RCOM Response to TRAI Consultation Paper on "Delivering Broadband Quickly: What do we need to do?"

Executive Summary:

1. (i) Minimizing / obviation of OSP and RoW costs, (ii) Categorization and unbundling of OSP plant of BSNL and MTNL, (iii) Realization of NOFN through private operators, (iv) Street side equipment installation permission, (v) mandatory in building connectivity, (vi) 'Must Carry' mandate, similar to DTH services, on the usage / sharing of a TSPs OFC network shall promote competition as well as proliferate the broad band connectivity through wireline technologies at affordable rates.
2. Measures like (i) Reduced Customs duty, (ii) Local and indigenous CPE manufacturing, (iii) lower license fees on revenues from rural areas and (iv) Nil RoW are recommended to be adopted for promotion of wireline based broadband services.
3. (i) Inadequate access spectrum, (ii) insufficient landlines based backhaul facilities, (iii) high RoW charges, (iv) tedious and time consuming permission obtaining processes and (v) non mandating of neutral hosting in campuses / buildings impede outdoor plant deployment irrespective of access technologies.
4. Measures like (i) availability of entire Globally Harmonized IMT spectrum, (ii) Doing away with WOL license and import licenses, (iii) simplified SACFA clearances, (iv) Nil RoW and timely permissions for building backhaul capacities and (v) mandating of neutral hosting in campuses / buildings shall fast pace deployment of wireless access networks.
5. TRAI microwave access and backhaul carriers allotment recommendations are unfair and shall result in creation of non-level playing field amongst the TSPs and are recommended to be revised to propel proliferation of broadband services.
6. Forbearance instead of reduced tariff ceiling would be preferable for DLC services. Measures like (i) Mandating Free and neutral access to all Multitenant Campuses / Buildings / Apartments, (ii) Tiered and uniform RoW pricing, (iii) Permission for P-MP radio links for DLC extension, (iii) incentives like Tax sops, special rebates in levies ,etc, shall aid in faster proliferation and delivery of cost effective DLC services.
7. Enhanced volume of local data content, by way of local hosting, shall make it profitable for local switching of data and therefore encourage the ISPs to connect to the NIXI. Presently, the un-favourable economics of connecting to NIXI is the primary reason for the ISPs to avoid connecting directly to it.
8. PSUs are not at all the ideal choices for the implementation the NOFN project and even the private TSPs should also be entrusted with the task of implementing NOFN for faster deployment of the network.
9. It is suggested that EPC based bids, for the turnkey contract(s) to Private Sector Telcos, should be sought and awarded on a Zonal basis by setting the Goals and Objectives for E2E manageable NOFN evolution with quantifiable and measurable parameters over a specified time.
10. Sunken investments of private telcos need to be exploited by encouraging them to contribute to the coverage of BHQ, Village Panchayat level and Village level.
11. Monetization of the fiber assets of the Telcos shall lead to improvement of the health of the telecom industry as well.

12. It would be most prudent to pick on the TSPs expertise and experience for reducing delivery costs both for the network rollout as well as the services that would be offered over the NOFN.

13. Municipal Authorities apathy, reluctance to follow a simplified and uniform policy driven and time bound delivery at reasonable rates of One time RoW charges are the major irritants in obtaining RoW for laying of optical fibre.

14. Cable TV networks growth in our country has been unstructured and haphazard and with digitization of the same yet to be completed, its business viability seems remote.

15. No Regulatory barriers are there today for providing Internet access facility through WiFi other than such an operator has to be a Licensed ISP. However, a plethora of regulatory and policy guidelines like (i) Nil RoW, (ii) Permission for inbuilding connectivity, (iii) reasonable equipment hosting rents, (iv) KYC exclusions, (v) ensuring physical security of the hotspot, would be required to be addressed for giving an impetus to internet facility through WiFi.

16. De-licensing and subsequent provisioning of newer bands like 60 GHz for deploying WIFi access shall aid rapid broadband proliferation.

17. A total of 40 MHz per TSP is the ultimate need for a true 'Digital India' and Wireless BB India to be a reality for the Top 6 TSPS in India.

18. 470-698 MHz, 2.6 GHz and 3.4-3.6 GHz bands should also be used for provision of wireless broadband services.

19. Government should consider auctioning of 700 MHz band only after two years.

Q.1. What immediate measures are required to promote wireline technologies in access networks? What is the cost per line for various wireline technologies and how can this cost be minimized? Please reply separately for each technology.

1. Wireline broadband access technologies like xDSL or xPON, despite being Capex intensive, are ideally suited to provide high speed broadband connectivity in the last mile as they are operationally more stable than wireless access. But given the arbitrary and at times astronomical costs of RoW, OSP (Outdoor plant Service Providers) infra coupled with uncoordinated developmental activities like road expansion, laying of electrical cables, etc that are undertaken by various agencies / private constructions, the outdoor plant is plagued by prolonged establishment time and frequent cuts resulting in increased Opex as well as decrease of useful life. These factors have contributed towards stunted growth and penetration of wired broadband services in the country. Any policy / regulatory impetus that shall contribute towards decreasing the Capex, Opex and ensure time bound establishment of wired broadband access plant shall promote their proliferation as well as enable provisioning of wired broadband services at affordable rates.

2. Accordingly, following **measures are recommended for promoting wireline technologies in access networks**.

   2.1. Regulate for equal opportunity to all operators other than BSNL /MTNL for OSP infrastructure set up, RoW grant and allowing shared OSP infrastructure on the same lines as that of Passive Tower Infrastructure sharing.

   2.2. Enable and legislate the equal access to build OSP for all TSPs, without discrimination, for all Multitenant Premises, Multitenant campuses, Integrated Townships.

   2.3. Unbundling of OSP plant of BSNL and MTNL.

2.4. Enable and regulate the leasing of Physical media of Copper loops, Dark fiber and Hybrid Fibre Coaxial (HFC) plant assets from incumbent operators.

2.5. TEC be mandated to categorize the incumbent OSP Copper plant for Type 1 to Type 16 Categories as per Global practices to make this buried Copper loops to be able to support xDSL based broadband service delivery at the technology capability as per the length of the corresponding copper loops.

2.6. Street side equipment installation permission to TSPs.

2.7. Similar to water and electricity connections, provisioning of infrastructure and connectivity for wired broadband should be mandatory within the buildings.

