Laboratory Assignment: Dipole Antennas

Names: _____ _____

_____ _____

Objective

This laboratory assignment introduces the students to basic antenna measurement practices and terminologies, while exploring the radiation characteristics of various dipole antennas.

Preparation

Before coming to the laboratory to perform this assignment, the students should prepare the following:

- Complete the laboratory assignments for using the spectrum and network analyzers.
- Bring a USB thumb drive to the laboratory for capturing network analyzer output.

Write-Up

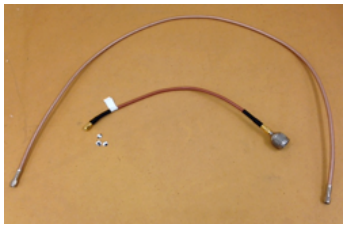
The students performing this laboratory may prepare an informal laboratory report for this assignment. This work may be submitted on copies of the lab manual pages and attached supplements.

Equipment Guide

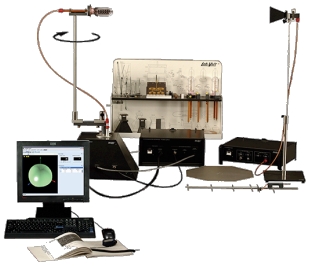
network analyzer

connectors/adapters

calibration kit



assorted coaxial cables



tabletop antenna range

Procedure

Part I: Radiation Pattern of a Half-Wave Dipole Antenna

1. Perform "Exercise 1-1: Radiation Pattern of a Half-Wave Dipole at 1 GHz" in your *Antenna Fundamentals* lab book (p 1-1 to 1-20). Complete all of the exercises as you go.
2. In addition to the exercises in the lab book, make an s11 measurement of the half-wave dipole antenna with the network analyzer, sweeping from 200 MHz to 2 GHz.

Capture the network analyzer screen output of the s11 measurement and attach a labeled graph to your final lab document. What is the 3 dB bandwidth of the half-wave dipole?

Part II: Dipoles of Other Lengths

1. Perform "Exercise 1-4: Experiments with Half, Full, and Three-halves Dipole" in your *Antenna Fundamentals* lab book (p 1-53 to 1-66). Complete all of the exercises as you go.
2. In addition to the exercises in the lab book, make an s11 measurement of the various dipole antennas with the network analyzer, sweeping from 200 MHz to 2 GHz.

Capture the network analyzer screen output of the s11 measurements and attach a labeled graph to your final lab document. What are the 3 dB bandwidth of these other dipole antennas?