

THIS SPEC IS OBSOLETE

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Spec Title: AN214866 - BCM920730: TRANSMIT AND RECEIVE
TESTING WITH BLUETOOL(TM)

Replaced by: None

BCM920730: Transmit and Receive Testing with BlueTool™

Associated Part Family: CYW20730

This application note describes the basic hardware and software setup needed to conduct transmit and receive tests using a BCM920730 reference board. It includes procedures to set the CYW20730 in Transmit and Receive modes as required when measuring emissions for FCC compliance.

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1 Introduction

This application note describes the basic hardware and software setup needed to conduct transmit and receive tests using a BCM920730 reference board. It includes procedures to set the CYW20730 in Transmit and Receive modes as required when measuring emissions for FCC compliance.

The CYW20730 is a Bluetooth 3.0 single-chip HID (human interface device) solution that enables advanced wireless connectivity for PC peripherals and 3D glasses at more competitive price points and longer battery life than competing solutions. The CYW20730 Bluetooth transceiver solution integrates key electronic components that are commonly found in keyboards, mouse devices, remote controls and 3D glasses, enabling more affordable wireless products that extend and enhance the experience of using PCs, notebooks, netbooks, tablets, DTVs, set-top-boxes, Blu-ray players, and a growing range of consumer electronics 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
BCM20730	CYW20730

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 Hardware and Software Requirements

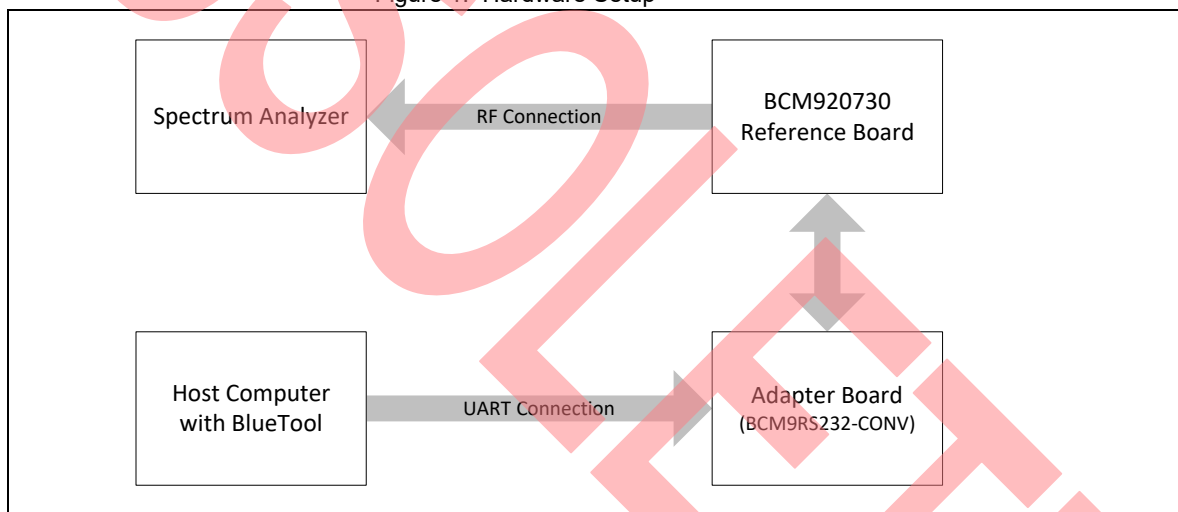
The following equipment and software are required to successfully complete the tasks described in this document:

- BCM920730 reference board
- BCM9RS232-CONV UART adapter board
- Personal computer
- Spectrum analyzer, such as the Agilent® ESA-E Series
- Miscellaneous serial and coax cables for connecting the hardware
- BlueTool software

3.1 Hardware Setup

1. Connect the device under test (the BCM920730 reference board) to the serial adapter board (BCM9RS232-CONV) with a 4-wire cable (see Figure 1).
 2. Connect the serial adapter board to the PC using a serial cable.
 3. Power up the serial adapter board.
 4. Connect the BCM920730 reference board to the spectrum analyzer using an SMA coaxial cable.
- You are now ready to begin testing. See [BlueTool Setup on page 3](#) for details on configuring BlueTool.

