ABSTRACT

Power Line Communication (PLC) is a data transmission system using electrical transmission cable as its transmission medium. The basic principle of this technology is data signals and voice are injected into electrical power lines at a frequency between 500 kHz–30MHz. Unfortunately, the development of PLC systems for high-speed data transmission (above 2 Mbps) is hampered by poor constraints PLC channel characteristics. PLC channel is not friendly to the propagation characteristics of signals having multipath, damping, and high noise levels caused a decrease in the quality of information through PLC [18] channel.

To overcome the effect of frequency selective fading on PLC channel, multicarrier modulation technique OFDM (Orthogonal Frequency Division Multiplexing) is used [3][17]. However, the use of OFDM modulation technique is not enough, to overcome the impulse noise that can cause burst errors in the PLC channel, channel coding technique is required. Channel coding techniques that commonly used is Block code and Convolution code.

Based on previous studies ([15] and [20]), the use of Convolution code with OFDM system on PLC channel did not provide a significant improvement results. For that purpose, Reed-Solomon channel coding techniques is considered, it's one of Block code. Reed-Solomon code serves as a Forward Error Corrections (FEC) that are expected to overcome burst errors are caused by impulsive noise at a low voltage PLC channel

In this final task, simulation and analysis conducted to determine performance using Reed-Solomon code that serves as FEC for OFDM systems in a low voltage PLC channel. The parameters that observed are the ratio between the SNR and BER.

From the simulation, can be seen that the Reed-Solomon code capable in overcoming the error in the transmission of data through the PLC channel. Performance improvement obtained can achieve 1.2 dB up to 6.2 dB for 10^{-4} BER values. Performance improvement will be even greater for the value of t (correction capability) higher and the value of m (number of bits each symbol) smaller.

Key words: *PLC, frequency selective fading, OFDM, impulse noise, Reed-Solomon code, FEC, burst error, BER.*