



TELECOM REGULATORY AUTHORITY OF INDIA
REGIONAL OFFICE - BHOPAL

Operator Assisted / Self Drive Test Report for March'2026

LSA-MP

**Damoh, Rehli, Katni Cities and
Intermediate Highways**
From 17/03/2026 to 20/03/2026

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1. Overview

The Operator Assisted Drive Test carried out in Damoh and Katni City Areas and NH 44 Highway from date 17/03/2026 to 20/03/2026 & 9:00 AM to 8:00 PM in DBH and NBH. The drive test covered drive route of around **377** Kms in 4 days and **11** 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	850,1800,2100,2300
3	Bharti Airtel Ltd.	5G	3500
4	BSNL/MTNL	2G	900
5	BSNL/MTNL	3G	2100
6	BSNL/MTNL	4G	700, 2100
7	Reliance JIO Infocomm Ltd.	4G	2300, 1800, 850
8	Reliance JIO Infocomm Ltd.	5G	3500, 700
9	Vodafone Idea Ltd.	2G	900, 1800
11	Vodafone Idea Ltd.	4G	900,1800,2300,2500

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

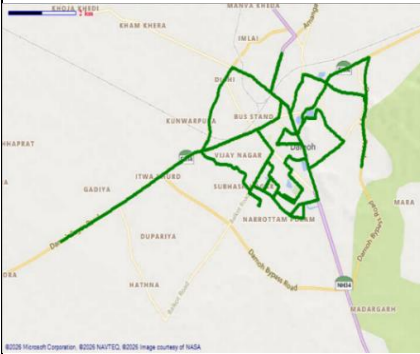
Drive Test Methodology adopted during the Drive test is attached as **Annexure-I**.

QoS Performance Analysis Madhya Pradesh LSA

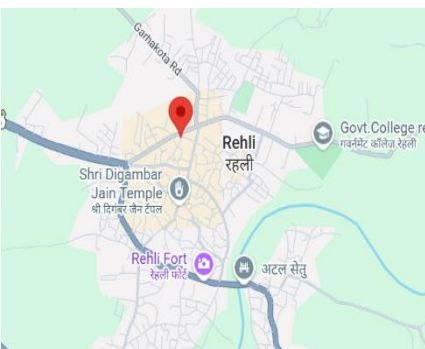
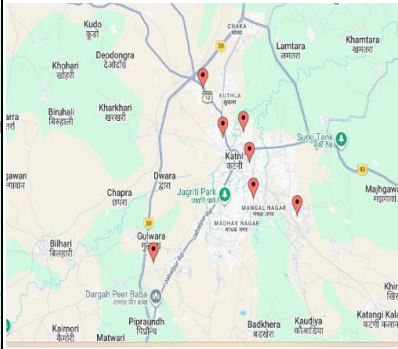
2. Executive Summary

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

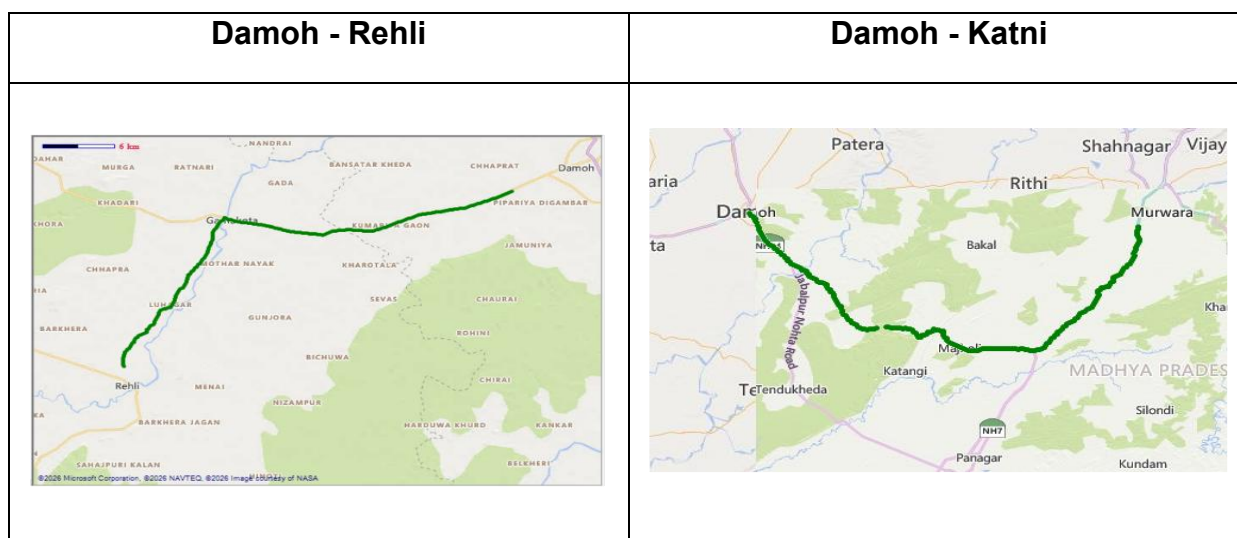
2.1 A. Route Map of Drive test in Cities:

Damoh	Rehli	Katni
		

B. Route Map of Drive test in Hotspot locations:

Damoh	Rehli	Katni
		

C. Route Map of Drive test on Highway:



2.2 Drive Test Area Details

Date	Duration AM to PM	Drive test route	Distance covered (in Kms)
17.03.2026	9 AM to 8 PM	Damoh City	45 KM
17.03.2026	9 AM to 8 PM	Rehli City	15 KM
19.03.2026 & 20.03.2026	9 AM to 8 PM	Katni City	120 KM
17.03.2026	9 AM to 8 PM	Damoh Rehli Highway	55 KM
18.03.2026	9 AM to 8 PM	Damoh Katni Highway	135 KM

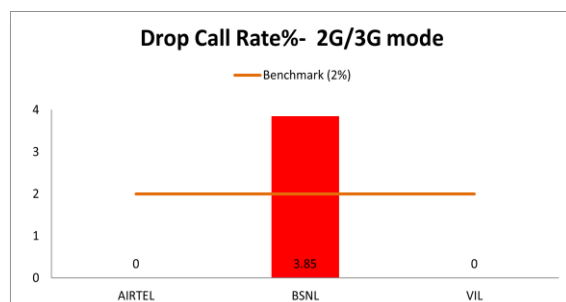
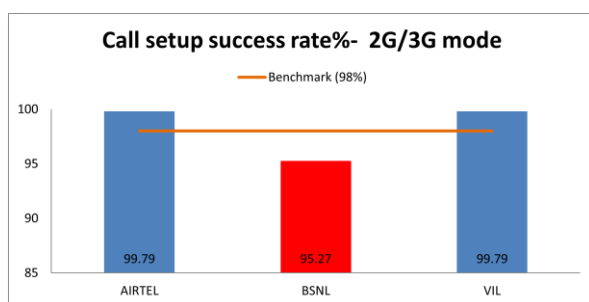
Date	Time	Hotspot Location	Latitude / Longitude
18.03.2026	09:47 AM	Ghanta Ghar	23.835388/79.439668
18.03.2026	10:35 AM	Railway Station	23.835847/79.432422
18.03.2026	11:22 AM	Govt. Polytechnic college	23.811964/79.450545
17.03.2026	6:30 AM	Bus Stand Rehli	23.640521/79.063025
20.03.2026	01:02 PM	Katni Bus Stand, New Badera, Katni	23.843802/80.383425
20.03.2026	02:00 PM	Katni Arts College	23.846227/80.395195
18.03.2026	04:50 PM	Govt. Girls College Katni Gulwara	23.787706/80.339754
20.03.2026	04:45 PM	Railway hospital, New Katni	23.809992/80.428323
20.03.2026	12:12 PM	Krishi Upaj Mandi Samiti	23.866845/80.369212
18.03.2026	06:48 PM	Katni Railway Station	23.834387/80.401726
20.03.2026	04:00 PM	South Katni Railway Station	23.817128/80.401428

2.3 Details of Drive Test Tools used:

TSP	Drive Test tool used
Airtel	TEMS Investigation
RJIL	XCAL
BSNL	3G/2G – TEMS, 4G- AZQ and TEMS
VI	TEMS Investigation

2.4 Key findings (Voice & Data)

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

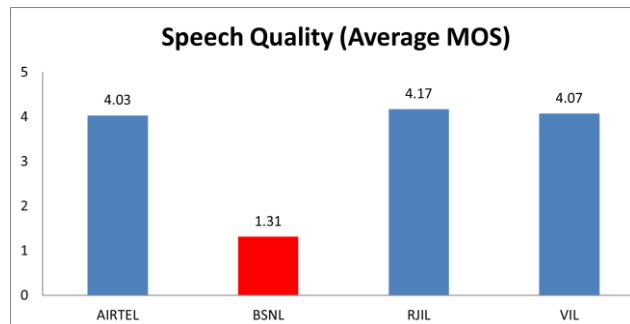
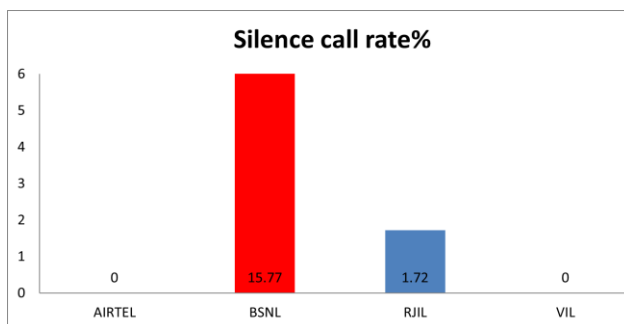
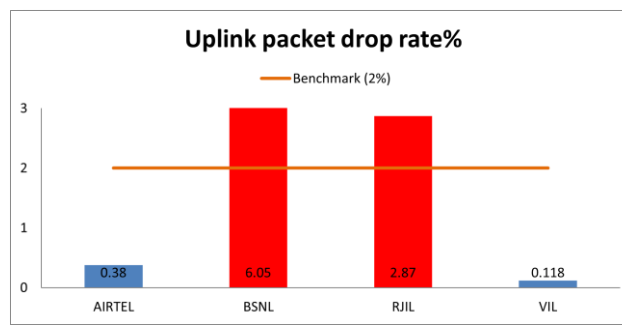
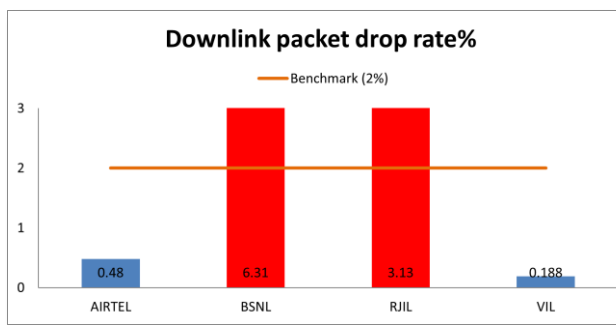
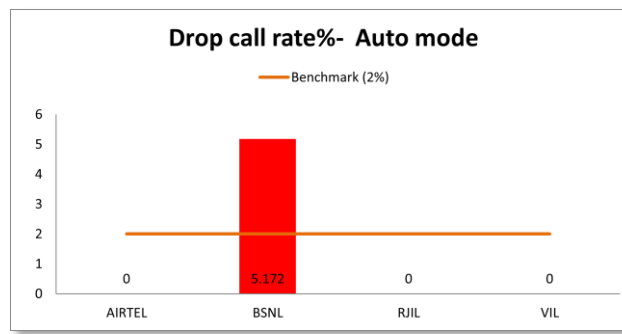
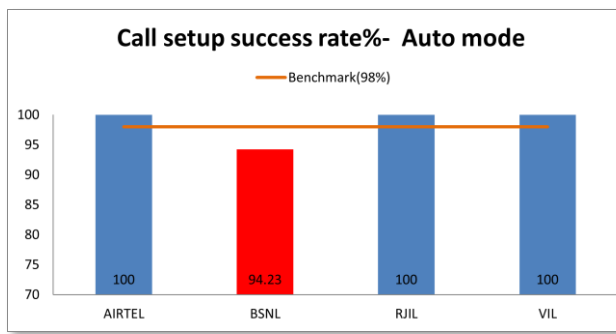


Parameter	Benchmark	AIRTEL	BSNL/MTNL	VIL
Call Attempts		480	486	481
Call Setup Success Rate (in %)	98%	99.79	95.27	99.79
Drop Call Rate (in %)	2%	0.00	3.85	0
Call Setup Time-Average (in Seconds)		3.58	2.99	2.55
Handover Success Rate (in %)		97.89	95.74	95.65

2.3.2 Number of Cell ids latched during drive test

Technology	AIRTEL	BSNL/MTNL	VIL
3G	NA	93	NA
2G	368	99	207

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

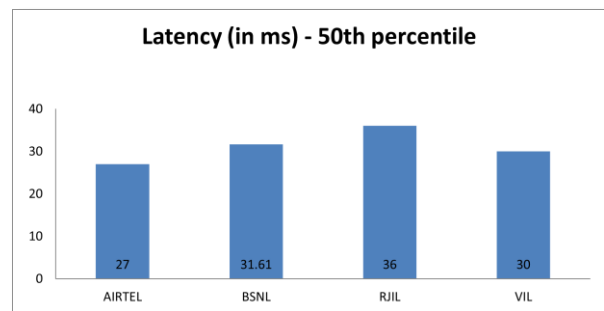
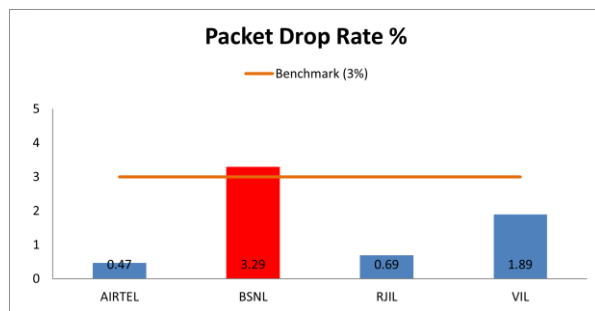
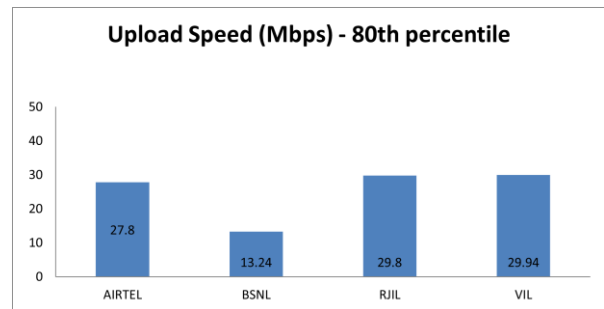
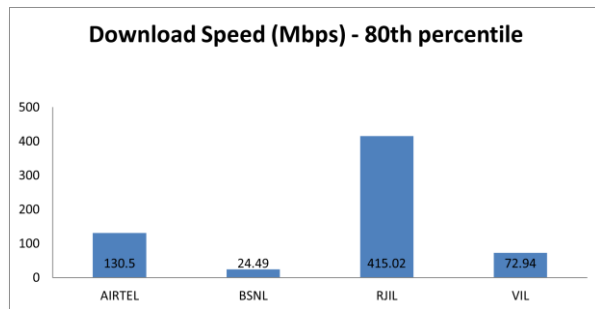


Parameter	AIRTEL	BSNL/MTNL	RJIL	VIL
Call Attempts	508	469	430	478
Call Setup Success Rate %	100	94.23	100	100
Drop Call Rate%	0.00	5.172	0	0
Call Setup Time-Average (Second)	1.25	3.39	1.1	0.77
Handover Success Rate %	99.81	96.43	99.65	100
Downlink Packet drop rate %	0.48	6.31	3.13	0.188
Uplink Packet drop rate %	0.38	6.05	2.87	0.118
Silence Call Rate %*	0.00	15.77	1.72	0
Speech Quality (Average MOS)	4.03	1.31	4.17	4.07

2.3.4 Number of Cell ids latched during drive test

Technology	AIRTEL	BSNL/MTNL	RJIL	VIL
5G	NA		148	
4G	734	140	459	311
3G		93		NA
2G	NA	99		207

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



QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	20 th Percentile	17.06	11.67	21.36	19.36
	Average	78.42	18.1	255.35	46.19
	80th Percentile	130.5	24.49	415.02	72.94
Download Session Setup Success Rate %		98.21	91.38	100	100
Upload speed (Mbps/s)	20 th Percentile	4.50	11.12	1.43	4.39
	Average	16.40	12.09	32.55	16.28
	80th Percentile	27.80	13.24	29.8	29.94
Upload Session Setup Success Rate %		98.32	90.16	100	100
Latency (in ms)	50th Percentile	27.00	31.61	36	30
Jitter (in ms)	Average	8.10	1.8	15.2	9.69
Packet Drop Rate %		0.47	3.29	0.69	1.89
Web browsing delay (in sec)		6.06	2.61	3.32	NA
Video Streaming performance for video		2.00	3.25	0.38	NA

2.3.6 TSP-wise Key Findings:

TSP	Important finding and benchmark not achieved.
Airtel	Voice 99.79% call setup success rate and 0.00% drop call rate have been observed in the lock mode (3G/2G) for LSA. Performance is well within the benchmark of 98.00% & 2.00% respectively. 100.00% call setup success rate and 0.00% drop call rate have been observed in the auto-selection mode (5G/4G/3G/2G) for LSA. Performance is well within the benchmark of 98.00% & 2.00% respectively. 100.00%, 100.00%, 100.00% call setup success rate and 0.00%, 0.00%, 0.00% drop call rate have been observed in the lock mode (3G/2G) for Damoh, Rehli, Katni city drive respectively. 100.00%, 100.00%, 100.00% call setup success rate and 0.00%, 0.00%, 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Damoh, Rehli, Katni city drive respectively. 100.00%, 100.00%, 100.00% call setup success rate and 0.00%, 0.00%, 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for all hotspot locations in Damoh, Rehli, Katni city respectively. 100.00%, 98.15% call setup success rate and 0.00%, 0.00% drop call rate have been observed in lock mode (3G/2G) for Damoh to Rehli and Damoh to Katni highway drive respectively. 100.00%, 100.00% call setup success rate and 0.00%, 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Damoh to Rehli and Damoh to Katni highway drive respectively. Data - Airtel has average download speed of 78.42 Mbps and average upload speed of 16.40 Mbps for LSA.

	- Airtel has average download speed of 84.85, 49.66, 91.24 Mbps and average upload speed of 18.15, 19.06, 17.38 Mbps across measured routes for Damoh, Rehli, Katni city drive respectively. - Airtel has average download speed of 128.54, 70.56, 80 Mbps and average upload speed of 29.75, 31.79, 14.20 Mbps across measured routes at Hotspot Locations in Damoh, Rehli, Katni city respectively. - Airtel has average download speed of 39.89, 57 Mbps and average upload speed of 11.60, 12.97 Mbps across measured routes for Damoh to Rehli and Damoh to Katni highway drive respectively.
BSNL	Voice 95.27% call setup success rate and 3.85% drop call rate have been observed in the lock mode (3G/2G) for LSA. Performance is not within the benchmark of 98.00% & 2.00% respectively. 94.23% call setup success rate and 5.172% drop call rate have been observed in the auto-selection mode (5G/4G/3G/2G) for LSA. Performance is not within the benchmark of 98.00% & 2.00% respectively. 99.25%, 100.00%, 98.7% call setup success rate and 0.75%, 0.00%, 1.23% drop call rate have been observed in the lock mode (3G/2G) for Damoh, Rehli, Katni city drive respectively. 97.29%, 100.00%, 97.97% call setup success rate and 0.92%, 0.00%, 1.65% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Damoh, Rehli, Katni city drive respectively. 100.00%, 100.00%, 100.00% call setup success rate and 0.00%, 0.00%, 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for all hotspot locations in Damoh, Rehli, Katni city respectively. 90.4%, 88% call setup success rate and 10.5%, 6.81% drop call rate have been observed in lock mode (3G/2G) for Damoh to Rehli and Damoh to Katni highway drive respectively. 91.30%, 84.6% call setup success rate and 14.2%, 9.09% drop call rate have been

	observed in auto-selection mode (5G/4G/3G/2G) for Damoh to Rehli and Damoh to Katni highway drive respectively. Data • BSNL has average download speed of 18.1 Mbps and average upload speed of 12.09 Mbps for LSA. • BSNL has average download speed of 18.87, 20.93, 20.28 Mbps and average upload speed of 14.62, 16.24, 16.27 Mbps across measured routes for Damoh, Rehli, Katni city respectively. • BSNL has average download speed of 17.77, 23.09, 12.41 Mbps and average upload speed of 18.06, 14.84, 3.37 Mbps across measured routes at Hotspot Locations in Damoh, Rehli, Katni city respectively. • BSNL has average download speed of 12.20, 22.20 Mbps and average upload speed of 15.61, 11.61 Mbps across measured routes for Damoh to Rehli and Damoh to Katni highway drive respectively.
RJIL	Voice • 100.00% call setup success rate and 0.00% drop call rate have been observed in the auto-selection mode (5G/4G/3G/2G) for LSA. Performance is well within the benchmark of 98.00% & 2.00% respectively. • 100.00%, 100.00%, 100.00% call setup success rate and 0.00%, 0.00%, 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Damoh, Rehli, Katni city drive respectively. • 100.00%, 100.00%, 100.00% call setup success rate and 0.00%, 0.00%, 0.00% drop call rate has been observed in auto-selection mode (5G/4G/3G/2G) for all hotspot locations in Damoh, Rehli, Katni city respectively. • 100.00%, 98.31% call setup success rate and 0.00%, 1.69% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Damoh to Rehli and Damoh to Katni highway drive respectively.

	Data • RJIL has average download speed of 255.35 Mbps and average upload speed of 32.55 Mbps for LSA. • RJIL has average download speed of 273.8, 198, 242.1 Mbps and average upload speed of 38.23, 25, 28.46 Mbps across measured routes for Damoh, Rehli, Katni city drive respectively. • RJIL has average download speed of 292.3, 94.6, 275.35 Mbps and average upload speed of 103.27, 15.81, 53.69 Mbps across measured routes at Hotspot Locations in Damoh, Rehli, Katni city respectively. • RJIL has average download speed of 126.51, 153 Mbps and average upload speed of 17.36, 28.2 Mbps across measured routes for Damoh to Rehli and Damoh to Katni highway drive respectively.
VIL	Voice • 99.79% call setup success rate and 0.00% drop call rate have been observed in the lock mode (3G/2G) for LSA. Performance is within the benchmark of 98.00% & 2.00% respectively. • 100.00% call setup success rate and 0.00% drop call rate have been observed in the auto-selection mode (5G/4G/3G/2G) for LSA. Performance is well within the benchmark of 98.00% & 2.00% respectively. • 100.00%, 100.00%, 100.00% call setup success rate and 0.00%, 0.00%, 0.00% drop call rate have been observed in the lock mode (3G/2G) for Damoh, Rehli, Katni city drive respectively. • 100.00%, 100.00%, 100.00% call setup success rate and 0.00%, 0.00%, 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Damoh, Rehli, Katni city drive respectively. • 100.00%, 100.00%, 100.00% call setup success rate and 0.00%, 0.00%, 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for all hotspot locations in Damoh, Rehli, Katni city respectively. • 94.44%, 100.00% call setup success rate and 0.00%, 0.00% drop call rate have been observed in lock mode (3G/2G) for Damoh to

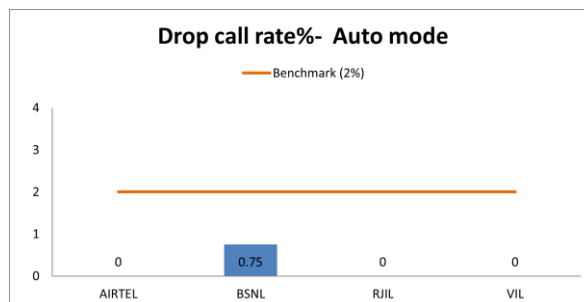
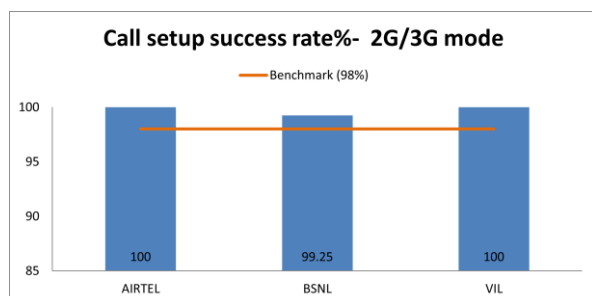
	Rehli and Damoh to Katni highway drive respectively. 100.00%, 100.00% call setup success rate and 0.00%, 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Damoh to Rehli and Damoh to Katni highway drive respectively. Data - VIL has average download speed of 46.19 Mbps and average upload speed of 16.28 Mbps for LSA. - VIL has average download speed of 28.75, 13.34, 54.42 Mbps and average upload speed of 5.16, 12.99, 16.96 Mbps across measured routes for Damoh, Rehli, Katni city drive respectively. - VIL has average download speed of 37.28, 11.11, 44.66 Mbps and average upload speed of 22.77, 23.30, 24.22 Mbps across measured routes at Hotspot Locations in Damoh, Rehli, Katni city respectively. - VIL has average download speed of 26.01, 43.21 Mbps and average upload speed of 11.05, 26.27 Mbps across measured routes for Damoh to Rehli and Damoh to Katni highway drive respectively.
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Detailed QoS Performance Analysis

City – Damoh City

3.0 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)	45	45	N/A	45
No. of Call Attempts	110	133	N/A	89
No. of Call Established	110	132	N/A	89
Call setup success rate (CSSR) %	100	99.25	N/A	100
No. of Drop Call	0	01	N/A	0
Drop Call Rate %	0.00	0.75	N/A	0
Call Setup Time Average (Sec.)	3.78	2.84	N/A	2.48
No. of Handover Attempts	140	68	N/A	194
No. of Handover success	137	66	N/A	191
HOSR %	97.86	97	N/A	98.45
Total no of RLT Occurrence	21782	18	N/A	32
No of RLT > 48	0	0	N/A	0

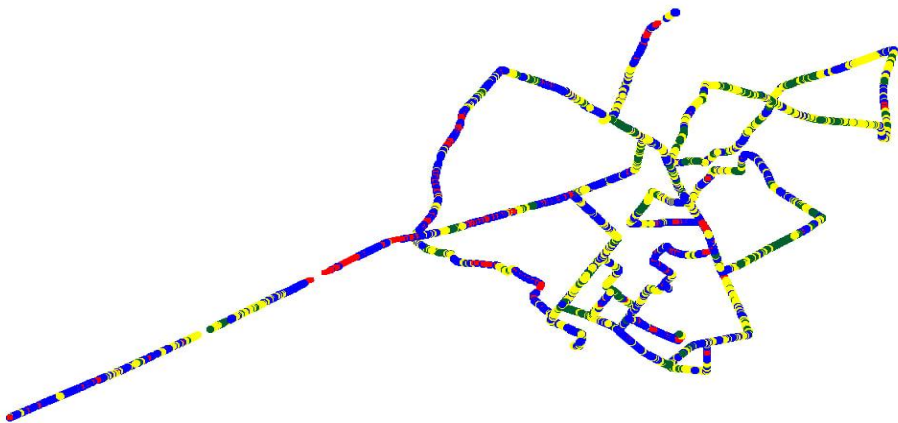
3.1.2 Number of Cell ids latched during drive test (3G/2G - Lock mode)

Number of unique Cell ids covered in Voice test				
Technology	AIRTEL	BSNL/MTNL	RJIL	VIL
3G	NA	42		NA
2G	77	42		64

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

Parameter Name	Technology	Signal Strength (dBm)			
		Excellent	Good	Fair	Poor
Rx Level	GSM	0 to $\geq$ -65	<-65 to $\geq$ -75	<-75 to $\geq$ -85	<-85 to min
RSCP	WCDMA	0 to $\geq$ -70	<-70 to $\geq$ -80	<-80 to $\geq$ -90	<-90 to min
RSRP	LTE	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min
SS_RSRP	NR	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min

