IRREGULAR RHOMBUS SLOTTED PATCH ANTENNA FOR WLAN APPLICATION

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Abstract -In this paper an irregular rhombus slotted Microstrip antenna design for wireless communication application ,the simulation has been done on a frequency of 1.5 GHz, and the proposed antenna has a bandwidth of 58.5 % which has a quite large utility for wireless communication application point of view. The antenna has gain of 3.5dBi and the antenna and radiation efficiency is 70 to 90%,90% respectively.

Key word –irregular, rhombus, slotted, microstrip, bandwidth

Introduction-

Since last few year a great research has been done for increasing bandwidth with the help of many techniques like slotting, stacking, shorting pins and shorting patches. In this paper an antenna is proposed with the slotted technique the bandwidth of the proposed antenna is 58.5% which is quite large [1].

In this antenna we used the glass epoxy substrates and the material has the dielectric constant of 4.4. The shape of the antenna is "Rhombus Shape" in Fig. 1.The basic geometry of the antenna is tetragonal shape and clipped out a rhombus from inside the original geometry. The feed point location is find out by hit and trial method which has given good resonance.

All the factors including the cutting technique worked together to get a usefull pattern of the bandwidth [2]. The antenna has co-axial probe as feed point near to the right corner of the antenna.

Substrate Selection-

The first design stepis to choose a suitable dielectric substrate with appropriate thickness and appropriate value of loss tangent. A thicker substrate not only being mechanically strong but also will increases the radiated power, reduce conductor losses and improve impedance bandwidth however it will also increase the weight, dielectric loss, surface wave loss and extraneous radiations from the probe field. The substrate taken for the designing is Glass epoxy which is low cost and possesses nearly all appropriate characteristic for designing an antenna, value of height (h) is 1.6 mm.

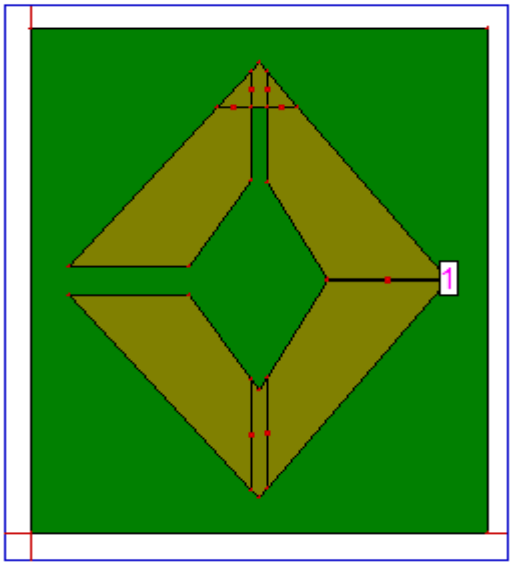

Fig. 1.Simulated Geometry of Proposed Antenna

Antenna designing-

Microstrip antenna has a designing procedure in which first we calculate the width and length of the radiating patch [5] and then the calculation of the Width and Length of the ground plate is to be done, values of W and L of the radiating patch for 1.5 GHz is 60.8 mm. and 47.4 mm. respectively and then *Wg* and *Lg* can be calculated with the help of formulas, so *Wg=70.4mm and Lg=57.0mm* .

IE3D Simulation Results

Zelands Software's IE3D is a platform where we can find out the performance of the antenna few important parameters of the proposed design are calculated and find as below

