.0..0   CHAPTER-10

WiMAX infrastructure of Bangladesh

Bangladesh's telecoms regulator, the Bangladesh Telecommunication Regulatory Commission has published its draft guidelines for issuing Broadband Wireless Access (BWA) licenses. The national licenses are being proposed - two in the 2.3 GHz band and one in the 2.5 GHz band.

In a radical move, the incumbent operators are banned from bidding - and the new bidders are limited to having 60% foreign shareholding. The licensees will be authorized to develop and operate a telecoms network to provide nationwide BWA services based on IEEE 802.16e (WiMAX) standards. The system can be point-to-multipoint or mesh radio systems consisting of BWA distribution hub stations and their associated subscriber stations (or BWA access devices). The last mile solution may be implemented in conjunction with WiFi.

The operators and end-users are allowed to use their equipment in fixed locations, in a nomadic manner or with a fully mobile capability, at their choice. Interestingly, the draft proposals will mandate that all the licensed operators will have to share the same tower and the existing infrastructures. 30MHz contiguous channel will be allocated to each operator to provide BWA services. Per channel bandwidth should be either 5 or 10 MHz Subject to the availability, two pair of frequency will be assigned form any of the 18, 23, 26 and 38 GHz band to build their own point to point link.

The existing ISP license holders operating in **2.3, 3.5, 5.2, 5.4** GHz and 700 MHz will be allowed to continue their wireless Internet services for 5 years with pre-WiMAX equipments - but will not be allowed to replace any existing equipment.

Spectrum Distribution (opted by three companies):

- BanglaLion Communications: 2585 - 2620 MHz
- BRAC BDMail Network Limited: 2320 - 2365 MHz
- Augere Wireless Broadband Bangladesh: 2365 - 2400 MHz
-

10.2   Bangla Lion Communications Ltd:

BanglaLion Communications Ltd is a private limited company incorporated in Bangladesh on 5 Nov 2008 under the Companies Act, 1994. The company obtained license from Bangladesh Telecommunication Regulatory Commission (BTRC) to operate Broadband Wireless Access (BWA) services nationwide using WiMAX technology in 18 November 2008. The license allows using WiMAX standard 802.16e and onward revisions only. It allows VoIP services as well. The license was obtained through an open bid process at a cost of about 31 million USD. BanglaLion was the highest bidder in obtaining the access frequency in 2.5 GHz band.

The operators and end-users are allowed to use their equipment in fixed locations, in a nomadic manner or with a fully mobile capability, at their discretion. Again in the spirt of a radical document each of the licensed operators will have to share the same tower and the existing infrastructures. The proposals will award a contiguous 30 MHz of unpaired spectrum from 2.3 GHz band (23xx-23xx MHz and 23xx-23xx MHz) to two licencees. A contiguous 30 MHz of unpaired spectrum from 2.5 GHz band (25xx-26xx MHz) will be assigned to one licencee, with 2615-2620 MHz kept as a guard block between TDD and future FDD assignment. 30MHz contiguous channel will be allocated to each operator to provide BWA services, while per channel bandwidth should be either 5 or 10 MHz Existing ISP licence holders operating in 2.3, 3.5, 5.2, 5.4 GHz and 700 MHz will be allowed to continue their wireless Internet services for five years with pre-WiMAX equipments - but will not be allowed to replace any existing equipment.

10.2.1 BanglaLion will offer several tariff plans at 128 kbps speed:

1. Home User/Individual for Tk 600/Month

2. Corporate (5-10 users) for Tk 550/Month

3. Corporate (10 users above) for Tk 500/Month

4. Day User (Max 3GB) for Tk 45/Day

5. Night Package (12 AM to 9 AM =9 hrs) for Tk 300/Month

BanglaLion WiMAX Service Package:

- **Home User/Individual** for Tk 600/Month (USD 8.69)

- **Corporate (5-10 users)** for Tk 550/Month (USD7.97)

- **Corporate (10 users above**) for Tk 500/Month (USD 7.24)

- **Day User (Max3GB)** for Tk 45/Day (USD 0.65)

- **Night Package (12 AM to 9 AM =9 hrs)** for Tk 300/Month (USD 4.35)

BanglaLion Communication LTD, **BRAC** BD Mail Network Ltd and Augere Wireless Broadband Bangladesh Ltd won the licences from Bangladesh Telecommunication Regulatory Commission (BTRC) to operate Broadband Wireless Access (BWA) services nationwide using WiMAX technology in 18 November 2008.The license was obtained through an open bid process at a cost of about 31 million USD. BanglaLion was the highest bidder in obtaining the access frequency in 2.5 GHz band. The license allows using WiMAX standard 802.16e and onward revisions only. It allows VoIP services as well. BanglaLion said it would be ready to launch WiMAX services in Dhaka by June. Apparently they will be the first company to provide WiMAX service in Bangladesh.

