

TELECOM REGULATORY AUTHORITY OF INDIA

New Delhi, 5th March 2025

For Immediate release

Website: - www.trai.gov.in

TRAI releases report on Independent Drive Tests (IDT) conducted in Nine cities including Highways and Railway routes of Gujarat LSA, Jammu & Kashmir LSA, Kerala LSA, Madhya Pradesh LSA, Mumbai LSA, Odisha LSA, Uttar Pradesh-East LSA, Uttar Pradesh-West LSA and West Bengal LSA during Dec-2024.

New Delhi, March 5th, 2025: TRAI, through its appointed agency, conducted Independent Drive Tests (IDT) in nine cities, highways and railway routes viz. Aligarh city and Meerut to Dehradun Railway route (UP-West LSA), Bhubaneshwar city (Odisha LSA), Jammu City & Jammu to Srinagar Highway (J&K LSA), Lucknow city and Fatehpur to Varanasi Highway (UP-East LSA), Navi-Mumbai city (Mumbai LSA), Raipur city (MP LSA), Siliguri, Darjeeling & Kalimpong city (West Bengal LSA), Thiruvananthapuram city (Kerala LSA) and Vapi-Rewari Highway (Gujarat LSA). Drive tests were conducted to assess the quality of service provided by Cellular Mobile Telephone Service providers for voice and data services in December-2024.

2. In IDT, the performance of M/s Bharti Airtel Ltd., M/s BSNL/MTNL, M/s Reliance Jio Infocom Ltd. and M/s Vodafone Idea Ltd., providing services in a Licensed Service Area (LSA) through various technologies (like 2G/ 3G/ 4G/ 5G) for voice and data, has been measured by conducting drive test. The observations presented in drive test reports represent the performance of the service providers on the area/ route under test on the day/ time of conducting the drive test.
3. The following Key Performance Indicators (KPIs) for Voice as well as Data service were assessed for the networks of all Telecom service providers operating in the region.

I. Voice services:

- a) Call setup success rate
- b) Drop call rate (DCR)
- c) Speech Quality using MOS (mean opinion score)
- d) Downlink & Uplink packet (voice) drop rate
- e) Call Silence Rate
- f) Coverage (%) - Signal strength

II. Data Service:

- a) Data Throughput (Downlink and uplink both)
- b) Packet drop rate (Downlink & Uplink)
- c) Video streaming delay
- d) Latency
- e) Jitter

4. The details of drive tests conducted in the nine areas are given below:

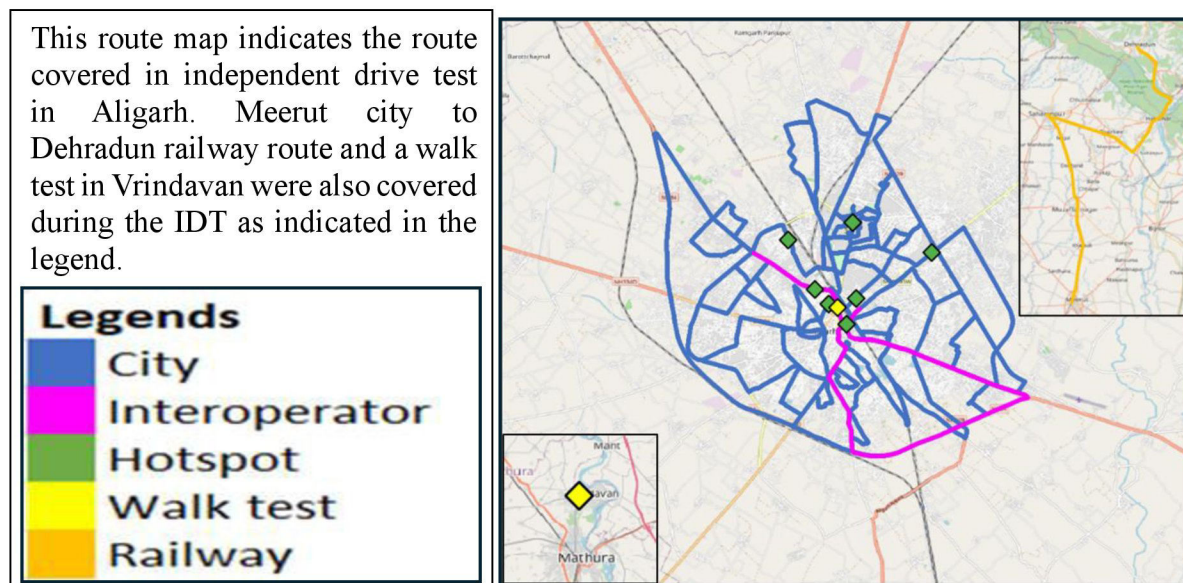
S. No.	City / Routes Covered	Licensed Service Area	Period of Drive Test	Distance Covered	Performance summary (attached at)
1	Aligarh & Meerut to Dehradun Railway Route	UP West	16-12-2024 to 20-12-2024	City :204 Kms Walk Test: 7.3 Kms Railway: 242 Kms	Annexure A
2	Bhubaneshwar	Odisha	10-12-2024 to 13-12-2024	City :355.8 Kms Walk Test: 10.8 Kms	Annexure B
3	Jammu City & Jammu to Srinagar Highway	J&K	09-12-2024 to 13-12-2024	City :257.5 Kms Highway :295 Kms	Annexure C
4	Lucknow & Fatehpur to Varanasi Highway	UP East	09-12-2024 to 13-12-2024	City :370.2 Kms Walk Test: 5.5 Kms Highway: 248 Kms	Annexure D
5	Navi-Mumbai	Mumbai	16-12-2024 to 20-12-2024	City: 350.26 Kms Walk Test: 12.85 Kms Railway: 31.03 Kms Coastal: 6.71 Kms	Annexure E
6	Raipur	Madhya Pradesh	02-12-2024 to 05-12-2024	City: 315 Kms Walk Test: 5.2 Kms	Annexure F
7	Siliguri, Darjeeling & Kalimpong	West Bengal	01-12-2024 to 09-12-2024	City :467 Kms Walk Test: 2.05 Kms	Annexure G
8	Thiruvananthapuram	Kerala	02-12-2024 to 06-12-2024	City: 177 Kms Walk Test: 13 Kms Highway: 224 Kms Railway: 212 Kms	Annexure H
9	Vapi-Rewari Highway	Gujarat	17-12-2024 to 19-12-2024	Highway: 1242.64 Kms	Annexure I

5. The detailed reports are available at TRAI website www.traigov.in. For any clarification/information, Shri Tejpal Singh, Advisor (QoS-I) TRAI may be contacted on email: adv-qos1@traigov.in or at Tel. No. +91-11-20907759.


