Submission of Comments on TRAI's Consultation Paper on Proliferation of Broadband through Public Wi-Fi Networks

By Digital Empowerment Foundation

New Delhi, 10 Aug 2016

To,
Shri Arvind Kumar,
Advisor (Broadband & Policy Analysis)
Telecom Regulatory Authority of India
Mahanagar Doorsanchar Bhawan,
Jawahar Lal Nehru Marg,
New Delhi – 110002

Subject: Submission of comments on TRAI's Consultation Paper on Proliferation of Broadband through Public Wi-Fi Networks

Dear Sir,

The Digital Empowerment Foundation (DEF) wishes to thank the Hon'ble Authority for the opportunity to submit our comments on the Consultation Paper on Proliferation of Broadband through Public Wi-Fi Networks.

Digital Empowerment Foundation is a New Delhi-based not-for-profit organization. It was born out of the deep understanding that marginalized communities living in socio-economic backwardness and information poverty can be empowered to improve their lives almost on their own, simply by providing them access to information and knowledge using digital tools.

We recognize unhindered and universal access to the internet as a key driver of development and empowerment amongst the digital excluded masses in India. We are glad that the TRAI has sought inputs on a regulatory position on the creation of public Wi-Fi hotspots across the country.

My colleagues, Mr. Shahid Ahmad, Ms. Ritu Srivastava, Ms. Rucha Deshpande and Mr. Rajat Kumar who have drafted our response, can provide additional material and DEF is happy to provide any further support to TRAI.

Yours sincerely,

Osama Manzar
Founder & Director
Digital Empowerment Foundation

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

Yes, there are regulatory issues and licensing restrictions that are hampering the growth of public Wi-Fi services in the country.

Regulatory & License Restrictions

1.1 Spectrum management and regulation is the collective responsibility of more than one body in India. There are different bodies handling spectrum licensing, regulation, pricing, and the levy of penalties; some bodies have only an advisory role. The key decision makers on spectrum allocation and assignment include the Wireless Planning and Coordination (WPC) Wing, the Department of Telecommunications (DoT), the Ministry for Communications and Information Technology (CIT) and ad hoc groups such as the Empowered Group of Ministers (EGoM) for third generation (3G) and Broadband Wireless Access (BWA) spectrum auctions. Therefore, any institution, organization or individual who applies for Internet Service Providers' (ISP) license is required to engage with all these regulatory bodies. A large number of institutions that are stakeholders in this process lead to an increase in waiting time and associated costs. We, therefore **recommend** simplifying the licensing process and channelizing the process through one institution.

1.2 The Wireless Planning Commission (WPC) wing in the Dept. of Telecommunications (DOT) is responsible for managing the "*policy of spectrum management, wireless licensing, frequency assignments, and international coordination for spectrum management and administration of the Indian Telegraph Act"*. The WPC has different sections such as Licensing and Regulation (L&R), New Technology Group (NTG) and the Standing Advisory Committee on Radio Frequency Allocation (SACFA).

DoT takes a minimum three months for processing the Letter of Intent. These processes are not transparent and are complicated for any new organization, institution and individual to understand. Therefore, we strongly **recommend** making the licensing process transparent and open.

There is currently no licensing provision for any institution that wishes to provide internet access at a smaller scale than that of a Category B ISP license holder. The

entry fees, PBG[1] and FBG[2] requirements for Cat A and Cat B ISP licenses are quite high and therefore restrictive for any non-profit-organization, small organization or any individual, who is seeking to apply for an ISP license.

1.3 If any NGO, small organization or individual wants to provide the last mile internet connectivity, they either have to become a franchisee of an ISP and provide the bill via ISP or share their private internet connection at their own risk. In case of the franchisee model, the entity also needs to maintain the user-log for which they need local data server, which is a technically tedious task and many times outside the management capability of small entities.

1.4 The technical and logistical issues also lend themselves to the maintenance of Triple-A compliance[3]. Maintenance of Triple-A compliance requires technical support and access to data centres, which are expensive and often difficult to access from rural areas or small towns. This is an additional technical hurdle for small ISP providers who may struggle to maintain the data centre and receive high-level technical support.

1.5 As ISPs are the only entities that are eligible to apply for SACFA clearance, entities which are acting as franchisees with ISPs and may need to set up towers of more than 5 meters above the roof of a certified structure/building, cannot apply for SACFA clearance. Thus, it is challenging for small organisations to provide last mile connectivity. It also creates regulatory grey areas which can lead to prosecution under the current law.

