

ABSTRACT

One of the international communications standards, particularly communications Broadband Wireless Access (BWA), which is considered adequate and in accordance with the demands of users today is the Worldwide Interoperability for Microwave Access (WiMAX) issued by the Institute of Electrical and Electronics Engineering (IEEE). WiMAX itself has also experienced growth with the variants that are designated as a service to certain conditions such as 802.16a standard, 802.16a rev.d-2004, and 802.16e for mobile WiMAX. This system uses the technique of *Multiple Input Multiple Output* (MIMO), a sistem that use multiple antenna at the transmitter and receiver. One of the schemes of MIMO is Space Time Block Code (STBC). STBC is a coding system on the domain of space and time that aims to obtain the maximum spatial diversity.

In this final project has been designed encoder and decoder STBC MIMO 4x4 and implemented on FPGA. Design encoder and decoder is use VHDL programming language. Rate of Encoder and decoder that designed is $\frac{1}{2}$ and code word that used is assumed same with codeword in Space Time Coding book by Branka Vucetic.

After the implementation in FPGA has been done, we can get some conclusions such as for encoder block, resources needed is amount of occupied slice is 3%, amount of slice register is 1%, amount of 4 input LUT is 2%, amount of bonded IOB is 54%, amount of BUFG/BUFGCTRLs is 83%. And for decoder block, resources needed is amount of occupied slice is 40%, amount of slice register is 4%, amount of 4 input LUT is 34%, amount of IOB is 54%, amount of BUFG/BUFGCTRLs is 3% and amount of DSP48s is 91%.

Keywords : MIMO, STBC, FPGA, VHDL