10.3 Bangla Lion Service provided in Bangladesh:

- **High speed access**

  -Turbo up surfing to 42 times the speed of dial-up with Banglalion WiMAX.

  -Quick service activation

  -Waiting is so yesterday. Simply register and wait for launch for BanglaLion's WiMAX.

  -Value for money

  -With super savings, tailored packages and other cost effective solutions, able to save and surf more.

- **IP Mobile Phone Services**

  -Unlimited call on WiMAX Phone.

- **Triple Play**

  -High Speed Voice, Video and Data in a single home subscription

- **MPLS VPN**

  Corporate High Speed Virtual Private network incorporating Voice, Video and Data, Internet.

  High Speed Internet with minimum 128kbps speed.

- **Live Streaming**
- **IPTV.FM Radio, Cable TV Channel**
- **Live TV**
- **Data Connectivity**
- **Corporate IP PBX**
- **ATM Connection**

10.4 WiMAX Connectivity of different purpose in Bangladesh:

- Connecting Wi-Fi hotspots to the Internet.
- Providing a wireless alternative to cable and DSL for "last mile" broadband access.
- Providing data and telecommunications services.
- Providing a source of Internet connectivity as part of a business continuity plan.
- Providing portable connectivity.

10.5 WiMAX Considerations with respect in Bangladesh :

Speed

Minimum speed of 2 Mbit/s for stationary or walking users, and 348 kbit/s in a moving vehicle

Service

Converged fixed, mobile, voice, data, Internet and multimedia services. One of its key visions is to provide seamless global roaming, enabling users to move across borders while using the same number and handset.

Flexibility

Providing a highly flexible system, capable of supporting a wide range of services and applications. The IMT-2000 standard accommodates five possible radio interfaces based on three different access technologies (FDMA, TDMA and CDMA).

Affordability

3G systems had to be affordable, in order to encourage their adoption by consumers and operators.

Compatibility

3G has to be compatible with existing systems. 2G systems, such as the GSM standard.

Design

3G must be easily expandable in order to allow for growth in users, coverage areas, and new services, with minimum initial investment.

10.6 WiMAX speed and Bandwidth price in Bangladesh:

First of all Bandwidth should be calculated as Kbps or Mbps not KBps or MBps [Always calculate bandwidth in bit (b) rather than Byte (B) where 1 Byte = 8 bit]

WiMAX standard define WiMAX is capable to provide 72 Mbps over 72 Km [Depending on channel size and base station power]

Bandwidth Per Sector (Approximate) (3.74 x 10 x .8)= 29.92Mb Where 3.74 (constant), 10 (Channel Size= 10 MHz) and .8 is 80 % Utilization [if we assume that WiMAX provider plan their channel size 10 MHZ]

TDD system are used in WiMAX deployment in Bangladesh. So one can expect that Max Upload and Download Speed Should be half of the total Bandwidth that is around 15 Mb per sector.
If four Sector is used, one particular POP can provide maximum of (4 x29.92)=120 Mb of Bandwidth. But Still a consumer can connect only one Sector at a time.

As of Now price of 1 Mbps Full Duplex (Download/Upload) submarine cable Bandwidth provided by BTCL is around 27,000 +15 % vat= Tk 31050 (Approximate) which is equivalent to around USD 453.

So even if WiMAX provider allocates the full bandwidth of a sector to a particular Client, he should get Maximum of 15 Mbps download speed. So it is not possible to provide 128 Mbps in WiMAX technology. And again from the pricing aspect, I don't know how BanglaLion will provide 128 kbps in only USD 8.69. At that rate they can sell eight 128 kbps link which is equivalent to 1 Mbps (8 x 128 kbps = 1024 kbps or 1 Mbps) and the price will be (8.69 x 8 = 69.52) which is way below the buying price. So I am expecting they will provide shared bandwidth instead of dedicated.

10.7 Updates:
31-May-2009:
BanglaLion is not going to start WiMAX from 1st June, it may take 2/3 months more to start officially, this is due to technical issues and setup. However they expect to go with test-run from 1st June. On the other hand **Augere** is having frequency issues and then can only start trial after August.

10.8 Broadband and it's future in Bangladesh:

Augere Wireless Launches WiMAX on Trial in Dhaka:

Augere Wireless Broadband Bangladesh Ltd, one of the two WiMAX licensees, launched high-speed broadband internet services yesterday on a trial basis with a focus for commercial operations.

The wireless internet technology, which will initially be launched in some areas of Gulshan and Banani on trial.WiMAX (Worldwide Interoperability for Microwave Access) is a wireless digital communication system that can provide broadband wireless access across 30 miles for fixed phone and 3-10 miles for mobile stations.

