

**For Immediate Release**

**Information note to the Press (Press Release No. 55/2018)**

**Telecom Regulatory Authority of India**

**TRAI Releases Report on Independent Drive Tests conducted in 6 cities viz. Agra, Lucknow, Imphal, Trivandrum, Nashik and Ahmedabad.**

**New Delhi, 22<sup>nd</sup> May 2018:** TRAI through its agency conducted Independent Drive Tests (IDT) in 6 cities viz. Agra, Lucknow, Imphal, Trivandrum, Nashik, and Ahmadabad. 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 6 cities are given below:-

S.No	City	Licensed Service Area (LSA)	Period of Conducting IDT	Summary of Results of IDT
1)	Agra	UP-West	12 <sup>th</sup> Mar to 16 <sup>th</sup> Mar 2018	Annexure-A
2)	Lucknow	UP-East	26 <sup>th</sup> Feb to 3 <sup>rd</sup> Mar 2018	Annexure-B
3)	Imphal	North East	24 <sup>th</sup> Feb to 26 <sup>th</sup> Feb 2018	Annexure-C
4)	Trivandrum	Kerala	19 <sup>th</sup> Feb to 23 <sup>rd</sup> Feb 2018	Annexure-D
5)	Nashik	Maharashtra	13 <sup>th</sup> Feb to 17 <sup>th</sup> Feb 2018	Annexure-E
6)	Ahmadabad	Gujarat	29 <sup>th</sup> Jan to 2 <sup>nd</sup> Feb 2018	Annexure-F

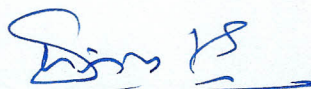
2. The Key Performance Indicators (KPIs) were assessed for the networks of all telecom service providers operating in the region. KPIs for voice services were Coverage; Call Setup Success Rate; Drop Call Rate; Block Call Rate; Handover Success Rate and Rx Quality. KPIs for data services were Download and Upload Throughputs, Web Browsing experience, Video Streaming 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) Most of the TSPs have met the 2% of QoS benchmark of drop call rate except BSNL 3G and Tata 3G in Agra, BSNL 2G, Idea 2G, Aircel 3G and Tata 3G in Lucknow, BSNL CDMA, BSNL 3G and Idea 3G in Imphal, Telenor 2G, Tata CDMA, Tata 3G and BSNL 3G in Nashik, and Tata CDMA, Tata 3G and BSNL 3G in Ahmadabad. All TSPs are meeting this parameter in Trivandrum.

(ii) All TSPs have met the 3% of QoS benchmark of Call Block rate (CBR %) in Agra and Trivandrum. Most of the TSPs have met this parameter except Aircel, Tata 3G and Telenor in Lucknow, Aircel 3G and BSNL CDMA in Imphal, Tata CDMA, 3G in Nashik and Tata CDMA in Ahmadabad.

(iii) All TSPs are meeting the Rx Quality >95% of QoS benchmark in Agra. In Lucknow, BSNL and Idea is meeting. In Imphal Airtel 3G, BSNL 3G and Jio is not meeting, in Trivandrum all are meeting except Jio, In Nashik, Telenor, Tata CDMA and all TSPs are not meeting in 3G & 4G services while in Ahmadabad Tata CDMA and all TSPs are not meeting for 3G & 4G services.

(iv) Download Throughput has been observed highest for Jio (Agra & Lucknow), Vodafone (Imphal & Ahmadabad) and for Airtel (Trivandrum & Nashik) for 4G services.

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 Tel. No. +91-11-2323-0404 or at email.id: [advqos@traigov.in](mailto:advqos@traigov.in)

  
(U.K. Srivastava)  
Secretary I/C  
TRAI

**Report on Independent Drive Test conducted in  
Agra from 12<sup>th</sup> to 16<sup>th</sup> March 2018**

The drive test in the city of Agra in UP-West LSA was conducted for a period of 5 days during 12<sup>th</sup> to 16<sup>th</sup> March 2018. It covered a route of approximately 630 KMs and data tests conducted on 5 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, Idea, Tata, Telenor, Vodafone and Jio. Tests included 2G, 3G and 4G 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					
	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
Call Attempt	919	917	920	936	883	929
Blocked Call Rate (%)	0.0%	1.0%	0.7%	0.6%	0.2%	0.0%
CSSR% (Accessibility)	100.0%	99.0%	99.3%	99.4%	99.8%	100.0%
Drop Call Rate (%)	0.1%	1.2%	0.1%	0.1%	0.2%	0.4%
Mobility HOSR (%)	98.5%	91.7%	98.8%	98.9%	95.9%	97.2%
Rx Quality (%)	97.7%	97.0%	97.6%	97.8%	98.7%	98.7%

