Small rectangle UWB antenna with triple band-notched characteristics
Small square Monopole antenna with 6.9GHz band-notch characteristics
Abstract ' a Ultra-wideband slots antenna is simulated and designed with rectangle and U-shaped slots. Detailed study on parameters is presented.
A rectangular Ultra-wideband (UWB) antenna with triple band-notched characteristics is presented. In this study, by using the slots on the radiate patch of the proposed antenna, single, dual and triple band notch characteristics are obtained. We can change the frequency center and its bandwidth from turning the length...
and width of the slots. Additionally, by using two small notches on the ground plane can adjust the electromagnetic coupling effects between the disk monopole and the ground plane, and improves its performance of the impedance bandwidth.

The antenna is designed on the FR4 substrate of 28mm (length), 25mm (width), 0.8mm (thickness), and all parameters are optimized by using commercial full-wave software CST Microwave Studio. The measurement and simulation results show that the antenna covers the frequency range for UWB systems from 3.1 to 11.7GHz with a voltage standing wave ratio (VSWR) < 2, except for the triple-notched bands of WiMAX band (3.3-3.6GHz), WLAN band (5.1-5.9GHz) and IEEE INSAT/super-extended C-band (6.7-7.1GHz) frequency. Furthermore, simulation and measurement results show that the proposed antenna has good radiation characteristics in the entire UWB band. Two planar ultra-wideband slots antenna with band-notch functions are presented in this study. The proposed antenna consists of a square radiating patch with a U-shaped slot and a symmetrical rectangle slots on the radiating patch and a notched ground plane, which offers a 2:1 voltage standing wave ratio (VSWR) bandwidth from 3.1 to 12GHz. In the proposed structure, a single band notched frequency band of 6.7-7.1GHz is obtained by etching two symmetrical notches on the radiating patch. Then by cutting a U-shaped slots on the radiating patch by using the U-shaped and two symmetrical rectangle slots on the radiation patch of the presented antenna, 5-6GHz and 6.7-7.1GHz IEEE INSAT/super-extended C-band frequency band-notch characteristic are realized, respectively, which can eliminate the UWB frequency band interference with the WLAN and IEEE INSAT/super-extended C-band systems, and we can control the frequency and its bandwidth from turning the length and gap of the slots the designed antenna has a small size of 28mm??25mm. The impedance bandwidths of the presented antenna, defined by the measured return loss < -10dB is from 3.1GHz to 12GHz with a ratio of about 2.5:1. Simulated and measured studies show that the proposed antenna offers good radiation characteristics in the entire UWB band. In this A novel printed monopole antenna with band-notch has been designed and simulated. In the proposed antenna, in order to generate single band-notched characteristics, two symmetric rectangular slots are etched on the radiating patch, and we can control the frequency center and its bandwidth from turning the length and gap of the slots. Additionally, by using two small notches on the ground plane can adjust the electromagnetic coupling effects between the disk monopole and the ground plane, and improves its impedance bandwidth. The antenna is designed on the FR4 substrate of 28mm (length), 25mm (width), 0.8mm (thickness), and all parameters are optimized by using commercial full-wave software CST Microwave Studio. The measurement and simulation results show that the antenna covers the frequency range for UWB systems between 3.1-11.7GHz with a band-rejection performance in 6.7-7.1GHz IEEE INSAT/super-extended C-band frequency. Furthermore, simulated and measured studies show that the proposed antenna offers good radiation characteristics in the entire UWB band. The top layer of the proposed antenna mainly consists of a rectangular metallic patch and two symmetric rectangular slots. The bottom layer of the proposed antenna printed a novel notched ground for potential low-cost ultra-wideband. The antenna is designed on the FR4 substrate of 28mm (length), 25mm (width), 0.8mm (thickness), and all parameters are optimized by using commercial full-wave software CST Microwave Studio. The measurement and simulation results show that the antenna covers the frequency range for UWB systems between 3.1-11.7GHz with a band-rejection performance in 6.7-7.1GHz IEEE INSAT/super-extended C-band frequency. The impedance of the proposed antenna defined by VSWR < 2 is from 3.1 to 11.7GHz with a ratio of about 2.5:1. Furthermore, this novel antenna has the most omnidirectional radiation pattern. Simulated and measured studies show that the proposed antenna offers good radiation characteristics in the entire UWB band. Index Terms ‘Monopole antenna, rectangular slots, band-notch, ultra-wideband (UWB).’ I. INTRODUCTION Ultra-wideband (UWB) has been widely used in various radars and has attracted much attention recently in communication systems [1]. In UWB communication systems, one of the key issues is the design of a compact and omnidirectional antenna while providing wideband characteristic over the whole operating band. Among the numerous UWB antenna types available, Planar monopole antennas have been widely used and studied for a long time due to their attractive merits such as wide impedance bandwidth, simple structure and nearly Omni-directional radiation patterns [2'][4]. In addition, printed monopoles have been introduced for their compact size, low cost, and simple structure and convenience to integrate with microwave circuits [5'][8]. The wide frequency range for UWB systems between 3.1-10.6GHz will cause interference to the existing wireless communication systems, such as the wireless local area network (WLAN) for IEEE 802.11a operating in 5.15-
5.35GHz and 5.725-5.825GHz bands, the existing WiMAX from the 3.3-3.6GHz and the IEEE INSAT/Super-Extended C-band from 6.7-7.1 GHz [9,13], so the UWB antenna with a band-notch performance is required. To overcome this problem, several novel planar antennas with band-notched characteristic have been presented recently. Most examples of band-notch antennas are about WiMAX and WLAN, such as [1-4][13][14],[15] few reports about C-band. The most common and easiest technique is embedding a narrow slot into the patch of the antenna and changing the current flow on its metallic parts, as used in [10]-[11]. In [10], cutting a C-shaped slot on circular radiating patch and embedded hairpin slot on microstrip transmission line for notched frequencies. In [11], a U-shaped slot is placed within the monopole antenna to reject a fixed frequency band. In this paper, we present a simple designed band-notch monopole antenna with two symmetric rectangular slots are used to reject the INSAT C-bands 6.7-7.1GHz. Two rectangular slots are working at the same time, once one of them is short, the band-notch characteristics of the UWB antenna will not achieved, so it can also be designed as Reconfigurable Antenna. This antenna is also applied to the impedance matching method which utilizes two notches on the ground plane[]. The notched ground could improve the impedance about matching performance of planar monopoles. Its radiation patterns and gain are presented and discussed. (a) (b) Fig. 1. Geometry of the proposed antenna. (a) top layer; (b) bottom layer.

