



# Operator Assisted Drive Test Report

Haryana Service Area

**Karnal City**

(25<sup>th</sup> Nov 2025 to 27<sup>th</sup> Nov 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 November 2025 under the supervision of TRAI Regional Office (RO), Jaipur. Details of route/area covered during the OADT is as given below:

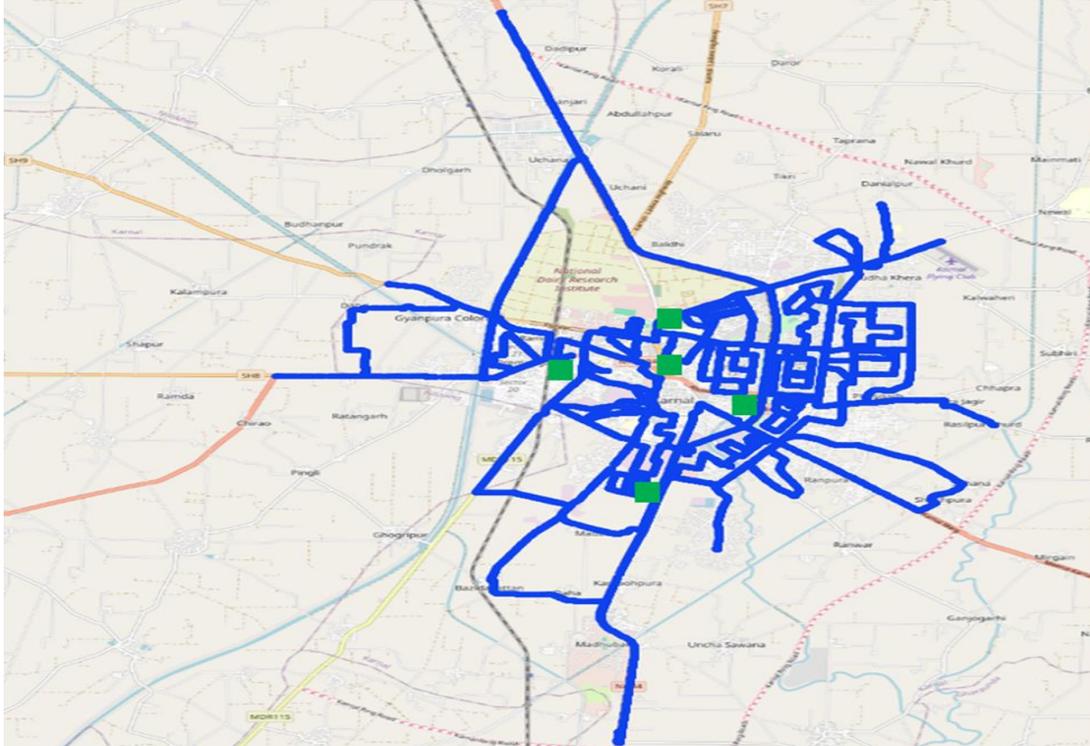
Sl. No	Drive test route	Type of route	Distance covered (KMs)/ Locations	From date	To date
1	Karnal	City	85km	25-11-2025	25-11-2025
2	Karnal	Hotspot	05 Locations	27-11-2025	27-11-2025
3	Karnal	City +Highway	120km	26-11-2025	26-11-2025

Table-1: Drive test summary

## 2.2 Drive test routes

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

**Figure-1:** Drive Test Route map (Karnal)



## 2.3 Areas covered

### (a) Karnal City

Hotel jewels, Kunjpura road, Sec 8, Sec 7, Sec 6, Sec 5, Sec 4, sec 32, Sec 33, Meerut Road, Ansal, Phusgarh, Chapra khera, Sec 14, Sec 13, Karnal old city, Ram nagar, Madhuban, Anaj mandi, Daha Jagir, New Anaj mandi, Central Jail, Canal route, Shiv colony, Sham garh, GT road and city outskirts area etc

### (b) Hot spots Covered:

Sr No	Hotspot Location
1	Namaste Chowk, Karnal
2	Sector-6 Market, Karnal
3	Kalpana Chawla Medical College & Hospital, Karnal
4	Old Bus Stand , Karnal
5	Railway Station, Karnal

**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	700,850,2500
7	Reliance JIO Infocomm Ltd.	4G	850,1800,2300
8	Reliance JIO Infocomm Ltd.	5G	700,3500
9	Vodafone Idea Ltd.	2G	900
10	Vodafone Idea Ltd.	4G	900,1800,2100,2500