Three bidders — BanglaLion Communication, BRAC BD Mail Network Ltd and Augere Wireless Broadband Bangladesh Ltd — won the WiMAX licences through an auction organized by Bangladesh Telecommunication Regulatory Commission (BTRC) in September last year. However, BRAC later refused to take the licence.The Tk 215 crore bid price had become a 'double bind' for both the telecom regulator and licensees. The regulator extended the deadline for launching WiMAX services several times.UK-based Augere Holdings owns 60 percent of Augere Wireless Broadband Bangladesh Ltd along with two other local companies. Teleport Bangladesh owns 30 percent and Aamra Resources Ltd owns 10 percent in the company.

Technology must be welcome and should be avoid a digital divide. WiMAX is a technology that can be availed anywhere."The real internet experience is here," said Sanjiv Ahuja, chairman and chief executive officer of Augere Holdings. Augere Bangladesh is poised to meet demand for the internet using WiMax technology.

BTRC permitted Augere Bangladesh, were also present at the launch at the Westin Dhaka.
Bangladesh, with the lowest internet penetration in the world at 4 percent, will be exposed to high-speed wireless internet by the launch of the WiMax technology. At present, the country has four million internet users.

10.9 Bangladesh aspect Implemented of WiMAX:

Sector that can be implemented:

1) Corporate firms
2) Banking sectors
3) Software firms
4) Educational Institutions
5) E-commerce
6) Public safety
7) Rural connectivity

10.10 Usage Scenarios in Bangladesh:

WiMAX technology will revolutionize the way we communicate. It will provide total freedom to people who are highly mobile, allowing them to stay connected with voice,data and video services. WiMAX will allow people to go from their homes to their cars,and then travel to their offices or anywhere in the world, all seamlessly. To illustrate the ability of WiMAX to address the applications outlined in the preceding section, several representative usage scenarios, grouped into two broad categories – private and public networks – are outlined in the following sections.

10.10.1 Private Networks

Private networks, used exclusively by a single organization, institution or business, offer dedicated communication links for the 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 or Point-to-Multipoint. Wireless Service Providers (WSPs) use WiMAX equipment to backhaul traffic from Base Stations in their access networks, as shown below:
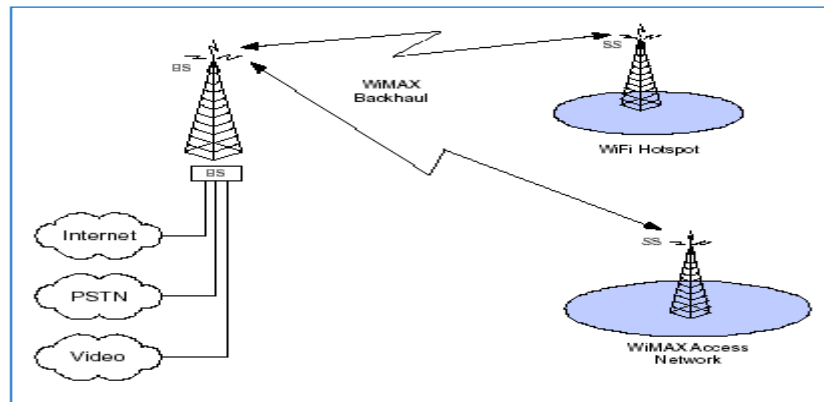

Fig: 10.10.1 Private Networks

Access networks may be based on WiFi, WiMAX or any proprietary wireless access technology. If the access network uses WiFi equipment, the overall WSP network is referred to as a Hot Zone. Since WSPs typically offer voice, data and video, the built-in QoS feature of WiMAX will help prioritize and optimize the backhauled traffic. WiMAX equipment can be deployed quickly, facilitating a rapid rollout of the WSP network. As already illustrated, leasing backhaul facilities from the local telephone company will increase operating costs, and deployment of a fiber solution can be very costly and requires significant lead times, negatively impacting rollout. Furthermore, fiber, DSL and cable are not cost-effective in rural and suburban areas, and most versions of DSL and cable technology will not provide the capacity required for these networks.