Voice Call	3G						VoLTE
	Airtel	BSNL	Idea	Tata	Telenor*	Vodafone	Jio
Call Attempt	919	947	934	925	863	926	917
Blocked Call Rate (%)	0.4%	1.2%	1.2%	2.1%	1.3%	0.3%	0.8%
CSSR% (Accessibility)	99.6%	98.8%	98.8%	97.9%	98.7%	99.7%	99.2%
Drop Call Rate (%)	0.1%	4.5%	0.5%	4.1%	0.4%	0.2%	0.1%
Mobility HOSR (%)	99.8%	99.2%	99.8%	99.0%	99.8%	100.0%	99.8%
Rx Quality (%)	91.6%	96.0%	94.7%	72.8%	86.3%	97.3%	78.1%

\*Due to lack of coverage at outskirts of Agra calls were not initiated for Telenor 2G & 3G.

Data Services	2G					
	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
Download Throughput (Kbps)	124.4	128.7	101.7	102.7	22.1	142.3
Upload Throughput (kbps)	131.8	103.9	81.4	107.1	209.7	139.1
Web Browsing Delay (sec)	23.3	27.6	24.4	27.4	3.0	22.4
Latency (msec)	284	486	242	330	-	186

Data Services	3G					
	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
Download Throughput (Mbps)	2.6	2.7	3.9	1.9	2.6	0.3
Upload Throughput (Mbps)	0.8	1.8	2.1	0.4	0.9	1.6
Web Browsing Delay (sec)	13.0	9.6	9.5	17.2	13.1	13.9
Video Streaming Delay (sec)	1.3	1.7	1.3	4.1	2.2	2.4
Latency (msec)	304	171	157	302	281	123

Data Services	4G				
	Airtel	Idea	Jio	Telenor	Vodafone
Download Throughput (Mbps)	2.0	5.0	7.1	2.5	2.1
Upload Throughput (Mbps)	2.8	7.5	4.5	3.2	3.6
Web Browsing Delay (sec)	8.7	9.0	6.5	8.9	9.2
Video Streaming Delay (sec)	1.5	1.5	1.9	1.6	3.4
Latency (msec)	115	115	100	79	83

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**Report on Independent Drive Test conducted in  
Lucknow from 26<sup>th</sup> Feb to 3<sup>rd</sup> March 2018**

The drive test in the city of Lucknow in UP-East LSA was conducted for a period of 5 days during 26<sup>th</sup> Feb to 3<sup>rd</sup> March 2018. It covered a route of approximately 660 KMs and data tests conducted on 5 hotspots. Cellular mobile telephone service providers included namely Aircel, Airtel, BSNL, Idea, Tata, Telenor, Vodafone and Jio. Tests included 2G, 3G and 4G 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						
	Aircel *	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
Call Attempt	593	1180	1168	1247	1142	1125	1206
Blocked Call Rate (%)	7.3%	1.2%	0.2%	2.0%	1.1%	0.2%	0.1%
CSSR% (Accessibility)	92.7%	98.8%	99.8%	98.0%	98.9%	99.8%	99.9%
Drop Call Rate (%)	0.9%	0.1%	2.1%	3.1%	0.4%	0.1%	0.3%
Mobility HOSR (%)	99.2%	97.3%	97.3%	98.9%	97.4%	98.9%	98.5%
Rx Quality (%)	93.0%	97.5%	97.9%	97.9%	97.3%	99.0%	98.0%

Voice Call	3G							VoLTE
	Aircel *	Airtel	BSNL	Idea	Tata	Telenor	Vodafone	Jio
Call Attempt	463	1207	1211	1211	1099	1187	1200	1187
Blocked Call Rate (%)	6.9%	2.6%	0.3%	0.2%	3.5%	5.6%	0.5%	0.0%
CSSR% (Accessibility)	93.1%	97.4%	99.7%	99.8%	96.5%	94.4%	99.5%	100.0%
Drop Call Rate (%)	2.1%	0.5%	1.2%	1.7%	6.5%	0.4%	0.3%	0.0%
Mobility HOSR (%)	99.7%	99.8%	99.8%	99.5%	97.7%	99.9%	99.9%	99.8%
Rx Quality (%)	88.5%	94.3%	97.3%	98.0%	63.6%	93.1%	93.2%	83.8%

