

## INFSCI1072/TELCOM 2700: Wireless Networks Homework 4

*Read the articles posted on Courseweb. Answer the following questions.*

1. What is the far field of a  $\frac{1}{2}$  wavelength dipole antenna that is designed to operate at 2.4 GHz?
2. How much is 50 mW in dBm? How much is it in dBW?
3. The received signal strength at location A is -60 dBm. The received signal strength in location B is -75 dBW. Convert both the RSS values into mW. Which location has the higher signal strength and by how much and in what units?
4. For each carrier frequency given below, plot the received power (in dBm) in free space of a signal whose transmit power is 4W as a function of distance of the receiver being 0.5km to 5 km from the transmitter. Use R or Matlab. The plot should have the received power in dBm on the y-axis and the distance on a log scale on the x-axis. What is the path loss in dB at 5 km in each case?
  - a. Cellular Band transmitter: 830 MHz
  - b. PCS Band transmitter: 1880 MHz
  - c. WLAN Band transmitter: 5.5 GHz