

WIBRO: Emerging Trend in Wireless Communication

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Abstract—This paper introduce WiBro, one of the emerging wireless technologies for portable Internet services, which are designed to enable mobile broadband access based on an experimental examination of consumer preferences for mobile broadband technologies and an estimation of the future demand for WiBro, The WiBro is a specific subset of the 802.16 standards, specially focusing on supporting full mobility of wireless access systems with OFDMA. This study proposes that specification and characteristics of the WiBro. And it also deals with different features and comparative analysis with other standards which we have studied in this paper.

Keywords: WiBro, Portable Internet service (PIS), Mobile broadband technologies, Telecommunication.

I. INTRODUCTION

This technology is the latest advancement in Wireless Communication which presents harsh change in Wireless Internet and helps connect each and every person globally. It is the most advanced and upcoming technology now a days. wibro is the Portable Internet Service to provide a high data rate and wireless internet access with PSS (Personal Subscriber Station) under the stationary or mobile environment, anytime and anywhere. It is part of the IEEE 802.16 family such as WiMAX. It follows IEEE 802.16e standard. With the help of wibro, it is possible to expand the bandwidth and to accommodate a plenty of user to access the wireless internet. Because of large frequency band of 2.3 to 2.4 GHz and channel bandwidth of 9 MHz, it can cover of large coverage area of hundreds and thousands of km. It adopts TDM multiplexing, TDD duplexing technique and OFDMA multiple access technique. Due to OFDMA all the carriers are orthogonal to each other, It minimizes the self-interference.

II. WHAT IS WIBRO?

WiBro stands for wireless broadband Internet. It can realize lower cost, higher speed than mobile phone Internet and add mobility. Using WiBro, we can enjoy high speed Internet even when we moving. Many of people believe that WiBro can realize Ubiquitous society.

III. SPECIFICATION OF WIBRO

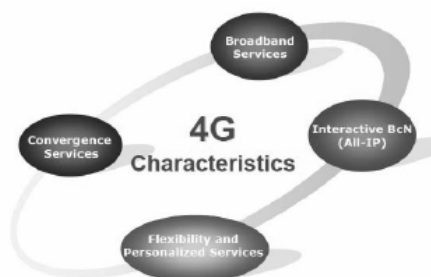
WiBro supports with data rates between 20 Mbps and 50 Mbps It is distinguished by the handover and may, at speeds exceeding 100 kph receive. The WiBro wireless

cells have a radius of one to five kilometers. As the transmission frequencies using the Koreans and Japanese, a 100-MHz band at 2.3 GHz. Technically WiBro transmission works with scalable SOFDMA with 2,048 subcarrier.

WiBro offers service (QoS), making it even for streaming media and VoIP is interesting. In conjunction with the handover, it can also as an alternative to the techniques of the 3rd mobile Generation (3G) such as UMTS will be considered. In order for the wireless broadband technologies, WiBro and WiMAX later mutually compatible have well-known chip manufacturer and Korean firms, the WiBro project have developed for compatibility issues asserted

IV. CHARACTERISTICS OF WIBRO

Wireless broadband is a web technology based on 802.16e standard similar to Wimax of USA. It is developed to solve the problem of speed limitation of mobile phone and attaching to broadband connection. It can provide mobility up to 74.5 miles per hour in a moving device. This device also has some additional features like video content and less sensitive data storage in itself reliably. WIBro is very similar to WiMax technology, South Korea claims that it is a superior technology in the comparison of Wimax, because it does not work when receiver is in motion, on the other hand WiBro works effectively all the time, no matter, the receiver is in dynamic form or in static.



V. FEATURES OF WIBRO

Wibro is a wireless broadband solution that offers a rich set of features with a lot of flexibility in terms of deployment options and potential service offerings. Some of the more salient features that deserve highlighting are as follows

A. OFDM-Based Physical Layer

The Wibro physical layer (PHY) is based on orthogonal frequency division multiplexing, a scheme that offers good resistance to multipath. OFDM is now widely recognized as the method of choice for justifying multipath for broadband wireless.

B. Very High Peak Data Rates

Wibro is capable of supporting very high peak data rates. In fact, the peak PHY data rate can be as high as 74Mbps when operating using a 20MHz wide spectrum. More typically, using a 10MHz spectrum operating using TDD scheme with a 3:1 downlink-to-uplink ratio, the peak PHY data rate is about 25Mbps and 6.7Mbps for the downlink and the uplink, respectively.

