

**Design of Truncated Square Monopole L-Band Antenna**Ravi Prajapati<sup>1</sup>, Ashish Duvey<sup>2</sup><sup>1,2</sup>Department of electronics & Communication,  
ShriRam College of Engineering & Management, Gwalior- 476444, India

**Abstract**— This paper presents the wide band antenna for L-band application . Which is designed for band 1.13 GHz to 2.4 GHz. This antenna mainly consist of square which is truncated from all the corners and triangular slot. It is designed on dielectric substrate of FR4 glass epoxy with relative permittivity ( $\epsilon_r$ ) of 4.3, thickness of 1.6 mm, a square monopole antenna is feeded via a single feeding strip. It has a gain of 2.57db and -70db return loss.

**Keywords**— Wide band, Monopole, L-band, Truncated Square .

**I. INTRODUCTION**

Printed monopole antennas are widely used in the wideband communication systems. Among printed monopole antennas of various shapes [1-3], rectangular monopole antenna are the easy in geometry and their radiation patterns are Omni-directional with wide impedance bandwidth. Antennas, which can work properly in more than one frequency region either for transmitting or receiving electromagnetic (EM) waves, are termed as Multiband antennas. Such antennas are usually tri-band, penta-band etc. Multi-band antennas are much more complex than the single band antennas in their design, structures and operations [1]. In this paper, L-band rectangular monopole antenna with feeding line and etched ground plane is presented which is actually a single band antenna in the 1-2.4 GHz frequency bands. The antenna corners has been truncated on each corner and slotted in middle to enhance the bandwidth [2].

In this paper, L-band rectangular monopole antenna with feeding line and etched ground plane is presented which is actually a single band antenna in the 1.13-2.4 GHz frequency bands. The antenna corners has been truncated on each corner and slotted in middle to enhance the bandwidth [2]. The proposed printed rectangular monopole antenna is a simple configuration.. The properties of the antenna such as return loss, radiation patterns, directivity and gain are determined via a simulation process using CST (Computer Simulation Technology) Microwave Studio Software. Printed rectangular monopole antenna can be optimizing to provide extremely wide impedance bandwidths with acceptable radiation performance. They can be developed to cover several operating frequency bands of wireless communication from DCS: 1.71-1.88 GHz, Personal Communication System (PCS 1.85-1.99 GHz, Universal Mobile Telecommunication System (UMTS 1.92-2.17 GHz), IMT-2000 [3].

CST MICROWAVE STUDIO is a fully featured software package for electromagnetic analysis and design in the high frequency range. The software contains four different simulation techniques (transient solver, frequency domain solver, Eigen mode solver, modal analysis solver) which best fit their particular applications. The most flexible tool is the transient solver, which can obtain the entire broadband frequency behaviour of the simulated device from only one calculation run (in contrast to the frequency stepping approach of many other simulators). This solver is very efficient for most kinds of high frequency applications such as connectors, transmission lines, filters, antennas and many more.

Planar monopole antennas has an interesting design due to their wideband matching characteristic, Omni-directional radiation pattern, high radiation efficiency and compact size.

**III. DESIGNING OF MONO POLE ANTENNA**

The proposed antenna is made by using double sided printed circuit board (PCB). Elements are designed on a 1.6 mm thick glassy epoxy (FR-4 lossy) substrate and refractive index of  $\epsilon_r=4.3$ . first of all square patch is designed and then it is truncated from all the corners. And then triangular slot is also etched as shown in fig. 1. Dimension of patch are shown in figure 1, Dimension of ground plan is shown in figure 2, Simulated Return loss, VSWR and Radiation pattern with gain is shown in figure 3, figure 4 and figure 5 respectively. The dimension of an etched ground plane is 76 x 24.5 mm<sup>2</sup>

