

Artificial Magnetic Conductor to Enhance Microstrip Patch Textile Antenna Performance for WiMAX Application

Abstract

A rectangular microstrip patch textile antenna with Artificial Magnetic Conductor (AMC) operated at the center frequency of 5.80 gigahertz (GHz) for Worldwide Interoperability for Microwave Access (WiMAX) application was designed and simulated using the CST Microwave Studio 2016 and fabricated in this study. The use of AMC could solve the inflexibility of FR4 substrate that limits human body movement and reduce the radiation scattered on the human body whilst increasing the antenna gain and directivity. The antenna consists of 5 5 square shape gap of AMC unit cells ground layer using ShieldIt Super, five substrate layers using cotton (viscose) fabric as well as patch layer and another ground layer using the same ShieldIt Super. AMC is a metamaterial that imitates the conduct of zero reflection phase of Perfect Magnetic Conductor (PMC) on the resonant frequency not evidently existed in nature. Overall, the antenna with AMC has the significant return loss, S_{11} below than -30 decibel (dB), gain improved to more than 8 dB, and directivity elevated to more than 9 dBi at resonant frequency near to 5.80 GHz, respectively.