



TELECOM REGULATORY AUTHORITY OF INDIA

Independent Drive Test Report

UP East LSA

September 2026

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1. Introduction

TRAI Act, 1997 mandates the Authority to ensure the services delivered through various telecommunications networks meet the required quality standards prescribed, to protect the interest of the consumers of telecommunication services. TRAI is also responsible for conducting the periodical audit of such services provided by the service providers so as to protect the interests of the consumers of telecommunications services.

Accordingly, TRAI has engaged M/s RedMango Analytics Pvt. Ltd. to undertake assessment of Quality of Service of mobile service through Independent Drive Test (IDT).

In IDT, the performance of all service providers providing service in a Licensed Service Area (LSA) through various technologies (like 2G/ 3G/ 4G/ 5G) for voice and data are measured by conducting drive test. The drive test routes are finalised based on various objective criteria like reported network performance, consumer complaints etc. Methodology adopted for conducting IDT is elaborated in **APPENDIX-I**.

2. Executive Summary (LSA)

2.1 Drive test details

This report covers the findings of the IDT undertaken in Uttar Pradesh East License Service Area (LSA) during the month of September-2026 under the supervision of TRAI Regional Office (RO) Bhopal. Details of route/area covered during the IDT are as given below:

S. No	Drive test route	Type of route	Distance covered (KMs)	From date	To date
1	Gonda, Bahraich, Shravasti & Balrampur	City	355.4	07-Sep-2026	10-Sep-2026
2	Balrampur	Inter Operator Calling	12.3 & 2 Locations	10-Sep-2026	10-Sep-2026
3	Gonda, Bahraich & Balrampur	Hotspot	7 Locations	08-Sep-2026	10-Sep-2026
4	Gonda & Balrampur	Walk test	2.7	08-Sep-2026	10-Sep-2026
5	Prayagraj to Gonda	Highway	204.3	07-Sep-2026	07-Sep-2026
6	Gonda to Bahraich	Highway	51.9	09-Sep-2026	09-Sep-2026

Table-1: Drive test summary.

2.2 Drive test routes

The map provides overview of drive test routes indicating city drive, Inter-operator call test, hotspots, walk test and highway as per the legends shown on the map.

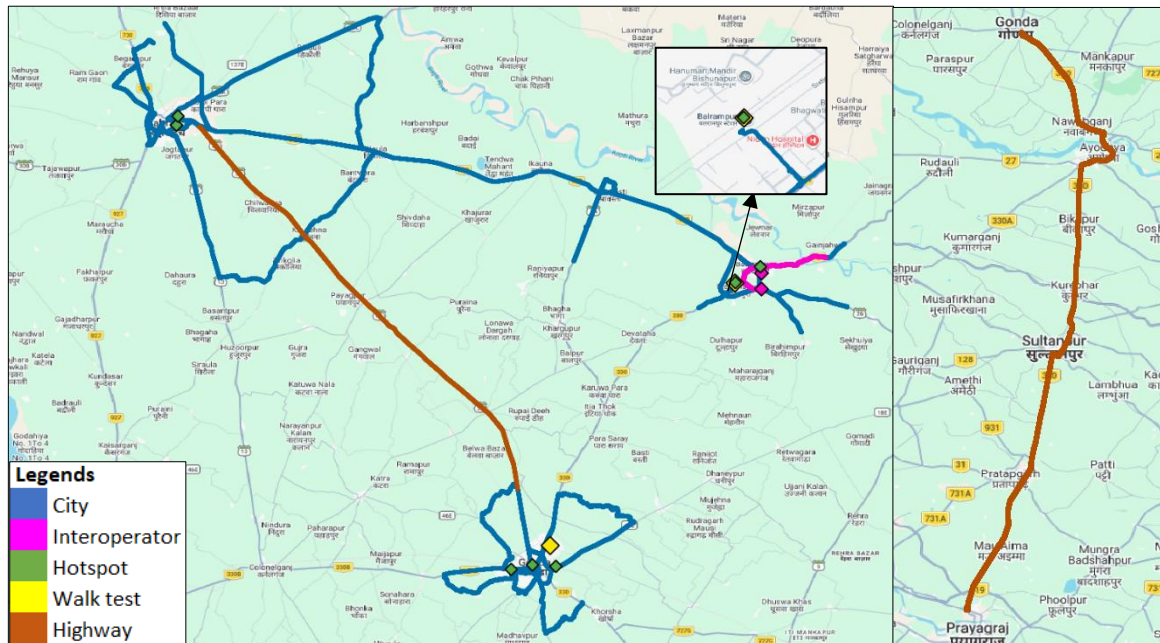


Figure-1: Drive test routes.

2.3 Summary of areas covered

a) City- Gonda- Banghusra, Jhanjhari, Police line, Balpur Jot, Keswapur Pahrwa, Veerpur, Janki Nagar, Semra Damman, Tulsipur and Sekhapur etc.

Bahraich- Begampur, Godan Basahi, Mohammad Nagar, Bakshi pura, Dikauli, Doob Kalan, Pachdewari, Gilaula, Khutehna, Chakujot, Jagtapur and Kamla Bhari etc.

Balrampur- Harbaspur, Bishunipur, Bishunapur, Dhusah, Benijot, Pahalwara koeliha, Shravasti, Ikauna, Khargaura Basti, Gopalpur and Ararpakar etc.

b) Hotspot

1. District Court Gonda
2. District Hospital Bahraich
3. District Hospital Balrampur
4. Government Bus Stand Gonda
5. Government Polytechnic College Gonda
6. Railway Station Bahraich
7. Railway Station Balrampur

c) Walk Test

1. Gonda Junction Railway Station
2. Railway Station Balrampur

d) Highway-

i) Prayagraj to Gonda- Passing through Mau Aima, Bela Pratapgarh, Sultanpur, Faizabad, Ayodhya and Nawabganj etc.

ii) Gonda to Bahraich- Passing through Pipra Bazar, Manohar Jot, Suhelwa, Imaliya Ganj and Chilwariya etc.

2.4 Telecom service providers detected frequency bands

Technologies covered during the IDT and frequency bands in use are summarised in table below:

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

Table-2: Telecom service provider (TSP) covered in IDT.

2.5 Key findings of Independent Drive Test

1. Drive Test Area: The overall mobile network performance across Gonda city (UP East LSA) for the key Parameters have been summarized below:

a) Coverage Gap – The signal strength observed during voice testing on the drive test route in auto-selection mode (5G/4G/3G/2G). (refer figure- 26 to 29)

Parameter	AIRTEL	BSNL	RJIL	VIL
Total Number of Samples captured on Drive test route	19284	16823	18995	19266
Number of Samples having poor signal strength	818	7289	919	1775
Number of Samples having limited service (No Coverage)	0	715	0	0

b) Dropped Calls - The TSP-wise details of dropped calls in auto selection mode (5G/4G/3G/2G). (refer figure-15 and 16)

Parameter	AIRTEL	BSNL	RJIL	VIL
Number of successful Calls Established	171	162	171	171
Number of dropped Calls	1	23	0	0

c) Call Silence Instance – The TSP-wise details of Call silence instance in Auto-selection mode (5G/4G). (refer figure-17 to 19)

Parameter	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider network)	161	119	166	165
Number of silences calls for >3 Sec	2	NA	4	5
Total number of silence instances for >3 Sec	2	NA	6	8

d) Packet loss rate Downlink & Uplink- The TSP-wise details of packet loss rate in downlink & uplink for Auto-selection mode (5G/4G).

Parameter	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider network)	161	119	166	165
Packet loss Rate Downlink %	1.25	NA	2.19	2.22
Packet loss Rate Uplink %	0.76	NA	1.49	1.23

e) Data Download and Upload Throughput-

i) Data Download Throughput: The TSP-wise details of **Average Download (DL) throughput** against declared typical DL Throughput for month, in Auto-selection mode (5G/4G/3G/2G). (refer figure- 31 to 34)

Parameter	Measured in	AIRTEL (upto 5G)	BSNL (upto 4G)	RJIL (upto 5G)	VIL (upto 5G)
Typical Download Throughput declared by TSP	(Mbits/s)	23.00	4.19	15.00	15.00
Average Download Throughput measured during IDT	(Mbits/s)	94.98	1.15	167.44	34.31

ii) Data Upload Throughput: The TSP-wise details of **Average Upload (UL) throughput** against declared typical UL Throughput for month, in Auto-selection mode (5G/4G/3G/2G). (refer figure- 35 to 38)

Parameter	Measured in	AIRTEL (upto 5G)	BSNL (upto 4G)	RJIL (upto 5G)	VIL (upto 5G)
Typical Upload Throughput declared by TSP	(Mbits/s)	10.00	3.61	7.00	8.00
Average Upload Throughput measured during IDT	(Mbits/s)	14.59	1.86	18.94	9.53

2. Drive Test Area: The overall mobile network performance across Bahraich city (UP East LSA) for the key Parameters have been summarized below:

a) Coverage Gap – The signal strength observed during voice testing on the drive test route in auto-selection mode (5G/4G/3G/2G). (refer figure- 64 to 67)

Parameter	AIRTEL	BSNL	RJIL	VIL
Total Number of Samples captured on Drive test route	23477	19472	23226	23442
Number of Samples having poor signal strength	485	11807	1796	1369
Number of Samples having limited service (No Coverage)	0	858	0	0

b) Dropped Calls - The TSP-wise details of dropped calls in auto selection mode (5G/4G/3G/2G). (refer figure-53 to 55)

Parameter	AIRTEL	BSNL	RJIL	VIL
Number of successful Calls Established	205	159	206	205
Number of dropped Calls	1	6	0	1

c) Call Silence Instance – The TSP-wise details of Call silence instance in Auto-selection mode (5G/4G). (refer figure-56 and 57)

Parameter	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider network)	196	137	200	199
Number of silences calls for >3 Sec	0	NA	6	1
Total number of silence instances for >3 Sec	0	NA	10	1

d) Packet loss rate Downlink & Uplink- The TSP-wise details of packet loss rate in downlink & uplink for Auto-selection mode (5G/4G).

Parameter	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider network)	196	137	200	199
Packet loss Rate Downlink %	0.78	NA	1.42	1.71
Packet loss Rate Uplink %	0.71	NA	1.34	0.75

e) Data Download and Upload Throughput-

i) Data Download Throughput: The TSP-wise details of **Average Download (DL) throughput** against declared typical DL Throughput for month, in Auto-selection mode (5G/4G/3G/2G). (refer figure- 69 to 72)

Parameter	Measured in	AIRTEL (upto 5G)	BSNL (upto 4G)	RJIL (upto 5G)	VIL (upto 5G)
Typical Download Throughput declared by TSP	(Mbits/s)	23.00	4.19	15.00	15.00
Average Download Throughput measured during IDT	(Mbits/s)	105.94	7.30	146.74	41.12

ii) Data Upload Throughput: The TSP-wise details of **Average Upload (UL) throughput** against declared typical UL Throughput for month, in Auto-selection mode (5G/4G/3G/2G). (refer figure- 73 to 76)

Parameter	Measured in	AIRTEL (upto 5G)	BSNL (upto 4G)	RJIL (upto 5G)	VIL (upto 5G)
Typical Upload Throughput declared by TSP	(Mbits/s)	10.00	3.61	7.00	8.00
Average Upload Throughput measured during IDT	(Mbits/s)	17.60	2.88	12.09	11.86

3. Drive Test Area: The overall mobile network performance across Balrampur city (UP East LSA) for the key Parameters have been summarized below:

a) Coverage Gap – The signal strength observed during voice testing on the drive test route in auto-selection mode (5G/4G/3G/2G). (refer figure- 101 to 104)

Parameter	AIRTEL	BSNL	RJIL	VIL
Total Number of Samples captured on Drive test route	8605	7994	8466	8666
Number of Samples having poor signal strength	114	3271	411	159
Number of Samples having limited service (No Coverage)	0	70	0	0

b) Dropped Calls - The TSP-wise details of dropped calls in auto selection mode (5G/4G/3G/2G). (refer figure-91 and 92)

Parameter	AIRTEL	BSNL	RJIL	VIL
Number of successful Calls Established	78	72	78	78
Number of dropped Calls	2	2	0	0

c) Call Silence Instance – The TSP-wise details of Call silence instance in Auto-selection mode (5G/4G). (refer figure-93 and 94)

Parameter	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider network)	73	56	74	73
Number of silences calls for >3 Sec	1	NA	1	0
Total number of silence instances for >3 Sec	1	NA	2	0

d) Packet loss rate Downlink & Uplink- The TSP-wise details of packet loss rate in downlink & uplink for Auto-selection mode (5G/4G).

Parameter	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider network)	73	56	74	73
Packet loss Rate Downlink %	0.92	NA	1.51	0.94
Packet loss Rate Uplink %	0.97	NA	1.18	0.53

e) Data Download and Upload Throughput-

i) Data Download Throughput: The TSP-wise details of **Average Download (DL) throughput** against declared typical DL Throughput for month, in Auto-selection mode (5G/4G/3G/2G). (refer figure- 106 to 109)

Parameter	Measured in	AIRTEL (upto 5G)	BSNL (upto 4G)	RJIL (upto 5G)	VIL (upto 4G)
Typical Download Throughput declared by TSP	(Mbits/s)	23.00	4.19	15.00	15.00
Average Download Throughput measured during IDT	(Mbits/s)	130.93	4.09	167.93	31.66

ii) Data Upload Throughput: The TSP-wise details of **Average Upload (UL) throughput** against declared typical UL Throughput for month, in Auto-selection mode (5G/4G/3G/2G). (refer figure- 110 to 113)

Parameter	Measured in	AIRTEL (upto 5G)	BSNL (upto 4G)	RJIL (upto 5G)	VIL (upto 4G)
Typical Upload Throughput declared by TSP	(Mbits/s)	10.00	3.61	7.00	8.00
Average Upload Throughput measured during IDT	(Mbits/s)	21.40	2.16	16.90	12.79

4. Drive Test Route: The overall mobile network performance on Prayagraj to Gonda highway route (UP East LSA) for the key Parameters has been summarized below:

a) Coverage Gap- The signal strength observed during voice testing on the drive test route in auto-selection mode (5G/4G/3G/2G). (refer figure- 142 to 145)

Parameter	AIRTEL	BSNL	RJIL	VIL
Total Number of Samples captured on Drive test route	19873	17748	19765	19913
Number of Samples having poor signal strength	364	8799	332	813
Number of Samples having limited service (No Coverage)	0	419	0	0

b) Dropped Calls- The TSP-wise details of dropped calls in auto selection mode (5G/4G/3G/2G). (refer figure-130 to 132)

Parameter	AIRTEL	BSNL	RJIL	VIL
Number of successful Calls Established	98	91	99	98
Number of dropped Calls	1	10	1	0

c) Call Silence Instance- The TSP-wise details of Call silence instance in Auto-selection mode (5G/4G). (refer figure-133 to 135)

Parameter	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider network)	96	70	94	97
Number of silences calls for >3 Sec	1	NA	1	2
Total number of silence instances for >3 Sec	1	NA	1	2

d) Packet loss rate Downlink & Uplink- The TSP-wise details of packet loss rate in downlink & uplink for Auto-selection mode (5G/4G).

Parameter	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider network)	96	70	94	97
Packet loss Rate Downlink %	1.36	NA	1.00	1.43
Packet loss Rate Uplink %	1.44	NA	1.19	1.13

e) Data Download and Upload Throughput-

i) Data Download Throughput: The TSP-wise details of **Average Download (DL) throughput** against declared typical DL Throughput for month, in Auto-selection mode (5G/4G/3G/2G). (refer figure- 147 to 150)

Parameter	Measured in	AIRTEL (upto 5G)	BSNL (upto 4G)	RJIL (upto 5G)	VIL (upto 5G)
Typical Download Throughput declared by TSP	(Mbits/s)	23.00	4.19	15.00	15.00
Average Download Throughput measured during IDT	(Mbits/s)	87.92	6.54	183.83	46.43

ii) Data Upload Throughput: The TSP-wise details of **Average Upload (UL) throughput** against declared typical UL Throughput for month, in Auto-selection mode (5G/4G/3G/2G). (refer figure- 151 to 154)

Parameter	Measured in	AIRTEL (upto 5G)	BSNL (upto 4G)	RJIL (upto 5G)	VIL (upto 5G)
Typical Upload Throughput declared by TSP	(Mbits/s)	10.00	3.61	7.00	8.00
Average Upload Throughput measured during IDT	(Mbits/s)	13.03	2.92	16.43	12.42

5. Drive Test Route: The overall mobile network performance on Gonda to Bahraich highway route (UP East LSA) for the key Parameters has been summarized below:

a) Coverage Gap- The signal strength observed during voice testing on the drive test route in auto-selection mode (5G/4G/3G/2G). (refer figure- 178 to 181)

Parameter	AIRTEL	BSNL	RJIL	VIL
Total Number of Samples captured on Drive test route	4830	2208	4699	4800
Number of Samples having poor signal strength	346	1875	328	939
Number of Samples having limited service (No Coverage)	0	600	37	0

b) Dropped Calls- The TSP-wise details of dropped calls in auto selection mode (5G/4G/3G/2G). (refer figure-169)

Parameter	AIRTEL	BSNL	RJIL	VIL
Number of successful Calls Established	25	9	25	25
Number of dropped Calls	0	3	0	0

c) Call Silence Instance- The TSP-wise details of Call silence instance in Auto-selection mode (5G/4G). (refer figure-170 & 171)

Parameter	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider network)	24	8	25	25
Number of silences calls for >3 Sec	0	NA	2	1
Total number of silence instances for >3 Sec	0	NA	2	1

d) Packet loss rate Downlink & Uplink- The TSP-wise details of packet loss rate in downlink & uplink for Auto-selection mode (5G/4G).

Parameter	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider network)	24	8	25	25
Packet loss Rate Downlink %	2.60	NA	1.24	2.34
Packet loss Rate Uplink %	2.85	NA	1.63	2.15

e) Data Download and Upload Throughput-

i) Data Download Throughput: The TSP-wise details of **Average Download (DL) throughput** against declared typical DL Throughput for month, in Auto-selection mode (5G/4G/3G/2G). (refer figure- 183 to 186)

Parameter	Measured in	AIRTEL (upto 5G)	BSNL (upto 4G)	RJIL (upto 5G)	VIL (upto 4G)
Typical Download Throughput declared by TSP	(Mbits/s)	23.00	4.19	15.00	15.00
Average Download Throughput measured during IDT	(Mbits/s)	92.65	9.24	141.94	24.44

ii) Data Upload Throughput: The TSP-wise details of **Average Upload (UL) throughput** against declared typical UL Throughput for month, in Auto-selection mode (5G/4G/3G/2G). (refer figure- 187 to 190)

Parameter	Measured in	AIRTEL (upto 5G)	BSNL (upto 4G)	RJIL (upto 5G)	VIL (upto 4G)
Typical Upload Throughput declared by TSP	(Mbits/s)	10.00	3.61	7.00	8.00
Average Upload Throughput measured during IDT	(Mbits/s)	10.23	2.34	6.48	5.22

QoS Performance Analysis- Uttar Pradesh East LSA

3. QoS performance analysis-LSA level

3.1 Overview

This section provides summary of overall QoS performance of the telecom service provider's network in the LSA by aggregating the results of drive tests conducted in the Uttar Pradesh East LSA during the month of September-2026 covering city drive, hotspots, walk tests and highways. (Refer Table-1)

3.2 Voice performance

(a) Voice Call Performance in 3G/2G network mode only: 3G/2G network mode testing has been done to reflect experience for respective users as they have only 3G/2G compatible handsets.

Parameters	Service Provider		
	3G/2G network mode only		
	AIRTEL	BSNL	VIL
Call Attempts	557	709	552
Call Setup Success Rate %	100.00	68.83	99.28
Drop Call Rate %	0.18	9.22	0.55
Call Setup Time-Average (Second)	4.00	3.85	4.67
Handover Success Rate %	99.22	99.37	98.05

Table-3: Summary of voice call performance in 3G/2G network mode only.

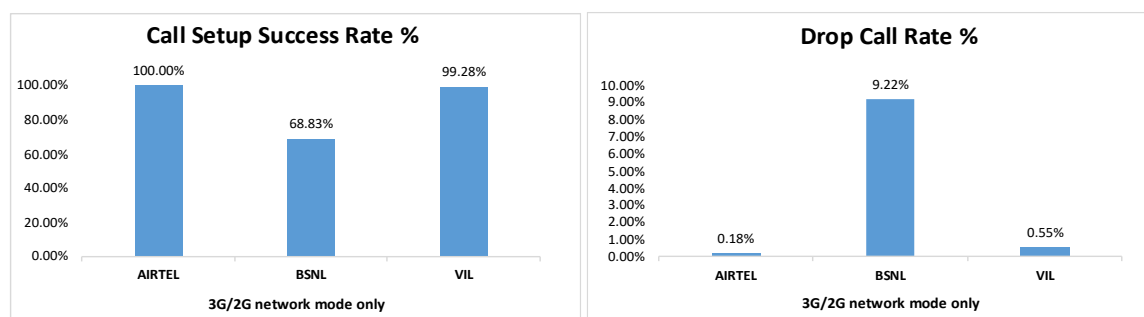


Figure-2: Call setup success rate and drop call rate performance.

Number of unique cell Id's covered in Voice test- Technology wise			
Technology	Service Provider		
	3G/2G network mode only		
	AIRTEL	BSNL	VIL
3G	NA	120	NA
2G	708	154	598

Table-4: Technology wise number of network cell Id's latched during drive test.

Note-

- RJIL does not have 3G/2G network.
- NA- Service provider doesn't provide services in respective technology.

(b) Voice Call Performance in auto network selection mode (5G/4G/3G/2G)

Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempts	670	829	676	673
Call Setup Success Rate %	99.85	70.57	99.41	99.55
Drop Call Rate %	0.75	8.21	0.30	0.15
Call Setup Time-Average (Second)	0.64	5.75	0.76	0.81
Handover Success Rate %	100.00	99.54	99.95	100.00

Table-5: Summary of voice call performance in network auto-selection mode.

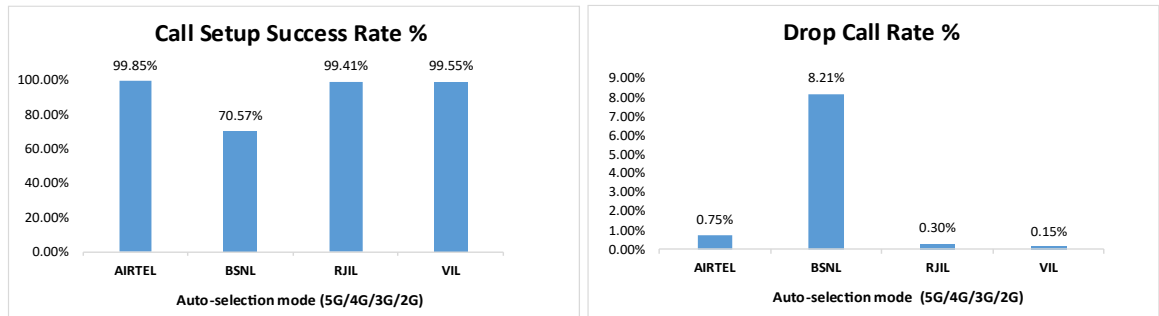


Figure-3: Performance for call setup success rate and drop call rate.

Parameter	Service Provider			
	Mobile-to-Mobile (5G/4G – Open Mode)			
	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider Network)	550	390	559	559
Number of silences call for >4 Sec	3	NA	11	5
Silence Call Rate %	0.55	NA	1.97	0.89
Number of silence instances for >4 Sec	3	NA	14	7
Number of silence instances for >3 Sec	4	NA	21	12
Number of silence instances for >2 sec	19	NA	35	25
RTP Jitter (4G & 5G) in ms	8.02	NA	15.53	11.39
Packet loss Rate Downlink %	1.12	NA	1.58	1.74
Packet loss Rate Uplink %	0.98	NA	1.35	1.62

Table-6: Summary of silence instances & packet loss rate for mobile to mobile calls.

Note-

- NA- Due to unavailability of packet switched (VoLTE & VoNR) network in BSNL, silence instances are not captured.

Number of unique cell Id's covered in Voice test- Technology wise				
Technology	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
5G	33	NA	683	0
4G	1484	283	1192	1163
3G	NA	94	NA	NA
2G	1	208	NA	30

Table-7: Technology wise number of network cell Id's latched during drive test.

Note-

- NA- Service provider doesn't provide services in respective technology.
- 0- No cell Id's were found in respective technology.

(c) Mean Opinion Score (MOS) performance for speech quality:

Mean opinion score indicates quality of speech observed during the drive test across different technologies. This parameter has been calculated for mobile-to-mobile calls made within same operator network in auto mode (5G/4G/3G/2G). As per ITU-T Recommendation P.863.1, MOS values means: 5-Excellent, 4-Good, 3-Fair, 2-Poor, 1-Bad.

Speech Quality (MOS) distribution	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
Total Number of MOS Samples for calls table-6	4100	2732	4133	4242
Speech Quality (Average MOS)	3.88	2.23	4.39	4.34
Number of samples with MOS ≥ 4 to < 5 (Excellent)	3055	0	3486	3503
Number of samples with MOS ≥ 3 to < 4 (Good)	767	0	378	437
Number of samples with MOS ≥ 2 to < 3 (Fair)	112	1908	118	147
Number of samples with MOS ≥ 1 to < 2 (Poor)	166	824	151	155
%age of samples with MOS ≥ 4 to < 5 (Excellent)	74.51%	0.00%	84.35%	82.58%
%age of samples with MOS ≥ 3 to < 4 (Good)	18.71%	0.00%	9.15%	10.30%
%age of samples with MOS ≥ 2 to < 3 (Fair)	2.73%	69.84%	2.86%	3.47%
%age of samples with MOS ≥ 1 to < 2 (Poor)	4.05%	30.16%	3.65%	3.65%

Table-8: Summary of speech quality (MOS) samples.

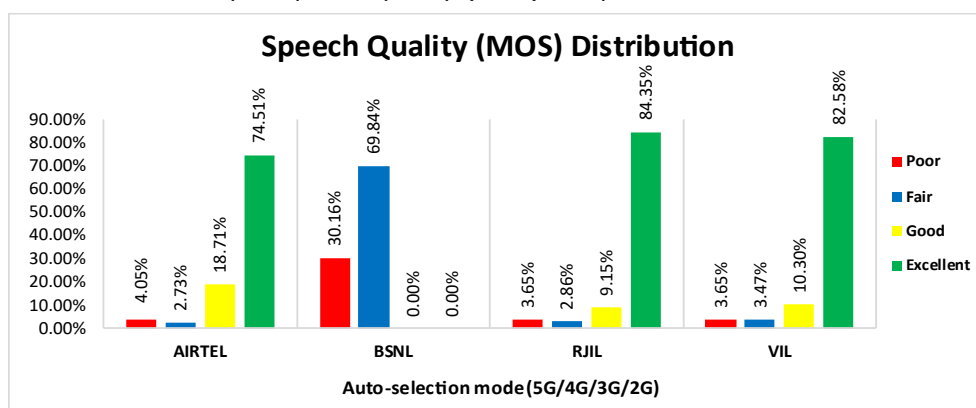


Figure- 4: Distribution of samples in MOS range.

(d) Inter-service provider voice call performance: To check the performance of inter-service providers call setup success rate, total 54 to 66 inter operator calls were attempted at 2 locations which are Balika Inter College Balrampur and Geeta Public School Balrampur. Additionally, testing was conducted during dynamic drive tests in Balrampur. The call setup success rate and call setup time observation is as below.

Call Setup Success Rate %				
From Service Provider	To Service Provider			
	AIRTEL	BSNL	RJIL	VIL
AIRTEL	NA	81.48	98.44	100.00
BSNL	98.21	NA	94.83	100.00
RJIL	100.00	94.74	NA	100.00
VIL	100.00	100.00	100.00	NA

Table-9: Call setup success rate across service providers.

Note-

- NA- Only inter-operator calls were measured during test.

Call setup time average (seconds)				
From Service Provider	To Service Provider			
	AIRTEL	BSNL	RJIL	VIL
AIRTEL	NA	6.35	1.20	1.43
BSNL	5.01	NA	4.62	5.83
RJIL	1.70	5.60	NA	1.18
VIL	1.62	6.56	1.28	NA

Table-10: Call setup time across service providers.

Note-

- NA- Only inter-operator calls were measured during test.

3.3 Data performance

(a) Data Parameters (Auto-selection mode- 5G/4G/3G/2G)

Parameters		Service Provider			
		Auto-selection mode (5G/4G/3G/2G)			
		AIRTEL	BSNL	RJIL	VIL
Download Throughput (Mbits/s)	Average	103.59	5.52	164.22	38.64
	80 th Percentile	188.97	9.87	293.40	54.15
	20 th Percentile	18.48	0.71	13.85	8.12
Upload Throughput (Mbits/s)	Average	17.22	3.39	16.54	11.84
	80 th Percentile	31.03	4.40	32.37	20.36
	20 th Percentile	2.65	0.84	1.37	1.68
Latency (ms)	50 th Percentile	44.63	31.67	22.49	36.68

Table-11: Summary of data performance in network auto-selection mode.

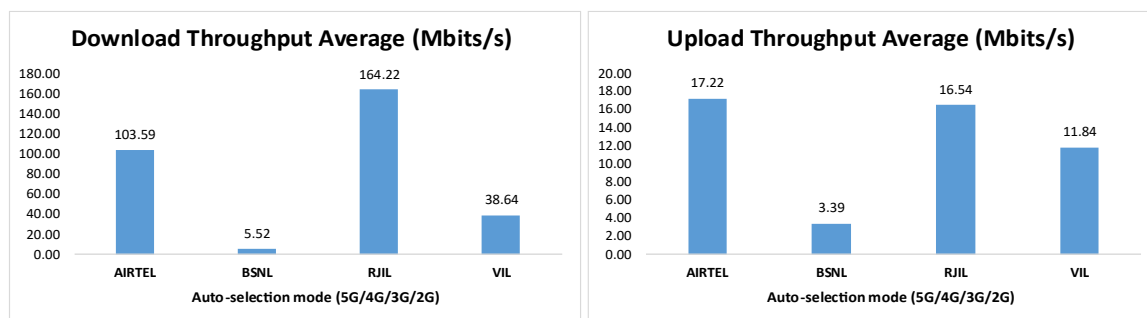


Figure- 5: Download and Upload throughput.

Number of unique cell Id's covered in Data test- Technology wise				
Technology	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
5G	10	NA	779	0
4G	1559	329	857	1094
3G	NA	129	NA	NA
2G	0	94	NA	82

Table-12: Technology wise number of network cell Id's latched during drive test.

Note-

- NA- Service provider doesn't provide services in respective technology.
- 0- No cell Id's were found in respective technology.

Detailed QoS Performance Analysis

4. Detailed QoS performance analysis

4.1 Overview

This section covers analysis on performance of various categories of drives like city, hotspots, walk test and highway for all telecom service providers, the results of drive tests conducted are shown individually for respective areas/locations.

4.2 City

Drive test has been conducted from 7th September 2026 to 10th September 2026 in Gonda, Bahraich, Shravasti & Balrampur city. (Refer Table-1)

4.2.1 Gonda

4.2.1.1 Drive test route

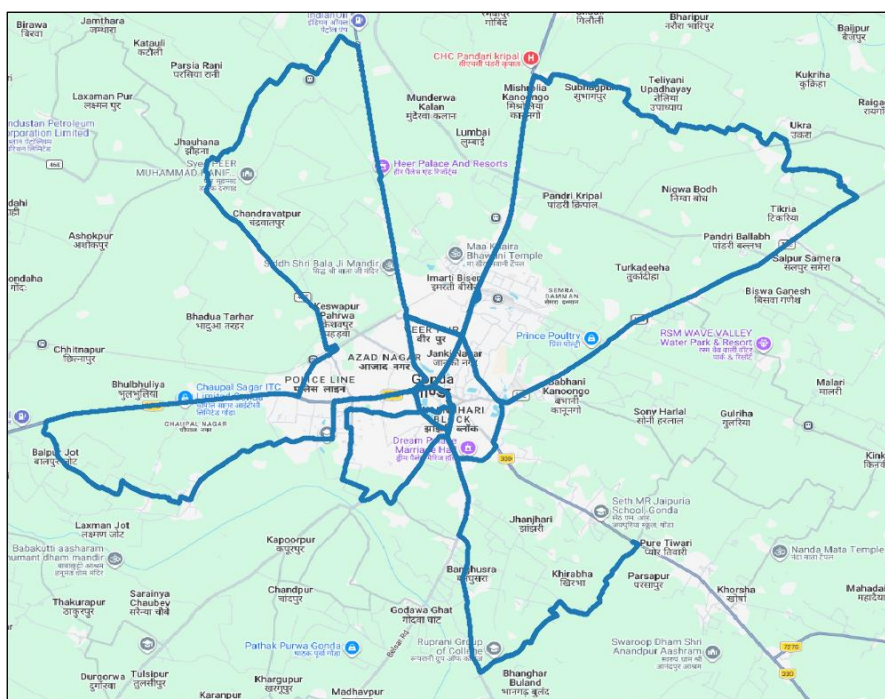


Figure- 6: Drive test routes.

4.2.1.2 Areas covered

Gonda- Banghusra, Jhanjhari, Police line, Balpur Jot, Keswapur Pahrwa, Veer Pur, Janki Nagar, Semra Damman, Tulsipur and Sekhapur etc.

4.2.1.3 Voice performance

(a) Voice Call Performance in 3G/2G network mode only: 3G/2G network mode testing has been done to reflect experience for respective users as they have only 3G/2G compatible handsets.

Parameters	Service Provider		
	3G/2G network mode only		
	AIRTEL	BSNL	VIL
Call Attempts	161	205	162
Call Setup Success Rate %	100.00	78.05	99.38
Drop Call Rate %	0.00	15.63	0.62
Call Setup Time-Average (Second)	3.74	4.12	4.59
Handover Success Rate %	99.71	100.00	99.54

Table-13: Summary of voice call performance in 3G/2G network mode only.

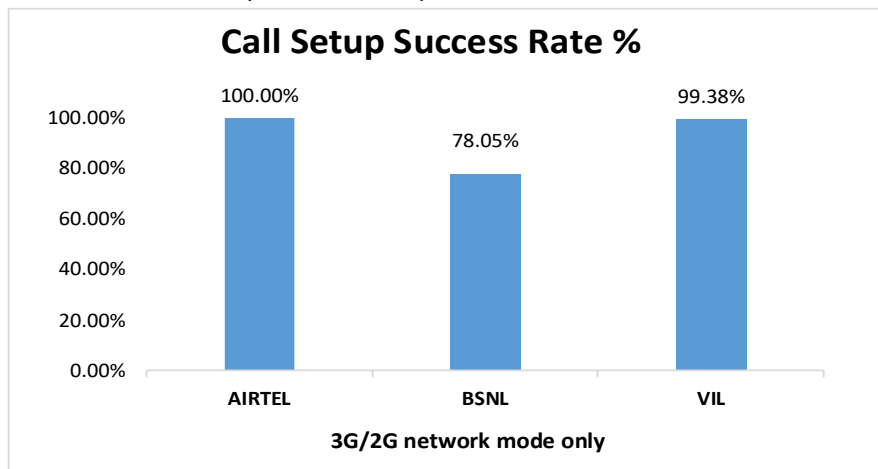


Figure-7: Performance for call setup success rate.

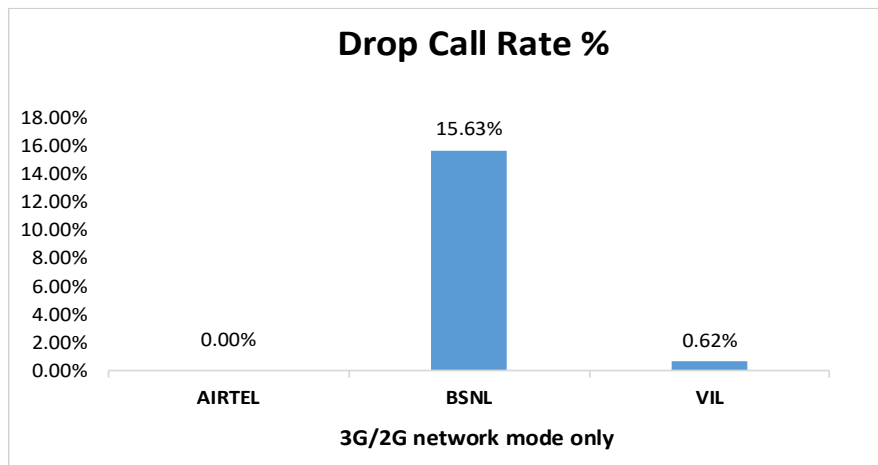


Figure-8: Performance for drop call rate.

(b) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider		
	AIRTEL	BSNL	VIL
3G	NA	83.54%	NA
2G	100.00%	11.97%	100.00%
Limited Service	0.00%	4.48%	0.00%

Table-14: Time spent on technology during drive test 3G/2G network mode.

Note-

- NA- Service provider doesn't provide services in respective technology.

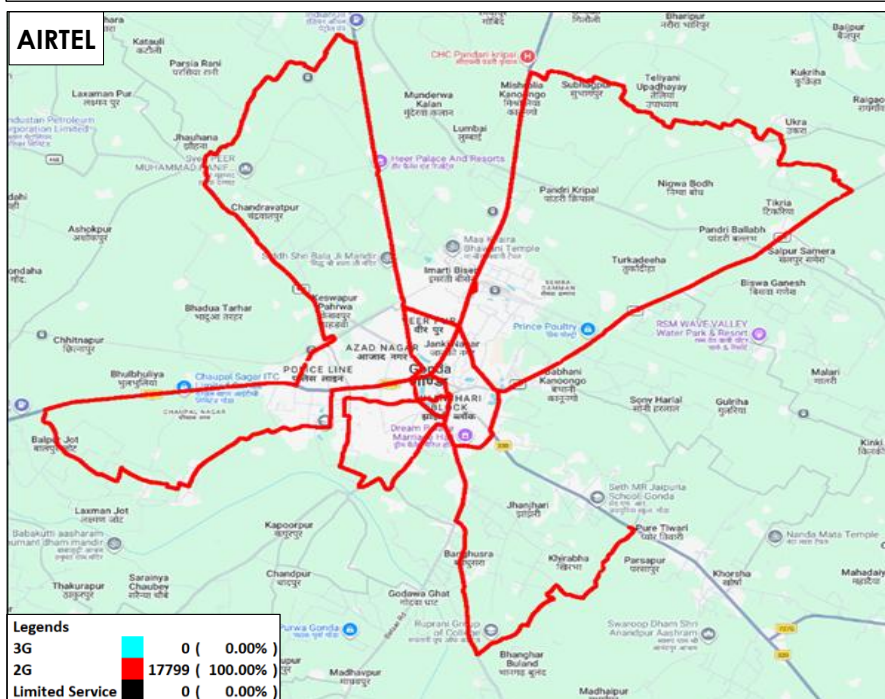


Figure-9: Serving technology plots 3G/2G network mode - AIRTEL.

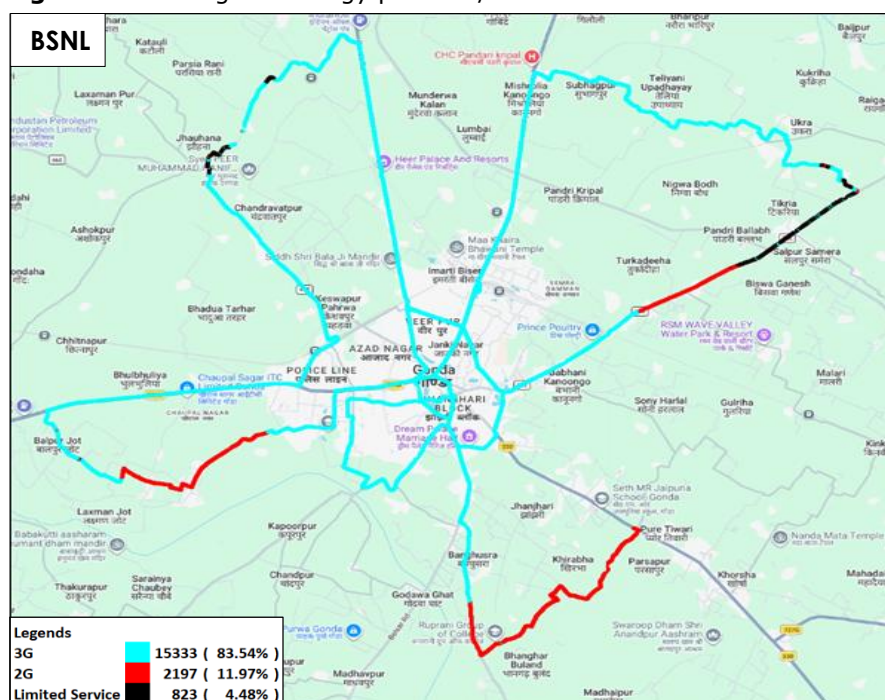


Figure-10: Serving technology plots 3G/2G network mode - BSNL.

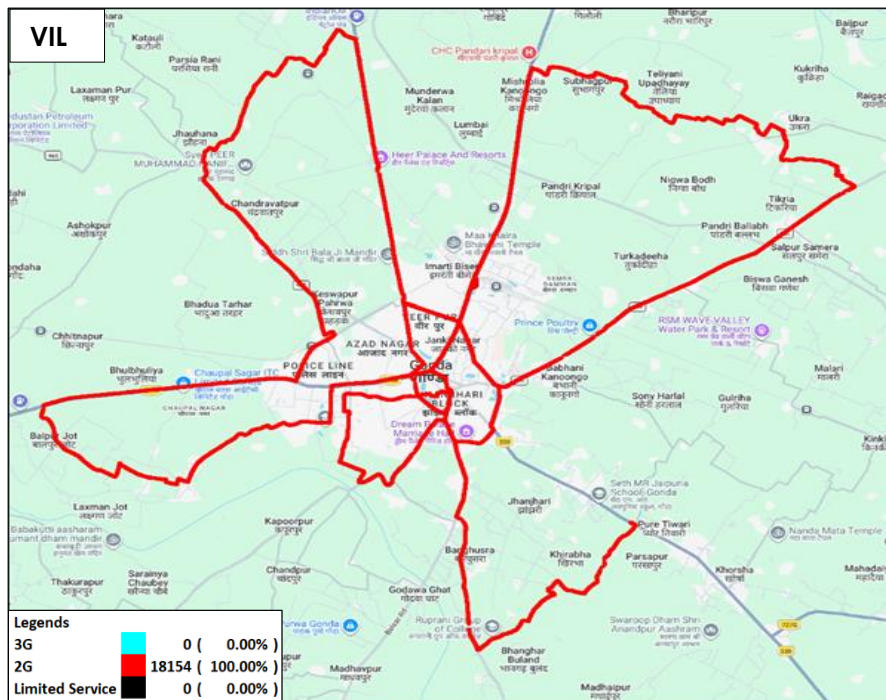


Figure-11: Serving technology plots 3G/2G network mode - VIL.

(c) Network Signal Strength Distribution: The following chart represents signal strength distribution for 3G/2G network mode only. (Refer figure- 196, 197 & 198 for map view)

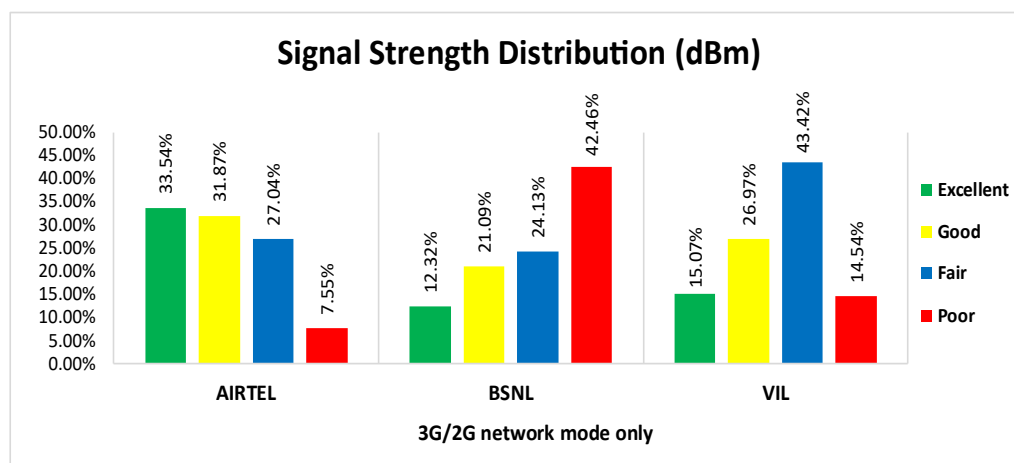


Figure-12: Signal strength distribution 3G/2G network mode only.

Observations:

- Airtel has 34% of samples falling in the excellent signal strength category.
- BSNL has 12% of samples falling in the excellent signal strength category.
- VIL has 15% of samples falling in the excellent signal strength category.

(d) Voice Call Performance in auto network selection mode (5G/4G/3G/2G)

Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempts	172	210	171	172
Call Setup Success Rate %	99.42	77.14	100.00	99.42
Drop Call Rate %	0.58	14.20	0.00	0.00
Call Setup Time Average (Second)	0.44	5.39	0.71	0.89
Handover Success Rate %	100.00	100.00	99.91	100.00

Table-15: Summary of voice call performance in network auto-selection mode.

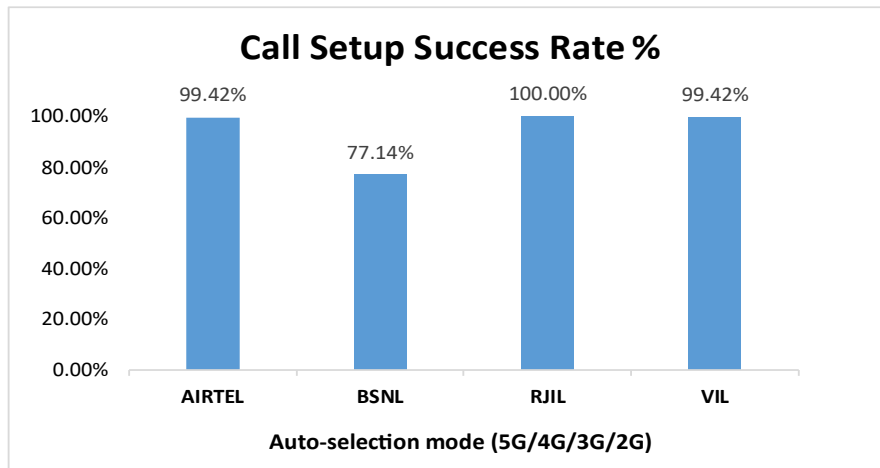


Figure-13: Performance for call setup success rate.

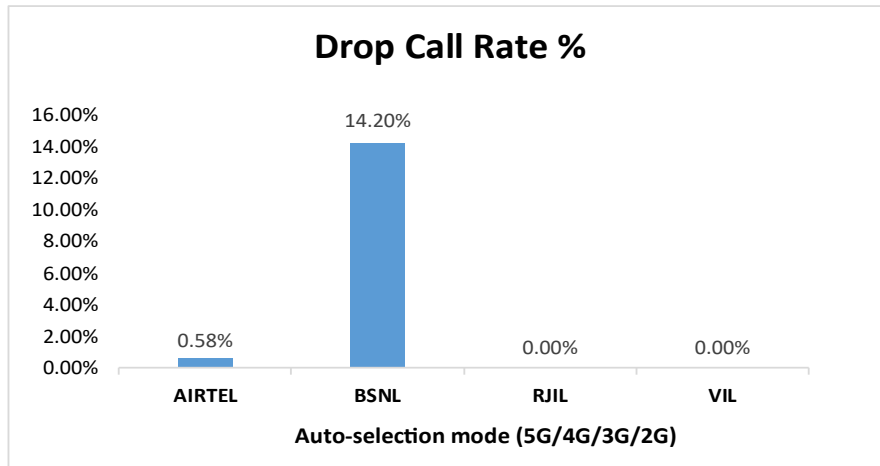


Figure-14: Performance for drop call rate.

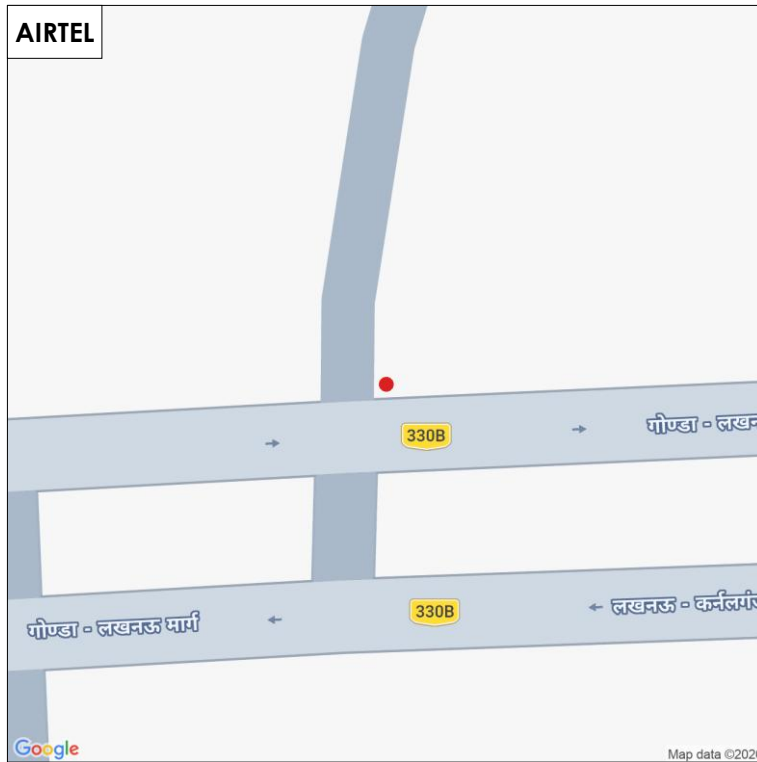


Figure-15: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

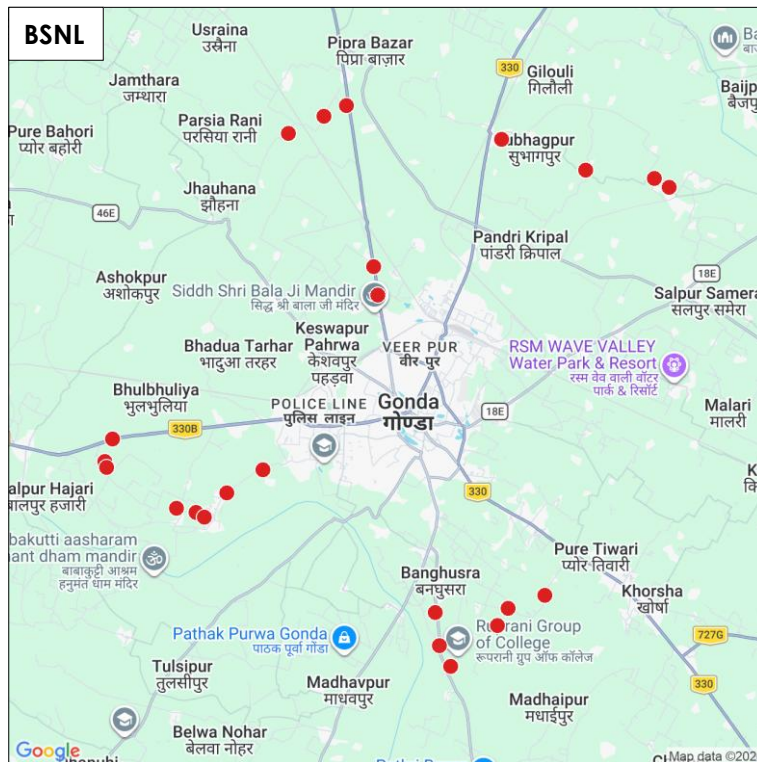


Figure-16: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

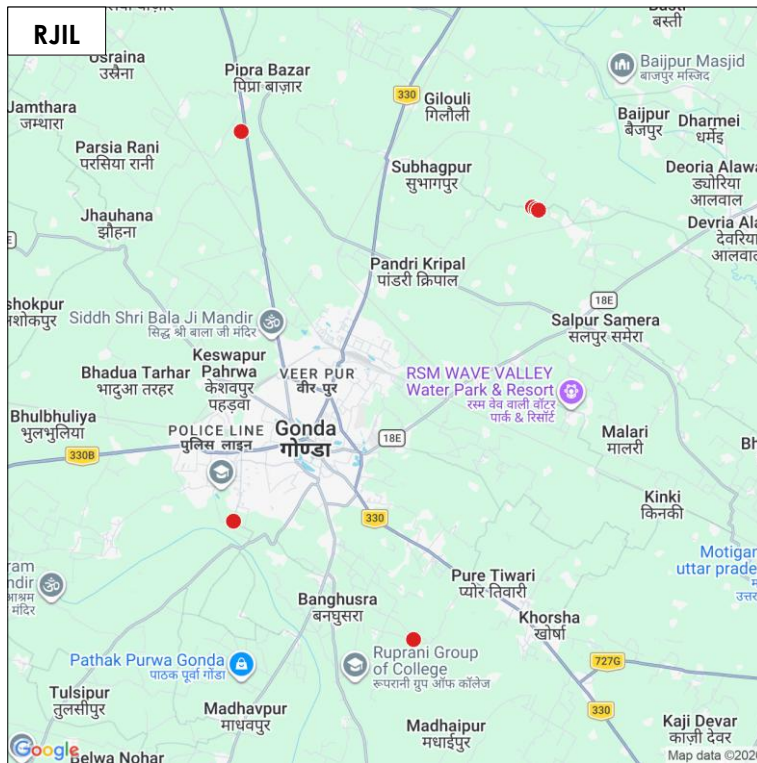


Figure-18: Number of silence instances for >3 Sec Mobile-to-Mobile (5G/4G-Open Mode) - RJIL.

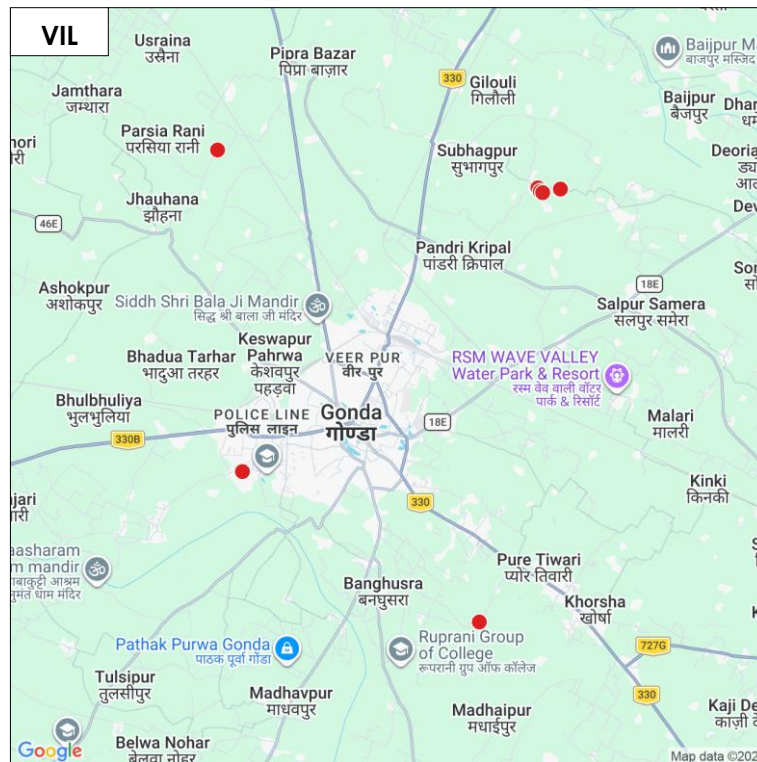


Figure-19: Number of silence instances for >3 Sec Mobile-to-Mobile (5G/4G-Open Mode) - VIL.

(e) Mean Opinion Score (MOS) performance for speech quality:

Mean opinion score indicate quality of speech observed during the drive test across different technologies. This parameter has been calculated for mobile to mobile calls made within same operator network in auto mode (5G/4G/3G/2G). As per ITU-T Recommendation P.863.1, MOS value means: 5-Excellent, 4-Good, 3-Fair, 2-Poor, 1-Bad.

Speech Quality (MOS) distribution	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
Total Number of MOS Samples for calls in table-16	972	688	980	1020
Speech Quality (Average MOS)	3.90	1.96	4.34	4.27
Number of samples with MOS ≥ 4 to < 5 (Excellent)	731	0	814	824
Number of samples with MOS ≥ 3 to < 4 (Good)	184	0	86	112
Number of samples with MOS ≥ 2 to < 3 (Fair)	22	351	28	36
Number of samples with MOS ≥ 1 to < 2 (Poor)	35	337	52	48
%age of samples with MOS ≥ 4 to < 5 (Excellent)	75.21%	0.00%	83.06%	80.78%
%age of samples with MOS ≥ 3 to < 4 (Good)	18.93%	0.00%	8.78%	10.98%
%age of samples with MOS ≥ 2 to < 3 (Fair)	2.26%	51.02%	2.86%	3.53%
%age of samples with MOS ≥ 1 to < 2 (Poor)	3.60%	48.98%	5.31%	4.71%

Table-17: Summary of speech quality (MOS) samples.

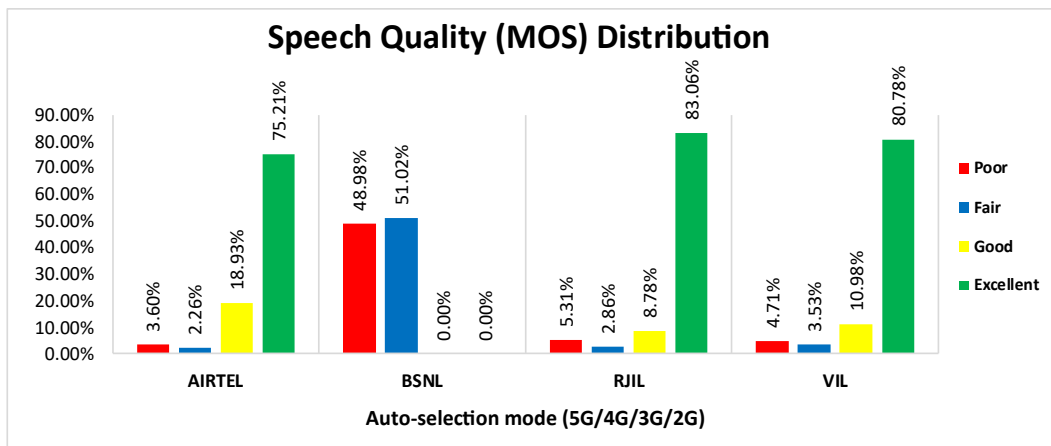


Figure-20: Distribution of samples in MOS range.

(f) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	2.62%	NA	63.36%	1.00%
4G	97.38%	7.83%	36.64%	95.16%
3G	NA	56.58%	NA	NA
2G	0.00%	31.65%	NA	3.84%
Limited Service	0.00%	3.93%	0.00%	0.00%

Table-18: Time spent on technology during drive test in auto-selection mode (5G/4G/3G/2G) voice.

Note-

- NA- Service provider doesn't provide services in respective technology.