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

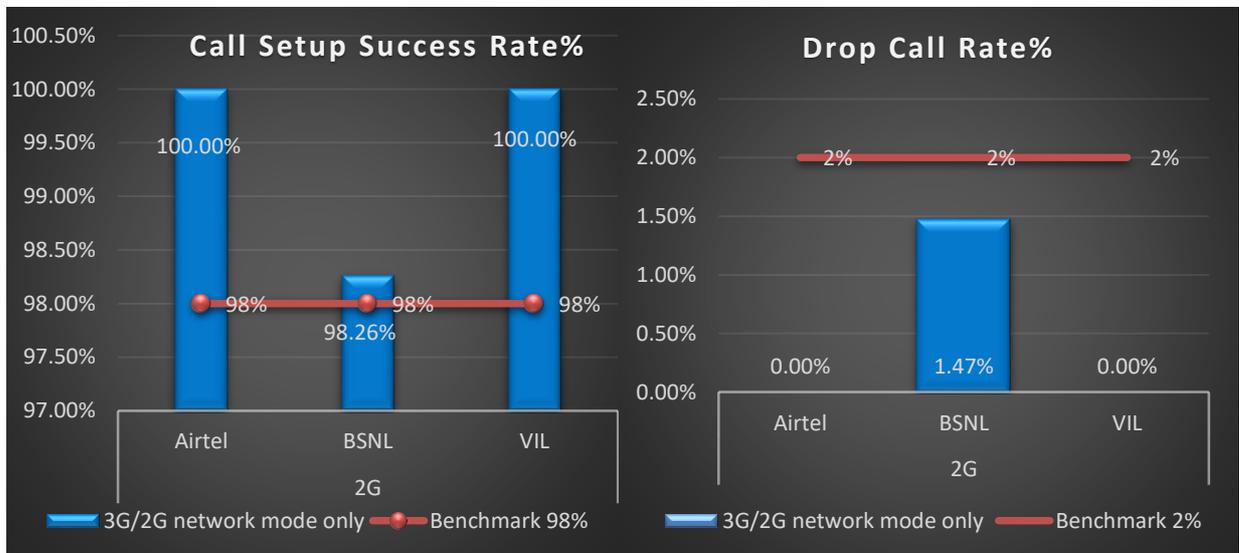
### 3.Detailed QoS Performance Analysis:

This section provides summary of overall QoS performance of the telecom service provider’s network in the Karnal City of Haryana LSA by aggregating the results of drive tests conducted in month of November 2025 covering city drive, 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.

Parameters	Service Provider		
	3G/2G network mode only		
	AIRTEL	BSNL	VIL
Call Attempts	326	346	349
Call Setup Success Rate %	100	98.26	100.00
Drop Call Rate %	0.00	1.47	0
Call Setup Time-Average (Second)	3.21	4.35	3.95
Handover Success Rate %	97.28	97.09	100.00

**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	102	NA
2G	277	51	396

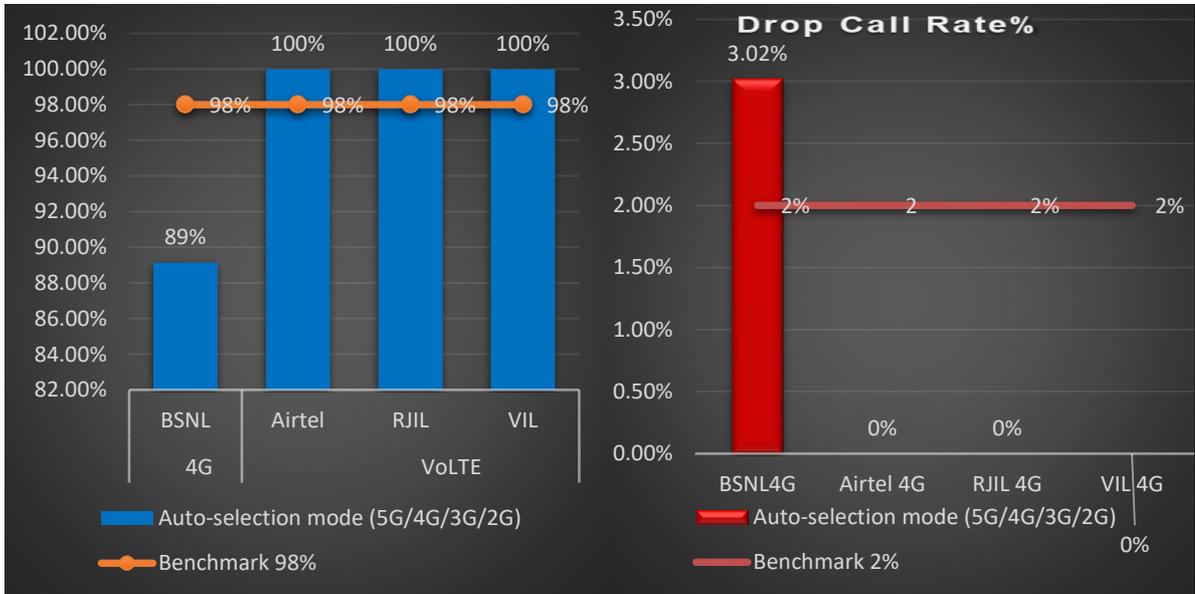
**Table-5:** Technology wise number of network cell id’s latched during drive test.

<p><b>Note-</b></p> <ul style="list-style-type: none"> <li>RJIL does not have 3G/2G network.</li> <li>NA- Service provider doesn't provide services in respective technology.</li> </ul>
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**(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	342	331	292	353
Call Setup Success Rate %	100	<b>89.13</b>	100.00	100.00
Drop Call Rate %	0.00	<b>3.02</b>	0.00	0.00
Call Setup Time-Average (Second)	1.20	3.182	1.16	0.73
Handover Success Rate %	99.74	100.00	99.43	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.

