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A Simple Planar Rectangular Antenna with Band Distribution

Mr. B. Praveen Kitti
Assistant Professor
Dept., of ECE
PSCMR, Vijayawada, A.P

Mr. A. Ramesh Babu
Assistant Professor
Dept., of ECE
PSCMR, Vijayawada, A.P

Ms. T. Prasanna
Student of Antenna Research Group
Dept., of ECE
PSCMR, Vijayawada, A.P

Ms. S. Susmitha
Student of Antenna Research Group
Dept., of ECE
PSCMR CET, Vijayawada,A.P

Ms. N. Naseema
Student of Antenna Research Group
Dept., of ECE
PSCMR CET, Vijayawada, A.P

***Abstract* - Micro-strip slot antenna became very popular in day to day world because of its ease of analysis and fabrication, low cost, light weight, easy to feed and their attractive radiation characteristics. Although slot antenna has numerous advantages, it has also some drawbacks such as restricted bandwidth, and a potential decrease in radiation pattern. A compact planar ultrawideband (UWB) antenna with band notched characteristics is presented. Modification in the shape of radiation element and ground plane with two symmetrical level slots on the lower edge of the radiation element and on the upper edge of the ground plane makes the antenna different from the rectangular printed monopole. These slots improve the input impedance bandwidth and the high frequency radiation characteristics. With this design, the reflection coefficient is lower than 10dB in the 2.5-9.85GHz frequency range and the VSWR is less than 2dB in the 2GHz-10GHz frequency range.**

I. INTRODUCTION

The advances in ultrawideband (UWB) systems and applications are advancing at a huge rate. Numerous rising microwave methods andapplications work on the UWB recurrence range, utilizing ultra short heartbeats on the request of nanoseconds. UWB frameworks have turned out to be more conspicuous and pulled in consideration since US-FCC has doled out the recurrence band of 3.1–10.6 GHz in 2002. The essential target of UWB is the possiblity of accomplishing high information rate correspondence in the vicinity of existing remote correspondence norms. The utilization of UWB signs in microwave imaging applications notwithstanding remote correspondences requires suitable reception apparatuses as transducers between UWB handsets also, the spreading medium. Broadband planar monopole antennas have gotten significant consideration inferable from their appealing benefits, for example, expansive impedance transfer speed, simplicity of manufacture and adequate radiation properties [1]–[3]. Routine planar monopole reception apparatuses require substantial metallic ground planes opposite to the radiation component, and thus are not low profile, which restrains their applications in smaller systems. In order reduce the size considerably, a series of planar of planar UWB radio antenna with microstrip or CPW bolstering structures were proposed in [4]–[6].

Ultrawideband (UWB) transmitter can cause EM interference to adjacent correspondence frameworks, for example, the remote neighborhood system (WLAN). Therefore UWB antennas with scored attributes in the WLAN recurrence groups are required and can be found in [7]–[8]. There are different strategies to accomplish the band-scored attributes. The customary techniques are cutting a space (i.e., U-moulded, curve formed and pi-moulded opening) on the patch [8]–[9], embedding's an opening on the patch [10]–[12] and implanting a quarter wavelength tuning stub inside of an extensive space on the patch [13]. Interchange way is putting parasitic components close to the printed monopole as channels to dismiss the constrained band [14], or installing a couple of T-formed stubs inside as circular opening, cut in the radiation patch [15]. In this paper a basic micro strip sustained UWB radio wire is proposed with an observational equation to compute the most reduced thunderous recurrence of planar monopole/dipole setups. Symmetrical incline openings are framed on the radiation and ground patch to bring about a wide transmission capacity from 3.1–10.6 GHz for UWB applications. The scored band covering the 5 GHz WiFi band is accomplished by a little rectangular patch bolstered by 50 transmission line. The width and length of the patch offer adequate opportunity in selecting the scored band and the methodology is prepared to do moving the scored recurrence with more extreme ascent in V.S.W.R. The radio wire has a minimal size of 30mm *18 mm* 0.76 mm. The deliberate 10-dB reflection coefficient demonstrates that the proposed radio wire accomplishes a data transmission running from 3–11 GHz with an indented band of 5–6 GHz. The proposed radio wire presents omnidirectional radiation designs over the entire working band in the H - plane.

