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CORNER AND CROSS SLIT MICROSTRIP PATCH ANTENNA

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ABSTRACT

There are various types of microstrip antenna that can be used for various applications in communication systems. This paper presents the design of a rectangular microstrip patch antenna to operate at frequency range of 1.58 GHz. This antenna based on a thickness of 1.6mm Flame Retardant 4 (FR-4) substrate with a dielectric constant of approximately 4.4. After simulation, the antenna performance characteristics such as axial ration, VSWR are improved with reference with corner slit. It has been found that this antenna offers higher directivity with good radiation properties required for GPS system and mobile applications

Keywords: Keywords: GPS Microstrip Antenna, VSWR, And Axial Ratio.

I. INTRODUCTION

Microstrip antenna technology began its rapid development in the late 1970s. By the early 1980s basic microstrip antenna elements and arrays were fairly well establish in term of design and modeling. In the last decades printed antennas have been largely studied due to their advantages over other radiating systems, which include: light weightiness, reduced size, low cost, conformability and the ease of integration with active device. [2]

Although micro strip antennas in their basic form normally provide linear polarization, circular polarization (CP) operation may be obtained by certain modifications to the basic antenna geometry and/or feed. These modifications include adjusting the dimensions of the basic patch with one or more feeds, trimming the corners of a square patch, feeding the patch at adjacent sides, feeding the patch (rectangular) from its corner along the diagonal, and cutting a slot inside the patch [1].

In the paper [8] the bandwidth of corner slit antenna is about 35 MHz .In this paper, the design of a rectangular patch antenna with corner and cross slit is presented and is expected to operate with 1.58 GHz frequency. This antenna is designed on a double side fiber Reinforced (FR-4) epoxy and its performance characteristics which includes return loss, VSWR, Axial ratio and directivity.

II. ANTENNA DESIGN

The geometry of the antenna is shown in Figure 1. This is basically the antenna excited by connecting a coaxial probe. The antenna is proposed to operate with a center frequency of 1.58GHz.

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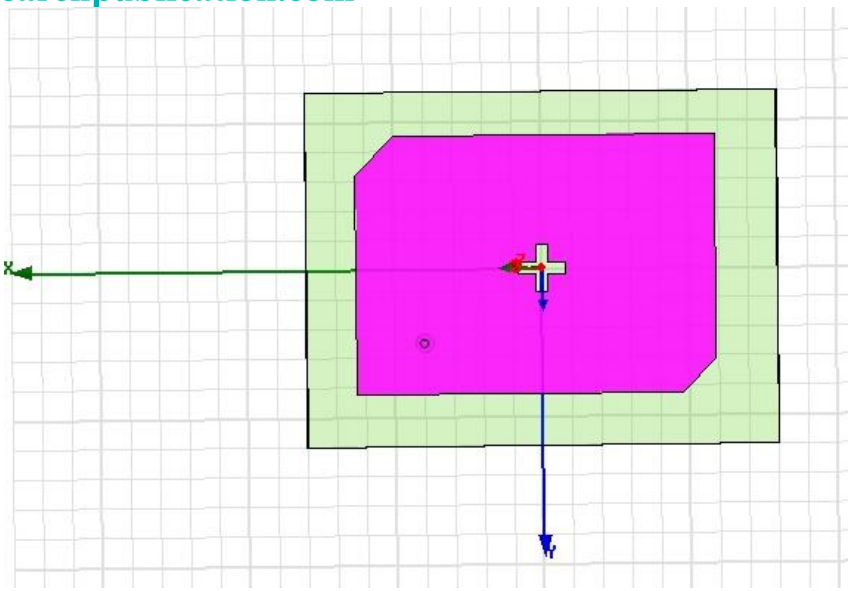

Fig 1: Proposed Antenna

III. SIMULATION

In this study we use an FR4 substrate (dielectric constant=4.4, tan delta = 0.0023 and thickness=1.6mm) placed above the ground plane at a 6mm height. Minimum possible width of the feed strip is 9mm so that a hole can be made to connect the probe pin. Its minimum length is approximately one fifth the side of the patch.

Due to fabrication constraints the minimum separation between the patch and the feed strip is 0.5mm. The physical parameters of the antenna geometry with a slot are optimized using HFSS simulations and are listed in Table 1. These geometrical parameters (Table 1) are optimized with HFSS software.

Table 1. Dimensions for the antenna geometry shown in.

