

**For Immediate Release**

**Information note to the Press (Press Release No 68/2019)**

**Telecom Regulatory Authority of India**

**TRAI Releases Report on Independent Drive Tests conducted in six cities viz. Aizawl, Bhopal, Chennai, Pondicherry, Shillong & Trivandrum.**

**New Delhi, 28<sup>th</sup> August 2019:** TRAI, through its agency, conducted Independent Drive Tests (IDT) in six cities viz. Aizawl, Bhopal, Chennai, Pondicherry, Shillong & Trivandrum 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**

<b>S. No</b>	<b>City</b>	<b>Licensed Service Area (LSA)</b>	<b>Period of Conducting IDT</b>	<b>Summary of Results of IDT</b>
1)	Aizawl	NE	6 <sup>th</sup> to 8 <sup>th</sup> March 2019	Annexure-A
2)	Bhopal	MP	3 <sup>rd</sup> to 6 <sup>th</sup> June 2019	Annexure-B
3)	Chennai	Tamil Nadu	17 <sup>th</sup> December 2018 to 2 <sup>nd</sup> January 2019	Annexure-C
4)	Pondicherry	Tamil Nadu	24 <sup>th</sup> to 26 <sup>th</sup> June 2019	Annexure-D
5)	Shillong	NE	6 <sup>th</sup> to 8 <sup>th</sup> February 2019	Annexure-E
6)	Trivandrum	Kerala	1 <sup>st</sup> to 5 <sup>th</sup> January 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](http://www.analytics.trai.gov.in)
3. The key findings of Drive test are summarized below:
  - (i) Aizawl City: All the TSPs have failed to meet the  $\leq 2\%$  of Drop Call Rate. All the TSPs have met the  $\approx 95\%$  of CSSR. Maximum throughput has been observed in 3G & 4G network of BSNL & Airtel respectively



- (ii) Bhopal 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.
- (iii) Chennai 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).
- (iv) Pondicherry City: All the TSPs have met the  $\leq 2\%$  of Drop Call Rate. All the TSPs have met the  $\geq 95\%$  of CSSR except Tata 2G. Maximum throughput has been observed in 3G & 4G network of Airtel.
- (v) Shillong City: All the TSPs have failed to meet the  $\leq 2\%$  of Drop Call Rate. All the TSPs have met the  $\geq 95\%$  of CSSR except Airtel 3G. Maximum throughput has been observed in 3G & 4G network of Airtel.
- (vi) Trivandrum 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) & Jio respectively.
4. The complete report is available at TRAI website [www.analytics.trai.gov.in](http://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  
Aizawl from 6<sup>th</sup> to 8<sup>th</sup> March 2019**

The drive test in the city of Aizawl in North East LSA was conducted for a period of 3 days during 6<sup>th</sup> to 8<sup>th</sup> March 2019. It covered a route of approximately 255 KMs and data tests conducted on 4 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, 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	VIL(Idea)	VIL(Vodafone)
Call Attempt	504	506	413	439
Blocked Call Rate (%)	2.18%	1.38%	0.48%	0.23%
CSSR% (Accessibility)	97.82%	98.62%	99.52%	99.77%
Drop Call Rate (%)	3.25%	7.01%	6.08%	8.22%
Mobility HOSR (%)	91.96%	85.95%	96.21%	94.77%
Rx Quality (%)	87.95%	91.77%	90.84%	89.72%

Voice Call	3G				VoLTE	
	Airtel	BSNL	VIL(Idea)	VIL(Vodafone)	Airtel	Jio
Call Attempt	464	501	400	400	436	455
Blocked Call Rate (%)	4.09%	2.00%	1.75%	4.75%	3.21%	1.10%
CSSR% (Accessibility)	95.91%	98.00%	98.25%	95.25%	96.79%	98.90%
Drop Call Rate (%)	2.92%	6.52%	6.36%	3.15%	2.84%	2.89%
Mobility HOSR (%)	99.28%	92.38%	99.86%	98.82%	99.90%	99.00%
Rx Quality (%)	82.94%	92.03%	69.96%	74.44%	36.43%	73.89%



Data Services	2G			
	Airtel	BSNL	VIL(Idea)	VIL(Vodafone)
Download Throughput (Kbps)	23.68	134.84	117.31	88.87
Upload Throughput (kbps)	23.25	111.69	106.39	122.96
Web Browsing Delay (sec)	47.43	44.60	32.07	31.83
Latency (msec)	467	766	373	391

