

Implementation of Powerline Communication using FSK and BCH code

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Abstract

This thesis designs transmitter and receiver for exchanging data over powerline medium. Unfortunately, powerline cable is non-ideal communication medium, which is not actually designed for the data communication. High level of interference, noise distortions within the channel and disturbance from the use of other electrical equipments cause severe effect to degrade the signal. The impedance in the powerline is varied over the time due to the external environment as currently load. The channel coding plus frame format is applied to improve the transmission quality to the acceptable level.

The Frequency Shift Keying (FSK), is mainly concerned in the hardware implementation. The performance evaluation of the proposed hardware implementation for transmission at 19.2kbps is measured for 880kHz / 940kHz FSK with approximately 10^{-7} of error rate and for 690kHz / 750kHz FSK with 10^{-2} error rate. Then, 10^{-2} error rate can be improved by increasing a bit bandwidth to be 680kHz / 750kHz FSK, the error rate is decreased to 10^{-4} . By applying proposed protocol with BCH error correction, the performance is improved with the expense of bit rate. At the end, the proposed implementation is achieved approximately the error rate of 10^{-7} for the powerline communication at 9.6kbps. Finally, the performance comparison of transmission with and without protocol design is provided.