\*Due to lack of coverage at outskirts of Lucknow calls were not initiated for Aircel 2G & 3G

Data Services	2G						
	Aircel	Airtel	BSNL	Idea	Tata	Telenor	Vodafone
Download Throughput (Kbps)	91.5	99.2	134.2	101.8	70.5	125.0	164.1
Upload Throughput (kbps)	57.4	121.2	102.5	106.3	89.8	153.9	89.2
Web Browsing Delay (sec)	16.5	21.8	23.4	25.6	24.4	17.9	26.0
Latency (msec)	363	584	392	338	692	392	211

Data Services	3G							4G				
	Aircel	Airtel	BSNL	Idea	Tata	Telenor	Vodafone	Airtel	Idea	Jio	Telenor	Vodafone
Download Throughput (Mbps)	-	-	-	-	-	-	-	4.5	6.3	8.9	6.0	5.7
Upload Throughput (Mbps)	0.9	0.8	1.3	1.9	0.3	0.9	1.4	4.3	6.4	5.6	4.4	4.9
Web Browsing Delay (sec)	10.8	9.8	12.7	12.6	18.9	11.2	14.6	9.7	10.8	6.9	7.9	7.9
Video Streaming Delay (sec)	2.3	3.0	2.8	2.5	-	3.4	1.6	3.8	1.8	1.0	1.0	3.2
Latency (msec)	164	78	293	118	189	101	77	83	113	73	81	120

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

The drive test in the city of Imphal in North East LSA was conducted for a period of 3 days during 24<sup>th</sup> to 26<sup>th</sup> February 2018. It covered a route of approximately 260 KMs and data tests conducted on 10 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, Idea, BSNL (CDMA), Vodafone 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	Vodafone	BSNL
Call Attempt	500	486	452	508	434
Blocked Call Rate (%)	0.4%	0.2%	0.4%	0.2%	9.9%
CSSR% (Accessibility)	99.6%	99.8%	99.6%	99.8%	90.1%
Drop Call Rate (%)	0.2%	1.6%	0.2%	0.8%	8.7%
Mobility HOSR (%)	99.2%	95.2%	99.1%	95.2%	100.0%
Rx Quality (%)	96.5%	97.1%	98.7%	97.2%	96.4%

Voice Call	3G					VoLTE
	Aircel *	Airtel	BSNL	Idea	Vodafone	Jio
Call Attempt	43	486	495	454	489	473
Blocked Call Rate (%)	11.6%	0.4%	0.6%	0.0%	0.6%	0.0%
CSSR% (Accessibility)	88.4%	99.6%	99.4%	100.0%	99.4%	100.0%
Drop Call Rate (%)	0.0%	0.6%	4.3%	2.4%	1.0%	0.0%
Mobility HOSR (%)	100.0%	100.0%	96.2%	96.2%	99.8%	99.8%
Rx Quality (%)	97.2%	79.6%	91.0%	96.4%	96.0%	83.5%

\*Due to lack of coverage calls were not initiated for Aircel 3G.

Data Services	2G				CDMA
	Airtel	BSNL	Idea	Vodafone	BSNL
Download Throughput (Kbps)	64.0	150.9	98.8	116.7	668.8
Upload Throughput (kbps)	57.3	110.6	147.8	131.1	136.7
Web Browsing Delay (sec)	39.2	39.5	39.1	37.0	25.5
Latency (msec)	435	353	465	397	228

Data Services	3G				4G			
	Airtel	BSNL	Idea	Vodafone	Airtel	Idea	Jio	Vodafone
Download Throughput (Mbps)	0.2	0.6	0.2	0.4	3.6	1.9	4.5	6.6
Upload Throughput (Mbps)	0.1	1.2	1.2	1.5	2.8	5.4	3.2	8.5
Web Browsing Delay (sec)	14.1	11.2	13.2	12.5	11.0	11.1	9.5	8.7
Video Streaming Delay (sec)	8.6	5.4	2.1	2.0	2.4	3.0	1.5	0.9
Latency (msec)	317	207	283	261	164	151	165	147

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**Report on Independent Drive Test conducted in Trivandrum from 19<sup>th</sup> to 23<sup>rd</sup> February 2018**

