

For Immediate Release

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Telecom Regulatory Authority of India

TRAI Releases Report on Independent Drive Tests conducted in six cities viz. Amritsar, Bilaspur, Hyderabad, Kollam, Meerut & Srinagar

New Delhi, 15 October, 2019: TRAI, through its agency, conducted Independent Drive Tests (IDT) in six cities viz. Amritsar, Bilaspur, Hyderabad, Kollam, Meerut & Srinagar. 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)	Amritsar	Punjab	13 th May to 17 th May 2019	Annexure-A
2)	Bilaspur	MP	7 th to 9 th May 2019	Annexure-B
3)	Hyderabad	AP	13 th to 24 th May 2019	Annexure-C
4)	Kollam	Kerala	7 th to 10 th May 2019	Annexure-D
5)	Meerut	UP - West	21 st to 23 rd May 2019	Annexure-E
6)	Srinagar	J&K	14 th to 17 th May 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) Amritsar City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate except BSNL 3G & Tata 3G. All the TSPs have met the $\approx 95\%$ of CSSR. Maximum throughput has been observed in 3G & 4G network of BSNL & Airtel respectively.



- (ii) Bilaspur 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) & VIL(Idea) respectively.
- (iii) Hyderabad City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate and $\geq 95\%$ of CSSR. Whereas in the case of Hyderabad Metro, all the TSPs have met the $\leq 2\%$ of Drop Call Rate except BSNL 2G, VIL(Idea) 2G and VIL(Idea) 3G. All the TSPs have met the $\geq 95\%$ of CSSR. Maximum throughput has been observed in Hyderabad city 3G & 4G network of VIL(Idea) & RJio respectively.
- (iv) Kollam 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(Idea) & Airtel respectively.
- (v) Meerut City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate except Tata 3G. All the TSPs have met the $\geq 95\%$ of CSSR except Tata 3G. Maximum throughput has been observed in 3G & 4G network of BSNL & RJio respectively.
- (vi) Srinagar 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. 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) 14/11/2019
Secretary

**Report on Independent Drive Test conducted in
Amritsar from 13th to 17th May 2019**

The drive test in the city of Amritsar in Punjab LSA was conducted for a period of 5 days during 13th to 17th May 2019. It covered a route of approximately 619 KMs and data tests conducted on 6 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, Tata, 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	1103	1030	1076	1037
Blocked Call Rate (%)	0.63%	0.29%	0.84%	0.39%
CSSR% (Accessibility)	99.37%	99.71%	99.16%	99.61%
Drop Call Rate (%)	0.64%	1.75%	0.47%	1.36%
Mobility HOSR (%)	97.32%	99.12%	98.14%	99.02%
Rx Quality (%)	95.64%	99.30%	94.29%	98.13%

Voice Call	3G				VoLTE	
	Airtel	BSNL	Tata	VIL(Idea)	Airtel	JIO
Call Attempt	1038	1100	1101	1025	1004	1003
Blocked Call Rate (%)	0.77%	0.45%	1.54%	0.49%	0.10%	0.80%
CSSR% (Accessibility)	99.23%	99.55%	98.46%	99.51%	99.90%	99.20%
Drop Call Rate (%)	1.36%	3.38%	4.61%	0.10%	0.70%	0.20%
Mobility HOSR (%)	99.98%	99.01%	99.97%	99.83%	99.67%	99.66%
Rx Quality (%)	97.34%	98.47%	96.98%	95.97%	86.68%	87.37%

Data Services Static	2G			
	Airtel	BSNL	VIL(Idea)	Tata
Download Throughput (Kbps)	52.42	98.68	95.43	20.86
Upload Throughput(kbps)	69.76	115.81	81.53	50.01
Web Browsing Delay (sec)	24.26	28.53	27.65	21.62
Latency (msec)	336	491	440	585

Data Services Static	3G				4G		
	Airtel	BSNL	VIL(Idea)	Tata	Airtel	VIL(Idea)	Jio
Download Throughput (Mbps)	1.52	2.97	1.96	1.08	10.81	6.67	5.67
Upload Throughput (Mbps)	0.46	1.06	0.82	0.23	2.97	4.85	4.83
Web Browsing Delay (sec)	15.08	10.90	13.52	17.40	11.34	10.05	7.35
Video Streaming Delay (sec)	7.60	T0	4.35	6.12	5.65	1.21	5.12
Latency (msec)	130	126	118	163	69	115	92

