

ABSTRACT

The development of research on Ultra-Wideband (UWB) technology has been used in medical imaging. One application about medical imaging is microwave imaging, where in the UWB system the antenna becomes a component that needs to be considered because it is a transmitter and receiver. Microwave imaging is an attractive and promising choice, because it has many advantages such as low cost, safer and more accurate with the nonionized radiation produced. The Federal Communications Commission (FCC) sets the frequency for the interests of the UWB medical imaging system in the range of 3.1 GHz to 10.6 GHz. Therefore an antenna is needed to support the UWB system in a medical imaging antenna application that is planar, compact, with high radiation efficiency and relatively stable in the operating band frequency.

This study designed and realized the UWB microstrip antenna for brain cancer detection. UWB technology plays a very important role for detection purposes, because with wide bandwidth, the characteristics of a narrow UWB pulse will support high resolution. Antenna design is done by simulation using software and realized using copper for patches and ground planes. Then for the substrate used is Rogers Duroid RT5880 with a dielectric constant $\epsilon_r = 2.2$ and its thickness is $h = 1.575$ mm. The antenna works in the frequency range of 3,989 GHz – 10,138 GHz, the resulting bandwidth is more than 500 MHz, unidirectional radiation patterns, return loss ≤ -10 dB or VSWR ≤ 2 . Results from simulation, the antenna can detect the presence of cancer marked by changes value of electric field and return loss value on healthy human head tissue and head tissue with cancer.

Keywords : *Ultra-Wideband, Microwave Imaging, Cancer, Microstrip Antenna.*