ABSTRACT

Long Term Evolution (LTE) is the evolution of the *Universal Mobile Telecommunications Sistem (*UMTS) to respond the growing demand for high-quality multimedia services in accordance with user expectations. The LTE sistem uses Multiple Input Multiple *Output* (MIMO) sistem. One of the coding schemes in LTE MIMO technique is a Space Frequency Block Code (SFBC) scheme is based on more reliable research on the conditions of mobility compared to the Space Time Block Code (STBC). SFBC can be used to solve the problems that occur in the application of LTE sistem, such as fading problems, so the information can be well received by the receiver.

In this final project has been designed SFBC detector with two antennas transmitter and implemented on FPGA. SFBC detector design is using VHDL programming language. In this final project, the SFBC detector integrated with the OFDM 512 subcarriers that have been studied by previous researchers. SFBC-OFDM simulation results of testing conducted to verify the *output*. After that, SFBC detector in VHDL designs implemented on FPGA board.

The result of the verification and implementation SFBC detector and SFBC-OFDM have the same results. The synthesize results obtained on the Xilinx software is the amount of used resource in the FPGA for SFBC detector is *occupied slice* 7%, *slice register* 1%, 4 input LUTs 7%, *bonded* IOBs 1%, BUFG/BUFGCTRLs 6% and SFBC-OFDM is *slice register* 12% , occupied slice 83%, input LUT 70%, *bonded* IOB 1% and the number of BUFG/BUFGCTRLs 9%.

Keywords : LTE, MIMO, SFBC , FPGA, VHDL