



Effect of PIN Diode on Slotted Microstrip Patch Antenna

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ABSTRACT: In this paper, slotted microstrip patch antenna is employed with PIN diode to study its effect on operating frequency. The antenna is designed using ANSYS HFSS and consists of radiating patch with slot mounted on FR4 epoxy substrate with permittivity 4.4. The working frequency of antenna ranges from 3 to 5GHz. The return loss of the antenna is studied.

KEYWORDS: Microstrip Patch, HFSS, PIN Diode

I. INTRODUCTION

Microstrip patch antennas are extensively used in antenna design as they offer several advantages in terms of fabrication and cost. To meet the increase demand for high data rate, more functionality, several patch antennas operating with multiple frequencies are proposed in [1-10].

In this paper, slotted microstrip patch antenna is used to study the effect of insertion of PIN diode on the slot. The structure is explained in section II. It is expected to achieve frequency reconfiguration from the structure. The simulations from HFSS are reported in section III.

II. ANTENNA DESIGN

The structure of slotted microstrip patch antenna with PIN diode is shown in Figure 1. PIN diode is introduced on the slotted patch to achieve frequency reconfigurability. The dimension of the antenna is 28x36x0.1 mm. The slot dimension is 15mmx4mm. The FR4 epoxy substrate dimension is 88x99x1.57mm.

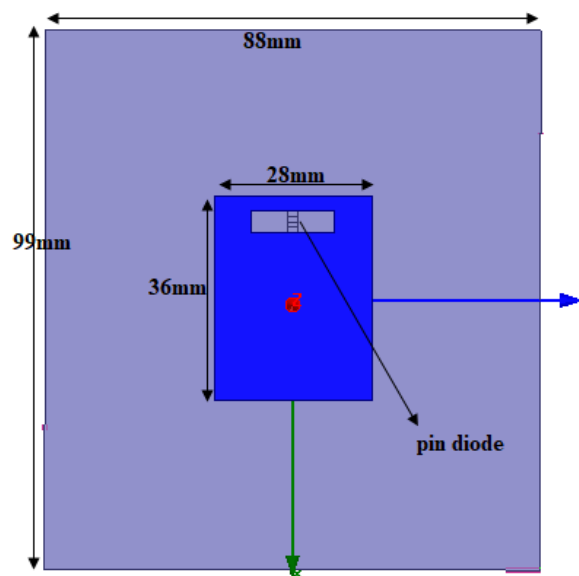


Figure:1 Slotted MPA with PIN diode



III. RESULTS AND DISCUSSIONS

The antenna system is simulated using ANSYS HFSS simulator. The return loss plots of slotted patch with PIN diode ON and OFF are shown in Figure 2 and Figure 3 respectively. As seen from figures the operating frequency shifts from 4.4GHz to 3.2 GHz when the diode is switched from ON state to OFF state. In both the cases the return loss is less than -10dB.

