



TELECOM REGULATORY AUTHORITY OF INDIA

Independent Drive Test Report

Kerala LSA

July 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 Kerala License Service Area (LSA) during the month of July-2026 under the supervision of TRAI Regional Office (RO) Bengaluru. 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	Thrissur	City	297.9	21-July-2026	23-July-2026
2	Thrissur	Inter Operator Calling	1 Location	23-July-2026	23-July-2026
3	Thrissur	Hotspot	10 Locations	21-July-2026	24-July-2026
4	Thrissur	Walk test	5.9	22-July-2026	23-July-2026
5	Kochi to Thrissur to Calicut	Highway	180.4	21-July-2026	24-July-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.

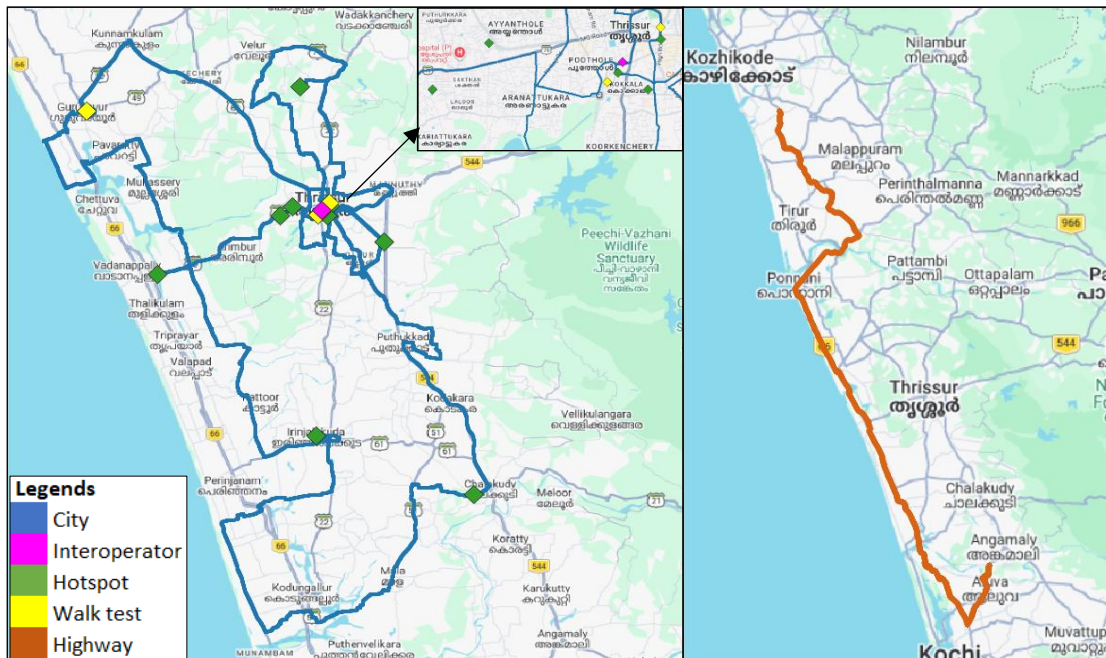


Figure-1: Drive test routes.

2.3 Summary of areas covered

a) City- Vadanappally, Arimbur, Mannu, Mannuthy, Kuranchery, Kiralur, Kuttur, Punkunnam, Kechery, Kunnamkulam, Chavakkad, Pavaratty, Manalur, Irinjalakuda, Mala, Chalakudy, Puthukkad and Ollur etc.

b) Hotspot

1. Chalakudy Railway Station
2. District Hospital Thrissur
3. Government Medical College Hospital Thrissur
4. Hilite Mall Thrissur
5. Irinjalakuda KSRTC Bus Stand
6. Shakthan Thampuran Bus Stand
7. Thrissur Collectorate
8. Thrissur Corporation Office
9. Thrissur KSRTC Bus Stand
10. Vadanapally

c) Walk Test

1. Guruvayur Temple
2. Thrissur Railway Station
3. Thrissur Swaraj Round Walkway

d) Highway- Kochi to Calicut passing through Athani, Edappally, Varapuzha, Kodungallur, Thalikulam, Chavakkad, Ponnani, Valanchery and Paingottoor 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	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	900,1800,2100,2300,2500
11	Vodafone Idea Ltd.	5G	3500

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

2.5 Key finding of Independent Drive Test

1. Drive Test Area: The overall mobile network performance across Thrissur city (Kerala 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- 24 to 27)

Parameter	AIRTEL	BSNL	RJIL	VIL
Total Number of Samples captured on Drive test route	38626	38579	38365	38871
Number of Samples having poor signal strength	577	1115	686	802
Number of Samples having limited service (No Coverage)	0	0	0	0

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

Parameter	AIRTEL	BSNL	RJIL	VIL
Number of successful Calls Established	347	359	348	344
Number of dropped Calls	0	17	0	0

c) Call Silence Instance – The TSP-wise details of Call silence instance in Auto-selection mode (5G/4G). (refer figure-16 & 17)

Parameter	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider network)	335	321	337	329
Number of silences calls for >3 Sec	0	3	0	35
Total number of silence instances for >3 Sec	0	3	0	37

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)	335	321	337	329
Packet loss Rate Downlink %	0.14	1.16	0.38	0.94
Packet loss Rate Uplink %	0.16	1.62	0.40	1.91

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- 29 to 32)

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	5.00	15.00	15.00
Average Download Throughput measured during IDT	(Mbits/s)	145.43	7.92	328.12	44.52

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- 33 to 36)

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	3.00	7.00	8.00
Average Upload Throughput measured during IDT	(Mbits/s)	27.96	5.41	23.95	14.64

2. Drive Test Route: The overall mobile network performance on Kochi to Thrissur to Calicut highway route (Kerala 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- 64 to 67)

Parameter	AIRTEL	BSNL	RJIL	VIL
Total Number of Samples captured on Drive test route	18406	18366	17686	18345
Number of Samples having poor signal strength	90	207	62	115
Number of Samples having limited service (No Coverage)	0	0	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	92	94	87	93
Number of dropped Calls	0	2	1	2

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

Parameter	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider network)	91	92	87	91
Number of silences calls for >3 Sec	0	9	0	7
Total number of silence instances for >3 Sec	0	11	0	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)	91	92	87	91
Packet loss Rate Downlink %	0.11	1.16	0.26	1.43
Packet loss Rate Uplink %	0.09	1.09	0.42	1.40

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	5.00	15.00	15.00
Average Download Throughput measured during IDT	(Mbits/s)	165.81	10.14	346.73	22.77

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	3.00	7.00	8.00
Average Upload Throughput measured during IDT	(Mbits/s)	38.36	5.17	29.92	13.70

QoS Performance Analysis- Kerala 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 Kerala LSA during the month of July-2026 covering city drive, hotspots, walk test and highway. (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	421	418	420
Call Setup Success Rate %	99.29	100.00	99.52
Drop Call Rate %	1.20	0.24	0.00
Call Setup Time-Average (Second)	4.36	4.60	4.18
Handover Success Rate %	98.57	97.88	98.60

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

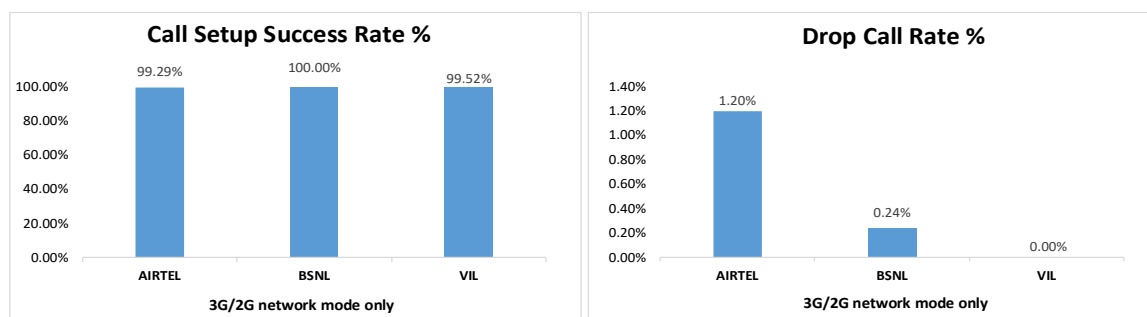


Figure-2: Call setup success rate and drop call rate performance.

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	48	NA
2G	873	479	878

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	589	608	589	597
Call Setup Success Rate %	100.00	99.34	99.15	98.32
Drop Call Rate %	0.00	3.64	0.17	0.34
Call Setup Time-Average (Second)	1.21	0.97	0.57	0.86
Handover Success Rate %	99.96	99.14	99.94	100.00

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

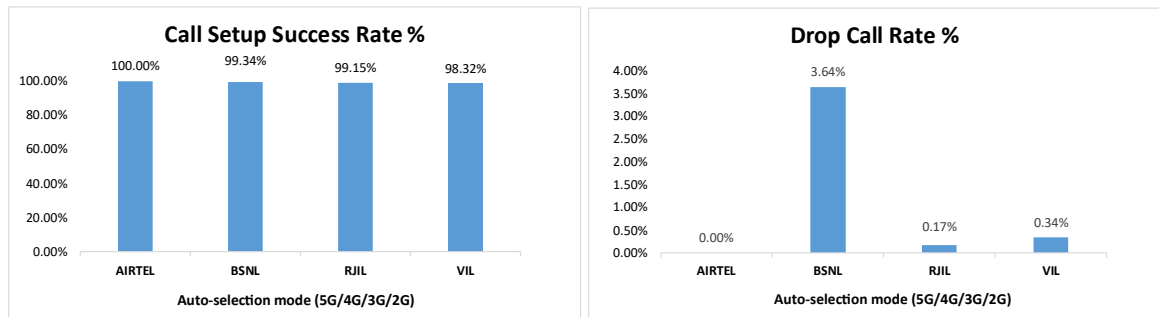


Figure-3: Performance for call setup success rate and drop call rate.

Parameter	Service Provider			
	Mobile-to-Mobile (5G/4G – Open Mode)			
	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider Network)	426	413	424	420
Number of silences call for >4 Sec	0	6	0	40
Silence Call Rate %	0.00	1.45	0.00	9.52
Number of silence instances for >4 Sec	0	6	0	40
Number of silence instances for >3 Sec	0	14	0	45
Number of silence instances for >2 sec	0	41	3	72
RTP Jitter (4G & 5G) in ms	4.49	5.70	11.96	14.87
Packet loss Rate Downlink %	0.13	1.16	0.36	1.05
Packet loss Rate Uplink %	0.15	1.42	0.40	1.79

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

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	0	NA	674	0
4G	1450	961	1158	1389
3G	NA	4	NA	NA
2G	0	56	NA	0

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	3162	2947	3084	3010
Speech Quality (Average MOS)	4.05	3.38	4.56	4.51
Number of samples with MOS ≥ 4 to < 5 (Excellent)	2739	1314	2783	2679
Number of samples with MOS ≥ 3 to < 4 (Good)	394	330	222	217
Number of samples with MOS ≥ 2 to < 3 (Fair)	22	1032	52	50
Number of samples with MOS ≥ 1 to < 2 (Poor)	7	271	27	64
%age of samples with MOS ≥ 4 to < 5 (Excellent)	86.62%	44.59%	90.24%	89.00%
%age of samples with MOS ≥ 3 to < 4 (Good)	12.46%	11.20%	7.20%	7.21%
%age of samples with MOS ≥ 2 to < 3 (Fair)	0.70%	35.02%	1.69%	1.66%
%age of samples with MOS ≥ 1 to < 2 (Poor)	0.22%	9.20%	0.88%	2.13%

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

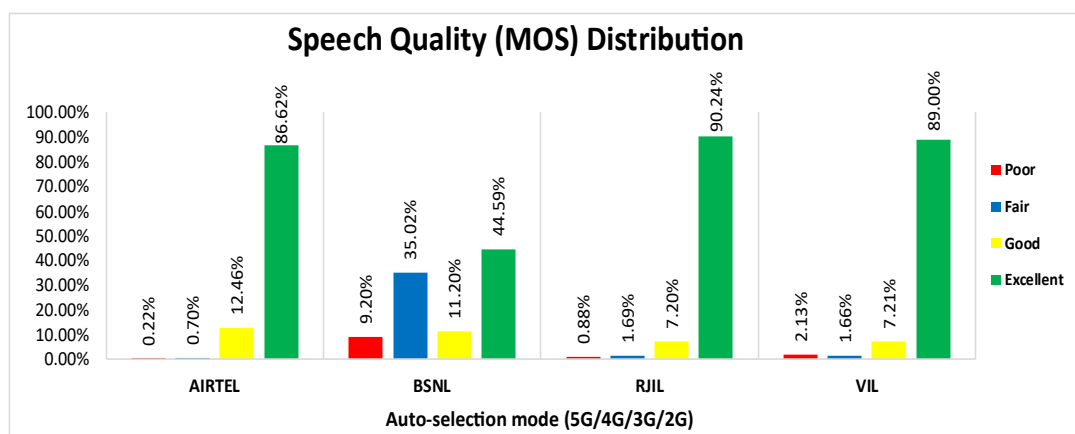


Figure- 4: Distribution of samples in MOS range.

(d) Inter-service provider voice call performance: To check the performance of inter-service providers call setup success rate, total 15 to 16 inter operator calls were attempted at one location which is Thrissur KSRTC Bus Stand. 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	100.00	100.00	100.00
BSNL	100.00	NA	100.00	100.00
RJIL	100.00	100.00	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	2.81	1.19	1.74
BSNL	4.37	NA	4.06	4.22
RJIL	1.77	2.40	NA	1.69
VIL	1.82	3.72	1.41	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	147.37	8.61	315.13	40.25
	80 th Percentile	236.36	13.09	511.16	43.74
	20 th Percentile	46.41	2.58	119.71	13.96
Upload Throughput (Mbits/s)	Average	30.94	5.50	24.54	16.08
	80 th Percentile	58.05	8.61	45.15	29.98
	20 th Percentile	5.09	1.50	4.19	2.50
Latency (ms)	50 th Percentile	38.33	48.71	23.61	38.05

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

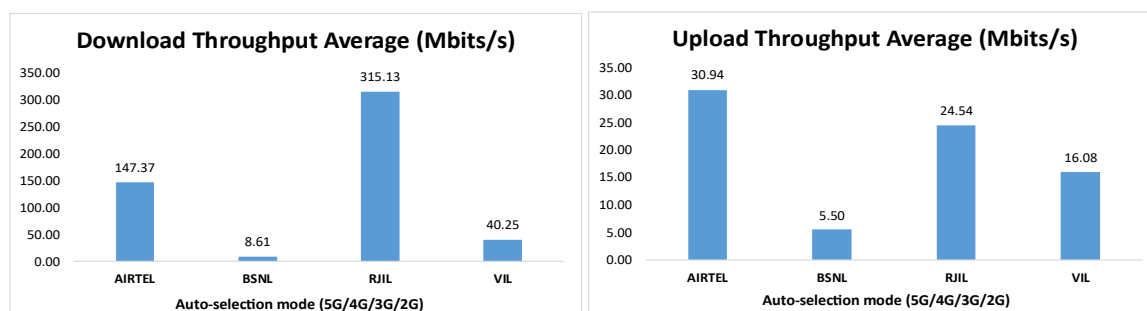


Figure- 5: Download and Upload throughput.

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	0	NA	907	0
4G	1468	1063	197	1310
3G	NA	0	NA	NA
2G	0	1	NA	4

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 21st July 2026 to 23rd July 2026 in Thrissur city. (Refer Table-1)

4.2.1 Drive test route

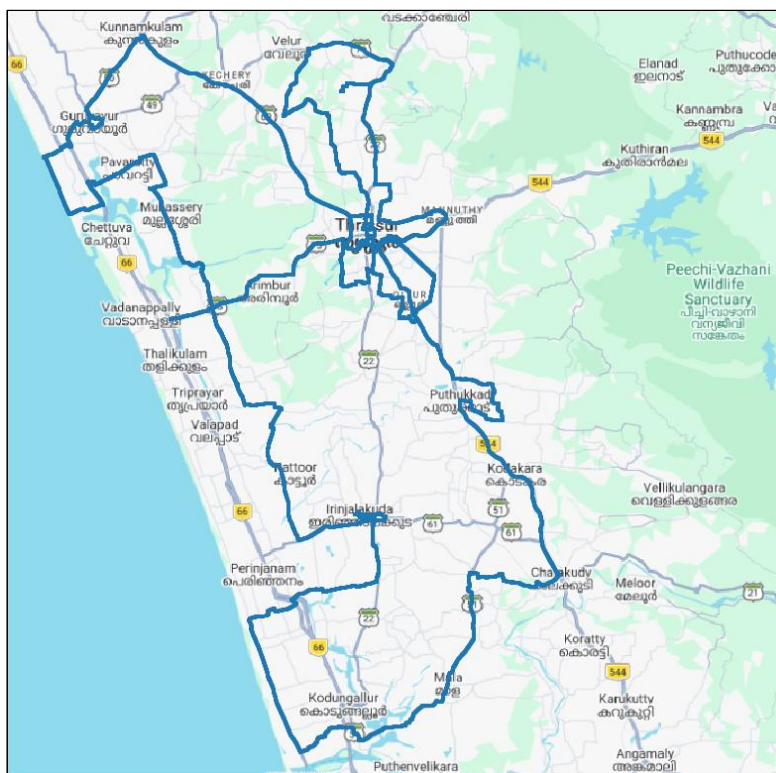


Figure- 6: Drive test routes.

4.2.2 Areas covered

Vadanappally, Arimbur, Mannu, Mannuthy, Kuranchery, Kiralur, Kuttor, Punkunnam, Kechery, Kunnamkulam, Chavakkad, Pavaratty, Manalur, Irinjalakuda, Mala, Chalakudy, Puthukkad and Ollur etc.

4.2.3 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	328	328	330
Call Setup Success Rate %	99.70	100.00	99.39
Drop Call Rate %	0.61	0.00	0.00
Call Setup Time-Average (Second)	4.37	4.72	4.15
Handover Success Rate %	98.55	96.11	99.32

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

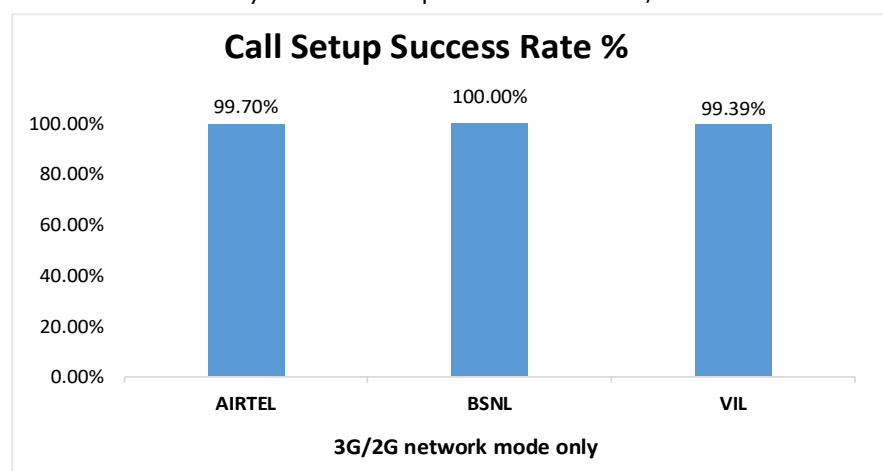


Figure-7: Performance for call setup success rate.

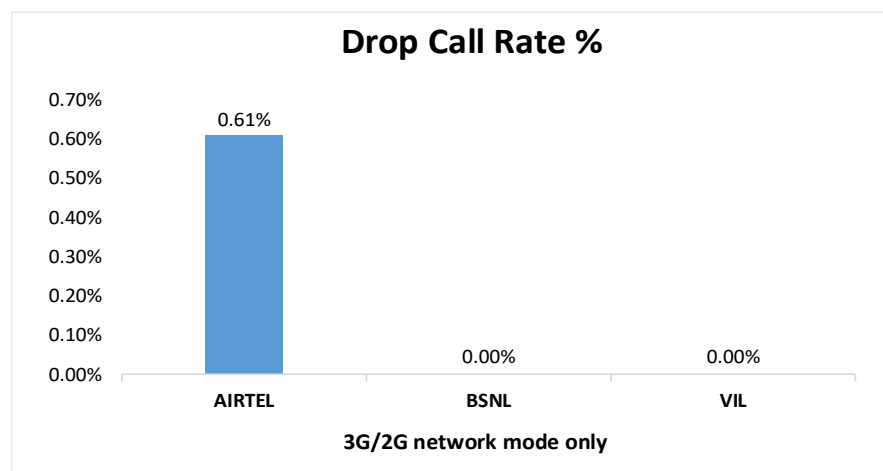


Figure-8: Performance for drop call rate.

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

Technology	Service Provider		
	AIRTEL	BSNL	VIL
3G	NA	2.65%	NA
2G	100.00%	97.35%	100.00%
Limited Service	0.00%	0.00%	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.

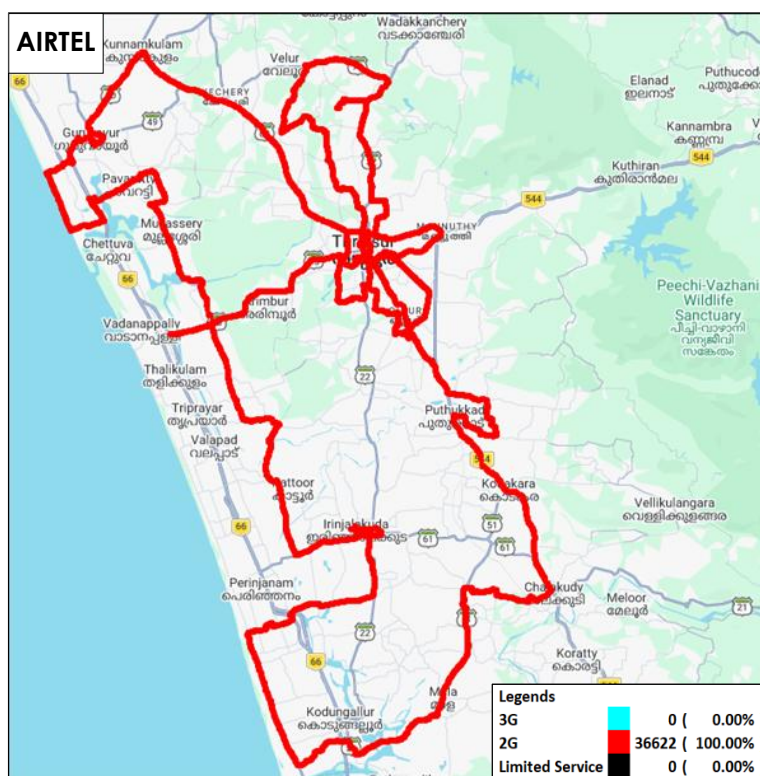


Figure-9: Serving technology plots 3G/2G network mode – AIRTEL.

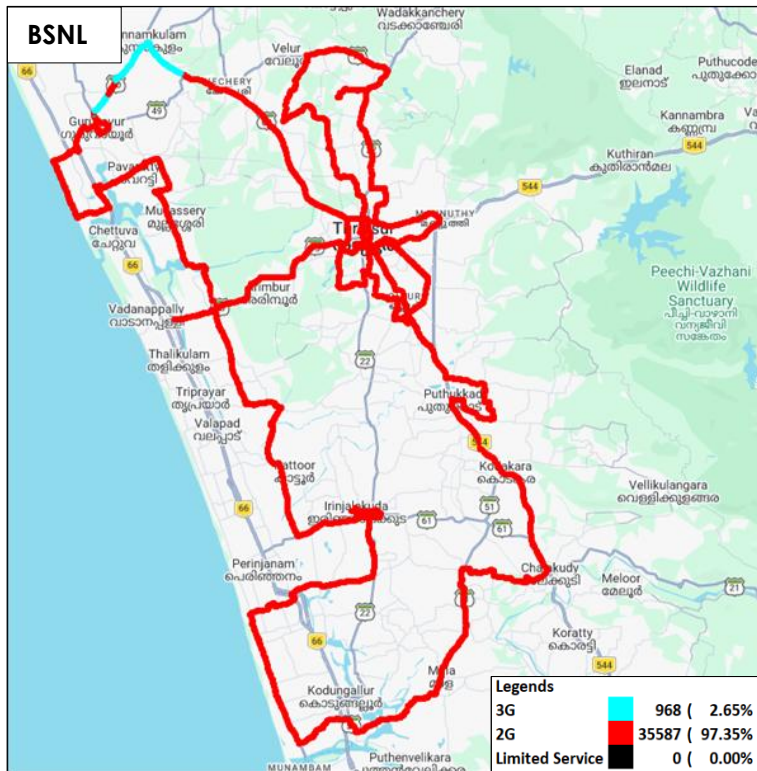


Figure-10: Serving technology plots 3G/2G network mode – BSNL.

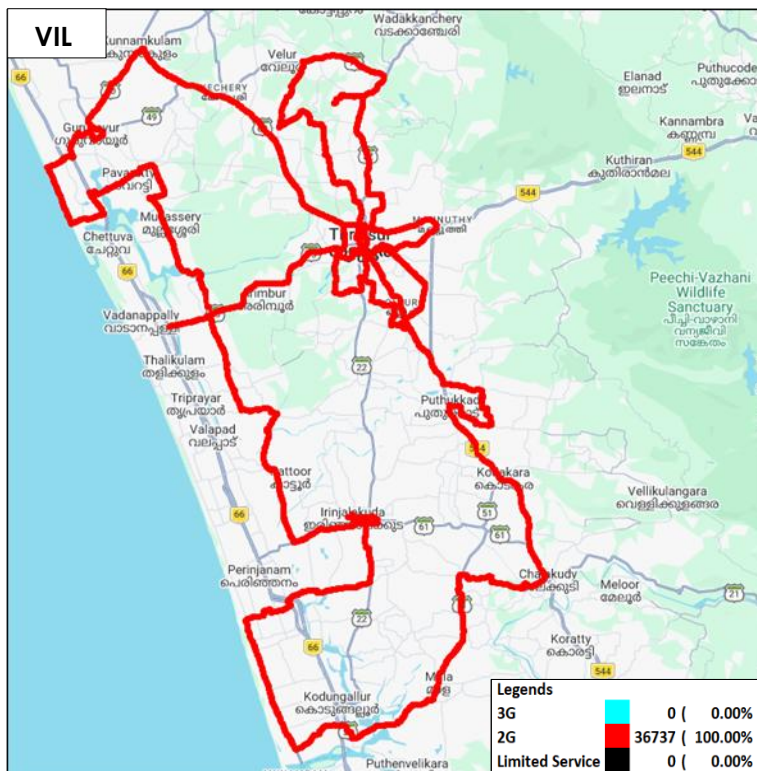


Figure-11: Serving technology plots 3G/2G network mode – VIL.

(c) Network Signal Strength Distribution: The following chart represents signal strength distribution for 3G/2G network mode only. (Refer figure- 82, 83 & 84 for map view)

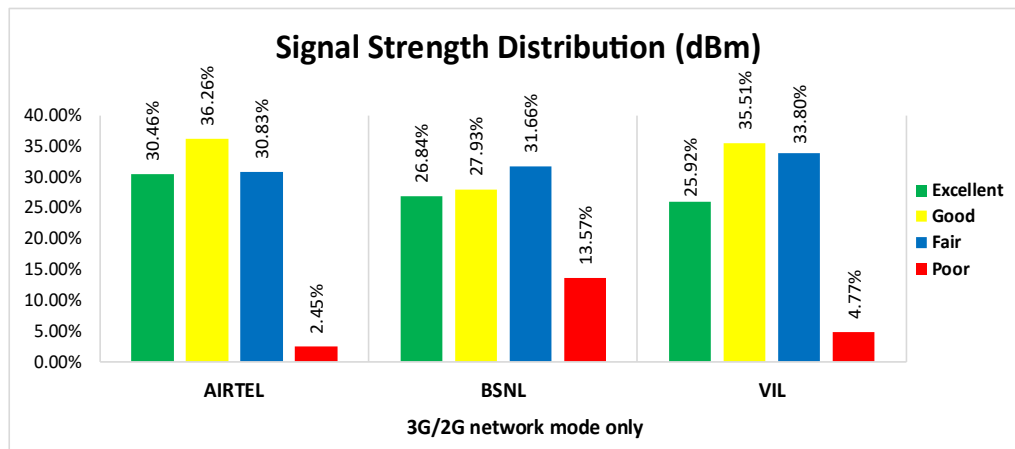


Figure-12: Signal strength distribution 3G/2G network mode only.

