For Immediate Release

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Telecom Regulatory Authority of India

TRAI Releases Report on Independent Drive Tests conducted in six cities viz. Durg-Bhilai, Gangtok, Kolkata, Mumbai, Navi-Mumbai & Raipur

New Delhi, 14 October, 2019: TRAI, through its agency, conducted Independent Drive Tests (IDT) in six cities viz. Durg-Bhilai, Gangtok, Kolkata, Mumbai, Navi-Mumbai & Raipur 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)	Durg-Bhilai	MP	1st to 2nd March 2019	Annexure-A
2)	Gangtok	West Bengal	27th to 29th March 2019	Annexure-B
3)	Kolkata	Kolkata	4th to 13th March 2019	Annexure-C
4)	Mumbai	Mumbai	4th to 13th February 2019	Annexure-D
5)	Navi Mumbai	Mumbai	11th to 15th March 2019	Annexure-E
6)	Raipur	MP	25th, 26th & 28th February 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) Durg-Bhilai City: All the TSPs have met the $\leq 2\%$ of Drop Call Rate except BSNL 2G & BSNL 3G. All the TSPs have met the $=95\%$ of CSSR. Maximum throughput has been observed in 3G & 4G network of BSNL & VIL(Vodafone) respectively.

(ii) Gorakhpur City: All the TSPs have met the $\leq$2% of Drop Call Rate except VIL(Vodafone) 2G, BSNL 3G & VIL(Vodafone) 3G. All the TSPs have met the =95% of CSSR. Maximum throughput has been observed in 3G & 4G network of BSNL & VIL(Vodafone) respectively.

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

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

(v) Navi-Mumbai 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 =95% of CSSR except VIL(Idea) 2G. Maximum throughput has been observed in 3G & 4G network of MTNL & Airtel respectively.

(vi) Raipur City: All the TSPs have met the $\leq$2% of Drop Call Rate except BSNL 2G. All the TSPs have met the =95% of CSSR except Tata 3G. Maximum throughput has been observed in 3G & 4G network of BSNL & RJio 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@trai.gov.in

(S.K. Gupta)
Secretary

Report on Independent Drive Test conducted in Durg-Bhalia from 1st & 2nd March 2019

The drive test in the city of Durg-Bhilai in Madhya Pradesh LSA was conducted for a period of 2 days during 1st & 2nd March 2019. It covered a route of approximately 302 KMs and data tests conducted on 1 hotspot. 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	442	437	434	438	441
Blocked Call Rate (%)	0.00%	0.92%	0.46%	0.23%	0.45%
CSSR% (Accessibility)	100.00%	99.08%	99.54%	99.77%	99.55%
Drop Call Rate (%)	0.45%	2.54%	0.23%	0.46%	0.46%
Mobility HOSR (%)	98.91%	96.58%	98.97%	93.49%	95.96%
Rx Quality (%)	98.46%	98.74%	98.42%	95.60%	97.05%

Voice Call	3G					VoLTE	
	Airtel	BSNL	Tata	VIL		Airtel	Jio
				Idea	Vodafone		
Call Attempt	431	420	430	444	440	416	450
Blocked Call Rate (%)	0.00%	0.71%	0.93%	0.23%	0.45%	0.48%	0.00%
CSSR% (Accessibility)	100.00%	99.29%	99.07%	99.77%	99.55%	99.52%	100.00%
Drop Call Rate (%)	0.23%	3.12%	0.23%	0.23%	0.00%	0.00%	0.00%
Mobility HOSR (%)	99.93%	100.00%	99.97%	99.85%	99.85%	99.57%	99.97%
Rx Quality (%)	96.47%	94.47%	98.32%	95.58%	95.09%	76.98%	92.19%

Data Services Static	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Download Throughput (kbps)	180.62	196.3	137.6	114.59	117.91
Upload Throughput (kbps)	145.97	139.46	130.33	113.83	122.6
Web Browsing Delay (sec)	41.01	38.75	40.35	26.83	23.97
Latency(msec)	332	188	555	370	T0