**Report on Independent Drive Test conducted in
Bilaspur from 7th to 9th May 2019**

The drive test in the city of Bilaspur in Madhya Pradesh LSA was conducted for a period of 3 days during 7th to 9th May 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, RJio and 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	505	497	488	501	500
Blocked Call Rate (%)	0.40%	1.21%	1.84%	0.00%	0.40%
CSSR% (Accessibility)	99.60%	98.79%	98.16%	100.00%	99.60%
Drop Call Rate (%)	0.00%	0.20%	0.63%	0.00%	0.00%
Mobility HOSR (%)	99.84%	97.12%	99.82%	98.58%	97.81%
Rx Quality (%)	98.81%	99.81%	98.83%	98.12%	98.71%

Voice Call	3G					VoLTE	
	Airtel	BSNL	Tata	VIL		Airtel	Jio
				Idea	Vodafone		
Call Attempt	496	451	481	499	492	460	442
Blocked Call Rate (%)	0.00%	4.43%	0.62%	0.40%	0.61%	0.00%	0.45%
CSSR% (Accessibility)	100.00%	95.57%	99.38%	99.60%	99.39%	100.00%	99.55%
Drop Call Rate (%)	0.60%	0.23%	0.00%	0.40%	0.00%	0.00%	0.00%
Mobility HOSR (%)	100.00%	97.56%	99.98%	99.91%	99.98%	99.83%	99.84%
Rx Quality (%)	97.50%	95.18%	97.93%	90.75%	91.25%	83.95%	89.50%

Data Services Static	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Download Throughput (kbps)	101.91	181.03	75.19	145.19	133.31
Upload Throughput (kbps)	105.08	103.56	101.63	168.71	154.78
Web Browsing Delay (sec)	25.77	28.67	24.66	45.98	44.45
Latency(msec)	771	189	723	216	228

Data Services Static	3G					4G			
	Airtel	BSNL	Tata	VIL		Airtel	Jio	VIL	
				Idea	Vodafone			Idea	Vodafone
Download Throughput (Mbps)	0.62	2.37	1.42	1.39	12.00	2.90	2.47	4.33	2.33
Upload Throughput (Mbps)	0.38	1.65	1.78	0.51	4.23	5.91	2.68	5.08	5.84
Web Browsing Delay (sec)	13.02	12.26	11.47	12.91	6.83	9.23	10.90	9.21	8.33
Video Streaming Delay (sec)	7.35	2.52	2.27	3.26	1.76	1.46	2.51	1.95	1.03
Latency (sec)	180	96	130	109	91	110	109	71	73

**Report on Independent Drive Test conducted in
Hyderabad from 13th to 24th May 2019**

The drive test in the city of Hyderabad in Andhra Pradesh LSA was conducted for a period of 10 days during 13th to 24th May 2019. During this drive on 16th May 2019, Hyderabad Metro is also covered for Voice test only. It covered a route of approximately 1181 KMs and data tests conducted on 10 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, Tata, 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: -

Hyderabad City

Voice Call	2G			
	Airtel	BSNL	Tata	VIL(Idea)
Call Attempt	1944	2029	1836	2111
Blocked Call Rate (%)	0.93%	0.25%	3.49%	0.57%
CSSR% (Accessibility)	99.07%	99.75%	96.51%	99.43%
Drop Call Rate (%)	0.78%	1.38%	0.85%	1.38%
Mobility HOSR (%)	95.75%	97.08%	96.12%	97.54%
Rx Quality (%)	95.81%	97.42%	95.59%	95.39%

Voice Call	3G			VoLTE	
	Airtel	BSNL	VIL(Idea)	Airtel	JIO
Call Attempt	1931	1995	2021	1902	1921
Blocked Call Rate (%)	0.73%	0.85%	0.59%	0.32%	0.21%
CSSR% (Accessibility)	99.27%	99.15%	99.41%	99.68%	99.79%
Drop Call Rate (%)	0.73%	1.42%	0.45%	0.16%	0.05%
Mobility HOSR (%)	99.21%	99.24%	99.67%	99.91%	99.65%
Rx Quality (%)	92.40%	96.93%	92.60%	86.73%	87.76%

Data Services Static	2G			
	Airtel	BSNL	Tata	VIL(Idea)
Download Throughput (Kbps)	99.97	136.72	84.88	113.55
Upload Throughput (kbps)	131.55	109.25	89.26	107.61
Web Browsing Delay (sec)	27.55	36.36	26.74	38.01
Latency (msec)	302	272	389	258

