

Measuring Antenna Isolation

Associated Part Family: CYW43242

This document provided guidance on how to measure antenna isolation to customers who are designing WLAN/Bluetooth combo boards that include the CYW43242.

1 About This Document

1.1 Purpose and Audience

This document provided guidance on how to measure antenna isolation to customers who are designing WLAN/Bluetooth combo boards that include the CYW43242.

1.2 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
BCM43242	CYW43242

1.3 Acronyms and Abbreviations

In most cases, acronyms and abbreviations are defined on 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

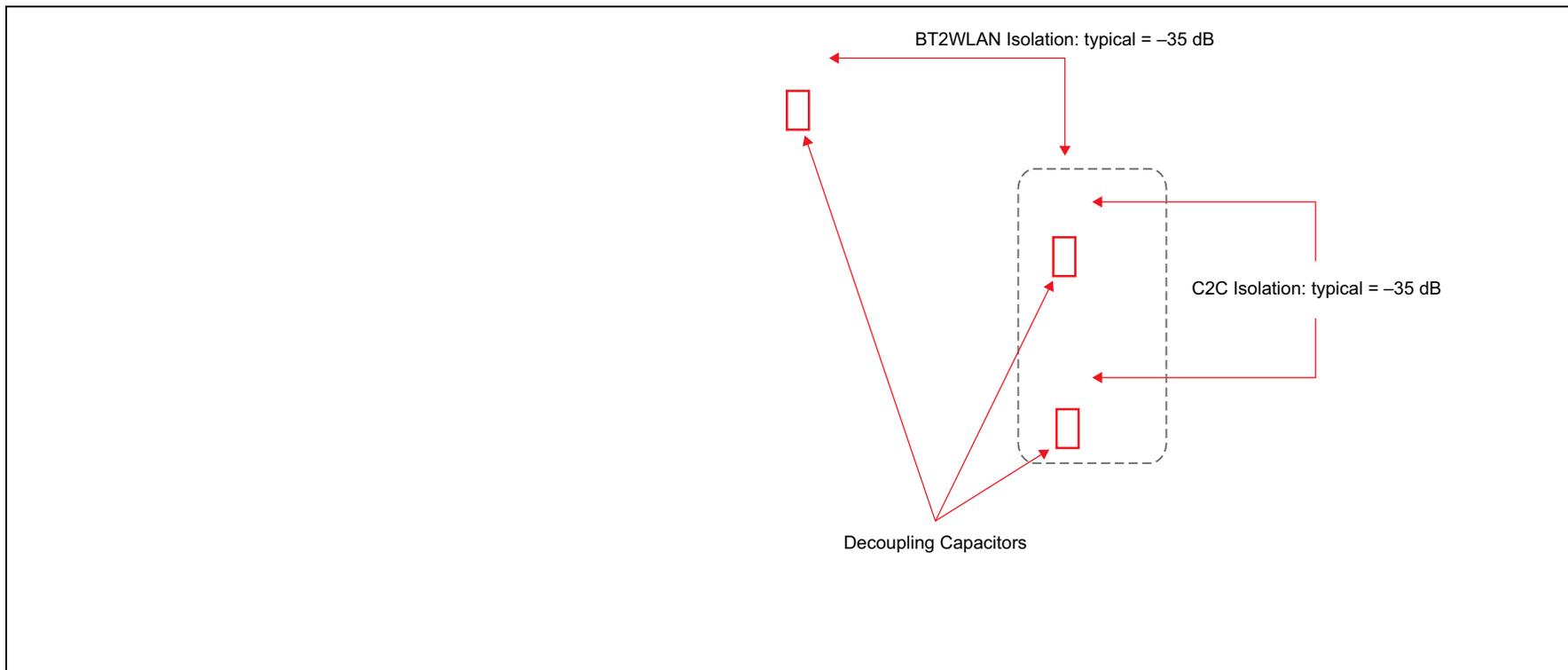
Cypress provides a wealth of data at <http://www.cypress.com/internet-things-iot> to help you to select the right IoT device for your design, and quickly and effectively integrate the device into your design. Cypress provides customer access to a wide range of information, including technical documentation, 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/>).

1 Board Setup For Antenna Isolation Measurements

Install pigtails on the board so that each of the antennas can be monitored. To do this, follow the steps below:

