Equilateral Triangular Microstrip Patch Antenna using Different Substrates

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Abstract

The triangular geometry of micro strip antenna is one of the most common shapes having a wide range of wireless application ranging from circuit element to wireless antennas .The proposed equilateral triangular micro strip patch antenna is designed by using different substrates of different permittivity .Proposed paper gives an idea about bandwidth changes with change of substrate material. Proposed antenna operated in C-Band .This antenna designed on soft HFSS designer software, impedance bandwidth, VSWR, return losses smith charts are observed and experimentally studied. Details of simulated results are presented and discussed.

Index terms—

1 I. Introduction

ompact micro strip antennas have recently received much attention due to the increasing demand of small antennas for personal as well as commercial communication equipment. It has been demonstrated that equilateral triangular micro strip patch can effectively reduce the required patch size for a given operating frequency [1]. In mobile communication system such as satellite, RADAR, Global Position System (GPS) often require extremely small size, light weight. The 'C' band of frequency is used for the satellite communication and terrestrial application.

2 II. Antenna Geometry

The geometry of the proposed triangular antenna using a co-axial probe feed is shown in fig. 1. The proposed antenna is constructed on a dielectric substrate on different substrates such as: 1. Rogers RT/duriod 5880(TM) which has a dielectric constant 2.2, & loss tangent 0.0009. 2. FR-4 EPOXY which has a dielectric constant 4.4, & loss tangent 0.002

Author: e-mail: abhishek.pandey32@yahoo.com [2]. This paper reports the simulation result using equilateral triangular patch antenna with co-axial feed. This paper therefore proposed a design of single & dual band operation of equilateral triangular micro strip antenna using HFSS (high frequency structure stimulator) which is commercially available in the market and the it depend on the FEM(finite element method) analysis.

3 III. Simulation Result a) Rogers RT/duriod 5880(TM)

The impedance bandwidth of proposed antenna at the centre frequencies is shown in Fig. **??**.1.This result shows single band width below to the -10dB so we can operate this antenna in the single bands and the return loss is-19.67dB. Proposed antenna can operate efficiently at frequency 3.42GHz. impedence Bandwidth achieved by this antenna is 34.23%.The VSWR is 1.26.

The impedance bandwidth and VSWR shows in fig.