The paper is composed as takes after. Area II gives a brief depiction of the radio wire arrangement. Segment III exhibits the proposed outline technique and aftereffects of recreation utilizing Ansoft HFSS. Area IV gives an account of exploratory results and Section V finishes up the discoveries of this paper.

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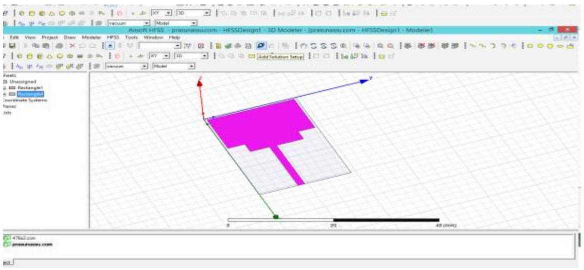

Fig:1Microstrip-1

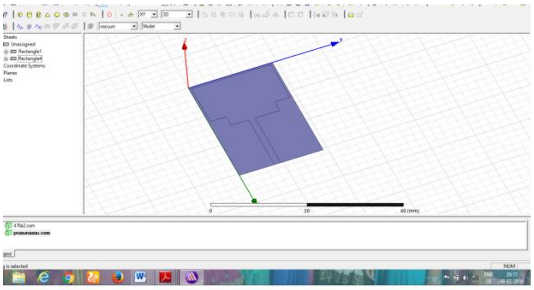

Fig:2 *Microstrip-2*

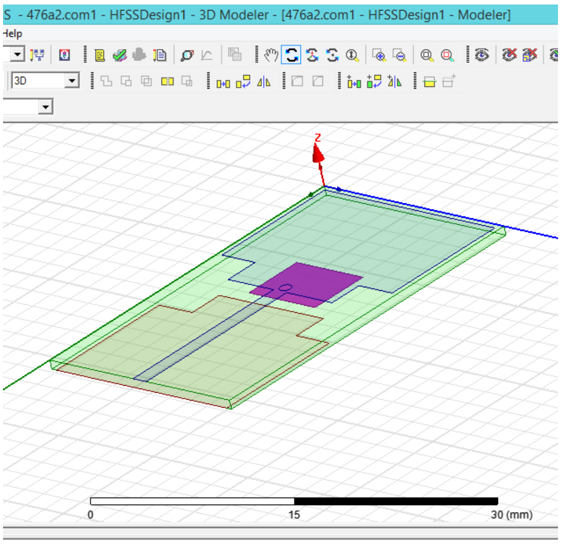

Fig:3 SideView

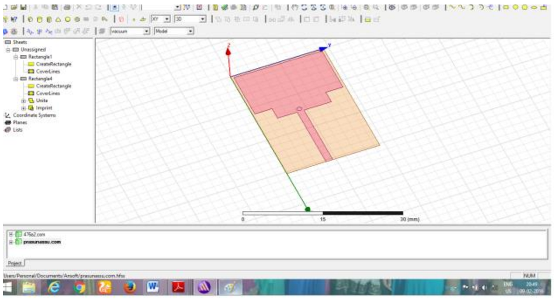

Fig:4 Slot

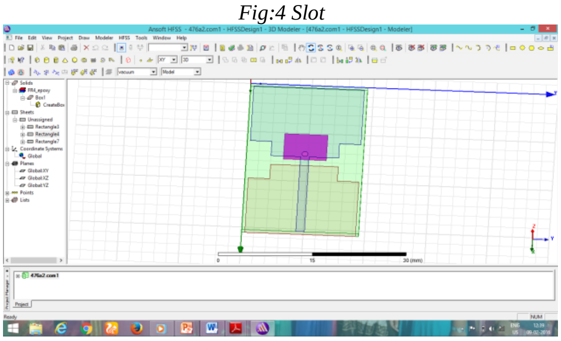

Fig:5 TopView-1

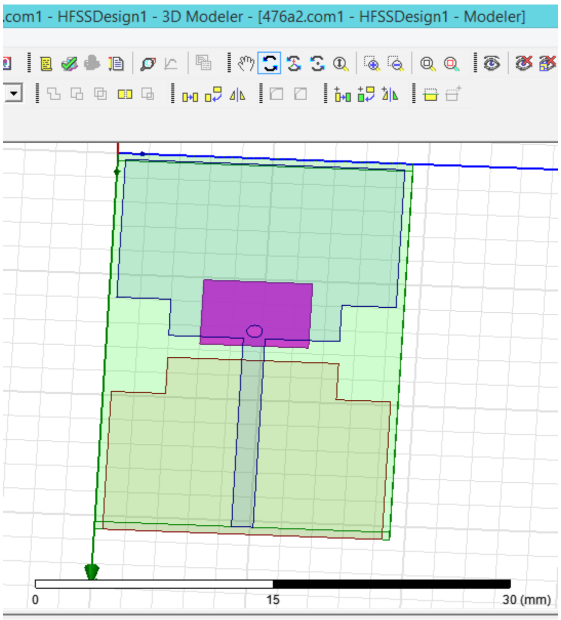

Fig:6 Topview-2

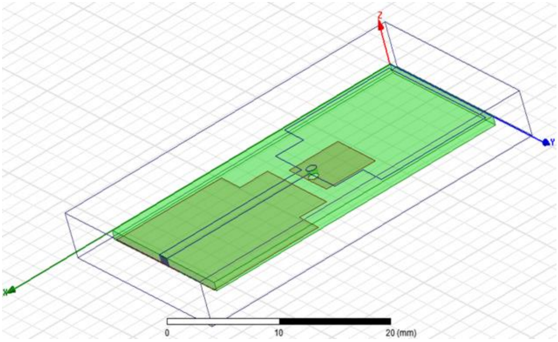

Fig:7 3-D View

II.ANTENNA CONFIGURATION

TABLE I. THE VALUES OF THE VARIABLES ((MM)

L	L_0	W_1	L_1	A	L_2	W_f	L_f	W_f
30	38	3.5	14.4	5.3	14.4	3	16.8	1.4
W	B	h_1	W	W_t	L_t	L_G	l_f	G
18	7	3	18	2	2.5	16	15.6	1.2

REFLECTION COEFFICIENT

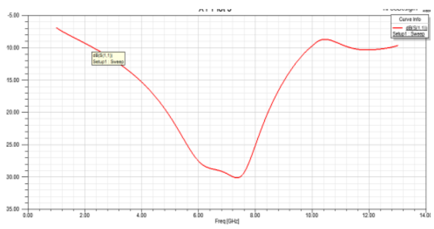

Fig-8:The simulation of reflection coefficient

Fig. 1 demonstrates the geometry of the proposed antenna. It comprises of a rectangular radiation patch with symmetrical angle spaces put on the lower side of the patch and a mostly changed rectangular ground plane with symmetrical angle spaces found on its upper side. These slots with measurements w_1 and h_1 play a critical part in accomplishing an expansive impedance transmission capacity. The cutting of openings results in ventures on the lower side of the radiation patch and additionally on the upper side of the ground plane. The width of the stride shaped is signified as and the between receive the radiation patch and the ground plane is denoted as g. A 50ohms micro strip line of width 1.4 mm is associated with the radiation patch as the food line. It can be seen from Fig. 1 that the rectangular radiation patch what's more, the 50 line are imprinted on the top side of the substrate while the ground plane is imprinted on the base side of the substrate. A little rectangular patch with measurements and , imprinted on the base side of the substrate is associated with the 50 line through by means of opening to create a scored band in the region of 5.5 GHz and hence keeps the impedance with WLAN frameworks. The antenna was executed on a modest FR4 substrate with a thickness of 0.76 mm and relative permittivity of 4.4. A model of the proposed band scored UWB rectangular printed antenna is the ideal configuration, i.e.as appeared in Fig. 1, was created and tried and the reflection coefficients were measured utilizing Agilent system analyzer E8363B. Fig. 2 demonstrates the mimicked and measured reflection coefficient bends. The estimation affirms the UWB and band-dismissal attributes of the proposed antenna, as predicted in the simulation.

