

Low-Energy Bluetooth RF Testing Using BlueTool

Associated Part Family: CYW20738

This document contains detailed information on using BlueTool to perform RF testing on Bluetooth Low Energy (BLE) devices.

1 Introduction

This document contains detailed information on using BlueTool to perform RF testing on Bluetooth Low Energy (BLE) devices.

1.1 Cypress Part Numbering Scheme

Cypress is converting the acquired IoT part numbers from Broadcom to the Cypress part numbering scheme. Due to this conversion, there is no change in form, fit, or function as a result of offering the device with Cypress part number marking. The table provides Cypress ordering part number that matches an existing IoT part number.

Table 1. Mapping Table for Part Number between Broadcom and Cypress

| Broadcom Part Number | Cypress Part Number |
|----------------------|---------------------|
| BCM20738 | CYW20738 |

1.2 Acronyms and Abbreviations

In most cases, acronyms and abbreviations are defined upon first use. For a more complete list of acronyms and other terms used in Cypress documents, go to: <http://www.cypress.com/glossary>.

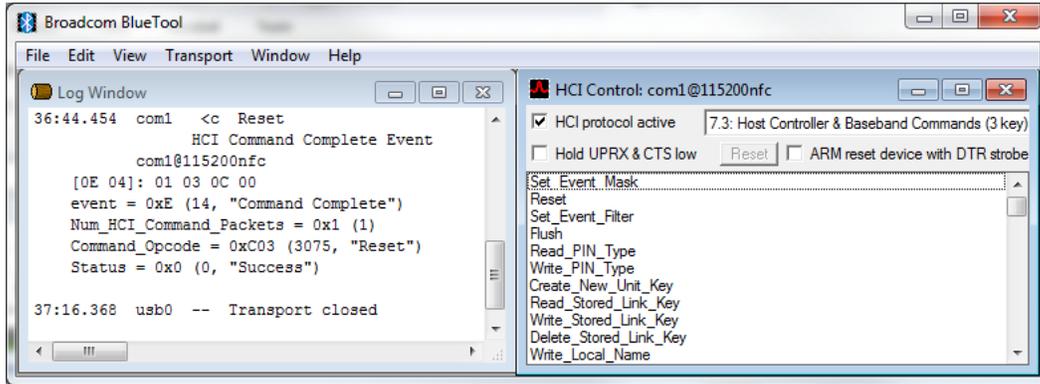
2 IoT Resources

Cypress provides a wealth of data at <http://www.cypress.com/internet-things-iot> to help you to select the right IoT device for your design, and quickly and effectively integrate the device into your design. Cypress provides customer access to a wide range of information, including technical documentation, schematic diagrams, product bill of materials, PCB layout information, and software updates. Customers can acquire technical documentation and software from the Cypress Support Community website (<http://community.cypress.com/>).

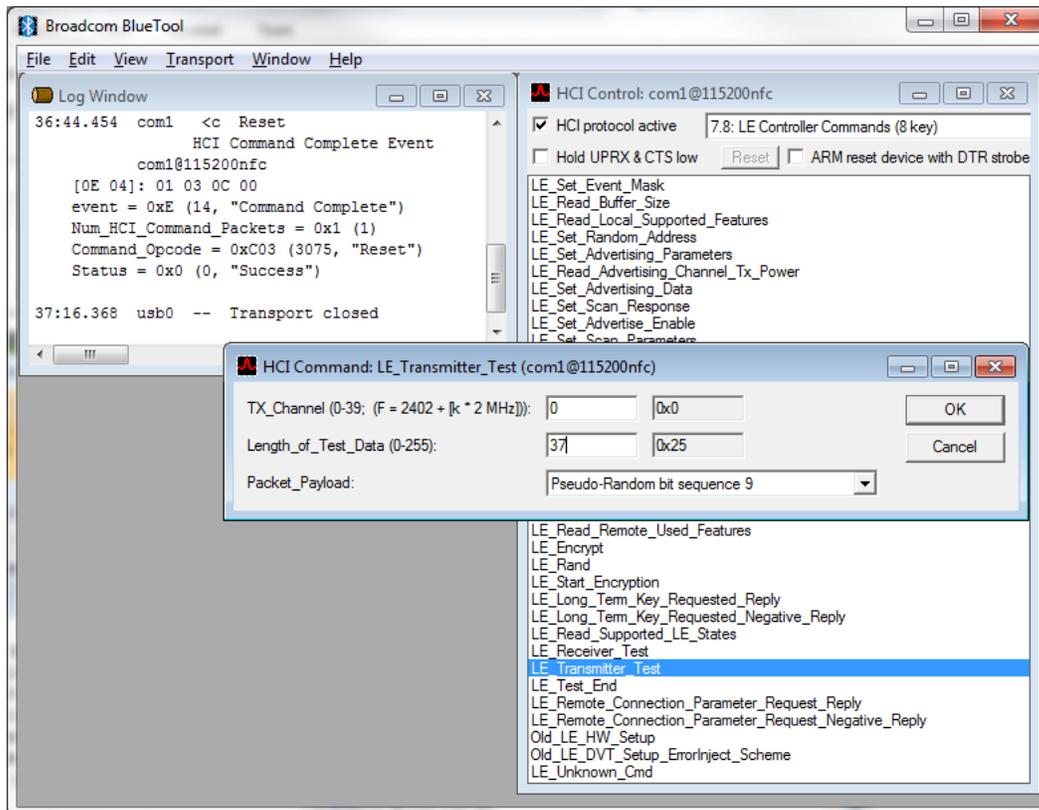
3 Low-Energy RF Testing

3.1 Performing a Low-Energy Transmit Test

1. Under HCI Control, select **7.3: Host Controller & Baseband Commands (3 key)**, and then double-click **Reset** to reset the DUT.