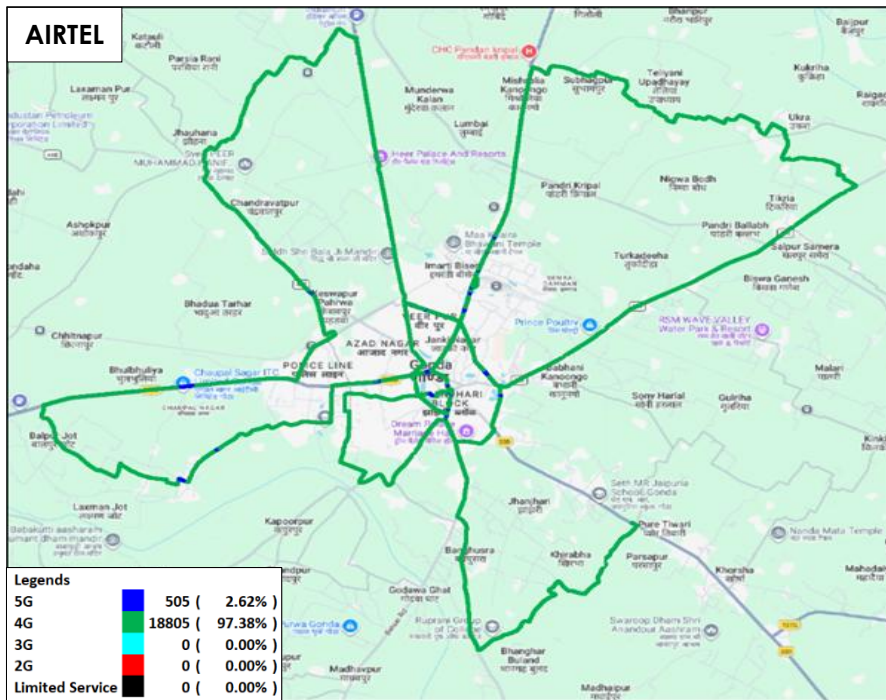


Figure-21: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

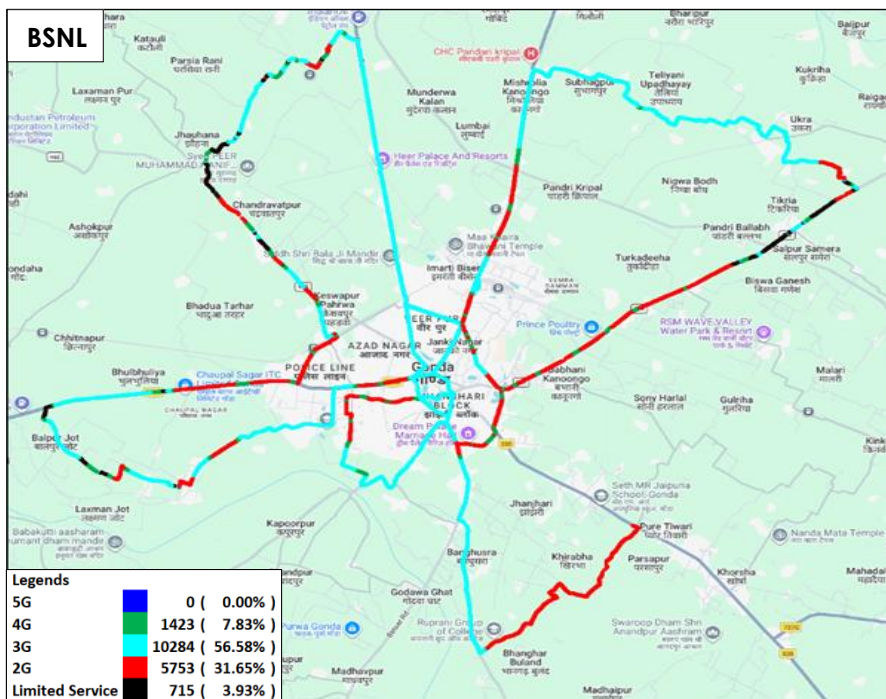


Figure-22: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

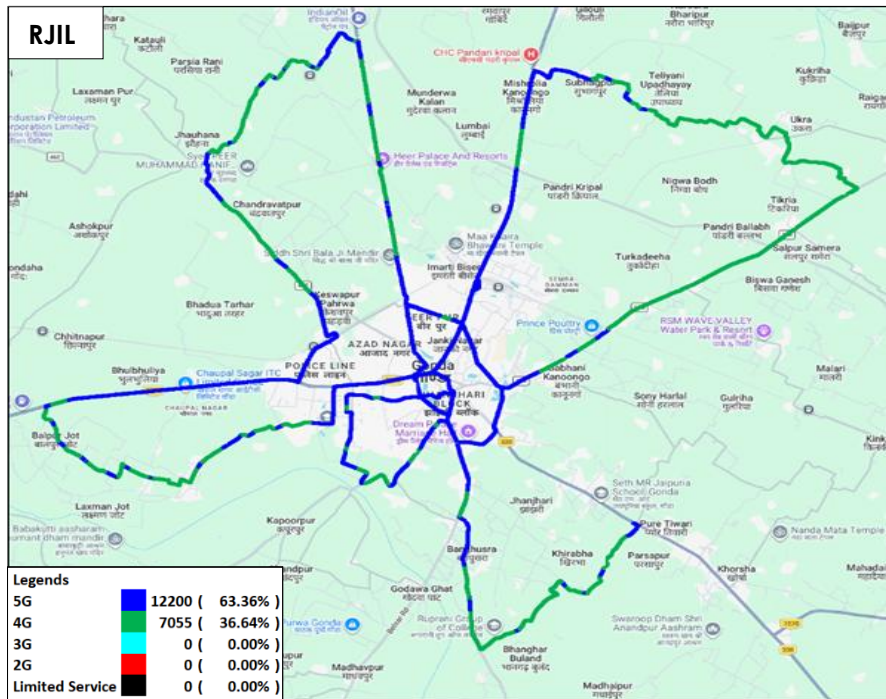


Figure-23: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - RJIL.

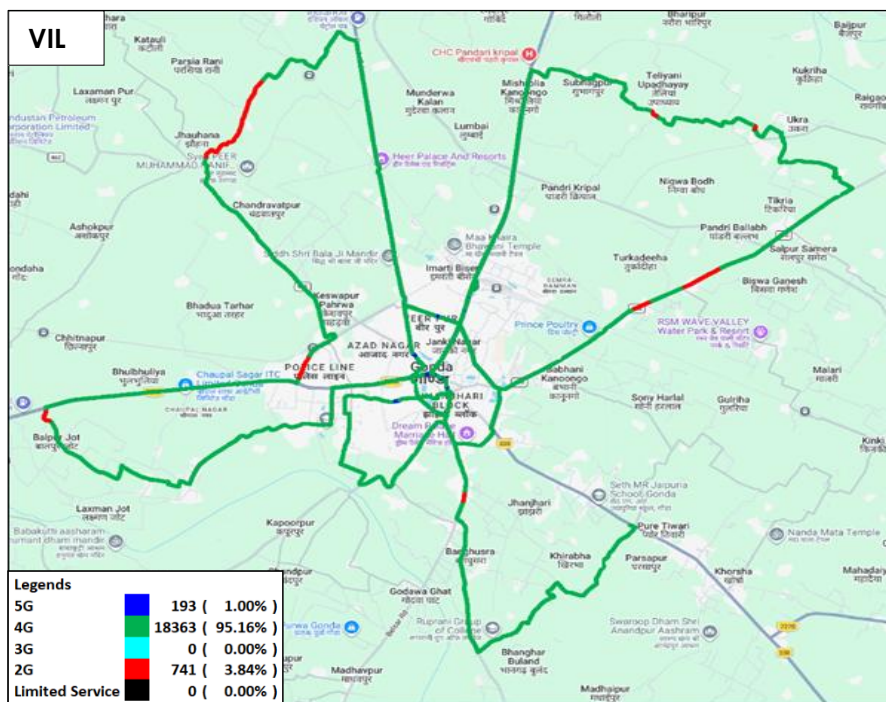


Figure-24: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - VIL.

(g) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) voice. (Refer figure-199, 200, 201 & 202 for map view)

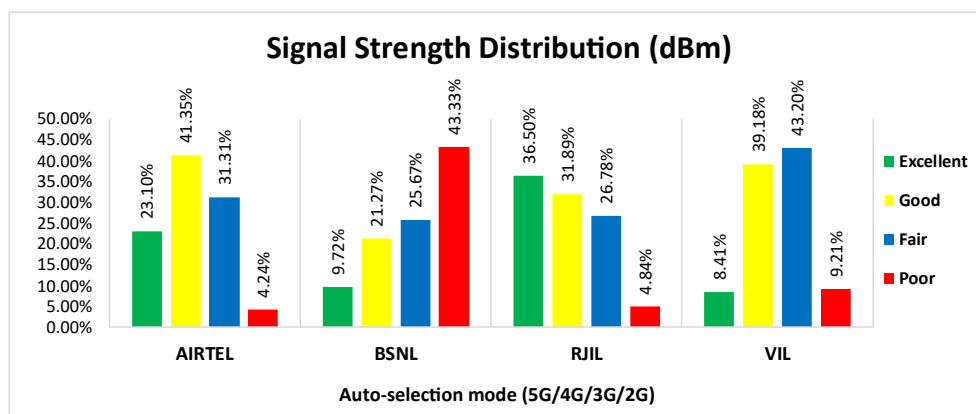


Figure-25: Signal strength distribution auto-selection mode (5G/4G/3G/2G) voice.

Observations:

- Airtel has 23% of samples falling in the excellent signal strength category.
- BSNL has 10% of samples falling in the excellent signal strength category.
- RJIL has 37% of samples falling in the excellent signal strength category.
- VIL has 8% of samples falling in the excellent signal strength category.

(h) Coverage Gap observed

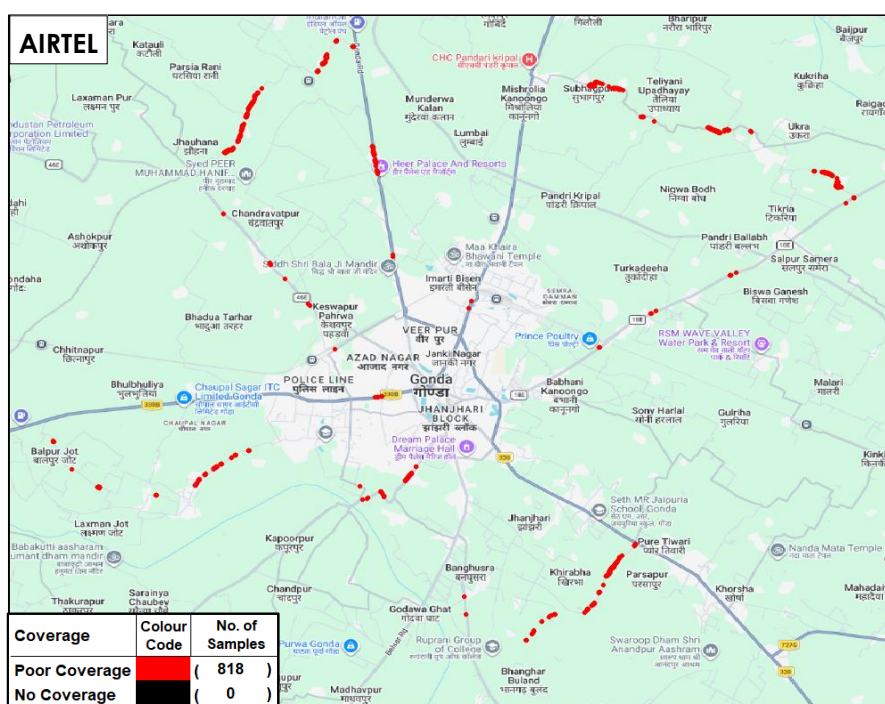


Figure-26: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

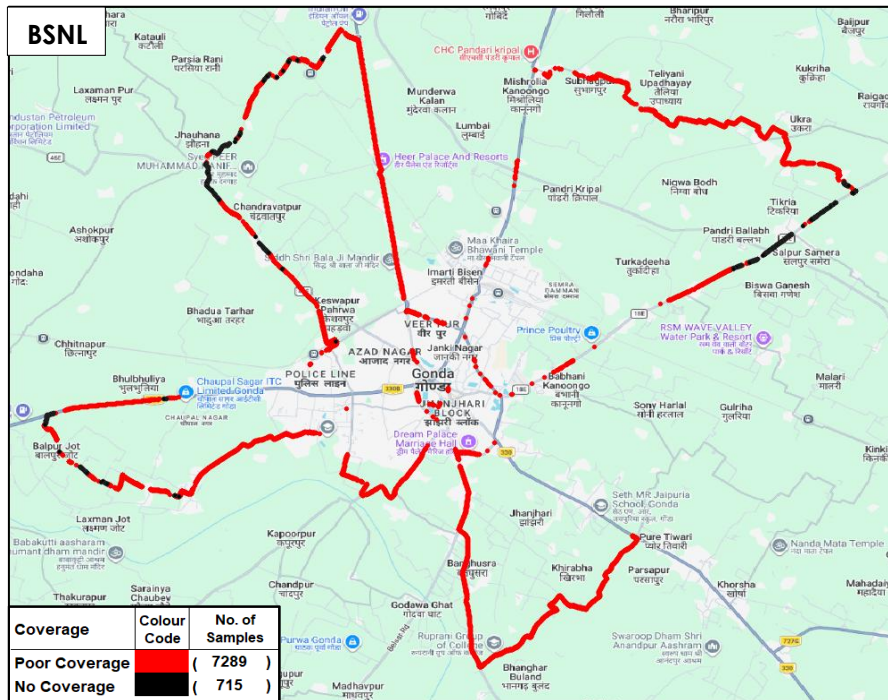


Figure-27: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

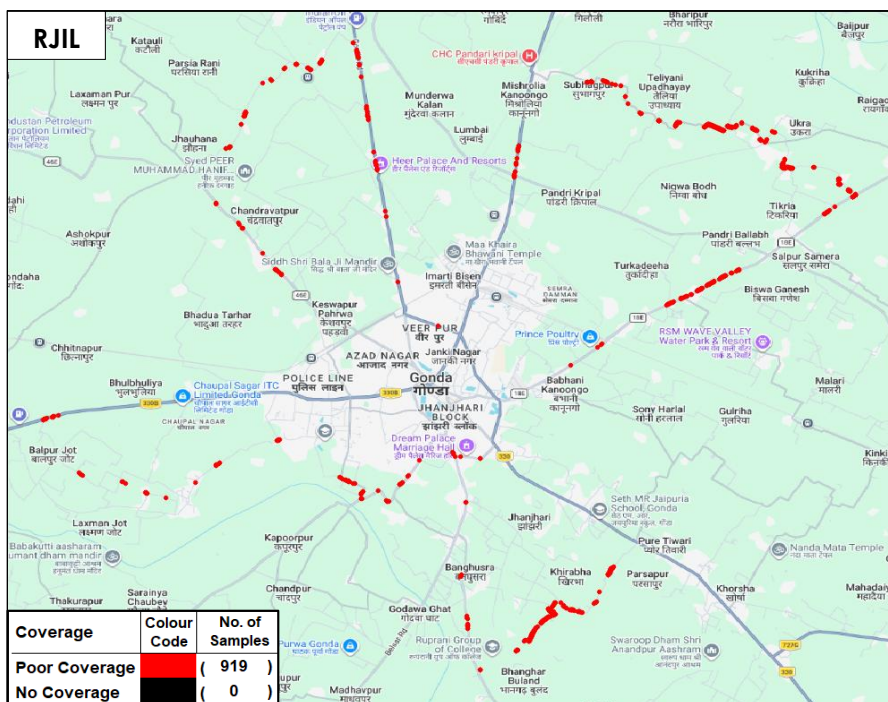


Figure-28: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - RJIL.

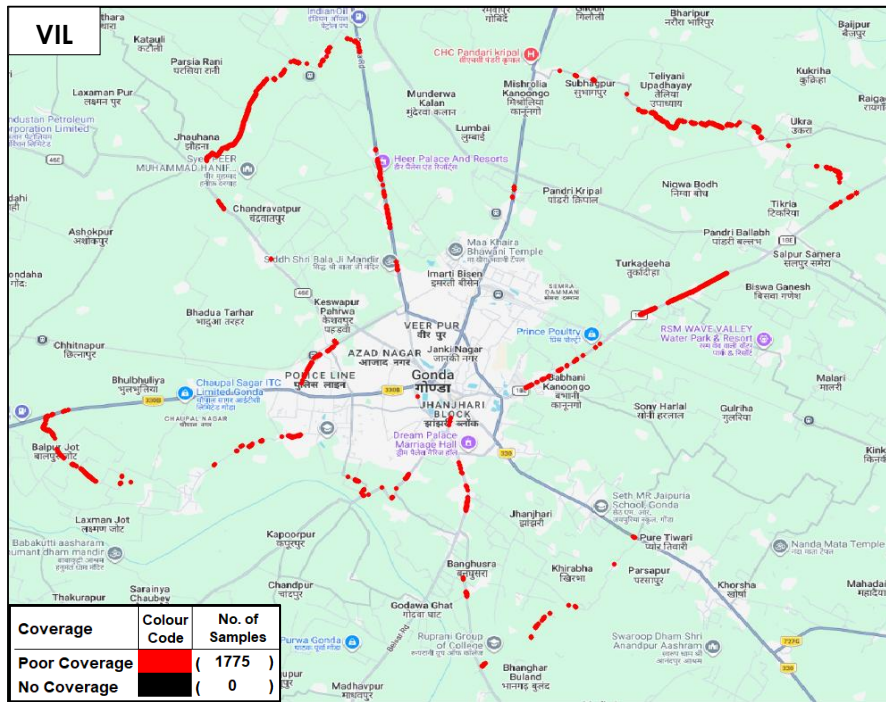


Figure-29: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - VIL.

4.2.1.4 Data performance

(a) Data Parameters (Auto-selection mode- 5G/4G/3G/2G)

Parameters		Service Provider			
		Auto-selection mode (5G/4G/3G/2G)			
		AIRTEL	BSNL	RJIL	VIL
Download Throughput (Mbits/s)	Average	94.98	1.15	167.44	34.31
	80 th Percentile	172.19	1.79	291.53	39.40
	20 th Percentile	18.06	0.17	8.62	4.22
Upload Throughput (Mbits/s)	Average	14.59	1.86	18.94	9.53
	80 th Percentile	27.70	2.14	33.96	15.09
	20 th Percentile	2.24	0.11	1.27	1.12
Latency (ms)	50 th Percentile	45.02	35.40	21.88	36.33

Table-19: Summary of Data performance in network auto-selection mode.

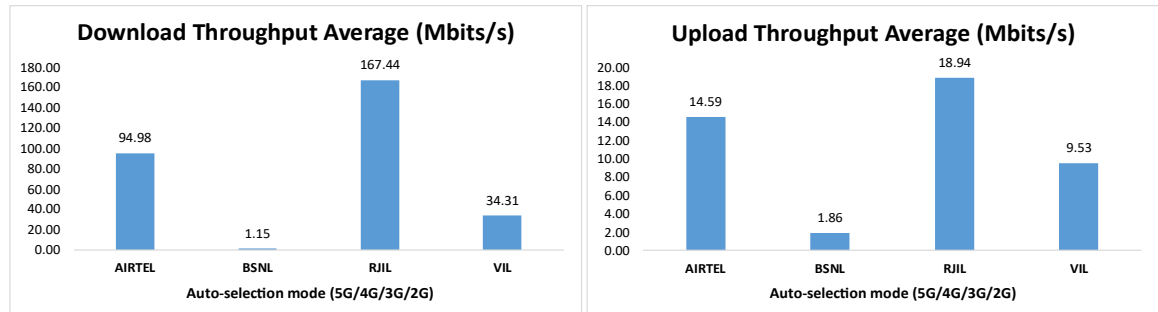


Figure- 30: Download & Upload throughput.

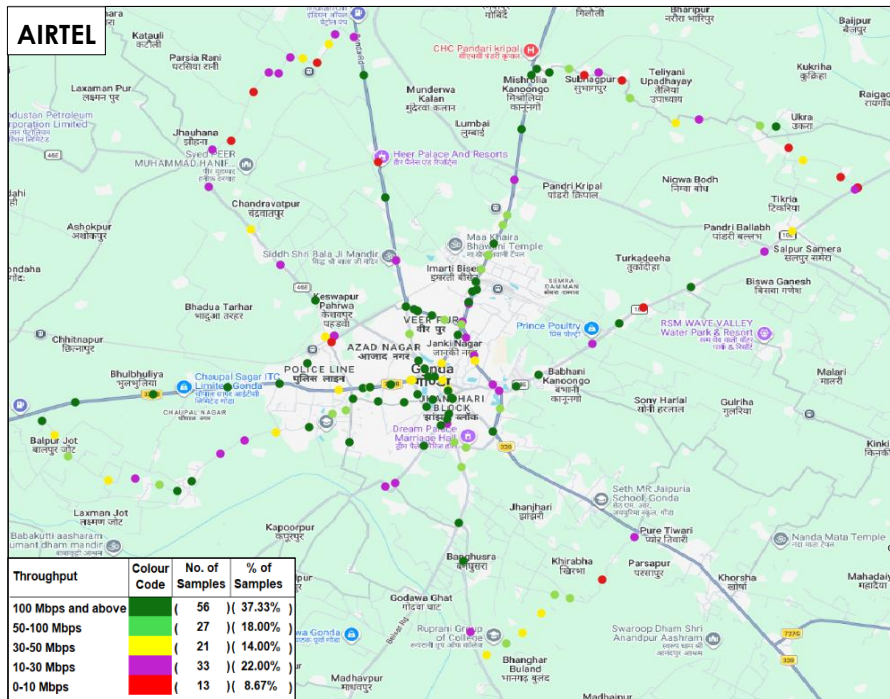


Figure-31: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - AIRTEL.

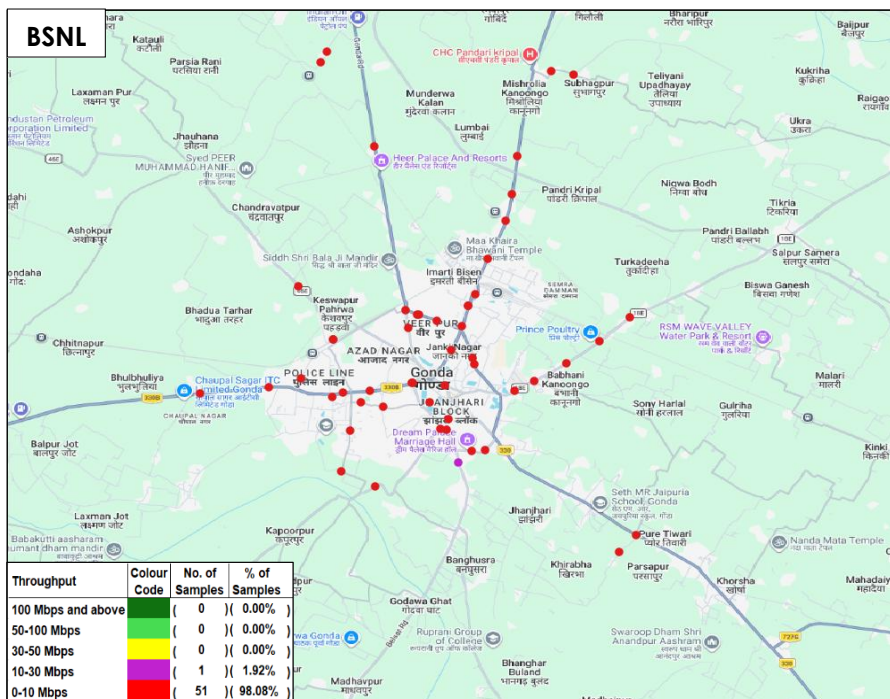


Figure-32: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - BSNL.

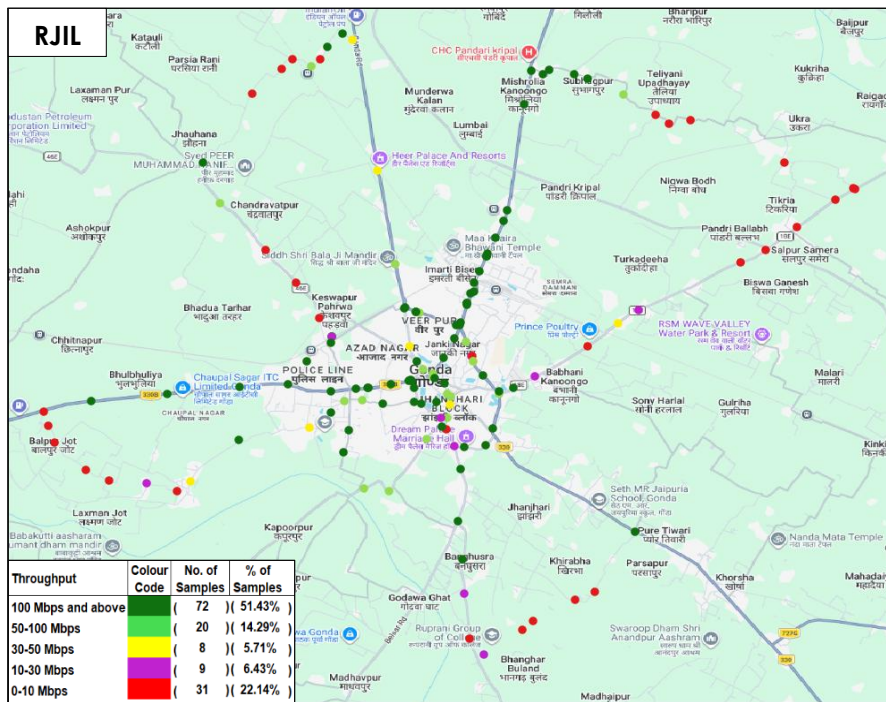


Figure-33: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - RJIL.

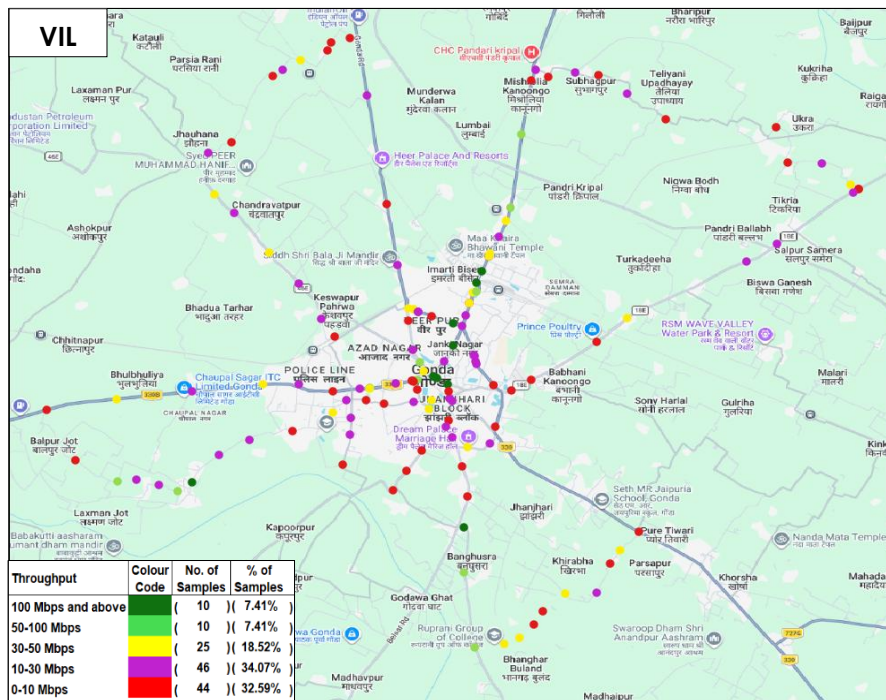


Figure-34: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - VIL.

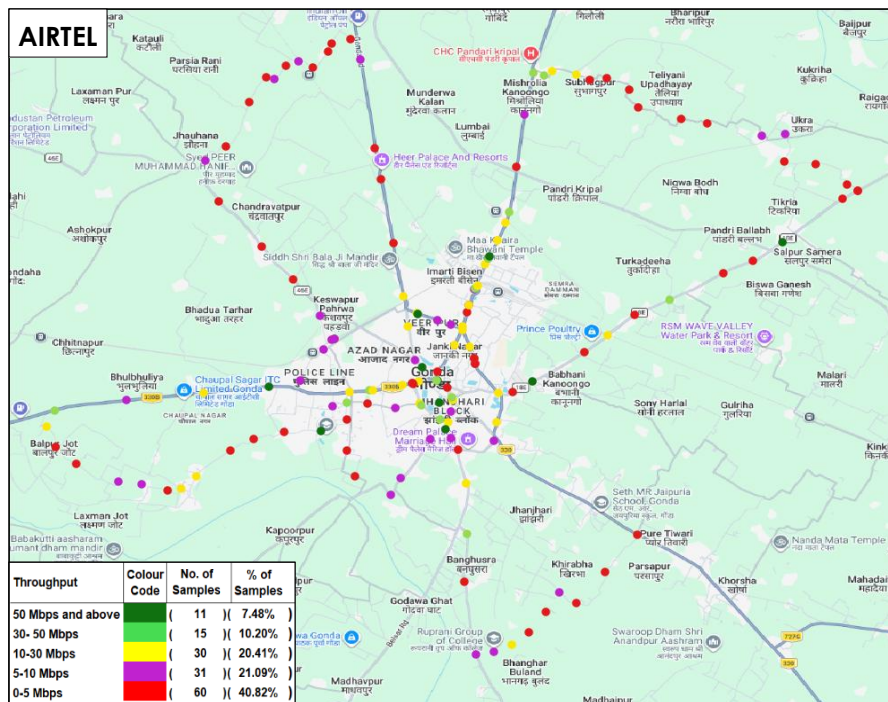


Figure-35: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - AIRTEL.

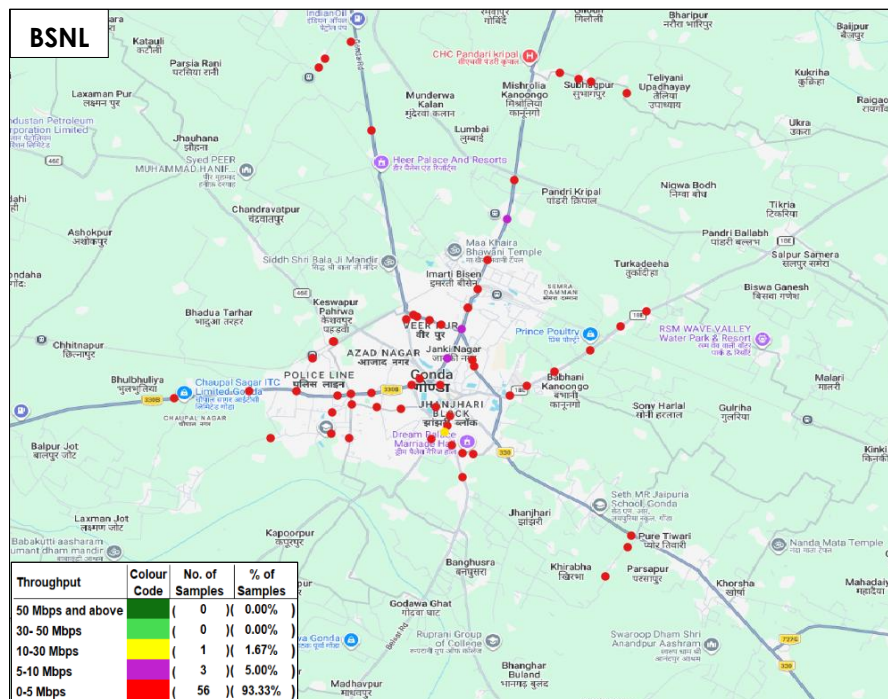


Figure-36: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - BSNL.

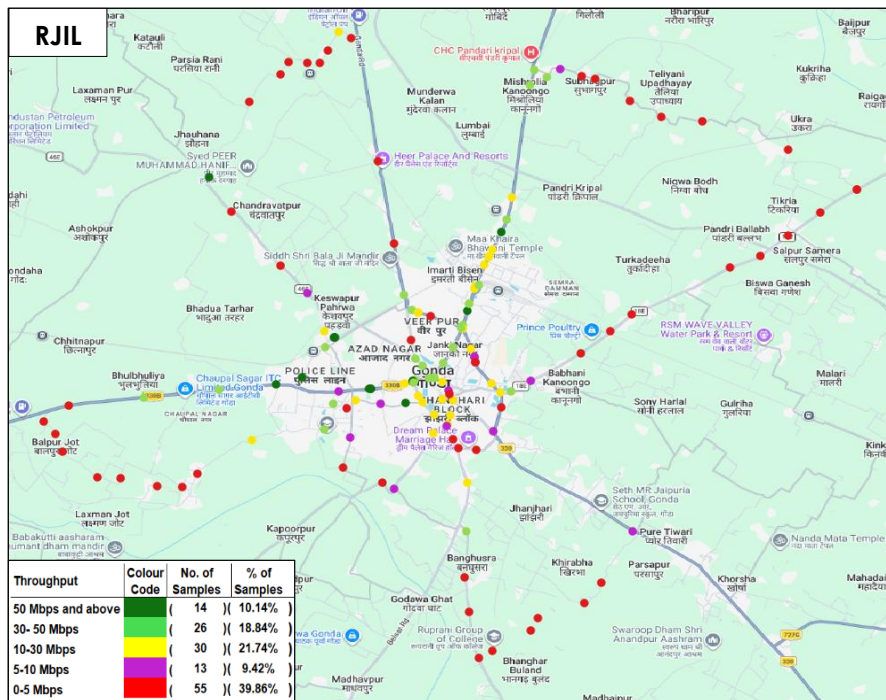


Figure-37: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - RJIL.

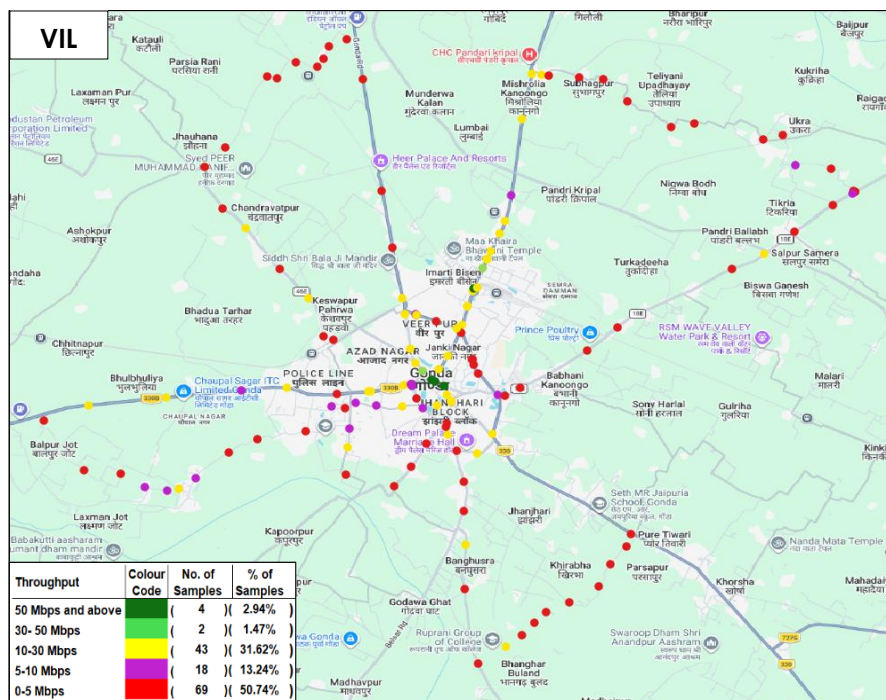


Figure-38: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - VIL.

(b) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	50.63%	NA	65.22%	9.64%
4G	49.37%	51.33%	34.51%	86.30%
3G	NA	33.37%	NA	NA
2G	0.00%	5.05%	NA	3.90%
Limited Service	0.00%	10.25%	0.27%	0.17%

Table-20: Time spent on technology during drive test in auto-selection mode (5G/4G/3G/2G) data.

Note-

- NA- Service provider doesn't provide services in respective technology.

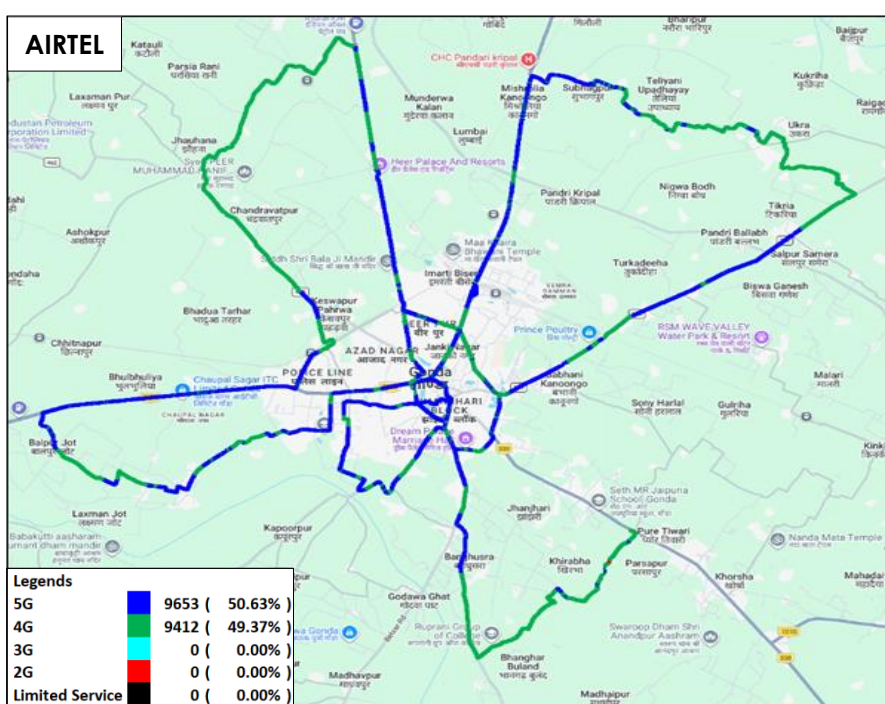


Figure-39: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - AIRTEL.

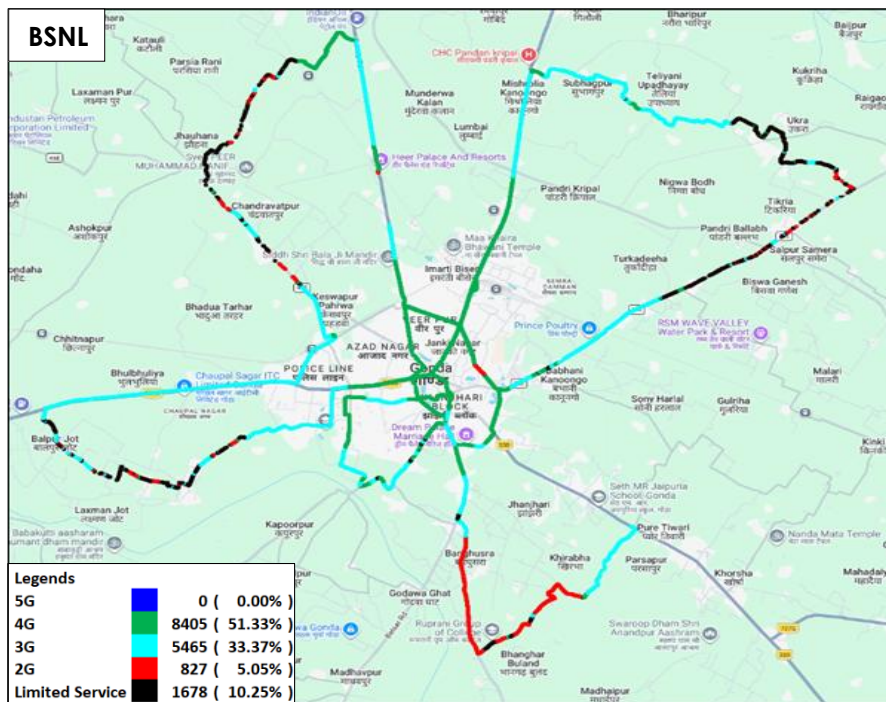


Figure-40: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - BSNL.

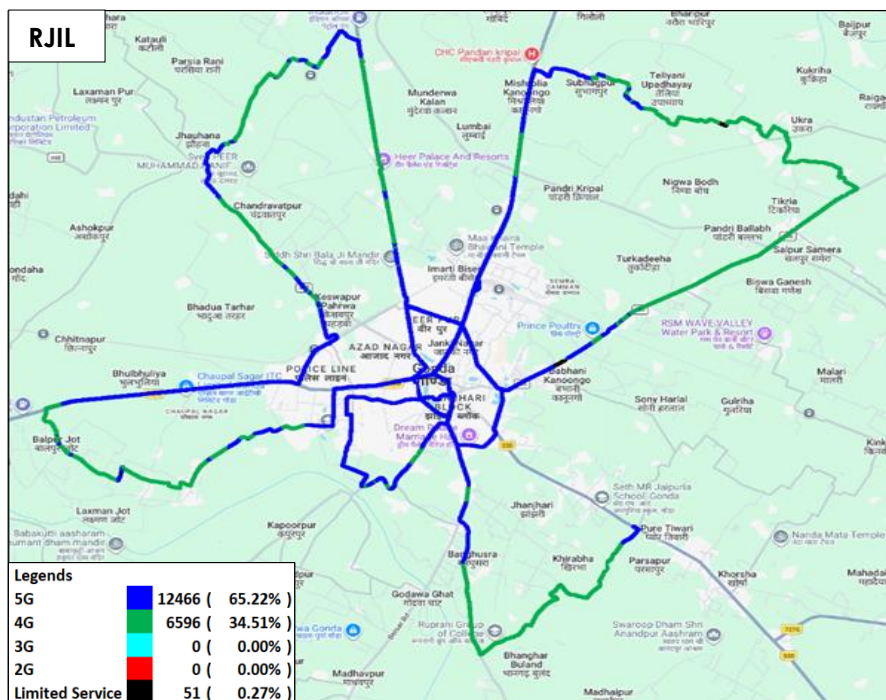


Figure-41: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - RJIL.

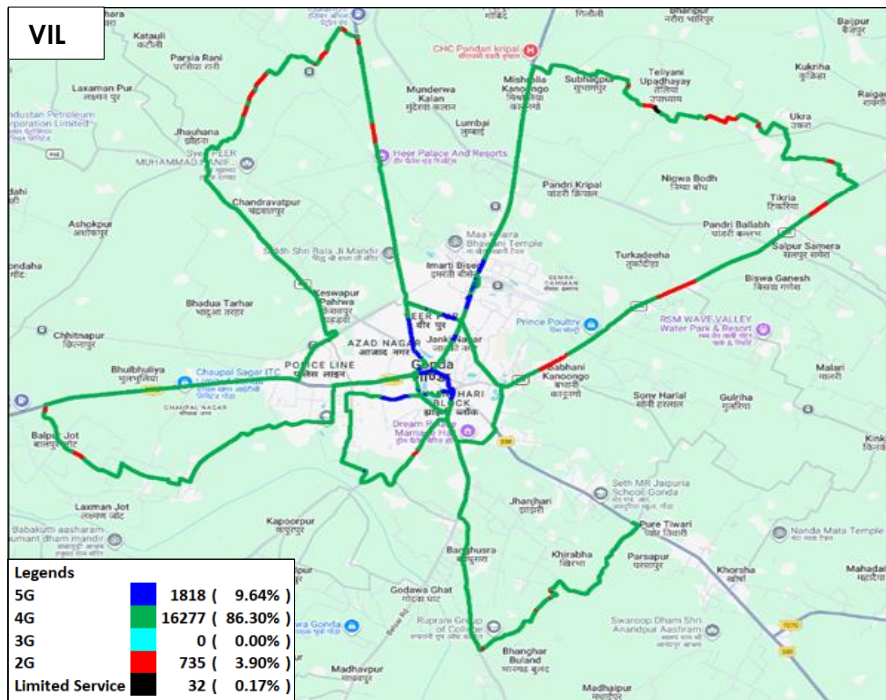


Figure-42: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - VIL.

(c) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) data. (Refer figure-203, 204, 205 & 206 for map view)

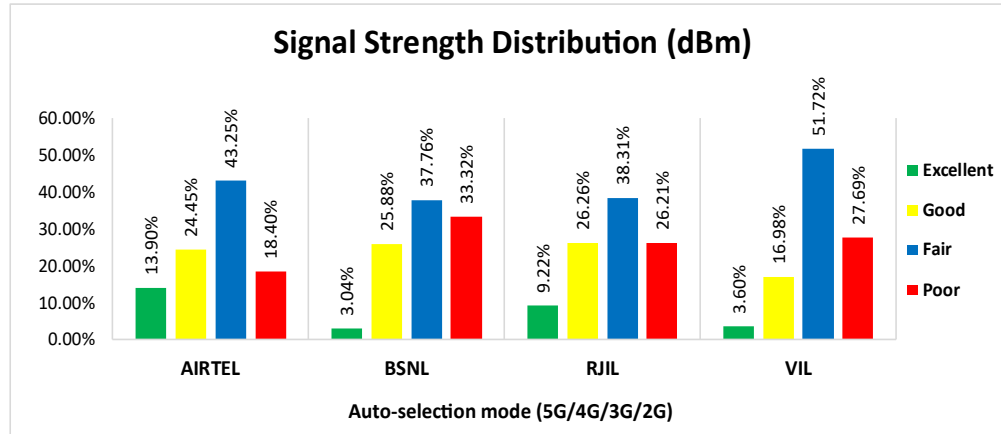


Figure-43: Signal strength distribution auto-selection mode (5G/4G/3G/2G) data.

Observations:

- Airtel has 14% of samples falling in the excellent signal strength category.
- BSNL has 3% of samples falling in the excellent signal strength category.
- RJIL has 9% of samples falling in the excellent signal strength category.
- VIL has 4% of samples falling in the excellent signal strength category.

4.2.2 Bahraich

4.2.2.1 Drive test route

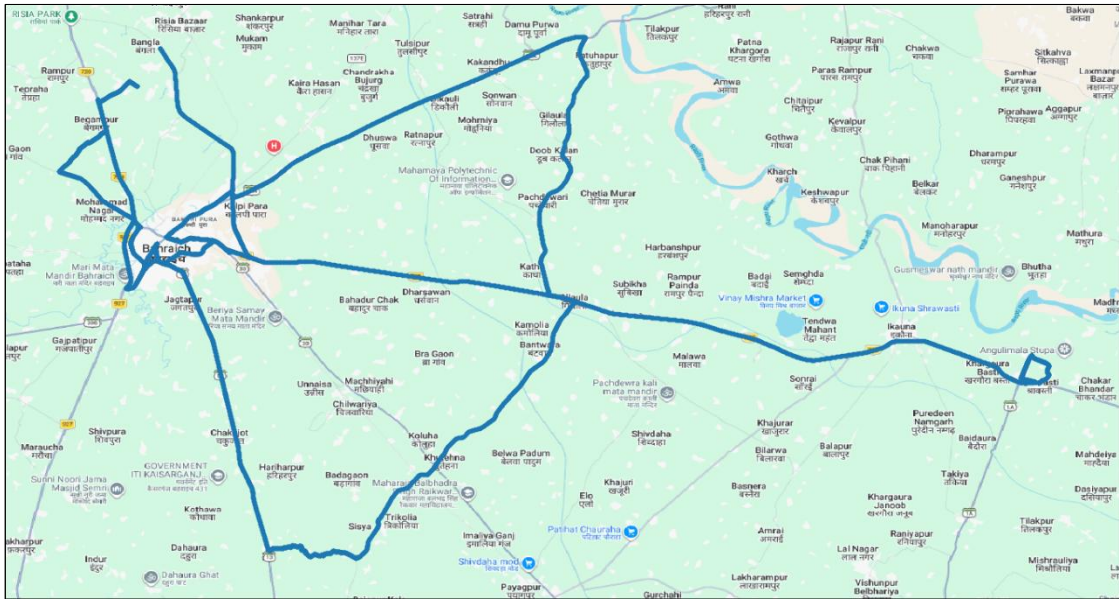


Figure-44: Drive test routes.

4.2.2.2 Areas covered

Bahraich- Begampur, Godan Basahi, Mohammad Nagar, Bakshi pura, Dikauli, Doob Kalan, Pachdewari, Gilaula, Khutehna, Chakujot, Jagtapur and Ikauna etc.

4.2.2.3 Voice performance

(a) Voice Call Performance in 3G/2G network mode only: 3G/2G network mode testing has been done to reflect experience for respective users as they have only 3G/2G compatible handsets.

Parameters	Service Provider		
	3G/2G network mode only		
	AIRTEL	BSNL	VIL
Call Attempts	195	234	195
Call Setup Success Rate %	100.00	66.24	99.49
Drop Call Rate %	0.51	4.52	0.00
Call Setup Time-Average (Second)	4.19	3.61	4.62
Handover Success Rate %	98.46	100.00	95.98

Table-21: Summary of voice call performance in 3G/2G network mode only.

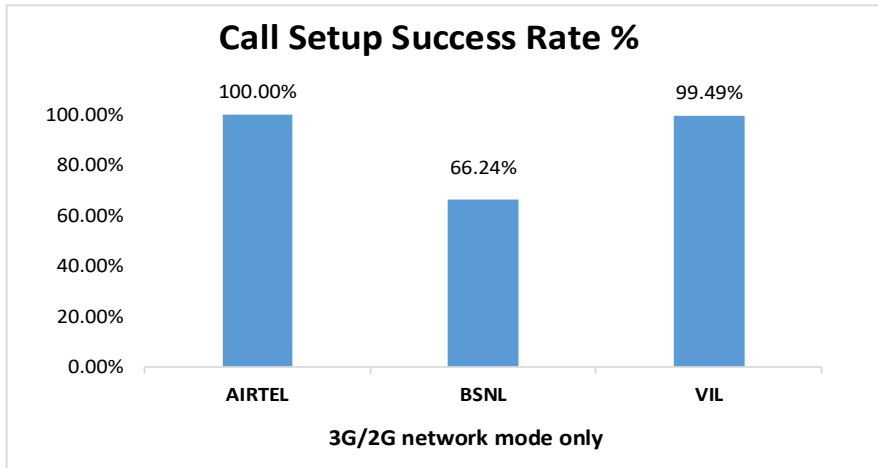


Figure-45: Performance for call setup success rate.

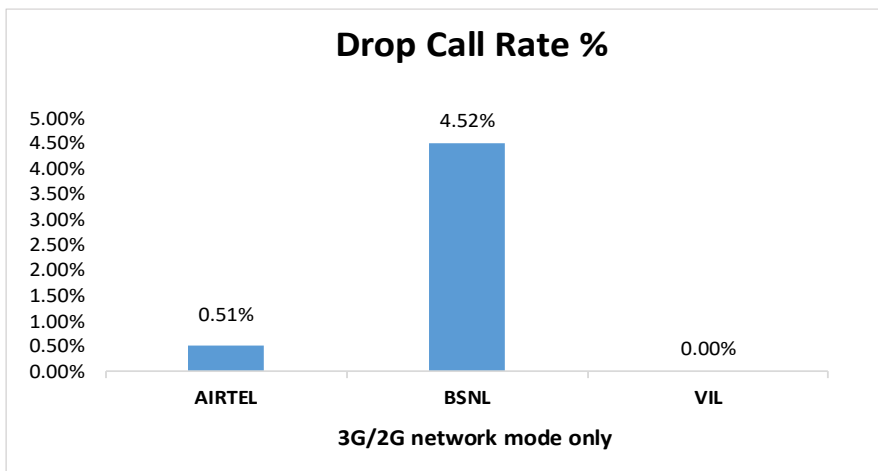


Figure-46: Performance for drop call rate.

(b) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider		
	AIRTEL	BSNL	VIL
3G	NA	67.97%	NA
2G	99.92%	22.21%	99.97%
Limited Service	0.08%	9.82%	0.03%

Table-22: Time spent on technology during drive test 3G/2G network mode.

Note-

- NA- Service provider doesn't provide services in respective technology.

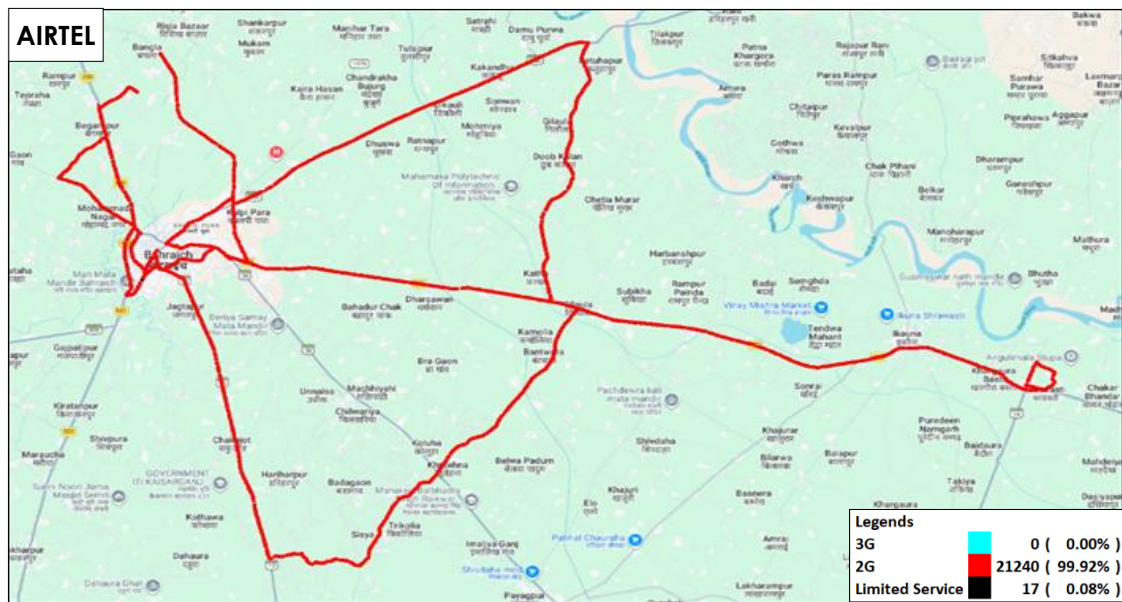


Figure-47: Serving technology plots 3G/2G network mode - AIRTEL.



Figure-48: Serving technology plots 3G/2G network mode - BSNL.



Figure-49: Serving technology plots 3G/2G network mode - VIL.

(c) Network Signal Strength Distribution: The following chart represents signal strength distribution for 3G/2G network mode only. (Refer figure- 207, 208 & 209 for map view)

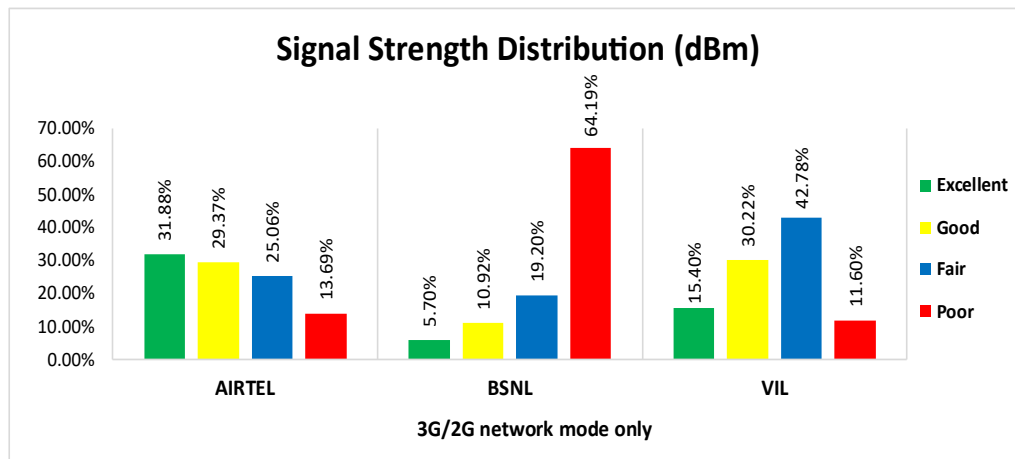


Figure-50: Signal strength distribution 3G/2G network mode only.

Observations:

- Airtel has 32% of samples falling in the excellent signal strength category.
- BSNL has 6% of samples falling in the excellent signal strength category.
- VIL has 15% of samples falling in the excellent signal strength category.

(d) Voice Call Performance in auto network selection mode (5G/4G/3G/2G)

Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempts	205	251	206	206
Call Setup Success Rate %	100.00	63.35	100.00	99.51
Drop Call Rate %	0.49	3.77	0.00	0.49
Call Setup Time Average (Second)	0.60	5.78	0.66	0.79
Handover Success Rate %	100.00	100.00	100.00	100.00

Table-23: Summary of voice call performance in network auto-selection mode.

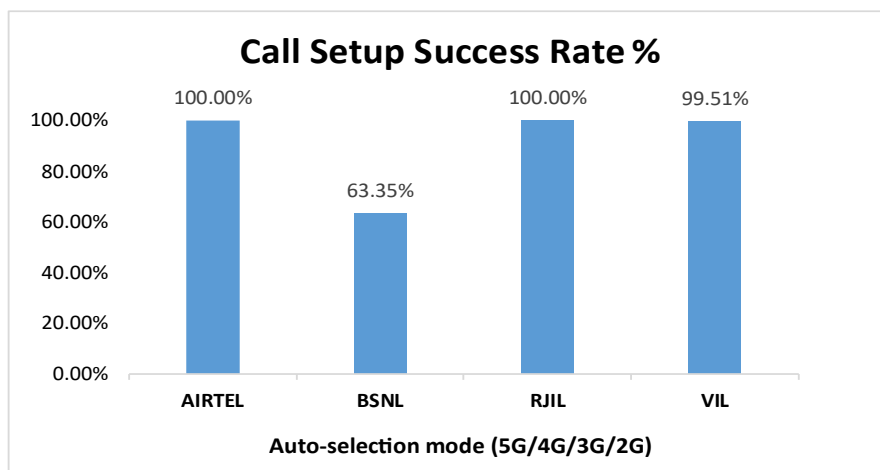


Figure-51: Performance for call setup success rate.

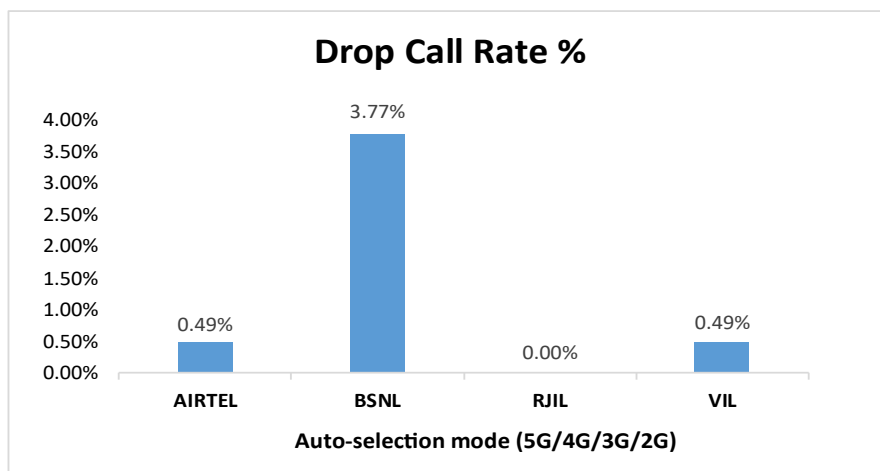


Figure-52: Performance for drop call rate.

