

## ABSTRACT

High speed radio data communication systems are needed to support varieties of data and voice services. On single carrier modulation technique, higher data rate mean shorter symbol period and if symbol period smaller than channel delay spread it will result in intersymbol interference (ISI), in frequency domain this is correspond with frequency selective fading effect.

Orthogonal frequency division multiplexing (OFDM) multicarrier modulation method was developed to overcome noise happened on single carrier modulation system. Transmitting signal in parallel onto some subcarrier will result on longer symbol period, using this technique with interval guard will remove ISI effect. Subcarrier with smaller bandwidth compared to coherent bandwidth will obviate frequency selective fading effect. Usage of mutually orthogonal and overlapping subcarrier will increase bandwidth efficiency.

Trellis code modulation (TCM) technique used on the chance to increase system performance, this coding technique appropriate with the condition of system's limited power and bandwidth. TCM specifications used are 256 state, rate  $\frac{1}{2}$ , generator array  $g_0=212$   $g_1=475$  and using quadrature phase shift keying (QPSK) signal mapping scheme. Channel estimation conducted to measure channel's characteristics used to compensate receiver's signal and increase system performance. Pilot tones method used as channel estimation technique.

Simulation result on AWGN channel show TCM able to give 6 dB coding gain on  $10^{-5}$  BER. Use of channel estimator and coding scheme on multipath fading channel with BER  $10^{-5}$  give total gain of 6 dB for doppler frequency 0 Hz and 10,7 dB for doppler frequency 9 Hz.