 (Atul Kumar Chaudhary)
 Secretary

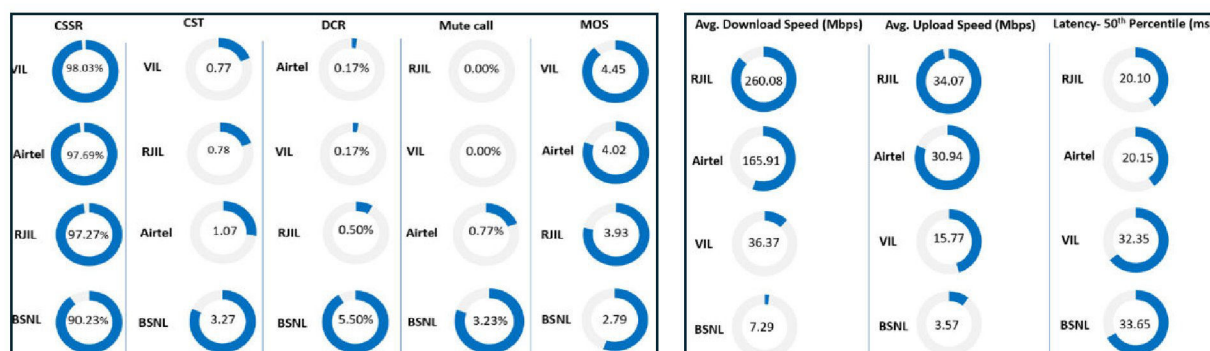
05/03/2025

1. Drive test route Map: (Aligarh City & Meerut City to Dehradun Railway route– UP West LSA)



2. Performance against key QoS parameters:

CSSR: Call setup success rate (in %), CST: Call setup time (in milli seconds), DCR: Drop call rate (in %) & MOS: Mean Opinion Score



Summary-Voice Service

Call Setup Success Rate: Airtel, BSNL, RJIL and VIL have %, 97.69%, 90.23, 97.27% and 98.03% call setup success rate respectively.

Call Setup Time: BSNL has taken comparatively longer time (3.27 seconds) to establish the voice call. Whereas, Airtel, RJIL and VIL call setup time is 1.07, 0.78 & 0.77 second respectively in open mode (5G/4G/3G/2G).

Call Drop Rate: BSNL's overall call drop rate (5.50%) is higher (QoS benchmark of 2%), while Airtel, RJIL and VIL have call drop rate of 0.17%, 0.50% and 0.17% respectively.

Call Silence/Mute Rate: In packet switched network (4G/5G), Airtel, BSNL, RJIL and VIL have 0.77%, 3.23%, 0.00% & 0.00% silence call rate respectively.

Mean Opinion Score (MOS): Quality of speech of VIL (4.45) and Airtel (4.02) are having a MOS score >4, whereas BSNL (2.79) and RJIL (3.93) are having MOS score <4.

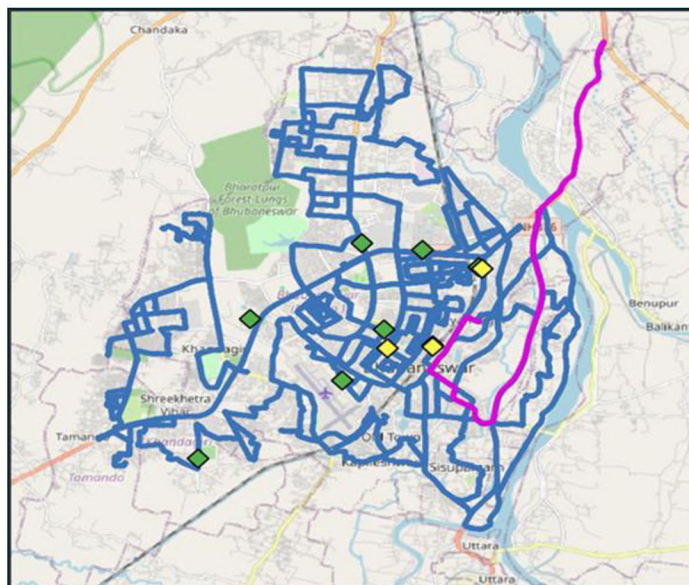
Summary-Data Service

Data Download performance (Dynamic): BSNL (7.29 Mbps) and VIL (36.37 Mbps), operating on 4G/3G technologies, have comparatively lower average download speed. Whereas Airtel and RJIL achieved significantly higher average download speed of 165.91 Mbps and 260.08 Mbps in 4G/5G technology.

Data Upload performance (Dynamic): BSNL (3.57 Mbps) and VIL (15.77 Mbps), operating on 4G/3G technologies, have comparatively lower average upload speed. Whereas Airtel and RJIL achieved significantly higher average upload speed of 30.94 Mbps and 34.07 Mbps, respectively in 4G/5G technology.

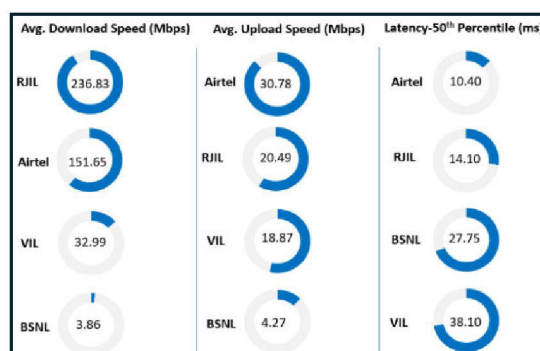
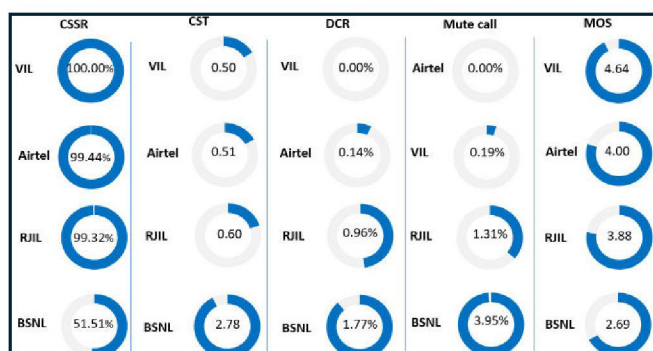
1. Drive test route Map: (Bhubaneswar City- Odisha LSA)

This route map indicates the route covered in independent in Bhubaneswar City during the IDT as indicated in the legend.