Data Services Static	3G					4G			
	Airtel	BSNL	Tata	VIL		Airtel	Jio	VIL	
				Idea	Vodafone			Idea	Vodafone
Download Throughput (Mbps)	3.59	5.09	3.02	4.24	5.03	10.24	9.72	4.31	12.77
Upload Throughput (Mbps)	0.57	1.69	0.59	1.95	3.53	5.71	9.69	5.82	9.33
Web Browsing Delay (sec)	10.81	10.65	11.93	11.85	12.86	10.89	7.05	13.41	11.59
Video Streaming Delay (sec)	7.74	2.17	T0	1.14	0.90	1.39	0.98	1.75	0.55
Latency (sec)	86	102	104	77	106	83	98	71	95

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Report on Independent Drive Test conducted in Gangtok from 27th to 29th March 2019

The drive test in the city of Gangtok in West Bengal LSA was conducted for a period of 3 days during 27th to 29th March 2019. It covered a route of approximately 251 KMs and data tests conducted on 5 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, RJio and 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	415	380	408
Blocked Call Rate (%)	0.24%	0.79%	0.00%
CSSR% (Accessibility)	99.76%	99.21%	100.00%
Drop Call Rate (%)	1.69%	1.59%	2.45%
Mobility HOSR (%)	92.83%	88.96%	97.01%
Rx Quality (%)	95.39%	96.50%	93.88%

Voice Call	3G			VoLTE
	Airtel	BSNL	VIL(Vodafone)	Jio
Call Attempt	403	342	409	383
Blocked Call Rate (%)	1.24%	0.88%	0.98%	1.04%
CSSR% (Accessibility)	98.76%	99.12%	99.02%	98.96%
Drop Call Rate (%)	1.01%	2.06%	2.22%	0.79%
Mobility HOSR (%)	98.98%	96.85%	99.60%	98.90%
Rx Quality (%)	84.89%	94.21%	87.79%	72.34%

Data Services	2G		
	Airtel	BSNL	VIL(Vodafone)
Download Throughput (Kbps)	62.82	177.96	102.18
Upload Throughput (kbps)	86.69	109.58	61.62
Web Browsing Delay (sec)	38.15	31.75	31.25
Latency (msec)	751	403	275

Data Services	3G			4G		
	Airtel	BSNL	VIL(Vodafone)	Airtel	Jio	VIL(Vodafone)
Download Throughput (Mbps)	0.77	4.67	0.27	2.39	1.22	4.50
Upload Throughput (Mbps)	0.39	1.67	1.15	0.36	0.58	7.31
Web Browsing Delay (sec)	14.67	12.98	16.53	15.41	12.25	14.25
Video Streaming Delay (sec)	5.72	2.33	5.32	8.54	3.27	3.30
Latency (msec)	169	126	201	140	95	180

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Report on Independent Drive Test conducted in Kolkata from 4th to 13th March 2019

The drive test in the city of Kolkata in Kolkata LSA was conducted for a period of 8 days during 4th to 13th March 2019. It covered a route of approximately 843 KMs and data tests conducted on 12 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	1502	1527	1545	1255	1495
Blocked Call Rate (%)	0.27%	0.20%	1.10%	1.20%	0.13%
CSSR% (Accessibility)	99.73%	99.80%	98.90%	98.80%	99.87%
Drop Call Rate (%)	0.67%	0.59%	0.39%	0.24%	0.13%
Mobility HOSR (%)	98.53%	95.15%	98.49%	98.05%	97.66%
Rx Quality (%)	95.98%	98.89%	97.35%	96.57%	98.35%

Voice Call	3G				VoLTE	
	Airtel	BSNL	VIL		Airtel	Jio
			Idea	Vodafone		
Call Attempt	1668	1536	1184	1517	1405	1473
Blocked Call Rate (%)	0.12%	0.13%	1.69%	0.66%	0.07%	0.20%
CSSR% (Accessibility)	99.88%	99.87%	98.31%	99.34%	99.93%	99.80%
Drop Call Rate (%)	0.30%	0.91%	0.69%	0.60%	0.07%	0.00%
Mobility HOSR (%)	99.96%	97.26%	99.65%	99.81%	99.73%	99.63%
Rx Quality (%)	96.53%	97.73%	86.17%	86.94%	78.58%	90.46%

Data Services Static	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Download Throughput (kbps)	72.34	127.97	79.01	63.91	59.93
Upload Throughput (kbps)	61.38	109.94	60.87	48.65	51.44
Web Browsing Delay (sec)	27.19	26.44	26.97	29.19	32.63
Latency(msec)	358	260	390	403	TO