Observations:

- Airtel has 30% of samples falling in the excellent signal strength category.
- BSNL has 27% of samples falling in the excellent signal strength category.
- VIL has 26% 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	347	361	348	354
Call Setup Success Rate %	100.00	99.45	100.00	97.18
Drop Call Rate %	0.00	4.74	0.00	0.00
Call Setup Time Average (Second)	1.21	0.95	0.58	0.93
Handover Success Rate %	99.94	98.45	99.95	100.00

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

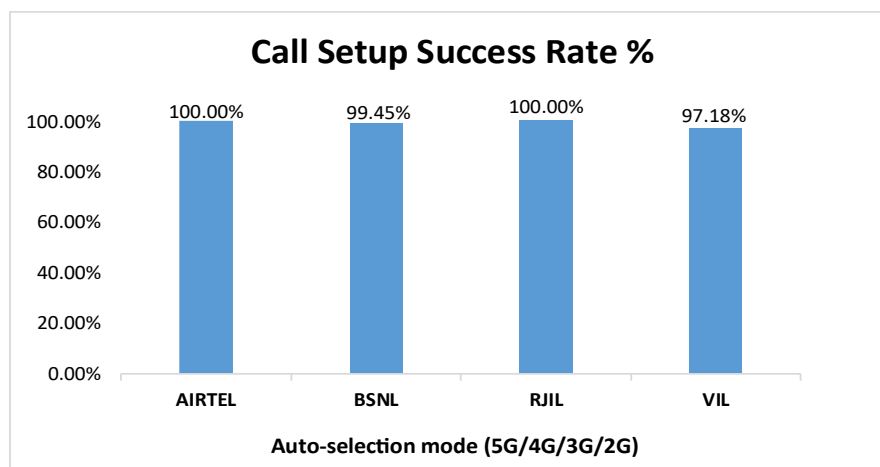


Figure-13: Performance for call setup success rate.

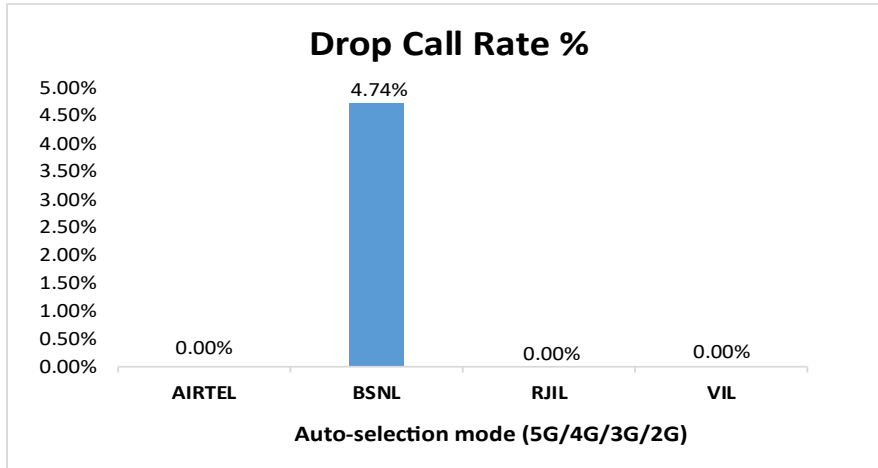


Figure-14: Performance for drop call rate.

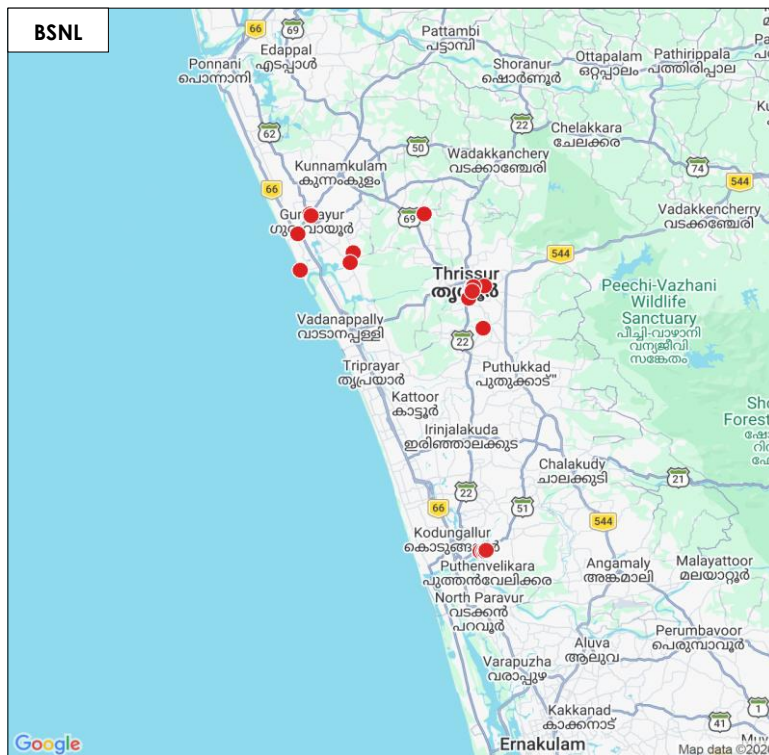


Figure-15: Drop call location in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

Parameter	Service Provider Mobile-to-Mobile (5G/4G – Open Mode)			
	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider Network)	335	321	337	329
Number of silences call for >4 Sec	0	3	0	33
Silence Call Rate %	0.00	0.93	0.00	10.03
Number of silence instances for >4 Sec	0	3	0	33
Number of silence instances for >3 Sec	0	3	0	37
Number of silence instances for >2 sec	0	15	2	51
RTP Jitter (4G & 5G) in ms	4.40	5.86	12.29	14.59
Packet loss Rate Downlink %	0.14	1.16	0.38	0.94
Packet loss Rate Uplink %	0.16	1.62	0.40	1.91

Table-16: Summary of silence instances & packet loss rate for mobile to mobile call.

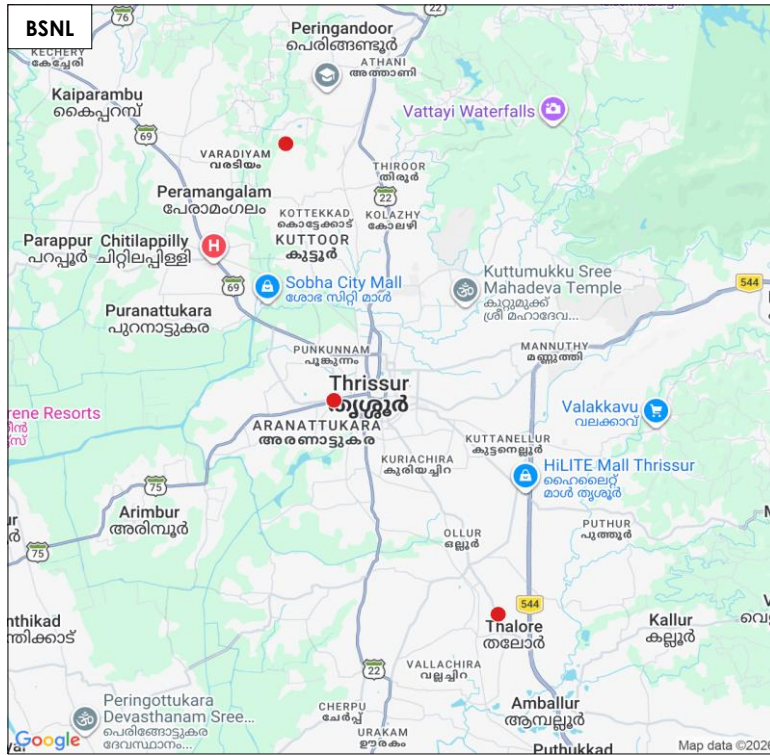


Figure-16: Number of silence instances for >3 Sec Mobile-to-Mobile (5G/4G-Open Mode)-BSNL.

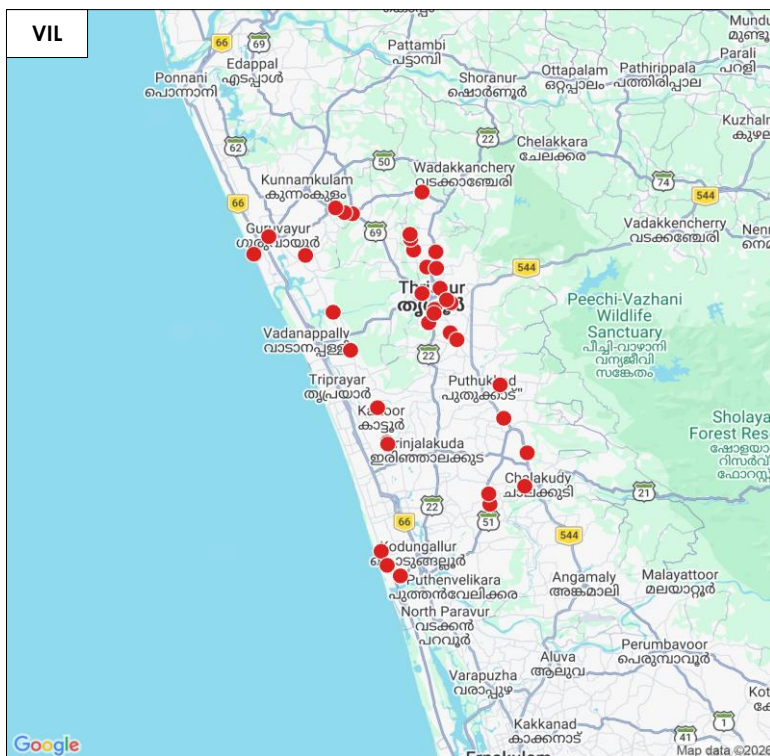


Figure-17: Number of silence instances for >3 Sec Mobile-to-Mobile (5G/4G-Open Mode)-VIL.

(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	1992	1817	1980	1894
Speech Quality (Average MOS)	4.05	3.08	4.54	4.51
Number of samples with MOS ≥ 4 to < 5 (Excellent)	1742	494	1774	1687
Number of samples with MOS ≥ 3 to < 4 (Good)	231	208	150	143
Number of samples with MOS ≥ 2 to < 3 (Fair)	14	904	38	29
Number of samples with MOS ≥ 1 to < 2 (Poor)	5	211	18	35
%age of samples with MOS ≥ 4 to < 5 (Excellent)	87.45%	27.19%	89.60%	89.07%
%age of samples with MOS ≥ 3 to < 4 (Good)	11.60%	11.45%	7.58%	7.55%
%age of samples with MOS ≥ 2 to < 3 (Fair)	0.70%	49.75%	1.92%	1.53%
%age of samples with MOS ≥ 1 to < 2 (Poor)	0.25%	11.61%	0.91%	1.85%

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

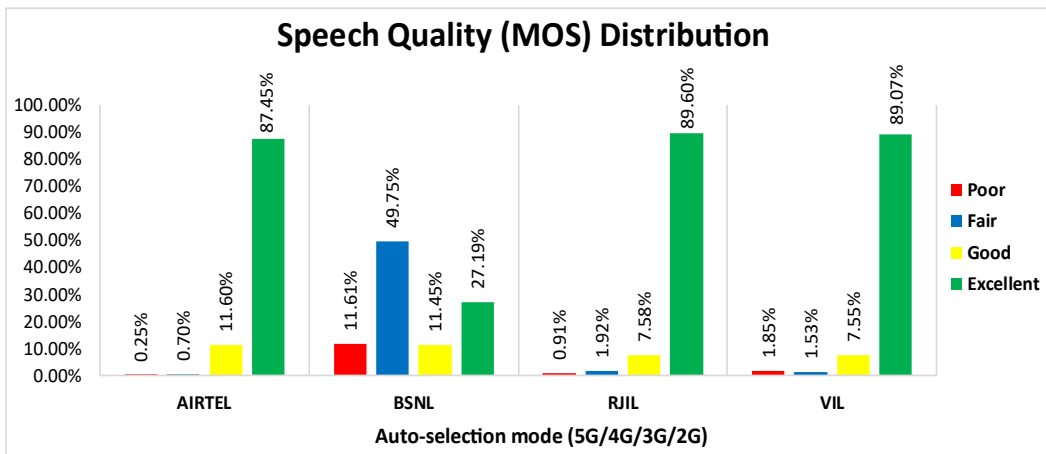


Figure-18: Distribution of samples in MOS range.

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

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	9.61%	NA	33.40%	5.19%
4G	90.39%	93.86%	66.60%	94.81%
3G	NA	0.00%	NA	NA
2G	0.00%	6.14%	NA	0.00%
Limited Service	0.00%	0.00%	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.

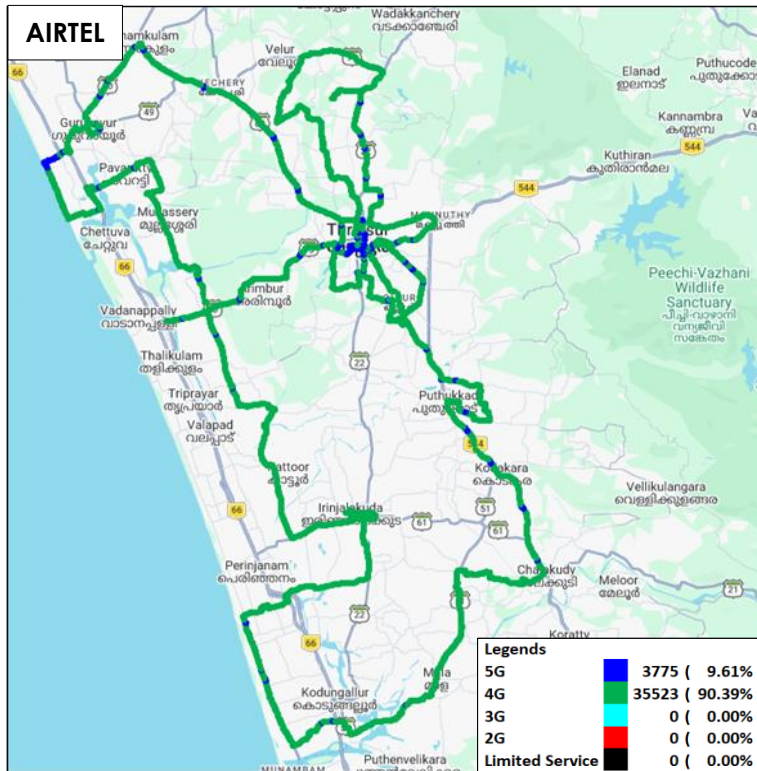


Figure-19: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice – AIRTEL.

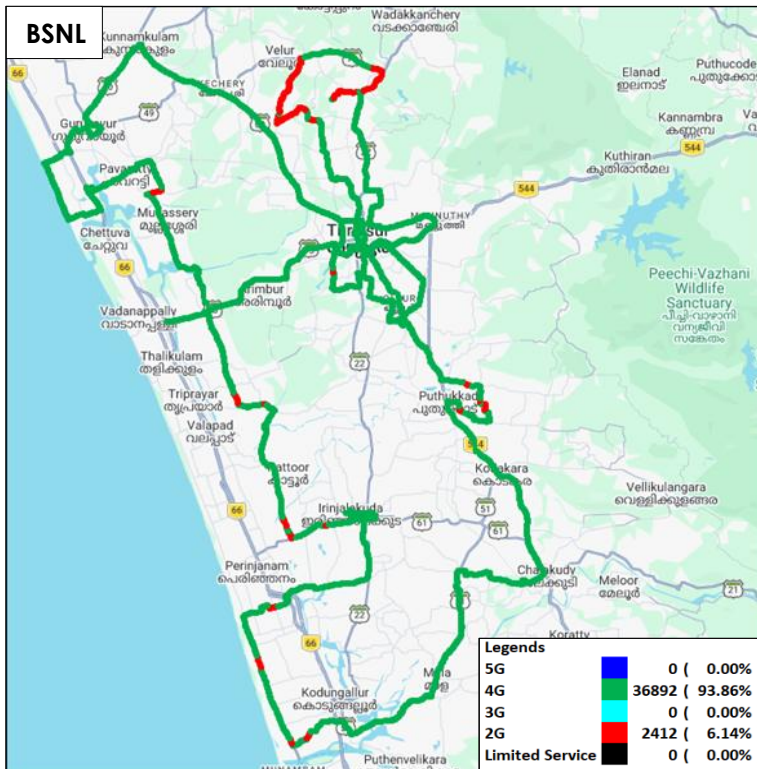


Figure-20: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice – BSNL.

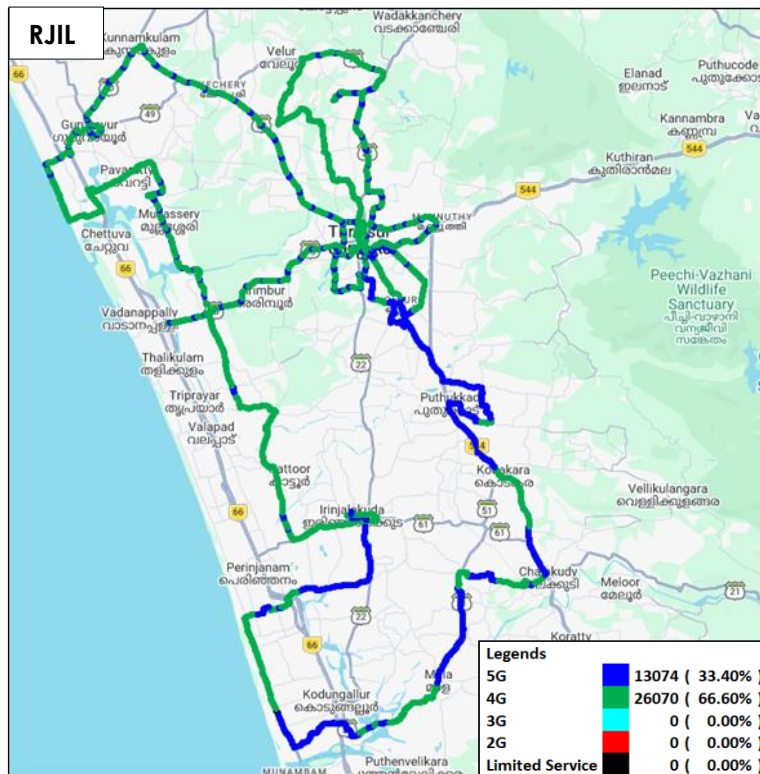


Figure-21: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice – RJIL.

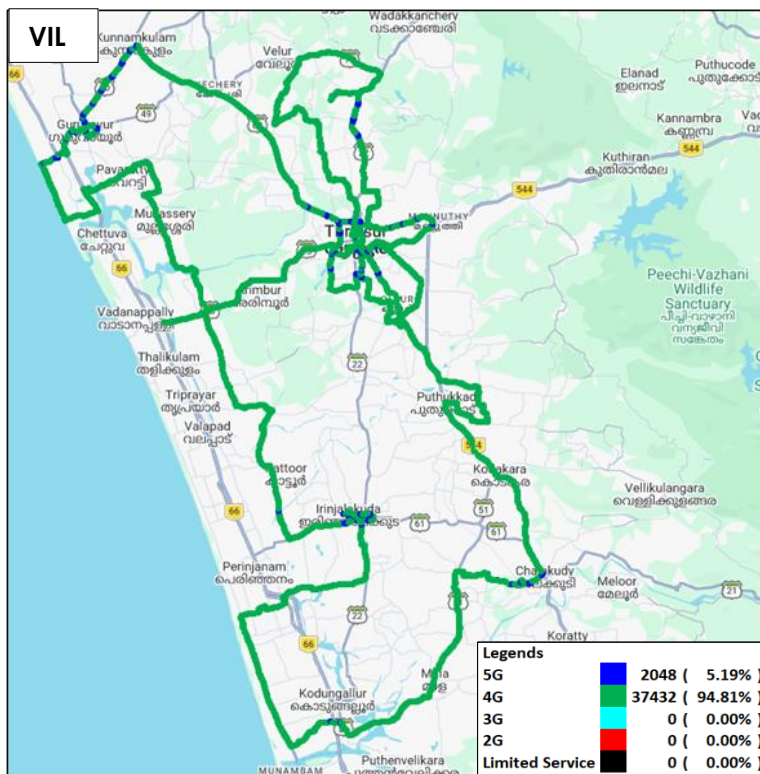


Figure-22: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice – VIL.

(g) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) voice. (Refer figure-85, 86, 87 & 88 for map view)

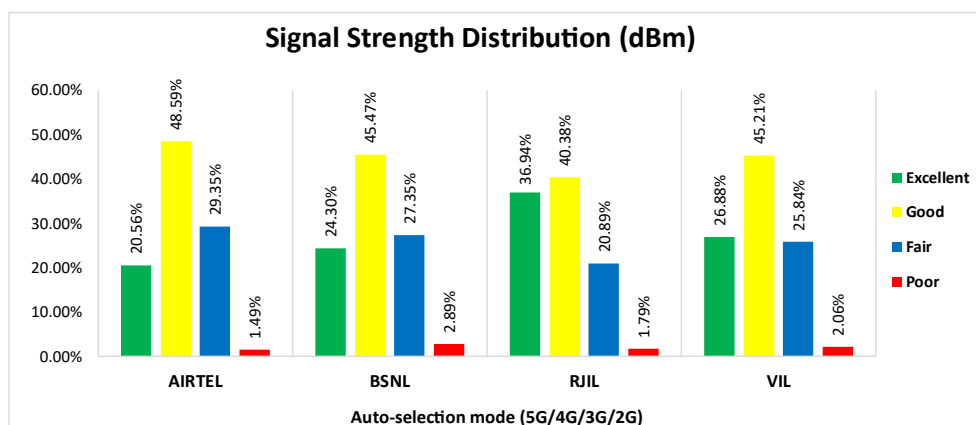


Figure-23: Signal strength distribution auto-selection mode (5G/4G/3G/2G) voice.

Observations:

- Airtel has 21% of samples falling in the excellent signal strength category.
- BSNL has 24% of samples falling in the excellent signal strength category.
- RJIL has 37% of samples falling in the excellent signal strength category.
- VIL has 27% of samples falling in the excellent signal strength category.

(h) Coverage Gap observed

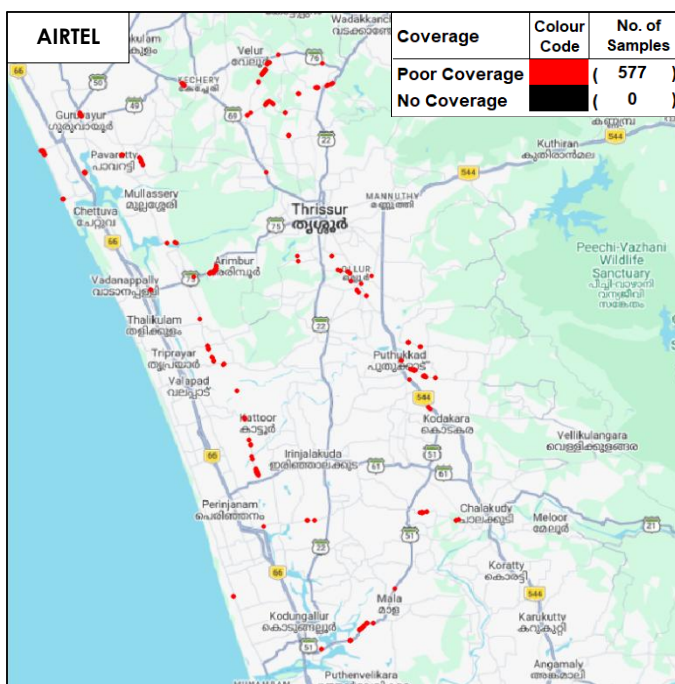


Figure-24: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice-Airtel.

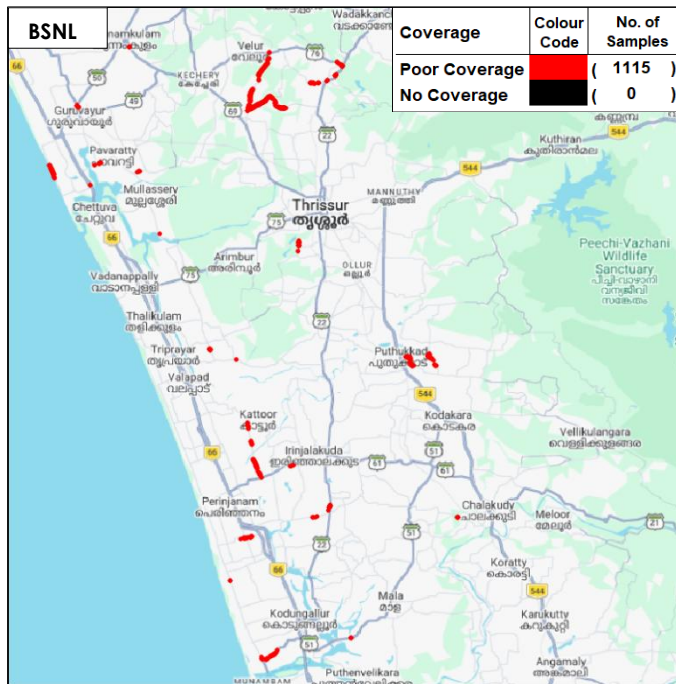


Figure-25: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice-BSNL.

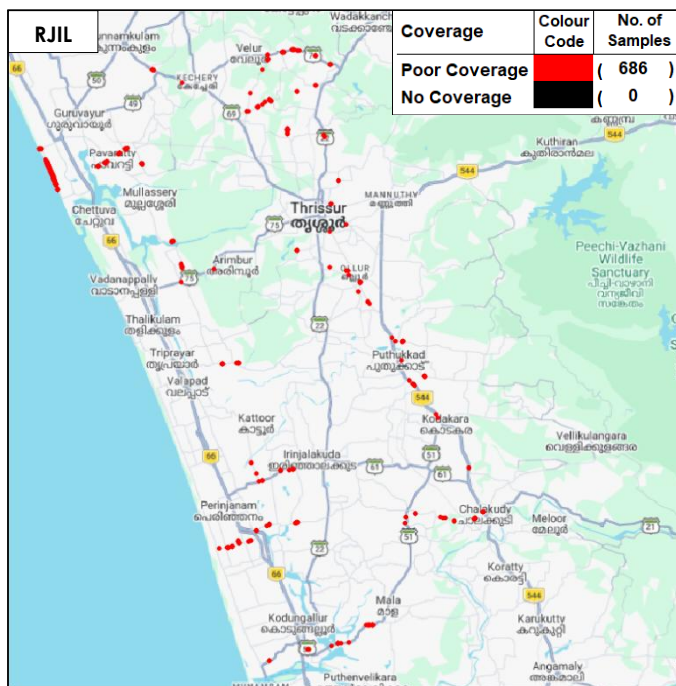


Figure-26: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice-RJIL.

