AN214775

Enabling the CYW20704 for Transmit and Receive Testing

Associated Part Family: CYW20704

This document describes the procedures using BlueTool™ software to verify FCC compliance of the CYW20704 in the transmit and receive modes for Bluetooth and Bluetooth low energy (BLE).

1 About This Document

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

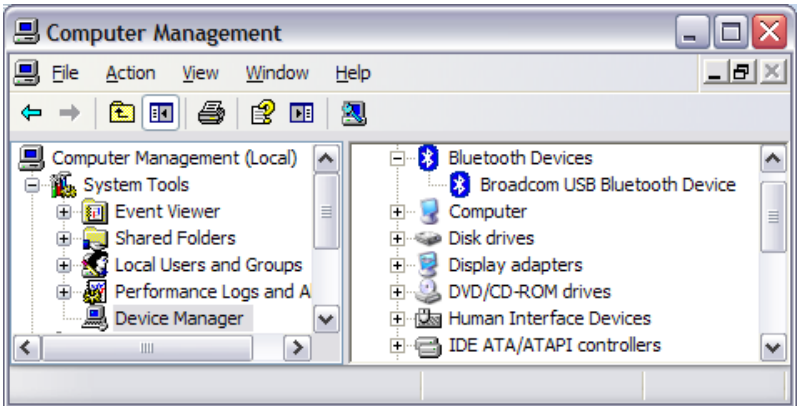
Broadcom Part Number	Cypress Part Number
BCM20704	CYW20704

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 Connect the Device and Verify Communication

1. Connect the Bluetooth device to a USB port on the computer.
2. From the **Start** menu on the PC, right-click **My Computer**, then select **Manage** from the context menu.
3. On the left panel of the Computer Management window, select **Device Manager**.
4. On the right panel, verify that “Broadcom USB Bluetooth Device” is present under “Bluetooth Devices”. This indicates that the device is communicating with the computer.
5. Close the Computer Management window.

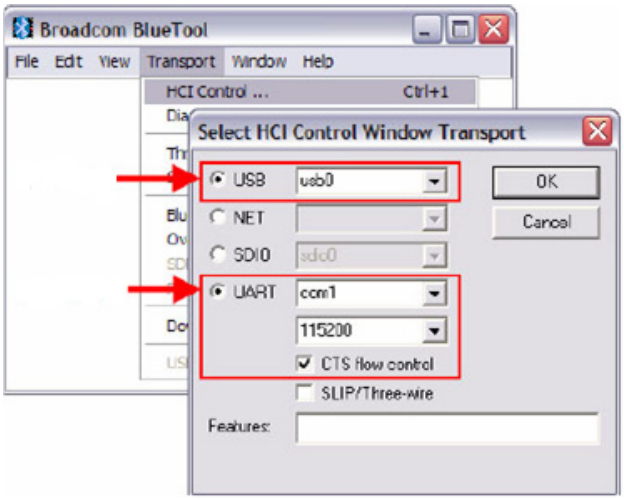


4 Set Up BlueTool For Bluetooth Testing

Note: BlueTool™ version 1.1.8 was used for the following procedures.

1. Start BlueTool (from the **Start** menu, select **Programs**, then **Broadcom BlueTool**, then **BlueTool**).
2. From the BlueTool **View** menu, select **Log Window**. The BlueTool log window is used to verify issued commands and display their results.
3. From the BlueTool **Transport** menu, select **HCI Control**.
4. In the Select HCI Control Window Transport window, select one of the following options:

- USB—If the USB option is selected, then select **usb0** from the menu.
- UART—If the UART option is selected, then select the appropriate COM port, set the baud rate to **115200**, and select **CTS flow control**.

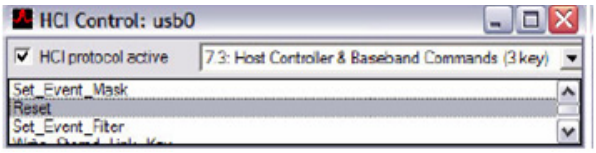


5. Click the **OK** button.
   The HCI Control window appears.

5 Reset the Device Under Test

Note: The Device Under Test (DUT) should be reset before each procedure.