2.8. **NOFN.** Should be realised fast by pooling the unused /spare assets of the private TSPs so as to make the supply side Bandwidth available in plenty and in much faster time frame thus making bandwidth available at much more affordable rates.

2.9. **'Must Carry'** on sharing of OFC network. Today, BSNL, Airtel, TATA, Reliance, PSUs etc have more than 6 lakhs Km of Fibre in the country. A 'Must Carry' mandate, similar to DTH services, on the usage / sharing of a TSPs OFC network shall promote competition as well as proliferate the broad band connectivity. Charges for such 'Must Carry' though, can be left to the TSPs mutual agreement.

3. **Average cost** per line of E2E Electronics depending on the Density of Ports on PoP Infra, for various wireline technologies, is as given below,

3.1.	xDSL	:	US $ 15 to US $25.
3.2.	MEN	:	US $ 25 to US $ 35.
3.3.	HFC	:	US $ 20 to US $ 30.
3.4.	xPoN	:	US $ 50 to US $ 70.
3.5.	G.fast based DSL	:	US $ 75 to US $ 85.

3.6. Also an additional per subscriber CPE Cost varies from US $ 15 to US $ 80.

4. Certain cost minimization steps, for Wireline broadband access technologies, are suggested for consideration as follows.

4.1. Encourage indigenous product development and manufacturing for wireline access.

4.2. Reduce Customs duty and declare Customs Holiday for wireline broadband access infra and CPE.

4.3. Apart from the above suggested measures, Govt. can also incentivize TSPs in terms of lower license fee esp. in rural India.

4.4. Nil RoW for promotion of wireline based services. (Also please refer our response to Q 11 for details)

Q2. What are the impediments to the deployment of wireless technologies in the access network? How can these deployments be made faster? Please reply separately for each technology.

1. Wireless is indeed the fastest means of provision digital services in a vast area. The exponential growth of Indian economy, in the past two decades, has been possible due to an even faster proliferation of telecom services through the mobile cellular communication systems. But this phenomenal growth of telecom services could have been bettered had there been more favourable policy and regulatory frameworks in place. In the present regulatory environment it is felt that

the **key impediments in the deployment of telecom services, irrespective of wireless access technologies,** are as given below.

1.1. Lack of availability of Adequate Access Spectrum.

1.2. Lack of Back haul transmission facilities like xPoN, xWDM, Carrier Ethernet, Disciplined Hybrid Fibre Coaxial (HFC) plant.

1.3. High RoW costs for establishing Wireless access PoP and Backhaul Facilities.

1.4. Complex and time consuming grant of permissions for set up of access network and backhaul facilities.

1.5. Mandating the Neutral Hosting of IBS / DAS / WiFi / Small Cell at multitenant Complexes, Campuses etc.

1.6. High prices of Microwave access and backbone spectrum.

2. In order to put deployment of telecom services, irrespective of wireless access technologies, on a faster pace following measures are suggested as enablers.

2.1. **Getting the entire spectrum, as per IMT bands, released from MoD / DoS and MIB and having the globally Harmonized IMT spectrum available by end 2015 in all the bands for the standards compliant Quantity as per Global norms.**

2.1.1. Most important requirement for the effective deployment of mobile broadband technologies is **availability of sufficient quantity of globally harmonized spectrum.** In India, all IMT spectrum bands are either occupied by the government agencies or assigned to operators in small chunks which cannot be used effectively for deployment of mobile broadband. Therefore, to deploy high speed broadband technologies like 4G, it is essential that the current assignments to operators is harmonized and the government agencies be migrated out of these commercial spectrum bands.

2.1.2. There is also a need to define the roadmap, including quantum, broad timelines for availability and tentative auction time for all the bands of spectrum to be used for mobile broadband. This should be the prerequisite for the commencement of any auction in the Telecom sector along with regulatory certainty as well as financial sustainability.

2.2. **Mandating and enacting a Central Government Policy for nil RoW across the country in a tiered model to enable provisioning of the adequate Back haul capacities.** Availability of the sufficient backhaul capacity is the key enabler for provisioning and consequently proliferation of wireless broad band services. With the advent of 3G and 4G access technologies, the necessity for provisioning high capacity backhaul links has increased many folds. To ensure adequate QoS requirements for increased adoption of 3G and 4G services, the TSPs wireless backhaul capacities shall have to be necessarily be supplemented with wired backhaul links. Lack of backhaul transmission facilities like xPoN, xWDM, Carrier Ethernet and disciplined HFC Plant are an impediment for the growth and quick roll out of wireless access based broadband facilities. It is therefore important that the TSPs be incentivized to roll out more and more fiber network and backhaul facilities. It is suggested similar to NOFN, Pvt. TSPs too should be provided RoW at nil charges.

2.3. **Mandate regulations for simplified and timely grant of permissions for Access NW establishment.**

2.3.1. Presently, the operators are required to **obtain 'wireless operating licence' and 'import licence'** before rolling out their sites and network, which raises administrative challenges and delay in getting the licences and also has significant negative impact on the network planning and rollout capabilities of telecom operators. Since, the Industry is gearing up for broadband revolution, which requires faster network rollouts across the nation. Therefore, it is critical that the administrative bottlenecks and outdated processes such as 'import licence' and 'wireless operating licence', which are hindering the network planning and growth of telecom infrastructure, should be reviewed and abolished.

2.3.2. **SACFA Approval**: There is a need for further simplification of the process to have a single window clearance and timely approvals by SACFA.

2.3.3. **Right of Way:** There is a need to synchronize site approvals / rights of way procedures so as to lower the costs and expedite the process. Otherwise such operational bottlenecks truly hinder the effective implementation of broadband. On RoW, a coordinated effort must be initiated on the part of central and state governments. RoW permissions should be provided on priority and a time limit needs to be fixed. We suggest to **mandate and enact a Central Govt Policy for least cost based uniform RoW across the country in a tiered model.** Please refer our response to Q 11 for details.

2.4. **Mandate Neutral Hosting IBS/DAS at multitenant Complexes, Campuses etc.** sharing especially sharing of IBS/DAS at multitenant complexes and campuses can be mandated to promote quick roll out of broadband services.

Q3. The recommendations of the Authority on Microwave backhaul have been recently released. Are there any other issues which need to be addressed to ensure availability of sufficient Microwave backhaul capacity for the growth of broadband in the country?

