

## Comments by LIRNEasia on the draft regulations of the Standards of Quality of Service for Mobile Data Services, submitted to the Telecom Regulatory Agency of India

LIRNEasia appreciates the opportunity to offer comments on the draft regulation and trusts that its research based comments will contribute to the improvement of the text.

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LIRNEasia is a regional information and communication technology (ICT) policy and regulation think tank active across the Asia Pacific. It has commented on numerous TRAI consultations and its Chair & CEO, Professor Rohan Samarajiva, is frequent participant in telecom policy and regulatory events in New Delhi. Annex 1 contains the organizational profile.

### Preamble

In wireline and fixed wireless networks, there is a static relation between the number of users and the exchange/base station, and this relationship is within the control of the service provider. In contrast, in cellular networks, the number of users served by a Base Transceiver Station (BTS) is not under the control of the operator, nor is it under the control of any user. Therefore, the load on a BTS can vary within a very short span of time, resulting in variation on QoSE. Based on operator configurations, such occurrences may cause the cell to dynamically resize (the cell breathing phenomenon in 3G networks) thereby affecting changes to the user experience, including, in some cases, disruption of service.

News reports<sup>1</sup> as well as research by LIRNEasia<sup>2</sup> carried out in October 2011 (and on multiple occasions prior) indicate that user experience of broadband rarely matches advertised promises.

### Recommendation 1: On Advertised speeds

The draft regulation does not specify the speeds advertised by the service providers. Often it is the theoretical maximum that is advertised, which is misleading to consumers because it is not achieved always. The proposed regulation sets limits on operators meeting a certain percentage of the “subscribed” (i.e. advertised) speed. But unless stringent guidelines are set up on what constitutes the subscribed speed, confusion in reporting can arise. Therefore, it is recommended that the TRAI includes a regulation to say that service providers should measure and publish typical download speeds. Additionally, theoretical maximum speeds (or “up to” speeds) may be shared with consumers.

As a benchmark, the Infocomm Development Authority (IDA) of Singapore implemented the same in 2011 (See “Transparency of Internet Broadband Speeds” section at <http://www.ida.gov.sg/News%20and%20Events/20110314122636.aspx?getPagetype=20>)

<sup>1</sup> E.g., The Sunday Times (2008, April 15). Broadband Speeds ‘less than half those advertised’. [http://technology.timesonline.co.uk/tol/news/tech\\_and\\_web/article3750426.ece](http://technology.timesonline.co.uk/tol/news/tech_and_web/article3750426.ece); The Hindu (2010, December 12). How fast are they? <http://www.hindu.com/2010/12/12/stories/2010121256561000.htm>

<sup>2</sup> LIRNEasia. (2010, October). Broadband Quality of Service Experience Indicators. <http://lirneasia.net/wp-content/uploads/2010/10/Broadband-QoSE-report-Oct-2010-V61.pdf>

## Recommendation 2: On minimum download speeds (Serial number 3.4)

The draft regulation defines the following benchmark;

Minimum download speed: To be measured by the service provider and reported to TRAI. (Serial number 3.4)

2.1 It is recommended that the service providers carry out these diagnostics six-hourly over a seven day testing period because speeds can vary significantly at different times of the day (specially peak vs. off-peak differences) and different days of the week (specially week days vs. weekends). Minimum data speeds should be reported during each test (for a particular day during the specified time slot). Diagnostics must be reported every six months, in the least.

2.2 It is recommended that the regulation specifies the domains (e.g., within ISP, within country but different ISPs, international) within which the diagnostics are carried out, and the results reported separately. At a minimum, two domains are recommended – local (a server located within the service provider’s network) and International (a server located beyond the first U.S. Point-of-Presence). This recommendation is because LIRNEasia’s previous experience in testing broadband quality of service shows that download speeds vary significantly based on whether the data is hosted locally (i.e. within the ISP network / within the country) or internationally (Figure 1).