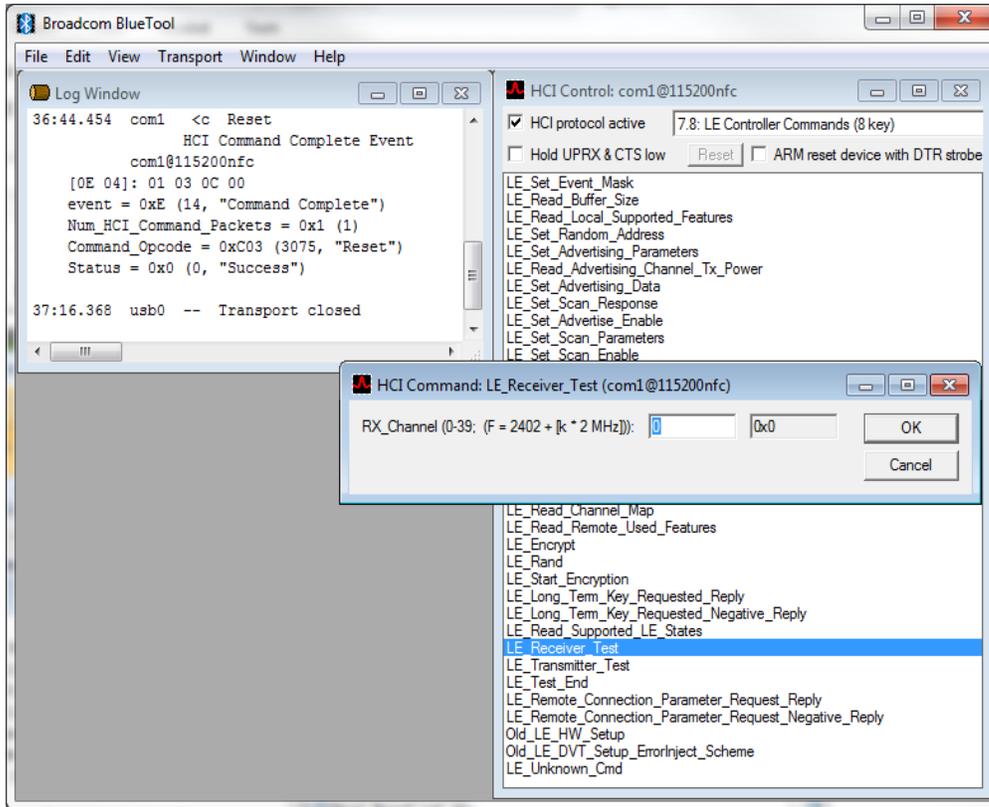
2. Select **7.8: LE Controller Commands (8 key)**, and then double-click **LE_Transmitter_Test**.
3. In HCI Command: LE_Receiver_Test window, enter the channel number (k) as indicated by TX_Channel (0-39; (F=2402+[k*2MHz])).



4. Enter number of bytes (37) per packet as indicated by Length_of_Test_Data (0-37).
5. In the Packet_Payload field, select the packet type.
6. Click **OK**.
The tester analyzes the data, and then outputs the results.
7. Repeat [Step 1](#) through [Step 6](#) to make the next transmit test measurement.

3.2 Perform a Low-Energy Receive Test

1. Under HCI Control, select **7.3: Host Controller & Baseband Commands (3 key)**, and then double-click **Reset** to reset the DUT.
2. Select **7.8: LE Controller Commands (8 key)**, and then double-click select **LE_Receiver_Test**.
3. Enter the channel number (k) as indicated by TX_Channel (0-39; (F=2402+[k*2MHz])).

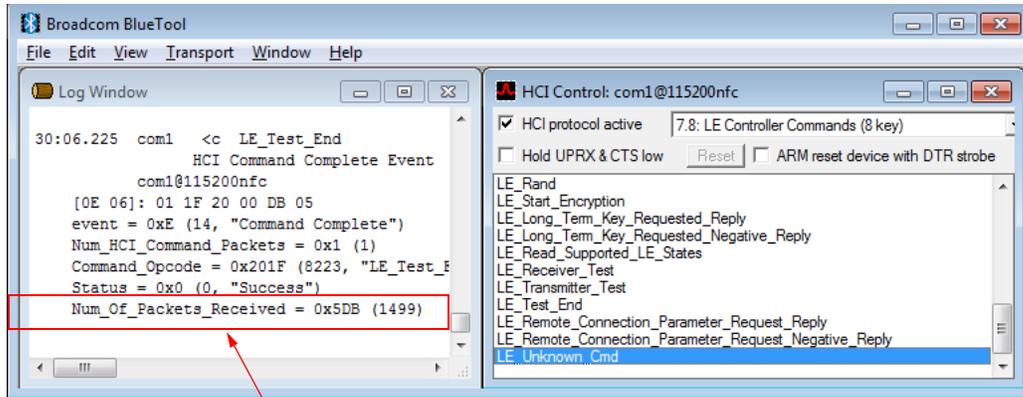


4. Click **OK**.

Note: Make sure the tester transmits the number of packets (1500 packets as specified) and the level appropriately.

