

Four-armed Dual-band Rectangular Patch Antenna Design

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Abstract : This paper mainly focuses and describes four-armed dual-band rectangular type patch antenna using teflon of 0.54 mm thickness substrate for the application in personal wireless communications at about 2 GHz and 2.5 GHz frequency ranges. The dual-band patch antenna is obtained by embedding one centered and two pairs of rectangular patches on single body above the substrate. Details of the proposed antenna design are presented and discussed as a novel design with remarkable value of return loss (S11) of -28.68 dB and it is the most suitable for WiMAX applications as well.

Key Words : Micro-strip, patch-antenna, dual-band, wireless communication, WiMAX.

1. Introduction

In the wireless communication systems, such as wireless LAN, WiMAX, and Blue-tooth are broadly used nowadays. Teflon material as a substrate is used in the microstrip patch antenna. Microstrip patch antennas are the most attractive and popular antenna due to their natural advantages such as light weight, conformability and low costs and are characterized with compact size, simple structure, and easy to be fabricated. Dual-band operation is an important subject in microstrip antenna designs [1, 2]. In this work, similar irregular type rectangular four patches arms are attached with centered square patch for generating the dual-band frequency of 2 GHz and 2.5 GHz for especially focus on different kinds of wireless communication areas. The result of the proposed antenna on its S11 (dB) characteristic along with the current density and radiation patters are mainly focused.

2. Design and Results

The geometry of the proposed antenna is illustrated in Fig. 1. The antenna parameters are also given in Fig.2. The antenna is fabricated on a 0.54 mm Teflon substrate and fed by a coaxial transmission line. Simulations were performed using SONNET tool. Dual frequency band of 2 GHz and 2.5 GHz frequencies are tested and that resulted as -21.5 dB of S11 values for 2 GHz and -28.68 dB of S11 for 2.5 GHz frequency band. The swept response of the S11, can be used to calculate the VSWR referred to a 50 Ω transmission line.

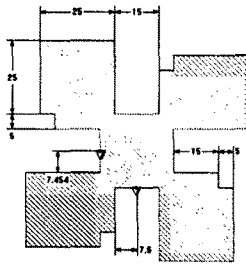


Fig.1 Geometry of Four-armed Patch Antenna

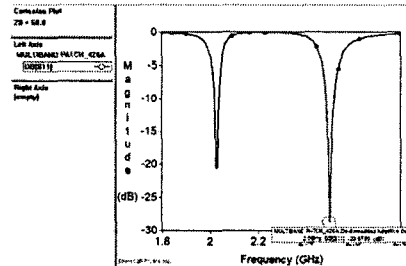


Fig.2 Return loss (S11) of Proposed Patch Antenna

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