ABSTRACT

Tumor occurs due to body tissue cells that turn malignant and develop faster than other normal cells. There are several methods that can be used to detect tumor, such as MRI, ultrasound and mammograph. However, these methods are only available in large hospitals and are quite expensive. To make them more affordable, wearable antennas can be used as a solution in the medical field. Wearable antennas have a simple design, are lightweight, and relatively cheaper. In this Final Project, a microstrip antenna made from FR-4 is made to detect breast tumor at a frequency of 5.8 GHz. This antenna uses feedline microstrip unification with inset feed, slotted patch and the addition of Defected Ground Structure (DGS) on the groundplane to get a wider bandwidth. Breast tumor detection is done using breast modeling or *breast phantom*. The detection antenna will be used on the *breast phantom* that has been made and observe the changes in the S_{11} Parameter that occur as the size of the tumor is detected.

The designed antenna has dimensions of 21.5 mm x 40.5 mm and uses 3D electromagnetic simulation software. This antenna is realized using FR-4 material based on the simulation results, the antenna has an S_{11} Parameter value of -40.16 dB and a VSWR value of 1.1 at a frequency of 5800 MHz, S_{11} Parameter -11.59 dB at a frequency of 5725 MHz and S_{11} Parameter -15.25 dB at a frequency of 5875 MHz, while the results in the realization of the antenna have an S_{11} Parameter value of -25.19 dB at a frequency of 5850 MHz and a VSWR value of 1.12, S_{11} Parameter -6.88 dB at a frequency of 5725 MHz and -21.05 dB at a frequency of 5875 MHz. The antenna can detect tumors through different tumor materials found in the *breast phantom* which affects changes in S_{11} Parameter values. Based on measurements, if the size of the tumor is getting bigger, the S_{11} Parameter value obtained is getting smaller due to more electromagnetic waves returning to the antenna.

Keyword: *Breast phantom, Inset Feed, Slotted Patch, Defected Ground Structure.*