5. After the test completes the transmission, under HCI Control, select **7.8: LE Controller Commands (8 key)**, and then double-click **LE_Test_End**.

The number of good packets received is reported in the log window.



Good Packets Received

6. Repeat Step 1 through Step 5 to make the next receive test measurement.

Document History Page

| Document Title: AN214890 - Low-Energy Bluetooth RF Testing Using BlueTool | | | | |
|---|---------|-----------------|-----------------|----------------------------------|
| Document Number: 002-14890 | | | | |
| Rev. | ECN No. | Orig. of Change | Submission Date | Description of Change |
| ** | - | - | 03/18/2014 | 20738-AN300-R Initial release |
| *A | 5452409 | UTSV | 09/28/2016 | Updated in Cypress template |
| *B | 5824556 | AESATMP8 | 07/19/2017 | Updated logo and Copyright. |

Worldwide Sales and Design Support

Cypress maintains a worldwide network of offices, solution centers, manufacturer's representatives, and distributors. To find the office closest to you, visit us at [Cypress Locations](#).

Products

| | |
|-------------------------------|--|
| ARM® Cortex® Microcontrollers | cypress.com/arm |
| Automotive | cypress.com/automotive |
| Clocks & Buffers | cypress.com/clocks |
| Interface | cypress.com/interface |
| Internet of Things | cypress.com/iot |
| Memory | cypress.com/memory |
| Microcontrollers | cypress.com/mcu |
| PSoC | cypress.com/psoc |
| Power Management ICs | cypress.com/pmic |
| Touch Sensing | cypress.com/touch |
| USB Controllers | cypress.com/usb |
| Wireless Connectivity | cypress.com/wireless |

PSoC® Solutions

[PSoC 1](#) | [PSoC 3](#) | [PSoC 4](#) | [PSoC 5LP](#) | [PSoC 6](#)

Cypress Developer Community

[Forums](#) | [WICED IOT Forums](#) | [Projects](#) | [Video](#) | [Blogs](#) | [Training](#) | [Components](#)

Technical Support

cypress.com/support

All other trademarks or registered trademarks referenced herein are the property of their respective owners.



Cypress Semiconductor
198 Champion Court
San Jose, CA 95134-1709

© Cypress Semiconductor Corporation, 2014-2017. This document is the property of Cypress Semiconductor Corporation and its subsidiaries, including Spansion LLC ("Cypress"). This document, including any software or firmware included or referenced in this document ("Software"), is owned by Cypress under the intellectual property laws and treaties of the United States and other countries worldwide. Cypress reserves all rights under such laws and treaties and does not, except as specifically stated in this paragraph, grant any license under its patents, copyrights, trademarks, or other intellectual property rights. If the Software is not accompanied by a license agreement and you do not otherwise have a written agreement with Cypress governing the use of the Software, then Cypress hereby grants you a personal, non-exclusive, nontransferable license (without the right to sublicense) (1s) under its copyright rights in the Software (a) for Software provided in source code form, to modify and reproduce the Software solely for use with Cypress hardware products, only internally within your organization, and (b) to distribute the Software in binary code form externally to end users (either directly or indirectly through resellers and distributors), solely for use on Cypress hardware product units, and (2) under those claims of Cypress's patents that are infringed by the Software (as provided by Cypress, unmodified) to make, use, distribute, and import the Software solely for use with Cypress hardware products. Any other use, reproduction, modification, translation, or compilation of the Software is prohibited.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS DOCUMENT OR ANY SOFTWARE OR ACCOMPANYING HARDWARE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. To the extent permitted by applicable law, Cypress reserves the right to make changes to this document without further notice. Cypress does not assume any liability arising out of the application or use of any product or circuit described in this document. Any information provided in this document, including any sample design information or programming code, is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Cypress products are not designed, intended, or authorized for use as critical components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or system could cause personal injury, death, or property damage ("Unintended Uses"). A critical component is any component of a device or system whose failure to perform can be reasonably expected to cause the failure of the device or system, or to affect its safety or effectiveness. Cypress is not liable, in whole or in part, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from or related to all Unintended Uses of Cypress products. You shall indemnify and hold Cypress harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of Cypress products.

Cypress, the Cypress logo, Spansion, the Spansion logo, and combinations thereof, WICED, PSoC, CapSense, EZ-USB, F-RAM, and Traveo are trademarks or registered trademarks of Cypress in the United States and other countries. For a more complete list of Cypress trademarks, visit cypress.com. Other names and brands may be claimed as property of their respective owners.