

For Immediate Release

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Telecom Regulatory Authority of India

TRAI Releases Report on Independent Drive Tests conducted in six cities viz. Bhubaneswar, Chandigarh, Itanagar & Phasighat, Kalyan, Pune, Surat

New Delhi, 14 October, 2019: TRAI, through its agency, conducted Independent Drive Tests (IDT) in six cities viz. Bhubaneswar, Chandigarh, Itanagar & Phasighat, Kalyan, Pune, Surat. Drive tests were conducted to assess the network quality provided by cellular mobile telephone service providers for voice and data services. The details of drive tests conducted are given below: -

Cities


S. No	City	Licensed Service Area	Period of Conducting IDT	Summary of Results of IDT
1)	Bhubaneswar	Orissa	22 nd to 26 th April 2019	Annexure-A
2)	Chandigarh	Punjab	22 nd to 26 th April 2019	Annexure-B
3)	Itanagar & Phasighat	NE	29 th April to 1 st May 2019	Annexure-C
4)	Kalyan	MH	18 th to 23 rd March 2019	Annexure-D
5)	Pune	MH	20 th February to 2 nd March 2019	Annexure-E
6)	Surat	Gujarat	8 th to 12 th April 2019	Annexure-F

2. The Key Performance Indicators (KPIs) were assessed for the networks of all telecom service providers operating in the region. KPIs for voice services are Coverage; Call Setup Success Rate (CSSR); Drop Call Rate; Block Call Rate, Handover Success Rate; Rx Quality. KPIs for data services are Download and Upload Throughputs, Web Browsing Delay, Video Streaming Delay and Latency. The complete report is available at TRAI website www.analytics.trai.gov.in

3. The key findings of Drive test are summarized below:

- (i) Bhubaneswar City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate and $\geq 95\%$ of CSSR. Maximum throughput has been observed in 3G & 4G network of VIL(Vodafone) & Airtel respectively.

- (ii) Chandigarh City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate and $\geq 95\%$ of CSSR. Maximum throughput has been observed in 3G & 4G network of BSNL & Airtel respectively.
- (iii) Itanagar & Phasighat City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate except BSNL 3G & VIL(Vodafone) 3G. All the TSPs have met the $\geq 95\%$ of CSSR. Maximum throughput has been observed in 3G & 4G network of Airtel & RJio respectively.
- (iv) Kalyan City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate except MTNL 2G, VIL(Idea) 2G, & MTNL 3G. All the TSPs have met the $\geq 95\%$ of CSSR except VIL(Idea) 2G. Maximum throughput has been observed in 3G & 4G network of MTNL & Airtel respectively.
- (v) Pune City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate except BSNL 2G & BSNL 3G. All the TSPs have met the $\geq 95\%$ of CSSR except Airtel 2G & VIL(Idea) 2G. Maximum throughput has been observed in 3G & 4G network of VIL(Vodafone) & Airtel respectively.
- (vi) Surat City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate except BSNL 2G. All the TSPs have met the $\geq 95\%$ of CSSR. Maximum throughput has been observed in 3G & 4G network of BSNL & Airtel respectively.
4. The complete report is available at TRAI website www.analytics.trai.gov.in
In case of any clarification, please contact, Shri. Asit Kadayan, Advisor (QoS) at
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(S.K. Gupta)
Secretary

**Report on Independent Drive Test conducted in
Bhubaneswar from 22nd to 26th April 2019**

The drive test in the city of Bhubaneswar in Orissa LSA was conducted for a period of 5 days during 22nd to 26th April 2019. It covered a route of approximately 612 KMs and data tests conducted on 5 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, Tata, Vodafone Idea Ltd (VIL (Idea & Vodafone), and RJio. Tests included 2G, 3G and 4G technologies.

