Microstrip Super broadband antenna with semi-fractal structure and removal of two frequency bands with new method

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***Abstract*—The purpose of this paper is to examine the monopole micro-strip antenna types and ways to increase its bandwidth. These antennas have broadband properties. In this paper, a new design for monopole antenna flat-band broadband with removal properties was suggested. Using parametric analysis in this antenna, the ability of band removal, especially in the field of frequency band for WLAN / WiMAX, was created. The results of software simulation with HFSS were compared with the measurements results performed in communication research center. Antenna parameters such as VSWR and radiation pattern of the antenna together with software HFSS and antenna measurements in the laboratory with Network analyzer is given at the end of which all the results are in good agreement with experimental results.**

Keywords—monopole antennas, micro-strip antennas, broadband, frequency domain.

I. Introduction

Monopole antennas are increasingly used in UWB applications because of having interesting properties. Planar printed monopole super broad-bands antennas are good options for wireless technology. Because they have wide impedance bandwidth and radiation pattern in all the directions. Many forms of uni-polar flat antennas like flat disks have a wide bandwidth. Some of these structures are even wider than the bandwidth required bandwidth in the super broad-band systems. But flat disk structures would be a better choice for these applications because they deliberately installed on a large ground plane so as to stand vertically on the

screen like the one along the longest are (so that a three-dimensional structure formed the day), as well as the large size of the ground plane radiation pattern at just half the hemisphere. In other words, monopole antennas are flat planar and their radiation patterns and dipole antennas are similar. The monopoles can be integrated with other tools on a printed circuit board are therefore also have the ability to create easily. Printed antennas are usually made on FR4 substrate, which is advantageous in terms of cost so that is suitable for low-cost systems using ultra-wideband technology requirements. In this paper unipolar flat rectangular plug and dual power is discussed. Design plot for tiny strip 50 ohm feed line leading to the highest bandwidth for frequency becomes lower edge of the band were considered. The design plot includes a low frequency of 3.1 GHz to 10.6 GHz for ultra-broad-band applications. Most of them are also valid for the line feed. All these results are in good agreement with experimental results.

II. Problem Statement

Micro-strip antennas usually have a bandwidth that are suitable for a variety of applications but if one or more of the specified frequency band using this type of extremely broadband antennas remove the antenna impedance is affected. In this article, we will. Antennas of mobile devices are very suitable for small dimensions. For example, computers or portable Laptop, portable devices and Cell phones that has a module Wireless Local Area Network (WLAN) that the Worldwide Interoperability for Microwave Access (WiMAX) support the associated process of expanding current can Module third-generation WLAN upgrade [7-17].

So for this type of device which support the above technology, supporting multiple frequency bands with proper impedance matching include:

2400 to 2484 MHz (specified by IEEE 802.11b/g), 2500 to 2569 MHz (specified by IEEE 802.16e) and 5150 to 5350 MHz and 5725 to 5825 MHz (specified by IEEE 802.11a) is mandatory. Many of these types of antennas are comprehensively referenced in [6-1], which often have problems such as a large antenna size and lack of support for the above bands together or overlap with other frequency bands. A number of such antennas have been studied in the literature that study them and comparison help to understand how to design antennas and antenna design problems such as micro-strip antennas [8-3]. Simulation and measurement results show that an increase in Fractal steps not only leads to increase impedance bandwidth, but also improve impedance matching for applications in WiMAX / WLAN considerably. In addition, radiation patterns such as dipole antenna obtained for the whole band.

III. The proposed antenna

This antenna is a monopole with micro-strip line and has created with a fractal patch for the Super Broadband. It has a semi-elliptical structure of the main patch is printed on the rear panel. The antenna modules for mobile devices that support Wireless Local-Area Network (WLAN) have been designed. Compared with monopole structures with ultra broadband applications, miniaturized antenna has dimensions of 20 × 25 mm above the square with a thickness of 5/1 mm, in comparison with other similar structures (144%) is 15 times smaller than their dimensions. Reducing antenna size shall not accidental, but 15 times using a combination of techniques known in antenna design has been done to include the use of micro-strip structure, the use of appropriate fractal. Figure 1 showed small fractal -like super-band antenna model new band consisting of several elliptical structures, an elliptical shape in the back half of the antenna. This fractal antenna was printed on a FR4 substrate loss tangent as indicated 0.024, coefficient of permittivity of 4.4 and 20m in 25 mm square. The width of the micro-strip line was 2.78mm to get the characteristic impedance of 50 ohm equivalent. On page XY, ground against Lg = 9.375mm width is equal to Wg = 20mm on the rear panel is displayed in a semi-oval. Simulation results show that, increasing the dry weight per dry weight per Add-a-half ovals fractal several new resonance new or old structure is created. Fractal patch of the antennas have gap by p, 3.2 mm which is printed on the back semi-elliptical ground antenna substrate.

