

For Immediate Release

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Telecom Regulatory Authority of India

TRAI Releases Report on Independent Drive Tests conducted in five cities viz. Allahabad, Goa, Guwahati, Kottayam and Varanasi.

New Delhi, 17th October, 2019: TRAI, through its agency, conducted Independent Drive Tests (IDT) in five cities viz. Allahabad, Goa, Guwahati, Kottayam and Varanasi. 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 (LSA)	Period of Conducting IDT	Summary of Results of IDT
1)	Allahabad	UP – East	24 th to 26 th June 2019	Annexure-A
2)	Goa	Maharashtra	24 th to 28 th June 2019	Annexure-B
3)	Guwahati	Assam	24 th to 28 th June 2019	Annexure-C
4)	Kottayam	Kerala	27 th to 29 th June 2019	Annexure-D
5)	Varanasi	UP -East	27 th to 29 th June 2019	Annexure-E

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) Allahabad City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate except VIL(Vodafone) (VoLTE). All the TSPs have met the $\approx 95\%$ of CSSR. Maximum throughput has been observed in 3G & 4G network of Airtel & VIL(Idea) respectively.



- (ii) Goa City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate except Tata (2G), VIL(Idea) (2G), Airtel (3G), BSNL (3G), VIL(Vodafone) (3G) & VIL(Vodafone) (VoLTE). All the TSPs have met the $\approx 95\%$ of CSSR except VI(Vodafone) (3G). Maximum throughput has been observed in 3G & 4G network of Airtel & VIL(Vodafone) respectively.
- (iii) Guwahati City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate except BSNL (3G). All the TSPs have met the $\approx 95\%$ of CSSR. Maximum throughput has been observed in 3G & 4G network of BSNL & Airtel respectively.
- (iv) Kottayam 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 Tata & Airtel respectively.
- (v) Varanasi City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate except VIL(Vodafone) (VoLTE). All the TSPs have met the $\approx 95\%$ of CSSR except VIL(Idea) (3G). Maximum throughput has been observed in 3G & 4G network of VIL(Idea) & 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
Tel. No. +91-11-2323-0404 or at email.id: advqos@traigov.in


(S.K. Gupta)
Secretary

**Report on Independent Drive Test conducted in
Allahabad from 24th to 26th June 2019**

The drive test in the city of Allahabad in UP - East LSA was conducted for a period of 3 days during 24th to 26th June 2019. It covered a route of approximately 283 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	Vodafone
Call Attempt	369	357	388	373
Blocked Call Rate (%)	0.27%	2.80%	0.77%	1.07%
CSSR% (Accessibility)	99.73%	97.20%	99.23%	98.93%
Drop Call Rate (%)	0.27%	1.15%	0.00%	0.81%
Mobility HOSR (%)	98.09%	96.99%	99.21%	97.66%
Rx Quality (%)	95.52%	94.40%	96.23%	96.11%

Voice Call	3G				VoLTE		
	Airtel	BSNL	VIL		Airtel	Jio	VIL(Vodafone)
			Idea	Vodafone			
Call Attempt	364	355	366	363	338	376	343
Blocked Call Rate (%)	1.10%	2.82%	0.55%	2.20%	1.48%	0.80%	0.58%
CSSR% (Accessibility)	98.90%	97.18%	99.45%	97.80%	98.52%	99.20%	99.42%
Drop Call Rate (%)	0.28%	0.87%	1.10%	0.56%	0.90%	0.80%	3.23%
Mobility HOSR (%)	99.78%	98.80%	99.72%	99.92%	99.85%	99.76%	99.26%
Rx Quality (%)	94.88%	93.71%	91.13%	89.41%	77.65%	82.99%	67.19%

Data Services Static	2G							
	Airtel		BSNL		VIL			
					Idea		Vodafone	
Download Throughput (Kbps)	104.81		161.03		91.04		86.94	
Upload Throughput (kbps)	31.63		45.30		38.18		37.81	
Web Browsing Delay (sec)	17.97		13.55		18.10		18.83	
Latency (msec)	479		219		270		228	

Data Services Static	3G				4G			
	Airtel		BSNL		VIL			
					Idea		Vodafone	
Download Throughput (Mbps)	2.04	0.58	1.63	0.56	7.11	1.24	7.60	1.29
Upload Throughput (Mbps)	0.57	0.97	1.68	1.13	2.34	2.65	5.32	2.37
Web Browsing Delay (sec)	10.13	13.85	13.33	16.58	7.42	12.79	6.87	14.91
Video Streaming Delay (sec)	1.64	3.49	3.77	2.35	1.21	4.11	1.64	4.53
Latency (msec)	82	140	136	106	87	101	81	109

