BROADBAND RECTANGULAR RING SLOT MICROSTRIP ANTENNAWITH HIGH RETURN LOSS AND ALSO COMPARE WITH RECTANGULAR MSA

Dr. D.C. Dhubkarya — Dept. of EC, BIET Jhansi (UP) India

Jeetendra Rai, — Dept. of CSE, Jhansi (UP) India

Satyendra Swarnkar — Dept. of EC, Jhansi (UP) India

Abstract-*A rectangular MSA and ring slot MSA with circular polarization radiation. The antenna has a high return loss, where the return loss is compare with its experimental value. The experimental results of both antennas compared with each others, the proposed antenna is able to achieve the return loss above -10db.*

Key Word-Micro strip, Ring slot, returns loss

I INTRODUCTION

Antennas are a very important component of communication systems [1]. By definition, an antenna is a device used to transform an RF signal, traveling on a conductor, in to an electromagnetic wave in free space the broadband circularly polarized MSA, play a vital role in wireless communication due to its low-profile, small-size and light weight. As well known, a circularly polarized wave can be obtained when spatially orthogonal modes are excited with equal amplitude. Conventional designs [2] of MSA for circular polarization are usually achieved by truncating patch corners, cutting rectangular ring slots in the rectangular patch.

II SUBSTRATE MATERIAL

The first design step is to choose a suitable dielectric substrate of appropriate thickness h and loss tangent [3]. A thicker substrate, besides being mechanical strong, will increase the radiated power, reduce conductor loss, and improved impedance, bandwidth, however it will also increase the weight, dielectric loss, surface wave loss, and extraneous radiations from the probe field. Substrate dielectric constant ε_r plays a role similar to that of the substrate thickness.

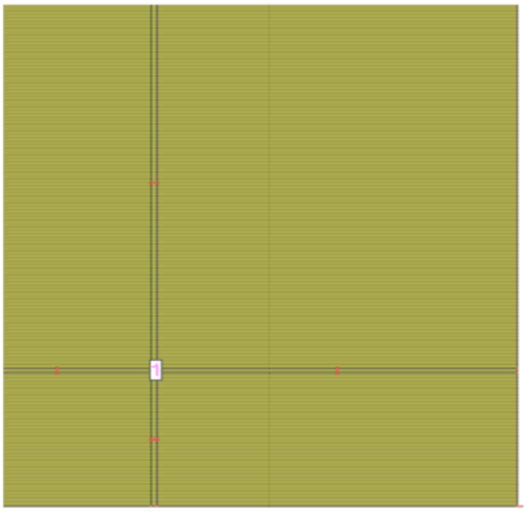

Figure1: Proposed Geometry of rectangular Antenna on IE3D

III ANTENNA DESIGN

Figure.1 and Figure 7 shows the geometry of the proposed broadband MSA, The radiating rectangular patch, printed on a substrate of thickness h and relative permittivity ε, has the dielectric material thickness is 1.6mm the length of both side, L=29mm and W=30mm . Which are oriented in orthogonal directions and have the same distance of feed point is X= 3 mm. and Y=3mm for rectangular ring slotted antenna and other feed point is X=8mm and Y=10mm for rectangular antenna [4] [5].

IV EXPERIMENTAL RESULTS

To validate whether the design technique is applicable, the antenna has been simulated with IE3D Fig.2, Fig.3 and Fig. 4 shows the Gain , VSWR versus frequency and smith chart respectively the proposed rectangular slotted antenna,Fig7,Fig.8,and Fig.9 shows the Gain , VSWR versus frequency and smith chart respectively for the proposed rectangular antenna .From the simulation results, we observe that the proposed rectangular slotted antenna and ring slot is able to achieve the gain is -15.55db,-29.20db respectively and the VSWR less than 2. The output result by the spectrum analyzer is shown in Fig.5and Fig.11, return loss (reflection coefficient) versus frequency of the proposed antenna. Since the feed point connected with the coaxial connector [6] [7], have good equal amplitude and 90° phase shift, broadband CP radiation can be achieved. Furthermore, by using the thick air substrate, much wider CP bandwidth can thus be obtained. The impedance matching of the antenna can be achieved by fine adjusting the feed position, and the distance between the radiating patch and the ground plane (1.6mm) [8].

