

# A Report on

## 3rd Wireless for Communities & Open Spectrum Summit



*Focus: 'W4C: Connecting rural communities of India through Unlicensed spectrum'*

**Date: 5 December 2013**  
**Venue: India Habitat Centre, Delhi**

Organized by



Partners



## Introduction

Globally and even in India, the recent growth of telecom services is largely led by wireless services, however, disparity between urban and rural tele-density (urban tele-density 146% as of July 2013 and rural tele-density stood at 41.64%), is increasing between them day-by-day. In fact, rural tele-density has barely crawled up under 42% now from 39% in March last year. One of the main reasons behind this is today's highly competitive business among operators. Therefore, in result, it forces operators to achieve their goal of economic sustainability without even concerning about connecting remotest and rural regions of the country.

Thus, it raises a question on optimal allocation and management of spectrum and whether we have sufficient a number of internet providers in the country. Besides domestic issues of optimal allocation and management, there are also issues of international coordination or harmonization that national regulators have to deal with.

What is required – an institutional mechanism for managing spectrum?

Spectrum is a central input for providing wireless services. The spectrum is a technical issue; it has economic and commercial value. 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. However, in many developed and developing countries, one regulator manages the spectrum.

Even though, spectrum is a critical resource, nevertheless, it has been treated in an ad-hoc manner in India that obviously states there is a lack of national strategic framework providing long-term vision and plan for spectrum. Many countries for example in the US, Federal Communications Commission are wholly responsible for commercial spectrum. Most of developed and developing countries such as US, UK, Malaysia, South Africa are moving progressively away from "command and control" mechanism and largely using license-exempt bands.

Despite a decent number of internet players in Indian market, trying to offer high-speed internet plans, the average internet speed in the country remains roughly around 1 Mbps, the lowest among Asian countries. Only 2.4% of India's internet connections have speeds higher than 4 Mbps and barely 0.3% have 10 Mbps or higher, according to report released by cloud platform company, Akamai Technologies Inc. And given that, only 10% population has access to computer or computing devices. Thus, the large number of users are accessing the Net in public cafes. And even connectivity in the country is not only limited by internet infrastructure, but also by mobile and cellular infrastructure that is connecting just 600 million out of 1.2 billion.

In India, there are three levels of ISPs who are providing their services at national, state and districts in terms of license, fees and jurisdiction. Ironically, on an average, there are 11.7 operators per circle with assigned spectrum who are paying minimum licensing fee of 0.25 million for the

district level (Category C). Most of these ISPs are more biased towards their economic sustainability instead of connecting community-based approach. And even if one has capacity to provide broadband internet in rural regions, still, at backend one has to be depended on state-owned firm, Bharat Sanchar Nigam Ltd. (BSNL).

Thus, it raises question – do we have sufficient number of internet providers to connect entire India?

This is where few organizations in India are marking an attempt to be as rural wireless-based enterprises with aim of narrow down digital gaps. For example AirJaldi is a wireless based social enterprise established in Dharamsala, India with aim of narrowing these gaps in 2005, and created the Dharamsala Community Wireless-Mesh Network in cooperation with the Tibetan Technology Center. In one such instance, Daknet has worked in Karnataka in providing point to point services. There is micro deployment & usage of wireless connectivity by Krishi Gram Vikash Kendra (KGVK) in Ranchi District of Jharkhand in India. On the other hand, Digital Empowerment Foundation (DEF), Delhi based NGO from the last three years, is trying to make an effort to provide internet connectivity as a social necessity in various remotest regions of the country using unlicensed spectrum. The motivation behind ideating for the project is twofold – firstly to democratize the availability of connectivity and enable internet accessibility to information in rural parts of the country, secondly to address the issue of lack of content product and services originating from rural areas which affects the economy from percolating to the bottom of the pyramid.

Entitled as Wireless for Communities (W4C) programme, supported by partners, Internet Society and the Ford Foundation, so far established eight (8) community networks in Madhya Pradesh, Rajasthan, Meghalaya, Jharkhand and Uttarakhand to provide affordable and reliable internet connectivity in remote regions of the above-mentioned states. And to advocate towards rural internet service providers (ISPs), DEF in association with its partners, ISOC and Ford Foundation has been continuously organizing the Wireless for Communities & Open Spectrum Summit on the occasion of Manthan Awards Asia Pacific.

