*User's Guide*
# SimpleLink™ Wi-Fi® SensorTag



**ABSTRACT**

The SimpleLink™ Wi-Fi® SensorTag from Texas Instruments® (model CC3200SensorTag) provides a demo platform for showcasing the capabilities of the CC3200 device. With this easy-to-use platform, environmental sensing and other Internet of Things (IoT) applications can be done with ease.

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# 1 Introduction

## 1.1 CC3200 SensorTag

The high-performance CC3200 device is the industry's first single-chip microcontroller (MCU) with built-in Wi-Fi connectivity for easy system application. Created for the Internet of Things (IoT), the SimpleLink™ Wi-Fi CC3200 device is a wireless MCU that integrates a high-performance ARM® Cortex®-M4 MCU that allows customers to develop an entire application with a single device. With on-chip Wi-Fi, internet, and robust security protocols, no prior Wi-Fi experience is needed for fast development.

The CC3200 SensorTag is a low-cost IoT demo platform for ARM® Cortex®-M4F-based microcontrollers. The SensorTag design highlights the Internet-on-a chip™ solution and Wi-Fi capabilities. The CC3200 SensorTag features programmable user buttons, LEDs, reed relay, digital microphone, and a buzzer for user interaction. Onboard sensors, gyroscope, accelerometer, and compass allow for easy environmental sensing and IoT applications. Figure 1-1 shows the CC3200 SensorTag.

The CC3200 Wi-Fi SensorTag is intended for demonstration purposes only. For Wi-Fi development and prototyping, TI recommends the CC3220SF LaunchPad development kit. For a similar example to the CC3200 Sensortag that can be used for development, download the Sensor and Actuator Plugin for SimpleLink MCU SDKs and use the example for CC3220SF called "mqtt_sensor". This example requires the Sensors BoosterPack Plug-In Module for sensor data.



**Figure 1-1. CC3200 SensorTag**

# 2 Hardware Description

## 2.1 RF Function and Frequency Range

The CC3200 SensorTag device is designed to operate in the WLAN 2.4-GHz band. The CC3200 SensorTag device also supports Channels 1 through 11 (2142 MHz to 2462 MHz). The SensorTag design uses the SimpleLink Wi-Fi CC3200 Internet-on-a chip device (see *CC3200 SimpleLink™ Wi-Fi® and IoT SensorTag Design Files*).

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**Note**

The maximum RF power transmitted in each WLAN 2.4-GHz band is 16.5 dBm (EIRP power).

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# 3 Operation Description

At start-up, the SensorTag enters access point mode for 2 minutes. When the SensorTag enters access point mode, the red LED blinks three times.

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**Note**

After 5 minutes, the SensorTag emits a short beep and enters hibernate mode. To wake the SensorTag from hibernate mode into access point mode, press the power button.

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TI recommends using the Watch DevPack with the Wi-Fi SensorTag. The display shows important status information and technical data that is useful for debugging network settings.

## 3.1 Downloading the SensorTag App

The SensorTag is available from the Apple® store and the Google Play™ store.

- SimpleLink SensorTag, Google Play store
- TI SensorTag, Apple Store

## 3.2 Setting Up the SensorTag as an Access Point

Pull the plastic tab on the batteries to power the SensorTag.

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**Note**

If the SensorTag has been connected to an access point before, you can reset the Wi-Fi settings by pressing both buttons on the side simultaneously for 6 seconds.

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### 3.2.1 First-Time Configuration Only

On your mobile phone, go to the *Settings* menu and connect to the SensorTag-xx access point (see Figure 3-1). The -xx value is the two last digits of the SensorTag MAC address; this value is used to uniquely identify your SensorTag.

Connecting the phone to the access point may take up to 30 seconds the first time it connects.

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**Note**

Only one device can be connected to the Wi-Fi SensorTag when it is configured as an access point. On some phone models, the 4G connection and 5-GHz Wi-Fi must be disabled to detect the SensorTag as access point.

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**Figure 3-1. Example of SensorTag Access Point**

To launch the SensorTag app, you may have to pull down the menu in the SensorTag device list to refresh the device list. The app detects the new Wi-Fi SensorTag. If the SensorTag is programmed with firmware version

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0.98, the app will prompt you to upgrade the SensorTag to the latest version (see Figure 3-2). Follow the steps to upgrade the SensorTag.

If an upgrade has already taken place and a newer firmware version becomes available, users must first revert back to the factory default (firmware version 0.98). This can be done in one of 2 ways:

• In the mobile application, select Firmware Upgrade → Factory Default.

   or

• Depress the two SensorTag hardware buttons simultaneity for a few seconds until the beep sound is activated.
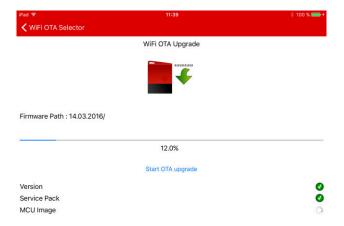


**Figure 3-2. Wi-Fi® OTA Upgrade**

From the firmware upgrade screen, go back to the SensorTag device list screen (see Figure 3-3 and Figure 3-4).