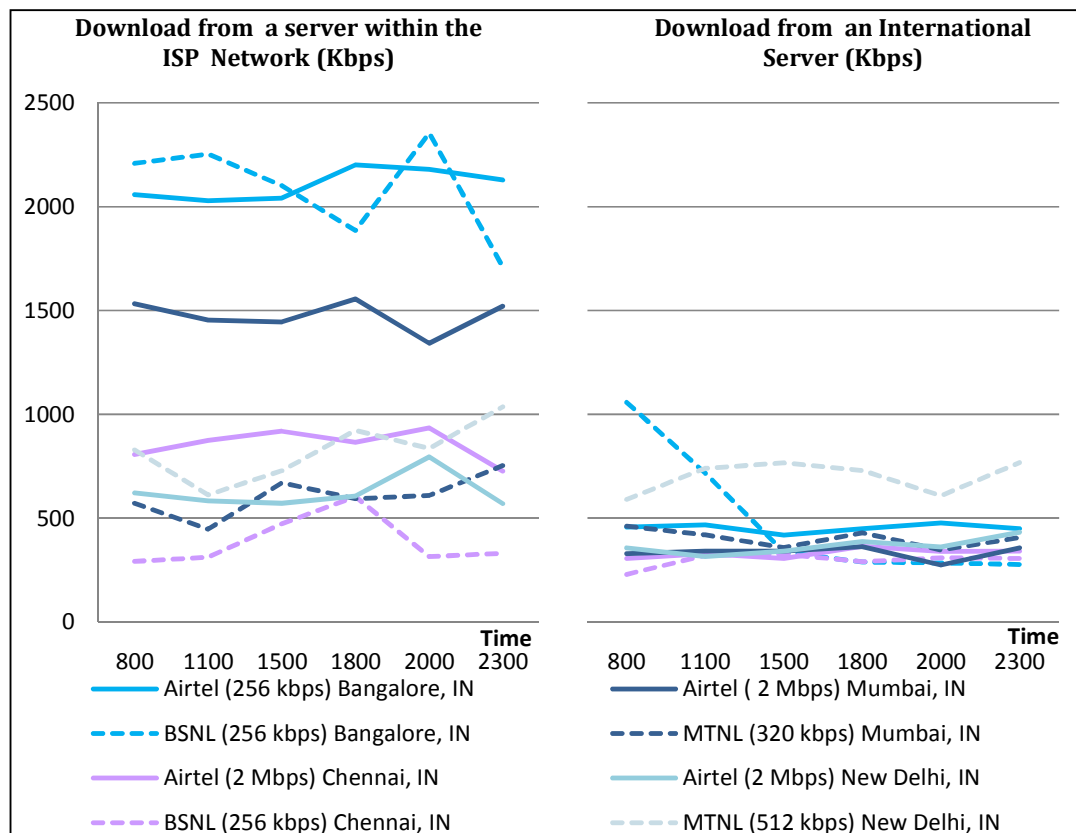


Figure 1: ISP vs. International Domain Download Speeds – Fixed Broadband, India. (LIRNEasia2011)<sup>3</sup>

<sup>3</sup> Complete reports available at <http://lirneasia.net/projects/2010-12-research-program/indicators-continued/benchmarks/>

Note: The above results are for fixed broadband packages. Similar speed deterioration is visible in mobile broadband (USB dongle based) packages tested in Sri Lanka, the Philippines and Indonesia (Refer Annex 2).

2.3 India's National Telecom Policy 2012 defines broadband as having a minimum download speed of 512 Kbps. It does not, however, specify if this definition applies to mobile broadband as well. The International Telecommunication Union (ITU) defines mobile broadband as a minimum of 256 Kbps (Refer Definitions of World Telecommunication/ICT Indicators<sup>4</sup>).

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Based on the ITU definition and taking in to account the erratic nature of the mobile network, it is recommended that the minimum download speed of 256 Kbps must be met, at the onset, at least 80 percent of the time (assuming service providers run the diagnostics in a systematic manner, i.e. six-hourly during a seven-day test period). Table 1 illustrates this further. It consists of results obtained by LIRNEasia for two fixed broadband packages in four Indian cities in 2011. The numbers in red do not meet the minimum broadband speeds of 256 Kbps. The BSNL 512 Kbps package in Bangalore and the Airtel 512 Kbps package in Chennai failed to provide 256 Kbps at least 80 percent of the time, out of the six time slots tested.

City, Country	Mumbai, IN		New Delhi, IN		Bangalore, IN		Chennai, IN	
	Airtel 2 Mbps	MTNL 512 kbps	Airtel 512 kbps	MTNL 2 Mbps	Airtel 512 kbps	BSNL 512 kbps	Airtel 512 kbps	BSNL 256 kbps
<b>8:00 AM</b>	293.4	375.3	337.6	416.7	1297.8	2366.7	142.8	1072.3
<b>11:00 AM</b>	316.1	381.3	182.8	425.8	1302.1	1591.6	162.9	1052.8
<b>3:00 PM</b>	304.3	387.8	336.2	343.7	1179.4	269.4	163.8	553.4
<b>6:00 PM</b>	275.0	401.6	331.6	437.3	237.8	221.4	268.2	320.6
<b>8:00 PM</b>	322.6	337.2	337.1	429.7	357.0	147.1	169.1	611.7
<b>11:00 PM</b>	308.0	377.1	394.5	429.3	1310.4	90.1	175.3	919.5
<b>Average</b>	<b>303.2</b>	<b>376.7</b>	<b>319.9</b>	<b>413.7</b>	<b>947.4</b>	<b>781.0</b>	<b>180.4</b>	<b>755.1</b>

**Table 1: LIRNEasia Fixed Broadband Quality of Service Experience Benchmarks, October 2011**

Note: These diagnostics are carried out as per LIRNEasia's methodology<sup>5,6</sup> developed by Prof. T Gonsalves, Director, IIT-Mandi.

