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Efficient technique for Improvement of Axial ratio Bandwidth of Circularly polarized micro strip Antenna

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***Abstract*—- Microstrip antennas can provide circular polarization. Wireless field facing a problem of multipath fading. This improves by improving axial ratio bandwidth .In this paper axial ratio bandwidth enhanced by improving shape, structure of microstrip antenna. Circular polarized antenna designed with the help of HFSS software simultaneously study the parameter of circularized polarized antenna having FR4 material. Axial ratio bandwidth increases from 43%to 50%. Microstrip antenna, Axial ratio,HFSS,FR4**

***Index Terms*—Component, formatting, style, styling, insert.** *(key words)*

I. INTRODUCTION

Microstrip antenna has been considered as a good choice for communication over years due to their several advantages like simplicity, light weight, easy fabrication, low cost, low profile, integrability and microwave circuits. MSA are widely employed for a variety of applications such as industrial, scientific and medical, modern wireless communication and defense equipments. Circular polarized microstrip antennas have been widely used for mobile communication, global positioning system ,radio frequency identification readers and wireless local network. A microstrip patch antenna consists of a conducting patch of any non planar or planar geometry on one side of a dielectric substrate and a ground plane on other side[1,2,3]. In communication system or field there is major problem that is multipath fading. This problem arises when the electromagnetic magnetic waves are loss or dispers due to collide with mountains, trees, building. We remove this problem by enhancing circular MSA Axial ratio bandwidth. Circular polarization combats multipath fading by introducing polarization diversity in radio propagation environment thus providing high probability of a successful link, enhances weather penetration, superior mobility and improved system performance[4]. Antennas radiate either linear or circular polarization. A linear polarized antenna radiates wholly in one plane containing the direction of propagation. Circular polarized antenna, the plane of polarization rotates in a circle making one complete revolution during one period of the wave. If the rotation is clockwise looking in the direction of propagation, the sense is called right-hand-circular(RHC). If the rotation is counter clockwise, the sense is called left-hand-circular(LHC). A circularly polarized wave consist of two electromagnetic plane waves of equal amplitude with a phase difference of 900.

II. AXIAL RATIO

In antenna field axial ratio defines the structure or shape of polarization. It is the ratio of the length axis, to each other the longer axis divided by the shorter.

POLARIZATION	AXIAL RATIO
Linear polarization	1<(0dB)
Circular polarization	1 or (0dB)
Elliptical polarization	1>(0dB)

Table:1 Value of axial ratio for different types of polarization.

III. GEOMETRY AND PARAMETERS

Fabricated antenna on a Taconic RF35 substrate with a relative permittivity of 3.5. The substrate dimensions are 50 mm × 50 mm × 1.57 mm. The arrangement of surface currents on the dipole arms and on the orthogonal printed line provides right-hand circular polarization (RHCP) in the +z direction. A 50 Ω microstrip line connects to the shorter arm on the other side and is used to feed the antenna. Ground plane having small cavity.

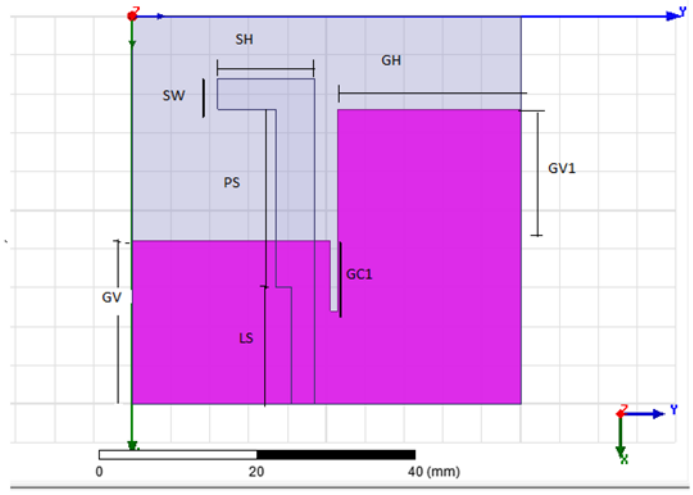

Fig 1: Structure of proposed Microstrip antenna type(A).