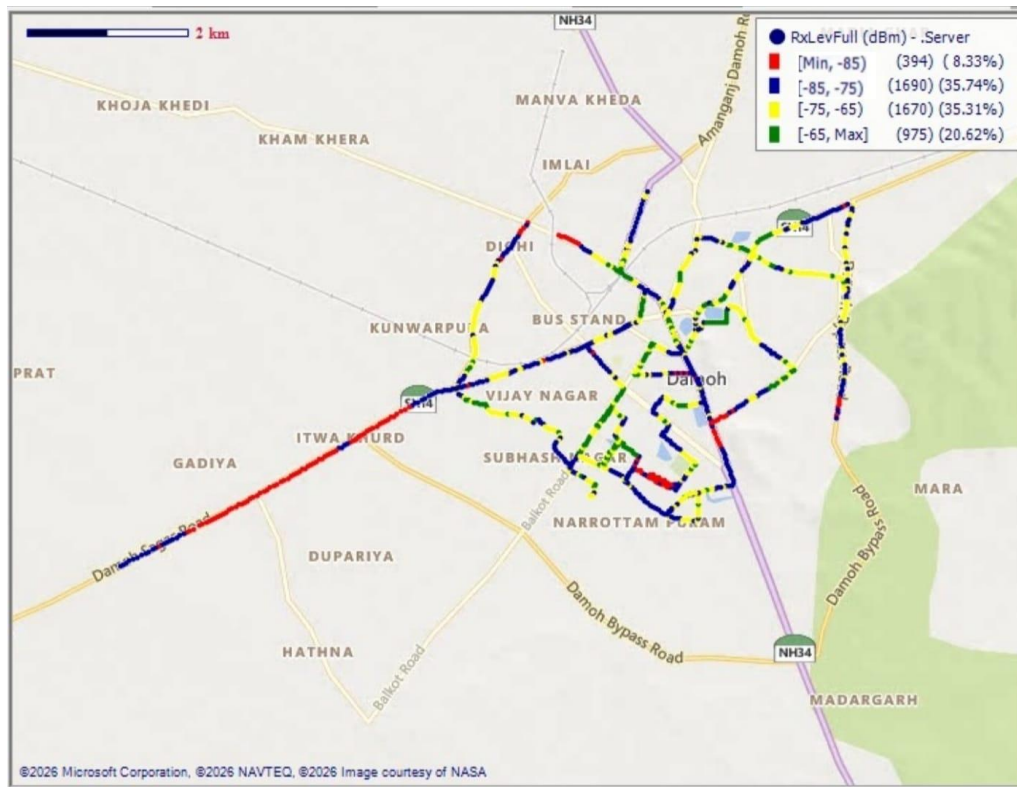
TSP - Airtel



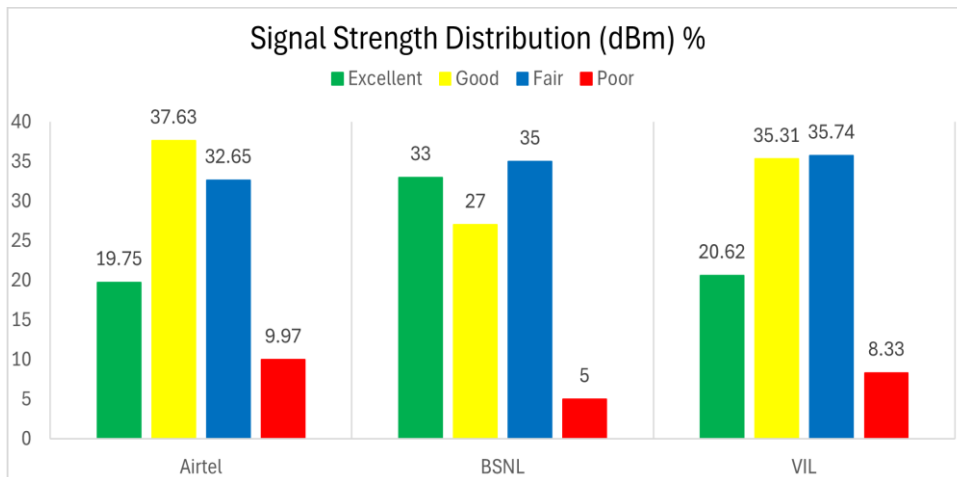
TSP - BSNL



TSP - VIL



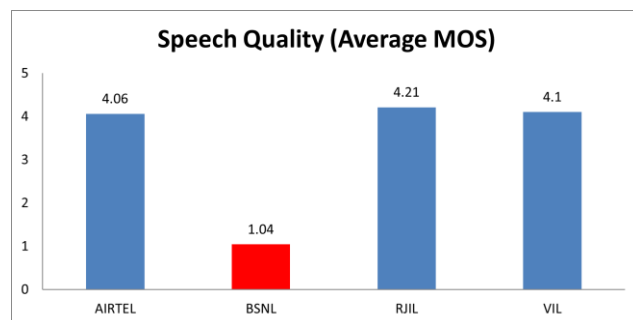
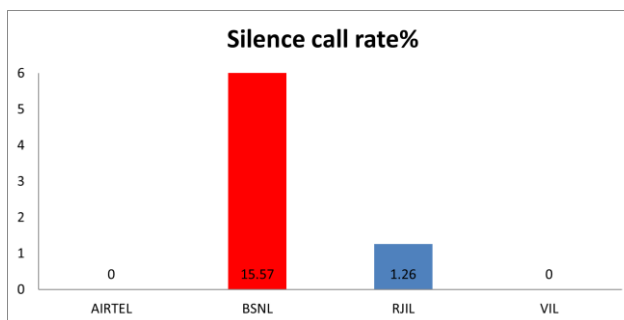
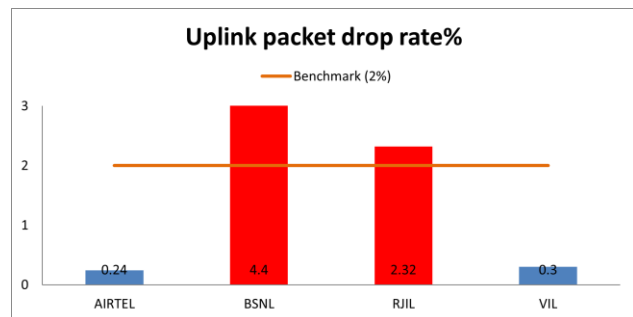
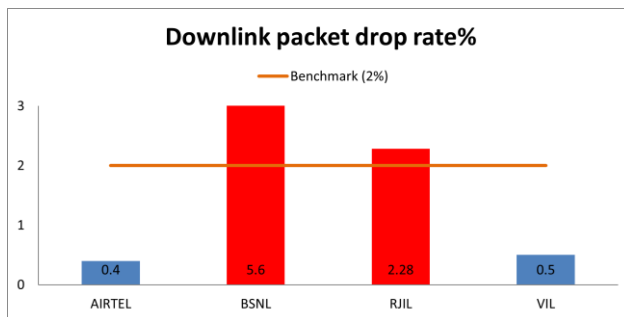
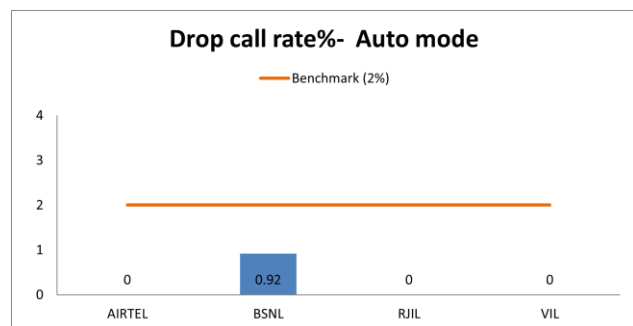
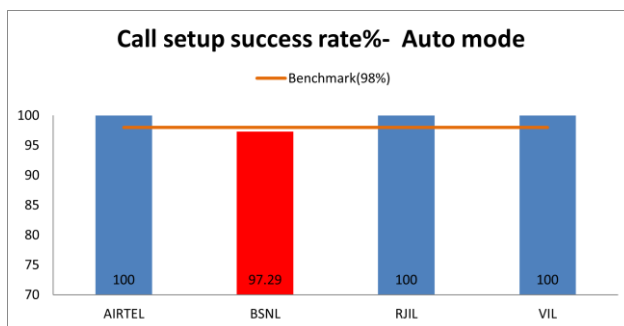
3.1.4 Signal Strength distribution: (3G/2G - Lock mode)



Rx Level -2G								
Overall Rx Level	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-65]	390297	13698	NA	975	19.75	33	NA	20.62
[-65, ≥-75]	743427	11207	NA	1670	37.63	27	NA	35.31
[-75, ≥-85]	645056	14528	NA	1690	32.65	35	NA	35.74
[-85, ≥Min]	197019	2075	NA	394	9.97	5	NA	8.33
Total	1975799	41508	NA	4729	100	100	NA	100

Rx Level -3G								
Overall RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
s[Max, ≥-70]	NA	732964	NA	NA	NA	92.78	NA	NA
[-70, ≥-80)	NA	8346	NA	NA	NA	1.06	NA	NA
[-80, ≥-90)	NA	23711	NA	NA	NA	3.00	NA	NA
[-90, ≥Min)	NA	25006	NA	NA	NA	3.17	NA	NA
Total	NA	790027	NA	NA	NA	100	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)	45	45	45	45
No. of Call Attempts	118	111	123	79
No. of Call Established	118	108	123	79
Call setup success rate (CSSR) %	100	97.29	100	100
No. of Drop Call	0	01	0	0
Drop Call Rate %	0	0.92	0	0
Call Setup Time Average (Sec.)	1.24	3.07	1.13	0.79
No. of Handover Attempts	269	158	734	353
No. of Handover success	268	157	732	353
HOSR %	99.63	99.36	99.73	100
Packet Drop Rate (Downlink)	0.40	5.6	2.28	0.50
Packet Drop Rate (Uplink)	0.24	4.4	2.32	0.30
Number of silence call for > 2 sec.	0	33	3	0
Silence Call Rate %	0.00	15.57	1.26	0
Number of MOS samples	673	33	555	602
Average MOS score	4.06	1.04	4.21	4.10

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

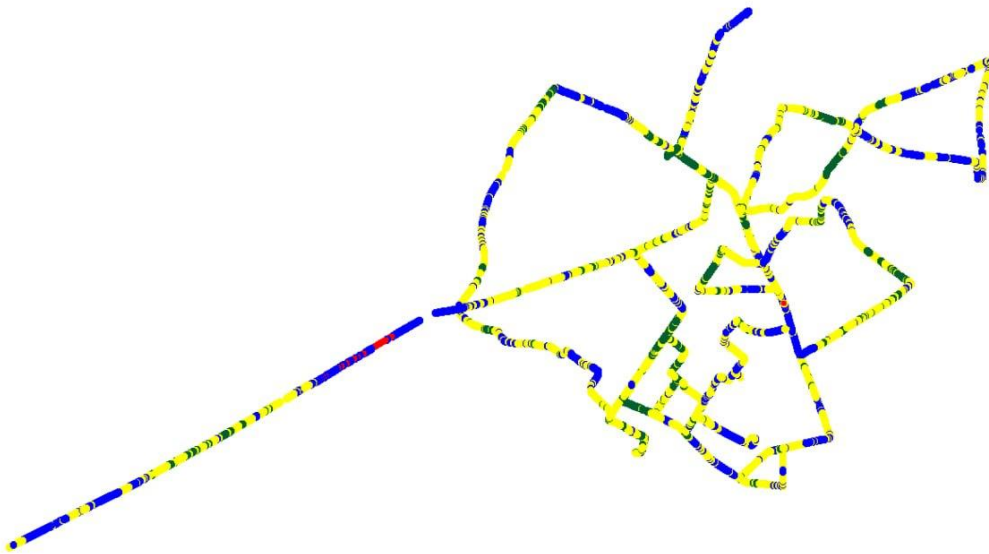
Number of unique cell ids covered in Voice test				
Technology	Service Provider			
	AIRTEL	BSNL/MTNL	RJIL	VIL
3G	NA	42	NA	NA
2G	NA	42	NA	NA
4G	136	42	68	28
5G	NA	00	36	NA

Table-6

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

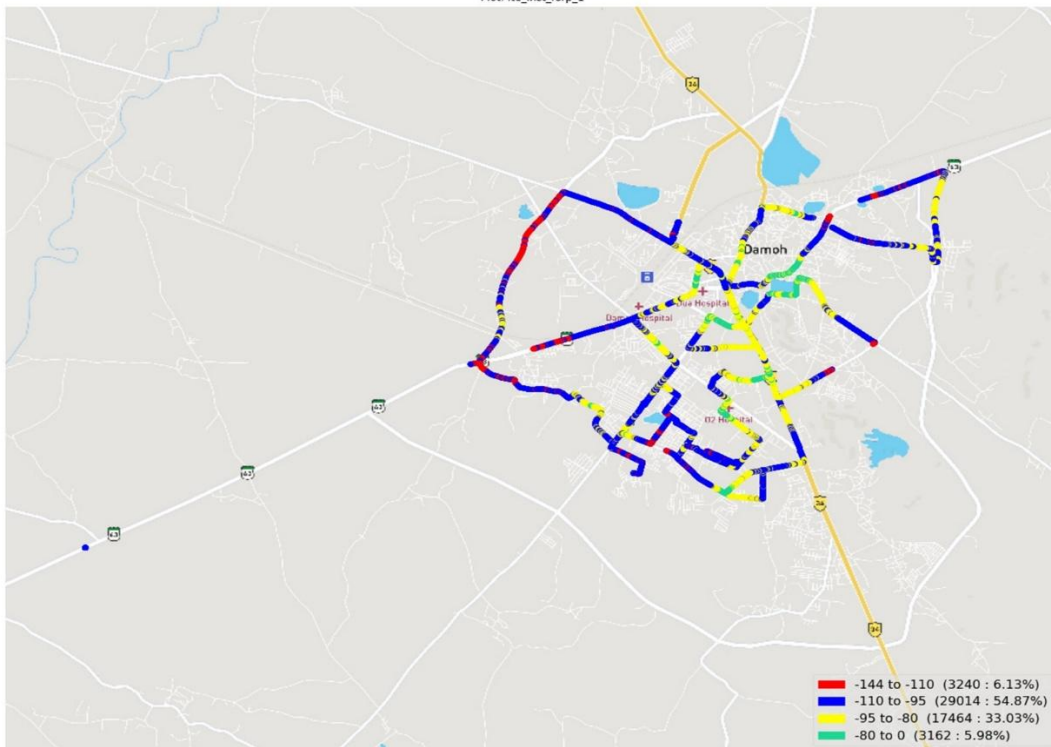
Parameter Name	Technology	Signal Strength (dBm)			
		Excellent	Good	Fair	Poor
Rx Level	GSM	0 to $\geq$ -65	<-65 to $\geq$ -75	<-75 to $\geq$ -85	<-85 to min
RSCP	WCDMA	0 to $\geq$ -70	<-70 to $\geq$ -80	<-80 to $\geq$ -90	<-90 to min
RSRP	LTE	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min
SS_RSRP	NR	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min

TSP - Airtel



TSP - BSNL

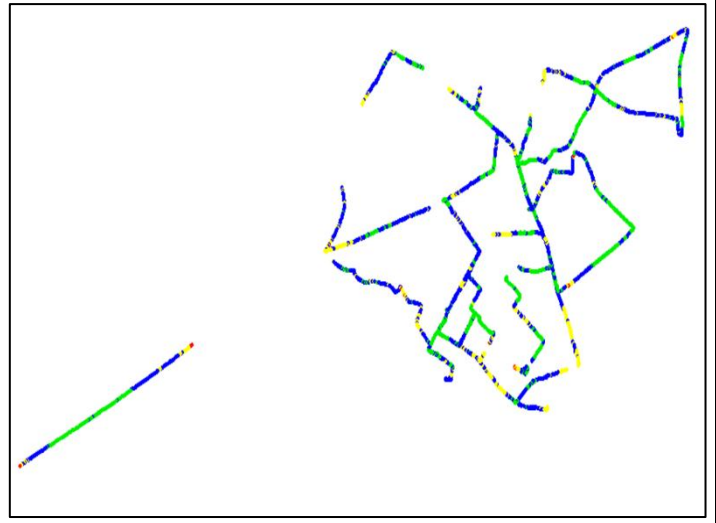
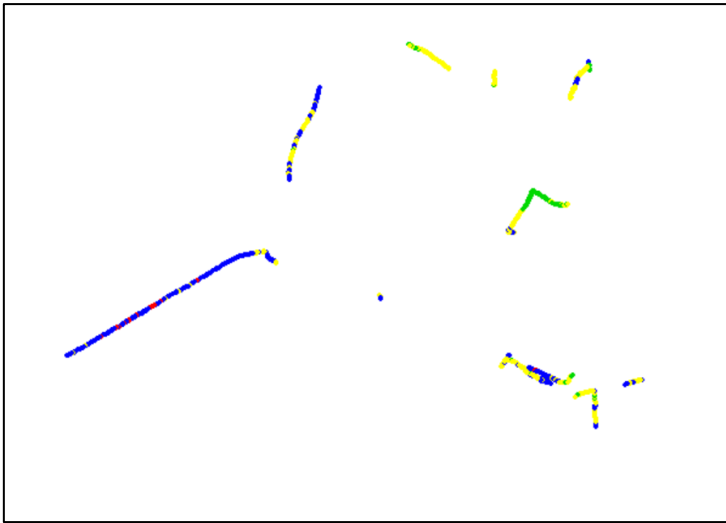
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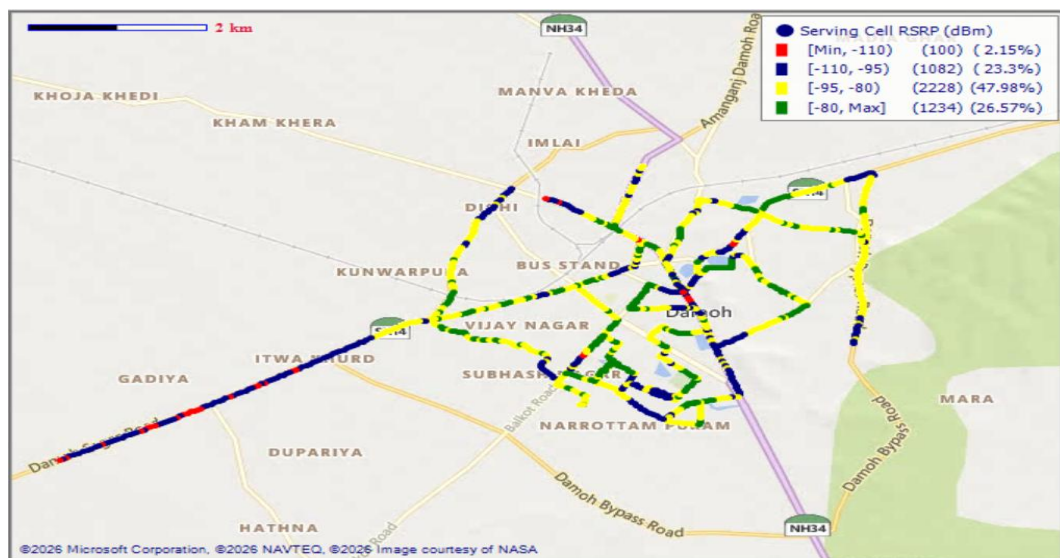
TSP - RJIL

LTE

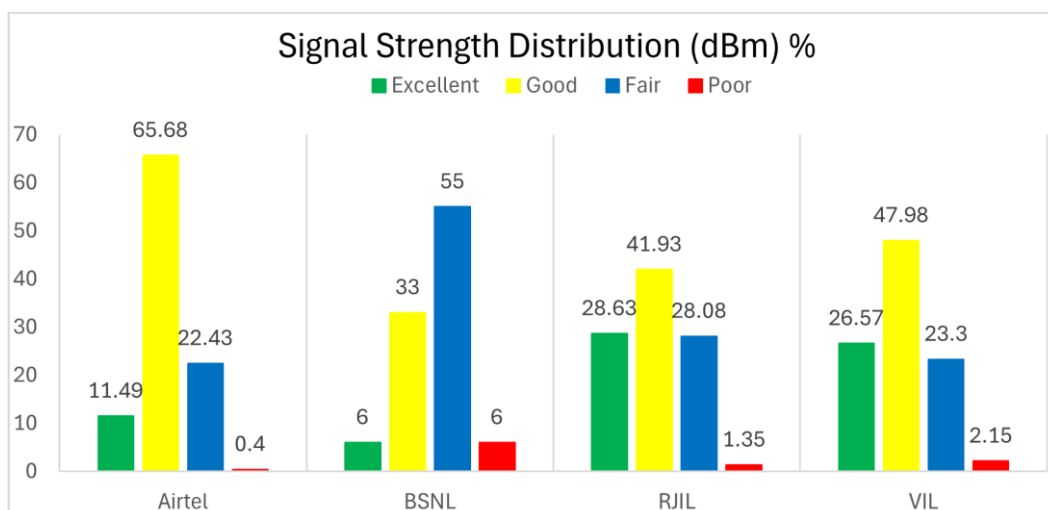
NR



TSP - VIL



3.2.4 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]	NA	12	NA	NA	NA	6	NA	NA
[-65, ≥-75)	NA	68	NA	NA	NA	33	NA	NA
[-75, ≥-85)	NA	113	NA	NA	NA	55	NA	NA
[-85, ≥Min]	NA	12	NA	NA	NA	6	NA	NA
Total	NA	205	NA	NA	NA	100	NA	NA

Rx Level -3G								
Overall RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-70]	NA	30	NA	NA	NA	6	NA	NA
[-70, ≥-80)	NA	163	NA	NA	NA	33	NA	NA
[-80, ≥-90)	NA	272	NA	NA	NA	55	NA	NA
[-90, ≥Min]	NA	30	NA	NA	NA	6	NA	NA
Total	NA	494	NA	NA	NA	100	NA	NA

Rx Level -4G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	419837	3162	465	1234	11.49	6	28.63	26.57
[-80, ≥-95]	2399890	17464	681	2228	65.68	33	41.93	47.98
[-95, ≥-110]	819517	29014	456	1082	22.43	55	28.08	23.3
[-110, ≥Min]	14477	3240	22	100	0.40	6	1.35	2.15
Total	3653721	52880	1626	4644	100.00	100	100	100

Rx Level -5G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	NA	NA	3725	NA	NA	NA	33.23	NA
[-80, ≥-95]	NA	NA	6093	NA	NA	NA	54.36	NA
[-95, ≥-110]	NA	NA	1352	NA	NA	NA	12.06	NA
[-110, ≥Min]	NA	NA	39	NA	NA	NA	0.35	NA
Total	NA	NA	11209	NA	NA	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	84.85	18.87	273.8	28.75
	80th Percentile	142.1	34.28	426.72	45.15
	20th Percentile	21.7	12.08	19.23	11.87
Upload speed (Mbps/s)	Average	18.15	14.62	38.23	5.16
	80th Percentile	28.5	22.62	69.80	4.61
	20th Percentile	7.08	9.82	3.21	1.23
Latency (ms)	Average	30.16	45.12	37.6	43.94
	50th Percentile	30.00	58.46	33	30
Jitter (ms)	Average	8.83	0.86	13.94	17.74

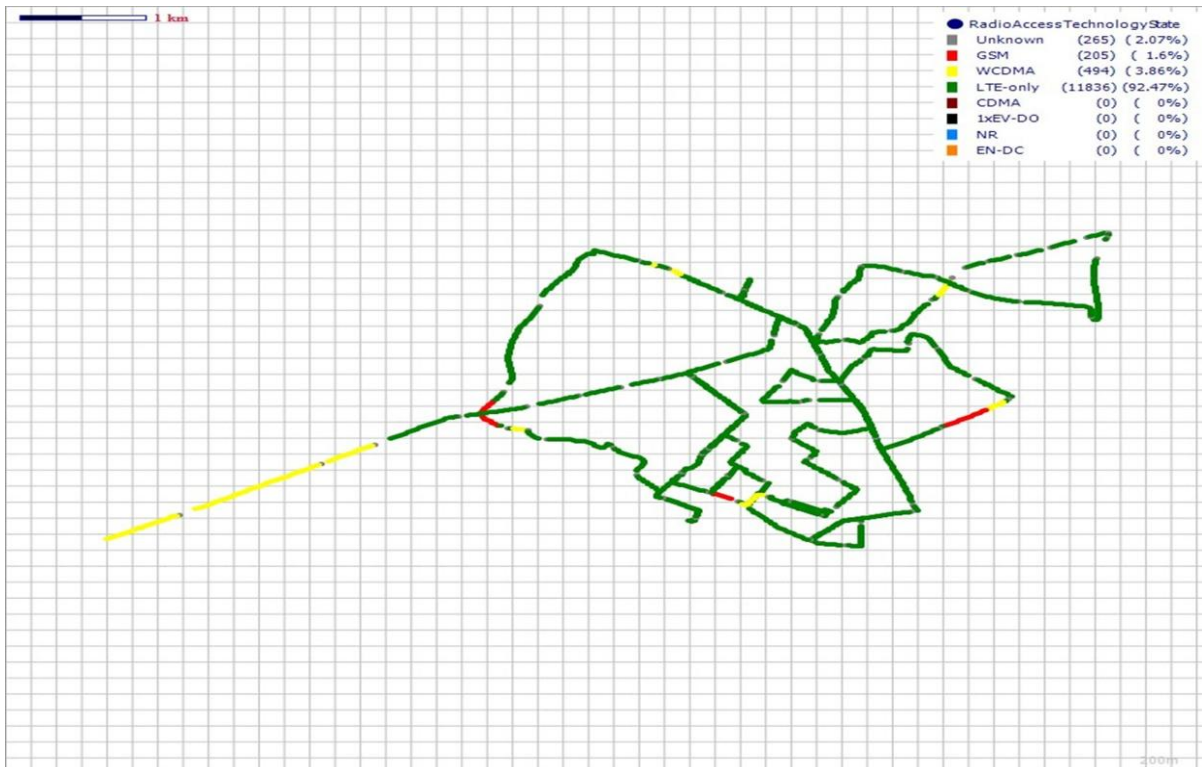
3.4 Time Spent (Technology-wise)

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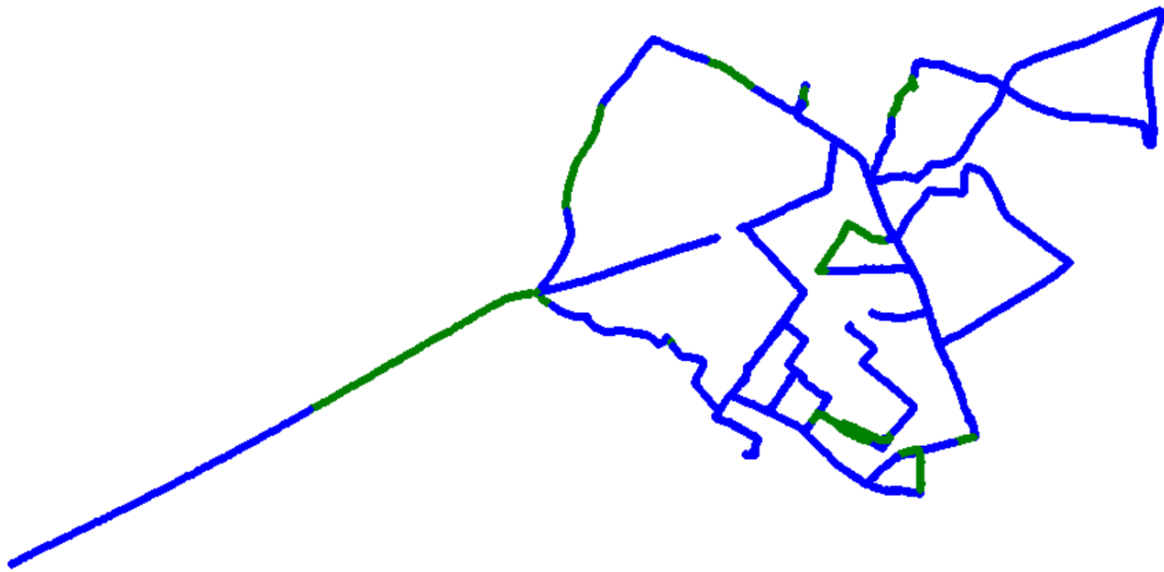
TSP – Airtel



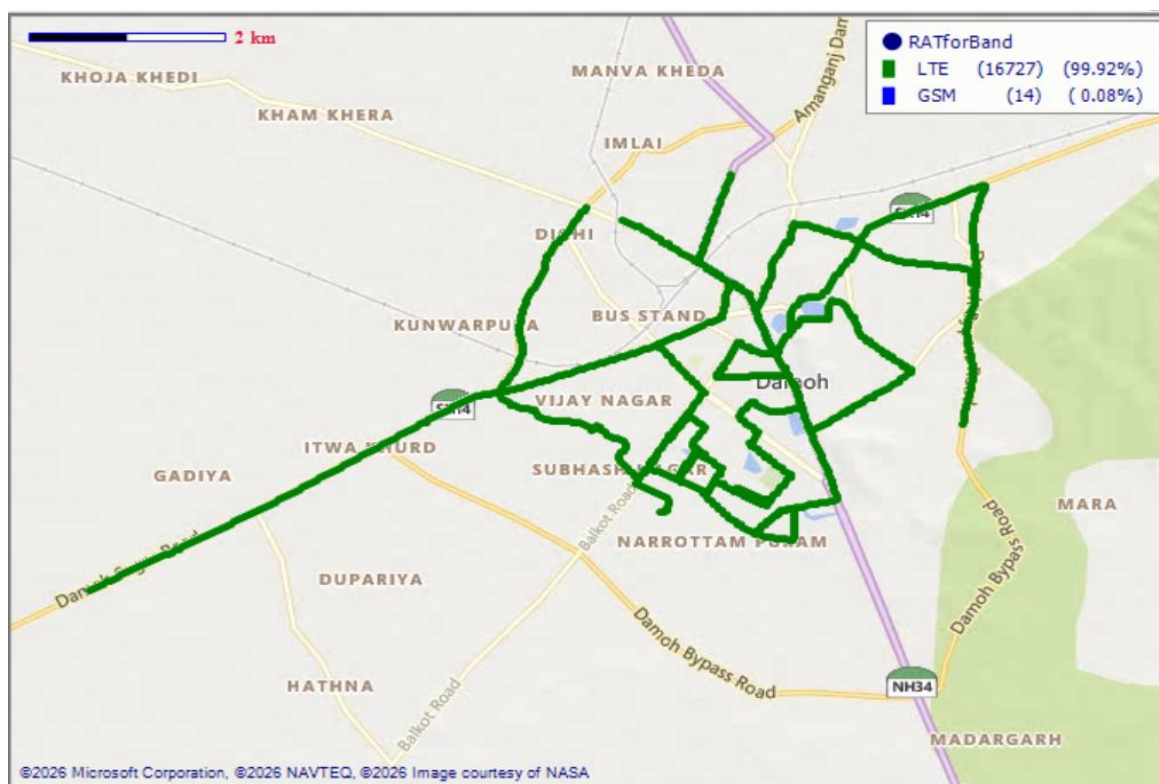
TSP – BSNL



TSP - RJIL

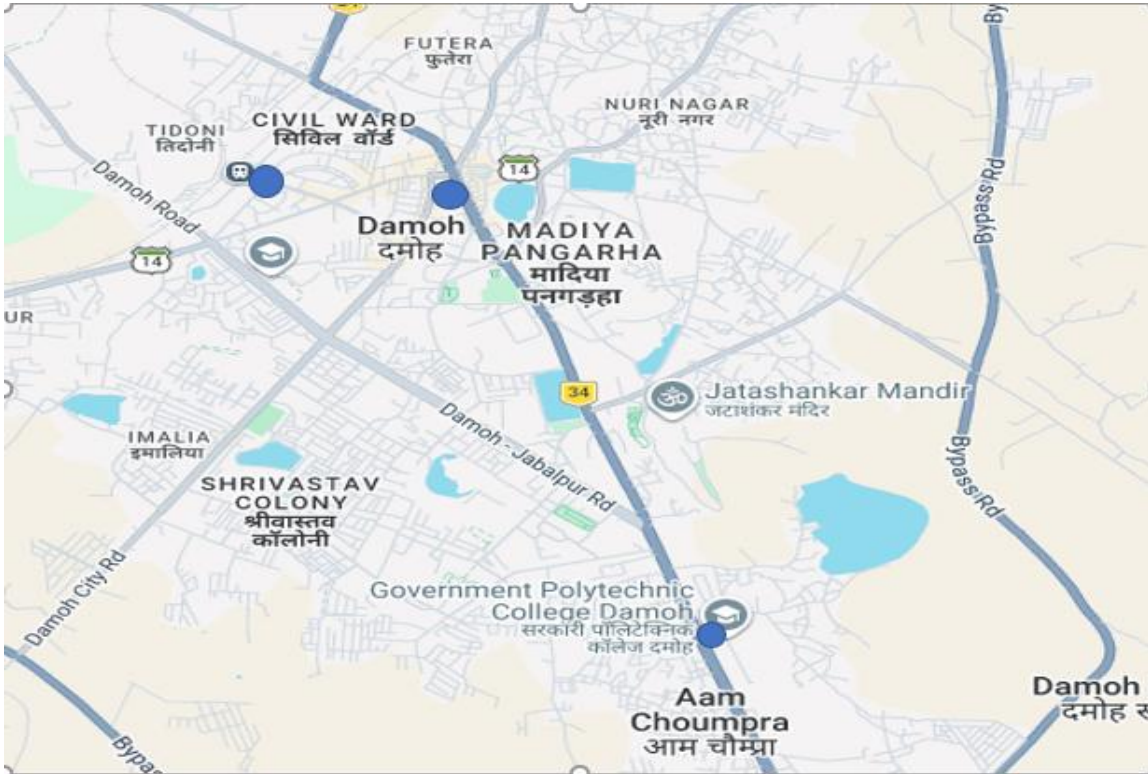


TSP - VIL



4.0 QoS Performance Analysis - Static

4.1 Hot spot Locations



Hotspot Name	Latitude & Longitude	Date of Measurement	Time of Measurement
Ghanta Ghar	23.835388,79.439668	18.03.2026	09:45 to 10:30 AM
Railway Station	23.835847,79.432422	18.03.2026	10:45 to 11:30 AM
Govt.Polytechnic college	23.811964,79.450545	18.03.2026	11:40 to 12:00 AM

