

**Response from Center of Excellence in Wireless Technology to
“Consultation Paper on National Broadband Plan”
Dated 10th June 2010**

5.1 What should be done to increase broadband demand?

5.2 What, according to you, will improve the perceived utility of broadband among the masses?

The growth of broadband depends on key factors like a) Availability of devices that support broadband connectivity like PCs, Notebooks, Thin clients, and Smart phones, b) Availability of Right Applications and services which attract usage and c) Right pricing. We are suggesting few points related to the first two.

Availability of devices

The cost of broadband service to a user has two parts - the initial capital cost for PC and the modems, and the recurring service cost from the service provider. Just as the growth of PC/notebook market depends on availability of broadband service, the broadband growth depends heavily on the growth of PC/notebook market. This aspect needs to be addressed immediately if broadband connections have to reach target of 100M by 2014. Considering a liberal estimate of total number of PCs at 40Million and with just 8-10Million PCs sold every year, the target of adding more than 60Million broadband capable devices in the next 3 years is a gargantuan task, though not unachievable. There could be encouragement to develop and market low cost Internet Access devices targeted at non-urban consumers.

The initial thrust for this can be from the government and the education sector by ensuring broadband connection to all the CSC/Panchayats, Health Centers and to all the schools/educational institutions across the country. Thus a major impetus can come from the Government departments which can implement and utilise this infrastructure for various initiatives already planned.

The mass market needs to be addressed with attractive incentives from the market players, especially on the pricing front. Bundling of offerings as suggested in the report is one such scheme which can help overcome the initial cost hurdle.

Availability of Applications and Content

The key to perceived utility of broadband is the utility of services provided over it. Voice will continue to be provided by cellular networks for a few years before the convergence happens for Broadband and voice services. Right applications and content relevant to each segment of the broadband users need to be available for broadband users to see value from the broadband service. The ecosystem for this will evolve when the broadband market grows. Here too, the initial impetus can be in the form of basic services provided by the governmental institutions. Some areas of applications which could be the focus to start with are:

- Public Health Services like administrative procedures, information for farmers, delivery of public services like education, transport, health, public safety etc.
- Mobile banking and e-commerce
- Entertainment including films, video clips, sports clips etc
- Location Based Services like traffic information

Very much like the Mobile market, the VAS players will come with innovative offerings when the broadband market reaches a sizable market.

5.6 Do you agree that existing telecom infrastructure is inadequate to support broadband demand? If so what actions has to be taken to create an infrastructure capable to support futuristic broadband?

5.7 What network topology do you perceive to support high speed broadband using evolving wireless technologies?

The existing infrastructure was designed for wired broadband access which suffers from several limitations as documented in the TRAI consultation paper. With auction of BWA spectrum over, India will have its wireless broadband access for the first. Irrespective of the choice of actual technology used, BWA has the potential to unleash a broadband revolution in the country. However, for this to happen, several additional aspects need to be considered.

Roaming: There is only one operator with BWA spectrum in all circles. Hence, other providers will have to fall back on 3G/EVDO/GPRS/EDGE in areas where they do not have BWA spectrum, if they want to provide national roaming service to their customers. Alternatively, operators with BWA spectrum in different circles may allow each roaming in

each others' networks. Just as inter-circle roaming is allowed for mobile operators, similar arrangement maybe needed in BWA case to support national roaming.

Support for heterogeneous network deployments (pico, femto, relays etc): Multi-layer deployments are expected to play an important role in ensuring that spectrum is used efficiently by BWA technologies such as WiMAX and LTE. There is a great deal of interest in the use of low power nodes such as femto/pico base stations and relays to create a hierarchical network. This approach can improve spectrum reuse as well as enhance throughput and provide better indoor coverage. Since the low-power nodes use the same spectrum as the macro base station and may be user-deployed, the regulatory framework needs to be flexible enough to deal with these use cases.

Co-existence of multiple technologies: It is quite likely that multiple BWA technologies (for e.g. WiMAX and TD-LTE) will be used by service providers in same band in the same geographic area. The recently auctioned BWA spectrum has a minimum 2.5 MHz spacing between adjacent blocks which provides a natural guard band between two deployments. However, in case of TDD systems the UL:DL ratio will also come into play and unless there is proper harmonization of the ratio used by different deployed in the same area, the performance can be severely degraded. Hence, some regulatory intervention may be needed to ensure smooth and efficient operation of BWA networks using different technologies.

BWA backhaul: In order to make the best use of high data rates and capacity of BWA technologies like LTE and WiMAX, adequate backhaul capacity will be needed. Operators that have deployed 3G (HSPA/EVDO) networks in other parts have been facing backhaul crunch, thus hampering their growth. Indian operators need to learn from these experiences and deploy BWA networks that can scale as the demand for broadband increases.

5.16 Is there a need to define fixed and mobile broadband separately? If yes, what should be important considerations for finalizing new definitions?

There are two dimensions here that need to be considered separately. Firstly, broadband access can be provided via wired and wireless technologies. In the case of latter, access can be fixed or mobile. In other words, a BWA service can be provided to a user only at a specific location or it may be possible to access the same service at multiple locations. Secondly, mobility has many connotations. The basic case is where portable access is possible. In other words, a user can access the service within a small area, typically within the confines of home or office. Another form of mobility is termed as nomadic where the user is allowed to

access the service from multiple locations in a larger area, say a big campus or even a city. Another possibility is that the same operator can offer the broadband service to a user anywhere within a circle. Finally, if nationwide roaming is supported, then a full-mobility broadband service can be realised.

In the case of wired broadband, it is typical to speak of service parameters such as minimum rate, delay and loss etc. However, it may not always be possible to provide these guarantees in a wireless network. Therefore, there is possibly a need to use different definitions of broadband for wired and wireless access. In particular, any guarantees may have to be subject to user location and mobility profile.

Another aspect that is important to consider is the 'always on' feature which is difficult to enforce in a wireless network where radio resources are not available to a specific user all the time. A more relevant parameter here would be the time taken to setup a connection with the network. This is analogous to call-setup time used in voice telephony networks.

5.17 Is present broadband definition too conservative to support bandwidth intensive applications? If so, what should be the minimum speed of broadband connection?

The present definition of broadband service calls for a minimum speed of 256 kbps which is restrictive considering the increasing use of bandwidth-hungry services such as video streaming, tele-education, tele-medicine etc. A study on the Indian Broadband Wireless Technology Requirements was done by Broadband Wireless Consortium of India (BWCI) in 2007 [report available at www.bwci.org.in] which has also arrived at similar conclusion with regard to the broadband speeds that could be looked at for Indian market. Therefore, we recommend that minimum speed be increased to 512 kbps.

5.30 Is there a need to define new/redefine existing quality of service parameters considering future bandwidth hungry applications, time sensitivity of applications and user expectation? What should be such parameters including their suggestive value and should such parameters be mandated?

In addition to the parameters currently used by TRAI to benchmark broadband services, we recommend the following metrics to be used as well.

Upload speed: Important in the light of increasing use of video/photo sharing, blogging, social networking etc.

Jitter: Important for VoIP applications

Latency from end user to POP: This will ensure that the last-mile access does not become a bottleneck, particularly in case of BWA networks.

5.33 Do you perceive need for any regulatory or licensing change to boost broadband penetration?

The rollout obligations currently specified by DoT call for particular amount of coverage in a 5-year period. Such a long time can result in spectrum hoarding. We recommend that for future the rollout obligations be specified in incremental steps over 5 years period. For example, this may take the form of rollout targets after 1/2/5 years after the spectrum is made available to the service provider.