



Operator Assisted Drive Test Report

Haryana Service Area

Mahendragarh & Narnaul City

(11th Aug 2025 to 14th Aug 2025)

TRAI Regional Office Jaipur

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1. Introduction

TRAI Act, 1997 mandates the Authority to ensure the services delivered through various telecommunications networks meet 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 interest of the consumers of telecommunications service.

Accordingly, TRAI with help of TSPs teams undertake assessment of Quality of Service of mobile service through Operator Assisted Drive Test (OADT).

In OADT, 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 finalized based on various objective criteria like reported network performance, consumer complaints etc.

2. Executive Summary

2.1 Drive test details

This report covers the findings of the OADT undertaken in Haryana License Service Area (LSA) during the month of August 2025 under the supervision of TRAI Regional Office (RO), Jaipur. Details of route/area covered during the OADT is as given below:

From date	To date	Drive test route	Type of route	Distance covered (KMs)/ Locations
11-Aug-2025	14-Aug-2025	Narnaul & Mahendergarh	City	110
12-Aug-2025	14-Aug-2025	Narnaul & Mahendergarh	Hotspot	05 Locations
12-Aug-2025	12-Aug-2025	Narnaul To Mahendergarh	Highway	21

Table-1: Drive test summary

2.2 Drive test route

Drive test route was prepared by the analysis of worst performing cells, in monthly performance monitoring reports (PMRs) of last three months submitted by TSPs as given below:

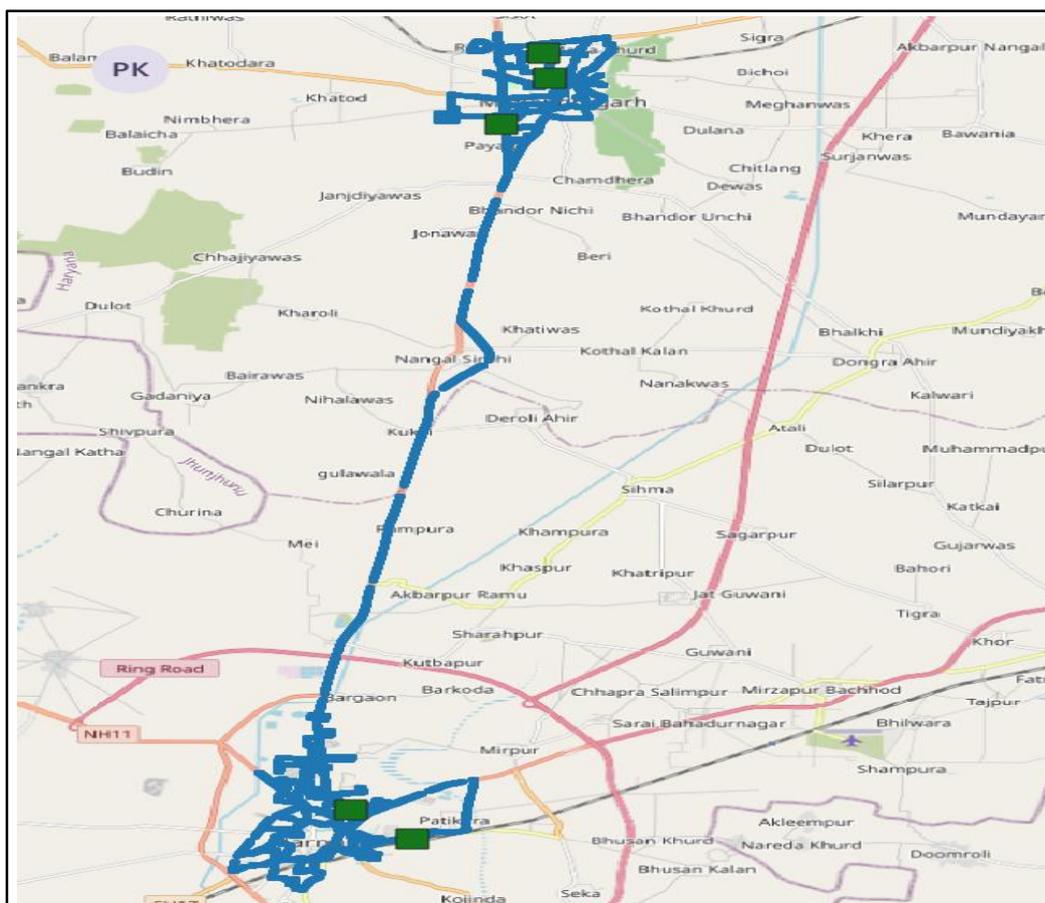


Figure-1: Drive Test Route map

2.3 Areas covered

(a) Mahendergarh City & Narnaul City

- **Mahendergarh City-** Majra khurd, Rewasa, karamchari colony, Krishna colony, Shankar colony, Mahendergarh sabji mandi, Bas mohalla, Shiv colony, Sainipura etc.
- **Narnaul City-**Nasibpur, Huda sector, Employee colony, kailash nagar, Shyamcolony,Nalapur, Adarsh nagar, Bawripur narnaul, Guru nanakpura etc.
- **Mahendergarh to Narnaul Highway.**

(b) Hot spots Covered:

S.No	Hotspot Locations
1	GSRTC Bus Stand, Narnaul
2	Railway Station, Narnaul
3	Railway station, Mahendergarh
4	Civil hospital, Mahendergarh
5	District Court, Mahendergarh

Table 2: Hot spot locations covered in OADT

2.4 Telecom service providers detected frequency bands

Technologies covered during the OADT and frequency bands in use are summarized in below table.