1. We are not in agreement with the said TRAI recommendations and consider TRAI view as unfair and lacking comprehension of valid reasoning presented by us wrt the allocation and pricing of Microwave carriers. Authority recommendations also totally ignore the recommendations of TEC committee report on max. required MWA carriers. We request that

   1.1 MWA carrier allotment should be strictly based upon the allocation criteria set forth by TEC committee report.

   1.2 Microwave carriers for different technologies should be allocated separately.

   1.3 TRAI recommended linear charging methodology for MWA should not be considered and the earlier escalating charging principal should be continued with.

   1.4 A cap of max. 2 MWA carriers allocation in each band, especially in 15 GHz.

   1.5 Excess spectrum especially in 15 GHz should be withdrawn immediately and should be distributed equally among all TSPs.

   1.6 MWB allocation should be done on exclusive basis and the charging for these links should continue to be on AGR i.e. circle basis.

2. We believe that the above suggested measures will ensure availability of sufficient MW backhaul for the growth of the broadband in the country.

Q4. The pricing of Domestic Leased Circuits (DLC) have been reviewed in July 2014. Apart from pricing, are there any other issues which can improve availability of DLC?

1. It is submitted that reducing the ceiling as mandated by TRAI vide Regulation dated July 14th 2014 is a highly disappointing step for the market where customers are already getting services at highly competitive prices fueled by the continuous reduction in tariffs due to high bandwidth demand and effective competition in the leased circuit market**. We believe and recommend that the tariffs for DLC should be under forbearance.**

2. **Some additional measures to improve the availability of DLC are as given below:-**

   2.1 Mandate Free and neutral access to all Potential Multitenant Campuses, Buildings, Apartments

   2.2 Permission for P-MP radio links and the corresponding Spectrum Availability on appropriate Radio bands for DLC extension in the last mile.

   2.3 Authority should explore the possibility of infrastructure development in the remote and hilly areas. TRAI should look to incentivize infrastructure development in these areas by way of giving Tax Sops, allowing for special rebates in various levies or any other way that the authority deems fit.

   2.4 **Strategic Alliances with MoD for infrastructure sharing.** It is brought out that the defence forces have been permitted to enter into strategic alliances with BSNL, in North and North East areas, for developing telecom infrastructure, e.g. Srinagar – Leh or Siliguri – Darjeeling OFC links. For aiding infrastructure development at lower costs, in the remote and hilly areas, TRAI is requested to put in suitable recommendations with MoD and other agencies like railtel, PGCIL, etc for permitting enactment of similar strategic alliances with the private TSPs as well. Such measures shall aid in faster proliferation and delivery of cost effective DLC services in these areas.

   2.5 E band to be made available for provisioning DLC especially in areas where it is difficult to lay Fibre.

Q5. What are the specific reasons that ISPs are proactively not connecting with NIXI? What measures are required so that all ISPs are connected to the NIXI?

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Q6. Would the hosting of content within the country help in reduction of the cost of broadband to a subscriber? If yes, what measures are required to encourage content service providers to host content in the data centre situated within India?

Enhanced volume of local data content, by way of local hosting, shall make it profitable for local switching of data and therefore encourage the ISPs to connect to the NIXI. Presently, the un-favourable economics of connecting to NIXI is the primary reason for the ISPs to avoid connecting directly to it.

Local Hosting of Content certainly reduces the Broad Band Service delivery cost by almost 10 to 20 % and should be mandated so that the TSPS get an opportunity to have additional Cloud, Datacentre and Intracity Fiber utilization business opportunities and also ensure better Cloud Based products and better Security enabled content to be delivered at affordable rates. Local hosting enables Digital India ,Smart City India and better Online India objectives and enables Digital Inclusion thus Digital Democracy would be a true reality in near future in next 3 to 5 years.

1. The internet eco-system consists of the hosted applications, backbone and access networks and the user. Internet data exchange points (IXP) are a vital part of this eco-system as without them each separate network would require to connect individually to each other to be able to exchange traffic. Economic viability for establishment of dedicated IXP(s) is directly dependent on (a) the volume of traffic that is required to be exchanged locally and (b) the likely cost of connecting to the IXP. In case the traffic is to be routed off shores then ISPs would prefer one to one connectivity with their upstream providers, at the nearest point, instead of carrying their traffic to a IXP. Indian ISPs are disinclined to connect to the local IXP (NIXI) due to the reasons elucidated in subsequent paragraphs.

2. **Local Content Availability.** The lack of availability of mass appealing (Local vernacular based) internet content like Facebook, WhatsApp, etc, has resulted in ensuring that there is no incentive for the ISPs to connect to the IXP (NIXI).The situation is further aggravated by the fact that even the basic service like banking and rail reservation (IRCTC website) through internet, is usable by only the English speaking population. Due to the limited availability of local internet based content / unavailability of internet based content in local vernacular, most of the internet traffic generated by users is not required to be exchanged locally, thereby obviating the need for the ISP to get connected directly to NIXI. According to a survey conducted by Pingdom in March 2013, 42% of the world's top 1 million sites are hosted in the U.S while India ranks 18th in the top web hosting countries. Despite India being the world's largest IT services provider with companies like Infosys, Wipro and TCS, these companies prefer to host their applications for servicing global clients outside India.

3. **Local Hosting of Content.** Latency (delay) in availability of the internet based content plays an important part in the kind of experience a user has while accessing the same. Local hosting helps in development, deployment and availability of more advanced services which require low latency connections, such as multi-media streaming, gamming applications, VoIP, etc. It also acts as a catalyst in ensuring faster and greater adoption of net based services. To this end, local hosting of content ensures that the ISPs prefer to route the traffic locally (i.e connect to an IXP like NIXI) thereby reducing response time from a few seconds to a few milliseconds. Due to lack of economic competitiveness and relatively inferior network infrastructure, India is not an attractive destination for local hosting of international internet based content like, WhatsApp, Facebook, Google search, etc. Here too, the situation gets aggravated by the fact that even the India specific content is being hosted in data centers abroad instead of within India. Snapdeal.com or Amazon.co.in, though catering to Indian market, are hosted in US instead of India. Even hosting platforms like Webworks, etc, those are explicitly available for hosting sites with '.in' extension are hosted in places like Singapore and not India.