98.88% 100% 100% 100%

Parameter	Service Provider			
	Mobile-to-Mobile (5G/4G - Open Mode)			
	AIRTEL	BSNL	RJIL	VIL
Call Established (within service provider Network)	317	NA	621	353
Number of silences call for >4 Sec	2	NA	0	0
Silence Call Rate %	0.63	NA	0.16	0
Number of silence instances for >4 Sec	2	NA	0	0
Number of silence instances for >3 Sec	0	NA	0	0
Number of silence instances for >2 sec	4	NA	1	0
RTP Jitter (4G & 5G) in ms	4.0	NA	7.20	0
Packet loss Rate Downlink %	0.40	NA	0.80	0
Packet loss Rate Uplink %	0.40	NA	0.80	0

**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	49	NA	NA
2G	635	59	NA	396
4G	NA	155	6	743
5G	0	NA	366	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.

<i>Speech Quality (MOS) distribution</i>	<i>Service Provider</i>			
	<i>AIRTEL</i>	<i>BSNL</i>	<i>RJIL</i>	<i>VIL</i>
<i>Total Number of MOS Samples for calls</i>	2154	*	2191	2254
<i>Speech Quality (Average MOS Score)</i>	4.08	*	4.16	3.94
<i>Number of samples with MOS &gt;=4 to &lt;5 (Excellent)</i>	1931	*	1736	1454
<i>Number of samples with MOS &gt;=3 to &lt;4 (Good)</i>	205	*	275	657
<i>Number of samples with MOS &gt;=2 to &lt;3 (Fair)</i>	11	*	126	130
<i>Number of samples with MOS &gt;=1 to &lt;2 (Poor)</i>	7	*	53	13
<i>%age of samples with MOS &gt;=4 to &lt;5 (Excellent)</i>	89.65	*	79%	64.51
<i>%age of samples with MOS &gt;=3 to &lt;4 (Good)</i>	9.52	*	13%	29.15
<i>%age of samples with MOS &gt;=2 to &lt;3 (Fair)</i>	0.51	*	6%	5.77
<i>%age of samples with MOS &gt;=1 to &lt;2 (Poor)</i>	0.32	*	2.4%	0.57

**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	119.37	9.39	347.61	26.3
	80 <sup>th</sup> Percentile	164.35	15.90	494.40	43.54
	20 <sup>th</sup> Percentile	52.67	1.72	207.14	11.09
Upload Throughput (Mbits/s)	Average	30.62	1.83	36.54	16.7
	80 <sup>th</sup> Percentile	49.52	3.03	56.962	27.03
	20 <sup>th</sup> Percentile	11.92	0.17	9.728	6.91
Latency (ms)	50 <sup>th</sup> Percentile	10.50	50.62	19	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	214	NA	366	NA
4G	474	162	6	743
3G	NA	63	NA	NA
2G	0	0	NA	396

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

**(d) Hotspots**

Hotspot testing has been done on 5 November 2025. Total 5 locations have been tested in the Karnal City.

**i. Hotspot covered :**

Sr No	Hotspot Location
1	Namaste Chowk, Karnal
2	Sector-6 Market, Karnal
3	Kalpana Chawla Medical College & Hospital, Karnal
4	Old Bus Stand , Karnal
5	Railway Station, Karnal

**Table-12:** Hotspot covered in Karnal City

ii. Voice performance

Overall, Voice Performance				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Call Attempt	50	50	50	50
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 (Sec)	1.23	1.64	1.08	0.74

**Table-13:** Overall summary of voice call performance in network auto-selection mode(5G/4G/3G/2G).

Namaste Chowk, Karnal				
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 (Sec)	1.19	1.21	1.08	0.68

iii. **Table-14:** Summary of voice call performance in network auto-selection mode 5G/4G/3G/2G).

Sector-6 Market, Karnal				
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 (Sec)	1.21	1.51	1.26	0.78

iv. **Table-15:** Summary of voice call performance in network auto-selection mode 5G/4G/3G/2G).

Kalpana Chawla Medical College & Hospital, Karnal				
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 (Sec)	1.18	2.61	1.17	0.7

v. **Table-16:** Summary of voice call performance in network auto-selection mode 5G/4G/3G/2G).

Old Bus Stand, Karnal				
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 (Sec)	1.30	1.57	1.23	0.76

i. **Table-17:** Summary of voice call performance in network auto-selection mode 5G/4G/3G/2G).

Railway Station, Karnal				
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 (Sec)	1.29	1.32	1.12	0.78

i. **Table-18:** 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)	102.04	9.39	355.16	26.3
Download Throughput 80th Percentile (Mbit/s)	125.41	15.90	465.24	43.54
Download Throughput 20th Percentile (Mbit/s)	86.29	1.72	241.10	11.09
Download Session Setup Success Rate %	100.00	100.00	100.00	100.00
Upload Throughput Average (Mbits/s)	25.01	1.83	68.72	16.7
Upload Throughput 80th Percentile (Mbit/s)	28.24	3.03	79.18	27.03
Upload Throughput 20th Percentile (Mbit/s)	20.37	0.17	46.82	6.91
Upload Session Setup Success Rate %	100.00	100.00	100.00	100.00
Web Browsing Delay (Second)	5.15	2.27	3.45	2.17
Youtube Initial Buffer Delay (Second)	1.15	2.09	0.29	1.23
Latency (ms)-50th Percentile	12.20	50.62	37	29.10
Jitter (ms)	2.64	8.11	6.03	4.82
Packet Loss Rate%	0.006	1.19	0.88	0.51