2. Performance against key QoS parameters:

CSSR: Call setup success rate (in %), CST: Call setup time (in milli seconds), DCR: Drop call rate (in %) & MOS: Mean Opinion Score



Summary-Voice Service

Call Setup Success Rate: Airtel, BSNL, RJIL and VIL have 99.44%, 51.51%, 99.32% and 100.00% call setup success rate respectively.

Call Setup Time: BSNL has taken comparatively longer time (2.78 seconds) to establish the voice call, whereas Airtel, RJIL and VIL call setup time is 0.51, 0.60 & 0.50 second respectively in open mode (5G/4G/3G/2G).

Call Drop Rate: BSNL's overall call drop rate (1.77%) is higher (QoS benchmark of 2%), while Airtel, RJIL and VIL have call drop rate of 0.14%, 0.96% and 0.00% respectively.

Call Silence/Mute Rate: In packet switched network (4G/5G), Airtel, BSNL, RJIL and VIL have 0.00%, 3.95%, 1.31% & 0.19% silence call rate respectively.

Mean Opinion Score (MOS): Quality of speech of VIL (4.64) and Airtel (4.00) is having a MOS score ≥ 4 , whereas BSNL (2.69) and RJIL (3.88) are having a MOS score < 4 .

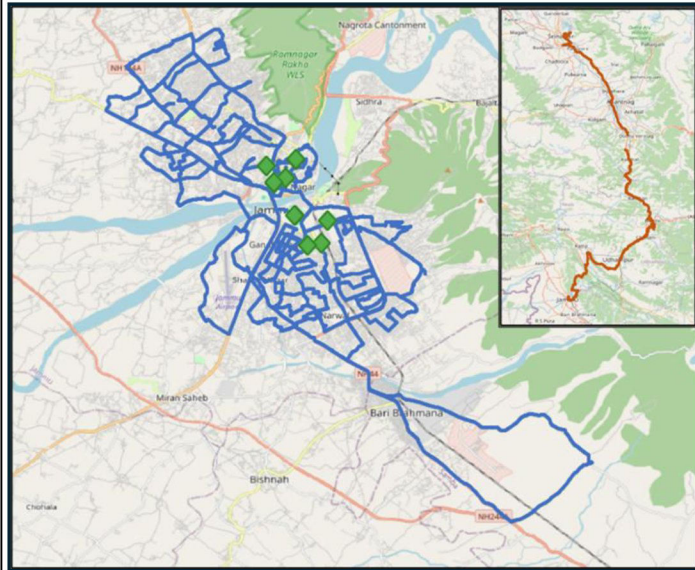
Summary-Data Service

Data Download performance (Dynamic): BSNL (3.86 Mbps) and VIL (32.99 Mbps), operating on 4G/3G technologies, have comparatively lower average download speed. Whereas, Airtel and RJIL achieved significantly higher average download speed of 151.65 Mbps and 236.83 Mbps in 4G/5G technology.

Data Upload performance (Dynamic): BSNL (4.27 Mbps) and VIL (18.87 Mbps), operating on 4G/3G technologies, have comparatively lower average upload speed. Whereas, Airtel and RJIL achieved significantly higher average upload data speed of 30.78 Mbps and 20.49 Mbps, respectively in 4G/5G technology.

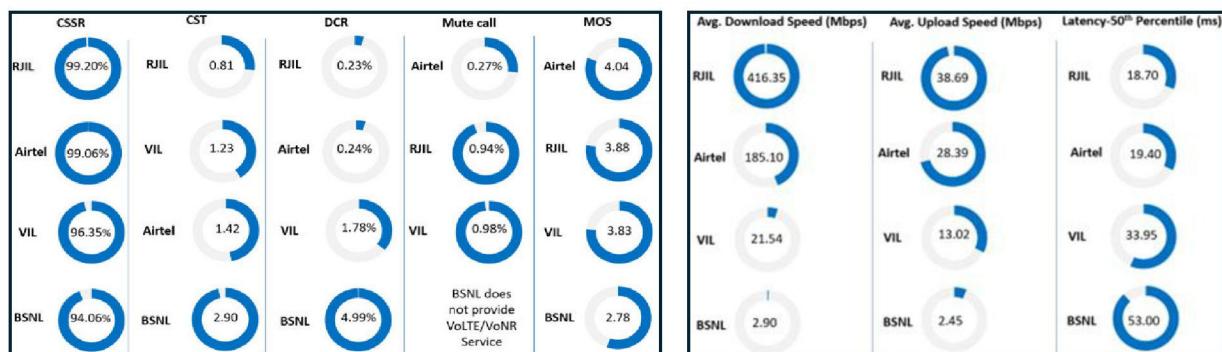
1. Drive test route Map: (Jammu City & Jammu-Srinagar Highway – Jammu & Kashmir LSA)

This route map indicates the route covered in independent drive test in Jammu City. The Jammu to Srinagar via Patnitop highway route is also covered during the IDT as indicated in the legend.



2. Performance against key QoS parameters:

CSSR: Call setup success rate (in %), CST: Call setup time (in milli seconds), DCR: Drop call rate (in %) & MOS: Mean Opinion Score



Summary-Voice Service

Call Setup Success Rate: Airtel, BSNL, RJIL and VIL have 99.06%, 94.06%, 99.20% and 96.35% call setup success rate respectively.

Call Setup Time: BSNL has taken comparatively longer time (2.90 second) to establish the voice call, whereas Airtel, RJIL & VIL call setup time is 1.42, 0.81 & 1.23 seconds respectively in Auto-selection mode (5G/4G/3G/2G).

Call Drop Rate: BSNL's overall call drop rate 4.99% is higher (QoS benchmark of 2%), while Airtel, RJIL & VIL have drop call rate of 0.24%, 0.23% and 1.78% respectively in Auto-selection mode (5G/4G/3G/2G).

Call Silence/Mute Rate: In packet switched network (4G/5G), Airtel, RJIL and VIL have 0.27%, 0.94% & 0.98% silence call rate respectively.

Mean Opinion Score (MOS): Quality of speech of Airtel (4.04) is having a MOS score >4, whereas BSNL (2.78), RJIL (3.88) and VIL (3.83) are having MOS score <4.

