

## ABSTRACT

In today's digital telecommunication technology, data is transmitted through wireless technology. I/FFT is a method of solving discrete signals that are used in WiMAX technology (802.16e). All this FFT only be viewed as a system of FFT computation, but now has become something that is very important especially in communication using BWA (Broadband Wireless Access).

Cooley-Tukey method is used for making the design of Fast Fourier Transform and Inverse Fast Fourier Transform algorithm, which refers to the specification used 802.16e (1024 points radix-4) by using a Xilinx Virtex-4 XCVLX25 on board Field Programmable Gate Array (FPGA) using language VHSIC Hardware Description language (VHDL). Design with VHDL modeling system is in accordance with the requirements of the system processor I/FFT 1024 point and simulate with ModelSim before translating software synthesis in the hardware design. Then compared with the results of simulation modeling has been done in MATLAB.

From the results of modeling and simulation is carried out on a hardware level FPGA synthesis with Xilinx Shynthesize Tools. From the synthesis processor system block I / FFT 1024 point root-4 obtained the required number of resources is the number of 1% slice, slice flip-flop number 1%, number 4 LUT (Look Up Table) 1% and 27% IOB number with maximum error bit for FFT 5,95% and IFFT 0,1%. Overall, this study has shown that I/FFT 1024 points using minimum resources to allow for the development of applications and power. But in the process of testing requires a block of ADC / DAC.

Key Words : WiMAX, FPGA, VHDL, BWA, *Fast Fourier Transform, Inverse Fast Fourier Transform.*