4. **Cost Effectiveness of Connecting to NIXI.** In a country like India where the per capita incomes are one of the lowest in the world, the cost effectiveness of the internet access pre-dominates all other factors responsible for adoption of data services. In case, an ISP is mandated to get connected to NIXI, it shall entail incurring of extra cost (Capex and Opex) thereby escalating the access cost for the users. It is therefore most economical for an ISP to get connected, at the nearest point, to a higher level ISP who in turn is connected to the NIXI. Even TRAI in their response (letter no No.1-612006-CN/534 dated 21st April, 2009) to DoTs reference (letter No.820-1C/02-LR (Vol.II) dated 2nd April, 2009) on TRAIs recommendations on "Improvement in the Effectiveness of National Internet Exchange of India (NIXI)" has provided this kind of leverage to the ISPs; quoted below is the text from TRAIs letter,

"All ISPs or their upstream provider(s) should either be connected to all NIXI nodes or to another upstream service provider(s) having- connectivity to all NIXI nodes or to an International Internet bandwidth provider through separate domestic peering link."

5. **Cost Effectiveness of Local Hosting.** Apart from ensuring Broadband proliferation and mushrooming of local IXPs another major benefit that accrues from hosting content locally is that ISPs can limit the need to purchase costly international bandwidth which is the biggest operational expense in an ISPs costing. This in turn shall enable ISPs to offer better broadband services at affordable prices. From the Capex perspective, Content Hosting Services costs are on account of (i) Real Estate i.e space for developing a Data Center, (ii) Power for IT systems and environmental conditioning purposes and (iii) Physical Security of the IT systems such as Servers, Storage and networking equipment. It is the relatively higher costs of the first two components of Capex that has prevented evolution of attractive business case(s) for the international / domestic community to host content in India.

Measures required to encourage Local Hosting of Content

6. A study conducted by OECD has found that (i) Local content, (ii) Internet infrastructure and (iii) Access prices are the three inter-related elements which feed into each other in a virtuous circle. This leads to three key lines of policy considerations as follows,

6.1. **Fostering content development.**

6.1.1. Youth is the driving force for growth of internet as it provides them with instant knowledge as well as acts as a library that is available anywhere and all the time. Therefore, the government, especially the ministry of education, should leverage the cloud facilities for creating an enabling learning environment for improving basic literacy (e.g. drafting, language, etc), critical thinking ability, as well as media, information and digital literacy skills.

6.1.2. ICT equipment such as computers, mobile phones, cameras, scanners and audio / video recorders are important tools for digital content creators. Though the governments' 'Make in India' initiative shall give an impetus to easy availability of these basic tools for content creation, but other measures like removing any trade barriers, taxes or levies that limit the development, production and importation of these devices, should also be considered.

6.2. **Expanding connectivity.**

6.2.1. It is suggested that an important area for the governments' focus should be to be an enabler for increasing international Internet connectivity with India. Given our geographical location, India is aptly located to be the global hosting center. Steps that lower the costs and barriers of delivering international bandwidth are particularly important.

6.2.2. Another major advantage that would be accrued from expanding connectivity shall be that market participants will self-organize themselves into efficient Internet exchange points, producing Internet bandwidth to the benefit of the economy.

6.2.3. In some cases the marginal cost of extending a backhaul connection to an additional location / community could be much lower than the benefit it could potentially provide. It is suggested that any government investment in road construction or electrification should consider installing the infrastructure for OFC networks at the

same time to save on the significant digging costs. These backhaul networks can support both fixed and mobile Internet connectivity over the last mile.

7. Certain other measures that shall aid in ensuring fast paced and affordable proliferation of broadband services are as given below.

   7.1. **Exemption of 'Right of Way' (ROW) charges for laying optical fibre.** According to the "State of Internet" Report by Akamai, India's average broadband speed is less than the half of the global average & peak speeds. The ROW charges for laying Optical fiber is very high in Metros & Tier 2 Cities where the generation & hosting of the content will be highest which makes it very difficult to provide high speed Internet to broadband users. Exempting ROW for rolling out the fibre network to provide high speed broadband services shall entice global content owners to move the content in the country for better accessibility & at affordable cost.

   7.2. **Subsidize power for development of domestic content hosting services.** Industrial Power rates vary from State to state. In an Internet Data Centre, Power is the most critical cost element which due to its high costs makes hosting of content unviable in India as compare to developed countries across the Globe. Concerted efforts at providing power subsidy to Internet Data Centers will help transfer the benefits for hosting services facilities thus making it lucrative for them to Invest in India. As per the Data Centre Risk Index Report by Index, Hurleyplamerflatt& Cushman & Wakefield, Power Security still remains a significant risk which puts India on rank 25 among the Top 30 destinations in the Globe.

   7.3. **Tax holidays for content provider hosted in Indian data centers.** The government should look at providing Tax holidays for the companies that deliver digital content or services through Servers based in India. Policies for establishing Data Centers in special zones, like the STPs, shall go a long way in attracting content hosting in India. It would helps companies draw long term commitment in terms of choosing India as the preferred location for Hosting & delivering digital content. E.g. In US Virgin Islands, companies can save up to 90% on their Federal & State Taxes that too for a period of 15 years. Certain other countries which offer such tax benefits are Switzerland, Ireland, Singapore etc.

8. A summary of recommendations made in the foregoing write-up are as follows,

   8.1. **Adequate policy initiatives with focus on development and hosting of content locally should be formulated.**

   8.2. **Adequate policy initiatives for attracting international content hosting should be formulated.**

   8.3. **Efficacy of NIXI shall automatically improve with such measures as ISPs would be able to realize the benefits of local switching.**

   8.4. **This shall lead to lowering of prices for provisioning broadband and consequently result in enhanced proliferation of the same.**

Q7. Are PSUs ideal choices for implementing the National Optical Fibre Network (NOFN) project?

1. **PSUs are not at all the ideal choices for the implementation the NOFN project.** This is primarily due to the relatively much lower order of magnitude difference in efficiency, productivity, responsiveness, QoS / SLA, Timely Roll out realization and most importantly the cost of realization of NOFN.

2. Moreover, the lowest quote based Procurement by PSUs leads to compromise in quality infrastructure of Duct, Fiber, Optical equipment, Technology Choice, Proactive Centralised Manageability and proactive Position based tracking of Fault management.

3. NOFNs' objective is to provide faster, cost efficient, scalable and Service Oriented enablement of BB Service Delivery Infrastructure as against Tender, Procurement, selection and empanelment of vendors and using USOF Fund disbursement and distribution to the survival and revival of PSUs.

