

Quad Band Patch Antenna for Multiple Wireless Applications

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Abstract: In this paper quad band micro strip patch antenna have been design and analysis. The design is by FEKO software based on method of Moment analysis. This antenna is more suitable for L & S band applications. More rectangular slots are introduced in rectangular geometry to enhance radiation. Micro-strip feed technique is used for this design. Four resonant frequencies generated. Slot in the rectangular patch increases the current length and discontinuity. The return loss is below -10 dB in quad band with considerable bandwidth. Resonant frequencies are 0.4GHz, 1.4GHz, 2.2GHz, 2.6GHz, and their respective return loss are -53 dB, -35 dB, -32 dB, -28 dB. The antenna is thin and compact which makes it portable. The VOLTAGE SATNDING WAVE RATIO (VSWR) parameter is found to be less than 2 within the operating frequency range. The antenna is designed and simulated on FR4 substrate with dielectric 4.4 and thickness of 1.6 mm.

Keywords: Quad band antenna, Micro strip antenna, Slot antenna, Rectangular patch.

1. INTRODUCTION

The Micro strip patch antennas are very commonly used and preferred in this modern era for their compatibly to be fit in Mobile, Aircraft and satellite owing to very small size. Micro strip antennas are very attractive due to their various advantages such as low cost, light weight, low profile planner, and configuration and easy to manufacture designed and fabricated in multi rectangular slotted. It operates in L & S band (1to3GHZ). So it is suitable for radio telecommunication, WIFI, cordless communication and radar.

The most advancement in the wireless communication field in the past few decades has led to the improvement of more efficient antenna design to be used for various cutting edge applications. Antenna is an important structure in any wireless communication system and good antenna design definitely improves the overall performance of the system. Most applications require low cost, minimum weight, low profile antennas that are capable of providing high performance over a large range of frequency. The continuous improvement in modern integrated circuit technology has made sure that the size and weight of wireless electronic system must keep on reducing. In order to work with miniature size electronic system, high performance antenna designs are the need of the time. All the above mentioned needs are best met by micro strip antennas. They are easily fabricated and are also easy to integrate into arrays or into microwave printed circuits. The design of high performance micro strip antenna has always been a challenge for the antenna designers Micro-strip patch antenna consists of a radiating patch which is generally made of conducting material such as gold or copper and can take any possible shape.

The radiating patch and the feed lines are usually photo etched on the dielectric substrate which has a ground plane as shown in Fig. 1.

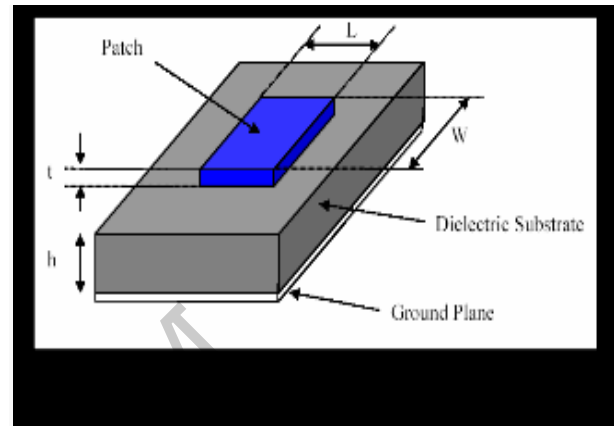


Fig. 1

As shown in Fig.1 three layers of patch radiating patch on the top, dielectric material in the middle and ground plane in the bottom.

2. ANTENNA DESIGN

The proposed antenna design is a rectangular slotted antenna as shown in Fig 2. The design is simple and the feed used is micro strip line. The dimensions of antenna are $40 \times 50 \times 1.6 \text{ mm}^3$ used for the simulation. There are six rectangular slots in this patch to increase the bandwidth.

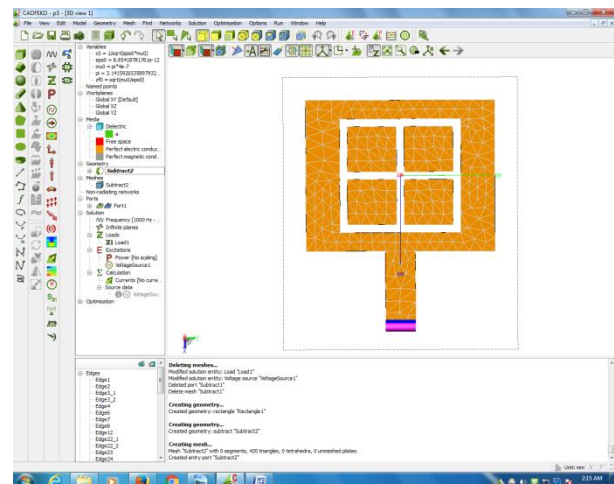


Fig.2

In the fig.2 first geometry with six rectangular slots is introduced. The dimension of the antenna is 40×50 , and dimensions of slot are 2×40 .

