



ANALYSIS OF QUAD BAND PATCH ANTENNA WITH I SLOT FOR L & S BAND APPLICATION

Engineering

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ABSTRACT

The rapid 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.[1]

This paper investigates I slotted micro strip patch antenna with FR-4 substrate of dielectric with 1.6 mm thickness on rectangular micro strip patch. This paper represents analysis of rectangular patch antenna. Size of both the antenna is taken as 40\*50 and micro strip feeding choose as feeding technique. Which gives quad band on 250MHz, 1400MHz, 1900MHz & 2600Mhz. and observed value of VSWR is lies between 1 to 2. By this we can conclude that if we increase number of slots with right dimension increase number of resonant frequencies. The antenna is designed and simulated on FR4 substrate with dielectric 4.4. The design is analyzed by FEKO software based on Method of Moment.[2]

The derivation of quantities as means volume density of space charge, threshold for DC space charge accumulation, apparent-trap controlled mobility is discussed and various applications to dielectric materials are shown. This creates an internal electric field that reduces the overall field within the dielectric itself.[3]

KEYWORDS

Micro strip patch, Dielectric, VSWR, Return Loss

1. INTRODUCTION

The magnitude of the electric field is indicated by the bunching of the electric lines of force. The free electrons on the conductors are forcibly displaced by the electric lines of force and the movement of these charges causes the flow of current which in turn leads to the creation of a magnetic field.

A conducting wire radiates mainly because of time-varying current or an acceleration (or deceleration) of charge. If there is no motion of charges in a wire, no radiation takes place, since no flow of current occurs. Radiation will not occur even if charges are moving with uniform velocity along a straight wire. However, charges moving with uniform velocity along a curved or bent wire will produce radiation. Antennas are metallic structures designed for radiating and receiving electromagnetic energy. [4]

An antenna acts as a transitional structure between the guiding device

(e.g. waveguide, transmission line) and the free space. In order to know how an antenna radiates, let us first consider how radiation occurs. If the charge is oscillating with time, then radiation occurs even along a straight wire as explained by Balanis.[5]

When a sinusoidal voltage is applied across the transmission line, an electric field is created which is sinusoidal in nature and these results in the creation of electric lines of force which are tangential to the electric field. 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. Most applications require low cost, minimum weight, low profile antennas that are capable of providing high performance over a large range of frequency. [6]

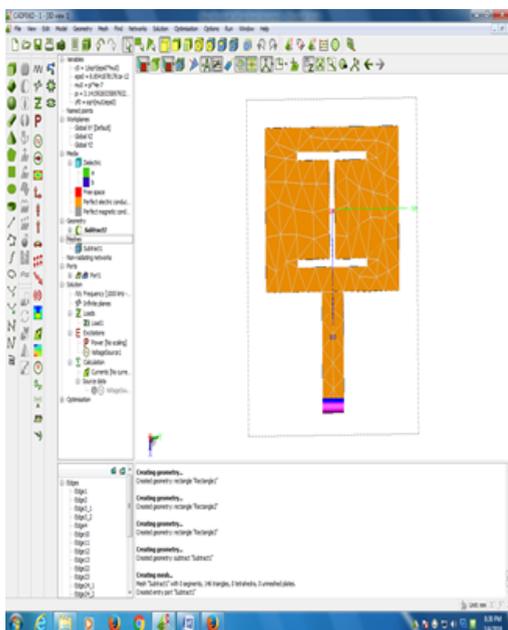


Fig. 1 As shown in Fig.1 a meshed structure of rectangular patch with 40\*50mm is given.

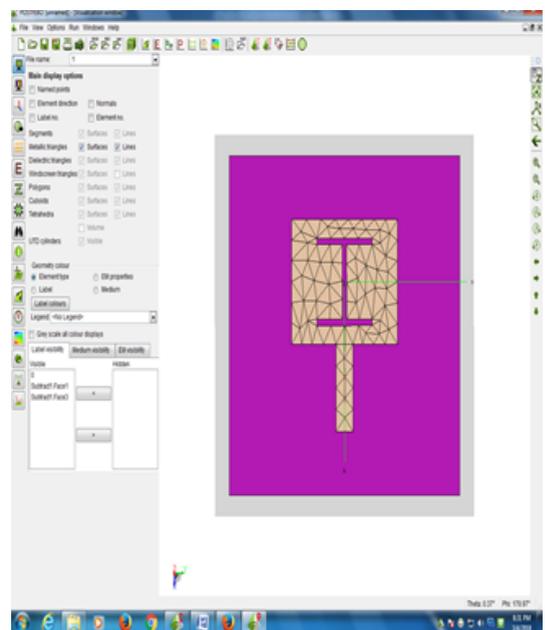
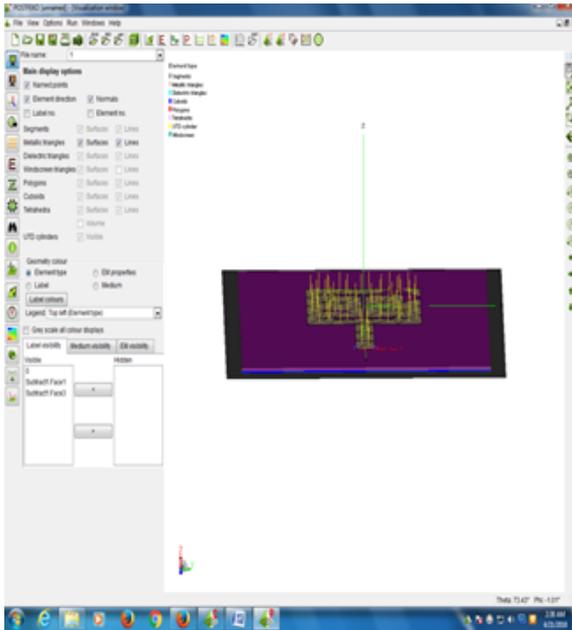


