

SimpleLink™ CC3351 Dual-Band Wi-Fi® 6 and Bluetooth® Low Energy BoosterPack™ Plug-In Module

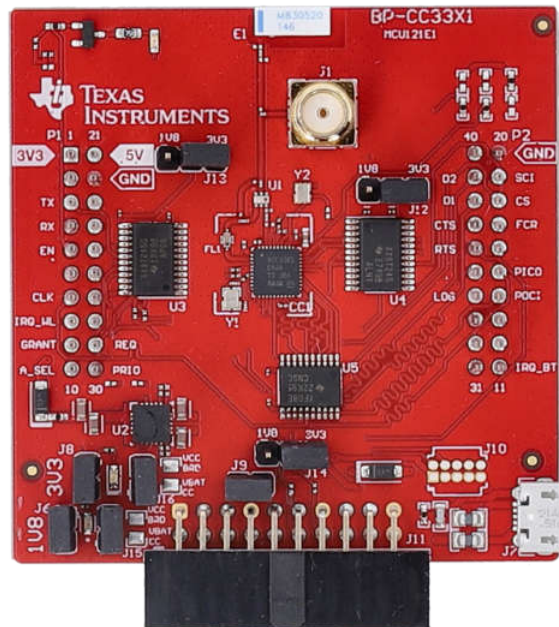


Description

The SimpleLink™ CC3351 Dual-Band Wi-Fi® 6 and Bluetooth® Low Energy devices enable affordable, reliable, and secure connectivity in embedded applications with a processor host running Linux® or an MCU host running RTOS. The CC3351 BoosterPack™ plug-in module (BP-CC3351) is a test and development board that can be easily connected to TI LaunchPad™ development kits or processor boards; thus, enabling rapid software development.

Features

- CC3351 dual-band Wi-Fi 6 and Bluetooth Low Energy combo device
- Two 20-pin stackable connectors (BoosterPack standard)
- Onboard chip dual-band antenna
- SMA/U.FL connector for conducted RF testing
- Power from onboard dual rail (3.3V and 1.8V) LDO using USB or LaunchPad
- 3 level shifters for voltage translation (3.3V to 1.8V)
- JTAG header pins for SWD interface with XDS110 or LP-XDS110ET
- Jumper for current measurement on both power supplies (3.3V and 1.8V) with provision to mount 0.1-ohm (0603) resistors for measurement with a voltmeter
- 32kHz oscillator for lower power evaluation



1 Evaluation Module Overview

1.1 Introduction

The CC3351 BoosterPack plug-in module (BP-CC3351) is a test and development board that can easily be connected to a TI LaunchPad or processor boards; thus, enabling rapid software development.

This user's guide explains the various hardware configurations and features of the BP-CC3351. For more information about the CC335x or CC330x devices, refer to the [CC3351](#) or [CC3301](#) product page.

Note

This plug-in module is designed to develop single-band (2.4GHz) CC330x and dual-band (2.4GHz and 5GHz) CC335x devices.

1.2 Kit Contents

- BP-CC3351 PCBA

1.3 Regulatory Compliance

The CC3351 BoosterPack plug-in module (BP-CC3351) is tested for and found to be in compliance with CE regulations regarding unlicensed intentional radiators. Hereby, Texas Instruments Inc. declares that the radio equipment type BP-CC3351 is in compliance with Directive 2014/53/EU. The BP-CC3351 is found to be RoHS compliant in accordance to EU Directives. The full text of the [EU Declaration of Conformity](#) is available.

RF Exposure Information (MPE)

This device has been tested and meets applicable limits for Radio Frequency (RF) exposure. To comply with the RF exposure requirements, this module must be installed in a host platform that is intended to be operated in a minimum of 20-cm separation distance to the user.

Frequency Bands and Max Power (e.i.r.p)

- Bluetooth LE: **8.58dBm** (EIRP power)
- Wi-Fi 2.4GHz: **17.92dBm** (EIRP power)
- Wi-Fi 5Ghz (5150MHz - 5725MHZ) : **17.51dBm** (EIRP power)

Indoor Usage Restrictions

The device is restricted to indoor use only when operating in the 5150MHz to 5350MHz frequency range.

	AT	BE	BG	HR	CY	CZ	DK
	EE	FI	FR	DE	EL	HU	IE
	IT	LV	LT	LU	MT	NL	PL
	PT	RO	SK	SI	ES	SE	UK(NI)

This label is not included on product packaging to maintain standard and consistent packaging required by Texas Instruments Incorporated. Users are encouraged to reference the EVM User's Guide for information on device compliance.

1.3.1 Waste Electrical and Electronic Equipment (WEEE)



Waste Electrical and Electronic Equipment (WEEE)

This symbol means that according to local laws and regulations your product and/or battery shall be disposed of separately from household waste. When this product reaches its end of life, take it to a collection point designated by local authorities. Proper recycling of your product will protect human health and the environment.

1.4 Specification

The BP-CC3351 is a board designed to enable rapid and easy software and hardware development for the CC335x (2.4GHz and 5GHz) and CC330x (2.4GHz) devices. The block diagram for the BP-CC3351 is shown in Figure 1-1.

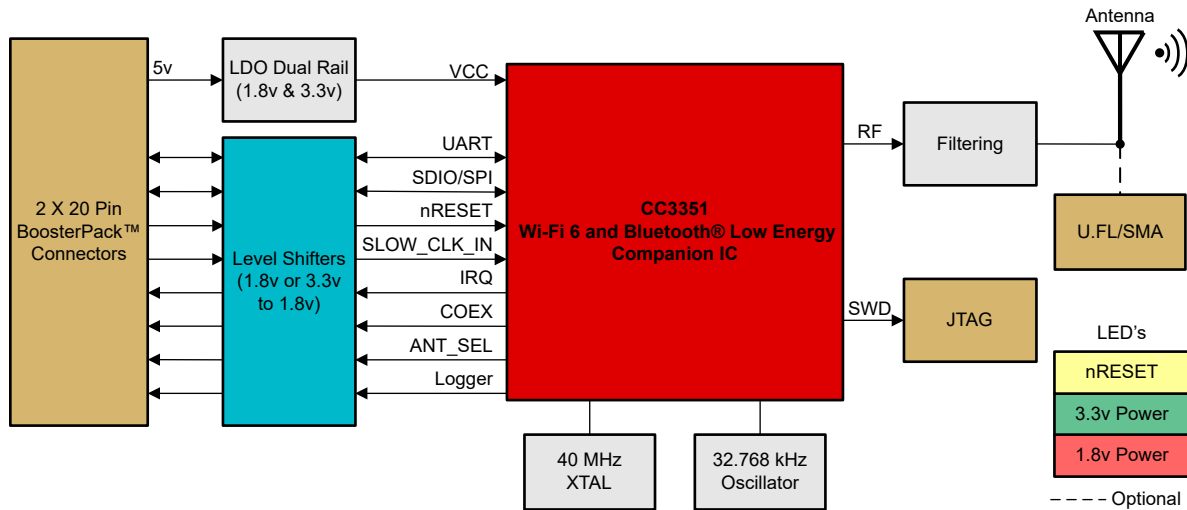


Figure 1-1. BP-CC3351 Block Diagram

This kit can be used in three configurations:

1. MCU and RTOS evaluation: BP-CC3351 and LaunchPad with the MCU running TCP or IP like the LP-AM243.
2. Processor and Linux evaluation: BP-CC3351, BP-CC33-BBB-ADAPT, BEAGL-BONE-BLACK.
3. RF-testing with PC tools: BP-CC3351 and LP-XDS110ET.

In addition, the BP-CC3351 can also be wired to any other Linux or RTOS host board running TCP, IP stack.

Refer to [Section 3.1](#) for more information.

1.5 Device Information

The purpose of the BP-CC3351 is to showcase the hardware and software capabilities of the CC335x and CC330x devices. The other components on the board are populated for testing and support of these main devices.

2 Hardware

Figure 2-1 shows the overview of the BP-CC3351.