II. ANTENNA DESIGN The structure of the proposed monopole antenna is shown in Fig. 1. It is printed on a Teflon substrate with thickness of 0.8mm, relative permittivity ??r =2.65 and loss tangent 0.036. The monopole is fed by a microstrip line with the Wf = 2mm. It can be observed that two rectangle notches have been added to the ground plane, which can adjust the electromagnetic coupling effects between the disk monopole and the ground plane and improve its impedance bandwidth as shown in Fig. 3. The notches coupled to the ground plane with protruded rectangular strip causes a resonant frequency controllable by changing the shape and size of the protruded rectangular strip [12]. The monopole antenna has compact dimensions of 28 by 25mm. The radiation element is a rectangular patch. Lp, Wp denote the size of the rectangular patch, which could influence the lower part of the impedance bandwidth. The desired notch-band characteristics can be achieved by adjusting the parameters Lps and Wps, for the slots. All the parameters have been optimized by using commercial full-wave software CST Microwave Studio. The optimal dimensions of designed antenna are as follows: Wp=14mm, Lp=17mm, Wp1=2mm, Wp2=1mm, Lps=15mm, Lf=6mm, Wf=2mm, Wgnd=14mm, Land=3mm, Lp=0.75mm, Wp=2.2mm. III. RESULTS AND DISCUSSIONS In this section, the printed monopole antenna with various design parameters is constructed, the numerical and experimental results of the input impedance and radiation characteristics are presented and discussed. All the parameters have been optimized by using commercial full-wave software CST MICROWAVE STUDIO. Fig. 2 shows the simulated current distributions on the top patch of the proposed antenna. It can be observed in Fig. 2 (b) that the current on the edges of the rectangle notches is at 7GHz. We can conclude that the notch frequency is closed to the rectangle notches. Fig. 3 illustrates the simple monopole antenna has a good VSWR characteristics at the frequency of UWB bands and a rejection band of 6.7-7.1GHz. Fig. 4 illustrates the return loss of the proposed antenna. From the result we can see that the upper-frequency bandwidth is significantly affected by the two rectangle notches. Fig. 5, Fig. 6 and Fig. 7 illustrate the simulated radiation patterns in the H-plane (x-z plane) and E-plane (y-z plane). It can be seen that the radiation patterns in the x-z plane are nearly omnidirectional for the three frequencies. (a) 4 GHz (b) 7 GHz (c) 10GHz Fig. 2. Simulated current distributions of the proposed antenna: (a) 4 GHz, (b) 7 GHz, (c) 10GHz Fig. 2. Simulated return loss against frequency for the proposed UWB antenna, antenna with 6.7 to 7.1GHz notch band. Fig. 4. Simulated return loss against frequency for the proposed UWB antenna, antenna with 6.7 to 7.1GHz notch band. Fig. 5. Simulated radiation patterns for the proposed UWB antenna at 4 GHz. Fig. 6. Simulated radiation patterns for the proposed UWB antenna at 7 GHz. Fig. 7. Simulated radiation patterns for the proposed UWB antenna at 10 GHz. IV. CONCLUSION In this paper, a novel compact printed monopole antenna with desired notch-band characteristics has been proposed for UWB applications. By using two slots inside in the rectangular patch, the antenna can avoid the interference signals of 6.7-7.1GHz IEEE INSAT/Super-extended C-band frequency. The proposed antenna has a simple structure and easy to fabricate. Simulated results show that the proposed antenna could be a good candidate for UWB application. REFERENCES [1] M. Ojaroudi, G. Ghanbari, N. Ojaroudi, and C. Ghobadi, “Small Square Monopole Antenna for UWB Applications With Variable Frequency Band-Notch Function,” Antennas and Wireless Propagation Letters, IEEE, vol. 8, pp. 1061-1064, 2009-01-01 2009. [2] N. P. Agrawall, G.Kumar, and K. P. Ray, 'Wide-band planar monopole antennas,'
About this essay:

