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DESIGN OF COMPACT ASYMMETRIC COPLANAR STRIP FED ANTENNAS FOR WLAN APPLICATIONS

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Abstract: The purpose of this paper is to be design an antenna of very compact size, by the effective miniaturization of antenna elements Isolation of the best feed for use in compact antennas. In this paper, I want to present a design of compact planner antenna, with a proper feeding technique to the design as the result is simple compact uniplanar geometries. Here we are using coplanar feeding technique, the asymmetric coplanar feed used to excite the antennas is found to be a suitable choice for feeding compact antennas. The designing of MSPA should be compact single, dual and multi band antennas with uniplanar structure. Before writing this paper, I have studied more papers on antennas with ultra-compact dimensions are obtained as a result of the study. Simple equations are provided to design antennas with the required characteristics. The design equations are verified by designing different antennas for different applications.

Keywords: MSPA, coplanar, uniplanar, miniaturization.

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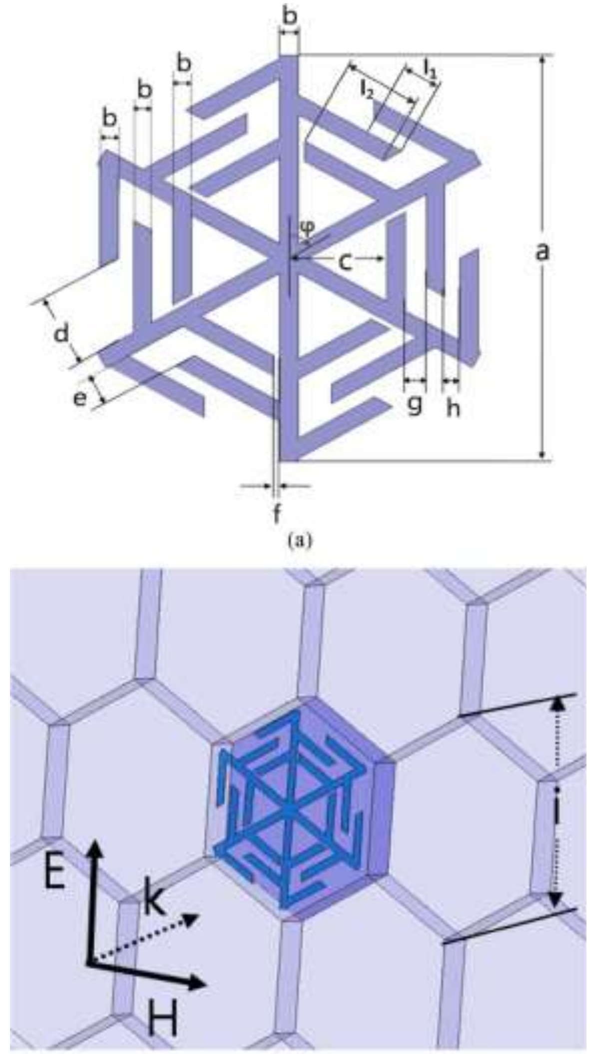
INTRODUCTION

Now days, this world is based on technology. The new research & development of wireless communication systems has the main region of this changed era. To fulfill the demand of these, invention of compact microstrip antennas with high gain and wideband operating frequencies has developed. Microstrip patch antenna has many salient features like small size, low profile, light weight, simple realization process and low manufacturing cost. With so many advantages, MSPA have some disadvantages also, such as narrow bandwidth etc. To improve the performance & Enhancement of the performance of such antennas &to meet the demand of bandwidth is necessary [1]. There are many ways via them, we can improve the bandwidth of antennas, including of the substrate material, via different ways with low dielectric substrate, slotted patch antenna, the use of various impedance matching and feeding techniques, with the use of absorbers & resonators [2-8].

In this paper, I want to presents a paper with new design zig zag shape patch antenna that is for enhancing the impedance & bandwidth. We have an innovative design with 50 ohm microstrip line feeding. The antenna is simulated using IE3D, 12.32 version & HFSS software. The results show that the impedance bandwidth has achieved a good match. It is observed that the impedance bandwidth changes with the change in the length of the offset [9].

Another type of absorber is the frequency selective surface (FSS) absorber, which is also called the electrical resonant absorber [16]–[25]. In the FSS absorber, the ground plate is located on the back of a lossy substrate, and a periodic metallic patch layer, called the electrical resonator [26], is placed on top of the substrate. In the middle of the feed line there is an offset present to achieve a good impedance bandwidth the resonance effect takes place on the patch layer. At the desired frequency, this resonance helps to reduce the reflection wave by matching the material impedance with that of air. The transmitted wave is absorbed due to losses in the absorber. These absorbers are much thinner than any other absorbers. The typical thickness of such absorbers varies from one tenth to one fiftieth of a wavelength. The drawback of this absorber is its narrow bandwidth.

DESIGN AND SIMULATED RESULTS



(a)

(b)

Fig. Presents the unit cell geometry of the proposed FSS, which shows a periodic metallic pattern printed on single side of a dielectric substrate.