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

Table 3: Frequency Bands of Telecom service provider (TSP) covered in OADT.

3. Detailed QoS Performance Analysis

3.1 QoS performance analysis- Over all Overview

This section provides summary of overall QoS performance of the telecom service provider's network in the Mahendergarh & Narnaul City of Haryana LSA by aggregating the results of drive tests conducted in month of August-2025 covering city drive and hotspots.

(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 and the results are here under:

Parameters	Service Provider		
	3G/2G network mode only		
	AIRTEL	BSNL	VIL
Call Attempts	305	435	341
Call Setup Success Rate %	100	98.62	100.00
Drop Call Rate %	0	0.23	0
Call Setup Time-Average (Second)	3.85	3.45	4.13
Handover Success Rate %	99.80	99.69	99.33

Table-4: Summary of voice call performance in 3G/2G network mode only.

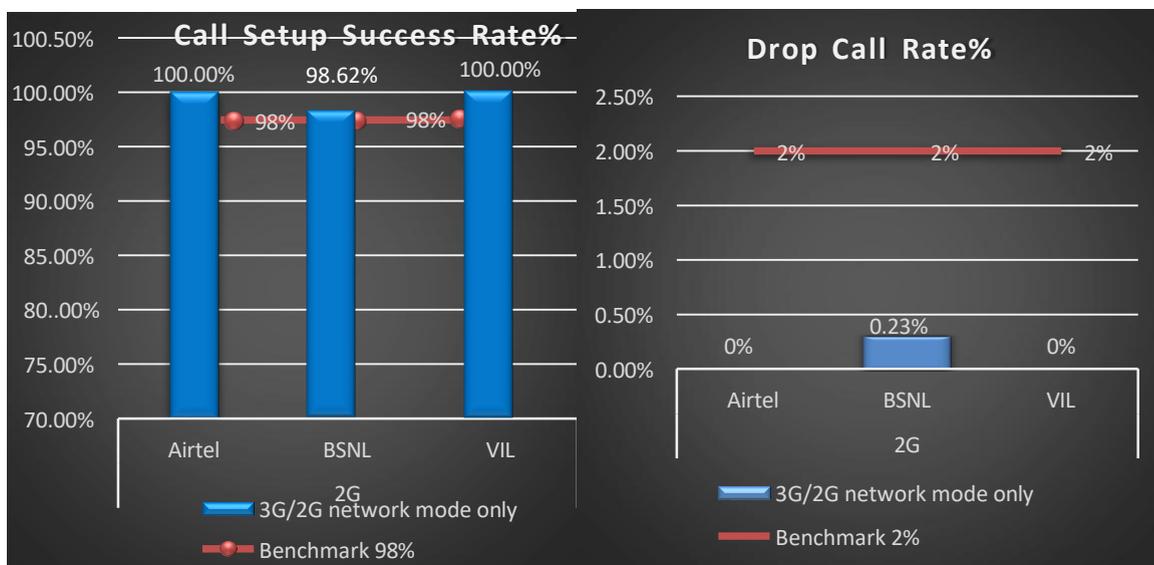


Figure-2: Call setup success rate and drop call rate performance.

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	79	NA
2G	125	80	194

Table-5: 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	392	369	322	322
Call Setup Success Rate %	100.00	92.41	100.00	100.00
Drop Call Rate %	0.00	0.81	0.00	0.00
Call Setup Time-Average (Second)	1.20	1.85	1.14	0.36
Handover Success Rate %	99.93	100.00	99.92	100.00

Table-6: Summary of voice call performance in network auto-selection mode.

