July 20, 2010

The Chairman,
Telecom Regulatory Authority of India,
Mahanagar Doorsanchar Bhawan,
Jawahar Lal Nehru Marg,
New Delhi 110002

Sub: Consultation Paper on NATIONAL BROADBAND PLAN (CP 09/ 2010)

Dear Sir,

We are pleased to present our views on the Consultation Paper on National Broadband Plan.

The proposed 'National Broadband Plan' document is a significant document that would serve as a Vision and Strategy Document for the next decade or so.

We hope our enclosed views would help in these efforts. We would be glad to share and explain our suggestions in person as well.

Thanking you,

Yours faithfully,

MAHENDRA NAHATA
DIRECTOR

**INFOTEL BROADBAND SERVICES PVT LTD'S VIEWS ON
CONSULTATION PAPER ON NATIONAL BROADBAND PLAN (CP 09/ 2010)**

CHAPTER 2: Broadband – Demand & Supply

Para 2.23
What should be done to increase broadband demand?
What, according to you, will improve the perceived utility of broadband among the masses?
What measures should be taken to enhance the availability of useful applications for broadband?
How can broadband be made more consumer friendly especially to those having limited knowledge of English and computer?

Response:

We interpret 'Broadband demand' as content and applications that users find useful in their day-to-day needs and meet their aspirational needs. These needs can be classified as:
- Communication
- Information
- Transaction
- Entertainment

Individually, or in combination, these needs translate into content and application needs.

Broadband changes the way a need is fulfilled; it makes the fulfilment cheaper, convenient, faster (sometimes all):
- Communication – I can speak with/ write to/ chat with/ see another person through broadband instead of going to meet/ writing a letter. I can speak to or consult a distant doctor through a video conference.
- Information – I can get weather, commodity, stocks, land records, etc. information that may not be available hitherto or needs to be begged from government officials. I can learn from the treasure of information available on the Internet. I could get distance education through a video conference.
- Transaction - I can pay taxes and bills more conveniently. I can trade (stocks, commodities) more conveniently and with better access to factual information.
- Entertainment – I can get music and videos conveniently, and don't have to buy the entire album. Searching & discovering is easier.

Communication and Information are the more fundamental of the needs listed. Then comes transaction. Entertainment is an aspirational need.

Advances in voice telecommunication have made a tremendous impact in meeting the fundamental needs. Now, people across the strata of the society can communicate with their family members and loved ones, wherever they are.
Internet has enabled easier & faster written communication, and access to information. But, there is a lot more to do. Improvement in connectivity is one significant task (discussed in subsequent sections). In addition, there is a lot to achieve on the content and applications front.

The perceived utility of broadband among the masses will improve through actions and programs that help fulfill the fundamental needs of communication, information and transaction. The efforts of Government and Regulator should be oriented towards enabling content and applications that meet the fundamental needs.

From a user perspective, following is an illustrative set of content and application expectations towards meeting the fundamental needs:

- We know that some aspects of health-care can be delivered through broadband. But, how many of the government controlled health-care centres have been enabled to do so? Is there a mandate/ directive/ budget to do this? If Government does it, private sector would run to match-up.
- Distant-education too can be delivered over broadband. But, how many of the government controlled educational institutes have online courses or live video delivery capabilities? Again, private sector would not lag behind if government programs take off.
- We have heard about information on land-ownership records. Can a user verify the legal ownership of the property that he/ she is looking to buy/ sell or that he/ she owns.
- Is online gathering and dis-semination of birth and death records available through-out the country
- Can a user apply for & get driving licence, ration cards, passports, etc online.
- Can a user get information on status of the police complaints lodged and legal cases he/ she is involved in.
- Can a user participate in court proceedings through broadband.
- Right to Information and Right to Education have strengthened citizen rights. Could there be a government or legislative mandate to fulfill these rights (RTI, RTE) through broadband. Can a citizen seek and get information online.

The benefits of the above illustrations are obvious, but can we make it happen. These are "fundamental" needs; Content (databases) and Applications (online process flows) that deliver these through broadband will certainly improve the perceived as well as actual utility of broadband.