Figure 1: Hardware Setup



3.2 BlueTool Setup

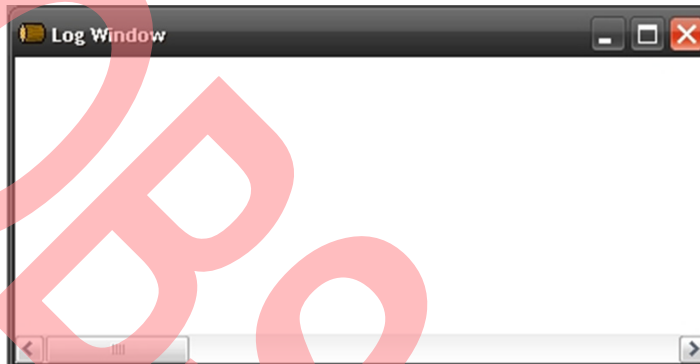
BlueTool has an integrated Perl module that provides an interface to automate the use of Perl Scripts.

ActivePerl 5.8.4 (or newer) must be installed before the BlueTool application is installed. Click the link below to get a free download of ActivePerl:

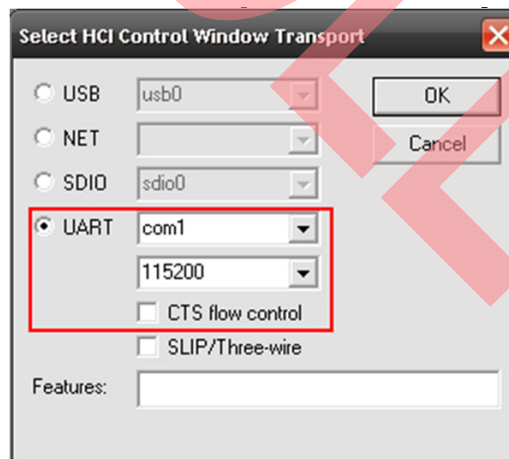
www.activestate.com/activeperl/

Follow the steps below to set up BlueTool for receive/transmit testing.

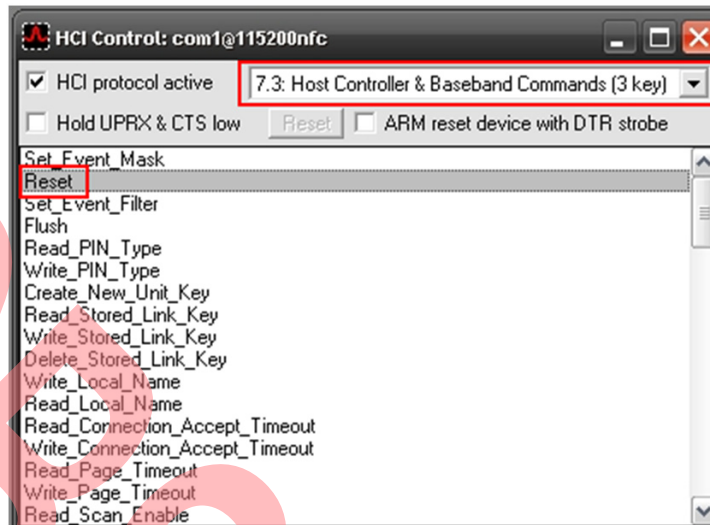
1. Start the BlueTool application. In the **View** menu, select **Log Window** to open the BlueTool **Log Window**.



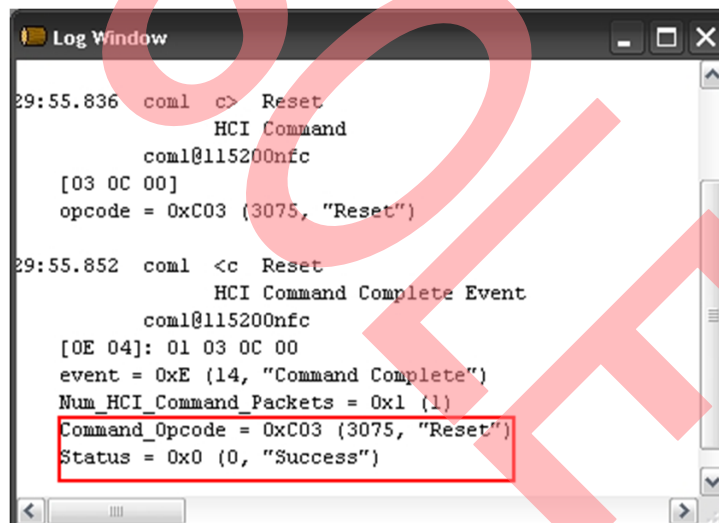
2. In the **Transport** menu, select **HCI Control** to open the **Select HCI Control Window Transport** window, then set the following options:
 - a. Select the **UART** option.
 - b. Select **com1** for the COM port.
 - c. Set the baud rate to 115200.
 - d. Make sure **CTS flow control** is NOT selected.
 - e. Click **OK** to save the option settings.



