

For Immediate Release

Information note to the Press (Press Release No. 27 /2018)

Telecom Regulatory Authority of India

TRAI Releases Report on Independent Drive Test conducted in Coimbatore, Kozhikode, Pondicherry and Vijayawada cities

New Delhi 21st February 2018: Telecom Regulatory Authority of India (TRAI) is regularly monitoring the performance of Telecom Service Providers (TSPs) against the prescribed benchmarks for the various Quality of Service (QoS) parameters laid down by the Authority. TRAI through its agency conducted Independent Drive Tests (IDT) in the city of Coimbatore and Pondicherry in Tamil Nadu, Kozhikode in Kerala and Vijayawada in Andhra Pradesh License Service Area. 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 in the above cities are given below:-

S.No	City	Licensed Service	Period of Conducting IDT	Summary of Results of IDT
1)	Coimbatore	TN	9 th Oct to 14 th Oct 2017	Annexure-A
2)	Kozhikode	Kerala	23 rd Oct to 27 th Oct 2017	Annexure-B
3)	Pondicherry	TN	13 th Nov to 15 th Nov 2017	Annexure-C
4)	Vijayawada	AP	27 th Nov to 1 st Dec 2017	Annexure-D

2. The Key Performance Indicators (KPIs) were assessed for voice services are Network Coverage, Call Setup Success Rate; Drop Call Rate; Block Call Rate, Handover Success Rate and Rx Quality. The KPIs for data services were Download and Upload Throughputs, Web Browsing Delay, Video Streaming Delay and Latency.

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

- (i) Most of the TSPs have met the 2% of QoS benchmark Drop Call Rate (DCR %) except and Tata CDMA in Coimbatore, RCOM, RJio, Tata, Tata CDMA & MTS in Kozhikode, TATA CDMA in Pondicherry and Vijayawada.

- (ii) Most of the TSPs have met the 3% of QoS benchmark of Call Block rate (CBR %) except MTS and Tata CDMA in Coimbatore and Kozhikode, Aircel 3G and Tata CDMA in Pondicherry and Tata CDMA in Vijayawada.
- (iii) Most of the TSPs have met the Rx Quality >95% of QoS bench mark except MTS, Tata, Idea 3G, Vodafone 3G and RJio in Coimbatore, Tata and RJio in Pondicherry and Airtel 3G, RJio and Tata CDMA in Vijayawada.
- (iv) Download Throughput has been observed highest for Vodafone in Coimbatore and Pondicherry, RJio in Kozhikode and Airtel in Vijayawada.
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
TRAI

**Report on Independent Drive Test conducted in
Coimbatore from 9th to 14th October 2017**

The drive test in the city of Coimbatore in TN LSA was conducted for a period of 6 days during 9th Oct to 14th Oct, 2017. It covered a route of approximately 738 KMs and data tests conducted on 5 hotspots. Cellular mobile telephone service providers included namely Aircel, Airtel, BSNL, Idea, RCOM, Tata, Vodafone, MTS(CDMA), TATA(CDMA) and Jio. Tests included 2G, 3G, 4G and CDMA radio access 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							CDMA	
	Aircel	Airtel	BSNL	Idea	RCOM	Tata	Vodafone	MTS	Tata
Call Attempt	1140	1132	1097	1054	914	1104	1128	1140	1052
Blocked Call Rate (%)	0.1%	0.1%	0.6%	0.8%	0.2%	0.3%	0.1%	8.86%	8.37%
CSSR% (Accessibility)	99.9%	99.9%	99.4%	99.2%	99.8%	99.7%	99.9%	91.1%	91.6%
Drop Call Rate (%)	0.1%	0.3%	1.0%	0.2%	0.7%	0.4%	0.4%	8.7%	5.5%
Mobility HOSR (%)	99.5%	99.8%	98.7%	99.7%	99.3%	98.8%	95.7%	100.0%	100.0%
Rx Quality (%)	99.11%	99.07%	95.61%	98.71%	98.29%	98.63%	97.49%	89.17%	92.99%