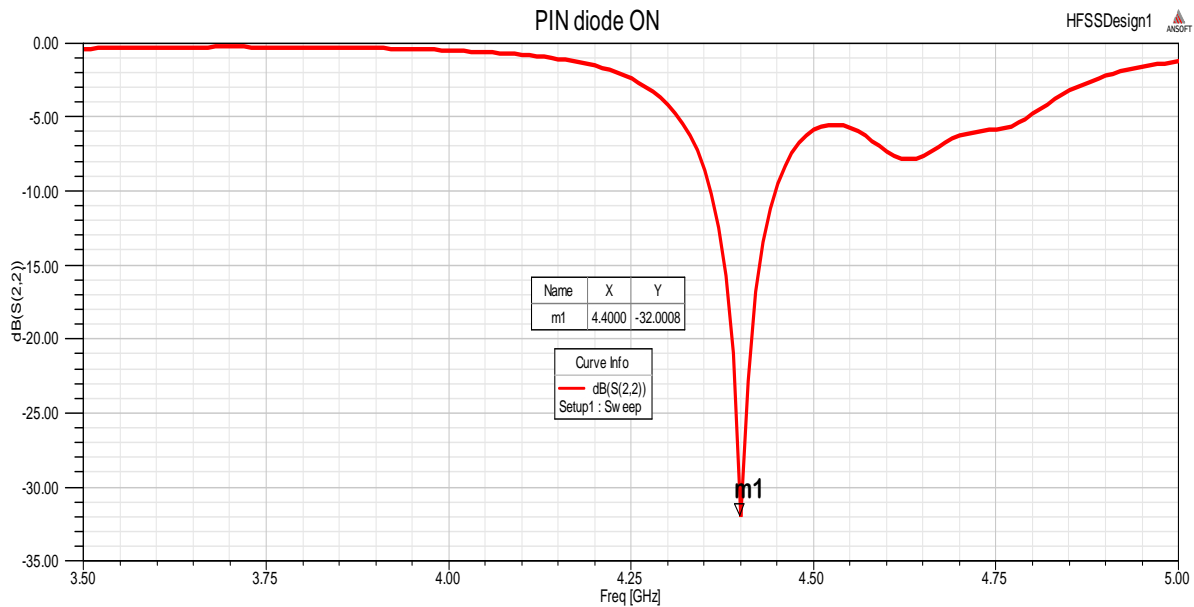


Figure:2 S11 plot of slotted MPA with PIN diode ON

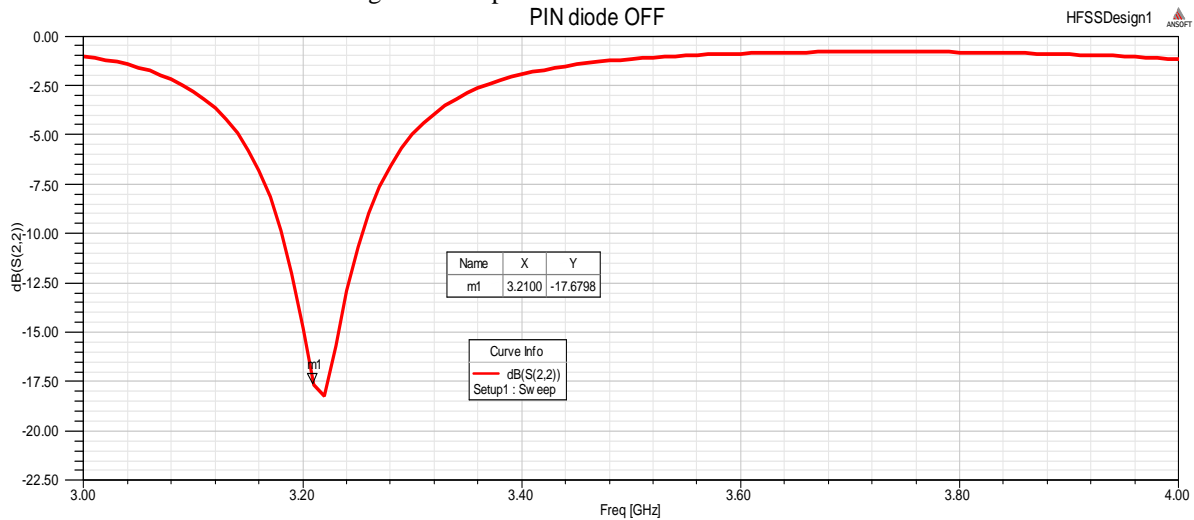


Figure:3 S11 plot of slotted MPA with PIN diode OFF

IV. CONCLUSION

Slotted MPA with PIN diode is considered in this paper to study the implementation of PIN diode on the slot. It is observed that the operating frequency shifts from 4.4GHz to 3.2 GHz when the diode is switched from ON state to OFF state thereby exhibiting frequency reconfigurability. The designed antenna is suitable for operation in 3 to 5GHz.

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