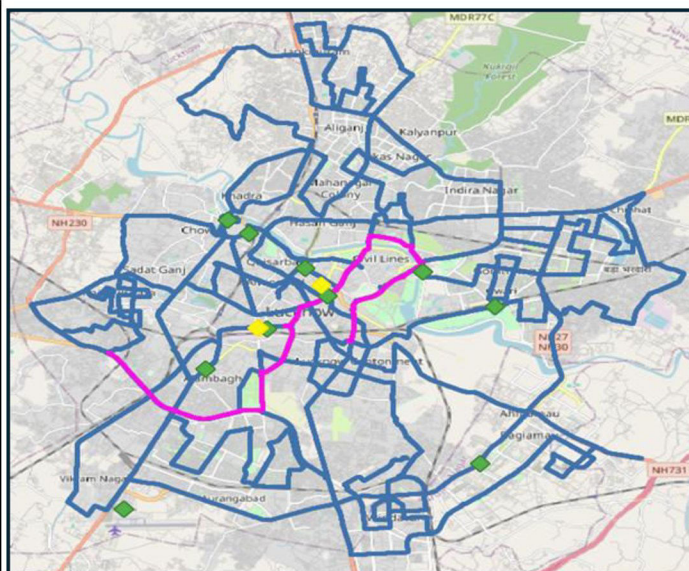
Summary-Data Service

Data Download performance (Dynamic): BSNL (2.90 Mbps) and VIL (21.54 Mbps), operating on 4G/3G technologies, have comparatively lower average download speed. Whereas, Airtel and RJIL achieved significantly higher average download speed of 185.10 Mbps and 416.35 Mbps in 4G/5G technology.

Data Upload performance (Dynamic): BSNL (2.45 Mbps) and VIL (13.02 Mbps), operating on 4G/3G technologies, have comparatively lower average upload speeds. Whereas, Airtel and RJIL achieved significantly higher average upload speed of 28.39 Mbps and 38.69 Mbps, respectively in 4G/5G technology.

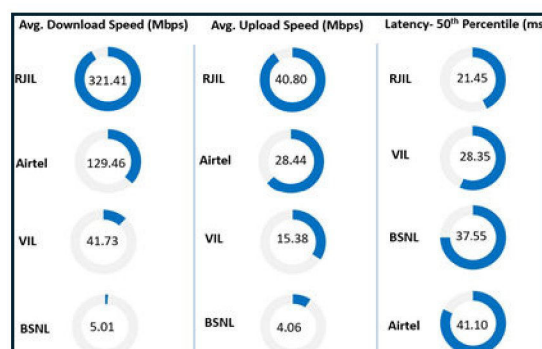
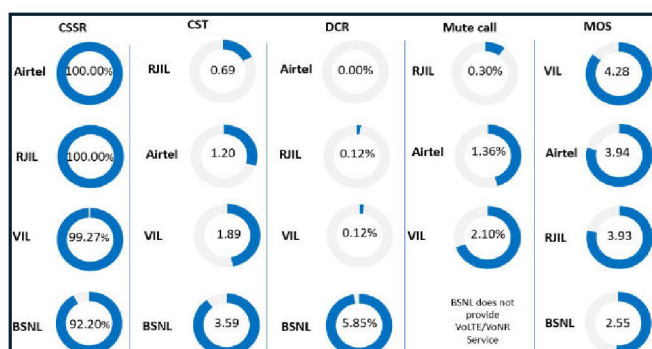
1. Drive test route Map: (Lucknow City & Fatehpur to Varanasi Highway – UP East LSA)

This route map indicates the routes covered in independent drive test in Lucknow city. Fatehpur to Varanasi via Khaga, Soraon, Gopalganj & Bhainsa highway routes were also covered during the IDT as indicated in the legend.



2. Performance against key QoS parameters:

CSSR: Call setup success rate (in %), CST: Call setup time (in milli seconds), DCR: Drop call rate (in %) & MOS: Mean Opinion Score



Summary-Voice Service

Call Setup Success Rate: Airtel, BSNL, RJIL and VIL have call setup success rate of 100.00%, 92.20%, 100.00% and 99.27% respectively.

Call Setup Time: BSNL has taken comparatively longer time (3.59 seconds) to establish the voice call, whereas Airtel, RJIL and VIL call setup time is 1.20, 0.69 & 1.89 second respectively in open mode (5G/4G/3G/2G).

Call Drop Rate: BSNL's overall call drop rate (5.85%) is higher (QoS benchmark of 2%), while Airtel, RJIL and VIL have 0.00%, 0.12% and 0.12% respectively.

Call Silence/Mute Rate: In packet switched network (4G/5G), Airtel, RJIL and VIL have 1.36%, 0.30% and 2.10% silence call rate respectively.

Mean Opinion Score (MOS): Quality of speech of VIL (4.28) having MOS score > 4, whereas Airtel (3.94), BSNL (2.55) and RJIL (3.93) are having MOS score < 4.

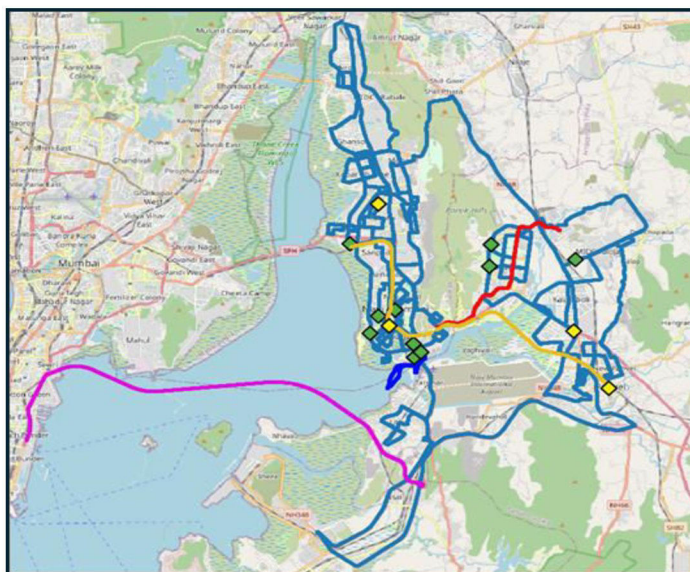
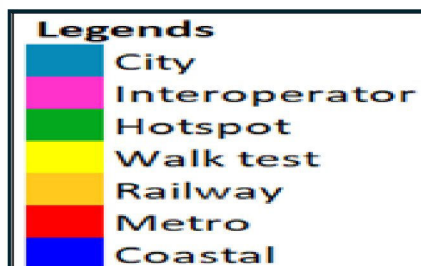
Summary-Data Service

Data Download performance (Dynamic): BSNL (5.01 Mbps) and VIL (41.73 Mbps), operating on 4G/3G technologies, have comparatively lower average download speeds. Whereas, Airtel and RJIL achieved significantly higher average download speeds of 129.46 Mbps and 321.41 Mbps in 4G/5G technology.