4. It is suggested that NOFN should be used only a BackHaul / Back Bone Network and NOFN through BBNL should never ever get into Access Services like WiFi for GUN etc. This is a criminal waste of redundant investments for another layer of Access Network on such HotSpot WiFi technologies as the world is moving towards better scale adoption of 3G ,4G and 5Gfor ubiquitous availability of Wireless broadband.

5. **Pvt. TSPs should also be entrusted with the task of implementing NOFN for faster deployment of the network.**

Q8. Should awarding of EPC turnkey contracts to private sector parties through International Competitive Bidding (ICB) be considered for the NOFN project?

1. NOFN, apart from being a national broadband enabling infrastructure project, is also a project of national strategic import. Though we welcome the view of awarding of EPC turnkey contracts to private sector parties through International Competitive Bidding (ICB) for the NOFN project, however, it is brought out that the Indian TSPs and OSPs have gained immense experience in deploying optical networks of this gigantic proportion. They are well recognized and equipped, if not better from their international counterparts, to undertake optical fiber rollout on such a large scale and would be definitely better suited for implementing NOFN which has strategic implications as well.

2. It is suggested that EPC based bids, for the turnkey contract(s) to Private Sector Telcos, should be sought and awarded on a Zonal basis by setting the Goals and Objectives for E2E manageable NOFN evolution with quantifiable and measurable parameters over a specified time. For ensuring timely completion of the project while maintain highest standards for quality of implementation of NOFN project, it is suggested that the contracts can be awarded to the winning bidders with the conditions / preconditions as given below.

   2.1 The bidder to be mandated to complete # RKM in XX Months with pre-mandated Duct / Fiber and Electronics Quality.

   2.2 The biider should be permitted to exploit the utilization of sunken Fiber Infra and Access Infra while realizing the proposed Contracted Goals of RKMs in that zone.

   2.3 Network to have the inherent flexibility for provisioning scalable backbone bandwidth Capacity from 2.5 Gbps to 100 Gbps with graduated scaling of bandwidth in steps of 10 Gbps and 40 Gbps.

   2.4 The NOFN access bandwidth should have the flexibility of being offered in steps of 10 Mbps / 100Mbps / 1Gbps for facilitating cost effective Backhaul bandwidths to Cellular infrastructure in Block / VP / Village level.

   2.5 The network should also be capable of offering Wireless / Wireline Broad Band Access services to end users from n*E1 to n* 10 Mbps.

3. For ensuring level playng field for all the TSPs, NOFN should provide equated access of bandwidth on offer to all Telcos and ISPs at mandated tariff ranges with Distance and Volume based back haul / Broad Band Bandwidth service delivery .

Q9. Are there any ways in which infrastructure development costs can be reduced? Is it possible to piggyback on the existing private sector access networks so as to minimize costs in reaching remote rural locations?

It is suggested that the sunken investments of private telcos need to be exploited by encouraging them to contribute to the coverage of BHQ, Village Panchayat level and Village level. Each of the 5 major Pvt Telcos can roughly and instantaneously contribute to about 50 % coverage of the Village Panchayats with the sharing of the unused /spare dark Fiber capacity and lighted Fiber Capacity readily available in their NWs. Our own experience in NOFN Pilot Project has revealed this fact. This shall enable reduction of costs as well as the sunken costs could be better utilized. Also, monetization of the fiber assets of the Telcos shall lead to improvement of the health of the telecom industry as well.

Q10. What can the private sector do to reduce delivery costs? Please provide specific examples.

1. Indian TSPs and OSPs have rolled out vast swaths of optical fiber networks across the length and breadth of the country. Therefore, it would be most prudent to pick on their expertise and experience for reducing delivery costs both for the network rollout as well as the services that would be offered over the NOFN. Following measures are suggested for the same.

   1.1. Extensive and effective utilisation of the geographic reach of the deep and wide presence of the existing teleco networks establishment and operational setups.

   1.2. The telcos are ideally placed to offer procurement efficiency for quality NOFN Infrastructure material, products and Services.

   1.3. They are most suited to bring best Industry practices of engaging globally proven, time-tested and stable vendor(s) base through the Managed Services expertise.

   1.4. Having built excessive capacities on their existing links, they can offer their excess / spare / unused capacity for speedier realization of NOFN plans**.**

Q11. What are the major issues in obtaining right of way for laying optical fiber? What are the applicable charges / constraints imposed by various bodies who grant permission of right of way? In your opinion what is the feasible solution?

AND

Q14. What measures are required to reduce the cost and create a proper eco system for deployment of FTTH in the access network?

1. It has been amply debated and highlighted that RoW is the main irritant that needs to be addressed on priority if 'Digital India' is to be realized in the near future. Even NTP'12 has recognized the problem and set out an objective to "Address the Right of Way (RoW) issues in setting up of telecom infrastructure". Any impediment for network infrastructure rollout on account of RoW, potentially results in double burden of delays and increased cost for the telcos thereby negating the attainment of the stated vision to provide affordable broadband services across India.

2. Key Issues related to RoW, that are required to be addressed are as follows:-

   2.1 Municipal Authorities apathy and reluctance to follow a simplified policy driven and time bound delivery at reasonable rates of One time RoW charges.

2.2 Different Municipal authorities craving for recurring charges on per km / per year charges.

2.3 Municipal authorities counting fiber route Kms as a summation on a per Operator basis even in a common duct where in multiple number of telcos are sharing the same or a single duct.

2.4 Different rates being levied in different Zones of the same city like CBD etc.

2.5 Not allowing deployment of aerial fiber for speedy deployment on a temporary basis which the telcos guarantee to convert into a regular trench based OFC at a later but time bound time frame.

2.6 Arbitrary and outlandish RoW charges + Recurring Charges which at times are almost amounting to about 15% to 20% of Gross Revenue for some of the Operators.

2.7 Lack of a single window clearance leading to the avoidable requirement of approaching multiple agencies for obtaining RoW clearance.

3. In our opinion, in order to overcome the challenge of RoW related network rollout impediments, **following solutions are feasible and are suggested to be adopted:-**

3.1 No RoW charges for laying of fibre by Pvt. TSPs. This is similar to the RoW waiver provided for the NOFN project. Notwithstanding, in case the government continues to levy RoW charges then,

3.1.1 Govt to enact a Law and evolve a Policy directive for the graded model of RoW charges and making the State Govt to mandatorily grant permissions to Telcos to lay OFC Plant / Copper Plant or HFC plant.

