TRAI CONSULTATION PAPER ON PROLIFERATION OF BROADBAND THROUGH PUBLIC WI-FI NETWORKS

BIF lauds TRAI for focussing on regulatory measures to facilitate access and growth of Broadband Networks and expanding data usage through Public Wi-Fi networks We would like to highlight and stress the fact that as per ITU and IEEE, Wi-Fi plays an important complementary role with wireline and wireless broadband access to increase broadband penetration.. Since fixed broadband based fibre connectivity will require more time and funds, TRAI has correctly highlighted the importance of wireless technologies viz. Wifi for broadband penetration in India.

BIF believes that proliferation of broadband through public of Wifi would need the following measures viz.

- **Improved ROW rules Pan-India**
  The matter is under active and serious consideration of the Govt. DOT is seized of the issue and came out with a draft ROW Rules a few months ago. TRAI too in their Recommendations dated 17th April, 2015 for Acceleration of Broadband Penetration highlighted the importance of the same and its role in proliferation of broadband penetration.
  Wireless Fiber for Technically Non Feasible Areas
  There are many places where Optical Fiber cannot reach even in dense urban areas viz. Chandni Chowk where one would need the help of Gigabit Broadband wireless technologies viz. E & V band to backhaul data back to the nearest Fiber Node . The Role of E band to carry large data capacities in both Rural & Urban areas as well as that of V band for Urban locations is hence very important
- **Ease of Authentication**: e-KYC recently introduced and accepted by DOT is likely to substantially ease the process.
- **Facilitation of Roaming through Bilateral Agreements** should be similar as in the well established case of International Mobile Roaming.
- **Ease of making Payments**: This should be easily possible through a Central Clearing House. Since this facility is extensively used in the case of cellular networks and also for the purpose of number portability, the same could be extended here. Besides, , payments can be centrally handled through a payment aggregator/platform
- **Inclusion of all Technologies** Keeping in view that BIF wishes to be technology neutral, BIF recognises that there are other Wireless Broadband technologies also using Unlicensed Spectrum viz. LTE-Wi-Fi, LTE-U/LAA, Multefire, etc . BIF supports a healthy eco-system for promotion of broadband infrastructure based on multiple technologies instead of a specific /single one.
- **Competition & legal framework**

It also wishes to encourage all innovative and entrepreneurial initiatives for broadband proliferation as long as they are under the umbrella of a valid telecom framework under Section 4 of Indian Telegraph Act and fair competition rules under all conditions.

Q1. Are there any regulatory issues, licensing restrictions or other factors that are hampering the growth of public Wi-Fi services in the country?

BIF RESPONSE

India has not seen adequate broadband growth and the pace of broadband growth is lagging behind many other countries. Hence, proliferation of broadband needs regulatory attention. Some of the key factors responsible for affecting this growth and suggestions for their resolution are:

1. **Right-of-Way** - Providing Right-of-way for installation of required equipment will also be a critical factor in the successful deployment of public Wi-Fi. The frequencies at which Wi-Fi services are provided are sufficiently high such that propagation through walls of buildings or over large areas is dramatically worse as compared to the cellular technologies.. There is thus a need for high densities of Access Points – especially in dense urban areas such as those which characterize Indian cities and towns. These areas require significantly larger access points on the network to provide sufficient coverage. Providing an enabling policy on Right-of-Way in this context becomes important as installation can be legally complicated, costly, and time-consuming. Such a policy should be premised on permitting deployment of Wi-Fi infrastructure on government buildings/ electricity poles free of cost or at very low cost. ROW should also include permission to use new bands viz. E band which provides wireless backhaul to the nearest fiber node.

2. KYC requirement – The current ISP licensing process and the Know-Your-Customer (KYC) requirements in India curb innovation and flexibility in the business models of those seeking to deploy Wi-Fi access. For instance, the OTP-based verification process creates a bottleneck when SMS service is not efficient or there is mobile coverage issue or in cases of foreign nationals who do not use Indian SIM cards. These types of regulatory requirements immediately create an obstacle to the use of public Wi-Fi. Instead, reference should be made to best practices in other jurisdictions such as in the United States, United Kingdom and Japan by adopting the global standards like Hotspot 2.0 and 802.11U.

e-KYC has now been introduced and accepted by DOT and the same could also be applied here to enable speedy access.

3. **Permit users to enhance coverage and provide services to the surrounding communities** - As Wi-Fi is provided over a delicensed band, customers should be allowed to install Wi-Fi repeaters to enhance coverage and provide service to the surrounding areas. Of course, this

shall be subject to meeting the prevailing license obligations. All verification/ authentication and service support can be handled by the home service provider.