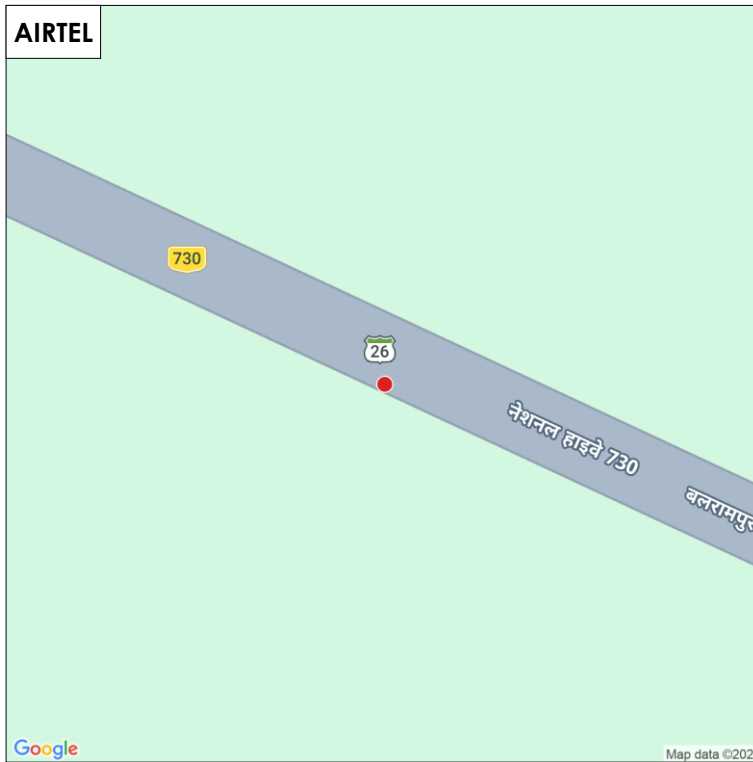


Figure-53: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

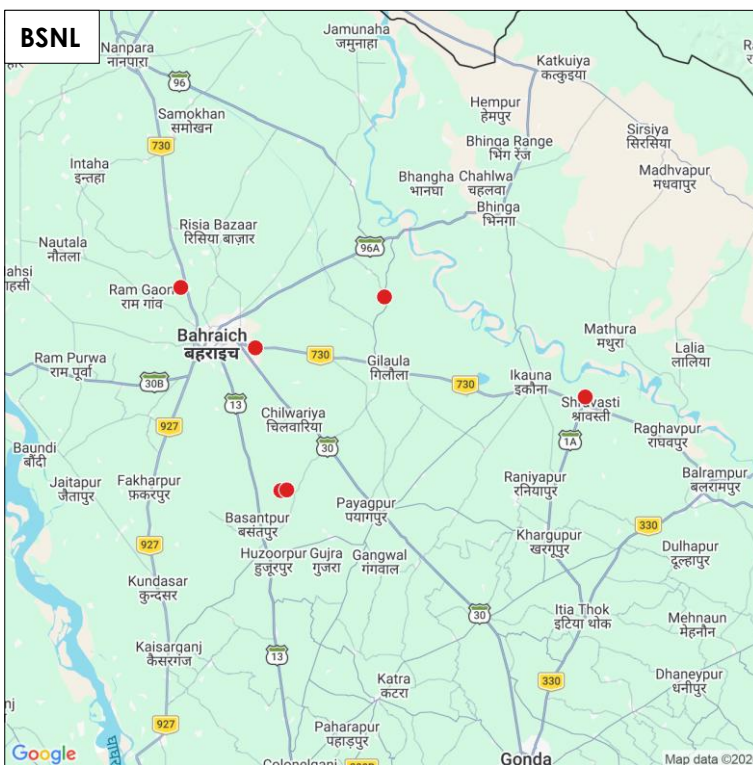


Figure-54: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice - BSNL.



Figure-55: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice - VIL.

Parameter	Service Provider			
	Mobile-to-Mobile (5G/4G – Open Mode)			
	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider Network)	196	137	200	199
Number of silences call for >4 Sec	0	NA	5	1
Silence Call Rate %	0.00	NA	2.50	0.50
Number of silence instances for >4 Sec	0	NA	8	1
Number of silence instances for >3 Sec	0	NA	10	1
Number of silence instances for >2 sec	8	NA	15	5
RTP Jitter (4G & 5G) in ms	7.29	NA	14.90	12.70
Packet loss Rate Downlink %	0.78	NA	1.42	1.71
Packet loss Rate Uplink %	0.71	NA	1.34	0.75

Table-24: Summary of silence instances & packet loss rate for mobile to mobile call.

Note-

- NA- Due to unavailability of packet switched (VoLTE & VoNR) network in BSNL, silence instances are not captured.

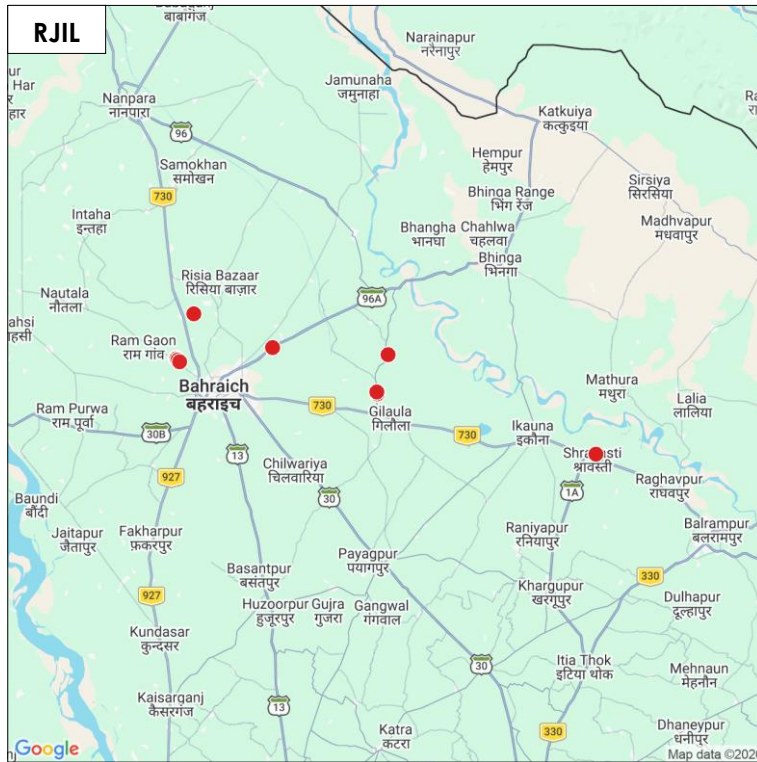


Figure-56: Number of silence instances for >3 Sec Mobile-to-Mobile (5G/4G-Open Mode) - RJIL.

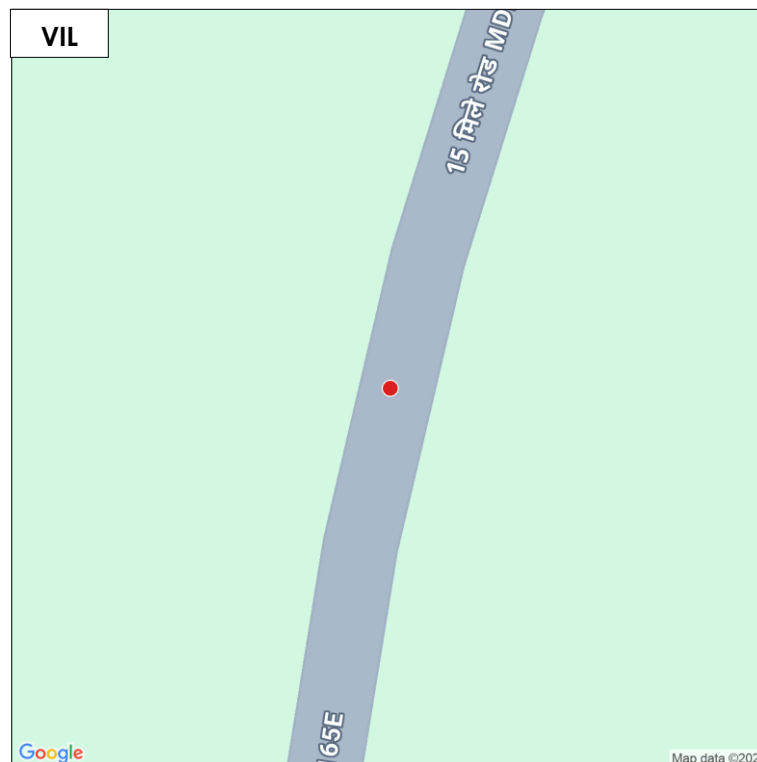


Figure-57: Number of silence instances for >3 Sec Mobile-to-Mobile (5G/4G-Open Mode) - VIL.

(e) Mean Opinion Score (MOS) performance for speech quality:

Mean opinion score indicate quality of speech observed during the drive test across different technologies. This parameter has been calculated for mobile to mobile calls made within same operator network in auto mode (5G/4G/3G/2G). As per ITU-T Recommendation P.863.1, MOS value means: 5-Excellent, 4-Good, 3-Fair, 2-Poor, 1-Bad.

Speech Quality (MOS) distribution	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
Total Number of MOS Samples for calls in table-24	1185	784	1220	1234
Speech Quality (Average MOS)	3.94	2.36	4.37	4.35
Number of samples with MOS ≥ 4 to < 5 (Excellent)	939	0	1005	1011
Number of samples with MOS ≥ 3 to < 4 (Good)	194	0	139	141
Number of samples with MOS ≥ 2 to < 3 (Fair)	24	629	35	41
Number of samples with MOS ≥ 1 to < 2 (Poor)	28	155	41	41
%age of samples with MOS ≥ 4 to < 5 (Excellent)	79.24%	0.00%	82.38%	81.93%
%age of samples with MOS ≥ 3 to < 4 (Good)	16.37%	0.00%	11.39%	11.43%
%age of samples with MOS ≥ 2 to < 3 (Fair)	2.03%	80.23%	2.87%	3.32%
%age of samples with MOS ≥ 1 to < 2 (Poor)	2.36%	19.77%	3.36%	3.32%

Table-25: Summary of speech quality (MOS) samples.

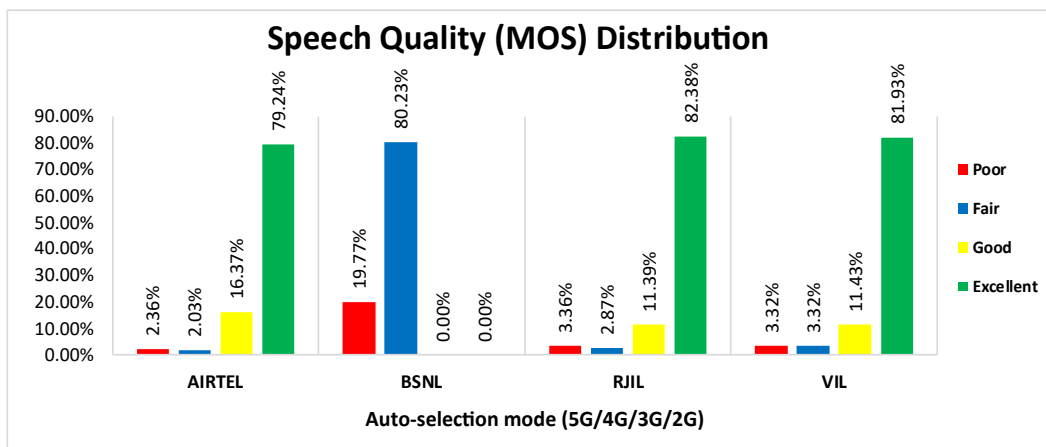


Figure-58: Distribution of samples in MOS range.

(f) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	2.43%	NA	46.03%	0.41%
4G	97.15%	13.96%	53.97%	97.63%
3G	NA	37.92%	NA	NA
2G	0.42%	44.14%	NA	1.96%
Limited Service	0.00%	3.98%	0.00%	0.00%

Table-26: Time spent on technology during drive test in auto-selection mode (5G/4G/3G/2G) voice.

Note-

- NA- Service provider doesn't provide services in respective technology.



Figure-59: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.



Figure-60: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

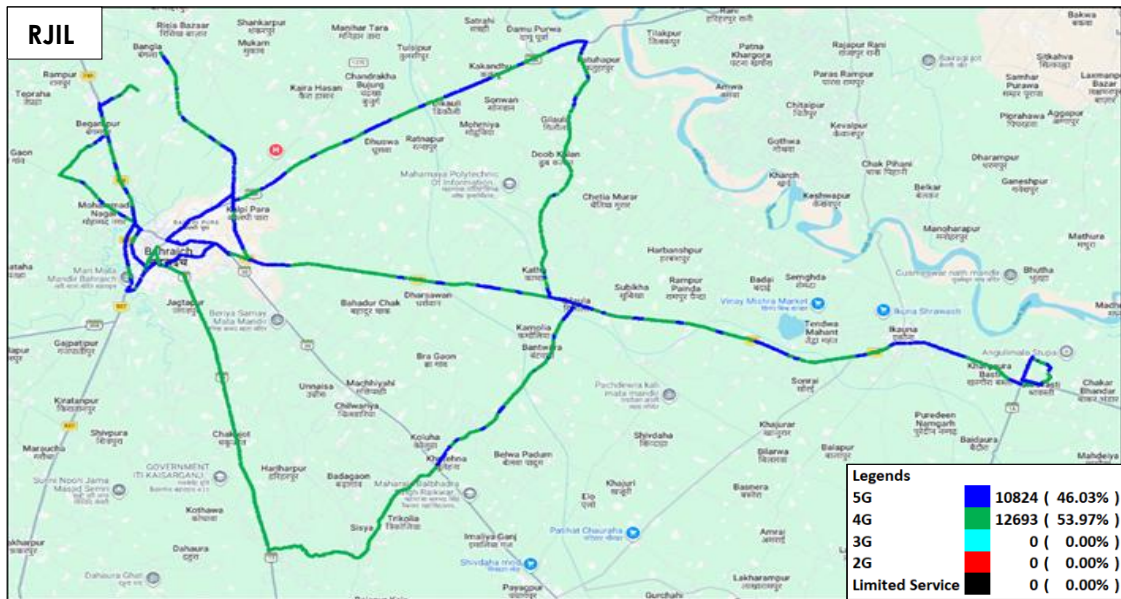


Figure-61: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - RJIL.

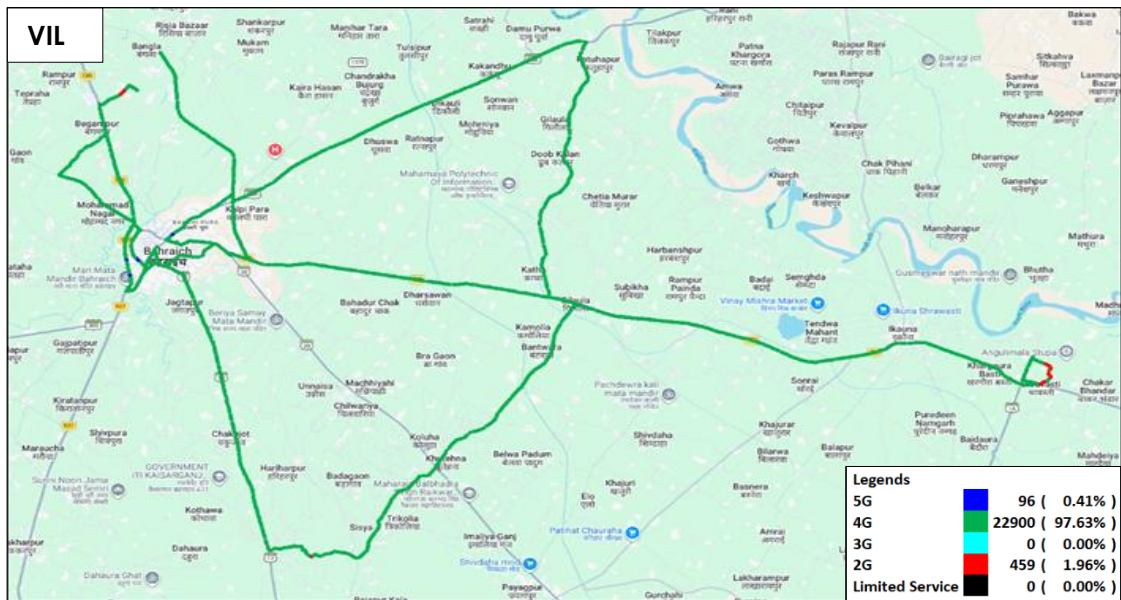


Figure-62: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - VIL.

(g) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) voice. (Refer figure-210, 211, 212 & 213 for map view)

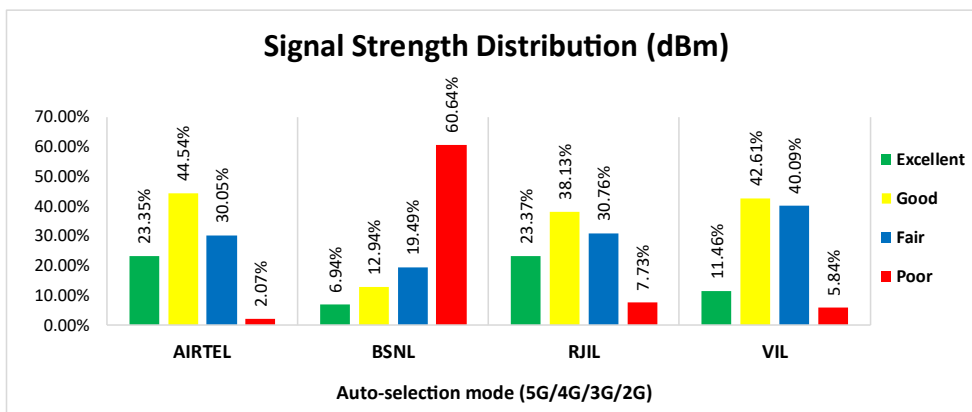


Figure-63: Signal strength distribution auto-selection mode (5G/4G/3G/2G) voice.

Observations:

- Airtel has 23% of samples falling in the excellent signal strength category.
- BSNL has 7% of samples falling in the excellent signal strength category.
- RJIL has 23% of samples falling in the excellent signal strength category.
- VIL has 11% of samples falling in the excellent signal strength category.

(h) Coverage Gap observed



Figure-64: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

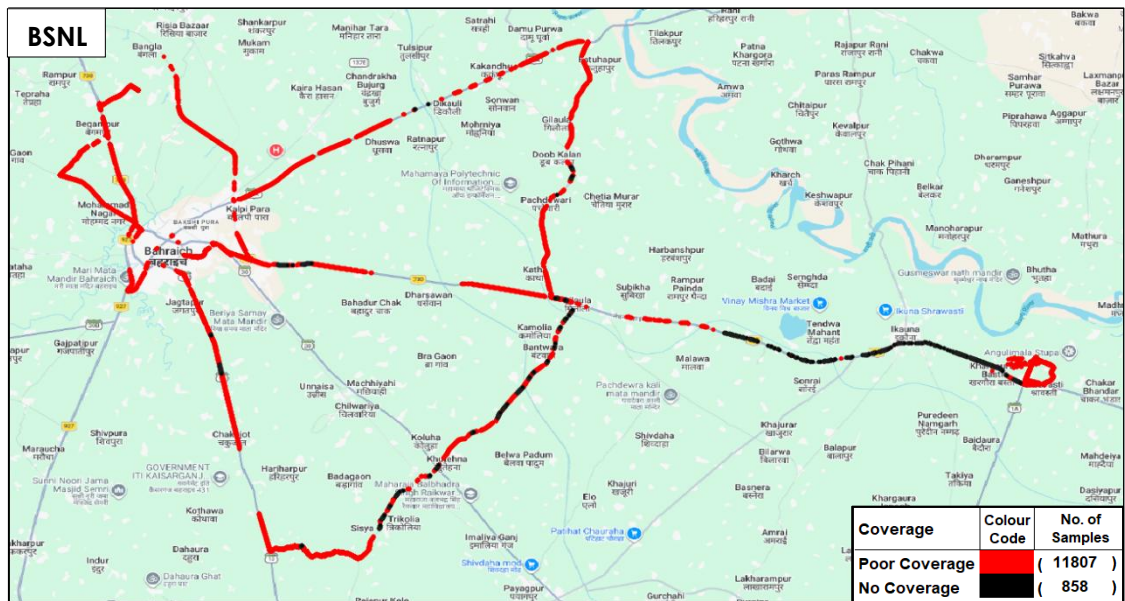


Figure-65: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

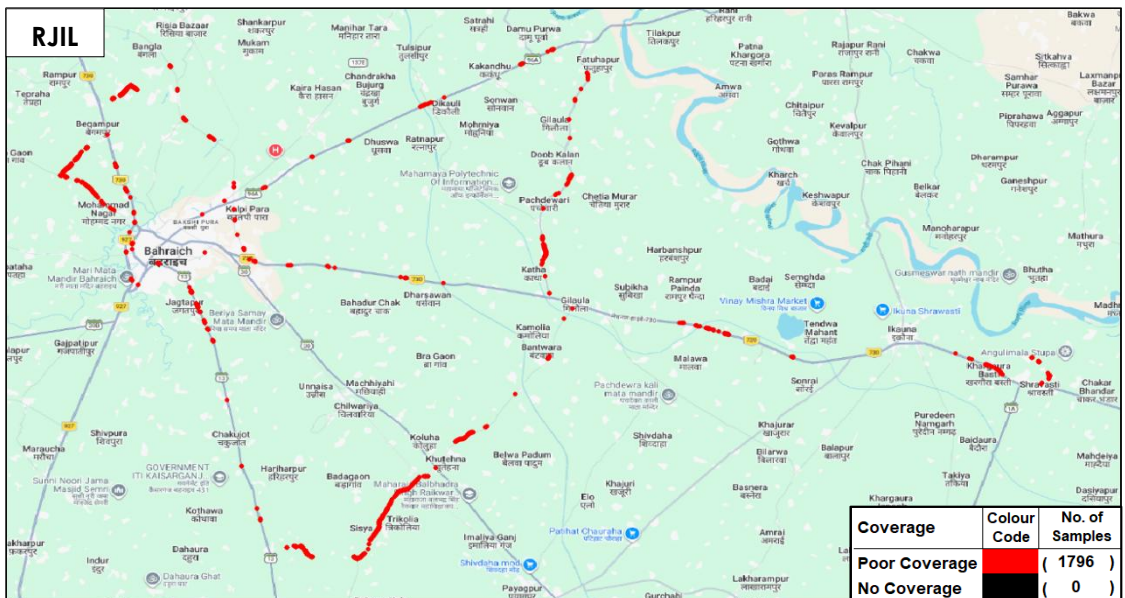


Figure-66: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - RJIL.

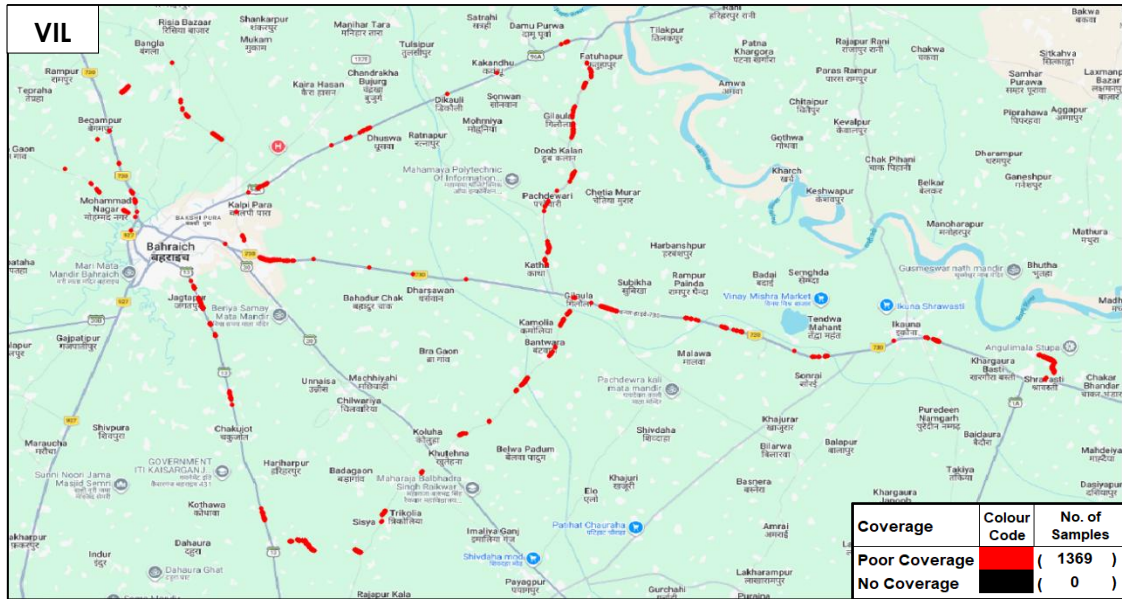


Figure-67: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - VIL.

4.2.2.4 Data performance

(b) Data Parameters (Auto-selection mode- 5G/4G/3G/2G)

Parameters		Service Provider			
		Auto-selection mode (5G/4G/3G/2G)			
		AIRTEL	BSNL	RJIL	VIL
Download Throughput (Mbps/s)	Average	105.94	7.30	146.74	41.12
	80 th Percentile	193.18	13.24	267.34	62.44
	20 th Percentile	23.50	1.75	8.79	8.59
Upload Throughput (Mbps/s)	Average	17.60	2.88	12.09	11.86
	80 th Percentile	28.95	3.71	19.29	20.40
	20 th Percentile	2.97	0.84	1.36	1.95
Latency (ms)	50 th Percentile	44.90	32.50	22.91	36.50

Table-27: Summary of Data performance in network auto-selection mode.

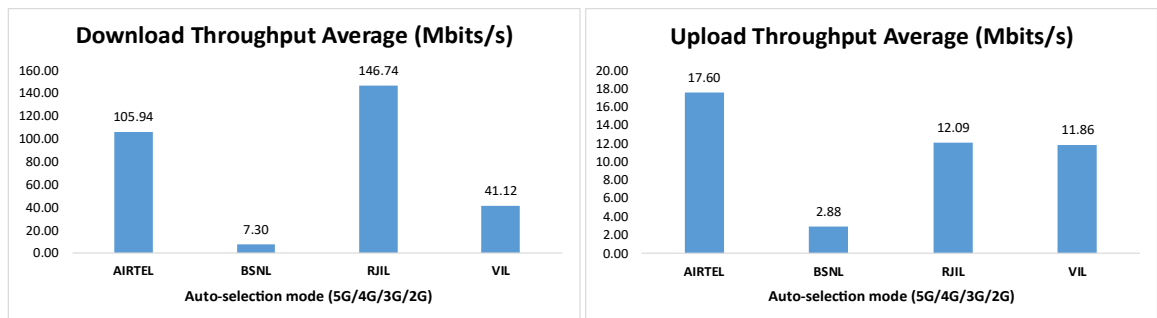


Figure- 68: Download & Upload throughput.

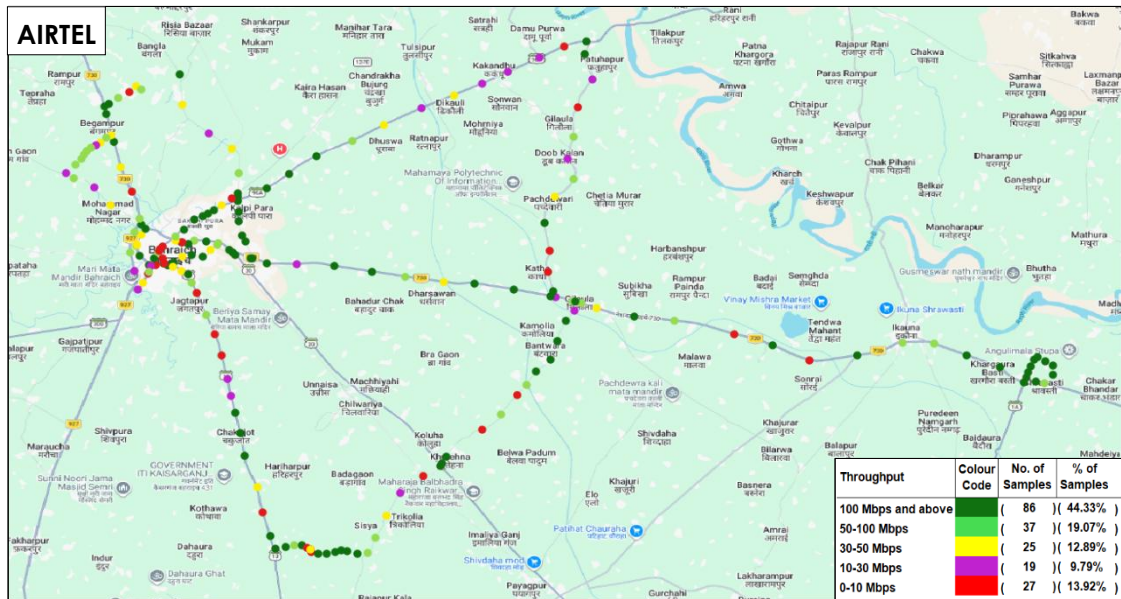


Figure-69: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - AIRTEL.

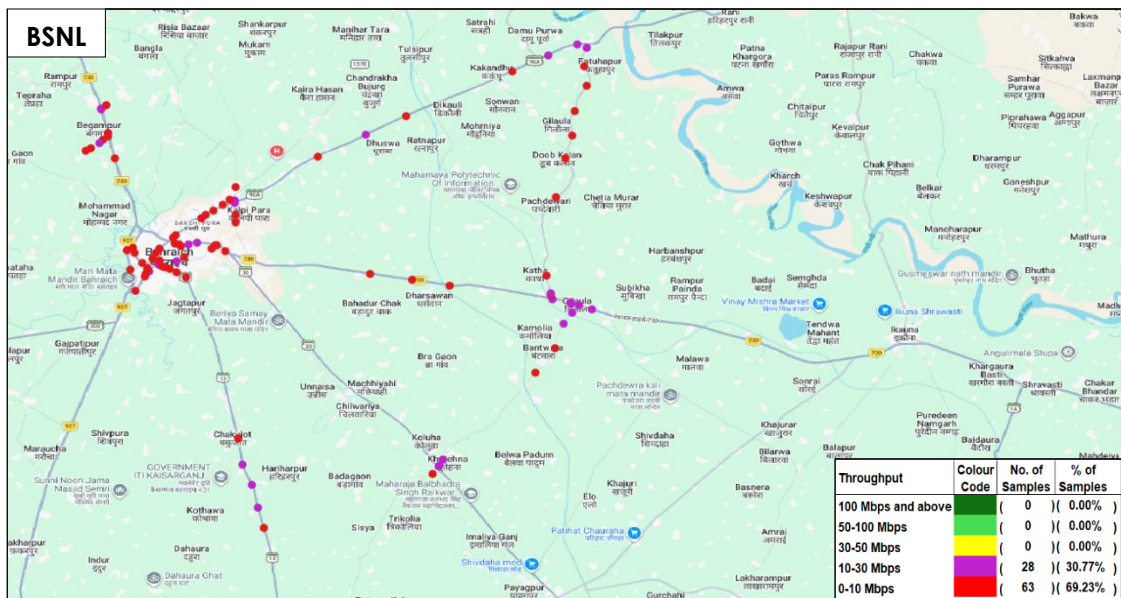


Figure-70: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - BSNL.

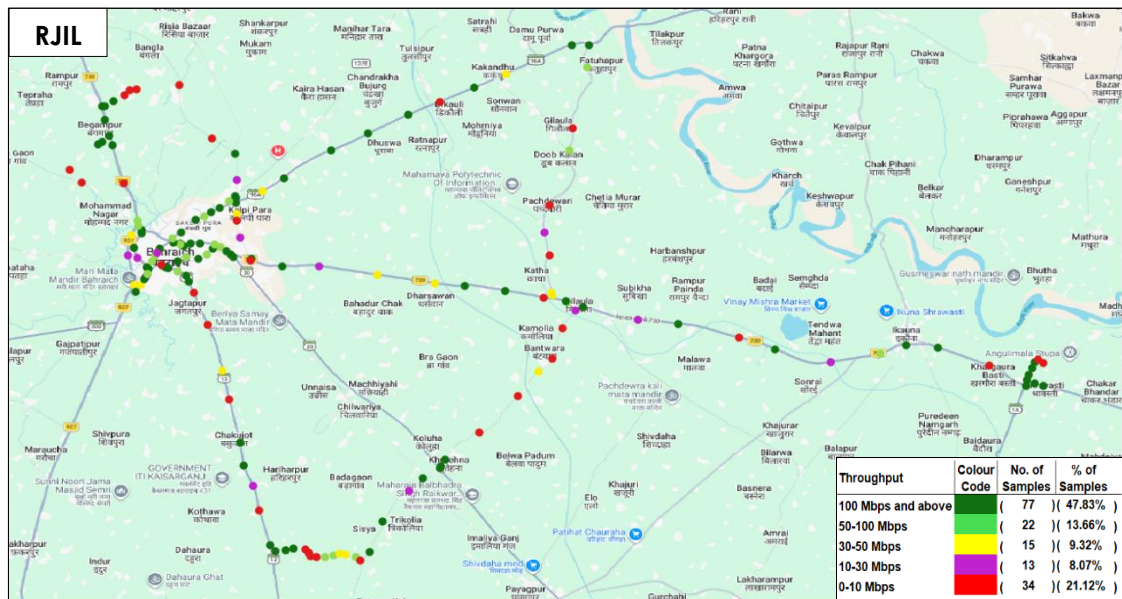


Figure-71: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - RJIL.

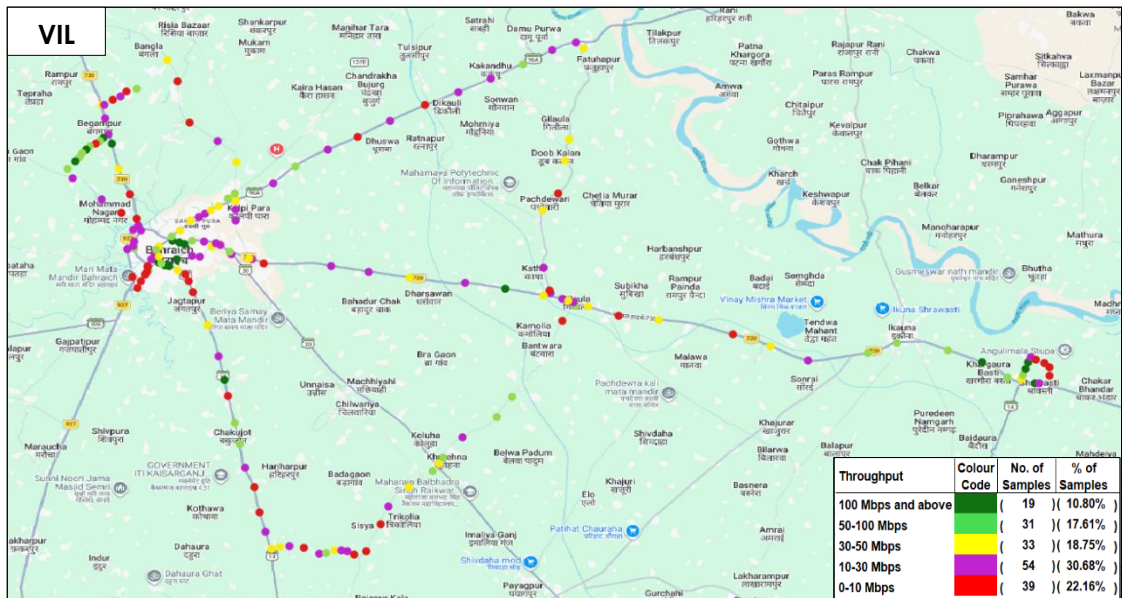


Figure-72: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - VIL.

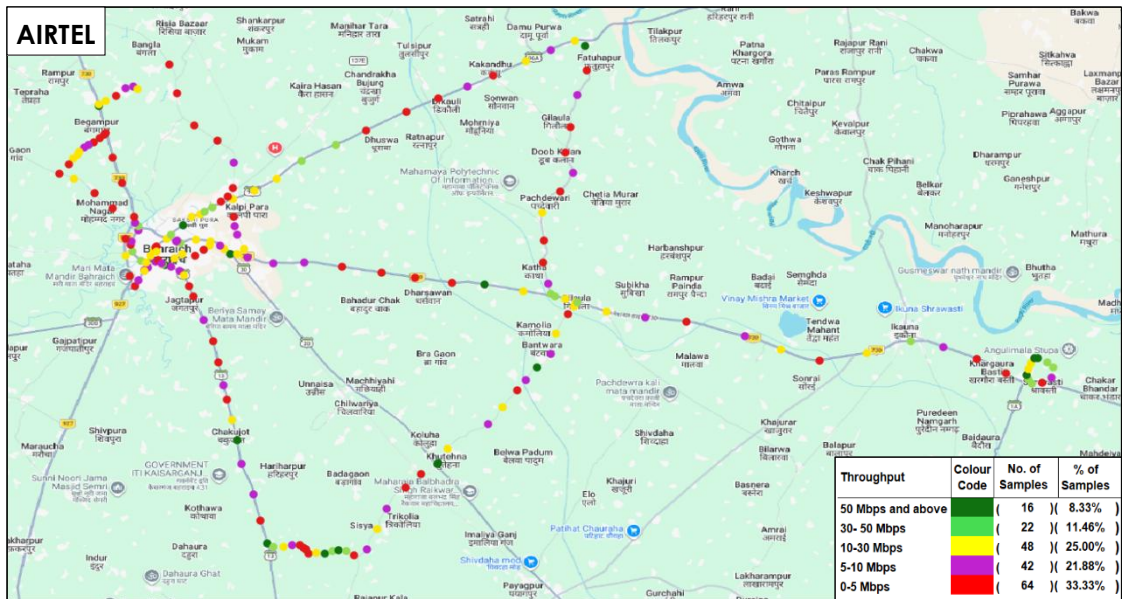


Figure-73: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - AIRTEL.

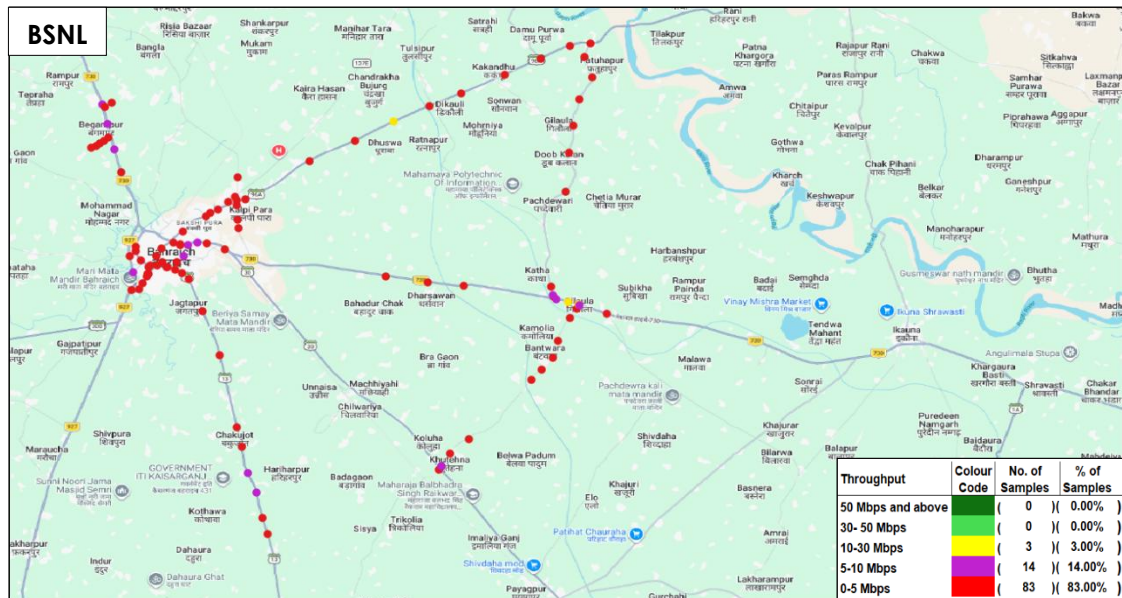


Figure-74: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - BSNL.

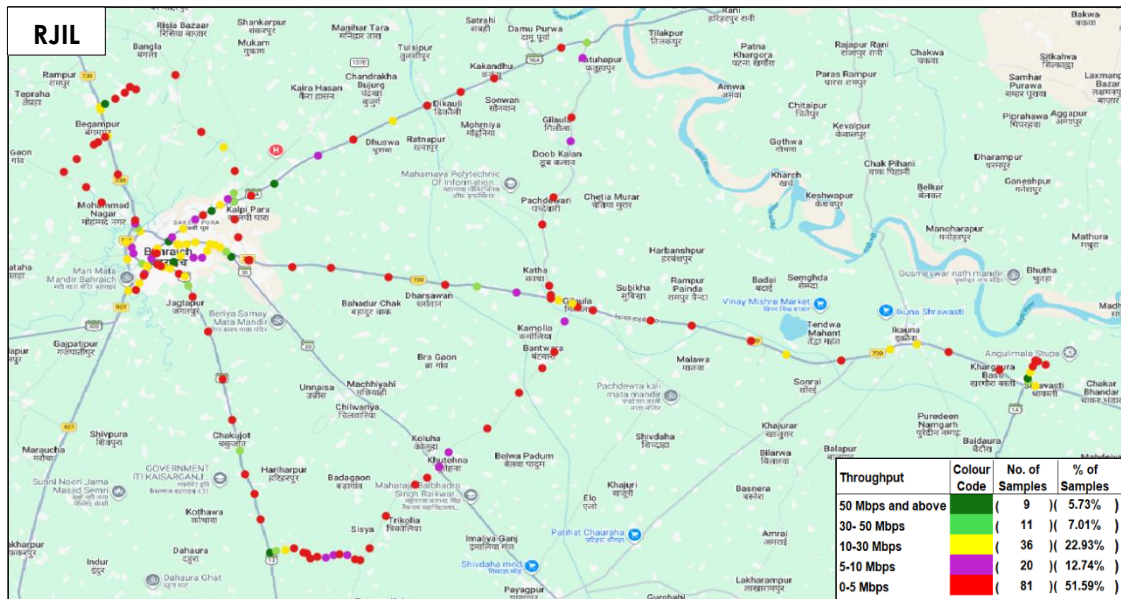


Figure-75: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - RJIL.

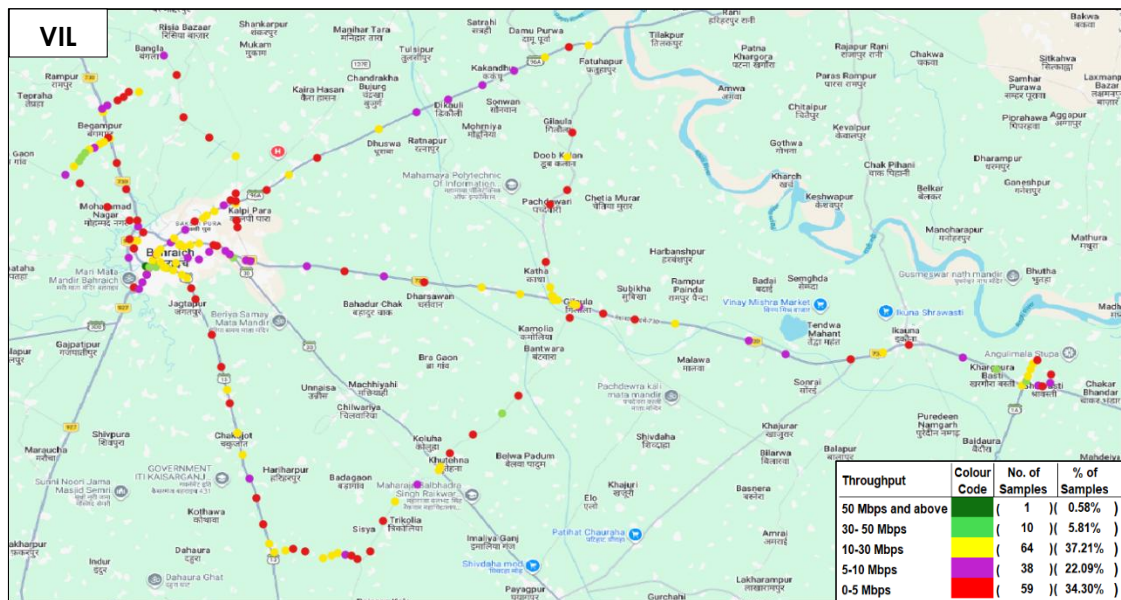


Figure-76: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - VIL.

(b) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	57.80%	NA	65.91%	8.46%
4G	42.20%	46.59%	33.95%	88.95%
3G	NA	44.38%	NA	NA
2G	0.00%	2.45%	NA	2.59%
Limited Service	0.00%	6.58%	0.14%	0.00%

Table-28: Time spent on technology during drive test in auto-selection mode (5G/4G/3G/2G) data.

Note-

- NA- Service provider doesn't provide services in respective technology.

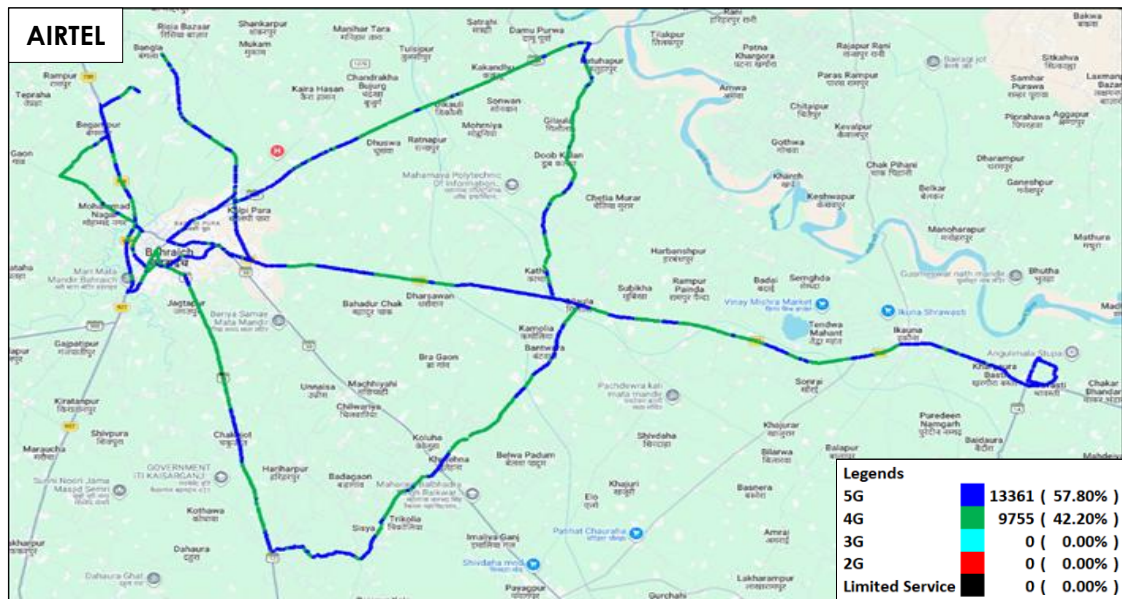


Figure-77: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - AIRTEL.

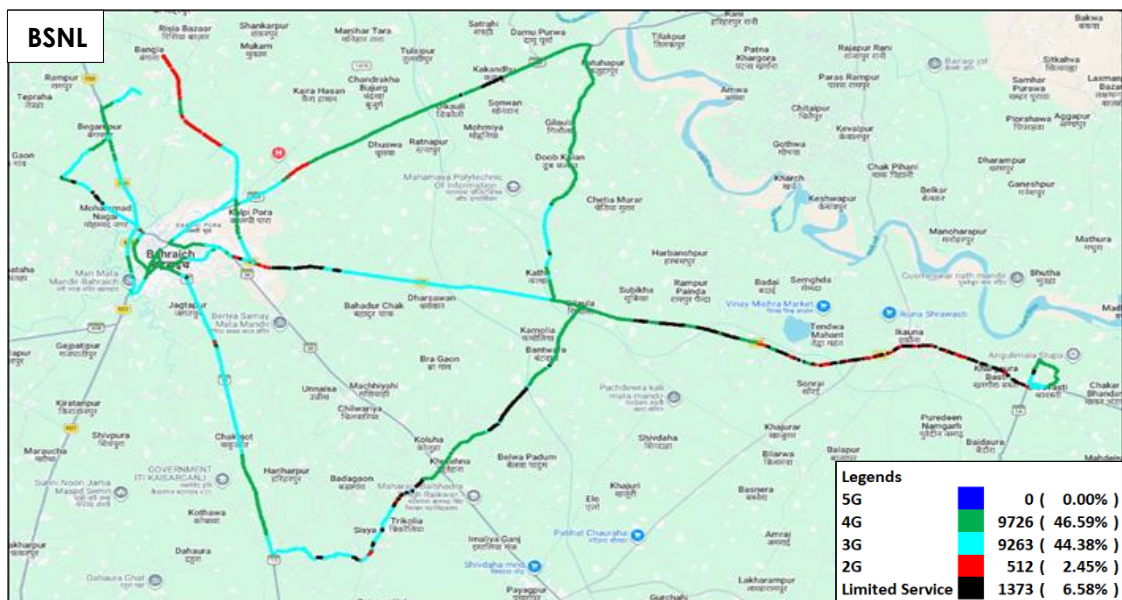


Figure-78: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - BSNL.



Figure-79: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - RJIL.



Figure-80: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - VIL.

(c) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) data. (Refer figure-214, 215, 216 & 217 for map view)

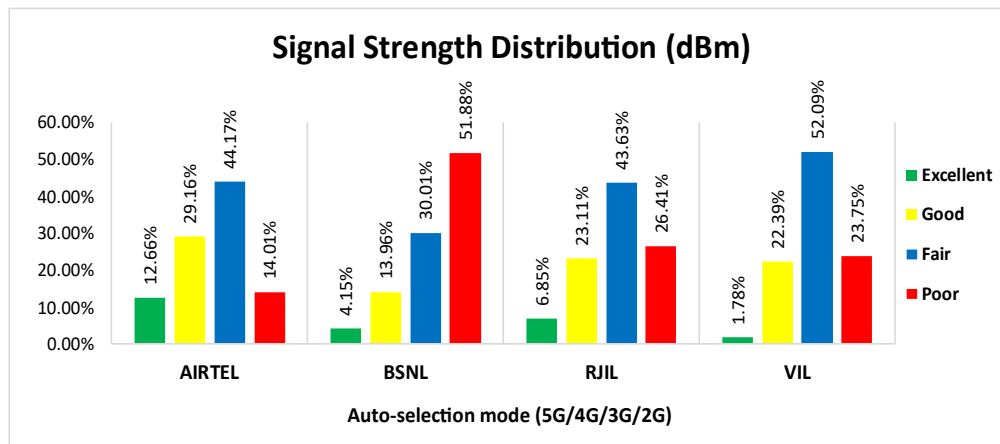


Figure-81: Signal strength distribution auto-selection mode (5G/4G/3G/2G) data.

Observations:

- Airtel has 13% of samples falling in the excellent signal strength category.
- BSNL has 4% of samples falling in the excellent signal strength category.
- RJIL has 7% of samples falling in the excellent signal strength category.
- VIL has 2% of samples falling in the excellent signal strength category.

4.2.3 Balrampur

4.2.3.1 Drive test route

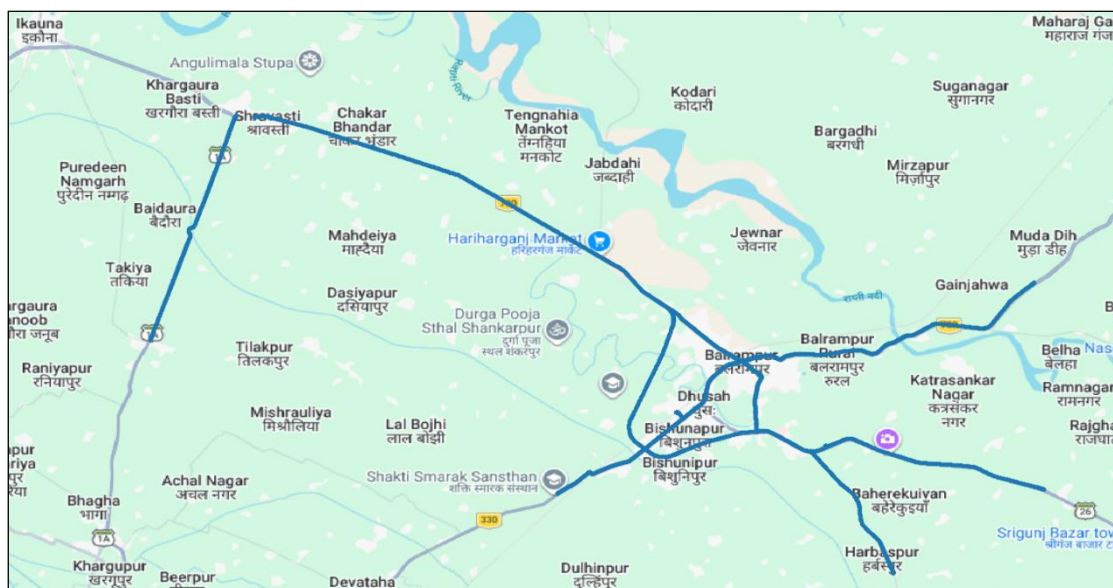


Figure-82: Drive test routes.

4.2.3.2 Areas covered

Balrampur- Harbaspur, Bishunipur, Bishunapur, Dhusah, Benijot, Pahalwara koeliha, Shrivasti, Ikauna, Khargaura Basti, Gopalpur and Ararpakar etc.

4.2.3.3 Voice performance

(a) Voice Call Performance in 3G/2G network mode only: 3G/2G network mode testing has been done to reflect experience for respective users as they have only 3G/2G compatible handsets.

Parameters	Service Provider		
	3G/2G network mode only		
	AIRTEL	BSNL	VIL
Call Attempts	73	81	73
Call Setup Success Rate %	100.00	90.12	100.00
Drop Call Rate %	0.00	4.11	0.00
Call Setup Time-Average (Second)	4.13	4.29	4.54
Handover Success Rate %	100.00	69.64	99.10

Table-29: Summary of voice call performance in 3G/2G network mode only.

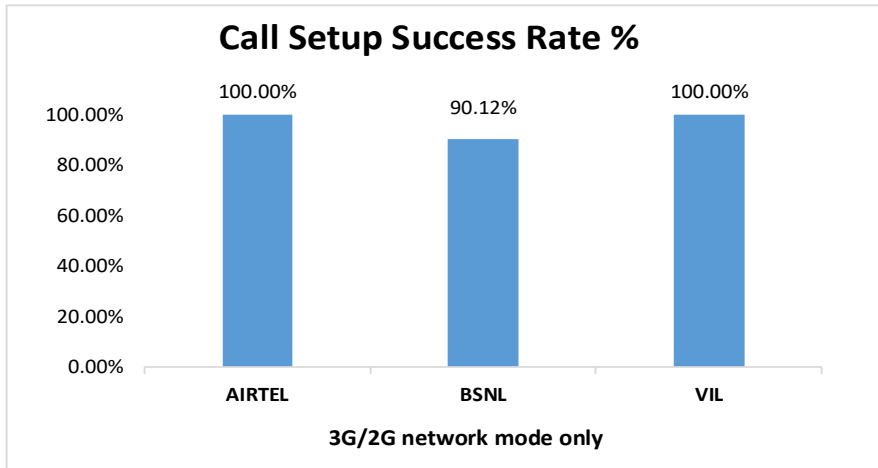


Figure-83: Performance for call setup success rate.

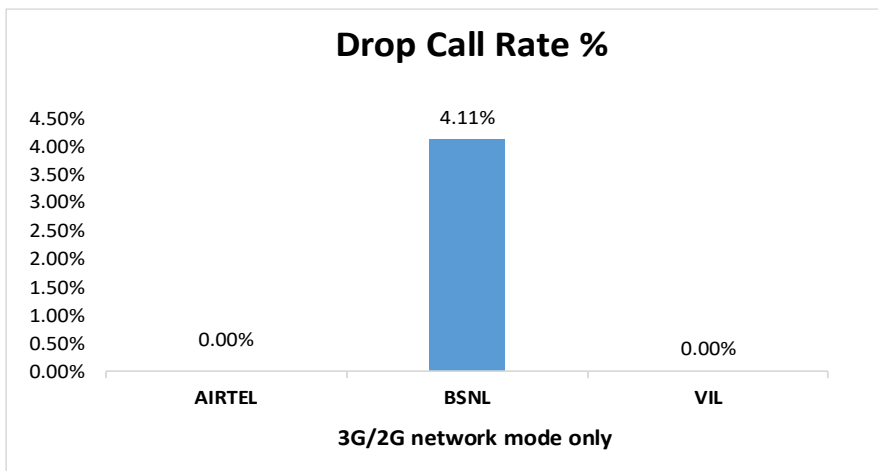


Figure-84: Performance for drop call rate.

(c) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider		
	AIRTEL	BSNL	VIL
3G	NA	27.36%	NA
2G	99.91%	72.64%	100.00%
Limited Service	0.09%	0.00%	0.00%

Table-30: Time spent on technology during drive test 3G/2G network mode.

Note-

- NA- Service provider doesn't provide services in respective technology.

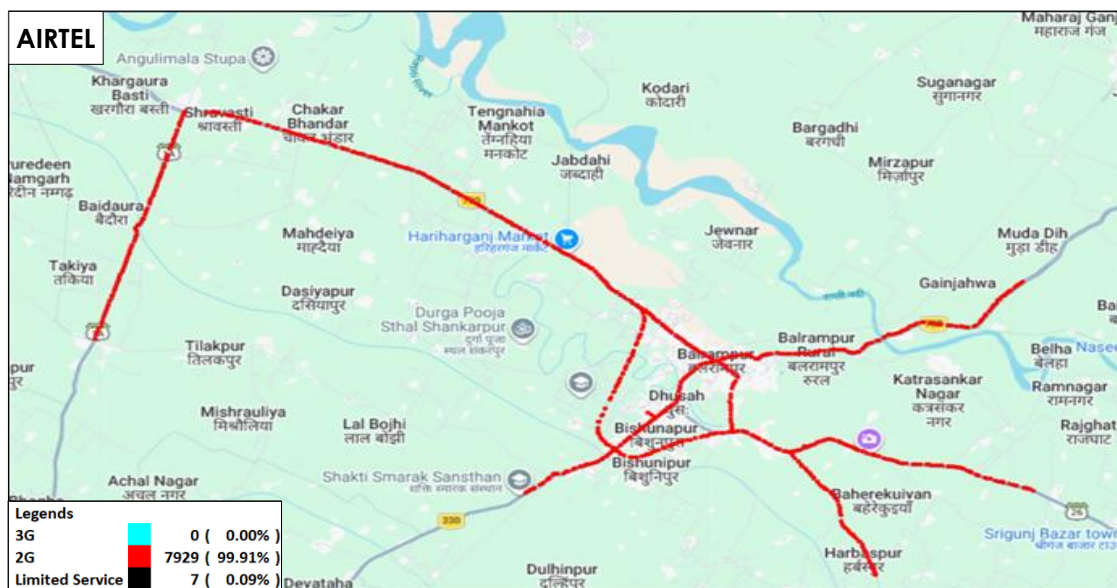


Figure-85: Serving technology plots 3G/2G network mode - AIRTEL.

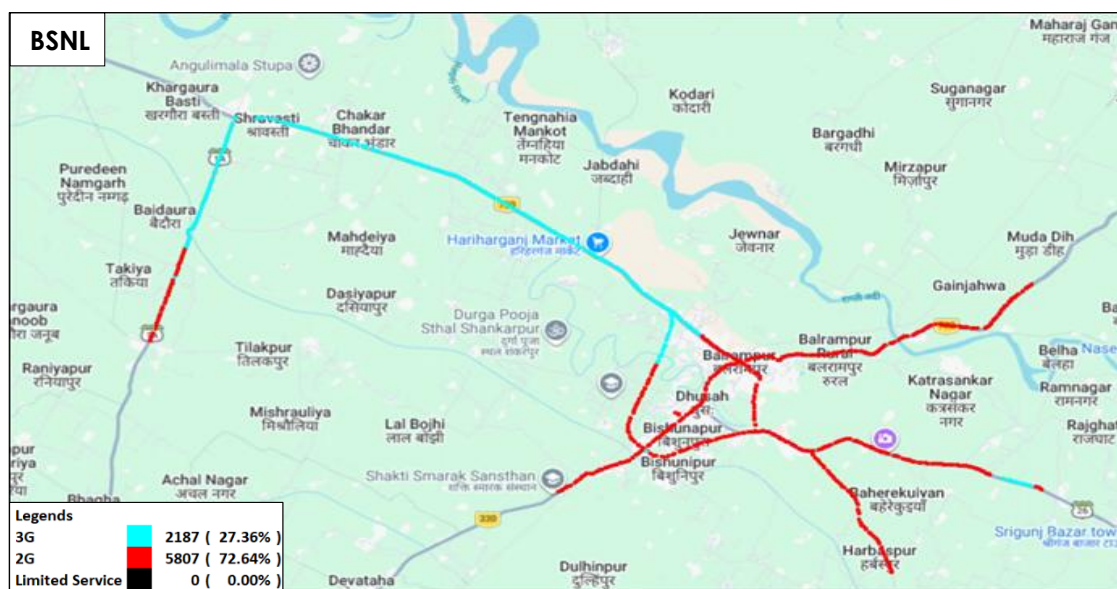


Figure-86: Serving technology plots 3G/2G network mode - BSNL.

