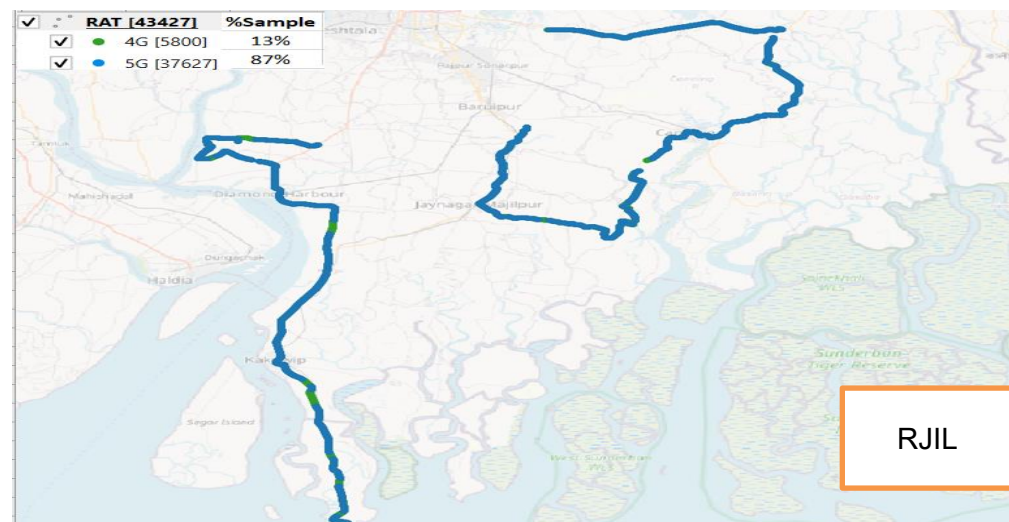
3.3 Data Service performance in 5G/4G/3G/2G (Auto mode) - Dynamic

QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	37.74	5	179	20.84
	80th Percentile	57.67	6.19	344	33.47
	20th Percentile	9.87	3.69	12	13.76
Upload speed (Mbps/s)	Average	13.88	3.5	26	9.37
	80th Percentile	20.54	3	47	18.34
	20th Percentile	5.72	3.50	12	8.11
Latency (ms)	Average	50.36	3.50	25	56.54
	50th Percentile	46.00	5.23	24	47.5
Jitter (ms)	Average	11.65	48.49	8	1.04

3.4 Time Spent (Technology-wise)

Time Spent Map (for each TSP)	Map Legend: 2G – Red 4G – Green 3G – Yellow 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
Kantatala Vivekanda Club	22.5082383/88.4996485	12.02.2026	9:20
Dhap Dhapi Dakshneswar Mandir	22.3214647/88.4751673	12.02.2026	19:50
Tatini High School	22.2866260/88.2327780	13.02.2026	9:30
Bakkhali WBTDCL lodge	21.5614525/88.2677150	13.02.2026	16:10

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

Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	40	5	469	45
No of Call Established	40	5	469	45
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	2	0
Drop Call Rate %	0	0	0.43	0
Call Setup Time Average (Sec.)	1.52	6.7	1.44	1.97

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	32.84	5.0	***	15
	Average	54.70	4.19	179	28.59
	80th Percentile	66.10	7.69	344	38.29
Download Session Setup Success Rate %		100	95.32	100	100
Upload speed (Mbps/s)	Typical	10.42	3.0	***	8
	Average	20.32	3.50	26	19.82
	80th Percentile	26.97	5.41	47	29.43
Upload Session Setup Success Rate %		100	92.68	100	100
Latency (in ms)	50th Percentile	46.16	48.49	24	48.31
Jitter (in ms)	Average	11.87	17.26	8	0.93
Packet Drop Rate %		0	5.31	0.55	0.73
Web browsing delay (in sec)		2.50	0.784	1.38	8.18
Video Streaming performance for video		1.07	1.753	0.46	8.88

*** TSPs have not submitted the Report

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

Name of Hotspot Location	Kantatala Vivekanda Club			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	10	38	***	12
No of Call Established	10	38	***	12
Call setup success rate (CSSR) %	100	100	***	100
No. of Drop Call	0	0	***	0
Drop Call Rate %	0	0	***	0

Call Setup Time Average (Sec.)	1.59	6.29	***	2.04
Total no of RLT Occurrence	0	21	***	-
No of RLT > 48	0	0	***	-

*** Data not provided

Name of Hotspot Location	Bakkhali WBTDCL lodge			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	10	***	***	11
No of Call Established	10	***	***	11
Call setup success rate (CSSR) %	100	***	***	100
No. of Drop Call	0	***	***	0
Drop Call Rate %	0	***	***	0
Call Setup Time Average (Sec.)	1.87	***	***	1.88
Total no of RLT Occurrence	0	***	***	-
No of RLT > 48	0	***	***	-

*** Data not provided

Name of Hotspot Location	Dhap Dhapi Dakshneswar Mandir			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	10	***	***	11
No of Call Established	10	***	***	11
Call setup success rate (CSSR) %	100	***	***	100
No. of Drop Call	0	***	***	0
Drop Call Rate %	0	***	***	0
Call Setup Time Average (Sec.)	1.28	***	***	1.98
Total no of RLT Occurrence	0	***	***	-
No of RLT > 48	0	***	***	-