1.6 The unlicensed 2.4 GHz band has lately become very noisy in urban areas due to the high penetration of WLAN and other devices that are communicating in the same frequency range, such as microwave ovens, cordless phones and Bluetooth devices. While the 5 GHz band gives the advantage of less interference, it faces other problems due to its nature. 5 GHz radio waves are more sensitive to absorption than 2.4 GHz waves. These waves are especially sensitive to water and surrounding buildings or other objects due to the higher absorption rate in this range.

1.7 Carrying internet connectivity from the BTS to our Hub Station is another challenge. In urban areas, even if we get bandwidth at BTS, ISP will not provide power (5 -10

[1] PBG – Performance Bank Guarantee
[2] FBG – Financial Bank Guarantee
[3] https://www.w3.org/WAI/WCAG1AAA-Conformance

W) for wireless equipment or share the tower for client device. The ISP will just give Ethernet out (10-30 meter Ethernet wire) and not provide any support for further laying of cables.

Other Challenges

1.8 Even if any small organisation is providing Wi-Fi connectivity in rural areas, purchase of leased line from any ISP is a time-consuming process. This requires three-level coordination with all stakeholders who are providing the backhaul bandwidth and can take around 3-4 months or longer.

1.9 Maintaining wireless Internet tower in raining season is at high risk due to thunderstorm. It is difficult to protect wireless equipment; so we have to maintain extra equipment with system backup file for restoration of network. This increases the burden on small ISPs as they need to maintain extra equipment with system backup file for restoration of network.

1.10 There are various stringent security and regulatory systems surrounding the entire Internet connectivity ecosystem. Theses systems are especially restrictive in certain states and may hamper the growth of Wi-Fi in these states. Access to the internet leads to an increase in the access to basic public services. Additional provision of public services can aid in the growth and development of these states.

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?

2.1 We strongly **recommend** that 'Rural/Village level ISPs' should be encouraged and promoted by government as well as major ISP stakeholders. Any NGO, small organization or individual should be encouraged to become a 'Rural/Village ISP' and be allowed to further distribute the internet connectivity.

2.2 We strongly **recommend** the creation of a separate 'Class C' for rural ISPs that would enable village level entrepreneurs to set up internet services. 'Class A' & 'Class B' category ISPs should enable 'Class C' to take the bandwidth from them as a backhaul and allow them to further distribute it. For example – any 'Class C' ISP can

visit 'Class A or B' provider's website and purchase a leased line from their website itself and act as a reseller for further distribution of the connectivity.

A potential structure for entry fees, PBG and FBG requirements for a Class C ISP are stated in the table below. The fees for Sub-Class C ISPs can be the subject of a later consultation.

S. No.	Service	Minimum Equity (Rs. Cr.)	Minimum Net Worth (Rs. Cr.)	Entry Fee (Rs. Cr.)	PBG (Rs. Cr.)	FBG (Rs. Cr.)	Application Processing Fee (Rs. Cr.)
1	ISP "A" (National Area)	Not Prescribed	Not Prescribed	0.3 (30 lakh)	2.0 (2 crore)	0.1 (10 lakh)	0.005 (50000)
2	ISP "B" (Telecom circle/Metro Area)	Not Prescribed	Not Prescribed	0.020 (2 lakh)	0.100 (10 lakh)	0.010 (1 lakh)	0.0015 (15000)
3	ISP "C" (Small Service Area)	Not Prescribed	Not Prescribed	0.002 (20000)	0.005 (50,000)	0.001 (10000)	0.001 (10000)

2.3 According to DOT guidelines, ISPs need to pay 15 percent service tax and 8 percent of the Adjusted Gross Revenue (AGR)[4]. Therefore, any ISP pays 23 percent tax in total. We **recommend** that 'Class C and Sub-Class C or Rural/Village' ISPs should be exempted from 8 percent of AGR to promote the last mile connectivity. We suggest the following sub-categories or rural/village ISPs that can be considered under Class C:

Sub-Class C or Rural/Village Categories	Entry Fee (in Thousand)	PBG	FBG	Application Processing Fee
Class C – 1 (Very large village	15,000	30,000	10,000	10,000
Class C – 2 (Medium large village	10,000	20,000	10,000	10,000
Class C – 3 (Small Villages)	5,000	15,000	5000	5000
Class D – 4 (Individual level)	3,000	10,000	5000	5000

[4]License Agreement For Unified License http://dot.gov.in/sites/default/files/Unified%20Licence_0.pdf

2.4 According to the Consultation Paper (Page no. 9), there are 31,518 Wi-Fi hotspot areas in the country. We join the authority in recognising the need for improving the number of hotspots across the country. This should be done by enabling existing public institutions alongside the development of a vibrant private local ISP market. For example, there are 14 lakh government schools, 759 universities recognized by the University Grants Commission of India (UGC), 1.5 lakh post offices and about 7000 railway stations in India. We strongly **recommend** these institutions should be encouraged to transform as Wi-Fi hotspots.