Data Services	3G				4G			
	Airtel	BSNL	VIL(Idea)	VIL(Vodafone)	Airtel	Jio	VIL(Idea)	VIL(Vodafone)
Download Throughput (Mbps)	1.27	2.81	0.12	0.18	6.69	6.29	1.11	1.23
Upload Throughput (Mbps)	0.49	1.37	1.35	1.34	2.63	5.71	3.72	5.81
Web Browsing Delay (sec)	16.11	14.76	19.72	17.42	11.62	11.53	13.99	14.23
Video Streaming Delay (sec)	5.47	2.96	2.47	2.01	4.69	4.03	2.85	3.42
Latency (msec)	326	292	191	133	146	137	163	113

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**Report on Independent Drive Test conducted in  
Bhopal from 3<sup>rd</sup> to 6<sup>th</sup> June 2019**

The drive test in the city of Bhopal in Madhya Pradesh LSA was conducted for a period of 3 days during 3<sup>rd</sup> to 6<sup>th</sup> June 2019. It covered a route of approximately 302 KMs and data tests conducted on 4 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	411	420	415	422	419
Blocked Call Rate (%)	0.00%	2.14%	0.72%	0.00%	1.67%
CSSR% (Accessibility)	100.00%	97.86%	99.28%	100.00%	98.33%
Drop Call Rate (%)	1.46%	0.49%	1.70%	0.24%	0.97%
Mobility HOSR (%)	97.62%	96.42%	98.35%	99.03%	98.14%
Rx Quality (%)	97.35%	99.17%	97.21%	98.10%	98.50%

Voice Call	3G					VoLTE		
	Airtel	BSNL	Tata	VIL		Airtel	Jio	VIL(Vodafone)
				Idea	Vodafone			
Call Attempt	409	408	395	429	414	396	430	378
Blocked Call Rate (%)	0.49%	2.21%	0.25%	1.63%	1.93%	0.51%	0.00%	0.00%
CSSR% (Accessibility)	99.51%	97.79%	99.75%	98.37%	98.07%	99.49%	100.00%	100.00%
Drop Call Rate (%)	0.49%	1.25%	0.51%	0.71%	0.74%	0.51%	0.23%	0.79%
Mobility HOSR (%)	99.91%	99.97%	99.97%	99.49%	99.51%	99.80%	99.77%	99.84%
Rx Quality (%)	96.40%	98.17%	98.40%	93.81%	91.86%	80.64%	90.04%	73.63%

Data Services Static	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Download Throughput (Kbps)	76.36	159.02	102.22	143.41	139.47
Upload Throughput (kbps)	90.90	108.94	76.75	149.42	129.59
Web Browsing Delay (sec)	20.58	41.59	51.52	42.57	27.41
Latency (msec)	573	227	674	221	264

Data Services Static	3G					4G			
	Airtel	BSNL	Tata	VIL		Airtel	Jio	VIL	
				Idea	Vodafone			Idea	Vodafone
Download Throughput (Mbps)	2.72	2.65	1.52	2.30	2.89	5.85	3.13	2.77	5.51
Upload Throughput (Mbps)	0.49	1.14	0.42	0.98	1.00	3.78	1.95	4.54	7.39
Web Browsing Delay (sec)	11.57	11.01	15.33	12.85	12.43	9.02	10.17	8.74	8.20
Video Streaming Delay (sec)	4.03	3.37	6.13	2.31	2.14	1.20	4.05	2.32	1.80
Latency (msec)	95	81	138	279	TO	106	78	69	TO



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**Report on Independent Drive Test conducted in  
Chennai from 17<sup>th</sup> December 2018 to 2<sup>nd</sup> January 2019**

The drive test in the city of Chennai in Tamil Nady LSA was conducted for a period of 12 days during 17<sup>th</sup> December 2018 to 2<sup>nd</sup> January 2019. It covered a route of approximately 1450 KMs and data tests conducted on 10 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)	VIL(Vodafone)
Call Attempt	2567	2410	2374	2556	2615
Blocked Call Rate (%)	0.19%	0.21%	0.51%	0.08%	0.38%
CSSR% (Accessibility)	99.81%	99.79%	99.49%	99.92%	99.62%
Drop Call Rate (%)	0.39%	1.46%	0.30%	0.08%	0.35%
Mobility HOSR (%)	98.47%	97.76%	98.10%	99.02%	98.36%
Rx Quality (%)	98.06%	98.47%	97.86%	98.86%	98.65%

Voice Call	3G					VoLTE	
	Airtel	BSNL	Tata	VIL(Idea)	VIL(Vodafone)	Airtel	Jio
Call Attempt	2480	2505	2364	2307	2439	710	2592
Blocked Call Rate (%)	0.48%	0.96%	4.31%	1.21%	0.70%	3.66%	0.00%
CSSR% (Accessibility)	99.52%	99.04%	95.69%	98.79%	99.30%	96.34%	100.00%
Drop Call Rate (%)	0.12%	1.21%	0.04%	0.18%	0.50%	0.44%	0.12%
Mobility HOSR (%)	99.97%	99.84%	99.97%	98.97%	99.88%	98.66%	99.76%
Rx Quality (%)	96.15%	98.13%	96.72%	96.35%	91.94%	70.87%	91.93%

