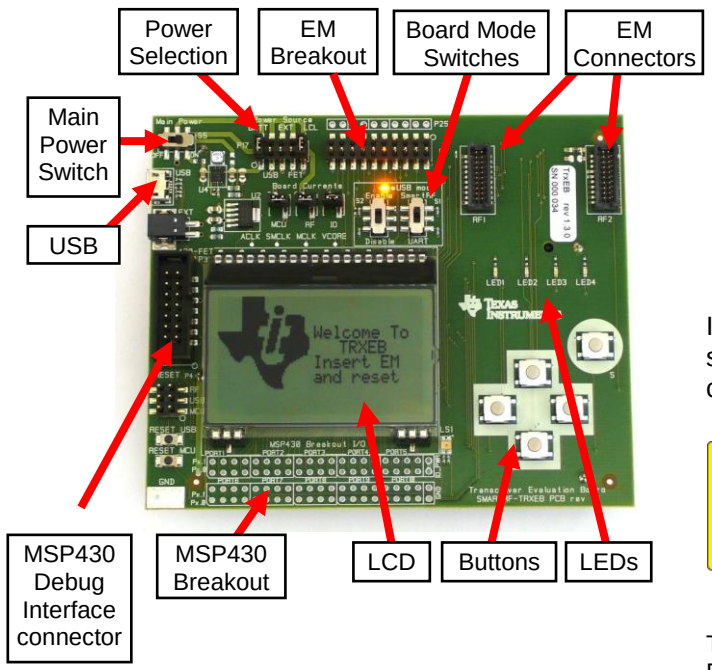
CC1125 Development Kit Quick Start Guide

Opening the Box and Running the Packet Error Rate Test

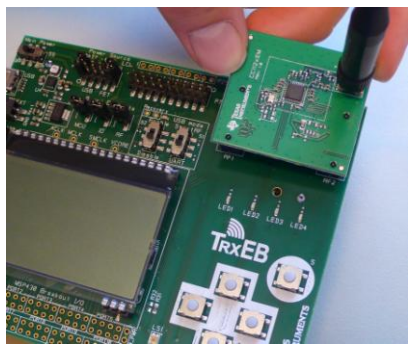
1. Kit Contents

2 x SmartRF Transceiver Evaluation Boards (TrxEB)
2 x CC1125 ETSI Cat1 868 MHz Boards (CC1125EM-CAT1-868)
2 x W5017 Pulse Antennas
1 x MSP430 Debug Probe (FET)
2 x Micro USB Cables
1 x Standard USB Cable
1 x 14-pin Flat Cable
4 x 1.5 Volt AA Batteries
Documentation

2. TrxEB Overview



3. Plug the EM into the TrxEB



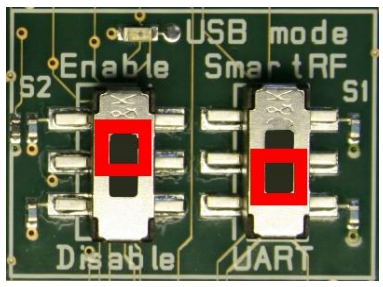
Insert a CC1125EM board into the TrxEB as shown above. Connect the antenna to the SMA connector on the EM.

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.

The hardware in this kit is tested and complies with ETSI/R&TTE over temperature from 0 to +35°C. The W5017 whip antenna from Pulse has a gain of 2 dBi. The CC1125 is a receiver category 1 device, c.f. ETSI EN 300 220-1, §4.1.1.

4. Select Board Mode

Use the switches S1 and S2 to select the operating mode of the board. For the sake of this quick start guide, please select "Enable" and "UART". This configuration will make it possible to communicate directly with the MSP430 over a virtual COM port on the PC.



5. Power Options

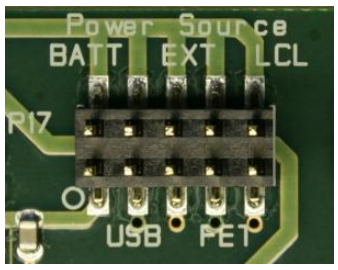
There are several ways of applying power to the TrxEB.