A. Effect of notch in the form of C and T

In the creation of T-shaped notch a new method for the removal band is used. By embedding T-shaped structure in the gap V Patch current structure equivalent to a quarter wavelength structure is T-shaped and T-shaped structure divided on both sides of the V-shaped patch it is not that will frequency band in the frequency equivalent to during the T-shaped structure. In Figure 2 VSWR plot based on changes in the T-shaped papillae is displayed. It is obvious that by changing the structure of the T-shaped antenna locations associated with the frequency change decreases. Also in Figure 3 it was shown how to change the profile of the antenna with a C-shaped slot is shown. In Figure 4, a plot of the antenna pattern is displayed. *Figure 5: Gain total* of the antenna*.* *Figure 6:* The results of test and simulation of proposed antenna.

Figure 1: Suggested fractal antenna

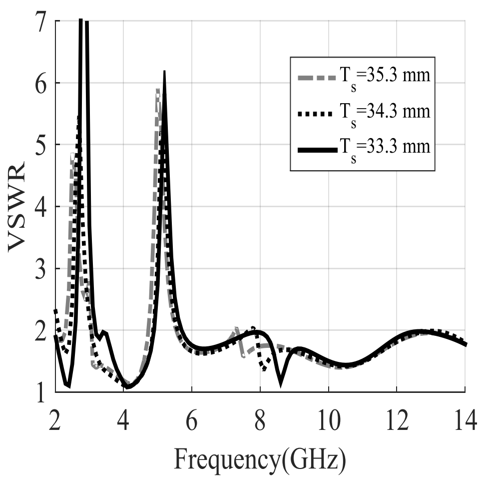

Figure 2: Evaluation of changes in the form of T NOTCH

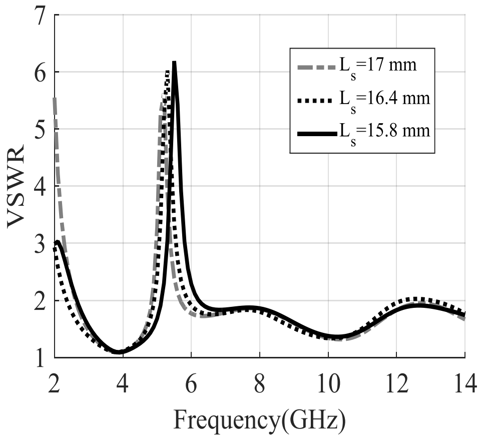

Figure 3: Evaluation of changes in the form of C NOTCH

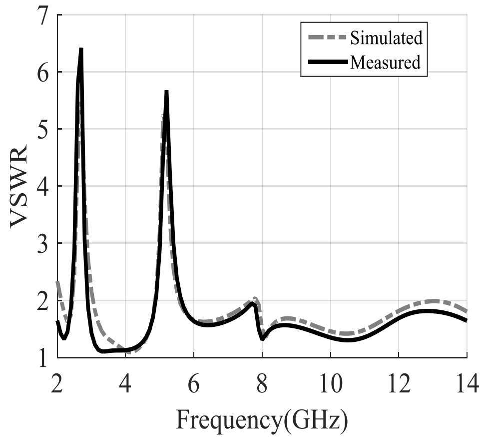

Figure 6: The results of test and simulation of proposed antenna

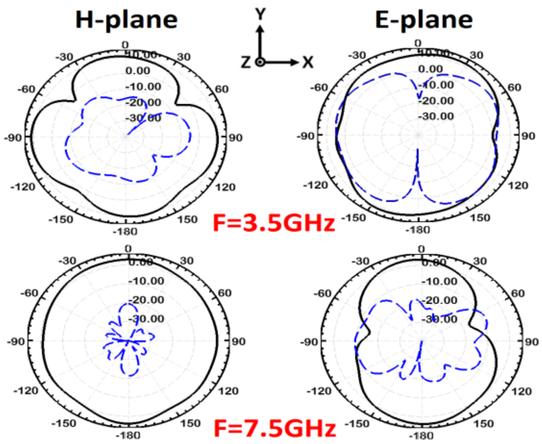

Figure 4: Evaluation of changes in the pattern of proposed antenna

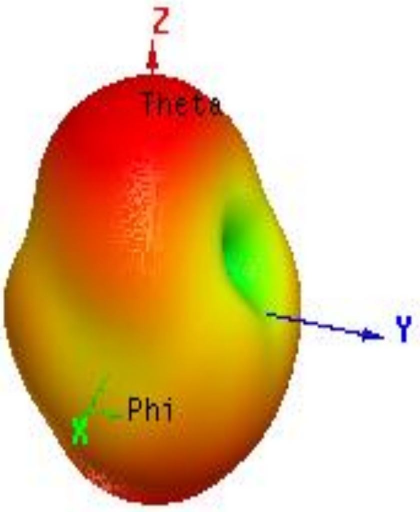

Figure 5: Gain total of the antenna

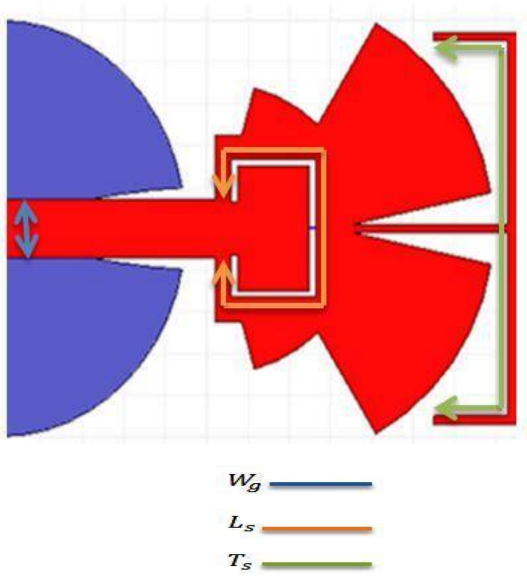

Figure 7: Antenna simulation

Suggested fractal antenna parameters	
20*25mm	Antenna dimensions
FR6 1.6mm	The thickness and type of substrate
1.8mm	The size parameter W_g
60°	The size parameter θ_2
16.4mm	The size parameter L_s
34.3 mm	The size parameter T_s

Table 1: Suggested fractal antenna parameters

IV. Conclusion