**Table-19:** Overall Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

Namaste Chowk, Karnal				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	68.93	12.48	635.19	65.5
Download Session Setup Success Rate %	100.00	100.00	100.00	100
Upload Throughput Average (Mbits/s)	13.36	6.41	139.70	22.1
Upload Session Setup Success Rate %	100.00	100.00	100.00	100
Web Browsing Delay (Second)	5.01	3.66	3.2	33.50
Youtube Initial Buffer Delay (Second)	1.64	3.12	0.27	3.95
Latency (ms)-50th Percentile	12.50	45.9	19	0.07
Jitter (ms)	2.86	7.57	5.41	1.2
Packet Loss Rate%	0.00	3.30	0.53	0.59

**Table-20:** Summary of Data performance in network auto-selection mode (5G/4G/3G/2G)

<b>Sector-6 Market, Karnal</b>				
<b>Parameters</b>	<b>Service Provider</b>			
	<b>Auto-selection mode (5G/4G/3G/2G)</b>			
	<b>AIRTEL</b>	<b>BSNL</b>	<b>RJIL</b>	<b>VIL</b>
<b>Download Throughput Average (Mbits/s)</b>	99.17	33.48	252.81	48.7
<b>Download Session Setup Success Rate %</b>	100.00	100.00	100.00	100
<b>Upload Throughput Average (Mbits/s)</b>	24.81	13.06	53.92	28.6
<b>Upload Session Setup Success Rate %</b>	100.00	100.00	100.00	100
<b>Web Browsing Delay (Second)</b>	5.72	1.77	1.83	45.50
<b>Youtube Initial Buffer Delay (Second)</b>	1.14	1.24	0.28	6.87
<b>Latency (ms)-50th Percentile</b>	12.50	43.39	31	0.97
<b>Jitter (ms)</b>	2.50	8.19	5.44	2.04
<b>Packet Loss Rate%</b>	0.03	0.08	0.03	1.1

**Table-21:** Summary of Data performance in network auto-selection mode (5G/4G/3G/2G).

<b>Kalpana Chawla Medical College &amp; Hospital, Karnal</b>				
<b>Parameters</b>	<b>Service Provider</b>			
	<b>Auto-selection mode (5G/4G/3G/2G)</b>			
	<b>AIRTEL</b>	<b>BSNL</b>	<b>RJIL</b>	<b>VIL</b>
<b>Download Throughput Average (Mbits/s)</b>	125.24	20.44	422.76	48.4
<b>Download Session Setup Success Rate %</b>	100.00	100.00	100.00	100
<b>Upload Throughput Average (Mbits/s)</b>	39.24	5.21	64.06	24.4
<b>Upload Session Setup Success Rate %</b>	100.00	100.00	100.00	100
<b>Web Browsing Delay (Second)</b>	4.92	1.76	3.9	35.50
<b>Youtube Initial Buffer Delay (Second)</b>	0.85	1.54	0.34	6.84
<b>Latency (ms)-50th Percentile</b>	12.50	45.93	38	0.12
<b>Jitter (ms)</b>	2.81	10.83	4.23	1.78
<b>Packet Loss Rate%</b>	0.00	0.91	1.89	1.79

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

<b>Old Bus Stand, Karnal</b>				
<b>Parameters</b>	<b>Service Provider</b>			
	<b>Auto-selection mode (5G/4G/3G/2G)</b>			
	<b>AIRTEL</b>	<b>BSNL</b>	<b>RJIL</b>	<b>VIL</b>
<b>Download Throughput Average (Mbits/s)</b>	90.63	26.34	270.77	18.6
<b>Download Session Setup Success Rate %</b>	100.00	100.00	100.00	100
<b>Upload Throughput Average (Mbits/s)</b>	25.49	7.29	49.39	6.3
<b>Upload Session Setup Success Rate %</b>	100.00	100.00	100.00	100
<b>Web Browsing Delay (Second)</b>	5.22	2.18	4.12	44.50
<b>Youtube Initial Buffer Delay (Second)</b>	1.27	1.67	0.27	5.43
<b>Latency (ms)-50th Percentile</b>	11.00	38.09	21	0.90
<b>Jitter (ms)</b>	2.20	6.38	5.98	4.2
<b>Packet Loss Rate%</b>	0.00	1.59	0.29	1.7

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

Railway Station, Karnal				
Parameters	Service Provider			
	Auto-selection mode (5G/4G/3G/2G)			
	AIRTEL	BSNL	RJIL	VIL
Download Throughput Average (Mbits/s)	126.10	11.69	194.27	26.4
Download Session Setup Success Rate %	100.00	100.00	100.00	100
Upload Throughput Average (Mbits/s)	22.13	9.36	35.57	10.8
Upload Session Setup Success Rate %	100.00	100.00	100.00	100
Web Browsing Delay (Second)	4.92	1.96	4.23	46.50
Youtube Initial Buffer Delay (Second)	0.85	2.88	0.32	1.04
Latency (ms)-50th Percentile	12.5	36.07	34	0.50
Jitter (ms)	2.86	7.58	9.11	1.67
Packet Loss Rate%	0.00	0.09	1.69	0.99

