

Design and Analysis of Three Different UWB Antennas

Prof. Jayesh Gokul Pathak

Lecturer, Department of Electronics and Telecommunication Engineering
Amrutvahini Polytechnic, Sangamner, Maharashtra, India

Abstract: *In this article, the design and analysis of three different UWB antennas, such as microstrip feedline, coplanar waveguide (CPW) feed and asymmetrical coplanar strip (ACS) feed UWB antenna are carried out. All antennas are fabricated on a FR-4 substrate of thickness $h = 1.6\text{mm}$ having loss tangent of 0.02 and dielectric constant of $\epsilon_r = 4.4$. We first design microstrip feed line UWB antenna, which consists of circular radiating patch of radius R , microstrip feedline of length L_p and width W_p and destructive ground structure (DGS) of length L_g and width W_g . The optimized dimensions of the structure are: $L_{sub} = 24\text{mm}$, $W_{sub} = 20\text{mm}$, $W_f = 2\text{mm}$, $L_f = 10\text{mm}$, $R = 5.65\text{mm}$, $g = 1.25\text{mm}$, $L_1 = 2\text{mm}$, $W_1 = 2\text{mm}$. Then design a CPW feed Ultra wideband Antenna, with optimized dimensions of: $L_{sub} = 24\text{mm}$, $W_{sub} = 20\text{mm}$, $W_f = 2\text{mm}$, $L_f = 10\text{mm}$, gap between radiating patch and ground plane $g = 1.25\text{mm}$, gap between CPW feed line and ground plane $h = 0.25\text{mm}$, $L_g = 8.75\text{mm}$, $W_g = 9.75\text{mm}$. Finally design an ACS feed UWB Antenna, which can approximately reduce 50% size as that of the traditional CPW feed antenna. The final ACS feed UWB antenna provides an impedance bandwidth of $V_{SWR} \geq 2$ over the frequency band of 2.4-11GHz providing services in various applications such as Bluetooth, WiMax, WLAN, Cband satellite, X band satellite and ITU-T band. The proposed antenna provides a stable peak gain of 3.8 dB over the entire UWB frequency band.*

Keywords: UWB antennas