3.1.2 RoW +Recurring charges not to exceed a fractional percentage of SUC .

3.2 JNURM Cities to be graded into a tiered model and rates to be Uniform and to be Fixed by Ministry of Urban Development and to be accepted by State Govt .

3.3 Electrictiy Boards to allow the use of Electricity Distribution NW to be used for Aerial fiber distribution also and at a Regulator determined rate.

3.4 There is an urgent need for a centralized and common procedure for RoW permissions and charges, therefore, the Central Government should issue guidelines on RoW under the Section 7 of the Indian Telegraph Act.

4. Supporting trenching activities of USOF through Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) as discussed in TRAI consultation paper on "National Broadband Plan" released on 10th June 2010.

5. Stipulated time frame with accountability for RoW clearances at nil charges will enable timely implementation of telecom networks. The Central / State Government / Local bodies I Ministry of Surface Transport etc. should take necessary steps to provide the necessary directives.

6. As an international best practice, in Canada, the prohibition, restriction or regulation of land for its use for development of a wireless telecommunications facility does not rest with the Land-Use Authority so that zoning and other laws do not interfere with federal undertaking for infrastructure projects such as cellular networks. Industry in Canada is aware that once a participating land-use authority is contacted, the consultation process is to be and shall be concluded within 120 days.

7. FTTH is provided by IP-1 licensees. Therefore, it should be allowed to be shared amongst the operators. This can be made possible by allowing Active Infrastructure sharing by the Government. This will also lower the cost.

8. Additionally, FDF should be allowed to be set up by TSPs, by Municipal authorities, at no charge basis.

Q12. Should the Government consider framing guidelines to mandate compulsory deployment of duct space for fiber / telecommunications cables and space for telecommunication towers in all major physical infrastructure construction projects such as building or upgrading highways, inner-city metros, railways or sewer networks?

1. Realization of the PMs' vision of 'Digital India' mandates establishment of a reliable and robust backbone network is critical for provisioning broadband service. Towards this end, it is important that the govt considers framing guidelines to mandate compulsory deployment of duct space for fiber / telecommunications cables and space for telecommunication towers in all major physical infrastructure construction projects such as building or upgrading highways, inner-city metros, railways or sewer networks.

2. Following suggestions are submitted for formulating effective guidelines to for the same:-

   2.1. It should be mandated that, development of roads / bridges (inter & intra city) shall necessarily have utility ducts built alongside for laying of OFC.

   2.2. All buildings / towers should be mandated to provision conduits, with well-defined access mechanisms, for laying of last mile in-building cabling for broadband services.

   2.3. Building by-laws currently deem only electricity, water, and fire safety as mandatory infrastructure for obtaining a completion certificate. Provisioning of cable ducts too should be included as a mandatory requirement for obtaining the completion certificate.

   2.4. Development authorities should mandate city developers and builders to have properly demarcated sections within buildings and on rooftops for housing broadband infrastructure, power systems and antennae.

   2.5. Mandated establishment of a tower and a common transmission / equipment room in every village, by the village panchayat, as part of the village infrastructure.

   2.6. Mandating extension of incentives to residential societies & RWA for deployment of small cells / WiFi networks, by the operators.

   2.7. Formulation of a policy for mandating power companies to develop fiber infrastructure along their transmission lines.

Q13. What are the impediments to the provision of Broadband by Cable operators? Please suggest measures (including policy changes) to be taken for promoting broadband through the cable network.

1. Cable networks, by virtue of their vast and dense reach, can definitely be leveraged for provisioning broadband services. However, in view of the Authorities observations, in the CP itself, that worldwide cable broadband penetration is quite marginal it is unlikely that cable operators in India would be willing to make the necessary investments in upgrading their network for providing broadband services. Cable TV networks growth in our country, to say the least, has been unstructured and haphazard and with digitization of the same yet to be completed, its business viability seems remote. In our opinion the key impediments to the provision of broadband by cable operators are as below:

   1.1 With telecos already facing major challenges on the RoW charges and clearance front, willingness of the cable operators to bite the opportunity for creating a structured network for delivery of broadband services too seems unlikely.

1.2 Cable TV operations do not require highly skilled task force as a TV can be controlled and configured through just a remote device at the customer premise. However, it is not the case in delivering broadband services.

1.3 Indifference of cable operators to deploy global class network deployment Architectures and Solutions to support broadband service at par with telco grade,

1.4 Willingness of a cable operator to deploy Telco grade O & M and Customer Service capability for delivering broadband services is suspect.

1.5 Ability of Cable operators to become a professional reseller of BB services and Internet Bandwidth is also doubtful.

1.6 Non Availability of an affordable Ku / Ka band Space Spectrum Segment for broadband services delivery through Satellite Based DTH providers too is remote.

1.7 With addressability of STBs yet to be 100%, deployment of billing systems for the cable based broadband services shall be a major challenge.

2. **In order to overcome the impediments elucidated in the previous paragraph, following measures are suggested to promote BB through Cable TV operators:-**

2.1 Regulator to mandate adherence to global standards based HFC plant construction and deployment guide lines and ensure 100% addressability.

2.2 Regulator to recommend global standards based HFC network architectures, products and solutions.

2.3 Regulator to recommend standards based OSS/BSS Platforms to be deployed by cable operators.

2.4 Regulator to recommend bringing cable operators under licensing and Interconnect Regimes i.e. cable operators to acquire the ISP license / get themselves registered for provisioning broadband services and ensure compliance to various license conditions like rollout obligations, Lawful Interception and Monitoring (LIM), etc.

2.5 Regulator to recommend RoW guidelines with tiered Charges.

2.6 Recommend for Lower Customs Duty on HFC based network equipment and CPE.

2.7 Enable adequate availability of space spectrum by coordinating the permission of slots in international consortiums for more satellites to be launched by ISRO.

Q15. Are there any regulatory issues in providing internet facility through Wi-Fi Hotspots? What are the reasons that installation of Wi-Fi hotspots has not picked up in the country? What type of business model needs to be adopted to create more Wi-Fi hotspots?

1. No Regulatory barriers are there today for providing Internet access facility through WiFi other than such an Operator has to be a Licensed ISP.