2.5 The consultation paper (Page no. 23) identifies the maximum EIRP for frequency range 2.4 GHz to 2.4835 GHz as 4 Watt and for 5 GHz as 200 Milliwatts. We **recommend** increasing EIRP ratings of wireless equipment because there are channels within these frequency bands that are non-interfering. Increasing the power will increase the coverage area and the Quality of Service (QoS).

2.6. According to DOT guidelines, the height of tower should be 5 meters from the roof of an approved building or 30 meters from the ground. If the height of tower is more than that, then ISPs require SACFA clearance. If tower aerial distance between tower and airport is within 7 kilometres, then ISPs also need approval from the Airports Authority of India and there are other requirements in case of defence lands and border lands. Most of these airports are in metro cities. Thus, we **recommend** increasing the allowance for tower height to 36 meters from the ground. We also **recommend** that for towers falling within circumference of Class C towns, VLVs[5], MLVs[6] and SVs[7] as per Census, the ISP should be allowed to take approval from the Municipality and the tower infrastructure should be vetted and authorized by the local architect(s) and engineer(s).

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

3.1 We agree with the issue of interoperability between Wi-Fi networks of different operators as stated in the consultation paper. Our **recommendation** is that a regulatory framework should be created that would allow for handshake agreements between Wi-Fi operators of different countries and also a process for simplifying and expediting the

[5] Very large village
[6] Medium large village
[7] Small Villages & Below

process of gaining access to Indian Wi-Fi hotspots for foreign tourists. However, we cannot elaborate on this issue at this point in time.

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

4.1 We cannot comment on this issue at this point in time.

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.

5.1 The consultation paper (Page nos. 11, 23 and 27) identifies that Microwave and TV White Spaces should be de-licensed for providing the last mile connectivity. We strongly **recommend** de-licensing TV White Space (470-698 MHz band) for providing the backhaul connectivity. Due to the lower frequency, coverage area of a single tower can be increased. Due to the reduced number of towers that would need to be set up, the capital and operating costs can be significantly reduced.

***Note**: Answers to Ques. 6 – 10 are combined.*

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?

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.

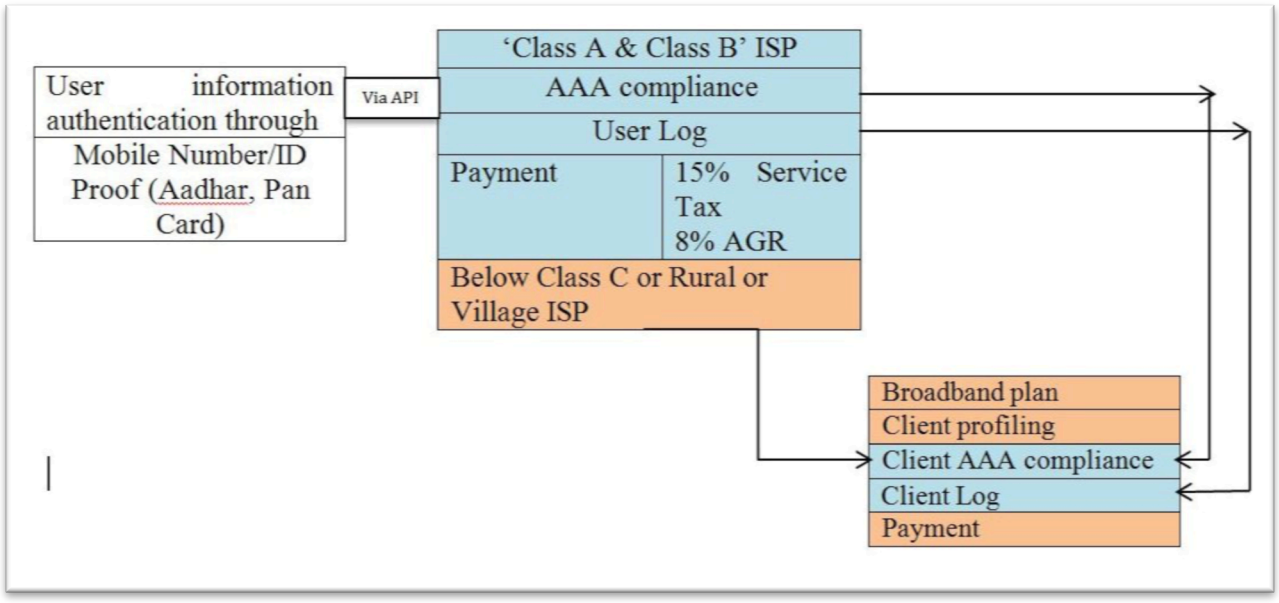
Q8. Is there a need to adopt a hub-based model along the lines suggested by the WBA, where a central third party AAA (Authentication, Authorization and Accounting) hub will facilitate interconnection, authentication and payments? Who should own and control the hub? Should the hub operator be subject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

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.