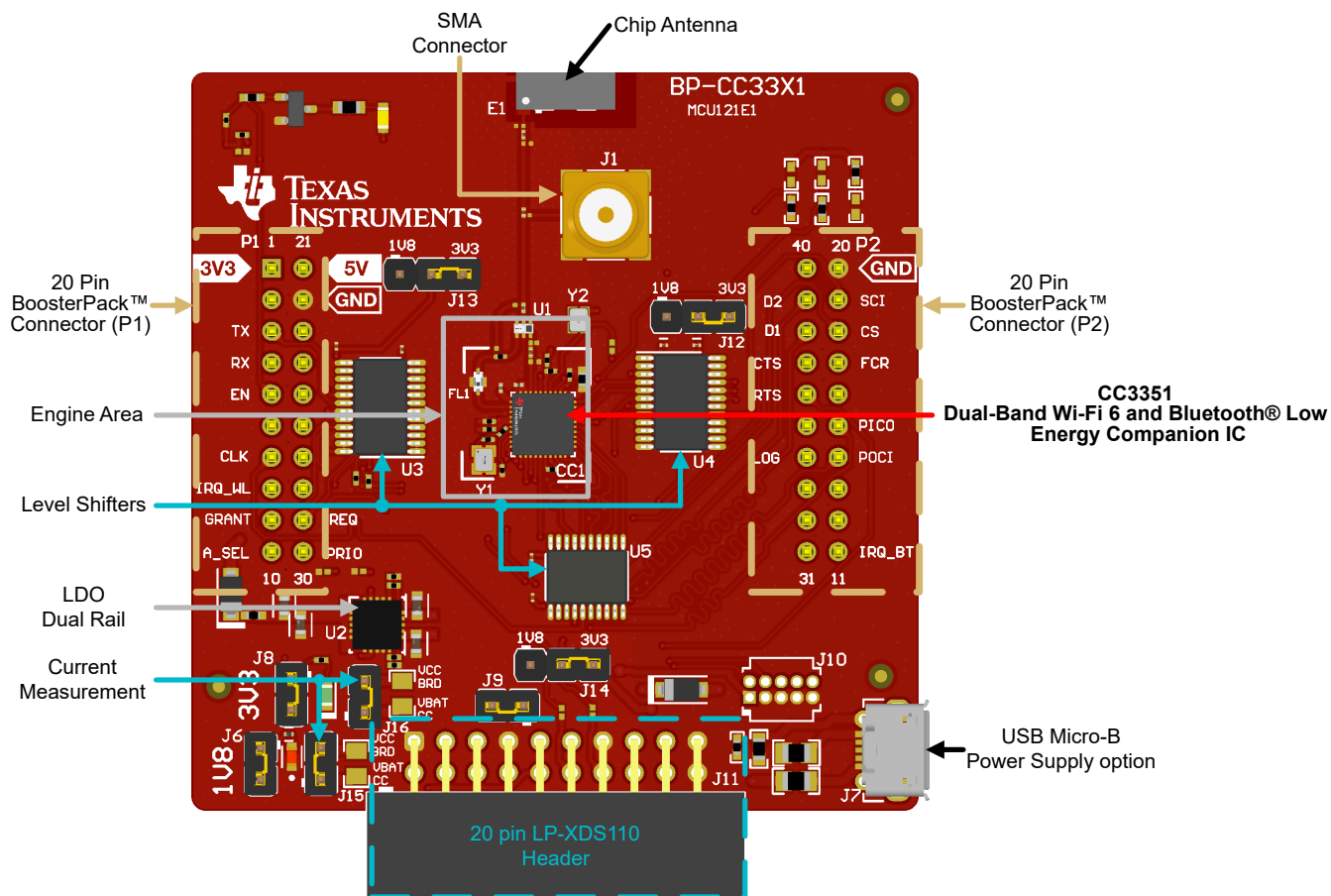


Figure 2-1. BP-CC3351 Overview

2.1 Hardware Features

- CC3351 Wi-Fi 6 and Bluetooth Low Energy combo device which can interface with MPU or MCU systems; adding connectivity
- Two 20-pin stackable connectors (BoosterPack standard)
- Onboard chip dual-band antenna with on-board SMA/U.FL connector for conducted RF testing
- Power from on board dual rail (3.3V and 1.8V) LDO using USB or LaunchPad
- Three level shifters for voltage translation (3.3V to 1.8V)
- JTAG header pins for SWD interface with XDS110 or LP-XDS110ET
- Jumper for current measurement on both power supplies (3.3V and 1.8V) with the provision to mount 0.1-ohm (0603) resistors for measurement with voltmeter
- 32kHz oscillator for lower power evaluation

2.2 Connector and Jumper Descriptions

2.2.1 LED Indicators

Table 2-1 lists the LED descriptions.

Table 2-1. LEDs

Reference	Color	Usage	Comments
D4	Green	3.3V power indication	On: 3.3V power rail is up. Off: no 3.3V power supplied.
D6	Red	1.8V power indication	On: 1.8V power rail is up. Off: no 1.8V power supplied.
D5	Yellow	nRESET	The LED indicates the state of the nReset pin. If that LED is on, the device is functional which means the nReset is high.

Figure 2-2 shows the mentioned LEDs on the board.

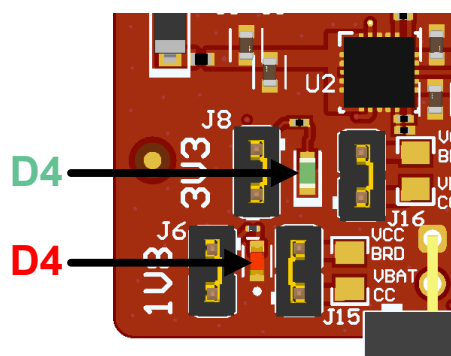


Figure 2-2. LEDs D4 and D5

2.2.2 Jumper Settings

Table 2-2 lists the jumper settings. To reference the default jumper configurations, see Figure 2-1.

Table 2-2. Jumper Settings

Reference	Usage	Comments
J1, J2	RF test	SMA connector (J1) or U.FL connector (J2) for conducted testing in the lab. See Section 2.5 .
J6, J8	Power to board	Used to enable power to board for both supplies. See Section 2.3 .
J15, J16	Current measurement	Used to measure power to device only. See Section 2.3.1 .
J7	USB connector	For powering the BoosterPack standalone (not connected to LaunchPad).
J10, J11	JTAG connectors	Headers to interface with XDS110 debug probe. See Section 2.2.4 .
J9	20-pin header (J11) 5V power	Enables 5V power supply to come from LP-XDS110.
J12, J13, J14	Level shifter host voltage	Set to 3.3V or 1.8V to enable relevant level shifters to translate to correct host voltage level.
P1, P2	BoosterPack header	2 × 20 pins each connected to LaunchPad. See Section 2.2.3 .

2.2.3 BoosterPack Header Assignment

The CC3351 BoosterPack has 2 × 20-pin connectors that provide access to many of the CC3351 pins and features. The signal assignment on these 2 × 20-pin connectors is shown in the figure below and described in [Table 2-3](#) and [Table 2-4](#).