A study of global practices shows that the key priority areas for Government and Regulator actions using Broadband as an infrastructure are:

- Education – Online Courses and Live Contact
- Healthcare delivery
- eGovernance
- Public Safety
- Energy Management

Most importantly, ubiquitous availability of broadband itself will generate the desired demand for broadband services in India. Indian telecom sector has experienced this phenomenon in case of mobile telephony wherein mere presence of services at everyplace has created tremendous demand and we are adding millions of subscribers every month on account of expanding network and service availability. Similarly, if we make broadband available to everyone at everyplace, the demand will automatically pick up. This will be possible only with the help of broadband wireless access deployment in India.

From the above, some of the key action programs that need to be considered in the Indian context are:

- **Identify and implement eGovernance Applications (Information and Transactional) in Central, State and Local Governments within defined time-frames.**

- **Enable Government Medical Institutions with Video-consultation Centres to delivery consulting and where possible advanced diagnostic services. These centres need to be equipped with reliable optic fibre connectivity. Customers, however, should be able to connect with 256 kbps or higher speed connections.**
- **Introduce Education Applications - Virtual class-rooms using video-conferencing platform in Government Education Institutes, Online Educational Courses for self study, Online Examination Centres for Competitive Entrance, Online Training Centers.**
- **Enable online Banking and Money Transfer in Rural areas**
- **Facilitate deployment of broadband wireless access so as to quickly achieve policy targets**

Para 2.35
Do you agree with projected broadband growth pattern and futuristic bandwidth requirements?

Response:

We broadly agree with the projected broadband growth and bandwidth requirement for various applications.

With the recently concluded spectrum auction, the Government has taken a very successful first step towards the growth of wireless broadband segment. Going forward, this will be a primary driver for broadband growth in India. As in case of Governement's target for teledensity which were easily surpassed by emerging mobile telephony, we can certainly look forward to not only achieving target of 100 mn broadband subscribers by 2014 but surpassing these targets with efforts to promote wireless broadband.

Similarly in case of bandwith requirement, with wider reach of broadband services, popularity of smart phones and associated applications will increase exponentially. New contents and applications will be created and accessed across divergent fields such as telecom, IT, broadcasting, entertainment, health, education etc. There will be ever increasing demand from consumers for bandwith hungry real-time applications, video streaming, cloud computing, gaming etc. In additon Thus with projected growth in users and development of new content and applications, the bandwith requirement, going forward, will be certainly in the range of 6000 Gbps as projected.

Para 2.35
Do you agree that existing telecom infrastructure is inadequate to support broadband demand? If so, what actions have to be taken to create an infrastructure capable to support futuristic broadband?

Response:

We certainly agree that the telecom infrastructure needs significant upgradation and capacity enhancement in all the three segments – last mile access, backhaul, and core – to meet the target of 100 mn connections.
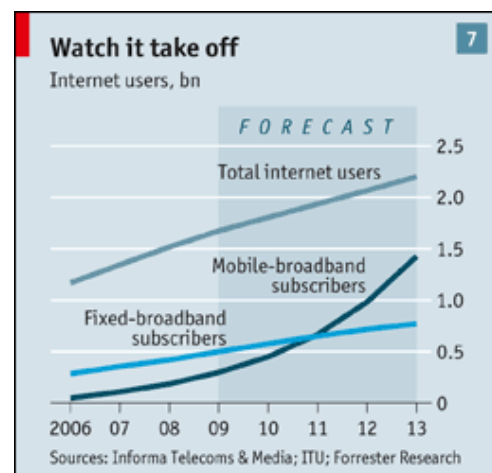
Last Mile Access Network

Copper Networks have speed limitations and especially given the historical status in India, not more than 30% of current network would be capable of supporting broadband. Further, a declining customer base, which is also a global phenomenon, will severely limit the contribution that copper networks would be able make towards broadband growth.

Similarly in case of **Cable Network** in India, in light of the fragmented ownership (that leads to sub-scale size) and unstructured network topology (that requires significant investment in upgradation), current infrastructure will not be able to contribute significantly to broadband penetration.

While **fibre-optic networks** in last mile can support higher bandwidth, they suffer from the viability challenges given the limitations on account of speed of deployment and ROW issues, high cost of terminal equipments, deployment as well as maintenance.

As with voice, **wireless platforms** hold the ultimate promise for ubiquitous broadband availability. With continued technological improvements, wireless networks have started to offer speeds comparable to wireline networks. Globally, it is estimated that, by 2011-12, wireless platforms would have more broadband customers than the fixedline networks (see chart).