The drive test in the city of Trivandrum in Kerala LSA was conducted for a period of 5 days during 19<sup>th</sup> to 23<sup>rd</sup> February 2018. It covered a route of approximately 620 KMs and data tests conducted on 5 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, Idea, Tata, Vodafone and Jio. Tests included 2G, 3G and 4G 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				
	Airtel	BSNL	Idea	Tata	Vodafone
Call Attempt	912	933	931	911	945
Blocked Call Rate (%)	0.11%	0.11%	0.11%	0.55%	0.00%
CSSR% (Accessibility)	99.89%	99.89%	99.89%	99.45%	100.00%
Drop Call Rate (%)	0.22%	0.86%	0.43%	0.88%	0.00%
Mobility HOSR (%)	99.33%	98.33%	99.53%	98.50%	99.75%
Rx Quality (%)	97.20%	98.64%	97.48%	97.05%	99.34%

Voice Call	3G					VoLTE
	Airtel	BSNL	Idea	Tata	Vodafone	Jio
Call Attempt	922	920	926	907	949	917
Blocked Call Rate (%)	0.76%	0.00%	0.65%	0.99%	0.00%	0.00%
CSSR% (Accessibility)	99.24%	100.00%	99.35%	99.01%	100.00%	100.00%
Drop Call Rate (%)	0.33%	0.76%	0.43%	0.67%	0.00%	0.00%
Mobility HOSR (%)	99.94%	99.67%	99.73%	99.93%	99.90%	99.57%
Rx Quality (%)	96.52%	98.54%	96.15%	96.36%	98.63%	83.55%

Data Services	2G				
	Airtel	BSNL	Idea	Tata	Vodafone
Download Throughput (Kbps)	90.7	52.5	112.0	61.2	77.1
Upload Throughput (kbps)	105.6	117.5	120.0	90.2	99.3
Web Browsing Delay (sec)	39.1	32.4	41.7	34.7	35.7
Latency (msec)	582	330	313	683	551

Data Services	3G					4G			
	Airtel	BSNL	Idea	Tata	Vodafone	Airtel	Idea	Jio	Vodafone
Download Throughput (Mbps)	0.5	0.2	0.3	0.4	0.8	11.9	4.4	7.1	8.4
Upload Throughput (Mbps)	0.7	1.2	1.2	0.7	1.9	1.9	4.3	3.4	6.4
Web Browsing Delay (sec)	11.6	11.8	11.3	14.0	9.4	8.7	8.9	7.1	6.9
Video Streaming Delay (sec)	6.7	3.9	3.4	5.4	5.5	3.4	2.1	1.6	1.2
Latency (msec)	142	149	165	182	119	86	219	109	123

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**Report on Independent Drive Test conducted in  
Nashik from 13<sup>th</sup> to 17<sup>th</sup> February 2018**

The drive test in the city of Nashik in Maharashtra LSA was conducted for a period of 5 days during 13<sup>th</sup> to 17<sup>th</sup> February 2018. It covered a route of approximately 640 KMs and data tests conducted on 5 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, Idea, Tata, Tata (CDMA), Vodafone 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	Tata	Telenor	Vodafone	Tata *
Call Attempt	848	828	850	830	824	855	754
Blocked Call Rate (%)	0.4%	1.1%	0.0%	0.8%	0.5%	0.8%	5.2%
CSSR% (Accessibility)	99.6%	98.9%	100.0%	99.2%	99.5%	99.2%	94.8%
Drop Call Rate (%)	1.1%	1.6%	0.7%	1.8%	2.3%	0.8%	4.5%
Mobility HOSR (%)	97.9%	95.0%	98.0%	97.7%	95.7%	97.8%	100.0%
Rx Quality (%)	96.5%	97.9%	96.7%	96.8%	94.2%	96.5%	81.4%

Voice Call	3G						VoLTE
	Airtel	BSNL	Idea	Tata	Telenor	Vodafone	Jio
Call Attempt	862	824	858	867	816	856	865
Blocked Call Rate (%)	2.0%	2.7%	1.0%	4.8%	0.7%	0.5%	0.1%
CSSR% (Accessibility)	98.0%	97.3%	99.0%	95.2%	99.3%	99.5%	99.9%
Drop Call Rate (%)	1.1%	5.2%	0.1%	3.8%	2.0%	0.7%	0.1%
Mobility HOSR (%)	99.9%	98.8%	99.5%	98.7%	99.4%	99.9%	99.8%
Rx Quality (%)	93.0%	94.9%	89.3%	76.7%	91.2%	92.2%	77.9%

\*Due to lack of coverage at outskirts of Nashik calls were not initiated for Tata CDMA.