Table-12

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

Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	56	30	30	30
No of Call Established	56	30	30	30
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.36	3.21	1.09	0.81

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

QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	20 th Percentile	35.68	16.31	121.19	18.70
	Average	128.54	17.77	292.3	37.28

	80th Percentile	232.2	18.25	528.4	52.88
Download Session Setup Success Rate %		100	75.33	100	100
Upload speed (Mbps/s)	20 th Percentile	25.82	17.26	48.8	14.49
	Average	29.75	18.06	103.27	22.77
	80th Percentile	35.4	18.64	184.2	31.04
Upload Session Setup Success Rate %		100	72.67	100	100
Latency (in ms)	50th Percentile	33.00	35.78	33	24
Jitter (in ms)	Average	10.11	0.54	5.10	5.38
Packet Drop Rate %		0.00	5.05	0.03	0.00
Web browsing delay (in sec)		7.11	2.67	3.19	3.98
Video Streaming performance for video		2.29	3.39	0.41	0.99

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

Name of Hotspot Location	1. Clock Tower Circuit (Ghanta Ghar) Damoh			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	19	10	10	10
No of Call Established	19	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0.00	0	0	0
Call Setup Time Average (Sec.)	1.38	3.11	1.1	0.66
Total no of RLT Occurrence	N/A	0	N/A	40
No of RLT > 48	N/A	0	N/A	0

Name of Hotspot Location	2. Government Polytechnic College Damoh			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	19	10	10	10
No of Call Established	19	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0.00	0	0	0
Call Setup Time Average (Sec.)	1.34	3.07	1.09	0.76
Total no of RLT Occurrence	N/A	0	N/A	32
No of RLT > 48	N/A	0	N/A	0

Name of Hotspot Location	3. Damoh Railway Station			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	18	10	10	10
No of Call Established	18	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.35	3.46	1.08	0.95
Total no of RLT Occurrence	N/A	0	N/A	32
No of RLT > 48	N/A	0	N/A	0

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

Name of Hotspot Location		1. Clock Tower Circuit (Ghanta Ghar)			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	147.52	19.25	487.9	46.41
Download Session Setup Success Rate %		100	100	100	100
Upload speed (Mbps/s)	Average	29.19	12.7	145.2	15.51
Upload Session Setup Success Rate %		100	100	100	100
Latency (in ms)	50th Percentile	25	58	30	29
Jitter (in ms)	Average	7.34	5.57	4.74	6.63
sPacket Drop Rate %		0	5.25	0	0.50
Web browsing delay (in sec)		6.43	3.82	3.31	4.05
Video Streaming performance for video		2.90	4.16	0.41	1.02

Name of Hotspot Location		2. Government Polytechnic College			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	87.75	14.87	158.10	26.59
Download Session Setup Success Rate %		100	100	100	100
Upload speed (Mbps/s)	Average	26.98	10.41	57.64	18.92
Upload Session Setup Success Rate %		100	100	100	100
Latency (in ms)	50th Percentile	35	61	35	24
Jitter (in ms)	Average	13.63	6.49	4.81	6.11
Packet Drop Rate %		0	4.81	0.10	0.20

Web browsing delay (in sec)	8.21	2.78	3.09	3.92
Video Streaming performance for video	0.94	3.46	0.4	0.98

Name of Hotspot Location		3. Damoh Railway Station			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	186.68	16.5	548.6	41.63
Download Session Setup Success Rate %		100	100	100	100
Upload speed (Mbps/s)	Average	34.10	11.28	179.4	32.02
Upload Session Setup Success Rate %		100	100	100	100
Latency (in ms)	50th Percentile	35	62	35	21
Jitter (in ms)	Average	7.42	5.7	4.5	3.40
Packet Drop Rate %		0	0	0	0.14
Web browsing delay (in sec)		7	2.95	3.17	3.97
Video Streaming performance for video		3.14	3.24	0.37	0.96

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/MTNL	RJIL	VIL
[Max, ≥-65]	NA	19472	NA	417	NA	18	NA	25.9
[-65, ≥-75)	NA	84231	NA	794	NA	76	NA	49.32
[-75, ≥-85)	NA	4769	NA	399	NA	4	NA	24.78
[-85, ≥Min)	NA	2297	NA	0	NA	2	NA	0
Total	NA	110769	NA	1610	NA	100	NA	100

Rx Level -3G								
Overall RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-70]	NA	20968	NA	NA	NA	19	NA	NA
[-70, ≥-80)	NA	54735	NA	NA	NA	48	NA	NA
[-80, ≥-90)	NA	33960	NA	NA	NA	30	NA	NA
[-90, ≥Min)	NA	3467	NA	NA	NA	3	NA	NA
Total	NA	113130	NA	NA	NA	100	NA	NA

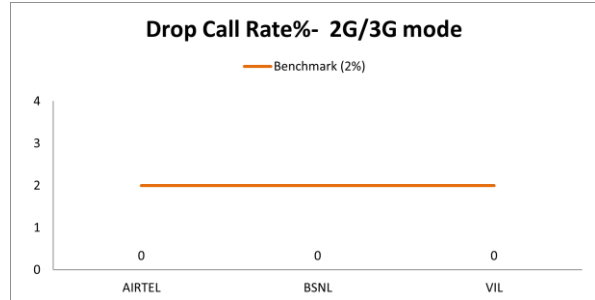
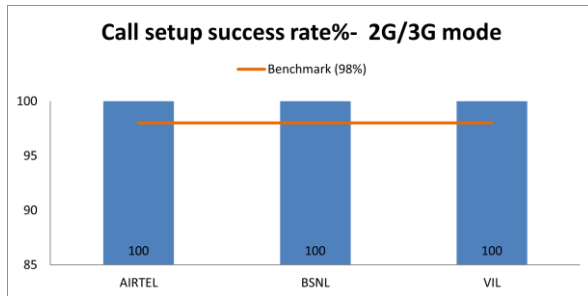
Rx Level -4G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	1334	84768	NA	728	45.53	75	NA	35.49
[-80, ≥-95]	1571	14203	NA	800	53.62	13	NA	39.01
[-95, ≥-110]	25	13876	NA	523	0.85	12	NA	25.5
[-110, ≥Min]	0	241	NA	0	0.00	0	NA	0
Total	2930	113088	NA	2051	100	100	NA	100

Rx Level -5G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	111	NA	3154	NA	47.03	NA	93.70	NA
[-80, ≥-95]	125	NA	211	NA	52.97	NA	6.27	NA
[-95, ≥-110]	0	NA	1	NA	0.00	NA	0.03	NA
[-110, ≥Min]	0	NA	0	NA	0.00	NA	0	NA
Total	236	NA	3366	NA	100	NA	100	NA

City – Rehli City

5.0 QoS Performance Analysis - Dynamic

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



Parameters	Airtel	BSNL/MTNL	RJIL	VIL
Total Distance covered (in Kms)	15	15	N/A	15
No. of Call Attempts	32	37	N/A	28
No. of Call Established	32	37	N/A	28
Call setup success rate (CSSR) %	100	100	N/A	100
No. of Drop Call	0	00	N/A	0
Drop Call Rate %	0	0	N/A	0
Call Setup Time Average (Sec.)	3.55	2.48	N/A	2.45
No. of Handover Attempts	38	64	N/A	20
No. of Handover success	37	64	N/A	20
HOSR %	97.37	100	N/A	100
Total no of RLT Occurrence	6029	0	N/A	32
No of RLT > 48	0	0	N/A	0

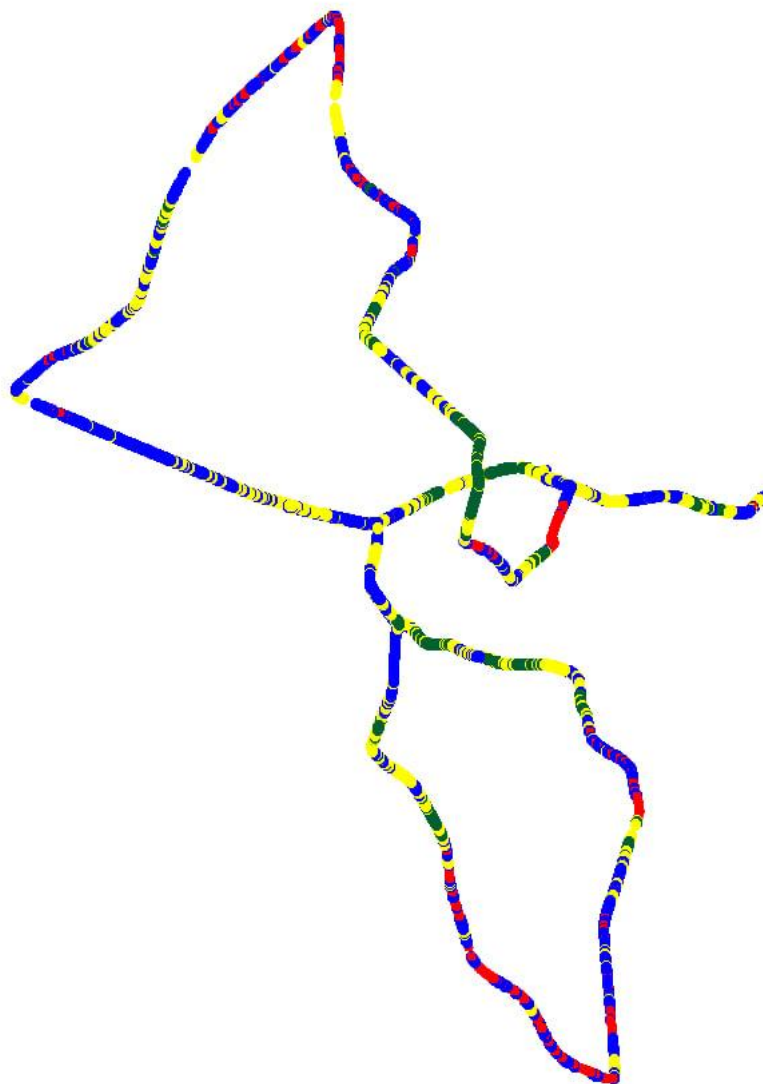
5.1.2 Number of Cell ids latched during drive test (3G/2G - Lock mode)

Number of unique Cell ids covered in Voice test				
Technology	AIRTEL	BSNL/MTNL	RJIL	VIL
3G	NA	00		NA
2G	15	06		09

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

Parameter Name	Technology	Signal Strength (dBm)			
		Excellent	Good	Fair	Poor
Rx Level	GSM	0 to $\geq$ -65	<-65 to $\geq$ -75	<-75 to $\geq$ -85	<-85 to min
RSCP	WCDMA	0 to $\geq$ -70	<-70 to $\geq$ -80	<-80 to $\geq$ -90	<-90 to min
RSRP	LTE	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min
SS_RSRP	NR	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min

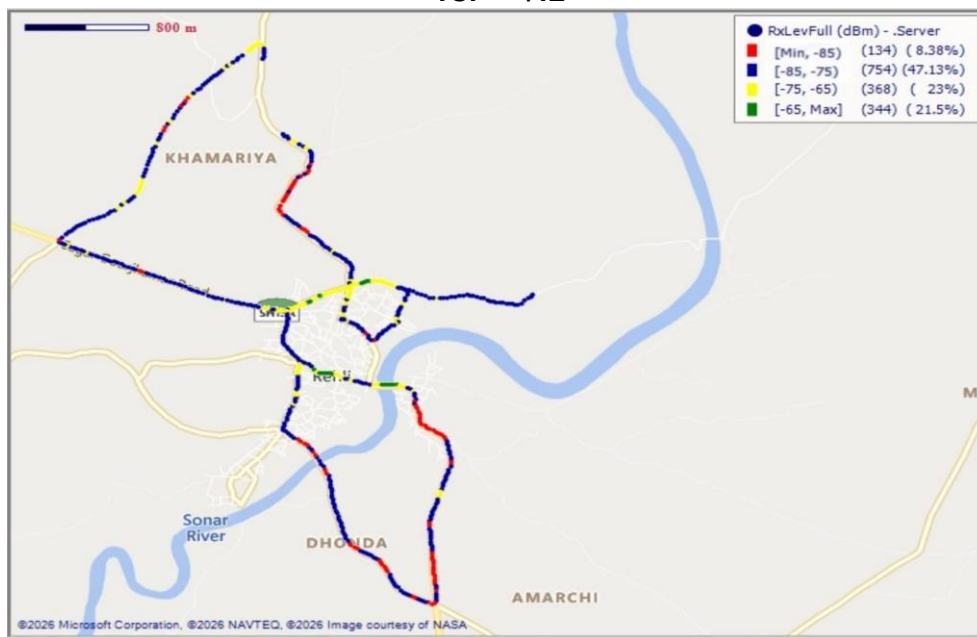
TSP - Airtel



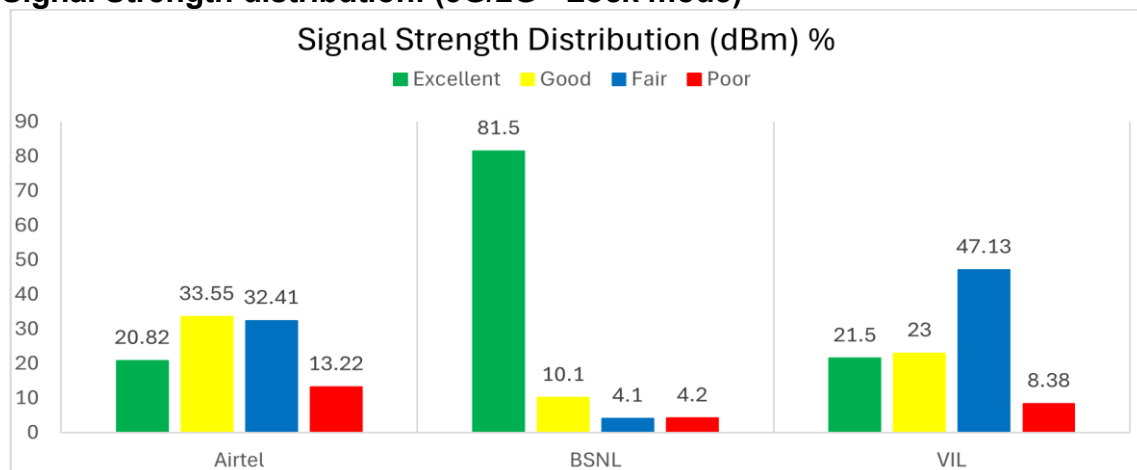
TSP - BSNL



TSP - VIL



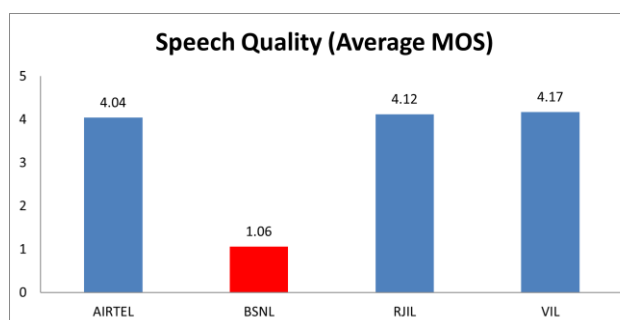
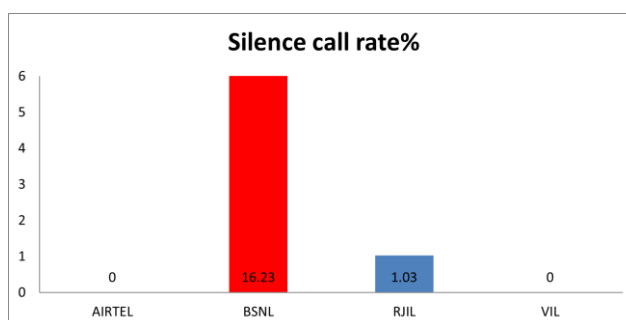
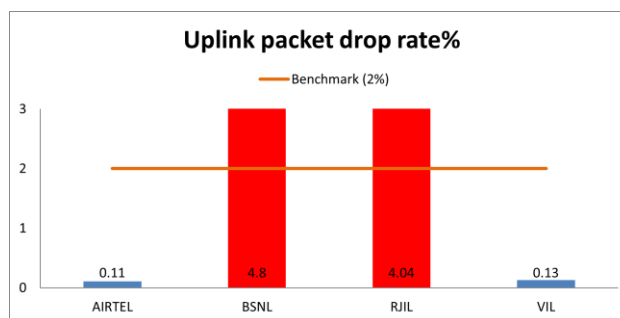
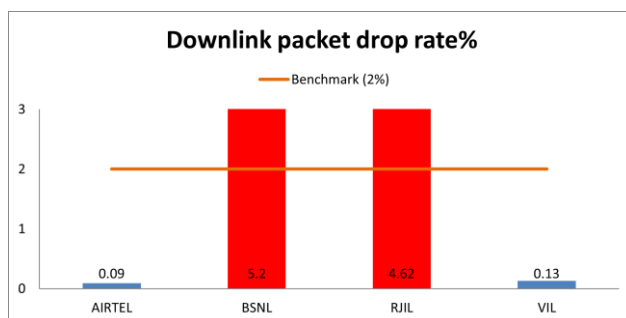
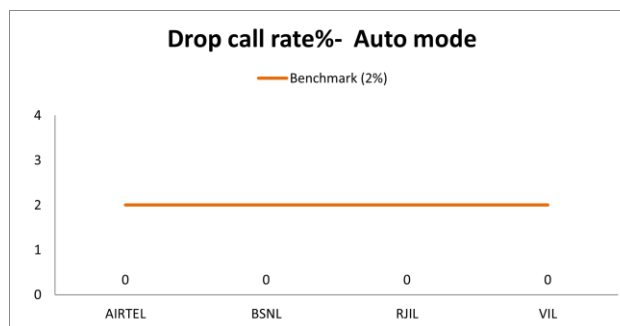
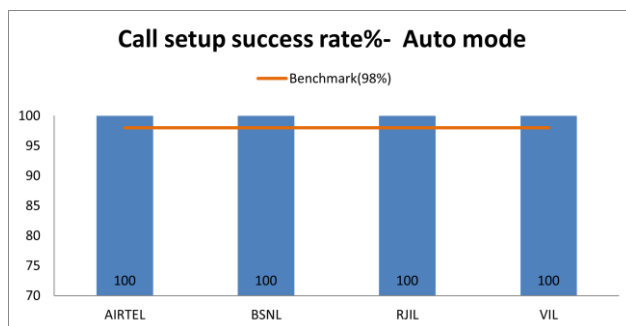
5.1.4 Signal Strength distribution: (3G/2G - Lock mode)



Rx Level -2G								
Overall Rx Level	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-65]	112325	362567	NA	344	20.82	81.5	NA	21.5
[-65, ≥-75]	181017	45052	NA	368	33.55	10.1	NA	23.00
[-75, ≥-85]	174871	18482	NA	754	32.41	4.1	NA	47.13
[-85, ≥Min)	71400	18536	NA	134	13.22	4.1	NA	8.38
Total	539613	444637	NA	1600	100	100	NA	100

Rx Level -3G								
Overall 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

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



Parameters	Airtel	BSNL/MTNL	RJIL	VIL
Total Distance covered (in Kms)	15	15	15	15
No. of Call Attempts	33	36	29	29
No. of Call Established	33	36	29	29
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	00	0	0
Drop Call Rate %	0	00	0.00	0
Call Setup Time Average (Sec.)	1.25	3.06	1.21	0.66
No. of Handover Attempts	69	67	282	74
No. of Handover success	69	67	281	74
HOSR %	100	100	99.64	100

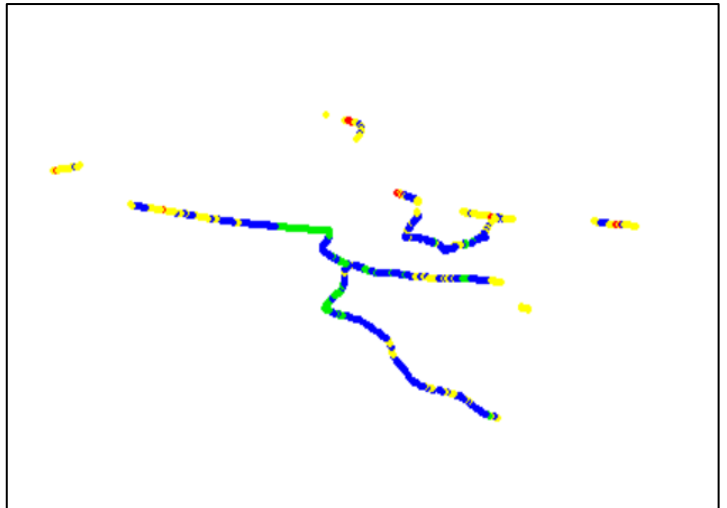
TSP - BSNL



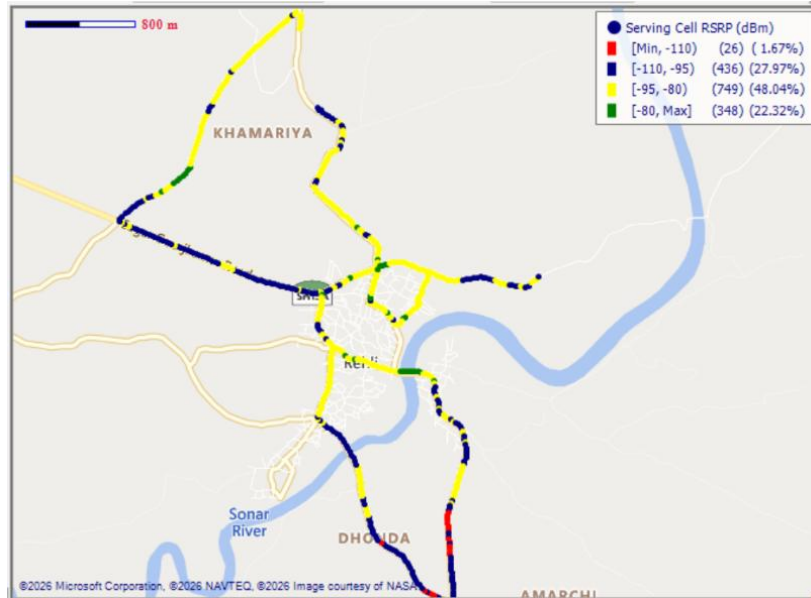
TSP - RJIL

LTE

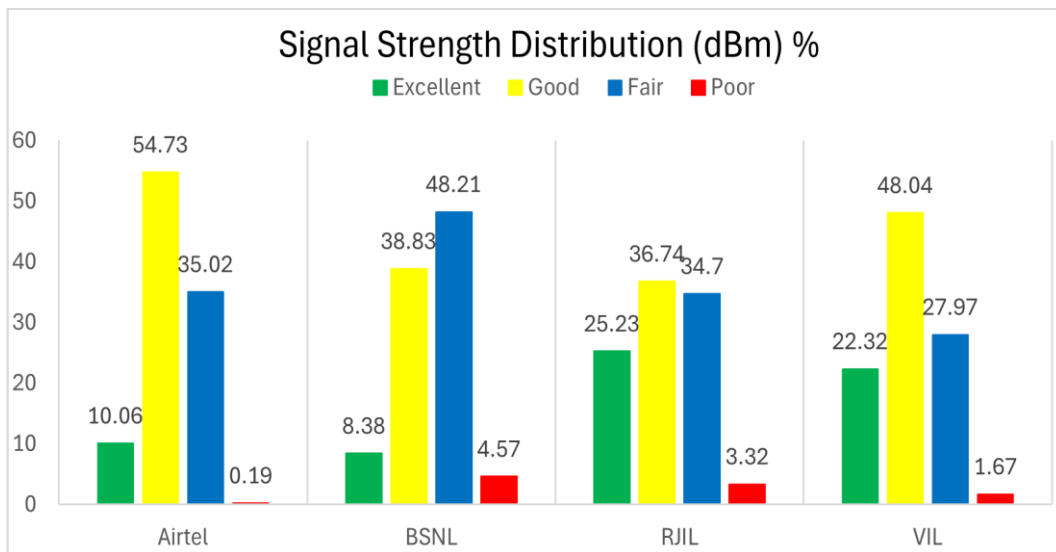
NR



TSP - VIL



5.2.4 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]	NA	362567	NA	NA	NA	81.5	NA	NA
[-65, ≥-75]	NA	45052	NA	NA	NA	10.1	NA	NA
[-75, ≥-85]	NA	18482	NA	NA	NA	4.1	NA	NA
[-85, ≥Min]	NA	18536	NA	NA	NA	4.1	NA	NA
Total	NA	444637	NA	NA	NA	100	NA	NA

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

Rx Level -4G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, $\geq$ -80]	92651	1382	296	348	10.06	8.38	25.23	22.32
[-80, $\geq$ -95]	503785	6402	431	749	54.73	38.83	36.74	48.04
[-95, $\geq$ -110]	322362	7949	407	436	35.02	48.21	34.70	27.97
[-110, $\geq$ Min]	1774	754	39	26	0.19	4.57	3.32	1.67
Total	920572	16487	1173	1559	100	100	100	100

Rx Level -5G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, $\geq$ -80]	NA	NA	430	NA	NA	NA	22.57	NA
[-80, $\geq$ -95]	NA	NA	1027	NA	NA	NA	53.91	NA
[-95, $\geq$ -110]	NA	NA	423	NA	NA	NA	22.20	NA
[-110, $\geq$ Min]	NA	NA	25	NA	NA	NA	1.31	NA
Total	NA	NA	1905	NA	NA	NA	100	NA

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

QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbits/s)	Average	49.66	20.93	198	13.34
	80th Percentile	90.4	22.41	325	20.87
	20th Percentile	12.77	14.32	43	8.63
Upload speed (Mbits/s)	Average	19.06	16.24	25	12.99
	80th Percentile	28.7	14.18	47	26.40
	20th Percentile	10.38	17.63	3	1.53
Latency (ms)	Average	34.14	42.63	38.9	32.32
	50th Percentile	35.00	46.51	35	29
Jitter (ms)	Average	8.85	0.89	14.06	13.17

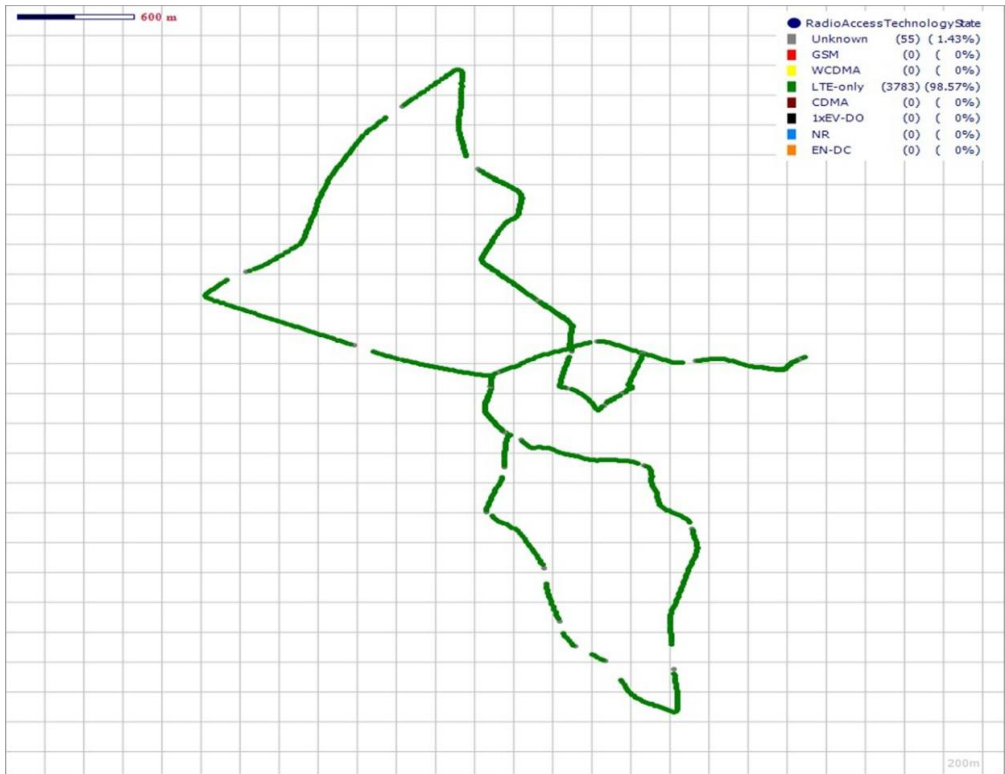
5.4 Time Spent (Technology-wise)