We expect a similar phenomenon in India too, and expect wireless technologies to contribute most of the 100 mn connections by 2014.

Watch it take off
Internet users, bn

With the recently concluded spectrum, the Government has taken a very successful first step towards the growth of wireless broadband segment.

Going forward too, Government Policies and Programs should be prioritized towards growing the wireless broadband segment – both in terms of reach and capacity.

Backhaul Network

Backhaul Network (referred to as Feeder Network in the Consultation Paper) – Network between the Access Distribution Node point (like a DSLAM or Wireless Tower) to a City Aggregation Point – is a very significant segment of the network.

In urban areas, multiple rings are required to connect Access nodes in a redundant mode. The route length and cost of laying, esp the ROW charges, make this segment a very significant investment. Often, parts of this network are built using microwave links, which typically suffer from capacity limitations (as compared to fibre) and spectrum availability constraints. Thus the current access infrastructure suffers from the challenge of finding a cost-efficient back-haul network to connect to the core networks. The Consultation Paper also acknowledges that robust feeder networks are required to connect the Wireless Broadband Towers.

In case of rural areas, where the distance between the distribution node and aggregation Point is large, cost of creating a link for a small revenue opportunity (small end user base with lower tariff) looks unviable.

Hence, there is a need for a shared/ pooled high capacity fibre-optic backhaul network for catering to all the above cases.

Governments in USA, Australia, and several other countries have either committed or commiting to building shared fibre-optic networks. Some of these networks extend upto the home

Fibre-optic networks are the metaphorical "digital highways". An article in 'The Economist' describes these networks as:
"…Fibre-optic networks can be run like any other public infrastructure: government, municipalities or utilities lay the cables and let private firms compete to offer services, just as public roadways are used by private logistics firms."

Thus, we suggest that a Government funded/ supported shared "National Digital Highway" Project be established to create shared high-capacity fibre-optic backhaul network to connect last mile access networks to core inter-city networks.

Given that several inter-city networks have already been created by Telecom and Utility Companies, the focus of the suggested network should be the capacity deficient backhaul segment.

In order to manage the support requirement and kick-start this program, Government should consider consolidating the network infrastructure already laid out by various PSUs under one entity, and making a common "digital highway" network that runs through every city and village. A single entity should own, manage and toll the shared fibre-optic networks. Initially, this network should be funded/ supported through USF and Government, but eventually should be made self-sufficient through IRU/ recurring usage charges.

With practically limitless capacity, the sharing potential in fibre-optics is far larger than any of the sharing initiatives undertaken in mobile networks.

CHAPTER 3: National Broadband Network

Para 3.22
What network topology do you perceive to support high speed broadband using evolving wireless technologies?

Response:

As mentioned in the response to question under Para 2.35, **wireless platforms hold the ultimate promise for ubiquitous broadband availability**. With continued technological improvements, wireless networks have started to offer speeds comparable to wireline networks.

We expect a similar phenomenon in India too, and expect wireless technologies to contribute most of the 100 mn connections by 2014.

With the recently concluded spectrum, the Government has taken a very successful first step towards the growth of wireless broadband segment. Going forward too, Government Policies and Programs should be prioritized towards growing the wireless broadband segment – both in terms of reach and capacity.

Para 3.22
Do you see prominent role for fibre based technologies in access network in providing high speed broadband in next 5 years? What should be done to encourage such optical fibre to facilitate high speed broadband penetration?

Response:
As submitted in response to question at Para 2.35, given the certain limitations of fibre based technologies in access network, it would not be the 'game changer' for our envisaged broadband vision.

Para 3.22
What changes do you perceive in existing licensing and regulatory framework to encourage Cable TV operators to upgrade their networks to provide broadband?

Response:

As submitted in response to question at Para 2.35, we believe that in light of the fragmented ownership (that leads to sub-scale size) and unstructured network topology (that requires significant investment in upgradation), cable networks may not be able to transform enough to contribute significantly to broadband penetration. We believe only wireless platforms hold the ultimate promise for ubiquitous broadband availability.