- After clicking OK to save the UART option, an **HCI Control** command window will open. Select **7.3: Host Controller & Baseband Commands (3 key)** from the command list, then double-click the **Reset** command.



- After double-clicking the **Reset** command, the log window should indicate **Success** for the reset status.



BlueTool is now set for receive/transmit testing. Three tests are described in the following sections:

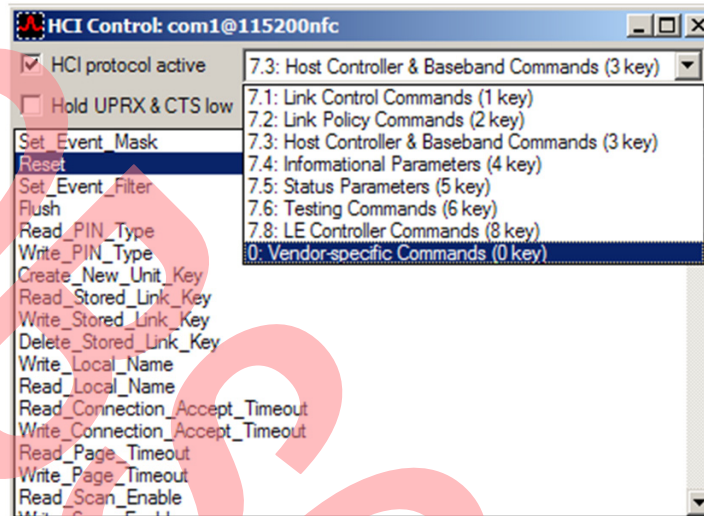
- [Receive Testing](#)
- [Single-Frequency Transmit Testing](#)
- [Frequency-Hopping Transmit Testing](#)

4 Receive Testing

Follow the steps below to set the BCM920730 reference board in Receive mode for receive testing.

Note: You must complete all the steps in [Hardware Setup on page 2](#) and [BlueTool Setup on page 3](#) before starting this procedure.

1. In the **HCI Control** window, select **0: Vendor specific Command (0 Key)** from the command list.



2. In the **HCI Control** window, double-click the **Write_Receive_Only** command to open the **HCI Command: Write_Receive_Only** window (you may have to scroll down to find this command).
3. In the **HCI Command: Write_Receive_Only** window, enter the appropriate frequency in the **Receive_Frequency** field (2042 MHz for low channel, 2441 MHz for mid-channel, and 2480 MHz for high channel), then click **OK**.



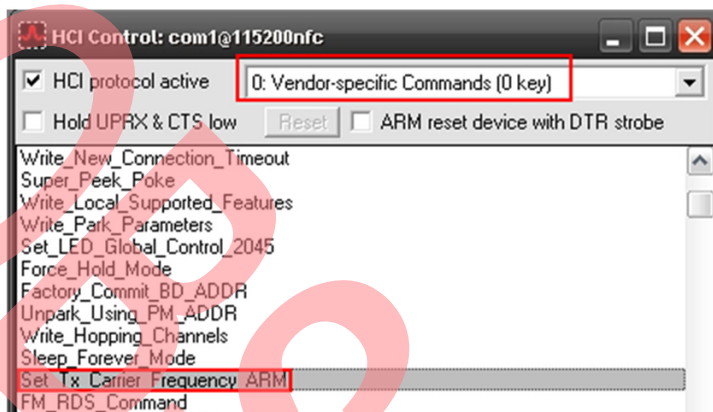
4. To verify the results, check the **BlueTool Log Window** to verify the parameters were set correctly and the response **Receive_Frequency** is the same as the frequency set in Step 3 above.