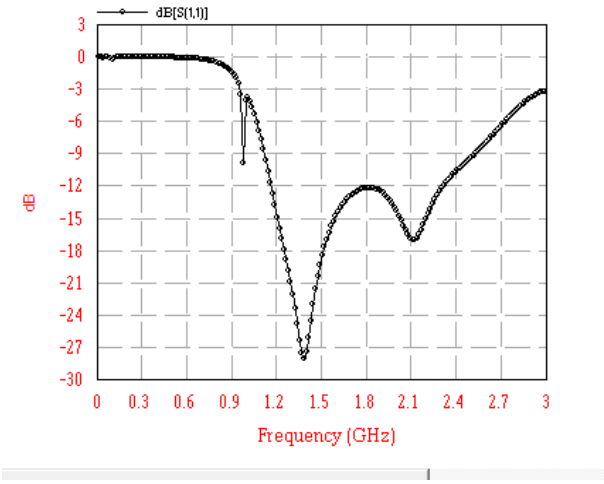

Fig.2. Return Loss vs Frequency of Praposed Antenna

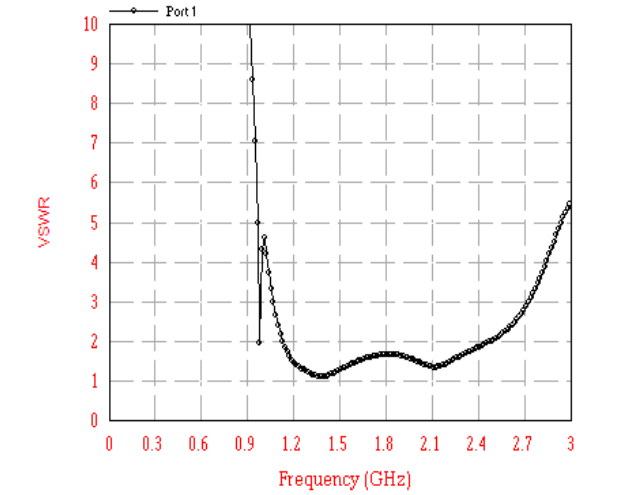

Fig.4. VSWR vs Frequency of Proposed antenna

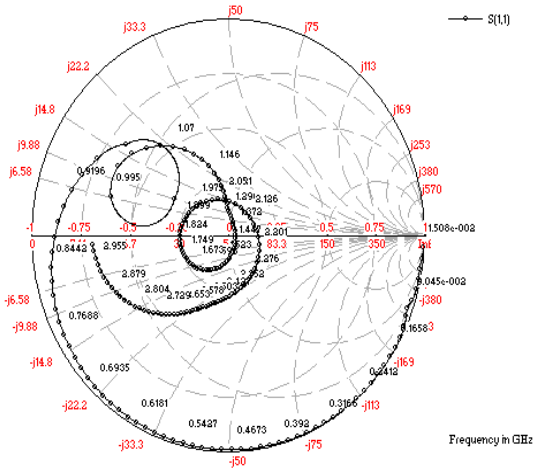

Fig.3. Smith Chart of Proposed Antenna

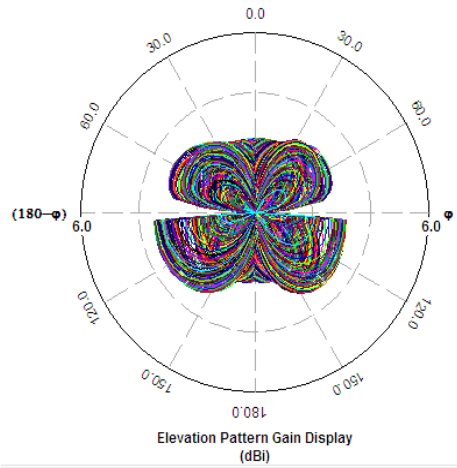

Fig.5.2D radiation Pattern

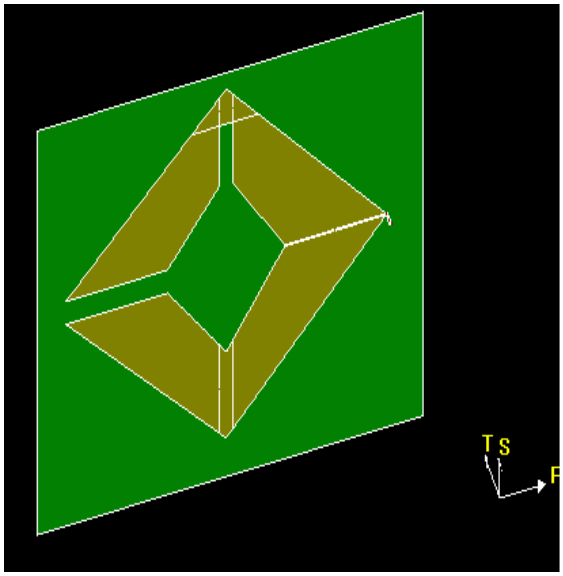

Fig.6. 3D View geomatry of Praposed Antenna

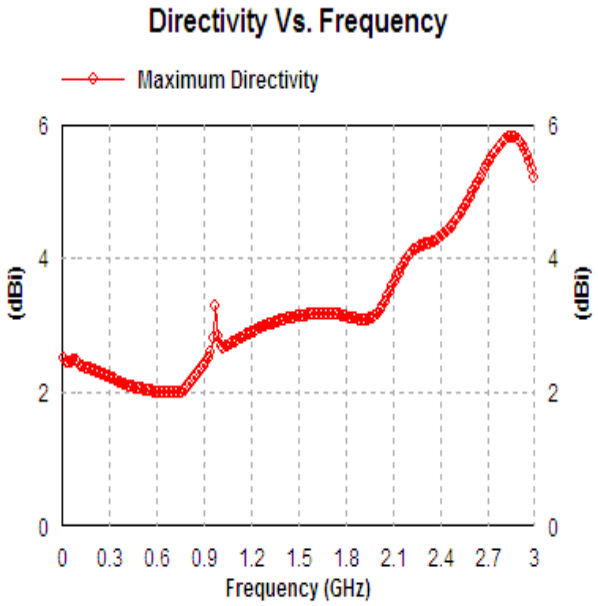

Fig.8. Directivety vs frequency graph

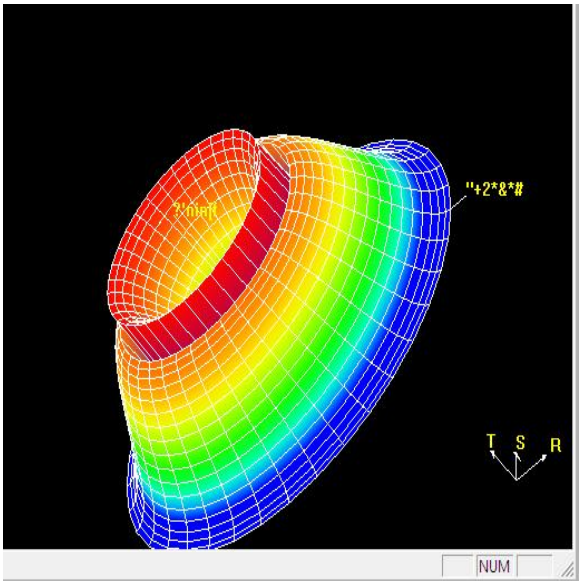

Fig.7. 3D Radiation Pattern of Praposed Antenna

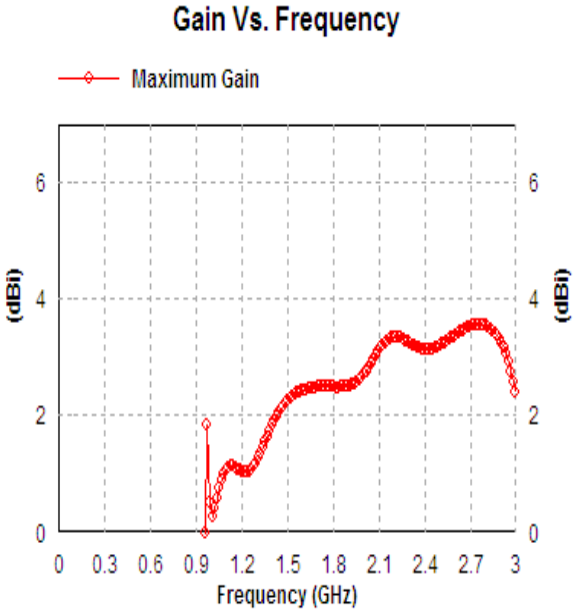

Fig.9. Gain vs frequency graph

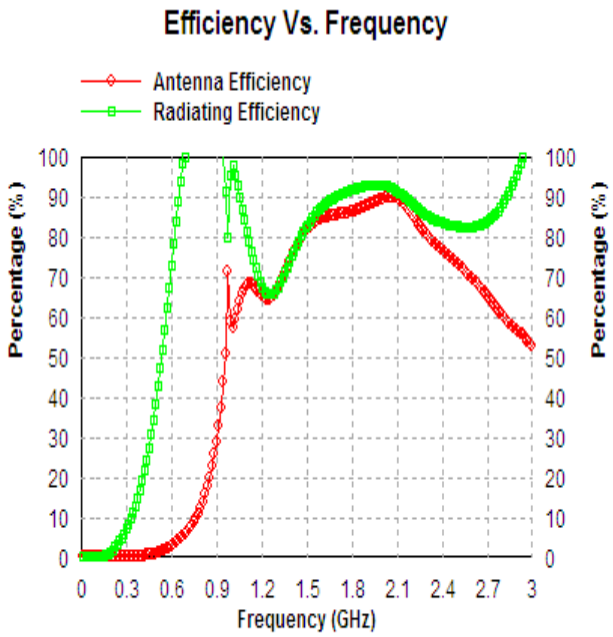

Fig.10. .Antenna and radiation Efficiency

Parameters Discussion –

Figure-1 shows the top view of proposed antenna where the designed slot is clearly visible, in Figure-2 Frequency Vs. Return loss graph has been represented, desired return loss value is starting from 1.14 GHz frequency and upto 2.45 Ghz. In figure-3 Smith chart performance can be concluded, Figure-4 VSWR display, Figure-5 shows the 2D radiation pattern , Figure-6 3D view of proposed geomatry, Figure-7 shows the 3Dradiation pattern of the proposed design ,Figure-8 shows the directive gain , Figure-9 indicate the radiated Gain of antenna and Figure-10 shows the efficiency of proposed antenna ,than all the charecterstics veryfy by its ideal value of microstrip patch

Conclusion –

Slotting or cutting is the very effective technique of increasing the bandwidth of the microstrip antenn the technique has been used to get better results and wider bandwidth in proposed antenna. At 1.5 Ghz all the wireless communication and L Band application is taking place. Thus the antenna who has a broad bandwith and has actual parameter, usefull for such applications.

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