Table 1. Dimensions for the Antenna

Sr.no	Parameters	Dimensions (mm)
1.	Patch Length(L)	63.0
2.	Patch Width(W)	83.0
3.	Substrate Length(Ls)	108.0
4.	Substrate width (Ws)	132.0
5.	Slot length(Ls1)	2.5
6.	Slot length(Ws1)	11.0
7.	Air gap(h)	9.0
8	Corner Slot length(Cs)	10.0

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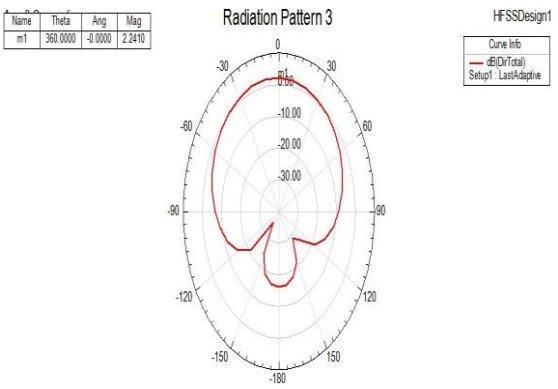
IV. RESULT



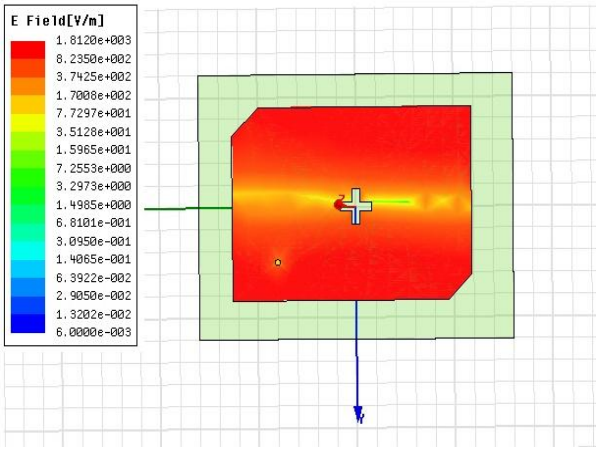
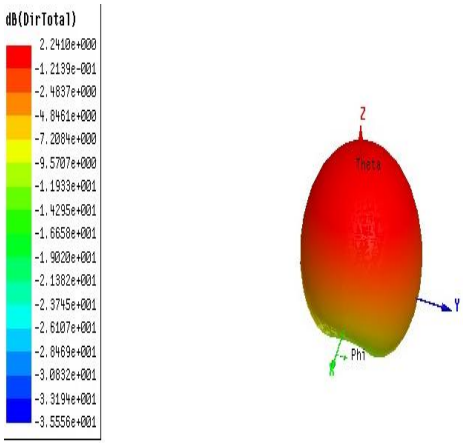


Fig 2: Radiation Pattern of Proposed Antenna **Fig 3: Current Distribution**



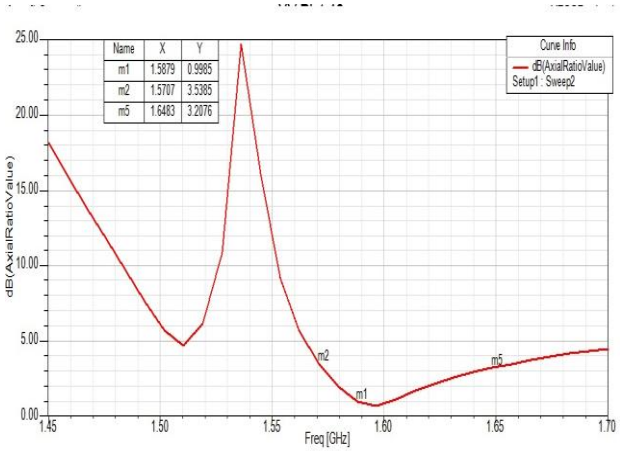
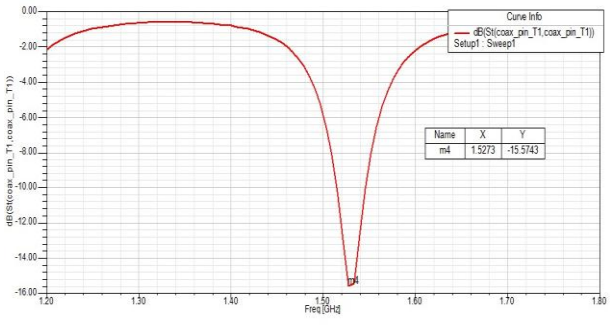


Fig 4: Directivity **Fig 5: Axial Ratio of Antenna**



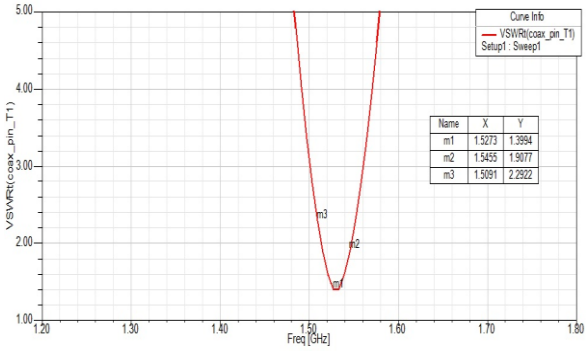


Fig 6: s 11 Parameter of Proposed Antenna **Fig7: VSWR of Proposed Antenna**

V. CONCLUSION

The radiation performance of the rectangular patch antenna with corner and cross slit is investigated. Compared with patch antenna [8] excited under similar condition .The modified rectangular patch antenna has much more improved bandwidth of 65 MHz, VSWR1.39 and axial ratio 0.98 than corner slit.. The proposed antenna

produces radiation pattern within the frequency range and exhibit good impedance matching at center frequency 1.58 GHz.

VI. ACKNOWELDGMENT

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