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DESIGN AND ANALYSIS OF SINGLE NOTCH BAND UWB ANTENNA

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ABSTRACT

In this paper a single notch band UWB antenna is proposed. In this antenna a bow –tie shaped slot is placed on the circular patch. That cross slot is responsible for the notching of the band. This antenna is designed on the FR-4 substrate having thickness of 1.6 mm and dielectric constant of 4.4 and loss tangent of 0.02. This antenna covers 3.6- 13.34 GHz. When a single crossed slot placed on the circular patch, it notches the frequency from 4.34-5.6 GHz.

KEY WORDS: *UWB antenna, single notch band, cross slot, microstrip patch antenna.*

I. INTRODUCTION

Wireless communication is very important for the development of the technology. UWB (Ultra wide Band)techniques is used by wireless communication due to its low power consumption, low cost [1].

There are variety of antennas are proposed for the notch band antenna [4-5].

II. ANTENNA CONFIGURATION

Fig 1 (a) and (b) shows the UWB and single notched band UWB antenna. A partial ground of 30X10 mm^2 is used. A transmission line feeding method is used to excite the antenna .

First of all a circular patch antenna is designed that covers the range of frequency 3.6- 13.34 GHz. The circular patch is of radius of 9 mm is considered and a feeding line of 15X2.5 mm^2 is used for feeding purpose. This is shown in the figure 1(a).

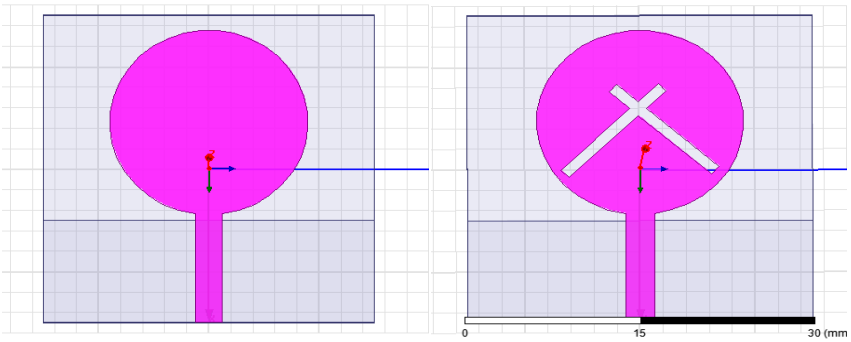

Fig 1.(a) Circular patch UWB antenna (b) Bow –tie shaped slot antenna

For notching purpose a bow tie shaped slot placed on the circular patch that notch the single band of frequency 4.34-5.6 GHz.

III. SIMULATION AND RESULT

For the simulation of this antennaHFSS 15.1 is used. There are so many parameters are observed such as return loss S11 , VSWR, Radiation Pattern, Current distribution etc.

Fig. 2(a) shows the S11 of the simple circular Patch antenna that show that is antenna covers the frequency range from 3.6- 13.34 GHz. Fig 2(b) shows the S11 of the bow –tie shaped slot circular patch antenna , that work as band reject filter and reject the frequency from 4.34-5.6 GHz. As shown in the figure.