The summary of the Service Provider's performance on the key parameters based on Independent Drive Test is given here under: -

Voice Call	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Call Attempt	681	757	753	696	736
Blocked Call Rate (%)	0.29%	0.40%	0.27%	0.86%	0.82%
CSSR% (Accessibility)	99.71%	99.60%	99.73%	99.14%	99.18%
Drop Call Rate (%)	0.59%	0.93%	0.67%	1.01%	1.10%
Mobility HOSR (%)	98.23%	97.68%	98.35%	95.66%	95.00%
Rx Quality (%)	96.01%	98.11%	96.41%	94.52%	93.11%

Voice Call	3G			VoLTE		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Call Attempt	675	760	728	665	766	714
Blocked Call Rate (%)	2.07%	1.05%	0.69%	0.45%	1.31%	0.84%
CSSR% (Accessibility)	97.93%	98.95%	99.31%	99.55%	98.69%	99.16%
Drop Call Rate (%)	0.76%	1.46%	0.28%	0.00%	0.66%	0.71%
Mobility HOSR (%)	99.95%	98.25%	99.77%	99.70%	99.51%	99.78%
Rx Quality (%)	95.03%	97.88%	92.05%	78.81%	88.66%	79.71%

Data Services Static	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Download Throughput (kbps)	76.94	107.31	70.62	89.52	66.63
Upload Throughput (kbps)	100.38	108.05	85.38	124.8	67.12
Web Browsing Delay (sec)	31.53	44.28	52.75	27.64	31.82
Latency(msec)	612	253	653	536	357

Data Services Static	3G			4G			
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL	
						Idea	Vodafone
Download Throughput (Mbps)	0.08	1.49	2.20	9.62	3.25	7.67	0.95
Upload Throughput (Mbps)	0.09	1.30	1.77	1.45	3.32	5.94	3.24
Web Browsing Delay (sec)	21.08	12.00	15.44	8.71	12.68	11.80	12.96
Video Streaming Delay (sec)	8.70	4.19	2.89	2.15	1.76	1.25	9.74
Latency (sec)	101	173	133	66	131	188	90

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**Report on Independent Drive Test conducted in
Chandigarh from 22nd to 26th April 2019**

The drive test in the city of Chandigarh in Punjab LSA was conducted for a period of 5 days during 22nd to 26th April 2019. It covered a route of approximately 603 KMs and data tests conducted on 6 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, RJio and Vodafone Idea Ltd (VIL (Idea), and RJio. Tests included 2G, 3G and 4G technologies.

The summary of the Service Provider's performance on the key parameters based on Independent Drive Test is given here under: -

Voice Call	2G			
	Airtel	BSNL	Tata	VIL(Idea)
Call Attempt	883	837	853	836
Blocked Call Rate (%)	1.36%	0.12%	1.17%	2.63%
CSSR% (Accessibility)	98.64%	99.88%	98.83%	97.37%
Drop Call Rate (%)	1.15%	0.12%	1.19%	0.37%
Mobility HOSR (%)	97.25%	99.25%	96.86%	98.46%
Rx Quality (%)	92.50%	99.02%	91.75%	96.88%

Voice Call	3G				VoLTE		
	Airtel	BSNL	Tata	VIL(Idea)	Airtel	JIO	VIL(Idea)
Call Attempt	866	850	876	877	836	849	1066
Blocked Call Rate (%)	0.58%	0.71%	0.57%	2.62%	0.24%	0.24%	0.38%
CSSR% (Accessibility)	99.42%	99.29%	99.43%	97.38%	99.76%	99.76%	99.62%
Drop Call Rate (%)	0.93%	0.83%	1.15%	0.23%	1.08%	0.24%	1.69%
Mobility HOSR (%)	99.99%	99.11%	99.85%	99.84%	99.84%	99.74%	100.00%
Rx Quality (%)	94.72%	98.71%	93.35%	95.34%	79.89%	86.35%	80.26%



Data Services Static	2G			
	Airtel	BSNL	Tata	VIL(Idea)
Download Throughput (Kbps)	129.81	128.44	88.73	128.44
Upload Throughput(kbps)	120.97	124.06	105.02	124.06
Web Browsing Delay (sec)	37.87	31.41	39.20	31.41
Latency(msec)	236	232	242	232

Data Services Static	3G				4G		
	Airtel	BSNL	Tata	VIL(Idea)	Airtel	Jio	VIL(Idea)
Download Throughput (Mbps)	2.17	5.15	2.25	1.82	8.72	7.71	4.11
Upload Throughput (Mbps)	0.57	1.57	0.39	0.85	3.47	3.17	4.04
Web Browsing Delay (sec)	13.80	11.08	15.58	14.58	11.70	8.29	10.75
Video Streaming Delay (sec)	4.14	T0	4.34	1.99	6.90	3.65	1.48
Latency (msec)	115	99	148	138	56	112	121

