



## Wireless Networking aka “Wireless for IoT Class”

Course code: CS4222/CS5422

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## TUTORIAL 2 for WEEK4 (Starting 30th of January 2023)

In this tutorial, we will assist students in getting started with SensorTag. Additionally, for those who missed the tutorial in Week 3 (due to a public holiday), we will be available to address any questions they may have. There are also two specific (listed below) questions that will be covered.

[1] **Question 1:** A wireless receiver with an effective radius of 100cm is receiving signals at 2 GHz from a transmitter that transmits at a power of 100W and a gain of 40dB (or 10,000). Assume path loss exponent is 2.

- What is the gain of the receiver antenna?
- What is the received power if the receiver is 1km away from the transmitter?
- If the receiver is receiving signals at 900 MHz frequency (instead of 2GHz), please calculate (a) and (b) again? What do you notice and why?

[2] **Question 2:** Can you explain the difference between a microcontroller, system-on-chip, and microprocessor? Furthermore, what processor does Texas Instruments CC2650 (used for projects) use and the reasoning behind this choice? Can you also provide an estimate for the maximum communication range (BLE) for CC2650, taking into consideration  $G_t$  and  $G_r$  equal to 2 dBi, as well as identifying other relevant parameters from the datasheet?

#### [CC2650 Wireless MCU Datasheet](#)

[3] **Question 3:** We would spend the rest of the tutorial getting students started with Assignment #1. The deadline for showing working Assignment #1, is Tutorial #3, Week 5.