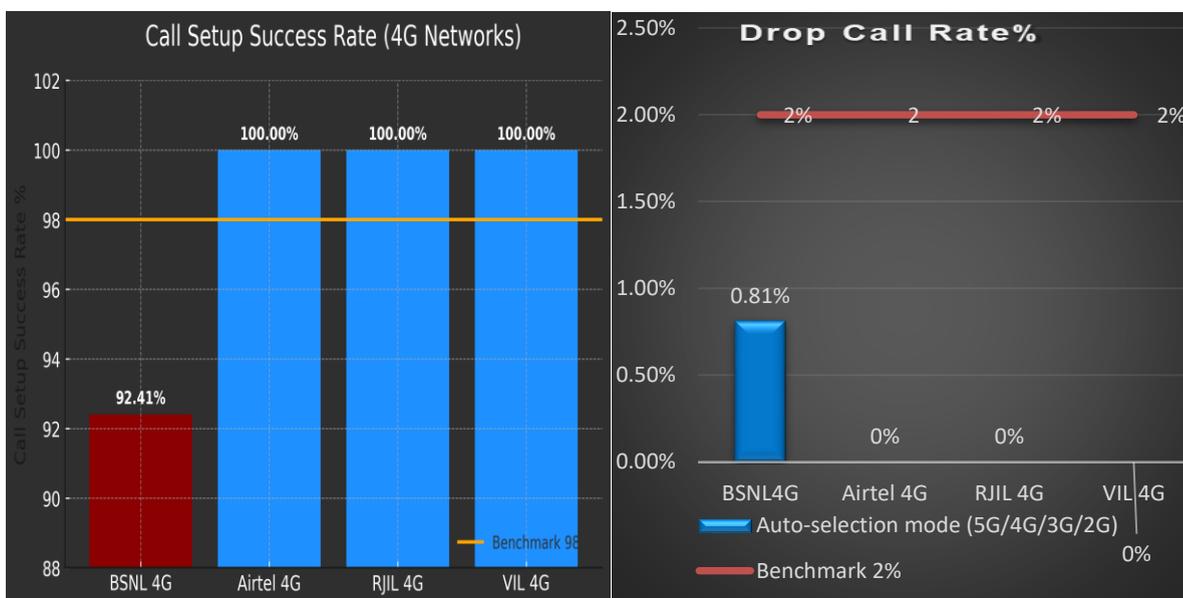


Figure-3: Performance for call setup success rate and drop call rate.

Parameter	Service Provider			
	Mobile-to-Mobile (5G/4G - Open Mode)			
	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider Network)	374	NA	544	349
Packet Drop Rate (Downlink)	0.9	NA	0.84	0.26
Packet Drop Rate (Uplink)	0.9	NA	0.84	0.29
Number of silence call for > 2 sec.	1	NA	1	7
Silence Call Rate %	0.27%	NA	0.0%	0.61%

Table-7: Summary of silence instances & packet loss rate for mobile-to-mobile call

Number of unique cell ids covered during Voice test				
	AIRTEL	BSNL	RJIL	VIL
3G	NA	79	NA	NA
2G	NA	80	NA	194
4G	329	137	252	204
5G	NA	NA	76	NA

Table-8: Technology wise number of network cell id's latched during drive test.

Note-NA- Service provider doesn't provide services on 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 score values means: 5- Excellent, 4-Good, 3-Fair, 2-Poor, 1-Bad.

The results for OADT for MOS Testing are given as under:

Speech Quality (MOS) distribution	Service Provider			
	AIRTEL	BSNL	RJIL	VIL
Total Number of MOS Samples	2472	NA*	3169	2537
Speech Quality (Average MOS Score)	3.98	NA*	4.33	3.91

Table-9: Summary of speech quality (MOS) samples.

*BSNL has not tested the 4G Voice parameters due to non-availability of testing equipment.

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

Parameters		Service Provider			
		AIRTEL	BSNL	RJIL	VIL
Download Throughput (Mbits/s)	Average	223	10.20	226.08	21.6
	80th Percentile	331.87	18.12	384.96	34.4
	20th Percentile	50.87	1.88	46.58	10.63
Upload Throughput (Mbits/s)	Average	21.06	4.18	25.85	10.5
	80th Percentile	34.13	5.93	42.34	17.13
	20th Percentile	8.16	1.58	2.83	2.39
Latency (ms)	50th Percentile	17	33.20	38	29.10

Table-10: Summary of data performance in network auto-selection mode.

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	70	NA#	64	NA
4G	240	137	21	204
3G	NA	79	NA#	NA#
2G	0	80	NA#	0

Table-11: Technology wise number of network cell id's latched during drive test.

Note- #Service provider doesn't provide services on respective technology.

3.2 Hotspots

a. Locations:

Hotspot testing was done on 12th August & 14th August 2025. Five locations were tested in the Narnaul & Mahendergarh Cities.

