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REVIEW OF PERFORMANCE OF DIFFERENT SHAPES (E,S,U) IN MICRO-STRIP PATCH ANTENNA

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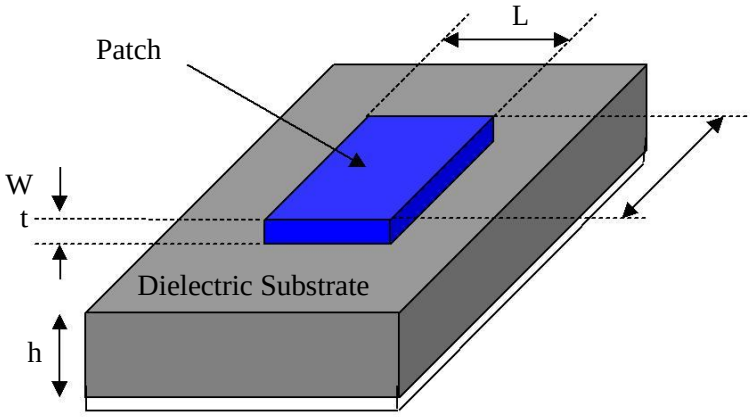
Abstract
The growth of portable wireless communication devices has pushed designers to design miniature size antennas. The most prized among miniature antenna choices is the micro-strip patch antenna. These antennas have significant advantages such as low profile, light weight, relatively low manufacturing cost, and polarization diversity. This paper compares the performance of micro-strip patch antenna having different alphabetic shapes of patch (E,S,U)

Keywords*: Patch Antenna, IED3, E-Shaped Antenna, U slot Antenna, S-shaped Antenna.*

I. INTRODUCTION

A Micro-strip patch antenna consists of a radiating patch on one side of a dielectric substrate which has a ground plane on the other side. The patch is generally made of conducting material such as copper or gold and can take any possible shape. The radiating patch and the feed lines are usually photo etched on the dielectric.

substrate.



Ground Plane

II . ANTENNA DESIGN & STRUCTURE

E shaped micro-strip patch antenna is designed by cutting two notches in rectangular patch antenna as shown in figure 1 and this design is simulated using IE3D software ver.15.2. Co-axial probe feeding is used for feeding purpose. The designed antenna structure is simulated over IE3D.
The design of proposed S-shaped antenna is depicted in Figure 2. Now patch is look likes in S shape .It is designed by inserting two slots into rotated square patch which provide increase in bandwidth.

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The proposed antenna is design by cutting single slot in rectangular patch to make it a U shaped antenna as shown in fig 3.Cutting of these slots in antenna increases the current path which increases current intensity as a result efficiency is increased. The dimension of the ground plane is taken as (70mmx70mm). The substrate dielectric constant is 4.2 and substrate thickness is 1.6mm and loss tangent

Figure-1

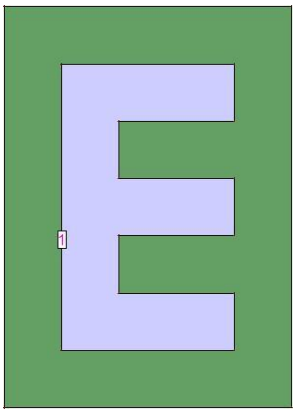


Figure 2

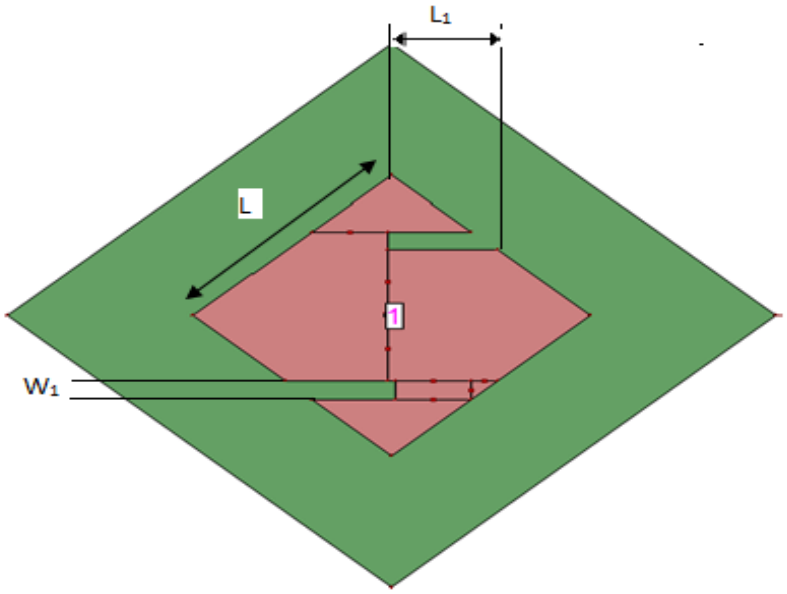
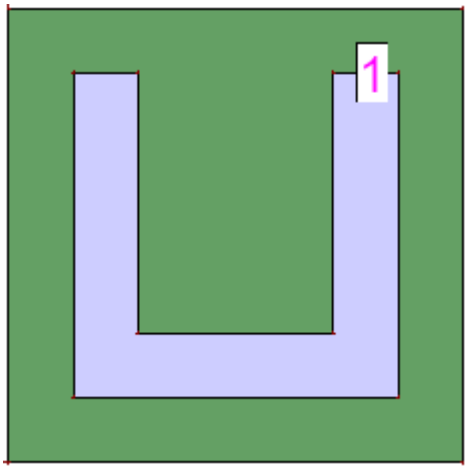


