

Rectangular Patch Array Antenna with Liquid Crystal Substrate (LCS)

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ABSTRACT: this paper mainly dealing with liquid crystal substrate. We have been take original design and enhancement by adding enhancement factor are proposed and apply deferent number of array (6x6,4x4). This work using certain frequency between (1-45) GHz. the advance design system ADS is using to simulate our work 8x8 and 6x6,4x4 array antenna. The performance of these proposed antennas are illustrated in [Gain, BW, and Radiation pattern]. Finally results will list in table for comparing.

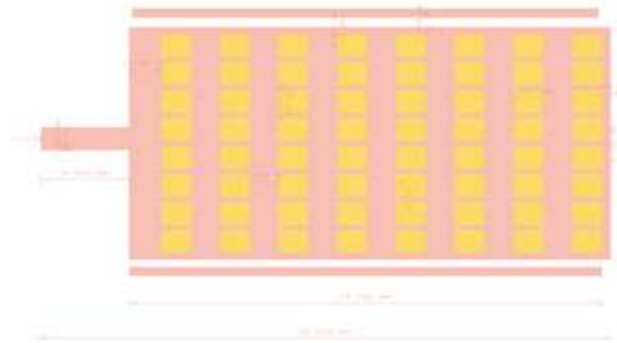
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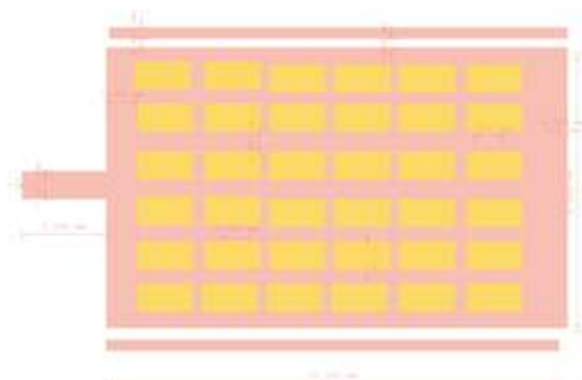
I. INTRODUCTION

Micro strip patch antenna consists of a radiating patch on one side of a dielectric substrate, which has a ground plane on the other side. A Micro strip patch antenna/patch antenna is a narrowband, wide-beam antenna fabricated by etching the antenna element pattern in metal trace bonded to an insulating dielectric substrate with a continuous metal layer bonded to the opposite side of the substrate which forms a ground plane.

II. PATCH MODEL.



Fig(1) 8x8 patch module



Fig(2) 6x6 patch module

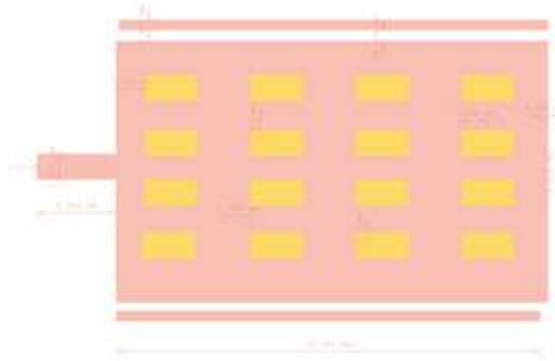


Fig (3) 4x4 patch module

III. ANTENNA MODEL.

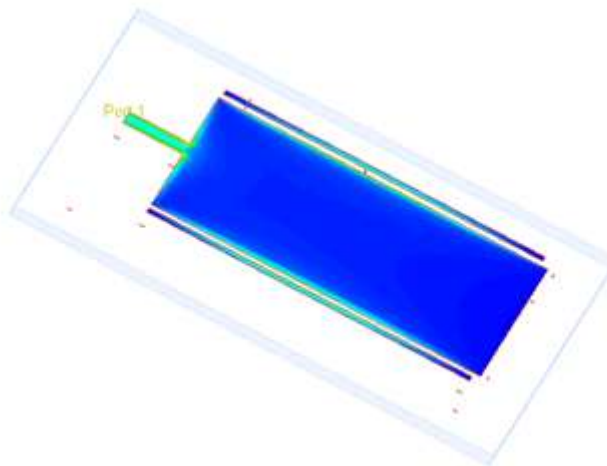


Figure (4) Antennasubstrate

IV. ANTENNA DESIGN CONSTRUCTIONS

A 8x8 rectangular patch array antenna adding a liquid Cristal shown in figure (1) with (5mmx3mm) dimension with totalcrystal number are 16 partsshown in figure (2). Another design of crystal 6x6 with (5mmx3mm) dimension shown in figure (2) and 4x4 with (5mmx3mm)dimension shown in figure (1). The dielectric constant (ϵ_r) as 3 and loss tangent (δ) as 0.003.If „L“ is the resonant length of patch, normally width (W) should be larger than L so that large bandwidth can be obtained. Here we have taken width (W) as 1.5 times of length (L). Height of the dielectric substrate should be in between $0.003 \lambda_0$ and $0.05\lambda_0$. We have taken 0.02 times of λ_0 . As 50Ω coaxial cables are used normally, feed point is taken where 50Ω resistance occurs.