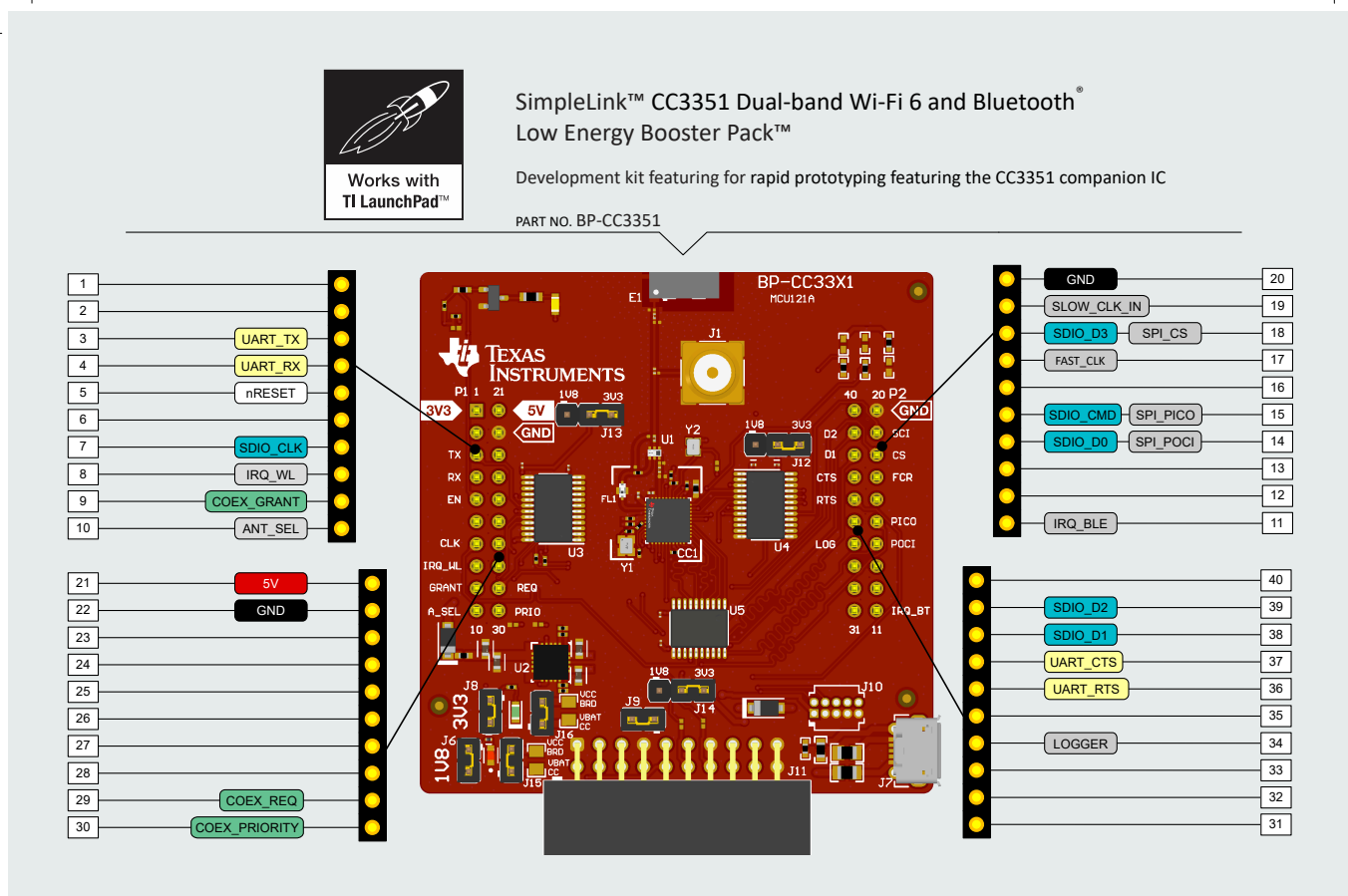


Figure 2-3. BP-CC3351 BoosterPack Header Pinout

Table 2-3. P1 Header Pin Assignment

Pin	Name (in Schematic)	Type/ Direction	Description
P1.1	VCC_MCU_3V3	Input	No functional purpose
P1.2	Reserved	N/A	N/A
P1.3	UART_TX_3V3 (from CC3351)	Output	The CC3351 UART TX to host for Bluetooth Low Energy host controller interface
P1.4	UART_RX_3V3 (to CC3351)	Input	The CC3351 UART RX from host for Bluetooth Low Energy host controller interface
P1.5	LP_RESET	Input	Reset line for CC3351 used to enable or disable (active low). Driven by host through LaunchPad pins
P1.6	Reserved	N/A	N/A
P1.7	SDIO_CLK_3V3	Input	SDIO clock or SPI clock. Must be driven by host
P1.8	IRQ_WL_3V3	Output	Interrupt request from CC3351 to host for Wi-Fi activity
P1.9	COEX_GRANT_3V3	Output	External coexistence interface - grant (reserved for future use)

Table 2-3. P1 Header Pin Assignment (continued)

Pin	Name (in Schematic)	Type/ Direction	Description
P1.10	ANT_SEL_3V3	Output	Antenna select control
P1.21	VCC_MCU_5V	Power	5V supply to board
P1.22	GND	GND	Board ground
P1.23	Reserved	N/A	N/A
P1.24	Reserved	N/A	N/A
P1.25	Reserved	N/A	N/A
P1.26	Reserved	N/A	N/A
P1.27	Reserved	N/A	N/A
P1.28	Reserved	N/A	N/A
P1.29	COEX_REQ_3V3	Input	External coexistence interface — request (reserved for future use)
P1.30	COEX_PRIORITY_3V3	Input	External coexistence interface — priority (reserved for future use)

Table 2-4. P2 Header Pin Assignment

Pin	Name (in schematic)	Type/Direction	Description
P2.11	IRQ_BLE_3V3	Output	Interrupt request from CC3351 to host for Bluetooth Low Energy activity
P2.12	Reserved	N/A	N/A
P2.13	Reserved	N/A	N/A
P2.14	SDIO_D0_3V3 (POCI)	Input/Output	SDIO data D0 or SPI POCI
P2.15	SDIO_CMD_3V3 (PICO)	Input/Output	SDIO command or SPI PICO
P2.16	Reserved	N/A	N/A
P2.17	FAST_CLK_REQ_3V3	Output	Fast clock request from CC3351 to host
P2.18	SDIO_D3_3V3 (CS)	Input/Output	SDIO data D3 or SPI CS
P2.19	SLOW_CLK_IN_3V3	Input	Input for external RTC clock 32.768kHz
P2.20	GND	GND	Board ground
P2.31	Reserved	N/A	N/A
P2.32	Reserved	N/A	N/A
P2.33	Reserved	N/A	N/A
P2.34	LOGGER_3V3	Output	Tracer from CC3351 (UART TX debug logger)
P2.35	Reserved	N/A	N/A
P2.36	UART_RTS_3V3 (from CC3351)	Output	UART RTS from CC3351 to host for Bluetooth Low Energy HCI flow control
P2.37	UART_CTS_3V3 (to CC3351)	Input	UART CTS to CC3351 from host for Bluetooth Low Energy HCI flow control
P2.38	SDIO_D1_3V3	Input/Output	SDIO data D1
P2.39	SDIO_D2_3V3	Input/Output	SDIO data D2
P2.40	Reserved	N/A	N/A

2.2.4 JTAG Headers

The BP-CC3351 was designed with 2 JTAG headers (J10, J11) for SWD interface with the XDS110 debug probe. The signal assignment for these headers is described in the figures and tables below.

The main JTAG interface for the BP-CC3351 is via the LP-XDS110 (ET) that is connected to the 20-pin header (J11). An XDS110 debug probe can also interface with this board via a 10-pin header (J10), however, this header is not populated with the default kit.

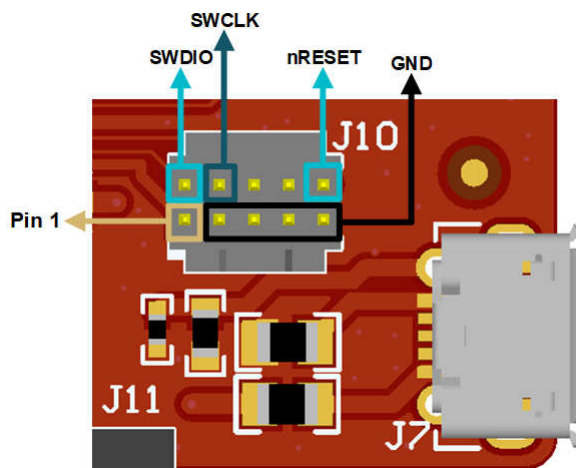


Figure 2-4. ARM 10-Pin JTAG Connector (J10)

Table 2-5. ARM 10 pin JTAG Connector (J10) Assignment

Pin	Signal Name	Description
J10.1	VCC_BRD_1V8	1.8V supply for reference voltage to connector
J10.2	SWDIO	Serial wire data in/out
J10.4	SWCLK	Serial wire clock
J10.10	RESET_1V8	nReset (Enable line for CC3351)
J10.3, J10.5, J10.7, J10.9	GND	Board ground

