ABSTRACT

Ground Penetrating Radar (GPR) is an underground object detection system. The GPR method is carried out by emitting electromagnetic pulses. The credit propagates into the ground and is reflected by an object. GPR applications for transportation infrastructure generally include measuring concrete layers

Ultra WideBand (UWB) is developed in the civil field. One application of UWB is the Ground Penetrating Radar (GPR). Ultra wide-band has the advantages of high transmission speed, wide bandwidth, not having to come into contact with the concrete surface, making it safe to penetrate civilian networks. Therefore UWB is used for various radar applications, especially in the civilian field. The GPR UWB must be supported by an UWB antenna where the characteristics of the UWB are observed from the impedance bandwidth and ringing level possessed.

In this final assignment research, a UWB dipole antenna resistive loading will be designed and applied to the Ground Penetrating Radar for the detection system of the thickness of the concrete layer with wide bandwidth and accurate results. Measurements are made using the Vector Network Analyzer (VNA) as a radar model to see the results of the thickness of the concrete layer, the dipole antenna does not have to come into contact with the concrete surface. The design concept uses resistive loading with a folding structure so that the dimensions of the antenna are not large and resistive loading uses resistor trimpot so that the value can be entered according to the calculations done during the simulation. The design of the dipole antenna is done by software simulation and realized using thin wire for patches, the antenna works at a Bandwidth of 2-6 GHz, the FR-4 Epoxy subtract, then VSWR <2, and ringing level < -20 dB.

Keywords: *Ultra WideBand, Ground Penetrating Radar*, Dipole Antenna, *Vector Network Analyzer* (VNA).