10.10.2 Wireless Service Provider Access Network

Wireless Service Providers (WSPs) use WiMAX networks to provide connectivity to both residential (voice, data and video) and business (primarily voice and Internet) customers, illustrated as follows:
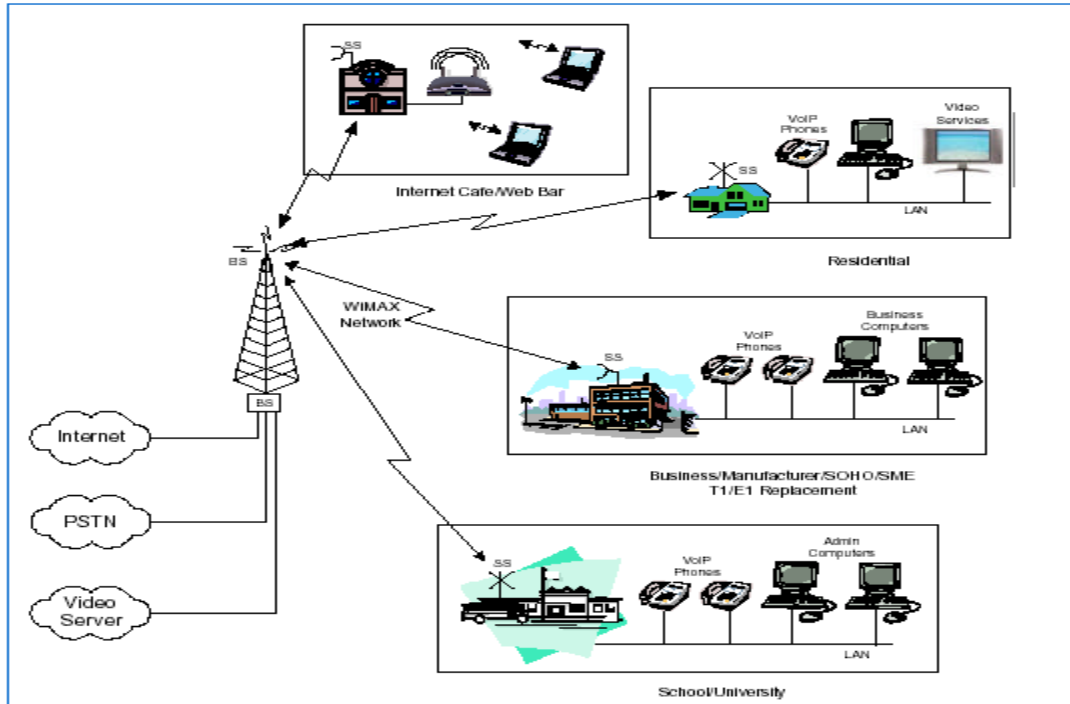

Fig: 10.10.2 Wireless Service Provider Access Network

The WSP could be a CLEC (Competitive Local Exchange Carriers) that is starting its business with little or no installed infrastructure. Since WiMAX is easy to deploy, the CLEC can quickly install its network and be in position to compete with the ILEC (Incumbent Local Exchange Carrier). The WiMAX built-in QoS mechanism is highly suited for the mix of traffic carried by the CLEC. The QoS MAC also offers multi-level service to address the variety of customer service needs. A common network platform, offering voice, data and video, is highly attractive to end customers, because it presents a one-stop shop and a single monthly bill. Support for multiple service types allows for different revenue streams, yet it reduces customer acquisition cost, and increases ARPU (Average Revenue Per User). The WSP needs only one billing system and one customer database. Cellular operators may also be interested in applying WiMAX in their networks. These operators already have towers, billing infrastructure and a customer base in place, but the deployment of a WiMAX solution will expand their market presence in their service area. All of the wired solutions, including fiber, DSL, and cable, require substantial up-front costs for implementing the wired infrastructure. In particular, wired solutions are not suited for markets in developing countries, where there is very little infrastructure, or in the less-populated areas of developed countries, such as rural areas, small towns or the suburban edges of major centers.

10.10.3 Banking Networks

Large banks can connect branches and ATM sites to their regional office through a private WiMAX network carrying voice, data and video traffic, as shown below. These banks are normally spread over a large area and need high security and bandwidth to handle the traffic:
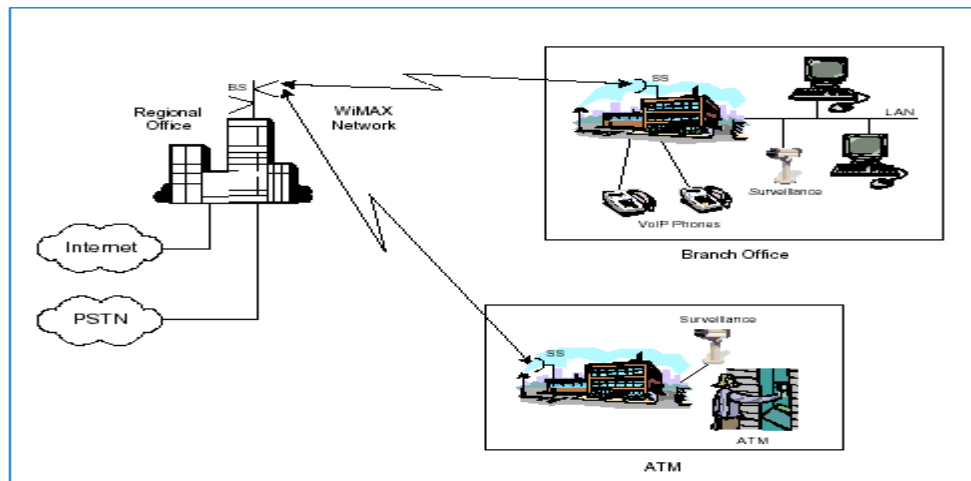