Data Services Static	3G			4G		
	Airtel	BSNL	VIL(Idea)	Airtel	Jio	VIL(Idea)
Download Throughput (Mbps)	1.31	1.39	2.75	9.23	11.63	2.51
Upload Throughput (Mbps)	0.51	0.89	0.85	4.83	4.68	2.56
Web Browsing Delay (sec)	11.49	14.89	13.83	6.04	10.79	9.94
Video Streaming Delay (sec)	3.98	3.44	4.08	1.81	1.54	3.57
Latency (msec)	203	112	82	78	92	80

Hyderabad Metro

Voice Call	2G			
	Airtel	BSNL	Tata	VIL(Idea)
Call Attempt	63	68	62	75
Blocked Call Rate (%)	3.17%	2.94%	4.84%	0.00%
CSSR% (Accessibility)	96.83%	97.06%	95.16%	100.00%
Drop Call Rate (%)	1.64%	4.55%	0.00%	5.33%
Mobility HOSR (%)	94.35%	98.19%	92.21%	96.20%
Rx Quality (%)	89.32%	94.37%	87.88%	86.58%

Voice Call	3G			VoLTE	
	Airtel	BSNL	VIL(Idea)	Airtel	Jio
Call Attempt	56	63	65	57	58
Blocked Call Rate (%)	0.00%	0.00%	0.00%	0.00%	0.00%
CSSR% (Accessibility)	100.00%	100.00%	100.00%	100.00%	100.00%
Drop Call Rate (%)	1.79%	0.00%	3.08%	0.00%	1.72%
Mobility HOSR (%)	97.61%	99.58%	98.57%	99.79%	99.01%
Rx Quality (%)	83.63%	96.64%	85.48%	74.75%	73.82%

Annexure-D

**Report on Independent Drive Test conducted in
Kollam from 7th to 10th May 2019**

The drive test in the city of Kollam in Kerala LSA was conducted for a period of 4 days on 7th to 10th May 2019. It covered a route of approximately 461 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	BSNL	Tata	VIL	
				Idea	Vodafone
Call Attempt	679	676	657	690	668
Blocked Call Rate (%)	0.88%	0.15%	1.07%	0.14%	0.00%
CSSR% (Accessibility)	99.12%	99.85%	98.93%	99.86%	100.00%
Drop Call Rate (%)	0.45%	0.44%	1.23%	1.02%	0.15%
Mobility HOSR (%)	97.82%	98.54%	97.47%	99.59%	99.60%
Rx Quality (%)	97.11%	99.26%	95.24%	97.01%	98.44%

Voice Call	3G					VoLTE	
	Airtel	BSNL	Tata	VIL		Airtel	Jio
				Idea	Vodafone		
Call Attempt	667	667	643	636	671	647	676
Blocked Call Rate (%)	1.20%	2.70%	0.78%	2.52%	0.45%	1.70%	0.00%
CSSR% (Accessibility)	98.80%	97.30%	99.22%	97.48%	99.55%	98.30%	100.00%
Drop Call Rate (%)	1.21%	0.92%	0.63%	1.61%	0.75%	1.10%	0.89%
Mobility HOSR (%)	99.85%	98.68%	99.80%	99.43%	99.96%	99.93%	98.43%
Rx Quality (%)	94.60%	94.56%	96.04%	92.49%	92.70%	78.95%	89.47%

Data Services Static	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Download Throughput (kbps)	127.87	66.8	96.31	92.8	96.89
Upload Throughput (kbps)	135.04	73.25	115.6	81.46	109.68
Web Browsing Delay (sec)	28.53	42.15	46.14	40.17	35.25
Latency(msec)	487	363	615	351	493

Data Services Static	3G				4G			
	Airtel	BSNL	VIL		Airtel	Jio	VIL	
			Idea	Vodafone			Idea	Vodafone
Download Throughput (Mbps)	1.01	0.72	1.87	1.08	7.80	5.71	2.28	2.68
Upload Throughput (Mbps)	0.73	0.69	1.54	1.14	2.76	2.48	3.76	3.34
Web Browsing Delay (sec)	11.70	15.24	11.78	12.01	6.18	8.53	11.08	9.87
Video Streaming Delay (sec)	3.69	8.88	2.49	7.68	1.36	3.96	5.37	3.84
Latency (sec)	85	116	109.00	116	63	91	104	87