The above results are for fixed broadband packages. They are presented here to further illustrate the recommendation.

<sup>4</sup>[http://www.itu.int/ITU-D/ict/material/TelecomICT\\_Indicators\\_Definition\\_March2010\\_for\\_web.pdf](http://www.itu.int/ITU-D/ict/material/TelecomICT_Indicators_Definition_March2010_for_web.pdf)

<sup>5</sup> The methodology is available at [http://lirneasia.net/wp-content/uploads/2010/10/Methodology\\_FixedQoS1.pdf](http://lirneasia.net/wp-content/uploads/2010/10/Methodology_FixedQoS1.pdf)

<sup>6</sup><http://www.lirneasia.net/wp-content/uploads/2008/03/broadband-quality-test-plan1.pdf>

### Recommendation 3: On Latency (Serial number 3.7)

It is recommended that latency is measured and reported on at least two domains – local (a server located within the service provider’s network) and International (a server located at the first U.S. Point-of-Presence).

Figure 2 shows the latency (or Round Trip Time, RTT) received during the last round of fixed broadband testing carried out by LIRNEasia in October 2011. The thresholds used are that of the IDA standards<sup>7</sup> which are lower or equal to 50 ms for a server within the ISP network and lower or equal to 300 ms for a server in the international domain. The results from India show that none of the packages reach the ISP domain benchmark consistently (during all six time slots), while the majority of the packages performed well in the international domain due to the higher benchmark.