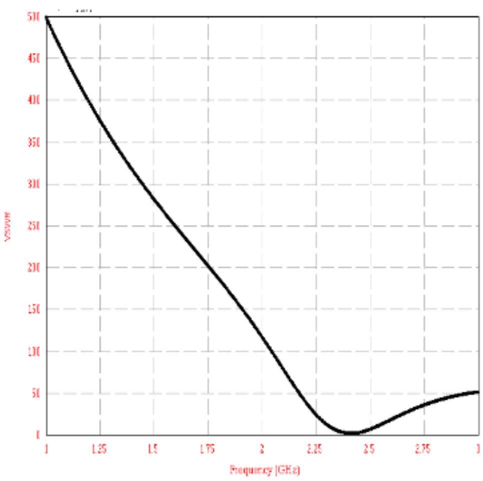

Figure 2: Return loss Vs frequency of rectangular antenna

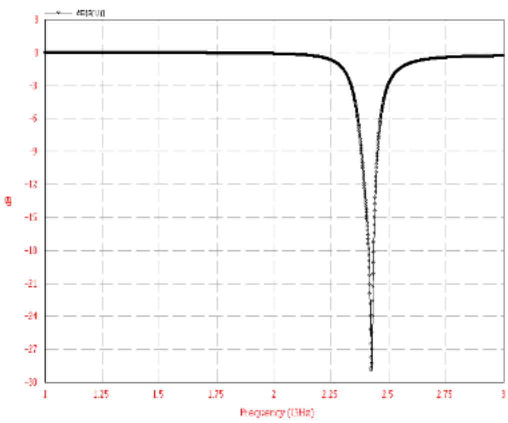

Figure 3: VSWR Vs frequency of rectangular antenna

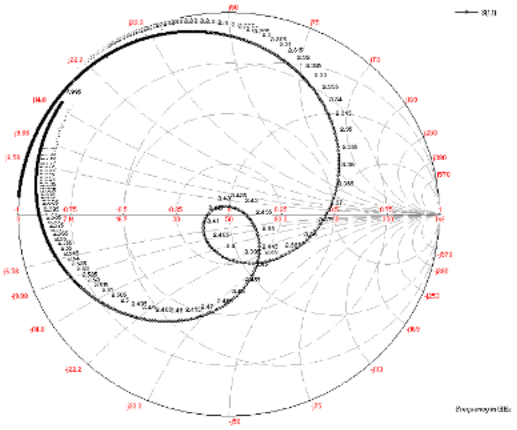

Figure 4: Smith chart of rectangular antenna

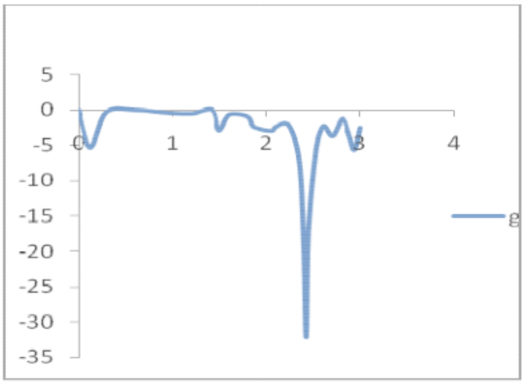

Figure 5: Practical graph (Return loss Vs frequency of Rectangular Antenna on axial)

