

## CHAPTER-5

### Broadband Technologies

#### 5.1 Introduction

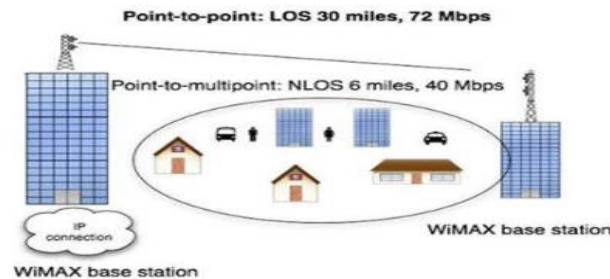
WiMAX provides fixed, portable or mobile non-line-of sight service from a base station to a subscriber station, also known as customer premise equipment (CPE). Some goals for WiMAX include a radius of service coverage of 6 miles from a WiMAX base station for point-to-multipoint, non-line-of-sight (see following pages for illustrations and definitions) service. This service should deliver approximately 40 megabits per second (Mbps) for fixed and portable access applications.

#### Types of WiMAX

- Fixed WiMAX
- Mobile WiMAX

##### 5.1.1 Fixed WiMAX

###### ■ Fixed WiMAX



*Fig: 5.1.1 Fixed WiMAX*

WiMAX provides fixed, portable or mobile non-line-of -sight service from a base station to a subscriber station, also known as customer premise equipment (CPE). Some goals for WiMAX include a radius of service coverage of 6 miles from a WiMAX base station for point-to-multipoint, non-line-of-sight. This service should deliver approximately 40 megabits per second (Mbps) for fixed and portable access applications. That WiMAX cell site should offer enough bandwidth to support hundreds of business with T1 speeds and thousands of residential customers with the equivalent of DSL services from one base station.

5.1.2 Mobile WiMAX

Mobile WiMAX



Fig: 5.1.2 Mobile WiMAX

Mobile WiMAX takes the fixed wireless application a step further and enables cell phone-like applications on a much larger scale. For example, mobile WiMAX enables streaming video to be broadcast from a speeding police or other emergency vehicle at over 70 MPH. It potentially replaces cell phones and mobile data offerings from cell phone operators such as EvDo, EvDv and HSDPA. Mobile WiMAX will be very valuable for emerging services such as mobile TV and gaming.

5.2 WiMAX Standard Differences

This figure shows a comparison between the original Fixed WiMAX standard and the WiMAX standard that can be used for fixed, mobile and portable. This table shows that the original 802.16 standard was released in 2004 and it was only capable of providing fixed wireless data services.

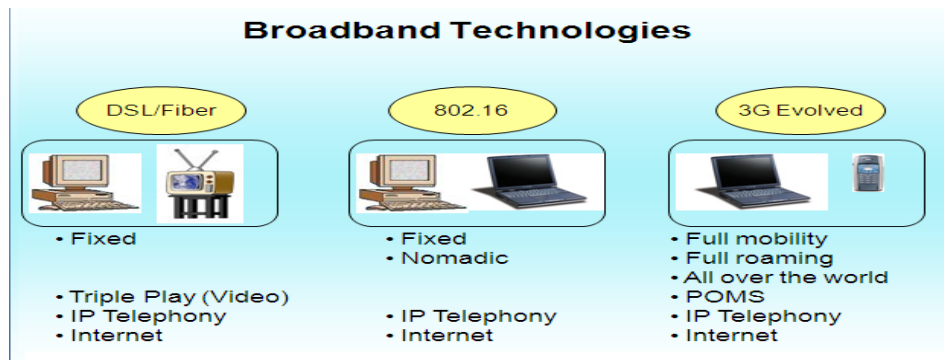


Fig: 5.2.a WiMAX Standard Differences

It used OFDM modulation and could be deployed in both TDD or FDD formats. The 802.16e standard was released in 2005 (now merged into the original 802.16 standard) was designed for fixed, mobile and portable operation. It used OFDMA modulation with TDD and optionally FDD duplexing capability.

Characteristic	Fixed WiMAX	Mobile WiMAX
Industry	802.16.2004	802.16.2005
Access type	Fixed	Fixed, Portable and mobile
Modulation	OFDM	OFDMA
Duplexing	TDD,FDD	TDD,FDD optional
Types of Service Providers	DSL, Cable Modems and Competitive Access Providers(CAPs)	Mobile operation DSL, Cab Modems, Wireless and wired ISPs
Subscriber Units	High Performance Outdoor and indoor CPE	Low Cost consumer Electronics CPE and Embedded modules
Preferred Frequency Bands	2.5 GHz,3.4-3.6 GHz 5.8GHz	2.3-2.4 GHz, 2.5-2.7 GHz,3.3-3.4 GHz, 3.4-3.8 GHz
Service	Internet	Internet (For package)

*Table: 5.2 WiMAX Characteristic Differences*

### 5.3 WiMAX - Mobility Support

**WiMAX envisions four mobility-related usage scenarios:**

**Nomadic:** The user is allowed to take a fixed subscriber station and reconnect from a different point of attachment.

**Portable:** Nomadic access is provided to a portable device, such as a PC card, with expectation of a best-effort handover.

**Simple mobility:** The subscriber may move at speeds up to 60 kmph with brief interruptions (less than 1 sec) during handoff.

**Full mobility:** Up to 120 kmph mobility and seamless handoff (less than 50 ms latency and < 1% packet loss) is supported. It is likely that WiMAX networks will initially be deployed for fixed and nomadic applications and then evolves to support portability to full mobility over time.