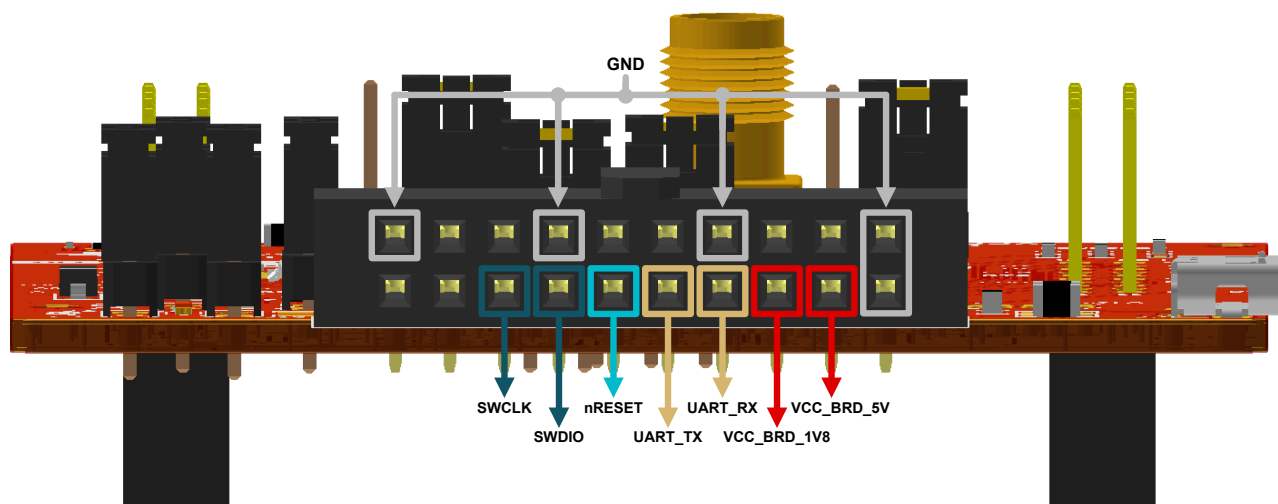


Figure 2-5. 20-Pin LP-XDS110ET Connector (J11)

Table 2-6. 20-Pin LP-XDS110ET Connector (J11) Assignment

Pin	Signal Name	Description
J11.6	SWCLK	Serial wire clock
J11.8	SWDIO	Serial wire data in/out
J11.10	RESET_1V8	nReset (Enable line for the CC3351)
J11.12	UART_TX_1V8	The CC3351 UART TX to host for BLE host controller interface
J11.14	UART_RX_1V8	The CC3351 UART RX from host for BLE host controller interface
J11.16	VCC_BRD_1V8	1.8V supply for reference voltage to connector
J11.18	VCC_BRD_5V	5V supply to BP-CC3351 from LP-XDS110ET
J11.1, J11.7, J11.13, J11.19, J11.20	GND	Board ground

2.3 Power

The board is designed to accept power from a connected LaunchPad kit. Some LaunchPad kits cannot source the peak current requirements for Wi-Fi, which can be as high as 500mA. In such cases, the USB connector (J7) on the BP-CC3351 can be used to aid in extra current. The use of Schottky diodes make sure that load sharing occurs between the USB connectors on the LaunchPad kit and the BoosterPack module without any board modifications. The jumpers labeled J6 (1.8V) and J8 (3.3V) can be used to measure the total current consumption of the board from the onboard LDO.

2.3.1 Measure the CC3351 Current Draw

2.3.1.1 Low Current Measurement (LPDS)

To measure the current draw of the CC3351 device for both power supplies (3.3V or 1.8V), a jumper labeled J16 (for 3.3V supply) and a jumper labeled J15 (for 1.8V supply) is provided on the board. By removing J16, users can place an ammeter into this path to observe the current on the 3.3V supply. The same process can be used for observing the current on the 1.8V supply with J15. TI recommends this method for measuring the LPDS.

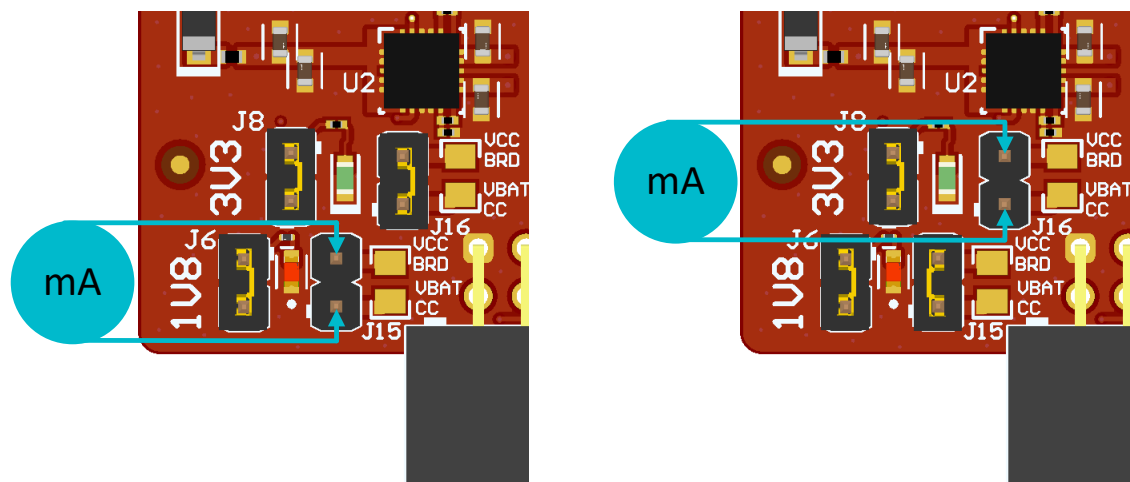


Figure 2-6. Low Current Measurement

2.3.1.2 Active Current Measurement

To measure active current in a profile form, TI recommends using a 0.1Ω 1% 0603 resistor on the board, and measuring the differential voltage across the resistor. This can be done using a voltmeter or an oscilloscope for measuring the current profile for both power supplies (3.3V or 1.8V).

Jumper J15 shunt is removed and a 0.01 resistor is populated in parallel to measure the active currents on the 1.8V supply (see [Figure 2-8](#)). Similar operation with J16 and 3.3V supply.

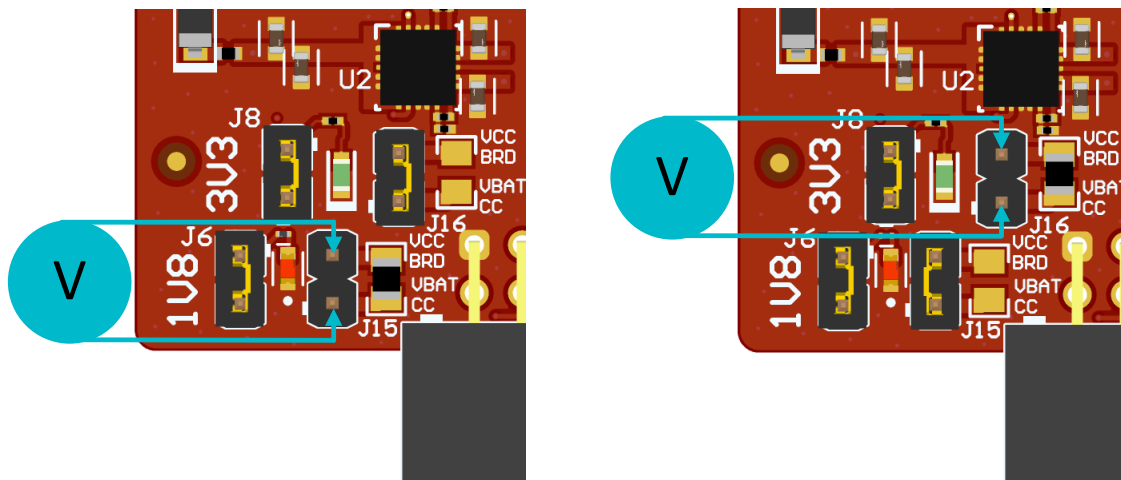


Figure 2-7. Active Current Measurement

2.4 Clocking

The BP-CC3351 provides two clock inputs to the CC3351 device:

- Y1 is a 40MHz crystal for fast clock input.
- Y2 is a 32.768kHz oscillator for slow clock input.

If the user desires to provide the own external slow clock through the Slow Clock Input pin (P2.19), then some re-work must be performed. The Y2 oscillator needs to be removed, and populate a 0201-sized, 0-ohm resistor on the R29 pad. See [Figure 2-8](#). The slow clock can also be generated internally to save on BOM.