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Data Services	2G				
	Airtel	BSNL	Tata	VIL(Idea)	VIL(Vodafone)
Download Throughput (Kbps)	146.95	117.10	111.13	138.98	120.58
Upload Throughput (Kbps)	137.31	101.50	142.04	123.90	135.52
Web Browsing Delay (sec)	27.53	28.60	26.30	27.26	26.55
Latency (msec)	259	238	395	428	249

Data Services	3G					4G			
	Airtel	BSNL	Tata	VIL(Idea)	VIL(Vodafone)	Airtel	Jio	VIL(Idea)	VIL(Vodafone)
Download Throughput (Mbps)	3.62	3.77	1.88	1.88	4.11	7.55	6.47	3.14	9.89
Upload Throughput (Mbps)	0.46	1.32	1.26	1.26	1.55	2.45	3.08	3.82	8.61
Web Browsing Delay (sec)	13.70	9.87	13.43	13.43	12.22	7.87	8.88	10.42	9.35
Video Streaming Delay (sec)	4.55	2.43	2.69	2.69	2.31	1.69	4.61	2.25	2.73
Latency (msec)	114	63	91	91	93	49	69	90	62



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**Report on Independent Drive Test conducted in  
Pondicherry from 24<sup>th</sup> to 26<sup>th</sup> June 2018**

The drive test in the city of Pondicherry in Tamil Nadu LSA was conducted for a period of 3 days on 24<sup>th</sup> to 26<sup>th</sup> June 2019. It covered a route of approximately 278 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	393	385	436	359	396
Blocked Call Rate (%)	0.51%	0.00%	15.83%	0.56%	1.01%
CSSR% (Accessibility)	99.49%	100.00%	84.17%	99.44%	98.99%
Drop Call Rate (%)	0.00%	0.78%	0.00%	0.00%	0.51%
Mobility HOSR (%)	99.29%	99.80%	99.48%	99.76%	98.21%
Rx Quality (%)	98.69%	98.64%	98.86%	98.86%	98.45%

Voice Call	3G				VoLTE	
	Airtel	BSNL	VIL		Airtel	Jio
			Idea	Vodafone		
Call Attempt	386	385	351	395	363	358
Blocked Call Rate (%)	0.52%	0.00%	0.57%	1.01%	0.00%	0.56%
CSSR% (Accessibility)	99.48%	100.00%	99.43%	98.99%	100.00%	99.44%
Drop Call Rate (%)	0.00%	0.26%	0.29%	1.02%	0.00%	0.28%
Mobility HOSR (%)	100.00%	100.00%	100.00%	99.92%	100.00%	99.65%
Rx Quality (%)	96.82%	97.92%	95.60%	91.68%	85.90%	88.15%

Data Services Static	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Download Throughput (Kbps)	150.33	95.61	145.04	121.18	123.95
Upload Throughput (kbps)	64.19	42.35	65.59	49.51	52.08
Web Browsing Delay (sec)	17.39	11.45	18.64	15.92	16.24
Latency (msec)	242	270	223	289	317

Data Services Static	3G				4G			
	Airtel	BSNL	VIL		Airtel	Jio	VIL	
			Idea	Vodafone			Idea	Vodafone
Download Throughput (Mbps)	5.16	0.41	0.26	0.46	14.74	6.02	2.85	7.80
Upload Throughput (Mbps)	1.62	0.81	1.18	1.45	5.86	2.05	5.10	5.11
Web Browsing Delay (sec)	7.52	12.29	18.81	12.38	5.69	7.22	10.32	6.77
Video Streaming Delay (sec)	3.81	10.85	2.43	1.41	0.84	2.41	2.93	2.44
Latency (msec)	66	81	132	82	31	61	72	63



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**Report on Independent Drive Test conducted in  
Shillong from 6<sup>th</sup> to 8<sup>th</sup> February 2019**

The drive test in the city of Shillong in North East LSA was conducted for a period of 3 days during 6<sup>th</sup> to 8<sup>th</sup> February 2019. It covered a route of approximately 255 KMs and data tests conducted on 6 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, 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	VIL(Idea)	VIL(Vodafone)
Call Attempt	417	424	386	415
Blocked Call Rate (%)	2.88%	1.89%	1.30%	1.45%
CSSR% (Accessibility)	97.12%	98.11%	98.70%	98.55%
Drop Call Rate (%)	2.72%	6.49%	4.46%	2.20%
Mobility HOSR (%)	96.93%	92.44%	99.02%	95.05%
Rx Quality (%)	89.15%	91.46%	93.53%	94.16%