2. WiFi being a Hotspot based access technology with the lowest transmit power limit in an unlicensed spectrum band, it only offers a deployment model to extend Wire line / HFC based broadband services as a convenience within a Residential / Enterprise premise. Thus, WiFi technology based internet access is an extension of Internet facility and is basically dependent on the already available Wireline / HFC / MEN / xPON / Macro cellular wireless access based broadband in the backend.

3. **Deployment of WiFi network in India is fraught with the following challenges:**

2.1 Not easy to get permissions from Premise Owners to establish Hot Spots.

2.1.1 Exorbitant cost and time spent in getting permissions / clearances for ROW / installation of Pole(s) for building cost effective backhaul network.

2.1.2 Lack of permission for in building wiring, cable routing and deployment of WiFi hotspots by the premise owners.

2.1.3 Exorbitant rents for space being provided by the premise owners for installation of backhaul equipment.

2.2 Very limited back haul extension from WiFi being restricted to Copper based xDSL, Fiber based xPoN ,and much more complex 5GHz based Unlicensed Spectrum for back haul and its radiated Power restrictions.

2.3 Cumbersome RoW permissions and RoW charges, especially for building backhaul networks within the city municipality limits.

2.4 Carrier Grade WiFi standards with Off load are still getting evolved.

2.5 Lack of availability of Carrier Grade WAP, WAC with centrally manageable equipments supporting Service Provider.

2.6 WiFi standards are not yet available for 99.999 level Reliability and Maintainability and lowest MTTR and longest MTBF as per the known standards of Macro Cellular equipment's like BTS, BSC etc.

2.7 Densification of WiFi spots leads to high level of Interference impacting WiFi based service delivery levels.

2.8 Lack of availability of uninterrupted power for WiFi equipment.

2.9 Lack of physical Security of the network and WiFi hotspot infrastructure.

2.10 KYC of users accessing internet through non SIM (only WiFi) devices / cumbersome authentication process for usage of WiFi hotspot facility, as defined

2.11 Telcos compulsions for monetizing the access spectrum that has been acquired at very high prices through auctions.

2.12 Power availability for limited time during the day in hinterland.

2.13 Business models not supporting WiFi based Internet services extension due to High costs of ROW ,BH bandwidth, and High Internet bandwidth with extremely Limited Coverage around a HoT Spot

4. In order to catalyze the deployment of WiFi networks in India, it is imperative that policy and regulatory support is extended for development of an economically viable business case for the Telcos. Towards this end, following policy and regulatory changes / modifications / facilitations are proposed to be effected.

4.1 Declaring Telecom as a Priority Sector & advising State Governments for Single Window Clearance for RoW, site survey, site deployment, space and power availability and support during implementation for new fiber rollout, especially for backhaul of Wi-Fi networks.

4.2 Time bound and highly subsidized / free ROW for developing backhaul infrastructure for deployment of Wi-Fi Hotspot based network.

4.3 WPC has stipulated the maximum Effective Isotropic Radiated Power (EIRP) for 2.4 GHz and 5 GHz as 4W (36 dbm). Given the challenges (Cost and Time) being faced in deployment of OFC for backhaul connectivity, it is recommended that the EIRP be increased to 55 dbm to enable utilization of WiFi radios in bridge mode for backhaul purposes.

4.4 Considering construction of proper utility corridor for telecom services especially within the cities.

4.5 Permitting sharing of public infrastructure like electric poles, traffic light poles, telephone lines poles, etc shall enable deployment of WiFi hotspots.

4.6 WiFi hotspots being low power transmitters should be exempted from SACFA clearances.

4.7 It would be most prudent of adequate clarifications on EMF issues are provided well in advance, before investments by the operators.

4.8 Ensuring security and safety of WiFi hotspot equipment needs detailed deliberations.

4.9 Government and its agencies to undertake extensive campaign for educating the public and creating awareness against the myths related to radio radiations.

4.10 Provisioning of electricity connections within a specific time frame and at industrial rates instead of commercial rates shall aid in deployment of WiFi networks.

4.11 Ensuring seamless authentication and charging mechanisms that are operator agnostic.

Q16. What are other spectrum bands which can be unlicensed for usage of Wi-Fi technology or any other technology for provision of broadband?

De-licensing and subsequent provisioning of newer bands like 60 GHz for deploying WIFi access shall aid rapid broadband proliferation.

It is brought out that 60 GHz Band is already a exempted from licensing requirements in countries like USA, UK, Australia and Japan. WiGig specification allows devices to communicate at multi-gigabit speeds. WiGig tri-band enabled devices are compatible with existing WiFi devices as they operate in the 2.4 GHz, 5 GHz and 60 GHz bands. They are capable of delivering data transfer speeds of up to 7 Gbps i.e. nearly 50 times faster than the highest 802.11n rate.

Q17. How much spectrum will be required in the immediate future and in the long term to meet the target of broadband penetration? What initiatives are required to make available the required spectrum?

1. It is a policy and market accepted reality now that the broadband revolution in India will be spearheaded by mobile (wireless) broadband. Therefore, it is imperative that all the stakeholders are seized of the need for urgent resolution of spectrum related issues that continue to plague the sector. An estimated requirement of spectrum to meet the immediate future and long term targets of broadband penetration is as given below.

1.1 All Major operators are expected to have at the least 25% to 35% of the existing 2G / 3G subscribers with Smart phone adoption. It is these subscribers that constitute the potential Mobile broadband users with expectations of better grade of service at higher speeds supporting Video clip capable downloads.

1.2 Also, in a country with highest Subscriber density per Sq.km, highest concrete density per Sq.Km and highest vegetation density per Sq km, each TSP should have at the least 2 carriers of 4G Spectrum of 10 Mhz Channel width and 2 Carriers of 3G with 5Mhz Channel width and that too preferably in sub GHz bands for better indoor coverage.

1.3 This requires to be complemented by Inter Band Carrier Aggregation technology for wide scale adoption and thus Telcos need at the least one 10 Mhz carrier or two 5 Mhz carriers from 2.6 GHz and 1800 MHz bands.

1.4 **Therefore, a total of 40 MHz per TSP is the ultimate need for a true 'Digital India' and Wireless BB India to be a reality for the Top 6 TSPS in India.**

2. **Initiatives that are required to make available the required spectrum are given below:-**

2.1 In NTP-2012, it has been highlighted that additional 300 MHz is required by 2017 and another 200 MHz by 2020. Apart from getting additional bands for mobile broadband, it is first and foremost important that the existing bands which are being used for commercial purposes are made completely available to the operators.