*** Data not provided

Name of Hotspot Location	Tatini High School			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	10	***	***	11
No of Call Established	10	***	***	11
Call setup success rate (CSSR) %	100	***	***	100
No. of Drop Call	0	***	***	0
Drop Call Rate %	0	***	***	0
Call Setup Time Average (Sec.)	1.32	***	***	2.01

Total no of RLT Occurrence	0	***	***	-
No of RLT > 48	0	***	***	-

***Data not provided

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

Name of Hotspot Location		Kantatala Vivekanda Club			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbits/s)	Typical	75.52	5.0	***	15
	Average	111.96	5.20	53	27.62
	80th Percentile	150	7.83	73	29.81
Download Session Setup Success Rate %		100	96.12	100	100
Upload speed (Mbits/s)	Typical	5.644	3	***	8
	Average	25.56	3.70	10	14.93
	80th Percentile	68.864	4.71	12	16.61
Upload Session Setup Success Rate %		100	95.98	100	100
Latency (in ms)	50th Percentile	47.5	47.59	34.5	48.42
Jitter (in ms)	Average	2.40	18.36	11	0.92
Packet Drop Rate %		0	4.11	0.90	0.71
Web browsing delay (in sec)		1.51	0.964	2.7	8.76
Video Streaming performance for video		0.97	1.747	0.653	9.12

***Data not provided

Name of Hotspot Location		Bakkhali WBTDCL lodge			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbits/s)	Typical	39.11	5	***	15
	Average	45.56	5.8	297	28.53
	80th Percentile	57.71	8.3	366	32.32
Download Session Setup Success Rate %		100	99.65	100	100
Upload speed (Mbits/s)	Typical	13.98	3	***	8
	Average	17.37	3.53	87	25.01
	80th Percentile	20.71	5.19	102	42.41
Upload Session Setup Success Rate %		100	97.61	100	100

Latency (in ms)	50th Percentile	63	9.67	21	44.5
Jitter (in ms)	Average	7.56	10.48	4.68	0.95
Packet Drop Rate %		0	3.64	0.10	0.74
Web browsing delay (in sec)		4.2	0.653	0.79	8.77
Video Streaming performance for video		1	4.62	0.282	7.35

***Data not provided

Name of Hotspot Location		Dhap Dhapi Dakshneswar Mandir			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbits/s)	Typical	32.448	5.0	***	15
	Average	40.65	5.50	51	31.34
	80th Percentile	48.418	6.31	66	33.41
Download Session Setup Success Rate %		100	93.88	100	100
Upload speed (Mbits/s)	Typical	25.49	3	***	8
	Average	25.98	4.75	30	24.44
	80th Percentile	27.12	4.88	34	34.21
Upload Session Setup Success Rate %		100	97.54	100	100
Latency (in ms)	50th Percentile	40	11.11	28	45.5
Jitter (in ms)	Average	6.57	8.72	4.58	0.82
Packet Drop Rate %		0	4.04	0.9	0.69
Web browsing delay (in sec)		1.65	0.466	0.93	9.11
Video Streaming performance for video		1.01	5.91	0.398	8.02

*** Data not provided

Name of Hotspot Location		Tatini High School			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbits/s)	Typical	14.74	5	***	15
	Average	59.91	6.02	500	26.45
	80th Percentile	111.84	6.51	622	28.39
Download Session Setup Success Rate %		100	99.7	100	100
Upload speed (Mbits/s)	Typical	10.29	3	***	8
	Average	17.80	4.85	31	15.23
	80th	33.88	5.94	37	18.75

	Percentile				
Upload Session Setup Success Rate %		100	97.69	100	100
Latency (in ms)	50th Percentile	26	10.75	29	46.5
Jitter (in ms)	Average	2.41	9.37	6.49	1.02
Packet Drop Rate %		0	3.64	0.10	0.79
Web browsing delay (in sec)		2.63	0.785	1.10	8.91
Video Streaming performance for video		0.95	5.34	0.511	8.22

*** 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	NA			NA	NA
[-65, ≥-75)			NA	NA			NA	NA
[-75, ≥-85)			NA	NA			NA	NA
[-85, ≥Min)			NA	NA			NA	NA
Total			NA	NA			NA	NA

Rx Level -3G								
Overall RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTN L	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

Rx Level -4G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTN L	RJIL	VIL
[Max, ≥-80]	3224	6856	538	451	38.53	25.44	27	11.99
[-80, ≥-95]	4171	11	522	2646	49.84	0.04	26	70.33
[-95, ≥-110]	973	9185	776	665	11.63	34.08	39	17.68
[-110, ≥Min]	0	10892	168	0	0	40.42	8	0

Total	8368	26944	2004	3762	100	100	100	100
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Rx Level -5G								
Overall I RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	3761	NA	579	NA	70.84	NA	25	NA
[-80, ≥-95]	1309	NA	1577	NA	24.66	NA	69	NA
[-95, ≥-110]	167	NA	122	NA	3.15	NA	5	NA
[-110, ≥Min]	72	NA	25	NA	1.36	NA	1	NA
Total	5309	NA	2303	NA	100.00	NA	100	NA

Annexure-I

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 $\geq$ 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 $\geq$ 4 and $<$ 5, Good: MOS $\geq$ 3 and $<$ 4, Fair: MOS $\geq$ 2 and $<$ 3, Poor: MOS $\geq$ 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