

ANTENNAS AND PROPAGATION

Modeling, Simulation & Measurements

Edited by

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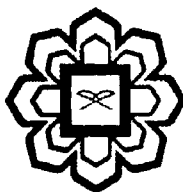
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Chapter 6

Design of Symmetrical Fed Patch UWB Antenna With Tuning Stub And Symmetrical Slotted Ground

Md. Rafiqul Islam¹, Shaker MM. Al-Karaki¹ and Muhammad Feroze Akbar J. Khan¹

6.1 Introduction

This chapter discusses the design of the proposed symmetrical fed rectangular patch antenna with tuning stub and symmetrical slotted ground. Various techniques will be used to achieve UWB bandwidth such as [1-4]:

- Partial ground.
- Stairs beneath the patch.
- Slotted ground.
- Tuning stub.

Moreover, the steps that have been taken in designing UWB antennas will be discussed, the discussion will include the various antenna parameters that are of concern to us such as, feed matching, radiation patterns, antenna gain, antenna efficiency and most importantly antenna bandwidth.

6.2 Design of Symmetrical Fed Patch With Partial Slotted Ground

Simple rectangular patch antennas were designed to operate on a frequency of 5.5 GHz. After that the various techniques will be implemented and examined to enhance the proposed antenna characteristics. Therefore it is very important to design simple patch antenna which can give optimum performance. Following subtopic discussed designing and optimization of simple patch antenna. Transmission line model is used to calculate the dimensions of a patch. There are several main input parameters that have to be selected to carry out design of rectangular patch:

- Frequency of operation (f_0): 5.5 GHz.
- Dielectric constant of substrate (ϵ_r): $\epsilon_r = 5.2$.
- Height of the substrate (h): thickness of substrate is 1.6 mm. This is based on availability of Printed Circuit Board (PCB) that we are using in the lab.
- Input Impedance (Z_0): input impedance is 50Ω . To achieve full match Impedance.

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