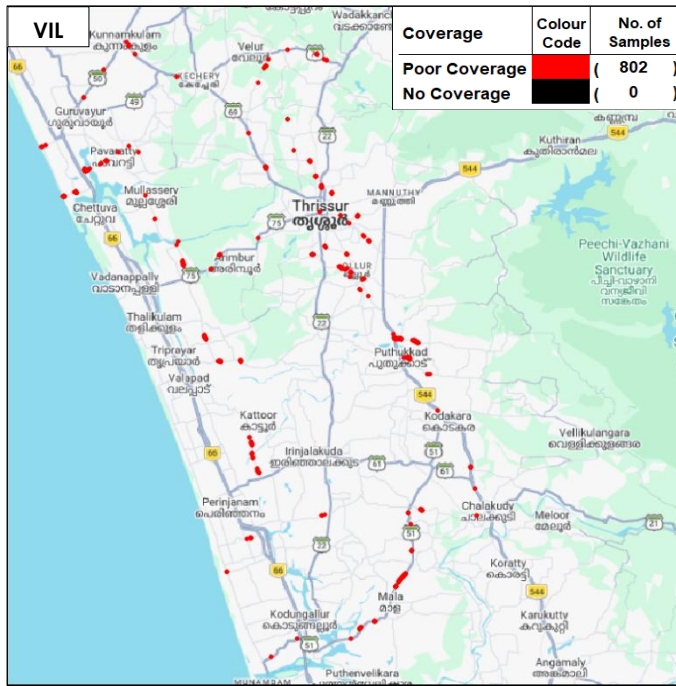


Figure-27: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice-VIL.

4.2.4 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	145.43	7.92	328.12	44.52
	80 th Percentile	237.56	11.98	525.38	43.70
	20 th Percentile	38.74	2.11	114.57	14.97
Upload Throughput (Mbits/s)	Average	27.96	5.41	23.95	14.64
	80 th Percentile	53.69	8.24	44.35	27.11
	20 th Percentile	3.83	1.51	3.31	2.55
Latency (ms)	50 th Percentile	37.06	47.72	21.99	38.16

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

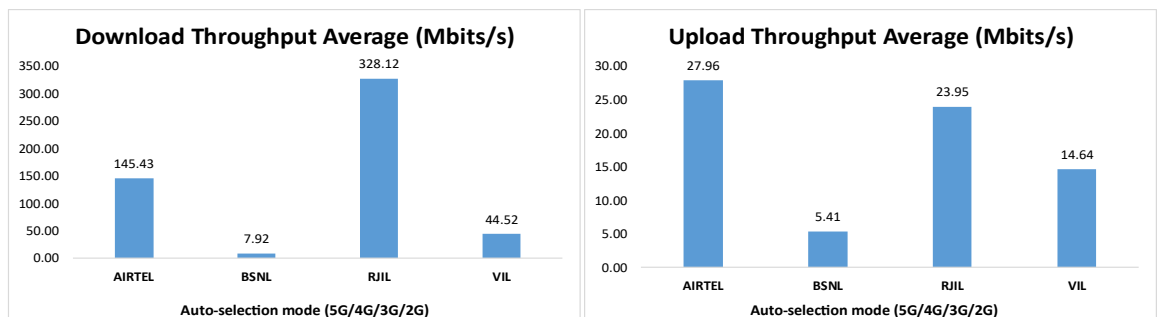


Figure- 28: Download & Upload throughput.

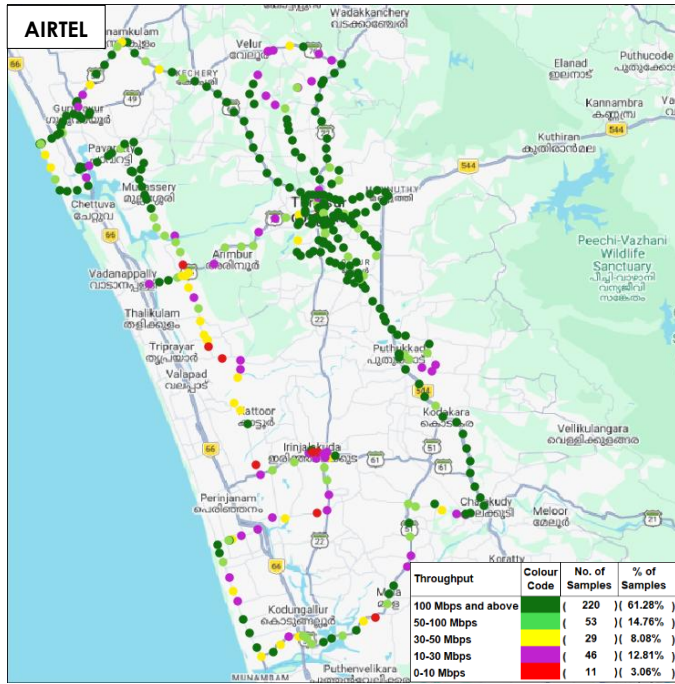


Figure-29: Download throughput distribution auto-selection mode (5G/4G/3G/2G) – AIRTEL.

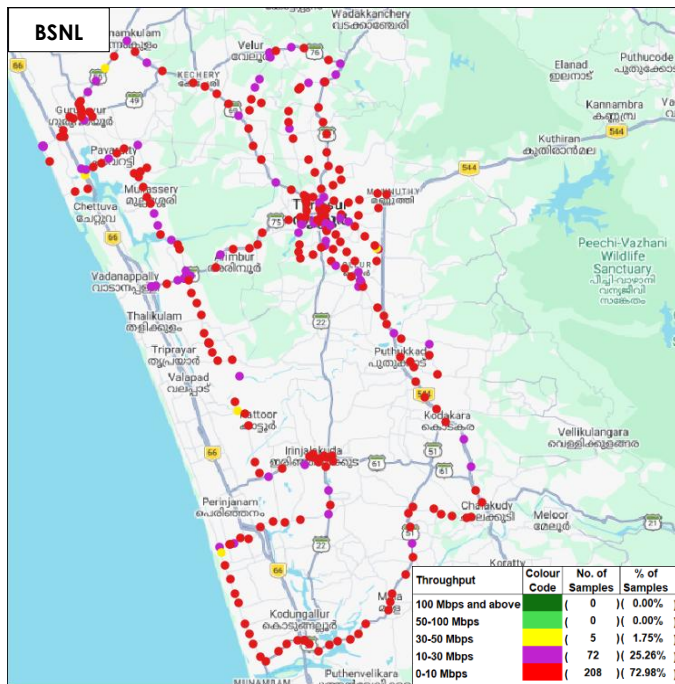


Figure-30: Download throughput distribution auto-selection mode (5G/4G/3G/2G) – BSNL.

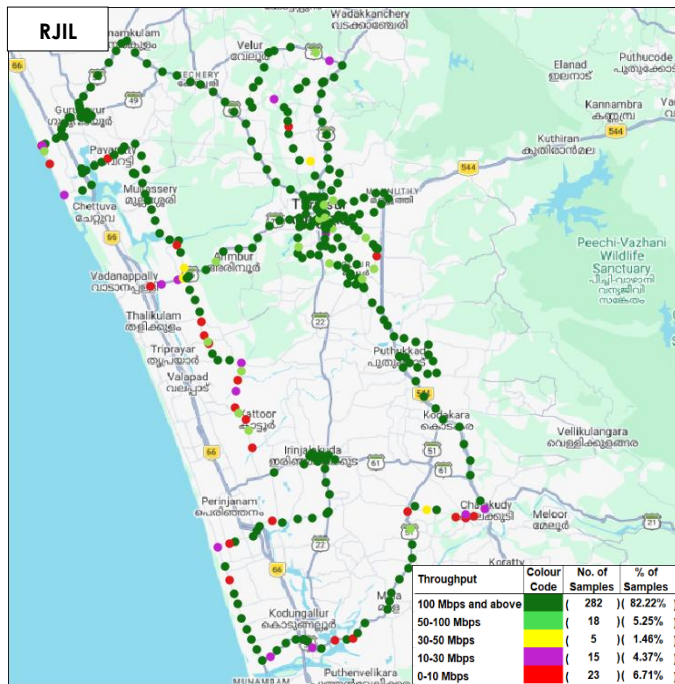


Figure-31: Download throughput distribution auto-selection mode (5G/4G/3G/2G) – RJIL.

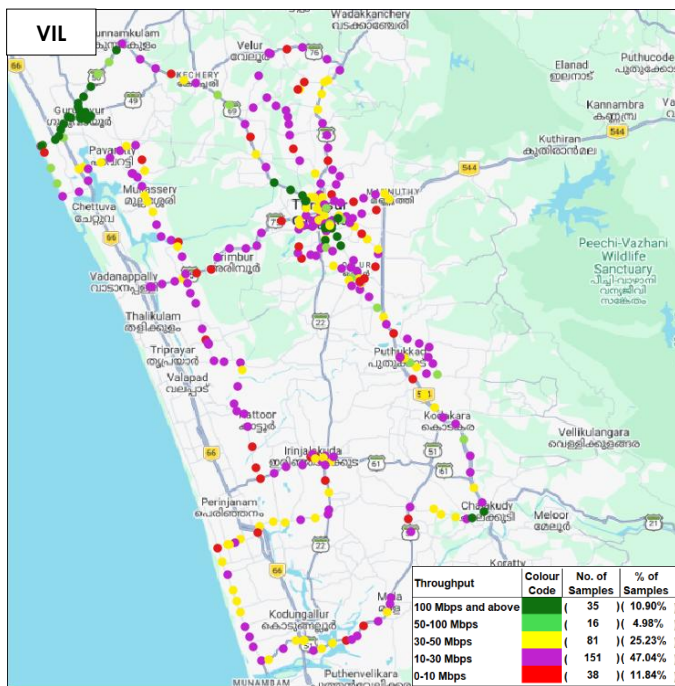


Figure-32: Download throughput distribution auto-selection mode (5G/4G/3G/2G) – VIL.

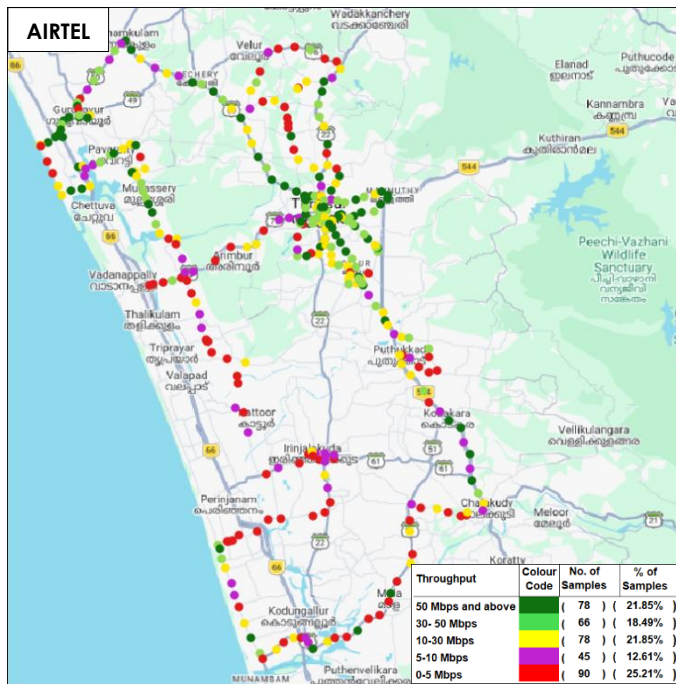


Figure-33: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) – AIRTEL.

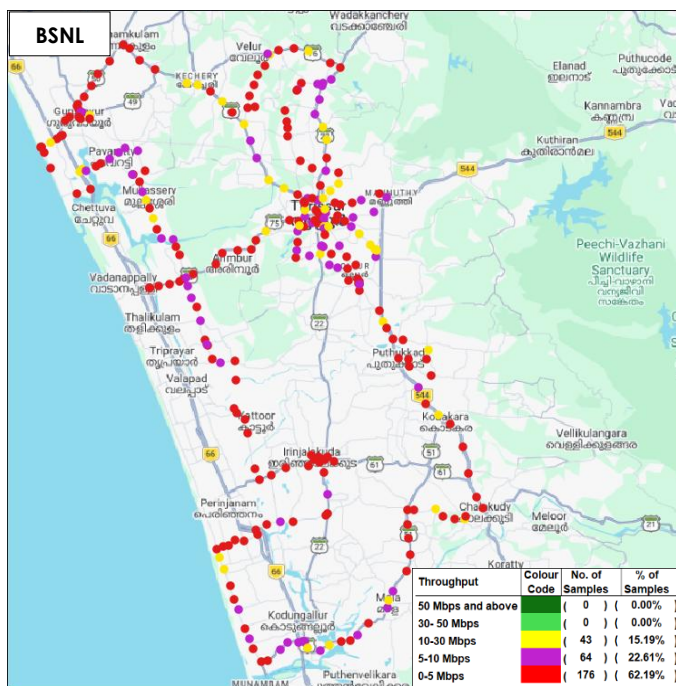


Figure-34: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) – BSNL.

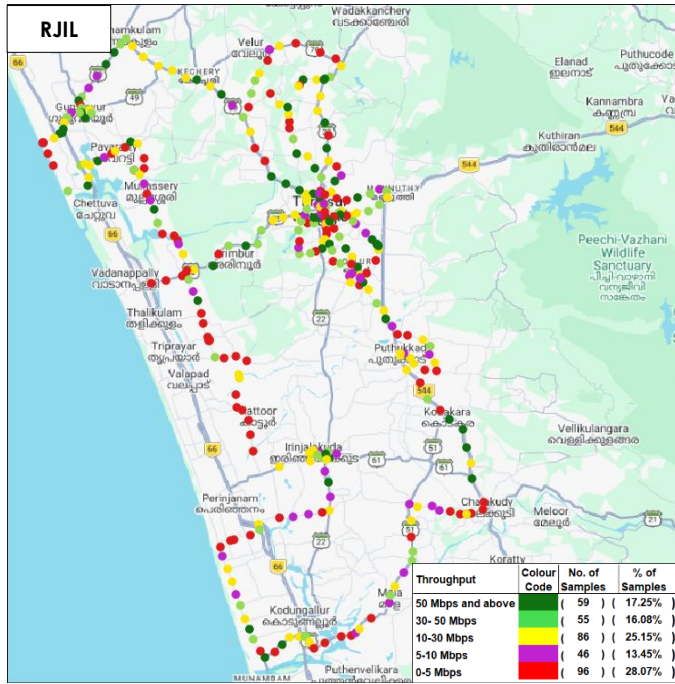


Figure-35: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) – RJIL.

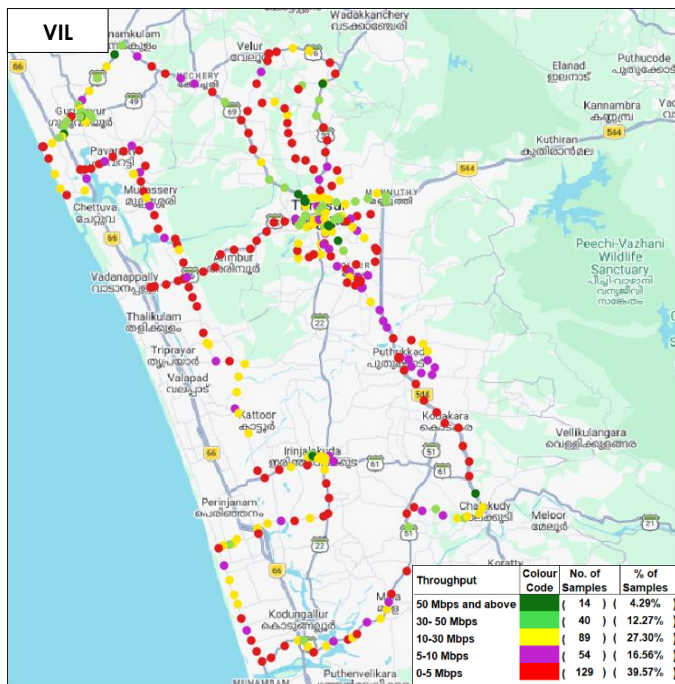


Figure-36: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) – VIL.

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

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	53.92%	NA	90.17%	24.90%
4G	46.08%	99.72%	9.83%	75.01%
3G	NA	0.00%	NA	NA
2G	0.00%	0.28%	NA	0.09%
Limited Service	0.00%	0.00%	0.00%	0.00%

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.

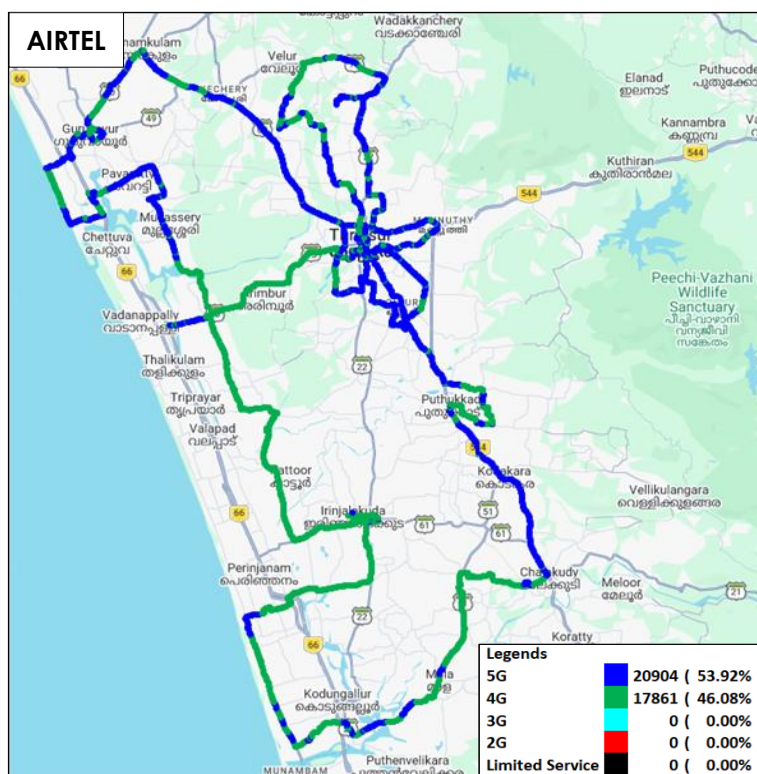


Figure-37: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data – AIRTEL.

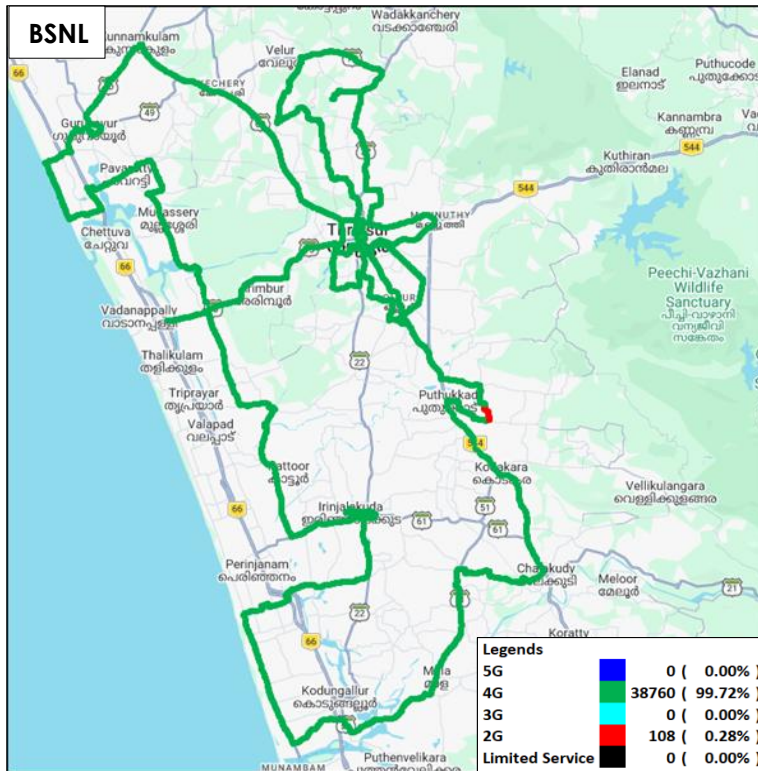


Figure-38: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data – BSNL.

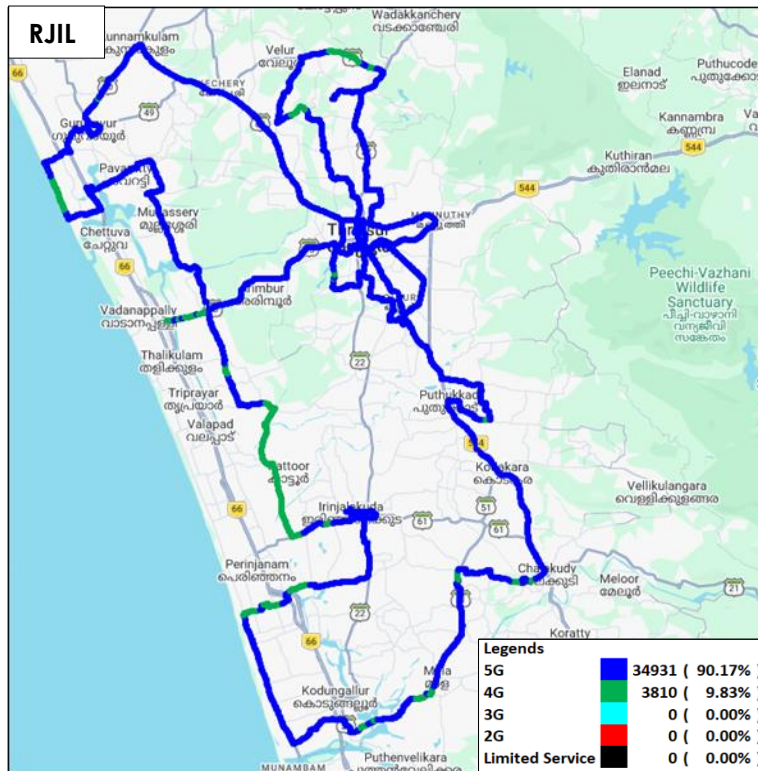


Figure-39: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data – RJIL.

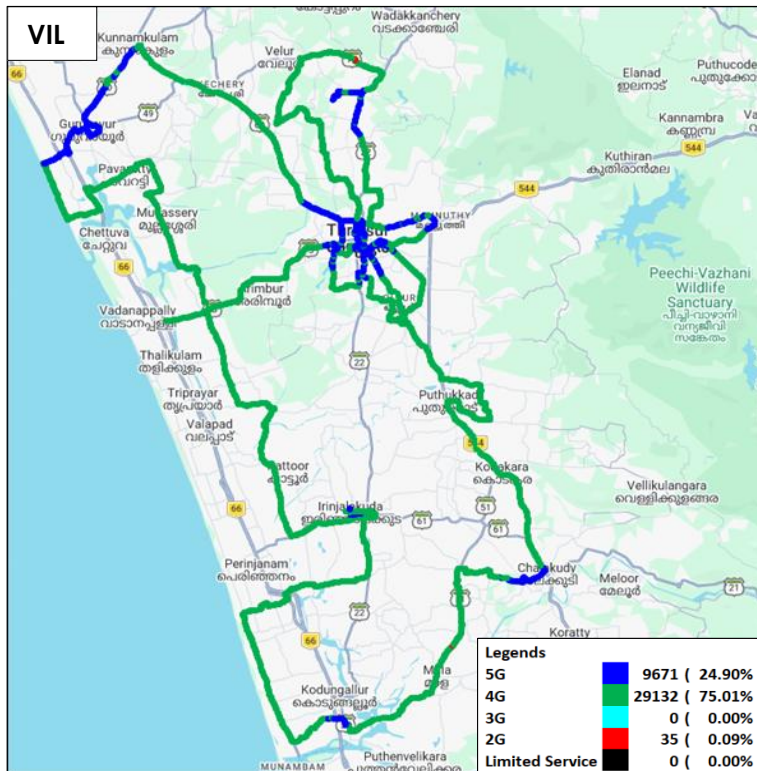


Figure-40: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data – VIL.

(c) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) data. (Refer figure-89, 90, 91 & 92 for map view)

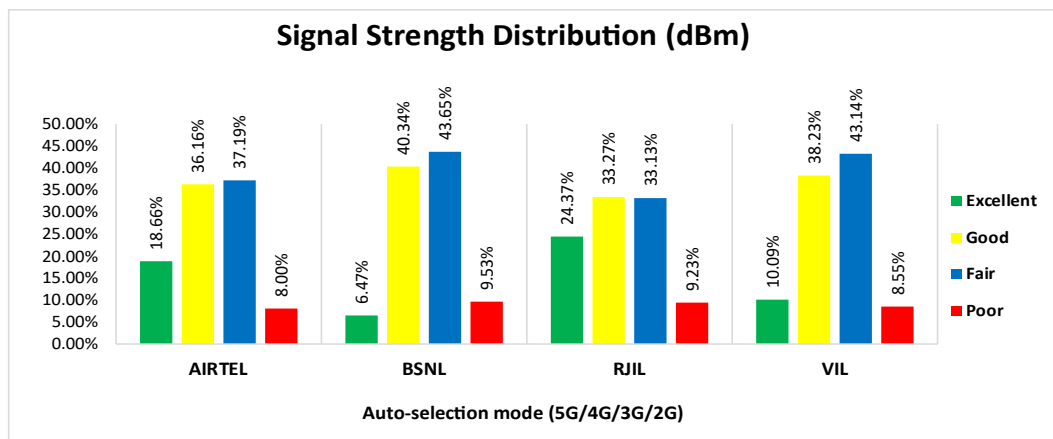


Figure-41: Signal strength distribution auto-selection mode (5G/4G/3G/2G) data.

Observations:

- Airtel has 19% of samples falling in the excellent signal strength category.
- BSNL has 6% of samples falling in the excellent signal strength category.
- RJIL has 24% of samples falling in the excellent signal strength category.
- VIL has 10% of samples falling in the excellent signal strength category.

4.3 Hotspots

Hotspot testing has been done from 21st July 2026 to 24th July 2026. Ten locations have been tested in the Thrissur city. (Refer Table-1)

4.3.1 Locations

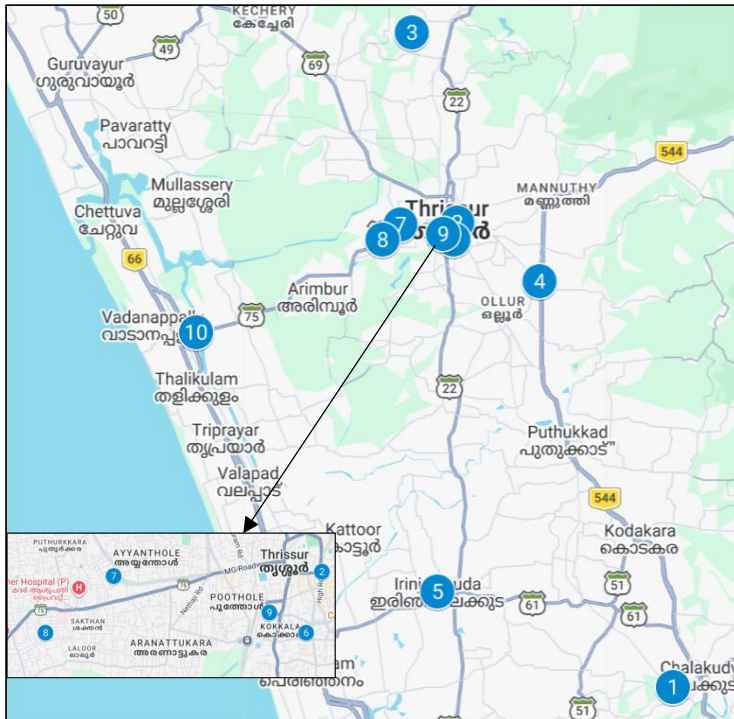


Figure- 42: Hotspot locations.

4.3.2 Hotspot covered

1. Chalakudy Railway Station
2. District Hospital Thrissur
3. Government Medical College Hospital Thrissur
4. Hilite Mall Thrissur
5. Irinjalakuda KSRTC Bus Stand
6. Shakthan Thampuran Bus Stand
7. Thrissur Collectorate
8. Thrissur Corporation Office
9. Thrissur KSRTC Bus Stand
10. Vadanapally

4.3.3 Voice performance

Overall Voice Performance				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	100	100	100	100
Call Setup Success Rate %	100.00	99.00	100.00	100.00
Drop Call Rate %	0.00	0.00	0.00	0.00
Call Setup Time-Average (Second)	1.23	1.08	0.55	0.77

Table-21: Overall summary of voice call performance in network auto-selection mode (5G/4G/3G/2G).