- USB (5V)
- 2 x 1.5 V AA batteries
- External regulated power supply
- MSP430 debugger

For the batteries and USB, there are voltage regulators on the TrxEB that will set the on-board voltage to 3.3 V.

Warning! To minimize risk of injury or property damage, never use rechargeable batteries to power the board. Always select a power source that is suitably rated for use with this EVM, **not exceeding 3.6 VDC, with a current output rating between 0 and 500 mA.**

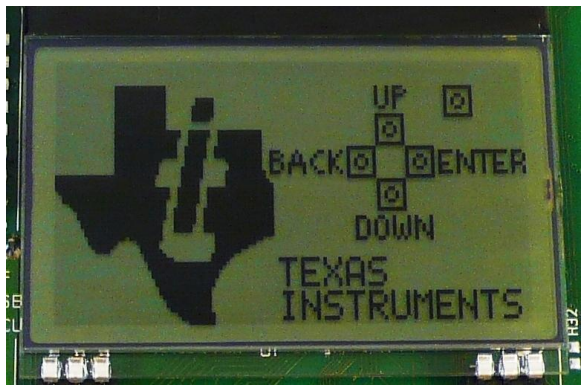
6. Select Power Source



Depending on the power source, make sure you connect jumpers to the appropriate pins on the "Power Source" header. For instance, if you use batteries, use a jumper to short-circuit pin 1 and 2 on the header. See back side of board for explanation of the jumpers..

Note that there should only be one active power source at any one time. Do not leave the EVM powered when unattended.

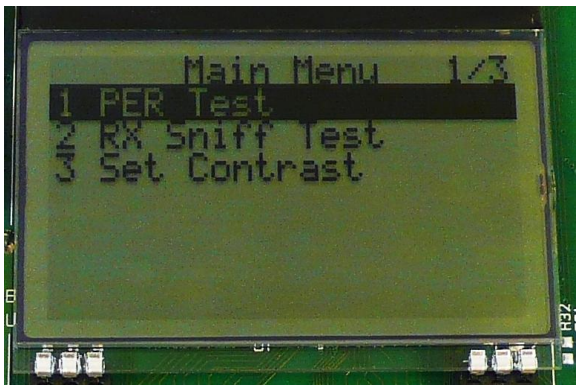
7. Welcome Screen



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.

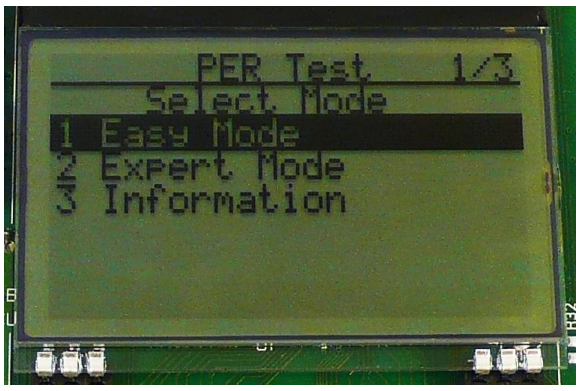
NB! If you don't see anything on the screen make sure the mode switches are in the correct positions (see step 4 above).

8. Packet Error Rate Test



Select the PER (Packet Error Rate) test by highlighting the selection using the up/down buttons. Confirm your selection by pressing Enter (right button).

9. Select Test Mode

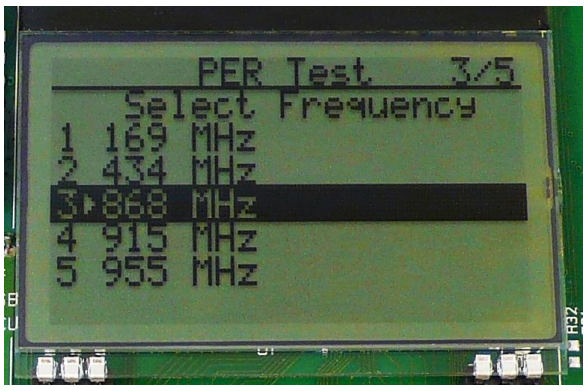


The PER test can be run is several modes. Easy Mode sets up a one-way test and uses default settings. This test is convenient for practical range testing.