The metallic layer consists of two convoluted meandered patterns in each quadrant of the unit cell which are connected at the center through a cross-dipole. Commercially available FR-4 has been used as dielectric having relative permittivity *εr* = 4.4, and loss tangent *tanδ* = 0.02. The optimized dimensions of the design are: *p* = 8.4 mm, *d* = 8.2 mm, *w* = 0.2 mm, *w*1 = 12.73 mm, and *t* = 0.8 mm. When the unit cell structure is simulated by Ansys HFSS using periodic from *z* direction, the proposed FSS exhibits dual stopband characteristics at 2.35 and 3.05 GHz having transmission incident boundary conditions and EM wave coefficients of −18.85 and −29.88 dB, respectively, as shown in Fig. 2(a). The bands are very closely located with higher to lower frequency ratio of 1.29. The structure is also miniaturized having the unit cell size of 0.065λ0 × 0.065λ0, where λ0 is the free-space wavelength corresponding to the lower resonance frequency.

SIMULATION RESULTS

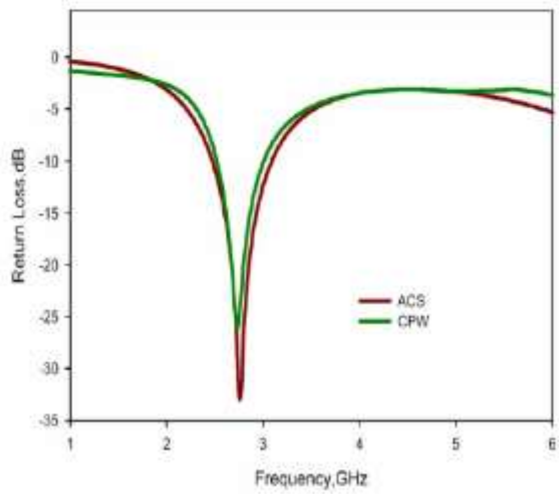
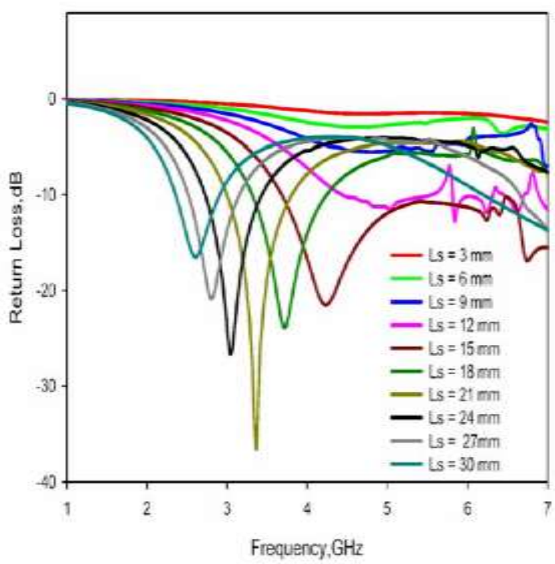
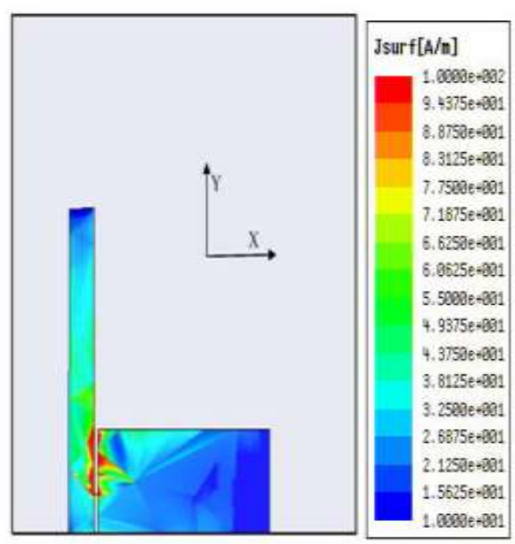