This essay was submitted to us by a student in order to help you with your studies.

If you use part of this page in your own work, you need to provide a citation, as follows:


Review this essay:

*Please note that the above text is only a preview of this essay. The full essay has 176 words and can be downloaded free in PDF format, using the link above.*

<table>
<thead>
<tr>
<th>Name *</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td></td>
</tr>
<tr>
<td>Rating *</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Comments (optional)</td>
<td></td>
</tr>
</tbody>
</table>

Submit

Latest reviews:

- Engineering essays
Harnessing energy through knowledge – business development strategy of e-commerce companies
Minimizing of power losses for distribution system
Translating the Biggles Stories for Czech Readers: A Case of Moderate Transposition
Questioning is a Useful Form of AfL
Enhancing literacy
Cadburys
Advancements in Procurement Practices and Supply-Chain Management...
LITERARY REVIEW – fashion industry
Chlorpyrifos

Student essay categories:

Accounting essays
Architecture essays
Business essays
Economics essays
Education essays
Engineering essays
English language essays
English literature essays
Environmental studies essays
Finance essays
Health essays
History essays
Information technology essays
International Relations
Law essays
Literature essays
Management essays
Marketing essays
Miscellaneous essays
Music Essays
Photography and arts essays
Politics essays
Project management
Psychology essays
Religious studies and Theology essays
Science essays
Sociology essays
Zoology essays
Average review:

Overall rating: 0 out of 5 based on 0 reviews.

Q: Is EssaySauce.com free?

Yes! EssaySauce.com is a completely free resource for students. You can view our terms of use here.

Why use Essay Sauce?

The brightest students know that the best way to learn is by example! EssaySauce.com has thousands of great essay examples for students to use as inspiration when writing their own essays.

Is Essay Sauce completely free?

Yes! EssaySauce.com is a completely free resource for students. You can view our terms of use here.

Info:

About
Content policy
Essay removal request
Privacy
Terms of use