# Design of Single Band Microstrip Patch Antenna for C-band Application

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***Abstract-*** *This paper presents a single band Microstrip patch Antenna. The antenna consists of resonant radiating loop. Based on single band design, a notched operation is achieved. The designed antenna has been optimized using CST Microwave studio software. The gain of 3.8 dB and directivity of 4.51 dB has been achieved with corresponding impedance of 50.02 ohm. The corresponding simulated results of this designed antenna have been illustrated in this paper.*

***Keywords-*** Loop antenna, single frequency, antenna gain, return loss.

## I. INTRODUCTION

Microstrip antenna is a simplest form of antenna configuration. It consists of a radiating patch on one side of dielectric substrate and it has a ground plane on other side. Loop antennas are one of the popular balanced antennas. Several configurations of slot loop antennas, etched on the ground plane of a microstrip line, to obtain various characteristics such as circular polarization [1], multi-band [2], and single-band operations. Microstrip patch antennas are increasing in popularity for use in wireless applications due to their low-profile structure. The advantages of microstrip antenna [3] are light weight, low profile, low cost and easily to integrate with other circuit. The applications of these types of antennas in various fields such as in the medical applications satellite and of course even in the military systems just like in the rockets, aircrafts missiles [4]. However, the microstrip antenna has a low gain and a narrow bandwidth. To overcome its limitation of narrow impedance bandwidth and low gain, many techniques have been proposed.

A simple patch antenna with basic rectangular patch operates in a single frequency band. A patch antenna planned to operate at a centre resonance frequency mounted on a substrate having dielectric constant ɛr would have length L and width W of the patch as calculated from equations.

## II. DESIGN ANTENNA GEOMETRY

A proposed Microstrip patch antenna with a rectangular patch, substrate and ground plane. These rectangular parameters are simulated to optimize the performance. The proposed antenna use Microstrip line feed impedance of 50 ohm. The proposed antenna has dimensions given below:

Substrate Thickness=0.813
Relative Permittivity (ɛr) = 3.38
Width of Patch (W) = 0.01mm
Width of Ground (W) = 0.01mm

For designing the proposed rectangular microstrip patch antenna the equations are used to calculate the dimensions of antenna. The designed antenna is resonating at 6.08 GHz.

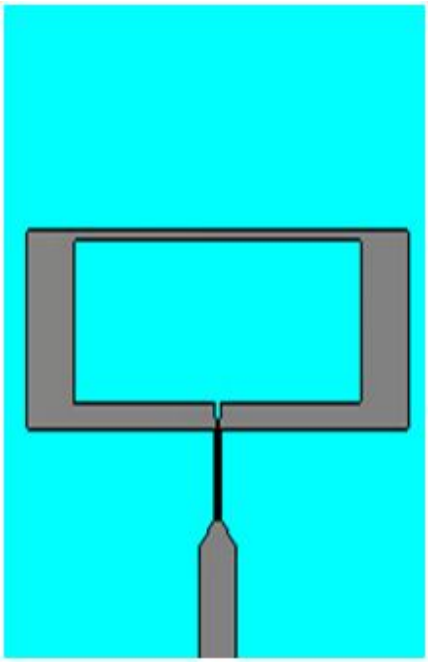

Fig.1 Microstrip patch Loop antenna

## III. SIMULATED RESULT

The result of proposed antenna have been calculated and the simulated results for S11 are shown in Fig 2. The proposed antenna design is simulated using CST Microwave studio [5]. The return loss value is -22dB this shows that there is possible good matching at the frequency point below the -10 dB region.

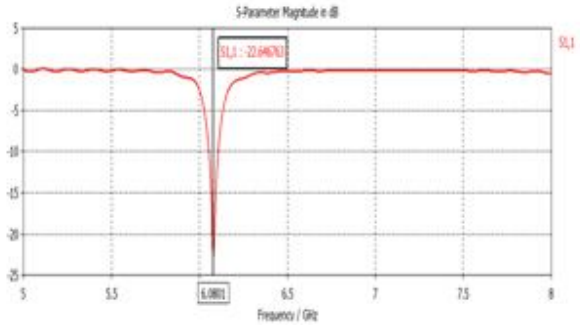


Fig.2 S11 plot vs frequency

## III. CONCLUSION

The design of a single band loop microstrip patch antenna has been simulated and from simulated results it is clear that the proposed antenna is useful for 6.08 GHz. This frequency finds application in C band.

## REFERENCES

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