Voice Call	3G						VoLTE
	Aircel	Airtel	BSNL	Idea	Tata	Vodafone	Jio
Call Attempt	1144	1150	1098	1016	1092	1134	1117
Blocked Call Rate (%)	0.35%	1.13%	0.91%	1.57%	0.64%	0.88%	0.98%
CSSR% (Accessibility)	99.7%	98.9%	99.1%	98.4%	99.4%	99.1%	99.0%
Drop Call Rate (%)	0.4%	0.4%	1.0%	0.8%	0.6%	0.4%	0.3%
Mobility HOSR (%)	99.6%	100.0%	99.5%	99.9%	100.0%	99.6%	99.4%
Rx Quality (%)	97.17%	98.57%	96.37%	94.27%	92.02%	94.67%	91.43%

Data Services	2G							CDMA	
	Aircel	Airtel	BSNL	Idea	RCOM	Tata	*Vodafone	MTS	Tata
Download Throughput (Kbps)	24.6	177.6	127.7	131.3	30.1	163.0	98.6	845.1	89.1
Upload Throughput (kbps)	75.9	180.2	58.7	126.6	57.2	168.1	85.4	387.0	87.8
Web Browsing Delay (sec)	24.0	33.2	34.3	34.1	24.7	33.5	19.3	47.7	66.5
Latency (msec)	274	331	421	474	617	540	-	259	432

Data Services	3G						4G				
	Aircel	Airtel	BSNL	Idea	Tata	*Vodafone	Airtel	Idea	Jio	RCOM	*Vodafone
Download Throughput (Mbps)	0.4	7.2	4.2	2.2	1.8	3.7	18.9	8.7	9.6	6.3	20.7
Upload Throughput (Mbps)	1.5	1.2	1.2	1.3	1.3	1.7	3.6	7.0	3.5	1.6	9.0
Web Browsing Delay (sec)	13.4	6.0	11.6	8.7	9.0	6.9	4.7	4.3	5.1	8.3	4.0
Video Streaming Delay (sec)	0.0	2.4	2.5	2.7	2.9	1.8	1.9	0.9	2.0	3.2	0.7
Latency (msec)	151	82	177	122	94	-	86	104	85	148	-

*Vodafone has disabled ping on its network



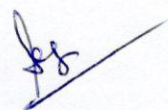
**Report on Independent Drive Test conducted in
Kozhikode from 23rd to 27th October 2017**

The drive test in the city of Kozhikode in Kerala LSA was conducted for a period of 5 days during 23rd Oct to 27th Oct, 2017. It covered a route of approximately 732 KMs and data tests conducted on 5 hotspots. Cellular mobile telephone service providers included namely Aircel, Airtel, BSNL, Idea, RCOM, Tata, Vodafone, MTS (CDMA), TATA (CDMA) and Jio. Tests included 2G, 3G, 4G and CDMA radio access 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						CDMA	
	Airtel	BSNL	Idea	RCOM	Tata	Vodafone	MTS	Tata
Call Attempt	1010	1063	1053	790	864	1053	990	893
Blocked Call Rate (%)	0.0%	0.28%	0.4%	0.9%	0.6%	0.0%	8.8%	3.0%
CSSR% (Accessibility)	100.0%	99.7%	99.6%	99.1%	99.4%	100.0%	91.2%	97.0%
Drop Call Rate (%)	0.7%	1.2%	0.5%	3.3%	2.1%	0.2%	9.5%	2.1%
Mobility HOSR (%)	99.1%	98.8%	99.5%	99.1%	99.9%	99.5%	100.0%	100.0%
Rx Quality (%)	97.8%	98.6%	98.1%	97.0%	97.1%	98.8%	82.5%	88.9%

Voice Call	3G					VoLTE
	Airtel	BSNL	Idea	Tata	Vodafone	Jio
Call Attempt	998	1054	1044	844	1056	990
Blocked Call Rate (%)	2.00%	0.76%	0.29%	1.07%	0.19%	1.92%
CSSR% (Accessibility)	98.0%	99.2%	99.7%	98.9%	99.8%	98.1%
Drop Call Rate (%)	1.8%	1.2%	0.9%	2.3%	0.4%	2.7%
Mobility HOSR (%)	99.9%	99.7%	99.9%	100.0%	100.0%	100.0%
Rx Quality (%)	96.2%	98.0%	96.4%	96.7%	97.0%	91.31%