This year, the Summit was focused on ***‘Connecting rural communities of India through Unlicensed spectrum’*** is an effort to advocate towards ***‘how to become community-based rural ISP’*** and to promote such several community based wireless networks to work on a sustainable basis which could be implemented, run and managed by the communities in different parts of country using open spectrum. The Summit not only represented government stakeholders, policy advocators, private and civil stakeholders, but ground practitioners and network implementers also participated and shared their ground experiences and challenges. This post-consultation report gives you overall understanding of what the programme was about, session highlights and policy and regulatory framework in India. It comes out with key recommendation and suggestions as relevant for policy formulation and documentation towards achieving larger development and empowerment goals by providing equitable access to information to everybody.

## Background

Provision of telecom services in rural areas of India is still one of the major thrust areas to attain the goal of accelerated economic development and social change. Although the telecom network has grown rapidly in recent years, its growth needs to be accelerated further. According to the national programme of Bharat Nirman – telecom connectivity constitutes an important part of the effort to upgrade the rural infrastructure. Under the Bharat Nirman Programme, Rural teledensity of at least 40% by 2014, and Broadband coverage of all 250,000 village Panchayats & Setting up of Bharat Nirman Common Service Centers at Panchayat level by 2012 were to be achieved.

The announcement of Broadband Policy in Oct 2004, broadband subscribers have grown from 0.18 million to 10.34 million at the end of October 2010. Wireless broadband is expected to take off as 3G/BWA network rollouts are expected soon, with recent concluded auction of 3G/ BWA Spectrum. To empower the common man in the rural/remote parts, the Department of Telecom has set target of providing Broadband coverage for all 2.5 Lakh Gram Panchayats by 2012 out of which 97426 have been stated to be provided. Despite this figures, the situation is far from encouraging given the country crossing a billion plus population across almost or more than 635,000 villages.

Even though the government may declare many initiatives, but they often do not reach the people on the ground for whom they are intended. We need to equip more than a million healthcare workers and get across primary healthcare facilities to every Indian citizen. Governance and government initiatives need to reach every citizen of the country. However, in the current scenario, there are still many miles to go and many glitches to overcome before achieving the target of inclusive growth for everyone. For example, in India, even with mobile penetration, the tele-density in rural areas is still less than 40%, and there is no Internet connectivity in many areas. The reason for this lag has mostly been the issues centring on last mile connectivity.

On the other hand, last mile wireless connectivity has the potential to resolve the issue of prohibitive cost of deploying conventional wired infrastructure in remotest areas of the country.

With an objective to address the issues of internet accessibility and connect remote and underserved regions of the country, in late 2010, Digital Empowerment Foundation (DEF) and Internet Society (ISOC) initiated a joint called “Wireless for Communities” (W4C) which utilizes low-cost Wi-Fi based equipment and unlicensed spectrum (free spectrum) to connect and empower rural and underserved communities. The motivation behind ideating for the project is twofold – firstly to democratize the availability of connectivity and enable internet accessibility to information in rural parts of the country, secondly to address the issue of lack of content product and services originating from rural areas which affects the economy from percolating to the bottom of the pyramid.

The project includes two factors – providing Training of Trainer (ToT) programme to community members on wireless technology and wireless mesh technology and deploying wireless mesh

network in cluster-based environment to understand and observe the benefits and impact of the project over a period of time.

The first pilot project was launched in late 2011 in Chanderi cluster, highly populated with marginalized handloom weavers, located in Madhya Pradesh experimenting on the following key factors:

- Addressing the issue of last mile connectivity;
- Democratizing the availability of connectivity and enable internet accessibility and information decentralization;
- Addressing the issue of content and services gap that obstructs local economy and pulls back social indicators; to address wireless technology skill gaps;
- Initiating a dialogue and deliberation between stakeholders including public and private parties on the impact, need, scope, viability and sustainability of wireless deployment for community empowerment and meeting needs of underserved regions;
- Initiating advocacy with the relevant public and private partners to propagate and adopt wireless technology as an unconventional solution to connect rural remote areas and communities with broadband connectivity and services on it.