**Report on Independent Drive Test conducted in
Meerut from 21st to 23rd May 2019**

The drive test in the city of Meerut in UP - West LSA was conducted for a period of 3 days during 21st to 23rd May 2019. It covered a route of approximately 301 KMs and data tests conducted on 5 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	555	497	499	597	516
Blocked Call Rate (%)	0.36%	0.20%	0.60%	1.01%	0.39%
CSSR% (Accessibility)	99.64%	99.80%	99.40%	98.99%	99.61%
Drop Call Rate (%)	0.36%	1.41%	0.20%	1.18%	0.19%
Mobility HOSR (%)	96.36%	93.89%	99.46%	99.75%	97.78%
Rx Quality (%)	98.07%	98.33%	93.35%	97.20%	97.27%

Voice Call	3G				VoLTE		
	Airtel	BSNL	Tata	VIL		Airtel	Jio
				Idea	Vodafone		
Call Attempt	500	505	461	551	502	511	505
Blocked Call Rate (%)	0.40%	0.40%	10.63%	1.09%	2.19%	2.74%	0.79%
CSSR% (Accessibility)	99.60%	99.60%	89.37%	98.91%	97.81%	97.26%	99.21%
Drop Call Rate (%)	0.60%	0.80%	10.92%	0.92%	0.61%	0.40%	0.00%
Mobility HOSR (%)	100.00%	99.71%	99.72%	100.00%	99.97%	100.00%	99.68%
Rx Quality (%)	96.33%	96.43%	90.92%	93.70%	94.41%	84.24%	84.26%

Data Services Static	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Download Throughput (kbps)	106.51	135.71	116.88	69.51	84.19
Upload Throughput (kbps)	98.92	115.17	156.2	113.46	110.09
Web Browsing Delay (sec)	29.31	28.94	30.05	27.46	45.47
Latency(msec)	243	304	271	232	245

Data Services Static	3G					4G			
	Airtel	BSNL	Tata	VIL		Airtel	Jio	VIL	
				Idea	Vodafone			Idea	Vodafone
Download Throughput (Mbps)	0.39	2.39	0.61	1.48	0.35	7.25	8.68	4.84	0.95
Upload Throughput (Mbps)	0.56	1.27	0.57	1.26	1.11	4.79	3.78	5.52	3.24
Web Browsing Delay (sec)	15.79	12.99	16.06	13.45	14.93	6.24	6.55	9.09	12.96
Video Streaming Delay (sec)	4.69	1.69	3.60	2.54	1.69	2.35	1.67	1.77	9.74
Latency (sec)	257	109	268	124	193	41	71	114	90

**Report on Independent Drive Test conducted in
Srinagar from 14th to 17th May 2019**

The drive test in the city of Srinagar in Jammu & Kashmir LSA was conducted for a period of 4 days during 14th to 17th May 2019. It covered a route of approximately 246 KMs and data tests conducted on 10 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, 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	VIL(Idea)
Call Attempt	436	438	434
Blocked Call Rate (%)	0.92%	0.00%	4.61%
CSSR% (Accessibility)	99.08%	100.00%	95.39%
Drop Call Rate (%)	0.46%	2.05%	0.48%
Mobility HOSR (%)	98.83%	96.22%	96.26%
Rx Quality (%)	96.16%	97.68%	96.51%

Voice Call	3G			VoLTE	
	Airtel	BSNL	VIL(Idea)	Airtel	Jio
Call Attempt	429	435	433	400	401
Blocked Call Rate (%)	1.17%	1.38%	4.85%	0.25%	1.25%
CSSR% (Accessibility)	98.83%	98.62%	95.15%	99.75%	98.75%
Drop Call Rate (%)	0.94%	3.73%	1.94%	0.50%	1.26%
Mobility HOSR (%)	99.96%	99.18%	96.41%	99.89%	99.50%
Rx Quality (%)	93.36%	96.37%	94.52%	85.68%	90.95%

Data Services	2G		
	Airtel	BSNL	VIL(Idea)
Download Throughput (Kbps)	83.67	141.83	103.51
Upload Throughput (kbps)	115.40	128.42	140.50
Web Browsing Delay (sec)	37.81	41.14	29.42
Latency (msec)	298	255	456

Data Services	3G			4G		
	Airtel	BSNL	VIL(Idea)	Airtel	JIO	VIL(Idea)
Download Throughput (Mbps)	1.31	3.43	3.18	13.39	11.90	5.69
Upload Throughput (Mbps)	0.39	1.14	1.06	3.33	6.97	4.56
Web Browsing Delay (sec)	15.50	10.07	11.44	8.45	9.09	9.54
Video Streaming Delay (sec)	6.67	4.10	0.99	1.05	1.44	1.24
Latency (msec)	300	120	294	129	78	113

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.