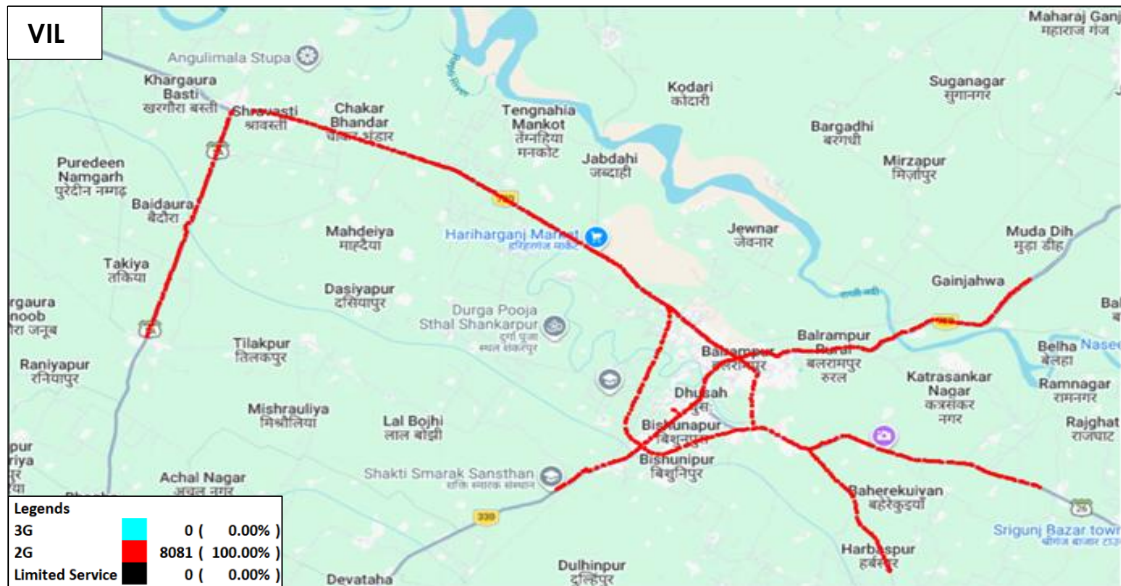


Figure-87: Serving technology plots 3G/2G network mode - VIL.

(c) Network Signal Strength Distribution: The following chart represents signal strength distribution for 3G/2G network mode only. (Refer figure- 218, 219 & 220 for map view)

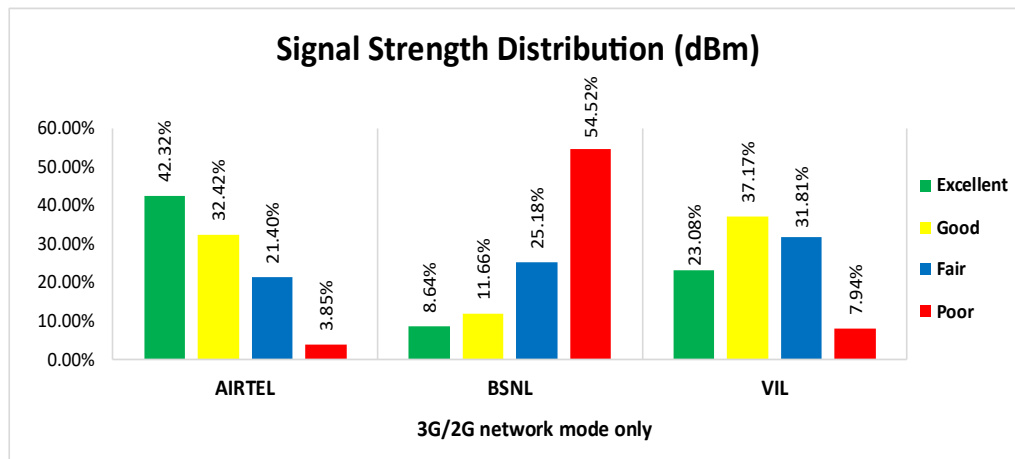


Figure-88: Signal strength distribution 3G/2G network mode only.

Observations:

- Airtel has 42% of samples falling in the excellent signal strength category.
- BSNL has 9% of samples falling in the excellent signal strength category.
- VIL has 23% of samples falling in the excellent signal strength category.

(d) Voice Call Performance in auto network selection mode (5G/4G/3G/2G)

Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempts	78	82	78	78
Call Setup Success Rate %	100.00	87.80	100.00	100.00
Drop Call Rate %	2.56	2.78	0.00	0.00
Call Setup Time Average (Second)	0.54	5.98	0.68	0.81
Handover Success Rate %	100.00	93.04	99.89	100.00

Table-31: Summary of voice call performance in network auto-selection mode.

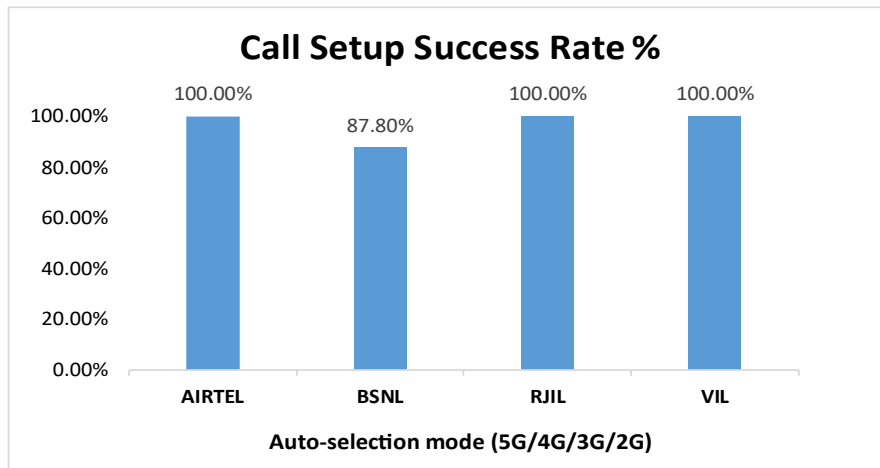


Figure-89: Performance for call setup success rate.

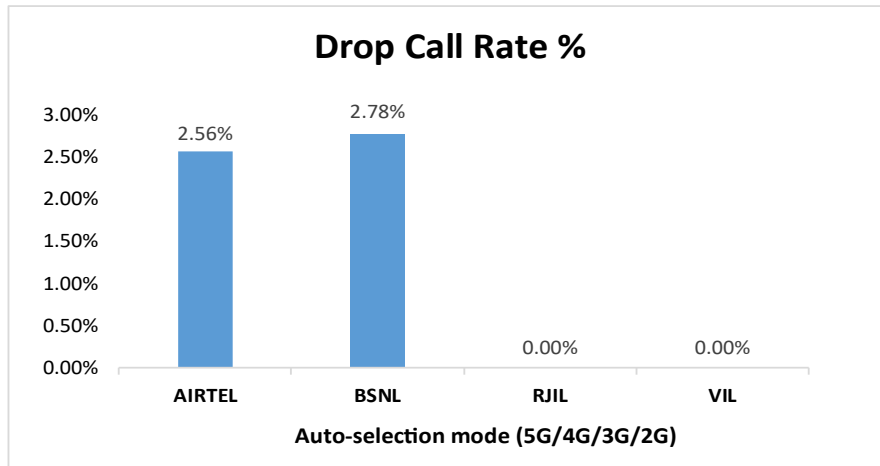


Figure-90: Performance for drop call rate.

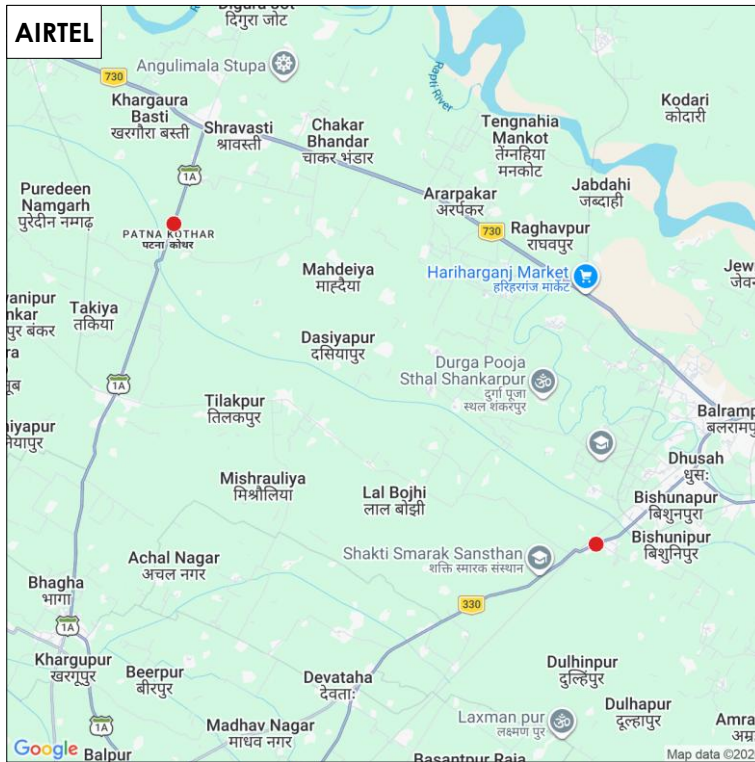


Figure-91: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

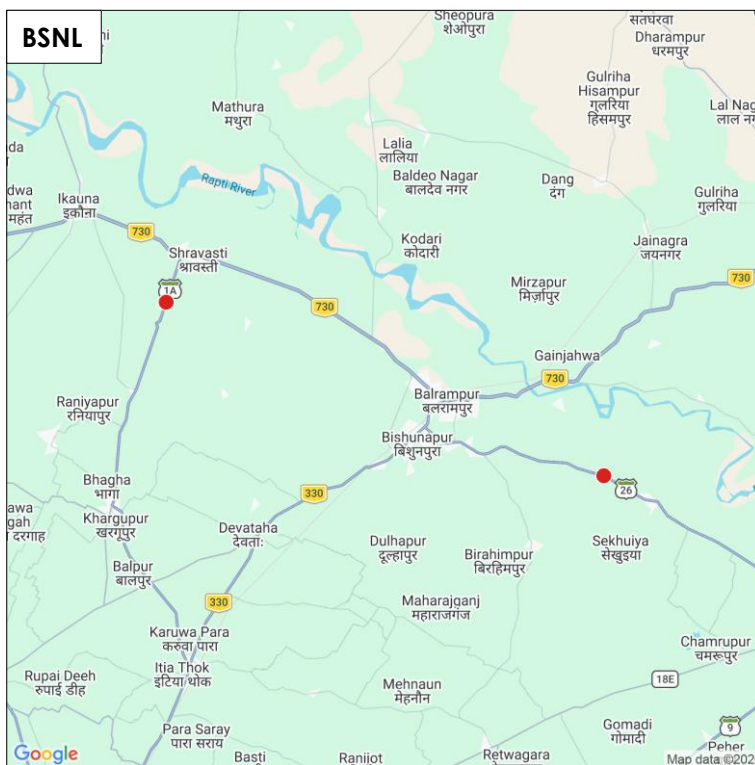


Figure-92: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

Parameter	Service Provider			
	Mobile-to-Mobile (5G/4G – Open Mode)			
	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider Network)	73	56	74	73
Number of silences call for >4 Sec	1	NA	1	0
Silence Call Rate %	1.37	NA	1.35	0.00
Number of silence instances for >4 Sec	1	NA	1	0
Number of silence instances for >3 Sec	1	NA	2	0
Number of silence instances for >2 sec	1	NA	3	1
RTP Jitter (4G & 5G) in ms	8.17	NA	17.01	13.95
Packet loss Rate Downlink %	0.92	NA	1.51	0.94
Packet loss Rate Uplink %	0.97	NA	1.18	0.53

Table-32: Summary of silence instances & packet loss rate for mobile to mobile call.

Note-

- NA- Due to unavailability of packet switched (VoLTE & VoNR) network in BSNL, silence instances are not captured.

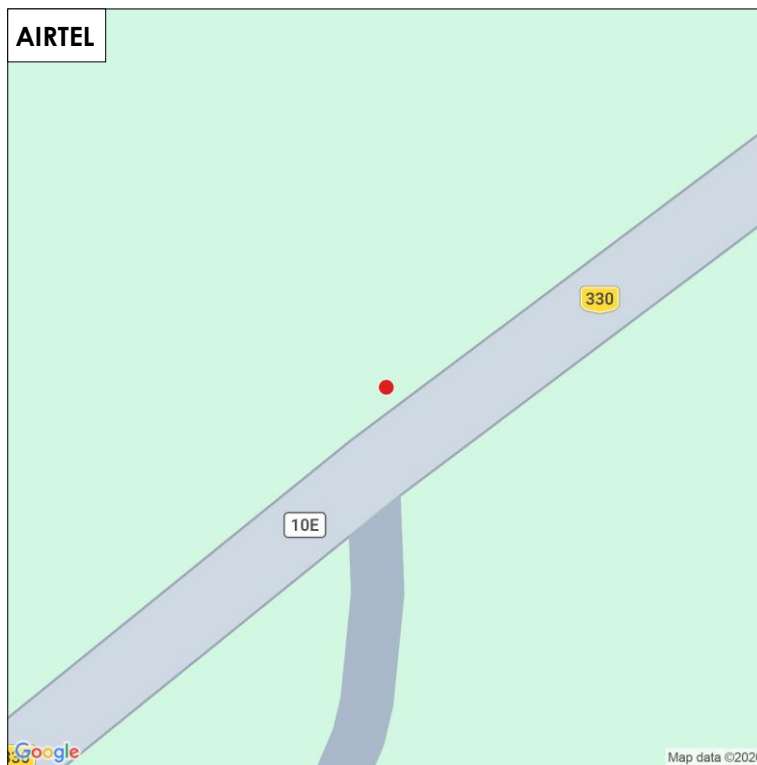


Figure-93: Number of silence instances for >3 Sec Mobile-to-Mobile (5G/4G-Open Mode) - AIRTEL.



Figure-94: Number of silence instances for >3 Sec Mobile-to-Mobile (5G/4G-Open Mode) - RJIL.

(e) Mean Opinion Score (MOS) performance for speech quality:

Mean opinion score indicate quality of speech observed during the drive test across different technologies. This parameter has been calculated for mobile to mobile calls made within same operator network in auto mode (5G/4G/3G/2G). As per ITU-T Recommendation P.863.1, MOS value means: 5-Excellent, 4-Good, 3-Fair, 2-Poor, 1-Bad.

Speech Quality (MOS) distribution	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
Total Number of MOS Samples for calls in table-32	440	363	436	451
Speech Quality (Average MOS)	3.93	2.11	4.36	4.36
Number of samples with MOS ≥ 4 to < 5 (Excellent)	333	0	369	378
Number of samples with MOS ≥ 3 to < 4 (Good)	88	0	35	46
Number of samples with MOS ≥ 2 to < 3 (Fair)	7	211	16	17
Number of samples with MOS ≥ 1 to < 2 (Poor)	12	152	16	10
%age of samples with MOS ≥ 4 to < 5 (Excellent)	75.68%	0.00%	84.63%	83.81%
%age of samples with MOS ≥ 3 to < 4 (Good)	20.00%	0.00%	8.03%	10.20%
%age of samples with MOS ≥ 2 to < 3 (Fair)	1.59%	58.13%	3.67%	3.77%
%age of samples with MOS ≥ 1 to < 2 (Poor)	2.73%	41.87%	3.67%	2.22%

Table-33: Summary of speech quality (MOS) samples.

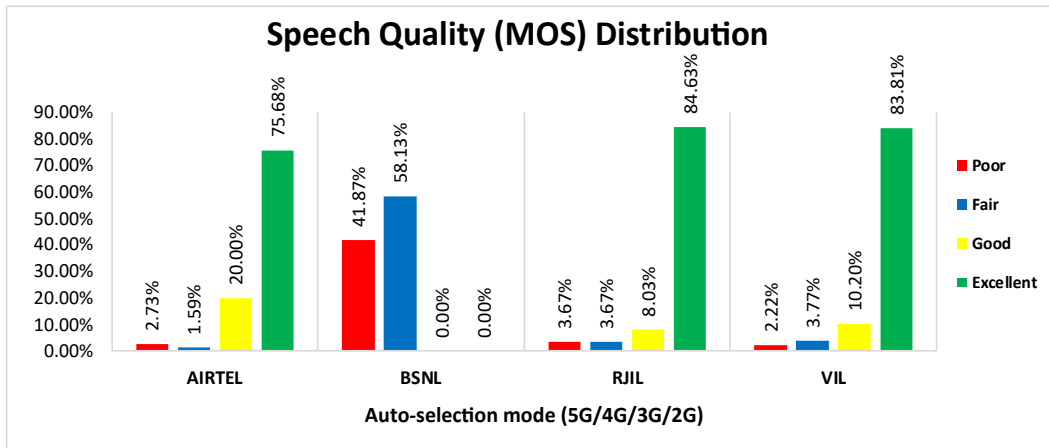


Figure-95: Distribution of samples in MOS range.

(f) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	6.52%	NA	61.90%	NA
4G	93.48%	11.45%	38.10%	97.85%
3G	NA	21.99%	NA	NA
2G	0.00%	65.71%	NA	2.15%
Limited Service	0.00%	0.84%	0.00%	0.00%

Table-34: Time spent on technology during drive test in auto-selection mode (5G/4G/3G/2G) voice.

Note-

- NA- Service provider doesn't provide services in respective technology.

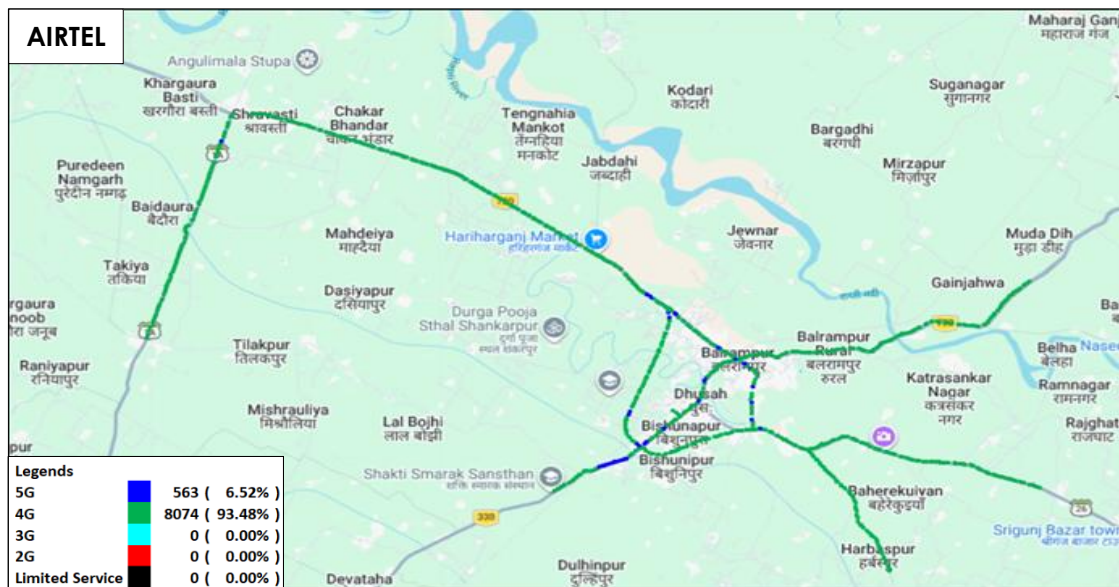


Figure-96: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

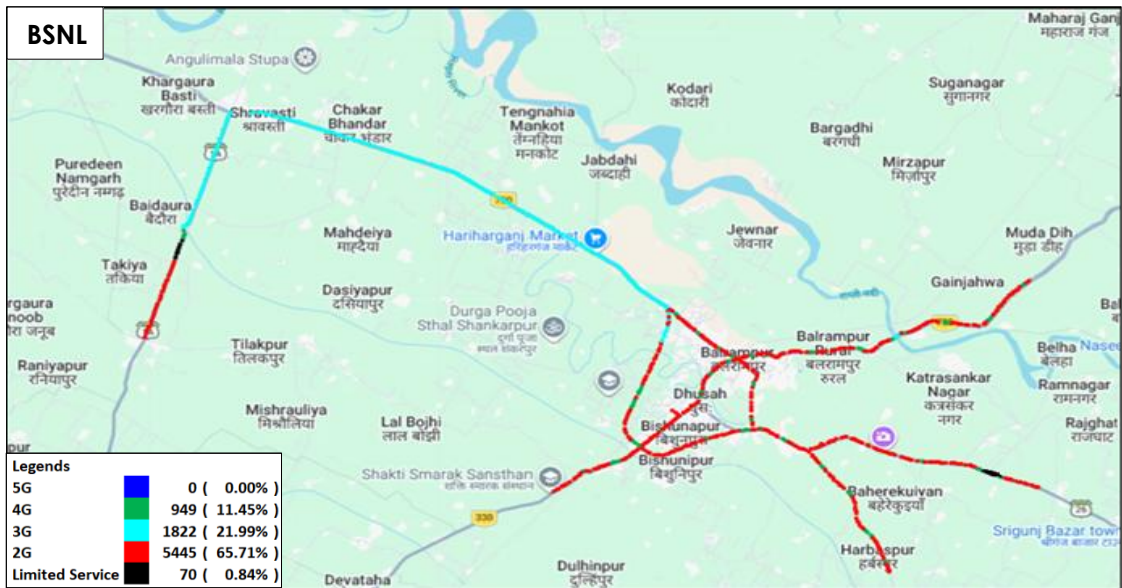


Figure-97: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

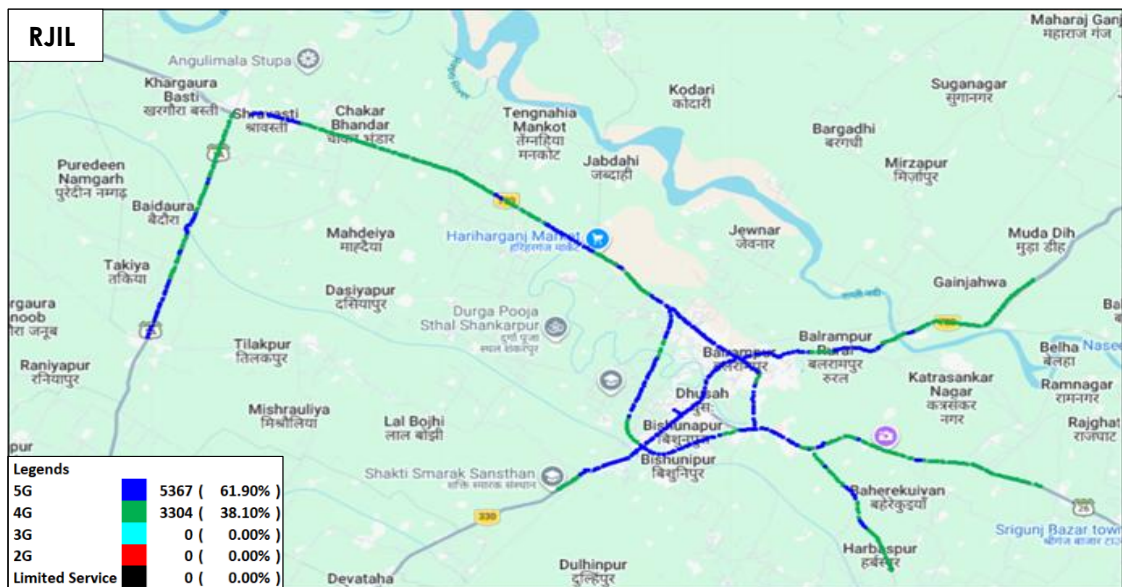


Figure-98: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - RJIL.

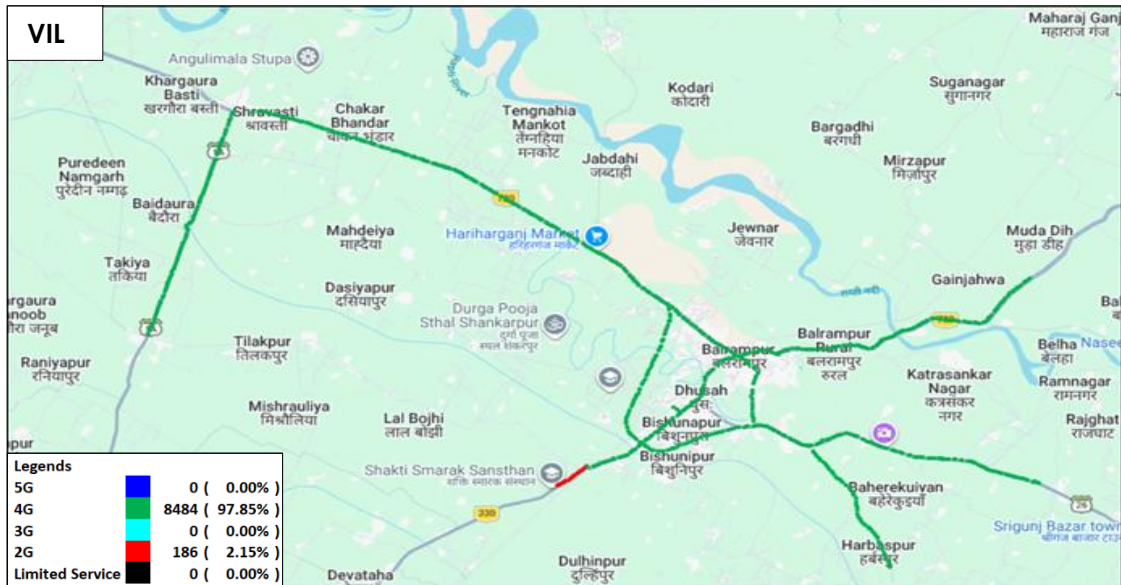


Figure-99: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - VIL.

(g) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) voice. (Refer figure-221, 222, 223 & 224 for map view)

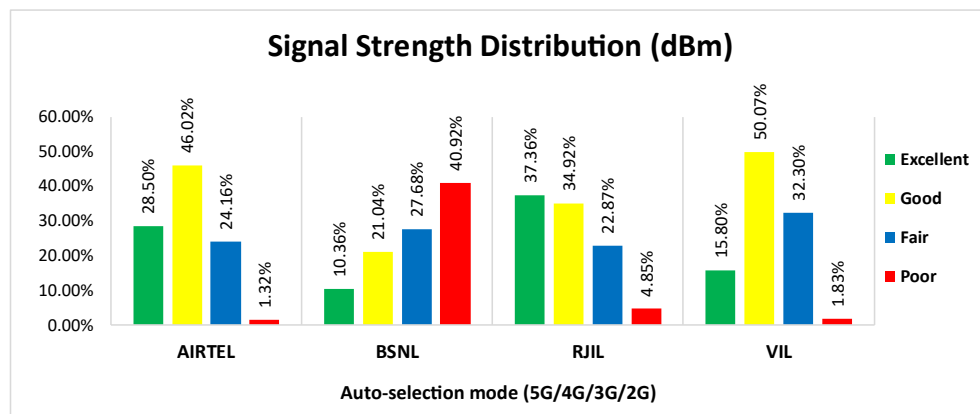


Figure-100: Signal strength distribution auto-selection mode (5G/4G/3G/2G) voice.

Observations:

- Airtel has 29% of samples falling in the excellent signal strength category.
- BSNL has 10% of samples falling in the excellent signal strength category.
- RJIL has 37% of samples falling in the excellent signal strength category.
- VIL has 16% of samples falling in the excellent signal strength category.

(h) Coverage Gap observed



Figure-101: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.



Figure-102: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - BSNL.



Figure-103: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - RJIL.

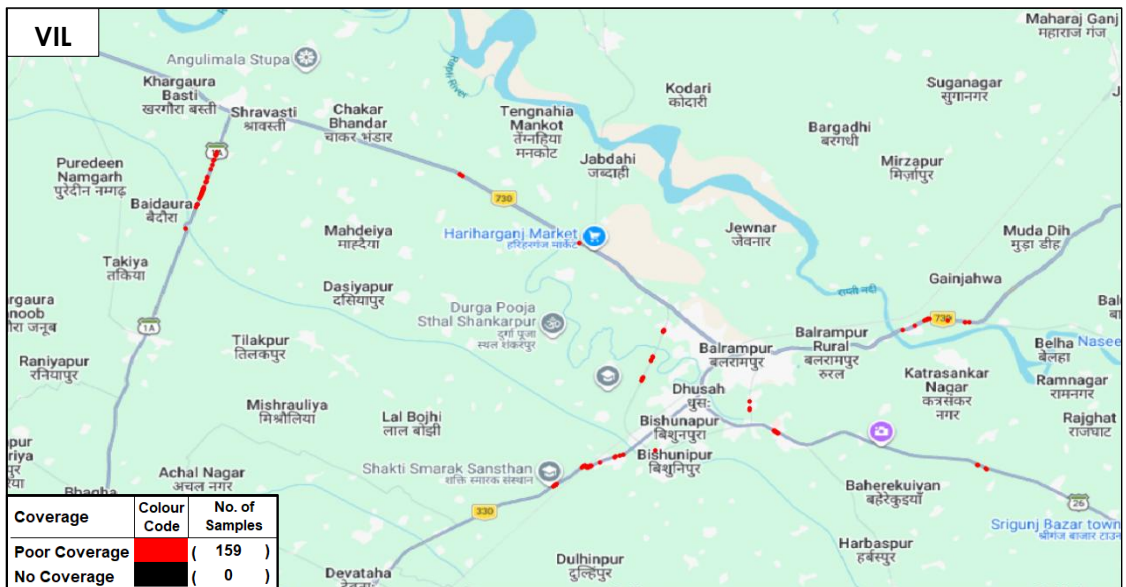


Figure-104: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - VIL.

4.2.3.4 Data performance

(c) Data Parameters (Auto-selection mode- 5G/4G/3G/2G)

Parameters		Service Provider			
		Auto-selection mode (5G/4G/3G/2G)			
		AIRTEL	BSNL	RJIL	VIL
Download Throughput (Mbits/s)	Average	130.93	4.09	167.93	31.66
	80 th Percentile	235.97	4.58	259.15	47.23
	20 th Percentile	24.82	0.57	41.09	10.35
Upload Throughput (Mbits/s)	Average	21.40	2.16	16.90	12.79
	80 th Percentile	44.51	2.01	32.20	22.90
	20 th Percentile	3.88	0.83	2.25	2.79
Latency (ms)	50 th Percentile	41.30	42.59	24.54	37.02

Table-35: Summary of Data performance in network auto-selection mode.

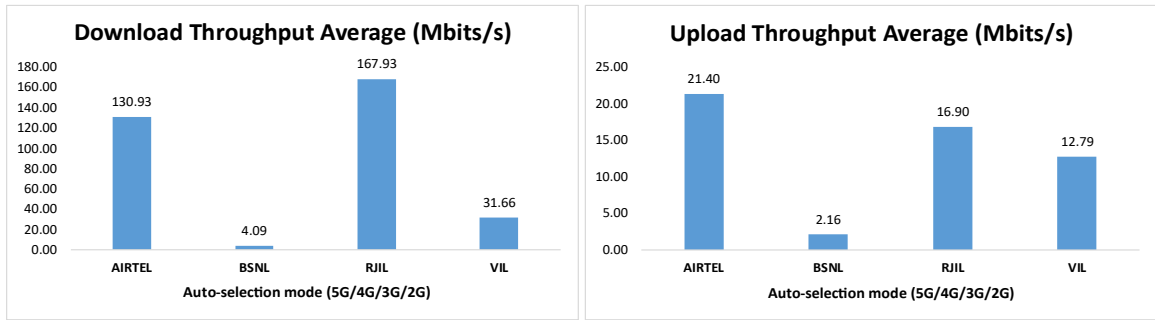


Figure- 105: Download & Upload throughput.

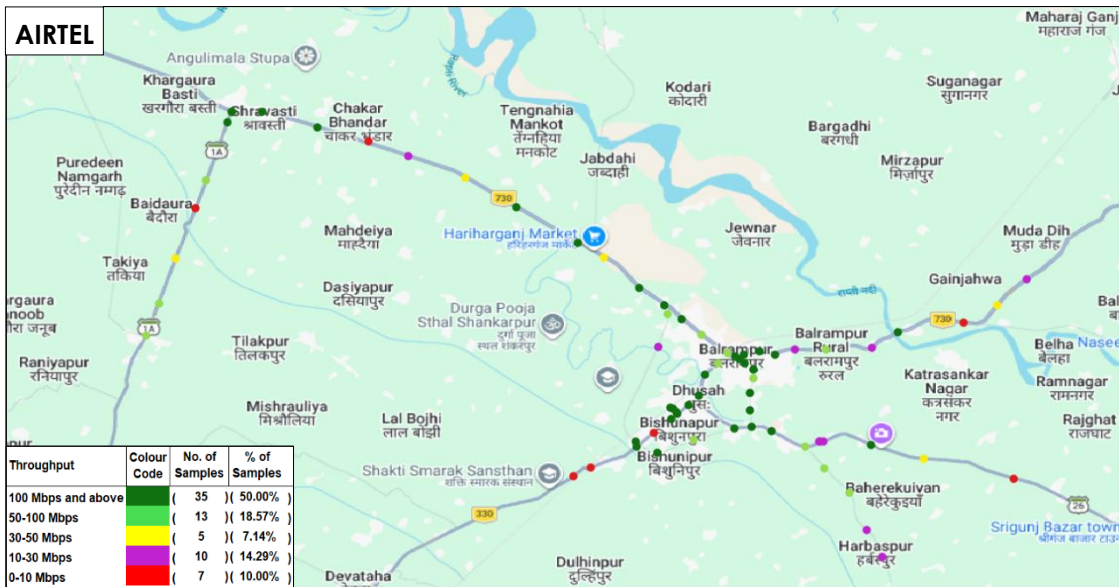


Figure-106: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - AIRTEL.

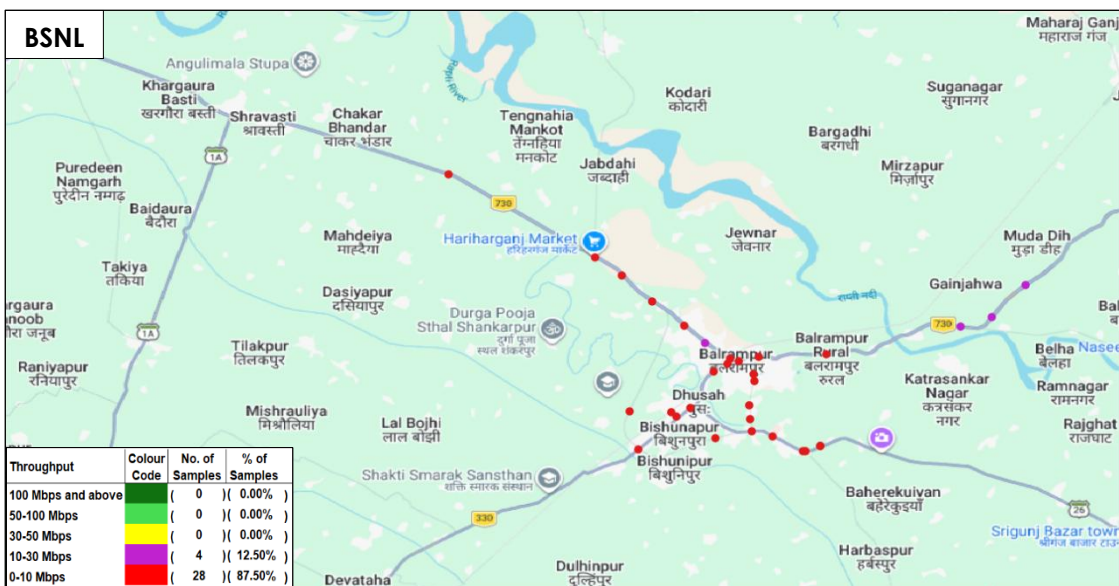


Figure-107: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - BSNL.

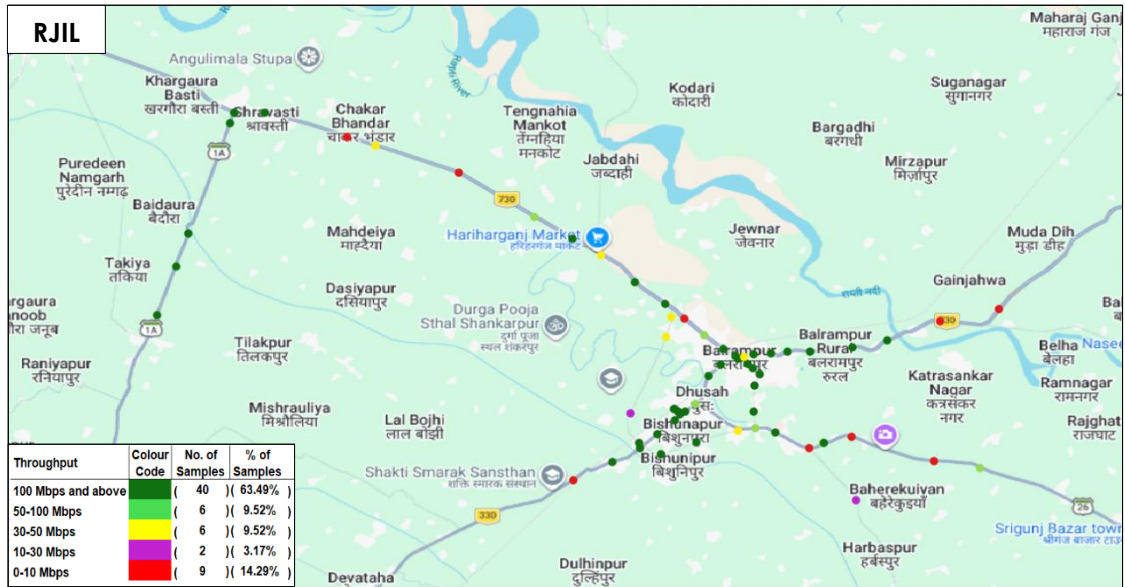


Figure-108: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - RJIL.

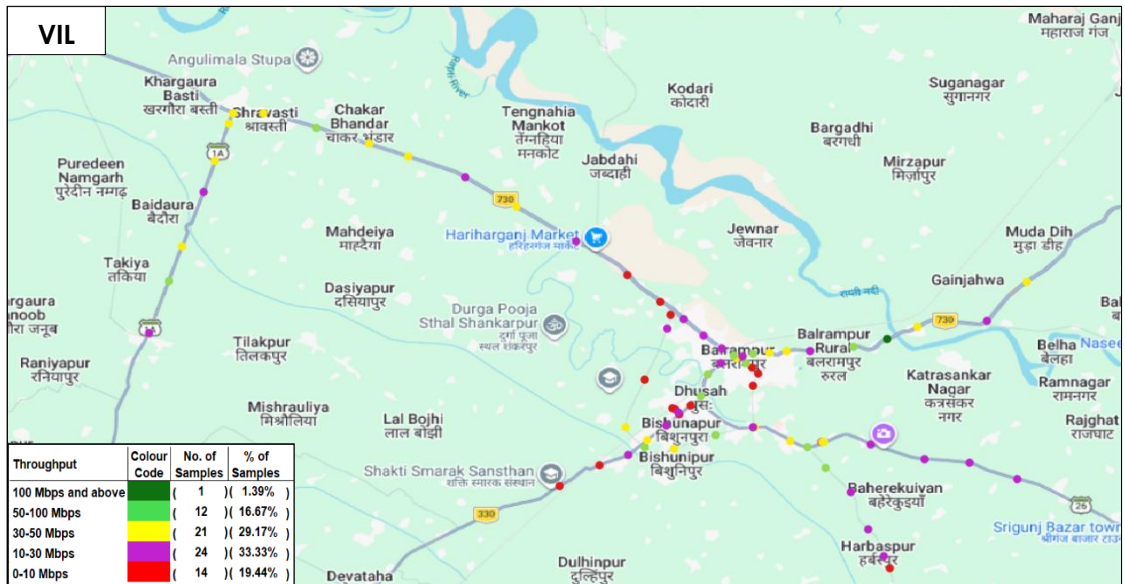


Figure-109: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - VIL.

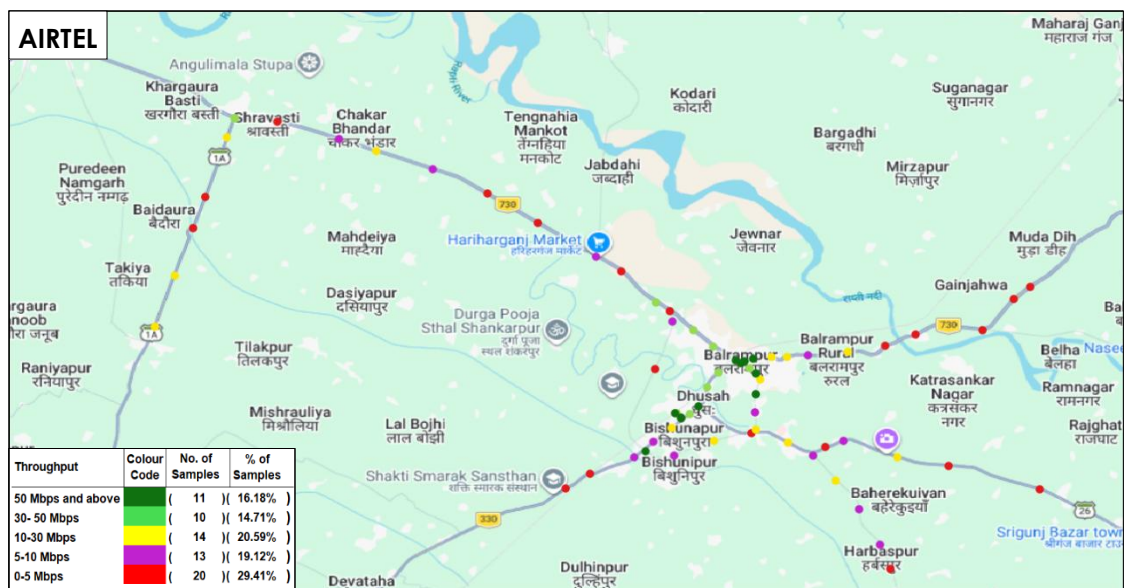


Figure-110: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - AIRTEL.

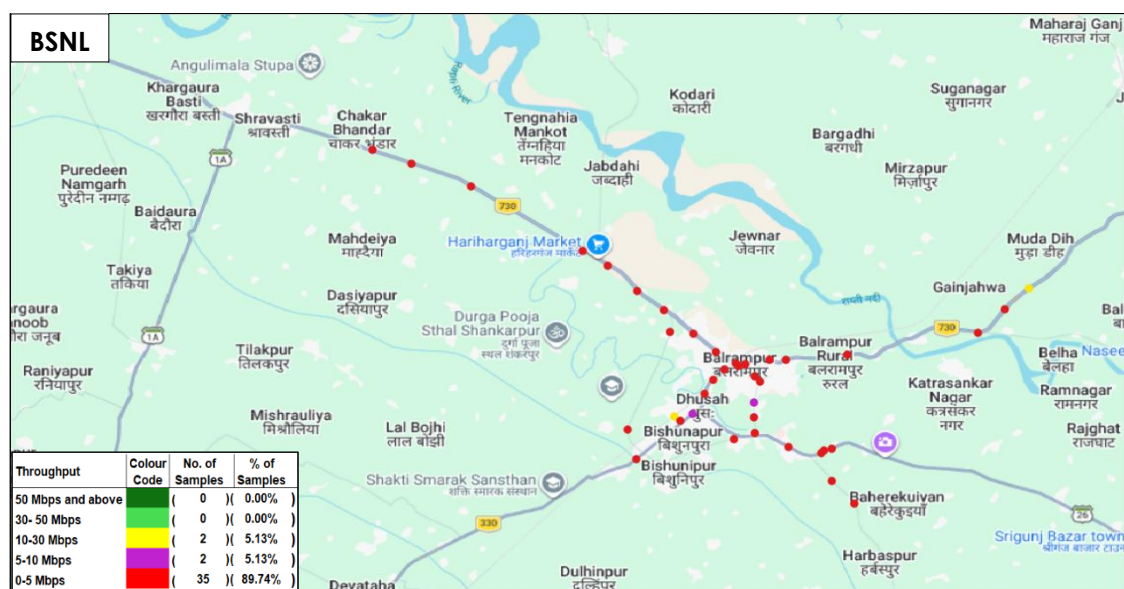


Figure-111: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) – BSNL.

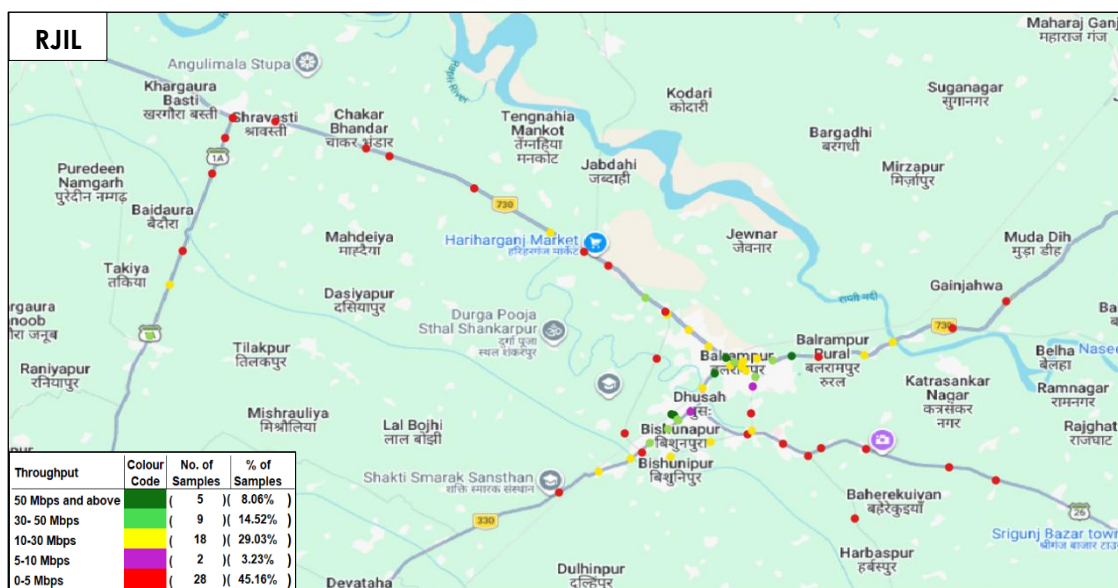


Figure-112: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - RJIL.

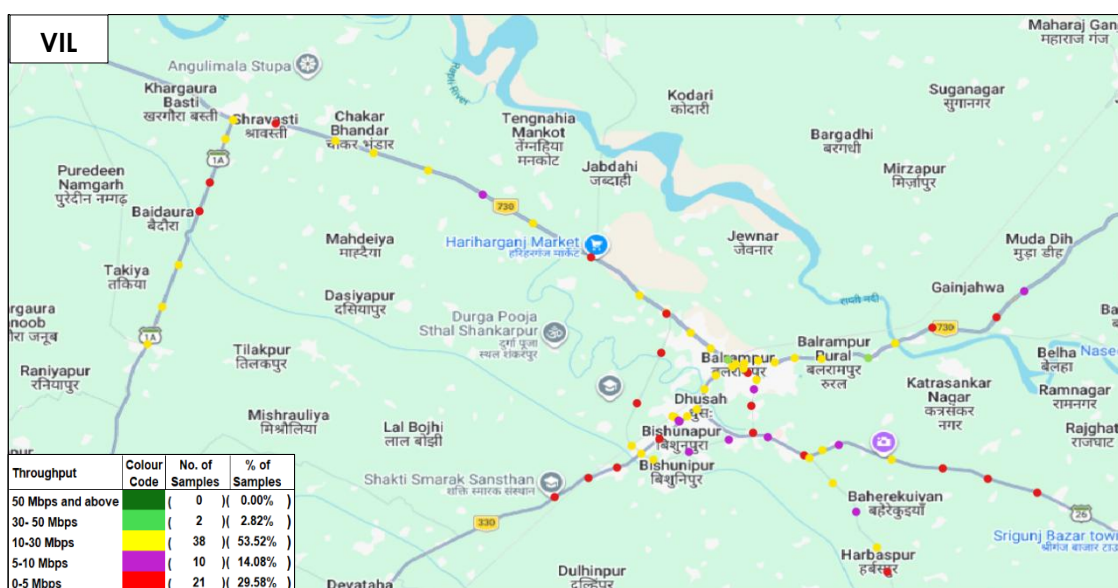


Figure-113: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - VIL.

(b) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	57.25%	NA	75.50%	NA
4G	42.75%	66.38%	24.50%	98.82%
3G	NA	21.57%	NA	NA
2G	0.00%	5.38%	NA	1.18%
Limited Service	0.00%	6.68%	0.00%	0.00%

Table-36: Time spent on technology during drive test in auto-selection mode (5G/4G/3G/2G) data.

Note-

- NA- Service provider doesn't provide services in respective technology.

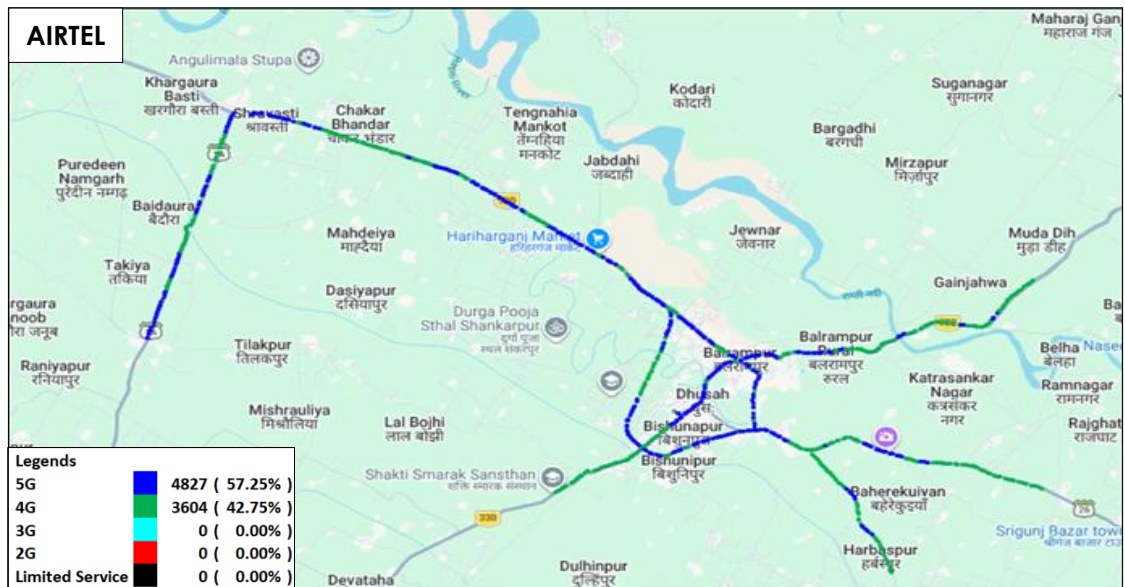


Figure-114: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - AIRTEL.



Figure-115: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - BSNL.

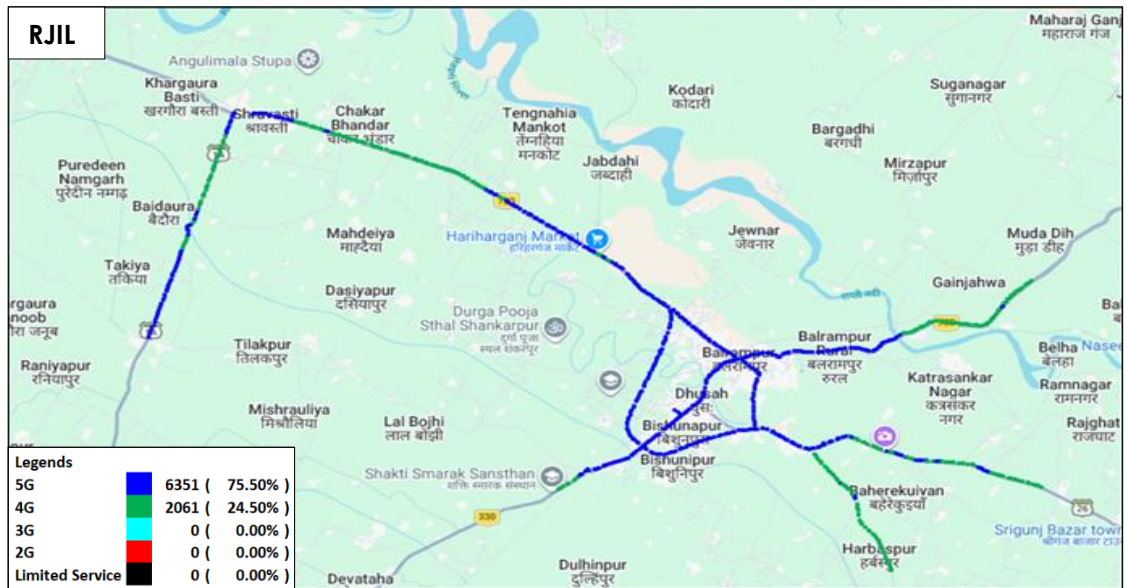


Figure-116: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - RJIL.

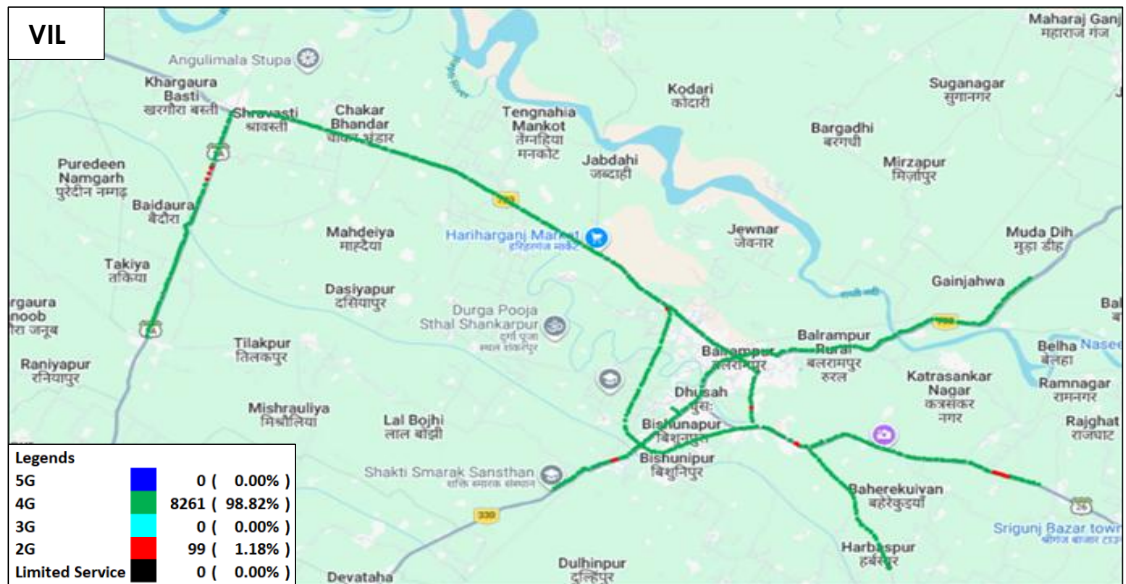


Figure-117: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - VIL.

(c) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) data. (Refer figure-225, 226, 227 & 228 for map view)

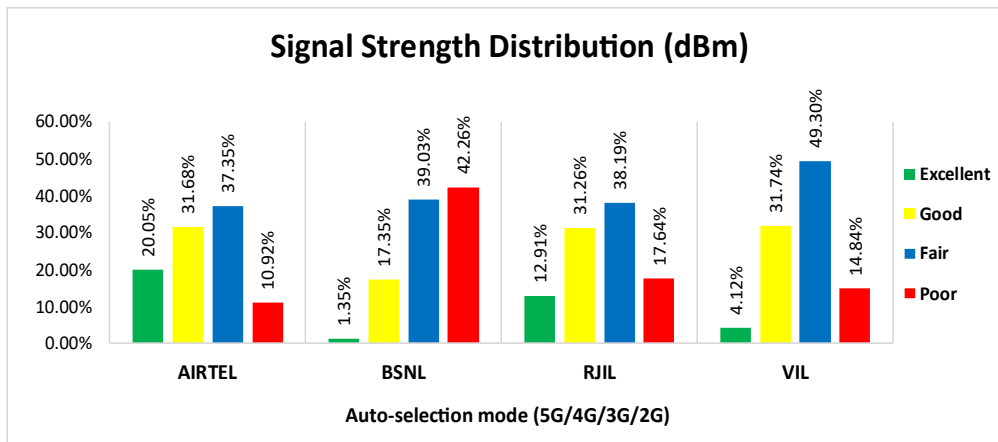


Figure-118: Signal strength distribution auto-selection mode (5G/4G/3G/2G) data.

Observations:

- Airtel has 20% of samples falling in the excellent signal strength category.
- BSNL has 1% of samples falling in the excellent signal strength category.
- RJIL has 13% of samples falling in the excellent signal strength category.
- VIL has 4% of samples falling in the excellent signal strength category.

4.3 Hotspots

Hotspot testing has been done from 8th September 2026 to 10th September 2026. Seven locations have been tested in the Gonda, Bahraich & Balrampur cities. (Refer Table-1)

4.3.1 Locations

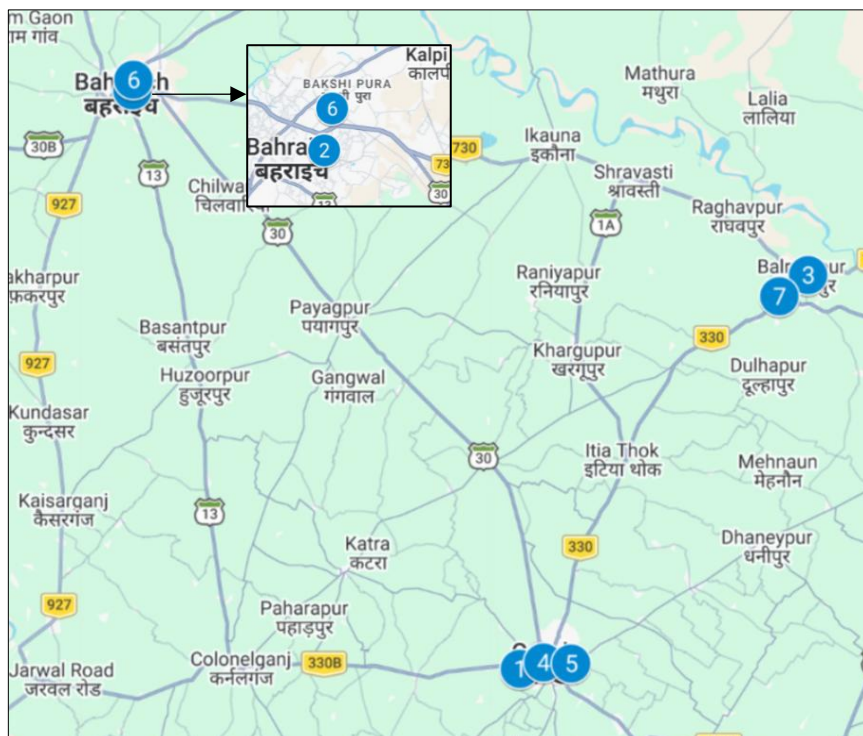


Figure- 119: Hotspot locations.

4.3.2 Hotspot covered

1. District Court Gonda
2. District Hospital Bahraich
3. District Hospital Balrampur
4. Government Bus Stand Gonda
5. Government Polytechnic College Gonda
6. Railway Station Bahraich
7. Railway Station Balrampur

4.3.3 Voice performance

Overall Voice Performance				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	70	70	70	70
Call Setup Success Rate %	100.00	97.14	100.00	100.00
Drop Call Rate %	0.00	4.41	0.00	0.00
Call Setup Time-Average (Second)	0.89	6.65	0.49	0.68

Table-37: Overall summary of voice call performance in network auto-selection mode (5G/4G/3G/2G).

District Court Gonda				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	10	10	10	10
Call Setup Success Rate %	100.00	100.00	100.00	100.00
Drop Call Rate %	0.00	0.00	0.00	0.00
Call Setup Time-Average (Second)	0.97	5.63	0.48	0.67

Table-38: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G).

