COMPACT PRINTED DIPOLE ANTENNA WITH LOW RETURN LOSS AND VSWR

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Abstract

In this paper a small sized printed dipole antenna is proposed which operates at frequency of 2.4 GHz. Design is simple in structure and posses low return loss value with low VSWR ratio. The impedance about 73 ohms is used for excitation port which is large compared to other antennas. The simulation results are carried out using HFSS software.

Keywords: - *Printed dipole, FR4 Epoxy, Return loss and VSWR*

I. INTRODUCTION

Due to rapid increase in the evolution of wireless communication systems, there is a need of small size antenna. In this paper a printed dipole antenna with a low return loss value and VSWR is proposed.

Ghuang Ma et al [1] introduce a design guideline of a printed dipole antenna fed by slot with tapering for ultra wideband applications. Antenna consist of tapered slot feed structure and curved radiators. Bao et al [2] proposed a printed dipole antenna for a circular polarization. This antenna consist of unequal arms fed by microstrip feed line. Centre frequency at 3.2 GHz is considered for return loss and bandwidth plot. To obtain broad bandwidth of a dipole antenna attempts like inductive load, double side printing method and series feed are used et al. [3-6].

Above discussed antenna structures uses microstrip feed line, which makes antenna little complicated. So there is need of a simple antenna structure providing low return loss values.

In this paper a simple printed dipole antenna is designed over FR4 Epoxy substrate operating at the centre frequency of 2.4 GHz.

II. DESIGN PARAMETERS

Proposed antenna design consists of two equal but opposite in direction arms. These areas are separated by excitation port. Here excitation port is used to provide excitation signal to both the dipole arms. The impedance resistance of the excitation port is 73 ohms.

FR4 Epoxy substrate of size 6*3*2 cm is used to design dipole. HFSS 13 software is used for simulation and analysis purpose. First dipole arms of length 2 cm and breadth 1cm is drawn over FR4 Epoxy substrate. The two dipole arms are separated by excitation port of size 1*1 cm. The lumped port method is used for excitation port. Perfect E boundary is assigned to both dipole arms.

III. RESULTS & CONCLUSION

The centre frequency of a dipole is set at 2.4 GHz within frequency sweep of 1 to 5 GHz. Fig 1 shows the return loss verses frequency plot. It is clear from the plot the lowest return loss value is -41 dB at 2 GHz which is very low. The -10 dB bandwidth concluded from the plot is approximately 2 GHz.

Fig 2 shows the VSWR verses frequency plot, for good performance VSWR value should be less than 2. Next Fig 3 introduces 3D polar plot of gain. At the end it is concluded that proposed antenna design provides good bandwidth with low return loss.

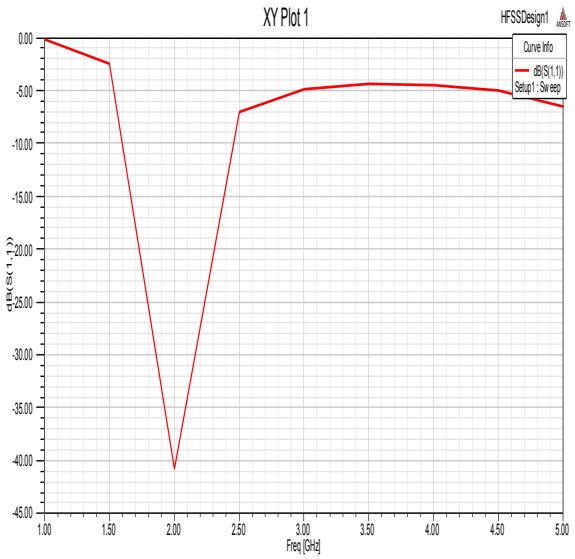

Fig.1 RETURN LOSS VS FREQUENCY PLOT

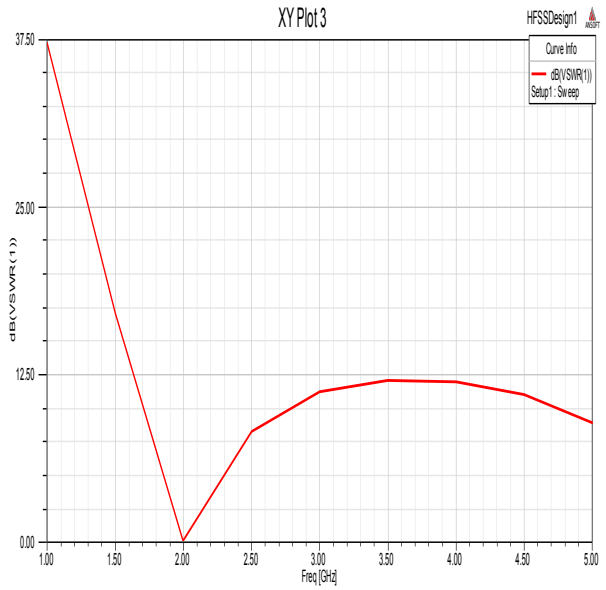

Fig.2 VSWR VS FREQUENCY PLOT

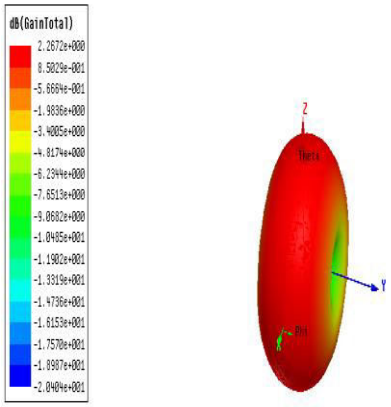

Fig.3 3D POLAR PLOT OF GAIN PATTERN

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