Para 3.39
Is non-availability of optical fibre from districts/ cities to villages one of the bottlenecks for effective backhaul connectivity and impacts roll out of broadband services in rural areas?
If so, is there a need to create national optical fibre network extending upto villages?
In order to create National optical fibre core network extending upto villages, do you think a specialized agency can leverage on various government schemes as discussed in para B?
Among the various options discussed in Para 3.35 to 3.37, what framework do you suggest for National Fibre Agency for creating optical fibre network extending upto village level and why?
What precautions should be taken while planning and executing such optical fibre network extending upto villages so that such networks can be used as national resource in future?
What is suitable time frame to rollout such project?

Response:
Non-availability of optical fibre from districts/ cities to villages is definitely one of the bottlenecks for effective backhaul connectivity and does impact roll out of broadband services in rural areas. As mentioned in response to an earlier question, with a large distance between the last mile distribution node and aggregation Point, cost of creating a link for a small revenue opportunity (small end user base with lower tariff) looks unviable.

The cost of last mile is, in itself, a hindrance to serving low user base market segment. Availability of computers and power adds to the challenge. The last mile network, CPE and computer terminal need to be supported through USF.

There is a definite need to extend broadband services to all villages. However, as estimated in the Consultation Paper, the cost of laying fibre-optic networks to the villages would be prohibitive, while still not connecting all the villages.

Instead, the focus of a national fibre-optic network should be backhaul connectivity – connecting the access networks to the core networks. And this needs to be done in cities as well as for the villages.

We believe that the national fibre-optic backbone should be extended upto the talukas; and talukas should be connected to the village serving access point (Tower) through long haul microwave links.

As submitted in response to earlier question under Para 3.32, we suggest that:
- **A Government funded/ supported shared "National Digital Highway" Project be established to create shared high-capacity fibre-optic backhaul network to connect last mile access networks to core inter-city networks. Existing backhaul networks should be brought into the shared network regime.**
- **A single entity should own, manage and toll the shared fibre-optic networks. The entrusted entity can leverage on the various government schemes for funding. Initially, this network should be funded/ supported through USF and other Government schemes, but eventually should be made self-sufficient through IRU/ recurring usage charges.**

Further, we suggest that the access network serving the villages (including CPE and Computers) and the long-haul microwave links for connecting the access network to the national fibre-optic back-bone be funded through USF.

CHAPTER 4: Regulatory Challenges and Future Approach

Para 4.18
Is there a need to define fixed and mobile broadband separately? If yes, what should be important considerations for finalizing new definitions?

Response:

There is a need to have two definitions - separate for Fixedline and Wireless modes.

Fixedline Broadband should be defined as "wired" media with a dedicated resource (real or virtual) between service provider's POP and customer premises terminal equipment. This would typically include copper, cable, fibre, powerlines. Virtual circuits should be explicitly considered for sake of clarity as:
- DSL services can support multiple virtual circuits. In an unbundled network scenario, multiple providers could technically ride on the same copper line. In any case, even a single DSL connection shares the media with the voice circuit.
- Cable is a shared media with very high capacity. Cable Networks are typically deployed in a shared media architecture, with different channels/ services running at different frequencies. For broadband services, customer traffic runs on shared media for most part of the link upto the POP.
- Fibre is also deployed in a manner similar to cable, and customer traffic runs on different virtual circuits in a shared media for most part of the link upto the POP.

Wireless Broadband should be defined as "wireless" media between service provider's POP and trans-receiver antenna at customer premises. For sake of clarity, this would include situations with cable used to extend the antenna away from the terminal equipment.

The aspect of "always on" should be done away with. Strictly speaking, even DSL connections are, at times, configured to release the IP address after certain defined period of inactivity. The key aspect is that the resources are available on demand.

It would pertinent to emphasise that the definitions in the UN Report cited in the Consultation Paper is at variance with the above. The UN Report definitions seem oriented towards defining the state of user – tethered or mobile.

Para 4.18
Is present broadband definition too conservative to support bandwidth intensive applications? If so, what should be the minimum speed of broadband connection?

Response:

In case of fixedline broadband,
the speed should be raised to 2 Mbps and the definition should be:
"A data connection that is able to support interactive services including Internet access and has the capability of the minimum download speed of 2 Mbps to an individual subscriber from the Point of Presence (POP) of the service provider…"

However, to enable multiple service plans to meet market requirement, it should be allowed to have a declared lower speed cap at the Policy Server/ RAS. This means that a connection that is capable of supporting 2 Mbps between the customer and POP, but capped at, say, 1Mbps at the Policy Server, could still be considered as a broadband connection.

