

# Dual Band Circularly Polarized Antenna for C- Band Application

K. Rekha<sup>1</sup>, K. Shanthalakshmi<sup>2</sup>

P.G. Student, Department of ECE, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India<sup>1</sup>

Associate Professor, Department of ECE, Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India<sup>2</sup>

**ABSTRACT:** In our paper a dual band circularly polarized antenna have been designed. C-band frequencies have various applications in satellite communications, amateur radio, industrial and commercial applications, etc. Here the dual band antenna operating at 5.7GHz and 6 GHz is designed with the return loss of -19.98dB and -16.65 dB respectively. This antenna is operating in C-band and can be used in above mentioned applications. The proposed antenna's performance is analyzed using Ansoft-HFSS 13.0 software simulator.

**KEYWORDS:** Circular Polarization (CP), Linear Polarization (LP), Dual band, Coaxial Feed, Single feed, Dual feed.

## I. INTRODUCTION

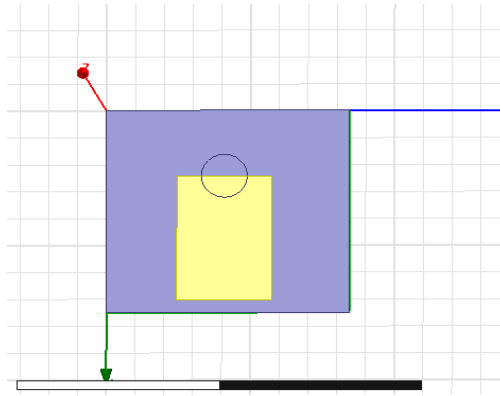
The IEEE C-band have frequency range from 4 to 8 GHz used for satellite communication transmissions, some Wi-Fi devices, some cordless telephones. These C-band frequencies perform better under adverse weather conditions. C-band communication satellites use the band of frequencies from 3.7 to 4.2 GHz for their downlinks, the frequency band from 5.925 to 6.425 GHz for their uplinks. C band is also typically used by large ships that transverse the oceans on a regular basis and require uninterrupted, dededicated, always on connectivity as they move from region to region. For amateur radio operations, the frequency range of 5.650 to 5.925 GHz is allowed by the International Telecommunication Union. 5.7 GHz band is also allowed in most parts of the world as common ISM bands for industrial and commercial applications. 5.7 GHz have wider channels than the lower frequency bands and can carry higher data rates than lower frequency bands. Compared to the lower frequencies the higher 5.7GHz frequencies have a much shorter reliable distance.

## II. ANTENNA DESIGN

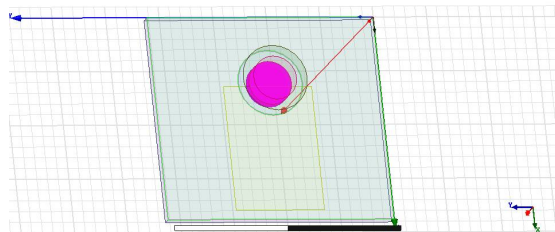
Substrate	FR4_epoxy
Dielectric constant	4.4
Height	1.67mm

**Table 1 Design parameters**

By using the above design parameters an antenna is being designed. The antenna is designed using HFSS. The feed type chosen is coaxial and the patch is of square shape. The designed antenna of linear polarization is given below:

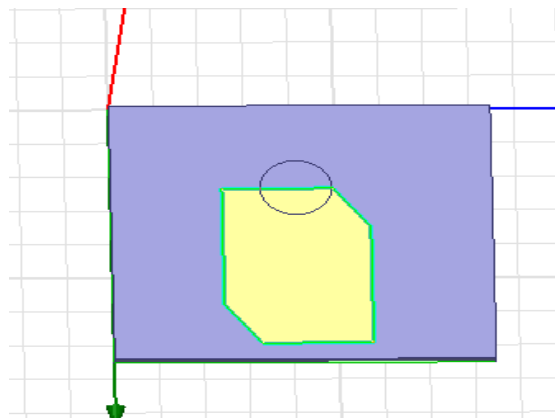


**Fig.1** Top view of the antenna



**Fig.2** Coaxial feed of the antenna

For obtaining circular polarization the edges of the square are truncated or by embedding cross slot in the square patch. By using the perturbation segments the field is split into two orthogonal modes with  $90^\circ$  phase shift and equal magnitude, excitation of two degenerating modes is made with equal amplitude and  $90^\circ$  difference.



**Fig.3** Circular polarization antenna

For the antenna to be operated in dual band, the H shaped slot is introduced in the patch. The frequencies obtained are 5.7GHz and 6 GHz.

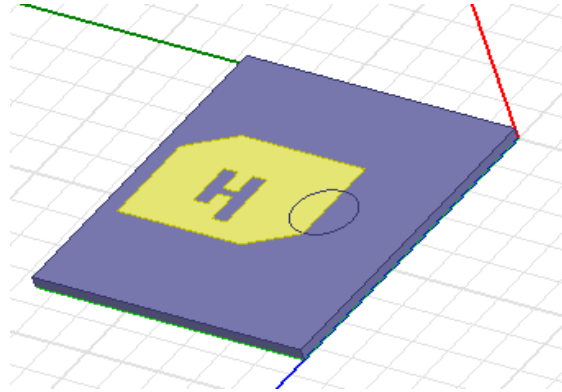


Fig.4 Circular polarization dual band antenna

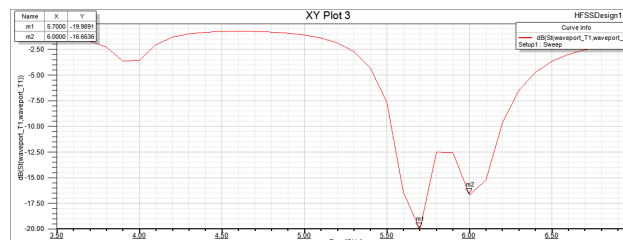


Fig.5 Return loss of antenna

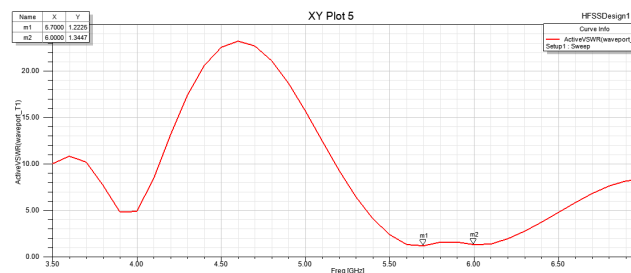


Fig.6 VSWR of the antenna



Fig.7 Gain of antenna

### III. CONCLUSION

The dual band antenna have been designed. The operating frequencies are 5.7 and 6GHz and their corresponding frequencies are 19.98dB and -16.65 dB respectively. The antenna can be used for C-band applications. It has narrow band and can also be used in satellite communications.

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