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

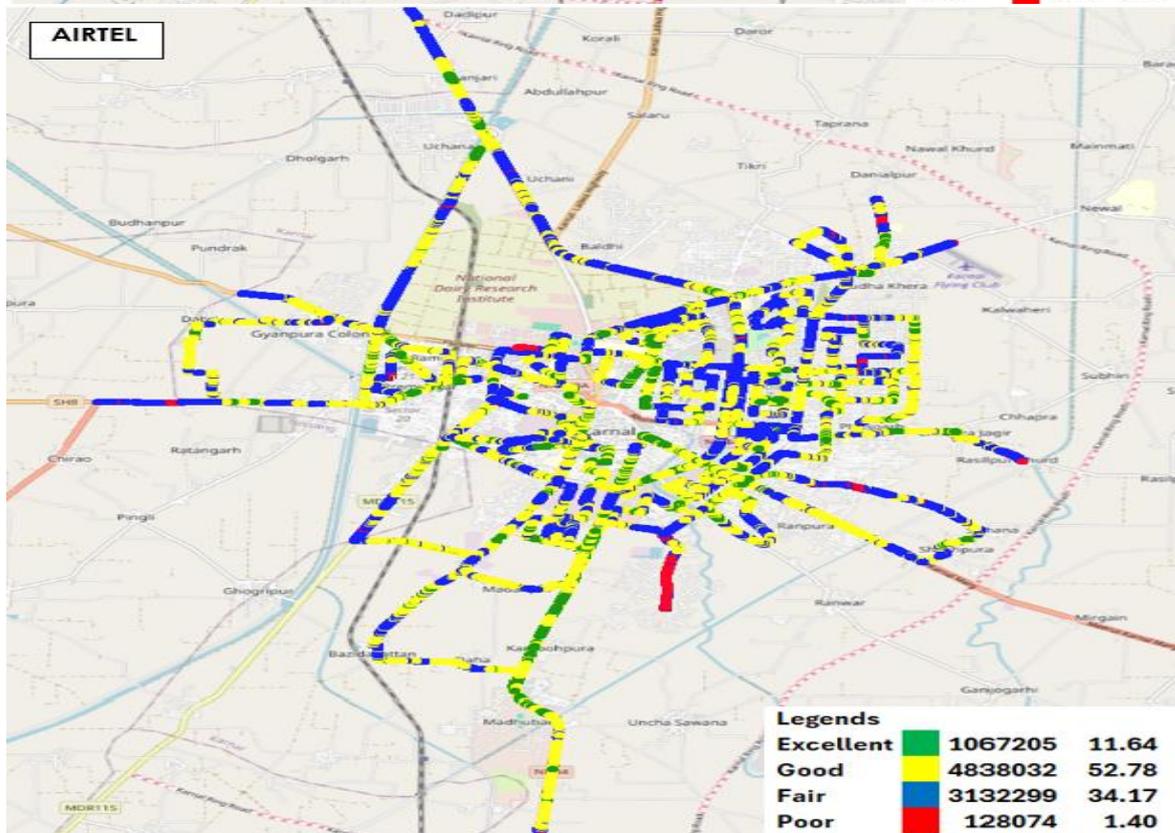
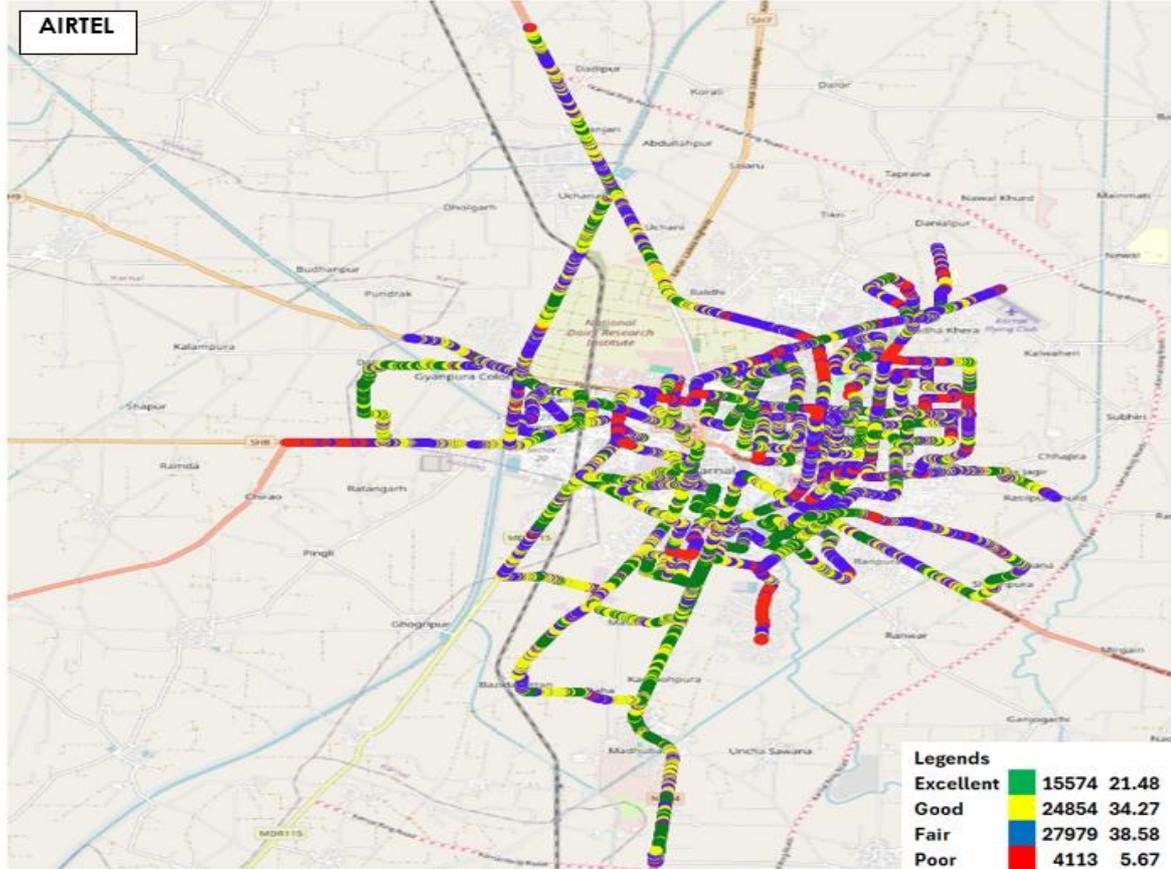
#### **4. TSP Wise signal Strength :**

