

## ABSTRACT

*Powerline Communication* (PLC) is a technology of using low and medium voltage electricity distribution grid as communication media. Till this day the technology have been develop to satisfy the necessity for broadband access in high speed data transmission with low cost manner, last miles, and secure from interference to other radio communication system.

The horrible characteristics of powerline medium for communication, make it a major problem on implementation using 220 V / 50 Hz low voltage grid which is distributed to houses and buildings (In-Home PLC). However, using several techniques proven to other wireline network such as *Asynchronous Data Subscriber Lines* the successful data rate that PLC equipment can reach till this moment is 12 up to 200 Mbps.

In this theses the design and implementation of Customer Premises End Broadband PLC Modem prototype as the nearest equipment to the customer for accessing a broadband network will be shown briefly. Modulation technique for carrying data from transmitter to receiver specifically choose is Orthogonal Frequency Division Multiplexing which has been successfully proven for handling multipath effect and bandwidth efficiency. From research work, baseband OFDM processor can be implemented on Xilinx FPGA which part of Virtex-4 LC development board with minimum resource utilization. Other resources suggested for extended application such as channel coding. Utilization efficiency depends on design of calculation part which we use here is radix-8 64 point I/FFT.

Performance of baseband OFDM processor simulated on Modelsim fit the data from MATLAB simulation. It uses 2380 gates, 9343 4-input LUT, and 1045 flip-flops with FPGA resource utilization not more than 50%. The design work on maximum frequency of 66.079 MHz.

Keyword: **BPLC, OFDM, FPGA, Modem CPE**