DOWNLINK SPECTRAL EFFICIENCY OF MOBILE WiMAX

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ABSTRACT

Abstract — The IEEE 802.16 is the working group on broadband wireless access standards. The Mobile WiMAX was introduced in the final standard, IEEE 802.16e-2005. The mobile WiMAX makes changes and give benefits in mobility and flexibility for the user. Mobile WiMAX is a cost-effective approach to significantly extend the coverage and enhance the throughput and capacity especially the downlink part. This project has been investigated the performance of advanced antenna such as Single Input Single Output (SISO) and Multiple Input Multiple Output (MIMO) techniques in the downlink of mobile WiMAX by deploying Hyper Text Transfer Protocol (HTTP) application. The OPNET modeler software is used to evaluate the performances including throughput, spectral efficiency, SNR and Modulation Coding Scheme (MCS). Results of simulation show that higher MCS (e.g. 64-QAM) which deployed MIMO antenna has better performance as compared to lower MCS (e.g. QPSK) with SISO antenna.

Index Terms — *Mobile WiMAX, OFDMA, SISO, MIMO, throughput, delay, spectral efficiency, HTTP.*

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The demand of the internet has increased recently especially for mobile internet services which is to give the best coverage experience comparable to existing fixed internet [1]. The number of radical is needed enhancement for example usage of scalable OFDMA (SOFDMA) and advanced antenna techniques to compare existing mobile radio system and achieve the best level of performance for the next generation of mobile broadband network. The large channel bandwidth will offer the possibility of higher throughput for the user [2]. The cost-effective application of MIMO technology gives lot of advantages especially in a wireless channel in order to increase the throughput over the same frequency [3].

The mobile broadband wireless access (MBWA) which has been standardized by IEEE 802.16-2005 [4] supports time division duplexing (TDD) and Quality-of-Service (QoS) which is a flexible and seamless solution for multimedia services [5]. The application in fix internet (laptop) for example video streaming, FTP and web browsing also demand in a flexible internet (mobile). So, mobile WiMAX tried to overcome and focus on several important parts such as flexibility, spectral efficiency for that kind of application.