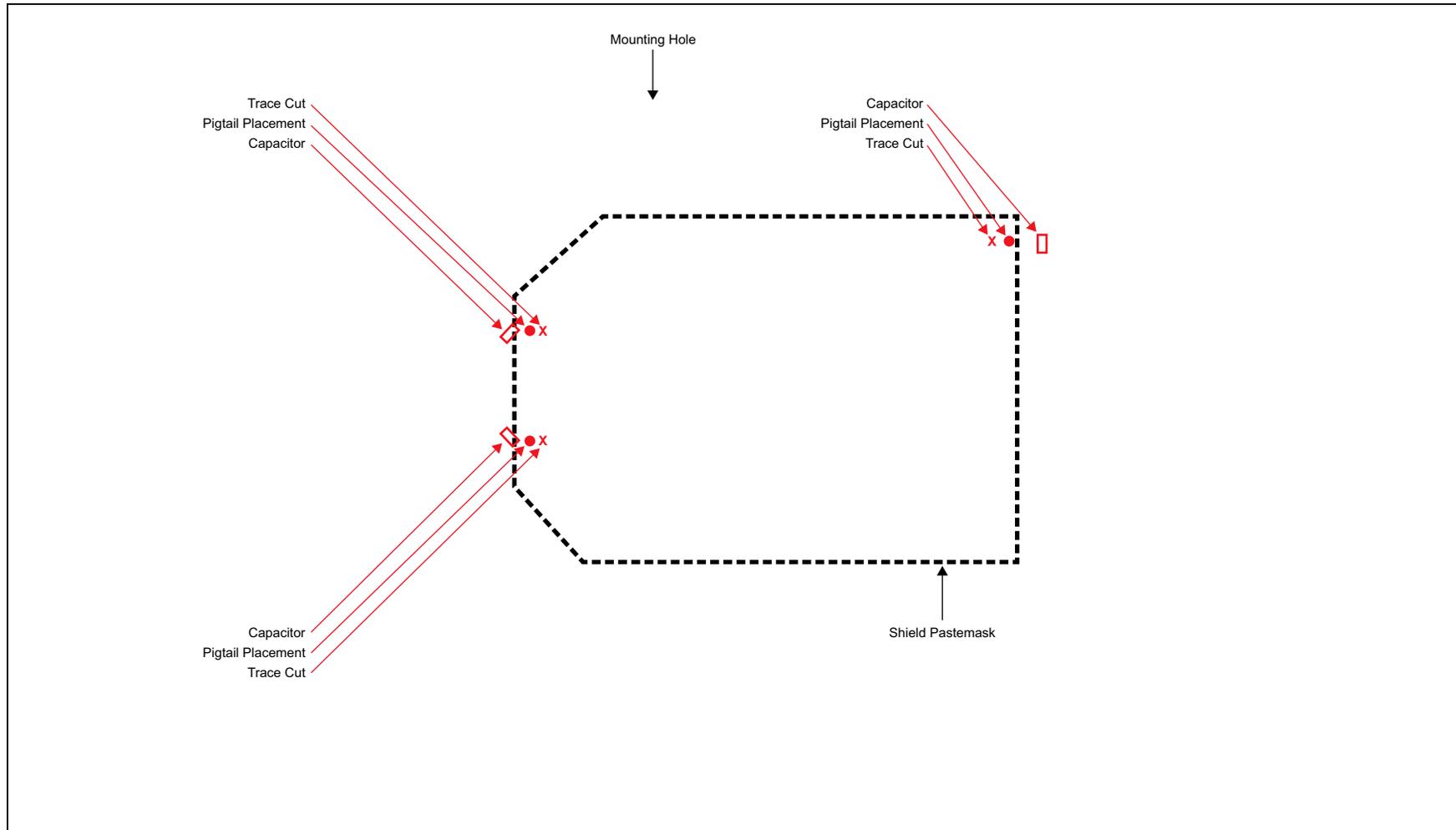
1. Configure the coupling capacitors so that CYW43242 is attached to the antennas rather than the U.FL connectors (see [Figure 1](#)). For the BCM43242UAB_P300, this should be:
 - C943 = AC
 - C966 = BC
 - C935 = BC

Figure 1. Block Diagram of the BCM43242UAB_P300 PCB Showing the Location of the Coupling Capacitors



2. Cut the trace as marked in [Figure 2](#). This should be within the boundaries of the shield.
3. Cut four pigtails of equal length. Connect three of the pigtails to the antennas and set aside one for vector network analyzer calibration. Install ferrite sleeves on the three pigtails connected to the antennas. Attach the sleeved pigtails between the trace cuts and the capacitors as shown in [Figure 2](#).