**Report on Independent Drive Test conducted in
Goa from 24th to 28th June 2019**

The drive test in the city of Goa in Maharashtra LSA was conducted for a period of 5 days during 24th to 28th June 2019. It covered a route of approximately 610 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	Vodafone Idea Ltd.	
				Idea	Vodafone
Call Attempt	756	792	587	814	796
Blocked Call Rate (%)	1.5%	0.4%	2.2%	2.0%	1.6%
CSSR% (Accessibility)	98.5%	99.6%	97.8%	98.0%	98.4%
Drop Call Rate (%)	1.6%	1.9%	2.4%	3.1%	1.8%
Mobility HOSR (%)	98.8%	92.3%	98.7%	95.0%	95.4%
Rx Quality (%)	97.8%	97.0%	97.0%	92.7%	92.9%

Voice Call	3G					VoLTE		
	Airtel	BSNL	Tata	Vodafone Idea Ltd.		Airtel	Jio	VIL(Vodafone)
				Idea	Vodafone			
Call Attempt	749	786	598	788	737	639	582	607
Blocked Call Rate (%)	2.5%	0.9%	3.0%	2.4%	5.7%	0.2%	0.5%	2.8%
CSSR% (Accessibility)	97.5%	99.1%	97.0%	97.6%	94.3%	99.8%	99.5%	97.2%
Drop Call Rate (%)	2.2%	3.0%	1.9%	1.4%	2.6%	0.2%	1.4%	3.7%
Mobility HOSR (%)	99.9%	98.6%	99.9%	99.4%	99.7%	99.5%	99.6%	99.6%
Rx Quality (%)	95.1%	95.0%	96.1%	81.4%	70.5%	94.8%	85.4%	78.6%

Data Test - Stationary	2G				
	Airtel	BSNL	Tata	Vodafone Idea Ltd.	
				Idea	Vodafone
Download Throughput (Kbps)	91.45	98.66	134.87	122.41	113.02
Upload Throughput (Kbps)	36.16	40.63	52.16	55.36	41.33
Web Browsing Delay (sec)	18.45	17.49	17.83	18.42	17.73
Latency (msec)	507	315	420	179	399

Data Test - Stationary	3G				
	Airtel	BSNL	Tata	Vodafone Idea Ltd.	
				Idea	Vodafone
Download Throughput (Mbps)	4.34	3.72	4.17	1.75	2.76
Upload Throughput (Mbps)	0.58	1.56	0.59	1.08	0.93
Web Browsing Delay (sec)	8.66	10.35	10.02	11.55	11.64
Video Streaming Delay (sec)	3.73	2.10	1.00	6.13	1.24
Latency (msec)	79	76	144	128	202



**Report on Independent Drive Test conducted in
Guwahati from 24th to 28th June 2019**

The drive test in the city of Guwahati in Assam LSA was conducted for a period of 5 days on 24th to 28th June 2019. It covered a route of approximately 611 KMs and data tests conducted on 7 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	1001	1052	1006
Blocked Call Rate (%)	0.80%	0.67%	0.80%
CSSR% (Accessibility)	99.20%	99.33%	99.20%
Drop Call Rate (%)	1.01%	1.53%	0.60%
Mobility HOSR (%)	96.85%	95.18%	97.63%
Rx Quality (%)	96.03%	96.72%	95.12%

Voice Call	3G			VoLTE		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Call Attempt	977	960	1002	924	953	930
Blocked Call Rate (%)	4.61%	1.56%	1.20%	0.22%	0.63%	1.40%
CSSR% (Accessibility)	95.39%	98.44%	98.80%	99.78%	99.37%	98.60%
Drop Call Rate (%)	0.75%	2.86%	1.11%	0.43%	0.00%	1.09%
Mobility HOSR (%)	99.87%	94.91%	99.78%	99.85%	99.38%	99.90%
Rx Quality (%)	94.96%	95.98%	87.81%	78.05%	80.67%	77.48%



Data Services Static	2G					
	Airtel		BSNL		VIL(Vodafone)	
Download Throughput (Kbps)	90.13		140.53		123.02	
Upload Throughput (kbps)	44.17		62.00		49.09	
Web Browsing Delay (sec)	18.50		17.62		16.47	
Latency (msec)	333		239		T0	

Data Services Static	3G			4G		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Download Throughput (Mbps)	1.04	1.43	0.27	4.66	4.14	2.43
Upload Throughput (Mbps)	0.54	1.54	1.63	2.18	5.38	7.71
Web Browsing Delay (sec)	15.99	11.37	16.53	8.57	8.86	10.63
Video Streaming Delay (sec)	9.11	2.16	T0	1.91	1.81	2.02
Latency (msec)	264	112	T0	107	104	T0

