COMPARISON ON PAPR AND BER IN RESOURCE ALLOCATION FOR MIMO-OFDMA BASED COGNITIVE RADIO USING DIVERSITY TECHNIQUE

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ABSTRACT

Orthogonal Frequency Division Multiple Access (OFDMA) and Single Carrier Frequency Division Multiple Access (SC-FDMA) is suitable for high speed transmission in downlink transmission and uplink transmission respectively. Recently, spectrum sharing is widely used in the OFDMA-based system. Cognitive radio (CR) is one of the spectrums sharing that emerging in the mobile wireless network and creates opportunity for the network to be use when the network is vacant. However, OFDMA has high Power-to-Peak Average Ratio (PAPR) and consists of minimum diversity order system. This paper objective is to evaluate the performance of both resource allocation for MIMO-OFDMA and SC-FDMA based on cognitive radio network (CRN) parameters. It aims to achieve maximum diversity order system by implementing Space-Time-Frequency Block Code (SFTBC) technique and to compare PAPR between both systems, for better performance in application that requiring low PAPR in cognitive radio (CR). The result obtained proves that the present of STFBC reduce the bit error rate (BER) while improve the signal at the receiving end and achieve lower PAPR compared to the existing OFDMA and SC-FDMA system.

CONTENTS

CHAPTER I

INTRODUCTION

1.1 BACKGROUND

During the past decades, the evolution of wireless communication has benefited from substantial advances and it is an improvement technique of innovative for future consumer products. In order to fulfill the market growth and satisfy the consumer requirements of various applications, significant technological achievement are required to ensure that wireless device operates at appropriate standards for supporting various kind of services delivered to the end user [1]. Most of the cellular networks are using wireless system, which include the orthogonal frequency division multiple access (OFDMA).

Orthogonal Frequency Multiplex Division (OFDM) had evolved to OFDM-Access (OFDMA) which allow the evolution of digital transmission technique and enhance in the digital signal processing methods and technologies. Broadcast systems were initial application that is used in OFDM system. The very first, OFDM is adopted for digital radio and video broadcasting standards in e-Terrestrial system (DVB-T) in 1997. Afterward, the advance technology grows into wireless standards such as IEEE 802.11a for wireless LAN and the European HiperLAN project in 1999, IEEE 802.16 in 2001 and Mobile WiMAX in 2005. Nowadays, OFDMA is used widely and almost all broadband wireless system because of its advantages for broadband wireless transport [2].

OFDMA is known as the new potential technique for future Cognitive Radio (CR). CR has been reported to be the low spectrum utilization in the traditional fixed spectrum allocation. In modern wireless communication CR has begun as a new