Data Services	2G						CDMA	
	Airtel	BSNL	Idea	RCOM	Tata	Vodafone	MTS	Tata
Download Throughput (Kbps)	127.9	69.6	113.3	90.9	131.3	119.7	2249.6	1078.9
Upload Throughput (kbps)	143.7	82.7	71.9	112.7	126.5	139.3	968.6	343.9
Web Browsing Delay (sec)	26.0	25.7	22.7	24.0	27.5	24.7	11.8	20.1
Latency (msec)	545	229	297	279	583	438	90	153

Data Services	3G					4G				
	Airtel	BSNL	Idea	Tata	*Vodafone	Airtel	Idea	Jio	RCOM	*Vodafone
Download Throughput (Mbps)	2.8	2.1	3.1	4.9	3.7	6.6	7.9	9.4	4.6	8.9
Upload Throughput (Mbps)	1.2	1.6	1.4	2.1	2.8	4.5	6.9	3.4	2.4	8.8
Web Browsing Delay (sec)	8.3	11.1	7.6	6.8	6.1	4.4	5.2	4.1	5.5	4.8
Video Streaming Delay (sec)	1.9	3.6	2.2	2.4	1.1	1.5	2.8	1.7	2.4	0.8
Latency (msec)	161	138	186	96	-	89	128	119	147	-

* Vodafone has disabled ping on its 3G & 4G network

**Report on Independent Drive Test conducted in
Pondicherry from 13th to 15th November 2017**

The drive test in the city of Pondicherry in TN LSA was conducted for a period of 3 days during 13th Nov to 15th Nov, 2017. It covered a route of approximately 315 KMs and data tests conducted on 5 hotspots. Cellular mobile telephone service providers included namely Aircel, Airtel, BSNL, Idea, Tata, Vodafone, Tata (CDMA) and Jio. Tests included 2G, 3G, 4G and CDMA radio access 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						CDMA
	Aircel	Airtel	BSNL	Idea	Tata	Vodafone	Tata
Call Attempt	559	542	544	559	602	559	362
Blocked Call Rate (%)	0.7%	0.4%	0.0%	0.0%	0.8%	0.2%	7.18%
CSSR% (Accessibility)	99.3%	99.6%	100.0%	100.0%	99.2%	99.8%	92.8%
Drop Call Rate (%)	0.5%	0.4%	0.2%	0.0%	0.2%	0.2%	5.65%
Mobility HOSR (%)	99.4%	95.0%	98.9%	99.8%	98.9%	97.9%	100.0%
Rx Quality (%)	98.2%	98.5%	98.1%	99.1%	98.9%	98.1%	81.9%

Voice Call	3G						VoLTE
	Aircel	Airtel	BSNL	Idea	Tata	Vodafone	Jio
Call Attempt	596	548	540	531	534	556	562
Blocked Call Rate (%)	4.5%	0.00%	0.37%	0.75%	1.87%	0.36%	0.00%
CSSR% (Accessibility)	95.5%	100.0%	99.6%	99.2%	98.1%	99.6%	100.0%
Drop Call Rate (%)	1.2%	0.2%	0.2%	0.2%	0.2%	0.0%	0.5%
Mobility HOSR (%)	99.9%	100.0%	99.9%	100.0%	100.0%	100.0%	99.7%
Rx Quality (%)	96.3%	96.2%	97.9%	97.5%	94.3%	95.1%	83.8%

Data Services	2G						CDMA
	Aircel	Airtel	BSNL	Idea	Tata	Vodafone	Tata
Download Throughput (Kbps)	144.1	153.6	92.6	128.4	103.7	40.8	1029.0
Upload Throughput (kbps)	92.3	185.2	95.3	104.1	105.0	60.3	579.0
Web Browsing Delay (sec)	21.6	30.9	16.8	22.4	17.1	24.9	23.2
Latency (msec)	261	289	278	518	547	372	328

