

Antenna design using uwb configuration for gpr scanning applications

Abstract

Ultra-wideband (UWB) technology is gaining more attention, as the wireless communication research is progressing with every passing day. This radio technology offers a greater bandwidth with nominal characteristics such as low power, system compactness, and cost-effectiveness. In 1887, first experiment was conducted on UWB for electromagnetic wave production [1]. However, the technology was restricted to military applications only. Thereafter, with the increasing demand of UWB spectrum, US states department Federal Communication Commission (FCC) localized the bandwidth of 7.5 GHz from 3.1– 10.6 GHz for the commercial and experimental purpose. Since then, this UWB technology was also used in the development of antenna design, because antennas are the front-end components of the radio frequency (RF) system used in many applications. Therefore, the recent development of RF system is focusing mainly on the search and rescue applications for victim detection behind the obstacle, to make UWB a significant technology. The aim of writing this research article is to highlight the characteristic configuration of a tilted arc-shaped compact size planar antenna design with the frequency ranging from 2.8–15.6 GHz and a gain of around 6 dB for human detection applications. To fulfill the purpose, an antenna is carried out under different configurations for the development of a 2D image in the form of radar cross section (RCS). Thereafter, the analysis is performed to validate the human skin detection capability of the designed antennae. Therefore, a suitable antenna configuration possess proper results is proposed with the help of experimental modeling to proceed further.

Keywords

Antennae; GPR; Ultra-wideband antenna; UWB applications