**Report on Independent Drive Test conducted in
Itanagar & Phasihat from 29th April to 1st May 2019**

The drive test in the city of Itanagar & Phasihat in North East LSA was conducted for a period of 3 days during 29th April to 1st May 2019. It covered a route of approximately 241 KMs and data tests conducted on 5 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, Vodafone Idea Ltd (VIL (Vodafone)), and RJio. Tests included 2G, 3G and 4G technologies.

The summary of the Service Provider's performance on the key parameters based on Independent Drive Test is given here under: -

Voice Call	2G		
	Airtel	BSNL	VIL(Vodafone)
Call Attempt	421	428	401
Blocked Call Rate (%)	2.85%	1.40%	1.50%
CSSR% (Accessibility)	97.15%	98.60%	98.50%
Drop Call Rate (%)	0.98%	1.90%	1.27%
Mobility HOSR (%)	96.37%	92.78%	97.38%
Rx Quality (%)	90.56%	95.68%	93.51%

Voice Call	3G			VoLTE	
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio
Call Attempt	383	423	391	389	368
Blocked Call Rate (%)	2.61%	1.65%	1.53%	2.83%	0.27%
CSSR% (Accessibility)	97.39%	98.35%	98.47%	97.17%	99.73%
Drop Call Rate (%)	0.54%	6.01%	3.90%	1.59%	0.82%
Mobility HOSR (%)	99.42%	97.62%	99.21%	99.86%	99.34%
Rx Quality (%)	86.75%	93.82%	80.61%	73.17%	76.49%

Data Services Static	2G		
	Airtel	BSNL	VIL(Vodafone)
Download Throughput (Kbps)	135.54	110.02	64.83
Upload Throughput (kbps)	171.18	84.96	81.42
Web Browsing Delay (sec)	27.28	36.91	54.24
Latency (msec)	300	452	T0

Data Services Static	3G			4G		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Download Throughput (Mbps)	2.65	2.20	0.29	4.74	6.97	0.17
Upload Throughput (Mbps)	0.80	1.26	0.85	2.41	3.41	2.14
Web Browsing Delay (sec)	14.60	14.51	17.44	10.19	12.44	22.04
Video Streaming Delay (sec)	2.42	4.23	5.81	2.53	6.52	7.32
Latency (msec)	334	244	T0	157	118	172

**Report on Independent Drive Test conducted in
Kalyan from 18th to 23rd March 2019**

The drive test in the city of Kalyan in Maharashtra LSA was conducted for a period of 5 days on 18th to 23rd March 2019. It covered a route of approximately 470 KMs and data tests conducted on 6 hotspots. Cellular mobile telephone service providers included namely Airtel, MTNL, Tata, Vodafone Idea Ltd (VIL (Idea & Vodafone), and RJio. Tests included 2G, 3G and 4G technologies.

The summary of the Service Provider's performance on the key parameters based on Independent Drive Test is given here under: -

Voice Call	2G				
	Airtel	MTNL	Tata	VIL	
				Idea	Vodafone
Call Attempt	939	985	914	1153	959
Blocked Call Rate (%)	0.11%	2.03%	0.11%	17.52%	0.42%
CSSR% (Accessibility)	99.89%	97.97%	99.89%	82.48%	99.58%
Drop Call Rate (%)	0.75%	6.63%	0.22%	3.05%	0.42%
Mobility HOSR (%)	98.98%	78.88%	99.37%	96.68%	97.74%
Rx Quality (%)	98.55%	96.55%	98.50%	93.57%	97.47%

Voice Call	3G			VoLTE
	Airtel	MTNL	VIL(Vodafone)	Jio
Call Attempt	939	946	948	905
Blocked Call Rate (%)	0.32%	3.17%	1.37%	0.22%
CSSR% (Accessibility)	99.68%	96.83%	98.63%	99.78%
Drop Call Rate (%)	0.21%	4.15%	0.43%	0.00%
Mobility HOSR (%)	99.99%	92.18%	99.86%	99.79%
Rx Quality (%)	93.95%	96.14%	77.61%	87.14%