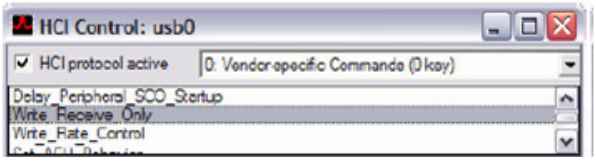
1. In the HCI Control window, clear the **HCI protocol active** option, then select it again.
2. Select **7.3: Host Controller & Baseband Commands (3 key)** from the menu.
3. Double-click **Reset** from the command list to reset the DUT.



6 Receive Test

The following procedure puts the DUT in receive mode. It is a nonhopping, write receive-only test.

1. In the HCI Control window, select **0: Vendor-specific Commands (0 key)** from the menu.
2. Double-click **Write_Receive_Only** from the command list.



3. In the HCI Command: Write_Receive_Only window, enter the desired frequency:
   - Low: 2402 MHz
   - Mid: 2441 MHz
   - High: 2480 MHz
4. Click the **OK** button.

If the test is successful, then in the BlueTool Log Window, the last line will read “Status = 0x0 (0, "Success")”.

7 Transmit Tests

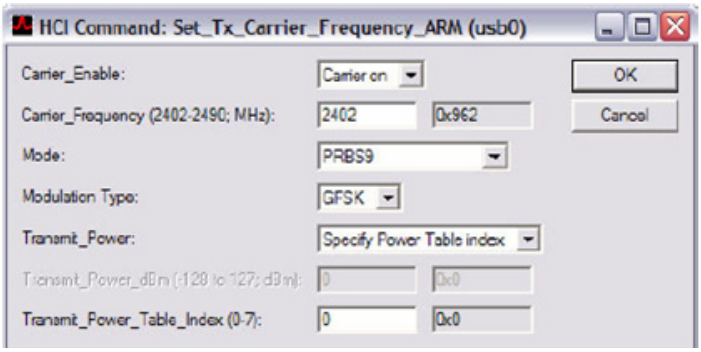
7.1 Single Frequency, Nonhopping

The following procedure sets the transmit carrier frequency ARM.

1. Reset the device (see Reset the Device Under Test on page 3).
2. In the HCI Control window, select **0: Vendor-specific Commands (0 key)** from the menu.
3. Double-click **Set_Tx_Carrier_Frequency_ARM** from the command list.
4. In the HCI Command: Set_Tx_Carrier_Frequency_ARM window, select the following options:
   - Carrier_Enable—Select **Carrier on**.
   - Carrier_Frequency—Enter the desired output frequency.
   - Mode—Select **PRBS9**.
   - Modulation Type—Select **GFSK**, **8PSK**, or **QPSK**.

Note: Only one modulation type can be selected for a specific test instance, but all three types must be tested for FCC compliance.

   - Transmit_Power—Select **Specify Power Table index**.
   - Transmit_Power_Table_Index—Enter **0**.

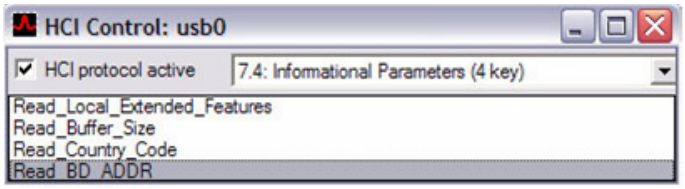


5. Click the **OK** button.

7.2 Frequency Hopping

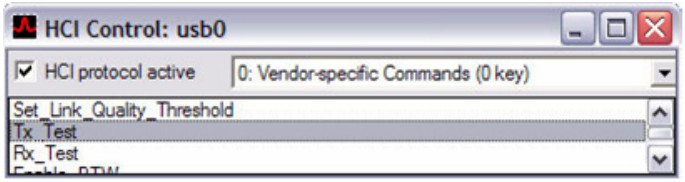
7.2.1 ACL Basic

1. Reset the device (see Reset the Device Under Test on page 3).
2. In the HCI Control window, select **7.4: Informational Parameters (4 key)** from the menu.
3. Double-click **Read_BD_ADDR** from the command list.