District Hospital Bahraich				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	10	10	10	10
Call Setup Success Rate %	100.00	100.00	100.00	100.00
Drop Call Rate %	0.00	0.00	0.00	0.00
Call Setup Time-Average (Second)	1.27	4.72	0.47	0.68

Table-39: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G).

District Hospital Balrampur				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	10	10	10	10
Call Setup Success Rate %	100.00	100.00	100.00	100.00
Drop Call Rate %	0.00	10.00	0.00	0.00
Call Setup Time-Average (Second)	0.83	11.06	0.46	0.67

Table-40: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G).

Government Bus Stand Gonda				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	10	10	10	10
Call Setup Success Rate %	100.00	100.00	100.00	100.00
Drop Call Rate %	0.00	10.00	0.00	0.00
Call Setup Time-Average (Second)	0.34	5.55	0.42	0.76

Table-41: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G).

Government Polytechnic College Gonda				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	10	10	10	10
Call Setup Success Rate %	100.00	80.00	100.00	100.00
Drop Call Rate %	0.00	12.50	0.00	0.00
Call Setup Time-Average (Second)	1.48	9.36	0.53	0.68

Table-42: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G).

Railway Station Bahraich				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	10	10	10	10
Call Setup Success Rate %	100.00	100.00	100.00	100.00
Drop Call Rate %	0.00	0.00	0.00	0.00
Call Setup Time-Average (Second)	0.63	4.91	0.48	0.70

Table-43: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G).

Railway Station Balrampur				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	10	10	10	10
Call Setup Success Rate %	100.00	100.00	100.00	100.00
Drop Call Rate %	0.00	0.00	0.00	0.00
Call Setup Time-Average (Second)	0.71	5.25	0.59	0.63

Table-44: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G).

4.3.4 Data performance (Auto-selection mode 5G/4G/3G/2G)

Overall Data Performance				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	157.72	4.78	188.90	43.21
Download Throughput 80 th Percentile (Mbit/s)	246.06	9.06	321.85	76.90
Download Throughput 20 th Percentile (Mbit/s)	37.89	0.63	61.41	3.50
Download Session Setup Success Rate %	100.00	94.29	100.00	97.14
Upload Throughput Average (Mbits/s)	32.52	7.22	35.10	15.53
Upload Throughput 80 th Percentile (Mbit/s)	63.18	12.95	56.99	27.00
Upload Throughput 20 th Percentile (Mbit/s)	4.04	2.18	7.91	3.05
Upload Session Setup Success Rate %	100.00	94.29	100.00	97.14
Web Browsing Delay (Second)	6.31	4.86	4.27	4.04
Youtube Initial Buffer Delay (Second)	2.81	1.94	1.91	1.18
Latency (ms) – 50 th Percentile	48.02	29.63	21.37	37.28
Jitter (ms)	14.14	371.27	11.94	32.67
Packet Loss Rate%	4.49	21.99	0.34	4.26
Packet Loss Rate- 90 th percentile	12.54	77.80	1.16	11.42

Table-45: Overall Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

District Court Gonda				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	67.88	0.32	78.18	2.68
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	1.68	3.40	8.02	2.97
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	8.66	5.70	4.37	3.24
Youtube Initial Buffer Delay (Second)	1.99	3.88	1.02	2.73
Latency (ms) – 50 th Percentile	59.76	28.00	27.60	36.54
Jitter (ms)	21.05	3.40	5.97	19.13
Packet Loss Rate%	14.70	12.00	0.10	0.40

Table-46: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

District Hospital Bahraich				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	155.18	8.13	30.45	117.39
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	18.52	5.03	1.83	12.71
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	5.71	3.10	7.92	3.01
Youtube Initial Buffer Delay (Second)	3.17	2.56	11.35	1.00
Latency (ms) – 50 th Percentile	37.38	24.79	25.10	34.24
Jitter (ms)	2.52	10.85	54.24	4.97
Packet Loss Rate%	0.00	0.30	1.50	0.60

Table-47: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

District Hospital Balrampur				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	163.19	1.73	307.83	63.46
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	24.69	13.74	53.89	11.83
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	5.89	3.21	3.90	7.13
Youtube Initial Buffer Delay (Second)	3.64	1.31	0.81	0.88
Latency (ms) – 50 th Percentile	38.28	32.44	18.29	39.13
Jitter (ms)	5.69	14.45	2.36	2.92
Packet Loss Rate%	0.40	2.00	0.10	1.20

Table-48: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Government Bus Stand Gonda				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	140.27	0.91	63.62	71.98
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	59.05	3.46	41.42	30.69
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	4.21	5.71	4.20	4.23
Youtube Initial Buffer Delay (Second)	0.67	5.10	0.84	0.95
Latency (ms) – 50 th Percentile	43.00	29.42	20.01	31.23
Jitter (ms)	26.05	2.36	7.02	2.96
Packet Loss Rate%	5.60	73.80	0.10	0.20

Table-49: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Government Polytechnic College Gonda				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	313.02	3.79	418.35	2.24
Download Session Setup Success Rate%	100.00	60.00	100.00	80.00
Upload Throughput Average (Mbits/s)	61.13	1.68	33.84	1.33
Upload Session Setup Success Rate %	100.00	60.00	100.00	80.00
Web Browsing Delay (Second)	7.57	5.81	3.98	11.81
Youtube Initial Buffer Delay (Second)	1.57	2.23	0.87	-
Latency (ms)- 50 th Percentile	52.41	63.25	21.11	51.70
Jitter (ms)	20.31	2380.74	3.93	183.44
Packet Loss Rate%	6.70	64.60	0.00	24.30

Table-50: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Note- "-" Youtube tests were failed.

Railway Station Bahraich				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	42.05	7.20	116.13	17.76
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	4.65	4.67	17.34	26.78
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	11.09	4.70	4.08	2.25
Youtube Initial Buffer Delay (Second)	7.41	1.44	0.91	0.99
Latency (ms) – 50 th Percentile	53.05	24.67	19.85	35.40
Jitter (ms)	15.48	7.67	6.87	11.20
Packet Loss Rate%	3.20	0.20	0.50	2.10

Table-51: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Railway Station Balrampur				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	222.47	10.96	307.76	16.35
Download Session Setup Success Rate%	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	57.93	16.37	89.37	19.57
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	4.17	5.45	3.37	2.45
Youtube Initial Buffer Delay (Second)	0.58	0.96	1.34	0.82
Latency (ms)- 50 th Percentile	41.59	36.20	22.86	38.01
Jitter (ms)	7.94	11.85	3.28	5.70
Packet Loss Rate%	0.80	1.00	0.10	1.00

Table-52: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

4.3.5 Data performance (5G Only & 4G Only Download & Upload Speed)

Overall Data Performance					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	199.24	-	162.30	68.37
	Upload Throughput Average (Mbits/s)	35.56	-	21.26	15.41
4G	Download Throughput Average (Mbits/s)	28.19	7.02	53.67	22.13
	Upload Throughput Average (Mbits/s)	4.18	9.97	14.44	13.30

Table-53: Overall Summary of 5G only & 4G only data download & upload speed.

Note- “-”Respective technology was not observed during the test.

District Court Gonda					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	85.22	-	59.10	-
	Upload Throughput Average (Mbits/s)	2.80	-	8.75	-
4G	Download Throughput Average (Mbits/s)	19.00	0.41	2.83	4.32
	Upload Throughput Average (Mbits/s)	1.26	8.06	0.48	3.96

Table-54: Overall Summary of 5G only & 4G only data download & upload speed.

Note- “-”Respective technology was not observed during the test.

District Hospital Bahraich					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	269.49	-	11.34	101.17
	Upload Throughput Average (Mbits/s)	31.00	-	2.24	15.41
4G	Download Throughput Average (Mbits/s)	29.76	14.87	38.09	35.08
	Upload Throughput Average (Mbits/s)	4.96	11.47	9.62	16.62

Table-55: Overall Summary of 5G only & 4G only data download & upload speed.

Note- “-”Respective technology was not observed during the test.

District Hospital Balrampur					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	135.67	-	311.65	-
	Upload Throughput Average (Mbits/s)	44.46	-	54.48	-
4G	Download Throughput Average (Mbits/s)	33.85	8.68	129.43	49.45
	Upload Throughput Average (Mbits/s)	5.54	14.16	55.78	14.25

Table-56: Overall Summary of 5G only & 4G only data download & upload speed.

Note- “-”Respective technology was not observed during the test.

Government Bus Stand Gonda					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	183.14	-	49.05	51.96
	Upload Throughput Average (Mbits/s)	55.43	-	14.47	-
4G	Download Throughput Average (Mbits/s)	48.37	0.26	50.62	23.15
	Upload Throughput Average (Mbits/s)	10.69	7.45	12.33	10.86

Table-57: Overall Summary of 5G only & 4G only data download & upload speed.

Note- “-”Respective technology was not observed during the test.

Government Polytechnic College Gonda					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	-	-	429.29	-
	Upload Throughput Average (Mbits/s)	-	-	39.53	-
4G	Download Throughput Average (Mbits/s)	5.46	0.39	43.55	3.01
	Upload Throughput Average (Mbits/s)	1.52	2.13	8.11	1.23

Table-58: Overall Summary of 5G only & 4G only data download & upload speed.

Note- “-”Respective technology was not observed during the test.

Railway Station Bahraich					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	-	-	157.61	-
	Upload Throughput Average (Mbits/s)	-	-	20.93	-
4G	Download Throughput Average (Mbits/s)	19.61	8.86	49.14	26.95
	Upload Throughput Average (Mbits/s)	0.97	7.89	2.65	23.13

Table-59: Overall Summary of 5G only & 4G only data download & upload speed.

Note- “-”Respective technology was not observed during the test.

Railway Station Balrampur					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	216.85	-	118.05	-
	Upload Throughput Average (Mbits/s)	55.40	-	7.04	-
4G	Download Throughput Average (Mbits/s)	41.27	19.53	62.05	12.95
	Upload Throughput Average (Mbits/s)	4.31	19.49	12.11	23.06

Table-60: Overall Summary of 5G only & 4G only data download & upload speed.

Note- “-”Respective technology was not observed during the test.

4.4 Walk Test

Walk Test has been conducted on 8th September 2026 and 10th September 2026. Two locations have been tested in Gonda & Balrampur cities. (Refer Table-1)

4.4.1 Walk test locations

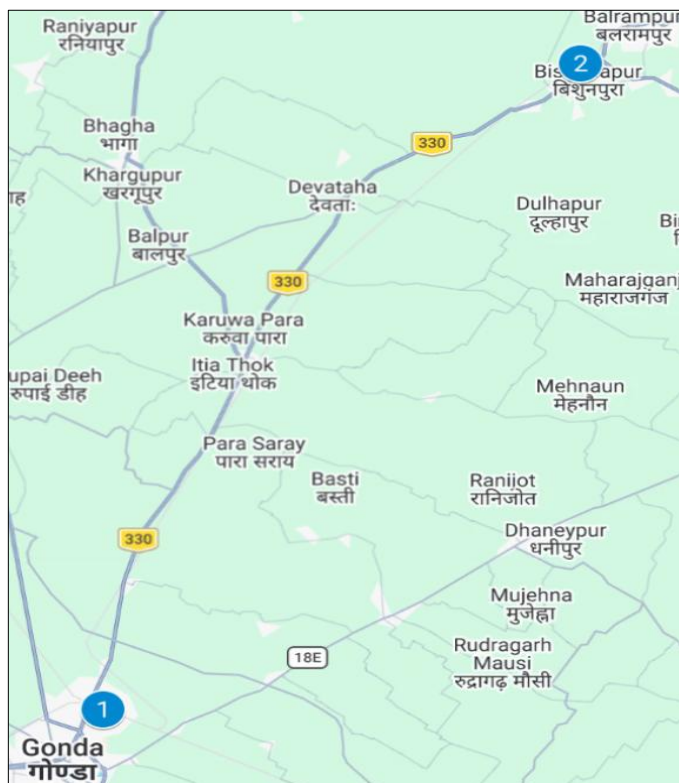


Figure-120: Walk Test locations.

4.4.2 Walk Test Covered

1. Gonda Junction Railway Station
2. Railway Station Balrampur

4.4.3 Voice Performance

Gonda Junction Railway Station				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	12	14	13	13
Call Setup Success Rate %	100.00	100.00	100.00	100.00
Drop Call Rate %	0.00	7.14	7.69	0.00
Call Setup Time-Average (Second)	0.52	4.00	1.25	0.74

Table-61: Summary of voice call performance in network auto-selection mode (5G/4G/3G/2G).

Railway Station Balrampur				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	10	10	10	10
Call Setup Success Rate %	100.00	100.00	100.00	100.00
Drop Call Rate %	0.00	0.00	0.00	0.00
Call Setup Time-Average (Second)	1.21	5.15	3.34	0.63

Table-62: Summary of voice call performance in network auto-selection mode (5G/4G/3G/2G).

4.4.4 Data Performance

(a) Data Parameters (Auto-selection mode- 5G/4G/3G/2G)

Gonda Junction Railway Station				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	80.59	0.59	27.54	36.94
Download Session Setup Success Rate %	100.00	35.29	100.00	100.00
Upload Throughput Average (Mbits/s)	40.88	1.16	4.64	21.10
Upload Session Setup Success Rate %	100.00	43.75	100.00	100.00
Latency (ms) – 50 th Percentile	40.41	50.55	22.48	33.83

Table-63: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Railway Station Balrampur				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	122.22	7.30	236.82	13.50
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	29.89	23.00	38.41	26.33
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Latency (ms) – 50 th Percentile	47.50	28.98	26.74	36.51

Table-64: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

4.5 Highway

Drive test has been conducted on 7th September 2026 and 9th September 2026 covering two Highway routes. (Refer Table-1)

4.5.1 Prayagraj to Gonda

4.5.1.1 Drive test route

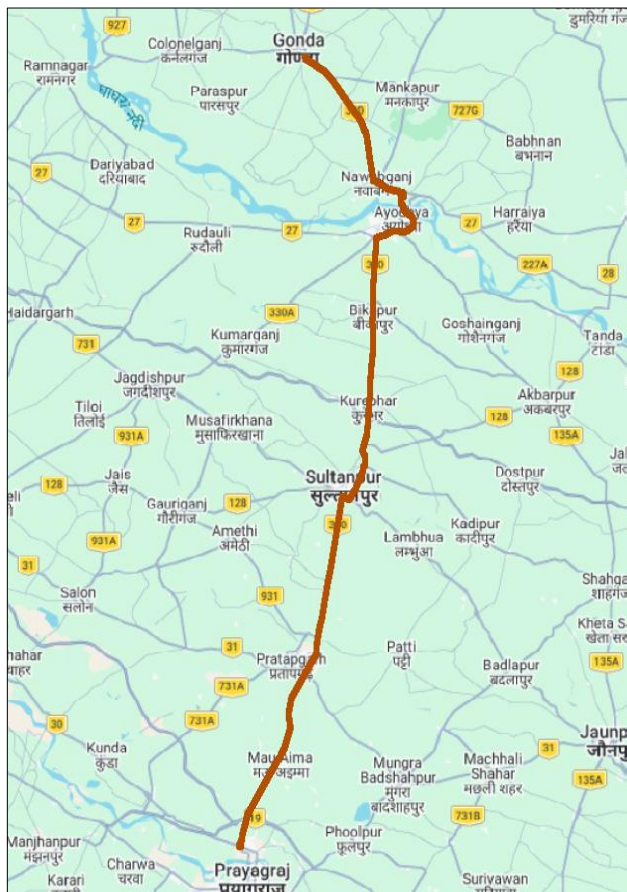


Figure-121: Drive test route Highway.

4.5.1.2 Areas covered

Prayagraj to Gonda Passing through Mau Aima, Bela Pratapgarh, Sultanpur, Faizabad, Ayodhya and Nawabganj etc.

4.5.1.3 Voice performance

(a) **Voice Call Performance in 3G/2G network mode only:** 3G/2G network mode testing has been done to reflect the experience for respective users as they have only 3G/2G compatible handsets.

Parameters	Service Provider		
	3G/2G network mode only		
	AIRTEL	BSNL	VIL
Call Attempts	104	126	99
Call Setup Success Rate %	100.00	70.63	97.98
Drop Call Rate %	0.00	6.74	2.06
Call Setup Time-Average (Second)	4.02	3.37	5.07
Handover Success Rate %	98.88	100.00	98.29

Table-65: Summary of voice call performance in 3G/2G network mode only.

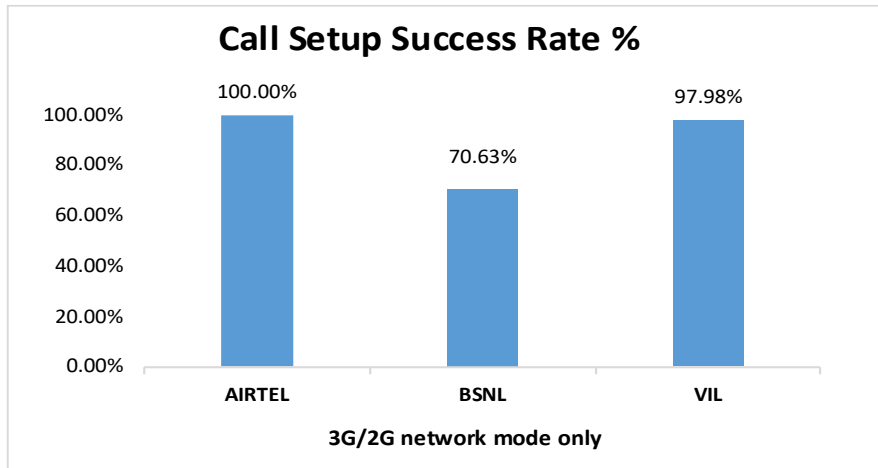


Figure-122: Performance for call setup success rate.

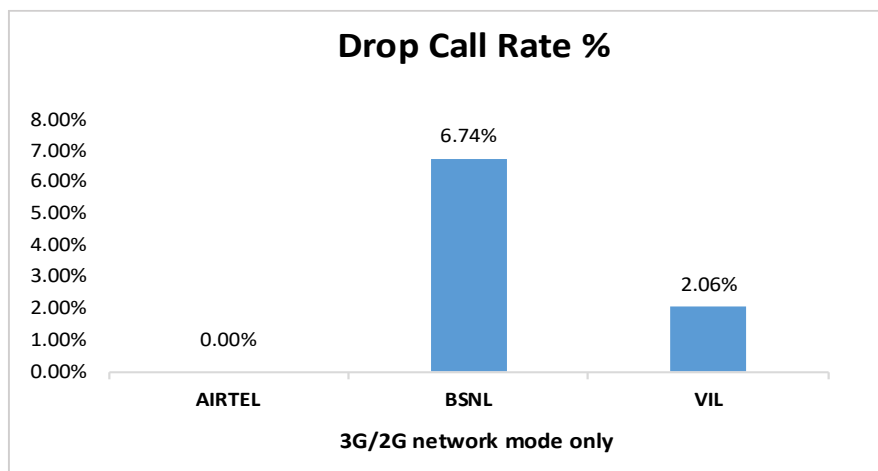


Figure-123: Performance for drop call rate.

(b) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider		
	AIRTEL	BSNL	VIL
3G	NA	50.15%	NA
2G	100.00%	45.51%	100.00%
Limited Service	0.00%	4.34%	0.00%

Table-66: Time spent on technology during drive test 3G/2G network mode only.

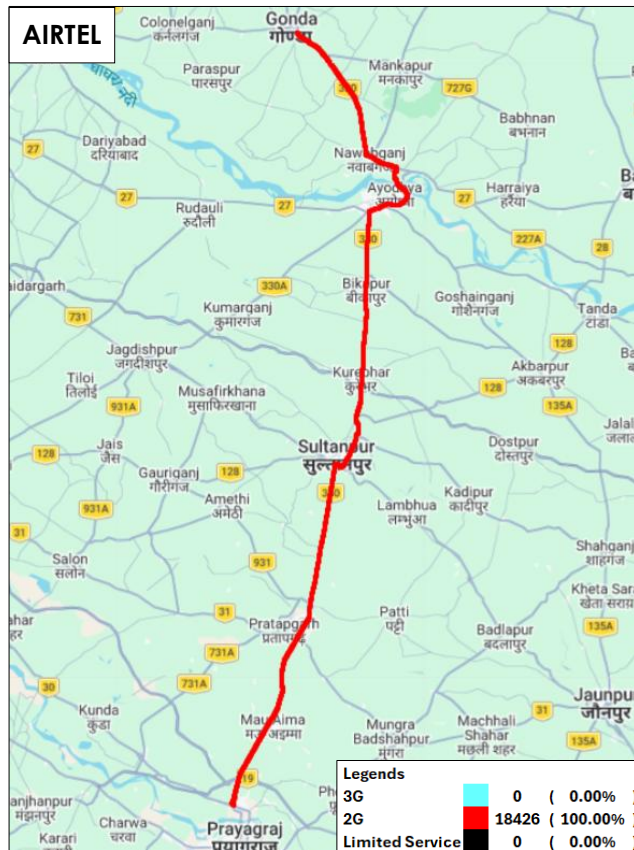


Figure-124: Serving technology plots 3G/2G network mode - AIRTEL.

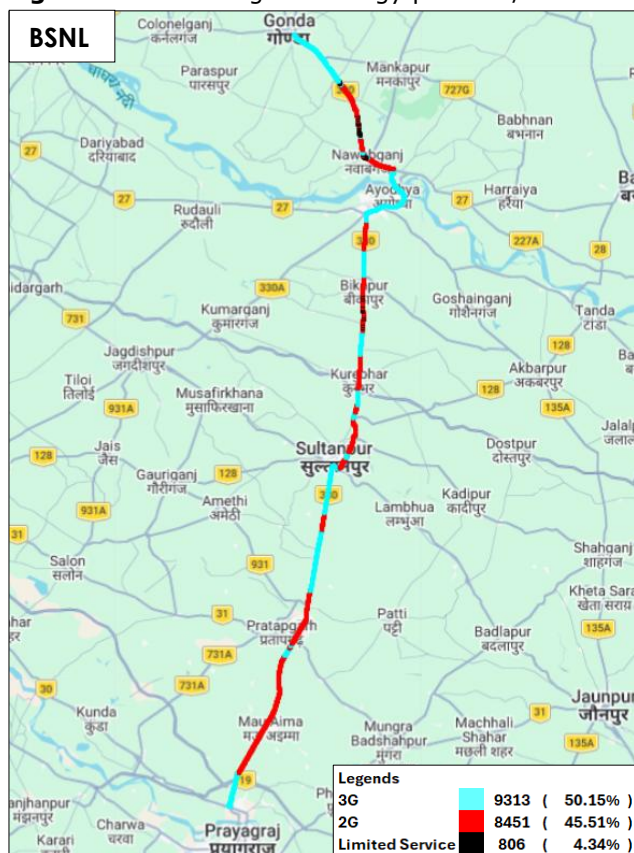


Figure-125: Serving technology plots 3G/2G network mode - BSNL.

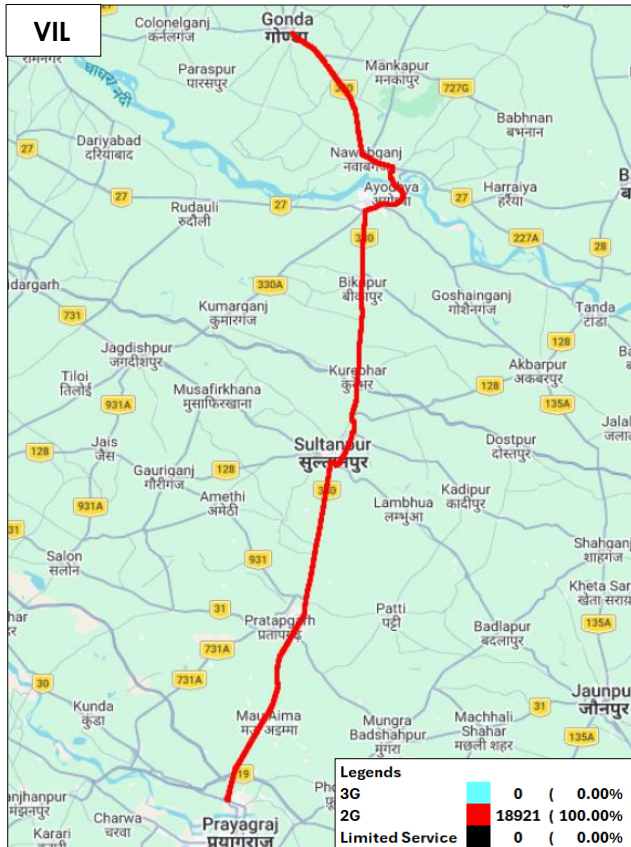


Figure-126: Serving technology plots 3G/2G network mode - VIL.

(c) Network Signal Strength Distribution: The following chart represents signal strength distribution for 3G/2G network mode only. (Refer figure-229, 230 & 231 for map view)

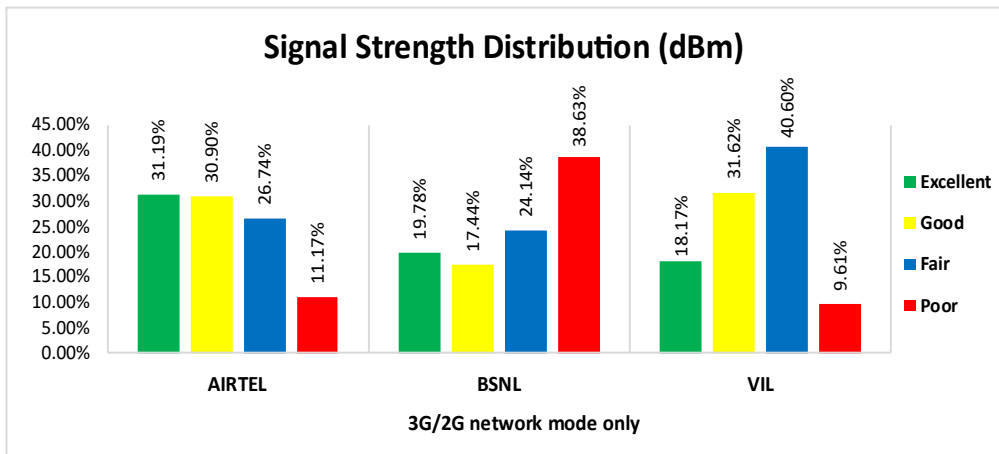


Figure-127: Signal strength distribution 3G/2G network mode only.

Observations:

- Airtel has 31% of samples falling in the excellent signal strength category.
- BSNL has 20% of samples falling in the excellent signal strength category.
- VIL has 18% of samples falling in the excellent signal strength category.

(d) Voice Call Performance in auto network selection mode (5G/4G/3G/2G)

Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempts	98	126	101	99
Call Setup Success Rate %	100.00	72.22	98.02	98.99
Drop Call Rate %	1.02	10.99	1.01	0.00
Call Setup Time Average (Second)	0.99	5.90	0.76	0.75
Handover Success Rate %	100.00	100.00	99.94	100.00

Table-67: Summary of voice call performance in network auto-selection mode.

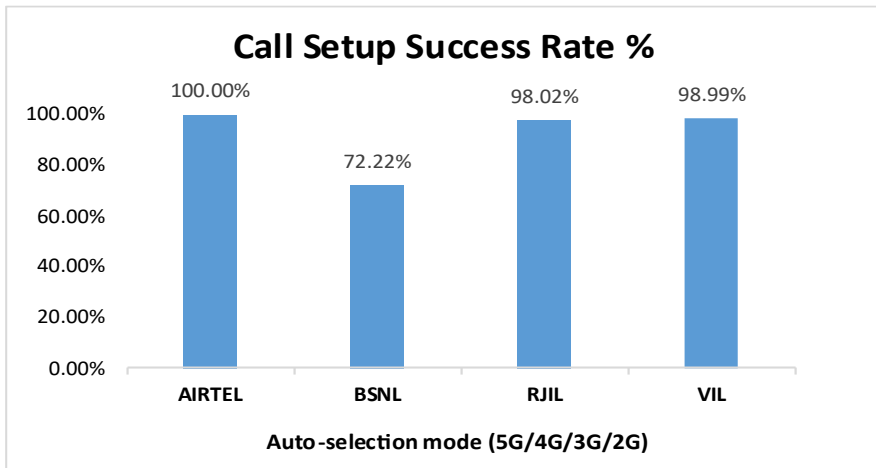


Figure-128: Performance for call setup success rate.

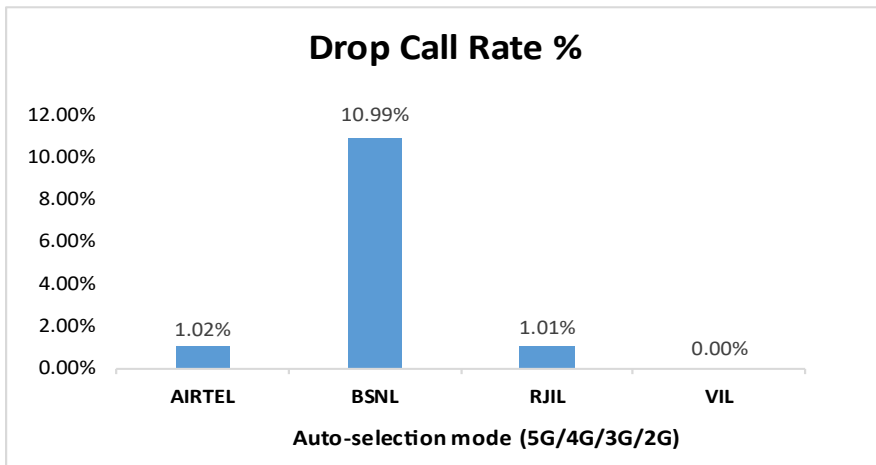


Figure-129: Performance for drop call rate.



Figure-130: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

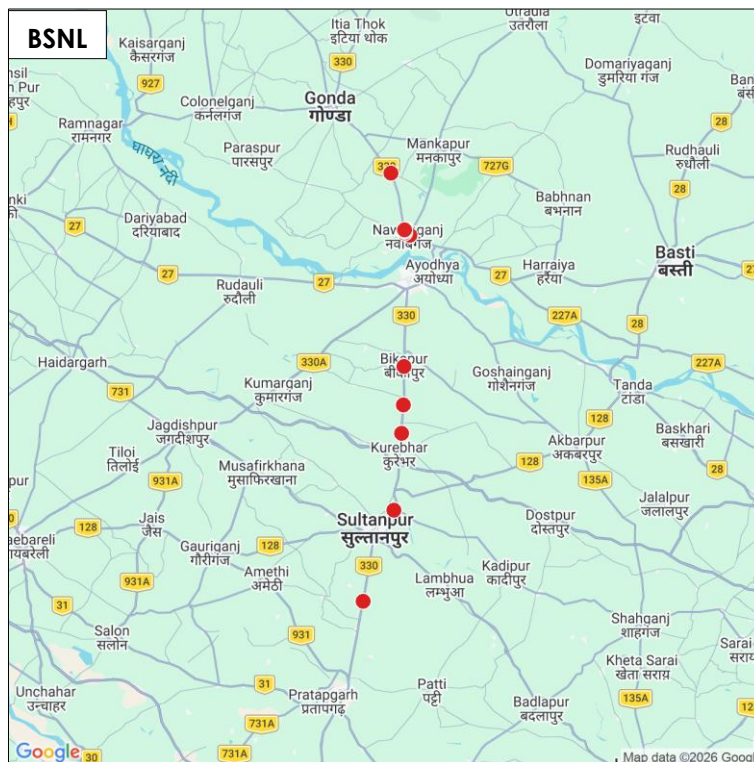


Figure-131: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice – BSNL.



Figure-132: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice – RJIL.

Parameter	Service Provider			
	Mobile-to-Mobile (5G/4G – Open Mode)			
	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider Network)	96	70	94	97
Number of silence call for >4 Sec	1	NA	0	1
Silence Call Rate %	1.04	NA	0.00	1.03
Number of silence instances for >4 Sec	1	NA	0	1
Number of silence instances for >3 Sec	1	NA	1	2
Number of silence instances for >2 sec	4	NA	2	5
RTP Jitter (4G & 5G) in ms	8.60	NA	14.57	8.87
Packet loss Rate Downlink %	1.36	NA	1.00	1.43
Packet loss Rate Uplink %	1.44	NA	1.19	1.13

Table-68: Summary of silence instances & packet loss rate for mobile to mobile call.

Note-

- NA- Due to unavailability of packet switched (VoLTE & VoNR) network in BSNL, silence instances are not captured.

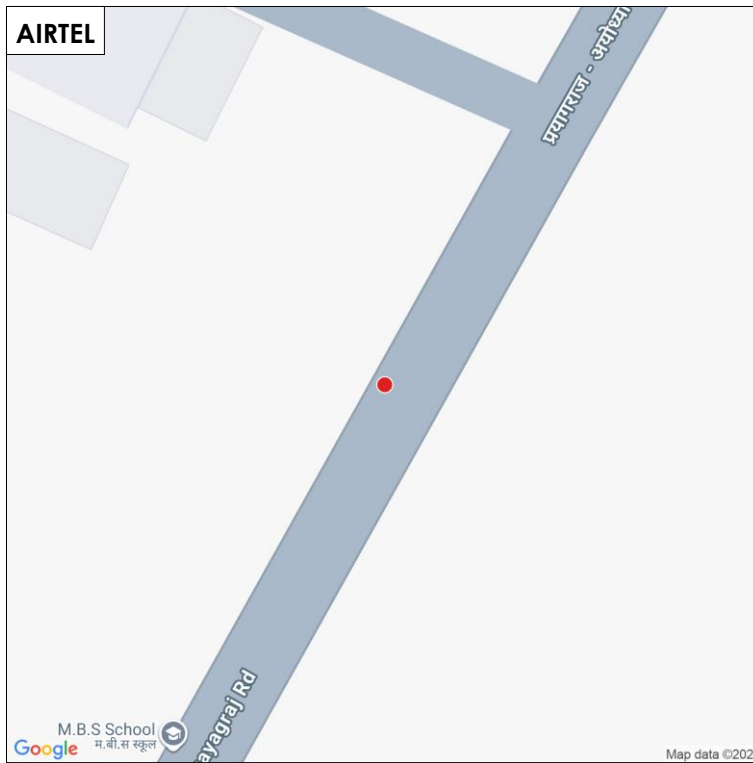


Figure-133: Number of silence instances for >3 Sec Mobile-to-Mobile (5G/4G-Open Mode)-

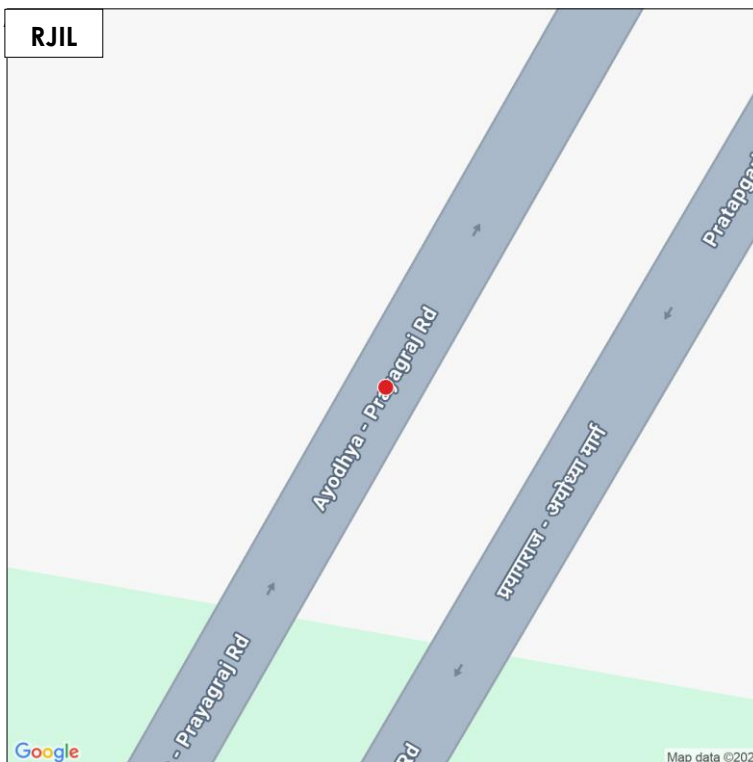


Figure-134: Number of silence instances for >3 Sec Mobile-to-Mobile (5G/4G-Open Mode)-RJIL.



Figure-135: Number of silence instances for >3 Sec Mobile-to-Mobile (5G/4G-Open Mode)-VIL.

(e) Mean Opinion Score (MOS) performance for speech quality:

Mean opinion score indicate quality of speech observed during the drive test across different technologies. This parameter has been calculated for mobile to mobile calls made within same operator network in auto mode (5G/4G/3G/2G). As per ITU-T Recommendation P.863.1, MOS values means: 5-Excellent, 4-Good, 3-Fair, 2-Poor, 1-Bad.

Speech Quality (MOS) distribution	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
Total Number of MOS Samples for calls in table-68	1200	843	1208	1235
Speech Quality (Average MOS)	3.81	2.38	4.46	4.41
Number of samples with MOS ≥ 4 to <5 (Excellent)	843	0	1055	1059
Number of samples with MOS ≥ 3 to <4 (Good)	239	0	91	105
Number of samples with MOS ≥ 2 to <3 (Fair)	50	683	30	37
Number of samples with MOS ≥ 1 to <2 (Poor)	68	160	32	34
%age of samples with MOS ≥ 4 to <5 (Excellent)	70.25%	0.00%	87.33%	85.75%
%age of samples with MOS ≥ 3 to <4 (Good)	19.92%	0.00%	7.53%	8.50%
%age of samples with MOS ≥ 2 to <3 (Fair)	4.17%	81.02%	2.48%	3.00%
%age of samples with MOS ≥ 1 to <2 (Poor)	5.67%	18.98%	2.65%	2.75%

Table-69: Summary of speech quality (MOS) samples.

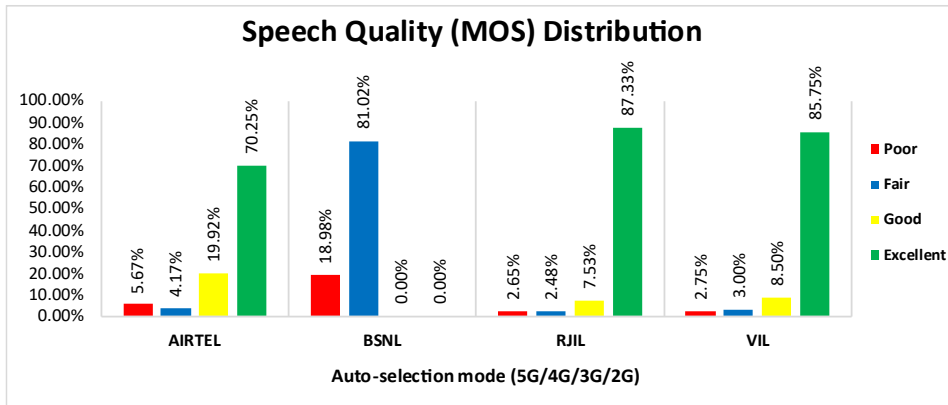


Figure-136: Distribution of samples in MOS range.

(f) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	4.15%	NA	63.94%	0.09%
4G	95.85%	8.46%	36.06%	99.27%
3G	NA	24.10%	NA	NA
2G	0.00%	65.21%	NA	0.64%
Limited Service	0.00%	2.24%	0.00%	0.00%

Table-70: Time spent on technology during drive test in auto-selection mode (5G/4G/3G/2G) voice.

Note-

- NA- Service provider doesn't provide services in respective technology.

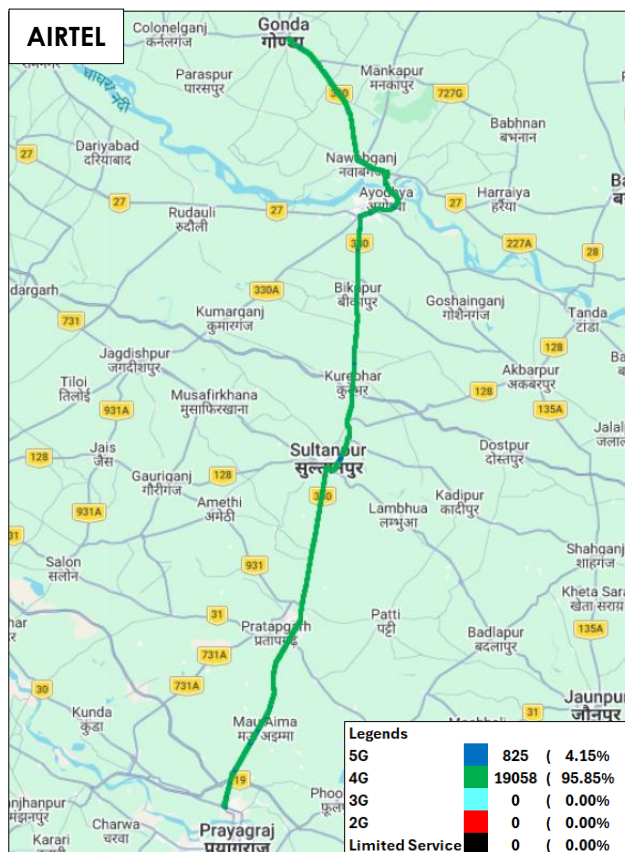


Figure-137: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

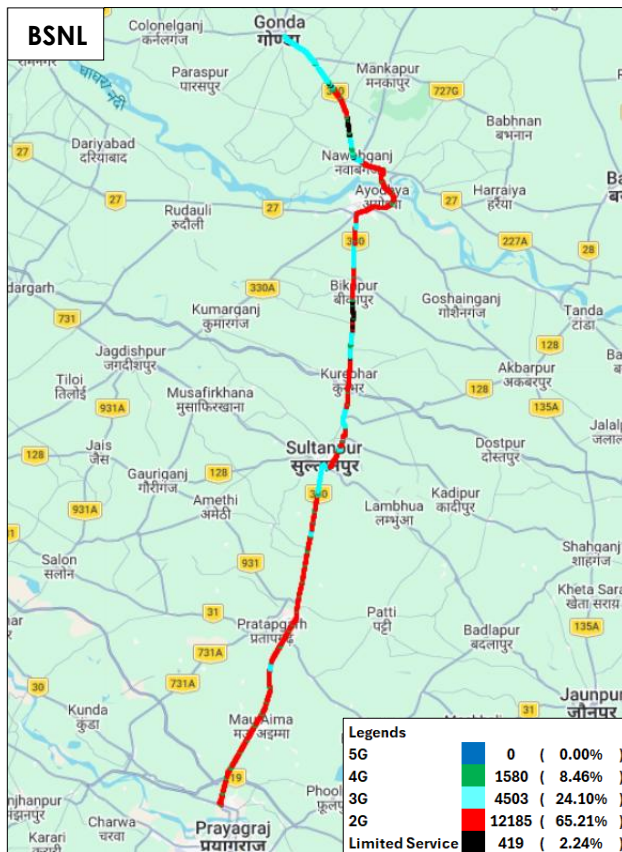


Figure-138: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

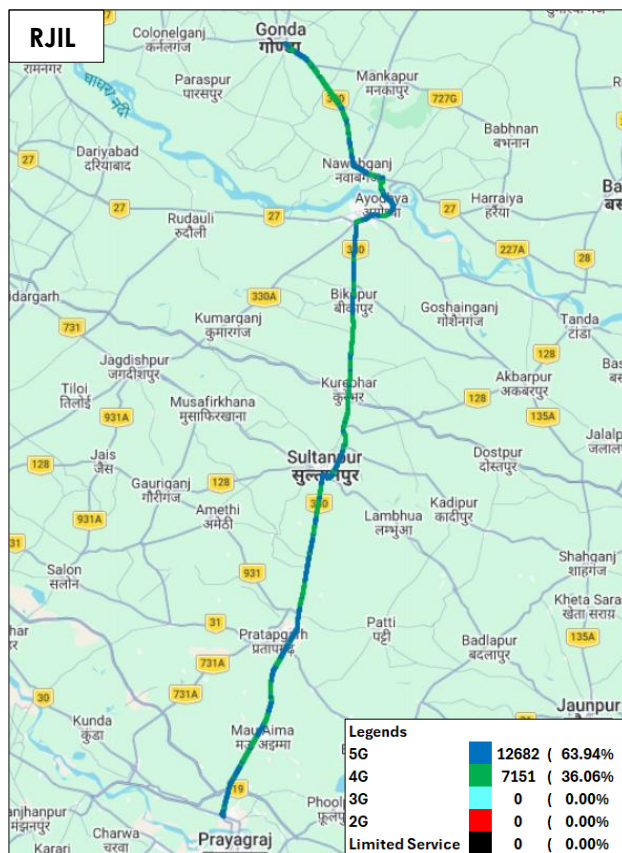


Figure-139: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - RJIL.

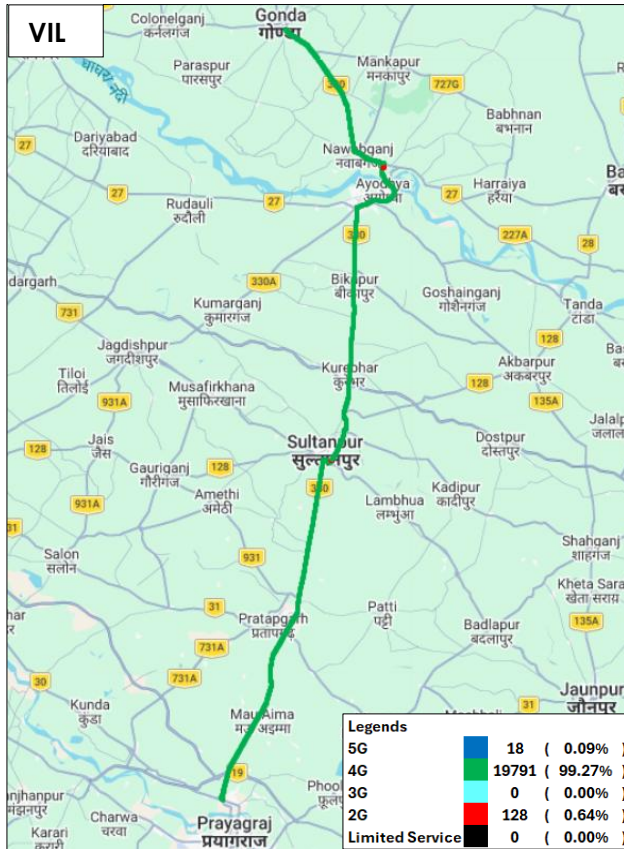


Figure-140: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - VIL.

(g) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) voice. (Refer figure-232, 233, 234 & 235 for map view)

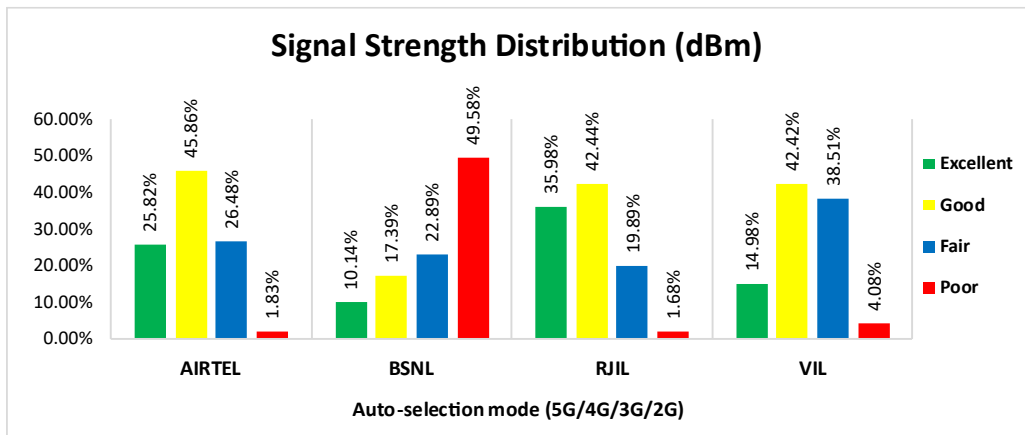


Figure-141: Signal strength distribution auto-selection mode (5G/4G/3G/2G) voice.

Observations:

- Airtel has 26% of samples falling in the excellent signal strength category.
- BSNL has 10% of samples falling in the excellent signal strength category.
- RJIL has 36% of samples falling in the excellent signal strength category.
- VIL has 15% of samples falling in the excellent signal strength category.

(h) Coverage Gap observed

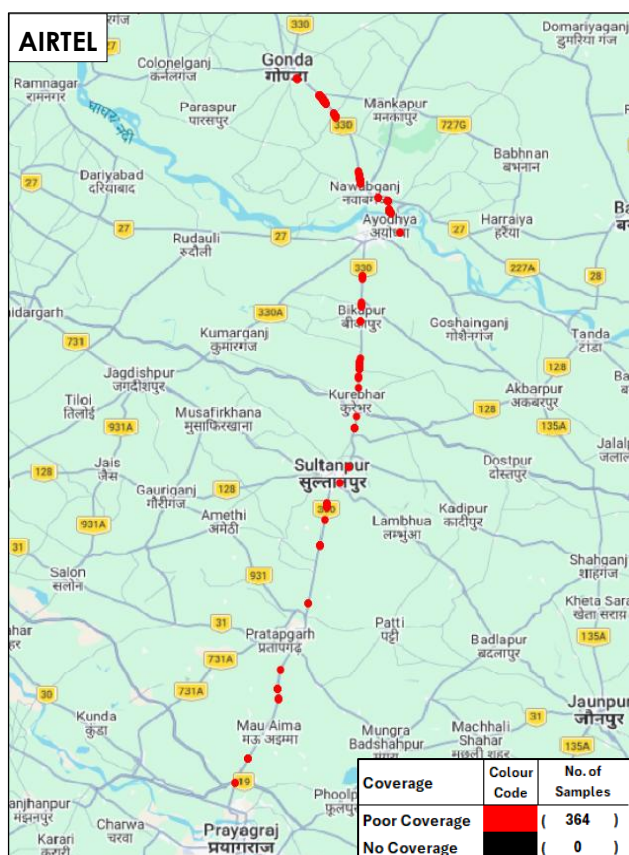


Figure-142: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.



Figure-143: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

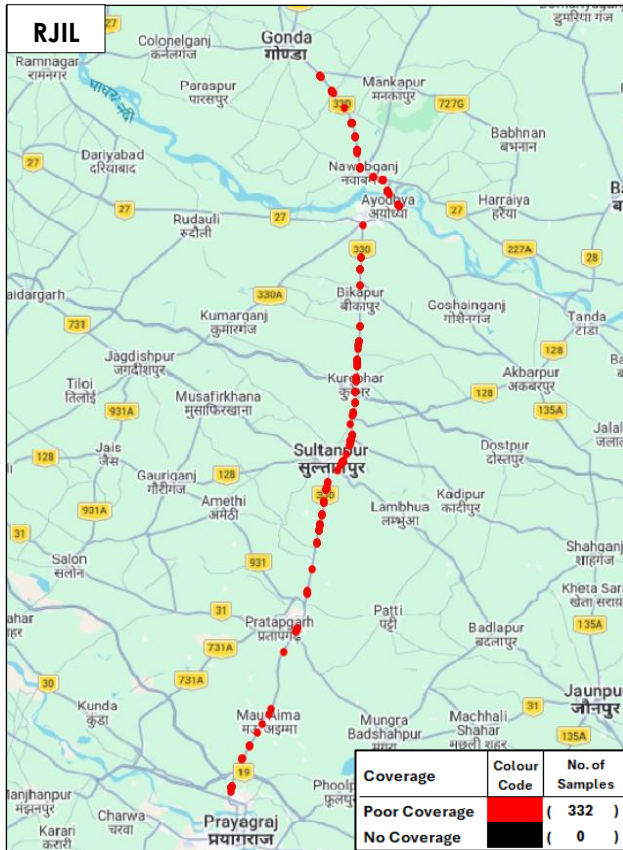


Figure-144: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - RJIL.



Figure-145: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - VIL.

4.5.1.4 Data performance

(a) Data Parameters (Auto-selection mode- 5G/4G/3G/2G)

Parameters		Service Provider			
		Auto-selection mode (5G/4G/3G/2G)			
		AIRTEL	BSNL	RJIL	VIL
Download Throughput (Mbits/s)	Average	87.92	6.54	183.83	46.43
	80 th Percentile	151.14	10.94	322.13	60.39
	20 th Percentile	16.09	1.69	33.16	12.82
Upload Throughput (Mbits/s)	Average	13.03	2.92	16.43	12.42
	80 th Percentile	20.73	4.09	32.00	20.49
	20 th Percentile	2.66	0.84	1.27	2.10
Latency (ms)	50 th Percentile	44.57	33.50	22.83	36.50

Table-71: Summary of Data performance in network auto-selection mode.

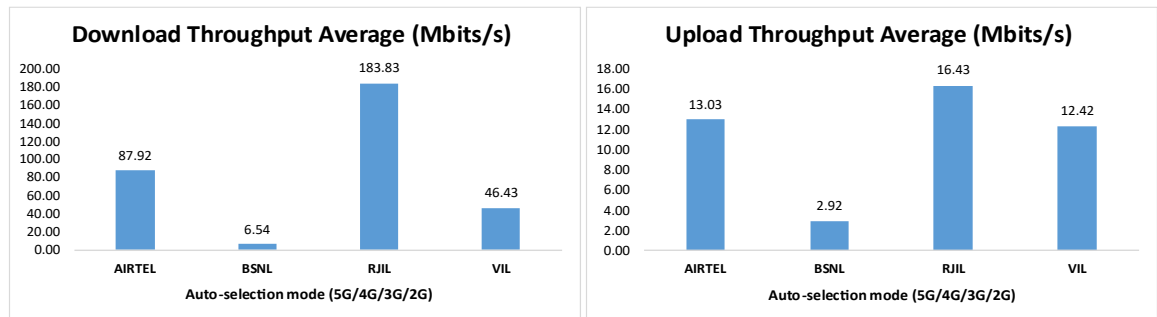


Figure-146: Download & Upload throughput.

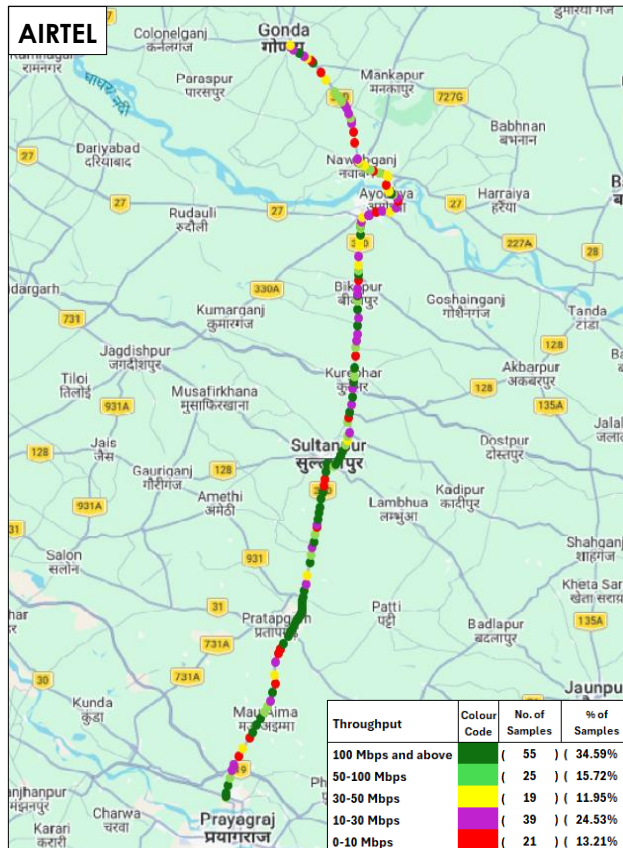


Figure-147: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - AIRTEL.



Figure-148: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - BSNL.

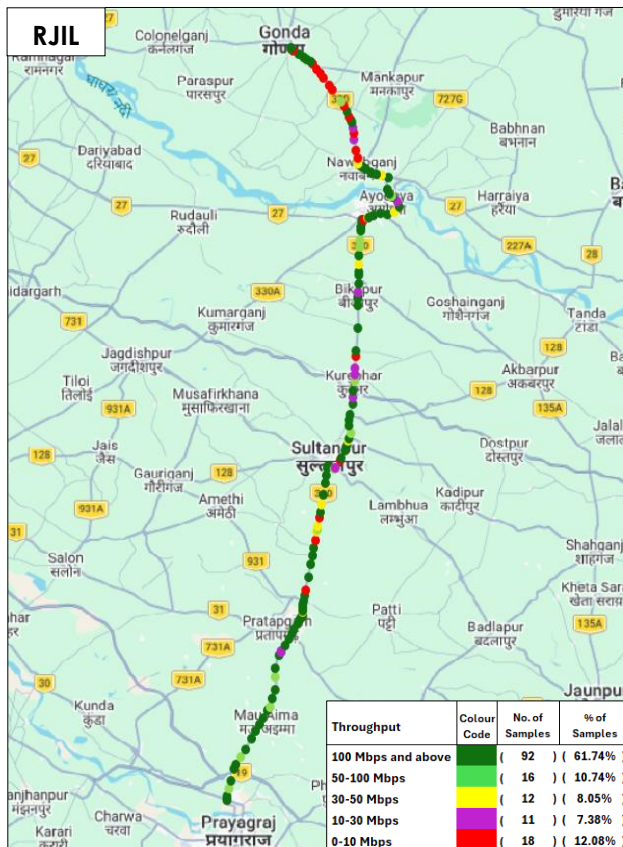


Figure-149: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - RJIL.



Figure-150: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - VIL.

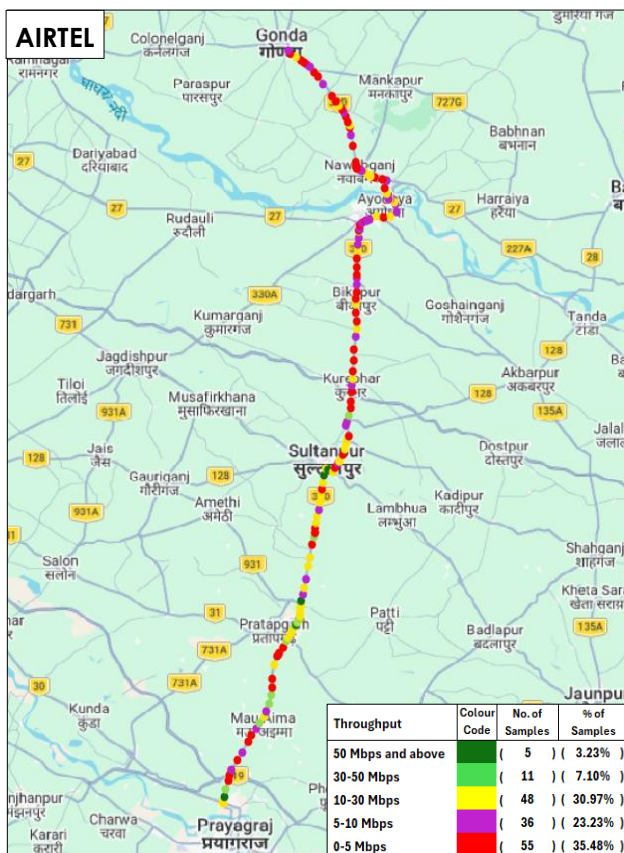


Figure-151: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - AIRTEL.



Figure-152: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - BSNL.