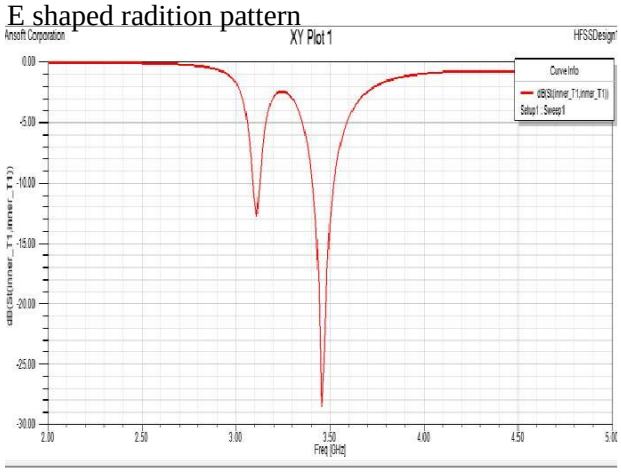
Figure-3

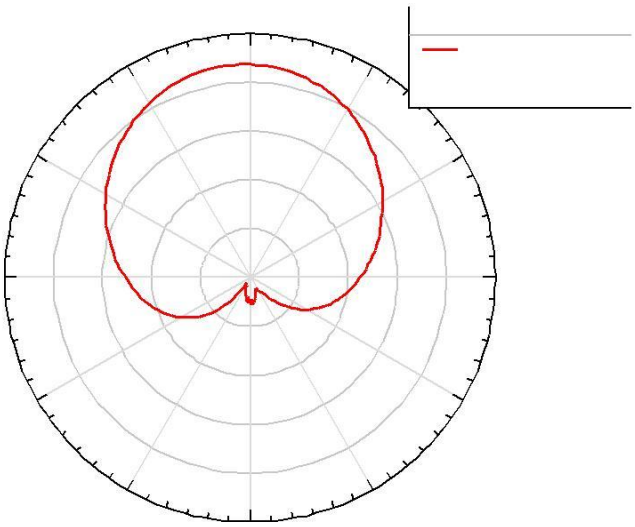


III. RADIATION PATTERN

From the simulation analysis of the proposed antenna it can be easily observed that the designed E-shaped microstrip antenna has gain of 4.7dB and optimized return loss -28dB at frequency 3.45GHz. It has also been observed that position of feed point has a serious effect on the performance of the designed antenna. By varying the feed point position, different parameters of designed antenna can be optimized.

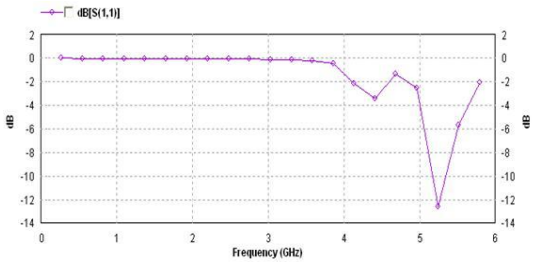
E shaped radition pattern



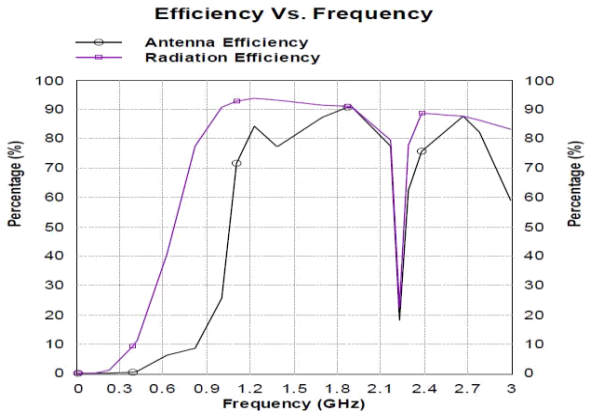


The VSWR is 1.11 at the frequency 5.992 GHz which is in the X band. The ideal value of the VSWR is 1

S shaped radiation pattern



The bandwidth of proposed antenna on simulation comes out to be 34.27% and 14.68% at 1.909GHz and 2.66GHz resonance frequency respectively.



IV. CONCLUSION

All these antenna uses coaxial feeding technique for excitation which provide enhance in bandwidth .S shaped antenna provide a bandwidth of approximately 12% greater than the simple micro-strip patch antenna. All the three pattern provide better performance than basic microstrip antenna along with band width antenna directivity, efficiency and radiation pattern also changes the proposed antennas has high bandwidth which can be used for wireless communication of high data rate.

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