Long Range Demo Hardware

- 2 x TrxEB
- 2 x CC1120EM with TCXO
- 2 x Antenna

Figure 1. TIDC-CC112X-LRM-DEMO
1 Running the Long Range Demo

The SmartRF™ TrxEB includes a battery holder for two 1.5-V AA batteries. The power source selection jumpers should short circuit pin 1-2 ("BATT") and 9-10 ("LCL") of header. P17.

To run the software application from the MSP430, enable the MCU by setting the correct operating mode of the TrxEB. Set switches S1 and S2 to “UART” and “Enable”, respectively.

Set the main power supply switch (S5, in top left corner of TrxEB) in the “on” position.

When the board is powered up, the arrows on the LCD will show all possible ways to navigate through the menu.
Running the Long Range Demo

Figure 2. Demo Flowchart

1. **Freq. Band**
   - Select between 470 MHz and 868 MHz and press the «down» key.

2. **Mode**
   - Select between RX and TX and press the «down» key.

3. **Start Test**
   - Start the test by pressing the «right» key.

4. **RX**
5. **TX**

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1.1 **Transfer (TX) Mode**

In TX mode, the following data is transmitted (at 470 MHz or 868 MHz).

<table>
<thead>
<tr>
<th>Table 1. Packet 1 (Containing SYNC_1 and a Dummy Byte)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0xAA 0xAA 0xAA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2. Packet 2 (Containing SYNC_2, a 16-Bits Sequence Number, and a Dummy Byte)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0xAA 0xAA 0xAA</td>
</tr>
</tbody>
</table>

Stop and restart TX mode by pressing any key.

1.2 **Receiver (RX) Mode**

In RX mode, the radio runs two different algorithms based on the frequency band selected:

- 470 MHz
  - No frequency offset compensation
  - The radio looks for Packet 2 only

- 868 MHz
  - Frequency offset compensation
  - The radio looks for Packet 1, compensates for the frequency offset, and reconfigures to look for Packet 2 using an RX filter BW of 7.8 kHz (compared to 12.5 kHz for Packet 1)
  - If Packet 2 is not received within a given timeout or a packet is received, the radio goes back to search for Packet 1

When RX starts, the number of received packets, the number of lost packets, and the received RSSI are displayed on the LCD as shown in Figure 3.

![Figure 3. LCD Feedback](image)

Stop and restart RX mode by pressing any key.

2 **References**

- Generic PER test, simple link, and RX sniff mode: *TrxEB RF PER Test Software Example User’s Guide (SWRU296)*
- For detailed information about the SmartRF TrxEB, see *SmartRF Transceiver Evaluation Board “TrxEB” User’s Guide (SWRU294)*
- The TrxEB and CC1120EM can also be used with SmartRF Studio to evaluate and configure CC1120 for testing in the lab. For the software package and user’s guide, see [http://www.ti.com/tool/smartrftm-studio](http://www.ti.com/tool/smartrftm-studio).
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