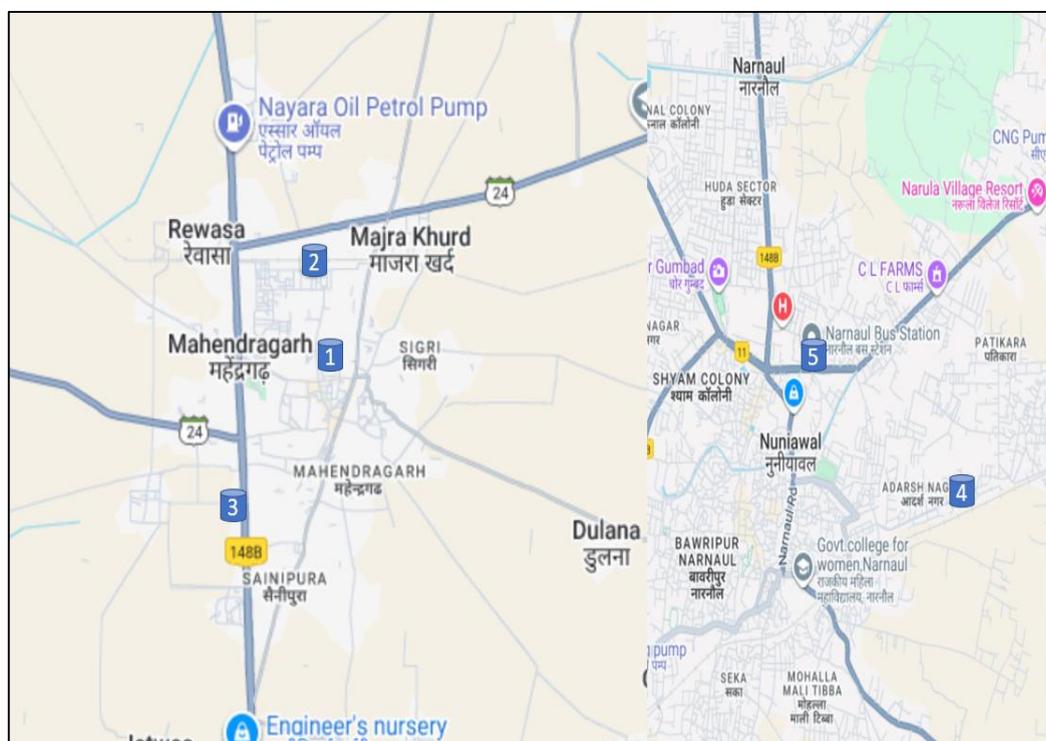


Figure- 4: Hotspot locations

S. No.	Hotspot Name	Date of Testing
1	Civil hospital Mahendergarh	12 th August 2025
2	Railway station Mahendergarh	12 th August 2025
3	District court Mahendergarh	12 th August 2025
4	Railway station Narnaul	14 th August 2025
5	Narnaul Bus Stand	14 th August 2025

12: List of Hot Spots Covered

Table-

b. Voice performance (5G/4G/3G/2G-Auto mode) at Hotspot locations.

1. Civil hospital, Mahendragarh

Parameters	Airtel	BSNL	RJIL	VIL
No of Call Attempts	10	10	10	10
No of Call Established	10	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.13	1.17	1.26	1.37

Table-13: Voice Performance at Civil Hospital Mahendragarh

2. Railway station, Mahendragarh

Parameters	Airtel	BSNL	RJIL	VIL
No of Call Attempts	10	10	10	10
No of Call Established	10	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.12	1.17	1.11	1.45

Table-14: Voice Performance at Railway station Mahendragarh

3. District Court, Mahendragarh

Parameters	Airtel	BSNL	RJIL	VIL
No of Call Attempts	10	10	10	10
No of Call Established	10	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.14	2.64	1.14	1.40

Table-15: Voice Performance at District Court, Mahendragarh

4. Railway Station, Narnaul

Parameters	Airtel	BSNL	RJIL	VIL
No of Call Attempts	10	10	10	10
No of Call Established	10	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.09	2.49	1.18	1.31

Table-16: Voice Performance at Railway Station Narnaul

5. Bus Stand Narnaul

Parameters	Airtel	BSNL	RJIL	VIL
No of Call Attempts	10	10	10	10
No of Call Established	10	10	10	10
Call setup success rate (CSSR) %	100	100	100	100
No. of Drop Call	0	0	0	0
Drop Call Rate %	0	0	0	0
Call Setup Time Average (Sec.)	1.16	4.08	1.26	1.30

Table-17: Voice Performance at Bus Stand Narnaul

c. Data performance (5G/4G/3G/2G - auto mode) at each Hotspot location:

1. Civil hospital, Mahendergarh:

QoS Parameters		AIRTEL	BSNL	RJIL	VIL
Download Throughput (Mbits/s)	Average	194.70	8.02	635.19	6.1
Download Session Setup Success Rate %		100	100	100	100
Upload Throughput (Mbits/s)	Average	7.6	2.20	139.70	7.3
Upload Session Setup Success Rate %		100	100	100%	100
Latency (in ms)	50th Percentile	22	32.45	16.28	40.25
Jitter (in ms)	Average	4.46	9.85	4.24	6.32
Packet Drop Rate %		0.09	0.40	0.10	0.50
Web browsing delay (in sec)		6.79	1.73	3.2	1.49
Video Streaming performance for video		7.3	3.20	0.39	0.57

Table-18: Data Performance at Civil Hospital Mahendragarh.

2. Railway Station Mahendragarh

QoS Parameters		AIRTEL	BSNL	RJIL	VIL
Download Throughput (Mbits/s)	Average	113.06	2.99	399.10	34.2
Download Session Setup Success Rate %		100	100	100	100
Upload Throughput (Mbits/s)	Average	2.93	4.27	79.66	15.9
Upload Session Setup Success Rate %		100	100	100	100
Latency (in ms)	50th Percentile	24.0	30.75	34	2.39
Jitter (in ms)	Average	2.1	8.78	4.62	0.98
Packet Drop Rate %		0.0	0.50	0.10	30.43
Web browsing delay (in sec)		10.32	1.79	3.9	89.04
Video Streaming performance for video		1.13	1.89	1.01	11.12

Table-19: Data Performance at Railway Station Mahendragarh

3. District Court, Mahendragarh

QoS Parameters		AIRTEL	BSNL	RJIL	VIL
Download Throughput (Mbits/s)	Average	116.0	11.83	494.34	8.7
Download Session Setup Success Rate %		100	100	100	100
Upload Throughput (Mbits/s)	Average	6.48	7.99	62.92	8.8
Upload Session Setup Success Rate %		100	100	100	100
Latency (in ms)	50th Percentile	14.2	32.13	32	47.80
Jitter (in ms)	Average	1.19	4.08	6.25	12.64
Packet Drop Rate %		0.6	1.50	0.00	2.10
Web browsing delay (in sec)		10.64	1.91	3.4	2.78
Video Streaming performance for video		8.85	1.20	1.13	0.79

Table-20: Data Performance at District Court Mahendragarh.