Chalaky Railway Station				
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	90.00	100.00	100.00
Drop Call Rate %	0.00	0.00	0.00	0.00
Call Setup Time-Average (Second)	1.22	0.67	0.62	0.68

Table-22: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G)

District Hospital Thrissur				
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)	1.33	1.74	0.52	0.73

Table-23: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G)

Government Medical College Hospital Thrissur				
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)	1.13	1.14	0.52	0.65

Table-24: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G)

Hilite Mall Thrissur				
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	0.66	0.48	0.85

Table-25: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G)

Irinjalakuda KSRTC Bus Stand				
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)	1.22	1.04	0.54	1.21

Table-26: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G)

Shakthan Thampuran Bus Stand				
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)	1.23	2.50	0.55	0.68

Table-27: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G)

Thrissur Collectorate				
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)	1.20	0.64	0.60	0.70

Table-28: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G)

Thrissur Corporation Office				
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	1.03	0.56	0.70

Table-29: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G)

Thrissur KSRTC Bus Stand				
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)	1.25	0.60	0.64	0.62

Table-30: Summary of voice call performance in network auto-selection mode(5G/4G/3G/2G)

Vadanapally				
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	0.72	0.53	0.84

Table-31: 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)	127.58	10.39	185.93	42.63
Download Throughput 80 th Percentile (Mbit/s)	214.43	14.85	323.23	48.13
Download Throughput 20 th Percentile (Mbit/s)	20.18	5.01	48.53	10.58
Download Session Setup Success Rate %	100.00	100.00	94.00	96.00
Upload Throughput Average (Mbits/s)	23.18	5.47	8.50	13.81
Upload Throughput 80 th Percentile (Mbit/s)	36.40	8.34	11.74	26.96
Upload Throughput 20 th Percentile (Mbit/s)	2.58	1.61	3.74	1.63
Upload Session Setup Success Rate %	100.00	100.00	94.00	98.00
Web Browsing Delay (Second)	3.56	3.12	3.35	4.21
Youtube Initial Buffer Delay (Second)	1.66	1.52	1.24	2.02
Latency (ms) – 50 th Percentile	42.41	51.87	26.16	41.71
Jitter (ms)	40.79	7.54	6.56	44.11
Packet Loss Rate%	6.89	3.17	8.75	9.26
Packet Loss Rate- 90 th percentile	15.72	5.88	9.82	16.24

Table-32: Overall Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Chalaky Railway Station				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	241.20	4.58	5.95	39.96
Download Session Setup Success Rate %	100.00	100.00	40.00	100.00
Upload Throughput Average (Mbits/s)	28.48	1.42	1.35	31.97
Upload Session Setup Success Rate %	100.00	100.00	40.00	100.00
Web Browsing Delay (Second)	3.03	2.14	7.48	3.36
Youtube Initial Buffer Delay (Second)	1.69	2.82	-	0.56
Latency (ms) – 50 th Percentile	33.83	48.81	-	44.90
Jitter (ms)	7.22	7.00	-	6.46
Packet Loss Rate%	0.20	1.60	81.10	3.30

Table-33: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Note- "-" Youtube and Ping tests were failed.				
District Hospital Thrissur				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	45.42	9.13	41.90	27.24
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	16.98	6.17	4.87	33.30
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	2.01	4.9	3.52	1.38
Youtube Initial Buffer Delay (Second)	2.06	0.99	0.94	1.09
Latency (ms) – 50 th Percentile	59.59	59.67	49.53	48.20
Jitter (ms)	95.03	7.82	13.80	11.09
Packet Loss Rate%	7.50	1.30	2.70	0.70

Table-34: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Government Medical College Hospital Thrissur				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	36.85	22.54	261.35	9.44
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	2.04	6.29	8.00	2.00
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	9.00	5.54	3.42	1.57
Youtube Initial Buffer Delay (Second)	5.52	1.02	0.93	1.42
Latency (ms) – 50 th Percentile	51.56	41.52	26.11	35.93
Jitter (ms)	231.00	3.62	3.08	18.38
Packet Loss Rate%	35.00	0.00	0.00	0.90

Table-35: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Hilite Mall Thrissur				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	192.85	1.21	161.51	28.43
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	61.25	2.52	8.25	1.42
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	3.15	2.22	2.58	9.01
Youtube Initial Buffer Delay (Second)	0.59	1.46	0.76	-
Latency (ms) – 50 th Percentile	40.72	51.13	34.32	34.14
Jitter (ms)	1.74	5.74	7.45	7.87
Packet Loss Rate%	0.60	1.10	0.00	0.60

Table-36: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Note- "-" Youtube tests were failed.

Irinjalakuda KSRTC Bus Stand				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	136.85	9.18	348.90	44.09
Download Session Setup Success Rate%	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	20.43	3.88	10.87	42.68
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	3.16	1.47	3.31	3.40
Youtube Initial Buffer Delay (Second)	2.13	1.32	1.19	0.84
Latency (ms)- 50 th Percentile	41.56	46.26	21.10	33.23
Jitter (ms)	9.21	4.94	2.06	5.22
Packet Loss Rate%	0.30	0.10	0.00	0.20

Table-37: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Shakthan Thampuran Bus Stand				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	134.38	8.79	107.38	8.98
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	27.85	7.90	10.78	2.09
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	2.47	1.79	3.70	2.86
Youtube Initial Buffer Delay (Second)	0.66	1.05	1.00	5.70
Latency (ms) – 50 th Percentile	45.28	60.99	41.40	39.72
Jitter (ms)	6.66	4.45	8.25	21.67
Packet Loss Rate%	0.20	0.60	1.50	2.30

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

Thrissur Collectorate				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	135.81	14.45	320.25	172.66
Download Session Setup Success Rate%	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	8.31	8.21	10.23	13.62
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	3.70	4.50	2.94	3.51
Youtube Initial Buffer Delay (Second)	0.95	1.00	0.87	0.87
Latency (ms)- 50 th Percentile	29.65	60.18	22.36	42.45
Jitter (ms)	8.28	4.87	7.97	6.60
Packet Loss Rate%	1.00	0.30	0.30	0.20

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

Thrissur Corporation Office				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	114.79	10.56	148.94	2.81
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	14.97	2.22	10.03	4.29
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	2.80	1.39	1.06	2.87
Youtube Initial Buffer Delay (Second)	0.70	1.45	0.55	1.33
Latency (ms) – 50 th Percentile	45.14	55.07	23.39	40.62
Jitter (ms)	6.12	13.37	2.21	229.61
Packet Loss Rate%	0.30	0.10	0.00	6.10

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

Thrissur KSRTC Bus Stand				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	194.94	8.15	323.36	51.82
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	46.61	4.31	14.90	1.75
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	2.30	3.26	3.59	10.24
Youtube Initial Buffer Delay (Second)	0.64	1.53	0.65	6.57
Latency (ms) – 50 th Percentile	39.38	78.74	40.56	107.90
Jitter (ms)	14.07	18.99	9.03	61.22
Packet Loss Rate%	6.80	21.00	1.80	76.50

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

Vadanapally				
Parameters	Service Provider			
	Auto-Selection Mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	42.74	15.34	31.73	39.75
Download Session Setup Success Rate %	100.00	100.00	100.00	60.00
Upload Throughput Average (Mbits/s)	4.88	11.82	1.46	2.75
Upload Session Setup Success Rate %	100.00	100.00	100.00	80.00
Web Browsing Delay (Second)	4.36	2.28	4.87	10.71
Youtube Initial Buffer Delay (Second)	1.77	2.54	4.15	-
Latency (ms) – 50 th Percentile	48.58	50.64	28.80	42.56
Jitter (ms)	28.75	4.39	5.22	79.84
Packet Loss Rate%	17.00	5.60	0.10	1.80

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

Note- "-" Youtube tests were failed.

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)	149.10	-	306.06	55.58
	Upload Throughput Average (Mbits/s)	28.21	-	14.96	35.60
4G	Download Throughput Average (Mbits/s)	21.37	9.14	35.84	28.49
	Upload Throughput Average (Mbits/s)	5.80	6.44	6.31	16.90

Table-43: Overall Summary of 5G only & 4G only data download & upload speed.

Note- "-"Respective technology was not observed during the test.

Chalakyady Railway Station					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	188.76	-	3.34	-
	Upload Throughput Average (Mbits/s)	31.76	-	2.16	-
4G	Download Throughput Average (Mbits/s)	49.20	6.04	1.13	23.46
	Upload Throughput Average (Mbits/s)	5.29	3.12	0.88	21.73

Table-44: Overall Summary of 5G only & 4G only data download & upload speed.

Note- "-"Respective technology was not observed during the test.

District Hospital Thrissur					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	91.06	-	106.84	39.72
	Upload Throughput Average (Mbits/s)	20.12	-	3.63	38.13
4G	Download Throughput Average (Mbits/s)	7.81	8.95	8.79	14.79
	Upload Throughput Average (Mbits/s)	2.60	8.83	3.78	36.68

Table-45: Overall Summary of 5G only & 4G only data download & upload speed.

Note- "--Respective technology was not observed during the test.					
Government Medical College Hospital Thrissur					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	17.74	-	352.96	-
	Upload Throughput Average (Mbits/s)	2.69	-	8.24	-
4G	Download Throughput Average (Mbits/s)	8.40	6.87	41.07	7.96
	Upload Throughput Average (Mbits/s)	1.62	2.31	4.03	3.73

Table-46: Overall Summary of 5G only & 4G only data download & upload speed.

Note- "--Respective technology was not observed during the test.					
Hilite Mall Thrissur					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	210.02	-	577.80	-
	Upload Throughput Average (Mbits/s)	68.35	-	25.03	-
4G	Download Throughput Average (Mbits/s)	41.25	1.13	104.33	28.91
	Upload Throughput Average (Mbits/s)	9.76	4.93	14.53	4.39

Table-47: Overall Summary of 5G only & 4G only data download & upload speed.

Note- "--Respective technology was not observed during the test.					
Irinjalakuda KSRTC Bus Stand					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	214.65	-	395.91	-
	Upload Throughput Average (Mbits/s)	41.40	-	17.67	37.31
4G	Download Throughput Average (Mbits/s)	14.19	8.31	59.77	37.61
	Upload Throughput Average (Mbits/s)	5.98	5.69	7.39	45.05

Table-48: Overall Summary of 5G only & 4G only data download & upload speed.

Note- "--Respective technology was not observed during the test.					
Shakthan Thampuran Bus Stand					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	155.10	-	384.17	64.80
	Upload Throughput Average (Mbits/s)	34.48	-	28.19	-
4G	Download Throughput Average (Mbits/s)	5.09	19.66	14.10	10.99
	Upload Throughput Average (Mbits/s)	8.86	10.44	4.80	7.36

Table-49: Overall Summary of 5G only & 4G only data download & upload speed.

Note- "--Respective technology was not observed during the test.					
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Thrissur Collectorate					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	219.69	-	361.74	-
	Upload Throughput Average (Mbits/s)	24.18	-	16.95	-
4G	Download Throughput Average (Mbits/s)	27.03	13.03	13.29	67.02
	Upload Throughput Average (Mbits/s)	5.62	14.72	3.23	26.18

Table-50: Overall Summary of 5G only & 4G only data download & upload speed.

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

Thrissur Corporation Office					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	221.09	-	443.93	-
	Upload Throughput Average (Mbits/s)	33.44	-	23.11	-
4G	Download Throughput Average (Mbits/s)	14.68	11.04	26.93	16.80
	Upload Throughput Average (Mbits/s)	10.46	4.12	11.29	2.33

Table-51: Overall Summary of 5G only & 4G only data download & upload speed.

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

Thrissur KSRTC Bus Stand					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	184.54	-	369.69	72.90
	Upload Throughput Average (Mbits/s)	31.45	-	19.56	14.34
4G	Download Throughput Average (Mbits/s)	11.98	14.03	22.11	38.22
	Upload Throughput Average (Mbits/s)	3.25	5.15	8.68	16.66

Table-52: Overall Summary of 5G only & 4G only data download & upload speed.

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

Vadanapally					
Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
5G	Download Throughput Average (Mbits/s)	66.42	-	3.77	-
	Upload Throughput Average (Mbits/s)	3.74	-	2.63	-
4G	Download Throughput Average (Mbits/s)	34.10	2.32	66.85	34.56
	Upload Throughput Average (Mbits/s)	4.55	5.05	4.44	1.98

Table-53: 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 22nd July 2026 & 23rd July 2026. Three locations have been tested in the city. (Refer Table-1)

4.4.1 Walk test locations

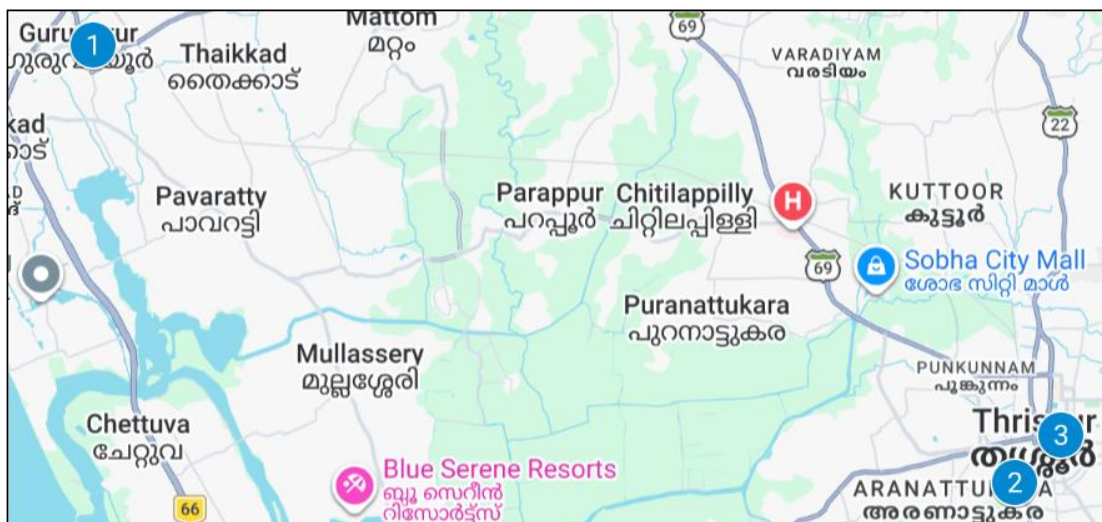


Figure-43: Walk Test locations.

4.4.2 Walk Test Covered

1. Guruvayur Temple
2. Thrissur Railway Station
3. Thrissur Swaraj Round Walkway

4.4.3 Voice Performance

Guruvayur Temple				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	20	20	20	20
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)	1.16	0.64	0.63	0.58

Table-54: Summary of voice call performance in network auto-selection mode (5G/4G/3G/2G).

Thrissur Railway Station				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	12	14	13	12
Call Setup Success Rate %	100.00	100.00	100.00	100.00
Drop Call Rate %	0.00	14.29	0.00	0.00
Call Setup Time-Average (Second)	1.21	0.64	0.51	0.62

Table-55: Summary of voice call performance in network auto-selection mode (5G/4G/3G/2G).

Thrissur Swaraj Round Walkway				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	18	18	16	18
Call Setup Success Rate %	100.00	100.00	100.00	100.00
Drop Call Rate %	0.00	5.56	0.00	0.00
Call Setup Time-Average (Second)	1.12	0.81	0.58	0.59

Table-56: 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)

Guruvayur Temple				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	53.42	6.47	275.63	74.16
Download Session Setup Success Rate %	100.00	93.75	100.00	100.00
Upload Throughput Average (Mbits/s)	20.16	6.38	23.72	28.62
Upload Session Setup Success Rate %	100.00	93.75	100.00	100.00
Latency (ms) – 50 th Percentile	57.03	49.22	38.26	36.26

Table-57: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Thrissur Railway Station				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	150.23	5.48	233.15	54.76
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	36.20	6.79	34.61	29.83
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Latency (ms) – 50 th Percentile	39.73	49.78	38.28	39.01

Table-58: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Thrissur Swaraj Round Walkway				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	153.91	4.90	229.06	64.77
Download Session Setup Success Rate %	100.00	88.24	100.00	100.00
Upload Throughput Average (Mbits/s)	41.82	8.39	24.86	46.31
Upload Session Setup Success Rate %	100.00	94.12	100.00	100.00
Latency (ms) – 50 th Percentile	47.44	50.22	40.68	36.23

Table-59: Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

4.5 Highway

Drive test has been conducted on 21st July 2026 and 24th July 2026 covering one Highway route. (Refer Table-1)

4.5.1 Drive test route

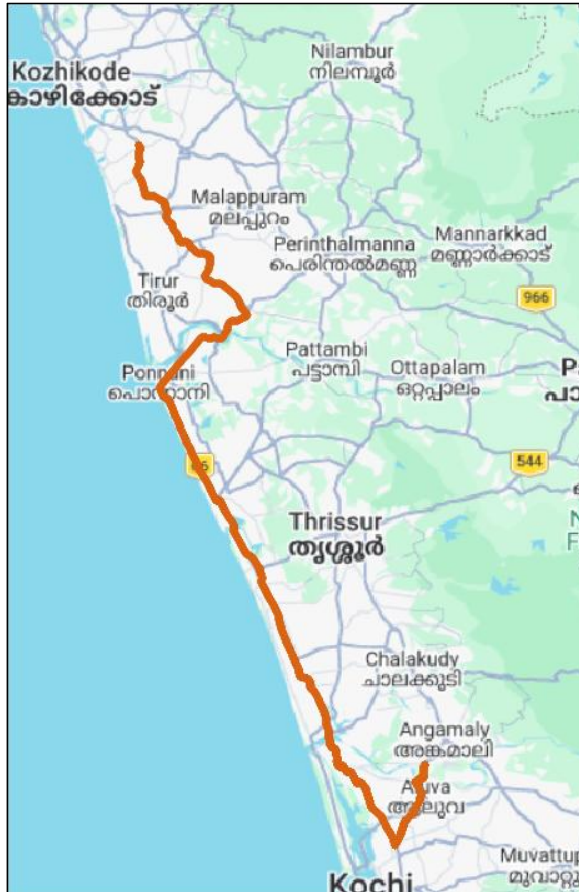


Figure-44: Drive test route Highway.

4.5.2 Routes Covered

Kochi to Thrissur to Calicut passing through Athani, Edappally, Varapuzha, Kodungallur, Thalikulam, Chavakkad, Ponnani, Valanchery and Paingottoor etc.

4.5.3 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	93	90	90
Call Setup Success Rate %	97.85	100.00	100.00
Drop Call Rate %	3.30	1.11	0.00
Call Setup Time-Average (Second)	4.33	4.18	4.30
Handover Success Rate %	98.60	99.78	97.25

Table-60: Summary of voice call performance in 3G/2G network mode only.

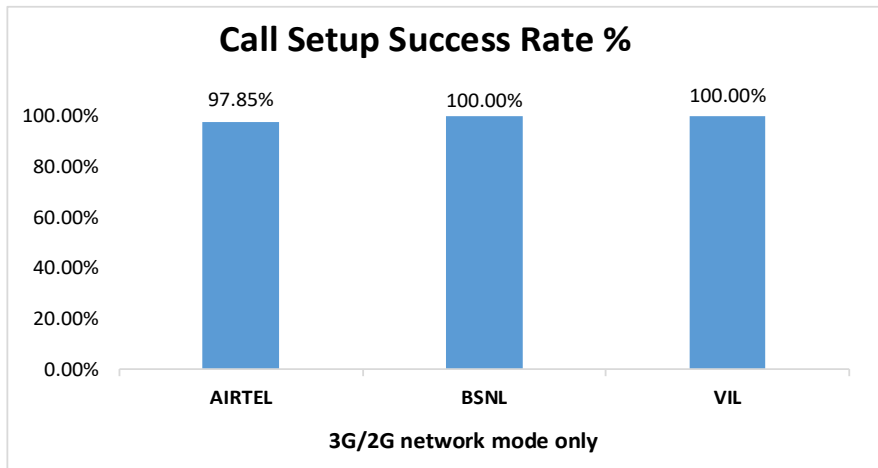


Figure-45: Performance for call setup success rate.

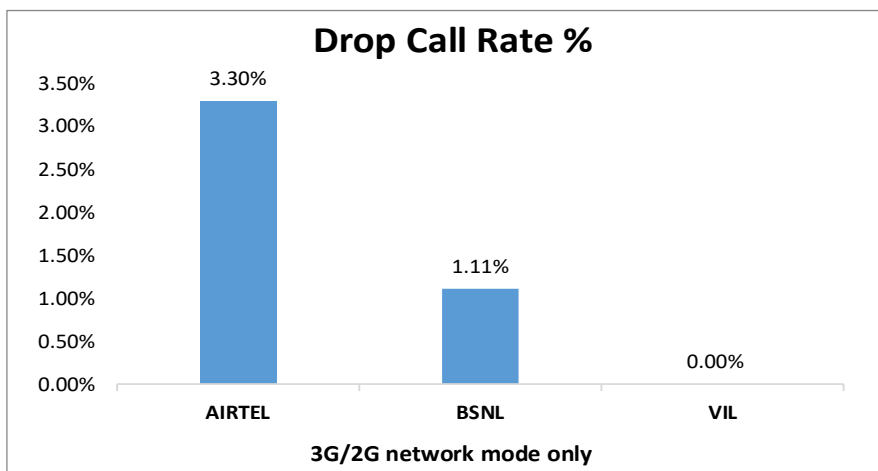


Figure-46: Performance for drop call rate.

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

Technology	Service Provider		
	AIRTEL	BSNL	VIL
3G	NA	33.95%	NA
2G	100.00%	66.05%	100.00%
Limited Service	0.00%	0.00%	0.00%

Table-61: Time spent on technology during drive test 3G/2G network mode only.

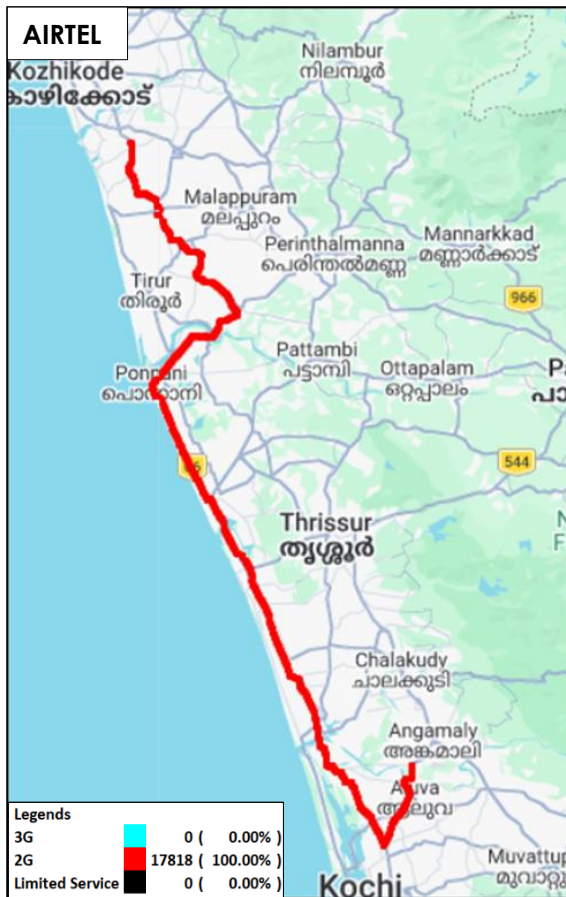


Figure-47: Serving technology plots 3G/2G network mode – AIRTEL.

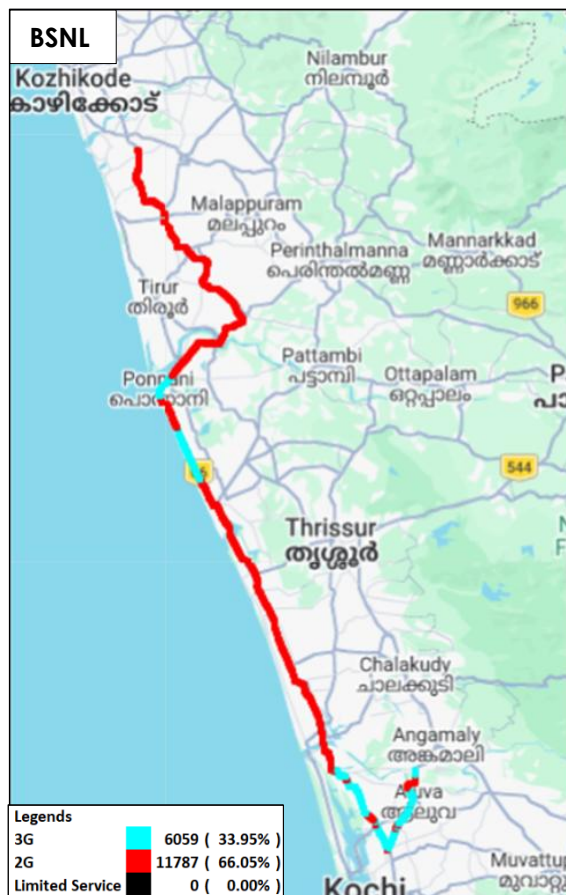


Figure-48: Serving technology plots 3G/2G network mode – BSNL.

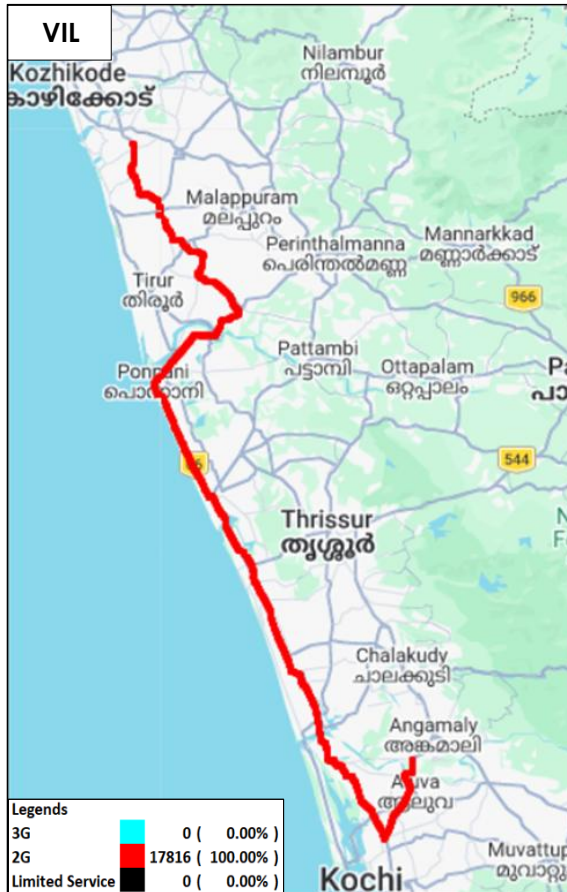


Figure-49: Serving technology plots 3G/2G network mode – VIL.

(c) Network Signal Strength Distribution: The following chart represents signal strength distribution for 3G/2G network mode only. (Refer figure-93, 94 & 95 for map view)

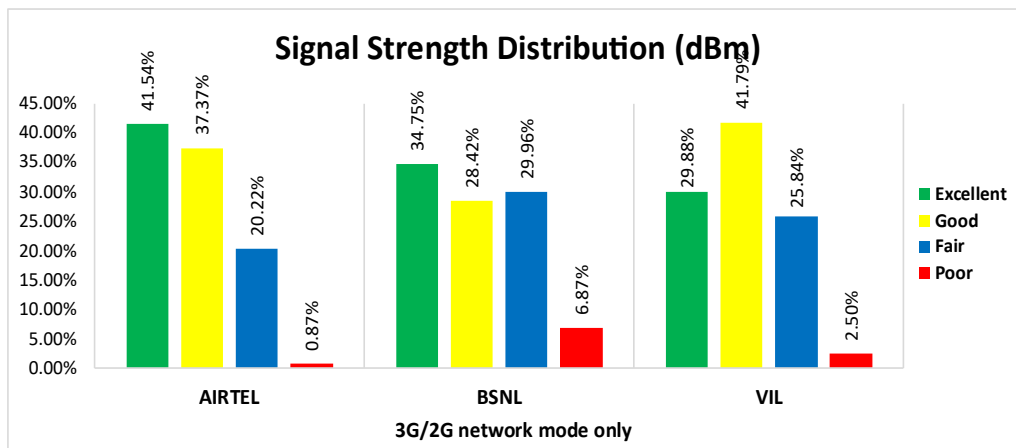


Figure-50: Signal strength distribution 3G/2G network mode only.