Data Upload performance (Dynamic): BSNL (4.06 Mbps) and VIL (15.38 Mbps), operating on 4G/3G technologies, have comparatively lower upload speeds. Whereas, Airtel and RJIL achieved significantly higher average upload speeds of 28.44 Mbps and 40.80 Mbps, respectively in 4G/5G technology.

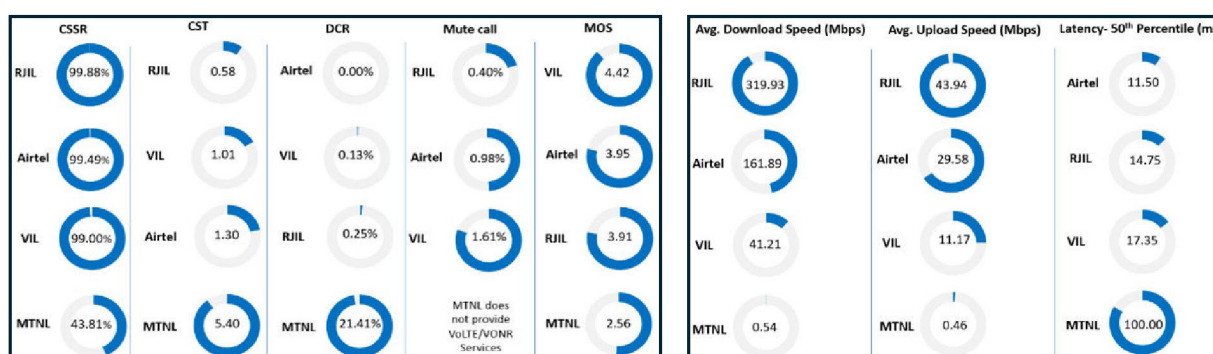
1. Drive test route Map: (Navi Mumbai, Panvel to Vashi Railway, Belapur to Pendhar Metro & JNPT Belapur area towards Vashi Coastal route - Mumbai LSA)

This map indicates the route covered in IDT in Navi Mumbai and Panvel to Vashi Railway route, Belapur to Pendhar Metro route and JNPT Belapur area towards Vashi Coastal route as indicated in the legend.



2. Performance against key QoS parameters:

CSSR: Call setup success rate(in %), CST: Call setup time (in milli seconds), DCR: Drop call rate(in %) & MOS: Mean Opinion Score



Summary-Voice Service

Call Setup Success Rate: Airtel, MTNL, RJIL and VIL have 99.49%, 43.81%, 99.88% and 99.00% call setup success rate respectively.

Call Setup Time: MTNL has taken longer time (5.40 second) to establish the voice call, whereas Airtel, RJIL and VIL call setup time is 1.30, 0.58 & 1.01 seconds respectively in Auto-selection mode (5G/4G/3G/2G).

Call Drop Rate: MTNL's overall call drop rate (21.41%) is higher (QoS benchmark of 2%), while Airtel, RJIL and VIL have drop call rate of 0.00%, 0.25% and 0.13% respectively in Auto-selection mode (5G/4G/3G/2G).

Call Silence/Mute Rate: In packet switched network (4G/5G) Airtel, RJIL and VIL have 0.98%, 0.40% and 1.61% silence call rate respectively.

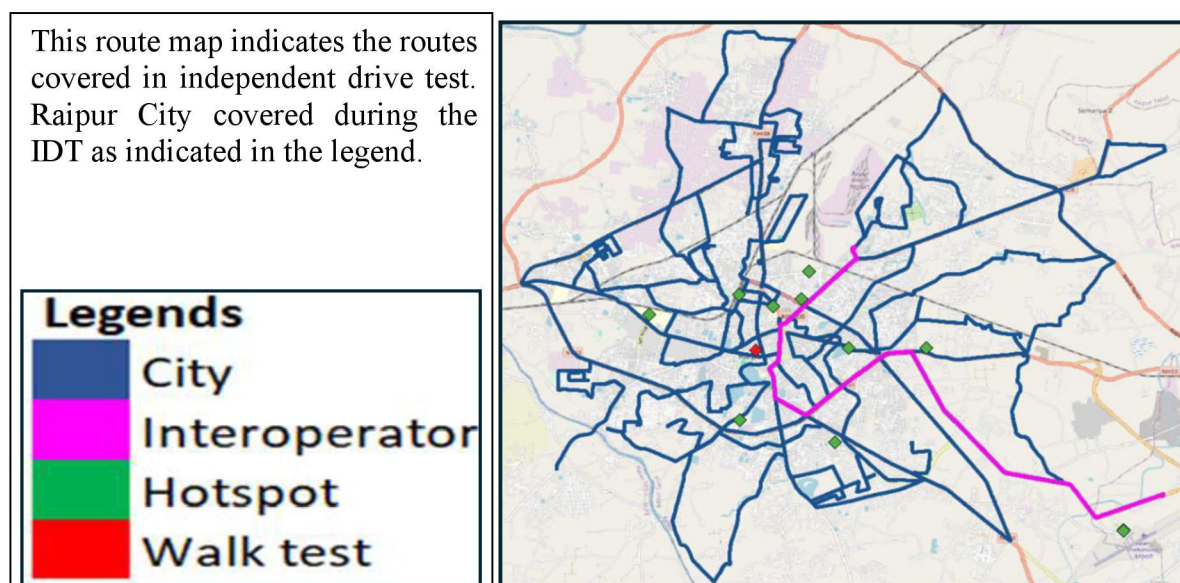
Mean Opinion Score (MOS): Quality of speech of VIL (4.42) having MOS score > 4, whereas Airtel (3.95), MTNL (2.56) and RJIL (3.91) have relatively lower MOS score.

Summary-Data Service

Data Download performance (Dynamic): MTNL (0.54 Mbps) and VIL (41.21 Mbps), operating on 4G/3G technologies, have comparatively lower average download speeds. Whereas, Airtel and RJIL achieved significantly higher average download speeds of 161.89 Mbps and 319.93 Mbps in 4G/5G technology.