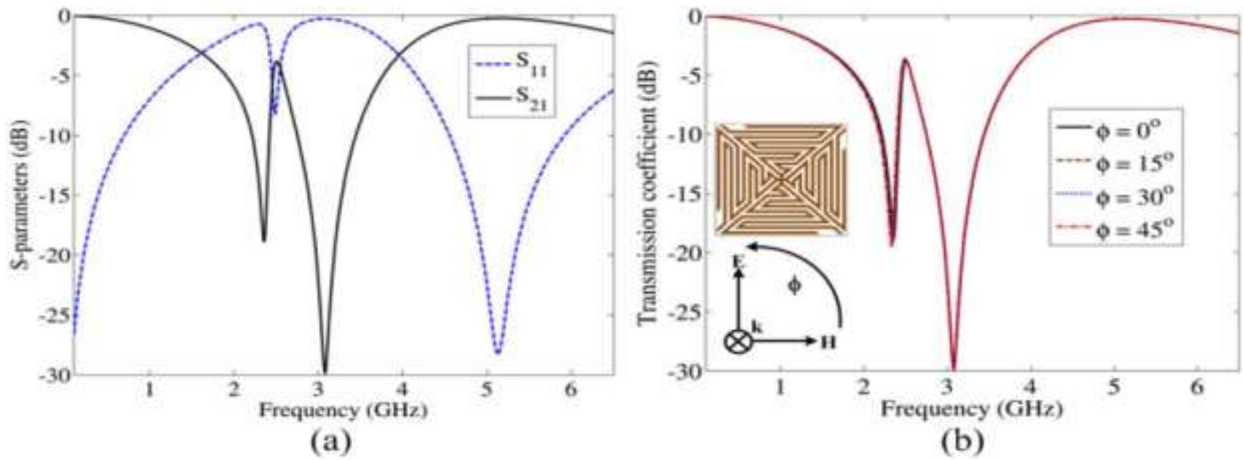
Fig. Proposed ultra-thin FSS absorber, (a) the geometry of the FSS unit cell

Fig. Return Loss curves of the ACS and CPW

on the top of the substrate, and (b) perspective view of the proposed absorber







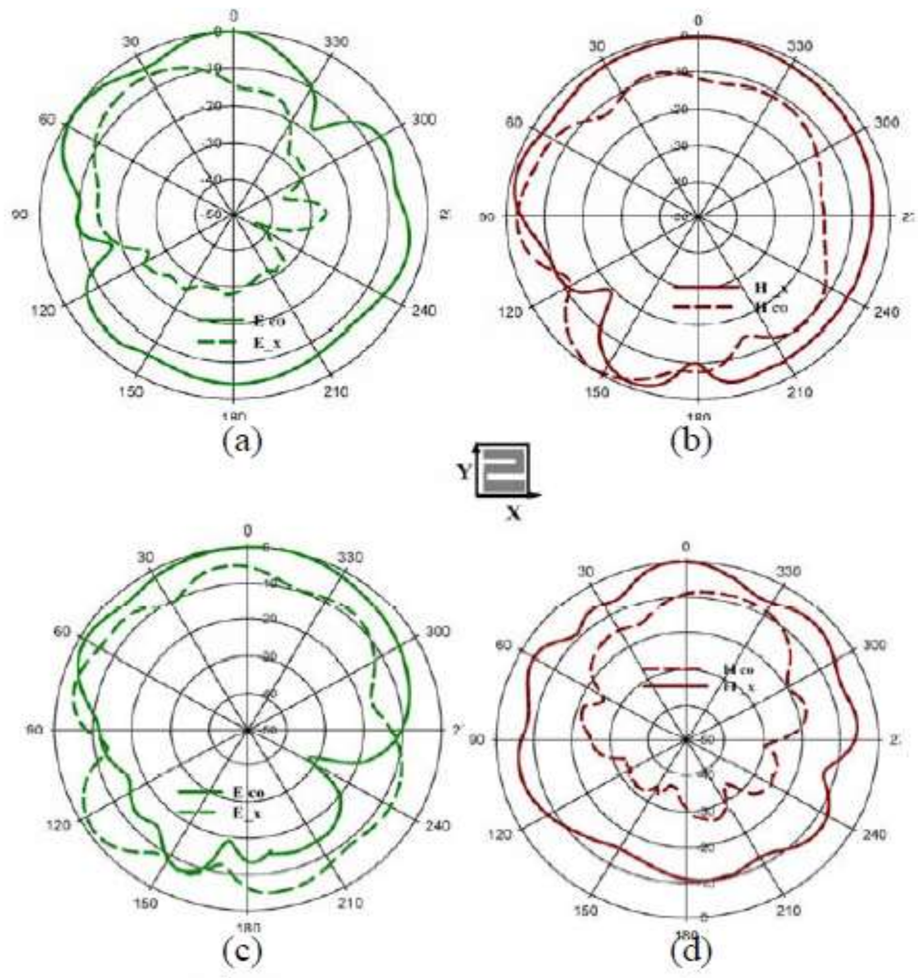


Fig. 2-D radiation pattern of the final antenna
(a)E plane pattern at 1.74 GHz (b) H plane pattern at 1.74 GHz
(c)E plane pattern at 2.34 GHz (d) H plane pattern at 2.34 GHz

CONCLUSION

A microstrip patch antenna with improved bandwidth is demonstrated to cover the applications of X-band. The hardware design is not too much difficult for these simulations. The radiation efficiency of the antenna is 78.85%.The normal design procedure for the proposed antenna for dual frequency operation has also been improved than conventional. As we can see in results, the gain 4.31 dB, bandwidth 1.59 GHz &the Return loss of -17.14 dB and -14.29 dB, at the frequencies 10.25 GHz and 11.54 GHz respectively. These
simulated results are found reasonably well. The relevant radiation patterns are shown in figures. Some characteristics efficiency with improved bandwidth and higher gain & low cross polarization, make the proposed antenna useful for various applications.

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