Fig: 10.10.3 Banking Networks

WiMAX data encryption offers excellent link security ,however,banks will most likely also need end-to-end security,such as that provided by SSL,to protect against undesired interception and maanipulation of sensitive Banking traffic.The broad coverage and high capacity allows the bank's regional office to be connected to a large number of diversely located brand offices and ATM sites.WiMAX networks also offer a high degree of scaalability, so that low-data-rate traffic between the regional office and ATM machines can co-exist with the high levels of traffic needed to support branch-to regional office commination .This is made possible by the WiMAX QoS, which is used to prioritize voice(telephony among braches),data (financial transaction,email,Internet,and intranet) and video (surveillance,CCTV) traffic.

It is desirable for banks to own their own networks for a number of reasons.Besideseliminating the the repeat costs charged by telephone companies,this will provide banks the ability to quickly redeploy thrie network if an ATM or branchis temporarily or permanently relocated.In addition to their inability to be quickly deployed,most versions of DSL and cable technology will not provide the bandwidth required to support and sustain brach to regoinal office communications.
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10.10.4 Education Networks

School boards can use WiMAX networks to connect schools and school board offices within a district, as shown below. Some of the key requirements for a school system are NLOS, high bandwidth (>15 Mbps), Point-to-Point and Point-to-Multipoint capability, and a large coverage footprint.
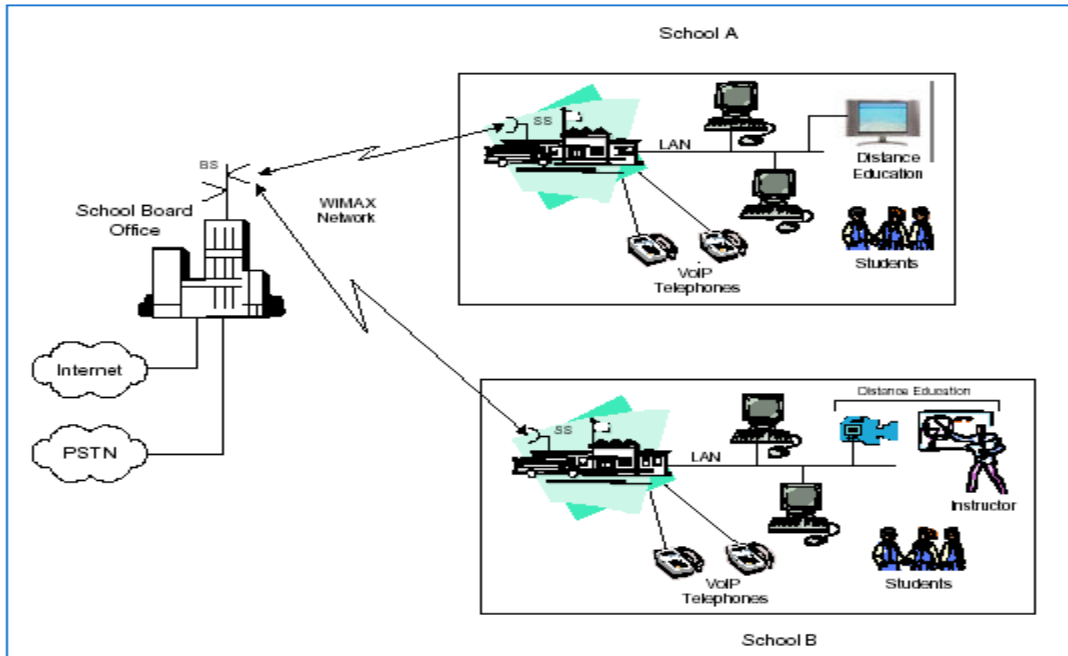

Fig: 10.10.4 Education Networks

WiMAX-based education networks, using QoS, can deliver the full range of communication requirements, including telephony voice, operating data (such as student records), email, Internet and intranet access (data), and distance education (video) between the school board office and all of the schools in the school district, and between the schools themselves. In the above scenario, the camera at School B delivers real-time classroom instruction to School A, allowing the schools to simultaneously deliver instruction from a recognized subject-matter expert to a large number of students, eliminating the need for additional instructors. The WiMAX solution provides broad coverage, making it very cost-effective, particularly for rural schools, which may have little or no communications infrastructure,and which are widely dispersed. When school boards own and operate their own network, they can be responsive to changes in the location and layout of their facilities. This will significantly reduce the annual operating cost of leased lines. Wired solutions can notoffer a quickly deployable, low-cost solution, and most versions of DSL and cable technology do not have the throughput required by these education networks.