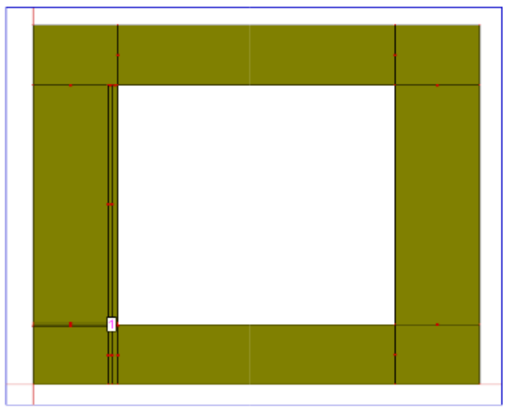

Figure 6: Return loss of rectangular microstrip antenna by spectrum

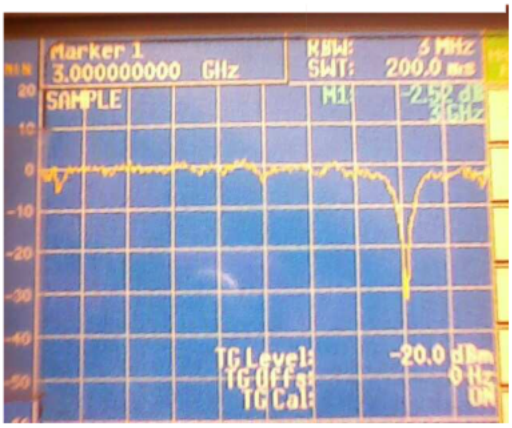

Figure 7: Proposed Geometry of rectangular ring

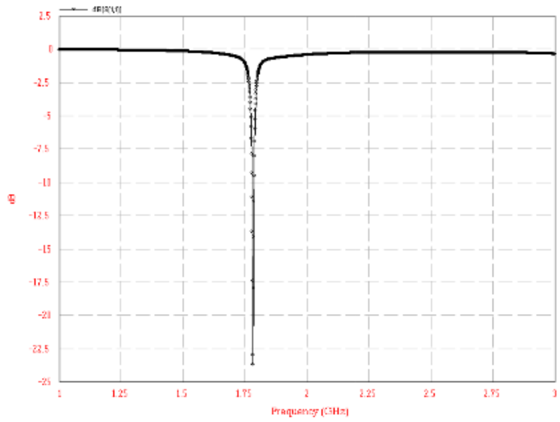

Figure 8: Return loss Vs frequency of rectangular ring slot antenna on IE3D

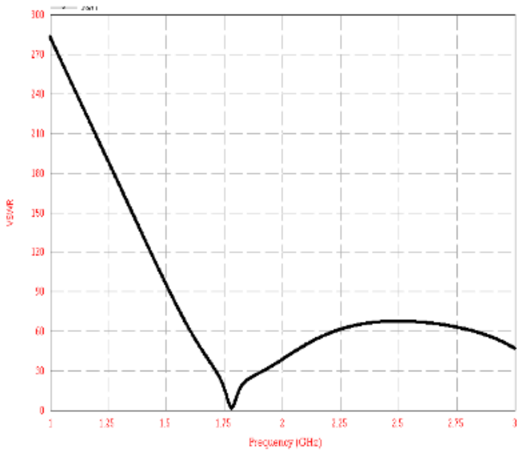

Figure. 9: VSWR versus frequency of rectangular ring slot antenna

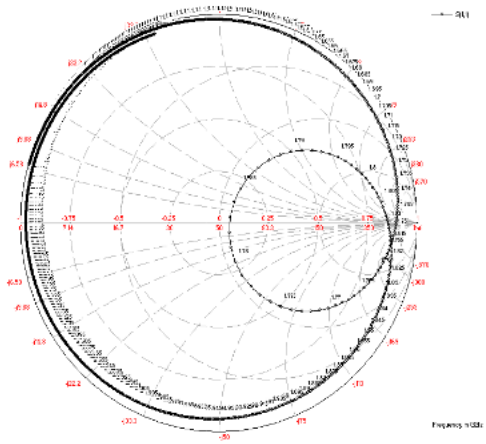

Figure 10: Smith chart of S11 parameter

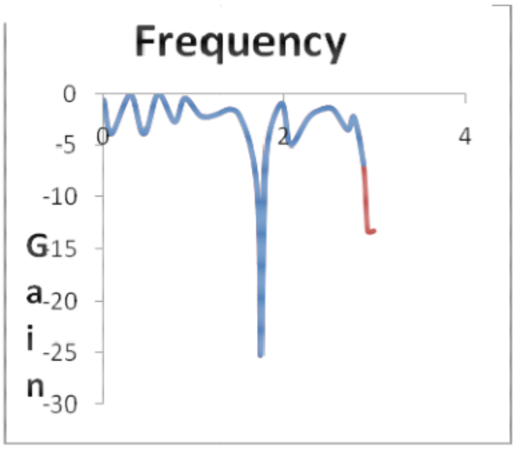

Figure.11: Practical graph (Gain Vs frequency of rectangular ring slotted antenna) on excel.

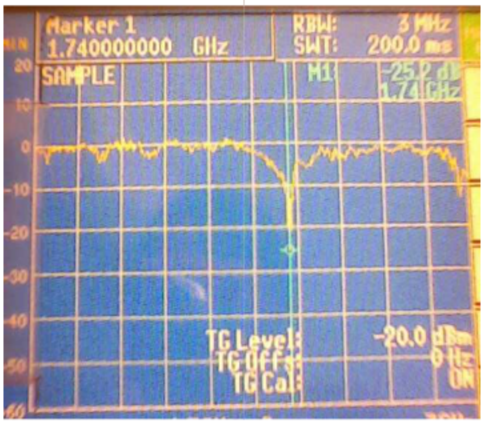

Figure 12: Return loss of rectangular ring slotted microstrip antenna on spectrum analyzer

Fr. in GHz.	Experimental value(return loss)	IE3D output (return loss)
2.5	-25.25	-15.55
2.5	-30.20	-29.20

Table1: content the experimental value

IE3D simulation output (return loss) which is at frequency 2.5 GHz.Table 1, shows the two output readings of antennas, at 2.5 GHz. Antenna 1st is rectangular slotted and 2nd is rectangular ring slotted antenna. In this paper, a new design [9] of broadband rectangular ring slotted MSA with 2.5 GHz is presented. The antenna has an output by using IE3D and compared with the experimental value. A thick air substrate is used in the present proposed design, and impedance matching is obtained through the rectangular radiating patch. The experimental results show that the proposed antenna is able to achieve VSWR less than 2 and the return loss less then - 10.db.

IV CONCLUSION

Characteristics of a design of broadband rectangular slotted and rectangular ring slotted microstrip antenna (MSA) have been experimental studies. The proposed antenna is achieved high return loss of -10 dB by using the experimental results show that the broadband MSA is able to achieve for VSWR less than 2 and the return loss less than -10 dB. So this is applicable in wireless communication. And also guide during the tenure of work.

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