5 Single-Frequency Transmit Testing

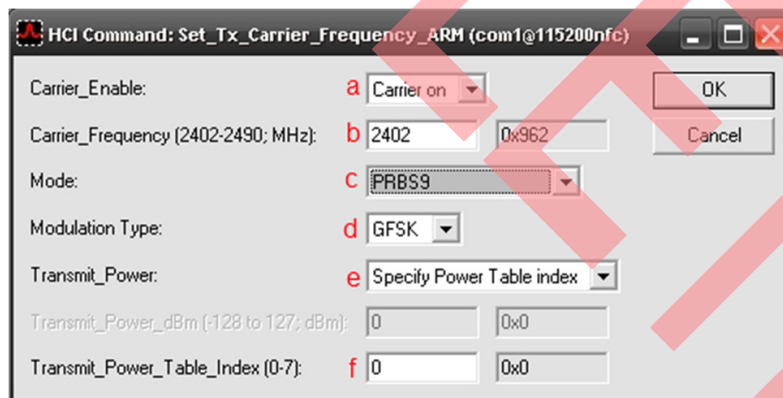
Follow the steps below to set the BCM920730 reference board in Transmit mode for single-frequency testing.

Note: You must complete all the steps in [Hardware Setup on page 2](#) and [BlueTool Setup on page 3](#) before starting this procedure.

1. In the **HCI Control** window, select **0: Vendor-specific Command (0 Key)** from the command list, then double-click the **Set_Tx_Carrier_Frequency_ARM** command to set the BCM920730 reference board in Transmit mode and open the **HCI Control: Set_Tx_Carrier_Frequency_ARM** window.



2. Select the following options in the **HCI Control: Set_Tx_Carrier_Frequency_ARM** window:
 - a. **Carrier Enable:** select **Carrier on**.
 - b. **Carrier Frequency:** enter the appropriate carrier frequency in this field (low channel = 2402 MHz, mid channel = 2441 MHz, high channel = 2480 MHz)
 - c. **Mode:** select **PRBS9**.
 - d. **Modulation Type:** select **GFSK**.
 - e. **Transmit Power:** select **Specify Power Table Index**.
 - f. **Transmit Power Table Index:** enter zero in this field.



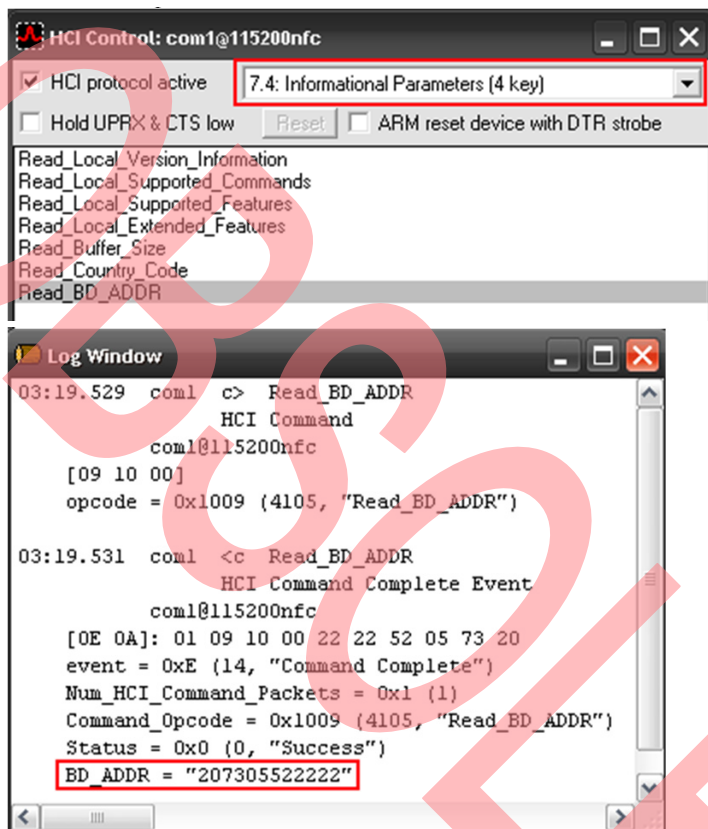
3. Click **OK**. BlueTool should now be set to measure transmit spurs. Check the **BlueTool Log Window** to verify the parameters were set correctly and the response transmit frequency is same as the frequency set in Step 3 above.