C. Scalable Bandwidth and Data Rate Support

Wibro has a scalable physical-layer architecture that allows for the data rate to scale easily with available channel bandwidth. This scalability is supported in the OFDMA mode, where the FFT (fast fourier transform) size may be scaled based on the available channel bandwidth.

D. Orthogonal Frequency Division Multiple Access (OFDMA)

Wibro uses OFDM as a multiple-access technique, whereby different users can be allocated different subsets of the OFDM tones.

E. Flexible and Dynamic Per user Resource Allocation

Both uplink and downlink resource allocation are controlled by a scheduler in the base station. Capacity is shared among multiple users on a demand basis, using a burst TDM scheme. When using the OFDMA-PHY mode, multiplexing is additionally done in the frequency dimension, by allocating different subsets of OFDM subcarriers to different users.

F. Support for Advanced Antenna Techniques

The Wibro solution has a number of hooks built into the physical-layer design, which allows for the use of multiple-antenna techniques, such as beamforming, space-time coding, and spatial multiplexing.

G. Quality-of-Service Support

The Wibro MAC layer has a connection-oriented architecture that is designed to support a variety of applications, including voice and multimedia services. The system offers support for constant bit rate, variable bit rate, real-time, and non-real-time traffic flows.

H. Robust Security

Wibro supports strong encryption, using Advanced Encryption Standard (AES), and has a robust privacy and key-management protocol. The system also offers a very flexible authentication architecture based on Extensible Authentication Protocol (EAP), which allows for a variety of user credentials, including username/password, digital certificates, and smart cards.

I. Support for Mobility

The mobile Wibro variant of the system has mechanisms to support secure seamless handovers for delay-tolerant full-mobility applications, such as VoIP. The system also has built-in support for power-saving mechanisms that extend the battery life of handheld subscriber devices.

VI. COMPARATIVE ANALYSIS OF WIBRO WITH OTHER STANDARDS

Following table shows the comparative analysis of Wibro with WLAN and Wimax.

	WLAN	WiMAX	Wibro
Peak Data Rate	802.11a,g=54 Mbps	DL:70 Mbps	DL:18.4 Mbps
	802.11b=11 Mbps	UL:70 Mbps	UL:6.1 Mbps
Bandwidth	20MHz	5-6 GHz	9MHz
Multiple Access	CSMA/CA	OFDM/OFDMA	OFDMA
Duplex	TDD	TDD	TDD
Mobility	Low	Low	Mid
Coverage	Small	Mid	Mid
Standardization	802.11x	802.16	802.16e

Comparative analysis of WLAN, WiMAX and WiBro is done according to the following points.

- Market penetration,
- Vendor difficulties,
- Power of buyers,
- Threat of new entrants
- Threat of new substitutes.

VII. KEY FACTORS OF WIBRO

Following table shows the key factors of the wibro.

Parameter	Values
Duplex	TDD
Multiple Access	OFDMA
System Bandwidth	10mhz
Sampling Frequency	10mhz
No. of Used tones	864 out of 1024
No. of Data tones	768
No. of polite tones	96
Tone spacing	9.765625khz
Signal Bandwidth	8.447mhz
Basic OFDMA Symbol time	102.4ms
Cycling prefix time	12.8ms
OFDMA symbol time	115.2ms
TDD frame length	5ms
No. of symbol in frame	42

VIII. BENEFITS OF WIBRO

- Economical and easy to install ; Save 90% of investment to network
- High performance solution ; High data rate, Scalability and extra
- Broadband service in not only urban area but also rural & remote area

One disadvantage of wibro is the spectral limitation, in other words limitation of wireless bandwidth. For use in high density areas, it is possible that the bandwidth may not be sufficient to cater to the needs of a large clientele, driving the costs high.

IX. CONCLUSION

Besides of service & marketing, policy, and technology aspects, it seems to require other aspects such as contents and distribution network, terminal, or network. And then, we can examine more specifically about the

solution of wibro. Also, if we can prepare questionnaire in more various direction, we guess we could find new solutions.

The number of expert and diversity of expert also require getting the new or other solutions. And, if we increase the number of feedback, also we could get the more exact and specific results.

The lasting thing is the survey. If we survey to current user of WiBro, we could get more real solutions. This is the subject in the future.

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