Data Services	3G				4G			
	Airtel	BSNL	VIL		Airtel	Jio	VIL	
			Idea	Vodafone			Idea	Vodafone
Download Throughput (Mbps)	1.14	3.07	1.33	9.60	4.15	3.26	2.86	3.81
Upload Throughput (Mbps)	0.38	1.74	1.64	1.93	5.76	4.70	2.11	3.77
Web Browsing Delay (sec)	18.34	11.66	19.89	8.92	11.07	17.45	11.09	11.09
Video Streaming Delay (sec)	4.66	3.30	7.69	2.01	4.55	8.96	5.21	2.92
Latency (sec)	171	109	220	69	156	91	94	36

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Report on Independent Drive Test conducted in Mumbai from 4th to 13th February 2019

The drive test in the city of Mumbai in Mumbai LSA was conducted for a period of 8 days on 4th to 13th February 2019. It covered a route of approximately 605 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	MTNL	Tata	Vodafone Idea Ltd	
				Idea	Vodafone
Call Attempt	1436	1589	1390	1143	1249
Blocked Call Rate (%)	0.28%	5.22%	0.14%	1.31%	1.20%
CSSR% (Accessibility)	99.72%	94.78%	99.86%	98.69%	98.80%
Drop Call Rate (%)	0.56%	9.89%	0.65%	0.71%	3.40%
Mobility HOSR (%)	98.31%	87.79%	98.80%	97.05%	97.06%
Rx Quality (%)	98.31%	98.44%	98.33%	94.60%	97.82%

Voice Call	3G			VoLTE
	Airtel	MTNL	VIL(Vodafone)	Jio
Call Attempt	1450	1526	1480	1485
Blocked Call Rate (%)	1.10%	3.28%	0.68%	0.34%
CSSR% (Accessibility)	98.90%	96.72%	99.32%	99.66%
Drop Call Rate (%)	0.63%	5.96%	1.02%	0.07%
Mobility HOSR (%)	99.99%	95.96%	99.90%	99.68%
Rx Quality (%)	93.16%	97.67%	80.22%	83.57%

Data Services Static	2G				
	Airtel	MTNL	Tata	Vodafone Idea Ltd	
				Idea	Vodafone
Download Throughput (kbps)	114.89	69.61	96.99	100.78	108.2
Upload Throughput (kbps)	141.9	97.73	99.95	137.93	98.86
Web Browsing Delay (sec)	28.63	55.32	27.94	27	35.29
Latency(msec)	479	693	450	245	T0

Data Services Static	3G			4G			
	Airtel	MTNL	VIL(Vodafone)	Airtel	Jio	Vodafone Idea Ltd	
						Idea	Vodafone
Download Throughput (Mbps)	1.01	2.80	2.19	9.88	4.61	3.84	4.97
Upload Throughput (Mbps)	0.36	0.84	1.39	2.54	2.70	4.24	3.34
Web Browsing Delay (sec)	13.69	13.17	21.48	7.86	8.75	9.85	9.84
Video Streaming Delay (sec)	3.82	2.58	7.97	1.67	2.66	2.36	2.43
Latency (sec)	85	104	203	58	56	69	52

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Report on Independent Drive Test conducted in Navi-Mumbai from 11th to 15th March 2019

The drive test in the city of Navi-Mumbai in Mumbai LSA was conducted for a period of 5 days during 11th to 15th March 2019. It covered a route of approximately 520 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	803	1165	775	995	962
Blocked Call Rate (%)	0.12%	3.95%	0.13%	16.68%	0.52%
CSSR% (Accessibility)	99.88%	96.05%	99.87%	83.32%	99.48%
Drop Call Rate (%)	1.62%	7.51%	0.90%	4.10%	0.73%
Mobility HOSR (%)	98.77%	90.53%	98.76%	96.23%	96.76%
Rx Quality (%)	96.99%	94.54%	97.68%	93.05%	97.83%