4 Ansoft Corporation HFSSDesign1

Smith Plot 1

Corporation HFSSDesign1 Smith Plot 1

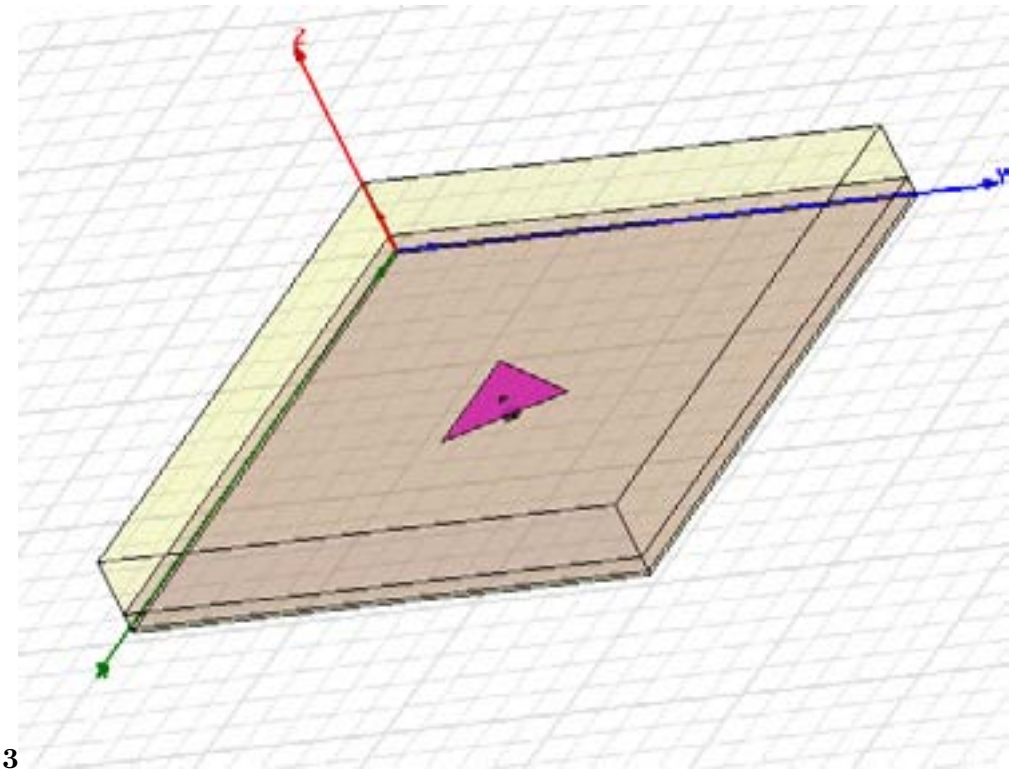

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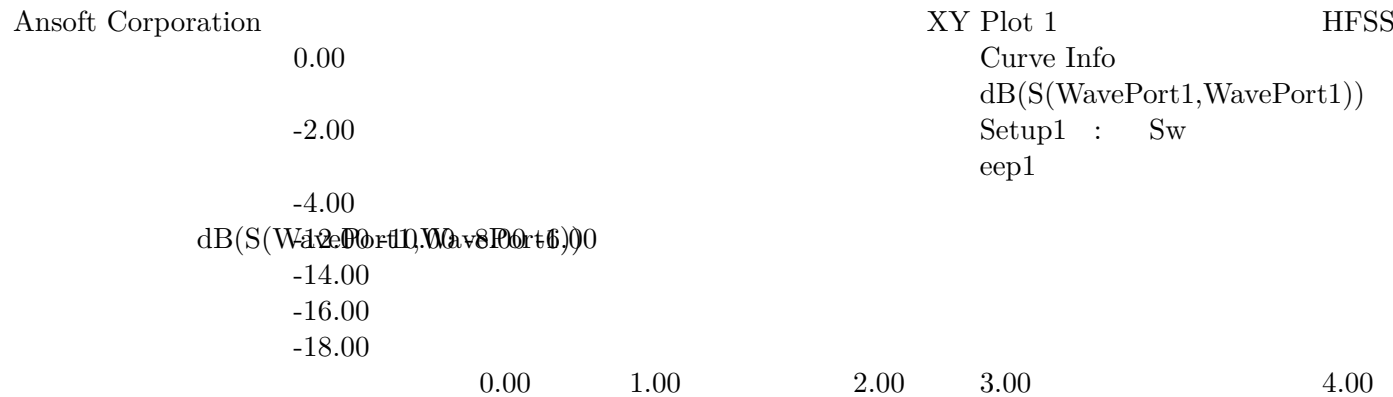
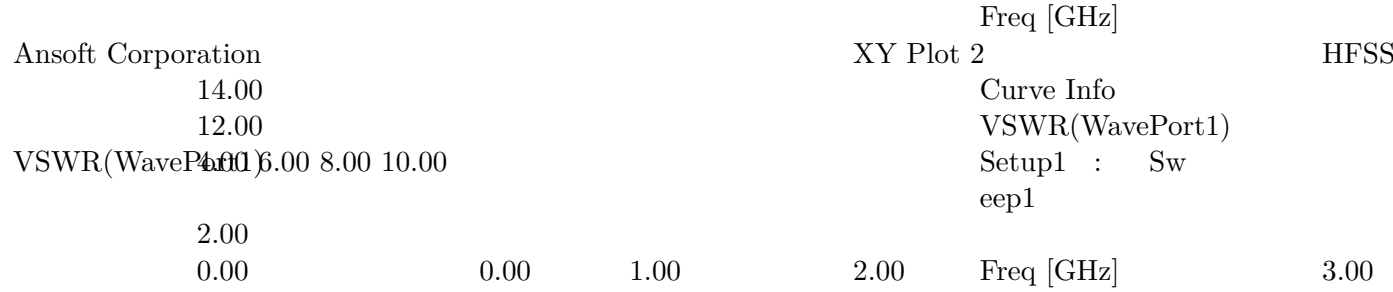
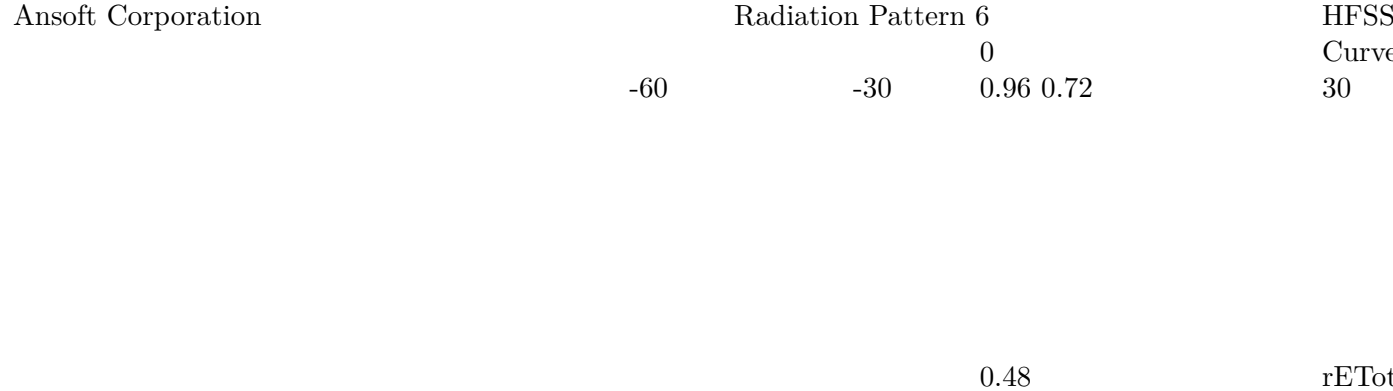
Figure 1: 3 .

