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 ½ 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

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