4. Railway station, Narnaul

QoS Parameters		AIRTEL	BSNL	RJIL	VIL
Download Throughput (Mbits/s)	Average	141.89	5.28	475.24	34.2
Download Session Setup Success Rate %		100	100	100	100
Upload Throughput (Mbits/s)	Average	49.13	21.22	87.30	15.9
Upload Session Setup Success Rate %		100	100	100	100
Latency (in ms)	50th Percentile	32	2.4	31	30.43
Jitter (in ms)	Average	0.3	1.44	4.38	89.04
Packet Drop Rate %		0.10	31.05	0.12	11.12
Web browsing delay (in sec)		7.27	3.46	1.83	2.39
Video Streaming performance for video		9.4	0.60	0.61	0.98

Table-21: Data Performance at Railway station, Narnaul.

5. Bus Stand Narnaul:

QoS Parameters		AIRTEL	BSNL	RJIL	VIL
Download Throughput (Mbits/s)	Average	145.31	4.96	385.63	10.1
Download Session Setup Success Rate %		100	100	100	100
Upload Throughput (Mbits/s)	Average	23.02	1.95	47.74	4.7
Upload Session Setup Success Rate %		100	100	100	100
Latency (in ms)	50th Percentile	138	36.40	31	2.31
Jitter (in ms)	Average	0.43	24.03	4.38	1.79
Packet Drop Rate %		0.10	2.80	0.12	23.23
Web browsing delay (in sec)		11.04	2.46	3.13	19.2
Video Streaming performance for video		10.24	2.84	0.31	3.6

Table-22: Data Performance at Bus Stand Narnaul.

4. TSP Wise signal Strength (Mahendergarh & Narnaul City)

Technology	Parameter	Range	Colour
2G	Rx Level	≥ -85 dBm	Magenta
		< -85 dBm	Red
3G	RSCP	≥ -90 dBm	Cyan
		< -90 dBm	Blue
4G	RSRP	≥ -110 dBm	Light Green
		< -110 dBm	Dark Green
5G	RSRP	≥ -110 dBm	Yellow
		< -110 dBm	Orange

Table:23 Signal strength legend format.