Observations:

- Airtel has 42% of samples falling in the excellent signal strength category.
- BSNL has 35% of samples falling in the excellent signal strength category.
- VIL has 30% 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	92	95	92	93
Call Setup Success Rate %	100.00	98.95	94.57	100.00
Drop Call Rate %	0.00	2.13	1.15	2.15
Call Setup Time Average (Second)	1.17	1.08	0.57	0.87
Handover Success Rate %	100.00	100.00	99.88	100.00

Table-62: Summary of voice call performance in network auto-selection mode.

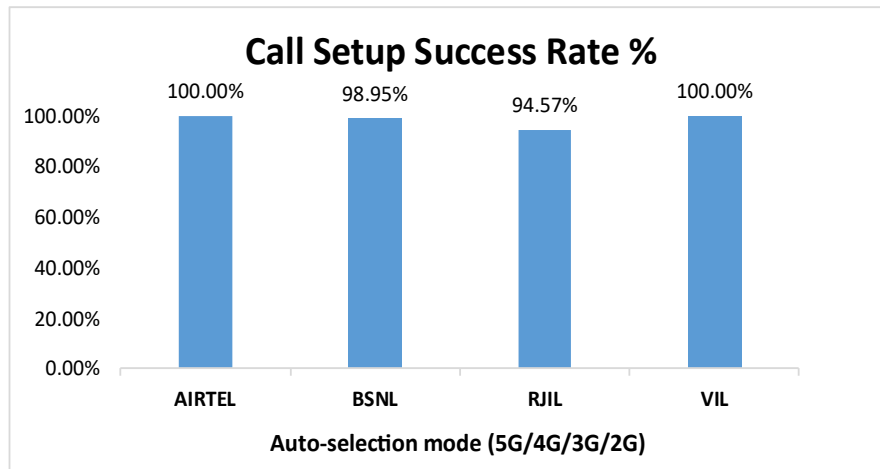


Figure-51: Performance for call setup success rate.

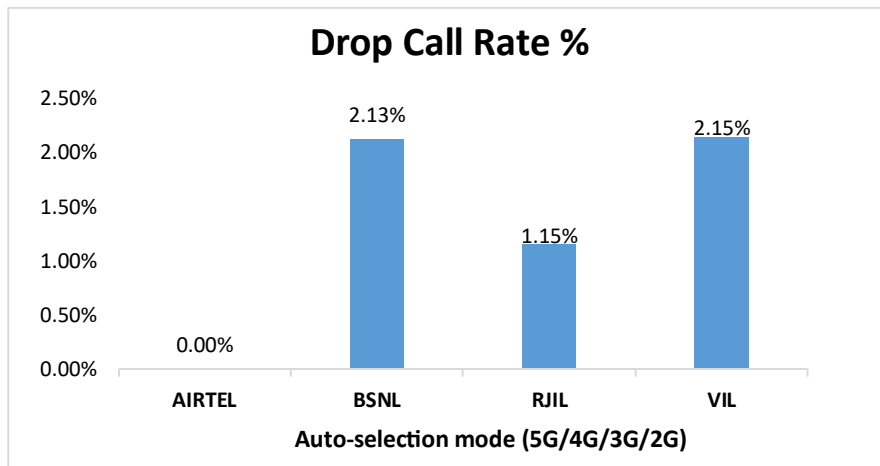


Figure-52: Performance for drop call rate.

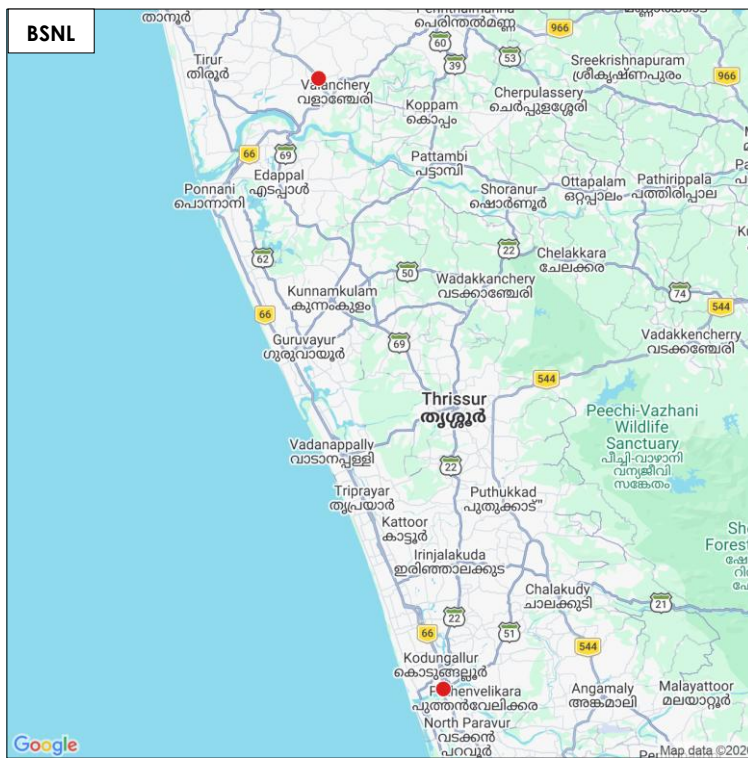


Figure-53: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice - BSNL.

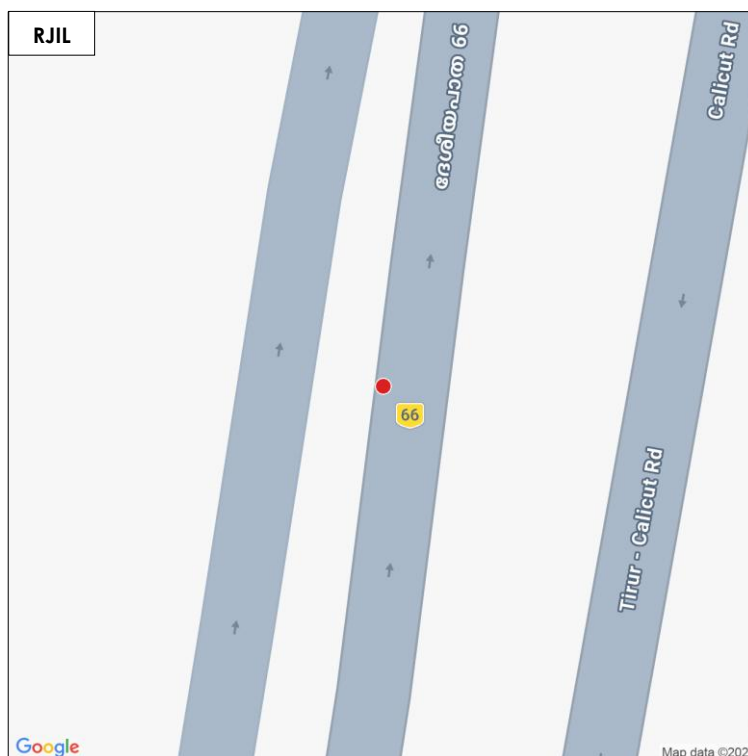


Figure-54: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice - RJIL.

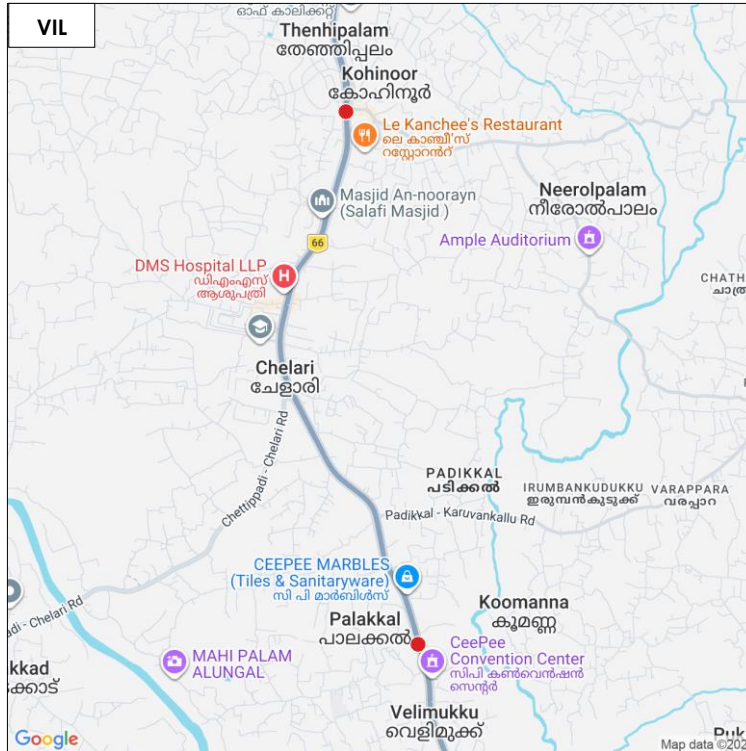


Figure-55: Drop call locations in auto-selection mode (5G/4G/3G/2G) voice - VIL.

Parameter	Service Provider			
	Mobile-to-Mobile (5G/4G – Open Mode)			
	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider Network)	91	92	87	91
Number of silence call for >4 Sec	0	3	0	7
Silence Call Rate %	0.00	3.26	0.00	7.69
Number of silence instances for >4 Sec	0	3	0	7
Number of silence instances for >3 Sec	0	11	0	8
Number of silence instances for >2 sec	0	26	1	21
RTP Jitter (4G & 5G) in ms	4.65	5.28	11.31	15.26
Packet loss Rate Downlink %	0.11	1.16	0.26	1.43
Packet loss Rate Uplink %	0.09	1.09	0.42	1.40

Table-63: Summary of silence instances & packet loss rate for mobile to mobile call.

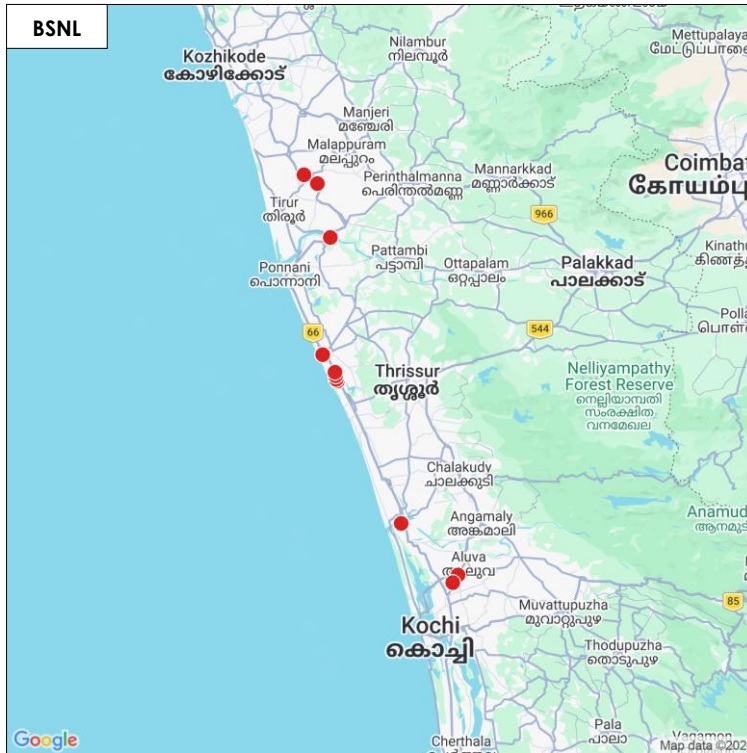


Figure-56: Number of silence instances for >3 Sec Mobile-to-Mobile (5G/4G-Open Mode)-BSNL.

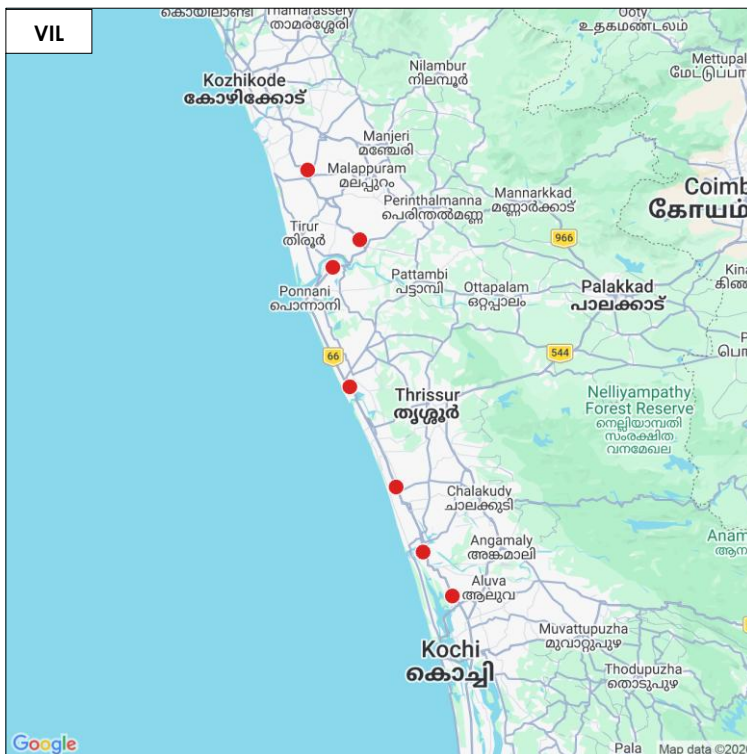


Figure-57: Number of silence instances for >3 Sec Mobile-to-Mobile (5G/4G-Open Mode)-VIL.

(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 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-63	1170	1130	1104	1116
Speech Quality (Average MOS)	4.05	3.86	4.58	4.49
Number of samples with MOS ≥ 4 to < 5 (Excellent)	997	820	1009	992
Number of samples with MOS ≥ 3 to < 4 (Good)	163	122	72	74
Number of samples with MOS ≥ 2 to < 3 (Fair)	8	128	14	21
Number of samples with MOS ≥ 1 to < 2 (Poor)	2	60	9	29
%age of samples with MOS ≥ 4 to < 5 (Excellent)	85.21%	72.57%	91.39%	88.89%
%age of samples with MOS ≥ 3 to < 4 (Good)	13.93%	10.80%	6.52%	6.63%
%age of samples with MOS ≥ 2 to < 3 (Fair)	0.68%	11.33%	1.27%	1.88%
%age of samples with MOS ≥ 1 to < 2 (Poor)	0.17%	5.31%	0.82%	2.60%

Table-64: Summary of speech quality (MOS) samples.

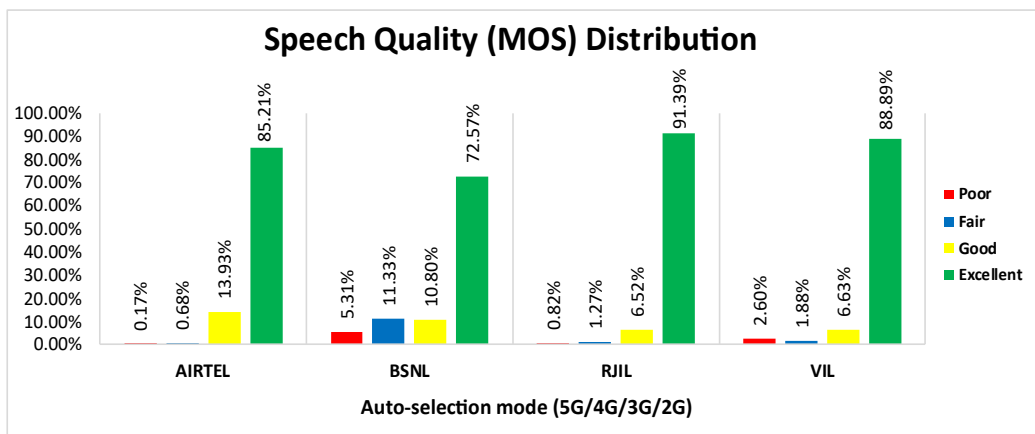


Figure-58: Distribution of samples in MOS range.

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

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	6.70%	NA	40.43%	2.90%
4G	93.30%	96.39%	59.57%	97.10%
3G	NA	2.48%	NA	NA
2G	0.00%	1.13%	NA	0.00%
Limited Service	0.00%	0.00%	0.00%	0.00%

Table-65: 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.

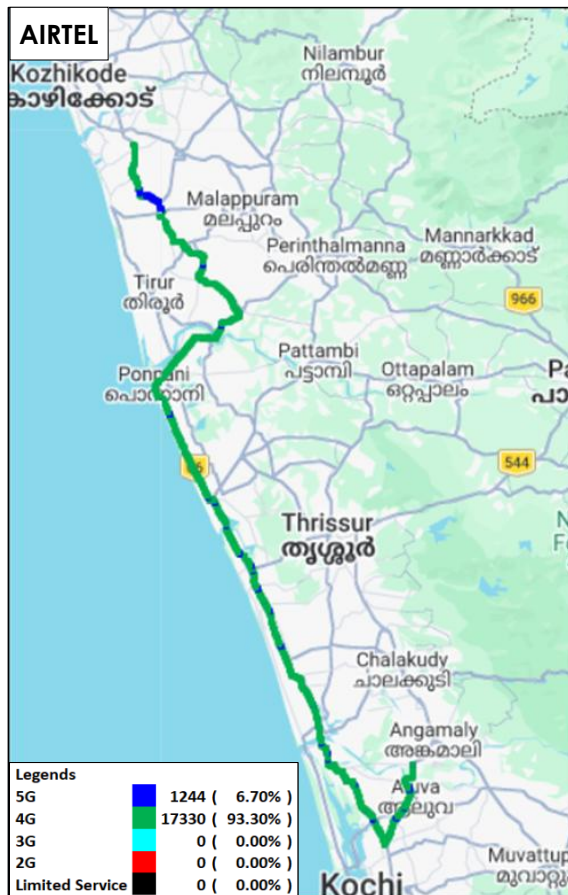


Figure-59: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice – AIRTEL

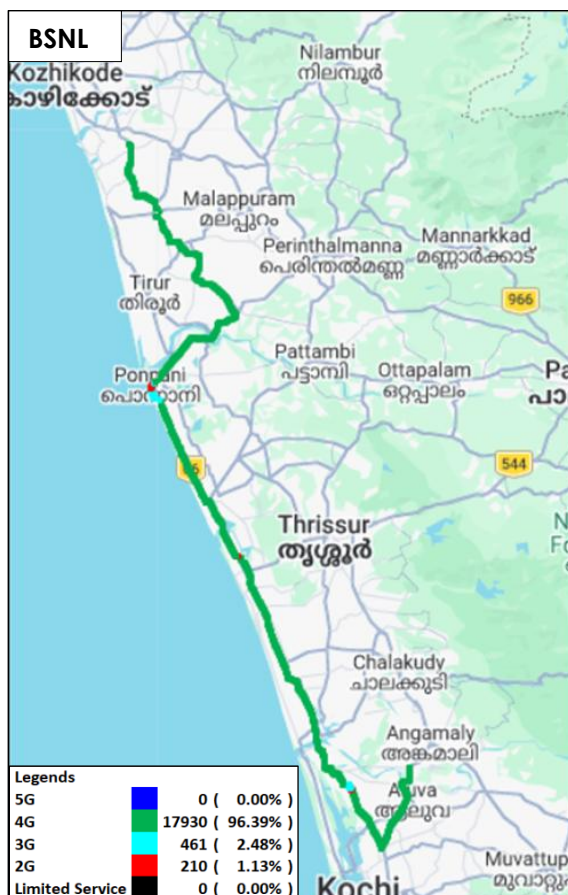


Figure-60: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice – BSNL.

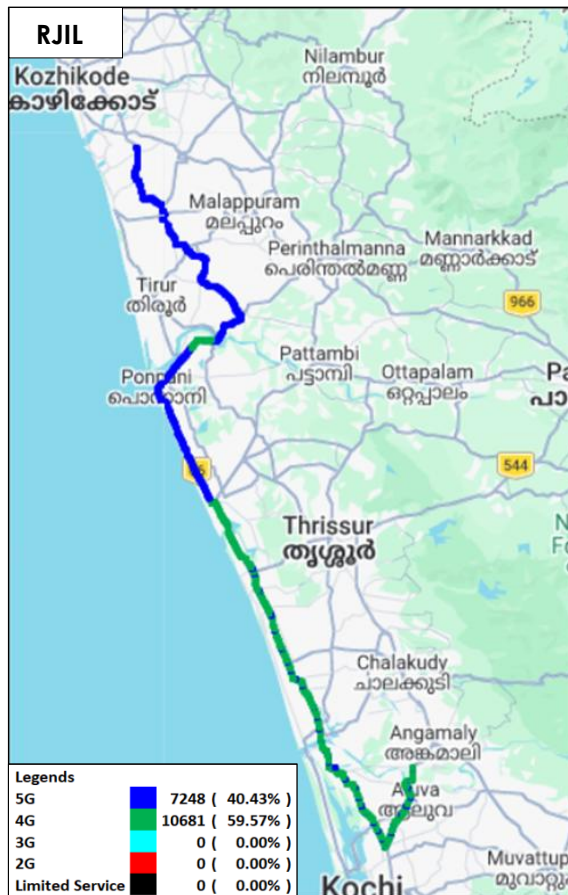


Figure-61: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice – RJIL.

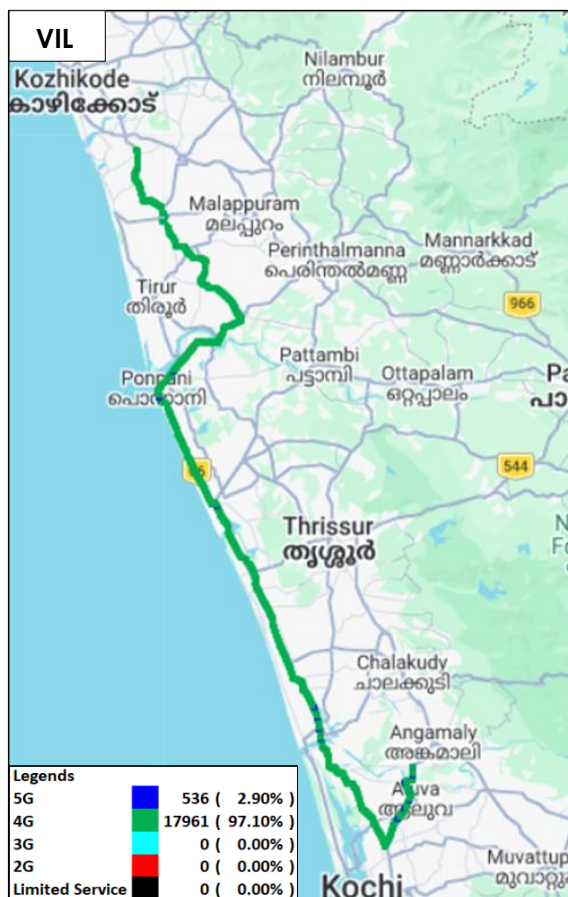


Figure-62: Serving technology plots in auto-selection mode (5G/4G/3G/2G) voice – VIL.

(g) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) voice. (Refer figure-96, 97, 98 & 99 for map view)

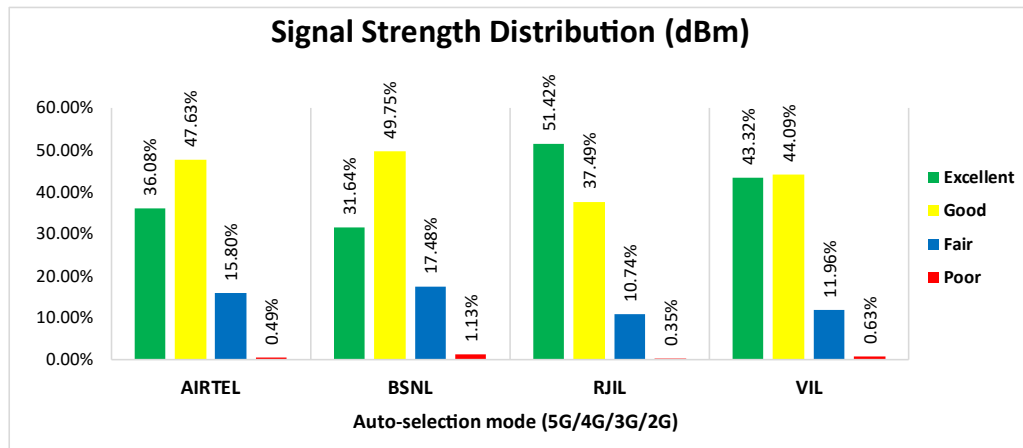


Figure-63: Signal strength distribution auto-selection mode (5G/4G/3G/2G) voice.

Observations:

- Airtel has 36% of samples falling in the excellent signal strength category.
- BSNL has 32% of samples falling in the excellent signal strength category.
- RJIL has 51% of samples falling in the excellent signal strength category.
- VIL has 43% of samples falling in the excellent signal strength category.

(h) Coverage Gap observed

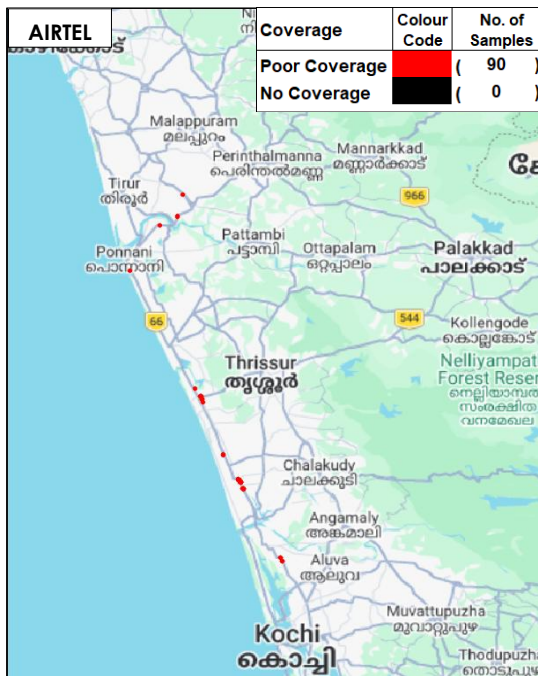


Figure-64: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice-Airtel.

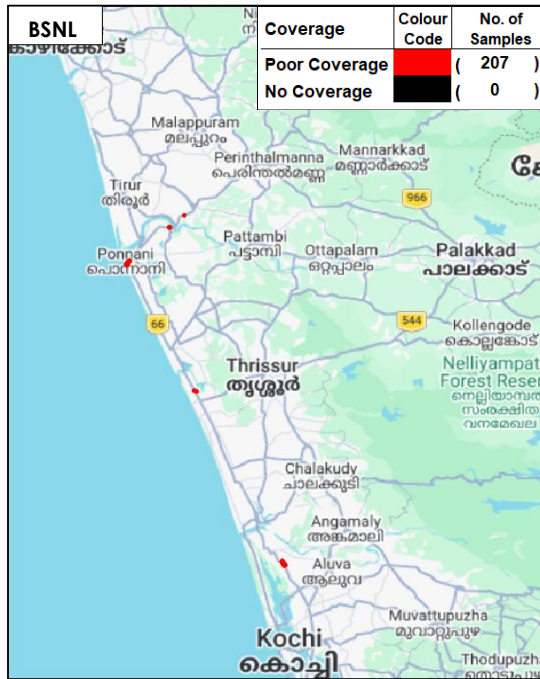


Figure-65: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice-BSNL.