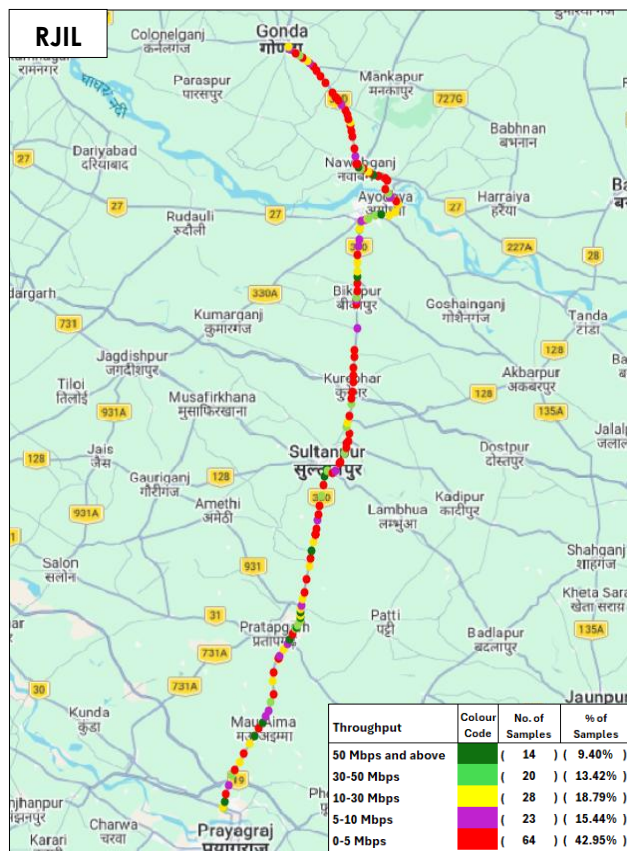


Figure-153: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - RJIL.

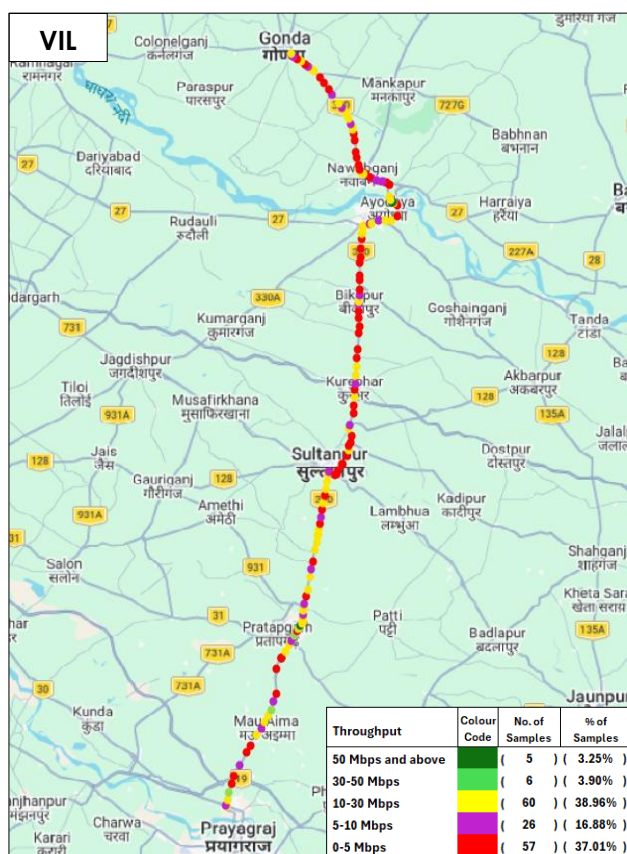


Figure-154: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - VIL.

(b) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	46.06%	NA	79.74%	5.12%
4G	53.83%	61.71%	20.26%	92.02%
3G	NA	34.70%	NA	NA
2G	0.00%	1.74%	NA	2.75%
Limited Service	0.11%	1.86%	0.00%	0.11%

Table-72: Time spent on technology during drive test in auto-selection mode (5G/4G/3G/2G) data.

Note-

- NA- Service provider doesn't provide services in respective technology.



Figure-155: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - AIRTEL.

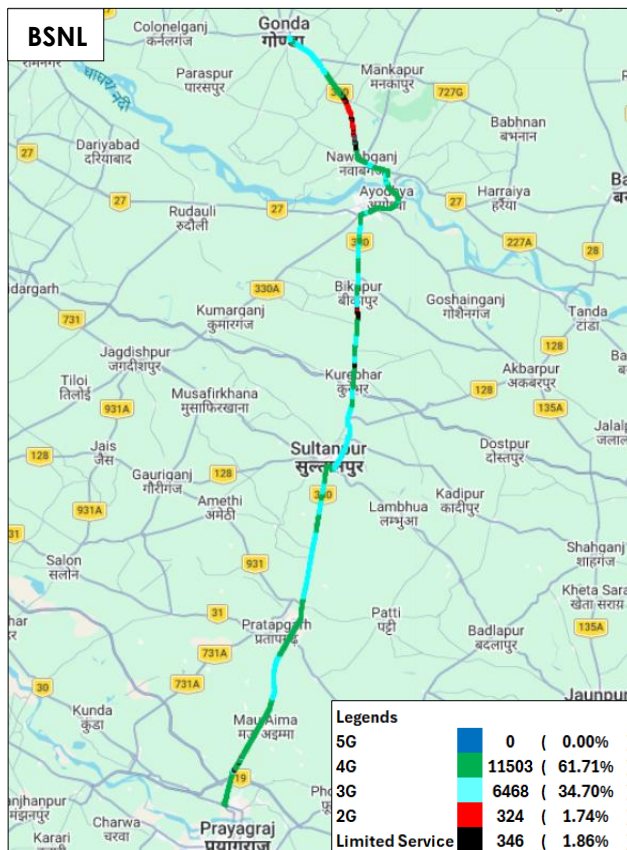


Figure-156: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - BSNL.

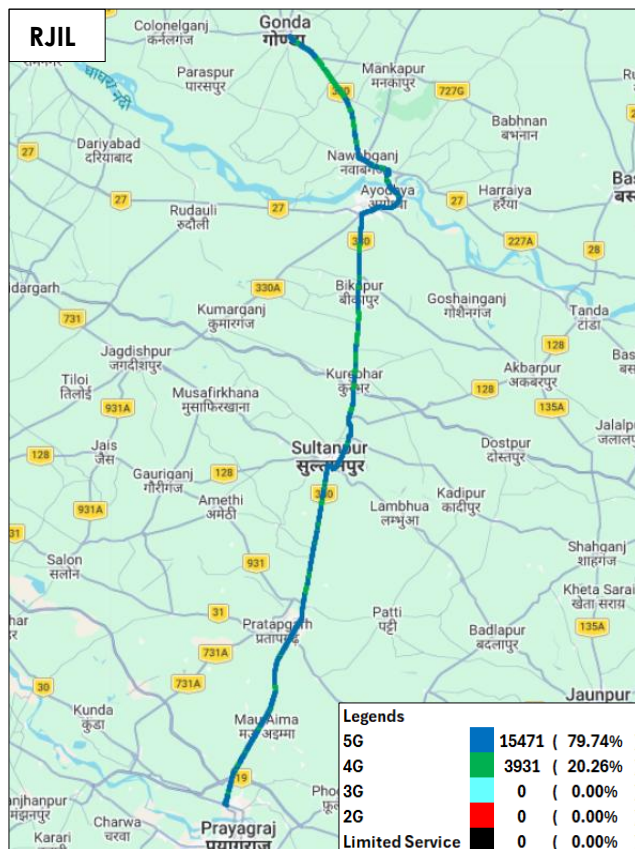


Figure-157: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - RJIL.

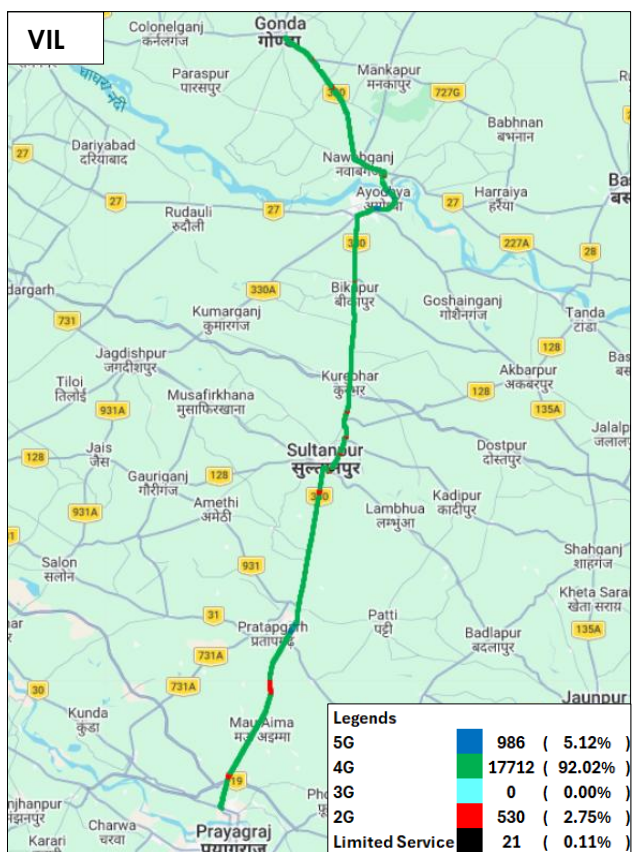


Figure-158: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - VIL.

(c) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) data. (Refer figure-236, 237, 238 & 239 for map view)

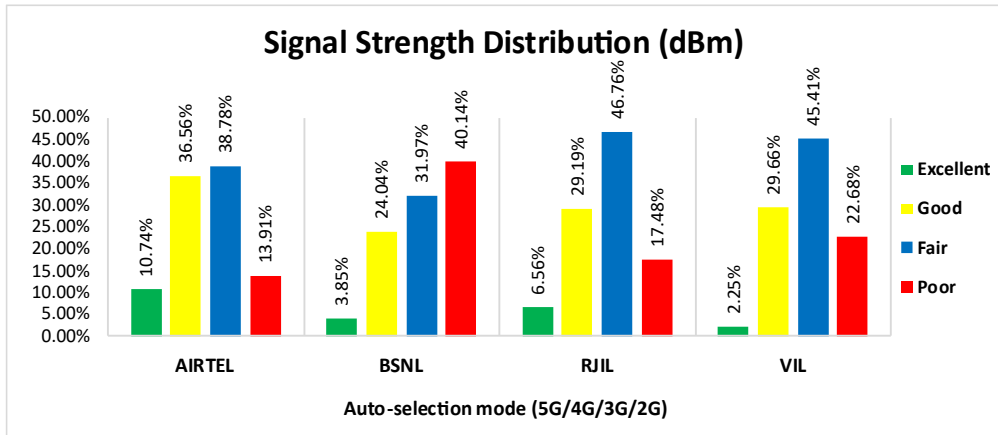


Figure-159: Signal strength distribution auto-selection mode (5G/4G/3G/2G) data.

Observations:

- Airtel has 11% of samples falling in the excellent signal strength category.
- BSNL has 4% of samples falling in the excellent signal strength category.
- RJIL has 7% of samples falling in the excellent signal strength category.
- VIL has 2% of samples falling in the excellent signal strength category.

4.5.2 Gonda to Bahraich

4.5.2.1 Drive test route



Figure- 160: Drive test routes.

4.5.2.2 Areas covered

Gonda to Bahraich Passing through Pipra Bazar, Manohar Jot, Suhelwa, Imaliya Ganj and Chilwariya etc.

4.5.2.3 Voice performance

(a) Voice Call Performance in 3G/2G network mode only: 3G/2G network mode testing has been done to reflect experience for respective users as they have only 3G/2G compatible handsets.

Parameters	Service Provider		
	3G/2G network mode only		
	AIRTEL	BSNL	VIL
Call Attempts	24	63	23
Call Setup Success Rate %	100.00	17.46	100.00
Drop Call Rate %	0.00	36.36	0.00
Call Setup Time-Average (Second)	3.75	4.40	4.26
Handover Success Rate %	100.00	100.00	98.31

Table-73: Summary of voice call performance in 3G/2G network mode only.

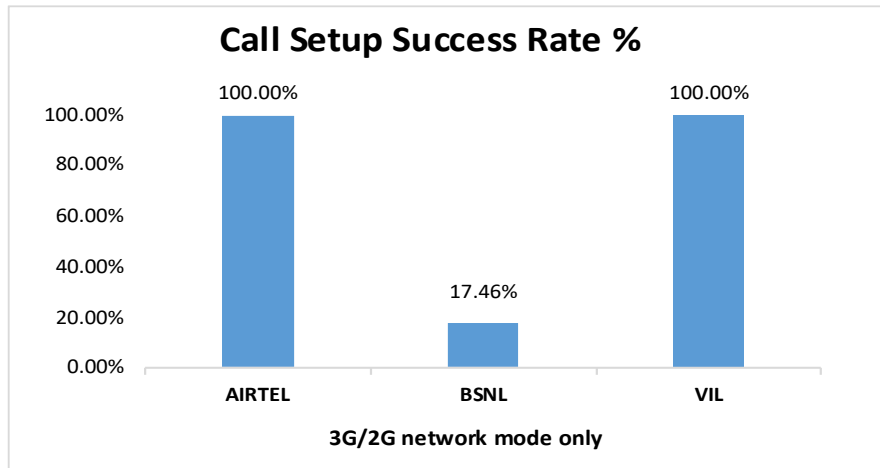


Figure-161: Performance for call setup success rate.

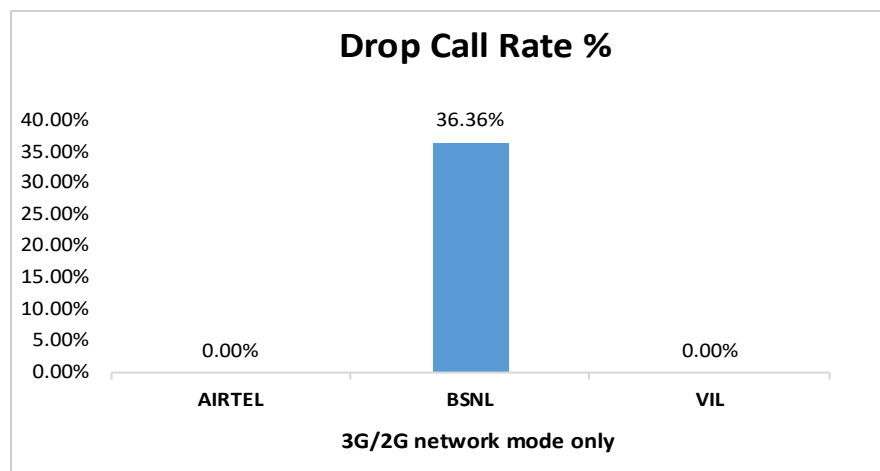


Figure-162: Performance for drop call rate.

(c) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider		
	AIRTEL	BSNL	VIL
3G	NA	44.77%	NA
2G	100.00%	18.94%	100.00%
Limited Service	0.00%	36.29%	0.00%

Table-74: Time spent on technology during drive test 3G/2G network mode only.

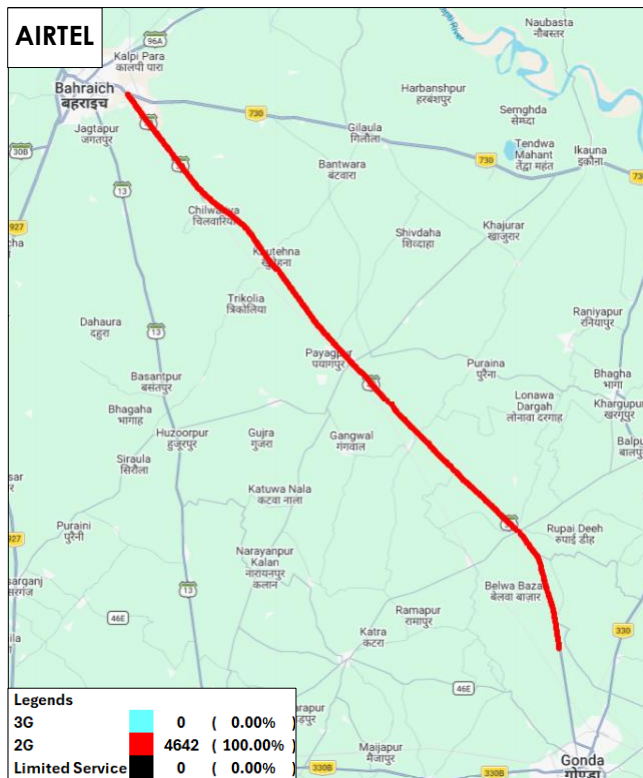


Figure-163: Serving technology plots 3G/2G network mode - AIRTEL.



Figure-164: Serving technology plots 3G/2G network mode - BSNL.

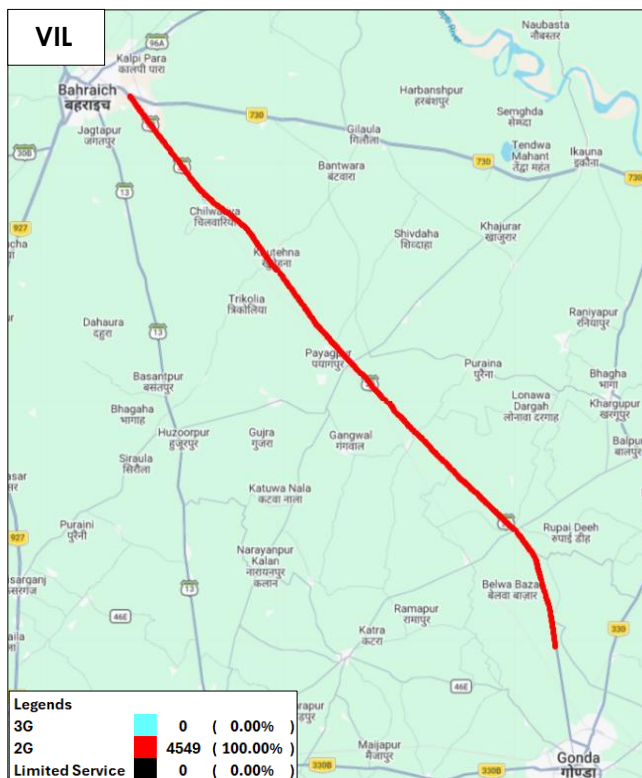


Figure-165: Serving technology plots 3G/2G network mode - VIL.

(c) Network Signal Strength Distribution: The following chart represents signal strength distribution for 3G/2G network mode only. (Refer figure-240, 241 & 242 for map view)

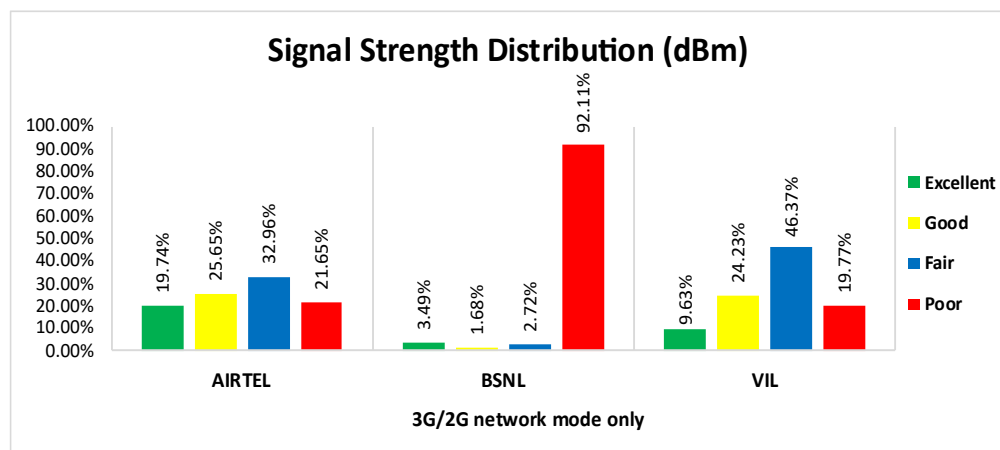


Figure-166: Signal strength distribution 3G/2G network mode only.

Observations:

- Airtel has 20% of samples falling in the excellent signal strength category.
- BSNL has 3% of samples falling in the excellent signal strength category.
- VIL has 10% of samples falling in the excellent signal strength category.

(d) Voice Call Performance in auto network selection mode (5G/4G/3G/2G)

Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempts	25	66	27	25
Call Setup Success Rate %	100.00	13.64	92.59	100.00
Drop Call Rate %	0.00	33.33	0.00	0.00
Call Setup Time Average (Second)	0.46	4.58	1.70	1.20
Handover Success Rate %	100.00	99.14	100.00	100.00

Table-75: Summary of voice call performance in network auto-selection mode.

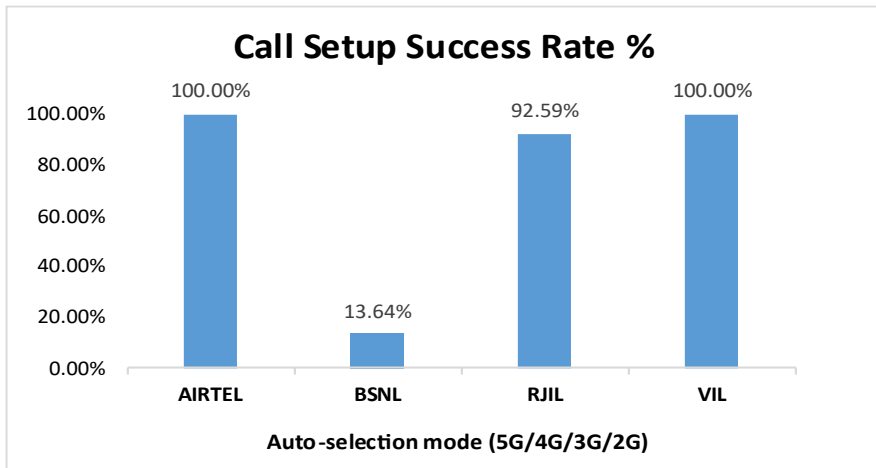


Figure-167: Performance for call setup success rate.

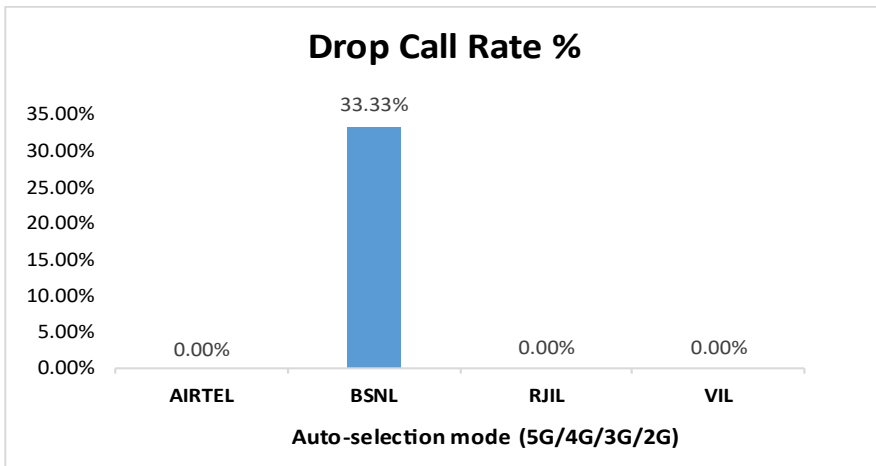


Figure-168: Performance for drop call rate.

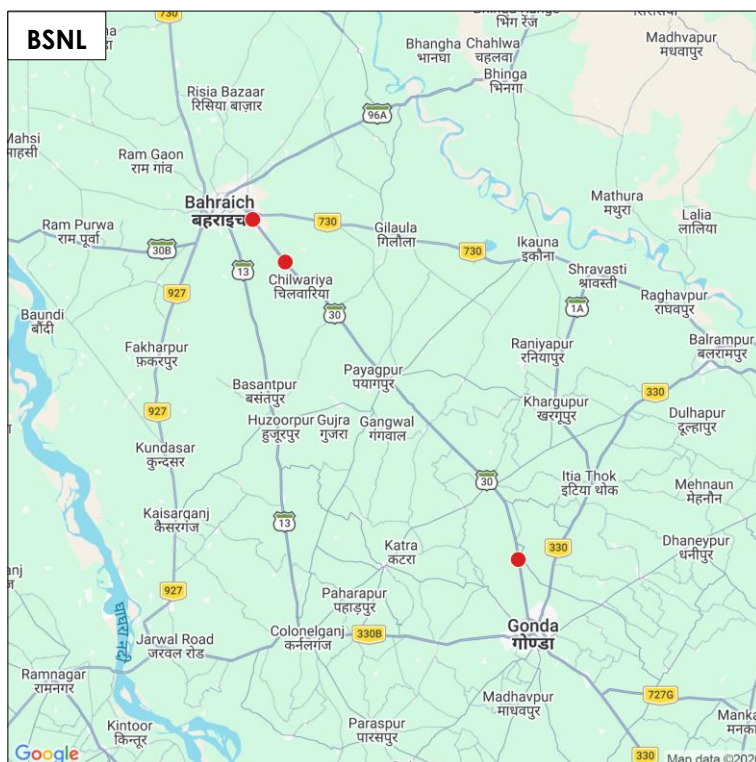


Figure-169: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

Parameter	Service Provider			
	Mobile-to-Mobile (5G/4G – Open Mode)			
	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider Network)	24	8	25	25
Number of silence call for >4 Sec	0	NA	2	0
Silence Call Rate %	0.00	NA	8.00	0.00
Number of silence instances for >4 Sec	0	NA	2	0
Number of silence instances for >3 Sec	0	NA	2	1
Number of silence instances for >2 sec	0	NA	2	2
RTP Jitter (4G & 5G) in ms	10.12	NA	12.99	8.41
Packet loss Rate Downlink %	2.60	NA	1.24	2.34
Packet loss Rate Uplink %	2.85	NA	1.63	2.15

Table-76: Summary of silence instances & packet loss rate for mobile to mobile call.

Note-

- NA- Due to unavailability of packet switched (VoLTE & VoNR) network in BSNL, silence instances are not captured.

(e) Mean Opinion Score (MOS) performance for speech quality:

Mean opinion score indicate quality of speech observed during the drive test across different technologies. This parameter has been calculated for mobile to mobile calls made within same operator network in auto mode (5G/4G/3G/2G). As per ITU-T Recommendation P.863.1, MOS values means: 5-Excellent, 4-Good, 3-Fair, 2-Poor, 1-Bad.

Speech Quality (MOS) distribution	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
Total Number of MOS Samples for calls in table-76	303	54	289	302
Speech Quality (Average MOS)	3.77	2.10	4.39	4.19
Number of samples with MOS ≥ 4 to <5 (Excellent)	209	0	243	231
Number of samples with MOS ≥ 3 to <4 (Good)	62	0	27	33
Number of samples with MOS ≥ 2 to <3 (Fair)	9	34	9	16
Number of samples with MOS ≥ 1 to <2 (Poor)	23	20	10	22
%age of samples with MOS ≥ 4 to <5 (Excellent)	68.98%	0.00%	84.08%	76.49%
%age of samples with MOS ≥ 3 to <4 (Good)	20.46%	0.00%	9.34%	10.93%
%age of samples with MOS ≥ 2 to <3 (Fair)	2.97%	62.96%	3.11%	5.30%
%age of samples with MOS ≥ 1 to <2 (Poor)	7.59%	37.04%	3.46%	7.28%

Table-77: Summary of speech quality (MOS) samples.

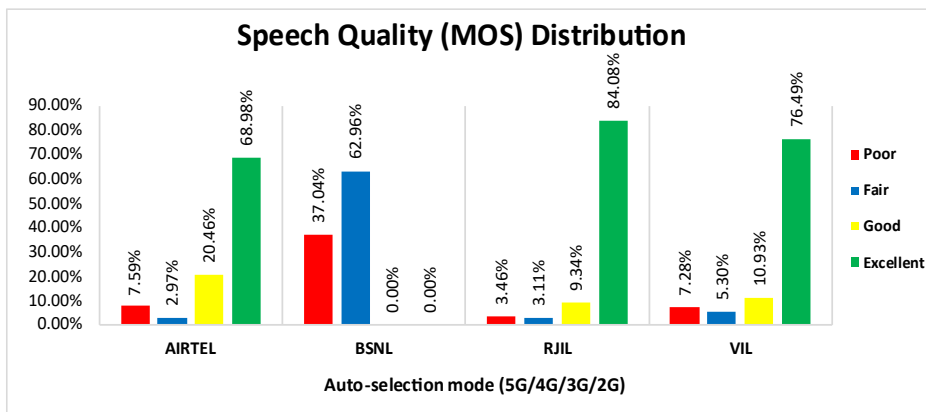


Figure-172: Distribution of samples in MOS range.

(f) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	0.85%	NA	31.03%	0.00%
4G	99.15%	20.67%	68.20%	93.92%
3G	NA	47.66%	NA	NA
2G	0.00%	13.78%	NA	6.08%
Limited Service	0.00%	17.89%	0.77%	0.00%

Table-78: Time spent on technology during drive test in auto-selection mode (5G/4G/3G/2G) voice.

Note-

- NA- Service provider doesn't provide services in respective technology.

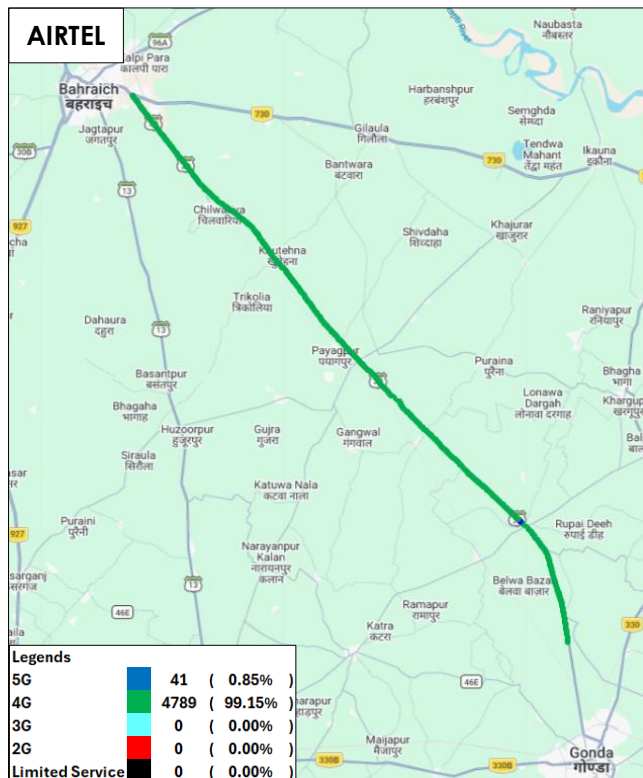


Figure-173: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

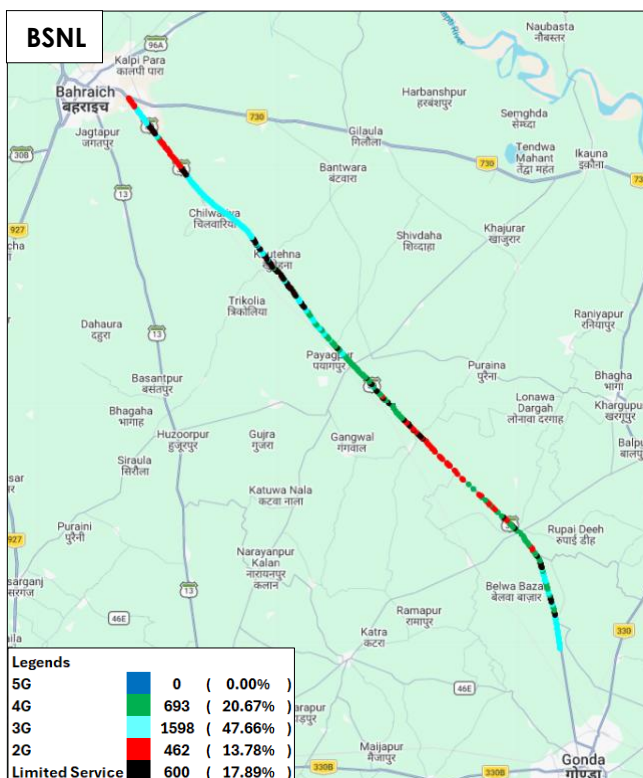


Figure-174: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

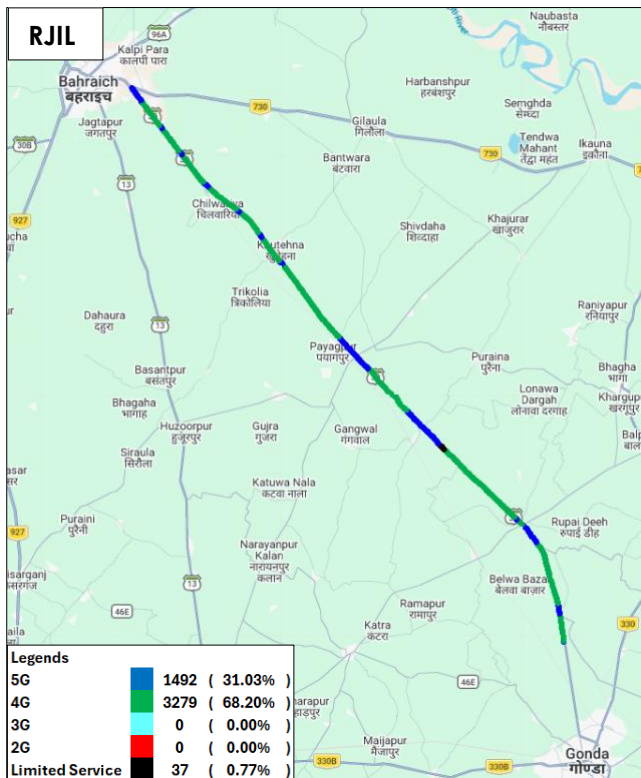


Figure-175: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - RJIL.

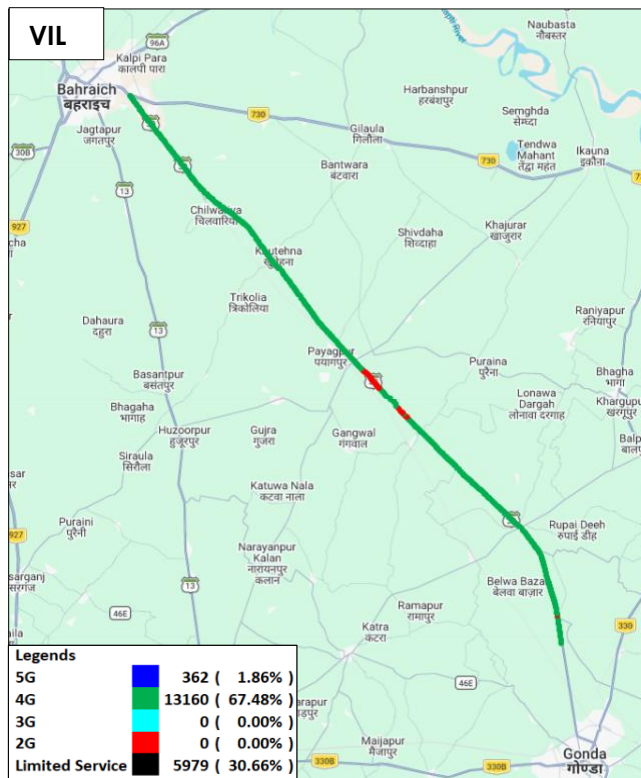


Figure-176: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice - VIL.

(g) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) voice. (Refer figure-243, 244, 245 & 246 for map view)

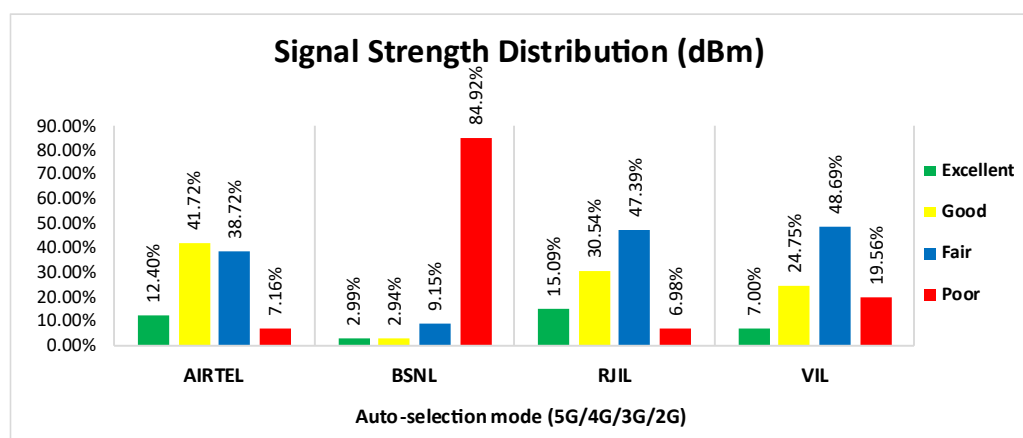


Figure-177: Signal strength distribution auto-selection mode (5G/4G/3G/2G) voice.

Observations:

- Airtel has 12% of samples falling in the excellent signal strength category.
- BSNL has 3% of samples falling in the excellent signal strength category.
- RJIL has 15% of samples falling in the excellent signal strength category.
- VIL has 7% of samples falling in the excellent signal strength category.

(h) Coverage Gap observed

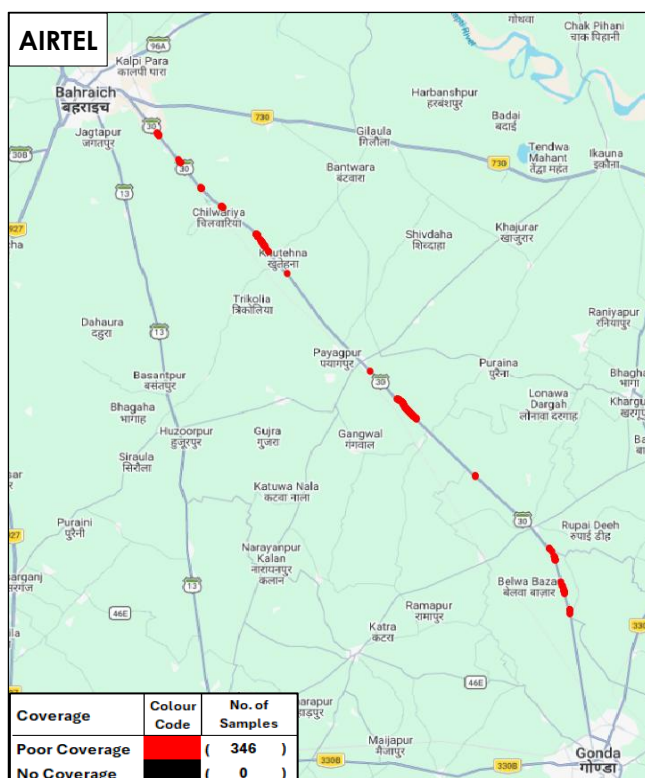


Figure-178: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

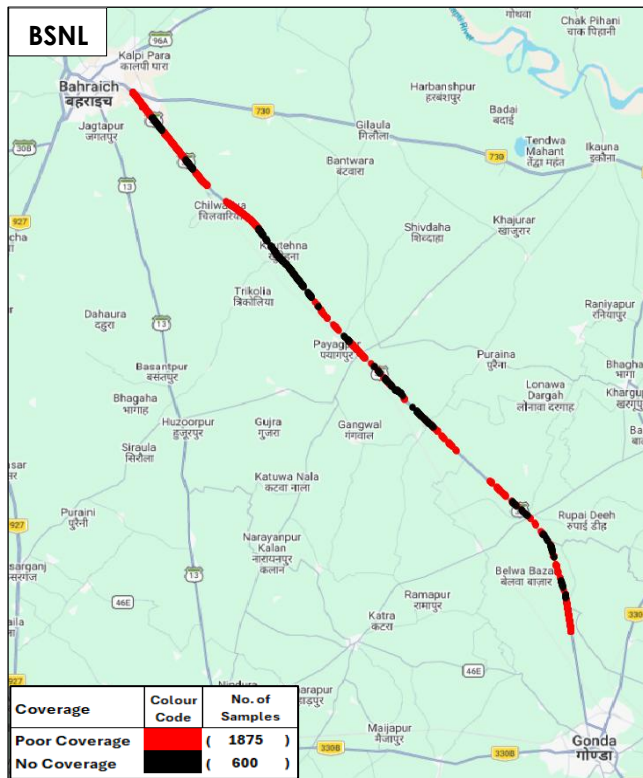


Figure-179: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

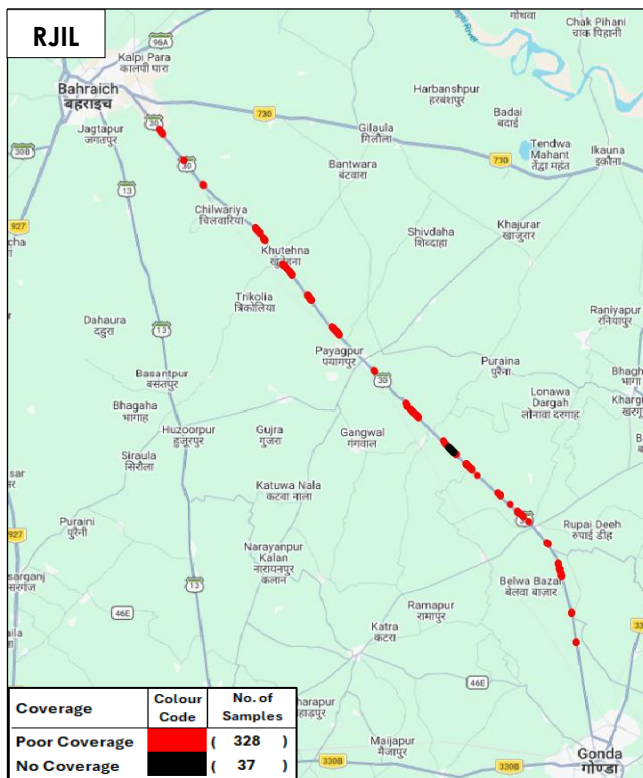


Figure-180: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - RJIL.

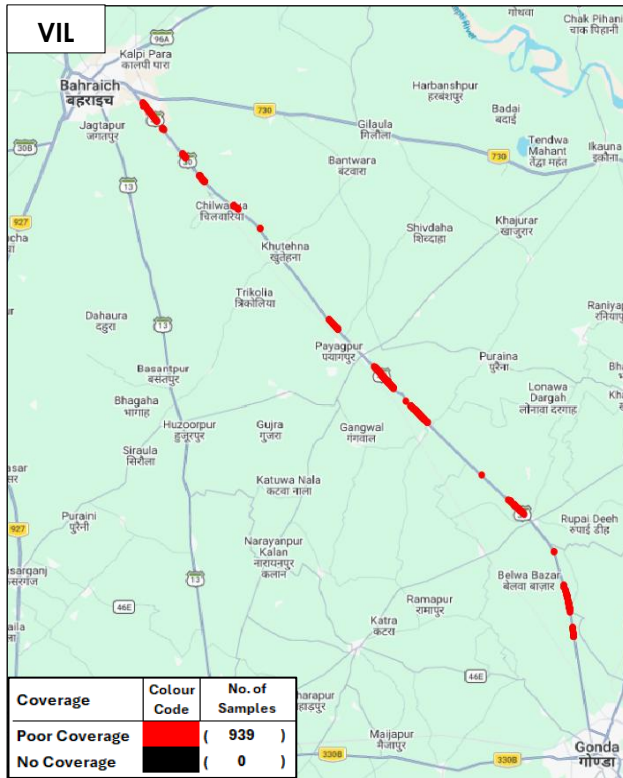


Figure-181: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice - VIL.

4.5.2.4 Data performance

(b) Data Parameters (Auto-selection mode- 5G/4G/3G/2G)

Parameters		Service Provider			
		Auto-selection mode (5G/4G/3G/2G)			
		AIRTEL	BSNL	RJIL	VIL
Download Throughput (Mbits/s)	Average	92.65	9.24	141.94	24.44
	80 th Percentile	176.05	17.07	288.19	37.05
	20 th Percentile	9.85	3.02	3.84	3.12
Upload Throughput (Mbits/s)	Average	10.23	2.34	6.48	5.22
	80 th Percentile	13.95	3.40	10.48	9.64
	20 th Percentile	1.39	0.84	1.10	0.84
Latency (ms)	50 th Percentile	45.96	28.80	23.81	37.30

Table-79: Summary of Data performance in network auto-selection mode.

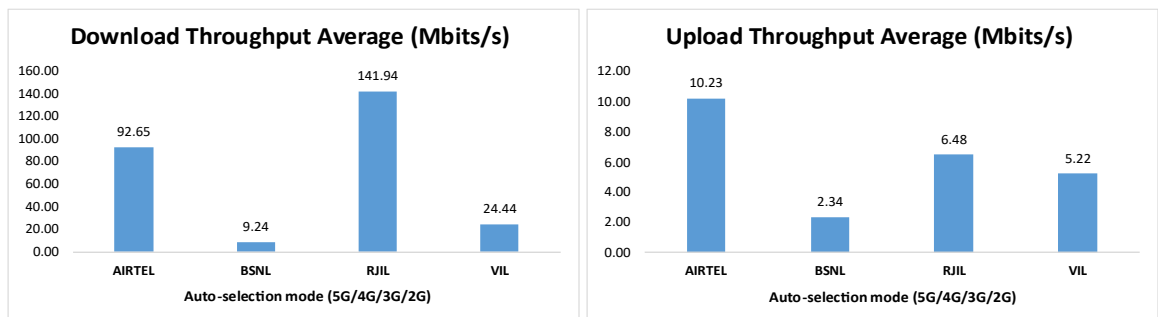


Figure-182: Download & Upload throughput.

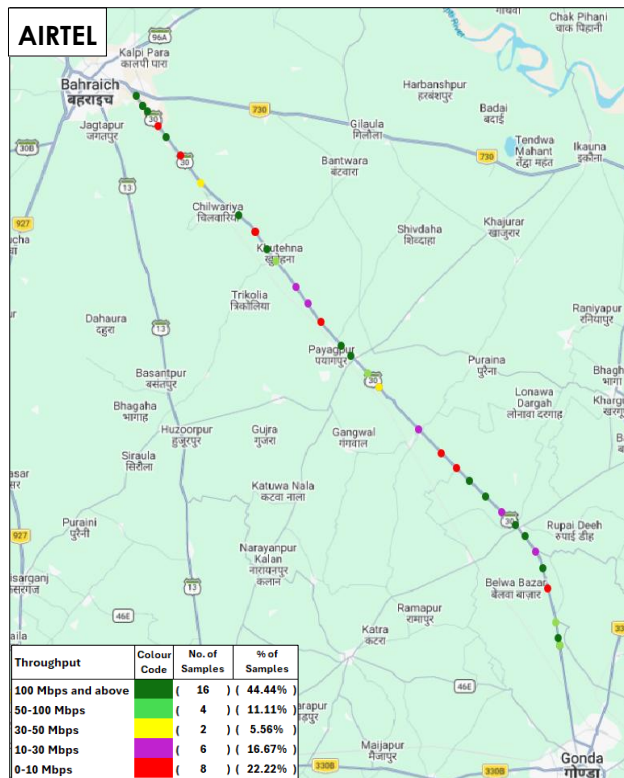


Figure-183: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - AIRTEL.

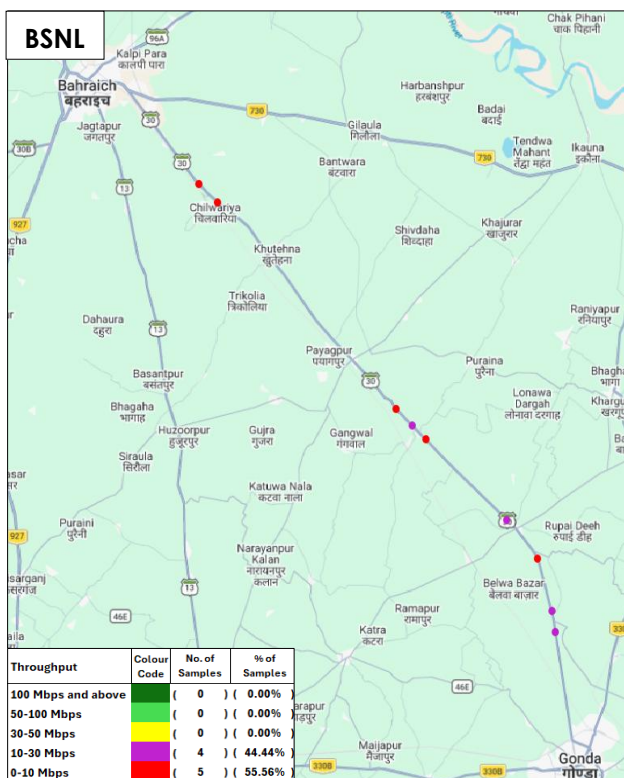


Figure-184: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - BSNL.

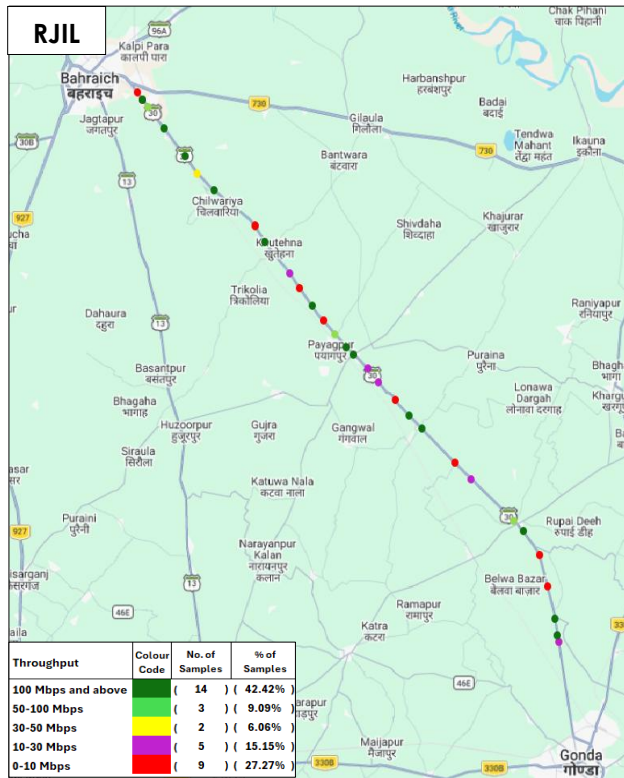


Figure-185: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - RJIL.

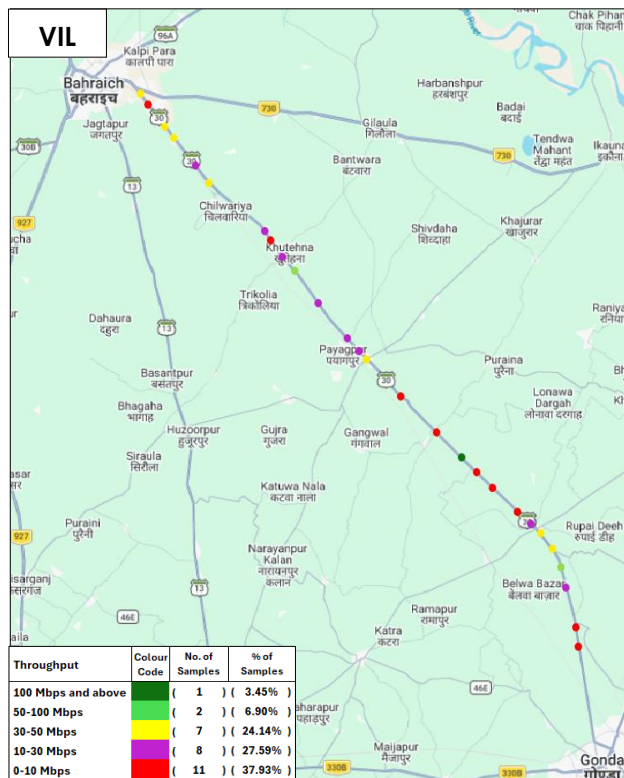


Figure-186: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - VIL.

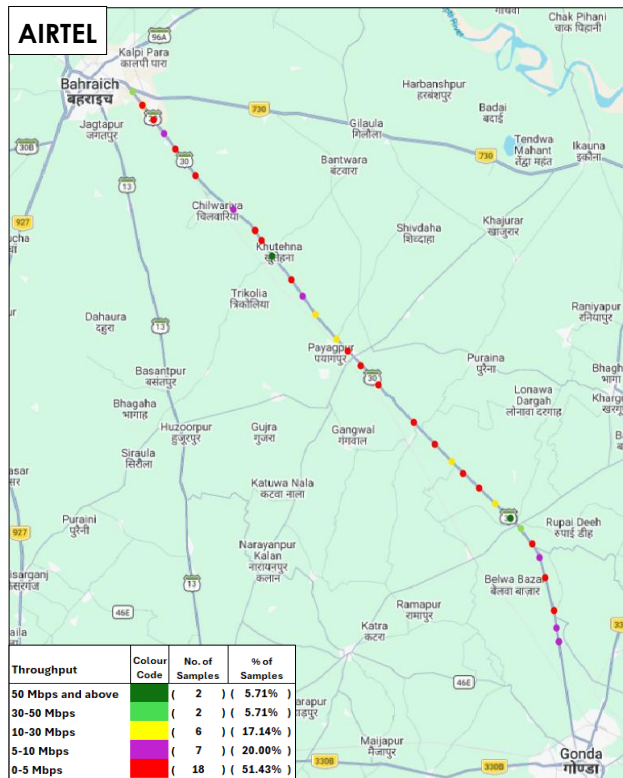


Figure-187: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - AIRTEL.

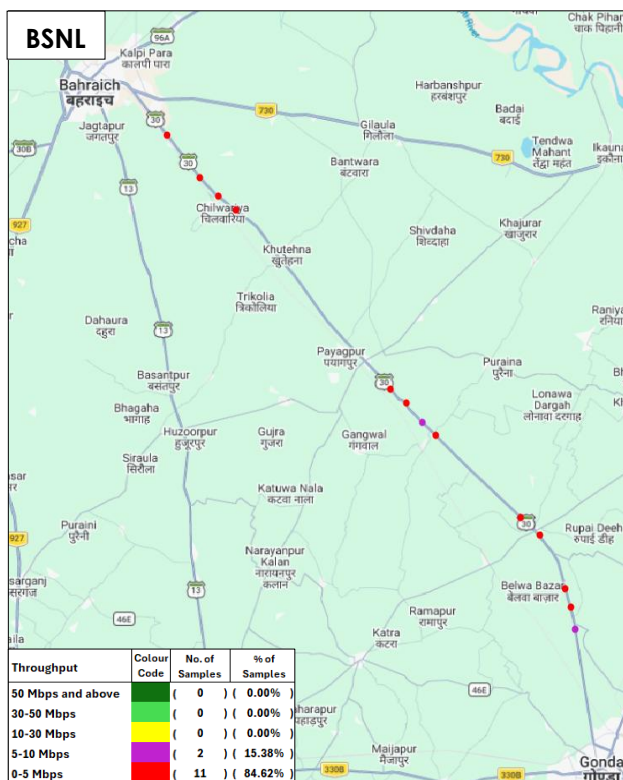


Figure-188: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - BSNL.

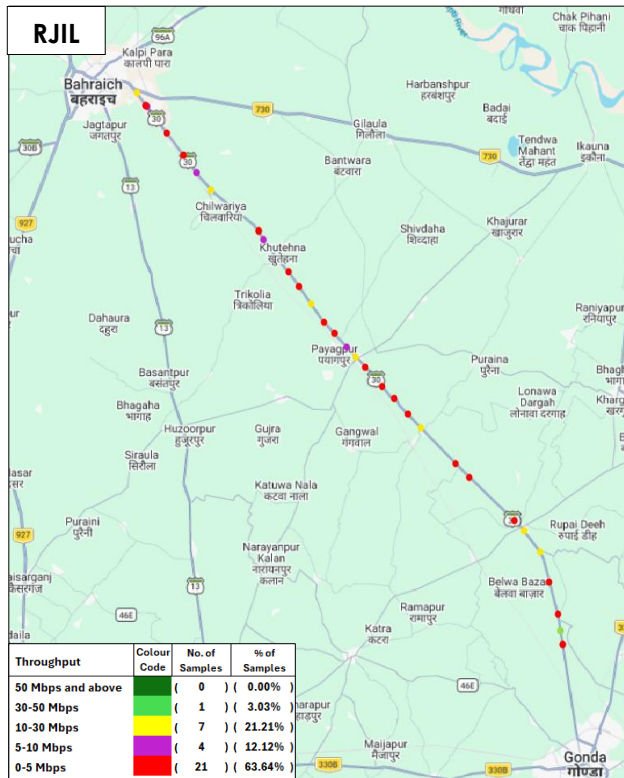


Figure-189: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - RJIL.

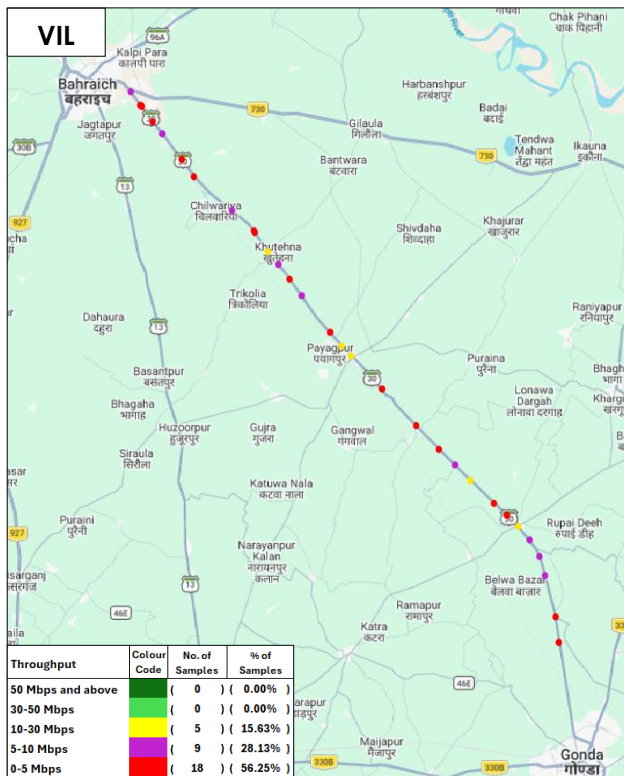


Figure-190: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - VIL.

(b) Network Technology: This section represents time spent on various network technologies.

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	44.24%	NA	60.02%	0.00%
4G	55.76%	34.70%	38.73%	91.43%
3G	NA	26.87%	NA	NA
2G	0.00%	7.05%	NA	8.57%
Limited Service	0.00%	31.38%	1.25%	0.00%

Table-80: Time spent on technology during drive test in auto-selection mode (5G/4G/3G/2G) data.

Note-

- NA- Service provider doesn't provide services in respective technology.

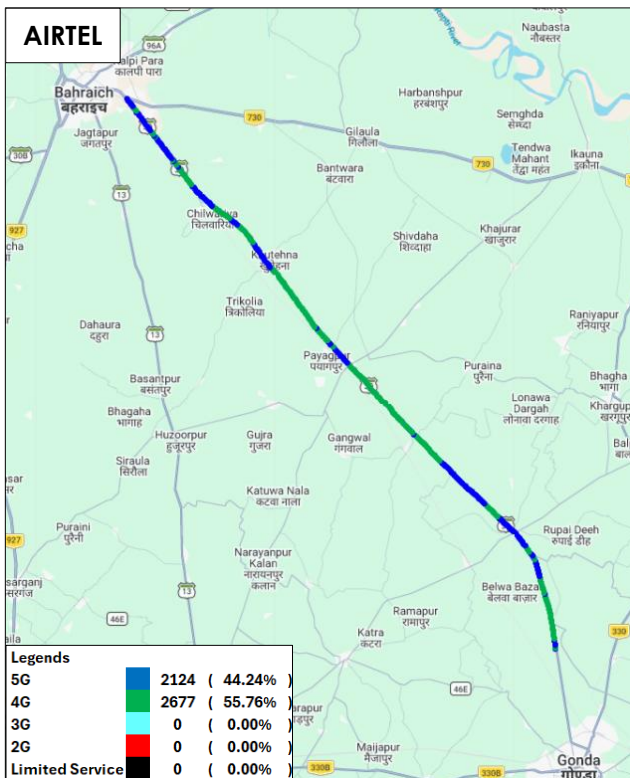


Figure-191: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - AIRTEL.

