ABSTRACT

Ground Penetrating Radar (GPR) is one type of radar that adopts a non-destructive technique to detect objects in the ground for example to find the location of damage to cable in the ground without digging.

This thesis designs antipodal multislot antenna to fulfill the requirement of GPR systems. This thesis selects stepped frequency continuous wave signal technique as a radar signal generator to achieve high-resolution levels. The antenna required for this GPR system should have ultrawide-band (UWB) properties with more than 20% fractional bandwidth. Ringing values are needed to be pressed until less than -30 dB such that no reflection to the receiver side causing masking effects. To expand bandwidth bandwidth and reduce ringing effects a slot patch method the transformer matching impedance $\lambda/4$ are also added.

This thesis uses software and realize the antenna FR-4 Eproxy substrate with a dielectric constant of 4.6 and a thickness of 1.6 mm. The antenna is designed to work in the frequency range 1-2 GHz. The realized antenna is found to have 567 MHz bandwidth, -31.016 dB ringing level, -19.544 dB return loss, and 1.238 VSWR with a bidirectional radiation pattern in the time domain. The result show that the ralized antenna can fulfil the requirement to the ultrawideband UWB antenna criteria and meet the antenna specifiacation for the GPR systems.

Keyword: Bowtie antenna, GPR, Ground Penetrating Radar, Ultrawide-band, ringing level, SFCW