![Texas Instruments logo]

# SimpleLink™ CC2650 Evaluation Module Kit Quick Start Guide

## Opening the Box and Running the Packet Error Rate Test

## 1. Kit Contents



2 x CC2650 Evaluation Modules
Documentation

**Note! The CC2650EMK is an add-on kit for the CC2650DK. It is assumed that you already have two SmartRF06EB boards. The SmartRF06EB can be purchased separately on TI eStore.**

The RF boards in this kit are designed, but not certified, to comply with FCC, IC and ETSI requirements.

## 2. SmartRF06EB Overview
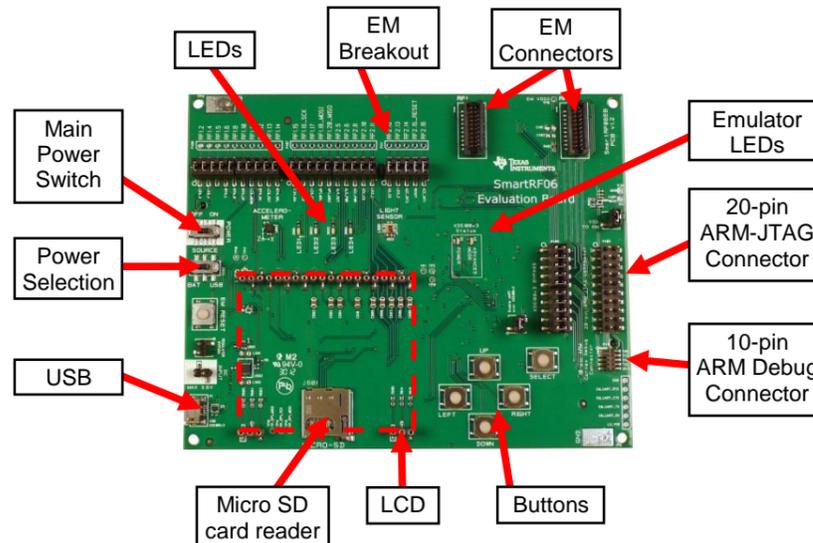


## 3. Plug the EM into the 06EB



Insert a CC2650EM board into the SmartRF06EB as shown above.

**Caution!** The kit contains ESD sensitive components. Handle with care to prevent permanent damage.

## 4. Power Options

The CC2650EM should be powered through the SmartRF06EB, which will supply a voltage from 2.1 V to 3.6 V to the daughter card. The SmartRF06EB can be powered in several different ways:

- USB (5 V through USB plug)
- 2 x 1.5V AAA alkaline batteries (non rechrg.)
- External regulated power supply

External Regulated Power Supply Requirements[1]:
- Nominal voltage: 2.1 to 3.3 VDC
- Maximum voltage 3.6 VDC
- Max Current: 1000 mA
- Efficiency Level V

**Warning!** To minimize risk of injury or property damage, never use rechargeable batteries to power the board. Do not leave the EVM powered when unattended.

## 5. Select Power Source
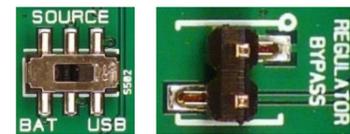


The power source is selected using the Source switch on the left hand side of the SmartRF06EB.

In "USB" position, the EM is powered over USB, running at **3.3V**.

In "BAT" position, the board is powered from batteries or an external source, running at **2.1V**.

The 2.1V regulator can be bypassed by shorting the pins on the "regulator bypass" jumper. In this case, the EM is powered directly from the external source or batteries.

**Note that there should only be one active power source at any one time.**

## 6. Welcome Screen



Turn on power with the Main Power switch. You should now see the Texas Instruments logo and a short description of the buttons on the LCD. Pushing any of the five buttons on the board will take you to the main menu.

**Note! The packet error rate test only runs on the 7x7 variant of the CC2650EM.**

**Note! If you don't see anything on the screen (when you have the 7x7 board) make sure the board is correctly powered (see step 4 and 5 above).**

## 7. Select Board and Protocol

Start by selecting the plug-in board you have.



Then select the protocol.



In this guide, we will use BLE, but the settings and operations that follow will be the same or similar for IEEE 802.15.4.

## 8. Select Channel and Mode

Once you have selected the protocol, you should select which frequency you want to operate at. For BLE you can chose any of the three advertising channels or the data channels.



Then select the type of test you want to run. Packet mode is the Packet Error Rate test. CW is a continuous wave signal, either modulated or unmodulated.



