

# CC2531 USB Evaluation Kit Quick Start Guide

## 1. Kit Contents



- 1 x CC2531 USB Dongle
- Documentation

The RF boards in this kit are FCC and IC certified and tested to comply with ETSI/R&TTE over temperature from 0 to +35°C.



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

## 2. Getting Started

The CC2531 USB Dongle can be used as a development platform for USB and RF applications.

An external development tool, like the CC Debugger, is required to program and debug software running on the CC2531.

The CC2531 Dongle comes preprogrammed with software that lets the dongle operate as a packet capture device for the SmartRF Packet Sniffer.

This Quick Start Guide will describe how to use the dongle with the packet sniffer and the next steps for your own software development.

## 3. Install the driver

Before plugging the dongle into the PC, please install TI's SmartRF Packet Sniffer. When installing the Packet Sniffer, you will also automatically install the USB driver required for proper communication between the dongle and the packet sniffer.



The Packet Sniffer can be downloaded from [www.ti.com/tool/packet-sniffer](http://www.ti.com/tool/packet-sniffer)

## 4. Insert the USB dongle

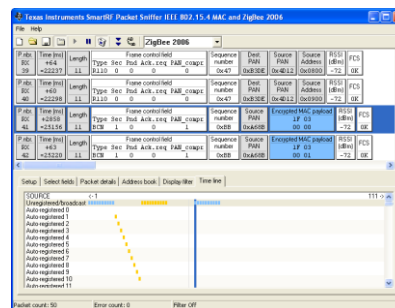
When inserting the USB dongle into a USB slot, Windows' new hardware wizard will appear. Select the options for automatic installation and wait for the driver installation to complete. After installation, the Packet Sniffer is ready for use.



**Caution!** This USB dongle has been designed to be powered from a USB port. Do not attempt to connect other power sources to the device. Avoid powering the unit when not in use.

## 5. Packet Sniffer

TI's SmartRF Packet Sniffer is a convenient tool for debugging of RF protocols. It displays the captured packets and decodes the packet contents depending on what protocol you are running.



When starting the packet sniffer, select the protocol as required. The Packet Sniffer for CC2531 supports SimplicTI, RemoTI and ZigBee PRO, in addition to a generic mode (no packet parsing).

## 6. Debugging and Programming

For software development on the CC2531 an external debugger is necessary. This can be either a SmartRF05EB [3] as shown in the first picture,

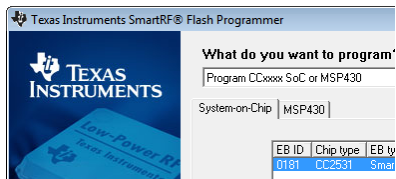


...or a CC Debugger [4] as shown in the second picture.



## 7. Flash Programmer

Texas Instruments has a simple tool which can be used to program the flash on the CC2531.

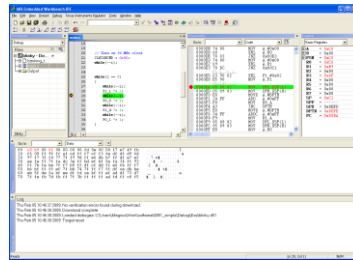


The Flash Programmer application, available on the kit web page [3], can be used to program Intel HEX files, read the contents of flash and several other operations.

You will need a SmartRF05EB, a CC Debugger or other programmers from Third Parties [5] to program the device.

## 8. IAR Embedded Workbench

To develop software and debug software running on the CC2531, you should use IAR Embedded Workbench for 8051.



A free, code size limited version can be downloaded from the web. See [www.iar.com/ew8051](http://www.iar.com/ew8051).

## A. Available Software

### CC2531 USB Firmware Library and Examples.

Source code of the USB Protocol Stack including simple HID and CDC examples [2].

### RemoTI™ Network Protocol

TI's implementation of the ZigBee RF4CE standard: [www.ti.com/tool/remoti](http://www.ti.com/tool/remoti)

### TIMAC Software

TI's IEEE 802.15.4 medium-access-control stack: [www.ti.com/tool/timac](http://www.ti.com/tool/timac)

### Z-Stack™ Software

TI's ZigBee-compliant protocol stack [www.ti.com/tool/z-stack](http://www.ti.com/tool/z-stack)

## B. More information

On Texas Instruments' Low-Power RF web site you will find all our latest products, application and design notes, FAQ section, news and events updates, and much more. Just go to [www.ti.com/lprf](http://www.ti.com/lprf)

The Low Power RF Online Community has forums, blogs and videos. Use the forums to find information, discuss and get help with your design. Join us at [www.ti.com/lprf-forum](http://www.ti.com/lprf-forum)

The TI LPRF eNewsletter keeps you up to date on e.g. new products, application notes, software and events. Sign up at [www.ti.com/lprfnewsletter](http://www.ti.com/lprfnewsletter)

## 9. Thank You!

We hope you will enjoy working with the CC2531 and associated Low-Power RF products from Texas Instruments.

## C. References

[1] CC2531EMK product web page

[www.ti.com/tool/cc2531emk](http://www.ti.com/tool/cc2531emk)

[2] CC2531 product web page

[www.ti.com/product/cc2531](http://www.ti.com/product/cc2531)

[3] CC2530 Development Kit

[www.ti.com/tool/cc2530dk](http://www.ti.com/tool/cc2530dk)

[4] CC Debugger

[www.ti.com/tool/cc-debugger](http://www.ti.com/tool/cc-debugger)

[5] LPRF Developer's Network

[www.ti.com/general/docs/gencontent.tsp?contentId=29028](http://www.ti.com/general/docs/gencontent.tsp?contentId=29028)

## EVALUATION BOARD/KIT/MODULE (EVM) ADDITIONAL TERMS

Texas Instruments (TI) provides the enclosed Evaluation Board/Kit/Module (EVM) under the following conditions:

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 this Product 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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**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.
2. You have full and exclusive responsibility to assure the safety and compliance of your products with all such laws and other applicable regulatory requirements, and also to assure the safety of any activities to be conducted by you and/or your employees, affiliates, contractors or designees, using the EVM. Further, you are responsible to assure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard.
3. 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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