Voice Call	3G				VoLTE	
	Airtel	BSNL	VIL(Idea)	VIL(Vodafone)	Airtel	Jio
Call Attempt	413	435	384	380	350	375
Blocked Call Rate (%)	6.30%	1.84%	3.39%	2.89%	2.54%	0.52%
CSSR% (Accessibility)	93.70%	98.16%	96.61%	97.11%	97.46%	99.48%
Drop Call Rate (%)	6.46%	4.92%	3.50%	6.50%	3.79%	0.26%
Mobility HOSR (%)	99.13%	96.77%	98.67%	98.85%	99.20%	99.38%
Rx Quality (%)	80.69%	90.91%	79.96%	79.55%	67.83%	76.00%



Data Services Static	2G			
	Airtel	BSNL	VIL(Idea)	VIL(Vodafone)
Download Throughput (Kbps)	111.06	140.84	92.34	104.17
Upload Throughput (kbps)	126.21	102.68	103.66	138.73
Web Browsing Delay (sec)	30.60	41.26	24.77	28.57
Latency (msec)	472	307	480	375

Data Services Static	3G				4G			
	Airtel	BSNL	VIL(Idea)	VIL(Vodafone)	Airtel	Jio	VIL(Idea)	VIL(Vodafone)
Download Throughput (Mbps)	2.18	1.12	0.17	0.19	13.81	5.14	1.65	2.23
Upload Throughput (Mbps)	0.75	1.29	0.93	1.50	3.39	3.71	5.02	6.00
Web Browsing Delay (sec)	16.54	14.31	17.41	17.02	8.45	8.91	13.00	12.14
Video Streaming Delay (sec)	6.65	2.59	2.22	1.43	1.53	1.51	3.37	3.10
Latency (msec)	298	105	233	192	119	112	142	111

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**Report on Independent Drive Test conducted in  
Trivandrum from 1<sup>st</sup> to 5<sup>th</sup> January 2019**

The drive test in the city of Trivandrum in Kerla LSA was conducted for a period of 5 days during 1<sup>st</sup> to 5<sup>th</sup> January 2019. It covered a route of approximately 555 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)	VIL(Vodafone)
Call Attempt	844	857	812	846	838
Blocked Call Rate (%)	0.83%	0.23%	0.37%	0.00%	0.00%
CSSR% (Accessibility)	99.17%	99.77%	99.63%	100.00%	100.00%
Drop Call Rate (%)	0.36%	1.52%	0.25%	0.47%	0.12%
Mobility HOSR (%)	97.85%	97.79%	99.31%	98.65%	99.36%
Rx Quality (%)	97.36%	98.66%	98.09%	97.65%	98.86%

Voice Call	3G					VoLTE
	Airtel	BSNL	Tata	VIL(Idea)	VIL(Vodafone)	Jio
Call Attempt	839	855	832	845	854	809
Blocked Call Rate (%)	0.83%	0.35%	1.32%	2.13%	0.70%	0.00%
CSSR% (Accessibility)	99.17%	99.65%	98.68%	97.87%	99.30%	100.00%
Drop Call Rate (%)	0.48%	1.53%	0.37%	0.12%	0.00%	0.00%
Mobility HOSR (%)	99.92%	98.55%	100.00%	99.30%	98.71%	99.43%
Rx Quality (%)	95.11%	97.16%	98.09%	93.71%	95.48%	87.88%



Data Services Static	2G				
	Airtel	BSNL	Tata	VIL(Idea)	VIL(Vodafone)
Download Throughput (Kbps)	145.45	80.22	78.28	129.55	148.35
Upload Throughput (kbps)	133.97	138.51	134.39	100.11	157.00
Web Browsing Delay (sec)	26.99	43.29	25.40	30.59	40.28
Latency (msec)	539	243	548	212	335

Data Services Static	3G					4G			
	Airtel	BSNL	Tata	VIL(Idea)	VIL(Vodafone)	Airtel	Jio	VIL(Idea)	VIL(Vodafone)
Download Throughput (Mbps)	3.48	1.37	3.61	1.57	4.18	9.31	7.30	2.60	7.08
Upload Throughput (Mbps)	0.98	1.15	1.16	1.61	2.08	1.85	4.36	5.81	4.67
Web Browsing Delay (sec)	10.81	13.52	13.17	12.45	10.30	7.38	8.44	10.90	9.66
Video Streaming Delay (sec)	3.11	4.18	4.69	0.94	2.23	2.48	0.85	1.32	3.38
Latency (msec)	86	173	152	117	100	65	73	78	101

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## 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.

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