• For IOS® devices, go into Settings and manually reconnect to the SensorTag-xx access point.
• For Android devices, the phone will keep the connection to the SensorTag access point. On the Android device, select *Configure new Wi-Fi SensorTag*, and follow the on-screen instructions to configure the Wi-Fi settings.
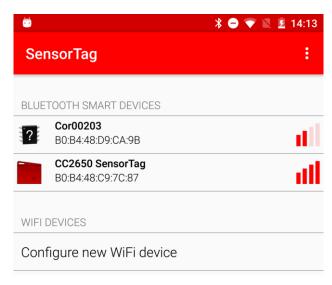


**Figure 3-3. Available Device**

**Figure 3-4. New Device Found**

## 3.3 Connecting the SensorTag to Your Local Wi-Fi Network

On the *Sensor View* screen, the SensorTag data is displayed (see Figure 3-5). The default update interval for the sensor view is 1 second. After 90 seconds of inactivity, the SensorTag emits a short beep and enters hibernate mode to save power. Press any button to wake up the SensorTag.
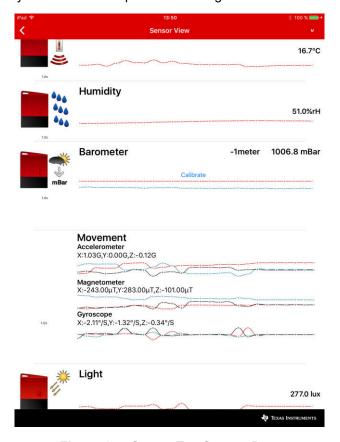


**Figure 3-5. SensorTag Sensor Data**

To view the sensor data directly in the Cloud, follow the Cloud URL. The SensorTag will now send data directly to the IBM® quickstart cloud using MQTT.

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**Note**

These data are sent directly without any security or encryption enabled.

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To view the SensorTag on another PC or web browser, use the *Share* button and share by email (see Figure 3-6).
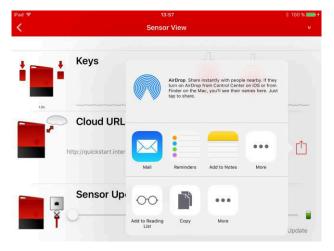


**Figure 3-6. Sharing SensorTag View**

## 3.4 Switching Between Modes

If you would like to repeat the provisioning method, press and hold the user button for 6 seconds to toggle between station mode (connected to your AP) and AP mode (direct connection to your phone). When in AP mode, the provisioning process can be repeated.

## 3.5 Troubleshooting

If you have problems connecting the SensorTag to your access point, use the advanced setup.

Take note of the IP address of the SensorTag (see Figure 3-7).



**Figure 3-7. Example of SensorTag IP Address**

The IP address can be used to configure the Wi-Fi setup for advanced settings through a web browser. Alternatively, the Wi-Fi SensorTag can be accessed by typing *sensortag.net* in the browser. Advanced Wi-Fi settings can be configured in the profiles tab. (see Figure 3-8).
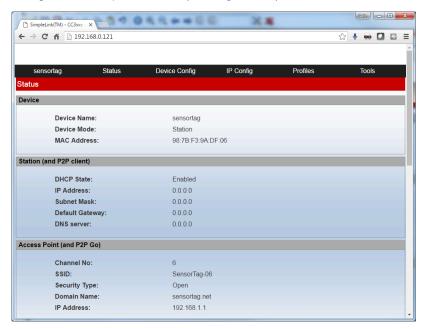


**Figure 3-8. Sensortag.net Snippet**

Pressing both buttons simultaneously for 6 seconds resets the SensorTag and deletes all the Wi-Fi settings. The SensorTag can now be configured as a new device.

## 3.6 Replacing the Batteries

To replace the battery, follow these steps:

1. Remove the red rubber casing and plastic casing as shown in Figure 3-9.
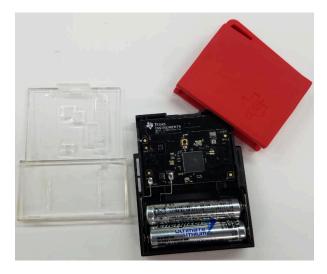2. Remove and replace batteries.



**Figure 3-9. Replacing the Batteries**

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**WARNING**

There is a risk of explosion if the batteries are replaced by an incorrect type. To minimize the risk of explosion, ensure the replacement batteries are the correct type. Dispose of used batteries according to the instructions.

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**Waste Electrical and Electronic Equipment (WEEE)**

This symbol means that according to local laws and regulations your product and/or its battery shall be disposed of separately from household waste. When this product reaches its end of life, take it to a collection point designated by local authorities. Proper recycling of your product will protect human health and the environment.

# Revision History

**Changes from March 1, 2017 to July 23, 2020 (from Revision A (February 2017) to Revision B (July 2020))**     **Page**

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