10.10.5 Campus Connectivity

Government agencies, large enterprises, industrial campuses, transportation hubs, Universities, and colleges, can use WiMAX networks to connect multiple locations, sites and offices within their campus, as shown below. Campus systems require high data Capacity, low latency, a large coverage footprint, and high security:
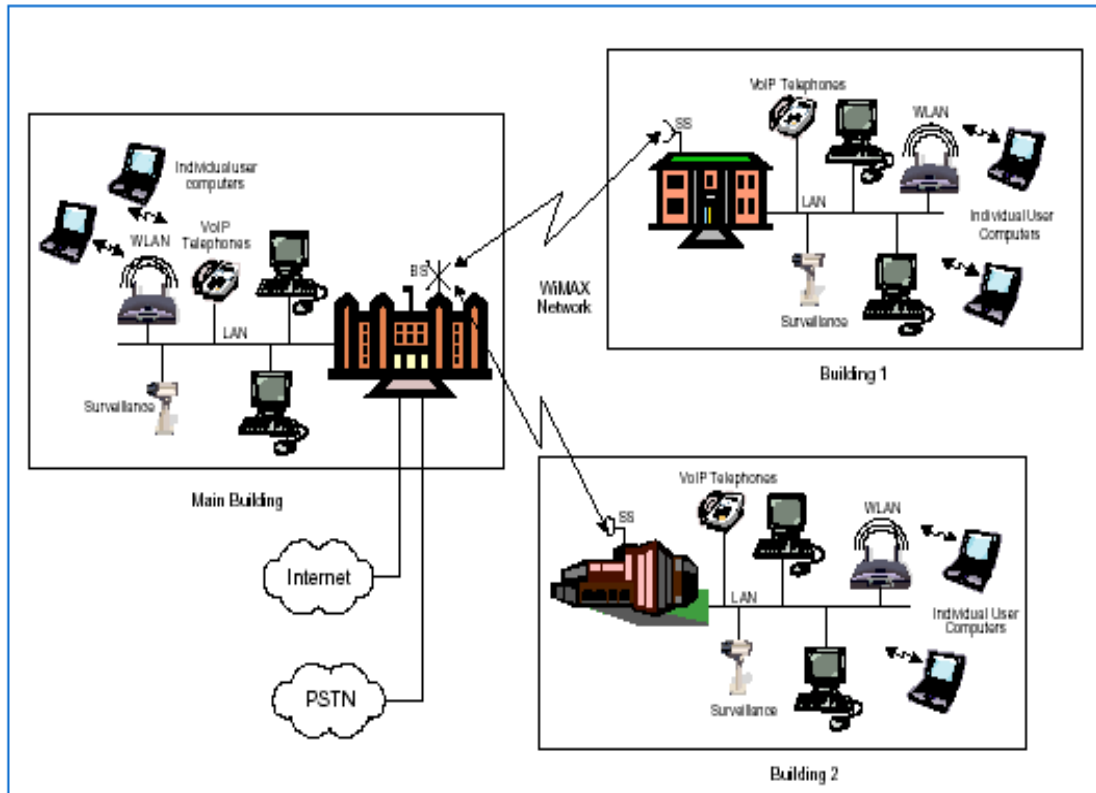

Fig: 10.10.5 Campus Connectivity

Like other usage scenarios, campus networks carry a mix of voice, data, and video, which the WiMAX QoS helps prioritize and optimize. It takes less time and resources to interconnect a campus through a WiMAX network, since excavation and external construction are not required. Some campuses have been around for a long time, and digging trenches for cable may not be permitted. In such cases, WiMAX solutions may be one of the most effective ways to interconnect campus buildings. Even if wired installations are permitted, the lead-time to deploy a wired solution is much longer than the lead-time to deploy a WiMAX solution, without offering any accompanying benefits.

10.10.6 Public Safety

Government public safety agencies, such as police, fire, and search and rescue, can use WiMAX networks to support response to medical and other emergency situations, as illustrated below:
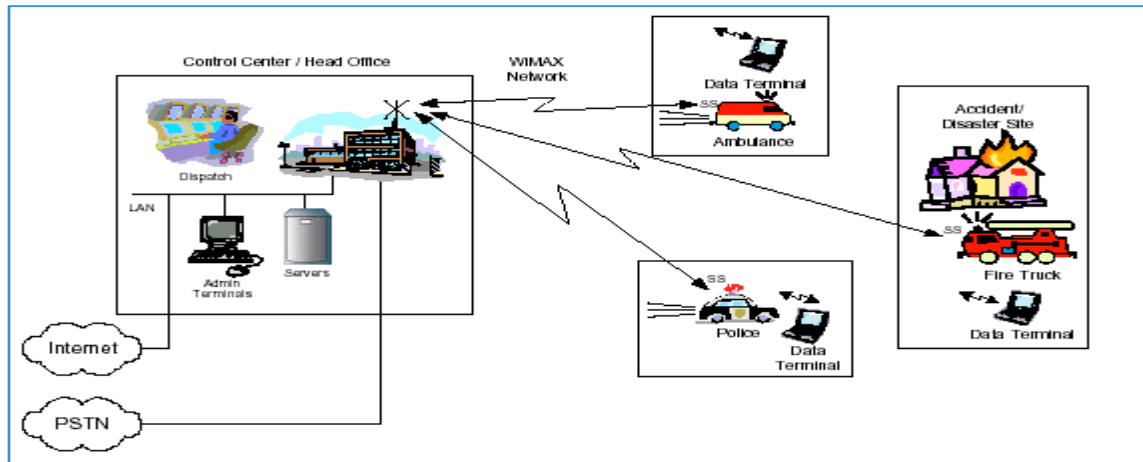