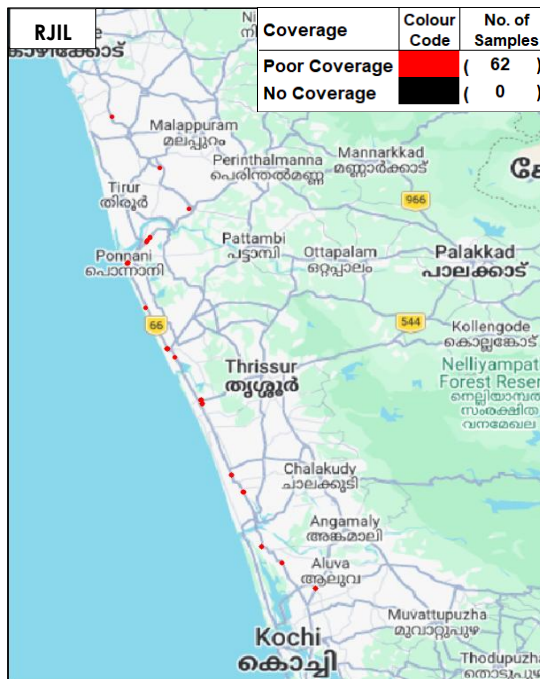


Figure-66: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice-RJIL.

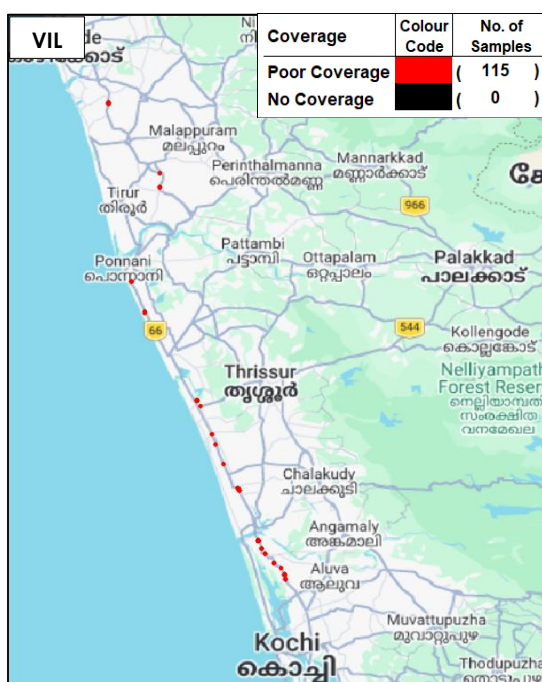


Figure-67: Poor coverage & no coverage locations in auto-selection mode (5G/4G/3G/2G) voice-VIL.

4.5.4 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	165.81	10.14	346.73	22.77
	80 th Percentile	247.27	14.21	522.91	34.87
	20 th Percentile	75.00	4.88	166.86	12.12
Upload Throughput (Mbits/s)	Average	38.36	5.17	29.92	13.70
	80 th Percentile	64.10	7.80	56.63	22.10
	20 th Percentile	11.64	1.40	6.41	2.74
Latency (ms)	50 th Percentile	30.75	46.89	22.68	35.57

Table-66: Summary of Data performance in network auto-selection mode.

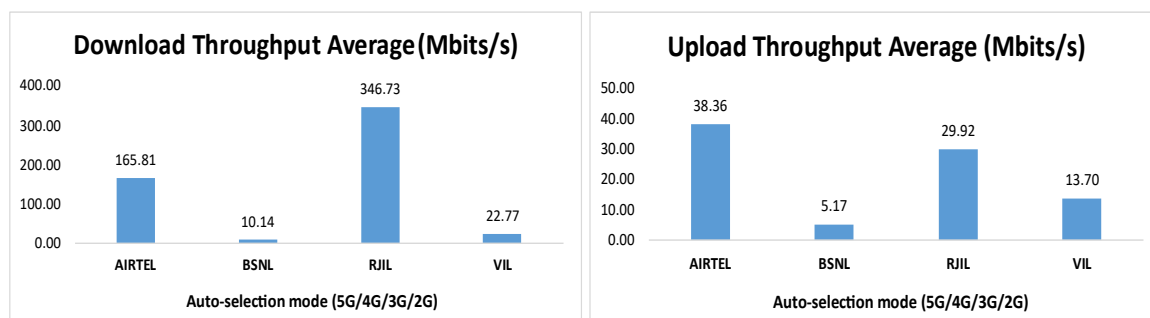


Figure-68: Download & Upload throughput.

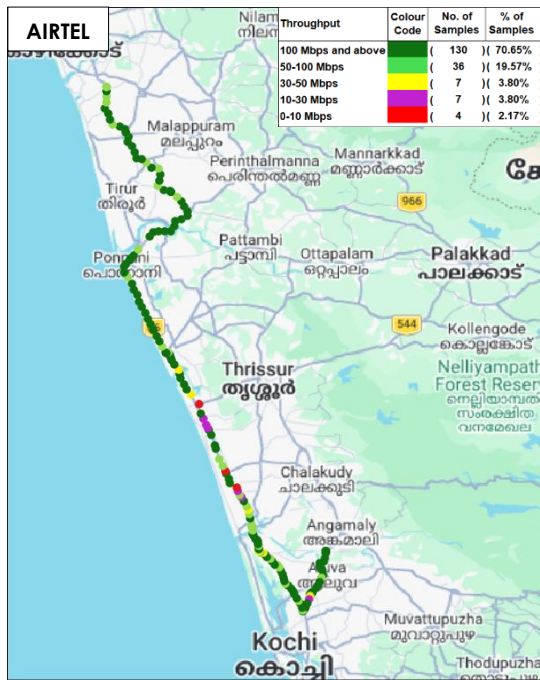


Figure-69: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - AIRTEL.

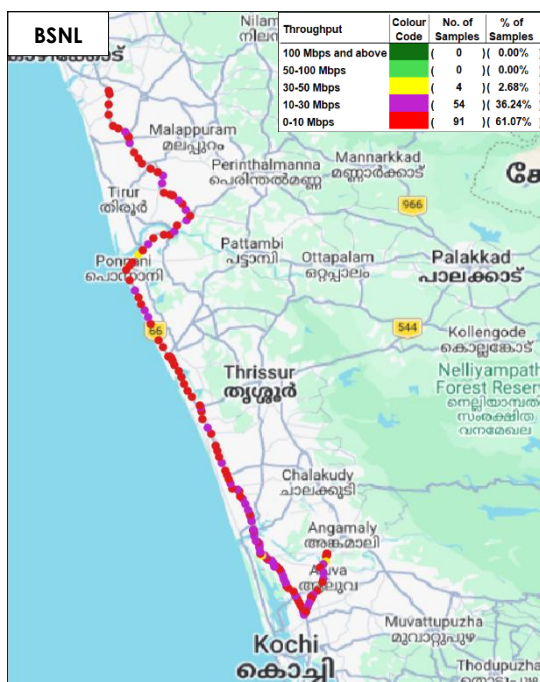


Figure-70: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - BSNL.

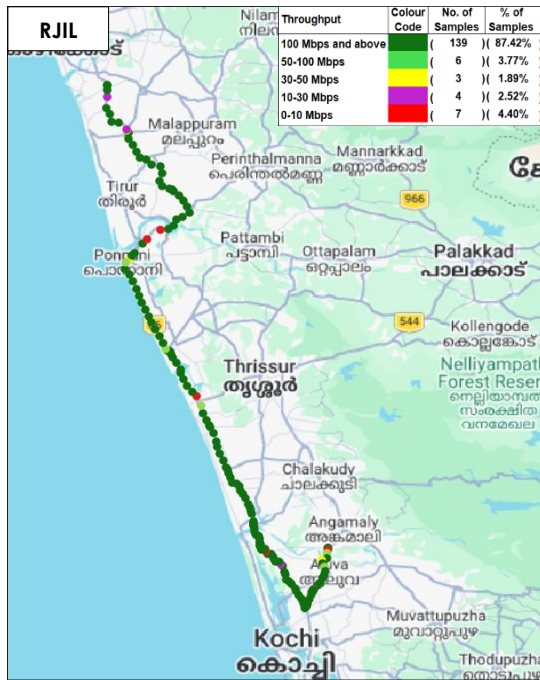


Figure-71: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - RJIL.

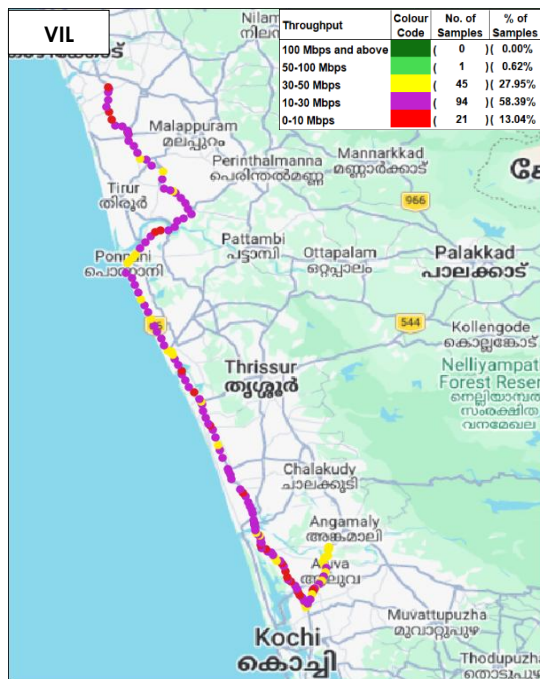


Figure-72: Download throughput distribution auto-selection mode (5G/4G/3G/2G) - VIL.

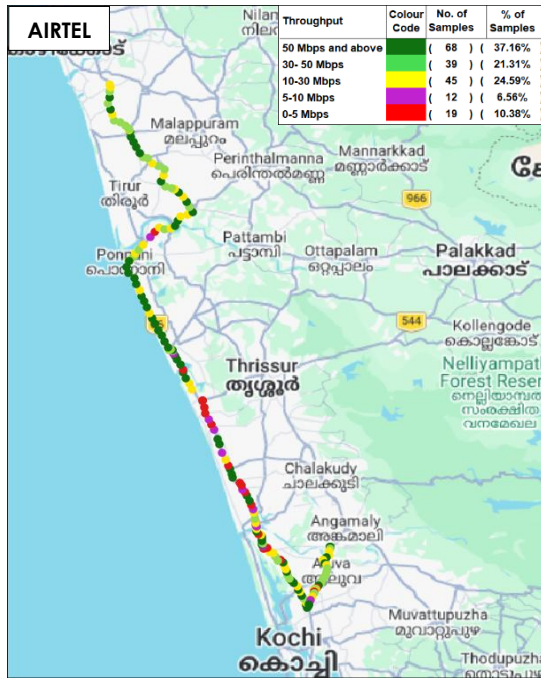


Figure-73: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - AIRTEL.

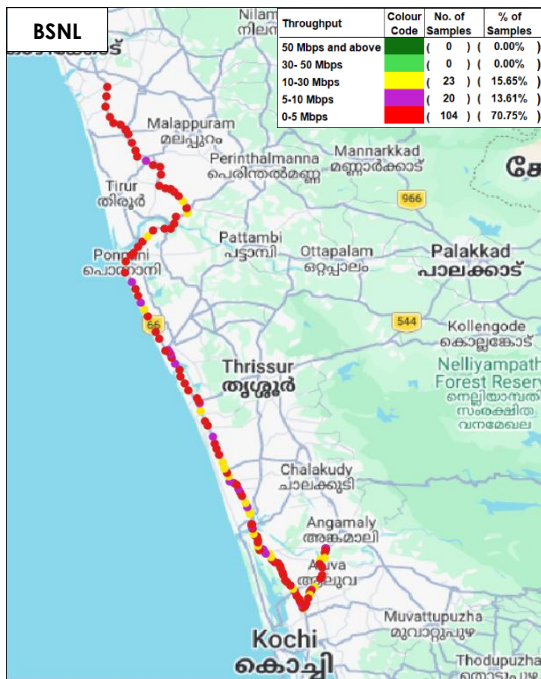


Figure-74: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - BSNL.

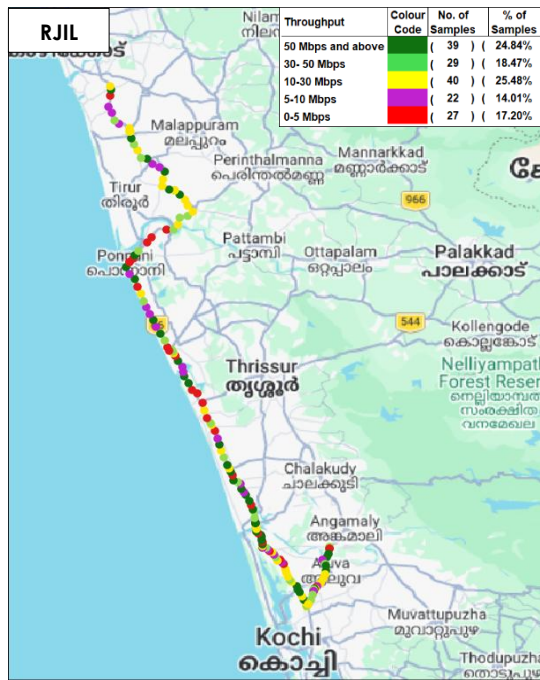


Figure-75: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - RJIL.

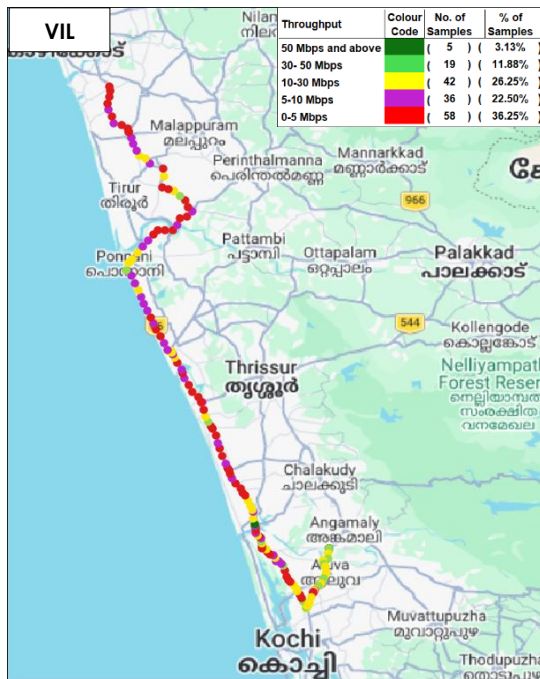


Figure-76: Upload throughput distribution auto-selection mode (5G/4G/3G/2G) - VIL.

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

Technology	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
5G	71.67%	NA	96.27%	11.62%
4G	28.33%	100.00%	3.73%	88.35%
3G	NA	0.00%	NA	NA
2G	0.00%	0.00%	NA	0.03%
Limited Service	0.00%	0.00%	0.00%	0.00%

Table-67: 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.

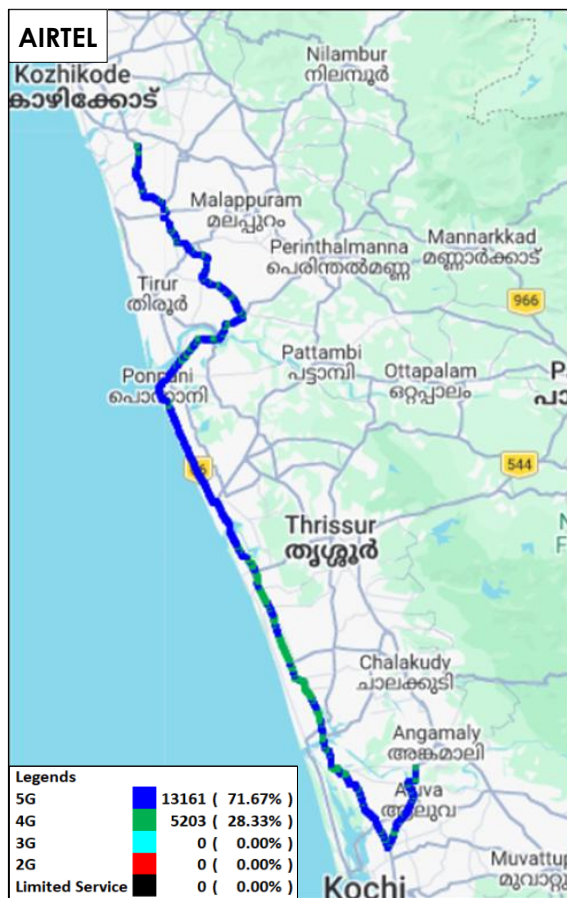


Figure-77: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - AIRTEL

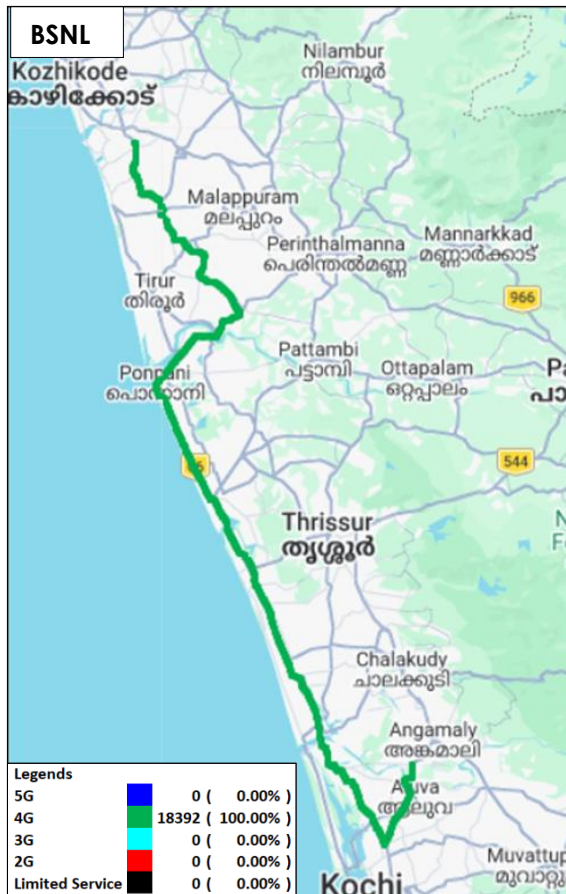


Figure-78: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - BSNL.

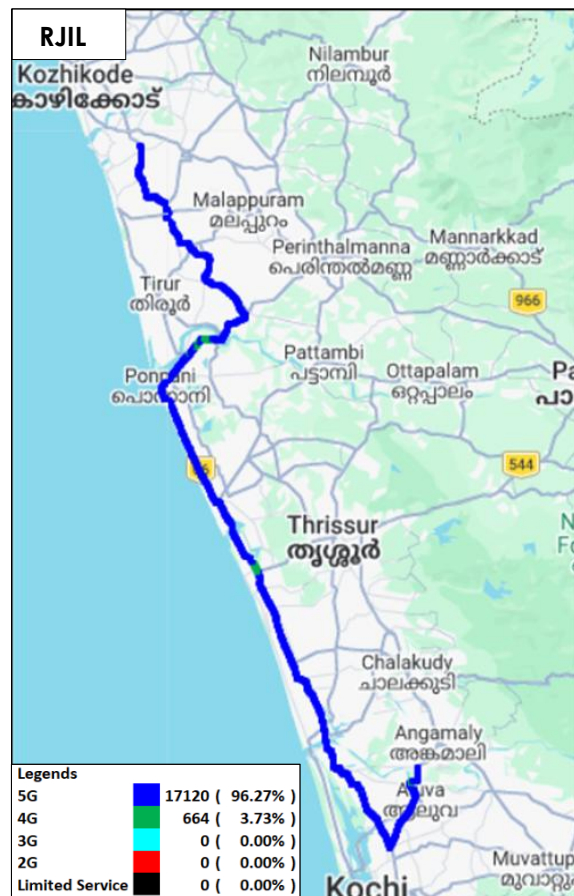


Figure-79: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - RJIL.

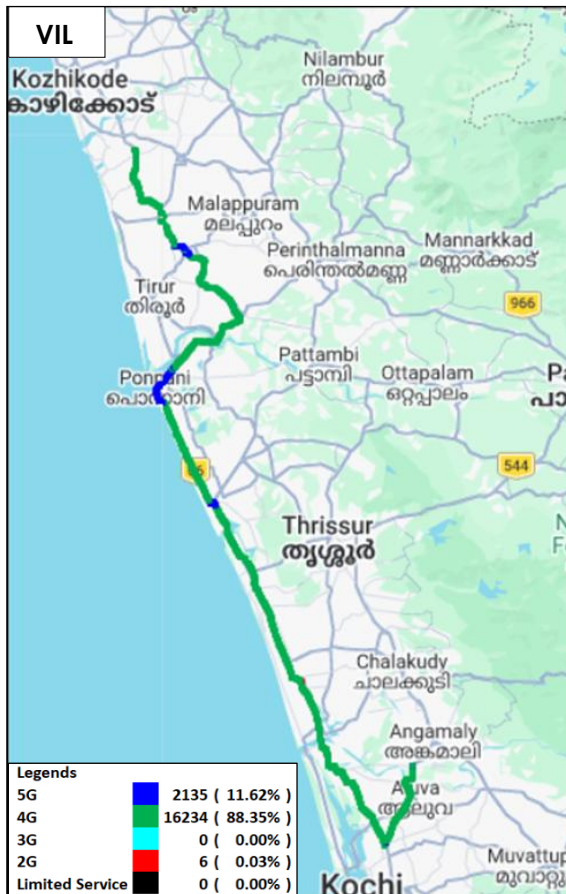


Figure-80: Serving technology plots in auto-selection mode (5G/4G/3G/2G) data - VIL.

(c) Network Signal Strength Distribution: The following chart provides signal strength distribution for auto-selection mode (5G/4G/3G/2G) data. (Refer figure-100, 101, 102 & 103 for map view)

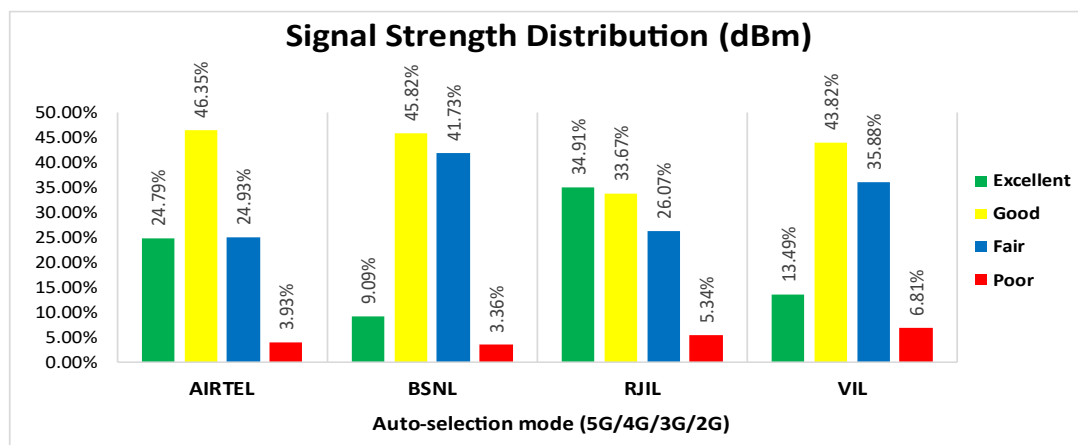


Figure-81: Signal strength distribution auto-selection mode (5G/4G/3G/2G) data.

Observations:

- Airtel has 25% of samples falling in the excellent signal strength category.
- BSNL has 9% of samples falling in the excellent signal strength category.
- RJIL has 35% of samples falling in the excellent signal strength category.
- VIL has 13% 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 99.29%, 100.00% and 99.52% call setup success rate respectively in 3G/2G network mode. (refer table-3)
- b) Airtel, BSNL, RJIL and VIL have 100.00%, 99.34%, 99.15% and 98.32% call setup success rate respectively in auto-selection mode (5G/4G/3G/2G). (refer table-5)
- c) All operators 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 4.36, 4.60 & 4.18 seconds respectively in 3G/2G network mode. (refer table-3)
- b) Airtel, BSNL, RJIL & VIL call setup time is 1.21, 0.97, 0.57 & 0.86 seconds respectively in auto-selection mode (5G/4G/3G/2G). (refer table-5)

3. Call Silence/Mute Rate:

In packet switched network (4G/5G) VIL, BSNL, Airtel & RJIL have 9.52%, 1.45%, 0.00% & 0.00% silence call rate respectively. Further BSNL has higher RTP packet loss rate in downlink (1.16%) compared to VIL (1.05%), RJIL (0.36%) & Airtel (0.13%). In uplink the RTP packet loss rate is higher for VIL (1.79%) compared to BSNL (1.42%), RJIL (0.40%) & Airtel (0.15%). (refer table-6)

4. Drop Call Rate:

- a) Airtel, BSNL and VIL drop call rate is 1.20%, 0.24% and 0.00% respectively in 3G/2G network mode. (refer table-3)
- b) Airtel, BSNL, RJIL and VIL drop call rate is 0.00%, 3.64%, 0.17% and 0.34% 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 147.37 Mbps, 8.61 Mbps, 315.13 Mbps and 40.25 Mbps respectively. (refer table-11)
- b) Airtel, BSNL, RJIL and VIL average upload speeds are 30.94 Mbps, 5.50 Mbps, 24.54 Mbps and 16.08 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 127.58 Mbps, 10.39 Mbps, 185.93 Mbps and 42.63 Mbps respectively. (refer table-32)
- b) Airtel, BSNL, RJIL and VIL average upload speeds are 23.18 Mbps, 5.47 Mbps, 8.50 Mbps and 13.81 Mbps respectively. (refer table-32)

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

- a) Airtel, BSNL, RJIL and VIL have 100.00%, 100.00%, 94.00% and 96.00% download session setup success rate respectively. (refer table-32)
- b) Airtel, BSNL, RJIL and VIL have 100.00%, 100.00%, 94.00% and 98.00% upload session setup success rate respectively. (refer table-32)

5.3 Operator wise Key Findings

1. Airtel:

Voice

- 99.29% call setup success rate and 1.20% drop call rate have been observed in 3G/2G network mode for LSA. (refer table-3)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for LSA. (refer table-5)
- 99.70% call setup success rate and 0.61% drop call rate have been observed in 3G/2G network mode for city drive. (refer table-13)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for 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 all hotspot locations. (refer table-21)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) at all walk test locations. (refer table-54, 55 & 56)
- 97.85% call setup success rate and 3.30% drop call rate have been observed in 3G/2G network mode for highway drive. (refer table-60)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for highway drive. (refer table-62)

Data

- Airtel has 147.37 Mbps average download speed & 30.94 Mbps average upload speed for LSA. (refer table-11)
- Airtel has 145.43 Mbps average download speed & 27.96 Mbps average upload speed across the measured routes for city drive. (refer table-19)
- District Hospital Thrissur, Government Medical College Hospital Thrissur and Vadanapally have less download speed (less than 100 Mbps) out of total 10 hotspot locations for auto-selection mode (5G/4G/3G/2G). (refer table- 34, 35 & 42)
- District Hospital Thrissur, Government Medical College Hospital Thrissur, Thrissur Collectorate, Thrissur Corporation Office and Vadanapally have less upload speed (less than 20 Mbps) out of total 10 hotspot locations for auto-selection mode (5G/4G/3G/2G). (refer table- 34, 35, 39, 40 & 42)
- Guruvayur Temple has less download speed (less than 100 Mbps) out of total 3 Walk Test locations for auto-selection mode (5G/4G/3G/2G). (refer table-57)
- Airtel has 165.81 Mbps average download speed & 38.36 Mbps average upload speed across the measured routes for highway drive. (refer table-66)

2. BSNL:

Voice

- 100.00% call setup success rate and 0.24% drop call rate have been observed in 3G/2G network mode for LSA. (refer table-3)