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

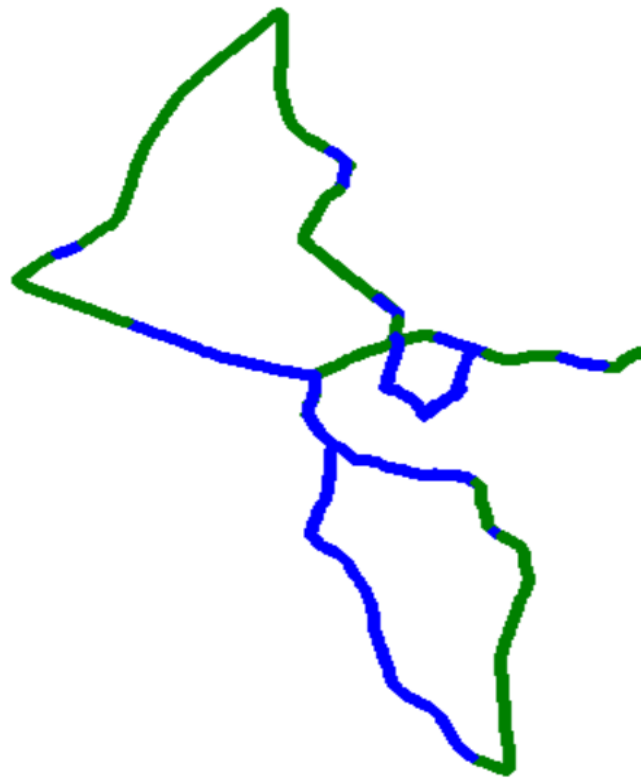
TSP - Airtel



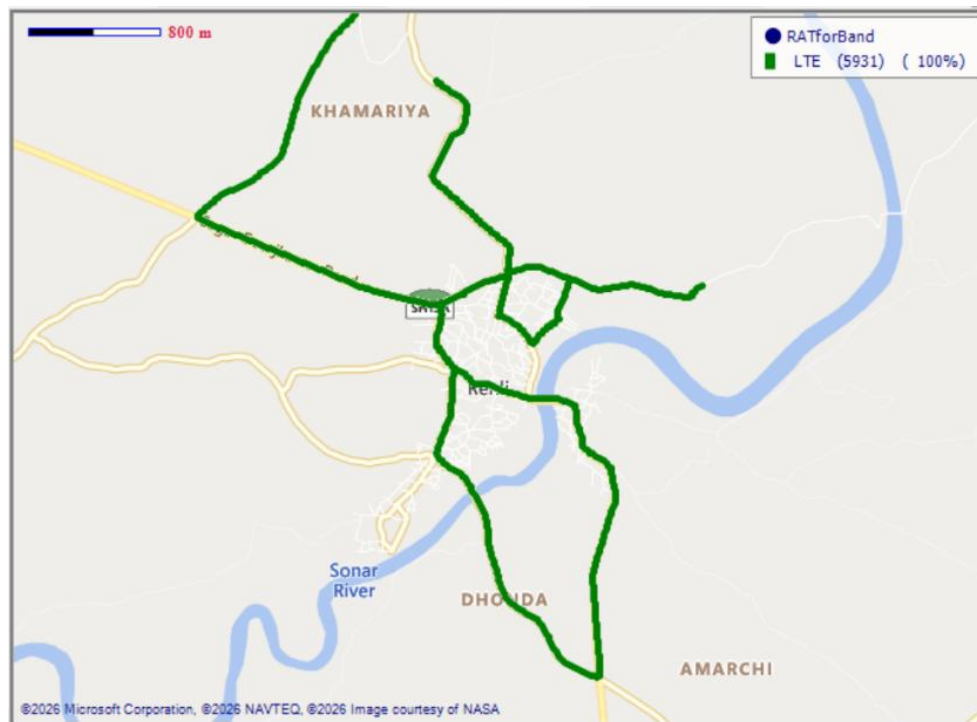
TSP - BSNL



TSP - RJIL

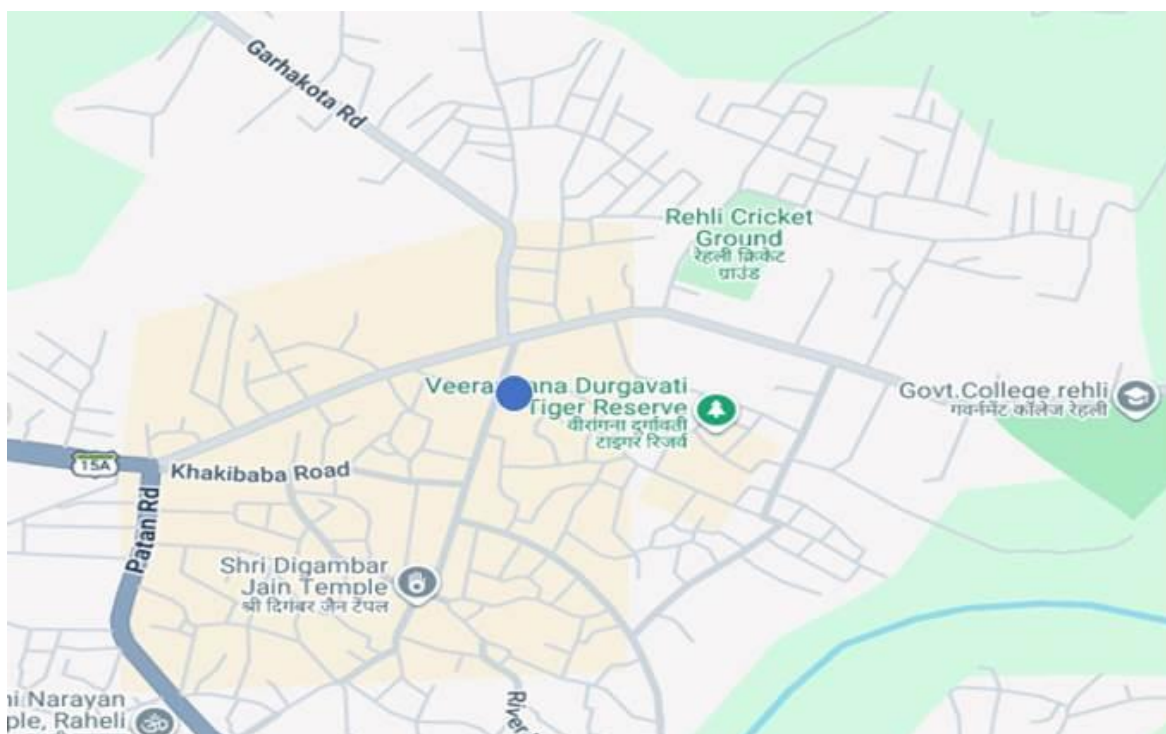


TSP - VIL



6.0 QoS Performance Analysis - Static

6.1 Hot spot Locations



Hotspot Name	Latitude & Longitude	Date of Measurement	Time of Measurement
Bus Stand Rehli	23.640521,79.063025	17.03.2026	7:45 PM

Table-12

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

Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	19	10	10	10
No of Call Established	19	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	00	0	0
Drop Call Rate %	0	00	0	0
Call Setup Time Average (Sec.)	1.38	3.24	1.04	0.45

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

QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	20 th Percentile	34.65	12.71	61.7	5.76
	Average	70.56	23.09	94.6	11.11
	80 th Percentile	104.7	24.32	121.5	16.01

Download Session Setup Success Rate %		100	100	100	100
Upload speed (Mbps/s)	20 th Percentile	27.9	10.82	11.4	19.43
	Average	31.79	14.84	15.81	23.30
	80 th Percentile	36.8	16.26	19.5	26.06
Upload Session Setup Success Rate %		100	100	100	100
Latency (in ms)	50 th Percentile	32	5.07	37	31
Jitter (in ms)	Average	8.28	0	9.8	6.97
Packet Drop Rate %		0.00	0	0	0.53
Web browsing delay (in sec)		7.79	2.41	3.71	4.39
Video Streaming performance for video		3.47	3.16	0.40	0.95

6.4 Voice Service Performance (5G/ 4G/ 3G/ 2G - Auto mode) at each Hotspot location

Name of Hotspot Location	1. Bus Stand Rehli			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	19	10	10	10
No of Call Established	19	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.38	3.18	1.04	0.45
Total no of RLT Occurrence	N/A	0	NA	25
No of RLT > 48	N/A	0	NA	0

6.5 Data Service Performance (5G/4G/3G/2G - auto mode) at each Hotspot location:

Name of Hotspot Location		1. Bus Stand Rehli			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	70.56	23.09	94.6	11.11
Download Session Setup Success Rate %		100	100	100	100
Upload speed (Mbps/s)	Average	31.79	14.84	15.81	23.30
Upload Session Setup Success Rate %		100	100	100	100
Latency (in ms)	50 th Percentile	32	5.07	37	31
Jitter (in ms)	Average	8.28	0	9.8	6.97
Packet Drop Rate %		0	0	0	0.53
Web browsing delay (in sec)		7.79	2.41	3.71	4.39
Video Streaming performance for video		3.47	3.16	0.40	0.95

6.6 Signal Strength distribution at Static location – Over all

Rx Level -2G								
Overall Rx Level	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-65]	NA	7928	NA	650	NA	37	NA	78.98
[-65, ≥-75)	NA	8432	NA	167	NA	40	NA	21.02
[-75, ≥-85)	NA	4769	NA	0	NA	22	NA	0
[-85, ≥Min)	NA	79	NA	0	NA	0	NA	0
Total	NA	21208	NA	817	NA	100	NA	100

Rx Level -3G								
Overall 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

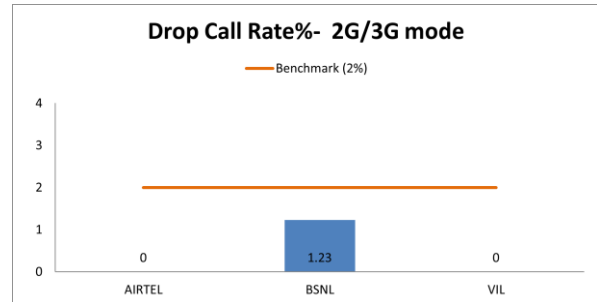
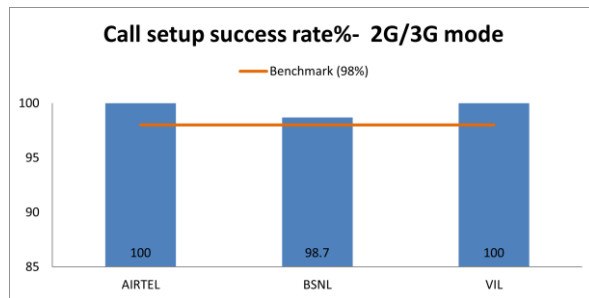
Rx Level -4G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	964	9762	NA	721	98.17	88	NA	75.03
[-80, ≥-95]	18	893	NA	240	1.83	8	NA	24.97
[-95, ≥-110]	0	297	NA	0	0	3	NA	0
[-110, ≥Min]	0	194	NA	0	0	2	NA	0
Total	982	11146	NA	961	100	100	NA	100

Rx Level -5G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	98	NA	NA	NA	100	NA	NA	NA
[-80, ≥-95]	0	NA	NA	NA	0	NA	NA	NA
[-95, ≥-110]	0	NA	NA	NA	0	NA	NA	NA
[-110, ≥Min]	0	NA	NA	NA	0	NA	NA	NA
Total	98	NA	NA	NA	100	NA	NA	NA

City – Katni City

7.0 QoS Performance Analysis - Dynamic

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



Parameters	Airtel	BSNL/MTNL	RJIL	VIL
Total Distance covered (in Kms)	120	120	N/A	120
No. of Call Attempts	266	245	N/A	280
No. of Call Established	266	242	N/A	280
Call setup success rate (CSSR) %	100	98.7	N/A	100
No. of Drop Call	0	03	N/A	0
Drop Call Rate %	0	1.23	N/A	0
Call Setup Time Average (Sec.)	3.48	2.46	N/A	2.61
No. of Handover Attempts	324	278	N/A	248
No. of Handover success	318	276	N/A	237
HOSR %	98.15	99.28	N/A	95.56
Total no of RLT Occurrence	52435	62	N/A	41.63
No of RLT > 48	0	0	N/A	0

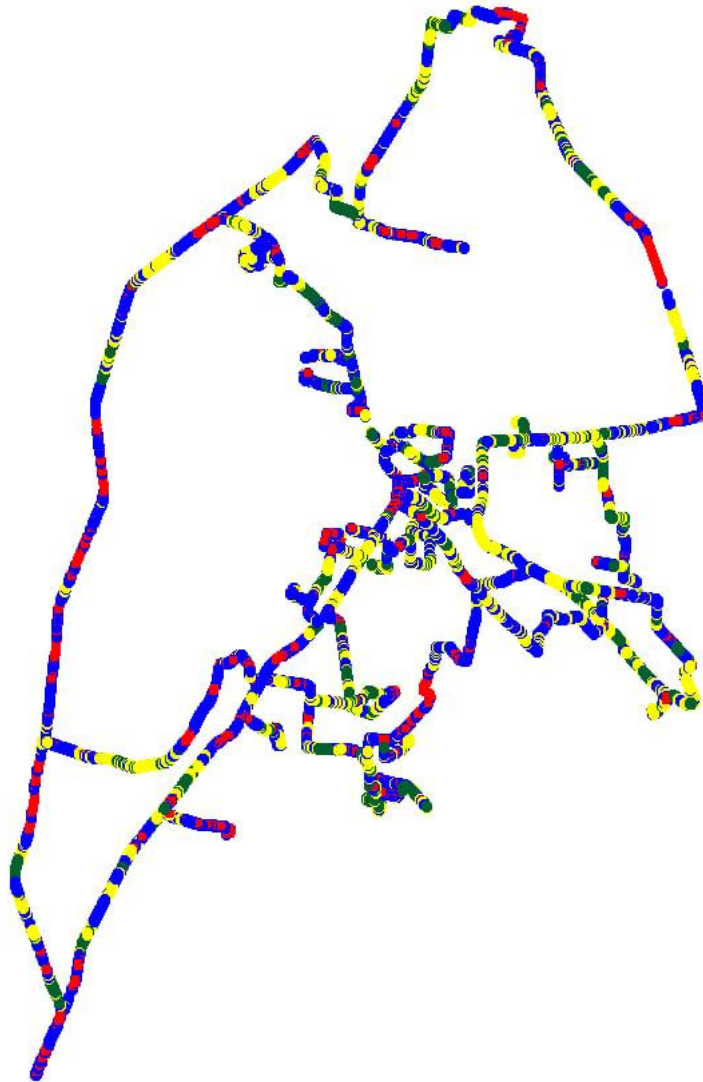
7.1.2 Number of Cell ids latched during drive test (3G/2G - Lock mode)

Number of unique Cell ids covered in Voice test				
Technology	AIRTEL	BSNL/MTNL	RJIL	VIL
3G	NA	51		NA
2G	162	51		134

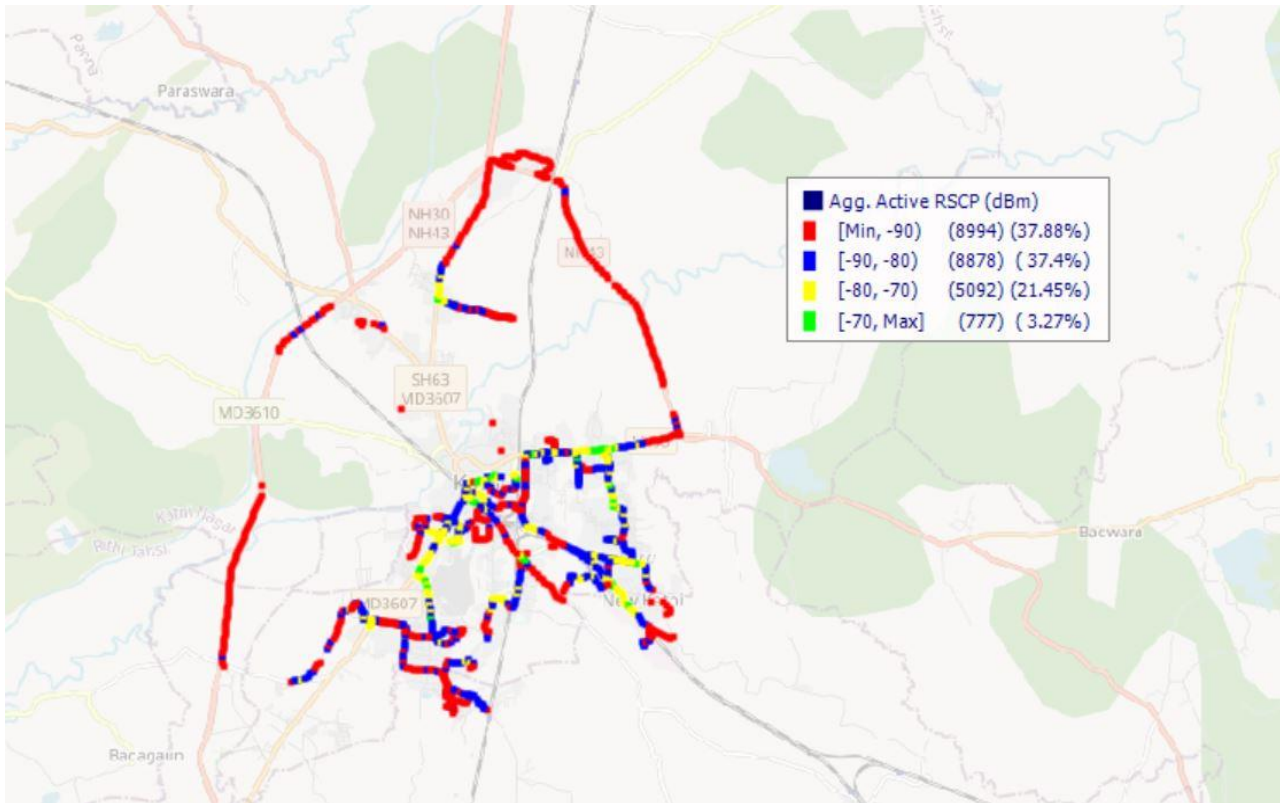
7.1.3 Signal Strength Map (3G/2G - Lock mode)

Parameter Name	Technology	Signal Strength (dBm)			
		Excellent	Good	Fair	Poor
Rx Level	GSM	0 to $\geq$ -65	<-65 to $\geq$ -75	<-75 to $\geq$ -85	<-85 to min
RSCP	WCDMA	0 to $\geq$ -70	<-70 to $\geq$ -80	<-80 to $\geq$ -90	<-90 to min
RSRP	LTE	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min
SS_RSRP	NR	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min

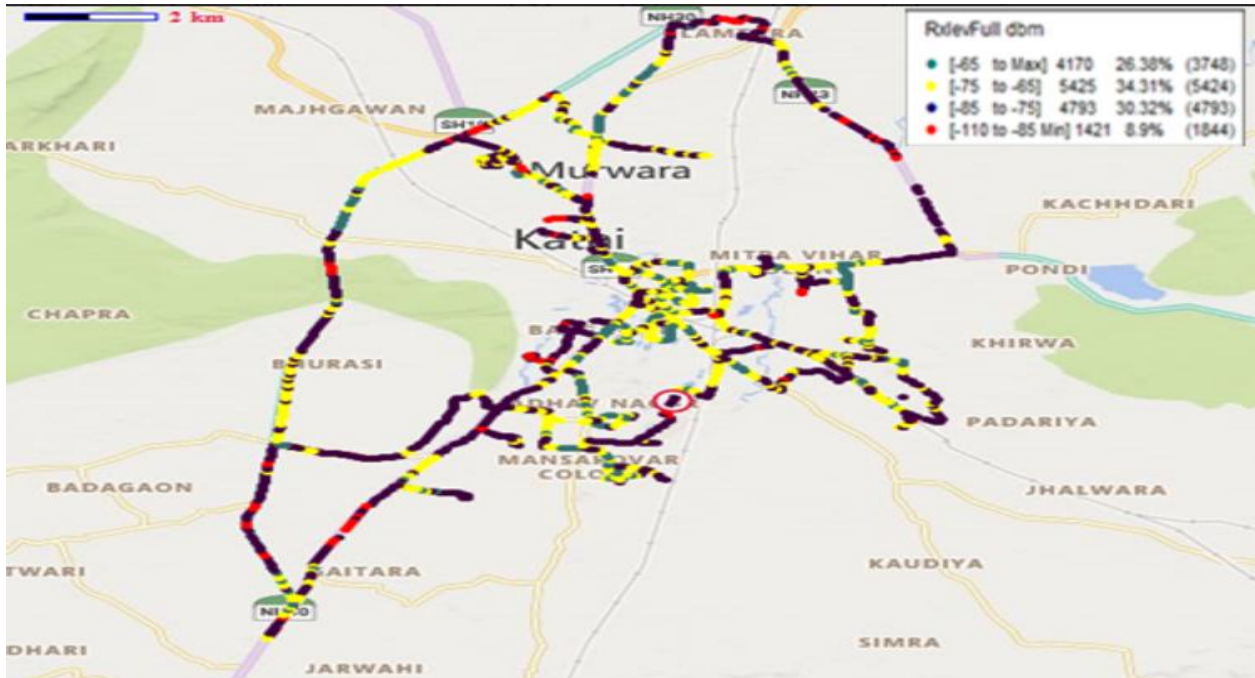
TSP - Airtel



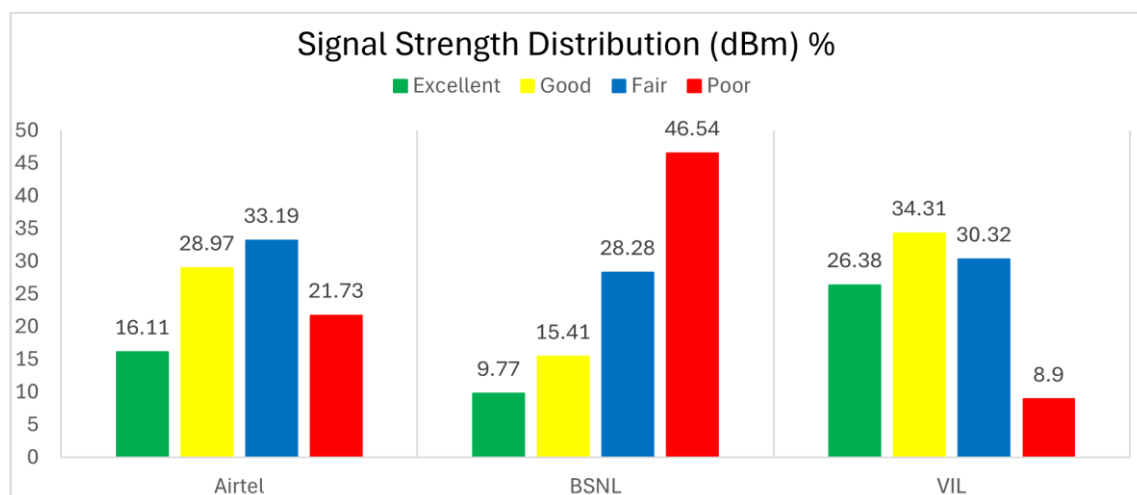
TSP - BSNL



TSP - VIL



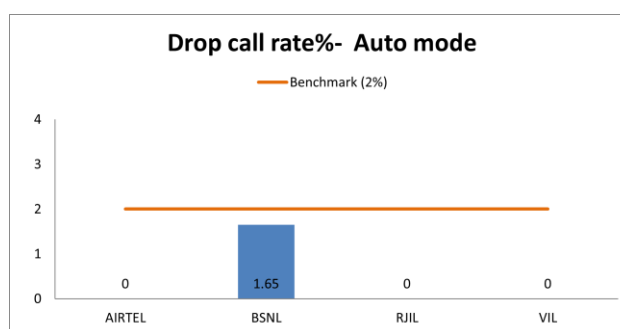
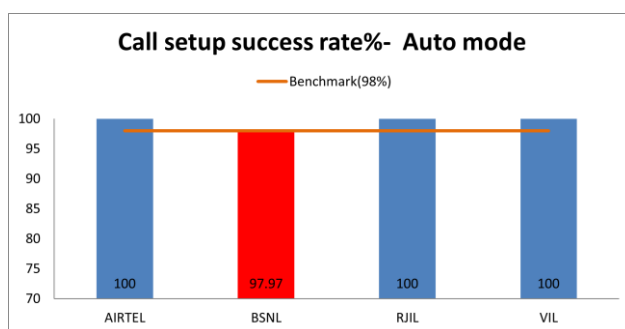
7.1.4 Signal Strength distribution: (3G/2G - Lock mode)

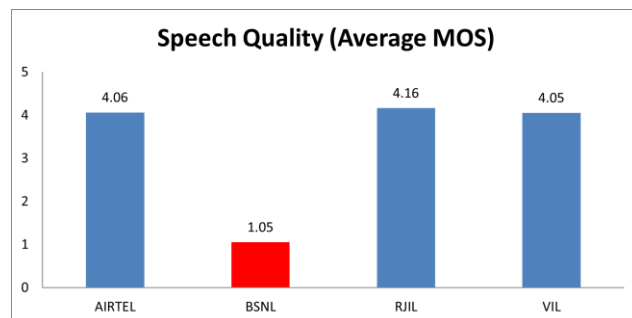
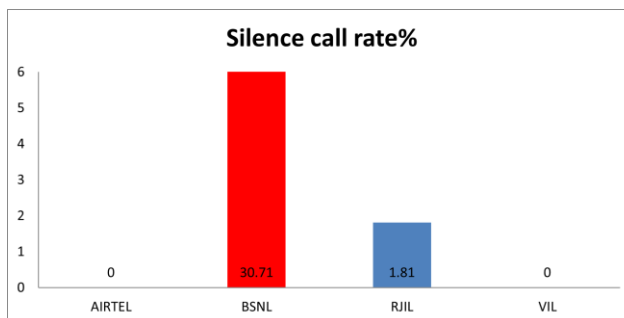
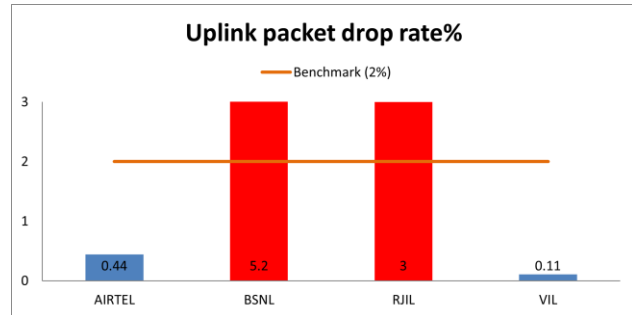
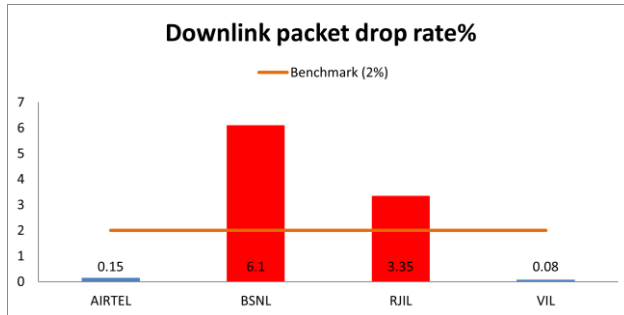


Rx Level -2G								
Overall Rx Level	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-65]	721561	1743	NA	4170	16.11	9.77	NA	26.38
[-65, ≥-75]	1297257	2750	NA	5425	28.97	15.41	NA	34.31
[-75, ≥-85]	1486063	5045	NA	4793	33.19	28.28	NA	30.32
[-85, ≥Min)	972896	8304	NA	1421	21.73	46.54	NA	8.9
Total	4477777	17842	NA	15827	100.00	100	NA	100

Rx Level -3G								
Overall RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-70]	NA	777	NA	NA	NA	3.27	NA	NA
[-70, ≥-80]	NA	5092	NA	NA	NA	21.45	NA	NA
[-80, ≥-90]	NA	8878	NA	NA	NA	37.4	NA	NA
[-90, ≥Min)	NA	8994	NA	NA	NA	37.88	NA	NA
Total	NA	23741	NA	NA	NA	100	NA	NA

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





Parameters	Airtel	BSNL/MTNL	RJIL	VIL
Total Distance covered (in Kms)	120	120	120	120
No. of Call Attempts	282	247	278	285
No. of Call Established	282	242	278	285
Call setup success rate (CSSR) %	100	97.97	100	100
No. of Drop Call	0	4	0	0
Drop Call Rate %	0	1.65	0	0
Call Setup Time Average (Sec.)	1.23	3.14	1.11	0.69
No. of Handover Attempts	675	298	1877	773
No. of Handover success	674	295	1870	773
HOSR %	99.85	98.90	99.63	100
Packet Drop Rate (Downlink)	0.15	6.1	3.35	0.08
Packet Drop Rate (Uplink)	0.44	5.2	3.0	0.11
Number of silence call for > 2 sec.	0	44	10	0
Silence Call Rate %	0	30.71	1.81	0
Number of MOS samples	1727	117	1460	1462
Average MOS score	4.06	1.05	4.16	4.05

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

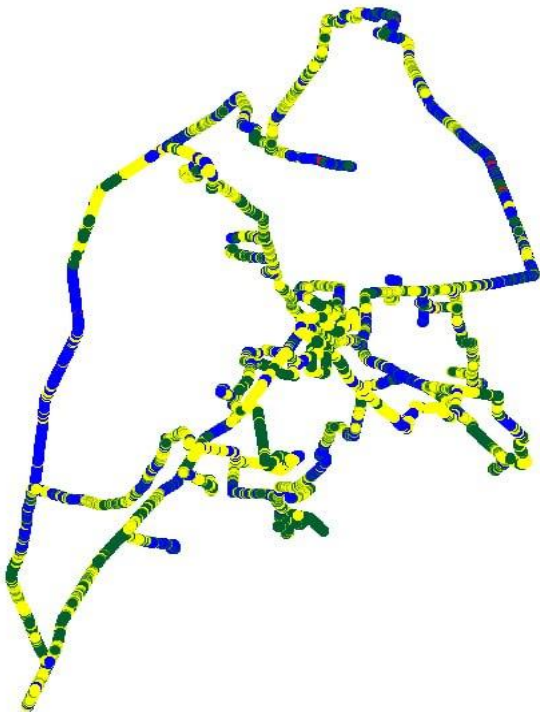
Number of unique cell ids covered in Voice test				
Technology	Service Provider			
	AIRTEL	BSNL/MTNL	RJIL	VIL
3G	NA	51	NA	NA
2G	NA	51	NA	134
4G	298	92	355	279
5G	NA	NA	99	NA

