ABSTRACT

In the current era of telecommunications technology, Ultra WideBand impulse radars (UWB) are widely used in the medical field such as detecting vital signs in humans, namely breathing. UWB has several advantages that have earned it attention in the medical field, including having wide bandwidth and high resolution. Therefore UWB is used for various applications on radar especially in the health field.

In this Final Project research the author will make a bow-tie antenna to detect vital signs, namely breathing in humans. Then testing with numerical simulation using antenna simulation software. Measurements were made using Vector Network Analyzer (VNA) as a UWB radar model to see the results of breathing that is carried out and using the UWB radar system. The antenna will be placed parallel to the human chest to find out the vital signs of breathing in humans whether the human is still alive or not is gone, and can be used to detect earthquake victims behind the rubble.

The antenna is realized using FR4 dielectric substrate with relative permittivity of $(\varepsilon_r) = 4.3$ and thickness of h = 1,6 mm. The antenna was design to cover the UWB range from 4 - 10 GHz. Simulation and measurement results show that the proposed antenna has fulfill the bandwidth requirement. The proposed antenna has a bandwidth within range 2,8 GHz - 10 GHz. Due to the minimum distortion point of view, the S_{21} result from both simulation and measurement indicate that the antenna has linear phase response. The Respiration radar experiments using VNA shows that the reflected signal from chest wall at exhale and inhale can be identified well using the proposed antenna.

Keywords: Ultra WideBand (UWB), Antenna Bow-tie, Vector Network Analyzer (VNA).