6.1 We propose the following model for providing the last mile public Wi-Fi services:

MODEL HERE



6.2 The above diagram depicts that user information can be authenticated by using various APIs at one level instead of authenticating at various levels. This way, Triple-A compliance and user-log will be maintained at one stage itself, instead of at rural ISP's level.

6.3 Interoperability among ISPs can be done through APIs via DNS (Domain Name System) server. It means that once a user has created an account under one public Wi-Fi, it can be used in another. Unique entries held by various ISPs through their resellers (Sub-Class C or Rural/Village ISPs) would be shared within themselves. This way, users can authenticate themselves by giving answers of the security question and they will be able to create a login ID while using any public Wi-Fi service.

6.4 However, the payment system will be challenging in this stage. If the payment structure as stated in the consultation paper is implemented correctly, it could be a legitimate solution.

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?

10.1 Taking the above architecture, a common grid can be developed where small entities (Sub-Class C or Rural/Village) can become data service providers and be able to share the data. Regulatory monitoring by TRAI would enable the creation of a centralised authority that would expedite these requests.

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 Networks and allow innovation in the market?

11.1 Our response to this question is detailed in our response to Question 2 of the consultation paper.

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

12.1 Decentralised community networking allows for network managers to provide locally created and locally relevant content on the relatively high speed intranet. Even in the event of the failure of the backhaul connectivity, it would allow people access to such content due to the local storage and sharing of data.

12.2 Additionally, operationalising video conferencing and VoIP services over the intranet would allow communication within the network between citizens and similarly connected public and private institutions like schools, primary health centres, government offices etc.

12.3 There are examples of low cost servers that have been created in India that can be connected to a community network and can provide a hosting location for local content.

12.4 It is **recommended** that the regulator explore the possibilities of using USOF funds to subsidise the costs of these low-cost local servers for Class C and Sub-Class C ISPs.

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

13.1 We thank the authority for recognising DEF's work to provide decentralised community networking at rural levels. We wish to add the following to our response.

13.2 Wireless for Communities (www.wforc.in) programme of Digital Empowerment Foundation has created public Wi-Fi systems in more than 20 locations. These public Wi-Fi hotspots have provided the common man easy access to the Internet and also opened opportunities for jobs, entrepreneurships, entitlements and access to information online, among other things.

13.3 For example, in Guna tribal district located in Madhya Pradesh, we work almost like a local rural ISP by purchasing a 40-Mbps backhaul line from one of the Class B ISPs, and have used it to extend last mile connectivity to the community members in three ways — subsidised model, free model and community donation model.

13.4 At this location, there are three kinds of users. The first kind are individual subscribers who have taken the access to their houses and provide an access point for their neighbours who can come and enjoy the network. The second kind is small shop keepers who may or may not have had connectivity earlier and their retail was suffering due to slow or no connectivity. The third kind of users require very high bandwidth (and not shared bandwidth) such as the local tollbooth on the nearby national highway.

13.5 There is a serious need for trained Wireless Network engineers at the grassroots level and a mechanism for technical support to Class C and Sub-Class C ISPs. Moreover, the creation of Class C and Sub-Class C ISPs across India would motivate these wireless engineers to become Wireless Internet Entrepreneurs. It is also **recommended** to provide financial and non-financial incentives to encourage them to continue working in rural areas for longer durations.

Annexure 1 – Article on Public Wi-Fi in Mint on 10th August 2016

DIGITAL WORLD

OSAMA MANZAR

Respond to this column at feedback@livemint.com

PUBLIC WI-FI HOTSPOTS CAN BE NEW PCO BOOTHS

Remember the days when we had public call office (PCO) booths on almost every street in our cities? They helped create jobs and entrepreneurs, besides providing an easy way to make calls. While PCO booths have become redundant with a mobile penetration of 1 billion subscribers (as per the Telecom Regulatory Authority of India's numbers, as of January 2016), perhaps it is time to replicate the PCO model with Wi-Fi booths.

