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**A B S T R A C T**

*World wide interoperability for microwave access (Wi-Max) is a wireless solution for providing last mile connectivity. Wi-Max Can be used in fix as well as portable version. Wi-Max is able to provide the wireless broadband connectivity to areas beyond the reach of traditional broadband with built in quality of service (QoS) Wi-Max technology can be used by private networks, education networks and Govt. agencies for public safety and rescue operations in times of need.*

**Introduction**

Wi-Max" stands for "world wide interoperability for microwave access". It is a high speed wireless technology that supports fixed, portable and mobile access. Wimax can provide speed up to, 14.4 Mbps and is likely to support much higher speed with further advancement.

**1. wireless broad band :** India is an underserved market for broadband as on date and once a faster rate of speed is offered through the Wi-max route, adoption rate will also increase. The government of India has set a target of very high broadband subscribers by 2020, which can be only achieved by accelerating the use of wireless technologies like Wi-Fi, Wi-Max etc. service providers are looking at Wi-max as a last mile solution for their broadband services.

**2. Tech- aspect:** Wi-Max Wi-Max technology is available in 'fixed' version as well as for 'mobile' use. Fix Wi-Max equipment will not work in mobile equipment, unless someone has opted for dual mode implementation. Mobile Wi-Max are low gain devices compared to fixed ones, as mobile Wi-Max equipment have only omni-directional antenna unlike fixed Wi-Max devices. Using mobile Wi-Max technology, data intensive application can be accessed by mobile phones over distances ranging from 5-15 Km in the mobile scenario. As per Wi-Max forum specification, Wi-max can be operated in 5.8 GHz, 2.5GHz and 3.5 GHz bands.

**2.1 HOW WI-MAX WORKS?**

Wi-Max needs two main components to form an operational network: (a) Base station (Serves as a repeater connected to Internet backbone). (b) End user equipment Wi-Max can provide two kinds of wireless services: these are Non-line of sight and Line of sight.

**2.2 Non Line of Sight(NLOS)**

This is a Wi-Fi kind of service in which a small antenna on the subscriber terminal connects to the tower. Wi-max uses 2-11 GHz range(similar to Wi-Fi).

**2.3 Line of Sight(LOS)**

In this service, a dish antenna fixed on roof top or pole points straight to Wi-Max tower. The LOS connection is more stronger and more stable, so it is able to send a lot of data with fewer errors. LOS transmission uses higher frequencies (up to 66 GHz). At higher frequencies, there is less interference and lot more bandwidth.

**4. Wi-Max STANDARDS**

Over the years many different standards have been proposed for Wi-Max, each one catered to a specific area of interest. The table below compares the various IEEE 802.11 standards: Suitability for use Back-haul for hotspots Back-haul for hotspots Indoor broadband access, VOIP, High speed internet Portable broadband access , mobile internet , always best connected

**3. Wi-Max APPLICATION**

Wi-Max technology will provide total freedom to people who are highly mobile, allowing them to stay con-

Standard	802.16	802.6a	802.16d(Fixed)	802.16e(Mobile)
Mode	LOS	LOS and NLOS	LOS and NLOS	NLOS
Spectrum	10-66GHz	2-11 GHz	<11 GHz	<6GHz
Bit rate	32-134Mbps	75Mbps	75Mbps	Up to 15 Mbps
Mobility	Fixed	Fixed, Portable	Fixed	Mobile (but low speed)
Suitability for use	Back-haul for hotspots	Back-haul for hotspots	Indoor broadband access, VOIP, High speed internet	Portable broadband access , mobile internet , always best connected

ected with voice, data and video services. Wi-Max addresses the issues with private & public networks as outlined below

#### **PRIVATE NETWORKS**

These networks used exclusively by a single organization, institution or business, offer communication links for secure and reliable transfer of voice, data and video. Quick and easy deployment is generally a high priority, and configurations are typically point to point and point to multipoint.

#### **CELLULAR BACKHAUL**

Backhaul costs for cellular operator represent a significant portion of their recurring costs. Wi-max can provide point -to-point links of up to 50 Km with high data rates. Cellular traffic is a mix of voice and data, for which the built in quality of service (QoS) feature of Wi-Max is highly suited, while the wired solutions for providing cellular backhaul are seldom cost-effective in rural or suburban areas.

#### **BANKING NETWORKS**

Banks are normally spread over a large area and need high security and bandwidth to handle the traffic. Wi-Max data encryption offers excellent link security. The broad coverage and high capability of Wi-Max allows a bank's regional office to be connected to a large number of diversely located branch offices and ATM sites. The built in QoS is used to priorities voice (telephony among branches), data (financial transactions, e-mail, Internet and Intranet) and video (CCTV surveillance) traffic.

#### **EDUCATION NETWORKS**

Wi-Max networks can be used to connect schools and school board offices within a district. Full range of communication including telephony, voice, data(Student's records)e-mail, internet and distance education (video) between the the school board office and all the schools in the district and between schools themselves is feasible.

#### **PUBLIC SAFFTY**

Government agencies such as police, search and rescue teams can use Wi-Max networks to support response to emergency situations. The network can relay video image and data from the accident site to the control center in addition to providing two way voice communications. Wi-Max solutions are highly deployable, whereas wired solutions are not appropriate in situations like these due to unpredictability of accidents and disasters.

#### **OFF SHORE COMMUNICATIONS**

Oil and gas producers can use Wi-Max equipment to provide communication links from Land based facilities to oil rigs and platforms and thus to support remote operations which include remote trouble shooting of complex equipment problems and site monitoring.

#### **CAMPUS CONNECTIVITY**

University and colleges require high data capacity, low latency and high security. They use Wi-Max networks to correct multiple locations, sites and offices within their campus. Campus networks carry a mix of voice, data and video which the Wi-Max QoS helps prioritize and optimize.

#### **Wi-Max - AN IMPORTANT OPTION FOR RURAL PENETRATION**

It has been established that deployment of copper and cable would not be able to serve more than 15% of Indian population. Wireless technology (Wi-Max, Wi-Fi etc) is the only way out to achieve our dream of broadband penetration. Wi-Max is going to play a key role in improving broadband penetration especially in rural areas and providing e-governance and e-education in rural markets. It is felt that equipment availability (indoor and portable) at right price points, performance, service capabilities and support will be the key to the success of Wi-Max.

**THE ISSUES and CHALLENGES** The globally used band for Wi-Max is 2.5-2.7 GHz, but in India this band is locked for satellite based mobile and broadcast applications. What is available is 3.3 GHz and 5.8GHz. However, the government is planning to free 2.5 GHz spectrum for Wi-Max. Once a policy for Wi-Max is in place and spectrum is decided, the rate of deployment will increase manifold.

#### **CONCLUSION**

Today's user wants to remain connected everywhere. In this scenario, Wi-Max is going to be adapted at a faster rate as it would operate at higher speeds over greater number of users. Wi-Max could potentially erase the suburban and rural blackout areas that currently have no broadband Internet access due to non-availability of wired infrastructure for these remote locations. Wi-Max technology has an edge over 3G technologies, which include better spectrum utilization and higher data transfer rate. Mobile Wi-Max, a spectrally efficient technology is going to provide higher data transfer rate as compared to earlier version and open up new vistas for communication and commerce.

### **REFERENCE**

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