# Design of Planar Monopole Microstrip Antenna

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***Abstract* - This paper presents a planar micro strip-fed monopole antenna for ultra wideband (UWB) applications. Monopole antenna is a class of radio antenna. Monopole antenna is a one half of a dipole antenna. This antenna is based on the planar rectangle monopole antenna. The characteristic of the antenna can be improved by altering the figure of the radiation patch and the ground. HFSS is used to conduct simulation calculation so as to get various performance parameter of the antenna, to make sure that its frequency band range is 11 GHz – 14 GHz, and to meet the design requirement of the ultra-wideband antenna.**

***Keywords — Ultra-wideband; planar monopole antenna; HFSS, scaling down***

## I.INTRODUCTION

UWB correspondence systems have many advantages, including fast information rate, greatly low spectral power density, high precision ranging, and minimal effort. So the investigation of ultra-wideband antenna is dependably a problem area.

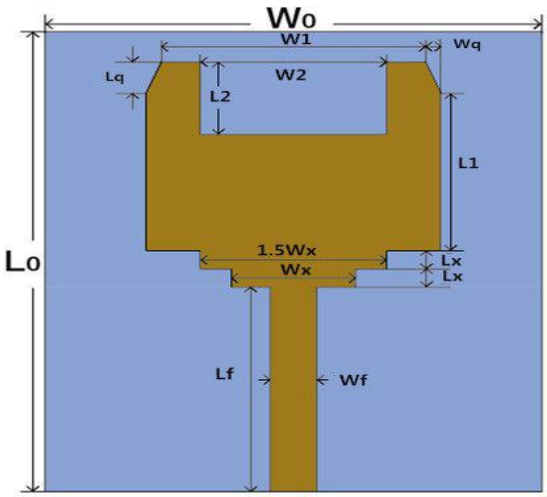
In the course of recent years research demonstrates that TEM horn antenna [4], patch radio wire and space reception apparatuses [5] can be utilized as the UWB reception apparatus as a part of the previous couple of years. The patch antenna has focal points of low profile, light weight, simple reconciliation and low assembling expense and it has potential favorable position in the portable correspondence. In any case, the data transmission of the patch antenna is very successful. Numerous specialists have attempted numerous thoughts to enhance the bandwidth; among these thoughts resistive stacking and changing the antenna shape are exceptionally effective. Lately, numerous researchers have likewise concentrated how to understand the scaling down of the antenna. The examination of current distribution on the surface of the reception apparatus, and diminishing the radiator and ground plate structure to enhance the antenna radiation attributes are the basic techniques to minimize the volume of the antenna.

In this paper, the rectangular planar monopole antenna is utilized as the model. Using the ladder structure and gradient structure in the shape of the radiation patch and the ground to increase the band width [6],the return loss of the antenna in 3 GHz to 14 GHz bandwidth is less than or equal to -10dB. When the bandwidth this 11GHz~14GHztheVSWRvalueislessthanorequalto2.Sothe frequencyrangemeetsthe requirements. And the H plane pattern keeps omnidirectional distribution. Thus it realizes the optimization of the original antenna performance.

## II. THE DESIGN OF THE ANTENNA

The structure of the micro strip antenna apparatus is extremely standard. For the most part, the dielectric consistent of substrate is close to 10. The paper picks RT5880 as the substrate, in view of low permittivity, and better adaptability. The thickness H is 1mm, dielectric consistent εr is 2.2. The extent of the substrate is W0×L0.This radio antenna embraces the 50Ω micro stripline feeding. The point by point measurements are appeared in Table I. The geometry structure of the proposed reception apparatus is outlined in Figure 1. In antenna plan, we examine and recreate this radio wire by utilizing Ansoft HFSS programming. By changing the state of the patch and floor, the measure of the antenna can be reduced and the data transfer capacity of the antenna can be improved.