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	Light Yellow

**Table-25 :** Signal strength legend format.

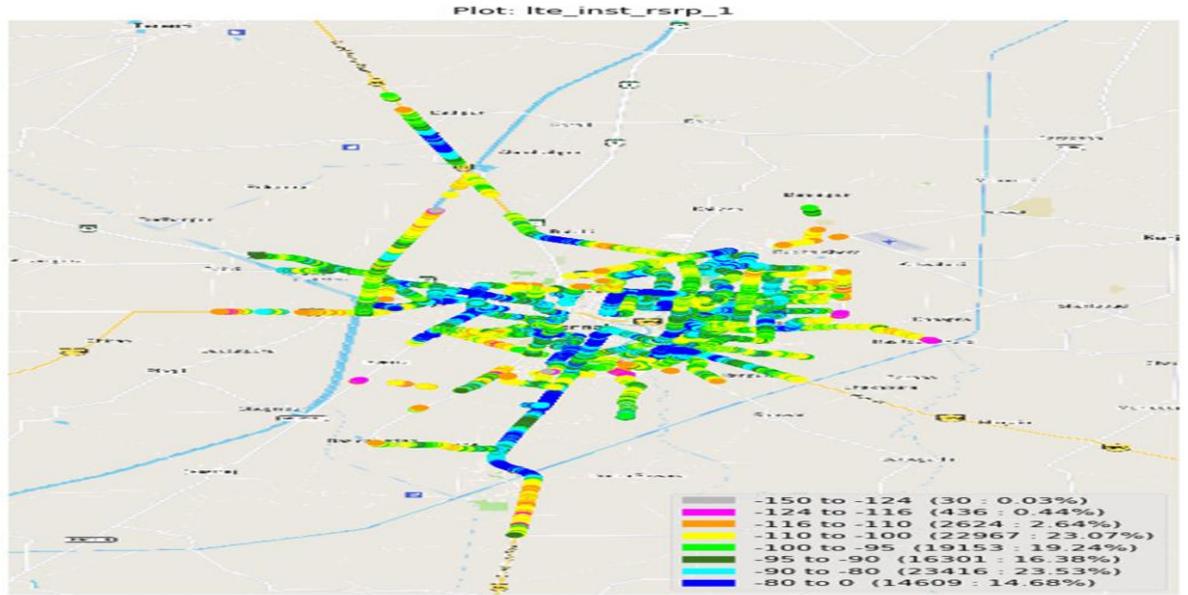
# A. Airtel

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