4. **Centralized hub for AAA –** A centralized hub for Authentication, Authorization and Accounting (AAA) will not be desirable. This is keeping in view that since Wifi is only an extension of a public broadband service and hence it should fall in line with the AAA standards/protocols and implementation models which are implemented in the cellular domain. Also centralised hub for AAA globally is fraught with security issues and may run into domestic barriers in the form of security clearances from the Govt. itself. Also, by doing so, it would unnecessarily centralize information, raise innovation barrier, increase security risk, and increase cost of compliance. While we support the standardization of AAA, we submit that a decentralized model, with the various ISPs managing AAA, will be easier and quicker to implement.

The upstream ISP can provide such authentication services, thus removing the need for the downstream provider to provide them. The ISPs can connect with each other, on mutually agreed commercial arrangements, to provide inter-operability of the payment instruments/ balance transfer etc. Settlement of the financial arrangement can be managed at the ISP level and is particularly appropriate when the downstream reseller is not, itself, an ISP, but rather a customer with the capacity or desire to resell as part of the financial model supporting its use of the upstream provider's services.

From a user's perspective, there must be no restriction on simultaneous login through multiple devices using same user ID and password.

5. **Edge caching –** Edge caching is helpful in reducing cost and latency and it should be enabled and encouraged and there shouldn't be any prohibitive regulation on caching.

6. **Wi-Fi Equipment** - Customs duties and other taxes on Wi-Fi equipment need to be reduced considering that this shall help in promoting the broadband networks adds significant value at multiple levels towards the economic and social growth of the country.

7. **Free Spectrum for Wi-Fi and end link connectivity** - Government should provision adequate free spectrum for enabling the proliferation of cost effective Wi-Fi networks for providing affordable Internet services to the unserved and underserved. TRAI has already recommended complete de-licensing of the V-band (60Ghz) for access purpose and light licensing for backhaul purposes. It is recommended that since this band is best suited for providing high capacity data links in dense urban areas, the true potential of the V-band will remain locked until it is completely de-licensed for backhaul as well. Similarly, spectrum across the 5.725-5.825 GHz band must be delicensed for outdoor use too.

8. **Multiple payment methods** – For availing Wi-Fi services, multiple payment methods should be allowed such as cash, electronic payment vouchers/ recharge, paper vouchers, on-line etc.

9.. **Incentives to invest in Wi-Fi networks** - Operators should be given sufficient incentives to invest in Wi-Fi networks. Commercial models for deployment of public Wi-Fi services which involve transfer of assets at the end of the contract period, viz., BOOT (Build, Own, Operate & Transfer) model may need to be assessed taking into account feasibility of Return on Capital (RoC) on investments in network equipment deployed by the ISP. For a viable business model to exist in which the service provider is expected to invest in CAPEX and OPEX to setup and maintain public Wi-Fi networks, other policy & regulatory measures may also be considered such as:

- mandating of common telecom infrastructure and availability of open access to the same inside buildings in a transparent and non-discriminatory manner;
- ease of acquisition of Wi-Fi customers; and
- ease of access for international travellers.

Q2. What regulatory/licensing or policy measures are required to encourage the deployment of commercial models for ubiquitous city-wide Wi-Fi networks as well as expansion of Wi-Fi networks in remote or rural areas?

BIF RESPONSE

City wide networks viz. Delhi or Mumbai are a licensed service area by itself. Hence any single operator who sets up a city-wide Wi-Fi network should be permitted to do so under the ambit of a regular telecom license under Section 4 of Indian Telegraph Act, 1885.

In addition to our detailed response to Question No. 1 above, we perceive backhaul availability as one of most important factors deciding the success of Wi-Fi networks. If fibre backhaul is available to provide connectivity to the Access Points, the issue is somewhat mitigated, but ISPs have themselves experienced several cases where overall fibre bandwidth was insufficient to handle peak usage times. For example, in the peak time of traffic, capacity in some areas served by broadband fibre backbones can be so saturated that effective available bandwidth will decrease to a small fraction of its rated capacity.

Moreover, as explained in the pre-amble itself and in response to Q1, new bands viz. E Band should be permitted to enable wireless backhaul to the nearest fibre node in many semi-rural and rural locations, If Government de-license V band (60 GHz band) for the purpose of access and backhaul too, it would be easier to overcome the backhaul constraints in urban area and will also cater to the ever increasing data traffic by providing large number of short

distance high capacity end links in the urban areas. In the Absence of such de-licensed frequency bands for backhaul, one is forced to depend on the slow and expensive build-out of landline fibre networks, thereby delaying the march of broadband and also making it unaffordable.

Q3. What measures are required to encourage interoperability between the Wi-Fi networks of different service providers, both within the country and internationally?

BIF RESPONSE

Interoperability and standardized APIs should be encouraged for all activities. Moreover, the Government may consider mandating roaming agreements between all ISPs.