- 99.34% call setup success rate and 3.64% 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 city drive. (refer table-13)
- 99.45% call setup success rate and 4.74% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for city drive. (refer table-15)
- 99.00% 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-21)
- 100.00% call setup success rate and 0.00% drop call rate has been observed in auto-selection mode (5G/4G/3G/2G) at Guruvayur Temple walk test location. (refer table- 54)
- 100.00% call setup success rate and 14.29% drop call rate has been observed in auto-selection mode (5G/4G/3G/2G) at Thrissur Railway Station walk test location. (refer table- 55)
- 100.00% call setup success rate and 5.56% drop call rate has been observed in auto-selection mode (5G/4G/3G/2G) at Thrissur Swaraj Round Walkway walk test location. (refer table- 56)
- 100.00% call setup success rate and 1.11% drop call rate have been observed in 3G/2G network mode for highway drive. (refer table-60)
- 98.95% call setup success rate and 2.13% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for highway drive. (refer table-62)

Data

- BSNL has 8.61 Mbps average download speed & 5.50 Mbps average upload speed for LSA. (refer table-11)
- BSNL has 7.92 Mbps average download speed & 5.41 Mbps average upload speed across the measured routes for city drive. (refer table-19)
- Chalakudy Railway Station, District Hospital Thrissur, Hilite Mall Thrissur, Irinjalakuda KSRTC Bus Stand, Shakthan Thampuran Bus Stand and Thrissur KSRTC Bus Stand have less download speed (less than 10 Mbps) out of total 10 hotspots locations for auto-selection mode (5G/4G/3G/2G). (refer table-33, 34, 36, 37, 38 & 41)
- Chalakudy Railway Station has less upload speed (less than 2 Mbps) out of total 10 hotspots locations for auto-selection mode (5G/4G/3G/2G). (refer table-33)
- All walk test locations have less download speed (less than 10 Mbps) for auto-selection mode (5G/4G/3G/2G). (refer table-57, 58 & 59)
- BSNL has 10.14 Mbps average download speed & 5.17 Mbps average upload speed across the measured routes for highway drive. (refer table- 66)

3. RJIL:

Voice

- 99.15% call setup success rate and 0.17% 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 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 all hotspot locations. (refer table-21)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) at all walk test locations. (refer table-54, 55 & 56)
- 94.57% call setup success rate and 1.15% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for highway drive. (refer table- 62)

Data

- RJIL has 315.13 Mbps average download speed & 24.54 Mbps average upload speed for LSA. (refer table-11)
- RJIL has 328.12 Mbps average download speed & 23.95 Mbps average upload speed across the measured routes for city drive. (refer table-19)
- Chalakudy Railway Station, District Hospital Thrissur and Vadanapally have less download speed (less than 100 Mbps) out of total 10 hotspot locations for auto-selection mode (5G/4G/3G/2G). (refer table-33, 34 & 42)
- All hotspot locations have less upload speed (less than 20 Mbps) for auto-selection mode (5G/4G/3G/2G). (refer table-33 to 42)
- RJIL has 346.73 Mbps average download speed & 29.92 Mbps average upload speed across the measured routes for highway drive. (refer table- 66)

4. VIL: Voice

- 99.52% call setup success rate and 0.00% drop call rate have been observed in 3G/2G network mode for LSA. (refer table-3)
- 98.32% call setup success rate and 0.34% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for LSA. (refer table-5)
- 99.39% call setup success rate and 0.00% drop call rate have been observed in 3G/2G network mode for city drive. (refer table-13)
- 97.18% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for 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 all hotspot locations. (refer table-21)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) at all walk test locations. (refer table-54, 55 & 56)
- 100.00% call setup success rate and 0.00% drop call rate have been observed in 3G/2G network mode for highway drive. (refer table-60)
- 100.00% call setup success rate and 2.15% drop call rate have been observed in auto-selection mode (5G/4G/3G/2G) for highway drive. (refer table- 62)

Data

- VIL has 40.25 Mbps average download speed & 16.08 Mbps average upload speed for LSA. (refer table-11)
- VIL has 44.52 Mbps average download speed & 14.64 Mbps average upload speed across the measured routes for city drive. (refer table-19)
- All hotspot locations have less download speed (less than 100 Mbps) except Thrissur Collectorate for auto-selection mode (5G/4G/3G/2G). (refer table- 33, 34, 35, 36, 37, 38, 40, 41 & 42)
- Government Medical College Hospital Thrissur, Hilite Mall Thrissur, Shakthan Thampuran Bus Stand, Thrissur Collectorate, Thrissur Corporation Office, Thrissur KSRTC Bus Stand and Vadanapally have less upload speed (less than 20 Mbps) out of total 10 hotspot locations for auto-selection mode (5G/4G/3G/2G). (refer table-35, 36, 38, 39, 40, 41 & 42)
- All walk test locations have less download speed (less than 100 Mbps) for auto-selection mode (5G/4G/3G/2G). (refer table-57, 58 & 59)
- VIL has 22.77 Mbps average download speed & 13.70 Mbps average upload speed across the measured routes for highway drive. (refer table- 66)

6. Annexure

6.1 Route wise coverage map

6.1.1 City

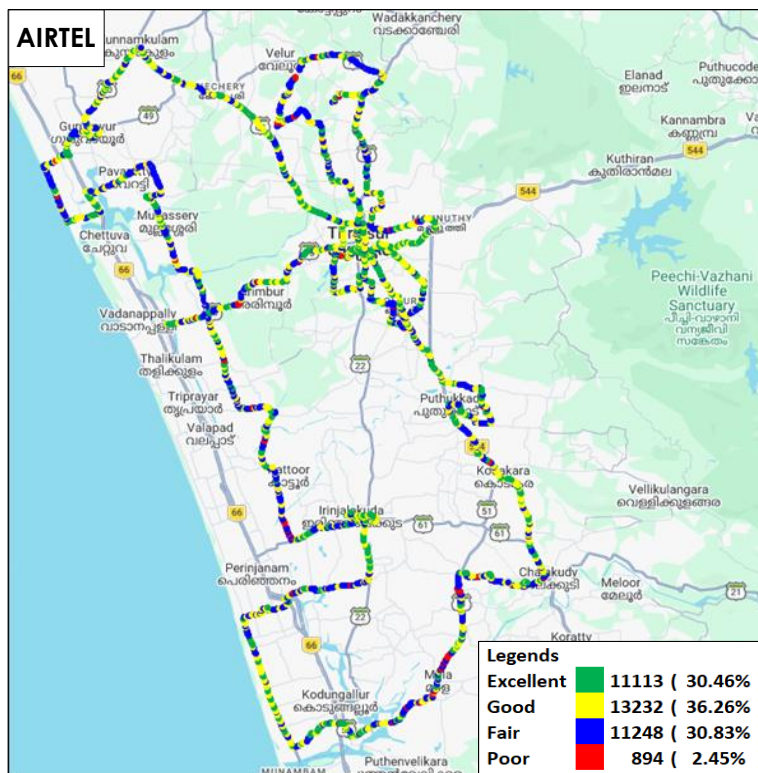


Figure-82: Signal strength 3G/2G network mode voice - AIRTEL.

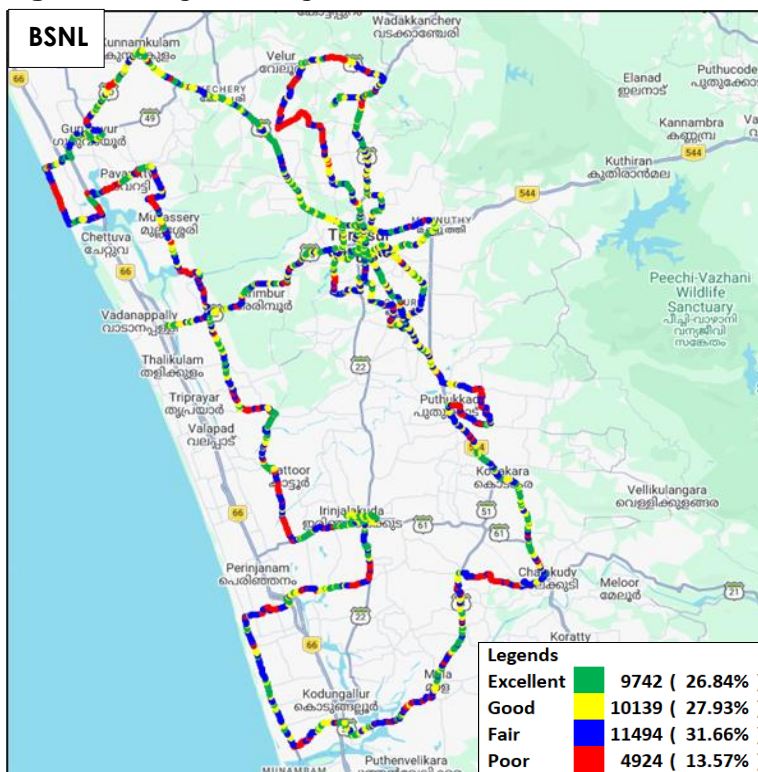


Figure-83: Signal strength 3G/2G network mode voice - BSNL.

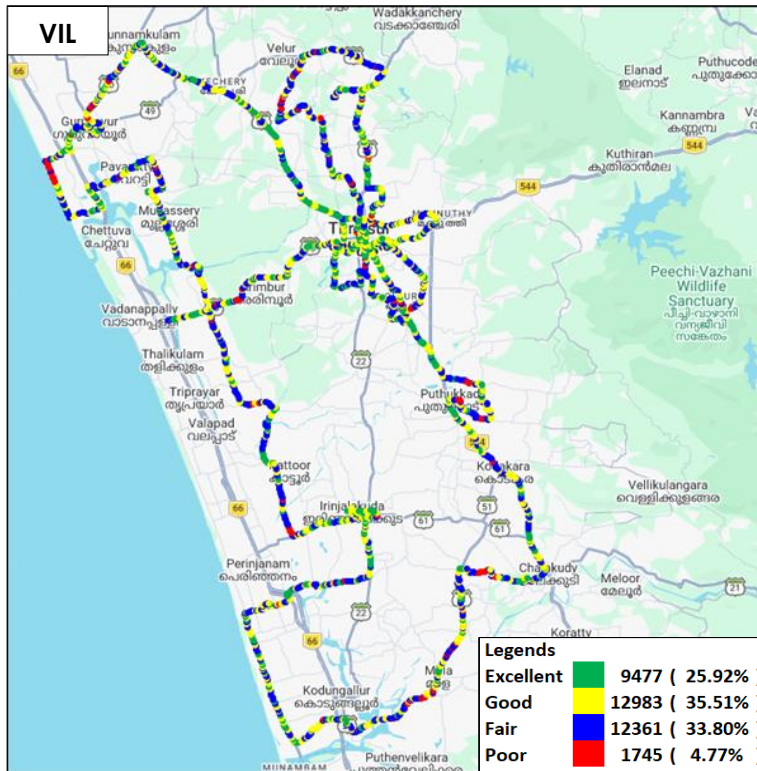


Figure-84: Signal strength 3G/2G network mode voice - VIL.

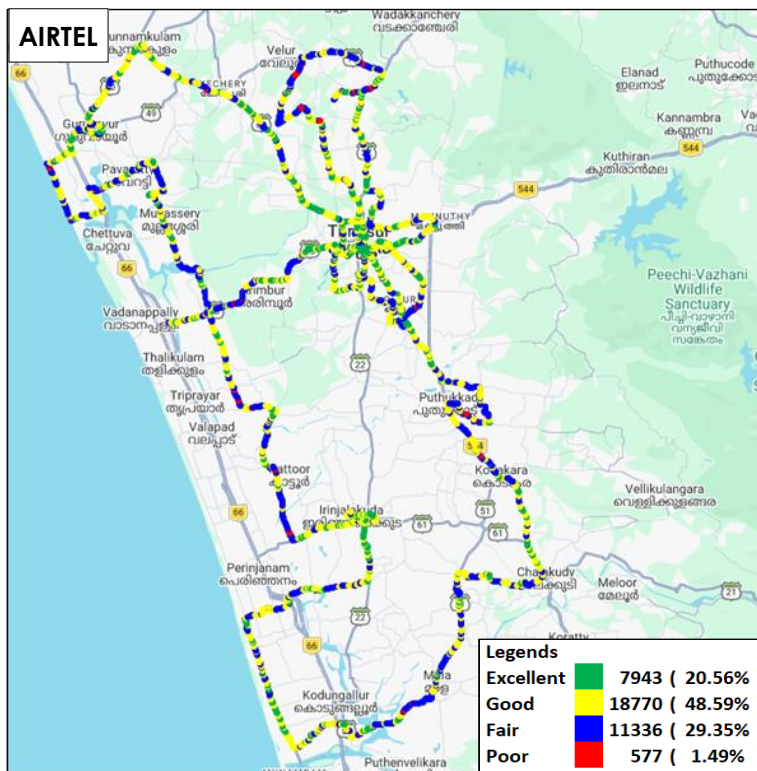


Figure-85: Signal strength auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

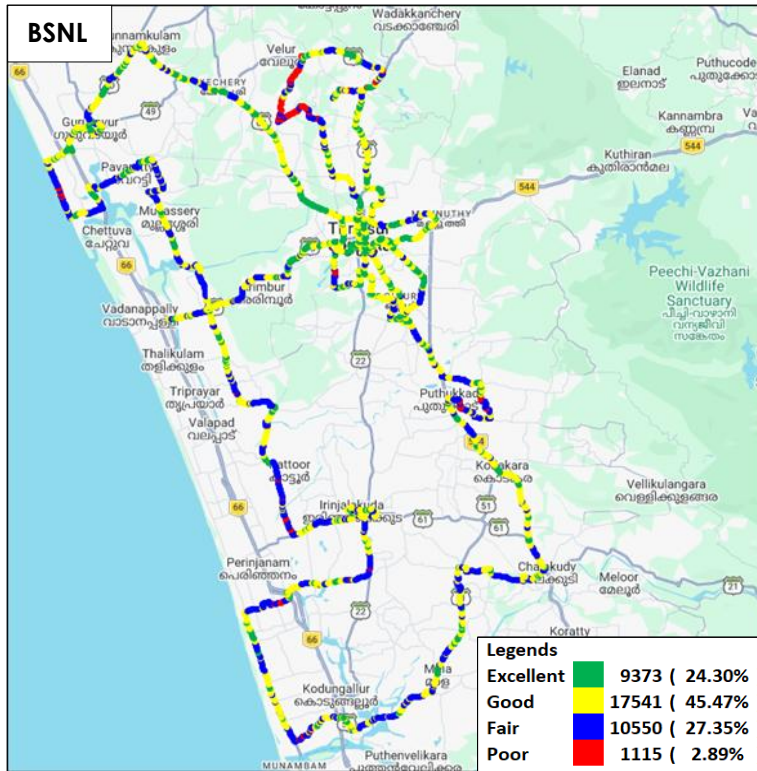


Figure-86: Signal strength auto-selection mode (5G/4G/3G/2G) voice - BSNL.

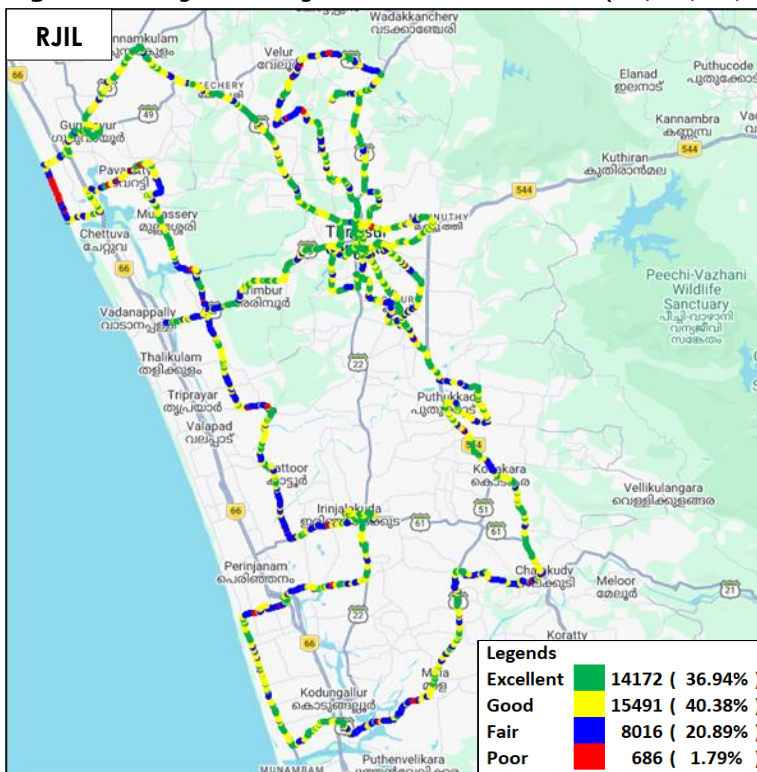


Figure-87: Signal strength auto-selection mode (5G/4G/3G/2G) voice - RJIL.

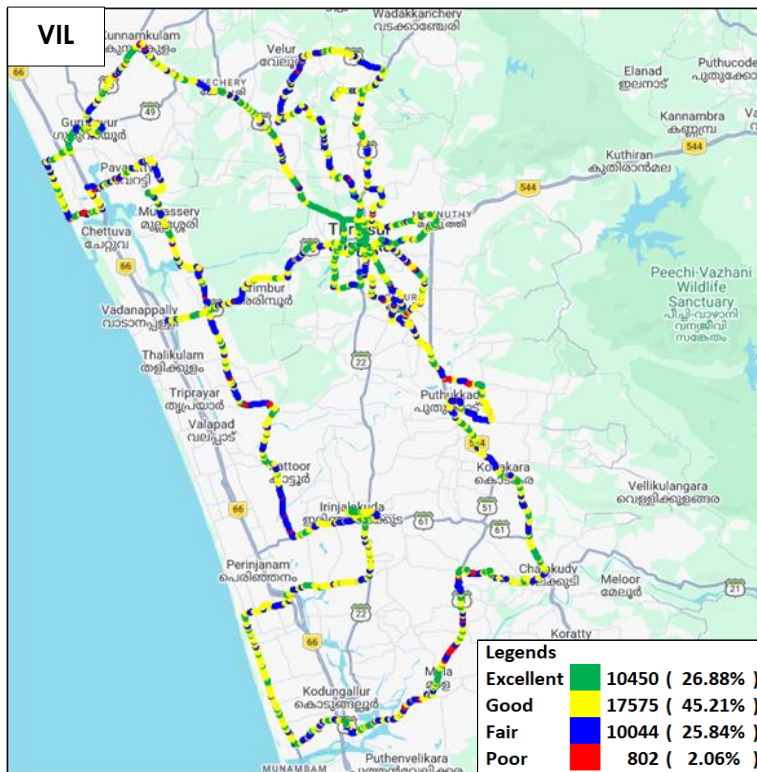


Figure-88: Signal strength auto-selection mode (5G/4G/3G/2G) voice - VIL.

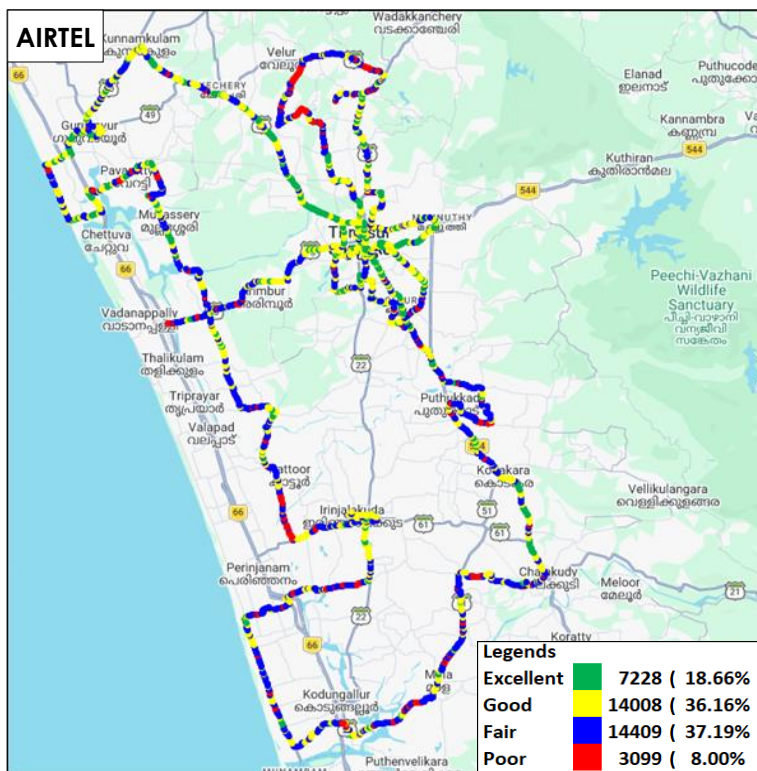


Figure-89: Signal strength auto-selection mode (5G/4G/3G/2G) data - AIRTEL.

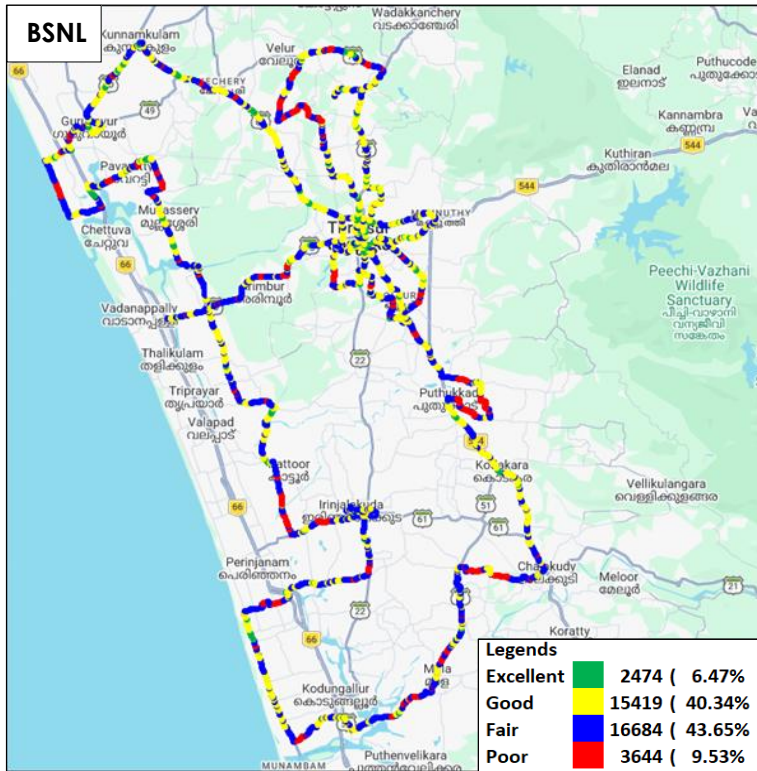


Figure-90: Signal strength auto-selection mode (5G/4G/3G/2G) data - BSNL.

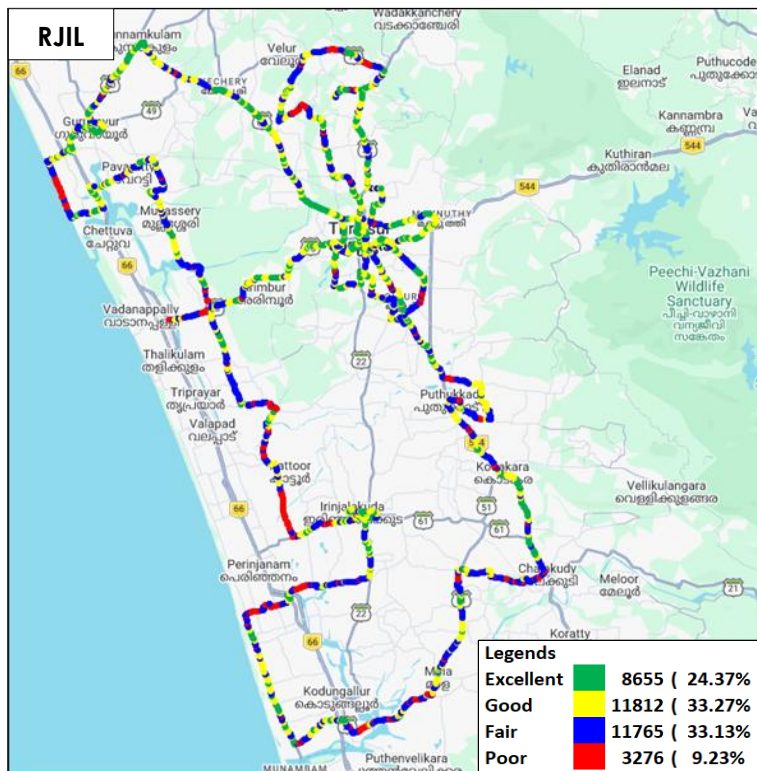


Figure-91: Signal strength auto-selection mode (5G/4G/3G/2G) data - RJIL.

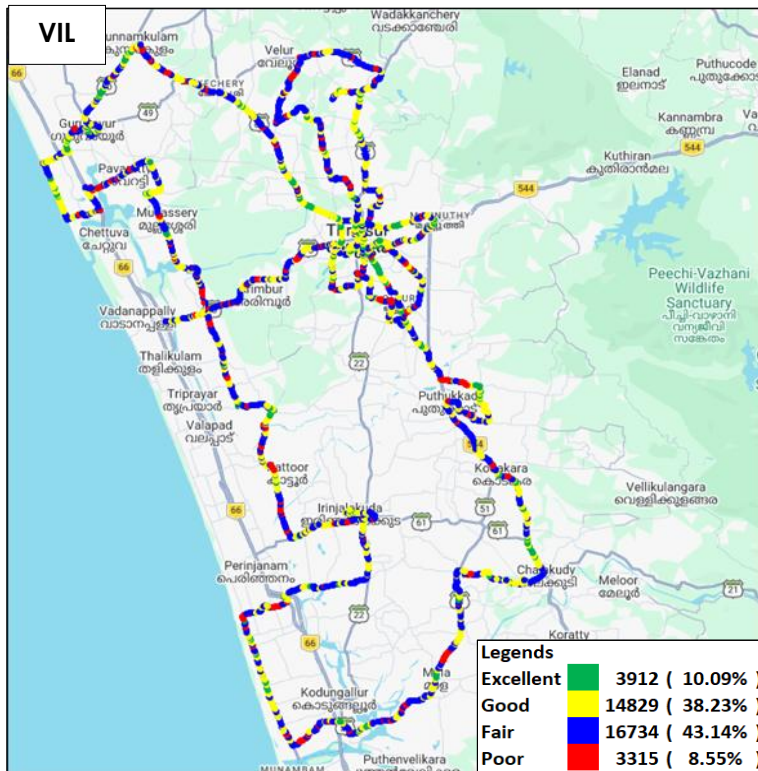


Figure-92: Signal strength auto-selection mode (5G/4G/3G/2G) data - VIL.

6.1.2 Highway

i) Kochi to Thrissur to Calicut

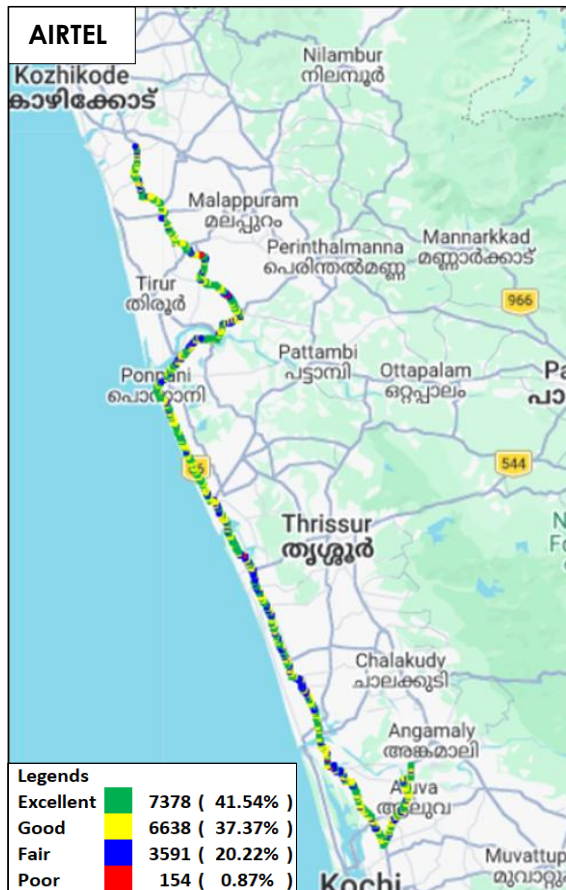


Figure-93: Signal strength 3G/2G network mode voice - AIRTEL.