PARAMETRERS	VALUES
Short arm length(SH)	17.0mm
short arm width(SW)	4.0mm
Feedline length(PS)=23mm	23mm
Matching line length(LS)	15mm
Ground width(GV)	21mm
,Ground cavity(GC1)	3mm*8mm
(GV1)	21mm
(GH)	23.5mm

Table 2-Parameters of proposed microstrip antenna.

IV. SIMULATION AND RESULTS

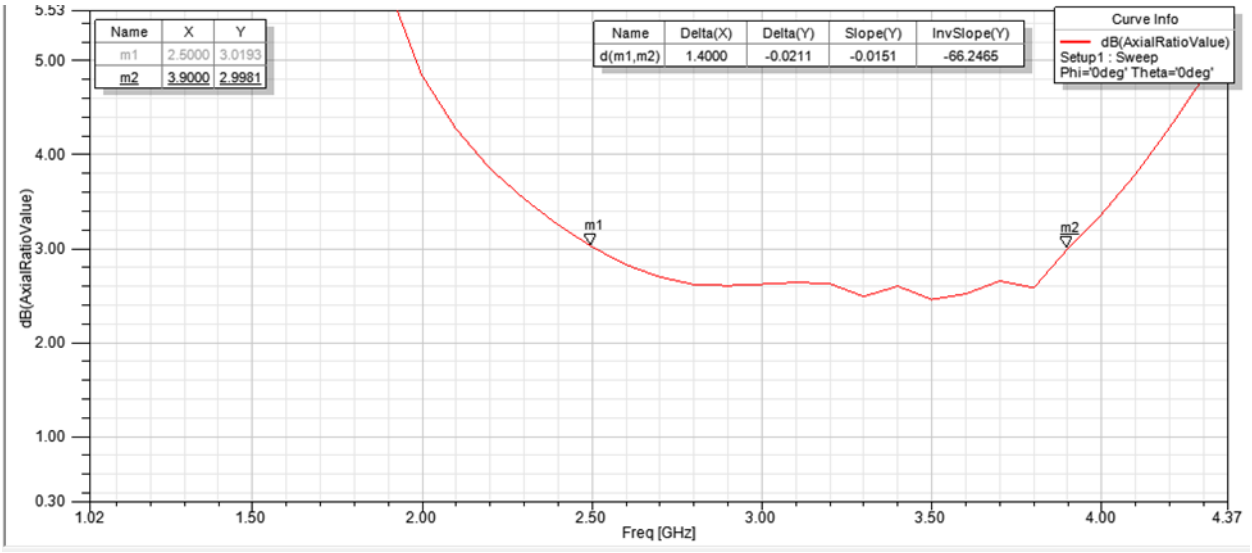

Fig 2: Graph of Axial ratio of MSA type(A).

MSA type(A) has axial ratio 43% but when we cut one square(8.5mm*3mm)on ground plane as an figure 3 then we enhance the axial ratio bandwidth 45% and our axial ratio slope come more less than 3db which good for circular polarization.

Fig 3: MSA type(B)