Data Services Static	2G				
	Airtel	MTNL	Tata	VIL	
				Idea	Vodafone
Download Throughput (kbps)	111.23	T0	115.71	135.4	88.2
Upload Throughput (kbps)	192.21	65.38	178.4	172.1	110.53
Web Browsing Delay (sec)	27.12	22.77	28.72	45.67	28.01
Latency(msec)	394	696	492	216	T0

Data Services Static	3G			4G			
	Airtel	MTNL	VIL(Vodafone)	Airtel	Jio	VIL	
						Idea	Vodafone
Download Throughput (Mbps)	0.59	3.23	1.40	10.62	3.75	3.22	4.50
Upload Throughput (Mbps)	0.33	0.56	1.20	1.72	3.22	3.23	3.18
Web Browsing Delay (sec)	18.15	14.91	17.70	8.75	11.08	10.78	12.20
Video Streaming Delay (sec)	7.59	2.92	1.33	2.22	3.38	2.10	2.91
Latency (sec)	67	125	T0	58	56	67	169

**Report on Independent Drive Test conducted in
Pune from 20th February to 2nd March 2019**

The drive test in the city of Pune in Maharashtra LSA was conducted for a period of 10 days during 20th February to 2nd March 2019. It covered a route of approximately 1004 KMs and data tests conducted on 13 hotspots. Cellular mobile telephone service providers included namely Airtel, MTNL, Tata, Vodafone Idea Ltd (VIL (Idea & Vodafone), and RJio. Tests included 2G, 3G and 4G technologies.

The summary of the Service Provider's performance on the key parameters based on Independent Drive Test is given here under: -

Voice Call	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Call Attempt	1872	1773	1716	1720	1853
Blocked Call Rate (%)	5.82%	0.68%	0.23%	1.22%	0.81%
CSSR% (Accessibility)	94.18%	99.32%	99.77%	98.78%	99.19%
Drop Call Rate (%)	1.08%	4.26%	0.70%	0.65%	1.90%
Mobility HOSR (%)	98.61%	95.19%	98.96%	97.71%	98.12%
Rx Quality (%)	96.83%	97.28%	96.54%	95.79%	96.82%

Voice Call	3G				VoLTE		
	Airtel	BSNL	Tata	VIL		Airtel	Jio
				Idea	Vodafone		
Call Attempt	1817	1759	1699	1931	1771	1586	1694
Blocked Call Rate (%)	3.41%	0.45%	1.06%	7.20%	0.79%	0.19%	0.47%
CSSR% (Accessibility)	96.59%	99.55%	98.94%	92.80%	99.21%	99.81%	99.53%
Drop Call Rate (%)	0.68%	3.94%	0.54%	1.28%	0.68%	0.76%	0.00%
Mobility HOSR (%)	99.90%	98.91%	99.92%	99.77%	99.89%	98.97%	99.52%
Rx Quality (%)	95.97%	94.38%	96.60%	78.83%	89.13%	84.62%	80.55%

Data Services Static	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Download Throughput (kbps)	99.24	133.1	87.46	110.08	97.68
Upload Throughput (kbps)	105.94	78.77	88.8	121.95	82.7
Web Browsing Delay (sec)	27.93	39.74	27.18	37.85	28.67
Latency(msec)	285	338	367	278	274

Data Services Static	3G					4G			
	Airtel	BSNL	Tata	VIL		Airtel	Jio	VIL	
				Idea	Vodafone			Idea	Vodafone
Download Throughput (Mbps)	3.47	2.73	2.05	1.69	6.94	9.26	4.07	3.28	6.92
Upload Throughput (Mbps)	0.51	1.20	0.53	0.83	2.62	4.50	1.81	3.28	2.65
Web Browsing Delay (sec)	10.80	12.35	13.04	12.41	9.30	8.03	10.46	10.62	9.05
Video Streaming Delay (sec)	3.17	5.03	3.98	6.10	2.49	1.75	3.50	2.98	2.32
Latency (sec)	93	80	118	171	56	78	95	96	56

**Report on Independent Drive Test conducted in
Surat from 8th to 12th April 2019**

The drive test in the city of Surat in Gujarat LSA was conducted for a period of 5 days during 8th to 12th April 2019. It covered a route of approximately 608 KMs and data tests conducted on 6 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, Tata, Vodafone Idea Ltd (VIL (Idea & Vodafone), and RJio. Tests included 2G, 3G and 4G technologies.