Wi-Fi data sharing should be allowed, where the parent network allows a user to roam in other user's network through a transparent system by which the roaming bills are paid only to the home network provider who in turn compensates the visited network provider for the number of minutes/data used. Also payment should be on the pay-as-you-use model and not on a fixed flat charge. Interoperability including subscriber authentication, authorisation & billing functionality should be based on mutual commercial agreements between the operators.

Q4. What measures are required to encourage interoperability between cellular and Wi-Fi networks?

BIF RESPONSE

Standardisation should be adopted to encourage interoperability between cellular and Wi-Fi networks. This standardisation can be implemented by operators to connect to each other on mutually agreed commercial arrangement to provide intra-operability. Please see our response to Question No. 8 below.

Q5. Apart from frequency bands already recommended by TRAI to DoT, are there additional bands which need to be de-licensed in order to expedite the penetration of broadband using Wi-Fi technology? Please provide international examples, if any, in support of your answer.

BIF RESPONSE

As suggested in the CP, 5.7 GHz band may be delicensed for outdoor use. Although this is a "Wi-Fi band", it can also be used also as unlicensed backhaul band. This is especially the case as there is already an existing ecosystem of low-cost microwave backhaul equipment that can utilize this band and would facilitate additional reductions in backhaul provisioning costs. In general, we support the delicensing of as much 5GHz spectrum as possible. The case of the United States, where FCC has consistently expanded the unlicensed 5GHz bands,

demonstrates that such delicensing (a) can be performed without creating wide-scale disruptive interference; and (b) can drive significant economic stimulus.

In addition, as suggested in the CP and as seen in our response to Question No. 1 above, the Government should delicense the V band completely for access and backhaul purposes as this is the most suitable band to provide high capacity wireless end link connectivity in the dense urban areas.

Q6. Are there any challenges being faced in the login/authentication procedure for access to Wi-Fi hotspots? In what ways can the process be simplified to provide frictionless access to public Wi-Fi hotspots, for domestic users as well as foreign tourists?

BIF RESPONSE

As explained in our response to Question No. 1 above, we submit that the present SMS regime for KYC inhibits access to public Wi-Fi services by domestic users in areas where SMS traffic is delayed or where mobile coverage is missing and by foreign nationals including tourists who do not have Indian SIM cards and thus cannot receive SMS messages on Indian numbers.

A number of technologies have been proposed to unify and simply Wi-Fi roaming and access. Such technologies permit online sign-up, immediate account provisioning, secure registration, adding multiple devices, and the enforcement of operator-specific policies.

Q7. Are there any challenges being faced in making payments for access to Wi-Fi hotspots? Please elaborate and suggest a payment arrangement which will offer frictionless and secured payment for the access of Wi-Fi services.

BIF RESPONSE

In the case where the Wi-Fi operator is a associate of a licensed TSP/ISP , the billing & payment collection shall be the responsibility of the central/home service provider. However, in case the Wi-Fi operator holds a standalone telecom licence, then he shall have the necessary infrastructure to bill and collect payment by itself.

One of the major bottlenecks in the proliferation of broadband penetration using Wi-Fi is the challenges in making payments for Wi-Fi access. Therefore, multiple payment methods should be allowed for access to Wi-Fi hotspots, such as cash, electronic recharge, paper vouchers, online payment, etc. Existing cellular top-up mechanisms offer an excellent and widely-used model for Wi-Fi related pre-payment. In particular, these approaches offer frictionless payment by permitting cash top-up at local retailers. Such cellular top-up retailers and entrepreneurs offer marginal consumers without access to electronic payment and/or credit mechanisms to pay for pre-paid cellular service.

In this regard, a number of stakeholders have pioneered a similar pre-paid Wi-Fi approach in which software permits local retailers to act as a sales agent and facilitate payment for pre-paid Wi-Fi services from a local ISP.

A suggested payment arrangement/mechanism that could be implemented to ensure risk free & friction less mode of payment for Wi-Fi services is to develop a payment platform which would facilitate easy access to public Wi-Fi services across ISPs and through any payment instrument viz. Credit Cards, payment wallets, Bank accounts, etc, as also mentioned by TRAI in the CP. The Unified Payment Interface (UPI) of National Payments Corporation of India (NPCI) could be put into use to achieve this objective.

Overall, the objective should be to allow users to make payment through multiple modes, including cash, electronic recharge, paper vouchers, online payment, etc.

Q8. Is there a need to adopt a hub-based model along the lines suggested by the WBA, where a central third party AAA (Authentication, Authorization and Accounting) hub will facilitate interconnection, authentication and payments? Who should own and control the hub? Should the hub operator be subject to any regulations to ensure service standards, data protection, etc?