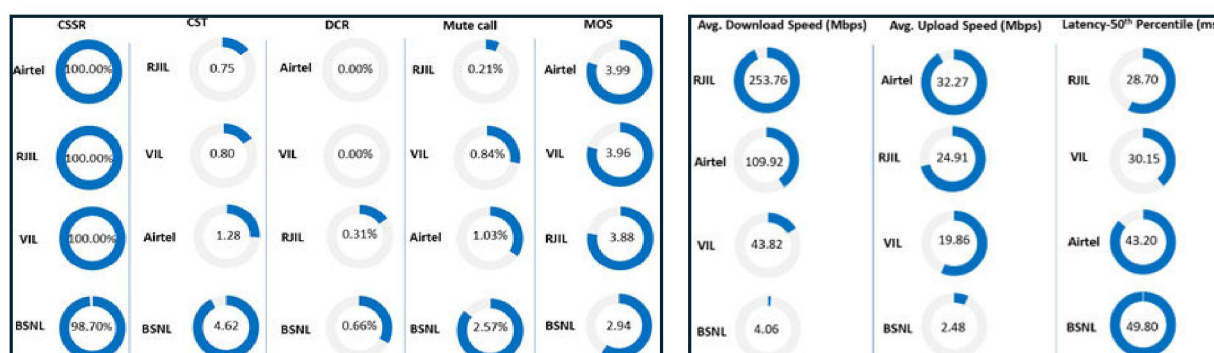
Data Upload performance (Dynamic): MTNL (0.46 Mbps) and VIL (11.17 Mbps) being on 3G & 4G as top technology respectively, have comparatively lower average upload speeds. While Airtel and RJIL have average upload speed of 29.58 Mbps and 43.94 Mbps respectively in 4G/5G technology.

1. Drive test route Map: (Raipur City- Madhya Pradesh LSA)



2. Performance against key QoS parameters:

CSSR: Call setup success rate(in %), CST: Call setup time (in milli seconds), DCR: Drop call rate(in %) & MOS: Mean Opinion Score



Summary-Voice Service

Call Setup Success Rate: Airtel, BSNL, RJIL and VIL have 100.00%, 98.70%, 100.00% and 100.00% call setup success rate respectively.

Call Setup Time: BSNL has taken comparatively longer time (4.62 second) to establish the voice call, whereas Airtel, RJIL and VIL call setup time is 1.28, 0.75 & 0.80 seconds respectively in Auto-selection mode (5G/4G/3G/2G).

Call Drop Rate: Airtel, BSNL, RJIL and VIL have drop call rate of 0.00%, 0.66%, 0.31% and 0.00% respectively in Auto-selection mode (5G/4G/3G/2G).

Call Silence/Mute Rate: In packet switched network (4G/5G), Airtel, BSNL, RJIL and VIL have silence call rate of 1.03%, 2.57%, 0.21 and 0.84% respectively.

Mean Opinion Score (MOS): Quality of speech of Airtel (3.99), BSNL (2.94), RJIL (3.88) and VIL (3.96) is <4.

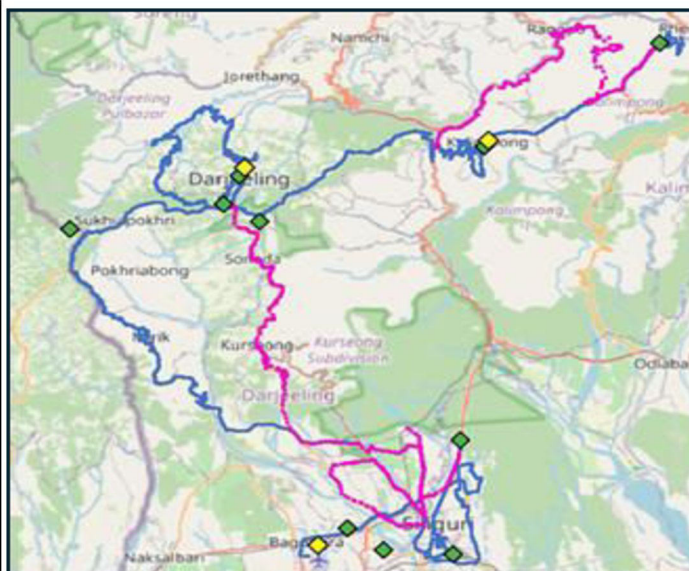
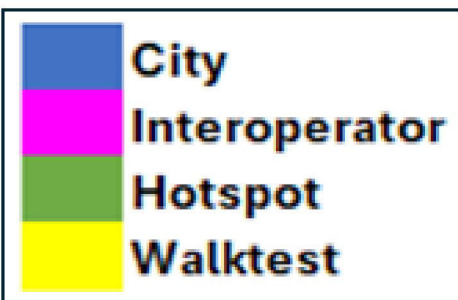
Summary-Data Service

Data Download performance (Dynamic): BSNL (4.06 Mbps) and VIL (43.82 Mbps) operating on 4G/3G technologies, have comparatively lower average download speed. Whereas, Airtel and RJIL have average download speed of 109.92 Mbps and 253.76 Mbps respectively in 4G/5G technology.

Data Upload performance (Dynamic): BSNL (2.48 Mbps) and VIL (19.86 Mbps) operating on 4G/3G technologies, have comparatively lower average upload speed. Whereas, Airtel and RJIL have average upload speed of 32.27 Mbps and 24.91 Mbps respectively in 4G/5G.

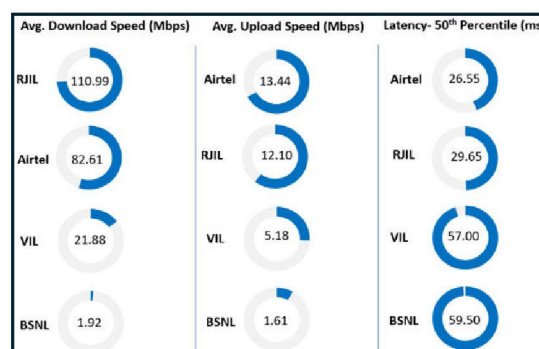
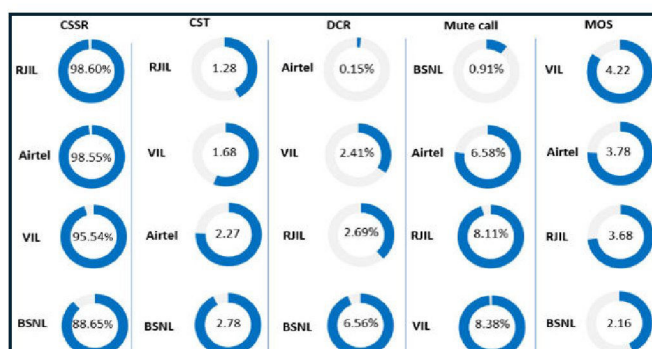
1. Drive test route Map: (Siliguri City, Darjeeling & Kalimpong Districts- West Bengal LSA)

This route map indicates the route covered in independent drive test. Siliguri city, Darjeeling & Kalimpong Districts covered during the IDT as indicated in the legend.



