

ABSTRACT

Advances in wireless communication encourage the development of various communication technologies with various frequency spectrum. With a high frequency spectrum can increase the speed of data transfer in communication. wireless technology can used in various mobile and electronic devices, has data transfer speeds consistent, and can be applied to a wider network. There are various There are various types of antennas that can be used in wireless communication.

UWB is a low-energy radio technology for short-range communication with high bandwidth. According to the Federal Communications Commission (FCC), UWB is technology that requires a bandwidth of at least 500 MHz or 20% of the center frequency. The working frequency of the UWB antenna is 3.1 GHz to 10.6 GHz. UWB antenna has wide bandwidth results in low antenna gain. SIW is a method that works as a filter. Some of the advantages of SIW are that it reduces the effect of the reflection coefficient, increase bandwidth, gain, and easier and more efficient fabrication. SIW is method applied by forming rows of metal cylinders in part wall beside the waveguide embedded in the dielectric substrate connecting the patch and ground palm. Metal cylinders can transmit high frequencies at a loss which is very small. Where the metal cylinder serves as a barrier to the propagation area wave.

In this thesis, the UWB antenna is designed using a planar antenna with a circular patch and the substrate FR4(lossy) which operates at a frequency of 3.1 Ghz to 10.6 Ghz. UWB antenna has dimensions of 40x36x1.6 mm³ and $VSWR \leq 2$. Then the SIW structure is designed for increase the gain of the UWB antenna. The SIW structure is designed under the UWB antenna with Dimensions 40x36x1.6 mm³ and between the structural design of the SIW and the UWB antenna are given layer FR4(lossy). The SIW structure consists of circular slots with a radius of 0.4mm in the shape of a squares parallel to the patch antenna UWB. Slots are made to penetrate the SIW structure that is consists of FR4(lossy) coated metal copper on the bottom and top. Expected design produces an increase in UWB antenna gain of 1 dBm and has $VSWR \leq 2$. Design antenna using CSR studio and the design results will be presented with a comparison the gain and VSWR values of UWB antennas that do not use the SIW method and those that do not using the SIW method.

Keywords: Ultra-wideband (UWB), Planar Antennas, Gain, Substrate Integrated Waveguide