

ABSTRACT

Multimedia service has become a common thing nowadays. The growth for multimedia service demand for the availability of bandwidth. Therefore, Broadband Wireless Access (BWA) is the solution. But, those wireless access has to be able to use the resource efficiently and simultaneously among the user. The joint of Orthogonal Frequency Division Multiple Access (OFDMA) and adaptive modulation is the answers of those wishes.

The control mechanism is needed for the simultaneous use of wireless resources. Beside efficient use of bandwidth, the transmit power limit on the user usage efficiency level can also be increased. OFDMA system has several resource allocation mechanisms which are : (a) Maximum Sum Rate (MSR) and (b) Maximum Fairness (MF).

If the user has transmit power and distance that are relatively equal to the base station then channel capacity will be easy to predict. But, in reality, wireless network users will be distributed equally among the base station service area. Beside variable distance, channel response from signal for each user will vary because it undergoes different multipath effects. Those reasons make the channel capacity which is used together on real conditions will not be linear. Thus, the idea to add spatial diversity to the system. Multi Input Multi Output (MIMO) and Maximal Ratio Combining (MRC) which are the most widely used spatial diversity.

This research is about the comparison of MSR and MF algorithm performance on system which uses spatial diversity (MIMO-OFDMA and MRC-OFDMA) with the one without using spatial diversity (SISO-OFDMA). In this research, distance between each user will be weighted variably with or without power control. Rayleigh and AWGN channel model is used on transmission media modeling in this research.

The result of this research is to be able to give contribution for hardware system engineer in giving system performance description on the real condition simulation.

Keyword : *Resource allocation mechanisms, Maximum Sum Rate(MSR), Maximum Fairness(MF), MIMO-OFDMA, MRC-OFDMA, SISO-OFDMA, power control for OFDMA system, Dynamic sub channel allocation, The combination of spatial diversity and multiuser*