The project has all key elements in such as network deployment, internet access, developing capacity of local human resource in wireless skills and empowers community with content and service.

The impact is overwhelming; stakeholders is not only connecting remotest regions such as Chanderi, Guna & Shivpuri (Madhya Pradesh); Baran (Rajasthan), Tura (Meghalaya), Giridh (Bihar) and other regions of the country but also attracted the attention of stakeholders, including policy advocators, government and private players to adopt the wireless technology as an alternative solution towards connectivity and access.

## About the Summit

The national consultative summit was a first kind effort to bring all stakeholders to deliberate, discuss, share, experience and emerge with a concrete set of recommendations as how unlicensed spectrum in India can be used to serving the last mile connectivity. The summit saw stakeholders from the government departments, agencies, industry, civil society, academia, network implementers, policy advocates, wireless practitioners, and others to air views, opinions, inputs, concerns and suggestions on a wide area of topics. One unique approach was to present and share good practices and challenges in wireless network deployment and operations in India and other developing countries.

The Summit was formed in a free-flow format allowing not only experts and policy advocates to share their ideas and information but also given opportunity to each participant to share their challenges and issues. That made the session highly interactive (including the ability to converse in local languages).

## Summit Objectives

Key objectives of the national summit identified were:

- Arrive at better understanding of unlicensed band, free spectrum and its importance to serve last mile connectivity
- To share good practices and challenges faced during the wireless network deployment and operations in India and other developing countries
- Deliberate on the need availability & challenges of appropriate wireless technologies to bridge access and connectivity divides
- To bring implications related to wireless, mobile & broadband technologies which help transcend traditional infrastructural bottlenecks in rural areas of India
- To emerge with working framework with necessary inputs, suggestions, comments, recommendations on ways to connect the government and business services that can reach the masses through the wireless and mobile networks in local languages and in oral medium

## Summit Broad Areas

In light of the above, the summit discussed the following broad areas:

1. Discuss the importance of free spectrum for public good and advocacy towards utilizing it for social development
2. To understand the scope and opportunities of unlicensed spectrum in India and other developing countries
3. The magnitude and extent of unlicensed wireless band/free spectrum can be used to connect isolated areas and communities of the country.

4. Explore and understand the rights and ethics challenges and issues around unlicensed spectrum

## Summit Themes

The consultative summit deliberated on the following themes:

1. Access, rights & ethics for providing uniform wireless
2. Economic and social advancement of using wireless network
3. Developing uniform policy framework for unlicensed spectrum

## Summit Outcome

The national summit looked at the following key outcomes

1. Consolidate factors and inputs to uniform policy framework for unlicensed wireless spectrum;
2. Consolidate solutions towards issues related to media, access and rights, ownership of unlicensed spectrum, ownership of accessibility and exploring opportunities in terms of accessibility;
3. Building a roadmap towards a working framework on adopting cost-effective technologies to propagate the wireless network networks far and wide across the country for ensuring equality of access, digital equity and media access.
4. Consolidating scope of policy areas and suggest workable action steps;

## Summit Proceedings

The summit was formed in a discussion-oriented format sharing the case studies around wireless network deployment and operations in India. The focus of the summit is to empower rural communities via providing them affordable internet connectivity. The summit also focused on understanding the importance of unlicensed band and how wire and wireless network can be used together to provide uniform internet access across the country. The Summit was chaired by Mr. N. Ravi Shankar, MD, BBNL & Administrator of USOF, DoT, MoCIT and moderated by Mr. Rajneesh Singh, Regional Bureau Director for Asia, ISOC.

**Chairperson & Keynote Address:** N. Ravi Shankar, MD, BBNL & Administrator, USOF, DoT, MoCIT

### Moderator

- Rajneesh Singh, Regional Bureau Director for Asia, ISOC

### Panelists

- Deepak Maheshwari, Public Policy Professional
- Dr. Ravina Aggarwal, Program Officer for Media Rights and Access, Ford Foundation

- Prof Rekha Jain, Executive Chair, IIMA-IDEA Telecom Centre of Excellence & Professor, Computers and Information Systems Group, IIM –Ahmadabad
- Vibhas Sharma, Founding Director and CEO, Aura Ventures Pvt. Ltd.
- Viresh Goel, Deputy Wireless Adviser (T), WPC Wing
- Shahid Ahmad, Project Director, DEF

## The Proceedings

Moderator, Mr. Rajneesh, initiated the summit by the introduction of panelists and participants. Further, he raised the question with N. Ravi Shanker to share his opinion and feedback on fibre optic network and what is the mission of government in terms of connecting the country.