A. Airtel

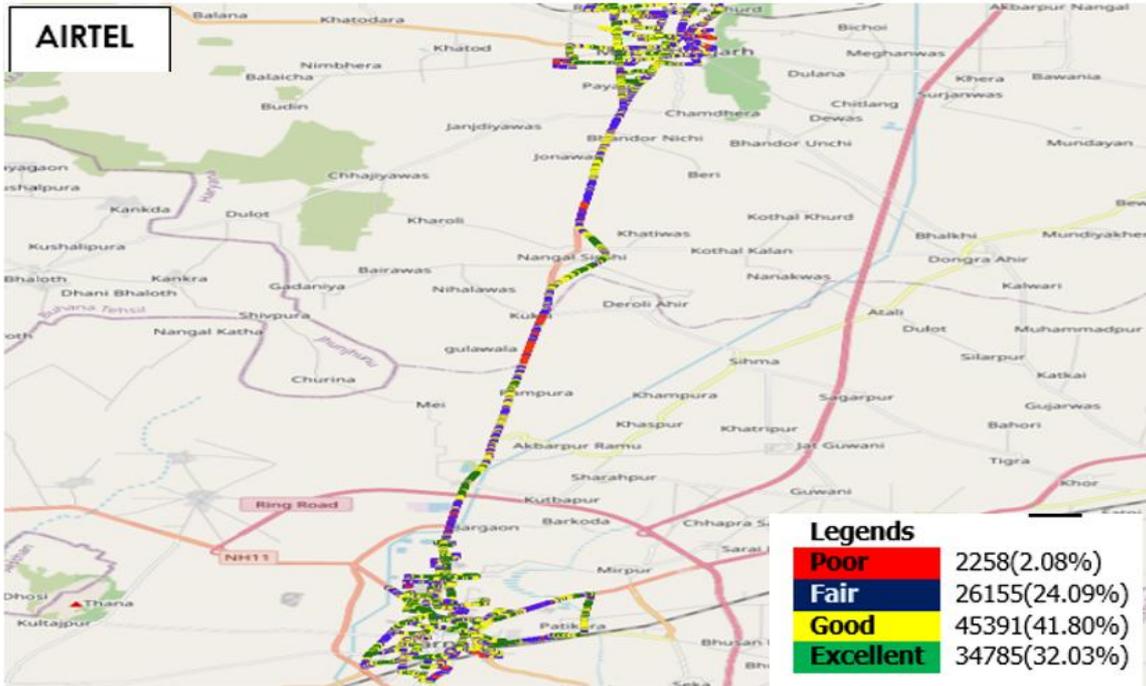


Figure-5: Signal strength 2G /3G network mode – AIRTEL

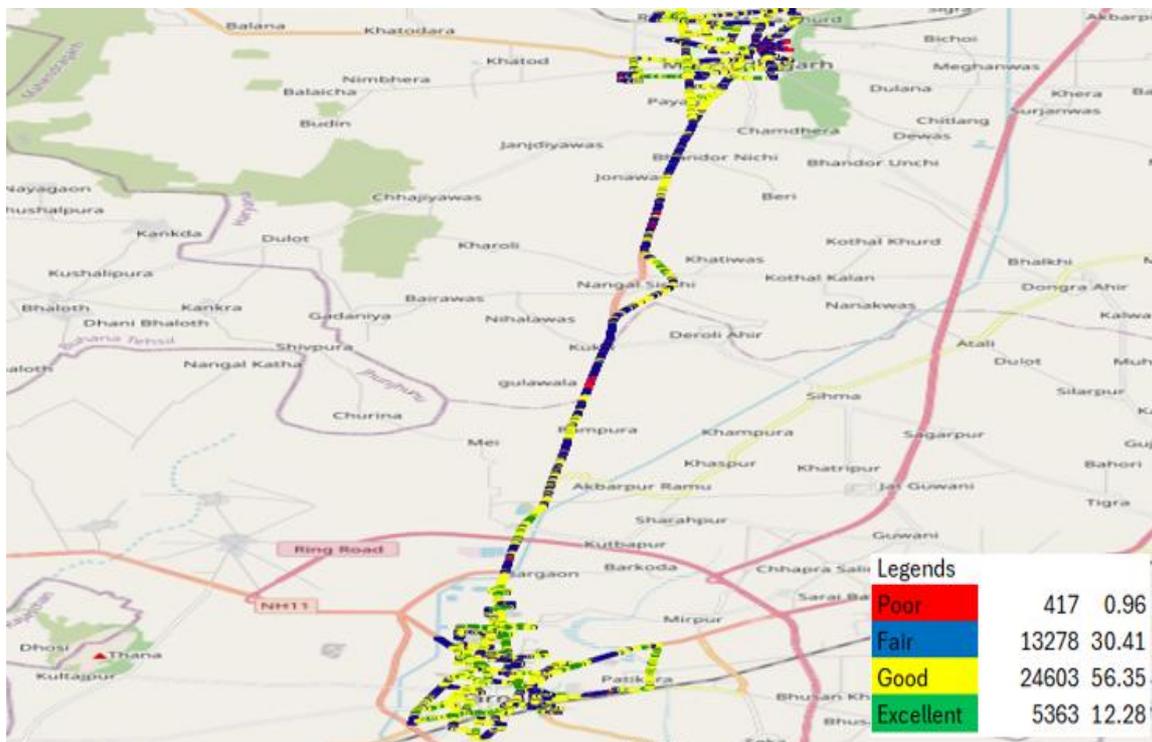


Figure-6: Signal strength auto-selection mode 4G– AIRTEL.