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[1] When using an external power supply, make sure it meets the listed requirements in addition to complying with applicable regional product regulatory and safety certification requirements such as UL, CSA, VDE, CCC, and PSE

## 9. Select Direction



For the packet error rate test, set one of the boards up as the receiver (RX) and the other as the transmitter (TX).

The receiver does not require any further set-up and is now ready to receive packets.

## 10. Select Burst Size and Rate
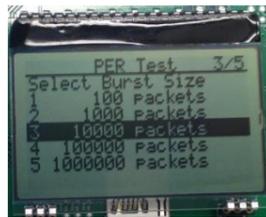


Next, still on the transmitter side, select the desired burst size, that is, the number of packets to transmit.
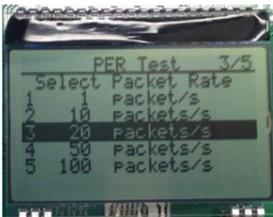


Then select the packet rate (number of packets to transmit per second).

## 11. Select Output Power
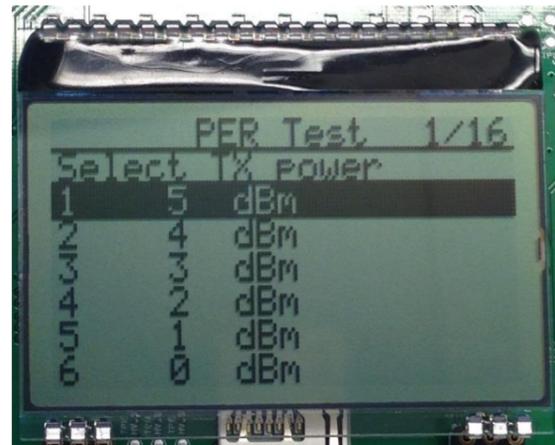


On the transmitter, select the desired output power.

## 12. Start Sending Packets

The transmitter is now configured and in idle state. Sending packets is started and stopped by pressing the Select button.



## 13. PER Test Results

On the receiver, the statistics window will show the error rate based on the number of lost or erroneous packets divided by the total number of packets that should have been received.



## 14. Next Steps

Please refer to your local TI FAE or contact person to get more information about the SimpleLink CC2650 device and other devices in this new family of ultra-low power wireless microcontrollers.

In particular, you will be able to start working with software development on the BLE Stack and other software solutions from TI.

**We sincerely hope that you will enjoy working with the CC2650 device.**

## 15. Troubleshooting

It you are experiencing problems with this test, please check the following:

- Nothing is shown in the display! Make sure the board is powered correctly (see steps 5 and 6 above).
- Please visit the kit web page and check for updated SW and documentation. Updated SW can be downloaded to the device using IAR Embedded Workbench for ARM or SmartRF Flash Programmer.

# SmartRF™ Studio

## 1. Getting Started

SmartRF Studio can be used to test the radio interface on the CC2650 via an XDS debugger from TI. The SmartRF06EB has an onboard XDS100v3 debugger and can serve this purpose.

Get an early adopter version of SmartRF Studio from your local TI FAE or contact person.

Before connecting SmartRF06EB to your PC, download and install SmartRF Studio from www.ti.com/smartrfstudio.

## 2. Launch SmartRF Studio
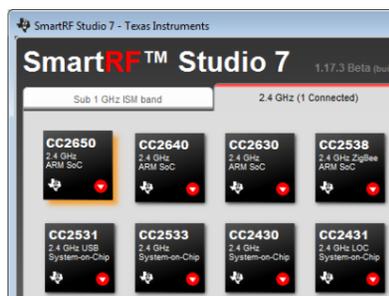


After installing the tool, connect the EB to the PC using the USB cable and start SmartRF Studio. Select the "2.4 GHz" tab and click the refresh ("Find device") button in the lower right corner. Studio will now find the connected SmartRF06EB. Double click on the detected SmartRF06EB to launch the CC2650 device control panel.

## 3. Test the Radio
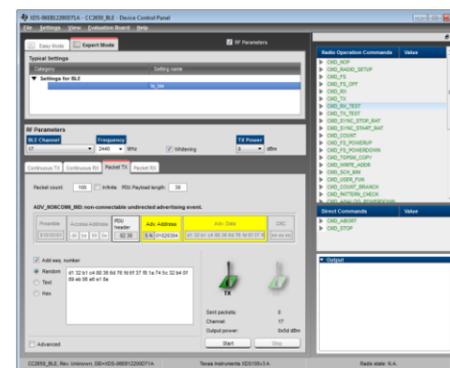


You can now configure the radio, run performance tests and run link tests with another CC2650 device controlled either by your own software or by SmartRF Studio.

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