ANTENNAS AND PROPAGATION

Modeling, Simulation & Measurements

Edited by

MD. RAFIQUL ISLAM B.Sc.,M.Sc.,Ph.D.,MIEEE
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JALEL CHEBIL B.Sc.,M.Sc.,Ph.D.,MIEEE
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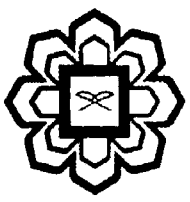

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68100 BATU CAVES
SELANGOR DARUL EHSAN
TEL: +603-6188 1542 / 44 / 45 FAX: +603-6188 1543
EMAIL: iiumprinting@yahoo.com

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Chapter 10

Multi-Band Planar Patch Antenna

AHM Zahirul Alam[1] and Md. Rafiqul Islam[1]

10.1 Introduction

Multifrequency antennas are attractive solutions when several operating systems have to present similar radiation performances (bandwidth, gain, and radiation pattern, for example). Sometimes, in order to cover several operating frequencies, a broadband antenna solution is proposed [1]. Although this technique is simple, radiation pattern and gain usually vary across the band. On the other hand, a broadband solution is sometimes a drawback because the antenna receives other nondesired frequencies and some kind of a filtering network is needed to cancel such frequency range. In this sense, a multifrequency antenna solution focuses only on the frequencies of interest. Recent advancements in antenna technology, the availability of efficient computer-aided design (CAD) tools, and the availability of fast and powerful computers have resulted in a variety of different techniques for designing low-profile, cost effective, and highly efficient multiple-frequency antennas. Many of the techniques used for designing dual-band antennas make use of certain approaches to manipulate the current distribution of one of the higher order resonant modes of the structure to change its resonant frequency as well as current distribution [2-4].

The present chapter is focused on designing a multifrequency antenna using microstrip radiators on a planar considering infinite plane on the back of the substrate using a high frequency structured simulator.

10.2 Antenna Design

The geometry of the proposed planar antenna is shown in Figure 10.1. The proposed antenna is excited using a 50-Ω coaxial feed line for the centre patch known as driven patch. The ground plane is considered infinite ground on the back of the substrate. The substrate is chosen alumina with dielectric constant ε_r=9.4 and thickness of 0.75mm. The dimension of the driven patch is chosen to 29mm×20mm to operate at 2.4GHz and the dimension of the adjacent patches defined as wing patches is found after optimization to operate at various multiband operation.

[1] *Department of Electrical and Computer Engineering, Kulliyyah of Engineering International Islamic University Malaysia (IIUM)*