

CC2520 Development Kit Quick Start Guide

1. Kit Contents



3 x SmartRF05 Evaluation Boards
 2 x MSP430F2618 Sandwich Boards
 3 x CC2520 Evaluation Modules
 3 x Pulse W1010 antennas
 1 x MSP430 Debugger
 Cables & Documentation

The CC2520EM in this kit is FCC/IC certified and complies with ETSI/R&TTE over temperature from 0 to +35°C.

The antenna, W1010 from Pulse, is a ¼ wave dipole antenna with 2 dBi gain.

FCC/IC Regulatory Compliance
 FCC Part 15 Class A Compliant
 IC ICES-003 Class A Compliant

2. Assemble the Boards



Insert the MSP430 sandwich boards (called CC MSP-EM430F2618) into the SmartRF05EBs. Connect antennas to both of the CC2520EM. Make sure the antennas are firmly attached to the SMA connector. If not, RF performance may be reduced. Insert the CC2520EM into the MSP430 board. Do not use excessive force when assembling the boards.



Caution! The kit contains ESD sensitive components. Handle with care to prevent permanent damage. To minimize risk of injury, avoid touching components during operation if symbolized as hot.

3. Power Options

There are several ways of applying power to the SmartRF05EB;

- USB (5V through USB plug)
- External Power Supply (requirements below)
- 2 x 1.5V AA Non-Rechargeable Alkaline Batteries

Voltage regulators on the SmartRF05EB will set the on-board voltage to 3.3V.

External Power Supply¹ Requirements:

Nom Voltage: 4 to 20 VDC

Max Current: 1500 mA

Efficiency Level V

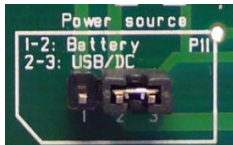
Warning! To minimize risk of personal injury or property damage, never use rechargeable batteries to power the board.



There should only be one active power source connected to the board at any time.

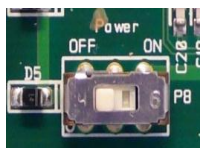
4. Select Power Source

Locate the power source header P11 just above the LCD on the SmartRF05EB. Connect pins 1 and 2 if you are using batteries to power the board. Connect pins 2 and 3 if you are using USB or external power supply.



Once you have set P11, find switch P8 just next to the DC jack on the SmartRF05EB.

To power on the board, flip the switch from "OFF" to "ON".



Do not leave the EVM powered when unattended.

5. Packet Error Rate Tester



When power is turned on, the Packet Error Rate Test program, which is preprogrammed on the MSP430, will start running.

The LCD should display the screen as shown in the picture above. Press Button 1 to enter the menu.

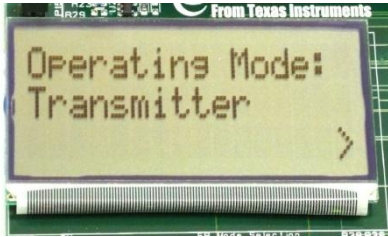
6. Set Channel



Select a channel between 11 and 26 (2405-2480 MHz). The channel is selected by pushing the joystick to the right or left. Confirm the selection by pressing Button 1.

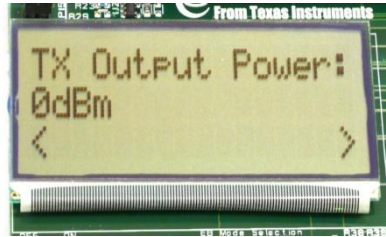
¹ When using an external power supply, make sure it meets the listed requirements in addition to complying with applicable regional product regulatory and safety certification requirements such as UL, CSA, VDE, CCC, and PSE.

7. Select Transmitter/Receiver



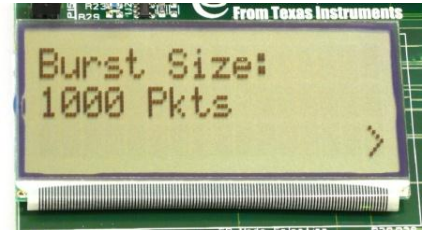
Select transmitter on one of the SmartRF05EB's and receiver on the other by navigating with the joystick. Confirm the selection by pressing Button 1 on both devices. The receiver is now ready to receive packets.

8. Select Output Power



On the transmitter node, selection of TX output power and burst size (number of packets to send) is also needed. Select TX output power by navigating the joystick, either -4 dBm, 0 dBm or 4 dBm, and confirm with Button 1.

9. Select Burst Size



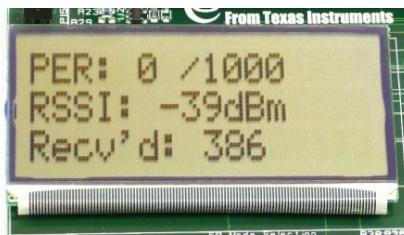
Select burst size by navigating the joystick, either 1000, 10K, 100K or 1M packets. Confirm the selection with Button 1.

10. PER Test Transmitter



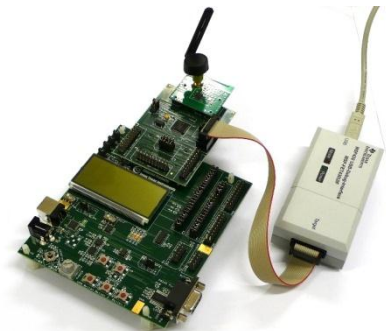
The transmitter is now configured for the PER test. The PER test is started by moving the joystick UP. The transmitter will display the number of packets sent during the PER test. The PER test is stopped by moving the joystick UP again.