III.TOP VIEW OF ANTENNA




IV.BOTTOM VIEW OF ANTENNA

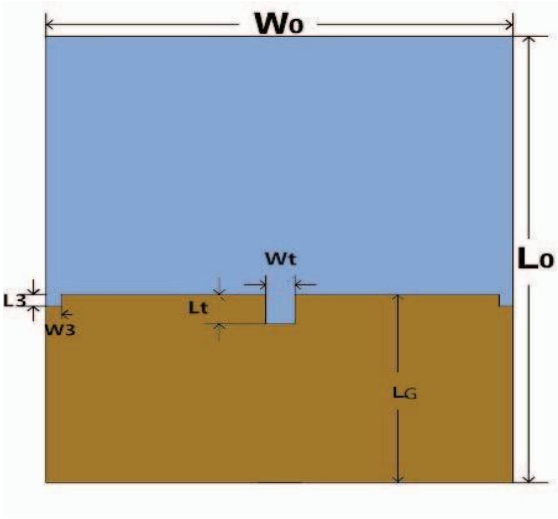
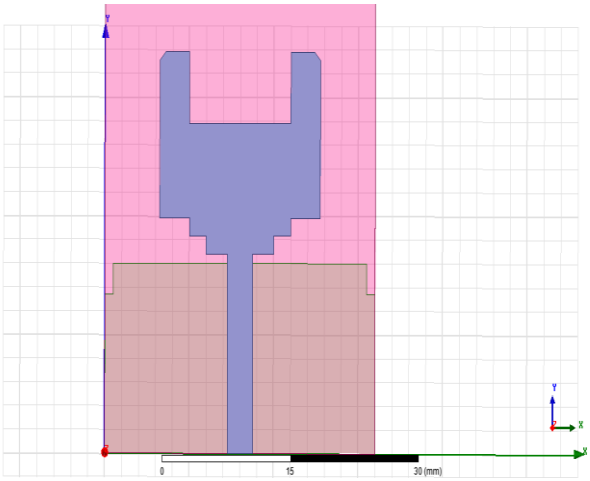



*Table : THE VALUES OF THE VARIABLES (MM)*

| $W_0$ | $L_0$ | $W_1$ | $L_1$ | $W_2$ | $L_2$ | $W_f$ | $L_f$ | $W_x$ |
|---|---|---|---|---|---|---|---|---|
| 32 | 38 | 17 | 13 | 12 | 6 | 3 | 16.8 | 8 |
| $W_q$ | $L_q$ | $L_3$ | $W_3$ | $W_t$ | $L_t$ | $L_G$ | $L_x$ | |
| 1 | 1 | 2.6 | 1 | 2 | 2.5 | 16 | 1.5 | |

V.ANTENNA DESIGN



VI.VSWR

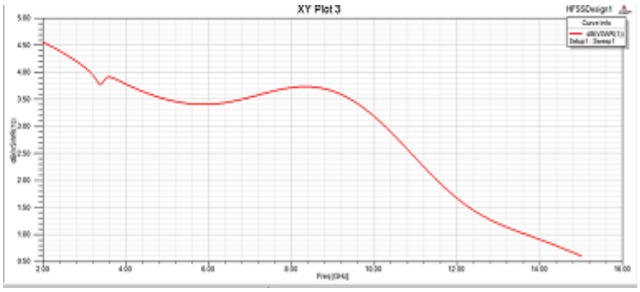



Fig.1. The simulated voltage standing-wave ratio (VSWR) of the antenna

VII.THE SIMULATION AND ANALYSIS OF THE ANTENNA

In this paper, we utilize Ansoft HFSS to simulate the UWB antenna.In this paper, we use Ansoft HFSS to simulate the UWB antenna. The voltage standing-wave proportion (VSWR) is appeared in below figure 1.It can be seen that when the data transmission is in11GHz to 14GHz, the VSWR less than or equivalent to 2.The return loss S11 of the simulation result is easy to find that when the bandwidth is in 3.0GHz-14 GHZ, the value of S11 is less than -10dB by using Ansoft HFSS software.

VIII.CONCLUSION

The planar monopole antenna is a important one for the research ofthe UWB antennas. In this paper, the ladder structure and gradient structure in the shape of the radiation patch and the ground are proposed to increase the bandwidth of the planarmonopole antenna. The bandwidth is extended to 11.0GHz to14 GHz. Moreover, the radiation characteristics are good inworking bandwidth. The size is small and the structure is simple.

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