III.ANTENNA DESIGN

In this segment, the radio wire covering the full UWB band (3.1–10.6 GHz) is initially portrayed. At that point the new band indented structure which is equal to arrangement LC circuit, is explored. The impacts of changing the geometric parameters of the proposed antenna on impedance, transfer speed and radiation design are talked about. The proposed antenna structure is reproduced utilizing the Ansoft High Frequency Structure Simulator (HFSS) programming, with lumped port excitation.

A. *UWB Antenna Design*
B. The UWB antenna plan highlights a crevice (space) between the radiation patch and the ground plane which presents a coupling

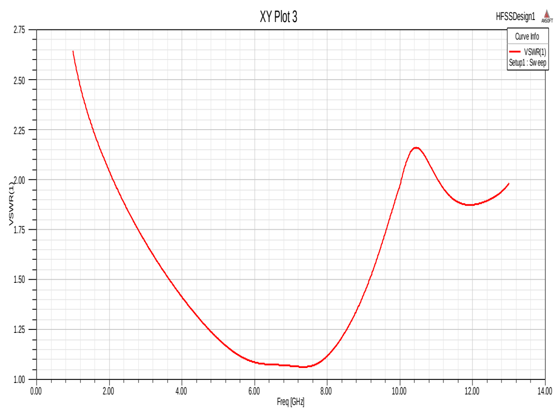

Fig 9:The simulation of voltage standing wave ratio

Fig.2. Measured and recreated reflection coefficients of the proposed UWB radio wire capacitance and assumes an essential part in getting UWB conduct. Consequently the ground plane of the proposed antenna is moreover a part of the transmitting arrangement and current dissemination on the ground plane influences the attributes of the antenna. It is to be noticed that the radiation fix, the hole and the ground plane structure an identical dipole antenna with essential reverberation, for the most part dictated by the length of the reception apparatus. It merits specifying that firmly separated different resonances which

are sounds of central reverberation cover, bringing about ultrawide transfer speed. The span of the hole opening characterizes the impedance placing so as to coordinate and subsequently incline spaces on the lower side of the radiation patch and on the upper side of the ground plane, impedance transfer speed is extensively improved.

IV.MEASURED ANTENNA PERFORMANCE

In light of the configuration in the past segment, the proposed band-scored UWB antenna was created and sustained by a 50ohms SMA connector. The measured and recreated reflection coefficient of the proposed antenna from 3–11 GHz is appeared Measured and recreated results track genuinely well.

V.CONCLUSION

A micro strip-nourished rectangular printed antenna is proposed and executed for UWB applications. The general antenna size is a 30 mm*18mm*0.76mm. The radio antenna,minimized and straightforward, has least plan parameters which have been explored for ideal configuration. A recurrence indented reception apparatus is additionally figured it out with great out of band execution from 5–6 GHz by including an extra little radiation patch. Additionally, by taking the dielectric consistent of the substrate into thought, an estimated observational recipe is introduced to compute the least resounding recurrence for the planar printed monopole/dipole antenna by and large. Study and examination of the recipe have demonstrated that different printed geometric setups reported as planar monopoles can be characterized and exhibited as planar. The present outline can without much ofstretch be reached out to double or triple notch antenna.

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