In case of wireless broadband
All consumers should have a clear and unambiguous view of what they are getting when subscribing for a broadband service. It is therefore very crucial to decide all important metrics and methodology to measure them.

One way to achieve this is by defining wireless broadband access not just in terms of the bandwidth per user but also the number of users in a given cell. The number of users criteria is equally important to ensure that the claimed maximum achievable speed is not just a theoretical speed but is of practical value. With these criteria we can define wireless broadband as

"A data connection that has the technical capability to support services including Internet access with an average download speed of 512 kbps to an individual subscriber from the Point of Presence (POP) of the service provider intending to provide Broadband service where multiple such individual Broadband connections are aggregated and there are at least 200 users downloading concurrently at any given point of time per sector".

Again, as suggested in case of fixedline, to enable multiple service plans to meet market requirement, declared lower speed cap at the Policy Server/ RAS could be allowed. This means that a connection that is capable of supporting speed upto the broadband definition speed between the customer and POP, but capped at, say, 1 Mbps at the Policy Server, could still be called as a broadband connection.

Para 4.30

What specific steps do you feel will ease grant of speedy ROW permission and ensure availability of ROW at affordable cost?

Response:

The challenge in implementing uniform ROW policies is understandable given that it is a State subject.

As discussed in response to previous questions, shared intra-city fibre-optic network deployed and managed by a Government controlled/ nominated agency is a long term solution towards resolving the ROW challenge.

Para 4.42

Does the broadband sector lack competition? If so, how can competition be enhanced in broadband sector?

Response:

No, already there is enough competition with more that 100 service providers. In addition, there is no barrier to entry in the broadband sector. In addition to the choice of DSL network, cable network or other networks, customers also have availability of wireless internet access through USB based wireless modem offered by mobile operators and thus have multiple options for broadband services. With the recently concluded spectrum auctions, choice is set to increase further by atleast 2-3 operators in all geographies.

Para 4.42

Do you think high broadband usage charge is hindrance in growth of broadband? If yes, what steps do you suggest to make it more affordable?

Response:

Usage charges are not hindrance to growth. With increased options of service providers, broadband plans are already available at very competitive monthly tariffs. It is important to ensure that customers get all information on tariffs and associated terms/ conditions transparently and unambiguously.

Para 4.42

Do you think simple and flat monthly broadband tariff plans will enhance broadband acceptability and usage?

Response:

Multiple tariff Plans should be allowed to serve the diverse needs of different customers. Some customers want more speed, some others want more download capacity. Some wish to control budgets, while others want best of speeds and capacity. Thus the choice of tariff plans should always be left to an end user.

The issues highlighted at Para 4.35 and 4.36 of the Consultation Paper are addressable. Technology solutions are available that can:

- inform users about their usage in a session, enabling customers to understand how much they would typically consume for a given type of traffic – browsing, chatting, email, streaming video, video download, etc.
- inform users periodically about the total usage in the current billing period

- warn users when they reach the free usage limit, inform about incremental usage charges and seek an affirmative confirmation before allowing further usage

Solutions, such as these, if deployed, can raise consumer confidence in usage based plans.

Para 4.42
Should broadband tariff be regulated in view of low competition in this sector as present?
What should be the basis for calculation of tariff for broadband, if it is to be regulated?

Response:

As mentioned in earlier responses, there is no barrier to entry in the broadband sector, and that choice has increased with USB based wireless internet access offerings from mobile operators, and that choice is slated to increase further following the recently concluded spectrum auctions.

There is no need for tariff regulation. Current regime should continue. As expressed earlier, it is important to ensure that customers get all information on tariffs and associated terms/ conditions transparently and unambiguously.

Para 4.42
How can utilization of International Internet bandwidth be made more efficient in present situation?
How can use of domestic and international internet bandwidth be segregated? Will it have direct impact on broadband affordability? If so, quantify the likely impact.

Response:

Bandwidth utilization can be made more efficient through increased local exchange of domestic traffic, better caching, domestic hosting and more domestic content/ applications of interest to users. For large operators, bandwidth cost is 10-20% of Revenue. Though small, it is a relevant determinant in tariffing for both usage based and unlimited plans.