Mr. N. Ravi Shanker initiated the discussion sharing mission of Telecom Ministry, Govt. of India – ‘Internet of people to Internet to things’ is theme of the National Telecom Congress which is inaugurated on 5 December 2013. He further mentioned there is a need that all kind of technologies should reach rural parts of the country. For example voice communication is still missing in several parts of the country. About 90% of the country has luxury to have towers and this is endeavor of the Telecom Ministry. The government is trying to bring each and every kind of technologies such as 2G, 3G, 4G and community wireless network, community radio, etc. He further explained there is a need to understand how technology permits to the rural area and how technology has been acting as a democratizing element. Mr. Ravi Shanker welcomed all panelists and participants and requested them to share their feedback and add valuable experiences in the summit.

### **Deepak Maheshwari, Public Policy Professional**

To take the discussion forward – moderator, Mr. Singh introduced Deepak Maheshwari, who is Public Policy Professional and worked with various organisations, and asked to share his experiences on how rural wireless is fitting into wholesome picture of wireless network specifically from the policy framework angle.

Deepak initiated the discussion giving three basic facts regarding the spectrum. Firstly the spectrum is one resource that is common in each country. Secondly in comparison to urban regions, spectrum is largely available in rural areas because number of users in metro/cities is larger than the rural areas. Thus overall usage in rural areas is less than urban.

Talking about earlier days of spectrum, he mentioned that 11 years back, using wireless technology was illegal. In 2003, the Wireless Planning & Coordination (WPC) wing of the Department of Telecommunications delicensed 2.4 GHz and 5.8 GHz frequency that can be used as unlicensed spectrum. In the last decade, unlicensed spectrum has come into its existence and it can be used by community members.

Describing about delicensed spectrum, he mentioned that delicensed spectrum is like pedestrian path which means that anybody can use this spectrum. Non-exclusive, non-interfering, and non-

protection are three features of unlicensed spectrum. Non-exclusive means unlicensed spectrum can be used by anybody and everybody. Non-interfering means spectrum usage should not disturb others. Non-protecting means that usually ISP providers use antenna gain to receive better signal.

### **Ravina Aggarwal, Program Officer for Media Rights and Access, Ford Foundation**

In order to understand ethics of unlicensed, Ravina Aggarwal, Program Officer for Media Rights and Access, Ford Foundation initiated the discussion with Ford Foundation's principle of providing universal access in rural regions of the country. Describing about Ford's objectives, Ms. Aggarwal mentioned that we are addressing the issue of access. Through several ground projects, Ford Foundation is trying to understand how internet as a resource can be implemented uniformly and right to education, right to information, right to freedom of expression can be exercised through this medium.

She further explained that there is no use of such policy planning until and unless it cannot be used at ground level. Thus in order to bring strengthen ground practices, Ford Foundation is working with DEF and AirJaldi and promoting them to small and rural enterprises. In addition, she further explained if infrastructure and low-cost technologies are available then it is also important to have rural and small enterprises and to have bottom-up approach for wireless planning. Moreover, internet is different type of technology that can be devised differently and its infrastructure can be used differently.

In terms of telecom policy, Ms. Aggarwal emphasized on making policies for rural-level entrepreneurs/players who want to serve rural parts of the country and they should be allowed to be partnered with large level players. Thus, the infrastructure can be used for various purposes – telemedicine, education, providing e-governance services.

### **Major Vibhas, Founding Director and CEO, Aura Ventures Pvt. Ltd**

To understand the aspects of wireless networks from the perspective of private stakeholder, moderator, Mr. Rajneesh raised a question from Vibhas Sharma who is Founding Director and CEO, Aura Ventures Pvt. Ltd. what are the challenges of private stakeholders in terms of providing wireless connectivity.