The other test modes are described in the "**Software Examples for CC112x, CC11xL and CC1101 User's Guide**".

To proceed, highlight "Easy Mode" and press Enter (right button).

10. Select Frequency

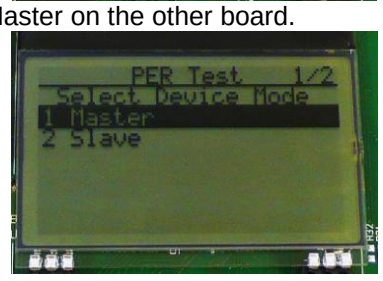


Select which frequency to use for the test. Make sure that the evaluation modules you have match the selected frequency.

11. Select Mode

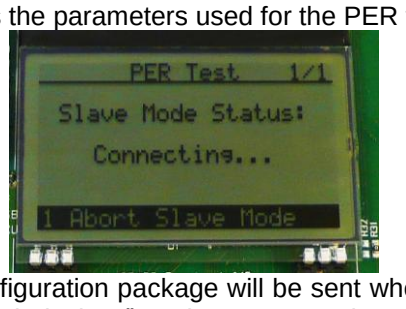
One of the boards must operate as the slave (transmitter) and the other as master (receiver). Select Slave on one board…

…and Master on the other board.

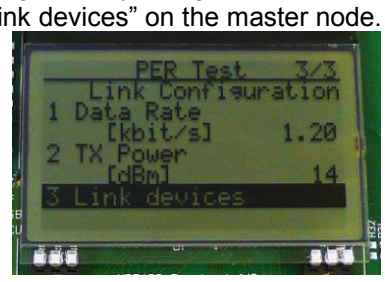


12. Establish Link

The slave node will now wait for a configuration package from the Master. The configuration contains the parameters used for the PER test.

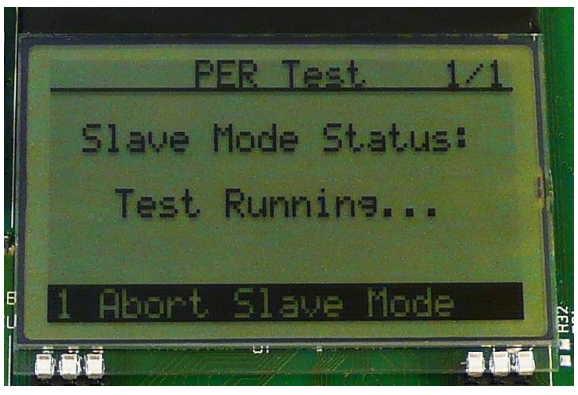


The configuration package will be sent when you select "link devices" on the master node.



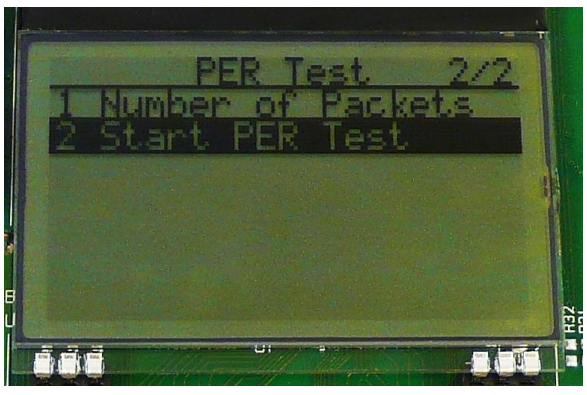
13. Link Established

When the initial linking has completed, the slave node will start the test by continuously transmitting packets to the master.