Table-6

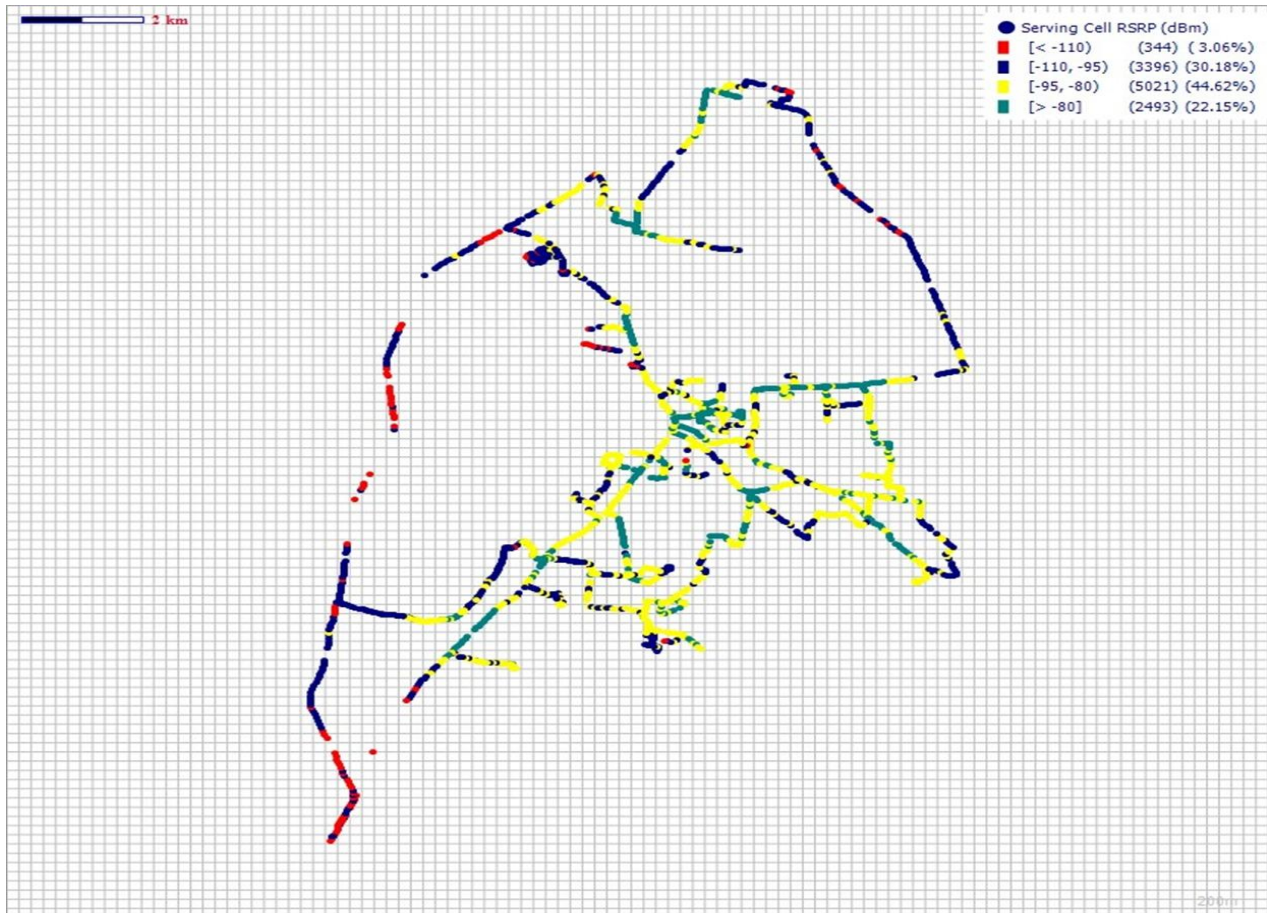
7.2.3 Signal Strength Map (5G/4G/3G/2G - Auto mode)

Parameter Name	Technology	Signal Strength (dBm)			
		Excellent	Good	Fair	Poor
Rx Level	GSM	0 to $\geq$ -65	<-65 to $\geq$ -75	<-75 to $\geq$ -85	<-85 to min
RSCP	WCDMA	0 to $\geq$ -70	<-70 to $\geq$ -80	<-80 to $\geq$ -90	<-90 to min
RSRP	LTE	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min
SS_RSRP	NR	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min

TSP - Airtel

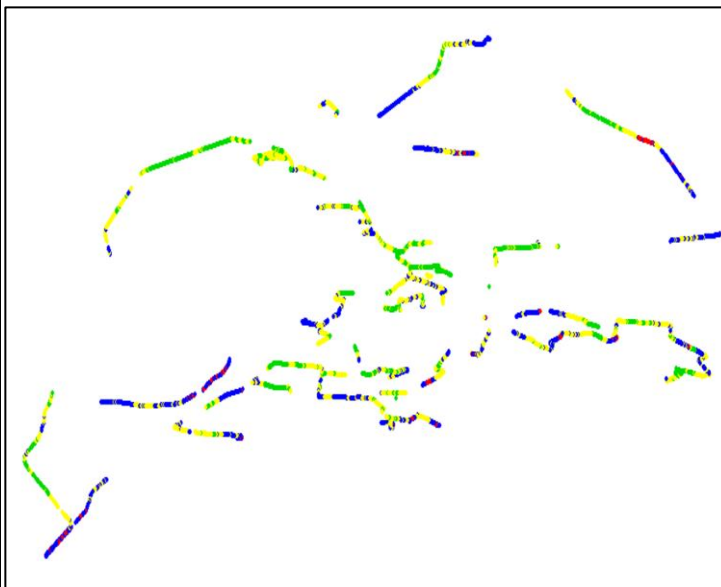


TSP - BSNL

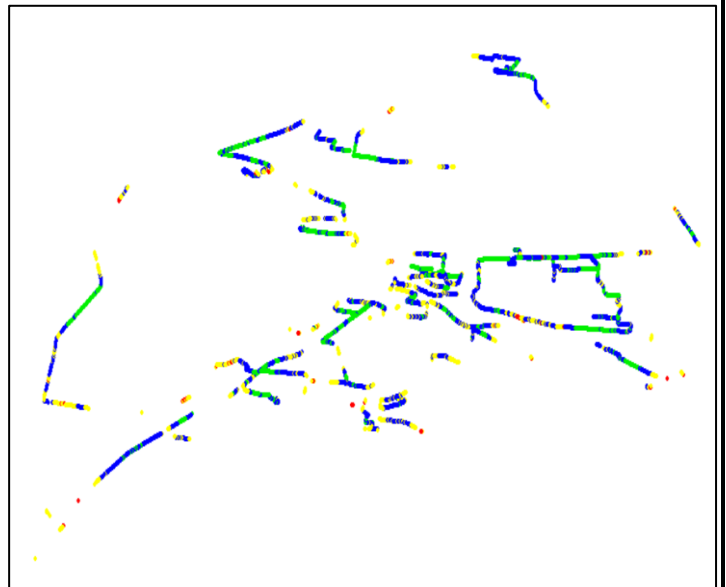


TSP - RJIL

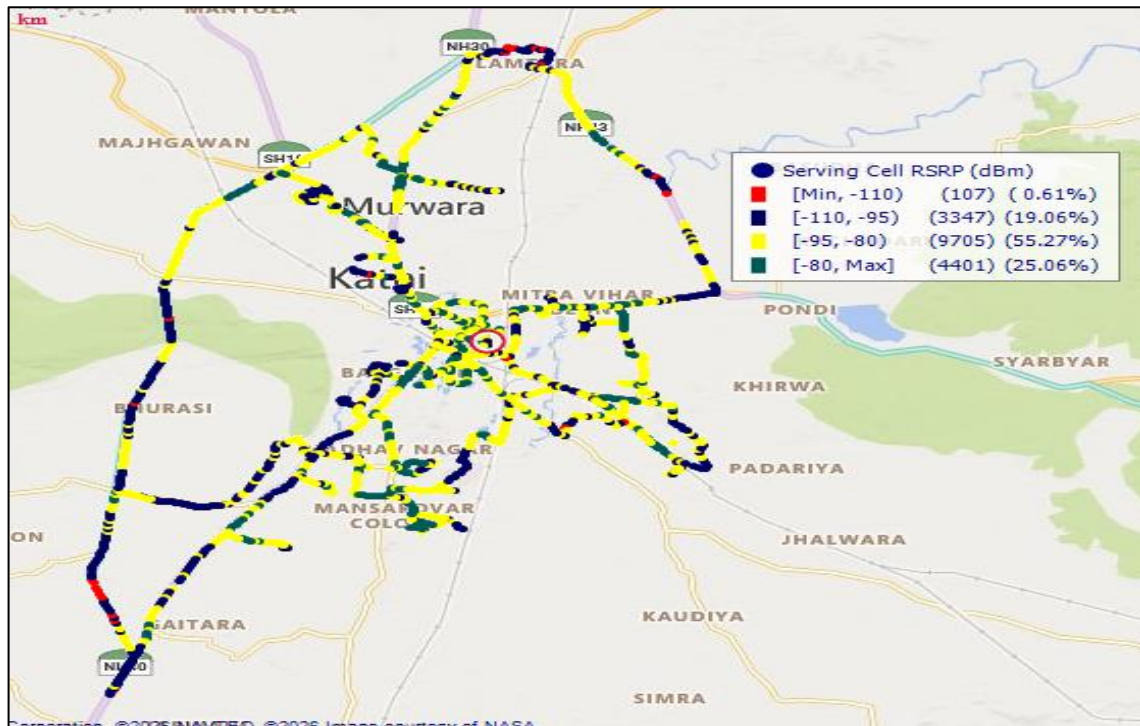
LTE



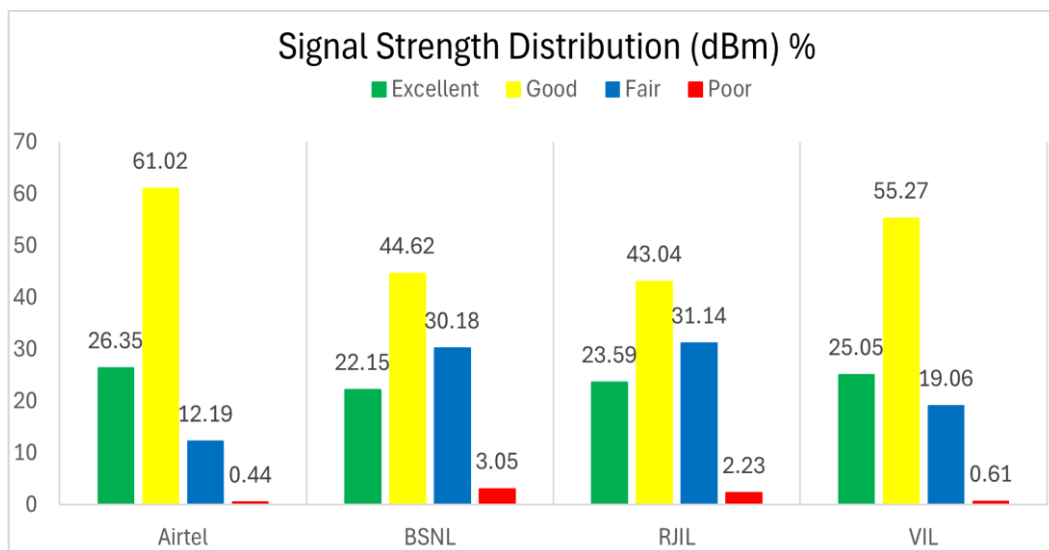
NR



TSP - VIL



7.2.4 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]	NA	1743	NA	NA	NA	9.77	NA	NA
[-65, ≥-75]	NA	2750	NA	NA	NA	15.41	NA	NA
[-75, ≥-85]	NA	5045	NA	NA	NA	28.28	NA	NA
[-85, ≥Min]	NA	8304	NA	NA	NA	46.54	NA	NA
Total	NA	17842	NA	NA	NA	100	NA	NA

Rx Level -3G								
Overall RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-70]	NA	777	NA	NA	NA	3.27	NA	NA
[-70, ≥-80)	NA	5092	NA	NA	NA	21.45	NA	NA
[-80, ≥-90)	NA	8878	NA	NA	NA	37.4	NA	NA
[-90, ≥Min)	NA	8994	NA	NA	NA	37.88	NA	NA
Total	NA	23741	NA	NA	NA	100	NA	NA

Rx Level -4G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	3097304	2493	2916	4401	26.35	22.15	23.59	25.05
[-80, ≥-95]	7172982	5021	5321	9705	61.02	44.62	43.04	55.27
[-95, ≥-110]	1433133	3396	3850	3347	12.19	30.18	31.14	19.06
[-110, ≥Min]	51949	344	276	107	0.44	3.05	2.23	0.61
Total	11755368	11254	12363	17560	100	100	100	100

Rx Level -5G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	NA	NA	4821	NA	NA	NA	29.55	NA
[-80, ≥-95]	NA	NA	8171	NA	NA	NA	50.08	NA
[-95, ≥-110]	NA	NA	3135	NA	NA	NA	19.22	NA
[-110, ≥Min]	NA	NA	188	NA	NA	NA	1.15	NA
Total	NA	NA	16315	NA	NA	NA	100	NA

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

QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbits/s)	Average	91.24	20.28	242.1	54.42
	80th Percentile	153.1	19.08	409.1	79.91
	20th Percentile	25.73	11.32	13.2	25.22
Upload speed (Mbits/s)	Average	17.38	16.27	28.46	16.96
	80th Percentile	28.3	24.21	50.1	28.98
	20th Percentile	5.75	14.81	2.3	4.42
Latency (ms)	Average	27.08	52.8	38.2	16.46
	50th Percentile	25.00	32.8	36	27
Jitter (ms)	Average	5.42	2.61	18.20	6.97

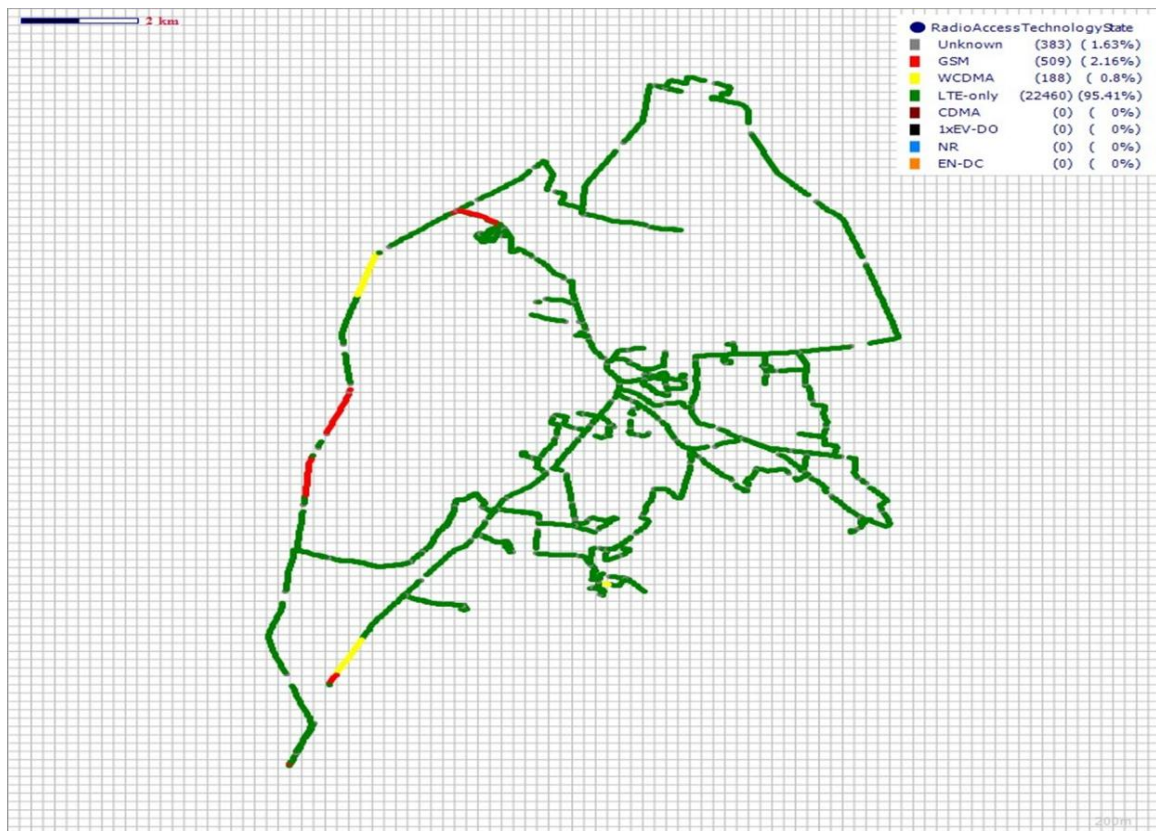
7.4 Time Spent (Technology-wise)

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

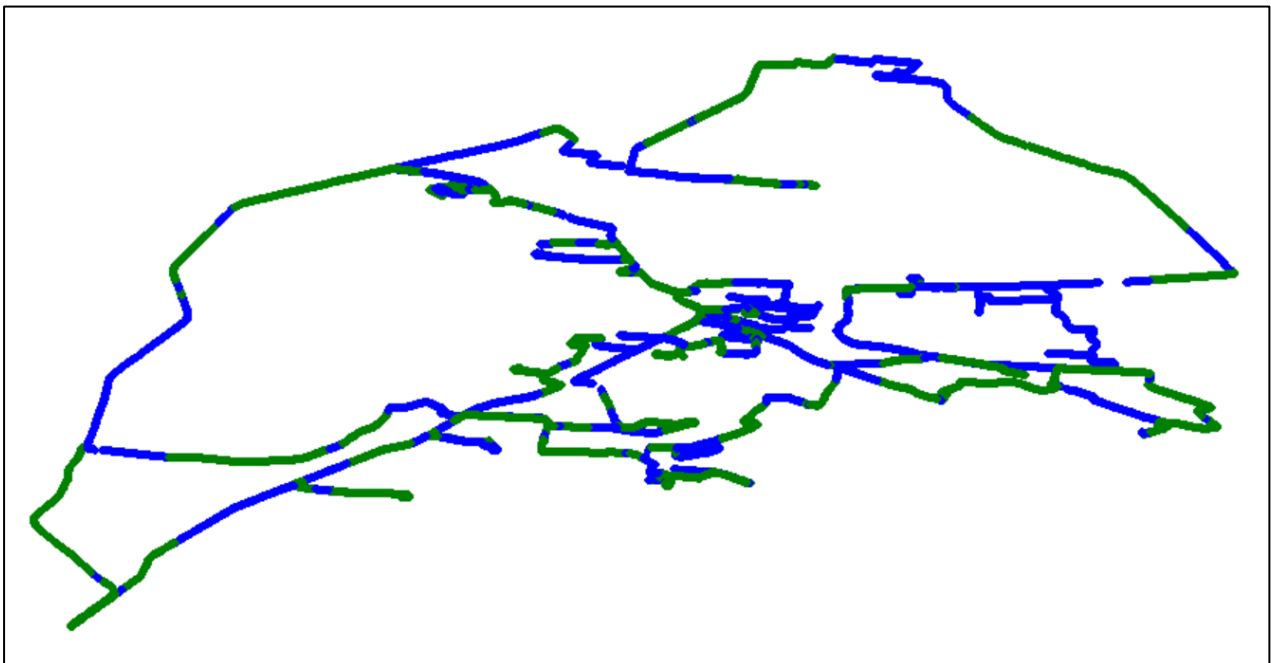
TSP - Airtel



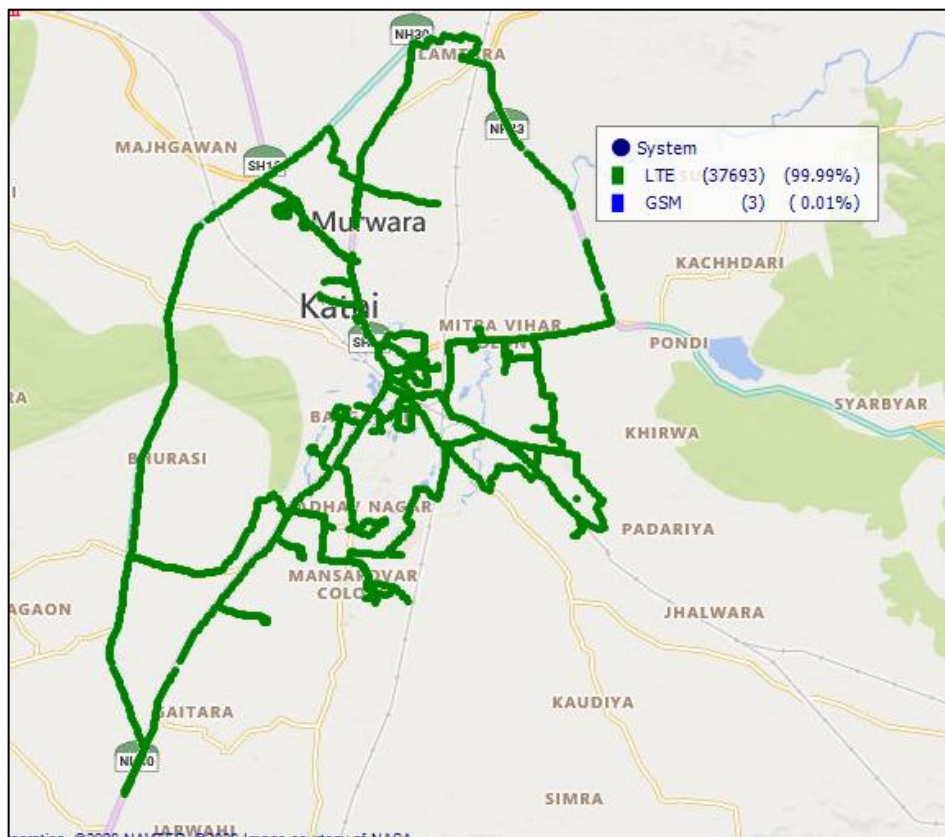
TSP - BSNL



TSP - RJIL

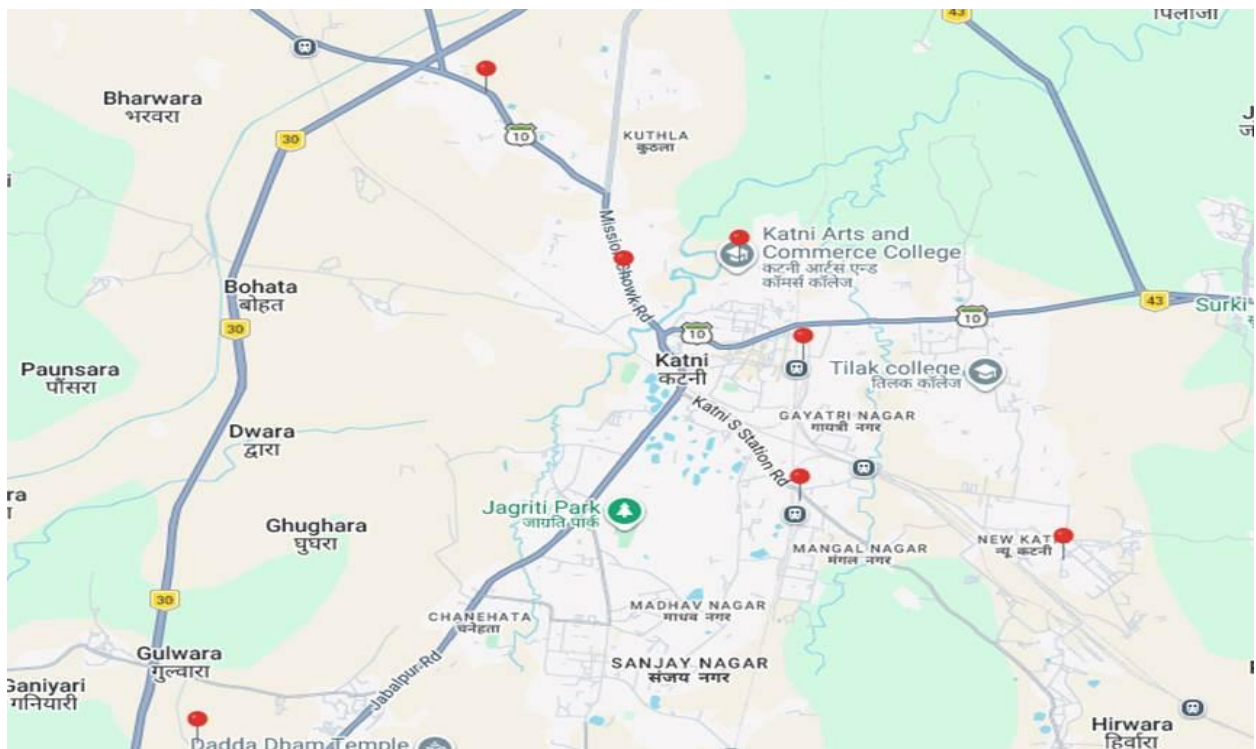


TSP - VIL



8.0 QoS Performance Analysis - Static

8.1 Hot spot Locations



Hotspot Name	Latitude & Longitude	Date of Measurement	Time of Measurement
Katni Bus Stand, New, Badera, Katni	23.843802/80.383425	20.03.2026	01:02 PM
Katni Arts College	23.846227/80.395195	20.03.2026	02:00 PM
Govt. Girls College Katni Gulwara	23.787706/80.339754	18.03.2026	04:50 PM
Railway hospital, New Katni	23.809992/80.428323	20.03.2026	04:45 PM
Krishi Upaj Mandi Samiti	23.866845/80.369212	20.03.2026	12:12 PM
Katni Railway Station	23.834387/80.401726	18.03.2026	06.:48 PM
South Katni Railway Station	23.817128/80.401428	20.03.2026	04:00 PM

Table-12

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

Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	87	70	70	70
No of Call Established	87	70	70	70
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.41	3.20	1.08	0.63

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

QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	20 th Percentile	12.15	10.12	141.1	33.24
	Average	80	12.41	275.35	44.66
	80 th Percentile	149.6	14.86	404.3	59.68
Download Session Setup Success Rate %		100	98.81	100	100
Upload speed (Mbps/s)	20 th Percentile	7.52	5.28	22.35	13.67
	Average	14.20	3.37	53.69	24.22
	80 th Percentile	22.9	4.82	80.12	35.36
Upload Session Setup Success Rate %		100	97.82	100	100
Latency (in ms)	50 th Percentile	27	54	37.4	28
Jitter (in ms)	Average	6.70	4.86	8.44	4.43
Packet Drop Rate %		0.00	4.84	0.03	1.74
Web browsing delay (in sec)		6.21	2.77	3.07	3.19
Video Streaming performance for video		1.68	3.21	0.33	0.99

8.4 Voice Service Performance (5G/ 4G/ 3G/ 2G - Auto mode) at each Hotspot location

Name of Hotspot Location	1. Govt. Girls College Katni (Gulwara)			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	13	10	10	10
No of Call Established	13	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.34	3.52	1.25	0.67
Total no of RLT Occurrence	N/A	6		41
No of RLT > 48	N/A	0		0

Name of Hotspot Location	2. Railway Hospital, New Katni			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	12	10	10	10
No of Call Established	12	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.36	3.12	1	0.62
Total no of RLT Occurrence	N/A	4	N/A	33
No of RLT > 48	N/A	0	N/A	0

Name of Hotspot Location	3. Katni Bus Stand, New, Badera, Katni			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	12	10	10	10
No of Call Established	12	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.32	3.24	1.1	0.71
Total no of RLT Occurrence	N/A	2	N/A	39
No of RLT > 48	N/A	N/A	N/A	0

Name of Hotspot Location	4. Katni Arts College			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	12	10	10	10
No of Call Established	12	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.42	3.26	1	0.69
Total no of RLT Occurrence	N/A	4	N/A	41
No of RLT > 48	N/A	0	N/A	0

Name of Hotspot Location	5. Krishi Upaj Mandi Samiti, Katni			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	12	10	10	10
No of Call Established	12	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.31	3.01	1	0.79
Total no of RLT Occurrence	N/A	4	N/A	32
No of RLT > 48	N/A	0	N/A	0

Name of Hotspot Location	6. Katni Railway Station			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	15	10	10	10
No of Call Established	15	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.70	3.21	1.2	0.81

Total no of RLT Occurrence	N/A	2	N/A	38
No of RLT > 48	N/A	0	N/A	0

Name of Hotspot Location	7. South Katni Railway Station			
Parameters	Airtel	BSNL/MTNL	RJIL	VIL
No of Call Attempts	11	10	10	10
No of Call Established	11	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.33	3.04	0.99	0.77
Total no of RLT Occurrence	N/A	2	N/A	35
No of RLT > 48	N/A	0	N/A	0

8.5 Data Service Performance (5G/4G/3G/2G - auto mode) at each Hotspot location:

Name of Hotspot Location		1. Govt. Girls College Katni (Gulwara)			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	14.21	4.45	285.7	32.62
Download Session Setup Success Rate %		100	98	100	100
Upload speed (Mbps/s)	Average	9.67	0.59	39.07	15.91
Upload Session Setup Success Rate %		100	80	100	100
Latency (in ms)	50th Percentile	32	57	29	20
Jitter (in ms)	Average	7.74	4.79	6.53	3.12
Packet Drop Rate %		0	6.21	0.10	0
Web browsing delay (in sec)		10.18	2.26	2.96	3.39
Video Streaming performance for video		2.38	4.21	0.33	1.54

Name of Hotspot Location		2. Railway hospital, New Katni			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	48.83	19.36	394.4	40.75
Download Session Setup Success Rate %		100	100	100	100

Upload speed (Mbps/s)	Average	16.37	8.47	78.7	36.15
Upload Session Setup Success Rate %		100	95	100	100
Latency (in ms)	50th Percentile	27	5.07	38	29
Jitter (in ms)	Average	4.66	3.99	4.89	4.51
Packet Drop Rate %		0	0	0	0.22
Web browsing delay (in sec)		6.02	3.29	3.41	3.91
Video Streaming performance for video		1.2	3.87	0.32	1.31

Name of Hotspot Location		3. Katni Bus Stand, New, Badera, Katni			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	153	8.22	246.5	49.80
Download Session Setup Success Rate %		100	100	100	100
Upload speed (Mbps/s)	Average	11.76	3.09	39.7	14.12
Upload Session Setup Success Rate %		100	91	100	100
Latency (in ms)	50th Percentile	29	85	38	28
Jitter (in ms)	Average	4.55	5.23	4.4	5.49
Packet Drop Rate %		0	0	0	0.22
Web browsing delay (in sec)		4.68	2.68	3.19	3.86
Video Streaming performance for video		1.24	3.91	0.34	1.4