**Report on Independent Drive Test conducted in
Kottayam from 27th to 29th June 2019**

The drive test in the city of Kottayam in Kerala LSA was conducted for a period of 3 days during 27th to 29th June 2019. It covered a route of approximately 308 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	382	382	378	386	375
Blocked Call Rate (%)	0.26%	0.00%	0.26%	0.00%	0.00%
CSSR% (Accessibility)	99.74%	100.00%	99.74%	100.00%	100.00%
Drop Call Rate (%)	1.31%	0.26%	0.27%	0.52%	0.00%
Mobility HOSR (%)	97.90%	99.51%	98.52%	99.39%	99.90%
Rx Quality (%)	96.86%	99.35%	97.98%	98.03%	99.63%

Voice Call	3G					VoLTE	
	Airtel	BSNL	Tata	VIL		Airtel	Jio
				Idea	Vodafone		
Call Attempt	375	376	366	372	374	348	340
Blocked Call Rate (%)	0.00%	0.80%	0.00%	1.34%	0.00%	2.30%	0.59%
CSSR% (Accessibility)	100.00%	99.20%	100.00%	98.66%	100.00%	97.70%	99.41%
Drop Call Rate (%)	0.27%	0.27%	0.27%	0.00%	0.00%	0.88%	0.00%
Mobility HOSR (%)	100.00%	97.30%	99.61%	99.60%	100.00%	99.79%	99.68%
Rx Quality (%)	96.62%	96.83%	97.13%	93.36%	98.00%	81.86%	89.81%

Data Services Static	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Download Throughput (Kbps)	115.05	95.64	100.58	114.49	114.17
Upload Throughput (kbps)	49.60	53.82	53.80	51.57	56.24
Web Browsing Delay (sec)	17.19	19.01	17.67	16.65	17.12
Latency (msec)	625	200	592	333	217

Data Services Static	3G					4G			
	Airtel	BSNL	Tata	VIL		Airtel	Jio	VIL	
				Idea	Vodafone			Idea	Vodafone
Download Throughput (Mbps)	2.35	1.41	2.46	1.81	1.89	9.07	3.29	2.16	1.52
Upload Throughput (Mbps)	1.36	3.04	1.30	1.62	1.13	2.51	2.13	5.99	4.48
Web Browsing Delay (sec)	12.49	11.83	14.65	12.46	12.86	9.09	10.35	11.30	8.83
Video Streaming Delay (sec)	5.73	5.11	2.37	2.86	8.59	1.86	2.90	2.42	1.66
Latency (msec)	153	73	171	107	128	96	67	81	78

for

**Report on Independent Drive Test conducted in
Varanasi from 27th to 29th June 2019**

The drive test in the city of Varanasi in UP - East Pradesh LSA was conducted for a period of 3 days during 27th to 29th June 2019. It covered a route of approximately 274 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	Vodafone
Call Attempt	369	376	419	385
Blocked Call Rate (%)	3.25%	1.06%	5.01%	0.00%
CSSR% (Accessibility)	96.75%	98.94%	94.99%	100.00%
Drop Call Rate (%)	0.84%	1.61%	1.76%	1.82%
Mobility HOSR (%)	96.38%	96.09%	93.65%	97.67%
Rx Quality (%)	93.68%	96.29%	90.83%	94.96%

Voice Call	3G				VoLTE		
	Airtel	BSNL	VIL		Airtel	Jio	VIL(Vodafone)
			Idea	Vodafone			
Call Attempt	358	386	382	357	329	379	355
Blocked Call Rate (%)	1.68%	2.33%	4.19%	0.84%	0.61%	0.79%	1.69%
CSSR% (Accessibility)	98.32%	97.67%	95.81%	99.16%	99.39%	99.21%	98.31%
Drop Call Rate (%)	0.57%	1.86%	1.09%	0.28%	0.00%	0.53%	3.15%
Mobility HOSR (%)	99.85%	99.65%	98.84%	99.95%	99.75%	99.24%	99.87%
Rx Quality (%)	96.53%	93.69%	92.17%	92.82%	79.60%	83.04%	73.96%

Data Services Static	2G							
	Airtel		BSNL		VIL			
					Idea	Vodafone		
Download Throughput (Kbps)	89.09		93.58		52.99	62.45		
Upload Throughput (kbps)	36.88		49.99		34.57	44.46		
Web Browsing Delay (sec)	18.31		20.18		18.61	16.36		
Latency (msec)	517		429		299	284		

Data Services Static	3G				4G			
	Airtel	BSNL	VIL		Airtel	Jio	VIL	
			Idea	Vodafone			Idea	Vodafone
Download Throughput (Mbps)	2.08	1.79	2.92	0.43	5.25	3.68	1.77	0.88
Upload Throughput (Mbps)	0.58	1.17	1.51	1.04	2.56	2.90	1.84	1.56
Web Browsing Delay (sec)	11.27	12.72	11.31	16.25	8.47	11.02	12.18	12.11
Video Streaming Delay (sec)	1.89	2.65	TO	6.66	2.75	3.73	5.72	4.10
Latency (msec)	90	131	105	137	90	90	89	81

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.