Giving the perspective of private stakeholders, Vibhas shared that Aura Ventures has been initiated a year ago with a mission to increase broadband penetration through the village level entrepreneurs. This could only be possible if village-level entrepreneurs can be trained on skill development in a cost-effective manner.

Therefore, Aura started evaluating the reach of broadband in semi-urban and rural parts of the country. To find out aspiration at village level, considering the fact that language is barrier, Aura started giving training and capacity building using YouTube as a medium. At initial stage, Aura

started providing 2MBPs connection which was affordable and able to provide the last mile connectivity.

Talking about the cost of internet in today's situation, Vibhas mentioned that the cost of internet is still Rs. 3000 (~50 USD) using either TP link, microtek radio. This could be taken under through USOF (Universal Service Obligation Fund of India) as it provides fund for establishing infrastructure. While evaluating broadband reach in project area Wajirabad (nearby Gurgaon), Aura Ventures identified that cable TV operators were keen to explore other opportunities as they were stuck on CAS (Conditional Access System) or digitization process. Because of this process they were earning just INR 250 (~5 USD). Thus, Aura has created village level entrepreneurs through Cable TV operators as cable TV is going in every house. Presently, Aura has signed a master distributor with RailTel Corporation of India.

Thus, Aura envisioned that reliable bandwidth is available at every railway station across every district of the country. This bandwidth is easily available to access. Therefore, if fibre optic can be used as backhaul network and cable TV networks on fibre that can be used for providing internet. Moreover, within 2KMs of that region, network can be created that can be used by communities. This kind of network will cost approx. Rs. 1800 per customer (~36 USD) or Rs. 1800(~36 USD) per household which is equal to the cost of dongle. Thus, YouTube can be used for distributing content and making rural villagers to understand the importance of internet.

In congruence with Mr. Sharma, MD of BBNL & Administrator of USOF, Mr. N. Ravi Shanker stated that government is aiming to provide fibre optic at gram panchayat (village council) level and other alternative technologies such as wireless network, cable TV operators can be used to telecast the information. Thus, cable TV wires can be used for telecasting the information but also broadcasting the information and to take act as two-way information system. Thus, education, governance, health services can be revolutionized using these kinds of technologies. Additionally due to the cable TV Operator being a Village Level Entrepreneur, the Service Levels can be maintained satisfactorily to create a sustainable broadband model.

**Rekha Jain, Executive Chair, IIMA-IDEA Telecom Centre of Excellence & Professor, Computers and Information Systems Group, IIM -Ahmadabad**

Ms. Rekha Jain initiated the discussion with the recommendation point of having village-level wireless operators and these operators should be managed by communities over there. Though government is providing hardware which is just basic infrastructure at panchayat (village council) however, there is need of Softer(ware) – content at panchayat level need to provided, which can be easily accessible and affordable. Talking about organizational structure of BBNL (Bharat Broadband Network Limited), she emphasized that there is also need of involvement from civil society, academia, private, individual entrepreneurs in BBNL. This of multi-stakeholder ecosystem will not only strengthen BBNL policy system but also resolve operational issues. Web hosting is another issue in the country as website development is an easy task; however, hosting them is an issue.

At last, she recommended to developing a mechanism for content that could be easily affordable. This content needs to be managed and developed by communities. For example, Ministry of Human Resource Development (MHRD) who has already digitized books and courses can make them easily available. Similarly, other government departments, agencies can also take part in developing and providing community-based content as per the need of communities.

### **Viresh Goel, Deputy Wireless Adviser (T), WPC Wing**

Describing about the mission of WPC wing, Mr. Viresh Goel, Deputy Wireless Advisor of WPC Wing mentioned that it is true that spectrum is more available in rural parts of the country rather than urban cities. Delicensed of spectrum has taken all over the world through which unlimited information can be provided to the world.

### **Shahid Ahmad, Project Director, DEF**

To understand challenges of being rural ISP, Mr. Singh asked Mr. Shahid Ahmad, Programme Manager at DEF to share his experiences of implementing wireless networks in rural regions of the country. Mr. Shahid initiated the discussion that presently DEF has implemented 7-8 wireless networks. Understanding the theoretical aspects of technology is entirely different from implementing it in practical situation. Moreover, being a technical person, instead of reading technical aspects of the networks, these days technologist needs to read a lot of government rules and regulations which is tough to understand.