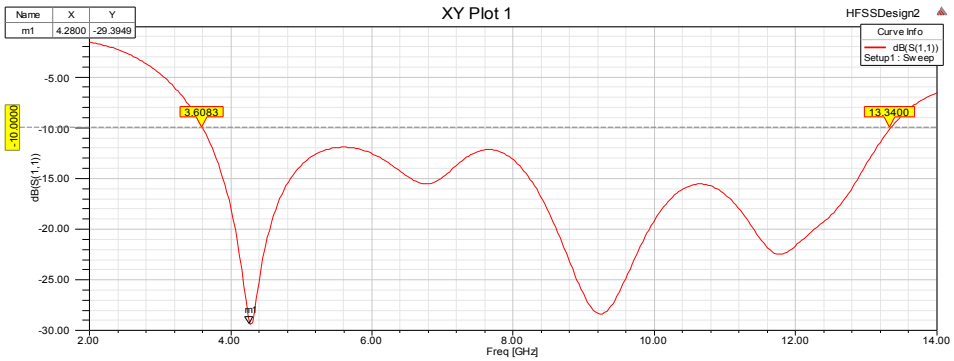

Fig 2(a) Return Loss of simple circular patch antenna

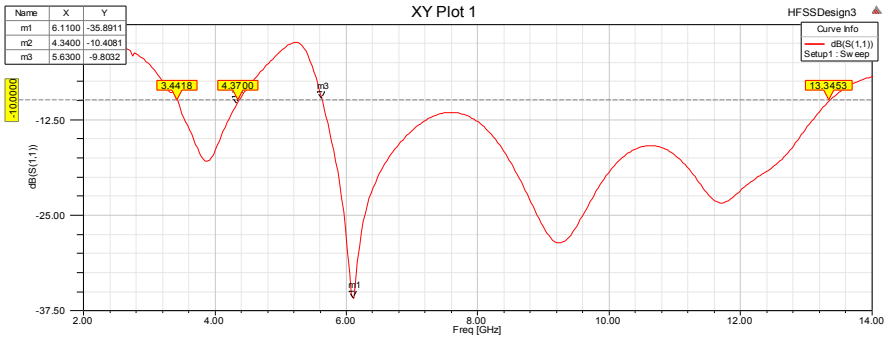

Fig 2(b) Return Loss of Bow-tie shaped slot circular patch antenna

Fig 3(a) and (b) shows the VSWR of the simple circular and Bow-tie shaped slotted circular shaped antenna. Fig 3 (a) shows that VSWR of the antenna is less than 2 in the range of 3.6- 13.34 GHz. Fig 3(b) shows that the VSWR is greater than 2 in the range of 4.34-5.6 GHz. Which shows that the antenna is not operating in the same frequency band and this antenna reject that particular band of frequency. Frequency of the rejection can be adjusted by changing the length and width of the bow-tie slot that is placed on the circular patch antenna.