B. BSNL

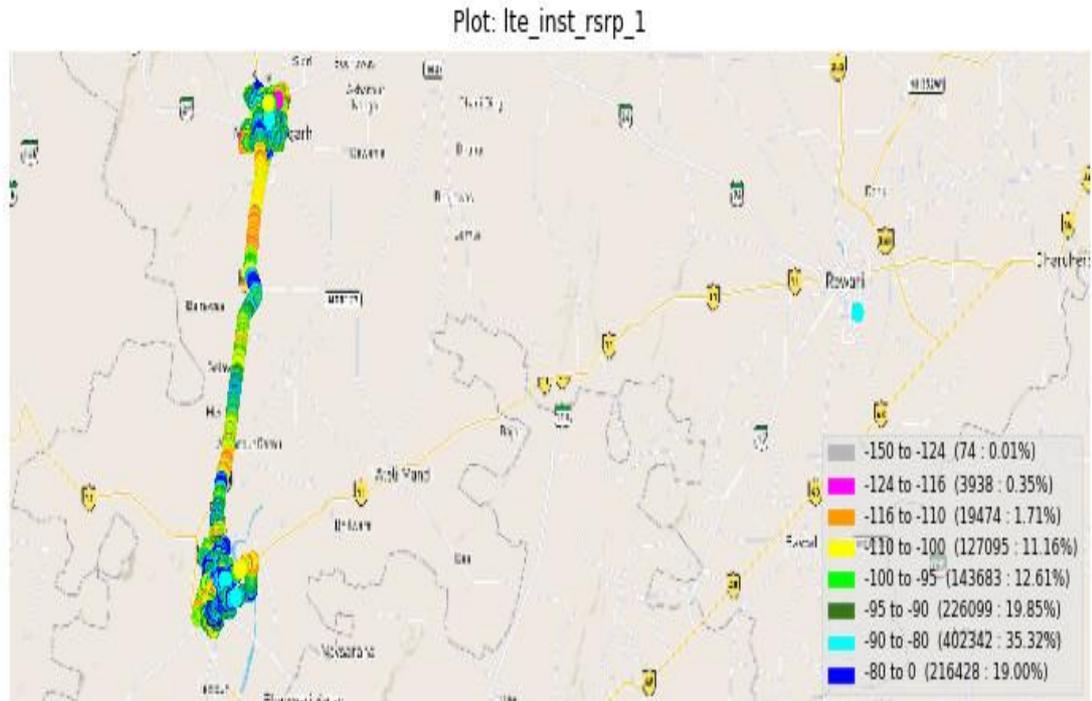


Figure-7: Signal strength auto-selection mode 3G/2G – BSNL

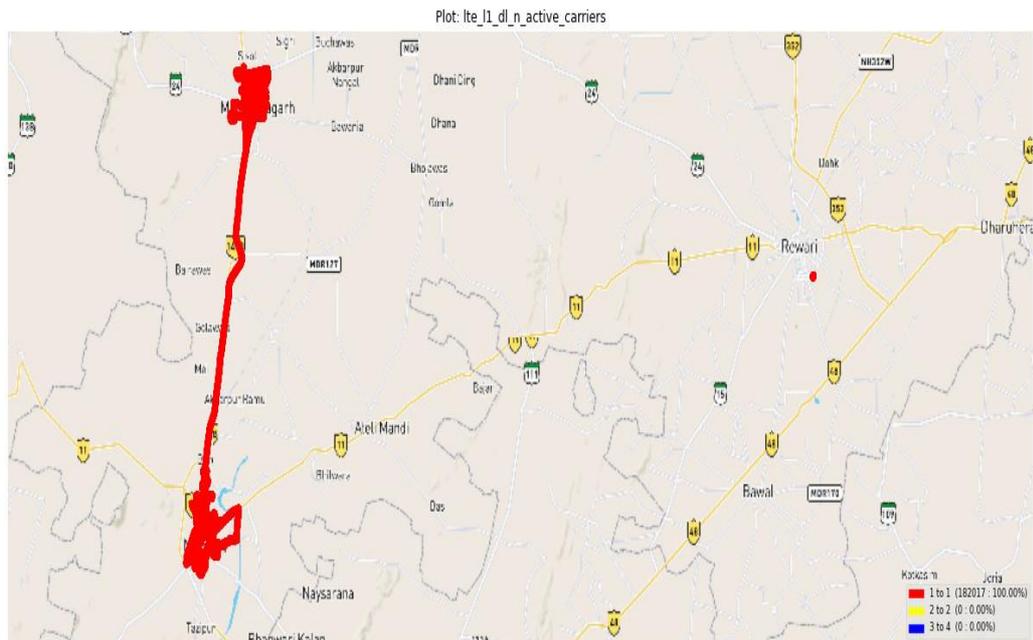


Figure-8: Serving technology plots in auto-selection mode (5G/4G/3G/2G) – BSNL.

C. RJIL

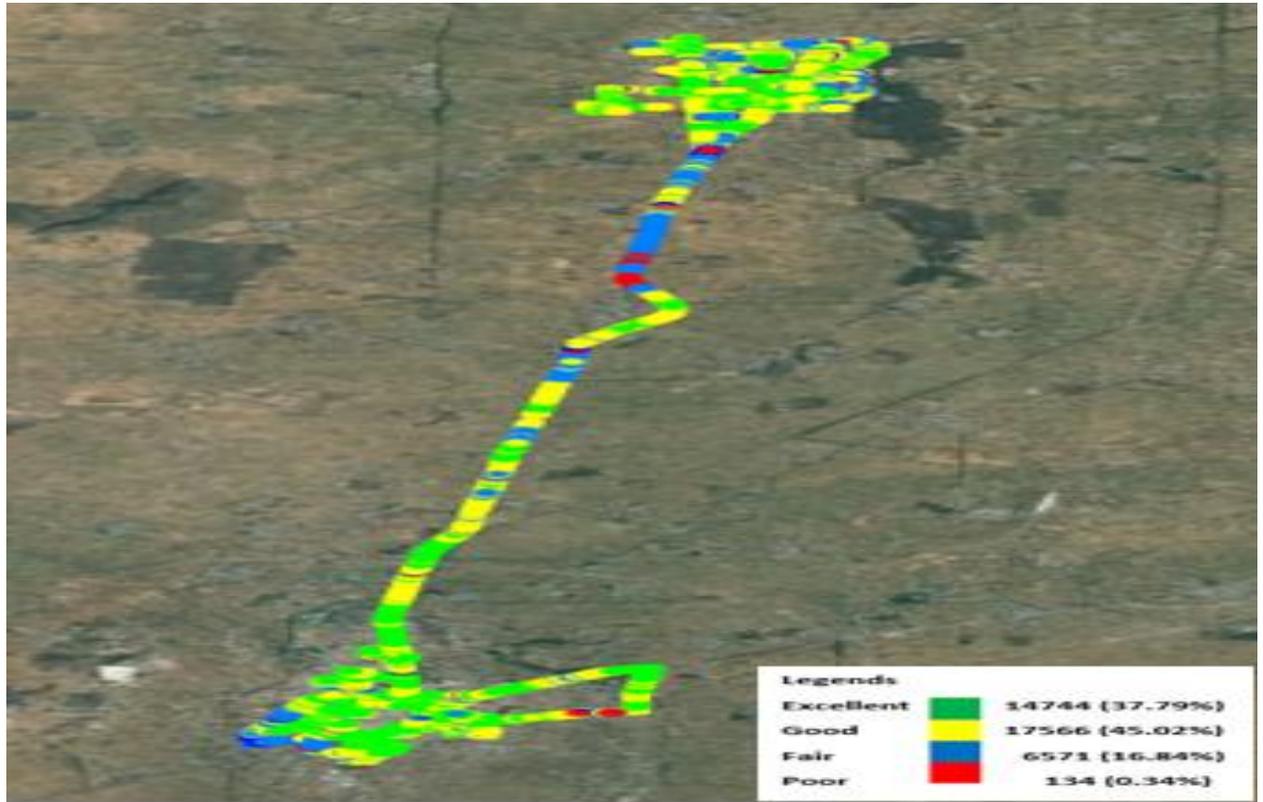


Figure-9: Signal strength auto-selection mode 5G/4G/3G/2G – RJIL.