Microstrip monopole antennas are used increasingly in UWB applications due to its interesting properties. Monopole flat antennas are coming good options for broadband wireless technology because they have a wide impedance bandwidth and radiation pattern in all the directions. Many of flat shapes, such as flat disc monopole antenna has a wide bandwidth requirements. This paper discussed the flat slot antenna. Design plots for power line leading to the tiny bar most widely bandwidth frequency becomes lower edge of the band were considered. These design curves that includes a frequency of 3.1 GHz to 10.6 GHz to the lower edge of the band are for broadband applications. Most of the time is also valid for the line feed-be. All these results are in good agreement with experimental results. Some aspects of the design of these antennas were studied in this paper. Property of frequency band removal in the frequency domain WLAN which is our aim appears well in antenna impedance bandwidth. The main objective of this paper was to have an antenna with a property of radiation in the area of UWB and property of frequency band removal in the WLAN area. Since frequency mono-polar not cover all areas UWB we design tricks such as adding sleeves was used to create resonator. To create frequency removal properties from a band gap radiation levels was used. Antenna provided in the antenna lab of Iran Telecommunication Research Center test and measurement results are also obtained in this way. Laboratory results are in good agreement with the simulated results.

As the charts VSWR, return loss and radiation patterns seen in the entire frequency band UWB antenna made good and Pattern Omni directional radiation properties and also has two removal modes in the frequency band WLAN / WiMAX. This antenna is small similar to the antenna has recently been published in the literature.

V. References

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