BIF RESPONSE

No, there is no need to adopt such an approach. India cannot afford to wait for such hub based systems to be worked out as they usually take a very long time. India cannot afford to wait for broadband service to be rolled out. Hence it is best left to market forces. As seen in our response to Question No. 1 above, such approaches unnecessarily centralize information, raise innovation barriers, and increase costs of compliance. Moreover, such an approach would represent a security target for hackers providing a single point of critical information storage. Instead, TRAI should adopt a model oriented at the standardization of AAA APIs which are to be implemented by identity providers (login providers) wishing to participate. Thereafter, ISPs can connect to each other on mutually agreed commercial arrangement to provide intra-operability of the payment instruments/ balance transfer etc. We also support a decentralized model of accounting which simply reports account balances back to originating identity providers. Such models are easier to implement and have been used successfully by, *e.g.* Boingo Wireless, which currently supports a 1,000,000+-access point network through numerous partners in the Americas, Europe, Asia, South Asia, and Africa.

Q9. Is there a need for ISPs/ the proposed hub operator to adopt the Unified Payment Interface (UPI) or other similar payment platforms for easy subscription of Wi-Fi access? Who should own and control such payment platforms? Please give full details in support of your answer.

BIF RESPONSE

Please see our response to Question No. 7 above.

Q10. Is it feasible to have an architecture wherein a common grid can be created through which any small entity can become a data service provider and able to share its available data to any consumer or user?

BIF RESPONSE

It must be clearly stated that such innovative and entrepreneurial initiatives must be encouraged but under the overall ambit of either as an associate/tie-up with a licensed Service provider or as a VNO or as a standalone UL/UASL licensee. There should be no scope to permit backdoor entry under the guise of either a small or large entity. All service providers must fall under the ambit of a regular license as specified under Section 4 of the Indian Telegraph Act.

If the end user is allowed to put his own APs / repeaters to enhance his signal and provide to the surrounding communities commercially under the ambit of the prevailing license conditions as specified above, then there should not be any meaningful technical barrier to common grid architecture. Wi-Fi mesh technologies are quite mature, and have reached scales of 50,000+ APs deployed in India and operational even with low-end, single-radio devices. More modern dual-radio or quad-radio mesh approaches offer far greater performance and easier deployment. There are many routing protocols supporting wireless mesh, and IEEE is developing the 802.11s standard to define a common architecture and protocol. Examples of such endeavors in other countries include Ninux in Italy; CUWiN in the United States; the related initiatives Freifunk in Germany, FunkFeuer in Austria, and Open Wireless in Switzerland; and Guifi.net in Spain.

Q11. What regulatory/licensing measures are required to develop such architecture? Is this a right time to allow such reselling of data to ensure affordable data tariff to public, ensure ubiquitous presence of Wi-Fi Network and allow innovation in the market?

BIF RESPONSE

We think this is the right time to allow such data reselling by the end user as it will accelerate the growth of broadband services and internet exponentially and will also open huge employment opportunities at bottom of the pyramid. However, it must be clearly stated that such innovative and entrepreneurial initiatives must be encouraged under the

overall ambit of a regular license strictly under the provisions of Section 4 of the Indian Telegraph Act, 1885.Such innovative and enabling regulatory provisions are required to provide broadband to a billion people and Government can't leave this humongous task to the conventional methods and to the few service providers.

Q12. What measures are required to promote hosting of data of community interest at local level to reduce cost of data to the consumers?

BIF RESPONSE

TRAI or the Government need not take any action to encourage such "edge caching" other than to explicitly permit such activities without prohibitive regulation or licensing. Such caching benefits both end users by reducing latency as well as cost and ISPs by reducing upstream bandwidth requirements. Provided there are no regulatory or legal hurdles imposed, caching thus presents sufficient incentive to both ISPs and their customers to be driven by market dynamics and there is no need for any regulatory intervention.

Q13. Any other issue related to the matter of Consultation.

BIF RESPONSE

BIF believes that proliferation of broadband through Public Wi-Fi would need the following measures viz.

- **Improved ROW rules Pan-India**
  The matter is under active and serious consideration of the Govt. DOT is seized of the issue and came out with a draft ROW Rules a few months ago. TRAI too in their Recommendations dated 17th April, 2015 for Acceleration of Broadband Penetration highlighted the importance of the same and its role in proliferation of broadband penetration.
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for the purpose of number portability, the same could be extended here. Besides, , payments can be centrally handled through a payment aggregator/platform

- **Inclusion of all Technologies** Keeping in view that BIF wishes to be technology neutral, BIF recognises that there are other Wireless Broadband technologies also using Unlicensed Spectrum viz. LTE-Wifi, LTE-U/LAA, Multefire, etc . BIF supports a healthy eco-system for promotion of broadband infrastructure based on multiple technologies instead of a specific /single one.
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