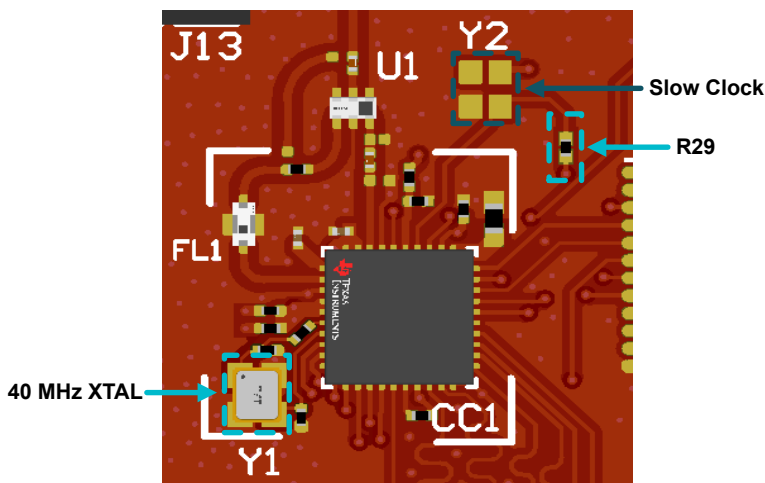


Figure 2-8. BP-CC3351 Clock Circuitry

2.5 Performing Conducted Testing

As seen in [Figure 2-9](#), the BP-CC3351 has an on-board SMA connector and component antenna. The SMA connector (J1) provides a way for testing conducted measurements. Alternately, a track pad for a U.FL connector (J2) is provided on-board to replace the SMA connector and provide a way to test in the lab using a compatible cable (see [Figure 2-9](#)).

A rework is needed before using the connector on J1/J2. This involves swapping the position of the existing 3.9pF capacitor to lead the transmission line on the desired connection (see [Figure 2-9](#)).

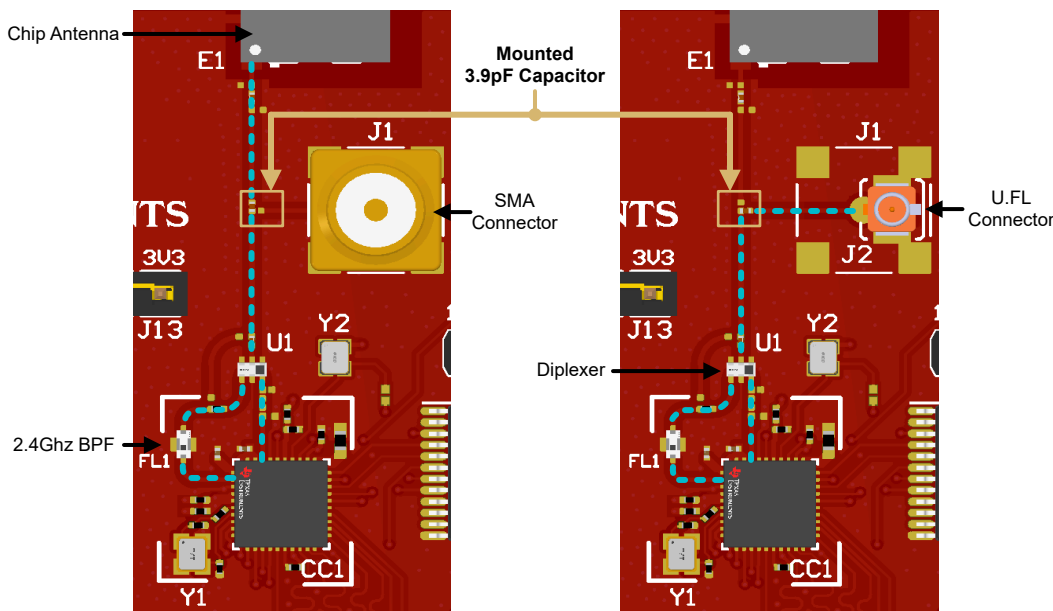


Figure 2-9. RF Path on BP-CC3351

Note

For single band (2.4GHz) usage only, the user can swap the position of the two existing 10pF capacitors to bypass the diplexer. Additionally, the user must add a 50-ohm termination resistor (see [Figure 2-10](#)).

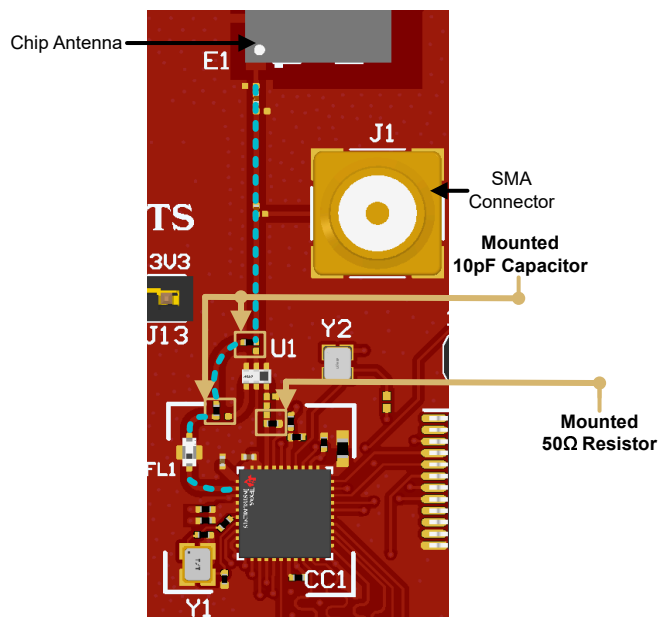


Figure 2-10. BP-CC3351 Single-Band Rework

3 Implementation Results

3.1 Evaluation Setups

The CC3351 BoosterPack can be used in the following configurations:

- MCU and RTOS evaluation: BP-CC3351 + LaunchPad with the MCU running TCP/IP like the LP-AM243
- Processor and Linux evaluation: BP-CC3351 + BP-CC33-BBB-ADAPT + BEAGL-BONE-BLACK
- RF testing with PC tools: BP-CC3351 + LP-XDS110ET

In addition, the BP-CC3351 can also be wired to any other Linux or RTOS host board running TCP/IP stack.

3.1.1 MCU and RTOS

The BP-CC3351 can be used with an MCU running TCP/IP, like the LP-AM243, and can easily integrate with the LaunchPad by stacking the 40-pin headers, as shown in [Figure 3-1](#).

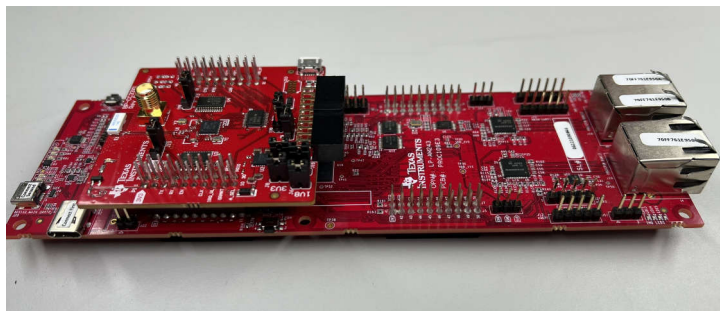


Figure 3-1. BP-CC3351 with LP-AM243

3.1.2 Processor and Linux

The BP-CC3351 can integrate with a host platform running Linux OS, like the BeagleBoard.org® BeagleBone® Black (BBB). The BeagleBone Black is a low-cost, community-supported development platform as shown below.



Figure 3-2. BeagleBone Black Board

To interface with the BP-CC3351 with the BeagleBone Black, the user also needs the [BP-CC33-BBB-ADAPT](#) to BBB Adapter Board .