Name of Hotspot Location		4. Katni Arts College			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	126.15	19.34	443.7	65.65
Download Session Setup Success Rate %		100	100	100	100
Upload speed (Mbps/s)	Average	12.87	6.98	75.67	33.53
Upload Session Setup Success Rate %		100	100	100	100
Latency (in ms)	50th Percentile	20	65	36	37
Jitter (in ms)	Average	1.78	3.00	4.75	3.79
Packet Drop Rate %		0	0	0	0.28
Web browsing delay (in sec)		4.81	2.39	2.81	3.22
Video Streaming performance for video		1.29	2.96	0.36	1.3

Name of Hotspot Location		5. Krishi Upaj Mandi Samiti			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	153	12.12	237.2	49.68
Download Session Setup Success Rate %		100	100	100	100
Upload speed (Mbps/s)	Average	11.76	2.03	11.29	18.05
Upload Session Setup Success Rate %		100	95	100	100
Latency (in ms)	50th Percentile	29	58	38	27
Jitter (in ms)	Average	4.55	5.24	4.06	3.99
Packet Drop Rate %		0	0	0	0
Web browsing delay (in sec)		4.69	2.71	3.13	3.87
Video Streaming performance for video		1.24	3.64	0.32	1.43

Name of Hotspot Location		6. Katni Railway Station			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	24.63	9.78	141.3	58.57
Download Session Setup Success Rate %		100	100	100	100
Upload speed (Mbps/s)	Average	10.13	1.84	38.38	32.71
Upload Session Setup Success Rate %		100	100	100	100
Latency (in ms)	50th Percentile	39	81	37	42
Jitter (in ms)	Average	11.04	3.99	5.99	3.96
Packet Drop Rate %		0	0	0.10	0.21
Web browsing delay (in sec)		9.62	2.79	3.09	3.97
Video Streaming performance for video		3.9	3.28	0.37	1.44

Name of Hotspot Location		7. South Katni Railway Station			
QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	132.78	13.61	506.2	48.31
Download Session Setup Success Rate %		100	100	100	100
Upload speed (Mbps/s)	Average	24.55	0.57	92.16	33.41
Upload Session Setup Success Rate %		100	85	100	100
Latency (in ms)	50th Percentile	25	69	32	42
Jitter (in ms)	Average	2.01	6.51	4.70	4.22
Packet Drop Rate %		0.00	0	0	0.22
Web browsing delay (in sec)		4.86	2.21	2.93	4.14
Video Streaming performance for video		0.87	2.98	0.30	1.22

8.6 Signal Strength distribution at Static location – Over all

Rx Level -2G								
Overall Rx Level	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-65]	NA	1595	NA	35	NA	20.6	NA	0.92
[-65, ≥-75)	NA	523	NA	1906	NA	6.8	NA	50.18
[-75, ≥-85)	NA	2056	NA	1717	NA	26.6	NA	45.21
[-85, ≥Min)	NA	3565	NA	140	NA	46.1	NA	3.69
Total	NA	7739	NA	3798	NA	100	NA	100

Rx Level -3G								
Overall RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-70]	NA	4420	NA	NA	NA	2.4	NA	NA
[-70, ≥-80)	NA	64180	NA	NA	NA	34.7	NA	NA
[-80, ≥-90)	NA	66088	NA	NA	NA	35.8	NA	NA
[-90, ≥Min)	NA	50130	NA	NA	NA	37.1	NA	NA
Total	NA	184818	NA	NA	NA	100	NA	NA

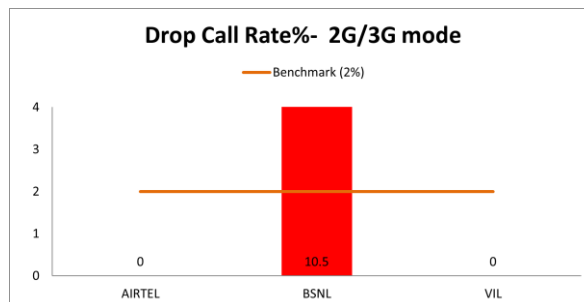
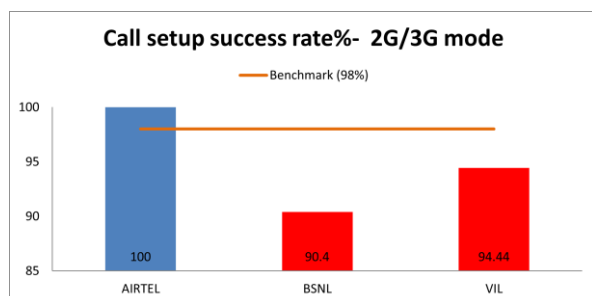
Rx Level -4G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	534.00	15398	NA	31	11.86	14.71	NA	0.78
[-80, ≥-95]	2101.00	42228	NA	2163	46.66	40.34	NA	54.29
[-95, ≥-110]	1868.00	46928	NA	1790	41.48	44.83	NA	44.93
[-110, ≥Min]	0.00	126	NA	0	0.00	0.12	NA	0
Total	4503.00	104680	NA	3984	100.00	100	NA	100

Rx Level -5G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	99	NA	4978	NA	33.67	NA	64.11	NA
[-80, ≥-95]	44	NA	2562	NA	14.97	NA	32.99	NA
[-95, ≥-110]	145	NA	225	NA	49.32	NA	2.9	NA
[-110, ≥Min]	6	NA	0	NA	2.04	NA	0	NA
Total	294	NA	7765	NA	100.00	NA	100	NA

Highway (Damoh-Rehli)

9.0 QoS Performance Analysis - Dynamic

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

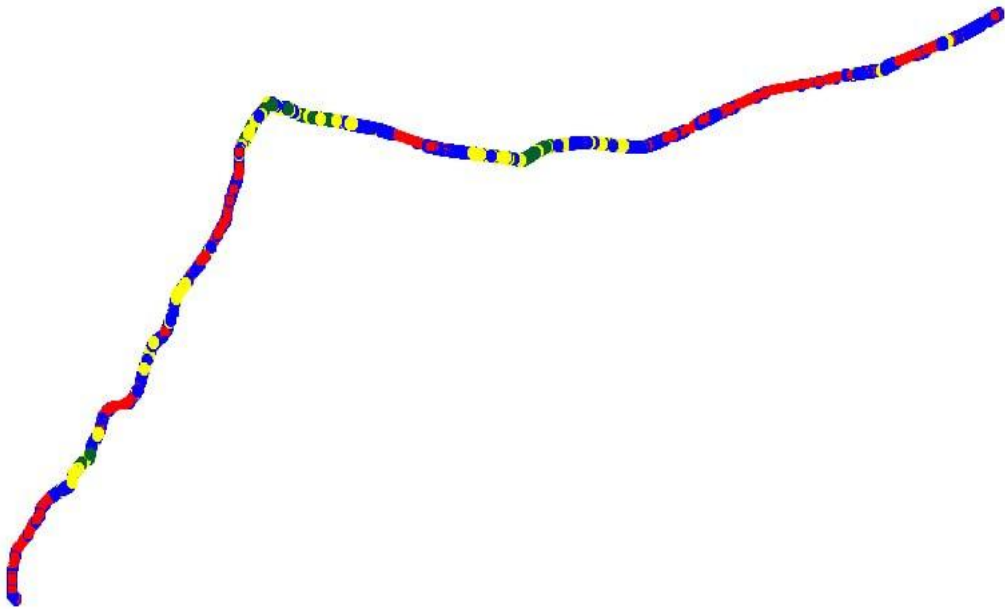


Parameters	Airtel	BSNL/MTNL	RJIL	VIL
Total Distance covered (in Kms)	55	55	N/A	55
No. of Call Attempts	18	21	N/A	18
No. of Call Established	18	19	N/A	17
Call setup success rate (CSSR) %	100	90.4	N/A	94.44
No. of Drop Call	0	2	N/A	0
Drop Call Rate %	0.00	10.5	N/A	0
Call Setup Time Average (Sec.)	3.96	4.03	N/A	2.50
No. of Handover Attempts	35	37	N/A	52
No. of Handover success	34	32	N/A	49
HOSR %	97.14	86.48	N/A	94.23
Total no of RLT Occurrence	6617	36	N/A	38
No of RLT > 48	0	0	N/A	0

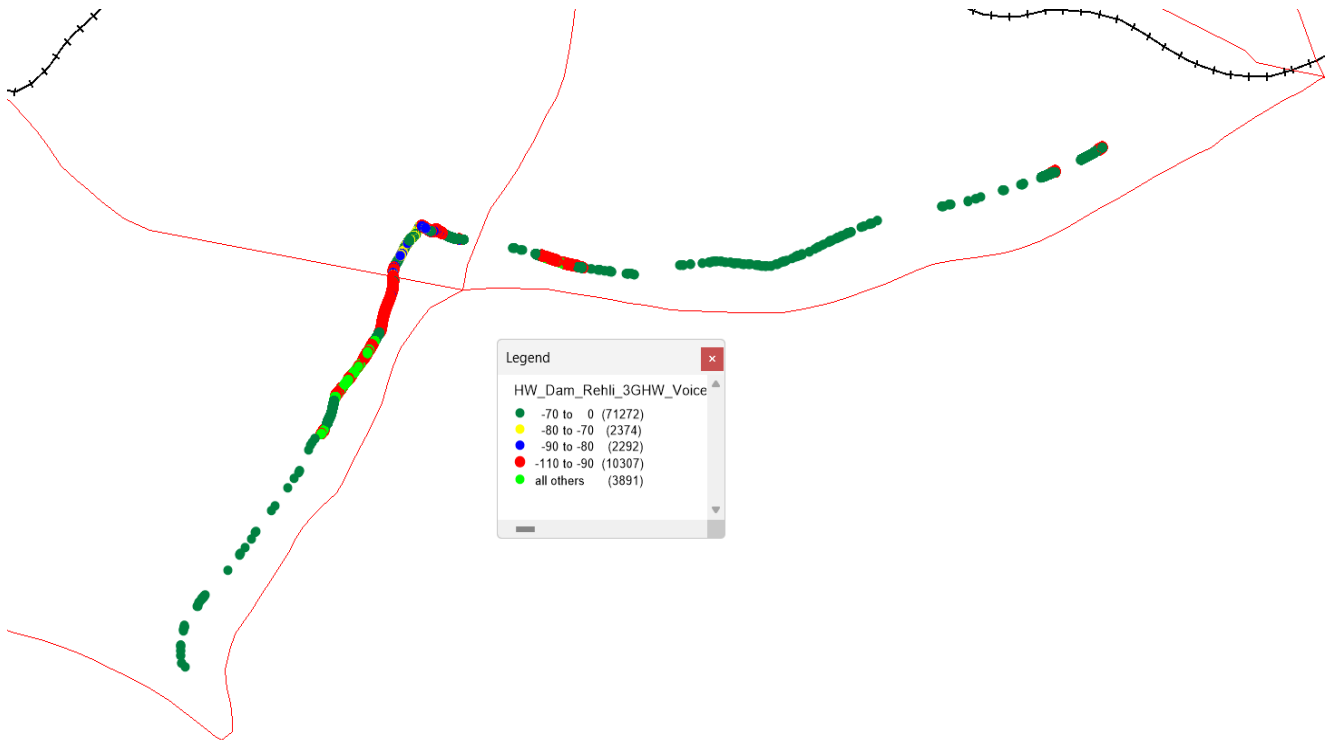
9.1.1 Signal Strength Map (3G/2G - Lock mode)

Parameter Name	Technology	Signal Strength (dBm)			
		Excellent	Good	Fair	Poor
Rx Level	GSM	0 to $\geq$ -65	<-65 to $\geq$ -75	<-75 to $\geq$ -85	<-85 to min
RSCP	WCDMA	0 to $\geq$ -70	<-70 to $\geq$ -80	<-80 to $\geq$ -90	<-90 to min
RSRP	LTE	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min
SS_RSRP	NR	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min

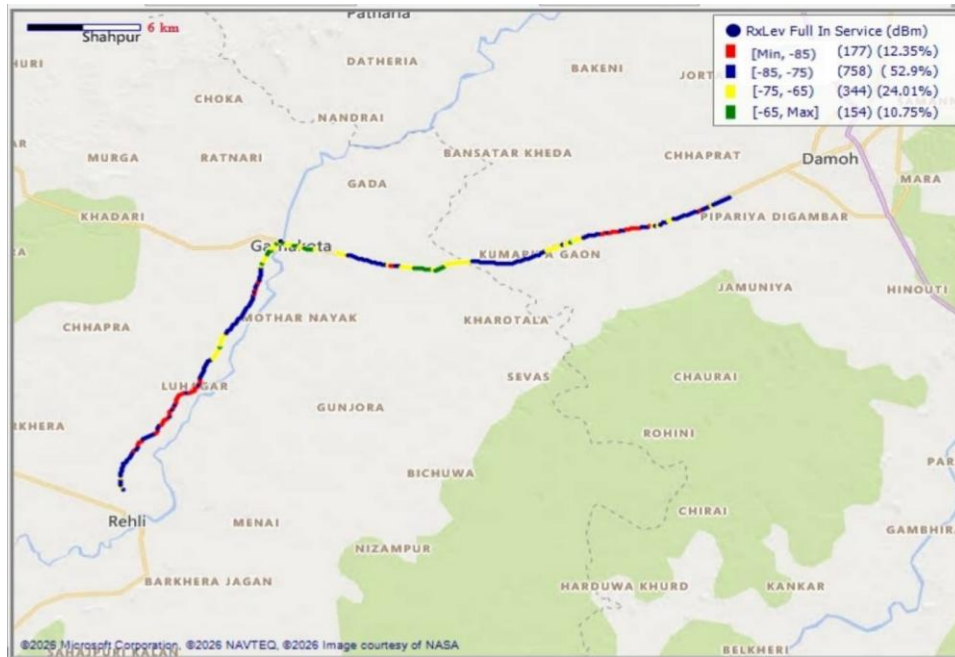
TSP - Airtel



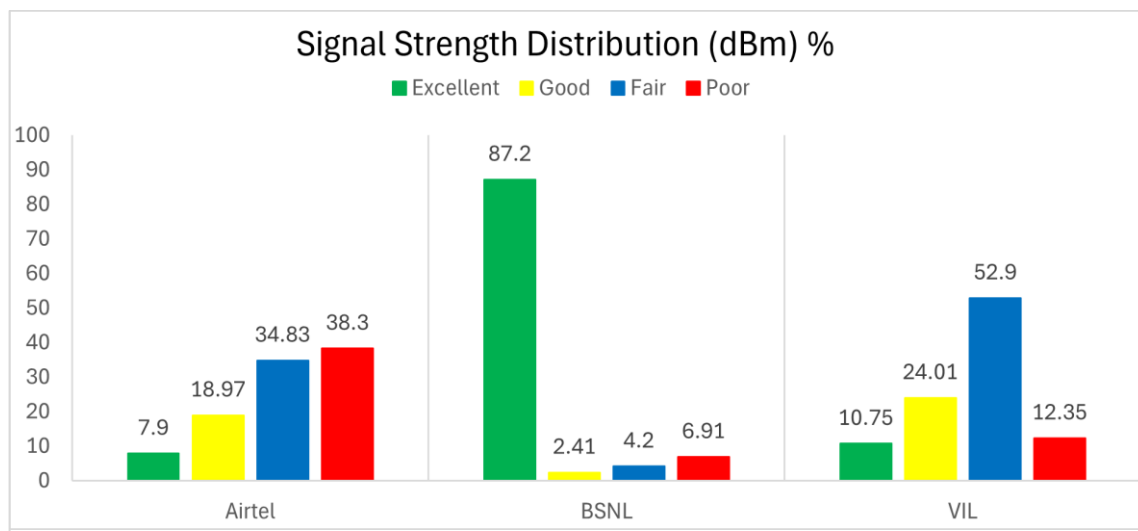
TSP - BSNL



TSP - VIL



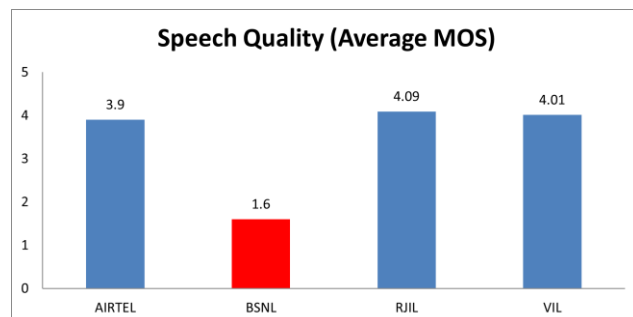
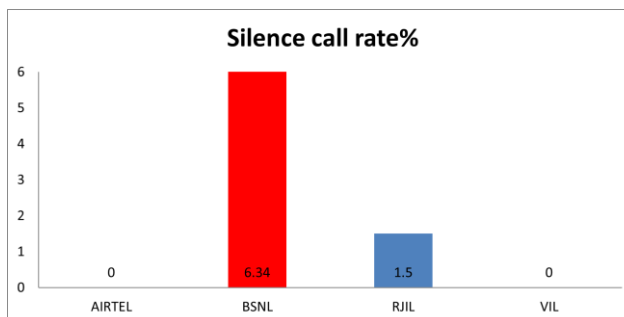
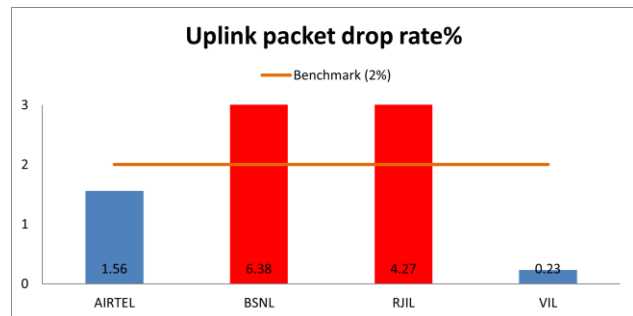
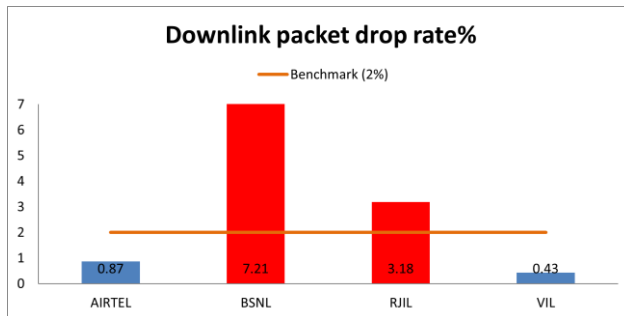
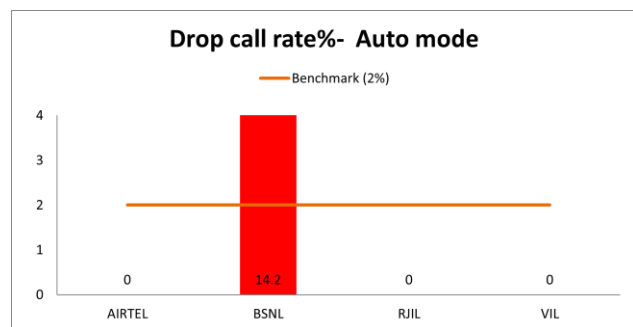
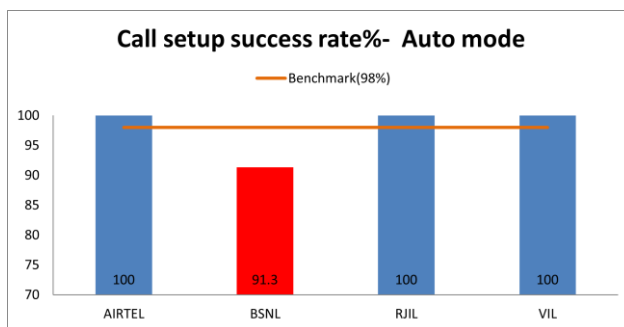
9.1.2 Signal Strength distribution: (3G/2G - Lock mode)



Rx Level -2G								
Overall Rx Level	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-65]	45036	75261	NA	154	7.90	87.2	NA	10.75
[-65, ≥-75]	108165	1821	NA	344	18.97	2.41	NA	24.01
[-75, ≥-85]	198605	3201	NA	758	34.83	4.2	NA	52.9
[-85, ≥Min]	218412	5962	NA	177	38.30	6.91	NA	12.35
Total	570218	86245	NA	1433	100.00	100	NA	100

Rx Level -3G								
Overall RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, $\geq$ -70]	NA	71272	NA	NA	NA	82.6	NA	NA
[-70, $\geq$ -80)	NA	2374	NA	NA	NA	2.7	NA	NA
[-80, $\geq$ -90)	NA	2292	NA	NA	NA	2.6	NA	NA
[-90, $\geq$ Min)	NA	10307	NA	NA	NA	11.9	NA	NA
Total	NA	86245	NA	NA	NA	100	NA	NA

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

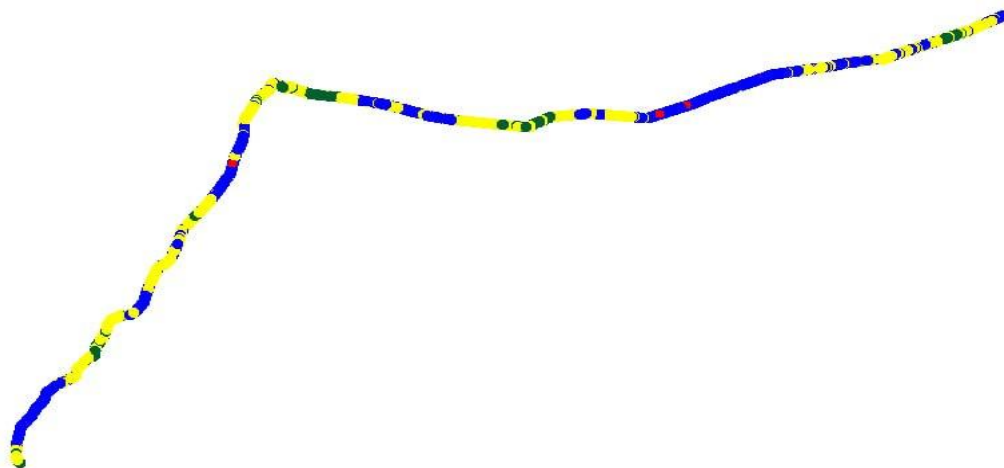


Parameters	Airtel	BSNL/MTNL	RJIL	VIL
Total Distance covered (in Kms)	55	55	55	55
No. of Call Attempts	19	23	18	15
No. of Call Established	19	21	18	15
Call setup success rate (CSSR) %	100.00	91.30	100	100
No. of Drop Call	0	03	0	0
Drop Call Rate %	0.00	14.2	0	0
Call Setup Time Average (Sec.)	1.23	3.89	1.28	0.95
No. of Handover Attempts	196	52	340	132
No. of Handover success	196	47	338	132
HOSR %	100.00	90.38	99.41	100
Packet Drop Rate (Downlink)	0.87	7.21	3.18	0.43
Packet Drop Rate (Uplink)	1.56	6.38	4.27	0.23
Number of silence call for > 2 sec.	0	24	4	0
Silence Call Rate %	0.00	6.34	1.5	0
Number of MOS samples	221	38	155	165
Average MOS score	3.90	1.6	4.09	4.01
RTP Jitter (4G & 5G) in ms	NA	8.45	15.6	N/A

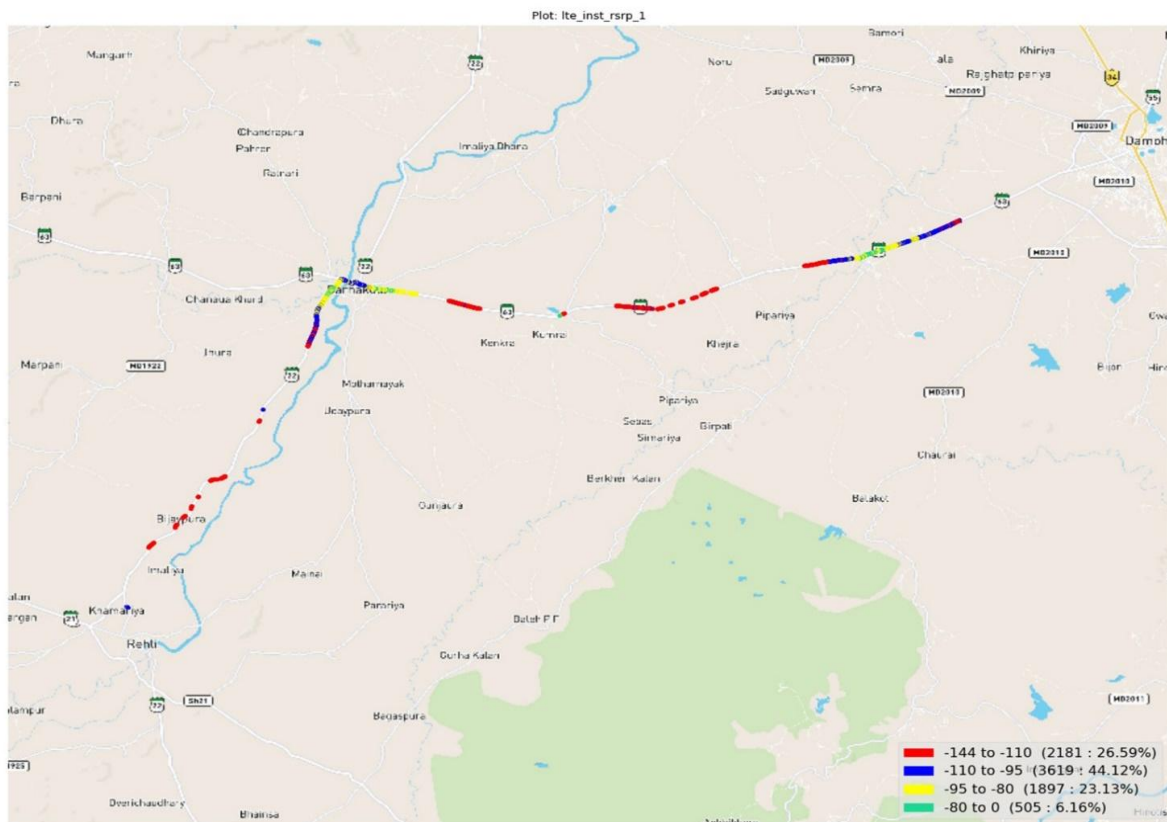
9.2.1 Signal Strength Map (5G/4G/3G/2G - Auto mode)

Parameter Name	Technology	Signal Strength (dBm)			
		Excellent	Good	Fair	Poor
Rx Level	GSM	0 to $\geq$ -65	<-65 to $\geq$ -75	<-75 to $\geq$ -85	<-85 to min
RSCP	WCDMA	0 to $\geq$ -70	<-70 to $\geq$ -80	<-80 to $\geq$ -90	<-90 to min
RSRP	LTE	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min
SS_RSRP	NR	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min

TSP - Airtel



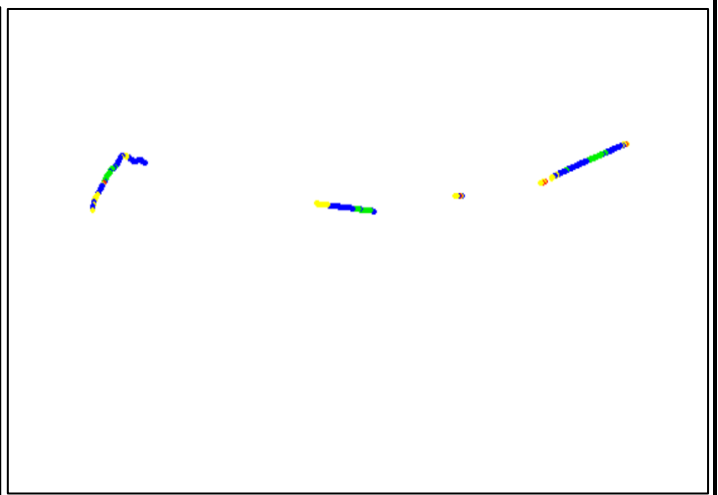
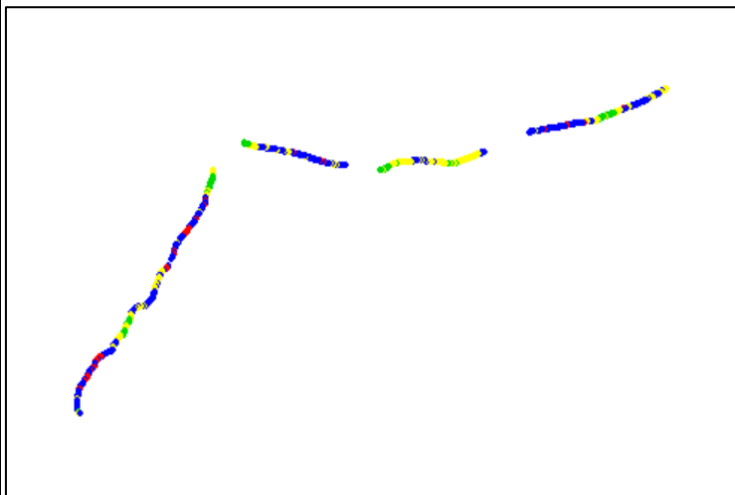
TSP - BSNL