Figure 2. BCM43242UAB_P300 PCB Showing Installation of Coupling Capacitors

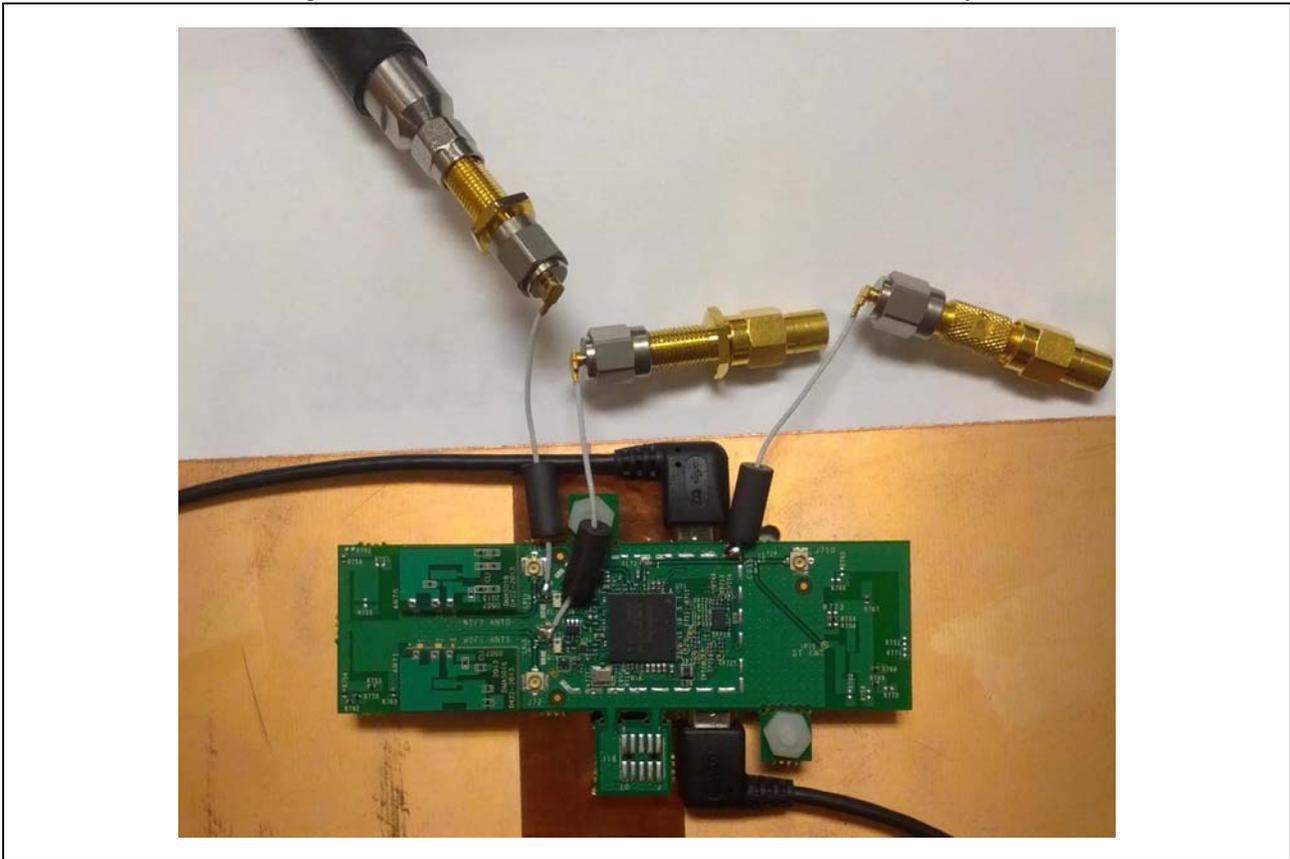


2 Test Setup For Antenna Isolation Measurements

Connect USB cables to the J73 and J74 connectors on the BCM43242UAB_P300 PCB. If the measurements are being done over a metal chassis, the metal and the USB cable should have a common ground. If no metal plate reference is used for the antennas (as is the case with open air measurements), then attach the USB cables to J73 and J74 and keep the other end of each cable unconnected.

Slide the ferrite sleeves on the pigtails close to the BCM43242UAB_P300 board as shown in [Figure](#) .

Figure 3. Cable Connections from the Board to the Network Analyzer



3 Making Isolation Measurements

Calibrate the network analyzer using 2-port calibration. Apply port extension using the pigtail set aside for calibration.

Attach the pigtails to the network analyzer, ensuring that the pigtails do not overlap the antennas on the BCM43242UAB_P300 board. Keep the network analyzer cables from touching the ground of the metal chassis, and keep the pigtails from touching each other. Any open pigtails should be terminated with 50Ω loads.

Recommended Bluetooth and WLAN return loss and isolation values are defined in [Table 1](#).

Table 1. Recommended Return Loss and Isolation Values

Measurement	Frequency of Interest (MHz)	Recommended Value
BT return loss	2402 to 2480	≤ -10 dB
S11 WLAN0 return loss	2402 to 2484, 5180 to 5825	≤ -10 dB
S11 WLAN1 return loss	2402 to 2484, 5180 to 5825	≤ -10 dB
S12 BT to WLAN0 isolation	2402 to 2480	≤ -35 dB
S12 BT to WLAN1 isolation	2402 to 2480	≤ -35 dB
S12 Core-to-Core isolation	2402 to 2484, 5180 to 5825	≤ -35 dB

Document History Page

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Rev.	ECN No.	Orig. of Change	Submission Date	Description of Change
**	—	—	02/05/2013	43242-AN100-R Initial release
*A	—	—	09/11/2013	43242-AN101-R Updated: • The entire document was updated to reflect the latest CYW43242 PCB design.
*B	5463525	UTSV	10/19/2016	Updated to Cypress template Added Cypress part numbering scheme
*C	5834576	BENV	07/27/2017	Updated logo and copyright

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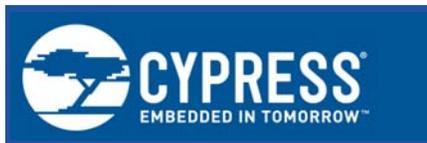
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