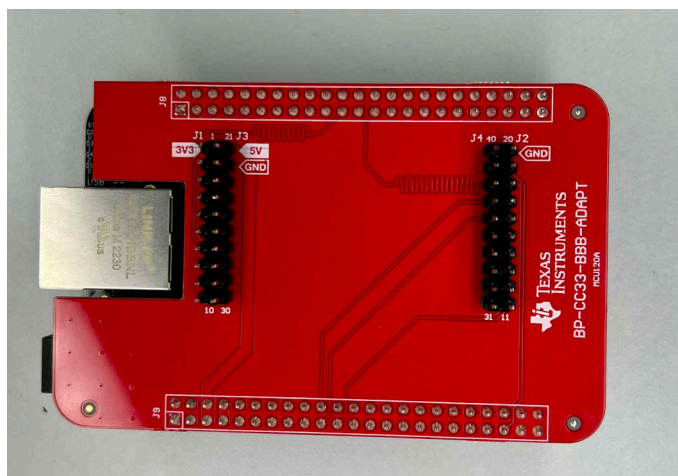


Figure 3-3. Adapter Board for the BeagleBone Black

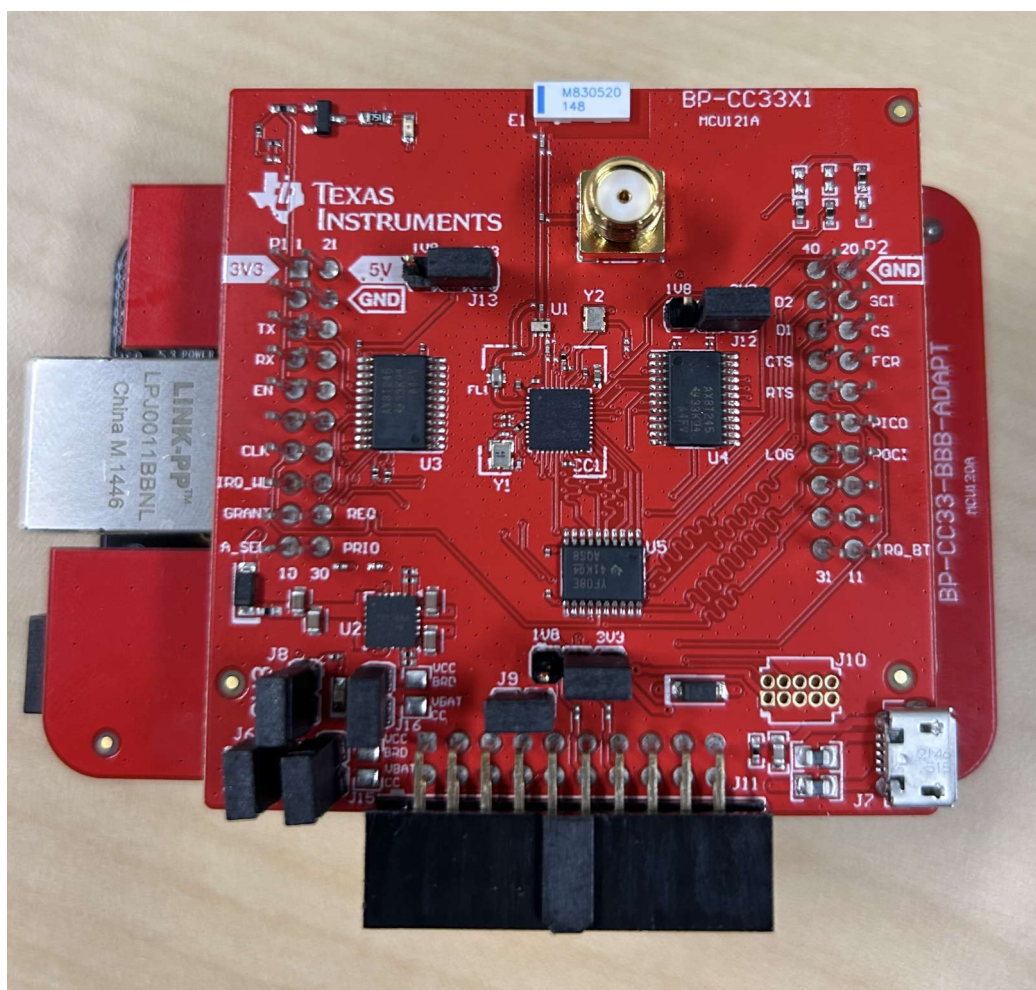


Figure 3-4. BP-CC3351 and BBB with Adapter Board

To make sure the BeagleBone Black boots up from the SD card, TI recommends to a remove the 100kohm resistor R68 seen on the bottom of the BBB, and add as R93 on the top of the BBB. Alternatively, press and

hold the S2 button on the BeagleBone board during power-up if the hardware modifications were not made. (See [Figure 3-5](#) and [Figure 3-6](#).)

Lastly, adding a right-angle header on the bottom of the BBB to easily connect the FTDI cable is optional. When the adapter board is attached to the BBB, the FTDI cable can get pinched between the BBB and the adapter board, which can cause communication problems. (See [Figure 3-6](#).)

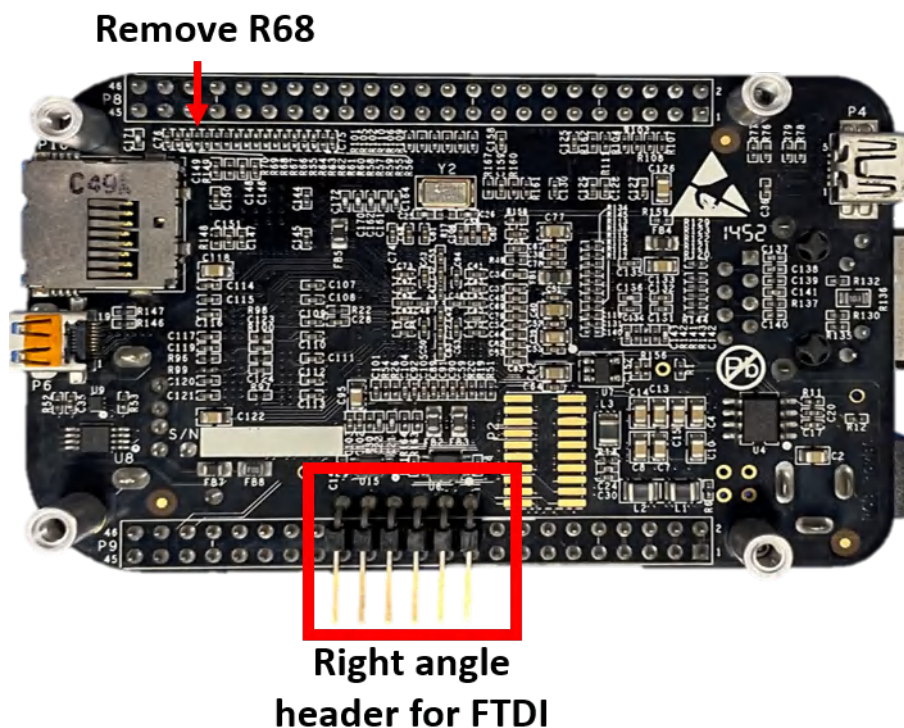


Figure 3-5. Modified BBB (Bottom View)

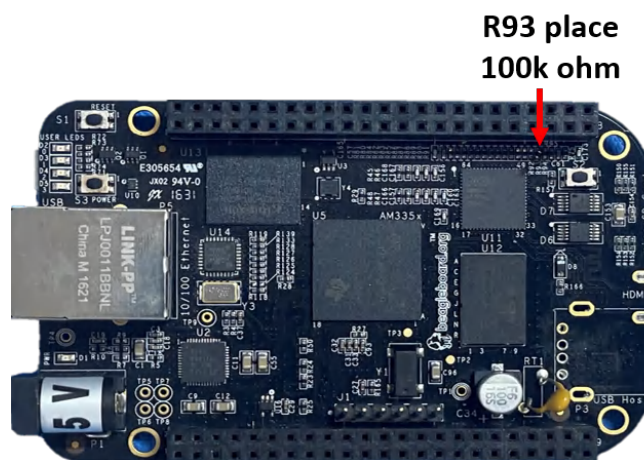


Figure 3-6. Modified BBB (Top View)

3.1.3 Standalone RF Testing

The BP-CC3351 can be used standalone (without a host) to test RF capabilities, using Radio Tool. For more information on the Radio Tool and where to download, refer to [Section 3.1.3.1](#).

The BP-CC3351 has an onboard SMA connector and component antenna, and a U.FL can be populated on the board, for conducted RF testing using compatible cables (a rework can be needed). For more information, see [Section 2.5](#).

3.1.3.1 Radio Tool BP-CC3351 Hardware Setup

Radio Tool is a GUI-based tool for RF evaluation and testing of CC33xx designs during development and certification. The tool enables low-level radio testing capabilities by manually setting the radio into transmit or receive modes. Using the tool requires familiarity and knowledge of radio circuit theory and radio test methods. To perform conducted RF testing on the BP-CC3351, refer to [Section 2.5](#). Note that a rework can be needed.

The user can download this tool from the [Simplelink Wi-Fi Toolbox](#) page on [ti.com](#).

HW Prerequisites

- Windows 10 64-bit/ Ubuntu 18 (or higher) 64-bit operation system
- Latest Chrome web browser
- Installation of [Simplelink Wi-Fi Toolbox](#)
- BP-CC3351
- [LP-XDS110ET](#) debugger for SWD communication

The LP-XDS110ET enables direct communication to the CC3351 device via the SWD interface. This allows external tools, such as the Radio Tool, to send commands directly to the device without the use of an embedded host.