2. Performance against key QoS parameters:

CSSR: Call setup success rate(in %), CST: Call setup time (in milli seconds), DCR: Drop call rate(in %) & MOS: Mean Opinion Score



Summary-Voice Service

Call Setup Success Rate: Airtel, BSNL, RJIL and VIL have 98.55%, 88.65%, 98.60% and 95.54% call setup success rate respectively.

Call Setup Time: BSNL has taken comparatively longer time (2.78 second) to establish the voice call, whereas Airtel, RJIL and VIL call setup time is 2.27, 1.28 & 1.68 seconds respectively in Auto-selection mode (5G/4G/3G/2G).

Call Drop Rate: BSNL, RJIL, VIL call drop rate of 6.56%, 2.69% and 2.41% is higher (QoS benchmark of 2%), while Airtel has drop call rate of 0.15% in Auto-selection mode (5G/4G/3G/2G).

Call Silence/Mute Rate: In packet switched network (4G/5G), Airtel, BSNL, RJIL and VIL have silence call rate of 6.58%, 0.91%, 8.11% and 8.38% respectively.

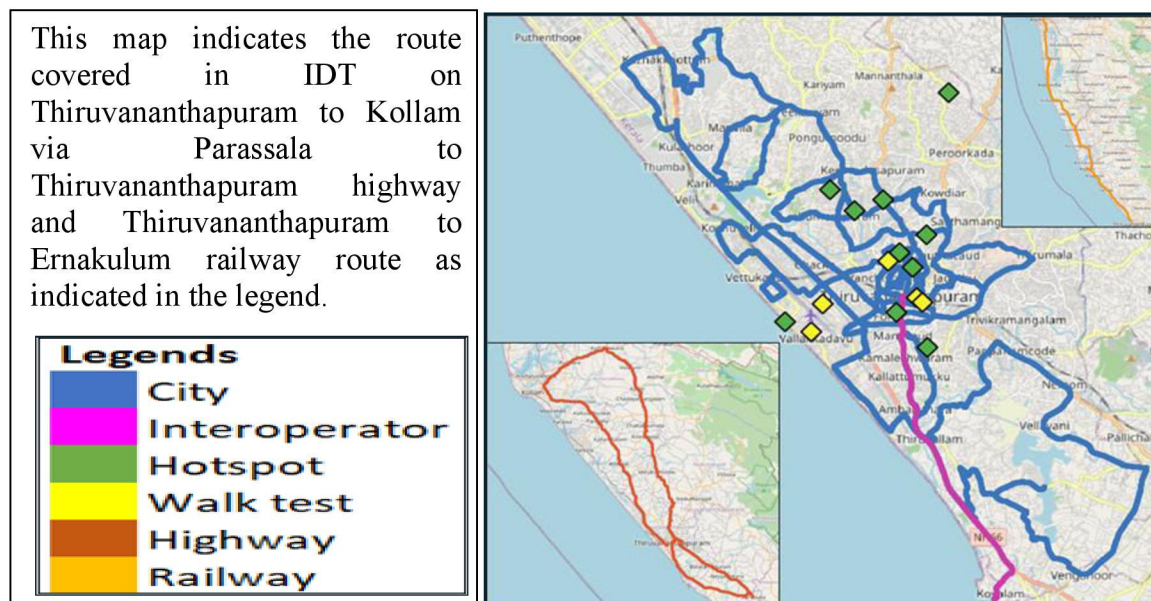
Mean Opinion Score (MOS): Quality of speech of VIL (4.22) is having a MOS score > 4, whereas Airtel (3.78), BSNL (2.16) and RJIL (3.68) have MOS score <4.

Summary-Data Service

Data Download performance (Dynamic): BSNL (1.92 Mbps) and VIL (21.88 Mbps) operating on 4G/3G technologies, have comparatively lower average download speed. While Airtel and RJIL have average download data speed of 82.61 Mbps and 110.99 Mbps respectively in 4G/5G technology.

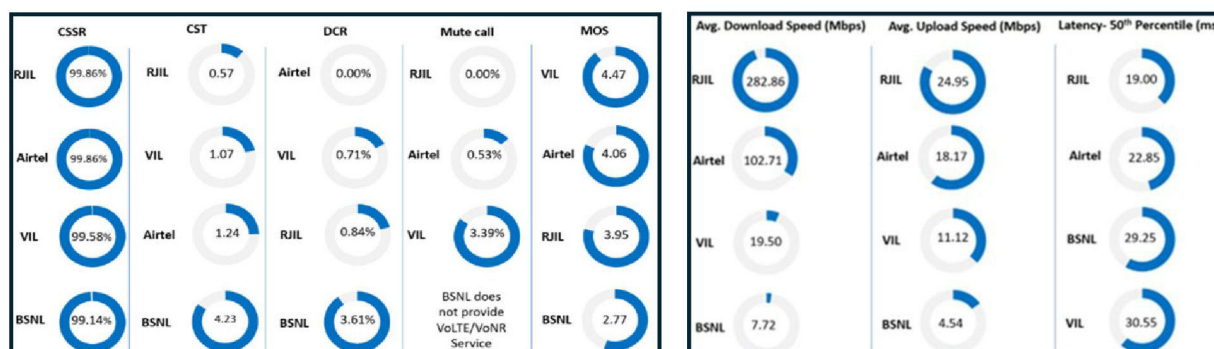
Data Upload performance (Dynamic): BSNL (1.61 Mbps) and VIL (5.18 Mbps) operating on 4G/3G technologies, have comparatively lower average upload speed. While Airtel and RJIL have average upload speed of 13.44 Mbps and 12.10 Mbps respectively in 4G/5G technology.

1. Drive test route Map: (Thiruvananthapuram City, Thiruvananthapuram to Kollam via Parassala and Kottarakkara & Kollam to Thiruvananthapuram Highway and Thiruvananthapuram to Ernakulum Rail Route – Kerala LSA)



2. Performance against key QoS parameters:

CSSR: Call setup success rate (in %), CST: Call setup time (in milli seconds), DCR: Drop call rate (in %) & MOS: Mean Opinion Score



Summary-Voice Service

Call Setup Success Rate: Airtel, BSNL, RJIL and VIL have 99.86%, 99.14%, 99.86% and 99.58% call setup success rate respectively.