Data Services	3G						4G			
	Aircel	Airtel	BSNL	Idea	Tata	Vodafone	Airtel	Idea	Jio	Vodafone
Download Throughput (Mbps)	4.5	7.7	1.5	2.2	2.7	3.6	6.9	4.8	8.0	9.9
Upload Throughput (Mbps)	0.8	1.2	1.4	1.4	1.2	2.1	5.5	4.2	4.0	7.3
Web Browsing Delay (sec)	6.5	6.0	10.3	9.7	8.9	7.8	3.9	7.1	5.7	5.5
Video Streaming Delay (sec)	2.5	1.6	5.8	2.8	3.4	1.0	1.4	1.7	3.4	1.0
Latency (msec)	108	67	156	177	111	85	79	145	110	86

**Report on Independent Drive Test conducted in
Vijaywada from 27th Nov to 1st December 2017**

The drive test in the city of VijayWada in AP LSA was conducted for a period of 5 days during 27th Nov to 1st Dec, 2017. It covered a route of approximately 670 KMs and data tests conducted on 5 hotspots. Cellular mobile telephone service providers included namely Aircel, Airtel, BSNL, Idea, Tata, Telenor, Vodafone, Tata (CDMA) and Jio. Tests included 2G, 3G, 4G and CDMA radio access 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							CDMA
	Aircel	Airtel	BSNL	Idea	Tata	Telenor	Vodafone	Tata
Call Attempt	732	1044	1031	1067	888	897	1055	1088
Blocked Call Rate (%)	0.5%	0.0%	0.4%	0.7%	1.0%	0.3%	0.4%	3.2%
CSSR% (Accessibility)	99.5%	100.0%	99.6%	99.3%	99.0%	99.7%	99.6%	96.8%
Drop Call Rate (%)	0.3%	0.3%	0.7%	0.6%	0.7%	0.4%	0.0%	7.4%
Mobility HOSR (%)	99.6%	99.3%	98.5%	99.3%	98.8%	98.3%	98.4%	100.0%
Rx Quality (%)	97.8%	97.9%	98.5%	97.8%	97.5%	98.0%	99.3%	91.7%

Voice Call	3G				VoLTE
	Aircel	Airtel	BSNL	Idea	Jio
Call Attempt	813	1052	1008	1044	1038
Blocked Call Rate (%)	0.9%	0.6%	1.4%	0.4%	0.0%
CSSR% (Accessibility)	99.1%	99.4%	98.6%	99.6%	100.0%
Drop Call Rate (%)	0.0%	0.3%	0.0%	0.0%	0.0%
Mobility HOSR (%)	97.6%	97.6%	95.4%	100.0%	99.7%
Rx Quality (%)	96.3%	83.1%	97.5%	96.4%	80.7%



Data Services	2G							CDMA
	Aircel	Airtel	BSNL	Idea	Tata	Telenor	Vodafone	Tata
Download Throughput (Kbps)	9.4	98.0	88.1	100.5	83.4	87.6	119.0	850.3
Upload Throughput (kbps)	57.9	106.5	119.8	88.9	82.8	82.7	82.1	649.5
Web Browsing Delay (sec)	25.3	20.9	19.2	25.0	23.6	23.9	20.1	37.3
Latency (msec)	793	385	363	Fail	474	478	283	171

Data Services	3G				4G			
	Aircel	Airtel	BSNL	Idea	Airtel	Idea	Jio	Telenor
Download Throughput (Mbps)	1.4	4.0	1.5	2.1	11.1	3.2	6.1	5.9
Upload Throughput (Mbps)	0.8	0.6	0.7	0.4	3.2	3.3	2.7	3.8
Web Browsing Delay (sec)	16.3	8.5	13.7	12.4	7.1	9.7	8.1	6.9
Video Streaming Delay (sec)	9.2	2.7	7.1	2.2	2.0	3.1	2.6	0.9
Latency (msec)	651	229	181	Fail	172	Fail	102	95

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