Testing with LP-XDS110ET

To use the LP-XDS110ET with the BP-CC3351, connect the 20-pin LP-XDS110ET connector (J11) on the BP-CC3351 to the corresponding connector on the LP-XDS110ET (see [Figure 3-7](#)). Make sure that the jumper on the LP-XDS110ET (labeled TGT VDD) is in the EXT. configuration, as shown in [Figure 3-7](#). This verifies that the target voltage for the JTAG signals is sourced from the BP-CC3351 (which is 1.8V) instead of the default LP-XDS110 target voltage (3.3V).

The power supply for the BP-CC3351 comes from the LP-XDS110ET in this case, but there can be usage scenarios where additional current is needed from the USB connection (J7).

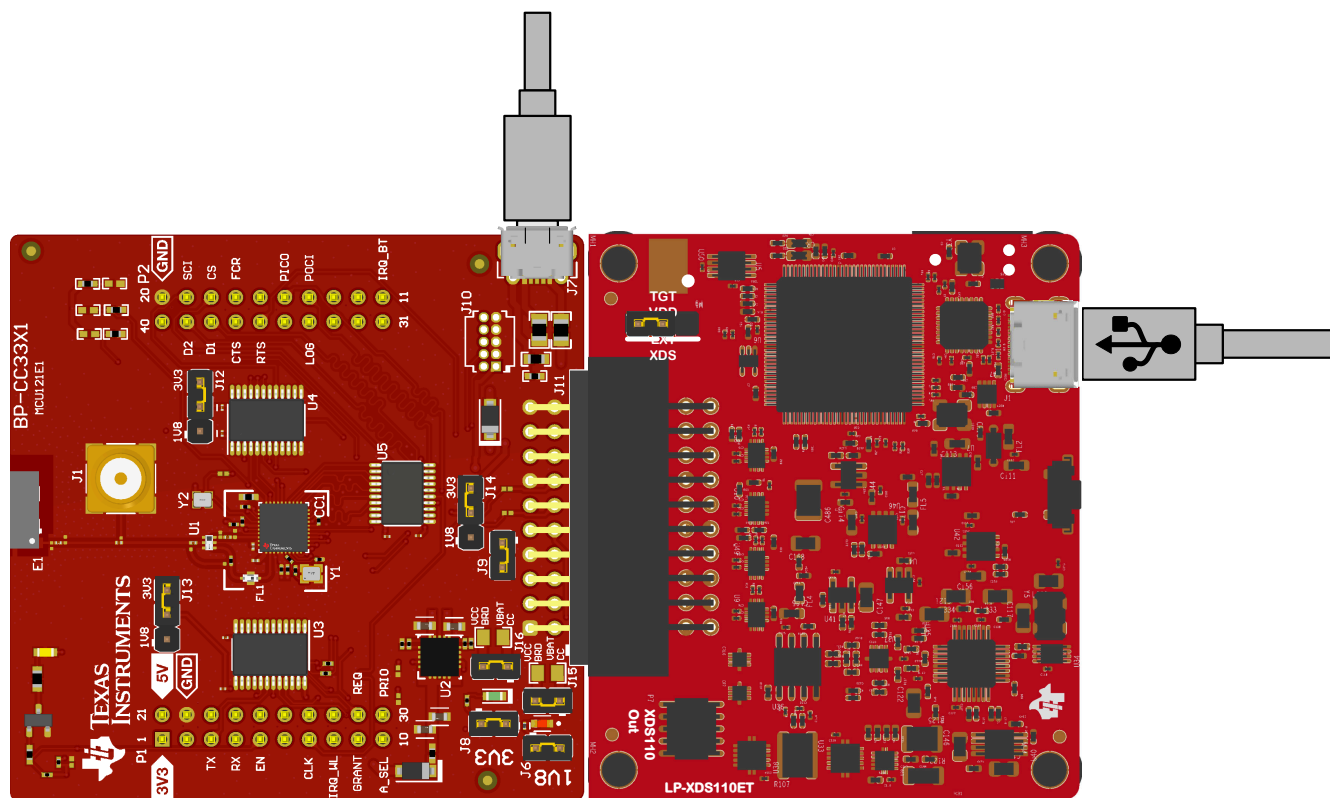


Figure 3-7. BP-CC3351 Connected to LP-XDS110 (ET)

4 Hardware Design Files

4.1 Schematics

To download the schematics for the BP-CC3351, the user can find them on the ti.com BP-CC3351 tool folder under [Design Files](#).

4.2 PCB Layouts

To access the Gerber files for the BP-CC3351, the user can find them on the ti.com BP-CC3351 tool folder under [Design Files](#).

4.3 Bill of Materials (BOM)

To access the BOM list for the BP-CC3351, go to the ti.com BP-CC3351 tool folder under [Design Files](#).

5 Additional Information

5.1 Support Resources

[TI E2E™ support forums](#) are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own questions to get the quick design help you need.

5.2 Trademarks

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6 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from April 1, 2024 to February 1, 2025 (from Revision * (April 2024) to Revision A (August 2025))

	Page
• Updated hardware image.....	1
• Added <i>Regulatory Compliance</i> section.....	2
• Updated image.....	6
• Added Figure 2-10 and note.....	11
• Updated links to design files.....	16

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2. *Limited Warranty and Related Remedies/Disclaimers:*
 - 2.1 These terms do not apply to Software. The warranty, if any, for Software is covered in the applicable Software License Agreement.
 - 2.2 TI warrants that the TI EVM will conform to TI's published specifications for ninety (90) days after the date TI delivers such EVM to User. Notwithstanding the foregoing, TI shall not be liable for a nonconforming EVM if (a) the nonconformity was caused by neglect, misuse or mistreatment by an entity other than TI, including improper installation or testing, or for any EVMs that have been altered or modified in any way by an entity other than TI, (b) the nonconformity resulted from User's design, specifications or instructions for such EVMs or improper system design, or (c) User has not paid on time. Testing and other quality control techniques are used to the extent TI deems necessary. TI does not test all parameters of each EVM. User's claims against TI under this Section 2 are void if User fails to notify TI of any apparent defects in the EVMs within ten (10) business days after delivery, or of any hidden defects with ten (10) business days after the defect has been detected.
 - 2.3 TI's sole liability shall be at its option to repair or replace EVMs that fail to conform to the warranty set forth above, or credit User's account for such EVM. TI's liability under this warranty shall be limited to EVMs that are returned during the warranty period to the address designated by TI and that are determined by TI not to conform to such warranty. If TI elects to repair or replace such EVM, TI shall have a reasonable time to repair such EVM or provide replacements. Repaired EVMs shall be warranted for the remainder of the original warranty period. Replaced EVMs shall be warranted for a new full ninety (90) day warranty period.

WARNING

Evaluation Kits are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems.

User shall operate the Evaluation Kit within TI's recommended guidelines and any applicable legal or environmental requirements as well as reasonable and customary safeguards. Failure to set up and/or operate the Evaluation Kit within TI's recommended guidelines may result in personal injury or death or property damage. Proper set up entails following TI's instructions for electrical ratings of interface circuits such as input, output and electrical loads.

NOTE:

EXPOSURE TO ELECTROSTATIC DISCHARGE (ESD) MAY CAUSE DEGRADATION OR FAILURE OF THE EVALUATION KIT; TI RECOMMENDS STORAGE OF THE EVALUATION KIT IN A PROTECTIVE ESD BAG.

3 Regulatory Notices:

3.1 United States

3.1.1 Notice applicable to EVMs not FCC-Approved:

FCC NOTICE: This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

3.1.2 For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:

CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

3.2 Canada

3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

3.3 Japan

3.3.1 *Notice for EVMs delivered in Japan:* Please see http://www.tij.co.jp/sds/ti_ja/general/eStore/notice_01.page 日本国内に輸入される評価用キット、ボードについては、次のところをご覧ください。

<https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-delivered-in-japan.html>

3.3.2 *Notice for Users of EVMs Considered "Radio Frequency Products" in Japan:* EVMs entering Japan may not be certified by TI as conforming to Technical Regulations of Radio Law of Japan.