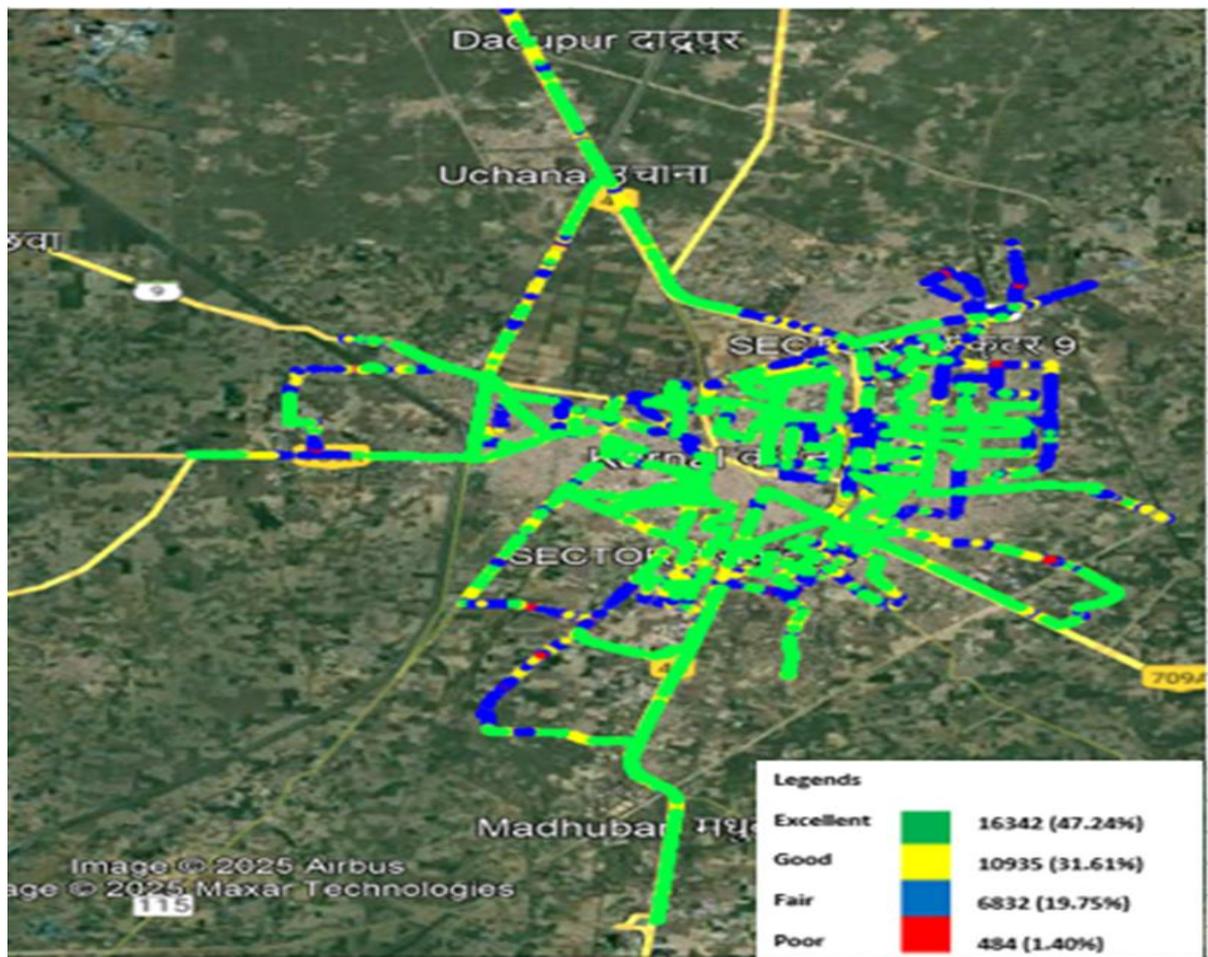
**Figure-6:** Signal strength auto-selection mode 5G/4G/2G– AIRTEL.

B. BSNL



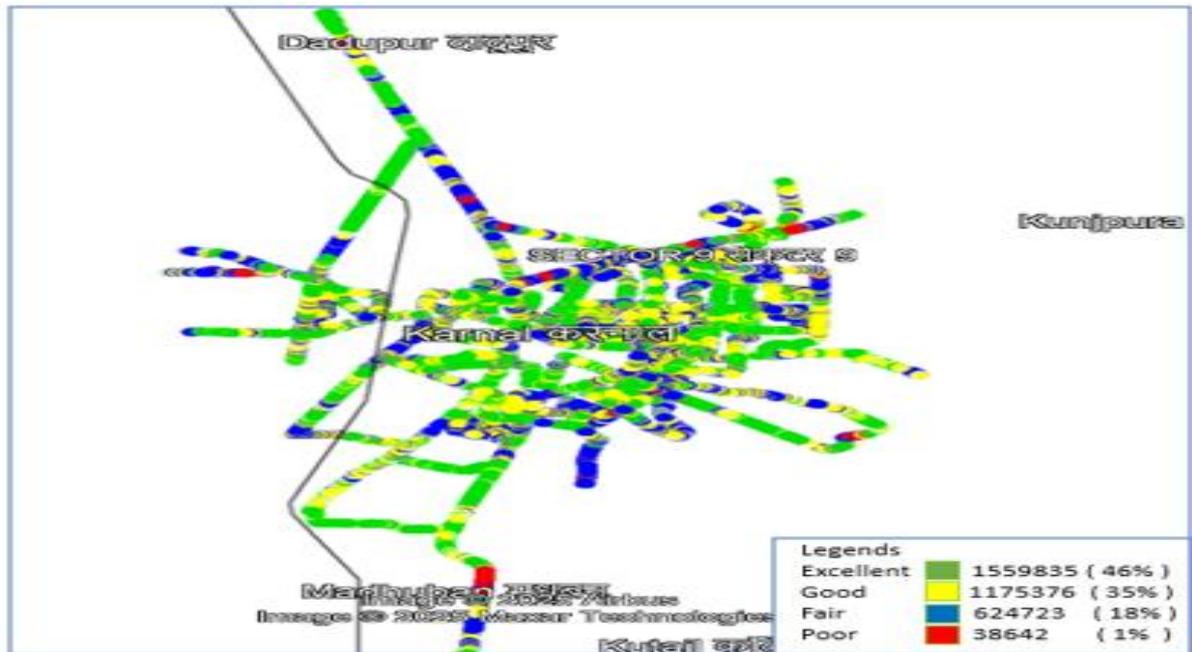
**Figure-9:** Serving technology plots in auto-selection mode (5G/4G/3G/2G) –BSNL