Voice Call	3G			VoLTE
	Airtel	MTNL	VIL	Jio
			Vodafone	
Call Attempt	815	1145	440	782
Blocked Call Rate (%)	0.61%	1.66%	0.45%	0.38%
CSSR% (Accessibility)	99.39%	98.34%	99.55%	99.62%
Drop Call Rate (%)	1.23%	4.71%	0.00%	0.00%
Mobility HOSR (%)	99.95%	98.28%	99.85%	99.76%
Rx Quality (%)	93.33%	94.60%	95.09%	86.72%

Data Services Static	2G				
	Airtel	MTNL	Tata	VIL	
				Idea	Vodafone
Download Throughput (kbps)	125.14	TO	86.5	109.4	81.22
Upload Throughput (kbps)	141.02	59.23	105.44	150	116.76
Web Browsing Delay (sec)	28.94	24.25	31.54	41.8	31.85
Latency(msec)	451	597	386	225	255

Data Services Static	3G			4G			
	Airtel	MTNL	VIL Vodafone	Airtel	Jio	VIL	
						Idea	Vodafone
Download Throughput (Mbps)	0.64	3.77	0.23	9.71	2.72	3.85	1.58
Upload Throughput (Mbps)	0.27	0.97	1.12	1.88	4.23	3.58	4.57
Web Browsing Delay (sec)	13.95	13.40	19.98	8.35	10.43	9.77	13.27
Video Streaming Delay (sec)	3.16	3.88	4.84	1.38	7.66	2.52	1.64
Latency (sec)	86	103	333	50	57	60	76

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Report on Independent Drive Test conducted in
Raipur from 25th 26th & 28th February 2019

The drive test in the city of Raipur in Madhya Pradesh LSA was conducted for a period of 3 days during 25th, 26th and 28th February 2019. It covered a route of approximately 322 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	394	337	474	413	427
Blocked Call Rate (%)	0.25%	0.89%	0.63%	0.00%	0.00%
CSSR% (Accessibility)	99.75%	99.11%	99.37%	100.00%	100.00%
Drop Call Rate (%)	0.00%	3.59%	0.42%	0.00%	0.70%
Mobility HOSR (%)	98.80%	97.01%	98.56%	97.77%	96.55%
Rx Quality (%)	95.62%	96.47%	94.61%	98.18%	97.75%

Voice Call	3G					VoLTE	
	Airtel	BSNL	Tata	VIL		Airtel	Jio
				Idea	Vodafone		
Call Attempt	444	422	553	369	374	352	386
Blocked Call Rate (%)	0.45%	1.42%	10.67%	0.27%	0.53%	0.57%	0.26%
CSSR% (Accessibility)	99.55%	98.58%	89.33%	99.73%	99.47%	99.43%	99.74%
Drop Call Rate (%)	0.23%	1.20%	0.40%	0.82%	0.00%	0.00%	0.00%
Mobility HOSR (%)	99.88%	99.72%	100.00%	99.82%	99.97%	99.92%	99.83%
Rx Quality (%)	93.88%	98.47%	97.28%	88.25%	93.01%	91.81%	86.63%

Data Services Static	2G				
	Airtel	BSNL	Tata	VIL	
				Idea	Vodafone
Download Throughput (kbps)	143.94	118.04	155.37	111.62	126.11
Upload Throughput (kbps)	111.09	94.07	109.08	88.5	115.39
Web Browsing Delay (sec)	45.05	27.38	34.1	39.4	30.87
Latency(msec)	542	333	490	323	279

Data Services Static	3G					4G			
	Airtel	BSNL	Tata	VIL		Airtel	Jio	VIL	
				Idea	Vodafone			Idea	Vodafone
Download Throughput (Mbps)	2.50	3.48	1.54	3.66	2.67	8.92	9.85	6.09	7.61
Upload Throughput (Mbps)	0.52	1.12	0.40	1.77	2.14	5.85	5.93	4.11	7.05
Web Browsing Delay (sec)	11.86	12.67	12.30	13.62	13.95	10.11	10.94	12.40	11.78
Video Streaming Delay (sec)	2.44	3.55	4.71	1.89	1.63	2.24	3.20	1.81	1.11
Latency (sec)	99	111	111	163	164	97	98	86	101

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Definitions

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

Block Call <=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) >=95%: Ratio of Established Calls to Call Attempts.

Drop Call Rate <=2%: An ability to maintain a call once it has been correctly established.

Hand over Success Rate (HOSR) >=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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