D. VIL

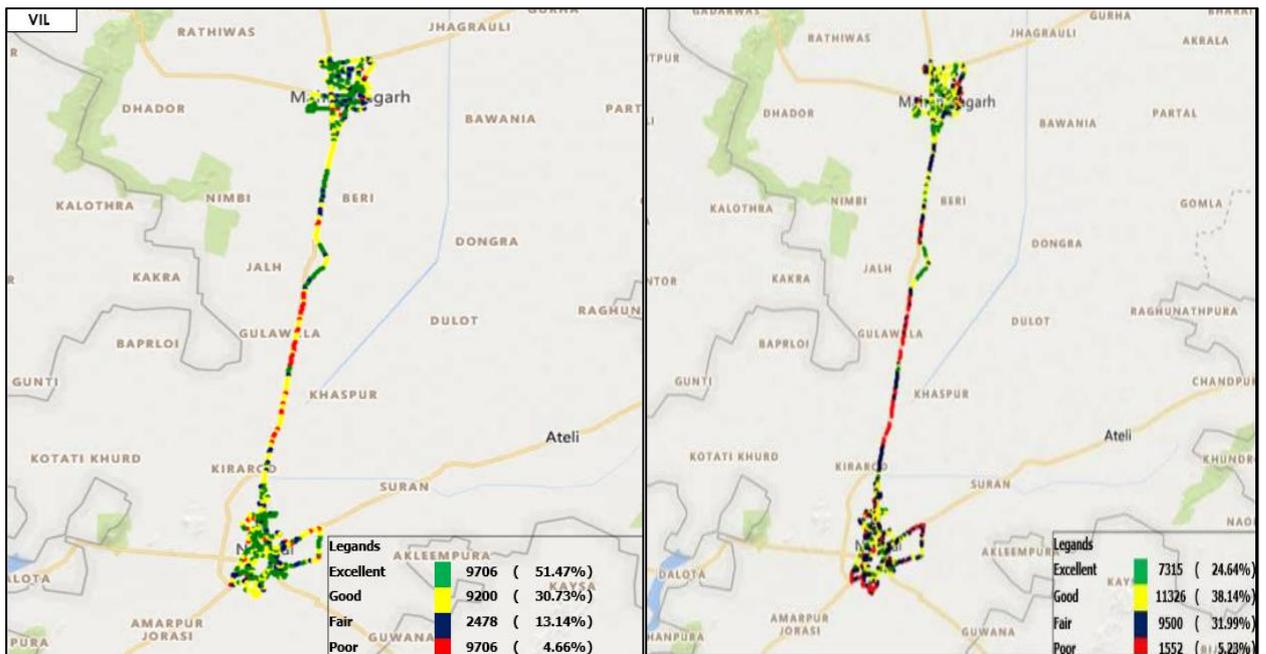


Figure-10: Signal strength 3G/2G network mode – VIL. **Figure 11-:** Signal strength auto-selection mode 5G/4G/3G/2G – VIL

5. Conclusion:

The operator wise comparative Analysis of various key parameters is given in table below:

S.No	KPIs (Auto-selection mode (5G/4G/3G/2G))		Measured in	AIRTEL	BSNL	RJIL	VIL
1	Call Setup Success Rate (CSSR)		%	100.00	92.41	100.00	100.00
2	Drop Call Rate (DCR)		%	0.00	0.81	0.00	0.00
3	Call Silence rate (Mute Call)		%	0.27	NA*	0.00	0.61
4	Average MOS Score		1-5	3.98	NA*	4.33	3.91
5	Average Download throughput	Declared as per PMR for Aug. 2025	(Mbits/s)	18.45	3.54	15.00	15.00
6		Measured during testing	(Mbits/s)	223	10.20	226.08	21.6
7	Average Upload throughput	Declared as per PMR of Aug. 2025	(Mbits/s)	4.79	2.93	7.00	8.00
8		Measured during testing	(Mbits/s)	21.06	4.18	25.85	10.5

*NA-BSNL has not tested the 4G Voice parameters due to non-availability of testing equipment.

BSNL in this drive test has not met the QoS benchmark of Call Setup Success Rate (CSSR) of $\geq 98\%$.

In this regard, The comment received from BSNL is reproduced as below:

“We have conducted Drive test on 28 to 30 October 2025 of both the cities but again the CSSR was also not upto the bench mark due to excessive call block due to some IMS issue.

We are also optimising the sites and we will again conduct drive test of both cities from 07.11.2025 and the compliance report will be submitted on 10.11.2025. “