

COMP4336/9336 Mobile Data Networking

Lab 4: Experimental study of wireless path loss due to obstacles

Objectives

- To observe wireless signal path loss in WiFi frequencies due to different types of obstacles

Prerequisites

- Access to two mobile devices, such as a laptop and a mobile phone with WiFi interfaces
- Wireshark (and any additional monitoring software, e.g., Network Monitor for Windows users) installed in one of the devices, such as in the laptop
- Familiarity with Wireshark, such as completion of Lab 1
- Understanding of the concepts of path loss, such as lecture notes from Week 2

Introduction

Path loss refers to the loss of signal power as it travels through space. Obstacles between the transmitter and the receiver also contribute to path loss. Different materials attenuate wireless signals of different frequency with different amount. In this lab, you will use simple tools, such as laptops, phones, and WiFi packet capture tools (e.g., Wireshark), to observe pathloss due to various types of obstacles for 2.4GHz and 5GHz WiFi signals.

Your Tasks

Your first task is to capture RSS data with and without an obstacle between a wifi transmitter and receiver. Configure your phone as a WiFi hotspot (set SSID to your UNSW ZID) and connect your laptop to it so that you can capture, e.g., using Wireshark, the beacon and other type (e.g., PING) of packets transmitted by the phone. First place the laptop and the phone within LoS without any obstacle between them and collect a large number (>500) of RSS data. Then place an obstacle, such as a sofa, between them and recollect the RSS data. Repeat this for three different types of obstacles (choose your obstacles that you have easy access to) and for two different frequencies if you have access to both 2.4GHz and 5.0GHz WiFi.

Plot the RSS distributions with and without the obstacles and observe their mean values. The difference of mean values can be used as path loss due to obstacle. For example, a sofa may cause only 1 dB or 2 dB loss, but a brick wall may cause significantly more path loss.

What to submit?

1. Submit a ZIP file containing all your RSS CSV files for different obstacles **[2 marks]**
 2. Submit a PDF report showing the RSS distributions. Show path loss (attenuation) due to obstacles in a 2-column table, for both 2.4GHz and 5GHz frequencies if you have access to both frequencies. Write a one paragraph commentary on your observation of the results. **[2 marks]**
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Penalty at the rate of 10% for each day late will be strictly enforced for all lab submissions. All submissions will be subject to strict UNSW plagiarism rules.

End of Lab 4 – Hope you enjoyed this lab.