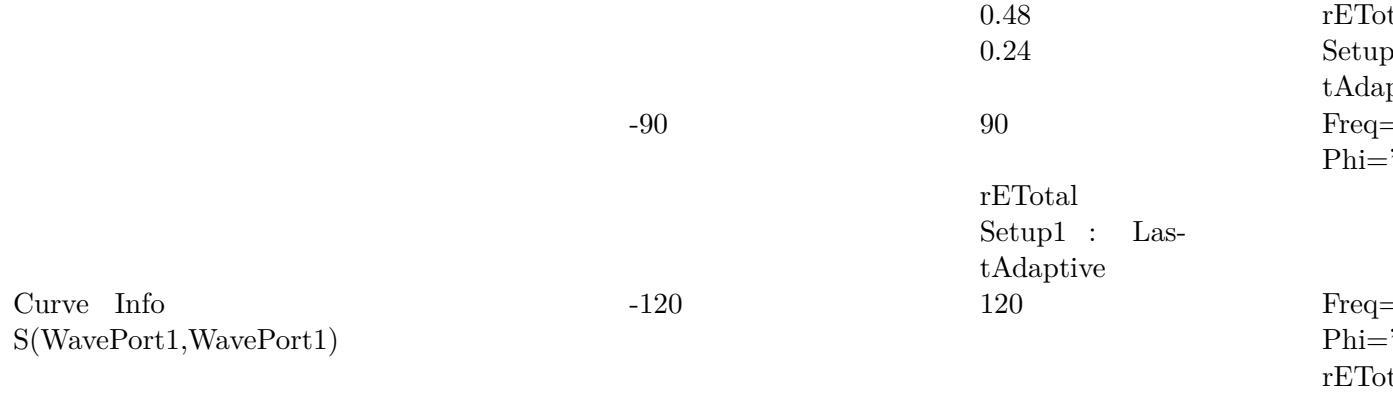
c) Rogers

TMM6









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	Resonant frequency	Return losses	Bandwidth	VSWR
? 1=2.2	3.42GHz	-19.67 dB	34.23%	1.26
?2=4.4	2.90 GHz	-18 dB	32%	1.24
? 3=6.0	2.68 GHz 4.88 GHz	-17.43 dB	30.85%	1.34
		-20.33 dB	6.25%	1.16
? 4=10.2	2.29 GHz	-16.10 dB	27%	1.37
	3.87 GHz	-20.33 dB	6.47%	1.13

? 1 -Rogers RT/duriod 5880(TM)
? 2 -FR-4 EPOX
? 3 -Rogers TMM
? 4 -Rogers RT/duroid 6010/6010 LM(TM)

IV. Conclusion

Figure 3: Table :

[Fang and Wong (October 199)] 'A Dual Frequency Equilateral Triangular Microstrip Antenna with Pair of Narrow Slots'. S Fang , Kin Lu Wong . *Microwave and Optical Technology Letters* October 199. 23 (2) .

[I ()] *Bahl and P. Bhartia microstrip antennas*, I . 1980. Dedham, MA: Artech House.

[Lu and Wong (1998)] 'Single Feed Dual Frequency Equilateral Triangular Microstrip Antenna with Pair of Spur Lines'. J Lu , Kin Lu Wong . *Electronics Letters* June 1998. 34 (12) . (i) (ii)