Call Setup Time: BSNL has taken comparatively longer time (4.23 seconds) to establish the voice call, whereas Airtel, RJIL and VIL call setup time is 1.24, 0.57 and 1.07 second respectively in open mode (5G/4G/3G/2G).

Call Drop Rate: BSNL's overall call drop rate (3.61%) is higher (QoS benchmark of 2%), while Airtel, RJIL and VIL have call drop rate of 0.00%, 0.84 and 0.71% respectively.

Call Silence/Mute Rate: In packet switched network (4G/5G) Airtel, RJIL and VIL have silence call rate of 0.53%, 0.00 and 3.39% respectively.

Mean Opinion Score (MOS): Quality of speech of VIL (4.47) and Airtel (4.06) are having MOS score >4, whereas BSNL (2.77) and RJIL (3.95) are having a MOS score <4.

Summary-Data Service

Data Download performance (Dynamic): BSNL (7.72 Mbps) and VIL (19.50 Mbps) operating on 4G/3G technologies, have comparatively lower average download speed. While Airtel and RJIL have average download data speed of 102.71 Mbps and 282.86 Mbps in 4G/5G technology.

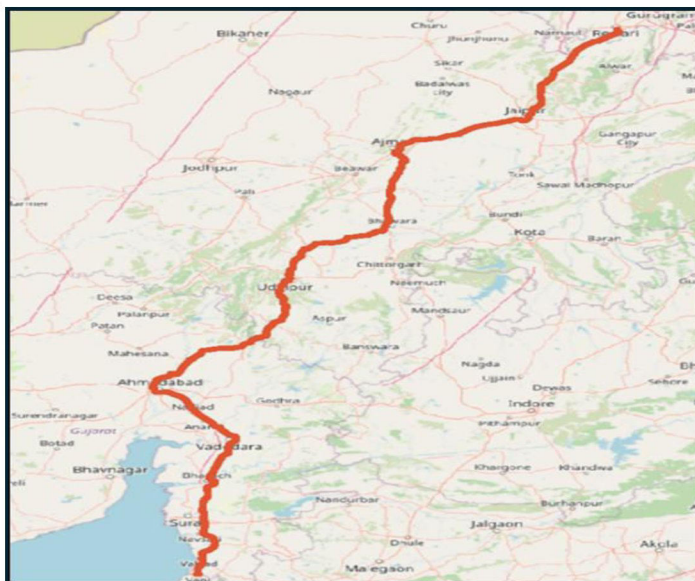
Data Upload performance (Dynamic): BSNL (4.54 Mbps) and VIL (11.12 Mbps) operating on 4G/3G technologies, have comparatively lower average upload speed. While Airtel and RJIL have average upload speed of 18.17 Mbps and 24.95 Mbps respectively in 4G/5G technology.

1. Drive test route Map: (Vapi to Rewari National Highways – Gujarat, Rajasthan & Haryana LSA)

This route map indicates the route covered in independent drive test. Vapi to Rewari inter-state National Highways, part of Golden Quadrilateral highways covered during the IDT as indicated in the legend.

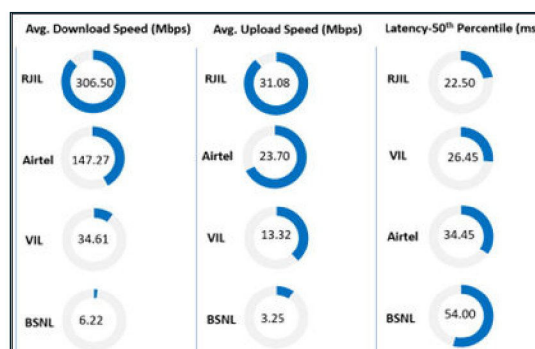
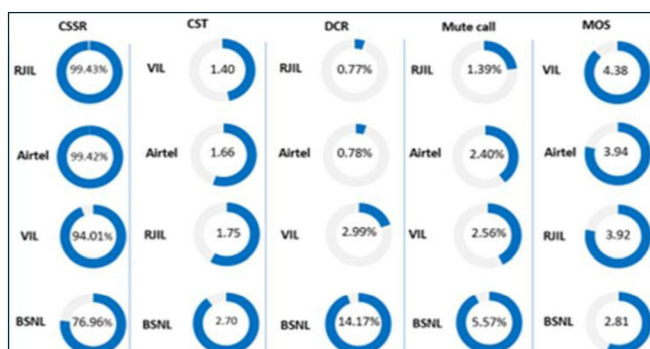
Legends

 Highway



2. Performance against key QoS parameters:

CSSR: Call setup success rate (in %), CST: Call setup time (in milli seconds), DCR: Drop call rate (in %) & MOS: Mean Opinion Score



Summary-Voice Service

Call Setup Success Rate: Airtel, BSNL, RJIL and VIL have call setup success rate of 99.42%, 76.96%, 99.43% and 94.01% respectively.

Call Setup Time: BSNL has taken comparatively longer time (2.70 seconds) to establish the voice call, whereas Airtel, RJIL and VIL call setup time is 1.66, 1.75 and 1.40 second respectively in open mode (5G/4G/3G/2G).

Call Drop Rate: BSNL (14.17%) and VIL (2.99%) have higher call drop rate (QoS benchmark of 2%), while Airtel and RJIL have call drop rate of 0.78% and 0.77% respectively.

Call Silence/Mute Rate: In packet switched network (4G/5G) Airtel, BSNL, RJIL and VIL have 2.40%, 5.57%, 1.39%, and 2.56% silence call rate respectively.

Mean Opinion Score (MOS): Quality of speech of VIL (4.38) is having a MOS score >4, whereas Airtel (3.94), BSNL (2.81) and RJIL (3.92) are having MOS score <4.

Summary-Data Service

Data Download performance (Dynamic): BSNL (6.22 Mbps) and VIL (34.61 Mbps) operating on 4G/3G technologies have comparatively lower average download speed. Whereas, Airtel and RJIL have average download data speed of 147.27 Mbps and 306.50 Mbps in 4G/5G technology.

Data Upload performance (Dynamic): BSNL (3.25 Mbps) and VIL (13.32 Mbps) operating on 4G/3G technologies have comparatively lower upload speeds. Whereas Airtel and RJIL have average upload data speeds of 23.70 Mbps and 31.08 Mbps respectively in 4G/5G technology.