The summary of the Service Provider's performance on the key parameters based on Independent Drive Test is given here under: -

Voice Call	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Call Attempt	979	1008	940	985	972
Blocked Call Rate (%)	0.00%	1.59%	0.00%	0.41%	0.51%
CSSR% (Accessibility)	100.00%	98.41%	100.00%	99.59%	99.49%
Drop Call Rate (%)	0.72%	3.33%	1.28%	0.31%	0.31%
Mobility HOSR (%)	98.68%	92.79%	98.81%	97.60%	96.91%
Rx Quality (%)	94.96%	98.76%	96.18%	97.23%	96.96%

Voice Call	3G					VoLTE		
	Airtel	BSNL	Tata	VIL		Airtel	Jio	VIL
				Idea	Vodafone			Vodafone
Call Attempt	965	991	940	964	969	902	902	898
Blocked Call Rate (%)	0.52%	0.20%	0.32%	0.93%	0.93%	0.11%	0.33%	0.22%
CSSR% (Accessibility)	99.48%	99.80%	99.68%	99.07%	99.07%	99.89%	99.67%	99.78%
Drop Call Rate (%)	0.42%	0.10%	0.53%	0.31%	0.00%	0.33%	0.00%	0.78%
Mobility HOSR (%)	99.94%	99.88%	99.97%	99.57%	99.74%	99.92%	99.72%	99.89%
Rx Quality (%)	93.82%	98.43%	96.18%	90.34%	90.63%	87.43%	86.47%	82.44%

Data Services Static	2G								
	Airtel	BSNL	Tata	VIL					
				Idea	Vodafone				
Download Throughput (kbps)	81.92	87.03	111.41	118.1	100.51				
Upload Throughput (kbps)	90.11	59.72	100.8	123.4	105.72				
Web Browsing Delay (sec)	31.19	31.47	30.31	43.83	42.81				
Latency(msec)	293	268	330	207	183				
Data Services Static	3G					4G			
	Airtel	BSNL	Tata	VIL		Airtel	Jio	VIL	
				Idea	Vodafone			Idea	Vodafone
Download Throughput (Mbps)	0.93	1.98	1.22	2.95	2.34	8.28	4.84	4.19	4.21
Upload Throughput (Mbps)	0.36	1.39	0.51	1.79	1.77	2.94	3.02	3.95	7.67
Web Browsing Delay (sec)	14.46	10.34	12.06	11.29	13.53	7.14	9.48	7.95	10.12
Video Streaming Delay (sec)	6.34	2.34	3.74	2.16	1.38	1.55	4.51	1.85	2.52
Latency (sec)	93	51	93.00	238	178	74	81	58	43

Definitions

Call Attempt: An attempt to achieve a connection to device attached to a telecommunication network.

Block Call $\leq 3\%$: A call that is not connected because there is no free channel in radio access network to serve a call attempt.

CSSR (Call Setup Success Rate) $\geq 95\%$: Ratio of Established Calls to Call Attempts.

Drop Call Rate $\leq 2\%$: An ability to maintain a call once it has been correctly established.

Hand over Success Rate (HOSR) $\geq 95\%$: Ratio between successful handovers to handover requested. (Handover is a process by which a mobile telephone call is transferred from one base station to another as the subscriber passes the boundary of a cell).

Rx Quality $> 95\%$: Measure of quality of voice.

Download Throughput: Data transmission rate for downloading a test file from a test server to a test device.

Upload Throughput: Data transmission rate for uploading a test file from a test device to test server.

Web browsing delay (secs): Average time taken to fully load the website tested.

Video Steaming delay (secs): Average time taken to fully download the video tested.

Latency (m secs): Time taken for a packet to reach the receiving endpoint after transmitted from the sending point.

Time Out (TO): Observation cannot be taken due to Time out.