Fig.2 In the fig.2 first geometry with meshed rectangular antenna is given with the dimension of the antenna is 40\*50.

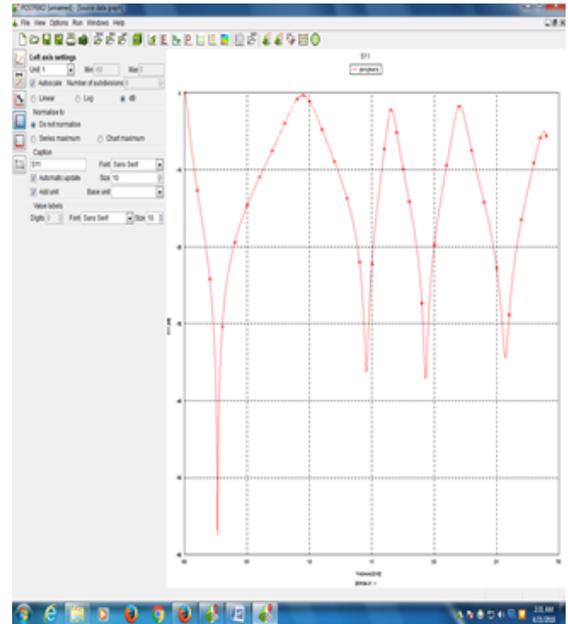
**ANTENNA DESIGN**

The proposed antenna design is a rectangular slotted antenna as shown in Fig 1. The design is simple and the feed used is micro strip line. The

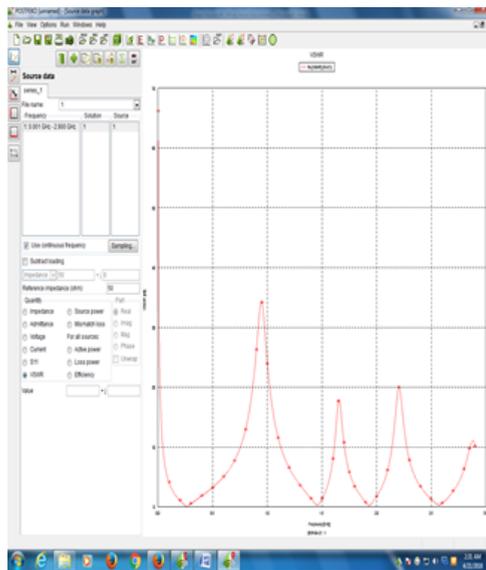
dimensions of antenna are  $40 \times 50 \times 1.6$  [mm] <sup>3</sup> used for the simulation. [7]



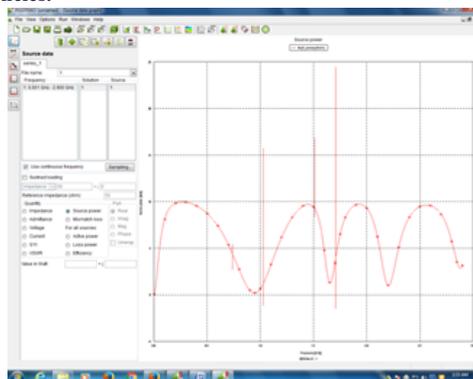
**Fig.3** In the fig.3 show the direction of radiation for Antenna



**Fig.4** In the fig.4 return loss of antennas which having thickness of 1.6mm.



**Fig.5** In the fig.5 vswr is given which is less than two for all resonant frequencies.



**Fig.6** In the fig.6 power distribution is given

**3. RESULT & CONCLUSION**

In this paper we have observed that, if we use I slot at correct position than four resonant frequencies will we achieved. In this project, FEKO simulation software has been used which work on method of moment generally called MOM. [8]

**4. FUTURE SCOPE**

We can further calculate percentage of return loss decrement. Length of micro strip patch can also be modified. The parameter like gain, directivity, VSWR, impedance bandwidth of antenna can be further improved. Antenna miniaturization can be possible by different technique. Multi layer dielectric may be used for bandwidth enhancement. Different combination of material can be used for substrate layer and modify thickness to increase the bandwidth of antenna. [9]

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