Data Services	2G						CDMA
	Airtel	BSNL	Idea	Tata	Telenor	Vodafone	Tata
Download Throughput (Kbps)	79.0	142.8	135.8	83.1	100.5	138.1	609.5
Upload Throughput (kbps)	81.4	108.8	97.8	84.1	186.4	101.0	602.1
Web Browsing Delay (sec)	24.5	26.3	28.4	26.9	24.1	24.3	57.4
Latency (msec)	482	337	369	490	743	188	211

Data Services	3G						4G				
	Airtel	BSNL	Idea	Tata	Telenor	Vodafone	Airtel	Idea	Jio	Telenor	Vodafone
Download Throughput (Mbps)	1.6	1.9	2.0	0.9	1.9	1.6	6.5	4.7	2.1	6.3	6.3
Upload Throughput (Mbps)	0.6	0.5	1.0	0.5	0.5	1.4	3.1	6.9	2.2	4.4	5.3
Web Browsing Delay (sec)	11.0	12.7	11.5	12.5	10.9	11.5	9.1	8.5	9.3	6.4	2.0
Video Streaming Delay (sec)	6.0	3.1	2.1	7.8	5.5	1.7	2.4	1.9	3.4	1.2	1.7
Latency (msec)	173	164	229	163	174	107	125	83	218	102	73

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**Report on Independent Drive Test conducted in  
Ahmadabad from 29<sup>th</sup> Jan to 2<sup>nd</sup> February 2018**

The drive test in the city of Ahmadabad in Gujarat LSA was conducted for a period of 5 days during 29<sup>th</sup> Jan to 2<sup>nd</sup> February 2018. It covered a route of approximately 665 KMs and data tests conducted on 10 hotspots. Cellular mobile telephone service providers included namely Airtel, BSNL, Idea, Tata, Tata (CDMA), Telenor, Vodafone, 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	Tata	Telenor	Vodafone	Tata
Call Attempt	990	975	898	939	946	973	662
Blocked Call Rate (%)	0.2%	0.6%	0.1%	1.7%	0.3%	0.0%	23.11%
CSSR% (Accessibility)	99.8%	99.4%	99.9%	98.3%	99.7%	100.0%	76.9%
Drop Call Rate (%)	1.6%	0.6%	0.0%	0.4%	0.3%	0.4%	5.1%
Mobility HOSR (%)	98.5%	97.9%	98.6%	99.1%	98.1%	97.2%	100.0%
Rx Quality (%)	95.2%	98.7%	98.6%	96.1%	98.3%	97.0%	93.81%

Voice Call	3G				VoLTE
	BSNL	Idea	Tata	Vodafone	Jio VoLTE
Call Attempt	835	962	973	948	974
Blocked Call Rate (%)	0.8%	0.9%	2.1%	0.7%	0.21%
CSSR% (Accessibility)	99.2%	99.1%	97.9%	99.3%	99.8%
Drop Call Rate (%)	15.8%	0.9%	9.2%	0.7%	0.10%
Mobility HOSR (%)	100.0%	99.8%	99.7%	99.9%	99.2%
Rx Quality (%)	93.7%	80.6%	91.6%	91.3%	83.74%

\*Due to inconsistent data collection in Airtel 3G, results are not included.

Data Services	2G					
	Airtel	BSNL	Idea	Tata *	Telenor	Vodafone
Download Throughput (Kbps)	128.0	94.4	136.1	Fail	154.7	125.6
Upload Throughput (kbps)	116.2	88.8	155.2	Fail	155.1	103.4
Web Browsing Delay (sec)	26.5	26.7	35.6	Fail	34.7	26.0
Latency (msec)	341	525	268	481	305	-

Data Services	3G					4G			
	Airtel	BSNL	Idea	Tata *	Vodafone	Airtel	Idea	Jio	Vodafone
Download Throughput (Mbps)	1.4	1.1	2.0	Fail	1.1	7.8	4.8	6.6	9.5
Upload Throughput (Mbps)	1.1	0.7	1.2	Fail	1.1	2.3	10.4	3.8	9.2
Web Browsing Delay (sec)	10.1	12.4	12.0	Fail	14.4	8.9	5.8	7.4	5.3
Video Streaming Delay (sec)	4.7	7.2	4.6	Fail	2.1	3.2	3.7	4.1	1.1
Latency (msec)	159	189	238	544	131	87	82	100	74

Tata has Data failure in all the static location

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

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