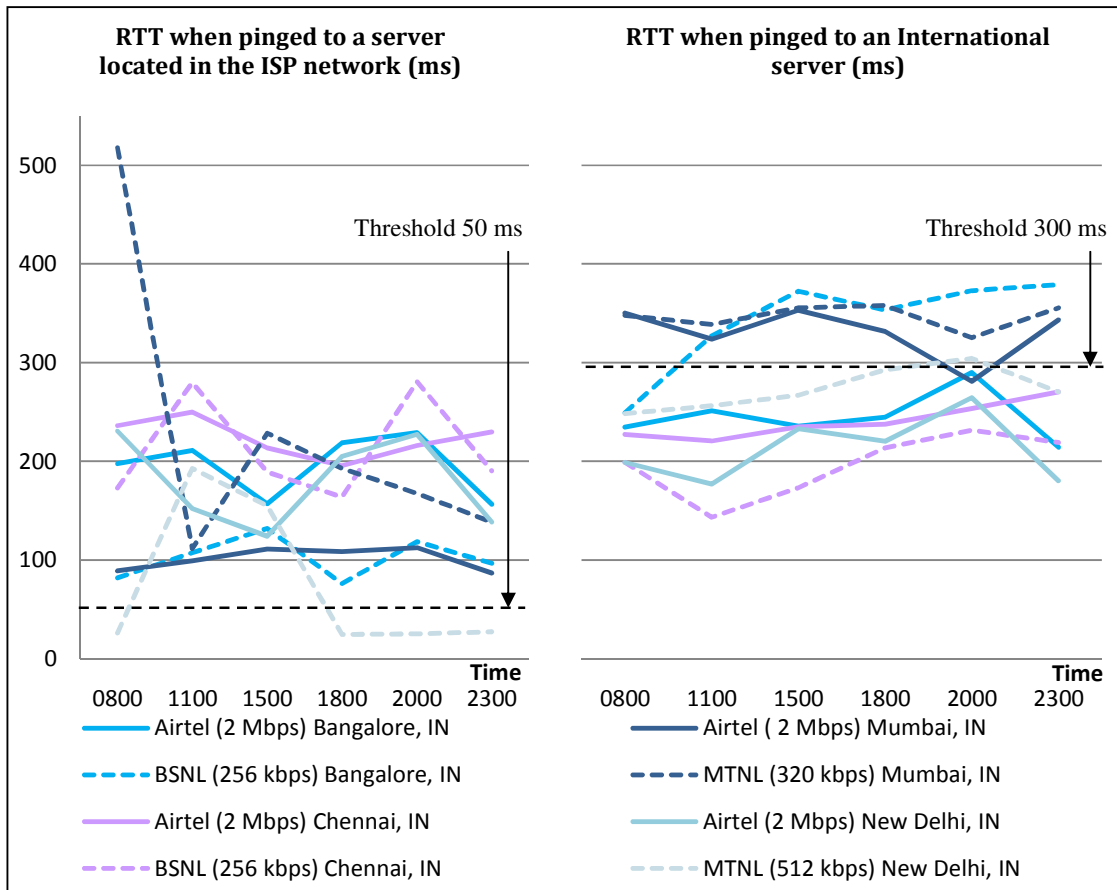


Figure 2: ISP vs. International Domain Latency – Fixed Broadband, India. (LIRNEasia 2011)

Measurements using in multiple, pre-defined domains adds value to the data at hand and provides an important element for analysis and for refining QoS standards in time. It also is likely to hint at bottlenecks in the network and highlights segments where service degradation occurs.

<sup>7</sup>[http://www.ida.gov.sg/doc/Policies%20and%20Regulation/Policies\\_and\\_Regulation\\_Level2/20060424141236/Qos\\_webpage\\_bb.pdf](http://www.ida.gov.sg/doc/Policies%20and%20Regulation/Policies_and_Regulation_Level2/20060424141236/Qos_webpage_bb.pdf)

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**Recommendation 4: Recording and reporting of diagnostics multiples times a day, multiple days of the week, in multiple domains in multiple locations in India**

Specifically for parameters in Section II bearing serial numbers 3.2, 3.3, 3.4, 3.5 and 3.7, operators must carry out diagnostics;

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- 4.1 During multiple times of the day (to account for peak and off-peak times)
- 4.2 During multiple days of the week (to account for changes in data traffic during week days and weekends)
- 4.3 In multiple domains (at least two domains – local [a server located within the ISP network] and International [a server located at the first U.S. Point-of-Presence]).
- 4.4 In multiple locations in India (to account for service areas of varying levels of congestion)
- 4.5 On a quarterly basis, in the least

**Recommendation 5: On the download file size**

It is recommended that the regulations state the minimum file size used to test download speeds. Typically, the file size should be a large file of at least 2 MB<sup>8</sup> so that the time taken to perform the download is longer (lasts at least 180 seconds) thereby providing a more accurate reading.

**Recommendation 6: Reporting of supporting parameters**

It is recommended that service providers also record and report the corresponding current load on the Node B / BTS for a period of time, so that a possible correlation may be made between this parameter and the others listed in the draft regulation. This may help improve the benchmarks in the future.

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<sup>8</sup>Page 12, Guideline 3, <http://www.lirneasia.net/wp-content/uploads/2008/03/broadband-quality-test-plan1.pdf>

## Annex 1: Organizational profile

LIRNEasia is a regional information and communication technology (ICT) policy and regulation think tank active across the Asia Pacific. Its mission is “to improve the lives of the people of the emerging Asia Pacific by facilitating their use of ICTs and related infrastructures; by catalyzing the reform of laws, policies and regulations to enable those uses through the conduct of policy relevant research, training and advocacy with emphasis on building in-situ expertise”. The core focus is on conducting in-depth research and analysis of key policy issues, disseminating that research and analysis to policymakers, regulators, managers of the relevant firms, other stakeholders and the media. Capacity building is a core element of our mission. We have a strong record of accomplishment in conducting policy relevant and successful training programs for a range of stakeholders, not limited to government, in several countries.

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LIRNEasia is incorporated as a company limited by guarantee under the Sri Lanka Companies Act. It has been in operation since September 2004, with an annual budget in the range of USD one million for the past four years, of which about a quarter is spent on India. It has established a reputation as an independent and effective think tank with several significant achievements, such as contributing through timely and targeted dissemination of evidence towards the lowering of leased line prices in Indonesia in 2007, the removal of regressive elements of a mobile-only tax in Sri Lanka also in that year, the reform of universal service policies in India and the improvement of quality-of-service regulation in India and Bangladesh.

In 2007, LIRNEasia in collaboration with IIT Madras designed a subscriber oriented diagnostic methodology (the ‘AsokaTissa’ methodology<sup>9</sup>) to test the quality of service experience (QoSE) of the end user<sup>10</sup>. In order to normalize anomalies in the network, the methodology suggests the tests are carried out at six time slots per day (08:00, 11:00, 15:00, 18:00, 20:00, 23:00) on multiple days covering both weekdays and weekends. The parameters measured are download and upload speeds (Kbps), latency or Round Trip Time (RTT, ms), jitter (ms), packet loss (%) and network availability (%). In the initial stages diagnostics were run only in Sri Lanka and India but since 2010 the test base has increased to eleven cities in seven countries<sup>11</sup> in South and Southeast Asia.