Counting his challenges at ground at Sankalp Foundation's Bhawargarh centre, he mentioned that laying out 32 meter was not that tough instead of making it legal because according to government the height of tower should not be more than 5 metre in any government approved building. Thus, SACFA clearance was must for which we have applied three months ago, but there is no response. Secondly equipment's are available in the country as per government norms and bandwidth is available for personal usage, however, distribution is not allowed as if we distribute the bandwidth, if any problem arises then distributor will be trouble.

This is where – we want to make a strong recommendation for the need of rural Internet service providers (R-ISPs). For example, in Guna district, majorly populated by Sahariya and Bheel tribe, most of

ISPs do not have the feasibility to provide seamless connectivity in a cost-effective manner in remote areas of the district.

Talking about kind of ISPs in India, he mentioned that there are three levels of ISPs who are providing their services at national, state and districts in terms of license, fees and jurisdiction. Ironically, on an average, there are 11.7 operators per circle who are paying minimum licensing fee of Rs. 0.25 million for the district level (Category C). Most of these ISPs are biased towards economic sustainability instead of connecting community-based approach. And even if one has a capacity to provide broadband internet in rural areas, at the backend, one has to be dependent on state-owned firm, Bharat Sanchar Nigam Ltd. (BSNL). So, the question arises – do we have sufficient number of internet providers to connect entire India?

## Recommendations

1. One of the major recommendation came out is to understand how technology permits to the rural area and how technology has been acting as a democratizing element;
2. Harmonised regulatory approval processes and finite approval timelines, appropriate licensing mechanism is very much required for the last mile connectivity or at community level (using a rural ISP type model or perhaps the highly successful cable TV retailer model in India), deployment and access costs that are affordable to the target community, business and sustainability models and the importance of knowledge sharing between communities and practitioners.
3. One of the strong recommendations that has been emerged that DOT (Department of Telecom), TRAI (Telecom Regulatory Authority of India) should look at policy aspect of unlicensed spectrum and make other spectrums to be delicensed not only villagers but internet proliferation in general;
4. Regulations like using premium bandwidths on shared basis for both paid as well as non-paid spectrum can be initiated in India to solve the issues related to substandard quality of ISP service. Though there are issues like security, interference and even non-working of the business model, however, there is need to rework on sharing model of spectrum;
5. Another major recommendation is to develop sustainable social enterprises and to generate strong demand at the lowest price that could work for the poor. There is also need to understand the price-factor which has to be reduces before it reaches at grassroots level;
6. It must be mandatory to understand whether rural communities are able to harness the benefits of the existing bandwidth;
7. In terms of new policies, policy makers and government needs to come forward and provide any kind of subsidy to internet users rather than internet service provider.
8. Assessing the potential of open spectrum or rural broadband networks, first steps of bringing out sustainable models in semi-urban cities and towns, so that rural communities can also get inspired and look upon these models. In result, it will create an ecosystem and help rural regions to be connected with the mainstream.
9. Instead of always talking about bureaucratic hurdles, there is a need of bringing all kind of technology in rural areas right now, not after the 5 years as these technologies can drastically change the lives of villagers.
10. Being most of rural broadband is state controlled mostly (through BSNL) and this needs to change by opening up infrastructure for shared usage and subsidy depending on location of installation. On understanding the requirements of rural broadband networks, there is need to analyze ways and models which can fill in gap with provision some level of subsidy or tax exemption for ISPs.

11. There is a need to explore alternative solutions such as fibre optic as backhaul option and other solutions such as cable network, wireless networks to provide the last mile connectivity.
12. There is a need to explore opportunities of 5Cs approach – content; connectivity; cost of devices, competitive tariff, and computer literacy and to implement the concept of wholesaler, retailer and distributor to provide internet connectivity at rural parts of the country;
13. There is a need to emphasize on making policies for rural-level entrepreneurs/players who want to serve rural parts of the country and they should be allowed to be partnered with large level players. Thus, the infrastructure can be used for various purposes – telemedicine, education, providing e-governance services.