

CC1101-CC1190EMK Quick Start Guide

Opening the box and using the modules with SmartRF04EB

1. Kit Contents



2 x CC1101-CC1190EM (869 or 915 MHz)
 2 x Pulse W5017 Antennas (2 dBi)

The 869 MHz RF board is tested to comply with ETSI/R&TTE over temperatures from 0 to +70°C. The 915 MHz RF board is FCC and IC certified.

The boards should not be modified to operate in other frequency bands than what they have been designed for.

FCC/IC Regulatory Compliance (915 MHz board only)
 FCC Part 15 Class A Compliant
 IC ICES-003 Class A Compliant

2. How to Use the Modules

The CC1101-CC1190 Evaluation Module (EM) boards can be plugged into the SmartRF04EB (EB), which is included in the CC1101DK. This board lets you control the devices from SmartRF™ Studio and it can also be used as a development platform.

The evaluation module is also supported by the SmartRF TrxEB, included in the CC11xL, CC1120 and CC1200 development kits.

This Quick Start Guide describes how to properly power the SmartRF04EB with a CC1101-CC1190EM and how to control the combo from SmartRF Studio.

3. Plug EM into SmartRF04EB



Insert the EM into the EB. Attach the antenna firmly.



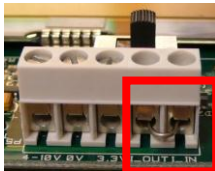
Caution! The kit contains ESD sensitive components. Handle with care to prevent permanent damage. To minimize risk of injury, avoid touching components during operation if symbolized as hot.

4a. Apply Power

The EB can be powered from different sources: USB, Battery or an External Power Supply

The voltage regulator on the EB supplies 3.3 V to the assembly, but it can only source up to 150 mA. It *cannot* supply the CC1101-CC1190EM since it can consume more than 300 mA. An external power supply is therefore required for powering the EM.

It is possible to have separate power sources for the EB and for the EM. This is controlled with the strap between I_OUT and I_IN on P5 (the screw terminal). Remove it to allow separate power supplies.



4b. Power the EB



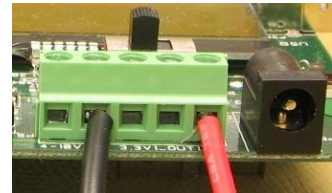
Connect the EB to a USB port on a PC.



Alternatively, connect a 9 V, non-rechargeable, alkaline battery (not included in the kit) to the battery connector on the bottom side of the board.

Note that if multiple power sources are connected, the source with the highest voltage will power the EB. This means that you should disconnect any attached battery when using USB power; otherwise the battery will be drained.

4c. Power the EM

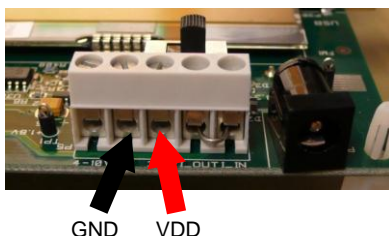


As noted in 4a, remove the strap on P5 and connect the external power supply as shown in the picture above. The red wire is the positive supply and the black wire is GND.

This will power the EM directly from the external power supply, whereas the rest of the EB will be powered from USB or the battery.

The power supply range should be within 3.0 to 3.6 V.

4d. Optional: Same Power Supply for both EB and EM



Connect a 3.3 V voltage source between the 3.3 V and 0 V terminals. 3.3 V is the middle terminal.

In this case, the on-board voltage regulator will be bypassed. Note that the strap on P5 should not be removed.

5. Set Power Switch



If EB and EM are powered from different sources as described in 4a-4c, the switch should be set to the rightmost position.

If EB and EM are powered from the same external supply as described in 4d, the switch should be set to the leftmost position.

This switch can be used to turn off the EB by switching it to the opposite position of that used to turn it on.

6. External Power Supply Range

With the test setup in 4a-4c, the EB is connected to a 3.3 V supply through the on-board voltage regulator and the EM is powered by the external supply. Since the EB is powered through a regulated 3.3 V supply the signals going from CC1101-CC1190 to the EB (and vice versa) need to be within 3.0 V to 3.6 V. The external supply connected to the EM when using the setup in 4a-4c is therefore limited to 3.0 V to 3.6 V.

With the setup in 4d the supply range is limited 2.7 V to 3.6 V.

External Power Supply¹ Requirements:
 Nom Voltage: 3.3VDC
 Max Current: 800 mA
 Efficiency Level V

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

SmartRF™ Studio

1. Download and Install SmartRF Studio

Before connecting the EB to your PC, download SmartRF™ Studio from www.ti.com/smarterfstudio. Install the program and follow the instructions in the wizard.

Connect the EB with a CC1101-CC1190EM to the PC using the USB cable and install the USB driver as described in the manual.

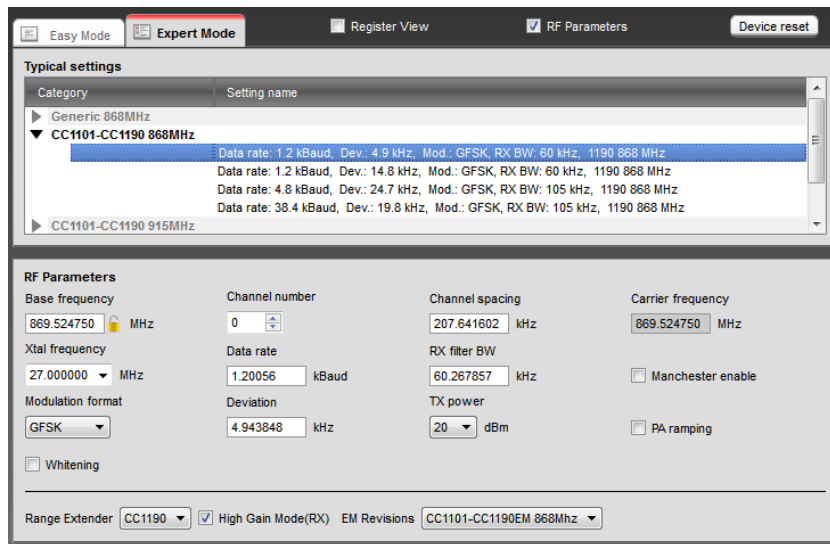
2. Launch SmartRF Studio



Launch SmartRF Studio and double click on the highlighted CC1101 device icon to get complete control of the device from the PC.

You can now configure the radio, run tests, export register settings and run link tests with another CC1101-CC1190EM on a SmartRF04EB connected to the PC.

3. Configure the Radio



In order to control the CC1190 select CC1190 as “Range Extender” and select the appropriate “EM Revisions” as shown (either 869 or 915 MHz). You can now use all the features in Studio as for a standalone EM. Test the performance of the radio using some of these features:

- Continuous TX: Output power, spectrum
- Continuous RX: Received signal strength, synchronous/asynchronous serial RX mode
- Packet TX/RX: Link and sensitivity testing

References

Please visit

- <http://www.ti.com/product/cc1190>
- <http://www.ti.com/tool/cc1101cc1190emk868>
- <http://www.ti.com/tool/cc1101cc1190emk915>
- <http://www.ti.com/lit/swra356> (Using the CC1190 Front End with CC1101 under EN 300 220)
- <http://www.ti.com/lit/swra361> (Using the CC1190 Front End with CC1101 under FCC 15.247)

Download the SmartRF™ Studio software, as well as datasheets, reference designs and application notes.

You will also find a lot of information on the TI E2E forum at <http://e2e.ti.com>

We hope you will enjoy working with the CC1101 and CC1190 devices.

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

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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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