If User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required to follow the instructions set forth by Radio Law of Japan, which includes, but is not limited to, the instructions below with respect to EVMs (which for the avoidance of doubt are stated strictly for convenience and should be verified by User):

1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

【無線電波を送信する製品の開発キットをお使いになる際の注意事項】 開発キットの中には技術基準適合証明を受けていないものがあります。技術適合証明を受けていないもののご使用に際しては、電波法遵守のため、以下のいずれかの措置を取っていただく必要がありますのでご注意ください。

1. 電波法施行規則第6条第1項第1号に基づく平成18年3月28日総務省告示第173号で定められた電波暗室等の試験設備でご使用いただく。
2. 実験局の免許を取得後ご使用いただく。
3. 技術基準適合証明を取得後ご使用いただく。

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東京都新宿区西新宿 6 丁目 2 4 番 1 号
西新宿三井ビル

3.3.3 *Notice for EVMs for Power Line Communication:* Please see http://www.tij.co.jp/sds/ti_ja/general/eStore/notice_02.page

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3.4 European Union

3.4.1 *For EVMs subject to EU Directive 2014/30/EU (Electromagnetic Compatibility Directive):*

This is a class A product intended for use in environments other than domestic environments that are connected to a low-voltage power-supply network that supplies buildings used for domestic purposes. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

4 *EVM Use Restrictions and Warnings:*

4.1 EVMS ARE NOT FOR USE IN FUNCTIONAL SAFETY AND/OR SAFETY CRITICAL EVALUATIONS, INCLUDING BUT NOT LIMITED TO EVALUATIONS OF LIFE SUPPORT APPLICATIONS.

4.2 User must read and apply the user guide and other available documentation provided by TI regarding the EVM prior to handling or using the EVM, including without limitation any warning or restriction notices. The notices contain important safety information related to, for example, temperatures and voltages.

4.3 *Safety-Related Warnings and Restrictions:*

4.3.1 User shall operate the EVM within TI's recommended specifications and environmental considerations stated in the user guide, other available documentation provided by TI, and any other applicable requirements and employ reasonable and customary safeguards. Exceeding the specified performance ratings and specifications (including but not limited to input and output voltage, current, power, and environmental ranges) for the EVM may cause personal injury or death, or property damage. If there are questions concerning performance ratings and specifications, User should contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may also result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM user guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative. During normal operation, even with the inputs and outputs kept within the specified allowable ranges, some circuit components may have elevated case temperatures. These components include but are not limited to linear regulators, switching transistors, pass transistors, current sense resistors, and heat sinks, which can be identified using the information in the associated documentation. When working with the EVM, please be aware that the EVM may become very warm.

4.3.2 EVMs are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems. User assumes all responsibility and liability for proper and safe handling and use of the EVM by User or its employees, affiliates, contractors or designees. User assumes all responsibility and liability to ensure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard. User assumes all responsibility and liability for any improper or unsafe handling or use of the EVM by User or its employees, affiliates, contractors or designees.

4.4 User assumes all responsibility and liability to determine whether the EVM is subject to any applicable international, federal, state, or local laws and regulations related to User's handling and use of the EVM and, if applicable, User assumes all responsibility and liability for compliance in all respects with such laws and regulations. User assumes all responsibility and liability for proper disposal and recycling of the EVM consistent with all applicable international, federal, state, and local requirements.

5. *Accuracy of Information:* To the extent TI provides information on the availability and function of EVMs, TI attempts to be as accurate as possible. However, TI does not warrant the accuracy of EVM descriptions, EVM availability or other information on its websites as accurate, complete, reliable, current, or error-free.

6. *Disclaimers:*

6.1 EXCEPT AS SET FORTH ABOVE, EVMS AND ANY MATERIALS PROVIDED WITH THE EVM (INCLUDING, BUT NOT LIMITED TO, REFERENCE DESIGNS AND THE DESIGN OF THE EVM ITSELF) ARE PROVIDED "AS IS" AND "WITH ALL FAULTS." TI DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, REGARDING SUCH ITEMS, INCLUDING BUT NOT LIMITED TO ANY EPIDEMIC FAILURE WARRANTY OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF ANY THIRD PARTY PATENTS, COPYRIGHTS, TRADE SECRETS OR OTHER INTELLECTUAL PROPERTY RIGHTS.

6.2 EXCEPT FOR THE LIMITED RIGHT TO USE THE EVM SET FORTH HEREIN, NOTHING IN THESE TERMS SHALL BE CONSTRUED AS GRANTING OR CONFERRING ANY RIGHTS BY LICENSE, PATENT, OR ANY OTHER INDUSTRIAL OR INTELLECTUAL PROPERTY RIGHT OF TI, ITS SUPPLIERS/LICENSORS OR ANY OTHER THIRD PARTY, TO USE THE EVM IN ANY FINISHED END-USER OR READY-TO-USE FINAL PRODUCT, OR FOR ANY INVENTION, DISCOVERY OR IMPROVEMENT, REGARDLESS OF WHEN MADE, CONCEIVED OR ACQUIRED.

7. *USER'S INDEMNITY OBLIGATIONS AND REPRESENTATIONS.* USER WILL DEFEND, INDEMNIFY AND HOLD TI, ITS LICENSORS AND THEIR REPRESENTATIVES HARMLESS FROM AND AGAINST ANY AND ALL CLAIMS, DAMAGES, LOSSES, EXPENSES, COSTS AND LIABILITIES (COLLECTIVELY, "CLAIMS") ARISING OUT OF OR IN CONNECTION WITH ANY HANDLING OR USE OF THE EVM THAT IS NOT IN ACCORDANCE WITH THESE TERMS. THIS OBLIGATION SHALL APPLY WHETHER CLAIMS ARISE UNDER STATUTE, REGULATION, OR THE LAW OF TORT, CONTRACT OR ANY OTHER LEGAL THEORY, AND EVEN IF THE EVM FAILS TO PERFORM AS DESCRIBED OR EXPECTED.

8. *Limitations on Damages and Liability:*

8.1 *General Limitations.* IN NO EVENT SHALL TI BE LIABLE FOR ANY SPECIAL, COLLATERAL, INDIRECT, PUNITIVE, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES IN CONNECTION WITH OR ARISING OUT OF THESE TERMS OR THE USE OF THE EVMS, REGARDLESS OF WHETHER TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. EXCLUDED DAMAGES INCLUDE, BUT ARE NOT LIMITED TO, COST OF REMOVAL OR REINSTALLATION, ANCILLARY COSTS TO THE PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES, RETESTING, OUTSIDE COMPUTER TIME, LABOR COSTS, LOSS OF GOODWILL, LOSS OF PROFITS, LOSS OF SAVINGS, LOSS OF USE, LOSS OF DATA, OR BUSINESS INTERRUPTION. NO CLAIM, SUIT OR ACTION SHALL BE BROUGHT AGAINST TI MORE THAN TWELVE (12) MONTHS AFTER THE EVENT THAT GAVE RISE TO THE CAUSE OF ACTION HAS OCCURRED.

8.2 *Specific Limitations.* IN NO EVENT SHALL TI'S AGGREGATE LIABILITY FROM ANY USE OF AN EVM PROVIDED HEREUNDER, INCLUDING FROM ANY WARRANTY, INDEMNITY OR OTHER OBLIGATION ARISING OUT OF OR IN CONNECTION WITH THESE TERMS, EXCEED THE TOTAL AMOUNT PAID TO TI BY USER FOR THE PARTICULAR EVM(S) AT ISSUE DURING THE PRIOR TWELVE (12) MONTHS WITH RESPECT TO WHICH LOSSES OR DAMAGES ARE CLAIMED. THE EXISTENCE OF MORE THAN ONE CLAIM SHALL NOT ENLARGE OR EXTEND THIS LIMIT.

9. *Return Policy.* Except as otherwise provided, TI does not offer any refunds, returns, or exchanges. Furthermore, no return of EVM(s) will be accepted if the package has been opened and no return of the EVM(s) will be accepted if they are damaged or otherwise not in a resalable condition. If User feels it has been incorrectly charged for the EVM(s) it ordered or that delivery violates the applicable order, User should contact TI. All refunds will be made in full within thirty (30) working days from the return of the components(s), excluding any postage or packaging costs.

10. *Governing Law:* These terms and conditions shall be governed by and interpreted in accordance with the laws of the State of Texas, without reference to conflict-of-laws principles. User agrees that non-exclusive jurisdiction for any dispute arising out of or relating to these terms and conditions lies within courts located in the State of Texas and consents to venue in Dallas County, Texas. Notwithstanding the foregoing, any judgment may be enforced in any United States or foreign court, and TI may seek injunctive relief in any United States or foreign court.

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