14. Start the Receiver (master)

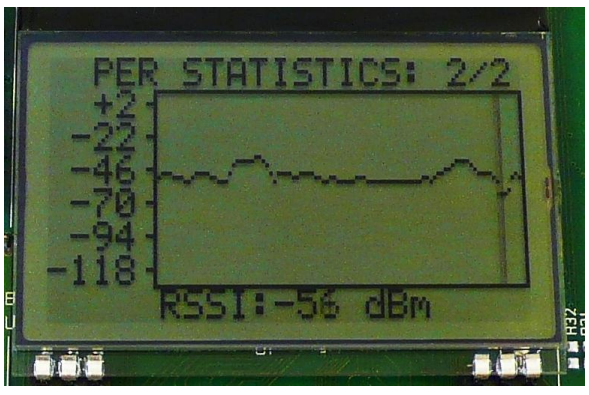
On the master node, you can select the number of packets you want to receive in order to calculate the packet error.



When selecting "Start PER Test", the master (receiver) will begin to count the number of received packets and provide some statistics.

15. PER Test Results

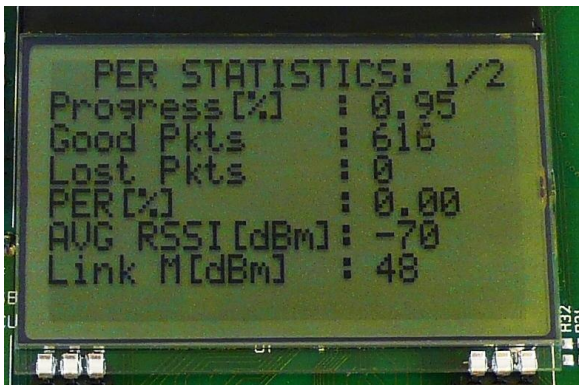
The master will display a window that plots the received signal strength (RSSI) for each packet.



Press the "Up" button to go to the detailed statistical window.

16. PER Test Results

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.



17. Troubleshooting

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

- Nothing is shown in the display! Make sure the mode switches are in the correct positions (see step 4 above).
- Please visit the kit web page and check for updated SW and documentation. Updated SW can be downloaded to the device using IAR EW430 or SmartRF Flash Programmer.
- If you get poor PER results at short distances, try to move the transmitter and receiver further apart. The CC1125 receiver may be saturated if it is too close to the other CC1125 transmitting at full output power.

18. References

Please visit www.ti.com and

http://www.ti.com/tool/cc1125dk

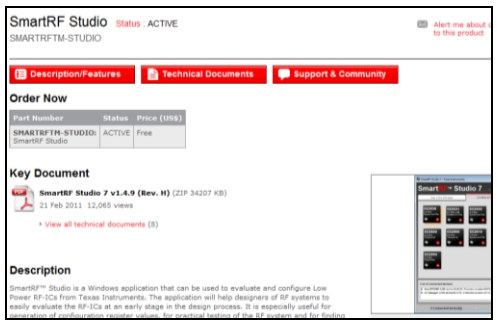
On the kit product page, you will find additional documentation, links to updated software examples and software tools like SmartRF Studio.

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

We hope that you will enjoy working with the CC1125 device.

SmartRF™ Studio

1. Download and Install

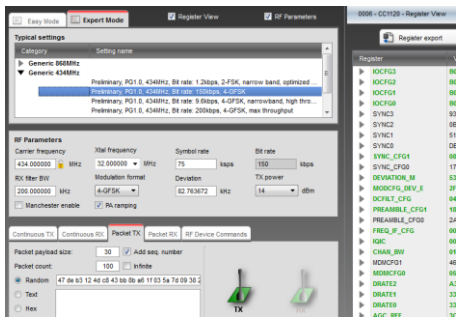


Before connecting SmartRF TrxEB to your PC, download and install SmartRF Studio from www.ti.com/smartrfstudio.

2. Launch SmartRF Studio

After installing the tool, connect the EB to the PC using the USB cable and start SmartRF Studio. Select the "Sub 1 GHz" tab and double click the highlighted CC1125 device icon.

3. Test the Radio



You can now configure the radio, run performance tests, export register settings and run link tests with another CC1125 on a SmartRF TrxEB connected to the PC.

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Caution

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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.

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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.

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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.

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(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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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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