6 Frequency-Hopping Transmit Testing

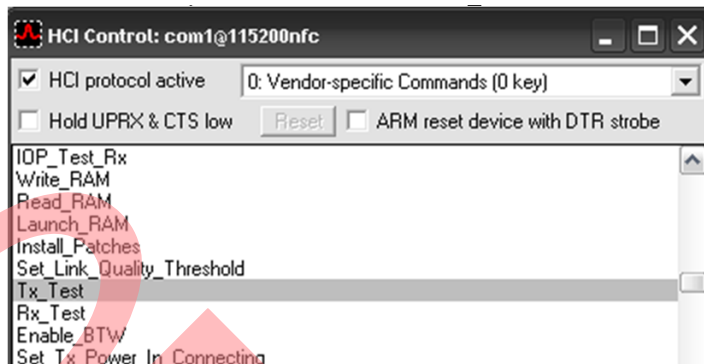
Follow the steps below to set the BCM920730 reference board in Transmit mode for frequency-hopping testing.

Note: You must complete all the steps in [Hardware Setup on page 2](#) and [BlueTool Setup on page 3](#) before starting this procedure.

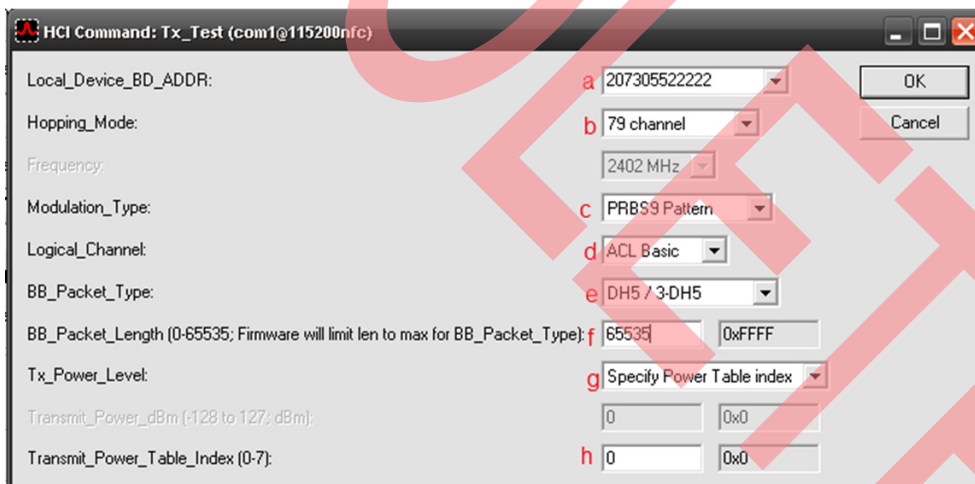
1. In the **HCI Control** window, select **74: Informational Parameters (4 Key)** from the command list, then double-click the **Read_BD_ADDR** command. Record the board address shown in the **Log Window**.



2. In the **HCI Control** window, select **0: Vendor-specific Command (0 Key)** from the command list, then double-click the **Tx_Test** command to open the **HCI Command: Tx_Test** window.



3. Set the following options in the **HCI Command: Tx_Test** window:
 - a. **Local_Device_BD_ADDR**: make sure this board address matches the board address recorded in [Step 1 on page 7](#).
 - b. **Hopping_Mode**: select **79 channel**.
 - c. **Modulation_Type**: select **PRBS9 Pattern**.
 - d. **Logical_channel**: select **ACL Basic**.
 - e. **BB_Packet_type**: select **DH5/3-DH5**.
 - f. **BB_Packet_Length**: enter **65535** in this field.
 - g. **Tx_Power_Level**: select **Specify Power Table index**.
 - h. **Transmit_Power_Table_Index**: enter zero in this field.



4. Click **OK** to perform frequency hopping test.

Appendix A: Acronyms and Abbreviations

The following list of acronyms and abbreviations applies specifically to Cypress wireless and mobile products and associated power management products. This list is updated regularly. If you come across a term that is not here but should be, contact your Cypress representative.