In the BlueTool Log Window, the last line will show the Bluetooth device address of the DUT.

4. In the HCI Control window, select **0: Vendor-specific Commands (0 key)** from the menu.
5. Double-click **Tx_Test** from the command list.

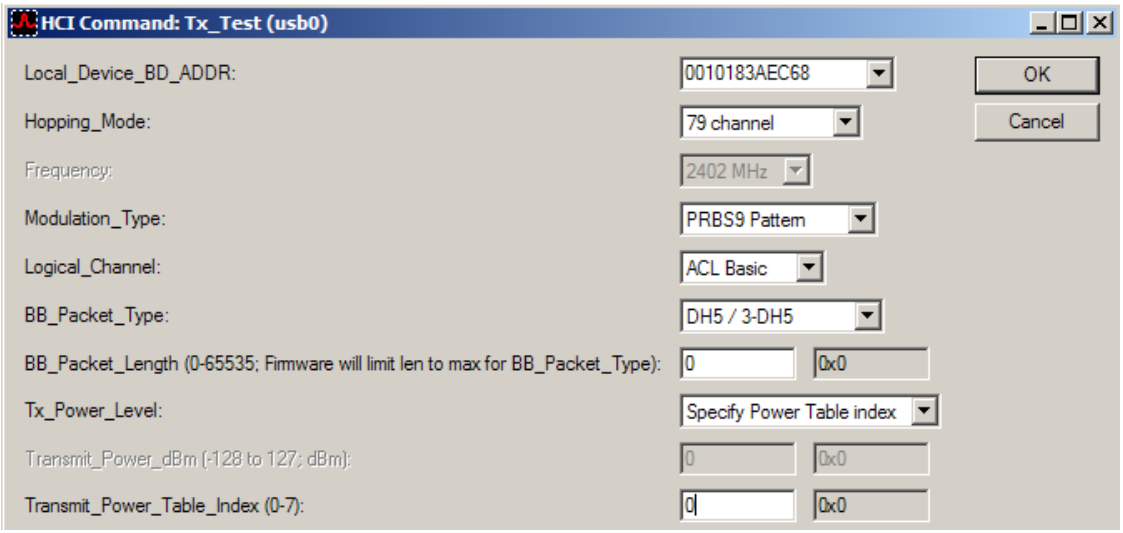


6. In the HCI Command: Tx_Test window, select the following options:

- Local_Device_BD_ADDR—Select the Bluetooth device address of the DUT.
- Hopping_Mode—Select **79 channel**.
- Modulation_Type—Select **PRBS9 Pattern**.
- Logical_Channel—Select **ACL Basic**.
- BB_Packet_Type—Select **DH5/3-DH5**, **DH3/3-DH3**, or **DH1/2-DH1**.

Note: Only one packet type can be selected for a specific test instance, but all three types must be tested for FCC compliance.

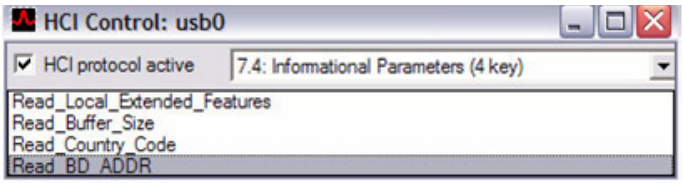
- BB_Packet_Length—Enter **65535**.
- Tx_Power_Level—Select **Specify Power Table index**.
- Transmit_Power_Table_Index—Enter **0**.



