

ABSTRACT

Ultra wideband (UWB) technology began to be used not only for the communication system but also for the imaging system. UWB imaging system is designed to be able to apply microwave imaging technology where the antenna is one of the main components that must be considered. UWB antennas for microwave imaging should be designed so that a planar, compact, have high radiation efficiency and stable during the entire operation band.

In this final project will be the design and realization of antipodal Vivaldi antenna for UWB imaging system for breast cancer detection at a frequency of 3.1 - 10.6 GHz. The design of the antenna is done by using software CST Microwave Studio 2014 and realized by using materials Rogers RT5580 ($\epsilon_r = 2.2$, $p = 1.575$ mm). The analysis conducted in this final project is to compare the difference value of E-Field, Field H- and current density of antennas on the structure of breast with cancer and without cancer and to detect the depth of the breast cancer.

The antenna has a size of 76.507 mm x 117.857 mm and is realized using materials Rogers RT5580 ($\epsilon_r = 2.2$, $p = 1.575$ mm). Based on simulation results, the antenna has a value of return loss ≤ -10 dB and VSWR ≤ 2 at 3.1 GHz - 10.6 GHz. Maximum gain of the antenna is 7.283 dB at 6.85 GHz.

Based on simulation results, antenna can detect the presence of cancer which is characterized by their different value of parameter electromagnetic between breast cancer structure with cancer and without cancer. In addition, antenna also can predict the location of the depth of the cancer. Experimental verification is done against the antenna realization, where the result is the antenna can detect the difference material characterized by the difference value of the S_{11} parameter.

Keyword: ultra wideband, microwave imaging, breast cancer detection