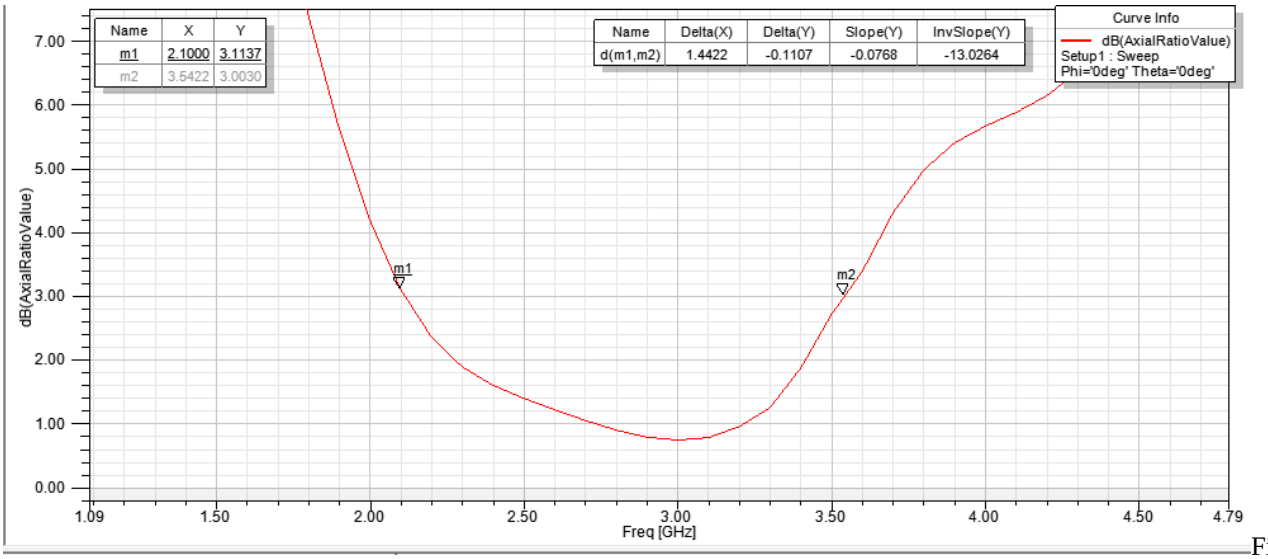

Fig 4: Graph of axial ratio of MSA type(B)

In MSA type (C) we further cut second square(8.5mm*3mm) as an figure 5 then we get more enhance axial ratio bandwidth 50% with slope goes more near to 0(dB) which gives best results.

Fig 5: MSA type (C).

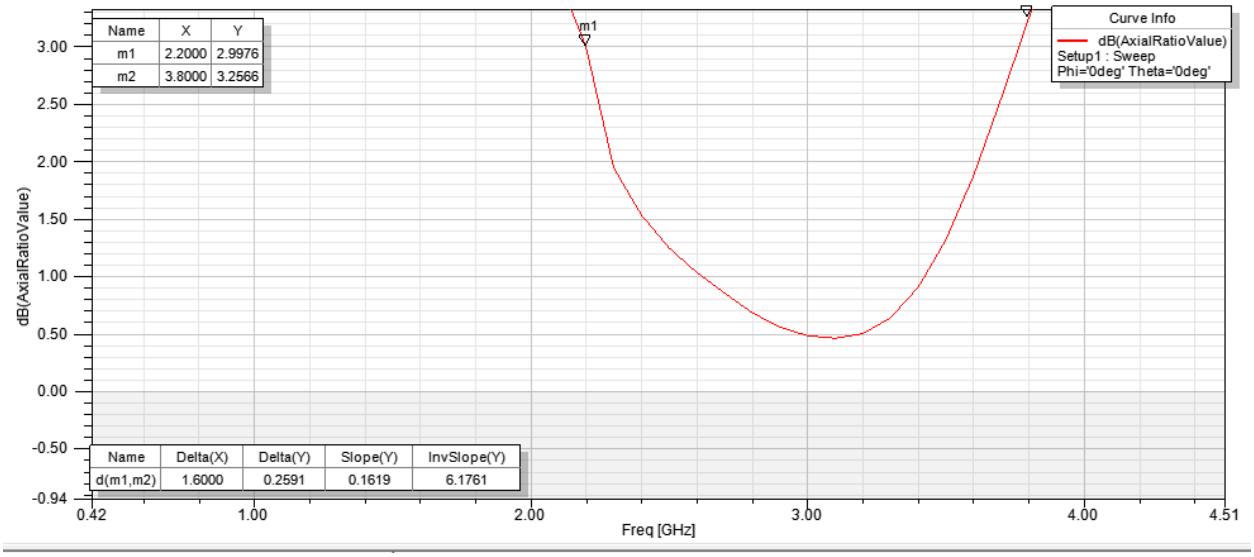

Fig : 6 Graph of axial ratio of MSA(C).

For calculating frequency bandwidth percentage :
$F_{H-}F_L /(F_H+F_L)/2 \quad * 100$

V. Conclusion

MSA employing asymmetrical arm with ground plane slit is shown wideband circular polarization. By adjusting structures it provide circular-polarization with an axial-ratio bandwidth in excess of 38% with good slope.

VI. References

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