

ABSTRACT

Soil Water Content (SWC) is an important parameter in ecological, agricultural, hydrological and engineering studies. SWC determines the conversion of rainfall to runoff and infiltration, thereby affecting soil erosion, river recharge and groundwater recharge. SWC determines the separation of rainfall into runoff and infiltration, and thus affects erosion, river discharge, and groundwater recharge. At the field scale, SWC is the main controller of plant growth and plant quality.

To determine the water content in the soil, a tool is used, namely the Ground Penetrating Radar (GPR). GPR is a tool that utilizes high-frequency electromagnetic waves that can detect an object or element below the ground surface. GPR can function with an antenna intermediary, the antenna used for GPR applications is the Ultra Wide-Band antenna. Ultra Wide-Band Antenna is an antenna that has a wide bandwidth, therefore the antenna used for GPR applications is a UWB antenna because the wider the bandwidth, the better the radar resolution will be.

From these conditions, in this final project, a planar monopole antenna with a frequency range of 1-3 GHz is made which is used as an intermediary for sending and receiving electromagnetic waves in GPR. The monopole antenna designed has the shape of a circular patch and is realized with copper material. The dimensions of the antenna are 85 mm x 85 mm with a patch radius of 30 mm. The measurement results obtained a bandwidth of 695 MHz, Returnloss 22.29 dB, VSWR 1.16, gain of 3.06 dBi with omnidirectional radiation pattern, and elliptical polarization. These results have met the UWB specifications.

Keyword : *Ultra Wide Band (UWB). Ground Penetrating Radar (GPR), Soil Water Content (SWC).*