11. PER Test Receiver



The PER test receiver will display the total PER (calculated based on the received sequence numbers), and moving average RSSI value on the display. It will also display the number of packets received during the PER test.

12. Download Your Own SW



In order to program the MSP430 MCU on the CCMSP-EM430F2618 board the MSP430 Debug Interface is needed. Connect the MSP430 debug interface to JTAG connector P12 on the CCMSP-EM430F2618. Connect the debug interface to the PC with a USB cable.

Use either MSP430 Flasher, CCS or IAR to download your code.

13. SmartRF Studio



In order to use SmartRF Studio to control the CC2520 radio, the CC2520EM should be connected directly to the SmartRF05EB.

SmartRF Studio can be downloaded from www.ti.com/smarterfstudio.

14. Documentation

Hardware

A comprehensive description of the hardware included in the CC2520 development kit is found in the CC2520DK User's Manual.

Software

The PER tester and other software examples are documented in the CC2520 Software Examples User's Guide. This document also describes how to download the application to the MSP430 on the CCMSP-EM430F2618 board.

Kit website

The user manuals are found on the CC2520DK website: <http://www.ti.com/tool/cc2520dk>

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The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user indemnifies TI from all claims arising from the handling or use of the goods.

Should this evaluation board/kit not meet the specifications indicated in the User's Guide, the board/kit may be returned within 30 days from the date of delivery for a full refund. THE FOREGOING LIMITED WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. EXCEPT TO THE EXTENT OF THE INDEMNITY SET FORTH ABOVE, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

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As noted in the EVM User's Guide and/or EVM itself, this EVM and/or accompanying hardware may or may not be subject to the Federal Communications Commission (FCC) and Industry Canada (IC) rules.

For EVMs **not** subject to the above rules, this evaluation board/kit/module is intended for use for ENGINEERING DEVELOPMENT, DEMONSTRATION OR EVALUATION PURPOSES ONLY and is not considered by TI to be a finished end product fit for general consumer use. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC or ICES-003 rules, which are designed to provide reasonable protection against radio frequency interference. Operation of the equipment may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

General Statement for EVMs including a radio

User Power/Frequency Use Obligations: This radio is intended for development/professional use only in legally allocated frequency and power limits. Any use of radio frequencies and/or power availability of this EVM and its development application(s) must comply with local laws governing radio spectrum allocation and power limits for this evaluation module. It is the user's sole responsibility to only operate this radio in legally acceptable frequency space and within legally mandated power limitations. Any exceptions to this are strictly prohibited and unauthorized by Texas Instruments unless user has obtained appropriate experimental/development licenses from local regulatory authorities, which is responsibility of user including its acceptable authorization.

For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant

Caution

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

For EVMs annotated as IC – INDUSTRY CANADA Compliant

This Class A or B digital apparatus complies with Canadian ICES-003.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Concerning EVMs including radio transmitters

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concerning EVMs including detachable antennas

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Cet appareil numérique de la classe A ou B est conforme à la norme NMB-003 du Canada.

Les changements ou les modifications pas expressément approuvés par la partie responsable de la conformité ont pu vider l'autorité de l'utilisateur pour actionner l'équipement.

Concernant les EVMs avec appareils radio

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

【Important Notice for Users of EVMs for RF Products in Japan】

This development kit is NOT certified as Confirming to Technical Regulations of Radio Law of Japan

If you use this product in Japan, you are required by Radio Law of Japan to follow the instructions below with respect to this product:

1. Use this product in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use this product only after you obtained the license of Test Radio Station as provided in Radio Law of Japan with respect to this product, or
3. Use of this product only after you obtained the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to this product. Also, please do not transfer this product, unless you give the same notice above to the transferee. Please note that if you could not follow the instructions above, you will be subject to penalties of Radio Law of Japan.

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EVALUATION BOARD/KIT/MODULE (EVM) WARNINGS, RESTRICTIONS AND DISCLAIMERS

For Feasibility Evaluation Only, in Laboratory/Development Environments. Unless otherwise indicated, this EVM is not a finished electrical equipment and not intended for consumer use. It is intended solely for use for preliminary feasibility evaluation in laboratory/development environments by technically qualified electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems and subsystems. It should not be used as all or part of a finished end product.

Your Sole Responsibility and Risk. You acknowledge, represent and agree that:

1. You have unique knowledge concerning Federal, State and local regulatory requirements (including but not limited to Food and Drug Administration regulations, if applicable) which relate to your products and which relate to your use (and/or that of your employees, affiliates, contractors or designees) of the EVM for evaluation, testing and other purposes.
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3. Since the EVM is not a completed product, it may not meet all applicable regulatory and safety compliance standards (such as UL, CSA, VDE, CE, RoHS and WEEE) which may normally be associated with similar items. You assume full responsibility to determine and/or assure compliance with any such standards and related certifications as may be applicable. You will employ reasonable safeguards to ensure that your use of the EVM will not result in any property damage, injury or death, even if the EVM should fail to perform as described or expected.
4. You will take care of proper disposal and recycling of the EVM's electronic components and packing materials.

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