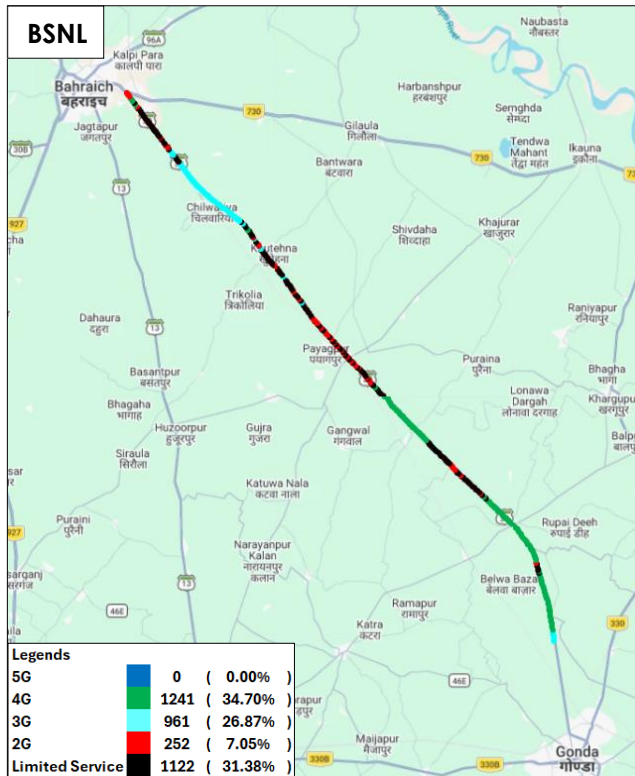


Figure-192: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - BSNL.

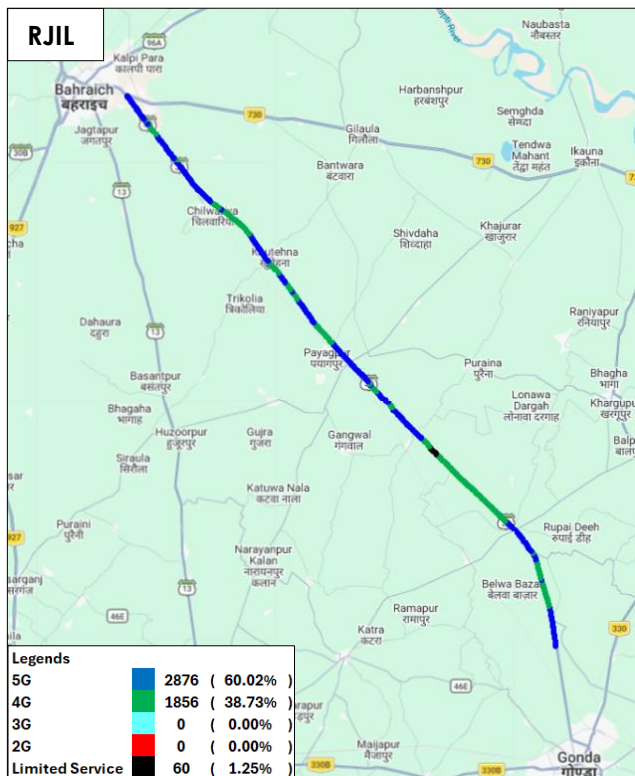


Figure-193: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - RJIL.

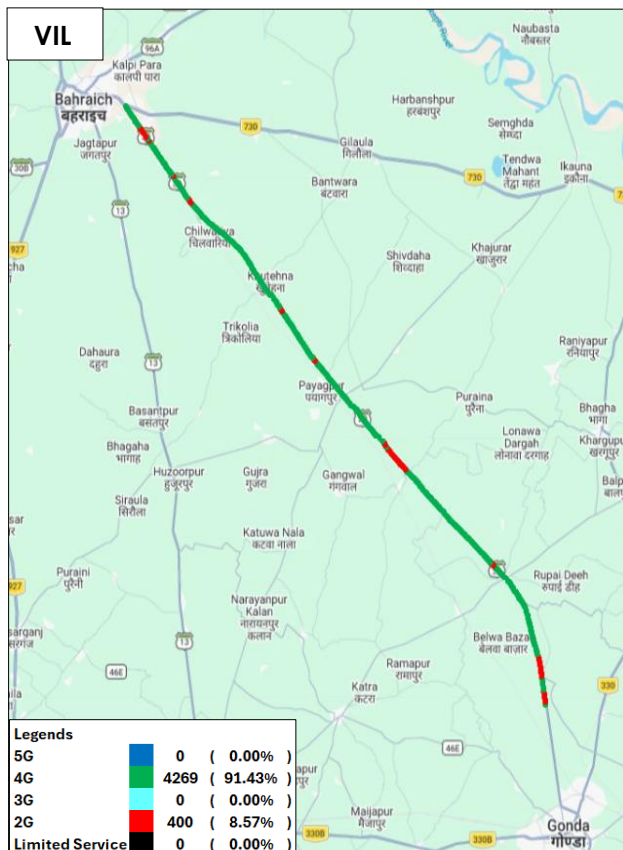


Figure-194: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - VIL.

(c) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) data. (Refer figure-247, 248, 249 & 250 for map view)

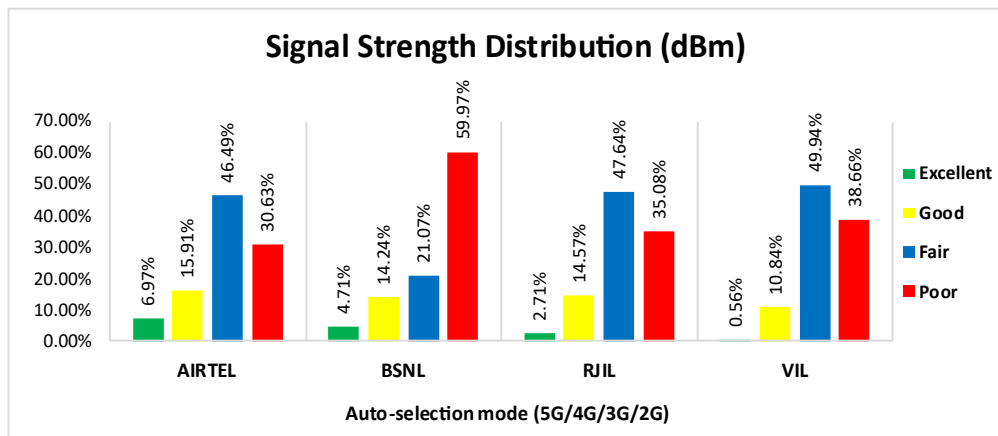


Figure-195: Signal strength distribution auto-selection mode (5G/4G/3G/2G) data.

Observations:

- Airtel has 7% of samples falling in the excellent signal strength category.
- BSNL has 5% of samples falling in the excellent signal strength category.
- RJIL has 3% of samples falling in the excellent signal strength category.
- VIL has 1% of samples falling in the excellent signal strength category.

5. Voice & Data Key findings

5.1 Overall Voice

1. Call Setup Success Rate:

- a) Airtel, BSNL and VIL have 100.00%, 68.83% and 99.28% call setup success rate respectively in 3G/2G network mode. (refer table-3)
- b) Airtel, BSNL, RJIL and VIL have 99.85%, 70.57%, 99.41% and 99.55% call setup success rate respectively in auto-selection mode (5G/4G/3G/2G). (refer table-5)
- c) Airtel had a 100.00% call setup success rate while calling VIL whereas call blocking was observed when calling on BSNL & RJIL. (refer table-9)
- d) BSNL had a 100.00% call setup success rate while calling VIL whereas call blocking was observed when calling on Airtel & RJIL. (refer table-9)
- e) RJIL had a 100.00% call setup success rate when calling Airtel and VIL whereas call blocking was observed when calling on BSNL. (refer table-9)
- f) VIL have 100.00% call setup success rate while calling on peer service provider's network for inter-operator calls. (refer table-9)

2. Call Setup Time:

- a) Airtel, BSNL and VIL call setup time is 4.00, 3.85 & 4.67 seconds respectively in 3G/2G network mode. (refer table-3)
- b) Airtel, BSNL, RJIL & VIL call setup time is 0.64, 5.75, 0.76 & 0.81 seconds respectively in auto-selection mode (5G/4G/3G/2G). (refer table-5)

3. Call Silence/Mute Rate:

In packet switched network (4G/5G) RJIL, VIL & Airtel have 1.97%, 0.89% & 0.55% silence call rate respectively. Further VIL has higher RTP packet loss rate in downlink (1.74%) compared to RJIL (1.58%) & Airtel (1.12%). In uplink the RTP packet loss rate is higher for VIL (1.62%) compared to RJIL (1.35%) & Airtel (0.98%). (refer table-6)

4. Drop Call Rate:

- a) Airtel, BSNL and VIL drop call rate is 0.18%, 9.22% and 0.55% respectively in 3G/2G network mode. (refer table-3)
- b) Airtel, BSNL, RJIL and VIL drop call rate is 0.75%, 8.21%, 0.30% and 0.15% respectively in auto-selection mode (5G/4G/3G/2G). (refer table-5)

5.2 Overall Data

1. Data download and upload performance (Overall i.e. LSA):

- a) Airtel, BSNL, RJIL and VIL average download speeds are 103.59 Mbps, 5.52 Mbps, 164.22 Mbps and 38.64 Mbps respectively. (refer table-11)
- b) Airtel, BSNL, RJIL and VIL average upload speeds are 17.22 Mbps, 3.39 Mbps, 16.54 Mbps and 11.84 Mbps respectively. (refer table-11)

2. Data download and upload performance (static i.e. while stationary):

- a) Airtel, BSNL, RJIL and VIL average download speeds are 157.72 Mbps, 4.78 Mbps, 188.90 Mbps and 43.21 Mbps respectively. (refer table-45)
- b) Airtel, BSNL, RJIL and VIL average upload speeds are 32.52 Mbps, 7.22 Mbps, 35.10 Mbps and 15.53 Mbps respectively. (refer table-45)

3. Data session setup success rate (static i.e. while stationary):

- a) Airtel, BSNL, RJIL and VIL have 100.00%, 94.29%, 100.00% and 97.14% download session setup success rate respectively. (refer table-45)
- b) Airtel, BSNL, RJIL and VIL have 100.00%, 94.29%, 100.00% and 97.14% upload session setup success rate respectively. (refer table-45)

5.3 Operator wise Key Findings

1. Airtel:

Voice

- 100.00% call setup success rate and 0.18% drop call rate have been observed in 3G/2G network mode for LSA. (refer table-3)
- 99.85% call setup success rate and 0.75% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for LSA. (refer table-5)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in 3G/2G network mode for Gonda city drive. (refer table-13)
- 99.42% call setup success rate and 0.58% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Gonda city drive. (refer table-15)
- 100.00% call setup success rate and 0.51% drop call rate have been observed in 3G/2G network mode for Bahraich city drive. (refer table-21)
- 100.00% call setup success rate and 0.49% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Bahraich city drive. (refer table-23)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in 3G/2G network mode for Balrampur city drive. (refer table-29)
- 100.00% call setup success rate and 2.56% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Balrampur city drive. (refer table-31)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for all hotspot locations. (refer table-37)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) at both walk test locations. (refer table-61 & 62)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in 3G/2G network mode across Prayagraj to Gonda highway route. (refer table-65)
- 100.00% call setup success rate and 1.02% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) across Prayagraj to Gonda highway route. (refer table-67)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in 3G/2G network mode across Gonda to Bahraich highway route. (refer table-73)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) across Gonda to Bahraich highway route. (refer table-75)

Data

- Airtel has 103.59 Mbps average download speed & 17.22 Mbps average upload speed for LSA. (refer table-11)
- Airtel has 94.98 Mbps average download speed & 14.59 Mbps average upload speed across the measured routes for Gonda city drive. (refer table-19)
- Airtel has 105.94 Mbps average download speed & 17.60 Mbps average upload speed across the measured routes for Bahraich city drive. (refer table-27)
- Airtel has 130.93 Mbps average download speed & 21.40 Mbps average upload speed across the measured routes for Balrampur city drive. (refer table-35)
- District Court Gonda and Railway Station Bahraich have less download speed (less than 100 Mbps) out of total 7 hotspot locations for auto-selection mode (5G/4G/3G/2G). (refer table- 46 & 51)
- District Court Gonda, District Hospital Bahraich and Railway Station Bahraich have less upload speed (less than 20 Mbps) out of total 7 hotspot locations for auto-selection mode (5G/4G/3G/2G). (refer table- 46, 47 & 51)
- Gonda Junction Railway Station has less download speed (less than 100 Mbps) out of total 2 Walk Test locations for auto-selection mode (5G/4G/3G/2G). (refer table-63)
- Airtel has 87.92 Mbps average download speed & 13.03 Mbps average upload speed across the measured routes for Prayagraj to Gonda highway drive. (refer table-71)
- Airtel has 92.65 Mbps average download speed & 10.23 Mbps average upload speed across the measured routes for Gonda to Bahraich highway drive. (refer table- 79)

2. BSNL:

Voice

- 68.83% call setup success rate and 9.22% drop call rate have been observed in 3G/2G network mode for LSA. (refer table-3)
- 70.57% call setup success rate and 8.21% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for LSA. (refer table-5)
- 78.05% call setup success rate and 15.63% drop call rate have been observed in 3G/2G network mode for Gonda city drive. (refer table-13)
- 77.14% call setup success rate and 14.20% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Gonda city drive. (refer table-15)
- 66.24% call setup success rate and 4.52% drop call rate have been observed in 3G/2G network mode for Bahraich city drive. (refer table-21)
- 63.35% call setup success rate and 3.77% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Bahraich city drive. (refer table-23)
- 90.12% call setup success rate and 4.11% drop call rate have been observed in 3G/2G network mode for Balrampur city drive. (refer table-29)
- 87.80% call setup success rate and 2.78% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Balrampur city drive. (refer table-31)

- 97.14% call setup success rate and 4.41% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for all hotspot locations. (refer table-37)
- 100.00% call setup success rate and 7.14% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) at Gonda Junction Railway Station walk test location. (refer table-61)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) at Railway Station Balrampur walk test location. (refer table-62)
- 70.63% call setup success rate and 6.74% drop call rate have been observed in 3G/2G network mode across Prayagraj to Gonda highway route. (refer table-65)
- 72.22% call setup success rate and 10.99% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) across Prayagraj to Gonda highway route. (refer table-67)
- 17.46% call setup success rate and 36.36% drop call rate have been observed in 3G/2G network mode across Gonda to Bahraich highway route. (refer table-73)
- 13.64% call setup success rate and 33.33% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) across Gonda to Bahraich highway route. (refer table-75)

Data

- BSNL has 5.52 Mbps average download speed & 3.39 Mbps average upload speed for LSA. (refer table-11)
- BSNL has 1.15 Mbps average download speed & 1.86 Mbps average upload speed across the measured routes for Gonda city drive. (refer table-19)
- BSNL has 7.30 Mbps average download speed & 2.88 Mbps average upload speed across the measured routes for Bahraich city drive. (refer table-27)
- BSNL has 4.09 Mbps average download speed & 2.16 Mbps average upload speed across the measured routes for Balrampur city drive. (refer table-35)
- All hotspot locations have less download speed (less than 10 Mbps) except Railway Station Balrampur for auto-selection mode (5G/4G/3G/2G). (refer table-46 to 52)
- Government Polytechnic College Gonda has less upload speed (less than 2 Mbps) out of total 7 hotspot locations for auto-selection mode (5G/4G/3G/2G). (refer table-50)
- Both Walk Test locations have less download speed (less than 10 Mbps) for auto-selection mode (5G/4G/3G/2G). (refer table- 63 & 64)
- Gonda Junction Railway Station has less upload speed (less than 2 Mbps) out of total 2 Walk test locations for auto-selection mode (5G/4G/3G/2G). (refer table-63)
- BSNL has 6.54 Mbps average download speed & 2.92 Mbps average upload speed across the measured routes for Prayagraj to Gonda highway drive. (refer table- 71)

- BSNL has 9.24 Mbps average download speed & 2.34 Mbps average upload speed across the measured routes for Gonda to Bahraich highway drive. (refer table- 79)

3. RJIL:

Voice

- 99.41% call setup success rate and 0.30% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for LSA. (refer table-5)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Gonda city drive. (refer table-15)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Bahraich city drive. (refer table-23)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Balrampur city drive. (refer table-31)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for all hotspot locations. (refer table-37)
- 100.00% call setup success rate and 7.69% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) at Gonda Junction Railway Station walk test location. (refer table- 61)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) at Railway Station Balrampur walk test location. (refer table- 62)
- 98.02% call setup success rate and 1.01% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) across Prayagraj to Gonda highway route. (refer table- 67)
- 92.59% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) across Gonda to Bahraich highway route. (refer table- 75)

Data

- RJIL has 164.22 Mbps average download speed & 16.54 Mbps average upload speed for LSA. (refer table-11)
- RJIL has 167.44 Mbps average download speed & 18.94 Mbps average upload speed across the measured routes for Gonda city drive. (refer table-19)
- RJIL has 146.74 Mbps average download speed & 12.09 Mbps average upload speed across the measured routes for Bahraich city drive. (refer table-27)
- RJIL has 167.93 Mbps average download speed & 16.90 Mbps average upload speed across the measured routes for Balrampur city drive. (refer table-35)
- District Court Gonda, District Hospital Bahraich and Government Bus Stand Gonda have less download speed (less than 100 Mbps) out of total 7 hotspot locations for auto-selection mode (5G/4G/3G/2G). (refer table-46, 47 & 49)
- District Court Gonda, District Hospital Bahraich and Railway Station Bahraich have less upload speed (less than 20 Mbps) out of total 7 hotspot locations for auto-selection mode (5G/4G/3G/2G). (refer table-46, 47 & 51)

- Gonda Junction Railway Station has less download speed (less than 100 Mbps) out of total 2 Walk Test locations for auto-selection mode (5G/4G/3G/2G). (refer table- 63)
- Gonda Junction Railway Station has less upload speed (less than 20 Mbps) out of total 2 Walk Test locations for auto-selection mode (5G/4G/3G/2G). (refer table- 63)
- RJIL has 183.83 Mbps average download speed & 16.43 Mbps average upload speed across the measured routes for Prayagraj to Gonda highway drive. (refer table- 71)
- RJIL has 141.94 Mbps average download speed & 6.48 Mbps average upload speed across the measured routes for Gonda to Bahraich highway drive. (refer table- 79)

4. VIL: Voice

- 99.28% call setup success rate and 0.55% drop call rate have been observed in 3G/2G network mode for LSA. (refer table-3)
- 99.55% call setup success rate and 0.15% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for LSA. (refer table-5)
- 99.38% call setup success rate and 0.62% drop call rate have been observed in 3G/2G network mode for Gonda city drive. (refer table-13)
- 99.42% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Gonda city drive. (refer table-15)
- 99.49% call setup success rate and 0.00% drop call rate have been observed in 3G/2G network mode for Bahraich city drive. (refer table-21)
- 99.51% call setup success rate and 0.49% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Bahraich city drive. (refer table-23)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in 3G/2G network mode for Balrampur city drive. (refer table-29)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for Balrampur city drive. (refer table-31)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for all hotspot locations. (refer table-37)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) at both walk test location. (refer table-61 & 62)
- 97.98% call setup success rate and 2.06% drop call rate have been observed in 3G/2G network mode across Prayagraj to Gonda highway route. (refer table-65)
- 98.99% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) across Prayagraj to Gonda highway route. (refer table-67)

- 100.00% call setup success rate and 0.00% drop call rate have been observed in 3G/2G network mode across Gonda to Bahraich highway route. (refer table-73)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) across Gonda to Bahraich highway route. (refer table-75)

Data

- VIL has 38.64 Mbps average download speed & 11.84 Mbps average upload speed for LSA. (refer table-11)
- VIL has 34.31 Mbps average download speed & 9.53 Mbps average upload speed across the measured routes for Gonda city drive. (refer table-19)
- VIL has 41.12 Mbps average download speed & 11.86 Mbps average upload speed across the measured routes for Bahraich city drive. (refer table-27)
- VIL has 31.66 Mbps average download speed & 12.79 Mbps average upload speed across the measured routes for Balrampur city drive. (refer table-35)
- All hotspot locations have less download speed (less than 100 Mbps) except District Hospital Bahraich for auto-selection mode (5G/4G/3G/2G). (refer table-46, 48, 49, 50, 51 & 52)
- All hotspot locations have less upload speed (less than 20 Mbps) except Government Bus Stand Gonda and Railway Station Bahraich for auto-selection mode (5G/4G/3G/2G). (refer table- 46, 47, 48, 50 & 52)
- Both Walk Test locations have less download speed (less than 100 Mbps) for auto-selection mode (5G/4G/3G/2G). (refer table- 63 & 64)
- VIL has 46.43 Mbps average download speed & 12.42 Mbps average upload speed across the measured routes for Prayagraj to Gonda highway drive. (refer table-71)
- VIL has 24.44 Mbps average download speed & 5.22 Mbps average upload speed across the measured routes for Gonda to Bahraich highway drive. (refer table- 79)

6. Annexure

6.1 Route wise coverage map

6.1.1 City

i) Gonda

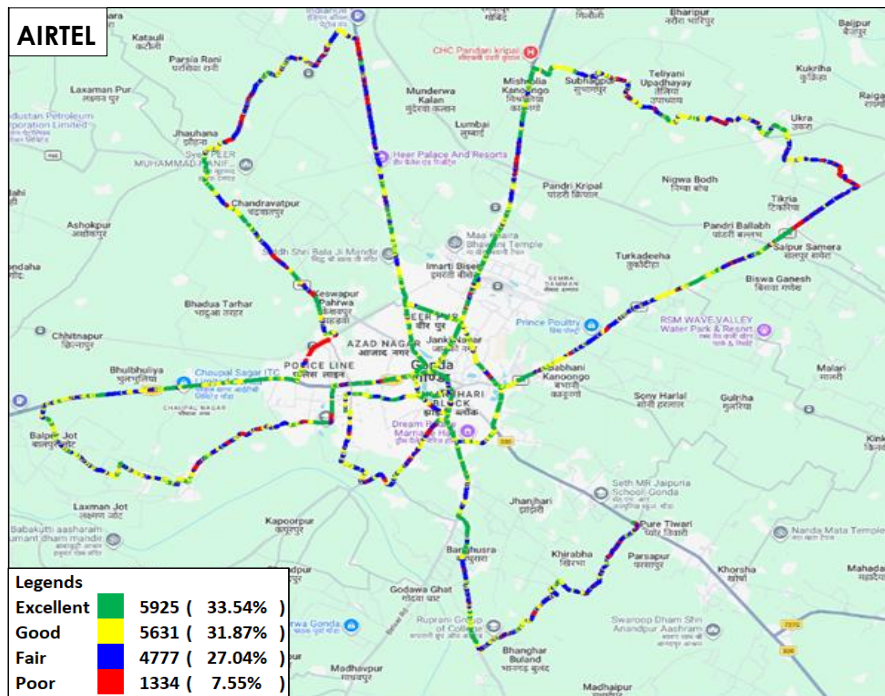


Figure-196: Signal strength 3G/2G network mode voice - AIRTEL.

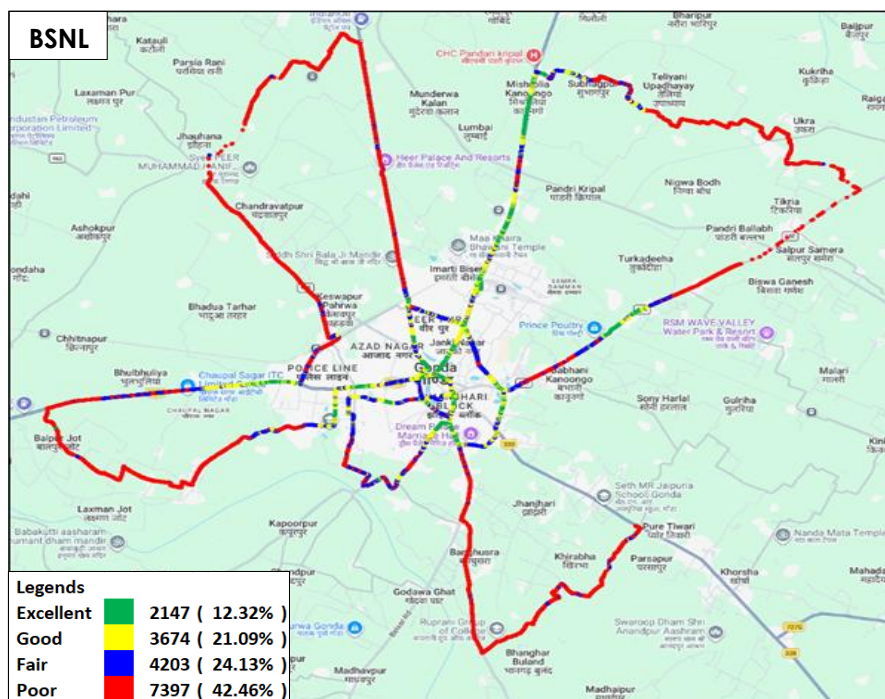


Figure-197: Signal strength 3G/2G network mode voice - BSNL.

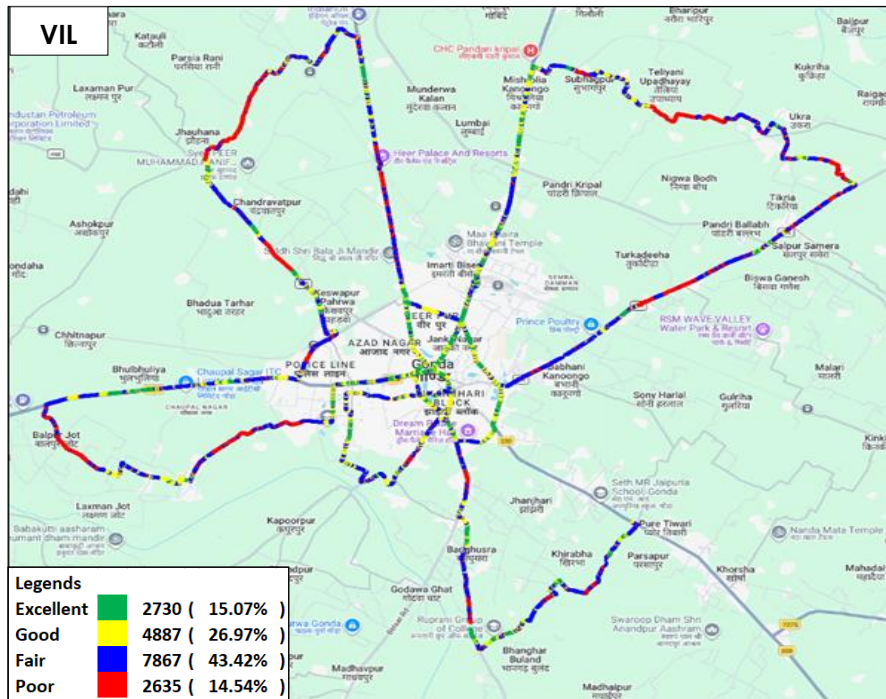


Figure-198: Signal strength 3G/2G network mode voice - VIL.

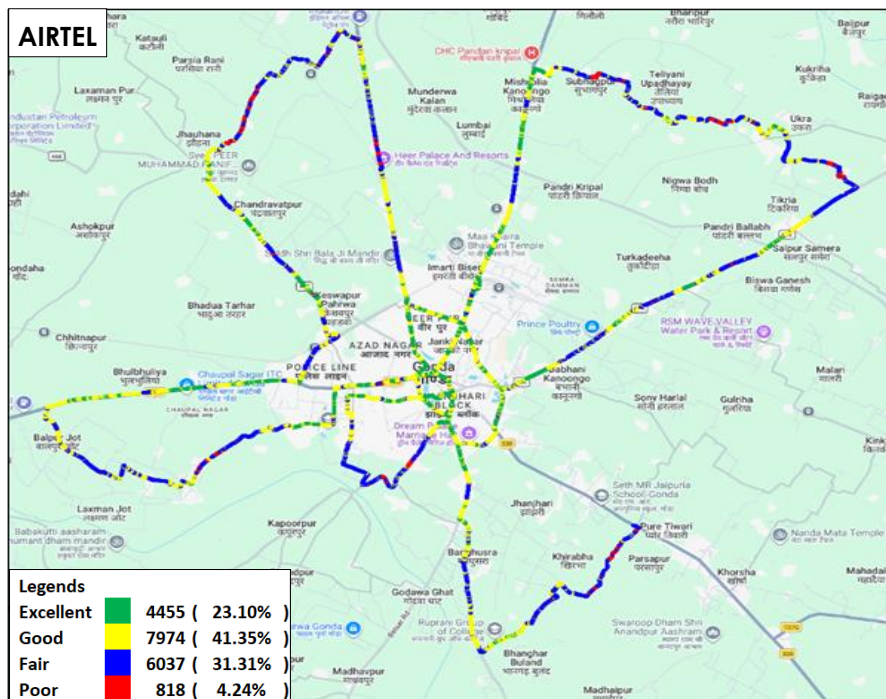


Figure-199: Signal strength auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

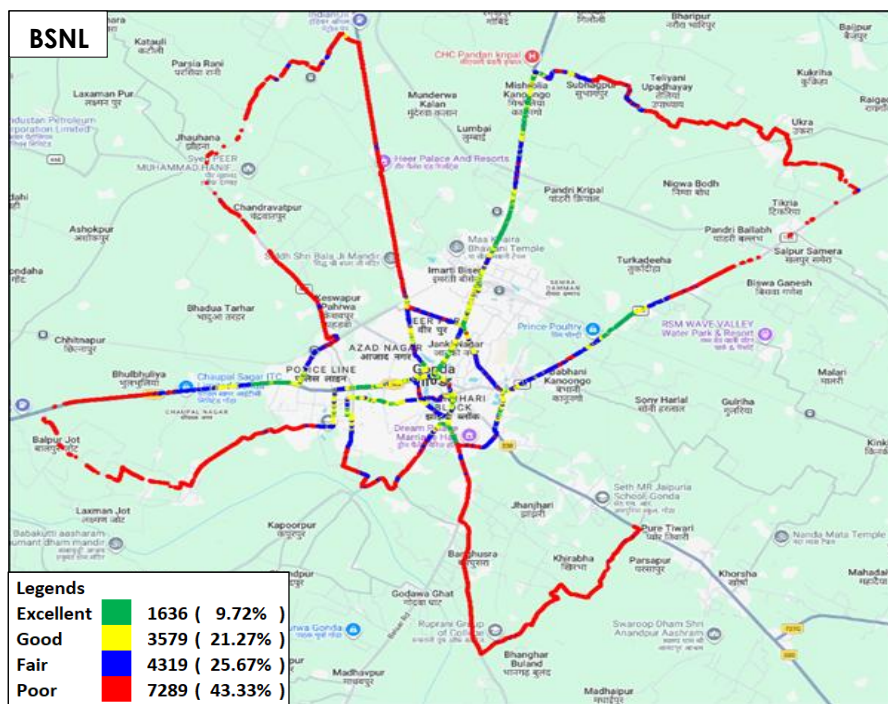


Figure-200: Signal strength auto-selection mode (5G/4G/3G/2G) voice - BSNL.

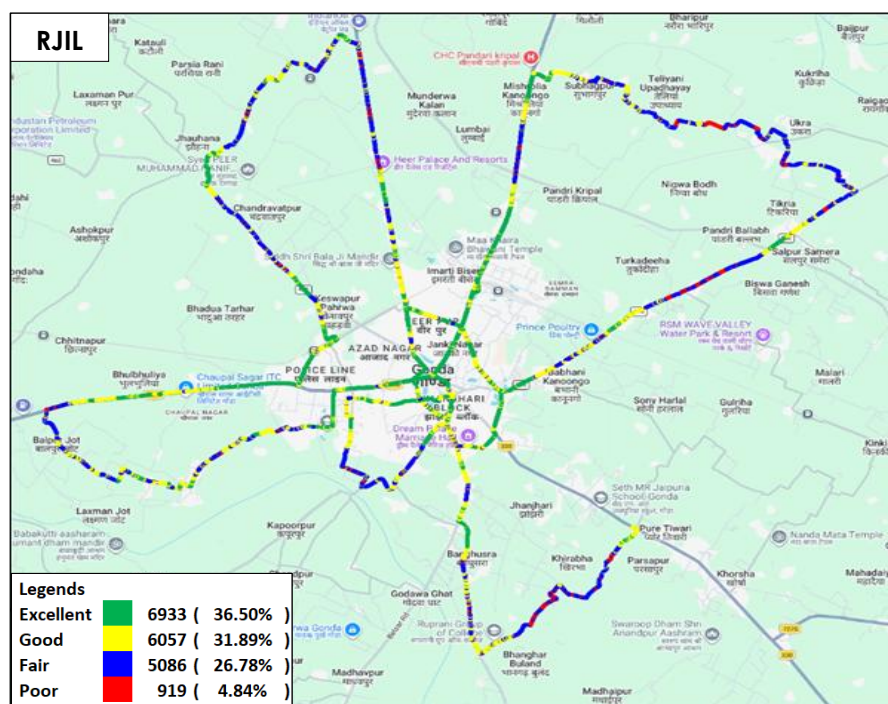


Figure-201: Signal strength auto-selection mode (5G/4G/3G/2G) voice - RJIL.

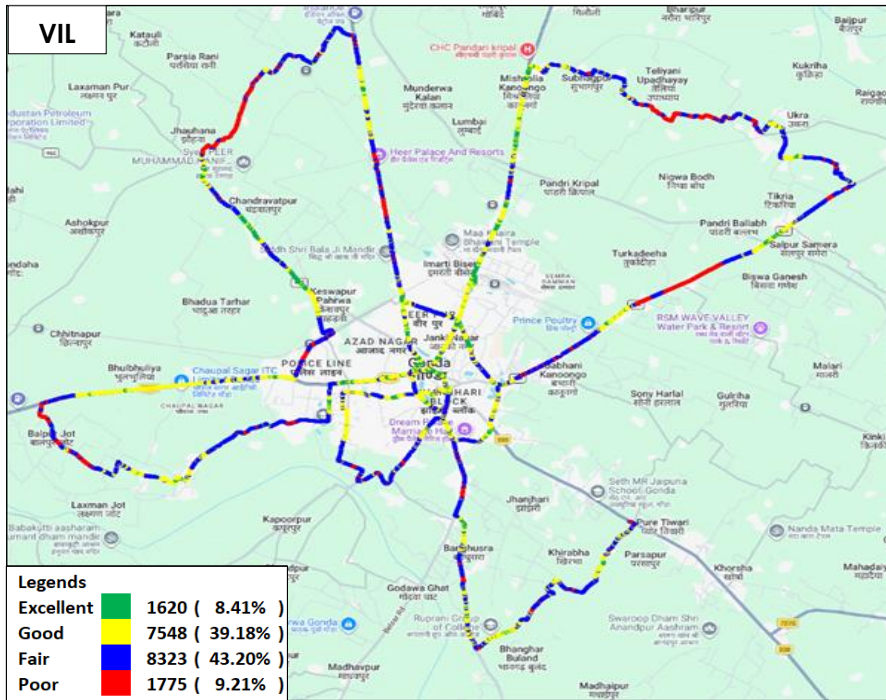


Figure-202: Signal strength auto-selection mode (5G/4G/3G/2G) voice - VIL.

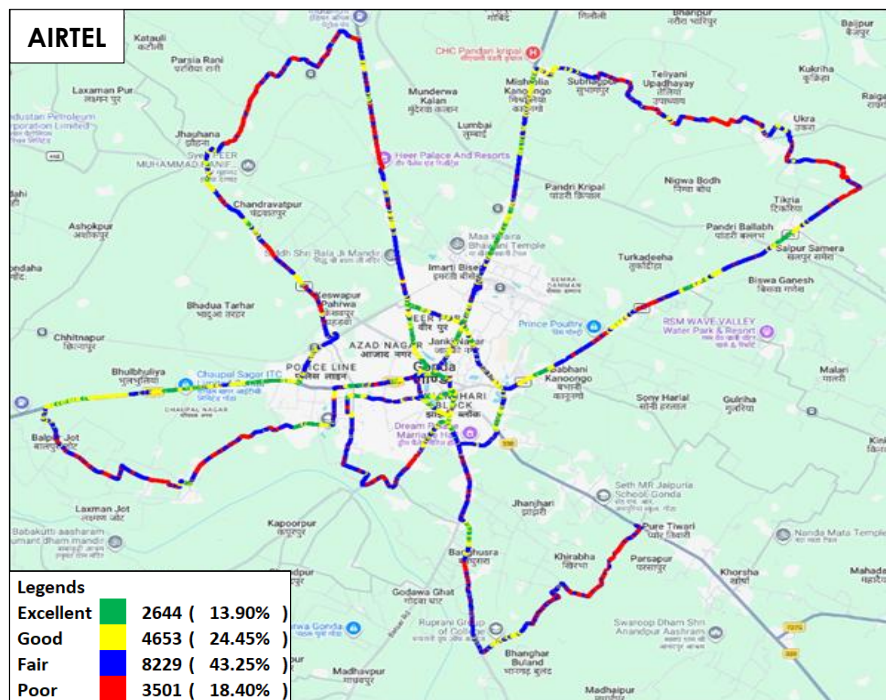


Figure-203: Signal strength auto-selection mode (5G/4G/3G/2G) data - AIRTEL.

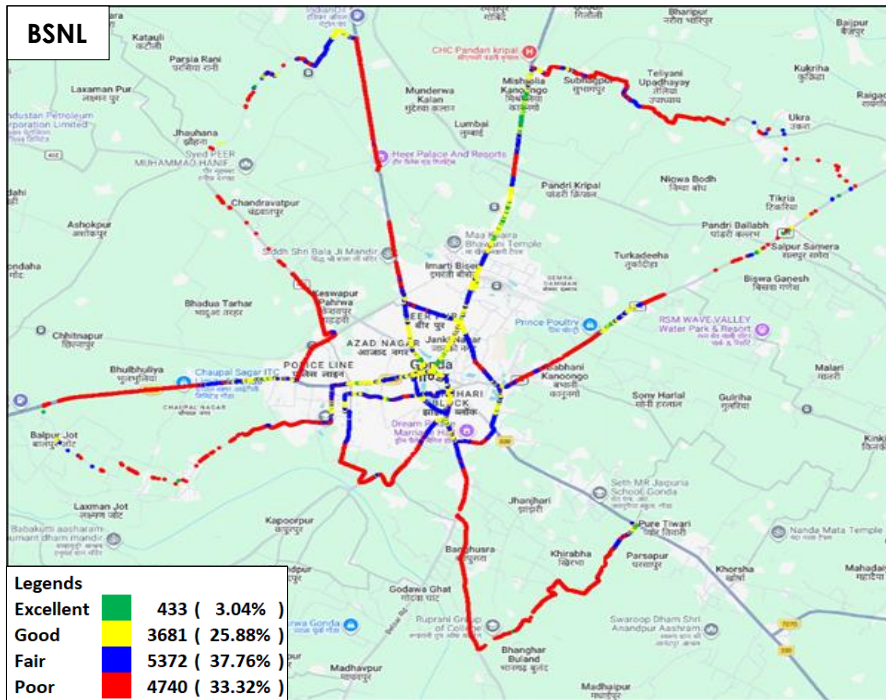


Figure-204: Signal strength auto-selection mode (5G/4G/3G/2G) data - BSNL.

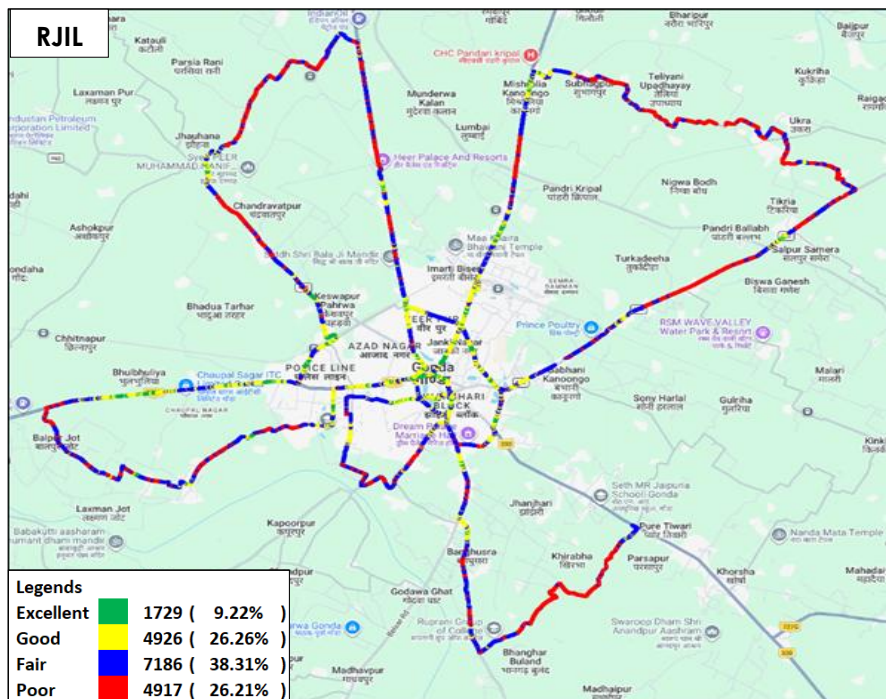


Figure-205: Signal strength auto-selection mode (5G/4G/3G/2G) data - RJIL.

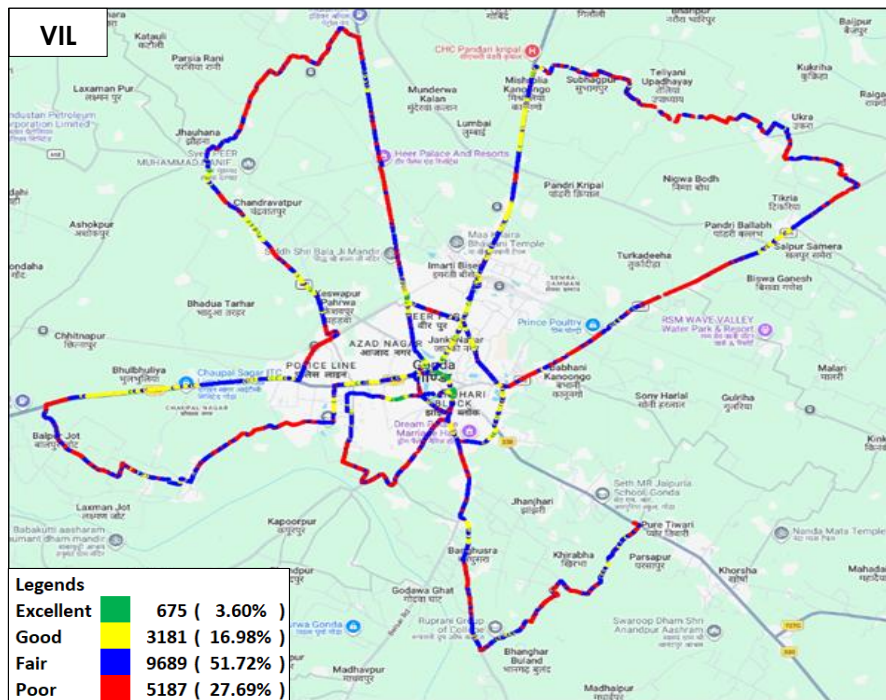


Figure-206: Signal strength auto-selection mode (5G/4G/3G/2G) data - VIL.

ii) Bahraich

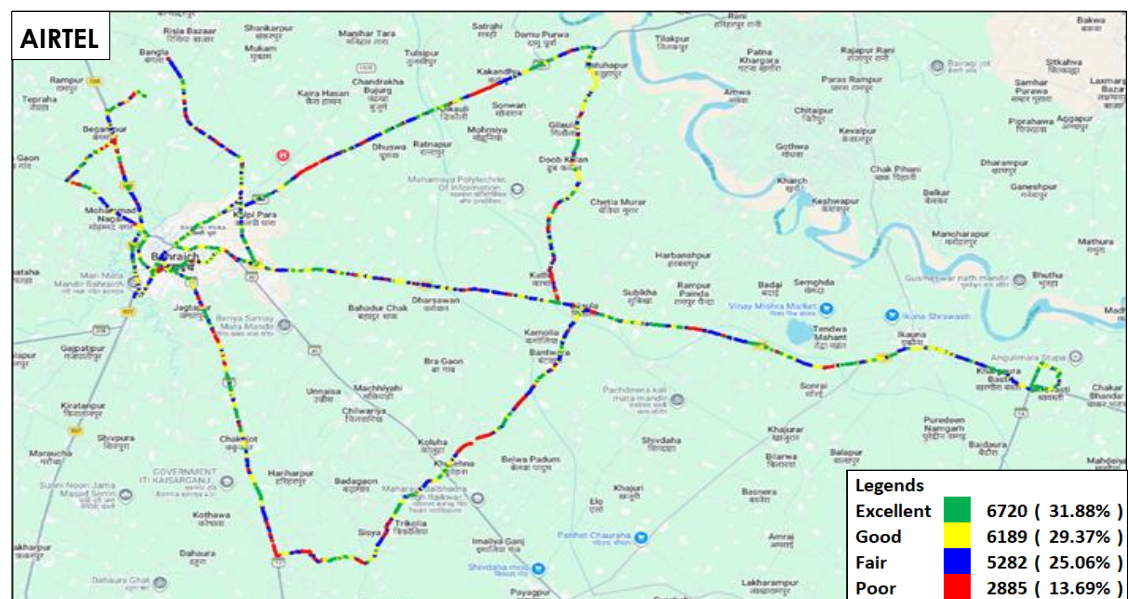


Figure-207: Signal strength 3G/2G network mode voice - AIRTEL.

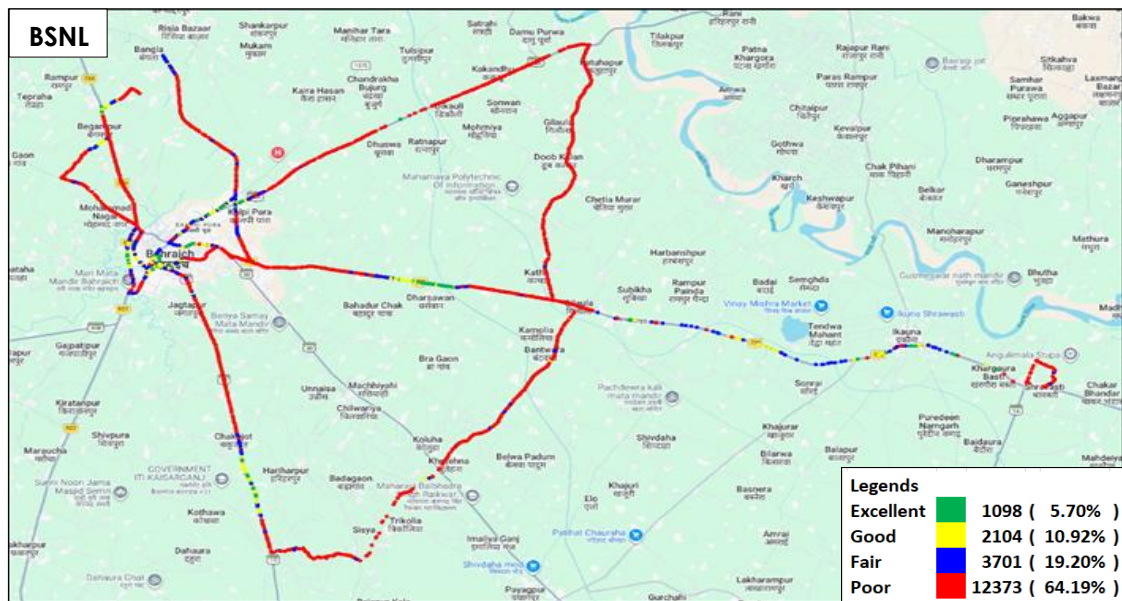


Figure-208: Signal strength 3G/2G network mode voice - BSNL.



Figure-209: Signal strength 3G/2G network mode voice - VIL.



Figure-210: Signal strength auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

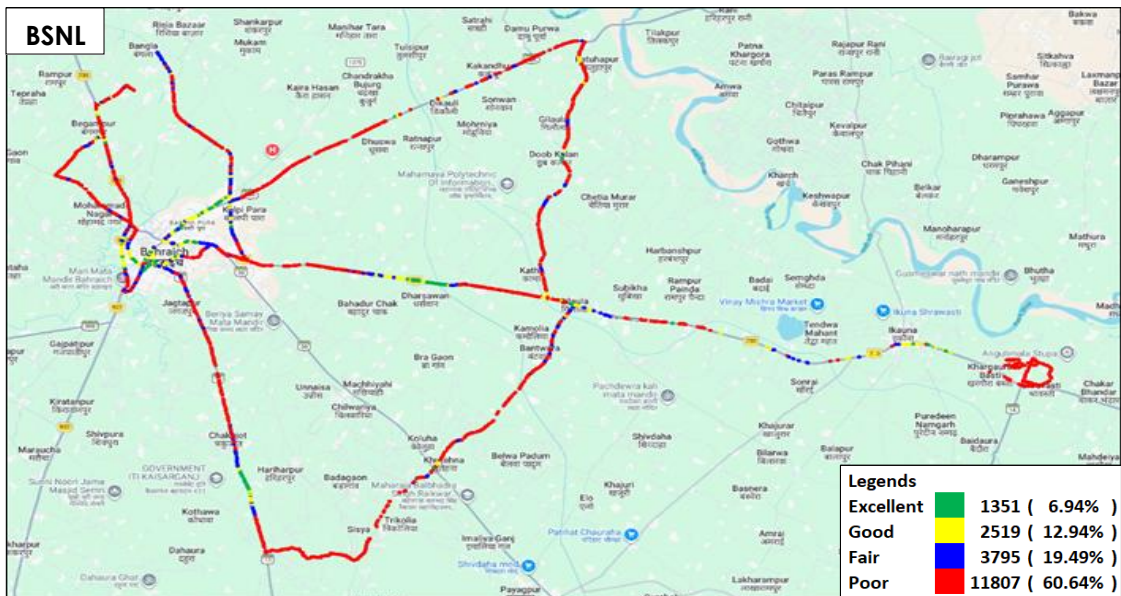


Figure-211: Signal strength auto-selection mode (5G/4G/3G/2G) voice - BSNL.

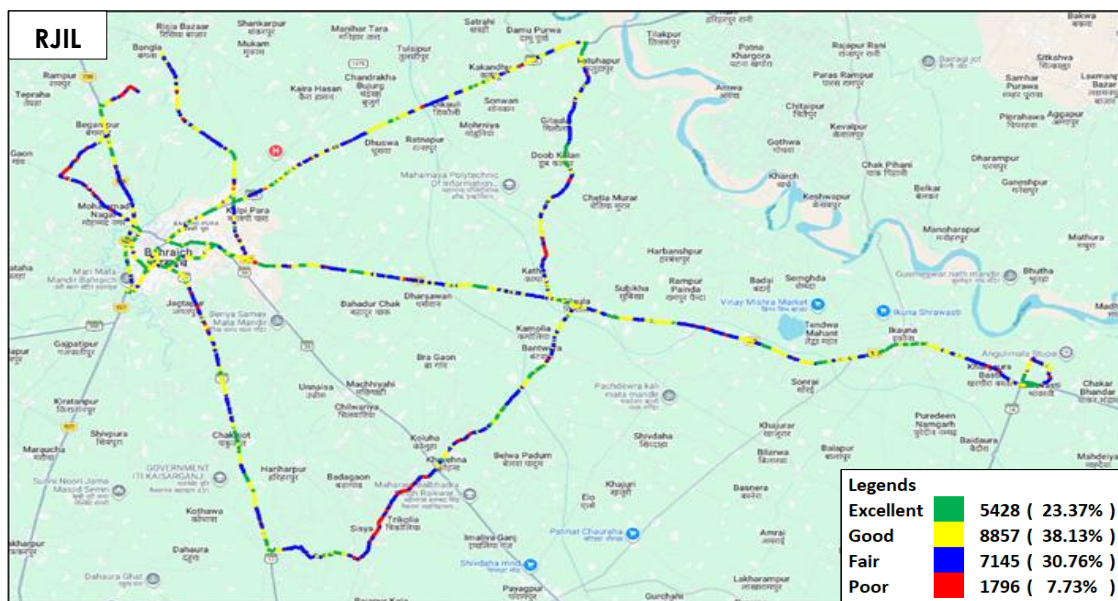


Figure-212: Signal strength auto-selection mode (5G/4G/3G/2G) voice - RJIL.



Figure-213: Signal strength auto-selection mode (5G/4G/3G/2G) voice - VIL.



Figure-214: Signal strength auto-selection mode (5G/4G/3G/2G) data - AIRTEL.

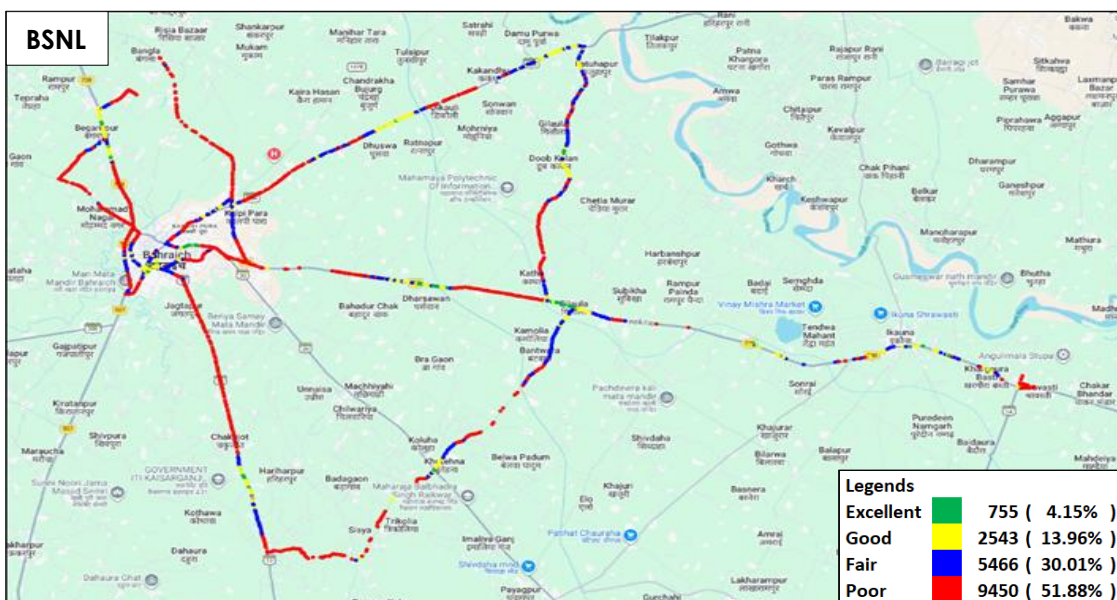


Figure-215: Signal strength auto-selection mode (5G/4G/3G/2G) data - BSNL.



Figure-216: Signal strength auto-selection mode (5G/4G/3G/2G) data - RJIL.



Figure-217: Signal strength auto-selection mode (5G/4G/3G/2G) data - VIL.

iii) Balrampur



Figure-218: Signal strength 3G/2G network mode voice - AIRTEL.

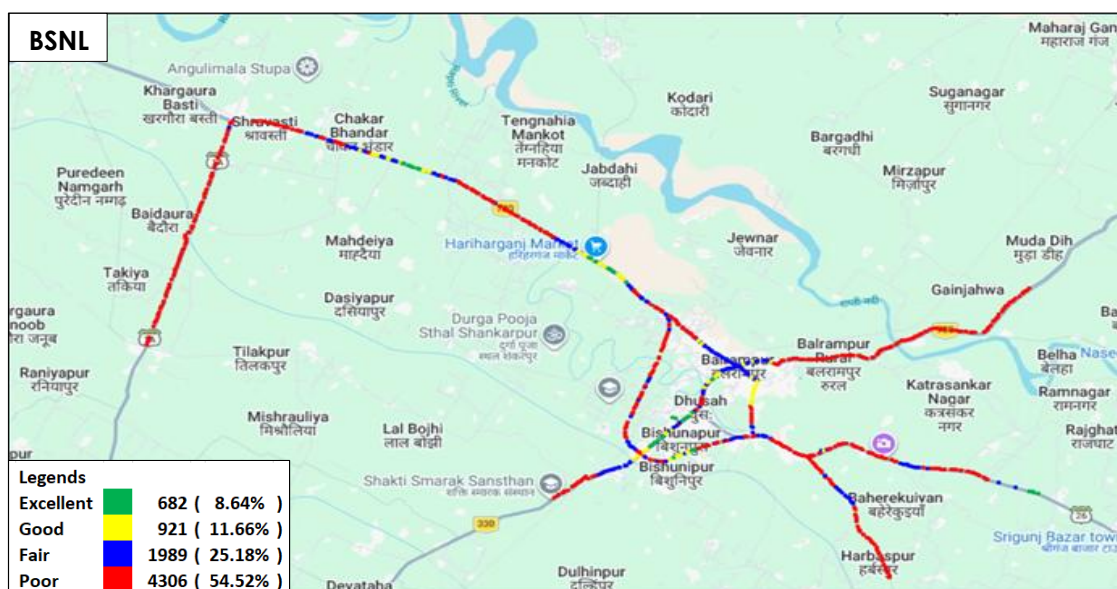


Figure-219: Signal strength 3G/2G network mode voice - BSNL.



Figure-220: Signal strength 3G/2G network mode voice - VIL.

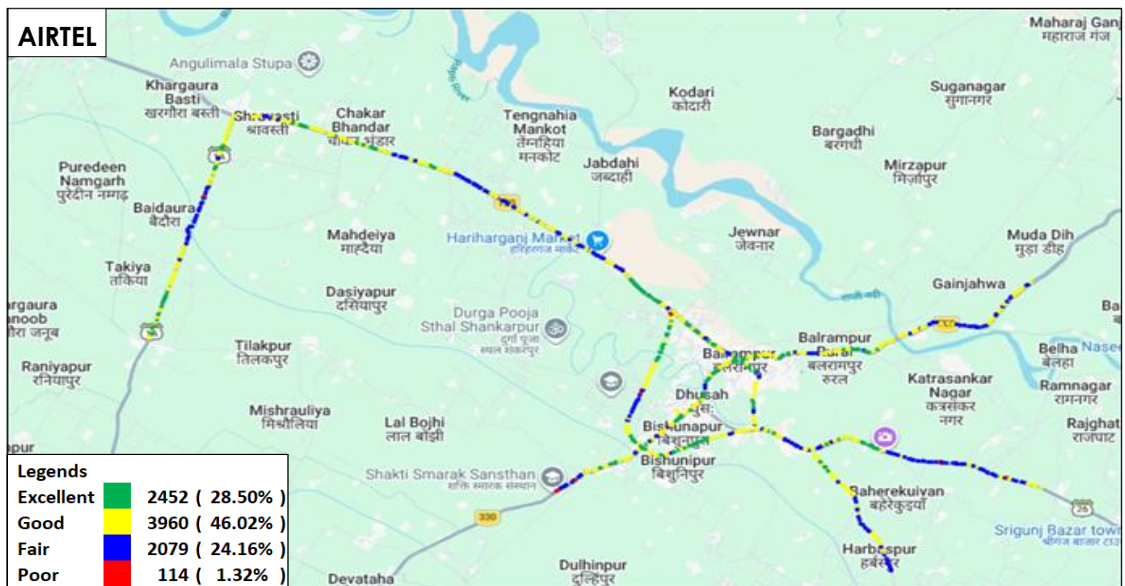


Figure-221: Signal strength auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

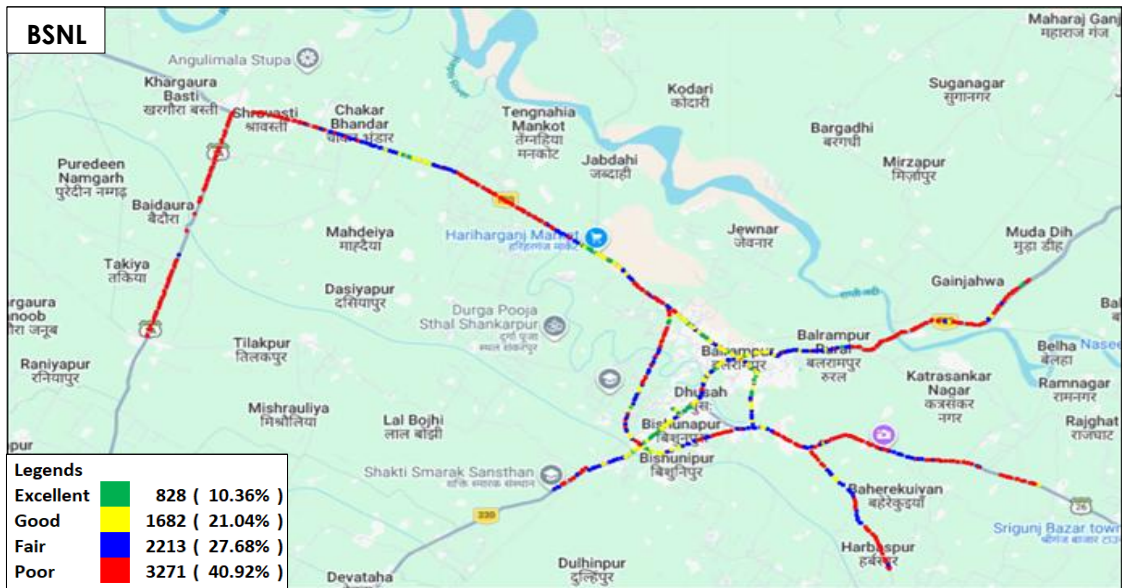


Figure-222: Signal strength auto-selection mode (5G/4G/3G/2G) voice - BSNL.