7. Click the **OK** button.

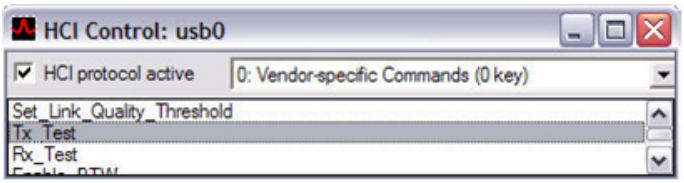
7.2.2 ACL EDR

1. Reset the device (see Reset the Device Under Test on page 3).
2. In the HCI Control window, select **7.4: Informational Parameters (4 key)** from the menu.
3. Double-click **Read_BD_ADDR** from the command list.



In the BlueTool Log Window, the last line will show the Bluetooth device address of the DUT.

4. In the HCI Control window, select **0: Vendor-specific Commands (0 key)** from the menu.
5. Double-click **Tx_Test** from the command list.

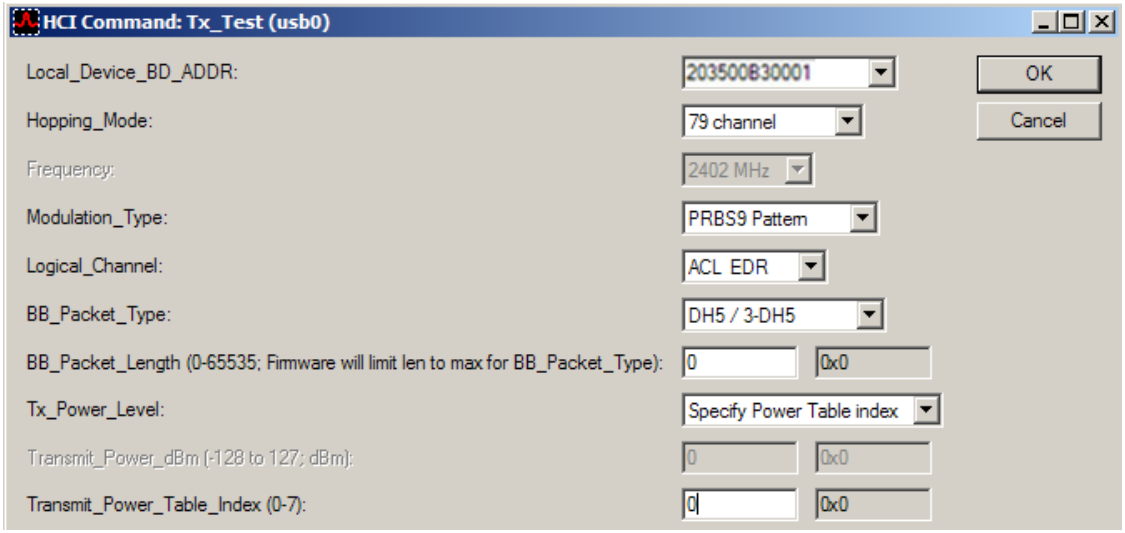


6. In the HCI Command: Tx_Test window, select the following options:

- Local_Device_BD_ADDR—Select the Bluetooth device address of the DUT.
- Hopping_Mode—Select **79 channel**.
- Modulation_Type—Select **PRBS9 Pattern**.
- Logical_Channel—Select **ACL EDR**.
- BB_Packet_Type—Select **DH5/3-DH5** or **DM5-2DH5**.

Note: Only one packet type can be selected for a specific test instance, but both types must be tested for FCC compliance.

- BB_Packet_Length—Enter **65535**.
- Tx_Power_Level—Select **Specify Power Table index**.
- Transmit_Power_Table_Index—Enter **0**.



7. Click the **OK** button.

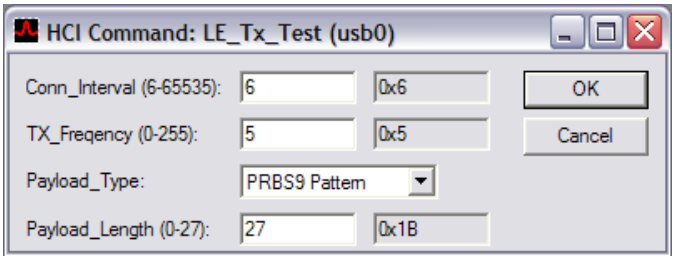
8 Set Up BlueTool for BLE Testing

8.1 Transmit Mode BLE

8.1.1 Single Frequency, Nonhopping

1. Reset the device (see Reset the Device Under Test on page 3).
2. In the HCI Control window, select **0: Vendor-specific Commands (0 key)** from the menu.
3. Double-click **LE_Tx_Test** from the command list.
4. In the HCI Command: LE_Tx_Test window, select the following options:

- Conn_Interval—Enter **6**.
- TX_Frequency—Enter a specific channel (0–36).
- Payload_Type—Select a pattern.
- Payload_Length—Enter **27**.