Fig: 10.10.6 Public Safety

In addition to providing two-way voice communications between the dispatch center and on-site emergency response teams, the network relays video images and data from the site of the accident or disaster to the control center. This data can be relayed to expert teams of medical or emergency staff, who can analyze the situation in real-time, as if they were on site. WiMAX QoS allows the network to handle these diverse types of traffic. WiMAX solutions are highly deployable, so the initial response team can set up temporary wireless network at the site of the accident, event, or natural disaster, in a matter of minutes. They can also relay traffic from this network back to a control or dispatch center, over an existing WiMAX network. Wired solutions are not appropriate situations like these, due to unpredictability and instability of accidents and disasters. As well, there may be a requirement for mobility, such as, for example, a policeman having to access a database from a moving vehicle, or a fireman having to download information about the best route to a fire scene or the architecture of the building on fire. A video camera in the ambulance can offer advance information about the condition of a patient, before the ambulance reaches the hospital. In all of these cases, WiMAX provides support for mobility and high bandwidth, which narrowband systems cannot deliver.

10.10.7 Temporary Construction Communications

Construction companies can use WiMAX networks to establish communication links between the company head office, construction sites, offices of other project participants, such as architectural and engineering firms, and storage facilities, as shown below:
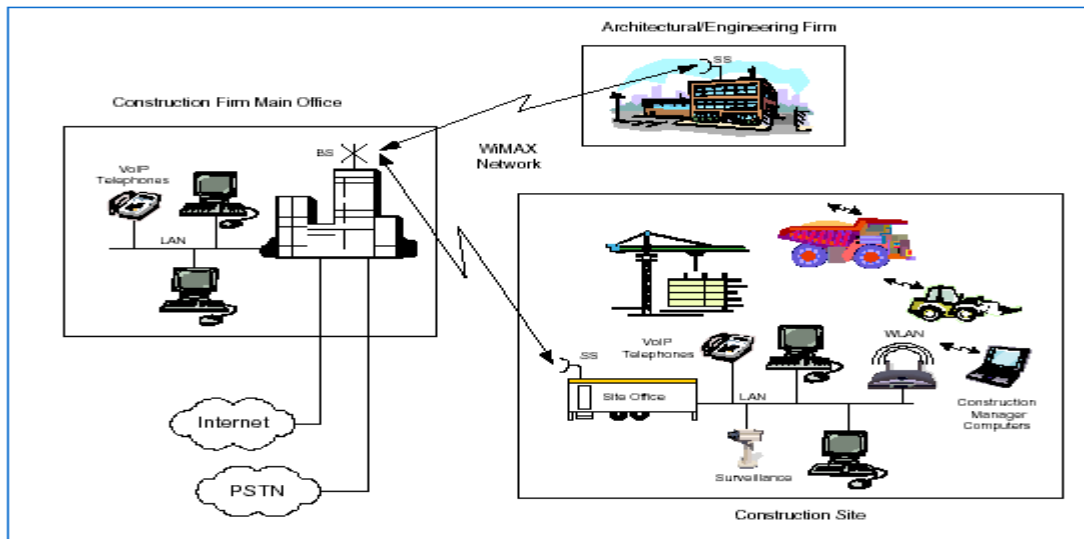

Fig: 10.10.7 Temporary Construction Communications

The fast deployability of WiMAX networks is also important in this scenario, since it allows for quick provision of communications to the construction site, including voice (telephony) and data (emails, engineering drawings, and Internet access). Surveillance video can also be carried over the network, to support monitoring of the site or areas of the site that are otherwise difficult to access. A local Hotspot can also be set up at the construction site, allowing personnel at the site to communicate and exchange data and schedule information.

Like the other usage scenarios, the WiMAX built-in QoS will prioritize network traffic and optimize the communications channel. Construction sites include, but are not limited to, office buildings, residential land development, and oil and gas facilities. Since construction activity at these sites is temporary, wired solutions are usually not appropriate. WiMAX equipment, being highly portable, can be redeployed and reused at other construction sites.