For a comprehensive list of acronyms and other terms used in Cypress documents, go to:

<http://www.cypress.com/glossary>

7 Mobile Communications

Term	Description
ACI	Accessory Control Interface
ACP	Accelerator Coherency Port
AHB	Advanced High Performance Bus
ALU	Arithmetic and Logic Unit
APB	Advanced Peripheral Bus
ATB	Advanced Trace Bus
AXI	Advanced eXtensible Interface
BBC	backup battery charger
BSC	Broadcom Serial Control
CCI	Camera Control Interface
CCP	Compact Camera Port
CCU	Clock Control Unit
CSI	Camera Serial Interface
CSR	core switching regulator
CTI	cross trigger interface
CTM	Cross Trigger Matrix
DAP	Debug Access Port
DBI	Display Bus Interface
DCXO	Digitally Compensated Crystal Oscillator
DigRF	Baseband/RF Digital interface specification
DPI	display pixel interface
DRM	Digital Rights Management
DSI	Display Serial Interface
ETB	Embedded Trace Buffer
ETM	Embedded Trace Macrocell
EVM	Error Vector Magnitude
GIC	General Interrupt Controller
GPRS	General Packet Radio Service
HSDPA	High Speed Downlink Packet Access
HSUPA	High Speed Upload Packet Access
I ² S	Inter-IC Sound
IF	Intermediate Frequency
IHF	Internal Hands-Free
IOSR	Input/Output Service Request
ITM	Instruction Trace Module

Term	Description
ITU	International Telecommunication Union
LDO	low dropout regulator
LNA	Low Noise Amplifier
MEMC	memory controller
MIDI	Musical Instrument Digital Interface
MIPI	Mobile Industry Processor Interface
MM	multimedia
MTT	mobile trace terminal
NTC	Negative Temperature Coefficient
OCP	Open Core Protocol
PA	Power Amplifier
PCGUI	Phone Control Graphical User Interface
PDM	pulse density modulation
PIM	personal information manager
PMU	Power Management Unit
PTI	Parallel Trace Interface
PTM	Program-flow Trace Macrocell
SAIC	Single Antenna Interferer Cancellation
STM	System Trace Module
STP	System Trace Protocol
SWD	Serial Wire Debug
TLB	translation lookaside buffer
TPIU	Trace Port Interface Unit
UMI	Unified Memory Interface

8 Power Management

Term	Description
ACA	Accessory Charger Adapter
BB	baseband
CC	Constant Current
CDP	Charging Downstream Port
CV	Constant Voltage
DBI	Digital Battery Interface
DCP	Dedicated Charging Port
DVS	Dynamic Voltage Scaling
FG	fuel gauge
HOSTON	PMU state is on
Li-ion	Lithium ion battery
LPM	low power mode
MBC	main battery charger
MBRDY	PMU state is off but it is ready to turn on
MBWV	Main Battery Working Voltage
NM	normal mode
OTG	On-the-Go
PSRR	Power Supply Rejection Ratio
PWRUP	PMU state is off and it is not ready to turn on
SDP	Standard Downstream Port
SDSR	SD switching regulator
USBC	USB charger
VBAT	Main Battery Voltage
WAC	wall adapter charger
WDT	watchdog timer

8.1

References

The references in this section may be used in conjunction with this document.

Note: Cypress provides customer access to technical documentation and software through its Customer Support Portal (CSP) and Downloads & Support site (see [IoT Resources](#)).

For Cypress documents, replace the “XX” in the document number with the largest number available in the repository to ensure that you have the most current version of the document.

Document	Cypress Document Number	Source
Cypress Documents		
[1] Single-Chip Bluetooth® Transceiver for Wireless Input Devices	002-14866	community.cypress.com
[2] Bluetooth Evaluation Board Reference Design	–	community.cypress.com
[3] Bluetooth Evaluation Board Reference Design	–	community.cypress.com
Bluetooth 2.0 Specifications and Documentation		
[4] Bluetooth SIG Specification of the Bluetooth System Core v1.1	–	http://bluetooth.com/
[5] Bluetooth SIG Specification of the Bluetooth System Core v1.2	2/22, 2001	http://bluetooth.com/
[6] Bluetooth SIG Specification of the Bluetooth System Profiles v1.1	2/22, 2001	http://bluetooth.com/

Document History Page

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Rev.	ECN No.	Orig. of Change	Submission Date	Description of Change
**	—	—	01/31/2011	920730-AN200-RI Initial release.
*A	5454766	UTSV	11/12/2016	Updated to Cypress template.
*B	5815102	AESATMP9	07/13/2017	Updated logo and copyright.
*C	6439086	SELE	01/11/2019	Obsolete document. Completing Sunset Review.

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