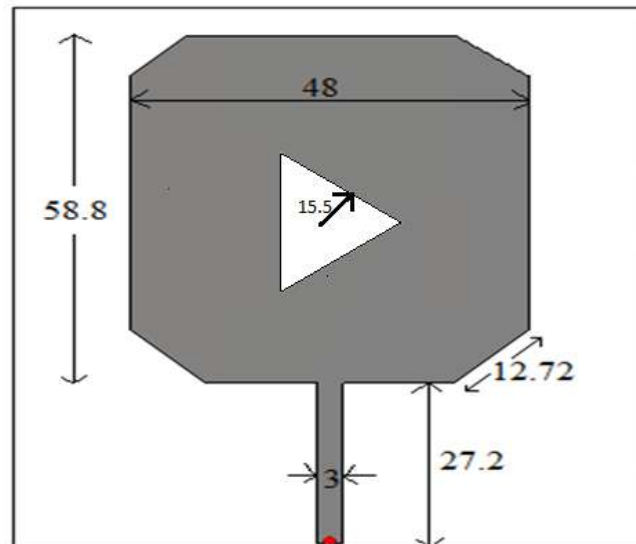


Figure 1: Monopole antenna Dimension layout in mm

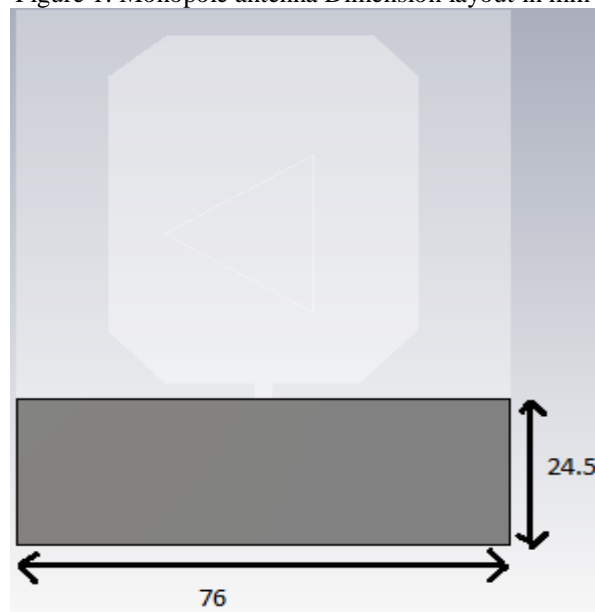


Figure 2: Monopole Ground Dimension layout in mm

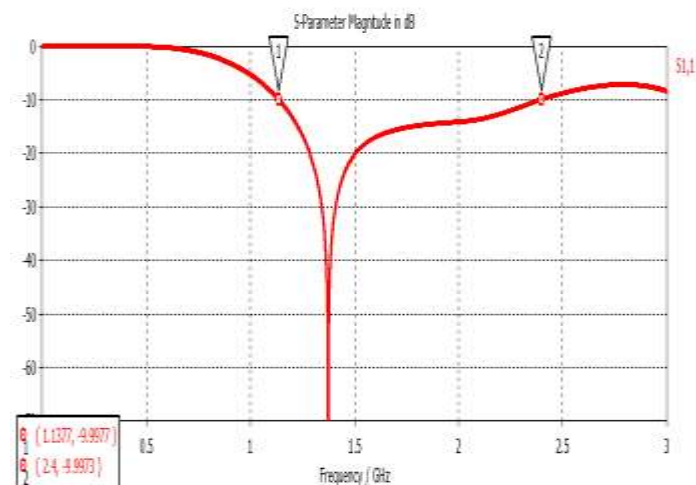


Figure 3: Simulated return loss of mono pole antenna

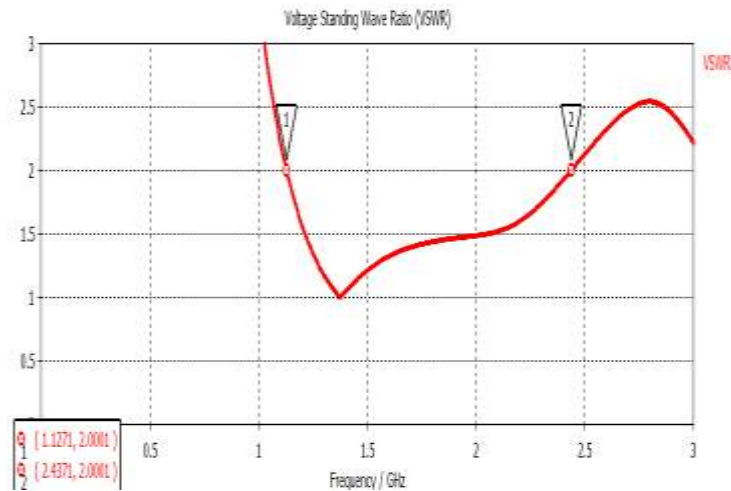


Figure 4: Simulated VSWR of mono pole antenna

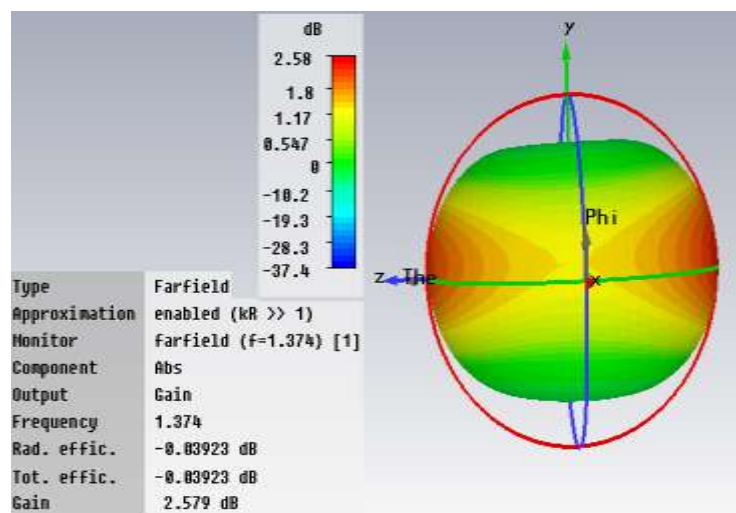


Figure 5: Simulated Radiation pattern with Gain of mono pole antenna.

#### IV. RESULT

The Monopole antenna with truncated corners with an etched ground plane was simulated using the CST Microwave Software. Figure 3 shows the simulated return loss of the proposed antenna from 0 to 3 GHz. Using a 50\_ SMA (Sub Miniature version A) connector at the port 1. The achieved simulated return loss of the PRMA with truncated corners and Triangular shaped slots on the Etched ground plane is -70dB at a frequency 1.374 GHz having the lower frequency (fL) and higher frequency (fH) of the bandwidth is 1.13GHz and 2.4 GHz respectively and obtain a bandwidth of proposed antenna is 1.27 GHz.

#### V. CONCLUSION

Monopole patch antenna is designed for band 1.13 GHz to 2.4 GHz. Its response is improved by truncating the corners and providing the triangular slot in the patch. Here proposed Design has been simulated with -70db return loss and which has the good recorded radiation efficiency of 99%.

#### VI. REFERENCES

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