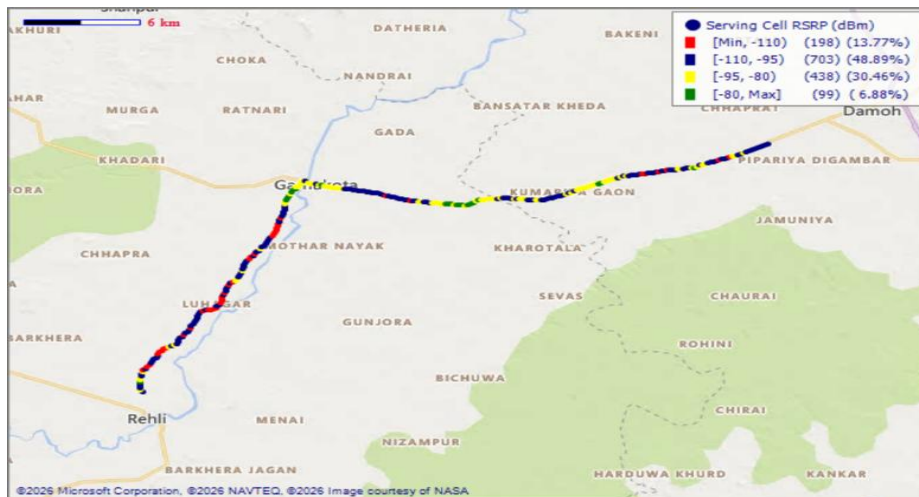
TSP - RJIL

LTE

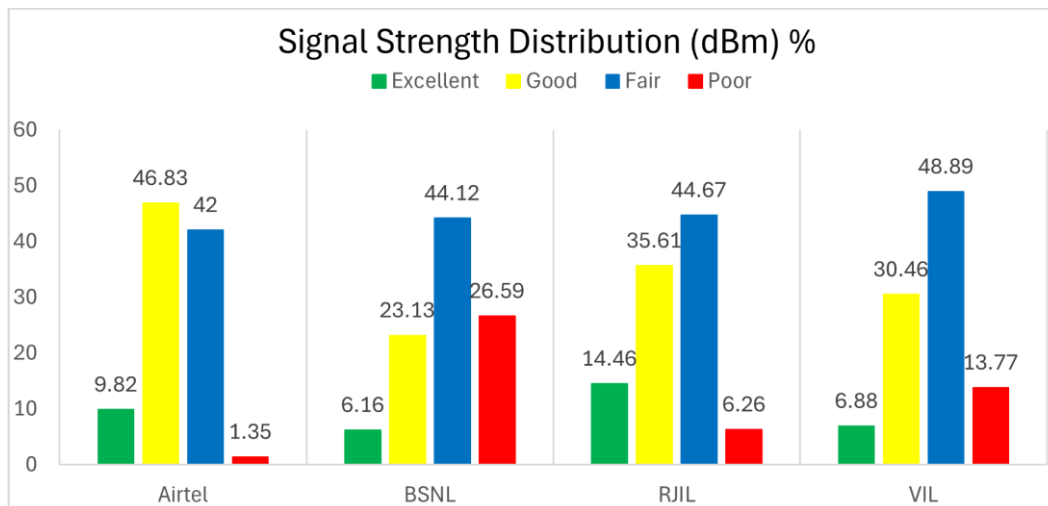
NR



TSP - VIL



9.2.2 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]	NA	75261	NA	NA	NA	87.2	NA	NA
[-65, ≥-75]	NA	1821	NA	NA	NA	2.41	NA	NA
[-75, ≥-85]	NA	3201	NA	NA	NA	4.2	NA	NA
[-85, ≥Min]	NA	5962	NA	NA	NA	6.91	NA	NA
Total	NA	86245	NA	NA	NA	100	NA	NA

Rx Level -3G								
Overall RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-70]	NA	71272	NA	NA	NA	82.6	NA	NA

[-70, ≥-80)	NA	2374	NA	NA	NA	2.7	NA	NA
[-80, ≥-90)	NA	2292	NA	NA	NA	2.6	NA	NA
[-90, ≥Min)	NA	10307	NA	NA	NA	11.9	NA	NA
Total	NA	86245	NA	NA	NA	100	NA	NA

Rx Level -4G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	101021	505	376	99	9.82	6.16	14.46	6.88
[-80, ≥-95]	481959	1897	995	438	46.83	23.13	35.61	30.46
[-95, ≥-110]	432193	3619	1248	703	42.00	44.12	44.67	48.89
[-110, ≥Min]	13976	2181	175	198	1.35	26.59	6.26	13.77
Total	1029149	8202	2794	1438	100.00	100	100	100

Rx Level -5G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	NA	NA	156	NA	NA	NA	17.35	NA
[-80, ≥-95]	NA	NA	543	NA	NA	NA	60.40	NA
[-95, ≥-110]	NA	NA	189	NA	NA	NA	21.02	NA
[-110, ≥Min]	NA	NA	11	NA	NA	NA	1.22	NA
Total	NA	NA	899	NA	NA	NA	100	NA

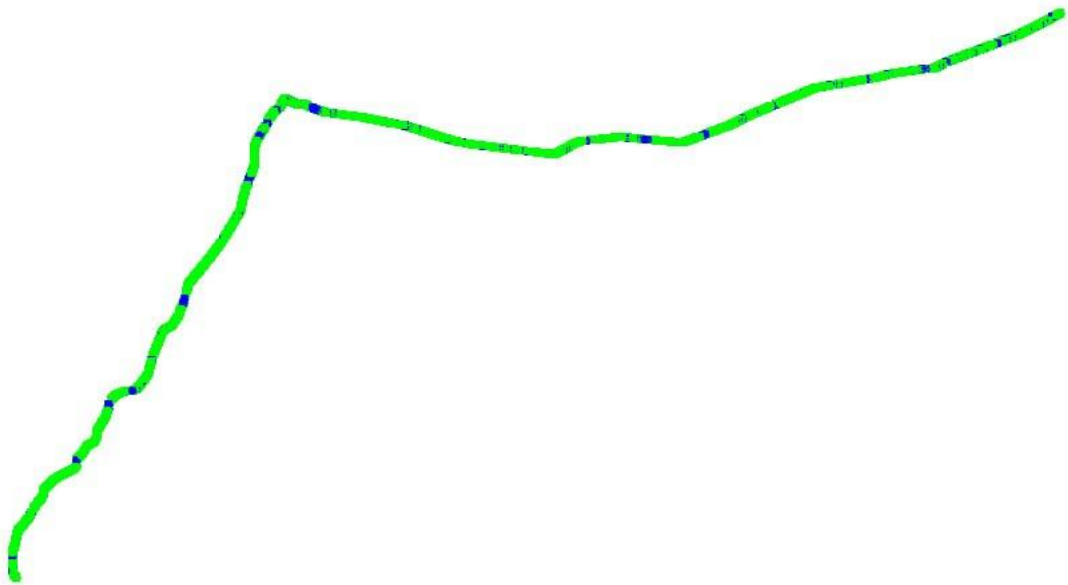
9.3 Data Service performance in 5G/4G/3G/2G (Auto mode) - Dynamic

QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	39.89	12.20	126.51	26.01
	80th Percentile	55.2	14.27	222.93	41.07
	20th Percentile	2.26	11.15	3.5	6.5
Upload speed (Mbps/s)	Average	11.60	15.61	17.36	11.05
	80th Percentile	22.3	12.80	25.94	19.66
	20th Percentile	1.08	16.22	1.56	2.40
Latency (ms)	Average	38.10	45.7	39.8	37.84
	50th Percentile	38.00	38.23	36	30
Jitter (ms)	Average	5.91	6.31	15.6	14.88

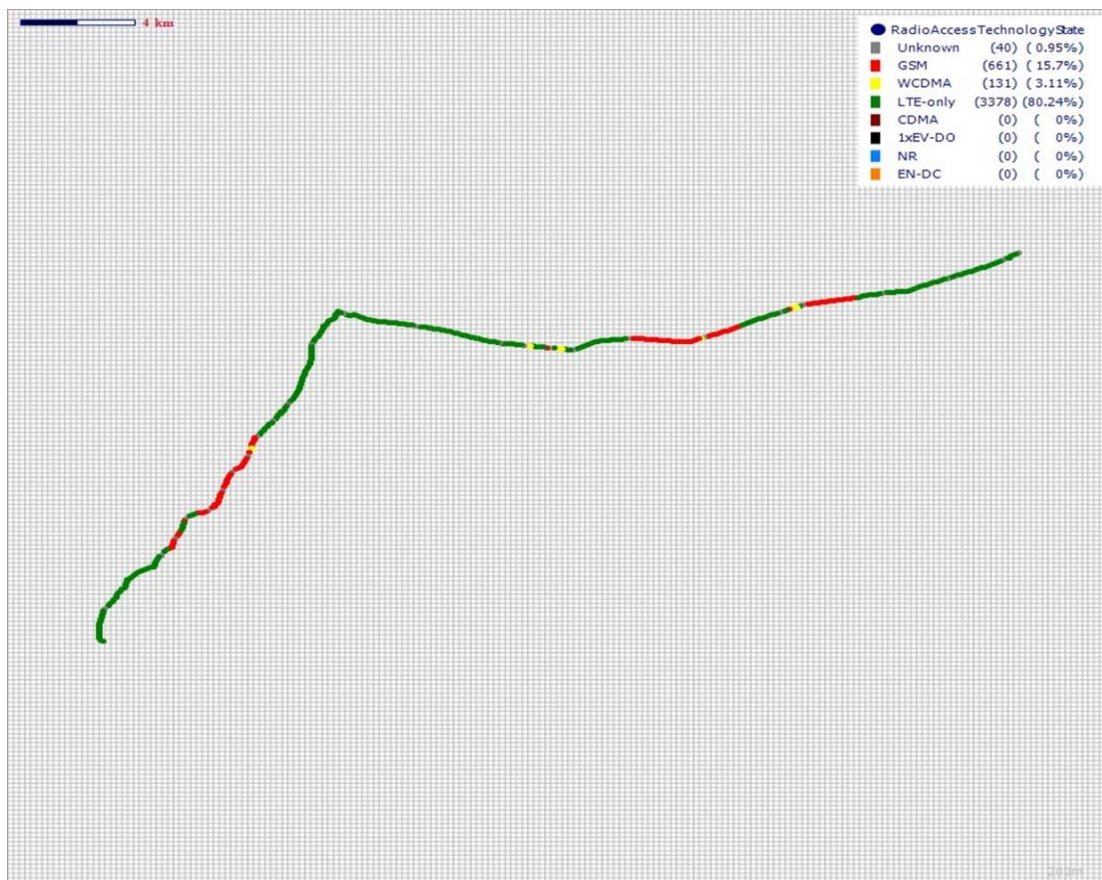
9.4 Time Spent (Technology-wise)

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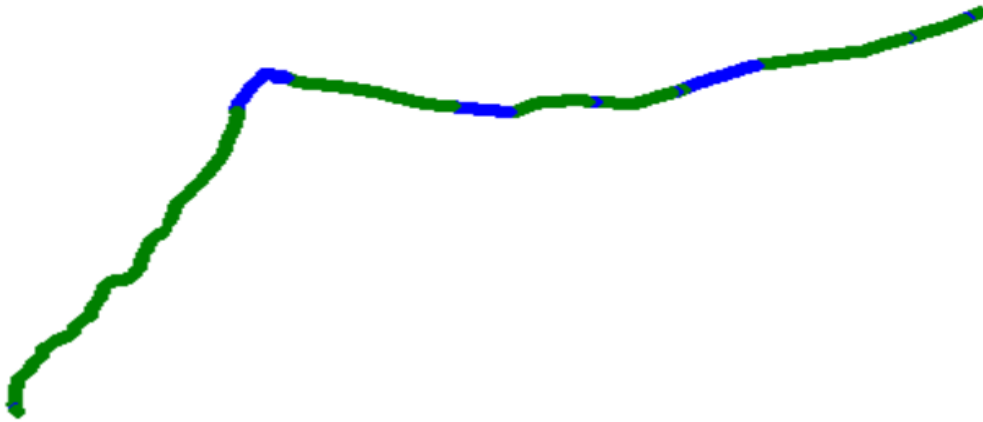
TSP - Airtel



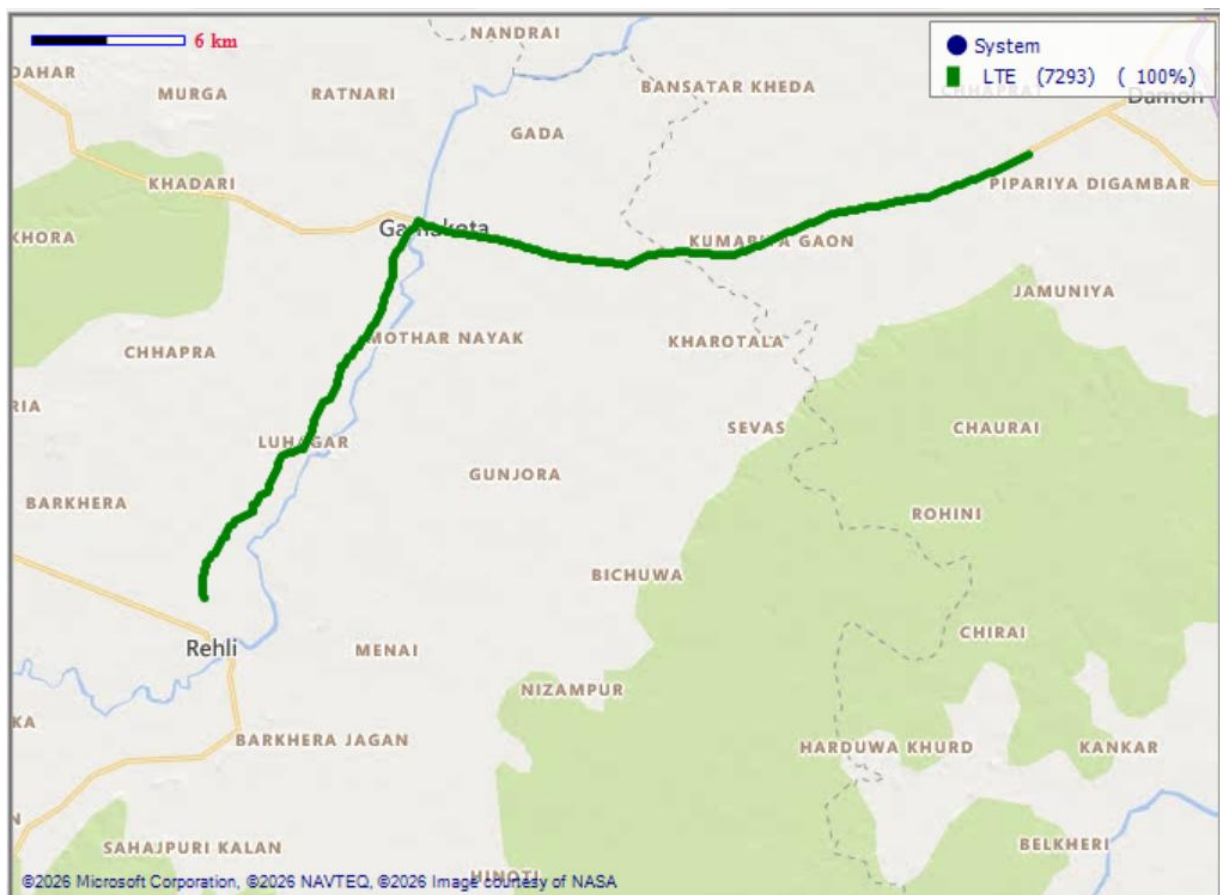
TSP - BSNL



TSP - RJIL



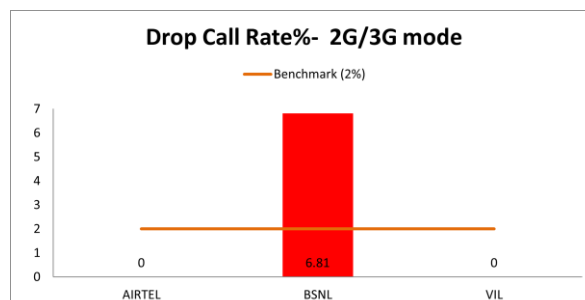
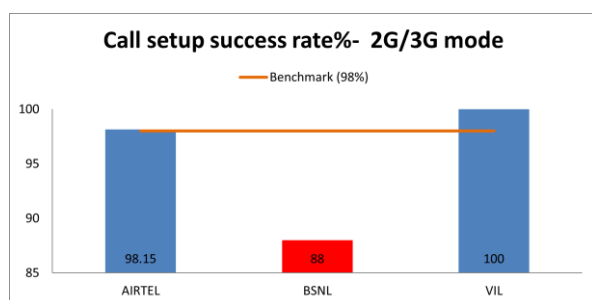
TSP - VIL



Highway (Damoh-Katni)

10.0 QoS Performance Analysis - Dynamic

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

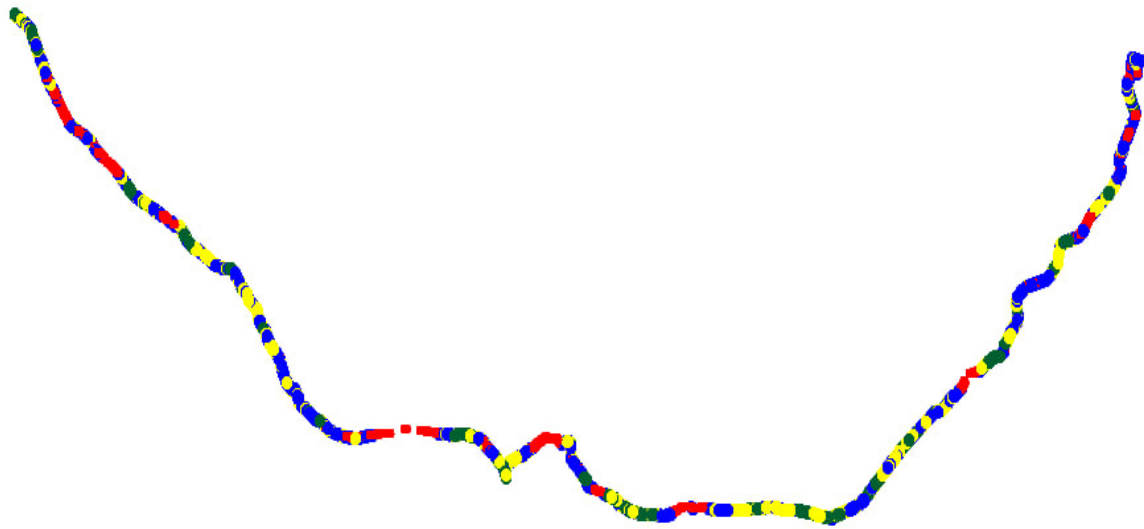


Parameters	Airtel	BSNL/MTNL	RJIL	VIL
Total Distance covered (in Kms)	135	135	N/A	135
No. of Call Attempts	54	50	N/A	66
No. of Call Established	53	44	N/A	66
Call setup success rate (CSSR) %	98.15	88	N/A	100
No. of Drop Call	0	03	N/A	0
Drop Call Rate %	0.00	6.81	N/A	0
Call Setup Time Average (Sec.)	3.53	3.14	N/A	2.48
No. of Handover Attempts	125	28	N/A	107
No. of Handover success	122	27	N/A	106
HOSR %	97.6	96	N/A	99.05
Total no of RLT Occurrence	19143	14	N/A	42.96
No of RLT > 48	0	0	N/A	0

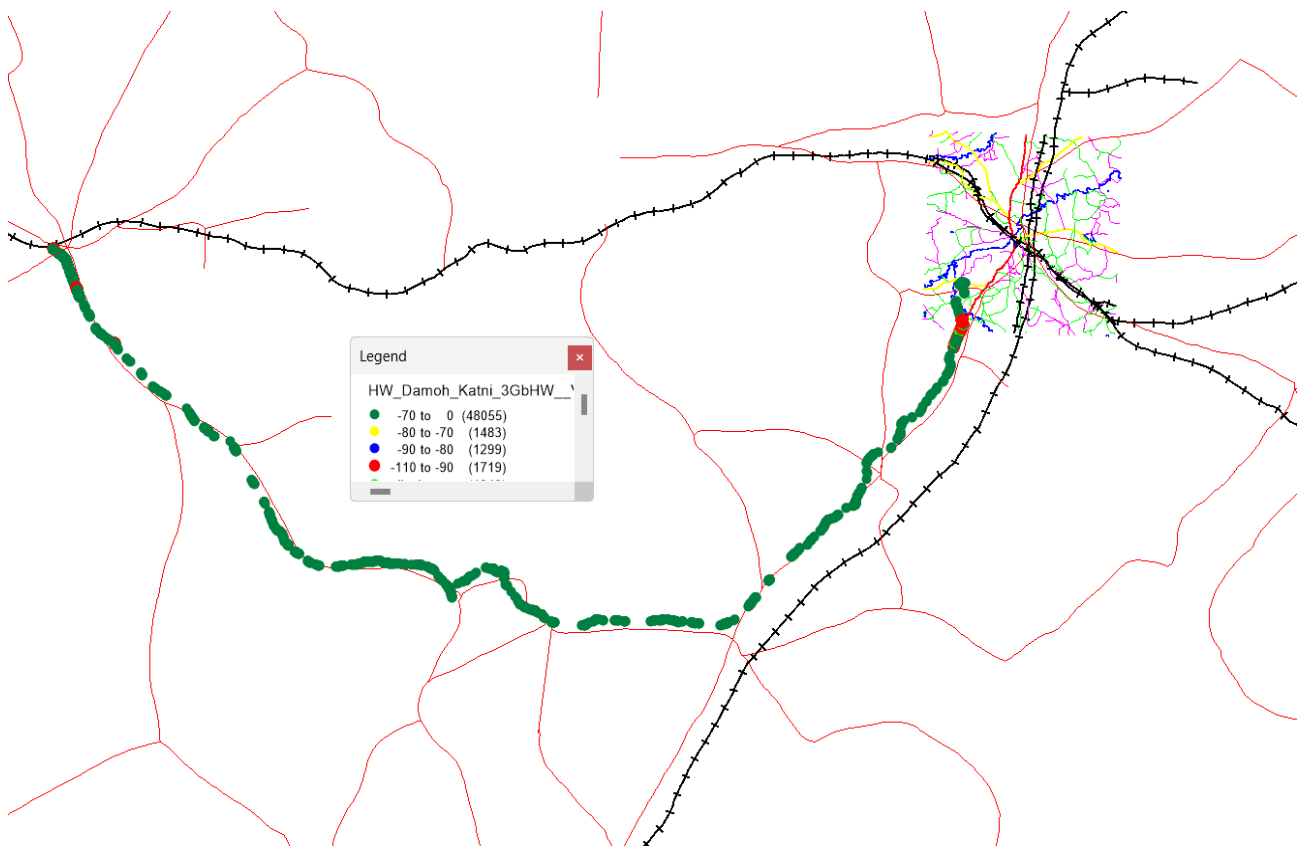
10.1.1 Signal Strength Map (3G/2G - Lock mode)

Parameter Name	Technology	Signal Strength (dBm)			
		Excellent	Good	Fair	Poor
Rx Level	GSM	0 to $\geq$ -65	<-65 to $\geq$ -75	<-75 to $\geq$ -85	<-85 to min
RSCP	WCDMA	0 to $\geq$ -70	<-70 to $\geq$ -80	<-80 to $\geq$ -90	<-90 to min
RSRP	LTE	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min
SS_RSRP	NR	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min

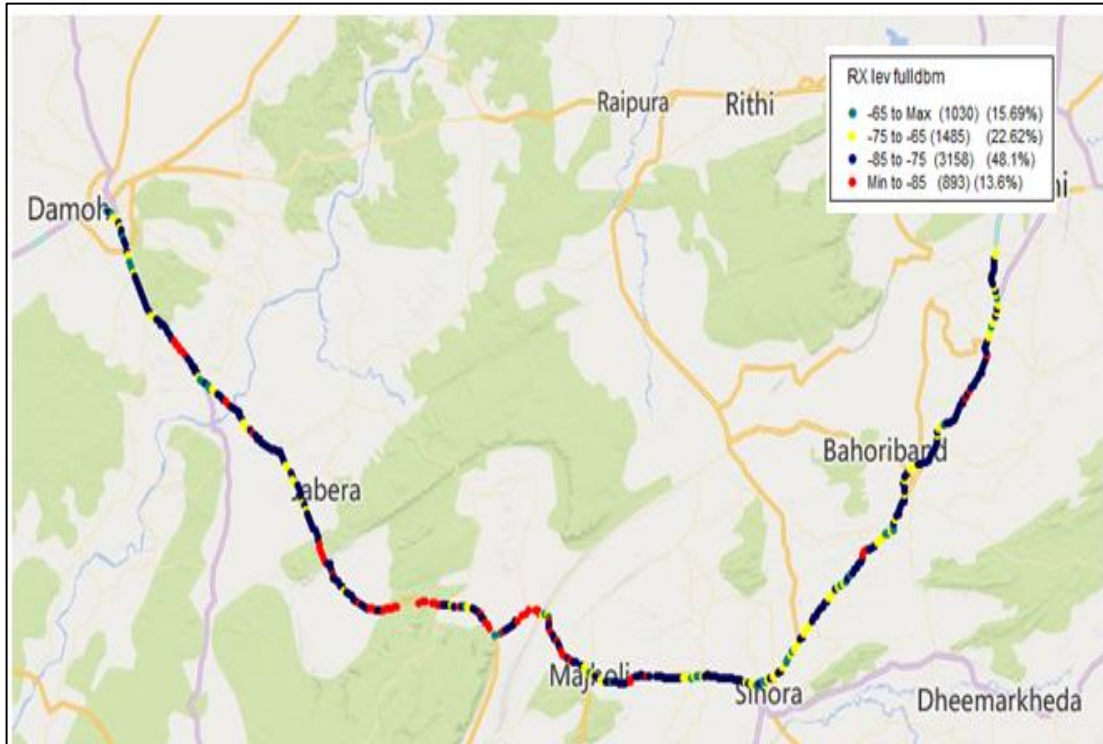
TSP - Airtel



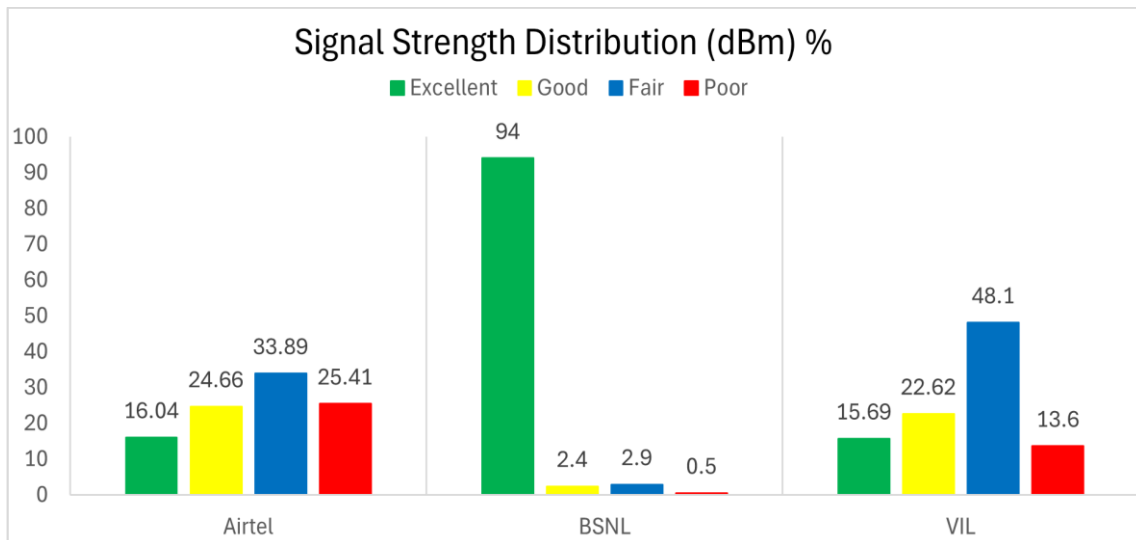
TSP - BSNL



TSP - VIL



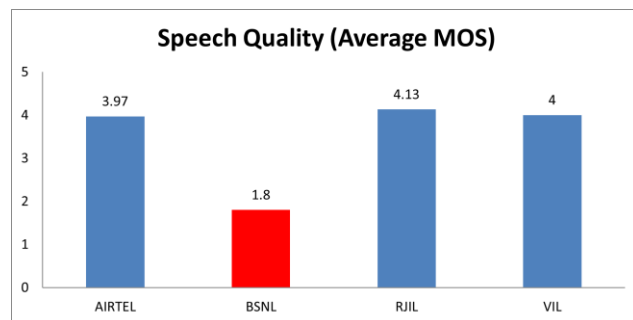
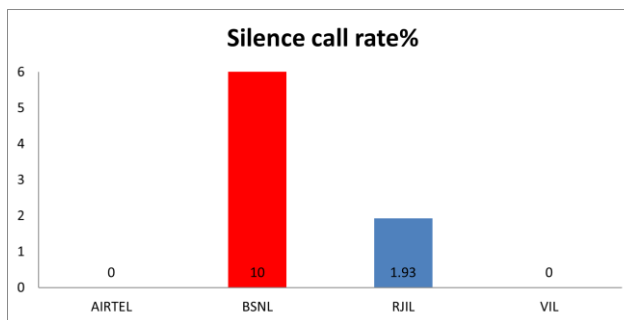
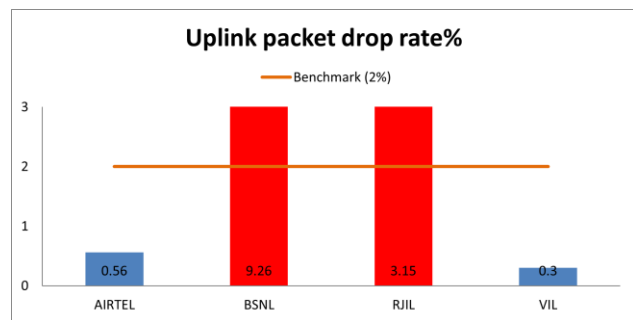
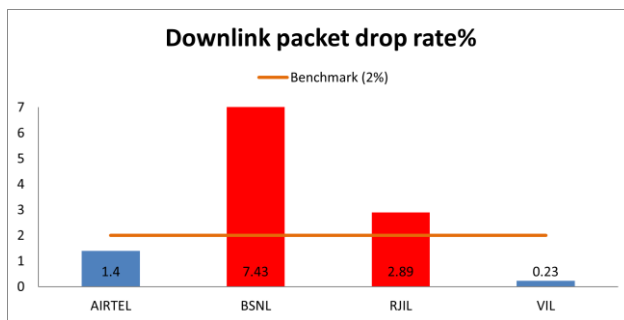
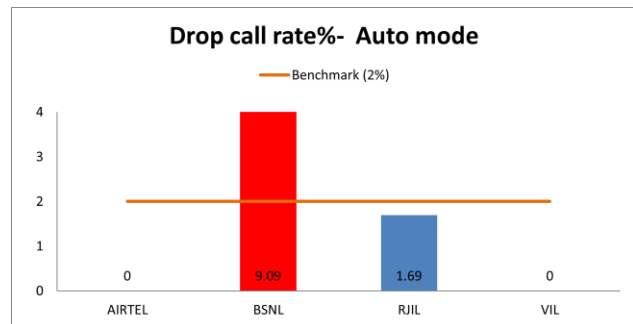
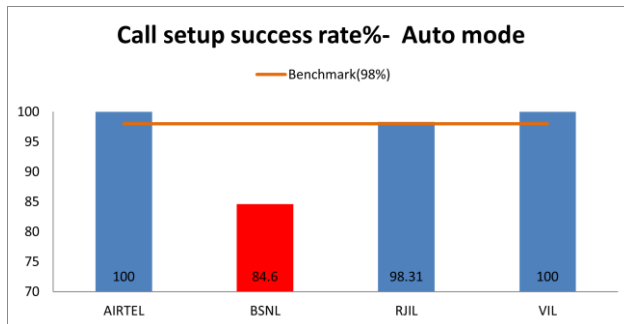
10.1.2 Signal Strength distribution: (3G/2G - Lock mode)