2.2 In each of the 4 critical bands, viz, 800 MHz, 900 Mhz, 1800 MHz & 2100 MHz, used at present by telecom operators, none of the bands are completely made available for commercial use. There is still significant amount of spectrum that has not been assigned as it is being used by various other users, including government agencies, Defence, etc.

Q18. Are there any other spectrum bands apart from the ones mentioned in Chapter-2 to be identified for provision of wireless broadband services?

1. It has already been specified by us in response to Q 17 that the immediate need for the industry to allocate the bands completely in which the industry is operating at present.

2. However, in order to meet the requirements of mobile broadband in the country, the following bands should be allocated in the near future:

2.1 **470-698 MHz** – This band is already having a co-primary allocation to the mobile service in the Asia Pacific region. This band is essential to provide widespread mobile broadband access, especially inside buildings and in rural areas.

2.2 **2.6 GHz** – Presently this band is used by Department of spacefor satellite uplink however the same is being done in some pockets and rest of the spectrum can be made available for broadband use.

2.3 **3400-3600 MHz** – This band has already been identified for IMT in India as well as by few other major countries in the Asia Pacific region This is a good spectrum for areas of high population density.

Q19. What are the measures required to encourage Government agencies to surrender spectrum occupied by them in IMT bands?

1. India as a signatory to WRC recommendations and ITU recommendations. Thus it is imperative and bounden fundamental duty for DoT and WPC to make every effort to comply to global harmonized band allocations as per IMT Spectrum bands and make the full spectrum available for Cellular Industry.

2. MoD with all its financial budgetary support needs to realize the need for modernizing the battle Field Telecom networks from the point view of ECCM compatibility and move on to 3 Ghz + bands and free up the entire sub GHz bands and the entire 2+Ghz bands from strategic use and make them available for Cellular industry .

3. DoS with all its proven, recognized and reputed R&D capabilities should also design and produce Satellite Communication terminals and migrate to global standards for making Tablet form factor Satellite terminals for Defence forces usage. Thus the entire 2.6 Ghz Spectrum which is the most

popular band in all the countries in USA / Europe / APAC / Africa & Middle East and South America for 4G technology should be made available to Cellular industry.

4. MIB should also enable the release of the entire 700 MHz band which is conformant to Global harmonized Spectrum band allocations as this is the most popular techno-economical spectrum band for Mobile BB Service delivery.

5. As an interim measure, the concept of Authorized Shared Access (ASA) should be adopted. ASA permits other authorized licensees to utilize spectrum bandwidth held by the government agencies when it is not being used by them. The idea with ASA is that spectrum of government agencies can be utilized for other purposes during the time when they are not using it, but if it can be used freely by anyone, its usage is difficult to control. Therefore, usage should be limited to licensees that have been granted permission in advance. ASA is becoming a popular concept in Europe and Japan.

Q20. What should be the time frame for auctioning the spectrum in 700 MHz band?

1. In India 700 MHz band has been identified for IMT services as it is well suited for provisioning mobile broadband services due to it in building propagation characteristics. India has also adopted the APT 700 model for using this band in FDD mode. However, there are two aspects which need to be considered before this band is considered for auctioning. They are,

   1.1. **Availability:** As per WPC out of the 2*45 MHz, only 2*15 MHz has been assigned to defence and balance 2*30 MHz has been planned to be assigned for the IMT services. It is requested that complete 45 MHz should be made available for the mobile broadband usage.

   1.2. **Eco-system:** Secondly, the operators will only be able to use this spectrum efficiently once the eco-system for this band is developed globally. As per GSA report, at present only 7 operators have commercially launched LTE services using APT 700 (700 MHz) spectrum known as 3GPP band 28.

2. Given the above critical issues, it is recommended that the Government should consider auctioning of this band only after another two years as by then it is envisaged that at least the eco-system would have got developed to create a viable business case for the telcos.

Q21. Do you agree with the demand side issues discussed in Chapter 5 and Chapter 6? How these issues can be addressed? Please also indicate any other demand side issues which are not covered in the CP.

1. Yes we completely agree with the demand side issues highlighted in chapters 5 & 6 of the consultation paper. Govt. initiatives for creating smart cities and thereby building a digital India has the potential to create enormous demand for e-services & digital content. Some of the measures that can be adopted for addressing these issues are as follows:-

   1.1. Fast tracking the availability of common usage websites such as IRCTC, banking services, RTO / Land registration services, etc in local Indian vernacular.

   1.2. Undertaking development of content that would be of interest and useful for the rural populations requirement. A website providing the prices of vegetables / food grains in various mandies in and around the subscribers area shall enable him to sell his produce at the best prices and shall entice him to access the services often.

   1.3. Undertaking initiatives similar to rural skill development, adult education, etc for enhancing computer literacy.

1.4. To promote synergies between roll-out of broadband and various Government programs viz e- governance, e-panchayat, e-health, m-banking, MNREGA, NKN, AADHAR, low cost CPEs/ devices etc.

Q22. Please give your comments on any related matter, not covered above.

1. **Rationalization Of Levies And Duties On The Sector**

   a. The Indian mobile industry is burdened with a very high cost structure and also subject to multiple duties and levies, both at the central as well as the state level which hamper expansion of affordable service.

   b. There is a need to reduce and rationalize the cost structure of the sector to bring it in line with comparable regimes so that affordability of services can be improved further. With respect to provisioning of broadband, it is essential that these levies are rationalized as this will not only serve to increase take up of service but will also improve usage.

   c. Permit this to be amortizable for tax computation purposes during the tenure for spectrum usage rights.

   d. Companies providing Internet and broadband connectivity be exempt from income tax for ten years under section 35 (A) of Income Tax Act.

   e. Lowering of customs duty on broadband network deployment products & user devices.

   f. Tax relief in terms of custom duty, import duty should be considered in order to reduce the cost of CPE imported for broadband in the country.

   g. 100% depreciation should be allowed on capital expenditure on Information technology and telecom/ broadband equipment.

2. **Creation of Broadband Fund**: We would further like to suggest that a special Broadband Fund may be set up to specifically meet the national broadband objectives of the Government. A part of earnings from the spectrum auction say 1% from those auctions should be transferred to the National Broadband Fund to support national level broadband activities to be used for urban areas.