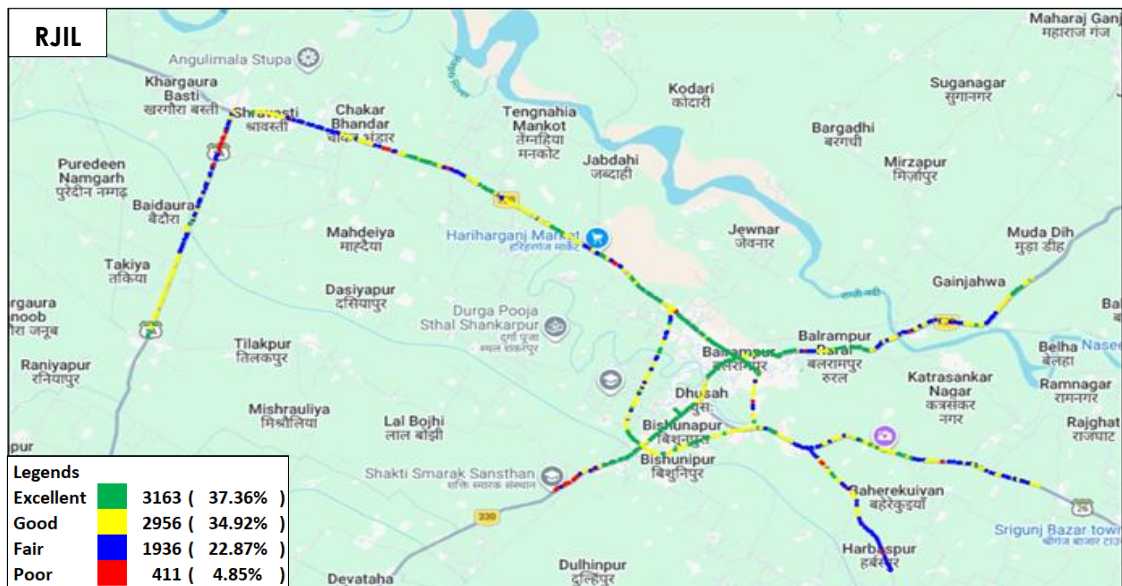


Figure-223: Signal strength auto-selection mode (5G/4G/3G/2G) voice - RJIL.



Figure-224: Signal strength auto-selection mode (5G/4G/3G/2G) voice - VIL.

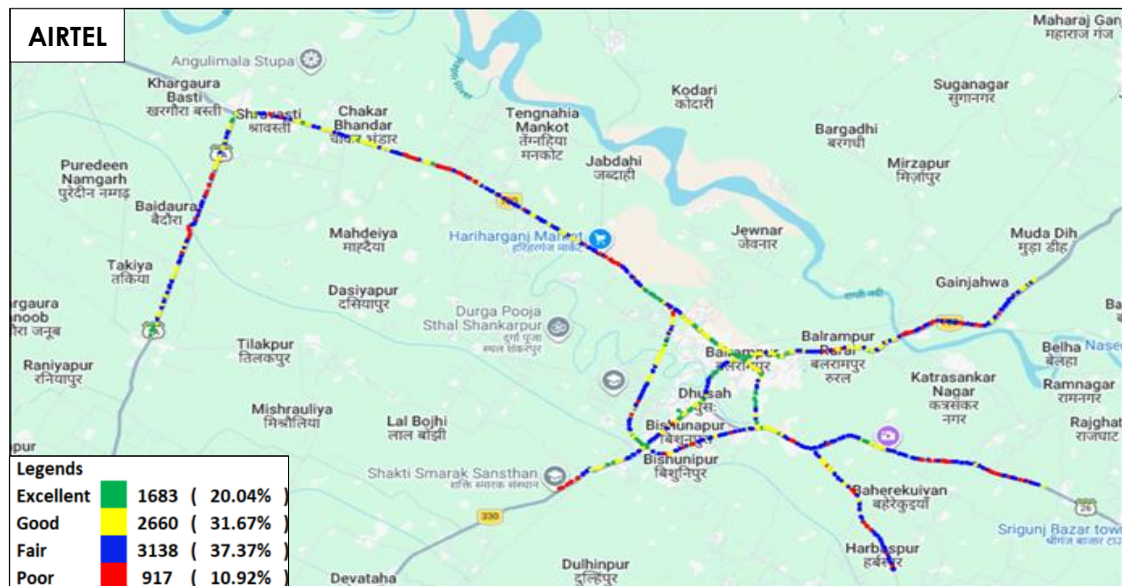


Figure-225: Signal strength auto-selection mode (5G/4G/3G/2G) data - AIRTEL.

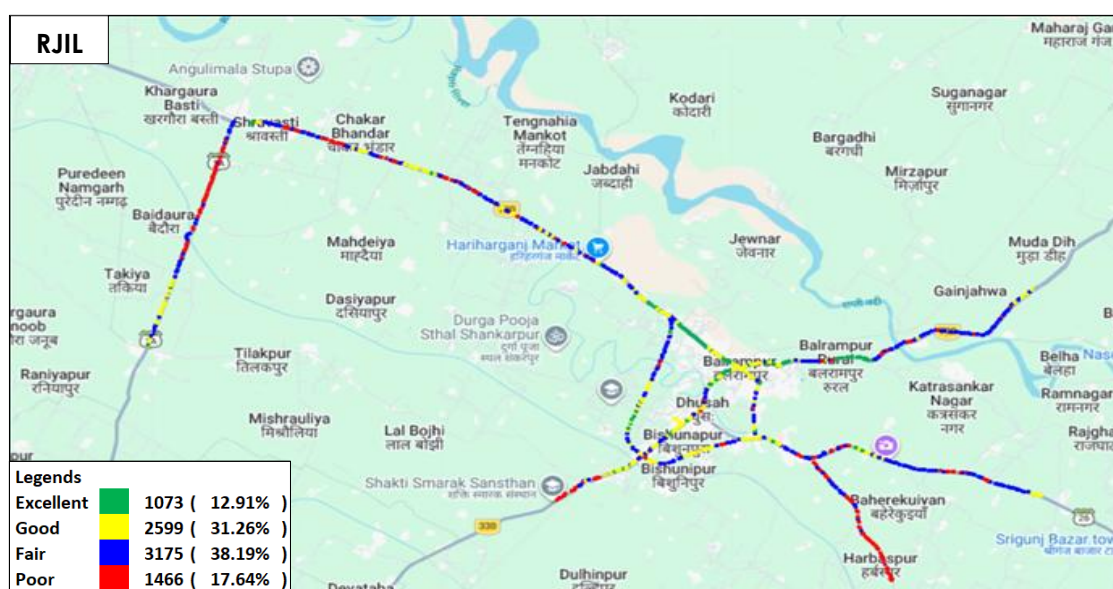
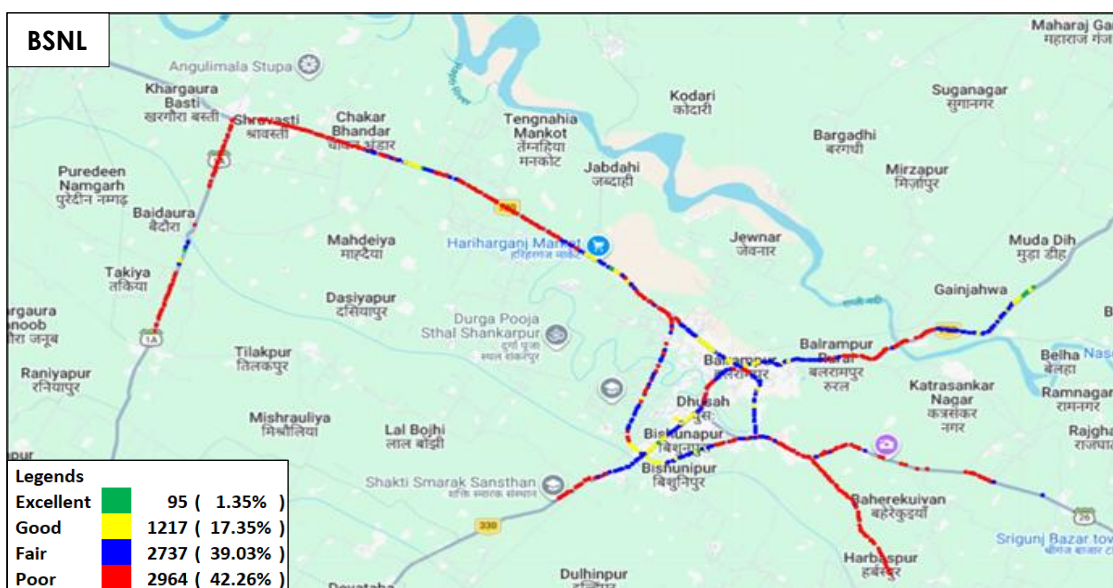




Figure-228: Signal strength auto-selection mode (5G/4G/3G/2G) data - VIL.

6.1.2 Highway

i) Prayagraj to Gonda

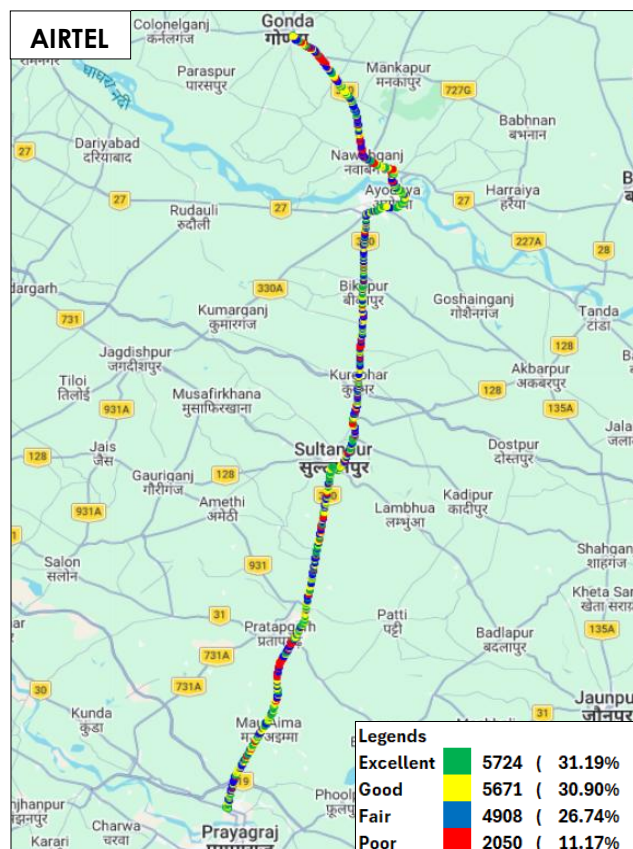


Figure-229: Signal strength 3G/2G network mode voice - AIRTEL.



Figure-230: Signal strength 3G/2G network mode voice - BSNL.

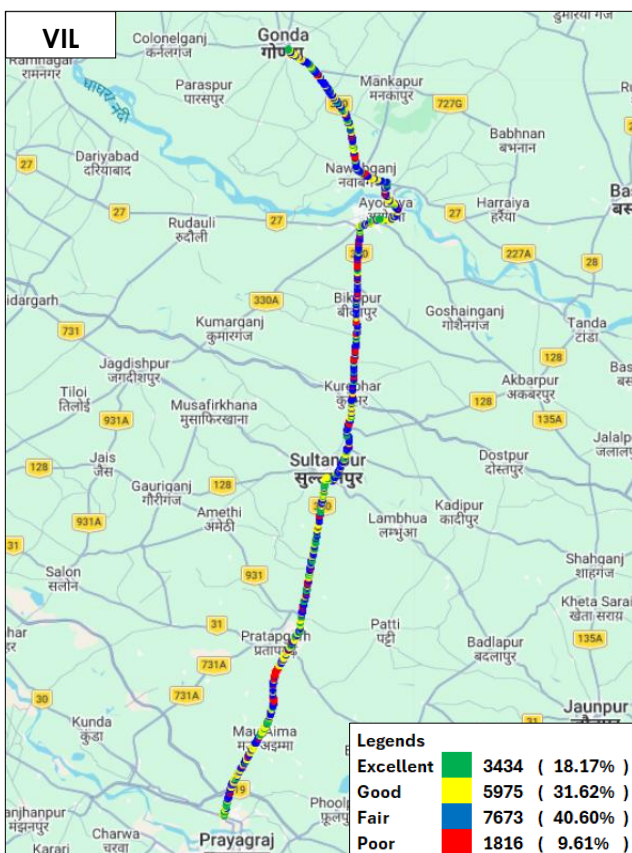


Figure-231: Signal strength 3G/2G network mode voice - VIL.

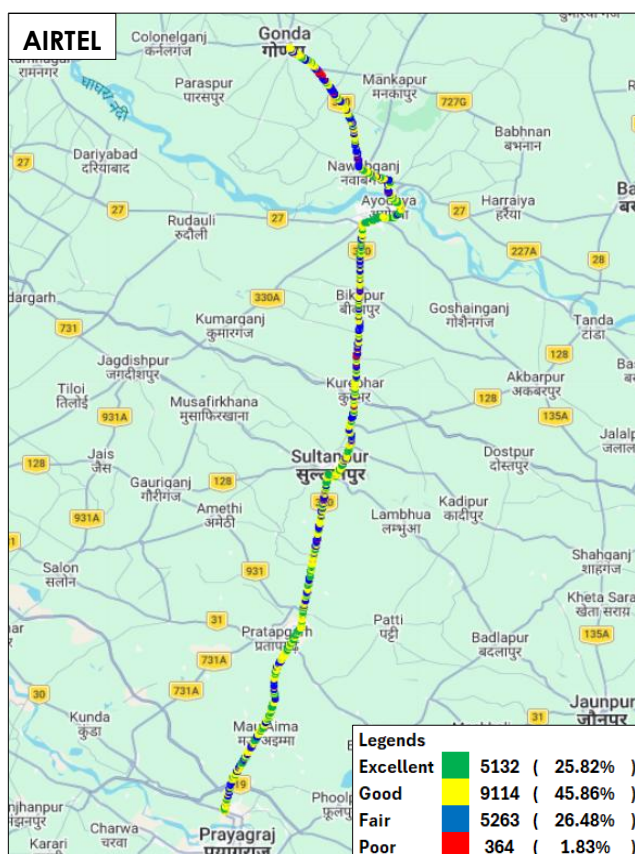


Figure-232: Signal strength auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.



Figure-233: Signal strength auto-selection mode (5G/4G/3G/2G) voice - BSNL.

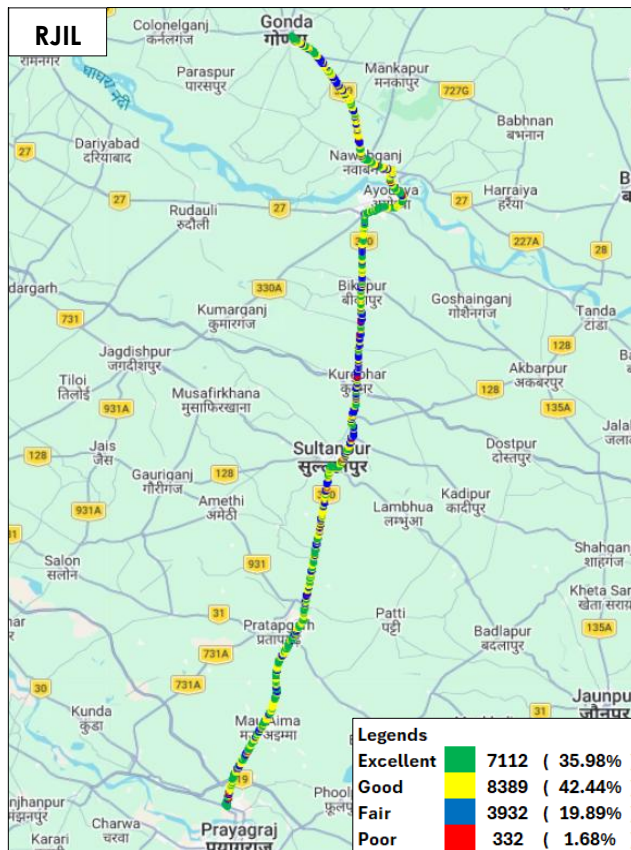


Figure-234: Signal strength auto-selection mode (5G/4G/3G/2G) voice - RJIL.

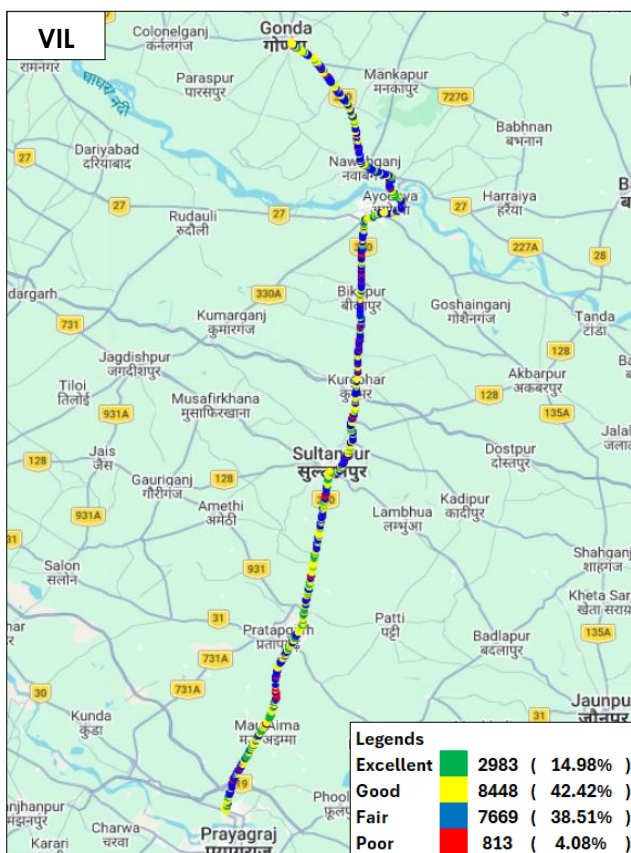


Figure-235: Signal strength auto-selection mode (5G/4G/3G/2G) voice - VIL.

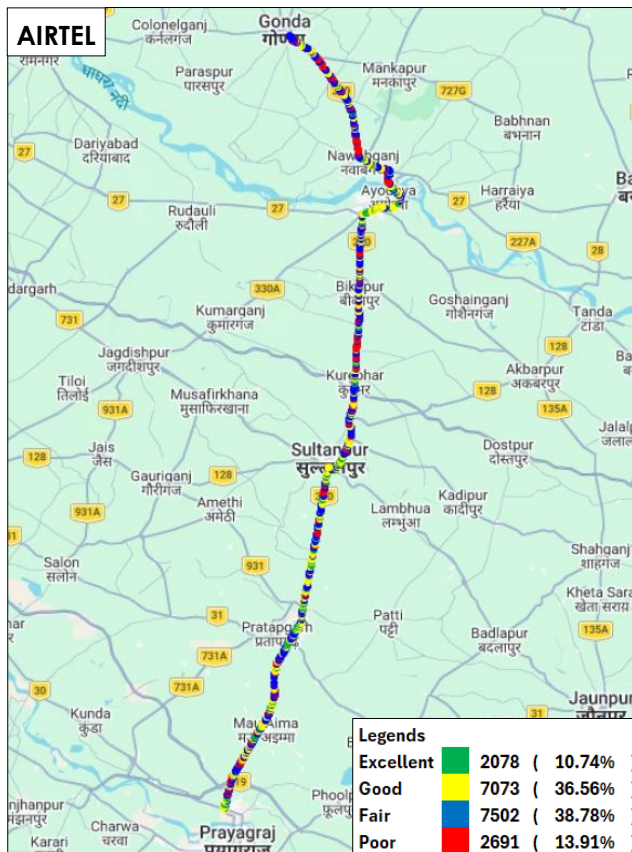


Figure-236: Signal strength auto-selection mode (5G/4G/3G/2G) data - AIRTEL.



Figure-237: Signal strength auto-selection mode (5G/4G/3G/2G) data - BSNL.

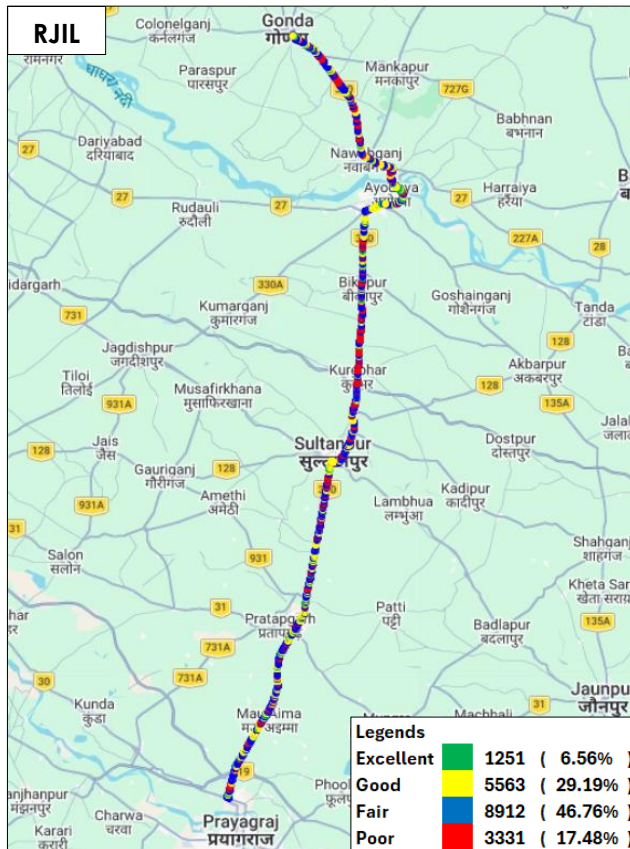


Figure-238: Signal strength auto-selection mode (5G/4G/3G/2G) data - RJIL.



Figure-239: Signal strength auto-selection mode (5G/4G/3G/2G) data - VIL.

ii) Gonda to Bahraich

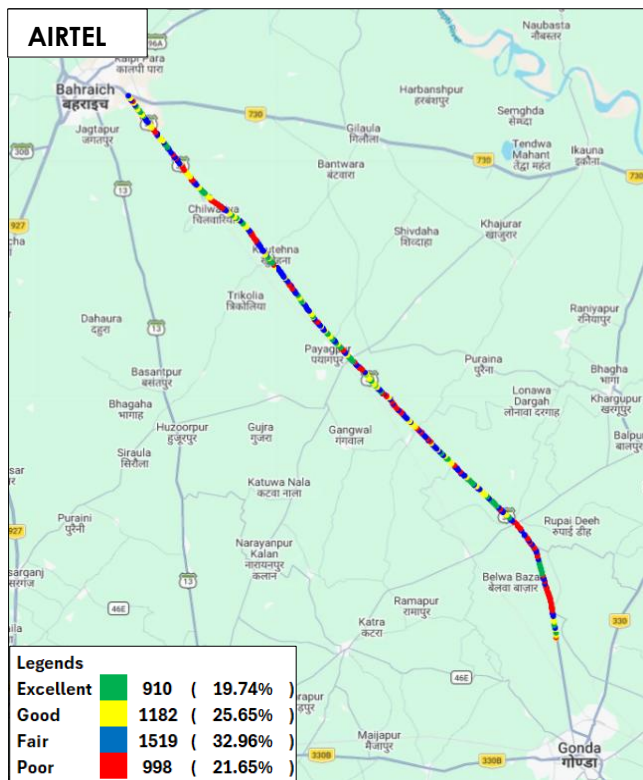


Figure-240: Signal strength 3G/2G network mode voice - AIRTEL.

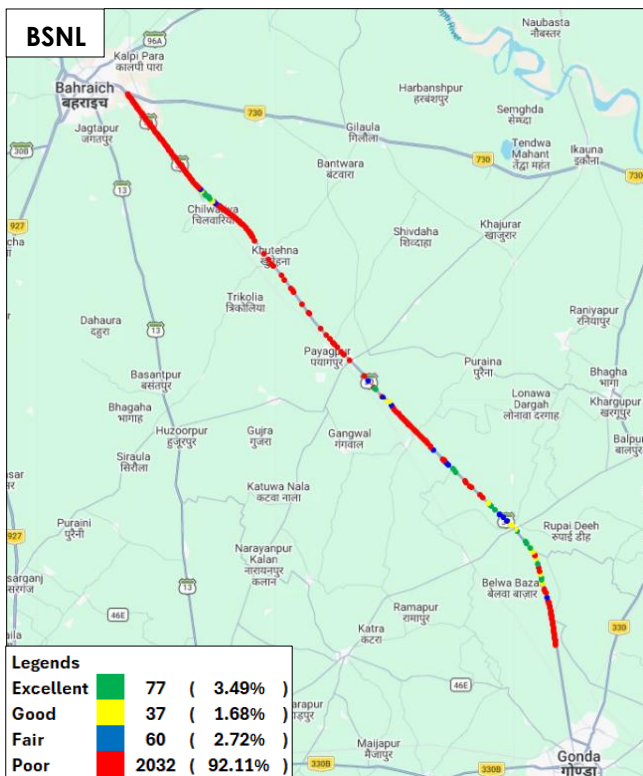


Figure-241: Signal strength 3G/2G network mode voice - BSNL.

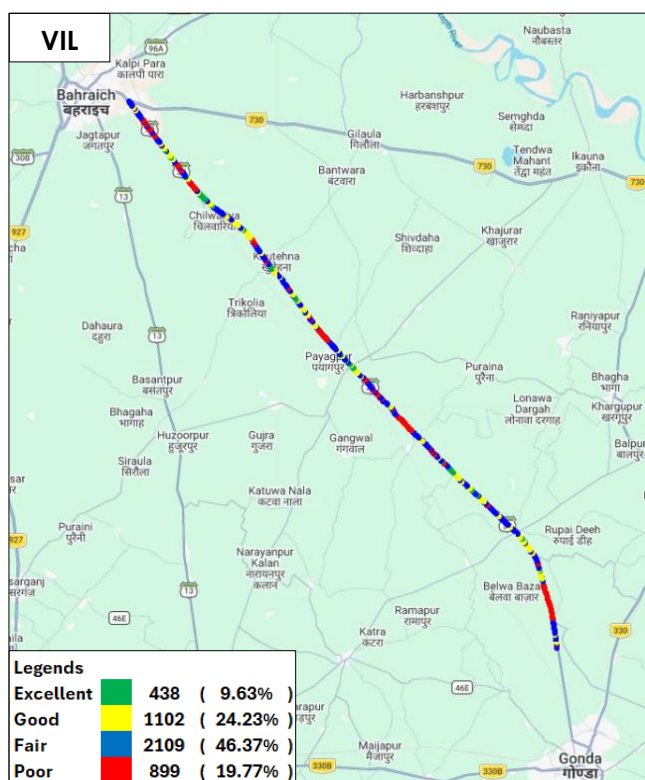


Figure-242: Signal strength 3G/2G network mode voice - VIL.

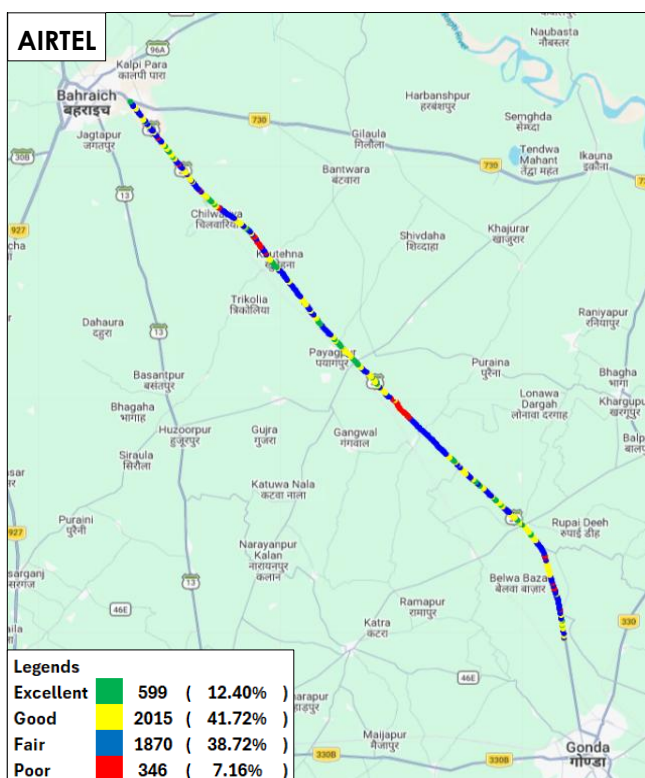


Figure-243: Signal strength auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

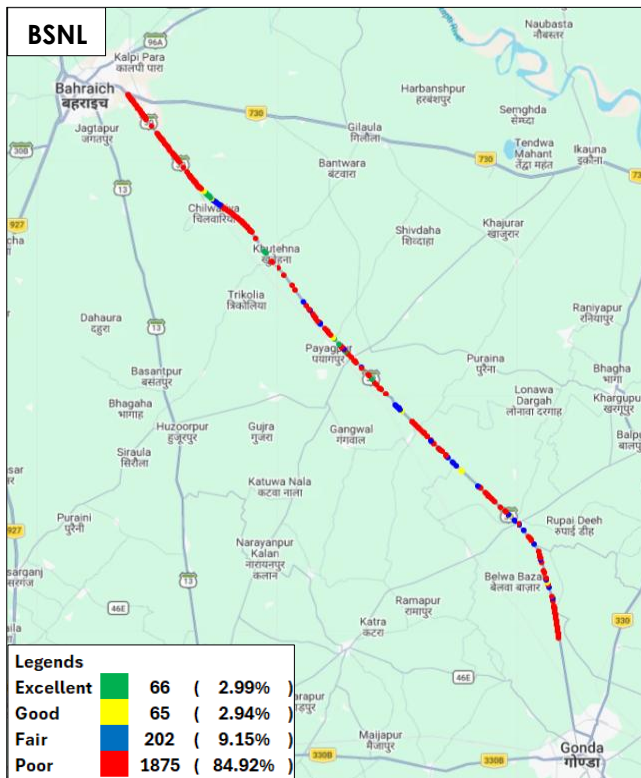


Figure-244: Signal strength auto-selection mode (5G/4G/3G/2G) voice - BSNL.

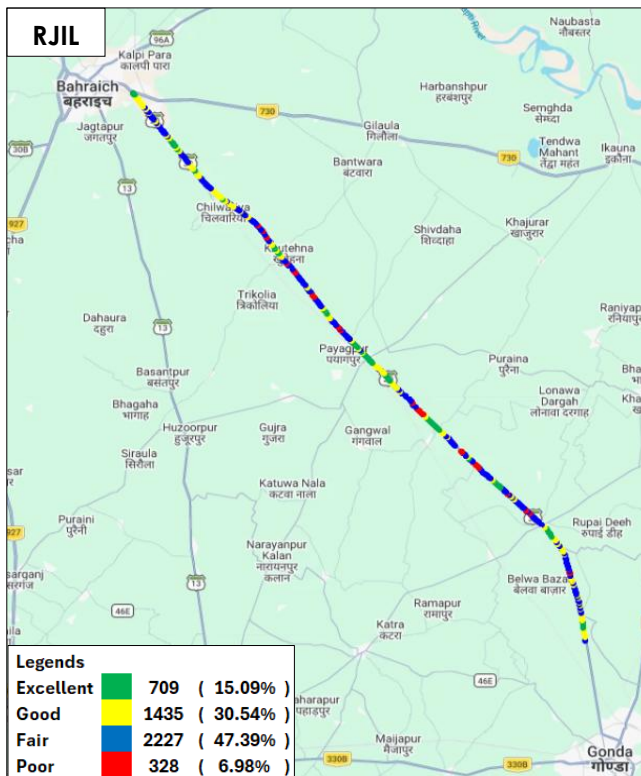


Figure-245: Signal strength auto-selection mode (5G/4G/3G/2G) voice - RJIL.

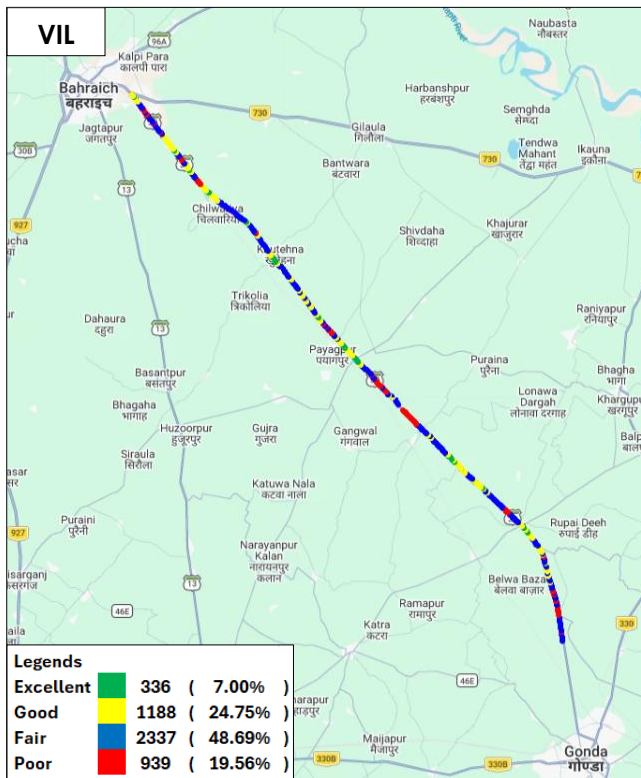


Figure-246: Signal strength auto-selection mode (5G/4G/3G/2G) voice - VIL.

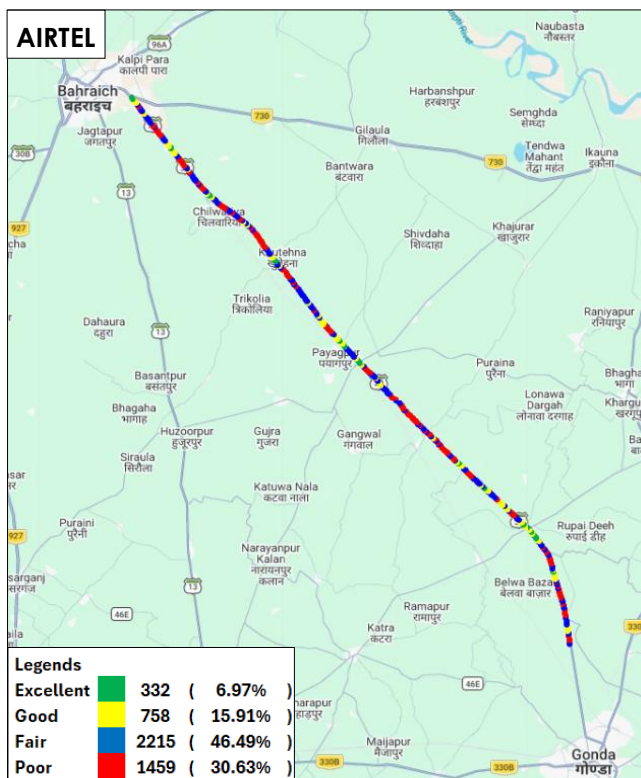


Figure-247: Signal strength auto-selection mode (5G/4G/3G/2G) data - AIRTEL.

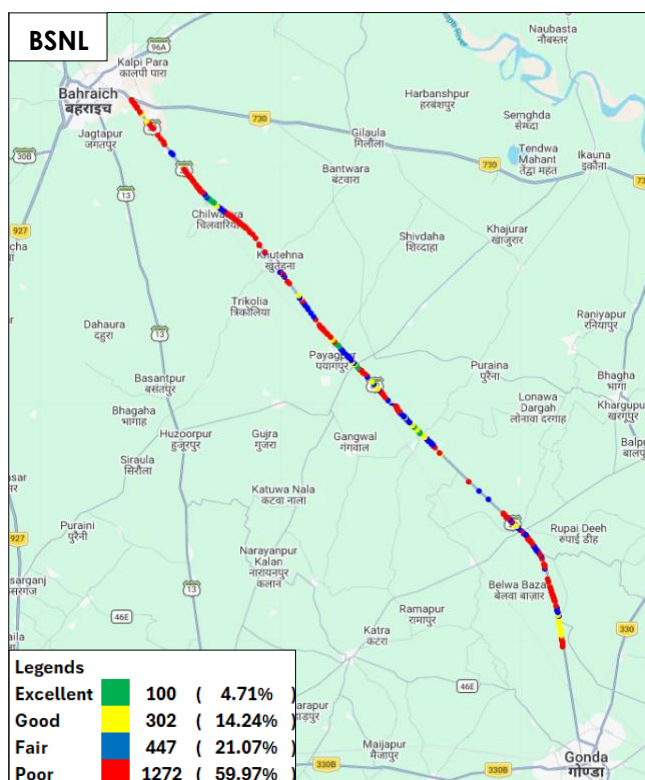


Figure-248: Signal strength auto-selection mode (5G/4G/3G/2G) data - BSNL.

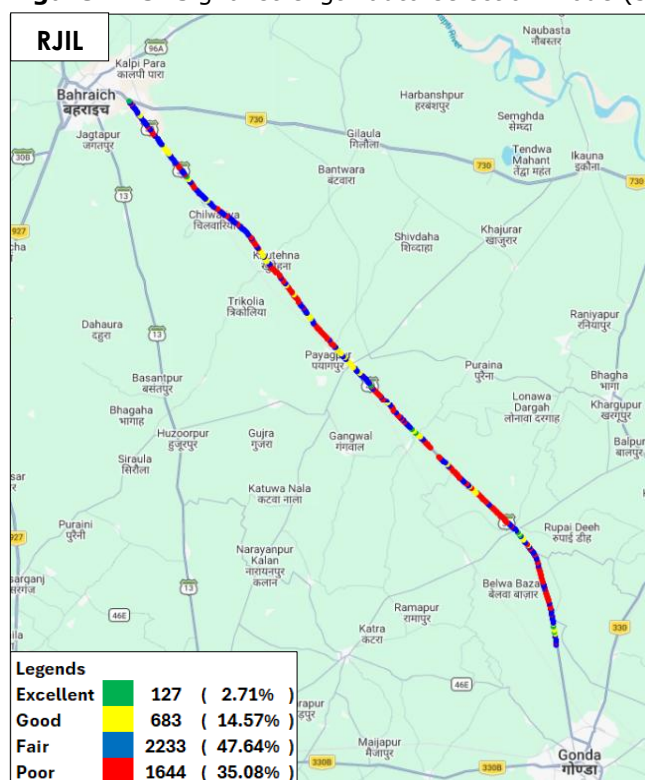


Figure-249: Signal strength auto-selection mode (5G/4G/3G/2G) data - RJIL.

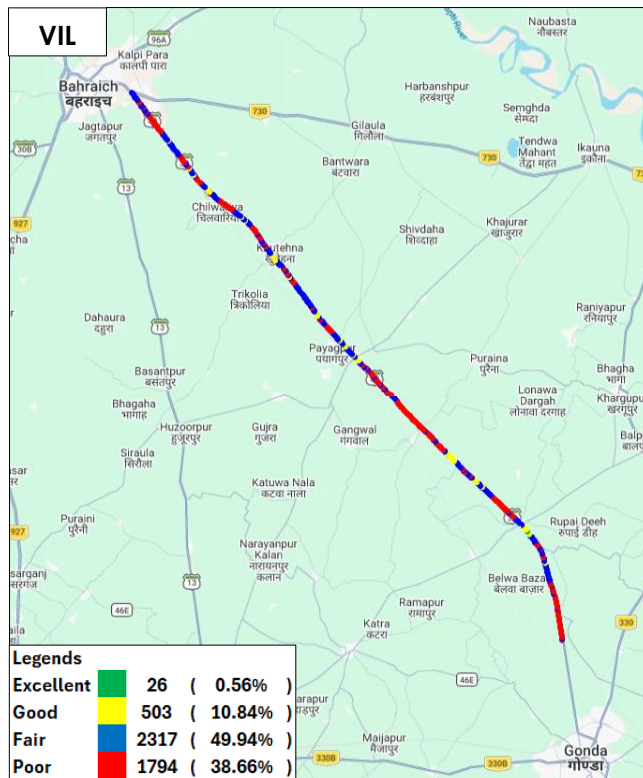


Figure-250: Signal strength auto-selection mode (5G/4G/3G/2G) data - VIL.

7. Appendix

The details of the setup used for conducting the drive test and the network or performance parameters captured under different conditions may be seen at Appendix-I. The calculation method of each QoS parameter is given in Appendix-II of the report. The summary of key equipment used in technical setup is as under

- **Device-1:** OnePlus Nord CE3 for 3G/2G CAT-15 Smartphone.
- **Device-2:** Samsung Galaxy S23 for 5G/4G/3G/2G CAT-20 Smartphone
- **Drive test Software:** Azenqos Engineering capable Applications to capture actual user experience.

7.1 Appendix-I

7.1.1 Drive test setup

Voice Call		
Call details	Technology	Detail
Call Setup Timeout	• 3G/2G auto mode- switch Call • 5G/4G/3G/2G auto mode- switch Call • 5G/4G MOS Call	30 Sec
Call Duration		90/180 seconds
Wait/ Guard Time		15 Sec

Table-81: Voice test detail

Note-

- There is 15 sec wait time after locking and before starting first call in 3G/2G call.
- 10 calls to be made at each Hotspot location.
- Minimum 10 Calls to be made during the walk test. Call count will be increased based on walk test distance.
- Speech quality (MOS) has been measured only in city drive & highway by making Mobile to Mobile call.
- 180 Sec calls were made in highway route drive.

Data Test		
Test Type	Technology	Detail
FTP/HTTP Download	5G/4G/3G/2G Auto Mode	500 MB File- 30 Sec Timeout, (Multithread 3- TCP Connection at a time)
FTP/HTTP Upload		250 MB File- 30 Sec Timeout, (Multithread 3- TCP Connection at a time)
YouTube Streaming		20 Sec Video & 25 sec Timeout (Only at Hotspot)
Web Browsing		3 popular websites (www.google.co.in , www.irctc.co.in , www.sbi.bank.in) 20 sec timeout (only at Hotspot)

Latency & Jitter (TWAMP-UDP)		25 count- Dynamic 500 count- Hotspot Payload- 42 bytes in all drive
Packet Loss Rate (TWAMP-UDP & TCP)		500 counts (TWAMP-UDP) 500 counts (TCP) at each hotspot Payload- 42 bytes in all drive

Table-82: Data test detail

Note-

- 5 Data iteration to be done at each hotspot location.
- Minimum 5 iteration to be made during the walk test. Iteration count will be increased based on walk test distance.
- TWAMP-UDP & TCP test to be performed only once at hotspot location.
- Youtube & Web browsing test to be performed at static location only.
- All values are taken up to two decimal places with round off.
- Airtel server was used for FTP Download, FTP Upload, TCP and TWAMP testing, for Airtel
- Delhi-based TRAI server was used for HTTP Download, HTTP Upload, TCP and TWAMP testing, for BSNL.
- RJIL server was used for FTP Download, FTP Upload, TCP and TWAMP testing, for RJIL.
- VIL server was used for HTTP Download, HTTP Upload, TCP and TWAMP testing, for VIL.

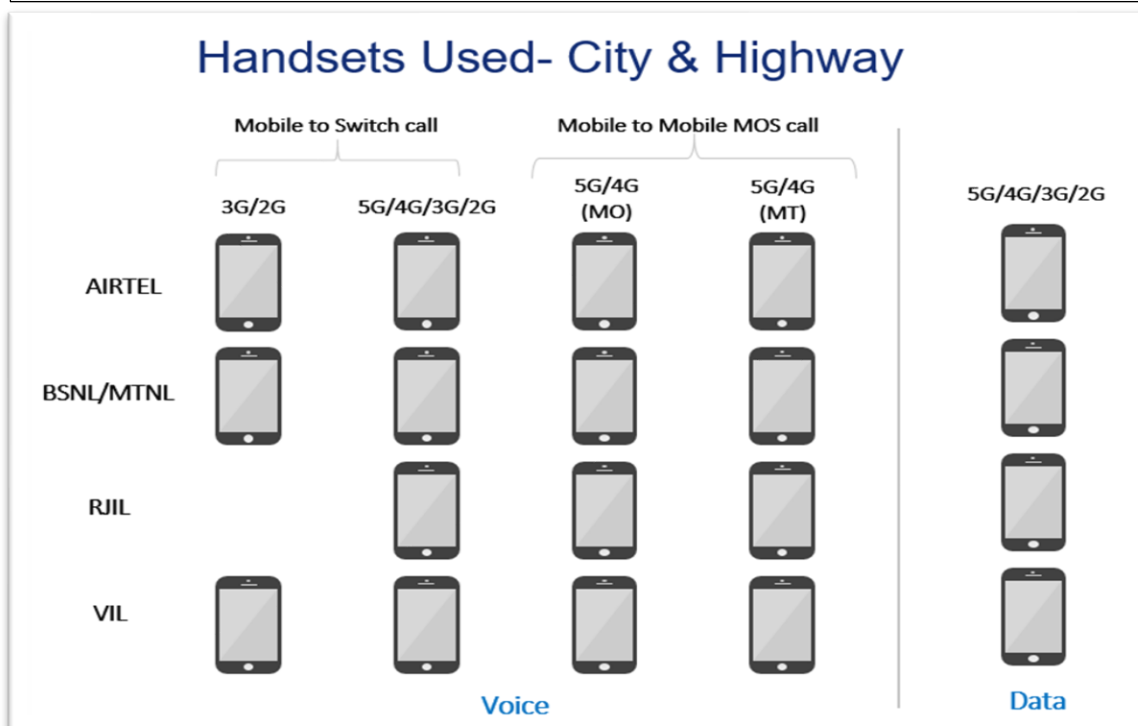


Figure-251: Number of handsets used in city & highway drive

MO: Mobile originating

MT: Mobile terminating

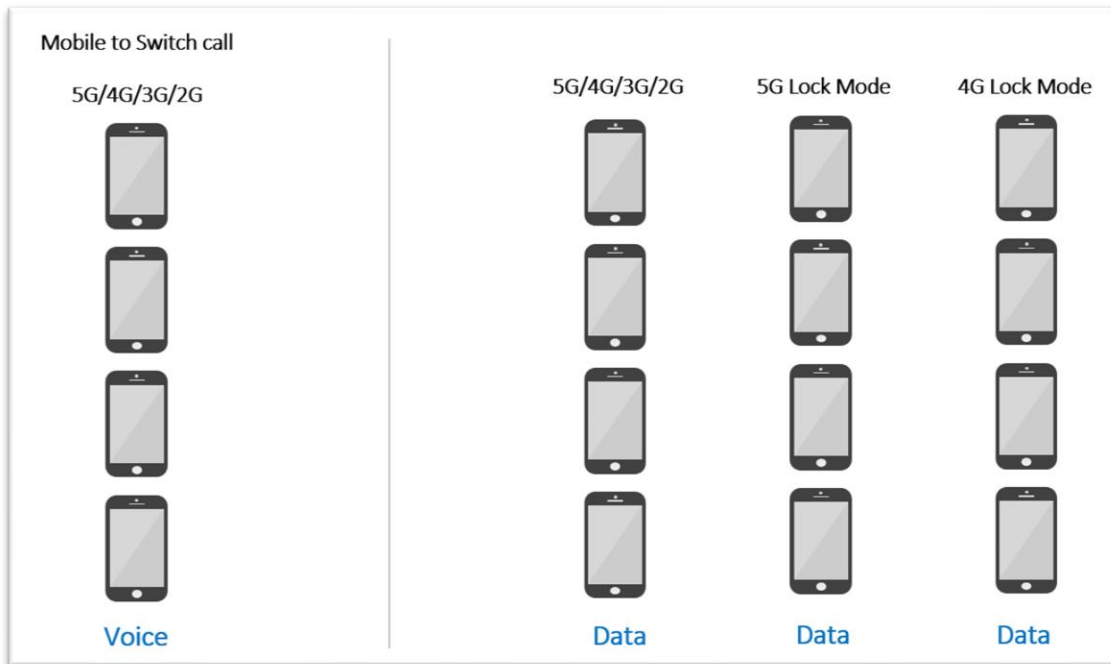


Figure-252: Number of handsets used in railway/metro/walktest/hotspot/coastal area

Note- 5G & 4G Lock mode testing has been performed at hotspot locations only.

7.1.2 Drive test Methodology

(a) Dynamic voice testing (on the move)

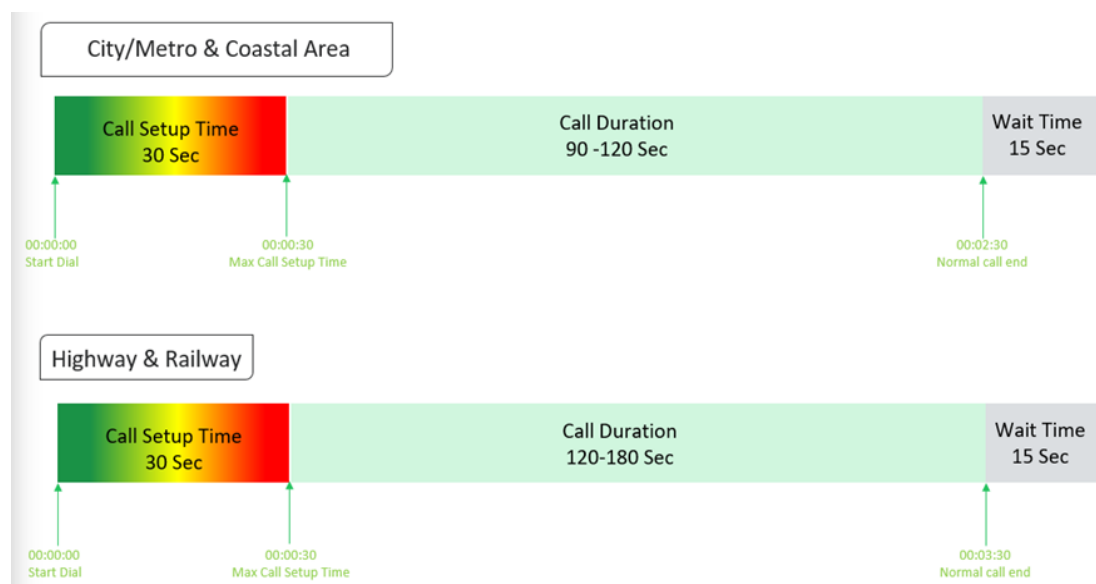


Figure-253: Voice test script for city/railway/metro/highway & coastal area

- 15 sec wait time is applied after locking Radio Access Technology (RAT) to 3G/2G and before starting first call in 3G/2G call.
- Speech quality (MOS) will be measured only City & Highway drive by making Mobile to Mobile calls.

(b) Hotspot voice testing



Figure-254: Voice test script for walktest/hotspot

- 10 calls to be made at each Hotspot location.
- Minimum 10 Calls to be made during the walk test. Call count will be increased based on walk test distance.

(c) Dynamic Data (internet) test

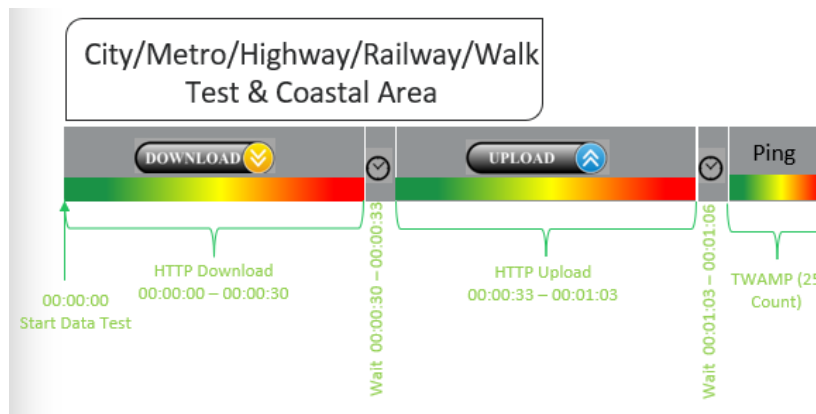


Figure-255: Data test script used in city/metro/railway/highway/walk test & coastal area

(d) Static Data(internet) testing

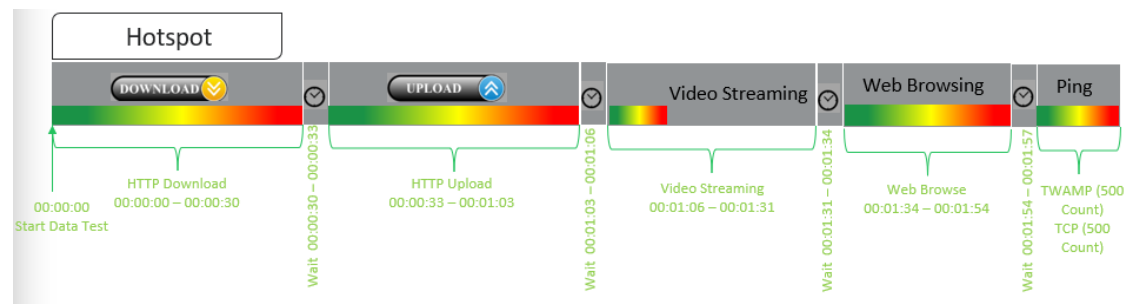


Figure-256: Data test script used at hotspot

- 5 Data iteration done at each hotspot location
- Min. 5 iteration made during the walk test.
- Web browsing duration mentioned above is for one web site only.
- One ping iteration (with 500 Count of each- TWAMP & TCP) done at hotspot location.

7.2 Appendix-II

7.2.1 Network Performance Parameters for Voice calls

Parameter Name	Definition
Call Setup Success Rate	(i) Call Setup Success Rate is defined as the ratio of Established Calls to Call Attempts. 'Established Calls' mean the following events have happened in call setup: (a) Call attempt is made (b) The signaling channel is allocated (c) The call is routed to the outwards path of the terminating network (d) An alert signal is received by caller in the form of ring back tone, busy tone, or an announcement. CSSR = (Total Call Established/ Total Call Attempt) *100 As per QoS Regulation 2024 benchmark value is >=98%
Drop Call Rate	Call drop represents the service provider network's ability to maintain a call once it has been successfully established. This parameter shall include both incoming calls and outgoing calls which, once they have been established and have an assigned traffic channel/ bearer, are dropped, or interrupted before their normal completion by the user, the cause of the early termination being within the service provider's network Drop Call Rate = (Total Call Drop/Total Call Established) *100 As per QoS Regulation 2024 benchmark value is <=2%
Call Setup Time	Time taken from call initiate to call alerting/ringing. Call Setup Time = T2- T1 T2- Ringing (VoLTE/VoNR) & Alerting (for WCDMA & GSM), T1- Invite (VoLTE/VoNR) & CM Service Request (for WCDMA & GSM)
Voice Quality (MOS)	Voice quality in mobile networks is measured with algorithms based on ITU-T P.863 (POLQA). The grading for Voice quality has been given as: Excellent: MOS ≥ 4 and < 5 Good : MOS ≥ 3 and < 4 Fair : MOS ≥ 2 and < 3 Poor : MOS ≥ 1 and < 2
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 type which are considered- 2G Inter & Intra cell, 3G Soft & IRAT, 4G Inter & Intra frequency & SRVCC, 5G Inter & Intra frequency & 5G to 4G handovers.
Silence Call	A call which has ≥ 4 sec continuous RTP gap is considered as a Silence Call. Silence call rate = (count of silence call / Total calls established) *100 If a call observes multiple silence count ≥ 4 sec in a particular established call it has been taken as one silent event.

Jitter	The inter arrival jitter is the difference in the relative transit time for two packets. The relative transit time is the difference between a packet's Real-time Transport Protocol (RTP) timestamp and the receiver's clock at the time of arrival, measured in the same units. If S_i is the RTP timestamp from packet i, and R_i is the time of arrival in RTP timestamps units for packet i, then for two packets i and j the inter-arrival jitter D can be expressed as: $D(i,j) = (R_j - R_i) - (S_j - S_i)$ The interarrival jitter is calculated continuously as each data packet i is received from source $SSRC_n$, using this difference D for that packet and the previous packet $i-1$ in order of arrival (not necessarily in sequence), according to the formula $J(i) = J(i-1) + (D(i-1,i) - J(i-1))/16$ or 8																																		
Downlink Packet Drop Rate	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 is calculated from MOS call for packet call only (VoNR/VoLTE)																																		
Uplink Packet Drop Rate	Number of RTP (Real-time Transport Protocol) Packets lost divided by total RTP packet received (against each source_SSRC and sequence number) at call terminating handset. This KPI is calculated from MOS call for packet call only (VoNR/VoLTE).																																		
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>Rx Level</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	Rx Level	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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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																														

Table-83: Network performance parameter and definition voice

7.2.2 Network Performance Parameters Data tests

Parameter Name	Definition
Download Speed (Mbps)	The download speed is defined as the data transmission rate that is achieved for downloading a test file from a test server to a test device. Download Speed = Total bytes transferred during download / Total time for transfer 80th percentile (upper range) & 20th percentile (lower range) value has been calculated for download throughput in dynamic drive and Hotspot combine data
Upload Speed (Mbps)	The upload speed is the data transmission rate that is achieved for uploading a test file from a test device to a test server. Upload Speed = Total bytes transferred during upload / Total time for transfer. 80th percentile (upper range) & 20th percentile (lower range) value has been calculated for upload throughput in dynamic drive and Hotspot combine data.
Download Session Setup Success Rate	(total download session established (successfully connected to server)/ total download session attempt) *100. This KPI has been calculated for Hotspot only.

Upload Session Setup Success Rate	(total upload session established (successfully connected to server)/ total upload session attempt)*100. This KPI need to report for Hotspot only.
Web Page Download Time	Web browsing test is used to measure performance in terms of opening a web/HTTP page. Time taken to open the web page successfully is considered as web browsing delay/web page download time.
Video Streaming Delay	The Video streaming delay is time taken from start of video transfer to First video frame displayed in player.
Latency (TWAMP-UDP)	Latency is the time it takes for a small data set to be transmitted from a device to a server on the Internet and back to the same device again. The Latency is measured in milliseconds (ms). To calculate the one-way latency, we just do half of the round-trip time. 50th percentile of one-way latency has been reported.
Jitter (TWAMP-UDP)	Measure of variation in time in arrival of packets from a source to destination The consideration of packet delay jitter is considered by standard deviation of Inter Packet Delay Variation. If IPDV is used. By standard deviation is meant the average of standard deviation of IPDV on DL $IPDV(i) = D(i) - D(i-1)$ then Stdvs of IPDV is considered as jitter.
Packet Loss Rate (TWAMP-UDP & TCP)	Number of packets lost out of total packet transferred during test. Packet loss rate = (Total packet lost / Total packet sent) *100 * Packet delay (using TWAMP-UDP & TCP) >90 ms considered as packet loss and included in packet loss rate. * Packet loss rate is calculated based on TWAMP-UDP & TCP. *90th percentile for Packet loss rate has been reported in overall Hotspot performance summary.

Table-84: Network performance parameter and definition Data

Disclaimer: The observations presented above and, in the reports, represent the performance of the service providers on the area/route under test on the day/time of conducting the drive test and no inference whatsoever may be drawn regarding the quality of the telecom service by the service providers in the whole city/state/licensed service area.