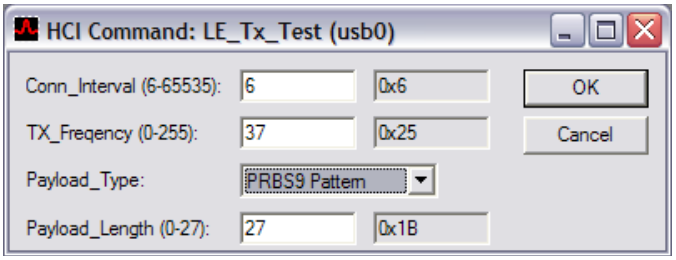
5. Click the **OK** button.

8.1.2 Hopping Across All 37 Channel Frequencies

1. Reset the device (see Reset the Device Under Test on page 3).
2. In the HCI Control window, select **0: Vendor-specific Commands (0 key)** from the menu.
3. Double-click **LE_Tx_Test** from the command list.
4. In the HCI Command: LE_Tx_Test window, select the following options:

- Conn_Interval—Enter **6**.

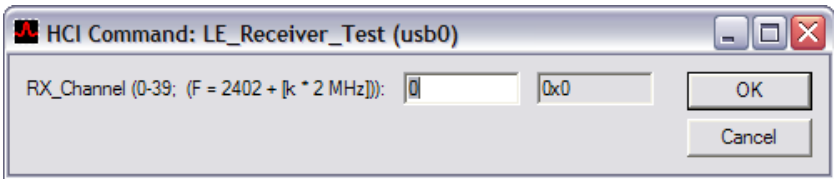
- TX_Frequency—Enter **37**.
- Payload_Type—Select a pattern.
- Payload_Length—Enter **27**.



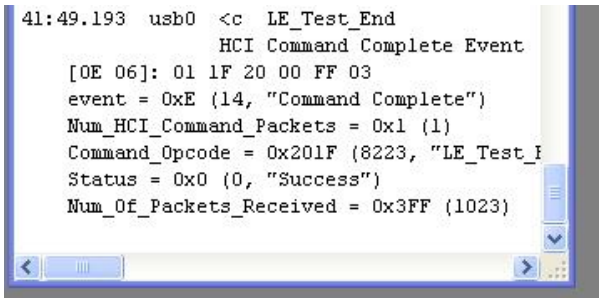
5. Click the **OK** button.

8.2 Receive Test BLE

1. Reset the device (see Reset the Device Under Test on page 3).
2. In the HCI Control window, select **7.8: LE Controller Commands (8 key)** from the menu.
3. Double-click **LE_Receiver_Test** from the command list.
4. In the HCI Command: LE_Receiver_Test window, enter the RX channel number.



5. Click the **OK** button.
6. When finished running the receiver test, then in the HCI Control window, select **7.8: LE Controller Commands (8 key)** from the menu.
7. Double-click **LE_Test_End** from the command list.
   In the BlueTool Log Window, the “Num_Of_Packets_Received” line will show the amount of packets received by the DUT.



Document History Page

Document Title: AN214775 - Enabling the CYW20704 for Transmit and Receive Testing Document Number: 002-14775				
Rev.	**ECN No.**	**Orig. of Change**	**Submission Date**	**Description of Change**
**	-	-	05/11/2015	Initial release
*A	5449057	UTSV	09/27/2016	Updated in Cypress template Added Cypress part numbering scheme
*B	5840403	AESATMP8	08/01/2017	Updated logo and Copyright.

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