Rx Level -2G								
Overall Rx Level	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-65]	278695	49452	NA	1039	16.04	94	NA	15.69
[-65, ≥-75]	428521	1301	NA	1485	24.66	2.4	NA	22.62
[-75, ≥-85]	588749	1536	NA	3158	33.89	2.9	NA	48.1
[-85, ≥Min)	441462	238	NA	893	25.41	0.5	NA	13.6
Total	1737427	52527	NA	6575	100	100	NA	100

Rx Level -3G								
Overall RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, $\geq$ -70]	NA	48055	NA	NA	NA	91	NA	NA
[-70, $\geq$ -80)	NA	1483	NA	NA	NA	2.8	NA	NA
[-80, $\geq$ -90)	NA	1299	NA	NA	NA	2.4	NA	NA
[-90, $\geq$ Min)	NA	1719	NA	NA	NA	3.2	NA	NA
Total	NA	52556	NA	NA	NA	100	NA	NA

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

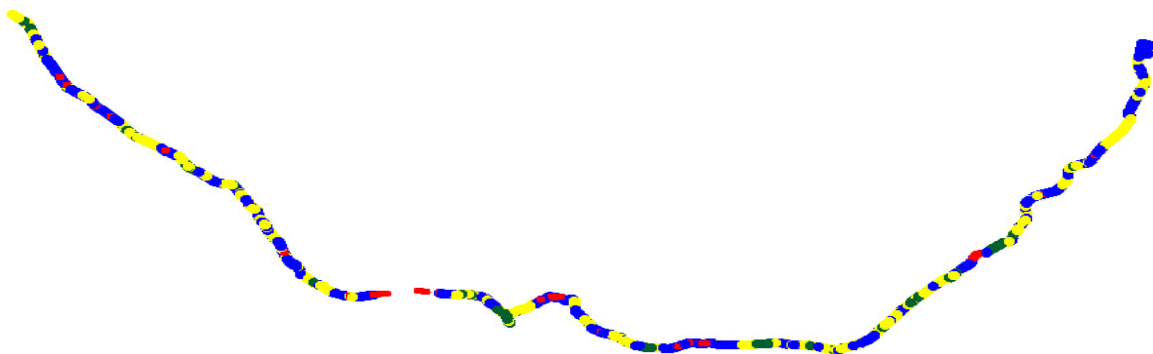


Parameters	Airtel	BSNL/MTNL	RJIL	VIL
Total Distance covered (in Kms)	135	135	135	135
No. of Call Attempts	56	52	59	70
No. of Call Established	56	44	58	70
Call setup success rate (CSSR) %	100	84.6	98.31	100
No. of Drop Call	0	04	1	0
Drop Call Rate %	0.00	9.09	1.69	0
Call Setup Time Average (Sec.)	1.40	3.82	1.1	0.79
No. of Handover Attempts	381	31	600	233
No. of Handover success	380	29	595	233
HOSR %	99.74	93.5	99.17	100
Packet Drop Rate (Downlink)	1.40	7.43	2.89	0.23
Packet Drop Rate (Uplink)	0.56	9.26	3.15	0.30
Number of silence call for > 2 sec.	0	76	5	0
Silence Call Rate %	0.00	10	1.93	0
Number of MOS samples	747	64	437	726
Average MOS score	3.97	1.8	4.13	4.0
RTP Jitter (4G & 5G) in ms	NA	8.34	19.45	NA

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

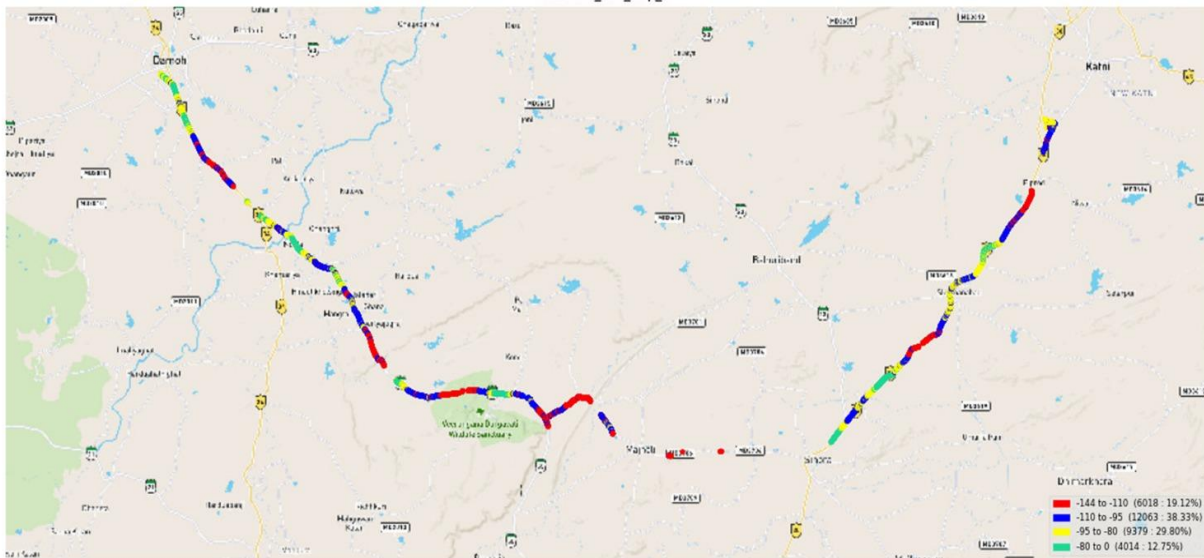
Parameter Name	Technology	Signal Strength (dBm)			
		Excellent	Good	Fair	Poor
Rx Level	GSM	0 to $\geq$ -65	<-65 to $\geq$ -75	<-75 to $\geq$ -85	<-85 to min
RSCP	WCDMA	0 to $\geq$ -70	<-70 to $\geq$ -80	<-80 to $\geq$ -90	<-90 to min
RSRP	LTE	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min
SS_RSRP	NR	0 to $\geq$ -80	<-80 to $\geq$ -95	<-95 to $\geq$ -110	<-110 to min

TSP - Airtel



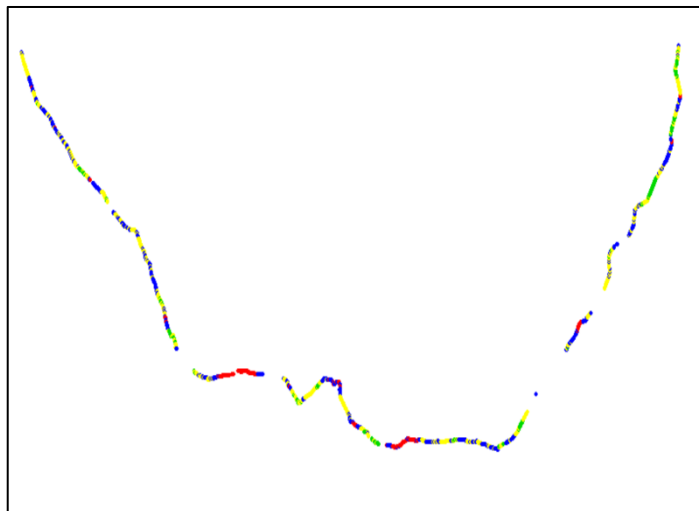
TSP - BSNL

Plot: lte_inst_rsrp_1

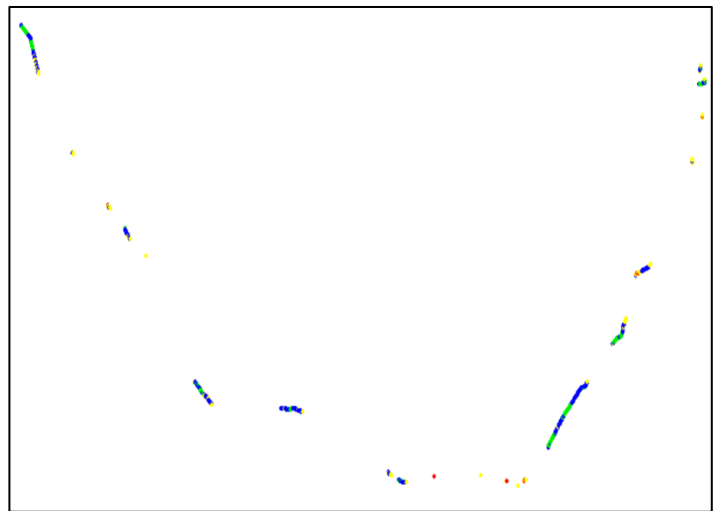


TSP - RJIL

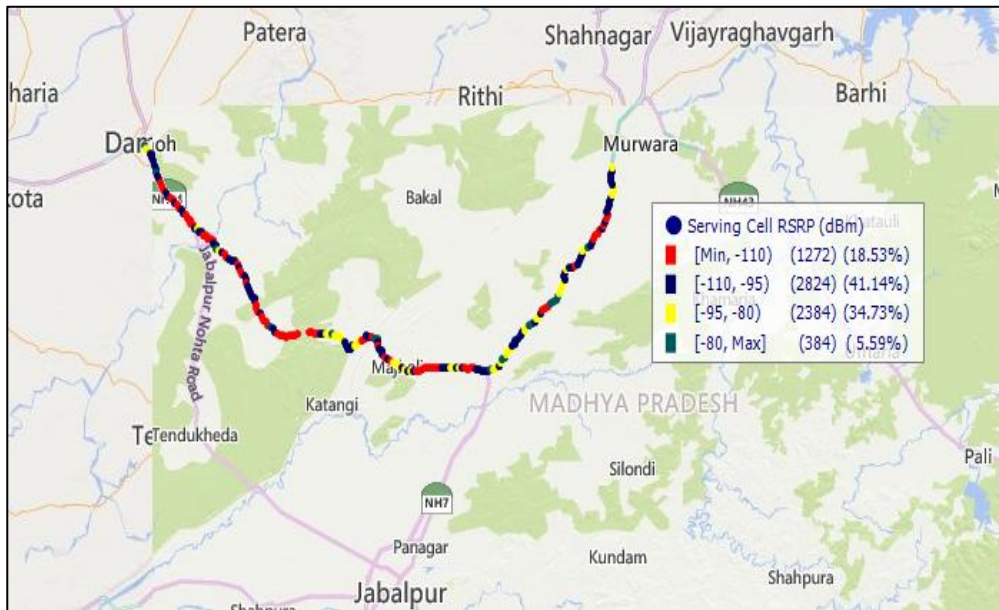
LTE



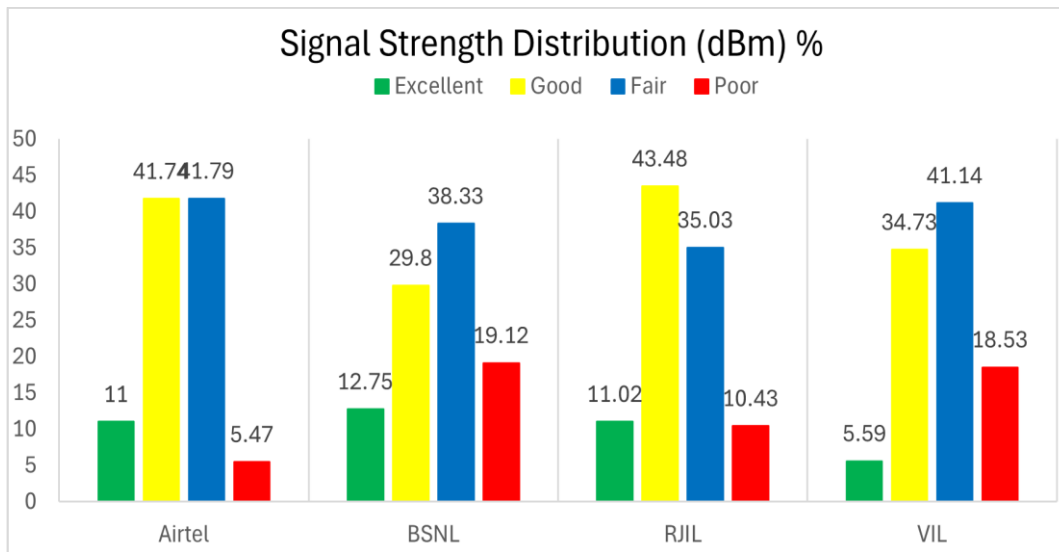
NR



TSP - VIL



10.2.2 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]	NA	49452	NA	NA	NA	94	NA	NA
[-65, ≥-75]	NA	1301	NA	NA	NA	2.4	NA	NA
[-75, ≥-85]	NA	1536	NA	NA	NA	2.9	NA	NA
[-85, ≥Min]	NA	238	NA	NA	NA	0.5	NA	NA
Total	NA	52527	NA	NA	NA	100	NA	NA

Rx Level -3G								
Overall RSCP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-70]	NA	48055	NA	NA	NA	91	NA	NA
[-70, ≥-80)	NA	1483	NA	NA	NA	2.8	NA	NA
[-80, ≥-90)	NA	1299	NA	NA	NA	2.4	NA	NA
[-90, ≥Min)	NA	1719	NA	NA	NA	3.2	NA	NA
Total	NA	52556	NA	NA	NA	100	NA	NA

Rx Level -4G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	320458	4014	800	384	11.00	12.75	11.07	5.59
[-80, ≥-95]	1215883	9379	3143	2384	41.74	29.8	43.48	34.73
[-95, ≥-110]	1217575	12063	2532	2824	41.79	38.33	35.03	41.14
[-110, ≥Min]	159410	6018	754	1272	5.47	19.12	10.43	18.53
Total	2913326	31474	7229	6864	100.00	100	100	100

Rx Level -5G								
Overall RSRP	No of Sample				Sample %			
	Airtel	BSNL	RJIL	VIL	Airtel	BSNL/MTNL	RJIL	VIL
[Max, ≥-80]	NA	NA	1095	NA	NA	NA	31.13	NA
[-80, ≥-95]	NA	NA	1797	NA	NA	NA	51.08	NA
[-95, ≥-110]	NA	NA	599	NA	NA	NA	17.03	NA
[-110, ≥Min]	NA	NA	27	NA	NA	NA	0.77	NA
Total	NA	NA	3518	NA	NA	NA	100	NA

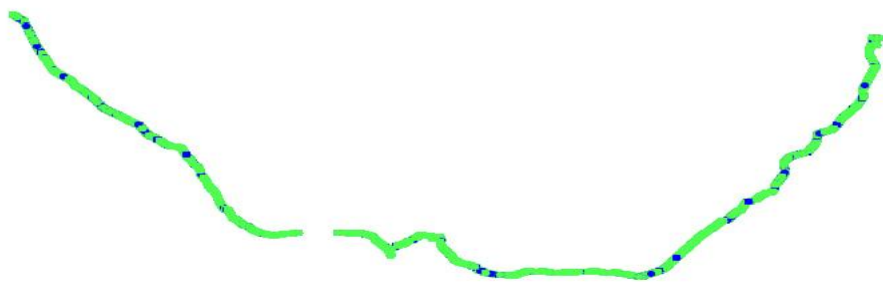
10.3 Data Service performance in 5G/4G/3G/2G (Auto mode) - Dynamic

QoS Parameters		AIRTEL	BSNL/MTNL	RJIL	VIL
Download speed (Mbps/s)	Average	57.00	22.20	153.0	43.21
	80th Percentile	67.4	16.27	371.0	86.17
	20th Percentile	8.9	24.15	4.47	13.75
Upload speed (Mbps/s)	Average	12.97	11.61	28.2	26.27
	80th Percentile	25.9	12.80	52.9	44.57
	20th Percentile	1.47	16.22	1.7	8.38
Latency (ms)	Average	34.70	55.7	36.1	31.61
	50th Percentile	29.00	48.23	33	29
Jitter (ms)	Average	11.97	5.31	19.45	9

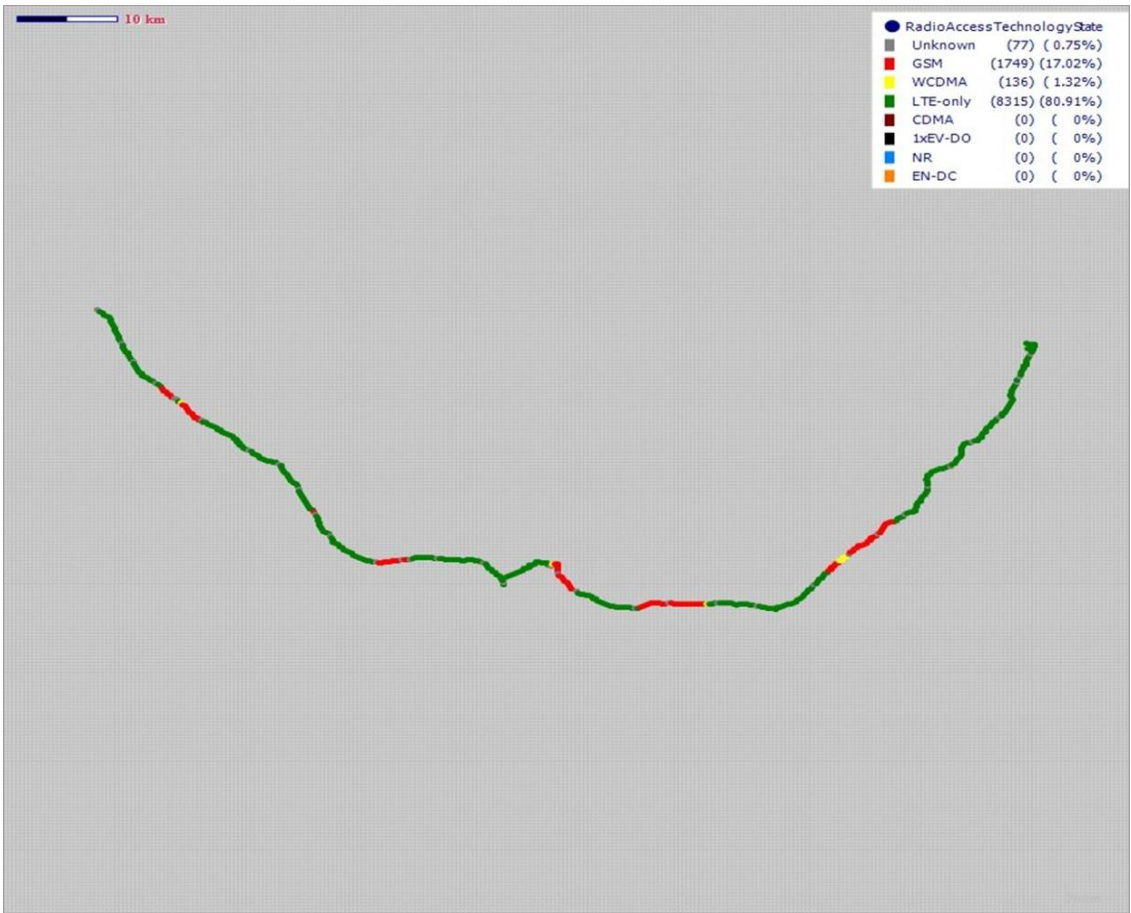
10.4 Time Spent (Technology-wise)

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

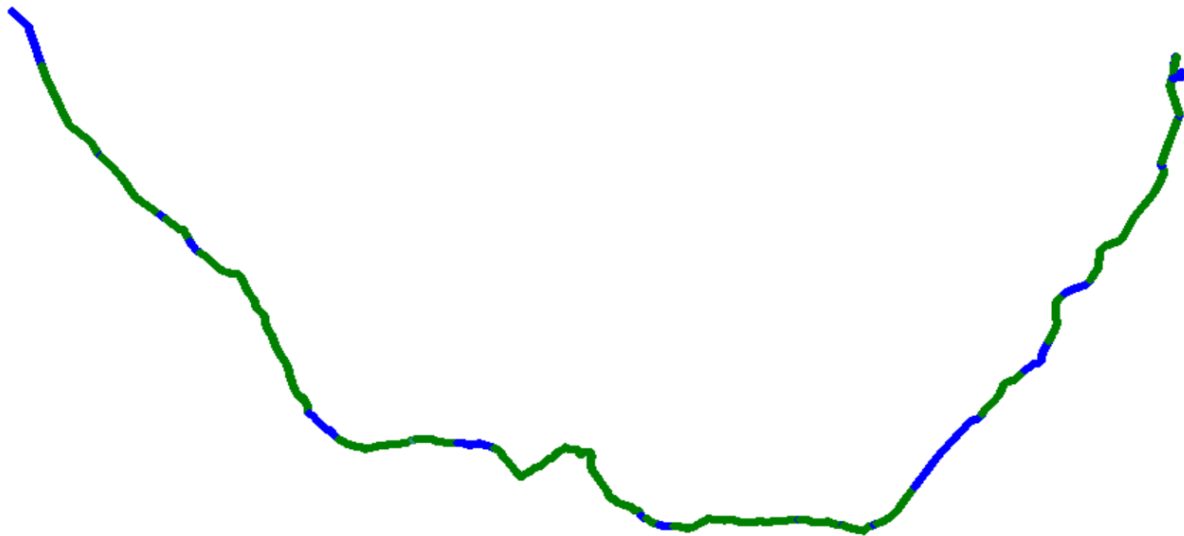
TSP - Airtel



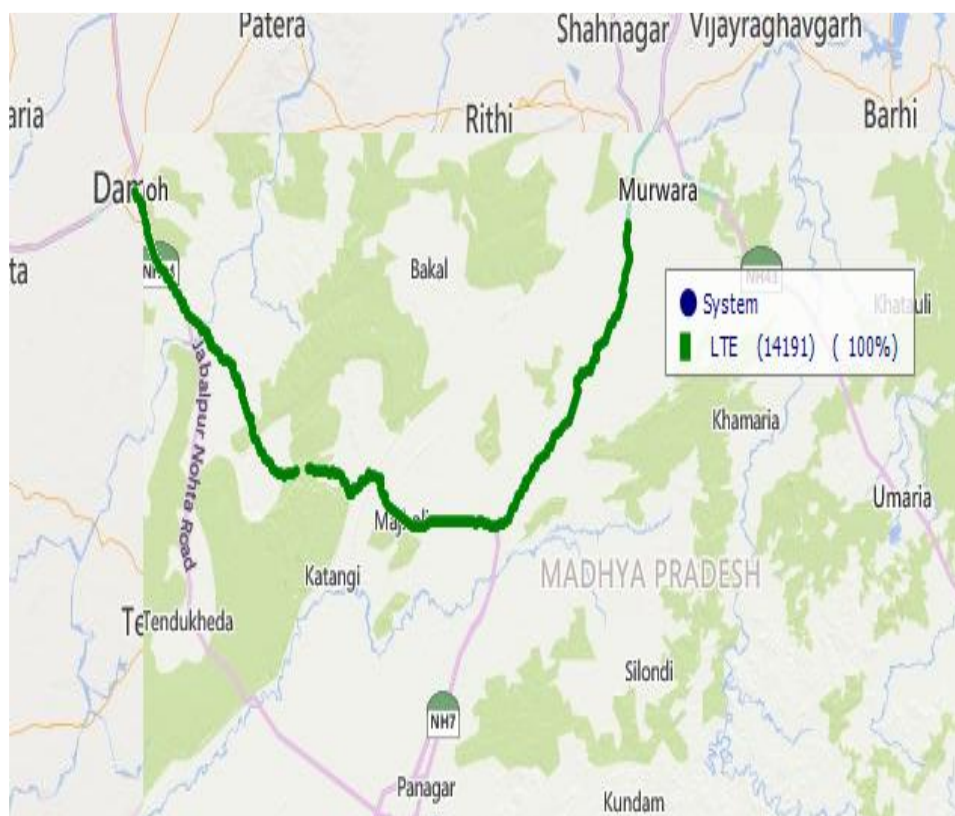
TSP - BSNL



TSP - RJIL



TSP - VIL



11.0 Data testing on hotspots using trainmyspeed app

Hotspot		Airtel	BSNL	JIO	VIL
1. Clock Tower Circuit (Ghanta Ghar)	3G download in Mbps	NA	3.99	NA	NA
	3G upload in Mbps	NA	2.09	NA	NA
	4G download in Mbps	61.87	22.51	NA	48.67
	4G upload in Mbps	16.4	9.06	NA	16.89
	5G download in Mbps	381.51	NA	337.46	NA
	5G upload in Mbps	28.62	NA	13.66	NA
2. Government Polytechnic College	3G download in Mbps	NA	10.47	NA	NA
	3G upload in Mbps	NA	1.83	NA	NA
	4G download in Mbps	17.36	43.8	NA	55.89
	4G upload in Mbps	8.29	6.58	NA	24.56
	5G download in Mbps	166.81	NA	150.14	NA
	5G upload in Mbps	24.81	NA	19.01	NA
3. Damoh Railway Station	3G download in Mbps	NA	3.15	NA	NA

	3G upload in Mbps	NA	1.15	NA	NA
	4G download in Mbps	19.42	16.8	NA	47.55
	4G upload in Mbps	1.69	18.3	NA	20.01
	5G download in Mbps	415.4	NA	442.48	NA
	5G upload in Mbps	29.93	NA	19.82	NA
4. Bus Stand Rehli	3G download in Mbps	NA	NA	NA	NA
	3G upload in Mbps	NA	NA	NA	NA
	4G download in Mbps	27.23	33.9	NA	55.16
	4G upload in Mbps	7.08	3.67	NA	14.01
	5G download in Mbps	97.01	NA	125.8	NA
	5G upload in Mbps	22.72	NA	13.58	NA
5. Govt. Girls College Katni (Gulwara)	3G download in Mbps	NA	9.02	NA	NA
	3G upload in Mbps	NA	1.92	NA	NA
	4G download in Mbps	6.11	21.9	NA	49.43
	4G upload in Mbps	9.32	11.6	NA	23.11

	5G download in Mbps	104.92	NA	88.00	NA
	5G upload in Mbps	11.6	NA	24.56	NA

6. Railway hospital, New Katni	3G download in Mbps	NA	3.72	NA	NA
	3G upload in Mbps	NA	0.91	NA	NA
	4G download in Mbps	13.07	23.15	NA	55.09
	4G upload in Mbps	1.41	8.62	NA	2.56
	5G download in Mbps	NA	NA	428.72	NA
	5G upload in Mbps	NA	NA	98.07	NA

7. Katni Bus Stand, New, Badera, Katni	3G download in Mbps	NA	2.28	NA	NA
	3G upload in Mbps	NA	0.51	NA	NA
	4G download in Mbps	12.65	17.83	NA	50.37
	4G upload in Mbps	1.43	5.62	NA	15.47
	5G download in Mbps	236.66	NA	326.41	NA

	5G upload in Mbps	11.63	NA	35.45	NA
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8. Katni Arts College	3G download in Mbps	NA	10.60	NA	NA
	3G upload in Mbps	NA	1.47	NA	NA
	4G download in Mbps	19.04	37.9	NA	24.16
	4G upload in Mbps	7.37	12.01	NA	18.79
	5G download in Mbps	199.26	NA	649.89	NA
	5G upload in Mbps	15.97	NA	33.30	NA

9. Krishi Upaj Mandi Samiti	3G download in Mbps	NA	3.54	NA	NA
	3G upload in Mbps	NA	1.27	NA	NA
	4G download in Mbps	23.69	12.3	NA	35.01
	4G upload in Mbps	3.17	1.87	NA	17.54
	5G download in Mbps	229.45	NA	369.04	NA
	5G upload in Mbps	21.55	NA	11.64	NA

10. Katni Railway Station	3G download in Mbps	NA	9.33	NA	NA
	3G upload in Mbps	NA	2.2	NA	NA
	4G download in Mbps	4.95	47.3	NA	59.54
	4G upload in Mbps	3.22	11.7	NA	33.28
	5G download in Mbps	15.5	NA	209.42	NA
	5G upload in Mbps	5.12	NA	10.37	NA

11. South Katni Railway Station	3G download in Mbps	NA	5.28	NA	NA
	3G upload in Mbps	NA	1.35	NA	NA
	4G download in Mbps	89.64	18.1	NA	25.73
	4G upload in Mbps	16.85	10.4	NA	18.69
	5G download in Mbps	286.78	NA	710.36	NA
	5G upload in Mbps	19.5	NA	60.96	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 ≥ 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																																		
8	Signal Strength (Signal strength is the signal power level received by the wireless user)	<table><tr><th rowspan="2">Parameter Name</th><th rowspan="2">Technology</th><th colspan="4">Signal Strength (dBm)</th></tr><tr><th>Excellent</th><th>Good</th><th>Fair</th><th>Poor</th></tr><tr><td>RxLevel</td><td>GSM</td><td>0 to ≥ -65</td><td><-65 to ≥-75</td><td><-75 to ≥-85</td><td><-85 to min</td></tr><tr><td>RSCP</td><td>WCDMA</td><td>0 to ≥ -70</td><td><-70 to ≥-80</td><td><-80 to ≥-90</td><td><-90 to min</td></tr><tr><td>RSRP</td><td>LTE</td><td>0 to ≥ -80</td><td><-80 to ≥-95</td><td><-95 to ≥-110</td><td><-110 to min</td></tr><tr><td>SS_RSRP</td><td>NR</td><td>0 to ≥ -80</td><td><-80 to ≥-95</td><td><-95 to ≥-110</td><td><-110 to min</td></tr></table>	Parameter Name	Technology	Signal Strength (dBm)				Excellent	Good	Fair	Poor	RxLevel	GSM	0 to ≥ -65	<-65 to ≥-75	<-75 to ≥-85	<-85 to min	RSCP	WCDMA	0 to ≥ -70	<-70 to ≥-80	<-80 to ≥-90	<-90 to min	RSRP	LTE	0 to ≥ -80	<-80 to ≥-95	<-95 to ≥-110	<-110 to min	SS_RSRP	NR	0 to ≥ -80	<-80 to ≥-95	<-95 to ≥-110	<-110 to min
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(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