Internet access is still not available to more than 80% of the country—according to a recent World Bank report, more than a billion Indians are still offline—in an easy and affordable manner. The Wi-Fi booths could work as Internet access points, just as PCOs did for telephones, and can be made sustainable through a paid model.

Additionally, a public Wi-Fi system will enable last-mile connectivity by extending access to people to go online and access information. Public Wi-Fi can democratize digital access if communities, individuals and micro enterprises set up Wi-Fi hot spots at various locations for use by the masses.

Despite the problem of last-mile connectivity and an Internet penetration of only 34.8% (according to Internet Live Stats), India has not yet tried the public Wi-Fi system at any significant level. As per data published by iPass and Maravedis Rethink, a global Wi-Fi service and a wireless market research and analysis firm, respectively, India has only 31,518 Wi-Fi hotspots despite a population of over 1.2 billion people. Of these, almost 13,000 are at hotels.

On the other hand, countries such as France (which has a population of 64 million) and UK (which has a population of 66 million) have a significantly higher number of Wi-Fi hot spots at 13 million and 5.6 million, respectively. According to a Telecom Regulatory Authority of India consultation paper released last month, though India represents one-sixth of the world population, our share of Wi-Fi hotspots is less than 1/1,000. This is a disappointing figure.

If you think about it, a robust public Wi-Fi system will address the need gap in India perfectly. We could start by converting our 240,000 gram panchayats into public Wi-Fi hot spots. Technically, all gram panchayats are supposed to have an Internet connection under the National Optic Fibre Network, but many await connectivity and many among the 'connected' do not work. Further, we could make the 150,000 post offices in India public Wi-Fi hot spots, too. And also look at enabling 600 district libraries to provide public Wi-Fi access.

COLUMN

The Bihar government recently decided to make all colleges public Wi-Fi hot spots. There are more than 1.4 million government schools in India, and 759 universities recognized by the University Grants Commission. Perhaps they too can introduce the public Wi-Fi.

Additionally, the government claims there will be more than 200,000 common service centres (CSC), a cornerstone of the Digital India programme, by December 2016. Let's say if even 50% of them are functional, can they become public Wi-Fi hot spots as well?

These are many opportunities to make India a more connected nation but a major hurdle stopping the establishment of paid public Wi-Fi systems is the stringent security and regulatory apparatus surrounding the Internet connectivity ecosystem. If one wants to put up a connectivity tower in a village, there are too many rules. If the dream to connect India is for real, then complete liberalization or at least a fast-track processing of applications is the need of the hour. Every individual, office, public institution, shop, society, academic institution or not-for-profit organization should be allowed to set up a public Wi-Fi system and run it as a social enterprise.

If someone buys a 2mbps line, they should get a step-by-step guide (with necessary equipment) to convert this line into a public Wi-Fi system. Wi-Fi hot spot owners can then charge users through a paid model, a freemium model—in which a product/service is provided free of charge initially but money is charged for proprietary features or continued usage after a limited period, or even an advertisement model.

And this isn't anything new. It's something that we have already tried at 56 locations of India through Digital Edge Foundation's (DEF) Wireless for Communities (www.wforc.in) project. Creating a public Wi-Fi system at these locations has not just provided the common man easy access to the Internet but also opened up opportunities for jobs, entrepreneurship and entitlements.

In Baran district of Rajasthan, we have established a 200km network, connected to a local server. This way even if the Internet is down, the community can share content and access content through the local server, thus creating a system of intranet or community Internet (read more: http://bit.ly/1JdamoJ).

Chanderi, a municipality town in Ashoknagar district of Madhya Pradesh, is known for its silk sarees. Our purpose of providing a public Wi-Fi system in this cluster was to empower the 3,500-strong weaver community that is always on the lookout for information related to weaving, designing, market access, prices and e-commerce, among other things.

To meet these challenges, including regulatory requirements, we created a small training centre in Guna where we provide three months of wireless network engineering training to anybody who is genuinely interested in becoming a barefoot network engineer. So far, we have trained more than 50 wireless engineers.

A public Wi-Fi system is extremely crucial for India, as it can meet the information and access needs of underserved and marginalized communities. However, to successfully implement the public Wi-Fi system, deregulation of all restrictive practices is important.

Osama Manzar is founder-director of Digital Empowerment Foundation and chair of Manthan and mBillionth awards. He is member, advisory board, at Alliance for Affordable Internet and has co-authored NetCh@kra–15 Years of Internet in India and Internet Economy of India. His Twitter handle is @osamamanzar.