

ABSTRACT

Antenna footprint is the parameter that affects the antenna detection results on the Ground Penetrating Radar (GPR). Footprint is a field on the ground surface or below the surface of the land that is illuminated by an electromagnetic field emitted by a Ground Penetrating Radar (GPR) antenna. In reality, the condition of the soil to be detected is inhomogeneity and in general the GPR antenna has only a limited size or shape of the footprint.

With these considerations, in this thesis research the author tries to develop a GPR antenna system that has the ability to adjust the antenna footprint. The proposed technology is to use an ultra-wideband antenna consisting of three concentric dipole microstrip arrangements with different arm lengths in a circular shape. To widen the bandwidth produced, the authors use the addition of resistive load on the antenna arm.

This Final Project was designed using software and realized an antenna with FR-4 Epoxy substrate with dielectric constant 4.3 and thickness of 1.6 mm. The antenna is designed to work in the 100-1000 Mhz frequency range. The result of the design that has been made from this final project is that the antenna which is realized has fulfilled the GPR criteria, which is ultra wide band with the value of return loss under -10 dB at range frequency 100-1000 Mhz. Antenna measurement using Virtual Network Analyzer (VNA) shows that the antenna that is realized can produces three footprints with different shape without affecting the input impedance value on the antenna.

Keywords: *Footprint Antena, Ground Penetrating Radar, Microstrip Line.*