C. RJIL

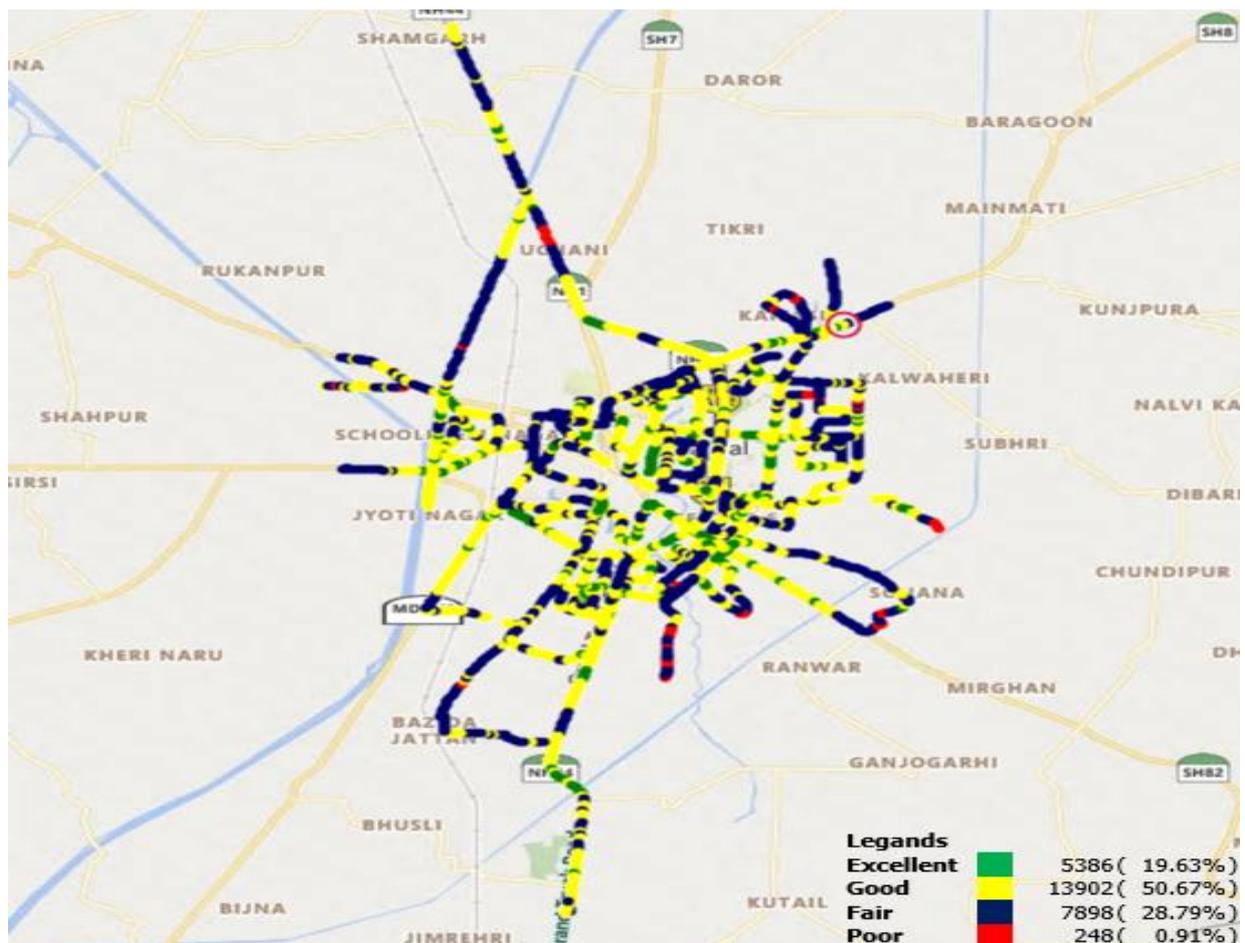


**Figure-10:** Signal strength auto-selection mode 5G/4G/3G/2G – RJIL.

**D. VIL**



**Figure-11:** Signal strength 3G/2G network mode – VIL.



**Figure 12-:** 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	89.13	100	100
2	Drop Call Rate (DCR)	%	0.00	3.02	0.00	0.00
3	Call Silence rate (Mute Call)	%	0.63	NA	0.16	0.00
4	Average MOS Score	1-5	4.08	NA	4.16	3.94
5	TSP Offered typical download speed (In Mbps)	(Mbits/s)				
6	Average Download Throughput (Data Speed)	(Mbits/s)	119.37	9.39	347.61	26.3
7	TSP Offered typical upload speed (In Mbps)	(Mbits/s)				
8	Average Upload Throughput (Data Speed)	(Mbits/s)	30.62	1.83	36.54	16.7

**Table-26** : Operator wise comparative Analysis of various key parameters

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

BSNL Haryana has not met the KPI benchmarks for: -

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

i) Call Setup Success Rate % (Benchmark 98%), reported 89.13%

& ii) Drop Call Rate %(Benchmark 02%), reported 3.02%.

**BSNL has stated following reasons for the above KPI's below benchmark performance.**

**Quoted:** - "Currently our network is in upgradation stage. Presently we have upgraded existing 2G/3G locations to 4G Sites. In view of less coverage of 4G sites in compare to 2G/3G coverage, we have less no of sites to give seamless coverage. Also, drive test route covered city outskirts where we do not have 4G BTS, which resulted in overall poor coverage samples and Call performance. During the OADT on 25 Nov, Also, IMS fluctuation during the testing resulted in multiple call fails. We have planned deploying more sites to Improve coverage. Also media up gradation to advance MAAN N/W and fibrization of mini-link sites will further improve network quality."

No comments received from other TSPs (Airtel/RJIL/VIL) for this OADT report.