Calculating Signal Propagation

Use Excel to create a spreadsheet that would allow you to calculate the following values that are important to the propagation of wireless signals.

# Free Space

Knowing an expected wattage at your endpoint is important when setting up/configuring a wireless system. In this lab, you will calculate a signal’s propagation over free space.

Create an Excel spreadsheet that will calculate the received wattage for a particular set of antennas given the parameters below.

Frequency: 2400MHz

Transmitter Power: 50 watts

Distance: 4 miles

# Path Loss

Create a second tab on your spreadsheet that calculates the path loss for a cellular telephone given the following parameters:

Frequency: 800Mhz

Antenna Height: 50 meters

Cell phone height: 1.5 meters

Distance from transmitter: 3 miles

Assume the transmitter and receiver are in an *urban* area.

# Doppler Shift

Create a third sheet to calculate the frequency that we need to tune to in order to communicate with our research satellite. Use the following details:

Frequency: 2314776625 Hz

Angle of broadcast: 45 degrees

Speed: 15.7 km/s

What frequency would the transmissions actually take place on?

# Outside Research

Finally, create a fourth sheet in Excel for the purpose of gain calculations. Create a calculator to convert gain values from dBi to dBd and vice versa. Include conversions for dB, if appropriate.