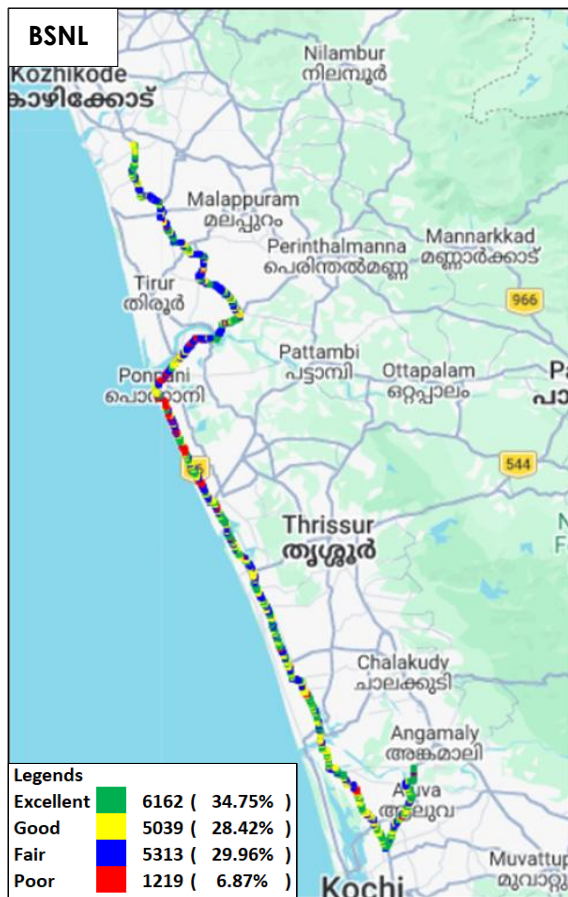


Figure-94: Signal strength 3G/2G network mode voice - BSNL.

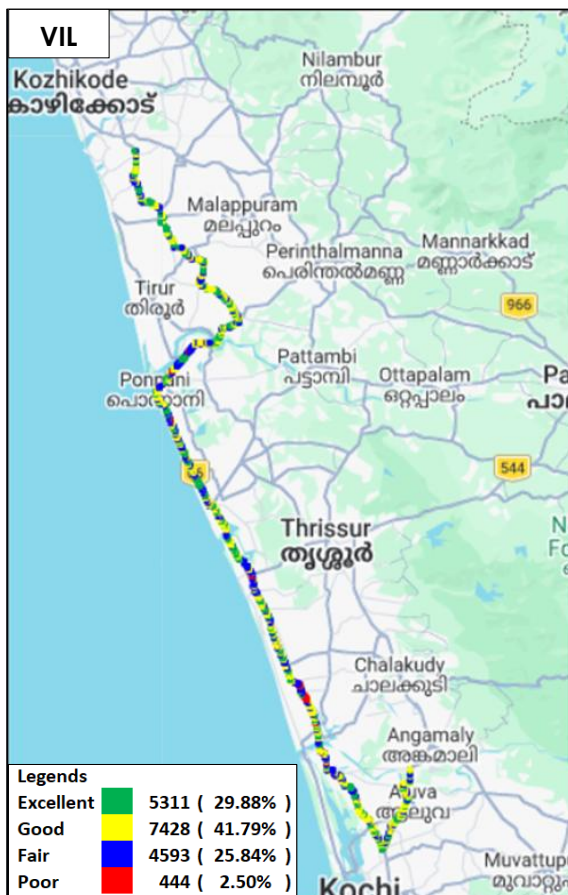


Figure-95: Signal strength 3G/2G network mode voice - VIL.

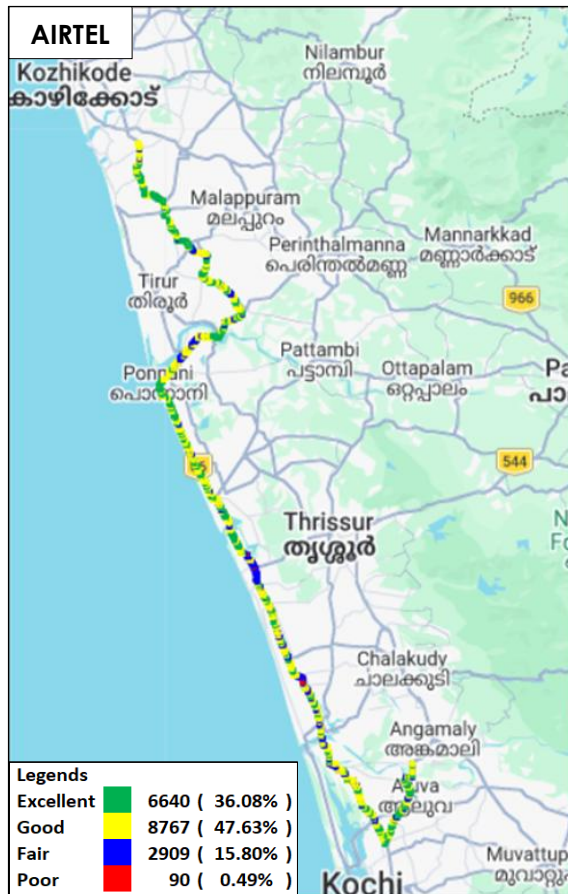


Figure-96: Signal strength auto-selection mode (5G/4G/3G/2G) voice - AIRTEL.

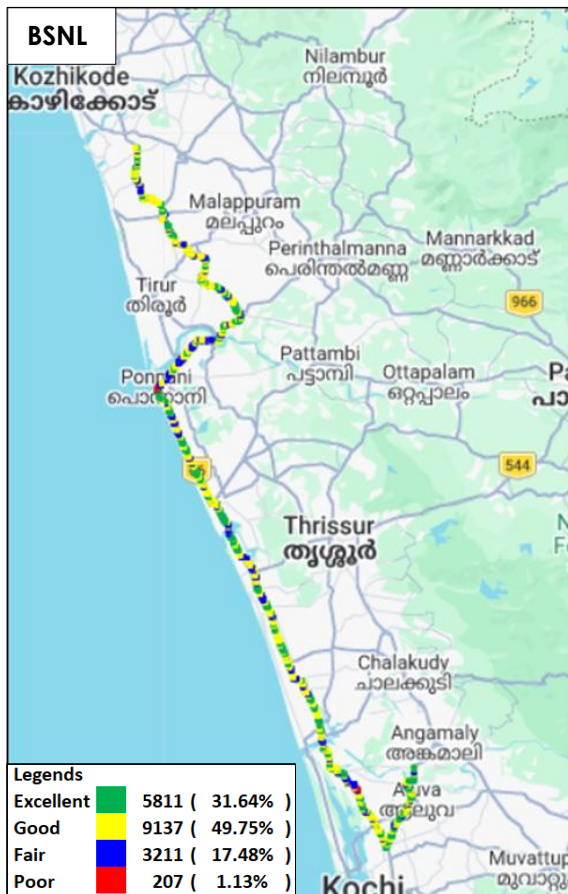


Figure-97: Signal strength auto-selection mode (5G/4G/3G/2G) voice - BSNL.

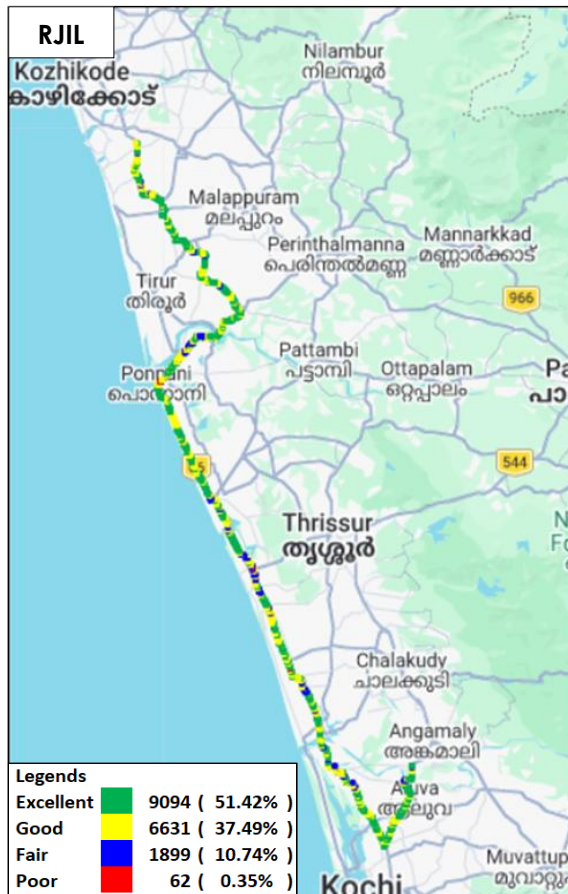


Figure-98: Signal strength auto-selection mode (5G/4G/3G/2G) voice - RJIL.

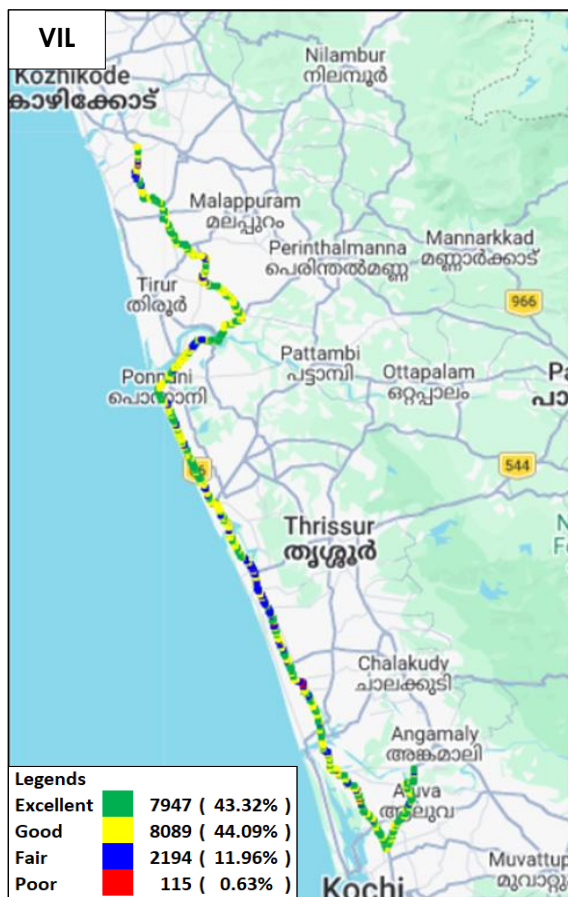


Figure-99: Signal strength auto-selection mode (5G/4G/3G/2G) voice - VIL.

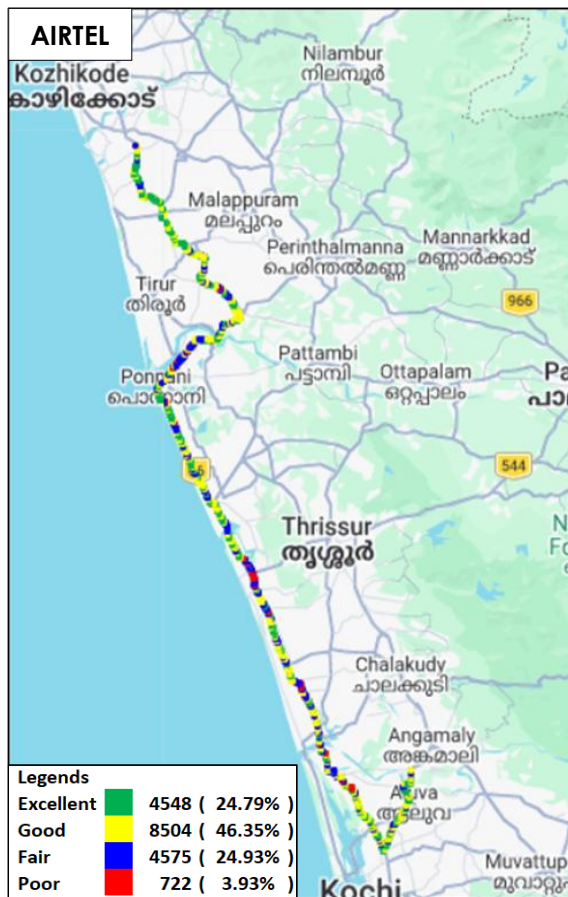


Figure-100: Signal strength auto-selection mode (5G/4G/3G/2G) data - AIRTEL.

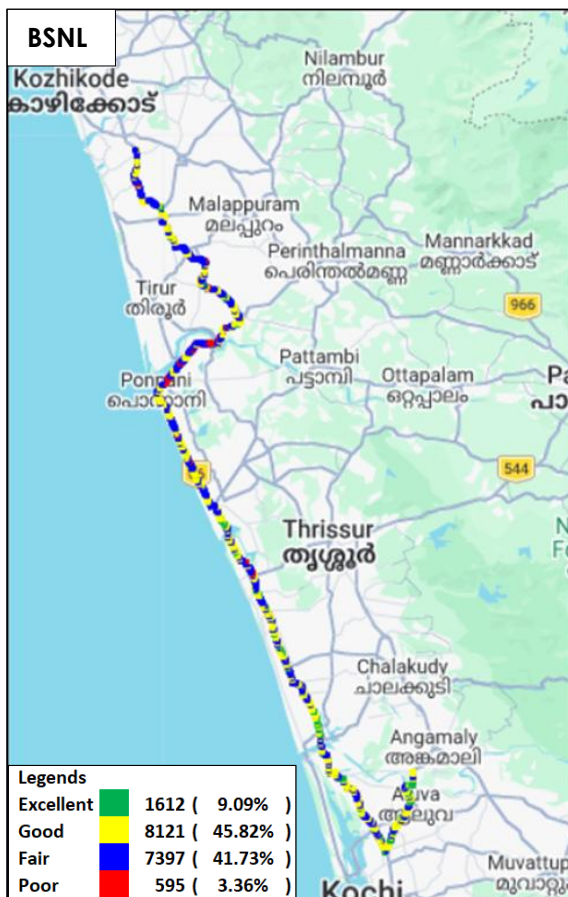


Figure-101: Signal strength auto-selection mode (5G/4G/3G/2G) data - BSNL.

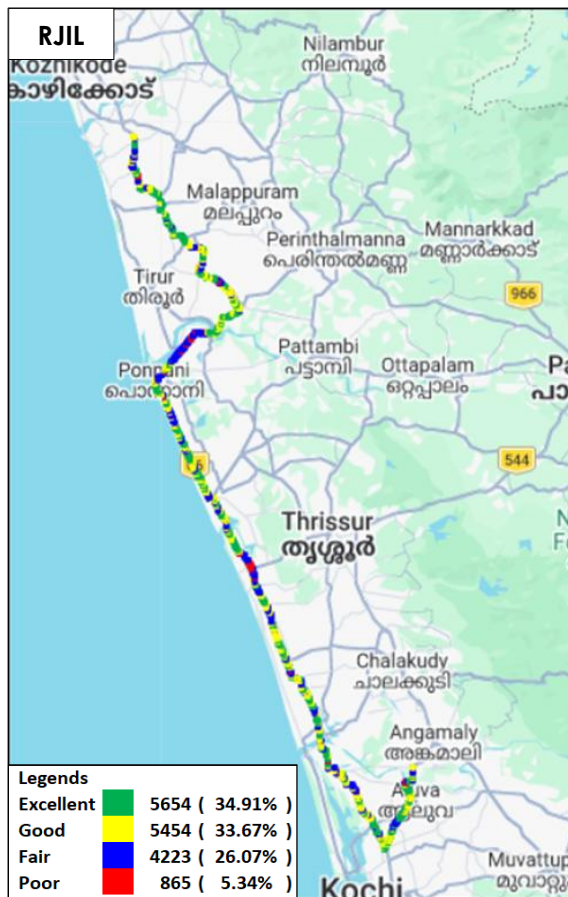


Figure-102: Signal strength auto-selection mode (5G/4G/3G/2G) data - RJIL.

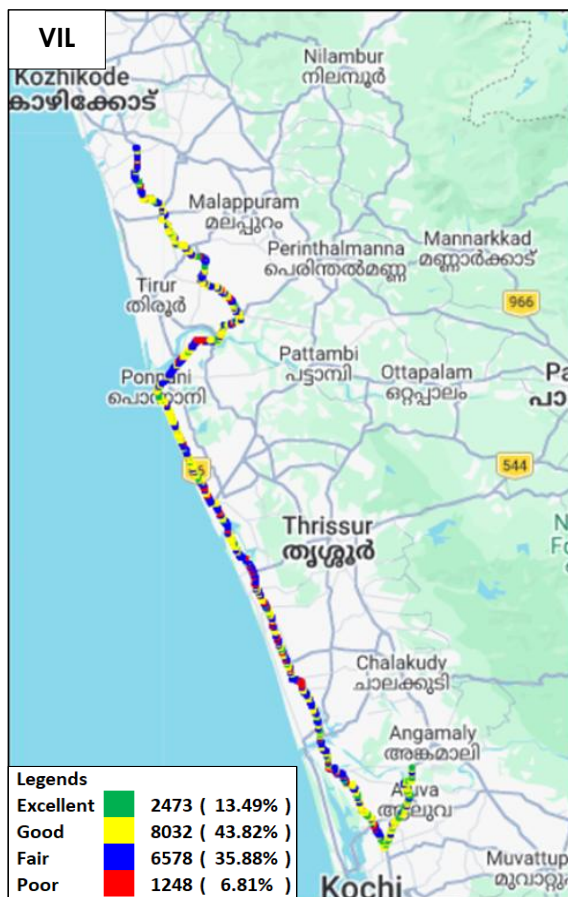


Figure-103: Signal strength auto-selection mode (5G/4G/3G/2G) data - VIL.

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-68: 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-69: 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.

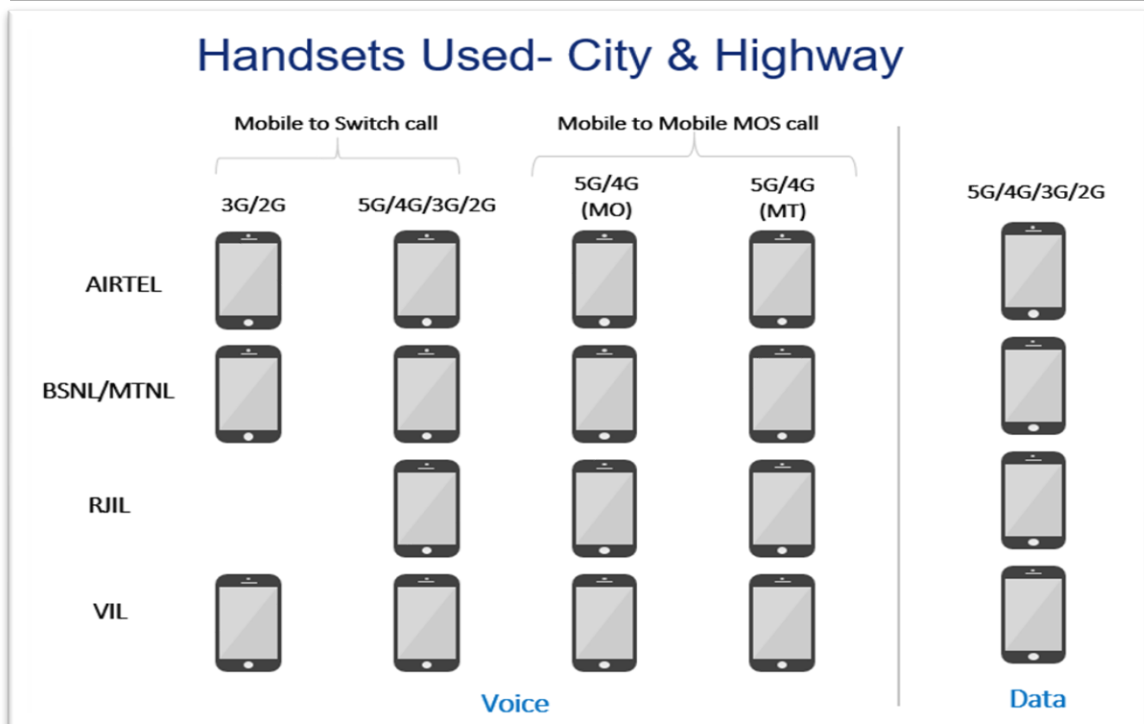


Figure-104: Number of handsets used in city & highway drive

MO: Mobile originating

MT: Mobile terminating

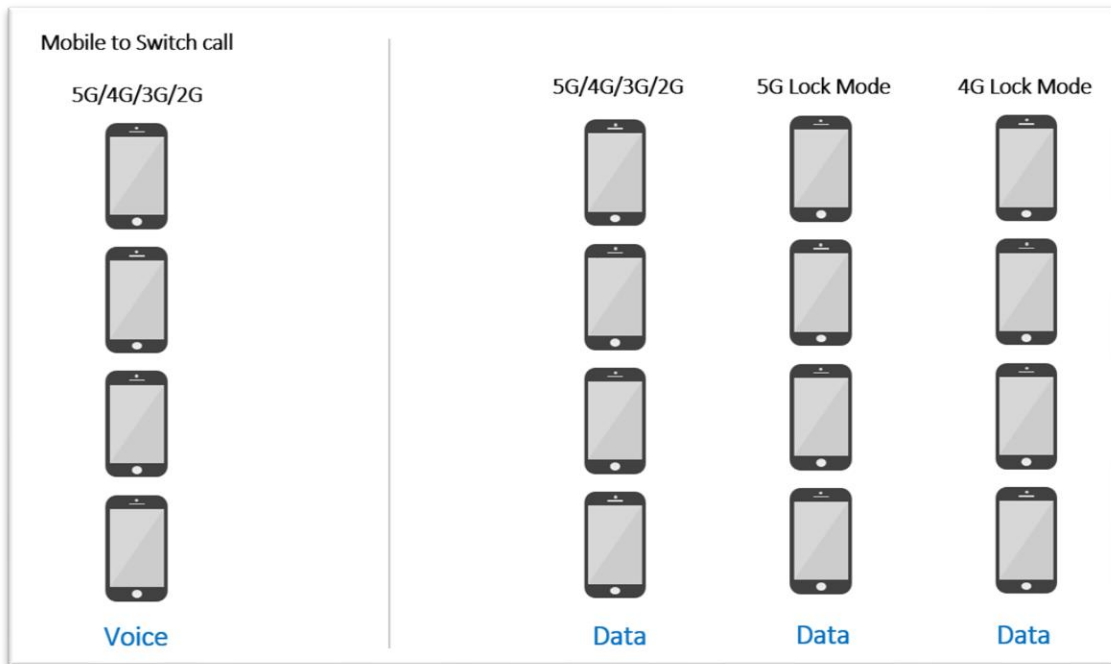


Figure-105: Number of handsets used in railway/metro/walktest/hotspot/ coastal area

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)

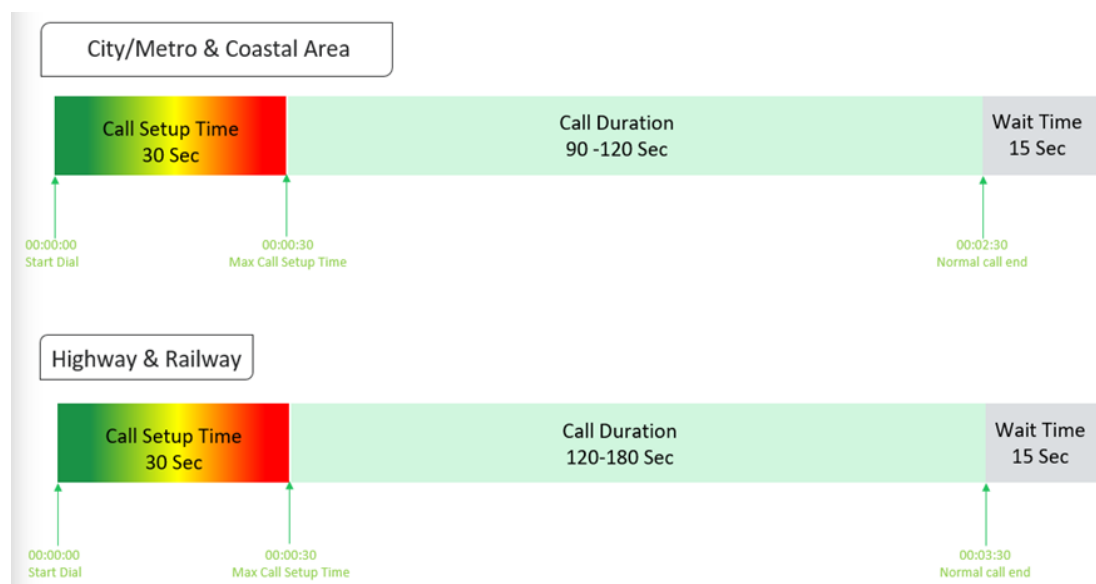


Figure-106: Voice test script for city/railway/metro/highway & coastal area

- 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-107: 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

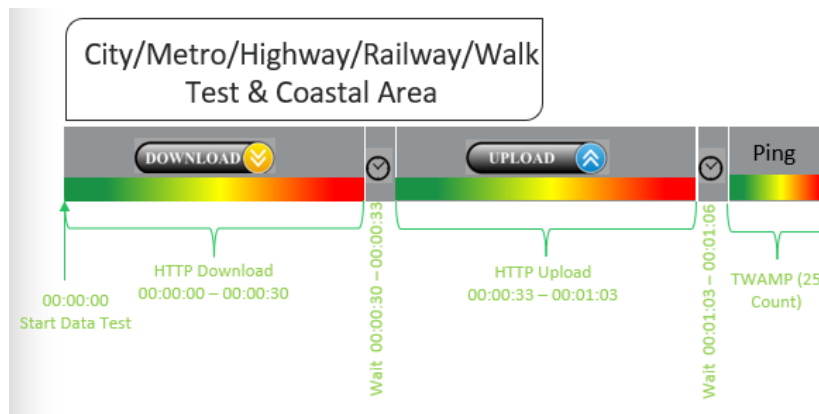


Figure-108: Data test script used in city/metro/railway/highway/walk test & coastal area

(d) Static Data(internet) testing

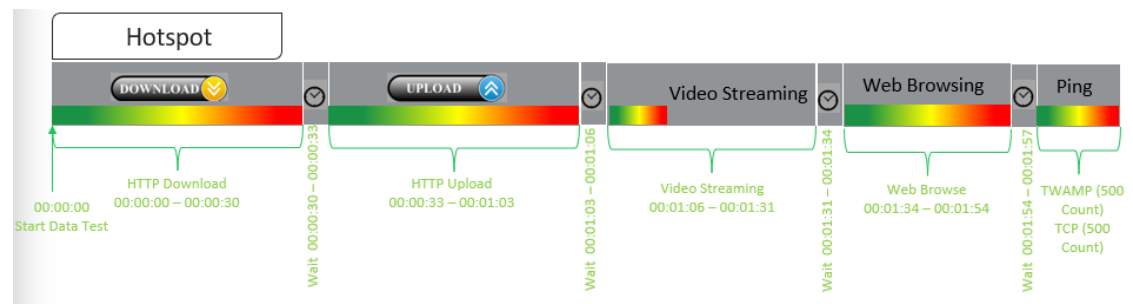


Figure-109: Data test script used at hotspot

- 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
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																														

Table-70: 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-71: 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.

Hardik
Rajeshbhai
Patel

Digitally signed by
Hardik Rajeshbhai
Patel
Date: 2026.08.19
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