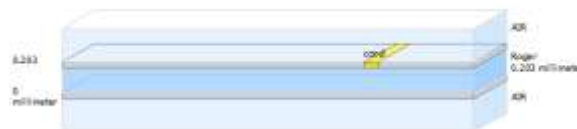


Figure (3) Antenna substrate

V. SIMULATION&ANALYSIS.

The designed antenna is simulated using ADS software.

VI. RESULTS

The measure results that we reported are Gain –Return loss-radiation pattern- directivity as are mentioned in table below.figure 3&4 for rectangular antenna and 5&6 for cercal antenna

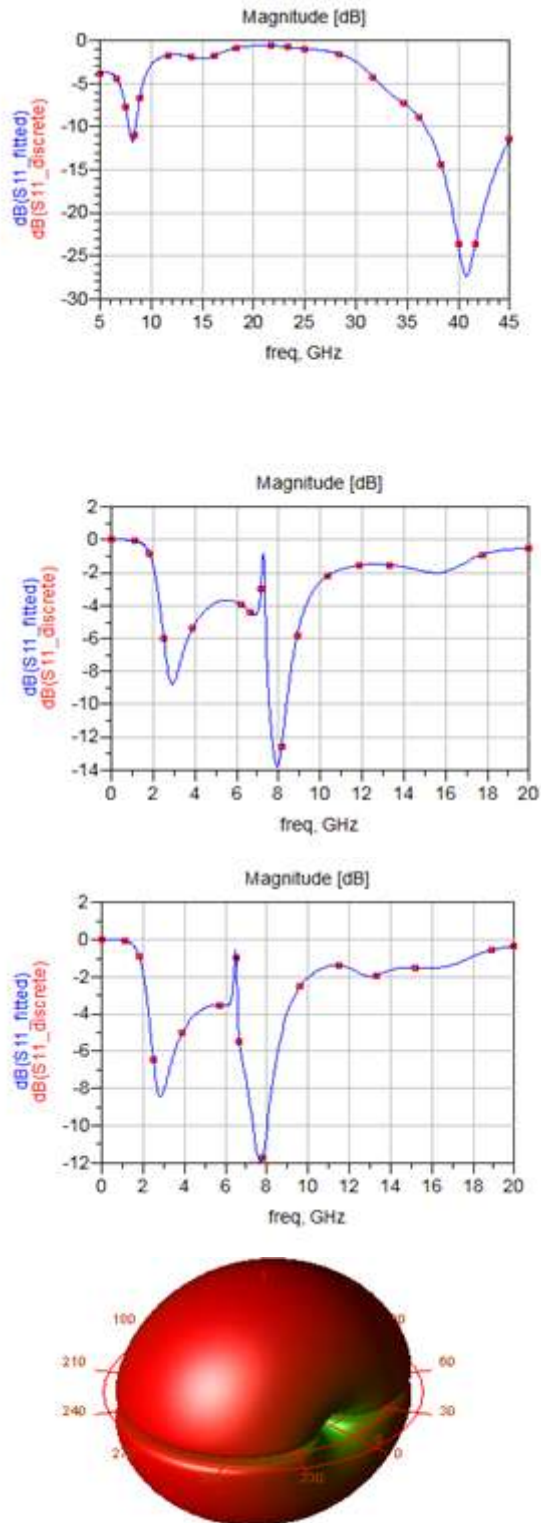
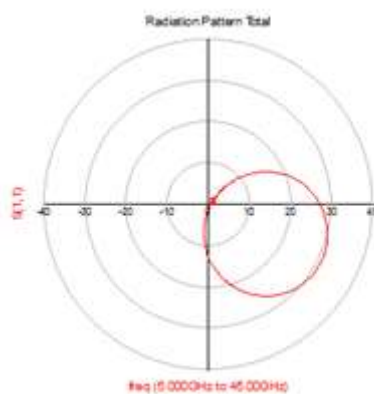


Figure (8) the batten

Table (1) Radiation pattern for rectangular antenna



. Figure (9) the batten

VII. CONCLUSIONS

The Microstrip patch antenna with liquid crystal substrate at 45GHz will work properly because of the high gain .As it is constructed with liquid crystal substrate, it is very flexible. This antenna can be moulded into any shape and it is stable at high temperatures. Thus it is most suitable for circuits for operating in all kinds of environments. The results of gain are enhanced compared to previous paper research.