

## ABSTRACT

The needs of high data rate and high mobility is increasing. However, communication systems with high data rates, susceptible to frequency selective fading and fast fading. In previous work the fading effect can be reduced by applying various diversity techniques. This research use modulation diversity by applying a certain rotation to the signal constellation, then by interleaving components at the transmitter and de-interleaving components at the receiver. However, the scheme are only suitable for independent flat fading channel and cannot be directly used for frequency selective fading channels. So it should cooperate with MC-CDMA to make full use of modulation diversity and frequency diversity to reduce selective fading and fast fading.

In this research, the Coding Rotated Modulation(CRM) will be placed after the block mapper and before the serial to parallel of MC - CDMA process. Coding Rotated Modulation is implemented by rotating the signal constellation and use inphase and quadrature subcarrier interleaver . The scheme is downlink transmission in MC -CDMA system and simulated by Rayleigh channels.

The results showed that the speed of 120 km / h with the number subcarrier 256, MC-CDMA system with 16 QAM modulation applying Rotated Coding Modulation (CRM) requires gain 8.32 dB to achieve BER  $10^{-4}$ , while the MC-CDMA system with conventional modulation required power 10.96 dB.

Keyword— CRM, MC-CDMA, power efficiency, modulation