10.10.8 Rural Connectivity

Service providers use WiMAX networks to deliver service to underserved markets in rural areas and the suburban outskirts of cities, as shown below:
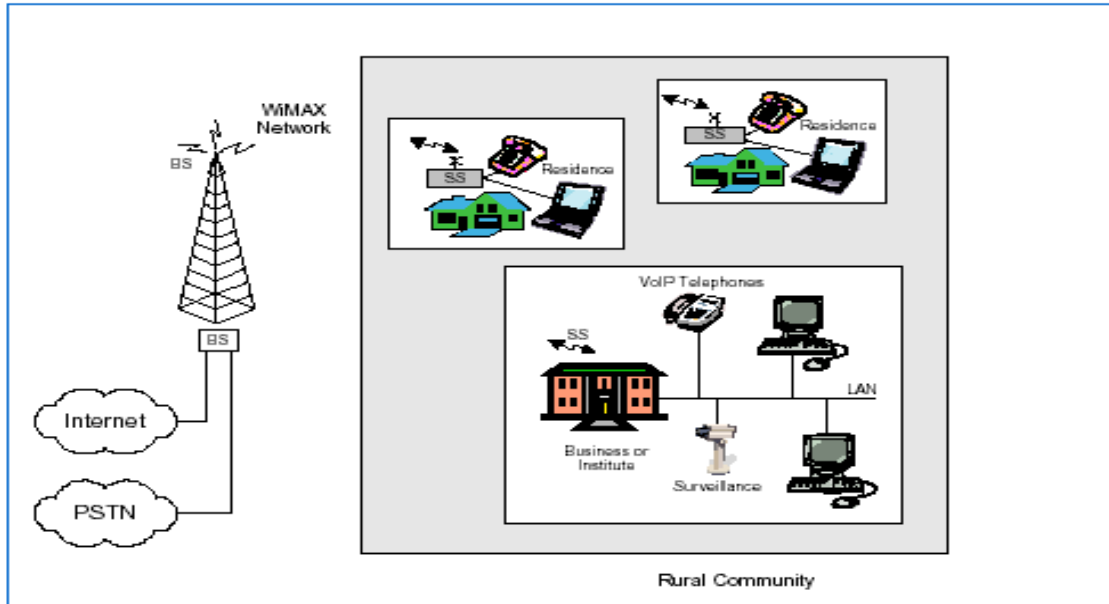

Fig: 10.10.8 Rural Connectivity

The delivery of rural connectivity is critical in many developing countries and underserved areas of developed countries, where little or no infrastructure is available. Rural connectivity delivers much-needed voice telephony and Internet service. Since the WiMAX solution provides extended coverage, it is a much more cost-effective solution than wired technology in areas with lower population densities. WiMAX solutions can be deployed quickly, providing communication links to these underserved areas, providing amore secure environment, and helping to improve their local economies.

10.11 Design consideration:

- ❖ The operators and end-users are allowed to use their equipment in fixed locations, in a nomadic manner or with a fully mobile capability, at their choice.

- ❖ All the licensed operators will have to share the same tower and the existing infrastructures. 30MHz contiguous channel will be allocated to each operator to provide BWA services. Per channel bandwidth should be either 5 or 10 MHz Subject to the availability, two pair of frequency will be assigned form any of the 18, 23 GHz band to build their own point to point link.

- ❖ The existing ISP license holders operating in **2.3, 3.5, 5.2, 5.4** GHz and 700 MHz will be allowed to continue their wireless Internet services for 5 years with pre-WiMAX equipments - but will not be allowed to replace any existing equipment.

- ❖ Connecting Wi-Fi hotspots to the Internet, Providing data and telecommunications services, providing portable connectivity.

10.12 WiMAX Connectivity and Solutions

WiMAX allows equipment vendors to create many different types of IEEE802.16-based products, including various configurations of base stations and customer premise equipment (CPE). WiMAX also allows the services provider to deliver many types of wireless access services. The WiMAX can be used on a variety of wireless broadband connections and solutions:"Last Mile" Broadband Access Solution-Metropolitan-Area Networks (MAN) connections to home and business office, especially in those areas that were not served by cable or DSL or in areas where the local telephone company may need a long time to deploy broadband service. The WiMAX-based wireless solution makes it possible for the service provider to scale-up or scale-down service levels in short times with the client request. Backhaul networks for cellular base stations, bypassing the Public Switched Telephone Network (PSTN); the cellular service providers can look to wireless backhaul as a more cost-effective alternative. The robust WiMAX technology makes it a nice choice for backhaul for enterprises such as hotspots as well as point-to-point backhaul solutions. Backhaul enterprise connections to the Internet for WiFi hotspots. It will allow users to connect to a wireless Internet service provider even when they roam outside their home or business office. A variety of new business services by wireless Internet service provider.