Local Exchange of Traffic through NIXI
The local traffic exchange mechanism could be strengthened by inter-connection of NIXI exchange routers funded by Government, and enabling hand-over at any NIXI router rather than hand-over at router defined for terminating locations.

Better Caching
Operators need to make their own economic decisions on this aspect

Domestic Hosting/ Mirroring of Sites
The market needs to evolve its own mechanism to make domestic hosting/ mirroring more appealing. One of the ways could be pay domestically hosted sites for the traffic at rates linked to international bandwidth rates. Alternatively, operators need to look at tariffing mechanisms to charge lower or perhaps nothing for locally hosted sites.

Government could consider making it mandatory for "**.in**" sites to have domestic hosting/ mirroring. Further, Government could consider making it mandatory for all domestic data centres to connect with NIXI Routers.

<u>Domestic Content/ Applications</u>
The need for domestic content/ applications has been discussed in detail in response to questions in early sections of the Consultation Paper.

Para 4.48
What steps should be taken to bring down the cost of international internet bandwidth in India?
How can competition be enhanced in the International bandwidth sector?

Response:
Over the last few years, international bandwidth rates have fallen significantly and steadily on account of the various Regulatory initiatives by TRAI and Government – IPLC Tariffing, Improved Access to Cable Landing Stations, Easier entry in ILDO/ NLDO services.
Continual liberalization in the above areas to improve access and competition would have a salutary impact on bandwidth prices.

Para 4.59
QoS of broadband, availability of bandwidth, adherence to given contention ratio, affordability, availability and spread are some intricately linked parameters. In your opinion what should be done to ensure good quality broadband to subscribers?
Do you think that bad quality of broadband connection is impacting the performance of bandwidth hungry applications and hence crippling the broadband growth? If so, please suggest remedial actions.
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?

Response:

QoS norms for broadband services are well defined. As Wireless Broadband Services evolve, there would be further need to review and define QoS norms much like the norms for fixed and mobile voice services. In addition to norms, there should be a periodic audit mechanism so as to prevent misleading of customers or selling substandard service to customers under the garb of broadband service.

Some observations/ suggestions are as follows:
- Some significant parameters that need to be included in the Regulations are Broadband Fault Rate and MTTR. These parameters should carry the same performance targets as fixedline voice.
- Since broadband (esp fixedline) is an add-on to voice or video (in case of cable operators) and new last-mile cabling is generally not required, the service provisioning norm should be tightened to 3 days.
- In the absence of any reported data on connection quality, it is difficult to assess its impact on uptake. One does not know if 'slow speed experience' is even considered a fault.
- As mentioned in an earlier question, there is a need to lay down conditions under which the claimed maximum achievable wireless broadband speed is computed.

Para 4.64
What measures do you propose to make Customer Premises Equipment affordable for common masses? Elaborate your reply giving various options.

Response:
As an immediate measure, Import duties on PCs and CPE should be kept at 0% levels. In longer run, if Government provides all possible incentives and support for growth of broadband services, the increased demand for services will lead to lower prices for CPEs making them more affordable for common masses.

Para 4.68
What measures are required to encourage development of content in Indian vernacular languages?

Response:
On its part, Governments could ensure that all eGovernance applications are available in local language besides English and Hindi.

Para 4.71
Do you perceive need for any regulatory or licensing change to boost broadband penetration?

Response:

As mentioned earlier, TRAI Recommendations on Unified Licencing Regime should be implemented to enable wider participation. Further, TRAI recommendation on Licence Fee increase (to 6% over few years) should be withdrawn and Broadband services should be given the right boost by keeping Licence Fee at 0%.

Para 4.71
Are there any specific competition and market related issues that are hindering growth of broadband?

Response:
Availability of PCs and Laptops is a key determining factor in Broadband growth.
Currently, annual PC sales is about 7.2 mn with just over 50% going into household segment. Future growth in PCs sales would remain a key determinant of broadband uptake.

Para 4.71
What other fiscal/ non-fiscal measures should be considered to boost broadband penetration?

Response:
(a) Income Tax exemption in form of Sect 80 IA like benefits should be extended for broadband service providers.
(b) No revenue share/ license fee should be levied on wireless broadband service providers
(c) Broadband Services should be accorded infrastructure status.