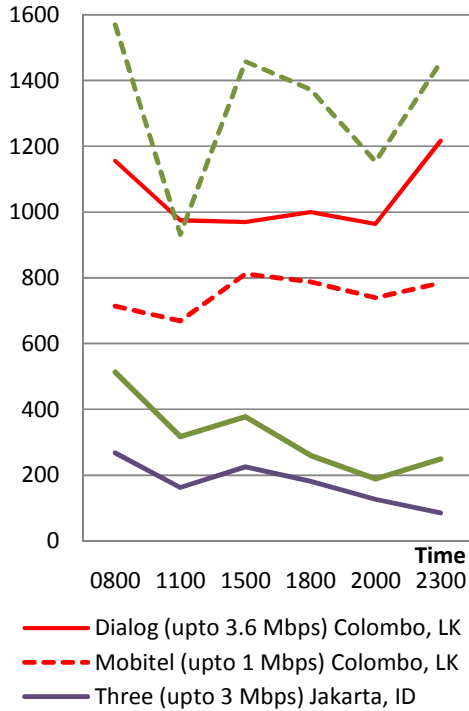
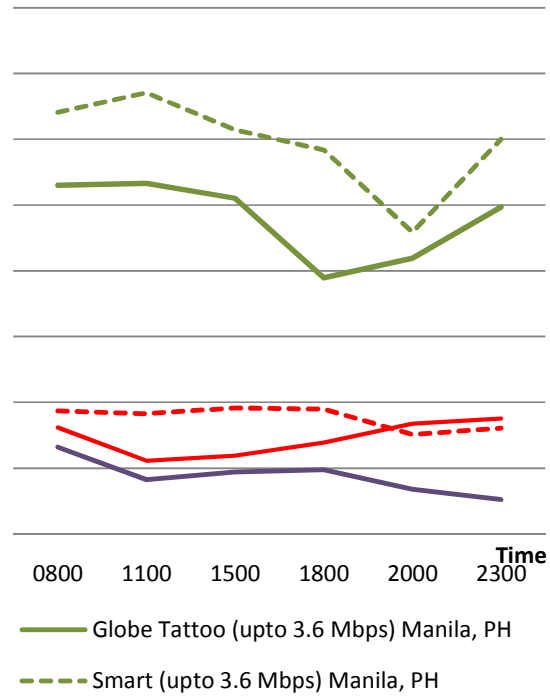
LIRNEasia has a network of researchers spread across South and Southeast Asia. We are also formally connected to research networks in Africa (Research ICT Africa), Latin America (DIRSI) and Europe (European universities of LIRNE.NET), and as such provide geographically comprehensive research coverage on ICT and telecom policies. More information on the organization including fully downloadable annual reports is available at <http://lirneasia.net/about/>.

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<sup>9</sup><http://www.lirneasia.net/wp-content/uploads/2008/03/broadband-quality-test-plan1.pdf>

<sup>10</sup>The 2011 report is available at [http://lirneasia.net/wp-content/uploads/2010/10/Broadband-QoSE-report-OCT-2011\\_V5.pdf](http://lirneasia.net/wp-content/uploads/2010/10/Broadband-QoSE-report-OCT-2011_V5.pdf). Past reports are available at [http://lirneasia.net/wp-content/uploads/2010/10/Broadband-QoSE-report-OCT-2011\\_V5.pdf](http://lirneasia.net/wp-content/uploads/2010/10/Broadband-QoSE-report-OCT-2011_V5.pdf) and <http://lirneasia.net/projects/2008-2010/indicators-continued/benchmarks/>

<sup>11</sup>Colombo - Sri Lanka; Chennai, Mumbai, Bangalore, New Delhi - India; Dhaka - Bangladesh; Thimphu - Bhutan; Chiang Mai, Bangkok - Thailand; Jakarta - Indonesia; Manila – Philippines.

**Annex 2: ISP vs. International Domain Download Speeds – Mobile Broadband (USB Dongle based) in Sri Lanka, the Philippines and Indonesia**
**Download from a server within the ISP Network (Kbps)**

**Download from an International Server (Kbps)**


— Dialog (upto 3.6 Mbps) Colombo, LK  
- - - Mobitel (upto 1 Mbps) Colombo, LK  
— Three (upto 3 Mbps) Jakarta, ID

— Globe Tattoo (upto 3.6 Mbps) Manila, PH  
- - - Smart (upto 3.6 Mbps) Manila, PH