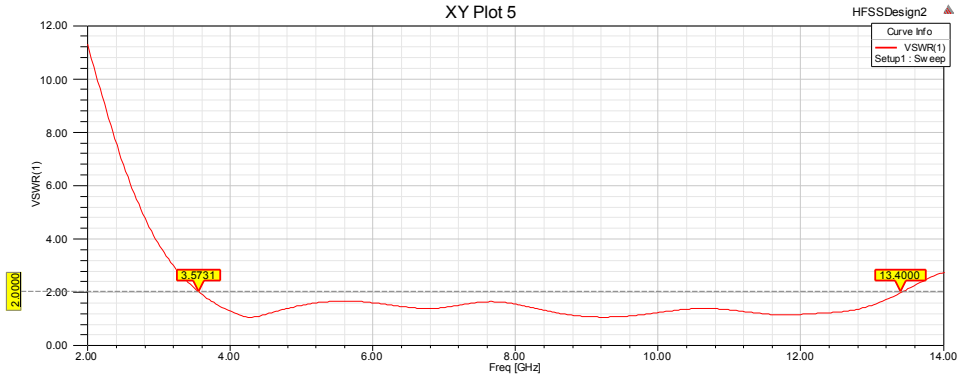

Fig 3(a) VSWR Vs Frequency graph of simple circular patch antenna

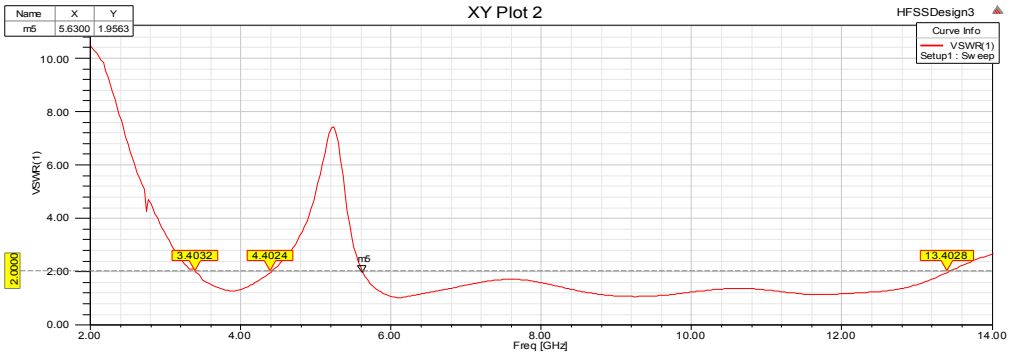

Fig 3(a) VSWR Vs Frequency graph of simple circular patch loaded with bow tie slotted antenna

Fig 4 (a) shows the 3-D radiation pattern of the simple circular patch antenna. It show that it is a monopole antenna and its radiation pattern is like a doughnut shaped and Fig 4(b) shows the 3-D radiation pattern of bow tie slot loaded circular patch antenna. Fig 4 (a) show that at frequency of 5.27 GHz antenna gives the gain about 4 dBi and in the Fig 4(b) the gain of the antenna is in negative range that means antenna is not radiated in that frequency .

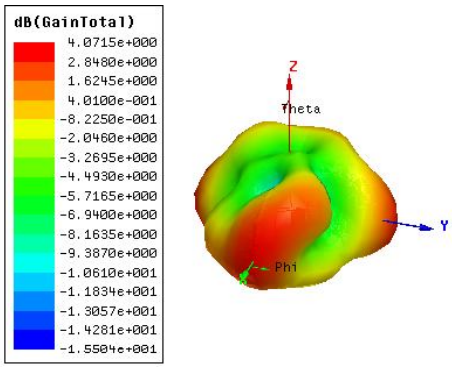

Fig4 (a) 3-D radiation pattern at frequency 5.27 GHz

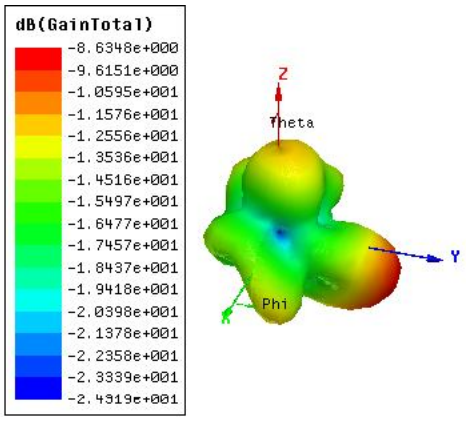

Fig 4(b) 3-D radiation pattern at frequency 5.27 GHz

IV.CONCLUSION

In this paper a single notch band circular patch UWB antenna is proposed. It notches a single band of frequency 4.34-5.6 GHz and and covers the frequency range of 3.6- 13.34 GHz. This antenna is useful for wireless communication.

REFERENCES

[1]. Federal communication commission, first Report Order, "Revision of part 15 of the Commision ,s Rules regarding Ultra Wideband Transmission Systems, Feburary(2002).

[2].C.A. Balanis , Antenna Theory ,2nd Ed. , Jhon Wiley & Sons inc. New York . 1982.

[3]. John D. Kraus and Ronald J Marhefra , Antennas : for all Applications , McGraw-Hill , 3rd edition ,2002, pg. 387-391.

[4] S. M. Zhang, F. S. Zhang, W. Z. Li, T. Quan, and H. Y.Wu, "A compact UWB monopole antenna with WiMAX and WLAN band rejections," Progress in Electromagnetics Research Letters,vol. 31, pp. 159–168,2012.

[5]ChaabaneAbdelhalim, DjahliFarid, "A Compact Planar UWB Antenna with Triple Controllable Band-Notched Characteristics", *International Journal of Antennas and Propagation*, vol. 2014, Article ID 848062, 10 pages, 2014. https://doi.org/10.1155/2014/848062